

TD-SCDMA, incl TD-SCDMA enhanced features Digital Standard for R&S[®]Signal Generators Operating Manual



1171.5260.12 – 10

This document describes the following software options:

- R&S®AMU-K50/-K51/-K250/-K251
1402.8950.02, 1402.9005.02, 1402.8409.02, 1402.8509.02
- R&S®SMATE-K50/-K51
1404.7100.02, 1404.7200.02
- R&S®SMBV-K50/-K51/-K250/-K251
1415.8125.xx, 1415.8131.xx, 1415.8325.xx, 1415.8331.xx
- R&S®SMJ-K50/-K51/-K250/-K251
1404.1660.02, 1404.1760.02, 1409.1316.02, 1409.1416.02
- R&S®SMU-K50/-K51/-K250/-K251
1161.0966.02, 1161.1062.02, 1408.6314.02, 1408.6414.02
- R&S®AFQ-K250/-K251
1401.6702.02, 1401.6754.02
- R&S®CMW-KW750/-KW751
1203.1406.02, 1203.1458.02
- R&S®SFU-K250/-K251
2115.2320.02, 2115.2337.02

© 2011 Rohde & Schwarz GmbH & Co. KG

Muehldorfstr. 15, 81671 Munich, Germany

Phone: +49 89 41 29 - 0

Fax: +49 89 41 29 12 164

E-mail: info@rohde-schwarz.com

Internet: <http://www.rohde-schwarz.com>

Printed in Germany – Subject to change – Data without tolerance limits is not binding.

R&S® is a registered trademark of Rohde & Schwarz GmbH & Co. KG.

Trade names are trademarks of the owners.

The following abbreviations are used throughout this manual: R&S®AMU is abbreviated as R&S AMU, R&S®SMATE is abbreviated as R&S SMATE, R&S®SMBV is abbreviated as R&S SMBV, R&S®SMJ is abbreviated as R&S SMJ, R&S®SMU is abbreviated as R&S SMU, R&S®WinIQSIM2 is abbreviated as R&S WinIQSIM2

Basic Safety Instructions

Always read through and comply with the following safety instructions!

All plants and locations of the Rohde & Schwarz group of companies make every effort to keep the safety standards of our products up to date and to offer our customers the highest possible degree of safety. Our products and the auxiliary equipment they require are designed, built and tested in accordance with the safety standards that apply in each case. Compliance with these standards is continuously monitored by our quality assurance system. The product described here has been designed, built and tested in accordance with the attached 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, you must 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 any 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.

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 and when using the product. It is also absolutely essential to observe the additional safety instructions on personal safety, for example, 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.

Symbols and safety labels

							
Notice, general danger location Observe product documentation	Caution when handling heavy equipment	Danger of electric shock	Warning! Hot surface	PE terminal	Ground	Ground terminal	Be careful when handling electrostatic sensitive devices

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

Tags and their meaning

The following signal words are used in the product documentation in order to warn the reader about risks and dangers.

	indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
	indicates the possibility of incorrect operation which can result in damage to the product. 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 in personal injury or material damage.

Operating states and operating positions

The product may be operated only under the operating conditions and in the positions specified by the manufacturer, without the product's ventilation being obstructed. If the manufacturer's specifications are not observed, this can result in electric shock, fire and/or serious personal injury or death. Applicable local or national safety regulations and rules for the prevention of accidents must be observed in all work performed.

1. Unless otherwise specified, the following requirements apply to Rohde & Schwarz products: predefined operating position is always with the housing floor facing down, IP protection 2X, pollution severity 2, overvoltage category 2, use only indoors, max. operating altitude 2000 m above sea level, max. transport altitude 4500 m above sea level. A tolerance of $\pm 10\%$ shall apply to the nominal voltage and $\pm 5\%$ to the nominal frequency.
2. 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). An installation that is not carried out as described in the product documentation could result in personal injury or death.
3. Do not place the product on heat-generating devices such as radiators or fan heaters. The ambient temperature must not exceed the maximum temperature specified in the product documentation or in the data sheet. Product overheating can cause electric shock, fire and/or serious personal injury or death.

Electrical safety

If the information on electrical safety is not observed either at all to the extent necessary, electric shock, fire and/or serious personal injury or death may occur.

1. Prior to switching on the product, always ensure 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.
2. In the case of products of safety class I with movable power cord and connector, operation is permitted only on sockets with an earthing contact and protective earth connection.
3. 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.
4. If the product does not have a power switch for disconnection from the AC supply network, the plug of the connecting cable is regarded as the disconnecting device. In such cases, always ensure 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 network. If products without power switches are integrated into racks or systems, a disconnecting device must be provided at the system level.
5. 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, you can ensure that the cable will not be damaged and that no one can be hurt by, for example, tripping over the cable or suffering an electric shock.
6. 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).
7. Do not insert the plug into sockets that are dusty or dirty. Insert the plug firmly and all the way into the socket. Otherwise, sparks that result in fire and/or injuries may occur.
8. Do not overload any sockets, extension cords or connector strips; doing so can cause fire or electric shocks.
9. For measurements in circuits with voltages $V_{\text{rms}} > 30 \text{ V}$, suitable measures (e.g. appropriate measuring equipment, fusing, current limiting, electrical separation, insulation) should be taken to avoid any hazards.
10. Ensure that the connections with information technology equipment, e.g. PCs or other industrial computers, comply with the IEC60950-1/EN60950-1 or IEC61010-1/EN 61010-1 standards that apply in each case.
11. 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.
12. 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 licensed electrician.
13. 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 anyone who has access to the product, as well as the product itself, is adequately protected from injury or damage.

Basic Safety Instructions

14. Use suitable overvoltage protection to ensure that no overvoltage (such as that caused by a bolt of lightning) can reach the product. Otherwise, the person operating the product will be exposed to the danger of an electric shock.
15. Any object that is not designed to be placed in the openings of the housing must not be used for this purpose. Doing so can cause short circuits inside the product and/or electric shocks, fire or injuries.
16. Unless specified otherwise, products are not liquid-proof (see also section "Operating states and operating positions", item 1. Therefore, the equipment must be protected against penetration by liquids. If the necessary precautions are not taken, the user may suffer electric shock or the product itself may be damaged, which can also lead to personal injury.
17. Never use the product under conditions in which condensation has formed or can form in or on the product, e.g. if the product has been moved from a cold to a warm environment. Penetration by water increases the risk of electric shock.
18. Prior to cleaning the product, disconnect it completely from the power supply (e.g. AC supply network or battery). Use a soft, non-linting cloth to clean the product. Never use chemical cleaning agents such as alcohol, acetone or diluents for cellulose lacquers.

Operation

1. Operating the products requires special training and intense concentration. Make sure that persons who use the products are physically, mentally and emotionally fit enough to do so; otherwise, injuries or material damage may occur. It is the responsibility of the employer/operator to select suitable personnel for operating the products.
2. Before you move or transport the product, read and observe the section titled "Transport".
3. As with all industrially manufactured goods, the use of substances that induce an allergic reaction (allergens) such as nickel cannot be generally excluded. If you develop an allergic reaction (such as a skin rash, frequent sneezing, red eyes or respiratory difficulties) when using a Rohde & Schwarz product, consult a physician immediately to determine the cause and to prevent health problems or stress.
4. Before you start processing the product mechanically and/or thermally, or before you take it apart, be sure to read and pay special attention to the section titled "Waste disposal", item 1.
5. Depending on the function, certain products such as RF radio equipment can produce an elevated level of electromagnetic radiation. Considering that unborn babies require increased protection, pregnant women must be protected by appropriate measures. Persons with pacemakers may also be exposed to risks from electromagnetic radiation. The employer/operator must evaluate workplaces where there is a special risk of exposure to radiation and, if necessary, take measures to avert the potential danger.
6. Should a fire occur, the product may release hazardous substances (gases, fluids, etc.) that can cause health problems. Therefore, suitable measures must be taken, e.g. protective masks and protective clothing must be worn.
7. If a laser product (e.g. a CD/DVD drive) is integrated into a Rohde & Schwarz product, absolutely no other settings or functions may be used as described in the product documentation. The objective is to prevent personal injury (e.g. due to laser beams).

Repair and service

1. The product may be opened only by authorized, specially trained personnel. Before any work is performed on the product or before the product is opened, it must be disconnected from the AC supply network. Otherwise, personnel will be exposed to the risk of an electric shock.
2. Adjustments, replacement of parts, maintenance and repair may be performed only by electrical experts 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). This helps ensure the continued safety of the product.

Batteries and rechargeable batteries/cells

If the information regarding batteries and rechargeable batteries/cells is not observed either at all or to the extent necessary, product users may be exposed to the risk of explosions, fire and/or serious personal injury, and, in some cases, death. Batteries and rechargeable batteries with alkaline electrolytes (e.g. lithium cells) must be handled in accordance with the EN 62133 standard.

1. Cells must not be taken apart or crushed.
2. Cells or batteries must not be exposed to heat or fire. Storage in direct sunlight must be avoided. Keep cells and batteries clean and dry. Clean soiled connectors using a dry, clean cloth.
3. Cells or batteries must not be short-circuited. Cells or batteries must not be stored in a box or in a drawer where they can short-circuit each other, or where they can be short-circuited by other conductive materials. Cells and batteries must not be removed from their original packaging until they are ready to be used.
4. Keep cells and batteries out of the hands of children. If a cell or a battery has been swallowed, seek medical aid immediately.
5. Cells and batteries must not be exposed to any mechanical shocks that are stronger than permitted.
6. If a cell develops a leak, the fluid must not be allowed to come into contact with the skin or eyes. If contact occurs, wash the affected area with plenty of water and seek medical aid.
7. Improperly replacing or charging cells or batteries that contain alkaline electrolytes (e.g. lithium cells) can cause explosions. Replace cells or batteries only with the matching Rohde & Schwarz type (see parts list) in order to ensure the safety of the product.
8. Cells and batteries must be recycled and kept separate from residual waste. Rechargeable batteries and normal batteries that contain lead, mercury or cadmium are hazardous waste. Observe the national regulations regarding waste disposal and recycling.

Transport

1. The product may be very heavy. Therefore, the product must be handled with care. In some cases, the user may require a suitable means of lifting or moving the product (e.g. with a lift-truck) to avoid back or other physical injuries.

2. Handles on the products are designed exclusively to enable personnel to transport the product. It is therefore not permissible to use handles to fasten the product to or on transport equipment such as cranes, fork lifts, wagons, etc. The user is responsible for securely fastening the products to or on the means of transport or lifting. Observe the safety regulations of the manufacturer of the means of transport or lifting. Noncompliance can result in personal injury or material damage.
3. If you use the product in a vehicle, it is the sole responsibility of the driver to drive the vehicle safely and properly. The manufacturer assumes no responsibility for accidents or collisions. Never use the product in a moving vehicle if doing so could distract the driver of the vehicle. Adequately secure the product in the vehicle to prevent injuries or other damage in the event of an accident.

Waste disposal

1. If products or their components are mechanically and/or thermally 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 by specially trained personnel. Improper disassembly may be hazardous to your health. National waste disposal regulations must be observed.
2. If handling the product releases 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. The improper disposal of hazardous substances or fuels can cause health problems and lead to environmental damage.

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. Nuestro sistema de garantía de calidad controla constantemente que sean cumplidas estas normas. El presente producto ha sido fabricado y examinado según el certificado de conformidad adjunto de la UE 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 sin tener en cuenta las instrucciones 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.

Informaciones elementales de seguridad

Se parte del uso correcto del producto para los fines definidos si el producto es utilizado conforme a las indicaciones de la correspondiente documentación del 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 técnicos y ciertos conocimientos del idioma inglés. Por eso se debe tener en cuenta que el producto solo pueda ser operado por personal especializado o personas instruidas en profundidad con las capacidades correspondientes. Si fuera necesaria indumentaria de seguridad para el uso de productos de Rohde & Schwarz, encontraría 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 entréguelas a usuarios posteriores.

Tener en cuenta las informaciones de seguridad sirve para evitar en lo posible lesiones o daños por peligros de toda clase. Por eso es imprescindible leer detalladamente y comprender por completo las siguientes informaciones de seguridad antes de usar el producto, y respetarlas durante el uso del producto. Deberán tenerse en cuenta todas las demás informaciones de seguridad, como p. ej. las referentes a la protección de personas, que encontrarán en el capítulo correspondiente de la documentación del producto y que también son de obligado cumplimiento. En las presentes informaciones de seguridad se recogen todos los objetos que distribuye el grupo de empresas Rohde & Schwarz bajo la denominación de "producto", entre ellos también aparatos, instalaciones así como toda clase de accesorios.

Símbolos y definiciones de seguridad

							
Aviso: punto de peligro general Observar la documentación del producto	Atención en el manejo de dispositivos de peso elevado	Peligro de choque eléctrico	Advertencia: superficie caliente	Conexión a conductor de protección	Conexión a tierra	Conexión a masa	Aviso: Cuidado en el manejo de dispositivos sensibles a la electrostática (ESD)

					
Tensión de alimentación de PUESTA EN MARCHA / PARADA	Indicación de estado de espera (Standby)	Corriente continua (DC)	Corriente alterna (AC)	Corriente continua / Corriente alterna (DC/AC)	El aparato está protegido en su totalidad por un aislamiento doble (reforzado)

Palabras de señal y su significado

En la documentación del producto se utilizan las siguientes palabras de señal con el fin de advertir contra riesgos y peligros.



PELIGRO identifica un peligro inminente con riesgo elevado que provocará muerte o lesiones graves si no se evita.



ADVERTENCIA identifica un posible peligro con riesgo medio de provocar muerte o lesiones (graves) si no se evita.



ATENCIÓN identifica un peligro con riesgo reducido de provocar lesiones leves o moderadas si no se evita.



AVISO indica la posibilidad de utilizar mal el producto y, como 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 del 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 interpretaciones equivocadas y tener por consecuencia daños en personas u objetos.

Estados operativos y posiciones de funcionamiento

El producto solamente debe ser utilizado según lo indicado por el fabricante respecto a los estados operativos y posiciones de funcionamiento sin que se obstruya la ventilación. Si no se siguen las indicaciones del fabricante, pueden producirse choques eléctricos, incendios y/o lesiones graves con posible consecuencia de muerte. En todos los trabajos deberán ser tenidas en cuenta las normas nacionales y locales de seguridad del trabajo y de prevención de accidentes.

1. Si no se convino de otra manera, es para los productos Rohde & Schwarz 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, uso solamente en estancias interiores, utilización hasta 2000 m sobre el nivel del mar, transporte hasta 4500 m sobre el nivel del mar. Se aplicará una tolerancia de $\pm 10\%$ sobre el voltaje nominal y de $\pm 5\%$ sobre la frecuencia nominal.
2. No sitúe el producto encima de superficies, vehículos, estantes o mesas, que por sus características de peso o de estabilidad no sean aptos para él. Siga siempre las instrucciones de instalación del fabricante cuando instale y asegure el producto en objetos o estructuras (p. ej. paredes y estantes). Si se realiza la instalación de modo distinto al indicado en la documentación del producto, pueden causarse lesiones o incluso la muerte.
3. No ponga el producto sobre aparatos que generen calor (p. ej. radiadores o calefactores). La temperatura ambiente no debe superar la temperatura máxima especificada en la documentación del producto o en la hoja de datos. En caso de sobrecalentamiento del producto, pueden producirse choques eléctricos, incendios y/o lesiones graves con posible consecuencia de muerte.

Seguridad eléctrica

Si no se siguen (o se siguen de modo insuficiente) las indicaciones del fabricante en cuanto a seguridad eléctrica, pueden producirse choques eléctricos, incendios y/o lesiones graves con posible consecuencia de muerte.

1. Antes de la puesta en marcha del producto se deberá comprobar siempre que la tensión preseleccionada en el producto coincida con la de la red de alimentación eléctrica. Si es necesario modificar el ajuste de tensión, también se deberán cambiar en caso dado los fusibles correspondientes del producto.
2. Los productos de la clase de protección I con alimentación móvil y enchufe individual solamente podrán enchufarse a tomas de corriente con contacto de seguridad y con conductor de protección conectado.
3. Queda prohibida la interrupción intencionada del conductor de protección, tanto en la toma de corriente como en el mismo producto. La interrupción puede tener como consecuencia el riesgo de que el producto sea fuente de choques eléctricos. Si se utilizan cables alargadores o regletas de enchufe, deberá garantizarse la realización de un examen regular de los mismos en cuanto a su estado técnico de seguridad.
4. Si el producto no está equipado con un interruptor para desconectarlo de la red, se deberá considerar el enchufe del cable de conexión como interruptor. En estos casos se deberá asegurar que el enchufe siempre sea de fácil acceso (de acuerdo con la longitud del cable de conexión, 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 colocar el interruptor en el nivel de la instalación.
5. No utilice nunca el producto si está dañado el cable de conexión a red. Compruebe regularmente el correcto estado de los cables de conexión a red. Asegúrese, mediante las medidas de protección y de instalación adecuadas, de que el cable de conexión a red no pueda ser dañado o de que nadie pueda ser dañado por él, p. ej. al tropezar o por un choque eléctrico.
6. Solamente está permitido el funcionamiento en redes de alimentación TN/TT aseguradas con fusibles de 16 A como máximo (utilización de fusibles de mayor amperaje solo previa consulta con el grupo de empresas Rohde & Schwarz).
7. 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. La no observación de estas medidas puede provocar chispas, fuego y/o lesiones.
8. No sobrecargue las tomas de corriente, los cables alargadores o las regletas de enchufe ya que esto podría causar fuego o choques eléctricos.
9. En las mediciones en circuitos de corriente con una tensión $U_{\text{eff}} > 30 \text{ V}$ se deberán tomar las medidas apropiadas para impedir cualquier peligro (p. ej. medios de medición adecuados, seguros, limitación de tensión, corte protector, aislamiento etc.).
10. Para la conexión con dispositivos informáticos como un PC o un ordenador industrial, debe comprobarse que éstos cumplan los estándares IEC60950-1/EN60950-1 o IEC61010-1/EN 61010-1 válidos en cada caso.
11. 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 lesiones, fuego o daños en el producto.

12. Si un producto se instala en un lugar fijo, se deberá primero conectar el conductor de protección fijo con el conductor de protección del producto antes de hacer cualquier otra conexión. La instalación y la conexión deberán ser efectuadas por un electricista especializado.
13. En el caso de dispositivos fijos que no estén provistos de fusibles, interruptor automático ni otros mecanismos de seguridad similares, el circuito de alimentación debe estar protegido de modo que todas las personas que puedan acceder al producto, así como el producto mismo, estén a salvo de posibles daños.
14. Todo producto debe estar protegido contra sobretensión (debida p. ej. a una caída del rayo) mediante los correspondientes sistemas de protección. Si no, el personal que lo utilice quedará expuesto al peligro de choque eléctrico.
15. No debe introducirse en los orificios de la caja del aparato ningún objeto que no esté destinado a ello. Esto puede producir cortocircuitos en el producto y/o puede causar choques eléctricos, fuego o lesiones.
16. Salvo indicación contraria, los productos no están impermeabilizados (ver también el capítulo "Estados operativos y posiciones de funcionamiento", punto 1). Por eso es necesario tomar las medidas necesarias para evitar la entrada de líquidos. En caso contrario, existe peligro de choque eléctrico para el usuario o de daños en el producto, que también pueden redundar en peligro para las personas.
17. No utilice el producto en condiciones en las que pueda producirse o ya se hayan producido condensaciones sobre el producto o en el interior de éste, como p. ej. al desplazarlo de un lugar frío a otro caliente. La entrada de agua aumenta el riesgo de choque eléctrico.
18. Antes de la limpieza, desconecte por completo el producto de la alimentación de tensión (p. ej. red de alimentación o batería). Realice la limpieza de los aparatos con un paño suave, que no se deshilache. No utilice bajo ningún concepto productos de limpieza químicos como alcohol, acetona o diluyentes para lacas nitrocelulósicas.

Funcionamiento

1. El uso del producto requiere instrucciones especiales y una alta concentración durante el manejo. Debe asegurarse que las personas que manejen el producto estén a la altura de los requerimientos necesarios en cuanto a aptitudes físicas, psíquicas y emocionales, ya que de otra manera no se pueden excluir lesiones o daños de objetos. El empresario u operador es responsable de seleccionar el personal usuario apto para el manejo del producto.
2. Antes de desplazar o transportar el producto, lea y tenga en cuenta el capítulo "Transporte".
3. Como con todo producto de fabricación industrial no puede quedar excluida en general la posibilidad de que se produzcan alergias provocadas por algunos materiales empleados, los llamados alérgenos (p. ej. el níquel). Si durante el manejo de productos Rohde & Schwarz se producen reacciones alérgicas, como p. ej. irritaciones cutáneas, estornudos continuos, enrojecimiento de la conjuntiva o dificultades respiratorias, debe avisarse inmediatamente a un médico para investigar las causas y evitar cualquier molestia o daño a la salud.
4. Antes de la manipulación mecánica y/o térmica o el desmontaje del producto, debe tenerse en cuenta imprescindiblemente el capítulo "Eliminación", punto 1.

5. Ciertos productos, como p. ej. las instalaciones de radiocomunicación RF, pueden a causa de su función natural, emitir una radiación electromagnética aumentada. Deben tomarse todas las medidas necesarias para la protección de las mujeres embarazadas. También las personas con marcapasos pueden correr peligro a causa de la radiación electromagnética. El empresario/operador tiene la obligación de evaluar y señalar las áreas de trabajo en las que exista un riesgo elevado de exposición a radiaciones.
6. Tenga en cuenta que en caso de incendio pueden desprenderse del producto sustancias tóxicas (gases, líquidos etc.) que pueden generar daños a la salud. Por eso, en caso de incendio deben usarse medidas adecuadas, como p. ej. máscaras antigás e indumentaria de protección.
7. En caso de que un producto Rohde & Schwarz contenga un producto láser (p. ej. un lector de CD/DVD), no debe usarse ninguna otra configuración o función aparte de las descritas en la documentación del producto, a fin de evitar lesiones (p. ej. debidas a irradiación láser).

Reparación y mantenimiento

1. El producto solamente debe ser abierto por personal especializado con autorización para ello. Antes de manipular el producto o abrirlo, es obligatorio desconectarlo de la tensión de alimentación, para evitar toda posibilidad de choque eléctrico.
2. El ajuste, el cambio de partes, el mantenimiento y la reparación deberán ser efectuadas solamente por electricistas autorizados por Rohde & Schwarz. Si se reponen partes con importancia para los aspectos de seguridad (p. ej. el enchufe, los transformadores o los fusibles), solamente podrán ser sustituidos por partes originales. Después de cada cambio de partes relevantes para la seguridad deberá realizarse un control de seguridad (control a primera vista, control del conductor de protección, medición de resistencia de aislamiento, medición de la corriente de fuga, control de funcionamiento). Con esto queda garantizada la seguridad del producto.

Baterías y acumuladores o celdas

Si no se siguen (o se siguen de modo insuficiente) las indicaciones en cuanto a las baterías y acumuladores o celdas, pueden producirse explosiones, incendios y/o lesiones graves con posible consecuencia de muerte. El manejo de baterías y acumuladores con electrolitos alcalinos (p. ej. celdas de litio) debe seguir el estándar EN 62133.

1. No deben desmontarse, abrirse ni triturarse las celdas.
2. Las celdas o baterías no deben someterse a calor ni fuego. Debe evitarse el almacenamiento a la luz directa del sol. Las celdas y baterías deben mantenerse limpias y secas. Limpiar las conexiones sucias con un paño seco y limpio.
3. Las celdas o baterías no deben cortocircuitarse. Es peligroso almacenar las celdas o baterías en estuches o cajones en cuyo interior puedan cortocircuitarse por contacto recíproco o por contacto con otros materiales conductores. No deben extraerse las celdas o baterías de sus embalajes originales hasta el momento en que vayan a utilizarse.
4. Mantener baterías y celdas fuera del alcance de los niños. En caso de ingestión de una celda o batería, avisar inmediatamente a un médico.
5. Las celdas o baterías no deben someterse a impactos mecánicos fuertes indebidos.

Informaciones elementales de seguridad

6. En caso de falta de estanqueidad de una celda, el líquido vertido no debe entrar en contacto con la piel ni los ojos. Si se produce contacto, lavar con agua abundante la zona afectada y avisar a un médico.
7. En caso de cambio o recarga inadecuados, las celdas o baterías que contienen electrolitos alcalinos (p. ej. las celdas de litio) pueden explotar. Para garantizar la seguridad del producto, las celdas o baterías solo deben ser sustituidas por el tipo Rohde & Schwarz correspondiente (ver lista de recambios).
8. Las baterías y celdas deben reciclarse y no deben tirarse a la basura doméstica. Las baterías o acumuladores que contienen plomo, mercurio o cadmio deben tratarse como residuos especiales. Respete en esta relación las normas nacionales de eliminación y reciclaje.

Transporte

1. El producto puede tener un peso elevado. Por eso es necesario desplazarlo o transportarlo con precaución y, si es necesario, usando un sistema de elevación adecuado (p. ej. una carretilla elevadora), a fin de evitar lesiones en la espalda u otros daños personales.
2. Las asas instaladas en los productos sirven solamente de ayuda para el transporte del producto por personas. Por eso no está permitido utilizar las asas para la sujeción en o sobre medios de transporte como p. ej. grúas, carretillas elevadoras de horquilla, carros etc. Es responsabilidad suya fijar los productos de manera segura a los medios de transporte o elevación. Para evitar daños personales o daños en el producto, siga las instrucciones de seguridad del fabricante del medio de transporte o elevación utilizado.
3. Si se utiliza el producto dentro de un vehículo, recae de manera exclusiva en el conductor la responsabilidad de conducir el vehículo de manera segura y adecuada. El fabricante no asumirá ninguna responsabilidad por accidentes o colisiones. No utilice nunca el producto dentro de un vehículo en movimiento si esto pudiera distraer al conductor. Asegure el producto dentro del vehículo debidamente para evitar, en caso de un accidente, lesiones u otra clase de daños.

Eliminación

1. Si se trabaja de manera mecánica y/o térmica cualquier producto o componente más allá del funcionamiento previsto, pueden liberarse sustancias peligrosas (polvos con contenido de metales pesados como p. ej. plomo, berilio o níquel). Por eso el producto solo debe ser desmontado por personal especializado con formación adecuada. Un desmontaje inadecuado puede ocasionar daños para la salud. Se deben tener en cuenta las directivas nacionales referentes a la eliminación de residuos.
2. En caso de que durante el trato del producto se formen sustancias peligrosas o combustibles que deban tratarse como residuos especiales (p. ej. refrigerantes o aceites de motor con intervalos de cambio definidos), deben tenerse en cuenta las indicaciones de seguridad del fabricante de dichas sustancias y las normas regionales de eliminación de residuos. Tenga en cuenta también en caso necesario las indicaciones de seguridad especiales contenidas en la documentación del producto. La eliminación incorrecta de sustancias peligrosas o combustibles puede causar daños a la salud o daños al medio ambiente.

Qualitätszertifikat

Certificate of quality

Certificat de qualité

Certified Quality System
ISO 9001

Certified Environmental System
ISO 14001

Sehr geehrter Kunde,

Sie haben sich für den Kauf eines Rohde&Schwarz-Produktes entschieden. Hiermit erhalten Sie ein nach modernsten Fertigungsmethoden hergestelltes Produkt. Es wurde nach den Regeln unseres Qualitätsmanagementsystems entwickelt, gefertigt und geprüft. Das Rohde&Schwarz-Qualitätsmanagementsystem ist u.a. nach ISO9001 und ISO14001 zertifiziert.

Der Umwelt verpflichtet

- ▮ Energie-effiziente, RoHS-konforme Produkte
- ▮ Kontinuierliche Weiterentwicklung nachhaltiger Umweltkonzepte
- ▮ ISO 14001-zertifiziertes Umweltmanagementsystem

Dear Customer,

You have decided to buy a Rohde&Schwarz product. You are thus assured of receiving a product that is manufactured using the most modern methods available. This product was developed, manufactured and tested in compliance with our quality management system standards. The Rohde&Schwarz quality management system is certified according to standards such as ISO9001 and ISO14001.

Environmental commitment

- ▮ Energy-efficient products
- ▮ Continuous improvement in environmental sustainability
- ▮ ISO 14001-certified environmental management system

Cher client,

Vous avez choisi d'acheter un produit Rohde&Schwarz. Vous disposez donc d'un produit fabriqué d'après les méthodes les plus avancées. Le développement, la fabrication et les tests respectent nos normes de gestion qualité. Le système de gestion qualité de Rohde&Schwarz a été homologué, entre autres, conformément aux normes ISO9001 et ISO14001.

Engagement écologique

- ▮ Produits à efficience énergétique
- ▮ Amélioration continue de la durabilité environnementale
- ▮ Système de gestion de l'environnement certifié selon ISO 14001

Customer Support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz equipment, contact one of our Customer Support Centers. A team of highly qualified engineers provides telephone support and will work with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz equipment.

Up-to-date information and upgrades

To keep your instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish. We will take care that you will get the right information.

Europe, Africa, Middle East

Phone +49 89 4129 12345
customersupport@rohde-schwarz.com

North America

Phone 1-888-TEST-RSA (1-888-837-8772)
customer.support@rsa.rohde-schwarz.com

Latin America

Phone +1-410-910-7988
customersupport.la@rohde-schwarz.com

Asia/Pacific

Phone +65 65 13 04 88
customersupport.asia@rohde-schwarz.com



Contents

1	Preface	7
1.1	Documentation Overview.....	7
1.2	Typographical Conventions.....	8
2	Introduction	9
3	Modulation System	11
3.1	TD-SCDMA Signal Structure (Frames and Time Slots).....	11
3.2	DwPTS and UpPTS.....	11
3.3	Structure of Traffic Burst.....	12
3.3.1	Burst Without Layer 1 Control Information.....	12
3.3.2	Burst With Layer 1 Control Information.....	13
4	TD-SCDMA User Interface	15
4.1	General Settings for TD-SCDMA Signals.....	15
4.2	Filtering, Clipping, ARB Settings.....	22
4.2.1	Filter Settings.....	23
4.2.2	Clipping Settings.....	24
4.2.3	ARB Settings.....	27
4.3	Power Ramping.....	27
4.4	Trigger/Marker/Clock Settings.....	28
4.4.1	Trigger In.....	29
4.4.2	Marker Mode.....	34
4.4.3	Marker Delay.....	34
4.4.4	Clock Settings.....	35
4.4.5	Global Settings.....	37
4.5	Predefined Settings.....	37
4.6	Cell Configuration.....	39
4.7	Enhanced Channels Settings.....	42
4.7.1	Broadcast Channels (BCH).....	44
4.7.2	Dedicated Channels (DCH).....	45
4.7.3	Transport Channel.....	48
4.7.4	RMC PLCCH Channel Settings.....	52

4.7.5	RMC HS-SICH Channel Settings.....	53
4.7.6	Bit Error Insertion.....	54
4.7.7	Block Error Insertion.....	55
4.8	HSDPA/HSUPA Settings.....	55
4.8.1	HSDPA Settings.....	56
4.8.2	HSUPA Settings.....	57
4.8.3	HS-SCCH Settings (HSDPA).....	57
4.8.4	Global Settings.....	58
4.8.5	Coding Configuration.....	59
4.8.6	Signal Structure.....	62
4.8.7	HARQ Setup.....	63
4.9	Slot Configuration.....	64
4.9.1	General Settings.....	65
4.9.2	Channel Table.....	66
4.10	DPCCH Settings.....	70
4.10.1	Slot Structure and Slot Format.....	71
4.10.2	TFCI Settings.....	72
4.10.3	Sync Shift Settings.....	72
4.10.4	E-UCCH Settings.....	73
4.10.5	TPC Settings.....	74
4.11	Slot Mode PRACH Settings.....	75
4.12	Code Domain.....	78
4.13	Channel Graph.....	80
5	Remote-Control Commands.....	81
5.1	General Commands.....	81
5.2	Filter/Clipping/ARB Settings.....	89
5.3	Trigger Settings.....	94
5.4	Marker Settings.....	99
5.5	Clock Settings.....	103
5.6	Predefined Settings.....	105
5.7	Cell Settings.....	107
5.8	Enhanced Channels of Cell 1.....	111
5.9	Channel Settings.....	127

5.10 HSDPA/HSUPA Settings.....	145
List of Commands.....	157
Index.....	162

1 Preface

1.1 Documentation Overview

The user documentation for the R&S Signal Generator consists of the following parts:

- Online Help system on the instrument,
- "Quick Start Guide" printed manual,
- Documentation CD-ROM with:
 - Online help system (*.chm) as a standalone help,
 - Operating Manuals for base unit and options,
 - Service Manual,
 - Data sheet and specifications,
 - Links to useful sites on the R&S internet.

Online Help

The Online Help is embedded in the instrument's firmware. It offers quick, context-sensitive access to the complete information needed for operation and programming. The online help contains help on operating the R&S Signal Generator and all available options.

Quick Start Guide

The Quick Start Guide is delivered with the instrument in printed form and in PDF format on the Documentation CD-ROM. It provides the information needed to set up and start working with the instrument. Basic operations and an example of setup are described. The manual includes also general information, e.g., Safety Instructions.

Operating Manuals

The Operating Manuals are a supplement to the Quick Start Guide. Operating Manuals are provided for the base unit and each additional (software) option.

These manuals are available in PDF format - in printable form - on the Documentation CD-ROM delivered with the instrument. In the Operating Manual for the base unit, all instrument functions are described in detail. Furthermore, it provides an introduction to remote control and a complete description of the remote control commands with programming examples. Information on maintenance, instrument interfaces and error messages is also given.

In the individual option manuals, the specific instrument functions of the option are described in detail. For additional information on default settings and parameters, refer to the data sheets. Basic information on operating the R&S Signal Generator is not included in the option manuals.

These manuals can also be orderd in printed form (see ordering information in the data sheet).

Service Manual

The Service Manual is available in PDF format - in printable form - on the Documentation CD-ROM delivered with the instrument. It describes how to check compliance with rated specifications, on instrument function, repair, troubleshooting and fault elimination. It contains all information required for repairing the instrument by the replacement of modules.

This manual can also be ordered in printed form (see ordering information in the data sheet).

Release Notes

The release notes describe new and modified functions, eliminated problems, and last minute changes to the documentation. The corresponding firmware version is indicated on the title page of the release notes. The current release notes are provided in the Internet.

1.2 Typographical Conventions

The following text markers are used throughout this documentation:

Convention	Description
"Graphical user interface elements"	All names of graphical user interface elements on the screen, such as dialog boxes, menus, options, buttons, and softkeys are enclosed by quotation marks.
KEYS	Key names are written in capital letters.
File names, commands, program code	File names, commands, coding samples and screen output are distinguished by their font.
<i>Input</i>	Input to be entered by the user is displayed in italics.
Links	Links that you can click are displayed in blue font.
"References"	References to other parts of the documentation are enclosed by quotation marks.

2 Introduction

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-SSCH, 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 2-1: Parameters of the modulation system TD-SCDMA

Parameter	Value
Chip rate	1.28 Mcps
Carrier spacing	1.6 MHz
Data modulation	QPSK

Parameter	Value
Filter	Root-raised cosine (0.22)
Channel types	Downlink : <ul style="list-style-type: none"> • 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 : <ul style="list-style-type: none"> • 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 μ s Time slot (DwPTS): 75 μ s Time slot (UpPTS): 125 μ s 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

3 Modulation System

3.1 TD-SCDMA Signal Structure (Frames and Time Slots)

The TDSCDMA 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.

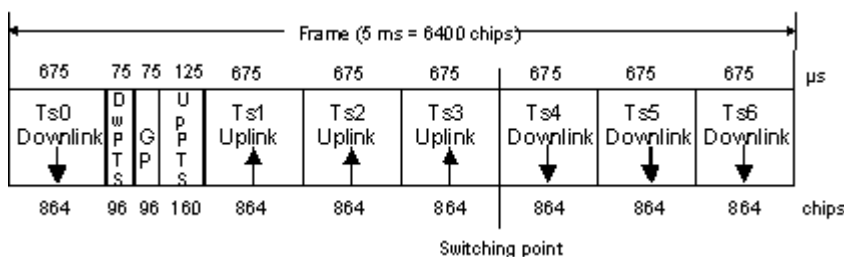


Fig. 3-1: Structure of TDSCDMA frame

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.

3.2 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.

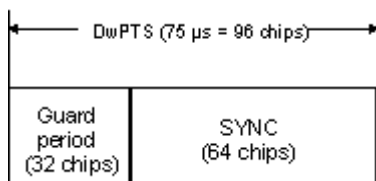


Fig. 3-2: Structure of DwPTS

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.

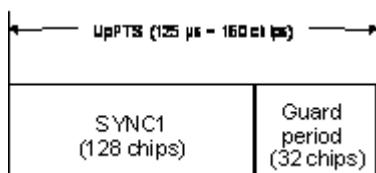


Fig. 3-3: Structure of UpPTS

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

3.3 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.

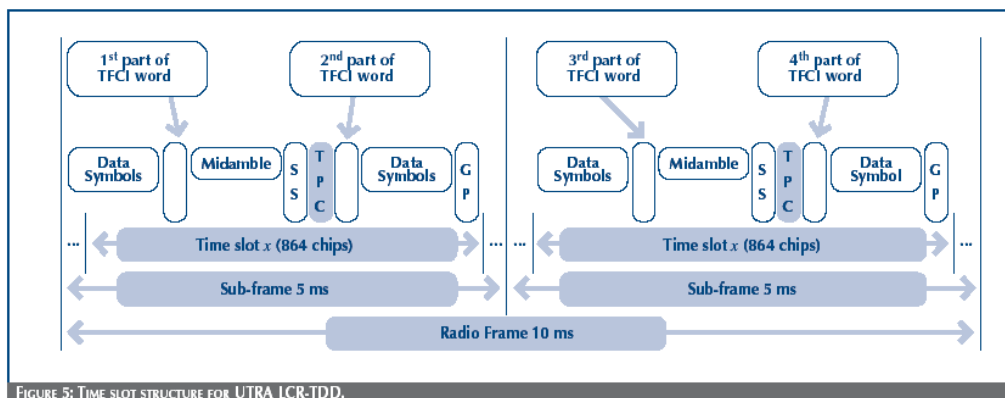


Fig. 3-4: Burst Without Layer 1 Control Information

3.3.1 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.

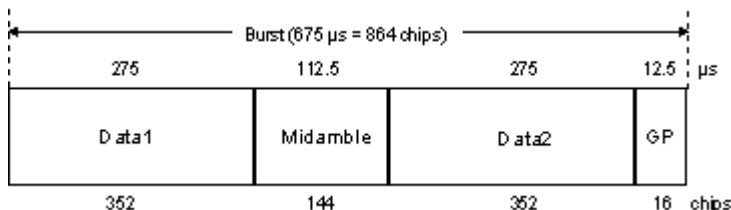


Fig. 3-5: Traffic burst without layer 1 control information

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.

3.3.2 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.

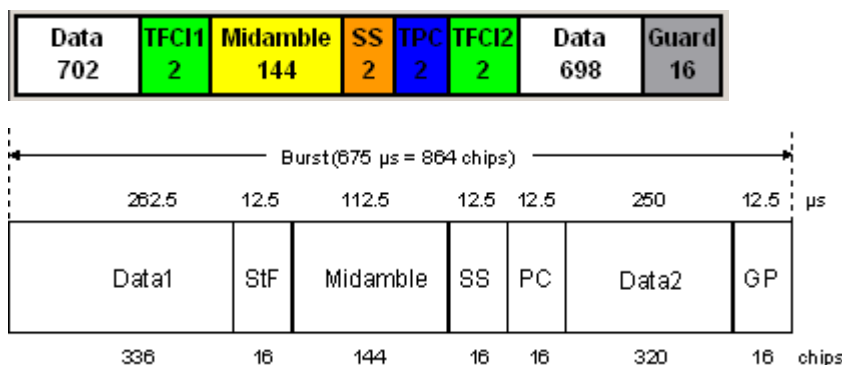


Fig. 3-6: Traffic burst with layer 1 control information

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.

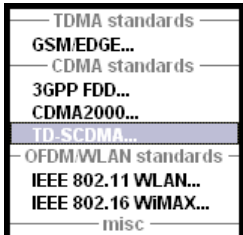
The Transport Format Indicator field (TFI) conveys transport format information to the receiver, which is used by the channel decoder to recover transport channels. The information is distributed into two segments in one burst (four segments in two burst = one frame)

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 $T_{\text{chip}}/8$. 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.

4 TD-SCDMA User Interface

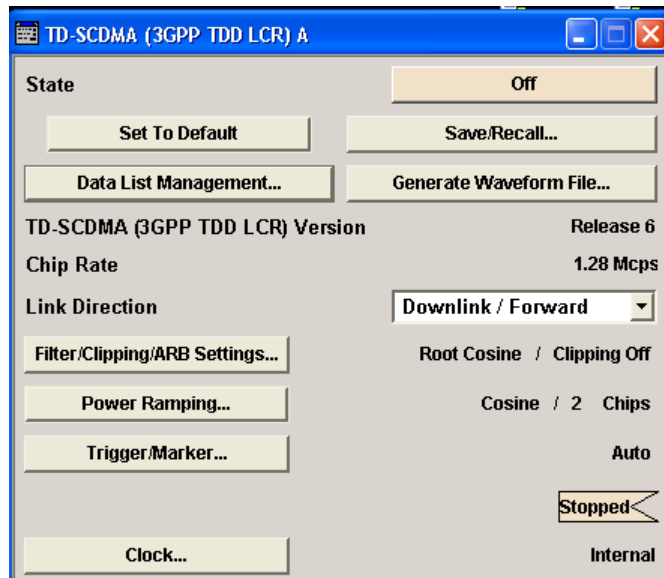


To access the dialog for setting the TD-SCDMA digital standard, select "Baseband Block > Config > TD-SCDMA" or press the MENU key and select "Baseband > TD-SCDMA".

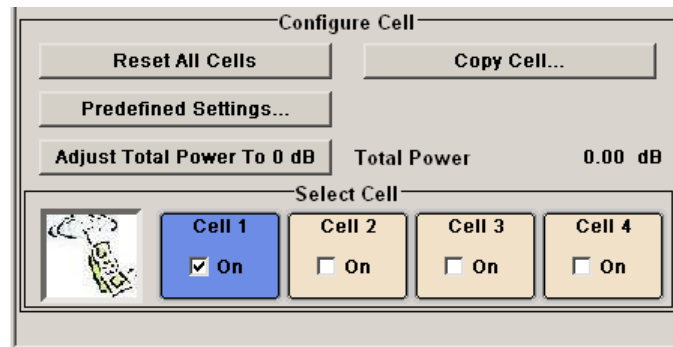
The menu is split into several sections for configuring the standard.

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.



4.1 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.

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.

State

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.

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:STATe` on page 88

Set To Default

Calls the default settings, see [chapter 4.1, "General Settings for TD-SCDMA Signals"](#), on page 15.

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.

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

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:PRESet` on page 86

Save/Recall...

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.
"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 The "Fast Save" checkbox determines whether the instrument performs an absolute or a differential storing of the settings. Enable this function to accelerate the saving process by saving only the settings with values different to the default ones. "Fast Save" is not affected by the "Pre-set" function.
"File Manager"	Calls the "File Manager". The "File Manager" is used to copy, delete, and rename files and to create new directories.

SCPI command:

[\[:SOURce<hw>\]:BB:TDSCdma:SETTING:CATalog](#) on page 86

[\[:SOURce<hw>\]:BB:TDSCdma:SETTING:LOAD](#) on page 86

[\[:SOURce<hw>\]:BB:TDSCdma:SETTING:STORe](#) on page 87

[\[:SOURce<hw>\]:BB:TDSCdma:SETTING:STORe:FAST](#) on page 87

Data List Management...

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.

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.

Example: 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....
```

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DATA on page 130
[ :SOURce<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DATA:DSElect on page 131
[ :SOURce<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DPCCh:TPC:DATA on page 133
[ :SOURce<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DPCCh:TPC:DATA:DSElect on page 133
[ :SOURce<hw> ] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA
on page 122
[ :SOURce<hw> ] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA:DSElect
on page 123
[ :SOURce<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:
DATA on page 116
[ :SOURce<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:
DATA:DSElect on page 117
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA
on page 138
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA:
DSElect on page 139
```

Generate Waveform File...

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.

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:WAVEform:CREate on page 88
```

TD-SCDMA Version

Displays the current version of the TD-SCDMA standard.

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

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:VERSion on page 88
```

Chip Rate

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 dialog (see [chapter 4.2, "Filtering, Clipping, ARB Settings"](#), on page 22).

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:CRATe on page 83

Link Direction

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.

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

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:LINK on page 84

Filtering, Clipping, ARB Settings

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 [chapter 4.2, "Filtering, Clipping, ARB Settings"](#), on page 22.

SCPI command:

n.a.

Power Ramping...

Calls the menu for setting the power ramping.

The menu is described in Section [chapter 4.3, "Power Ramping"](#), on page 27.

SCPI command:

n.a.

Trigger - Marker

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 [chapter 4.4, "Trigger/Marker/Clock Settings"](#), on page 28).

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

SCPI command:

n.a.

Execute Trigger

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.

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:TRIGger:EXECute on page 95

Arm

Stops signal generation manually.

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

SCPI command:

[:SOURce<hw>] :BB:TdSCdma:TRIGger:ARM:EXECute on page 94

Clock

Calls the menu for selecting the clock source and for setting a delay, see [chapter 4.4, "Trigger/Marker/Clock Settings"](#), on page 28.

SCPI command:

n.a.

Reset All Cells

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.

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
"Slot Configuration"	
State	OFF
Slot Mode (only in uplink)	Dedicated
Channel Configuration	
State	OFF
"Channel Type"	Depending on channel number
Current User	1
Slot Format	0
Spreading Factor	16
Spreading Code	0

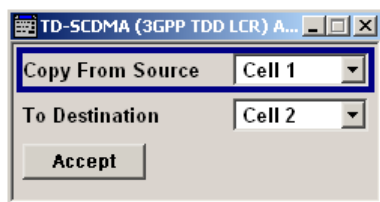
Parameter	Value
Power	0 dB
Data Source	PRBS: PN9, Data Pattern: 0
Number of TFCI bits	0
TFCI Value	0
Number of Sync Shift & TPC bits	0 & 0
Sync Shift Pattern	1
Sync Shift Repetition M	1
TPC Source/TPC Pattern	01
Read Out Mode	Continuous

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:RESet on page 86

Copy Cell...

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.

"To Destination" Selects the cell whose settings are to be overwritten.

"Accept" Starts the copy process.

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:COPY:SOURce on page 82

[:SOURce<hw>] :BB:TDSCdma:COPY:DESTination on page 82

[:SOURce<hw>] :BB:TDSCdma:COPY:EXECute on page 82

Predefined Settings

Calls the menu for setting predefined configurations.

The menu is described in [chapter 4.5, "Predefined Settings"](#), on page 37.

SCPI command:

n.a.

Adjust Total Power to 0dB

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.

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:POWer:ADJust` on page 84

Total Power

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.

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:POWer [:TOTal]` on page 84

Test Setups/Models

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

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:SETTing:TMODe1` on page 87

Select Cell

Selects the cell by pressing the accompanying button.

This opens a menu for editing the selected cell.

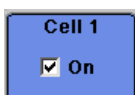
The menu is described in [chapter 4.6, "Cell Configuration"](#), on page 39.

SCPI command:

n.a.

Cell On / Cell Off

Activates or deactivates the cells.



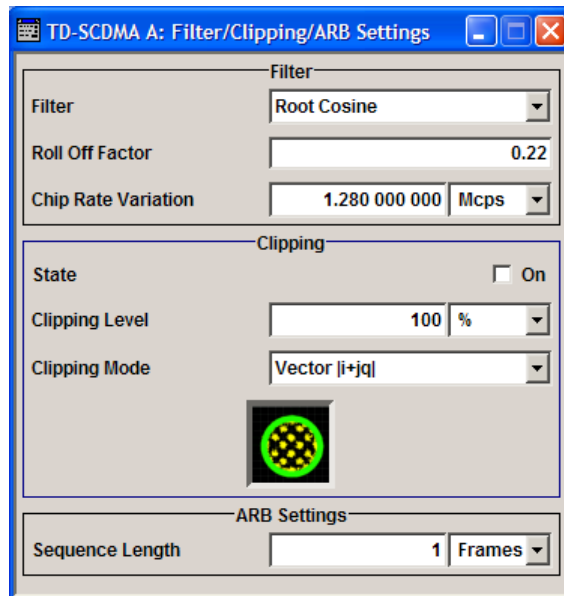
SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:STATe` on page 110

4.2 Filtering, Clipping, ARB Settings

To access this dialog, select "Main Menu > Filter/Clipping".

The baseband filter, sample rate variation and clipping are defined in this menu.



4.2.1 Filter Settings

Filter

Sets the baseband filter.

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:FILTer:TYPE` on page 90

Roll Off Factor / BxT

Sets the filter parameter.

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

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:FILTer:PARAMeter:APCO25` on page 91

`[:SOURce<hw>] :BB:TDSCdma:FILTer:PARAMeter:COsine` on page 92

`[:SOURce<hw>] :BB:TDSCdma:FILTer:PARAMeter:GAUSS` on page 92

`[:SOURce<hw>] :BB:TDSCdma:FILTer:PARAMeter:PGAuss` on page 93

`[:SOURce<hw>] :BB:TDSCdma:FILTer:PARAMeter:RCOSine` on page 93

`[:SOURce<hw>] :BB:TDSCdma:FILTer:PARAMeter:SPHase` on page 93

Cut Off Frequency Factor

(available for filter parameter Lowpass only)

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

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:FILTer:PARAMeter:LPASs` on page 92

`[:SOURce<hw>] :BB:TDSCdma:FILTer:PARAMeter:LPASSEVM` on page 92

Chip Rate Variation

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.

SCPI command:

[\[:SOURce<hw>\]:BB:TDSCdma:CRATe:VARiation](#) on page 83

Impulse Length

(For WinIQSIM2 only)

Displays the number of filter taps. 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.

SCPI command:

[\[:SOURce<hw>\]:BB:TDSCdma:FILTer:ILENgtH:AUTO](#) on page 91

[\[:SOURce<hw>\]:BB:TDSCdma:FILTer:ILENgtH](#) on page 90

Oversampling

(For WinIQSIM2 only)

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

SCPI command:

[\[:SOURce<hw>\]:BB:TDSCdma:FILTer:OSAMpling:AUTO](#) on page 91

[\[:SOURce<hw>\]:BB:TDSCdma:FILTer:OSAMpling](#) on page 91

4.2.2 Clipping Settings

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

Clipping State

Switches baseband clipping on and off.

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

With baseband clipping, the signal level is 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.

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.

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.

Table 4-1: 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.

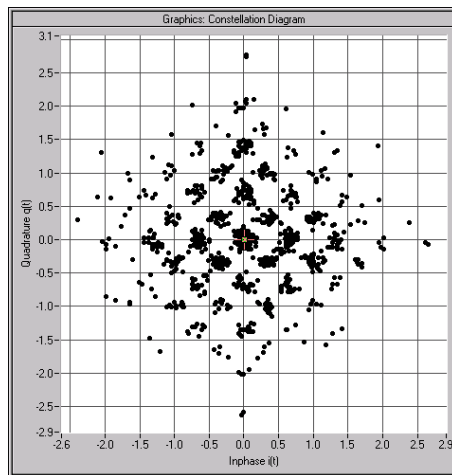


Fig. 4-1: Constellation diagram of the signal without clipping, shows the level mapping

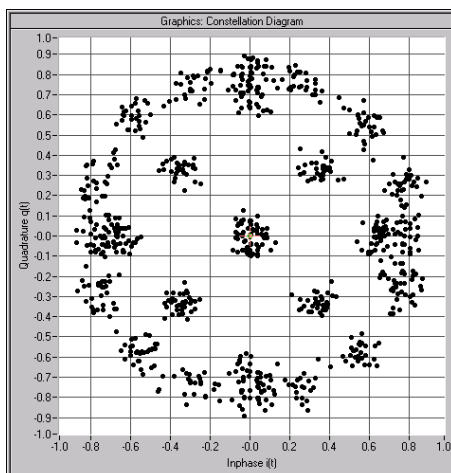


Fig. 4-2: Constellation diagram with clipping level 380 %, vector mode (|i+jq|).

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:CLIPping:STATE on page 90
```

Clipping Level

Sets the limit for clipping.

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

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:CLIPping:LEVel on page 89
```

Clipping Mode

Selects the clipping method. A graphic illustration of the way in which these two methods work is given in the menu.

"Vector | i + q |" The limit is related to the amplitude | i + q |. The I and Q components are mapped together, the angle is retained.



"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.



SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:CLIPping:MODE on page 89
```


4.2.3 ARB Settings

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

Sequence Length ARB

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.

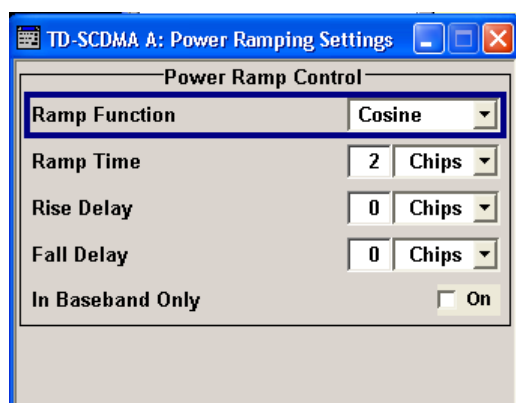
SCPI command:

[\[:SOURce<hw>\]:BB:TDSCdma:SLENgth](#) on page 94

4.3 Power Ramping

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

The menu is used to set the power ramping.



Ramp Function

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.

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

SCPI command:

[\[:SOURce<hw>\]:BB:TDSCdma:PRAMp:SHAPE](#) on page 85

Ramp Time

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

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:PRAMp:TIME on page 85

Rise Delay

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.

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:PRAMp:RDELay on page 85

Fall Delay

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.

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:PRAMp:FDELay on page 85

In Baseband Only

Activates or deactivates power ramping for the baseband signals.

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:PRAMp:BBONly on page 84

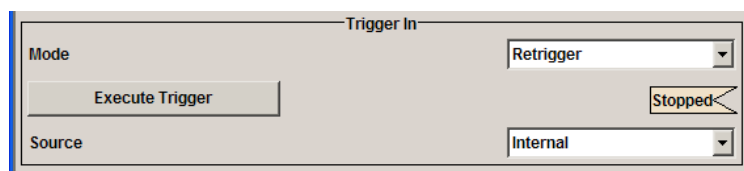
4.4 Trigger/Marker/Clock Settings



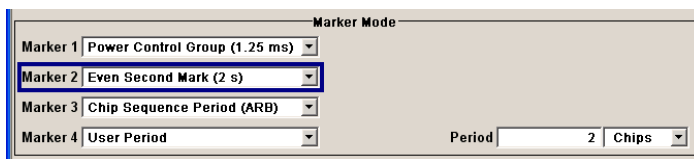
The trigger, clock, and marker delay functions are available for R&S SMx and R&S AMU instruments only.

To access this dialog, select "Main Menu > Trigger/Marker".

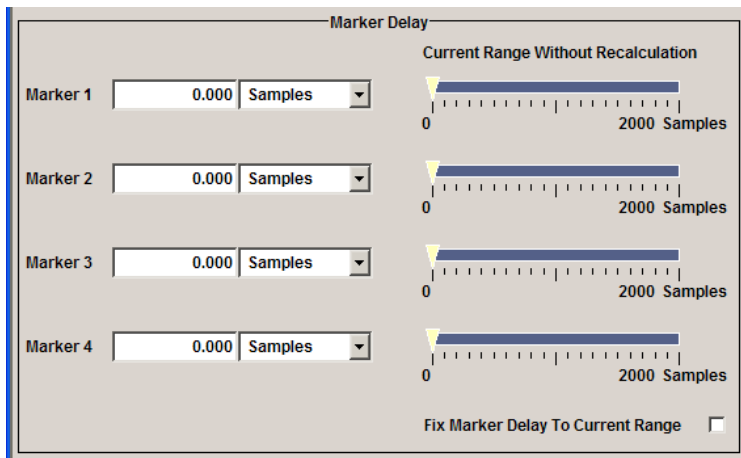
The "Trigger In" section is where the trigger for the signal is set. Various parameters will be provided for the settings, depending on which trigger source - internal or external - is selected. The current status of signal generation ("Running" or "Stopped") is indicated for all trigger modes.



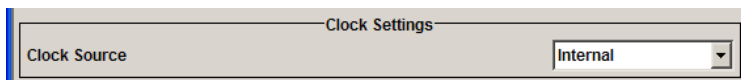
The "Marker Mode" section is where the marker signals at the MARKER output connectors are configured.



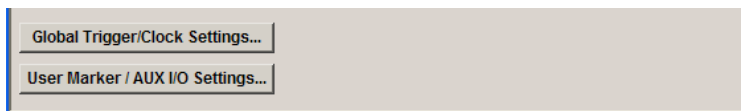
The "Marker Delay" section is where a marker signal delay can be defined, either without restriction or restricted to the dynamic section, i.e., the section in which it is possible to make settings without restarting signal and marker generation.



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



The buttons in the last section lead to submenu for general trigger, clock and mapping settings.



4.4.1 Trigger In



The trigger functions are available for R&S SMx and R&S AMU instruments only.

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

Trigger Mode

Selects trigger mode.

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

"Auto"	The signal is generated continuously.
"Retrigger"	The signal is generated continuously. A trigger event (internal or external) causes a restart.
"Armed_Auto"	The signal is generated only when a trigger event occurs. Then the signal is generated continuously. Button "Arm" stops signal generation. A subsequent trigger event (internal with "Execute Trigger" or external) causes a restart.
"Armed_Retrigger"	The signal is generated only when a trigger event occurs. Then the signal is generated continuously. Every subsequent trigger event causes a restart. Button "Arm" stops signal generation. A subsequent trigger event (internal with "Execute Trigger" or external) causes a restart.
"Single"	The 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.

SCPI command:

[\[:SOURce<hw>\]:BB:TDSCdma\[:TRIGger\]:SEQUence](#) on page 99

Signal Duration Unit

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.

SCPI command:

[\[:SOURce<hw>\]:BB:TDSCdma:TRIGger:SLUNit](#) on page 97

Signal Duration

Defines the length of the signal sequence to be output in the "Single" trigger mode.

It is possible to output deliberately just part of the signal, an exact sequence of the signal, or a defined number of repetitions of the signal.

SCPI command:

[\[:SOURce<hw>\]:BB:TDSCdma:TRIGger:SLENgth](#) on page 97

Running/Stopped

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

"Running"	The modulation signal is generated; a trigger was (internally or externally) initiated in triggered mode. If "Armed_Auto" and "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).

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:TRIGger:RMODe on page 96

Arm

Stops signal generation for trigger modes "Armed Auto" and "Armed Retrigger". A subsequent internal or external trigger event restart signal generation.

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:TRIGger:ARM:EXECute on page 94

Execute Trigger

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.

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:TRIGger:EXECute on page 95

Trigger Source

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".

"Internal (two-path instruments only)

(Baseband A/
B)" The trigger event is executed by the trigger signal from the second path

"External The trigger event is executed with the aid of the active edge of an external trigger signal.

(TRIGGER 1 /
2)" The trigger signal is supplied via the TRIGGER connector.

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

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:TRIGger:SOURce on page 97

Sync. Output to External Trigger

(enabled for Trigger Source External)

Enables/disables output of the signal synchronous to the external trigger event.

For R&S SMBV instruments:

For one or two or more R&S SMBVs configured to work in a master-slave mode for synchronous signal generation, configure this parameter depending on the provided system trigger event and the properties of the output signal. See the table below for an overview of the required settings.

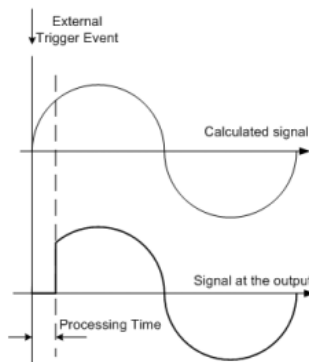
Table 4-2: Typical Applications

System Trigger	Application	"Sync. Output to External Trigger"
Common External Trigger event for the master and the slave instruments	All instruments are synchronous to the external trigger event	ON
	All instruments are synchronous among themselves but starting the signal from first symbol is more important than synchronicity with external trigger event	OFF
Internal trigger signal of the master R&S SMBV for the slave instruments	All instruments are synchronous among themselves	OFF

"On"

Corresponds to the default state of this parameter.

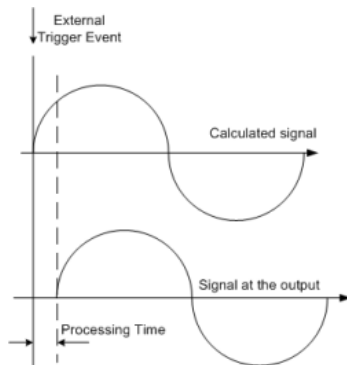
The signal calculation starts simultaneously with the external trigger event but because of the instrument's processing time the first samples are cut off and no signal is outputted. After elapsing of the internal processing time, the output signal is synchronous to the trigger event.



"Off"

The signal output begins after elapsing of the processing time and starts with sample 0, i.e. the complete signal is outputted.

This mode is recommended for triggering of short signal sequences with signal duration comparable with the processing time of the instrument.



SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:TRIGger:EXTernal:SYNChronize:OUTPut`
on page 95

Trigger Delay

Sets the trigger signal delay in samples on external triggering or on internal triggering via the second path.

Sets the trigger signal delay in samples on external triggering.

This enables the R&S Signal Generator to be synchronized with the device under test or other external devices.

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

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:TRIGger [:EXTernal<ch>] :DELay` on page 98
`[:SOURce<hw>] :BB:TDSCdma:TRIGger:OBASeband:DELay` on page 95

Trigger Inhibit

Sets the duration for inhibiting a new trigger event subsequent to triggering. The input is to be expressed in samples.

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, the trigger inhibit can be set separately for each of the two paths.

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:TRIGger [:EXTernal<ch>] :INHibit`
on page 98
`[:SOURce<hw>] :BB:TDSCdma:TRIGger:OBASeband:INHibit` on page 96

4.4.2 Marker Mode

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

The R&S SMBV supports only two markers.

Marker Mode

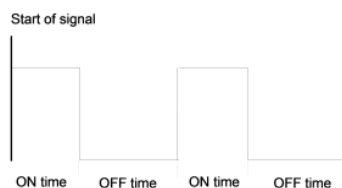
Selects a marker signal for the associated "MARKER" output.

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

"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.

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

"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 samples and are set in an input field which opens when ON/OFF ratio is selected.



SCPI command:

[\[:SOURCE<hw>\]:BB:TDSCdma:TRIGGER:OUTPUT<ch>:ONTime](#) on page 102

[\[:SOURCE<hw>\]:BB:TDSCdma:TRIGGER:OUTPUT<ch>:OFFTime](#) on page 102

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

SCPI command:

[\[:SOURCE<hw>\]:BB:TDSCdma:TRIGGER:OUTPUT<ch>:PERIOD](#) on page 102

SCPI command:

[\[:SOURCE<hw>\]:BB:TDSCdma:TRIGGER:OUTPUT<ch>:MODE](#) on page 101

4.4.3 Marker Delay

The delay of the signals on the MARKER outputs is set in the "Marker Delay" section.



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

The R&S SMBV supports only two markers.

Marker x Delay

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

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

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:TRIGger:OUTPut<ch>:DELay` on page 100

Current Range without Recalculation

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

The delay can be defined by moving the setting mark.

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:TRIGger:OUTPut<ch>:DELay:MINimum`
on page 101

`[:SOURce<hw>] :BB:TDSCdma:TRIGger:OUTPut<ch>:DELay:MAXimum`
on page 101

Fix marker delay to current range

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

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:TRIGger:OUTPut:DELay:FIXed` on page 100

4.4.4 Clock Settings

The Clock Settings is used to set the clock source and a delay if required.



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

Sync. Mode

(for R&S SMBV only)

Selects the synchronization mode.

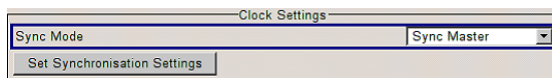
This parameter is used to enable generation of very precise synchronous signal of several connected R&S SMBVs.

Note: If several instruments are connected, the connecting cables from the master instrument to the slave one and between each two consecutive slave instruments must have the same length and type.

Avoid unnecessary cable length and branching points.

"None" The instrument is working in stand-alone mode.

"Sync. Master" The instrument provides all connected instrument with its synchronisation (including the trigger signal) and reference clock signal.



"Sync. Slave" The instrument receives the synchronisation and reference clock signal from another instrument working in a master mode.

SCPI command:

[\[:SOURce<hw>\]:BB:TDSCdma:CLOCK:SYNChronization:MODE](#) on page 105

Set Synchronization Settings

(for R&S SMBV only)

Performs automatically adjustment of the instrument's settings required for the synchronization mode, selected with the parameter "Synchronization Mode".

SCPI command:

[\[:SOURce<hw>\]:BB:TDSCdma:CLOCK:SYNChronization:EXECute](#) on page 104

Clock Source

Selects the clock source.

"Internal" The internal clock reference is used to generate the symbol clock.

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

The symbol rate must be correctly set to an accuracy of +/-2 % (see data sheet).

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

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

SCPI command:

[\[:SOURce<hw>\]:BB:TDSCdma:CLOCK:SOURce](#) on page 104

Clock Mode

Selects the type of externally supplied clock.

"Chip" A chip clock is supplied via the CLOCK connector.

"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.

SCPI command:

[\[:SOURce<hw>\]:BB:TDSCdma:CLOCK:MODE](#) on page 103

Clock Multiplier

Enters the multiplication factor for clock type "Multiple".

SCPI command:

[\[:SOURce<hw>\]:BB:TDSCdma:CLOCK:MULTIplier](#) on page 103

Measured External Clock

Indicates 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.

SCPI command:
CLOC:INP:FREQ?

4.4.5 Global Settings

The buttons in this section lead to submenu for general trigger, clock and mapping settings.

This settings are available for R&S SMx and R&S AMU instruments only.

Global Trigger/Clock Settings

Calls the "Global Trigger/Clock/Input Settings" dialog.

This dialog is used among other things for setting the trigger threshold, the input impedance and the polarity of the clock and trigger inputs.

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

The parameters in this menu affect all digital modulations and standards, and are described in chapter "Global Trigger/Clock/Input Settings" in the Operating Manual.

User Marker / AUX I/O Settings

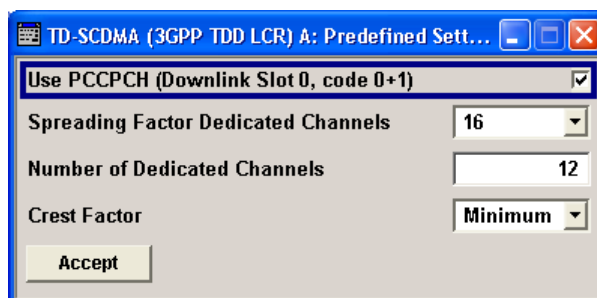
Calls the "User Marker AUX I/O Settings" menu, used used to map the connector on the rear of the instruments.

See also "User Marker / AUX I/O Settings" in the Operating Manual.

4.5 Predefined Settings

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)

(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.

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:DOWN:PPARameter:PCCPch:STATe` on page 107

Spreading Factor Dedicated Channels

Selects the spreading factor for the DPCHs.

The available spreading factors depend on the link direction.

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:PPARameter:DPCH:SFACTOR`

on page 106

Number of Dedicated Channels

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

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:PPARameter:DPCH:COUNT` on page 106

Crest Factor

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.
"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.
"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.

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:PPARameter:DPCH:CRESt` on page 106

Accept

Presets the channel table of cell 1 with the parameters defined in the "Predefined Settings" menu.

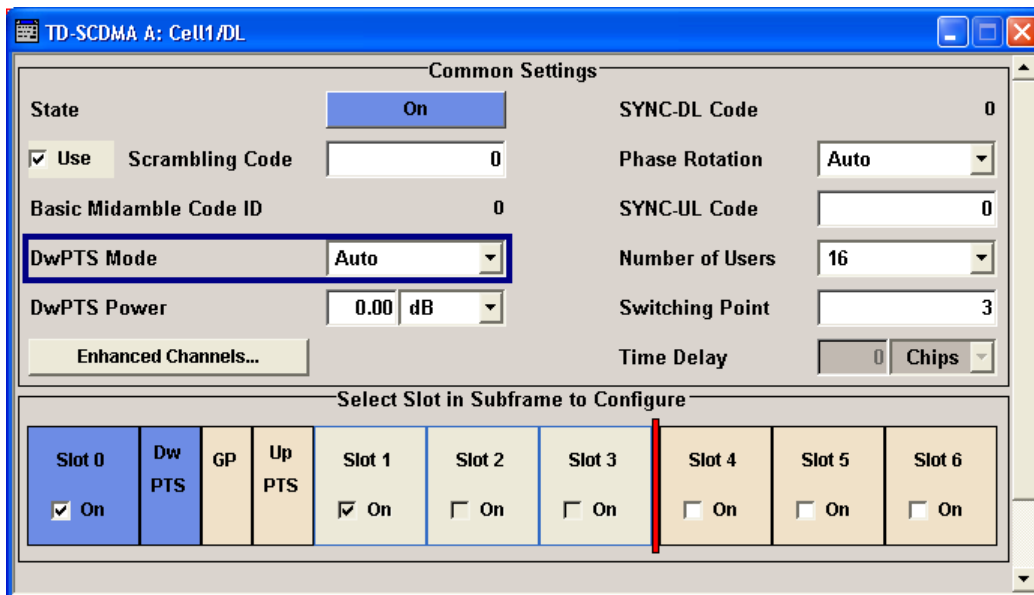
SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:PPARameter:EXECute` on page 107

4.6 Cell Configuration

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

Activates or deactivates the selected cell.

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

SCPI command:

[\[:SOURce<hw>\]:BB:TDSCdma:DOWN|UP:CELL<st>:STATe](#) on page 110

Use (Scrambling Code)

Activates or deactivates the scrambling code.

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

SCPI command:

[\[:SOURce<hw>\]:BB:TDSCdma:DOWN|UP:CELL<st>:SCODE:STATe](#) on page 109

Scrambling Code

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.

SCPI command:

[\[:SOURce<hw>\]:BB:TDSCdma:DOWN|UP:CELL<st>:SCODE](#) on page 109

Basic Midamble Code ID

Displays the basic midamble code ID of the cell.

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

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:MCODe on page 108

DwPTS Mode/ UpPTS Mode

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 [chapter 3.2, "DwPTS and UpPTS"](#), on page 11.

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:DOWN:CELL<st>:DWPTs:MODE on page 108

[:SOURce<hw>] :BB:TDSCdma:DOWN:CELL<st>:DWPTs:STATe on page 108

[:SOURce<hw>] :BB:TDSCdma:UP:CELL<st>:UPPTs:MODE on page 108

[:SOURce<hw>] :BB:TDSCdma:UP:CELL<st>:UPPTs:STATe on page 108

DwPTS Power/ UpPTS Power

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

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:DOWN:CELL<st>:DWPTs:POWeR on page 108

Time Delay

(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.

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:TDELaY on page 110

SYNC-DL Code

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.

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SDCOde on page 109

Phase Rotation

Selects the phase rotation for the downlink pilots.

"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.

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:PROtation on page 109

SYNC-UL Code

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.

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SUCode on page 110

Number of Users

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

SCPI command:

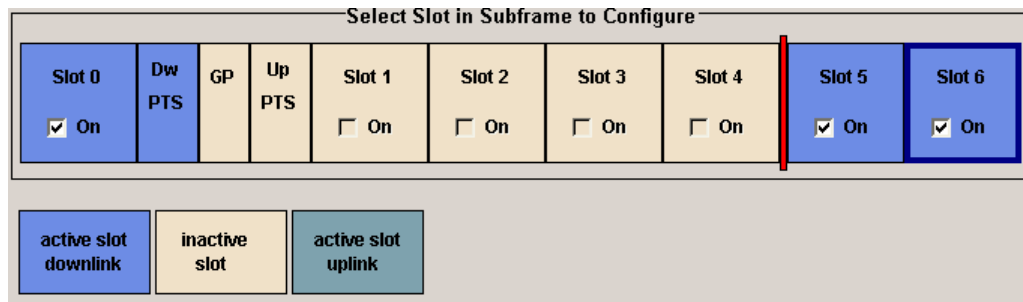
[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:USERS on page 111

Switching Point

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 always allocated to the uplink.

In the "Select Slot in Subframe to Configure" section, the switching point is 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.

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SPoint on page 110

GP (Guard Period)

The base station sends 16chips of GP in each subframe and is inserted between the DwPTS and UpPTS in each subframe. The GP is used to avoid the multipath interference.

SCPI command:

n.a.

Enhanced Channels...

(This button is available for cell1 only.)

Calls the menu for setting enhanced channel configurations.

The menu is described in [chapter 4.7, "Enhanced Channels Settings"](#), on page 42.

SCPI command:

n.a.

Select Slot in Subframe to Configure

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 [chapter 4.9, "Slot Configuration"](#), on page 64.

SCPI command:

n.a.

Slot Icon

Activates or deactivates the slot in the subframe.

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:STATE
on page 138

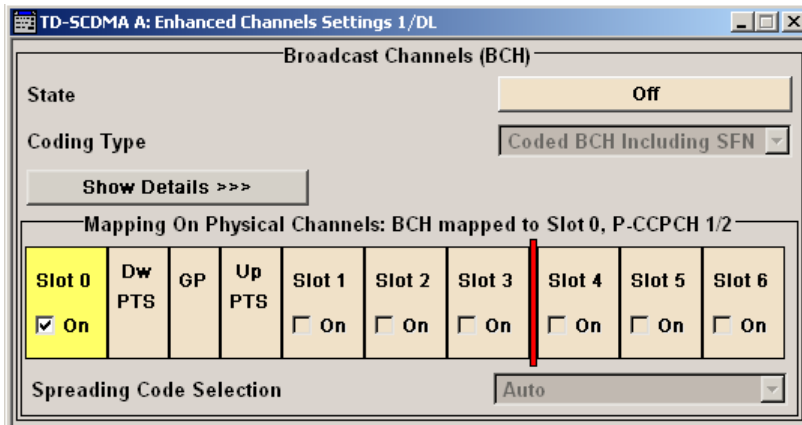
4.7 Enhanced Channels Settings

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

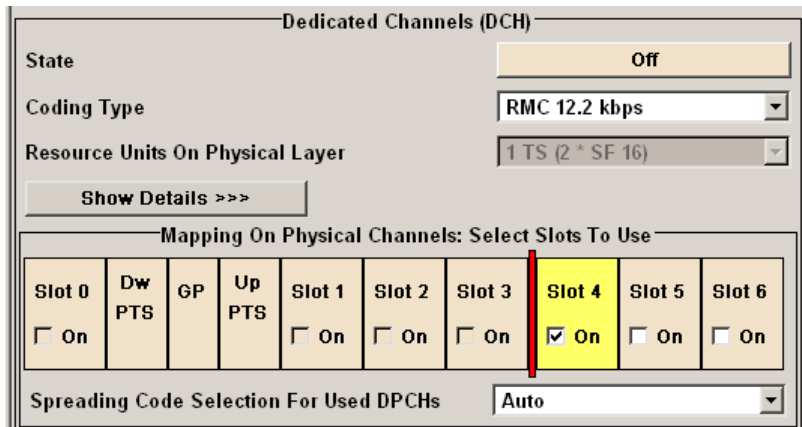
"This menu is only available for cell 1".

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.

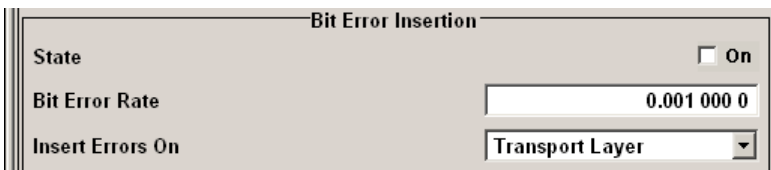
The "Broadcast Channels (BCH)" section is where the enhanced state of the channels can be activated. The detailed "Transport Channel" settings can be revealed with the "Show Details >>>" button and hidden with the "<<<Hide Details" button.



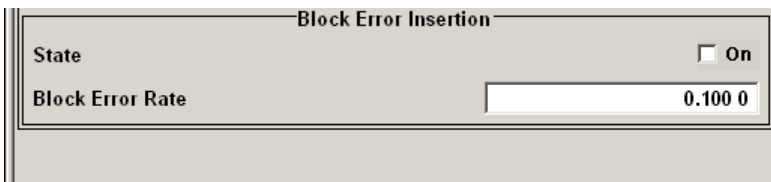
The "Dedicated Channels (DCH)" section is where the enhanced state of the channel can be activated and settings can be made. The detailed "Transport Channel" settings can be revealed with the "Show Details >>>" button and hidden with the "<<<Hide Details" button.



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.



4.7.1 Broadcast Channels (BCH)

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)

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

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

SCPI command:

[\[:SOURCE<hw>\]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:STATE](#) on page 127

Coding Type (BCH)

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.

SCPI command:

[\[:SOURCE<hw>\]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:TYPE](#) on page 127

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.

SCPI command:

n.a.

Slot Format

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.

SCPI command:

[\[:SOURCE<hw>\]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SFORMAT](#) on page 126

Data Bits Per Frame (10 ms)

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

SCPI command:

[\[:SOURCE<hw>\]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:BPFRAME](#) on page 122

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

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

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SLOTstate<ch>
```

on page 126

Spreading Code Selection (BCH)

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.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SCSMODE on page 126
```

4.7.2 Dedicated Channels (DCH)

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

State (DCH)

Activates or deactivates DCH channel coding.

Wenn the state is set to On, it 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.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:STATE
```

on page 121

Coding Type

Selects the channel coding.

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

Additionally, special RMCs are defined for HSDPA, HSUPA, HS-SICH and PLCCH.

Select one of the predefined downlink RMCs to preconfigure the settings for UE Tests according to 3GPP TS25.102, Annex A.2.

Select one of the predefined uplink RMCs to preconfigure the settings for BS Tests according to 3GPP TS25.142, Annex A.

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

"RMC 12.2 Downlink/uplink 12.2 kbps measurement channel.

kbps"

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

"RMC 64 kbps" Downlink/uplink 64 kbps measurement channel

"RMC 144 kbps"	Downlink/uplink 144 kbps measurement channel
"RMC 384 kbps"	Downlink/uplink 384 kbps measurement channel
"RMC 2048 kbps"	Downlink 2048 kbps measurement channel
"RMC PLCCH"	Downlink RMC PLCCH channel (see RMC PLCCH Channel Settings)
"HSDPA"	(downlink only) HSDPA reference measurement channel (see chapter 4.8, "HSDPA/HSUPA Settings" , on page 55).
"RMC HS-SICH"	Uplink RMC for transport channel HS-SICH (see chapter 4.7.5, "RMC HS-SICH Channel Settings" , on page 53)
"HSUPA"	(uplink only) HSUPA reference measurement channel (see chapter 4.8, "HSDPA/HSUPA Settings" , on page 55).
"User"	The channel settings are user-definable

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:TYPE on page 122

Resource Units On Physical Layer

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

The table below gives an overview of the used resource units (RU) depending on the selected Coding Type. The used Number of Time Slots and Number of Channels is also displayed by the corresponding parameters.

RMC	Resource Units Allocated	Description	Transport Channels
Downlink			
RMC 12.2 Kbps	1TS (2*SF16) = 2RU/5ms	1 slot with 2 code channels using spreading factor 16	1DTCH + 1DCCH
RMC 64 Kbps	1TS (8*SF16) = 8RU/5ms	1 slot with 8 code channels using spreading factor 16	1DTCH + 1DCCH
RMC 144 Kbps	2TS (8*SF16) = 16RU/5ms	2 slots with 8 code channels using spreading factor 16	1DTCH + 1DCCH
RMC 384 Kbps	4TS (10*SF16) = 40RU/5ms	4 slots with 10 code channels using spreading factor 16	1DTCH + 1DCCH
RMC 2048 kbps	5TS (1*SF1) = 80RU/5ms (8PSK)	5 slots with 1 code channel using spreading factor 1	1DTCH + 1DCCH
RMC-PLCCH	1TS (1*SF16) = 1RU/5ms (QPSK)	1 slot with 1 code channel using spreading factor 16	1DTCH
Uplink			
RMC 12.2 Kbps	1TS (1*SF8) = 2RU/5ms	1 slot with 1 code channel using spreading factor 8	1DTCH + 1DCCH

RMC	Resource Units Allocated	Description	Transport Channels
RMC 64 Kbps	1TS (1*SF2) = 8RU/5ms	1 slot with 1 code channel using spreading factor 2	1DTCH + 1DCCH
RMC 144 Kbps	2TS (1*SF2) = 16RU/5ms	2 slots with 1 code channel using spreading factor 2	1DTCH + 1DCCH
RMC 384 Kbps	4TS (1*SF2 + 1*SF8) = 40RU/5ms	4 slots with 2 code channel using spreading factor 2 and 8	1DTCH + 1DCCH
RMC HS-SICH	1TS (1*SF16) = 1RU/5ms	1 slot with 1 code channel using spreading factor 16	

See "RMC Configuration" on page 56 and "E-DCH Fixed Reference Channel (FRC)" on page 57 for an overview of the used resource units in HSDPA and HSUPA mode respectively.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:RUPLayer
```

on page 120

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.

SCPI command:

n.a.

Number of Time Slots (DCH)

Sets the number of time slots to be used.

The initial value is preset according to the selected [Coding Type](#).

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:TSCOUNT
```

on page 121

Number of Channels (DCH)

Sets the number of channels to be used.

The initial value is preset according to the selected [Coding Type](#).

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:CCOUNT
```

on page 116

Slot Format

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.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:SFORMAT
```

on page 121

Data Bits Per Frame (10 ms)

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

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:BPFrame
```

on page 115

Mapping On Physical Channels: Select Slots To Use

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.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:SLOTstate<ch>
```

on page 121

Spreading Code Selection For Used DPCHs

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

"User" The spreading codes can be set manually.

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

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:SCSMode
```

on page 120

4.7.3 Transport Channel

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.

Transport Channel	
DTCH 246 PN 16 <input checked="" type="checkbox"/> On	DCCH 246 PN 9 <input type="checkbox"/> On

Transport Channel						
DCCH 100 PN 9 <input checked="" type="checkbox"/> On	DTCH 2 100 PN 9 <input type="checkbox"/> On	DTCH 3 100 PN 9 <input type="checkbox"/> On	DTCH 4 100 PN 9 <input type="checkbox"/> On	DTCH 5 100 PN 9 <input type="checkbox"/> On	DTCH 6 100 PN 9 <input type="checkbox"/> On	DTCH 7 100 PN 9 <input type="checkbox"/> On

Data Source	<input type="text" value="PN 9"/>
Transport Time Interval	<input type="text" value="20 ms"/>
Transport Blocks	<input type="text" value="1"/>
Transport Block Size	<input type="text" value="244"/>
Size Of CRC	<input type="text" value="16"/>
Rate Matching Attribute	<input type="text" value="256"/>
Error Protection	<input type="text" value="Conv 1/3"/>
Interleaver 1 State	<input checked="" type="checkbox"/> On
Interleaver 2 State	<input checked="" type="checkbox"/> On

DTCH On/DCCH On

Displays the transport channel state.

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

SCPI command:

[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:STATE on page 119

Data Source

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.
- "PN xx" PRBS data as per CCITT with period lengths between 2^9-1 and $2^{23}-1$ is generated internally.
- "Pattern" A user-definable bit pattern with a maximum length of 64 bits is generated internally.
The bit pattern is defined in the "Pattern" entry field.

"Data List" 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.

SCPI command:

`[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA`

on page 122

`[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:DATA` on page 116

`[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA:DSElect` on page 123

`[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:DATA:DSElect` on page 117

`[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA:PATtern` on page 124

`[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:DATA:PATtern` on page 118

Transport Time Interval

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

SCPI command:

`[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TTInterval`

on page 126

`[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:TTInterval` on page 120

Transport Blocks

Displays the number of transport blocks for the TCH.

SCPI command:

`[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TBCount`

on page 125

`[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:TBCount` on page 119

Transport Block Size

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

SCPI command:

`[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TBSize`

on page 125

`[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:TBSize` on page 119

Size Of CRC

Displays the type (length) of the CRC.

SCPI command:

`[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:CRCSIZE`

on page 122

`[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:CRCSIZE` on page 116

Rate Matching Attribute

Displays the rate matching.

SCPI command:

`[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:RMATTRIBUTE`

on page 125

`[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:RMATTRIBUTE` on page 119

Error Protection

Displays the error protection.

SCPI command:

`[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:EPROTTECTION`

on page 124

`[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:EPROTTECTION` on page 118

Interleaver 1 State

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.

SCPI command:

`[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:IONE`

on page 124

`[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:IONE` on page 118

Interleaver 2 State

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.

SCPI command:

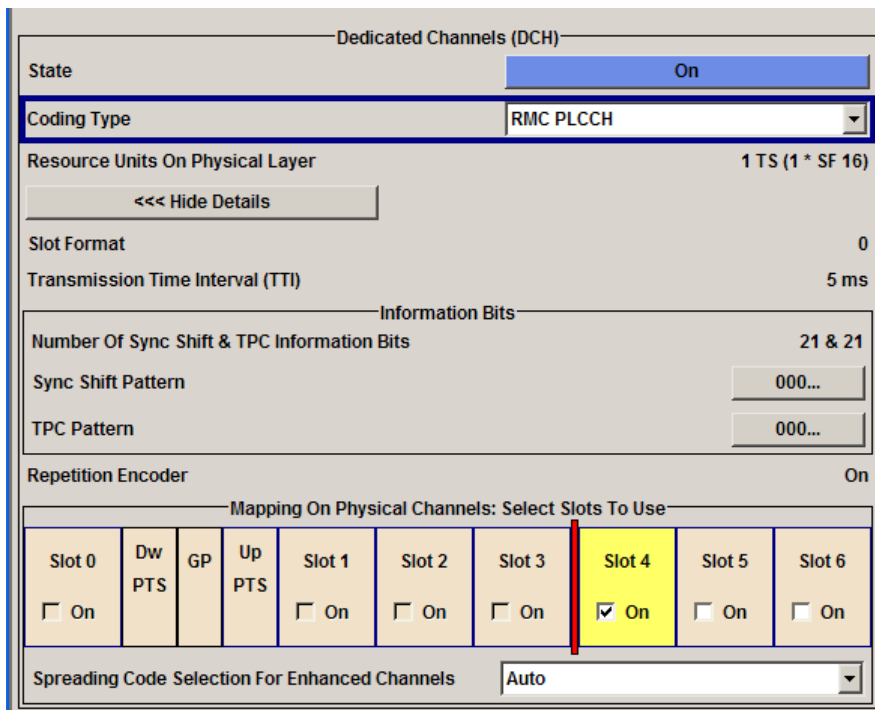
`[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:ITWO`

on page 124

`[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:ITWO` on page 118

4.7.4 RMC PLCCH Channel Settings

These settings are available only for downlink transmission direction and "Coding Type" set to RMC PLCCH.



Transmission Time Interval (TTI) – RMC PLCCH

Displays the transmission time interval.

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:TTINterval`
on page 113

Number of Sync Shift&TPC Information Bits

Displays the number of information bits used for sync shift and TPC. The RMC PLCCH does not contain data bits.

SCPI command:

n.a.

Sync Shift Pattern

Sets the sync shift pattern. The pattern length is 21 bits.

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:SSPattern`
on page 112

TPC Pattern

Sets the TPC pattern. The pattern length is 21 bits.

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:TPCPattern on page 113

Repetition Encoder

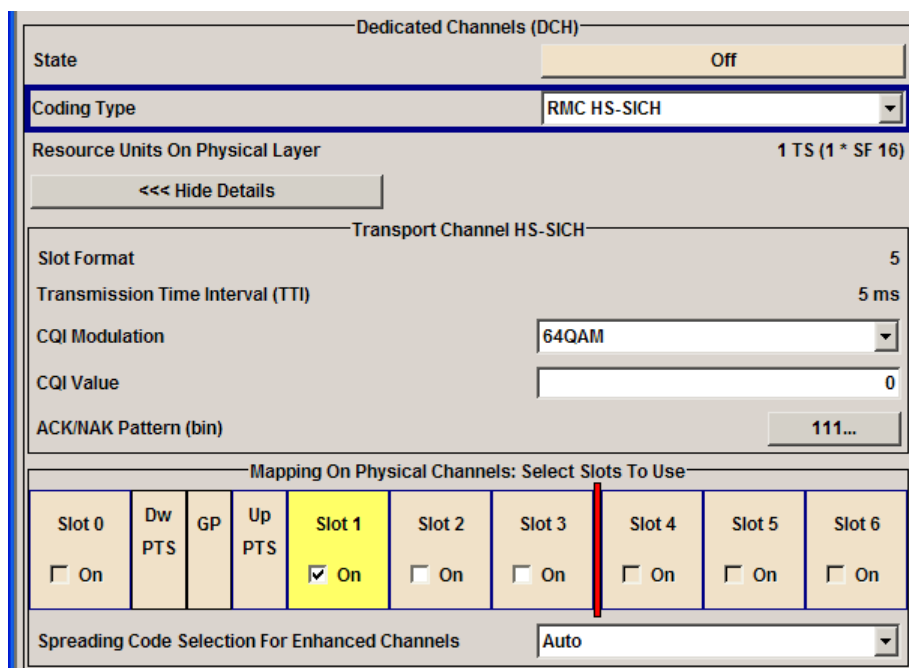
Displays the state of the repetition encoder.

SCPI command:

n.a.

4.7.5 RMC HS-SICH Channel Settings

These settings are available only for uplink transmission direction and "Coding Type" set to RMC HS-SICH.



Transmission Time Interval (TTI) – RMC HS-SICH

Displays the transmission time interval.

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSICH:TTIInterval on page 114

CQI Modulation

Sets the CQI modulation.

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSICH:CQI:MODulation on page 113

CQI Value

Sets the CQI value.

With the CQI (Channel quality indicator), the user equipment informs the base station about the received quality of downlink HS-PDSCH. Thus the base station can adapt the modulation and coding scheme to improve the signal quality.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSICh:CQI:VALue
on page 114
```

ACK/NAK Pattern

Sets the ACK/NAK Pattern. The pattern has a maximal length of 36 bits; a "1" corresponds to ACK, a "0" to NAK.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSICh:ANPattern
on page 113
```

4.7.6 Bit Error Insertion

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

State (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.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:BIT:STATE
on page 115
```

Bit Error Rate

Enters the bit error rate.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:BIT:RATE
on page 114
```

Insert Errors On

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.
-------------------	--

"Physical Layer" Bit errors are inserted in the physical layer.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:BIT:LAYer
```

on page 114

4.7.7 Block Error Insertion

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

State (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.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:BLOCK:STATE
```

on page 115

Block Error Rate

Enters the block error rate.

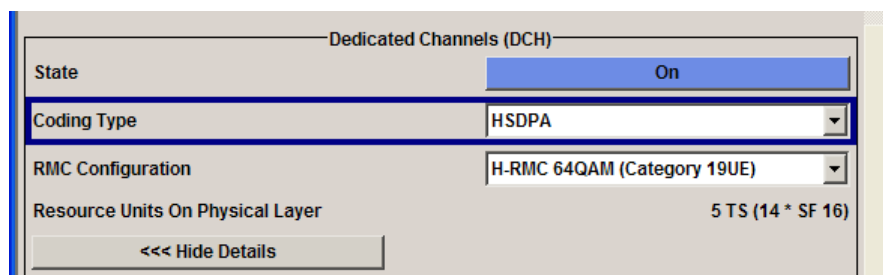
SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:BLOCK:RATE
```

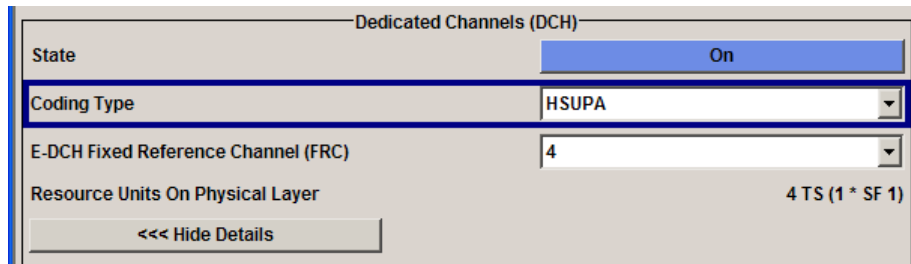
on page 115

4.8 HSDPA/HSUPA Settings

The HSDPA settings are available only for downlink transmission and "Coding Type" set to HSDPA.



The HSUPA settings are available only for uplink transmission and "Coding Type" set to HSUPA.



4.8.1 HSDPA Settings

RMC Configuration

(HSDPA only)

Enables a predefined set of RMC channels or fully configurable user mode.

Following combinations are possible:

RMC Config.	Modulation	Resource Units Allocated	Description	Transport Channels
H-RMC 0.5 Mbps	QPSK	2TS (10*SF16) = 20RU/5ms	2 slots with 10 code channels using spreading factor 16	1H-DTCH
H-RMC 1.1 Mbps	QPSK	2TS (10*SF16) = 20RU/5ms	2 slots with 10 code channels using spreading factor 16	1H-DTCH
	16QAM	2TS (12*SF16) = 24RU/5ms	2 slots with 12 code channels using spreading factor 16	1H-DTCH
H-RMC 1.6 Mbps	QPSK	3TS (10*SF16) = 30RU/5ms	3 slots with 10 code channels using spreading factor 16	1H-DTCH
	16QAM	3TS (12*SF16) = 36RU/5ms	3 slots with 12 code channels using spreading factor 16	1H-DTCH
H-RMC 2.2 Mbps	QPSK	4TS (10*SF16) = 40RU/5ms	4 slots with 10 code channels using spreading factor 16	1H-DTCH
	16QAM	4TS (12*SF16) = 48RU/5ms	4 slots with 12 code channels using spreading factor 16	1H-DTCH
H-RMC 2.8 Mbps	QPSK	5TS (10*SF16) = 50RU/5ms	5 slots with 10 code channels using spreading factor 16	1H-DTCH
	16QAM	5TS (12*SF16) = 50RU/5ms	5 slots with 12 code channels using spreading factor 16	1H-DTCH
H-RMC 64QAM	64QAM (Category 16UE)	3TS (14*SF16) = 42RU/5ms	3 slots with 14 code channels using spreading factor 16	1H-DTCH
	64QAM (Category 19UE)	5TS (14*SF16) = 70RU/5ms	5 slots with 14 code channels using spreading factor 16	1H-DTCH
	64QAM (Category 22UE)	5TS (14*SF16) = 70RU/5ms	5 slots with 14 code channels using spreading factor 16	1H-DTCH
User	-	-	-	-

Several parameters are automatically set, depending on the selected RMC. However, it is also possible to change these parameters. In this case, the value of the parameter "RMC Configuration" is automatically set to User.

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:RMC
on page 146
```

4.8.2 HSUPA Settings

E-DCH Fixed Reference Channel (FRC)

(HSUPA only)

Selects a predefined E-DCH fixed reference channel or fully configurable user mode.

Following combinations are possible:

FRC	Modulation	Resource Units Allocated	Description	Transport Channels
1	QPSK	2TS(1*SF4) =2RU/5ms	2 slots with 1 code channel using spreading factor 4	1DTCH
2	QPSK	2TS(1*SF2) =2RU/5ms	2 slots with 1 code channel using spreading factor 2	1DTCH
3	16QAM	3TS(1*SF2) =3RU/5ms	3 slots with 1 code channel using spreading factor 2	1DTCH
4	16QAM	4TS(1*SF1) =2RU/5ms	4 slots with 1 code channel using spreading factor 1	1DTCH
User	-	-	-	-

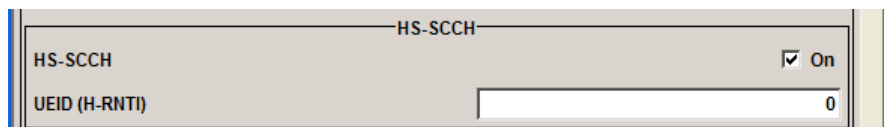
Several settings are preconfigured according to the selected FRC.

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:FRC on page 148
```

4.8.3 HS-SCCH Settings (HSDPA)

This section describes the "HS-SCCH" settings.



HS-SCCH State

(HSDPA only)

Enables/disables the HS-SCCH.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:SCCH
```

on page 146

UEID (H-RNTI)

(HSDPA only)

Sets the UE identity which is the HS-DSCH Radio network identifier(H-RNTI) defined in 3GPP TS25.331, "Radio resource control (RRC); Protocol Specification".

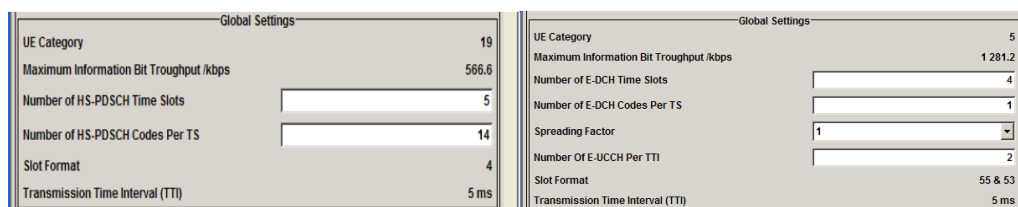
SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:UEID
```

on page 148

4.8.4 Global Settings

This section describes the HSDPA/HSUPA global settings.



UE Category

Displays the UE category that is minimum required to receive the selected RMC or FRC.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:UECategory on page 155
```

Maximum Information Bit Throughput /kbps

Displays maximum information bits sent in each TTI before coding.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:MIBT on page 153
```

Number of HS-PDSCH/E-DCH Time Slots

Sets the number of time slots.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:TSCount on page 155
```


Number of HS-PDSCH/E-DCH Codes per TS

Sets the number of physical channels per time slot.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:CTSCount on page 150
```

Spreading Factor (FRC)

(HSUPA only)

Selects the spreading factor for the FRC.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:SFACTOR on page 149
```

Number of E-UCCH per TTI

(HSUPA only)

Sets the number of E-UCCH channels per TTI.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:EUCTti on page 148
```

Slot Format (HSDPA/HSUPA)

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.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:SFORMAT on page 154
```

Transmission Time Interval (TTI)

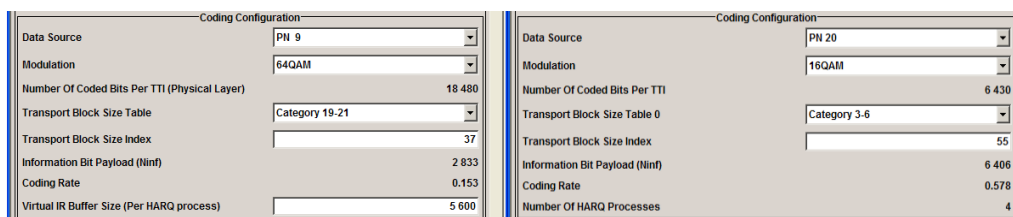
Displays the transmission time interval (TTI).

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN | UP:CELL<st>:ENH:DCH:HSDPA | HSUPA:TTINTERVAL on page 155
```

4.8.5 Coding Configuration

This section describes the HSDPA/HSUPA settings, related to the coding.



Data Source (HSDPA/HSUPA)

Selects the data source for the HSDPA/HSUPA channels.

The following are available for selection as data sources:

"All 0""All 1"	0 data and 1 data is generated internally.
"PN xx"	PRBS data as per CCITT with period lengths between 2^9-1 and $2^{23}-1$ is generated internally.
"Pattern"	A user-definable bit pattern with a maximum length of 64 bits is generated internally. The bit pattern is defined in the "Pattern" entry field.
"Data List"	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.

SCPI command:

[\[:SOURCE<hw>\]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:DATA](#) on page 151

[\[:SOURCE<hw>\]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:DATA:PATtern](#) on page 152

[\[:SOURCE<hw>\]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:DATA:DSElect](#) on page 151

Modulation (HSDPA/HSUPA)

Sets the modulation scheme for each HSDPA RMC or HSUPA FRC.

64QAM is not available for the HSUPA FRCs.

SCPI command:

[\[:SOURCE<hw>\]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:MODulation](#) on page 153

Number of Coded Bits Per TTI

Displays the number of bits after coding.

SCPI command:

[\[:SOURCE<hw>\]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:NCBTti](#) on page 153

Transport Block Size Table

(HSDPA only)

Sets the transport block size table, according to the specification 3GPP TS 25.321.

The values available depend on the selected modulation.

Modulation	TBS Table	
	Downlink	Uplink
QPSK	category [1, 3] category [4, 6] category [7, 9] category [10, 12] category [13, 15] category [16, 18] category [19, 21] category [22, 24]	category [1, 2] category [3, 6]
16QAM	category [4, 6] category [7, 9] category [10, 12] category [13, 15] category [16, 18] category [19, 21] category [22, 24]	category [1, 2] category [3, 6]
64QAM	category [16, 18] category [19, 21] category [22, 24]	-

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:TBS:TABLE
on page 147

Transport Block Size Table 0

(HSUPA only)

Sets the transport block size table, according to the specification 3GPP TS 25.321, Annex BC.

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:TBS:TABLE
on page 150

Transport Block Size Index

Selects the index for the corresponding table, as described in 3GPP TS 25.321.

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
TBS:INDEX on page 155

Information Bit Payload (Ninf)

Displays the payload of the information bit. i.e. transport block size. This value determines the number of transport layer bits sent in each TTI before coding.

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:BPAYload on page 150

Coding Rate (HSDPA/HSUPA)

Displays the resulting coding rate.

The coding rate is calculated as a relation between the Information Bit Payload and "Number of Coded Bits per TTI".

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:CRATe on page 150

Virtual IR Buffer Size (Per HARQ process)

(HSDPA only)

Sets the size of the virtual IR buffer.

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:VIBSize on page 148

4.8.6 Signal Structure

This section describes the HSDPA settings, necessary to configure the signal structure.

Signal Structure	
Inter TTI Distance	1
Number Of HARQ Processes	4
Signalling Pattern	0,1,2,3

Inter TTI Distance

(HSDPA only)

Sets the inter TTI distance, i.e. distance between two packets in HSDPA packet mode and determines whether data is send each TTI or there is a DTX transmission in some of the TTIs.

An "Inter TTI Distance" of 1 means continuous generation.

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:TTIDistance on page 147

Number of HARQ Processes

Sets the number of HARQ processes. This value determines the distribution of the payload in the subframes and depends on the "Inter TTI Distance".

A minimum of 3 HARQ Processes are required to achieve continuous data transmission.

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:HARQ:LENGTH on page 152

Signaling Pattern

Displays the distribution of packets over time. The Signaling Pattern displays a HARQ-Process cycle and is a sequence of HARQ-IDs and "-". A HARQ-ID indicates a packet, a "-" indicates no packet (see figure). The Signaling Pattern is cyclically repeated.

Long signaling patterns with regular repeating groups of HARQ-ID and "-" are not displayed completely. The signaling pattern is shortened and ". . ." is displayed but the scheduling is performed according to the selected "Inter TTI Distance". Long signaling patterns with irregularity in the HARQ-ID and "-" groups are displayed completely.

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:SPATtern on page 147

4.8.7 HARQ Setup

This section describes the HSDPA/HSUPA Hybrid-ARQ settings.

HARQ Setup	
HARQ Mode	Constant ACK
Redundancy Version Parameter	0
Retransmission Sequence Number	0

HARQ Mode

Sets the HARQ simulation mode.

"Constant ACK"	New data is used for each new TTI. This mode is used to simulate maximum throughput transmission.
"Constant NACK"	Enables NACK simulation, i.e. depending on the sequence selected with parameter "Redundancy Version Sequence" packets are retransmitted. This mode is used for testing with varying redundancy version.

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:HARQ:MODE on page 152

Redundancy Version Parameter

(for "HARQ Mode" set to Constant ACK)

Enters the redundancy version parameter.

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:HARQ:MODE on page 152

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:RVParameter on page 153

Redundancy Version Sequence

(for "HARQ Mode" set to Constant NACK)

Sets the retransmission sequence.

The sequence has a length of maximum 30 values. The sequence length determines the maximum number of retransmissions. New data is retrieved from the data source after reaching the end of the sequence.

For HSUPA, this parameter is read-only.

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
HARQ:MODE on page 152

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
RVSequence on page 154

Retransmission Sequence Number

(for HSUPA and "HARQ Mode" set to Constant ACK)

Sets the retransmission sequence number.

The value is fixed to 0.

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
HARQ:MODE on page 152

[:SOURCE<hw>] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:RSNumber
on page 149

Retransmission Sequence

(for HSUPA and "HARQ Mode" set to Constant NACK)

Sets the retransmission sequence.

SCPI command:

[:SOURCE<hw>] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:RSEquence
on page 149

4.9 Slot Configuration

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.

Channel Type	Enhanced	Crt.User/ Mid.Shift	Slot Fmt	Sprd. Fact.	Sprd. Code	Power /dB	Data	DList / Pattern	DPCCH Settings	State	Do. Cfl.
0	PUSCH	1/120	0	16	1	0.00	PN 9		Config...	Off	
1	DPCH QPSK	1/120	0	16	1	0.00	PN 9		Config...	Off	
2	DPCH QPSK	1/120	0	16	1	0.00	PN 9		Config...	Off	
3	DPCH QPSK	1/120	0	16	1	0.00	PN 9		Config...	Off	
4	DPCH QPSK	1/120	0	16	1	0.00	PN 9		Config...	Off	

4.9.1 General Settings

State

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

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:STATE
on page 138
```

Slot Mode

(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.

"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 [chapter 4.11, "Slot Mode PRACH Settings"](#), on page 75).

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:MODE
on page 138
```

Code Domain...

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

The display is described in [chapter 4.12, "Code Domain"](#), on page 78.

SCPI command:

n.a.

Channel Graph...

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

The display is described in [chapter 4.13, "Channel Graph"](#), on page 80.

SCPI command:

n.a.

4.9.2 Channel Table

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.

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

Table 4-3: 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 (16QAM)	High Speed Phys. Downlink Shared Channel 16 QAM	

Index	Shortform	Name	Function
	HS-PDSCH (64QAM)	High Speed Phys. Downlink Shared Channel 64QAM	
	PLCCH	Physical layer common control channel	
	E-AGCH	E-DCH Absolute Grant Channel	
	E-HICH	E-DCH Hybrid ARQ Indicator Channel	

Table 4-4: 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	
	HS-SICH	High Speed Shared Information Channel	
	E-PUCH (QPSK)	E-DCH Uplink Physical Channel (QPSK)	
	E-PUCH (16QAM)	E-DCH Uplink Physical Channel (16QAM)	
	E-RUCCH	E-DCH Random Access Uplink Control Channel	

Channel Number

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.

SCPI command:

n.a.

Channel Type

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 4-3](#) and [table 4-4](#)).

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:TYPE on page 137
```

Enhanced

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

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:  
CHANnel<us0>:ENHanced on page 135
```

Crt.User/Mid.Shift

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

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:  
CHANnel<us0>:USER on page 137
```

Slot Fmt

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 is 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.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:  
CHANnel<us0>:SFORmat on page 136
```

Sprd. Fact.

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

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:  
CHANnel<us0>:SFACtor on page 136
```

Sprd. Code

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.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:  
CHANnel<us0>:SCODE on page 136
```

Power/dB

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 $10 \cdot \log_{10}(1/\text{duty_cycle})$.

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:POWer on page 135
```

Data

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.

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DATA on page 130
```

```
[ :SOURce<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DATA:DSElect on page 131
```

```
[ :SOURce<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DATA:PATtern on page 131
```

DPCCH Settings

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 [chapter 4.10, "DPCCH Settings"](#), on page 70

SCPI command:

n.a.

State

Activates or deactivates the channel.

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:STATe on page 136
```

Do. Cfl.

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 [chapter 4.12, "Code Domain"](#), on page 78).

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:DCONflict
on page 137
```

4.10 DPCCH Settings

The "Config DPCCH" menu for configuring the fields of the dedicated physical controller 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.

Data	Midamble	Data	Guard
44	144	44	16
Slot Format			0
Midamble Shift			120

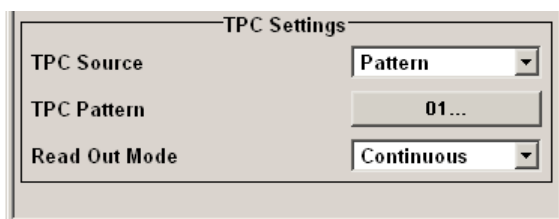
The "TFCI Settings" section is where the TFCI length and value are set.

TFCI Settings	
Number of TFCI Bits	0
TFCI Value	0

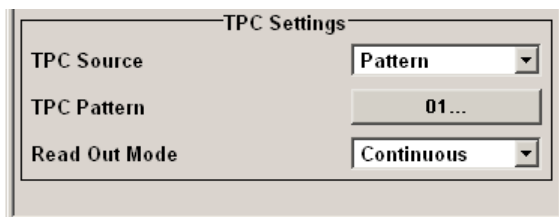
The "Sync Shift Settings" section is where the settings regarding the Sync Shift are set.

Sync Shift Settings	
Number of Sync Shift & TPC Bits	0 & 0
Sync Shift Pattern	1...
Sync Shift Repetition M	1

The "E-UCCH Settings" section is available only for "Channel Type" E-PUCH QPSK/16QAM.



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



4.10.1 Slot Structure and Slot Format

Slot Structure

Displays the slot structure.

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



SCPI command:

n.a.

Slot Format

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.

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:SFORmat` on page 136

Midamble Shift

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.

SCPI command:

`[:SOURce<hw>] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:MSHift` on page 135

4.10.2 TFCI Settings

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

Number of TFCI Bits

Selects the length of the TFCI field expressed in bits.

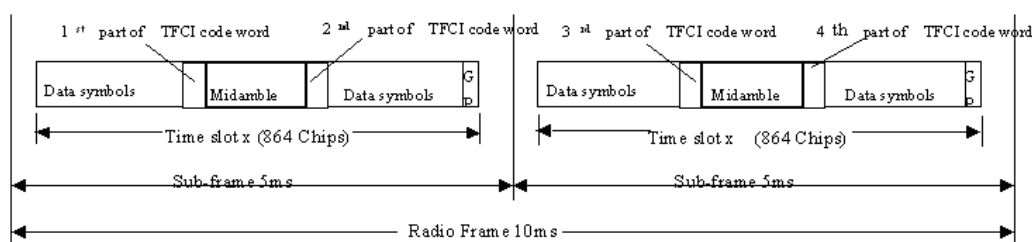
SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DPCCh:TFCI:LENGTh on page 132
```

TFCI Value

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

The coded TFCI word is divided into 4 parts:



SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DPCCh:TFCI:VALue on page 132
```

4.10.3 Sync Shift Settings

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

Number of Sync Shift & TPC Bits

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.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DPCCh:SYNC:LENGTh on page 131
```

Sync Shift Pattern

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

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DPCCh:SYNC:PATTern on page 132
```

Sync Shift Repetition M

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 sub-frames of 5 ms each.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DPCCh:SYNc:REPetition on page 132
```

4.10.4 E-UCCH Settings

The "E-UCCH Settings" section is available only for "Channel Type" E-PUCH QPSK/16QAM.

These settings are preconfigured and disabled, if a HSUPA coding type is enabled for the corresponding channel.

Number of E-UCCH Channels

Sets the number of the E-DCH Uplink Control Channels (E-UCCH).

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCC:EUCC:CCOunt on page 129
```

Number of Phy. Chan. Bits per E-UCCH

Displays the number of physical channel bits per one E-UCCH.

The value is fixed to 32.

SCPI command:

n.a.

E-TFCI Value

Enters the value of the TFCI field.

If a HSUPA is enabled for the corresponding channel, the E-TFCI value is set of the value configured for the parameter [Transport Block Size Index](#).

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCC:EUCC:TFCI on page 130
```

Retransmission Sequence Number (E-UCCH)

Sets the retransmission sequence number.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:RSNumber
on page 149
```

HARQ Process ID

Sets the HARQ process ID.

SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
```

DPCCH:EUCCL:HPID on page 129

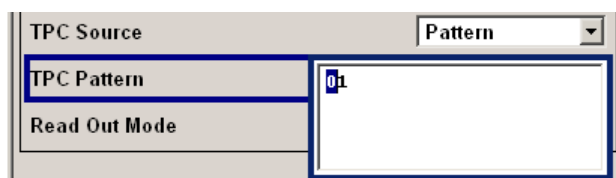
4.10.5 TPC Settings

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

TPC Source

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.



SCPI command:

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCCh:TPC:DATA on page 133
```

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCCh:TPC:DATA:PATtern on page 134
```

```
[ :SOURCE<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCCh:TPC:DATA:DSElect on page 133
```

Read Out Mode

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).

"Continuous" The TPC bits are used cyclically.

"Single + All 0" The TPC bits are used once, and then the TPC sequence is continued with 0 bits.

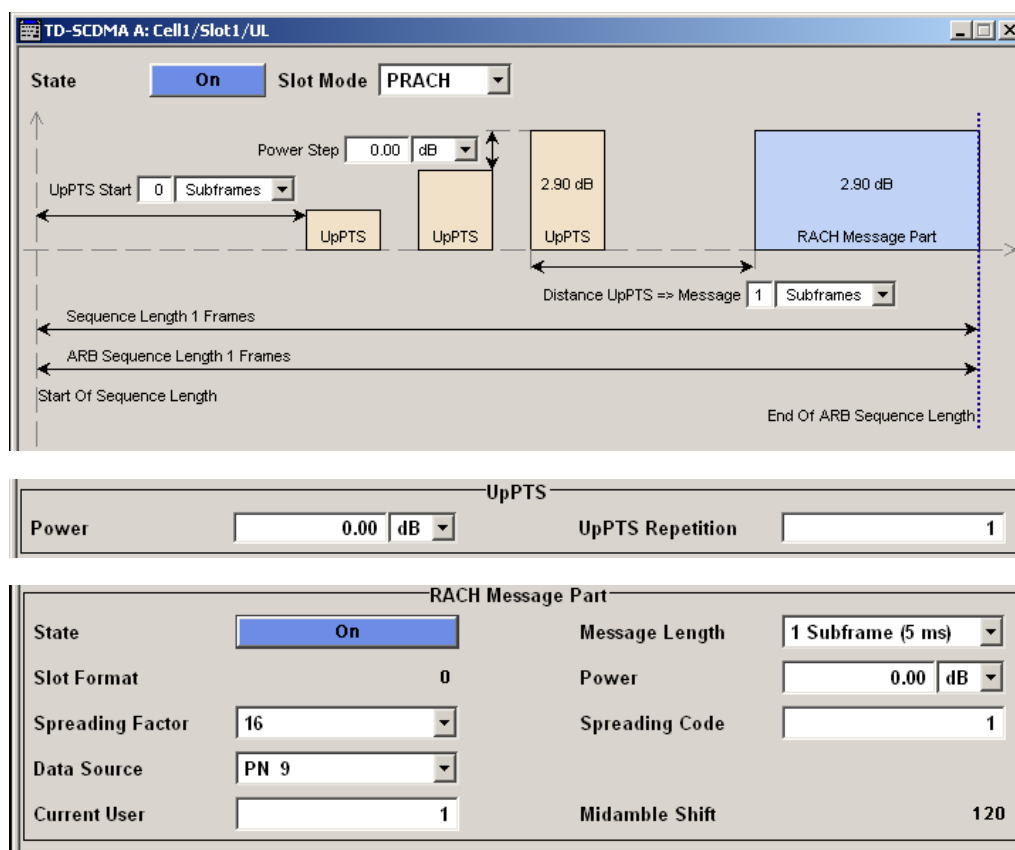
- "Single + All 1" The TPC bits are used once, and then the TPC sequence is continued with 1 bits.
- "Single + alt. 01" The TPC bits are used once, and then the TPC sequence is continued with 0 and 1 bits alternately (in multiples, depending on by the symbol rate, for example, 00001111).
- "Single + 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).

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:
CHANnel<us0>:DPCCh:TPC:READ on page 134
```

4.11 Slot Mode PRACH Settings

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



Power Step

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
---------------------	----------	---------------------	----------	--------------------

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:PSTep
on page 143
```

UpPTS Start

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

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:START
on page 144
```

Distance UpPTS

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

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:DISTance
on page 142
```

Sequence Length

Displays the value of the sequence length.

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:SLENgth
on page 144
```

Power

Enters the power of the UpPTS.

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:POWer
on page 143
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:
PCORrection on page 142
```

UpPTS Repetition

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

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:
REPetition on page 144
```

State (RACH Message Part)

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

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:STATE
```

on page 142

Message Length

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

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:LENGTH
```

on page 140

Slot Format (PRACH)

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

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:SFORMAT
```

on page 141

Power (RACH Message Part)

Enters the power of the PRACH message part.

The value range is -80 dB to 0 dB.

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:POWER
```

on page 141

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:
```

```
PCORrection on page 140
```

Spreading Factor (PRACH)

Selects the spreading factor for the PRACH.

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:SFACTOR
```

on page 141

Spreading Code (PRACH)

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.

SCPI command:

```
[ :SOURce<hw> ] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:SCODE
```

on page 141

Data Source (PRACH)

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.

SCPI command:

`[:SOURCE<hw>] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA`
on page 138

`[:SOURCE<hw>] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA:DSElect` on page 139

`[:SOURCE<hw>] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA:PATtern` on page 139

Current User (PRACH)

Enters the number of current user.

SCPI command:

`[:SOURCE<hw>] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:USER`
on page 142

Midamble Shift (PRACH)

Displays the value for the midamble shift.

SCPI command:

`[:SOURCE<hw>] :BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:MSHift`
on page 140

4.12 Code Domain

The channelization codes are taken from a code tree of hierarchical structure (see below). The higher the spreading factor, the smaller the symbol rate and vice versa. The product of the spreading factor and symbol rate is constant and always yields the chip rate.

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

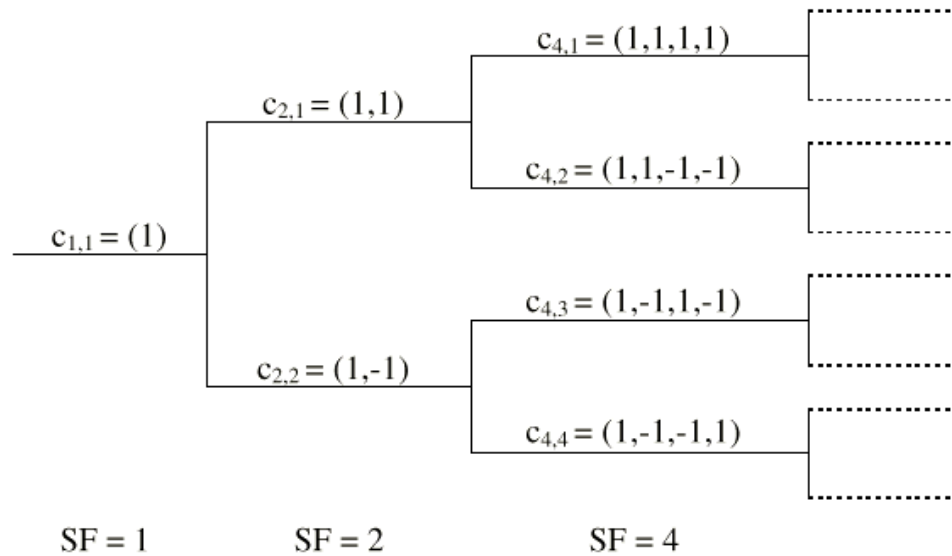
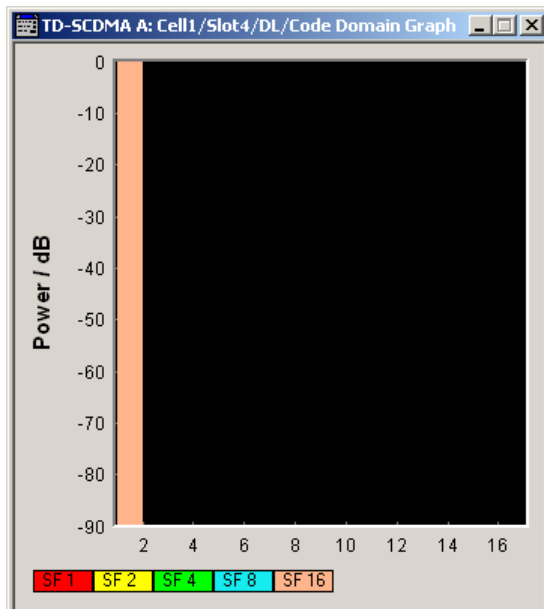


Fig. 4-3: Code tree of channelization codes

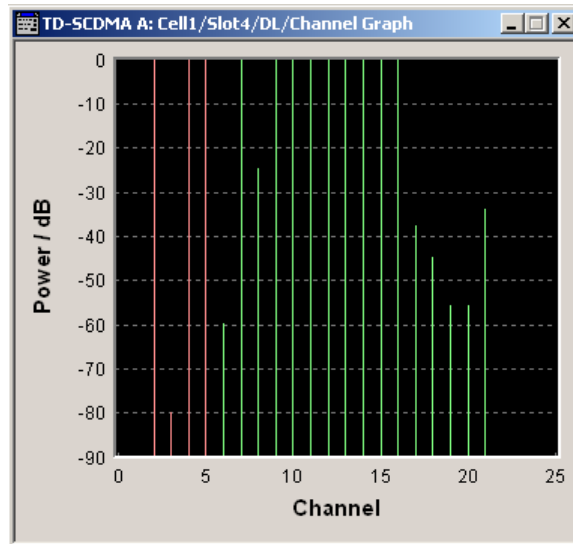
The domain of a certain channelization code is the outer branch range (with minimum symbol rate and max. spreading factor) which is based on the channelization code selected in the code tree. Using a spreading code means that its entire domain is used.

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



4.13 Channel Graph

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.



5 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<hw>

For one-path instruments, the keyword `SOURce` is optional and can be omitted.

The numeric suffix to `SOURce` distinguishes between signal generation for path A and path B in the case of two-path instruments:

- `SOURce[1]` = path A
The keyword `SOURce` is optional and can be omitted
- `SOURce2` = path B
The keyword `SOURce` is mandatory, i.e. the command must contain the keyword with suffix 2.

OUTPut<ch>

The numeric suffix to `OUTPut` distinguishes between the available markers.

Only two markers are available for the R&S SMBV, i.e. the allowed values for the suffix are 1 or 2.

Placeholder <root>

For commands that read out or save files in the default directory, the default directory is set using command `MME:CDIRectory`. The examples in this description use the placeholder `<root>` in the syntax of the command.

- `D:\` - for selecting the internal hard disk of Windows instruments
- `E:\` - for selecting the memory stick which is inserted at the USB interface of Windows instruments
- `/var/<instrument>` - for selecting the internal flash card of Linux instrument, where `<instrument>` is the instrument name, e.g. `smbv`.
- `/usb` - for selecting the memory stick which is inserted at the USB interface of Linux instrument.

5.1 General Commands

<code>[:SOURce<hw>]:BB:TDSCdma:COPY:DESTination</code>	82
<code>[:SOURce<hw>]:BB:TDSCdma:COPY:EXECute</code>	82
<code>[:SOURce<hw>]:BB:TDSCdma:COPY:SOURce</code>	82
<code>[:SOURce<hw>]:BB:TDSCdma:CRATe</code>	83
<code>[:SOURce<hw>]:BB:TDSCdma:CRATe:VARiation</code>	83
<code>[:SOURce<hw>]:BB:TDSCdma:LINK</code>	84
<code>[:SOURce<hw>]:BB:TDSCdma:POWer:ADJust</code>	84
<code>[:SOURce<hw>]:BB:TDSCdma:POWer[:TOTal]</code>	84
<code>[:SOURce<hw>]:BB:TDSCdma:PRAMp:BBONly</code>	84

[:SOURce<hw>]:BB:TDSCdma:PRAMP:FDElay.....85
 [:SOURce<hw>]:BB:TDSCdma:PRAMP:RDElay.....85
 [:SOURce<hw>]:BB:TDSCdma:PRAMP:SHAPE.....85
 [:SOURce<hw>]:BB:TDSCdma:PRAMP:TIME.....85
 [:SOURce<hw>]:BB:TDSCdma:PRESet.....86
 [:SOURce<hw>]:BB:TDSCdma:RESet.....86
 [:SOURce<hw>]:BB:TDSCdma:SETTing:CATalog.....86
 [:SOURce<hw>]:BB:TDSCdma:SETTing:LOAD.....86
 [:SOURce<hw>]:BB:TDSCdma:SETTing:STORE.....87
 [:SOURce<hw>]:BB:TDSCdma:SETTing:STORE:FAST.....87
 [:SOURce<hw>]:BB:TDSCdma:SETTing:TMODeL.....87
 [:SOURce<hw>]:BB:TDSCdma:SETTing:TMODeL:CATalog.....87
 [:SOURce<hw>]:BB:TDSCdma:STATe.....88
 [:SOURce<hw>]:BB:TDSCdma:VERSion.....88
 [:SOURce<hw>]:BB:TDSCdma:WAVeform:CREate.....88

[:SOURce<hw>]:BB:TDSCdma:COPY:DESTination <Destination>

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

Parameters:

<Destination> 1 | 2 | 3 | 4
 Range: 1 to 4
 *RST: 2

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.

[:SOURce<hw>]:BB:TDSCdma:COPY:EXECute

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

Example:

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

Usage:

Event

[:SOURce<hw>]:BB:TDSCdma:COPY:SOURce <Source>

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

Parameters:

<Source> 1 | 2 | 3 | 4
 Range: 1 to 4
 *RST: 1

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.

[[:SOURce<hw>]: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.

Return values:

<CRate> R1M28

Example:

BB:TDSC:CRAT?
 queries the system chip rate.
 Response: R1M2
 the system chip rate is 1.2288 Mcps.

Usage:

Query only

[[:SOURce<hw>]:BB:TDSCdma:CRATe:VARiation <Variation>

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.

Parameters:

<Variation> float
 Range: 1 MHz to 5 MHz
 Increment: 1 Hz
 *RST: 1.28 MHz
 Default unit: Hz (c/s)

Example:

BB:TDSC:CRAT:VAR 4086001
 sets the chip rate to 4.08 Mcps.

[:SOURce<hw>]:BB:TDSCdma:LINK <Link>

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).

Parameters:

<Link> FORWard | DOWN | REVerse | UP
*RST: DOWN

Example:

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

[:SOURce<hw>]: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.

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.

Usage:

Event

[:SOURce<hw>]:BB:TDSCdma:POWER[:TOTal]?

The command queries the total power of the active channels. After "Power Adjust", this power corresponds to 0 dB.

Return values:

<Total> float

Example:

BB:TDSC:POW:TOT?
queries the total power of the active channels.
Response: -22.5
the total power is -25 dB.

Usage:

Query only

[:SOURce<hw>]:BB:TDSCdma:PRAMP:BBONly <BbOnly>

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

Parameters:

<BbOnly> 0 | 1 | OFF | ON
*RST: OFF

Example:

BB:TDSC:PRAM:BBON ON
activates power ramping for the baseband signals.

[[:SOURce<hw>]:BB:TDSCdma:PRAMP:FDElay <FDelay>

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.

Parameters:

<FDelay> integer
 Range: -9.0 to 9.0
 *RST: 0

Example: BB:TDSC:PRAMP:FDEL 8.0
 sets the offset in the falling edge of the envelope to 8.0 chips.

[[:SOURce<hw>]:BB:TDSCdma:PRAMP:RDElay <RDelay>

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.

Parameters:

<RDelay> integer
 Range: -9.0 to 9.0
 *RST: 0

Example: BB:TDSC:PRAMP:RDEL 8.0
 sets the offset in the rising edge of the envelope to 8.0 chips.

[[:SOURce<hw>]:BB:TDSCdma:PRAMP:SHAPE <Shape>

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

Parameters:

<Shape> LINear | COSine
 *RST: COSine

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

[[:SOURce<hw>]:BB:TDSCdma:PRAMP:TIME <Time>

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

Parameters:

<Time> integer
 Range: 0.3 to 16.0
 *RST: 2

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

[[:SOURce<hw>]: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.

An overview is provided by table in [General Settings for TD-SCDMA Signals](#).

Example: BB:TDSC:PRES
resets all the TD-SCDMA settings to default values.

Usage: Event

[[:SOURce<hw>]:BB:TDSCdma:RESet

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

An overview is provided by table in [General Settings for TD-SCDMA Signals](#).

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

Usage: Event

[[:SOURce<hw>]: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. Only files with the file extension *.tdscdma will be listed.

Return values:

<Catalog> string

Example: MMEM:CDIR '<root>\user\tdscdma'
sets the default directory to <root>\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.

Usage: Query only

[[:SOURce<hw>]:BB:TDSCdma:SETTing:LOAD <Filename>

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.

Setting parameters:

<Filename> string

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

Usage: Setting only

[:SOURCE<hw>]:BB:TDSCdma:SETTING:STORE <Filename>

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`.

Setting parameters:

<Filename> string

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

Usage: Setting only

[:SOURCE<hw>]:BB:TDSCdma:SETTING:STORE:FAST <Fast>

Determines whether the instrument performs an absolute or a differential storing of the settings.

Enable this function to accelerate the saving process by saving only the settings with values different to the default ones.

Note: This function is not affected by the "Preset" function.

Parameters:

<Fast> 0 | 1 | OFF | ON
*RST: 1

[:SOURCE<hw>]:BB:TDSCdma:SETTING:TMODEL <TModel>

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

Setting parameters:

<TModel> string

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

Usage: Setting only

[:SOURCE<hw>]:BB:TDSCdma:SETTING:TMODEL:CATALOG?

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

Return values:

<Catalog> string

Example:

```
MMEM:CDIR '<root>\user\tdscdma'
sets the default directory to <root>\user\tdscdma.
BB:TDSC:SETT:CAT?
reads out all the files with the test models.
Response: "'TDSCDMA_TM1','TDSCDMA_TM2'"
the files TDSCDMA_TM1 and TDSCDMA_TM2 are available.
```

Usage:

Query only

[:SOURCE<hw>]:BB:TDSCdma:STATe <State>

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).

BB:TDSC:STAT ON deactivates the other standards and digital modulation.

Parameters:

<State> 0 | 1 | OFF | ON
*RST: OFF

Example:

```
BB:TDSC:STAT ON
activates modulation in accordance with the TD-SCDMA stand-
ard.
```

[:SOURCE<hw>]:BB:TDSCdma:VERSion?

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

Return values:

<Version> string

Example:

```
BB:TDSC:VERS?
queries the TD-SCDMA version.
Response: Release C
TD-SCDMA Release 6.
```

Usage:

Query only

[:SOURCE<hw>]:BB:TDSCdma:WAVEform:CREate <Filename>

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.

Setting parameters:

<Filename> string

Example: MMEM:CDIR '<root>\user\waveform'
 BB:TDSC:WAV:CRE 'tdscdma_1'
 creates the waveform file `tdscdma.wv` in the default directory.

Usage: Setting only

5.2 Filter/Clipping/ARB Settings

[SOURce<hw>]:BB:TDSCdma:CLIPping:LEVel.....	89
[SOURce<hw>]:BB:TDSCdma:CLIPping:MODE.....	89
[SOURce<hw>]:BB:TDSCdma:CLIPping:STATE.....	90
[SOURce<hw>]:BB:TDSCdma:FILTer:TYPE.....	90
[SOURce<hw>]:BB:TDSCdma:FILTer:ILENgtH.....	90
[SOURce<hw>]:BB:TDSCdma:FILTer:ILENgtH:AUTO.....	91
[SOURce<hw>]:BB:TDSCdma:FILTer:OSAMpling.....	91
[SOURce<hw>]:BB:TDSCdma:FILTer:OSAMpling:AUTO.....	91
[SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:APCO25.....	91
[SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:COsine.....	92
[SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:GAUSS.....	92
[SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:LPASS.....	92
[SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:LPASSEVM.....	92
[SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:PGAuss.....	93
[SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:RCOSine.....	93
[SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:SPHase.....	93
[SOURce<hw>]:BB:TDSCdma:SLENgtH.....	94

[SOURce<hw>]:BB:TDSCdma:CLIPping:LEVel <Level>

Sets the limit for clipping.

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

Parameters:

<Level> integer
 Range: 1 to 100
 Increment: 1
 *RST: 100
 Default unit: PCT

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.

[SOURce<hw>]:BB:TDSCdma:CLIPping:MODE <Mode>

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

Parameters:

<Mode> VECTor | SCALar

VECTorThe reference level is the amplitude $|i+jq|$.**SCALar**

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

*RST: VECTor

Example:

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

[:SOURce<hw>]:BB:TDSCdma:CLIPping:STATe <State>

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.

Parameters:

<State> 0 | 1 | OFF | ON

*RST: 0

Default unit: OFF

Example:

```
BB:TDSC:CLIP:STAT ON
activates level clipping
```

[:SOURce<hw>]:BB:TDSCdma:FILTer:TYPE <Type>

The command selects the filter type.

Parameters:<Type> RCOSine | COSine | GAUSs | LGAuss | CONE | COF705 |
COEQualizer | COFequalizer | C2K3x | APCO25 | SPHase |
RECTangle | PGAuss | LPASs | DIRac | ENPShape | EWPSHape |
LPASSEVM

*RST: RCOSine

Example:

```
BB:TDSC:FILT:TYPE RCOS
sets the filter type RCOSine.
```

[:SOURce<hw>]:BB:TDSCdma:FILTer:ILENght <Length>

for R&S WinIQSIM2 only

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

Parameters:

<Length> integer

Range: 1 to 128

Increment: 1

*RST: 10

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

[:SOURce<hw>]:BB:TDSCdma:FILTer:ILEnGth:AUTO <Auto>

for R&S WinIQSIM2 only

The command activates/deactivates the impulse length state. If activated, the most sensible parameter values are selected. The value depends on the coherence check.

Parameters:

<Auto> 0 | 1 | OFF | ON
*RST: ON

Example: `BB:TDSC:FILT:ILEN:AUTO ON`
the most sensible parameters are selected automatically.

[:SOURce<hw>]:BB:TDSCdma:FILTer:OSAMpling <OSampling>

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

The command sets the upsampling factor.

Parameters:

<OSampling> integer
Range: 1 to 32
*RST: 32

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

[:SOURce<hw>]:BB:TDSCdma:FILTer:OSAMpling:AUTO <Auto>

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

The command activates/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.

Parameters:

<Auto> 0 | 1 | OFF | ON
*RST: ON

Example: `BB:TDSC:FILT:OSAM:AUTO ON`
the most sensible parameters are selected automatically.

[:SOURce<hw>]:BB:TDSCdma:FILTer:PARAmeter:APCO25 <Apco25>

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

Parameters:

<Apco25> float
 Range: 0.05 to 0.99
 Increment: 0.01
 *RST: 0.2

Example:

BB:TDSC:FILT:PAR:APCO25 0.2
 sets the roll-off factor to 0.2 for filter type APCO25.

[:SOURCE<hw>]:BB:TDSCdma:FILTer:PARAmeter:COsine <Cosine>

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

Parameters:

<Cosine> float
 Range: 0.00 to 1.0
 Increment: 0.01
 *RST: 0.35

Example:

BB:TDSC:FILT:PAR:COS 0.35
 sets the roll-off factor to 0.35 for filter type Cosine.

[:SOURCE<hw>]:BB:TDSCdma:FILTer:PARAmeter:GAUSs <Gauss>

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

Parameters:

<Gauss> float
 Range: 0.15 to 2.5
 Increment: 0.01
 *RST: 0.5

Example:

BB:TDSC:FILT:PAR:GAUS 0.5
 sets B x T to 0.5 for the Gauss filter type.

[:SOURCE<hw>]:BB:TDSCdma:FILTer:PARAmeter:LPASs <LPass>

The command sets the cut off frequency factor for the Lowpass (ACP Opt.) filter type.

Parameters:

<LPass> float
 Range: 0.05 to 2
 Increment: 0.01
 *RST: 0.5

Example:

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

[:SOURCE<hw>]:BB:TDSCdma:FILTer:PARAmeter:LPASSEVM <LPassEvm>

The command sets the cut off frequency factor for the Lowpass (EVM Opt.) filter type.

Parameters:

<LPassEvm> float
 Range: 0.05 to 2
 Increment: 0.01
 *RST: 0.5

Example:

BB:TDSC:FILT:PAR:LPASSEVM 0.5
 the cut of frequency factor is set to 0.5.

[:SOURce<hw>]:BB:TDSCdma:FILT:PAR:PGAuss <PGauss>

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

Parameters:

<PGauss> float
 Range: 0.15 to 2.5
 Increment: 0.01
 *RST: 0.5

Example:

BB:TDSC:FILT:PAR:GAUS 0.5
 sets B x T to 0.5 for the Pure Gauss filter type.

[:SOURce<hw>]:BB:TDSCdma:FILT:PAR:RCOSine <RCosine>

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

Parameters:

<RCosine> float
 Range: 0 to 1.0
 Increment: 0.01
 *RST: 0.22

Example:

BB:TDSC:FILT:PAR:RCOS 0.22
 sets the roll-off factor to 0.22 for filter type Root Cosine.

[:SOURce<hw>]:BB:TDSCdma:FILT:PAR:SPHase <SPHase>

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

Parameters:

<SPHase> float
 Range: 0.15 to 2.5
 Increment: 0.01
 *RST: 2

Example:

BB:TDSC:FILT:PAR:SPH 0.5
 sets B x T to 0.5 for the Split Phase filter type.

[:SOURce<hw>]:BB:TDSCdma:SLEngth <SLength>

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.

Parameters:

<SLength> integer
 Range: 1 frame to 5000 frames
 *RST: 1 frame

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

5.3 Trigger Settings



The trigger settings are available for R&S SMx and R&S AMU instruments only.

EXternal<ch>

The numeric suffix to EXternal<ch> distinguishes between the external trigger via the TRIGGER 1 (suffix 1) and TRIGGER 2 (suffix 2) connector.

[:SOURce<hw>]:BB:TDSCdma:TRIGger:ARM:EXECute.....	94
[:SOURce<hw>]:BB:TDSCdma:TRIGger:EXECute.....	95
[:SOURce<hw>]:BB:TDSCdma:TRIGger:EXternal:SYNChronize:OUTPut.....	95
[:SOURce<hw>]:BB:TDSCdma:TRIGger:OBASeband:DELay.....	95
[:SOURce<hw>]:BB:TDSCdma:TRIGger:OBASeband:INHibit.....	96
[:SOURce<hw>]:BB:TDSCdma:TRIGger:RMODE.....	96
[:SOURce<hw>]:BB:TDSCdma:TRIGger:SLEngth.....	97
[:SOURce<hw>]:BB:TDSCdma:TRIGger:SLUNit.....	97
[:SOURce<hw>]:BB:TDSCdma:TRIGger:SOURce.....	97
[:SOURce<hw>]:BB:TDSCdma:TRIGger[:EXternal<ch>]:DELay.....	98
[:SOURce<hw>]:BB:TDSCdma:TRIGger[:EXternal<ch>]:INHibit.....	98
[:SOURce<hw>]:BB:TDSCdma[:TRIGger]:SEquence.....	99

[:SOURce<hw>]:BB:TDSCdma:TRIGger:ARM:EXECute

Stops signal generation for trigger modes "Armed Auto" and "Armed Retrigger". A subsequent internal or external trigger event restart signal generation.

Example: BB:TDSC:TRIG:ARM:EXEC
 stops signal generation for trigger modes "Armed Auto" and
 "Armed Retrigger".

Usage: Event

[[:SOURce<hw>]: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`.

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.

Usage:

Event

[[:SOURce<hw>]:BB:TDSCdma:TRIGger:EXTernal:SYNChronize:OUTPut <Output>

(enabled for "Trigger Source" External)

Enables/disables output of the signal synchronous to the external trigger event.

See also "[Sync. Output to External Trigger](#)" on page 31 for a detailed description of the applications of this setting.

Parameters:

<Output>

0 | 1 | OFF | ON

ON

The signal calculation starts simultaneously with the external trigger event but because of the instrument's processing time the first samples are cut off and no signal is outputted. After elapsing of the internal processing time, the output signal is synchronous to the trigger event.

OFF

The signal output begins after elapsing of the processing time and starts with sample 0, i.e. the complete signal is outputted.

This mode is recommended for triggering of short signal sequences with signal duration comparable with the processing time of the instrument.

```
*RST: ON
```

Example:

```
BB:TDSC:TRIG:SOUR EXT
```

sets external triggering.

```
BB:TDSC:TRIG:EXT:SYNC:OUTP ON
```

enables synchronous output to external trigger

[[:SOURce<hw>]:BB:TDSCdma:TRIGger:OBASeband:DELay <Delay>

The command specifies the trigger delay (expressed as a number of chips) for triggering by the trigger signal from the second path.

Parameters:

<Delay> float
 Range: 0 chips to 65 535 chips
 Increment: 1 chip
 *RST: 0 chips

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.

[:SOURce<hw>]:BB:TDSCdma:TRIGger:OBASeband:INHibit <Inhibit>

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.

Parameters:

<Inhibit> integer
 Range: 0 chips to (2²⁶-1) chips
 Increment: 1 chip
 *RST: 0 chips

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.

[:SOURce<hw>]:BB:TDSCdma:TRIGger:RMODE?

The command queries the current status of signal generation for all trigger modes with TD-SCDMA modulation on.

Return values:

<RMode> RUN | STOP

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.

Usage: Query only

[[:SOURce<hw>]:BB:TDSCdma:TRIGger:SLENgth <SLength>

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.

Parameters:

<SLength> float
 Range: 1 to 2³²-1 chips
 *RST: 1 frame length

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.

[[:SOURce<hw>]:BB:TDSCdma:TRIGger:SLUNit <SIUnit>

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`).

Parameters:

<SIUnit> FRAME | CHIP | SEQUENCE
 *RST: SEQUENCE

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.

[[:SOURce<hw>]:BB:TDSCdma:TRIGger:SOURce <Source>

Selects the trigger source.

Parameters:

<Source>

INTernal | EXTernal | BEXTernal | OBASeband

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).

*RST: INTernal

Example:

```
BB:TDSC:TRIG:SOUR EXT
```

executes triggering by means of the signal on the TRIGGER 1 connector.

[:SOURce<hw>]:BB:TDSCdma:TRIGger[:EXTernal<ch>]:DELay <Delay>

The command specifies the trigger delay (expressed as a number of chips) for external triggering.

Parameters:

<Delay>

float

Range: 0 chips to 65535 chips

Increment: 1 chip

*RST: 0 chips

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.

[:SOURce<hw>]:BB:TDSCdma:TRIGger[:EXTernal<ch>]:INHibit <Inhibit>

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.

Parameters:

<Inhibit>

integer

Range: 0 chips to $(2^{26}-1)$ chips

Increment: 1 chip

*RST: 0 chips

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.

[:SOURce<hw>]:BB:TDSCdma[:TRIGger]:SEQUence <Sequence>

The command selects the trigger mode.

Parameters:

<Sequence>

AUTO | RETRigger | AAUTo | ARETrigger | SINGLE

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.

*RST: AUTO

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.

5.4 Marker Settings

This section lists the remote control commands, necessary to configure the markers.



The marker delay settings are available for R&S SMx and R&S AMU instruments only.

OUTPut<ch>

The numeric suffix to OUTPut distinguishes between the available markers.

Only two markers are available for the R&S SMBV, i.e. the allowed values for the suffix are 1 or 2.

<code>[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut:DELay:FIXed</code>	100
<code>[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:DELay</code>	100
<code>[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:DELay:MAXimum</code>	101
<code>[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:DELay:MINimum</code>	101
<code>[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:MODE</code>	101
<code>[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:OFFTime</code>	102
<code>[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:ONTime</code>	102
<code>[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:PERiod</code>	102

[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut:DELay:FIXed <Fixed>

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.

Parameters:

<Fixed> 0 | 1 | OFF | ON
 *RST: OFF

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

[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:DELay <Delay>

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.

Parameters:

<Delay> float
 Range: 0 chips to (2³² - 1) chips
 Increment: 1 chip
 *RST: 0

Example: `BB:TDSC:TRIG:OUTP2:DEL 16000`
 sets a delay of 16000 chips for the signal on connector MARKER 2.

[[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:DELay:MAXimum?

The command queries the maximum marker delay for setting :BB:TDSC:TRIG:OUTP:DEL:FIX ON.

Return values:

<Maximum> float

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.

Usage: Query only

[[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:DELay:MINimum?

The command queries the minimum marker delay for setting :BB:TDSCdma:TRIGger:OUTPut: DELay:FIXed ON.

Return values:

<Minimum> float

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.

Usage: Query only

[[:SOURce<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:MODE <Mode>

The command defines the signal for the selected marker output.

Parameters:

<Mode>

RFRame | SFNR | CSPeriod | RATio | USER | FACTIVE | TRIGGER

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

SOURCE:BB:TDSC:TRIG:OUTP:PERiod.

*RST: RFRame

Example:

BB:TDSC:TRIG:OUTP2:MODE RFR

selects the traffic channel clock on output MARKER 2.

[:SOURCE<hw>]:BB:TDSCdma:TRIGGER:OUTPUT<ch>:OFFTime <OffTime>

[:SOURCE<hw>]:BB:TDSCdma:TRIGGER:OUTPUT<ch>:ONTime <OnTime>

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.

Parameters:

<OnTime>

integer

Range: 1 chip to 2²⁴-1 chips

Increment: 1 chip

*RST: 1 chip

Example:

BB:TDSC:TRIG:OUTP2:ONT 2000

sets an ON time of 2000 chips for marker.

[:SOURCE<hw>]:BB:TDSCdma:TRIGGER:OUTPUT<ch>:PERiod <Period>

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.

Parameters:

<Period> integer
 Range: 1 chip to (2³²-1) chips
 Increment: 1 chip
 *RST: 12800 chips

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.
```

5.5 Clock Settings

This section lists the remote control commands, necessary to configure the clock.



The clock settings are available for R&S SMx and R&S AMU instruments only.

<code>[[:SOURce<hw>]:BB:TDSCdma:CLOCK:MODE</code>	103
<code>[[:SOURce<hw>]:BB:TDSCdma:CLOCK:MULTIPLIER</code>	103
<code>[[:SOURce<hw>]:BB:TDSCdma:CLOCK:SOURce</code>	104
<code>[[:SOURce<hw>]:BB:TDSCdma:CLOCK:SYNCHRONIZATION:EXECUTE</code>	104
<code>[[:SOURce<hw>]:BB:TDSCdma:CLOCK:SYNCHRONIZATION:MODE</code>	105

`[[:SOURce<hw>]:BB:TDSCdma:CLOCK:MODE <Mode>`

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.

Parameters:

<Mode> CHIP | MCHIP
 *RST: CHIP

Example:

```
BB:TDSC:CLOCK:MODE MCH
sets the type of externally supplied clock.
```

`[[:SOURce<hw>]:BB:TDSCdma:CLOCK:MULTIPLIER <Multiplier>`

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.

Parameters:

<Multiplier> integer
 Range: 1 to 64
 Increment: 1
 *RST: 4

Example:

BB:TDSC:CLOCK:SOUR EXT
 selects the external clock source. The clock is supplied via the **CLOCK** connector.

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

BB:TDSC:CLOCK:MULT 12
 the multiplier for the external clock rate is 12.

[:SOURCE<hw>]:BB:TDSCdma:CLOCK:SOURCE <Source>

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:

<Source> **INTERNAL** | **EXTERNAL** | **AINTERNAL**

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.

*RST: **INTERNAL**

Example:

BB:TDSC:CLOCK:SOUR EXT
 selects the external clock source. The clock is supplied via the **CLOCK** connector.

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

BB:TDSC:CLOCK:MULT 12
 the multiplier for the external clock rate is 12.

[:SOURCE<hw>]:BB:TDSCdma:CLOCK:SYNCHRONIZATION:EXECUTE

(for R&S SMBV only)

Performs automatically adjustment of the instrument's settings required for the synchronization mode, set with the command **BB:TDSC:CLOCK:SYNC:MODE**.

Example: BB:TDSC:CLOC:SYNC:MODE MAST
the instrument is configured to work as a master one.
BB:TDSC:CLOC:SYNC:EXEC
all synchronization's settings are adjusted accordingly.

Usage: Event

[:SOURce<hw>]:BB:TDSCdma:CLOCK:SYNChronization:MODE <Mode>

(for R&S SMBV only)

Selects the synchronization mode.

This parameter is used to enable generation of very precise synchronous signal of several connected R&S SMBVs.

Note: If several instruments are connected, the connecting cables from the master instrument to the slave one and between each two consecutive slave instruments must have the same length and type. Avoid unnecessary cable length and branching points.

Parameters:

<Mode>

NONE | MASTer | SLAVe

NONE

The instrument is working in stand-alone mode.

MASTer

The instrument provides all connected instrument with its synchronization (including the trigger signal) and reference clock signal.

SLAVe

The instrument receives the synchronization and reference clock signal from another instrument working in a master mode.

*RST: NONE

Example:

BB:TDSC:CLOC:SYNC:MODE MAST
the instrument is configured to work as a master one.

5.6 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.

[:SOURce<hw>]:BB:TDSCdma:DOWN UP:PPARAmeter:DPCH:COUNT.....	106
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:PPARAmeter:DPCH:CRESt.....	106
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:PPARAmeter:DPCH:SFACTOR.....	106
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:PPARAmeter:EXECute.....	107
[:SOURce<hw>]:BB:TDSCdma:DOWN:PPARAmeter:PCCPch:STATE.....	107

```
[ :SOURce<hw>]:BB:TDSCdma:DOWN|UP:PPARameter:DPCH:COUNT <Count>
```

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

Parameters:

<Count> integer
 Range: 1 to 48
 *RST: 12

Example:

```
BB:TDSC:DOWN:PPAR:DPCH:COUN 48
```

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

```
[ :SOURce<hw>]:BB:TDSCdma:DOWN|UP:PPARameter:DPCH:CRESt <Crest>
```

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.

Parameters:

<Crest> MINimum | AVERage | WORSt

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.

*RST: MINimum

Example:

```
BB:TDSC:DOWN:PPAR:DPCH:CRES WORS
```

sets the crest factor to an unfavorable value.

```
[ :SOURce<hw>]:BB:TDSCdma:DOWN|UP:PPARameter:DPCH:SFACTOR <SFactor>
```

This command sets the the spreading factor for the DPCHs.

Max. No. DPCH = 3 x Spreading Factor

Parameters:

<SFactor> 1 | 2 | 4 | 8 | 16
 *RST: 16

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

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:PPARmeter:EXECute

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

Example: `BB:TDSC:DOWN:PPAR:EXEC`
configures the signal sequence as defined by the `:BB:TDSC:PPARmeter` commands.

Usage: Setting only

[:SOURce<hw>]:BB:TDSCdma:DOWN:PPARmeter:PCCPch:STATe <State>

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.

Parameters:

<State> 0 | 1 | OFF | ON
*RST: ON

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

5.7 Cell Settings

CELL<st>

Value Range [1] | 2 | 3 | 4

<code>[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:UPPTs:MODE</code>	108
<code>[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:DWPTs:MODE</code>	108
<code>[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:UPPTs:POWer</code>	108
<code>[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:DWPTs:POWer</code>	108
<code>[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:UPPTs:STATe</code>	108
<code>[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:DWPTs:STATe</code>	108
<code>[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:MCODe</code>	108
<code>[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:PROTation</code>	109
<code>[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SCODE</code>	109
<code>[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SCODE:STATe</code>	109
<code>[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SDCode</code>	109
<code>[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SPOint</code>	110
<code>[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:STATe</code>	110
<code>[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SUCode</code>	110
<code>[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:TDElay</code>	110
<code>[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:USERS</code>	111

```
[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:UPPTs:MODE
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:DWPTs:MODE <Mode>
```

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 Sub-frame to Configure" graph.

Parameters:

```
<Mode>          AUTO | ON | OFF
                *RST:    AUTO
```

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

```
[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:UPPTs:POWER
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:DWPTs:POWER <Power>
```

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

Parameters:

```
<Power>         float
                Range:   -80 dB to 10 dB
                Increment: 0.01
                *RST:    0
```

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

```
[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:UPPTs:STATE?
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:DWPTs:STATE?
```

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

Return values:

```
<State>         0 | 1 | OFF | ON
                *RST:    OFF
```

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

Usage: Query only

```
[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:MCODe?
```

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).

Return values:

```
<MCode>         integer
```

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

Usage: Query only

[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:PROTation <PRotation>

The command selects the phase rotation for the downlink pilots.

Parameters:

<PRotation>

AUTO | S1 | S2

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.

*RST: AUTO

Example:

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

[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SCODE <SCode>

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

Parameters:

<SCode>

integer

Range: 0 to 127

*RST: 0

Example:

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

[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SCODE:STATE <State>

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

Parameters:

<State>

0 | 1 | OFF | ON

*RST: ON

Example:

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

[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>: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.

Return values:

<SdCode> integer

Example:

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

Usage:

Query only

[<SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SPOint <SPoint>

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

Parameters:

<SPoint> float
Range: 1 to 6
*RST: 3

Example:

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

[<SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:STATe <State>

The command activates and deactivates the specified cell.

Parameters:

<State> 0 | 1 | OFF | ON
*RST: OFF

Example:

BB:TDSC:DOWN:CELL1:STAT ON
activates cell 1

[<SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SUCode <SuCode>

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.

Parameters:

<SuCode> float
Range: 0 to 255

Example:

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

[<SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:TDElay <TDelay>

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.

Parameters:

<TDelay> float
 Range: 0 chips to 6400 chips
 *RST: -

Example:

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

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:USERS <Users>

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

Parameters:

<Users> 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16
 *RST: 16

Example:

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

5.8 Enhanced Channels of Cell 1

CELL<st>

Value Range CELL1

DTCH<ch>

Value Range 1 .. 7

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:SSPattern	112
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:TPCPattern	113
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:TTInterval	113
[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSIch:ANPattern	113
[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSIch:CQI:MODulation	113
[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSIch:CQI:VALue	114
[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSIch:TTInterval	114
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:BIT:LAYer	114
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:BIT:RATE	114
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:BIT:STATE	115
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:BLOCK:RATE	115
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:BLOCK:STATE	115
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:BPFRame	115
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:CCOunt	116
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: CRCSize	116
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: DATA	116
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: DATA:DSElect	117

[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: DATA:PATtern.....	118
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: EPRotectioN.....	118
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: IONE.....	118
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: ITWO.....	118
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: RMATtribute.....	119
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: STATe.....	119
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: TBCount.....	119
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: TBSize.....	119
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH: TTINterval.....	120
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:RUPLayer.....	120
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:SCSMoDe.....	120
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:SFORmat.....	121
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:SLOTstate<ch>.....	121
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:STATe.....	121
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:TSCoUnT.....	121
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:TYPE.....	122
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:BPFRame.....	122
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:CRCSiZe.....	122
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA.....	122
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA:DSELect.....	123
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA:PATtern.....	124
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:EPRotectioN.....	124
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:IONE.....	124
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:ITWO.....	124
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:RMATtribute.....	125
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:STATe.....	125
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TBCoUnT.....	125
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TBSiZe.....	125
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TTINterval.....	126
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SCSMoDe.....	126
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SFORmat.....	126
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SLOTstate<ch>.....	126
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:STATe.....	127
[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:TYPE.....	127

**[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:SSPattErN
<SsPattErN>**

Sets the sync shift pattern. The pattern length is 21 bits.

Parameters:

<SsPattern> integer
*RST: 0

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:PLCC:SSP #HA5,8
sets the sync shift pattern.

[:SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:TPCPattern
<TpcPattern>

Sets the TPC pattern. The pattern length is 21 bits.

Parameters:

<TpcPattern> integer
*RST: 0

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:PLCC:TPCP #HA5,8
sets the TPC pattern

[:SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:TTInterval?

Queries the transmission time interval.

Return values:

<TtInterval> 5MS | 10MS | 20MS | 40MS | 80MS

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:PLCC:TTIN?
queries the TTI value
Response: 5ms

Usage:

Query only

[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSICCh:ANPattern
<AnPattern>

Sets the ACK/NACK Pattern. The pattern has a maximal length of 36 bits; a "1" corresponds to ACK, a "0" to NAK.

Parameters:

<AnPattern> integer

Example:

BB:TDSC:UP:CELL1:ENH:DCH:HSIC:ANP #HAA,8
sets the ACK/NACK pattern

[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSICCh:CQI:MODulation
<Modulation>

Sets the CQI modulation.

Parameters:

<Modulation> QPSK | QAM16 | QAM64
*RST: QPSK

Example: BB:TDSC:UP:CELL1:ENH:DCH:HSIC:CQI:MOD QAM16
sets the CQI modulation

[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSIC:HQI:VALue
<Value>

Sets the CQI value.

Parameters:

<Value> integer
Range: 0 to 63
*RST: 0

Example: BB:TDSC:UP:CELL1:ENH:DCH:HSIC:HQI:VAL 10
sets the CQI value

[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSIC:TTINterval?

Queries the transmission time interval.

Return values:

<TtInterval> 5MS | 10MS | 20MS | 40MS | 80MS

Example: BB:TDSC:UP:CELL1:ENH:DCH:HSIC:TTIN?
queries the TTI
Response: 5ms

Usage: Query only

[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:BIT:LAYer
<Layer>

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

Parameters:

<Layer> TRANsport | PHYSical
*RST: TRANsport

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

[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:BIT:RATE <Rate>

The command sets the bit error rate.

Parameters:

<Rate> float
Range: 1E-7 to 5E-1
*RST: 5E-1

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

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:BIT:STATE
<State>**

The command activates or deactivates bit error generation.

Parameters:

<State> 0 | 1 | OFF | ON
*RST: OFF

Example:

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

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:BLOCK:RATE
<Rate>**

The command sets the block error rate.

Parameters:

<Rate> float
Range: 10E-4 to 10E-1
*RST: 10E-1

Example:

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

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:BLOCK:STATE
<State>**

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.

Parameters:

<State> 0 | 1 | OFF | ON
*RST: OFF

Example:

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

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>: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.

Return values:

<BpFrame> string

Example:

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

Usage:

Query only

```
[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:CCOUNT <CCOUNT>
```

Sets the number of channels to be used.

The number of time slots is set with the command

```
BB:TDSC:DOWN|UP:CELL1:ENH:DCH:TSCOUNT.
```

Parameters:

```
<CCOUNT>          integer
                   Range:    1 to 16
```

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:CCO 2
sets two channels

```
[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:CRCSIZE <CRCSIZE>
```

Sets the type (length) of the CRC.

Parameters:

```
<CRCSIZE>         NONE | 8 | 12 | 16 | 24
                   *RST:    16
```

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

```
[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:DATA <DATA>
```

The command selects the data source for the specified channel.

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

Parameters:

<Data> PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLIS | ZERO | ONE | PATtern

PNxx

PRBS data as per CCITT with period lengths between 29-1 and 223-1 is generated internally.

DLIS

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>.
```

```
*RST: PN9
```

Example:

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

```
[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:
DATA:DSElect <DSelect>
```

The command selects the data list for the DLIS 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.

Parameters:

<DSelect> string

Example:

```
BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:DATA DLIS
selects the Data Lists data source for the transport channel.
MMEM:CDIR '<root>\Lists\DM\IqData'
selects the directory for the data lists.
BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:DATA:DSEL
'tdscdma_1'
selects file tdscdma_1 as the data source. This file must be in the
directory <root>\Lists\DM\IqData and have the file extension
*.dm_iqd.
```

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:DATA:PATtern <Pattern>

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.

Parameters:

<Pattern> 64 bit pattern
 Range: #B0,1 to #B111..1,64
 *RST: 0

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:DATA:PATT
 #H800FE038,30
 defines the bit pattern.

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:EPRotectio n <EProtection>

Sets the error protection.

Parameters:

<EProtection> NONE | TURBo3 | CON2 | CON3
 *RST: CON3

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:EPR CON2
 sets the error protection.

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:IONE <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.

Parameters:

<IOne> 0 | 1 | OFF | ON
 *RST: ON

Example:

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

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:ITWO <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.

Parameters:

<ITwo> 0 | 1 | OFF | ON
 *RST: ON

Example:

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

[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:RMAtribute <RmAttribute>

Sets the rate matching.

Parameters:

<RmAttribute> integer
 Range: 16 to 1024
 *RST: 256

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:RMA 32
 sets the rate matching.

[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:STATE <State>

Sets the state of the transport channel.

Parameters:

<State> 0 | 1 | OFF | ON
 *RST: ON

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:STAT ON
 enables the transport channel.

[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:TBCount <TbCount>

Sets the number of transport blocks for the TCH.

Parameters:

<TbCount> integer
 Range: 1 to 24
 *RST: 1

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:TBC 2
 sets the number of transport blocks for the TCH.

[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:TBSize <TbSize>

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

Parameters:

<TbSize> float
 Range: 0 to 4096
 *RST: 244

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:TBS 4096
 sets the size of transport block of the channel coding input.

[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:DTCH<ch>|DCCH:TTInterval <TtInterval>

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

Parameters:

<TtInterval> 5MS | 10MS | 20MS | 40MS
 *RST: 20 ms

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:DTCH:TTIN 40MS
 sets the number of frames into which a TCH is divided.

[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:RUPLayer?

The command queries the resource units on the physical layer needed to generate the selected channel.

Return values:

<RupLayer> string

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:RUPL?
 queries the resource units on the physical layer needed to generate the selected channel.

Usage:

Query only

[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:SCSMMode <ScsMode>

The command sets the spreading code selection mode for the used transport channels.

Parameters:

<ScsMode> AUTO | USER
 *RST: AUTO

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:SCSM AUTO
 queries the spreading code.

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH: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.

Return values:

<SFormat> string

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:SFOR?
queries the channel coding type.

Usage: Query only

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:SLOTstate<ch>
<SlotState>**

The command queries the state of the slots off cell 1 used to transmit the transport channel.

Suffix:

<ch> [0] .. 6

Parameters:

<SlotState> 0 | 1 | OFF | ON

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:SLOT 3?
queries the state of slot 3.

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:STATE <State>

The command activates or deactivates the enhanced state for the DCH channel coding.

Parameters:

<State> 0 | 1 | OFF | ON
*RST: OFF

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:STAT ON
deactivates the enhanced state for the DCH channel.

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:TSCOUNT
<TsCount>**

Sets the number of time slots to be used.

Parameters:

<TsCount> integer
Range: 1 to 5
*RST: -

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:TSC 2
sets 2 time slots.

[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:TYPE <Type>

The command sets the channel coding type.

Parameters:

<Type> RMC12K2 | RMC64K | RMC144K | RMC384K | RMC2048K |
 HRMC526K | HRMC730K | UP_RMC12K2 | UP_RMC64K |
 UP_RMC144K | UP_RMC384K | HSDPA | HSUPA | HS_SICH |
 PLCCH | USER | USER
 *RST: RMC12K2

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:TYPE RMC12K2
 sets the channel coding type to RMC12K2.

[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>: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.

Return values:

<BpFrame> string

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

Usage: Query only

[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:CRCSIZE?

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

Return values:

<CrCSize> NONE | 8 | 12 | 16 | 24

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

Usage: Query only

[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA <Data>

The command selects the data source for the specified channel.

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

Parameters:

<Data> PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLIS | ZERO | ONE | PATTErn

PNxx

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

DLIS

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>.
```

```
*RST: PN9
```

Example:

```
BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA PN9
selects PN9 as the data source of the transport channel.
```

[:SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA:DSELEct <DSelect>

The command selects the data list for the DLIS 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.

Parameters:

<DSelect> string

Example:

```
BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA DLIS
selects the Data Lists data source for the transport channel.
MMEM:CDIR '<root>\Lists\DM\IqData'
selects the directory for the data lists.
BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA:DSEL
'tdscdma_1'
selects file tdscdma_1 as the data source. This file must be in the
directory <root>\Lists\DM\IqData and have the file extension
*.dm_iqd.
```

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA: PATTern <Pattern>

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.

Parameters:

<Pattern> 64 bit pattern
 Range: #B0,1 to #B111..1,64
 *RST: 0

Example: BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:DATA:PATT
 #H800FE038,30
 defines the bit pattern.

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:EPRotectioN?

The command queries the error protection.

Return values:

<EProtection> NONE | TURBo3 | CON2 | CON3

Example: BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:EPR?
 queries the error protection.

Usage: Query only

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:IONE <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.

Parameters:

<IOne> 0 | 1 | OFF | ON
 *RST: ON

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

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:ITWO <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.

Parameters:

<ITwo> 0 | 1 | OFF | ON
 *RST: ON

Example:

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

[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:RMATtribute?

The command queries the rate matching.

Return values:

<RmAttribute> integer

Example:

BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:RMAT?
 queries the rate matching.

Usage:

Query only

[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:STATE?

The command queries the state of the transport channel.

Return values:

<State> 0 | 1 | OFF | ON

Example:

BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:STAT?
 queries the state of the transport channel.

Usage:

Query only

[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TBCount?

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

Return values:

<TbCount> integer

Example:

BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:TBC?
 queries the number of transport blocks for the TCH.

Usage:

Query only

[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TBSize?

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

Return values:

<TbSize> integer

Example:

BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:TBS?
 queries the size of transport block of the channel coding input.

Usage: Query only

[:SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TTInterval?

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

Return values:

<TtInterval> 5MS | 10MS | 20MS | 40MS | 80MS

Example:

BB:TDSC:DOWN:CELL1:ENH:BCH:DTCH:TTIN?
queries the number of frames into which a TCH is divided.

Usage: Query only

[:SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SCSMode?

The command queries the spreading code predetermined in the standard. For BCH, the spreading code is always "Auto."

Return values:

<ScsMode> AUTO

Example:

BB:TDSC:DOWN:CELL1:ENH:BCH:SCSM?
queries the spreading code.

Usage: Query only

[:SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>: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.

Return values:

<SFormat> string

Example:

BB:TDSC:DOWN:CELL1:ENH:BCH:SFOR?
queries the channel coding type.

Usage: Query only

[:SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SLOTstate<ch>?

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.

Suffix:

<ch> [0] .. 6

Return values:

<SlotState> 0 | 1 | OFF | ON

Example: BB:TDSC:DOWN:CELL1:ENH:BCH:SLOT1?
queries the state of slot 1.

Usage: Query only

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:STATE <State>

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.

Parameters:

<State> 0 | 1 | OFF | ON
*RST: OFF

Example: BB:TDSC:DOWN:CELL1:ENH:BCH:STAT ON
deactivates the enhanced state for the P-CCPCH 1/2 channel.

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:TYPE?

The command queries the channel coding type.

Return values:

<Type> BCHSfn

Example: BB:TDSC:DOWN:CELL1:ENH:BCH:TYPE?
queries the channel coding type.

Usage: Query only

5.9 Channel Settings

CELL<st>

Value Range CELL1

SLOT<ch0>

Value Range [0] .. 6

CHANnel<us0>

Value Range [0] .. 21

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCC: EUCC:CCOunt.....	129
[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCC: EUCC:HPID.....	129
[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCC: EUCC:RSNumber.....	129
[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCC: EUCC:TFCI.....	130

[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: DATA.....	130
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: DATA:DSElect.....	131
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: DATA:PATtern.....	131
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: DPCCh:SYNC:LENGth.....	131
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: DPCCh:SYNC:PATtern.....	132
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: DPCCh:SYNC:REPetition.....	132
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: DPCCh:TFCI:LENGth.....	132
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: DPCCh:TFCI:VALue.....	132
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: DPCCh:TPC:DATA.....	133
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: DPCCh:TPC:DATA:DSElect.....	133
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: DPCCh:TPC:DATA:PATtern.....	134
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: DPCCh:TPC:READ.....	134
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: ENHanced.....	135
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: MSHift.....	135
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: POWer.....	135
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: SCODE.....	136
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: SFACtor.....	136
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: SFORmat.....	136
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: STATe.....	136
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: TYPE.....	137
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: USER.....	137
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:DCONFlict.....	137
[:SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:STATe.....	138
[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:MODE.....	138
[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA.....	138
[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA:DSElect.....	139
[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA:PATtern.....	139
[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:LENGth.....	140
[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:MSHift.....	140

<code>[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:PCORrection</code>	140
<code>[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:POWer</code>	141
<code>[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:SCODE</code>	141
<code>[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:SFACTOR</code>	141
<code>[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:SFORMAT</code>	141
<code>[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:STATE</code>	142
<code>[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:USER</code>	142
<code>[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:DISTance</code>	142
<code>[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:PCORrection</code>	142
<code>[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:POWer</code>	143
<code>[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:PSTep</code>	143
<code>[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:REPetition</code>	144
<code>[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:START</code>	144
<code>[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:SLENgth</code>	144

**`[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCC:
EUCC:CCOunt <CCount>`**

Sets the number of the E-DCH Uplink Control Channels (E-UCCH).

Parameters:

`<CCount>` integer
 Range: 0 to 8
 *RST: 0

Example:

```
BB:TDSC:UP:CELL1:SLOT1:CHAN7:TYPE E_PUCH_QPSK
sets channel type E-PUCH QPSK
BB:TDSC:UP:CELL1:SLOT1:CHAN7:DPCC:EUCC:CCO 5
sets number of E-UCCH channels
```

**`[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCC:
EUCC:HPID <Hpid>`**

Sets the HARQ process ID.

Parameters:

`<Hpid>` float
 Range: 0 to 3
 *RST: 0

Example:

```
BB:TDSC:UP:CELL1:SLOT1:CHAN7:TYPE E_PUCH_QPSK
sets channel type E-PUCH QPSK
BB:TDSC:UP:CELL1:SLOT1:CHAN7:DPCC:EUCC:HPID 2
sets number HARQ process ID
```

**`[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCC:
EUCC:RSNumber <RsNumber>`**

Sets the retransmission sequence number.

Parameters:

<RsNumber> integer
 Range: 0 to 3
 *RST: 0

Example:

```
BB:TDSC:UP:CELL1:SLOT1:CHAN7:TYPE E_PUCH_QPSK
sets channel type E-PUCH QPSK
BB:TDSC:UP:CELL1:SLOT1:CHAN7:DPCC:EUECC:RSN 2
sets retransmission sequence number
```

**[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANNEL<us0>:DPCC:
 EUECC:TFCI <Tfci>**

Enters the value of the TFCI field.

Parameters:

<Tfci> float
 Range: 0 to 63
 *RST: 0

Example:

```
BB:TDSC:UP:CELL1:SLOT1:CHAN7:TYPE E_PUCH_QPSK
sets channel type E-PUCH QPSK
BB:TDSC:UP:CELL1:SLOT1:CHAN7:DPCC:EUECC:TFCI 10
sets the TFCI value
```

**[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANNEL<us0>:
 DATA <Data>**

The command determines the data source for the selected channel.

Parameters:

<Data> PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | ZERO |
 ONE | PATtErn

PNxx

PRBS data as per CCITT with period lengths between 29-1 and 223-1 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.

*RST: PN9

Example:

```
BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DATA PN9
sets the data source for the selected channel to PN9.
```

**[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANNEL<us0>:
DATA:DSElect <DSelect>**

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.

Parameters:

<DSelect> string

Example:

```
BB:TDSC:UP:CELL1:SLOT3:CHAN6:DATA DLIS
selects the Data Lists data source.
MMEM:CDIR '<root>\Lists\DM\IqData'
selects the directory for the data lists.
BB:TDSC:UP:CELL1:SLOT3:CHAN6:DATA:DSEL
'tdscdma_1'
selects file tdscdma_1 as the data source. This file must be in the
directory <root>\Lists\DM\IqData and have the file exten-
sion *.dm_iqd.
```

**[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANNEL<us0>:
DATA:PATTERN <Pattern>**

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.

Parameters:

<Pattern> integer
Range: #B0,1 to B11..1,64
*RST: 0

Example:

```
BB:TDSC:UP:CELL1:SLOT3:CHAN6:DATA:PATT #H3F, 8
defines the bit pattern.
```

**[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANNEL<us0>:
DPCCh:SYNC:LENGTH <Length>**

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.

Parameters:

<Length> 0 | 2 | 3 | 4 | 8 | 16 | 32 | 48
*RST: 0

Example:

```
BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCCh:SYNC:LENG 2
sets the Sync Shift and the length of the TPC field to 2 bits.
```

**[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:SYNC:PATtern <Pattern>**

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

Parameters:

<Pattern> string
*RST: 1

Example:

BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:SYNC:PATT
10-01
sets the bit pattern for the sync shift.

**[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:SYNC:REPetition <Repetition>**

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.

Parameters:

<Repetition> integer
Range: 1 to 8
*RST: 1

Example:

BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:SYNC:REP 1
sets the value for the sync shift repetition.

**[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:TFCI:LENGth <Length>**

The command sets the length of the TFCI field in bits.

Parameters:

<Length> 0 | 4 | 6 | 8 | 12 | 16 | 24 | 32 | 48
*RST: 0

Example:

BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:TFCI:LENG
12
sets the length of the TFCI field to 12 bits.

**[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCh:TFCI:VALue <Value>**

The command sets the value of the TFCI field.

Parameters:

<Value> integer
Range: 0 to 1023
*RST: 0

Example: `BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:TFCI:VAL 0`
sets the value of the TFCI field to 0.

**[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANNEL<us0>:
DPCCh:TPC:DATA <Data>**

The command sets the data source for the TPC field of the DPCCH.

Parameters:

<Data>

DLISt | ZERO | ONE | PATTErn

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`

*RST: PATTErn

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.

**[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANNEL<us0>:
DPCCh:TPC:DATA:DSElect <DSelect>**

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.

Parameters:

<DSelect>

string

Example:

```
BB:TDSC:DOWN:CELL1:SLOT3:CHAN5:DPCC:TPC:DATA
DLIS
selects the Data Lists data source.
MMEM:CDIR '<root>\Lists\DM\IqData'
selects the directory for the data lists.
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 <root>\Lists\DM\IqData and have the file exten-
sion *.dm_iqd.
```

```
[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCCh:TPC:DATA:PATTern <Pattern>
```

The command sets the bit pattern. The maximum bit pattern length is 64 bits.

Parameters:

<Pattern> integer
 Range: #B0,1 to #B111...1,64
 *RST: 01

Example:

```
BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:DPCC:TPC:DATA:
PATT #H3F,8
defines the bit pattern.
```

```
[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
DPCCCh:TPC:READ <Read>
```

The command sets the read out mode for the bit pattern of the TPC field.

Parameters:

<Read> CONTInuous | S0A | S1A | S01A | S10A

CONTInous
 The TPC bits are used cyclically.

S0A
 The TPC bits are used once and then the TPC sequence is con-
 tinued with 0 bits.

S1A
 The TPC bits are used once and then the TPC sequence is con-
 tinued with 1 bit.

S01A
 The TPC bits are used once and then the TPC sequence is con-
 tinued 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 con-
 tinued with 1 and 0 bits alternately (in multiples, depending on by
 the symbol rate, for example, 11110000).

*RST: CONTInuous

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).

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:ENHanced?

The command queries the enhanced state. If the enhanced state is set to ON, the channel coding cannot be changed.

Return values:

<Enhanced> 0 | 1 | 2 | OFF | ON | NOvalue

Example: BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:ENH?
queries the enhanced state of channel 6.

Usage: Query only

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>: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.

Return values:

<MShift> integer

Example: BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:MSH?
queries the midamble shift.

Usage: Query only

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:POWER <Power>

The command sets the channel power in dB.

Parameters:

<Power> float
Range: -80 to 0 dB
Increment: 0.01 dB
*RST: 0 dB

Example: BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:POW -20
set the channel power to -20 dB.

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
SCODE <SCode>**

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.

Parameters:

<SCode> float
Range: 1 to 16
*RST: 1

Example: BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:SCOD 1
set the spreading code for channel 6 to 1.

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
SFACTOR <SFactor>**

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

Parameters:

<SFactor> 1 | 2 | 4 | 8 | 16
*RST: 16

Example: BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:SFAC 16
sets the spreading factor for channel 6 to 16.

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
SFORMAT <SFormat>**

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.

Parameters:

<SFormat> float
Range: 0 to 69
*RST: -

Example: BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:SFOR 0
sets the slot format for channel 6 to 0.

**[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:
STATE <State>**

The command activates or deactivates the channel.

Parameters:

<State> 0 | 1 | OFF | ON
 *RST: OFF

Example:

BB:TDSC:UP:CELL1:SLOT3:CHAN6:STAT ON
 activates channel 6.

**[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANNEL<us0>:
 TYPE <Type>**

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.

Parameters:

<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 |
 HS_PDS_64QAM | E_PUCH_QPSK | E_PUCH_16QAM |
 E_RUCCH | PLCCH | EAGCH | EHICH
 *RST: depending on channel number

Example:

BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:TYPE DPC_QPSK
 sets the channel type DPC_QPSK for channel 6 of the channel
 table.

**[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:CHANNEL<us0>:
 USER <User>**

The command sets the number of the user.

Parameters:

<User> float
 Range: 1 to 16
 *RST: 1

Example:

BB:TDSC:DOWN:CELL4:SLOT3:CHAN6:USER 3
 sets the number of the users to 3.

[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:DCONFLICT?

The command queries the global domain conflict state per slot.

Return values:

<DConflict> 0 | 1 | OFF | ON

Example:

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

Usage: Query only

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:SLOT<ch0>:STATe <State>

The command activates and deactivates the slot in the subframe.

Parameters:

<State> 0 | 1 | OFF | ON
 *RST: OFF

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

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:MODE <Mode>

The command sets the mode in which the slot is to work.

Parameters:

<Mode> DEDicated | PRACH

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.

*RST: DEDicated

Example: BB:TDSC:UP:CELL4:SLOT3:MODE PRACH
 sets the PRACH mode for the selected slot.

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA <Data>

The command determines the data source for the PRACH.

Parameters:

<Data> PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLIS | ZERO | ONE | PATtern

PNxx

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

DLIS

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.

*RST: PN9

Example:

BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:DATA PN9
selects PN9 as the data source for the PRACH.

**[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA:
DSElect <DSelect>**

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.

Parameters:

<DSelect> string

Example:

BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:DATA DLIS
selects the Data Lists data source.

MMEMoRY:CDIR '<root>\Lists\DM\IqData'
selects the directory for the data lists.

BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:DATA:DSEL
'tdscdma_1'

selects file `tdscdma_1` as the data source. This file must be in the directory `<root>\Lists\DM\IqData` and have the file extension `*.dm_iqd`.

**[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA:
PATtern <Pattern>**

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.

Parameters:

<Pattern> integer
 Range: #B0,1 to B11..1,64

Example:

BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:DATA:PATT #H3F,
 8
 defines the bit pattern.

**[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:LENGTH
 <Length>**

The command sets the message length of the random access channel in subframes.

Parameters:

<Length> 1 | 2 | 4
 *RST: 1

Example:

BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:LENG 1
 sets the message length of the random access channel to 1 sub-
 frame.

[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:MSHift?

The command queries the value of the midamble shift.

Return values:

<MShift> integer

Example:

BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:MSH?
 queries the value of the midamble shift.

Usage:

Query only

**[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:
 PCORrection?**

The command queries the value of the power correction.

Return values:

<PCorrection> float
 *RST: -

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

Usage:

Query only

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:POWer
 <Power>

The command sets the power of the PRACH message part.

Parameters:

<Power> float
 Range: -80.0 dB to 0.0 dB
 Increment: 0.01
 *RST: 1 dB

Example: BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:POW 1
 sets the power of the PRACH message part.

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:SCODE
 <SCode>

The command sets the spreading code for the PRACH. The code channel is spread with the set spreading code.

Parameters:

<SCode> integer
 Range: 1 to 16
 *RST: 0

Example: BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:SCOD 16
 sets the power of the PRACH message part.

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:SFACTOR
 <Sfactor>

The command sets the spreading factor for the PRACH.

Parameters:

<Sfactor> 4 | 8 | 16
 *RST: 16

Example: BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:SFAC 16
 sets the power of the PRACH message part.

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:SFORMAT?

This command queries the slot format of the PRACH. The slot format depends on the selected spreading factor.

Return values:

<SFormat> integer

Example: BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:SFOR 1
 queries the slot format of the PRACH.

Usage: Query only

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:STATe
 <State>

The command activates or deactivates the RACH (random access channel) message part.

Parameters:

<State> 0 | 1 | OFF | ON
 *RST: 1

Example:

BB:TDSC:UP:CELL4:SLOT3:PRAC:MSG:STAT ON
 activates the RACH (random access channel) message part.

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:USER
 <User>

The command sets number of current user.

Parameters:

<User> float
 Range: 1 to 16
 *RST: 1

Example:

BB:TDSC:UP:CELL1:SLOT3:PRAC:MSG:USER 1
 sets number of current user.

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:DISTance
 <Distance>

The command sets the value to vary the timing between UpPTS and RACH.

Parameters:

<Distance> integer
 Range: 1 to 4
 *RST: 1

Example:

BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:DIST 1
 sets the number of the subframe in which the first UpPTS should be transmitted.

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:PCORrection?

The command queries the power corection of the UpPTS.

The value is computed based 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
- ARB sequence length
BB:TDSC:SLEN

Return values:

<PCorrection> float
*RST: 1

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

Usage: Query only

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:POWer
<Power>

The command sets the power of the UpPTS.

Parameters:

<Power> float
Range: -80 to 0 dB
Increment: 0.01 dB
*RST: 1 dB

Example: BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:POW -12
sets the power of the UpPTS.

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:PSTep
<PStep>

The command sets the power by which the UpPTS is increased from repetition to repetition.

Parameters:

<PStep> float
Range: 0.0 to 10.0 dB
Increment: 0.01
*RST: 0 dB

Example: BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:PST 3
defines the power by which the UpPTS is increased from repetition to repetition.

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:REPetition
 <Repetition>

The command sets the number of UpPTS repetitions before a PRACH burst happens.

Parameters:

<Repetition> integer
 Range: 1 dB to 10 dB
 *RST: 1 dB

Example:

BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:REP 1
 sets the number of UpPTS repetitions before a PRACH burst happens.

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:STARt
 <Start>

The command sets the number of the subframe in which the first UpPTS should be transmitted.

Parameters:

<Start> integer
 Range: 0.0 dB to 10.0 dB
 *RST: 0.0 dB

Example:

BB:TDSC:UP:CELL4:SLOT3:PRAC:PTS:STAR 3
 sets the number of the subframe in which the first UpPTS should be transmitted.

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:SLENGth?

The command queries the sequence length of the PRACH slot.

The value is computed based on:

- 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
- Message Length
 BB:TDSC:UP:CELL:SLOT:PRAC:MSG:LENG

Return values:

<SLength> float
 Range: 0.5 to 13.5

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

Usage: Query only

5.10 HSDPA/HSUPA Settings

CELL<st>

Value Range CELL1

[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:RMC.....	146
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:SCCH.....	146
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:SPATtern.....	147
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:TBS:TABLE.....	147
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:TTIDistance.....	147
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:UEID.....	148
[SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:VIBSize.....	148
[SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:EUCTi.....	148
[SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:FRC.....	148
[SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:RSEquence.....	149
[SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:RSNumber.....	149
[SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:SFACTOR.....	149
[SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:TBS:TABLE.....	150
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA: BPAYload.....	150
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA: CRATE.....	150
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA: CTSCount.....	150
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:DATA.....	151
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA: DATA:DSElect.....	151
[SOURce<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA: DATA:PATTERN.....	152

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
 HARQ:LENGth..... 152

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
 HARQ:MODE..... 152

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:MIPT..... 153

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
 MODulation..... 153

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
 NCBTti..... 153

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
 RVParameter..... 153

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
 RVSequence..... 154

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
 SFORmat..... 154

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:TBS:
 INdex..... 155

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
 TSCount..... 155

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
 TTINterval..... 155

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
 UECategory..... 155

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:RMC <Rmc>

Enables a predefined set of RMC channels or fully configurable user mode.

Parameters:

<Rmc> HRMC_0M5_QPSK | HRMC_1M1_QPSK |
 HRMC_1M1_16QAM | HRMC_1M6_QPSK |
 HRMC_1M6_16QAM | HRMC_2M2_QPSK |
 HRMC_2M2_16QAM | HRMC_2M8_QPSK |
 HRMC_2M8_16QAM | HRMC_64QAM_16UE |
 HRMC_64QAM_19UE | HRMC_64QAM_22UE | USER

*RST: HRMC_0M5_QPSK

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:RMC
 HRMC_2M8_QPSK
 sets the RMC mode

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:SCCH <Scch>

Enables/disables the HS-SCCH.

Parameters:

<Scch> 0 | 1 | OFF | ON

*RST: OFF

Example:

BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:SCCH ON
 enables HS-SCCH

[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:SPATtern?

Queries the distribution of packets over time.

The Signaling Pattern displays a HARQ-Process cycle and is a sequence of HARQ-IDs and "-". A HARQ-ID indicates a packet, a "-" indicates no packet. The Signaling Pattern is cyclically repeated.

Return values:

<SPattern> string

Example:

```
BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:TTID 2
```

sets the TTI distance

```
BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:HARQ:LENG 4
```

```
BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:SPAT?
```

queries the signaling pattern

```
Response: '0,-,1,-2,-,3,-'
```

Usage: Query only

**[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:TBS:TABLE
<Table>**

Sets the transport block size table, according to the specification 3GPP TS 25.321.

Parameters:

<Table> C1TO3 | C4TO6 | C10TO12 | C7TO9 | C13TO15 | C16TO18 |
C19TO21 | C22TO24

*RST: C1TO3

Example:

```
BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:TSB:TABL
```

```
C13TO15
```

sets the transport block table

**[[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:TTIDistance
<TtiDistance>**

Sets the inter TTI distance, i.e. distance between two packets in HSDPA packet mode and determines whether data is send each TTI or there is a DTX transmission in some of the TTIs.

An Inter TTI Distance of 1 means continuous generation.

Parameters:

<TtiDistance> integer

Range: 0 to 8

*RST: 1

Example:

```
BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:TTID 2
```

sets the TTI distance

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:UEID <Ueid>

Sets the UE identity.

Parameters:

<Ueid> integer
 Range: 0 to 65535
 *RST: 0

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:UEID 2
 sets the UE ID

[:SOURce<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:VIBSize <VibSize>

Sets the size of the virtual IR buffer.

Parameters:

<VibSize> float
 Range: 704 to 63360
 Increment: 704

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:VIBS 2800
 sets the size of the virtual IR buffer

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:EUCTti <Euctti>

Sets the number of E-UCCH channels per TTI.

Parameters:

<Euctti> integer
 Range: 1 to 8
 *RST: 4

Example: BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:EUCT 2
 sets the number of channels

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:FRC <Frc>

Selects a predefined E-DCH fixed reference channel or fully configurable user mode.

Parameters:

<Frc> 1 | 2 | 3 | 4 | USER
 *RST: 1

Example: BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:EUCT 2
 sets the number of channels

[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:RSEquence
 <RSequence>

(for "HSUPA" and "HARQ Mode" set to Constant NACK)

Sets the retransmission sequence.

Parameters:

<RSequence> string
 *RST: 0

Example:

```
BB:TDSC:DOWN:CELL1:ENH:DCH:TYPE HSUPA
sets the channel coding type to HSUPA.
BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:HARQ:MODE CNAC
sets the HARQ mode
BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:RSEQ '0,2,3'
sets the retransmission sequence
```

[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:RSNumber?

(for HARQ Mode set to Constant ACK)

Queries the retransmission sequence number.

The value is fixed to 0.

Return values:

<RsNumber> integer

Example:

```
BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:HARQ:MODE CACK
sets the HARQ mode
BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:RSN?
queries the retransmission sequence number
Response: 0
```

Usage: Query only

[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:SFACTOR
 <SFactor>

Selects the spreading factor for the FRC.

Parameters:

<SFactor> 1 | 2 | 4 | 8 | 16
 *RST: 4

Example:

```
BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:SFAC 2
sets the spreading factor
```

[:SOURce<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:TBS:TABLE
<Table>

Sets the transport block size table, according to the specification 3GPP TS 25.321, Annex BC.

Parameters:

<Table> C1TO2 | C3TO6
 *RST: C1TO2

Example: BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:TBS:TABLE C3TO6
 sets the transport blk table

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:BPAYload?

Queries the payload of the information bit. i.e. transport block size. This value determines the number of transport layer bits sent in each TTI before coding.

Return values:

<BPayload> float

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:BPAY?
 queris the Ninf

Usage: Query only

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:CRATe?

Queries the coding rate.

Return values:

<CRate> float

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:CRAT?
 queris the coding rate

Usage: Query only

[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:CTSCount <CtsCount>

Sets the number of physical channels per time slot.

Parameters:

<CtsCount> integer
 Range: 1 to 14

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:CTSC
 2
 sets the number of codes per TS

```
[ :SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
  DATA <Data>
```

The command determines the data source for the HSDPA/HSUPA channels.

Parameters:

<Data> PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | ZERO | ONE | PATtErn

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.

*RST: PN9

Example:

```
BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:DATA
PN11
selects the data source
```

```
[ :SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
  DATA:DSElect <DSelect>
```

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.

Parameters:

<DSelect> string

Example:

```
BB:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:DATA DLIS
selects the Data Lists data source.
MMEM:CDIR '<root>\Lists\DM\IqData'
selects the directory for the data lists.
BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:DATA:
DSEL 'tdscdma_1'
selects file tdscdma_1 as the data source. This file must be in the
directory <root>\Lists\DM\IqData and have the file exten-
sion "*.dm_iqd".
```

[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:DATA:PATTern <Pattern>

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.

Parameters:

<Pattern> integer
Range: #B0,1 to B11..1,64

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:DATA:PATT #H3F, 8
defines the bit pattern.

[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:HARQ:LENGth <Length>

Sets the number of HARQ processes. This value determines the distribution of the payload in the subframes and depends on the Inter TTI Distance.

A minimum of 3 HARQ Processes are required to achieve continuous data transmission.

Parameters:

<Length> integer
Range: 1 to 8
*RST: 4

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:HARQ:LENG 5
sets the number of HARQ processess

[[:SOURce<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:HARQ:MODE <Mode>

Sets the HARQ simulation mode.

Parameters:

<Mode> CACK | CNACK

CACK

New data is used for each new TTI. This mode is used to simulate maximum throughput transmission.

CNACK

Enables NACK simulation, i.e. depending on the sequence selected with command

BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:RVS packets are retransmitted. This mode is used for testing with varying redundancy version.

*RST: CACK

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:HARQ:
MODE CNAC
sets the HARQ mode

**[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
MIBT?**

Queries maximum information bits sent in each TTI before coding.

Return values:

<Mibt> float

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:MBIT?
queris the maximum information bit troughput

Usage: Query only

**[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
MODulation <Modulation>**

Sets the modulation scheme for each HSDPA RMC or HSUPA FRC.

The HSUPA FRCs do not support modulation scheme 64QAM.

Parameters:

<Modulation> QPSK | QAM16 | QAM64
*RST: QPSK

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:MOD
QAM16
sets the modulation

**[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
NCBTti?**

Queries the number of bits after coding.

Return values:

<NcbTti> float

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:NCBT?
queris the number of bits after coding

Usage: Query only

**[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
RVParameter <RvParameter>**

(for HARQ Mode set to Constant ACK)

Sets the redundancy version parameter, i.e. indicates which redundancy version of the data is sent. .

Parameters:

<RvParameter> float
Range: 0 to 7

Example:

BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:HARQ:
MODE CACK
sets the HARQ mode
BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:RVP 2
sets the redundancy version parameter

**[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
RVSequence <RvSequence>**

(for HARQ Mode set to Constant NACK)

Sets the retransmission sequence.

The sequence has a length of maximum 30 values. The sequence length determines the maximum number of retransmissions. New data is retrieved from the data source after reaching the end of the sequence.

For HSUPA, the command is a query only.

Parameters:

<RvSequence> string
*RST: 0

Example:

BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:HARQ:
MODE CNAC
sets the HARQ mode
BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:RVS '0,2,1'
sets the redundancy version sequence
BB:TDSC:DOWN:CELL1:ENH:DCH:TYPE HSUPA
sets the channel coding type to HSUPA.
BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:HARQ:MODE CNAC
sets the HARQ mode
BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:RSEQ '0,2,3'
sets the retransmission sequence
BB:TDSC:UP:CELL1:ENH:DCH:HSUPA:RVS?
queries the redundancy version sequence
Response: '0,2,1'

**[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
SFormat?**

Queries 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.

Return values:

<SFormat> string

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:SFOR?
 queris the slot format

Usage: Query only

**[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
 TBS:INDEX <Index>**

Sets the index for the corresponding table, as described in 3GPP TS 25.321.

Parameters:

<Index> integer
 Range: 0 to 63
 *RST: -

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:TBS:
 IND 20
 sets the TB table index

**[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
 TSCOUNT <TsCount>**

Sets the number of time slots.

Parameters:

<TsCount> integer
 Range: 2 to 5

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:TSC 3
 sets the number of time slots

**[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
 TTInterval?**

Queries the transmission time interval (TTI).

Return values:

<TtInterval> 5MS

Example: BB:TDSC:DOWN|UP:CELL1:ENH:DCH:HSDPA|HSUPA:TTIN?
 queris the TTI
 Response: 5MS

Usage: Query only

**[:SOURCE<hw>]:BB:TDSCdma:DOWN|UP:CELL<st>:ENH:DCH:HSDPA|HSUPA:
 UECategory?**

Queries the UE category that is minimum required to receive the selected RMC or FRC.

Return values:

<UeCategory> float

Example: BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:RMC
HRMC_2M8_16QAM
sets a RMC
BB:TDSC:DOWN:CELL1:ENH:DCH:HSDPA:UEC?
queris the UE category
Response: 13

Usage: Query only

List of Commands

[SOURCE<hw>]:BB:TDSCdma:CLIPping:LEVel.....	89
[SOURCE<hw>]:BB:TDSCdma:CLIPping:MODE.....	89
[SOURCE<hw>]:BB:TDSCdma:CLIPping:STATe.....	90
[SOURCE<hw>]:BB:TDSCdma:CLOCK:MODE.....	103
[SOURCE<hw>]:BB:TDSCdma:CLOCK:MULTIplier.....	103
[SOURCE<hw>]:BB:TDSCdma:CLOCK:SOURce.....	104
[SOURCE<hw>]:BB:TDSCdma:CLOCK:SYNChronization:EXECute.....	104
[SOURCE<hw>]:BB:TDSCdma:CLOCK:SYNChronization:MODE.....	105
[SOURCE<hw>]:BB:TDSCdma:COPY:DESTInation.....	82
[SOURCE<hw>]:BB:TDSCdma:COPY:EXECute.....	82
[SOURCE<hw>]:BB:TDSCdma:COPY:SOURce.....	82
[SOURCE<hw>]:BB:TDSCdma:CRATe.....	83
[SOURCE<hw>]:BB:TDSCdma:CRATe:VARiation.....	83
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:DWPTs:MODE.....	108
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:DWPTs:POWER.....	108
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:DWPTs:STATe.....	108
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:BPFRame.....	122
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:CRCSIZE.....	122
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA.....	122
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA:DSElect.....	123
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:DATA:PATtern.....	124
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:EPROTectioN.....	124
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:IONE.....	124
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:ITWO.....	124
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:RMATtribute.....	125
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:STATe.....	125
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TBCount.....	125
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TBSIZE.....	125
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:DTCH:TTINterval.....	126
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SCSMODE.....	126
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SFORmat.....	126
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:SLOTstate<ch>.....	126
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:STATe.....	127
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:BCH:TYPE.....	127
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:RMC.....	146
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:SCCH.....	146
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:SPATtern.....	147
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:TBS:TABLE.....	147
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:TTIDistance.....	147
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:UEID.....	148
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:HSDPA:VIBSIZE.....	148
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:SSPATtern.....	112
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:TPCPATtern.....	113
[SOURCE<hw>]:BB:TDSCdma:DOWN:CELL<st>:ENH:DCH:PLCCh:TTINterval.....	113
[SOURCE<hw>]:BB:TDSCdma:DOWN:PPARAmeter:PCCPch:STATe.....	107

[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:BIT:LAYer.....	114
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:BIT:RATE.....	114
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:BIT:STATe.....	115
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:BLOCK:RATE.....	115
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:BLOCK:STATe.....	115
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:BPFRame.....	115
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:CCOunt.....	116
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH:CRCSIZE.....	116
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH:DATA.....	116
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH:DATA:DSElect.....	117
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH:DATA:PATTern.....	118
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH:EPROTectiOn.....	118
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH:IONE.....	118
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH:ITWO.....	118
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH:RMATtribute.....	119
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH:STATe.....	119
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH:TBCOunt.....	119
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH:TBSIZE.....	119
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:DTCH<ch> DCCH:TTINterval.....	120
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:BPAYload.....	150
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:CRATE.....	150
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:CTSCOunt.....	150
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:DATA.....	151
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:DATA:DSElect.....	151
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:DATA:PATTern.....	152
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:HARQ:LENGth.....	152
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:HARQ:MODE.....	152
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:MIBT.....	153
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:MODulatiOn.....	153
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:NCBTti.....	153
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:RVParameter.....	153
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:RVSequence.....	154
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:SFORmat.....	154
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:TBS:INDEX.....	155
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:TSCOunt.....	155
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:TTINterval.....	155
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:HSDPA HSUPA:UECategory.....	155
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:RUPLayer.....	120
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:SCSMODE.....	120
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:SFORmat.....	121
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:SLOTstate<ch>.....	121
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:STATe.....	121
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:TSCOunt.....	121
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:ENH:DCH:TYPE.....	122
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:MCODe.....	108
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:PROTatiOn.....	109
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SCODE.....	109
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SCODE:STATe.....	109

[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SDCode.....	109
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DATA.....	130
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DATA:DSElect.....	131
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DATA:PATtern.....	131
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCCh:SYNC: LENGth.....	131
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCCh:SYNC: PATtern.....	132
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCCh:SYNC: REPetition.....	132
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCCh:TFCl: LENGth.....	132
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCCh:TFCl: VALue.....	132
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCCh:TPC: DATA.....	133
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCCh:TPC: DATA:DSElect.....	133
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCCh:TPC: DATA:PATtern.....	134
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCCh:TPC: READ.....	134
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:ENHanced.....	135
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:MSHift.....	135
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:POWer.....	135
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:SCODE.....	136
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:SFACtor.....	136
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:SFORmat.....	136
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:STATe.....	136
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:TYPE.....	137
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:USER.....	137
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:DCONflict.....	137
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SLOT<ch0>:STATe.....	138
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SPOint.....	110
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:STATe.....	110
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:SUCode.....	110
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:TDELay.....	110
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:CELL<st>:USERs.....	111
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:PPARAmeter:DPCH:COUNT.....	106
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:PPARAmeter:DPCH:CRESt.....	106
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:PPARAmeter:DPCH:SFACtor.....	106
[:SOURCE<hw>]:BB:TDSCdma:DOWN UP:PPARAmeter:EXECute.....	107
[:SOURCE<hw>]:BB:TDSCdma:FILTer:ILENGth.....	90
[:SOURCE<hw>]:BB:TDSCdma:FILTer:ILENGth:AUTO.....	91
[:SOURCE<hw>]:BB:TDSCdma:FILTer:OSAMpling.....	91
[:SOURCE<hw>]:BB:TDSCdma:FILTer:OSAMpling:AUTO.....	91
[:SOURCE<hw>]:BB:TDSCdma:FILTer:PARAmeter:APCO25.....	91
[:SOURCE<hw>]:BB:TDSCdma:FILTer:PARAmeter:COsine.....	92

[:SOURCE<hw>]:BB:TDSCdma:FILTer:PARAmeter:GAUSSs.....	92
[:SOURCE<hw>]:BB:TDSCdma:FILTer:PARAmeter:LPASSEVM.....	92
[:SOURCE<hw>]:BB:TDSCdma:FILTer:PARAmeter:LPASS.....	92
[:SOURCE<hw>]:BB:TDSCdma:FILTer:PARAmeter:PGAuss.....	93
[:SOURCE<hw>]:BB:TDSCdma:FILTer:PARAmeter:RCOSine.....	93
[:SOURCE<hw>]:BB:TDSCdma:FILTer:PARAmeter:SPHase.....	93
[:SOURCE<hw>]:BB:TDSCdma:FILTer:TYPE.....	90
[:SOURCE<hw>]:BB:TDSCdma:LINK.....	84
[:SOURCE<hw>]:BB:TDSCdma:POWer:ADJust.....	84
[:SOURCE<hw>]:BB:TDSCdma:POWer[:TOTAl].....	84
[:SOURCE<hw>]:BB:TDSCdma:PRAMp:BBONly.....	84
[:SOURCE<hw>]:BB:TDSCdma:PRAMp:FDELay.....	85
[:SOURCE<hw>]:BB:TDSCdma:PRAMp:RDELay.....	85
[:SOURCE<hw>]:BB:TDSCdma:PRAMp:SHAPE.....	85
[:SOURCE<hw>]:BB:TDSCdma:PRAMp:TIME.....	85
[:SOURCE<hw>]:BB:TDSCdma:PRESet.....	86
[:SOURCE<hw>]:BB:TDSCdma:RESet.....	86
[:SOURCE<hw>]:BB:TDSCdma:SETTing:CATalog.....	86
[:SOURCE<hw>]:BB:TDSCdma:SETTing:LOAD.....	86
[:SOURCE<hw>]:BB:TDSCdma:SETTing:STORE.....	87
[:SOURCE<hw>]:BB:TDSCdma:SETTing:STORE:FAST.....	87
[:SOURCE<hw>]:BB:TDSCdma:SETTing:TMOdel.....	87
[:SOURCE<hw>]:BB:TDSCdma:SETTing:TMOdel:CATalog.....	87
[:SOURCE<hw>]:BB:TDSCdma:SLENgth.....	94
[:SOURCE<hw>]:BB:TDSCdma:STATe.....	88
[:SOURCE<hw>]:BB:TDSCdma:TRIGger:ARM:EXECute.....	94
[:SOURCE<hw>]:BB:TDSCdma:TRIGger:EXECute.....	95
[:SOURCE<hw>]:BB:TDSCdma:TRIGger:EXTernal:SYNChronize:OUTPut.....	95
[:SOURCE<hw>]:BB:TDSCdma:TRIGger:OBASeband:DELay.....	95
[:SOURCE<hw>]:BB:TDSCdma:TRIGger:OBASeband:INHibit.....	96
[:SOURCE<hw>]:BB:TDSCdma:TRIGger:OUTPut:DELay:FIXed.....	100
[:SOURCE<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:DELay.....	100
[:SOURCE<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:DELay:MAXimum.....	101
[:SOURCE<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:DELay:MINimum.....	101
[:SOURCE<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:MODE.....	101
[:SOURCE<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:OFFTime.....	102
[:SOURCE<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:ONTime.....	102
[:SOURCE<hw>]:BB:TDSCdma:TRIGger:OUTPut<ch>:PERiod.....	102
[:SOURCE<hw>]:BB:TDSCdma:TRIGger:RMOde.....	96
[:SOURCE<hw>]:BB:TDSCdma:TRIGger:SLENgth.....	97
[:SOURCE<hw>]:BB:TDSCdma:TRIGger:SLUNit.....	97
[:SOURCE<hw>]:BB:TDSCdma:TRIGger:SOURce.....	97
[:SOURCE<hw>]:BB:TDSCdma:TRIGger[:EXTernal<ch>]:DELay.....	98
[:SOURCE<hw>]:BB:TDSCdma:TRIGger[:EXTernal<ch>]:INHibit.....	98
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSICh:ANPattern.....	113
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSICh:CQI:MODulation.....	113
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSICh:CQI:VALue.....	114
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSICh:TTINterval.....	114

[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:EUCTti.....	148
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:FRC.....	148
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:RSEquence.....	149
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:RSNumber.....	149
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:SFACTOR.....	149
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:ENH:DCH:HSUPA:TBS:TABLE.....	150
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCC:EUC:CCOunt.....	129
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCC:EUC:HPID.....	129
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCC:EUC:RSNumber.....	129
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:CHANnel<us0>:DPCC:EUC:TFCI.....	130
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:MODE.....	138
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA.....	138
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA:DSElect.....	139
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:DATA:PATTern.....	139
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:LENGth.....	140
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:MSHift.....	140
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:PCORrection.....	140
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:POWEr.....	141
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:SCODE.....	141
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:SFACTOR.....	141
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:SFORMat.....	141
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:STATE.....	142
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:MSG:USER.....	142
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:DISTance.....	142
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:PCORrection.....	142
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:POWEr.....	143
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:PSTep.....	143
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:REPetition.....	144
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:PTS:STARt.....	144
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:SLOT<ch0>:PRAC:SLENGth.....	144
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:UPPTs:MODE.....	108
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:UPPTs:POWEr.....	108
[:SOURCE<hw>]:BB:TDSCdma:UP:CELL<st>:UPPTs:STATE.....	108
[:SOURCE<hw>]:BB:TDSCdma:VERSion.....	88
[:SOURCE<hw>]:BB:TDSCdma:WAVEform:CREate.....	88
[:SOURCE<hw>]:BB:TDSCdma[:TRIGger]:SEquence.....	99

Index

A

Accept Copy	21
Accept - Copy	82
Accept - Predefined Settings	107
ACK/NAK Pattern	54, 113
Activate Cell	22, 39
Activate Slot	42
Activate Slot – TD-SCDMA	138
Activate TD-SCDMA Standard	16
Activate Transport Channel	119, 125
Adjust Total Power to 0 dB	22, 84
ARB Marker	34
ARB-Settings	19
Arm	31
Armed_Auto	99
Armed_Retrigger	99
Arm Trigger	20, 94
Auto	99

B

Baseband Clipping	24
Baseband filter	23, 90
Baseband Filter	19
Basic midamble code	9
Basic Midamble Code ID	40, 108
BCH Slot	45, 126
BCH Spreading Code Selection	45, 126
Bit Error Rate	54
Bit Error State	54, 114, 115
Block Error Rate	55, 115
Block Error State	55, 115
BxT	23
B x T	91

C

Cannel Graph - Downlink	65
Carrier Spacing	9
CDMS Version	88
Cell Default Values	86
Cell Default Valus	20
Cell State	22
Channel Coding	44, 45, 121, 127
Channel Number	67
Channel Power	68, 135
Channel State	69, 136
Channel Type	67, 137
Channel types	9
Chip Clock Mode	36
Chip Clock Multiplier	103
Chip Rate	9, 18, 83
Chip Rate Variation	24, 83
Chip Sequence Period Marker	34
Clipping	19
Clipping Level	26
Clipping Mode	26, 89
Clipping State	24
Clock Mode	36, 103
Clock Multiplier	36
Clock Source	36, 104
Code Domain Graph - Downlink	65

Coding Rate	62, 150
Coding Scheme	44, 45
Coding Type	44, 45
Copy Cell	21, 82
Copy Cell Settings	21
Copy From Source	21
Copy To Destination	21, 82
CQI Modulation	53, 113
CQI Value	54, 114
CRC	51, 116, 122
Crest factor	24
Crest Factor	38, 106
Crest factor - Clipping	89
Current Range without Recalculation	35
Current Range Without Recalculation Maximum	101
Current Range Without Recalculation Minimum	101
Cut Off Frequency Factor	23

D

Data Bits Per Frame	44, 48, 115, 122
Data List	69
Data List Management	17
Data List – TD SCDMA	117
Data List – TD-SCDMA	123
Data Modulation	9
Data Pattern	118, 124
Data Source	49, 60, 69, 116, 122
DCCH On	49, 119, 125
DCH Slot	48, 121
DCH Spreading Code Selection	48, 120
DCH State	45, 121
Deactivate Cell	22, 39
Deactivate Slot	42
Deactivate TD-SCDMA Standard	16
Dedicated Slot Mode	65, 138
Default settings	20, 86
Default Settings	16, 21, 37
Delay - Marker	35, 100
Delay - Trigger	98
Distance UpPTS	76, 142
DList/Pattern	131
Documentation Overview	7
Domain Conflict	70, 137
Downlink	19
DPCH Settings	69
DPCH Spreading Factor	38, 106
DTCH On	49, 119, 125
DwPTS Mode	40, 108
DwPTS Power	40, 108
DwPTS State	108

E

E-DCH Fixed Reference Channel (FRC)	57, 148
Edit Data List	17
Enhanced	68, 135
Enhanced Channel Settings	42
Error Protection	51, 118, 124
E-TFCI Value	73, 130
Execute Trigger	19, 31, 95
External Trigger Delay	98
External Trigger Inhibit	98

F

Fall Delay	28, 85
File Manger	16
Filter	9, 19, 23
Filtering, Clipping, ARB Settings	19
Filter Parameter	91
Filter Type	90
Fix marker delay to current range	35
Fix marker to dynamic range	100
Frame structure	9

G

Generate Waveform File	18
Global Trigger/Clock Settings	37
Guard period	41

H

HARQ Mode	63, 152
HARQ Process ID	74, 129
Hide BCH Details	44
Hide Channel Details	44, 47
Hide DCH Details	47
HS-SCCH State	57, 146

I

Impulse Length	24, 90
Impulse Length Auto State	91
In Baseband Only	28, 84
Information Bit Payload (Ninf)	62, 150
Insert Bit Errors	54, 114
Insert Errors On	54, 114
Interleaver 1 State	51, 118, 124
Interleaver 2 State	51, 118, 124
Inter TTI Distance	62, 147

L

Link Direction	19, 84
Load TD-SCDMA Settings	16

M

Manual Trigger	95
Marker	19
Marker Delay	35, 100
Marker Mode	34, 101
Marker Period	34, 102
Maximum Information Bit Throughput	58, 153
Measured External Clock	37
Message Length	77, 140
Midamble Code ID	40, 108
Midamble Shift	78, 135, 140
Modulation	60, 153
Multiple Chip Clock Mode	36
Multiplier	103

N

Number of channels	9
Number of Channels (DCH)	47, 116
Number of Coded Bits Per TTI	60, 153
Number of Dedicated Channels	38, 106
Number of DPCHs	38, 106
Number of E-DCH Codes per Time Slots	59, 150

Number of E-DCH Time Slots	58, 155
Number of E-UCCH Channels	73, 129
Number of E-UCCH per TTI	59, 148
Number of HARQ Processes	62, 152
Number of HS-PDSCH Codes per Time Slots	59, 150
Number of HS-PDSCH Time Slots	58, 155
Number of Phy. Chan. Bits per E-UCCH	73
Number of Sync Shift	72, 131
Number of Sync Shift&TPC Information Bits	52
Number of TFCI Bits	72, 132
Number of Time Slots (DCH)	47, 121
Number of TPC Bits	72
Number of User	137
Number of Users	41, 78, 142
Number of Users – TD-SCDMA	111
Nyquist filter	90

O

ON/OFF Ratio Marker	34, 102
Open File Manager	16
Options	37
Oversampling	24
Oversampling Auto State	91
Oversamplingt	91
Overwrite Cell Settings	21, 82

P

Pattern	69
P-CCPCH State	44, 127
Phase Rotation	40, 109
Physical channels	9
Power/dB	68, 135
Power Correction	140
Power Ramping	19
Power Step	75, 143
PRACH	65
PRACH Data Source	77, 131, 139
PRACH Message Part Power	77, 141
PRACH Select Data List	139
PRACH Slot Mode	65, 138
PRACH Spreading Factor	77, 141
Predefined Settings	21, 37

R

RACH Message Length	77, 140
RACH State	77, 142
Radio Frame Marker	34
Ramp Function	27, 85
Ramp Time	28, 85
Rate Matching Attribute	51, 119, 125
Read Out Mode	74, 134
Recall TD-SCDMA Settings	16
Redundancy Version Parameter	63, 153
Redundancy Version Sequence	64, 154
Repetition Encoder	53
Reset All Cells	20, 86
Resource Units On Physical Layer	46, 120
Retransmission Sequence	64, 149
Retransmission Sequence Number	64, 73, 129, 149
Retrigger	99
Rise Delay	28, 85
RMC Configuration	56, 146
Roll Off	91

Roll Off Factor	23
Running	30
Running - Trigger	96

S

Save TD-SCDMA Settings	16
Scrambling code	9
Scrambling Code	39, 109
Scrambling Code – TD-SCDMA	109
Select Cell - BS	22
Select Slot	42
Select TPC List	74, 133
Sequence Length	76
Sequence Length (ARB)	27, 94
Set Synchronization Settings	36
Set Synchronization Settings - TDSCdma	104
Settings	37
Set to default	86
Set to Default	16
Show BCH Details	44
Show Channel Details	44, 47
Show DCH Details	47
Signal Duration	30
Signal Duration - Trigger	97
Signal Duration Unit - Trigger	30, 97
Signaling Pattern - HSDPA	63, 147
Size of CDC	51, 116, 122
Slot Configuration	42
Slot Format	44, 47, 59, 68, 71, 121, 126, 136, 154
Slot Format PRACH	77, 141
Slot Mode	65, 138
Slot PRACH Sequence Length	144
Slot Structure	71
Spreading code	9
Spreading Code	68, 136
Spreading Code PRACH	77, 141
Spreading Code Selection	45, 48, 120, 126
Spreading Factor	38, 68, 106, 136
Spreading Factor (FRC)	59, 149
Standard settings	86
Standard Settings	16
Start Copy	21
State	16, 88
Cell	39
Slot	65
State - BS - CDMA	110
State - Clipping	90
State RACH	77, 142
Stopped	30
Stop Signal Generation	20
Switching Point	41
Symbol rates	9
Sync. Output to External Trigger	31
SYNC1 code	9
SYNC code	9
SYNC-DL Code	40
SYNC-DL Code – TD-SCDMA	109
Synchronize Base Station to Mobile Station	110
Synchronize Base Station to User Equipment	41
Synchronization mode	35
Synchronization Mode - TDSCdma	105
Synchronize Mobile Station to Base Station	109
Synchronize User Equipment to Base Station	40
Sync Shift Pattern	52, 72, 112, 132
Sync Shift Repetition M	73, 132
SYNC-UL Code	41

SYNC-UL Code – TD-SCDMA	110
System Chip Rate	18
System Frame Number Restart Marker	34

T

TD-SCDMA Version	18
Test Setup/Models	22, 87
TFCI Bits	72, 132
TFCI Value	72, 132
Time Delay	40, 110
Total Number of Users	68
Total Power	22, 84
TPC Pattern	53, 74, 113, 133, 134
TPC Source	74, 133
Transmission direction	19, 84
Transmission Time Interval	59, 155
Transport Blocks	50, 119, 125
Transport Block Size	50, 119, 125
Transport Block Size Index	61, 155
Transport Block Size Table	60, 147
Transport Block Size Table 0	61, 150
Transport Channel State	49
Transport Time Interval	50, 120, 126
Trigger	19
Trigger Delay	33
Trigger Delay External	98
Trigger Delay Other Baseband	95
Trigger Inhibit	33
Trigger Inhibit External	98
Trigger Inhibit Other Baseband	96
Trigger - Marker	19
Trigger Mode	99
Armed	30
Auto	30
Retrigger	30
Single	30
Trigger Source	31, 97
TTI	52, 53, 113, 114

U

UE Category	58, 155
UEID	58, 148
Uplink	19
UpPTS Mode	40, 108
UpPTS Power	40, 76, 108, 143
UpPTS Power Correction	142
UpPTS Power Step	75, 143
UpPTS Repetition	76, 144
UpPTS Start	76, 144
UpPTS State	108
Use P-CCPCH	38, 107
User	41, 111
User Marker / AUX I/O Settings	37
User Period	102
User Period Marker	34
Use Scrambling Code	39
Use Scrambling Code – TD-SCDMA	109

V

Version	18, 88
Virtual IR Buffer Size	62, 148

W

Waveform File 18