Supplement

Digital Standard TD-SCDMA, inclusive TD-SCDMA enhanced features

R&S® AMU-K50/-K51
1402.8950.02
1402.9005.02

R&S® AFQ-K250/-K251
1401.6702.02
1401.6754.02

R&S® SMU-K250 /-K251
1408.6314.02
1408.6414.02

R&S® SMATE-K50/-K51
1404.7100.02
1404.7200.02

R&S® AMU-K250 /-K251
1402.8409.02
1402.8509.02

R&S® SMJ-K50/-K51
1404.1660.02
1404.1760.02

R&S® CMW-KW750/-KW751
1203.1406.02
1203.1458.02

R&S® SMU-K50/-K51
1161.0966.02
1161.1062.02

R&S® SMJ-K250/-K251
1409.1316.02
1409.1416.02

ROHDE&SCHWARZ
Test and Measurement

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

					
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 GPS

Digital Standard TD-SCDMA

Introduction - TD-SCDMA (3GPP TDD LCR)

TD-SCDMA (3GPP TDD LCR) designates a mobile radio transmission method developed for 3G mobile communication by the China Wireless Telecommunication Standard group (CWTS, http://www.cwts.org). This standard is similar to the 3GPP TDD proposition, but with greater emphasis placed on GSM compatibility and with a chip rate limited to 1.28 Mcps. TD-SCDMA is one option of UTRA-TDD, called 1.28Mcps TDD or low chip rate (LCR) TDD.
Option TD-SCDMA (3GPP TDD LCR) enhanced MS/BS tests incl. HSDPA extends the TD-SCDMA signal generation with simulation of high speed channels in the downlink (HS-SCCH, (HS-SCCH, HS-PDSCH) and the uplink (HS-SICH) and with channel coding for BCH in real time and a reference measurement channel. HSDPA (high speed downlink packet access) mode enhances the TD:SCDMA standard by data channels with high data rates especially for multi media applications.

TD-SCDMA is a mobile radio standard in which available bandwidth is divided among subscribers according to frequency (FDMA), time (TDMA) and code (CDMA). The same frequency is used for both directions of transmission (TDD). Each resource (i.e. a combination of frequency, code and time slot) can be used simultaneously by several base stations or user equipments provided the scrambling codes differ. A cell is understood to be a base station and all user equipments communicating with this base station. The R&S Signal Generator simulates a maximum of four cells at the same frequency. The Multi Carrier Mode can be used to simulate more than four cells at the same frequency or cells at several frequencies.

The TD-SCDMA signals are generated in a combination of realtime mode (real time channels) and arbitrary waveform mode. Simulation of bit and block errors can be activated for the channels generated in realtime. In arbitrary waveform mode, the signal is first calculated and then output.

The R&S Signal Generator simulates TD-SCDMA at the physical channel layer.The following list gives an overview of the options provided by the R&S Signal Generator for generating a TD-SCDMA signal:

- Configuration of up to four TD-SCDMA cells with variable switching point of uplink and downlink.
- Freely configurable channel table for each slot and simulation of the downlink and uplink pilot time slot.
- Real time generation of one traffic channel and the SYNC channel on the downlink
- Slot modes "Dedicated" and "PRACH" on the uplink.
- Clipping for reducing the crest factor

Table 1 Parameters of the modulation system TD-SCDMA

Parameter	**Value**
Chip rate	1.28 Mcps
Carrier spacing	1.6 MHz
Data modulation	QPSK
Filter	Root-raised cosine (0.22)
Channel types	Downlink : Primary Common Control Physical Channel (P-CCPCH) Secondary Common Control Physical Channel (S-CCPCH) Physical Forward Access Channel (F-FACH) Downlink Pilot Time Slot (DwPTS) Dedicated Physical Channel (DPCH) Uplink : Physical Random Access Channel (P-RACH) Uplink Pilot Time Slot (UpPTS) Dedicated Physical Channel (DPCH)
Data rates	17.6 kbps, 35.2 kbps, 70.4 kbps to 281.6 kbps depending on channel type
Number of channels	4 cells, each containing max. 7 active slots. Each slot with up to 16 DPCHs and 5 special channels.
Frame structure	Frame: 5 ms with 7 (traffic) time slots Time slot (traffic): 675 µs Time slot (DwPTS): 75 µs Time slot (UpPTS): 125 µs The number of symbols transmitted in a slot depends on the symbol rate.
Scrambling code	128 different codes with length of 16 chips
SYNC codes	32 different codes with length of 64 chips
SYNC1 codes	256 different codes with length of 128 chips
Basic midamble codes	128 different codes with length of 128 chips
Spreading code	“Orthogonal Variable Spreading Factor Code (OVSF)“; spreading factors 1, 2, 4, 8, 16

Modulation System TD-SCDMA

TD-SCDMA Signal Structure (Frames and Time Slots)

The TD-SCDMA signal is organized in frames of 5 ms length. Each frame comprises 7 traffic time slots (Ts0 to Ts6, each 0.675 ms) and two special time slots (DwPTS and UpPTS) for synchronization.

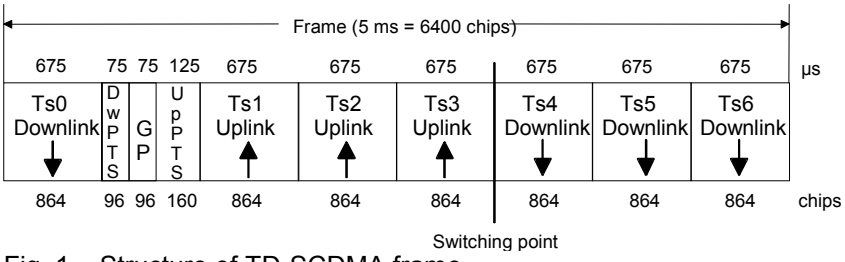


Fig. 1 Structure of TD-SCDMA frame

Ts0 is always allocated to the downlink, Ts1 to the uplink. The other time slots are divided between the two directions of transmission, the switching point being variable.

DwPTS and UpPTS

In the downlink pilot time slot (DwPTS), the base station sends one of 32 possible 64-chip SYNC codes. The SYNC code allows the user equipment to synchronize to the base station. At the same time, the SYNC code defines the value range for the scrambling code and the basic midamble code.

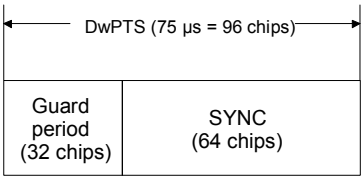


Fig. 2 Structure of DwPTS

The real-valued SYNC sequence is converted into a complex-valued SYNC sequence by a rotating-vector operation.

This SYNC sequence is divided up into four symbols with 16 chips each. The symbols are phase-modulated (possible phases are 45°, 135°, 225° and 315°) in order to signal the frame number of the interleaver.

In the supplied software, all symbols are modulated with 45°.

The uplink pilot time slot (UpPTS) is sent by the user equipment to initiate a call with the base station (before a P-RACH is sent, for example). The transmitted SYNC1 code is randomly selected from eight possible codes. If the base station does not respond to the UpPTS, the UpPTS is repeated in the next frame.

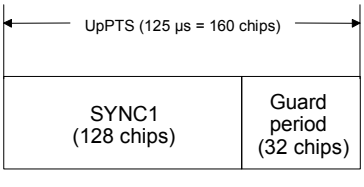


Fig. 3 Structure of UpPTS

The UpPTS is a complex-valued signal resulting from the real SYNC1 sequence by a rotating-vector operation.

Structure of Traffic Burst

In time slots Ts0 to Ts6, bursts can be sent by the base station or the user equipment, i.e. in both directions of transmission. The burst structure is identical for both directions. There are two types of burst, however, which are described in the following.

Burst Without Layer 1 Control Information

This type of burst can be used for all physical channels. It comprises two data fields, a midamble and a guard period.

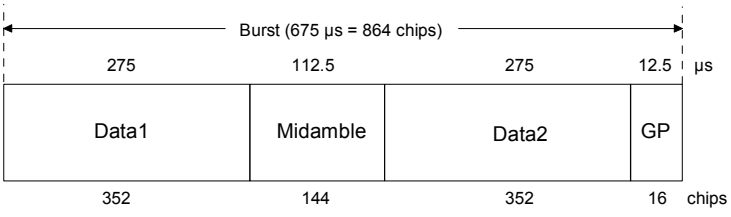


Fig. 4 Traffic burst without layer 1 control information

The useful data are

- alternately fed to the I and the Q path (QPSK data modulation),
- mapped from the 0/1 plane into the –1/+1 plane,
- spread with the complex spreading code (spreading factor SF = 1, 2, 4, 8 or 16),
- scrambled with the real-valued scrambling code,
- weighted with the channel power and
- filtered (root-raised cosine 0.22)

Since each user sends only one burst per frame, the following gross data rate is obtained:

$$Gross\_Data\_Rate = \frac{704 * 2}{SF * 5ms} = 281600/SF \text{ kbit/s}$$

The midamble is obtained from the basic midamble by periodic repetition and shifting. For some channels, the midamble shift can be set in steps of 8 chips. The basic midamble is 128 chips long, while the length for the midamble field in the time slot is 144 chips. Each scrambling code (setting parameter at cell level) is assigned a basic midamble code.

The midamble is neither spread nor scrambled.

No signal is transmitted during the guard period. This avoids crosstalk of the burst into the next time slot at the receiver end.

Burst With Layer 1 Control Information

This type of burst can be used only with DPCHs (dedicated physical channels). It differs from the "normal" burst only in that the data fields are shortened ahead of and after the midamble to enable the transmission of layer 1 control information.

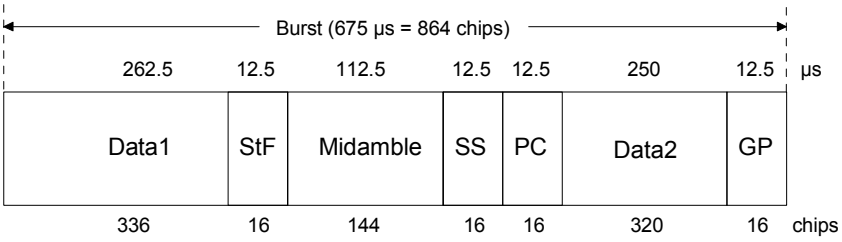


Fig. 5 Traffic burst with layer 1 control information

The burst consists of two fields of data symbols, a fixed-length 144 chip midamble, and control fields for Synchronization Shift (SS), Transmit Power Control (TPC), and Transport Format Indicator (TFCI). The timeslot is delimited by a 16-chip guard period (GP).

Each data field consists of a maximum of 352 chips.

The Transport Format Indicator field (TFCI) conveys transport format information to the receiver, which is used by the channel decoder to recover transport channels. The information is distributed into two segments in one burst (four segments in two burst = one frame)

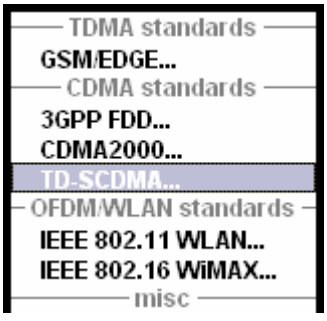
The synchronization shift (SS) field is used to inform the other station of a shift of the burst time ("'00" means that the sync shift is increased, "11" that it is decreased). The bits are transmitted in *M* consecutive frames. The shift value is a multiple *k* of $T_{chip}/8$. *M* and *k* are transmitted by signalling. The value for *M* (Sync Shift Repetition) can be selected.

Analogously to the Sync Shift field, the power control (TPC) field is used to initiate an increase or decrease of transmit power.

If the spreading factor SF is lower than 16, the control symbols are transmitted 16/SF times. Control symbols are treated like data symbols, i.e. they are spread and scrambled.

TD-SCDMA Menu

The menu for setting the TD-SCDMA digital standard is either called from the baseband block or from the menu tree under **Baseband**.

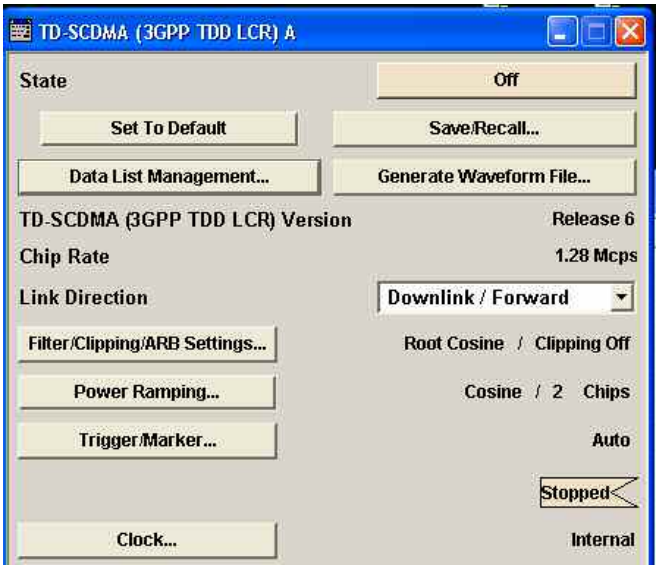


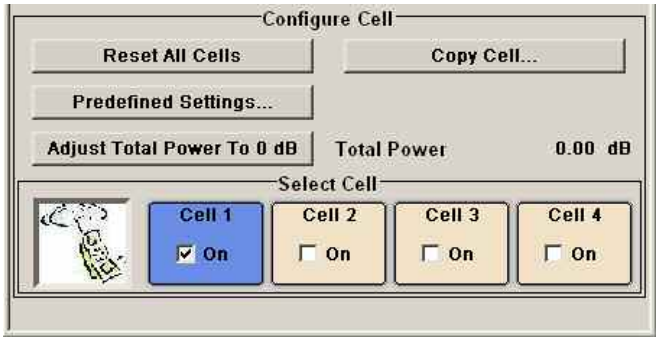
The menu is split into several sections for configuring the standard.

The upper section of the menu is where the TD-SCDMA digital standard is enabled, the default settings are called, and the transmission direction selected.

The valid TD-SCDMA version and the chip rate in use are displayed.

Many of the buttons lead to submenus for loading and saving the TD-SCDMA configuration and for setting the filter, trigger, and clock parameters.





General Settings for TD-SCDMA Signals

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

State – TD-SCDMA

Activates or deactivates the TD-SCDMA 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 TD-SCDMA signal is generated by a combination of realtime mode (enhanced channels) and arbitrary waveform mode (all the other channels).

On the downlink, one traffic channel and the SYNC channel of cell 1 are generated in realtime. All the other channels are generated in arbitrary waveform mode and added.

In the uplink, all the channels of cell 1 are generated in realtime, the other cells are generated in arbitrary waveform mode and added to the realtime signal.

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

Set To Default - TD-SCDMA

Calls the default settings, see section "*General Settings for TD-SCDMA Signals*, page 7".

The link direction is set to downlink. In order to get a signal, the following settings are performed for both link directions:

For downlink cells

Cell 1 is activated (State = ON), slot 0 is activated, and channel 0 and 1 are activated.

For uplink cells

Cell 1 is activated, slot 1 is activated, and channel 1 is activated.

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

Parameter	Value
Link Direction	Downlink/Forward
Filter	Root Cosine
Clipping	Off
Power ramping	Cosine / 2 chips
Trigger	Auto

Save/Recall... - TD-SCDMA Calls the **Save/Recall** menu.

From the **Save/Recall** menu, the **File Select** windows for saving and recalling TD-SCDMA configurations and the **File Manager** is called.

TD-SCDMA configurations are stored as files with the predefined file extension ***.tdscdma**. The file name and the directory they are stored in are user-definable.

The complete settings in the **TD-SCDMA** menu are saved and recalled.

Recall TD-SCDMA Setting Opens the **File Select** window for loading a saved TD-SCDMA configuration.

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

Remote-control command:
```
MMEM:CDIR 'F:\gen_list\tdscdma'

SOUR:BB:TDSC:SETT:CAT?
```
Response: `'tdscdma_1', 'tdscdma_2'`
```
SOUR:BB:TDSC:SETT:LOAD "tdscdma_1"
```

Save TD-SCDMA Setting Opens the **File Select** window for saving the current TD-SCDMA signal configuration.

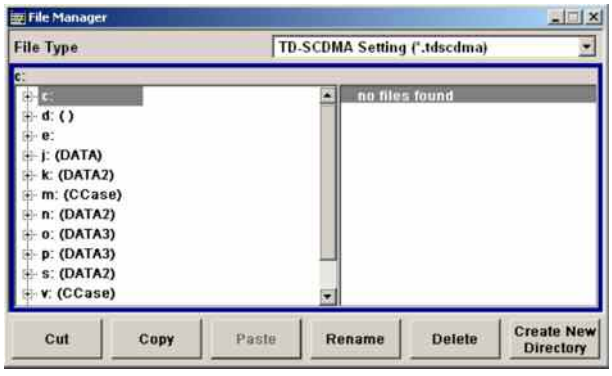
The name of the file is specified in the **File name** entry field, the directory selected in the **save into** field. The file is saved by pressing the **Save** button.

Remote-control command:
```
MMEM:CDIR 'F:\gen_list\tdscdma'

SOUR:BB:TDSC:SETT:STOR "tdscdma_1"
```

File Manager Calls the **File Manager**.

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



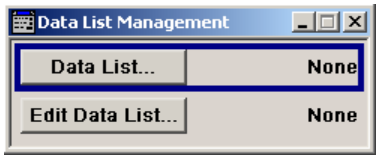
Remote-control command:

```
MMEM:CDIR 'F:\gen_list\tdscdma'

SOUR:BB:TDSC:SETT:DEL "tdscdma_1"
```

Data List Management… - TD-SCDMA

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 cells.

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 "d_list1"
SOUR:BB:DM:DLIS:DATA #B1111010101000001111....
SOUR:BB:DM:DLIS:DATA:APP #B1111010101000001111....
```

Selecting the data list:

```
SOUR:BB:TDSC:DOWN|UP:CELL1:SLOT2:CHAN5:DATA DLIS
SOUR:BB:TDSC:DOWN|UP:CELL1:SLOT2:CHAN5:DATA:DSEL
"tdscdma_1"

SOUR:BB:TDSC:DOWN|UP:CELL1:SLOT2:CHAN5:DPCC:TPC:DAT
A DLIS
SOUR:BB:TDSC:DOWN|UP:CELL1:SLOT2:CHAN5:DPCC:TPC:DAT
A:DSEL "tdscdma_1"

SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA DLIS
SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA:DSEL
"tdscdma_1"

SOUR:BB:TDSC:DOWN|UP:CELL1:ENH:DCH:DTCH|DCCH:DATA
DLIS
SOUR:BB:TDSC:DOWN|UP:CELL1:ENH:DCH:DTCH|DCCH:DATA:D
SEL "tdscdma_1"
```

SOUR:BB:TDSC:UP:CELL1:SLOT2:PRAC:MSG:DATA DLIS
SOUR:BB:TDSC:UP:CELL1:SLOT2:PRAC:MSG: DSEL "tdscdma_1"

Generate Waveform File… - TD-SCDMA Calls the **Generate Waveform** menu. This menu is used to store the current TD-SCDMA signal as ARB signal in a waveform file.

This file can be loaded in the **ARB** menu and processed as multicarrier or multisegment 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:TDSC:WAV:CRE "d:\temp\tdscdma.wv"

TD-SCDMA Version - TD-SCDMA Displays the current version of the TD-SCDMA standard.

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

Remote-control command:
`SOUR:BB:TDSC:VERS?`
Response: `Release 6`

Chip Rate - TD-SCDMA

Displays the system chip rate. This is fixed at 1.28 Mcps.

The output chip rate can be varied in the Filter, Clipping, ARB Settings menu (see section "*Filtering, Clipping, ARB Settings - TD-SCDMA*", page 16).

Remote-control command:
`SOUR:BB:TDSC:CRAT?`
Response: `R1M28`

Link Direction - TD-SCDMA

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

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

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

Uplink/ Reverse

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

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

Filtering, Clipping, ARB Settings - TD-SCDMA

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

The menu is described in section "*Filtering, Clipping, ARB Settings - TD-SCDMA*", page 16.

Remote-control command: n.a.

Power Ramping... - TD-SCDMA

Calls the menu for setting the power ramping.

The menu is described in Section "*Power Ramping- TD-SCDMA*", page 20.

Remote-control command: n.a.

Trigger - Marker - TD-SCDMA

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

Calls the menu for selecting the trigger mode and trigger source, for configuring the marker signals, and for setting the time delay of an external trigger signal (see Section "*Trigger-Marker-Clock - TD-SCDMA"* , page 21).

The currently selected trigger mode and trigger source are displayed next to the button.

Remote-control command: n.a.

Execute Trigger - TD-SCDMA **(R&S SMx and R&S AMU instruments only)**

Executes trigger manually.

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

Remote-control command:
`SOUR:BB:TDSC:TRIG:EXEC`

Arm - TD-SCDMA **(R&S SMx and R&S AMU instruments only)**

Stops signal generation manually.

The **Arm** button is displayed only if the trigger modes **Armed Retrigger** or **Armed Auto** have been selected.

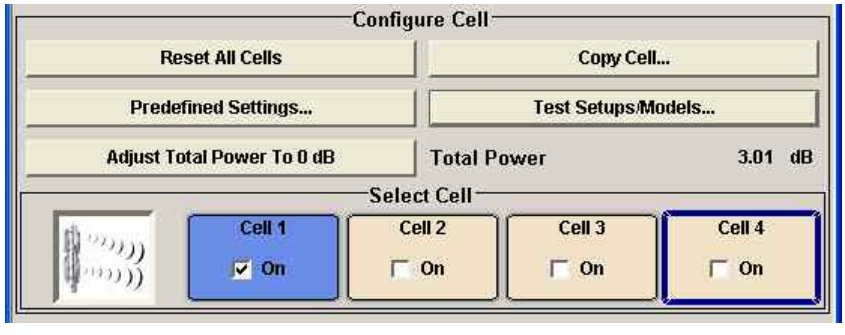
Remote-control command:
`SOUR:BB:TDSC:TRIG:ARM:EXEC`

Clock - TD-SCDMA **(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 - TD-SCDMA*"(, page 21).

Remote-control command: n.a.

In the lower menu section, the cells can be reseted to the predefined settings, parameters of one cell can be copied to another cell, and the total power can be set to 0 dB. Each cell can be activated or deactivated. Active cells are highlighted blue. Clicking a cell opens the configuration menu for setting the cell parameters.



Reset All Cells - TD-SCDMA

Resets all cells to the predefined settings. The reset applies to the selected link direction. 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 command:
`SOUR:BB:TDSC:RES`

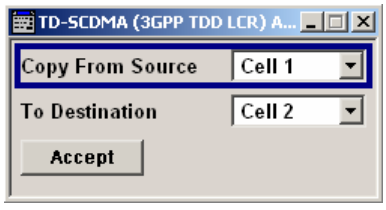
Parameter	Value
Cell Configuration	
State	OFF
(Use) Scrambling Code	ON
Scrambling Code (value)	0
SYNC-DL Code	0
SYNC-UL Code	0
Basic Midamble Code ID	0
Number of Users	16
Switching Point	3
DwPTS Power	0.0 dB

Parameter	Value
Slot Configuration	
State	OFF
Slote Mode (only in uplink)	Dedicated

Parameter	Value
Channel Configuration	
State	OFF
Channel Type	Depending on channel number
Current User	1
Slot Format	0
Spreading Factor	16
Spreading Code	0
Power	0 dB
Data Source	PRBS: PN9, Data Pattern: 0
Number of TFCI bits	0
TFCI Value	0
Number of Sync Shift & TPC bits	0 & 0
Sync Shift Pattern	1
Sync Shift Repetition M	1
TPC Source/TPC Pattern	01
Read Out Mode	Continuous

Copy Cell... - TD-SCDMA

Copies the settings of a cell to a second cell. A window opens for creating the destination station.



Copy From Source

Selects the cell whose settings are to be copied.

Remote-control command:
`SOUR:BB:TDSC:COPY:SOUR 1`

To Destination

Selects the cell whose settings are to be overwritten.

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

Accept

Starts the copy process.

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

Predefined Settings - TD-SCDMA

Calls the menu for setting predefined configurations.

The menu is described in section "*Predefined Settings - TD-SCDMA*, Page 29".

Remote-control command: n.a.

Adjust Total Power to 0dB - TD-SCDMA

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

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

Total Power - TD-SCDMA

Displays the total power of the active channels for the selected link direction.

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:TDSC:POW:TOT?`
Response: `0.00 dB`

Test Setups/Models - TD-SCDMA

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

Remote-control command:
SOUR:BB:TDSC:SETT:TMOD 'Test_Model_ACLR'

Select Cell - TD-SCDMA

Selects the cell by pressing the accompanying button.

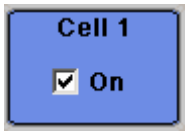
This opens a menu for editing the selected cell.

The menu is described in section "*Cell Configuration - TD-SCDMA*", Page *31* .

Remote-control command: n.a.
(the cell is selected by the keyword index `CELL <[1] | 2 | 3 | 4>`)

Cell On Cell Off - TD-SCDMA

Activates or deactivates the cells.



Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:STAT ON`

Filtering, Clipping, ARB Settings - TD-SCDMA

The **Filter, Clipping, ARB Settings** menu is reached via the **TD-SCDMA** 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 - TD-SCDMA

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:TDSC:FILT:TYPE RCOS
```

Roll Off Factor or BxT - TD-SCDMA

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:TDSC:FILT:PAR:APCO25 0.2
SOUR:BB:TDSC:FILT:PAR:COS 0.35
SOUR:BB:TDSC:FILT:PAR:GAUS 0.5
SOUR:BB:TDSC:FILT:PAR:PGA 0.5
SOUR:BB:TDSC:FILT:PAR:RCOS 0.35
SOUR:BB:TDSC:FILT:PAR:SPH 2
```

Cut Off Frequency Factor - TD-SCDMA

(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:TDSC:FILT:PAR:LPAS 0.5
```

Chip Rate Variation - TD-SCDMA

Enters the chip rate.

The default setting for the chip rate is 1.28 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:TDSC:CRAT:VAR 1228800
```

Impulse Length - TD-SCDMA **(For R&S 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:TDSC:FILT:ILEN:AUTO ON
SOUR:BB:TDSC:FILT:ILEN 120
```

Oversampling - TD-SCDMA **(For R&S 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:TDSC:FILT:OSAM:AUTO ON
SOUR:BB:TDSC:FILT:OSAM 20
```

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

Clipping State – TD-SCDMA

Activates or deactivates the baseband clipping.

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

TD-SCDMA signals may have very high crest factors in particular if a large number of channels and many inactive slots are involved. 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:TDSC:CLIP:STAT ON
```

Table 1 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 + Uplink: 48 DPCHs" "minimum crest"**	**Downlink: 48 DPCHs "minimum crest"**	**Downlink + Uplink: 10 DPCHs "average crest"**	**Downlink: 10 DPCHs "average crest"**
100 %	9.47 dB	11.47 dB	7.78 dB	9.71 dB
80 %	8.77 dB	10.75 dB	6.26 dB	8.33 dB
50 %	7.33 dB	9.42 dB	6.51 dB	8.64 dB
20 %	5.82 dB	8.10 dB	4.56 dB	6.95 dB
10 %	5.69 dB	8.11 dB	4.56 dB	6.95 dB
5 %	5.80 dB	8.26 dB	4.56 dB	6.95 dB

The following pictures demonstrate the affect of clipping with vector mode (|i+jq|), using a signal configuration with 10 active DPCHs.

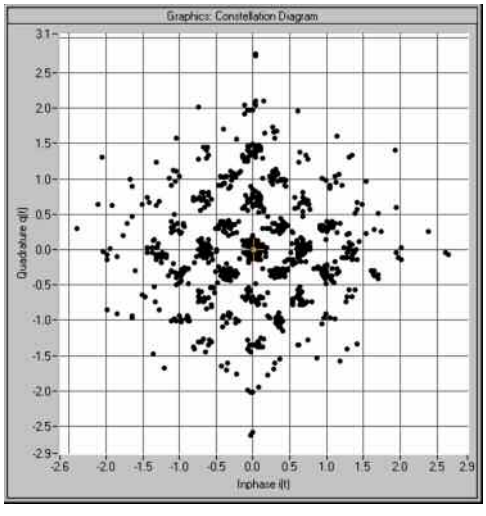


Fig. 1 Constellation diagram of the signal without clipping, shows the level mapping

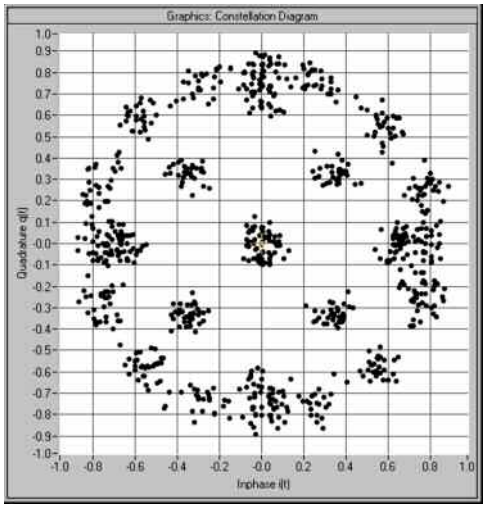


Fig. 2 Constellation diagram with clipping level 380 %, vector mode (|i+jq|).

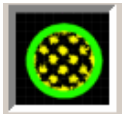
Clipping Level- TD-SCDMA Enters the limit for clipping.

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:TDSC:CLIP:LEV 50`

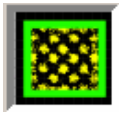
Clipping Mode - TD-SCDMA Selects the clipping method. A graphic illustration of the way in which these two methods work is given in the menu.

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



Remote-control command:
`SOUR:BB:TDSC: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.

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

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

Sequence Length ARB - TD-SCDMA Selects the sequence length of the arbitrary waveform component of the TD-SCDMA 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.

The number of chips is determined from this sequence length (1 Frame =10 ms) and the chip rate. At 1.2288 MChips/s a frame equals 12800 chips.

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

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

Power Ramping- TD-SCDMA

The **Power Ramping Settings** menu is reached via the **TD-SCDMA** main menu.

The menu is used to set the power ramping.

Ramp Function - TD-SCDMA

Selects the form of the transmitted power, i.e. the shape of the rising and falling edges during power ramp control.

Linear The transmitted power rises and falls linear fashion.

Remote-control command:
`SOUR:BB:TDSC:PRAM:SHAP LIN`

Cosine The transmitted power rises and falls with a cosine-shaped edge. This gives rise to a more favorable spectrum than the Linear setting.

Remote-control command:
`SOUR:BB:TDSC:PRAM:SHAP COS`

Ramp Time- TD-SCDMA

Sets the power ramping rise time and fall time for a burst.

Remote-control command:
`SOUR:BB:TDSC:PRAM:TIME 2.0`

Rise Delay- TD-SCDMA

Sets the offset in the rising edge of the envelope at the start of a burst. A positive value gives rise to a delay and a negative value causes an advance.

Remote-control command:
`SOUR:BB:TDSC:PRAM:RDEL 2.0`

Fall Delay- TD-SCDMA

Sets the offset in the falling edge of the envelope at the end of a burst. A positive value gives a rise to a delay and a negative value causes an advance.

Remote-control command:
`SOUR:BB:TDSC:PRAM:FDEL 8.0`

In Baseband Only- TD-SCDMA

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

Activates or deactivates power ramping for the baseband signals.

Remote-control command:
`SOUR:BB:TDSC:PRAM:BBON OFF`

Trigger-Marker-Clock - TD-SCDMA

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

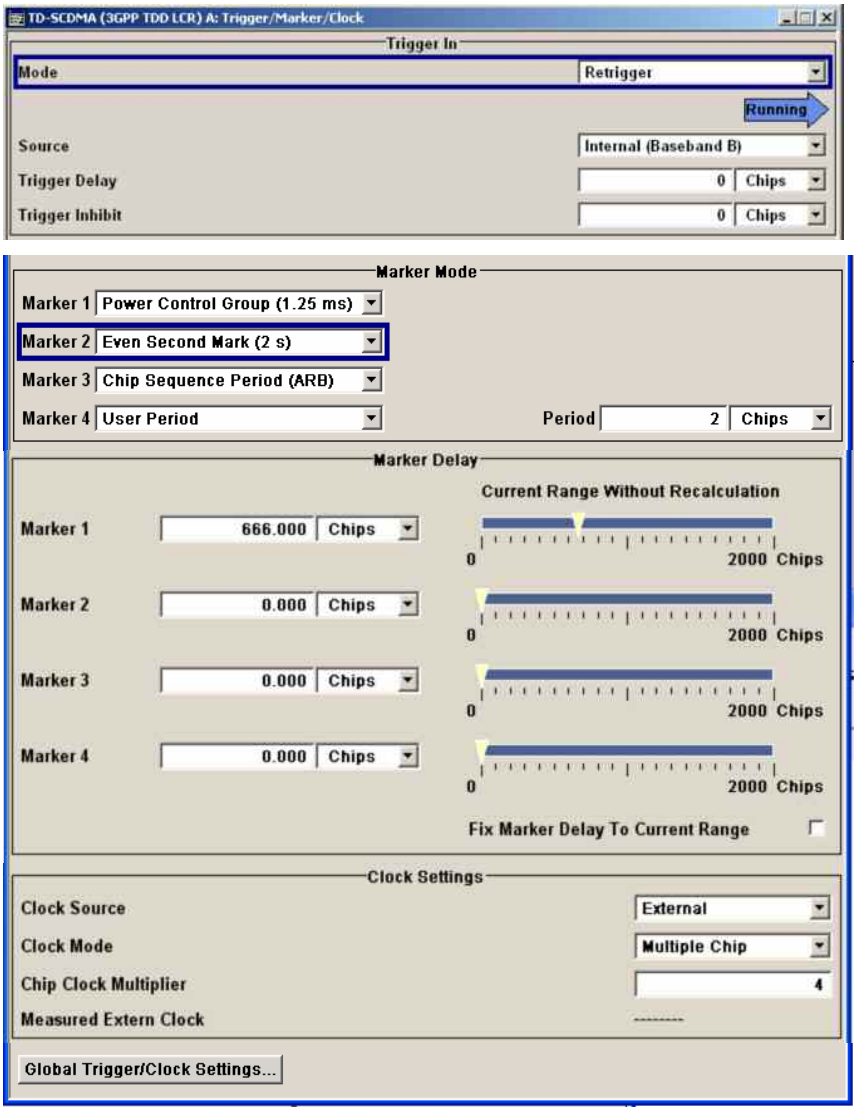
The **Trigger/Marker/Clock** menu can be reached via the **TD-SCDMA** main menu.

The **Trigger In** section is where the trigger for the TD-SCDMA signal is set. Various parameters are 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 the marker signal delay is 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 **Trigger In** section is where the trigger for the TD-SCDMA signal is set. The current status of the signal generation is displyed for all trigger modes.

Mode - TD-SCDMA **(R&S SMx and R&S AMU instruments only)**

Selects the trigger mode.

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

Auto The TD-SCDMA signal is generated continuously.

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

Retrigger The TD-SCDMA signal is generated continuously. A trigger event (internal or external) causes a restart.

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

Armed Auto The TD-SCDMA-Signal signal is generated only when a trigger event occurs. Then the signal is generated continuously.

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

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

Armed Retrigger The TD-SCDMA-Signal signal is generated only when a trigger event occurs. Then the signal is generated continuously. Every subsequent trigger event causes a restart.

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

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

Single The TD-SCDMA 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.

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

Signal Duration Unit - TD-SCDMA

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

Selects 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, or frames.

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

Signal Duration - TD-SCDMA

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

Enters the length of the signal sequence to be output in the **Single** trigger mode. The unit of the entry is defined unter **Signal Duration Unit**. 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.

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

Running - Stopped - TD-SCDMA

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

Displays the status of signal generation for all trigger modes. This display appears only when TD-SCDMA is enabled (**State On**).

Remote-control command:
`SOUR:BB:TDSC:TRIG:RMOD?`
Response: `RUN`

Running The TD-SCDMA modulation signal is generated; a trigger was (internally or externally) initiated in triggered mode.

If **Armed Auto** or **Armed Retrigger** have 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 - TD-SCDMA

(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:TDSC:TRIG:ARM:EXEC`

Execute Trigger - TD-SCDMA

(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:TDSC:TRIG:SOUR INT
SOUR:BB:TDSC:SEQ RETR
SOUR:BB:TDSC:TRIG:EXEC
```

Trigger Source - TD-SCDMA

(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:TDSC: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:TDSC: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:TDSC:TRIG:SOUR EXT|BEXT
```

Trigger Delay - TD-SCDMA

(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.

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

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

Trigger Inhibit - TD-SCDMA **(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.

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

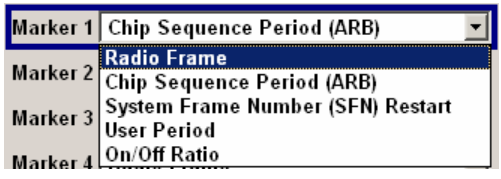
This parameter is only available on external triggering (or on internal triggering via the second path for two-path instruments).

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

Remote-control command:
`SOUR:BB:TDSC:TRIG:EXT1:INH 1000`
`SOUR:BB:TDSC:TRIG:OBAS:INH 1000`

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

Marker Mode - TD-SCDMA Selects a marker signal for the associated MARKER output.



Radio Frame A marker signal is generated every 10 ms (traffic channel frame clock).

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

Chip Sequence Period (ARB) A marker signal is generated at the beginning of every arbitrary waveform sequence (depending on the set sequence length). The marker signal is generated regardless of whether or not an ARB component is actually used.

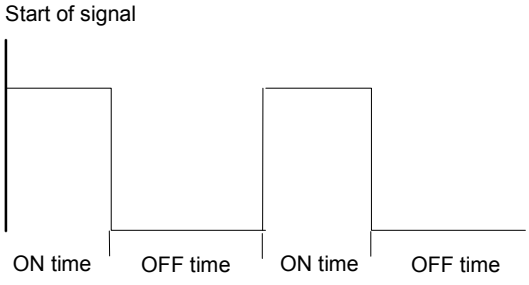
Remote-control command:
`SOUR:BB:TDSC:TRIG:OUTP1:MODE CSP`

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

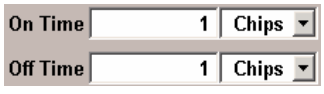
Remote-control command:
`SOUR:BB:TDSC:TRIG:OUTP1:MODE SFNR`

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:TDSC:TRIG:OUTP1:MODE RAT
SOUR:BB:TDSC:TRIG:OUTP1:OFFT 200
SOUR:BB:TDSC:TRIG:OUTP1:ONT 200
```

User Period

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

Remote-control command:

```
SOUR:BB:TDSC:TRIG:OUTP1:MODE USER
SOUR:BB:TDSC: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 Delay <n> - TD-SCDMA

(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 value range is $0…2^{32}$-1 chips

The input is expressed as a number of chips.

If the setting "**Fix Marker Delay to Current 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.

Remote-control command:

```
SOUR:BB:TDSC:TRIG:OUTP2:DEL 2
```

Current Range without Recalculation- TD-SCDMA **(R&S SMx and R&S AMU instruments only)**

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

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

Fix Marker Delay To Current Range - TD-SCDMA **(R&S SMx and R&S AMU instruments only)**
Restricts the marker delay setting range to the current range. In this range, the delay can be set without restarting the marker and signal.

Remote-control command:
`SOUR:BB:TDSC: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 - TD-SCDMA **(R&S SMx and R&S AMU instruments only)**

Selects the clock source.

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

Remote-control command:
`SOUR:BB:TDSC: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**.

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

Clock Mode - TD-SCDMA **(R&S SMx and R&S AMU instruments only)**

(This feature is available for the external clock source only.)

Selects the type of externally supplied clock.

Chip A chip clock is supplied via the CLOCK connector.

Remote-control command:
`SOUR:BB:TDSC: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 value range is 1 to 64.

The **Chip Clock Multiplier** field provided allows the multiplication factor to be entered.

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

Chip Clock Multiplier - TD-SCDMA

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

(This feature is available for the external clock source only.)

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

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

Measured External Clock - TD-SCDMA

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

(This feature is available for the external clock source 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 - TD-SCDMA

(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 trigger inputs TRIGGER 1/2.

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 – TD-SCDMA

(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*".

Predefined Settings - TD-SCDMA

The **Predefined Settings** menu is reached via the **TD-SCDMA** main menu. The channel table of cell 1 is filled (preset) with the set parameters.

With the **Predefined Settings** 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. The settings provided depend on the link direction and applies only to cell1.

Use PCCPCH (Downlink Slot 0, code 0+1) - TD-SCDMA

(This feature is available in the downlink only.)

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

If P-CCPCH is used, both P-CCPCHs are activated in slot 0 with spreading code 0+1.

Remote-control command:
`SOUR:BB:TDSC:DOWN:PPAR:PCCP:STAT ON`

Spreading Factor Dedicated Channels - TD-SCDMA

Selects the spreading factor for the DPCHs.

The available spreading factors depend on the link direction.

Remote-control command:
`SOUR:BB:TDSC:DOWN:PPAR:DPCH:SFAC 16`

Number of Dedicated Channels - TD-SCDMA

Sets the number of activated DPCHs.

The minimum number is 1 and the maximum number depends on the spreading factor:

Max. No. DPCH = 3 x Spreading Factor

Remote-control command:
`SOUR:BB:TDSC:DOWN:PPAR:DPCH:COUN 48`

Crest Factor - TD-SCDMA

Selects the desired range for the crest factor scenario.

The crest factor of the signal is kept in the desired range by varying the distribution of the channels inside one slot and in between several slots.

Minimum The crest factor is minimized. The channels are distributed uniformly over the slots and over the code domain of the individual slot.

Remote-control command:
`SOUR:BB:TDSC:DOWN:PPAR:DPCH:CRES MIN`

Average An average crest factor is set. The channel are distributed uniformly over the slots and sucessively in the code domain of the individual slot.

Remote-control command:
`SOUR:BB:TDSC:DOWN:PPAR:DPCH:CRES AVER`

Worst The crest factor is set to an unfavorable value (i.e. maximum). The channels are distributed in clusters over the slots and sucessively in the code domain of the individual slot.

Remote-control command:
`SOUR:BB:TDSC:DOWN:PPAR:DPCH:CRES WORS`

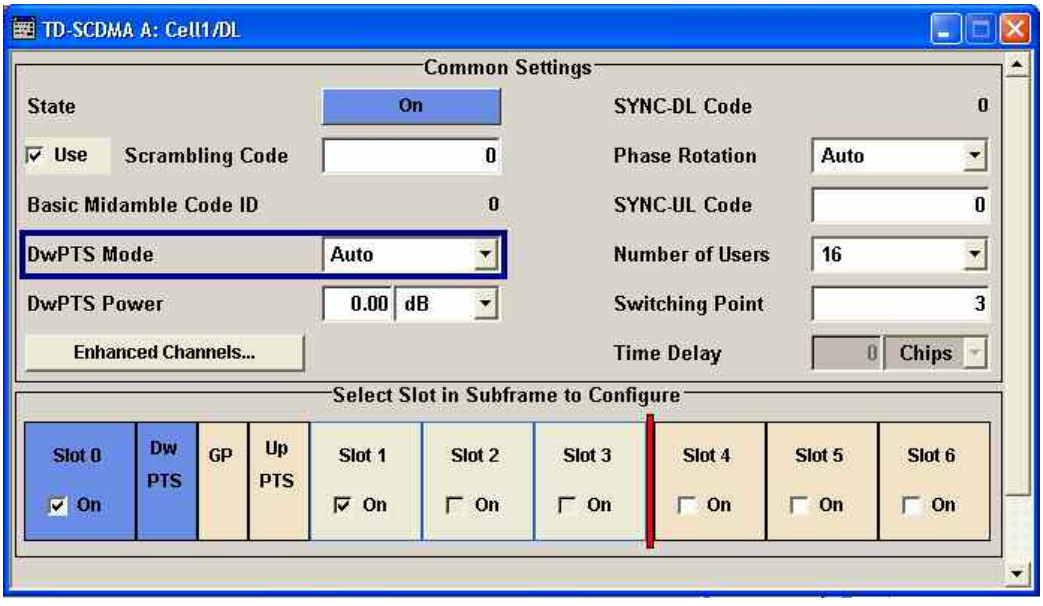
Accept - TD-SCDMA Presets the channel table of cell 1 with the parameters defined in the **Predefined Settings** menu.

Remote-control command:
`SOUR:BB:TDSC:DOWN:PPAR:EXEC`

Cell Configuration - TD-SCDMA

The **Cell Configuration** menu is called by selecting **Cell1** ... **Cell4** in the **TD-SCDMA** menu. Cells can be configured independently of one another. Cell1 also includes real time channels.

The menu comprises the **Common Settings** section, in which the general parameters of the cell are set and the **Select Slot in Subframe to Configure** section, in which the slots are selected for configuration.



State - TD-SCDMA

Activates or deactivates the selected cell.

The number of the selected cell is displayed in the menu header.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:STAT ON`

Use (Scrambling Code) – TD-SCDMA

Activates or deactivates the scrambling code.

The scrambling code is deactivated, for example, for test purposes.

Remote-control commands:
`SOUR:BB:TDSC:DOWN:CELL1:SCOD:STAT ON`

Scrambling Code – TD-SCDMA

Sets the scrambling code. The scrambling code identifies the cell and is the starting value of the scrambling code generator.

The scrambling code is used for transmitter-dependent scrambling of the chip sequence. The value range is 0 to 127.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:SCOD 4`

Basic Midamble Code ID - TD-SCDMA

Displays the basic midamble code ID of the cell.

The basic midamble code ID is derived from the scrambling code.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:MCOD?`
Response: `4`

DwPTS Mode- TD-SCDMA
UpPTS Mode - TD-SCDMA

Selects whether to use the pilot time slot and its power or not. In case of **Auto** and **On**, the DwPTS/UpPTS is used. This is indicated in the **Select Slot in Subframe to Configure** graph.

For details regarding the DwPTS/UpPTS, see *"DwPTS and UpPTS"*, page *3*.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:DWPT:MODE ON`
`SOUR:BB:TDSC:DOWN:CELL1:DWPT:STAT?`
Response: `ON`

DwPTS Power - TD-SCDMA
UpPTS Power - TD-SCDMA

Sets the power of the downlink/uplink pilot time slot.

Remote-control command:
SOUR:BB:TDSC:DOWN:CELL1:DWPT:POW -12.5
SOUR:BB:TDSC:UP:CELL1:UPPT:POW -12.5

Time Delay - TD-SCDMA

(This feature is available for cell 2, 3, and 4 only)

Enters the time delay of the signal of the selected cell compared to the signal of cell 1.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL2:TDEL 0`

SYNC-DL Code - TD-SCDMA

Displays the SYNC-DL code.

The SYNC-DL code is transmitted in the DwPTS (downlink pilot time slot). It is used by the the user equipment to synchronize to the base station.

The SYNC-DL code is derived from the scrambling code and the basic midamble code ID.

Remote-control commands:
`SOUR:BB:TDSC:DOWN:CELL1:SDC?`
Response: `14`

Phase Rotation - TD-SCDMA

Selects the phase rotation for the downlink pilots.

Auto

Sets the default phase rotation sequence according to the presence of the P-CCPCH.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:PROT AUTO`

S1

There is a P-CCPCH in the next four subframes.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:PROT S1`

S2

There is no P-CCPCH in the next four subframes.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:PROT S2`

SYNC-UL Code - TD-SCDMA

Sets the SYNC-UL code.

The SYNC-UL code is transmitted in the UpPTS. It is used by the base station to synchronize to the user equipment.

The SYNC-UL code is derived from the scrambling code and the basic midamble code ID.

Remote-control commands:
`SOUR:BB:TDSC:DOWN:CELL1:SUCode 4`

Number of Users - TD-SCDMA

Selects the total number of users of the cell. The number of users influences the actual midamble sequence transmitted in the burst.

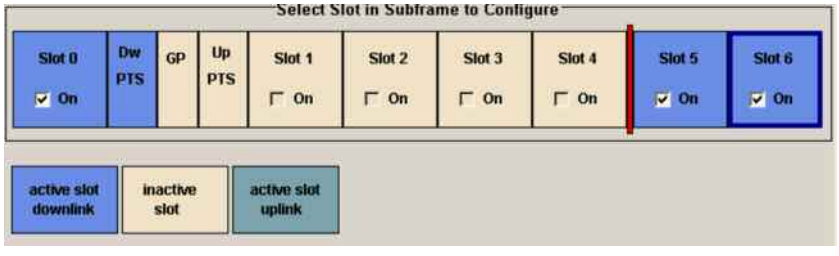
Remote-control commands:
`SOUR:BB:TDSC:DOWN:CELL1:USER 16`

Switching Point - TD-SCDMA

Sets the switching point between the uplink slots and the downlink slots in the frame.

Slot 0 is always allocated to the downlink, Slot 1 is allways allocated to the uplink.

In the **Select Slot in Subframe to Configure** section, the switching point in indicated by a red bar. The slots to the left of the red bar are generated for link direction downlink, to the right of the red bar for link direction uplink. Only the slots for one link direction are active at a time, the slots of the other link direction are inactive.



The DwPTs is always active in downlink mode. The UpPTS is only active if PRACH is selected for the uplink slots.

Remote-control commands:
`SOUR:BB:TDSC:DOWN:CELL1:SPO 4`

Enhanced Channels… - TD-SCDMA

(This button is available for cell1 only.)

Calls the menu for setting enhanced channel configurations.

The menu is described in Section "*Enhanced Channels Settings – TD-SCDMA*, Page 35.

Remote-control command: n.a.

Select Slot in Subframe to Configure – TD-SCDMA

Displays the slots of the cell.

Active slots are highlighted blue (downlink) and green (uplink). Clicking a slot in the subframe opens a menu for configuring the channels of the selected slot.

The menu is described in Section *Slot Configuration – TD-SCDMA*, Page 44.

Remote-command: n.a.

Slot Icon - TD-SCDMA

Activates or deactivates the slot in the subframe.

Remote-command:

```
SOUR:BB:TDSC:DOWN:CELL1:SLOT0:STAT ON
```

Enhanced Channels Settings – TD-SCDMA

The **Enhanced Channels Settings** menu is called in the **Cell Configuration** menu with button **Enhanced Channels…**.

This menu is only available for cell 1.

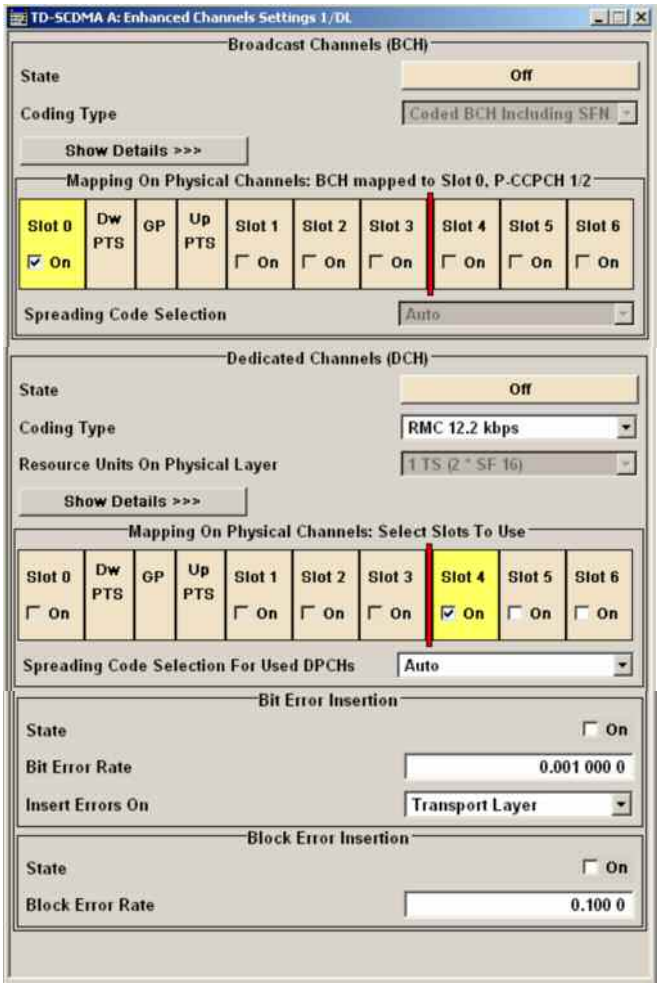
The layout of the **Enhanced Channels Settings** menu depends on the transmission direction. For downlink/forward direction, the Broadcast Channels (BCH) section is provided. All other sections are offered for both link directions.

The **Broadcast Channels (BCH)** section is where the enhanced state of the channels can be activated. The detailed **Transport Channel** settings can be revealed with the **Show Details >>>** button and hidden with the **<<<Hide Details** button.

The **Dedicated Channels (DCH)** section is where the enhanced state of the channel can be activated and settings can be made.The detailed **Transport Channel** 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.



The **Broadcast Channels (BCH)** section is where the enhanced state of the channel can be activated.

This section is only available for downlink/forward transmission direction.

State (BCH) – TD-SCDMA

Activates or deactivates P-CCPCH 1/2 channel coding.

ON
Slot 0 is active with P-CCPCH 1 and 2 switched on. The data source is fixed to BCH.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:STAT ON`

Coding Type (BCH) – TD-SCDMA

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 provided by the selected data source.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:TYPE?`

Show Details… - TD-SCDMA

Reveals the detailed settings options. Once the details are revealed, the labeling on the button changes to **<<<Hide Details**. Clicking the button hides the detailed settings options.

The menu is described in Section *Enhanced Channel Settings – Details – TD-SCDMA*, Page 40.

Remote-control command: `n.a.`

Mapping On Physical Channels: BCH mapped to <Slot> 0, P-CCPCH1/2– TD-SCDMA

Displays the slots of cell 1 used to transmit the broadcast channels. For BCH always slot 0 is used.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:SLOT 0?`
Response: `ON`

Spreading Code Selection (BCH) – TD-SCDMA

Selects if the spreading codes of the channels is set automatically or manually. For BCH, the spreading code is always set to **Auto** as the spreading code for the P-CCPCH is defined by the standard.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:SCSM?`
Response: `AUTO`

In the **Dedicated Channels (DCH)** section, the enhanced state of the channel can be activated and enhanced channel settings can be made.

State (DCH) – TD-SCDMA

Activates or deactivates DCH channel coding.

ON
Activates the slots selected in the **Mapping On…** graph below. The number and configuration of the DPCHs is defined by the selected coding type. State and slot format of the channels are preset. The data source is fixed to DCH.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:STAT ON`

Coding Type – TD-SCDMA

Selects the channel coding.

The current TD-SCDMA specification defines 4 reference measurement channel coding types in the uplink and 5+2 measurement channel coding types in the downlink, which differ in the input data bit rate to be processed.

The selected coding type defines the number of slots selected in section **Mapping On Physical Channels: Select Slots To Use**.

Uplink

In the uplink, the following measurement channel coding types can be selected:

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

Remote-control command:
`SOUR:BB:TDSC:UP:CELL1:ENH:DCH:TYPE UP_RMC12K2`

Note:
If `RMC12K2`, `RMC64K`, `RMC144K`, or `RMC384K` are selected for the uplink, they are automatically converted to `UP_RMCxxx`.

Downlink

In the downlink, the following measurement channel coding types can be selected:

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

RMC 2048 kbps: 2048 kbps measurement channel

H-RMC 526 kbps: 526 kbps HSDPA measurement channel

H-RMC 730 kbps: 730 kbps HSDPA measurement channel

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:TYPE RMC12K2`

Resource Units On Physical Layer – TD-SCDMA

Displays the resource units on the physical layer needed to generate the selected channel.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:RUPL?`

Show Details…

Reveals the detailed settings options. Once the details are revealed, the labeling on the button changes to **<<<Hide Details**. Clicking the button hides the detailed settings options.

The menu is described in Section *Enhanced Channel Settings – Details – TD-SCDMA*, Page 40.

Remote-control command: n.a.

Mapping On Physical Channels: Select Slots To Use – TD-SCDMA

Displays the slots of cell 1. The slots used to transmit the transport channel are highlighted.

The number selected slots is determined by the selected coding type. If a slot is deactivated, another slot is activated automatically to keep the number of activated slots unchanged.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:SLOT4 ON`

Spreading Code Selection For Used DPCHs – TD-SCDMA

Selects the spreading code selection mode for the used transport channels.

User

The spreading codes can be set manually.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:SCSM USER`

Auto

The spreading codes are distributed evenly over the slot domains in order to ensure the minimum crest factor.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:SCSM AUTO`

In the Bit Error Insertion section, the bit error simulation is configured and activated.

State – TD-SCDMA (Bit Error)

Activates or deactivates bit error generation.

Bit errors are inserted into the data fields of the enhanced channels. If 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:TDSC:DOWN:CELL1:ENH:DCH:BIT:STAT ON`

Bit Error Rate – TD-SCDMA

Enters the bit error rate.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:BIT:RATE 1e-2`

Insert Errors On – TD-SCDMA 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 if channel coding is active.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:BIT:LAY TRAN`

Physical Layer Bit errors are inserted in the physical layer.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:BIT:LAY PHYS`

In the **Block Error Insertion** section, the block error simulation is configured and activated.

State – TD-SCDMA (Block Error) 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:TDSC:DOWN:CELL1:ENH:DCH:BLOC:STAT ON`

Block Error Rate – TD-SCDMA Enters the block error rate.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:BLOC:RATE 1e-2`

Enhanced Channel Settings – Details – TD-SCDMA

Slot Format – TD-SCDMA

Displays the slot format of the selected channel.

A slot format defines the complete structure of a slot made of data and control fields. The slot format depends on the coding type selected.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:SFOR?`
`SOUR:BB:TDSC:UP:CELL1:ENH:DCH:SFOR?`

Data Bits Per Frame (10 ms) – TD-SCDMA

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:TDSC:DOWN:CELL1:ENH:BCH:BPFR?`
`SOUR:BB:TDSC:UP:CELL1:ENH:DCH:BPFR?`

Redundancy Version Parameter – TD-SCDMA

Sets the redundancy version parameter. This parameter indicates which redundancy version of the data is sent.

Remote-control command:
`SOUR:BB:TDSC:UP:CELL1:ENH:DCH:HSCH:RVP 3`

Priorisation Of Systematic Bits - s

Displays the priorisation of systematic bits – s. This value depends on the redundancy version parameter.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:HSCH:PSBS?`

Response: `0`

Puncturing And Repetition Scheme - r

Displays the puncturing and repetition scheme - r. This value depends on the redundancy version parameter.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:HSCH:PRSR?`

Response: `1`

Constellation Version Parameter - b

Displays the constellation version parameter - b. This value depends on the redundancy version parameter.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:HSCH:CVPB?`

Response: `1`

In the **Transport Channel** section, the transport channels (TCHs) can be configured. The most important parameters of the TCH are displayed (transport block size and data source). 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.

DTCH On/DCCH On – TD-SCDMA

Displays the transport channel state.

Note:
For BCH, only the DTCH component is active.

Remote-control command:
```
SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:STAT?
SOUR:BB:TDSC:UP:CELL1:ENH:DCH:DTCH:STAT?
```

Data Source – TD-SCDMA

Selects the data source for the transport channel.

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:TDSC:DOWN:CELL1:ENH:BCH:DTCH:
DATA ZERO | ONE

SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:
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:TDSC:DOWN:CELL1:ENH:BCH:DTCH:
DATA PN9 | PN11 | 15 | 16 | 20 | 21 |
23
```

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:TDSC:DOWN:CELL1:ENH:BCH:DTCH:
DATA PATT
SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:
DATA:PATT #H3F,8

SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:
DATA PATT
SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:
DATA:PATT #H3F,8
```

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:TDSC:DOWN:CELL1:ENH:BCH:DTCH:
DATA DLIS
SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:
DATA:DSEL "tdscdma_1"

SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:
DATA DLIS
SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:
DATA:DSEL "tdscdma_1"
```

Transport Time Interval – TD-SCDMA

Displays the number of frames into which a TCH is divided. This setting also defines the interleaver depth.

Remote-control command:
```
SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:TTIN?
```
Response: `20ms`

```
SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:TTIN?
```
Response: `20ms`

Transport Blocks – TD-SCDMA

Displays the number of transport blocks for the TCH.

Remote-control command:
```
SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:DCCH:TBC?
```
Response: `1`
```
SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:DCCH:TBC?
```
Response: `1`

Transport Block Size – TD-SCDMA

Displays the size of the transport block at the channel coding input.

Remote-control commands:
```
SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:TBS?
```
Response: `24`
```
SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:TBS?
```
Response: `24`

Size Of CRC – TD-SCDMA

Displays the type (length) of the CRC.

Remote-control commands:
```
SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:CRCS?
```
Response: `16`
```
SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:CRCS?
```
Response: `16`

Rate Matching Attribute – TD-SCDMA

Displays the rate matching.

Remote-control commands:
```
SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:RMAT?
```
Response: `256`
```
SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:RMAT?
```
Response: `256`

Error Protection – TD-SCDMA

Displays the error protection.

Remote-control commands:

```
SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:EPR?
```

Response: `CON3`

```
SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:EPR?
```

Response: `CON3`

Interleaver 1 State – TD-SCDMA

Activates or deactivates the 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 commands:

```
SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:IONE ON
SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:IONE ON
```

Interleaver 2 State – TD-SCDMA

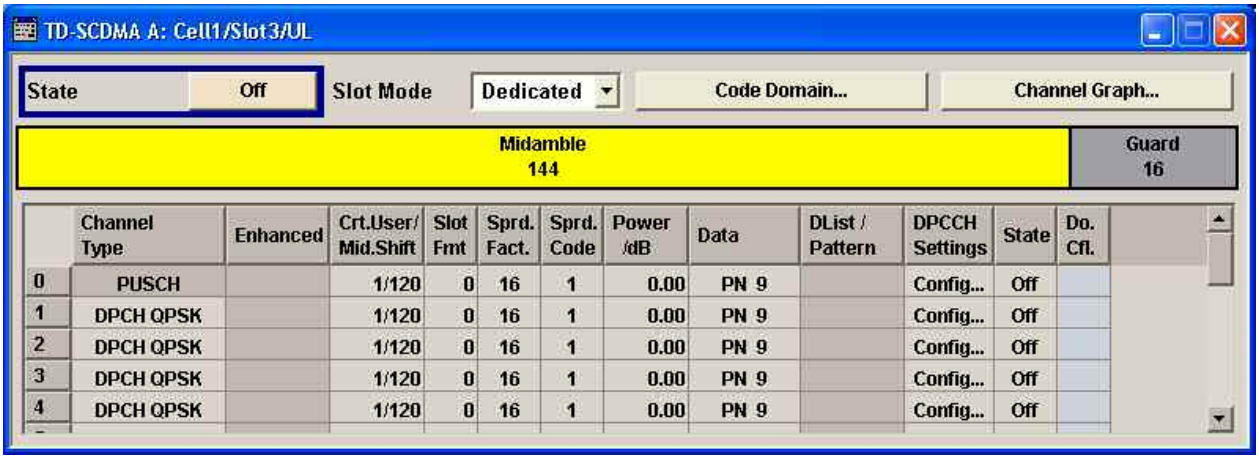
Activates or deactivates the channel coding interleaver state 2 off all the transport channels. Interleaver state 2 can only be set for all the TCHs together. Activation does not change the symbol rate.

Remote-control commands:

```
SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:ITWO ON
SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:ITWO ON
```

Slot Configuration – TD-SCDMA

The **Slot Configuration** menu is called by selecting the respective slot in the **Cell Configuration** menu. The most important part of the menu is the channel table with graphical display of the structure of the channel being edited.



State – TD-SCDMA

Activates or deactivates the selected slot. The index of the selected slot is displayed in the menu header.

Remote-control command:
`SOUR:BB:TDSC:UP:CELL1:SLOT3:STAT ON`

Slot Mode – TD-SCDMA

(This feature is available in the uplink only.)

Selects the slot mode.

Dedicated

Selects the Dedicated mode. In this mode, the instrument generates a signal with a dedicated physical control channel (DPCCH) and up to 6 dedicated physical data channels (DPDCH). The signal is used for voice and data transmission.

Remote-control command:
`SOUR:BB:TDSC:UP:CELL1:SLOT3:MODE DED`

PRACH

In this mode, the instrument generates a single physical random access channel (PRACH). This channel is needed to set up the connection between the mobile and the base station. All the PRACH parameters can be set in the **PRACH Settings** section (see Section *Slot Mode PRACH Settings – TD-SCDMA*, Page 53).

Remote-control command:
`SOUR:BB:TDSC:UP:CELL1:SLOT3:MODE PRAC`

Code Domain…
- TD-SCDMA

Opens the code domain display to visually check the code domain.

The display is described in Section *Code Domain – TD-SCDMA*, Page 56.

Remote-control command: n.a.

Channel Graph…
- TD-SCDMA

Opens the channel graph display to visually check the configured signal.

The display is described in Section *Channel Graph – TD-SCDMA*, Page 57.

Remote-control command: n.a

Channel Table – TD-SCDMA

The **channel table** is located in the lower part of the **Slot Configuration** 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.

The number of channels and the available channel types depend on the link direction. In downlink, Channels 0 to 5 are assigned to the special channels, with the allocation of the channels being fixed. In uplink, Channels 0 is assigned to a special channel, with the allocation of the channel being fixed. It is possible to simulate the signal of a base station that supports high speed channels.

Channel Number – TD-SCDMA

Displays the consecutive channel numbers. The range depends on the selected transmission direction.

All available channels are displayed, even those that are inactive. Each channel is activated/deactivated by the **State** button.

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

Channel Type – TD-SCDMA

Selects the channel type.

In the uplink, the channel type is fixed for channel number 0.

In the downlink, the channel type is fixed for channel numbers 0 to 5.

For the remaining numbers, the choice lies between the relevant standard channels and the high speed channels (see table below).

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:SLOT0:CHAN3:TYPE S_CCPCH1`

Table 2 List of supported channel types and their sequence in the TD-SCDMA channel table

For Downlink:

Index	Shortform	Name	Function
0	P-CCPCH 1	Primary Common Control Phys. Channel 1	Transfers the system frame number (SFN) Timing reference for additional downlink channels Contains the BCH transport channel
1	P-CCPCH 2	Primary Common Control Phys. Channel 2	Transfers the system frame number (SFN) Timing reference for additional downlink channels Contains the BCH transport channel
2	S-CCPCH 1	Secondary Common Control Phys. Channel	
3	S-CCPCH 2	Secondary Common Control Phys. Channel	
4	FPACH	Fast Physical Access Channel	
5	PDSCH	Phys. Downlink Shared Channel	
6-21	DPCH QPSK	Dedicated Phsy. Channel Modulation QPSK	Transfers the user data and the control information
	DPCH 8PSK	Dedicated Phsy. Channel Modulation 8PSK	
	HS-SCCH 1	High Speed Shared Control Channel 1	
	HS-SCCH 2	High Speed Shared Control Channel 2	
	HS-PDSCH (QPSK)	High Speed Phys. Downlink Shared Channel QPSK	
	HS-PDSCH (16 QAM)	High Speed Phys. Downlink Shared Channel 16 QAM	

For Uplink:

Index	Shortform	Name	Function
0	PUSCH	Phys. Uplink Shared Channel	
1-16	DPCH QPSK	Dedicated Phys. Channel Modulation QPSK	
	DPCH 8PSK	Dedicated Phys. Channel Modulation 8PSK	

Enhanced – TD-SCDMA

Displays the enhanced state. If the enhanced state is set to ON, the channel coding cannot be changed.

Remote-control command:

```
SOUR:BB:TDSC:UP:CELL1:SLOT1:CHAN6:ENH?
```

Crt.User/Mid.Shift – TD-SCDMA

Enters the value for the user and displays the midamble shift.

Remote-control command:

```
SOUR:BB:TDSC:DOWN:CELL1:SLOT0:CHAN6:USER 3
```

Slot Fmt – TD-SCDMA

Enters the slot format for the selected channel.
The range of the values depends on the channel selected. For DPCH 8PSK channels, for example, the value range for the slot formats ise 0 to 24.
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.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:SLOT0:CHAN6:SFOR 15`

Sprd. Fact. – TD-SCDMA

Enters the spreading factor for the selected channel. The selection depends on the channel type and interacts with the slot format.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:SLOT0:CHAN4:SFAC16`

Sprd. Code – TD-SCDMA

Enters the spreading code for the selected channel. The code channel is spread with the set spreading code. The range of values for the spreading code depends on the channel type and the spreading factor. Depending on the channel type, the range of values can be limited.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:SLOT0:CHAN6:SCOD16`

Power/dB – TD-SCDMA

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 TD-SCDMA menu), all the power data is relative to 0 dB.

The value range is -80 dB 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 $10 * \log_{10} \frac{1}{duty\_cycle}$*).*

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:SLOT0:CHAN6:POW -20`

Data – TD-SCDMA

Selects data source.

The data sources **PN9**, **PN11**, **PN15**, **PN16**, **PN20**, **PN21**, **PN23**, **ALL0**, **ALL1**, **Pattern** and **Data List** are available to choose from.

If the **Pattern** data type is used, the bit pattern can be entered 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, the list can be selected 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 commands:

```
SOUR:BB:TDSC:DOWN:CELL1:SLOT0:CHAN6:DATA PN9
```

```
SOUR:BB:TDSC:DOWN:CELL1:SLOT0:CHAN6:DATA PATT
SOUR:BB:TDSC:DOWN:CELL1:SLOT0:CHAN6:DATA:PATT #H3F,
8
```

```
SOUR:BB:TDSC:DOWN:CELL1:SLOT0:CHAN6:DATA DLIS
SOUR:BB:TDSC:DOWN:CELL1:SLOT0:CHAN6:DATA:DSEL
"BST_3GPP"
```

DList/Pattern – TD-SCDMA

Only active, if data source pattern or data list is selected.

For data source **Pattern**, a user-definable bit pattern can be entered in the **Pattern** entry field.

For data source **Data List**, a data list can be selected.

Remote-control commands:

```
SOUR:BB:TDSC:DOWN:CELL1:SLOT0:CHAN6:DATA:PATT #H3F,
8
SOUR:BB:TDSC:DOWN:CELL1:SLOT0:CHAN6:DATA:DSEL
"BST_3GPP"
```

DPCCH Settings – TD-SCDMA

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 – TD-SCDMA*, page 49.

Remote-control commands: n.a.

State – TD-SCDMA

Activates or deactivates the channel.

Remote-control command:

```
SOUR:BB:TDSC:DOWN:CELL1:SLOT3:CHAN5:STAT ON
```

Do. Cfl. – TD-SCDMA

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. You get the button required for this purpose by clicking the table field in a submenu.

The graphical display of the code domain occupancy by all the active code channels can be called by clicking the **Code Domain** button (see also Section *Code Domain – TD-SCDMA*, page 56).

Remote-control command:

```
SOUR:BB:TDSC:DOWN:CELL1:SLOT1:DCON?
```

Response: `ON`

DPCCH Settings – TD-SCDMA

The **Config DPCCH** menu for configuring the fields of the dedicated physical controler can be called in the channel table in column **DPCCH Settings** with the **Config…** button.

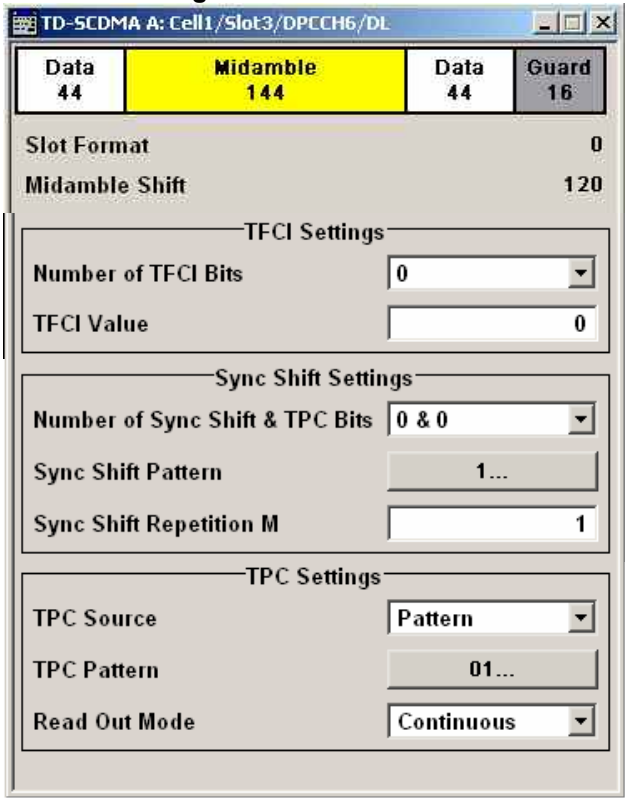
The selected slot format predetermines the setting of the parameter provided in the menu. Whenever the TFCI State and Pilot Length settings are changed, the slot format is adjusted accordingly. Pilot Length and TFCI State can be selected for the S-CCPCH channel.

The upper section of the menu is where the slot structure and slot information is displayed.

The **TFCI Settings** section is where the TFCI length and value are set.

The **Sync Shift Settings** section is where the settings regarding the Sync Shift are set.

The **TPC Settings** section is where the TPC field is set.



Slot Structure – TD-SCDMA Displays the slot structure.

The structure of the slot depends on the slot format selected.

Remote-control command: n.a.

Slot Format – TD-SCDMA Displays the slot format.

The slot format display changes when the **Number of TFCI Bits** and the **Number of Sync Shift & TPC Bits** are modified.

Remote-control command:
SOUR:BB:TDSC:DOWN:CELL1:SLOT3:CHAN6:SFOR?
Response: 0

Midamble Shift – TD-SCDMA

Displays the midamble shift.

The midamble can be shifted in the range of 0 to 120 chips in increments of 8 chips. Channels belonging to the same user equipment are characterized by the same midamble shift.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:SLOT3:CHAN6:MSH?`
Response: `120`

Number of TFCI Bits – TD-SCDMA

Selects the length of the TFCI field expressed in bits.

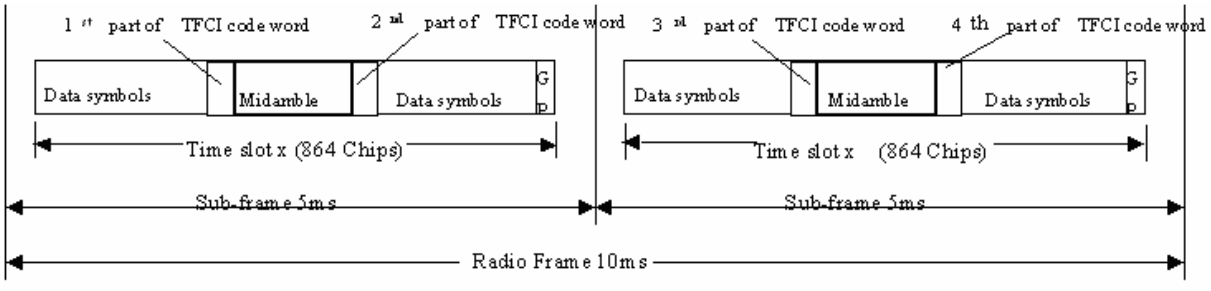
Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:SLOT3:CHAN6:DPCC:TFCI:LENG 4`

TFCI Value – TD-SCDMA

Enters the value of the TFCI field. The value range is 0 to 1023.

The coded TFCI word is divided into 4 parts:

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:SLOT3:CHAN6:DPCC:TFCI:VAL 2`



Number of Sync Shift & TPC Bits – TD-SCDMA

Selects the length of the sync shift and the length of the TPC field expressed in bits. The available values depend on the slot format.

Remote-control command:

```
SOUR:BB:TDSC:DOWN:CELL1:SLOT3:CHAN6:DPCC:SYNC:LENG
4
```

Sync Shift Pattern – TD-SCDMA

Enters the bit pattern for the sync shift. The maximum pattern length is 64 bits.

The following values are allowed:

0: decreases the sync shift

1: increases the sync shift

-: the sync shift stays unchanged

Remote-control command:

```
SOUR:BB:TDSC:DOWN:CELL1:SLOT3:CHAN6:DPCC:SYNC:PATT
10-01
```

Sync Shift Repetition M – TD-SCDMA

Enters the value for the sync shift repetition. This value defines the spacing for the sync shift which is used to transmit a new timing adjustment. M specifies the spacing in subframes of 5 ms each.

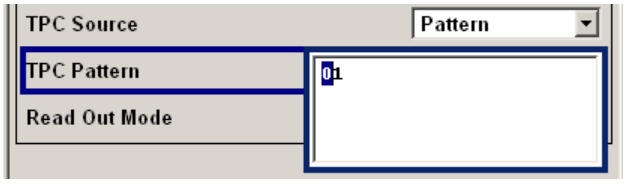
Remote-control command:

```
SOUR:BB:TDSC:DOWN:CELL1:SLOT3:CHAN6:DPCC:SYNC:REP 2
```

TPC Source – TD-SCDMA

Selects the data source for the TPC field of the DPCCH.

If **Pattern** is selected, an entry field appears for the bit pattern. The maximum bit pattern length is 64 bits.



If **Data List** is selected, a button appears for calling the **File Select** window.

Remote-control command:

```
SOUR:BB:TDSC:DOWN:CELL1:SLOT3:CHAN6:DPCC:TPC:DATA
ONE
SOUR:BB:TDSC:DOWN:CELL1:SLOT3:CHAN6:DPCC:TPC:DATA:P
ATT #HFF,8

SOUR:BB:TDSC:DOWN:CELL1:SLOT3:CHAN6:DPCC:TPC:DATA:D
SEL 'd:\data1'
```

Read Out Mode – TD-SCDMA

Selects TPC data usage.

With TD-SCDMA, 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).

Continous The TPC bits are used cyclically.

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:SLOT3:CHAN6: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:TDSC:DOWN:CELL1:SLOT3:CHAN6: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:TDSC:DOWN:CELL1:SLOT3:CHAN6: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).

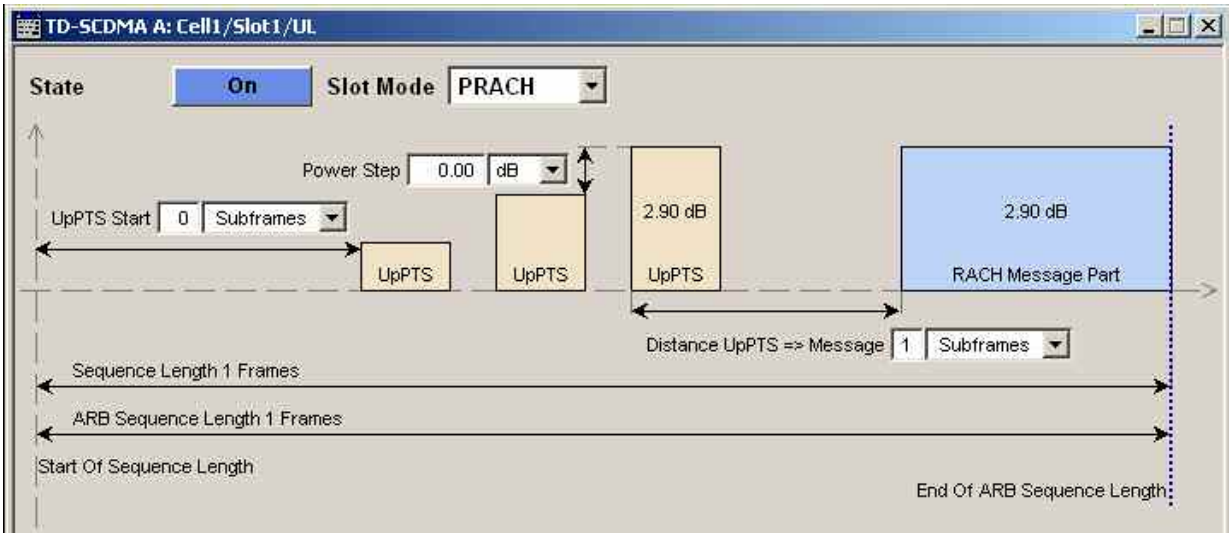
Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:SLOT3:CHAN6:DPCC:TPC:READ S01A`

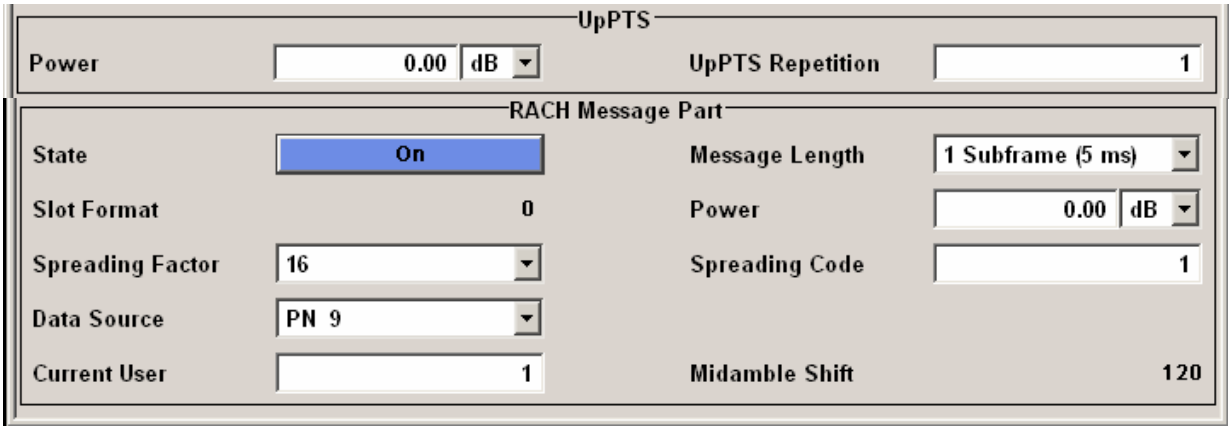
Single + alt.10 The TPC bits are used once, and then the TPC sequence is continued with 1 and 0 bits alternately (in multiples, depending on by the symbol rate, for example, 11110000).

Remote-control command:
`SOUR:BB:TDSC:DOWN:CELL1:SLOT3:CHAN6:DPCC:TPC:READ S10A`

Slot Mode PRACH Settings – TD-SCDMA

The PRACH settings menu can be called by selecting slot mode **PRACH** in the **Slot Configuration** menu.





Power Step – TD-SCDMA

Enters the power by which the UpPTS is increased from repetition to repetition. The power set under **Power** is the „target power“, used during the last repetition of the preamble.

Example:

UpPTS Power: 0 dB
UpPTS Repetition: 3
Power Step: 3
Generated power sequence:

Preamble 1 -6 dB	→ + 3 dB	Preamble 2 -3 dB	→ + 3 dB	Preamble 3 0 dB

Remote-control command:
`SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:PTS:PST 5`

UpPTS Start – TD-SCDMA

Enters the number of the subframe in which the first UpPTS should be transmitted. The value range is 0 to 10.

Remote-control command:
```
SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:PTS:STAR 2
```

Distance UpPTS – TD-SCDMA

Enters the value to vary the timing between UpPTS and RACH.

Remote-control command:
```
SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:PTS:DIST 2
```

Sequence Length – TD-SCDMA

Displays the value of the sequence langth.

Remote-control command:
```
SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:SLEN?
Response: 3.5
```

Power – TD-SCDMA

Enters the power of the UpPTS.

Remote-control command:
```
SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:PTS:POW -20
SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:PTS:PCOR?
Response: -13.99186583177393
```

UpPTS Repetition – TD-SCDMA

Enters the number of UpPTS repetitions before a PRACH burst happens.

Remote-control command:
```
SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:PTS:REP 2
```

State (RACH Message Part) – TD-SCDMA

Activates or deactivates the RACH (random access channel) message part.

Remote-control command:
```
SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:STAT ON
```

Message Length – TD-SCDMA

Selects the message length of the random access channel expressed in subframes.

Remote-control command:
```
SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:LENG 2
```

Slot Format (PRACH) – TD-SCDMA

Displays the slot format of the PRACH. The slot format depends on the selected spreading factor.

Remote-control command:
```
SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:SFOR?
```
Response: `0`

Power (RACH Message Part) – TD-SCDMA

Enters the power of the PRACH message part.

The value range is -80 dB to 0 dB.

Remote-control command:
```
SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:POW -10
SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:PCOR?
Response: 2.99945614371761
```

Spreading Factor (PRACH) – TD-SCDMA

Selects the spreading factor for the PRACH.

Remote-control command:
```
SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:SFAC 4
```

Spreading Code (PRACH)– TD-SCDMA

Enters the spreading code for the PRACH. The code channel is spread with the set spreading code. The range of values of the spreading code depends on the channel type and the spreading factor.

Remote-control command:
```
SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:SCOD 2
```

Data Source (PRACH) – TD-SCDMA

Selects data source for the PRACH.

The data sources **PN9**, **PN11**, **PN15**, **PN16**, **PN20**, **PN21**, **PN23**, **ALL0**, **ALL1**, **Pattern** and **Data List** are available to choose from.

If the **Pattern** data type is used, the bit pattern can be entered in a bit editor via the **Data Pattern 0…** button. The length is limited to 64 bits.

If the **Data List** data type is used, the list can be selected from a file window via the **Select Data List…** button..

Remote-control command:
```
SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:DATA PN16

SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:DATA:DSEL
'd:\data1'

SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:DATA:PATT
#HFF,8
```

Current User (PRACH) – TD-SCDMA

Enters the number of current user.

Remote-control command:
```
SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:USER 2
```

Midamble Shift (PRACH) – TD-SCDMA

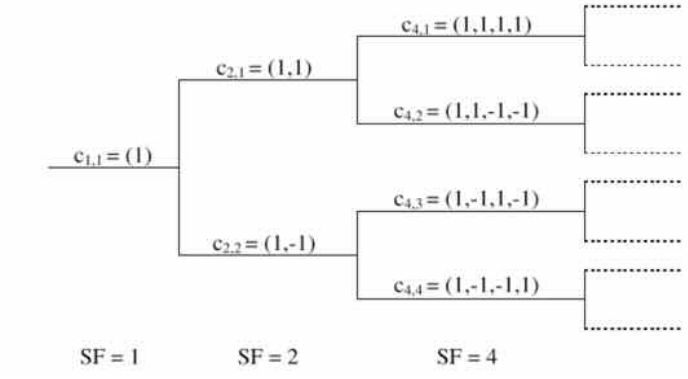
Displays the value for the midamble shift.

Remote-control command:
```
SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:MSH?
```

Code Domain – TD-SCDMA

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.

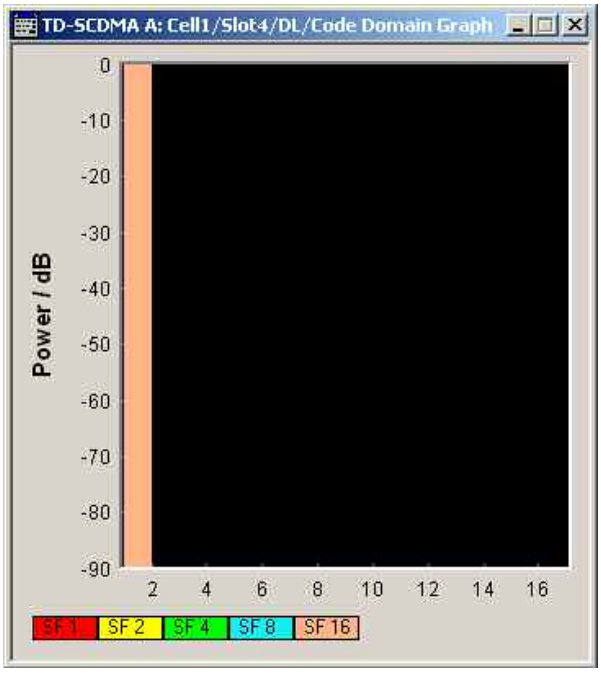
The outer branches of the tree (right-most position in the figure) indicate the channelization codes for the smallest symbol rate (and thus the highest spreading factor). The use of a channelization code of the level with spreading factor N blocks the use of all other channelization codes of levels with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



Code tree of channelization codes

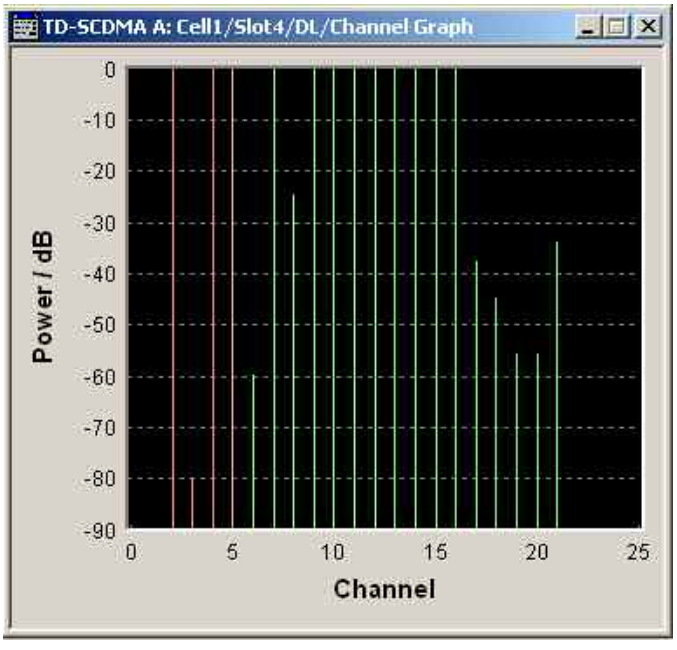
The domain of a certain channelization code is the outer branch range (with minimum symbol rate and max. spreading factor) which is based on the channelization code selected in the code tree. Using a spreading code means that its entire domain is used.

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 to the spreading factor, the allocation is shown below the graph. The relative power can be taken from the height of the bar.



Channel Graph – TD-SCDMA

The channel graph display shows the active code channels. The channel number is plotted on the X axis. The red bars represent the special channel (P-CCPCH1 to PDSCH in the downlink, P-CCPCH1 to PUSCH in the uplink), 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.



SOURce:BB:TDSCdma-Subsystem- Remote-control commands

The commands in the SOURce:BB:TDSCdma subsystem are described in three sections, separated into general remote commands, commands for cell settings and commands for slot settings.

SOURce:BB:TDSCdma - General Remote-Control Commands

This subsystem contains commands for the primary and general settings of the TD-SCDMA 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 cells and the slots are described in separate sections. The commands are divided up in this way to make the extremely comprehensive `SOURce:BB:TDSCdma` subsystem clearer.

The numerical suffix at SOURce distinguishes between path A and path B for two-path instruments:

SOURce<1> = path A

SOURce<2> = 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 Table – General Remote-Control-Commands - TDSCdma

Command	Parameter	Default Unit	Comments
[SOURce<[1]|2>:]BB:TDSCdma:CLIPping:LEVel	1...100	PCT	
[SOURce<[1]|2>:]BB:TDSCdma:CLIPping:MODE	VECTor | SCALar		
[SOURce<[1]|2>:]BB:TDSCdma:CLIPping:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:TDSCdma:CLOCk:MODE	CHIP | MCHip		
[SOURce<[1]|2>:]BB:TDSCdma:CLOCk:MULTiplier	1... 64		
[SOURce<[1]|2>:]BB:TDSCdma:CLOCk:SOURce	EXTernal | INTernal | AINTernal		
[SOURce<[1]|2>:]BB:TDSCdma:COPY:DESTination	1...4		
[SOURce<[1]|2>:]BB:TDSCdma:COPY:EXECute	-		
[SOURce<[1]|2>:]BB:TDSCdma:COPY:SOURce	1...4		
[SOURce<[1]|2>:]BB:TDSCdma:CRATe?			Query only
[SOURce<[1]|2>:]BB:TDSCdma:CRATe:VARiation	1 MHz ... 5 MHz	Hz (c/s)	
[SOURce<[1]|2>:]BB:TDSCdma:FILTer:ILENgth	1...128		
[SOURce<[1]|2>:]BB:TDSCdma:FILTer:ILENgth:AUTO	ON | OFF		
[SOURce<[1]|2>:]BB:TDSCdma:FILTer:OSAMpling	1...32		
[SOURce<[1]|2>:]BB:TDSCdma:FILTer:OSAMpling:AUTO	ON | OFF		
[SOURce<[1]|2>:]BB:TDSCdma:FILTer:PARameter:APCO25	0.15 ... 2.5		
[SOURce<[1]|2>:]BB:TDSCdma:FILTer:PARameter:COSine	0.00 ... 0.99		

[SOURce<[1]|2>:]BB:TDSCdma:FILTer:PARameter:GAUSs	0.15 ... 2.50		
[SOURce<[1]|2>:]BB:TDSCdma:FILTer:PARameter:LPASs	0.05...2.0		
[SOURce<[1]|2>:]BB:TDSCdma:FILTer:PARameter:PGAus	0.15 ... 2.5		
[SOURce<[1]|2>:]BB:TDSCdma:FILTer:PARameter:RCOSine	0.00 ... 0.99		
[SOURce<[1]|2>:]BB:TDSCdma:FILTer:PARameter:SPHase	0.15 ... 2.5		
[SOURce<[1]|2>:]BB:TDSCdma:FILTer:TYPE	RCOSine | COSine | GAUSs | LGAuss | PGAuss | CONE | COF705 | LPASs COEQualizer | COFequalizer | C2K3x | APCO25 | SPHase | EWPShape RECTangle | ENPShape | DIRac		
[SOURce<[1]|2>:]BB:TDSCdma:LINK	FORWard | REVerse (Alias DOWN | UP)		
[SOURce<[1]|2>:]BB:TDSCdma:POWer:ADJust	-		No query
[SOURce<[1]|2>:]BB:TDSCdma:POWer[:TOTal]?			Query only
[SOURce<[1]|2>:]BB:TDSCdma:PRAMp:BBONly	OFF | ON		
[SOURce<[1]|2>:]BB:TDSCdma:PRAMp:FDELay	-9.0…9.0		
[SOURce<[1]|2>:]BB:TDSCdma:PRAMp:RDELay	-9.0…9.0		
[SOURce<[1]|2>:]BB:TDSCdma:PRAMp:SHAPe	LINear | COSine		
[SOURce<[1]|2>:]BB:TDSCdma:PRAMp:TIME	0.3…16.0		
[SOURce<[1]|2>:]BB:TDSCdma:PRESet			No query
[SOURce<[1]|2>:BB:TDSCdma:RESet			No query
[SOURce<[1]|2>:]BB:TDSCdma:SEQuence	AUTO | RETRigger | AAUTo | ARETrigger | SINGle		
[SOURce<[1]|2>:]BB:TDSCdma:SETTing:CATalog?			Query only
[SOURce<[1]|2>:]BB:TDSCdma:SETTing:DELete	<file_name>		
[SOURce<[1]|2>:]BB:TDSCdma:SETTing:LOAD	<file_name>		
[SOURce<[1]|2>:]BB:TDSCdma:SETTing:STORe	<file_name>		
[SOURce<[1]|2>:]BB:TDSCdma:SETTing:TMODel	<file_name>		
[SOURce<[1]|2>:]BB:TDSCdma:SLENgth	1 ... 511 frames		
[SOURce<[1]|2>:]BB:TDSCdma:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:ARM:EXECute			No query
[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:EXECute			No query
[SOURce<[1]|2>:]BB:TDSCdma:TRIGger[:EXTernal<[1]|2>]:DELay	0 ...65 535 chips		
[SOURce<[1]|2>:]BB:TDSCdma:TRIGger[:EXTernal<[1]|2>]:INHibit	0 ... (2^26 - 1) chips		
[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:OBASeband:DELay	0 ...65 535 chips		
[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:OBASeband:INHibit	0 ... (2^26 - 1) chips		
[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:OUTPut<[1]...4>:DELay	0 ... (2^24 - 1) chips		
[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:OUTPut:DELay:FIXed	ON | OFF		
[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:OUTPut<[1]...4>:DELay:MAXimum?			Query only
[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:OUTPut<[1]...4>:DELay:MINimum?			Query only

[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:OUTPut<[1]...4>:MODE	RFRame | SFNR | CSPeriod | USER | RATio		
[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:OUTPut<[1]...4>:OFFTime	0 ...(2^24 - 1) chips		
[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:OUTPut<[1]...4>:ONTime	0 ...(2^24 - 1) chips		
[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:OUTPut<[1]...4>:PERiod	2 ... (2^32 - 1) chips		
[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:RMODe			Query only
[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:SLENgth	0 ...(2^32 - 1) chips		
[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:SLUNit	FRAMe | CHIP | SEQuence		
[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:SOURce	EXTernal | INTernal | BEXTernal | OBASeband		
[SOURce<[1]|2>:]BB:TDSCdma:VERSion?			Query only
[SOURce<[1]|2>:]BB:TDSCdma:WAVeform:CREate			No query

SOURce-TDSCdma - Primary Commands

[SOURce<[1]|2>:]BB:TDSCdma:CLIPping:LEVel 1 ... 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.

Example: `"BB:TDSC:CLIP:LEV 80"`
'sets the limit for level clipping to 80% of the maximum level.

`"BB:TDSC:CLIP:STAT ON"`
'activates level clipping.

*RST value	Resolution	SCPI
100 PCT	1	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:CLIPping:MODE VECTor | SCALar

The command sets the method for level clipping (Clipping).

Parameters:

VECTor
The reference level is the amplitude | i+jq |.

SCALar
The reference level is the absolute maximum of the I and Q values.

Example: `"BB:TDSC:CLIP:MODE VECT"`
'sets the amplitude as reference level.

*RST value	Resolution	SCPI
VECTor	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:CLIPping:STATe ON | OFF

The command activates level clipping (Clipping). The value is defined with the command `BB:TDSCdma:CLIPping:LEVel`, the mode of calculation with the command `BB:TDSCdma:CLIPping:MODE`.

Example: `"BB:TDSC:CLIP:STAT ON"`
'activates level clipping.

*RST value	Resolution	SCPI
OFF		Device-specific

[SOURce<[1]|2>:]BB:TDSCdma: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:TDSCdma: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:TDSCdma: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:TDSC:CLOC:MODE MCH"`
'sets the type of externally supplied clock.

*RST value	Resolution	SCPI
CHIP	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma: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:TDSCdma: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:TDSC:CLOC:SOUR EXT"`
'selects the external clock source. The clock is supplied via the CLOCK connector.

`"BB:TDSC:CLOC:MODE MCH"`
'selects clock type **Multiplied**, i.e. the supplied clock has a rate which is a multiple of the chip rate.

`"BB:TDSC:CLOC:MULT 12"`
'the multiplier for the external clock rate is 12.

*RST value	Resolution	SCPI
4	1	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:CLOCk:SOURce INTernal | EXTernal | AINTernal

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; selecting EXTernal is only possible for path B.

Parameters:

INTernal

The internal clock reference is used.

EXTernal

The external clock reference is supplied to the CLOCK connector. Commands `:BB:TDSC:CLOCk:MODE` and `:MULTiplier` are used to enter the type of the external clock.

Example:

`"BB:TDSC:CLOC:SOUR EXT"`
'selects the external clock source. The clock is supplied via the CLOCK connector.

`"BB:TDSC:CLOC:MODE MCH"`
'selects clock type **Multiplied**, i.e. the supplied clock has a rate which is a multiple of the chip rate.

`"BB:TDSC:CLOC:MULT 12"`
'the multiplier for the external clock rate is 12.

*RST value	Resolution	SCPI
INTernal	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:COPY:DESTination 1 ...4

The command selects the cell whose settings are to be overwritten.

Example:

`"BB:TDSC:LINK DOWN"`
'selects the downlink/forward transmit direction (base station to mobile station).

`"BB:TDSC:COPY:SOUR 1"`
'selects cell 1 as the source.

`"BB:TDSC:COPY:DEST 4"`
'selects cell 4 as the destination.

`"BB:TDSC:COPY:EXEC"`
'starts copying the parameter set of cell 1 to cell 4.

*RST value	Resolution	SCPI
2	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:COPY:EXECute

The command starts the copy process. The dataset of the selected source cell is copied to the destination cell.

This command triggers an event and therefore has no *RST value and no query form.

Example: "BB:TDSC:COPY:EXEC"
'starts copying the parameter set of the selected source cell to the selected destination cell.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:COPY:SOURce 1 ...4

The command selects the cell whose settings are to be copied.

Example: "BB:TDSC:LINK UP"
'selects the uplink transmit direction (mobile station to base station).

"BB:TDSC:COPY:SOUR 1"
'selects cell 1 as the source.

"BB:TDSC:COPY:DEST 4"
'selects cell 4 as the destination.

"BB:TDSC:COPY:EXEC"
'starts copying the parameter set of cell 1 to cell 4.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:CRATe?

The command queries the system chip rate. The output chip rate which determines the rate of the spread symbols as is used for signal output can be set with the command SOUR:BB:TDSC:CRAT:VAR.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:CRAT?"
'queries the system chip rate.

Response: "R1M2"
'the system chip rate is 1.2288 Mcps.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:CRATe:VARiation 1 Mcps ... 5 Mcps

The command enters the output chip rate.

The output chip rate 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:TDSC:CRAT:VAR 4086001"
'sets the chip rate to 4.08 Mcps.

*RST value	Resolution	SCPI
1.28	1 Hz	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:FILTer:ILENgth 1...128

Note:
This command is available for R&S WinIQSIM2 only.

The command sets the impulse length (number of filter tabs).

Example: "BB:TDSC:FILT:ILEN 10"
'sets the number of filter tabs to 10.

*RST value	Resolution	SCPI
10	1	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:FILTer:ILENgth:AUTO ON | OFF

Note:
This command is available for R&S 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:TDSC:FILT:ILEN:AUTO ON"
'the most sensible parameters are selected automatically.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:FILTer:OSAMpling 1...32

Note:
This command is available for R&S WinIQSIM2 only.

The command sets the upsampling factor.

Example: "BB:TDSC:FILT:OSAM 32"
'sets the upsampling factor to 32.

*RST value	Resolution	SCPI
32	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:FILTer:OSAMpling:AUTO ON | OFF

Note:
This command is available for R&S 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:TDSC:FILT:OSAM:AUTO ON"
'the most sensible parameters are selected automatically.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:FILTer:PARameter:APCO25 0.05 ... 0.99

The command sets the roll-off factor for filter type APCO25.

Example: "BB:TDSC: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:TDSCdma:FILTer:PARameter:COSine 0.00 ... 0.99

The command sets the roll-off factor for the Cosine filter type.

Example: "BB:TDSC: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:TDSCdma:FILTer:PARameter:GAUSs 0.15 ... 2.5

The command sets the B x T for the Gauss filter type.

Example: "BB:TDSC: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:TDSCdma:FILTer:PARameter:LPASs 0.05...2.0

The command sets the cut off frequency factor for the Lowpass filter type.

Example: "BB:TDSC:FILT:PAR:LPAS 0.5"
'the cut of frequency factor is set to 0.5.

*RST value	Resolution	SCPI
0.50	0.01	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:FILTer:PARameter:PGAuss 0.15 ... 2.5

The command sets the B x T for the Pure Gauss filter type.

Example: "BB:TDSC:FILT:PAR:GAUS 0.5"
'sets B x T to 0.5 for the Pure Gauss filter type.

*RST value	Resolution	SCPI
0.5	0.01	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:FILTer:PARameter:RCOSine 0.00 ... 0.99

The command sets the roll-off factor for the Root Cosine filter type.

Example: "BB:TDSC: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:TDSCdma:FILTer:PARameter:SPHase 0.15 ... 2.5

The command sets the B x T for the Split Phase filter type.

Example: "BB:TDSC: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:TDSCdma:FILTer:TYPE RCOSine|COSine|GAUSs|LGAuss|PGAuss|EWPShape |COF705|COEQualizer|COFequalizer|C2K3x|APCO25|SPHase|RECTangle|LPASs|DIRac|ENPShape|CONE

The command selects the filter type. The filter types are described in Chapter 4, Section "*Baseband Filter - Custom Digital Mod*".

Example: "BB:TDSC:FILT:TYPE RCOS"
'sets the filter type RCOSine.

*RST value	Resolution	SCPI
RCOS	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma: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 mobile station (REVerse | UP).

Example: "BB:TDSC:LINK DOWN"
'the transmission direction selected is base station to mobile station. The signal corresponds to that of a base station.

*RST value	Resolution	SCPI
DOWN	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma: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:TDSC:POW:TOT?"
'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:TDSCdma: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:TDSC: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:TDSCdma:PRAMp:BBONly ON | OFF

Note:
This command is available for R&S SMx and R&S AMU instruments only.

The command activates or deactivates power ramping for the baseband signals.

Example: "SOUR:BB:TDSC:PRAM:BBON ON"
'activates power ramping for the baseband signals.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:PRAMp:FDELay -9.0…9.0

The command sets the offset in the falling edge of the envelope at the end of a burst. A positive value gives a rise to a delay and a negative value causes an advance.

Example: "SOUR:BB:TDSC:PRAM:FDEL 8.0"
'sets the offset in the falling edge of the envelope to 8.0 chips.

*RST value	Resolution	SCPI
0.0	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:PRAMp:RDELay -9.0…9.0

The command sets the offset in the falling edge of the envelope at the end of a burst. A positive value gives a rise to a delay and a negative value causes an advance.

Example: "SOUR:BB:TDSC:PRAM:RDEL 8.0"
'sets the offset in the rising edge of the envelope to 8.0 chips.

*RST value	Resolution	SCPI
0.0	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:PRAMp:SHAPe LINear | COSine

The command selects the form of the transmitted power, i.e. the shape of the rising and falling edges during power ramp control.

Example: "SOUR:BB:TDSC:PRAM:SHAP LIN"
'sets linear shape for the rising and falling edges during power ramp control.

*RST value	Resolution	SCPI
COSine	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:PRAMp:TIME 0.3…16.0

The command sets the power ramping rise time and fall time for a burst.

Example: "SOUR:BB:TDSC:PRAM:TIME 2.0"
'sets the power ramping rise time and fall time for a burst to 2 chips.

*RST value	Resolution	SCPI
2.0	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:PRESet

The command produces a standardized default for the TD-SCDMA 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:TDSC:PRES"
'resets all the TD-SCDMA settings to default values.

*RST value	Resolution	Dependencies	SCPI
-	-	All TD-SCDMA settings are preset. An overview is provided by Table in Chapter 4, Section "General Settings for TD-SCDMA Signals".	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:RESet

The command resets all cells to the predefined settings. The reset applies to the selected link direction.

This command triggers an action and therefore has no *RST value and no query form.

Example: "BB:TDSC:RES"
'resets all the cells to the predefined settings.

*RST value	Resolution	Dependencies	SCPI
-	-	All cells are reset. An overview is provided by Table in Chapter 4, Section "General Settings for TD-SCDMA Signals".	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma: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.

Parameters:

AUTO
The modulation signal is generated continuously.

RETRigger
The modulation signal is generated continuously. A trigger event (internal or external) causes a restart.

AAUTo
The 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:TDSC:TRIG:ARM:EXEC and started again when a trigger event occurs.

ARETrigger
The 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:TDSC:TRIG:ARM:EXEC and started again when a trigger event occurs.

SINGle

The modulation signal is generated only when a trigger) event occurs. After the trigger event, the signal is generated once to the set sequence length (`SOUR:BB:TDSC:TRIG:SLEN`). Every subsequent trigger event causes a restart.

Example: `"BB:TDSC: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:TDSCdma:SETTing:CATalog?

This command reads out the files with TD-SCDMA settings in the default directory. The default 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 files with the file extension ***.tdscdma** will be listed.

The command is a query command and therefore has no *RST value.

Example: `"MMEM:CDIR 'D:\user\tdscdma'"`
'sets the default directory to `D:\user\tdscdma`.

`"BB:TDSC:SETT:CAT?"`
'reads out all the files with TD-SCDMA settings in the default directory.

Response: `"'TDSCDMA_UP','TDSCDMA_DN'"`
'the files `'TDSCDMA_UP'` and `'TDSCDMA_DN'` are available.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:SETTing:DELete <file_name>

This command deletes the selected file with TD-SCDMA 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 ***.tdscdma** will be deleted.

This command triggers an event and therefore has no *RST value and no query form.

Example: `"BB:TDSC:SETT:DEL 'D:\user\tdscdma'"`
'deletes the specified file with TD-SCDMA settings.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:SETTing:LOAD <file_name>

This command loads the selected file with TD-SCDMA 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 ***.tdscdma** will be loaded.

This command triggers an event and therefore has no *RST value and no query form.

Example: `"BB:TDSC:SETT:LOAD 'tdscdma_1'"`
'loads file 'tdscdma_1'.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:SETTing:STORe <file_name>

This command stores the current TD-SCDMA 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. TD-SCDMA settings are stored as files with the specific file extensions ***.tdscdma**.

This command triggers an event and therefore has no *RST value and no query form.

Example: `"BB:TDSC:SETT:STOR 'tdscdma_1'"`
'stores the current TD-SCDMA settings into file '`tdscdma_1`'.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:SETTing:TMODel <file_name>

This command selects the file with the test models defined in the TD-SCDMA standard or a self-defined test setup.

This command triggers an event and therefore has no *RST value and no query form.

Example: `"BB:TDSC:SETT:TMOD 'Test_Mode_ACLR'"`
'calls the specified test model.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:SLENgth 1 ... 5000 frames

The command sets the sequence length of the arbitrary waveform component of the TD-SCDMA 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.

Example: `"BB:TDSC:SLEN 10"`
'sets the sequence length to 10 frames.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:STATe ON | OFF

The command activates modulation in accordance with the TD-SCDMA 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:TDSC:STAT ON"
'activates modulation in accordance with the TD-SCDMA standard.

*RST value	Resolution	Dependencies	SCPI
OFF	-	BB:TDSC:STAT ON deactivates the other standards and digital modulation.	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma: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:TDSC:TRIG:ARM:EXEC"
'stops signal generation for trigger modes **Armed Auto** and **Armed Retrigger**.

*RST value	Resolution	SCPI
-		Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:EXECute

The command executes a trigger. The internal trigger source must be selected using the command SOUR:BB:TDSC:TRIG:SOUR INT and a trigger mode other than **AUTO** must be selected using the command SOUR:BB:TDSC:TRIG:SEQ.

This command triggers an event and therefore has no *RST value and no query form.

Example: "BB:TDSC:TRIG:SOUR INT"
'sets internal triggering.

"BB:TDSC:TRIG:SEQ RETR"
'sets Retrigger mode, i.e. every trigger event causes signal generation to restart.

"BB:TDSC:TRIG:EXEC"
'executes a trigger.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:TRIGger[:EXTernal<[1]|2>]:DELay 0 ... 65 535 chips

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:TDSC:TRIG:SOUR EXT"`
'sets an external trigger via the TRIGGER 1 connector.

`"BB:TDSC:TRIG:DEL 50"`
'sets a delay of 50 symbols for the trigger.

*RST value	Resolution	SCPI
0 chips	1 chip	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:TRIGger[:EXTernal<[1]|2>]:INHibit 0 ...67 108 863 chips

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:TDSC:TRIG:SOUR EXT1"`
'selects an external trigger via the TRIGGER 1 connector.

`"BB:TDSC: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:TDSCdma:TRIGger:OBASeband:DELay 0 ... 65 535 chips

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:TDSC:TRIG:SOUR OBAS"`
'sets for path A the internal trigger executed by the trigger signal from the second path (path B).

`"BB:TDSC:TRIG:OBAS:DEL 50"`
'sets a delay of 50 symbols for the trigger.

*RST value	Resolution	SCPI
0 chips	1 chip	Device-specific

SOURce<[1]|2>:]BB:TDSCdma:TRIGger:OBASband:INHibit 0 ...67 108 863 chips

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.

Example: `"BB:TDSC:TRIG:SOUR OBAS"`
'sets for path A the internal trigger executed by the trigger signal from the second path (path B).

`"BB:TDSC: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:TDSCdma: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:TDSCdma: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:TDSC: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:TDSCdma: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 current 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:TDSC:TRIG:OUTP:DEL:FIX ON"`
'restricts the marker signal delay setting range to the current range.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma: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:TDSC:TRIG:OUTP:DEL:FIX ON`.

The command is a query only and therefore has no *RST value.

Example: `"BB:TDSC:TRIG:OUTP:DEL:FIX ON"`
'restricts the marker signal delay setting range to the dynamic range.

`"BB:TDSC: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:TDSCdma: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:TDSCdma:TRIGger:OUTPut:DELay:FIXed ON`.

The command is a query only and therefore has no *RST value.

Example: `"BB:TDSC:TRIG:OUTP:DEL:FIX ON"`
'restricts the marker signal delay setting range to the dynamic range.

`"BB:TDSC:TRIG:OUTP:DEL:MIN?"`
'queries the minimum of the dynamic range.

Response: `"0"`
'the minimum for the marker delay setting is 0 symbols.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:OUTPut<[1]...4>:MODE RFRame | SFNR | CSPeriod | USER | RATio

The command defines the signal for the selected marker output.

Parameters:

RFRame
A marker signal is generated every 10 ms (traffic channel clock).

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

CSPeriod

A marker signal is generated at the start of each arbitrary waveform sequence (depending on the set sequence length). The marker signal is also generated if the signal contains no ARB.

RATio

A regular marker signal corresponding to the Time Off / Time On specifications in the commands `SOURce:BB:TDSCdma:TRIGger:OUTPut:OFFTime` and `SOURce:BB:TDSCdma:TRIGger:OUTPut:ONTime` is generated.

USER

A marker signal is generated at the beginning of every user-defined period. The period is defined with command `SOUR:BB:TDSC:TRIG:OUTP:PERiod`.

Example: `"BB:TDSC:TRIG:OUTP2:MODE RFR"`
'selects the traffic channel clock on output MARKER 2.

*RST value	Resolution	SCPI
RFRame	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:OUTPut<[1]...4>:OFFTime 1 ... 2^24 - 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:TDSCdma:TRIGger:OUTPut:MODE RATio` on the marker outputs is OFF.

Example: `"BB:TDSC:TRIG:OUTP2:OFFT 2000"`
'sets an OFF time of 2000 chips for marker signal 2.

*RST value	Resolution	SCPI
1 chip	1	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:OUTPut<[1]...4>:ONTime 1 ... 2^24 - 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:TDSCdma:TRIGger:OUTPut:MODE RATio` on the marker outputs is ON.

Example: `"BB:TDSC:TRIG:OUTP2:ONT 2000"`
'sets an ON time of 2000 chips for marker.

*RST value	Resolution	SCPI
1 chip	1	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:TRIGger:OUTPut<[1]...4>:PERiod 2 ... (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 `:BB:TDSC:TRIG:OUTP:MODE`.

Example: `"BB:TDSC:TRIG:OUTP2:MODE USER"`
'selects the user marker for the signal on connector MARKER 2.

`"BB:TDSC:TRIG:OUTP2:PER 1600"`
'sets a period of 1600 chips, i.e. the marker signal is repeated every 1600th chip.

*RST value	Resolution	SCPI
12800	1 chip	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma: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 TD-SCDMA 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.

STOP
the signal is not generated. A trigger event did not occur in the triggered modes, or signal generation was stopped by the command `:BB:TDSC:TRIG:ARM:EXECute` (armed trigger modes only).

Example: `BB:TDSC:TRIG:MODE ARET"`
'selects the Armed_Retrigger mode.

`BB:TDSC: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:TDSCdma:TRIGger:SLENgth 1 … 2^32-1 (4 294 967 295) 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:TDSC:SEQ SING`). The unit is defined with command `SOUR:BB:TDSC:TRIG:SLUNit`. It is then 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:TDSC:SEQ SING"`
'sets trigger mode Single.

`BB:TDSC:TRIG:SLUN CHIP"`
'sets unit chips for the entry of sequence length.

`BB:TDSC: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:TDSCdma:TRIGger:SLUNit FRAMe | 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:TDSC:TRIG:SLEN`) to be output in the **Single** trigger mode (`SOUR:BB:TDSC:SEQ SING`).

Example: `BB:TDSC:SEQ SING"`
'sets trigger mode Single.

`BB:TDSC:TRIG:SLUN FRAM"`
'sets unit frames for the entry of sequence length.

`BB:TDSC: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:TDSCdma: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 `SOURce<[1]|2>:BB:TDSCdma: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:TDSC:TRIG:SOUR EXT"
'executes triggering by means of the signal on the TRIGGER 1 connector.

Response: "Release C"
'TD-SCDMA Release 6.

*RST value	Resolution	SCPI
INTernal	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:VERSion?

The command queries the version of the TD-SCDMA standard underlying the definitions.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:VERS?"
'queries the TD-SCDMA version.

Response: "Release C"
'TD-SCDMA Release 6.

*RST value	Resolution	SCPI
	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:WAVeform:CREate <file_name>

This command creates a waveform using the current settings of the **TD-SCDMA** 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:TDSC:WAV:CRE 'tdscdma_1'"
'creates the waveform file tdscdma.wv in the default directory.

*RST value	Resolution	SCPI
-	-	device-specific

SOURce:BB:TDSCdma - Predefined Settings

The R&S Signal Generator gives you the opportunity to generate predefined test settings for cell 1: These predefined settings enable the creation of highly complex scenarios with just a few keystrokes. The settings take effect only after execution of command `BB:TDSCdma:PPARameter:EXECute`.

Command	Parameter	Default Unit	Comments
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:PPARameter:DPCH:COUNt	1…48		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:PPARameter:DPCH:CREStt	MINimum | AVERage | WORSt		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:PPARameter:DPCH:SFACtor	1 | 2 | 4 | 8 | 16		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:PPARameter:EXECute			No query
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:PPARameter:PCCPch:STATE	ON | OFF		

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:PPARameter:DPCH:COUNt 1…48

This command sets the number of activated DPCHs.The minimum number is one and the maximum number depends on the spreading factor:

Max. No. DPCH = 3 x Spreading Factor

Example: `"BB:TDSC:DOWN:PPAR:DPCH:COUN 48"`
'selects if P-CCPCH is used in the scenario or not.

*RST value	Resolution	SCPI
12	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:PPARameter:DPCH:CREStt 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 `:SOURce:BB:TDSC:DOWN | UP:PPARameter:EXEC`.

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.

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.

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.

Example: "BB:TDSC:DOWN:PPAR:DPCH:CRES WORS"
'sets the crest factor to an unfavorable value.

*RST value	Resolution	SCPI
MINimum	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:PPARameter:DPCH:SFAC 1 | 2 | 4 | 8 | 16

This command sets the the spreading factor for the DPCHs.

Max. No. DPCH = 3 x Spreading Factor

Example: "BB:TDSC:DOWN | UP:PPAR:DPCH:SFAC 16"
'sets the the spreading factor for the DPCH.

*RST value	Resolution	SCPI
16	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:PPARameter:EXECute

This command presets the channel table of cell 1 with the parameters defined by the PPARameter commands. Scrambling Code 0 is automatically selected.

The command triggers an event and therefore has no query form and no *RST value.

Example: "BB:TDSC:DOWN:PPAR:EXEC"
'configures the signal sequence as defined by the :BB:TDSC:PPARameter commands.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN:PPARameter:PCCPch:STATE ON | OFF

This command defines, if P-CCPCH is used in the scenario or not. If P-CCPCH is used, both P-CCPCHs are activated in slot 0 with spreading code 0+1.

Example: "BB:TDSC:DOWN:PPAR:PCCP:STAT ON"
'selects if P-CCPCH is used in the scenario or not.

*RST value	Resolution	SCPI
ON	-	Device-specific

SOURce:BB:TDSCdma – Cell Settings

Command	Parameter	Default Unit	Comments
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:DWPTs | UPPTs:MODE	AUTO | ON | OFF		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN |UP:CELL<[1]|2|3|4>:DWPTs | UPPTs:POWer	-80 dB to 10dB		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN |UP:CELL<[1]|2|3|4>:DWPTs | UPPTs:STATe			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:MCOD			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:PROTation	AUTO | S1 | S2		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SCODe	0...127		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SCODe:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0] 6>:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:DCONflict			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SPOint	1…6		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SDCode			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SUCode	0 to 255		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<2|3|4>:TDELay	0 to 6400		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:USERs	2 | 4 | 6 | 8 | 10 | 12 | 14 | 16		

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:DWPTs | UPPTs:MODE ON |OFF | AUTO

The command selects whether to use the pilot time slot and its power or not. In case of **Auto** and **On**, the DwPTS/UpPTS is used. This is indicated in the **Select Slot in Subframe to Configure** graph.

Example: "BB:TDSC:DOWN:CELL1:DWPT:MODE ON"
'the DwPTS is used.

*RST value	Resolution	SCPI
AUTO	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN |UP:CELL<[1]|2|3|4>:DWPTs | UPPTs:POWer -80 dB…10 dB

The command sets the power of the downlink/uplink pilot time slot.

Example: "BB:TDSC:DOWN:CELL1:DWPT:POW -12.5"
'sets the power of the downlink pilot slot.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:DWPTs | UPPTs:STATe?

The command queries the state of the downlink/uplink pilot time slot.

Example: "BB:TDSC:DOWN:CELL1:DWPT:STAT?"
'queries the state of the downlink pilot slot.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:MCOD?

The command queries the basic midamble code id. The value is set automatically by the change of the scrambling code parameter (it is equal to scrambling code).

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:SCOD 15"
'queries the basic midamble code id.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:PROTation AUTO | S1 | S2

The command selects the phase rotation for the downlink pilots.

Parameter: **AUTO**
Sets the default phase rotation sequence according to the presence of the P-CCPCH.

S1
There is a P-CCPCH in the next four subframes.

S2
There is no P-CCPCH in the next four subframes.

Example: "BB:TDSC:DOWN:CELL1:PROT AUTO"
'sets the phase rotation to AUTO.

*RST value	Resolution	SCPI
AUTO	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SCODe 0 to 127

The command sets the scrambling code. The scrambling code is used for transmitter-dependent scrambling of the chip sequence.

Example: "BB:TDSC:DOWN:CELL1:SCOD 15"
'sets the scrambling code for cell 1.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SCODe:STATe ON | OFF

The command activates or deactivates the scrambling code. The scrambling code is deactivated, for example, for test purposes.

Example: "BB:TDSC:DOWN:CELL1:SCOD:STAT ON"
'activates the scrambling code for cell 1.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:DCONflict ?

The command queries the global domain conflict state per slot.

Example: "SOUR:BB:TDSC:UP:CELL1:SLOT3:DCON?"
'queries whether the slot has a code domain conflict.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0] 6>:STATe ON | OFF

The command activates and deactivates the slot in the subframe.

Example: "BB:TDSC:DOWN:CELL1:SLOT0:STAT ON"
'activates slot0.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SPOint 1…6

The command sets the switching point between the uplink slots and the the downlink slots in the frame.

Example: "BB:TDSC:DOWN:CELL1:SPO 4"
'sets the switching point in the frame.

*RST value	Resolution	SCPI
3	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:STATe ON | OFF

The command activates and deactivates the specified cell.

Example: "BB:TDSC:DOWN:CELL1:STAT ON"
'activates cell 1.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SDCode?

The command queries the SYNC-DL code. The SYNC-DL code is transmitted in the DwPTS to synchronize the mobile station to the base station. The SYNC-DL code is derived from the scrambling code and the basic midamble code ID.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:SDC?"
'queries the SYNC-DL code.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SUCode 0…255

The command sets the SYNC-UL code. The SYNC-UL code is transmitted in the UpPTS to synchronize the base station to the mobile station.

Example: "BB:TDSC:DOWN:CELL1:SUC 120"
'sets the SYNC-UL code.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<2|3|4>:TDELay 0…6400 chips

The command sets the time shift of the selected cell compared to cell 1 in chips.

The command is only valid for cell 2, 3 and 4.

Example: "BB:TDSC:DOWN:CELL2:TDEL 100"
"shifts cell 2 by 100 chips compared to cell 1.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:USERs 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16

The command sets the total number of users of the cell.

Example: "BB:TDSC:DOWN:CELL1:USER 4"
'sets the total number of users.

*RST value	Resolution	SCPI
16	-	Device-specific

SOURce:BB:TDSCdma – Enhanced Channels of Cell 1

Command	Parameter	Default Unit	Comments
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:BIT:LAYer	TRANsport | PHYSical		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:BIT:RATE	1E-7…5E-1		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:BIT:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:BLOCk:RATE	10E-4…10E-1		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:BLOCk:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:BPFRame			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:CRCSize			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:DATA	PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | ZERO | ONE | PATTern		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:DATA:DSELect	<data list name>		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:DATA:PATTern	#B0,1 ... #B111..1,64		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:EPRotection			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:IONE			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:ITWO			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:RMATtribute			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:STATe			Qery only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:TBCount			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:TBSize			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:TTINterval			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:HSCH:CVPB			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:HSCH:PRSR			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:HSCH:PSBS			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:HSCH:RVParameter	0 to 7		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:RUPLayer			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:SCSMode	AUTO | USER		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:SFOR			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:SLOTstate<[0]…6>			Query only

Command	Parameter	Default Unit	Comments
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:TYPE	RMC12K2 | RM64K | RMC144K | RMC384K | RMC2048K | HRMC526K | HRMC730K | UP_RMC12K2 | UP_RMC64K | UP_RMC144K		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:BPFRame			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:CRCSize			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:DATA	PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | ZERO | ONE | PATTern		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:DATA:DSELect	<data list name>		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:DATA:PATTern	#B0,1 ... #B111..1,64		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:EPRotection			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:IONE			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:ITWO			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:RMATtribute			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:STATe			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:TBCount			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:TBSize			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:TTINterval			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:SCSMode			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:SFORmat			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:SLOTstate<[0]…6>			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:TYPE			Query only

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:BIT:LAYer TRANsport | PHYSical)

The command sets the layer in the coding process at which bit errors are inserted.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:BIT:LAY TRAN"
'inserts the bit errors in the transport layer.

*RST value	Resolution	SCPI
TRANsport	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:BIT:RATE 1E-7…5E-1)

The command sets the bit error rate.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:BIT:RATE 5E-1"
'sets the bit error rate.

*RST value	Resolution	SCPI
5E-1	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:BIT:STATe ON | OFF)

The command activates or deactivates bit error generation.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:BIT:STAT ON"
'activates the bit error generation.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:BLOCk:RATE 10E-4…10E-1)

The command sets the block error rate.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:BLOC:RATE 10E-1"
'sets the block error rate.

*RST value	Resolution	SCPI
10E-1	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:BLOCk:STATe ON | OFF)

The command 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.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:BLOC:STAT ON"
'activates block error generation.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:BPFRame?

The command queries the data bits in the DPDCH component of the DPCH frame at physical level. The value depends on the slot format.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:BPFR?"
'queries the data bits in the DPDCH component of the DPCH frame at physical level.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:CRCSize?

The command queries the type (length) of the CRC.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:CRCS?"
'queries the type (length) of the CRC.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:DATA PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | ZERO | ONE | PATTern

The command selects the data source for the specified channel.

For the traffic channels, this value is specific for the selected radio configuration.

Parameter:

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

DLISt 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. The data list is selected with the command BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA:DSEL <data list name>.

ZERO | ONE Internal 0 and 1 data is used.

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**. The bit pattern is selected with the command BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA:PATT <bit pattern>.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:DATA PN9"
'selects PN9 as the data source of the transport channel.

*RST value	Resolution	SCPI
PN9	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH: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.

For the traffic channels, this value is specific for the selected radio configuration.

Example: `"SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:DATA DLIS"`
'selects the Data Lists data source for the transport channel.

`"MMEM:CDIR 'D:\Lists\DM\IqData'"`
'selects the directory for the data lists.

`"SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:DATA:DSEL 'tdscdma_1'"`
'selects file 'tds`cdma_1`' 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:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:DATA:PATTern #B0,1 ... #B111..1,64

The command sets the bit pattern for the PATTern selection. The first parameter determines the bit pattern (choice of hexadecimal, octal, or binary notation). The second specifies the number of bits to use. The maximum length is 64 bits.

For the traffic channels, this value is specific for the selected radio configuration.

Example: `"SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:DATA:PATT #H800FE038,30"`
'defines the bit pattern.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:EPRotection?

The command queries the error protection.

The command is a query command and therefore does not have an *RST value.

Example: `"BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:EPR?"`
'queries the error protection.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:IONE?

The command activates or deactivates the 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.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:IONE ON"
'activates the channel coding interleaver state 1 of the transport channel.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:ITWO?

The command activates or deactivates the channel coding interleaver state 2 off all the transport channels. Interleaver state 2 can only be set for all the TCHs together. Activation does not change the symbol rate.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:ITWO ON"
'activates the channel coding interleaver state 2 of all the transport channel.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:RMATtribute?

The command queries the rate matching.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:RMAT?"
'queries the rate matching.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:STATe?

The command queries the state of the transport channel.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:STAT?"
'queries the state of the transport channel.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:TBCount?

The command queries the number of transport blocks for the TCH.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:TBC?"
'queries the number of transport blocks for the TCH.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:TBSize?

The command queries the size of the transport block at the channel coding input.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:TBS?"
'queries the size of transport block of the channel coding input.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:DTCH | DCCH:TTINterval?

The command queries the number of frames into which a TCH is divided. This setting also defines the interleaver depth.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:TTIN?"
'queries the number of frames into which a TCH is divided.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:HSCH:CVPB?

The command queries the constellation version parameter - b. This value depends on the redundancy version parameter.

The command is a query command and therefore does not have an *RST value.

Example: "SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:HSCH:CVPB?"
'queries the constellation version parameter - b.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:HSCH:PRSR?

The command queries the puncturing and repetition scheme - r. This value depends on the redundancy version parameter.

The command is a query command and therefore does not have an *RST value.

Example: "SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:HSCH:PRSR?"
'queries the puncturing and repetition scheme - r.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:HSCH:PSBS?

The command queries the priorisation of systematic bits – s. This value depends on the redundancy version parameter.

The command is a query command and therefore does not have an *RST value.

Example: "SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:HSCH:PSBS?"
'queries the priorisation of systematic bits – s.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:HSCH:RVParameter 0…7

The command sets the redundancy version parameter. This parameter indicates which redundancy version of the data is sent.

Example: "SOUR:BB:TDSC:DOWN:CELL1:ENH:DCH:HSCH:RVP 3"
'sets the redundancy version parameter to 3.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:RUPLayer?

The command queries the resource units on the physical layer needed to generate the selected channel.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:RUPL?"
'queries the resource units on the physical layer needed to generate the selected channel.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:SCSMode AUTO | USER

The command sets the spreading code selection mode for the used transport channels.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:SCSM AUTO"
'queries the spreading code.

*RST value	Resolution	SCPI
AUTO	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:SFOR?

The command queries the slot format of the selected channel. A slot format defines the complete structure of a slot made of data and control fields and includes the symbol rate. The slot format (and thus the symbol rate, the pilot length, and the TFCI State) depends on the coding type selected.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:SFOR?"
'queries the channel coding type.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:SLOTstate<[0]…6>?

The command queries the state of the slots off cell 1 used to transmit the transport channel.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:SLOT 3?"
'queries the state of slot 3.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:STATe ON | OFF

The command activates or deactivates the enhanced state for the DCH channel coding.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:STAT ON"
'deactivates the enhanced state for the DCH channel.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL1:ENH:DCH:TYPE RMC12K2 | RM64K | RMC144K | RMC384K | RMC2048K | HRMC526K | HRMC730K | UP_RMC12K2 | UP_RMC64K | UP_RMC144K

The command sets the channel coding type.

Example: "BB:TDSC:DOWN:CELL1:ENH:DCH:TYPE RMC12K2"
'sets the channel coding type to RMC12K2.

*RST value	Resolution	SCPI
RMC12K2	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:BPFRame?

The command queries the data bits in the DPDCH component of the DPCH frame at physical level. The value depends on the slot format.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:BCH:BPFR?"
'queries the data bits in the DPDCH component of the DPCH frame at physical level.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:CRCSize?

The command queries the type (length) of the CRC.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:CRCS?"
'queries the type (length) of the CRC.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:DATA PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | ZERO | ONE | PATTern

The command selects the data source for the specified channel.

For the traffic channels, this value is specific for the selected radio configuration.

Parameter:

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

DLISt
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. The data list is selected with the command BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA:DSEL <data list name>.

ZERO | ONE
Internal 0 and 1 data is used.

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**. The bit pattern is selected with the command `BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA:PATT <bit pattern>`.

Example: `"BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA PN9"`
'selects PN9 as the data source of the transport channel.

*RST value	Resolution	SCPI
PN9	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH: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.

For the traffic channels, this value is specific for the selected radio configuration.

Example: `"SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA DLIS"`
'selects the Data Lists data source for the transport channel.

`"MMEM:CDIR 'D:\Lists\DM\IqData'"`
'selects the directory for the data lists.

`"SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA:DSEL 'tdscdma_1'"`
'selects file 'tds`cdma_1`' 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:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:DATA:PATTern #B0,1 ... #B111..1,64:

The command sets the bit pattern for the PATTern selection. The first parameter determines the bit pattern (choice of hexadecimal, octal, or binary notation). The second specifies the number of bits to use. The maximum length is 64 bits.

For the traffic channels, this value is specific for the selected radio configuration.

Example: `"SOUR:BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA:PATT #H800FE038,30"`
'defines the bit pattern.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:EPRotection?

The command queries the error protection.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:EPR?"
'queries the error protection.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:IONE?

The command activates or deactivates the 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.

Example: "BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:IONE ON"
'activates the channel coding interleaver state 1 of the transport channel.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:ITWO?

The command activates or deactivates the channel coding interleaver state 2 off all the transport channels. Interleaver state 2 can only be set for all the TCHs together. Activation does not change the symbol rate.

Example: "BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:ITWO ON"
'activates the channel coding interleaver state 2 of all the transport channel.

*RST value	Resolution	SCPI
ON	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:RMATtribute?

The command queries the rate matching.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:RMAT?"
'queries the rate matching.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:STATe?

The command queries the state of the transport channel.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:STAT?"
'queries the state of the transpor channel.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:TBCount?

The command queries the number of transport blocks for the TCH.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:TBC?"
'queries the number of transport blocks for the TCH.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:TBSize?

The command queries the size of the transport block at the channel coding input.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:TBS?"
'queries the size of transport block of the channel coding input.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:DTCH:TTINterval?

The command queries the number of frames into which a TCH is divided. This setting also defines the interleaver depth.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:TTIN?"
'queries the number of frames into which a TCH is divided.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:SCSMode?

The command queries the spreading code predetermined in the standard. For BCH, the spreading code is always **Auto**.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:BCH:SCSM?"
'queries the spreading code.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:SFORmat?

The command queries the slot format of the selected channel. A slot format defines the complete structure of a slot made of data and control fields and includes the symbol rate. The slot format (and thus the symbol rate, the pilot length, and the TFCI State) depends on the coding type selected.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:BCH:SFOR?"
'queries the channel coding type.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:SLOTstate<[0]…6>?

The command queries the state of the slots off cell 1 used to transmit the broadcast channels. Slot 0 is always ON and all the other slots are always OFF.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:BCH:SLOT 0?"
'queries the state of slot 1.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:STATe ON | OFF

The command activates and deactivates the enhanced state for the P-CCPCH 1/2 channel. If the enhanced state is activated, the channel coding cannot be changed in the channel table.

Example: "BB:TDSC:DOWN:CELL1:ENH:BCH:STAT ON"
'deactivates the enhanced state for the P-CCPCH 1/2 channel.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN:CELL1:ENH:BCH:TYPE?

The command queries the channel coding type.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL1:ENH:BCH:TYPE?"
'queries the channel coding type.

*RST value	Resolution	SCPI
-	-	Device-specific

SOURce:BB:TDSCdma – Channel Settings

Command	Parameter	Default Unit	Comments
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DATA	PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | ZERO | ONE | PATTern		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DATA:DSELect	<data list name>		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DATA:PATTern	#B0,1…B11..1,64		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DPCC:SYNC:LENGth	0 | 2 | 3 | 4 | 8 | 16 | 32 | 48		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DPCC:SYNC:PATTern	<bit pattern>		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DPCC:SYNC:REPetition	1…8		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DPCC:TFCI:LENGth	0 | 2 | 4 | 6 | 8 | 12 | 16 | 24 | 32 | 48		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DPCC:TFCI:VALue	0…1023		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DPCC:TPC:DATA	ZERO | ONE | PATTern | DLISt		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DPCC:TPC:DATA:DSELect	<data list name>		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DPCC:TPC:DATA:PATTern	#B0,1…#B111…1,64		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DPCC:TPC:READ	CONTinuous | S0A | S1A | S01A | S10A		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:ENHanced			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:MSHift			Query only
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:POWer	-80 dB…0 dB		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:SCODe	1…16		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:SFACtor	1 | 2 | 4 | 8 | 16		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:SFORmat	0…69		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:TYPE	P_CCPCH1 | P_CCPCH2 | S_CCPCH1 | S_CCPCH2 | F_PACH | PDSCH | DPCH_QPSK | DPCH_8PSK |		

Command	Parameter	Default Unit	Comments
	HS_SCCH1 | HS_SCCH2 | HS_PDS_QPSK | HS_PDS_16QAM | PUSCH | UP_DPCH_QPSK | UP_DPCH_8PSK | HS_SICH		
[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:USER	1…16		
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:MODE	DEDicated | PRACh		
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:DATA	PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | ZERO | ONE | PATTern		
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:DATA:DSELect	<data list name>		
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:DATA:PATTern	#B0,1…B11..1,64		
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:LENGth	1 | 2 | 4		
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:MSHift			Query only
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:PCORrection			Query only
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:POWer	-80.0 dB…0.0 dB		
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:SCODe	1…16		
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:SFACtor	4 | 8 | 16		
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:SFORmat	0 | 10 | 25		
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:STATe	ON | OFF		
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:USER	1…16		
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:PTS:DISTance	1…4		
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:PTS:POWer	-80 dB…0 dB		
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:PTS:PCORrection			Query only
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:PTS:PSTep	0.0 dB…10.0 dB		
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:PTS:REPetition	1…10 dB		
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:PTS:STARt			
[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:SLENgth	0.5 … 13.5		

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DATA PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | ZERO | ONE | PATTern

The command determines the data source for the selected channel.

Parameter:

PNxx

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

DLISt

Internal data from a programmable data list is used.

ZERO | ONE

Internal 0 and 1 data is used.

PATTern

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

Example: `"BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DATA PN9"`
'sets the data source for the selected channel to PN9.

*RST value	Resolution	SCPI
PN9	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DATA:DSELect <data list name>

The command selects the data list for the **Data List** data source selection of the selected channel.

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: `"SOUR:BB:TDSC:UP:CELL1:SLOT3:CHAN6:DATA: DLIS"`
'selects the Data Lists data source.

`"MMEM:CDIR 'D:\Lists\DM\IqData'"`
'selects the directory for the data lists.

`"SOUR:BB:TDSC:UP:CELL1:SLOT3:CHAN6:DATA:DSEL 'tdscdma_1'"`
'selects file 'tds`cdma_1`' 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:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DATA:PATTern #B0,1…B11..1,64

The command determines the bit pattern. 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:TDSC:UP:CELL1:SLOT3:CHAN6:DATA:PATT #H3F, 8"`
'defines the bit pattern.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DPCC:SYNC:LENGth 0 | 2 | 3 | 4 | 8 | 16 | 32 | 48

The command sets the length of the Sync Shift and the length of the TPC field in bits. The available values depend on the slot format.

Example: "BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:SYNC:LENG 2"
'sets the Sync Shift and the length of the TPC field to 2 bits.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DPCC:SYNC:PATTern <bit pattern>

The command sets the bit pattern for the sync shift. The maximum pattern length is 64 bits.

Example: "BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:SYNC:PATT 10-01"
'sets the bit pattern for the sync shift.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DPCC:SYNC:REPetition 1…8

The command sets the value for the sync shift repetition. This value is used to define the time lag for which the sync shift is used to transmit a new time adjustment. Thereby, M specifies the time lag in subframes a 5 ms.

Example: "BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:SYNC:REP 1"
'sets the value for the sync shift repetition.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DPCC:TFCI:LENGth 0 | 2 | 4 | 6 | 8 | 12 | 16 | 24 | 32 | 48

The command sets the length of the TFCI field in bits.

Example: "BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:TFCI:LENG 12"
'sets the length of the TFCI field to 12 bits.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DPCC:TFCI:VALue 0…1023

The command sets the value of the TFCI field.

Example: "BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:TFCI:VAL 0"
'sets the value of the TFCI field to 0.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DPCC:TPC:DATA ZERO | ONE | PATTern | DLISt

The command sets the data source for the TPC field of the DPCCH.

Parameter:

DLISt
A data list is used.The data list is selected with the command SOUR:BB:TDSC:DOWN:CELL1:SLOT3:CHAN6: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:TDSC:DOWN:CELL1:SLOT3:CHAN6:DPCC:TPC:DATA:PATT.

Example: "BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:TPC:DATA PATT"
'selects as the data source for the TPC field of channel 6 of cell 4 the bit pattern defined with the following command.

"BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:TPC:DATA:PATT #H3F,8"
'defines the bit pattern.

*RST value	Resolution	SCPI
PATT	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DPCC:TPC:DATA:DSELect <data list name>

The command selects the data list for the Data List TPC 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.

For the traffic channels, this value is specific for the selected radio configuration.

Example: "SOUR:BB:TDSC:DOWN:CELL1:SLOT3:CHAN5:DPCC:TPC:DATA DLIS"
'selects the Data Lists data source.

"MMEM:CDIR 'D:\Lists\DM\IqData'"
'selects the directory for the data lists.

"SOUR:BB:TDSC:DOWN:CELL1:SLOT3:CHAN5:DPCC:TPC:DATA:DSEL 'tdscdma_1'"
'selects file 'tdscdma_1' 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:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DPCC:TPC:DATA:PATTern #B0,1…#B111…1,64

The command sets the bit pattern. The maximum bit pattern length is 64 bits.

Example: "BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:TPC:DATA:PATT #H3F,8"
'defines the bit pattern.

*RST value	Resolution	SCPI
01	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:DPCC:TPC:READ CONTinuous | S0A | S1A | S01A | S10A

The command sets the read out mode for the bit pattern of the TPC field.

Parameter:

CONTinous
The TPC bits are used cyclically.

S0A
The TPC bits are used once and then the TPC sequence is continued with 0 bits.

S1A
The TPC bits are used once and then the TPC sequence is continued with 1 bit.

S01A
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).

S10A
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).

Example: "BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:TPC:READ S01A"
'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).

*RST value	Resolution	SCPI
CONTinuous	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:ENHanced?

The command queries the enhanced state. If the enhanced state is set to ON, the channel coding cannot be changed.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:ENH?"
'queries the enhanced state of channel 6.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:MSHift?

The command queries the midamble shift.

The midamble can be shifted in a value range of 0 to 128 chips in increments of 8 chips. Channels belonging to the same mobile station are characterized by the same midamble shift.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:MSH?"
'queries the midamble shift.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:POWer -80 dB…0 dB

The command sets the channel power in dB.

Example: "BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:POW -20"
'set the channel power to -20 dB.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:SCODe 1…16

The command sets the spreading code for the selected channel. The code channel is spread with the set spreading code. The range of values of the spreading code depends on the channel type and the spreading factor. Depending on the channel type, the range of values can be limited.

Example: "BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:SCOD 1"
'set the spreading code for channel 6 to 1.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:SFACtor 1 | 2 | 4 | 8 | 16

The command sets the spreading factor for the selected channel. The selection depends on the channel type and interacts with the slot format.

Example: "BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:SFAC 16"
'sets the spreading factor for channel 6 to 16.

*RST value	Resolution	SCPI
16	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:SFORmat 0…69

The command sets the slot format for the selected channel. A slot format defines the complete structure of a slot made of data and control fields and includes the symbol rate. The slot format displays changes when a change is made to the **Number of TFCI Bits** and the **Number of Sync Shift & TPC Bits** field settings.

Example: "BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:SFOR 0"
'sets the slot format for channel 6 to 0.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:STATe ON | OFF

The command activates or deactivates the channel.

Example: "SOUR:BB:TDSC:UP:CELL1:SLOT3:CHAN6:STAT ON"
'activates channel 6.

*RST value	Resolution	SCPI
OFF	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:TYPE P_CCPCH1 | P_CCPCH2 | S_CCPCH1 | S_CCPCH2 | FPACH | PDSCH | DPCH_QPSK | DPCH_8PSK | HS_SCCH1 | HS_SCCH2 | HS_PDS_QPSK | HS_PDS_16QAM | PUSCH | UP_DPCH_QPSK | UP_DPCH_8PSK | HS_SICH

The command sets the channel type.

In the uplink, the channel type is fixed for channel number 0. In the downlink, the channel type is fixed for channel numbers 0 to 5. For the remaining numbers, the choice lies between the relevant standard channels and the high speed channels.

Example: "BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:TYPE DPC_QPSK"
'sets the channel type DPC_QPSK for channel 6 of the channel table.

*RST value	Resolution	SCPI
Depending on the channel number.l	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:DOWN | UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:CHANnel<[0]…21>:USER 1…16

The command sets the number of the user.

Example: "BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:USER 3"
'sets the number of the users to 3.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:MODE DEDicated | PRACh

The command sets the mode in which the slot is to work.

Parameter: **DEDicated**
The instrument generates a signal with a dedicated physical control channel (DPCCH) and up to 6 dedicated physical data channels (DPDCH). The signal is used for voice and data transmission.

PRACh
The instrument generates a single physical random access channel (PRACH). This channel is needed to set up the connection between the mobile station and the base station.

Example: "BB:TDSC:UP:CELL4:SLOT3:MODE PRAC"
'sets the PRACH mode for the selected slot.

*RST value	Resolution	SCPI
DEDicated	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:DATA PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | ZERO | ONE | PATTern

The command determines the data source for the PRACH.

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

DLISt
Internal data from a programmable data list is used.

ZERO | ONE
Internal 0 and 1 data is used.

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

Example: "BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:DATA PN9"
'selects PN9 as the data source for the PRACH.

*RST value	Resolution	SCPI
PN9	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:DATA:DSELect <data list name>

The command selects the data list for the Data List 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: `"SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:DATA DLIS"`
'selects the Data Lists data source.

`"MMEM:CDIR 'D:\Lists\DM\IqData'"`
'selects the directory for the data lists.

`"SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:DATA:DSEL 'tdscdma_1'"`
'selects file 'tds`cdma_1`' 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:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:DATA:PATTern #B0,1…B11..1,64

The command determines the bit pattern. 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:TDSC:UP:CELL1:SLOT3:PRAC:MSG:DATA:PATT #H3F, 8"`
'defines the bit pattern.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:LENGth 1 | 2 | 4

The command sets the message length of the random access channel in subframes.

Example: `"BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:LENG 1"`
'sets the message length of the random access channel to 1 subframe.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:MSHift ?

The command queries the value of the midamble shift.

The command is a query command and therefore does not have an *RST value.

Example: `"SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:MSH?"`
'queries the value of the midamble shift.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:PCORrection?

The command queries the value of the power correction.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:POW -10"
'sets the power of the PRACH message part

"BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:PCOR?"
'queries the value of the power correction.

Response: 2.99086185076844

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:POWer -80.0 dB…0.0 dB

The command sets the power of the PRACH message part.

Example: "BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:POW 1"
'sets the power of the PRACH message part.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:SCODe 1…16

The command sets the spreading code for the PRACH. The code channel is spread with the set spreading code.

Example: "BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:SCOD 16"
'sets the power of the PRACH message part.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:SFACtor 4 | 8 | 16

The command sets the spreading factor for the PRACH.

Example: "BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:SFAC 16"
'sets the power of the PRACH message part.

*RST value	Resolution	SCPI
16	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:SFORmat ?

This command queries the slot format of the PRACH. The slot format depends on the selected spreading factor.

The command is a query command and therefore does not have an *RST value.

Example: "BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:SFOR 1"
'queries the slot format of the PRACH.

*RST value	Resolution	SCPI
-	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:STATe ON | OFF

The command activates or deactivates the RACH (random access channel) message part.

Example: "BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:STAT ON"
'activates the RACH (random access channel) message part.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:MSG:USER 1…16

The command sets number of current user.

Example: "SOUR:BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:USER 1"
'sets number of current user.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:PTS:DISTance 1…4

The command sets the value to vary the timing between UpPTS and RACH.

Example: "BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:DIST 1"
'sets the number of the subframe in which the first UpPTS should be transmitted.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:PTS:PCORrection?

The command queries the power corection of the UpPTS.

The value is computed based on the on UpPTS power (`BB:TDSC:UP:CELL:SLOT:PRAC:PTS:POW`), power step (`BB:TDSC:UP:CELL:SLOT:PRAC:PTS:PST`), message power (`BB:TDSC:UP:CELL:SLOT:PRAC:MSG:POW`), UpPTS length, Message Length (`BB:TDSC:UP:CELL:SLOT:PRAC:MSG:LENG`) and ARB sequence length (`BB:TDSC:SLEN`).

Example: `"BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:POW -12"`
'sets the power of the UpPTS.

`"BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:PCOR?"`
'queries the power correction of the UpPTS.

Response: 0.8890863332626

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:PTS:POWer -80 dB…0 dB

The command sets the power of the UpPTS.

Example: `"BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:POW -12"`
'sets the power of the UpPTS.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:PTS:PSTep 0.0 dB…10.0 dB

The command sets the power by which the UpPTS is increased from repetition to repetition.

Example: `"BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:PST 3"`
'defines the power by which the UpPTS is increased from repetition to repetition.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:PTS:REPetition 1…10 dB

The command sets the number of UpPTS repetitions before a PRACH burst happens.

Example: `"BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:REP 1"`
'sets the number of UpPTS repetitions before a PRACH burst happens.

*RST value	Resolution	SCPI
1	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6>:PRAC:PTS:STARt 0.0 dB…10.0 dB

The command sets the number of the subframe in which the first UpPTS should be transmitted.

Example: "BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:STAR 3"
'sets the number of the subframe in which the first UpPTS should be transmitted.

*RST value	Resolution	SCPI
0	-	Device-specific

[SOURce<[1]|2>:]BB:TDSCdma:UP:CELL<[1]|2|3|4>:SLOT<[0]…6:PRAC:SLENgth 0.5…13.5

The command queries the sequence length of the PRACH slot.

The value is computed based on the Start Subframe (BB:TDSC:UP:CELL:SLOT:PRAC:PTS:STAR), UpPTS Repetition (BB:TDSC:UP:CELL:SLOT:PRAC:PTS:REP), Distance UpPTS and RACH (BB:TDSC:UP:CELL:SLOT:PRAC:PTS:DIST) and Message Length (BB:TDSC:UP:CELL:SLOT:PRAC:MSG:LENG).

Example: "BB:TDSC:UP:CELL:SLOT:PRAC:PTS:STAR 3"
'sets the number of the subframe in which the first UpPTS should be transmitted.

"BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:REP 2"
'sets the number of UpPTS repetitions before a PRACH burst happens.

"BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:DIST 2"
'sets the number of the subframe in which the first UpPTS should be transmitted.

"BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:LENG 1"
'sets the message length of the random access channel to 1 subframe.

"BB:TDSC:UP:CELL4:SLOT3:PRAC:SLEN?"
'queries the sequence length.

Response: 3.5

*RST value	Resolution	SCPI
-	-	Device-specific

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