1xEV-DO Rev. A Digital Standard for R&S®Signal Generators

Operating Manual

1171.5631.12 ─ 08

Test & Measurement

Operating Manual

ROHDE&SCHWARZ

This document describes the following software options:

- R&S®AMU-K47/-K247
  1402.6602.02, 1402.9357.02
- R&S®SMATE-K47
  1404.7900.02
- R&S®SMBV-K47/-K247
  1415.8090.xx, 1415.8290.xx
- R&S®SMJ-K47/-K247
  1409.2306.02, 1409.2358.02
- R&S®SMU-K47/-K247
  1408.7410.02, 1408.7462.02
- R&S®AFQ-K247
  1401.5958.02
- R&S®SFU-K247
  2115.2295.02

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.

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 ±10 % shall apply to the nominal voltage and ±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_{rms} > 30 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.

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.

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	Adver-tencia: 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 ±10 % sobre el voltaje nominal y de ±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_{eff} > 30 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 señalizar 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.

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.

Contents

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

This manual 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

This 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 orderd 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.
Input	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

The R&S Signal Generator provides you with the ability to generate signals in accordance with the standard CDMA2000 1xEV-DO (Evolution-Data Optimized), Rev. A. CDMA2000 1xEV-DO is the North American standard for the third mobile radio generation (3G). CDMA2000 1xEV-DO is a high-speed packet-switched transmission technique with forward peak data rates of 3.1 Mbps, designed and optimized for a data-centric broadband network.

The R&S Signal Generator simulates 1xEV-DO signal at the physical layer. In forward link (downlink) mode the signal is generated in realtime. Parameter changes during active signal output take effect immediately without signal interruption. In reverse link (uplink) mode the signal is precalculated and played from the ARB memory. Parameter changes result in a recalculation of the signal.

The following list gives an overview of the main options provided by the R&S Signal Generator for generating an 1xEV-DO signal in accordance with 3GGP2 C.S0024-A.v3.0.

- Generation of 1xEV-DO signals with a chip rate of 1.2288 Mcps
- Independent configuration of up to 4 traffic channels or 4 access terminals
- Support of physical layer subtypes 0, 1 and 2
- Operating modes "Traffic" and "Access" on the uplink
- Simulation of up to 110 additional MAC users
- Generation of standard compliant forward/downlink and reverse/uplink channel types
- Supports configuration of public data as defined in the standard, such as Long Code Masks for I and Q channel, PreambleLength, DRCLength etc.
- Filling the data files for data channels from all possible sources of the R&S Signal Generator: pattern (all1, all0, user-defined up to 64 bits), PN data or data lists
- Clipping for reducing the crest factor

The following table gives an overview of parameters of the modulation system 1xEV-DO.

Table 2-1: Parameters of the modulation system 1xEV-DO

Parameter	Value
Chip rate	1.2288 Mcps
Channel types	Forward link: ● Pilot Channel ● Forward Traffic Channel (Rev. A) ● Reverse Activity ● DRCLock ● Reverse Power Control ● ARQ (Rev. A) ● Control Channel Reverse link, access mode: ● Pilot Channel ● Data Channel Reverse link, traffic mode: ● Pilot Channel ● Auxiliary Pilot Channel (Rev. A) ● Reverse Rate Indicator ● Data Rate Control ● Data Source Control (Rev. A) ● ACK Channel ● Data Channel
Generation mode	Forward link: ● Realtime mode Reverse link: ● Arbitrary waveform mode
Data rates	Forward link: ● 38.4 .. 2457.6 kbps (Rev. 0) ● 4.8 .. 3072 kbps (Rev. A) Reverse link: ● 9.6 .. 153.6 kbps (Rev. 0) ● 4.8 .. 1843.2 kbps (Rev. A)
Frame length	26.67 ms (1 frame = 16 slots)
Slot duration	1.67 ms (1 slot = 2048 PN chips)
PN offset	0 .. 511
Channel coding	All channel coding modes defined in the standard (channel encoding, block interleaving, repetition, modulation, orthogonal spreading by Walsh function)
Modulation	BPSK, QPSK, 8PSK, 16QAM
Multi-code modulation	B4, Q2, Q4, Q4Q2, E4E2
Long Code Mask	Separate Long Code Masks for I and Q channel. The Long Code Generator is reloaded at every PN rollover with 0x24B91BFD3A8.
Walsh covers	Different Walsh functions for the different channels

2.1 Traffic Scheduling Process

Since the Forward Link of a 1xEV-DO system is govern by a time division multiple access technique, access to Forward Link bandwidth by a user channel is governed by a scheduling process. The schedule process determines who gets access to Forward Link slots to carry user data.

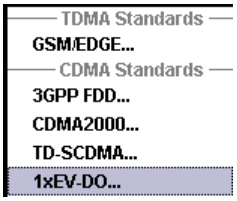
The traffic scheduling process for the R&S Signal Generator follows a number of rules to schedule which user's data is sent for each slot.

The rules are listed in order of priority, with the highest priority rules being listed first. In the event that two rules contradict each other, the circumstances invoking the lower priority rule must be altered to resolve the contradiction.

The rules are listed in order of priority, with the highest priority rules being listed first. In the event that two rules contradict each other, the circumstances invoking the lower priority rule must be altered to resolve the contradiction.

- A channel with State set to OFF is never transmitted.
- The first slot of the control channel packet is always transmitted at its specified offset at the start of the control channel cycle.
- Once the first slot of a multiple slot packet is sent, the remaining slots are always transmitted with the proper interlace (3 slots skipped after 1 slot sent).
- Packets for a user can be transmitted on 1-4 interlaces (there are a total of 4 interlaces in the 1xEV-DO system). Packets on the different interlaces will be duplicates of those sent on the other interlaces for a given user. The interleave factor user interface parameter is used to control the number of interlaces used for each user.
- Immediately after the transmission of the last slot of a multiple slot packet, a lockout period of three slots is created. No additional packets from the same source may be scheduled before the three slot period expires.
- A control channel packet has priority over all other traffic channels. This may exclude transmission of user channels in advance of the control channel packet, if the other channel would require a slot that the control channel packet would require.
- User1 traffic has priority over User2, User3, and User4 traffic.
- User2 traffic has priority over User3 and User4 traffic.
- User3 traffic has priority over User4 traffic.
- If no traffic is scheduled for a slot, an idle slot will be transmitted.

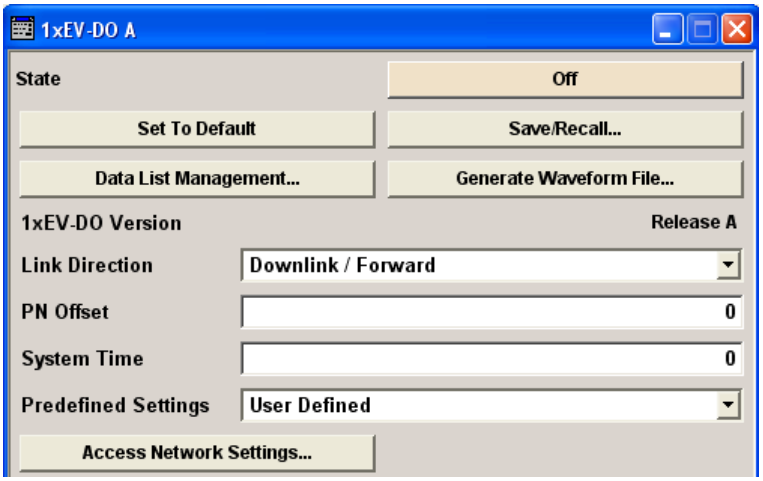
3 1xEV-DO User Interface



To access the dialog for setting the 1xEV-DO digital standard, select "Baseband block > 1xEV-DO" or use the menu tree under "Baseband".

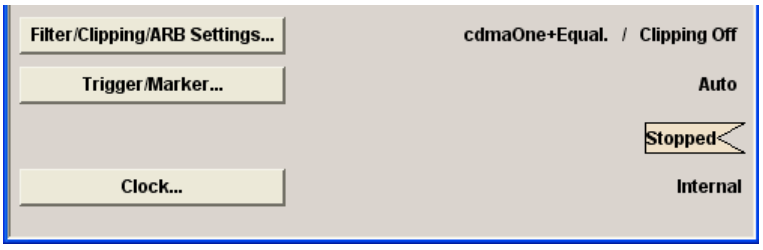
The menu is split into three sections for configuring the standard. The choice of transmission direction determines which displays and parameters are made available in the middle section.

The upper section of the menu is where the 1xEV-DO digital standard is enabled, the default settings are called, the transmission direction selected and where the valid 1xEV-DO version is displayed.



The middle menu section is where either the traffic channels per user or the access terminals are configured, depending on the transmission direction selected.

Many of the buttons lead to submenus for loading and saving the 1xEV-DO configuration and for setting the filter, trigger and clock parameters.



3.1 General Settings for 1xEV-DO Signals

The upper menu section is where the 1xEV-DO digital standard is enabled and reset and where all the settings valid for the signal in both transmission directions are made.

State
Enables/disables the 1xEV-DO 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).

SCPI command:
`[:SOURce<hw>]:BB:EVDO:STATe` on page 56

Set to Default
Calls the default settings. The following table gives an overview of the settings. The preset value for each parameter is specified in the description of the remote-control commands.

Parameter	Value
State	Not affected by Set to default
Link Direction	Downlink/ Forward
PN Offset	0
System Time	0
Predefined Settings	User Defined
Filter	CdmaOne + Equalizer
Clipping	Off
Trigger	Auto
Clock	Internal

SCPI command:
`[:SOURce<hw>]:BB:EVDO:PRESet` on page 54

Save/Recall ...
Calls the "Save/Recall" menu.

From the Save/Recall menu the "Save/Recall Settings" windows for saving and recalling 1xEV-DO configurations and the "File Manager" can be called.

1xEV-DO configurations are stored as files with the predefined file extension "*. 1xevdo". The file name and the directory they are stored in are user-definable.

The complete settings in the "1xEV-DO" menu are saved and recalled.

"Recall 1xEV-DO Setting" Opens the "Recall Settings" window for loading a saved 1xEV-DO configuration.
The configuration of the selected (highlighted) file is loaded by pressing the "Select" button.

"Save 1xEV-DO Setting" — Opens the "Save Settings" window for saving the current 1xEV-DO 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.

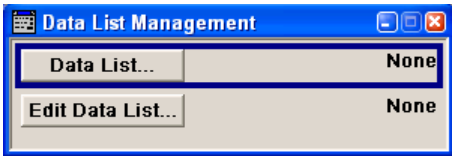
"File Manager" — Calls the "File Manager".
The "File Manager" is used to copy, delete and rename files and to create new directories.

SCPI command:

[:SOURce<hw>]:BB:EVDO:SETTing:CATalog on page 54
[:SOURce<hw>]:BB:EVDO:SETTing:LOAD on page 55
[:SOURce<hw>]:BB:EVDO:SETTing:STORe on page 55
[:SOURce<hw>]:BB:EVDO:SETTing:DELete on page 54

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.

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:EVDO:TERMinal<st>:DCHannel:DATA on page 97
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DATA:DSELection on page 97
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DATA on page 100
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DATA:DSELection on page 101

Generate Waveform File
Opens the submenu for storing the current 1xEV-DO 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:EVDO:WAVeform:CREate` on page 57

1xEV-DO Version
Displays the current version of the 1xEV-DO standard.

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

SCPI command:
`[:SOURce<hw>]:BB:EVDO:VERSion` on page 57

Link Direction
Selects the transmission direction.

The settings of the traffic channels per user and the access terminals are provided in the following menu section in accordance with the selection.

"Downlink/Forward"	The transmission direction selected is base station to access terminal. The signal corresponds to that of a base station.
"Uplink/ Reverse"	The transmission direction selected is access terminal to base station. The signal corresponds to that of an access terminal.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:LINK` on page 52

PN Offset
Sets the PN Offset of the 1xEV-DO signal.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:PNOFfset` on page 52

System Time
Sets the System Time value of the 1xEV-DO signal and the base station. The System Time value is expressed in units of 1.67 ms intervals (80 ms/ 48).

Note: In uplink, the value selected for system time must be multiple of 16.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:STIMe` on page 56

Predefined Settings
Enables selection of UL predefined settings for Terminal 1 for faster configuration.

The predefined settings are made according to 3GPP2 C.S0032-A to allow easy receiver testing.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:PREDefined` on page 52

Access Network Settings
Opens the Access Network Settings window.

Note: This parameter is present for transmission direction downlink only.

The menu is described in chapter 3.2, "Access Network Settings", on page 15.

SCPI command:
n.a.

Configure Traffic Channels
Each of the four buttons USER 1 .. 4 activates/deactivates the selected user and opens the corresponding "Configure Traffic User 1 .. 4" window.

Note: This parameter is present for transmission direction downlink only.

The menu is described in chapter 3.3, "Configure Traffic User 1..4", on page 17.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:STATe` on page 91

Configure Access Terminals
Each of the four buttons TERMINAL 1 .. 4 activates/deactivates the selected terminal and opens the corresponding "Configure Access Terminal 1 .. 4" window.

Note: This parameter is present for transmission direction uplink only.

The menu is described in chapter 3.4, "Configure Access Terminal 1..4", on page 25.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:STATe` on page 112

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

The menu is described in chapter 3.5, "Filter/Clipping/ARB Settings", on page 37.

SCPI command:
n.a.

Trigger/Marker
Calls the menu for selecting the trigger source, for configuring the marker signals and for setting the time delay of an external trigger signal (see chapter 3.6, "Trigger/Marker/Clock", on page 42).

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

SCPI command:
n.a.

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:EVDO:TRIGger:EXECute` on page 65

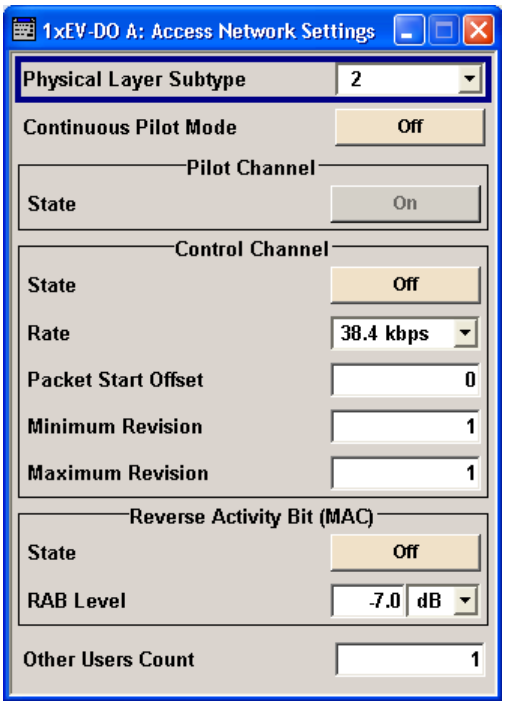
Clock
Calls the menu for selecting the clock source and for setting a delay (see chapter 3.6, "Trigger/Marker/Clock", on page 42).

SCPI command:
n.a.

3.2 Access Network Settings

The "Access Network Settings" menu allows configuration of physical layer subtype, the pilot and control channels and reverse activity bit.

The "Access Network Settings" menu consists of three main sections, "Pilot Channel", "Control Channel" and "Reverse Activity Bit (MAC)".



Physical Layer Subtype (Access Network Settings)
Defines the physical layer subtype for the forward link direction.

Physical layer subtype 0 is the original (release "0").

Physical layer subtype 1 and 2 are the revision "A" physical layers.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:ANETwork:SUBType` on page 80

Continuous Pilot Mode
Enables or disables a special mode within the 1xEV-DO generator. When the state is off, normal operation is selected. When the state is on, a special mode is selected.

In this special mode, the 1xEV-DO generator generates a pilot signal only.

Note: During the special mode, all other parameters do not affect the signal output.

SCPI command:
[:SOURce<hw>]:BB:EVDO:ANETwork:CPMode on page 78

State (Pilot Channel)
Displays the state of the pilot channel. Pilot channel is transmitted by sector on each active forward channel. It is present always and transmitted at the full sector power.

SCPI command:
[:SOURce<hw>]:BB:EVDO:ANETwork:PCHannel:STATe on page 79

State (Control Channel)
Enables or disables the control channel messages.

The only control channel message that is ever sent is the Sync Message.When this is enabled, the control channel messages will have the highest priority for placement within the slots. The Sync Message will be updated constantly, even when the control channel is not enabled.

SCPI command:
[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:STATe on page 77

Rate (Control Channel)
Sets the rate that the control channel messages are transmitted at.

SCPI command:
[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:RATE on page 77

Packet Start Offset
Sets the offset (in slots) from the start of control channel cycle to the start of the synchronous message capsule that contains the Sync Message.

Seechapter 2.1, "Traffic Scheduling Process", on page 9 for an explanation on how the control and traffic channels are transmitted over time.

SCPI command:
[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:PSOFfset on page 76

Minimum Revision
Sets the value of the minimum revision field within the control channel message.

SCPI command:
[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:REVision:MINimum
on page 77

Maximum Revision
Sets the value of the maximum revision field within the control channel message.

SCPI command:
[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:REVision:MAXimum
on page 77

State (Reverse Activity Bit)
Activates or deactivates the reverse activity bit (RAB).

SCPI command:
[:SOURce<hw>]:BB:EVDO:ANETwork:RAB:STATe on page 80

RAB Level
Sets the power within the MAC block for the Reverse Activity Channel.

SCPI command:
[:SOURce<hw>]:BB:EVDO:ANETwork:RAB:LEVel on page 79

RAB Length
for physical layer subtype 0&1 only

Sets the duration (in slots) of a Reverse Activity bit.

SCPI command:
[:SOURce<hw>]:BB:EVDO:ANETwork:RAB:LENGth on page 79

RAB Offset
for physical layer subtype 0&1 only

Sets the starting time offset of the Reverse Activity (RA) bit in slots. The command is specified in Reverse Activity Length/8 units.

The RA bit starts when the following equation is satisfied:
- System Time mod RABlenght = RABOffset,
- where System Time is expressed in slots.

SCPI command:
[:SOURce<hw>]:BB:EVDO:ANETwork:RAB:OFFSet on page 79

Other User Count
Sets the number of additional users (beyond the four defined users) that appear in the MAC Channel.

These additional users will never have a packet addressed to them, but are used to fill in the MAC channel code domain.

These Other Users are used to evenly distribute the excess power (beyond what is required by the "User 1..4" and RAB channels).

SCPI command:
[:SOURce<hw>]:BB:EVDO:ANETwork:OUCount on page 78

3.3 Configure Traffic User 1..4

The "Configure Traffic User 1..4" menu allows configuration of the traffic channel and configuration of the forward MAC channel settings, such as Reverse Power Control (RPC) and DRCLock.

There is one "Configure Traffic User" panel for each of the 4 users. The user number is indicated in the panel headline.

The "Configure Traffic User 1..4" menu consists of three main sections, "General Traffic Settings", "RPC (MAC)" and "DRC Lock (MAC)".

State (User)
Enables or disables the selected user.

If the user is enabled, the proper MAC Index will be placed within the MAC channel and packets may be sent to the user. If disabled, the MAC Index will not be present within the MAC channel and packets may not be sent to the user.

Note: Disabling the state of a user during a transfer aborts all transfers to the user.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:STATe` on page 91

Physical Layer Subtype (User)
Displays the physical layer subtype selected in the menu "Access Network Settings".

SCPI command:
`[:SOURce<hw>]:BB:EVDO:ANETwork:SUBType` on page 80

Number of Packets to Send
Sets the number of packets to send to the selected user.

The number of packets to be sent depends on whether the parameter "Infinite" is enabled or disabled. If "Infinite" is enabled, there is no limit to the number of packets sent to the user.

If "Infinite" is disabled and a value is specified while packets are being sent, the new count value will be used at the end of transmission of the current packet. If a value of zero is specified, the transmission to the user will be stopped at the end of the current packet.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:PACKet:INFinite` on page 85
`[:SOURce<hw>]:BB:EVDO:USER<st>:PACKet:COUNt` on page 84

Infinite
Enables or disables sending an unlimited number of packets to the selected user.

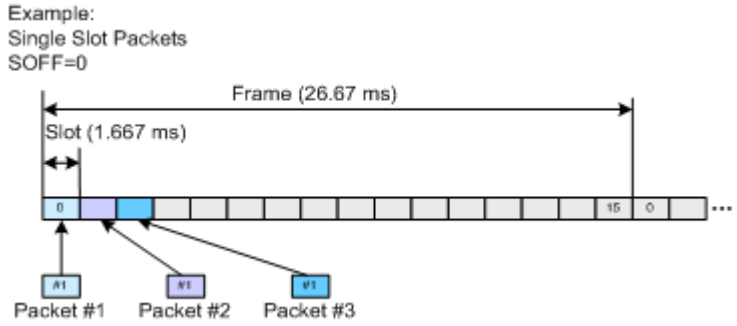
If "Infinite" is enabled, there is no limit to the number of packets sent to the user.

If "Infinite" is disabled, the number of packets to be sent to the selected user can be specified.

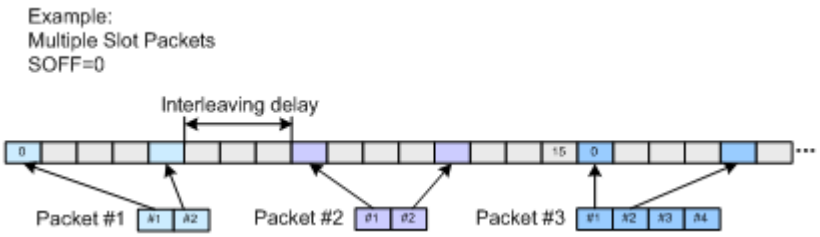
SCPI command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:PACKet:INFinite` on page 85

Packet Start Offset
Sets the minimum number of slots between the end of one packet and the beginning of the next.

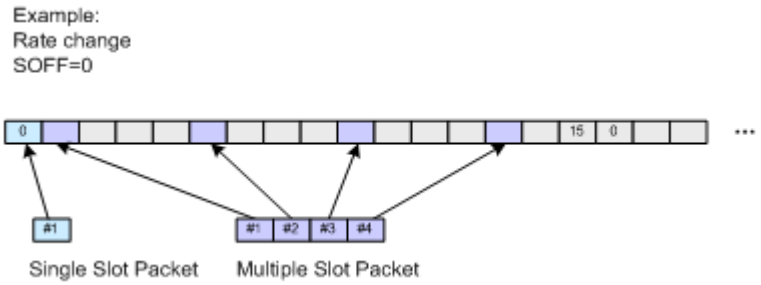
For single slot packets, a value of zero will cause the next packet to be sent in the immediate next slot (subject to scheduling).



For multiple slot packets, a value of zero will cause the next packet transmission to start three slots after the end of the previous packet. The three slot delay is identical to the interleaving delay between slots for multiple slot packets. The offset value is attached to the end of the preceding packet.



Note: An offset value of zero with a rate change from a single slot packet to multiple slot packets will cause the first slot of the multiple slot packets to be transmitted in the slot immediately following the single slot packet.



See chapter 2.1, "Traffic Scheduling Process", on page 9 for an explanation on how the control and traffic channels are transmitted over time.

SCPI command:

`[:SOURce<hw>]:BB:EVDO:USER<st>:PACKet:SOFFset` on page 85

Rate Index

Sets an index into the table of rates and slot counts.

Note: Selected rate becomes effective at the beginning of the next packet transmitted to the selected user.

For physical layer 0&1, the parameter "Rate Index" alone automatically set the packet size, data rate and the slot count for the packets sent to the selected user. Parameters "Packet Size", "Data Rate" and "Slot Count" are read-only.

Table 3-1: Rate Index for Physical Layer Subtype 0&1

Rate Index	Packet Size Index	Packet Size, bits	Data Rate, kbps	Slot count
1	0	1024	38.4	16
2	0	1024	76.8	8
3	0	1024	153.6	4
4	0	1024	307.2	2
5	0	2048	307.2	4
6	0	1024	614.4	1
7	0	2048	614.4	2
8	0	3072	921.6	2
9	0	2048	1228.8	1
10	0	4096	1228.8	2
11	0	3072	1843.2	1
12	0	4096	2457.6	1

For physical layer subtype 2 however, a combination of the parameters Rate Index and the parameter Packet Size sets the data rate and the slot count for the packets sent to the selected user.

Table 3-2: Rate Index for Physical Layer Subtype 2

Rate Index	Packet Size Index	Packet Size, bits	Data Rate, kbps	Slot count
1	3	128	4.8	16
1	2	256	9.6	16
1	1	512	19.2	16
1	0	1024	38.4	16
2	3	128	9.6	8
2	2	256	19.2	8
2	1	512	38.4	8
2	0	1024	76.8	8
3	3	128	19.2	4
3	2	256	38.4	4
3	1	512	76.8	4
3	0	1024	153.6	4
4	3	128	38.4	2
4	2	256	76.8	2
4	1	512	153.6	2
4	0	1024	307.2	2

Rate Index	Packet Size Index	Packet Size, bits	Data Rate, kbps	Slot count
5	2	512	76.8	4
5	1	1024	153.6	4
5	0	2048	307.2	4
6	3	128	76.8	1
6	2	256	153.6	1
6	1	512	307.2	1
6	0	1024	614.4	1
7	2	512	153.6	2
7	1	1024	307.2	2
7	0	2048	614.4	2
8	1	1024	307.2	2
8	0	3072	921.6	2
9	2	512	307.2	1
9	1	1024	614.4	1
9	0	2048	1228.8	1
10	0	4096	1228.8	2
11	1	1024	614.4	1
11	0	3072	1843.2	1
12	0	4096	2457.6	1
13	0	5120	1536	2
14	0	5120	3072	1

SCPI command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:RATE:INDex` on page 87

Packet Size
Sets the packet size for the packets sent to the selected user.

For physical layer 0&1, the parameter "Packet Size" is read-only. The value is automatically set depending on the selection for the parameter "Rate Index". (see table 3-1)

For physical layer subtype 2, a combination of the parameter "Packet Size" and the parameter "Rate Index" sets the data rate and the slot count for the packets sent to the selected user. (see table 3-2)

Note: Selected rate becomes effective at the beginning of the next packet transmitted to the selected user.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:PSIZe` on page 85

Data Rate
Displays the data rate of the packets sent to the selected user. This parameter is read-only. The value is set automatically, depending on the selected "Rate Index "and "Packet Size" (see table 3-1 and table 3-2).

Note: Selected rate becomes effective at the beginning of the next packet transmitted to the selected user.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:RATE` on page 86

Slot Count
Displays the slot count of the packets sent to the selected user.

This parameter is read-only. The value is set automatically, depending on the selected Rate Index and Packet Size. (see table 3-1 and table 3-2)

Note: Selected rate becomes effective at the beginning of the next packet transmitted to the selected user.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:SCOunt` on page 91

Data Pattern
Sets the data pattern for the data portion of the packets sent to the user.

The most significant bit (MSB) of this value is the MSB of the packet and the word is repeated to fill all space within the packet. This parameter is in a hexadecimal format.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:DATA:PATTern` on page 81

MAC Index
Sets the MAC Index used for the selected user.

MAC Index should be different for the different users. However, in case that two users are using the same value for MAC Index, the lower priority user will be disabled, or be unable to enable.

The values for the MAC Indexes for the 'OtherUsers' (see parameter Other User Count) will be assigned from a pool of valid MAC Indexes, that exclude the MAC Indexes specified for each of the four configurable users.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:MAC:INDex` on page 83

MAC Level
Sets the power within the MAC channel that is dedicated to the selected user.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:MAC:LEVel` on page 84

Interleave Factor
Controls the number of interleave slots used for the selected user on the forward link.

Four interleave slots are defined in the 1xEV-DO system.By default, only 1 Interleave slot (Interleave Factor = 1) for an access terminal is configured and transmission to that access terminal every 4th slot is selected. For an interleave factor > 1, packets on multiple interleave slots will be sent, increasing the data throughput to the access terminal.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:IFACtor` on page 83

RPC Mode
Sets the operation mode for the Reverse Power Control (RPC) Channel within the MAC channel for the selected user.

"Hold" An alternating series of Up and Down power control bits are transmitted. The intent is to hold the access terminal at a constant power level. This mode always starts with an Up bit, and ends with the following Down bit. This mode is two bits long.

"All up" A continuous stream of Up (0) power control bits are transmitted. The intent is to force the access terminal to the highest transmit power level. This mode is a single bit long.

"All down" A continuous stream of Down (1) power control bits are transmitted. The intent is to force the access terminal to the lowest transmit power level. This mode is a single bit long.

"Range" A sequence of Up power control bits are sent followed by an equal number of Down power control bits. The intent is to force the access terminal to ramp its power from one extreme to another. The number of power control bits in each direction is specified by the "RPC Range Count" parameter. (see RPC Range Count). Each time that the Range mode is specified, the sequence will be restarted.
The Range mode starts with the first Up bit and ends with the last Down bit.
The length of the mode is two times the RPC Range Count.

"Pattern" A user-defined sequence of RPC bits is sent. The mode starts with the bit defined in the first (0) zone, and ends with the last bit of the last (3) zone. The length of the pattern is the sum of the Count values for each RPC Zone.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:MODE` on page 88

RPC Range Count
Sets the number of Reverse Power Control (RPC) bits sent in each direction when the "RPC Mode" is set to Range. The specified value is used immediately.

Note: This parameter is displayed in RPC Mode "Range" only.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:RANGe` on page 89

RPC Pattern
Defines the Reverse Power Control (RPC) pattern in form of table with four zones (zone 0 .. 3).

For each zone, a bit and a count can be defined.

"Bit" Defines the RPC bits sent within the specific zone of the RPC Pattern.

"Count" Defines the number of RPC bits sent within the specific zone of the RPC Pattern.

SCPI command:

`[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:ZONE<ch0>:BIT` on page 90

`[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:ZONE<ch0>:COUNt` on page 90

DRC Lock State

Sets the state of the DRC (Data Rate Control) Lock bit for the selected user.

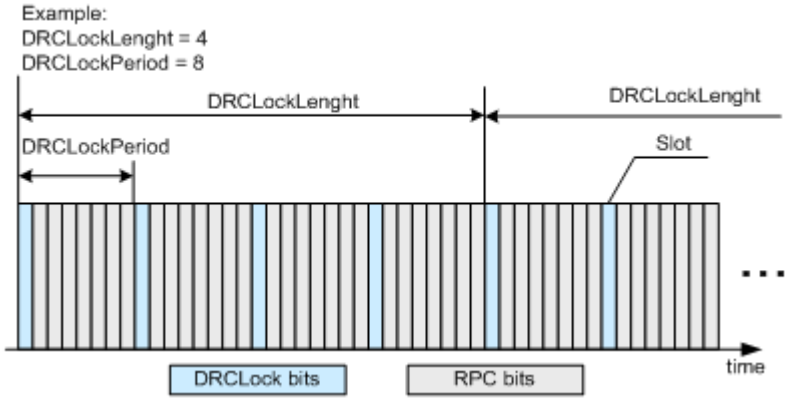
Note: Changes in the DRC Lock state are only considered at the interval defined by the parameter DRC Lock Length.

SCPI command:

`[:SOURce<hw>]:BB:EVDO:USER<st>:DRCLock:STATe` on page 82

DRC Lock Period

Sets the period (measured in slots) of time between successive transmissions of the DRC (Data Rate Control) Lock bit for the selected user.



Note: A value of zero will disable the DRC Lock subchannel and the MAC RPC channel of the selected user will not be punctured with the DRC Lock subchannel.

SCPI command:

`[:SOURce<hw>]:BB:EVDO:USER<st>:DRCLock:PERiod` on page 82

DRC Lock Length

Sets the number of DRC (Data Rate Control) Lock Periods that the state of the DRC Lock for the selected user will be held constant.

Note: Changes in the DRC Lock state are only considered at the interval defined by the parameter DRC Lock Length.

A value of one allows updating of the DRC Lock bit at anytime.

SCPI command:

`[:SOURce<hw>]:BB:EVDO:USER<st>:DRCLock:LENGth` on page 81

Frame Offset
Sets the reverse link frame offset for the reverse link.

The frame offset is used to properly position the DRC Lock bit within the MAC channel.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:DRCLock:OFFSet` on page 82

H-ARQ Mode
Enables or disables the H-ARQ Channel.

The H-ARQ channel is used by the access network to transmit positive acknowledgement (ACK) or a negative acknowledgement (NAK) in response to a physical layer packet.

Note: This parameter is enabled for Physical Layer Subtype 2 only.

"Off" Disables transmission of the H-ARQ channel.

"ACK" The channel will be transmitted with all bits set to ACK.

"NAK" The channel will be transmitted with all bits set to NAK.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:USER<st>:HARQ:MODE` on page 82

3.4 Configure Access Terminal 1..4

The "Configure Access Terminal 1..4" menu allows configuration of the mode of the access terminal, configuration of the data channel and configuration of the different channels, such as Pilot Channel, Auxiliary Pilot Channel, Reverse Rate Indicator (RRI) Channel, Data Source Control (DSC) Channel, Data Rate Control (DRC) Channel and ACK channel.

Note:This menu is available for transmission direction uplink only.

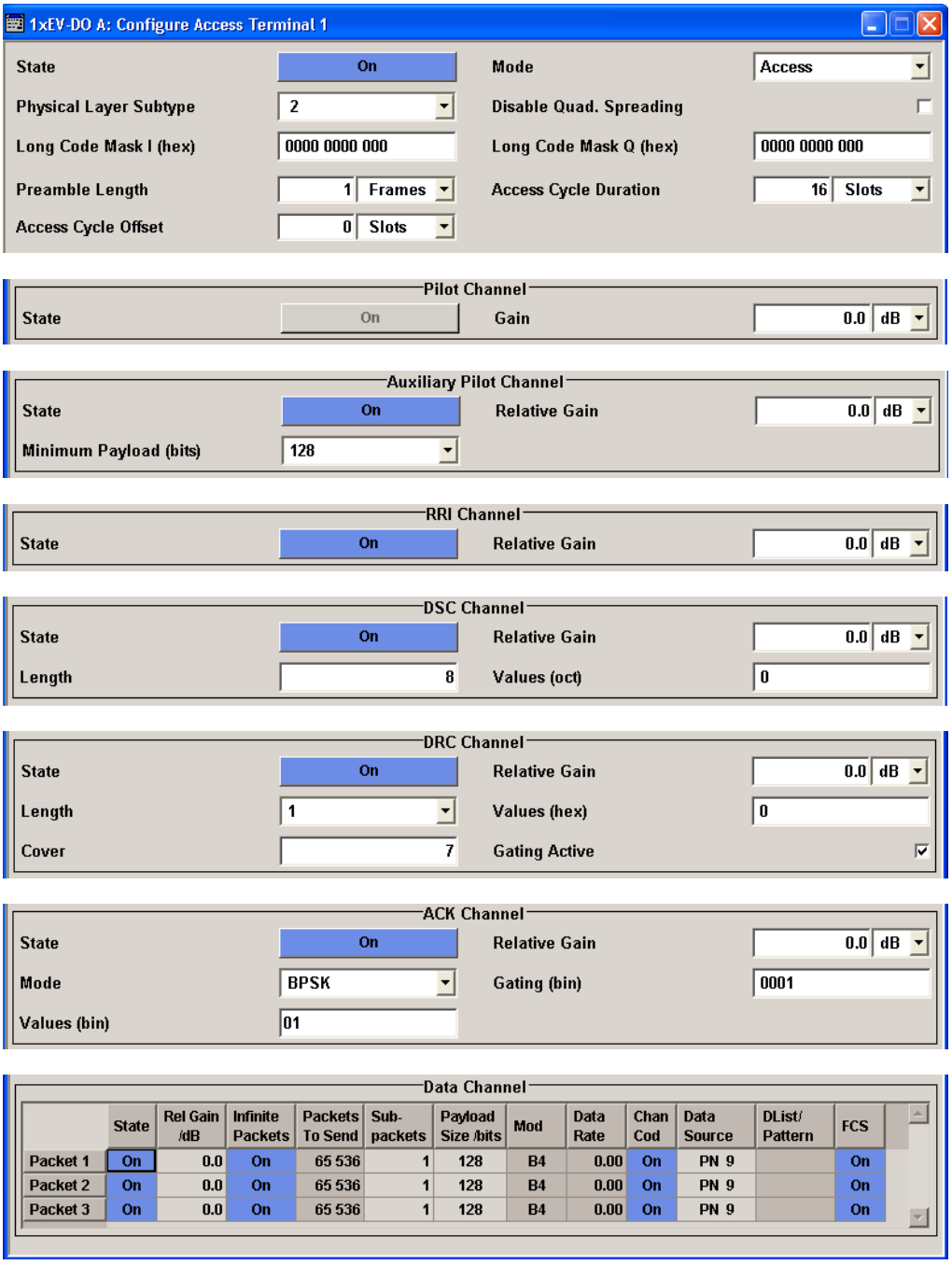
There is one "Configure Access Terminal" panel for each of the 4 users. The user number is indicated in the panel headline.

The "Configure Access Terminal 1..4" menu consists of several main sections, General Access Terminal Settings, different "Channels Settings" and "Data Channel". The available channels depend on the selected Physical Layer Subtype and the selected Access Terminal Mode, see table below.

Table 3-3: Overview on available channels, depending on physical layer subtype and access terminal mode

Physical Layer Subtype	Access Terminal Mode	Pilot Channel	Auxiliary Pilot Channel	RRI Channel	DSC Channel	DRC Channel	ACK Channel	Data Channel
0&1	Traffic	X	-	X	-	X	X	Packet 1
	Access	X	-	-	-	-	-	Packet 1

Physical Layer Subtype	Access Terminal Mode	Pilot Channel	Auxiliary Pilot Channel	RRI Channel	DSC Channel	DRC Channel	ACK Channel	Data Channel
2	Traffic	X	X	X	X	X	X	Packet 1..3
	Access	X	-	-	-	-	-	Packet 1



State (Access Terminal)
Enables or disables the selected access terminal.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:STATe` on page 112

Mode (Access Terminal)
Sets the mode (Traffic or Access) of the selected access terminal.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:MODE` on page 110

Physical Layer Subtype (Access Terminal)
Selects the physical layer subtype for the selected access terminal.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:SUBType` on page 112

Disable Quad. Spreading
Disables the quadrature spreading (complex multiply) with PN sequences and long code.

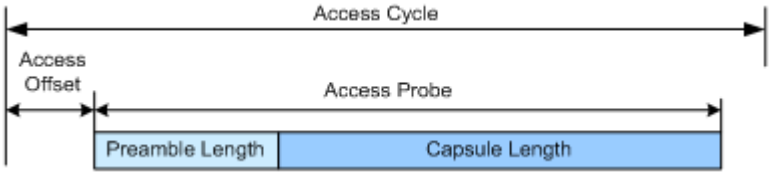
SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DQSPreading` on page 106

Long Code Mask I (hex)
Sets the long code mask of the I channel.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:IMASk` on page 110

Preamble Length
(enabled for access terminal working in access mode only)

Specifies the length of the preamble in frames (16 slots each) of the access probe (see figure below).



SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:PLENgth` on page 111

Access Cycle Duration
(enabled for access terminal working in access mode only)

Sets the access cycle duration in slots. Access probes are repeated with a period of access cycle duration slots.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACYCle:DURation` on page 95

Access Cycle Offset
(enabled for access terminal working in access mode only)

The access channel transmission starts with this number of slots relative to the beginning of each access cycle duration.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACYCle:OFFSet` on page 95

State (Pilot Channel)
Displays the state of the pilot channel.

Note: The pilot channel is always switched on.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:PCHannel:STATe` on page 110

Gain (Pilot Channel)
Sets the gain of the pilot channel.

Gains of other channels are relative to the pilot channel power. This setting is used to distinguish the power between access terminals, when more than one access terminal is active.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:PCHannel:GAIN` on page 110

State (Auxiliary Pilot Channel)
(enabled for Physical Layer subtype 2 and an access terminal working in traffic mode only)

Enables or disables the state of the auxiliary pilot channel.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:APCHannel:STATe` on page 96

Relative Gain (Auxiliary Pilot Channel)
Sets the gain of the auxiliary pilot channel relative to the data channel power.

Note: All other channel gains are specified relative to the pilot channel power, but the auxiliary pilot gain is specified relative to the data channel power. This parameter is only enabled for Physical Layer subtype 2 and for an access terminal working in traffic mode.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:APCHannel:GAIN` on page 95

Minimum Payload (Auxiliary Pilot Channel)
(enabled for Physical Layer subtype 2 and an access terminal working in traffic mode only)

Sets the minimum payload size in bits of the data channel that activates the transmission of the auxiliary pilot channel.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:APCHannel:PAYLoad:MINimum` on page 96

State (RRI Channel)
(enabled for access terminal working in traffic mode only)

Enables or disables the state of the reverse rate indicator (RRI) channel.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:RRIChannel:STATe` on page 112

Relative Gain (RRI Channel)
(enabled for access terminal working in traffic mode only)

Sets the gain of the reverse rate indicator (RRI) channel relative to the pilot channel power.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:RRIChannel:GAIN` on page 111

State (DSC Channel)
(enabled for Physical Layer subtype 2 and an access terminal working in traffic mode only)

Enables or disables the state of the data source control (DSC) channel.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DSCChannel:STATe` on page 109

Relative Gain (DSC Channel)
(enabled for Physical Layer subtype 2 and an access terminal working in traffic mode only)

Sets the gain of the data source control (DSC) channel relative to the pilot channel power.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DSCChannel:GAIN` on page 108

Length (DSC Channel)
(enabled for Physical Layer subtype 2 and an access terminal working in traffic mode only)

Specifies the transmission duration of the data source control (DSC) channel in slots.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DSCChannel:LENGth` on page 109

Values (DSC Channel)
(enabled for Physical Layer subtype 2 and an access terminal working in traffic mode only)

Specifies the pattern transmitted on the data source control (DSC) Channel.

The sequence starts at frame 0 and slot 0 and is repeated with the length of the pattern. Each specified value is transmitted for DSC length slots.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DSCChannel:VALues` on page 109

State (DRC Channel)
(enabled for access terminal working in traffic mode only)

Enables or disables the state of the data rate control (DRC) channel.

SCPI command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:STATe on page 108

Relative Gain (DRC Channel)
(enabled for access terminal working in traffic mode only)

Sets the gain of the data rate control (DRC) channel relative to the pilot channel power.

SCPI command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:GAIN on page 107

Length (DRC Channel)
(enabled for access terminal working in traffic mode only)

Specifies the transmission duration of the data rate control (DRC) channel in slots.

SCPI command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:LENGth on page 107

Values (DRC Channel)
(enabled for access terminal working in traffic mode only)

Specifies the pattern transmitted on the data rate control (DRC) channel.

The sequence starts at frame 0 and slot 0 and is repeated with the length of the pattern. Each specified value is used for DRC length slots.

SCPI command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:VALues on page 108

Cover (DRC Channel)
(enabled for access terminal working in traffic mode only)

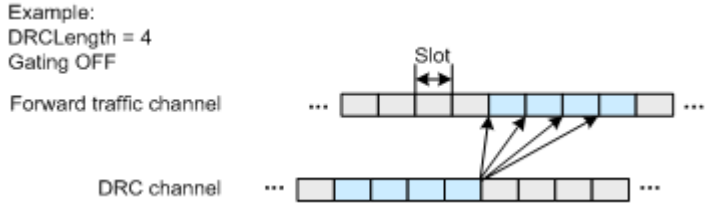
Selects the data rate control (DRC) channel Walsh cover.

SCPI command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:COVer on page 106

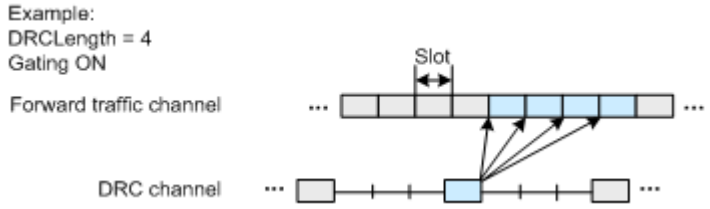
Gating Active (DRC Channel)
(enabled for access terminal working in traffic mode only)

Activates or deactivates the data rate control (DRC) Channel gating.

With deactivated gating, each DRC value is repeated for DRC length slots.



If gating is active, each value of the DRC channel is transmitted for one slot followed by DRCLenght-1 empty slots.



SCPI command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:GATing[:STATe] on page 107

State (ACK Channel)
(enabled for access terminal working in traffic mode only)

Enables or disables the ACK channel.

SCPI command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:STATe on page 94

Relative Gain (ACK Channel)
(enabled for access terminal working in traffic mode only)

Sets the gain of the ACK channel relative to the pilot channel power.

SCPI command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:GAIN on page 93

Mode (ACK Channel)
(enabled for access terminal working in traffic mode only)

Specifies the modulation mode of the ACK channel.

"BPSK" Sets the modulation to BPSK (Binary Phase Shift Keying).
With BPSK modulation, a 0 (ACK) is mapped to +1 and a 1 (NAK) to -1 respectively.

"OOK" Sets the modulation to OOK (On-Off Keying).With OOK modulation, a 0 (ACK) is mapped to ON and a 1 (NAK) to OFF.

Note: OKK modulation is only enabled for physical layer subtype 2.

SCPI command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:MODE on page 93

Gating (ACK Channel)
(enabled for access terminal working in traffic mode only)

Sets the active and inactive slots of the ACK channel.

The sequence starts at frame 0 and slot 0 and is repeated with the length of the pattern.

A 0 gates the ACK channel off for the corresponding slot, a 1 activates the channel.

SCPI command:
[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:GATing on page 93

Values (ACK Channel)
(enabled for access terminal working in traffic mode only)

Specifies the data pattern transmitted on the ACK Channel.

The sequence starts at frame 0 and slot 0 and is repeated with the length of the pattern. A 0 specifies an ACK, a 1 specifies a NAK. This pattern is only read for slots that are gated on.

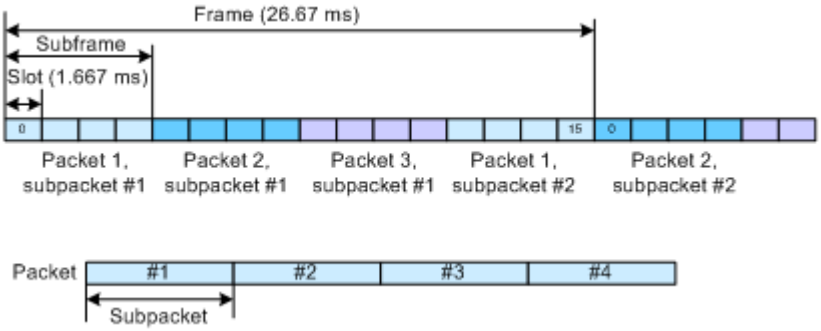
SCPI command:

`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:VALues` on page 94

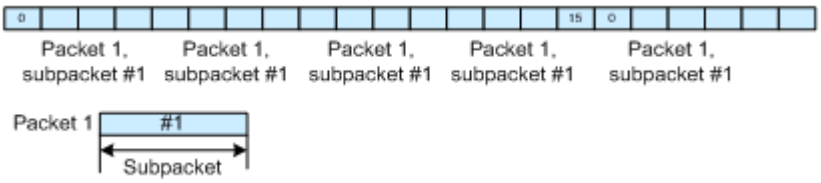
State (Packet)
(enabled for access terminal working in traffic mode only)

Enables or disables the state of the packet(s).

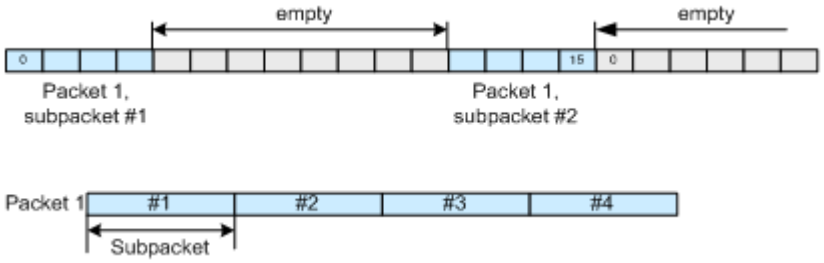
There are three configurable packets (Packet 1… 3) for physical layer subtype 2. When more then one packet is active, packet 1 is sent on the first subframe (first 4 slots), packets 2 and 3 are sent respectively on the second and the third subframe (see figure below).



When only one packet is active and Number of Sub-packets is set to 1, no interleaving will be performed between the packets. In this case, the data channel is active continuously (see figure below).



When only one packet is active but the number of subpackets is larger than one, subframe interleaving has to be performed. In this case 2 subframes will be left empty inbetween every two subpackets (see figure below).



Only one configurable packet is available for physical layer subtype 0&1, the data channel is continuously active for the number of packets to send.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:STATe`
on page 105

Relative Gain (Packet)
(enabled for access terminal working in traffic mode only)

Sets the gain in dB of the selected packet relative to the pilot channel power.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:GAIN`
on page 103

Infinite Packets (Packet)
(enabled for access terminal working in traffic mode only)

Enables or disables sending an unlimited number of packets.

If "Infinite Packets" is disabled, the number of packets to send can be specified with the parameter "Number of Packets to Send".

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:INFinite`
on page 103

Number of Packets to Send (Packet)
(enabled for access terminal working in traffic mode only)

Sets the number of packets to be sent.

The number of packets to send depends on whether the parameter "Infinite Packets "is enabled or disabled. If "Infinite Packets" is enabled, there is no limit to the number of packets sent.

If "Infinite Packets" is disabled, the number of packets can be specified. The data channel will be switched off after the specified "Number of Packets" have been sent.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:COUNt`
on page 99

Number of Sub-packets (Packet)
(enabled for physical layer subtype 2 and an access terminal working in traffic mode only)

Sets the number of sub-packets to be sent.

Example:

If number of sub-packets is 4, then subpacket 0, 1, 2 and 3 of a packet will be sent in a subframe each (with 2 subframes interleaving between) before the next packet is started. This is to simulate a situation where 3 times NAK has been received from the base station with an ACK after the 4th subpacket.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:SUBPackets[:COUNt]` on page 105

Payload Size (Packet)
(enabled for access terminal working in traffic mode only)

Sets the payload size in bits for the selected packet.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:PSIZe` on page 104

Modulation (Packet)
(enabled for physical layer subtype 2 and an access terminal working in traffic mode only)

Displays the modulation type per packet.

The modulation type is set automatically according to the selected payload size. The value is read-only.

Remote-control command: SOUR:BB:EVDO:TERM2:DCH:PACK3:MOD?

"B4"	The modulation type is set to BPSK modulation with 4-ary Walsh cover.
"Q4"	The modulation type is set to QPSK modulation with 4-ary Walsh cover.
"Q2"	The modulation type is set to QPSK modulation with 2-ary Walsh cover.
"Q4Q2"	Sum of Q4 and Q2 modulated symbols.
"E4E2"	Sum of E4 (8-PSK modulated with 4-ary Walsh cover) and E2 (8-PSK modulated with 2-ary Walsh cover) modulated symbols.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:MODulation` on page 104

Data Rate (Packet)
(enabled for access terminal working in traffic mode only)

Displays the resulting data rate for the selected Packet.

This is the effective data rate achieved for the specific packet. Sum up the data rates of all 3 packets to obtain the total effective data rate for the uplink data channel.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DRATe` on page 102

Channel Coding (Packet)
(enabled for access terminal working in traffic mode only)

Activates or deactivates channel coding, including scrambling, turbo encoding and channel interleaving.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:CCODing`
on page 99

Data Source (Packet)
(enabled for access terminal working in traffic mode only)

Selects the data source.

The number of bits read from the data source for each packet depends on the payload size, channel coding state and FCS state. The following table gives an overview on the number of bits read.

	FCS ON	**FCS OFF**
Channel Coding ON	PayloadSize - FCSSize - 6	PayloadSize - 6
Channel Coding OFF	(PayloadSize/CodeRate) - FCSSize	(PayloadSize/CodeRate)

FCSSize and code rate depend on the physical layer subtype (see table bellow).

	Physical layer subtype 0&1	**Physical layer subtype 2**
FCSSize	16	24
Code rate	1/4 or 1/2	1/5 or 1/3

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

"ZERO, ONE" 0 data or 1 data is internally generated.

"PNxx" PRBS data in accordance with the IUT-T with period lengths between 29-1 and 223-1 are internally generated.

"PATTern" A user-definable bit pattern with a maximum length of 64 bits is internally generated.
The bit pattern is defined in the Pattern input box.

"DLISt " Data lists will be used. Data lists can be generated internally in the data editor or externally.
Data lists are selected in the "Select Data List" field.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DATA`
on page 100

DList/ Pattern (Packet)
(enabled for access terminal working in traffic mode only)

Displays selected data list or pattern.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DATA:DSELection` on page 101
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DATA:PATTern` on page 101

FCS (Packet)
(enabled for access terminal working in traffic mode only)

Enables or disables appending a standard Frame Check Sequence (FCS) to the MAC layer packet.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:FCS[:STATe]` on page 102

State (Data Channel)
(enabled for access terminal working in access mode only)

Enables or disables the state of the Data Channel.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:STATe` on page 106

Relative Gain (Data Channel)
(enabled for access terminal working in access mode only)

Sets the gain in dB of the data channel relative to the pilot channel power.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:GAIN` on page 98

Capsule Length (Data Channel)
(enabled for access terminal working in access mode only)

Sets the number of frames (16 slots each) to be transmitted after the preamble. Each frame contains one data packet.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:CLENgth` on page 96

Data Rate (Data Channel)
(enabled for access terminal working in access mode only)

Selects the data rate for the data channel.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DRATe` on page 98

Data Source (Data Channel)
(enabled for access terminal working in access mode only)

Selects the data source.

"ZERO, ONE" 0 data or 1 data is internally generated.

"PNxx" PRBS data in accordance with the IUT-T with period lengths between 29-1 and 223-1 are internally generated.

"PATTern" A user-definable bit pattern with a maximum length of 64 bits is internally generated.
The bit pattern is defined in the Pattern input box.

"DLISt" Data lists will be used. Data lists can be generated internally in the data editor or externally.
Data lists are selected in the "Select Data List" field.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DATA` on page 97
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DATA:PATTern` on page 97

Append FCS (Data Channel)
(enabled for access terminal working in access mode only)

Enables or disables appending a standard Frame Check Sequence (FCS) to the MAC layer packet.

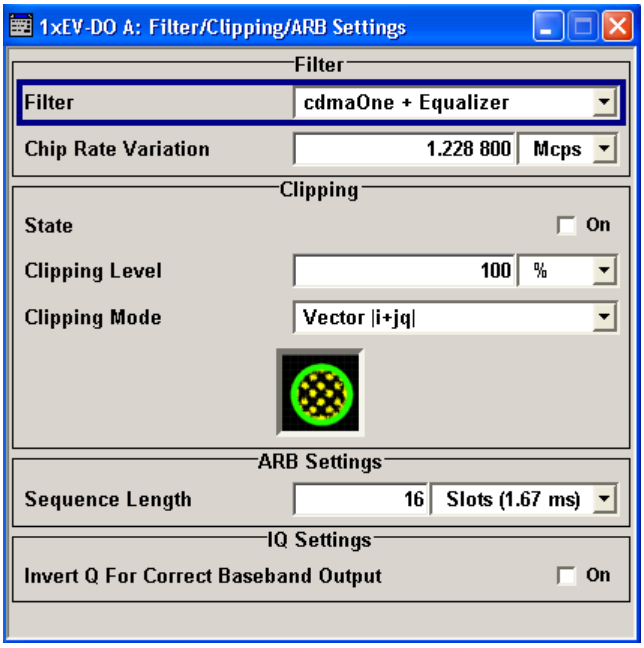
SCPI command:
`[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:FCS[:STATe]` on page 98

3.5 Filter/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.

Generation of baseband signals according to 1xEV-DO standard by inverting the Q-part of the signal is enabled in the I/Q Settings section.



3.5.1 Filter

Filter
Selects baseband filter.

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

SCPI command:
`[:SOURce<hw>]:BB:EVDO:FILTer:TYPE` on page 63

Roll Off Factor or 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:EVDO:FILTer:PARameter:APCO25` on page 60
`[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:COSine` on page 61
`[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:GAUSs` on page 61
`[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:PGAuss` on page 62
`[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:RCOSine` on page 62
`[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:SPHase` on page 62

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:EVDO:FILTer:PARameter:LPASs on page 61

[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:LPASSEVM on page 61

Chip Rate Variation

Enters the chip rate.

The chip rate entry changes the output clock and the modulation bandwidth.

SCPI command:

[:SOURce<hw>]:BB:EVDO:CRATe:VARiation on page 59

Impulse Length

(For WinIQSIM2 only)

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

SCPI command:

[:SOURce<hw>]:BB:EVDO:FILTer:ILENgth:AUTO[:STATe] on page 60

[:SOURce<hw>]:BB:EVDO:FILTer:ILENgth on page 59

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:EVDO:FILTer:OSAMplinng:AUTO[:STATe] on page 60

[:SOURce<hw>]:BB:EVDO:FILTer:OSAMpling on page 60

3.5.2 Clipping

Clipping State

(For reverse link mode only)

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.

1xEV-DO signals may have very high crest factors particularly with many channels and long sequences.

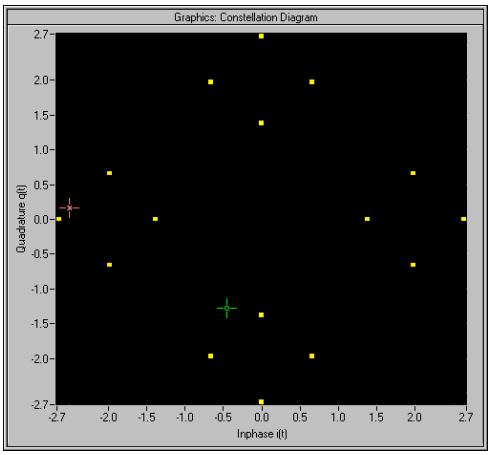
High crest factors entail two basic problems:

- 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.

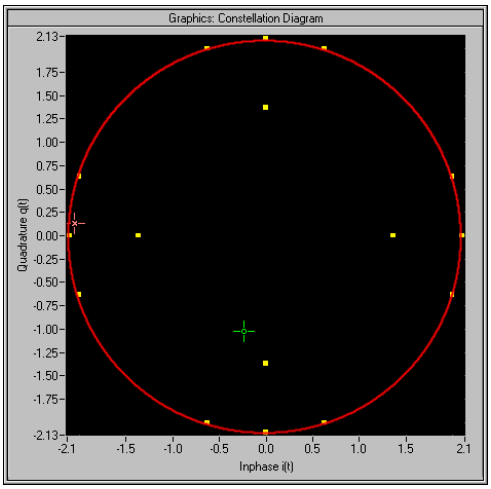
Both effects increase the adjacent-channel power.

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.

The following pictures demonstrate the affect of clipping with vector mode (|i+q|), using a signal configuration with 2 active channels.



Constellation diagram of the signal without clipping, shows the level mapping



Constellation diagram with clipping level 80 %, vector mode (|i+q|) The circle emphasizes the changed constellation points

SCPI command:

`[:SOURce<hw>]:BB:EVDO:CLIPping:STATe` on page 59

Clipping Level

(For reverse link mode only)

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:EVDO:CLIPping:LEVel` on page 58

Clipping Mode

(For reverse link mode only)

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:EVDO:CLIPping:MODE` on page 58

3.5.3 ARB Settings

Sequence Length ARB
(For reverse link mode only)

Changes the sequence length of the arbitrary waveform component of the 1xEV-DO signal in number of slots. 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. One slot of 1.67ms duration equals 2048 chips.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:SLENgth` on page 55

3.5.4 I/Q Setting

Invert Q for Correct Baseband Output
Inverts Q-part of the baseband signal.

"ON" The signal on the baseband outputs meets the 1xEV-DO standard. In order to generate an RF signal that conforms to the standard, the I/Q Swap function in the I/Q Modulator menu must be enabled (On).

"OFF" The signal on the baseband outputs does not meet the 1xEV-DO standard. It can however be mixed with other signals from the second baseband without any problem. In order to generate a standards compliant RF signal, the I/Q Swap function in the I/Q Modulator menu must be disabled (Off).

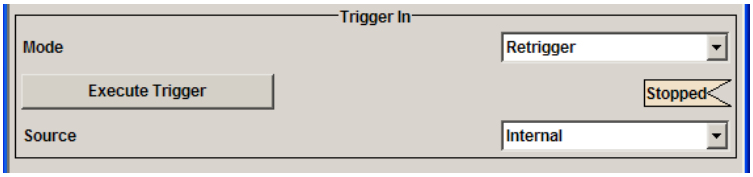
SCPI command:
`[:SOURce<hw>]:BB:EVDO:IQSWap:STATe` on page 63

3.6 Trigger/Marker/Clock

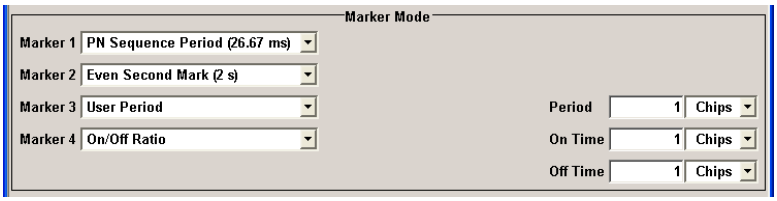
The trigger, clock, and marker delay functions are available for R&S SMx and R&S AMU instruments only.

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

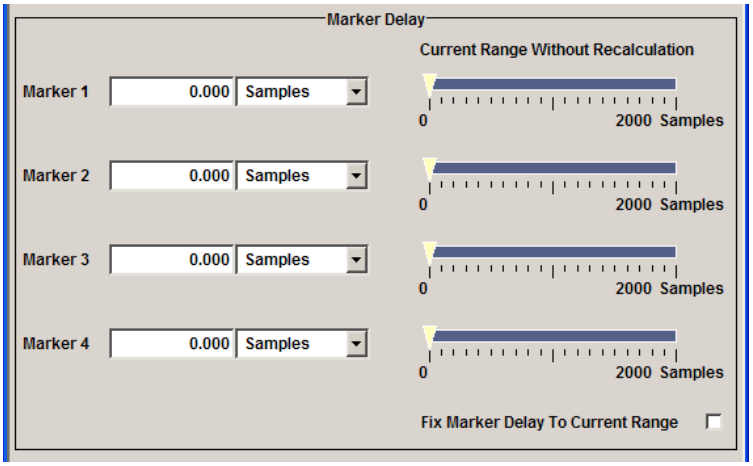
The "Trigger In" section is where the trigger for the signal is set. Various parameters will be provided for the settings, depending on which trigger source - internal or external - is selected. The current status of signal generation ("Running" or "Stopped") is indicated for all trigger modes.



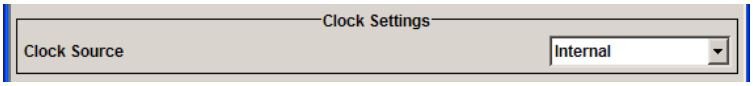
The "Marker Mode" section is where the marker signals at the MARKER output connectors are configured.



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.

3.6.1 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 1xEV-DO 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:EVDO[:TRIGger]:SEQuence` on page 64

Signal Duration Unit
Defines the unit for the entry of the length of the signal sequence to be output in the Single trigger mode.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TRIGger:SLUNit` on page 68

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:EVDO:TRIGger:SLENgth` on page 67

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:EVDO:TRIGger:RMODe` on page 67

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:EVDO:TRIGger:ARM:EXECute` on page 65

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:EVDO:TRIGger:EXECute` on page 65

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 (Baseband A/B)"
  (two-path instruments only)

The trigger event is executed by the trigger signal from the second path

- "External (TRIGGER 1 / 2)"
  The trigger event is executed with the aid of the active edge of an external trigger signal.
  The trigger signal is supplied via the TRIGGER 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:EVDO:TRIGger:SOURce` on page 68

Sync. Output to External Trigger
(enabled for Trigger Source External)

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

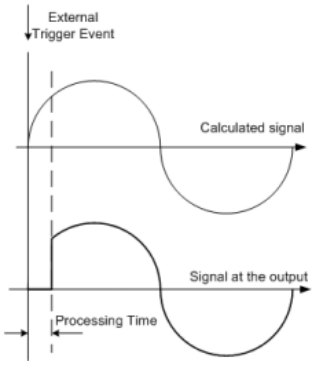
For R&S SMBV instruments:

For 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 below for an overview of the required settings.

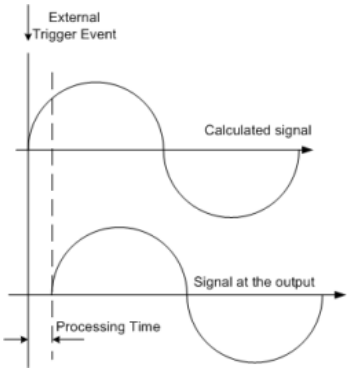
Typical Applications

- All instruments are synchronous to the external trigger event
  - System Trigger = common External Trigger event for the master and the slave instruments
  - "Sync. Output to External Trigger" = ON
- All instruments are synchronous among themselves but starting the signal from first symbol is more important than synchronicity with external trigger event
  - System Trigger = common External Trigger event for the master and the slave instruments
  - "Sync. Output to External Trigger" = OFF
- All instruments are synchronous among themselves
  - System Trigger = internal trigger signal of the master R&S SMBV for the slave instruments
  - "Sync. Output to External Trigger" = 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:EVDO:TRIGger:EXTernal:SYNChronize:OUTPut` on page 65

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:EVDO:TRIGger[:EXTernal<ch>]:DELay` on page 69
`[:SOURce<hw>]:BB:EVDO:TRIGger:OBASeband:DELay` on page 66

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:EVDO:TRIGger[:EXTernal<ch>]:INHibit` on page 69
`[:SOURce<hw>]:BB:EVDO:TRIGger:OBASeband:INHibit` on page 66

3.6.2 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.

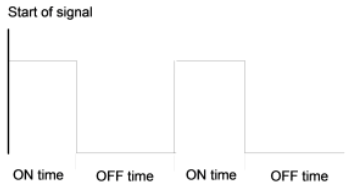
"Slot (1.67 ms)" A marker signal is generated at the start of each slot (every 1.67 ms).

"PN Sequence Period (26,67 ms)" A marker signal is generated every 26.67 ms (PN Sequence Period).

"Even Second Mark (2 s)" A marker signal is generated every 2 seconds.

"Chip Sequence Period (ARB)" (For reverse link mode only)
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.

"ON/OFF Period" 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:EVDO:TRIGger:OUTPut<ch>:ONTime` on page 72
`[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:OFFTime` on page 73

"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:EVDO:TRIGger:OUTPut<ch>:PERiod` on page 73

SCPI command:
`[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:MODE` on page 72

3.6.3 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:EVDO:TRIGger:OUTPut<ch>:DELay` on page 71

Current Range without Calculation
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:EVDO:TRIGger:OUTPut<ch>:DELay:MINimum` on page 71
`[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:DELay:MAXimum` on page 71

Fix Marker 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:EVDO:TRIGger:OUTPut:DELay:FIXed` on page 70

3.6.4 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:EVDO:CLOCk:SYNChronization:MODE` on page 75

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:EVDO:CLOCk:SYNChronization:EXECute` on page 75

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:EVDO:CLOCk:SOURce` on page 74

Clock Mode
Enters the type of externally supplied clock.

- "Chip"
  A chip clock is supplied via the CLOCK connector.
- "Multiple"
  A multiple of the chip clock is supplied via the CLOCK connector; the symbol clock is derived internally from this.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:CLOCk:MODE` on page 74

Chip Clock Multiplier
Enters the multiplication factor for clock type Multiple.

SCPI command:
`[:SOURce<hw>]:BB:EVDO:CLOCk:MULTiplier` on page 74

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?`

3.6.5 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 Remote-Control Commands

The commands in the SOURce:BB:EVDO subsystem are described in four sections, separated into general remote commands, commands for access network settings, commands for traffic channels settings and commands for access terminals settings.The commands are divided up in this way to make the comprehensive SOURce:BB:EVDO subsystem clearer.

SOURce<hw>

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

The numeric suffix to SOURce distinguishes between multicarrier 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 MMEM:CDIRectory. The examples in this description use the place holder <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 instument name, e.g. smbv.
- /usb - for selecting the memory stick which is inserted at the USB interface of Linux instrument.

4.1 General Commands

This subsystem contains commands for the primary and general settings of the 1XEV-DO standard. These settings concern activation and deactivation of the standard, setting the transmission direction, defining the chip rate and the sequence length, as well as the preset and power adjust setting.

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

The command defines the transmission direction. The settings of the traffic channels per user and the access terminals are provided in the following menu section in accordance with the selection.

Parameters:

<Link> FORWard/DOWN | REVerse/UP

*RST: FORWard/DOWN

Example: `BB:EVDO:LINK DOWN`
the transmission direction selected is base station to access terminal. The signal corresponds to that of a base station.

[:SOURce<hw>]:BB:EVDO:PNOFfset <PnOffset>

Sets the PN Offset of the 1xEV-DO signal.

Parameters:

<PnOffset> integer

Range: 0 to 511
*RST: 0

Example: `BB:EVDO:PNOFfset 10`
sets the PN offset to 10.

[:SOURce<hw>]:BB:EVDO:PREDefined <Predefined>

Sets the UL setting of Terminal 1 to one of the predefined configurations.

The predefined settings are made according to 3GPP2 C.S0032-A to allow easy receiver testing.

Parameters:

<Predefined> USER|ULS1DR9K6|ULS1DR19K2|ULS1DR38K4|
ULS1DR76K8|ULS1DR153K6|ULS2PS128LL|ULS2PS256HC|
ULS2PS256LL|ULS2PS512LL|ULS2PS768LL|ULS2PS1024LL|
ULS2PS1536LL|ULS2PS2048LL|ULS2PS3072LL|
ULS2PS4096LL|ULS2PS6144LL|ULS2PS8192LL|
ULS2PS12288LL

USER
there are no predefined settings

ULS1DR9K6
UL, Subtype 1, 9.6 kbps.

ULS1DR19K2
UL, Subtype 1, 19.2 kbps.

ULS1DR38K4
UL, Subtype 1, 38.4 kbps.

ULS1DR76K8
UL, Subtype 1, 76.8 kbps.

ULS1DR153K6
UL, Subtype 1, 153.6 kbps.

ULS2PS128LL
UL, Subtype 2, 128 bits payload, Low Latency.

ULS2PS256HC
UL, Subtype 2, 256 bits payload, Hight Capacity.

ULS2PS256LL
UL, Subtype 2, 256 bits payload, Low Latency.

ULS2PS512LL
UL, Subtype 2, 512 bits payload, Low Latency.

ULS2PS768LL
UL, Subtype 2, 768 bits payload, Low Latency.

ULS2PS1024LL
UL, Subtype 2, 1024 bits payload, Low Latency.

ULS2PS1536LL
UL, Subtype 2, 1536 bits payload, Low Latency.

ULS2PS2048LL
UL, Subtype 2, 2048 bits payload, Low Latency.

ULS2PS3072LL
UL, Subtype 2, 3072 bits payload, Low Latency.

ULS2PS4096LL
UL, Subtype 2, 4096 bits payload, Low Latency.

ULS2PS6144LL
UL, Subtype 2, 6144 bits payload, Low Latency.

ULS2PS8192LL
UL, Subtype 2, 8192 bits payload, Low Latency.

ULS2PS12288LL

UL, Subtype 2, 12288 bits payload, Low Latency.

*RST: USER

Example: `BB:EVDO:PRED ULS2PS256HC`
sets the UL settings of Terminal 1 to UL of Subtype 2 with 256 bits payload and Hight Capacity.
`BB:EVDO:TERM1:SUBT?`
Response: S2.
`BB:EVDO:TERM1:DCH:PACK1:PSIZ?`
Response: 256

[:SOURce<hw>]:BB:EVDO:PRESet

The command produces a standardized default for the 1XEV-DO standard. The settings correspond to the *RST values specified for the commands.

Example: `BB:EVDO:PRES`
resets all the 1XEV-DO settings to default values.

Usage: Event

[:SOURce<hw>]:BB:EVDO:SETTing:CATalog?

This command reads out the files with 1XEV-DO settings in the default directory. The default directory is set using command `MMEM:CDIRectory`. Only files with the file extension `*.1xevdo` will be listed.

Return values:
<Catalog> string

Example: `MMEM:CDIR '<root>\user\1xEVDO`
sets the default directory.
`BB:EVDO:SETT:CAT?`
reads out all the files with 1XEV-DO settings in the default directory.
`Response: '1xEVDO_1','1xEVDO_2'`
the files `1xEVDO_1` and `1xEVDO_2` are available.

Usage: Query only

[:SOURce<hw>]:BB:EVDO:SETTing:DELete <Filename>

This command deletes the selected file with 1XEV-DO 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 `*.1xevdo` will be deleted.

Setting parameters:
<Filename> string

Example: `BB:EVDO:SETT:DEL '1xEV_DO_UP`
deletes file `1xEV_DO`.

Usage: Setting only

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

This command loads the selected file with 1XEV-DO 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 `*.1xevdo` will be loaded.

Setting parameters:
<Filename> string

Example: `BB:EVDO:SETT:LOAD '1xEVDO_UP'`
loads file `1xEVDO_UP`.

Usage: Setting only

[:SOURce<hw>]:BB:EVDO:SETTing:STORe <Filename>

This command stores the current 1XEV-DO 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. 1XEV-DO settings are stored as files with the specific file extensions `*.1xevdo`.

Setting parameters:
<Filename> string

Example: `BB:EVDO:SETT:STOR '1xEVDO_UP'`
stores the current 1XEV-DO settings into file `1xEVDO_UP`.

Usage: Setting only

[:SOURce<hw>]:BB:EVDO:SLENgth <SLength>

(For reverse link mode only)

The command sets the sequence length of the arbitrary waveform component of the 1XEV-DO signal in number of frames. This component is calculated in advance and output in the arbitrary waveform generator. It is added to the real-time signal components.The number of chips is determined from this sequence length. One slot of 1.67ms duration equals 2048 chips.

Parameters:

<SLength> integer

Range: 1 slot to 65536 slots
*RST: 16 slots, 1.67ms each

Example: `BB:EVDO:SLEN 20`
sets the sequence length to 20 slots, 1.67ms each.

[:SOURce<hw>]:BB:EVDO:STATe <State>

The command activates modulation in accordance with the 1XEV-DO 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:EVDO:STAT ON` deactivates the other standards and digital modulation.

Parameters:

<State> 0|1|OFF|ON

*RST: OFF

Example: `BB:EVDO:STAT ON`
activates modulation in accordance with the 1XEV-DO standard.

[:SOURce<hw>]:BB:EVDO:STIMe <STime>

Sets the System Time value of the 1xEV-DO signal and the base station. The System Time value is expressed in units of 1.67 ms intervals (80 ms/ 48).

Note: In uplink, the value selected for system time must be multiple of 16.

Parameters:

<STime> float

Range: 0 to 2^41-1
*RST: 0

Example: `BB:EVDO:LINK DOWN`
the transmission direction selected is base station to access terminal. The signal corresponds to that of a base station.
`BB:EVDO:STIMe 10`
sets the system time to 10.
`BB:EVDO:LINK UP`
the transmission direction selected is access terminal to base station. The signal corresponds to that of a access terminal.
`BB:EVDO:STIMe 32`
sets the system time to 32.

[:SOURce<hw>]:BB:EVDO:VERSion?

The command queries the version of the 1xEV-DO standard underlying the definitions

The numerical suffix at SOURce has no significance for this command and should not be specified.

Return values:
<Version> string

Example: `BB:EVDO:VERS?`
queries the 1xEV-DO version.
`Response: 'Release A'`
1xEV-DO Release A

Usage: Query only

[:SOURce<hw>]:BB:EVDO:WAVeform:CREate <Filename>

This command creates a waveform using the current settings of the "1XEV-DO" 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>\waveform`
sets the default directory.
`BB:EVDO:WAV:CRE '1xEV_DO'`
creates the waveform file `1xEV_DO.wv` in the default directory.

Usage: Setting only

4.2 Filter/Clipping/ARB Settings

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

(For reverse link mode only)

The command sets the limit for level clipping (Clipping). This value indicates at what point the signal is clipped. It is specified as a percentage, relative to the highest level. 100% indicates that clipping does not take place.

Level clipping is activated with the command `SOUR:BB:EVDO:CLIP:STAT ON`

Parameters:

<Level> integer

Range: 0 PCT to 100 PCT
Increment: 1 PCT
*RST: 100 PCT

Example: `BB:EVDO:CLIP:LEV 80PCT`
sets the limit for level clipping to 80% of the maximum level.
`BB:EVDO:CLIP:STAT ON`
activates level clipping.

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

(For reverse link mode only)

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

Parameters:

<Mode> VECTor|SCALar

VECTor
The 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:EVDO:CLIP:MODE SCAL`
selects the absolute maximum of all the I and Q values as the reference level.
`BB:EVDO:CLIP:LEV 80PCT`
sets the limit for level clipping to 80% of this maximum level.
`BB:EVDO:CLIP:STAT ON`
activates level clipping.

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

(For reverse link mode only)

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

Parameters:

<State> 0|1|OFF|ON

*RST: OFF

Example: `BB:EVDO:CLIP:STAT ON`
activates level clipping.

[:SOURce<hw>]:BB:EVDO: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: 1Mcps to 5Mcps
Increment: 1e-6Mcps (1cps)
*RST: 1.2288Mcps

Example: `BB:EVDO:CRAT:VAR 4086001`
sets the chip rate to 4.08 Mcps.

[:SOURce<hw>]:BB:EVDO:FILTer:ILENgth <ILength>

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

Parameters:

<ILength> integer

Range: 1 to 128
Increment: 1
*RST: 10

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

[:SOURce<hw>]:BB:EVDO:FILTer:ILENgth:AUTO[:STATe] <State>

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:

<State> 0|1|OFF|ON

*RST: ON

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

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

The command sets the upsampling factor.

Parameters:

<OSampling> integer

Range: 1 to 32
*RST: 32

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

[:SOURce<hw>]:BB:EVDO:FILTer:OSAMplinng:AUTO[:STATe] <State>

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:

<State> 0|1|OFF|ON

*RST: ON

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

[:SOURce<hw>]:BB:EVDO: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:EVDO:FILT:PAR:APCO25 0.2`
sets the roll-off factor to 0.2 for filter type APCO25.

[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:COSine <Cosine>

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

Parameters:

<Cosine> float

Range: 0.05 to 0.99
Increment: 0.01
*RST: 0.35

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

[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:GAUSs <Gauss>

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

Parameters:

<Gauss> float

Range: 0.15 to 2.5
Increment: 0.01
*RST: 0.5

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

[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:LPASs <LPass>

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

Parameters:

<LPass> float

Range: 0.05 to 2
*RST: 0.5

Example: `BB:EVDO:FILT:PAR:LPAS 0.5`
the cut of frequency factor is set to 0.5.

[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:LPASSEVM <LPassEvm>

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

Parameters:

<LPassEvm> float

Range: 0.05 to 2
*RST: 0.5

Example: `BB:EVDO:FILT:PAR:LPASSEVM 0.5`
the cut of frequency factor is set to 0.5.

[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:PGAuss <PGauss>

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

Parameters:

<PGauss> float

Range: 0.15 to 2.5
Increment: 0.01
*RST: 0.5

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

[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:RCOSine <RCosine>

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

Parameters:

<RCosine> float

Range: 0.05 to 0.99
Increment: 0.01
*RST: 0.22

Example: `BB:EVDO:FILT:PAR:RCOS 0.22`
sets the roll-off factor to 0. 22 for filter type Root Cosine.

[:SOURce<hw>]:BB:EVDO:FILTer:PARameter:SPHase <SPhase>

The command sets 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:EVDO:FILT:PAR:SPH 0.5`
sets B x T to 0.5 for the Split Phase filter type.

[:SOURce<hw>]:BB:EVDO: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: Downlink:COEQ; Uplink: CONE

Example: `BB:EVDO:FILT:TYPE CONE`
sets the filter type CdmaOne. This filter type is defined by the standard for the uplink.

[:SOURce<hw>]:BB:EVDO:IQSWap:STATe <State>

This command inverts the Q-part of the baseband signal if set to ON. The signal on the baseband outputs meets the 1xEV-DO standard. In order to generate an RF signal that conforms to the standard, the "I/Q Swap" function in the "I/Q Modulator" menu must be enabled ("On") (`SOURce:IQ:SWAP ON`).

Parameters:

<State> 0|1|OFF|ON

*RST: OFF

Example: `BB:EVDO:IQSW:STAT ON`
inverts the Q-part of the baseband signal.

4.3 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:EVDO[:TRIGger]:SEQuence <Sequence>

The command selects the trigger mode.

Parameters:

<Sequence> AUTO|RETRigger|AAUTo|ARETrigger|SINGle

AUTO
The modulation signal is generated continuously.

RETRigger
(For reverse link mode only)
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:EVDO:TRIG:ARM:EXEC` and started again when a trigger event occurs.

ARETrigger
(For reverse link mode only)
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:EVDO:TRIG:ARM:EXEC` and started again when a trigger event occurs.

SINGle
(For reverse link mode only)
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:EVDO:TRIG:SLEN`). Every subsequent trigger event causes a restart.

*RST: AUTO

Example:

```
BB:EVDO: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.

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

The command stops signal generation for trigger modes Armed_Auto and Armed_Retrigger. A subsequent internal or external trigger event restart signal generation.

Example: `BB:EVDO:TRIG:SOUR INT`
sets internal triggering.
`BB:EVDO:TRIG:SEQ ARET`
sets Armed_Retrigger mode, i.e. every trigger event causes signal generation to restart.
`BB:EVDO:TRIG:EXEC`
executes a trigger, signal generation is started.
`BB:EVDO:TRIG:ARM:EXEC`
signal generation is stopped.
`BB:EVDO:TRIG:EXEC`
executes a trigger, signal generation is started again.

Usage: Event

[:SOURce<hw>]:BB:EVDO:TRIGger:EXECute

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

Example: `BB:EVDO:TRIG:SOUR INT`
sets internal triggering.
`BB:EVDO:TRIG:SEQ RETR`
sets Retrigger mode, i.e. every trigger event causes signal generation to restart.
`BB:EVDO:TRIG:EXEC`
executes a trigger.

Usage: Event

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

(enabled for Trigger Source External)

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

See also section "Sync. Output to External Trigger" for a detailed description of the applications of this parameter.

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:EVDO:TRIG:SOUR EXT`
sets external triggering.
`BB:EVDO:TRIG:EXT:SYNC:OUTP ON`
enables synchrounous output to external trigger

[:SOURce<hw>]:BB:EVDO: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 (two-path instruments only).

Parameters:

<Delay> float

Range: 0 chips to 65 535 chips
Increment: 1 chip
*RST: 0 chips

Example: `BB:EVDO:TRIG:SOUR OBAS`
sets for path A the internal trigger executed by the trigger signal from the second path (path B).
`BB:EVDO:TRIG:OBAS:DEL 50`
sets a delay of 50 symbols for the trigger.

[:SOURce<hw>]:BB:EVDO: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 2^26-1 chips
Increment: 1chip
*RST: 0 chips

Example: `BB:EVDO:TRIG:SOUR OBAS`
sets for path A the internal trigger executed by the trigger signal from the second path (path B).
`BB:EVDO:TRIG:INH 200`
sets a restart inhibit for 200 chips following a trigger event.

[:SOURce<hw>]:BB:EVDO:TRIGger:RMODe?

The command queries the current status of signal generation for all trigger modes with 1XEV-DO modulation on.

Return values:

<RMode> STOP|RUN

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:EVDO:TRIG:ARM:EXECute` (armed trigger modes only).

Example: `SOUR2:BB:EVDO:TRIG:SOUR EXT`
sets external triggering via the TRIGGER 1 connector for path B of a two-path instrument.
`BB:EVDO:TRIG:MODE ARET`
selects the Armed_Retrigger mode.
`BB:EVDO: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:EVDO:TRIGger:SLENgth <SLength>

The command defines the length of the signal sequence to be output in the "Single" trigger mode (`SOUR:BB:EVDO:SEQ SING`). The unit is defined with command `SOUR:BB:EVDO: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> integer

Range: 1 chip to 2^32-1 chips
*RST: 1 CSL

Example: `BB:EVDO:SEQ SING`
sets trigger mode Single.
`BB:EVDO:TRIG:SLUN CHIP`
sets unit chips for the entry of sequence length.
`BB:EVDO: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:EVDO:TRIGger:SLUNit <SLunit>

The command defines the unit for the entry of the length of the signal sequence (`SOUR:BB:EVDO:TRIG:SLEN`) to be output in the "Single" trigger mode (`SOUR:BB:EVDO:SEQ SING`).

Parameters:

<SLunit> SLOT|CHIP|SEQuence

*RST: SEQuence

Example: `BB:EVDO:SEQ SING`
sets trigger mode Single.
`BB:EVDO:TRIG:SLUN SLOT`
sets unit slots for the entry of sequence length.
`BB:EVDO: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:EVDO:TRIGger:SOURce <Source>

The command selects the trigger source.

Parameters:

<Source> INTernal|EXTernal|BEXTernal|OBASeband

INTernal
Triggering is executed by means of the Trigger command `BB:EVDO: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:EVDO:TRIG:SOUR EXT`
sets external triggering via the TRIGGER 1 connector.

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

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

Suffix:

<ch> 1|2
distinguishes between the external trigger via the TRIGGER 1 (suffix 1) and TRIGGER 2 (suffix 2) connector.

Parameters:

<Delay> float

Range: 0 chips to 65 535 chips
Increment: 1 chip
*RST: 0 chip

Example: `BB:EVDO:TRIG:SOUR EXT`
sets an external trigger via the TRIGGER 1 connector.
`BB:EVDO:TRIG:DEL 50`
sets a delay of 50 symbols for the trigger.

[:SOURce<hw>]:BB:EVDO: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.

Suffix:
<ch> 1|2
distinguishes between the external trigger via the TRIGGER 1 (suffix 1) and TRIGGER 2 (suffix 2) connector.

Parameters:
<Inhibit> integer

Range: 0 chips to 2^26-1 chips
Increment: 1 chip
*RST: 0 chips

Example: `BB:EVDO:TRIG:SOUR EXT`
selects an external trigger via the TRIGGER 1 connector.
`BB:EVDO:TRIG:INH 200`
sets a restart inhibit for 200 chips following a trigger event.

4.4 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.

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

The command restricts the marker delay setting range to 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.

Parameters:
<Fixed> 0|1|OFF|ON

*RST: OFF

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

[:SOURce<hw>]:BB:EVDO: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:EVDO: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 2^32-1 chips
Increment: 1 chip
*RST: 0 chips

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

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

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

Return values:

<Maximum> float

Example: `BB:EVDO:TRIG:OUTP:DEL:FIX ON`
restricts the marker signal delay setting range to the dynamic range.
`BB:EVDO: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:EVDO:TRIGger:OUTPut<ch>:DELay:MINimum?

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

Return values:

<Minimum> float

Example: `BB:EVDO:TRIG:OUTP:DEL:FIX ON`
restricts the marker signal delay setting range to the dynamic range.
`BB:EVDO: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:EVDO:TRIGger:OUTPut<ch>:MODE <Mode>

The command defines the signal for the selected marker output

Parameters:

<Mode> SLOT|PNSPeriod|ESM|CSPeriod|RATio|USER

SLOT
A marker signal is generated at the start of each slot (every 1.67 ms).

PNSPeriod
A marker signal is generated every 26.67 ms (PN Sequence Period).

ESM
A marker signal is generated every 2 s (even second mark).

CSPeriod
("For reverse link mode only")
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:EVDO:TRIGger:OUTPut:OFFTime` and
`SOURce:BB:EVDO:TRIGger:OUTPut:ONTime` is generated.

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

*RST: SLOT

Example: `BB:EVDO:TRIG:OUTP2:MODE ESM`
selects the even second mark clock (every 2 seconds) on output MARKER 2.

[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:ONTime <OnTime>

[:SOURce<hw>]:BB:EVDO:TRIGger:OUTPut<ch>:OFFTime <OffTime>

The command sets the number of chips in a period (ON time + OFF time) during which the marker signal in setting `SOURce:BB:EVDO:TRIGger:OUTPut:MODE RATio` on the marker outputs is OFF.

Parameters:

<OffTime> integer

Range: 1 chip to 2^24-1 chips
Increment: 1 chip
*RST: 1 chip

Example: `BB:EVDO:TRIG:OUTP2:OFFT 2000`
sets an OFF time of 2000 chips for marker signal 2 on path A.
`BB:EVDO:TRIG:OUTP2:OFFT 2000`
sets an OFF time of 2000 chips for marker signal 2.
`BB:EVDO:TRIG:OUTP2:OFFT 2000`
sets an OFF time of 2000 chips for marker signal 2.

[:SOURce<hw>]:BB:EVDO: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:EVDO:TRIG:OUTP:MODE`.

Parameters:

<Period> integer

Range: 2 chips to 2^24-1 chips
Increment: 1 chip
*RST: 1 chip

Example: `BB:EVDO:TRIG:OUTP2:MODE USER`
selects the user marker for the signal on connector MARKER 2.
`BB:EVDO:TRIG:OUTP2:PER 1600`
sets a period of 1600 chips, i.e. the marker signal is repeated every 1600th chip.

4.5 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.

[:SOURce<hw>]:BB:EVDO:CLOCk:MODE <Mode>

The command enters the type of externally supplied clock (`:EVDO: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:EVDO: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:EVDO:CLOC:MODE CHIP`
selects clock type "Chip", i.e. the supplied clock is a chip clock.

[:SOURce<hw>]:BB:EVDO:CLOCk:MULTiplier <Multiplier>

The command specifies the multiplier for clock type "Multiplied" (`:BB:EVDO: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:EVDO:CLOC:SOUR EXT`
selects the external clock source. The clock is supplied via the CLOCK connector.
`BB:EVDO:CLOC:MODE MCH`
selects clock type "Multiplied", i.e. the supplied clock has a rate which is a multiple of the chip rate.
`BB:EVDO:CLOC:MULT 12`
the multiplier for the external clock rate is 12.

[:SOURce<hw>]:BB:EVDO: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.

Parameters:

<Source> INTernal|EXTernal

INTernal
The internal clock reference is used.

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

*RST: INTernal

Example: `BB:EVDO:CLOC:SOUR EXT`
selects the external clock source. The clock is supplied via the CLOCK connector.
`BB:EVDO:CLOC:MODE MCH`
selects clock type "Multiplied", i.e. the supplied clock has a rate which is a multiple of the chip rate.
`BB:EVDO:CLOC:MULT 12`
the multiplier for the external clock rate is 12.

[:SOURce<hw>]:BB:EVDO:CLOCk:SYNChronization:EXECute

Performs automatically adjustment of the instrument's settings required for the synchronization mode, set with the command `BB:EVDO:CLOC:SYNC:MODE`.

Example: `BB:EVDO:CLOC:SYNC:MODE MAST`
the instrument is configured to work as a master one.
`BB:EVDO:CLOC:SYNC:EXEC`
all synchronizations settings are adjusted accordingly.

Usage: Event

[:SOURce<hw>]:BB:EVDO:CLOCk:SYNChronization:MODE <Mode>

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 synchronisation (including the trigger signal) and reference clock signal.

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

*RST: NONE

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

4.6 Access Network Settings

[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:PSOFfset <PSoffset>

Sets the offset (in slots) from the start of control channel cycle to the start of the synchronous message capsule that contains the Sync Message.

Parameters:

<PSoffset> float

Range: 0 to 3
*RST: 0

Example: `BB:EVDO:ANET:CCH:PSOF 2`
sets the packet start offset for the control channel to 2.

[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:RATE <Rate>

Sets the rate that the control channel messages are transmitted at.

Parameters:

<Rate> DR4K8|DR9K6|DR19K2|DR38K4|DR76K8|DR153K6|DR307K2|DR614K4|DR921K6|DR1228K8|DR1536K|DR1843K2|DR2457K6|DR3072K

*RST: 38.4 kbps

Example: `BB:EVDO:ANET:CCH:RATE DR76K8`
sets the control channel rate to 76.8 kbps.

[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:REVision:MAXimum <Maximum>

Sets the value of the maximum revision field within the control channel message.

Parameters:

<Maximum> float

Range: 0 to 255
*RST: 1

Example: `BB:EVDO:ANET:CCH:REV:MAX 10`
sets the value of the maximum revision field to 10.

[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:REVision:MINimum <Minimum>

Sets the value of the minimum revision field within the control channel message.

Parameters:

<Minimum> float

Range: 0 to 255
*RST: 1

Example: `BB:EVDO:ANET:CCH:REV:MIN 1`
sets the value of the minimum revision field to 1.

[:SOURce<hw>]:BB:EVDO:ANETwork:CCHannel:STATe <State>

Enables or disables the control channel messages. The only control channel message that is ever sent is the Sync Message.When this is enabled, the control channel messages will have the highest priority for placement within the slots. The Sync Message will be updated constantly, even when the control channel is not enabled.

Parameters:

<State> 0|1|OFF|ON

*RST: OFF

Example: `BB:EVDO:ANET:CCH:STAT ON`
enables the control channel message.

[:SOURce<hw>]:BB:EVDO:ANETwork:CPMode <CpMode>

Enables or disables a special mode within the 1xEV-DO generator.

Note: During the special mode, all other parameters do not affect the signal output.

Parameters:

<CpMode> 0|1|OFF|ON

ON
Enables working in a special mode.
In this special mode, the 1xEV-DO generator generates a pilot signal only.

OFF
Selects normal operation.

*RST: OFF

Example: `BB:EVDO:ANET:CPM ON`
enables the special mode.

[:SOURce<hw>]:BB:EVDO:ANETwork:OUCount <OuCount>

Sets the number of additional users (beyond the four defined users) that appear in the MAC Channel.

These additional users will never have a packet addressed to them, but are used to fill in the MAC channel code domain.

These Other Users are used to evenly distribute the excess power (beyond what is required by the User 1..4 and RAB channels).

Parameters:

<OuCount> float

Range: 0 for physical layer subtype 2 OR subtype 0&1)
to 110 for physical layer subtype 2 OR 55 for physical layer subtype 0&1

*RST: 0

Example: `BB:EVDO:ANET:OUC 5`
sets the number of additional users to 5.

[:SOURce<hw>]:BB:EVDO:ANETwork:PCHannel:STATe?

Displays the state of the pilot channel. Pilot channel is transmitted by sector on each active forward channel. It is present always and transmitted at the full sector power.

Return values:

<State> 0|1|OFF|ON

*RST: ON

Example: `BB:EVDO:ANET:PCH:STAT?`
displays the state of the pilot channel.

Usage: Query only

[:SOURce<hw>]:BB:EVDO:ANETwork:RAB:LENGth <Length>

Sets the duration (in slots) of a Reverse Activity bit.

Note: This parameter is available for physical layer subtype 0&1 only.

Parameters:

<Length> RL8|RL16|RL32|RL64

*RST: 8

Example: `BB:EVDO:ANET:RAB:LENG RL16`
sets the duration of the Reverse Activity Bit (RAB) to 16 slots.

[:SOURce<hw>]:BB:EVDO:ANETwork:RAB:LEVel <Level>

Sets the power within the MAC block for the Reverse Activity channel.

Parameters:

<Level> float

Range: -25 to -7
*RST: -7.0

Example: `BB:EVDO:ANET:RAB:LEV -7.0`
sets the power of the MAC block for the Reverse Activity Channel to -7.0 dB.

[:SOURce<hw>]:BB:EVDO:ANETwork:RAB:OFFSet <Offset>

Sets the starting time offset of the Reverse Activity bit in slots. The command is specified in Reverse Activity Length/8 units. The RA bit starts when the following equation is satisfied:

System Time mod RABlenght = RABOffset, where System Time is expressed in slots.

Note: This parameter is available for physical layer subtype 0&1 only.

Parameters:

<Offset> integer

Range: 0 to 7
*RST: 0

Example: `BB:EVDO:ANET:RAB:OFFS 1`
sets the starting time offset of the Reverse Activity bit to 1.

[:SOURce<hw>]:BB:EVDO:ANETwork:RAB:STATe <State>

Activates or deactivates the reverse activity bit (RAB).

Parameters:

<State> 0|1|OFF|ON

*RST: OFF

Example: `BB:EVDO:ANET:RAB:STAT ON`
activates the Reverse Activity Bit.

[:SOURce<hw>]:BB:EVDO:ANETwork:SUBType <Subtype>

Selects the physical layer subtype.

Note: The physical layer subtype settings can be queried per user.

Parameters:

<Subtype> S1|S2

*RST: 2

Example: `BB:EVDO:ANET:SUBT S2`
sets the physical layer subtype to 2.
`BB:EVDO:USER3:SUBT?`
queries the physical layer settings for user 3.

4.7 Configure Traffic User 1..4

`USER<ST>`

The numeric suffix to `USER` distinguishes between the available users. The value range is 1 .. 4.

[:SOURce<hw>]:BB:EVDO:USER<st>:DATA:PATTern <Pattern>

Sets the data pattern for the data portion of the packets sent to the user. The most significant bit (MSB) of this value is the MSB of the packet and the word is repeated to fill all space within the packet.This parameter is 32 bits and in a hexadecimal format.

Parameters:

<Pattern> integer

*RST: 0

Example: `BB:EVDO:USER2:DTA:PATT # H55aa55aa`
sets the data pattern for user 2.

[:SOURce<hw>]:BB:EVDO:USER<st>:DRCLock:LENGth <Length>

Sets the number of DRC (Data Rate Control) Lock periods that the state of the DRC Lock for the selected user will be held constant.

Note: Changes in the DRC Lock state are only considered at the interval defined by the parameter DRC Lock Length.

A value of one allows updating of the DRC Lock bit at anytime.

Parameters:

<Length> DL1|DL2|DL4|DL8|DL16|DL32

*RST: 1

Example: `BB:EVDO:USER2:DRCL:LENG DL8`
sets 8 DRCLock periods for holding the state of user 2 constant.

[:SOURce<hw>]:BB:EVDO:USER<st>:DRCLock:OFFSet <Offset>

Sets the reverse link frame offset for the reverse link. The frame offset is used to properly position the DRC Lock bit within the MAC channel.

Parameters:

<Offset> integer

Range: 0 to 15
*RST: 0

Example: `BB:EVDO:USER2:DRCL:OFFS 5`
sets the reverse link frame offset to 5.

[:SOURce<hw>]:BB:EVDO:USER<st>:DRCLock:PERiod <Period>

Sets the period (measured in slots) of time between successive transmissions of the DRC (Data Rate Control) Lock bit for the selected user.

Note: A value of zero will disable the DRC Lock subchannel and the MAC RPC channel of the selected user will not be punctured with the DRC Lock subchannel.

Parameters:

<Period> DP0|DP4|DP8|DP16

*RST: 4

Example: `BB:EVDO:USER2:DRCL:PER DP8`
sets the DRC Lock period for user 2 to 8 slots.

[:SOURce<hw>]:BB:EVDO:USER<st>:DRCLock:STATe <State>

Sets the state of the DRC (Data Rate Control) Lock bit for the selected user.

Note: Changes in the DRC Lock state are only considered at the interval defined by the parameter DRC Lock Length.

Parameters:

<State> 0|1|OFF|ON

*RST: OFF

Example: `BB:EVDO:USER2:DRCL:STAT ON`
activates the DRC Lock bit for user 2.

[:SOURce<hw>]:BB:EVDO:USER<st>:HARQ:MODE <Mode>

Enables or disables the H-ARQ Channel. The H-ARQ channel is used by the access network to transmit positive acknowledgement (ACK) or a negative acknowledgement (NAK) in response to a physical layer packet.

Note: This parameter is enabled for Physical Layer Subtype 2 only.

Parameters:

<Mode> OFF|ACK|NAK

OFF
Disables transmission of the H-ARQ channel.

ACK
Enables transmission of H-ARQ. The channel will be transmitted with all bits set to ACK.

NAK
Enables transmission of H-ARQ. The channel will be transmitted with all bits set to NAK

*RST: OFF

Example: `BB:EVDO:USER2:SUBT S2`
sets the physical layer subtype for user 2 to 2.
`BB:EVDO:USER2:HARQ:MODE ACK`
enables ARQ channel. The channel will be transmit with all bits set to ACK.

[:SOURce<hw>]:BB:EVDO:USER<st>:IFACtor <IFactor>

Controls the number of interleave slots used for the selected user on the forward link.

Four interleave slots are defined in the 1xEV-DO system.

By default, only 1 Interleave slot (Interleave Factor = 1) for an access terminal is configured and transmission to that access terminal every 4th slot is selected.

For an interleave factor > 1, packets on multiple interleave slots will be sent, increasing the data throughput to the access terminal.

Parameters:

<IFactor> integer

Range: 1 to 4
*RST: 1

Example: `BB:EVDO:USER2:IFAC 2`
sets 2 interleaved slots for user 2 on the forward link.

[:SOURce<hw>]:BB:EVDO:USER<st>:MAC:INDex <Index>

Sets the MAC Index used for the selected user.

MAC Index should be different for the different users. However, in case that two users are using the same value for MAC Index, the lower priority user will be disabled, or be unable to enable.

The values for the MAC Indexes for the 'OtherUsers' (see `[:SOURce<hw>]:BB:EVDO:ANETwork:OUCount`) will be assigned from a pool of valid MAC Indexes, that exclude the MAC Indexes specified for each of the four configurable users.

Parameters:

<Index> integer

Range: 5 physical layer subtype 0&1 OR 6 OR 72 physical layer subtype 2 to 63 physical layer subtype 0&1 OR 63 OR 127 physical layer subtype 2
*RST: Physical layer subtype 0&1: 5 for user 1; 6 for user 2; 7 for user 3; 8 for user 4; / Physical layer subtype 2: 6 for user 1; 7 for user 2; 8 for user 3; 9 for user 4

Example: `BB:EVDO:USER2:MAC:IND 6`
sets the MAC index for user 2 to 16.

[:SOURce<hw>]:BB:EVDO:USER<st>:MAC:LEVel <Level>

Sets the power within the MAC channel that is dedicated to the selected user.

Parameters:

<Level> float

Range: -25 to -7
Increment: -
*RST: -7

Example: `BB:EVDO:USER2:MAC:LEV -7.0`
sets the power within the MAC channel to -7.0 dB.

[:SOURce<hw>]:BB:EVDO:USER<st>:PACKet:COUNt <Count>

Sets the number of packets to send to the selected user.

The number of packets to be send depends on whether the parameter "Infinite" is enabled or disabled.

If "Infinite" is enabled, there is no limit to the number of packets sent to the user.

If "Infinite" is disabled and a value is specified while packets are being sent, the new count value will be used at the end of transmission of the current packet. If a value of zero is specified, the transmission to the user will be stopped at the end of the current packet.

Parameters:

<Count> integer

Range: 0 to 65536
*RST: 65536

Example: `BB:EVDO:USER2:PACK:INF OFF`
disables sending of unlimited number of packets.
`BB:EVDO:USER2:PACK:COUNT 10`
sets the number of packets to be send to 10.

[:SOURce<hw>]:BB:EVDO:USER<st>:PACKet:INFinite <Infinite>

Enables or disables sending an unlimited number of packets to the selected user.

Parameters:

<Infinite> 0|1|OFF|ON

ON
Enables sending of an unlimited number of packets to the user.

OFF
Disables sending of an unlimited number of packets to the user. The number of packets to be sent can be specified.

*RST: 65536

Example: `BB:EVDO:USER2:PACK:INF OFF`
disables sending of unlimited number of packets for user 2.
`BB:EVDO:USER2:PACK:COUNT 10`
sets the number of packets to be send to user 2 to10.

[:SOURce<hw>]:BB:EVDO:USER<st>:PACKet:SOFFset <SOffset>

Sets the minimum number of slots between the end of one packet and the beginning of the next.

For single slot packets, a value of zero will cause the next packet to be sent in the immediate next slot (subject to scheduling).

For multiple slot packets, a value of zero will cause the next packet transmission to start three slots after the end of the previous packet. The three slot delay is identical to the interleaving delay between slots for multiple slot packets. The offset value is attached to the end of the preceding packet.

Note: An offset value of zero with a rate change from a single slot packets to a multiple slot packets will cause the first slot of the multiple slot packet to be transmitted in the slot immediately following the single slot packet.

Parameters:

<SOffset> integer

Range: 0 to 255
*RST: 0

Example: `BB:EVDO:USER2:PACK:SOFF 10`
sets the packet start offset for user 2 to10.

[:SOURce<hw>]:BB:EVDO:USER<st>:PSIZe <PSize>

Sets the packet size for the packets sent to the selected user. For physical layer 0&1, the parameter Packet Size is read-only. The value is automatically set depending on the selection for the parameter Rate Index. (see Rate Index for Physical Layer Subtype 0&1)

For physical layer subtype 2, a combination of the parameter Packet Size and the parameter Rate Index sets the data rate and the slot count for the packets sent to the selected user. (see Rate Index for Physical Layer Subtype 0&1).

Note: Selected rate becomes effective at the beginning of the next packet transmitted to the selected user.

Parameters:

<PSize> PS128|PS256|PS512|PS768|PS1024|PS1536|PS2048|PS3072|PS4096|PS5120|PS6144|PS8192|PS12288

*RST: 128

Example: `BB:EVDO:ANET:SUBT S2`
sets the physical layer subtype to 2.
`BB:EVDO:USER2:RATE:IND 4`
sets the rate index of user 2 to 4.
`BB:EVDO:USER2:PSIZ PS256`
sets the packet size for user 2 to 256.
`SOUR:BB:EVDO:USER2:RATE?`
queries the data rare for user 2.
`Response: 76.8 kbps`

[:SOURce<hw>]:BB:EVDO:USER<st>:RATE?

For physical layer 0&1, the parameter "Rate Index" alone automatically set the packet size, data rate and the slot count for the packets sent to the selected user. Parameters "Packet Size", Data Rate and Slot Count are read-only. (see Rate Index for Physical Layer Subtype 0&1).

Displays the data rate of the packets sent to the selected user. This parameter is read-only. The value is set automatically, depending on the selected"Rate Index" and "Packet Size". (see Rate Index for Physical Layer Subtype 0&1and Rate Index for Physical Layer Subtype 0&1).

Note: Selected rate becomes effective at the beginning of the next packet transmitted to the selected user.

Return values:

<Rate> DR4K8|DR9K6|DR19K2|DR38K4|DR76K8|DR153K6|DR307K2|DR614K4|DR921K6|DR1228K8|DR1536K|DR1843K2|DR2457K6|DR3072K

*RST: 128

Example: `BB:EVDO:ANET:SUBT S2`
sets the physical layer subtype to 2.
`BB:EVDO:USER2:RATE:IND 4`
sets the rate index of user 2 to 4.
`BB:EVDO:USER2:PSIZ PS256`
sets the packet size for user 2 to 256.
`SOUR:BB:EVDO:USER2:RATE?`
queries the data rare for user 2.
`Response: 76.8 kbps`

Usage: Query only

[:SOURce<hw>]:BB:EVDO:USER<st>:RATE:INDex <Index>

For physical layer 0&1, the parameter "Rate Index" alone automatically set the packet size, data rate and the slot count for the packets sent to the selected user. Parameters Packet Size, Data Rate and Slot Count are read-only. (see Rate Index for Physical Layer Subtype 0&1).

For physical layer subtype 2 however, a combination of the parameters "Rate Index" and the parameter "Packet Size" sets the data rate and the slot count for the packets sent to the selected user. (see Rate Index for Physical Layer Subtype 0&1).

Note: Selected rate becomes effective at the beginning of the next packet transmitted to the selected user.

Parameters:

<Index> integer

Range: 1 (physical layer subtype 0&1) / 0 (physical layer subtype 2) to 12 (physical layer subtype 0&1) / 14 (physical layer subtype 2)

*RST: 1

Example: `BB:EVDO:ANET:SUBT S2`
sets the physical layer subtype to 2.
`BB:EVDO:USER2:RATE:IND 4`
sets the rate index of user 2 to 4.
`BB:EVDO:USER2:PSIZ PS256`
sets the packet size for user 2 to 256.
`SOUR:BB:EVDO:USER2:RATE?`
queries the data rare for user 2.
`Response: 76.8 kbps`

[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:INJect

Enables sending of user defined Reverse Power Control (RPC) pattern at the end of the current RPC mode.

The former RPC mode will be restart at the end of the pattern transmission.

Example: `BB:EVDO:USER2:RPC:MODE PATT`
sets the mode of the Reverse Power Control (RPC) Channel within the MAC channel for user 2 to pattern, i.e. a user-defined sequence will be transmitted.
`BB:EVDO:USER2:RPC:ZONE0:BIT 1`
sets the bit for zone 0 to 1
`BB:EVDO:USER2:RPC:ZONE0:COUNT 10`
sets the number of RPC bits for zone 0 to 10.
`BB:EVDO:USER2:RPC:ZONE1:BIT 0`
`BB:EVDO:USER2:RPC:ZONE1:COUNT 100`
`BB:EVDO:USER2:RPC:ZONE2:BIT 1`
`BB:EVDO:USER2:RPC:ZONE2:COUNT 50`
`BB:EVDO:USER2:RPC:ZONE3:BIT 0`
`BB:EVDO:USER2:RPC:ZONE3:COUNT 10`
`BB:EVDO:USER2:RPC:INJ`
the user defined RPC pattern will be inserted at the end of the current RPC mode.

Usage: Event

[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:MODE <Mode>

Sets the operation mode for the Reverse Power Control (RPC) Channel within the MAC channel for the selected user.

Parameters:

<Mode> HOLD|UP|DOWN|RANGe|PATTern

HOLD
An alternating series of Up and Down power control bits are transmitted. The intent is to hold the access terminal at a constant power level. This mode always starts with an Up bit, and ends with the following Down bit.

UP
A continuous stream of Up (0) power control bits are transmitted. The intent is to force the access terminal to the highest transmit power level.
This mode is a single bit long.

DOWN
A continuous stream of Down (1) power control bits are transmitted. The intent is to force the access terminal to the lowest transmit power level.
This mode is a single bit long.

RANGe
A sequence of Up power control bits are sent followed by an equal number of Down power control bits. The intent is to force the access terminal to ramp its power from one extreme to another. The number of power control bits in each direction is specified by the "RPC Range Count" parameter. (see `[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:RANGe`). Each time that the Range mode is specified, the sequence will be restarted.
The Range mode starts with the first Up bit and ends with the last Down bit.
The length of the mode is two times the RPC Range Count.

PATTern
A user-defined sequence of RPC bits is sent. The mode starts with the bit defined in the first (0) zone, and ends with the last bit of the last (3) zone.
The length of the pattern is the sum of the Count values for each RPC Zone.

*RST: HOLD

Example: `BB:EVDO:USER2:RPC:MODE UP`
a continuous stream of Up (0) are transmitted on the Reverse Power Control (RPC) Channel within the MAC channel for user 2.

[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:RANGe <Range>

Sets the number of Reverse Power Control (RPC) bits sent in each direction when the "RPC Mode" is set to Range. The specified value is used immediately.

Note: This parameter is displayed in RPC Mode "Range" only.

Parameters:

<Range> integer

Range: 1 to 256
*RST: 1

Example: `BB:EVDO:USER2:RPC:MODE RANG`
sets the mode of the Reverse Power Control (RPC) Channel within the MAC channel for user 2 to range.
`BB:EVDO:USER2:RPC:RANG:COUN 200`
sets the number of RPC bits to 200.

[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:ZONE<ch0>:BIT <Bit>

The Reverse Power Control (RPC) pattern is defined in form of table with four zones (zone 0 .. 3). For each zone, a bit and a cont can be defined.

This parameter defines the RPC bits sent within the specific zone of the RPC Pattern.

Parameters:

<Bit> 0|1

Range: 0 to 1
*RST: 0

Example: `BB:EVDO:USER2:RPC:MODE PATT`
sets the mode of the Reverse Power Control (RPC) Channel within the MAC channel for user 2 to pattern, i.e. a user-defined sequence will be transmitted.
`BB:EVDO:USER2:RPC:ZONE1:BIT 1`
sets the bit for zone 1 to 1.

[:SOURce<hw>]:BB:EVDO:USER<st>:RPC:ZONE<ch0>:COUNt <Count>

The Reverse Power Control (RPC) pattern is defined in form of table with four zones (zone 0 .. 3). For each zone, a bit and a count can be defined.

This parameter defines the number of RPC bits sent within the specific zone of the RPC Pattern.

Parameters:

<Count> integer

Range: 1 to 128
*RST: 0

Example: `BB:EVDO:USER2:RPC:MODE PATT`
sets the mode of the Reverse Power Control (RPC) Channel within the MAC channel for user 2 to pattern, i.e. a user-defined sequence will be transmitted.
`BB:EVDO:USER2:RPC:ZONE1:COUNT 10`
sets the number of RPC bits for zone 1 to 10.

[:SOURce<hw>]:BB:EVDO:USER<st>:SCOunt?

Displays the slot count of the packets sent to the selected user. This parameter is read-only. The value is set automatically, depending on the selected Rate Index and Packet Size. (see Rate Index for Physical Layer Subtype 0&1 and Rate Index for Physical Layer Subtype 0&1)

Return values:
<SCount> integer

Example: `BB:EVDO:ANET:SUBT S2`
sets the physical layer subtype to 2.
`BB:EVDO:USER2:RATE:IND 4`
sets the rate index of user 2 to 4.
`BB:EVDO:USER2:PSIZ PS256`
sets the packet size for user 2 to 256.
`SOUR:BB:EVDO:USER2:SCO?`
queries the number of slots for user 2.
`Response: 2`

Usage: Query only

[:SOURce<hw>]:BB:EVDO:USER<st>:STATe <State>

Enables or disables the selected user. If the user is enabled, the proper MAC Index will be placed within the MAC channel and packets may be sent to the user. If disabled, the MAC Index will not be present within the MAC channel and packets may not be sent to the user.

Note: Disabling the state of a user during a transfer aborts all transfers to the user.

Parameters:
<State> 0|1|OFF|ON

*RST: ON (user 1); OFF (user 2 .. 4)

Example: `BB:EVDO:USER2:STAT ON`
activates user 2.

4.8 Configure Access Terminal 1..4

`TERMinal<ST>`

The numeric suffix to `TERMinal` distinguishes between the available terminals. The value range is 1 .. 4.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:GAIN <Gain>

(enabled for access terminal working in traffic mode)

Sets the gain of the ACK channel relative to the pilot channel power.

Parameters:

<Gain> float

Range: -80 dB to 10 dB
*RST: 0 dB

Example: `BB:EVDO:TERM2:ACKC:GAIN -10`
sets the relative gain of ACK channel to -10 dB

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:GATing <Gating>

(enabled for access terminal working in traffic mode)

Sets the active and inactive slots of the ACK channel. This parameter is in binary format and has a maximal length of 16 bits.

The sequence starts at frame 0 and slot 0 and is repeated with the length of the pattern.A 0 gates the ACK channel off for the corresponding slot, a 1 activates the channel.

Parameters:

<Gating> integer

*RST: 0001

Example: `BB:EVDO:TERM2:ACKC:GAT #B11001100,8`
sets slots 3, 4, 7 and 8 of ACK channel as inactive.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:MODE <Mode>

(enabled for access terminal working in traffic mode)

Specifies the modulation mode of the ACK channel.

With BPSK modulation, a 0 (ACK) is mapped to +1 and a 1 (NAK) to -1.With OOK modulation, a 0 (ACK) is mapped to ON and a 1 (NAK) to OFF.

Parameters:

<Mode> BPSK|OOK

BPSK
Sets the modulation to BPSK (Binary Phase Shift Keying).

OOK
Sets the modulation to OOK (On-Off Keying).
Note: This value is only enabled for physical layer subtype 2.

*RST: BPSK

Example: `BB:EVDO:TERM2:MODE TRAF`
sets the mode of terminal 2 to traffic.
`BB:EVDO:TERM2:SUBT S2`
sets the physical layer subtype of terminal 2 to 2.
`BB:EVDO:TERM2:ACKC:MODE OOK`
selects OOK modulation for ACK channel of terminal 2.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:STATe <State>

(enabled for access terminal working in traffic mode)

Enables or disables the ACK channel.

Parameters:

<State> 0|1|OFF|ON

*RST: ON

Example: `BB:EVDO:TERM2:ACKC:STAT OFF`
deactivates the ACK channel for terminal 2.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACKChannel:VALues <Values>

(enabled for access terminal working in traffic mode)

Specifies the data pattern transmitted on the ACK Channel.

The sequence starts at frame 0 and slot 0 and is repeated with the length of the pattern.A 0 specifies an ACK, a 1 specifies a NAK. The pattern is only read for slots that are gated on.This parameter is in binary format and has a maximal length of 16 bits.

Parameters:

<Values> integer

*RST: 01

Example: `BB:EVDO:TERM2:ACKC:VAL #B011,3`
sets the data pattern transmitted on the ACK channel for terminal 2.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACYCle:DURation <Duration>

(enabled for access terminal working in access mode)

Sets the access cycle duration in slots. Access probes are repeated with a period of access cycle duration slots.

Parameters:

<Duration> float

Range: 1 to 255
*RST: 16

Example: `BB:EVDO:TERM2:MODE ACC`
enables terminal 2 to work in access mode.
`BB:EVDO:TERM2:ACYC:DUR 20`
sets the duration of the access cycle for terminal 2 to 20 slots.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:ACYCle:OFFSet <Offset>

(enabled for access terminal working in access mode)

The Access Channel transmission starts with this number of slots relative to the beginning of each access cycle duration.

Parameters:

<Offset> integer

Range: 0 to 12
Increment: -
*RST: 0

Example: `BB:EVDO:TERM2:MODE ACC`
enables terminal 2 to work in access mode.
`BB:EVDO:TERM2:ACYC:OFFS 10`
sets the offset of the Access Channel to 10.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:APCHannel:GAIN <Gain>

(enabled for Physical Layer subtype 2 and for an access terminal working in traffic mode)

Sets the gain of the auxiliary pilot channel relative to the data channel power.

Note: All other channel gains are specified relative to the pilot power, but the auxiliary pilot gain is specified relative to the data channel power.

Parameters:

<Gain> float

Range: -80.0 dB to 10.0 dB
*RST: 0 dB

Example: `BB:EVDO:TERM2:APCH:GAIN -10`
sets the relative gain of auxiliary pilot channel to -10 dB

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:APCHannel:PAYLoad:MINimum <Minimum>

(enabled for Physical Layer subtype 2 and for an access terminal working in traffic mode)

Sets the minimum payload size in bits of the Data Channel that activates the transmission of the Auxiliary Pilot Channel.

Parameters:

<Minimum> PS128|PS256|PS512|PS768|PS1024|PS1536|PS2048|PS3072|PS4096|PS6144|PS8192|PS12288

*RST: 128

Example: `BB:EVDO:TERM2:APCH:PAYL:MIN PS256`
sets the minimum payload of the auxiliary pilot channel to 256 bits.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:APCHannel:STATe <State>

(enabled for Physical Layer subtype 2 and for an access terminal working in traffic mode)

Enables or disables the auxiliary pilot channel.

Parameters:

<State> 0|1|OFF|ON

*RST: ON

Example: `BB:EVDO:TERM2:APCH:STAT OFF`
deactivates the auxiliary pilot channel for terminal 2.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:CLENgth <CLength>

(enabled for access terminal working in access mode)

Sets the number of frames (16 slots each) to be transmitted after the preamble. Each frame contains one data packet.

Parameters:

<CLength> integer

Range: 1 to 15 frames
*RST: 1 frame

Example: `BB:EVDO:TERM2:MODE ACC`
enables terminal 2 to work in access mode.
`BB:EVDO:TERM2:DCH:CLEN 10`
for terminal 2, 10 frames will be transmitted after the preamble.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DATA <Data>

Selects the data source.

Parameters:

<Data> ZERO|ONE|PN9|PN11|PN15|PN16|PN20|PN21|PN23|PATTern|DLISt

ZERO, ONE
0 data or 1 data is internally generated.

PN9, PN11, PN15, PN16, PN20, PN21, PN23
PRBS data in accordance with the IUT-T with period lengths between 29-1 and 223-1 are internally generated.

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

DLISt
Data lists will be used. Data lists can be generated internally in the data editor or externally.

*RST: PN9

Example: `BB:EVDO:TERM2:DCH:DATA PATT`
sets the data source of terminal 2 to pattern.
`BB:EVDO:TERM2:DCH:DATA:PATT #H3F,8`
sets the pattern for the data source of terminal 2.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DATA:DSELection <Filename>

Selects the data list for the data source.

Parameters:

<Filename> string

Example: `BB:EVDO:TERM2:DCH:DATA DLIS`
sets the data source of terminal 2 to data list.
`MMEM:CDIR '<root>\datalists'`
selects the directory for the data lists.
`BB:EVDO:TERM2:DCH:DATA:DSEL 'datalist.dm_iqd'`
selects `datalist.dm_iqd` file as data source. This file must be in the directory <root>\datalists and have a file extension `*.dm_iqd`.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DATA:PATTern <Pattern>

Selects the bit pattern for the data source.

Parameters:
<Pattern> integer

Example: `BB:EVDO:TERM2:DCH:DATA PATT`
sets the data source of terminal 2 to data list.
`BB:EVDO:TERM2:DCH:DATA:PATT #H3F,8`
defines the bit pattern.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:DRATe <DRate>

(enabled for an access terminal working in access mode)

Selects the data rate for the Data Channel.

Parameters:
<DRate> DR4K8|DR9K6|DR19K2|DR38K4|DR76K8|DR153K6|DR307K2|DR614K4|DR921K6|DR1228K8|DR1536K|DR1843K2|DR2457K6|DR3072K

*RST: 9.6 kbps

Example: `BB:EVDO:TERM2:MODE ACC`
enables terminal 2 to work in access mode.
`BB:EVDO:TERM2:DCH:DRAT DR19K2`
sets the data rate of the data channel for terminal 2 to 19.2 kbps.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:FCS[:STATe] <State>

(enabled for an access terminal working in access mode)

Enables or disables appending a standard Frame Check Sequence (FCS) to the MAC layer packet.

Parameters:
<State> 0|1|OFF|ON

*RST: ON

Example: `BB:EVDO:TERM2:MODE ACC`
enables terminal 2 to work in access mode.
`BB:EVDO:TERM2:DCH:FCS:STAT OFF`
disables appending of FCS to the MAC layer for terminal 2.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:GAIN <Gain>

(enabled for an access terminal working in access mode)

Sets the gain in dB of the Data Channel relative to the pilot channel power.

Parameters:

<Gain> float

Range: -80 to 10 dB
Increment: 0.01
*RST: 0 dB

Example: `BB:EVDO:TERM2:MODE ACC`
enables terminal 2 to work in access mode.
`BB:EVDO:TERM2:DCH:GAIN -10`
sets the relative gain of data channel to -10 dB

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:CCODing
<CCoding>

(enabled for an access terminal working in traffic mode)

Activates or deactivates channel coding, including scrambling, turbo encoding and channel interleaving.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Parameters:

<CCoding> 0|1|OFF|ON

*RST: ON

Example: `BB:EVDO:TERM2:MODE TRAF`
enables terminal 2 to work in traffic mode.
`BB:EVDO:TERM2:SUBT S2`
sets physical layer subtype 2 for terminal 2.
`BB:EVDO:TERM2:DCH:PACK3:CCOD OFF`
disables channel coding for packet 3.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:COUNt
<Count>

(enabled for an access terminal working in traffic mode)

Sets the number of packets to be sent.

The number of packets to be send depends on whether the parameter "Infinite Packets" is enabled or disabled. If "Infinite Packets "is enabled, there is no limit to the number of packets sent.

If "Infinite Packets" is disabled, the number of packets can be specified. In this case the data channel will be switched off after the specified number of packets have been sent.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Parameters:

<Count> integer

Range: 0 to 65536
*RST: 65536

Example: `BB:EVDO:TERM2:MODE TRAF`
enables terminal 2 to work in traffic mode.
`BB:EVDO:TERM2:SUBT S2`
sets physical layer subtype 2 for terminal 2.
`BB:EVDO:TERM2:DCH:PACK3:INF OFF`
disables sending of unlimited umber of packets.
`BB:EVDO:TERM2:DCH:PACK3:COUN 2000`
sets number of packets to be send to 2000.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DATA <Data>

(enabled for an access terminal working in traffic mode)

Selects the data source.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Parameters:

<Data> ZERO|ONE|PN9|PN11|PN15|PN16|PN20|PN21|PN23|PATTern|DLISt

ZERO, ONE
0 data or 1 data is internally generated.

PN9, PN11, PN15, PN16, PN20, PN21, PN23
PRBS data in accordance with the IUT-T with period lengths between 29-1 and 223-1 are internally generated.

PATTern
A user-definable bit pattern with a maximum length of 64 bits is internally generated.
The bit pattern is defined in the Pattern input box.

DLISt
Data lists will be used. Data lists can be generated internally in the data editor or externally.
Data lists are selected in the Select Data List field.

*RST: PN9

Example: `BB:EVDO:TERM2:MODE TRAF`
enables terminal 2 to work in traffic mode.
`BB:EVDO:TERM2:SUBT S2`
sets physical layer subtype 2 for terminal 2.
`BB:EVDO:TERM2:DCH:PACK3:DATA PATT`
sets the data source of terminal 2 to pattern.
`BB:EVDO:TERM2:DCH:PACK3:DATA:PATT #H3F,8`
sets the pattern for the data source of terminal 2.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DATA:DSELection <Filename>

(enabled for an access terminal working in traffic mode)

Selects the data list for the data source.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Parameters:
<Filename> string

Example: `BB:EVDO:TERM2:MODE TRAF`
enables terminal 2 to work in traffic mode.
`BB:EVDO:TERM2:DCH:PACK:DATA DLIS`
sets the data source of terminal 2, packet 1 to data list.
`MMEM:CDIR '<root>\datalists`
selects the directory for the data lists.
`BB:EVDO:TERM2:DCH:PACK:DATA:DSEL 'datalist.dm_iqd'`
selects datalist.dm_iqd file as data source. This file must be in the directory `<root>\datalists` and have a file extension `*.dm_iqd`.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DATA:PATTern <Pattern>

(enabled for an access terminal working in traffic mode)

Selects the bit pattern for the data source.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Parameters:
<Pattern> integer

Example: `BB:EVDO:TERM2:DCH:PACK:DATA PATT`
sets the data source of terminal 2 to data list.
`BB:EVDO:TERM2:DCH:PACK:DATA:PATT #H3F,8`
defines the bit pattern.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:DRATe?

(enabled for an access terminal working in traffic mode)

Displays the data rate in kbps of the selected packet.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Return values:
<DRate> float

Example: `BB:EVDO:TERM2:MODE TRAF`
enables terminal 2 to work in traffic mode.
`BB:EVDO:TERM2:DCH:PACK2:DRAT?`
queries the data rate of the packet number 2 for terminal 2.
`Response: '6.4'`
the data rate of packet 2 is 6.4 kbps.

Usage: Query only

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:FCS[:STATe]
<State>

(enabled for an access terminal working in traffic mode)

Enables or disables appending a standard Frame Check Sequence (FCS) and tail to the MAC layer packet.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Parameters:
<State> 0|1|OFF|ON

*RST: ON

Example: `BB:EVDO:TERM2:MODE ACC`
enables terminal 2 to work in access mode.
`BB:EVDO:TERM2:DCH:PACK:FCS:STAT OFF`
disables appending of FCS to the MAC layer for terminal 2, packet 1.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:GAIN <Gain>

(enabled for an access terminal working in traffic mode)

Sets the gain in dB of the Data Channel relative to the pilot channel power.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Parameters:

<Gain> float

Range: -80 dB to 10 dB
Increment: -
*RST: 0 dB

Example: `BB:EVDO:TERM2:MODE TRAF`
enables terminal 2 to work in traffic mode.
`BB:EVDO:TERM2:SUBT S2`
sets the physical layer subtype of terminal 2 to 2.
`BB:EVDO:TERM2:DCH:PACK3:GAIN -10`
sets the relative gain of packet 3 to -10 dB

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:INFinite <Infinite>

(enabled for an access terminal working in traffic mode)

Enables or disables sending an unlimited number of packets.

The parameter "Number of Packets to be Send" depends on whether the parameter "Infinite Packets" is enabled or disabled. If "Infinite Packets" is enabled, there is no limit to the number of packets sent.

If "Infinite Packets" is disabled, the number of packets can be specified.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Parameters:

<Infinite> 0|1|OFF|ON

*RST: ON

Example: `BB:EVDO:TERM2:MODE TRAF`
enables terminal 2 to work in traffic mode.
`BB:EVDO:TERM2:SUBT S2`
sets physical layer subtype 2 for terminal 2.
`BB:EVDO:TERM2:DCH:PACK3:INF OFF`
disables sending of unlimited umber of packets.
`BB:EVDO:TERM2:DCH:PACK3:COUN 2000`
sets number of packets to be send to 2000.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:MODulation?

(enabled for physical layer subtype 2 and for an access terminal working in traffic mode)

Displays the modulation type per packet.

Return values:

<Modulation> B4|Q4|Q2|Q4Q2|E4E2

B4
The modulation type is set to BPSK modulation with 4-ary Walsh cover.

Q4
The modulation type is set to QPSK modulation with 4-ary Walsh cover.

Q2
The modulation type is set to QPSK modulation with 2-ary Walsh cover.

Q4Q2
Sum of Q4 and Q2 modulated symbols.

E4E2
Sum of E4 (8-PSK modulated with 4-ary Walsh cover) and E2 (8-PSK modulated with 2-ary Walsh cover) modulated symbols.

*RST: B4

Example: `BB:EVDO:TERM2:DCH:PACK3:MOD?`
queries the modulation for packet 3 of terminal 2.

Usage: Query only

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:PSIZe <PSize>

(enabled for an access terminal working in traffic mode)

Sets the Payload Size in bits for the selected packet.

Note: Configuration of Packet 2 and Packet 3 transmitted on the second and the third subframe, is only enabled for physical layer subtype 2.

Parameters:

<PSize> PS128|PS256|PS512|PS768|PS1024|PS1536|PS2048|PS3072|PS4096|PS6144|PS8192|PS12288

*RST: 128

Example: `BB:EVDO:TERM2:MODE TRAF`
enables terminal 2 to work in traffic mode.
`BB:EVDO:TERM2:SUBT S2`
sets the physical layer subtype of terminal 2 to 2.
`BB:EVDO:TERM2:DCH:PACK3:PSIZ PS512`
sets the payload size fro packet 3 to 512.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:STATe <State>

(enabled for an access terminal working in traffic mode)

Enables or disables the state of the packet(s).

The number of configurable packets per Data Channel depends on the selected physical layer.

There are three configurable packets (Packet 1... 3) for physical layer subtype 2. When more then one packet is active, packet 1 is sent on the first subframe (first 4 slots), packets 2 and 3 are sent respectively on the second and the third subframe.

When only one packet is active and number of subpackets is set to 1, no interleaving will be performed between the packets. In this case, the data channel is active continuously.

When only one packet is active but the number of subpackets is larger than one, subframe interleaving has to be performed. In this case 2 subframes will be left empty inbetween every two subpackets.

Only one configurable packet is available for physical layer subtype 0&1, the dat channel is continuously active for the number of packets to send.

Parameters:

<State> 0|1|OFF|ON

*RST: ON

Example: `BB:EVDO:TERM2:MODE TRAF`
enables terminal 2 to work in traffic mode.
`BB:EVDO:TERM2:SUBT S2`
sets the physical layer subtype of terminal 2 to 2.
`BB:EVDO:TERM2:DCH:PACK2:STAT OFF`
deactivates packet 2 of terminal 2.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:PACKet<ch>:SUBPackets[:COUNt] <Count>

(enabled for physical layer subtype 2 and for an access terminal working in traffic mode)

Sets the number of sub-packets to be sent.

Parameters:

<Count> integer

Range: 1 to 4
*RST: 1

Example: `BB:EVDO:TERM2:MODE TRAF`
enables terminal 2 to work in traffic mode.
`BB:EVDO:TERM2:SUBT S2`
sets physical layer subtype 2 for terminal 2.
`BB:EVDO:TERM2:DCH:PACK3:SUBP:COUN 4`
sets the number of sub-packets to 4, i.e. subpacket 0, 1, 2 and 3 of a packet will be sent in a subframe each (with 2 subframes interleaving between) before the next packet is started.
This is to simulate a situation where 3 times NAK has been received freom the basestation with an ACK after the 4th sub-packet

---

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DCHannel:STATe <State>

(enabled for an access terminal working in access mode)

Enables or disables the state of the Data Channel.

Parameters:
<State> 0|1|OFF|ON

*RST: ON

Example: `BB:EVDO:TERM2:MODE ACC`
enables terminal 2 to work in access mode.
`BB:EVDO:TERM2:DCH:STAT OFF`
disables data channel for terminal 2.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DQSPreading <DqSpreading>

Disables the quadrature spreading (complex multiply) with PN sequences and long code.

Parameters:
<DqSpreading> 0|1|OFF|ON

*RST: OFF

Example: `BB:EVDO:TERM2:DQSP ON`
enables using quadrature spreading with PN sequence and long code.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:COVer <Cover>

(enabled for an access terminal working in traffic mode)

Selects the Data Rate Control (DRC) Channel walsh cover.

Parameters:

<Cover> integer

Range: 0 to 7
*RST: 7

Example: `BB:EVDO:TERM2:DRCC:COV 1`
sets the DRC cover to 1.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:GAIN <Gain>

(enabled for an access terminal working in traffic mode)

Sets the gain of the Data Rate Control (DRC) channel relative to the pilot channel power.

Parameters:

<Gain> float

Range: -80 dB to 10 dB
Increment: -
*RST: 0 dB

Example: `BB:EVDO:TERM2:DRCC:GAIN 10`
sets the relative gain for DRC to 10 dB.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:GATing[:STATe] <State>

(enabled for an access terminal working in traffic mode)

Activates or deactivates the Data Rate Control (DRC) Channel gating.

If gating is active, each value of the DRC channel is transmitted for one slot followed by DRCLenght-1 empty slots.

With deactivated gating, each DRC value is repeated for DRC length slots.

Parameters:

<State> 0|1|OFF|ON

*RST: ON

Example: `BB:EVDO:TERM2:DRCC:GAT:STAT OFF`
deactivates DRC gating.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:LENGth <Length>

(enabled for an access terminal working in traffic mode)

Specifies the transmission duration of the Data Rate Control (DRC) channel in slots.

Parameters:

<Length> DL1|DL2|DL4|DL8

*RST: 1

Example: `BB:EVDO:TERM2:DRCC:LENG DL2`
sets the transmission duration of DRC to 2 slots.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:STATe <State>

(enabled for an access terminal working in traffic mode)

Enables or disables the state of the Data Rate Control (DRC) channel.

Parameters:

<State> 0|1|OFF|ON

*RST: ON

Example: `BB:EVDO:TERM2:DRCC:STAT OFF`
deactivates DRC channel.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DRCChannel:VALues <Values>

(enabled for an access terminal working in traffic mode)

Specifies the pattern transmitted on the Data Rate Control (DRC) Channel. The sequence starts at frame 0 and slot 0 and is repeated with the length of the pattern. Each specified value is used for DRC length slots.

Parameters:

<Values> integer

*RST: 1

Example: `BB:EVDO:TERM2:DRCC:VAL #H7,4`
sets transmitted pattern on DRC to #H7,4.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DSCChannel:GAIN <Gain>

(enabled for Physical Layer subtype 2 and for an access terminal working in traffic mode)

Sets the gain of the Data Source Control (DSC) channel relative to the pilot channel power.

Parameters:

<Gain> float

Range: -80 dB to 10 dB
Increment: -
*RST: 0 dB

Example: `BB:EVDO:TERM2:DSCC:GAIN 10`
sets the relative gain for DSC to 10 dB.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DSCChannel:LENGth <Length>

(enabled for Physical Layer subtype 2 and for an access terminal working in traffic mode)

Specifies the transmission duration of the Data Source Control (DSC) channel in slots.

Parameters:
<Length> integer

Range: 8 to 256
Increment: 8
*RST: 8

Example: `BB:EVDO:TERM2:DSCC:LENG 16`
sets the transmission duration of DSC to 16 slots.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DSCChannel:STATe <State>

(enabled for Physical Layer subtype 2 and for an access terminal working in traffic mode)

Enables or disables the state of the Data Source Control (DSC) channel.

Parameters:
<State> 0|1|OFF|ON

*RST: ON

Example: `BB:EVDO:TERM2:DSCC:STAT OFF`
deactivates DSC channel.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:DSCChannel:VALues <Values>

(enabled for Physical Layer subtype 2 and for an access terminal working in traffic mode)

Specifies the pattern transmitted on the Data Source Control (DSC) Channel.

The sequence starts at frame 0 and slot 0 and is repeated with the length of the pattern. Each specified value is transmitted for DSC length slots.

Parameters:
<Values> integer

*RST: 0

Example: `BB:EVDO:TERM2:DSCC:VAL #H147,12`
sets transmitted pattern on DSC to #H147,12.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:IMASk <IMask>

Sets the long code mask of the I channel.

Parameters:

<IMask> integer

*RST: 0000 0000 0000

Example: `BB:EVDO:TERM2:IMAS #H2FFFFFFFFFFF,42`
sets the long code mask for I channel to #H2FFFFFFFFFFF,42.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:MODE <Mode>

Sets the mode (Traffic or Access) of the selected access terminal.

Parameters:

<Mode> ACCess|TRAFfic

*RST: TRAFfic

Example: `BB:EVDO:TERM2:MODE ACC`
sets the mode of terminal 2 to access.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:PCHannel:GAIN <Gain>

Sets the gain of the pilot channel.

Gains of other channels are relative to the Pilot Channel power.

This setting is used to distinguish the power between access terminals, when more than one access terminal is active.

Parameters:

<Gain> float

Range: -80 to 10 dB
Increment: 0.01
*RST: 0 dB

Example: `BB:EVDO:TERM2:PCH:GAIN 10`
sets the gain of pilot channel to 10 dB.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:PCHannel:STATe?

Displays the state of the pilot channel.

Note: The pilot channel is always switched on.

Return values:

<State> 0|1|OFF|ON

*RST: ON

Example: `BB:EVDO:TERM2:PCH:STAT?`
queries the state of the pilot channel.

Usage: Query only

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:PLENgth <PLength>

(enabled for access terminal working in access mode)

Specifies the length of the preamble in frames (16 slots each) of the acces probe.

Parameters:
<PLength> integer

Range: 1 frame to 7 frames
*RST: 1 frame

Example: `BB:EVDO:TERM2:PLEN 7`
sets the preamble length to 7 frames.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:QMASk <QMask>

Sets the long code mask of the Q channel.

Parameters:
<QMask> integer

*RST: 0000 0000 000

Example: `BB:EVDO:TERM2:IMAS #H3FFFFFFFFFFF,42`
sets the long code mask for I channel to #H3FFFFFFFFFFF,42.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:RRIChannel:GAIN <Gain>

(enabled for an access terminal working in traffic mode)

Sets the gain of the Reverse Rate Indicator (RRI) channel relative to the pilot channel power.

Parameters:
<Gain> float

Range: -80 to 10 dB
Increment: 0.01
*RST: 0 dB

Example: `BB:EVDO:TERM2:RRIC:GAIN 10`
sets the gain of pilot channel to 10 dB.

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:RRIChannel:STATe <State>

(enabled for an access terminal working in traffic mode)

Enables or disables the state of the Reverse Rate Indicator (RRI) channel.

Parameters:

<State> 0|1|OFF|ON

*RST: ON

Example: `BB:EVDO:TERM2:RRIC:STAT OFF`
disables the RRI channel..

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:STATe <State>

(enabled for an access terminal working in traffic mode)

Enables or disables the state of the Reverse Rate Indicator (RRI) channel.

Parameters:

<State> 0|1|OFF|ON

*RST: ON (access terminal 1)

Example: `BB:EVDO:TERM2:RRIC:STAT OFF`
disables the RRI channel..

[:SOURce<hw>]:BB:EVDO:TERMinal<st>:SUBType <Subtype>

Selects the physical layer subtype for the selected access terminal.

Parameters:

<Subtype> S1|S2

*RST: 2

Example: `BB:EVDO:TERM2:SUBT S2`
sets the physical layer subtype 2.

List of Commands

Index

S

T

U

V