Supplement

Digital Standard 3GPP FDD, 3GPP FDD enhanced MS/BS tests incl. HSDPA, 3GPP FDD HSUPA, 3GPP FDD HSPA+

R&S® AMU-K42/ -K43/ -K45/ -K59
1402.6206.02 , 1402.6306.02, 1402.8909.02, 1403.0053.02

R&S® SMATE-K42/ -K43/ -K45/ -K59
1404.5207.02, 1404.5307.02, 1404.7300.02, 1415.1320.02

R&S® SMJ-K42/ -K43/ -K45/ -K59
1404.0405.02 , 1404.0505.02, 1404.1816.02 1415.1508.02

R&S® SMU-K42/ -K43/ -K45/ -K59
1160.7909.02 , 1160.9660.02, 1161.0666.02, 1415.0001.02

R&S® AFQ-K242/ -K243/ -K245/ -K259
1401.6354.02 , 1401.6402.02 , 1401.6504.02, 1401.5658.02

R&S® AMU-K242/ -K243/ -K245/ -K259
1402.7702.02 , 1402.6306.02, 1402.8909.02, 1403.0153.02

R&S® SMJ-K242/-K243/ -K245/-K259
1409.0610.02, 1409.0710.02, 1409.0910.02, 1415.1608.02

R&S® SMU-K242/ -K243/ -K245/ -K259
1408.5618.02 ,1408.5718.02, 1408.5918.02, 1415.0101.02

R&S® CMW-KW401/ -KW402
1203.1058.02, 1203.1106.02

ROHDE & SCHWARZ
Test and Measurement Division

Dear Customer,

The Signal Generator includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (http://www.openssl.org/).

Grouped Safety Messages

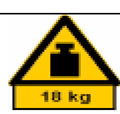
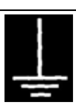
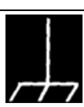
Make sure to read through and observe the following safety instructions!

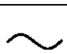
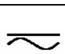
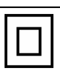
All plants and locations of the Rohde & Schwarz group of companies make every effort to keep the safety standard of our products up to date and to offer our customers the highest possible degree of safety. Our products and the auxiliary equipment required for them are designed and tested in accordance with the relevant safety standards. Compliance with these standards is continuously monitored by our quality assurance system. The product described here has been designed and tested in accordance with the EC Certificate of Conformity and has left the manufacturer's plant in a condition fully complying with safety standards. To maintain this condition and to ensure safe operation, observe all instructions and warnings provided in this manual. If you have any questions regarding these safety instructions, the Rohde & Schwarz group of companies will be happy to answer them.

Furthermore, it is your responsibility to use the product in an appropriate manner. This product is designed for use solely in industrial and laboratory environments or, if expressly permitted, also in the field and must not be used in any way that may cause personal injury or property damage. You are responsible if the product is used for an intention other than its designated purpose or in disregard of the manufacturer's instructions. The manufacturer shall assume no responsibility for such use of the product.

The product is used for its designated purpose if it is used in accordance with its product documentation and within its performance limits (see data sheet, documentation, the following safety instructions). Using the product requires technical skills and a basic knowledge of English. It is therefore essential that only skilled and specialized staff or thoroughly trained personnel with the required skills be allowed to use the product. If personal safety gear is required for using Rohde & Schwarz products, this will be indicated at the appropriate place in the product documentation. Keep the basic safety instructions and the product documentation in a safe place and pass them on to the subsequent users.

Symbols and safety labels

							
Observe product documentation	Weight indication for units >18 kg	Danger of electric shock	Warning! Hot surface	PE terminal	Ground	Ground terminal	Attention! Electrostatic sensitive devices

					
Supply voltage ON/OFF	Standby indication	Direct current (DC)	Alternating current (AC)	Direct/alternating current (DC/AC)	Device fully protected by double/reinforced insulation

Observing the safety instructions will help prevent personal injury or damage of any kind caused by dangerous situations. Therefore, carefully read through and adhere to the following safety instructions before putting the product into operation. It is also absolutely essential to observe the additional safety instructions on personal safety that appear in relevant parts of the product documentation. In these safety instructions, the word "product" refers to all merchandise sold and distributed by the Rohde & Schwarz group of companies, including instruments, systems and all accessories.

Tags and their meaning

DANGER	DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	NOTICE indicates a property damage message.
	In the product documentation, the word ATTENTION is used synonymously.

These tags are in accordance with the standard definition for civil applications in the European Economic Area. Definitions that deviate from the standard definition may also exist in other economic areas or military applications. It is therefore essential to make sure that the tags described here are always used only in connection with the related product documentation and the related product. The use of tags in connection with unrelated products or documentation can result in misinterpretation and thus contribute to personal injury or material damage.

Basic safety instructions

1. The product may be operated only under the operating conditions and in the positions specified by the manufacturer. Its ventilation must not be obstructed during operation. Unless otherwise specified, the following requirements apply to Rohde & Schwarz products:
   prescribed operating position is always with the housing floor facing down, IP protection 2X, pollution severity 2, overvoltage category 2, use only in enclosed spaces, max. operation altitude 2000 m above sea level, max. transport altitude 4500 m above sea level.
   A tolerance of ±10% shall apply to the nominal voltage and of ±5% to the nominal frequency.
2. Applicable local or national safety regulations and rules for the prevention of accidents must be observed in all work performed. The product may be opened only by authorized, specially trained personnel. Prior to performing any work on the product or opening the product, the product must be disconnected from the supply network. Any adjustments, replacements of parts, maintenance or repair must be carried out only by technical personnel authorized by Rohde & Schwarz. Only original parts may be used for replacing parts relevant to safety (e.g. power switches, power transformers, fuses). A safety test must always be performed after parts relevant to safety have been replaced (visual inspection, PE conductor test, insulation resistance measurement, leakage current measurement, functional test).
3. As with all industrially manufactured goods, the use of substances that induce an allergic reaction (allergens, e.g. nickel) such as aluminum cannot be generally excluded. If you develop an allergic reaction (such as a skin rash, frequent sneezing, red eyes or respiratory difficulties), consult a physician immediately to determine the cause.
4. If products/components are mechanically and/or thermically processed in a manner that goes beyond their intended use, hazardous substances (heavy-metal dust such as lead, beryllium, nickel) may be released. For this reason, the product may only be disassembled, e.g. for disposal purposes, by specially trained personnel. Improper disassembly may be hazardous to your health. National waste disposal regulations must be observed.

5. If handling the product yields hazardous substances or fuels that must be disposed of in a special way, e.g. coolants or engine oils that must be replenished regularly, the safety instructions of the manufacturer of the hazardous substances or fuels and the applicable regional waste disposal regulations must be observed. Also observe the relevant safety instructions in the product documentation.
6. Depending on the function, certain products such as RF radio equipment can produce an elevated level of electromagnetic radiation. Considering that unborn life requires increased protection, pregnant women should be protected by appropriate measures. Persons with pacemakers may also be endangered by electromagnetic radiation. The employer/operator is required to assess workplaces where there is a special risk of exposure to radiation and, if necessary, take measures to avert the danger.
7. Operating the products requires special training and intense concentration. Make certain that persons who use the products are physically, mentally and emotionally fit enough to handle operating the products; otherwise injuries or material damage may occur. It is the responsibility of the employer to select suitable personnel for operating the products.
8. Prior to switching on the product, it must be ensured that the nominal voltage setting on the product matches the nominal voltage of the AC supply network. If a different voltage is to be set, the power fuse of the product may have to be changed accordingly.
9. In the case of products of safety class I with movable power cord and connector, operation is permitted only on sockets with earthing contact and protective earth connection.
10. Intentionally breaking the protective earth connection either in the feed line or in the product itself is not permitted. Doing so can result in the danger of an electric shock from the product. If extension cords or connector strips are implemented, they must be checked on a regular basis to ensure that they are safe to use.
11. If the product has no power switch for disconnection from the AC supply, the plug of the connecting cable is regarded as the disconnecting device. In such cases, it must be ensured that the power plug is easily reachable and accessible at all times (corresponding to the length of connecting cable, approx. 2 m). Functional or electronic switches are not suitable for providing disconnection from the AC supply. If products without power switches are integrated in racks or systems, a disconnecting device must be provided at the system level.
12. Never use the product if the power cable is damaged. Check the power cable on a regular basis to ensure that it is in proper operating condition. By taking appropriate safety measures and carefully laying the power cable, ensure that the cable cannot be damaged and that no one can be hurt by e.g. tripping over the cable or suffering an electric shock.
13. The product may be operated only from TN/TT supply networks fused with max. 16 A (higher fuse only after consulting with the Rohde & Schwarz group of companies).
14. Do not insert the plug into sockets that are dusty or dirty. Insert the plug firmly and all the way into the socket. Otherwise, this can result in sparks, fire and/or injuries.
15. Do not overload any sockets, extension cords or connector strips; doing so can cause fire or electric shocks.
16. For measurements in circuits with voltages V_{rms} > 30 V, suitable measures (e.g. appropriate measuring equipment, fusing, current limiting, electrical separation, insulation) should be taken to avoid any hazards.
17. Ensure that the connections with information technology equipment comply with IEC 950/EN 60950.
18. Unless expressly permitted, never remove the cover or any part of the housing while the product is in operation. Doing so will expose circuits and components and can lead to injuries, fire or damage to the product.
19. If a product is to be permanently installed, the connection between the PE terminal on site and the product's PE conductor must be made first before any other connection is made. The product may be installed and connected only by a license electrician.

20. For permanently installed equipment without built-in fuses, circuit breakers or similar protective devices, the supply circuit must be fused in such a way that suitable protection is provided for users and products.
21. Do not insert any objects into the openings in the housing that are not designed for this purpose. Never pour any liquids onto or into the housing. This can cause short circuits inside the product and/or electric shocks, fire or injuries.
22. Use suitable overvoltage protection to ensure that no overvoltage (such as that caused by a thunderstorm) can reach the product. Otherwise the operating personnel will be endangered by electric shocks.
23. Rohde & Schwarz products are not protected against penetration of liquids, unless otherwise specified (see also safety instruction 1.). If this is not taken into account, there exists the danger of electric shock for the user or damage to the product, which can also lead to personal injury.
24. Never use the product under conditions in which condensation has formed or can form in or on the product, e.g. if the product was moved from a cold to a warm environment.
25. Do not close any slots or openings on the product, since they are necessary for ventilation and prevent the product from overheating. Do not place the product on soft surfaces such as sofas or rugs or inside a closed housing, unless this is well ventilated.
26. Do not place the product on heat-generating devices such as radiators or fan heaters. The temperature of the environment must not exceed the maximum temperature specified in the data sheet.
27. Batteries and storage batteries must not be exposed to high temperatures or fire. Keep batteries and storage batteries away from children. Do not short-circuit batteries and storage batteries.
    If batteries or storage batteries are improperly replaced, this can cause an explosion (warning: lithium cells). Replace the battery or storage battery only with the matching Rohde & Schwarz type (see spare parts list). Batteries and storage batteries must be recycled and kept separate from residual waste. Batteries and storage batteries that contain lead, mercury or cadmium are hazardous waste. Observe the national regulations regarding waste disposal and recycling.
28. Please be aware that in the event of a fire, toxic substances (gases, liquids etc.) that may be hazardous to your health may escape from the product.
29. The product can be very heavy. Be careful when moving it to avoid back or other physical injuries.
30. Do not place the product on surfaces, vehicles, cabinets or tables that for reasons of weight or stability are unsuitable for this purpose. Always follow the manufacturer's installation instructions when installing the product and fastening it to objects or structures (e.g. walls and shelves).
31. Handles on the products are designed exclusively for personnel to hold or carry the product. It is therefore not permissible to use handles for fastening the product to or on means of transport such as cranes, fork lifts, wagons, etc. The user is responsible for securely fastening the products to or on the means of transport and for observing the safety regulations of the manufacturer of the means of transport. Noncompliance can result in personal injury or material damage.
32. If you use the product in a vehicle, it is the sole responsibility of the driver to drive the vehicle safely. Adequately secure the product in the vehicle to prevent injuries or other damage in the event of an accident. Never use the product in a moving vehicle if doing so could distract the driver of the vehicle. The driver is always responsible for the safety of the vehicle. The manufacturer assumes no responsibility for accidents or collisions.
33. If a laser product (e.g. a CD/DVD drive) is integrated in a Rohde & Schwarz product, do not use any other settings or functions than those described in the product documentation. Otherwise this may be hazardous to your health, since the laser beam can cause irreversible damage to your eyes. Never try to take such products apart, and never look into the laser beam.
34. Prior to cleaning, disconnect the product from the AC supply. Use a soft, non-linting cloth to clean the product. Never use chemical cleaning agents such as alcohol, acetone or diluent for cellulose lacquers.

Informaciones elementales de seguridad

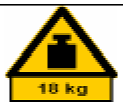
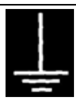
¡Es imprescindible leer y observar las siguientes instrucciones e informaciones de seguridad!

El principio del grupo de empresas Rohde & Schwarz consiste en tener nuestros productos siempre al día con los estándares de seguridad y de ofrecer a nuestros clientes el máximo grado de seguridad. Nuestros productos y todos los equipos adicionales son siempre fabricados y examinados según las normas de seguridad vigentes. Nuestra sección de gestión de la seguridad de calidad controla constantemente que sean cumplidas estas normas. El presente producto ha sido fabricado y examinado según el comprobante de conformidad adjunto según las normas de la CE y ha salido de nuestra planta en estado impecable según los estándares técnicos de seguridad. Para poder preservar este estado y garantizar un funcionamiento libre de peligros, el usuario deberá atenerse a todas las indicaciones, informaciones de seguridad y notas de alerta. El grupo de empresas Rohde & Schwarz está siempre a su disposición en caso de que tengan preguntas referentes a estas informaciones de seguridad.

Además queda en la responsabilidad del usuario utilizar el producto en la forma debida. Este producto está destinado exclusivamente al uso en la industria y el laboratorio o, si ha sido expresamente autorizado, para aplicaciones de campo y de ninguna manera deberá ser utilizado de modo que alguna persona/cosa pueda sufrir daño. El uso del producto fuera de sus fines definidos o despreciando las informaciones de seguridad del fabricante queda en la responsabilidad del usuario. El fabricante no se hace en ninguna forma responsable de consecuencias a causa del mal uso del producto.

Se parte del uso correcto del producto para los fines definidos si el producto es utilizado dentro de las instrucciones de la correspondiente documentación de producto y dentro del margen de rendimiento definido (ver hoja de datos, documentación, informaciones de seguridad que siguen). El uso del producto hace necesarios conocimientos profundos y conocimientos básicas del idioma inglés. Por eso se debe tener en cuenta que el producto sólo pueda ser operado por personal especializado o personas minuciosamente instruidas con las capacidades correspondientes. Si fuera necesaria indumentaria de seguridad para el uso de productos de R&S, encontrará la información debida en la documentación del producto en el capítulo correspondiente. Guarde bien las informaciones de seguridad elementales, así como la documentación del producto y entréguela a usuarios posteriores.

Símbolos y definiciones de seguridad

							
Ver documen-tación de producto	Informaciones para maquinaria con un peso de > 18kg	Peligro de golpe de corriente	¡Advertencia! Superficie caliente	Conexión a conductor protector	Conexión a tierra	Conexión a masa conductora	¡Cuidado! Elementos de construcción con peligro de carga electroestática

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Potencia EN MARCHA/PARADA	Indicación Stand-by	Corriente continua DC	Corriente alterna AC	Corriente continua/-alterna DC/AC	El aparato está protegido en su totalidad por un aislamiento de doble refuerzo

Tener en cuenta las informaciones de seguridad sirve para tratar de evitar daños y peligros de toda clase. Es necesario de que se lean las siguientes informaciones de seguridad concienzudamente y se tengan en cuenta debidamente antes de la puesta en funcionamiento del producto. También deberán ser tenidas en cuenta las informaciones para la protección de personas que encontrarán en el capítulo correspondiente de la documentación de producto y que también son obligatorias de seguir. En las informaciones de seguridad actuales hemos juntado todos los objetos vendidos por el grupo de empresas Rohde & Schwarz bajo la denominación de „producto“, entre ellos también aparatos, instalaciones así como toda clase de accesorios.

Palabras de señal y su significado

PELIGRO	Identifica un peligro directo con riesgo elevado de provocar muerte o lesiones de gravedad si no se toman las medidas oportunas.
ADVERTENCIA	Identifica un posible peligro con riesgo medio de provocar muerte o lesiones (de gravedad) si no se toman las medidas oportunas.
ATENCIÓN	Identifica un peligro con riesgo reducido de provocar lesiones de gravedad media o leve si no se toman las medidas oportunas.
AVISO	Indica la posibilidad de utilizar mal el producto y a consecuencia dañarlo.
	En la documentación del producto se emplea de forma sinónima el término CUIDADO.

Las palabras de señal corresponden a la definición habitual para aplicaciones civiles en el área económica europea. Pueden existir definiciones diferentes a esta definición en otras áreas económicas o en aplicaciones militares. Por eso se deberá tener en cuenta que las palabras de señal aquí descritas sean utilizadas siempre solamente en combinación con la correspondiente documentación de producto y solamente en combinación con el producto correspondiente. La utilización de las palabras de señal en combinación con productos o documentaciones que no les correspondan puede llevar a malinterpretaciones y tener por consecuencia daños en personas u objetos.

Informaciones de seguridad elementales

1. El producto solamente debe ser utilizado según lo indicado por el fabricante referente a la situación y posición de funcionamiento sin que se obstruya la ventilación. Si no se convino de otra manera, es para los productos R&S válido lo que sigue:
   como posición de funcionamiento se define por principio la posición con el suelo de la caja para abajo, modo de protección IP 2X, grado de suciedad 2, categoría de sobrecarga eléctrica 2, utilizar solamente en estancias interiores, utilización hasta 2000 m sobre el nivel del mar, transporte hasta 4.500 m sobre el nivel del mar.
   Se aplicará una tolerancia de ±10% sobre el voltaje nominal y de ±5% sobre la frecuencia nominal.
2. En todos los trabajos deberán ser tenidas en cuenta las normas locales de seguridad de trabajo y de prevención de accidentes. El producto solamente debe de ser abierto por personal especializado autorizado. Antes de efectuar trabajos en el producto o abrirlo deberá este ser desconectado de la corriente. El ajuste, el cambio de partes, la manutención y la reparación deberán ser solamente efectuadas por electricistas autorizados por R&S. Si se reponen partes con importancia para los aspectos de seguridad (por ejemplo el enchufe, los transformadores o los fusibles), solamente podrán ser sustituidos por partes originales. Después de cada recambio de partes elementales para la seguridad deberá ser efectuado un control de seguridad (control a primera vista, control de conductor protector, medición de resistencia de aislamiento, medición de la corriente conductora, control de funcionamiento).

3. Como en todo producto de fabricación industrial no puede ser excluido en general de que se produzcan al usarlo elementos que puedan generar alergias, los llamados elementos alergénicos (por ejemplo el níquel). Si se producieran en el trato con productos R&S reacciones alérgicas, como por ejemplo urticaria, estornudos frecuentes, irritación de la conjuntiva o dificultades al respirar, se deberá consultar inmediatamente a un médico para averiguar los motivos de estas reacciones.
4. Si productos / elementos de construcción son tratados fuera del funcionamiento definido de forma mecánica o térmica, pueden generarse elementos peligrosos (polvos de sustancia de metales pesados como por ejemplo plomo, berilio, níquel). La partición elemental del producto, como por ejemplo sucede en el tratamiento de materias residuales, debe de ser efectuada solamente por personal especializado para estos tratamientos. La partición elemental efectuada inadecuadamente puede generar daños para la salud. Se deben tener en cuenta las directivas nacionales referentes al tratamiento de materias residuales.
5. En el caso de que se produjeran agentes de peligro o combustibles en la aplicación del producto que debieran de ser transferidos a un tratamiento de materias residuales, como por ejemplo agentes refrigerantes que deben ser repuestos en periodos definidos, o aceites para motores, deberán ser tenidas en cuenta las prescripciones de seguridad del fabricante de estos agentes de peligro o combustibles y las regulaciones regionales para el tratamiento de materias residuales. Cuiden también de tener en cuenta en caso dado las prescripciones de seguridad especiales en la descripción del producto.
6. Ciertos productos, como por ejemplo las instalaciones de radiocomunicación RF, pueden a causa de su función natural, emitir una radiación electromagnética aumentada. En vista a la protección de la vida en desarrollo deberían ser protegidas personas embarazadas debidamente. También las personas con un bypass pueden correr peligro a causa de la radiación electromagnética. El empresario/usuario está comprometido a valorar y señalar áreas de trabajo en las que se corra un riesgo aumentado de exposición a radiaciones para evitar riesgos.
7. La utilización de los productos requiere instrucciones especiales y una alta concentración en el manejo. Debe de ponerse por seguro de que las personas que manejen los productos estén a la altura de los requerimientos necesarios referente a sus aptitudes físicas, psíquicas y emocionales, ya que de otra manera no se pueden excluir lesiones o daños de objetos. El empresario lleva la responsabilidad de seleccionar el personal usuario apto para el manejo de los productos.
8. Antes de la puesta en marcha del producto se deberá tener por seguro de que la tensión preseleccionada en el producto equivalga a la del la red de distribución. Si es necesario cambiar la preselección de la tensión también se deberán en caso dabo cambiar los fusibles correspondientes del producto.
9. Productos de la clase de seguridad I con alimentación móvil y enchufe individual de producto solamente deberán ser conectados para el funcionamiento a tomas de corriente de contacto de seguridad y con conductor protector conectado.
10. Queda prohibida toda clase de interrupción intencionada del conductor protector, tanto en la toma de corriente como en el mismo producto. Puede tener como consecuencia el peligro de golpe de corriente por el producto. Si se utilizaran cables o enchufes de extensión se deberá poner al seguro que es controlado su estado técnico de seguridad.
11. Si el producto no está equipado con un interruptor para desconectarlo de la red, se deberá considerar el enchufe del cable de distribución como interruptor. En estos casos deberá asegurar de que el enchufe sea de fácil acceso y nabejo (según la medida del cable de distribución, aproximadamente 2 m). Los interruptores de función o electrónicos no son aptos para el corte de la red eléctrica. Si los productos sin interruptor están integrados en bastidores o instalaciones, se deberá instalar el interruptor al nivel de la instalación.

12. No utilice nunca el producto si está dañado el cable eléctrico. Compruebe regularmente el correcto estado de los cables de conexión a red. Asegure a través de las medidas de protección y de instalación adecuadas de que el cable de eléctrico no pueda ser dañado o de que nadie pueda ser dañado por él, por ejemplo al tropezar o por un golpe de corriente.
13. Solamente está permitido el funcionamiento en redes de distribución TN/TT aseguradas con fusibles de como máximo 16 A (utilización de fusibles de mayor amperaje sólo previa consulta con el grupo de empresas Rohde & Schwarz).
14. Nunca conecte el enchufe en tomas de corriente sucias o llenas de polvo. Introduzca el enchufe por completo y fuertemente en la toma de corriente. Si no tiene en consideración estas indicaciones se arriesga a que se originen chispas, fuego y/o heridas.
15. No sobrecargue las tomas de corriente, los cables de extensión o los enchufes de extensión ya que esto pudiera causar fuego o golpes de corriente.
16. En las mediciones en circuitos de corriente con una tensión de entrada de U_{eff} > 30 V se deberá tomar las precauciones debidas para impedir cualquier peligro (por ejemplo medios de medición adecuados, seguros, limitación de tensión, corte protector, aislamiento etc.).
17. En caso de conexión con aparatos de la técnica informática se deberá tener en cuenta que estos cumplan los requisitos del estándar IEC950/EN60950.
18. A menos que esté permitido expresamente, no retire nunca la tapa ni componentes de la carcasa mientras el producto esté en servicio. Esto pone a descubierto los cables y componentes eléctricos y puede causar heridas, fuego o daños en el producto.
19. Si un producto es instalado fijamente en un lugar, se deberá primero conectar el conductor protector fijo con el conductor protector del aparato antes de hacer cualquier otra conexión. La instalación y la conexión deberán ser efectuadas por un electricista especializado.
20. En caso de que los productos que son instalados fijamente en un lugar sean sin protector implementado, autointerruptor o similares objetos de protección, el circuito de suministro de corriente deberá estar protegido de manera que usuarios y productos estén suficientemente protegidos.
21. Por favor, no introduzca ningún objeto que no esté destinado a ello en los orificios de la caja del aparato. No vierta nunca ninguna clase de líquidos sobre o en la caja. Esto puede producir cortocircuitos en el producto y/o puede causar golpes de corriente, fuego o heridas.
22. Asegúrese con la protección adecuada de que no pueda originarse en el producto una sobrecarga por ejemplo a causa de una tormenta. Si no se verá el personal que lo utilice expuesto al peligro de un golpe de corriente.
23. Los productos R&S no están protegidos contra líquidos si no es que exista otra indicación, ver también punto 1. Si no se tiene en cuenta esto se arriesga el peligro de golpe de corriente para el usuario o de daños en el producto lo cual también puede llevar al peligro de personas.
24. No utilice el producto bajo condiciones en las que pueda producirse y se hayan producido líquidos de condensación en o dentro del producto como por ejemplo cuando se desplaza el producto de un lugar frío a un lugar caliente.
25. Por favor no cierre ninguna ranura u orificio del producto, ya que estas son necesarias para la ventilación e impiden que el producto se caliente demasiado. No pongan el producto encima de materiales blandos como por ejemplo sofás o alfombras o dentro de una caja cerrada, si esta no está suficientemente ventilada.
26. No ponga el producto sobre aparatos que produzcan calor, como por ejemplo radiadores o calentadores. La temperatura ambiental no debe superar la temperatura máxima especificada en la hoja de datos.

27. Baterías y acumuladores no deben de ser expuestos a temperaturas altas o al fuego. Guardar baterías y acumuladores fuera del alcance de los niños. No cortocircuitar baterías ni acumuladores. Si las baterías o los acumuladores no son cambiados con la debida atención existirá peligro de explosión (atención células de litio). Cambiar las baterías o los acumuladores solamente por los del tipo R&S correspondiente (ver lista de piezas de recambio). Las baterías y acumuladores deben reutilizarse y no deben acceder a los vertederos. Las baterías y acumuladores que contienen plomo, mercurio o cadmio deben tratarse como residuos especiales. Respete en esta relación las normas nacionales de evacuación y reciclaje.
28. Por favor tengan en cuenta que en caso de un incendio pueden desprenderse del producto agentes venenosos (gases, líquidos etc.) que pueden generar daños a la salud.
29. El producto puede poseer un peso elevado. Muévalo con cuidado para evitar lesiones en la espalda u otras partes corporales.
30. No sitúe el producto encima de superficies, vehículos, estantes o mesas, que por sus características de peso o de estabilidad no sean aptas para él. Siga siempre las instrucciones de instalación del fabricante cuando instale y asegure el producto en objetos o estructuras (por ejemplo paredes y estantes).
31. Las asas instaladas en los productos sirven solamente de ayuda para el manejo que solamente está previsto para personas. Por eso no está permitido utilizar las asas para la sujeción en o sobre medios de transporte como por ejemplo grúas, carretillas elevadoras de horquilla, carros etc. El usuario es responsable de que los productos sean sujetados de forma segura a los medios de transporte y de que las prescripciones de seguridad del fabricante de los medios de transporte sean observadas. En caso de que no se tengan en cuenta pueden causarse daños en personas y objetos.
32. Si llega a utilizar el producto dentro de un vehículo, queda en la responsabilidad absoluta del conductor que conducir el vehículo de manera segura. Asegure el producto dentro del vehículo debidamente para evitar en caso de un accidente las lesiones u otra clase de daños. No utilice nunca el producto dentro de un vehículo en movimiento si esto pudiera distraer al conductor. Siempre queda en la responsabilidad absoluta del conductor la seguridad del vehículo. El fabricante no asumirá ninguna clase de responsabilidad por accidentes o colisiones.
33. Dado el caso de que esté integrado un producto de láser en un producto R&S (por ejemplo CD/DVD-ROM) no utilice otras instalaciones o funciones que las descritas en la documentación de producto. De otra manera pondrá en peligro su salud, ya que el rayo láser puede dañar irreversiblemente sus ojos. Nunca trate de descomponer estos productos. Nunca mire dentro del rayo láser.
34. Antes de proceder a la limpieza, desconecte el producto de la red. Realice la limpieza con un paño suave, que no se deshilache. No utilice de ninguna manera agentes limpiadores químicos como, por ejemplo, alcohol, acetona o nitrodiluyente.

Contents- Digital Standard 3GPP FDD

Digital Standard 3GPP FDD

Introduction - Digital Standard 3GPP FDD

The R&S Signal Generator provides you with the ability to generate signals in accordance with the WCDMA standard 3GPP FDD.
Option K43 3GPP FDD enhanced MS/BS tests incl. HSDPA extends the 3GPP FDD signal generation with simulation of high speed channels in the downlink (HS-SCCH, HS-PDSCH) and the uplink (HS-DPCCH) and with dynamic power control in real time. HSDPA (high speed downlink packet access) mode enhances the 3GPP FDD standard by data channels with high data rates especially for multi media applications. Option K45 3GPP FDD enhanced BS/MS test including HSUPA extends the 3GPP FDD signal generation with full HSUPA (high speed uplink packet access) support. Option K59 HSPA+ extends the 3GPP FDD signal generation with MIMO support and extension in the HSDPA downlink.
WCDMA (Wideband CDMA) describes a group of mobile radio communication technologies, the details of which differ greatly. The R&S Signal Generator supports the 3GPP FDD standard developed by the 3GPP ("3rd Generation Partnership Project") standardization committee. The standard is implemented in accordance with Release 8, dated December 2007. The signals can also be set to be compatible with previous releases, by not using the new functions of later releases (e.g. no HSDPA channels). Details can be found in the relevant releases of the standard.
The R&S Signal Generator generates the 3GPP FDD signals in a combination of realtime mode (enhanced channels) and arbitrary waveform mode. Channel coding and simulation of bit and block errors can be activated for the enhanced channels of Release 99 and for H-Sets 1-5 generated in realtime. Channel coding can also be activated for HSPA+ and HSUPA channels which are generated in arbitrary wave mode. Data lists can also be used for the data and TPC fields. The enhanced state of realtime channels can be switched off to generate specific test scenarios. In arbitrary waveform mode, the signal is first calculated and then output.
The R&S Signal Generator simulates 3GPP FDD at the physical channel level and also at the transport layer level for all channels for which channel coding can be activated.

The following list gives an overview of the functions provided by the R&S Signal Generator for generating a 3GPP FDD signal (Option K42):

- Configuration of up to 4 base stations and 4 user equipment.
- Combination of realtime mode (enhanced channels) and arbitrary waveform mode
- All special channels and up to 512 channels on the downlink, except HSDPA and HSUPA
- Various test models and pre-defined settings for the uplink and the downlink
- Modulation 16QAM and 64QAM (downlink) for configuring high-speed channels in continious mode (test model 5&6, HSDPA)
- Clipping for reducing the crest factor
- "Misuse TPC" parameter for varying the original normal transmit power over time
- Simulation of up to 64 additional user equipment

The following functions are provided specifically for the receiver test:

- Realtime generation of up to 4 code channels with the option of using data lists for the data and TPC fields
- Channel coding of the reference measurement channels, AMR and BCH in realtime
- Feeding through of bit errors (to test a BER tester) and block errors (to test a BLER tester)
- Simulation of orthogonal channel noise (OCNS in accordance with TS 25.101)
- External control of channel performance in realtime
- Presettings in accordance with 3GPP specifications
- HSDPA Downlink in continuous mode (test model 5&6 for TX tests)

The following functions are provided by extension K43 Enhanced BS/MS Tests Including HSDPA:

- HSDPA Uplink
- HSDPA Downlink (packet mode and H-Set mode without CPC, 64QAM and MIMO)
- Dynamic Power Control
- Predefined and user-definable H-Sets
- Assistance in the setting of the appropriate sequence length for arbitrary waveform mode

The following functions are provided by extension K45 Enhanced BS/MS test including HSUPA:

- HSUPA Downlink (RX measurements on 3GPP FDD UEs with correct timing)
- HSUPA Uplink (RX measurements on 3GPP FDD Node BS supporting HSUPA)
- HSUPA HARQ Feedback support

The following functions are provided by extension K59 HSPA+:

- MIMO in HSPA+
- HSDPA Downlink (H-Set mode with CPC, 64QAM and MIMO)

Tab. 1 Parameters of the modulation system 3GPP FDD

Parameter	Value
Chip rate	3.84 Mcps
Channel types	Downlink: Primary Common Pilot Channel (P-CPICH) Secondary Common Pilot Channel (S-CPICH) Primary Sync Channel (P-SCH) Secondary Sync Channel (S-SCH) Primary Common Control Phys. Channel (P-CCPCH) Secondary Common Control Phys. Channel (S-CCPCH) Page Indication Channel (PICH) Access Preamble Acquisition Indication Channel (AP-AICH) Collision Detection Acquisition Indication Channel (CD-AICH) Phys. Downlink Shared Channel (PDSCH) Dedicated Physical Control Channel (DL-DPCCH) Dedicated Phys. Channel (DPCH) High Speed Shared Control Channel (HS-SCCH) High Speed Physical Downlink Shared Channel (HS-PDSCH), Modulation QPSK, 16 QAM or 64QAM HSUPA channels (E-AGCH, E-RGCH, E-HICH, F-DPCH) Uplink: Phys. Random Access Channel (PRACH) Phys. Common Packet Channel (PCPCH) Dedicated Physical Control Channel (DPCCH) Dedicated Physical Data Channel (DPDCH) E-DCH Dedicated Physical Control Channel (E-DPCCH) E-DCH dedicated physical data channel (E-DPDCH)
Symbol rates	7.5 ksps, 15 ksps, 30 ksps to 960 ksps depending on the channel type (downlink) 15 ksps, 30 ksps, 60 ksps to 6 x 960 ksps overall symbol rate on uplink
Channel count	In downlink 4 base stations each with up to 128 DPCHs and 11 special channels. In uplink 4 user equipment either with PRACH or PCPCH or DPDCH and up to 6 DPDCHs.
Frame structure	Timeslot: 0.667 ms, Radio frame: 15 timeslots = 10 ms The frame structure of symbols depends on the symbol rate.
Scrambling code	Downlink: 18 bit M sequence Uplink: 25 bit M sequence in long mode and 8 bit M sequence in short mode
Channelization code for DPCH, DPDCH and DPCCH	"Orthogonal Variable Spreading Factor Code (OVSF)" square matrix of dimension *chip rate/symbol rate*

Modulation System 3GPP FDD

The following block diagram shows the components of the 3GPP FDD transmission system.

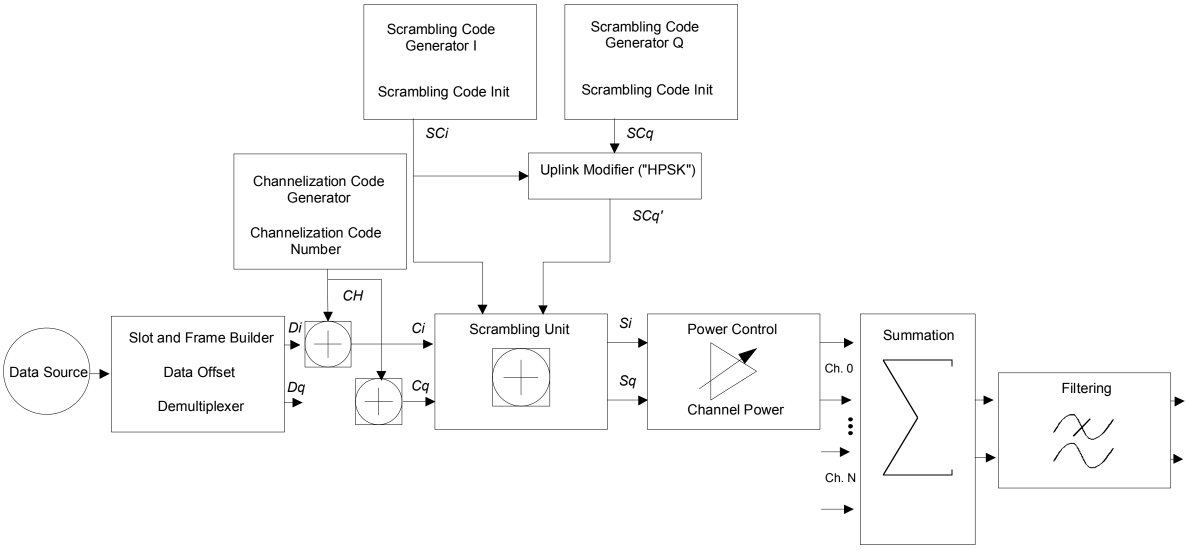


Fig. 1 Components of the 3GPP FDD transmission system

Scrambling Code Generator - 3GPP FDD

The scrambling code generator (previously called long code generator) is used to scramble the chip sequence as a function of the transmitter.
Depending on the link direction and mode (long or short), the structure and initialization regulation of the generator are different.

Downlink Scrambling Code Generator

This generator consists of a pair of shift registers from which the binary sequences for inphase and orthogonal component of the scrambling code are determined. Figure "Structure of downlink scrambling code generator" (see below) shows that the I component is produced as EXOR operation of the LSB outputs, whereas the register contents are first masked and read out for the Q component and then EXORed.

Tab. 2 Generator polynomials of the downlink scrambling code generators

Shift register 1	$x^{18}+x^{7}+1$
Shift register 2	$x^{18}+x^{10}+x^{7}+x^{5}+1$

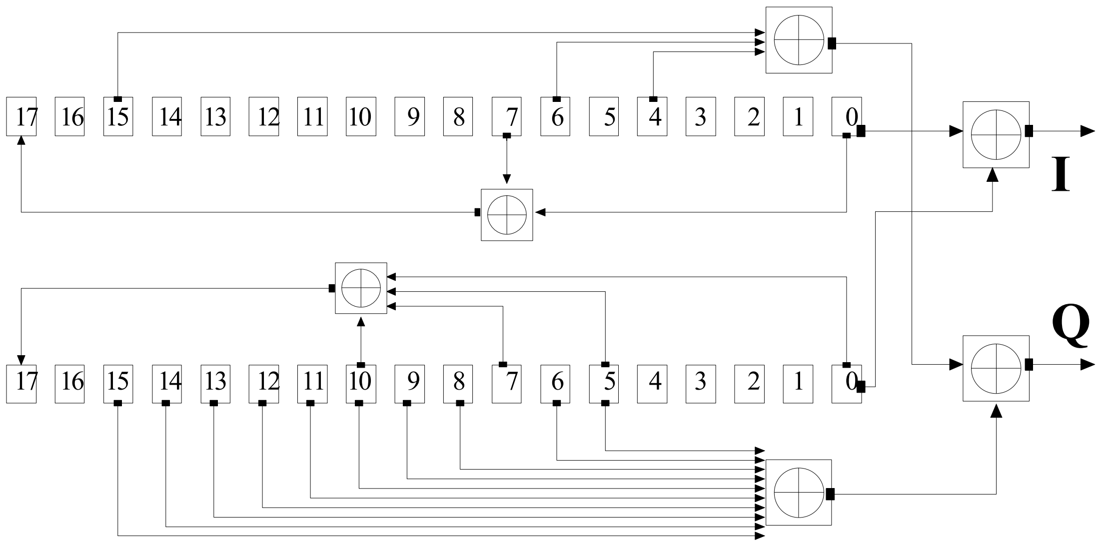


Fig. 2 Structure of downlink scrambling code generator

The shift registers are initialized by loading shift register 1 with "0...01" and shift register 2 completely with "1". In addition, shift register 1 is wound forward by n cycles, n being the scrambling code number or Scrambling Code (SC) for short.
After a cycle time of one radio frame the generators are reset, i.e. the above initialization is carried out again.

Uplink Scrambling Code Generator

In the uplink, a differentiation is made between two SC modes. The long SC, on the one hand, can be used for all types of channel. The short SC, on the other hand, can be used as an alternative to the long SC for all channels except PRACH and PCPCH.

Uplink long scrambling code
Principally, the code generator of the long SC in the uplink is of the same structure as the SC in the downlink. However, the generator polynomials of the shift registers and the type of initialization are different.

Tab. 3 Generator polynomials of the uplink long scrambling code generator

Shift register 1	$x^{25}+x^3+1$
Shift register 2	$x^{25}+x^3+x^2+x+1$

The shift registers are initialized by allocating 1 to shift register 1 bit number 24 and the binary form of the scrambling code number n to bits 23 to 0. Shift register 2 is completely loaded with "1".
The read-out positions for the Q component are defined such that they correspond to an IQ offset of 16.777.232 cycles.
After a cycle time of one radio frame the generators are reset, i.e. the above initialization is carried out again.

Uplink short scrambling code

The code generator of the short SC in the uplink consists of a total of 3 coupled shift registers.

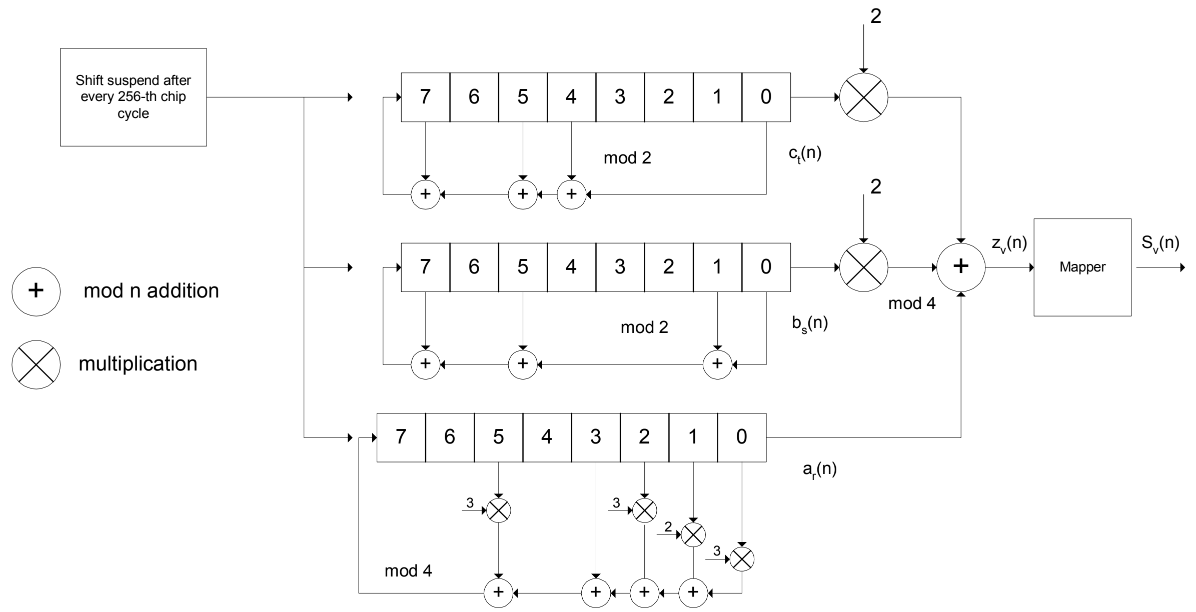


Fig. 3 Structure of uplink short scrambling code generator

Tab. 4 Generator polynomials of uplink short scrambling code generator

Shift register 1 (binary)	$x^8+x^7+x^5+x^4+1$
Shift register 2 (binary)	$x^8+x^7+x^5+x+1$
Shift register 3 (quaternary)	$x^8+x^5+3x^3+x^2+2x1$

The output sequences of the two binary shift registers are weighted with factor 2 and added to the output sequence of the quaternary shift register (Modulo 4 addition). The resulting quaternary output sequence is mapped into the binary complex level by the mapper block.
For initialization of the three 8-bit shift registers (in a modified way) the binary form of the 24-bit short SC number n is used, for details see 3GPP TS 25 213, Spreading and Modulation.

Tab. 5 Mapping of the quaternary output sequence into the binary IQ level

zv(n)	**Sv(n)**
0	+1 + j1
1	-1 + j1
2	-1 - j1
3	+1 - j1

Preamble scrambling code generator

When generating the preambles of the PRACH and PCPCH a special SC is used. It is based on the Long SC described under a), however only the I component is taken and subsequently a pointer ($e^{j(PI/4 + PI/4 * k)}$, k=0 to 4095) modulated upon it.

Modification of the long and short scrambling code output sequence

The scrambling code sequence of the Q component is modified as standard to reduce the crest factor of the signal. Zero-crossings can thus be avoided for every second cycle. (This method is often called "HPSK").

For details see 3GPP TS 25 213, Spreading and Modulation. R&S Signal Generator makes use of a decimation factor of 2.

Scrambling Unit - 3GPP FDD

In the scrambling unit, the output of the scrambling code generator is linked with spread symbols. If the input signal and the scrambling code signal are interpreted as complex signal (C_i , C_q , SC_i , $SC_q' \in \{ -1, +1 \}$), the output signal is a complex multiplication of the two signals:

$S_i + j\,S_q = (C_i + j\,C_q) * (SC_i + j\,SC_q')$

and the following equations apply

$$S_i = C_i SC_i - C_q SC_q'$$
$$S_q = C_i SC_q' + C_q SC_i$$

The signal thus obtained can be interpreted as a QPSK signal with the following constellation diagram:

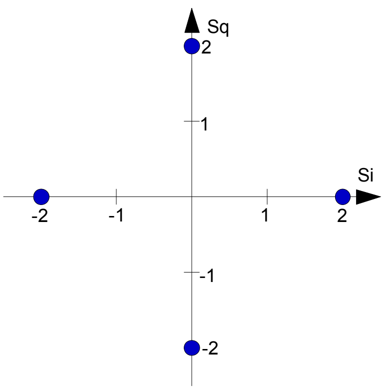


Fig. 4 Constellation diagram of a channel with 0 dB power

Note:

There are auxiliary conditions for some types of channels that may result in different constellation diagrams. If, for instance, symbols of the SCH are coded, a BPSK constellation is obtained without the scrambling unit.

Channelization Code Generator - 3GPP FDD

The channelization code generator cyclically outputs a channel-specific bit pattern. The length of the cycle corresponds to the period of the source symbol to be spread, i.e. the number of bits corresponds to the spread factor. The spreading sequence for the I and Q branch is identical (real value). Spreading is a simple EXOR operation.
Two different channelization code generators are used depending on the type of channel:

Channelization code generator for all channels except SCH
Due to this channelization code the channel separation takes place in the sum signal. The channelization code number is the line of an orthogonal spreading matrix which is generated according to an iterative scheme ("OVSF").

Channelization code generator SCH
This generator replaces the one described above if the synchronization code symbol of the SCH channels is spread.
The spreading matrix is replaced by a method that forms the spreading sequence from a Hadamard sequence and a statistical sequence. For details see 3GPP TS 25 213.

Data Source - 3GPP FDD

The data and TPC fields of the enhanced channels (realtime channels) can be filled from data lists containing data defined by the user. This allows user information from higher levels such as the transport or physical layers to be introduced into the signal generation process.
The choice of data sources is crucially important for the signal characteristics. The constellation diagram and the crest factor in particular are modeled to a great extent by a suitable choice of data.

Slot and Frame Builder - 3GPP FDD

The bits from the data source are first entered into a frame structure. The frames are made up of two hierarchical levels:

Tab. 6 Hierarchical structure of 3GPP FDD frames

Hierarchy	Length in ms	Remarks
Timeslot	0,667	
Radio frame	10	After a radio frame, pilot symbols are repeated. One radio frame consists of 15 timeslots. A frame is also the length of a scrambling code cycle. Frames are the basic unit in R&S Signal Generator. The sequence length is stated in radio frames.

The configuration of the timeslots depends on the channel type and symbol rate. The following components are distinguished:

- **Pilot sequence**
  The pilot sequence characterizes the timeslot position within the radio frame and also depends on the symbol rate, transmit diversity and the pilot length parameter.
  Channel types DPCH, S-CCPCH, DL-DPCCH, DPCCH, PRACH and PCPCH have a pilot sequence.
  The pilot sequence cannot be changed by the user.
- **Synchronization code symbol**
  The synchronization code symbol is the only symbol of the SCH. It is fixed to "11".
- **TPC symbol**
  This symbol is used to control the transmit power. It is used in DPCH, DL-DPCCH and DPCCH.
  A bit pattern for the sequence of TPC symbols can be indicated as a channel-specific pattern.
- **Data symbols**
  These symbols carry the user information and are fed from the data source. They are used in DPCH, P-CCPCH, S-CCPCH, PDSCH, DL-DPCCH, DPDCH, PRACH and PCPCH.
- **Signature**
  The signature is used in PRACH and PCPCH. 16 fixed bit patterns are defined of which the user may select one.
- **TFCI**
  The "Transport Format Combination Indicator" is used in DPCH/DPCCH if the state is set to On. In this case, a code sequence with the length of 30 is defined using this value and distributed among 15 subsequent timeslots. In PRACH and PCPCH, the TFCI field is provided as standard.
- **FBI**
  Feedback indication bits are only used in DPCCH and PCPCH.

Timing Offset - 3GPP FDD

The symbol stream can be shifted in time relative to the other channels. For this purpose a timing offset can be entered into the channel table, stating the range of shifting in multiples of 256 chips. Since the generator does not generate infinite symbol streams like a real-time system, this offset is implemented as a rotation.

Example for DPCH 30 ksps, 1 timeslot, timing offset = 2;
2 x 256 chips = 512 chip offset;
4 data symbols shifting at a symbol rate of 30 ksps (1 symbol corresponds to 3.84 Mcps / 30 ksps = 128 chips).
previously:

11	11	11	11	00	01	10	11	00	10	01	11	11	01	00	01	10	11	01	00

afterwards:

10	11	01	00	11	11	11	11	00	01	10	11	00	10	01	11	11	01	00	01

The use of the timing offset usually causes a reduction of the crest factor of the total signal, since it is not always the same spreading chips (channelization chips) *CH* and scramble chips SC_i/SC_q' that are applied to the pilot sequences of the channels.

Demultiplexer - 3GPP FDD

In the downlink, the symbol stream is divided into two bit streams D_i and D_q prior to processing in the spreading unit. The symbol stream is divided by allocating bits 1, 3, 5, to 2n-1 to the in-phase bit stream D_i, and bits 2, 4, 6, 2n to the quadrature bit stream D_q.
For the above example with timing offset:

D_i = *1 1 0 0 1 1 1 1 0 0 1 1 0 1 0 1 1 0 0 0*

Dq = 0 1 1 0 1 1 1 1 0 1 0 1 0 0 1 1 1 1 0 1

(left-hand bit is always the first one in the time sequence)
In the uplink, independent data are used for the two paths.

PRACH/PCPCH:	Preamble : signature parallel to I and Q
	Message part : data to I, pilot, TPC and TFCI to Q
DPCCH:	all bits to I, Q always unused
DPDCH:	all bits are always to I **or** Q (dependent on channel number), the other path is unused.

Power Control - 3GPP FDD

After spreading and scrambling, a channel-specific power factor *p* is applied to the signal. A value of -6 dB therefore results in half the level (or ¼ power) and the following diagram (DPCH):

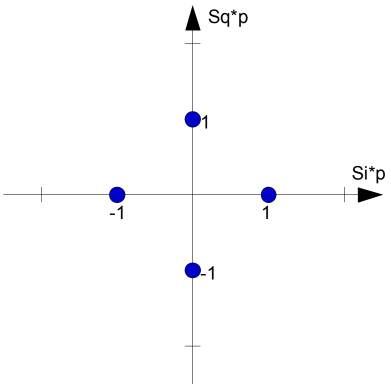


Fig. 5 Constellation diagram of a channel with –6 dB power

Summation and Filtering - 3GPP FDD

After application of the channel power, the components of the individual channels are summed up. The constellation diagram of the sum signal is obtained by superposition of the diagrams of the individual channels. If the signal consists of two channels with a power of -6 dB and -12 dB and each channel contains independent source data (DPCH), the following constellation diagram is obtained:

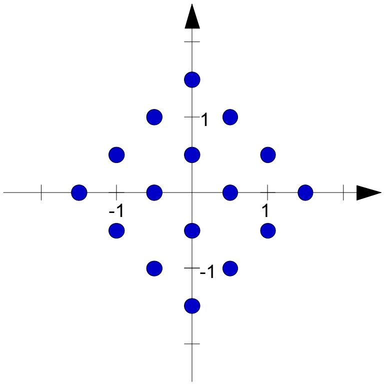


Fig. 6 Constellation diagram of a 3GPP W-CDMA signal with two DPCH channels

An unfiltered spread signal is obtained after summation. Due to filtering the number of samples is increased by the oversampling factor and band-limiting is performed.

Multicode - 3GPP FDD

3GPP FDD supports multicode transmission for downlink-dedicated physical channels (DPCH) .
This form of transmission is used for channels intended for the same receiver, i.e. those receivers that belong to a radio link. The first channel of this group is used as a master channel.
Shared parts (pilot, TPC and TCFI) are spread for all channels using the spreading code of the master channel.

Note:
Instead of changing the spreading code within a slot several times, the master code rather than the shared parts can be sent at higher power. The other channels then have to be blanked out correspondingly.

HARQ Feedback - 3GPP FDD

The "HARQ Feedback" functionality extends the R&S Signal Generator option 3GPP FDD in order to meet the requirements defined in 3GPP TS 25.141, chapter 8.12 and 8.13.
This allows the user to dynamically control the transmission of the HSUPA fixed reference channels (FRC 1-7). An ACK from the base station leads to the transmission of a new packet while a NACK forces the R&S Signal Generator to retransmit the packet with a new channel coding configuration (i.e. new redundancy version RV) of the concerned HARQ process.

Limitations
Although an arbitrary data source can be selected, the same user data is used for all HARQ processes and for all retransmissions.

Example:
If FRC4 is configured and the data source is set to PN9, then the first 5076 bits of the PN9 are used as input for all four HARQ processes, regardless of which retransmission is performed. Note that the bitstream after channel coding of course is different for different retransmissions due to different redundancy versions.
Furthermore, "DTX-Mode" and "Bit-Error-Insertion / Block-Error-Insertion" are not available in this mode.

Setup
If an instrument with fading simulation is available, no more test equipment is needed in order to fulfill the test setup described in 3GPP TS 25.141, Annex B.3.4.
As the instrument has no RF input available, the HARQ feedback from the base station needs to be a TTL signal. Therefore it is connected to the "LEVATT" connector on the external AUX I/O BNC adapter board R&S SMx-Z5 of the R&S Signal Generator. A high level (TTL) is interpreted as an ACK, while a low level corresponds to a NACK. Note that in the user interface this can also be defined the other way around.

Timing

In general the ACK/NACK feedback from the base station should be available at the instruments "LEVATT"-connector with the same timing the E-HICH is transmitted. The instrument will read out this port at time t_smu after the start of the HARQ process the feedback is related to (see figure below). The user is able to adjust this time via the **Additional User Delay** parameter. The signal should be constant on this instrument's input for 0.5 ms before and after the defined point in time.

As it probably takes some time for the base station to get synchronized to the signal transmitted from the instrument, the ACK/NACK feedback should be NACK during this period, in order to force the instrument to retransmit the packets, until the first packet is read out correctly from the base station.

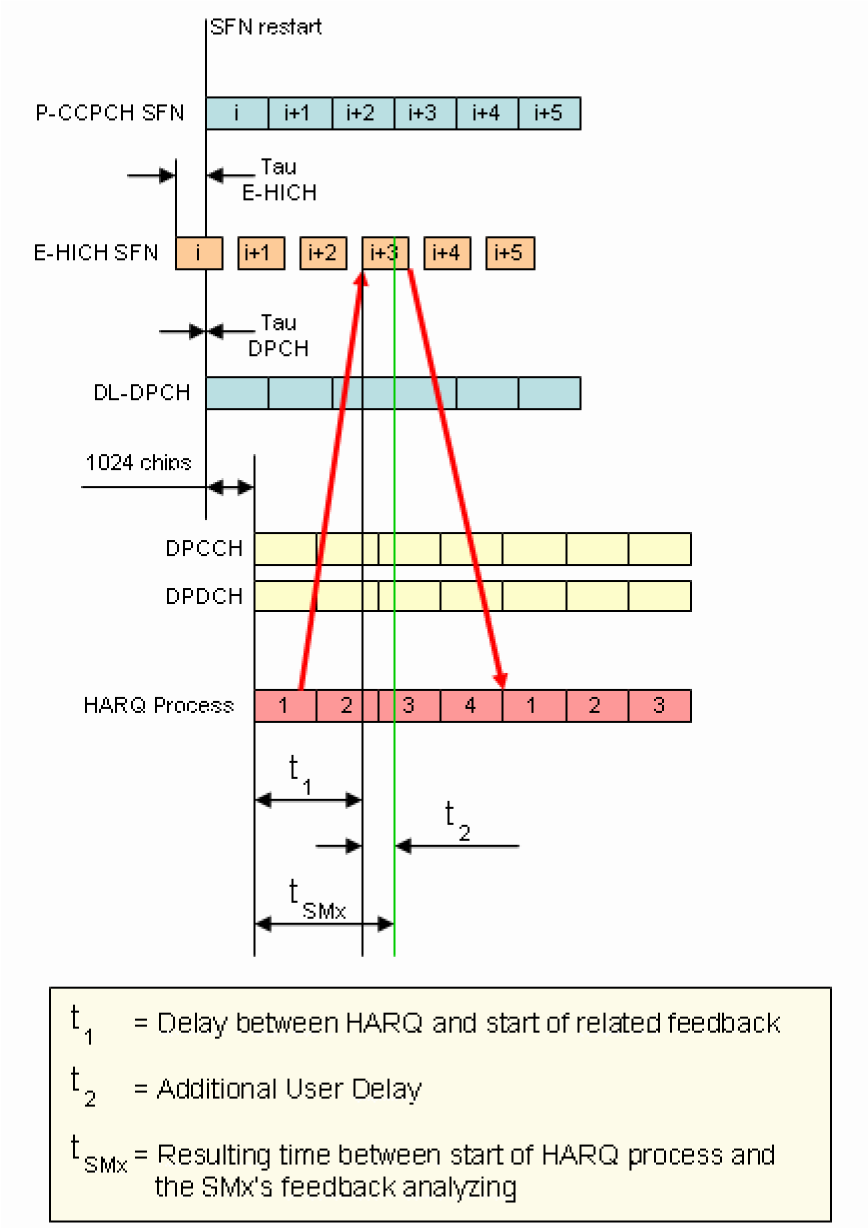


Fig. 7 Timing diagram for TTI 10ms, tau_dpch = 0, tau_E-HICH = -7slots

HS-SCCH less operation

HS-SCCH less operation is a special HSDPA mode of operation which reduces the HS-SCCH overhead and reduces UE battery consumption. It changes the conventional structure of HSDPA data reception.
In HSDPA as defined from 3GPP release 5 onwards, UE is supposed to read continuously HS-SCCH where data allocations are being signaled. The UE is being addressed via a UE specific identity (16 bit H-RNTI / HSDPA Radio Network Temporary Identifier) on HS-SCCH. As soon as the UE detects relevant control information on HS-SCCH it switches to the associated HS-PDSCH resources and receives the data packet.
This scheme is fundamentally changed in HS-SCCH less operation and HS-SCCH less operation is optimized for services with relatively small packets, e.g. VoIP.
In HS-SCCH less operation mode, the base station can decide for each packet again whether to apply HS-SCCH less operation or not, i.e. conventional operation is always possible.
The first transmission of a data packet on HS-DSCH is done without an associated HS-SCCH. The first transmission always uses QPSK and redundancy version Xrv = 0. Only four pre-defined transport formats can be used so the UE can blindly detect the correct format. The four possible transport formats are configured by higher layers. Only predefined channelization codes can be used for this operation mode and are configured per UE by higher layers: the parameter *HS-PDSCH code index* provides the index of the first HS-PDSCH code to use. For each of the transport formats, it is configured whether one or two channelization codes are required.
In order to allow detection of the packets on HS-DSCH, the HS-DSCH CRC (Cyclic Redundancy Check) becomes UE specific based on the 16 bit HRNTI. This is called CRC attachment method 2 (CRC attachment method 1 is conventional as of 3GPP release 5).
In case of successful reception of the packet, the UE will send an ACK on HS-DPCCH. If the packet was not received correctly, the UE will send nothing.
If the packet is not received in the initial transmission, the base station may retransmit it. The number of retransmissions is limited to two in HS-SCCH less operation.
In contrast to the initial transmission, the retransmissions are using HS-SCCH signaling. However, the coding of the HS-SCCH deviates from release 5, since the bits on HS-SCCH are re-interpreted. This is called **HS-SCCH type 2**. The conventional HS-SCCH as of 3GPP release 5 is called HS-SCCH type 1.

HS-SCCH Type 2

The table below gives a comparison of the HS-SCCH Type 1 (normal operation) and HS-SCCH Type 2 (Less Operation) formats.

Tab. 7 Comparison of HS-SCCH Type 1 and Type 2

HS-SCCH Type 1 (normal operation)	HS-SCCH Type 2 (less operation)
Channelization code set information (7 bits)	Channelization code set information (7 bits)
Modulation scheme information (1 bit)	Modulation scheme information (1 bit)
Transport block size information (6 bits)	Special Inforamtion type (6 bits)
HARQ process information (3 bits)	Special Information (7 bits)
Redundancy and constellation version (3 bits)	UE identity (16 bits)
New data indicator (1 bit)	
UE identity (16 bits)	

The Special Information type on HS-SCCH type 2 must be set to 111110 to indicate HS-SCCH less operation. The 7 bits Special information then contains:

- 2 bit transport block size information (one of the four possible transport block sizes as configured by higher layers)
- 3 bit pointer to the previous transmission of the same transport block (to allow soft combining with the initial transmission)
- 1 bit indicator for the second or third transmission
- 1 bit reserved.

QPSK is also used for the retransmissions. The redundancy version Xrv for the second and third transmissions shall be equal to 3 and 4, respectively.
For the retransmissions, also HS-DSCH CRC attachment method 2 is used.
ACK or NACK are reported by the UE for the retransmitted packets.

HS-SCCH Type 2 Fixed Reference Channel: H-Set 7

In order to support HS-SCCH Type 2 (Less Operation) testing, a fixed reference channel has been introduced. H-Set 7 is specified as reference test channel for HSDPA test cases.

The H-Set 7 consists of one HS-PDSCH and its parameterization and coding chain is based on 1 code with QPSK modulation and one HARQ proces.

Higher Order Modulation

64QAM in downlink

With the possibility to use 64QAM in downlink, HSPA+ can achieve downlink data rates of 21 Mbps.
This theoretical peak data rate (physical channel bit rate) with 64QAM is calculated as follow:
Peak data rate (64QAM) = 15 [codes] * 2880 bits/ 2 ms [subframe] = 21.6 MBps

64QAM Fixed Reference Channel: H-Set 8

In order to support 64QAM testing, a fixed reference channel has been introduced. H-Set 8 is specified as reference test channel for HSDPA test cases.
The H-Set 8 parameterization and coding chain is based on 15 codes with 64QAM modulation. Six Hybrid ARQ processes are used, and HS-DSCH is continuously transmitted.

MIMO in HSPA+

HSPA+ uses full MIMO approach including spatial multiplexing. The approach is called **D-TxAA** (Double Transmit Antenna Array). It is only applicable for the **High Speed Downlink Shared Channel, the HS-DSCH**.

The figure below shows the basic principle of the 2x2 approach.

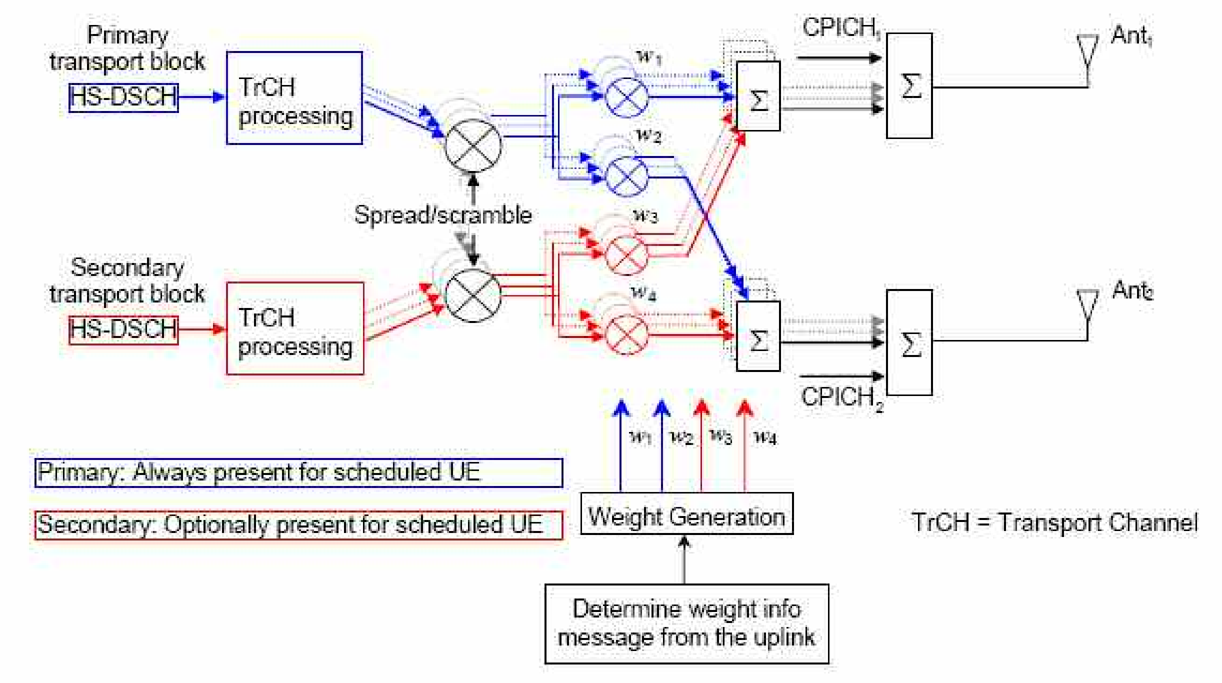


Fig. 8 MIMO for HSPA+

With D-TxAA, two independent data streams (transport blocks) can be transmitted simultaneously over the radio channel over the same WCDMA channelization codes. Each transport block is processed and channel coded separately. After spreading and scrambling, **precoding** based on weight factors is applied to optimize the signal for transmission over the mobile radio channel.

Four precoding weights w_1- w_4 are available. The first stream is multiplied with w_1 and w_2, the second stream is multiplied with w_3 and w_4. The weights can take the following values:

$$w_3 = w_1 = 1/\sqrt{2}\,,$$

$$w_4 = -w_2\,,$$

$$w_2 \in \left\{\frac{1+j}{2},\quad \frac{1-j}{2},\quad \frac{-1+j}{2},\quad \frac{-1-j}{2}\right\}.$$

Precoding weight w_1 is always fixed, and only w_2 can be selected by the base station. Weights w_3 and w_4 are automatically derived from w_1 and w_2, because they have to be orthogonal.

MIMO downlink control channel support

In order to support MIMO operation, changes to the HSDPA downlink control channel have become necessary, i.e. the HS-SCCH.
There is a new **HS-SCCH Type 3** for MIMO operation defined. The table below gives a comparison of the HS-SCCH Type 1 and Type 3 formats.

Tab. 8 Comparison of HS-SCCH Type 1 and Type 3

HS-SCCH Type 1 (normal operation)	HS-SCCH Type 3 (MIMO) One transport block	HS-SCCH Type 3 (MIMO) Two transports blocks
Channelization code set information (7 bits) Modulation scheme information (1 bit) Transport block size information (6 bits) HARQ process information (3 bits) Redundancy and constellation version (3 bits) New data indicator (1 bit) UE identity (16 bits)	Channelization code set information (7 bits) Modulation scheme and number of transport blocks information (3 bits) Precoding weight information (2 bits) Transport block size information (6 bits) HARQ process information (4 bits) Redundancy and constellation version (2 bits) UE identity (16 bits)	Channelization code set information (7 bits) Modulation scheme and number of transport blocks information (3 bits) Precoding weight informationfor primary transport block (2 bits) Transport block size information for primary transport block (6 bits) Transport block size information for secondary transport block (6 bits) HARQ process information (4 bits) Redundancy and constellation version for primary transport block (2 bits) Redundancy and constellation version for secondary transport block (2 bits) UE identity (16 bits)

The “Precoding weight info for the primary transport block” contains the information on weight factor w_2 as described above. Weight factors w_1, w_3, and w_4 are derived accordingly.
The number of transport blocks transmitted and the modulation scheme information are jointly coded as shown in the table below.

Tab. 9 Interpretation of “Modulation scheme and number of transport blocks info” sent on HS-SCCH

Modulation scheme + number of transport blocks info (3 bits)	Modulation for primary transport block	Modulation for secondary transport block	Number of transport blocks
111	16QAM	16QAM	2
110	16QAM	QPSK	2
101	64QAM 64QAM	n/a QPSK	1 2
100	16QAM	n.a.	1
011	QPSK	QPSK	2
010	64QAM	64QAM	2
001	64QAM	16QAM	2
000	QPSK	n.a.	1

Redundancy Version

Redundancy versions for the primary transport block and for the secondary transport block are signaled. Four redundancy version values are possible (unlike HSDPA in 3GPP release 5 where eight values for the redundancy version could be signaled).

HARQ Processes

Also the signaling of the HARQ processes differs from HSDPA in 3GPP release 5. In 3GPP release 5, up to **eight** HARQ processes can be signaled. A minimum of **six** HARQ processes needs to be configured to achieve continuous data transmission. Similarly, in MIMO with dual stream transmission, a minimum of **twelve** HARQ processes would be needed to achieve continuous data transmission. Each HARQ process has independent acknowledgements and retransmissions. In theory, HARQ processes on both streams could run completely independently from one another. This would however increase the signaling overhead quite significantly (to 8 bits), since each possible combination of HARQ processes would need to be addressed.
To save signaling overhead, a restriction is introduced: HARQ processes are only signaled for the primary transport block within 4 bits, the HARQ process for the secondary transport block is derived from that according to a fixed rule; according to 3GPP TS 25.212. Thus, there is a one-to-one mapping between the HARQ process used for the primary transport block and the HARQ process used for the secondary transport block. The relation is shown in the table below for the example of 12 HARQ processes configured.

Tab. 10 Combinations of HARQ process numbers for dual stream transmission (12 HARQ processes configured)

HARQ process number on primary stream	0	1	2	3	4	5	6	7	8	9	10	11
HARQ process number on secondary stream	6	7	8	9	10	11	0	1	2	3	4	5

Note:
Only an even number of HARQ processes is allowed to be configured with MIMO operation.

MIMO Fixed Reference Channel: H-Set 9

In order to support MIMO testing, a fixed reference channel has been introduced. H-Set 9 is specified as reference test channel for HSDPA test cases.

The H-Set 9 parameterization and coding chain is based on 15 codes with two different modulations, 16QAM and QPSK, for both primary and secondary transport blocks respectivelly. Six HARQ processes are used, and HS-DSCH is continuously transmitted.

MIMO and 64QAM UE Capabilities

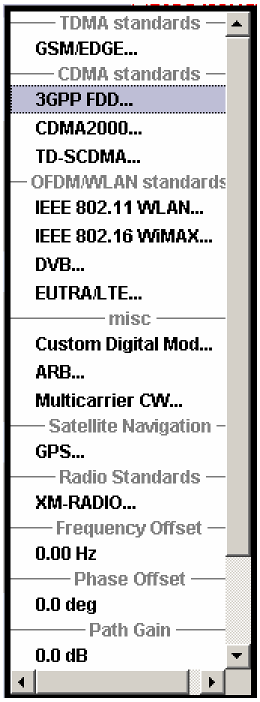
MIMO and 64QAM are UE capability, i.e. not all UEs will have to support it.
New UE categories have been introduced to provide MIMO support and support of 64QAM in addition to 16QAM and QPSK.
According to 3GPP TS25.306 V8.2.0, the following release 8 UE categories with MIMO and 64QAM support are defined:

- Categories 13 and 14:
  - Support of 64QAM
  - No support of MIMO
  - Maximum data rate of category 14 is 21 Mbps
- Categories 15 and 16:
  - Support of MIMO with modulation schemes QPSK and 16QAM
  - No support of 64QAM
  - Maximum data rate of category 16 is 27.6 Mbps
- Categories 17 and 18:
  - Support of MIMO with modulation schemes QPSK and 16QAM
  - Support of 64QAM and MIMO, but not simultaneously
  - Maximum data rate of category 18 is 27.6 Mbps when MIMO is used and 21 Mbps when 64QAM is used
- Categories 19 and 20:
  - Simultaneous support of MIMO and all modulation schemes (QPSK, 16QAM and 64QAM)
  - Maximum data rate of category 20 is 42.1 Mbps

R&S Signal Generator supports all UE categories.

3GPP FDD Menu

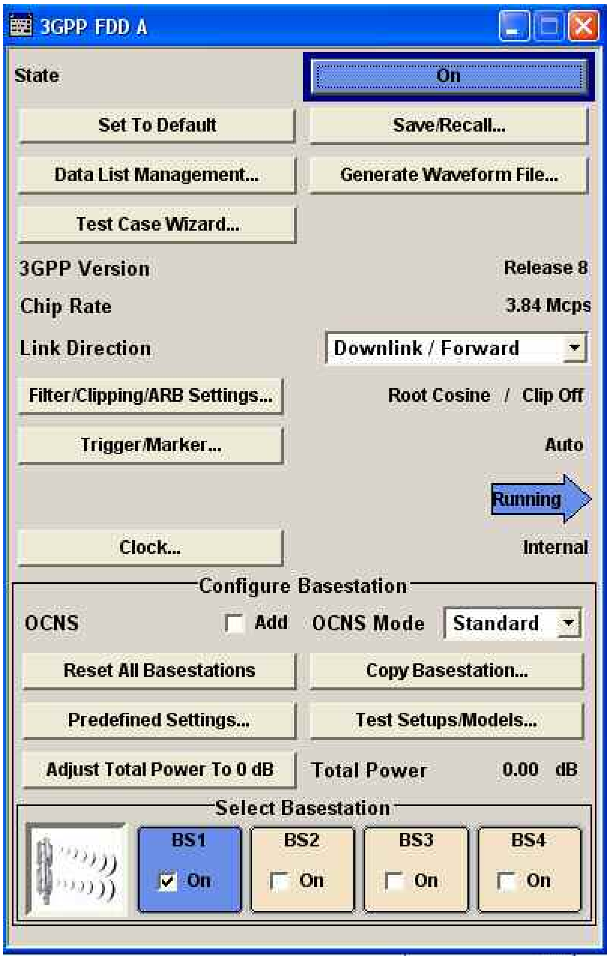
The menu for setting the 3GPP FDD digital standard is either called from the baseband block or from the menu tree under Baseband.



The menu is split into several sections for configuring the standard. The choice of transmission direction determines which displays and parameters are made available in the lower section.

The upper section of the menu is where the 3GPP FDD digital standard is enabled, the default settings are called and the transmission direction selected. Button **Test Case Wizard** opens a configuration menu with a selection of predefined settings according to Test Cases in TS 25.141. The valid 3GPP version and the chip rate in use are displayed. Many of the buttons lead to submenus for loading and saving the 3GPP FDD configuration and for setting the filter, trigger and clock parameters.

The lower menu section is where either the base station signal or the user equipment signal is configured, depending on the transmission direction selected.



The menu is extremely comprehensive, so a small list of contents is added here just for the 3GPP FDD to make orientation easier.

The headings are always given a shortform of the "menu path" and the header also shows you your current location in the menu.

General Settings for 3GPP FDD Signals

The upper menu section is where the 3GPP FDD digital standard is enabled and reset and where all the settings valid for the signal in both transmission directions are made.

State - 3GPP FDD

Enables/disables the 3GPP FDD standard.

Enabling this standard disables all the other digital standards and digital modulation modes (in case of two-path instruments, this affects the same path).

The 3GPP FDD signal is generated by a combination of realtime mode (enhanced channels) and arbitrary waveform mode (all the other channels).

On the downlink, P-CCPCH and up to three DPCHs of base station 1 are generated in realtime. All the other channels are generated in arbitrary waveform mode and added.

In the uplink, all the channels of user equipment 1 are generated in realtime (PRACH, PCPCH or DPCCH and up to 6 DPDCHs), the other user equipment are generated in arbitrary waveform mode and added to the realtime signal.

Remote-control command:
`SOUR:BB:W3GP:STAT ON`

Set to default - 3GPP FDD

Calls the default settings. Test Model 1 (64 channels) is preset.

Remote-control command:
`SOUR:BB:W3GP:PRES`

Save/Recall - 3GPP FDD

Calls the **Save/Recall** menu.

From the **Save/Recall** menu the **File Select** windows for saving and recalling 3GPP FDD configurations and the **File Manager** can be called.

3GPP FDD configurations are stored as files with the predefined file extension ***.3g.** The file name and the directory they are stored in are user-definable.

The complete settings in the **3GPP FDD** menu are saved and recalled.

Recall 3GPP FDD setting

Opens the **File Select** window for loading a saved 3GPP FDD configuration.

The configuration of the selected (highlighted) file is loaded by pressing the **Select** button.

Remote-control command:
`MMEM:CDIR 'F:\gen_lists\3gpp'`

`SOUR:BB:W3GP:SETT:CAT?`
Response: `'3g_1',3g_2'`
`SOUR:BB:W3GP:SETT:LOAD "3g_1"`

Save 3GPP FDD setting

Opens the **File Select** window for saving the current 3GPP FDD signal configuration.

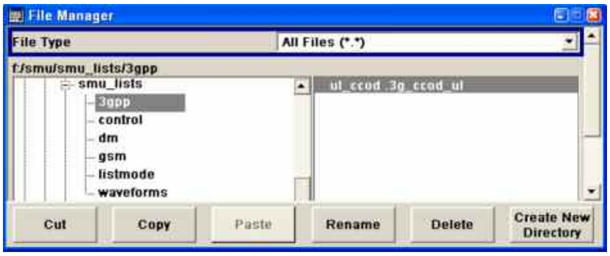
The name of the file is specified in the **File name** entry field, the directory selected in the **save into** field. The file is saved by pressing the **Save** button.
Remote-control command:
`MMEM:CDIR 'F:\gen_lists\3gpp'`

`SOUR:BB:W3GP:SETT:STOR '3g_3'`

File Manager

Calls the **File Manager**.

The **File Manager** is used to copy, delete and rename files and to create new directories.



Remote-control commands::
`MMEM:CDIR 'F:\gen_lists\3gpp'`

`SOUR:BB:W3GP:SETT:DEL '3g_1'`

Data List Management - 3GPP FDD

Calls the **Data List Management** menu. This menu is used to create and edit a data list.

All data lists are stored as files with the predefined file extension ***.dm_iqd**. The file name and the directory they are stored in are user-definable.
The data lists must be selected as a data source from the submenus under the individual function, e.g. in the channel table of the base stations.
Remote-control commands:

Note:
*All data lists are generated and edited by means of the SOURce:BB:DM subsystem commands. Files containing data lists usually end with *.dm_iqd. The data lists are selected as a data source for a specific function in the individual subsystems of the digital standard.*

Creating and editing the data list:
```
SOUR:BB:DM:DLIS:SEL "3gpp"
SOUR:BB:DM:DLIS:DATA 1,1,0,1,0,1,0,1,1,1,1,0,0,0
SOUR:BB:DM:DLIS:DATA:APP 1,1,0,1,0,1,0,1,1,1,1,0,0
```

Selecting the data list:

```
SOUR:BB:W3GP:BST2:CHAN13:DATA DLIS
SOUR:BB:W3GP:BST2:CHAN13:DATA:DSEL  "d_bst1"

SOUR:BB:W3GP:BST2:CHAN13:DPCC:TPC:DATA DLIS
SOUR:BB:W3GP:BST2:CHAN13:DPCC:TPC:DATA:DSEL 'tpc1'

SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH:DATA DLIS
SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH:DATA:DSEL 'd1'

SOUR:BB:W3GP:MST2:CHAN:DPDC:DATA DLIS
SOUR:BB:W3GP:MST2:CHAN:DPDC:DATA:DSEL "d_up1

SOUR:BB:W3GP:MST:CHAN:DPDC:DATA:DCCH DLIS
SOUR:BB:W3GP:MST:CHAN:DPDC:DATA:DCCH:DSEL "d_up1

SOUR:BB:W3GP:MST:ENH:DPDC:TCH:DATA DLIS
SOUR:BB:W3GP:MST:ENH:DPDC:TCH:DATA:DSEL "d_up2"

SOUR:BB:W3GP:MST2:DPCC:TPC:DATA DLIS
SOUR:BB:W3GP:MST2:DPCC:TPC:DATA:DSEL "d_up4"

SOUR:BB:W3GP:MST2:PCPC:DATA DLIS
SOUR:BB:W3GP:MST2:PCPC:DATA:DSEL "d_up5"

SOUR:BB:W3GP:MST2:PCPC:TPC:DATA DLIS
SOUR:BB:W3GP:MST2:PCPC:TPC:DATA:DSEL "d_up6"

SOUR:BB:W3GP:MST2:PRAC:DATA DLIS
SOUR:BB:W3GP:MST2:PRAC:DATA:DSEL "d_up7"
```

Generate Waveform File - 3GPP FDD

Opens the submenu for storing the current 3GPP signal as ARB signal in a waveform file. This file can be loaded in the ARB menu and processed as multi carrier or multi segment signal.

The file name is entered in the submenu. The file is stored with the predefined file extension ***.wv**. The file name and the directory it is stored in are user-definable.

Remote-control commands:
`SOUR:BB:W3GP:WAV:CRE "d:\temp\w3gpp_wv"`

Test Case Wizard - 3GPP FDD

Not for R&S SMJ

Opens a configuration menu with a selection of predefined settings according to Test Cases in TS 25.141.

The test casesare described in Section "*Tests on Base Stations in Conformance with the 3G Standard 3GPP-FDD*".

Remote-control command:n.a.

3GPP Version - 3GPP FDD

Displays the current version of the 3GPP FDD standard.

The default settings and parameters provided are oriented towards the specifications of the version displayed.

Remote-control command:
`SOUR:BB:W3GP:GPP3:VERS?`
Response: `V8.0.0`

Chip Rate - 3GPP FDD

Displays the system chip rate. This is fixed at 3.84 Mcps.

The output chip rate can be varied in the Filter menu, Clipping, ARB Settings (see Section "*Filtering, Clipping, ARB Settings - 3GPP FDD*", Page 1.25).

Remote-control command:
`SOUR:BB:W3GP:CRAT?`
Response: `R3M84`

Link Direction - 3GPP FDD

Selects the transmission direction.

The settings of the base station or the user equipment are provided in the following menu section in accordance with the selection.

Downlink/ Forward Link

The transmission direction selected is base station to user equipment. The signal corresponds to that of a base station.

Remote-control command:
`SOUR:BB:W3GP:LINK DOWN`

Uplink/ Reverse Link

The transmission direction selected is user equipment to base station. The signal corresponds to that of user equipment.

Remote-control command:
`SOUR:BB:W3GP:LINK UP`

Filtering, Clipping, ARB Settings - 3GPP FDD

Calls the menu for setting baseband filtering, clipping and the sequence length of the arbitrary waveform component. The current setting is displayed next to the button.

The menu is described in Section "*Filtering, Clipping, ARB Settings - 3GPP FDD*", Page 1.25).

Remote-control command: n.a.

Trigger - Marker - 3GPP FDD

(Trigger for R&S SMx and R&S AMU instruments only)

Calls the menu for selecting the trigger source, for configuring the marker signals and for setting the time delay of an external trigger signal (see Section "*Trigger/Marker/Clock - 3GPP FDD*", Page 1.36).

The currently selected trigger source is displayed to the right of the button.

Remote-control command: n.a.

Execute Trigger - 3GPP FDD

(R&S SMx and R&S AMU instruments only)

Executes trigger manually.

A manual trigger can be executed only when an internal trigger source and a trigger mode other than **Auto** have been selected.

Remote-control commands:
```
SOUR:BB:W3GP:TRIG:SOUR INT
SOUR:BB:W3GP:SEQ RETR
SOUR:BB:W3GP:TRIG:EXEC
```

Clock - 3GPP FDD

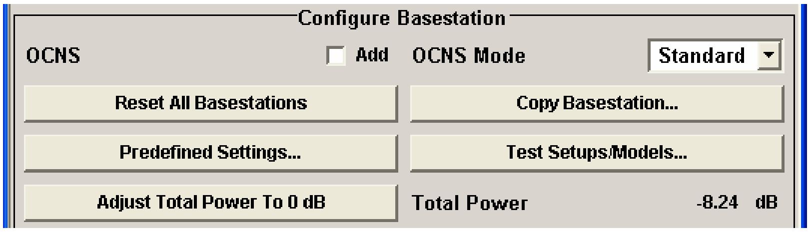
(R&S SMx and R&S AMU instruments only)

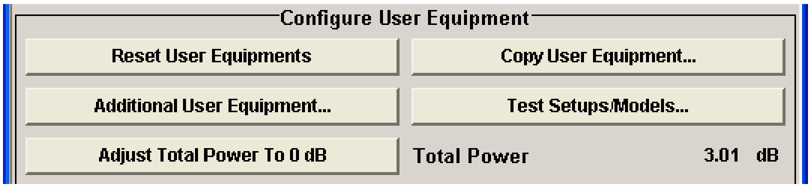
Calls the menu for selecting the clock source and for setting a delay (see Section "*Trigger/Marker/Clock - 3GPP FDD*", Page 1.36).

Remote-control command: n.a.

Configure Base Station or UE - 3GPP FDD

Depending on the transmission direction selection, the central section of the menu provides either the **Configure Base Station** section (selection **Downlink/Forward Link)** or the **Configure User Equipment** section (selection **Uplink/Reverse Link**).





OCNS Add - 3GPP FDD

Activates OCNS channels, as defined in the standard, in base station 1.

With Orthogonal Channel Noise, a practical downlink signal is generated to test the maximum input levels of user equipment in accordance with standard specifications. This simulates the useful and control signals of the other orthogonal channels in the downlink. 3GPP TS 25.101 contains a precise definition of the required appearance of the OCNS signal (see *OCNS Mode - 3GPP FDD*).

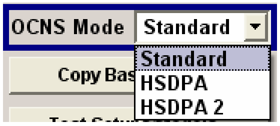
Three different OCNS scenarios are defined in the standard; one standard scenario and two scenario for testing HSDPA channels. You can choose the scenario you want with **OCNS Mode.**

Remote-control command:
```
SOUR:BB:W3GP:BST:OCNS:STAT ON
```

OCNS Mode - 3GPP FDD

Chooses the scenario for activating OCNS channels.

Three different OCNS scenarios are defined in the standard; one **standard** scenario and two scenarios for testing **HSDPA** channels.



The scenarios have different channel counts and different presetting. The presetting is listed in the three tables below. It applies to all three modes that the OCNS channels are all normal DPCHs. The symbol rate is set at 30 kps and the pilot length to 8 bits.

When activating OCNS and depending on the selected OCNS mode, different channel groups are assigned as in the following tables. These channels cannot be edited in the channel table.

The powers of the OCNS channel outputs are relative. In the R&S Signal Generator, the power of the OCNS component is automatically set so that OCNS channels supplement the remaining channels in base station 1 to make a total power of 0 dB (linear 1).

It is not possible to adapt the OCNS power; as the linear power of the remaining channels is >1, this will produce an error message. The OCNS channels are then given the maximum power (all -80 dB).

The **Total Power** display is updated after automatic calculation of the output; it is not possible to use **Adjust Total Power** to make the setting.

Remote-control command:
`SOUR:BB:W3GP:BST:OCNS:MODE STAN | HSDP`

*Tab. 11 Defined settings for the OCNS signal in base station 1 in **Standard** mode*

Channelization code	**Timing offset (x256Tchip)**	**Level setting (dB)**	**Channel type**	**Symbol rate**	**Pilot length**
2	86	-1	DPCH	30 ksps	8 bit
11	134	-3	DPCH	30 ksps	8 bit
17	52	-3	DPCH	30 ksps	8 bit
23	45	-5	DPCH	30 ksps	8 bit
31	143	-2	DPCH	30 ksps	8 bit
38	112	-4	DPCH	30 ksps	8 bit
47	59	-8	DPCH	30 ksps	8 bit
55	23	-7	DPCH	30 ksps	8 bit
62	1	-4	DPCH	30 ksps	8 bit
69	88	-6	DPCH	30 ksps	8 bit
78	30	-5	DPCH	30 ksps	8 bit
85	18	-9	DPCH	30 ksps	8 bit
94	30	-10	DPCH	30 ksps	8 bit
125	61	-8	DPCH	30 ksps	8 bit
113	128	-6	DPCH	30 ksps	8 bit
119	143	0	DPCH	30 ksps	8 bit

*Tab. 12 Defined settings for the OCNS signal in base station 1 in **HSDPA** mode*

Channelization code at SF=128	Relative Level setting (dB)	Channel type	Symbol rate	Pilot length
122	0	DPCH	30 ksps	8 bit
123	-2	DPCH	30 ksps	8 bit
124	-2	DPCH	30 ksps	8 bit
125	-4	DPCH	30 ksps	8 bit
126	-1	DPCH	30 ksps	8 bit
127	-3	DPCH	30 ksps	8 bit

*Tab. 13 Defined settings for the OCNS signal in base station 1 in **HSDP2** mode*

Channelization code at SF=128	Relative Level setting (dB)	Channel type	Symbol rate	Pilot length
4	0	DPCH	30 ksps	8 bit
5	-2	DPCH	30 ksps	8 bit
6	-4	DPCH	30 ksps	8 bit
7	-1	DPCH	30 ksps	8 bit

Reset all Base Stations - 3GPP FDD

Resets all base stations to the predefined settings. The following table gives an overview of the settings. The preset value for each parameter is specified in the description of the remote-control commands.

Remote-control commands:
`SOUR:BB:W3GP:BST:PRES`

Parameter	Value
Base Station Configuration	
State	Off
State (all channels)	Off
Scrambling Code	0
Slot Format DPCH	8
Symbol Rate DPCH	30 ksps
Channelization Code (all channels)	0
Data Source (all channels)	PN9
Timing Offset (all channels)	0
Multi Code State (all channels)	Off

Reset User Equipment - 3GPP FDD

Resets all user equipment to the predefined settings. The following table gives an overview of the settings. The preset value for each parameter is specified in the description of the remote-control commands.

Remote-control commands:
`SOUR:BB:W3GP:MST:PRES`

Parameter	Value
User Equipment Configuration	
State	Off
Mode	DPCCH + DPDCH
Scrambling Code (hex)	0
DPCCH Settings	
Power	0 dB
DPDCH Settings	
All DPDCH Active	On
Channel Power	0 dB
Overall Symbol Rate	60 ksps

Copy Basestation or Copy User Equipment... - 3GPP FDD

Copies the settings of a base or user equipment to a second base or user equipment. A window opens for creating the destination station.

Window for the **Downlink / Forward** transmission direction:

Window for the **Uplink / Reverse** transmission direction:

Copy from Source

Selects the base station or user equipment whose settings are to be copied.

Remote-control command:
`SOUR:BB:W3GP:LINK UP`
`SOUR:BB:W3GP:COPY:SOUR 1`

To Destination

Selects the base station or user equipment whose settings are to be overwritten.

Remote-control command:
`SOUR:BB:W3GP:COPY:DEST 2`

Channelization Code Offset (Base Station only)

Enters the offset to be applied when copying the base station to the channelization codes of the destination base station. The minimum value is 0 (channelization codes are identical), the maximum value is 511.

Remote-control command:
`SOUR:BB:W3GP:COPY:COFF 10`

Accept

Start the copy process.

Remote-control command:
`SOUR:BB:W3GP:COPY:EXEC`

Test Setups/Models - 3GPP FDD

Calls menu for selecting one of the test models defined in the 3GPP standard and the self-defined test setups.

The menu is described in Section "*Test Setups - Models - 3GPP FDD*", Page 1.45.

Remote-control command: n.a.

Predefined Settings Downlink - 3GPP FDD

Calls menu for setting predefined configurations.

The menu is described in Section "*Predefined Settings - Downlink - 3GPP FDD*", Page 1.48.

Remote-control command: n.a.

Additional UE - 3GPP FDD

(Configure User Equipment only)

Calls menu for simulating up to 64 additional user equipments.

The menu is described in Section "*Additional User Equipment - Uplink - 3GPP FDD*", Page 1.50.

Remote-control command: n.a.

Adjust Total Power to 0dB - 3GPP FDD

(only for State = ON)

Sets the power of the enabled channels so that the total power of all the active channels is 0 dB. This will not change the power ratio among the individual channels.

Remote-control command:
`SOUR:BB:W3GP:POW:ADJ`

Total Power - 3GPP FDD

Displays the total power of the active channels.

The total power is calculated from the power ratio of the powered up code channels with modulation on. If the value is not equal to 0 dB, the individual code channels (whilst still retaining the power ratios) are internally adapted so that the **Total Power** for achieving the set output level is 0 dB.

Remote-control command:
`SOUR:BB:W3GP:POW?`
Response: `0dB`

Select Basestation or Configure User Equipment... - 3GPP FDD

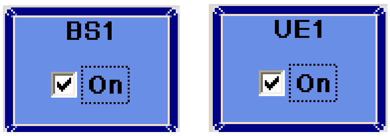
Selects the base station or user equipment by pressing the accompanying button. This opens a menu for editing the selected basestation or user equipment.

The menus are described in Sections "*Base Station Configuration - 3GPP FDD_D2HLink_162968*", Page 1.52 and "*User Equipment Configuration (UE) - 3GPP FDD*, Page 1.123.

Remote-control command n.a.
(the base station or user equipment is selected by the keyword index `BSTation<[1]|2|3|4>` or `MSTation<i>` .)

Base Station or UE On - 3GPP FDD

Activates or deactivates the base or user equipment.

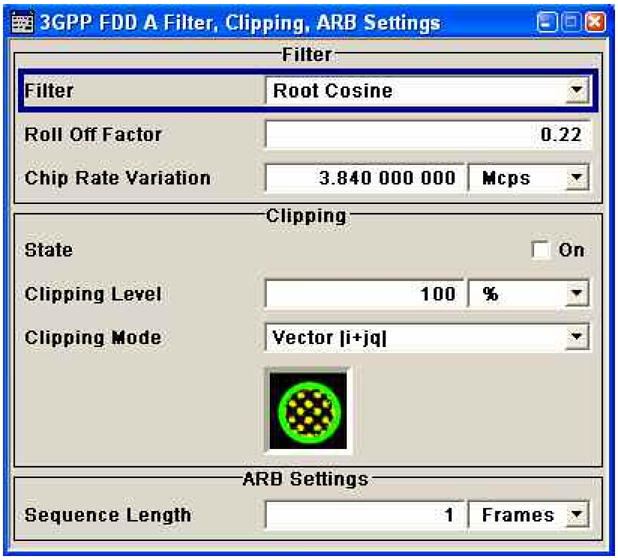


Remote-control command:
`SOUR:BB:W3GP:BST1:STAT ON | OFF`
`SOUR:BB:W3GP:MST2:STAT ON | OFF`

Filtering, Clipping, ARB Settings - 3GPP FDD

The **Filtering, Clipping, ARB Settings** menu is reached via the 3GPP FDD main menu.

The filter parameters (**Filter** section), clipping (**Clipping** section) and the sequence length of the arbitrary waveform component (**ARB Settings** section) are defined in this menu.



In the **Filter** section, the settings are made for the baseband filter.

Filter - 3GPP FDD

Selects baseband filter.

This opens a selection window containing all the filters available to the instrument.

The filter types are described in Section "*Baseband Filter - Custom Digital Mod*".

Remote-control command:
`SOUR:BB:W3GP:FILT:TYPE RCOS`

Roll Off Factor or BxT - 3GPP FDD

Enters the filter parameters.

The filter parameter offered (Roll Off factor or BxT) depends on the currently selected filter type. This parameter is always set to the default for each of the predefined filters.

Remote-control commands:
```
SOUR:BB:W3GP:FILT:PAR:APCO25 0.2
SOUR:BB:W3GP:FILT:PAR:COS 0.35
SOUR:BB:W3GP:FILT:PAR:GAUS 0.5
SOUR:BB:W3GP:FILT:PAR:RCOS 0.35
SOUR:BB:W3GP:FILT:PAR:SPH 2
```

Cut Off Frequency Factor - 3GPP FDD

(This feature is available for filter parameter Lowpass only.)

Sets the value for the cut off frequency factor. The cut off frequency of the lowpass filter can be adjusted to reach spectrum mask requirements.

Remote-control command:
`SOUR:BB:W3GP:FILT:PAR:LPAS 0.5`

Chip Rate Variation - 3GPP FDD

Enters the chip rate. The default settings for the chip rate is 3.84 Mcps.

The chip rate entry changes the output clock and the modulation bandwidth, as well as the synchronization signals that are output. It does not affect the calculated chip sequence.

Remote-control command:
`SOUR:BB:W3GP:CRAT:VAR 4096001`

Impulse Length - 3GPP FDD

(For WinIQSIM2 only)

Displays the number of filter tabs. If the check box is activated, the most sensible parameter values are selected. The value depends on the coherence check. If the check box is deactivated, the values can be changed manually.

Remote-control command:
```
SOUR:BB:W3GP:FILT:ILEN:AUTO ON
SOUR:BB:W3GP:FILT:ILEN 120
```

Oversampling - 3GPP FDD **(For WinIQSIM2 only)**

Determines the upsampling factor. If the check box is activated, the most sensible parameter values are selected. The value depends on the coherence check. If the check box is deactivated, the values can be changed manually.

Remote-control command:
`SOUR:BB:W3GP:FILT:OSAM:AUTO ON`
`SOUR:BB:W3GP:FILT:OSAM 20`

The settings for clipping are collected in the **Clipping** section.

Clipping State - 3GPP FDD Switches baseband clipping on and off.

Baseband clipping is a very simple and effective way of reducing the crest factor of the WCDMA signal.

WCDMA signals may have very high crest factors particularly with many channels and unfavorable timing offsets. High crest factors entail two basic problems:

The nonlinearity of the power amplifier (compression) causes intermodulation which expands the spectrum (spectral regrowth).

Since the level in the D/A converter is relative to the maximum value, the average value is converted with a relatively low resolution. This results in a high quantization noise.

Both effects increase the adjacent-channel power.

With baseband clipping, all the levels are limited to a settable value (**Clipping Level**). This level is specified as a percentage of the highest peak value. Since clipping is done prior to filtering, the procedure does not influence the spectrum. The EVM however increases.

Since clipping the signal not only changes the peak value but also the average value, the effect on the crest factor is unpredictable. The following table shows the effect of the **Clipping** on the crest factor for typical scenarios.

Remote-control command:
`SOUR:BB:W3GP:CLIP:STAT ON`

Tab. 14 Changing the crest factor by clipping (vector mode |i+q|) for signal configurations with different output crest factors. 100% clipping levels mean that clipping does not take place.

Clipping level	Downlink: 10 DPCHs "Minimum Crest" 30 ksps	Downlink: 10 DPCHs "Worst Crest" 30 ksps	Downlink: 10 DPCHs "Average Crest" 30 ksps	Downlink: 128 DPCHs "Average Crest" 30 ksps
100%	9.89 dB	14.7 dB	10.9 dB	21.7 dB
80%	8.86 dB	12.9 dB	9.39 dB	20.2 dB
50%	7.50 dB	10.1 dB	8.29 dB	16.9 dB
20%	5.50 dB	6.47 dB	6.23 dB	12.5 dB
10%	5.34 dB	6.06 dB	5.80 dB	9.57 dB
5%	5.34 dB	6.06 dB	5.80 dB	8.17 dB

The following pictures demonstrate the affect of clipping with vector mode (|i+q|), using a signal configuration with 4 DPCH as an example.

The arrows and the circle in the upper illustration show how the levels are mapped during subsequent clipping in vector mode (|i+q|).

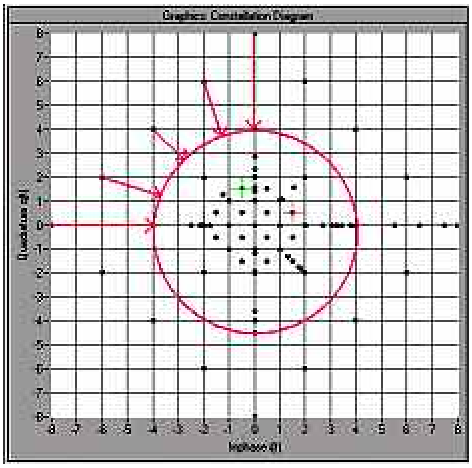


Fig. 9 Constellation diagram of the signal without clipping, shows the level mapping for vector mode

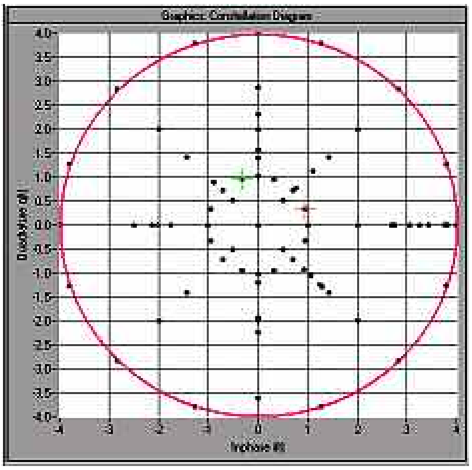


Fig. 10 Constellation diagram with clipping level 50 %, vector mode (|i+q|)

Clipping Level- 3GPP FDD

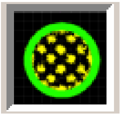
Sets the limit for clipping.

This value indicates at what point the signal is clipped. It is specified as a percentage, relative to the highest level. 100% indicates that clipping does not take place.

Remote-control command:
`SOUR:BB:W3GP:CLIP:LEV 50`

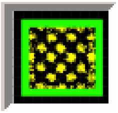
Clipping Mode - 3GPP FDD Selects the clipping method. A graphic illustration of the way in which these two methods work is given in the menu.

Vector | i + q | The limit is related to the amplitude | i + q |. The I and Q components are mapped together, the angle is retained (see also *Clipping State*).



Remote-control command:
`SOUR:BB:W3GP:CLIP:MODE VECT`

Scalar | i | + | q | The limit is related to the absolute maximum of all the I and Q values | i | + | q | .



The I and Q components are mapped separately, the angle changes.

In the picture below, the square and the arrows show how the levels are mapped for clipping level 50% in scalar mode (|i| + |q|).

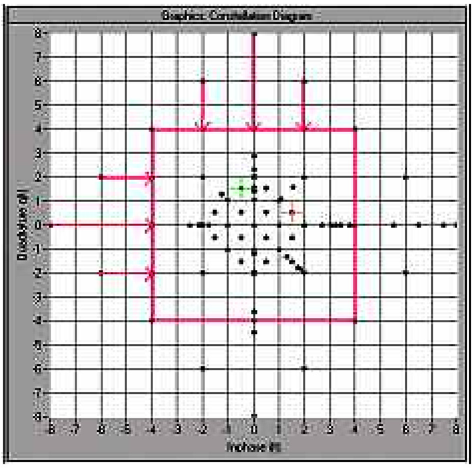


Fig. 11 Constellation diagram of the signal with 4 DPCH without clipping, shows the level mapping in scalar mode

Remote-control command:
`SOUR:BB:W3GP:CLIP:MODE SCAL`

The **ARB Settings** section is where the sequence length of the arbitrary waveform component is defined.

Sequence Length ARB - 3GPP FDD

Changes the sequence length of the arbitrary waveform component of the 3GPP signal in the number of frames. This component is calculated in advance and output in the arbitrary waveform generator. It is added to the realtime signal components (enhanced channels).

The maximum number of frames is calculated as follows:

Max. No. of Frames = Arbitrary waveform memory size/(3.84 Mcps x 10 ms).

In pure amplifier tests with several channels and no enhanced channels, it is possible to improve the statistical properties of the signal by increasing the sequence length.

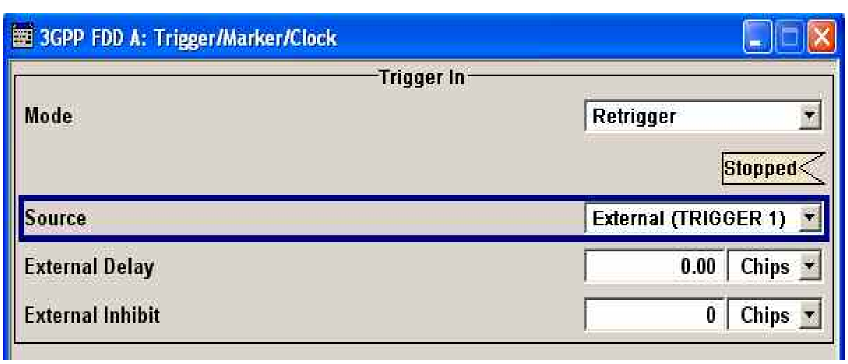
Remote-control command:
`SOUR:BB:W3GP:SLEN 20`

Trigger/Marker/Clock - 3GPP FDD

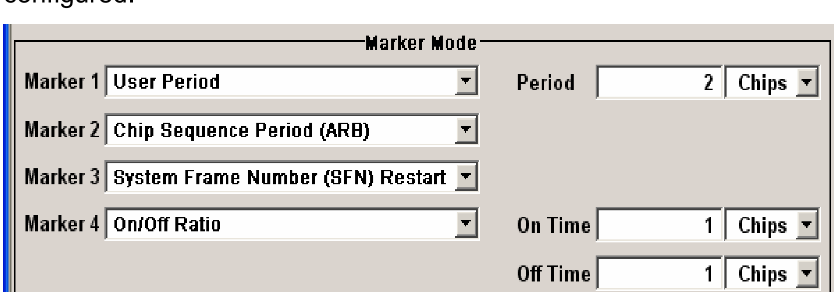
Note:
The trigger, clock, and marker delay functions are available for R&S SMx and R&S AMU instruments only.

The **Trigger/Marker/Clock** menu can be reached via the 3GPP FFD main menu.

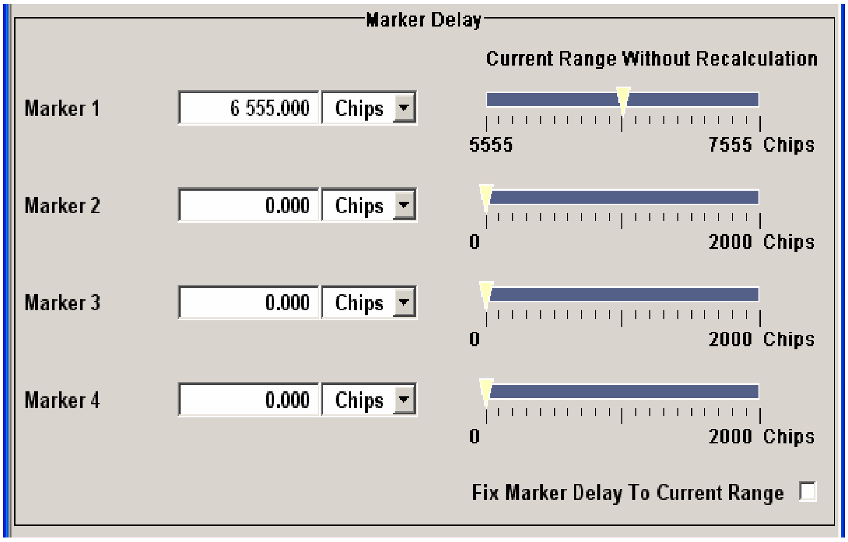
The **Trigger In** section is where the trigger for the 3GPP FDD signal is set. Various parameters will be provided for the settings, depending on which trigger source - internal or external - is selected. The current status of signal generation (**Running** or **Stopped**) is indicated for all trigger modes.



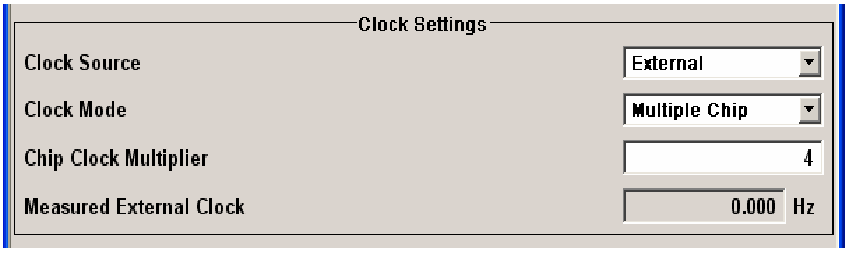
The **Marker Mode** section is where the marker signals at the MARKER output connectors are configured.



The **Marker Delay** section is where a marker signal delay can be defined, either without restriction or restricted to the dynamic section, i.e., the section in which it is possible to make settings without restarting signal and marker generation.



The **Clock Settings** section is where the clock source is selected and - in the case of an external source - the clock type.



The **Global Trigger/Clock Settings…** button calls a submenu for general trigger and clock settings and a submenu for defining the AUX I/Q interface.

The **User Marker/AUX I/O Settings…** button calls a submenu for mapping configuration.

The **Trigger In** section is where the trigger for the 3GPP FDD signal is set. The current status of the signal generation is displayed for all trigger modes.

Trigger Mode - 3GPP FDD **(R&S SMx and R&S AMU instruments only)**

Selects trigger mode.

The trigger mode determines the effect of a trigger on the signal generation.

Auto The 3GPP FDD signal is generated continuously.

Remote-control command:
`SOUR:BB:W3GP:SEQ AUTO`

Retrigger

The 3GPP FDD signal is generated continuously. A trigger event (internal or external) causes a restart.

Remote-control command:
`SOUR:BB:W3GP:SEQ RETR`

Armed Auto

The 3GPP FDD signal is generated only when a trigger event occurs. Then the signal is generated continuously.

Button **Arm** stops signal generation. A subsequent trigger event (internal with **Execute Trigger** or external) causes a restart.

Remote-control command:
`SOUR:BB:W3GP:SEQ AAUT`

Armed Retrigger

The 3GPP FDD signal is generated only when a trigger event occurs. Then the signal is generated continuously. Every subsequent trigger event causes a restart.

Button **Arm** stops signal generation. A subsequent trigger event (internal with **Execute Trigger** or external) causes a restart.

Remote-control command:
`SOUR:BB:W3GP:SEQ ARET`

Single

The 3GPP FDD signal is generated only when a trigger event occurs. Then the signal is generated once to the length specified at **Signal Duration**. Every subsequent trigger event (internal with **Execute Trigger** or external) causes a restart.

Note:
The signal length is the ARB sequence length or four frames for real time generation.

Remote-control command:
`SOUR:BB:W3GP:SEQ SING`

Signal Duration Unit - 3GPP FDD

(R&S SMx and R&S AMU instruments only)

Defines the unit for the entry of the length of the signal sequence to be output in the **Single** trigger mode. Available units are chip sequence length (CLS), chips, slots, or frames.

Remote-control commands:
`SOUR:BB:W3GP:TRIG:SLUN CHIP`

Signal Duration - 3GPP FDD

(R&S SMx and R&S AMU instruments only)

Defines the length of the signal sequence to be output in the **Single** trigger mode. The input is to be expressed in chips, slots, or numbers of frames. It is then possible to output deliberately just part of the signal, an exact sequence of the signal, or a defined number of repetitions of the signal.

Note:
The signal length is the ARB sequence length or four frames for real time generation.

Remote-control commands:
`SOUR:BB:W3GP:TRIG:SLEN 2000`

Running/Stopped - 3GPP FDD

(R&S SMx and R&S AMU instruments only)

Displays the status of signal generation for all trigger modes. This display appears only when 3GPP FDD standard is enabled (**State On**)

Remote-control commands:
```
SOUR:BB:W3GP:TRIG:RMOD?
Response:     RUN or STOP
```

Running The 3GPP FDD modulation signal is generated; a trigger was (internally or externally) initiated in triggered mode.

If **Armed Auto** or **Armed Retrigger** has been selected, generation of signals can be stopped with the **Arm** button. A new trigger (internally with Execute Trigger or externally) causes a restart.

Stopped The signal is not generated, and the instrument waits for a trigger event (internal or external).

Arm - 3GPP FDD

(R&S SMx and R&S AMU instruments only)

Stops signal generation. This button appears only with **Running** signal generation in the **Armed Auto** and **Armed Retrigger** trigger modes.

Signal generation can be restarted by a new trigger (internally with **Execute Trigger** or externally).

Remote-control command:
`SOUR:BB:W3GP:TRIG:ARM:EXEC`

Execute Trigger - 3GPP FDD

(R&S SMx and R&S AMU instruments only)

Executes trigger manually. A manual trigger can be executed only when an internal trigger source and a trigger mode other than Auto have been selected.

Remote-control commands:
```
SOUR:BB:W3GP:TRIG:SOUR INT
SOUR:BB:W3GP:SEQ RETR
SOUR:BB:W3GP:TRIG:EXEC
```

Trigger Source - 3GPP FDD

(R&S SMx and R&S AMU instruments only)

Selects trigger source. This setting is effective only when a trigger mode other than Auto has been selected.

Internal

The trigger event is executed by **Execute Trigger**.

Remote-control command:
`SOUR:BB:W3GP:TRIG:SOUR INT`

Internal (Baseband B)

The trigger event is executed by the trigger signal from the second path (two-path instruments only).

Remote-control command:
`SOUR:BB:W3GP:TRIG:SOUR OBAS`

External (TRIGGER 1 / 2)

The trigger event is executed with the aid of the active edge of an external trigger signal. The trigger signal is supplied via the TRIGGER 1 or TRIGGER 2 connector.

The polarity, the trigger threshold and the input impedance of the TRIGGER input can be set in the **Global Trigger/Clock Settings** menu.

Remote-control command:
`SOUR:BB:W3GP:TRIG:SOUR EXT | BEXT`

External/Trigger Delay - 3GPP FDD

(R&S SMx and R&S AMU instruments only)

Sets the trigger signal delay in chips on external triggering (or on internal triggering via the second path for two-path instruments).

This enables the R&S Signal Generator to be synchronized with the device under test or other external devices (only trigger source **External** or, in case of two-path instruments, trigger source **Internal Other baseband**).

Note
For two-path instruments, the delay can be set separately for each of the two paths.

Remote-control command:
`SOUR:BB:W3GP:TRIG:EXT:DEL 3`
`SOUR:BB:W3GP:TRIG:OBAS:DEL 3`

External/Trigger Inhibit - 3GPP FDD

(R&S SMx and R&S AMU instruments only)

Sets the duration for inhibiting a new trigger event subsequent to triggering. The input is to be expressed in chips (only trigger source **External** or, in case of two-path instruments, trigger source **Internal Other baseband**).

In the **Retrigger** mode, every trigger signal causes signal generation to restart. This restart is inhibited for the specified number of chips.

This parameter is available only on external triggering (or on internal triggering via the second path for two-path instruments).

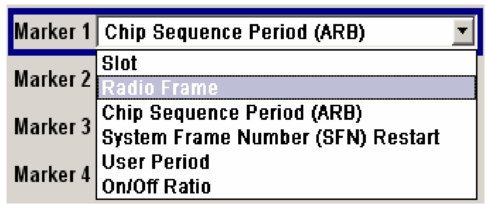
Note:
For two-path instruments, the trigger inhibit can be set separately for each of the two paths.

Remote-control command:
`SOUR:BB:W3GP:TRIG:EXT:INH 1000`
`SOUR:BB:W3GP:TRIG:OBAS:INH 1000`

The marker output signal for synchronizing external instruments is configured in the **Marker Settings** section **Marker Mode**.

Marker Mode - 3GPP FDD

Selects a marker signal for the associated MARKER output.



Slot

A marker signal is generated at the start of each slot (every 2560 chips or 0.667 ms).

Note:
*Marker 4 must be set to **Slot** mode if Dynamic Power Control with external control signal is active.*

Remote-control command:
`SOUR:BB:W3GP:TRIG:OUTP1:MODE SLOT`

Radio Frame

A marker signal is generated at the start of each frame (every 38400 chips or 10 ms).

Remote-control command:
`SOUR:BB:W3GP:TRIG:OUTP1:MODE RFR`

Chip Sequence Period (ARB)

A marker signal is generated at the start of every arbitrary waveform sequence (depending on the setting for the arbitrary waveform sequence length). If the signal does not contain an arbitrary waveform component, a radio frame trigger is generated.

Remote-control command:
`SOUR:BB:W3GP:TRIG:OUTP1:MODE CSP`

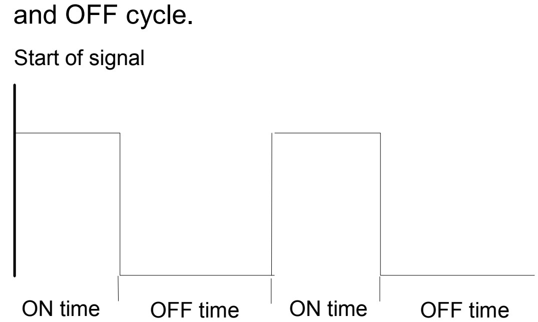
System Frame Number (SFN) Restart

A marker signal is generated at the start of every SFN period (every 4096 frames).

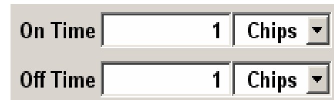
Remote-control command:
`SOUR:BB:W3GP:TRIG:OUTP1:MODE SFNR`

ON/OFF Ratio

A regular marker signal that is defined by an ON/OFF ratio is generated. A period lasts one ON and OFF cycle.



The ON time and OFF time are each expressed as a number of chips and are set in an input field which opens when **ON/OFF ratio** is selected.



Remote-control commands:
`SOUR:BB:W3GP:TRIG:OUTP1:MODE RAT`
`SOUR:BB:W3GP:TRIG:OUTP1:OFFT 20`
`SOUR:BB:W3GP:TRIG:OUTP1:ONT 20`

User Period

A marker signal is generated at the beginning of every user-defined period. The period is defined in **Period**.

This can be used, for instance, to generate a pulse at the start of each transport block (e.g. TTI 20 ms or 40 ms).

Remote-control command:
`SOUR:BB:W3GP:TRIG:OUTP1:MODE USER`
`SOUR:BB:W3GP:TRIG:OUTP1:PER 614400`

The **Marker Delay** section can be used to set a delay for the markers.

Note:
The marker delay functions are available for R&S SMx and R&S AMU instruments only.

Marker x Delay - 3GPP FDD

(R&S SMx and R&S AMU instruments only)

Enters the delay between the marker signal at the marker outputs and the start of the signal.

The input is expressed as a number of chips.

If the setting "**Fix marker delay to dynamic range**" is enabled, the setting range is restricted to the dynamic range. In this range the delay of the marker signals can be set without restarting the marker and signal.

The allocation of marker signals to the outputs is described in the section "*Marker Output Signals*".

Remote-control command:
`SOUR:BB:W3GP:TRIG:OUTP2:DEL 20`

Current Range without Calculation - 3GPP FDD

(R&S SMx and R&S AMU instruments only)

Displays the dynamic range within which the delay of the marker signals can be set without restarting the marker and signal.

The delay can be defined by moving the setting mark.

Remote-control command:
`SOUR:BB:W3GP:TRIG:OUTP2:DEL:MAX?`
`SOUR:BB:W3GP:TRIG:OUTP2:DEL:MIN?`

Fix marker delay to current range - 3GPP FDD

(R&S SMx and R&S AMU instruments only)

Restricts the marker delay setting range to the dynamic range. In this range the delay can be set without restarting the marker and signal.

Remote-control command:
`SOUR:BB:W3GP:TRIG:OUTP:DEL:FIX ON`

The clock source is selected in the **Clock Settings** section.

Note:
The clock functions are available for R&S SMx and R&S AMU instruments only.

Clock Source - 3GPP FDD

(R&S SMx and R&S AMU instruments only)

Selects the clock source (also see section "*Clock Signals*").

Internal

The internal clock reference is used to generate the chip clock.

Remote-control command:
`SOUR:BB:W3GP:CLOC:SOUR INT`

External

The external clock reference is fed in as the chip clock or multiple thereof via the CLOCK connector.

The chip rate must be correctly set to an accuracy of ± 2 % (see data sheet).

The polarity of the clock input can be changed with the aid of **Global Trigger/Clock Settings**.

In the case of two-path instruments, this selection applies to path A

Remote-control command:
`SOUR:BB:W3GP:CLOC:SOUR EXT`

Clock Mode - 3GPP FDD

(R&S SMx and R&S AMU instruments only)

Enters the type of externally supplied clock.

Chip

A chip clock is supplied via the CLOCK connector.

Remote-control command:
`SOUR:BB:W3GP:CLOC:MODE CHIP`

Multiple Chip

A multiple of the chip clock is supplied via the CLOCK connector; the chip clock is derived internally from this.

The **Multiplier** window provided allows the multiplication factor to be entered.

Remote-control command:
`SOUR:W3GP:CLOC:MODE MCH`

Chip Clock Multiplier - 3GPP FDD

(R&S SMx and R&S AMU instruments only)

Enters the multiplication factor for clock type **Multiple**.

Remote-control command:
`SOUR:BB:W3GP:CLOC:MULT 4`

Measured External Clock - 3GPP FDD

(R&S SMx and R&S AMU instruments only)

Displays the measured frequency of the external clock signal. This enables the user to permanently monitor the frequency of the externally introduced clock.

This information is displayed only if the external clock source has been selected.

Remote-control command:
`:CLOC:INP:FREQ?`

Global Trigger/Clock Settings - 3GPP FDD

(R&S SMx and R&S AMU instruments only)

Calls the **Global Trigger/Clock/Input Settings** menu. This menu is used among other things for setting the trigger threshold, the input impedance and the polarity of the clock and trigger inputs.

In the case of two-path instruments, these settings are valid for both paths.

The parameters in this menu affect all digital modulations and standards, and are described in the section "*Global Trigger/Clock/Input Settings – Setup -Environment*".

User Marker/AUX I/O Settings – 3GPP FDD

(R&S SMx and R&S AMU instruments only)

Calls the **UserMarker/AUX I/O** menu. This menu is used for mapping configuration.

The parameters in this menu affect all digital modulations and standards, and are described in the section "*Global Trigger/Clock/Input Settings – Setup -Environment* ".

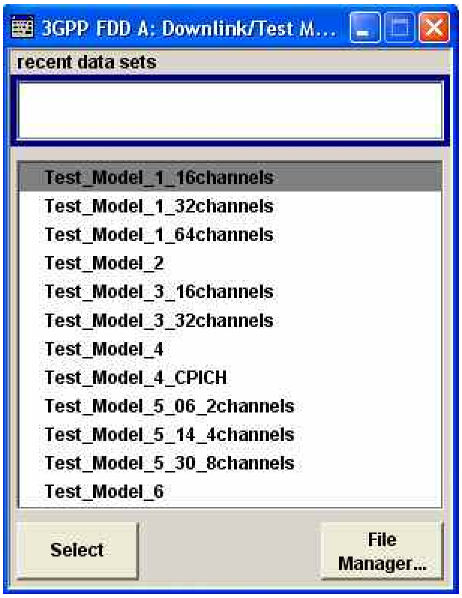
Test Setups - Models - 3GPP FDD

The **Test Setups / Models menu** can be reached via the **3GPP FFD** main menu.

The menu offers various test models, depending on which transmission direction is set. The presetting is defined in the 3GPP standard TS 25.141.

Test Models Downlink-3GPP FDD

Opens a window in which to select a test model in accordance with the 3GPP standard TS 25.141.



Selecting a test model for an active base station immediately generates the selected signal configuration.

Remote-control command:
`SOUR:BB:W3GP:SETT:TMOD:BST:CAT?`

The following test models are available for selection:

Test model	Settings
Test Model 1 (16 channels):	Spectrum emission mask ACLR Spurious emissions Transmit intermodulation Modulation accuracy Peak code domain error Remote-control command: `SOUR:BB:W3GP:SETT:TMOD:BST "Test_Model_1_16channels"`
Test Model 1 (32 channels)	Spectrum emission mask ACLR Spurious emissions Transmit intermodulation Modulation accuracy Remote-control command: `SOUR:BB:W3GP:SETT:TMOD:BST`

Test model	Settings
	"Test_Model_1_32channels"
Test Model 1 (64 channels)	Spectrum emission mask ACLR Spurious emissions Transmit intermodulation Modulation accuracy Remote-control command: `SOUR:BB:W3GP:SETT:TMOD:BST "Test_Model_1_64channels"`
Test Model 2	Output power dynamics Remote-control command: `SOUR:BB:W3GP:SETT:TMOD:BST "Test_Model_2"`
Test Model 3 (16 channels) **Test Model 3 (32 channels)**	Peak code domain error Remote-control command: `SOUR:BB:W3GP:SETT:TMOD:BST "Model_3_16channels"`
Test Model 4	Error Vector Magnitude, optional P-CPICH is not active Remote-control command: `SOUR:BB:W3GP:SETT:TMOD:BST "Test_Model_4"`
Test Model 4 _CPICH	Error Vector Magnitude, optional P-CPICH is active. Remote-control command: `SOUR:BB:W3GP:SETT:TMOD:BST "Test_Model_4_CPICH"`
Test Model 5 (8 HS-PDSCH + 30 DPCH) **Test Model 5 (4 HS-PDSCH + 14 DPCH)** **Test Model 5 (2 HS-PDSCH + 6 DPCH)**	Error Vector Magnitude at base stations that support high speed physical downlink shared channels with 16 QAMRemote-control command: `SOUR:BB:W3GP:SETT:TMOD:BST "Test_Model_5_30_8channels"`
Test Model 6	Relative Code Domain Error only applicable for 64QAM modulated codes. Remote-control command: `SOUR:BB:W3GP:SETT:TMOD:BST "Test_Model_6"`

Test Models Uplink- 3GPP FDD

Opens a window in which to select pre-defined test signals.

Remote-control command:
`SOUR:BB:W3GP:SETT:TMOD:MST:CAT?`

3GPP has not defined any test models for the Uplink transmission direction. But the R&S Signal Generator also makes pre-defined test signals available for the Uplink, so that useful test signals can be generated at the press of a button.

All the Uplink test models are generated in the enhanced state of user equipment 1. The sequence length is 1 frame.

The following configurations are available for selection:

DPCCH + DPDCH 60 ksps

User equipment 1 is activated in DPCCH + DPDCH mode. 60 ksps is selected as the overall symbol rate. All the other settings correspond to the preset setting.

Remote-control command:
`SOUR:BB:W3GP:SETT:TMOD:MST "DPCCH_DPDCH_60ksps"`

DPCCH + DPDCH 960 ksps

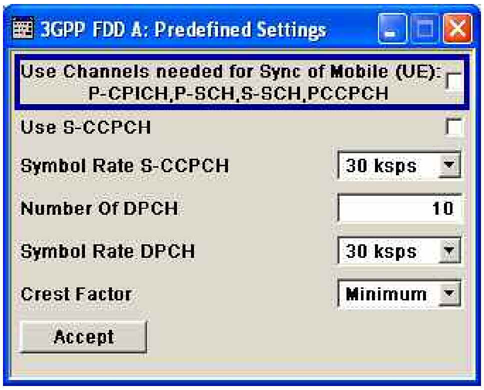
User equipment 1 is activated in DPCCH + DPDCH mode. 960 ksps is selected as the overall symbol rate. All the other settings correspond to the preset setting.

Remote-control command:
`SOUR:BB:W3GP:SETT:TMOD:MST "DPCCH_DPDCH960ksps"`

Predefined Settings - Downlink - 3GPP FDD

The **Predefined Settings** can be reached via the **3GPP FFD** main menu. It is only available when the Downlink transmission direction is selected. The channel table of base station 1 is filled (preset) with the set parameters. The sequence length of the generated signal is 1 frame.

With the **Parameter Predefined** function, it is possible to create highly complex scenarios with just a few keystrokes. This function is of use if, say, just the envelope of the signal is of interest.



Use Channels - 3GPP FDD

(This feature is available in the downlink only.)

Selects if P-CPICH, P-SCH, S-SCH and PCCPCH are used in the scenario or not. These "special channels" are required by user equipment for synchronization.

Remote-control command:
`SOUR:BB:W3GP:PPAR:SCH ON`

Use S-CCPCH - 3GPP FDD

(This feature is available in the downlink only.)

Selects if S-CCPCH is used in the scenario or not.

Remote-control command:
`SOUR:BB:W3GP:PPAR:SCCP:STAT ON`

Symbol Rate S-CCPCH - 3GPP FDD

(This feature is available in the downlink only.)

Sets the symbol rate of S-CCPCH.

Remote-control command:
`SOUR:BB:W3GP:PPAR:SCCP:SRAT D30K`

Number of DPCH - 3GPP FDD

(This feature is available in the downlink only.)

Sets the number of activated DPCHs.

The maximum number is the ratio of the chip rate and the symbol rate (maximum 512 at the lowest symbol rate of 7.5 ksps).

Remote-control command:
`SOUR:BB:W3GP:PPAR:DPCH:COUN 512`

Symbol Rate DPCH - 3GPP FDD

(This feature is available in the downlink only.)

Sets the symbol rate of all DPCHs.

Remote-control command:
`SOUR:BB:W3GP:PPAR:DPCH:SRAT D30K`

Crest Factor - 3GPP FDD

(This feature is available in the downlink only.)

Selects desired range for the crest factor of the test scenario. The crest factor of the signal is kept in the desired range by automatically setting appropriate channelization codes and timing offsets.

Minimum The crest factor is minimized. The channelization codes are distributed uniformly over the code domain. The timing offsets are increased by 3 per channel.

Remote-control command:
`SOUR:BB:W3GP:PPAR:CRES MIN`

Average An average crest factor is set. The channelization codes are distributed uniformly over the code domain. The timing offsets are all set to 0.

Remote-control command:
`SOUR:BB:W3GP:PPAR:CRES AVER`

Worst The crest factor is set to an unfavorable value (i.e. maximum). The channelization codes are assigned in ascending order. The timing offsets are all set to 0.

Remote-control command:
`SOUR:BB:W3GP:PPAR:CRES WORS`

Accept - 3GPP FDD

(This feature is available in the downlink only.)

Presets the channel table of basestation 1 with the parameters defined in the **Predefined Settings** menu. Scrambling Code 0 is automatically selected (as defined in the 3GPP test models).

Remote-control command:
`SOUR:BB:W3GP:PPAR:EXEC`

Additional User Equipment - Uplink - 3GPP FDD

Submenu **Additional User Equipment** can be reached via the **3GPP FFD** main menu. It is only available when the Uplink transmission direction is selected.

The menu makes it possible to simulate up to 128 additional user equipment and thus to generate a signal that corresponds to the received signal for a base station with high capacity utilization.

The fourth user equipment (UE4) serves as a template for all other stations. The following parameters are the only ones modified for the additional user equipment:

- Scrambling code (different for all stations)
- Power (different to UE4, but identical among themselves)

State - 3GPP FDD

(This feature is available in the uplink only)

Activates additional user equipment. At **State Off**, all the additional user equipment are switched off.

Remote-control command:
`SOUR:BB:W3GP:MST:ADD:STAT ON`

Number of Additional UE - 3GPP FDD

(This feature is available in the uplink only)

Sets the number of additional user equipment. As many as 128 additional user equipments can be simulated.

Remote-control command:
`SOUR:BB:W3GP:MST:ADD:COUN 64`

Scrambling Code Step - 3GPP FDD

(This feature is available in the uplink only)

Enters the step width for increasing the scrambling code of the additional user equipment. The start value is the scrambling code of UE4.

Remote-control command:
`SOUR:BB:W3GP:MST:ADD:SCOD:STEP 5`

Power Offset - 3GPP FDD

(This feature is available in the uplink only)

Sets the power offset of the active channels of the additional user equipment to the power outputs of the active channels of UE4.

The resultant power must fall within the range 0 ... - 80 dB. If the value is above or below this range, it is limited automatically.

Remote-control command:
`SOUR:BB:W3GP:MST:ADD:POW:OFFS -3`

Time Delay Step - 3GPP FDD

(This feature is available in the uplink only)

Enters the step width for the time delay of the additional user equipment to one another. The start value returns the time delay of UE4. Entry is made in chips and can be a maximum of 1 frame.

The time delay allows user equipment to be simulated even if the arrival of their signals is not synchronized at the base station.

Remote-control command:
`SOUR:BB:W3GP:MST:ADD:TDEL:STEP 256`

Base Station Configuration - 3GPP FDD

The **Base Station Configuration** menu is called by selecting base station **BS1** ... **BS4** in the **3GPP FFD** menu. Base stations can be configured independently of one another. Base station 1 (BS1) also includes enhanced channels (Enhanced Channels, Realtime).

The menu comprises the **Common Settings** section, in which the general parameters of the base station are set, a row containing the buttons **Multi Channel Assistant** **Code Domain...** and **Channel Graph...**, which call the appropriate submenus and graphics and the most important part, the channel table with graphical display of the structure of the channel being edited.

The general parameters of the base station are set in the **Common Settings** section.

State - BS - 3GPP FDD

Activates or deactivates the selected base station. The number of the selected base station is displayed in the menu header.

Remote-control command:
`SOUR:BB:W3GP:BST1:STAT ON`

2nd Search Code Group - BS - 3GPP FDD

Displays the 2nd search code group.

This parameter is specified in the table defined by the 3GPP standard "Allocation of SSCs for secondary SCH". This table assigns a specific spreading code to the synchronization code symbol for every slot in the frame. The value is calculated from the scrambling code.

Remote-control command:
`SOUR:BB:W3GP:BST3:SSCG?`

Use Scrambling Code - BS - 3GPP FDD

Activates or deactivates the scrambling code. The scrambling code can be deactivated for test purposes.

Remote-control command:
`SOUR:BB:W3GP:BST1:SCOD:STAT ON`

Scrambling Code - BS - 3GPP FDD

Enters the base station identification. This value is also the initial value of the scrambling code generator (see also Section "*Scrambling Code Generator - 3GPP FDD*", Page 1.4).

Remote-control command:
`SOUR:BB:W3GP:BST1:SCOD #H1`

Page Indicators/Frame - BS - 3GPP FDD

Enters the number of page indicators (PI) per frame in the page indicator channel (PICH).

Remote-control command:
`SOUR:BB:W3GP:BST2:PIND:COUN D36`

Use S-CPICH as Phase Reference - BS - 3GPP FDD

Activates or deactivates the use of S-CPICH as reference phase.

If activated the phase of S-CPICH and the phase of all DPCHs is 180 degrees offset from the phase of P-CPICH.

Remote-control command:
`SOUR:BB:W3GP:BST2:SCP:PREF:STAT ON`

Diversity / MIMO - BS - 3GPP FDD

Selects the antenna and the antenna configuration to be simulated.

The R&S Signal Generator supports two antenna configurations: a single-antenna system and a two-antenna system.
Thus, an instrument equipped with two paths can simulate simultaneously the signals of both antennas of one two-antenna system.
Moreover, for this two-antenna system, transmit diversity can be additionally activated or deactivated.

To simulate transmit diversity, a two-antenna system has to be selected and **Open Loop Transmit Diversity** has to be activated.

To configure HS-PDSCH MIMO channels, a two-antenna system has to be selected.

Single Antenna The signal of single-antenna system is calculated and applied.

Remote-control command:
`SOUR:BB:W3GP:BST1:TDIV OFF`

Antenna 1 of 2 Calculates and applies the output signal for antenna 1 of a two-antenna system.

Remote-control command:
`SOUR:BB:W3GP:BST1:TDIV ANT1`

Antenna 2 of 2 Calculates and applies the output signal for antenna 2 of a two-antennas system.

Remote-control command:
`SOUR:BB:W3GP:BST1:TDIV ANT2`

Open Loop Transmit Diversity - BS - 3GPP FDD

(Enabled for two-antenna system only)

Activates/deactivates open loop transmit diversity.
The antenna whose signal is to be simulated is selected with the paramer **Diversity/MIMO**.

Various forms of transmit diversity are described in the 3GPP standard. Different coding is used to divide the signal between the two antennas. As a result, the receiver can decode the traffic signal from the two input signals and is less liable to fading and other interferences.

A fixed diversity scheme is assigned to each channel type:

– TSTD (time switched transmit diversity for SCH) for P-SCH, S-SCH
– STTD (space time block coding transmit antenna diversity) for all other channels, except HS-PDSCH MIMO.
  The HS-PDSCH MIMO channels are precoded as described in section *"MIMO in HSPA+"*.

These two schemes are described in detail in TS 25.211.

Remote-control command:
`SOUR:BB:W3GP:BST1:TDIV ANT2`
`SOUR:BB:W3GP:BST2:OLTD ON`

Time Delay- BS - 3GPP FDD

(This feature is available for BS 2...4 only.)

Enters the time delay of the signal of the selected base station compared to the signal of base station 1.

Remote-control command:
`SOUR:BB:W3GP:BST2:TDEL 256`

Use Compressed Mode- BS - 3GPP FDD

(This feature is available for BS 2...4 only.)

Activates compressed mode.

The Compressed mode is configured in the submenu called by button **Compressed Mode…**.

Remote-control command:
`SOUR:BB:W3GP:BST2:CMOD:STAT ON`

Compressed Mode… - 3GPP FDD	Calls the menu for configuring the compressed mode. The menu is described in Section "*Compressed Mode - BS - 3GPP FDD*", page 1.56. Remote-control command: n.a.
Reset Channel Table - 3GPP FDD	Calls the default settings for the channel table. Remote-control command: `SOUR:BB:W3GP:BST:CHAN:PRES`
Multi Channel Assistant… – 3GPP FDD	Calls the menu for configuring several DPCH channels simultaneously. The menu is described in Section "*Multi Channel Assistant - BS - 3GPP FDD*", Page 1.119. Remote-control command: n.a.
Code Domain… - 3GPP FDD	Calls a graphical display of the assigned code domain. The code domain graph is described in Section "*Code Domain Graph – BS – 3GPP FDD*", Page 1.61. Remote-control command: n.a.
Channel Graph… - Base Station - 3GPP FDD	Opens the channel graph display to visually check the configured signal. The channel graph is described in Section "*Channel Graph – Base Station – 3GPP FDD*", page 1.64. Remote-control command: n.a.

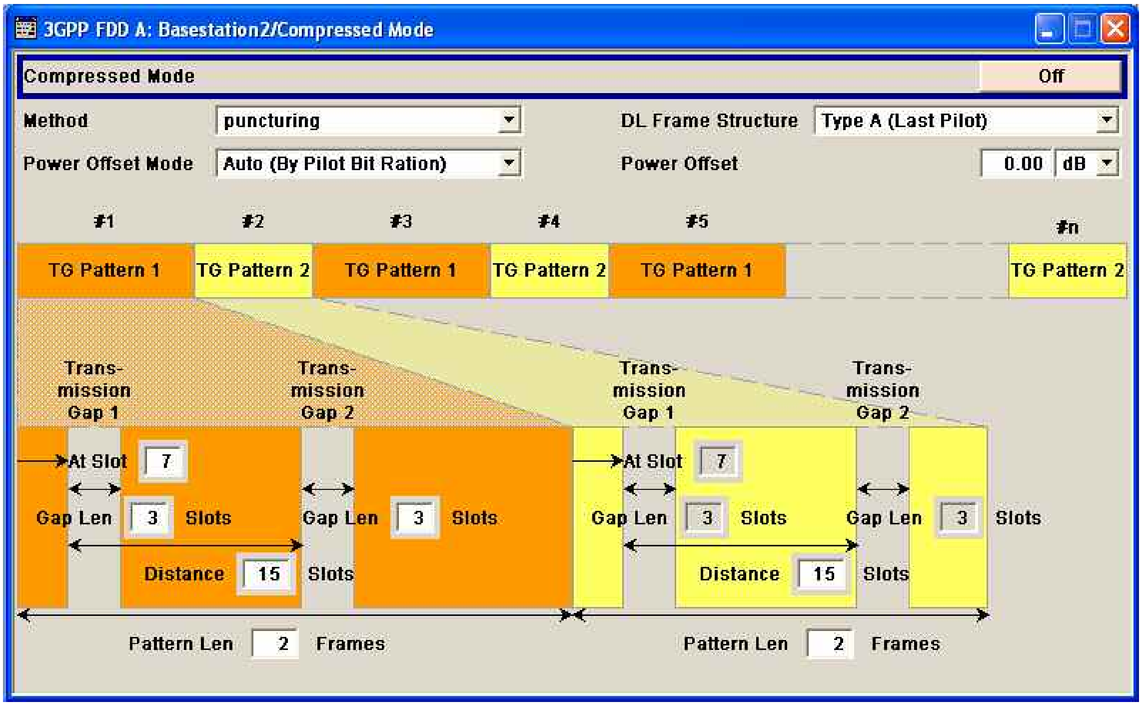
HSDPA H-Set - 3GPP FDD	**(This feature is available for BS 1 only.)**
	Calls the default settings of the channel table for the HSDPA H-Set mode.
	Channels 12 to 17 are preset for HSDPA H-Set 1.
	Remote-control command:
	`SOUR:BB:W3GP:BST1:CHAN:HSDP:HSET:PRES`
	`SOUR:BB:W3GP:BST1:CHAN12:TYPE?`
	`Response: HSSC`
	`SOUR:BB:W3GP:BST1:CHAN12:HSDP:HSET:PRED?`
	`Response: P1QPSK`

Compressed Mode - BS - 3GPP FDD

To enable handover of a mobile station from a 3GPP FDD base station to another base station, (3GPP FDD, 3GPP TDD or GSM) at a different frequency, transmission and reception of the 3GPP FDD signal must be interrupted for a short time. During this time, the mobile station changes to the frequency of the new base station, for example to measure the receive level of this station or read system information.

To transmit a consistently high data volume also in the remaining (shorter) period of time, the data is compressed. This can be done by halving the spreading factor (SF/2 method) or reducing error protection (puncturing method). In both cases, transmit power in the ranges concerned is increased to maintain adequate signal quality.

Apart from these two methods, there is also the method of "higher layer scheduling". With this method, transmission of the data stream is stopped during the transmission gap. This method is suitable for packet-oriented services; it involves no power increase (power offset) in the active ranges.



Compressed Mode State - BS - 3GPP FDD

(This feature is available for BS 2...4 only)

Activates compressed mode.

Remote-control command:
`SOUR:BB:W3GP:BST2:CMOD:STAT ON`

Compressed Mode Method - BS - 3GPP FDD

(This feature is available for BS 2...4 only)

Selects compressed mode method.

Puncturing The data is compressed by reducing error protection.

Remote-control command:
`SOUR:BB:W3GP:BST2:CMOD:METH PUNC`

Higher layer scheduling

The data is compressed by stopping the transmission of the data stream during the transmission gap.

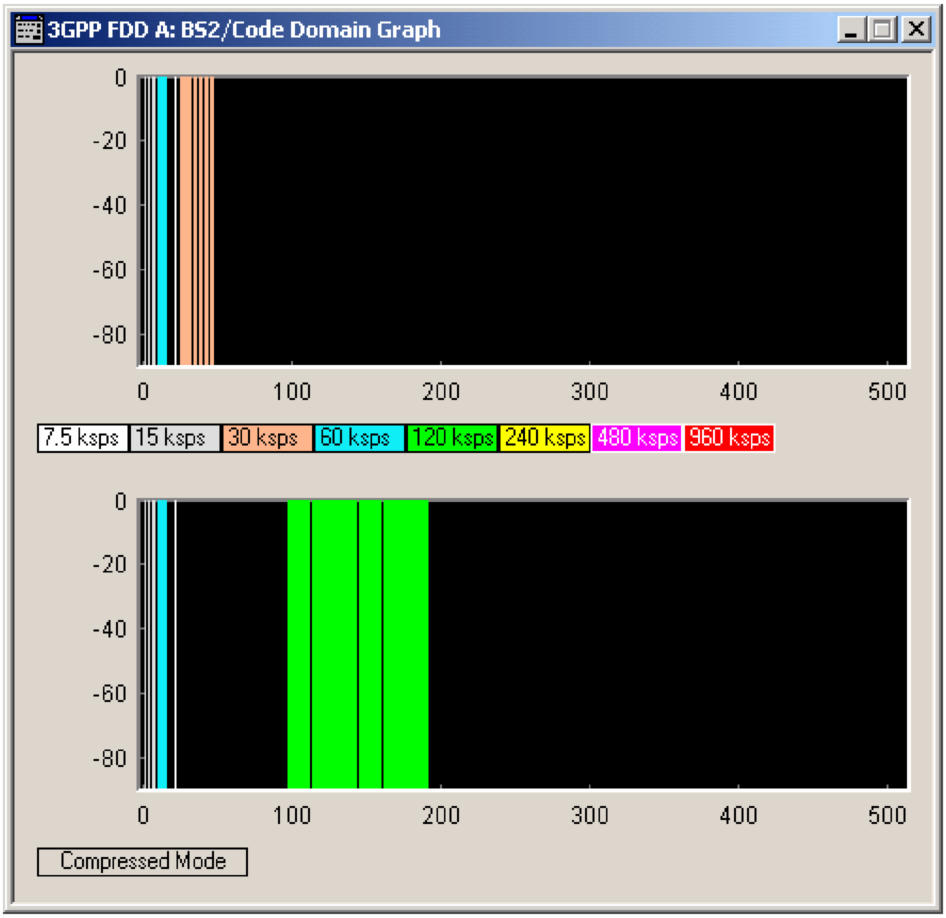
Remote-control command:
`SOUR:BB:W3GP:BST2:CMOD:METH HLSC`

SF/2

The data is compressed by halving the spreading factor.

This method can be demonstrated in the code domain graph. The graph is split into two windows. The upper window shows the code domain assignment with non-compressed slots, the lower window with compressed slots. It can be recognized clearly that the DPCH bars in the lower window are wider, which is due to the reduction of the spreading factor of these channels. The other channels (e.g. CPICH) have the same width in both halves.

Remote-control command:
`SOUR:BB:W3GP:BST2:CMOD:METH SF2`



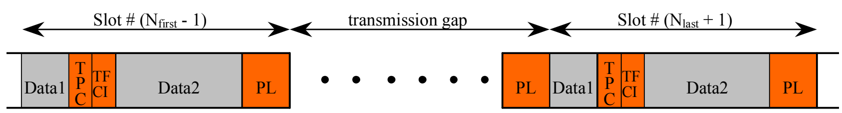
DL Frame Structure - BS - 3GPP FDD

(This feature is available for BS 2...4 only)

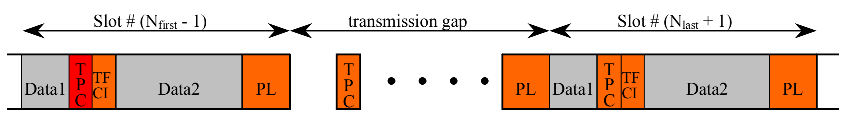
Selects frame structure. The frame structure determines the transmission of TPC and pilot field in the transmission gaps.

For 3GPP FDD radio communication to operate, the mobile station receiver requires information in the pilot field for synchronization and channel estimation and in the power control field TPC for control of the mobile station transmit power.

To keep the period during which no channel estimation takes place as short as possible, the pilot is sent in the last slot of each transmission gap.



Optionally, the first TPC field of the transmission gap can be sent in addition.



Type A (Last Pilot)

The pilot field is sent in the last slot of each transmission gap.

Remote-control command:
`SOUR:BB:W3GP:BST2:CMOD:DLFS A`

Type B (First TPC, Last Pilot)

The pilot field is sent in the last slot of each transmission gap. The first TPC field of the transmission gap is sent in addition.

Remote-control command:
`SOUR:BB:W3GP:BST2:CMOD:DLFS B`

Power Offset Mode - BS - 3GPP FDD

(This feature is available for BS 2...4 only)

Selects power offset mode.

The compressed slots can be sent with a power offset, i.e. at an increased power level.

Auto (By Pilot Bit Ratio)

The power offset is obtained as follows:

$$\frac{\text{Number of pilots bits of non-compressed slots}}{\text{Number of pilot bits by compressed slots}}$$

Remote-control command:
`SOUR:BB:W3GP:BST2:CMOD:POM AUTO`

User

The power offset is defined manually. The value is input in entry field **Power offset**.

Remote-control command:
`SOUR:BB:W3GP:BST2:CMOD:POM USER`

Power Offset - BS - 3GPP FDD

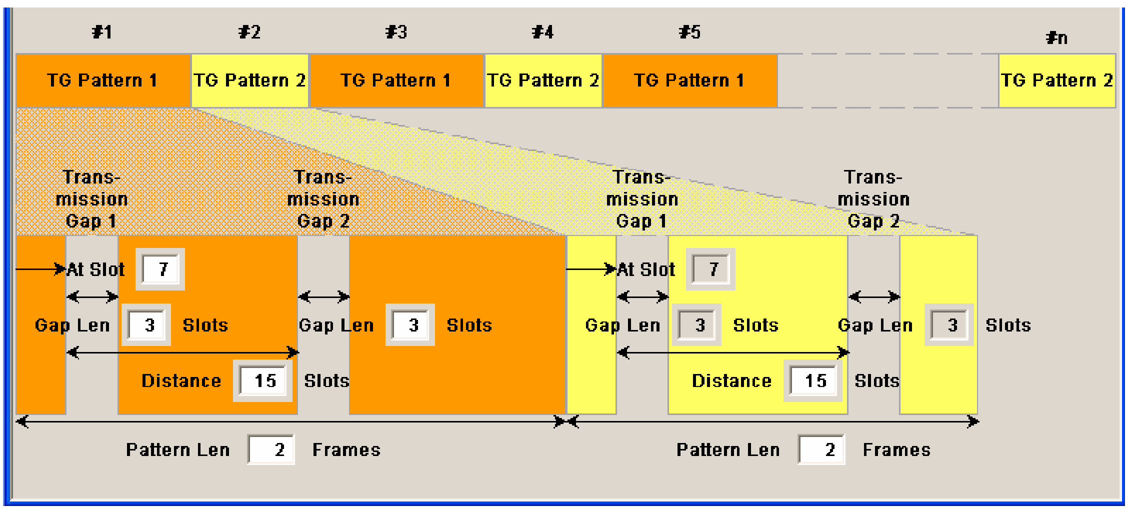
(This feature is available for BS 2...4 only.)

Defines power offset. The entered value is only valid for Power Offset Mode User. The value range is 0 dB to 10 dB.

Remote-control command:
`SOUR:BB:W3GP:BST2:CMOD:POFF 3dB`

Compressed Mode Configuration Graph - BS - 3GPP FDD

The remaining parameters of the compressed mode are set in the configuration graph. The graph displays the distribution of transmission gaps in a compressed mode signal.



The signal generated can be divided into three subranges.

Transmission Gaps

A transmission gap has a maximum length of 14 slots. Since at least eight active slots must be sent per frame, gaps comprising seven slots and more have to be distributed over two neighboring frames.

The transmitted signal consists of max. two patterns that are sent alternately. Each pattern comprises two transmission gaps.

The graph includes all parameters necessary to define the transmission gaps in the signal.

Note:
The settings in the graph are also valid for the compressed mode graph of the user equipment with the same number. For example, setting a distance of 9 slots for base station 4 also sets the distance to 9 slots for user equipment 4.

At Slot:

(This feature is available for BS 2...4 only.)

Transmission gap slot number.

Remote-control command:
`SOUR:BB:W3GP:BST2:CMOD:PATT1:TGSN 4`

Gap Len:

(This feature is available for BS 2...4 only.)

Transmission gap lengths

Remote-control command:
`SOUR:BB:W3GP:BST2:CMOD:PATT1:TGL2 7`

Distance **(This feature is available for BS 2...4 only.)**

Transmission gap distance

Remote-control command:
`SOUR:BB:W3GP:BST2:CMOD:PATT2:TGD 4`

Pattern Len: **(This feature is available for BS 2...4 only.)**

Transmission gap pattern length.
The input range is 0 ... 100 frames for pattern 1 and 1 ... 100 frames for pattern 2. Thus, it is possible to configure transmission gap pattern with only one pattern.

Remote-control command:
`SOUR:BB:W3GP:BST2:CMOD:PATT2:TGPL 23`

The above parameters are interrelated in many ways. For example, the transmission gap distance must be selected so that no frame contains more than one gap. In the event of an invalid entry, the next valid value is automatically set. If the entry is valid but changes the valid range for another parameter, the setting of the parameter is adapted.

In the above example, the signal (or more precisely: the pattern of transmission gaps) is repeated every 4 frames.

Compressed Ranges

All slots of a frame that are not blanked are compressed. If the transmission gap is transmitted within one frame (single-frame method), an envelope as shown by the diagram below is obtained:

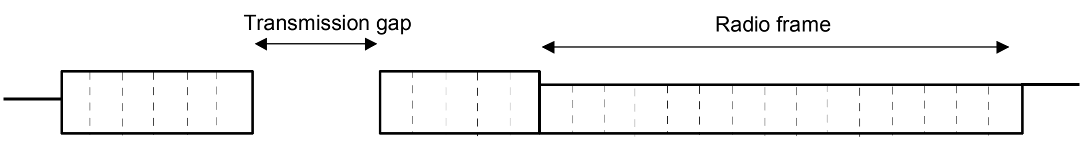


Fig. 12 Envelope of compressed mode signal with single-frame method

If the transmission gap is distributed over two neighboring frames, all slots of the two frames that are not blanked are compressed:

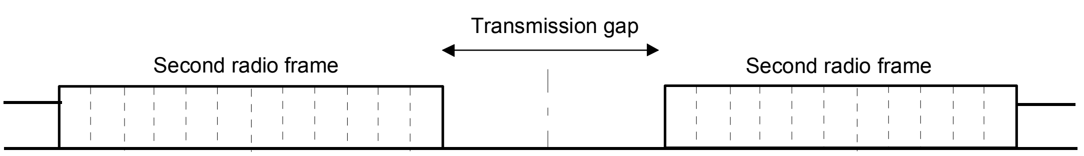


Fig. 13 Envelope of compressed mode signal with double-frame method

A different slot format, usually with a higher number of pilot bits, is used in the compressed ranges.

The transmit power can be increased (**Power Offset Mode**) automatically or manually by defining a power offset.

Non-compressed ranges

Frames containing no transmission gaps are sent with the same slot format and the same power as in the non-compressed mode.

Code Domain Graph – BS – 3GPP FDD

The channelization codes are taken from a code tree of hierarchical structure (see below).

The higher the spreading factor, the smaller the symbol rate and vice versa. The product of the spreading factor and symbol rate is constant and always yields the chip rate.

The outer branches of the tree (right-most position in the figure) indicate the channelization codes for the smallest symbol rate (and thus the highest spreading factor). The use of a channelization code of the level with spreading factor N blocks the use of all other channelization codes of levels with spreading factor >N available in the same branch of the code tree. Channelization codes with smaller spreading factor are contained in the codes with larger spreading factor in the same code branch. When using such competitive channelization codes at the same time, the signals of associated code channels are mixed such that they can no longer be separated in the receiver. Orthogonality will then be lost.

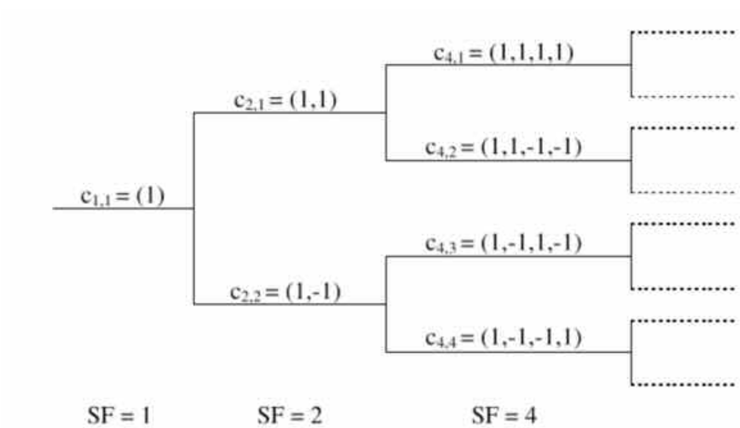


Fig. 14 Code tree of channelization codes

The outer branches of the tree (right-most position in the figure) indicate the channelization codes for the smallest symbol rate (and thus the highest spreading factor). The use of a channelization code of the level with spreading factor N blocks the use of all other channelization codes of levels with spreading factor >N available in the same branch of the code tree.

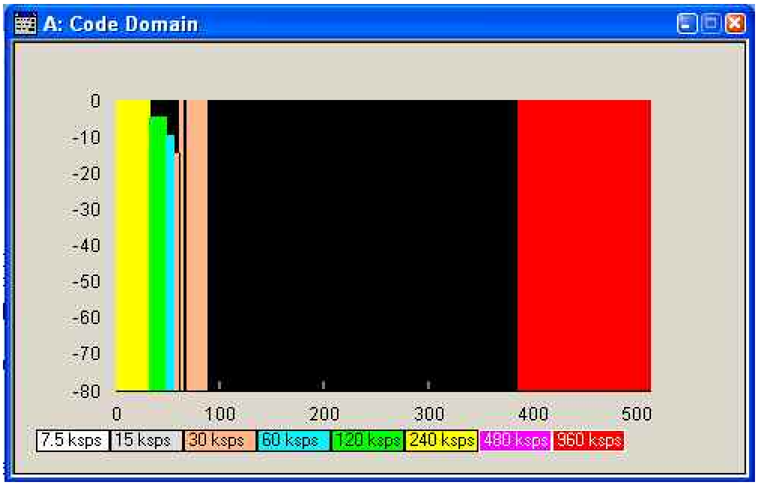
Example: If code $c_{2,1}$ is being used, the remaining branch with $c_{4,1}$ and $c_{4,2}$ is blocked.

The **domain** of a certain channelization code is the outer branch range (with minimum symbol rate and max. spreading factor) which is based on the channelization code selected in the code tree. Using a spreading code means that its entire domain is used.

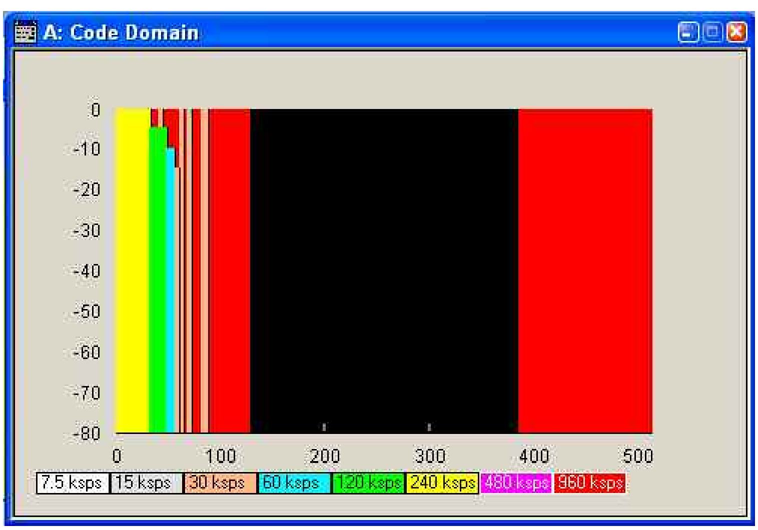
At a chip rate of 3.84 Mcps, the domain ranges from 0 to 511

$$= \frac{Chip\_rate}{min\_Symbol\_rate} - 1 = \frac{3.84Mcps}{7.5ksps} - 1$$

The **Code Domain** display indicates the assigned code domain. The channelization code is plotted at the X axis, the colored bars indicate coherent code channels. The colors are assigned to fixed symbol rates, the allocation is shown below the graph. The relative power can be taken from the height of the bar.



It is possible to determine from this display whether the settings made have resulted in a code domain conflict , that is to say, whether the code domains of the active channels intersect. A code domain conflict is indicated by overlapping bars:



Note:

*The graph is calculated from the settings that have been made. The code domain display for the measured signal can be called from the **Graphics** menu (**Graphics** function block).*

In the channel table, a code domain conflict with an overlying channel (with a lower index) is indicated in column **Do Conf** on the far right of the graph by a red dot and the orange-colored column.

16	DPCH	No	#8	30	15	0.00	PN 9		0	Config...	On	
17	DPCH	No	#16	960	3	0.00	PN 9		0	Config...	On	
18	DPCH	No	#8	30	17	0.00	PN 9		0	Config...	On	
19	DPCH	No	#8	30	10	0.00	PN 9		0	Config...	On	
20	DPCH	No	#16	960	0	0.00	PN 9		0	Config...	On	
21	DPCH	No	#8	30	20	0.00	PN 9		0	Config...	On	
22	DPCH	No	#8	30	21	0.00	PN 9		0	Config...	On	

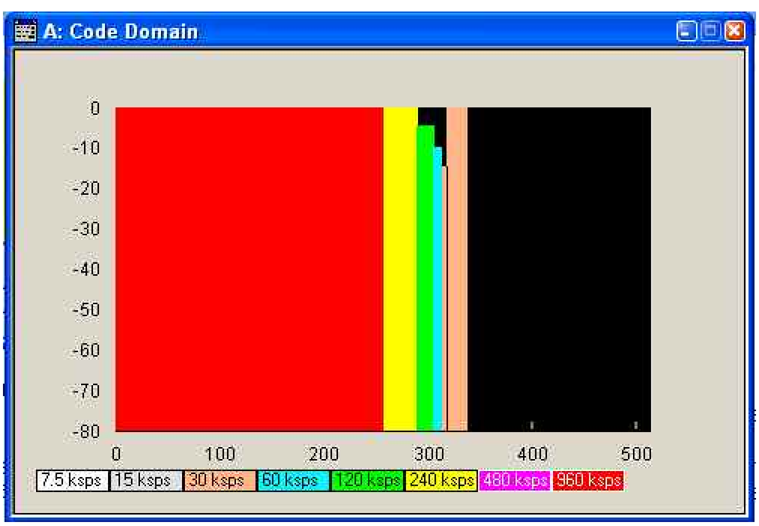
By pressing the red button, a submenu opens which allows automatic resolution of the existing code domain conflicts.

The code domain conflict is resolved by changing the channelization codes of the affected channels. The red dots in column **Co Conf** disappear and the column is blue-colored.

Note:
The HSUPA control channels E-RGCH and E-HICH may use the same channelization code as long as they use different signature sequence hopping index that identifies the user equipment.

16	DPCH	No	#8	30	79	0.00	PN 9	0	Config...	On
17	DPCH	No	#16	960	0	0.00	PN 9	0	Config...	On
18	DPCH	No	#8	30	80	0.00	PN 9	0	Config...	On
19	DPCH	No	#8	30	81	0.00	PN 9	0	Config...	On
20	DPCH	No	#16	960	1	0.00	PN 9	0	Config...	On
21	DPCH	No	#8	30	82	0.00	PN 9	0	Config...	On
22	DPCH	No	#8	30	83	0.00	PN 9	0	Config...	On

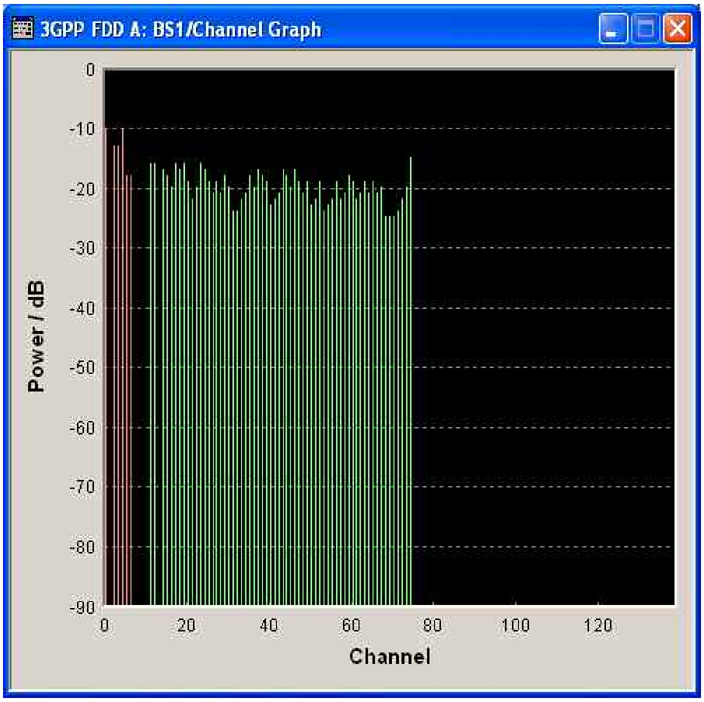
The graphs immediately display the change:



Channel Graph – Base Station – 3GPP FDD

The channel graph display shows the active code channels. The channel number is plotted on the X axis. The red bars represent the special channels (P-CPICH to DL-DPCCH), the green bars the data channels (DPCH). The height of the bars shows the relative power of the channel.

The graph is calculated from the settings that have been made.



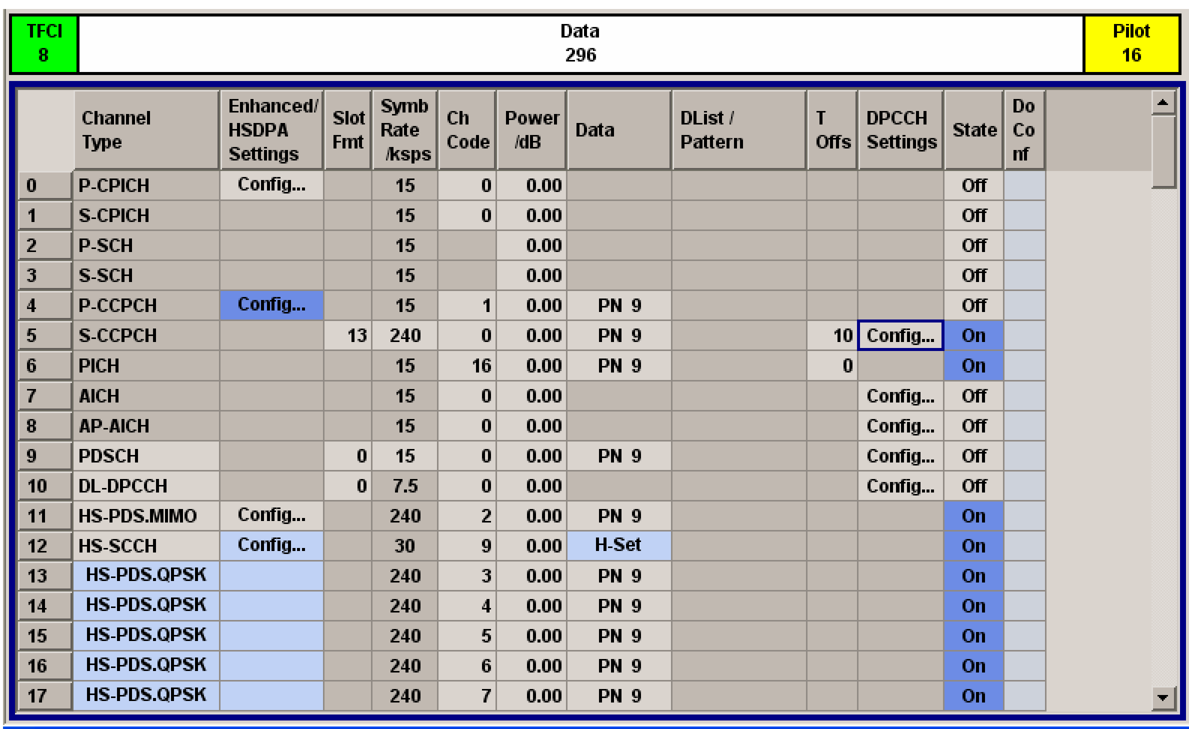
Channel Table - BS - 3GPP FDD

The **channel table** is located in the lower part of the menu. The channel table is where the individual channel parameters are set. The structure of the channel currently being edited is displayed graphically in the table header.

139 channels are available for each base station. Channels 0 to 10 are assigned to the special channels, with the allocation of channels 0 to 8 being fixed. Channels 9 and 10 can either be assigned a PDSCH, a DL-DPCCH, an HS-SCCH, an E-AGCH, an E-RGCH, or an E-HICH.

Code channels 11 to 138 can either be assigned a DPCH, an HS-SCCH, an HS-PDSCH (QPSK), an HS-PDSCH (16QAM), an HS-PDSCH (64QAM), an HS-PDSCH (MIMO), an E-AGCH, an E-RGCH, an E-HICH, or an F-DPCH (see also the List of Supported Channels). This makes it possible to simulate the signal of a base station that supports high speed channels.

Channels 4 and 11 to 13 of base station 1 can be generated in realtime (enhanced channels) and are highlighted in color. User-definable channel coding can be activated for these channels. Bit and block errors can be simulated and data can be added to the data and TPC fields from data lists either at the physical level or in the transport layer.



	Channel Type	Enhanced/ HSDPA Settings	Slot Fmt	Symb Rate /ksps	Ch Code	Power /dB	Data	DList / Pattern	T Offs	DPCCH Settings	State	Do Co nf
0	P-CPICH	Config...		15	0	0.00					Off	
1	S-CPICH			15	0	0.00					Off	
2	P-SCH			15		0.00					Off	
3	S-SCH			15		0.00					Off	
4	P-CCPCH	Config...		15	1	0.00	PN 9				Off	
5	S-CCPCH		13	240	0	0.00	PN 9		10	Config...	On	
6	PICH			15	16	0.00	PN 9		0		On	
7	AICH			15	0	0.00				Config...	Off	
8	AP-AICH			15	0	0.00				Config...	Off	
9	PDSCH		0	15	0	0.00	PN 9			Config...	Off	
10	DL-DPCCH		0	7.5	0	0.00				Config...	Off	
11	HS-PDS.MIMO	Config...		240	2	0.00	PN 9				On	
12	HS-SCCH	Config...		30	9	0.00	H-Set				On	
13	HS-PDS.QPSK			240	3	0.00	PN 9				On	
14	HS-PDS.QPSK			240	4	0.00	PN 9				On	
15	HS-PDS.QPSK			240	5	0.00	PN 9				On	
16	HS-PDS.QPSK			240	6	0.00	PN 9				On	
17	HS-PDS.QPSK			240	7	0.00	PN 9				On	

Channel Number - BS - 3GPP FDD

Displays the consecutive channel numbers from 0 to 138.

All the rows are always displayed, even if the channels are inactive. They are switched on and off by the **On/Off** button in the **State** column.

Remote-control command: n.a.
(selected via the suffix to the keyword `:CHANnel<n>`)

Channel Type - BS - 3GPP FDD

Selects channel type.

The channel type is fixed for channel numbers 0...8; for the remaining channel numbers, the choice lays between the relevant standard channels and the high speed channels (see Table below).

The first 11 channels in the table are reserved for special channels.

Remote-control command:
`SOUR:BB:W3GP:BST4:CHAN18:TYPE DPCH`

Tab. 15 List of supported channel types and their sequence in the 3GPP FDD channel table

Index	**Shortform**	**Name**	**Function**	**Optional Enhanced in BS1**
0	P-CPICH	Primary Common Pilot Channel	Specifies the scrambling code in the scrambling code group (2nd stage of scrambling code detection) Phase reference for additional downlink channels Reference for the signal strength	no
1	S-CPICH	Secondary Common Pilot Channel		no
2	P-SCH	Primary Sync Channel	Slot synchronization	no
3	S-SCH	Secondary Sync Channel	Frame synchronization Specifies the scrambling code group	no
4	P-CCPCH	Primary Common Control Phys. Channel	Transfers the system frame number (SFN) Timing reference for additional downlink channels Contains the BCH transport channel	yes
5	S-CCPCH	Secondary Common Control Phys. Channel		no
6	PICH	Page Indication Channel	Transfers the paging indicator	no
7	AICH	Acquisition Indication Channel		no
8	AP-AICH	Access Preamble Acquisition Indication Channel		no
9 / 10	PDSCH or DL-DPCCH or HS-SCCH or E-AGCH or E-RGCH or E-HICH	Phys. Downlink Shared Channel Dedicated Physical Control Channel High Speed Shared Control Channel E-DCH Absolute Grant Channel E-DCH Relative Grant Channel E-DCH Hybrid ARQ Indicator Channel		no
11 - 13	DPCH	Dedicated Phys. Channel	Transfers the user data and the control information	yes
	HS-SCCH	High Speed Shared Control Channel		no
	HS-PDSCH (QPSK)	High Speed Physical Downlink Shared Channel (QPSK)		no
	HS-PDSCH (16 QAM)	High Speed Physical Downlink Shared Channel (16 QAM)		no
	HS-PDSCH (64 QAM)	High Speed Physical Downlink Shared Channel (64 QAM)		no
	HS-PDSCH (MIMO)	High Speed Physical Downlink Shared Channel (MIMO)		no
	E-AGCH	E-DCH Absolute Grant Channel		no
	E-RGCH	E-DCH Relative Grant Channel		no
	E-HICH	E-DCH Hybrid ARQ Indicator Channel		no

Index	Shortform	Name	Function	Optional Enhanced in BS1
	F-DPCH	Fractional Dedicated Phys. Channel		no
14 - 138	DPCH or HS-SCCH or HS-PDSCH (QPSK) or HS-PDSCH (16 QAM) or HS-PDSCH (64 QAM) or HS-PDSCH (MIMO) or E-AGCH or E-RGCH or E-HICH or F-DPCH	Dedicated Phys. Channel High Speed Shared Control Channel High Speed Physical Downlink Shared Channel (QPSK) High Speed Physical Downlink Shared Channel (16 QAM) High Speed Physical Downlink Shared Channel (64 QAM) High Speed Physical Downlink Shared Channel (MIMO) E-DCH Absolute Grant Channel E-DCH Relative Grant Channel E-DCH Hybrid ARQ Indicator Channel Fractional Dedicated Phys. Channel	Transfers the user data and the control information	no

At the physical level, a downlink DPCH consists of the DPDCH (Dedicated Physical Data Channel) and the DPCCH (Dedicated Physical Control Channel); the channel characteristics are defined by the symbol rate. The DPDCH transports the user data that is fed directly into the data field.

The DPCCH transports the control fields (TFCI = Transport Format Combination Indicator; TPC = Transmit Power Control and Pilot field). DPDCH is grouped with DPCCH using time division multiplexing in accordance with 3GPP TS 25.211, see diagram below (the formation of a downlink reference measurement channel is described in Section "*Enhanced Settings for DPCHs - BS1 - 3GPP FDD*", Page 1.91).

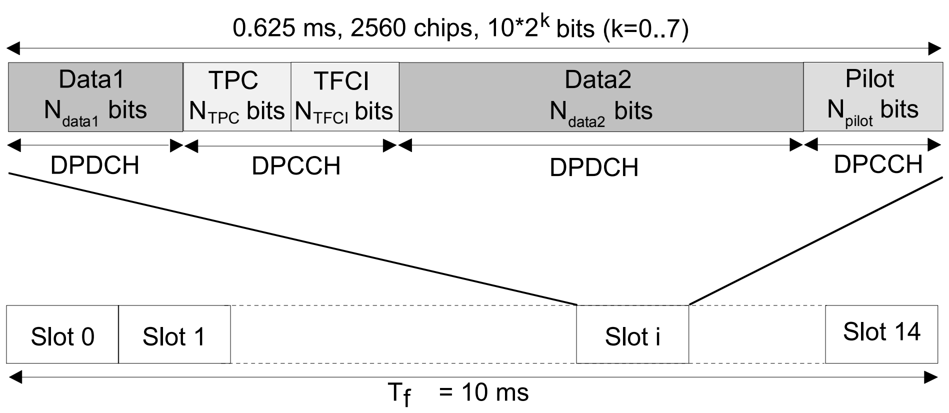


Fig. 15 Structure of a downlink DPCH in the time domain

Enhanced Settings / HSDPA Settings - BS1 - 3GPP FDD

(Enhanced Settings are available for BS1 only.)

Calls the menu for configuring the enhanced channels of BS1 or the menu for configuring the high speed channels for all base stations.

Enchanced Settings

The channel state, Enhanced On or Off, is displayed in different colors. If the Enhanced state is switched to Off, the ARB channel selection appears in the Data column of the table.

Enhanced channels are generated in realtime. Channel coding in accordance with the 'Reference Measurement Channels' definition in TS25.101, TS25.104 and TS25.141 can be activated. Any other user-defined coding can also be configured and stored.

If data lists are used as the data sources for data fields and TPC fields, it is possible to load external data, for example, user information from a higher layer, to the R&S Signal Generator. For example, this allows externally generated data with user information to be applied, or TPC lists to be used to generate longer, non-repetitive power profiles.

To test the BER/BLER testers (e.g. integrated in the base station), it is possible to feed through artificial bit errors to all the data sources (and block errors to the CRC checksum).

The enhanced settings menu is different for the P-CCPCH and the DPCHs. The menus are described in Sections "*Enhanced Settings for DPCHs - BS1 - 3GPP FDD*", Page 1.91) and "*Enhanced Settings for P-CCPCH - BS1 - 3GPP FDD*", Page 1.89.

HSDPA Settings

The available settings and indications of the HSDPA settings menu depend on the selected high-speed channel type HS-SCCH, HS-PDSCH (QPSK), HS-PDSCH (QAM) or HS-PDSCH (MIMO).

The menu is described in Section "*HSDPA Settings - BS - 3GPP FDD*", Page 1.72.

Remote-control command: n.a.

Slot Format - BS - 3GPP FDD

Enters the slot formats for the selected channel.

The range of values depends on the channel selected. For DPCH channels, for example, the slot formats are 0 to 16.

A slot format defines the complete structure of a slot made of data and control fields and includes the symbol rate.

Parameters set via the slot format can subsequently be changed individually.

The structure of the channel currently selected is displayed in a graphic above the channel table (slot structure).

Remote-control command:
`SOUR:BB:W3GP:BST4:CHAN18:SFOR 7`

Symbol Rate - BS - 3GPP FDD

Sets the symbol rate of the selected channel. The range of values depends on the channel selected.

A change in the symbol rate may lead to a change in the slot format and vice versa.

Remote-control command:
`SOUR:BB:W3GP:BST4:CHAN18:SRAT D30K`

Channelization Code - BS - 3GPP FDD

Enters the channelization code (formerly the spreading code number).

The code channel is spread with the set channelization code (spreading code). The range of values of the channelization code depends on the symbol rate of the channel.

The standard assigns a fixed channelization code to some channels (P-CPICH, for example, always uses channelization code 0).

The range of values runs from 0 to $\frac{chip\_rate(=3.84Mcps)}{symbol\_rate}-1$

Remote-control command:
`SOUR:BB:W3GP:BST4:CHAN18:CCOD 0`

Power - BS - 3GPP FDD

Sets the channel power in dB.

The power entered is relative to the powers outputs of the other channels. If **Adjust Total Power to 0 dB** is executed (top level of the 3GPP menu), all the power data is relative to 0 dB.

The set **Power** value is also the start power of the channel for **Misuse TPC** and **Dynamic Power Control** (enhanced channels of basestation 1).

***Note**:*
The maximum channel power of 0 dB applies to non-blanked channels (duty cycle 100%), with blanked channels, the maximum value can be increased (by Adjust Total Power) to values greater than 0 dB (to $10*\log_{10}\frac{1}{duty\_cycle}$*).*

Remote-control command:
`SOUR:BB:W3GP:BST4:CHAN18:POW -20`

Data - BS - 3GPP FDD

Selects data source.

The data sources **PN9**, **PN15**, **PN16**, **PN20**, **PN21**, **PN23**, **ALL 0**, **ALL1**, **Pattern,** and **Data List** are all available to choose from.

If the **Pattern** data type is used, you can enter the bit pattern in a bit editor that is called in the column **DList Pattern**. The length is limited to 64 bits.

If the **Data List** data type is used, you can select the list from a file window that is called in the **DList Pattern** column. The selected data list is shown in the **DList Pattern** column.

Remote-control command:
```
SOUR:BB:W3GP:BST3:CHAN13:DATA   PATT
SOUR:BB:W3GP:BST3:CHAN13:DATA:PATT #H3F,8

SOUR:BB:W3GP:BST3:CHAN13:DATA   DLIS
SOUR:BB:W3GP:BST3:CHAN13:DATA:DSEL "BST_3GPP"
```

Data Config - BS - 3GPP FDD

(This feature is available for BS1 with active channel coding only.)

Calls the menu for configuring the data sources of subchannels in the transport layer.

The menu is described in Section "*Enhanced Settings for DPCHs - BS1 - 3GPP FDD*", Page 1.91).

Remote-control command: n.a.

Timing Offset - BS - 3GPP FDD

Sets the timing offset.

The timing offset determines the shift of the source symbols before interleaving.

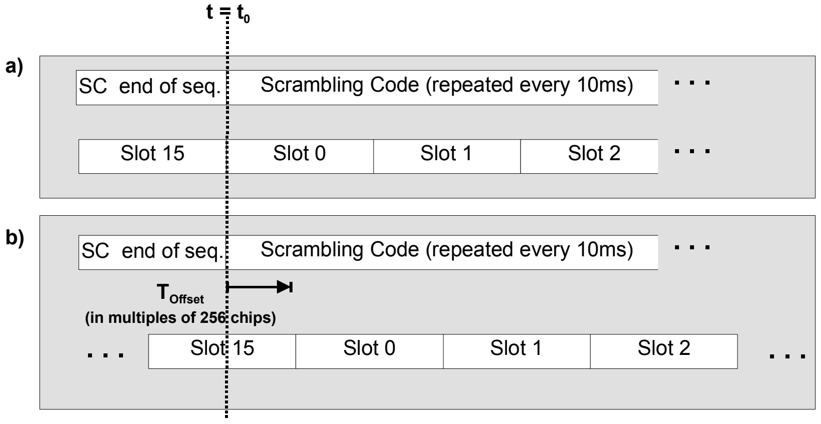
The absolute starting time of the frame (slot 0) is shifted relative to the start of the scrambling code sequence by the timing offset * 256 chips. This means that whatever the symbol rate, the resolution of the timing offset is always 256 chips.

This procedure is used to reduce the crest factor. To obtain a lower crest factor, for example, a good offset from channel to channel is 1, that is to say DPCH11 - timing offset 0, DPCH12 - timing offset 1, DPCH13 - timing offset 2, etc.

The illustration below shows the effect of the timing offset parameter. For various scenarios, the scrambling code sequence is shown in time relation to the data slots and to a reference time t_0 (starting from t_0 the signal is calculated in the R&S Signal Generator).

Timing offset is not used (T_{Offset} = 0). The beginning of the frame (slot 0) and the beginning of the scrambling code period are synchronous with starting point t_0.

Timing offset is used (T_{Offset} > 0). The absolute starting time of the frames (slot 0) is shifted relative to the reference time t_0 by T_{Offset} * 256 chips. The beginning of the scrambling code sequence is still synchronous with reference time t_0. The beginning of the scrambling code period and the frame (slot 0) are no longer synchronous.



Remote-control command:
`SOUR:BB:W3GP:BST3:CHAN13:TOFF 5`

DPCCH Settings- BS - 3GPP FDD

Calls the menu for configuring the control fields of the selected channel.

The selected slot format predetermines the setting of the control fields. So a change is also made to the control fields by changing the slot format and vice versa.

The menu is described in Section "*DPCCH Settings - BS Channel Table 3GPP FDD*", Page 1.108.

Remote-control command: n.a.

Channel State - BS - 3GPP FDD

Activates or deactivates the channel.

Remote-control command:
`SOUR:BB:W3GP:BST3:CHAN13:STAT ON`

Domain Conflict - BS - 3GPP FDD

Displays whether the channel has a code domain conflict with one of the channels lying above it (with a lower channel number). If there is a conflict, a red dot appears and the column is colored soft orange. If there is no conflict, the column is colored soft blue.

The R&S Signal Generator helps to resolve code domain conflicts by automatically adapting the channelization code of the channels involved. You get the button required for this purpose if you click the table field in a submenu.

To call the graphical display of code domain occupancy by all the active code channels, use the **Code Domain** button (also see "*Code Domain Graph – BS – 3GPP FDD*", Page 1.61).

You can recognize a domain conflict when the assigned domains of different channel rows overlap. The occupied code domain of a channel is calculated from the symbol rate of the channel, the minimum symbol rate (for 3GPP FDD 7.5 ksps), the chip rate (3.84 Mcps) and the channelization code number with

$$Domain\_Factor = \frac{current\_symbol\_rate}{\min\_symbol\_rate(=7.5ksps)}$$

as follows:

Lower domain limit =
current channelization code number * domain factor

Upper domain limit =
lower domain limit + domain_factor – 1.

Example:

Channel with symbol rate 30 ksps and channelization code 10:
Domain factor = 30/7.5 = 4,

Lower domain limit = 10 x 4 = 40,

Upper domain limit = 40 + 4 - 1 = 43.

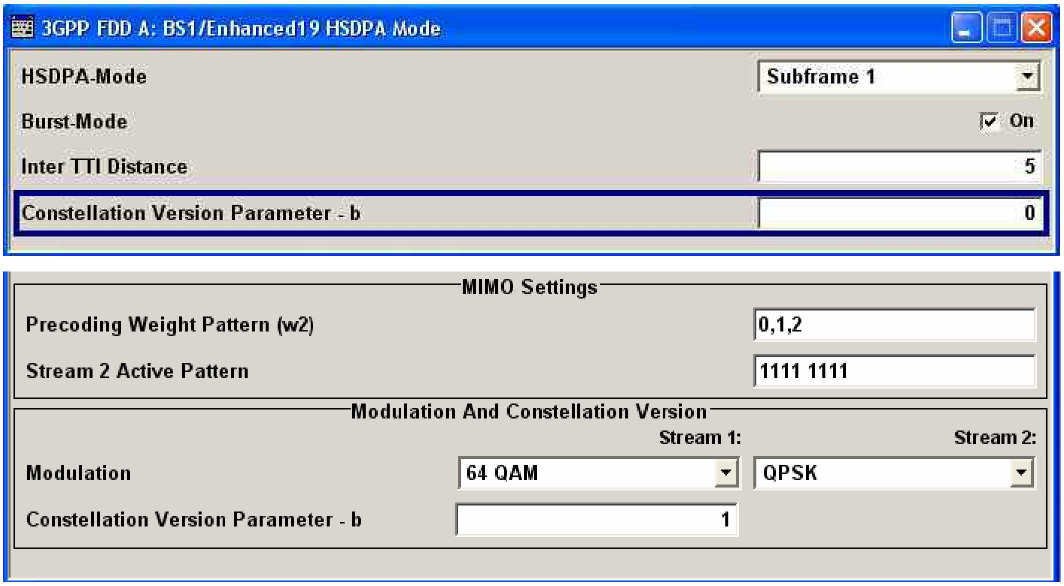
The channel occupies the code domain 40 to 43.

Remote-control command:
`SOUR:BB:W3GP:BST3:DCON:STAT?`
Response: `1`
`SOUR:BB:W3GP:BST3:DCON:RES`

HSDPA Settings - BS - 3GPP FDD

The **Enhanced HSDPA Mode** menu can be called in the BS channel table in column **HSDPA Settings** with button **Config...**. The available settings and indications of the menu depend on the selected HSDPA mode and channel type.

Section **MIMO Settings** is only available for enabled two-antenna system (see *"Diversity / MIMO - BS - 3GPP FDD"*) and selected HS-PDSCH MIMO channel.



The high speed channels can be generated either continuously as defined in test model 5, in packet mode or in H-Set mode according to TS 25.101 Annex A.7.

In packet mode, the start of the channel and the distance between the HSDPA packets can be set. The packets can be sent in one of five sub-frames (0 to 4). A sub-frame has the same length as a packet and is 3 slots long. A HS-SCCH starts at the beginning of the selected sub-frame, a HS-DPSCH starts with an offset of two slots to the selected sub-frame. The active parts of the HS-SCCH and the HS-PDCCH for a specific sub-frame setting differ by the slot offset of the HS-PDCCH.

Example: Setting **Sub-frame 1**

HS-SCCH: slot 3 to 5 active

HS-PDSCH: slot 5 to 7 active.

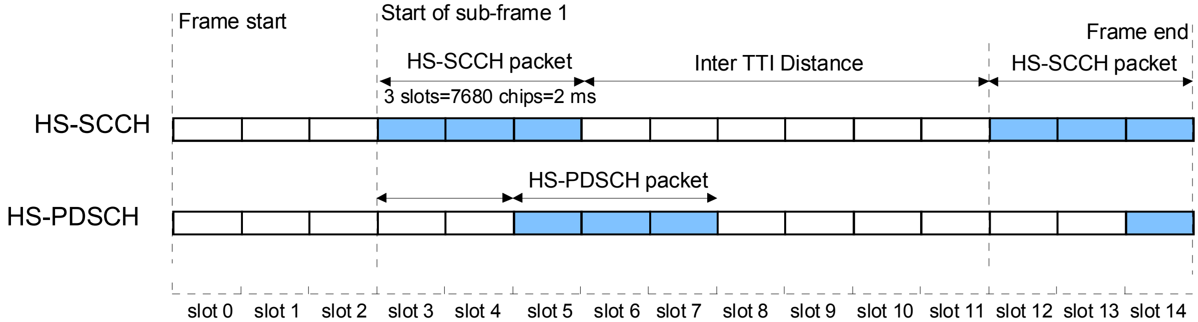


Fig. 16 Timing diagram for the HS-SCCH and the associated HS-PDSCH, Packet Subframe 1 mode and Inter TTI Distance = 3

In H-Set mode, the first packet is sent in the HS-SCCH subframe 0. Up to 15 HSDPA channels are coupled to be used as fixed reference channels. The number of coupled channels depends on the selected HS-PDSCH slot format. Channel coding is always performed over a certain number of bits. The resulting packets are distributed evenly over one subframe of all HS-PDSCH channels. Therefore, the data stream is not assigned to a defined channel but to all coupled channels.

HSDPA Mode - BS - 3GPP FDD

Selects the HSDPA mode.

Continuous

The high speed channel is generated continuously. This mode is used in test model 5 and 6.

Remote-control command:
`SOUR:BB:W3GP:BST2:CHAN15:HSDP:MODE CONT`

Subframe 0 | 1 | 2 | 3 | 4

The high speed channel is generated in packet mode.

The start of the channel is set by selecting the subframe in which the first packet is sent.

The distance between subsequent packets is set with parameter **Inter TTI Distance**.

Remote-control command:
`SOUR:BB:W3GP:BST2:CHAN15:HSDP:MODE PSF4`

H-Set

(This feature is available for BS1 and HS-SCCH only.)

The high speed channel is generated in packet mode. The first packet is sent in the HS-SCCH subframe 0.

The number of the coupled channel in the H-Set can be changed with the parameter **Number of HS-PDSCH Channel Codes**.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`

Burst Mode - BS - 3GPP FDD

Activates/deactivates burst mode. The signal is bursted when on, otherwise dummy data are sent during transmission brakes.

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:BMOD:STAT ON`

Inter TTI Distance - BS - 3GPP FDD

(Available for subframe x only)

Selects the distance between two packets in HSDPA packet mode.

The distance is set in number of sub-frames (3 slots = 2 ms).
An **Inter TTI Distance** of 1 means continuous generation.

Remote-control command:
`SOUR:BB:W3GP:BST2:CHAN15:HSDP:TTID 4`

Constellation Version Parameter b - BS - 3GPP FDD

(Available for HS-PDSCH 16QAM and 64QAM only)

Switches the order of the constellation points of the 16QAM or 64QAM mapping.

The re-arrangement is done according to 3GPP TS25.212.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN12:HSDP:CVPB 1`

MIMO Configuration - HSDPA BS1 - 3GPP FDD

Note:
The parameters in this menu section are available for instruments equipped with option SMx-K59, BS1 and Channel Type HS-PDSCH (MIMO) only.

Precoding Weight Pattern (w2) - BS - 3GPP FDD

Sets the precoding weight parameter w2 for MIMO precoding.

The values of the weight parameters w1, w3 and w4 are calculated based on the value for w2 (see *"MIMO in HSPA+"*).

Remote-control command:
```
BB:W3GP:BST1:CHAN12:TYPE HSM
BB:W3GP:BST1:CHAN12:HSDP:MIMO:PWP "0,1,3"
```

Stream 2 Active Pattern - BS - 3GPP FDD

Enables/disables a temporal deactivation of Stream 2 per TTI in form of sending pattern.

The stream 2 sending pattern is a sequence of max 16 values of "1" (enables Stream 2 for that TTI) and "-" (disabled Stream 2 for that TTI).

Remote-control command:
```
BB:W3GP:BST1:CHAN12:TYPE HSM
BB:W3GP:BST1:CHAN12:HSDP:MIMO:STAP "11-"
```

Modulation Stream 1/2 (HS-PDSCH MIMO) - BS - 3GPP FDD

Sets the modulation for stream 1 and respectively stream 2 to QPSK, 16QAM or 64QAM.

Remote-control command:
```
BB:W3GP:BST1:CHAN12:TYPE HSM
BB:W3GP:BST1:CHAN12:HSDP:MIMO:MOD1 QAM64
BB:W3GP:BST1:CHAN12:HSDP:MIMO:MOD2 QPSK
```

Constellation Version Parameter b Stream 1/2 - BS - 3GPP FDD

Switches the order of the constellation points of the 16QAM or 64QAM mapping.

The re-arrangement is done according to 3GPP TS25.212.

Remote-control command:
```
BB:W3GP:BST1:CHAN12:TYPE HSM
SOUR:BB:W3GP:BST1:CHAN12:HSDP:MIMO:CVPB2
1
```
_D2HLink_163339

HSDPA H-Set Mode Settings - BS - 3GPP FDD

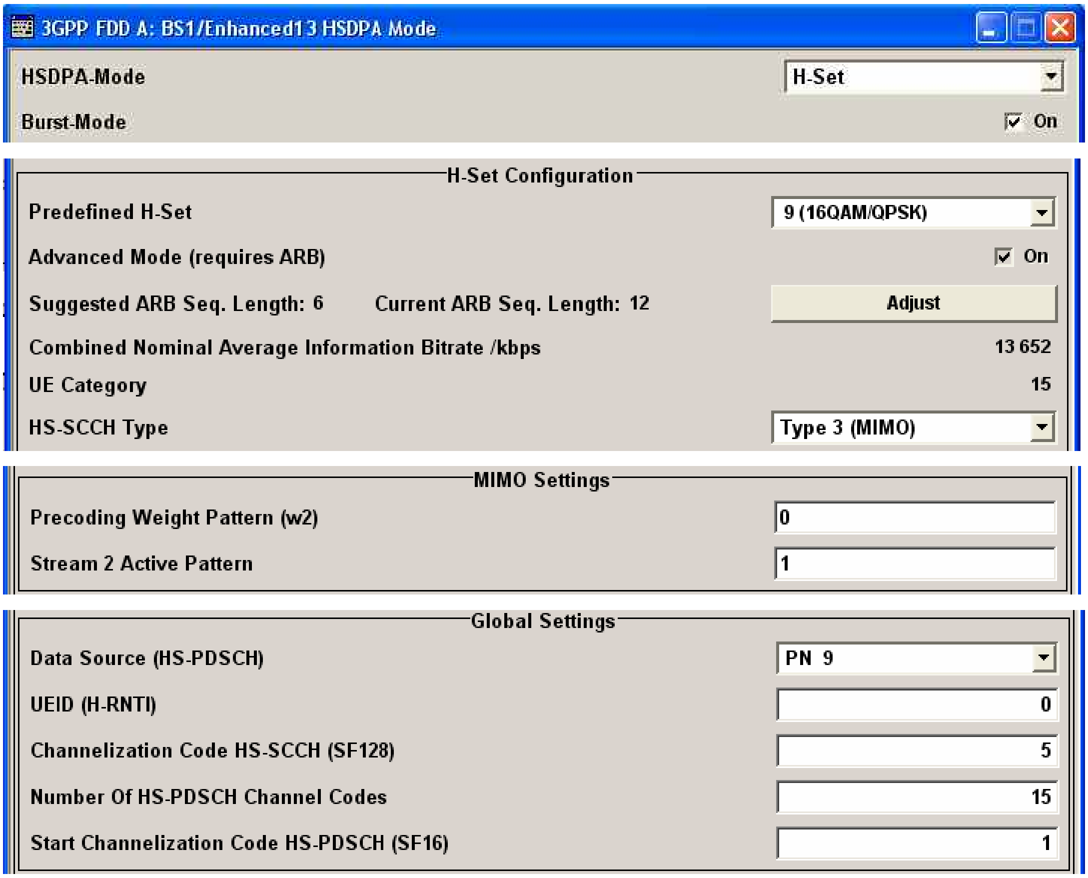
Note:
*The **Enhanced HSDPA H-Set Mode** menu is available for BS1, HS-SCCH and HSDPA Mode set to H-Set only.*

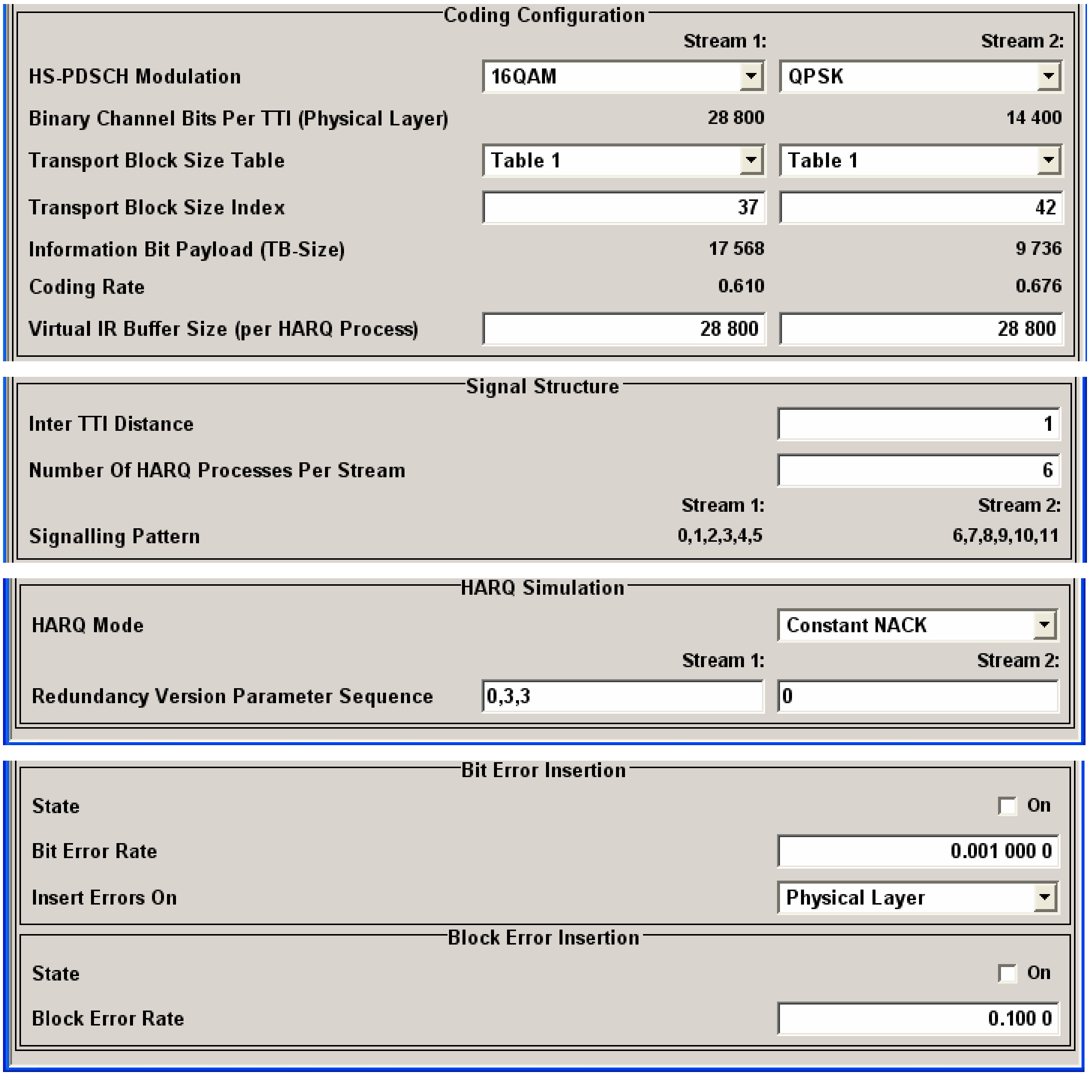
Compared to previous releases of the instrument's firmware, much more flexibility in the configuration of H-Sets is provided now. Several former fixed parameters are now configurable, e.g.:

– The channelization codes used for the physical channels are not any more fixed
– A redundancy version sequence can be selected, i.e. varying the RV is possible in case HARQ Mode Constant NACK is configured.

Note:
*To let the instrument generate a signal equal to the one generated by an instrument equipped with an older firmware, set the same **Channelization Codes** as the codes used for your physical channels and set the **HARQ Mode** to Constant ACK.*

A configuration according to an H-Set defined in TS 25.101 can be easily accomplished by selecting one of the predefined H-Sets in the **Enhanced HSDPA H-Set Mode** menu.





HSDPA Mode (H-Set) - BS - 3GPP FDD

Selects the HSDPA mode.

Continuous

The high speed channel is generated continuously. This mode is defined in test model 5.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN15:HSDP:MODE CONT`

Subframe 0 | 1 | 2 | 3 | 4

The high speed channel is generated in packet mode.

The start of the channel is set by selecting the subframe in which the first packet is sent.

The distance between subsequent packets is set with parameter **Inter TTI Distance**.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN15:HSDP:MODE PSF4`

H-Set

The high speed channel is generated in packet mode. The first packet is sent in the HS-SCCH subframe 0.

The number of the coupled channel in the H-Set can be changed with the parameter **Number of HS-PDSCH Channel Codes**.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`

Burst Mode (H-Set) - BS - 3GPP FDD

Activates/deactivates burst mode. The signal is bursted when on, otherwise dummy data are sent during transmission brakes.

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:BMOD ON`

H-Set Configuration Common settings - HSDPA H-Set BS1 - 3GPP FDD

Note:
The parameters in this section are available for BS1 and HSDPA H-Set Mode only.

Predefined H-Set - BS - 3GPP FDD

Selects the H-Set and the modulation according to TS 25.101 Annex A.7.

Following combinations are possible:

H-Set	Modulation
1, 2, 3, 6, 10	QPSK 16QAM
4, 5, 7	QPSK
8	64QAM
9	16QAM (Stream 1) QPSK (Stream 2)
User	-

Note:
H-Sets 7 - 9 are enabled for instruments equipped with option SMU-K59 only.
H-Set 9 is available only for enabled two-antenna system (see "Diversity / MIMO - BS - 3GPP FDD").

Several parameters are automatically set, depending on the selection made for the parameter **H-Set**. However, it is also possible to change these parameters. In this case the value of the parameter **H-Set** is automatically set to User.

Note:
Use the predefined settings to let the instrument generate a signal equal to the one generated by an instrument equipped with an older firmware.

Remote-control command:
`SOUR:BB:W3GP:BST1:TDIV ANT2`
`BB:W3GP:BST1:CHAN12:HSDP:HSET:PRED P9QAM16QPSK`

Advanced Mode (requires ARB) - BS - 3GPP FDD

Activates/deactivates the advanced mode in which the H-Set will be generated by the ARB.
The parameter can be configured only for H-Sets 1 - 5.
For H-Sets 6 - 10 and User it is always enabled.

For an H-Set calculated in arbitrary waveform mode (enabled **Advanced Mode**) it is critical to set an appropriate **Current ARB Sequence Length** in order to generate a signal without unwanted artefacts when the precalculated sequence is repeated cyclically.
In particular, the HARQ cycles have to terminate completely before restarting the signal.

Assistance in setting an appropriate sequence length is provided by the parameter **Suggested ARB Sequence Length** and the **Adjust** button.
When working in Advanced Mode, it is recommended to adjust the current ARB sequence length to the suggested one.

Remote-control command:
```
BB:W3GP:BST1:CHAN12:HSDP:HSET:AMOD ON
BB:W3GP:BST1:CHAN12:HSDP:HSET:SLEN:ADJ
```

Suggested ARB sequence length - BS - 3GPP FDD

Displays the suggested ARB sequence length.

The **Suggested ARB Sequence Length** is the calculated minimum length that depends on several parameters, like TTI distance, Number of HARQ Processes, HARQ cycles, HARQ Mode, RV Parameter Sequence, HS-SCCH Type, Precoding Weight Pattern and Stream 2 Active Pattern.

When working in Advanced Mode (see *"Advanced Mode"*), it is recommended to adjust the current ARB sequence length to the suggested one.

Remote-control command:
```
BB:W3GP:BST1:CHAN12:HSDP:HSET:AMOD ON
BB:W3GP:BST1:CHAN12:HSDP:HSET:SLEN?
Response: 12
BB:W3GP:BST1:CHAN12:HSDP:HSET:SLEN:ADJ
```

Current ARB sequence length - BS - 3GPP FDD

Displays the current ARB sequence length or the adjusted ARB sequence length, set after pressing the button **Adjust**.

When working in Advanced Mode (see *"Advanced Mode"*), it is recommended to adjust the current ARB sequence length to the suggested one.

Remote-control command:
```
SOUR:BB:W3GP:SLEN?
BB:W3GP:BST1:CHAN12:HSDP:HSET:SLEN:ADJ
```

Adjust - BS - 3GPP FDD

Sets the current ARB sequence length to the suggested value.

When working in Advanced Mode (see *"Advanced Mode"*), it is recommended to adjust the current ARB sequence length to the suggested one.

Remote-control command:
```
BB:W3GP:BST1:CHAN12:HSDP:HSET:SLEN:ADJ
```

Nominal Average Information Bitrate - BS - 3GPP FDD

Indicates the average data rate on the transport layer.
In case of MIMO, the parameter indicates the Combined Nominal Average Information Bitrate.

The Nominal Average Information Bitrate is calculated for the ideal case of infinite sequence and with regard of the Stream 2 Active Pattern.

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:HSET:NAIB?`

UE Category - BS - 3GPP FDD

Displays the UE category that is minimum required to receive the selected H-Set (see also *"MIMO and 64QAM UE Capabilities"*).

Remote-control command:
`SOUR:BB:W3GP:BST:CHAN12:HSDP:HSET:UEC?`

HS-SCCH Type - BS - 3GPP FDD

Sets the HS-SCCH type.

Type 1 (normal)

Normal operation mode.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN15:HSDP:HSET:TYPE NORM`

Type 2 (less operation)

(Available for instruments equipped with option SMx-K59 only)

HS-SCCH Less operation mode (see also "*HS-SCCH less operation*").

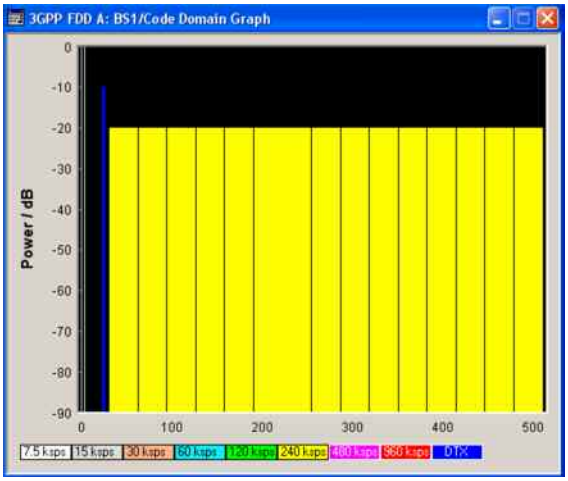
Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN15:HSDP:HSET:TYPE LOP`

Type 3 (MIMO)

(Available for instruments equipped with option SMx-K59 and enabled two-antenna system only)

HS-SCCH Type 3 mode is defined for MIMO operation (see also *"MIMO downlink control channel support"*).
Enabling this operation mode, enables the parameters in section **MIMO Settings** and the Stream 2 parameters in sections **HARQ Simulation**, **Signal Structure** and **Coding Configuration**.
While working in HS-SCCH Type 3 mode and simulating Antenna 2 of one two-antenna system without transmit diversity, no control channel is send althought the HS-SCCH channel is displayed as active in the channel table.

To prove that there is no control channel transmission, consult the **Code Domain Graph**.



The HS-SCCH channel is displayed as DTX.

Remote-control command:
`SOUR:BB:W3GP:BST1:TDIV ANT1`
`SOUR:BB:W3GP:BST1:CHAN15:HSDP:HSET:TYPE MIMO`

MIMO Settings - HSDPA H-Set BS1 - 3GPP FDD

Note:
The parameters in this section are available for instruments equipped with option SMx-K59, BS1, HSDPA H-Set Mode, and for HS-SCCH Type 3 (MIMO) only.

Precoding Weight Pattern (w2) - BS - 3GPP FDD

Selects the sequence for the MIMO precoding weight parameter w2.

The values of the weight parameters w1, w3 and w4 are calculated based on the value for w2 (see *"MIMO in HSPA+"*).

Remote-control command:
`SOUR:BB:W3GP:BST1:TDIV ANT1`
`SOUR:BB:W3GP:BST1:CHAN15:HSDP:HSET:TYPE MIMO`
`SOUR:BB:W3GP:BST1:CHAN15:HSDP:HSET:PWP "0,2,3,1"`

Stream 2 Active Pattern - BS - 3GPP FDD

Enables/disables a temporal deactivation of Stream 2 per TTI in form of sending pattern.

The stream 2 sending pattern is a sequence of max 16 values of "1" (enables Stream 2 for that TTI) and "-" (disabled Stream 2 for that TTI).

Remote-control command:
`SOUR:BB:W3GP:BST1:TDIV ANT1`
`SOUR:BB:W3GP:BST1:CHAN15:HSDP:HSET:TYPE MIMO`
`SOUR:BB:W3GP:BST1:CHAN15:HSDP:HSET:STAP "11-"`

Global Settings - HSDPA H-Set BS1 - 3GPP FDD

Note:
The parameters in this section are available for BS1 and HSDPA H-Set Mode only.

Data Source (HS-PDSCH) - BS - 3GPP FDD

Selects the data source for the transport channel.

New data is retrieved from the data source each time an initial transmission is performed within one TTI.
An initial transmission is performed in case of **HARQ Mode** set to Constant ACK or by each new beginning of the **Redundancy Version Sequence**.

The following are available for selection as data sources:

All 0
All 1

0 data and 1 data are generated internally.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN13:HSDP:HSET:DATA ZERO | ONE`

PN xx

PRBS data as per CCITT with period lengths between 2^9-1 and 2^{23}-1 is generated internally.

Remote-control commands:
`SOUR:BB:W3GP:BST1:CHAN13:HSDP:HSET:DATA PN9|PN11|PN15|PN16|PN20|PN21|PN23`

Pattern
Pattern

A user-definable bit pattern with a maximum length of 64 bits is generated internally.

The bit pattern is defined in the **Pattern** entry field.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN13:HSDP:HSET:DATA PATT`
`SOUR:BB:W3GP:BST1:CHAN13:HSDP:HSET:DATA:PATT #H3F,8`

Data List
Select Data List

Internal data from a programmable data list is used. The data list can be generated by the Data Editor or generated externally.

Data lists are selected in the **Select Data List** field.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN13:HSDP:HSET:DATA DSEL`
`SOUR:BB:W3GP:BST1:CHAN13:HSDP:HSET:DATA:DSEL "hset_list1"`

UEID (H-RNTI) - BS - 3GPP FDD

Enters the UE identity which is the HS-DSCH Radio Network Identifier (H-RNTI) defined in 3GPP TS 25.331: "Radio Resource Control (RRC); Protocol Specification".

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:HSET:UEID`

Channelization Code HS-SCCH (SF128) - BS - 3GPP FDD

Sets the channelization code of the HS-SCCH.

Note:
*To let the instrument generate a signal equal to the one generated by an instrument equipped with an older firmware, set the same **Channelization Codes** as the codes used for your physical channels.*

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:HSET:HSCC 10`

Number of HS-PDSCH Channel Codes - BS - 3GPP FDD

Sets the number of physical HS-PDSCH data channels assigned to the HS-SCCH.

The maximum number of channels assigned to the H-Set depends on the **HS-SCCH Type** and the channel number of the first HS-PDSCH channel in the H-Set.
For HS-SCCH Type 2 (less operation) maximum of two channels can be assigned.
For HS-SCCH Type 1 (normal operation) and Type 3 (MIMO) the maximum number of assigned channels is 15.

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:HSET:CLEN?`

Start Cannelization Code HS-PDSCH (SF16) - BS - 3GPP FDD

Sets the channelization code of the first HS-PDSCH channel in the H-Set.
The channelization codes of the rest of the HS-PDSCHs in this H-Set are set automatically.

Note:
*To let the instrument generate a signal equal to the one generated by an instrument equipped with an older firmware, set the same **Channelization Codes** as the codes used for your physical channels.*

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:HSET:SCC 5`

Coding Configuration - HSDPA H-Set BS1 - 3GPP FDD

Note:
The parameters in this section are available for BS1 and HSDPA H-Set Mode only.
The parameters for stream 2 are available for instruments equipped with option SMx-K59 and for HS-SCCH Type 3 only.

HS-PDSCH Modulation Stream1/2 - BS - 3GPP FDD

Sets the HS-PDSCH modulation for stream 1 and stream 2 to QPSK, 16QAM or 64QAM.

Note:
The modulation 64QAM is available for instruments equipped with option SMx-K59 only.

For HS-SCCH Type 2, the available modulation scheme is QPSK only.

For HS-SCCH Type 3 (MIMO), the modulation selected for stream 1 has to be the higher order one, i.e. combination 16QAM/64QAM is not allowed.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN15:HSDP:HSET:TYPE MIMO`
`SOUR:BB:W3GP:BST1:CHAN15:HSDP:HSET:MOD1 QAM64`
`SOUR:BB:W3GP:BST1:CHAN15:HSDP:HSET:MOD2 QAM16`

UE Supports 64QAM - BS - 3GPP FDD

(Available for HS-SCCH Type 1 and 16QAM only)

Enables/disables UE support of 64QAM.

In case this paramour is disabled, i.e. the UE does not support 64QAM, the $x_{ccs,7}$ bit is used for channelization information.

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:HSET:S64 ON`

Binary Channel Bits per TTI (Physical Layer) Stream1/2 - BS - 3GPP FDD

Displays the coded binary channel bits per TTI and per stream.

The value displayed is calculated upon the values and selections for the parameters **HS-PDSCH Modulation**, **Symbol Rate** and **Number of HS-PDSCH Channel Codes**.

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:HSET:BCBT2?`

Transport Block Size Table Stream1/2 - BS - 3GPP FDD

Selects Table 0 or Table 1 as described in in 3GPP TS 25.321.

For **HS-PDSCH Modulation** set to 64QAM, only Table 1 is available.

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:HSET:TBS:TABL1 TAB0`

Transport Block Size Index Stream1/2 - BS - 3GPP FDD

Selects the Index ki for the corresponding table and stream, as described in in 3GPP TS 25.321.

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:HSET:TBS:IND1 25`

Transport Block Size Reference Stream1/2 - BS - 3GPP FDD

(Available for HS-SCCH Type 2 only)

While working in less operation mode, this parameter is signaled instead of the parameter **Transport Block Size Index**.

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:HSET:TBS:REF 2`

Information Bit Payload (TB-Size) Stream 1/2 - BS - 3GPP FDD

Displays the payload of the information bit. This value determines the number of transport layer bits sent in each TTI before coding.

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:HSET:BPAY?`

Coding Rate Stream 1/2 - BS - 3GPP FDD

Displays the resulting coding rate per stream.

The coding rate is calculated as a relation between the **Information Bit Payload** and **Binary Channel Bits per TTI**.

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:HSET:CRAT2?`

Virtual IR Buffer Size (per HARQ Process) Stream1/2 - BS - 3GPP FDD

Sets the size of the Virtual IR Buffer (Number of SMLs per HARQ-Process) per stream.

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:HSET:VIBS1?`

Signal Structure - HSDPA H-Set BS1 - 3GPP FDD

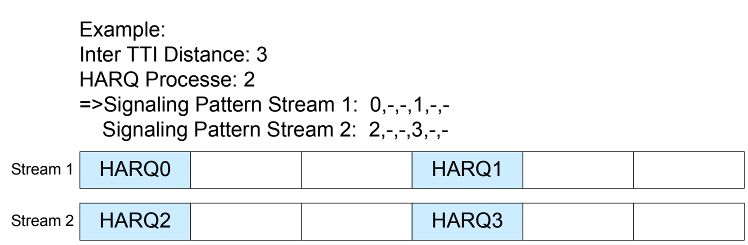
Note:
The parameters in this section are available for BS1 and HSDPA H-Set Mode only.
The parameters for stream 2 are available for instruments equipped with option SMx-K59 and for HS-SCCH Type 3 only.

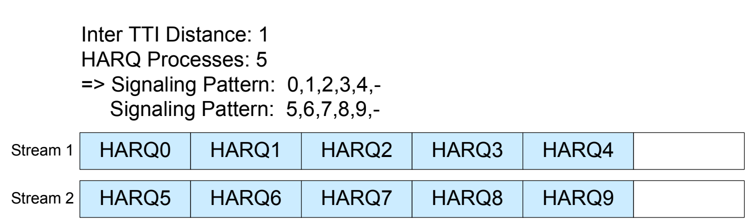
Inter TTI Distance (H-Set) - BS - 3GPP FDD

(Available for subframe x only)

Selects the distance between two packets in HSDPA packet mode.

The distance is set in number of sub-frames (3 slots = 2 ms).
An **Inter TTI Distance** of 1 means continuous generation.





Remote-control command:
`SOUR:BB:W3GP:BST2:CHAN15:HSDP:TTID 4`

Number of HARQ Processes per Stream - BS - 3GPP FDD

Sets the number of HARQ processes. This value determines the distribution of the payload in the subframes and depends on the **Inter TTI Distance** (see the figure above).

A minimum of 6 HARQ Processes are required to achieve continuous data transmission.

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:HSET:HARQ:LENG?`

Signaling Pattern Stream1/2 - BS - 3GPP FDD

Displays the distribution of packets over time.
The Signaling Pattern displays a HARQ-Process cycle and is a sequence of HARQ-IDs and "-".
A HARQ-ID indicates a packet, a "-" indicates no packet (see the figure above).
The Signaling Pattern is cyclically repeated.

Depending on the selected **Burst Mode**, a Dummy - TTI will be sent within the no packet subframes.

Remote-control command:
```
BB:W3GP:BST1:CHAN15:HSDP:TTID 3
BB:W3GP:BST1:CHAN12:HSDP:HSET:HARQ:LENG 2
BB:W3GP:BST1:CHAN12:HSDP:HSET:SPAT1?
Response: "0,-,-1,-,-"

BB:W3GP:BST1:CHAN12:HSDP:HSET:SPAT2?
Response: "2,-,-,3-,-"
```

HARQ Simulation - HSDPA H-Set BS1 - 3GPP FDD

Note:
The parameters in this section are available for BS1 and HSDPA H-Set Mode only.
The parameters for stream 2 are available for instruments equipped with option SMx-K59 and for HS-SCCH Type 3 only.

Mode (HARQ Simulation) - BS - 3GPP FDD

Sets the HARQ Simulation Mode.

Note:
*To let the instrument generate a signal equal to the one generated by an instrument equipped with an older firmware, set the **HARQ Mode** to **Constant ACK**.*

Constant ACK New data is used for each new TTI.

Remote-control command:
```
BB:W3GP:BST1:CHAN12:HSDP:MODE HSET
BB:W3GP:BST1:CHAN12:HSDP:HSET:HARQ:MO
DE CACK
```

Constant NACK **(enabled in Advanced Mode only)**

Enables NACK simulation, i.e. depending on the sequence selected for the parameter Redundancy Version Parameter Sequence packets are retransmitted.

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
`BB:W3GP:BST1:CHAN12:HSDP:HSET:AMOD ON`
`BB:W3GP:BST1:CHAN12:HSDP:HSET:HARQ:MODE CNAC`

Redundancy Version Parameter Stream1/2- BS - 3GPP FDD

The parameter is enabled for **HARQ Simulation Mode** set to Constant ACK.

Enters the Redundancy Version Parameter per stream.
This value determines the processing of the Forward Error Correction and Constellation Arrangement (16/64QAM modulation), see TS 25.212 4.6.2.

For HS-SCCH Type 2 (less operation), the Redundancy Version Parameter is always 0.

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:HSET:RVP2 2`

Redundancy Version Parameter Sequence Stream 1/2 - BS - 3GPP FDD

The parameter is enabled for **HARQ Simulation Mode** set to Constant NACK.

Enters a sequence of Redundancy Version Parameters per stream.
The value of the RV parameter determines the processing of the Forward Error Correction and Constellation Arrangement (16/64QAM modulation), see TS 25.212 4.6.2.

The sequence has a length of maximum 8 values. The sequence length determines the maximum number of retransmissions. New data is retrieved from the data source after reaching the end of the sequence.

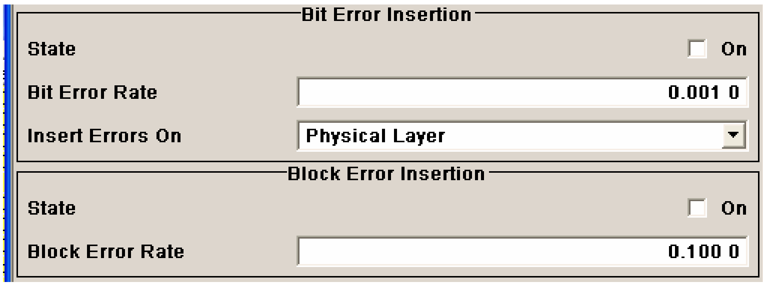
For HS-SCCH Type 2 (less operation), the Redundancy Version Parameter Sequence is always "0,3,4".

Remote-control command:
`BB:W3GP:BST1:CHAN12:HSDP:HSET:RVPS2 '0,1,3,2,0,1,2'`

Error Insertion - HSDPA H-Set BS1 - 3GPP FDD

Note:
The parameters in this menu section are available for BS1, HSDPA H-Set Mode and disabled Advanced Mode only.

In the **Bit Error Insertion** and **Block Error Insertion** sections, errors can be inserted into the data source and into the CRC checksum, in order, for example, to check the bit and block error rate testers.



Bit Error State - HSDPA H-Set BS1 - 3GPP FDD

Activates or deactivates bit error generation.

Bit errors are inserted into the data stream of the coupled HS-PDSCHs. It is possible to select the layer in which the errors are inserted (physical or transport layer).

When the data source is read out, individual bits are deliberately inverted at random points in the data bit stream at the specified error rate in order to simulate an invalid signal.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN12:HSDP:DERR:BIT:STAT ON`

Bit Error Rate TCH - HSDPA H-Set BS1 - 3GPP FDD

Sets the bit error rate.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN12:HSDP:DERR:BIT:RATE 1E-3`

Insert Errors On - HSDPA H-Set BS1 - 3GPP FDD

Selects the layer at which bit errors are inserted.

Transport layer
Bit errors are inserted in the transport layer.

Remote-control command:
`SOUR:BB:W3GP:ENH:CHAN12:HSDP:DERR:BIT:LAY TRAN`

Physical layer
Bit errors are inserted in the physical layer.

Remote-control commands:
`SOUR:BB:W3GP:BST:ENH:CHAN12:HSDP:DERR:BIT:LAY PHYS`

Block Error State - HSDPA H-Set BS1 - 3GPP FDD

Activates or deactivates block error generation.

The CRC checksum is determined and then the last bit is inverted at the specified error probability in order to simulate an invalid signal.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN12:HSDP:DERR:BLOC:STAT ON`

Block Error Rate - HSDPA H-Set BS1 - 3GPP FDD

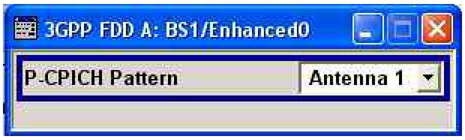
Sets the block error rate.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN12:HSDP:DERR:BLOC:RATE 1E-3`

Enhanced Settings for P-CPICH - BS1 - 3GPP FDD

The **Enhanced Settings** menu can be called in the BS channel table in column **Enhanced Settings** with button **Config...**.

This menu is only available for base station 1.



P-CPICH Pattern - Enhanced P-CPICH BS1 - 3GPP FDD

Sets the P-CPICH pattern (channel 0).

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:PCP:PATT ANT2`

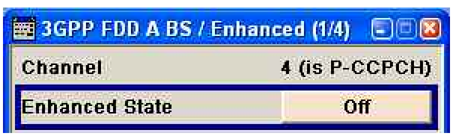
Enhanced Settings for P-CCPCH - BS1 - 3GPP FDD

The **Enhanced Settings** menu can be called in the BS channel table in column **Enhanced Settings** with button **Config...**.

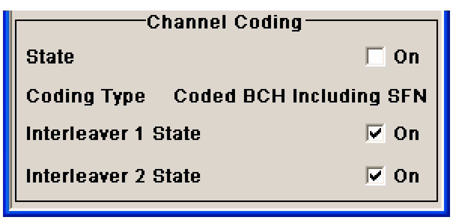
This menu is only available for base station 1.

The settings for the enhanced P-CCPCH channel and the enhanced DPCH channels are different (see Section "*Enhanced Settings for DPCHs - BS1 - 3GPP FDD*", Page 1.91). The menu for the enhanced P-CCPCH channel (channel 4) is described below.

The upper section is where the selected channel is displayed and where the enhanced state of this channel can be activated.



The **Channel Coding** section is where the channel coding settings are made. Interleaver states 1 and 2 can be activated separately.



Channel Number - Enhanced P-CCPCH BS1 - 3GPP FDD

Displays the channel number and the channel type.

Remote-control command: n.a.
(the channel is selected by the keyword PCCPch)

State- Enhanced P-CCPCH BS1 - 3GPP FDD

Switches the P-CCPCH (Primary Common Control Phys. Channel) to the enhanced state. The channel signal is generated in realtime.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:PCCP:STAT ON`

Channel Coding - Enhanced P-CCPCH BS1 - 3GPP FDD

The **Channel Coding** section is where the channel coding settings are made.

The channel-coded P-CCPCH (Broadcast Channel BCH) with System Frame Number is generated according to the following principle.

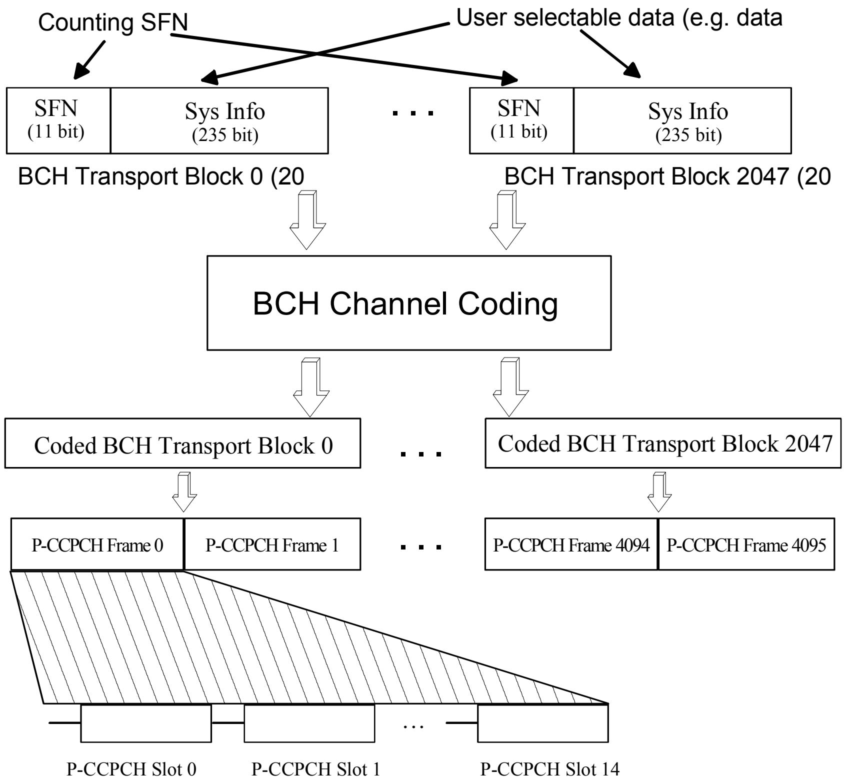


Fig. 17 Generation of a channel coded P-CCPCH/BCH

The data blocks of the BCH at transport-channel level comprise data determined for 20 ms of the P-CCPCH (i.e. 2 frames) after channel coding. The first field of such a data block is an 11-bit long field for the system frame number (SFN). The SFN is automatically incremented by 1 (as stipulated in the standard) from transport block to transport block (equivalent to a step width of 2 frames due to the transport time interval length of 20 ms). After 2048 transport blocks (equivalent to 4096 frames) the SFN is reset and starts again at 0 (SFN restart). An output trigger indicating the SFN restart can be generated (see *Trigger - Marker - 3GPP FDD_D2HLink_163497*", Page 1.25).

The SFN format is defined in the standard; it is MSB-first coded.

The remaining system information (a 235-bit long field per block) is filled from the data source selected for the P-CCPCH.

A data list can be used to transmit further specific system information in addition to the SFN. If only the SFN is required, **ALL 0** is recommended as data source for P-CCPCH.

The BCH transport blocks are then channel-coded. A coded transport block comprises the data sequence for two P-CCPCH frames.

Channel Coding State - Enhanced P-CCPCH BS1 - 3GPP FDD

Activates or deactivates channel coding.

The coding scheme is displayed in the field below.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:PCCP:CCOD:STAT ON`

Channel Coding Type - Enhanced P-CCPCH BS1 - 3GPP FDD

Displays the coding scheme.

The coding scheme of P-CCPCH (BCH) is specified in the standard. The channel is generated automatically with the counting system frame number (SFN). The system information after the SFN field is completed from the selected data source.

Remote-control command
`SOUR:BB:W3GP:BST:ENH:PCCP:CCOD:TYPE?`
Response: `BCHS`

Interleaver - Enhanced P-CCPCH BS1 - 3GPP FDD

Activates or deactivates channel coding interleaver states 1 and 2.

Note:
The interleaver states do not cause the symbol rate to change

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:PCCP:CCOD:INT1 ON`

Enhanced Settings for DPCHs - BS1 - 3GPP FDD

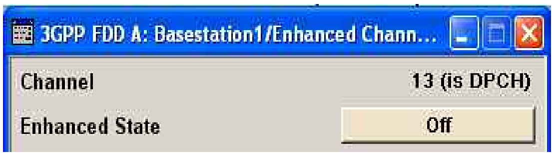
The **Enhanced Settings** menu can be called in the channel table in column **Enhanced/HSDPA Settings** with button **Config...**.

This menu is only available for base station 1.

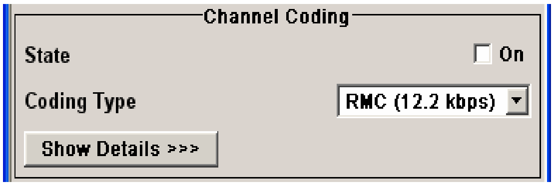
The settings for the enhanced P-CCPCH channel (see section above "*Enhanced Settings for P-CCPCH - BS1 - 3GPP FDD*", Page 1.89 and the enhanced DPCH channels are different. The menu for the enhanced DPCH channels (channels 12... 14) is described below. The channels can be set independently.

Note:
*For high speed channels, menu HSDPA Settings is called with button **Config...**.*

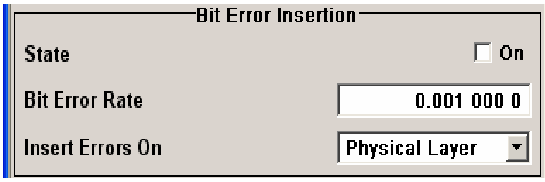
The upper section is where the selected channel is displayed and where the enhanced state of this channel can be activated.



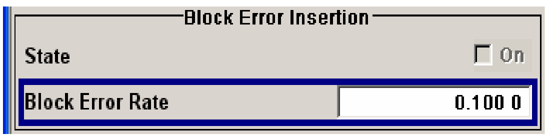
The **Channel Coding** section is where the channel coding settings are made. You can choose between a reduced display, where it is only possible to select the coding scheme, and a display with detailed setting options. The **Transport Channel** section for detailed settings can be revealed with the **Show Details >>>** button and hidden with the **<<< Hide Details** button.



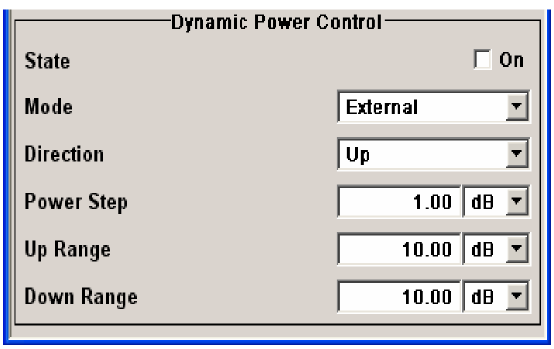
The **Bit Error Insertion** section is where the bit error simulation is configured and activated.



The **Block Error Insertion** section is where the block error simulation is configured and activated.



In the **Dynamic Power Control** section, the power of the selected Enhanced Channel can be increased or decreased within the predefined dynamic range (**Up Range** + **Down Range**) and with the predefined step size (**Power Step**).



In the **Closed Loop Transmit Diversity** section, the Closed Loop Transmit Diversity is enabled or disabled.

Channel Number - Enhanced DPCHs BS1 - 3GPP FDD

Displays the number and type of the channel being configured in the enhanced state.

Remote-control command: n.a.
(the channel is selected by the numerical suffix at `CHANnel<n>`)

Enhanced State - Enhanced DPCHs BS1 - 3GPP FDD

Switches the DPCH channel to the enhanced state.

In the enhanced state, the modulation signal of the selected channel is generated in realtime. It is possible to activate channel coding and simulate bit and block errors. Data lists, for example with user data for the transport layer, can be used as the data source.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:STAT ON`

Channel Coding - Enhanced DPCHs BS1 - 3GPP FDD

The **Channel Coding** section is where the channel coding settings are made. You can choose between a reduced display and the detailed setting options display. With the reduced display, it is only possible to select the coding scheme and this selection sets the associated parameters to the presetting prescribed in the standard. The **Transport Channel** section for detailed setting and for defining a user coding can be revealed with the **Show Details >>>** button and hidden with the **<<< Hide Details** button.

A downlink reference measurement channel according to 3GPP TS 25.101 is generated when the transport channels DTCH (Dedicated Traffic Channel) and DCCH (Dedicated Control Channel) , which contain the user data, are mapped to a DPCH (Dedicated Physical Channel) with a different data rate after channel coding and multiplexing. The display below is taken from the standard (TS 25.101) and shows in diagrammatic form the generation of a 12.2 kbps reference measurement channel from the DTCH and DCCH transport channels (see standard for figures and tables of other reference measurement channels).

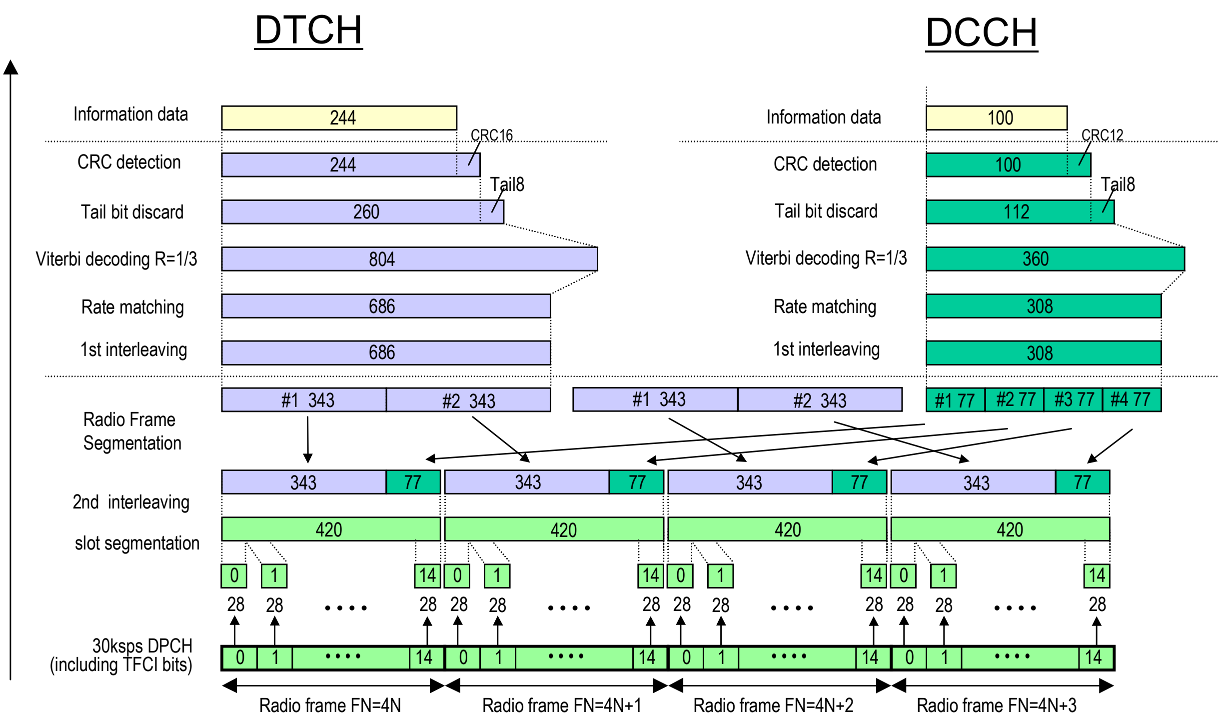


Fig. 18 Channel coding of the 12.2 kbps reference measurement channel (downlink)

Fig. 19 The table below shows a summary of the transport channel parameters of the 12.2 kpbs reference measurement channel

Parameter	**DCCH**	**DTCH**
Data Source	All 0	All 0
Transport Block Size	100	244
Transmission Time Interval	40 ms	20 ms
Type of Error Protection	Convolution Coding	Convolution Coding
Coding Rate	1/3	1/3
Rate Matching attribute	256	256
Size of CRC	12	16
Interleaver 1/2	On	On

Channel Coding State - Enhanced DPCHs BS1 - 3GPP FDD

Activates or deactivates channel coding.

Channel-coded measurement channels - so-called "reference measurement channels" - are required for many test procedures specified by the standard.

When channel coding is activated, (depending on the coding type) the slot format (and thus the symbol rate, the pilot length and the TFCI state) are predetermined. The corresponding parameters in the channel table are disabled.

Remote-control command:
`SOUR:BB:W3GP:BST1:ENH:CHAN13:DPCH:CCOD:STAT ON`

Channel Coding Type - Enhanced DPCHs BS1 - 3GPP FDD

Selects channel coding.

The 3GPP specification defines 4 reference measurement channel coding types, which differ in the input data bit rate bit to be processed (12.2, 64, 144 and 384 ksps). The additional AMR CODER coding scheme generates the coding of a voice channel.
The BTFD coding types with different data rates are also defined in the 3GPP specification (TS 34.121). They are used for the receiver quality test **Blind Transport Format Detection**. DTX (Discontinuous Transmission) bits are included in the data stream between rate matching and interleaving 1.

User coding can be defined as required in the detailed coding settings menu section revealed with button **Show Details >>>**. They can be stored and loaded in the **User Coding...** submenu. Selection **User** is indicated as soon as a coding parameter is modified after selecting a predefined coding type.

The input data bits are taken for channel coding from the data source specified in the **<<< Hide Details** menu section. The bits are available with a higher rate at the channel coding output. The allocations between the measurement input data bit rate and the output symbol rate are fixed, that is to say, the symbol rate is adjusted automatically.

The following are available for selection:

RMC 12.2 kbps 12.2 kbps measurement channel

RMC 64 kbps 64 kbps measurement channel

RMC 144 kbps 144 kbps measurement channel

RMC 384 kbps 384 kbps measurement channel

AMR 12.2 kbps channel coding for the AMR coder

BTFD Rate 1 12.2ksps
Blind Transport Format Detection Rate 1 (12.2 kbps)

BTFD Rate 2 7.95ksps
Blind Transport Format Detection Rate 2 (7.95 kbps)

BTFD Rate 3 1.95ksps
Blind Transport Format Detection Rate 3 (1.95 kbps)

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:CCOD:TYPE M12K`

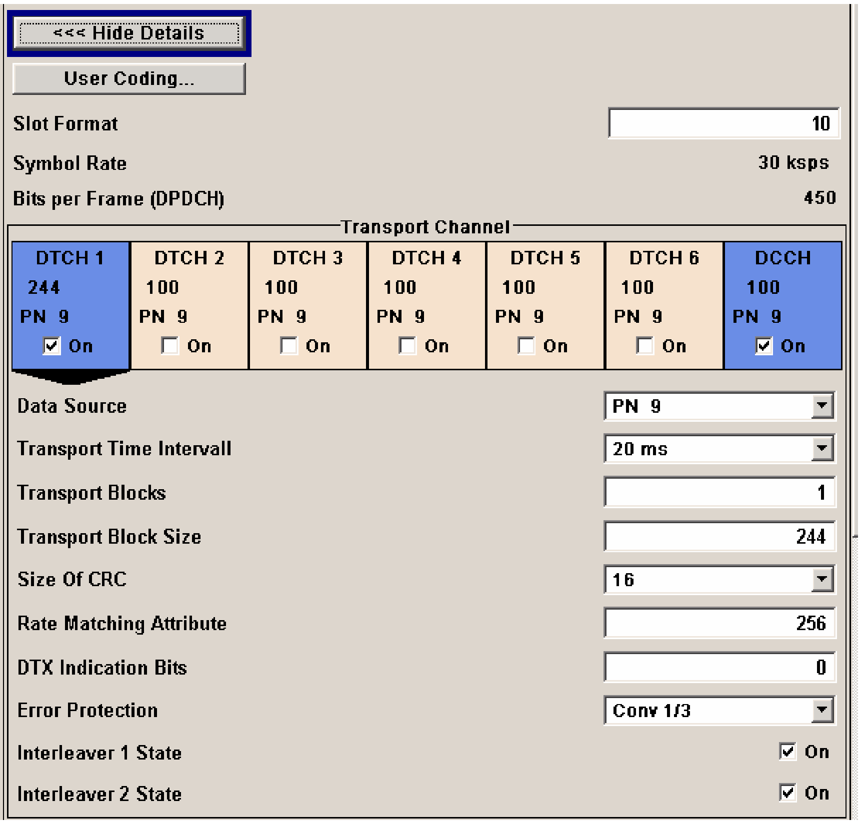
Show Details... - Enhanced DPCHs BS1 - 3GPP FDD

Reveals the detailed setting options for channel coding.

Available as well as the **Transport Channel** section are the **Bits per Frame** parameter and the **User Coding** button.

Once the details are revealed, the labeling on the button changes to **<<< Hide Details**. Use this to hide the detailed setting options display again.

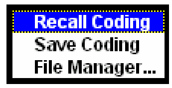
Remote-control command: n.a.



User Coding ... - Enhanced DPCHs BS1 - 3GPP FDD

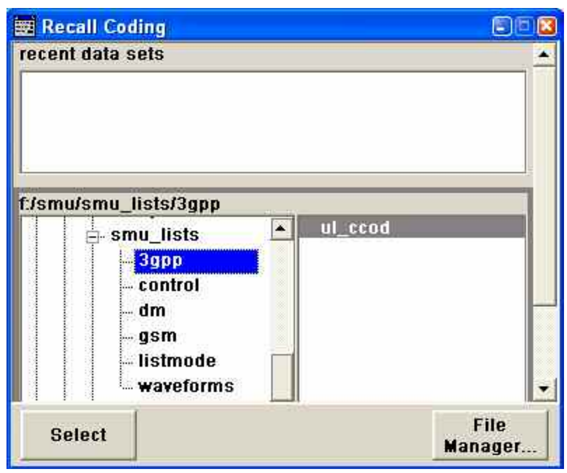
Calls the **User Coding** menu.

From the **User Coding** menu, the **File Select** windows for saving and recalling user-defined channel coding and the **File Manager** can be called.



User coding of BST1 are stored as files with the predefined file extension ***.3g_ccod_dl**. The file name and the directory they are stored in are user-definable; the file extension is assigned automatically

The complete channel coding settings in the menu section **Show Details>>>** are saved and recalled.



Remote-control command:
`MMEM:CDIR "f:/gen_lists/3gpp"`
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:CCOD:USER:CAT?`
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:CCOD:USER:STOR 'dl_c1'`
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:CCOD:USER:LOAD 'dl_c1'`

Slot Format (DPDCH) - Enhanced DPCHs BS1 - 3GPP FDD

Enters the slot format. The slot format (and thus the symbol rate, the pilot length and the TFCI state) depends on the coding type selected. The User Coding selection appears as soon as the slot format is changed.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:CCOD:SFOR?`

Symbol Rate (DPDCH) - Enhanced DPCHs BS1 - 3GPP FDD

Displays the symbol rate.

The symbol rate is determined by the slot format set.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:CCOD:SRAT?`

Bits per Frame (DPDCH) - Enhanced DPCHs BS1 - 3GPP FDD

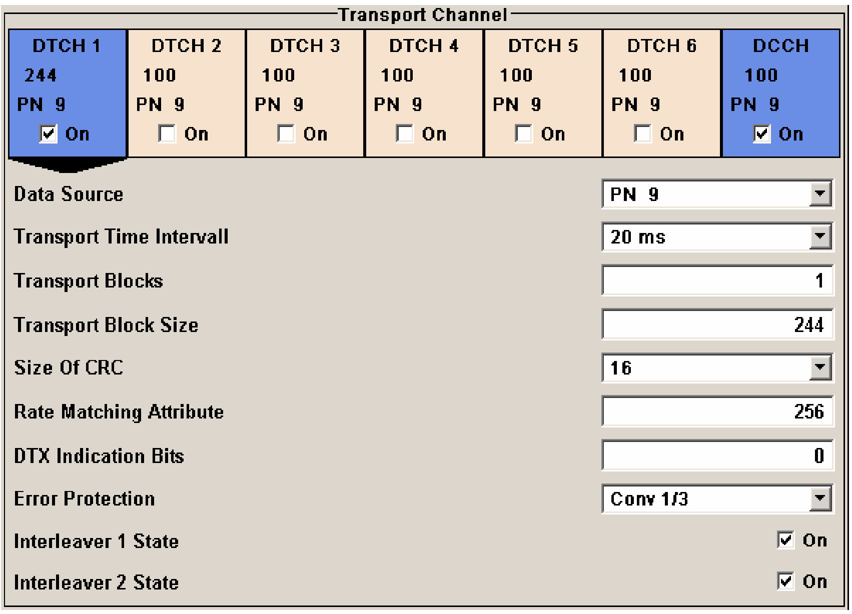
Displays the data bits in the DPDCH component of the DPCH frame at physical level. The value depends on the slot format.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:CCOD:BPFR?`

Transport Channel - Enhanced DPCHs BS1 - 3GPP FDD

In the **Transport Channel** section, up to 7 transport channels (TCHs) can be configured. The first one is always a DCCH; the other six are DTCHs (DTCH1 to 6). The most important parameters of the TCH are displayed (data source and transport block size). The associated parameters shown in the section below depend on which TCH is currently selected.

A wide arrow beneath the block indicates which TCH is currently selected.



Transport Channel State - Enhanced DPCHs BS1 - 3GPP FDD

Activates or deactivates the transport channel.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH3:STAT ON`

Note:
In case of remote control, DCCH corresponds to :TCHannel0, DTCH1 to :TCHannel1, etc.

Data Source TCH - Enhanced DPCHs BS1 - 3GPP FDD

Selects the data source for the transport channel.

The following are available for selection as data sources:

All 0 0 data and 1 data are generated internally.

All 1 Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH3 :DATA ZERO`
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH3 :DATA ONE`

PN xx PRBS data as per CCITT with period lengths between 2^9-1 and 2^{23}-1 is generated internally.

Remote-control commands:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH3 :DATA PN9|PN11|PN15|PN16|PN20|PN21|PN23`

Pattern
Pattern

A user-definable bit pattern with a maximum length of 64 bits is generated internally.

The bit pattern is defined in the **Pattern** entry field.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH3 :DATA PATT`
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH3 :DATA:PATT #H3F,8`

Data List
Select Data List

Internal data from a programmable data list is used. The data list can be generated by the Data Editor or generated externally.

Data lists are selected in the Select Data List field.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH3 :DATA DSEL`
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH3 :DSEL "dpdc_list1"`

Transport Time Interval TCH - Enhanced DPCHs BS1 - 3GPP FDD

Sets the number of frames into which a TCH is divided. This setting also defines the interleaver depth.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1:TTIN 10 ms`

Transport Block Count TCH - Enhanced DPCHs BS1 - 3GPP FDD

Sets the number of transport blocks for the TCH.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1:TBC 2`

Transport Block Size TCH - Enhanced DPCHs BS1 - 3GPP FDD

Sets the size of the transport block at the channel coding input.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1:TBS 244`

Size of CRC TCH - Enhanced DPCHs BS1 - 3GPP FDD

Defines the type (length) of the CRC. Checksum determination can also be deactivated (setting **None**).

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1:CRCS 8`

Rate Matching Attribute TCH - Enhanced DPCHs BS1 - 3GPP FDD

Sets data rate matching (Rate Matching).

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1:RMAT 256`

DTX Indication Bits TCH - Enhanced DPCHs BS1 - 3GPP FDD

Sets the number of DTX (Discontinuous Transmission) bits. These bits are entered in the data stream between rate matching and interleaver 1. Channel coding of BTFD reference measurement channels Rate 2 and Rate 3 includes DTX267 and DTX644, respectively (see 3GPP TS 34.121).

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1:DTX 257`

Error Protection TCH - Enhanced DPCHs BS1 - 3GPP FDD

Selects error protection.

None

No error protection

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1 :EPR NONE`

Turbo 1/3

Turbo Coder of rate 1/3 in accordance with the 3GPP specifications.

Remote-control commands:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1 :EPR TURB3`

Conv 1/2 | 1/3

Convolution Coder of rate ½ or 1/3 with generator polynomials defined by 3GPP.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1 :EPR CON2`

Interleaver 1 State TCH - Enhanced DPCHs BS1 - 3GPP FDD

Activates or deactivates channel coding interleaver state 1 of the transport channel. Interleaver state 1 can be set independently in each TCH. Activation does not change the symbol rate.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1:INT ON`

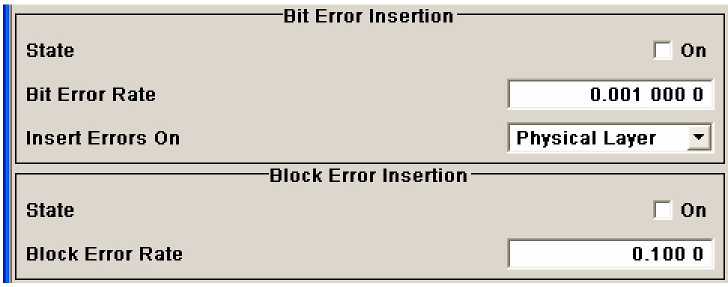
Interleaver 2 State TCH - Enhanced DPCHs BS1 - 3GPP FDD

Activates or deactivates channel coding interleaver state 2 of all the transport channels. Interleaver state 2 can only be set for all the TCHs together. Activation does not change the symbol rate.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:INT2 O`

Error Insertion - Enhanced DPCHs BS1 - 3GPP FDD

In the **Bit Error Insertion** and Block **Error Insertion** sections, errors can be inserted into the data source and into the CRC checksum, in order, for example, to check the bit and block error rate testers.



Bit Error State - Enhanced DPCHs BS1 - 3GPP FDD

Activates or deactivates bit error generation.

Bit errors are inserted into the data fields of the enhanced channels. When channel coding is active, it is possible to select the layer in which the errors are inserted (physical or transport layer).

When the data source is read out, individual bits are deliberately inverted at random points in the data bit stream at the specified error rate in order to simulate an invalid signal.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:DERR:BIT:STAT ON`

Bit Error Rate - Enhanced DPCHs BS1 - 3GPP FDD

Sets the bit error rate.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:DERR:BIT:RATE 1E-3`

Insert Errors On - Enhanced DPCHs BS1 - 3GPP FDD

Selects the layer in the coding process at which bit errors are inserted.

Transport layer

Bit errors are inserted in the transport layer.

This selection is only available when channel coding is active.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:DERR :BIT:LAY TRAN`

Physical layer

Bit errors are inserted in the physical layer.

Remote-control commands:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:DERR :BIT:LAY PHYS`

Block Error State - Enhanced DPCHs BS1 - 3GPP FDD

Activates or deactivates block error generation.

The CRC checksum is determined and then the last bit is inverted at the specified error probability in order to simulate an invalid signal.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:DERR:BLOC:STAT ON`

Block Error Rate - Enhanced DPCHs BS1 - 3GPP FDD

Sets block error rate.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:DERR:BLOC:RATE 1E-3`

Dynamic Power Control - Enhanced DPCHs BS1 - 3GPP FDD

In the **Dynamic Power Control** section of menu **Enhanced Settings**, the power of the selected enhanced channel can be increased or decreased within the predefined dynamic range (**Up Range** + **Down Range**) and with the predefined step size (**Power Step**) with an control signal.

The control signal can be provided either externally (LEV ATT), internally (TPC pattern) or manually (see **Mode** setting).

With **Dynamic Power Control** the test of Closed (Inner) Loop Power Control can be performed in two test constellations:

1. Test whether the DUT (receiver) correctly performs the SIR (Signal to Interference Ratio) measurement and inserts the corresponding bits into the TPC field of its transmitting signal. The TPC control information is provided by an external **Dynamic Power Control** signal.
2. Test whether the DUT (transmitter) responds with the correct output power to received TPC bits. This can be carried out by using a data list adapted to the test condition as TPC data source. The TPC pattern can be defined in the channel table.

The power change of the channels is performed by a switchover of the mapping table, controlled by the **Dynamic Power Control** signal which is queried at the beginning of the pilot field. Since the number of mappings is limited, the maximum dynamic range is restricted to 30 dB and the step width to min. 0.5 dB. The output power of each channel is thus limited to the dynamic range around the channel-specific start power.

Note:
*To obtain optimum signal quality, the **Power Up Range** should not be set higher than necessary since the mapping of the I/Q level in this range must be maintained as a level margin.*

Example:
Power Up Range = Power Down Range

Mode Up for channel11 and 13

Mode Down for channel 12

The following figure shows the change of channel power of the 3 enhanced channels. The external control signal LEV ATT is used.

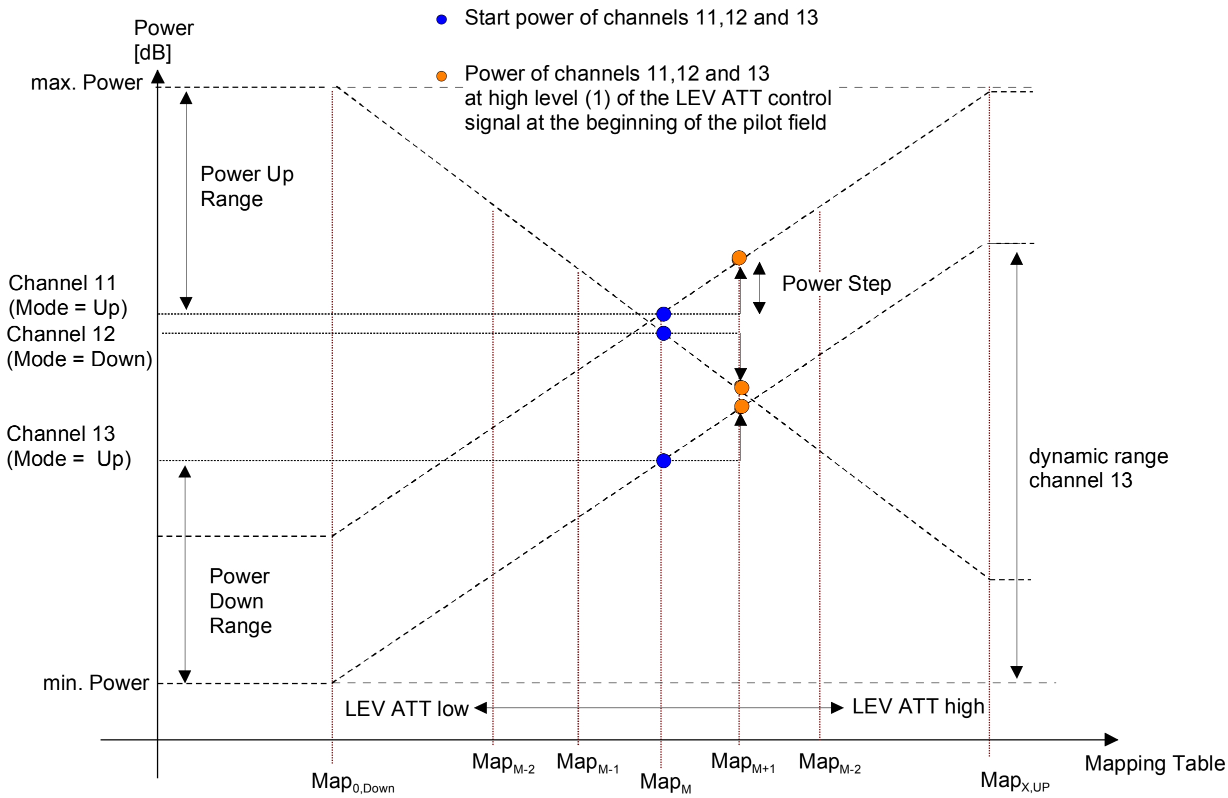


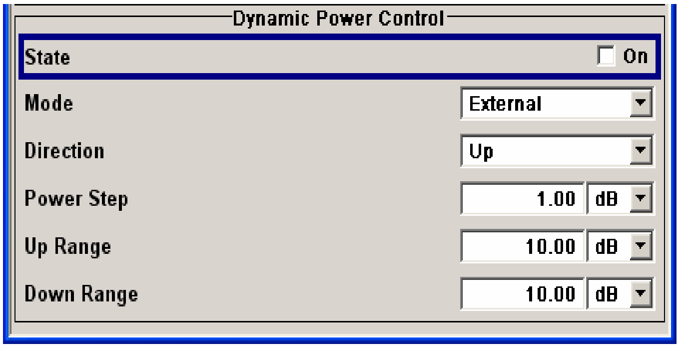
Fig. 20 Dynamic Power Control - Down Link

Available mappings are shown on the X-axis with MAP_M being the starting point. In this point, all channels have the start power which was set in the channel table.

At the beginning of the pilot field the LEVATT line is queried in each timeslot. If this line is set to logical "1" switchover is made to the right mapping MAP_{M+1}. This means an increase of the output power by **Power Step** for all channels with **Power Control Mode Up**. The power of channel 12 is decreased by the same value (see figure above).

If the LEVATT line is set to logical "0" switchover is made to the left mapping MAP_{M-1}. This means a reduction of the output power by **Power Step** for all channels with **Power Control Mode Down**. The power of channel 12 is increased by the same value.

The **Dynamic Power Control** settings are performed in the **Enhanced Settings** menu of the channel table**.**



Dynamic Power Control State - Enhanced DPCHs BS1 - 3GPP FDD

Activates or deactivates the **Dynamic Power Control** for the selected enhanced channel.

With activated Dynamic Power Control, the power of the enhanced channel can be increased or decreased within the predefined dynamic range (Up Range + Down Range) and with the predefined step size (Power Step) with an external control signal. The external control signal has to be supplied via the LEV ATT input of the AUX I/O connector.

For two-path instruments, the external control signal has to be supplied via the LEV ATT input of the AUX I/O connector (path A) or via one of the USER interfaces (path B).

The Mode settings determine if the channel power is increased or decreased by a high level of the control signal.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:STAT ON`

Mode - Enhanced DPCHs BS1 - 3GPP FDD

Selects the control signal for **Dynamic Power Control**.

External

An external control signal is used for Dynamic Power Control. The external control signal is supplied via the LEV ATT input of the AUX I/O connector.

For two-path instruments, external control signal is supplied via the LEV ATT input of the AUX I/O connector (path A) or via one of the USER interfaces (path B).

Note:
Marker 4 must be set to Slot mode and the length of the pilot fields of all active DPCHs must be same if Dynamic Power Control with external control signal is active.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:MODE EXT`

TPC

The TPC pattern is used for Dynamic Power Control. This selection corresponds to selection (Mis)Use TPC for not enhanced DPCHs.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:SOUR TPC`

Manual

The control signal is manually produced by pushing one of the buttons 0 or 1. Button 1 corresponds to a positive control signal, button 0 to a negative control signal.

The channel power is increased or decreased depending on the Direction setting by the set power step .

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:MODE MAN`
`SOUR:BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:STEP:MAN MAN0 | MAN1`

Direction - Enhanced DPCHs BS1 - 3GPP FDD

Selects the **Dynamic Power Control** direction. The **Direction** setting defines whether the channel power is increased or decreased by a high level of the control signal (see "Dynamic Power Control - Downlink" figure).

Up

A high level of the control signal leads to an increase of channel power.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:DIR UP`

Down

A high level of the control signal leads to a decrease of channel power.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:DIR DOWN`

Power Step Dyn Power Control - Enhanced DPCHs BS1 - 3GPP FDD

Sets step width by which – with **Dynamic Power Control** being switched on - the channel power of the selected enhanced channel in the timeslot grid (= 0,667 ms) is increased or decreased within the set dynamic range (**Up Range** + **Down Range**).

The start power of the channel is set in the Power column of the channel table.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:STEP 1`

Up Range Dyn Power Control - Enhanced DPCHs BS1 - 3GPP FDD

Sets dynamic range by which – with **Dynamic Power Control** switched on – the channel power of the selected enhanced channel can be increased. The resulting **Dynamic Power Control** dynamic range (**Up Range** + **Down Range**) may be 30 dB at max.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:RANG:UP 10`

Down Range Dyn Power Control - Enhanced DPCHs BS1 - 3GPP FDD

Sets dynamic range by which – with **Dynamic Power Control** switched on – the channel power of the selected enhanced channel can be decreased. The resulting **Dynamic Power Control** dynamic range (**Up Range** + **Down Range**) may be 30 dB at max.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:RANG:DOWN 10`

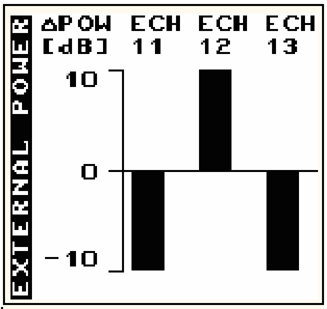
Power Control Graph - Enhanced DPCHs BS1 - 3GPP FDD

Indicates the deviation of the channel power (∆POW) from the set power start value of the corresponding enhanced channels.

The graph is automatically displayed with **Dynamic Power Control** switched on.

Note:

Since a realtime update of the window in the timeslot (= 0.667 ms) is not possible for reasons of speed, an update can be performed in a more coarse time interval. Fast channel power changes are not displayed but the settled state of the control loop can be recognized very easily.



Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:POW?`

Closed Loop Transmit Diversity - Enhanced DPCHs BS1 - 3GPP FDD

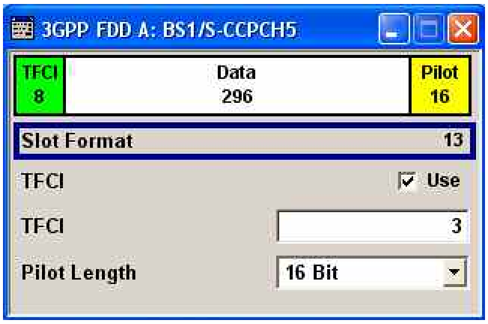
State (Closed Loop Transmit Diversity) - Enhanced DPCHs BS1 - 3GPP FDD

Enables/disables Closed Loop Transmit Diversity.

Remote-control command:
`SOUR:BB:W3GP:BST:ENH:CHAN11:DPCH:CLTD:STAT ON`

S-CCPCH Settings - BS Channel Table 3GPP FDD

The **Config S-CCPCH** menu for configuring the fields of the secondary common control physical channel can be called in the channel table in column **DPCCH Settings** with the **Config...** button.



The selected slot format predetermines the setting of the parameters provided in the menu. Whenever the TFCI State and Pilot Length settings are changed, the slot format is adjusted accordingly. Pilot Length and TFCI State can be selected for the S-CCPCH channel.

Slot Structure (S-CCPCH) - BS - 3GPP FDD

Displays the slot structure.

The structure of the slot depends on the slot format selected (see also 3GPP TS 25.211, Table 18: Secondary CCPCH fields)

Remote-control command: n.a.

Slot Format (S-CCPCH) - BS - 3GPP FDD

Displays the slot format.

The slot format displayed changes when a change is made to the TFCI and Pilot control field settings.

Remote-control command: n.a.

Use TFCI (S-CCPCH) - BS - 3GPP FDD

Activates TFCI field usage.

Note:
The remote-control command is not valid for multi channel mode.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN13:DPCC:TFCI:STAT ON`

TFCI Value (S-CCPCH) - BS - 3GPP FDD

Enters the value of the TFCI field (Transport Format Combination Indicator) . This value is used to select a combination of 30 bits, which is divided into two groups of 15 successive slots.

Note:
The remote-control command is not valid for multi channel mode.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN13:DPCC:TFCI 2`

Pilot Length (S-CCPCH) - BS - 3GPP FDD

Sets the length of the pilot fields.

The range of values for this parameter depends on the channel type and the symbol rate.

To achieve a constant slot length, the data fields are lengthened or shortened depending on the pilot length, as defined in the standard.

Notes:
The remote-control command is not valid for multi channel mode.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN13:DPCC:PLEN BIT2`

Config AICH or AP-AICH - BS Channel Table 3GPP FDD

The **Config AICH** or **Config AP-AICH** menu for configuring the fields of the dedicated physical control channel can be called in the channel table in column **DPCCH SETT** with the **Config...** button.

Signature ACK/NACK Pattern - BS - 3GPP FDD

Enters the 16 bit pattern for the ACK/NACK field.

This field is used by the base station to acknowledge, refuse or ignore requests of up to 16 user equipments.

Note:
Pattern + is entered using the numeric key 1. Pattern - is entered via the numeric key +/-.

Remote-control command: n.a.
`SOUR:BB:W3GP:BST1:CHAN7:AICH:SAP "+000000000000"`
`SOUR:BB:W3GP:BST1:CHAN8:APAI:SAP "+000000000000"`

"+" = ACK	The ACK is sent. Transmission was successful and correct.
"-" = NACK	The NACK is not sent. Transmission was not correct.
"0" = DTX	Nothing is sent. Transmission is interrupted (Discontinuous Transmission (DTX)).

Access Slot - BS - 3GPP FDD

Selects the slot in which the burst is transmitted.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN7:AICH:ASLO 2`
`SOUR:BB:W3GP:BST1:CHAN7:APAI:ASLO 2`

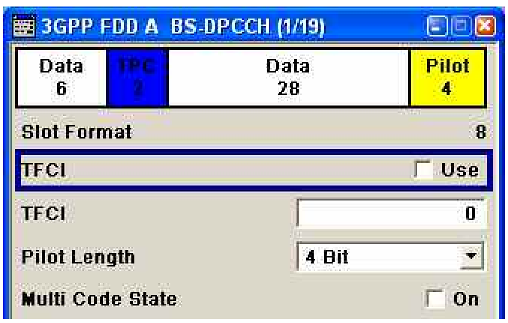
DPCCH Settings - BS Channel Table 3GPP FDD

The **Config DPCCH** menu for configuring the fields of the dedicated physical control channel can be called in the channel table in column **DPCCH Settings** with the **Config...** button.

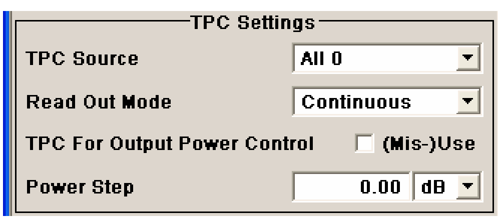
This menu is only available for selected channel types.

The selected slot format predetermines the setting of the parameters provided in the menu. Whenever the TFCI State and Pilot Length settings are changed, the slot format is adjusted accordingly.

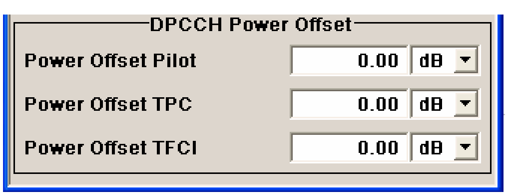
The upper section of the menu is where the slot structure is displayed and the TFCI and Pilot control fields are set.



The **TPC Settings** section is where the TPC field is set.



The **DPCCH Power Offset** section is where the power offset of the control fields to the set channel power is set.



Slot Structure (DPCCH) - BS - 3GPP FDD

Displays the slot structure.

The structure of the slot depends on the slot format selected (see also 3GPP TS 25.211, Table 11: DPDCH and DPCCH fields)

Remote-control command: n.a.

Slot Format (DPCCH) - BS - 3GPP FDD

Displays the slot format.

The slot format displayed changes when a change is made to the TFCI and Pilot control field settings.

Remote-control command: n.a.

Use TFCI (DPCCH) - BS - 3GPP FDD

Activates TFCI field usage.

Note:
The remote-control command is not valid for multi channel mode.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN13:DPCC:TFCI:STAT ON`

TFCI Value (DPCCH) - BS - 3GPP FDD

Enters the value of the TFCI field (Transport Format Combination Indicator) . This value is used to select a combination of 30 bits, which is divided into two groups of 15 successive slots.

Note:
The remote-control command is not valid for multi channel mode.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN13:DPCC:TFCI 2`

Pilot Length (DPCCH) - BS - 3GPP FDD

Sets the length of the pilot fields.

The range of values for this parameter depends on the channel type and the symbol rate.

To achieve a constant slot length, the data fields are lengthened or shortened depending on the pilot length, as defined in the standard.

Notes:
The pilot fields of all active DPCHs must be of the same length if Dynamic Power Control with external control signal is active.

The remote-control command is not valid for multi channel mode.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN13:DPCC:PLEN BIT2`

Multicode State (DPCCH) - BS - 3GPP FDD

Activates multicode transmission.

Multicode transmission can be activated for a group of channels destined for the same receiver that is to say, belonging to a radio link. The first channel of this group is used as the master channel.

With multicode transmission, the common components (Pilot, TPC and TCFI) for all the channels are spread using the spreading code of the master channel.

This parameter is only available for the DPCHs.

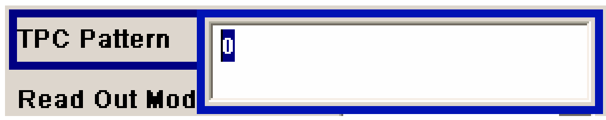
Note:
The remote-control command is not valid for multi channel mode.

Remote-control command:
```
SOUR:BB:W3GP:BST1:CHAN13:DPCC:MCOD ON
SOUR:BB:W3GP:BST1:CHAN14:DPCC:MCOD ON
SOUR:BB:W3GP:BST1:CHAN15:DPCC:MCOD ON
```

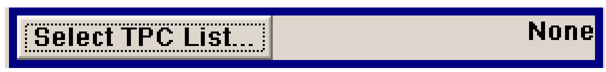
TPC Data Source (DPCCH) - BS - 3GPP FDD

The **TPC Settings** section is where the settings for the TPC field (Transmit Power Control) are made. This field is used to control the transmit power.

When **Pattern** is selected, an entry field appears for the bit pattern. The maximum bit pattern length is 64 bits.



When **Data List** is selected, a button appears for calling the **File Select** window.



Note:
The remote-control command is not valid for multi channel mode.

Remote-control command:

```
SOUR:BB:W3GP:BST2:CHAN13:DPCC:TPC:DATA ZERO | ONE

SOUR:BB:W3GP:BST2:CHAN13:DPCC:TPC:DATA PATT
SOUR:BB:W3GP:BST2:CHAN13:DPCC:TPC:DATA:PATT #H3F,8

SOUR:BB:W3GP:BST2:CHAN13:DPCC:TPC:DATA DLIS
SOUR:BB:W3GP:BST2:CHAN13:DPCC:TPC:DATA:DSEL
"tpc_bts"
```

TPC Read Out Mode (DPCCH) - BS - 3GPP FDD

Defines TPC data usage.

With 3GPP, the TPC bits are used to signal the increase or reduction in transmit power to the called station. With all read out modes, one bit is taken from the data stream for the TPC field for each slot and entered into the bit stream several times (depending on the symbol rate). The difference between the modes lies in the usage of the TPC bits.

These different modes can be used, for example, to deliberately set a base station to a specific output power (e.g. with the pattern 11111) and then let it oscillate around this power (with Single + alt. 01 and Single + alt. 10). This then allows power measurements to be carried out at the base station (at a quasi-constant power). Together with the option (Mis-) Use TPC for output power control (see below), TPC Read Out Mode can also be used to generate various output power profiles.

Continuous: The TPC bits are used cyclically.

Note:
The remote-control commands are not valid for multi channel mode.

```
Remote-control command:
SOUR:BB:W3GP:BST2:CHAN13:DPCC:TPC:REA
D CONT
```

Single + All 0
The TPC bits are used once, and then the TPC sequence is continued with 0 bits.

Remote-control commands:
`SOUR:BB:W3GP:BST2:CHAN13:DPCC:TPC:READ S0A`

Single + All 1
The TPC bits are used once, and then the TPC sequence is continued with 1 bit.

Remote-control command:
`SOUR:BB:W3GP:BST2:CHAN13:DPCC:TPC:READ S1A`

Single + alt. 01
The TPC bits are used once and then the TPC sequence is continued with 0 and 1 bits alternately (in multiples, depending on by the symbol rate, for example, 00001111).

Remote-control command:
`SOUR:BB:W3GP:BST2:CHAN13:DPCC:TPC:READ S01A`

Single + alt. 10
The TPC bits are used once and then the TPC sequence is continued with 1 and 0 bits alternately (in multiples, depending on by the symbol rate, for example, 11110000).

Remote-control command:
`SOUR:BB:W3GP:BST:DPCC:CHAN13:TPC:READ S10A`

Misuse TPC for Output Power Control (DPCCH) - BS - 3GPP FDD

Defines "mis-" use of the TPC data.

With 3GPP, the TPC bits are used to signal the increase or reduction in transmit power to the called station. If **(Mis-) use TPC for output power control** is activated, the specified pattern is misused; in order to vary the intrinsic transmit power over time. A bit of this pattern is removed for each slot in order to increase (bit = "1") or reduce (bit = "0") the channel power by the specified power step (**Power Step**). The upper limit for this is 0 dB and the lower limit -80 dB. The following envelope is produced at a channel power of 0 dB, power step 1.0 dB and pattern "001110100000011" and TPC Pattern ReadOut Mode **Continuous**.

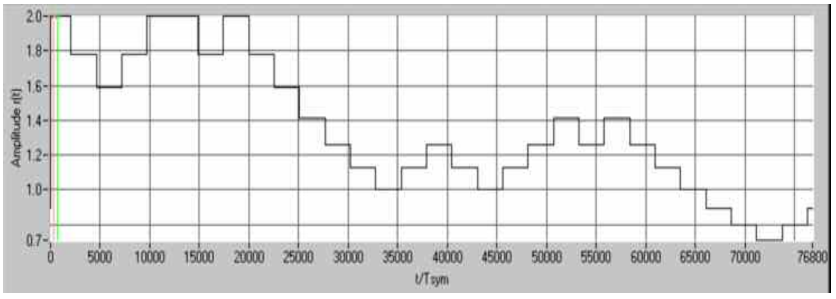


Fig. 21 Dynamic change of channel power (continuous)

Notes:

The change in power is always carried out (as stipulated in the standard) at the start of the slot pilot field.

Misuse TPC for Output Power Control is not available for enhanced DPCHs. Power Control via TPC pattern for enhanced channels can be selected for active Dynamic Power Control (see "Dynamic Power Control - Enhanced DPCHs BS1 - 3GPP FDD", page 1.101).

The remote-control command is not valid for multi channel mode.

Remote-control command:
`SOUR:BB:W3GP:BST2:CHAN13:DPCC:TPC:MIS ON`

TPC Power Step (DPCCH) - BS - 3GPP FDD

Sets the step width of the power change in dB for **(Mis-) use TPC for output power control**.

Note:

Misuse TPC for Output Power Control is not available for enhanced DPCHs. Power Control via TPC pattern for enhanced channels can be selected for active Dynamic Power Control (see "Dynamic Power Control - Enhanced DPCHs BS1 - 3GPP FDD", page 1.101).

The remote-control command is not valid for multi channel mode.

Remote-control command:
`SOUR:BB:W3GP:BST2:CHAN13:DPCC:TPC:PST 1.0`

The **DPCCH Power Offset** section is where the power offset of the control fields to the set channel power is set.

Power Offset Pilot (DPCCH) - BS - 3GPP FDD

Sets the power offset of the pilot field to the channel power in dB.

Note:

The remote-control command is not valid for multi channel mode.

Remote-control command:
`SOUR:BB:W3GP:BST2:CHAN13:DPCC:POFF:PIL 1`

Power Offset TPC (DPCCH) - BS - 3GPP FDD

Sets the power offset of the TPC field to the channel power in dB.

Note:

The remote-control command is not valid for multi channel mode.

Remote-control command:
`SOUR:BB:W3GP:BST2:CHAN13:DPCC:POFF:TPC 1`

Power Offset TFCI (DPCCH) - BS - 3GPP FDD

Sets the power offset of the TFCI field to the channel power in dB.

Note:

The remote-control command is not valid for multi channel mode.

Remote-control command:
`SOUR:BB:W3GP:BST2:CHAN13:DPCC:POFF:TFCI 1`

Config E-AGCH - BS Channel Table 3GPP FDD

The **Config E-AGCH** menu for configuring the fields of the HSUPA control channels can be called in the channel table in column **DPCCH Settings** with the **Config...** button.

E-AGCH Information Field Coding – HSUPA BS - 3GPP FDD

Enables/disables the information coding.
Disabling this parameter corresponds to a standard operation, i.e. no coding is performed and the data is sent uncoded.
Enabling this parameter allows you to configure the way the data is coded.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN20:HSUP:EAGC:IFC ON`

E-DCH TTI – HSUPA BS - 3GPP FDD

Switches between 2 ms and 10 ms. The processing duration also influences the number of used slots.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN20:HSUP:EAGC:IFC ON`
`SOUR:BB:W3GP:BST1:CHAN20:HSUP:EAGC:TTIE 2ms`

Number of entries (TTIs) – HSUPA BS - 3GPP FDD

Sets the number of configurable TTIs.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN20:HSUP:EAGC:IFC ON`
`SOUR:BB:W3GP:BST1:CHAN20:HSUP:EAGC:TTIL 10`

UEID (A-GCH) – HSUPA BS - 3GPP FDD

Sets the UE Id for the selected TTI.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN20:HSUP:EAGC:IFC ON`
`SOUR:BB:W3GP:BST1:CHAN20:HSUP:EAGC:TTIL 10`
`SOUR:BB:W3GP:BST1:CHAN20:HSUP:EAGC:TTI9:UEID 2000`

Absolute Grant Value Index – HSUPA BS - 3GPP FDD

Sets the Index for the selected TTI.
According to the TS 25.212 (4.10.1 A.1), there is a cross-reference between the grant index and the grant value.
The TTI configuration of the table is used cyclically. Depending on the selection made for the parameter E-DCH TTI, each table row corresponds to a 2ms TTI or to a 10ms TTI.

Remote-control command:
```
SOUR:BB:W3GP:BST1:CHAN20:HSUP:EAGC:IFC ON
SOUR:BB:W3GP:BST1:CHAN20:HSUP:EAGC:TTIL 10
SOUR:BB:W3GP:BST1:CHAN20:HSUP:EAGC:TTI9:AGVI 30
```

Absolute Grant Scope – HSUPA BS - 3GPP FDD

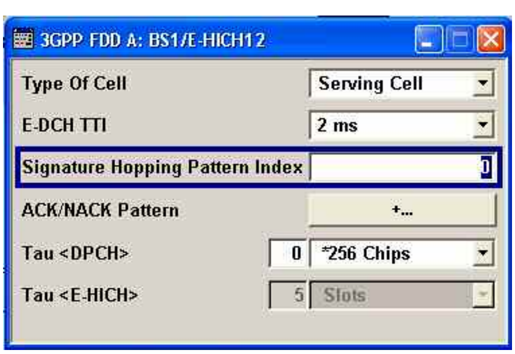
Sets the scope of the selected grant.
According to the TS 25.321, the impact of each grant on the UE depends on this parameter.

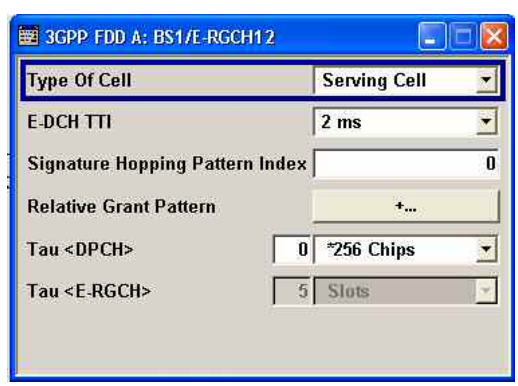
For E-DCH TTI = 10ms, the Absolute Grant Scope is always All HARQ Processes.

Remote-control command:
```
SOUR:BB:W3GP:BST1:CHAN20:HSUP:EAGC:IFC ON
SOUR:BB:W3GP:BST1:CHAN20:HSUP:EAGC:TTIL 10
SOUR:BB:W3GP:BST1:CHAN20:HSUP:EAGC:TTI9:AGSC PER
```

Config E-RGCH – E-HICH - BS Channel Table 3GPP FDD

The **Config E-RGCH** or **Config E-HICH** menu for configuring the fields of the HSUPA control channels can be called in the channel table in column **DPCCH Settings** with the **Config...** button.





Type of Cell – HSUPA BS - 3GPP

Switches between Serving Cell and Non Serving Cell. The cell type determines the number of used slots.

Remote-control command:
```
SOUR:BB:W3GP:BST1:CHAN9:HSUP:ERGC:CTYP SERV
SOUR:BB:W3GP:BST1:CHAN10:HSUP:EHIC:CTYP SERV
```

E-DCH TTI – HSUPA BS - 3GPP FDD

Switches between 2 ms and 10 ms. The processing duration also influences the number of used slots.

Remote-control command:
```
SOUR:BB:W3GP:BST1:CHAN9:HSUP:ERGC:TTIE 2ms
SOUR:BB:W3GP:BST1:CHAN10:HSUP:EHIC:TTIE 2ms
```

Signature Hopping Pattern Index – HSUPA BS - 3GPP FDD

Enters a value that identifies the user equipment. The values are defined in TS 25.211.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN9:HSUP:ERGC:SSIN 0`
`SOUR:BB:W3GP:BST1:CHAN10:HSUP:EHIC:SSIN 0`

Relative Grant Pattern – HSUPA BS - 3GPP FDD

(This feature is available for E-RGCH only.)

Enters a pattern: 0 = Hold, + = Up, - = Down.

Note:
Pattern + is entered using the numeric key 1. Pattern - is entered via the numeric key +/-.

For Non Serving Cell "1" is not allowed.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN9:HSUP:ERGC:RGPA "–"`

ACK/NACK Pattern - BS - 3GPP FDD

(This feature is available for E-HICH only.)

Enters the pattern for the ACK/NACK field.

For Non Serving Cell only "1" = ACK and "–" = NACK is allowed. For Serving Cells only "+" = ACK and "0" = NACK is allowed.

Note:
Pattern + is entered using the numeric key 1. Pattern - is entered via the numeric key +/-.

Remote-control command: n.a.
`SOUR:BB:W3GP:BST1:CHAN10:HSUP:EHIC:RGPA "+"`

Tau DPCH - BS - 3GPP FDD

Enters the offset of the downlink dedicated offset channels.

Remote-control command: n.a.
`SOUR:BB:W3GP:BST1:CHAN12:HSUP:EHIC:DTAU 5`
`SOUR:BB:W3GP:BST1:CHAN12:HSUP:ERGC:DTAU 5`

Tau E-RGCH/E-HICH - BS - 3GPP FDD

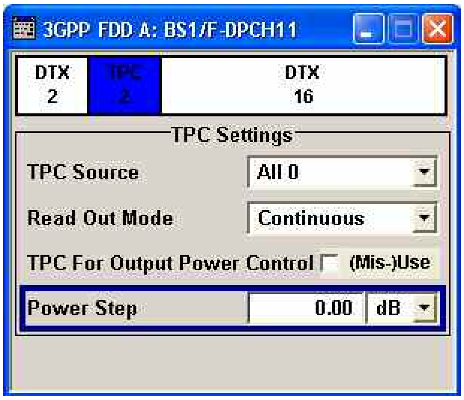
Displays the offset of the P-CCPCH frame boundary.

Remote-control command: n.a.
`SOUR:BB:W3GP:BST1:CHAN12:HSUP:EHIC:ETAU?`
`SOUR:BB:W3GP:BST1:CHAN12:HSUP:ERGC:ETAU?`

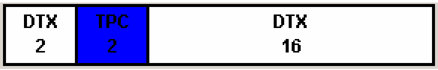
Config F-DPCH - BS Channel Table 3GPP FDD

The **Config F-DPCCH** menu for configuring the fields of the fractional dedicated physical control channel can be called in the channel table in column **DPCCH Settings** with the **Config...** button.

This menu is only available for selected channel types.



Slot Structure (F-DPCH) - BS - 3GPP FDD



Displays the slot structure.

The structure of the slot depends on the slot format selected.

Remote-control command: n.a.

TPC Source – F-DPCH - 3GPP FDD

Selects the data source for the F-DPCH channel.

The following data sources are available for selection

All 0

All 1

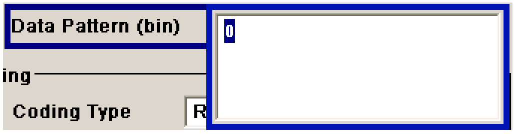
0 data and 1 data are generated internally.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:DATA ZERO`

Pattern

A user-definable bit pattern with a maximum length of 64 bits is generated internally.

The bit pattern is defined in the Data Pattern entry field.



Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:DATA PATT`
`SOUR:BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:DATA PATT #H0,1`

Data List Internal data from a programmable data list generated with the Data Editor or externally, is used.

Data lists are selected in the **File Select** window, which is called by means of the **Select Data List** button.

The **File Manager** is used to transmit external data lists to the R&S Signal Generator, and can be called within every **File Select** window by means of the **File Manager** button.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:DATA DLIS`
`SOUR:BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:DATA: DSEL "tpc_bts"`

TPC Read Out Mode (F-DPCH) - BS - 3GPP FDD

Defines TPC data usage.

With 3GPP, the TPC bits are used to signal the increase or reduction in transmit power to the called station. With all read out modes, one bit is taken from the data stream for the TPC field for each slot and entered into the bit stream several times (depending on the symbol rate). The difference between the modes lies in the usage of the TPC bits.

These different modes can be used, for example, to deliberately set a base station to a specific output power (e.g. with the pattern 11111) and then let it oscillate around this power (with Single + alt. 01 and Single + alt. 10). This then allows power measurements to be carried out at the base station (at a quasi-constant power). Together with the option (Mis-) Use TPC for output power control (see below), TPC Read Out Mode can also be used to generate various output power profiles.

Continuous: The TPC bits are used cyclically.

> ***Note:***
> *The remote-control commands are not valid for multi channel mode.*

Remote-control command
`SOUR:BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:READ CONT`

Single + All 0 The TPC bits are used once, and then the TPC sequence is continued with 0 bits.

Remote-control commands:
`SOUR:BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:READ S0A`

Single + All 1 The TPC bits are used once, and then the TPC sequence is continued with 1 bit.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:READ S1A`

Single + alt. 01 The TPC bits are used once and then the TPC sequence is continued with 0 and 1 bits alternately (in multiples, depending on by the symbol rate, for example, 00001111).

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:READ S01A`

Single + alt. 10 The TPC bits are used once and then the TPC sequence is continued with 1 and 0 bits alternately (in multiples, depending on by the symbol rate, for example, 11110000).

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:READ S10A`

TPC For Output Power Control (Mis-) Use (F-DPCH) - BS - 3GPP FDD

Defines "mis-" use of the TPC data.

With 3GPP, the TPC bits are used to signal the increase or reduction in transmit power to the called station. If **(Mis-) use TPC for output power control** is activated, the specified pattern is misused; in order to vary the intrinsic transmit power over time. A bit of this pattern is removed for each slot in order to increase (bit = "1") or reduce (bit = "0") the channel power by the specified power step (**Power Step**). The upper limit for this is 0 dB and the lower limit -80 dB. The following envelope is produced at a channel power of 0 dB, power step 1.0 dB and pattern "001110100000011" and TPC Pattern ReadOut Mode **Continuous:**

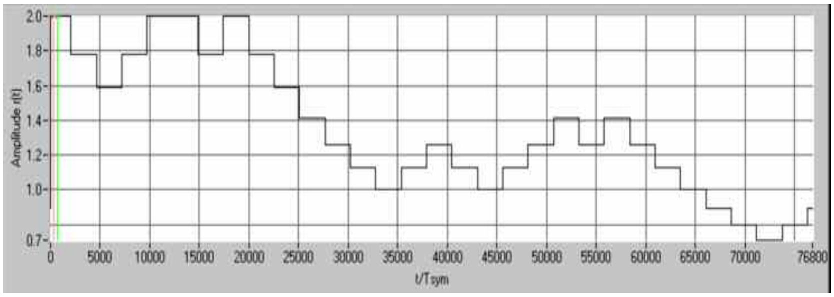


Fig. 22 Dynamic change of channel power (continuous)

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:MIS ON`

TPC Power Step (F-DPCH) - BS - 3GPP FDD

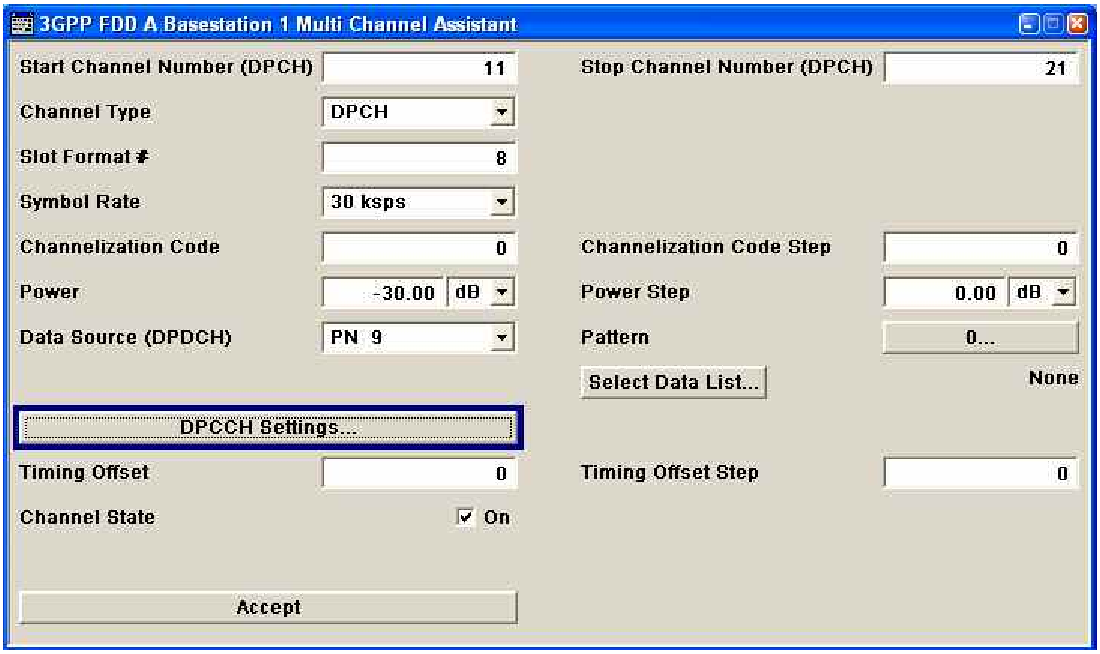
Sets the step width of the power change in dB for **(Mis-) use TPC for output power control**.

Remote-control command:
`SOUR:BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:PST 1.5dB`

Multi Channel Assistant - BS - 3GPP FDD

The **Multi Channel Assistant** menu is called with the button of the same name above the channel table. It allows several channels to be set simultaneously and is only available for the channel types DPCH, HS-SCCH, HS QPSK, HS 16QAM and HS 64QAM.

Enhanced state is automatically deactivated. The channel table is only filled with new values when the **Accept** button is pressed.



Start Channel Number - Multichannel Base Station - 3GPP FDD

Enters the index for the start channel of the channel range that is set jointly.

Remote-control command: n.a.

Stop Channel Number - Multichannel Base Station - 3GPP FDD

Enters the index for the stop channel of the channel range that is set jointly.

Remote-control command: n.a.

Channel Type - Multichannel Base Station - 3GPP FDD

Enters the channel type for the channel range that is set jointly. Available for selection are DPCH, HS-SCCH, HS QPSK, HS 16QAM, or HS 64QAM.

Remote-control command: n.a.

Slot Format - Multichannel Base Station - 3GPP FDD

Enters the slot format.

For DPCH channels, the slot formats are 0 to 16.

A slot format defines the structure of a slot made of data and control fields and includes the symbol rate.

The individual parameters of a slot can later be changed, with the slot format being adjusted, if necessary.

This parameter is not available for high-speed channels.

Note:
*For the **DPCCH Settings**, this value is read-only.*

Remote-control command: n.a.

Symbol Rate - Multichannel Base Station - 3GPP FDD

Sets the symbol rate. The range of values depends on the channel selected.

The symbol rate is determined by the slot format set. A change in the symbol rate leads automatically to an adjustment of the slot format.

Remote-control command: n.a.

Channelization Code - Multichannel Base Station - 3GPP FDD

Sets the channelization code for the start channel.

The channel is spread with the specified channelization code (spreading code).

The range of values of the channelization code depends on the symbol rate of the channel.

0 to $\frac{chip\_rate(=3.84Mcps)}{symbol\_rate} - 1$

Remote-control command: n.a.

Channelization Code Step-Multichannel Base Station - 3GPP FDD

Sets the step width for the channelization code from channel to channel.

The valid range of values for the channelization code of an individual channel must not be exceeded. If the range of values is exceeded, the channelization code is limited automatically.

Remote-control command: n.a.

Power - Multichannel Base Station - 3GPP FDD

Sets the channel power of the start channel in dB.

The power entered is relative to the powers of the other channels and does not initially relate to the LEVEL power display. If **Adjust Total Power** is executed (top level of the 3GPP menu), all the power data is relative to 0 dB.

***Note**:*

The maximum channel power of 0 dB applies to non-blanked channels (duty cycle 100%), with blanked channels, the maximum value can be increased (by Adjust Total Power) to values greater than 0 dB (to $10 * \log_{10} \frac{1}{\text{duty\_cycle}}$*).*

The Power value is also the starting power of the channel for Misuse TPC and Dynamic Power Control.

Remote-control command: n.a.

Power Step - Multichannel Base Station - 3GPP FDD

Enters the step width for the change of channel power from channel to channel.

The valid range of values must not be exceeded. If the range of values is exceeded, the power is automatically limited to the permissible of -80 dB to 0 dB.

Remote-control command: n.a.

Data Source (DPDCH) - Multichannel Base Station - 3GPP FDD

Selects data source.

The following are available for selection as data sources:

Remote-control command: n.a.

All 0
All 1
0 data and 1 data are generated internally.

PRBSxx
PRBS data as per CCITT with period lengths between 2^9-1 and 2^{23}-1 is generated internally.

Pattern
Pattern
A user-definable bit pattern with a maximum length of 64 bits is generated internally.

The bit pattern is defined in the **Pattern** entry field.

Data List
Select Data List
Internal data from a programmable data list generated with the Data Editor or externally, is used.

The data list selection is called with the **Select Data List** button.

DPCCH Settings - Multichannel Base Station - 3GPP FDD

Calls the menu for configuring DPCCH channels.

The parameters of the menu are described in Section "*DPCCH Settings - BS Channel Table 3GPP FDD*", page 1.108. In contrary to setting a single channel, the remote control commands are not available.

Remote-control command: n.a.

Timing Offset - Multichannel Base Station - 3GPP FDD

Sets the timing offset for the start channel.

The timing offset determines the shift of the source symbols before interleaving.

The absolute starting time of the frame (slot 0) is shifted relative to the start of the scrambling code sequence by the timing offset * 256 chips. This means that whatever the symbol rate, the resolution of the timing offset is always 256 chips.

This procedure is used to reduce the crest factor. A good way to obtain a lower crest factor is to use an offset of 1 from channel to channel, for example.

Remote-control command: n.a.

Timing Offset Step- Multichannel Base Station - 3GPP FDD

Sets the step width for the timing offset from channel to channel.

The valid range of values must not be exceeded. If the range of values is exceeded, the timing offset is automatically limited to the permissible range.

Remote-control command: n.a.

Channel State- Multichannel Base Station - 3GPP FDD

Activates or deactivates all the channels in the set channel range.

Remote-control command: n.a.

Accept- Multichannel Base Station - 3GPP FDD

Executes automatic completion of the channel table in accordance with the parameters set.

Remote-control commands: n.a.

User Equipment Configuration (UE) - 3GPP FDD

The **User Equipment Configuration** menu is called by selecting user equipment **UE1** ... **UE4** in the 3GPP FFD menu.

Note:
In the standard, the term "Mobile Station" has been replaced by the term "User Equipment", to take into account the fact that there is a great variety of mobile terminal equipment available to users, with functionality that is constantly being enhanced.

A user equipment has a maximum of 6 DPDCHs, with parameters largely prescribed by the standard (TS 25 211). To simplify operation, a distinction is made between three modes (**PRACH only**, **PCPCH only** and **DPCCH + DPDCH**).

With the DPCCH + DPDCH mode, the high speed channel HS-DPCCH can be activated.

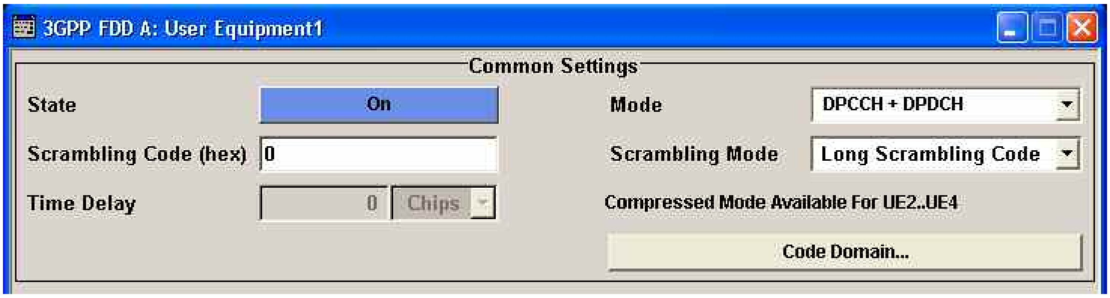
With the PRACH only and PCPCH only modes, there is also a choice between **Standard** (all parameters can be set) and **Preamble only** (only the preamble can be set). The menu of each particular mode only displays the parameters that are relevant.

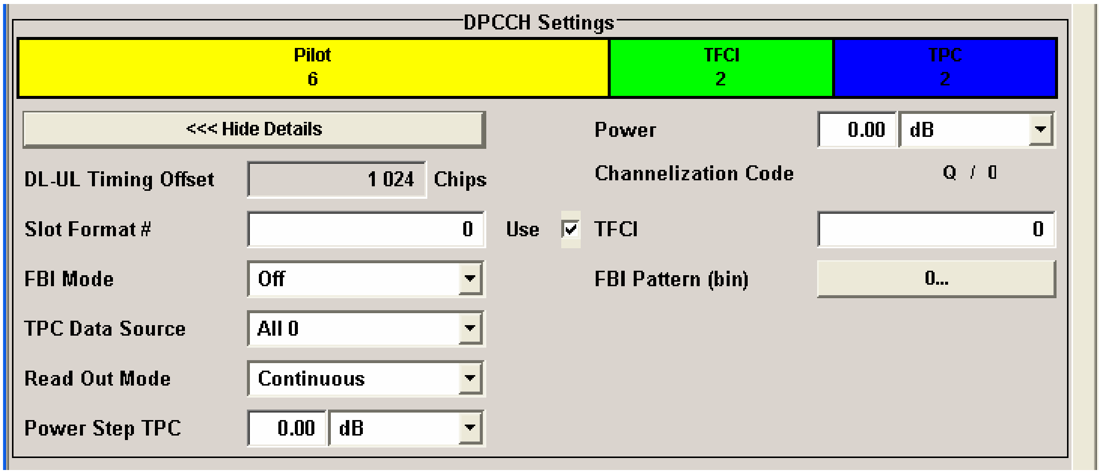
User equipment 1 (UE1) generates all the channels in enhanced mode (realtime).

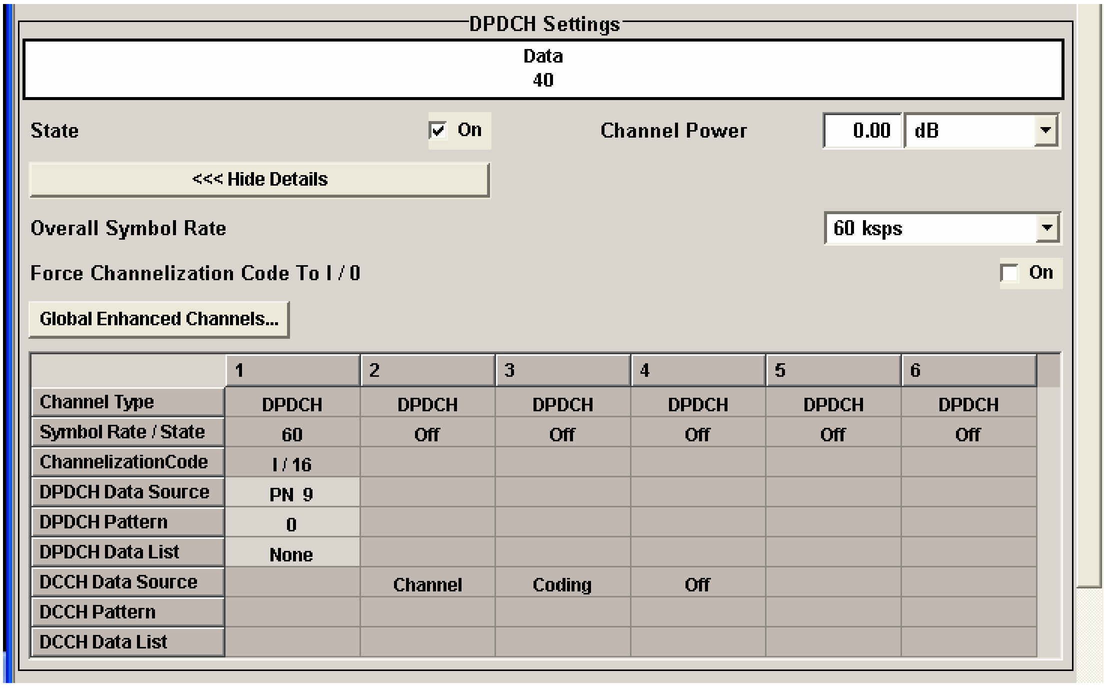
The menu comprises an upper section **Common Settings**, with central sections **PRACH Settings**, **PCPCH Settings** or **DPCCH Settings** with **DPDCH Settings**, depending on which mode is set. When **DPCCH + DPDCH** modes are selected, the only the channel structure , the state and the channel power are indicated. The **Channel Table** section also appears below. The section for detailed setting and the channel table can be revealed with the **Show Details >>>** button and hidden with the **<<< Hide Details** button.

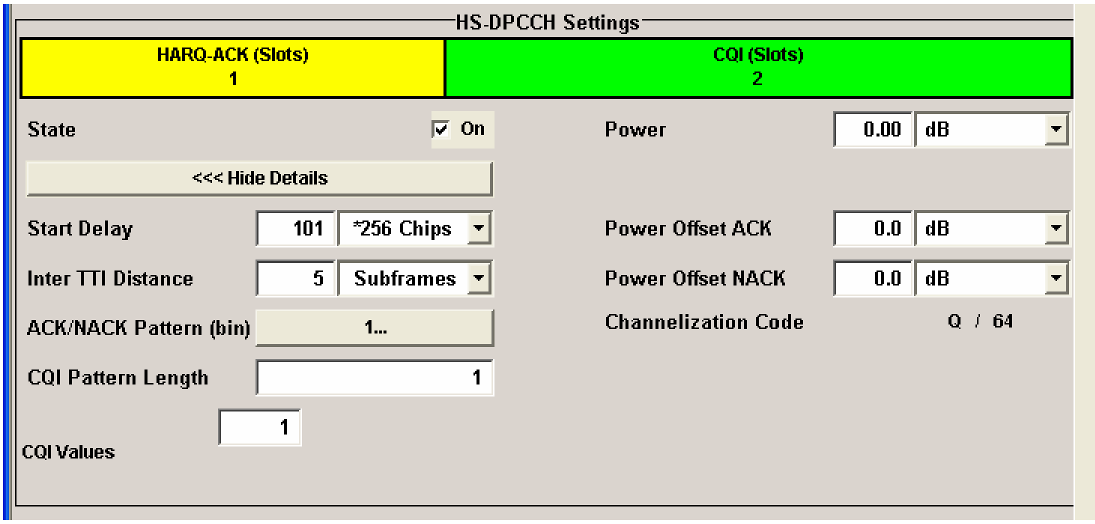
In the menu for user equipment 1, under DPDCH settings, there is a menu for setting the enhanced channel parameters. When **PRACH only** or **PCPCH only** mode is selected, the **Channel Coding** section also appears below.

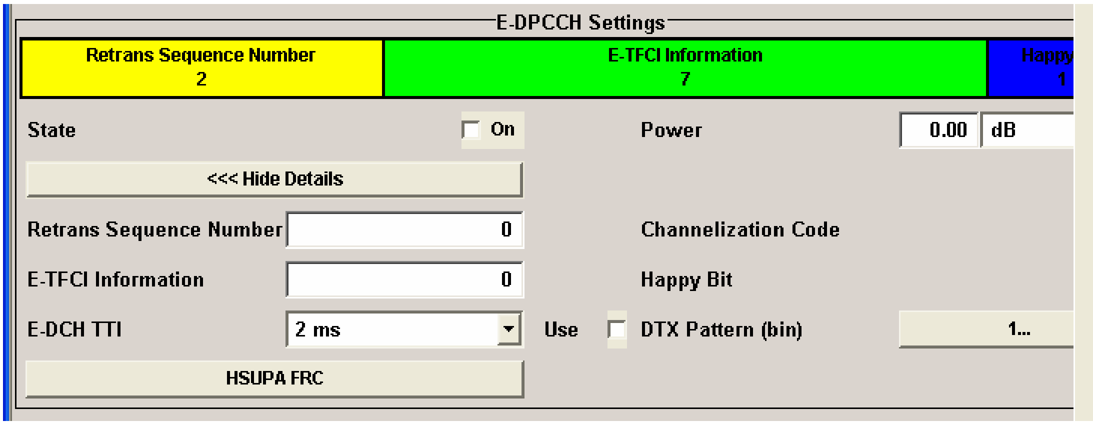
In the menus for user equipment 2, 3 and 4, the compressed mode can be activated and configured (**Use Compressed Mode**).

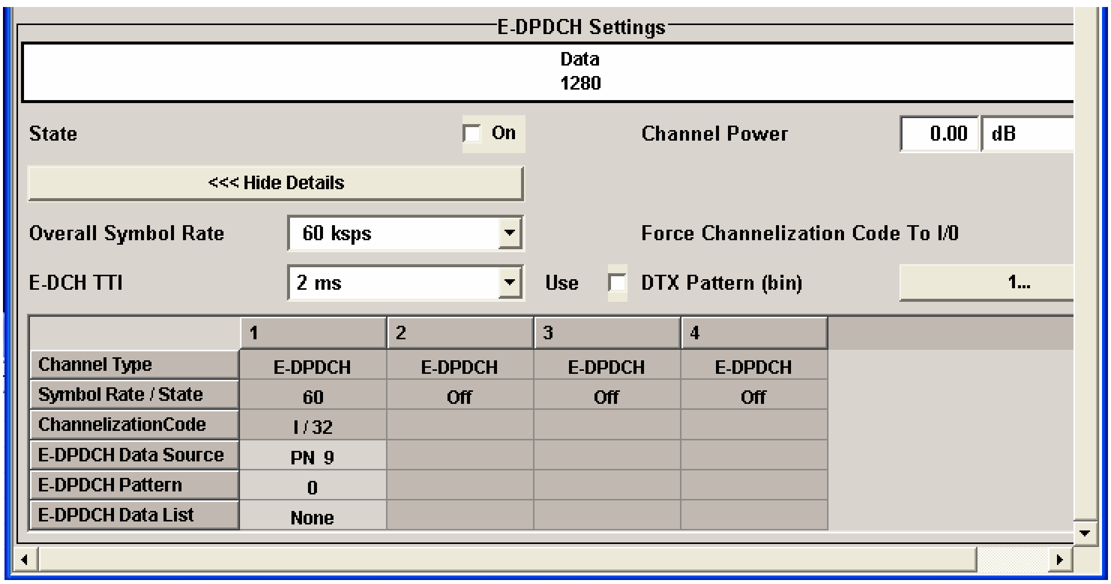



DPCCH Settings
Pilot
6
TFCI
2
TPC
2
<<< Hide Details
Power
0.00
dB
DL-UL Timing Offset
1 024
Chips
Channelization Code
Q / 0
Slot Format #
0
Use
TFCI
0
FBI Mode
Off
FBI Pattern (bin)
0...
TPC Data Source
All 0
Read Out Mode
Continuous
Power Step TPC
0.00
dB


DPDCH Settings
Data
40
State
On
Channel Power
0.00
dB
<<< Hide Details
Overall Symbol Rate
60 ksps
Force Channelization Code To I / 0
On
Global Enhanced Channels...
1 2 3 4 5 6
Channel Type DPDCH DPDCH DPDCH DPDCH DPDCH DPDCH
Symbol Rate / State 60 Off Off Off Off Off
ChannelizationCode I / 16
DPDCH Data Source PN 9
DPDCH Pattern 0
DPDCH Data List None
DCCH Data Source Channel Coding Off
DCCH Pattern
DCCH Data List

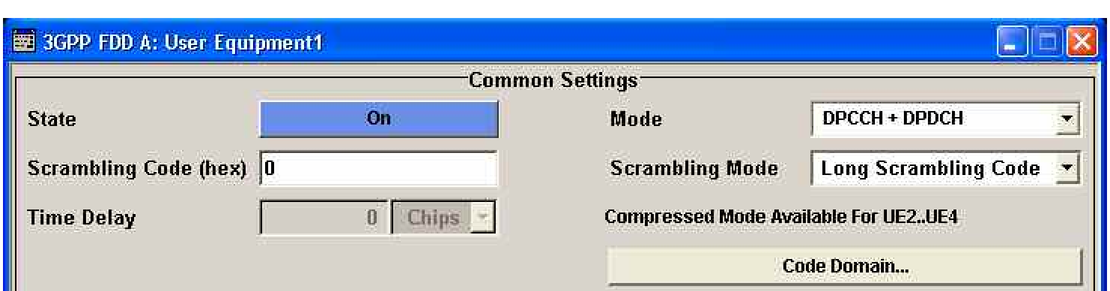

HS-DPCCH Settings
HARQ-ACK (Slots)
1
CQI (Slots)
2
State
On
Power
0.00
dB
<<< Hide Details
Start Delay
101
*256 Chips
Power Offset ACK
0.0
dB
Inter TTI Distance
5
Subframes
Power Offset NACK
0.0
dB
ACK/NACK Pattern (bin)
1...
Channelization Code
Q / 64
CQI Pattern Length
1
1
CQI Values





Common Settings - UE - 3GPP FDD

The **Common Settings** section is where the general settings for the selected user equipment are made.



State - UE - 3GPP FDD

Activates or deactivates the selected user equipment. The number of the selected user equipment is specified in the menu header.

Remote-control command:
`SOUR:BB:W3GP:MST1:STAT ON`

Mode - UE - 3GPP FDD

Selects the mode in which the user equipment is to work. The lower part of the menu will change in accordance with the mode. The following modes are available:

PRACH only - Standard

In this mode, the instrument generates a single physical random access channel (PRACH). This channel is needed to set up the connection between the user equipment and the base station. All the PRACH parameters can be set in the PRACH Settings section (see Section "*PRACH Settings - UE - 3GPP FDD*", page 1.132).

Remote-control command:
`SOUR:BB:W3GP:MST2:MODE PRAC`

PRACH only - Preamble only

In this mode, the instrument only generates the preamble of a physical random access channel (PRACH). Only the PRACH preamble parameters can be set in the PRACH Settings section. This mode is needed for Test Case 8.8 TS 25.141.

Remote-control command:
`SOUR:BB:W3GP:MST2:MODE PPR`

PCPCH only - Standard

In this mode the instrument generates a single physical common packet channel (PCPCH). This channel is used to transmit packet-oriented services (e.g. SMS). The specific PCPCH parameters can be set in the PCPCH Settings section (see Section "*PCPCH Settings - UE - 3GPP FDD*", page 1.141).

Remote-control commands:
`SOUR:BB:W3GP:MST2:MODE  PCPC`

PCPCH only - Preamble only

In this mode, the instrument only generates the preamble of a physical common packet channel (PCPCH). Only the PRACH preamble parameters can be set in the PCPCH Settings section. This mode is needed for Test Case 8.9 TS 25.141.

Remote-control commands:
`SOUR:BB:W3GP:MST2:MODE  PPCP`

DPCCH + DPDCH

In this mode the instrument generates a control channel (DPCCH) and up to 6 data channels (DPDCH). This mode corresponds to the standard mode of user equipment during voice and data transmission.

Alternatively a high speed HS-DPCCH can be activated.

Channel-specific parameters can be set in the DPCCH Settings and DPDCH Settings sections.

When UE1 is selected, the signal is generated in realtime (realtime; enhanced). All the channels (DPCCH + 6 DPDCH) can be generated simultaneously in realtime (see Sections "*DPCCH Settings - UE - 3GPP FDD*", Page 1.150) and "*DPDCH Settings - UE - 3GPP FDD*", Page 1.161).

Remote-control command:
`SOUR:BB:W3GP:MST2:MODE  DPCD`

Scrambling Code - UE - 3GPP FDD

Sets the scrambling code.

The scrambling code is used to distinguish the transmitter (UE) by transmitter-dependent scrambling. Hexadecimal values are entered. Long or short scrambling codes can be generated (see also section "*Scrambling Code Generator - 3GPP FDD*", Page 1.4).

Remote-control command:
`SOUR:BB:W3GP:MST1:SCOD #H1`

Scrambling Mode - UE - 3GPP FDD

Sets the type of scrambling code.

With scrambling code, a distinction is made between **Long** and **Short Scrambling Code** (see also Section "*Scrambling Code Generator - 3GPP FDD*", Page 1.4).

Off

Disables scrambling code for test purposes.

Remote-control command:
`SOUR:BB:W3GP:MST2:SCOD:MODE  OFF`

Long Scrambling Code

Sets the long scrambling code.

Remote-control commands:
`SOUR:BB:W3GP:MST2:SCOD:MODE LONG`

Short Scrambling Code (only modes DPCCH + DPDCH and PCPCH only)

Sets short scrambling code.

The short scrambling code is only standardized for DPCCH and DPDCH channels. But it can also be generated for the PCPCH channel for test purposes.

Remote-control command:
`SOUR:BB:W3GP:MST2:SCOD:MODE SHOR`

Time Delay - UE - 3GPP FDD

Enters the time delay of the signal of the selected user equipment compared to the signal of user equipment 1.

Remote-control command:
`SOUR:BB:W3GP:MST2:TDEL 256`

Use Compressed Mode- UE - 3GPP FDD

(This feature is available for UE 2...4 and DPCCH+DPDCH Mode only.)

Activates compressed mode.

The Compressed mode is configured in the submenu called by button **Compressed Mode**.

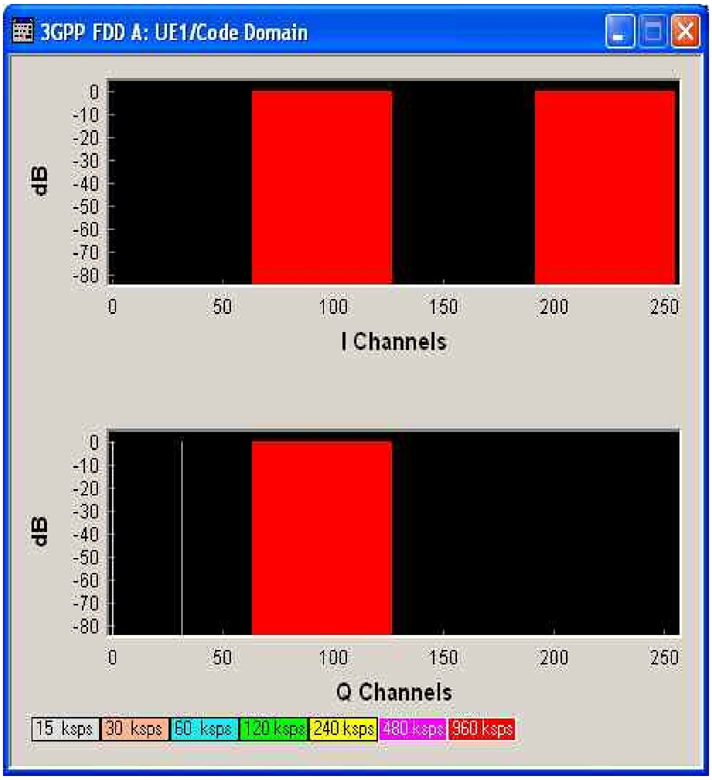
The menu is described in section "*Compressed Mode - User Equipment - 3GPP FDD*", page 1.129.

Remote-control command:
`SOUR:BB:W3GP:MST2:CMOD:STAT ON`

Code Domain Graph - UE - 3GPP FDD

The button **Code Domain ...** above the channel table calls a graphical display of the assigned code domain.

The **Code Domain** display indicates the assigned code domain. The channelization code is plotted at the X axis; the colored bars indicate coherent code channels. The colors are assigned to fixed symbol rates; the allocation is shown below the graph. The relative power can be taken from the height of the bar. The symbols on so-called I- and Q-branches are spread independently. The channelization codes are fixed for the channels.



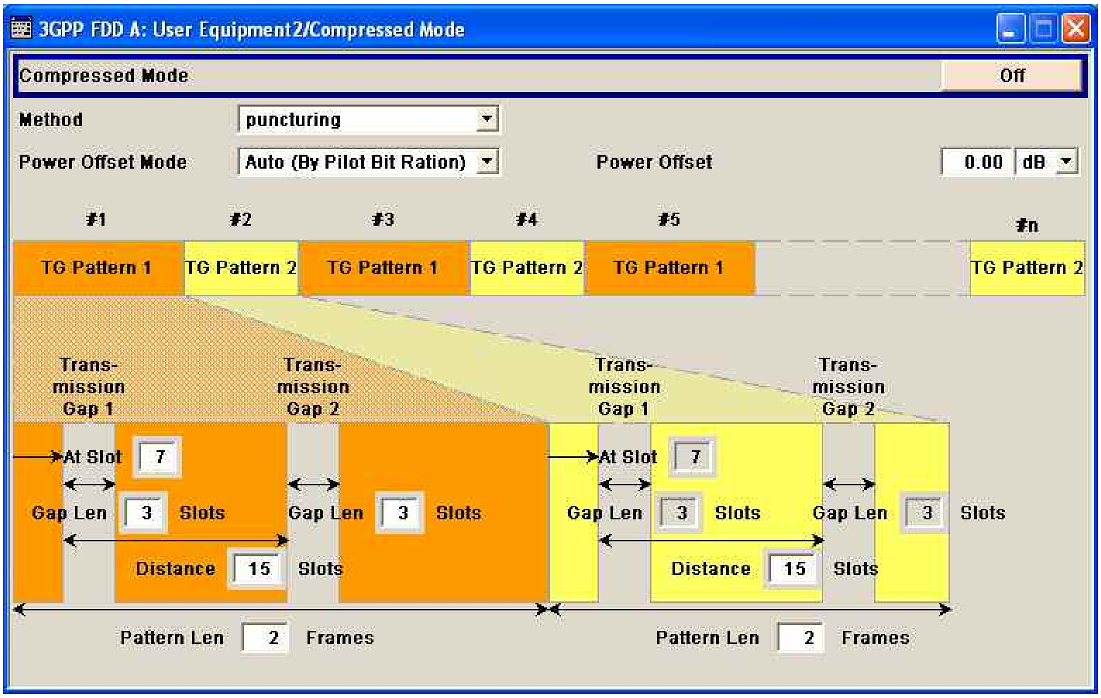
It is possible to determine from this display whether the settings made have resulted in a code domain conflict , that is to say, whether the code domains of the active channels intersect. A code domain conflict is indicated by overlapping bars. It may occur only when switch **Force Channelization Code to I/Q** is activated.

Compressed Mode - User Equipment - 3GPP FDD

To enable handover of a mobile station from a 3GPP FDD user equipment to another user equipment, (3GPP FDD, 3GPP TDD or GSM) at a different frequency, transmission and reception of the 3GPP FDD signal must be interrupted for a short time. During this time, the mobile station changes to the frequency of the new user equipment, for example to measure the receive level of this station or read system information.

To transmit a consistently high data volume also in the remaining (shorter) period of time, the data is compressed. This can be done by halving the spreading factor (SF/2 method) or reducing error protection (puncturing method). In both cases, transmit power in the ranges concerned is increased to maintain adequate signal quality.

Apart from these two methods, there is also the method of "higher layer scheduling". With this method, transmission of the data stream is stopped during the transmission gap. This method is suitable for packet-oriented services; it involves no power increase (power offset) in the active ranges.



Compresses Mode State - UE - 3GPP FDD

(This feature is available for UE 2...4 and DPCCH+DPDCH Mode only.)

Activates compressed mode.

Remote-control command:
`SOUR:BB:W3GP:MST2:CMOD:STAT ON`

Compressed Mode Method - UE - 3GPP FDD

(This feature is available for UE 2...4 and DPCCH+DPDCH Mode only.)

Selects compressed mode method.

Higher layer scheduling
The data is compressed by stopping the transmission of the data stream during the transmission gap.

Remote-control command:
`SOUR:BB:W3GP:MST2:CMOD:METH HLSC`

SF/2

The data is compressed by halving the spreading factor.

Remote-control command:
`SOUR:BB:W3GP:MST2:CMOD:METH SF2`

Power Offset Mode - UE - 3GPP FDD

(This feature is available for UE 2...4 and DPCCH+DPDCH Mode only.)

Selects power offset mode.

The compressed slots can be sent with a power offset, i.e. at an increased power level.

Auto (By Pilot Bit Ratio)

The power offset is obtained as follows:

$$\frac{\text{Number of pilots bits of non-compressed slots}}{\text{Number of pilot bits by compressed slots}}$$

Remote-control command:
`SOUR:BB:W3GP:MST2:CMOD:POM AUTO`

User

The power offset is defined manually. The value is input in entry field **Power Offset**.

Remote-control command:
`SOUR:BB:W3GP:MST2:CMOD:POM USER`

Power Offset - UE - 3GPP FDD

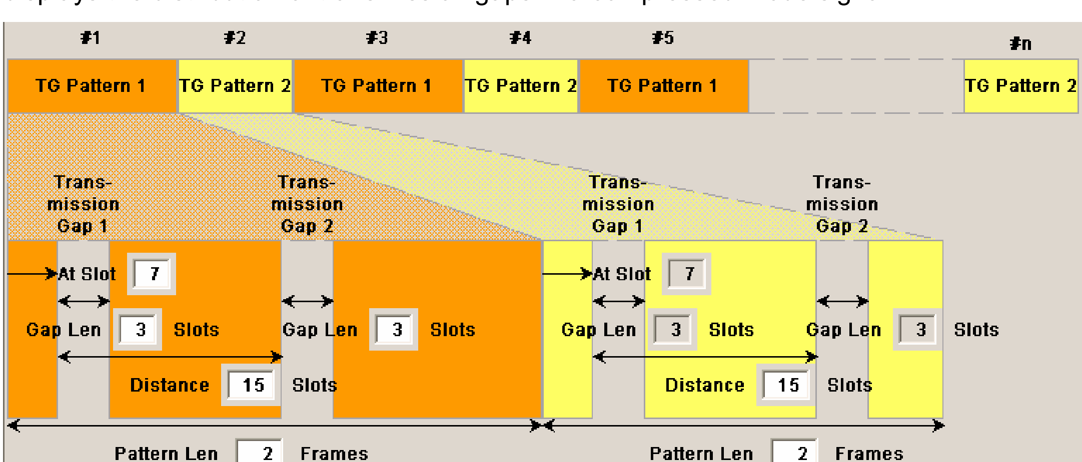
(This feature is available for UE 2...4 only.)

Defines power offset.The input is only valid for Power Offset Mode User.

Remote-control command:
`SOUR:BB:W3GP:MST2:CMOD:POFF 3dB`

Compressed Mode Configuration Graph - User Equipment - 3GPP FDD

The remaining parameters of the compressed mode are set in the configuration graph. The graph displays the distribution of transmission gaps in a compressed mode signal.



The signal generated can be divided into three subranges:

Transmission Gaps

A transmission gap has a maximum length of 14 slots. Since at least eight active slots must be sent per frame, gaps comprising seven slots and more have to be distributed over two neighboring frames.

The transmitted signal consists of max. two patterns that are sent alternately. Each pattern comprises two transmission gaps.

The graph includes all parameters necessary to define the transmission gaps in the signal:

Note:
The settings here are also valid for the compressed mode graph of the base station with the same number. For example, setting a distance of 9 slots for user equipment 4 also sets the distance to 9 slots for base station 4.

At Slot

(This feature is available for UE 2...4 only.)

Transmission gap slot number.

Remote-control command:
`SOUR:BB:W3GP:MST2:CMOD:PATT1:TGSN 4`

Gap Len

(This feature is available for UE 2...4 only.)

Transmission gap lengths

Remote-control command:
`SOUR:BB:W3GP:MST2:CMOD:PATT1:TGL2 7`

Distance

(This feature is available for UE 2...4 only.)

Transmission gap distance

Remote-control command:
`SOUR:BB:W3GP:MST2:CMOD:PATT2:TGD 4`

Pattern Len:

(This feature is available for UE 2...4 only.)

Transmission gap pattern length.
The input range is 0 ... 100 frames for pattern 1 and 1 ... 100 frames for pattern 2. Thus, it is possible to configure transmission gap pattern with only one pattern.

Remote-control command:
`SOUR:BB:W3GP:MST2:CMOD:PATT2:TGPL 23`

The above parameters are interrelated in many ways. For example, the transmission gap distance must be selected so that no frame contains more than one gap. In the event of an invalid entry, the next valid value is automatically set. If the entry is valid but changes the valid range for another parameter, the setting of the parameter is adapted.

In the above example, the signal (or more precisely: the pattern of transmission gaps) is repeated every 4 frames.

Compressed Ranges

All slots of a frame that are not blanked are compressed. If the transmission gap is transmitted within one frame (single-frame method), an envelope as shown by the diagram below is obtained:

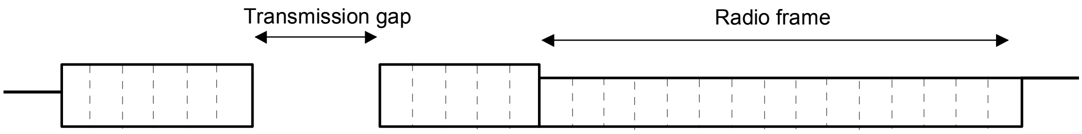


Fig. 23 Envelope of compressed mode signal with single-frame method

If the transmission gap is distributed over two neighboring frames, all slots of the two frames that are not blanked are compressed:

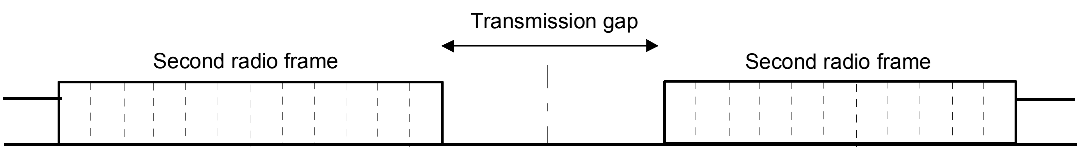


Fig. 24 Envelope of compressed mode signal with double-frame method

A different slot format, usually with a higher number of pilot bits, is used in the compressed ranges.

The transmit power can be increased (**Power Offset Mode**) automatically or manually by defining a power offset.

Non-compressed ranges

Frames containing no transmission gaps are sent with the same slot format and the same power as in the non-compressed mode.

PRACH Settings - UE - 3GPP FDD

The **PRACH Settings** section is where the settings are made for the PRACH channel. This section is only available when **PRACH only** mode is activated.

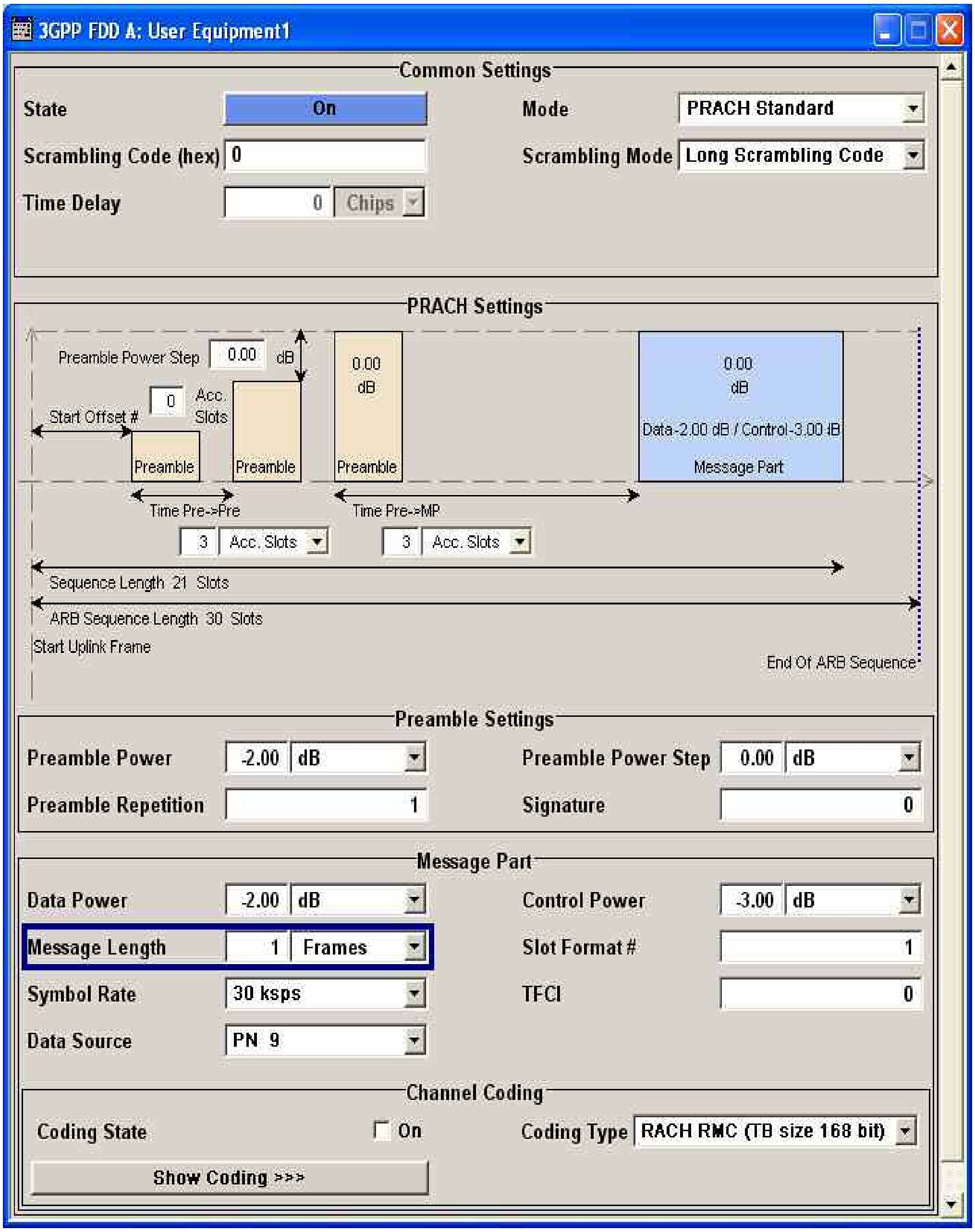
In **Standard** mode, the instrument generates a single physical random access channel (PRACH). This channel is needed to set up the connection between the user equipment and the base station.

In **Preamble only** mode, the instrument only generates the preamble of a physical random access channel (PRACH). This mode is needed for Test Case 8.8 TS 25.141.

When the selection is **PRACH only - Standard**, all the parameters described below are available, when the selection is **PRACH only - Preamble only**, only the preamble parameters are available.

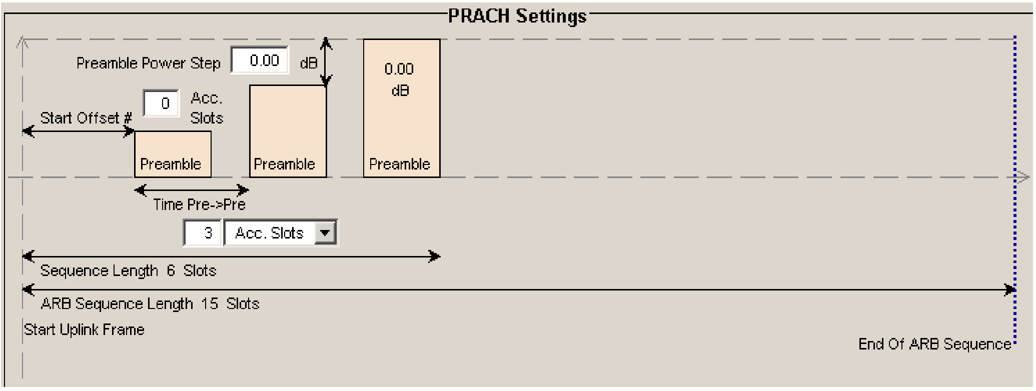
The menu section is subdivided into the graphical display of the PRACH including the timing parameters and the **Preamble Settings** and **Message Part** sections, in which the settings are made for the preamble and for the data part of the channel. Some settings are made directly in the input fields of the graphical display.

The **Channel Coding** section for activating channel coding is available for UE1 with enhanced channels.

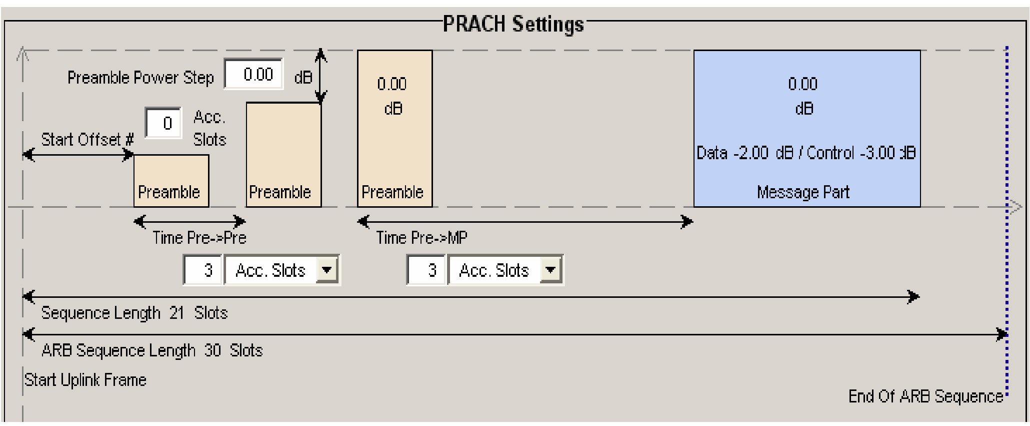


The graphical display shows either the complete PRACH including the message part or only the preamble depending on the selected mode

Display for PRACH - Preamble-only mode



Display for PRACH - Standard mode



Some of the parameter values can be input directly in the input fields of the graphical display. However, the displayed settings of most parameters does not correspond to their real settings. They are shown as an example to explain the parameter function. An exception are the indicated sequence period and the power correction values, they match the real settings. This allows the user to check if the sequence period fits into the set ARB sequence length. The power correction values can be used to calculate the correct settings for the desired RF level:

The graphic indicates the correction value for the last preamble before the message part (indication in the preamble block, ∆PowPre) and the correction values for the message part overall and separately for data and control part (indications in the message part block, ∆PowMP). The power of the other preambles can be calculated by subtracting the set **Preamble Power Step**.

For one active UE, the RF power of the message part is calculated by adding the set RF level to the correction value.

Example:

Level = 5 dBm
∆PowMP = 2,3 dB

The message part power is 7,3 dBm

Delta Power - Preamble - PRACH UE - 3GPP FDD (graphical display)

Indication of the level correction value for the last preamble before the message part.

The level of the other preambles can be calculated by subtracting the set **Preamble Power Step**.

Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:TIM:DPOW:PRE?`

Delta Power - Message Part - PRACH UE - 3GPP FDD

Indication of the level correction value for the message part.

In addition to the total value of the message part power, the power offsets of the data and control part are indicated separately. The indication of the total value is important for measurements where just the envelope of the signal is of interest whereas the separate indication is useful for receiver tests.

In case of one UE active, the power of the message part can be calculated by adding the set RF level:

Example: **Level** = 5 dBm + **∆PowMP** = 2,3 dB = 7,3 dBm.

Remote-control command
`SOUR:BB:W3GP:MST2:PRAC:TIM:DPOW:MPAR?`
`SOUR:BB:W3GP:MST2:PRAC:TIM:DPOW:MPAR:DATA?`
`SOUR:BB:W3GP:MST2:PRAC:TIM:DPOW:MPAR:CONT?`

Start Offset - PRACH UE - 3GPP FDD (graphical display)

Enters the start offset of the PRACH in access slots.

The starting time delay in timeslots is calculated according to:

2 x Start Offset #

Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:TIM:SOFF 1`

Transmission Time - Preamble - PRACH UE - 3GPP FDD (graphical display)

Enters the time difference between two successive preambles in access slots.

Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:TIM:TIME:PREP 4`

Transmission Time - Message Part - PRACH UE - 3GPP FDD (graphical display)

Enters the time difference between the last preamble and the message part in access slots or slots.

Two modes are defined in the standard. In mode 0, the preamble to message part difference is 3 access slots, in mode 1 it is 4 access slots.

Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:TIM:TIME:PREM 4`

Sequence Length - PRACH UE - 3GPP FDD (graphical display)

Indication of the sequence length.

This indication allows the user to check if the sequence period fits into the set ARB sequence length.

In PRACH only - Preamble mode, the sequence period is defined by settings Start Offset, Time Pre - Pre and Preamble Repetition:

Sequence Length = Start Offset (Slots) + Preamble Repetition x Time Pre - Pre

Example:

Start Offset = 2 Access Slots = 4 Slots

Preamble Repetition = 3

Time Pre - Pre = 3 Access Slots = 6 Slots

Sequence Length = 4 Slots + 3 x 6 Slots = 22 Slots

In PRACH only - Standard mode, the sequence period is defined by settings Start Offset, Time Pre - Pre, Time Pre - Pre, Message Part Length and Preamble Repetition:

Sequence Length = Start Offset (Slots) + (Preamble Repetition -) x Time Pre - Pre + Time Pre - MP + 15 x Message Part Length (Frames)

Example:

Start Offset = 2 Access Slots = 4 Slots

Preamble Repetition = 3

Time Pre - Pre = Time Pre - MP = 3 Access Slots = 6 Slots
Message Part Length = 2 Frames

Sequence Length = 4 Slots + 2 x 6 Slots + 6 Slots + 15 x 2 = 52 Slots

Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:TIM:SPER?`

ARB Sequence Length - PRACH UE - 3GPP FDD (graphical display)

Indication of the ARB sequence length.

This indication allows the user to check if the sequence period fits into the set ARB sequence length.

Remote-control command:
`SOUR:BB:W3GP:SLEN?`

The **Preamble Settings** section is where the settings for the preamble are available.

Preamble Power - PRACH UE - 3GPP FDD

Sets the power of the preamble component of the PRACH channel.

Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:PPOW -5`

Preamble Power Step - PRACH UE - 3GPP FDD

Sets the power by which the preamble is increased from repetition to repetition. The power set under **Preamble Power** is the "target power", used during the last repetition of the preamble.

Example:

Setting:

Preamble Power	0 dB
Preamble Repetition	3
Preamble Power Step	3 dB

Generated power sequence:

Preamble 1 -6 dB	→ + 3 dB	Preamble 2 -3 dB	→ + 3 dB	Preamble 3 0 dB

Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:PPOW:STEP`

Preamble Repetition - PRACH UE - 3GPP FDD

Sets the preamble count.

Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:PREP 3`

Signature - PRACH UE - 3GPP FDD

(This feature is available for the PRACH only – Standard mode only.)

Selects the signature to be used for the PRACH channel.

The signature defines the code domain for the channelization code being used. 16 fixed bit patterns are defined.

Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:SIGN 1`

The **Message Part** section is where the settings for the data part of the PRACH are available. This section is only available when **PRACH only - Standard** is selected.

Data Power - PRACH UE - 3GPP FDD

(This feature is available for the PRACH only – Standard mode only.)

Sets the power of the data component of the PRACH channel.

Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:DPOW -3`

Control Power - PRACH UE - 3GPP FDD

(This feature is available for the PRACH only – Standard mode only.)

Sets the power of the control component of the PRACH channel.

Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:CPOW -3`

Message Length - PRACH UE - 3GPP FDD

(This feature is available for the PRACH only – Standard mode only.)

Sets the length of the message component of the PRACH channel in frames.

Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:MLEN 1`

Slot Format - PRACH UE - 3GPP FDD

(This feature is available for the PRACH only – Standard mode only.)

Selects the slot format.

Slot formats 0 to 4 are available for the PRACH channel. The slot format defines the parameters (symbol rate and TFCI) of the message component.

Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:SFOR 1`

Symbol Rate - PRACH UE - 3GPP FDD

(This feature is available for the PRACH only – Standard mode only.)

Sets the symbol rate of the PRACH channel.

The symbol rate is determined by the slot format set. A change in the symbol rate leads automatically to an adjustment of the slot format.

Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:SRAT D15K`

TFCI - PRACH UE - 3GPP FDD

(This feature is available for the PRACH only – Standard mode only.)

Enters the value of the TFCI field (Transport Format Combination Indicator) in the control component of the PRACH channel.

Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:TFCI 2`

Data Source - PRACH UE - 3GPP FDD

(This feature is available for the PRACH only – Standard mode only.)

Selects the data source for the data component of the PRACH channel.

The following data sources are available for selection

All 0
All 1

0 data and 1 data is generated internally.

Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:DATA ZERO | ONE`

PN xx

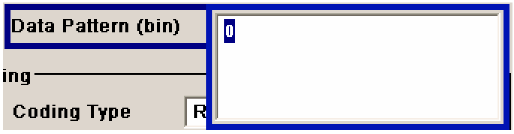
PRBS data as per CCITT with period lengths between 2^9-1 and 2^{23}-1 is generated internally.

Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:DATA PN9`

Pattern
Pattern

A user-definable bit pattern with a maximum length of 64 bits is generated internally.

The bit pattern is defined in the **Data Pattern** entry field.



Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:DATA PATT`
`SOUR:BB:W3GP:MST2:PRAC:DATA:PATT #H0,1`

Data List
Select Data List

Internal data from a programmable data list generated with the Data Editor or externally, is used.

Data lists are selected in the **File Select** window, which is called by means of the **Select Data List** button.

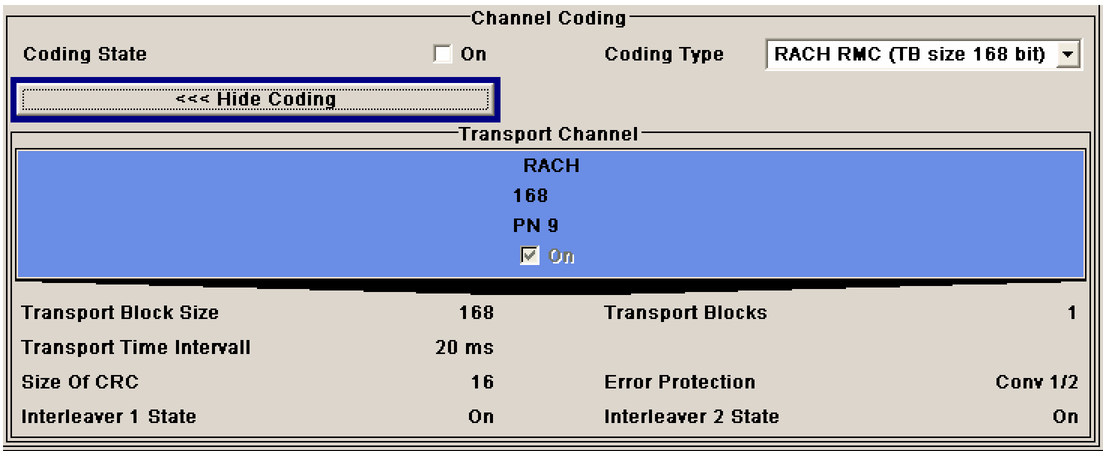
The **File Manager** is used to transmit external data lists to the R&S Signal Generator, and can be called within every **File Select** window by means of the **File Manager** button.

Remote-control command:
`SOUR:BB:W3GP:MST2:PRAC:DATA DLIS`
`SOUR:BB:W3GP:MST2:PRAC:DATA: DSEL 'prach1'`

Channel Coding State - PRACH UE - 3GPP FDD

The **Channel Coding** section is where the channel coding for the PRACH channel is activated and deactivated and the coding type is defined. Use **Show Coding>>>** to display the fixed settings for the channel coding parameters.

Channel coding of PRACH is possible for all UEs.



Channel Coding State - PRACH UE - 3GPP FDD

Activates or deactivates channel coding for the PRACH channel.

When On, the **Message Part Length** automatically is set to 2. It cannot be changed.

Remote-control command:
`SOUR:BB:W3GP:MST2:ENH:PRAC:CCOD:STAT ON`

Channel Coding Type - PRACH UE - 3GPP FDD

Selects the predefined reference measurement channel coding types for the PRACH channel. Available for selection are:

RACH RMC (TB size 168 bit)

RACH RMC (TB size 360 bit)

Remote-control command:
`SOUR:BB:W3GP:MST2:ENH:PRAC:CCOD:TYPE TB360`

Show Coding - PRACH UE - 3GPP FDD

Calls the menu for displaying the channel coding settings. The reference measurement channel parameters are set to fixed values.

Remote-control command: n.a.

The following parameters are displayed:

Data Source	The data source is displayed in the transport channel graphical display.
Transport Block Size	Size of the transport block at the channel coding input.
Transport Block	Transport block count.
Transport Time Interval	Number of frames into which a TCH is divided.
Size of CRC	CRC type (length).
Error Protection	Error protection.
Interleaver 1 / 2 State	Channel coding interleaver state

PCPCH Settings - UE - 3GPP FDD

The **PCPCH Settings** section is where the settings are made for the PCPCH channel. This section is only available when **PCPCH only** mode is activated.

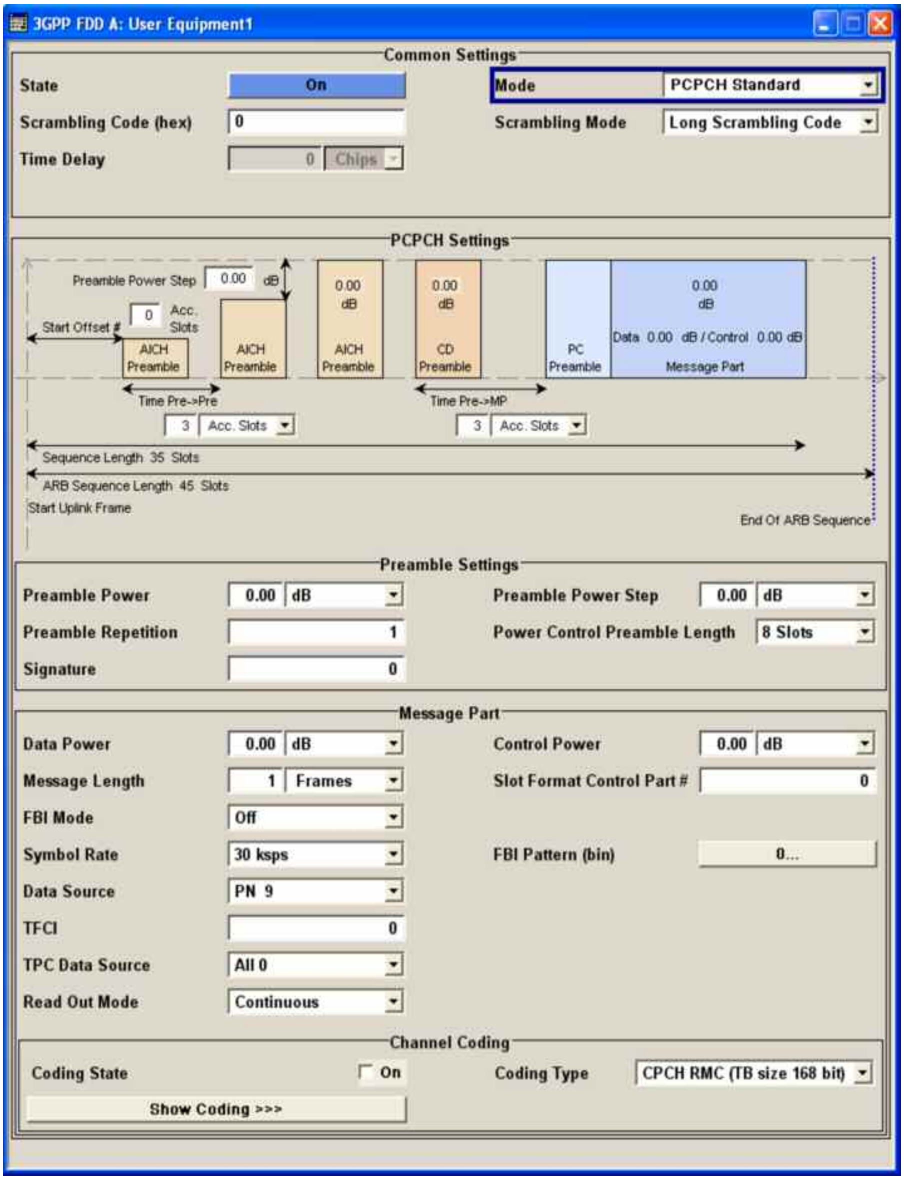
In **Standard** mode, the instrument generates a single physical common packet channel (PCPCH). This channel is used to transmit packet-oriented services (e.g. SMS).

In **Preamble only** mode, the instrument only generates the preamble of a physical common packet channel (PCPCH). This mode is needed for Test Case 8.9 TS 25.141.

When the selection is **PCPCH only - Standard**, all the parameters described below are available, when the selection is **PCPCH only - Preamble only**, only the preamble parameters are available.

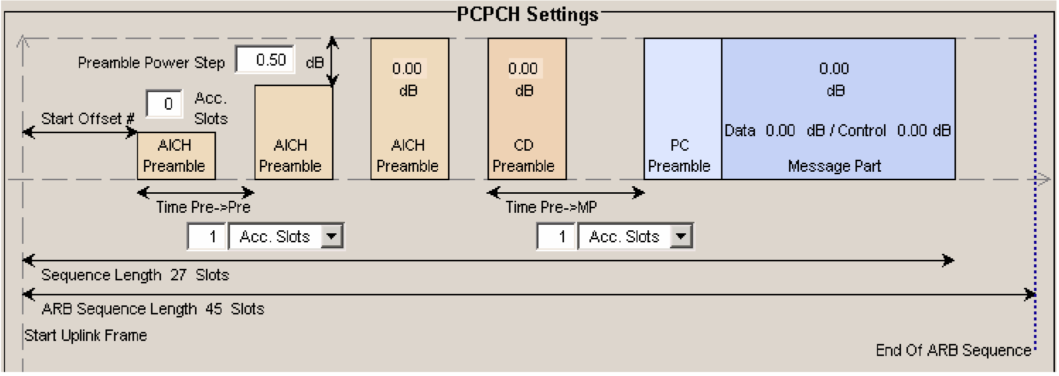
The menu section is subdivided into the graphical display of the PCPCH including the timing parameters and the **Preamble Settings** and **Message Part** sections, in which the settings are made for the preamble and for the data part of the channel. Some settings are made directly in the input fields of the graphical display.

The **Channel Coding** section for activating channel coding is available for UE1 with enhanced channels.

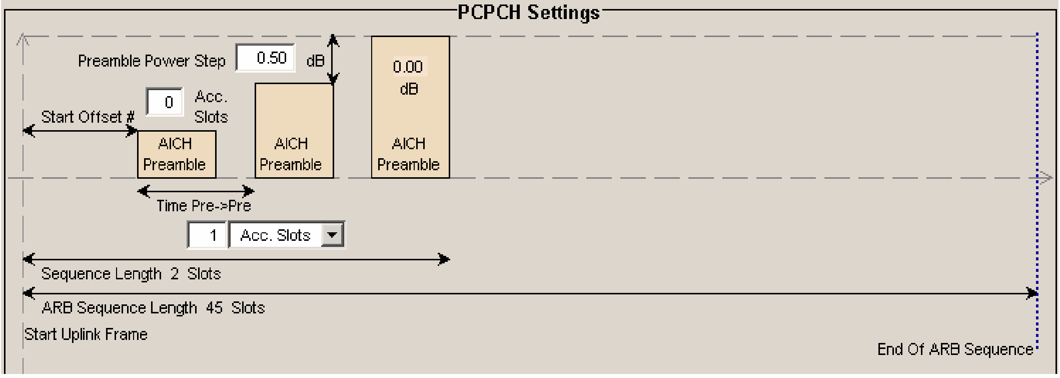


The graphical display shows either the complete PCPCH including the message part or only the preamble depending on the selected mode

Display for PCPCH - Standard mode



Display for PCPCH - Preamble-only mode



Some of the parameter values can be input directly in the input fields of the graphical display. However, the displayed settings of most parameters does not correspond to their real settings. They are shown as an example to explain the parameter function. An exception are the indicated sequence lengths and the power correction values, they match the real settings. This allows the user to check if the sequence period fits into the set ARB sequence length. The power correction values can be used to calculate the correct settings for the desired RF level:

The graphic indicates the correction value for the last AICH preamble before the message part and the CD Preamble (indication in the AICH and CD Preamble block, ∆PowPre). These two values are identical. The power of the other preambles can be calculated by subtracting the set **Preamble Power Step**. It also indicates the power correction value of the message part (indication in the message part block,∆PowMP).

For one active UE, the RF power of the message part is calculated by adding the set RF level to the correction value.

Example:

Level = 5 dBm
∆PowMP = 2,3 dB

The message part power is 7,3 dBm

Delta Power - Preamble - PCPCH UE - 3GPP FDD (graphical display)	Indication of the level correction value for the last AICH preamble before the message part. This value is identical to the correction value for the CD preamble. The level of the other preambles can be calculated by subtracting the set Preamble Power Step. Remote-control command: `SOUR:BB:W3GP:MST2:PCPC:TIM:DPOW:PRE?`
Delta Power - Message Part - PCPCH UE - 3GPP FDD (graphical display)	Indication of the level correction value for the message part. In case of one UE active, the power of the message part can be calculated by adding the set RF level: Example: Level = 5 dBm + ∆PowMP = 2,3 dB = 7,3 dBm. Remote-control command `SOUR:BB:W3GP:MST2:PCPC:TIM:DPOW:MPAR?`
Start Offset - PCPCH UE - 3GPP FDD (graphical display)	Enters the start offset of the PCPCH in access slots or slots. ***Note:*** *The PCPCH only transmitted once, at the start of the sequence.* The starting time delay in timeslots is calculated according to: 2 x Start Offset # TS 25 211Kapitel 7.3 PCPCH/AICH timing relation Remote-control command: `SOUR:BB:W3GP:MST2:PCPC:TIM:SOFF 1`
Transmission Timing - Preamble - PCPCH UE - 3GPP FDD (graphical display)	Enters the time difference between two successive preambles in access slots or slots. Remote-control command: `SOUR:BB:W3GP:MST2:PCPC:TIM:TIME:PREP 4`
Transmission Timing - Message Part - PCPCH UE - 3GPP FDD (graphical display)	Enters the time difference between the last preamble and the message part in access slots or slots. Two modes are defined in the standard. In mode AICH transmission timing 0, the preamble to message part difference is 3 access slots, in mode AICH transmission timing 1 it is 4 access slots. Remote-control command: `SOUR:BB:W3GP:MST2:PCPC:TIM:TIME:PREM 4`

Sequence Length - PCPCH UE - 3GPP FDD (graphical display)

Indication of the sequence length.

This indication allows the user to check if the sequence period fits into the set ARB sequence length.

In PCPCH only - Preamble mode, the sequence period is defined by settings Start Offset, Time Pre - Pre and Preamble Repetition:

Sequence Length = Start Offset (Slots) + Preamble Repetition x Time Pre - Pre

Example:

Start Offset = 2 access slots = 4 slots

Preamble Repetition = 3

Time Pre - Pre = 3 access slots = 6 slots

Sequence length = 4 slots + 3 x 6 slots = 22 slots

In PCPCH only - Standard mode, the sequence period is defined by settings Start Offset, Time Pre - Pre, Time Pre - Pre, Message Part Length and Preamble Repetition:

Sequence length = Start Offset (slots) + Preamble Repetition x Time Pre - Pre + Time Pre - MP + 15 x Message Part Length (frames)

Example:

Start Offset = 2 access slots = 4 slots

Preamble Repetition = 3

Time Pre - Pre = Time Pre - MP = 3 access slots = 6 slots
Power Control Preamble Length = 8 slots
Message Part Length = 2 frames

Sequence length = 4 slots + 3 x 6 slots + 6 slots + 8 + 15 x 2 = 66 slots

Note:
In PCPCH mode the CD preamble has to be taken into account. Therefore, Preamble Repetition instead of (Preamble Repetition - 1) is used.

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:TIM:SPER?`

ARB Sequence Length - PCPCH UE - 3GPP FDD (graphical display)

Indication of the ARB sequence length.

This indication allows the user to check if the sequence period fits into the set ARB sequence length.

Remote-control command:
`SOUR:BB:W3GP:SLEN?`

The **Preamble Settings** section is where the settings for the preamble are available.

Preamble Power - PCPCH UE - 3GPP FDD

Sets the power of the preamble component of the PCPCH channel.

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:PPOW -5`

Preamble Repetition - PCPCH UE - 3GPP FDD

Sets the preamble count.

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:PREP 3`

Preamble Power Step - PCPCH UE - 3GPP FDD

Sets the power by which the preamble is increased from repetition to repetition. The power set under **Preamble Power** is the "target power", used during the last repetition of the preamble.

Example:

Preamble Power	0 dB
Preamble Repetition	3
Preamble Power Step	3 dB

Generated power sequence:

Preamble 1 -6 dB	**➔ + 3 dB**	**Preamble 2 -3 dB**	**➔ + 3 dB**	**Preamble 3 0 dB**

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:PPOW:STEP 10 dB`

Power Control Preamble Length - PCPCH UE - 3GPP FDD

Sets the length of the power control preamble in slots.

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:PLEN S0 | S8`

Signature - PCPCH UE - 3GPP FDD

Selects the signature to be used for the PCPCH channel. The signature defines the code domain for the channelization code being used.

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:SIGN 1`

The **Message Part** section is where the settings for the data part of the PCPCH are available. This section is only available when **PCPCH only - Standard** is selected.

Data Power - PCPCH UE - 3GPP FDD

Sets the power of the data component of the PCPCH channel.

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:DPOW -3`

Control Power - PCPCH UE - 3GPP FDD

Sets the power of the control component of the PCPCH channel.

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:CPOW -3`

Message Length - PCPCH UE - 3GPP FDD

Sets the length of the message component of the PCPCH channel in frames.

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:MLEN 2`

Slot Format - PCPCH UE - 3GPP FDD

Selects the slot format of the control component of the PCPCH channel.

Slot formats 0 to 2 are available for the PCPCH channel. The slot format defines the structure of the control component, the FBI mode.

Slot format 0: no FBI field

Slot format 1: 1 FBI field

Slot format 2: 2 FBI fields

When channel coding is active, the FBI mode and the slot format are prescribed.

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:CPSF 1`

FBI Mode - PCPCH UE - 3GPP FDD

Selects the FBI (Feed Back Information) mode.

FBI Off: The FBI field is not in use.

FBI On 1 Bit: The FBI field is used with a length of 1 bit.

FBI On 2 Bit: The FBI field is used with a length of 2 bits.

The FBI mode is determined by the slot format set. A change in the FBI mode leads automatically to an adjustment of the slot format.

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:FBI:MODE OFF`

FBI Pattern - PCPCH UE - 3GPP FDD

Enters the bit pattern for the FBI field in the control part (of the message part) of the PCPCH.

The FBI field is filled cyclically with a pattern of up to 32 bits in length.

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:FBI:PATT H3F,8`

Symbol Rate - PCPCH UE - 3GPP FDD

Sets the symbol rate of the PCPCH channel.

The symbol rate is determined by the slot format set. A change in the symbol rate leads automatically to an adjustment of the slot format.

When channel coding is active, the symbol rate is prescribed.

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:SRAT D15K`

Data Source - PCPCH UE - 3GPP FDD

Selects the data source for the data component of the PCPCH channel.

The following data sources are available for selection:

All 0
All 1

0 data and 1 data is generated internally.

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:DATA ZERO | ONE`

PN xx

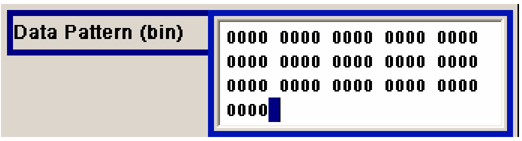
PRBS data as per CCITT with period lengths between 2^9-1 and 2^{23}-1 is generated internally.

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:DATA PN9`

Pattern
Pattern

A user-definable bit pattern with a maximum length of 64 bits is generated internally.

The bit pattern is defined in the **Pattern** entry field.



Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:DATA PATT`
`SOUR:BB:W3GP:MST2:PCPC:DATA:PATT #H3F,8`

Data List
Select Data List

Internal data from a programmable data list generated with the Data Editor or externally, is used.

Data lists are selected in the **File Select** window, which is called by means of the **Select Data List** button.

The **File Manager** is used to transmit external data lists to the R&S Signal Generator, and can be called within every **File Select** window by means of the **File Manager** button.

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:DATA DLIS`
`SOUR:BB:W3GP:MST2:PCPC:DATA:DSEL "pcd'`

TFCI - PCPCH UE - 3GPP FDD

Enters the value of the TFCI field (Transport Format Combination Indicator) in the control component of the PCPCH channel.

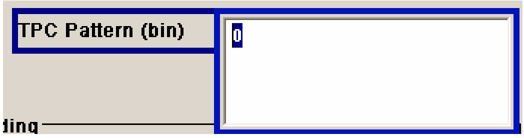
Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:TFCI 2`

TPC Data Source - PCPCH UE - 3GPP FDD

Defines the data source for the TPC field of the PCPCH channel.

During data list selection the **Select TPC Data List...** button appears for selecting a data list.

During pattern selection, the **TPC Pattern** entry window is displayed.



Remote-control command:
```
SOUR:BB:W3GP:MST2:PCPC:TPC:DATA ALL0

SOUR:BB:W3GP:MST2:PCPC:TPC:DATA DLIS
SOUR:BB:W3GP:MST2:PCPC:TPC:DATA:DSEL 'TPC_PCPC1'

SOUR:BB:W3GP:MST2:PCPC:TPC:DATA PATT
SOUR:BB:W3GP:MST2:PCPC:TPC:DATA:PATT #H3F,8
```

TPC Read Out Mode - PCPCH UE - 3GPP FDD

Defines the TPC data usage.
With 3GPP, the TPC bits are used to signal the increase or reduction in transmit power to the called station. With all read out modes, one bit is taken from the data stream for the TPC field for each slot and entered into the bit stream several times (depending on the symbol rate). The difference between the modes lies in the usage of the TPC bits.

Continuous: The TPC bits are used cyclically.

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:TPC:READ CONT`

Single + All 0 The TPC bits are used once, and then the TPC sequence is continued with 0 bits.

Remote-control commands:
`SOUR:BB:W3GP:MST2:PCPC:TPC:READ S0A`

Single + All 1 The TPC bits are used once, and then the TPC sequence is continued with 1 bits.

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:TPC:READ S1A`

Single + alt. 01 The TPC bits are used once and then the TPC sequence is continued with 0 and 1 bits alternately (in multiples, depending on by the symbol rate, for example, 00001111).

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:TPC:READ S01A`

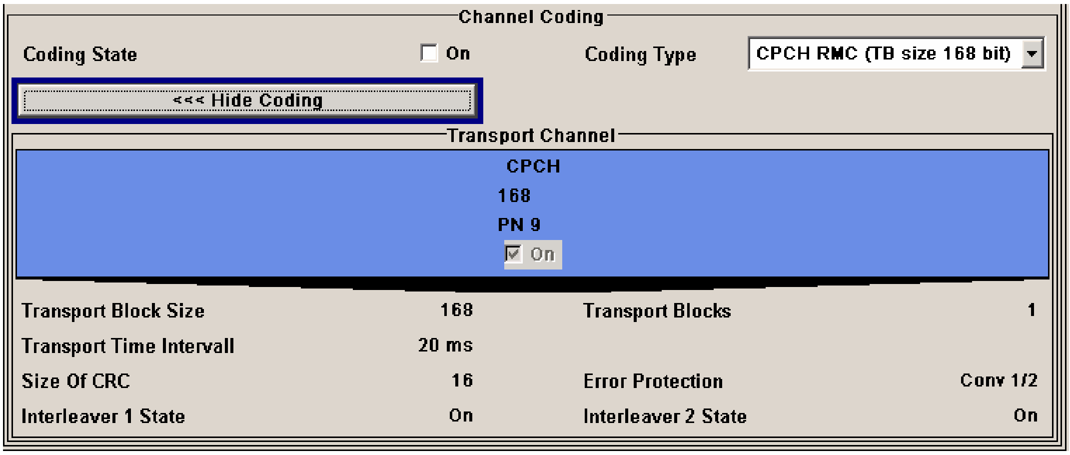
Single + alt. 10 The TPC bits are used once and then the TPC sequence is continued with 1 and 0 bits alternately (in multiples, depending on by the symbol rate, for example, 11110000).

Remote-control command:
`SOUR:BB:W3GP:MST2:PCPC:TPC:READ S10A`

Channel Coding - PCPCH UE1 - 3GPP FDD

The **Channel Coding** section is where the channel coding for the PCPCH channel is activated and deactivated and the coding type is defined. Use **Show Coding>>>** to display the fixed settings for the channel coding parameters.

Channel coding of PCPCH is only possible for the enhanced channel of UE1.



Channel Coding State - PCPCH UE1 - 3GPP FDD

Activates or deactivates channel coding for the PCPCH channel.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:PCPC:CCOD:STAT ON`

Channel Coding Type - PCPCH UE1 - 3GPP FDD

Selects the predefined reference measurement channel coding types for the PCPCH channel. Available for selection are:

CPCH RMC (TB size 168 bit)

CPCH RMC (TB size 360 bit)

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:PCPC:CCOD:TYPE TB360`

Show Coding - PCPCH UE1 - 3GPP FDD

Calls the menu for displaying channel coding. The reference measurement channel parameters are set to fixed values.

Remote-control command: -

The following parameters are displayed:

Data Source	The data source is displayed in the transport channel graphical display.
Transport Block Size	Size of the transport block at the channel coding input.
Transport Block	Transport block count.
Transport Time Interval	Number of frames into which a TCH is divided.
Size of CRC	CRC type (length).
Error Protection	Error protection.
Interleaver 1 / 2 State	Channel coding interleaver state

DPCCH Settings - UE - 3GPP FDD

The **DPCCH Settings** section is where the settings are made for the DPCCH channel. This section is only available if **DPCCH + DPDCH** mode is activated (see also Section "*DPDCH Settings - UE - 3GPP FDD*", Page 1.161).

When user equipment 1 (UE1) is selected, the signal is generated in realtime (realtime; enhanced). All the channels (DPCCH + 6 DPDCH) can be generated simultaneously in realtime.

At the physical level, an uplink DPCH consists of the DPDCH (Dedicated Physical Data Channel) and the DPCCH (Dedicated Physical Control Channel); the channel characteristics are defined by the symbol rate. The DPDCH transports the user data that is fed directly into the data field. The DPCCH transports the control fields (Pilot field; TPC = Transmit Power Control, FBI (Feedback Information) and TFCI = Transport Format Combination Indicator). DPDCH is grouped with DPCCH I/Q code multiplexing in accordance with 3GPP TS 25.211, see diagram below (the generation of an uplink reference measurement channel is described in Section "*Global Enhanced Channel Settings - UE1 - 3GPP FDD*".

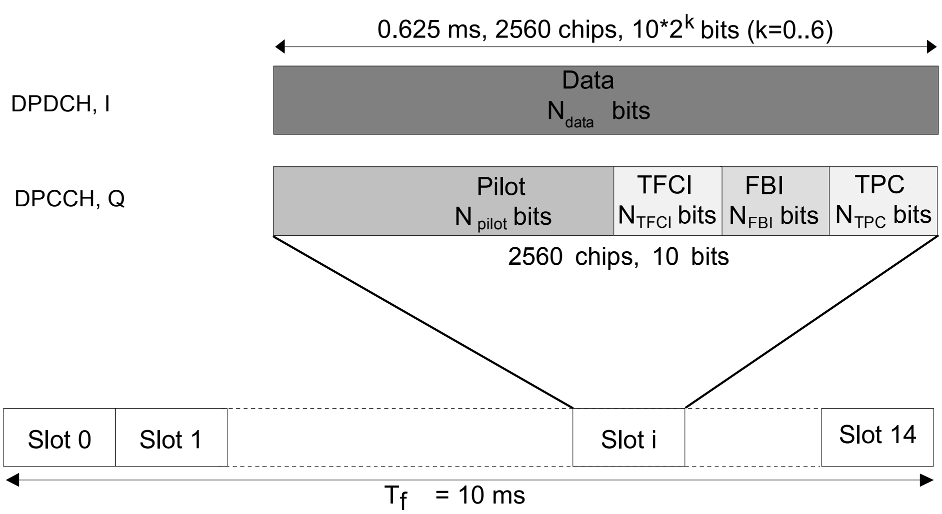
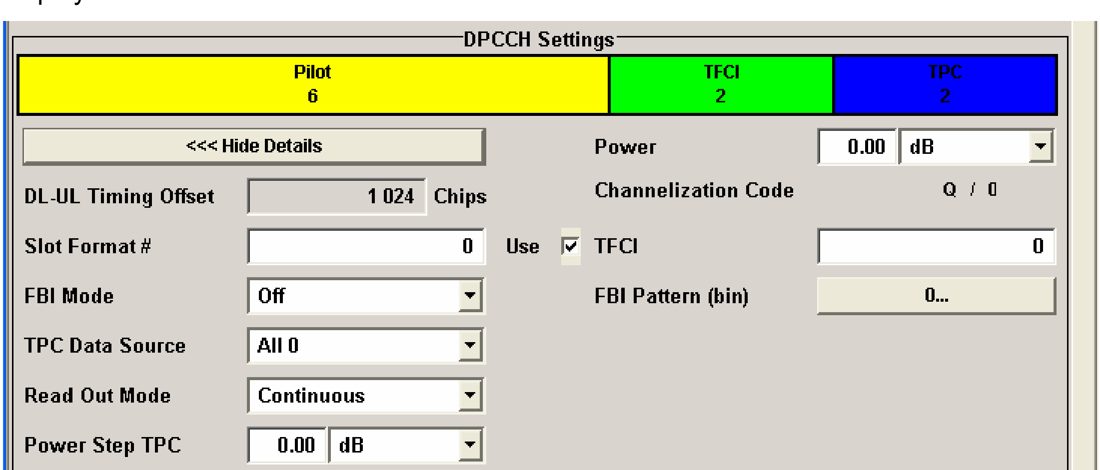


Fig. 25 Structure of an uplink DPCH in the time domain

In the upper section, the settings of the DPCCH parameters are made. The channel structure is displayed.



Channelization Code - DPCCH UE - 3GPP FDD

Displays the channelization code and the modulation branch (I or Q) of the DPCCH. The code channel is spread with the set channelization code (spreading code). The standard assigns a fixed channelization code to the DPCCH.

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:CCOD?`
Response: `"Q,0"`

Power - DPCCH UE - 3GPP FDD

Sets the power of the DPCCH channel.

Test cases defined in the 3GPP standard often use notation "Signalling values for βc and βd". The quantization of the gain parameters is shown in the following table which is taken from 3GPP Spec 25.213 (left columns) and supplemented by the instrument-specific values (right column).

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:POW -30`

Signalling values for βc and βd	Quantized amplitude ratios βc and βd	Power to be set for R&S Signal Generator / dB
15	1.0	0.0
14	14/15	-0.60
13	13/15	-1.24
12	12/15	-1.94
11	11/15	-2.69
10	10/15	-3.52
9	9/15	-4.44
8	8/15	-5.46
7	7/15	-6.62
6	6/15	-7.96
5	5/15	-9.54
4	4/15	-11.48
3	3/15	-13.99
2	2/15	-17.52
1	1/15	-23.52
0	Switch off	Switch channel off or -80 dB

DL-UL Timing Offset - DPCCH UE - 3GPP FDD

Displays the timing offset between the downlink and the uplink.

The timing offset determines the time delay in chips between receipt of the downlink signal and transmission of the uplink signal.

The standard specifies this value at 1024 chips and this is taken into account automatically when generating the uplink signal. The signal is calculated synchronously to the downlink reference timing, that is to say, the first uplink frame starts at chip position 1024 of the simulated signal.

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:TOFF?`
Response: `1024`

Slot Format # - DPCCH UE - 3GPP FDD

Selects the slot format.

Slot formats 0 to 5 are available for the DPCCH channel. The slot format defines the FBI mode and the TFCI status.

Slot format 0: no FBI field / TFCI on

Slot format 1: no FBI field / TFCI off

Slot format 2: 1 FBI field / TFCI on

Slot format 3: 1 FBI field / TFCI off

Slot format 4: 2 FBI field / TFCI off

Slot format 5: 2 FBI field / TFCI on

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:SFOR 4`

Use TFCI - DPCCH UE - 3GPP FDD

Activates the TFCI (Transport Format Combination Indicator) field.

The status of the TFCI field is determined by the slot format set. A change leads automatically to an adjustment of the slot format.

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:TFCI:STAT ON | OFF`

TFCI - DPCCH UE - 3GPP FDD

Enters the value of the TFCI field (Transport Format Combination Indicator) of the DPCCH channel.

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:TFCI 2`

FBI Mode - DPCCH UE - 3GPP FDD

Selects the FBI (Feed Back Information) mode.

FBI Off: The FBI field is not in use.

FBI On 1 Bit: The FBI field is used with a length of 1 bit.

FBI On 2 Bit: The FBI field is used with a length of 2 bits.

The FBI mode is determined by the slot format set. A change in the FBI mode leads automatically to an adjustment of the slot format.

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:FBI:MODE D1B`

FBI Pattern - DPCCH UE - 3GPP FDD

Enters the bit pattern for the FBI field.

The FBI field is filled cyclically with a pattern of up to 32 bits in length.

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:FBI:PATT #H3F,8`

TPC Data Source - DPCCH UE - 3GPP FDD

Defines the data source for the TPC field of the DPCCH channel.

When **Pattern** is selected, an entry field appears for the bit pattern. The maximum bit pattern length is 64 bits.

When **Data List** is selected, a button appears for calling the **File Select** window for selection of a data list.

Remote-control command:
```
SOUR:BB:W3GP:MST2:DPCC:TPC:DATA ZERO | ONE

SOUR:BB:W3GP:MST2:DPCC:TPC:DATA PATT
SOUR:BB:W3GP:MST2:DPCC:TPC:DATA:PATT #H3F,8

SOUR:BB:W3GP:MST2:DPCC:TPC:DATA DLIS
SOUR:BB:W3GP:MST2:DPCC:TPC:DATA:DSEL 'dpcc_data'
```

TPC Read Out Mode - DPCCH UE - 3GPP FDD

Defines the TPC data usage.

With 3GPP, the TPC bits are used to signal the increase or reduction in transmit power to the called station. With all read out modes, one bit is taken from the data stream for the TPC field for each slot and entered into the bit stream several times (depending on the symbol rate). The difference between the modes lies in the usage of the TPC bits.

These different modes can be used, for example, to deliberately set a DPCH of a base station to a specific output power (e.g. with the pattern 11111) and then let it oscillate around this power (with Single + alt. 01 and Single + alt. 10). This then allows power measurements to be carried out at the base station (at a quasi-constant power). Together with the option (Mis-)Use TPC for output power control (see below), TPC Read Out Mode can also be used to generate various output power profiles.

Continuous: The TPC bits are used cyclically.

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:TPC:READ CONT`

Single + All 0 The TPC bits are used once, and then the TPC sequence is continued with 0 bits.

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:TPC:READ S0A`

Single + All 1 The TPC bits are used once, and then the TPC sequence is continued with 1 bits.

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:TPC:READ S1A`

Single + alt. 01 The TPC bits are used once and then the TPC sequence is continued with 0 and 1 bits alternately (in multiples, depending on by the symbol rate, for example, 00001111).

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:TPC:READ S01A`

Single + alt. 10 The TPC bits are used once and then the TPC sequence is continued with 1 and 0 bits alternately (in multiples, depending on by the symbol rate, for example, 11110000).

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:TPC:READ S10A`

Misuse TPC for Output Power Control - DPCCH UE - 3GPP FDD

(This feature is available for UE2, UE3, and UE4 only.)

Defines "mis-" use of the TPC data.

With 3GPP, the TPC bits are used to signal the increase or reduction in transmit power to the called station. If **(Mis-) use TPC for output power control** is activated, the specified pattern is misused, in order to vary the intrinsic transmit power over time. A bit of this pattern is removed for each slot in order to increase (bit = "1") or reduce (bit = "0") the channel power by the specified power step (**Power Step**). The upper limit for this is 0 dB and the lower limit -80 dB. The following envelope is produced at a channel power of 0 dB, power step 1.0 dB and pattern "001110100000011" and TPC Pattern ReadOut Mode **Continuous:**

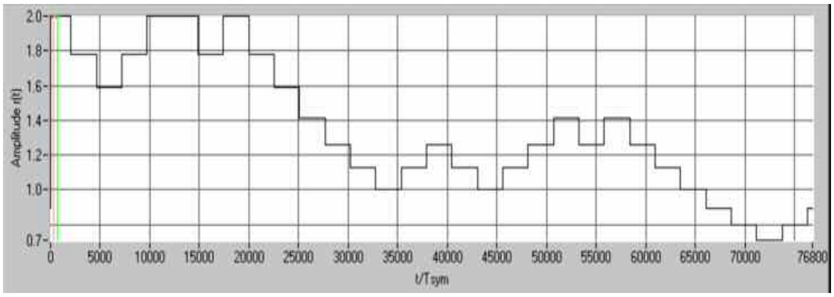


Fig. 26 Dynamic change of channel power (continuous)

***Note**:*

Power control works both on the DPCCH and all the active DPDCHs.

The change in power is always carried out (as stipulated in the standard) at the start of the slot pilot field

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:TPC:MIS ON`

TPC Power Step - DPCCH UE - 3GPP FDD

(This feature is available for UE2, UE3, and UE4 only.)

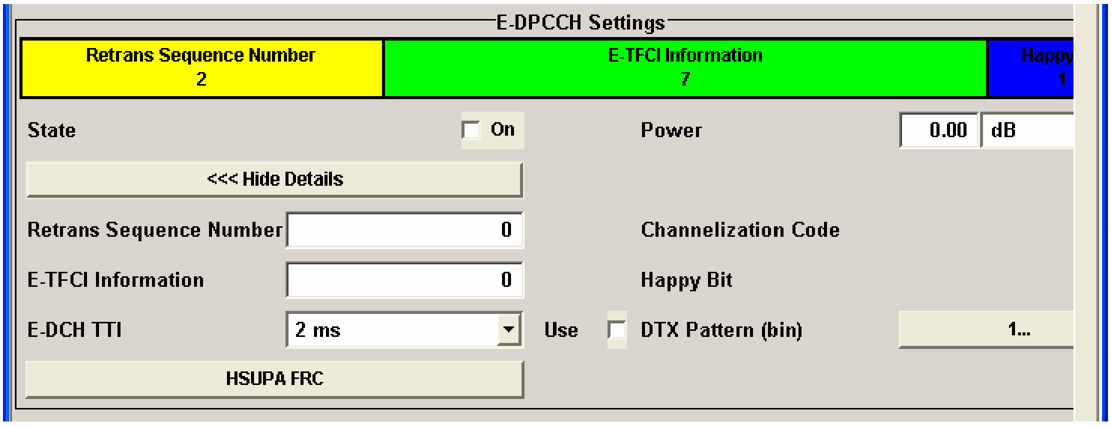
Sets the step width of the power change in dB for **(Mis-) use TPC for output power control**.

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:TPC:PST 1.0`

E-DPCCH Settings - UE - 3GPP FDD

The **E-DPCCH Settings** section is where the settings are made for the E-DPCCH channel. This section is only available if **DPCCH + DPDCH** mode is activated (see also Section "*DPDCH Settings - UE - 3GPP FDD*", Page 1.161).

In the upper section, the settings of the DPCCH parameters are made. The channel structure is displayed.



State – E-DPCCH UE - 3GPP FDD

Activates or deactivates the E-DPCCH channel. If an FRC is set for the channel, this field is activated automatically.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:STAT ON`

Power – E-DPCCH UE - 3GPP FDD

Sets the power of the E-DPCCH channel.

The value range is -80 dB to 0 dB.

Remote-control command:
`SOUR:BB:W3GP:MST:HSUP:DPCC:E:POW -2.5dB`

Channelization Code – E-DPCCH UE - 3GPP FDD

Displays the channelization code and the modulation branch (always **I**) of the E-DPCCH. The code channel is spread with the set channelization code (spreading code). The standard assigns a fixed channelization code to the E-DPCCH.

Remote-control command:
`SOUR:BB:W3GP:MST1:DPCC:HS:CCOD?`
Response: `"I,0"`

Retrans Sequence Number – E-DPCCH UE - 3GPP FDD

Sets the retransmission sequence number.

The value range is 0 to 3.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:RSN 2`

E-TFCI Information – E-DPCCH UE - 3GPP FDD	Sets the value for the TFCI (Transport Format Combination Indicator) field. The value range is 0 to 127. Remote-control command: `SOUR:BB:W3GP:MST1:HSUP:DPCC:E:TFCI 5`
Happy Bit – E-DPCCH UE - 3GPP FDD	Activating the happy bit. This bit is indicating whether the UE could use more resources (Not Happy/deactivatet) or not (Happy/activated). Remote-control command: `SOUR:BB:W3GP:MST1:HSUP:DPCC:E:HBIT ON`
E-DCH TTI – E-DPCCH UE - 3GPP FDD	Sets the value for the TTI (Transmission Time Interval). If an FRC is set for the channel, this field is read-only. Remote-control command: `SOUR:BB:W3GP:MST1:HSUP:DPCC:E:TTIE 2`
Use (DTX) – E-DPCCH UE - 3GPP FDD	Activates or deactivates the DTX (Discontinuous Transmission) mode. If an FRC is set for the channel, this field is read-only. Remote-control command: `SOUR:BB:W3GP:MST1:HSUP:DPCC:E:DTX:STAT ON`
DTX Pattern (bin) – E-DPCCH UE - 3GPP FDD	Sets the bit pattern for the DTX. The maximim length is 64 bits. The following values are allowed: 1: Data transmission -: DTX Remote-control command: `SOUR:BB:W3GP:MST1:HSUP:DPCC:E:DTX:PATT "11-1-"`
HSUPA FRC… - E-DPCCH UE - 3GPP FDD	**(This button is available for UE1 only).** Calls the menu for configuring the FRC (Fixed Reference Channel), see *"HSUPA FRC Settings - UE - 3GPP FDD"*. Remote-control command: n.a.

HS-DPCCH Settings - UE - 3GPP FDD

The **HS-DPCCH Settings** section is where the settings are made for the high speed channel. This section is only available if **DPCCH + DPDCH** mode is activated (see also Sections "*DPCCH Settings - UE - 3GPP FDD*", Page 1.150 and "*DPDCH Settings - UE - 3GPP FDD*", Page 1.161).

When user equipment 1 (UE1) is selected, the signal is generated in realtime.

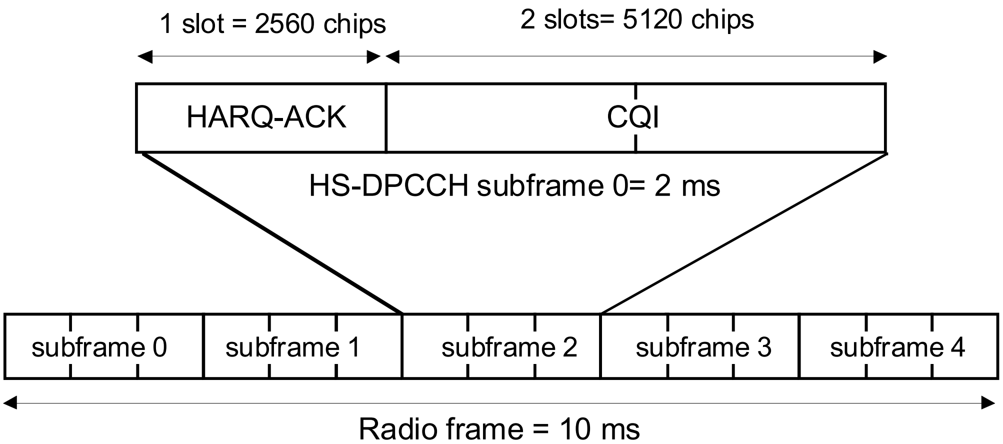


Fig. 27 Structure of an uplink HS-DPCCH in the time domain

The HS-DPCCH carries uplink feedback signalling related to the accuracy and quality of downlink HS-DSCH transmission. (Hybrid-ARQ Acknowledgement (HARQ-ACK) in the first subframe slot and Channel-Quality Indication (CQI) in the second and third subframe slot). Only one HS-DPCCH may be transmitted on each radio link. The HS-DPCCH can only exist together with an uplink DPCCH.

The HS-DPCCH subframe starts 256 $\times m$ chips after the start of an uplink DPCCH slot with m selected such that the subframe transmission starts within the first 0-255 chips after 7.5 slots following the end of the received HS-PDSCH sub-frame.

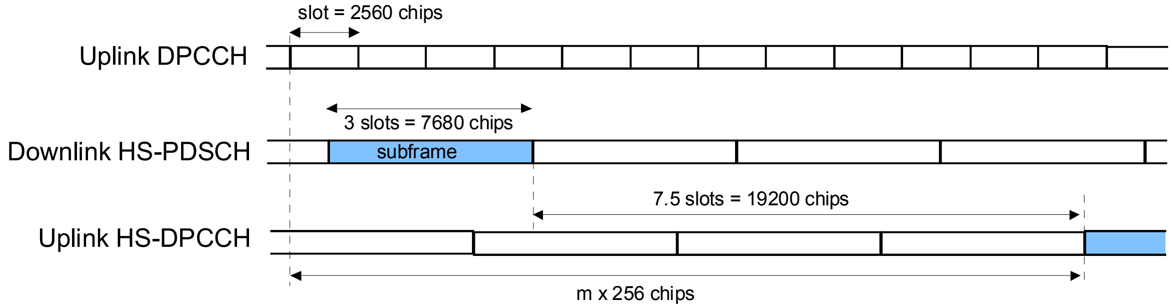
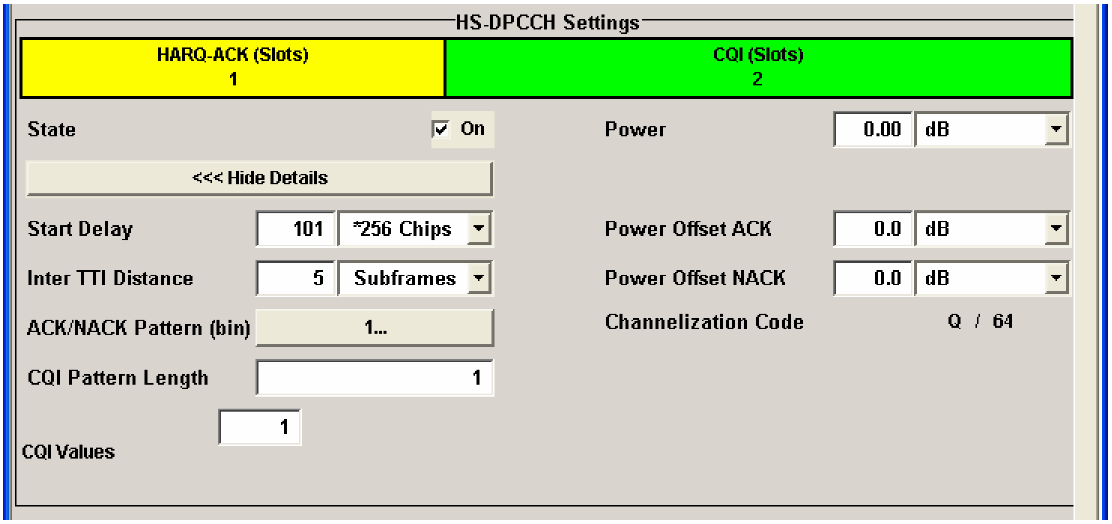


Fig. 28 Timing offset between the uplink DPCCH, the HS-PDSCH and the HS-DPCCH at the UE.

In the mid section, the settings of the HS-DPCCH parameters are made. The channel structure is displayed.



State - HS-DPCCH - UE - 3GPP FDD

Activates or deactivates the HS-DPCCH channel.

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:HS:STAT ON`

Channel Power - HS-DPCCH - UE - 3GPP FDD

Sets the channel power in dB.

The power entered is relative to the powers of the other channels and does not initially relate to the LEVEL power display. If **Adjust Total Power** is executed (top level of the 3GPP FDD menu), all the power data is relative to LEVEL.

***Note**:*
The uplink high speed channel is blanked (duty cycle 3/15).

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:HS:POW -30`

Channelization Code - HS-DPCCH - UE - 3GPP FDD

Displays the channelization code and the modulation branch (I or Q) of the HS-DPCCH.

The code channel is spread with the set channelization code (spreading code). The channelization code of the high speed channel depends on the number of activated DPDCHs, i.e. on the overall symbol rate.

Remote-control command:
`SOUR:BB:W3GP:MST1:DPCC:HS:CCOD?`
Response: `"Q,32"`

Start Delay - HS-DPCCH - UE - 3GPP FDD

Sets the delay between the uplink HS-DPCCH and the frame of uplink DPCH.

Thus, the channel can be synchronized with the associated downlink PDSCH.

The delay is entered as a multiple *m* of 256 chips according to TS 25.211 7.7:

$m = (T_{TX\_diff} / 256) + 101$

where T_{TX_diff} is the difference in chips (T_{TX_diff} =0, 256, ..., 38144).

The value range of *m* is 0 to 250 (2 frames +1024 chips)

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:HS:SDEL 101`

Inter TTI Distance - HS-DPCCH - UE - 3GPP FDD

Selects the distance between two HSDPA packets. The distance is set in number of sub-frames (3 slots = 2 ms). An **Inter TTI Distance** of 1 means continuous generation.

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:HS:TTID 4`

HARQ-ACK Pattern - HS-DPCCH - UE - 3GPP FDD

Enters the pattern for the HARQ-ACK field (Hybrid-ARQ Acknowledgement).

After receiving a transmission packet, the user equipment returns feedback information in the HARQ-ACK field that is related to the accuracy of downlink HS-DSCH transmission.

One bit is used per HS-DPCCH packet. The maximum length of the pattern is 32 bits.

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:HS:HAP "1110--0-0-111"`

"1" = ACK	The HARQ ACK is sent. Transmission was successful and correct.
"0" = NACK	The NACK is not sent. Transmission was not correct. With an NACK, the UE requests retransmission of the incorrect data.
"-" = DTX	Nothing is sent. Transmission is interrupted (Discontinuous Transmission (DTX)).

Power Offset ACK - HS-DPCCH - UE - 3GPP FDD

Sets the channel power part of the ACK in dB.

The value range is -10 dB to 10 dB.

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:HS:POAC 1.5dB`

Power Offset NACK - HS-DPCCH - UE - 3GPP FDD

_D2HLink_164180Sets the channel power part of the NACK in dB.

The value range is -10 dB to 10 dB.

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:HS:PONA 1.5dB`

CQI Length - HS-DPCCH - UE - 3GPP FDD

Sets the length of the CQI sequence. The values of the CQI sequence are entered in input fields **CQI Values**. The pattern is generated cyclically.

With the CQI (Channel Quality Indicator), the user equipment informs the base station about the receive quality of the downlink HS-PDSCH.

Thus, the base station can adapt the modulation and coding scheme to improve the signal quality. The R&S Signal Generator supports the control of the base station HS-PDSCH by CQI sequences with a length of 1 to 10 values.

Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:HS:CQI:PLEN 4`

CQI Values - HS-DPCCH - UE - 3GPP FDD

Enters the values of the CQI sequence. Value -1 means that no CQI is sent (DTX).

The length of the CQI sequence is set at input field **CQI Length**. The pattern is generated cyclically.

With the CQI (Channel Quality Indicator), the user equipment informs the base station about the receive quality of the downlink HS-PDSCH. Thus, the base station can adapt the modulation and coding scheme to improve the signal quality. The R&S Signal Generator supports the control of the base station HS-PDSCH by CQI sequences with a length of 1 to 10 values.

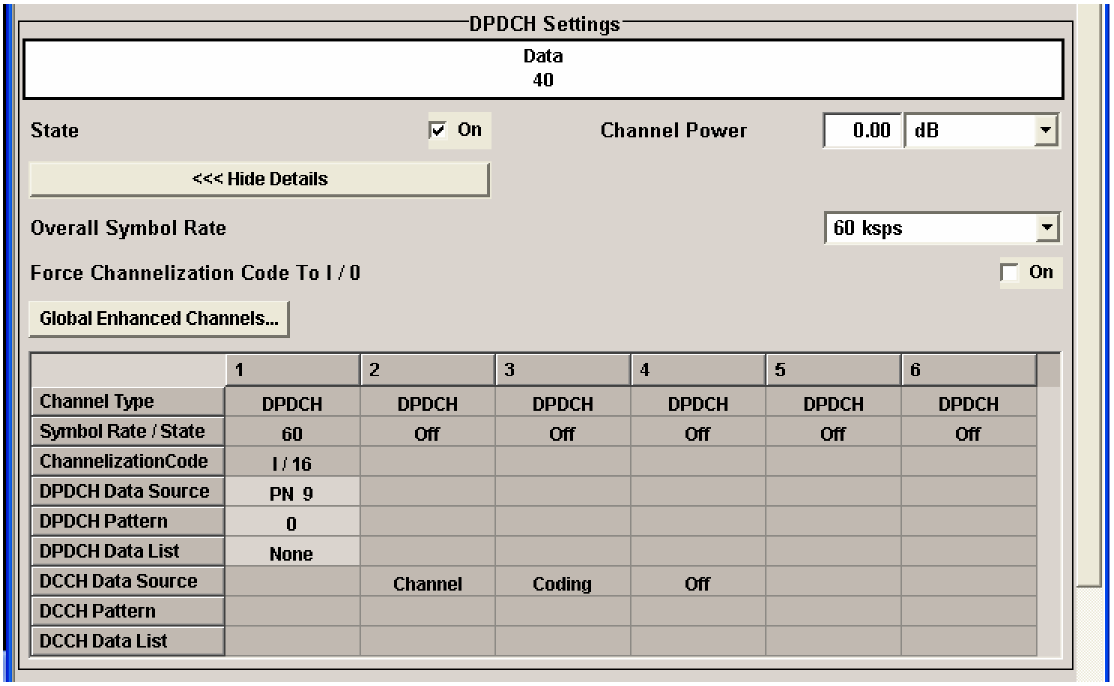
Remote-control command:
`SOUR:BB:W3GP:MST2:DPCC:HS:CQI1:VAL 4`

DPDCH Settings - UE - 3GPP FDD

The **DPDCH Settings** section is where the settings are made for the DPDCH channels. This section is only available if **DPCCH + DPDCH** mode is activated (see also Section "*DPCCH Settings - UE - 3GPP FDD*", Page 1.150.

The **Channel Table** section is where the channel table for the DPDCH channels is displayed. The number of active channels depends on the overall symbol rate set. The data sources for the data part of the individual channels can be selected in the channel table. The remaining parameters are only displayed and their value depends on the overall symbol rate set.

When UE1 is selected, the signal is generated in realtime (realtime; enhanced). All the channels (DPCCH + 6 DPDCH) can be generated simultaneously in realtime. The **Global Enhanced Channels...** button leads to a sub-menu for configuring the enhanced parameters.



State - DPDCH UE - 3GPP FDD

Activates or deactivates all the DPDCH channels.

Remote-control command:
`SOUR:BB:W3GP:MST2:DPDC:STAT ON`

Channel Power - DPDCH UE - 3GPP FDD

Sets the channel power in dB.

The power entered is relative to the powers of the other channels and does not initially relate to the LEVEL power display. If **Adjust Total Power** is executed (top level of the 3GPP FDD menu), all the power data is relative to LEVEL

Note*:*
The uplink channels are not blanked in this mode (duty cycle 100%).

Test cases defined in the 3GPP standard often use notation "Signalling values for βc and βd". The quantization of the gain parameters is shown in the following table which is taken from 3GPP Spec 25.213 (left columns) and supplemented by the instrument-specific values (right column).

Remote-control command:
`SOUR:BB:W3GP:MST2:DPDC:POW -30`

Signalling values for βc and βd	Quantized amplitude ratios βc and βd	Power to be set for R&S Signal Generator / dB
15	1.0	0.0
14	14/15	-0.60
13	13/15	-1.24
12	12/15	-1.94
11	11/15	-2.69
10	10/15	-3.52
9	9/15	-4.44
8	8/15	-5.46
7	7/15	-6.62
6	6/15	-7.96
5	5/15	-9.54
4	4/15	-11.48
3	3/15	-13.99
2	2/15	-17.52
1	1/15	-23.52
0	Switch off	Switch channel off or -80 dB

Force Channelization Code To I/0- DPDCH UE - 3GPP FDD

Sets the channelization code to I/0.

This mode can only be activated if the overall symbol rate is < 2 x 960 kbps.

It is provided for test purposes. Using an oscilloscope, the control and data bits of the DPDCH are visible on the I/Q signal if

Force Channelization Code to I/Q is On

Scrambling Code Mode is set to Off.

DPCCH power is - 80 dB

Remote-control command:
`SOUR:BB:W3GP:MST2:DPDC:FCIO ON`

Overall Symbol Rate - DPDCH UE - 3GPP FDD

Sets the overall symbol rate of all the DPDCH channels.

The structure of the DPDCH channel table depends on this parameter. The overall symbol rate determines which DPDCHs are active, which symbol rate they have and which channelization codes they use (see Table below).

DPDCHs that are not active by virtue of the overall rate, are also disabled for operation.

***Note**:*
Up to an overall rate of 960 ksps, only DPDCH 1 is active, its symbol rate is the same as the overall symbol rate and the channelization code is the same as spreading factor/4 (spreading factor = chip rate / symbol rate). With an overall symbol rate greater than 960 ksps, all the active DPDCH channels have the symbol rate 960 ksps.

Remote-control command:
`SOUR:BB:W3GP:MST2:DPDC:ORAT D60K`

Tab. 16 Structure of the DPDCH channel table in conjunction with the overall symbol rate

Overall Symbol Rate	**DPDCH 1**	**DPDCH 2**	**DPDCH 3**	**DPDCH 4**	**DPDCH 5**	**DPDCH 6**
I or Q branch	**I**	**Q**	**I**	**Q**	**I**	**Q**
15 ksps	State: ON S-Rate: 15 k Ch. Code: 64	State: OFF	State: OFF	State: OFF	State: OFF	State: OFF
30 ksps	State: ON S-Rate: 30 k Ch. Code: 32	State: OFF	State: OFF	State: OFF	State: OFF	State: OFF
60 ksps	State: ON S-Rate: 60 k Ch. Code: 16	State: OFF	State: OFF	State: OFF	State: OFF	State: OFF
120 ksps	State: ON S-Rate: 120 k Ch. Code: 8	State: OFF	State: OFF	State: OFF	State: OFF	State: OFF
240 ksps	State: ON S-Rate: 240 k Ch. Code: 4	State: OFF	State: OFF	State: OFF	State: OFF	State: OFF
480 ksps	State: ON S-Rate: 480 k Ch. Code: 2	State: OFF	State: OFF	State: OFF	State: OFF	State: OFF
960 ksps	State: ON S-Rate: 960 k Ch. Code: 1	State: OFF	State: OFF	State: OFF	State: OFF	State: OFF
2 x 960 ksps	State: ON S-Rate: 960 k Ch. Code: 1	State: ON S-Rate: 960 k Ch. Code: 1	State: OFF	State: OFF	State: OFF	State: OFF
3 x 960 ksps	State: ON S-Rate: 960 k Ch. Code: 1	State: ON S-Rate: 960 k Ch. Code: 1	State: ON S-Rate: 960 k Ch. Code: 3	State: OFF	State: OFF	State: OFF
4 x 960 ksps	State: ON S-Rate: 960 k Ch. Code: 1	State: ON S-Rate: 960 k Ch. Code: 1	State: ON S-Rate: 960 k Ch. Code: 3	State: ON S-Rate: 960 k Ch. Code: 3	State: OFF	State: OFF
5 x 960 ksps	State: ON S-Rate: 960 k Ch. Code: 1	State: ON S-Rate: 960 k Ch. Code: 1	State: ON S-Rate: 960 k Ch. Code: 3	State: ON S-Rate: 960 k Ch. Code: 3	State: ON S-Rate: 960 k Ch. Code: 2	State: OFF
6 x 960 ksps	State: ON S-Rate: 960 k Ch. Code: 1	State: ON S-Rate: 960 k Ch. Code: 1	State: ON S-Rate: 960 k Ch. Code: 3	State: ON S-Rate: 960 k Ch. Code: 3	State: ON S-Rate: 960 k Ch. Code: 2	State: ON S-Rate: 960 k Ch. Code: 2

Global Enhanced Channels... - DPDCH UE - 3GPP FDD

Calls the menu for configuring all the enhanced channel settings of user equipment UE1.

The menu is described in Section *"Global Enhanced Channel Settings - UE1 - 3GPP FDD"*.

Remote-control command: n.a.

Channel Table- DPDCH UE - 3GPP FDD

The **Channel Table** section is where the channel table for the DPDCH channels is displayed. The number of active channels depends on the overall symbol rate set. The data sources for the data part of the individual channels can be selected in the channel table. The remaining parameters are only displayed and their value depends on the overall symbol rate set.

Channel Type - DPDCH Channel UE - 3GPP FDD

Displays the channel type.

Remote-control command: n.a.

Channel Number - DPDCH Channel UE - 3GPP FDD

Displays the channel number.

Remote-control command: n.a.
(the channel is selected by the suffix at keyword `CHANnel<n>`)

Symbol Rate - DPDCH Channel UE - 3GPP FDD

Displays the symbol rate and the state of the DCDCH channel.

The symbol rate and the state of channel 2 to 6 are dependent on the overall symbol rate set and cannot be modified.

Remote-control command:
`SOUR:BB:W3GP:MST1:CHAN1:DPDC:SRAT?`
`Response:   D30k`

Channelization Code - DPDCH Channel UE - 3GPP FDD

Displays the channelization code and the modulation branch (I or Q) of the DPDCH channel.

The channelization code is dependent on the overall symbol rate set and cannot be modified.

Remote-control command:
`SOUR:BB:W3GP:MST1:CHAN1:DPDC:CCOD?`
Response: `Q,32`

DPDCH - DTCH Data - DPDCH Channel UE - 3GPP FDD

(UE2..UE4; UE1 without channel coding)
DPDCH / DTCH
(UE1 with channel coding)

Selects the data source for the DPDCH channel.

When the selection is UE2 ... UE4, the data source for the DPDCH is always entered here.

The data source for the DPDCH is also entered here for the enhanced channels of UE1 without channel coding.

When channel coding is active, the data source for the DTCH1 component in the transport layer is selected here. In this situation, the display reads **DPDCH / DTCH** and the **DCCH Data** entry field is enabled for selecting the data source of the DCCH channel. The data sources of the other DTCH channels can be set in the **Global Enhanced Channel Settings in the Transport Channel section** sub-menu, see Section "*Global Enhanced Channel Settings - UE1 - 3GPP FDD*", Page 1.177.

The following are available for selection as data sources:

All 0
All 1

0 data and 1 data is generated internally.

Remote-control commands:
`SOUR:BB:W3GP:MST1:CHAN1:DPDC:DATA ZERO | ONE`

PN xx

PRBS data as per CCITT with period lengths between 2^9-1 and 2^{23}-1 is generated internally.

Remote-control commands:
`SOUR:BB:W3GP:MST1:CHAN1:DPDC:DATA PN9| PN15| PN16| PN20| PN21| PN23`
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:DATA PN9| PN15| PN16| PN20| PN21| PN23`

Pattern
Pattern

A user-definable bit pattern with a maximum length of 64 bits is generated internally.

The bit pattern is defined in the **Pattern** entry field.

Remote-control commands:
`SOUR:BB:W3GP:MST1:CHAN1:DPDC:DATA:PATT #H3F,8`

Data List

Internal data from a programmable data list generated with the Data Editor or externally, is used.

Data lists are selected in the File Select window, which is called by means of the Select Data List button.

The File Manager is used to transmit external data lists to the R&S Signal Generator, and can be called within every File Select window by means of the File Manager button.

Remote-control commands:
`SOUR:BB:W3GP:MST1:CHAN1:DPDC:DATA DLIS`
`SOUR:BB:W3GP:MST1:CHAN1:DPDC:DSEL "dp1"`
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:DATA DLIS`
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:DATA:DSEL "dp"`
`SOUR:BB:W3GP:MST1:HSUP:CHAN1:DPDC:E:DATA:DSEL "dp1"`

DCCH Data Source - DPDCH Channel UE - 3GPP FDD

Selects the data source for the DCCH component.

This parameter is only available for UE1 for enhanced channels with active channel coding.

The following are available for selection as data sources:

All 0
All 1

0 data and 1 data is generated internally.

Remote-control command:
`SOUR:BB:W3GP:MST1:CHAN1:DPDC:DATA:DCCH ALL0 | ALL1`

PN xx

PRBS data as per CCITT with period lengths between 2^9-1 and 2^{23}-1 is generated internally.

Remote-control commands:
`SOUR:BB:W3GP:MST1:CHAN1:DPDC:DATA:DCCH  PN9| PN15| PN16| PN20| PN21| PN23`

Pattern
Pattern

A user-definable bit pattern with a maximum length of 64 bits is generated internally.

The bit pattern is defined in the **Pattern** entry field.

Remote-control command:
`SOUR:BB:W3GP:MST1:CHAN1:DPDC:DATA:DCCH PATT`
`SOUR:BB:W3GP:MST1:CHAN1:DPDC:DATA:DCCH:PATT #H3F,8`

Data List

Internal data from a programmable data list generated with the Data Editor or externally, is used.

Data lists are selected in the **File Select** window, which is called by means of the **DCCH Data List** button.

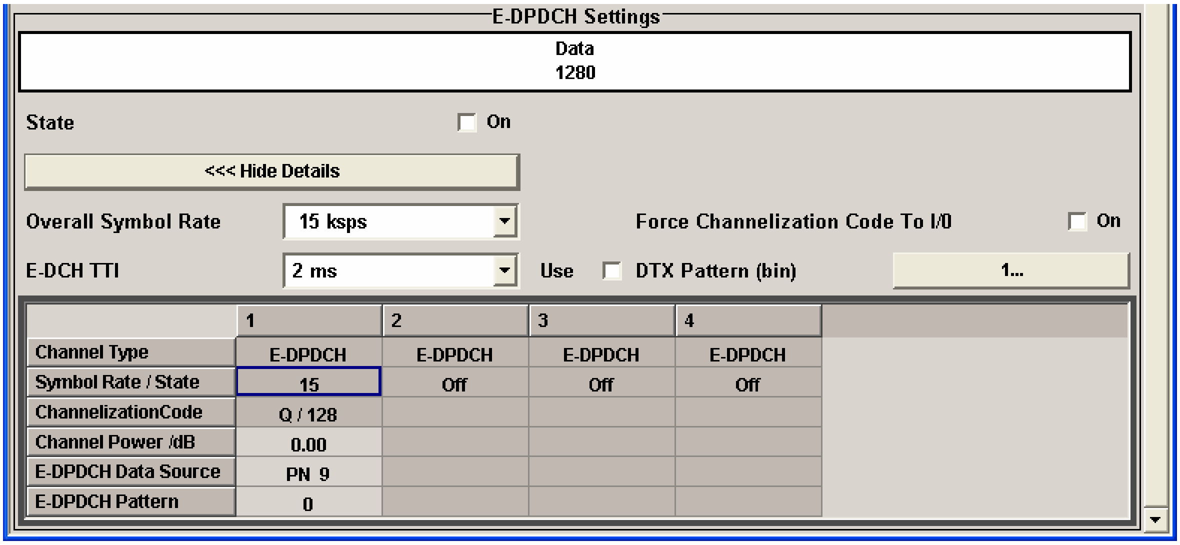
The **File Manager** is used to transmit external data lists to the R&S Signal Generator, and can be called within every **File Select** window by means of the **File Manager** button.

Remote-control command:
`SOUR:BB:W3GP:MST1:CHAN:DPDC:DATA:DCCH DLIS`
`SOUR:BB:W3GP:MST1:CHAN:DPDC:DATA:DCCH:DSEL 'dc1'`

E-DPDCH Settings - UE - 3GPP FDD

This section is only available if **DPCCH + DPDCH** mode is activated (see also Section "*DPCCH Settings - UE - 3GPP FDD*", Page 1.150).

The **Channel Table** section is where the channel table for the E-DPDCH channels is displayed. The number of active channels depends on the overall symbol rate set. The data sources for the data part of the individual channels can be selected in the channel table. The remaining parameters are only displayed and their value depends on the overall symbol rate set.



State – E-DPDCH UE - 3GPP FDD

Activates or deactivates all the E-DPDCH channels.

If an FRC is set for the channel, this field is activated automatically.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPDC:E:STAT ON`

Force Channelization Code To I/0 – E-DPDCH UE - 3GPP FDD

Sets the channelization code to I/0.

This mode can only be activated if the overall symbol rate is < 2 x 960 kbps.

It is provided for test purposes. Using an oscilloscope, the control and data bits of the E-DPDCH are visible on the I/Q signal if

Force Channelization Code to I/0 is On

Scrambling Code Mode is set to Off.

E-DPDCH power is - 80 dB

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPDC:E:FCIO ON`

Overall Symbol Rate – E-DPDCH UE - 3GPP FDD	Sets the overall symbol rate of all the E-DPDCH channels. The structure of the E-DPDCH channel table depends on this parameter. The overall symbol rate determines which E-DPDCHs are active, which symbol rate they have and which channelization codes they use (see Table below). E-DPDCHs that are not active by virtue of the overall rate, are also disabled for operation. If an FRC is set for the channel, this field is read-only. Remote-control command: `SOUR:BB:W3GP:MST1:HSUP:DPDC:E:ORAT D60K`
E-DCH TTI – E-DPDCH UE - 3GPP FDD	Sets the value for the TTI (Transmission Time Interval). If an FRC is set for the channel, this field is read-only. Remote-control command: `SOUR:BB:W3GP:MST1:HSUP:DPDC:E:TTIE 2ms`
Use (DTX) - DPDCH UE - 3GPP FDD	Activates or deactivates the DTX (Discontinuous Transmission) mode. If an FRC is set for the channel, this field is read-only. Remote-control command: `SOUR:BB:W3GP:MST1:HSUP:DPDCh:E:DTX:STAT ON`
DTX Pattern (bin) – E-DPDCH UE - 3GPP FDD	Sets the bit pattern for the DTX. The maximim length is 64 bits.The following values are allowed: 1: Data transmission -: DTX Remote-control command: `SOUR:BB:W3GP:MST1:HSUP:DPDC:E:DTX:PATT "1-1-"`

Tab. 17 Structure of the E-DPDCH channel table in conjunction with the overall symbol rate and no DPDCH activ

Overall Symbol Rate	**E-DPDCH 1**	**E-DPDCH 2**	**E-DPDCH 3**	**E-DPDCH 4**
I or Q branch	**I**	**Q**	**I**	**Q**
15 Ksps	State: ON S-Rate: 15 k Ch. Code: 64	State: OFF	State: OFF	State: OFF
30 ksps	State: ON S-Rate: 30 k Ch. Code: 32	State: OFF	State: OFF	State: OFF
60 ksps	State: ON S-Rate: 60 k Ch. Code: 16	State: OFF	State: OFF	State: OFF
120 ksps	State: ON S-Rate: 120 k Ch. Code: 8	State: OFF	State: OFF	State: OFF
240 ksps	State: ON S-Rate: 240 k Ch. Code: 4	State: OFF	State: OFF	State: OFF
480 ksps	State: ON S-Rate: 480 k Ch. Code: 2	State: OFF	State: OFF	State: OFF
960 ksps	State: ON S-Rate: 960 k Ch. Code: 1	State: OFF	State: OFF	State: OFF
2 x 960 ksps	State: ON S-Rate: 960 k Ch. Code: 1	State: ON S-Rate: 960 k Ch. Code: 1	State: OFF	State: OFF
2 x1920 ksps	State: ON S-Rate: 1920 k Ch. Code: 1	State: ON S-Rate: 1920 k Ch. Code: 1	State: OFF	State: OFF
2 x 960 ksps + 2 x 1920 ksps	State: ON S-Rate: 1920 k Ch. Code: 1	State: ON S-Rate: 1920 k Ch. Code: 1	State: ON S-Rate: 960 k Ch. Code: 1	State: ON S-Rate: 960 k Ch. Code: 1

Tab. 18 Structure of the E-DPDCH channel table in conjunction with the overall symbol rate and one DPDCH activ

Overall Symbol Rate	E-DPDCH 1	E-DPDCH 2	E-DPDCH 3	E-DPDCH 4
Activ HS-DPCCH? **I or Q branch**	**No** **Q**	**No** **I**	**Yes** **I**	**Yes** **Q**
15 ksps	State: ON S-Rate: 15 k Ch. Code: 128	State: OFF	State: ON S-Rate: 15 k Ch. Code: 128	State: OFF
30 ksps	State: ON S-Rate: 30 k Ch. Code: 64	State: OFF	State: ON S-Rate: 30 k Ch. Code: 64	State: OFF
60 ksps	State: ON S-Rate: 60 k Ch. Code: 32	State: OFF	State: ON S-Rate: 60 k Ch. Code: 32	State: OFF
120 ksps	State: ON S-Rate: 120 k Ch. Code: 16	State: OFF	State: ON S-Rate: 120 k Ch. Code: 16	State: OFF
240 ksps	State: ON S-Rate: 240 k Ch. Code: 8	State: OFF	State: ON S-Rate: 240 k Ch. Code: 8	State: OFF
480 ksps	State: ON S-Rate: 480 k Ch. Code: 4	State: OFF	State: ON S-Rate: 480 k Ch. Code: 4	State: OFF
960 ksps	State: ON S-Rate: 960 k Ch. Code: 2	State: OFF	State: ON S-Rate: 960 k Ch. Code: 2	State: OFF
2 x 960 ksps	State: ON S-Rate: 960 k Ch. Code: 2	State: ON S-Rate: 960 k Ch. Code: 2	State: ON S-Rate: 960 k Ch. Code: 2	State: ON S-Rate: 960 k Ch. Code: 2
2 x1920 ksps	State: ON S-Rate: 1920 k Ch. Code: 1	State: ON S-Rate: 1920 k Ch. Code: 1	State: ON S-Rate: 1920 k Ch. Code: 1	State: ON S-Rate: 1920 k Ch. Code: 1

Channel Table- E-DPDCH UE - 3GPP FDD

The **Channel Table** section is where the channel table for the E-DPDCH channels is displayed. The number of active channels depends on the overall symbol rate set. The data sources for the data part of the individual channels can be selected in the channel table. The remaining parameters are only displayed and their value depends on the overall symbol rate set.

Channel Type – E-DPDCH Channel UE - 3GPP FDD

Displays the channel type.

Remote-control command: n.a.

Channel Number – E-DPDCH Channel UE - 3GPP FDD

Displays the channel number.

Remote-control command: n.a.
(the channel is selected by the suffix at keyword `CHANnel<n>`)

Symbol Rate – E-DPDCH Channel UE - 3GPP FDD

Displays the symbol rate and the state of the E-DCDCH channel.

The symbol rate and the state of channel 2 to 6 are dependent on the overall symbol rate set and cannot be modified.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:CHAN1:DPDC:E:SRAT?`
`Response: D30k`

Channelization Code – E-DPDCH Channel UE - 3GPP FDD

Displays the channelization code and the modulation branch (I or Q) of the DPDCH channel.

The channelization code is dependent on the overall symbol rate set and cannot be modified.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:CHAN1:DPDC:E:CCOD?`
Response: `Q,32`

Channel Power – E-DPDCH UE - 3GPP FDD

Sets the power of the selected E-DPDCH channel (and all the other currently active channels).

The power entered is relative to the powers of the other channels and does not initially relate to the LEVEL power display. If **Adjust Total Power** is executed (top level of the 3GPP FDD menu), all the power data is relative to LEVEL

Note:
The uplink channels are not blanked in this mode (duty cycle 100%).
Exception: The DTX mode is set to ON.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:CHAN1:DPDC:E:POW -30`

DPDCH Data – E-DPDCH Channel UE - 3GPP FDD

(UE2..UE4; UE1 without channel coding)
DPDCH / DTCH
(UE1 with channel coding)

Selects the data source for the E-DPDCH channel.

When the selection is UE2 ... UE4, the data source for the DPDCH is always entered here.

The data source for the DPDCH is also entered here for the enhanced channels of UE1 without channel coding.

When channel coding is active, the data source for the DTCH1 component in the transport layer is selected here. In this situation, the display reads **DPDCH / DTCH** and the **DCCH Data** entry field is enabled for selecting the data source of the DCCH channel. The data sources of the other DTCH channels can be set in the **Global Enhanced Channel Settings in the Transport Channel section** submenu, see Section "*Global Enhanced Channel Settings - UE1 - 3GPP FDD*", Page 1.177.

The following are available for selection as data sources:

All 0

All 1

0 data and 1 data is generated internally.

Remote-control commands:
`SOUR:BB:W3GP:MST1:HSUP:CHAN1:DPDC:E:DATA ZERO | ONE`

PN xx

PRBS data as per CCITT with period lengths between 2^9-1 and 2^{23}-1 is generated internally.

Remote-control commands:
`SOUR:BB:W3GP:MST1:HSUP:CHAN1:DPDC:E:DATA PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23`

Pattern

Pattern

A user-definable bit pattern with a maximum length of 64 bits is generated internally.

The bit pattern is defined in the **Pattern** entry field.

Remote-control commands:
`SOUR:BB:W3GP:MST1:HSUP:CHAN1:DPDC:E:DATA PATT`
`SOUR:BB:W3GP:MST1:HSUP:CHAN1:DPDC:E:PATT #H3F,8`

Data List

Internal data from a programmable data list generated with the Data Editor or externally, is used.

Data lists are selected in the File Select window, which is called by means of the Select Data List button.

The File Manager is used to transmit external data lists to the R&S Signal Generator, and can be called within every File Select window by means of the File Manager button.

Remote-control commands:
`SOUR:BB:W3GP:MST1:CHAN1:DPDC:E:DATA DLIS`
`SOUR:BB:W3GP:MST1:CHAN1:DPDC:E:DSEL "dp1"`

HSUPA FRC Settings - UE - 3GPP FDD

State – HSUPA FRC - 3GPP FDD

Activates or deactivates the FRC state for the E-DPCCH channels.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:STAT ON`

Fixed Reference Channel (FRC) – HSUPA FRC - 3GPP FDD

Selects the FRC according to TS 25.141 Annex A.10.

The value range is 1 to 7.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:CHAN 4`

Maximum Information Bitrate/kbps – HSUPA FRC - 3GPP FDD

Displays the maximum information bit rate.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:MIBR?`
Response: `1353.0`

E-DCH TTI – HSUPA FRC - 3GPP FDD

Displays the TTI (Transmission Time Interval).

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:TTIE?`
Response: `2ms`

Number Of HARQ Processes – HSUPA FRC - 3GPP FDD

Displays the number of HARQ (Hybrid-ARQ Acknowlegement) process. This value determines the distribution of the payload in the subframes.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HPRO?`
`Response: 5`

Information Bit Payload (Ninf) – HSUPA FRC - 3GPP FDD

Displays the payload of the information bit. This value determines the number ob tranport layer bits sent in each HARQ process.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:PAYB?`
Response: `2706`

Binary Channel Bits/TTI (Nbin) – HSUPA FRC - 3GPP FDD

Displays the number of physical bits sent in each HARQ process.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:TTIB?`
Response: `3840`

Coding Rate (Nint/Nbin) – HSUPA FRC - 3GPP FDD

Displays the relation between the information bits to binary channel bits.

Remote-control command:
`SOUR1:BB:W3GP:MST1:HSUP:DPCC:E:FRC:CRAT?`
Response: `0.705`

(SF For Each) Physical Channel Codes – HSUPA FRC - 3GPP FDD

Displays the number of the E-DPDCHs with the corresponding channelization codes.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:PCCO?`
Response: `4.4`

State (DTX) – HSUPA FRC - 3GPP FDD

Activates or deactivates the DTX (Discontinuous Transmission) mode.

Note:
If activated, this setting is also set in the E-DPDCH Settings and E-DPCCH Settings menu. The settings in the menus will be overwritten.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:DTX:STAT ON`

User Data (DTX Pattern) – HSUPA FRC - 3GPP FDD

Sets user-definable the bit pattern for the DTX. The maximim length is 64 bits.

The following values are allowed:

1: Data transmission

-: DTX

Note:
This setting will overwrite the DTX pattern settings in the E-DPCCH Settings and E-DPDCH Settings menu.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:DTX:PATT "11-1-"`

State (HARQ) – HSUPA FRC - 3GPP FDD

Activates or deactivates the HARQ simulation mode.

Remote-control command:
`SOUR1:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HARQ:SIM:STAT ON`

Mode (HARQ) – HSUPA FRC - 3GPP FDD

Selects the HARQ simulation mode.

Virtual HARQ

This mode simulates basestation feedback. For every HARQ process (either 4 or 8), a bit pattern can be defined to simulate ACKs and NACKs.

Remote-control command:
`SOUR1:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HARQ:SIM:MODE VHAR`

HARQ Feedback

This mode allows the user to dynamically control the transmission of the HSUPA fixed reference channels (FRC 1-7). An "ACK" from the base station leads to the transmission of a new packet while a "NACK" forces the instrument to retransmit the packet with a new channel coding configuration (i.e. new "redundancy version") of the concerned HARQ process.

For further information, see "*HARQ Feedback - 3GPP FDD*", page 1.12.

Remote-control command:
`SOUR1:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HARQ:SIM:MODE HFE`

Always Use Redundancy Version 0 (HARQ) – HSUPA FRC - 3GPP FDD

(HARQ mode HARQ Feedback only)

If activated, the same redundancy version is sent, that is, the redundancy version is not adjusted for the next retransmission in case of a received NACK.

Remote-control command:
`SOUR1:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HARQ:SIM:RVZ ON`

Maximum Number Of Retransmissions (HARQ) – HSUPA FRC - 3GPP FDD

(HARQ mode HARQ Feedback only)

Sets the maximum number of retransmissions. After the expiration of this value, the next packet is sent, regardless of the received feedback.

Remote-control command:
`SOUR1:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HARQ:SIM:MRET 10`

ACK Definition (HARQ) – HSUPA FRC - 3GPP FDD

(HARQ mode HARQ Feedback only)

Selects whether a high level (TTL) is interpreted as an ACK or a low level.

Remote-control command:
`SOUR1:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HARQ:SIM:ADEF LOW`

Delay Between HARQ And Feedback (HARQ) – HSUPA FRC - 3GPP FDD

(HARQ mode HARQ Feedback only)

Displays the time between the start of the HARQ process and the start of the related feedback.

For further information, see "*HARQ Feedback - 3GPP FDD*", page 1.12.

Remote-control command:
`SOUR1:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HARQ:SIM:DEL:FEED?`

Additional User Delay – HSUPA FRC - 3GPP FDD

(HARQ mode HARQ Feedback only)

Sets an additional delay to adjust the delay between the HARQ and the feedback.

For further information, see "*HARQ Feedback - 3GPP FDD*", page 1.12.

Remote-control command:
`SOUR1:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HARQ:SIM:DEL:AUS 20`

HARQ: ACK/NACK – HSUPA FRC - 3GPP FDD

(HARQ mode Virtual HARQ only)

Enters the pattern for the HARQ-ACK field (Hybrid-ARQ Acknowledgement).

One bit is used per HSUPA packet. The maximum length of the pattern is 32 bits.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HARQ:PATT4 "1010"`

"1" = ACK	The HARQ ACK is sent. Transmission was successful and correct.
"0" = NACK	The NACK is not sent. Transmission was not correct. With an NACK, the UE requests retransmission of the incorrect data.
"-" = DTX	Nothing is sent. Transmission is interrupted (Discontinuous Transmission).

Bit Error State - HSUPA FRC - 3GPP FDD

Activates or deactivates bit error generation.

Bit errors are inserted into the data fields of the enhanced channels. When channel coding is active, it is possible to select the layer in which the errors are inserted (physical or transport layer).

When the data source is read out, individual bits are deliberately inverted at random points in the data bit stream at the specified error rate in order to simulate an invalid signal.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:DERR:BIT:STAT ON`

Bit Error Rate - HSUPA FRC - 3GPP FDD

Sets the bit error rate. The value range is 10E-1 to 10E-7.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:DERR:BIT:RATE 1e-3`

Insert Errors On - HSUPA FRC - 3GPP FDD

Selects the layer in the coding process at which bit errors are inserted.

Transport layer	Bit errors are inserted in the transport layer. This selection is only available when channel coding is active. Remote-control command: `SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:DERR:BIT:LAY TRAN`
Physical layer	Bit errors are inserted in the physical layer. Remote-control commands: `SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:DERR:BIT:LAY PHYS`

Block Error State - HSUPA FRC - 3GPP FDD

Activates or deactivates block error generation.

The CRC checksum is determined and then the last bit is inverted at the specified error probability in order to simulate an invalid signal.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:DERR:BLOC:STAT ON`

Block Error Rate - HSUPA FRC - 3GPP FDD

Sets block error rate.

Remote-control command:
`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:DERR:BLOC:RATE 1E-3`

Global Enhanced Channel Settings - UE1 - 3GPP FDD

The **Global Enhanced Settings** menu can also be called in the UE1 **User Equipment Configuration** menu by using the **Global Enhanced Settings** button.

Only available for user equipment 1 (UE1). The settings always apply to all the active DPDCH channels.

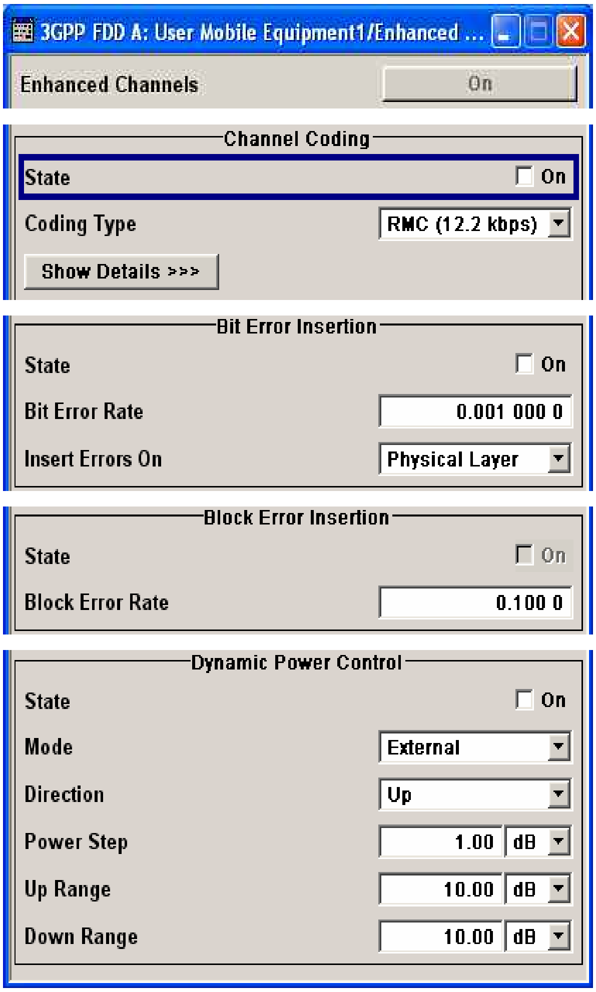
The upper section is where the enhanced state of all the UE1 channels is displayed.

The **Channel Coding** section is where the channel coding settings are made. You can choose between a reduced display, where it is only possible to select the coding scheme, and a display with detailed setting options. The **Transport Channel** section for detailed settings can be revealed with the **Show Details >>>** button and hidden with the **<<< Hide Details** button.

The **Bit Error Insertion** section is where the bit error simulation is configured and activated.

The **Block Error Insertion** section is where the block error simulation is configured and activated.

In the **Dynamic Power Control** section, the power of the enhanced channels can be increased or decreased within the predefined dynamic range (**Up Range** + **Down Range**) and with the predefined step size (**Power Step**) with an external, internal or manual control signal.



Enhanced Channels State-UE 1 - 3GPP FDD

Displays the enhanced state of the DPDCH channels.

The channels of user equipment 1 are always generated in the enhanced state, i.e. in realtime. It is possible to activate channel coding and simulate bit and block errors. Data lists, for example with user data for the transport layer, can be used as the data source.

Remote-control command: n.a.

Channel Coding - DPDCH Enhanced UE 1 - 3GPP FDD

The **Channel Coding** section is where the channel coding settings are made. You can choose between a reduced display and the detailed setting options display. With the reduced display, it is only possible to select the coding scheme and this selection sets the associated parameters to the presetting prescribed in the standard. The **Transport Channel** section for detailed setting and for defining a user coding can be revealed with the **Show Details >>>** button and hidden with the **<<< Hide Details** button.

An uplink reference measurement channel according to 3GPP TS 25.141 is generated when the transport channels DTCH (Dedicated Traffic Channel) and DCCH (Dedicated Control Channel), which contain the user data, are mapped to a DPDCH (Dedicated Physical Data Channel) with a different data rate after channel coding and multiplexing. The display below is taken from the standard (TS 25.141) and shows in diagrammatic form the generation of a 12.2 kbps reference measurement channel from the DTCH and DCCH transport channels.

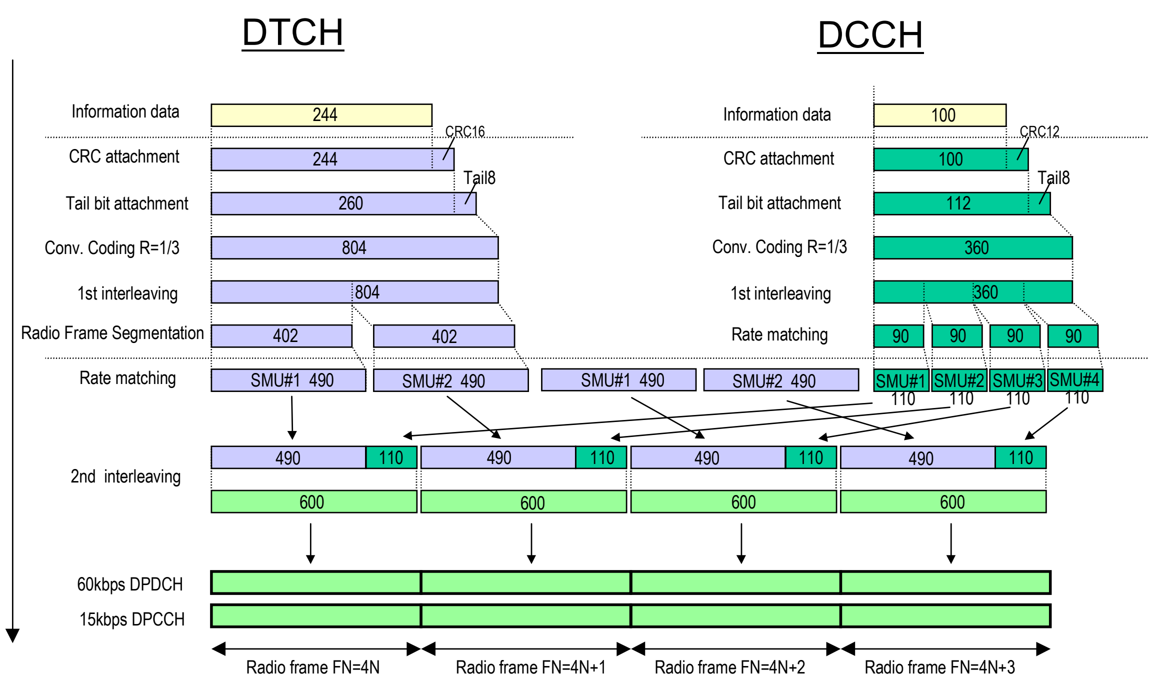


Fig. 29 Channel coding of the 12.2 kbps reference measurement channels (uplink)

Channel Coding State - Enhanced DPDCH UE1 - 3GPP FDD

Activates or deactivates channel coding.

Note:
Annex A.1, 3GPP TS 25.141, lists the recommended DPCCH-settings.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:CCOD:STAT ON`

Coding Type - Enhanced DPDCH UE1 - 3GPP FDD

Selects channel coding.

The 3GPP specification defines 4 reference measurement channel coding types, which differ in the input data bit rate bit to be processed (12.2, 64, 144 and 384 ksps). The additional AMR CODER coding scheme generates the coding of a voice channel.

User codings can be defined as required in the detailed coding settings menu section revealed with button **Show Details >>>**. They can be stored and loaded in the **User Coding...** submenu. Selection **User** is indicated as soon as a coding parameter is modified after selecting a predefined coding type.

The input data bits are taken from the data source specified for the **Transport Channels** for channel coding. The bits are available with a higher rate at the channel coding output. The allocations between the measurement input data bit rate and the output symbol rate are fixed, that is to say, the overall symbol rate is adjusted automatically.

The following are available for selection:

RMC 12.2 kbps: 12.2 kbps measurement channel

RMC 64 kbps: 64 kbps measurement channel

RMC 144 kbps: 144 kbps measurement channel

RMC 384 kbps: 384 kbps measurement channel

AMR 12.2 kbps: Channel coding for the AMR coder

Remote-control command:
```
SOUR:BB:W3GP:MST:ENH:DPDC:CCOD:TYPE M12K |M64K
|M144K |M384K | AMR
```

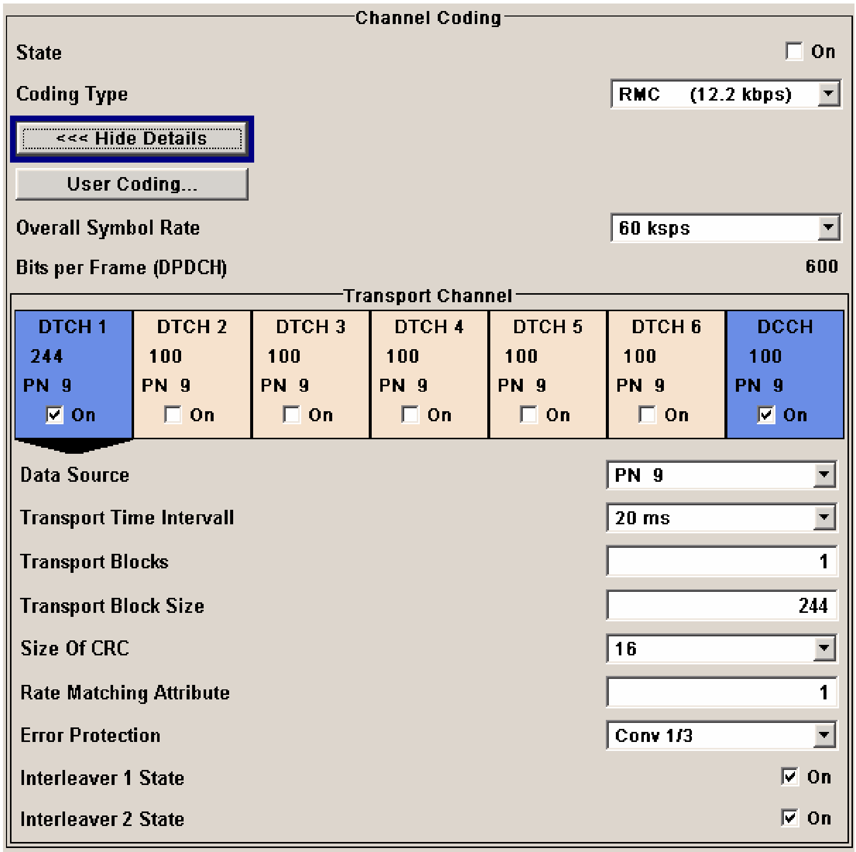
Show Details - Enhanced DPDCH UE1 - 3GPP FDD

Reveals the detailed setting options for channel coding.

Available as well as the **Transport Channel** section are the **Overall Symbol Rate** and **Bits per Frame** parameters as well as the **User Coding** button.

Once the details are revealed, the labelling on the button changes to **<<< Hide Details**. Use this to hide the detailed setting options display again.

Remote-control command: n.a.



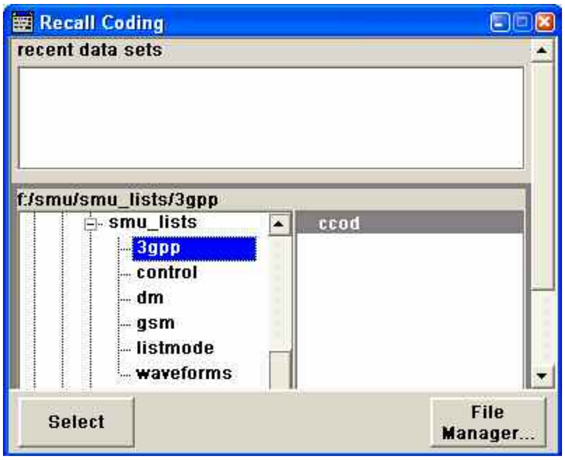
User Coding ... - DPDCH Enhanced UE - 3GPP FDD

Calls the **User Coding** menu.

From the **User Coding** menu the **File Select** windows for saving and recalling user-defined channel codings and the **File Manager** can be called.

User coding of UE1 are stored as files with the predefined file extension ***.3g_ccod_ul**. The file name and the directory they are stored in are user-definable, the file extension is assigned automatically.

The complete channel coding settings in the menu section **Show Details>>>** are saved and recalled.



Remote-control command:
`MMEM:CDIR "f:/gen_lists/3gpp"`
`SOUR:BB:W3GP:MST:ENH:CCOD:DPDC:USER CAT?`
`SOUR:BB:W3GP:MST:ENH:DPDC:CCOD:USER:DEL "c_ue1"`
`SOUR:BB:W3GP:MST:ENH:CCOD:DPDC:USER:LOAD "cod_ue1"`
`SOUR:BB:W3GP:MST:ENH:CCOD:DPDC:USER:STOR "cod_ue1"`

Overall Symbol Rate - Enhanced DPDCH UE1 - 3GPP FDD

Sets the overall symbol rate of all the DPDCHs.

The structure of the DPDCH channel table depends on this parameter. The overall symbol rate determines which DPDCHs are active, which symbol rate they have and which channelization codes they use.

DPDCHs that are not active by virtue of the overall rate, are also disabled for operation.

***Note**:*
Up to an overall rate of 960 ksps, only DPDCH 1 is active, its symbol rate is the same as the overall rate and the channelization code is the same as spreading factor/4 (spreading factor = chip rate / symbol rate). With an overall symbol rate greater than 960 ksps, all the active DPDCHs have the symbol rate 960 ksps.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:ORAT?`

Bits per Frame (DPDCH) - Enhanced DPDCH UE1 - 3GPP FDD

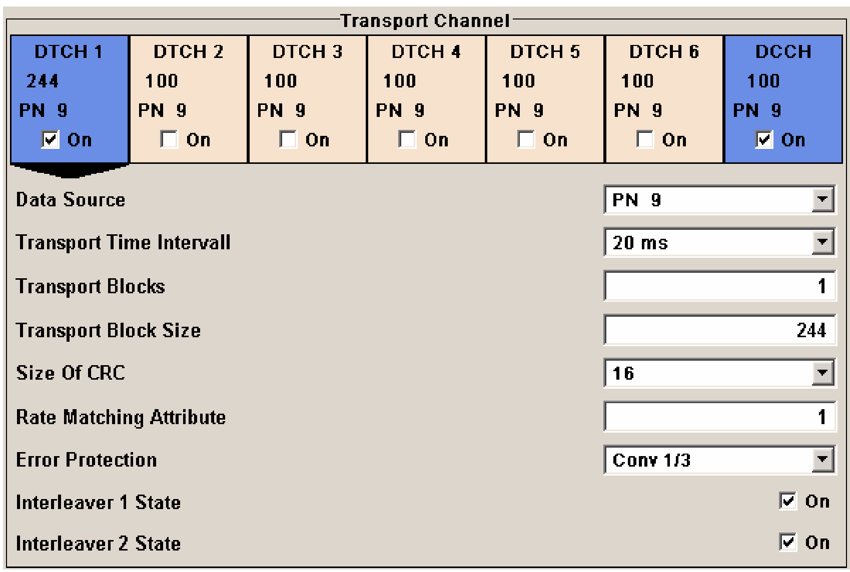
Displays the data bits in the DPDCH component of the frame at physical level. The value depends on the overall symbol rate.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:BPFR?`

Transport Channel - Enhanced DPDCH UE1 - 3GPP FDD

In the **Transport Channel** section, up to 7 transport channels (TCHs) can be configured. The first one is always a DCCH, the other six are DTCHs (DTCH1 to 6). The most important parameters of the TCH are displayed (data source and transport block size). The associated parameters shown in the section below depend on which TCH is currently selected.

A wide arrow beneath the block indicates which TCH is currently selected.



Transport Channel State - Enhanced DPDCH UE1 - 3GPP FDD

Activates or deactivates the transport channel.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:STAT ON`

Note:
In case of remote control, DCCH corresponds to :TCHannel0, DTCH1 to :TCHannel1, etc.

Data Source TCH - Enhanced DPDCH UE1 - 3GPP FDD

Selects the data source for the transport channel.

The data source for the DCCH and DTCH1 can also be selected in the main menu in the channel table.

The following are available for selection as data sources:

All 0
All 1

0 data and 1 data is generated internally.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:DATA ZERO | ONE`

PN xx

PRBS data as per CCITT with period lengths between 2^9-1 and 2^{23}-1 is generated internally.

Remote-control commands:
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:DATA PN9| PN15| PN16| PN20| PN21| PN23`

Pattern
Pattern

A user-definable bit pattern with a maximum length of 64 bits is generated internally.

The bit pattern is defined in the **Data Pattern** entry field.

Remote-control commands:
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:DATA PATT`
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:DATA:PATT #H3F,8`

Data List
Select Data List

Internal data from a programmable data list generated with the Data Editor or externally, is used.

Data lists are selected in the **Select Data List** field.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:DATA DLIS`
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:DATA:DSEL "dpdc_1"`

Transport Time Interval TCH - Enhanced DPDCH UE1 - 3GPP FDD

Sets the number of frames into which a TCH is divided. This setting also defines the interleaver depth.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:TTIN 10 ms`

Number of Transport Blocks TCH - Enhanced DPDCH UE1 - 3GPP FDD

Sets the number of transport blocks for the TCH.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:TBC 2`

Transport Block Size TCH - Enhanced DPDCH UE1 - 3GPP FDD

Sets the size of the transport block at the channel coding input.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:TBS 244`

Size of CRC TCH - Enhanced DPDCH UE1 - 3GPP FDD

Defines the type (length) of the CRC. Checksum determination can also be deactivated (setting **None**).

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:CRCS 8`

Rate Matching Attribute TCH - Enhanced DPDCH UE1 - 3GPP FDD

Sets data rate matching (Rate Matching).

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:RMAT 256`

Error Protection TCH- Enhanced DPDCH UE1 - 3GPP FDD

Selects error protection.

None No error protection

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:EPR NONE`

Turbo 1/3 Turbo Coder of rate 1/3 in accordance with the 3GPP specifications.

Remote-control commands:
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:EPR TURB3`

Conv 1/2 | 1/3 Convolution Coder of rate ½ or 1/3 with generator polynomials defined by 3GPP.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:EPR CON2`

Interleaver 1 State TCH - Enhanced DPDCH UE1 - 3GPP FDD

Activates or deactivates channel coding interleaver state 1 of the transport channel. Interleaver state 1 can be set independently in each TCH. Activation does not change the symbol rate.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:TCH1:INT1 ON`

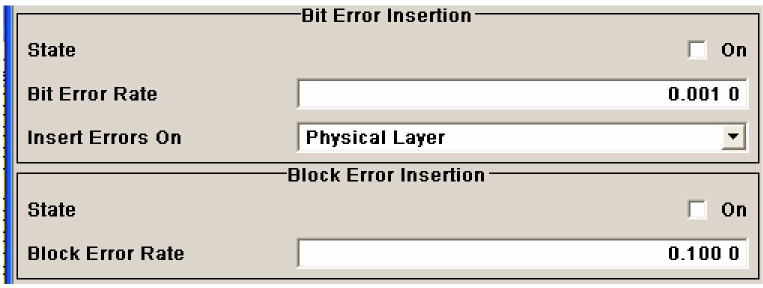
Interleaver 2 State TCH - Enhanced DPDCH UE1 - 3GPP FDD

Activates or deactivates channel coding interleaver state 2 of all the transport channels. Interleaver state 2 can only be set for all the TCHs together. Activation does not change the symbol rate.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:INT2  ON`

Error Insertion - Enhanced DPDCH UE1 - 3GPP FDD

In the **Bit Error Insertion** and **Block Error Insertion** sections, errors can be inserted into the data source and into the CRC checksum, in order, for example, to check the bit and block error rate testers.



Bit Error State - Enhanced DPDCH UE1 - 3GPP FDD

Activates or deactivates bit error generation.

Bit errors are inserted into the data fields of the enhanced channels. When channel coding is active, it is possible to select the layer in which the errors are inserted (physical or transport layer).

When the data source is read out, individual bits are deliberately inverted at random points in the data bit stream at the specified error rate in order to simulate an invalid signal.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:DERR:BIT:STAT ON`

Bit Error Rate TCH - Enhanced DPDCH UE1 - 3GPP FDD

Sets the bit error rate.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:DERR:BIT:RATE 1E-3`

Insert Errors On - Enhanced DPDCH UE1 - 3GPP FDD

Selects the layer at which bit errors are inserted.

Transport layer

Bit errors are inserted in the transport layer.

This layer is only available when channel coding is active.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:DERR:BIT:LAY TRAN`

Physical layer

Bit errors are inserted in the physical layer.

Remote-control commands:
`SOUR:BB:W3GP:MST1:ENH:DPDC:DERR:BIT:LAY PHYS`

Block Error State - Enhanced DPDCH UE1 - 3GPP FDD

Activates or deactivates block error generation.

The CRC checksum is determined and then the last bit is inverted at the specified error probability in order to simulate an invalid signal.

Block error generation is only available when channel coding is active.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:DERR:BLOC:STAT ON`

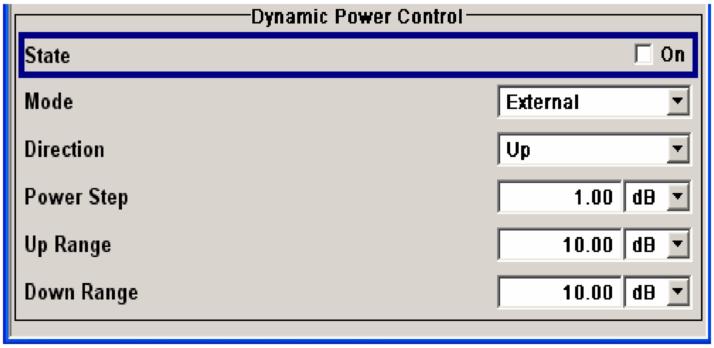
Block Error Rate - Enhanced DPDCH UE1 - 3GPP FDD

Sets the block error rate.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:DERR:BLOC:RATE 1E-3`

Dynamic Power Control - DPDCH Enhanced User Equipment - 3GPP FDD

In the **Dynamic Power Control** section of menu **Enhanced Settings**, the power of the enhanced channels can be increased or decreased within the predefined dynamic range (**Up Range** + **Down Range**) and with the predefined step size (**Power Step**) with an external, internal or manual control signal.



Dynamic Power Control State - Enhanced DPDCH UE1 - 3GPP FDD

Activates or deactivates the **Dynamic Power Control**.

With activated **Dynamic Power Control** the power of the enhanced channels can be increased or decreased within the predefined dynamic range (**Up Range** + **Down Range**) and with the predefined step size (**Power Step**) with an external control signal. The external control signal has to be supplied via the LEV ATT input of the AUX I/O connector.

For two-path instruments, the external control signal has to be supplied via the LEV ATT input of the AUX I/O connector (path A) or via one of the USER interfaces (path B).

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:DPC:STAT ON`

Mode - Enhanced DPDCH UE1 - 3GPP FDD

Selects the control signal for **Dynamic Power Control**.

External

An external control signal is used for Dynamic Power Control. The external control signal is supplied via the LEV ATT input of the AUX I/O.

For two-path instruments, the external control signal is supplied via the LEV ATT input of the AUX I/O connector (path A) or via one of the USER interfaces (path B).

Note:
Marker 4 must be set to Slot mode if Dynamic Power Control with external control signal is active.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:DPC:MODE EXT`

By TPC Pattern

The TPC pattern is used for Dynamic Power Control. This selection corresponds to selection (Mis)Use TPC for not enhanced channels.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:DPC:MODE TPC`

Manual

The control signal is manually produced by pushing one of the buttons 0 or 1.

The channel power is increased or decreased depending on the Direction setting by the set power step.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:DPC:MODE MAN`
`SOUR:BB:W3GP:MST:ENH:DPDC:DPC:STEP:MAN MAN1`

Direction - Enhanced DPCHs BS1 - 3GPP FDD

Selects the **Dynamic Power Control** mode.

Up

A high level of the control signal leads to an increase of channel power.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:DPC:DIR UP`

Down

A high level of the control signal leads to a decrease of channel power.

Remote-control commands:
`SOUR:BB:W3GP:MST:ENH:DPDC:DPC:DIR DOWN`

Power Step - DPDCH Enhanced UE - 3GPP FDD

Sets step width by which – with the **Dynamic Power Control** being switched on - the channel powers of the enhanced channels in the timeslot grid are increased or decreased within the set dynamic range (**Up Range** + **Down Range**).

The start power of the channel is set in the **Channel Power** entry field of the menu.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:DPC:STEP 1`

Up Range - DPDCH Enhanced UE - 3GPP FDD

Sets dynamic range by which – with **Dynamic Power Control** switched on – the channel powers of the enhanced channels can be increased. The resulting **Dynamic Power Control** dynamic range (**Up Range** + **Down Range**) may be 30 dB at max.

Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:DPC:RANG:UP 10.0`

Down Range - DPDCH Enhanced UE - 3GPP FDD

Sets dynamic range by which – with **Dynamic Power Control** switched on – the channel powers of the enhanced channels can be decreased. The resulting **Dynamic Power Control** dynamic range (**Up Range** + **Down Range**) may be 30 dB at max.

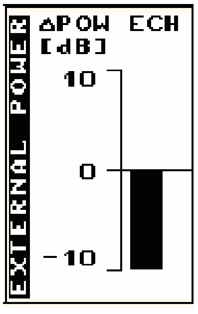
Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:DPC:RANG:DOWN 10.0`

Power Control Graph - DPDCH Enhanced UE - 3GPP FDD

Indicates the deviation of the channel power (ΔPOW) from the set power start value of the enhanced channels.

The graph is automatically displayed with **Dynamic Power Control** switched on.

Note:
Since a realtime update of the window in the timeslot (= 0.667 ms) is not possible for reasons of speed, an update can be performed in a more coarse time interval. Fast channel power changes are not displayed but the settled state of the control loop can be recognized very easily.



Remote-control command:
`SOUR:BB:W3GP:MST:ENH:DPDC:DPC:POW?`

SOURce:BB:W3GPp Subsystem Remote-Control Commands

Introduction

The commands in the SOURce:BB:W3GPp subsystem are described in three sections, separated into general remote commands, commands for base station settings and commands for user equipment settings.

SOURce:BB:W3GPp - General Remote-Control Commands

This subsystem contains commands for the primary and general settings of the 3GPP FDD standard. These settings concern activation and deactivation of the standard, setting the transmission direction, filter, clock, trigger and clipping settings, defining the chip rate and the sequence length, as well as the preset and power adjust setting.

The commands for setting the base station and the user equipment, the enhanced channels of the base and user equipment, as well as the commands for selecting the test models and the test setups, are described in separate sections. The commands are divided up in this way to make the extremely comprehensive `SOURce:BB:W3GPp` subsystem clearer.

The numerical suffix at SOURce distinguishes between path A and path B for two-path instruments:

SOURce<1> = path A

SOURce2 = path B

For two-path instruments, the keyword SOURce is optional with commands for path A and can be omitted. For path B, the command must include the keyword with the suffix 2.

For one-path instruments, the keyword SOURce is optional and can be omitted.

Command	Parameters	Default unit	Comments
[SOURce<[1]|2>:]BB:W3GPp:CLIPping:LEVel	1...100	PCT	
[SOURce<[1]|2>:]BB:W3GPp:CLIPping:MODE	VECTor | SCALar		
[SOURce<[1]|2>:]BB:W3GPp:CLIPping:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:CLOCk:MODE	CHIP | MCHip		
[SOURce<[1]|2>:]BB:W3GPp:CLOCk:MULTiplier	1... 64		
[SOURce<[1]|2>:]BB:W3GPp:CLOCk:SOURce	EXTernal | INTernal		
[SOURce<[1]|2>:]BB:W3GPp:COPY:COFFset	0...511		for DOWN LINK only
[SOURce<[1]|2>:]BB:W3GPp:COPY:DESTination	1...4		
[SOURce<[1]|2>:]BB:W3GPp:COPY:EXECute	-		
[SOURce<[1]|2>:]BB:W3GPp:COPY:SOURce	1...4		
[SOURce<[1]|2>:]BB:W3GPp:CRATe	Answer: R3M84		Query only
[SOURce<[1]|2>:]BB:W3GPp:CRATe:VARiation	1 MHz ... 5 MHz	Hz (c/s)	
[SOURce<[1]|2>:]BB:W3GPp:FILTer:ILENgth	1...128		
[SOURce<[1]|2>:]BB:W3GPp:FILTer:ILENgth:AUTO	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:FILTer:OSAMpling	1...32		
[SOURce<[1]|2>:]BB:W3GPp:FILTer:OSAMpling:AUTO	ON | OFF		

Command	Parameters	Default unit	Comments
[SOURce<[1]|2>:]BB:W3GPp:FILTer:PARameter:APCO25	0.15 ... 2.5		
[SOURce<[1]|2>:]BB:W3GPp:FILTer:PARameter:COSine	0.05 ... 0.99		
[SOURce<[1]|2>:]BB:W3GPp:FILTer:PARameter:GAUSs	0.15 ... 2.5		
[SOURce<[1]|2>:]BB:W3GP:FILTer:PARameter:LPASs	0.05...2.0		
[SOURce<[1]|2>:]BB:W3GPp:FILTer:PARameter:RCOSine	0.05 ... 0.99		
[SOURce<[1]|2>:]BB:W3GPp:FILTer:PARameter:SPHase	0.15 ... 2.5		
[SOURce<[1]|2>:]BB:W3GPp:FILTer:TYPE	RCOSine | COSine | GAUSs | LGAuss | CONE | COF705 | COEQualizer | COFequalizer | C2K3x | APCO25 | SPHase | RECTangle | PGAuss | LPASs | DIRac | ENPShape | EWPShape		
[SOURce:]BB:W3GPp:GPP3:VERSion			Query only
[SOURce<[1]|2>:]BB:W3GPp:LINK	FORWard | REVerse (Alias DOWN | UP)		
[SOURce<[1]|2>:]BB:W3GPp:POWer:ADJust	-		No query
[SOURce<[1]|2>:]BB:W3GPp:POWer[:TOTal]?			Query only
[SOURce<[1]|2>:]BB:W3GPp:PRESet			No query
[SOURce<[1]|2>:]BB:W3GPp:SEQuence	AUTO | RETRigger | AAUTo | ARETrigger | SINGle		
[SOURce<[1]|2>:]BB:W3GPp:SETTing:CATalog			Query only
[SOURce<[1]|2>:]BB:W3GPp:SETTing:DELete	<file_name>		
[SOURce<[1]|2>:]BB:W3GPp:SETTing:LOAD	<file_name>		
[SOURce<[1]|2>:]BB:W3GPp:SETTing:STORe	<file_name>		
[SOURce<[1]|2>:]BB:W3GPp:SLENgth	1 ... Max frames		
[SOURce<[1]|2>:]BB:W3GPp:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:TRIGger:ARM:EXECute			No query
[SOURce<[1]|2>:]BB:W3GPp:TRIGger:EXECute			No query
[SOURce<[1]|2>:]BB:W3GPp:TRIGger[:EXTernal<[1]|2>]:DELay	0 ...(2^32 - 1) Chips		
[SOURce<[1]|2>:]BB:W3GPp:TRIGger[:EXTernal<[1]|2>]:INHibit	0 ...(2^32 - 1) Chips		
[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OBASeband:DELay	0 ...(2^32 - 1) Chips		
[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OBASeband:INHibit	0 ...(2^32 - 1) Chips		
[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OUTPut<[1]...4>:MODE	SLOT | RFRame | CSPeriod | SFNR | USER | RATio		
[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OUTPut<[1]...4>:DELay	0 ...(2^32 - 1) Chips		
[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OUTPut:DELay:FIXed	ON | OFF	Hz	
[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OUTPut<[1]...4>:DELay:MAX			Query only
[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OUTPut<[1]...4>:DELay:MIN			Query only
[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OUTPut<[1]...4>:OFFTime	2 ... (2^24 - 1) Chips		

Command	Parameters	Default unit	Comments
[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OUTPut<[1]...4>:ONTime	2 ... (2^24 - 1) Chips		
[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OUTPut<[1]...4>:PERiod	0 ...(2^32 - 1) Chips		
[SOURce<[1]|2>:]BB:W3GPp:TRIGger:RMODe			Query only
[SOURce<[1]|2>:]BB:W3GPp:TRIGger:SLENgth	0 ...(2^32 - 1) Chips		
[SOURce<[1]|2>:]BB:W3GPp:TRIGger:SLUNit	FRAMe | SLOT | CHIP | SEQuence		
[SOURce<[1]|2>:]BB:W3GPp:TRIGger:SOURce	EXTernal | BEXternal | INTernal | OBASeband		
[SOURce<[1]|2>:]BB:W3GPp:WAVeform:CREate			No query

[SOURce<[1]|2>:]BB:W3GPp:CLIPping:LEVel 0 ... 100 PCT

The command sets the limit for level clipping (Clipping). This value indicates at what point the signal is clipped. It is specified as a percentage, relative to the highest level. 100% indicates that clipping does not take place.

Level clipping is activated with the command `SOUR:BB:W3GP:CLIP:STAT ON`

Example: `BB:W3GP:CLIP:LEV 80PCT`
'sets the limit for level clipping to 80% of the maximum level.

`BB:W3GP:CLIP:STAT ON`
'activates level clipping.

*RST value	Resolution	SCPI
100 PCT	1	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:CLIPping:MODE VECTor | SCALar

The command sets the method for level clipping (Clipping).

Parameters: **VECTor**The reference level is the amplitude | i+jq |

SCALarThe reference level is the absolute maximum of the I and Q values.

Example: `BB:W3GP:CLIP:MODE SCAL`
'selects the absolute maximum of all the I and Q values as the reference level.

`BB:W3GP:CLIP:LEV 80PCT`
'sets the limit for level clipping to 80% of this maximum level.

`BB:W3GP:CLIP:STAT ON`
'activates level clipping.

*RST value	Resolution	SCPI
VECTor	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:CLIPping:STATe ON | OFF

The command activates level clipping (Clipping). The value is defined with the command `BB:W3GPp:CLIPping:LEVel`, the mode of calculation with the command `BB:W3GPp:CLIPping:MODE`.

Example: `BB:W3GP:CLIP:STAT ON`
'activates level clipping.

*RST value	Resolution	SCPI
OFF		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:CLOCk:MODE CHIP | MCHip

Note:
This command is available for R&S SMx and R&S AMU instruments only.

The command enters the type of externally supplied clock (`:BB:W3GPp:CLOCk:SOURce EXTernal`.

When `MCHip` is used, a multiple of the chip clock is supplied via the CLOCK connector and the chip clock is derived internally from this. The multiplier is entered with the command `:BB:W3GPp:CLOCk:MULTiplier`.

For two-path instruments, the only numerical suffix allowed for SOURce is 1, since the external clock source is permanently allocated to path A.

Example: `BB:W3GP:CLOC:MODE CHIP`
'selects clock type **Chip**, i.e. the supplied clock is a chip clock.

*RST value	Resolution	SCPI
CHIP	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:CLOCk:MULTiplier 1 ... 64

Note:
This command is available for R&S SMx and R&S AMU instruments only.

The command specifies the multiplier for clock type **Multiplied** (`:BB:W3GPp:CLOCk:MODE MCHip)` in the case of an external clock source.

For two-path instruments, the only numerical suffix allowed for SOURce is 1, since the external clock source is permanently allocated to path A.

Example: `BB:W3GP:CLOC:SOUR EXT`
'selects the external clock source. The clock is supplied via the CLOCK connector.

`BB:W3GP:CLOC:MODE MCH`
'selects clock type **Multiplied**, i.e. the supplied clock has a rate which is a multiple of the chip rate.

`BB:W3GP:CLOC:MULT 12`
'the multiplier for the external clock rate is 12.

*RST value	Resolution	SCPI
4	1	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:CLOCk:SOURce INTernal | EXTernal | AINTernal

Note:
This command is available for R&S SMx and R&S AMU instruments only.

The command selects the clock source.

For two-path instruments, selecting EXTernal is only possible for path A, since the external clock source is permanently allocated to path A. Selectin AINternal is is only possible for path B.

Parameter: **INTernal**The internal clock reference is used.

EXTernalThe external clock reference is supplied to the CLOCK connector.

AINTernalThe clock source of path A is used for path B.

Example: `BB:W3GP:CLOC:SOUR EXT`
'selects an external clock reference. The clock is supplied via the CLOCK connector.

`BB:W3GP:CLOC:MODE CHIP`
'specifies that a chip clock is supplied via the CLOCK connector.

*RST value	Resolution	SCPI
INTernal	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:COPY:COFFset 0 ... 511

The command sets the offset for the channelization code in the destination base station.

This command is only available in the downlink (`SOUR:BB:W3GP:LINK FORW/DOWN`).

Example: `BB:W3GP:COPY:COFF 10`
'the channelization code is shifted by 10 when the source base station is copied to the destination base station.

*RST value	Resolution	SCPI
0	1	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:COPY:DESTination 1 ...4

The command selects the station to which data is to be copied. Whether the data is copied to a base station or a user equipment depends on which transmission direction is selected (command `W3GPp:LINK UP | DOWN`).

Example: `BB:W3GP:LINK DOWN`
'selects the downlink transmit direction (base station to user equipment).

`BB:W3GP:COPY:SOUR 1`
'selects base station 1 as the source.

`BB:W3GP:COPY:DEST 4`
'selects base station 4 as the destination.

`BB:W3GP:COPY:EXEC`
'starts copying the parameter set of base station 1 to base station 4.

*RST value	Resolution	SCPI
2	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:COPY:EXECute

The command starts the copy process. The dataset of the source station is copied to the destination station. Whether the data is copied to a base station or a user equipment depends on which transmission direction is selected (command `W3GPp:LINK UP | DOWN`).

This command triggers an event and therefore has no *RST value and no query form.

Example: `BB:W3GP:COPY:EXEC`
'starts copying the parameter set of the selected source station to the selected destination station.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:COPY:SOURce 1 ...4

The command selects the station that has data to be copied. Whether the station copied is a base or user equipment depends on which transmission direction is selected (command `W3GPp:LINK UP | DOWN`).

Example: `BB:W3GP:LINK UP`
'selects the uplink transmit direction (user equipment to base station).

`BB:W3GP:COPY:SOUR 1`
'selects user equipment 1 as the source.

`BB:W3GP:COPY:DEST 4`
'selects user equipment 4 as the destination.

`BB:W3GP:COPY:EXEC`
'starts copying the parameter set of user equipment 1 to user equipment 4.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:CRATe?

The command queries the set system chip rate. The output chip rate can be set with the command `SOUR:BB:W3GP:CRAT:VAR`.

The command is a query command and therefore does not have an *RST value.

Example `BB:W3GP:CRAT?`
'queries the system chip rate.

Response: "`R3M8`
'the system chip rate is 3.8 Mcps.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:CRATe:VARiation 1 Mcps ... 5 Mcps

The command enters the output chip rate.

The chip rate entry changes the output clock and the modulation bandwidth, as well as the synchronization signals that are output. It does not affect the calculated chip sequence.

Example: `BB:W3GP:CRAT:VAR 4086001`
"sets the chip rate to 4.08 Mcps.

*RST value	Resolution	SCPI
3.84 MHz	1 Hz	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:FILTer:ILENgth 1...128

Note:
This command is available for WinIQSIM2 only.

The command sets the impulse length (number of filter tabs).

Example: `BB:W3GP:FILT:ILEN 10`
'sets the number of filter tabs to 10.

*RST value	Resolution	SCPI
10	1	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:FILTer:ILENgth:AUTO ON | OFF

Note:
This command is available for WinIQSIM2 only.

The command acivates/deactivates the impulse length state. If activated, the most sensible parameter values are selected. The value depends on the coherence check.

Example: `BB:W3GP:FILT:ILEN:AUTO ON`
'the most sensible parameters are selected automatically.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:FILTer:OSAMpling 1...32

Note:
This command is available for WinIQSIM2 only.

The command sets the upsampling factor.

Example: `BB:W3GP:FILT:OSAM 32`
'sets the upsampling factor to 32.

*RST value	Resolution	SCPI
32	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:FILTer:OSAMpling:AUTO ON | OFF

Note:
This command is available for WinIQSIM2 only.

The command acivates/deactivates the upsampling factor state. If activated, the most sensible parameter values are selected. The value depends on the coherence check. If deactivated, the values can be changed manually.

Example: `BB:W3GP:FILT:OSAM:AUTO ON`
'the most sensible parameters are selected automatically.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:FILTer:PARameter:APCO25 0.05 ... 0.99

The command sets the roll-off factor for filter type APCO25.

Example: `BB:W3GP:FILT:PAR:APCO25 0.2`
'sets the roll-off factor to 0.2 for filter type APCO25.

*RST value	Resolution	SCPI
0.20	0.01	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:FILTer:PARameter:COSine 0.05 ... 0.99

The command sets the roll-off factor for the Cosine filter type.

Example: `BB:W3GP:FILT:PAR:COS 0.35`
'sets the roll-off factor to 0.35 for filter type Cosine.

*RST value	Resolution	SCPI
0.35	0.01	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:FILTer:PARameter:GAUSs 0.15 ... 2.5

The command sets the roll-off factor for the Gauss filter type.

Example: `BB:W3GP:FILT:PAR:GAUS 0.5`
'sets B x T to 0.5 for the Gauss filter type.

*RST value	Resolution	SCPI
0.5	0.01	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:FILTer:PARameter:LPASs 0.05...2.0

The command sets the cut off frequency factor for the Lowpass filter type. The minimum/maximum values depend on the current symbol rate:

Example: `BB:W3GP:FILT:PAR:LPAS 0.5`
'the cut of frequency factor is set to 0.5.

*RST value	Resolution	SCPI
0.50		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:FILTer:PARameter:RCOSine 0.05 ... 0.99

The command sets the roll-off factor for the Root Cosine filter type.

Example: `BB:W3GP:FILT:PAR:RCOS 0.22`
'sets the roll-off factor to 0. 22 for filter type Root Cosine.

*RST value	Resolution	SCPI
0.22	0.01	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:FILTer:PARameter:SPHase 0.15 ... 2.5

The command sets B x T for the Split Phase filter type.

Example: `BB:W3GP:FILT:PAR:SPH 0.5`
'sets B x T to 0.5 for the Split Phase filter type.

*RST value	Resolution	SCPI
2.00	0.01	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:FILTer:TYPE RCOSine | COSine | GAUSs | LGAuss | CONE | COF705 | COEQualizer | COFequalizer | C2K3x | APCO25 | SPHase | RECTangle | PGAuss | LPASs | DIRac | ENPShape | EWPShape

The command selects the filter type. The filter types are described in Chapter 4, Section "*Custom Dig Mod*".

Example: `BB:W3GP:FILT:TYPE COS`
'sets the filter type COSine.

*RST value	Resolution	SCPI
RCOSine	-	Device-specific

[SOURce:]BB:W3GPp:GPP3:VERSion?

The command queries the version of the 3GPP standard underlying the definitions.

The command is a query command and therefore does not have an *RST value. The numerical suffix at SOURce has no significance for this command and should not be specified.

Example: `BB:W3GP:GPP3:VERS?`
'queries the 3GPP version.

Response: "`V6.0.0`
'3GPP version 6.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:LINK FORWard|DOWN | REVerse|UP

The command defines the transmission direction. The signal either corresponds to that of a base station (FORWard | DOWN) or that of a user equipment (REVerse | UP).

Example: `BB:W3GP:LINK DOWN`
'the transmission direction selected is base station to user equipment. The signal corresponds to that of a base station.

*RST value	Resolution	SCPI
FORWard|DOWN	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:POWer[:TOTal]?

The command queries the total power of the active channels. After **Power Adjust**, this power corresponds to 0 dB.

The command is a query command and therefore does not have an *RST value.

Example: `BB:W3GP:POW?`
'queries the total power of the active channels.

Response: `"-22.5`
'the total power is -25 dB.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:POWer:ADJust

The command sets the power of the active channels in such a way that the total power of the active channels is 0 dB. This will not change the power ratio among the individual channels.

The command triggers an action and therefore has no *RST value and no query form.

Example: `BB:W3GP:POW:ADJ`
'the total power of the active channels is set to 0 dB, the power ratio among the individual channels is unchanged.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:PRESet

The command produces a standardized default for the 3GPP FDD standard. The settings correspond to the *RST values specified for the commands.

This command triggers an action and therefore has no *RST value and no query form.

Example: `BB:W3GP:PRES`
'resets all the 3GPP FDD settings to default values.

*RST value	Resolution	Dependencies	SCPI
-	-	All 3GPP FDD settings are preset.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:SEQuence AUTO | RETRigger | AAUTo | ARETrigger | SINGle

Note:
This command is available for R&S SMx and R&S AMU instruments only.

The command selects the trigger mode.

Parameter:

AUTOThe modulation signal is generated continuously.

RETRiggerThe modulation signal is generated continuously. A trigger event (internal or external) causes a restart.

AAUToThe modulation signal is generated only when a trigger event occurs. After the trigger event the signal is generated continuously. Signal generation is stopped with command `SOUR:BB:W3GP:TRIG:ARM:EXEC` and started again when a trigger event occurs.

ARETriggerThe modulation signal is generated only when a trigger event occurs. The device automatically toggles to RETRIG mode. Every subsequent trigger event causes a restart.
Signal generation is stopped with command `SOUR:BB:W3GP:TRIG:ARM:EXEC` and started again when a trigger event occurs.

SINGle
The modulation signal is generated only when a trigger event occurs. Then the signal is generated once to the length specified with command `SOUR:BB:W3GP:TRIG:SLEN`. Every subsequent trigger event causes a restart.

Example: `BB:W3GP:SEQ AAUT`
'sets the **Armed_auto** trigger mode; the device waits for the first trigger (e.g. with `*TRG`) and then generates the signal continuously.

*RST value	Resolution	SCPI
AUTO	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:SETTing:CATalog?

This command reads out the files with 3GPP FDD settings in the default directory. The default directory is set using command `MMEM:CDIRectory`. Only files with the file extension ***.3g** will be listed.

The command is a query command and therefore has no *RST value.

Example: "`MMEM:CDIR 'D:\user\dig_mod`
'sets the default directory to D:\user\dig_mod.

BB`:W3GP:SETT:CAT?`
'reads out all the files with 3GPP FDD settings in the default directory.

Response: "`'UPLINK','DOWNLINK'`
'the files '`'UPLINK'` and `'DOWNLINK'`' are available.

*RST value	Resolution	SCPI
	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:SETTing:DELete <file_name>

This command deletes the selected file with 3GPP FDD settings The directory is set using command `MMEM:CDIRectory`. A path can also be specified, in which case the files in the specified directory are read. The file extension may be omitted. Only files with the extension ***.3g** will be deleted.

This command triggers an event and therefore has no *RST value and no query form.

Example: BB:`W3GP:SETT:DEL 'UPLINK'`
'deletes file `'UPLINK'`.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:SETTing:LOAD <file_name>

This command loads the selected file with 3GPP FDD settings The directory is set using command `MMEM:CDIRectory`. A path can also be specified, in which case the files in the specified directory are read. The file extension may be omitted. Only files with the file extension ***.3g** will be loaded.

This command triggers an event and therefore has no *RST value and no query form.

Example: BB:`W3GP:SETT:LOAD 'UPLINK'`
'loads file `'UPLINK'`.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:SETTing:STORe <file_name>

This command stores the current 3GPP FDD settings into the selected file The directory is set using command `MMEM:CDIRectory`. A path can also be specified, in which case the files in the specified directory are read. Only the file name has to be entered. 3GPP FDD settings are stored as files with the specific file extensions ***.3g**.

This command triggers an event and therefore has no *RST value and no query form.

Example: `BB:W3GP:SETT:STOR 'UPLINK'`
'stores the current 3GPP FDD settings into file '`UPLINK`'.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:SLENgth 1 ... Max frames

The command sets the sequence length of the arbitrary waveform component of the 3GPP signal in the number of frames. This component is calculated in advance and output in the arbitrary waveform generator. It is added to the realtime signal components (Enhanced Channels).

The maximum number of frames is calculated as follows:

Max. No. of Frames = Arbitrary waveform memory size/(3.84 Mcps x 10 ms).

When working in Advanced Mode (`W3GP:BST1:CHAN:HSDP:HSET:AMOD ON)`, it is recommended to adjust the current ARB sequence length to the suggested one.

Example: `BB:W3GP:SLEN 10`
'sets the sequence length to 10 frames.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:STATe ON | OFF

The command activates modulation in accordance with the 3GPP FDD standard. Activating this standard deactivates all the other digital standards and digital modulation modes (in case of two-path instruments, this affects the same path).

Example: `BB:W3GP:STAT ON`
'activates modulation in accordance with the 3GPP FDD standard.

*RST value	Resolution	Dependencies	SCPI
OFF	-	`BB:W3GP:STAT ON` deactivates the other standards and digital modulation.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:TRIGger:ARM:EXECute

Note:
This command is available for R&S SMx and R&S AMU instruments only.

The command stops signal generation for trigger modes Armed_Auto and Armed_Retrigger. A subsequent internal or external trigger event restart signal generation.

This command triggers an event and therefore has no *RST value and no query form.

Example: `BB:W3GP:TRIG:SOUR INT`
'sets internal triggering.

`BB:W3GP:TRIG:SEQ ARET`
'sets Armed_Retrigger mode, i.e. every trigger event causes signal generation to restart.

`BB:W3GP:TRIG:EXEC`
'executes a trigger, signal generation is started.

`BB:W3GP:TRIG:ARM:EXEC`
'signal generation is stopped.

`BB:W3GP:TRIG:EXEC`
'executes a trigger, signal generation is started again.

*RST value	Resolution	SCPI
		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:TRIGger:EXECute

Note:
This command is available for R&S SMx and R&S AMU instruments only.

The command executes a trigger. The internal trigger source must be selected using the command `BB:W3GP:TRIG:SOUR INT` and a trigger mode other than `AUTO` must be selected using the command `:BB:W3GP:TRIG:SEQ`.

This command triggers an event and therefore has no *RST value and no query form.

Example: `BB:W3GP:TRIG:SOUR INT`
'sets internal triggering.

`BB:W3GP:TRIG:SEQ RETR`
'sets Retrigger mode, i.e. every trigger event causes signal generation to restart.

`BB:W3GP:TRIG:EXEC`
'executes a trigger.

*RST value	Resolution	SCPI
		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:TRIGger[:EXTernal<[1]|2>]:DELay 0 ... 2^32-1

Note:
This command is available for R&S SMx and R&S AMU instruments only.

The command specifies the trigger delay (expressed as a number of chips) for external triggering. The numeric suffix to EXTernal distinguishes between the external trigger via the TRIGGER 1 (suffix 1) and TRIGGER 2 (suffix 2) connector.

Example: `BB:W3GP:TRIG:SOUR EXT`
'sets an external trigger via the TRIGGER 1 connector.

`BB:W3GP:TRIG:DEL 50`
'sets a delay of 50 chips for the trigger.

*RST value	Resolution	SCPI
0 chips	1 chip	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:TRIGger[:EXTernal<[1]|2>]:INHibit 0 ... 2^32-1

Note:
This command is available for R&S SMx and R&S AMU instruments only.

The command specifies the number of chips by which a restart is to be inhibited following a trigger event. This command applies only in the case of external triggering. The numeric suffix to EXTernal distinguishes between the external trigger via the TRIGGER 1 (suffix 1) and TRIGGER 2 (suffix 2) connector.

Example: `BB:W3GP:TRIG:SOUR EXT`
'selects an external trigger via the TRIGGER 1 connector.

`BB:W3GP:TRIG:INH 200`
'sets a restart inhibit for 200 chips following a trigger event.

*RST value	Resolution	SCPI
0 chips	1 chip	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OBASeband:DELay 0 ... 2^32-1

Note:
This command is available for R&S SMx and R&S AMU two-path instruments only.

The command specifies the trigger delay (expressed as a number of chips) for triggering by the trigger signal from the second path.

Example: `BB:W3GP:TRIG:SOUR OBAS`
'sets for path A the internal trigger executed by the trigger signal from the second path (path B).
`BB:W3GP:TRIG:OBAS:DEL 50`
'sets a delay of 50 chips for the trigger.

*RST value	Resolution	SCPI
0 chips	1 chip	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OBASband:INHibit 0 ... 2^32-1

Note:
This command is available for R&S SMx and R&S AMU two-path instruments only.

The command specifies the number of chips by which a restart is to be inhibited following a trigger event. This command applies only for triggering by the second path (two-path instruments only).

Example: `BB:W3GP:TRIG:SOUR OBAS`
'sets for path A the internal trigger executed by the trigger signal from the second path (path B).
`BB:W3GP:TRIG:INH 200`
'sets a restart inhibit for 200 chips following a trigger event.

*RST value	Resolution	SCPI
0 chips	1 chip	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OUTPut<[1]...4>:MODE
SLOT | RFRame | SFRame | CSPeriod | SFNR | RATio | USER

The command defines the signal for the selected marker output.

Parameter:

SLOT A marker signal is generated at the start of each slot (every 2560 chips or 0.667 ms).

RFRame A marker signal is generated at the start of each frame (every 38400 chips or 10 ms).

CSPeriod A marker signal is generated at the start of every arbitrary waveform sequence (depending on the setting for the arbitrary waveform sequence length). If the signal does not contain an arbitrary waveform component, a radio frame trigger is generated.

SFNR A marker signal is generated at the start of every SFN period (every 4096 frames).

RATio A marker signal corresponding to the Time Off / Time On specifications in the commands `SOURce:BB:W3GPp:TRIGger:OUTPut:OFFT` and `SOURce:BB:W3GPp:TRIGger:OUTPut:ONT` is generated.

USER A marker signal is generated at the beginning of every user-defined period. The period is defined with command `SOUR:BB:W3GP:TRIG:OUTP:PERiod`.

Example: `BB:W3GP:TRIG:OUTP2:MODE SLOT`
'selects the slot marker signal on output MARKER 2.

*RST value	Resolution	SCPI
RFRame	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OUTPut<[1]...4>:DELay 0 ... 2^32 - 1 Chips

Note:
This command is available for R&S SMx and R&S AMU instruments only.

The command defines the delay between the signal on the marker outputs and the start of the signal, expressed in terms of chips. Command `:BB:W3GPp:TRIGger:OUTPut:DELay:FIXed` can be used to restrict the range of values to the dynamic range, i.e. the range within which a delay of the marker signals can be set without restarting the marker and signal.

Example: `BB:W3GP:TRIG:OUTP2:DEL 16000`
'sets a delay of 16000 chips for the signal on connector MARKER 2.

*RST value	Resolution	SCPI
0	1 Chip	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OUTPut:DELay:FIXed ON | OFF

Note:
This command is available for R&S SMx and R&S AMU instruments only.

The command restricts the marker delay setting range to the dynamic range. In this range the delay can be set without restarting the marker and signal. If a delay is entered in setting ON but is outside this range, the maximum possible delay is set and an error message is generated.

The numeric suffix in `OUTPut` has no significance for this command, since the setting always affects every marker.

Example: `BB:W3GP:TRIG:OUTP:DEL:FIX ON`
'restricts the marker signal delay setting range to the dynamic range.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OUTPut<[1]...4>:DELay:MAXimum

Note:
This command is available for R&S SMx and R&S AMU instruments only.

The command queries the maximum marker delay for setting `:BB:W3GPp:TRIG:OUTP:DEL:FIX ON`.

The command is a query only and therefore has no *RST value.

Example: `BB:W3GP:TRIG:OUTP:DEL:FIX ON`
'restricts the marker signal delay setting range to the dynamic range.

`BB:W3GP:TRIG:OUTP:DEL:MAX`
'queries the maximum of the dynamic range.

Response: "`20000`
'the maximum for the marker delay setting is 20000 chips.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OUTPut<[1]...4>:DELay:MINimum

Note:
This command is available for R&S SMx and R&S AMU instruments only.

The command queries the minimum marker delay for setting `:BB:W3GPp:TRIGger:OUTPut:DELay:FIXed ON`.

The command is a query only and therefore has no *RST value.

Example: `BB:W3GP:TRIG:OUTP:DEL:FIX ON`
'restricts the marker signal delay setting range to the dynamic range.

`BB:W3GP:TRIG:OUTP:DEL:MIN`
'queries the minimum of the dynamic range.

Response: "`0`
'the minimum for the marker delay setting is 0 chips.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OUTPut<[1]...4>:OFFTime 1.. 2^24 - 1 (1..16 777 215) chips

The command sets the number of chips in a period (ON time + OFF time) during which the marker signal in setting `SOURce:BB:W3GPp:TRIGger:OUTPut:MODE RATio` on the marker outputs is OFF.

Example: `BB:W3GP:TRIG:OUTP2:OFFT 2000`
'sets an OFF time of 2000 chips for marker signal 2.

*RST value	Resolution	SCPI
1	1	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OUTPut<[1]...4>:ONTime 1.. 2^24 - 1 (1..16 777 215) chips

The command sets the number of chips in a period (ON time + OFF time) during which the marker signal in setting `SOURce:BB:W3GP:TRIGger:OUTPut:MODE RATio` on the marker outputs is ON.

Example: `BB:W3GP:TRIG:OUTP2:ONT 2000`
'sets an ON time of 2000 chips for marker 2.

*RST value	Resolution	SCPI
1	1	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:TRIGger:OUTPut<[1]...4>:PERiod 1... 2^32-1 Chips

The command sets the repetition rate for the signal at the marker outputs, expressed in terms of chips. The setting is only valid for selection `USER` in `:W3GP:TRIG:OUTP:MODE`.

Example: `BB:W3GP:TRIG:OUTP2:MODE USER`
'selects the user marker for the signal on connector MARKER 2.

`BB:W3GP:TRIG:OUTP2:PER 1600`
'sets a period of 1600 chips, i.e. the marker signal is repeated every 1600th chip.

*RST value	Resolution	SCPI
1 Frame (38 400 Chips)	1 Chip	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:TRIGger:RMODe

Note:
This command is available for R&S SMx and R&S AMU instruments only.

The command queries the current status of signal generation for all trigger modes with 3GPP FDD modulation on.

The command is a query command and therefore has no *RST value.

Parameter: **RUN**the signal is generated. A trigger event occurred in the triggered mode.

STOPthe signal is not generated. A trigger event did not occur in the triggered modes, or signal generation was stopped by the command `:BB:W3GP:TRIG:ARM:EXECute` (armed trigger modes only).

Example: `BB:W3GP:TRIG:SOUR EXT`
'sets external triggering via the TRIGGER 1 connector.

`BB:W3GP:TRIG:MODE ARET`
'selects the Armed_Retrigger mode.

`BB:W3GP:TRIG:RMOD?`
'queries the current status of signal generation.

Response: `"RUN`
'the signal is generated, an external trigger was executed.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:TRIGger:SLENgth 1 … (2^32-1) chips

Note:
This command is available for R&S SMx and R&S AMU instruments only.

The command defines the length of the signal sequence to be output in the **Single** trigger mode (`SOUR:BB:W3GPp:SEQ SING`). The unit is defined with command `SOUR:BB:W3GP:TRIG:SLUNit`.

It is possible to output deliberately just part of the frame, an exact sequence of the frame, or a defined number of repetitions of the frame.

Example: `BB:W3GP:SEQ SING`
'sets trigger mode Single.

`BB:W3GP:TRIG:SLUN CHIP`
'sets unit chips for the entry of sequence length.

`BB:W3GP:TRIG:SLEN 200`
'sets a sequence length of 200 chips. The first 200 chips of the current frame will be output after the next trigger event.

*RST value	Resolution	SCPI
1 frame length	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:TRIGger:SLUNit FRAMe | SLOT | CHIP | SEQuence

Note:
This command is available for R&S SMx and R&S AMU instruments only.

The command defines the unit for the entry of the length of the signal sequence (`SOUR:BB:W3GPp:TRIG:SLEN`) to be output in the **Single** trigger mode (`SOUR:BB:W3GPp:SEQ SING`).

Example: `BB:W3GP:SEQ SING`
'sets trigger mode Single.

`BB:W3GP:TRIG:SLUN FRAM`
'sets unit frames for the entry of sequence length.

`BB:W3GP:TRIG:SLEN 2`
'sets a sequence length of 2 frames. The current frame will be output twice after the next trigger event.

*RST value	Resolution	SCPI
SEQuence	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:TRIGger:SOURce INTernal | EXTernal | BEXTernal | OBASeband

Note:
This command is available for R&S SMx and R&S AMU instruments only.

The command selects the trigger source.

Parameter:

INTernal Triggering is executed by means of the Trigger command `BB:W3GP:TRIGger:EXECute` or `*TRG` in the case of remote control and by means of **Execute Trigger** in the case of manual operation.

EXTernal Triggering is executed by means of the signal on the TRIGGER 1 connector.

BEXTernal Triggering is executed by means of the signal on the TRIGGER 2 connector.

OBASeband Triggering is executed by means of the trigger signal from the second path (two-path instruments only).

Example: `BB:W3GP:TRIG:SOUR EXT`
'sets external triggering via the TRIGGER 1 connector.

*RST value	Resolution	SCPI
INTernal	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:WAVeform:CREate <file_name>

This command creates a waveform using the current settings of the **3GPP FDD** menu. The file name is entered with the command. The file is stored with the predefined file extension ***.wv**. The file name and the directory it is stored in are user-definable.

This command triggers an event and therefore has no *RST value and no query form.

Example: "`MMEM:CDIR 'D:\user\waveform`
'sets the default directory to D:\user\waveform.

`BB:W3GP:WAV:CRE 'gpp3_bs'`
'creates the waveform file `gpp3_bs.wv` in the default directory.

*RST value	Resolution	SCPI
-	-	device-specific

SOURce-W3GPp - Test Models and Predefined Settings

The R&S Signal Generator gives you the opportunity to generate standardized or predefined test settings:

Test Models...

- Selection of test models for the downlink in accordance with 3GPP standard 25.141.
- Selection of non-standardized test models for the uplink.

Predefined Settings...

- Definition of Predefined Settings for base station 1 which enable the creation of highly complex scenarios for the downlink by presetting the channel table of base station 1. The settings take effect only after execution of command `BB:W3GPp:PPARameter:EXECute`.

Command	Parameters	Default unit	Comments
[SOURce<[1]|2>:]BB:W3GPp:PPARameter:CRESt	MINimum | AVERage | WORSt		
[SOURce<[1]|2>:]BB:W3GPp:PPARameter:DPCH:COUNt	0...512		
[SOURce<[1]|2>:]BB:W3GPp:PPARameter:DPCH:SRATe	D7K5 | D15K | D30K | D60K | D120K | D240K | D480K | D960K		
[SOURce<[1]|2>:]BB:W3GPp:PPARameter:EXECute			No query
[SOURce<[1]|2>:]BB:W3GPp:PPARameter:SCCPch:SRATe	D15K | D30K | D60K | D120K | D240K | D480K | D960K		
[SOURce<[1]|2>:]BB:W3GPp:PPARameter:SCCPch:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:PPARameter:SCHannels	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:SETTing:TMODel:BSTation	<test_model_name>		
[SOURce<[1]|2>:]BB:W3GPp:SETTing:TMODel:BSTation:CATalog	‘name‘		Query only
[SOURce<[1]|2>:]BB:W3GPp:SETTing:TMODel:MSTation	<test_model_name>		
[SOURce<[1]|2>:]BB:W3GPp:SETTing:TMODel:MSTation:CATalog?			Query only

[SOURce<[1]|2>:]BB:W3GPp:PPARameter:CRESt MINimum | AVERage | WORSt

This commands selects the desired range for the crest factor of the test scenario. The crest factor of the signal is kept in the desired range by automatically setting appropriate channelization codes and timing offsets.
The setting takes effect only after execution of command `BB:W3GPp:PPARameter:EXECute`.

Parameter: **MINimum**The crest factor is minimized. The channelization codes are distributed uniformly over the code domain. The timing offsets are increased by 3 per channel.

AVERageAn average crest factor is set. The channelization codes are distributed uniformly over the code domain. The timing offsets are all set to 0.

WORStThe crest factor is set to an unfavorable value (i.e. maximum). The channelization codes are assigned in ascending order. The timing offsets are all set to 0.

Example: `BB:W3GP:PPAR:CRES WORS"` 'sets the crest factor to an unfavorable value.

*RST value	Dependencies	SCPI
MINimum	The settings of commands `BB:W3GP:BST<n>:CHAN<n>:CCODe` and `BB:W3GP:BST<n>:CHAN<n>:TOFFset` are adjusted according to the selection	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:PPARameter:DPCH:COUNt 0 ... 512

This command sets the number of activated DPCHs. The maximum number is the ratio of the chip rate and the symbol rate (maximum 512 at the lowest symbol rate of 7.5 ksps).

The setting takes effect only after execution of command `BB:W3GPp:PPARameter:EXECute`.

Example: `BB:W3GP:PPAR:DPCH:COUN 21`
'the predefined signal contains 21 DPCHs.

*RST value	Resolution	SCPI
10	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:PPARameter:DPCH:SRATe
D7K5 | D15K | D30K | D60K | D120K | D240K | D480K | D960K

This command sets the symbol rate of DPCHs.

The setting takes effect only after execution of command `BB:W3GPp:PPARameter:EXECute`.

Example: `BB:W3GP:PPAR:DPCH:SRAT D240K`
'sets the symbol rate of the DPCHs to 240ksps.

*RST value	Resolution	SCPI
D30K	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:PPARameter:EXECute

This command presets the channel table of base station 1 with the parameters defined by the `PPARameter` commands.

The command triggers an event and therefore has no query form and no *RST value.

Example: `BB:W3GP:PPAR:EXEC`
'configures the signal sequence as defined by the `:PPARameter` commands.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:PPARameter:SCCPch:SRATe D7K5 | D15K | D30K | D60K | D120K | D240K | D480K | D960K

The command sets the symbol rate of S-CCPCH.

The setting takes effect only after execution of command `BB:W3GPp:PPARameter:EXECute`.

Example: `BB:W3GP:PPAR:SCCP:SRAT D240K`
'sets the SCCPCH to 240 ksps.

*RST value	Resolution	SCPI
D30K	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:PPARameter:SCCPch:STATe ON | OFF

The command activates/deactivates the S-CCPCH.

The setting takes effect only after execution of command `BB:W3GPp:PPARameter:EXECute`.

Example: `BB:W3GP:PPAR:SCCP:STAT ON`
'S-CCPCH is activated.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:PPARameter:SCHannels ON | OFF

The command activates/deactivates the PCPICH, PSCH, SSCH and PCCPCH. These "special channels" are required by a user equipment for synchronization.

The setting takes effect only after execution of command `BB:W3GPp:PPARameter:EXECute`.

Example: `BB:W3GP:PPAR:SCH ON`
'activates PCPICH, PSCH, SSCH and PCCPCH.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:SETTing:TMODel:BSTation <test_model_name>

The command selects a test model defined by the standard for the downlink.

This command triggers an action and therefore has no *RST value and no query form.

Parameters:

`Test_Model_1_16channels`
'Measurement: Spectrum emission mask ACLR; 16 Channels

`Test_Model_1_32channels`
'Measurement: Spectrum emission mask ACLR; 32 Channels

`Test_Model_1_64channels`
'Measurement: Spectrum emission mask ACLR; 64 Channels

`Test_Model_2`'Measurement: Output power dynamics

`Test_Model_3_16channels`
'Measurement: Peak code domain error; 16 Channels

`Test_Model_3_32channels`
'Measurement: Peak code domain error; 32 Channels

`Test_Model_4`
'Measurement: Error Vector Magnitude

`Test_Model_5_30_8channels`
'Measurement: Error Vector Magnitude; 8 High Speed Channels

`Test_Model_5_14_4channels`
'Measurement: Error Vector Magnitude; 4 High Speed Channels

`Test_Model_5_06_2channels`
'Measurement: Error Vector Magnitude; 2 High Speed Channels

`Test_Model_6`
'Measurement: Relative Code Domain Error, only applicable for 64QAM modulated codes

Example: `BB:W3GP:SETT:TMOD:BST 'Test_Model_1_64channels'`
'selects the test model 'Measurement: Spectrum emission mask ACLR; 64 Channels.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:SETTing:TMODel:BSTation:CATalog?

The command queries the list of test models defined by the standard for the downlink.

The command is a query command and therefore does not have an *RST value.

Example: `BB:W3GP:SETT:TMOD:BST:CAT?`
'queries the list of available test models for the downlink transmission direction.

Response: `"'Test_Model_1_16channels,..."`

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:SETTing:TMODel:MSTation <test_model_name>

The command selects a test model that is not defined by the standard for the uplink.

This command triggers an action and therefore has no *RST value and no query form.

Parameters: 'DPCCH_DPDCH_60ksps'
Preset, Uplink, UE1 on, DPDCH + DPCCH, Overall symbol rate 60 ksps.

'DPCCH_DPDCH960ksps'
Preset, Uplink, UE1 on, DPDCH + DPCCH, Overall symbol rate 960 ksps

Example: `BB:W3GP:SETT:TMOD:MST 'DPCCH_DPDCH960ksps'`
'selects the test model with a symbol rate of 960 ksps.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:SETTing:TMODel:MSTation:CATalog?

The command queries the list of non-standardized test models for the uplink.

The command is a query command and therefore does not have an *RST value.

Example: `BB:W3GP:SETT:TMOD:MST:CAT?`
'queries the list of available test models

Response: "`'DPCCH_DPDCH960ksps,DPCCH_DPDCH_60ksps'`"

*RST value	Resolution	SCPI
-	-	Device-specific

SOURce-W3GPp - Setting Base Stations

The SOURce:BB:W3GPp:BSTation system contains commands for setting base stations. The commands of this system only take effect if the 3GPP FDD standard is activated, the DOWN transmission direction is selected and the particular base station is enabled:

```
SOURce:BB:W3GPp:STATe ON
SOURce:BB:W3GPp:LINK DOWN
SOURce:BB:W3GPp:BSTation2:STATe ON
```

Important:*In case of remote control, suffix counting for channels corresponds to the suffix counting with 3GPP FDD (channel 0 to channel 138). SCPI prescribes that suffix 1 is the default state and used when no specific suffix is specified. Therefore, channel 1 (and not channel 0) is selected when no suffix is specified.*

The commands for setting the enhanced channels of base station 1 are described in the following Section "*SOURce-W3GPp - Enhanced Channels of Base Station 1*", Page 255 .

<table>
<tr><th>Command</th><th>Parameters</th><th>Def. unit</th><th>Comments</th></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:AICH:ASLOt</td><td>0…15</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:APAIch:ASLOt</td><td>0…15</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:AICH:SAPattern</td><td><bit pattern></td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:APAIch:SAPattern</td><td><bit pattern></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:CCODe</td><td>0...(511)
0 .. 3.84/symbol rate</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:DATA</td><td>PN9 | PN15 | PN16 | PN20 | PN21 | PN23 | ZERO | ONE | PATTern | DLISt</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:DATA:DSELect</td><td><dlist_name></td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:DATA:PATTern</td><td>#B0,1...B11..1,64</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:DPCCh:MCODe</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:DPCCh:PLENgth</td><td>BIT0 | BIT2 | BIT4 | BIT8 | BIT16 |</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:DPCCh:POFFset:PILot</td><td>-10 dB ... 10 dB</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:DPCCh:POFFset:TFCI</td><td>-10 dB ... 10 dB</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:DPCCh:POFFset:TPC</td><td>-10 dB ... 10 dB</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:DPCCh:TFCI</td><td>0...1023</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:DPCCh:TFCI:STATe</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:DPCCh:TPC:DATA</td><td>DLISt | ZERO | ONE |PATTern</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:DPCCh:TPC:DATA:DSELect</td><td><list_name></td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:DPCCh:TPC:DATA:PATTern</td><td>#B0,1...B11..1,64</td><td></td><td></td></tr>
</table>

Command	Parameters	Def. unit	Comments
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:DPCCh:TPC:MISuse	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:DPCCh:TPC:PSTep	-10 dB ...+10 dB	dB	
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:DPCCh:TPC:READ	CONTinuous | S0A | S1A | S01A | S10A		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:FDPCh:DPCCh:TPC: DATA -	DLISt | ZERO | ONE |PATTern		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:FDPCh:DPCCh:TPC: DATA : DSELect	<list_name>		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:FDPCh:DPCCh:TPC: DATA PATT	#B0,1...B11..1,64		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:FDPhC:DPCCh:TPC: MISuse	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:FDPhC:DPCCh:TPC: PSTep	-10 ...+10	dB	
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:FDPhC:DPCCh:TPC: READ	CONTinuous | S0A | S1A | S01A | S10A		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel:HSDPa:HSET:PRESet			No query
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<10..138>:HSDPa:BMOD e[:STATe]	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11..138>:HSDPa:CVPB	0, 1, 2, 3		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:AMODe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<11..138>:HSDPa:HSET:BCBTti<1| 2>?			Query only
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<11..138>:HSDPa:HSET:BPAYload <1|2>?			Query only
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:CLENgth	1 ... 15		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<11..138>:HSDPa:HSET:CRATe<1| 2>?			Query only
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:DATA	PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | ZERO | ONE | PATTern | DLISt		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:DATA:DS ELect	<dlist_name>		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:DATA:PAT Tern	#B0,1...B11..1,64		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:HARQ:LE Ngth	1..6		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:HARQ:MO DE	CACK | CNACk		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:HSCCode	0 ... 127		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:MODulatio n<1|2>	QPSK | QAM16 | QAM64		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:NAIBitrate ?	1 ... 5000		Query only

Command	Parameters	Def. unit	Comments
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:PREDefined	P1QPSK | P1QAM16 | P2QPSK | P2QAM16 | P3QPSK | P3QAM16 | P4QPSK | P5QPSK | P6QPSK | P6QAM16 | P7QPSK | P8QAM64 | P9QAM16QPSK | USER		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:PWPattern	<pattern>		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:RVParameter<1|2>	0 ... 7		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:RVPSequence<1|2>	<pattern>		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:S64Qam	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:SCCode	1 ... 15		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:SLENgth			
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:SLENgth:ADJust			No query
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:SPATtern<1|2>?			Query only
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:STAPattern	<pattern>		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:TBS:INDex<1|2>	0 ... 62		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:TBS:REFerence	0 ... 3		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:TBS:TABLe<1|2>	TAB0 | TAB1		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:TYPE	NORMal | LOPeration | MIMO		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:UECategory?	1 .. 5000		Query only
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:UEID	0 ... 65535		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:HSET:VIBSize<1|2>	0 … 304000		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:MIMO:CVPB<1|2>	0, 1, 2, 3		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:MIMO:MODulation<1|2>	QPSK | QAM16 | QAM64		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:MIMO:PWPattern	<pattern>		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel<10..138>:HSDPa:MIMO:STAPattern	<pattern>		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<10..138>:HSDPa:MODE	CONTinuous | PSF0 | PSF1 | PSF2 | PSF3 | PSF4 | HSET		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9..138>:HSDPa:TTIDistanc	1...16 slots		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSUPa:EAGCh:IFCoding	ON | OFF		

Command	Parameters	Def. unit	Comments
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSUPa:EAGCh:TTI<0..9>:AGSCope	ALL | PER		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSUPa:EAGCh:TTI<0..9>:AGVIndex	0 ... 31		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSUPa:EAGCh:TTI<0..9>:UEID	0 ... 65535		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSUPa:EAGCh:TTIEdch	2 | 10	ms	
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSUPa:EAGCh:TTILength	1 .. 10		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSUPa:EHICh:CTYPe	SERV | NOSER		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSUPa:EHICh:DTAU	0…149		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSUPa:EHICh:ETAU	0…149		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSUPa:EHICh:RGPAttern	<bit pattern>		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSUPa:EHICh:SSINdex	0..39		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSUPa:EHICh:TTIEdch	2 | 10	ms	
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSUPa:ERGCh:CTYPe	SER | NOSER		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSUPa:ERGCh:DTAU	0…149		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSUPa:ERGCh:ETAU	0…149		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSUPa:ERGCh:RGPAttern	<bit pattern>		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSUPa:ERGCh:SSINdex	0...39		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSUPa:ERGCh:TTIEdch	2 | 10	ms	
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:POWer	-80 dB ... 0 dB	dB	
[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel:PRESet			No query
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:SFORmat	<numeric_value>		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:SRATe	D7K5 | D15K | D30K | D60K | D120K | D240K | D480K | D960K (S/s)		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:TOFFset	0...149		

<table>
<tr><th>Command</th><th>Parameters</th><th>Def. unit</th><th>Comm ents</th></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:TYPE</td><td>PCPich | SCPich | PSCH | SSCH | PCCPch | SCCPch | PICH | APAich | AICH | PDSCh | DPCCh | DPCH | HSSCch | HSQPsk | HSQam | HS16Qam | HS64Qam | HSMimo | EAGCh | ERGCh | EHICh | FDPCh</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<2|3|4>:CMODe:DLFStructure</td><td>A | B</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<2|3|4>:CMODe:METHod</td><td>HLSCheduling | PUNCturing | SF2</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<2|3|4>:CMODe:PATTern<[1]|2>:TGD</td><td>3...100 slots</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<2|3|4>:CMODe:PATTern<[1]|2>:TGL<[1]|2></td><td>3...14 slots</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<2|3|4>:CMODe:PATTern<[1]|2>:TGPL</td><td>1(0) ... 100 frames</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<2|3|4>:CMODe:PATTern<[1]|2>:TGSN</td><td>Slot 0 ...slot 14</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<2|3|4>:CMODe:POFFset</td><td>0 dB ... 10 dB</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<2|3|4>:CMODe:POMode</td><td>AUTO | USER</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<2|3|4>:CMODe:STATe</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:DCONflict:RESolve</td><td></td><td></td><td>No query</td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:DCONflict[:STATe]</td><td></td><td></td><td>Query only</td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<ST>:ENHanced:PCPich:PATTern</td><td>ANT1 |ANT2</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation:OCNS:MODE</td><td>STANdard | HSDPa | HSDP2</td><td></td><td>BS1 only</td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation:OCNS:STATe</td><td>ON | OFF</td><td></td><td>BS1 only</td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:OLTDiversity</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:PINDicator:COUNt</td><td>D18 | D36 | D72 | D144</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation:PRESet</td><td></td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:SCODe</td><td>#H0...#H5FFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:SCODe:STATe</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:SCPich:PREFerence[:STATe]</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:SSCG?</td><td>Answer: 0...63</td><td></td><td>Query only</td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:STATe</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:TDELay</td><td>0...38400 chips</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:TDIVersity</td><td>OFF | ANT1 | ANT2</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel:HSDPa:HSET:PRESet</td><td></td><td></td><td>No query</td></tr>
</table>

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel7:AICH:ASLOt 0 ... 15

The command selects the slot in which the burst is transmitted.

Example: `BB:W3GP:BST1:CHAN7:AICH:ASLO 5`
'defines the slot to transmit the burst.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel7:APAIch:ASLOt 0 … 15

The command selects the slot in which the burst is transmitted.

Example: `BB:W3GP:BST1:CHAN7:APAI:ASLO 5`
'defines the slot to transmit the burst.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel7:AICH:SAPAttern <bit pattern>

Enters the 16 bit pattern for the ACK/NACK field.

This field is used by the base station to acknowledge, refuse or ignore requests of up to 16 user equipments.

Example: `"SOUR:BB:W3GP:BST1:CHAN7:AICH:SAP "+000000000000"`
'sets the bit pattern to "`+000000000000`" (ACK).

*RST value	Resolution	SCPI
"+000000000000"	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel8:APAIch:SAPAttern <bit pattern>

Enters the 16 bit pattern for the ACK/NACK field.

This field is used by the base station to acknowledge, refuse or ignore requests of up to 16 user equipments.

Example: `"SOUR:BB:W3GP:BST1:CHAN8:APAI:SAP "+000000000000"`
'sets the bit pattern to "+" (ACK).

*RST value	Resolution	SCPI
"+000000000000"	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BStation<[1]|2|3|4>:CHANnel<0|[1]|2|5...138>>:CCODe 0 ... 511

The command sets the channelization code (formerly the spreading code number). The range of values of the channelization code depends on the symbol rate of the channel. The standard assigns a fixed channelization code to some channels (P-CPICH, for example, always uses channelization code 0). $\frac{chip\_rate(=3.84Mcps)}{symbol\_rate}-1$

Example: `BB:W3GP:BST1:CHAN15:CCOD 123`
'sets channelization code 123 for channel 15 of base station 1.

*RST value	Res.	Dependency	SCPI
Depends on the channel type.	1	The slot format determines the symbol rate (and thus the range of values for the channelization code), the TFCI state and the pilot length. If the value of any one of the four parameters is changed, all the other parameters will be adapted as necessary. In the case of enhanced channels with active channel coding, the selected channel coding also affects the slot format and thus the remaining parameters. If these parameters are changed, the channel coding type is set to user.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BStation<[1]|2|3|4>:CHANnel<4|5|6|9|11...138>:DATA
PN9 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | ZERO | ONE | PATTern

The command determines the data source for the data fields of the specified channel.

For enhanced channels with channel coding, the data source is set with the command `:BB:W3GPp:BST:ENHanced:CHANnel<n>:DPCH:TCHannel<n>:DATA`.

Parameters:

PNxxThe pseudo-random sequence generator is used as the data source. Different random sequence lengths can be selected.

DLIStA data list is used. The data list is selected with the command `:BB:W3GPp:BST:CHANnel:DATA:DSELect`.

ZERO | ONE Internal 0 and 1 data is used.

PATTernInternal data is used The bit pattern for the data is defined by the command `:BB:W3GPp:BST:CHANnel:DATA:PATTern`.

Example: `BB:W3GP:BST2:CHAN13:DATA PATT`
'selects as the data source for the data fields of channel 13 of base station 2, the bit pattern defined with the following command.

`BB:W3GP:BST2:CHAN13:DATA:PATT #H3F,8`
'defines the bit pattern.

*RST value	Resolution	SCPI
PN9	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<4|5|6|9|11...138>:DATA:DSELect <data list name>

The command selects the data list for the DLISt data source selection.

The lists are stored as files with the fixed file extensions ***.dm_iqd** in a directory of the user's choice. The directory applicable to the following commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

Example: `BB:W3GP:BST2:CHAN13:DATA DLIS`
'selects the Data Lists data source.

`"MMEM:CDIR 'D:\Lists\DM\IqData'`
'selects the directory for the data lists.

`BB:W3GP:BST2:CHAN13:DATA:DLIS '3gpp_list1'`
'selects file '`3gpp_list1`' as the data source. This file must be in the directory `D:\Lists\DM\IqData` and have the file extension *.dm_iqd.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<4|5|6|9|11...138>:DATA:PATTern #B0,1... #B111..1,64

The command determines the bit pattern for the PATTern selection. The maximum length is 64 bits.

Example: `BB:W3GP:BST2:CHAN13:DATA:PATT #H3F,8`
'defines the bit pattern.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:DPCCh:MCODe ON | OFF

The command activates multicode transmission for the selected channel (ON) or deactivates it (OFF). The multicode channels are destined for the same receiver, that is to say, are part of a radio link. The first channel of this group is used as the master channel. The common components (Pilot, TPC and TCFI) for all the channels are then spread using the spreading code of the master channel.

This setting is only valid for DPCHs (`CHANnel11...138`).

Example: `BB:W3GP:BST2:CHAN12:DPCC:MCOD ON`
'activates the simulation in multicode mode for channel 12 of base station 2.

`BB:W3GP:BST2:CHAN13:DPCC:MCOD ON`
'activates the simulation in multicode mode for channel 13 of base station 2. Channel 12 is the master channel.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<5|10...138>:DPCCh:PLENgth BIT0 | BIT2 | BIT4 | BIT8 | BIT16

The command sets the length of the pilot fields. The range of values for this parameter depends on the channel type and the symbol rate. To achieve a constant slot length, the data fields are lengthened or shortened depending on the pilot length, as defined in the standard.

Example: `BB:W3GP:BST2:CHAN12:DPCC:PLEN BIT2`
'sets the length of the pilot fields for channel 12 of base station 2.

*RST value	Res.	Dependency	SCPI
BIT4	-	The slot format determines the symbol rate (and thus the range of values for the channelization code), the TFCI state and the pilot length. If the value of any one of the four parameters is changed, all the other parameters will be adapted as necessary. In the case of enhanced channels with active channel coding, the selected channel coding also affects the slot format and thus the remaining parameters. If these parameters are changed, the channel coding type is set to user.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<5|10...138>:DPCCh:POFFset:PILot -10 dB ... +10 dB

The command sets an offset to the set channel power for the pilot field.

Example: `BB:W3GP:BST2:CHAN12:DPCC:POFF:PIL -2 dB`
'in the pilot field, sets an offset of -2 dB relative to the channel power.

*RST value	Resolution	SCPI
0	0.1 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<5|8...138>:DPCCh:POFFset:TFCI -10 dB ... +10 dB

The command sets an offset to the set channel power for the TFCI field.

This setting is only valid for the DPCHs.

Example: `BB:W3GP:BST2:CHAN12:DPCC:POFF:PIL -2 dB`
'in the TFCI field, sets an offset of -2 dB relative to the channel power.

*RST value	Resolution	SCPI
0	0.01 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<10...138>:DPCCh:POFFset:TPC -10 dB ... +10 dB

The command sets an offset to the set channel power for the TPC field.

This setting is only valid for the DPCHs.

Example: `BB:W3GP:BST2:CHAN12:DPCC:POFF:TPC -2 dB`
'in the TPC field, sets an offset of -2 dB relative to the channel power.

*RST value	Resolution	SCPI
0	0.01 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<5|9...138>:DPCCh:TFCI 0...1023

The command enters the value of the TFCI field (Transport Format Combination Indicator) for the selected channel of the specified base station. The TFCI field is always filled with exactly 10 bits with leading zeros.

Example: `BB:W3GP:BST2:CHAN12:DPCC:TFCI 22`
'sets the value 22 for the TFCI field of channel 12 of base station 2.

*RST value	Resolution	SCPI
0	1	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<5|9...138>:DPCCh:TFCI:STATe
ON|OFF

The command activates the TFCI field (Transport Format Combination Identifier) for the selected channel of the specified base station.

Example: `BB:W3GP:BST2:CHAN12:DPCC:TFCI:STAT OFF`
'sets that the TFCI field of channel 12 of base station 2 is not used.

*RST value	Res.	Dependency	SCPI
OFF	-	The slot format determines the symbol rate (and thus the range of values for the channelization code), the TFCI state and the pilot length. If the value of any one of the four parameters is changed, all the other parameters will be adapted as necessary. In the case of enhanced channels with active channel coding, the selected channel coding also affects the slot format and thus the remaining parameters. If these parameters are changed, the channel coding type is set to user.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<10...138>:DPCCh:TPC:DATA
DLISt | ZERO | ONE | PATTern

The command determines the data source for the TPC field of the channel.

Parameters:

DLIStA data list is used. The data list is selected with the command `BB:W3GPp:BST:CHANnel:DPCCh:TPC:DATA:DSEL`.

ZERO | ONE Internal 0 and 1 data is used.

PATTernInternal data is used The bit pattern for the data is defined by the command `BB:W3GPp:BST:CHANnel:DPCCh:TPC:DATA:PATTern`. The maximum length is 32 bits.

Example: `BB:W3GP:BST2:CHAN13:DPCC:TPC:DATA PATT`
'selects as the data source for the TPC field of channel 13 of base station 2, the bit pattern defined with the following command.

`BB:W3GP:BST2:CHAN13:DPCC:TPC:DATA:PATT #H3F,8`
'defines the bit pattern.

*RST value	Resolution	SCPI
PATTern	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<10...138>:DPCCh:TPC:DATA:DSELect <data list name>

The command selects the data list for the DLISt data source selection.

The lists are stored as files with the fixed file extensions ***.dm_iqd** in a directory of the user's choice. The directory applicable to the following commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

Example: `BB:W3GP:BST2:CHAN13:DPCC:TPC:DATA DLIS`
'selects the "Data Lists" data source.

`"MMEM:CDIR 'D:\Lists\DM\IqData'`
'selects the directory for the data lists.

`BB:W3GP:BST2:CHAN13:DPCC:TPC:DATA:DSEL 'tpc_ch4'`
'selects the file 'tpc_ch4' as the data source. This file must be in the directory D:\Lists\DM\IqData and have the file extension *.dm_iqd.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<10...138>:DPCCh:TPC:DATA:PATTern #B0,1 ... #B111..1,64

The command determines the bit pattern for the PATTern selection. The maximum bit pattern length is 32 bits.

Example: `BB:W3GP:BST2:CHAN13:DPCC:TPC:DATA:PATT  #H3F, 8`
'defines the bit pattern for the TPC field of channel 13 of base station 2.

*RST value	Resolution	SCPI
#H0,1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<10...138>:DPCCh:TPC:MISuse ON|OFF

The command activates "mis-" use of the TPC field (Transmit Power Control) of the selected channel for controlling the channel powers of these channels of the specified base station.

The bit pattern (see commands `:W3GPp:BSTation<n>:CHANnel<n>:DPCCh:TPC...`) of the TPC field of each channel is used to control the channel power. A "1" leads to an increase of channel powers, a "0" to a reduction of channel powers. Channel power is limited to the range 0 dB to -80 dB. The step width of the change is defined with the command `:W3GPp:BSTation<n>:CHANnel<n>:DPCCh:TPC:PSTep`.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<10...138>:DPCCh:TPC:PSTep -10.0 ... 10.0 dB

The command defines the step width for the change of channel powers in the case of "mis-" use of the TPC field.

Example: `BB:W3GP:BST2:CHAN13:DPCC:TPC:PST 1 dB`
'sets the step width for the change of channel powers for channel 13 of base station 2 to 1 dB.

*RST value	Resolution	SCPI
0	0.01 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<10...138>:DPCCh:TPC:READ CONTinuous | S0A | S1A | S01A | S10A

The command sets the read out mode for the bit pattern of the TPC field.

The bit pattern is defined with the commands `:BB:W3GPp:BST<i>:CHANnel<n>:DPCCh:TPC....`

Parameters:

CONTinuous The bit pattern is used cyclically.

S0A The bit pattern is used once, then the TPC sequence continues with 0 bits.

S1A The bit pattern is used once, then the TPC sequence continues with 1 bits.

S01A The bit pattern is used once and then the TPC sequence is continued with 0 and 1 bits alternately (in multiples, depending on by the symbol rate, for example, 00001111).

S10A The bit pattern is used once and then the TPC sequence is continued with 1 and 0 bits alternately (in multiples, depending on by the symbol rate, for example, 11110000).

Example: `BB:W3GP:BST2:CHAN13:DPCC:TPC:READ S0A`
'the bit pattern is used once, after which a 0 sequence is generated (applies to channel 13 of base station 2).

*RST value	Resolution	SCPI
CONTinuous		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:FDPCh:DPCCh:TPC:DATA DLISt | ZERO | ONE | PATTern

The command determines the data source for the TPC field of the channel.

Parameters:

DLISt A data list is used. The data list is selected with the command `BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:DATA:DSEL`

ZERO | ONE Internal 0 and 1 data is used.

PATTern Internal data is used. The bit pattern for the data is defined by the command `BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:DATA:PATT`. The maximum length is 32 bits.

Example: `BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:DATA PATT`
'selects as the data source for the TPC field of channel 11 of base station 1, the bit pattern defined with the following command:

`BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:DATA:PATT #H3F,8`
'defines the bit pattern.

*RST value	Resolution	SCPI
PATTern	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BStation<[1]|2|3|4>:CHANnel<11...138>:FDPCh:DPCCh:TPC:DATA:DSELect <data list name>

The command selects the data list for the DLISt data source selection.

The lists are stored as files with the fixed file extensions ***.dm_iqd** in a directory of the user's choice. The directory applicable to the following commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

Example: `BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:DATA DLIS`
'selects the "Data Lists" data source.

`"MMEM:CDIR 'D:\Lists\DM\IqData'`
'selects the directory for the data lists.

`BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:DATA:DSEL 'tpc_ch4'`
'selects the file 'tpc_ch4' as the data source. This file must be in the directory D:\Lists\DM\IqData and have the file extension *.dm_iqd.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BStation<[1]|2|3|4>:CHANnel<11...138>:FDPCh:DPCCh:TPC:DATA:PATTern #B0,1 ... #B111..1,64

The command determines the bit pattern for the PATTern selection. The maximum bit pattern length is 32 bits.

Example: `BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:DATA:PATT #H3F, 8`
'defines the bit pattern for the TPC field of channel 11 of base station 1.

*RST value	Resolution	SCPI
#H0,1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BStation<[1]|2|3|4>:CHANnel<11...138>:FDPCh:DPCCh:TPC:MISuse ON|OFF

The command activates "mis-" use of the TPC field (Transmit Power Control) of the selected channel for controlling the channel powers of these channels of the specified base station.

The bit pattern (see commands `BB:W3GP:BStation:CHANnel<n>:FDPCh:DPCCh:TPC:DATA:PATTern`) of the TPC field of each channel is used to control the channel power. A "1" leads to an increase of channel powers, a "0" to a reduction of channel powers. Channel power is limited to the range 0 dB to -80 dB. The step width of the change is defined with the command `BB::W3GPp:BStation<n>:CHANnel<n>:FDPCh:DPCCh:TPC:PSTep`.

Example: `BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:MIS ON`
'activates regulation of channel power for channel 11 of base station 1 via the bit pattern of the associated TPC field.

`BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:PST 1dB`
'sets the step width for the change of channel powers for channel 11 of base station 1 to 1 dB.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:FDPCh:DPCCh:TPC:PSTep -10.0 ... 10.0 dB

The command defines the step width for the change of channel powers in the case of "mis-" use of the TPC field.

Example: `BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:PST 1.5dB`
'sets the step width for the change of channel powers for channel 11 of base station 1 to 1.5 dB.

*RST value	Resolution	SCPI
0	0.01 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:FDPCh:DPCCh:TPC:READ CONTinuous | S0A | S1A | S01A | S10A

The command sets the read out mode for the bit pattern of the TPC field.

Parameters:

CONTinuous
The bit pattern is used cyclically.

S0A The bit pattern is used once, then the TPC sequence continues with 0 bits.

S1A The bit pattern is used once, then the TPC sequence continues with 1 bits.

S01A The bit pattern is used once and then the TPC sequence is continued with 0 and 1 bits alternately (in multiples, depending on by the symbol rate, for example, 00001111).

S10A The bit pattern is used once and then the TPC sequence is continued with 1 and 0 bits alternately (in multiples, depending on by the symbol rate, for example, 11110000).

Example: `BB:W3GP:BST1:CHAN11:FDPC:DPCC:TPC:READ S0A`
'the bit pattern is used once, after which a 0 sequence is generated (applies to channel 11 of base station 1).

*RST value	Resolution	SCPI
CONTinuous		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel:HSDPa:HSET:PRESet

The command calls the default settings of the channel table for the HSDPA H-Set mode. Channels 12 to 17 are preset for HSDPA H-Set 1.

This command triggers an event and therefore has no *RST value and no query form.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:PRE`
'presets the H-Set.

*RST value	Resolution	SCPI
	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSDPa:BMODe[:STATe] ON | OFF

The command activates/deactivates burst mode. The signal is bursted when on, otherwise dummy data are sent during transmission brakes.

Example: `BB:W3GP:BST1:CHAN12:HSDP:BMOD OFF`
'deactivates burst mode, dummy data are sent during the transmission brakes.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:HSDPa:CVPB 0 | 1 | 2 | 3

The command switches the order of the constellation points of the 16QAM and 64QAM mapping.
The re-arrengement is done according to 3GPP TS25.212.

Example: `BB:W3GP:BST1:CHAN12:HSDP:CVPB 1`
'selects interchange of MSBs with LSBs.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSDPa:HSET:AMODe ON | OFF

Activates/deactivates the advanced mode in which the H-Set will be generated by the ARB.
The parameter can be configured only for H-Sets 1 - 5.
For H-Sets 6 - 10 and User it is always enabled.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:PRED P1QAM16`
'selects H-Set 1(16QAM).

`BB:W3GP:BST1:CHAN12:HSDP:HSET:AMOD ON`
'enables advanced mode for the selected H-Set.

*RST value	Resolution	SCPI
OFF (H-Sets 1..5) ON (H-Sets 6..9, User)	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:HSDPa:HSET:BCBTti <1 | 2>?

Displays the binary channel bits per TTI and per stream.

The value displayed is calculated upon the values sets with the commands `BB:W3GP:BST:CHAN:HSDP:HSET:MOD`, `BB:W3GP:BST:CHAN:SRAT` and `BB:W3GP:BST1:CHAN12:HSDP:HSET:HSCC`.
This command is query only and therefore has no *RST value.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:TYPE MIMO`
'sets the H-set type.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:BCBT2?`
'queries the binary channel bits per TTI for stream 2.

Response: "4800"

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:HSDPa:HSET:BPAYload <1 | 2>?

The command queries the payload of the information bit. This value determines the number ob transport layer bits sent in each subframe.
This command is query only and therefore has no *RST value.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:BPAY2?`
'queries the payload of the information bit.

Response: "256"

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:HSDPa:HSET:CLENgth 1..15

The command queries the number of physical HS-PDSCH data channels assigned to the HS-SCCH.

This command is query only and therefore has no *RST value.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:CLEN?`
'queries the number of physical HS-PDSCH data channels assigned to the HS-SCCH.

Response: "4"

*RST value	Resolution	SCPI
5	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:HSDPa:HSET:CRATe<1|2>?

Queries the resulting coding rate per stream.
The coding rate is calculated as a relation between the **Information Bit Payload** and **Binary Channel Bits per TTI**.
This command is query only and therefore has no *RST value.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:CRAT2?`
'queries the coding rate of stream 2.

Response: "0.658"

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:HSDPa:HSET:DATA DLISt | ZERO | ONE | PATTern

Selects the data source for the transport channel.

Parameters: **DLISt**A data list is used. The data list is selected with the command `BB:W3GP:BST:CHAN:HSDP:HSET:DATA:DSEL`

ZERO | ONE Internal 0 and 1 data is used.

PATTernInternal data is used. The bit pattern for the data is defined by the command `BB:W3GP:BST:CHAN:HSDP:HSET:DATA:PATT`.

Example: `BB:W3GP:BST1:CHAN11:HSDP:HSET:DATA PATT`
'selects as the data source for the transport channel

`BB:W3GP:BST1:CHAN11:HSDP:HSET:DATA:PATT #H3F,8`
'defines the bit pattern.

*RST value	Resolution	SCPI
PN9	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<10...138>:HSDPa:HSET:DATA: DSELect <data list name>

The command selects the data list for the DLISt data source selection.
The lists are stored as files with the fixed file extensions ***.dm_iqd** in a directory of the user's choice. The directory applicable to the following commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

Example: `BB:W3GP:BST1:CHAN11:HSDP:HSET:DATA DLIS`
'selects the "Data Lists" data source.

`"MMEM:CDIR 'D:\H-Sets'`
'selects the directory for the data lists.

`BB:W3GP:BST1:CHAN11:HSDP:HSET:DATA:DSEL 'hset_ch11'`
'selects the file 'hset_ch11' as the data source. This file must be in the directory D:\H-Sets and have the file extension *.dm_iqd.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:HSDPa:HSET:DATA:PATTern #B0,1 ... #B111..1,64

The command determines the bit pattern for the PATTern selection. The maximum bit pattern length is 32 bits.

Example: `BB:W3GP:BST1:CHAN11:HSDP:HSET:DATA PATT`
'selects as the data source for the H-set

`BB:W3GP:BST1:CHAN11:HSDP:HSET:DATA:PATT #H3F, 8`
'defines the bit pattern for the H-set.

*RST value	Resolution	SCPI
#H0,1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSDPa:HSET:HARQ:LENGth 1..6

Sets the number of HARQ processes. This value determines the distribution of the payload in the subframes.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:HARQ:LENG?`
'queries the number of HARQ processes.

Response: "2"

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSDPa:HSET:HARQ:MODE CACK | CNACk

Sets the HARQ Simulation Mode.

Parameters:

CACK
New data is used for each new TTI.

CNACk
Enables NACK simulation, i.e. depending on the sequence selected for the parameter Redundancy Version Parameter Sequence packets are retransmitted.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:AMOD ON`
'enables advanced mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:HARQ:MODE CNAC`
'sets Constant NACK HARQ Mode.

*RST value	Resolution	SCPI
CACK	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSDPa:HSET:HSCCode 0…17

Sets the channelization code of the HS-SCCH.

Note:
To let the instrument generate a signal equal to the one generated by an instrument equipped with an older firmware, set the same ***Channelization Codes*** *as the codes used for your physical channels.*

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:HSCC 10`
'sets channalization code 10 for the HS-SCCH.

*RST value	Resolution	SCPI
5	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<10..138>:HSDPa:HSET:MOD<1|2> QPSK | QAM16 | QAM64

Sets the modulation for stream 1 and stream 2 to QPSK, 16QAM or 64QAM.

The modulation 64QAM is available for instruments equipped with option SMx-K59 only.

For HS-SCCH Type 2, the available modulation scheme is QPSK only.

Example: `BB:W3GP:BST1:CHAN12:HSDP:HSET:TYPE MIMO`
'sets MIMO operation mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:MOD1 HS64Q`
'sets the modulation of stream 2 to 64QAM

*RST value	Resolution	SCPI
HSQP	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSDPa:HSET:NAIB?

The command queries the average data rate on the transport layer (Nominal Average Information Bitrate).

This command is query only and therefore has no *RST value.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:NAIB?`
'queries the average data rate on the transport layer.

Response: "455"

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSDPa:HSET:PREDefined 1QPSK | P1QAM16 | P2QPSK | P2QAM16 | P3QPSK | P3QAM16 | P4QPSK | P5QPSK | P6QPSK | P6QAM16 | P7QPSK | P8QAM64 | P9QAM16QPSK | USER

The command selects the H-Set and the modulation according to TS 25.101 Annex A.7.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:PRED P3QPSK`
'selects H-Set 3 (QPSK).

*RST value	Resolution	SCPI
1 (QPSK)	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSDPa:HSET:PWPattern <pattern>

Sets the precoding weight parameter w2 for MIMO precoding.

The values of the weight parameters w1, w3 and w4 are calculated based on the value for w2 (see *"MIMO in HSPA+"*).

Example: `BB:W3GP:BST1:CHAN12:HSDP:HSET:PWP "0,1,3"`
'selects the pattern.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSDPa:HSET:RVParameter<1|2> 0 ... 7

The parameter is enabled for **HARQ Simulation Mode** set to Constant ACK.

The command sets the Redundancy Version Parameter.
This value determines the processing of the Forward Error Correction and Constellation Arrangement (QAM16 modulation), see TS 25.212 4.6.2.

For HS-SCCH Type 2 (less operation), the Redundancy Version Parameter is always 0.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:HARQ:MODE CACK`
'sets Constant ACK HARQ Mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:RVP 7`
'sets the Redundancy Version Parameter to 7.

`BB:W3GP:BST1:TDIV ANT1`
'enables transmit diversity

`BB:W3GP:BST1:CHAN12:HSDP:HSET:TYPE MIMO`
'selects HS-SCCH Type 3 (MIMO).

`BB:W3GP:BST1:CHAN12:HSDP:HSET:RVP2 4`
'sets the Redundancy Version Parameter of stream 2.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSDPa:HSET:RVPSequence<1|2> 0 ... 7

The parameter is enabled for **HARQ Simulation Mode** set to Constant NACK.

Enters a sequence of Redundancy Version Parameters per stream.
The value of the RV parameter determines the processing of the Forward Error Correction and Constellation Arrangement (16/64QAM modulation), see TS 25.212 4.6.2.

The sequence has a length of maximum 8 values. The sequence length determines the maximum number of retransmissions. New data is used after reaching the end of the sequence.

For HS-SCCH Type 2 (less operation), the Redundancy Version Parameter Sequence is a read-only parameter.

Example:

```
BB:W3GP:BST1:CHAN12:HSDP:MODE HSET
```
'selects H-Set mode.

```
BB:W3GP:BST1:CHAN12:HSDP:HSET:AMOD ON
```
'enables advanced mode.

```
BB:W3GP:BST1:CHAN12:HSDP:HSET:HARQ:MODE CNAC
```
'sets Constant NACK HARQ Mode.

```
BB:W3GP:BST1:TDIV ANT1
```
'enables transmit diversity

```
BB:W3GP:BST1:CHAN12:HSDP:HSET:TYPE MIMO
```
'selects HS-SCCH Type 3 (MIMO).

```
BB:W3GP:BST1:CHAN12:HSDP:HSET:RVPS2 '0,1,3,2,0,1,2,3'
```
'sets the Redundancy Version Parameter sequence of stream 2.

```
BB:W3GP:BST1:CHAN12:HSDP:HSET:TYPE LOP
```
'selects HS-SCCH Type 2 (less operation).

```
BB:W3GP:BST1:CHAN12:HSDP:HSET:RVPS?
```
'queries the Redundancy Version Parameter sequence.

Response: '0,3,4'

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSDPa:HSET:S64Qam ON | OFF

Enables/disables UE support of 64QAM.

This command is enabled only for HS-SCCH Type 1 (normal operation) and 16QAM modulation.

In case this parameter is disabled, i.e. the UE does not support 64QAM, the $x_{ccs,7}$ bit is used for channelization information.

Example:

```
BB:W3GP:BST1:CHAN12:HSDP:MODE HSET
```
'selects H-Set mode.

```
BB:W3GP:BST1:CHAN12:HSDP:HSET:TYPE NORM
```
'selects HS-SCCH Type 1 (normal operation).

```
BB:W3GP:BST1:CHAN12:HSDP:HSET:MOD QAM16
```
'sets 16QAM modulation.

```
BB:W3GP:BST1:CHAN12:HSDP:HSET:S64Q ON
'enables UE support of 64QAM
```

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSDPa:HSET:SCCode 1..15

Sets the channelization code of the first HS-PDSCH channel in the H-Set. The channelization codes of the rest of the HS-PDSCHs in this H-Set are set automatically.

Note:
*To let the instrument generate a signal equal to the one generated by an instrument equipped with an older firmware, set the same **Channelization Codes** as the codes used for your physical channels.*

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:SCC 10`
'sets channelization code of the first HS-PDSCH.

*RST value	Resolution	SCPI
8	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:HSDPa:HSET:SLENgth?

Displays the suggested ARB sequence length.

The suggested ARB sequence length is the calculated minimum length that depends on several parameters, like TTI distance, Number of HARQ Processes, HARQ Mode, HARQ cycles, RV Parameter Sequence, HS-SCCH Type, Precoding Weight Pattern and Stream 2 Active Pattern.

When working in Advanced Mode (`W3GP:BST1:CHAN:HSDP:HSET:AMOD ON)`, it is recommended to adjust the current ARB sequence length to the suggested one.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:AMOD ON`
'enables advanced mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:SLEN?`
'queries the suggested ABR sequence length.

Response: "21"

`BB:W3GP:BST1:CHAN12:HSDP:HSET:SLEN:ADJ`
'sets the ARB sequence length to the suggested value.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:HSDPa:HSET:SLENgth:ADJust

Sets the ARB sequence length to the suggested value.

When working in Advanced Mode (`W3GP:BST1:CHAN:HSDP:HSET:AMOD ON`), it is recommended to adjust the current ARB sequence length to the suggested one.

Example:

`BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:AMOD ON`
'enables advanced mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:SLEN?`
'queries the suggested ABR sequence length.

Response: "21"

`BB:W3GP:SLEN?`
'queries the current ABR sequence length.

Response: "12"

`BB:W3GP:BST1:CHAN12:HSDP:HSET:SLEN:ADJ`
'sets the ARB sequence length to the suggested value.

`BB:W3GP:SLEN?`
'queries the current ABR sequence length.

Response: "21"

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:HSDPa:HSET:SPATtern<1|2>?

Queries the distribution of packets over time.
A "-" indicates no packet

Example:

`BB:W3GP:BST1:CHAN15:HSDP:TTID 3`
'sets the TTI

`BB:W3GP:BST1:CHAN12:HSDP:HSET:HARQ:LENG 2`
'sets the number of HARQ processes

`BB:W3GP:BST1:CHAN12:HSDP:HSET:SPAT1?`
'queries the signaling pattern for stream 1

`Response: "0,-,-1,-,-"`

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:HSDPa:HSET:STAPattern <pattern>

Enables/disables a temporal deactivation of Stream 2 per TTI in form of sending pattern.

The stream 2 sending pattern is a sequence of max 16 values of "1" (enables Stream 2 for that TTI) and "-" (disabled Stream 2 for that TTI).

Example: `BB:W3GP:BST1:CHAN12:HSDP:HSET:STAP "11-"`
'selects the pattern.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<10...138>:HSDPa:HSET:TBS:INDex<1|2> 0..62

Selects the Index ki for the corresponding table and stream, as described in in 3GPP TS 25.321.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:TBS:TABL2 TAB0`
'selects Table 0 for stream 2.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:TBS:IND2 25`
'sets the Index ki

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<10...138>:HSDPa:HSET:TBS:REFerence<1|2> 0..3

While working in less operation mode, this command is signaled instead of the command `BB:W3GP:BST:CHAN:HSDP:HSET:TBS:IND`.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:TYPE LOP`
'selects less operation mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:TBS:TABL2 TAB0`
'selects Table 0 for stream 2.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:TBS:REF 2`
'sets the reference.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<10...138>:HSDPa:HSET:TBS:TABLe<1|2> TAB0 | TAB1

Selects Table 0 or Table 1 as described in in 3GPP TS 25.321.
For HS-PDSCH Modulation set to 64QAM, only Table 1 is available.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:TBS:TABL2 TAB0`
'selects Table 0 for stream 2.

*RST value	Resolution	SCPI
TAB0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:HSDPa:HSET:TYPE NORMal | LOPeration | MIMO

Sets the HS-SCCH type.

Parameters:

NORMal
Normal operation mode.

LOPeration
HS-SCCH less operation mode.

MIMO
HS-SCCH Type 3 mode is defined for MIMO operation.
Enabling this operation mode, enables the MIMO parameters `BB:W3GP:BST<n>:CHAN<n>:HSDP:MIMO:CVPB<1|2>`, `BB:W3GP:BST<n>:CHAN<n>:HSDP:MIMO:MOD<1|2>`, `BB:W3GP:BST<n>:CHAN<n>:HSDP:MIMO:PWP`, `BB:W3GP:BST<n>:CHAN<n>:HSDP:MIMO:STAP` and all Stream 2 parameters.

Example: `BB:W3GP:BST1:TDIV ANT1`
'enables transmit diversity and antenna 1.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:TYPE MIMO`
'sets MIMO operation mode.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<10...138>:HSDPa:HSET:UECategory 0 ... 5000

Queries the UE category number.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:PRED P3QPSK`
'selects H-Set 3 (QPSK).

`BB:W3GP:BST1:CHAN12:HSDP:HSET:UEC?`
'queries the UE Category.

Response: 5

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<10...138>:HSDPa:HSET:UEID 0 ... 65535

The command sets the UE identity which is the HS-DSCH Radio Network Identifier (H-RNTI) defined in 3GPP TS 25.331: "Radio Resource Control (RRC); Protocol Specification".

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE HSET`
'selects H-Set mode.

`BB:W3GP:BST1:CHAN12:HSDP:HSET:UEID 256`
'sets the UE identity.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<10..138>:HSDPa:HSET:VIBSize<1|2> 0 .. 304000

Sets the size of the Virtual IR Buffer (Number of SMLs per HARQ-Process) per stream.

This command is query only and therefore has no *RST value.

Example: `BB:W3GP:BST1:CHAN12:HSDP:HSET:VIBS1 9600`
'sets the Virtual IR Buffer Size of stream 1.

*RST value	Resolution	SCPI
-	800	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:HSDPa:MIMO:CVPB<1 | 2> 0 | 1 | 2 | 3

The command switches the order of the constellation points of the 16QAM and 64QAM mapping. The re-arrengement is done according to 3GPP TS25.212.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MIMO:CVPB2 1`
'selects interchange of MSBs with LSBs for stream 2.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<n>:HSDPa:MIMO:MOD<1|2> QPSK | QAM16 | QAM64

Sets the modulation for stream 1 and stream 2 to QPSK, 16QAM or 64QAM.

The modulation 64QAM is available for instruments equipped with option SMx-K59 only.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MIMO:MOD1 HS64Q`
'sets the modulation of stream 2 to 64QAM

*RST value	Resolution	SCPI
HSQP	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:HSDPa:MIMO:PWPattern <pattern>

Sets the precoding weight parameter w2 for MIMO precoding.

The values of the weight parameters w1, w3 and w4 are calculated based on the value for w2 (see *"MIMO in HSPA+"*).

Example: `BB:W3GP:BST1:CHAN12:HSDP:MIMO:PWP "0,1,3"`
'selects the pattern.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<11...138>:HSDPa:MIMO:STAPattern <pattern>

Enables/disables a temporal deactivation of Stream 2 per TTI in form of sending pattern.

The stream 2 sending pattern is a sequence of max 16 values of "1" (enables Stream 2 for that TTI) and "-" (disabled Stream 2 for that TTI).

Example: `BB:W3GP:BST1:CHAN12:HSDP:MIMO:STAP "11-"`
'selects the pattern.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9..138>:HSDPa:MODE CONTinuous | PSF0 | PSF1 | PSF2 | PSF3 | PSF4 | HSET

The command selects the HSDPA mode.

Parameters:

CONTinuous
The high speed channel is generated continuously. This mode is defined in test model 5.

PSFx The high speed channel is generated in packet mode. The start of the channel is set by selecting the subframe in which the first packet is sent.

HSET
The high speed channels are preset according to TS 25.1401 Annex A.7, H-Set.

Example: `BB:W3GP:BST1:CHAN12:HSDP:MODE PSF1`
'selects packet mode for channel 12. The first packet is sent in packet subframe 1 (PSF1).

*RST value	Resolution	SCPI
CONT	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSUPa:EAGCh:IFCoding ON | OFF

Enables/disables the information coding.
Disabling this parameter corresponds to a standard operation, i.e. no coding is performed and the data is sent uncoded.
Enabling this parameter allows you to configure the way the data is coded.

Example: `BB:W3GP:BST1:CHAN10:HSUP:EAGC:IFC ON`
'enables information coding.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSUPa:EAGCh:TTI<0..9>:AGSCope ALL | PER

Sets the scope of the selected grant.
According to the TS 25.321, the impact of each grant on the UE depends on this parameter.

For E-DCH TTI = 10ms, the Absolute Grant Scope is always All HARQ Processes.

Example: `BB:W3GP:BST1:CHAN10:HSUP:EAGC:IFC ON`
'enables information coding.

`BB:W3GP:BST1:CHAN10:HSUP:EAGC:TTIL 10`
'enables 10 TTIs for configuration.

`BB:W3GP:BST1:CHAN10:HSUP:EAGC:TTI9:AGSC PER`
'sets the grant scope to Per HARQ Process.

*RST value	Resolution	SCPI
ALL	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSUPa:EAGCh:TTI<0..9>:AGVIndex 0..31

Sets the Index for the selected TTI.
According to the TS 25.212 (4.10.1A.1), there is a cross-reference between the grant's index and the grant value.
The TTI configuration of the table is used cyclically. Depending on the selection made for the parameter E-DCH TTI, each table row corresponds to a 2ms TTI or to a 10ms TTI.

Example: `BB:W3GP:BST1:CHAN10:HSUP:EAGC:IFC ON`
'enables information coding.

`BB:W3GP:BST1:CHAN10:HSUP:EAGC:TTIL 10`
'enables 10 TTIs for configuration.

`BB:W3GP:BST1:CHAN10:HSUP:EAGC:TTI9:AGVI 20`
'sets the absolute grant value index

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSUPa:EAGCh:TTI<0..9>:UEID 0..65535

Sets the UE Id for the selected TTI.

Example: `BB:W3GP:BST1:CHAN10:HSUP:EAGC:IFC ON`
'enables information coding.

`BB:W3GP:BST1:CHAN10:HSUP:EAGC:TTIL 10`
'enables 10 TTIs for configuration.

`BB:W3GP:BST1:CHAN10:HSUP:EAGC:TTI9:UEID 2000`
'sets the UE ID

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSUPa:EAGCh:TTIEdch 2ms | 10ms

The command sets processing duration.

Example: `BB:W3GP:BST1:CHAN10:HSUP:EAGC:TTIE 2ms`
'sets the processing duration to 2 ms.

*RST value	Resolution	SCPI
2ms	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSUPa:EAGCh:TTILength 0 ..10

Sets the number of configurable TTIs.

Example: `BB:W3GP:BST1:CHAN10:HSUP:EAGC:TTIE 2ms`
'sets the processing duration to 2 ms.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9..138>:HSDPa:TTIDistance 1 ... 16

The command selects the distance between two packets in HSDPA packet mode. The distance is set in number of sub-frames (3 slots = 2 ms). An **Inter TTI Distance** of 1 means continuous generation.

Example: `BB:W3GP:BST1:CHAN12:HSDP:TTID 2`
'selects an Inter TTI Distance of 2 subframes.

*RST value	Resolution	SCPI
5	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSUPa:EHICh:CTYPe SERVing | NOSERVing

The command selects the cell type.

Example: "SOUR:BB:W3GP:BST1:CHAN9:HSUP:ERGC:CTYP SERV
'selects the serving cell type.

*RST value	Resolution	SCPI
SERVing	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSUPa:EHICh:DTAU 0 ... 149

The command sets the offset of the downlink dedicated offset channels.

Example: "SOUR:BB:W3GP:BST1:CHAN12:HSUP:EHIC:DTAU 5
'selects the offset of the downlink dedicated offset channels.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSUPa:EHICh:ETAU ?

The command queries the offset of the P-CCPCH frame boundary.

The command is a query and therefore does not have an *RST value.

Example: "SOUR:BB:W3GP:BST1:CHAN12:HSUP:EHIC:ETAU?
'queries the offset of the P-CCPCH frame boundary.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSUPa:EHICh:RGPAttern <bit pattern>

The command sets the bit pattern for the ACK/NACK field.

Example: "SOUR:BB:W3GP:BST1:CHAN10:HSUP:EHIC:RGPA "+"
'sets the bit pattern to "+" (ACK).

*RST value	Resolution	SCPI
+	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSUPa:EHICh:SSINdex 0…39>

The command sets the value that identifies the user equipment. The values are defined in TS 25.211.

Example: "SOUR:BB:W3GP:BST1:CHAN9:HSUP:EHIC:SSIN 0
'sets the value to identify the user equipment.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSUPa:EHICh:TTIEdch 2ms | 10ms>

The command sets processing duration.

Example: "`SOUR:BB:W3GP:BST1:CHAN10:HSUP:EHIC:TTIE 2ms`
'sets the processing duration to 2 ms.

*RST value	Resolution	SCPI
2ms	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSUPa:ERGCh:CTYPe SERVing | NOSERVing

The command selects the cell type.

Example: "`SOUR:BB:W3GP:BST1:CHAN9:HSUP:ERGC:CTYP SERV`
'selects the serving cell type.

*RST value	Resolution	SCPI
SERVing	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSUPa:ERGCh:DTAU 0 … 149

The command sets the offset of the downlink dedicated offset channels.

Example: "`SOUR:BB:W3GP:BST1:CHAN12:HSUP:ERGC:DTAU 5`
'sets the offset of the downlink dedicated offset channels.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSUPa:ERGCh:ETAU ?

The command queries the offset of the P-CCPCH frame boundary.

The command is a query and therefore does not have an *RST value.

Example: "`SOUR:BB:W3GP:BST1:CHAN12:HSUP:ERGC:ETAU?`
'queries the offset of the P-CCPCH frame boundary.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSUPa:ERGCh:RGPAttern <bit pattern>

The command sets the bit pattern for the Relative Grant Pattern field.

Example: "`SOUR:BB:W3GP:BST1:CHAN10:HSUP:ERGC:RGPA` "-"
'sets the bit pattern to "-" (Down).

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSUPa:ERGCh:SSINdex 0…39>

The command sets the value that identifies the user equipment. The values are defined in TS 25.211.

Example: "`SOUR:BB:W3GP:BST1:CHAN9:HSUP:ERGC:SSIN 0`
'sets the value to identify the user equipment.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<9...138>:HSUPa:ERGCh:TTIEdch 2ms | 10ms>

The command sets processing duration.

Example: "`SOUR:BB:W3GP:BST1:CHAN10:HSUP:ERGC:TTIE 2ms`
'sets the processing duration to 2 ms.

*RST value	Resolution	SCPI
2ms	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<0|[1]...138>:POWer -80 dB... 0 dB

The command sets the channel power relative to the powers of the other channels. This setting also determines the starting power of the channel for Misuse TPC and Dynamic Power Control.

With the command `SOURce:BB:W3GPp:POWer:ADJust`, the power of all the activated channels is adapted so that the total power corresponds to 0 dB. This will not change the power ratio among the individual channels.

Example: `BB:W3GP:BST2:CHAN12:POW -10dB`
'sets the channel power of channel 12 of base station 2 to -10 dB relative to the power of the other channels.

*RST value	Resolution	SCPI
0 dB	0.01 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:CHANnel:PRESet

The command calls the default settings of the channel table.

This command triggers an event and therefore has no *RST value and no query form.

Example: `BB:W3GP:BST:CHAN:PRES`
'presets all channels of the base station.

*RST value	Resolution	SCPI
	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<5|9...138>:SFORmat <num_value>

The command sets the slot format of the selected channel. The value range depends on the selected channel.

Example: `BB:W3GP:BST2:CHAN12:SFOR 8`
'selects slot format 8 for channel 12 of base station 2.

*RST value	Res.	Dependency	SCPI
DPCH 8 S-CCPCH (`CHAN6`) 0 PDSCH (`CHAN10`) 0 DL-DPCCH (`CHAN11`) 0	-	The slot format determines the symbol rate (and thus the range of values for the channelization code), the TFCI state and the pilot length. If the value of any one of the four parameters is changed, all the other parameters will be adapted as necessary. In the case of enhanced channels with active channel coding, the selected channel coding also affects the slot format and thus the remaining parameters. If these parameters are changed, the channel coding type is set to user.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<0|[1]...138>:SRATe D7K5 | D15K | D30K | D60K | D120K | D240K | D480K | D960K

The command sets the symbol rate of the selected channel. The value range depends on the selected channel and the selected slot format.

Example: `BB:W3GP:BST2:CHAN12:SRAT D120K`
'sets the symbol rate for channel 12 of base station 2 to 120 ksps.

*RST value	Res.	Dependency	SCPI
DPCHs D30K CHAN1..10 D15K DL-DPCCH (`CHAN11`) D7K5	-	The slot format determines the symbol rate (and thus the range of values for the channelization code), the TFCI state and the pilot length. If the value of any one of the four parameters is changed, all the other parameters will be adapted as necessary. In the case of enhanced channels with active channel coding, the selected channel coding also affects the slot format and thus the remaining parameters. If these parameters are changed, the channel coding type is set to user.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<0|[1]...138>:STATe ON | OFF

The command activates the selected channel.

Example: `BB:W3GP:BST2:CHAN12:STAT OFF`
'deactivates channel 12 of base station 2.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<5|6|11...138>:TOFFset 0 ... 149

The command sets the timing offset. The timing offset defines the number of chips by which the absolute starting time of the frames (slot 0) is shifted relative to the start of the scrambling code sequence: T_{Offset} * 256 Chips. This procedure is used to reduce the crest factor.

Note:
For F-DPCH channels, the value range is 0 to 9.

Example: `BB:W3GP:BST2:CHAN12:TOFF 20`
'defines a frame shift relative to the scrambling code sequence of 20*256 chips.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:CHANnel<0|[1]...138>:TYPE PCPich | SCPich | PSCH | SSCH | PCCPch | SCCPch | PICH | APAich | AICH | PDSCh | DPCCh | DPCH | HSSCch | HSQPsk | HSQam | HS16Qam | HS64Qam | HSMimo | EAGCh | ERGCh | EHICh | FDPCh

The command selects the channel type.

The channel type is fixed for channel numbers 0 ... 8, for the remaining channel numbers, the choice lies between the relevant standard channels and the high-speed channels.

Example: `BB:W3GP:BST2:CHAN12:TYPE HSQP`
'selects channel type HS-PDS, QPSK for channel 12 of the channel table.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<2|3|4>:CMODe:DLFStructure A | B

The command selects the frame structure. The frame structure determines the transmission of TPC and pilot field in the transmission gaps.

Compressed Mode can be configured for base stations 2, 3 and 4.

Parameters:
AType A, the pilot field is sent in the last slot of each transmission gap.
BType B, the pilot field is sent in the last slot of each transmission gap. The first TPC field of the transmission gap is sent in addition.

Example: `BB:W3GP:BST2:CMOD:DLFS A`
'selects frame structure of type A.

*RST value	Resolution	SCPI
A	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<2|3|4>:CMODe:METHod HLSCheduling| PUNCturing| SF2

The command selects compressed mode method.

Compressed Mode can be configured for base stations 2, 3 and 4.

Parameters: **PUNCturing**
The data is compressed by reducing error protection.

HLSChedulingThe data is compressed by stopping the transmission of the data stream during the transmission gap.

SF2 The data is compressed by halving the spreading factor.

Example: `BB:W3GP:BST2:CMOD:METH HLSC`
'selects compressed mode method High Layer Scheduling.

*RST value	Resolution	SCPI
PUNCturing	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<2|3|4>:CMODe:PATTern<[1]|2>:TGD 3...100 slots

The command sets the transmission gap distances.

Compressed Mode can be configured for base stations 2, 3 and 4.

Example: `BB:W3GP:BST2:CMOD:PATT2:TGD 7`
'sets transmission gap distance of pattern 2 to 7 slots.

*RST value	Resolution	Dependencies	SCPI
15 slots	-	The transmission gap distances of the user equipment with the same suffix as the selected base station is set to the same value.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<2|3|4>:CMODe:PATTern<[1]|2>:TGL<[1]|2> 3...14 slots

The command sets the transmission gap lengths.

Compressed Mode can be configured for base stations 2, 3 and 4.

Example: `BB:W3GP:BST2:CMOD:PATT2:TGL1 4`
'sets transmission gap length of gap 1 of pattern 2 to 4 slots.

*RST value	Resolution	Dependencies	SCPI
3 slots	-	The transmission gap lengths of the user equipment with the same suffix as the selected base station are set to the same value.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<2|3|4>:CMODe:PATTern<[1]|2>:TGPL 1/0...100 frames

The command sets the transmission gap pattern lengths. Setting 0 is available only for pattern 2.

Compressed Mode can be configured for base stations 2, 3 and 4.

Example: `BB:W3GP:BST2:CMOD:PATT2:TGPL 7`
'sets transmission gap pattern length of pattern 2 to 7 frames.

*RST value	Resolution	Dependencies	SCPI
2 frames	-	The transmission gap pattern length of the user equipment with the same suffix as the selected base station is set to the same value.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BStation<2|3|4>:CMODe:PATTern<[1]|2>:TGSN slot 0...slot 14

The command sets the transmission gap slot number of pattern 1.

Compressed Mode can be configured for base stations 2, 3 and 4.

Example: `BB:W3GP:BST2:CMOD:PATT:TGSN 4`'sets slot number of pattern 1 to slot 4.

*RST value	Resolution	Dependencies	SCPI
Slot 7	-	The slot numbers of the user equipment with the same suffix as the selected base station are set to the same value.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BStation<2|3|4>:CMODe:POMode AUTO | USER

The command selects the power offset mode.

Compressed Mode can be configured for base stations 2, 3 and 4.

Parameters:

AUTO The power offset is obtained by pilot bit ratio as follows: Number of pilots bits of non-compressed slots/Number of pilot bits by compressed slots.

USER The power offset is defined by command `:BB:W3GP:BSTation<2|3|4>CMODe:POFFset`.

Example: `BB:W3GP:BST2:CMOD:POFF 4`
'sets the power offset value to 4 dB.

`BB:W3GP:BST2:CMOD:POM USER`
'selects power offset mode USER, the power offset is set to 4 dB.

*RST value	Resolution	SCPI
AUTO	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BStation<2|3|4>:CMODe:POFFset 0 dB...10 dB

The command sets the power offset for mode USER.

Compressed Mode can be configured for base stations 2, 3 and 4.

Example: `BB:W3GP:BST2:CMOD:POFF 4`
'sets the power offset value to 4 dB.

`BB:W3GP:BST2:CMOD:POM USER`
'selects power offset mode USER, the power offset is set to 4 dB.

*RST value	Resolution	SCPI
0 dB	0.01 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BStation<2|3|4>:CMODe:STATe ON | OFF

The command activates/deactivates the compressed mode.

Compressed Mode can be activated for base stations 2, 3 and 4.

Example: `BB:W3GP:BST2:CMOD:STAT ON`
'activates compressed mode for base station 2.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:DCONflict:RESolve

The command resolves existing domain conflicts by modifying the Channelization Codes of the affected channels.

The command is an event and therefore does not have an *RST value and a query form.

Example: `BB:W3GP:BST2:DCON:STAT?`
'queries whether a code domain conflict exists for base station 2.

'Response: "`1`
'there is a conflict.

`BB:W3GP:BST2:DCON:RES`
'resolves the code domain error by modifying the Channelization codes of the affected channels.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:DCONflict[:STATe]?

The command queries whether there is (response 1) or is not (response 0) a conflict (overlap) in the hierarchically-structured channelization codes. The cause of a possible domain conflict can be ascertained by manual operation in the **Code Domain** submenu (main menu 3GPP FDD).

The command is a query and therefore does not have an *RST value.

Example: `BB:W3GP:BST2:DCON:STAT?`
'queries whether a code domain conflict exists for base station 2.

"Response: "`0`
'there is no conflict.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:ENHanced:PCPich:PATTern ANT1 |ANT2

Sets the P-CPICh pattern (channel 0).

Example: `BB:W3GP:BST2:ENH:PCP:PATT ANT2`
'sets the P-CPICH Pattern to Antenna 2.

*RST value	Resolution	SCPI
ANT1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:OCNS:STATe ON | OFF

The command activates OCNS channels, as defined in the standard.

Three different OCNS scenarios are defined in the standard; one standard scenario and two scenarios for testing HSDPA channels. The required scenario can be selected with the command `:BB:W3GP:BST:OCNS:MODE`.

Example: `BB:W3GP:BST:OCNS:MODE STAN`
'selects the standard scenario.

`BB:W3GP:BST:OCNS:STAT ON`
'activates the OCNS channels with the settings defined in the standard.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:OCNS:MODE STANdard | HSDPa | HSDP2

The command selects the scenario for setting the OCNS channels.

Three different OCNS scenarios are defined in the standard; one standard scenario and two scenarios for testing HSDPA channels.

Example: `BB:W3GP:BST:OCNS:MODE HSDP`
'selects the scenario for testing the high-speed channels.

`BB:W3GP:BST:OCNS:STAT ON`
'activates the OCNS channels with the settings defined in the standard.

*RST value	Resolution	SCPI
STANdard	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:OLTDiversity ON | OFF

Activates/deactivates open loop transmit diversity.
The antenna whose signal is to be simulated is selected with the command `BB:W3GP:BST:TDIV`.

Example: `BB:W3GP:BST2:TDIV ANT2`
'calculates and applies the output signal for antenna 2 of one two-antenna system.

`BB:W3GP:BST2:OLTD ON`
'enables open loop transmit diversity.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:PINDicator:COUNt D18 | D36 | D72 | D144

The command sets the number of page indicators (PI) per frame in the page indicator channel (PICH).

Example: `BB:W3GP:BST2:PIND:COUN D36`
'sets the number of page indicators (PI) per frame in the page indicator channel (PICH) to 36.

*RST value	Resolution	SCPI
D18	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:PRESet

The command produces a standardized default for all the base stations. The settings correspond to the *RST values specified for the commands.

This command triggers an action and therefore has no *RST value and no query form.

Example: `BB:W3GP:BST:PRES`
'resets all the base station settings to default values.

*RST value	Resolution	Dependencies	SCPI
-	-	All base station settings are preset. An overview is provided by Table in Chapter 4.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:SCODe #H0...#H5FFF

The command sets the identification for the base station. This value is simultaneously the initial value of the scrambling code generator.

Example: `BB:W3GP:BST2:SCOD #H5FFF`
'sets scrambling code #HFFF.

*RST value	Resolution	SCPI
#H0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:SCODe:STATe ON | OFF

The command makes it possible to deactivate base station scrambling for test purposes.

Example: `BB:W3GP:BST2:SCOD:STAT OFF`
'deactivates scrambling for base station 2.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:SCPich:PREFerence[:STATe] ON | OFF

The command activates or deactivates the use of S-CPICH as reference phase.

Example: `BB:W3GP:BST2:SCP:PREF ON`
'activates the use of S-CPICH as reference phase for base station 2.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:SSCG?

The command queries the secondary synchronization code group. This parameter is specified in the table defined by the 3GPP standard "Allocation of SSCs for secondary SCH". This table assigns a specific spreading code to the synchronization code symbol for every slot in the frame. The value is calculated from the scrambling code.

The command is a query command and therefore does not have an *RST value.

Example: `BB:W3GP:BST2:SSCG?`
'queries the 2nd search code group for base station 2.

Response: `"24`
'the base station is part of second search group 24.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:STATe ON | OFF

The command activates and deactivates the specified base station.

Example: `BB:W3GP:BST2:STAT OFF`
'deactivates base station 2.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<2|3|4>:TDELay 0 ... 38400 chips

The command sets the time shift of the selected base station compared to base station 1 in chips.

The command is only valid for base stations 2, 3 and 4. So a suffix must be specified at BSTation (2, 3, or 4).

Example: `BB:W3GP:BST2:TDEL 256`
'shifts base station 2 by 256 chips compared to base station 1.

*RST value	Resolution	SCPI
0		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation<[1]|2|3|4>:TDIVersity OFF| ANT1 | ANT2

Selects the antenna and the antenna configuration to be simulated.

The R&S Signal Generator supports two antenna configurations: a single-antenna system and a two-antenna system.
Thus, an instrument equipped with two paths can simulate simultaneously the signals of both antennas of one two-antenna system.
Moreover, for this two-antenna system, transmit diversity can be additionally activated or deactivated.

To simulate transmit diversity, a two-antenna system has to be selected and Open Loop Transmit Diversity has to be activated (command `BB:W3GP:BST:OLTD ON`).

Parameters:

OFF The signal of single-antenna system is calculated and applied. No transmit diversity is possible.

ANT1 Calculates and applies the output signal for antenna 1 of a two-antenna system.

ANT2 Calculates and applies the output signal for antenna 2 of a two-antenna system.

Example: `BB:W3GP:BST2:TDIV ANT2`
'the signal of antenna 2 of one two-antenna system is simulated.

*RST value	Resolution	SCPI
OFF	-	Device-specific

SOURce-W3GPp - Enhanced Channels of Base Station 1

The SOURce:BB:W3GPp:BSTation:ENHanced subsystem contains the commands for setting the enhanced channels of base station 1. The commands of this system only take effect when the 3GPP FDD standard is activated, the uplink transmission direction is selected, base station 1 is enabled and enhanced channels are activated:

```
SOURce:BB:W3GPp:STATe ON
SOURce:BB:W3GPp:LINK UP
SOURce:BB:W3GPp:BST1:STATe ON
SOURce:BB:W3GPp:BST:ENHanced:CHANnel<11...13>:DPCH:STATe ON
```

or

```
SOURce:BB:W3GPp:BST:ENHanced:PCCPch:STATe ON
```

Command	Parameters	Def. unit	Comments
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:CCODing:BPFRame?			Query only
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:CCODing:SFORmat	0...16		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:CCODing:SRATe?			Query only
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:CCODing:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:CCODing:TYPE	M12K2| M64K| M144k| M384k | AMR | BTFD1 | BTFD2 | BTFD3		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:CCODing:USER:CATalog?			Query only
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel:DPCH:CCODing:USER:DELete	<u_coding>		No query
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:CCODing:USER:LOAD	<u_coding>		No query
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:CCODing:USER:STORe	<u_coding>		No query
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11..13>:DPCH:CLTDiversity:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DERRor:BIT:LAYer	TRANsport | PHYSical		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DERRor:BIT:RATE	1E-7...5E-1		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DERRor:BIT:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DERRor:BLOCk:RATE	1E-4....5E-1		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DERRor:BLOCk:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DPControl:DIRection	UP | DOWN		

Command	Parameters	Def. unit	Comments
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DPControl:MODE	EXTernal | TPC | MANual		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DPControl[:POWer]			Query only
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DPControl:RANGe:DOWN	0.0 ...30.0dB		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DPControl:RANGe:UP	0.0 ...30.0dB		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DPControl:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DPControl:STEP[:EXTernal]	0.5... 6.0dB		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DPControl:STEP:MANual	MAN0 | MAN1		No query
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:INTerleaver2	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TCHannel<0|[1]...6>:CRCSize	NONE | 8| 12| 16 | 24		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TCHannel<0|[1]...6>:DATA	PN9 | PN15 | PN16 | PN20| PN21 | PN23 | DLISt | ZERO | ONE | PATTern		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TCHannel<0|[1]...6>:DATA:DSELect	<data_list>		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TCHannel<0|[1]...6>:DATA:PATTern	#B0,1...#B11...1,64		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TCHannel<0|[1]...6>:DTX	0 ... 1024		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TCHannel<0|[1]...6>:EPRotection	NONE | TURBo3 | CON2 |CON3		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TCHannel<0|[1]...6>:INTerleaver	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TCHannel<0|[1]...6>:RMATtribute	16 ... 1024		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TCHannel<0|[1]...6>:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TCHannel<0|[1]...6>:TBCount			
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TCHannel<0|[1]...6>:TBSize	0 ... 4096		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TCHannel<0|[1]...6>:TTINterval	10ms | 20ms | 40ms	s	
[SOURce<[1]|2>:]BB:W3GPp:BSTation[:ENHanced]:CHANnel:HSDPa:DERRor:BIT:LAYer	TRANsport | PHYSical		
[SOURce<[1]|2>:]BB:W3GPp:BSTation[:ENHanced]:CHANnel:HSDPa:DERRor:BIT:RATE	10E-7 ... 10E-1		

Command	Parameters	Def. unit	Comments
[SOURce<[1]|2>:]BB:W3GPp:BSTation[:ENHanced]:CHANnel:HSDPa:DERRor:BIT:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation[:ENHanced]:CHANnel:HSDPa:DERRor:BLOCk:RATE	10E-4 ... 10E-1		
[SOURce<[1]|2>:]BB:W3GPp:BSTation[:ENHanced]:CHANnel:HSDPa:DERRor:BLOCk:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:PCCPch:CCODing:INTerleaver<[1]|2>	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:PCCPch:CCODing:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:PCCPch:CCODing:TYPE	M12K2 | M64K | M144K | M384K | AMR		

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:CCODing:BPFRame?

The command queries the number of data bits in the DPDCH component of the frame at the physical layer. The number of data bits depends on the slot format.

The command is a query command and therefore does not have an *RST value.

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:CCOD:BPFR?`
'queries the number of data bits.

Response: 1'the number of data bits is 1.

*RST value	Resolution	Dependencies	SCPI
-	-	The value returned depends on the selected slot format (`W3GPp:BST:ENH:CHAN<n>:DPCH:SFOR`), and if the slot format changes, this changes automatically as well.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:CCODing:SFORmat 0 ... 16

The command sets the slot format for the selected enhanced DPCH of base station 1. The slot format is fixed for channel-coded measurement channels conforming to the standard - "Reference Measurement Channel". Changing the slot format automatically activates User coding (`W3GP:BST:ENH:CHAN<11...13>:DPCH:CCOD:TYPE USER`). The slot format also fixes the symbol rate, bits per frame, pilot length and TFCI state parameters.

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:CCOD:SFOR 4`
'sets slot format 4 for Enhanced DPCH13.

*RST value	Res.	Dependencies	SCPI
8	-	When a channel coding type conforming to the standard is selected (`W3GP:BST:ENH:CHAN:DPCH:CCOD:TYPE`) and channel coding is activated, the slot format is (`W3GP:BST:ENH:CHAN:DPCH:CCOD:STAT`) automatically set to the associated value. Changing the slot format automatically activates User coding (`W3GP:BST:ENH:CHAN<11...13>:DPCH:CCOD:TYPE USER`). The command sets the symbol rate (`W3GP:BST:ENH:CHAN:DPCH:CCOD:SRAT`), the bits per frame (`W3GP:BST:ENH:CHAN:DPCH:CCOD:BPFR`), the pilot length (`W3GP:BST1:CHAN:DPCC:PLEN`), and the TFCI state (`W3GP:BST1:CHAN:DPCC:TFCI STAT`) to the associated values.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:CCODing:SRATe?

The command queries the symbol rate.

The command is a query command and therefore does not have an *RST value.

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:CCOD:SRAT?`
'queries the symbol rate.

Response: 'D30K"the symbol rate of Enhanced DPCH 13 is 30 ksps.

*RST value	Resolution	Dependencies	SCPI
-	-	The symbol rate depends on the selected slot format (`:BB:W3GPp:BST:ENH:CHAN:DPCH:SFOR`), and if the slot format changes, this changes automatically as well.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:CCODing:STATe ON | OFF

The command activates or deactivates channel coding for the selected enhanced DPCH.

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:CCOD:TYPE M12K2`
'selects channel coding type RMC 12.2 kbps for Enhanced DPCH 13.

`BB:W3GP:BST:ENH:CHAN13:DPCH:CCOD:STAT ON`
'activates channel coding.

*RST value	Res.	Dependency	SCPI
OFF	-	When channel coding is activated and a channel coding type conforming to the standard is selected, (`BB:W3GP:BST:ENH:CHAN:DPCH:CCOD:TYPE`) the slot format, (`BB:W3GP:BST:ENH:CHAN:DPCH:CCOD:SFOR`) and thus the symbol rate, (`BB:W3GP:BST:ENH:CHAN:DPCH:CCOD:SRAT`) the bits per frame, (`BB:W3GP:BST:ENH:CHAN:DPCH:CCOD:BPFR`), the pilot length (`BB:W3GP:BST1:CHAN:DPCC:PLEN`) and the TFCI state (`BB:W3GP:BST1:CHAN:DPCC:TFCI STAT`) are set to the associated values.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:CCODing:TYPE M12K2 | M64K | M144k | M384k| AMR | BTFD1 | BTFD2 | BTFD3

The command selects the channel coding scheme in accordance with the 3GPP specification.

The 3GPP specification defines 4 reference measurement channel coding types, which differ in the input data bit rate to be processed (12.2, 64, 144 and 384 ksps). The additional AMR CODER coding scheme generates the coding of a voice channel.

Parameters:

M12K2 Measurement channel with an input data bit rate of 12.2 ksps.

M64K Measurement channel with an input data bit rate of 64 ksps.

M144k Measurement channel with an input data bit rate of 144 ksps.

M384k Measurement channel with an input data bit rate of 384 ksps.

AMRChannel coding for the AMR Coder (coding a voice channel).

USER

This parameter cannot be set. USER is returned whenever a user-defined channel coding is active, that is to say, after a channel coding parameter has been changed or a user coding file has been loaded. The file is loaded by the command `:BB:W3GP:BST:ENH:CHAN:DPCH:CCOD:USER:LOAD`.

BTFD1

Blind Transport Format Detection Rate 1 (12.2 kbps).

BTFD2

Blind Transport Format Detection Rate 2 (7.95 kbps).

BTFD3

Blind Transport Format Detection Rate 3 (1.95 kbps).

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:CCOD:TYPE M144`
'selects channel coding scheme RMC 144 kbps.

*RST value	Dependency	SCPI
M12K2	When a channel coding type conforms to the standard and channel coding is activated, (`:BB:W3GP:BST:ENH:CHAN<n>:DPCH:CCOD:STAT`) the slot format (`:BB:W3GP:BST:ENH:CHAN<n>:DPCH:CCOD:SFOR`) and thus the symbol rate (`:BB:W3GP:BST:ENH:CHAN<n>:DPCH:CCOD:SRAT`) the bits per frame, (`:BB:W3GP:BST:ENH:CHAN<n>:DPCH:CCOD:BPFR`), the pilot length (`:BB:W3GP:BST1:CHAN<n>:DPCC:PLEN`) and the TFCI state (`:BB:W3GP:BST1:CHAN<n>:DPCC:TFCI:STAT`) are set to the associated values.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel:DPCH:CCODing:USER:CATalog?

The command queries existing files with stored user channel codings.

The files are stored with the fixed file extensions ***.3g_ccod_dl** in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`.

The numerical suffix at CHANnel must not be used for this command.

Example: `"MMEM:CDIR 'D:\Lists\Wcdma\CcodDpchUser'`
'selects the directory for the user channel coding files.

`BB:W3GP:BST:ENH:CHAN:DPCH:CCOD:USER:CAT?`
'queries the existing files with user coding.

Response: `"'user_cc1'`
'there is one file with user coding.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel:DPCH:CCODing:USER:DELete <user_coding>

The command deletes the specified files with stored user channel codings.

The files are stored with the fixed file extensions ***.3g_ccod_dl** in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

The numerical suffix at CHANnel must not be used for this command.

The command triggers an event and therefore has no query form and no *RST value.

Example: `"MMEM:CDIR 'D:\Lists\Wcdma\CcodDpchUser'`
'selects the directory for the user channel coding files.

`BB:W3GP:BST:ENH:CHAN:DPCH:CCOD:USER:DEL 'user_cc1'`
'deletes the specified file with user coding.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:CCODing:USER:LOAD <user_coding>

The command loads the specified files with stored user channel codings.

The files are stored with the fixed file extensions ***.3g_ccod_dl** in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

The command triggers an event and therefore has no query form and no *RST value.

Example: `"MMEM:CDIR 'D:\Lists\Wcdma\CcodDpchUser'`
'selects the directory for the user channel coding files.

`BB:W3GP:BST:ENH:CHAN13:DPCH:CCOD:USER:LOAD 'user_cc1'`
'loads the specified file with user coding.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:CCODing:USER:STORe <user_coding>

The command saves the current settings for channel coding as user channel coding in the specified file.

The files are stored with the fixed file extensions ***.3g_ccod_dl** in a directory of the user's choice. The directory in which the file is stored is defined with the command `MMEMory:CDIR`. To store the files in this directory, you only have to give the file name, without the path and the file extension.

The numerical suffix at CHANnel has no significance for this command.

The command triggers an event and therefore has no query form and no *RST value.

Example: "MMEM:CDIR 'D:\Lists\Wcdma\CcodDpchUser'
'selects the directory for the user channel coding files.

BB:W3GP:BST:ENH:CHAN13:DPCH:CCOD:USER:STOR 'user_cc1'
'saves the current channel coding setting in file user_cc1 in directory D:\Lists\Wcdma\CcodDpchUser.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:CLTDiversity:STATe ON | OFFßON | OFF

Enables/disables Closed Loop Transmit Diversity.

Example: BB:W3GP:BST:ENH:CHAN11:DPCH:CCLTD:STAT ON
'enables Closed Loop Transmit Diversity for channel 11.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DERRor:BIT:LAYer TRANsport | PHYSical

The command selects the layer in the coding process in which bit errors are inserted.

Parameters: **TRANsport**Transport Layer (Layer 2). This layer is only available when channel coding is active.

PHYSicalPhysical layer (Layer 1).

Example: BB:W3GP:BST:ENH:CHAN13:DPCH:DERR:BIT:LAY PHYS
'selects layer 1 for entering bit errors.

*RST value	Resolution	SCPI
PHYSical	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DERRor:BIT:RATE 1E-7 ... 5E-1

The command sets the bit error rate.

Example: BB:W3GP:BST:ENH:CHAN13:DPCH:DERR:BIT:RATE 1E-4
'sets a bit error rate of 0.0001.

*RST value	Resolution	SCPI
5E-3	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DERRor:BIT:STATe ON | OFF

The command activates bit error generation or deactivates it.

Bit errors are inserted into the data fields of the enhanced channels. When channel coding is active, it is possible to select the layer in which to insert the errors (the physical or the transport layer, `SOUR:BB:W3GP:BST:ENH:CHAN13:DPCH:DERR:BIT:LAY`). When the data source is read out, individual bits are deliberately inverted at random points in the data bit stream at the specified error rate in order to simulate an invalid signal.

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:DERR:BIT:STAT ON`
'activates bit error generation.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DERRor:BLOCk:RATE 1E-4 ... 5E-1

The command sets the block error rate.

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:DERR:BLOC:RATE 1E-2`
'sets the block error rate to 0.01.

*RST value	Resolution	SCPI
5E-1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DERRor:BLOCk:STATe ON | OFF

The command activates or deactivates block error generation. Block error generation is only possible when channel coding is activated.

During block error generation, the CRC checksum is determined and then the last bit is inverted at the specified error probability in order to simulate a defective signal.

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:CCOD:STAT ON`
'activates channel coding.

`BB:W3GP:BST:ENH:CHAN13:DPCH:DERR:BLOC:RATE 5E-1`
'sets the block error rate to 0.1.

`BB:W3GP:BST:ENH:CHAN13:DPCH:DERR:BLOC:STAT ON`
'activates block error generation.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DPControl:DIRection UP | DOWN

The command selects the Dynamic Power Control direction. The selected mode determines if the channel power is increased (`UP`) or decreased (`DOWN`) by a control signal with high level.

Example: `BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:DIR UP`
'selects mode up, a high level of the control signals leads to an increase of the channel power of DPCH 11.

*RST value	Resolution	SCPI
UP	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DPControl:MODE EXTernal | TPC | MANual

The command selects the control signal source for Dynamic Power Control.

Example: `BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:MODE EXT`
'selects external power control. The control signal is supplied via the LEV ATT input of the AUX I/O connector.

*RST value	Resolution	SCPI
EXT	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DPControl[:POWer]?

The command queries the deviation of the channel power (∆POW) from the set power start value of the corresponding enhanced channels.

The command is a query command and therefore does not have an *RST value.

Example: `BB:W3GP:BST:ENH:CHAN11:DPCH:DPC?`
'queries the deviation of the channel power of DPCH 11.

*RST value	Resolution	SCPI
	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DPControl:RANGe:DOWN 0 dB ... 30 dB

The command selects the dynamic range for ranging down the channel power.

Example: `BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:RANG:DOWN 20 dB`
'selects a dynamic range of 20 dB for ranging down the channel power of DPCH 11.

*RST value	Resolution	SCPI
10 dB	0.01 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DPControl:RANGe:UP 0 dB ... 30 dB

The command selects the dynamic range for ranging up the channel power.

Example: `BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:RANG:UP 20 dB`
'selects a dynamic range of 20 dB for ranging up the channel power of DPCH 11.

*RST value	Resolution	SCPI
10 dB	0.01 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DPControl:STATe ON | OFF

The command activates/deactivates Dynamic Power Control.

Example: `BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:STAT ON`
'activates Dynamic Power Control for DPCH 11.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DPControl:STEP [:EXTernal] 0.5 dB ... 6.0 dB

This command sets step width by which – with Dynamic Power Control being switched on - the channel power of the selected enhanced channel is increased or decreased.

Example: `BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:DIR UP`
'selects direction up, a high level of the control signals leads to an increase of the channel power of DPCH 11.

`BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:RANG:UP 10 dB`
'selects a dynamic range of 10 dB for ranging up the channel power of DPCH 11.

`BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:RANG:DOWN 10 dB`
'selects a dynamic range of 10 dB for ranging down the channel power of DPCH 11.

`BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:STEP 0.5 dB`
'selects a step width of 0.5 dB. A high level of the control signal leads to an increase of 0.5 dB of the channel power, a low level to a decrease of 0.5 dB. The overall increase and decrease of channel power is limited to 10 dB each.

`BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:MODE EXT`
'selects external power control.

`BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:STAT ON`
'activates Dynamic Power Control for DPCH 11.

*RST value	Resolution	SCPI
1 dB	0.01 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:DPControl:STEP:MANual MAN0 | MAN1

This command provides the control signal for manual mode of Dynamic Power Control.

Example:

`BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:DIR UP`
'selects direction up, a high level of the control signals leads to an increase of the channel power of DPCH 11.

`BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:RANG:UP 10 dB`
'selects a dynamic range of 10 dB for ranging up the channel power of DPCH 11.

`BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:RANG:DOWN 10 dB`
'selects a dynamic range of 10 dB for ranging down the channel power of DPCH 11.

`BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:STEP 0.5 dB`
'selects a step width of 0.5 dB. A high level of the control signal leads to an increase of 0.5 dB of the channel power, a low level to a decrease of 0.5 dB. The overall increase and decrease of channel power is limited to 10 dB each.

`BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:MODE MAN`
'selects manual power control.

`BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:STAT ON`
'activates Dynamic Power Control for DPCH 11.

`BB:W3GP:BST:ENH:CHAN11:DPCH:DPC:STEP:MAN MAN0`
'the power is decreased by 0.5 dB.

*RST value	Resolution	SCPI
MAN1		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:INTerleaver2 ON | OFF

The command activates or deactivates channel coding interleaver state 2 for the selected channel.

Interleaver state 2 is activated or deactivated for all the transport channels together. Interleaver state 1 can be activated and deactivated for each transport channel individually (command `SOUR:BB:W3GP:BST[1]:ENH:CHAN<n>:DPCH:TCH<n>:INT`).

Note:
The interleaver states do not cause the symbol rate to change.

Example

`BB:W3GP:BST:ENH:CHAN13:DPCH:INT OFF`
'deactivates channel coding interleaver state 2 for all the TCHs of DPCH13.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:STATe ON | OFF

The command switches the selected channel to the enhanced state.

Example:

`BB:W3GP:BST:ENH:CHAN13:DPCH:STAT ON`
'switches DPCH 13 to Enhanced State.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TChannel<0|[1]...6>:CRCSize NONE | 8 | 12 | 16 | 24

The command defines the CRC length for the selected transport channel. It is also possible to deactivate checksum determination.

***Note:** The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.*

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:TCH0:CRCS NONE`
'deactivates checksum determination for the DCCH of DPCH13.

*RST value	Resolution	SCPI
16	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TChannel<0|[1]...6>:DATA PN9 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | ZERO | ONE | PATTern

The command determines the data source for the data fields of enhanced channels with channel coding. If channel coding is not active, the DPCH data source is used (`:SOURce:BB:W3GPp:BST:CHANnel:DATA`).

***Note:** The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.*

Parameters:

PNxx The pseudo-random sequence generator is used as the data source. Different random sequence lengths can be selected.

DLISt A data list is used. The data list is selected with the command `:BB:W3GPp:BST:ENH:CHAN:DPCH:TCH:DATA:DSEL`.

ZERO | ONE Internal 0 and 1 data is used.

PATTern Internal data is used The bit pattern for the data is defined with the command `:BB:W3GPp:BST:ENH:CHAN:DPCH:TCH: DATA:PATT`.

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1:DATA PATT`
'selects the Pattern data source for the data fields of DTCH1 of DPCH13. The bit pattern is defined with the following command.

`BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1:DATA:PATT #H3F,8`
'defines the bit pattern.

*RST value	Resolution	SCPI
PN9	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BStation:ENHanced:CHANnel<11...13>:DPCH:TChannel<0|[1]...6>: DATA:DSELect <data list name>

The command selects the data list for enhanced channels for the DLISt selection.

The files are stored with the fixed file extensions ***.dm_iqd** in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

Note:*The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.*

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1:DATA DLIS`
'selects the Data Lists data source for DTCH1 of DPCH13.

`"MMEM:CDIR 'D:\Lists\Dm\IQData'`
'selects the directory for the data lists.

`BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1:DATA:DSEL 'bts_tch'`
'selects the file '`bts_tch`' as the data source.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BStation:ENHanced:CHANnel<11...13>:DPCH:TChannel<0|[1]...6>: DATA:PATTern #B0,1 ... #B111..1, 64

The command determines the bit pattern for the PATTern selection. The maximum length is 64 bits.

Note:*The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.*

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1:DATA:PATT #H3F, 8`
'defines the bit pattern.

*RST value	Resolution	SCPI
#H0, 1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BStation:ENHanced:CHANnel<11...13>:DPCH:TChannel<0|[1]...6>: DTX 0 ... 1024

The command sets the number of DTX (Discontinuous Transmission) bits. These bits are entered in the data stream between rate matching and interleaver 1 and used for the BTFD reference measurement channels rate 2 and rate 3.

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1:DTX 257`
'257 bits are entered in the data stream between rate matching and interleaver 1.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TChannel<0|[1]...6>:EPRotection NONE | TURBo3 | CON2 | CON3

The command determines the error protection.

Note:
The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.

Parameters: **NONE**No error protection

TURBo3 Turbo Coder of rate 1/3 in accordance with the 3GPP specifications.

CON2 | CON3 Convolution Coder of rate ½ or 1/3 with generator polynomials defined by 3GPP.

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1:EPR NONE`
'error protection for transport channel DTCH1 of DPCH13 is deactivated.

*RST value	Resolution	SCPI
CON3	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TChannel<0|[1]...6>:INTerleaver ON | OFF

The command activates or deactivates channel coding interleaver state 1 for the selected channel.

Interleaver state 1 can be activated and deactivated for each transport channel individually. The channel is selected via the suffix at TCHannel.

Interleaver state 2 can only be activated or deactivated for all the transport channels together. `SOUR:BB:W3GP:BST:ENH:CHAN<n>:DPCH:INT`).

Note:*The interleaver states do not cause the symbol rate to change.*
The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.

Example `BB:W3GP:BST:ENH:CHAN13:DPCH:TCH5:INT OFF`
'deactivates channel coding interleaver state 1 for DTCH5 of DPCH13.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TChannel<0|[1]...6>:RMATtribute 16 ... 1024

The command sets data rate matching (Rate Matching).

Note:*The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.*

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1:RMAT 1024`
'sets the rate matching attribute for DTCH1 of DPCH13 to 1024.

*RST value	Resolution	SCPI
256	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TCHannel<0|[1]...6>:STATe ON | OFF

The command activates/deactivates the selected transport channel.

Note: *The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.*

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1:STAT ON`
'activates DTCH1 of DPCH13.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TCHannel<0|[1]...6>:TBCount 1 ... 16

The command defines the number of blocks used for the selected transport channel.

Note: *The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.*

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:TCH:TBC 4`
'sets 4 transport blocks for DTCH1 of DPCH13.

*RST value	Resolution	SCPI
4	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TCHannel<0|[1]...6>:TBSize 0 - 4096

The command sets the size of the data blocks.

Note: *The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.*

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:TCH:TBS 1024`
'sets the length of the transport blocks for DTCH1 of DPCH13 to 1024.

*RST value	Resolution	SCPI
100	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:CHANnel<11...13>:DPCH:TCHannel<0|[1]...6>:TTINterval 10MS | 20MS | 40MS

The command sets the number of frames into which a TCH is divided. This setting also defines the interleaver depth.

***Note:** The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.*

Example: `BB:W3GP:BST:ENH:CHAN13:DPCH:TCH1:TTIN 20ms`
'sets that DTCH1 of DPCH13 is divided into 2 frames.

*RST value	Resolution	SCPI
40MS	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation[:ENHanced]:CHANnel12:HSDPa:DERRor:BIT:LAYer TRANsport | PHYSical

The command selects the layer in the coding process in which bit errors are inserted.

Parameters: **TRANsport** Transport Layer (Layer 2)

PHYSical Physical layer (Layer 1)

Example: `BB:W3GP:BST:ENH:CHAN12:HSDP:DERR:BIT:LAY PHYS`
'selects layer 1 for entering bit errors.

*RST value	Resolution	SCPI
PHYSical	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation[:ENHanced]:CHANnel12:HSDPa:DERRor:BIT:RATE 1E-7 to 5E-1

The command sets the bit error rate.

Example: `BB:W3GP:BST:ENH:CHAN12:HSDP:DERR:BIT:RATE 1E-4`
'sets a bit error rate of 0.0001.

*RST value	Resolution	SCPI
5E-3	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation[:ENHanced]:CHANnel12:HSDPa:DERRor:BIT:STATe ON | OFF

The command activates bit error generation or deactivates it.

Bit errors are inserted into the data stream of the coupled HS-PDSCHs. It is possible to select the layer in which the errors are inserted (physical or transport layer). When the data source is read out, individual bits are deliberately inverted at random points in the data bit stream at the specified error rate in order to simulate an invalid signal.

Example: `BB:W3GP:BST:ENH:CHAN12:HSDP:DERR:BIT:STAT ON`
'activates bit error generation.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation[:ENHanced]:CHANnel12:HSDPa:DERRor:BLOCk:RATE 1E-4 ... 5E-1

The command sets the block error rate.

Example: `BB:W3GP:BST:ENH:CHAN12:HSDP:DERR:BLOC:RATE 1E-2`
'sets the block error rate to 0.01.

*RST value	Resolution	SCPI
5E-1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation[:ENHanced]:CHANnel12:HSDPa:DERRor:BLOCk:STATe ON | OFF

The command activates or deactivates block error generation. During block error generation, the CRC checksum is determined and then the last bit is inverted at the specified error probability in order to simulate a defective signal.

Example: `BB:W3GP:BST:ENH:CHAN12:HSDP:DERR:BLOC:RATE 5E-1`
'sets the block error rate to 0.1.

`BB:W3GP:BST:ENH:CHAN12:HSDP:DERR:BLOC:STAT ON`
'activates block error generation.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:PCCPch:CCODing:INTerleaver<[1]|2> ON | OFF

The command activates or deactivates channel coding interleaver state 1 or 2 for the P-CCPCH.

Note: *The interleaver states do not cause the symbol rate to change.*

Example: `BB:W3GP:BST:ENH:PCCP:CCOD:INT1 OFF`
'deactivates channel coding interleaver state 1 for the P-CCPCH.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:PCCPch:CCODing:STATe ON | OFF

The command activates or deactivates channel coding for the enhanced P-CCPCH. The coding scheme of the P-CCPCH (BCH) is defined in the standard.

Example: `BB:W3GP:BST:ENH:PCCP:CCOD:STAT ON`
'activates channel coding for the enhanced P-CCPCH.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:PCCPch:CCODing:TYPE?

The command queries the channel coding scheme in accordance with the 3GPP specification. The coding scheme of the P-CCPCH (BCH) is defined in the standard. The channel is generated automatically with the counting system frame number (SFN). The system information after the SFN field is completed from the selected data source.

The command is a query command and therefore does not have an *RST value.

Example: `BB:W3GP:BST:ENH:PCCP:CCOD:TYPE?`
'queries the channel coding scheme of the P-CCPCH.

Response: `'BCHS'`'the channel coding scheme with SFN is used.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:BSTation:ENHanced:PCCPch:STATe ON | OFF

The command activates or deactivates the enhanced state of the P-CCPCH (BCH).

Example: `BB:W3GP:BST:ENH:PCCP:STAT ON`
'switches the P-CCPCH to Enhanced State.

*RST value	Resolution	SCPI
OFF	-	Device-specific

SOURce-W3GPp - User Equipment Settings

The SOURce:BB:W3GPp:MSTation system contains commands for setting the user equipment. The commands of this system only take effect when the 3GPP FDD standard is activated, the UP transmission direction is selected and the particular user equipment is enabled:

```
SOURce:BB:W3GPp:STATe ON
SOURce:BB:W3GPp:LINK UP
SOURce:BB:W3GPp:MSTation2:STATe ON
```

The commands for setting the enhanced channels of user equipment 1 are described in the following section.

Command	Parameters	Def. unit	Comments
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ADDitional:COUNt	1...128		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ADDitional:POWer:OFFSet	-80dB ... 0dB	dB	
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ADDitional:SCODe:STEP	#H0...#HFFFFFF		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ADDitional:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ADDitional:TDELay:STEP	1chip...1 frame	chips	
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:CHANnel<[1]...6>:DPDCh:CCODe?			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:CHANnel<[1]...6>:DPDCh:DATA	PN9 | PN15 | PN16 | PN20 | PN21 | PN23 | ZERO | ONE | DLISt | PATTern		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:CHANnel<[1]...6>:DPDCh:DATA:DCCH	PN9 | PN15 | PN16 | PN20 | PN21 | PN23 | ONE | ZERO | PATTern | DLISt		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:CHANnel<[1]...6>:DPDCh:DATA:DCCH:DSELect	<data_list>		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:CHANnel<[1]...6>:DPDCh:DATA:DCCH:PATTern	#B0,1...B11..1, 64		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:CHANnel<[1]...6>:DPDCh:DATA:DSELect	<data_list>		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:CHANnel<[1]...6>:DPDCh:DATA:PATTern	#B0,1...B11..1, 64		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:CHANnel<[1]...6>:DPDCh:SRATe			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:CMODe:METHod	HLSCheduling | SF2		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:CMODe:PATTern<[1]|2>:TGD	3...100 slots		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:CMODe:PATTern<[1]|2>:TGL<[1]|2>	3...14 slots		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:CMODe:PATTern<[1]|2>:TGPL	1(0) ... 100 frames		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:CMODe:PATTern<[1]|2>:TGSN	Slot 0 ...slot 14		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:CMODe:POFFset	0 dB ... 10 dB		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:CMODe:POMode	AUTO | USER		

<table>
<tr><th>Command</th><th>Parameters</th><th>Def. unit</th><th>Comments</th></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:CMODe:STATe</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPDCh:FCIO</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPDCh:ORATe</td><td>D15K | D30K | D60K | D120K | D240K | D480K | D960K | D1920K | D2880K | D3840K | D4800K | D5760K</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPDCh:POWer</td><td>-80dB ... 0 dB</td><td>dB</td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPDCh:STATe</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:CCODe</td><td></td><td></td><td>Query only</td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:FBI:MODE</td><td>OFF | D1B | D2B</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:FBI:PATTern</td><td>#B0,1...B11..1, 32</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:CCODe</td><td></td><td></td><td>Query only</td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:CQI:PLENgth</td><td>1 ... 10</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:CQI<n>[:VALues]</td><td>-1 ... 30</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:HAPattern</td><td><string></td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:POAC</td><td>-10dB..10dB</td><td>dB</td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:PONA</td><td>-10dB..10dB</td><td>dB</td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:POWer</td><td>-80dB ... 0dB</td><td>dB</td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:SDELay</td><td>0 ... 250</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:STATe</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:TTIDistance</td><td>1 ... 16</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:POWer</td><td>-80dB ... 0dB</td><td>dB</td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:SFORmat</td><td>0 ... 5</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:TFCI</td><td>0 ... 1023</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:TFCI:STATe</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:TOFFset?</td><td></td><td></td><td>Query only</td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:TPC:DATA</td><td>ZERO | ONE | DLISt | PATTern</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:TPC:DATA:DSELect</td><td><data_list></td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:TPC:DATA:PATTern</td><td>#B0,1...B11..1, 64</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:DPCCh:TPC:MISuse</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:TPC:PSTep</td><td>-10dB ...10dB</td><td>dB</td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:TPC:READ</td><td>CONTinuous | S0A | S1A | S01A | S10A</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:STATe</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:DTX:PATTern</td><td><string></td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:DTX:STATe</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:HBIT</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:POWer</td><td>-80dB ... 0 dB</td><td>dB</td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:RSNumber</td><td>0…3</td><td></td><td></td></tr>
</table>

Command	Parameters	Def. unit	Comments
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:TFCI	0…127		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:TTIEdch	2 | 10	ms	
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:CHANnel	1…7		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:CRATe			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:DERRor:BIT:LAYer	TRANsport | PHYSical		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:DERRor:BIT:RATE	10E-1…10E-7		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:DERRor:BIT:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:DERRor:BLOCk:RATE	10E-1…10E-4		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:DERRor:BLOCk:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:DTX:PATTern	<string>		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:DTX:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:HARQ:PATTern	<string>		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:HARQ:SIMulation:ADEFinition	HIGH | LOW		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:HARQ:SIMulation:DELay:AUSer	-50...50		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:HARQ:SIMulation:DELay:FEEDback			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:HARQ:SIMulation:MRETransmissions	0...20		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:HARQ:SIMulation:RVZero	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:HARQ:SIMulation[:STATe]	ON |OFF		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:HPROcesses			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:MIBRate			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:PAYBits			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:PCCOdes			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:TTIBits			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:TTIEdch			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:CHANnel<[1]...4>:DPDCh:E:CCODe			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:CHANnel<[1]...4>:DPDCh:E:DATA	PN9 | PN11 | PN15 | PN16 | PN16I | PN20 | PN21 | PN23 | ZERO | ONE | PATTern | DLISt		

<table>
<tr><th>Command</th><th>Parameters</th><th>Def. unit</th><th>Comments</th></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:CHANnel<[1]...4>:DPDCh:E:DATA:DSELect</td><td><data list></td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:CHANnel<[1]...4>:DPDCh:E:DATA:PATTern</td><td>#B0,1...B11..1, 32</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPDCh:E:DTX:PATTern</td><td>#B0,1...B11..1, 32</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPDCh:E:DTX:STATe</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPDCh:E:FCIO</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPDCh:E:ORATe</td><td>D15K | D30K | D60K | D120K | D240K | D480K | D960K | D1920K | D2x1920K | D2x960K2x1920K</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPDCh:E:POWer</td><td>-80dB ... 0 dB</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:CHANnel<[1]...4>:DPDCh:E:SRATe</td><td></td><td></td><td>Query only</td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPDCh:E:STATe</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPDCh:E:TTIEdch</td><td>2 | 10</td><td>ms</td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:MODE</td><td>PRACh | PCPCh | DPCDch</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:CPOWer</td><td>-80dB ... 0 dB</td><td>dB</td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:CPSFormat</td><td>0 | 1 | 2</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:DATA</td><td>PN9 | PN15 | PN16 | PN20 | PN21 | PN23 | ZERO | ONE | PATTern</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:DATA:DSELect</td><td><data_list></td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:DATA:PATTern</td><td>#B0,1...B11..1, 64</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:DPOWer</td><td>-80 dB ... 0dB</td><td>dB</td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:FBI:MODE</td><td>OFF | D1B | D2B</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:FBI:PATTern</td><td>#B0,1...B11..1, 32</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:MLENgth</td><td>1 | 2</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:PLENgth</td><td>S0 | S8</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:PPOWer</td><td>-80dB ... 0dB</td><td>dB</td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:PPOWer:STEP</td><td>0dB ... +10dB</td><td>dB</td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:PREPetition</td><td>1...10</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:SIGNature</td><td>0...15</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:SRATe</td><td>D15K | D30K | D60K | D120K | D240K | D480K | D960K</td><td>As per simulation of all these values</td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TFCI</td><td>0...1023</td><td></td><td></td></tr>
</table>

Command	Parameters	Def. unit	Comments
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TIMing:DPOWer:MPARt?			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TIMing:DPOWer:PREamble?			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TIMing:SOFFset	0 ... 14		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TIMing:SPERiod?			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TIMing:TIME:PREMp	0 ...14		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TIMing:TIME:PREPre	0 ...14		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TPC:DATA	PN9 | PN15 | PN16 | PN20 | PN21 | PN23 | ZERO | ONE | PATTern		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TPC:DATA:DSELect	<data_list>		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TPC:DATA:PATTern	#B0,1...B11..1, 64		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TPC:READ	CONTinuous | S0A | S1A | S01A | S10A		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:ATTiming	ATT0 | ATT1 | VOID		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:CPOWer	-80dB ... 0dB	dB	
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:DATA	PN9 | PN15 | PN16 | PN20 | PN21 | PN23 | ZERO | ONE | PATTern		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:DATA:DSELect	<data_list>		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:DATA:PATTern	#B0,1...B11..1, 64		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:DPOWer	-80dB ... 0 dB	dB	
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:MLENgth	1 | 2		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:PPOWer	-80dB ... 0 dB	dB	
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:PPOWer:STEP	-80dB ... 0 dB	dB	
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:PREPetition	1...10		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:SFORmat	0 ... 3		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:SIGNature	0...15		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:SRATe	D15K | D30K | D60K | D120K | D240K | D480K | D960K		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:TFCI	0...1023		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:TIMing:DPOWer:MPARt?			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:TIMing:DPOWer:MPARt:CONTrol?			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:TIMing:DPOWer:MPARt:DATA?			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:TIMing:DPOWer:PREamble?			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:TIMing:SOFFset	0 ... 14		
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:TIMing:SPERiod?			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:TIMing:TIME:PREMp	0 ...14		

<table>
<tr><th>Command</th><th>Parameters</th><th>Def. unit</th><th>Comments</th></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:TIMing:TIME:PREPre</td><td>0 ...14</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation:PRESet</td><td></td><td></td><td>No query</td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:SCODe</td><td>#H0...#HFFFFFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:SCODe:MODE</td><td>LONG | SHORt | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:STATe</td><td>ON | OFF</td><td></td><td></td></tr>
<tr><td>[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:TDELay</td><td>0 ... 38400 chips</td><td></td><td></td></tr>
</table>

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ADDitional:COUNt 1 ... 128

The command sets the number of additional user equipment.

The R&S Signal Generator gives you the opportunity to simulate up to 128 additional user equipment - corresponding to a receive signal for a base station with high capacity utilization. The fourth user equipment (UE4) serves as a template for all other stations. The only parameters of the additional user equipment to be modified are the scrambling code and the power.

Example: `BB:W3GP:MST:ADD:COUN 20`
'sets 20 additional user equipment.

`BB:W3GP:MST:ADD:POW:OFFS -3.0`
'sets the power offset to -3 dB.

`BB:W3GP:MST:ADD:SCOD:STEP 1`
'sets the step width for increasing the scrambling code to 1.

`BB:W3GP:MST:ADD:STAT ON`
'connects the 20 user equipment to the 3GPP FDD signal.

*RST value	Resolution	SCPI
4	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ADDitional:POWer:OFFSet -80 dB... 0 dB

The command sets the power offset of the active channels of the additional user equipment relative to the power of the active channels of the reference station UE4.

The offset applies to all the additional user equipment. The resultant overall power must fall within the range 0 ... - 80 dB. If the value is above or below this range, it is limited automatically.

Example: `BB:W3GP:MST:ADD:POW:OFFS -3.0`
'sets the offset to -3 dB.

*RST value	Resolution	SCPI
0 dB	0.1 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ADDitional:SCODe:STEP #H1 ... #HFFFF FF

The command sets the step width for increasing the scrambling code of the additional user equipment. The start value is the scrambling code of UE4.

Example: `BB:W3GP:MST:ADD:SCOD:STEP #H55`
'sets the step width for increasing the scrambling code to #H55.

*RST value	Resolution	SCPI
#H1		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ADDitional:STATe ON | OFF

The command activates additional user equipment.

The suffix at MSTation has no significance for this command and should not be specified.

Example: `BB:W3GP:MST:ADD:STAT ON`
'connects the additional user equipment to the 3GPP FDD signal.

*RST value	Resolution	SCPI
OFF		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ADDitional:TDELay:STEP 0 ... 38400 chips

The command sets the step width for the time delay of the additional user equipment to one another. The start value returns the time delay of UE4. Entry is made in chips and can be a maximum of 1 frame.

Example: `BB:W3GP:MST:ADD:TDEL:STEP 256`
'shifts each of the user equipment 256 chips apart, starting from the time delay of UE4.

*RST value	Resolution	SCPI
0 chip	1 chip	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:CHANnel<[1]...6>:DPDCh:CCODe?

The command queries the channelization code of the specified channel. The value is fixed and depends on the overall symbol rate of the user equipment (see the table with the channel table description in Chapter 4).

The command is a query command and therefore does not have an *RST value.

Example: `BB:W3GP:MST1:CHAN:DPDC:CCOD?`
'queries the channelization code for DPDCH 1 of user equipment 1.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:CHANnel<[1]...6>:DPDCh:DATA
PN9 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | ZERO | ONE | PATTern

The command determines the data source for the selected DPDCH.

For the enhanced channels of user equipment 1 (UE1), this entry is valid when channel coding is deactivated. When channel coding is active, data sources are selected for the transport channels with the commands `:BB:W3GPp:MST:CHANnel:DPDCh:DCCH:DATA a`nd `:BB:W3GPp:MST:ENHanced:TCHannel:DATA`.

Parameters:

PNxxThe pseudo-random sequence generator is used as the data source. Different random sequence lengths can be selected.

DLIStA data list is used. The data list is selected with the command `:BB:W3GPp:MST:CHANnel:DPDCh:DATA:DSELect`.

ZERO | ONE Internal 0 and 1 data is used.

PATTernInternal data is used The bit pattern for the data is defined by the command `SOURce:BB:W3GPp:CHANnel:DPDCh:DATA:PATTern`.

Example:

`BB:W3GP:MST1:CHAN:DPDC:DATA PN11`
'selects internal PRBS data with period length 2^{11}-1 as the data source.

*RST value	Resolution	SCPI
PN9	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:CHANnel<[1]...6>:DPDCh:DATA:DSELect
<data list name>

The command selects the data list for the DLISt data source selection.

The files are stored with the fixed file extensions *.dm_iqd in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

Example:

`BB:W3GP:MST1:CHAN1:DPDC:DATA DLIS`
'selects the Data Lists data source.

`"MMEM:CDIR 'D:\Lists\Dm\IQData'`
'selects the directory for the data lists.

`BB:W3GP:MST1:CHAN1:DPDC:DATA:DSEL 'dpdch_13'`
'selects the file 'dpdch_13' as the data source.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:CHANnel<[1]...6>:DPDCh:DATA:PATTern #B0,1...'B11..1,64

The command enters the bit pattern for the PATTern data source selection. The first parameter determines the bit pattern (choice of hexadecimal, octal or binary notation), the second specifies the number of bits to use.

Example: `BB:W3GP:MST1:CHAN1:DPDC:DATA PATT`
'selects the Pattern data source.

`BB:W3GP:MST1:CHAN1:DPDC:DATA:PATT  #H3F, 8`
'defines the bit pattern.

*RST value	Resolution	SCPI
#H0,1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:CHANnel<[1]...6>:DPDCh:DATA:DCCH PN9 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | ZERO | ONE | PATTern

The command determines the data source for the DCCH.

This command is only available for UE1 in the enhanced state (realtime signal generation) when channel coding is active. It is also possible to set the data source for the DCCH with the command `:BB:W3GPp:MSTation:ENHanced:TCHannel1:DATA`.

Parameters:

PNxx The pseudo-random sequence generator is used as the data source. Different random sequence lengths can be selected.

DLISt The internal data generator is used.

ZERO | ONE Internal 0 and 1 data is used.

PATTern Internal data is used. The bit pattern for the data is defined by the command `SOURce:BB:W3GPp:CHANnel:DPDCh:DCCH:DATA:PATTern`.

Example: `BB:W3GP:MST1:CHAN1:DPDC:DATA:DCCH PN11`
'selects internal PRBS data with period length 2^{11}-1 as the data source.

*RST value	Resolution	Dependencies	SCPI
PN9	-	This command and the command `:BB:W3GPp:MST:ENHanced:TCHannel:DATA` convert each other to the entered value.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:CHANnel<[1]...6>:DPDCh:DATA:DCCH:DSELect <data list name>

The command selects the data list for the DLISt data source selection.

The files are stored with the fixed file extensions ***.dm_iqd** in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

This command is only available for UE1 in the enhanced state (realtime signal generation) when channel coding is active. It is also possible to select a data list for the DCCH with the command `:BB:W3GPp:MSTation:ENHanced:TCHannel1:DATA:DSELect`.

Example: `BB:W3GP:MST1:CHAN1:DPDC:DATA:DCCH DLIS`
'selects the Data Lists data source.

`"MMEM:CDIR 'D:\Lists\Dm\IQData'`
'selects the directory for the data lists.

`BB:W3GP:MST1:CHAN1:DPDC:DATA:DCCH:DSEL 'dpdch_13'`
'selects the file 'dpdch_13' as the data source.

*RST value	Resolution	Dependencies	SCPI
-	-	This command and the command `:BB:W3GPp:MST:ENHanced:TCHannel:DATA:DSEL` each select the valid data list	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:CHANnel<[1]...6>:DPDCh:DATA:DCCH:PATTern #B0,1...B11..1,64

The command enters the bit pattern for the PATTern data source selection. The first parameter determines the bit pattern (choice of hexadecimal, octal or binary notation), the second specifies the number of bits to use.

This command is only available for UE1 in the enhanced state (realtime signal generation) when channel coding is active. It is also possible to select a data list for the DCCH with the command `:BB:W3GPp:MSTation:ENHanced:TCHannel1:DATA:PATTern`.

Example: `BB:W3GP:MST1:CHAN1:DPDC:DATA:DCCH PATT`
'selects the Pattern data source.

`BB:W3GP:MST1:CHAN1:DPDC:DATA:DCCH:PATT #H3F,8`
'defines the bit pattern.

*RST value	Resolution	Dependencies	SCPI
#H0,1	-	This command and the command `:BB:W3GPp:MST:ENHanced:TCHannel:DATA:PATTern` each overwrite the pattern that was entered by the other command.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:CHANnel<[1]...6>:DPDCh:SRATe?

The command queries the symbol rate of the DPDCH. The symbol rate depends on the overall symbol rate set and cannot be modified (see also the channel table in Chapter 4).

The command is a query command and therefore does not have an *RST value.

Example: `BB:W3GP:MST4:CHAN2:DPDC:SRAT?`
'queries the symbol rate of DPDCH 2 of user equipment 4.

Response: `"960`
'the symbol rate is 960 ksps.

Note: *DPDCH 2 is only active once the overall symbol rate is 2 x 960 ksps or more. When overall symbol rates are less, the error message "???" is returned.*

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:CMODe:METHod HLSCheduling | SF2

The command selects compressed mode method.

Compressed Mode can be configured for user equipment 2, 3 and 4.

Parameters:

SF2 The data is compressed by halving the spreading factor.

HLScheduling The data is compressed by stopping the transmission of the data stream during the transmission gap.

Example: `BB:W3GP:MST2:CMOD:METH HLSC`
'selects compressed mode method High Layer Scheduling.

*RST value	Resolution	SCPI
SF2	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:CMODe:PATTern<[1]|2>:TGD 3...100 slots

The command sets the transmission gap distances.

Compressed Mode can be configured for user equipment 2, 3 and 4.

Example: `BB:W3GP:MST2:CMOD:PATT2:TGD 7`
'sets transmission gap distance of pattern 2 to 7 slots.

*RST value	Resolution	Dependencies	SCPI
15 slots	-	The transmission gap distances of the base station with the same suffix as the selected user equipment is set to the same value	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:CMODe:PATTern<[1]|2>:TGL<[1]|2> 3...14 slots

The command sets the transmission gap lengths.

Compressed Mode can be configured for user equipment 2, 3 and 4.

Example: `BB:W3GP:MST2:CMOD:PATT2:TGL1 4`
'sets transmission gap length of gap 1 of pattern 2 to 4 slots.

*RST value	Resolution	Dependencies	SCPI
3 slots	-	The transmission gap lengths of the base station with the same suffix as the selected user equipment is set to the same value.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:CMODe:PATTern<[1]|2>:TGPL 1/0...100 frames

The command sets the transmission gap pattern lengths. Setting 0 is available only for pattern 2.

Compressed Mode can be configured for user equipment 2, 3 and 4.

Example: `BB:W3GP:MST2:CMOD:PATT2:TGPL 7`
'sets transmission gap pattern length of pattern 2 to 7 frames.

*RST value	Resolution	Dependencies	SCPI
2 frames	-	The transmission gap pattern lengths of the base station with the same suffix as the selected user equipment is set to the same value.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:CMODe:PATTern<[1]|2>:TGSN slot 0...slot 14

The command sets the transmission gap slot number of pattern 1.

Compressed Mode can be configured for user equipment 2, 3 and 4.

Example: `BB:W3GP:MST2:CMOD:PATT:TGSN 4`
'sets slot number of pattern 1 to slot 4.

*RST value	Resolution	Dependencies	SCPI
Slot 7	-	The transmission gap slot number of the base station with the same suffix as the selected user equipment is set to the same value.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:CMODe:POMode AUTO | USER

The command selects the power offset mode.

Compressed Mode can be configured for user equipment 2, 3 and 4.

Parameters:

AUTO
The power offset is obtained by pilot bit ratio as follows:
Number of pilots bits of non-compressed slots/Number of pilot bits by compressed slots.

USER The power offset is defined by command
`:BB:W3GP:MSTation<2|3|4>CMODe:POFFset`.

Example: `BB:W3GP:MST2:CMOD:POFF 4`
'sets the power offset value to 4 dB.

`BB:W3GP:MST2:CMOD:POM USER`
'selects power offset mode USER, the power offset is set to 4 dB.

*RST value	Resolution	SCPI
AUTO	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:CMODe:POFFset 0 dB...10 dB

The command sets the power offset for mode USER.

Compressed Mode can be configured for user equipment 2, 3 and 4.

Example: `BB:W3GP:MST2:CMOD:POFF 4`
'sets the power offset value to 4 dB.

`BB:W3GP:MST2:CMOD:POM USER`
'selects power offset mode USER, the power offset is set to 4 dB.

*RST value	Resolution	SCPI
0 dB	0.01 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:CMODe:STATe ON | OFF

The command activates/deactivates the compressed mode.

Compressed Mode can be activated for user equipment 2, 3 and 4.

Example: `BB:W3GP:MST2:CMOD:STAT ON`
'activates compressed mode for user equipment 2.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPDCh:FCIO ON | OFF

The command sets the channelization code to I/0. This mode can only be activated if the overall symbol rate is < 2 x 960 kbps.

Example: `BB:W3GP:MST1:DPDC:FCIO ON`
'sets the channelization code to I/O.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPDCh:ORATe
D15K | D30K | D60K | D120K | D240K | D480K | D960K | D1920K | D2880K | D3840K | D4800K | D5760K

The command sets the overall symbol rate. The overall symbol rate determines the number of DPDCHs as well as their symbol rate and channelization codes.

Parameters: **D15K ... D5760K**
15 ksps ... 6 x 960 ksps

Example: `BB:W3GP:MST1:DPDC:ORAT D15K`
'sets the overall symbol rate to 15 ksps. Only DPDCH1 is active, the symbol rate is 15 ksps and the channelization code is 64.

*RST value	Resolution	SCPI
D60K	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPDCh:POWer -80 dB ... 0 dB

The command defines the channel power of the DPDCHs. The power entered is relative to the powers of the other channels. If **Adjust Total Power to 0 dB** is executed (`:BB:W3GP:POWer:ADJust`), the power is normalized to a total power for all channels of 0 dB. The power ratios of the individual channels remains unchanged.

***Note**: The uplink channels are not blanked in this mode (duty cycle 100%).*

Example: `BB:W3GP:MST4:DPDC:POW -60dB`
'sets the channel power for DPDCH 2 of user equipment 4 to -60 dB. The channel power relates to the power of the other channels.

`BB:W3GP:POW:ADJ`
'the channel power relates to 0 dB.

*RST value	Resolution	SCPI
0 dB	0.01 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPDCh:STATe ON | OFF

The command activates or deactivates DPDCHs. This always activates or deactivates all the channels. The number of channels (1...6) is determined by the overall symbol rate (see the channel table in Chapter 4).

Example: `BB:W3GP:MST1:DPDC:STAT ON`
'activates all the DPDCHs.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:CCODe?

The command queries the channelization code and the modulation branch of the specified channel. The value is fixed.

The command is a query command and therefore does not have an *RST value.

Example: `BB:W3GP:MST1:DPCC:CCOD?`
'queries the channelization code for DPCCH of user equipment 1.

`Response: "Q,64"`

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:FBI:MODE OFF | D1B | D2B

The command sets the number of bits (1 or 2) for the FBI field. With OFF, the FBI field is not used.

Example: `BB:W3GP:MST1:DPCC:FBI:MODE OFF`
'an FBI field is not used.

*RST value	Resolution	Dependency	SCPI
OFF	-	The command sets the slot format (`BB:W3GP:MST:DPCC:SFOR`) in conjunction with the set TFCI status (`BB:W3GP:MST1:DPCC:TFCI STAT`) to the associated values.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:FBI:PATTern #B0,1...B11..1,32

The command determines the bit pattern when the PATTern data source is selected for the FBI field. The maximum length is 32 bits. The first parameter determines the bit pattern (choice of hexadecimal, octal or binary notation), the second specifies the number of bits to use.

Example: `BB:W3GP:MST1:DPCC:FBI:PATT #H3F,8`
'defines the bit pattern of the data for the FBI field.

*RST value	Resolution	SCPI
#H0, 1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:CCODe?

The command queries the channelization code and the modulation branch of the HS-DPCCH.

The command is a query command and therefore does not have an *RST value.

Example: `BB:W3GP:MST1:DPCC:HS:CCOD?`
'queries the channelization code.

Response: "Q,32
'the channelization code is 32 and the modulation branch is Q.

*RST value	Resolution	SCPI
		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:CQI:PLENgth 1 ... 10

The command sets the length of the CQI sequence. The values of the CQI sequence are defined with command `:SOURce:BB:W3GPp:MST:DPCCh:HS:CQI<n>:VALues`. The pattern is generated cyclically.

Example: `BB:W3GP:MST1:DPCC:HS:CQI:PLEN 2`
'the CQI sequence length is 2 values.

`BB:W3GP:MST1:DPCC:HS:CQI1 -1`
'the first CQI value is -1.

`BB:W3GP:MST1:DPCC:HS:CQI2 2`
'the second CQI value is 2.

*RST value	Resolution	SCPI
1		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:CQI[:VALues] 1 ... 10

The command sets the values of the CQI sequence. . Value 1 means that no CQI is sent (DTX - Discontinuous Transmission). The length of the CQI sequence is defined with command `:SOURce:BB:W3GPp:MST:DPCCh:HS:CQI:PLENgth`. The pattern is generated cyclically.

Example: `BB:W3GP:MST1:DPCC:HS:CQI:PLEN 2`
'the CQI sequence length is 2 values.

`BB:W3GP:MST1:DPCC:HS:CQI1 -1`
'the first CQI value is -1.

`BB:W3GP:MST1:DPCC:HS:CQI2 2`
'the second CQI value is 2.

*RST value	Resolution	SCPI
1		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:HAPattern <string>

The command enters the pattern for the HARQ-ACK field (Hybrid-ARQ Acknowledgement). One bit is used per HS-DPCCH packet. The maximum length of the pattern is 32 bits. The pattern is entered as string, the maximum number of entries is 32. Three different characters are permitted (see below).

Parameter: **"1"** The HARQ ACK is sent (ACK). Transmission was successful and correct.

"0" The NACK is not sent (NACK). Transmission was not correct. With an NACK, the UE requests retransmission of the incorrect data.

"-" Nothing is sent. Transmission is interrupted (Discontinuous Transmission (DTX)).

Example: `BB:W3GP:MST1:DPCC:HS:HAP "110--110-0`
'enters the pattern for the HARQ-ACK field.

*RST value	Resolution	SCPI
<empty>		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:POAC -10dB…10dB

The command sets the channel power part of the ACK in dB.

Example: `BB:W3GP:MST1:DPCC:HS:POAC -2.5dB`'sets the channel power part of the ACK to 2.5 dB.

*RST value	Resolution	SCPI
0>		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:PONA -10dB…10dB

The command sets the channel power part of the NACK in dB.

Example: `BB:W3GP:MST1:DPCC:HS:PONA -2.5dB`'sets the channel power part of the NACK to 2.5 dB.

*RST value	Resolution	SCPI
0>		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:POWer -80.00 ... 0.00 dB

The command sets the channel power in dB. The power entered is relative to the powers of the other channels.If **Adjust Total Power to 0 dB** is executed (`:BB:W3GP:POWer:ADJust`), the power is normalized to a total power for all channels of 0 dB. The power ratios of the individual channels remains unchanged.

Note*: The uplink high speed channel is blanked (duty cycle 3/15).*

Example: `BB:W3GP:MST1:DPCC:HS:POW -30`
'sets the channel power to -30 dB.

*RST value	Resolution	SCPI
0 dB	0.00 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:SDELay 0 ... 250

This command sets the delay between the uplink HS-DPCCH and the frame of uplink DPCH. The delay is entered as a multiple *m* of 256 chips according to TS 25.211 7.7

Example: `BB:W3GP:MST1:DPCC:HS:SDEL 101`
'sets a start delay of 101 x 256 chips.

*RST value	Resolution	SCPI
101		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:STATe ON | OFF

This command activates or deactivates the HS-DPCCH.

Example: `BB:W3GP:MST1:DPCC:HS:STAT ON`
'activates HS-DPCCH.

*RST value	Resolution	SCPI
OFF		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:HS:HSDPa:TTIDistance 1 ...16

The command selects the distance between two packets in HSDPA packet mode. The distance is set in number of sub-frames (3 slots = 2 ms). An **Inter TTI Distance** of 1 means continuous generation.

Example: `BB:W3GP:MST1:DPCC:HS:TTID 4`
'selects an Inter TTI Distance of 4 subframes.

*RST value	Resolution	SCPI
5	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:POWer -80 dB ... 0 dB

The command defines the channel power for the DPCCH.

Example: `BB:W3GP:MST1:DPCC:POW  -10 dB`
'sets the channel power to -10 dB.

*RST value	Resolution	SCPI
0 dB	0.1 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:SFORmat 0 ... 5

The command sets the slot format for the DPCCH.

Example: `BB:W3GP:MST2:DPCC:SFOR 3`
'selects slot format 3 for the DPCCH of user equipment 2.

*RST value	Resolution	Dependency	SCPI
0	-	The command sets the FBI mode (`BB:W3GP:MST:DPCC:FBI:MODE`) and the TFCI status (`BB:W3GP:MST1:DPCC:TFCI STAT`) to the associated values.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:TFCI 0 ... 1023

The command sets the value of the TFCI (Transport Format Combination Indicator) field. This value selects a combination of 30 bits, which are divided into two groups of 15 successive slots.

Example: `BB:W3GP:MST1:DPCC:TFCI 21`
'sets the TFCI value to 21.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:TFCI:STATe

The command activates the TFCI (Transport Format Combination Indicator) field for the DPCCH.

Example: `BB:W3GP:MST1:DPCC:TFCI:STAT ON`
'activates the TFCI field.

*RST value	Resolution	Dependency	SCPI
OFF	-	The command sets the slot format (`BB:W3GP:MST:DPCC:SFOR`) in conjunction with the set FBI mode (`BB:W3GP:MST1:DPCC:FBI MODE`) to the associated values.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:TOFFset?

The command queries the timing offset. The timing offset indicates the time difference between the user equipment signal and the base station signal. This offset is fixed at 1024 chips, as defined in the standard.

The command is a query command and therefore does not have an *RST value.

Example: `BB:W3GP:MST1:DPCC:TOFF?`
'queries the timing offset.

*RST value	Resolution	SCPI
1024	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:TPC:DATA DLISt | ZERO | ONE | PATTern

The command determines the data source for the TPC field of the DPCCH.

Parameters:

DLISt A data list is used. The data list is selected with the command `:BB:W3GPp:MST:DPDCh:TPC:DATA:DSELect`.

ZERO | ONE Internal 0 and 1 data is used.

PATTern Internal data is used. The bit pattern for the data is defined by the command `BB:W3GPp:MST:DPCCh:TPC:DATA:PATTern`. The maximum length is 64 bits.

Example: `BB:W3GP:MST2:DPCC:TPC:DATA PATT`
'selects as the data source for the TPC field of user equipment 2 the bit pattern defined with the following command.

`BB:W3GP:MST2:DPCC:TPC:DATA:PATT #H48D0,16`
'defines the bit pattern.

*RST value	Resolution	SCPI
PATTern	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:TPC:DATA:DSELect <data_list>

The command selects the data list when the DLISt data source is selected for the TPC field of the DPCCH.

The files are stored with the fixed file extensions ***.dm_iqd** in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

Example: `BB:W3GP:MST1:DPCC:TPC:DATA DLIS`
'selects the Data Lists data source.

`"MMEM:CDIR 'D:\Lists\Dm\IQData'`
'selects the directory for the data lists.

`BB:W3GP:MST1:DPCC:TPC:DATA:DSEL 'dpcch_tpc_1'`
'selects the data list 'dpcch_tpc1'.

*RST value	Resolution	SCPI
''	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:TPC:DATA:PATTern
#B0,1...B11..1,64

The command determines the bit pattern for the PATTern data source selection. The maximum length of the bit pattern is 64 bits.

Example: `BB:W3GP:MST1:DPCC:TPC:DATA:PATT  #B11110000,8`
'defines the bit pattern of the data for the TPC field.

*RST value	Resolution	SCPI
#H0, 1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:DPCCh:TPC:MISuse ON | OFF

The command activates "mis-" use of the TPC field (Transmit Power Control) for controlling the channel power of the user equipment.

The bit pattern (see commands `:SOURce:BB:W3GPp:MSTation:DPCChh:TPC:DATA...`) of the TPC field of the DPCCH is used to control the channel power. A "1" leads to an increase of channel powers, a "0" to a reduction of channel powers. Channel power is limited to the range 0 dB to -80 dB. The step width for the change is defined by the command
`:SOURce:BB:W3GPp:MSTation:DPCC:TPC:PSTep`.

Note:
"Mis-"using the TPC field is available for UE2, UE3,UE4 only.

Example: `BB:W3GP:MST2:DPCC:TPC:MIS ON`
'activates regulation of the channel power via the bit pattern of the TPC field.

`BB:W3GP:MST2:DPCC:TPC:PST 1 dB`
'sets the step width for the change of channel power to 1 dB.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:TPC:PSTep -10 dB ... +10 dB

The command sets the level of the power step in dB for controlling the transmit power via the data of the TPC field.

Example: `BB:W3GP:MST:DPCC:TPC:MIS ON`
'activates regulation of the channel power via the bit pattern of the TPC field.

`BB:W3GP:MST:DPCC:TPC:PST 1 dB`
'sets the step width for the change of channel power to 1 dB.

*RST value	Resolution	SCPI
0 dB	0.1 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:DPCCh:TPC:READ CONTinuous | S0A | S1A | S01A | S10A

The command sets the read out mode for the bit pattern of the TPC field of the DPCCH.

The bit pattern is selected with the command `SOUR:BB:W3GPp:MST:DPCC:TPC:DATA:PATT`.

Parameters: **CONTinuous**The bit pattern is used cyclically.

S0A The bit pattern is used once, then the TPC sequence continues with 0 bits.

S1A The bit pattern is used once, then the TPC sequence continues with 1 bits.

S01A The bit pattern is used once and then the TPC sequence is continued with 0 and 1 bits alternately (in multiples, depending on by the symbol rate, for example, 00001111).

S10A The bit pattern is used once and then the TPC sequence is continued with 1 and 0 bits alternately (in multiples, depending on by the symbol rate, for example, 11110000).

Example: `BB:W3GP:MST2:DPCC:TPC:READ CONT`
'the selected bit pattern is repeated continuously for the TPC sequence.

*RST value	Resolution	SCPI
CONTinuous	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:STATe ON | OFF

The command activates or deactivates E-DPCCHs. This always activates or deactivates all the channels.

Example: `BB:W3GP:MST1:HSUP:DPCC:E:STAT ON`
'activates all the E-DPCCHs.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:DTX:PATTern <string>

The command sets the bit pattern for the DTX. The maximim length is 64 bits.

Example: `BB:W3GP:MST1:HSUP:DPCC:E:DTX:PATT` "11-1-"
'sets the bit pattern for the DTX.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:DTX:STATe ON | OFF

The command activates or deactivates the DTX (Discontinuous Transmission) mode.

If an FRC is set for the channel, this field is read-only.

Example: `BB:W3GP:MST1:HSUP:DPCC:E:DTX:STAT ON`
'activates the DTX mode.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:HBIT ON | OFF

The command activates the happy bit.

Example: `BB:W3GP:MST1:HSUP:DPCC:E:HBIT ON`
'sets the happy bit.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:POWer -80dB…0dB

The command sets the power of the E-DPCCH channel.

Example: `BB:W3GP:MST1:HSUP:DPCC:E:POW -2.5dB`
'sets the power of the E-DPCCH channel.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:RSNumber 0…3

The command sets the retransmission sequence number.

Example: `BB:W3GP:MST1:HSUP:DPCC:E:RSN 0`
'sets the retransmission sequence number.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:TFCI 0…127

The command sets the value for the TFCI (Transport Format Combination Indicator) field.

Example: `BB:W3GP:MST1:HSUP:DPCC:E:TFCI 0`
'sets the value for the TFCI.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:TTIEdch 2 | 10

The command sets the value for the TTI (Transmission Time Interval).

Example: `BB:W3GP:MST1:HSUP:DPCC:E:TTIE 2`
'sets the value for the TTI to 2 ms.

*RST value	Resolution	SCPI
2	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:CHANnel 1…7

The command sets the FRC according to TS 25.141 Annex A.10.

Example: `"SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:CHAN 4`
'sets the FRC to channel 4.

*RST value	Resolution	SCPI
4	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:CRATe ?

The command queries the relation between the information bits to binary channel bits. The command is a query command and therefore does not have an *RST value.

Example: `"SOUR1:BB:W3GP:MST1:HSUP:DPCC:E:FRC:CRAT?`
'queries the coding rate.

Response: `0.705`
'the coding rate is 0.705.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:DERRor:BIT:LAYer
TRANsport | PHYSical

The command sets the layer in the coding process at which bit errors are inserted.

Example: `"SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:DERR:BIT:LAY TRAN`
'sets the bit error insertion to the transport layer.

*RST value	Resolution	SCPI
PHYSical	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:DERRor:BIT:RATE 10E-1…10E-7

The command sets the bit error rate.

Example: `"SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:DERR:BIT:RATE 1e-3`
'sets the bit error rate to 1e-3.

*RST value	Resolution	SCPI
5E-3	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:DERRor:BIT:STATe ON | OFF

The command activates or deactivates bit error generation.

Example: `"SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:DERR:BIT:STAT ON`
'activates the bit error state.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:DERRor:BLOCk:RATE 10E-1…10E-4

The command sets the block error rate.

Example: `"SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:DERR:BLOC:RATE 1E-3`
'sets the block error rate.

*RST value	Resolution	SCPI
5E-3	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:DERRor:BLOCk:STATe ON | OFF

The command activates or deactivates block error generation.

Example: `"SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:DERR:BLOC:STAT ON`
'activates the block error generation.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:DTX:PATTern <string>

The command sets the user-definable bit pattern for the DTX.

Example: `"SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:DTX:PATT "11-1-"`
'sets the bit pattern for the DTX.

*RST value	Resolution	SCPI
"1"	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:DTX:STATe ON | OFF

The command activates or deactivates the DTX (Discontinuous Transmission) mode.

Example: "`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:DTX:STAT ON`
'activates the DTX.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:HARQ:PATTern<CH> <string>

The command sets the pattern for the HARQ-ACK field (Hybrid-ARQ Acknowledgement).

Example: "`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HARQ:PATT4 "1010"`
'sets the bit pattern for the HARQ.

*RST value	Resolution	SCPI
	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:HARQ:SIMulation:ADEFinition HIGH | LOW

Selects whether a high level (TTL) is interpreted as an ACK or a low level.

Example: "`SOUR1:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HARQ:SIM:MADEF HIGH`
'a high level (TTL) is interpreted as an ACK.

*RST value	Resolution	SCPI
HIGH	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:HARQ:SIMulation:DELay:AUSer -50...50

Selects an additional delay to adjust the delay between the HARQ and the feedback.

Example: "`SOUR1:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HARQ:SIM:DEL:AUS 20`
'sets the additional user delay to 20.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:HARQ:SIMulation:DELay:FEEDback

Queries the delay between the HARQ and the feedback.

Example: "`SOUR1:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HARQ:SIM:DEL:FEED?`
'queries the delay between HARQ and feedback.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:HARQ:SIMulation: HARQ:PATTern

Sets the HARQ Simulation Pattern.

Example: "`SOUR1:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HARQ:SIM:HARQ:PATT 1010`
'sets the HARQ simulation pattern.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:HARQ:SIMulation: MODE HFEedback | VHARq

Selects the HARQ simulation mode.

Parameters:

VHARq This mode simulates basestation feedback. For every HARQ process (either 4 or 8), a bit pattern can be defined to simulate ACKs and NACKs.

HFEedback This mode allows the user to dynamically control the transmission of the HSUPA fixed reference channels (FRC 1-7). An "ACK" from the base station leads to the transmission of a new packet while a "NACK" forces the instrument to retransmit the packet with a new channel coding configuration (i.e. new "redundancy version") of the concerned HARQ process.

Example: "`SOUR1:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HARQ:SIM:MODE HFE`
'sets simulation mode **HARQ Feedback**.

*RST value	Resolution	SCPI
HFEedback	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:HARQ:SIMulation: MRETransmissions 0...20

Sets the maximum number of retransmissions. After the expiration of this value, the next packet is send, regardless of the received feedback.

Example: "`SOUR1:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HARQ:SIM:MRET 10`
'sets the maximum number of retransmissions to 10.

*RST value	Resolution	SCPI
4	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:HARQ:SIMulation: RVZero ON | OFF

If activated, the same redundancy version is sent, that is, the redundancy version is not adjusted for the next retransmission in case of a received NACK.

Example: "`SOUR1:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HARQ:SIM:RVZ ON`
'the same redundancy version is sent for the next retransmission.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:HARQ:SIMulation [:STATe] ON | OFF

Activates or deactivates the HARQ simulation mode.

Example: "`SOUR1:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HARQ:SIM:STAT ON`
'activates the HARQ simulation mode.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:HPROcesses?

The command queries the number of HARQ (Hybrid-ARQ Acknowlegement) process.

The command is a query command and therefore does not have an *RST value.

Example: "`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HPRO?`
'queries the number of HARQ processes.

Response: `5`

*RST value	Resolution	SCPI
	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:MIBRate?

The command queries the maximum information bit rate.

The command is a query command and therefore does not have an *RST value.

Example: "`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:HPRO?`
'queries the maximum ninformation bit rate.

Response: `1353.0`

*RST value	Resolution	SCPI
	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:PAYBits ?

The command queries the payload of the information bit. This value determines the number ob tranport layer bits sent in each HARQ process.

The command is a query command and therefore does not have an *RST value.

Example: "`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:PAYB?`
'queries the payload of the information bit.

Response: `2706`

*RST value	Resolution	SCPI
	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:PCCOdes ?

The command queries the number of the E-DPDCHs with the corresponding channelization codes.

The command is a query command and therefore does not have an *RST value.

Example: "`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:PCCO?`
'queries the number of the E-DPDCHs with the corresponding channelization codes.

Response: `4.4`

*RST value	Resolution	SCPI
	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:STATe ON | OFF

The command activates or deactivates the FRC state for the E-DPCCH channels.

Example: "`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:STAT ON`
'activates the FRC state for the E-DPCCH channels.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:TTIBits ?

The command queries the number of physical bits sent in each HARQ process.

The command is a query command and therefore does not have an *RST value.

Example: "`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:TTIB?`
'queries the number of physical bits sent in each HARQ process.

*RST value	Resolution	SCPI
	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPCCh:E:FRC:TTIEdch ?

The command queries the the TTI (Transmission Time Interval).

The command is a query command and therefore does not have an *RST value.

Example: "`SOUR:BB:W3GP:MST1:HSUP:DPCC:E:FRC:TTIE`
'queries the TTI.

*RST value	Resolution	SCPI
	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:CHANnel<[1]...4>:DPDCh:E:CCODe?

The command queries the channelization code and the modulation branch (I or Q) of the DPDCH channel.

The channelization code is dependent on the overall symbol rate set and cannot be modified.

The command is a query command and therefore does not have an *RST value.

Example: `BB:W3GP:MST4:HSUP:CHAN1:DPDC:E:CCOD?`
'queries the channelization code and the modulation branch (I or Q)of E-DPDCH 1 of user equipment 4.

Response: `"Q,32"`

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:CHANnel<[1]...4>:DPDCh:DATA PN9 | PN11 | PN15 | PN16 | PN16I | PN20 | PN21 | PN23 | ZERO | ONE | PATTern | DLISt

The command selects the data source for the E-DPDCH channel.

Parameters:

PNxxThe pseudo-random sequence generator is used as the data source. Different random sequence lengths can be selected.

DLIStA data list is used. The data list is selected with the command `SOURce:BB:W3GPp:MST:PCPCh:DATA:DSELect`.

ZERO | ONE Internal 0 and 1 data is used.

PATTernInternal data is used. The bit pattern for the data is defined by the command `SOUR:BB:W3GP:MST1:HSUP:CHAN1:DPDC:E:DATA PATT`.

Example: `"SOUR:BB:W3GP:MST1:HSUP:CHAN1:DPDC:E:DATA PN11`
'selects internal PRBS data with period length 2^{11}-1 as the data source.

*RST value	Resolution	SCPI
PN9	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:CHANnel<[1]...4>:DPDCh:E:DATA: DSELect <data_list_name>§DPDC:DPDC

The command selects the data list for the DLISt data source.

The files are stored with the fixed file extensions ***.dm_iqd** in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

Example: `"SOUR:BB:W3GP:MST1:CHAN1:DPDC:E:DATA DLIS`
'selects data lists as the data source.

`"MMEM:CDIR 'D:\Lists\Dm\IQData'`
'selects the directory for the data lists.

`BB:W3GP:MST1:CHAN1:DPDC:E:DATA:DSEL 'dp1'`
'selects the data list 'dp1'.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:CHANnel<[1]...4>:DPDCh:E:DATA:PATTern <bit pattern>§DPDC:DPDC

The command determines the bit pattern for the data component when the PATTern data source is selected. The first parameter determines the bit pattern (choice of hexadecimal, octal or binary notation), the second specifies the number of bits to use.

Example: `"SOUR:BB:W3GP:MST1:HSUP:CHAN1:DPDC:E:PATT #H3F,8`
'defines the bit pattern of the data for the DATA component.

*RST value	Resolution	SCPI
#H0, 1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPDCh:E:DTX:PATTern <string>

The command sets the bit pattern for the DTX. The maximim length is 64 bits.

Example: `BB:W3GP:MST1:HSUP:DPDC:E:DTX:PATT` "11-1-"
'sets the bit pattern for the DTX.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPDCh:E:DTX:STATe ON | OFF

The command activates or deactivates the DTX (Discontinuous Transmission) mode.

If an FRC is set for the channel, this field is read-only.

Example: `BB:W3GP:MST1:HSUP:DPDC:E:DTX:STAT ON`
'activates the DTX mode.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPDCh:E:FCIO ON | OFF

The command sets the channelization code to I/0.

Example: `BB:W3GP:MST1:HSUP:DPDC:E:FCIO ON`
'sets the channelization code to I/0.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPDCh:E:ORATe D15K | D30K | D60K | D120K | D240K | D480K | D960K | D1920K | D2x1920K | D2x960K2x1920K

The command sets the overall symbol rate of all the E-DPDCH channels.

Example: `BB:W3GP:MST1:HSUP:DPDC:E:ORAT D60K`
'sets the retransmission sequence number.

*RST value	Resolution	SCPI
D60K	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:CHANnel<[1]...4>:DPDCh:E:POWer -80dB...0dB

The command sets the power of the selected E-DPDCH channel.

Example: `BB:W3GP:MST1:HSUP:CHAN1:DPDC:E:POW -2.5dB`
'sets the power of E-DPDCH channel 1 (and all the other currently active channels) to 2.5 dB.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:CHANnel<[1]...4>:DPDCh:E:SRATe?

The command queries the symbol rate and the state of the E-DCDCH channel.

The symbol rate and the state of channel 2 to 6 are dependent on the overall symbol rate set and cannot be modified.

The command is a query command and therefore does not have an *RST value.

Example: `BB:W3GP:MST4:HSUP:CHAN1:DPDC:E:SRAT?`
'queries the symbol rate of E-DPDCH 1 of user equipment 4.

Response: `"960`
'the symbol rate is 960 ksps.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPDCh:E:STATe ON | OFF

The command activates or deactivates the E-DPDCHs. This always activates or deactivates all the channels.

Example: `BB:W3GP:MST1:HSUP:DPDC:E:STAT ON`
'activates all the E-DPDCHs.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:HSUPa:DPDCh:E:TTIEdch 2 | 10

The command sets the value for the TTI (Transmission Time Interval).

Example: `BB:W3GP:MST1:HSUP:DPDC:E:TTIE 2`
'sets the value for the TTI to 2 ms.

*RST value	Resolution	SCPI
2	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:MODE
PRACh | PPRAch | PCPCh | PPCPch | DPCDch

The command selects the operating mode for the user equipment.

Parameters:

PRACh The user equipment only generates a signal with a physical random access channel (PRACH). This channel is used to set up the user equipment connection with the base station. The channel-specific parameters of the PRACH can be set with the commands `:SOURce:BB:W3GPp:MSTation<n>:PRACh:....`

PPRAch The user equipment only generates a signal with the preamble component of a physical random access channel (PRACH). The parameters of the PRACH preamble can be set with the commands `:SOURce:BB:W3GPp:MSTation<n>:PRACh:....`

PCPCh The user equipment only generates a signal with a physical common packet channel (PCPCH). This channel is used to transmit packet-oriented services (e.g. SMS). The channel-specific parameters of the PCPCH can be set with the commands `:SOURce:BB:W3GPp:MSTation<n>:PCPCh:....`

PPCPch The user equipment only generates a signal with the preamble component of a physical common packet channel (PCPCH). The parameters of the PCPCH preamble can be set with the commands `:SOURce:BB:W3GPp:MSTation<n>:PCPCh:....`

DPCDch The user equipment generates a signal with a dedicated physical control channel (DPCCH) and up to 6 dedicated physical data channels (DPDCH). This signal is used for voice and data transmission. The channel-specific parameters can be set with the commands `:SOURce:BB:W3GPp:MSTation<n>:DPCCh:...` as well as `..:CHANnel<n>:DPDCh<n>:...` and `..:DPDCh<n>:....`

Example: `BB:W3GP:MST1:MODE DPCD`
'switches the user equipment to standard mode - transmission of voice and data.

*RST value	Resolution	SCPI
DPCDch	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:CPOWer -80 dB ... 0 dB

The command defines the power of the control component of the PCPCH.

Example: `BB:W3GP:MST1:PCPC:CPOW -10 dB`
'sets the power to -10 dB.

*RST value	Resolution	SCPI
0 dB	0.1 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:CPSFormat 0 | 1 | 2

The command defines the slot format of the control component of the PCPCH.

Example: `BB:W3GP:MST1:PCPC:CPSF 2`
'sets slot format 2.

*RST value	Resolution	Dependency	SCPI
0	-	The slot format sets the associated FBI mode automatically: Slot format 0 = FBI OFF Slot format 1 = FBI 1 bit Slot format 2 = FBI 2 bits	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:DATA
PN9 | PN11 | PN15 | PN16 | PN16I | PN20 | PN21 | PN23 | ZERO | ONE | PATTern

The command determines the data source for the PCPCH.

Parameters:

PNxxThe pseudo-random sequence generator is used as the data source. Different random sequence lengths can be selected.

DLIStA data list is used. The data list is selected with the command `SOURce:BB:W3GPp:MST:PCPCh:DATA:DSELect`.

ZERO | ONE Internal 0 and 1 data is used.

PATTernInternal data is used. The bit pattern for the data is defined by the command `SOURce:BB:W3GPp:PCPCh:DATA:PATTern`.

Example: `BB:W3GP:MST1:PCPC:DATA PN11`
'selects internal PRBS data with period length 2^{11}-1 as the data source.

*RST value	Resolution	SCPI
PN9	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:DATA:DSELect <data_list_name>

The command selects the data list for the DLISt data source.

The files are stored with the fixed file extensions ***.dm_iqd** in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

Example: `BB:W3GP:MST1:PCPC:DATA DLIS`
'selects data lists as the data source.

`"MMEM:CDIR 'D:\Lists\Dm\IQData'`
'selects the directory for the data lists.

`BB:W3GP:MST1:PCPC:DATA:DSEL 'pcpch_data'`
'selects the data list 'pcpch_data'.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:DATA:PATTern #B0,1...B11..1,64

The command determines the bit pattern for the data component when the PATTern data source is selected. The first parameter determines the bit pattern (choice of hexadecimal, octal or binary notation), the second specifies the number of bits to use.

Example: `BB:W3GP:MST:PCPC:DATA:PATT #H3F,8`
'defines the bit pattern of the data for the DATA component.

*RST value	Resolution	SCPI
#H0, 1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:DPOWer -80 dB ... 0 dB

The command defines the power of the data component of the PCPCH.

Example: `BB:W3GP:MST1:PCPC:DPOW -10 dB`
'sets the power to -10 dB.

*RST value	Resolution	SCPI
0 dB	0.1 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:FBI:MODE OFF | D1B | D2B

The command sets the number of bits (1 or 2) for the FBI field. With OFF, the field is not used.

Example: `BB:W3GP:MST2:PCPC:FBI:MODE OFF`
'the FBI field is not used.

*RST value	Resolution	Dependency	SCPI
OFF	-	The FBI pattern automatically sets the associated slot format: FBI OFF = Slot format 0 FBI 1 bit = Slot format 1 FBI 2 bits = Slot format 2	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:FBI:PATTern #B0,1...B11..1,32

The command determines the bit pattern for the FBI field when the PATTern data source is selected. The maximum length of the pattern is 32 bits.
The first parameter determines the bit pattern (choice of hexadecimal, octal or binary notation), the second specifies the number of bits to use.

Example: `BB:W3GP:MST1:PCPC:FBI:PATT #H3F,8`
'defines the bit pattern of the data for the FBI field.

*RST value	Resolution	SCPI
#H0, 1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:MLENgth 1 | 2 Frames

The command sets the length of the message component as a number of frames.

Example: `BB:W3GP:MST4:PCPC:MLEN 2`
'the length of the message component is 2 frames.

*RST value	Resolution	SCPI
1 Frame	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:PLENgth S0 | S8

The command defines the length of the power control preamble of the PCPCH as a number of slots.

Example: `BB:W3GP:MST1:PCPC:PLEN S8`
'sets a length of 8 slots for the power control preamble.

*RST value	Resolution	SCPI
S8	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:PPOWer -80 dB ... 0 dB

The command defines the power of the preamble component of the PCPCH. If the preamble is repeated and the power increased with each repetition, this setting specifies the power achieved during the last repetition.

Example: `BB:W3GP:MST1:PCPC:PPOW -10 dB`
'sets the power to -10 dB.

`BB:W3GP:MST1:PCPC:PPOW:STEP 1 dB`
'sets an increase in power of 1 dB per preamble repetition.

`BB:W3GP:MST1:PCPC:PREP 2`
'sets a sequence of 2 preambles. The power of the first preamble is - 9 dB, the power of the second, -1 dB.

*RST value	Resolution	SCPI
0 dB	0.1 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:PPOWer:STEP 0 dB ... +10 dB

The command defines the step width of the power increase, by which the preamble component of the PCPCH is increased from repetition to repetition. The power during the last repetition corresponds to the power defined by the command `:SOURce:BB:W3GP:MST:PCPCh:PPOWer`.

Example: `BB:W3GP:MST1:PCPC:PPOW:STEP 2dB`
'the power of the PCPCH preamble is increased by 2 dB with every repetition.

*RST value	Resolution	SCPI
0 dB	0.1 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:PREPetition 1 ... 10

The command defines the number of PCPCH preamble components.

Example: `BB:W3GP:MST1:PCPC:PREP 3`
'sets three preamble components.

*RST value	Resolution	SCPI
1		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:SIGNature 0 ... 15

The command selects the signature of the PCPCH (see Table 3 in 3GPP TS 25.213 Version 3.4.0 Release 1999).

Example: `BB:W3GP:MST1:PCPC:SIGN 5`
'selects signature 5.

*RST value	Resolution	SCPI
0		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:SRATe
D15K | D30K | D60K | D120K | D240K | D480K | D960K

The command sets the symbol rate of the PCPCH.

Example: `BB:W3GP:MST1:PCPC:SRAT D15K`
'sets the symbol rate of the PCPCH of user equipment 1 to 15 ksps.

*RST value	Resolution	Dependencies	SCPI
D30K		**User Equipment 1:** When channel coding is active, the symbol rate is limited to the range between 15 and 120 ksps. Values above this limit are automatically set to 120 ksps.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TFCI 0 ... 1023

The command sets the value of the TFCI (Transport Format Combination Indicator) field. This value selects a combination of 30 bits, which are divided into two groups of 15 successive slots.

Example: `BB:W3GP:MST1:PCPC:TFCI 21`
'sets the TFCI value to 21.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TIMing:DPOWer:MPARt?

This command queries the level correction value for the message part. In case of one UE active, the power of the message part can be calculated by adding the set RF level.

The command represents a query and thus has no *RST value.

Example: `BB:W3GP:MST3:PCPC:TIM:DPOW:MPAR?`
'queries the level correction value for the message part.

Response: "`1.2`
'the correction value is 1.2 dB.

"`POW?`
'queries the RF level.

Response: "`2`
'the RF output level is 2 dBm. The message part power is 3.2 dBm

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TIMing:DPOWer:PREamble?

This command queries level correction value for the last AICH preamble before the message part. This value is identical to the correction value for the CD preamble. The level of the other preambles can be calculated by subtracting the set **Preamble Power Step**.

The command represents a query and thus has no *RST value.

Example: `BB:W3GP:MST3:PCPC:TIM:DPOW:PRE?`
'queries the level correction value for the last AICH preamble before the message part.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TIMing:SOFFset 1 ... 14

This command defines the start offset of the PCPCH in access slots. The starting time delay in timeslots is calculated according to: 2 x Start Offset.

Example: `BB:W3GP:MST3:PCPC:TIM:SOFF 1`
'the start offset of the PCPCH of UE 3 is 2 access slots.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TIMing:SPERiod?

This command queries the sequence period.

The command represents a query and thus has no *RST value.

Example: `BB:W3GP:MST3:PCPC:TIM:SPER?`
'queries the sequence period.

Response: `"14`
'the sequence period is 14 slots.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TIMing:TIME:PREMp 1 ... 14

This command defines the AICH Transmission Timing. This parameter defines the time difference between the preamble and the message part. Two modes are defined in the standard. In mode 0, the preamble to message part difference is 3 access slots, in mode 1 it is 4 access slots.

Example: `BB:W3GP:MST3:PCPC:TIM:TIME:PREM 3`
'the difference between the preamble and the message part is 3 access slots.

*RST value	Resolution	SCPI
3	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TIMing:TIME:PREPre 1 ... 14

This command defines the time difference between two successive preambles in access slots.

Example: `BB:W3GP:MST3:PCPC:TIM:TIME:PREP 3`
'the time difference between two successive preambles is 3 access slots.

*RST value	Resolution	SCPI
3	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TPC:DATA DLISt ZERO| ONE| PATTern

The command determines the data source for the TPC field of the PCPCH.

Parameters:

DLIStA data list is used. The data list is selected with the command `:BB:W3GPp:MST:PCPCh:DATA:DSEL`.

ZERO | ONE Internal 0 and 1 data is used.

PATTernInternal data is used. The bit pattern for the data is defined by the command `:BB:W3GPp:MST:PCPCh:DATA:PATTern`. The maximum length is 64 bits.

Example: `BB:W3GP:MST2:PCPC:TPC:DATA PATT`
'selects as the data source for the TPC field of user equipment 2 the bit pattern defined with the following command.

`BB:W3GP:MST2:PCPC:TPC:DATA:PATT #H48D0,16`
'defines the bit pattern.

*RST value	Resolution	SCPI
PATTern	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TPC:DATA:DSELect <data_list>

The command selects the data list when the DLISt data source is selected for the TPC field of the PCPCH.

The files are stored with the fixed file extensions *.dm_iqd in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

Example: `BB:W3GP:MST1:PCPC:TPC:DATA DLIS`
'selects data lists as the data source.

`"MMEM:CDIR 'D:\Lists\Dm\IQData'`
'selects the directory for the data lists.

`BB:W3GP:MST1:PCPC:TPC:DATA:DSEL 'dpcch_tpc_1'`
'selects the data list 'dpcch_tpc1'.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TPC:DATA:PATTern #B0,1...B11..1,64

The command determines the bit pattern for the PATTern data source selection. The maximum length of the bit pattern is 64 bits.

Example: `BB:W3GP:MST1:PCPC:DATA:PATT #H3F,8`
'defines the bit pattern of the data for the FBI field.

*RST value	Resolution	SCPI
#H0, 1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PCPCh:TPC:READ
CONTinuous | S0A | S1A | S01A | S10A

The command sets the read out mode for the bit pattern of the TPC field of the PCPCH.

The bit pattern is selected with the command `:SOURce:BB:W3GPp:MST:PCPC:TPC:DATA`.

Parameters:

CONTinuousThe bit pattern is used cyclically.

S0A The bit pattern is used once, then the TPC sequence continues with 0 bits.

S1A The bit pattern is used once, then the TPC sequence continues with 1 bits.

S01A The bit pattern is used once and then the TPC sequence is continued with 0 and 1 bits alternately (in multiples, depending on by the symbol rate, for example, 00001111).

S10A The bit pattern is used once and then the TPC sequence is continued with 1 and 0 bits alternately (in multiples, depending on by the symbol rate, for example, 11110000).

Example: `BB:W3GP:MST2:PCPC:TPC:READ CONT`
'the selected bit pattern is repeated continuously for the TPC sequence.

*RST value	Resolution	SCPI
CONTinuous	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:ATTiming ATT0 | ATT1

This command defines which AICH Transmission Timing, time difference between the preamble and the message part or the time difference between two successive preambles in access slots, will be definded. .

Example: `BB:W3GP:MST3:PRAC:ATT ATT1`
'selects the AICH Transmission Timing as the difference between the preamble and the message part.

*RST value	Resolution	SCPI
ATT0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:CPOWer -80 dB ... 0 dB

The command defines the power of the control component of the PRACH.

Example: `BB:W3GP:MST1:PRAC:CPOW -10 dB`
'sets the power to -10 dB.

*RST value	Resolution	SCPI
0 dB	0.1 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:DATA
PN9 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | ZERO | ONE | PATTern

The command determines the data source for the PRACH.

Parameters:

PNxx The pseudo-random sequence generator is used as the data source. Different random sequence lengths can be selected.

DLISt A data list is used. The data list is selected with the command `:BB:W3GPp:MST:PRACh:DATA:DSELect`.

ZERO | ONE Internal 0 and 1 data is used.

PATTern Internal data is used. The bit pattern for the data is defined by the command `:BB:W3GPp:PRACh:DATA:PATTern`.

Example: `BB:W3GP:MST1:PRAC:DATA PN11`
'selects internal PRBS data with period length 2^{11}-1 as the data source.

*RST value	Resolution	SCPI
PN9	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:DATA:DSELect <data_list_name>

The command selects the data list for the DLISt data source.

The files are stored with the fixed file extensions *.dm_iqd in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

Example: `BB:W3GP:MST1:PRAC:DATA DLIS`
'selects data lists as the data source.

`"MMEM:CDIR 'D:\Lists\Dm\IQData'`
'selects the directory for the data lists.

`BB:W3GP:MST1:PRAC:DATA:DSEL 'pcpch_data'`
'selects the data list 'pcpch_data'.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:DATA:PATTern #B0,1...B11..1,64

The command determines the bit pattern for the data component when the PATTern data source is selected. The first parameter determines the bit pattern (choice of hexadecimal, octal or binary notation), the second specifies the number of bits to use.

Example: `BB:W3GP:MST1:PRAC:DATA:PATT #H3F,8`
'defines the bit pattern of the data for the DATA component.

*RST value	Resolution	SCPI
#H0, 1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:DPOWer -80 dB ... 0 dB

The command defines the power of the data component of the PRACH.

Example: `BB:W3GP:MST1:PRAC:DPOW -10 dB`
'sets the power to -10 dB.

*RST value	Resolution	SCPI
0 dB	0.1 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:MLENgth 1 | 2 Frames

The command sets the length of the message component as a number of frames.

Example: `BB:W3GP:MST4:PRAC:MLEN 2`
'the length of the message component is 2 frames.

*RST value	Resolution	SCPI
1 Frame	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:PPOWer -80 dB ... 0 dB

The command defines the power of the preamble component of the PRACH. If the preamble is repeated and the power increased with each repetition, this setting specifies the power achieved during the last repetition.

Example: `BB:W3GP:MST1:PRAC:PPOW -10 dB`
'sets the power to -10 dB.

`BB:W3GP:MST1:PRAC:PPOW:STEP 1 dB`
'sets an increase in power of 1 dB per preamble repetition.

`BB:W3GP:MST1:PRAC:PREP 2`
'sets a sequence of 2 preambles. The power of the first preamble is - 9 dB, the power of the second, -1 dB.

*RST value	Resolution	SCPI
0 dB	0.1 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:PPOWer:STEP 0 dB ... +10 dB

The command defines the step width of the power increase, by which the preamble component of the PRACH is increased from repetition to repetition. The power defined during the last repetition corresponds to the power defined by the command `:SOURce:BB:W3GPp:MST:PRACh:PPOWer`.

Example: `BB:W3GP:MST1:PRAC:PPOW:STEP 2 dB`
'the power of the PRACH preamble is increased by 2 dB with every repetition.

*RST value	Resolution	SCPI
0 dB	0.1 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:PREPetition 1 ... 10

The command defines the number of PRACH preamble components.

Example: `BB:W3GP:MST1:PRAC:PREP 3`
'sets three preamble components.

*RST value	Resolution	SCPI
1		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:SFORmat 0 | 1 | 2 | 3

The command defines the slot format of the PRACH.

Example: `BB:W3GP:MST:PRAC:SFOR 2`
'sets slot format 2.

*RST value	Resolution	Dependency	SCPI
0	-	A change of slot format leads to an automatic change of symbol rate `:BB:W3GPp:MST:PRACh:SRATe` User Equipment 1: When channel coding is active, the slot format is predetermined. So in this case, the command has no effect.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:SIGNature 0 ... 15

The command selects the signature of the PRACH (see Table 3 in 3GPP TS 25.213 Version 3.4.0 Release 1999).

Example: `BB:W3GP:MST1:PRAC:SIGN 5`
'selects signature 5.

*RST value	Resolution	SCPI
0		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:SRATe D15K | D30K | D60K | D120K

The command sets the symbol rate of the PRACH.

Example: `BB:W3GP:MST1:PRAC:SRAT D15K`
'sets the symbol rate of the PRACH of user equipment 1 to 15 ksps.

*RST value	Resolution	Dependency	SCPI
D30K	-	A change of symbol rate leads to an automatic change of slot format `:BB:W3GPp:MST:PRACh:SFORmat`	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:TFCI 0 ... 1023

The command sets the value of the TFCI (Transport Format Combination Indicator) field. This value selects a combination of 30 bits, which are divided into two groups of 15 successive slots.

Example: `BB:W3GP:MST1:PRAC:TFCI 21`
'sets the TFCI value to 21.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:TIMing:DPOWer:MPARt?

This command queries the level correction value for the message part. In case of one UE active, the power of the message part can be calculated by adding the set RF level.

The command represents a query and thus has no *RST value.

Example: `BB:W3GP:MST3:PRAC:TIM:DPOW:MPAR?`
'queries the level correction value for the message part.

Response: "`1.2`
'the correction value is 1.2 dB.

"`POW?`
'queries the RF level.

Response: "`2`
'the RF output level is 2 dBm. The message part power is 3.2 dBm.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:TIMing:DPOWer:MPARt:CONTrol?

This command queries the level correction value for the message control part.

The command represents a query and thus has no *RST value.

Example: `BB:W3GP:MST3:PRAC:TIM:DPOW:MPAR:CONT?`
'queries the level correction value for the message control part.

Response: "`-3.24`
'the correction value is -3.24 dB.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:TIMing:DPOWer:MPARt:DATA?

This command queries the level correction value for the message data part.

The command represents a query and thus has no *RST value.

Example: `BB:W3GP:MST3:PRAC:TIM:DPOW:MPAR:DATA?`
'queries the level correction value for the message data part.

Response: `"-3.24`
'the correction value is -3.24 dB.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:TIMing:DPOWer:PREamble?

This command queries level correction value for the preamble before the message part. The level of the other preambles can be calculated by subtracting the set **Preamble Power Step**.

The command represents a query and thus has no *RST value.

Example: `BB:W3GP:MST3:PRAC:TIM:DPOW:PRE?`
'queries the level correction value for the last preamble before the message part.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:TIMing:SOFFset 1 ... 50

This command defines the start offset of the PRACH in access slots. The starting time delay in timeslots is calculated according to: 2 x Start Offset.

Example: `BB:W3GP:MST3:PRAC:TIM:SOFF 1`
'the start offset of the PRACH of UE 3 is 2 access slots.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:TIMing:SPERiod?

This command queries the sequence period.

The command represents a query and thus has no *RST value.

Example: `BB:W3GP:MST3:PRAC:TIM:SPER?`
'queries the sequence period.

Response: `"14`
'the sequence period is 14 slots.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:TIMing:TIME:PREMp 1 ... 14

This command defines the AICH Transmission Timing. This parameter defines the time difference between the preamble and the message part. Two modes are defined in the standard. In mode 0, the preamble to message part difference is 3 access slots, in mode 1 it is 4 access slots.

Example: `BB:W3GP:MST3:PRAC:TIM.TIME:PREM 3`
'the difference between the preamble and the message part is 3 access slots.

*RST value	Resolution	SCPI
3	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:PRACh:TIMing:TIME:PREPre 1 ... 14

This command defines the time difference between two successive preambles in access slots.

Example: `BB:W3GP:MST3:PRAC:TIM.TIME:PREP 3`
'the time difference between two successive preambles is 3 access slots.

*RST value	Resolution	SCPI
3	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:PRESet

The command produces a standardized default for all the user equipment. The settings correspond to the *RST values specified for the commands.

This command triggers an action and therefore has no *RST value and no query form.

Example: `BB:W3GP:MST:PRES`
'resets all the user equipment settings to default values.

*RST value	Resolution	Dependencies	SCPI
-	-	All user equipment settings are preset. An overview is provided by Table in Chapter 4.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:SCODe #H0...#HFFFFFF

The command sets the scrambling code. Long or short scrambling codes can be generated (command `:BB:W3GP:MST2:SCOD:MODE`).

Example: `BB:W3GP:MST2:SCOD #H12`
'sets scrambling code #12.

*RST value	Resolution	SCPI
#H0	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:SCODe:MODE SHORt | LONG | OFF

The command sets the type for the scrambling code. The scrambling code generator can also be deactivated for test purposes.

SHORt is only standardized for the selection `:BB:W3GP:MST:MODE DPCDh` and `:BB:W3GP:MST:MODE PCPCh`. But it can also be generated for the PCPCH for test purposes.

Example: `BB:W3GP:MST2:SCOD:MODE OFF`
'deactivates the scrambling code generator.

*RST value	Resolution	SCPI
LONG	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<[1]|2|3|4>:STATe ON | OFF

The command activates and deactivates the specified user equipment.

Example: `BB:W3GP:MST2:STAT OFF`
'deactivates user equipment 2.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation<2|3|4>:TDELay 0 ... 38400 chips

The command sets the time shift of the selected user equipment compared to user equipment 1 in chips.

The command is only valid for user equipment 2, 3 and 4. So a suffix must be specified at MSTation (2, 3, or 4).

Example: `BB:W3GP:MST2:TDEL 256`
'shifts user equipment 2 by 256 chips compared to user equipment 1.

*RST value	Resolution	SCPI
0		Device-specific

SOURce-W3GPp - Enhanced Channels of the User Equipment

The `SOURce:BB:W3GPp`:MSTation:ENHanced subsystem contains the commands for setting the enhanced channels of user equipment 1 (UE1). The channels of UE1 are always generated in enhanced mode. The commands of this system only take effect when the 3GPP FDD standard is activated, the uplink transmission direction is selected and user equipment 1 is enabled:

`SOURce:BB:W3GPp:STATe ON`

`SOURce:BB:W3GPp:LINK UP`

`SOURce:BB:W3GPp:MSTation1:STATe ON`

Command	Parameters	Default unit	Comments
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:BPFRame?			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:CCODing:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:CCODing:TYPE	M12K2 | M64K | M144K | M384K | AMR		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:CCODing:USER:CATalog?			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:CCODing:USER:DELete	<u_coding>		No query
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:CCODing:USER:LOAD	<u_coding>		No query
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:CCODing:USER:STORe	<u_coding>		No query
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DERRor:BIT:LAYer	TRANsport | PHYSical		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DERRor:BIT:RATE	1E-7....5E-1		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DERRor:BIT:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DERRor:BLOCk:RATE	1E-4....5E-1		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DERRor:BLOCk:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DPControl:DIRection	UP | DOWN		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DPControl:MODE	EXTernal | TPC | MANual		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DPControl:[:POWer]			Query only
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DPControl:RANGe:DOWN	0.0 ...30.0dB		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DPControl:RANGe:UP	0.0 ...30.0dB		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DPControl:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DPControl:STEP:MANual	MAN0 | MAN1		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DPControl:STEP[:EXTernal]	0.25... 6.0dB		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:INTerleaver2	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:ORATe?			Query only

Command	Parameters	Default unit	Comments
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6 >:CRCSize	NONE | 8 | 12 | 16 | 24		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6 >:DATA	PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | ZERO | ONE | PATTern		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6 >:DATA:DSELect	<data_list>		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6 >:DATA:PATTern	:PRACh:DATA:PATTern		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6 >:EPRotection	NONE | TURBo3 | CON2 | CON3		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6 >:INTerleaver[1]	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6 >:RMATtribute	16 ... 1024		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6 >:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6 >:TBCount			
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6 >:TBSize	0 ... 4096		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6 >:TTINterval	10MS | 20MS | 40MS | 80MS	s	
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:PCPCh:CCODing:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:PCPCh:CCODing:TYPE	TB168 | TB360		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:PRACh:CCODing:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:PRACh:CCODing:TYPE	TB168 | TB360		

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:BPFRame?

The command queries the number of data bits in the DPDCH component of the frame at the physical layer. The number of data bits depends on the overall symbol rate.

The command is a query command and therefore does not have an *RST value.

Example: `BB:W3GP:MST:ENH:DPDC:BPFR?`
'queries the number of data bits.

Response: `"300`
'the number of data bits is `300`.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:CCODing:STATe ON | OFF

The command activates or deactivates channel coding for the enhanced channels.

Example:

`BB:W3GP:MST:ENH:DPDC:CCOD:TYPE M12K2`
'selects channel coding type RMC 12.2 kbps.

`BB:W3GP:MST:ENH:DPDC:CCOD:STAT ON`
'activates channel coding.

*RST value	Resolution	Dependency	SCPI
OFF	-	When channel coding is activated, the overall symbol rate (`:BB:W3GP:MST:DPDCh:ORATe`) is set to the value predetermined by the selected channel coding type (`:BB:W3GP:MST:ENH:DPDC:CCOD:TYPE`).	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:CCODing:TYPE
M12K2 | M64K | M144K | M384K | AMR

The command selects the channel coding scheme in accordance with the 3GPP specification. The channel coding scheme selected predetermines the overall symbol rate.

Parameters:

M12K2 Measurement channel with an input data bit rate of 12.2 ksps.

M64K Measurement channel with an input data bit rate of 64 ksps.

M144K Measurement channel with an input data bit rate of 144 ksps.

M384K Measurement channel with an input data bit rate of 384 ksps.

AMR Channel coding for the AMR Coder (coding a voice channel).

USER
This parameter cannot be set. USER is returned whenever a user-defined channel coding is active, that is to say, after a channel coding parameter has been changed or a user coding file has been loaded. The file is loaded by the command
`:BB:W3GP:BST:ENH:CHAN:DPCH:CCOD:USER:LOAD`.

Example:

`BB:W3GP:MST:ENH:DPDC:CCOD:TYPE M144K`
'selects channel coding scheme RMC 144 kbps.

*RST value	Resolution	Dependency	SCPI
M12K2	-	When channel coding is activated (`:BB:W3GP:MST:ENH:DPDC:CCOD:STAT`) the overall symbol rate (`:BB:W3GP:MST:DPDCh:ORATe`) is set to the value predetermined by the selected channel coding type.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:CCODing:USER:CATalog?

The command queries existing files with stored user channel codings.

The files are stored with the fixed file extensions ***.3g_ccod_ul** in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`.

Example: `"MMEM:CDIR 'D:\Lists\Wcdma\CcodDpchUser'`
'selects the directory for the user channel coding files.

`BB:W3GP:MST:ENH:DPDC:CCOD:USER:CAT?`
'queries the existing files with user coding.

Response: `"'user_cc1'`
'there is one file with user coding.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:CCODing:USER:DELete <user_coding>

The command deletes the specified files with stored user channel codings.

The files are stored with the fixed file extensions ***.3g_ccod_ul** in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

The command triggers an event and therefore has no query form and no *RST value.

Example: `"MMEM:CDIR 'D:\Lists\Wcdma\CcodDpchUser'`
'selects the directory for the user channel coding files.

`BB:W3GP:MST:ENH:DPDC:CCOD:USER:DEL 'user_cc1'`
'deletes the specified file with user coding.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:CCODing:USER:LOAD <user_coding>

The command loads the specified files with stored user channel codings.

The files are stored with the fixed file extensions ***.3g_ccod_ul** in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

The command triggers an event and therefore has no query form and no *RST value.

Example: `"MMEM:CDIR 'D:\Lists\Wcdma\CcodDpchUser'`
'selects the directory for the user channel coding files.

`BB:W3GP:MST:ENH:DPDC:CCOD:USER:LOAD 'user_cc1'`
'loads the specified file with user coding.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:CCODing:USER:STORe **<**user_coding>

The command saves the current settings for channel coding as user channel coding in the specified file.

The files are stored with the fixed file extensions ***.3g_ccod_ul** in a directory of the user's choice. The directory in which the file is stored is defined with the command `MMEMory:CDIR`. To store the files in this directory, you only have to give the file name, without the path and the file extension.

The command triggers an event and therefore has no query form and no *RST value.

Example: "`MMEM:CDIR 'D:\Lists\Wcdma\CcodDpchUser'`
'selects the directory for the user channel coding files.

`BB:W3GP:MST:ENH:DPDC:CCOD:USER:STOR 'user_cc1'`
'saves the current channel coding setting in file `user_cc1` in directory `D:\Lists\Wcdma\CcodDpchUser`.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DERRor:BIT:LAYer TRANsport | PHYSical

The command selects the layer at which bit errors are inserted.

Parameters: **TRANsport**Transport Layer (Layer 2). This layer is only available when channel coding is active.

PHYSicalPhysical layer (Layer 1)

Example: `BB:W3GP:MST:ENH:DPDC:DERR:BIT:LAY PHYS`
'selects layer 1 for entering bit errors.

*RST value	Resolution	SCPI
PHYSical	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DERRor:BIT:RATE 1E-7 ... 5E-1

The command sets the bit error rate.

Example: `BB:W3GP:MST:ENH:DPDC:DERR:BIT:RATE 1E-2`
'sets a bit error rate of 0.01.

*RST value	Resolution	SCPI
5E-3	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DERRor:BIT:STATe ON | OFF

The command activates or deactivates bit error generation.

Bit errors are inserted into the data fields of the enhanced channels. When channel coding is active, it is possible to select the layer in which the errors are inserted (physical or transport layer). When the data source is read out, individual bits are deliberately inverted at random points in the data bit stream at the specified error rate in order to simulate an invalid signal.

Example: `BB:W3GP:MST:ENH:DPDC:DERR:BIT:RATE 1E-2`
'sets a bit error rate of 0.01.

`BB:W3GP:MST:ENH:DPDC:DERR:BIT:LAY PHYS`
'selects layer 1 for entering bit errors.

`BB:W3GP:MST:ENH:DPDC:DERR:BIT:STAT ON`
'activates bit error generation.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DERRor:BLOCk:RATE 1E-4 ... 5E-1

The command sets the block error rate.

Example: `BB:W3GP:MST:ENH:DPDC:DERR:BLOC:RATE 1E-2`
'sets the block error rate to 0.01.

*RST value	Resolution	SCPI
5E-1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DERRor:BLOCk:STATe ON | OFF

The command activates or deactivates block error generation. Block error generation is only possible when channel coding is activated.

During block error generation, the CRC checksum is determined and then the last bit is inverted at the specified error probability in order to simulate a defective signal.

Example: `BB:W3GP:MST:ENH:DPDC:CCOD:STAT ON`
'activates channel coding.

`BB:W3GP:MST:ENH:DPDC:DERR:BLOC:RATE 10E-2`
'sets the block error rate to 0.1.

`BB:W3GP:MST:ENH:DPDC:DERR:BLOC:STAT ON`
'activates block error generation.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DPControl:DIRection UP | DOWN

The command selects the Dynamic Power Control direction. The selected direction determines if the channel power is increased (`UP`) or decreased (`DOWN`) by control signal with high level.

Example: `BB:W3GP:MST:ENH:DPDC:DPC:DIR UP`
'selects direction up, a high level of the control signals leads to an increase of the channel power.

*RST value	Resolution	SCPI
UP	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DPControl:MODE
EXTernal | TPC | MANual

The command selects the Dynamic Power Control mode. The mode determines the source of the control signal.

Example: `BB:W3GP:MST:ENH:DPDC:DPC:MODE EXT`
'selects external power control. The control signal is supplied via the LEV ATT input of the AUX I/O connector.

*RST value	Resolution	SCPI
EXT	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DPControl[:POWer]?

The command queries the deviation of the channel power (ΔPOW) from the set power start value of the DPDCH.

The command is a query command and therefore does not have an *RST value.

Example: `BB:W3GP:MST:ENH:DPDC:DPC?`
'queries the deviation of the channel power (ΔPOW) from the set power start value of the DPDCH

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DPControl:RANGe:DOWN 0 ... 30 dB

The command selects the dynamic range for ranging down the channel power.

Example: `BB:W3GP:MST:ENH:DPDC:DPC:RANG:DOWN 20dB`
'selects a dynamic range of 20 dB for ranging down the channel power.

*RST value	Resolution	SCPI
10 dB	0.01 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DPControl:RANGe:UP 0 ... 30 dB

The command selects the dynamic range for ranging up the channel power.

Example: `BB:W3GP:MST:ENH:DPDC:DPC:RANG:UP 20dB`
'selects a dynamic range of 20 dB for ranging up the channel power.

*RST value	Resolution	SCPI
10 dB	0.01 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DPControl:STATe ON | OFF

The command activates/deactivates Dynamic Power Control.

Example: `BB:W3GP:MST:ENH:DPDC:DPC:STAT ON`
'activates Dynamic Power Control for the enhanced channels of UE1.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DPControl:STEP[:EXTernal] 0.25 dB ... 6.0 dB

This command sets step width by which – with Dynamic Power Control being switched on - the channel power of the enhanced channels is increased or decreased.

Example: `BB:W3GP:MST:ENH:DPC:DPC:DIR UP`
'selects direction up, a high level of the control signals leads to an increase of the channel power.

`BB:W3GP:MST:ENH:DPC:RANG:UP 10 dB`
'selects a dynamic range of 10 dB for ranging up the channel power.

`BB:W3GP:MST:ENH:DPC:RANG:DOWN 10 dB`
'selects a dynamic range of 10 dB for ranging down the channel power.

`BB:W3GP:MST:ENH:DPC:STEP 0.5 dB`
'selects a step width of 0.5 dB. A high level of the control signal leads to an increase of 0.5 dB of the channel power, a low level to a decrease of 0.5 dB. The overall increase and decrease of channel power is limited to 10 dB each.

`BB:W3GP:MST:ENH:DPDC:DPC:MODE EXT`
'selects external power control.

`BB:W3GP:MST:ENH:DPDC:DPC:STAT ON`
'activates Dynamic Power Control for the enhanced channels of UE1.

*RST value	Resolution	SCPI
1 dB	0.01 dB	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:DPControl:STEP:MANual MAN1 | MAN2

This command provides the control signal for manual mode of Dynamic Power Control.

Example: `BB:W3GP:MST:ENH:DPC:DPC:DIR UP`
'selects direction up, a high level of the control signals leads to an increase of the channel power.

`BB:W3GP:MST:ENH:DPC:RANG:UP 10 dB`
'selects a dynamic range of 10 dB for ranging up the channel power.

`BB:W3GP:MST:ENH:DPC:RANG:DOWN 10 dB`
'selects a dynamic range of 10 dB for ranging down the channel power.

`BB:W3GP:MST:ENH:DPC:STEP 0.5 dB`
'selects a step width of 0.5 dB. A high level of the control signal leads to an increase of 0.5 dB of the channel power, a low level to a decrease of 0.5 dB. The overall increase and decrease of channel power is limited to 10 dB each.

`BB:W3GP:MST:ENH:DPDC:DPC:MODE MAN`
'selects manual power control.

`BB:W3GP:MST:ENH:DPDC:DPC:STAT ON`
'activates Dynamic Power Control for the enhanced channels of UE1.

`BB:W3GP:MST:ENH:DPDC:DPC:STEP:MAN MAN0`
'decreases the level by 0.5 dB.

*RST value	Resolution	SCPI
MAN1		Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:INTerleaver2 ON | OFF

The command activates or deactivates channel coding interleaver state 2 for all the transport channels.

Interleaver state 1 can be activated and deactivated for each channel individually (`:BB:W3GPp:MST[1]:ENHanced:DPDCh:TCHannel<n>:INTerleaver[1]`).

Note:*The interleaver states do not cause the symbol rate to change*

Example: `BB:W3GP:MST:ENH:DPDC:INT2 OFF`
'deactivates channel coding interleaver state 2 for all the transport channels.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:ORATe?

The command queries the overall symbol rate (Overall Symbol Rate) of the enhanced channels. The value is set with the command `:SOURce:BB:W3GPp:MSTation1:DPDCh:ORATe`. This setting also defines the number of active channels, their symbol rates and channelization codes.

The command is a query command and therefore does not have an *RST value.

Example: `BB:W3GP:MST:ENH:DPDC:ORAT?`
'queries the overall symbol rate of the DPDCH of user equipment 1.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6>:CRCSize NONE | 8 | 12 | 16 | 24

The command defines the CRC length for the selected transport channel. It is also possible to deactivate checksum determination.

Note: *The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.*

Example: `BB:W3GP:MST:ENH:DPDC:TCH:CRCS NONE`
'deactivates checksum determination for DTCH1.

*RST value	Resolution	SCPI
12	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6>:DATA PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | ZERO | ONE | PATTern

The command determines the data source for the data fields of the transport channels of enhanced channels with channel coding. If channel coding is not active, the data source is selected with the command `:BB:W3GP:MST:CHANnel<n>:DPDCh:DATA`. Also applicable for the DCCH is the command `:BB:W3GPp:MST:CHANnel1:DPDCh:DATA:DCCH`.

Note: *The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.*

Parameters:

PNxx The pseudo-random sequence generator is used as the data source. Different random sequence lengths can be selected.

DLISt A data list is used. The data list is selected with the command `W3GPp:MST:ENH:TCH:DATA:DSEL`.

ZERO | ONE Internal 0 and 1 data is used.

PATTern Internal data is used. The bit pattern for the data is defined by the command `SOUR:BB:W3GP:MST:ENH:DPDC:TCH<n>:DATA:PATT`.

Example: `BB:W3GP:MST:ENH:DPDC:TCH2:DATA PATT`
'selects as the data source for the data fields of DTCH2 of user equipment 1, the bit pattern defined with the following command.

`BB:W3GP:MST:ENH:DPDC:TCH2:DATA:PATT #H3F, 8`
'defines the bit pattern.

*RST value	Resolution	SCPI
PN9	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6>:DATA:PATTern #B0,1 ... #B11..1,64

The command determines the bit pattern for the PATTern data source selection for transport channels.

Note: *The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.*

Example: `BB:W3GP:MST:ENH:DPDC:TCH0:DATA:PATT #H3F, 8`
'defines the bit pattern for DCCH.

*RST value	Resolution	SCPI
#H0, 1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6>:DATA:DSELect <data list name>

The command selects the data list for the enhanced channels for the DLISt selection.

The files are stored with the fixed file extensions *.dm_iqd in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, you only have to give the file name, without the path and the file extension.

Note: *The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.*

Example: `BB:W3GP:MST:ENH:DPDC:TCH1:DATA DLIS`
'selects the Data Lists data source.

`"MMEM:CDIR 'D:\Lists\Dm\IQData'`
'selects the directory for the data lists.

`BB:W3GP:MST:ENH:DPDC:TCH1:DATA:DSEL 'TCH1'`
'selects the file 'tch1' as the data source.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6>:EPRotection
NONE | TURBo3 | CON2 | CON3

The command determines the error protection.

Note: *The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.*

Parameters: **NONE** No error protection.

TURBo3 Turbo Coder of rate 1/3 in accordance with the 3GPP specifications.

CON2 | CON3 Convolution Coder of rate ½ or 1/3 with generator polynomials defined by 3GPP.

Example: `BB:W3GP:MST:ENH:DPDC:TCH1:EPR NONE`
'error protection is deactivated.

*RST value	Resolution	SCPI
CON1/3	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6>:INTerleaver[1]
ON | OFF

The command activates or deactivates channel coding interleaver state 1 for the selected channel. Interleaver state 1 can be activated and deactivated for each channel individually. The channel is selected via the suffix at TCHannel.

Interleaver state 2 can only be activated or deactivated for all the channels together (`:BB:W3GP:MSTation:ENHanced:INTerleaver2`).

Note: *The interleaver states do not cause the symbol rate to change.*

The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.

Example: `BB:W3GP:MST:ENH:DPDC:TCH5:INT1 OFF`
'deactivates channel coding interleaver state 1 for TCH 5.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6>:RMATtribute
16...1024

The command sets data rate matching (Rate Matching).

Note: *The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.*

Example: `BB:W3GP:MST:ENH:DPDC:TCH:RMAT 1024`
'sets rate matching to 1024 for DTCH1.

*RST value	Resolution	SCPI
256	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6>:STATe ON|OFF

The command activates/deactivates the selected transport channel.

Note: *The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.*

Example: `BB:W3GP:MST:ENH:DPDC:TCH1:STAT`
'activates DTCH1.

*RST value	Resolution	SCPI
OFF	1	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6>:TBCount 1 ... 16

The command sets the transport block count.

Note: *The transport channel designations for manual operation and remote control are different: TCHannel1 designates DCCH, TCHannel2 to TCHannel7, DTCH1 to DTCH6.*

Example: `BB:W3GP:MST:ENH:DPDC:TCH2:TBC 4`
'activates 4 transport blocks for DTCH1.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6>:TBSize 0 - 4096

The command sets the size of the data blocks.

Example: `BB:W3GP:MST:ENH:DPDC:TCH2:TBS 1024`
'sets the length of the transport blocks for DTCH2 to 1024.

*RST value	Resolution	SCPI
100	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:DPDCh:TCHannel<0|[1]...6>:TTINterval
10MS | 20MS | 40MS | 80MS

The command sets the number of frames into which a TCH is divided. This setting also defines the interleaver depth.

Note: *The transport channel designations for remote control are TCHannel0 for DCCH, TCHannel1 to TCHannel6 for DTCH1 to DTCH6.*

Example: `BB:W3GP:MST:ENH:DPDC:TCH2:TTIN 20ms`
'sets that the transport channel is divided into 2 frames.

*RST value	Resolution	SCPI
10MS	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:PCPCh:CCODing:STATe ON | OFF

The command activates or deactivates channel coding for the PCPCH.

Example:
```
BB:W3GP:MST:ENH:PCPC:CCOD:TYPE TB168
```
'selects channel coding type CPCH RMC (TB size 168 bits).
```
BB:W3GP:MST:ENH:PCPC:CCOD:STAT ON
```
'activates channel coding.

*RST value	Resolution	Dependencies	SCPI
OFF	-	When channel coding is active, the symbol rate is limited to the range between 15 and 120 ksps. Values above this limit are automatically set to 120 ksps.	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:PCPCh:CCODing:TYPE TB168 | TB360

The command selects the channel coding scheme in accordance with the 3GPP specification.

Parameters:
TB168CPCH RMC (TB size 168 bits)
TB360CPCH RMC (TB size 360 bits)

Example:
```
BB:W3GP:MST:ENH:PCPC:CCOD:TYPE TB168
```
'selects channel coding scheme RMC 168 bits.

*RST value	Resolution	SCPI
TB168	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:PRACh:CCODing:STATe ON | OFF

The command activates or deactivates channel coding for the PRACH.

Example:
```
BB:W3GP:MST:ENH:PRAC:CCOD:TYPE TB168
```
'selects channel coding type RACH RMC (TB size 168 bits).
```
BB:W3GP:MST:ENH:PRAC:CCOD:STAT ON
```
'activates channel coding.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:W3GPp:MSTation:ENHanced:PRACh:CCODing:TYPE TB168 | TB360

The command selects the channel coding scheme in accordance with the 3GPP specification.

Parameters:
TB168RACH RMC (TB size 168 bits)
TB360RACH RMC (TB size 360 bits)

Example:
```
BB:W3GP:MST:ENH:PRAC:CCOD:TYPE TB168
```
'selects channel coding scheme RMC 168 bits.

*RST value	Resolution	SCPI
TB168	-	Device-specific

Tests on Base Stations in Conformance with the 3G Standard 3GPP-FDD

Introduction - Test Case Wizard

The Test Case Wizard supports tests on base stations in conformance with the 3G Standard 3GPP-FDD. It offers a selection of predefined settings according to Test Cases in TS 25.141.

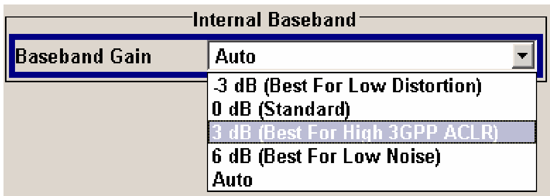
The basic equipment layout for the test is the same as for the 3GPP FDD signal generation. It includes the options Baseband Main Module (B13), Baseband Generator (B10/B11) and Digital Standard 3GPP FDD (K42). However, some of the tests require further options. An overview of the available test cases is given is in section "*Test Case - Test Case Wizard - 3GPP FDD*".
The Test Case Wizard has effect on frquency and level settings, link direction, trigger, baseband clock source, marker settings and base station or user equipment configuration. Besides the 3GPP required settings also interfering signals (AWGN, CW interferer, co-located modulation signals) or fading profiles are set.
The degree of freedom in setting the parameters can be determined. The "**According to Standard**" edit mode allows only settings in compliance with TS 25.141. The **"User Definable**" edit mode allows a wider range of settings.

The menu for selecting the 3GPP FDD test is either called in 3GPP FDD menu from the baseband block or from the menu tree under Baseband 3GPP FDD.

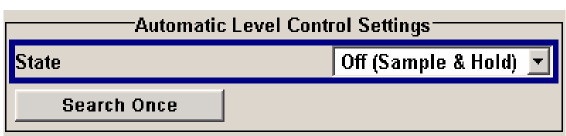
Button **Test Case Wizard** opens the menu.

Improvement of signal quality:
Improvement of signal quality is possible via several settings:

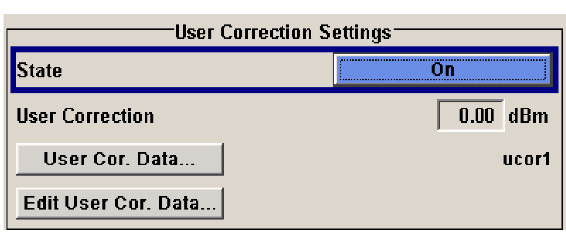
- In the **I/Q Settings** menu the internal baseband gain can be set to improved ACLR performance (3 dB or 6 dB)



- In the **Automatic Level Control Settings** menu the RF output level can be recalibrated with **Search Once** in **Sample&Hold** mode. This is recommended if in CW mode the signal/intermodulation ratio is to be improved for multi-transmitter measurements. With setting **Auto**, the level control is automatically adapted to the operating conditions, it may cause increased intermodulations, however.



- In the **User Correction** menu a list of correction values can be created and subsequently activated. Thus, the frequency response of the test setup can be taken into account .



- In order to compensate cable loss and additionally inserted attenuators, the RF level can directly be adjusted in the **Level** input field.

- Additional settings in the impairments section of the AWGN block

General Settings - Test Case Wizard - 3GPP FDD

In the **General Settings** section the edit mode and the general signal generator parameters are set.

Test Case - Test Case Wizard - 3GPP FDD

Selects the test case. The following table gives an overview of the available test cases, the type of signal transmitted by the signal generator and the required additional options besides the basic configuration. An equipment layout as required for 3GPP FDD signal generation for one-path instruments is assumed to be the basic configuration.

Remote-control command:
`SOUR:BB:W3GP:TS25141:TCAS TC881`

Transmitter Tests

TS 25.141 chapter	Test case	Generator Signal	Additional options
6.4.2	Power control steps: Output power dynamics	Uplink	-
6.6	Transmit intermodulation	Interferer (downlink)	-

Receiver Tests

TS 24.141 chapter	Test case	Generator Signal	Additional signal generator options
7.2	Reference sensitivity level	Uplink	-
7.3	Dynamic range	Uplink, AWGN	K62, AWGN
7.4	Adjacent Channel Selectivity (ACS)	Uplink, Interferer	B20x, RF path B 2nd B13, Baseband Main Module 2nd B10, Baseband Generator, 2nd K42, 3GPP FDD
7.5	Blocking characteristics	Uplink, Interferer	B20x, RF path B 2nd B13, Baseband Main Module 2nd B10, Baseband Generator, 2nd K42, 3GPP FDD
7.6	Intermodulation characteristics	Uplink, 2 x Interferer	B20x, RF path B 2nd B13, Baseband Main Module 2nd B10, Baseband Generator, 2nd K42, 3GPP FDD K62, AWGN
7.8	Verification of the internal BER calculation	Uplink	-
8.2.1	Performance requirement - Demodulation in static propagation conditions: Demodulation of DCH	Uplink, AWGN	B20x, RF path B 2nd B13, Baseband Main Module 2x K62, AWGN
8.3.1	Performance requirement - Demodulation of DCH in multipath fading conditions: Multipath fading case 1	Uplink, AWGN Fading	B20x, RF path B 2nd B13, Baseband Main Module 2x K62, AWGN B14, B15, K71, Fading Options
8.3.2	Performance requirement - Demodulation of DCH in multipath fading conditions: Multipath fading case 2	Uplink, AWGN Fading	B20x, RF path B 2nd B13, Baseband Main Module 2x K62, AWGN B14, B15, K71, Fading Options
8.3.3	Performance requirement - Demodulation of DCH in multipath fading conditions: Multipath fading case 3	Uplink, AWGN Fading	B20x, RF path B 2nd B13, Baseband Main Module 2x K62, AWGN B14, B15, K71, Fading Options

TS 24.141 chapter	Test case	Generator Signal	Additional signal generator options
8.3.4	Performance requirement - Demodulation of DCH in multipath fading conditions: Multipath fading case 4	Uplink, AWGN Fading	B20x, RF path B 2nd B13, Baseband Main Module 2x K62, AWGN B14, B15, K71, Fading Options
8.4	Demodulation of DCH in moving propagation conditions	Uplink, AWGN Fading	B20x, RF path B 2nd B13, Baseband Main Module 2x K62, AWGN B14, B15, K71, Fading Options
8.5	Demodulation of DCH in birth/death propagation conditions	Uplink, AWGN Fading	B20x, RF path B 2nd B13, Baseband Main Module 2x K62, AWGN B14, B15, K71, Fading Options
8.6	Verification of the internal BLER calculation	Uplink	B20x, RF path B 2nd B13, Baseband Main Module
8.8.1	RACH performance: RACH preamble detection in static propagation conditions	Uplink, AWGN	B20x, RF path B 2nd B13, Baseband Main Module 2x K62, AWGN
8.8.2	RACH performance: RACH preamble detection in multipath fading case 3	Uplink, AWGN Fading	B20x, RF path B 2nd B13, Baseband Main Module 2x K62, AWGN B14, B15, K71, Fading Options
8.8.3	RACH performance: Demodulation of RACH message in static propagation conditions	Uplink, AWGN	B20x, RF path B 2nd B13, Baseband Main Module 2x K62, AWGN
8.8.4	RACH performance: Demodulation of RACH message in multipath fading case 3	Uplink, AWGN Fading	B20x, RF path B 2nd B13, Baseband Main Module 2x K62, AWGN B14, B15, K71, Fading Options
8.9.1	CPCH performance: CPCH access preamble and collision detection, preamble detection in static propagation conditions	Uplink, AWGN	B20x, RF path B 2nd B13, Baseband Main Module 2x K62, AWGN
8.9.2	CPCH performance: CPCH access preamble and collision detection, preamble detection in multipath fading case 3	Uplink, AWGN Fading	B20x, RF path B 2nd B13, Baseband Main Module 2x K62, AWGN B14, B15, K71, Fading Options
8.9.3	CPCH performance: Demodulation of CPCH message in static propagation conditions	Uplink, AWGN	B20x, RF path B 2nd B13, Baseband Main Module 2x K62, AWGN
8.9.4	CPCH performance: Demodulation of CPCH message in multipath fading case 3	Uplink, AWGN Fading	B20x, RF path B 2nd B13, Baseband Main Module 2x K62, AWGN B14, B15, K71, Fading Options

Edit Mode - Test Case Wizard - 3GPP FDD

Selects the edit mode.

According to Standard

Only settings in compliance with TS 25.141 are possible in the wizard panel.

Remote-control command::
`SOUR:BB:W3GP:TS25141:EMOD STAN`

User Definable

A wider range of settings is possible in the wizard panel.

Remote-control command:
`SOUR:BB:W3GP:TS25141:EMOD USER`

Trigger Configuration - Test Case Wizard - 3GPP FDD

Selects the trigger configuration. The trigger is used to synchronize the signal generator to the other equipment.

Auto

The trigger settings are customized for the selected test case. In most cases trigger setting **Armed Auto** with external trigger source **External Trigger 1** is used. Unless otherwise noted the trigger delay is set equal to zero. Thus, the base station frame timing is able to synchronize the signal generator by a SFN (System Frame Number) periodic trigger. If the signal generator offers a channel coded signal (as all the Reference Measurements Channels require) the base station must emit a 'SFN mod 4' periodic trigger.

Remote-control command::
`SOUR:BB:W3GP:TS25141:TRIG AUTO`

Unchanged

The current trigger settings of the signal generator are retained unchanged.

Remote-control command:
`SOUR:BB:W3GP:TS25141:TRIG PRES`

Marker Configuration - Test Case Wizard - 3GPP FDD

Selects the marker configuration. The marker can be used to synchronize the measuring equipment to the signal generator.

Auto

The marker settings are customized for the selected test case. In most cases **Radio Frame** markers are output. Unless otherwise noted the marker delays are set equal to zero.

Remote-control command::
`SOUR:BB:W3GP:TS25141:TRIG:OUTP AUTO`

Unchanged

The current marker settings of the signal generator are retained unchanged.

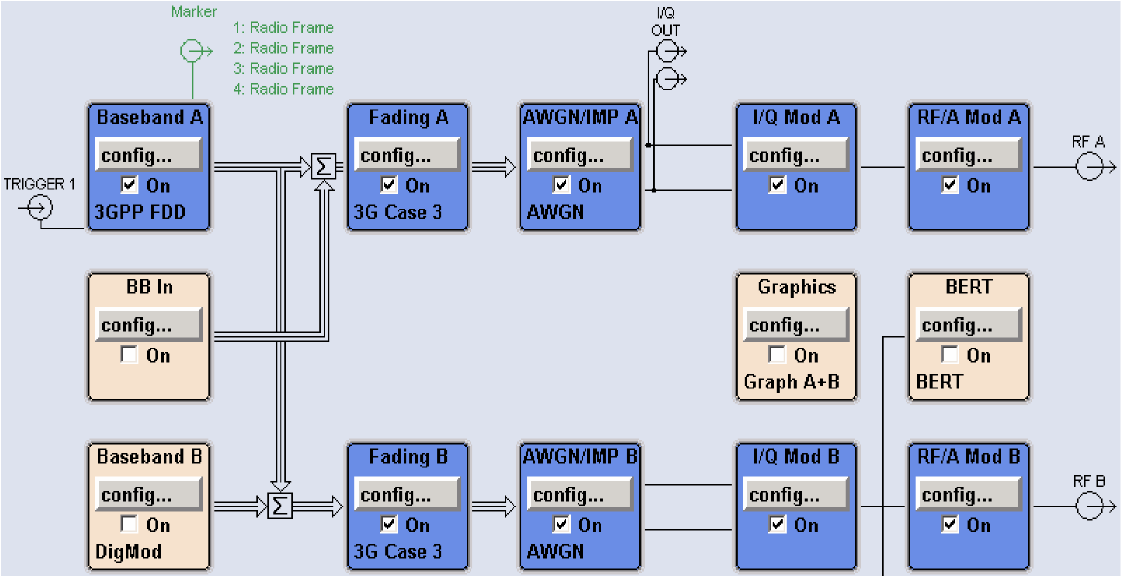
Remote-control command:
`SOUR:BB:W3GP:TS25141:TRIG:OUTP PRES`

Diversity - Test Case Wizard - 3GPP FDD

Selects the signal routing according to the base station's diversity processing capability.

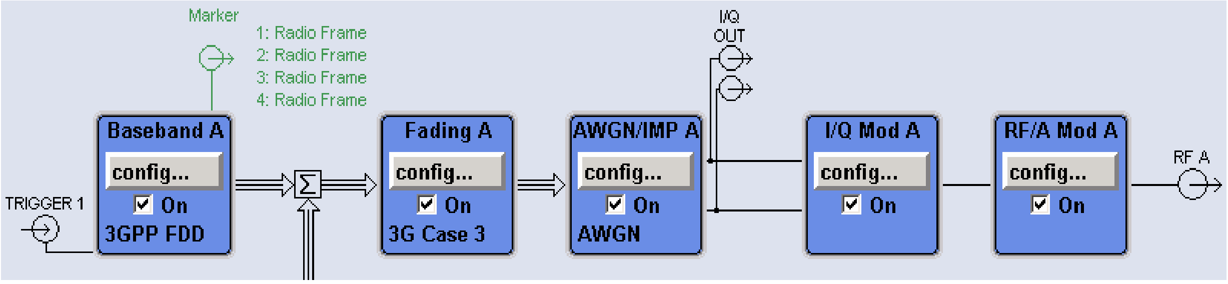
ON The test signal is routed to both RF outputs.

Remote-control command::
SOUR:BB:W3GP:TS25141:RXD ON



Off The test signal is routed to the selected RF output.

Remote-control command::
SOUR:BB:W3GP:TS25141:RXD OFF



Baseband A Signal Routing - Test Case Wizard - 3GPP FDD

Selects the signal routing for baseband A signal which in most test cases represents the wanted signal (exception test case 6.6).

A The baseband signal A is routed to RF output A.

Remote-control command::
`SOUR:BB:W3GP:TS25141:ROUT A`

B The baseband signal A is routed to RF output B.

Remote-control command:
`SOUR:BB:W3GP:TS25141:ROUT B`

Basestation Configuration - Test Case Wizard - 3GPP FDD

The base station parameters are input in the **Basestation Configuration** section.

Scrambling Code (hex) - Test Case Wizard - 3GPP FDD

Enters the scrambling code.

Remote-control command:
`SOUR:BB:W3GP:TS25141:SCOD #H5FFF`

Scrambling Mode - Test Case Wizard - 3GPP FDD

Sets the type of scrambling code.
With scrambling code, a distinction is made between **Long** and **Short Scrambling Code** for uplink signals. For downlink signals (test case 6.6) the scrambling code generator can be switched on and off.

On (downlink only)

Enables scrambling code generator.

Remote-control command:
`SOUR:BB:W3GP:TS25141:SCOD:MODE ON`

Off

Disables scrambling code generator for test purposes.

Remote-control command:
`SOUR:BB:W3GP:TS25141:SCOD:MODE OFF`

Long Scrambling Code (uplink only)

Sets the long scrambling code.

Remote-control commands:
`SOUR:BB:W3GP:TS25141:SCOD:MODE LONG`

Short Scrambling Code (uplink only)

Sets short scrambling code.

Remote-control command:
`SOUR:BB:W3GP:TS25141:SCOD:MODE SHOR`

Power Class - Test Case Wizard - 3GPP FDD

Enters the base station power class. The selected power class determines the output level of the signal generator. The output level is indicated in the **Wanted Signal** section of the Wizard panel.
The following selection is available:

- **Wide Area BS**
- **Medium Range BS**
- **Local Area BS**

For edit mode "**User Definable**", the output level can be set in the **Wanted Signal** section of the Wizard panel.

Remote-control command:
`SOUR:BB:W3GP:TS25141:BSPC MED`

Apply - Test Case Wizard - 3GPP FDD

Apply Settings - Test Case Wizard - 3GPP FDD

Activates the current settings of the test case wizard.
Initialization of the signal generator with the test case settings is performed by a partial reset that includes only the baseband, fading and AWGN module and the RF frequency and RF level settings. Other settings of the signal generator are not altered.
Before triggering the signal generator the user still can change these other settings. This is particularly useful when compensating for cable loss and additionally inserted attenuators by adjusting the RF power levels is required.

Signal generation is started at the first trigger received by the generator. The RF output is not activated /deactivated by the test case wizard, so care has to be taken that **RF State** is **On** at the beginning of the measurement.

Note:
*For safety reasons the RF is not active unless the button **RF ON** has been pressed.*

Remote-control command:
`SOUR:BB:W3GP:TS25141:TCAS:EXEC`

Transmitter Tests - 3GPP FDD

Basic Configuration - Transmitter Tests - 3GPP FDD

The test cases for transmitter tests require at least the following equipment layout for the signal generator:

- Digital Standard 3GPP FDD (K42)
- Universal Coder / Arbitrary Waveform Generator (B10/B11),
- Baseband Main module (DACIF; B13),
- Frequency option (B10x: RF 100 kHz - x GHz).

Transmitter tests always require a separate measuring equipment to perform the tests, e.g. the Vector Signal Analyzer R&S FSQ.

Test cases where the signal generator hardware equipment is not sufficient are shown in grey color but are not selectable. RF power and frequency limitations of the hardware equipment restrict the setting ranges.

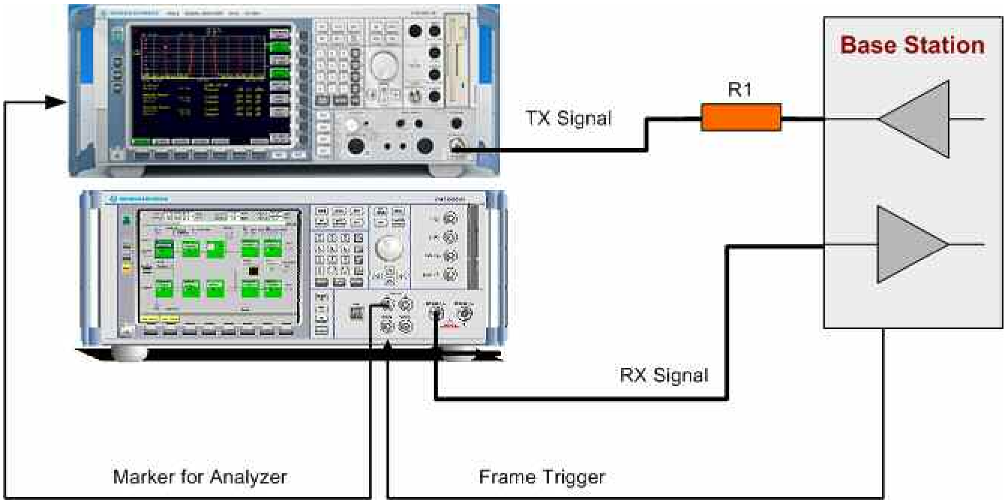
Test Case 6.4.2 - Power Control Steps

The test case requires the basic configuration.

It can be performed using the standard test setup according to TS 25.141. A vector signal analyzer is required, e.g. the Vector Signal Analyzer R&S FSQ.

For the signal generator, in case of two-path instruments signal routing to path A is assumed.
Output RF A of the signal generator is connected to the Rx port of the base station. The Tx Signal of the base station is connected to the RF input of the analyzer via an attenuator.

The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**. The analyzer is triggered by a marker signal (MARKER 1) of the generator.



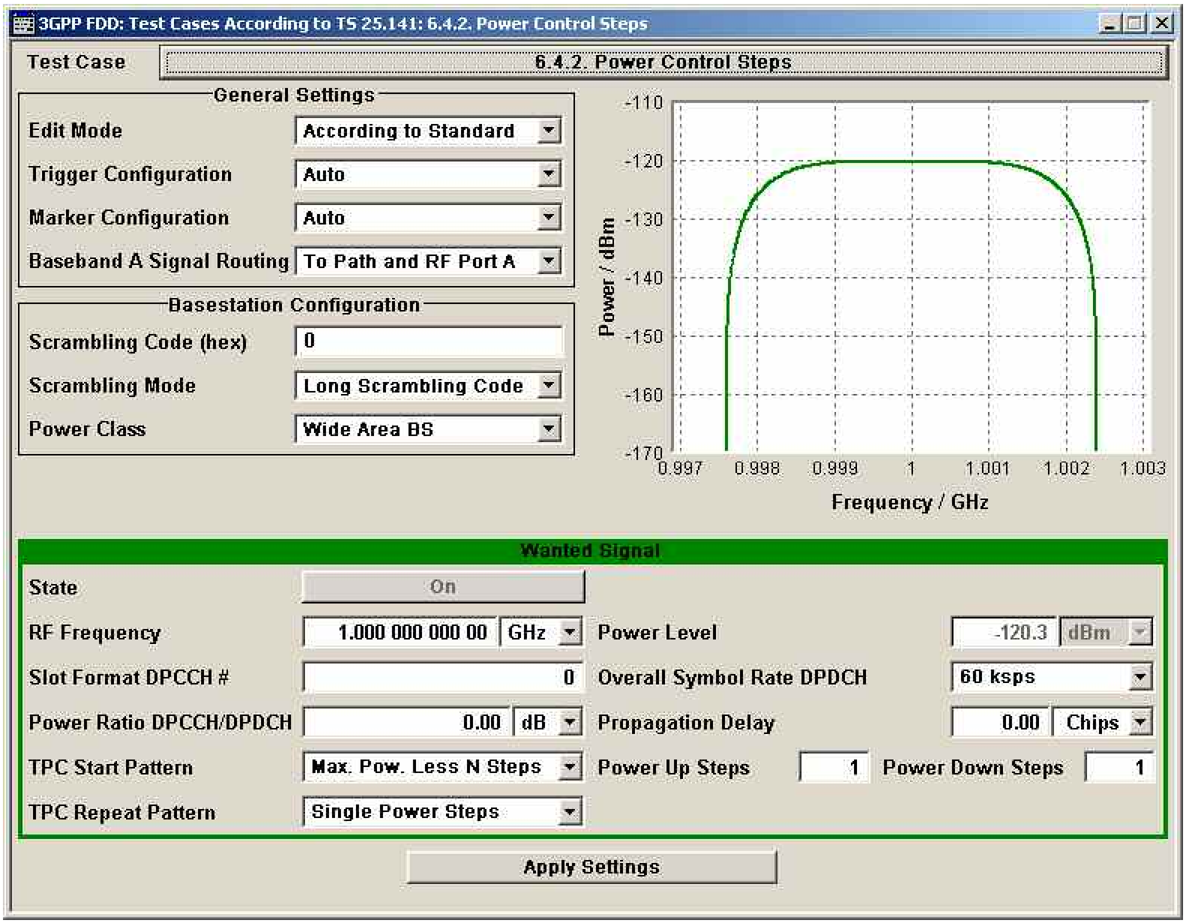
The signal generator provides an uplink link signal with a precisely defined TPC bit sequence. The base station responds to the TPC bits by controlling the transmitted power of the data channel which is checked by the analyzer.
The analyzer measures the base station transmit power in the code domain to verify the transmitter power control step tolerance and aggregated power control step range.

Test Purpose and Test Settings - Test Case 6.4.2

The test case verifies that a BS receiver has the capability to adjust its transmit power in response to the uplink TPC pattern. The cumulative power change as a result of ten successive (identical) TPC bits is also checked (aggregated transmit power).
The test is passed when the single or aggregated power control steps are within tolerance throughout the total dynamic range at the test frequencies B, M, and T.

Quotation from TS 25.141:

The power control step is the required step change in the code domain power of a code channel in response to the corresponding power control command. The combined output power change is the required total change in the DL transmitter output power of a code channel in response to multiple consecutive power control commands corresponding to that code channel.



Wanted Signal State - Test Case 6.4.2

Enables/disables the signal generation of the wanted 3GPP signal.
In edit mode '**According to Standard**' the state is fixed to '**On**'.

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:STAT ON | OFF`

Wanted Signal Frequency - Test Case 6.4.2

Sets the RF frequency of the wanted signal.

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:FREQ 100.0 kHz`

Wanted Signal Level - Test Case 6.4.2

Sets the RF level in edit mode '**User Definable**'.

In edit mode '**According to Standard**' the RF level is determined by the selected **Power Class**. It is always 10 dBm above the reference sensitivity.

- **-120.3 dB + 10 dBm** when **Wide Area BS**
- **-110.3 dB + 10 dBm** when **Medium Range BS**
- **-106.3 dB + 10 dBm** when **Local Area BS**

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:POW -45.0 dBm`

Slot Format DPCCH - Test Case 6.4.2

Selects the slot format.
Slot formats 0 to 5 are available for the DPCCH channel. The slot format defines the FBI mode and the TFCI status.

Slot format 0: no FBI field / TFCI on

Slot format 1: no FBI field / TFCI off

Slot format 2: 1 FBI field / TFCI on

Slot format 3: 1 FBI field / TFCI off

Slot format 4: 2 FBI field / TFCI off

Slot format 5: 2 FBI field / TFCI on

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:DPCC:SFOR 4`

Overall Symbol Rate - Test Case 6.4.2

Sets the overall symbol rate of all the DPDCH channels.
The structure of the DPDCH channel table depends on this parameter. The overall symbol rate determines which DPDCHs are active, which symbol rate they have and which channelization codes they use.

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:DPDC:ORAT D60K`

Power Ratio DPCCH to DPDCH - Test Case 6.4.2

Sets the channel power ratio of DPCCH to DPDCH.

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:DCR -3.0dB`

Propagation Delay - Test Case 6.4.2

Sets an additional propagation delay besides the fixed DL-UL timing offset of 1024 chip periods.

Note:
*The additional propagation delay is achieved by charging the start trigger impulse with the respective delay (= entering the value as an **External Delay** in the 3GPP Trigger /Marker menu).*

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:TRIG:EXT:DEL 140`

TPC Start Pattern - Test Case 6.4.2

Sets the TPC pattern for initialization of the base stations power level in edit mode '**User Definable**'. The TPC start pattern is sent before the TPC repeat pattern.
In edit mode '**According to Standard**' the pattern is fixed to '**Maximum Power Less n Steps**'.

Note:
*In edit mode '**According to Standard**', the TPC bits are read out of predefined data lists.*

The TPC start pattern ensures that the base station responds reliably to the TPC bits from the generator. It sets the base station to a defined initial state for the actual recording of the measurement data. The analyzer is only triggered after the generation of the start pattern using marker 1 of the generator.

Maximum Power Less n Steps

A sequence of power up steps (TPC bits "1") is followed by a number of power down steps (TPC bits "0").
A sufficiently long sequence of TPC bits "1" ('power up' commands) forces the base station to maximum transmit power. By the n 'power down' commands the base station is set to a defined number of n power steps (e.g. 1 dB or 0.5 dB) below its maximum transmit power at the beginning of the measurement.

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:DPCC:TPC:SDAT PMAX`

Data List

The TPC start pattern is taken from a user defined data list. When **Data List** is selected, a button appears for calling the **File Select** window.

Remote-control commands:
`SOUR:BB:W3GP:TS25141:WSIG:DPCC:TPC:SDAT DLIS`
`SOUR:BB:W3GP:TS25141:WSIG:DPCC:TPC:SDAT:DSEL "TS642_TPC_PATT"`

TPC Power Up Steps - Test Case 6.4.2

Sets the number of power up bits ("1") in the TPC start pattern. The total TPC start pattern length is the number of 'power up' bits plus the number of n 'power down' bits.
This parameter is only available for TPC Start Pattern = **Max. Pow. Less N Steps**.

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:DPCC:TPC:SDAT:PUST 4`

TPC Power Down Steps - Test Case 6.4.2

Sets the number of power down bits (‘0’) in the TPC start pattern. The total TPC start pattern length is the number of ‘power up’ ('1') bits plus the number of n ‘power down’ (‘0’) bits.
This parameter is only available for TPC Start Pattern = **Max. Pow. Less N Steps**.

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:DPCC:TPC:SDAT:PDST 2`

TPC Repeat Pattern - Test Case 6.4.2

Sets the TPC pattern for verification of the base stations power control steps.
In edit mode ‘**According to Standard**’ the selection is limited.

Single Power Steps
A 01 pattern is sent periodically for measurement of the transmitter power control step tolerance.

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:DPCC:TPC:RDAT SING`

Aggregated Power Steps
A 00000000001111111111 pattern is sent periodically for measurement of the transmitter aggregated power control step range. The power of the base station is measured after 10 consecutive equal TPC bits ('1' or '0').

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:DPCC:TPC:RDAT AGGR`

(All 1) Maximum Power
A all 1 pattern is sent continuously. The base station is forced to maximum power. This selection is only available in edit mode ‘**User Definable**’

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:DPCC:TPC:RDAT ONE`

(All 0) Minimum Power
A all 0 pattern is sent continuously. The base station is forced to minimum power. This selection is only available in edit mode ‘**User Definable**’

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:DPCC:TPC:RDAT ZERO`

User Defined Pattern
The TPC repeat pattern can be input. When **User Defined Pattern** is selected, an input field appears for entering the pattern. The maximum bit pattern length is 64 bits. This selection is only available in edit mode ‘**User Definable**’

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:DPCC:TPC:RDAT PATT`
`SOUR:BB:W3GP:TS25141:WSIG:DPCC:TPC:RDAT:PATT #H3F,8`

Data List
The TPC repeat pattern is taken from a data list. When **Data List** is selected, a button appears for calling the **File Select** window.

Remote-control commands:
`SOUR:BB:W3GP:TS25141:WSIG:DPCC:TPC:RDAT DLIS`
`SOUR:BB:W3GP:TS25141:WSIG:DPCC:TPC:RDAT:DSEL "TS642_TPC_RPATT"`

Carrying Out the Test Case 6.4.2 Measurement

For the preset Marker Configuration **Auto**, Marker 1 starts delayed by the TPC start pattern length. Each slot takes 0.625 ms and consists of 2560 chips. Depending on the slot format 1 or 2 TPC bits are sent for each slot.

The following table lists the settings on the base station:

Parameter	Value
Frequency	B, M and T
Test Model	2
Transmit power	Any
Scrambling Code	Any

1. Set the base station to the basic state
   - Initialize the base station,
   - Set the scrambling scheme,
   - Set the base station to test model 2,
   - Set the frequency

2. Set the signal generator to the basic state
   - Preset the signal generator unless some settings (e.g. in terms of I/Q and RF blocks) have to be kept.

3. Set the analyzer to the basic state
   - Set the test case wizard
   - Open the 3GPP FDD menu in the baseband block
   - Open the Test Case Wizard and select Test Case 6.4.2.
     The General Settings parameters are preset according to TS 25.141
   - Enter scrambling code and scrambling mode according to the base station scrambling scheme.
   - Enter the power class of the base station under test. The RF level is automatically adjusted to the selected power class.
   - Enter the test frequency (e.g. M). It must be the same as the base station has been set to.
   - Enter the Wanted Signal parameters.
   - Activate the settings with the Apply Settings button.
     The signal generator is now ready to start signal generation

4. Set the analyzer to the measurement frequency

5. Switch on RF output

6. Start the measurement
   - Send a start trigger impulse from the base station to the signal generator and to the analyzer. Signal generation and measurement procedures are started.

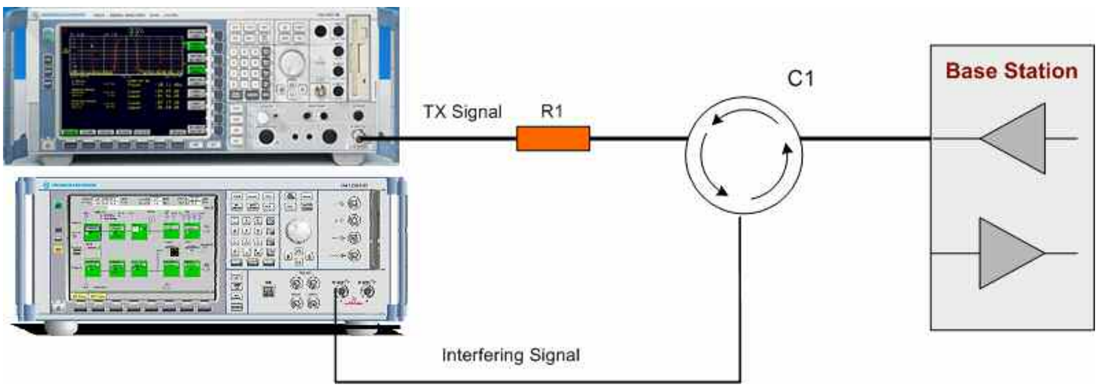
7. Calculate the result
   The analyzer calculates the resulting code domain power of the BS downlink channel.

Test Case 6.6 - Transmit Intermodulation

The test case requires the basic configuration.

It can be performed using the standard test setup according to TS 25.141. A vector signal analyzer is required, e.g. the Vector Signal Analyzer R&S FSQ.

For the signal generator, in case of two-path instruments signal routing to path A is assumed.
RF port A is connected to the RF input of the analyzer via a circulator and an external attenuator. The Tx Signal of the base station is connected to the RF input of the analyzer via a circulator.



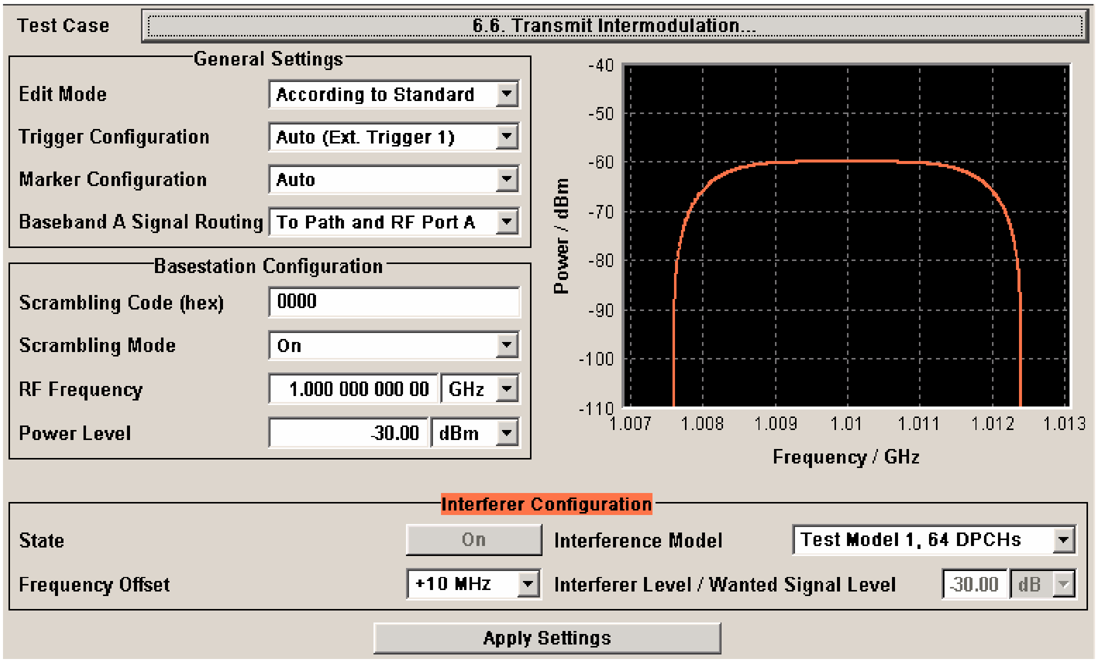
The signal generator outputs the test model interfering signal with different frequency offsets in relation to the BS carrier frequency and provides the trigger for the analyzer (MARKER 1).

Test Purpose and Test Settings - Test Case 6.6

The test case verifies that a BS transmitter has the capability to inhibit intermodulation products of non linear elements caused by the presence of an interfering signal at the adjacent frequency channels from the signal generator.
The test is passed when the transmit intermodulation level is below an upper out of band emission and spurious emission threshold at the test frequencies B, M, and T.

Quotation from TS 25.141:

> *The transmit intermodulation performance is a measure of the capability of the transmitter to inhibit the generation of signals in its non linear elements caused by presence of the wanted signal and an interfering signal reaching the transmitter via the antenna*
> *The transmit intermodulation level is the power of the intermodulation products when a WCDMA modulated interference signal is injected into an antenna connector at a mean power level of 30 dB lower than that of the mean power of the wanted signal. The frequency of the interference signal shall be 5 MHz, 10 MHz and 15 MHz offset from the subject signal carrier frequency, but exclude interference frequencies that are outside of the allocated frequency band for UTRA-FDD downlink specified in subclause 3.4.1.*
> *The requirements are applicable for single carrier.*



BS Frequency - Test Case 6.6

Enters the RF frequency of the base station.

Note:
In this test case the signal generator generates no wanted signal, but just the interfering signal.

Remote-control command:
`SOUR:BB:W3GP:TS25141:BSS:FREQ 1GHz`

BS RF Power - Test Case 6.6

Enters the RF power of the base station.

Note:
In this test case the signal generator generates no wanted signal, but just the interfering signal.

Remote-control command:
`SOUR:BB:W3GP:TS25141:BSS:POW -30`

Interferer State - Test Case 6.6

Enables/disables the signal generation of the interfering 3GPP signal. In edit mode '**According to Standard**' the state is fixed to '**On**'.

Note
In this test case the signal generator generates no wanted signal, but just the interfering signal .

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:STAT ON`

Interferer Mode - Test Case 6.6

Selects the interfering signal from a list of test models in accordance with TS 25.141. All test models refer to the predefined downlink configurations. In edit mode '**According to Standard**' Test Model 1, 64 DPCHs is fixed.
The following test models are available for selection in edit mode '**User Definable**':

- Test Model 1; 64 DPCHs
- Test Model 1; 16 Channels
- Test Model 1; 32 Channels
- Test Model 2
- Test Model 3; 16 Channels
- Test Model 3; 32 Channels
- Test Model 4
- Test Model 5; 38 Channels
- Test Model 5; 28 Channels
- Test Model 5; 8 Channels

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:SETT:TMOD:BST TM164`

Frequency Offset - Test Case 6.6

Enters the frequency offset of the interfering signal versus the wanted signal.
In edit mode '**According to Standard**' the choice is limited to values between +/- 15 MHz in 5-MHz steps:

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:FOFF -15 MHz`

Interferer Level to Signal Level - Test Case 6.6

Enters the ratio of interfering signal level versus wanted signal level.
In edit mode '**According to Standard**' the value is fixed to - 30 dB:

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:CNR -30`

Carrying Out a Test Case 6.6 Measurement

The signal generator outputs the test model interfering signal.

The following table lists the settings on the base station:

Parameter	Value
Frequency	B, M and T
Test Model	1
Transmit power	Maximum
Scrambling Code	any

1. Set the base station to the basic state
   - Initialize the base station,
   - Set the scrambling scheme,
   - Set the base station to test model 1,
   - Set maximum transmit power,
   - Set the frequency

2. Set the signal generator to the basic state
   - Preset the signal generator unless some settings (e.g. in terms of I/Q and RF blocks) have to be kept.

3. Set the analyzer to the basic state

4. Set the test case wizard
   - Open the 3GPP FDD menu in the baseband block
   - Open the Test Case Wizard and select Test Case 6.6.
     The **General Settings** parameters are preset according to TS 25.141
   - Enter scrambling code and scrambling mode according to the base station scrambling scheme.
   - Enter the power class of the base station under test. The RF level is automatically adjusted to the selected power class.
   - Enter the test frequency (e.g. M). It must be the same as the base station has been set to.
   - Enter the Interfering Signal parameters.
   - Activate the settings with the Apply Settings button.
     The signal generator is now ready to start signal generation

5. Set the analyzer to the measurement frequency

6. Switch on RF output

7. Start the measurement
   - Send a start trigger impulse from the base station to the signal generator and to the analyzer. Signal generation and measurement procedures are started.

8. Calculate the result
   The analyzer calculates the out of band emission and the spurious emission.

Overview - Receiver Tests - 3GPP FDD

Basic Configuration - Receiver Tests - 3GPP FDD

The test cases for receiver tests require at least the following equipment layout for the signal generator:

- Digital Standard 3GPP FDD (K42)
- Universal Coder / Arbitrary Waveform Generator (B10/B11),
- Baseband Main module (B13),
- Frequency option (B10x: RF 100 kHz - x GHz).

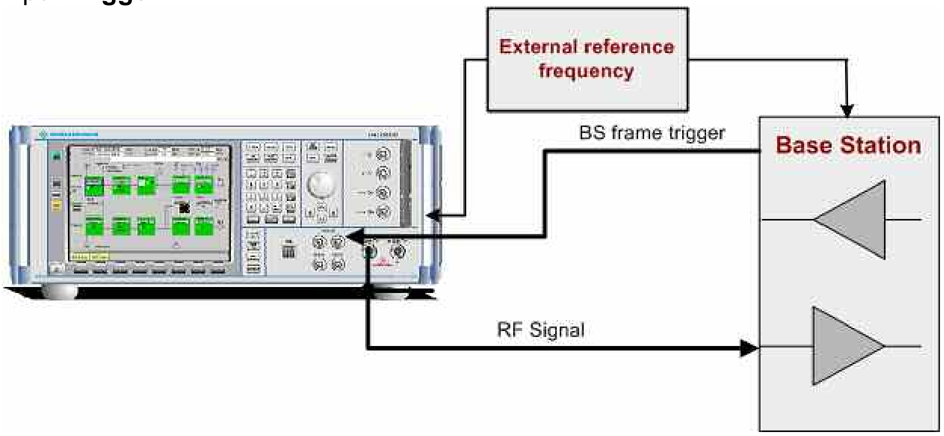
If the test case requires further options they are listed together with the description of the test case. Receiver test can be performed with the signal generator only, i.e. without additional measuring equipment.

Test Setups - Receiver Tests - 3GPP FDD

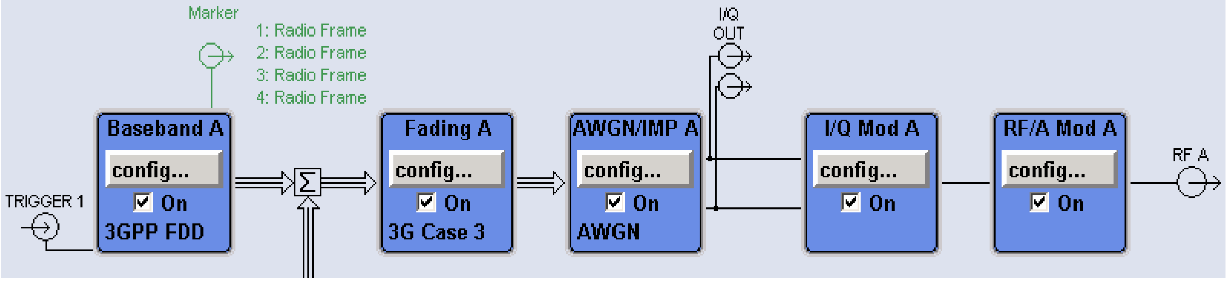
The tests can be performed using the standard test setup according to TS 25.141. Test setups beside the two standard test setups described below are specified at the Test Case description.

Standard Test Setup - One Path

In case of two-path instruments signal routing to path A is assumed for the graph below. RF port A outputs the wanted signal (with or without fading and/or interference) and is connected to the Rx port of the base station. The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.



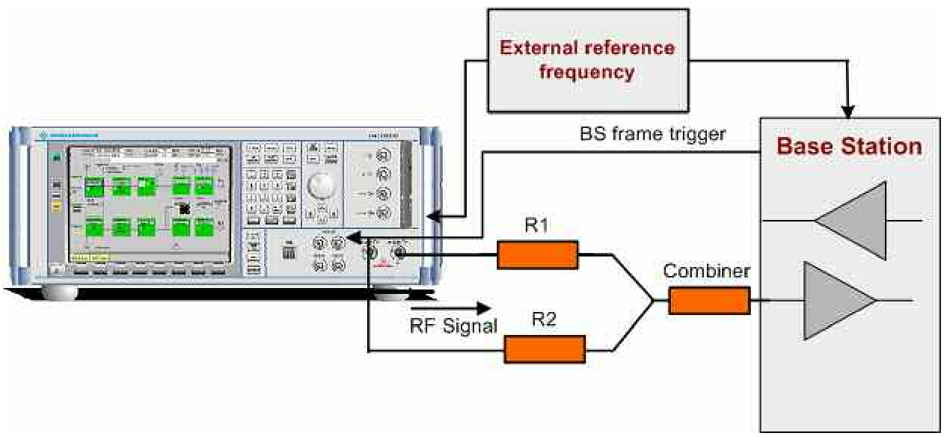
For two-path instruments it is also possible to route baseband signal A to RF output B and connect RF output B to the Rx port of the base station.
Example: Signal Routing **To Path and RF port A** for test case 6.3.2 Multipath Fading Case 2:



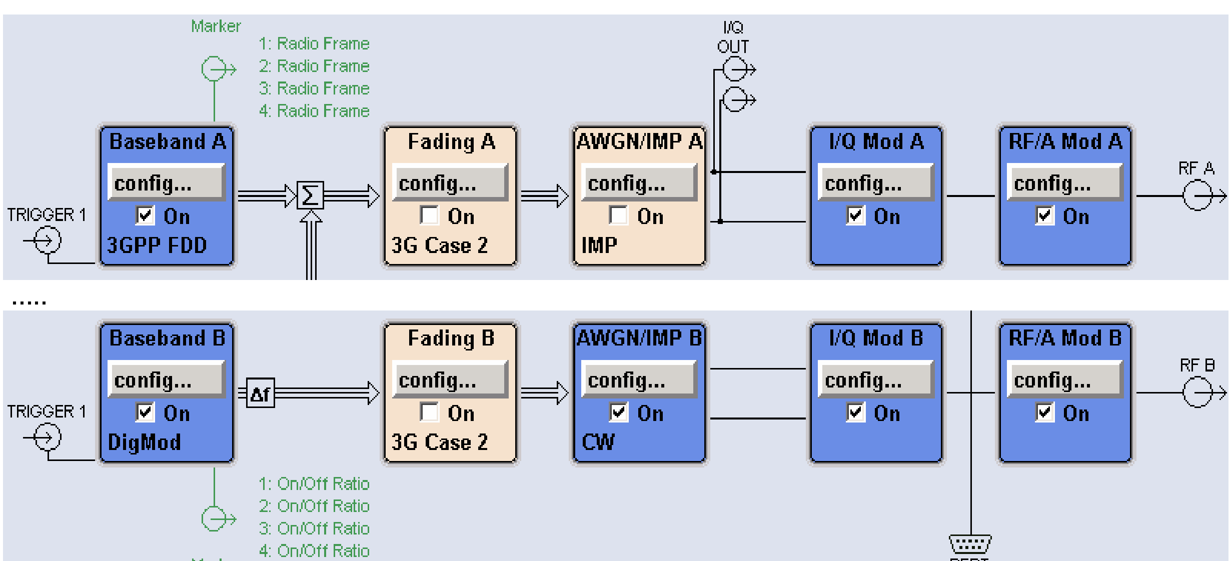
Standard Test Setup - Two Paths

For **two-paths measurements**, the test cases always require option Second RF path (B20x), a second option Baseband Main Module (B13) and at least one option to generate the interfering signal in addition to the basic configuration. The signal routing can be selected, the wanted signal can be provided either at output RF A or at output RF B.

The signal generator outputs the reference measurement channel signal (= wanted signal) at output RF A and the interfering signal(s) at output RF B. After combining the two(three) signals the sum signal is fed into the base station Rx port. The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.

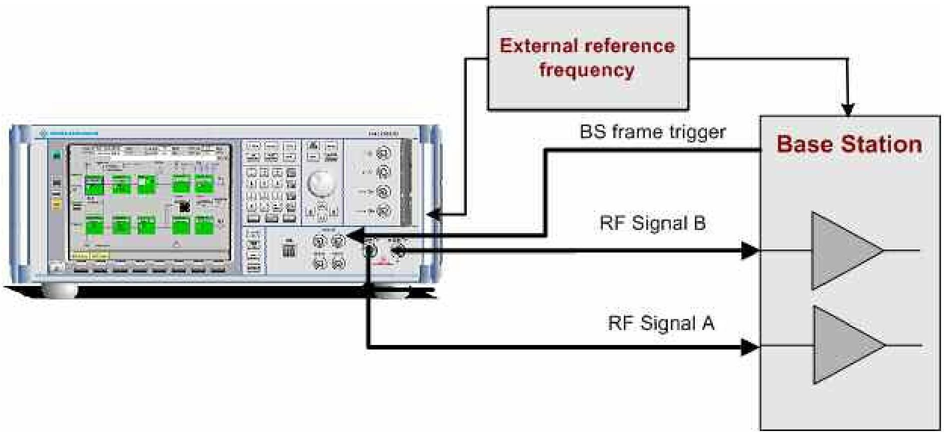


Example: Signal Routing **To Path and RF port A** for test case 7.6 Intermodulation Characteristics:



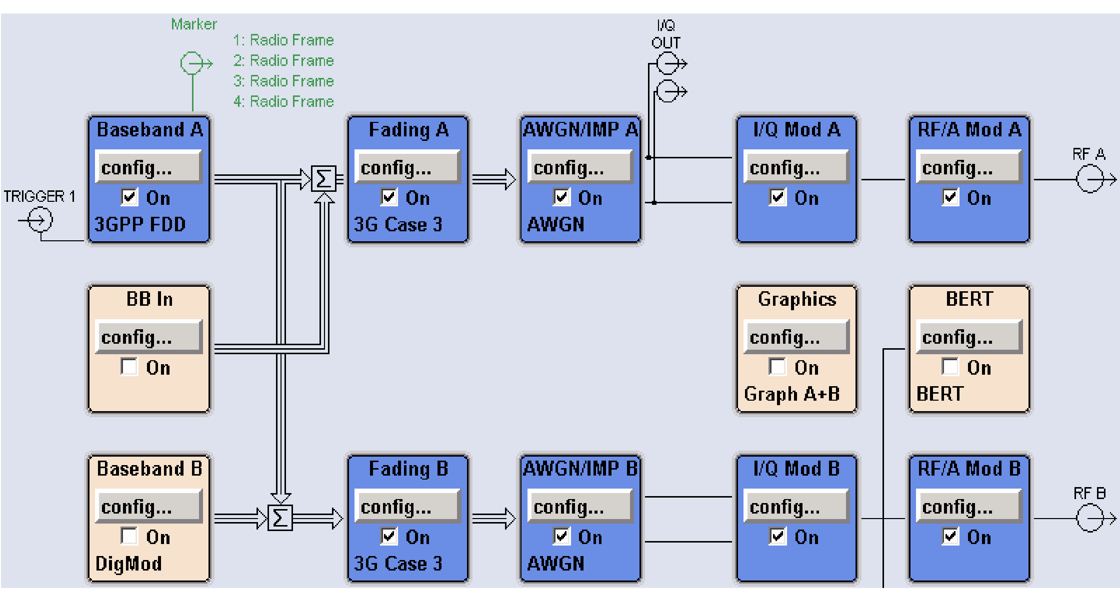
Standard Test Setup - Diversity Measurements

For **diversity measurements**, the test cases always require at least option Second RF path (B20x) and a second option Baseband Main Module (B13) in addition to the basic configuration. The signal routing is fixed.
RF output A and RF output B transmit the corrupted reference measurement channel signal (wanted signal) and are connected to the Rx ports of the base station for diversity reception. The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.



Example: Signal Routing for test case 8.3.1 Multipath Fading Case 1:

Note:
As signal routing takes place at the output of the baseband block, the interference settings of the two paths are identical for diversity measurments.



Carrying Out a Receiver Test Measurement

The following instructions lists the general steps for performing a receiver test. Specific requirements are described together with the individual test case.

1. Set the base station to the basic state
   - Initialize the base station,
   - Set the scrambling scheme,
   - Set the frequency
   - Set the base station to receive the Reference Measurement Channel (for most test cases),

2. Set the signal generator to the basic state
   - Preset the signal generator.

3. Set the test case wizard
   - Open the 3GPP FDD menu in the baseband block
   - Open the Test Case Wizard and select Test Case
     The General Settings parameters are preset according to TS 25.141
   - Enter scrambling code and scrambling mode according to the base station scrambling scheme.
   - Enter additional required parameters, e.g. power class of base station.
   - Enter the test frequency (e.g. M). It must be the same as the base station has been set to.
   - Activate the settings with the **Apply Settings** button.
     The signal generator is now ready to start signal generation

4. Switch on RF output

5. If required, make additional settings (e.g. in the I/Q Mod or RF block) or change test case settings (e.g. in the Fading block)

6. Start the measurement
   - Send a start trigger impulse (e.g. SFN modulo 4) from the base station to the signal generator.
     The signal generator will start signal generation.

7. Calculate the result
   The base station internally calculates the BER, BLER or Pd depending on the test case. This value is compared to the required value.

General Wanted Signal Parameters - Receiver Tests - 3GPP FDD

The following parameters are available for all receiver tests. Specific parameters are listed together with the Test Case description.

Wanted Signal State - Receiver Tests

Enables/disables the signal generation of the wanted 3GPP signal.
In edit mode '**According to Standard**' the state is fixed to '**On**'.

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:STAT ON | OFF`

RMC - Receiver Tests

Sets the reference measurement channel.

In edit mode '**According to Standard**' the selection of the reference measurement channel is restricted.

In edit mode '**User definable**', all following reference measurement channels are available for selection:

- **RMC 12.2 kbps** 12.2 kbps measurement channel
- **RMC 64 kbps** 64 kbps measurement channel
- **RMC 144 kbps** 144 kbps measurement channel
- **RMC 384 kbps** 384 kbps measurement channel
- **AMR 12.2 kbps** channel coding for the AMR coder

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:DPDC:CCOD:TYPE M12K2`

Wanted Signal Frequency - Receiver Tests

Sets the RF frequency of the wanted signal.

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:FREQ 100.0 kHz`

Wanted Signal Level - Receiver Tests

Sets the RF level in edit mode '**User Definable**'.

In edit mode '**According to Standard**' the RF level is determined by the selected **Power Class**.

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:POW -45.0`

Receiver Characteristics - Receiver Tests - 3GPP FDD

Test Case 7.2 - Reference Sensitivity Level

The test case requires the basic configuration and is performed using the standard test setup for one path. The signal generator outputs a reference measurement channel signal.
The following table lists the settings on the base station:

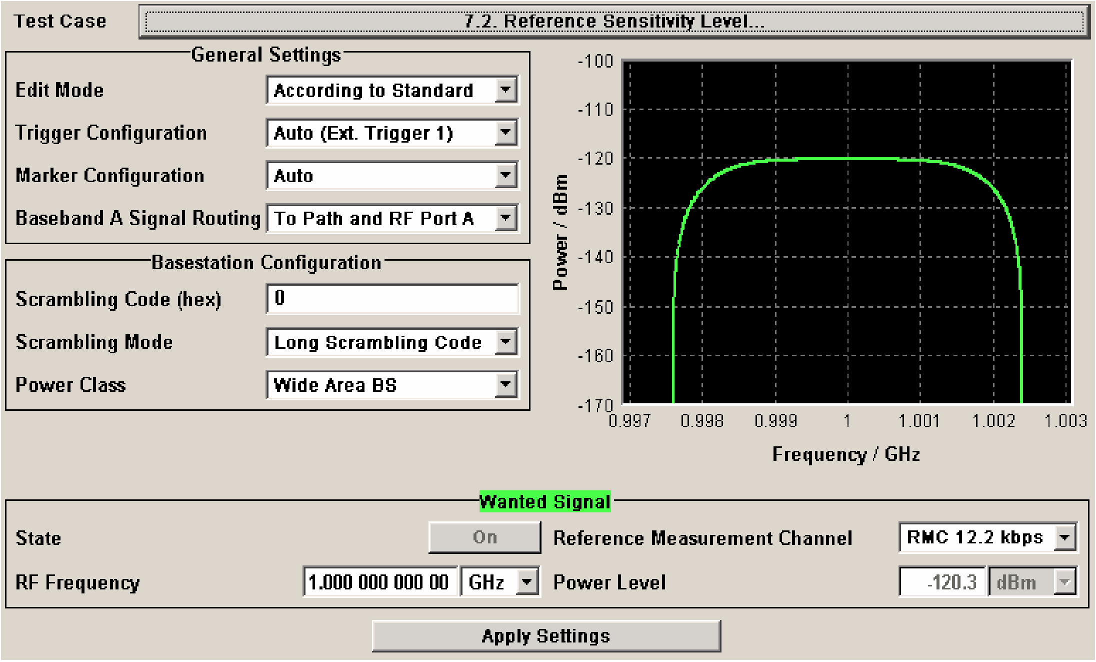
Parameter	Value
Frequency	B, M and T
RMC	12.2 kbps
Scrambling code	Any
TPC function	OFF

Test Purpose and Test Settings - Test Case 7.2

The test case verifies that a BS receiver has the capability to correctly demodulate the signal sent by the signal generator at the specified (low) reference sensitivity power level.
The test is passed when the resulting BER (calculated internally by the BS) is below a 0.001 at the test frequencies B, M, and T. Note TS 25.141 Annex C: General Rules for Statistical Testing, where test conditions in terms of test methods and test conditions are defined.
Quotation from TS 25.141:

> *The reference sensitivity level is the minimum mean power received at the antenna connector at which the BER shall not exceed the specific value indicated in subclause 7.2.2. The test is set up according to Figure B.7 and performed without interfering signal power applied to the BS antenna connector. For duplex operation, the measurement configuration principle is indicated for one duplex branch in Figure B.7. For internal BER calculation an example of the test connection is as shown in figure B.7. The reference point for signal power is at the input of the receiver (antenna connector).*

The measurement must be made at the three frequencies B, M and T.



The settings of the wanted signal are described in section "*General Wanted Signal Parameters - Receiver Tests - 3GPP FDD*", on page 2.25.

Test Case 7.3 - Dynamic Range

The test case is performed using the standard test setup for one path.
It requires option K62 - Additional White Gaussian Noise (AWGN) in addition to the basic configuration.

The signal generator outputs a reference measurement channel signal disturbed by an interfering AWGN signal.

The following table lists the settings on the base station:

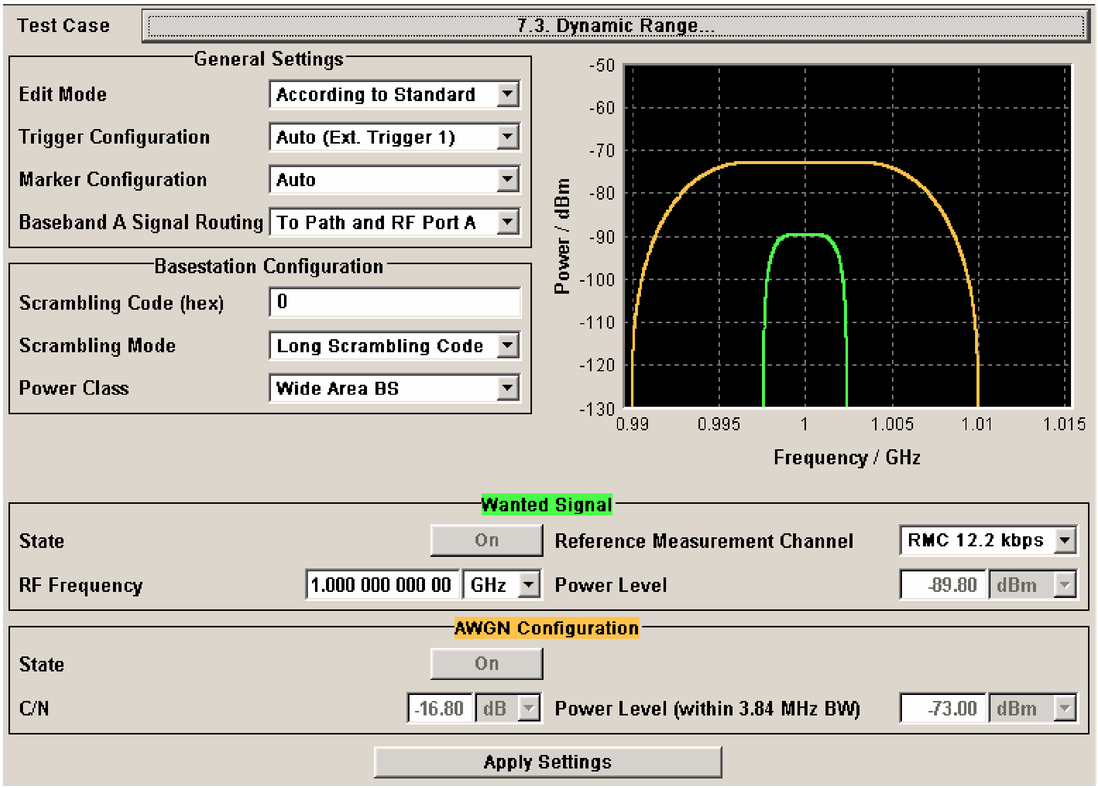
Parameter	Value
Frequency	B, M and T
RMC	12.2 kbps
Scrambling code	Any

Test Purpose and Test Settings - Test Case 7.3

The test case verifies that a BS receiver has the capability to demodulate the useful signal sent by the signal generator even when it is superimposed by a heavy AWGN (Additive White Gaussian Noise) signal.
The test is passed when the resulting BER (calculated internally by the BS) is below 0.001 at the test frequencies B, M, and T. Note TS 25.141 Annex C: General Rules for Statistical Testing, where test conditions in terms of test methods and test conditions are defined.

Quotation from TS 25.141:

> *Receiver dynamic range is the receiver ability to handle a rise of interference in the reception frequency channel. The receiver shall fulfil a specified BER requirement for a specified sensitivity degradation of the wanted signal in the presence of an interfering AWGN signal in the same reception frequency channel.*



Besides the settings described for all receiver tests, AWGN configuration is possible in edit mode "**User Definable**". In edit mode '**According to Standard**' the AWGN settings are preset:

AWGN State - Test Case 7.3

Enables/disables the generation of the AWGN signal.
In edit mode '**According to Standard**' the state is fixed to '**On**'.

Remote-control command:
`SOUR:BB:W3GP:TS25141:AWGN:STAT ON | OFF`

C to N - Test Case 7.3

Sets the carrier/noise ratio.

In edit mode '**According to Standard**' the state is fixed to '**-16.8 dB**'.

Remote-control command:
`SOUR:BB:W3GP:TS25141:AWGN:CNR -14dB`

Power Level - Test Case 7.3

Sets the AWGN level in edit mode '**User Definable**'.

In edit mode '**According to Standard**' the AWGN level is determined by the selected **Power Class** .

- **-73 dB** for **Wide Area BS**
- **-63 dB** for **Medium Range BS**
- **-59 dB** for **Local Area BS**

Remote-control command:
`SOUR:BB:W3GP:TS25141:AWGN:POW:NOIS -45.0 dBm`

Test Case 7.4 - Adjacent Channel Selectivity

The test case requires option Second RF path (B20x), a second option Baseband Main Module (13), a second option Baseband Generator (B10/B11) and a second option Digital Standard 3GPP FDD (K42) in addition to the standard configuration. It is performed using the standard test setup for two paths.

The signal generator outputs the reference measurement channel signal (= wanted signal) at output RF A(B) and the adjacent channel interfering signal at output RF B(A). After combining the two signals the sum signal is fed into the base station Rx port. The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.
The measurement must be made at the three frequencies B, M and T.

The following table lists the settings on the base station:

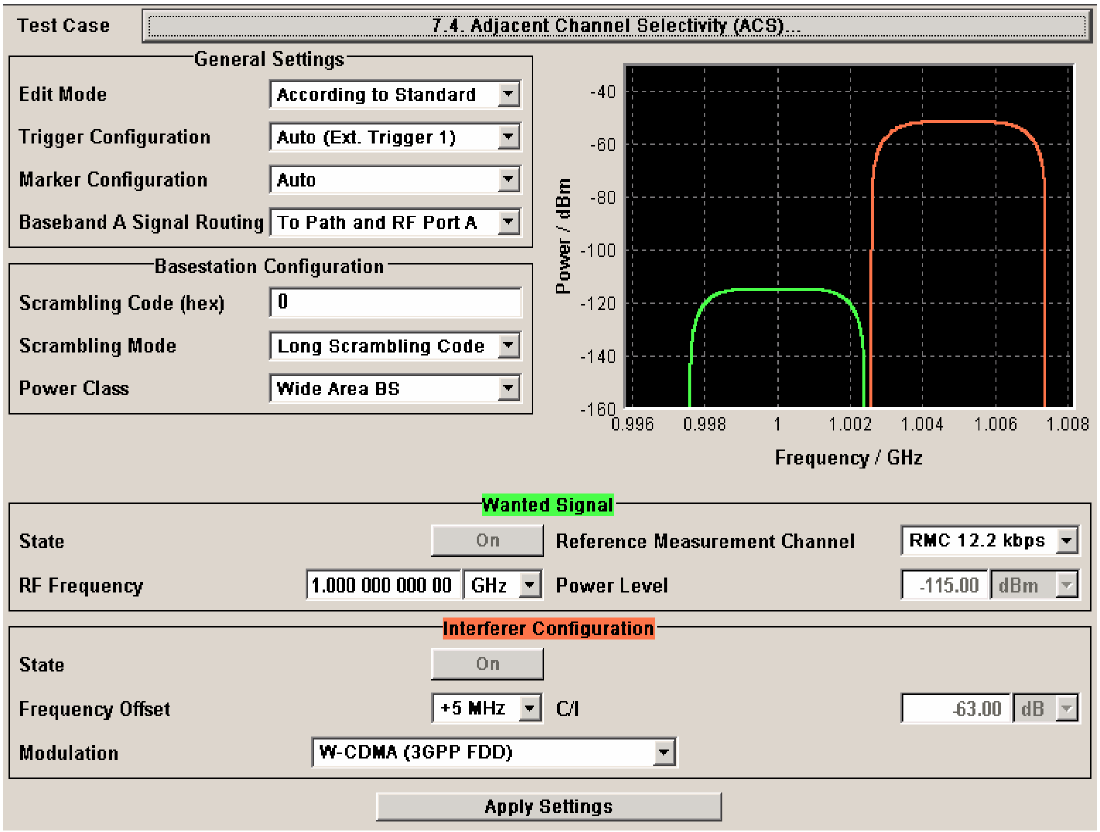
Parameter	**Value**
Frequency	B, M and T
RMC	12.2 kbps
Scrambling code	Any

Test Purpose and Test Settings - Test Case 7.4

The test case verifies that a BS receiver has the capability to demodulate a signal that is sent by the signal generator but superimposed by a heavy WCDMA signal in the adjacent channel.
The test is passed when the resulting BER (calculated internally by the BS) is below 0.001 at the test frequencies B, M, and T. Note TS 25.141 Annex C: General Rules for Statistical Testing, where test conditions in terms of test methods and test conditions are defined.

Quotation from TS 25.141:

> *Adjacent channel selectivity (ACS) is a measure of the receiver ability to receive a wanted signal at is assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the center frequency of the assigned channel. ACS is the ratio of the receiver filter attenuation on the assigned channel frequency to the receive filter attenuation on the adjacent channel(s).*
> *The interference signal is offset from the wanted signal by the frequency offset Fuw. The interference signal shall be a W-CDMA signal as specified in Annex I.*



Besides the settings described for all receiver test, interferer configuration is possible in edit mode "**User Definable**". In edit mode '**According to Standard**' the settings are preset.

Interferer State - Test Case 7.4

Enables/disables the signal generation of the interfering uplink signal in the second path.
In edit mode '**According to Standard**' the state is fixed to '**On**'.

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:STAT ON | OFF`

Frequency Offset - Test Case 7.4

Enters the frequency offset of the interfering signal versus the wanted signal.
In edit mode '**According to Standard**' the choice is limited to +/- 5MHz.

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:FOFF -5MHz`

C to I - Test Case 7.4

Enters the ratio of wanted signal level to interfering signal level.
In edit mode '**According to Standard**' the value is fixed to - 63 dB:

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:CNR -30`

Interferer Modulation - Test Case 7.4

Selects the type of modulation for the interfering uplink signal in the second path.
In edit mode '**According to Standard**' the modulation is fixed to '**W-CDMA (3GPP FDD)**'.

W-CDMA (3GPP FDD)

A 3GPP FDD uplink signal with the following characteristic is generated for path B.
- DPCCH + DPDCH mode
- DPDCH with 240 ksps, 0 dB relative power, PRBS23 data source
- DPCCH with -5.46 dB relative power and slot format 2
- Same scrambling code as the wanted signal (**3GPP FDD** menu)

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:TYPE WCDM`

QPSK (3.84 MHz, Root Cosine 0.22)

A QPSK signal (3.84 MHz bandwidth, root cosine filter 0.22, PRBS9 data source) is generated for path B (**Custom Dig Mod** menu).

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:TYPE QPSK`

Test Case 7.5 - Blocking Characteristics

The test case requires option Second RF path (B20x), a second option Baseband Main Module (13), a second option Baseband Generator (B10/B11) and a second option Digital Standard 3GPP FDD (K42) in addition to the standard configuration. It is performed using the standard test setup for two paths.

The signal generator provides the reference measurement channel signal (= wanted signal) at output RF A and the interfering signal with a selectable frequency offset at output RF B. After combining the two signals the sum signal is fed into the base station Rx port. The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.
The measurement must be made at the frequency M.

The following table lists the settings on the base station:

Parameter	**Value**
Frequency	M
RMC	12.2 kbps
Scrambling code	Any

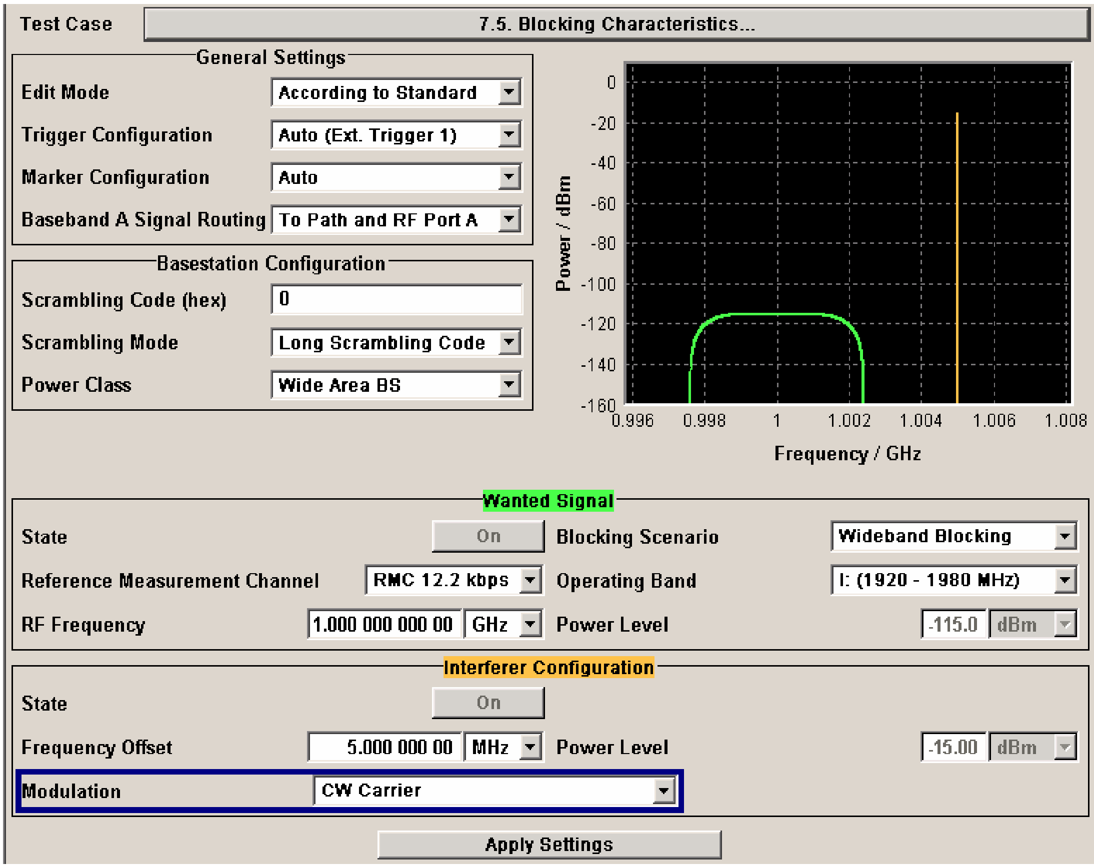
Note:
In comparison with test case 7.4 this test case requires very large offset frequencies for the interfering signal. Therefore, a second RF output is always required. Due to the maximum frequency range of 6 GHz (option B106), the test case can not be performed at all frequency offsets required by the standard (1 MHz to 12.75 GHz).

Test Purpose and Test Settings - Test Case 7.5

The test case verifies that a BS receiver has the capability to demodulate a signal that is sent by the signal generator but superimposed by a heavy interfering signal in the not adjacent channel.
The test is passed when the resulting BER (calculated internally by the BS) is below 0.001 at the test frequency M. Note TS 25.141 Annex C: General Rules for Statistical Testing, where test conditions in terms of test methods and test conditions are defined.

Quotation from TS 25.141:

The blocking characteristics is a measure of the receiver ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the adjacent channels. The blocking performance requirement applies as specified in tables 7.4A to 7.4J.
The requirements shall apply to the indicated base station class, depending on which frequency band is used. The requirements in Tables 7.4D to 7.4J may be applied for the protection of FDD BS receivers when GSM900, DCS1800, PCS1900, GSM850 and/or FDD BS operating in Bands I to VI are co-located with a UTRA FDD BS.



Besides the settings described for all receiver test, the following settings are possible in edit mode "**User Definable**". In edit mode '**According to Standard**' most settings are preset.

Additional settings in the **Wanted Signal** section:

Blocking Scenario - Test Case 7.5

Selects the type of blocking scenario in edit mode '**According to Standard**'.
The type of blocking scenario presets the selected **Interferer Modulation** and the **Power Level.**

Wideband Blocking

The interferer signal for wide band blocking depends on the set **Operating Band** and **RF Frequency**:

- As long as the interferer **RF frequency** lies within or close to the selected **Operating Band**, a **3GPP FDD** uplink signal with a defined power level (depending on the selected Power Class and RMC) is generated for path B.
- When the interferer **RF Frequency** lies outside the selected **Operating Band**, a **CW carrier** interfering signal with a defined power level (depending on the selected Power Class and RMC) is generated for path B.

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:BTYP WIDE`

Collocated BS Blocking

A CW carrier interfering signal with a defined power level (depending on the selected Power Class and RMC) is generated for path B (**RF** menu)

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:BTYP COL`

Narrowband Blocking

A GMSK (270.833 kHz) interfering signal with a defined power level (depending on the selected Power Class and RMC) is generated for path B (**Custom Dig Mod** menu).

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:BTYP NARR`

Operating Band - Test Case 7.5

Selects the operating band of the base station for **Wideband Blocking**. The operating band is required for the calculation of power levels and interferer modulation.

- Operating band I: (1920 – 1980 MHz)
- Operating band II: (1850 – 1910 MHz)
- Operating band III: (1710 – 1785 MHz)
- Operating band IV: (1710 – 1755 MHz)
- Operating band V: (824 – 849 MHz)
- Operating band VI: (830 – 840 MHz)

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:OBAN II`

Settings in the **Interferer Signal** section:

Interferer State - Test Case 7.5

Enables/disables the signal generation of the interfering signal in the second path.
In edit mode '**According to Standard**' the state is fixed to '**On**'.

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:STAT OFF`

Frequency Offset - Test Case 7.5

Enters the frequency offset of the interfering signal versus the wanted signal.

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:FOFF -5 MHz`

Power Level - Test Case 7.5

Enters the level of the interfering signal.
In edit mode '**According to Standard**' the value is fixed to a value determined by the selected **Blocking Scenario**, the **RF frequency** and **Frequency Offset** and the base station **Power Class**.

For blocking scenario **Colocated BS Blocking** several power settings are permitted by the standard. The following table show the blocking requirements for Medium Range and Local Area BS when co-located with BS in other bands.
For blocking performance requirement tables see section "Blocking performance requirements - Test Case 7.5".

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:POW -15`

Blocking performance requirement for Medium Range BS when co-located with BS in other bands.

Co-located BS type	Center Frequency of Interfering Signal	Interfering Signal mean power
Micro GSM850	869 – 894 MHz	-3 dBm
MR UTRA-FDD Band V	869 – 894 MHz	+8 dBm
MR UTRA-FDD Band III	1805 – 1880 MHz	+8 dBm
Micro DCS1800	1805 – 1880 MHz	+5 dBm
Micro PCS1900	1930 – 1990 MHz	+5 dBm
MR UTRA-FDD Band II	1930 – 1990 MHz	+8 dBm

Blocking performance requirement for Local Area BS when co-located with BS in other bands.

Co-located BS type	Center Frequency of Interfering Signal	Interfering Signal mean power
LA UTRA-FDD Band V	869 – 894 MHz	-6 dBm
Pico GSM850	869 – 894 MHz	-7 dBm
LA UTRA-FDD Band III	1805 – 1880 MHz	-6 dBm
Pico DCS1800	1805 – 1880 MHz	-4 dBm
LA UTRA-FDD Band II	1930 – 1990 MHz	-6 dBm
Pico PCS1900	1930 – 1990 MHz	-4 dBm

Interferer Modulation - Test Case 7.5

Selects the type of modulation for the adjacent channel interfering signal at output RF B.
In edit mode '**According to Standard**' the modulation is fixed to a value determined by the selected **Blocking Scenario**.

W-CDMA (3GPP FDD)

A 3GPP FDD uplink signal with the following characteristic is generated for path B.
- DPCCH + DPDCH mode
- DPDCH with 240 ksps, 0 dB relative power, PRBS23 data source
- DPCCH with -5.46 dB relative power and slot format 2
- Same scrambling code as the wanted signal

(**3GPP FDD** menu)

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:TYPE WCDM`

QPSK (3.84 MHz, Root Cosine 0.22)

A QPSK signal (3.84 MHz bandwidth, root cosine filter 0.22, PRBS9 data source) is generated for path B (**Custom Dig Mod** menu).

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:TYPE QPSK`

CW Carrier

A QPSK signal (3.84 MHz bandwidth, root cosine filter 0.22, PRBS9 data source) is generated for path B (**Custom Dig Mod** menu).

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:TYPE CW`

GMSK (270.833 kHz)

A GMSK signal (270.833 kHz bandwidth, PRBS9 data source) is generated for path B (**Custom Dig Mod** menu).

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:TYPE GMSK`

Blocking performance requirements - Test Case 7.5

The following table are taken from TS25141 (V6.6.0), chapter 7.5.5..

Blocking performance requirement for Medium Range BS when co-located with BS in other bands

Co-located BS type	Center Frequency of Interfering Signal	Interfering Signal mean power
Micro GSM850	869 – 894 MHz	-3 dBm
MR UTRA-FDD Band V	869 – 894 MHz	+8 dBm
MR UTRA-FDD Band III	1805 – 1880 MHz	+8 dBm
Micro DCS1800	1805 – 1880 MHz	+5 dBm
Micro PCS1900	1930 – 1990 MHz	+5 dBm
MR UTRA-FDD Band II	1930 – 1990 MHz	+8 dBm

Blocking performance requirement for Local Area BS when co-located with BS in other bands

Co-located BS type	Center Frequency of Interfering Signal	Interfering Signal mean power
LA UTRA-FDD Band V	869 – 894 MHz	-6 dBm
Pico GSM850	869 – 894 MHz	-7 dBm
LA UTRA-FDD Band III	1805 – 1880 MHz	-6 dBm
Pico DCS1800	1805 – 1880 MHz	-4 dBm
LA UTRA-FDD Band II	1930 – 1990 MHz	-6 dBm
Pico PCS1900	1930 – 1990 MHz	-4 dBm

Blocking characteristics for Wide Area BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
I	1920 - 1980 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal *
	1900 - 1920 MHz 1980 - 2000 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal *
	1 MHz -1900 MHz 2000 MHz - 12750 MHz	-15 dBm	-115 dBm	—	CW carrier
II	1850 - 1910 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal *
	1830 - 1850 MHz 1910 - 1930 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal *
	1 MHz - 1830 MHz 1930 MHz - 12750 MHz	-15 dBm	-115 dBm	—	CW carrier
III	1710 – 1785 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal *
	1690 - 1710 MHz 1785 – 1805 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal *
	1 MHz - 1690 MHz 1805 MHz - 12750 MHz	-15 dBm	-115 dBm	—	CW carrier
IV	1710 – 1755 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal *
	1690 - 1710 MHz 1755 – 1775 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal *
	1 MHz - 1690 MHz 1775 MHz - 12750 MHz	-15 dBm	-115 dBm	—	CW carrier

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
V	824-849 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal *
	804-824 MHz 849-869 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal *
	1 MHz – 804 MHz 869 MHz - 12750 MHz	-15 dBm	-115 dBm	—	CW carrier
VI	810 – 830 MHz 840 – 860 MHz	-40 dBm	-115 dBm	10 MHz	WCDMA signal *
	1 MHz – 810 MHz 860 MHz – 12750 MHz	-15 dBm	-115 dBm	—	CW carrier

*: The characteristics of the W-CDMA interference signal are specified in Annex I of TS 25.141.

Blocking performance requirement for Wide Area BS when co-located with BS in other bands.

Co-located BS type	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Type of Interfering Signal
Macro GSM900	921 – 960 MHz	+16 dBm	-115 dBm	CW carrier
Macro DCS1800	1805 – 1880 MHz	+16 dBm	-115 dBm	CW carrier
Macro PCS1900	1930 – 1990 MHz	+16 dBm	-115 dBm	CW carrier
Macro GSM850	869 – 894 MHz	+16 dBm	-115 dBm	CW carrier
WA UTRA-FDD Band I	2110 – 2170 MHz	+16 dBm	-115 dBm	CW carrier
WA UTRA-FDD Band II	1930 – 1990 MHz	+16 dBm	-115 dBm	CW carrier
WA UTRA-FDD Band III	1805 – 1880 MHz	+16 dBm	-115 dBm	CW carrier
WA UTRA-FDD Band IV	2110 – 2155 MHz	+16 dBm	-115 dBm	CW carrier
WA UTRA-FDD Band V	869 – 894 MHz	+16 dBm	-115 dBm	CW carrier
WA UTRA-FDD Band VI	875 – 885 MHz	+16 dBm	-115 dBm	CW carrier

Blocking performance requirement for Medium Range BS when co-located with BS in other bands.

Co-located BS type	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Type of Interfering Signal
Micro GSM900	921 – 960 MHz	-3 dBm	-105 dBm	CW carrier
Micro DCS1800	1805 – 1880 MHz	+5 dBm	-105 dBm	CW carrier
Micro PCS1900	1930 – 1990 MHz	+5 dBm	-105 dBm	CW carrier
Micro GSM850	869 – 894 MHz	-3 dBm	-105 dBm	CW carrier
MR UTRA-FDD Band I	2110 – 2170 MHz	+8 dBm	-105 dBm	CW carrier
MR UTRA-FDD Band II	1930 – 1990 MHz	+8 dBm	-105 dBm	CW carrier
MR UTRA-FDD Band III	1805 – 1880 MHz	+8 dBm	-105 dBm	CW carrier
MR UTRA-FDD Band IV	2110 – 2155 MHz	+8 dBm	-105 dBm	CW carrier
MR UTRA-FDD Band V	869 – 894 MHz	+8 dBm	-105 dBm	CW carrier
MR UTRA-FDD Band VI	875 – 885 MHz	+8 dBm	-105 dBm	CW carrier

Blocking performance requirement for Local Area BS when co-located with BS in other bands.

Co-located BS type	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Type of Interfering Signal
Pico GSM900	921 – 960 MHz	-7 dBm	-101 dBm	CW carrier
Pico DCS1800	1805 – 1880 MHz	-4 dBm	-101 dBm	CW carrier
Pico PCS1900	1930 – 1990 MHz	-4 dBm	-101 dBm	CW carrier
Pico GSM850	869 – 894 MHz	-7 dBm	-101 dBm	CW carrier
LA UTRA-FDD Band I	2110 – 2170 MHz	-6 dBm	-101 dBm	CW carrier
LA UTRA-FDD Band II	1930 – 1990 MHz	-6 dBm	-101 dBm	CW carrier
LA UTRA-FDD Band III	1805 – 1880 MHz	-6 dBm	-101 dBm	CW carrier
LA UTRA-FDD Band IV	2110 – 2155 MHz	-6 dBm	-101 dBm	CW carrier
LA UTRA-FDD Band V	869 – 894 MHz	-6 dBm	-101 dBm	CW carrier
LA UTRA-FDD Band VI	875 – 885 MHz	-6 dBm	-101 dBm	CW carrier

Blocking performance requirement (narrowband) for Wide Area BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
II	1850 - 1910 MHz	- 47 dBm	-115 dBm	2.7 MHz	GMSK modulated*
III	1710 – 1785 MHz	- 47 dBm	-115 dBm	2.8 MHz	GMSK modulated*
IV	1710 – 1755 MHz	- 47 dBm	-115 dBm	2.7 MHz	GMSK modulated*
V	824 – 849 MHz	- 47 dBm	-115 dBm	2.7 MHz	GMSK modulated*

* GMSK modulation as defined in TS 45.004.

Blocking performance requirement (narrowband) for Medium Range BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
II	1850 - 1910 MHz	- 42 dBm	-105 dBm	2.7 MHz	GMSK modulated*
III	1710 – 1785 MHz	- 42 dBm	-105 dBm	2.8 MHz	GMSK modulated*
IV	1710 – 1755 MHz	- 42 dBm	-105 dBm	2.7 MHz	GMSK modulated*
V	824 – 849 MHz	- 42 dBm	-105 dBm	2.7 MHz	GMSK modulated*

* GMSK modulation as defined in TS 45.004 [12].

Blocking performance requirement (narrowband) for Local Area BS

Operating Band	Center Frequency of Interfering Signal	Interfering Signal mean power	Wanted Signal mean power	Minimum Offset of Interfering Signal	Type of Interfering Signal
II	1850 - 1910 MHz	- 37 dBm	-101 dBm	2.7 MHz	GMSK modulated*
III	1710 – 1785 MHz	- 37 dBm	-101 dBm	2.8 MHz	GMSK modulated*
IV	1710 – 1755 MHz	- 37 dBm	-101 dBm	2.7 MHz	GMSK modulated*
V	824 – 849 MHz	- 37 dBm	-101 dBm	2.7 MHz	GMSK modulated*

* GMSK modulation as defined in TS 45.004.

Test Case 7.6 - Intermodulation Characteristics

The test case requires option Second RF path (B20x), a second option Baseband Main Module (13), a second option Baseband Generator (B10/B11), a second option Digital Standard 3GPP FDD (K42) and option AWGN (K62) in addition to the standard configuration. It is performed using the standard test setup for two paths.

The signal generator outputs the reference measurement channel signal (= wanted signal) at output RF A and both interfering signals (CW interferer and the WCDMA or GMSK modulated interferer) at output RF B. After combining the signals the sum signal is fed into the base station Rx port. The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.
The measurement must be made at frequency M.

Note:

In order to generate both interfering signals with the desired frequency offset, a frequency offset is introduced for baseband B. This baseband frequency offset has to be added to the RF frequency B.

The following table lists the settings on the base station:

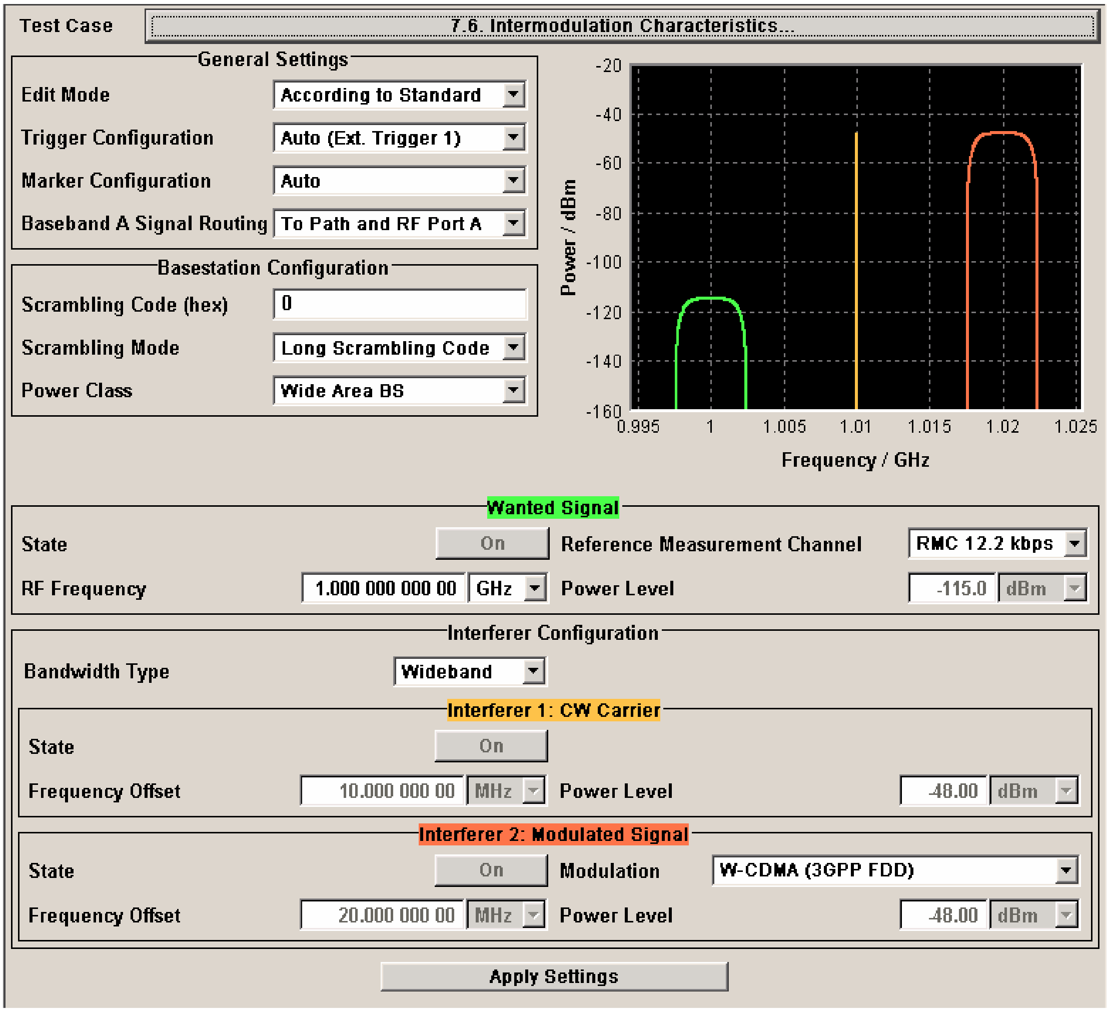
Parameter	Value
Frequency	M
RMC	12.2 kbps
Scrambling code	Any

Test Purpose and Test Settings - Test Case 7.6

The test case verifies that a BS receiver has the capability to demodulate a signal that is sent by the signal generator but superimposed by two heavy interfering signals in the adjacent channels, where the receiver intermodulation products disturb the wanted signal.
The test is passed when the resulting BER (calculated internally by the BS) is below 0.001 at the test frequency M. Note TS 25.141 Annex C: General Rules for Statistical Testing, where test conditions in terms of test methods and test conditions are defined.

Quotation from TS 25.141:

Third and higher order mixing of the two interfering RF signals can produce an interfering signal in the band of the desired channel. Intermodulation response rejection is a measure of the capability of the receiver to receiver a wanted signal on its assigned channel frequency in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal.



Besides the settings described for all receiver tests, interferer 1 and 2 configuration is possible in edit mode "**User Definable**". In edit mode '**According to Standard**' most of the settings are preset.

Interferer Bandwidth Type - Test Case 7.6

Selects the interferer scenario.

Wideband

A 3GPP FDD uplink interfering signal with the following characteristic is generated for path B.
- DPCCH + DPDCH mode
- DPDCH with 240 ksps, 0 dB relative power, PRBS23 data source
- DPCCH with -5.46 dB relative power and slot format 2
- Same scrambling code as the wanted signal

(**3GPP FDD** menu)

The 3GPP FDD uplink interfering signal is superimposed by a CW interfering signal with a frequency of 10 MHz and a level of -48 dBm (**AWGN** menu).

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:BWID WIDE`

Narrowband

A GMSK interfering signal (270.833 kHz bandwidth, PRBS9 data source) is generated for path B (**Custom Dig Mod** menu).
The GMSK interfering signal is superimposed by a CW interfering signal with a frequency of 3.5 MHz and a level of -47 dBm (**AWGN** menu).

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:BWID NARR`

Interferer 1 and 2 State - Test Case 7.6

Enables/disables the signal generation of the CW and modulation interfering signal in the second path.
In edit mode '**According to Standard**' both states are fixed to '**On**'.

Remote-control command:
```
SOUR:BB:W3GP:TS25141:IFS:CW:STAT ON
SOUR:BB:W3GP:TS25141:IFS:MOD:STAT ON
```

Interferer 1 and 2 Frequency Offset - Test Case 7.6

Enters the frequency offset of the interfering signals versus the wanted signal.
In edit mode '**According to Standard**' the value is fixed to a value determined by the selected **Interferer Bandwidth**.

Remote-control command:
```
SOUR:BB:W3GP:TS25141:IFS:CW:FOFF -3.5MHz
SOUR:BB:W3GP:TS25141:IFS:MOD:FOFF -5.9MHz
```

Interferer 1 and 2 Power Level - Test Case 7.6

Enters the level of the interfering signals..
In edit mode '**According to Standard**' the value is fixed to a value determined by the selected **Interferer Bandwidth Type**.

Remote-control command:
```
SOUR:BB:W3GP:TS25141:IFS:CW:POW -47dBm
SOUR:BB:W3GP:TS25141:IFS:MOD:POW -48dBm
```

Interferer 2 Modulation - Test Case 7.6

Selects the type of modulation for the interfering modulation signal in the second path.
In edit mode '**According to Standard**' the value is fixed to a value determined by the selected **Interferer Bandwidth**.

W-CDMA (3GPP FDD)

A 3GPP FDD uplink signal with the following characteristic is generated for path B.
- DPCCH + DPDCH mode
- DPDCH with 240 ksps, 0 dB relative power, PRBS23 data source
- DPCCH with -5.46 dB relative power and slot format 2
- Same scrambling code as the wanted signal

(**3GPP FDD** menu)

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:MOD:TYPE WCDM`

GMSK (270833 kHz)

A GMSK signal (270.833 kHz bandwidth, PRBS9 data source) is generated for path B (**Custom Dig Mod** menu).

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:MOD:TYPE GMSK`

QPSK (3.84 MHz, Root Cosine 0.22)

A QPSK signal (3.84 MHz bandwidth, root cosine filter 0.22, PRBS9 data source) is generated for path B (**Custom Dig Mod** menu).

Remote-control command:
`SOUR:BB:W3GP:TS25141:IFS:MOD:TYPE QPSK`

Test Case 7.8 - Verification of Internal BER

The test case requires the basic configuration and is performed using the standard test setup for one path.

The signal generator outputs a corrupted reference measurement channel signal (= wanted signal) at output RF A. The signal is fed into the base station Rx port.
The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.
The measurement must be made at the three frequencies B, M and T.

The following table lists the settings on the base station:

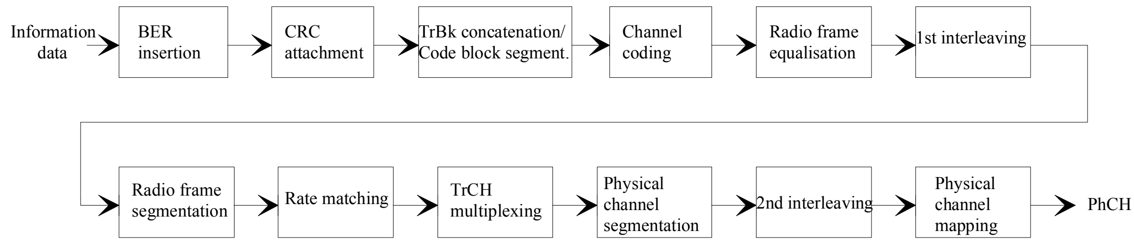
Parameter	Value
Frequency	B, M and T
RMC	12.2 kbps
Scrambling code	Any

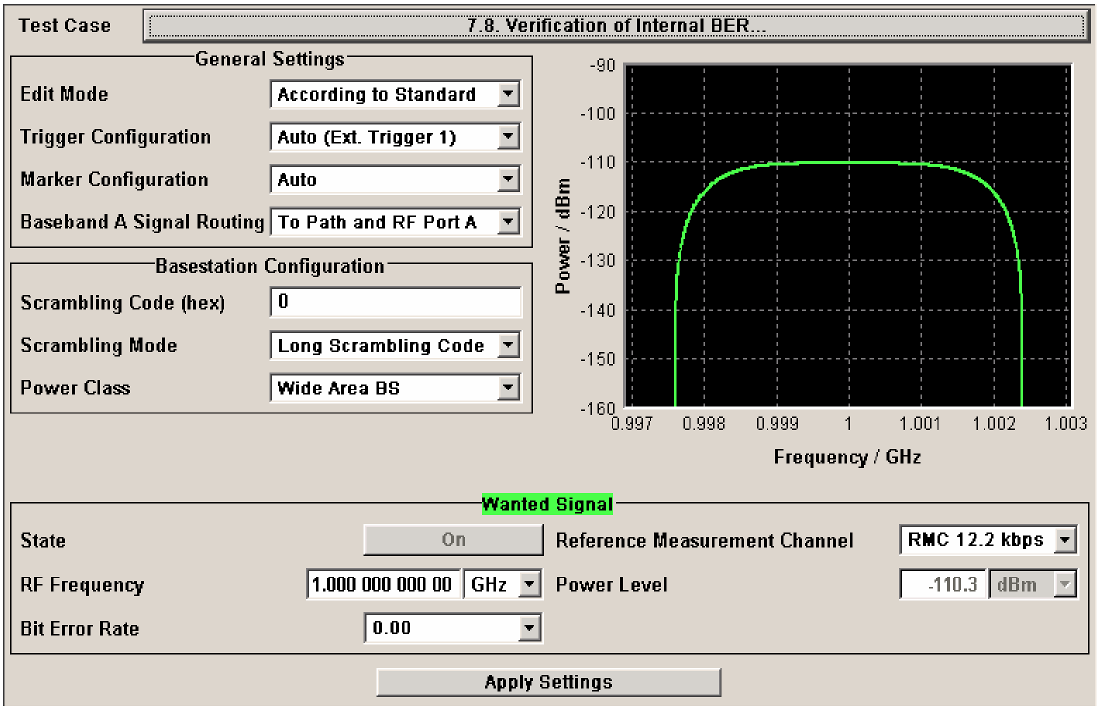
Test Purpose and Test Settings - Test Case 7.8

The test case verifies that a BS receiver has the capability to calculate the BER of a signal where erroneous bits are inserted in the data stream by the signal generator.
The test is passed when the calculated BER is within ±10% of the BER simulated by the signal generator the test frequencies B, M and T. Note TS 25.141 Annex C: General Rules for Statistical Testing, where test conditions in terms of test methods and test conditions are defined.

Quotation from TS 25.141:

Base Station System with internal BER calculation can synchronize it's receiver to known pseudo-random data sequence and calculates bit error ratio from the received data. This test is performed only if Base Station System has this kind of feature. This test is performed by feeding measurement signal with known BER to the input of the receiver. Locations of the erroneous bits shall be randomly distributed within a frame. Erroneous bits shall be inserted to the data bit stream as shown in (the following) figure 7.1.





Besides the settings described for all receiver test, Bit Error Rate and Block Error Rate selection is possible in edit mode "**User Definable**". In edit mode '**According to Standard**' only the Bit Error Rate setting is possible.

Bit Error Rate - Test Case 7.8

Sets the bit error rate. In edit mode '**According to Standard**' only values 0.00 (no bit errors are inserted) and 0.01 (1 percent bit errors are inserted) are available.

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:DPDC:DERR:BIT:RATE 0.01`

Block Error Rate - Test Case 7.8

Sets the block error rate in edit mode "**User Definable**".

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:DPDC:DERR:BLOC:RATE 0.001`

Performance Requirements - Receiver Tests - 3GPP FDD

Test Case 8.2.1 - Demodulation of DCH in Static Propagation Conditions

For **non-diversity measurements**, the test case requires Additional White Gaussian Noise (AWGN) (K62) in addition to the basic configuration.
The measurement is performed using the standard test setup for one path.
The signal generator outputs a reference measurement channel signal (= wanted signal) that is superimposed by a AWGN signal at output RF A. The signal is fed into the base station Rx port.
The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.
The measurement must be made at the three frequencies B, M and T. The RMC data rates are 12.2 kbps, 64 kbps, 144 kbps and 384 kbps.

For **diversity measurements**, the test case requires option Second RF path (B20x), a second option Baseband Main Module (13), a second option Baseband Generator (B10/B11) and two options Additional White Gaussian Noise (AWGN) (K62) in addition to the standard configuration. It is performed using the standard test setup for diversity measurement.

The signal generator outputs the reference measurement channel signal (= wanted signal) at output RF A and output RF B. The wanted signal is superimposed by a AWGN signal. The signals are fed into the base station Rx ports.
The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.
The measurement must be made at the three frequencies B, M and T.The RMC data rates are 12.2 kbps, 64 kbps, 144 kbps and 384 kbps.

The following table lists the settings on the base station:

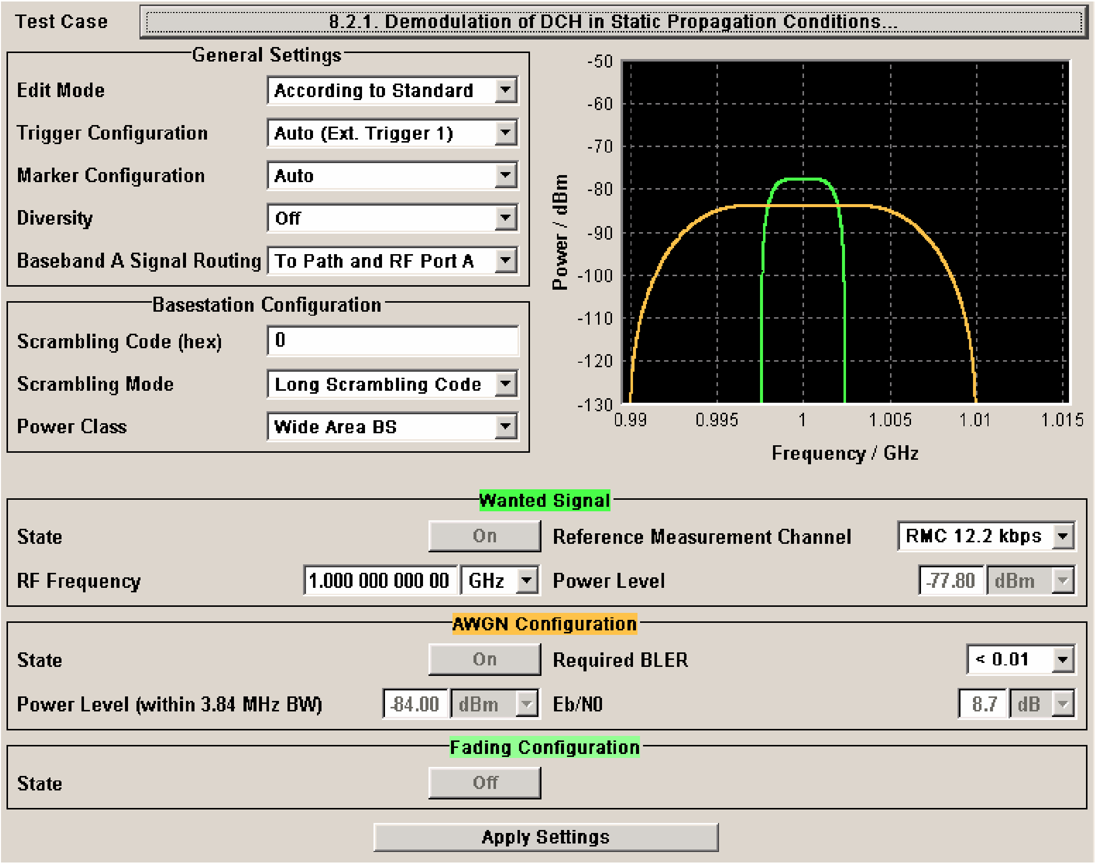
Parameter	Value(s)
Frequency	B, M and T
RMC	12.2 kbps, 64 kbps, 144 kbps, 384 kbps
Scrambling code	Any

Test Purpose and Test Settings - Test Case 8.2.1

The test case shall verify that a BS receiver has the capability to demodulate a signal that is sent by the signal generator and is superimposed by a heavy AWGN signal.
The test is passed when the resulting BLER (calculated internally by the BS) does not exceed the required BLER settings. Note TS 25.141 Annex C: General Rules for Statistical Testing, where test conditions in terms of test methods and test conditions are defined.

Quotation from TS 25.141:

> *The performance requirement of DCH in static propagation conditions is determined by the maximum Block Error Ratio (BLER) allowed when the receiver input signal is at a specified Eb/N0 limit. The BLER is calculated for each of the measurement channels supported by the base station.*



Besides the settings described for all receiver test, AWGN Configuration is possible in edit mode "**User Definable**". In edit mode '**According to Standard**' only the Required BLER setting is possible. Fading is always off.

AWGN State - Test Case 8.x

Enables/disables the generation of the AWGN signal.
In edit mode '**According to Standard**' the state is fixed to '**On**'.

Remote-control command:
`SOUR:BB:W3GP:TS25141:AWGN:STAT ON`

Required BLER - Test Case 8.x

Sets the required Block Error Rate in edit mode '**According to Standard**'.

Remote-control command:
`SOUR:BB:W3GP:TS25141:AWGN:RBL:RATE B001`

Power Level - Test Case 8.x

Sets the AWGN level in edit mode '**User Definable**'.

In edit mode '**According to Standard**' the AWGN level is determined by the selected **Power Class** .

- **-84 dBm** for **Wide Area BS**
- **-74 dBm** for **Medium Range BS**
- **-70 dBm** for **Local Area BS**

Remote-control command:
`SOUR:BB:W3GP:TS25141:AWGN:POW:NOIS -45.0dBm`

Eb to N0 - Test Case 8.x

Sets the ratio of bit energy to noise power density.

In edit mode '**According to Standard**' the value depends on the E_b/N_0 test requirements (see following table).

Remote-control command:
`SOUR:BB:W3GP:TS25141:AWGN:ENR 8.7dB`

E_b/N_0 test requirements in AWGN channel

Measurement channel	Received E_b/N_0 for BS with Rx diversity	Received E_b/N_0 for BS without Rx diversity	Required BLER
12.2 kbps	n.a. (5.5 dB)	n.a. (8.7 dB)	$< 10^{-1}$
	5.5 dB	8.7 dB	$< 10^{-2}$
64 kbps	1.9 dB	5.1 dB	$< 10^{-1}$
	2.1 dB	5.2 dB	$< 10^{-2}$
144 kbps	1.2 dB	4.2 dB	$< 10^{-1}$
	1.3 dB	4.4 dB	$< 10^{-2}$
384 kbps	1.3 dB	4.4 dB	$< 10^{-1}$
	1.4 dB	4.5 dB	$< 10^{-2}$

Fading State - Test Case 8.2.1

Indicates the state of the Fader.
The state is fixed to '**Off**'.

Remote-control command:
`SOUR:BB:W3GP:TS25141:FSIM:STAT?`

Test Case 8.3.1 - Demodulation of DCH in Multipath Fading Case 1 Conditions

For **non-diversity measurements**, the test case requires option Additional White Gaussian Noise (AWGN) (K62) and options Fading Simulator (B14), Path Extension (B15), and Enhanced Resolution and Dynamic Fading (K71) in addition to the basic configuration.
The measurement is performed using the standard test setup for one path.
The signal generator outputs a reference measurement channel signal (= wanted signal) that is disturbed by an AWGN signal and multipath fading effects at output RF A(B). The signal is fed into the base station Rx port.
The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.
The measurement must be made at the three frequencies B, M and T. The RMC data rates are 12.2 kbps, 64 kbps, 144 kbps and 384 kbps.

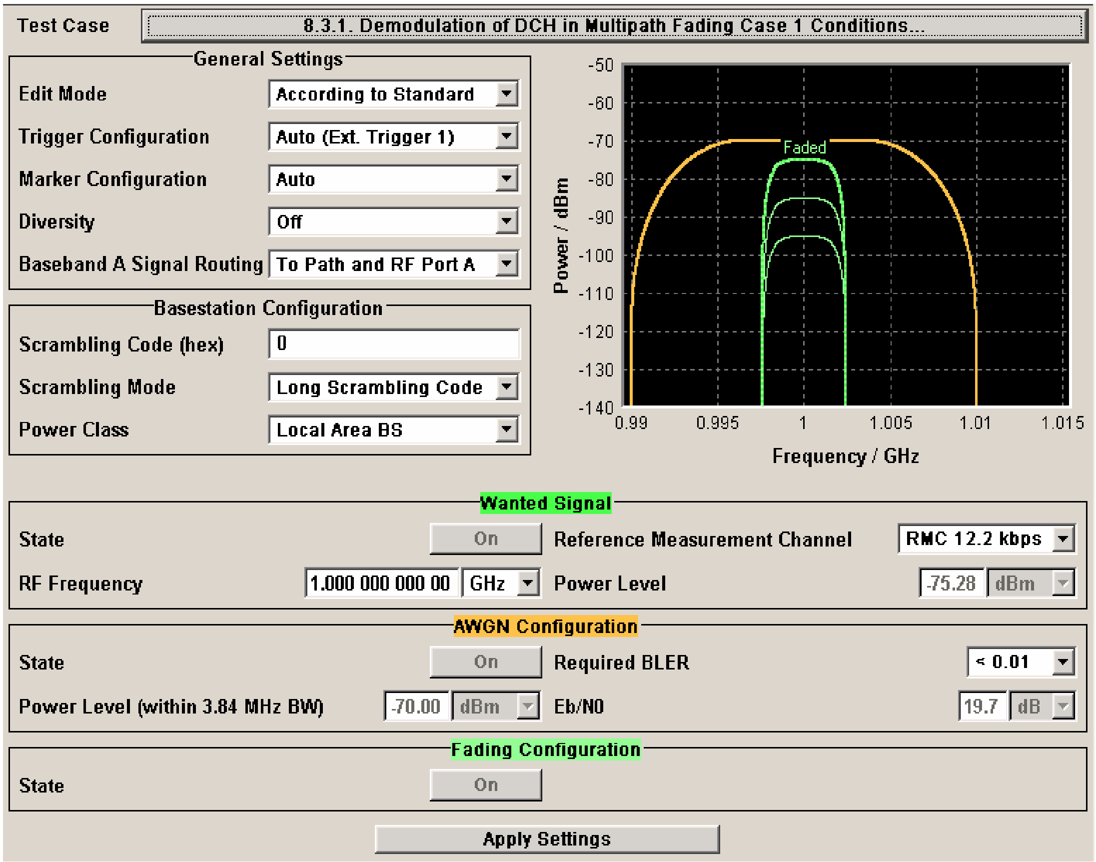
For **diversity measurements**, the test case requires option Second RF path (B20x), a second option Baseband Main Module (13), two options Additional White Gaussian Noise (AWGN) (K62) and options Fading Simulator (B14) and Path Extension (B15), Enhanced Resolution and Dynamic Fading (K71) in addition to the basic configuration.
It is performed using the standard test setup for diversity measurement.
The signal generator outputs the reference measurement channel signal (= wanted signal) that is disturbed by an AWGN signal and multipath fading effects at output RF A and output RF B. The signals are fed into the base station Rx ports.
The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.
The measurement must be made at the three frequencies B, M and T. The RMC data rates are 12.2 kbps, 64 kbps, 144 kbps and 384 kbps.

The following table lists the settings on the base station:

Parameter	Value(s)
Frequency	B, M and T
RMC	12.2 kbps, 64 kbps, 144 kbps, 384 kbps
Scrambling code	Any

Test Purpose and Test Settings - Test Case 8.3.1

The test case shall verify that a BS receiver has the capability to demodulate a signal that is sent by the signal generator but superimposed by a heavy AWGN signal and disturbed by multipath fading effects. The test is passed when the resulting BLER (calculated internally by the BS) does not exceed the required BLER settings. Note TS 25.141 Annex C: General Rules for Statistical Testing, where test conditions in terms of test methods and test conditions are defined.



This test case settings are identical to test case 8.2.1 except from the channel simulation that is set to '**Multipath Fading Case 1**' (**Fading** menu: Standard = 3GPP Case 1 UE/BS) and the specific E_b/N_0 test requirements (see following table).

E_b/N_0 Test requirements in multipath Case 1 channel

Measurement channel	Received E_b/N_0 for BS with Rx diversity	Received E_b/N_0 for BS without Rx diversity	Required BLER
12.2 kbps	n.a. (12.5 dB)	n.a. (19.7 dB)	< 10^{-1}
	12.5 dB	19.7 dB	< 10^{-2}
64 kbps	6.8 dB	12.2 dB	< 10^{-1}
	9.8 dB	16.5 dB	< 10^{-2}
144 kbps	6.0 dB	11.4 dB	< 10^{-1}
	9.0 dB	15.6 dB	< 10^{-2}
384 kbps	6.4 dB	11.8 dB	< 10^{-1}
	9.4 dB	16.1 dB	< 10^{-2}

Fading State - Test Case 8.x

Indicates the state of the Fader.
The state is fixed to '**On**'. The **Fading** menu is preset with the required settings for the test case.

Remote-control command:
`SOUR:BB:W3GP:TS25141:FSIM:STAT?`

Test Case 8.3.2 - Demodulation of DCH in Multipath Fading Case 2 Conditions

This test case is identical to test case 8.3.1 except from the channel simulation that is set to '**Multipath Fading Case 2**' (**Fading** menu: Standard = 3GPP Case 2 UE/BS) and the E_b/N_0 test requirements (see following table).

E_b/N_0 Test requirements in Multipath Case 2 channel

Measurement channel	Received E_b/N_0 for BS with Rx diversity	Received E_b/N_0 for BS without Rx diversity	Required BLER
12.2 kbps	n.a. (9.6 dB)	n.a. (15.6 dB)	< 10^{-1}
	9.6 dB	15.6 dB	< 10^{-2}
64 kbps	4.9 dB	9.8 dB	< 10^{-1}
	7.0 dB	12.9 dB	< 10^{-2}
144 kbps	4.3 dB	8.8 dB	< 10^{-1}
	6.2 dB	12.1 dB	< 10^{-2}
384 kbps	4.7 dB	9.3 dB	< 10^{-1}
	6.7 dB	12.7dB	< 10^{-2}

Test Case 8.3.3 - Demodulation of DCH in Multipath Fading Case 3 Conditions

This test case is identical to test case 8.3.1 except from the channel simulation that is set to '**Multipath Fading Case 3**' (**Fading** menu: Standard = 3GPP Case 3 UE/BS) and the E_b/N_0 test requirements (see following table).

E_b/N_0 Test requirements in multipath Case 3 channel

Measurement channel	Received E_b/N_0 for BS with Rx diversity	Received E_b/N_0 for BS without Rx diversity	Required BLER
12.2 kbps	n.a. (7.8 dB)	n.a. (11.4 dB)	$< 10^{-1}$
	7.8 dB	11.4 dB	$< 10^{-2}$
	8.6 dB	12.3 dB	$< 10^{-3}$
64 kbps	4.0 dB	7.7 dB	$< 10^{-1}$
	4.4 dB	8.3 dB	$< 10^{-2}$
	4.7 dB	9.1 dB	$< 10^{-3}$
144 kbps	3.4 dB	6.6 dB	$< 10^{-1}$
	3.8 dB	7.3 dB	$< 10^{-2}$
	4.2 dB	7.8 dB	$< 10^{-3}$
384 kbps	3.8 dB	7.1 dB	$< 10^{-1}$
	4.2 dB	7.8 dB	$< 10^{-2}$
	4.8 dB	8.5 dB	$< 10^{-3}$

Test Case 8.3.4 - Demodulation of DCH in Multipath Fading Case 4 Conditions

This test case is identical to test case 8.3.1 except from the channel simulation that is set to '**Multipath Fading Case 4**' (**Fading** menu: Standard = 3GPP Case 4 UE) and the E_b/N_0 test requirements (see following table).

E_b/N_0 Test requirements in multipath Case 4 channel

Measurement channel	Received E_b/N_0 for BS with Rx diversity	Received E_b/N_0 for BS without Rx diversity	Required BLER
12.2 kbps	n.a. (10.8 dB)	n.a. (14.4 dB)	$< 10^{-1}$
	10.8 dB	14.4 dB	$< 10^{-2}$
	11.6 dB	15.3 dB	$< 10^{-3}$
64 kbps	7.0 dB	10.7 dB	$< 10^{-1}$
	7.4 dB	11.3 dB	$< 10^{-2}$
	7.7 dB	12.1 dB	$< 10^{-3}$
144 kbps	6.4 dB	9.6 dB	$< 10^{-1}$
	6.8 dB	10.3 dB	$< 10^{-2}$
	7.2 dB	10.8 dB	$< 10^{-3}$
384 kbps	6.8 dB	10.1 dB	$< 10^{-1}$
	7.2 dB	10.8 dB	$< 10^{-2}$
	7.8 dB	11.5 dB	$< 10^{-3}$

Test Case 8.4 - Demodulation of DCH in Moving Propagation Conditions

This test case is identical to test case 8.3.1 except from the channel simulation that is set to '**Moving Propagation**' (**Fading** menu: Standard = Moving Propagation) and the E_b/N_0 test requirements.

E_b/N_0 Test requirements in moving channel

Measurement channel	Received E_b/N_0 for BS with Rx diversity	Received E_b/N_0 for BS without Rx diversity	Required BLER
12.2 kbps	n.a. (6.3 dB)	n.a. (9.3 dB)	$< 10^{-1}$
	6.3 dB	9.3 dB	$< 10^{-2}$
64 kbps	2.7 dB	5.9 dB	$< 10^{-1}$
	2.8 dB	6.1 dB	$< 10^{-2}$

Test Case 8.5 - Demodulation of DCH in Birth/Death Propagation Conditions

This test case is identical to test case 8.3.1 except from the channel simulation that is set to '**Birth/Death Propagation**' (**Fading** menu: Standard = Birth/Death Propagation) and the E_b/N_0 test requirements.

E_b/N_0 Test requirements in birth/death channel

Measurement channel	Received E_b/N_0 for BS with Rx diversity	Received E_b/N_0 for BS without Rx diversity	Required BLER
12.2 kbps	n.a. (8.3 dB)	n.a. (11.4 dB)	$< 10^{-1}$
	8.3 dB	11.4 dB	$< 10^{-2}$
64 kbps	4.7 dB	8.0 dB	$< 10^{-1}$
	4.8 dB	8.1 dB	$< 10^{-2}$

Test Case 8.6 - Verification of Internal BLER

For **non-diversity measurements**, the test case requires the basic configuration and is performed using the standard test setup for one path.
The signal generator outputs a corrupted reference measurement channel signal (= wanted signal) at output RF A. The signal is fed into the base station Rx port.
The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.
The measurement must be made at the three frequencies B, M and T. The RMC data rates are 12.2 kbps, 64 kbps, 144 kbps and 384 kbps.

For **diversity measurements**, the test case requires option Second RF path (B20x) and a second option Baseband Main Module (B13) in addition to the basic configuration.
It is performed using the standard test setup for diversity measurement.
The signal generator outputs the corrupted reference measurement channel signal (= wanted signal) at output RF A and output RF B. The signals are fed into the base station Rx ports.
The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.
The measurement must be made at the three frequencies B, M and T. The RMC data rates are 12.2 kbps, 64 kbps, 144 kbps and 384 kbps.

The following table lists the settings on the base station:

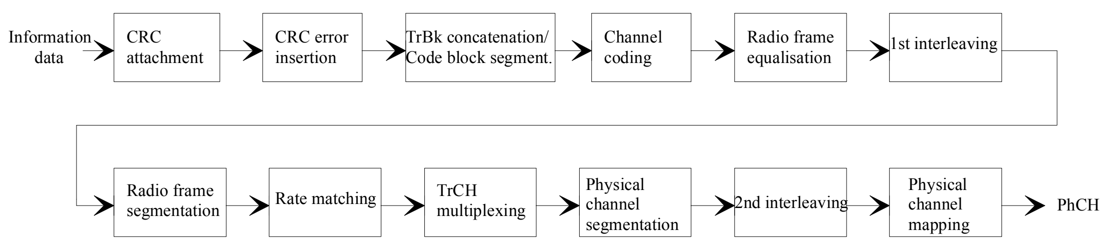
Parameter	Value
Frequency	B, M and T
RMC	12.2 kbps, 64 kbps, 144 kbps, 384 kbps
Scrambling code	Any

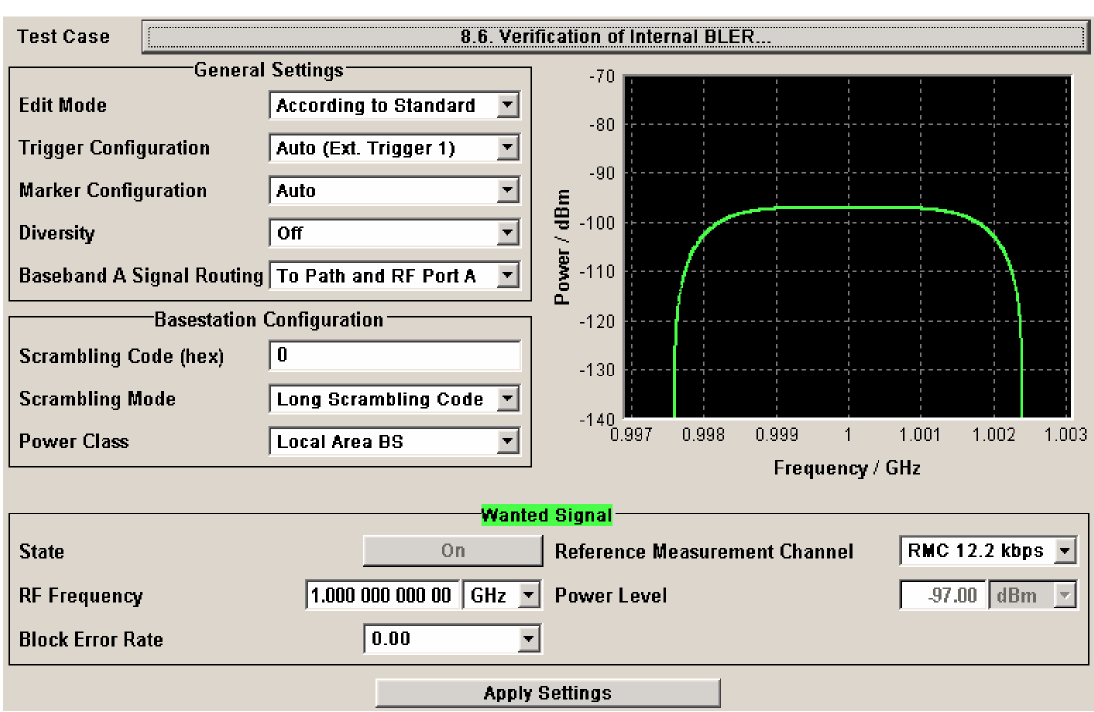
Test Purpose and Test Settings - Test Case 8.6

The test case verifies that a BS receiver has the capability to calculate the BLER of a signal where erroneous blocks are inserted in the data stream by the signal generator.
The test is passed when the calculated BLER is within ±10% of the BLER simulated by the signal generator the test frequencies B, M and T. Note TS 25.141 Annex C: General Rules for Statistical Testing, where test conditions in terms of test methods and test conditions are defined.

Quotation from TS 25.141:

> *Base Station System with internal BLER calculates block error rate from the CRC blocks of the received. This test is performed only if Base Station System has this kind of feature. All data rates which are used in clause 8 Performance requirement testing shall be used in verification testing. This test is performed by feeding measurement signal with known BLER to the input of the receiver. Locations of the erroneous blocks shall be randomly distributed within a frame. Erroneous blocks shall be inserted into the UL signal as shown in (the following) figure 8.1.*





Besides the settings described for all receiver test, Bit Error Rate and Block Error Rate selection is possible in edit mode "**User Definable**". In edit mode '**According to Standard**' only the Block Error Rate setting is possible.

UL signal levels for different data rates

Data rate	Signal level for Wide Area BS	Signal level for Medium Range BS	Signal level for Local Area BS	Unit
12,2 kbps	-111	-101	-97	dBm/3.84 MHz
64 kbps	-107	-97	-93	dBm/3.84 MHz
144 kbps	-104	-94	-90	dBm/3.84 MHz
384 kbps	-100	-90	-86	dBm/3.84 MHz

Block Error Rate - Test Case 8.6

Sets the block error rate. In edit mode '**According to Standard**' only values 0.00 (no block errors are inserted) and 0.01 (1 percent block errors are inserted) are available.

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:DPDC:DERR:BLOC:RATE 0.01`

Bit Error Rate - Test Case 8.6

Sets the bit error rate in edit mode "**User Definable**".

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:DPDC:DERR:BIT:RATE 0.001`

Test Case 8.8.1 - RACH Preamble Detection in Static Propagation Conditions

For **non-diversity measurements**, the test case requires option K62 - Additional White Gaussian Noise (AWGN) in addition to the basic configuration.
The measurement is performed using the standard test setup for one path.
The signal generator outputs a continuous sequence of preambles (wanted signal) that is superimposed by a AWGN signal at output RF A(B). The signal is fed into the base station Rx port.
The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.
The measurement must be made at the three frequencies B, M and T.

For **diversity measurements**, the test case requires option Second RF path (B20x), a second option Baseband Main Module (13), and two options Additional White Gaussian Noise (AWGN) (K62) in addition to the standard configuration. It is performed using the standard test setup for diversity measurement.
The signal generator outputs a continuous sequence of preambles (wanted signal) that is superimposed by a AWGN signal at output RF A and output RF B. The signals are fed into the base station Rx ports.
The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.
The measurement must be made at the three frequencies B, M and T.

The following table lists the settings on the base station:

Parameter	Value(s)
Frequency	B, M and T
RMC	RACH
Scrambling code	Any

Test Purpose and Test Settings - Test Case 8.8.1

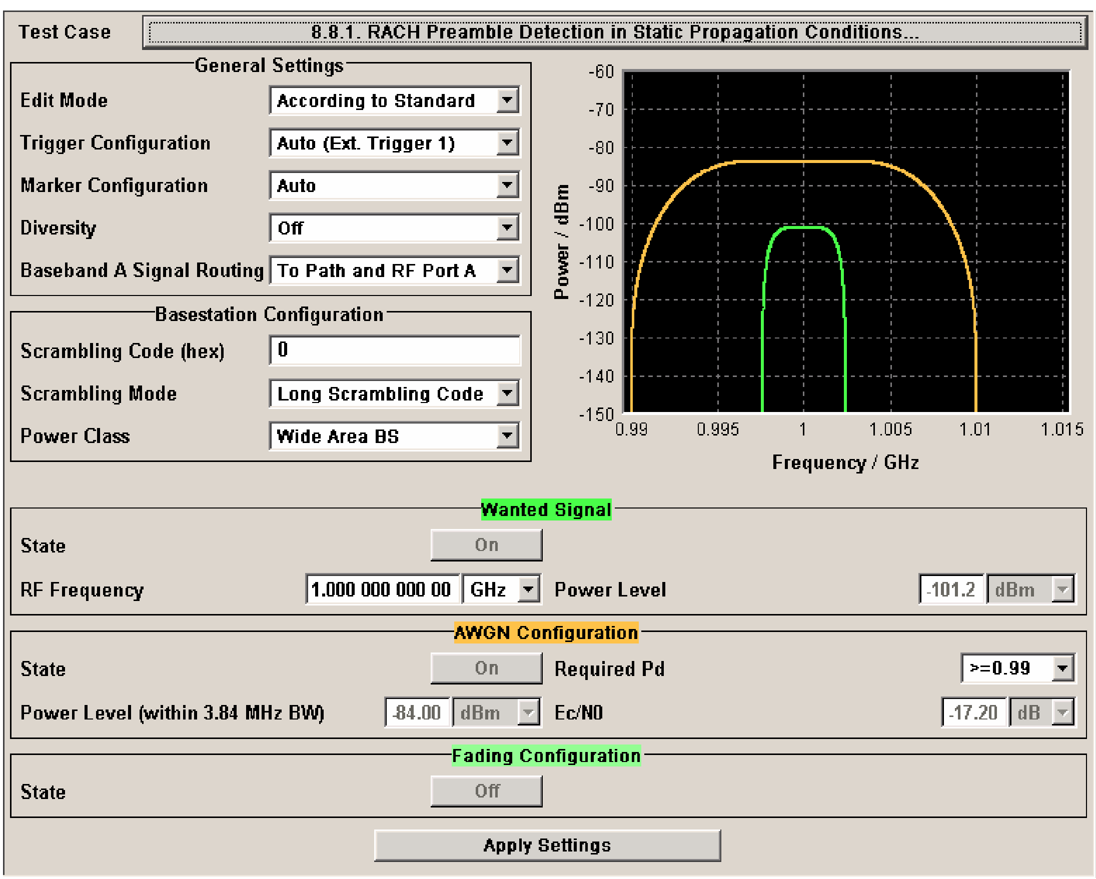
The test case verifies that a BS receiver has the capability to detect the RACH preamble that is sent by the signal generator and is superimposed by a heavy AWGN signal.
The test is passed when internally calculated Pd is equal or above the required Pd settings at the test frequencies B, M and T. Note TS 25.141 Annex C: General Rules for Statistical Testing, where test conditions in terms of test methods and test conditions are defined.

Quotation from TS 25.141:

> *The performance requirement of RACH for preamble detection in static propagation conditions is determined by the two parameters probability of false detection of the preamble (Pfa) and the probability of detection of preamble (Pd). The performance is measured by the required Ec/N0 at probability of detection, Pd of 0.99 and 0.999. Pfa is defined as a conditional probability of erroneous detection of the preamble when input is only noise (+interference). Pd is defined as conditional probability of detection of the preamble when the signal is present. Pfa shall be 10-3 or less. Only one signature is used and it is known by the receiver.*

Note:

The Probability of false detection of the preamble (Pfa) test is not supported.



Besides the settings described for all receiver test, AWGN and Fading Configuration is possible in edit mode "**User Definable**". In edit mode '**According to Standard**' only the **Required Pd** setting is possible.

AWGN State - Test Case 8.x

Enables/disables the generation of the AWGN signal.
In edit mode '**According to Standard**' the state is fixed to '**On**'.

Remote-control command:
`SOUR:BB:W3GP:TS25141:AWGN:STAT ON | OFF`

Required Pd - Test Case 8.x

Sets the Required Probability of Detection of Preamble (Required Pd) in edit mode '**According to Standard**':
- **>= 0.99**
- **>= 0.999**

This figure determines the ratio E_c/N_0 according to the following table of E_c/N_0 test requirements.

Remote-control command:
`SOUR:BB:W3GP:TS25141:AWGN:RPD:RATE PD099`

Preamble detection test requirements in AWGN channel

	E_c/N_0 for required Pd ≥ 0.99	E_c/N_0 for required Pd ≥ 0.999
BS with Rx Diversity	-20.1 dB	-19.7 dB
BS without Rx Diversity	-17.2 dB	-16.4 dB

Power Level - Test Case 8.x

Sets the AWGN level in edit mode '**User Definable**'.

In edit mode '**According to Standard**' the AWGN level is determined by the selected **Power Class** .

- **-84 dBm** for **Wide Area BS**
- **-74 dBm** for **Medium Range BS**
- **-70 dBm** for **Local Area BS**

Remote-control command:
`SOUR:BB:W3GP:TS25141:AWGN:POW:NOIS -45.0`

Eb to N0 - Test Case 8.x

Sets the ratio of bit energy to noise power density.

In edit mode '**According to Standard**' the value depends on the selected **Required Pd**.

Remote-control command:
`SOUR:BB:W3GP:TS25141:AWGN:ENR 8.7dB`

Fading State - Test Case 8.x.1

Indicates the state of the Fader.
The state is fixed to '**Off**'.

Remote-control command:
`SOUR:BB:W3GP:TS25141:FSIM:STAT?`

Test Case 8.8.2 - RACH Preamble Detection

in Multipath Fading Case 3

For **non-diversity measurements**, the test case requires option - Additional White Gaussian Noise (AWGN) (K62) and options Fading Simulator (B14), Path Extension (B15), and Enhanced Resolution and Dynamic Fading (K71) in addition to the basic configuration.
The measurement is performed using the standard test setup for one path.
The signal generator outputs a continuous sequence of preambles (= wanted signal) that is disturbed by an AWGN signal and multipath fading effects at output RF A(B). The signal is fed into the base station Rx port.
The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.
The measurement must be made at the three frequencies B, M and T. The RMC data rates are 12.2 kbps, 64 kbps, 144 kbps and 384 kbps.

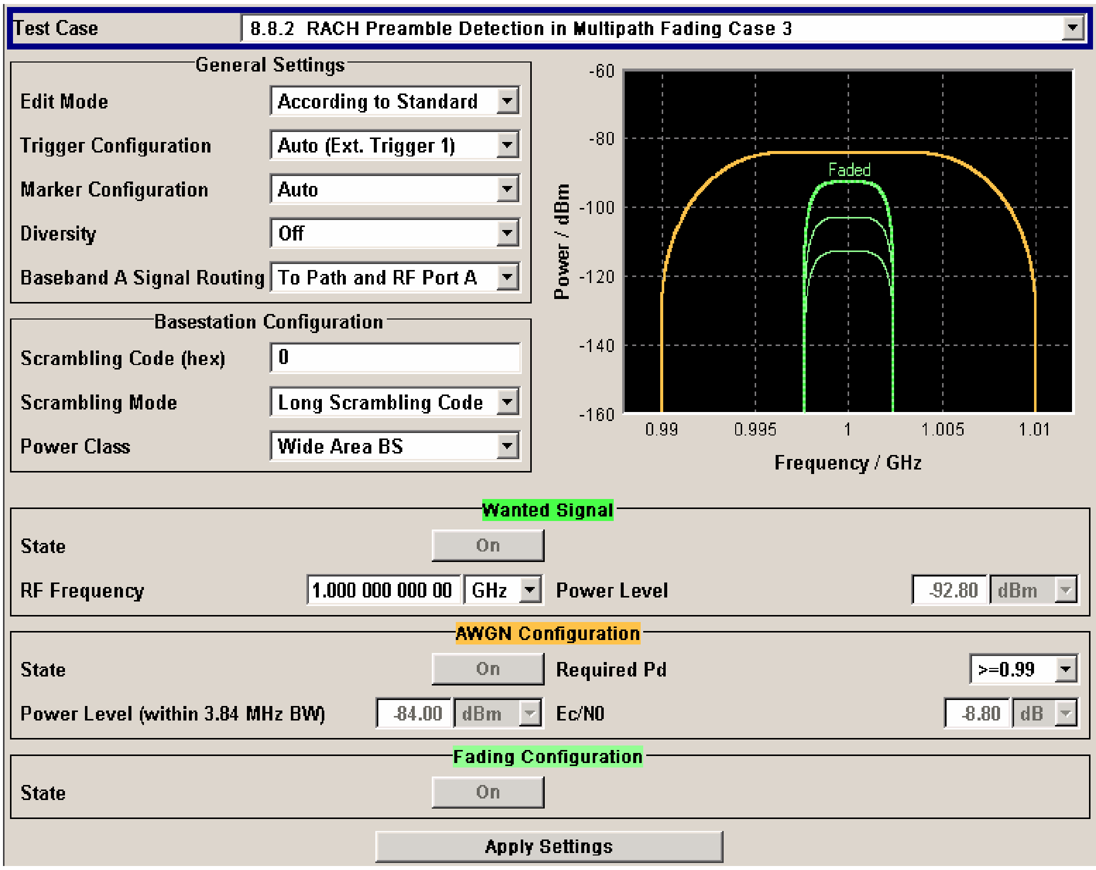
For **diversity measurements**, the test case requires option Second RF path (B20x), a second option Baseband Main Module (13), two options Additional White Gaussian Noise (AWGN) (K62) and options Fading Simulator (B14) and Path Extension (B15), Enhanced Resolution and Dynamic Fading (K71)in addition to the basic configuration.
It is performed using the standard test setup for diversity measurement.
The signal generator outputs a continuous sequence of preambles (= wanted signal) that is disturbed by an AWGN signal and multipath fading effects at output RF A and output RF B. The signals are fed into the base station Rx ports.
The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.
The measurement must be made at the three frequencies B, M and T. The RMC data rates are 12.2 kbps, 64 kbps, 144 kbps and 384 kbps.

The following table lists the settings on the base station:

Parameter	**Value(s)**
Frequency	B, M and T
RMC	12.2 kbps, 64 kbps, 144 kbps, 384 kbps
Scrambling code	Any

Test Purpose and Test Settings - Test Case 8.8.2

The test case shall verify that a BS receiver has the capability to detect the RACH preamble that is sent by the signal generator and is superimposed by a heavy AWGN signal and disturbed by multipath fading effects.
The test is passed when internally calculated Pd is equal or above the required Pd settings at the test frequencies B, M and T. Note TS 25.141 Annex C: General Rules for Statistical Testing, where test conditions in terms of test methods and test conditions are defined.



This test case is identical to test case 8.8.1 except from the channel simulation that is set to '**Multipath Fading Case 3**' (**Fading** menu: Standard = 3GPP Case 3 UE/BS) by default and the specific E_C/N_0 ratio requirements (see following table).

Preamble detection test requirements in fading case 3 channel

	E_c/N_0 for required Pd ≥ 0.99	E_c/N_0 for required Pd ≥ 0.999
BS with Rx Diversity	-14.9 dB	-12.8 dB
BS without Rx Diversity	-8.8 dB	-5.8 dB

Fading State - Test Case 8.x

Indicates the state of the Fader.
The state is fixed to '**On**'. The **Fading** menu is preset with the required settings for the test case.

Remote-control command:
`SOUR:BB:W3GP:TS25141:FSIM:STAT?`

Test Case 8.8.3 - RACH Demodulation of Message Part in Static Propagation Conditions

For **non-diversity measurements**, the test case requires option K62 - Additional White Gaussian Noise (AWGN) in addition to the basic configuration.
The measurement is performed using the standard test setup for one path.
The signal generator outputs a RACH message signal (= wanted signal) that is superimposed by a AWGN signal at output RF A(B). The signal is fed into the base station Rx port.

The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.
The measurement must be made at the three frequencies B, M and T. The Transport Block Sizes are 168 bits and 360 bits.

For **diversity measurements**, the test case requires option Second RF path (B20x), a second option Baseband Main Module (13), and two options Additional White Gaussian Noise (AWGN) (K62) in addition to the standard configuration. It is performed using the standard test setup for diversity measurement.
The signal generator outputs the RACH message signal (= wanted signal) that is superimposed by a AWGN signal at output RF A and output RF B. The signals are fed into the base station Rx ports.

The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.
The measurement must be made at the three frequencies B, M and T. The Transport Block Sizes are 168 bits and 360 bits.

The following table lists the settings on the base station:

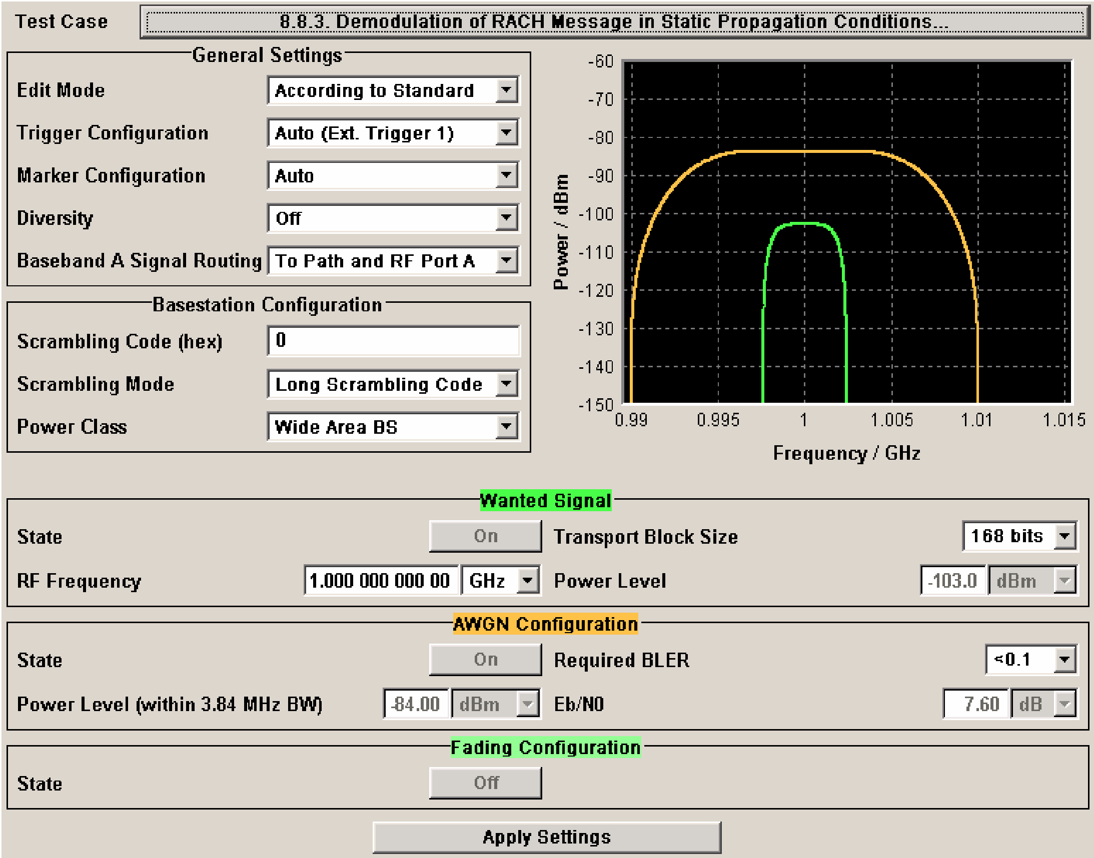
Parameter	**Value(s)**
Frequency	B, M and T
Transport Block Size	168 bits, 360 bits
RMC	RACH
Scrambling code	Any

Test Purpose and Test Settings - Test Case 8.8.3

The test case shall verify that a BS receiver has the capability to demodulate the RACH message sent by the signal generator but superimposed by AWGN.
The test is passed when the resulting BLER (calculated internally by the BS) does not exceed the required BLER settings. Note TS 25.141 Annex C: General Rules for Statistical Testing, where test conditions in terms of test methods and test conditions are defined.

Quotation from TS 25.141:

> *The performance requirement of RACH in static propagation conditions is determined by the maximum Block Error Ratio (BLER) allowed when the receiver input signal is at a specified Eb/N0 limit. The BLER is calculated for each of the measurement channels supported by the base station.*
> *The preamble threshold factor is chosen to fulfil the requirements on Pfa and Pd in subclauses 8.8.1 and 8.8.2. Only one signature is used and it is known by the receiver.*



Besides the settings described for all receiver test, selection of **Transport Block Size** of the wanted signal and AWGN Configuration is possible in edit mode '**According to Standard**'.

Transport Block Size - Test Case 8.8.x

Sets the Transport Block Size:

- **168 bits**
- **360 bits**

Remote-control command:
`SOUR:BB:W3GP:TS25141:WSIG:PRAC:CCOD:TYPE TB168`

AWGN State - Test Case 8.8.3

Enables/disables the generation of the AWGN signal.
In edit mode '**According to Standard**' the state is fixed to '**On**'.

Remote-control command:
`SOUR:BB:W3GP:TS25141:AWGN:STAT ON`

Required BLER - Test Case 8.x

Sets the required Block Error Rate in edit mode '**According to Standard**'.

- **< 0.1**
- **< 0.01**

This figure determines the ratio Eb/N0 according to the list of E_b/N_0 test requirements (see following table).

Remote-control command:
`SOUR:BB:W3GP:TS25141:AWGN:RBL:RATE B001`

E_b/N_0 requirements in AWGN channel

Transport Block size TB and TTI in frames: 168 bits, TTI = 20 ms / 360 bits, TTI = 20 ms

	E_b/N_0 for required BLER < 10^{-1}	E_b/N_0 for required BLER < 10^{-2}	E_b/N_0 for required BLER < 10^{-1}	E_b/N_0 for required BLER < 10^{-2}
BS with Rx Diversity	4.5 dB	5.4 dB	4.3 dB	5.2 dB
BS without Rx Diversity	7.6 dB	8.5 dB	7.3 dB	8.2 dB

Power Level - Test Case 8.8.3

Sets the AWGN level in edit mode '**User Definable**'.

In edit mode '**According to Standard**' the AWGN level is determined by the selected **Power Class** .

- **-84 dBm** for **Wide Area BS**
- **-74 dBm** for **Medium Range BS**
- **-70 dBm** for **Local Area BS**

Remote-control command:
`SOUR:BB:W3GP:TS25141:AWGN:POW:NOIS -45.0 dBm`

Eb to N0- Test Case 8.8.3

Sets the ratio of bit energy to noise power density.

In edit mode '**According to Standard**' the value depends on the selected **Required BLER**.

Remote-control command:
`SOUR:BB:W3GP:TS25141:AWGN:ENR 8.7dB`

Fading State - Test Case 8.8.3

Indicates the state of the Fader.
The state is fixed to '**Off**'.

Remote-control command:
`SOUR:BB:W3GP:TS25141:FSIM:STAT?`

Test Case 8.8.4 - RACH Demodulation of Message Part in Multipath Fading Case 3

For **non-diversity measurements**, the test case requires option Additional White Gaussian Noise (AWGN) (K62) and options Fading Simulator (B14), Path Extension (B15), and Enhanced Resolution and Dynamic Fading (K71) in addition to the basic configuration.
The measurement is performed using the standard test setup for one path.
The signal generator outputs a RACH message signal (= wanted signal) that is disturbed by an AWGN signal and multipath fading effects at output RF A. The signal is fed into the base station Rx port.
The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.

The measurement must be made at the three frequencies B, M and T. The Transport Block Sizes are 168 bits and 360 bits.

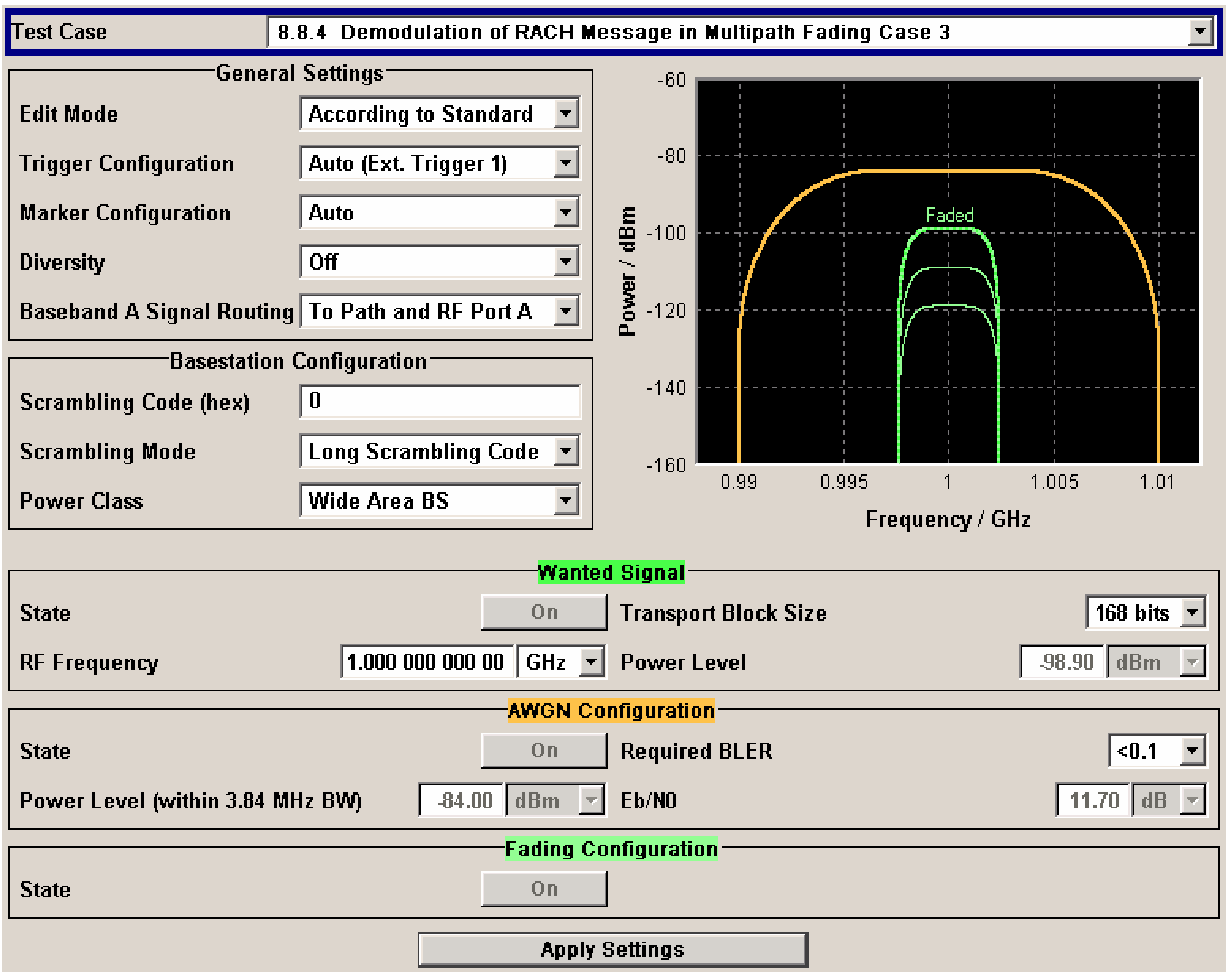
For **diversity measurements**, the test case requires option Second RF path (B20x), a second option Baseband Main Module (13), two options Additional White Gaussian Noise (AWGN) (K62), and options Fading Simulator (B14), Path Extension (B15), and Enhanced Resolution and Dynamic Fading (K71) in addition to the standard configuration. It is performed using the standard test setup for diversity measurement.

The signal generator outputs a RACH message signal (= wanted signal) that is disturbed by an AWGN signal and multipath fading effects at output RF A and output RF B. The signals are fed into the base station Rx ports.
The signal generator will start signal generation at the first BS frame trigger sent to input **Trigger 1**.

The measurement must be made at the three frequencies B, M and T. The Transport Block Sizes are 168 bits and 360 bits.

Test Purpose and Test Settings - Test Case 8.8.4

The test case shall verify that a BS receiver has the capability to demodulate the RACH message sent by the signal generator but superimposed by AWGN and disturbed by multipath fading effects.
The test is passed when the resulting BLER (calculated internally by the BS) does not exceed the required BLER settings. Note TS 25.141 Annex C: General Rules for Statistical Testing, where test conditions in terms of test methods and test conditions are defined.



This test case is identical to test case 8.8.3 except from the channel simulation that is set to '**Multipath Fading Case 3**' (**Fading** menu: Standard = 3GPP Case 3 UE/BS) and the specific E_b/N_0 ratio requirements.

E_b/N_0 test requirements in fading case 3 channel

Transport Block size TB and TTI in frames: 168 bits, TTI = 20 ms / 360 bits, TTI = 20 ms

	E_b/N_0 for required BLER < 10^{-1}	E_b/N_0 for required BLER < 10^{-2}	E_b/N_0 for required BLER < 10^{-1}	E_b/N_0 for required BLER < 10^{-2}
BS with Rx Diversity	8.0 dB	9.1 dB	7.9 dB	8.9 dB
BS without Rx Diversity	11.7 dB	13.0 dB	11.6 dB	12.7 dB

Test Case 8.9.1 - CPCH Access Preamble and Collision Detection Preamble Detection in Static Propagation Conditions

This test case is identical to test case 8.8.1 except that the CPCH Preamble is used instead of the RACH preamble.

Test Case 8.9.2 - CPCH Access Preamble and Collision Detection Preamble Detection in Multipath Fading Case 3

This test case is identical to test case 8.8.2 except that the CPCH Preamble is used instead of the RACH preamble.

Test Case 8.9.3 - Demodulation of CPCH Message in Static Propagation Conditions

This test case is identical to test case 8.8.3 except from differing E_b/N_0 ratio requirements and the demodulation of CPCH Message instead of the RACH Message.

Test requirements in AWGN channel

Transport Block size TB and TTI in frames: 168 bits, TTI = 20 ms / 360 bits, TTI = 20 ms

	E_b/N_0 for required BLER < 10^{-1}	**E_b/N_0 for required BLER < 10^{-2}**	**E_b/N_0 for required BLER < 10^{-1}**	**E_b/N_0 for required BLER < 10^{-2}**
BS with Rx Diversity	4.5 dB	5.4 dB	4.3 dB	5.2 dB
BS without Rx Diversity	7.5 dB	8.4 dB	7.3 dB	8.2 dB

Transport Block Size (TB) - Test Case 8.9.3

Sets the Transport Block Size:
- **168 bits**
- **360 bits**

Remote-control command:

`SOUR:BB:W3GP:TS25141:WSIG:PCPC:CCOD:TYPE TB360`

Test Case 8.9.4 - Demodulation of CPCH Message in Multipath Fading Case 3

This test case is identical to test case 8.8.4 except from differing E_b/N_0 ratio requirements and the demodulation of the CPCH Message instead of the RACH Message.

Test requirements in fading case 3 channel

Transport Block size TB and TTI in frames: 168 bits, TTI = 20 ms / 360 bits, TTI = 20 ms

	E_b/N_0 for required BLER < 10^{-1}	**E_b/N_0 for required BLER < 10^{-2}**	**E_b/N_0 for required BLER < 10^{-1}**	**E_b/N_0 for required BLER < 10^{-2}**
BS with Rx Diversity	8.1 dB	9.1 dB	7.9 dB	8.7 dB
BS without Rx Diversity	11.4 dB	12.6 dB	11.3 dB	12.3 dB

SOURce:W3GPp-Subsystem - Remote-Control Commands

SOURce-W3GPp-TS25141 - Test Wizard

The signal generator gives you the opportunity to generate predefined settings which enable tests on base stations in conformance with the 3G Standard 3GPP-FDD. It offers a selection of predefined settings according to Test Cases in TS 25.141. The settings take effect only after execution of command `[SOURce:]BB:W3GPp:TS25141:TCASe:EXECute`.

The test setups and equipment requirements for each Test Case are described in chapter *Tests on Base Stations in Conformance with the 3G Standard 3GPP-FDD.*

Unlike most of the other commands of the SOURce:W3GPp-Subsystem, key word SOURce is without Suffix. Signal routing is possible only for Test Cases that do not use diversity and is performed via command `:SOURce:BB:W3GPp:TS25141:ROUTe`.

Command	Parameter	Default unit	Comment
[SOURce:]BB:W3GPp:TS25141:AWGN:CNRatio	-40.0 dB ... 40.0 dB	dB	
[SOURce:]BB:W3GPp:TS25141:AWGN:ENRatio	-80.0 dB .. 80.0 dB	dB	
[SOURce:]BB:W3GPp:TS25141:AWGN:POWer:NOISe	Wanted Signal Level - C/N	dB	
[SOURce:]BB:W3GPp:TS25141:AWGN:RBLock:RATE	B0 (=0.0) | B01 (=0.1) | B001 (=0.01) | B0001 (=0.001)		
[SOURce:]BB:W3GPp:TS25141:AWGN:RPDetection:RATE	PD099 | PD0999		
[SOURce:]BB:W3GPp:TS25141:AWGN:STATe	ON | OFF		
[SOURce:]BB:W3GPp:TS25141:BSPClass	WIDE | MEDium | LOCal		
[SOURce:]BB:W3GPp:TS25141:BSSignal:FREQuency	100.0 kHz ... 6.0 GHz		
[SOURce:]BB:W3GPp:TS25141:BSSignal:POWer	-145.0 dBm ... 20.0 dBm	dBm	
[SOURce:]BB:W3GPp:TS25141:EMODe	STANdard | USER		
[SOURce:]BB:W3GPp:TS25141:FSIMulator:STATe	ON | OFF		
[SOURce:]BB:W3GPp:TS25141:IFSignal:BWIDth	WIDE | NARRow		
[SOURce:]BB:W3GPp:TS25141:IFSignal:CNRatio	-80.0 ... 80.0 dB	dB	
[SOURce:]BB:W3GPp:TS25141:IFSignal:CW:FOFFset	-40.0 MHz ... 40.0 MHz	Hz	
[SOURce:]BB:W3GPp:TS25141:IFSignal:CW:POWer	-145.0 dBm .. 20.0 dBm	dBm	
[SOURce:]BB:W3GPp:TS25141:IFSignal:CW:STATe	ON | OFF		
[SOURce:]BB:W3GPp:TS25141:IFSignal:FOFFset	-40.0 MHz ... 40.0 MHz	Hz	
[SOURce:]BB:W3GPp:TS25141:IFSignal:MODulated:FOFFset	-40.0 MHz .. 40.0 MHz	Hz	
[SOURce:]BB:W3GPp:TS25141:IFSignal:MODulated:POWer	-145.0 dBm ... 20.0 dBm	dBm	
[SOURce:]BB:W3GPp:TS25141:IFSignal:MODulated:STATe	ON | OFF		
[SOURce:]BB:W3GPp:TS25141:IFSignal:MODulated:TYPE	WCDMa | GMSK | CW | QPSK		
[SOURce:]BB:W3GPp:TS25141:IFSignal:POWer	-145.0 .. 20.0 dBm	dBm	
[SOURce:]BB:W3GPp:TS25141:IFSignal:SETTing:TMODel:BSTation	TM164 | TM116 | TM132 | TM2 | TM316 | TM332 | TM4 | TM538 | TM528 | TM58		
[SOURce:]BB:W3GPp:TS25141:IFSignal:STATe	ON | OFF		

Command	Parameter	Default unit	Comment
[SOURce:]BB:W3GPp:TS25141:IFSignal:TYPE	WCDMa | GMSK | CW | QPSK		
[SOURce:]BB:W3GPp:TS25141:ROUTe	A | B		
[SOURce:]BB:W3GPp:TS25141:RXDiversity	OFF | ON		
[SOURce:]BB:W3GPp:TS25141:SCODe	0x0 .. 0xFFFF FF (24 bits)		
[SOURce:]BB:W3GPp:TS25141:SCODe:MODE	OFF | LONG | SHORt		
[SOURce:]BB:W3GPp:TS25141:TCASe	TC642 | TC66 | TC72 | TC73 | TC74 | TC75 | TC76 | TC78 | TC821 | TC831 | TC832 | TC833 | TC834 | TC84 | TC85 | TC86 | TC881 | TC882 | TC883 | TC884 | TC891 | TC892 | TC893 | TC894		
[SOURce:]BB:W3GPp:TS25141:TCASe:EXECute			No query
[SOURce:]BB:W3GPp:TS25141:TRIGger	AUTO | PRESet		
[SOURce:]BB:W3GPp:TS25141:TRIGger:OUTPut	AUTO | PRESet		
[SOURce:]BB:W3GPp:TS25141:WSIGnal:BTYPe	WIDE | COLocated | NARRow		
[SOURce:]BB:W3GPp:TS25141:WSIGnal:DCRatio	-80.0 dB .. 80.0 dB	dB	
[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPCCh:SFORmat	0 ... 5		
[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPCCh:TPC:RDATa	AGGRegated | DLISt | ONE | SINGle | ZERO		
[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPCCh:TPC:RDATa:DSELect	<data_list>		
[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPCCh:TPC:RDATa:PATTern	#B0,1...#B11..1,64		
[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPCCh:TPC:SDATa	PMAXlessnsteps | DLISt		
[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPCCh:TPC:SDATa:DSELect	<data_list>		
[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPCCh:TPC:SDATa:PDSTeps	1 ... 1000		
[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPCCh:TPC:SDATa:PUSTeps	1 ... 1000		
[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPDCh:DERRor:BIT:RATE	0.0 ... 0.1		
[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPDCh:DERRor:BLOCk:RATE	0.0 ... 0.1		
[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPDCh:CCODing:TYPE	M12K2 | M64K | M144k | M384k | AMR		
[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPDCh:ORATe	D7K5 | D15K | D30K | D60K | D120k | D240k | D480k | D960k | D1920k | D2880k | D3840k | D4800k | D5760k		
[SOURce:]BB:W3GPp:TS25141:WSIGnal:FREQuency	100.0 kHz ... 6.0 GHz	Hz	
[SOURce:]BB:W3GPp:TS25141:WSIGnal:OBANd	I | II | III | IV | V		
[SOURce:]BB:W3GPp:TS25141:WSIGnal:PCPCh:CCODing:TYPE	TB168 | TB360		
[SOURce:]BB:W3GPp:TS25141:WSIGnal:POWer	-145.0 dBm ... 20.0 dBm	dBm	
[SOURce:]BB:W3GPp:TS25141:WSIGnal:PRACh:CCODing:TYPE	TB168 | TB360		
[SOURce:]BB:W3GPp:TS25141:WSIGnal:STATe	ON | OFF		
[SOURce:]BB:W3GPp:TS25141:WSIGnal:TRIGger[:EXTernal]:DELay	0.0 ... 65535.0 chips		

[SOURce:]BB:W3GPp:TS25141:AWGN:CNRatio -40.0 dB ... 40.0 dB

This command sets the carrier/noise ratio in mode "**User definable**" (`:SOURce:BB:W3GPp: TS25141:EMODe USER`). It is query only in mode "**According to Standard**" (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`).

Example: `"BB:W3GP:TS25141:TCAS TC73"`
'selects test case 7.3.

`"BB:W3GP:TS25141:EMOD STAN"`
'selects mode "**According to Standard**". Only settings in compliance with the standard can be made.

`"BB:W3GP:TS25141:AWGN:CNR?"`
'queries the signal/noise ratio of the interfering signal.

Response: "`-16.80`"
'the signal/noise ratio of the interfering signal is -16.8 dB.

*RST value	Resolution	Options	Dependencies	SCPI
-16.8 dB	0.01 dB	Test Cases 7.3, 8.x (not 8.6) minimum requirement: Options B13, B10/B11, K42 and K62 For additionally required options see selected test case.	Sets command `:SOURce1|2:AWGN:CNR` after execution of `:SOURce:BB:W3GP:TS25141:TCASe:EXECute`	Device-specific

[SOURce:]BB:W3GPp:TS25141:AWGN:ENRatio -80.0 dB .. 80.0 dB

This command sets the ratio of bit energy to noise power density in mode "**User definable**" (`:SOURce:BB:W3GPp: TS25141:EMODe USER`). It is query only in mode "**According to Standard**" (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`).

Example: `"BB:W3GP:TS25141:TCAS TC821"`
'selects test case 8.2.1.

`"BB:W3GP:TS25141:EMOD STAN"`
'selects mode "**According to Standard**". Only settings in compliance with the standard can be made.

`"BB:W3GP:TS25141:AWGN:ENR?"`
'queries the ratio of bit energy to noise power density of the interfering signal.

Response: "`8.70`"
'the E/N ratio of the interfering signal is 8.7 dB.

*RST value	Resolution	Options	Dependencies	SCPI
8.7 dB	0.01 dB	Test Cases 8.x (not 8.6) minimum requirement: Options B13, B10/B11, K42 and K62 For additionally required options see selected test case	Sets command `:SOURce1|2:AWGN:ENR` after execution of `:SOURce:BB:W3GP:TS25141:TCASe:EXECute`	Device-specific

[SOURce:]BB:W3GPp:TS25141:AWGN:POWer:NOISe wanted signal level - C/N

This command sets the noise level in mode "**User definable**" (`:SOURce:BB:W3GPp:TS25141:EMODe USER`). It is query only in mode "**According to Standard**" (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`).

Example: `"BB:W3GP:TS25141:TCAS TC73"`
'selects test case 7.3.

`"BB:W3GP:TS25141:EMOD STAN"`
'selects mode "**According to Standard**". Only settings in compliance with the standard can be made.

`"BB:W3GP:TS25141:AWGN:POW:NOIS?"`
'queries the noise level of the interfering signal.

Response: `"-73"`
'the noise level of the interfering signal is -73 dB.

*RST value	Resolution	Options	Dependencies	SCPI
Depending on the selected test case	0.1 dB	Test Cases 7.3, 8.x (not 8.6) minimum requirement: Options B13, B10/B11, K42 and K62 For additionally required options see selected test case	Sets command `:SOURce1|2:AWGN:POW:NOISe` after execution of `:SOURce:BB:W3GP:TS25141:TCASe:EXECute`	Device-specific

[SOURce:]BB:W3GPp:TS25141:AWGN:RBLock:RATE B0 | B01| B001 | B0001

This command sets the required block error rate in edit mode '**According to Standard**' (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`). The possible selection depends on the set fading configuration.

Example: `"BB:W3GP:TS25141:TCAS TC893"`
'selects test case 8.9.3.

`"BB:W3GP:TS25141:EMOD STAN"`
'selects mode "**According to Standard**". Only settings in compliance with the standard can be made.

`"BB:W3GP:TS25141:AWGN:RBL:RATE B01"`
'sets the required block error rate to< 0.01.

*RST value	Resolution	Options	SCPI
B001	-	Test Cases 8.x (, not 8.6, 8.8.1, 8.8.2, 8.9.1, 8.9.2), minimum requirement: Options B13, B10/B11, K42 and K62 For additionally required options see selected test case	Device-specific

[SOURce:]BB:W3GPp:TS25141:AWGN:RPDetection:RATE PD099 | PD0999

This command sets the required probability of detection of preamble (Pd) in edit mode '**According to Standard**' (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`). The selection determines the ratio E_b/N_0.

Example: `"BB:W3GP:TS25141:TCAS TC892"`
'selects test case 8.9.2.

`"BB:W3GP:TS25141:EMOD STAN"`
'selects mode "**According to Standard**". Only settings in compliance with the standard can be made.

`"BB:W3GP:TS25141:AWGN:RPD:RATE PD099"`

'sets the required probability of detection of preamble to > 0.99. The E/N ratio of the interfering signal is -8.8 dB.

*RST value	Resolution	Options	SCPI
PD099	-	Test Cases 8.8.1, 8.8.2, 8.9.1, 8.9.2 minimum requirement: Options B13, B10/B11, K42 and K62 For additionally required options see selected test case	Device-specific

[SOURce:]BB:W3GPp:TS25141:AWGN:STATe ON | OFF

This command enables/disables the generation of the AWGN signal in mode '**User Definable**'. In mode '**According to Standard**' the state is fixed to '**ON**'.

Example: `"BB:W3GP:TS25141:TCAS TC892"`
'selects test case 8.9.2.

`"BB:W3GP:TS25141:EMOD USER"`
'selects mode "**User definable**". Also settings that are not in compliance with the standard can be made.

`"BB:W3GP:TS25141:AWGN:STAT OFF"`
'disables the generation of the AWGN signal.

*RST value	Resolution	Options	Dependencies	SCPI
ON	-	Test Cases 7.3, 8.x (not 8.6) minimum requirement: Options B13, B10/B11, K42 and K62 For additionally required options see selected test case	Sets command `:SOURce1|2:AWGN:STATe` after execution of `:SOURce:BB:W3GP:TS25141:TCASe:EXECute`	Device-specific

[SOURce:]BB:W3GPp:TS25141:BSPClass WIDE | MEDium | LOCal

This command enters the base station power class in mode "**According to Standard**" (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`). The selected power class determines the output level of the signal generator. For edit mode "**User Definable**" (`:SOURce:BB:W3GPp:TS25141:EMODe USER`), the output level can be set with command `:SOURce:BB:W3GPp:TS25141:WSIGnal:POWer`.

Example: `"BB:W3GP:TS25141:BSPC WIDE"`
'the base station under test is a wide area base station.

*RST value	Resolution	Options	Dependencies	SCPI
ON	-	All test cases except for 6.6 minimum requirement: Options B13, B10/B11 and K42 For additionally required options see selected test case	Sets the power commands associated with the selected test case (e.g. `:SOURce1|2:POWer`) after execution of `:SOURce:BB:W3GP:TS25141:TCASe:EXECute`	Device-specific

[SOURce:]BB:W3GPp:TS25141:BSSignal:FREQuency 100.0 kHz ... 6.0 GHz

This command enters the RF frequency of the base station.

Example: `"BB:W3GP:TS25141:BSS:FREQ 1GHz"`
'the frequency of the base station under test is 1 GHz.

*RST value	Resolution	Options	SCPI
1 GHz	-	Test case 6.6 Options B13, B10/B11 and K42	Device-specific

[SOURce:]BB:W3GPp:TS25141:BSSignal:POWer -145.0 dBm ... 20.0 dBm

This command enters the RF power of the base station.

Example: `"BB:W3GP:TS25141:TCAS TC66"`
'selects test case 6.6.

`"BB:W3GP:TS25141:BSS:POW -30"`
'the power of the base station under test is -30 dBm.

*RST value	Resolution	Options	SCPI
-30 dBm	0.0 dBm	Test case 6.6 Options B13, B10/B11 and K42	Device-specific

[SOURce:]BB:W3GPp:TS25141:EMODe STANdard | USER

This command selects the edit mode for the configuration of the test cases.).

Parameter: **STANdard**
Edit mode "**According to Standard**". Only settings in compliance with TS 25.141 are possible. All other parameters are preset.

USER
Edit mode "**User definable**". A wider range of settings is possible.

Example: "BB:W3GP:TS25141:EMOD USER"
'selects edit mode "**User definable**".

*RST value	Resolution	Options	SCPI
STANdard	-	All test cases minimum requirement: Options B13, B10/B11 and K42 For additionally required options see selected test case	Device-specific

[SOURce:]BB:W3GPp:TS25141:FSIMulator:STATe?

This command queries the state of the Fading Simulator. For test cases using static propagation conditions this parameter is set to OFF.

For test cases using multipath fading, moving propagation or birth/death propagation conditions, this parameter is set to ON.

The command represents a query and thus has no *RST value.

Example: "BB:W3GP:TS25141:TCAS TC892"
'selects test case 8.9.2.
"BB:W3GP:TS25141:FSIM:STAT?"
'queries the state of the fading simulator.
Response: "0"
'the fading simulator is disabled.

*RST value	Resolution	Options	SCPI
-	-	Test Cases 8.x (not 8.6) minimum requirement Options B13, B10/B11, B14, B15, K42, K62 and K71 For additionally required options see selected test case	Device-specific

[SOURce:]BB:W3GPp:TS25141:IFSignal:BWIDth WIDE | NARRow

This command selects the interferer scenario. .

Parameter:

WIDE
A 3GPP FDD uplink interfering signal is generated for path B. In "**According to Standard**" mode, the 3GPP FDD uplink interfering signal is superimposed by a CW interfering signal with a frequency of 10 MHz and a level of -48 dB.

NARROW
A GMSK interfering signal (3.84 MHz bandwidth, root cosine filter 0.22, PRBS9 data source) is generated for path B. In "**According to Standard**" mode, the GMSK interfering signal is superimposed by a CW interfering signal with a frequency of 3.5 MHz and a level of -47 dB

Example: "BB:W3GP:TS25141:TCAS TC76"
'selects test case 7.6.
"BB:W3GP:TS25141:IFS:BWID WIDE"
'selects a 3GPP FDD uplink interfering signal 1

*RST value	Resolution	Options	SCPI
WIDE	-	Test Case 7.6 Option K62 and B20x, two options B13, B10/B11, and K42 each	Device-specific

[SOURce:]BB:W3GPp:TS25141:IFSignal:CNRatio -80.0 ... 80.0 dB

This command sets the power ratio of wanted signal to interfering signal for test case 7.4 in mode "**User definable**" (`:SOURce:BB:W3GPp: TS25141:EMODe USER`). It is query only in mode "**According to Standard**" (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`).

This command sets the power ratio of interfering signal to wanted signal for test case 6.6 in mode "**User definable**" (`:SOURce:BB:W3GPp: TS25141:EMODe USER`). It is query only in mode "**According to Standard**" (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`).

Example: `"BB:W3GP:TS25141:TCAS TC74"`
'selects test case 7.4.

`"BB:W3GP:TS25141:EMOD STAN"`
'selects mode "**According to Standard**". Only settings in compliance with the standard can be made.

`"BB:W3GP:TS25141:IFS:CNR?"`
'queries the power ratio.

Response: "`-63.0`"
'the signal/noise ratio of the interfering signal is -63 dB.

*RST value	Resolution	Options	Dependencies	SCPI
-63 dB	0.01 dB	Test case 6.6 Options B13, B10/B11 and K42 Test case 7.4 Options B13, B10/B11, B20x , and two options K42	Sets command `:SOURce2:POWer` after execution of `:SOURce:BB:W3GP:TS25141:TCASe:EXECute`	Device-specific

[SOURce:]BB:W3GPp:TS25141:IFSignal:CW:FOFFset -40.0 MHz ... 40.0 MHz

This command sets frequency offset of the CW interfering signal versus the wanted signal RF frequency. In mode "**According to Standard**" (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`) the frequency offset value is fixed to a value determined by the selected **Interferer Bandwidth** (`:SOURce:BB:W3GPp:TS25141:IFS:BWIDth`).

Example: `"BB:W3GP:TS25141:TCAS TC76"`
'selects test case 7.6.

`"BB:W3GP:TS25141:EMOD STAN"`
'selects mode "**According to Standard**". Only settings in compliance with the standard can be made.

`"BB:W3GP:TS25141:IFS:IFS:BWID WIDE"`
'selects interferer scenario wideband.

`"BB:W3GP:TS25141:IFS:CW:FOFF?"`
'queries the frequency offset of the CW interferer.

Response: "`10000000`"
'the frequency offset is 10 MHz.

*RST value	Resolution	Options	Dependencies	SCPI
10 MHz	0.01 Hz	Test Case 7.6 Options B20x and K62, second option B10/B11 and B13 each, two options K42.	Sets commands `:SOURce2:FREQ`, `:SOURce2:BB:FOFF` and `:SOURce2:AWGN:FREQ:TARGet` after execution of `:SOURce:BB:W3GP:TS25141:TCAS:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25141:IFSignal:CW:POWer -145.0 dBm ... 20.0 dBm

This command sets the RF level of the CW interfering signal. In mode "**According to Standard**" (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`) the RF level value is fixed to a value determined by the selected **Interferer Bandwidth** (`:SOURce:BB:W3GPp:TS25141:IFS:BWIDth`).

Example: `"BB:W3GP:TS25141:TCAS TC76"`
'selects test case 7.6.

`"BB:W3GP:TS25141:EMOD STAN"`
'selects mode "**According to Standard**". Only settings in compliance with the standard can be made.

`"BB:W3GP:TS25141:IFS:BWID NARR"`
'selects interferer scenario narrowband.

`"BB:W3GP:TS25141:IFS:CW:POW?"`
'queries the RF level of the CW interferer.

Response: "`-47`"
'the RF level is -47.00 dBm.

*RST value	Resolution	Options	Dependencies	SCPI
-48 dBm	0.01 dBm	Test Case 7.6 Options B20x and K62, two options B10/B11, B13, two options and K42 each.	Sets commands `:SOURce2:AWGN:CNRatio` and `:SOURce2:AWGN:POWer:NOISe` after execution of `:SOURce:BB:W3GP:TS25141:TCAS:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25141:IFSignal:CW:STATe ON | OFF

This command enable/disables the CW interfering signal. In mode "**According to Standard**" (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`) the value is fixed to "ON".

Example: `"BB:W3GP:TS25141:TCAS TC76"`
'selects test case 7.6.

`"BB:W3GP:TS25141:EMOD STAN"`
'selects mode "**According to Standard**". Only settings in compliance with the standard can be made.

`"BB:W3GP:TS25141:IFS:BWID NARR"`
'selects interferer scenario narrowband.

`"BB:W3GP:TS25141:IFS:CW:STAT?"`
'queries the state of the CW interferer.

Response: "`1`"
'the CW interferer is enabled.

*RST value	Resolution	Options	Dependencies	SCPI
-48 dBm	0.01 dBm	Test Case 7.6 Options B20x and K62, second option B10/B11 and B13 each, two options K42.	Sets commands `:SOURce2:AWGN:CNRatio` and `:SOURce2:AWGN:POWer:NOISe` after execution of `:SOURce:BB:W3GP:TS25141:TCAS:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25141:IFSignal:FOFFset -40.0 MHz ... 40.0 MHz

This command sets frequency offset of the interfering signal versus the wanted signal RF frequency. For test case 7.4, the choice is limited to +/- 5MHz in mode "**According to Standard**" (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`).

Example: `"BB:W3GP:TS25141:TCAS TC74"`
'selects test case 7.4.

`"BB:W3GP:TS25141:EMOD STAN"`
'selects mode "**According to Standard**". Only settings in compliance with the standard can be made.

`"BB:W3GP:TS25141:IFS:FOFF 0.5 MHz"`
'sets the frequency offset of the interferer to 5 MHz.

*RST value	Resolution	Options	Dependencies	SCPI
1 MHz	0.01 Hz	Test cases 7.4 / 7.5 Option B20x, two options B10/B11, B13 and K42 each.	Sets commands `:SOURce2:FREQ` after execution of `:SOURce:BB:W3GP:TS25141:TCAS:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25141:IFSignal:MODulated:FOFFset -40.0 MHz ... 40.0 MHz

This command sets frequency offset of the modulated interfering signal versus the wanted signal RF frequency. In mode "**According to Standard**" (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`) the frequency offset value is fixed to a value determined by the selected **Interferer Bandwidth** (`:SOURce:BB:W3GPp:TS25141:IFS:BWIDth`).

Example: `"BB:W3GP:TS25141:TCAS TC76"`
'selects test case 7.6.

`"BB:W3GP:TS25141:EMOD STAN"`
'selects mode "**According to Standard**". Only settings in compliance with the standard can be made.

`"BB:W3GP:TS25141:IFS:BWID WIDE"`
'selects interferer scenario wideband.

`"BB:W3GP:TS25141:IFS:MOD:FOFF?"`
'queries the frequency offset of the modulated interferer.

Response: "`20000000`"
'the frequency offset is 20 MHz.

*RST value	Resolution	Options	Dependencies	SCPI
20 MHz	0.01 Hz	Test Case 7.6 Options B20x and K62, second option B10/B11 and B13 each, two options K42.	Sets commands `:SOURce2:FREQ` and `:SOURce2:BB:FOFF` after execution of `:SOURce:BB:W3GP:TS25141:TCAS:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25141:IFSignal:MODulated:POWer -145.0 dBm ... 20.0 dBm

This command sets the RF level of the modulated interfering signal. In mode "**According to Standard**" (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`) the RF level value is fixed to a value determined by the selected **Interferer Bandwidth** (`:SOURce:BB:W3GPp:TS25141:IFS:BWIDth`).

Example: "`BB:W3GP:TS25141:TCAS TC76`"
'selects test case 7.6.

"`BB:W3GP:TS25141:EMOD STAN`"
'selects mode "**According to Standard**". Only settings in compliance with the standard can be made.

"`BB:W3GP:TS25141:IFS:BWID NARR`"
'selects interferer scenario narrowband.

"`BB:W3GP:TS25141:IFS:MOD:POW?`"
'queries the RF level of the modulated interferer.

Response: "`-47`"
'the RF level is 47.00 dBm.

*RST value	Resolution	Options	Dependencies	SCPI
-48 dBm	0.01 dBm	Test Case 7.6 Options B20x and K62, second option B10/B11 and B13 each, two options K42.	Sets command `:SOURce2:POWer` after execution of `:SOURce:BB:W3GP:TS25141:TCAS:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25141:IFSignal:MODulated:STATe ON | OFF

This command enable/disables the modulated interfering signal. In mode "**According to Standard**" (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`) the value is fixed to "ON".

Example: "`BB:W3GP:TS25141:TCAS TC76`"
'selects test case 7.6.

"`BB:W3GP:TS25141:EMOD STAN`"
'selects mode "**According to Standard**". Only settings in compliance with the standard can be made.

"`BB:W3GP:TS25141:IFS:BWID NARR`"
'selects interferer scenario narrowband.

"`BB:W3GP:TS25141:IFS:MOD:STAT?`"
'queries the state of the modulated interferer.

Response: "`1`"
'the modulated interferer is enabled.

*RST value	Resolution	Options	Dependencies	SCPI
ON		Test Case 7.6 Options B20x and K62, second option B10/B11 and B13 each, two options K42.	Sets command `:SOURce2:W3GP:STAT` (Bandwidth Type Wideband) or `:SOURce2:DM:STATe` (Bandwidth Type Narrowband) after execution of `:SOURce:BB:W3GP:TS25141:TCASe:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25141:IFSignal:MODulated:TYPE WCDMa | QPSK | GMSK

This command selects the type of modulation for the interfering uplink signal in the second path. In mode "**According to Standard**" (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`) the modulation type is fixed to '**WCDMA**' for interferer scenario "wideband" and to "**GMSK**" for interferer scenario "narrowband" (`:BB:W3GPp:TS25141:IFSignal:BWIDth WIDE|NARRow`).

Example: `"BB:W3GP:TS25141:TCAS TC76"`
'selects test case 7.6.

`"BB:W3GP:TS25141:EMOD STAN"`
'selects mode "**According to Standard**". Only settings in compliance with the standard can be made.

`"BB:W3GP:TS25141:IFS:BWID NARR"`
'selects interferer scenario narrowband.

`"BB:W3GP:TS25141:IFS:MOD:TYPE?"`
'queries the type of the modulated interferer.

Response: "`GMSK`"
'the modulation type is GMSK.

*RST value	Resolution	Options	Dependencies	SCPI
ON		Test case 7.6 Options B20x and K62, second option B10/B11 and B13 each, two options K42.	Sets commands of subsystem `:SOURce2:W3GPp:...` (`WCDMa`) or `:SOURce2:DM:...` (`QPSK` and `GMSK`) after execution of `:SOURce:BB:W3GP:TS25141:TCASe:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25141:IFSignal:POWer -145.0 dBm ... 20.0 dBm

This command sets the RF level of the interfering signal. In mode "**According to Standard**" (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`) the RF level value is fixed to a value determined by the selected **Blocking Scenario** (`:SOURce:BB:W3GPp:TS25141:WSIGnal:BTYPe`).

Example: `"BB:W3GP:TS25141:TCAS TC75"`
'selects test case 7.6.

`"BB:W3GP:TS25141:EMOD STAN"`
'selects mode "**According to Standard**". Only settings in compliance with the standard can be made.

`"BB:W3GP:TS25141:WSIG:BTYP NARR"`
'selects blocking scenario narrowband.

`"BB:W3GP:TS25141:IFS:POW?"`
'queries the RF level of the CW interferer.

Response: "`-47`"
'the RF level is -47.00 dBm.

*RST value	Resolution	Options	Dependencies	SCPI
-15 dBm	0.01 dBm	Test case 7.5 Option B20x, second option B10/B11 and B13 each, two options K42.	Sets command `:SOURce2:POWer` after execution of `SOUR:BB:W3GP:TS25141:TCASe:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25141:IFSignal:SETTing:TMODel:BSTation TM164 | TM116 | TM132 | TM2 | TM316 | TM332 | TM4 | TM538 | TM528 | TM58

This command selects the interfering signal from a list of test models in accordance with TS 25.141. All test models refer to the predefined downlink configurations. In edit mode '**According to Standard**' (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`) Test Model 1, 64 DPCHs is fixed.

Example: `"BB:W3GP:TS25141:TCAS TC66"`
'selects test case 6.6.

`"BB:W3GP:TS25141:EMOD USER"`
'selects mode "**User Definable**".

`"BB:W3GP:TS25141:IFS:SETT:TMOD:BST TM116"`
'the interfering signal is generated according to test model Test Model 1; 16 Channels.

*RST value	Resolution	Options	Dependencies	SCPI
T164		Test case 6.6 Options B13, B10/B11 and K42	Sets commands of subsystem `:SOURce1:W3GPp:...` after execution of `SOUR:BB:W3GP:TS25141:TCASe:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25141:IFSignal:STATe ON | OFF

This command enable/disables the modulated interfering signal. In mode "**According to Standard**" (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`) the value is fixed to "ON".

Example: `"BB:W3GP:TS25141:TCAS TC75"`
'selects test case 7.5.

`"BB:W3GP:TS25141:EMOD STAN"`
'selects mode "**According to Standard**". Only settings in compliance with the standard can be made.

`"BB:W3GP:TS25141:IFS:STAT?"`
'queries the state of the interferer.

Response: "`1`"
'the interferer is enabled.

*RST value	Resolution	Options	SCPI
ON	-	Test cases 7.4 / 7.5 Options B13, B10/B11, B20x , and two K42	Device-specific

[SOURce:]BB:W3GPp:TS25141:IFSignal:TYPE WCDMa | QPSK | GMSK | CW

This command selects the type of modulation for the interfering signal. In mode "**According to Standard**" (`:SOURce:BB:W3GPp:TS25141:EMODe STANdard`) the modulation type is fixed to '**WCDMA**' for test case 7.4 and to "**GMSK**" for test case 7.5.

Example: `"BB:W3GP:TS25141:TCAS TC75"`
'selects test case 7.5.

`"BB:W3GP:TS25141:EMOD STAN"`
'selects mode "**According to Standard**". Only settings in compliance with the standard can be made.

"BB:W3GP:TS25141:IFS:TYPE?"
'queries the type of the interferer.

Response: "CW"
'the modulation type is CW interferer.

*RST value	Resolution	Options	SCPI
WCDMa		Test cases 7.4 / 7.5 Options B13, B10/B11, B20x , and two K42	Device-specific

[SOURce:]BB:W3GPp:TS25141:ROUTe A | B

The command selects the signal routing for baseband A signal which in most test cases represents the wanted signal (exception test case 6.6). The command is only available for two-path-instruments and only for test cases that do not use both paths anyway.

Parameter: **A**
The baseband signal A is routed to RF output A.

B
The baseband signal A is routed to RF output B.

Example: "BB:W3GP:TS25141:ROUT B"
'the baseband signal of path A is introduced into path B.

*RST value	Resolution	Options	SCPI
A	-	All test cases minimum requirement: Option B20x, B10/B11, K42 and two options B13,	Device-specific

[SOURce:]BB:W3GPp:TS25141:RXDiversity ON | OFF

The command sets the signal generator according to the base station diversity processing capability. The command is only available for two-path-instruments and only for test cases that do not use both paths anyway.

Parameter: **ON**
The baseband signal A is routed to RF output A and B.

OFF
The baseband signal A is routed to either to RF output A or B.

Example: "BB:W3GP:TS25141:RXD ON"
'the baseband signal of path A is introduced into both paths.

*RST value	Resolution	Options	Dependencies	SCPI
OFF	-	Test cases 8.x Options B20x, B14, B15, K71, and K62, two options B10/B11 and B13 each.	Sets the power commands associated with the selected test case (e.g. `:SOURce1|2:POWer`) after execution of `SOUR:BB:W3GP:TS25141:TCASe:EXECute`	Device-specific

[SOURce:]BB:W3GPp:TS25141:SCODe <numeric_value>

The command sets the scrambling code. The value range depends on whether the generator is used in uplink or downlink direction (test case 6.6) according to the selected test case.

Example: `"BB:W3GP:TS25141:SCOD #H5FFF"`
'sets scrambling code #H5FFF.

*RST value	Resolution	Options	Dependencies	SCPI
#H0	-	All test cases minimum requirement: Options B13, B10/B11 and K42. For additionally required options see selected test case.	Sets command `:SOURce:BB:W3GP:BST:SCODe` (test case 6.6) or `:SOURce:BB:W3GP:MST:SCODe` after execution of `SOUR:BB:W3GP:TS25141:TCASe:EXECute`	Device-specific

[SOURce:]BB:W3GPp:TS25141:SCODe:MODE SHORt | LONG | OFF | ON

The command sets the type for the scrambling code for the uplink direction. The scrambling code generator can also be deactivated. In downlink direction (test case 6.6), the scrambling generator can be switched on and off.

Example: `"BB:W3GP:TS25141:SCOD:MODE OFF"`
'deactivates the scrambling code generator.

*RST value	Resolution	Options	Dependencies	SCPI
LONG | ON	-	All test cases minimum requirement: Options B13, B10/B11 and K42. For additionally required options see selected test case.	Sets command `:SOUR:BB:W3GP:BST:SCOD:STAT` (test case 6.6) or `:SOUR:BB:W3GP:MST:SCOD:MODE` after execution of `SOUR:BB:W3GP:TS25141:TCASe:EXECute`	Device-specific

[SOURce:]BB:W3GPp:TS25414:TCASe TC642 | TC66 | TC72 | TC73 | TC74 | TC75 | TC76 | TC78 | TC821 | TC831 | TC832 | TC833 | TC834 | TC84 | TC85 | TC86 | TC881 | TC882 | TC883 | TC884 | TC891 | TC892 | TC893 | TC894

The command selects a test case defined by the standard. The signal generator is preset according to the selected standard. The selected edit mode (`SOURce:BB:W3GP:TS25141:EMODe`) determines the range of parameters that can be adjusted.

Example: `"BB:W3GP:TS25141:TCAS TC73"`
'selects the test case 7.3, Dynamic Range.

*RST value	Resolution	Options	Dependencies	SCPI
TS642	-	Minimum requirement: Options B13, B10/B11 and K42	Depending on the selected test case the parameters of the TS25141 commands are preset. For most test cases also the parameters of one or more of the subsystems SOURce:AWGN, SOURce:W3GPp, SOURce:DM and SOURce:FSIM are preset. The preset parameters are activated with command `:BB:W3GP:TS25141:TCAS:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25414:TCASe:EXECute

The command activates the current settings of the test case wizard.. Signal generation is started at the first trigger received by the generator. The RF output is not activated /deactivated by this command, so care has to be taken that **RF State** is **On** (`OUTPut:STATe ON`) at the beginning of the measurement.

This command triggers an event and therefore has no *RST value and no query form.

Example: `"BB:W3GP:TS25141:TCAS TC73"`
'selects the settings for test case 7.3, Dynamic Range.

`"BB:W3GP:TS25141:BSPC MED"`
'sets the base station power class "Medium Range BS".

`"BB:W3GP:TS25141:SCOD #H000FFF"`
'sets the uplink scrambling code 'H000FFF.

`"BB:W3GP:TS25141:WSIG:FREQ 1710MHz"`
'sets the wanted signal frequency.

`"BB:W3GP:TS25141:TCAS:EXEC"`
'activates the settings for test case 7.3, Dynamic Range. For all other parameters the preset values are used.

`"OUTP ON"`
'activates RF output A.

*RST value	Resolution	Options	Dependencies	SCPI
TS642	-	Minimum requirement: Options B13, B10/B11 and K42. For additionally required options see selected test case.	The command activates the preset parameters of the TS25141 commands and - for most test cases - also the parameters of one or more of the subsystems SOURce:AWGN, SOURce:W3GPp, SOURce:DM and SOURce:FSIM.	Device-specific

[SOURce:]BB:W3GPp:TS25141:TRIGger AUTO | PRESet

The command selects the trigger mode. The trigger is used to synchronize the signal generator to the other equipment.

Parameter: **AUTO**
The trigger settings are customized for the selected test case. In most cases trigger setting **Armed Auto** with external trigger source **External Trigger 1** is used. Unless otherwise noted the trigger delay is set equal to zero.

PRESet
The current trigger settings of the signal generator are kept.

Example: `"BB:W3GP:TS25141:TRIG AUTO"`
'selects customization of trigger mode for the selected test case

*RST value	Resolution	Options	Dependencies	SCPI
AUTO	-	All test cases Minimum requirement: Options B13, B10/B11 and K42. For additionally required options see selected test case.	When AUTO is selected, all commands concerning the baseband trigger settings are adjusted to the requirements of the selected test case after execution of `SOUR:BB:W3GP:TS25141:TCASe:EXECute`.	Device-specific

[SOURce:]BB:W3GPp:TS25141:TRIGger:OUTPut AUTO | PRESet

The command defines the signal for the selected marker output.

Parameter: **AUTO**

The marker settings are customized for the selected test case.

PRESet

The current marker settings of the signal generator are kept.

Example: `"BB:W3GP:TS25141:TRIG:OUTP PRES"`

'selects thatf the current marker setting are kept independently of the selected test case.

*RST value	Resolution	Options	Dependencies	SCPI
AUTO	-	All test cases Minimum requirement: Options B13, B10/B11 and K42. For additionally required options see selected test case.	When AUTO is selected, all commands of the W3GPp Subsystem concerning the marker settings are adjusted to the selected test case after execution of `SOUR:BB:W3GP:TS25141:TCASe:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:BTYPe WIDE | COLocated | NARRow

The command selects the type of blocking scenario in edit mode '**According to Standard**' (`SOURce:BB:W3GP:TS25141:EMODe STAN`). The selected blocking scenario determines the type of interfering signal and its level.

Parameter: **WIDE**

The interferer signal for wide band blocking depends on the set **Operating Band** and **RF Frequency**:
As long as the interferer **RF frequency** lies within the selected **Operating Band**, a 3GPP FDD uplink signal with a power level of -40 dB is generated for path B.
When the interferer **RF Frequency** lies outside the selected **Operating Band**, a CW carrier interfering signal with a power level of -15 dB is generated for path B.

COLocated

A CW carrier interfering signal with a power level of -15 dB is generated for path B.

NARRow

A GMSK (270.833 kHz) interfering signal with a power level of -47 dB is generated for path B.

Example: `"BB:W3GP:TS25141:TCAS TC75"`

'selects the settings for test case 7.5, Blocking Characteristics.

`"BB:W3GP:TS25141:WSIG:BTYP NARR"`

'selects the GMSK (270.833 kHz) interfering signal

*RST value	Resolution	Options	Dependencies	SCPI
WIDE		Test case 7.5 Option B20x, two options B10/B11, B13 and K42 each.	Determines the settings of subsystems `:SOUR:BB:W3GP:... (WIDE)`, `:SOUR:BB:DM:... (NARRow)` or `:SOUR:FREQ:...` and `OUTPut:...` (`COLocated` and `WIDE`) after execution of `:SOURce:BB:W3GP:TS25141:TCASe:EXECute`	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:DCRatio -80.0 dB .. 80.0 dB

The command sets channel power ratio of DPCCH to DPDCH.

Example: `"BB:W3GP:TS25141:TCAS TC642"`
'selects the settings for test case 6.4.2, Power Control Steps.

`"BB:W3GP:TS25141:WSIG:DCR -3 dB"`
'sets a ratio of -3 dB for DPCCH power/DPDCH power

*RST value	Resolution	Options	Dependencies	SCPI
0 dB	0.01 dB	Test case 6.4.2 Options B13, B10/B11 and K42	Sets commands `:SOUR:BB:W3GP:MST1:DPCC:POW` and `:SOUR:BB:W3GP:MST1:DPDC:POW` after execution of `SOUR:BB:W3GP:TS25141:TCAS:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPCCh:SFORmat 0 ... 5

The command sets the slot format for the DPCCH. The slot format defines the FBI mode and the TFCI status.

Example: `"BB:W3GP:TS25141:TCAS TC642"`
'selects the settings for test case 6.4.2, Power Control Steps.

`"BB:W3GP:TS25141:WSIG:DPCC:SFOR 3"`
'selects slot format 3 for the DPCCH

*RST value	Resolution	Options	Dependencies	SCPI
0		Test case 6.4.2 Options B13, B10/B11 and K42	Sets command `:SOUR:BB:W3GP:MST1:DPCC:SFOR` after execution of `SOUR:BB:W3GP:TS25141:TCAS:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPCCh:TPC:RDATa AGGRegated | DLISt | ONE | SINGle | ZERO

The command sets the TPC repeat pattern for verification of the base stations power control steps.

Parameter:

AGGRegated
A 00000000001111111111 pattern is sent periodically for measurement of the transmitter aggregated power control step range after 10 consecutive equal commands.

DLISt
The TPC repeat pattern is taken from a data list. The data list is selected with the command `SOURce:BB:W3GP:TS25141:DPDCh:TPC:RDAT:DSELect`.

ONE
A all 1 pattern is sent continuously. The base station is forced to maximum power. This selection is only available in edit mode '**User Definable**' (`SOURce:BB:W3GP:TS25141:EMODe USER`).

PATTern
Internal data is used. The bit pattern for the data is defined by `SOURce:BB:W3GP:TS25141:DPDCh:TPC:RDAT:PATTern`. The maximum length is 64 bits. This selection is only available in edit mode '**User Definable**' (`SOURce:BB:W3GP:TS25141:EMODe USER`).

SINGle
A 01 pattern is sent periodically for measurement of the transmitter power control step tolerance.

ZERO
A all 0 pattern is sent continuously. The base station is forced to minimum power. This selection is only available in edit mode '**User Definable**' (`SOURce:BB:W3GP:TS25141:EMODe USER`).

Example: `"BB:W3GP:TS25141:TCAS TC642"`
'selects the settings for test case 6.4.2, Power Control Steps.

`"BB:W3GP:TS25141:WSIG:DPCC:TPC:RDAT SING"`
'selects the 01 pattern

*RST value	Resolution	Options	Dependencies	SCPI
SINGle		Test case 6.4.2 Options B13, B10/B11 and K42	Sets command `:SOUR:BB:W3GP:MST1:DPCC:TPC:DATA` to `DLISt` and activates a predefined data list for TPC pattern (command `:SOUR:BB:W3GP:MST1:DPCC:TPC:DATA:DSEL)` The commands are set only after execution of `:SOURce:BB:W3GP:TS25141:TCASe:EXECute`	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPCCh:TPC:RDATa:DSELect <data_list_name>

The command selects the data list when the DLISt data source is selected for the TPC repeat pattern of the DPCCH.

The files are stored with the fixed file extensions ***.dm_iqd** in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, only the file name has to be given, without the path and the file extension.

Example: `"BB:W3GP:TS25141:TCAS TC642"`
'selects the settings for test case 6.4.2, Power Control Steps.

`"BB:W3GP:TS25141:WSIG:DPCC:TPC:RDAT DLIS"`
'selects the data source DLISt

`"MMEM:CDIR 'D:\Lists\Dm\IQData'"`
'selects the directory for the data lists.

`"BB:W3GP:TS25141:WSIG:DPCC:TPC:RDAT:DSEL 'dpcch_tpc_1'"`
'selects the data list 'dpcch_tpc1'.

*RST value	Resolution	Options	Dependencies	SCPI
-		Test case 6.4.2 Options B13, B10/B11 and K42	Determines contents of the predefined data list used with command `:SOUR:BB:W3GP:MST1:DPCC:TPC:DTA:DSEL` after execution of `SOUR:BB:W3GP:TS25141:TCAS:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPCCh:TPC:RDATa:PATTern #B0,1 ... #B11..1,64

The command determines the bit pattern for the PATTern data source selection. The maximum length of the bit pattern is 64 bits. This command is only available in edit mode '**User Definable**' (`SOURce:BB:W3GP:TS25141:EMODe USER`).

Example: `"BB:W3GP:TS25141:TCAS TC642"`
'selects the settings for test case 6.4.2, Power Control Steps.

`"BB:W3GP:TS25141:WSIG:DPCC:TPC:RDAT PATT"`
'selects the data source pattern

`"BB:W3GP:TS25141:WSIG:DPCC:TPC:RDAT:PATT #HF0C20,19"`
'defines the TPC pattern

*RST value	Resolution	Options	Dependencies	SCPI
#H0, 1		Test case 6.4.2 Options B13, B10/B11 and K42	Determines the contents of the predefined data list used with command `:SOUR:BB:W3GP:MST1:DPCC:TPC:DTA:DSEL` after execution of `SOUR:BB:W3GP:TS25141:TCAS:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPCCh:TPC:SDATa DLISt | PMAXlessnsteps

The command sets the TPC pattern for initialization of the base stations power level in edit mode '**User Definable**' (`SOURce:BB:W3GP:TS25141:EMODe USER`). In edit mode '**According to Standard**' (`SOURce:BB:W3GP:TS25141:EMODe STAN`) the pattern is fixed to '**Maximum Power Less n Steps**' (`PMAXlessnsteps`). The TPC start pattern is sent before the TPC repeat pattern to set the base station to a defined initial state for the measurement.

Parameter: **PMAXlessnsteps**

A sequence of power up steps (TPC bits "1") is followed by a number of power down steps (TPC bits "0"). The TPC bits "1" ('power up' commands) force the base station to maximum transmit power. By the n 'power down' commands the base station is set to a defined number of n power steps (e.g. 1 dB or 0.5 dB) below its maximum transmit power at the beginning of the measurement.

DLISt

The TPC start pattern is taken from a data list. The data list is selected with the command `SOURce:BB:W3GP:TS25141:DPDCh:TPC:SDAT:DSELect`. This selection is only available in edit mode '**User Definable**' (`SOURce:BB:W3GP:TS25141:EMODe USER`).

Example: `"BB:W3GP:TS25141:TCAS TC642"`
'selects the settings for test case 6.4.2, Power Control Steps.

`"BB:W3GP:TS25141:WSIG:DPCC:TPC:SDAT PMAX"`
'selects the 01 pattern

*RST value	Resolution	Options	Dependencies	SCPI
PMAX		Test case 6.4.2 Options B13, B10/B11 and K42	Sets command `:SOUR:BB:W3GP:MST1:DPCC:TPC:DATA` to `DLISt` and activates a predefined data list for TPC pattern (command `:SOUR:BB:W3GP:MST1:DPCC:TPC:DATA:DSEL)` The commands are set only after execution of `:SOURce:BB:W3GP:TS25141:TCASe:EXECute`	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPCCh:TPC:SDATa:DSELect <data_list_name>

The command selects the data list when the DLISt data source is selected for the TPC start pattern of the DPCCH.

The files are stored with the fixed file extensions ***.dm_iqd** in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`. To access the files in this directory, only the file name has to be given, without the path and the file extension.

Example: `"BB:W3GP:TS25141:TCAS TC642"`
'selects the settings for test case 6.4.2, Power Control Steps.

`"BB:W3GP:TS25141:WSIG:DPCC:TPC:SDAT DLIS"`
'selects the data source DLISt for TPC start pattern.

`"MMEM:CDIR 'D:\Lists\Dm\IQData'"`
'selects the directory for the data lists.

`"BB:W3GP:TS25141:WSIG:DPCC:TPC:SDAT:DSEL 'dpcch_tpc_s'"`
'selects the data list 'dpcch_tpcs'.

*RST value	Resolution	Options	Dependencies	SCPI
-		Test case 6.4.2 Options B13, B10/B11 and K42	Determines contents of the predefined data list used with command `:SOUR:BB:W3GP:MST1:DPCC:TPC:DTA:DSEL` after execution of `SOUR:BB:W3GP:TS25141:TCAS:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPCCh:TPC:SDATa:PDSTep 1 ... 1000

The command sets the number of power down bits in the TPC start pattern. The total TPC start pattern length is the number of ‘power up’ ('1') bits plus the number of n ‘power down’ (‘0’) bits. This parameter is only available for TPC Start Pattern = **Max. Pow. Less N Steps** (`:BB:W3GP:TS25141:WSIG:DPCC:TPC:SDAT PMAXlessnsteps`).

Example: `"BB:W3GP:TS25141:TCAS TC642"`
'selects the settings for test case 6.4.2, Power Control Steps.

`"BB:W3GP:TS25141:WSIG:DPCC:TPC:SDAT PMAX"`

'selects the pattern **Max. Pow. Less N Steps**

`"BB:W3GP:TS25141:WSIG:DPCC:TPC:SDAT:PUST 100`
'defines 100 power up steps. Presumably the base station is set to to maximum transmit power.

`"BB:W3GP:TS25141:WSIG:DPCC:TPC:SDAT:PDST 10`
'defines 10 power down steps. The base station is set to two power steps below its maximum transmit power.

*RST value	Resolution	Options	Dependencies	SCPI
1		Test case 6.4.2 Options B13, B10/B11 and K42	Determines contents of the predefined data list used with command `:SOUR:BB:W3GP:MST1:DPCC:TPC:DTA:DSEL` after execution of `SOUR:BB:W3GP:TS25141:TCAS:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPCCh:TPC:SDATa:PUSTep 1 ... 1000

The command sets the number of power up bits in the TPC start pattern. The total TPC start pattern length is the number of 'power up' ('1') bits plus the number of n 'power down' ('0') bits. This parameter is only available for TPC Start Pattern = **Max. Pow. Less N Steps** (`:BB:W3GP:TS25141:WSIG:DPCC:TPC:SDAT PMAXlessnsteps`).

Example: `"BB:W3GP:TS25141:TCAS TC642"`
'selects the settings for test case 6.4.2, Power Control Steps.

`"BB:W3GP:TS25141:WSIG:DPCC:TPC:SDAT PMAX"`

'selects the pattern **Max. Pow. Less N Steps**

`"BB:W3GP:TS25141:WSIG:DPCC:TPC:SDAT:PUST 100`
'defines 100 power up bits. The base station is (presumably) set to maximum transmit power.

`"BB:W3GP:TS25141:WSIG:DPCC:TPC:SDAT:PDST 10`
'defines 10 power down bits. The base station is set to two power steps below its maximum transmit power. The TPC start patter is 110 bits long.

*RST value	Resolution	Options	Dependencies	SCPI
1		Test case 6.4.2 Options B13, B10/B11 and K42	Determines contents of the predefined data list used with command `:SOUR:BB:W3GP:MST1:DPCC:TPC:DTA:DSEL` after execution of `SOUR:BB:W3GP:TS25141:TCAS:EXEC`	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPDCh:CCODing:TYPE
M12K2 | M64K | M144K | M384K | AMR

The command selects the channel coding scheme in accordance with the 3GPP specification. The channel coding scheme selected predetermines the overall symbol rate.In mode '**According to Standard**' (`SOURce:BB:W3GP:TS25141:EMODe STAN`), RMC 12.2 kbps (`M12K2`) is selected.

Parameters:

M12K2
Measurement channel with an input data bit rate of 12.2 ksps

M64K
Measurement channel with an input data bit rate of 64 ksps

M144K
Measurement channel with an input data bit rate of 144 ksps

M384K
Measurement channel with an input data bit rate of 384 ksps

AMR
Channel coding for the AMR Coder (coding a voice channel)

Example: `"BB:W3GP:TS25141:WSIG:DPDC:CCOD:TYPE M144K"`
'selects channel coding scheme RMC 144 kbps.

*RST value	Resolution	Options	Dependency	SCPI
M12K2	-	Test cases 7.3, 8.x minimum requirement: Options B13, B10/B11, K42 and K62 For additionally required options see selected test case	Sets command `:BB:W3GP:MST:ENH:DPDC:CCOD:TYPE` and `:BB:W3GP:MST:DPDC:ORAT` after execution of `:SOURce:BB:W3GP:TS25141:TCASe:EXECute`	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPDCh:DERRor:BIT:RATE 0.0 .. 0.1

The command sets the bit error rate. For test case 7.8 in mode '**According to Standard**' (`SOURce:BB:W3GP:TS25141:EMODe STAN`), only values 0.00 (no bit errors are inserted) and 0.01 (1 percent bit errors are inserted) are available.For test case 8.6 this command is only available for mode '**User Definable**' (`SOURce:BB:W3GP:TS25141:EMODe USER`).

Example: `"BB:W3GP:TS25141:WSIG:DPDC:DERR:BIT:RATE 1E-2"`
'sets a bit error rate of 0.01.

*RST value	Resolution	Options	Dependencies	SCPI
0.0	0.001	Test cases 7.8, 8.6 minimum requirement: Options B13, B10/B11, K42 and K62 For additionally required options see selected test case	Sets command `:SOUR:BB:W3GP:MST1:DPDC:ENH:DERR:BIT:RATE` after execution of `SOUR:BB:W3GP:TS25141:TCASe:EXECute`	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPDCh:DERRor:BLOCk:RATE 0.0 .. 0.1

The command sets the block error rate. For test case 8.6 in mode '**According to Standard**' (`SOURce:BB:W3GP:TS25141:EMODe STAN`), only values 0.00 (no block errors are inserted) and 0.01 (1 percent block errors are inserted) are available. For test case 7.8 this command is only available for mode '**User Definable**' (`SOURce:BB:W3GP:TS25141:EMODe USER`).

Example: `"BB:W3GP:TS25141:WSIG:DPDC:DERR:BLOC:RATE 1E-2"`
'sets a bit error rate of 0.01.

*RST value	Resolution	Options	Dependencies	SCPI
0.0	0.001	Test cases 7.8, 8.6 minimum requirement: Options B13, B10/B11 and K42 For additionally required options see selected test case	Sets command `:SOUR:BB:W3GP:MST1:DPDC:ENH:DERR:BLOC:RATE` after execution of `SOUR:BB:W3GP:TS25141:TCASe:EXECute`	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:DPDCh:ORATe D15K | D30K | D60K | D120k | D240k | D480k | D960k | D1920k | D2880k | D3840k | D4800k | D5760kR

The command sets the overall symbol rate. The structure of the DPDCH channel table depends on this parameter. The overall symbol rate determines which DPDCHs are active, which symbol rate they have and which channelization codes they use.

Parameters: **D15K ... D5760K**
15 ksps ... 6 x 960 ksps

Example: `"BB:W3GP:TS25141:TCAS TC642"`
'selects the settings for test case 6.4.2, Power Control Steps.

`"BB:W3GP:TS25141:WSIG:DPDC:ORAT D15K"`
'sets the overall symbol rate to 15 ksps. Only DPDCH1 is active, the symbol rate is 15 ksps and the channelization code is 64.

*RST value	Resolution	Options	Dependency	SCPI
D60K	-	Test case 6.4.2 Options B13, B10/B11, and K42	Sets commands `:BB:W3GP:MST:DPDCh:ORATe` after execution of `SOUR:BB:W3GP:TS25141:TCAS:EXECute`	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:FREQuency MIN ... MAX

The command sets the RF frequency of the wanted signal.

Example: `"BB:W3GP:TS25141:WSIG:FREQ 2.5GHz"`
'sets a frequency of 2.5 GHz for the wanted signal.

*RST value	Resolution	Options	Dependencies	SCPI
1 GHz	0.01 Hz	All test cases except for 6.6 minimum requirement: Options B13, B10/B11 and K42 For additionally required options see selected test case	Sets command `:SOUR:FREQ` after execution of `SOUR:BB:W3GP:TS25141:TCASe:EXECute`	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:OBANd I | II | III | IV | V | VI

The command selects the operating band of the base station for **Wideband Blocking**. The operating band is required for calculation of power levels and interferer modulation.

Parameters:

I
Operating band I: (1920 – 1980 MHz)

II
Operating band II: (1850 – 1910 MHz)

III
Operating band III: (1710 – 1785 MHz)

IV
Operating band IV: (1710 – 1755 MHz)

V
Operating band V: (824 – 849 MHz)

VI
Operating band VI: (830 – 840 MHz)

Example: `"BB:W3GP:TS25141:TCAS TC75"`
'selects the settings for test case 7.5, Blocking Characteristics.

`"BB:W3GP:TS25141:EMOD STAN"`
'selects mode "**According to Standard**". Only settings in compliance with the standard can be made.

`"BB:W3GP:TS25141:WSIG:BTYP WIDE"`
'selects blocking scenario wideband.

`"BB:W3GP:TS25141:WSIG:OBAN III"`
'selects operating band III.

*RST value	Resolution	Options	Dependencies	SCPI
1 GHz	0.01 Hz	Test case 7.5 Option B20x, two options B10/B11, B13 and K42 each.	Sets command `:BB:W3GP:TS25141:IFS:TYPE`	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:PCPCh:CCODing:TYPE TB168 | TB360

The command selects the Transport Block Size.

Parameters:
TB168
transport block size 168 bits
TB360
transport block size 360 bits

Example:
"BB:W3GP:TS25141:TCAS TC893"
'selects the settings for test case 8.9.3, Demodulation of CPCH Message in Static Propagation Conditions.
"BB:W3GP:TS25141:WSIG:PCPC:CCOD:TYPE TB168"
'selects transport block size 168 bits.

*RST value	Resolution	Options	Dependency	SCPI
TB168	-	Test case 8.9.3 Option B20xs, and two option B13, B10/B11, and K42 each	Sets commands :BB:W3GP:MST:ENH:PCPC:CCOD:TYPE	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:POWer -145.0 dBm ... 20.0 dBm

The command sets the RF level of the wanted signal in mode '**User Definable**' (SOURce:BB:W3GP:TS25141:EMODe USER).In edit mode '**According to Standard**' (SOURce:BB:W3GP:TS25141:EMODe STAN) the RF level is determined by the selected **Power Class** (SOURce:BB:W3GP:TS25141:BSPC).

Example:
"BB:W3GP:TS25141:WSIG:POW?"
'queries the RF level of the wanted signal.

Response:"103.1"
'the RF level is -103.1 dBm

*RST value	Resolution	Options	Dependencies	SCPI
-120.3 dBm	0.01 dBm	Test cases 7.x, 8.x, 6.4.2 minimum requirement: Options B13, B10/B11 and K42 For additionally required options see selected test case	Sets command :SOURce:POWer	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:PRACh:CCODing:TYPE TB168 | TB360

The command selects the Transport Block Size.

Parameters:
TB168
transport block size 168 bits
TB360
transport block size 360 bits

Example:
"BB:W3GP:TS25141:TCAS TC883"
'selects the settings for test case 8.8.3, Demodulation of RACH Message in Static Propagation Conditions.
"BB:W3GP:TS25141:WSIG:PRAC:CCOD:TYPE TB168"
'selects transport block size 168 bits.

*RST value	Resolution	Options	Dependency	SCPI
TB168	-	Test case 8.8.3 Option B20x, and two options B13, B10/B11, and K42 each	Sets commands :BB:W3GP:MST:ENH:PRAC:CCOD:TYPE	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:STATe ON | OFF

This command enables/disables the generation of the wanted signal in mode '**User Definable**'. In mode '**According to Standard**' the state is fixed to '**ON**'.

Example: `"BB:W3GP:TS25141:TCAS TC892"`
'selects test case 8.9.2, CPCH Access Preamble and Collision Detection in Multipath Fading Case 3.

`"BB:W3GP:TS25141:EMOD USER"`
'selects mode "**User definable**". Also settings that are not in compliance with the standard can be made.

`"BB:W3GP:TS25141:WSIG:STAT OFF"`
'disables the generation of the wanted signal.

*RST value	Resolution	Options	Dependency	SCPI
ON	-	Test cases 6.4.2, 7.3, 8.x minimum requirement: Options B13, B10/B11, K62 and K42 For additionally required options see selected test case	Sets command `:BB:W3GP:STATe` after execution of `SOUR:BB:W3GP:TS25141:TCASe:EXECute`	Device-specific

[SOURce:]BB:W3GPp:TS25141:WSIGnal:TRIGger[:EXTernal<[1]|2>]:DELay 0.0 .. 65535.0 Chips

The command sets an additional propagation delay besides the fixed DL-UL timing offset of 1024 chip periods.

The additional propagation delay is obtained by charging the start trigger impulse with the respective delay.

Example: `"BB:W3GP:TS25141:TCAS TC642"`
'selects the settings for test case 6.4.2, Power Control Steps.

`"BB:W3GP:TS25141:WSIG:TRIG:EXT:DEL 14"`
'sets a additional propagation delay of 14 chips.

*RST value	Resolution	Options	Dependency	SCPI
0 chips	0.0 chips	Test case 6.4.2 Options B13, B10/B11, and K42	Sets command `:BB:W3GP:TRIGger:EXTernal:DELay` after execution of `SOUR:BB:W3GP:TS25141:TCASe:EXEC`	Device-specific

Alphabetical List of Commands

Digital Standard 3GPP FDD

Tests on Base Stations in Conformance with the 3G Standard 3GPP-FDD

Index

Digital Standard 3GPP FDD

D

N

O

P

R

S

T

Tests on Base Stations in Conformance with the 3G Standard 3GPP-FDD

(

2

3

A

B

C

D

E

F

G

H

I

L

M

N

O

P