Product Brochure

Anritsu

MG3700A

Vector Signal Generator

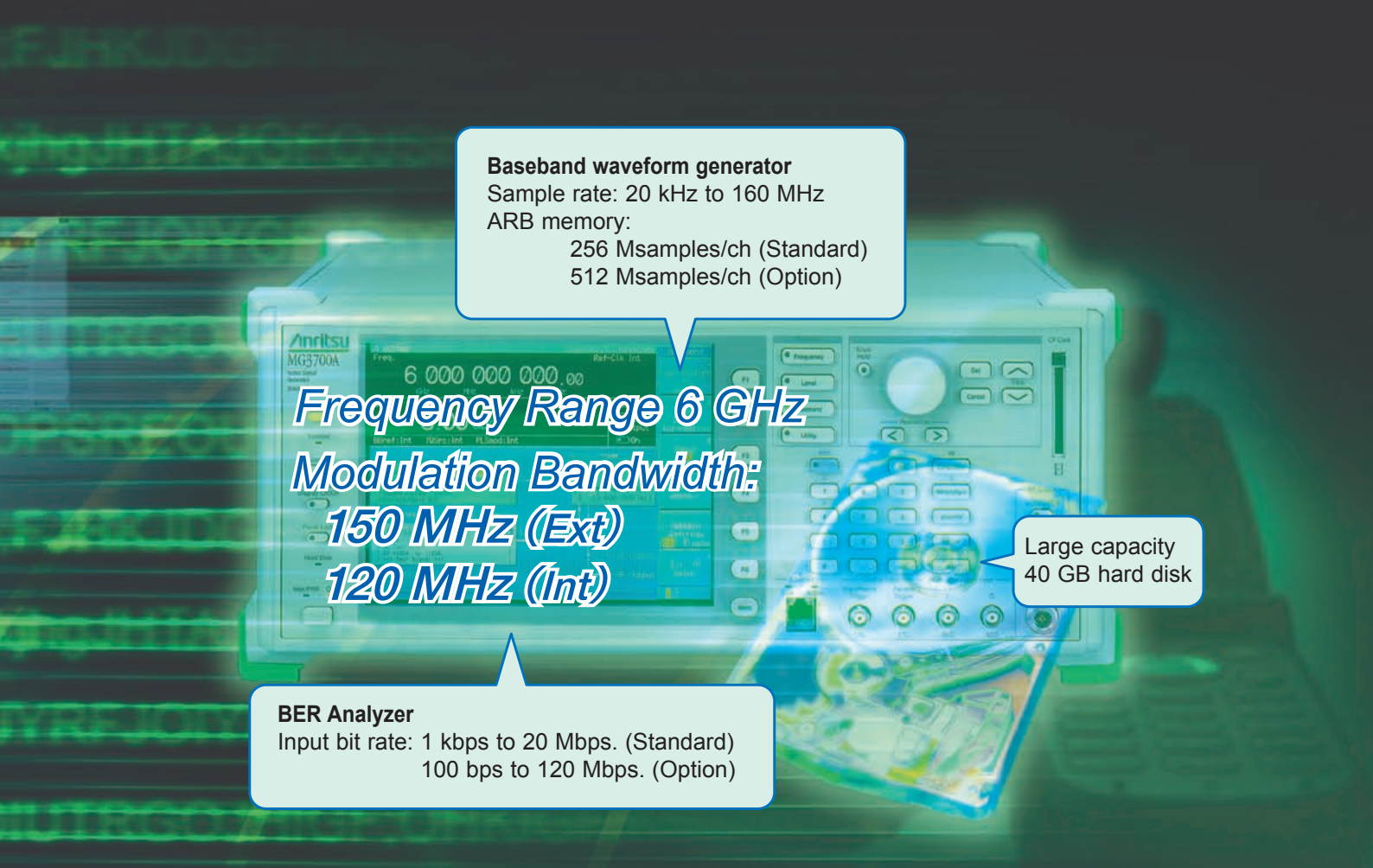
250 kHz to 3 GHz, 250 kHz to 6 GHz (Option)

Excellent Eco Product

Supporting High-speed, Large-capacity, and Wideband Wireless Communications

Wireless communications are evolving rapidly towards high speed, large capacity and wide bandwidth.
And next-generation wireless communications will combine cellular phone service with wireless LAN access.
The MG3700A Vector Signal Generator is based on a 160-MHz arbitrary waveform generator, including a wide vector modulation bandwidth and large-capacity baseband memory.

The MG3700A supports digital modulation signals for a wide range of wireless systems, supporting evaluation of general-purpose mobile communications, such as mobile phones as well as wireless LANs.
Anritsu's IQproducer software can create waveform data for transfer to the MG3700A via 100BASE-TX Ethernet. In addition, IQ sample data files (ASCII) created using general Electronic Design Automation (EDA) tools such as MATLAB can also be converted to waveform patterns for the MG3700A.
MATLAB® is a registered trademark of The MathWorks, Inc.



■ Performance and Functions

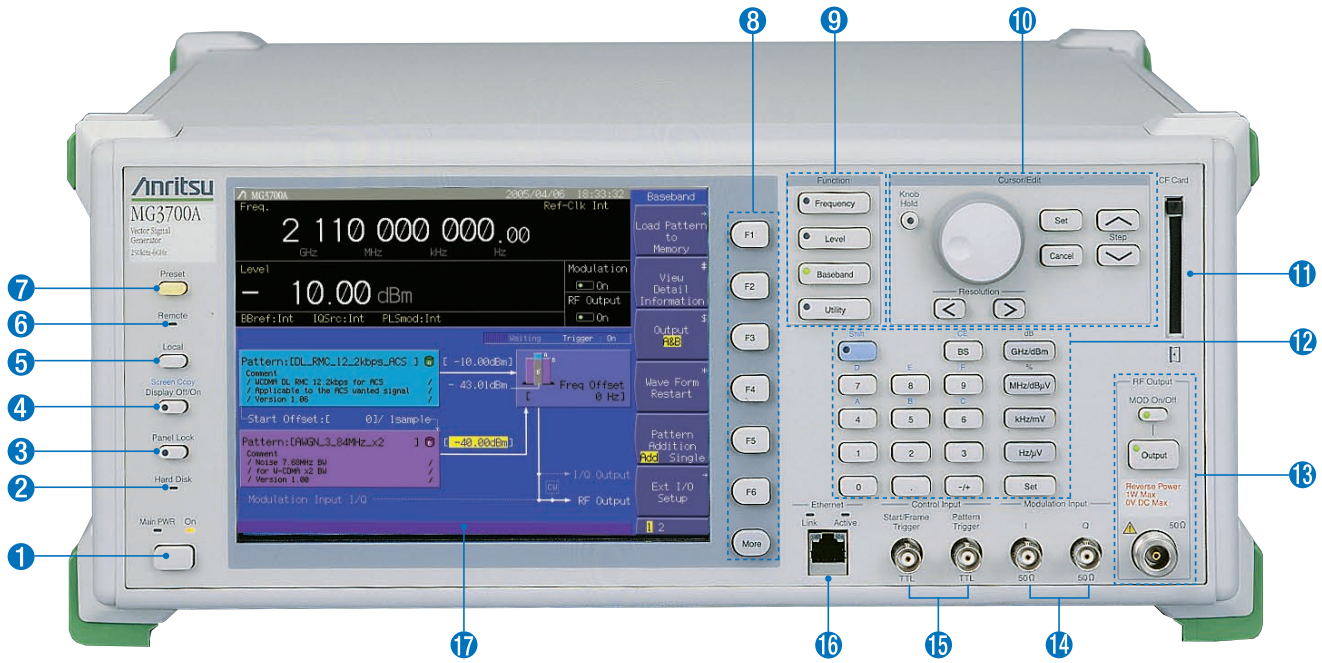
- **Frequency Range**
  250 kHz to 3 GHz (Standard)
  250 kHz to 6 GHz (Option)
- **Wide Vector Modulation Bandwidth**
  120 MHz (Internal baseband generator)
  150 MHz (External IQ input)
- **High Level Accuracy**
  ±0.5 dB (Absolute level accuracy)
  ±0.2 dB typical (Linearity)
- **High-speed Waveform Transfer over 100BASE-TX Ethernet**
- **Built-in 40 GB Hard Disk**
- **Large-capacity Baseband Memory**
  1 GB = 256 Msamples/channel (Standard)
  2 GB = 512 Msamples/channel (Option)
- **Waveform Addition Function**
  Adds and outputs two signals, such as wanted signal + interference signal or wanted signal + AWGN
- **Built-in Standard 20-Mbps BERT Analyzer**
  1 kbps to 20 Mbps (Standard)
  100 bps to 120 Mbps (Option)

■ Supports Various Communication Systems*1

- **Waveform Patterns**
  Waveform patterns for communication systems bundled as standard:
  W-CDMA/HSDPA, GSM/EDGE, CDMA2000 1X/1xEV-DO Wireless LAN (IEEE802.11a/b/g), PDC, PHS, AWGN, *Bluetooth*, GPS, Digital Broadcast (ISDB-T1 segment, BS, CS, CATV)
- **Optional Waveform Patterns**
  Waveform patterns for the following communication systems are offered as options:
  TD-SCDMA
  Public Radio System (RCR STD-39, ARIB STD-T61/T79/T86)
- **IQproducer Waveform Generation Software (Optional software license)**
  IQproducer is GUI-based PC application software for changing parameters and generating waveform patterns in compliance with the following system standards:
  W-CDMA, AWGN, HSDPA/HSUPA*2, TDMA*2, CDMA2000 1xEV-DO*2, Multi-carrier*2, Mobile WiMAX*2, DVB-T/H*2, Fading*2, Next generation PHS (XGP)*2, LTE FDD*2, LTE TDD*2

∗1: Read the MX370x Series Software Catalog for details.
∗2: A license key must be installed in the main frame.

Easy-to-use Panel



❶ Main PWR key
Switches power On/Off. When power is supplied, the lamp lights green. The On lamp lights orange at power-on.

❷ Hard Disk lamp
The lamp lights when the hard disk is being accessed.

❸ [Panel Lock] key
Disables all key operations except [Main PWR] and [Local]. The key lamp lights red when the panel is locked.

❹ Display Off/On key
Switches display On/Off. The key lamp lights red when the display is off.

❺ [Local] key
Disables remote control by GPIB and Ethernet and allows local control only.

❻ Remote lamp
Lights during remote control via GPIB and Ethernet.

❼ [Preset] key
Initializes parameters.

❽ Function Keys ([F1] to [F6] and [More])
Select and execute menu displayed on right of screen. When there are two or more screens, additional pages are displayed using the [More] key.

❾ Function key group
Change modes for setting equipment main functions.
[Frequency]: Frequency setting mode
[Level]: Output level setting mode
[Baseband]: Baseband setting mode
[Utility]: Utility setting mode

❿ Cursor/Edit key group
Select items or input numerical settings.
[Set]: Confirms selection
[Cancel]: Cancels selection
(The rotary encoder is disabled when the [Knob Hold] key is pressed and the key lamp is on.)

⓫ CF Card slot
Slot for memory card for installing waveform patterns or software, and for saving screen displays.

⓬ Keypad
[Shift]: Enables key functions described above keys in blue letters when key lamp lit
[Numeric keys]: Input numeric settings
[Unit keys]: Set unit after numeric input

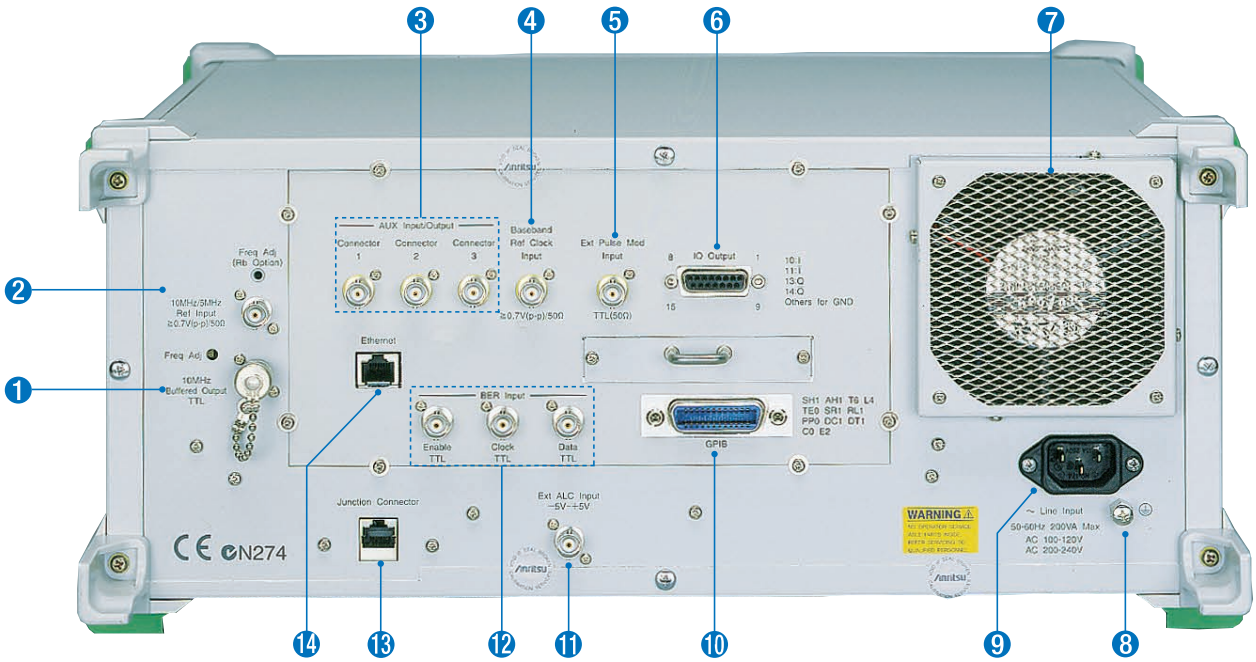
⓭ RF Output key group and connector
[Output]: Switches RF signal output On/Off. Key lamp is lit when RF output is active
[MOD On/Off]: Turns modulation On/Off when RF signal output is enabled. Key lamp is lit when signal modulation is active
[RF Output connector]: RF signal output (N-J, 50 Ω)

⓮ Modulation Input connectors
Connectors for I/Q input signal when external baseband signal is used for vector modulation (BNC-J, 50 Ω, Input voltage range ±5 Vpeak).

⓯ Control Input connectors
Connectors for start trigger, frame trigger and pattern trigger signals (BNC-J, TTL, reverse polarity of rising/falling edges supported).

⓰ Ethernet jack (RJ45)
100BASE-TX connector for connecting PC via LAN when using remote control or transferring waveform patterns. When using this connector, jumper the two Ethernet connectors on the rear panel using the supplied straight-through LAN cable (Category 5).

⓱ Display
8.4-inch, 640 × 480 dots, color TFT LCD.
Screen dump saved to built-in hard disk or CF card as color or gray-scale bitmap file.



❶ **Buffered Output connector**
Outputs 10-MHz reference frequency for synchronizing with other equipment (BNC-J, TTL, DC-coupled).

❷ **Ref Input connector**
Input for external reference frequency signal (10 MHz or 5 MHz) when higher accuracy than the internal reference can provide is required or when synchronizing with the reference signal of other equipment (BNC-J, ≥0.7 Vp-p/ 50 Ω, AC-coupled).

❸ **AUX Input/Output connectors**
Output for marker signal (BNC-J 3 port, TTL).

❹ **Baseband Ref Clock Input connector**
Input for clock signal reference for D/A sampling clock (BNC-J, ≥0.7 Vp-p/50 Ω, AC-coupled, Input frequency range from 20 kHz to 160 MHz).

❺ **Ext Pulse Mod Input connector**
Input for external pulse modulation signal (BNC-J, 50 Ω, Input voltage range from 0 to 5 V, Threshold of about 1 V).

❻ **IQ Output connector**
Differential output of baseband signal (I/Q) generated by arbitrary waveform generation function (D-Sub 15-J, 50 Ω). Converted to BNC using optional IQ Output Conversion Adapter.

❼ **Cooling fan**
Equipment cooling fan.

❽ **Protective ground terminal**
Ground when not using grounded power cord.

❾ **AC input connector**
AC power input.

❿ **GPIB connector**
For remote control by GPIB.

⓫ **Ext. ALC Input connector**
External DC voltage input for controlling output level (+3 to –8 dB, BNC-J, 600 Ω, Input voltage range ±5 V).

⓬ **BER Input connectors**
For BER measurements.
Enable TTL: BER measurement gate signal input
Clock TTL: Input for clock signal synchronized with data
Data TTL: Data input (BNC-J, TTL)

⓭ **Junction connector (RJ45 jack)**
When using the front-panel Ethernet jack, jumper this Junction connector and the Ethernet jack above using the supplied straight-through LAN cable (Category 5).

⓮ **Ethernet jack (RJ45)**
Ethernet jack for connecting PC when performing remote control or transferring waveform pattern.
This jack can be used instead of the Ethernet jack on the front panel.

Basic Performance

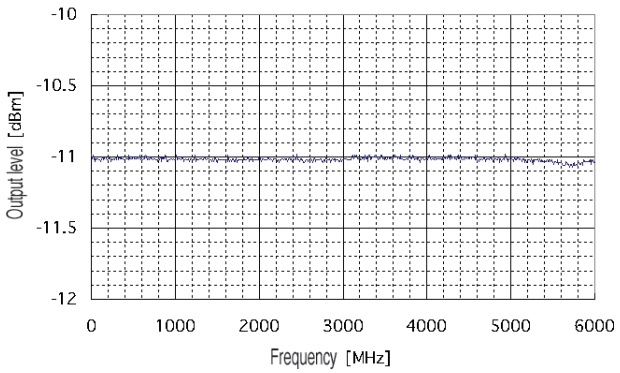
Covers Frequency Range from 250 kHz to 6 GHz

Choose a frequency range of either 250 kHz to 3 GHz (standard) or 250 kHz to 6 GHz (Option). The upper 6 GHz frequency is required for supporting WLANs in the 5-GHz band and next-generation communication systems.

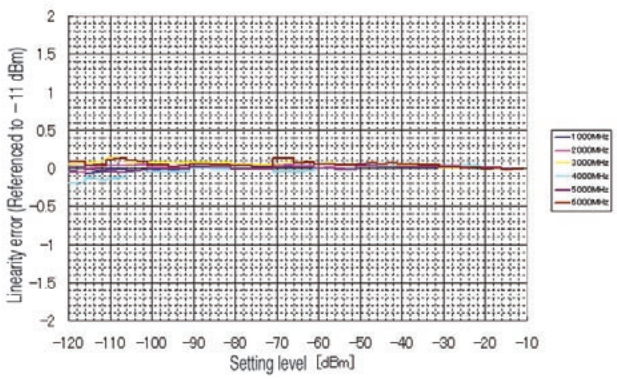
High Level Accuracy

The excellent level accuracy assures a high overall measurement accuracy.

Absolute level accuracy:
±0.5 dB typ (≥−120 dBm 25 MHz ≤ fc ≤ 3 GHz, E-ATT*)
±0.8 dB typ (≥−120 dBm 3 GHz < fc ≤ 6 GHz, E-ATT*)
±0.5 dB typ (≥−120 dBm 25 MHz ≤ fc ≤ 3 GHz, M-ATT*)
±0.8 dB typ (≥−100 dBm 3 GHz < fc ≤ 6 GHz, M-ATT*)
*: E-ATT: Electronic attenuator, M-ATT: Mechanical attenuator



Frequency characteristic

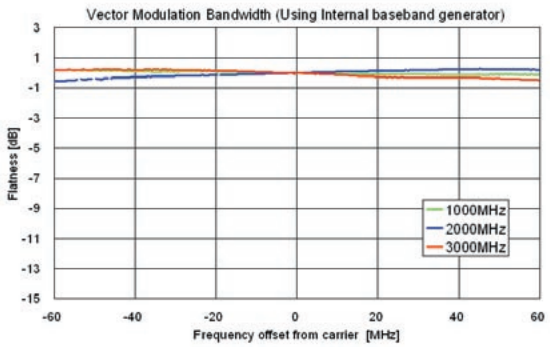


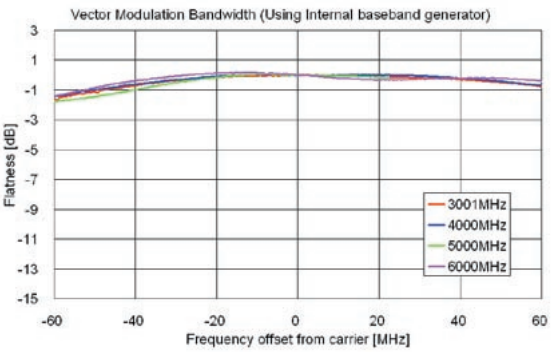
Linearity

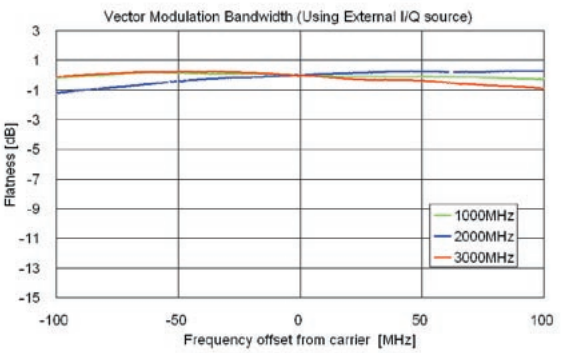
Wide Vector Modulation Bandwidth

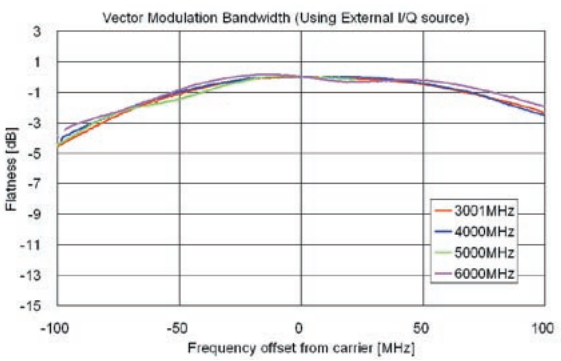
120 MHz (Using internal baseband signal generator)
150 MHz (Using External IQ input)

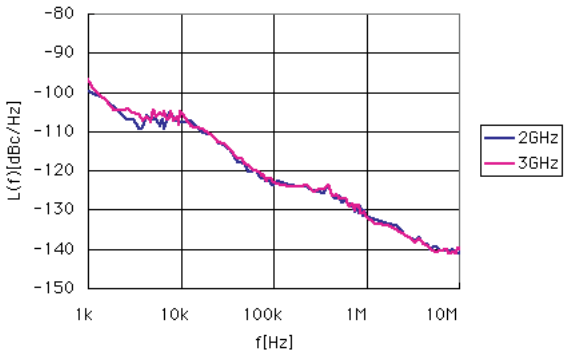
An RF modulation bandwidth of 120 MHz is available when using internal baseband signal generation.
The modulation bandwidth of 150 MHz can be achieved when using external IQ input.
Both bandwidths are supported up to 6 GHz.



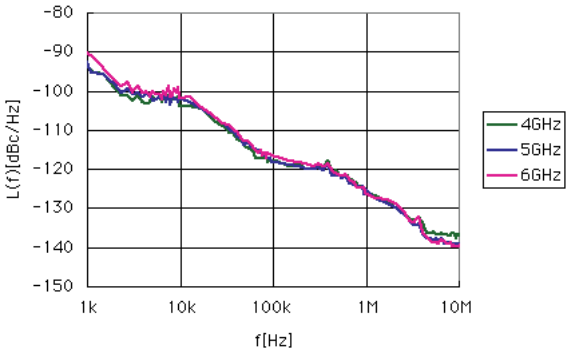








SSB Phase Noise (25 MHz ≤ f ≤ 3 GHz)
(CW, Continuous mode: OFF, Frequency changing speed: Normal)



SSB Phase Noise (3 GHz < f ≤ 6 GHz)
(CW, Continuous mode: OFF, Frequency changing speed: Normal)

Supports Large-capacity Waveform Patterns

High-speed Transfer over 100BASE-TX Ethernet

Wideband high-speed communication systems require transmission of long waveform patterns.
To transfer long patterns at high speed, the MG3700A supports 100BASE-TX LAN connections.
When the waveform patterns of two or more MG3700A systems must be updated, waveform data can be transferred simultaneously to all MG3700A units over the LAN, shortening update times.

- High-speed transmission of waveform patterns at 2 MB/s
- Waveform patterns transferred to MG3700A from external PC saved to built-in 40 GB hard disk
- Ethernet jacks on the front and rear panels for easy LAN connection

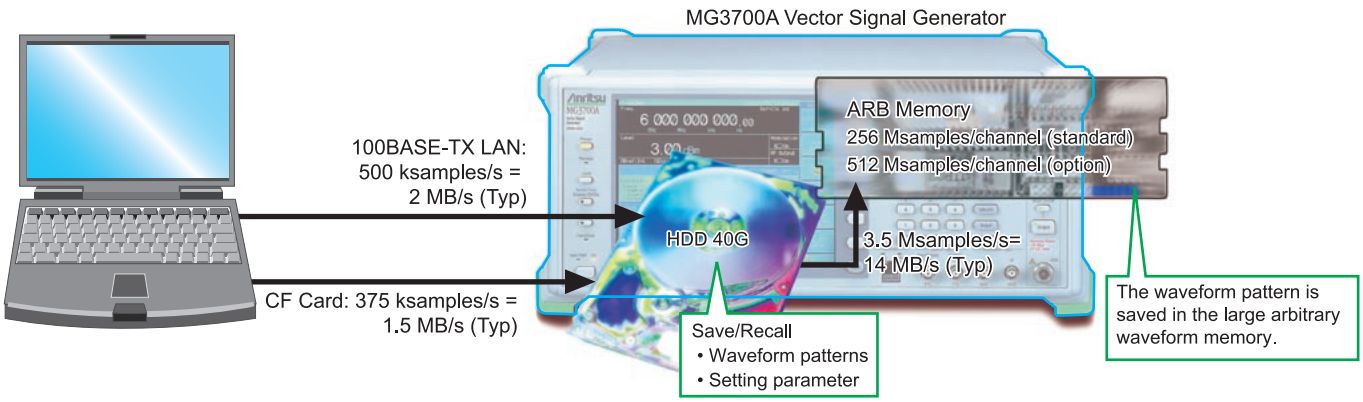
Built-in 40 GB Hard Disk

Various large-capacity waveform patterns and MG3700A parameters can be saved the built-in 40 GB hard disk.
The transfer speed between the hard disk and waveform memory is fast (14 MB/s typ).
If the hard disk fails, it can be changed using the optional HDD ASSY.

Up to 2 GB Waveform Memory

1 GB = 256 Msamples/channel (Standard)
2 GB = 512 Msamples/channel (Option)

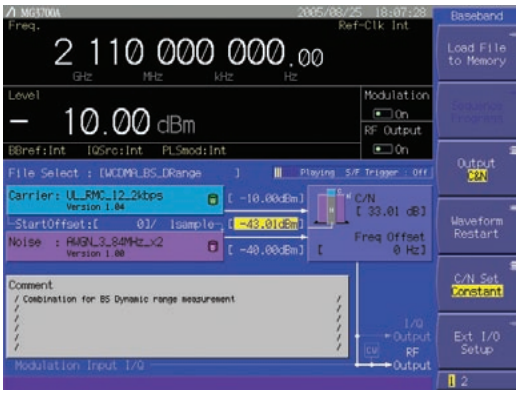
The large-capacity waveform memory can save many waveform patterns.
Waveform patterns are read from the hard disk and saved to memory for instant output without accessing the hard disk again.
The standard MG3700A waveform memory can save up to 256 Msamples/channel (128 Msamples/channel × 2).
This memory can be expanded to 512 Msamples/channel (256 Msamples/channel × 2) as an option.



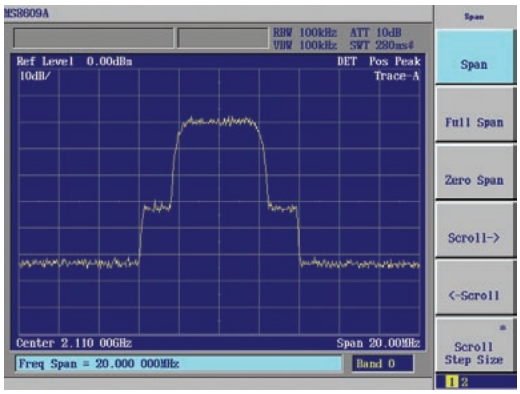
Useful Standard Functions

Waveform Combining Function

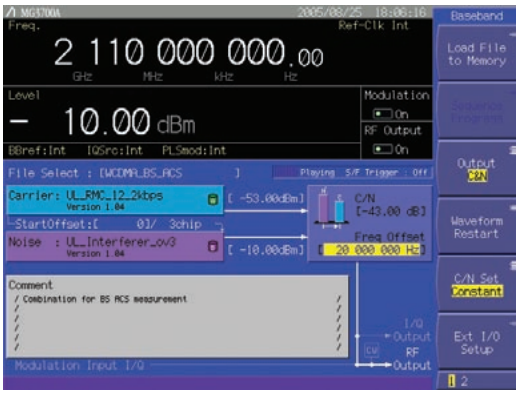
The MG3700A has two built-in arbitrary waveform memories, each of which can hold one waveform pattern.
The MG3700A can output a signal from either memory, as well as combine and output both signals simultaneously.
When measuring receiver characteristics, such as Adjacent Channel Selectivity (ACS) or Blocking characteristics, one MG3700A can output both the Wanted Signal and the Interfering Signal or the Wanted Signal with AWGN.
Digital signal processing ensures excellent level accuracy.



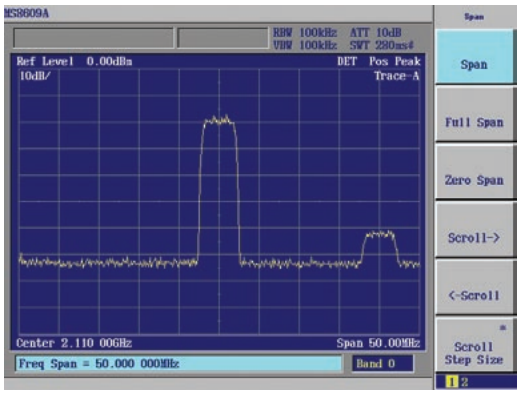
Wanted Signal + AWGN Screen



Output Waveform Screen



Wanted Signal + Interference Signal Screen



Output Waveform Screen

Combination file
The Combination function makes the work of waveform addition even easier. It uses a file in which various parameters, such as the pattern file for the two waveform memories, the output level ratio, and the offset frequency, are pre-defined.
When selected, the values for these parameters are automatically set in the MG3700A.

Steps without Combination function

- Processing required waveform + interference waveform
  - Set required waveform in memory A.
  - Set interference waveform in memory B.
  - Set level of required waveform.
  - Set level of interference waveform.
  - Set offset frequency of required and interference waveforms.
- Processing W-CDMA control CH + Data CH
  - Set Control CH in memory A.
  - Set Data CH in memory B.
  - Set level of Control CH.
  - Set level of Data CH.

Effect of Combination function

- Select the Combination file.
- Parameters are automatically set.
- Waveforms are ready to be generated.

Sequence Mode

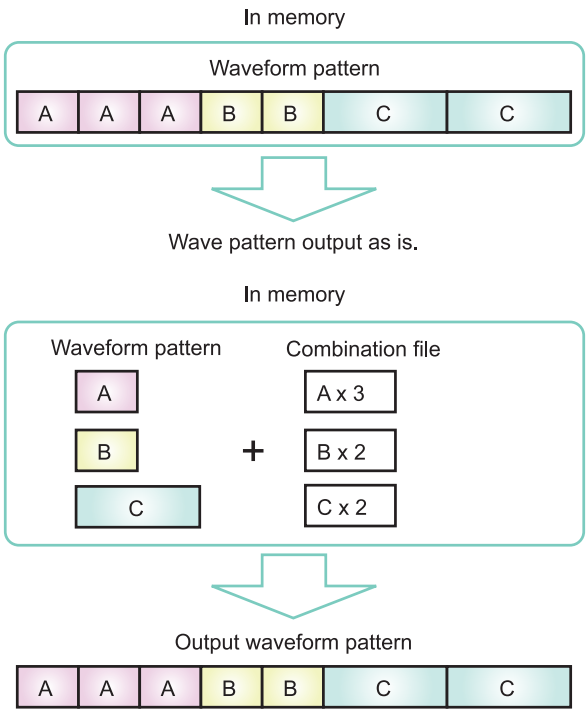
The Sequence Mode Combination function saves operating parameters, such as the waveform pattern repetition times, waveform pattern switching, and output level settings, to a file. Simply selecting this file performs these operations automatically. This is very convenient when investigating state transitions in response to received signals, such as during connection procedures.

Steps without Sequence mode

- Create a single waveform pattern combining the required waveform pattern type and times, and save it in memory.
- Create a new waveform pattern when the repetition time changes.

Effect of Sequence mode

The required waveform pattern and combination file are saved in memory. Moreover, an external trigger can be used to repeat each waveform pattern any number of times.
⇒ Makes efficient use of memory
⇒ Permits investigation of response status transitions
⇒ Enables manual sequence control

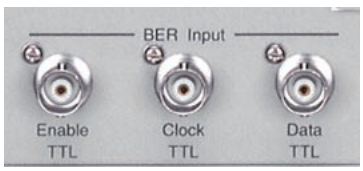


Built-in Standard 20 Mbps BER

The built-in BER analyzer supports easy BER measurement.
Input bit rate: 1 kbps to 20 Mbps
Measurable BER: 0 to 1%
A BER option supports measurement from 100 bps to 120 Mbps (next page).

BER Measurement Screen

This function is used by connecting the signal demodulated by the DUT to the Enable/Clock/Data BNC connectors on the rear panel. In addition, up to 100 BER measurement results can be logged in a file containing test information, including measurement time and date, error rate, bit count, termination cause, and measurement mode.



Rear-panel Connectors

Count Mode	Standard BER Measurement Function	MG3700A-031/131 High speed BER Test Function
Time	√	
Data Bit/Data	√	√
Error		√

Note: The Time setting, available in the Standard Measurement Function, is not available in the optional MG3700A-031/131 High-speed BER Test Function.

Options

Hardware Options

Model: MG3700A-001
Name: Rubidium Reference Oscillator
This option provides a 10 MHz reference signal VCO.
The frequency stability is better than the standard VCO.
Frequency: 10 MHz
Aging rate: ±1 × 10^{-10}/month
Temperature stability: ±1 × 10^{-9} (0° to +50°C)

Model: MG3700A-002
Name: Mechanical Attenuator
This option changes the standard electronic attenuator to a mechanical attenuator, improving the maximum permissible output level and distortion characteristics.
Settable range: –140 to +19 dBm
Accuracy range (CW): –140 to +10 dBm

Model: MG3700A-011
Name: Upper Frequency 6 GHz
This option extends the upper frequency to 6 GHz from 3 GHz.

Model: MG3700A-021
Name: ARB Memory Upgrade 512 Msamples
This option extends the memory capacity of the ARB unit to 256 Msamples/channel × 2 from 128 Msamples/channel × 2.

Model: MG3700A-031
Name: High-speed BER Test function
This option upgrades the standard built-in BER measurement functions as follows:
- Increases the data rate to a range of 100 bps to 120 Mbps
- Added SyncLoss count function
- Added discontinuous PN data measurement function
- Added user pattern measurement function

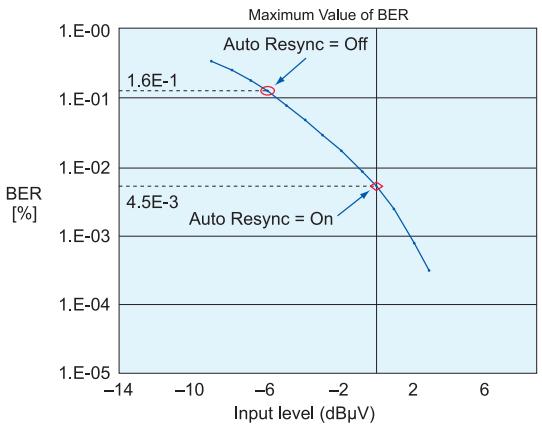
Comparison between Standard BER Measurement Function and Option BER Measurement Function

		Standard BER Measurement Function (ver2.02 or later)	MG3700A-031/131 High-speed BER Test Function	Case
On/Off function of Auto Resync		√	√ + Threshold adjustment	Can perform continuous measurement of high error rates by changing measurement conditions to match error rates. Auto Resync = OFF is required for manufacturing inspection of some communications systems requiring reception sensitivity with BER=1%, and for R&D applications that evaluate reception sensitivity limits.
Count Mode*	Time	√	—	Measurement range can be set.
	Data Bit/ Data	√	√	
	Error	—	√	
Measurement data rate upper limit		20 Mbps	120 Mbps	This can be used for WLAN and next-generation high-speed communications systems.
SyncLoss count function		—	√	This can be used for continuous measurement even when synchronization loss occurs.
Measurement of discontinuous PN data		—	√	When the size of continuous data such ISDB-T PN23 exceeds the MG3700A memory capacity, measurement can be performed by reducing the memory requirements using discontinuous PN data.
User pattern measurement		—	√	This can be used for measuring fixed patterns such as those specified by WiMAX.

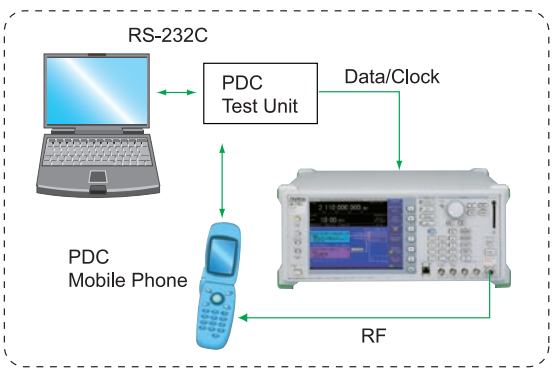
*: The measurement count of the standard BER measurement function (version 2.02 or earlier) could be set as Time and Number of bits. The High-speed BER Test Function option does not have the Time setting, and can set Number of bits and Number of error bits.

BER Measurement Variation Caused by Auto Resync On/Off

The figure below shows one example of a BER measurement that indicates SyncLoss. Actual results depend on the specific communication system and data rate, and will not necessarily match the measurement values below.



Measurement System



Software options: IQproducer License

The IQproducer software can be installed on any PC for evaluation before purchase. To generate RF signals from the waveform pattern created by the IQproducer software, the MG3700A must be equipped with a license key for each of the technologies.

Model: MX370101A
Name: HSDPA/HSUPA IQproducer
Parameters can be changed and the required waveform patterns can be generated for HSDPA Uplink/Downlink and HSUPA E-DPDCH/EDPCCH.

Model: MX370102A
Name: TDMA IQproducer
Parameters can be changed and the required waveform patterns can be generated for TDMA system signals. The parameters that can be set include Modulation, Frame, Slot, Data, and Filter.

Model: MX370103A
Name: CDMA2000 1xEV-DO IQproducer
Parameters can be changed and the required waveform patterns can be generated for CDMA2000 1xEV-DO Forward/ Reverse signals.

Model: MX370104A
Name: Multi-carrier IQproducer
The MX370104A Multi-carrier IQproducer software is GUI-driven PC application software for creating multi-carrier waveform patterns for the modulation and tone signals of various communication systems.
There is also a function for converting two waveform patterns with different sampling rates to a waveform pattern with one sampling rate, as well as a function for creating a waveform pattern with W-CDMA Downlink multi-carrier and clipping.

Model: MX370105A
Name: Mobile WiMAX IQproducer
Create UL and DL waveforms that comply with the IEEE 802.16e standard using a drop-and-drag GUI. Use these files wherever a mobile WiMAX signal is required. Test receivers per IEEE 802.16e standard section 8.4.13 - Receiver Requirements (excluding the tests that require test equipment other than a Signal Generator).

Model: MX370106A
Name: DVB-T/H IQproducer
The parameters for the ETSI EN 300 744 V1.5.1 (2004-11) Physical Layer specification are set and a waveform pattern is generated. A video file waveform pattern is generated by reading the user's MPEG-2 TS file. The generated waveform pattern can be used for the receiver sensitivity test using BER measurement and for the final operation check using the video.

Model: MX370107A
Name: Fading IQproducer
The MX370107A Fading IQproducer supports generation of faded waveform patterns (fading of each IQ channel, calculation of correlation line, addition of AWGN) by reading waveform patterns for the MG3700A.
Waveform patterns created by another IQproducer or IQ data (ASCII) created by general simulation tools can be selected as the input file.
The Channel Configuration can be selected from 1x1 SISO, 2x1 MISO, 1x2 SIMO, and 2x2 MIMO.

Model: MX370108A
Name: LTE IQproducer
The MX370108A LTE IQproducer supports creation of required waveform patterns by changing parameters standardized in the 3GPP LTE FDD specifications of 3GPP TS36.211, TS36.212, and TS25.814.

Model: MX370109A
Name: XG-PHS IQproducer
The MX370109A XG-PHS IQproducer supports creation of required waveform patterns by changing parameters standardized in the next generation PHS (XGP: eXtended Global Platform)

Model: MX370110A
Name: LTE TDD IQproducer
The MX370110A LTE TDD IQproducer supports creation of required waveform patterns by changing parameters standardized in the 3GPP LTE TDD specifications of 3GPP TS36.211, TS36.212, TS36.213 and TS25.814.

Read the MX370x Series Software catalog for details.

Software options: Waveform pattern

Waveform pattern options provide waveform data meeting the requirements of various communication systems and can be used by the MG3700A built-in arbitrary waveform generator.
Waveform patterns are downloaded to the MG3700A for use.

Model: MX370001A
Name: TD-SCDMA Waveform Pattern
Waveform patterns for transmission/reception test of 3GPP 1.28 Mcps TDD Option (TD-SCDMA)

Model: MX370002A
Name: Public Radio System Waveform Pattern
Waveform patterns complying with RCR STD-39 and ARIB STD-T61/T79/T86.
Waveform patterns, such as Uplink/Downlink and PN9/PN15 continuous waves.
RCR STD-39: Narrow band digital-communications system
ARIB STD-T61: Narrow band digital-communications system
ARIB STD-T79: Public digital-communications system
ARIB STD-T86: Public digital-communications system

Read the MX370x Series Software catalog for details.

Communication system		AWGN	W-CDMA	HSDPA (Test Model 5)	HSDPA/HSUPA	CDMA2000 1xEV-DO	CDMA2000	GSM/EDGE	Next generation PHS (XGP)	Advanced-PHS	PHS	PDC	ETC/DSRC	Digital Broadcast (BS/CS/CATV/ISDB-T)	Digital Broadcast (DVB-T/H)	WLAN (IEEE802.11a/b/g)	Mobile WiMAX (IEEE802.16e)	*Bluetooth*	GPS	TD-SCDMA	RCR STD-39	ARIB STD-T61/T79/T86	Multi-Carrier	Fading	3GPP LTE (FDD)	3GPP LTE (TDD)
Waveform pattern	Preinstalled	√	√	√		√	√	√			√	√		√		√		√	√							
	MX370001A TD-SCDMA																			√						
	MX370002A Public Radio System																				√	√				
IQproducer	Standard accessories AWGN	√																								
	Standard accessories W-CDMA		√																							
	MX370101A HSDPA/HSUPA		√		√																					
	MX370102A TDMA									√	√	√	√								√	√				
	MX370103A CDMA2000 1xEV-DO					√																				
	MX370104A Multi-carrier	Multi-carrier IQproducer is software that generates the multi-carrier signal based on waveform pattern of various telecommunications systems.																								
	MX370105A Mobile WiMAX															√										
	MX370106A DVB-T/H														√											
	MX370107A Fading	Fading IQproducer is software that generates the Fading signal based on waveform pattern of various telecommunication systems.																								
	MX370108A LTE FDD																								√	
	MX370109A XG-PHS								√																	
	MX370110A LTE TDD																									√

IQproducer Waveform Generation Software

Functions

IQproducer is PC application software used to generate waveform files. These files are then transferred to the MG3700A where they are used as the source of IQ data for modulated output. It is bundled with MG3700A as standard and has the following four functions:

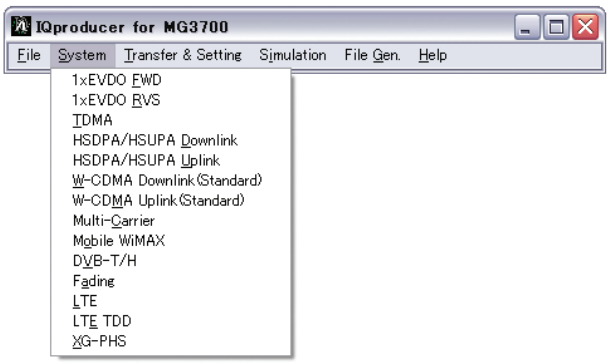
- Parameter setting
- Simulation
- File generation
- Data transfer

The IQproducer software can run on any PC that meets the operational requirements, however, a license must be installed on the MG3700A in order to play the files and produce a modulated RF signal.

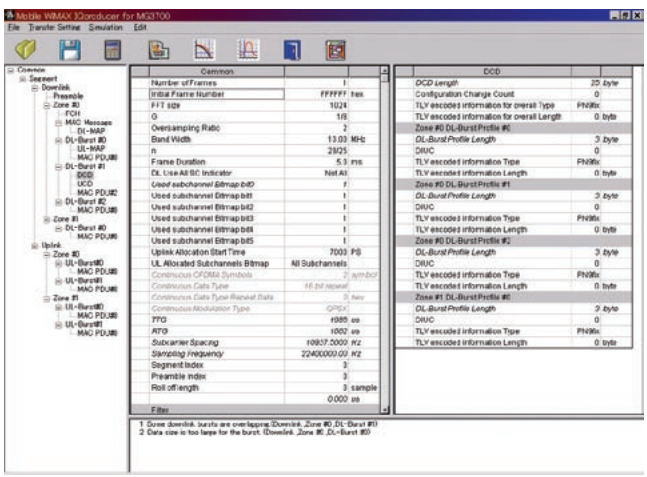
• IQproducer Operating Environment

CPU	Pentium III, 1 GHz or faster
Memory	≥ 512 MB
HDD	≥ 5 GB
Display	1024 × 768 pixels min.
OS	Windows 2000 Professional, Windows XP

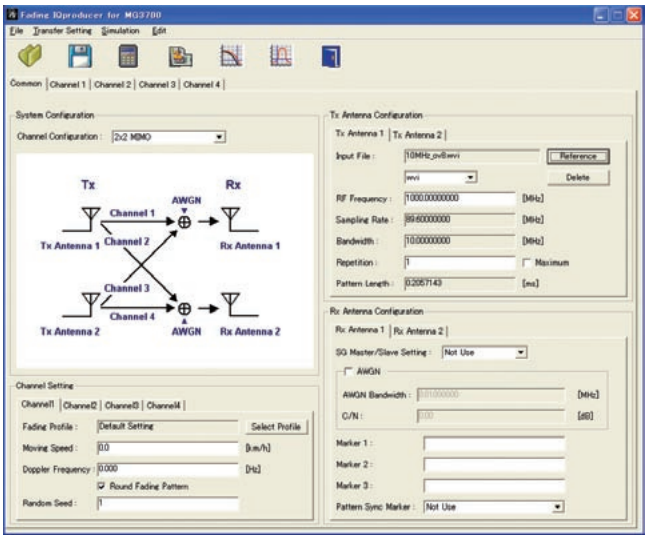
• Parameter setting: System



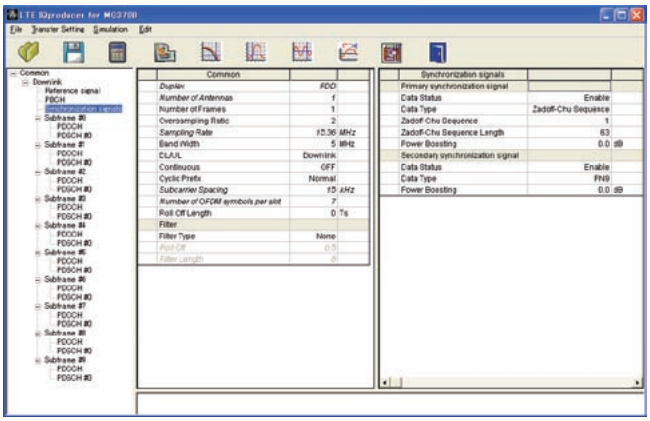
The IQproducer System function has a GUI for each communication system for easy parameter setting. Parameter settings can also be saved to a file and recalled.



Mobile WiMAX IQproducer Setting Screen

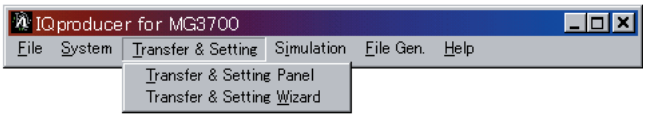


Fading IQproducer Setting Screen

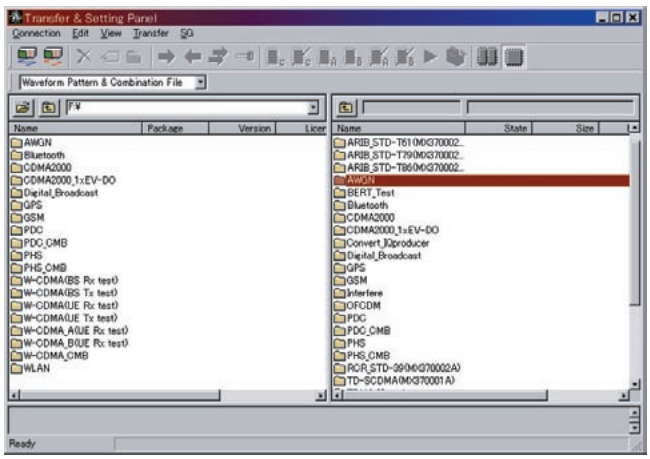


LTE IQproducer Setting Screen

• Data transfer: Transfer and Setting



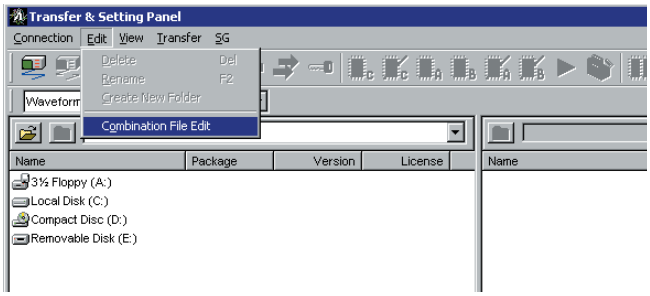
A PC and the MG3700A can be connected via 100BASE-TX Ethernet to transfer data such as a waveform pattern generated by IQproducer, firmware upgrade file, or graphics file.
Waveform patterns can be transferred to multiple MG3700A units simultaneously when using a LAN connection.
After the files are moved to the MG3700A, the IQproducer can remotely load the files into the waveform memory and select the appropriate file for playback.



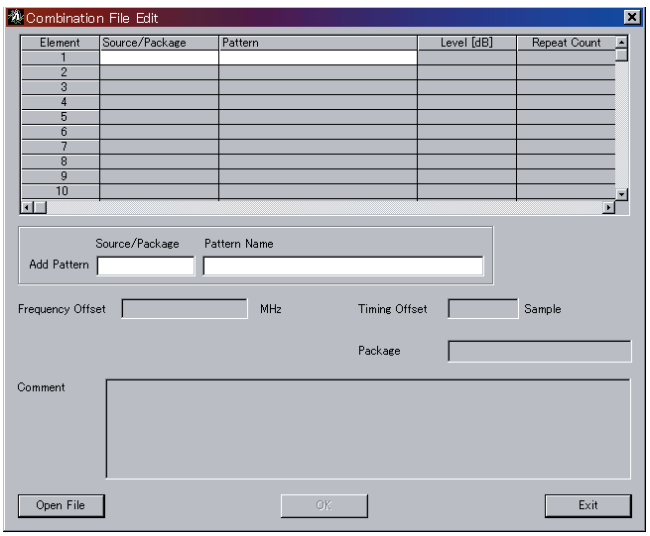
Transfer & Setting Screen

Combination File generation
The Combination File Edit function is one of the Transfer & Setting Edit functions. The following parameters are set automatically by selecting the Combination File:
• Waveform pattern
• Repetition times
• Interference waveform pattern (Memory B)
• Frequency offset (Used when Memory A and Memory B are to be added)
• Level ratio (This value represents C/N when Memory A and Memory B are added, or the relative level between elements when only Memory A is used)

Using Combination Files that place the wanted signal waveform and the interference waveform into two separate memories makes it easy to measure receiver characteristics. Combination files can also be used to create sequences of waveforms.
By using Sequence Mode Combination files in which switching and repetition times for multiple waveform patterns are defined, receive signal status transitions can be verified.



Transfer & Setting Screen



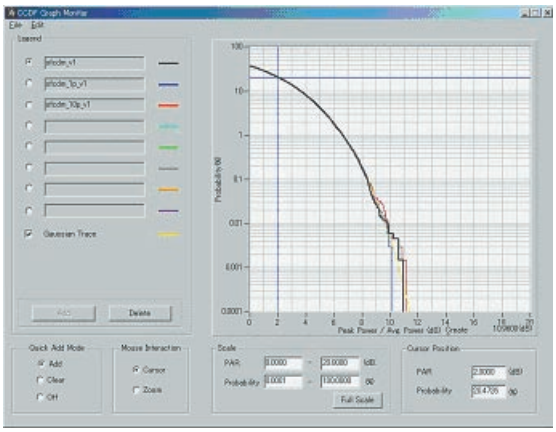
Combination File Edit Screen

• Graphical Simulation Displays

This function displays a generated waveform as a Complementary Cumulative Distribution Function (CCDF), Fast Fourier Transform (FFT) and Time Domain graph on the PC. It is useful for checking or reviewing waveforms.

CCDF Graph

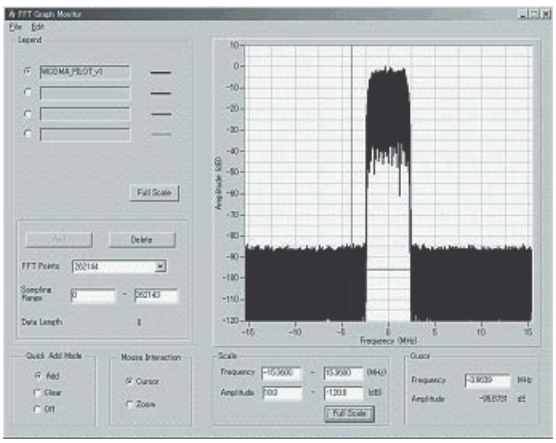
Up to eight generated waveform patterns can be read and displayed as CCDF graphs.



CCDF Graph

FFT Graph

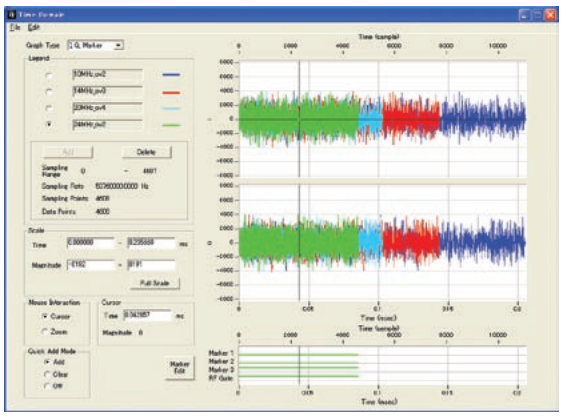
Up to four generated waveform patterns can be read and displayed as FFT graphs.



FFT Graph

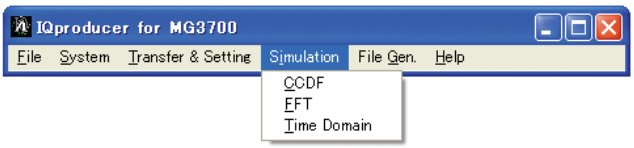
Time Domain Graph

Up to four generated waveform patterns can be read and displayed as a Time Domain graph.

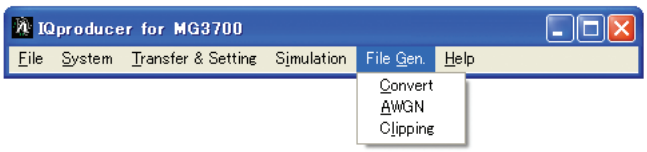


Time Domain Graph

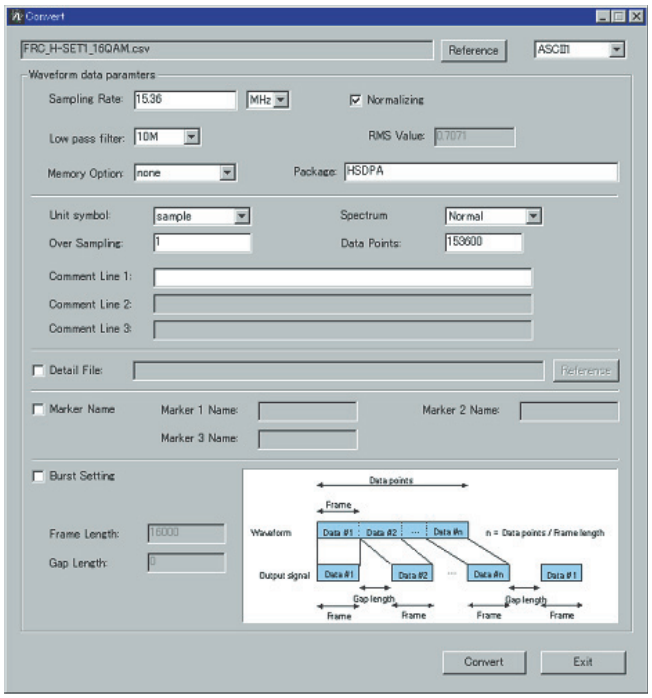
• Simulation: Simulation



• File generation: File Gen

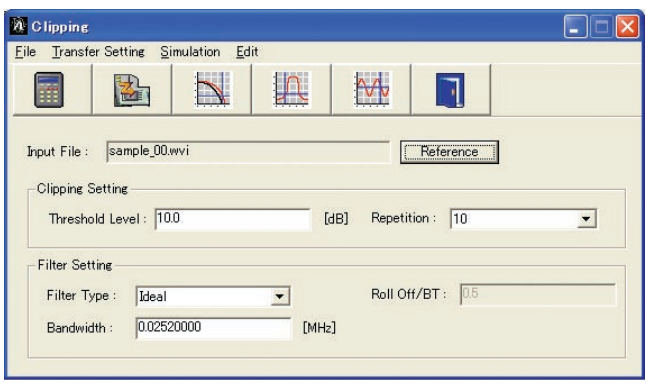


Convert: Data format conversion
ASCII-format IQ sample data created by general signal generation software (such as MATLAB) can be converted to waveform patterns for the MG3700A.
Data produced during R&D simulations can be converted using the IQproducer and moved to the MG3700A to produce signals that accurately reproduce the simulation data.



Convert Screen

Clipping
This function performs clipping of each type of waveform pattern. The clipped waveform pattern is created by setting the filter, bandwidth, and repletion times.



Clipping Graph

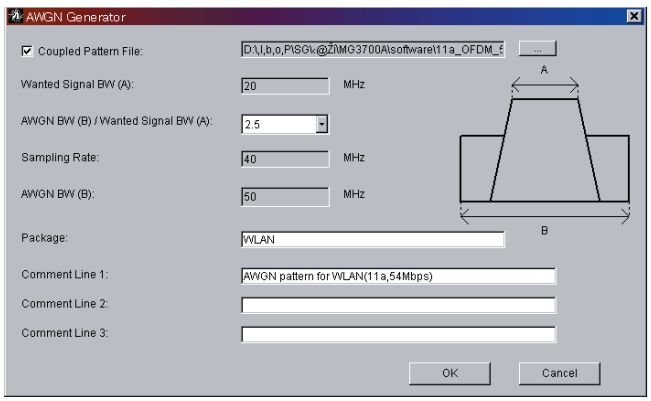
Additive White Gaussian Noise (AWGN) waveform generation
This function establishes the sampling rate and bandwidth, allowing any AWGN waveform pattern to be created.
In addition, when the first combined waveform pattern (Wanted Signal) is selected, the Wanted Signal bandwidth and sampling rate are set automatically.
The resulting AWGN waveform pattern can be combined with an existing waveform pattern, which is useful for base-station dynamic-range measurements.

Main setting parameters
(1) Wanted Signal BW: Wanted Signal bandwidth
Setting range: 0.0010 to 120.0000 MHz

(2) AWGN BW (B)/Wanted Signal BW (A):
Magnification of AWGN to Wanted Signal
Setting range: 1.0, 1.5, 2.0, 2.5

(3) Sampling Rate:
Setting range: 0.0200 to 160.0000 MHz
Same value as Wanted Signal.

(4) AWGN BW (B): Bandwidth of AWGN
Calculated automatically from (1) and (2) under following items:
Limit range: 0.001 to 20.000 MHz and Sampling rate/2 max.
20.001 to 120.000 MHz and Sampling rate max.



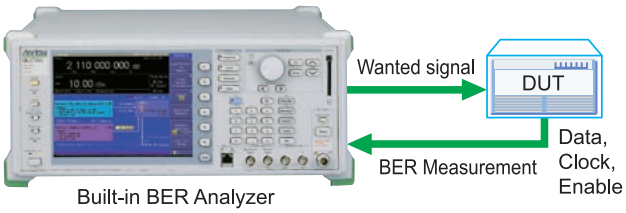
AWGN Screen

Measurement Sampling

Evaluating Receiver Characteristic for Base Station and UEs of Various Mobile Communications Systems

Because the MG3700A supports waveform patterns meeting the requirements of mobile communications systems and includes a built-in BER analyzer, it is ideal for measuring receiver characteristics. The waveform combination function can combine two waveform patterns, so a single MG3700A can output two signals, such as the Wanted signal + Interference signal or Wanted signal + AWGN (Additive White Gaussian Noise).

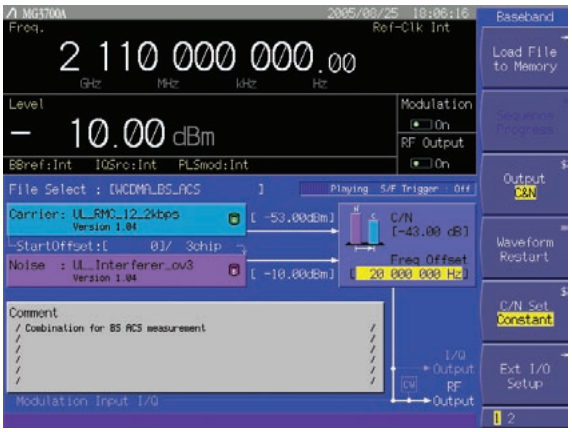
MG3700A Vector Signal Generator



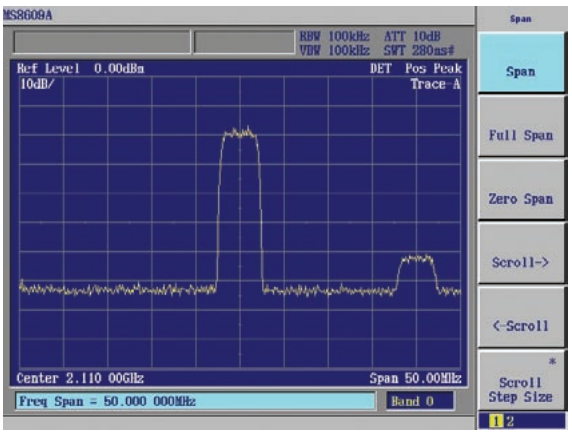
Built-in BER Analyzer

Input bit rate: 1 kbps to 20 Mbps (Standard)
100 bps to 120 Mbps (Option)

- The receiver sensitivity test covers BER measurement items
  Examples: W-CDMA, GSM, PHS, and PDC
- Since the built-in BER analyzer is a standard feature, a receiver test can be carried out easily without extra test equipment.



Wanted Signal + Interfering Screen



Output Waveform Screen

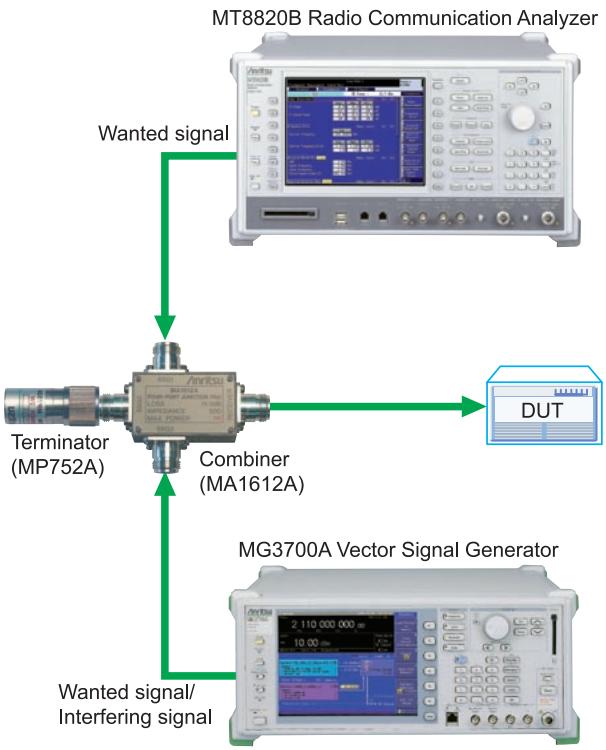
MG3700A Vector Signal Generator

The waveform combination function is built-in.

- The receiver sensitivity test covers measurements using two signals, such as Adjacent Channel Selectivity (ACS) and blocking characteristic.
- The waveform combination function enables one MG3700A to output a single RF signal containing the Wanted signal + Interfering signal or the Wanted signal + AWGN.
- The level ratio accuracy is excellent because S/N adjustment is performed by digital processing.

Evaluating Receiver Characteristics of Multi-Mode Wireless Devices

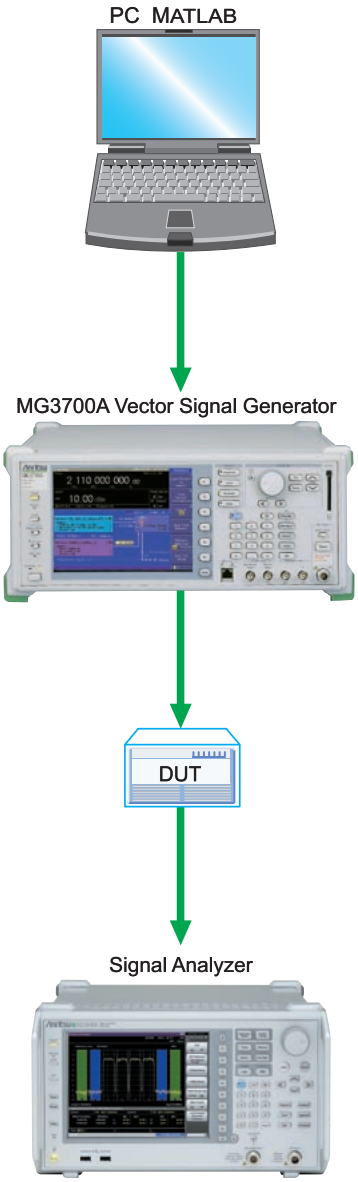
Multi-mode equipment that supports multiple wireless technologies is now common. Signal generators that can support multiple communication technologies are required for evaluating the receiver characteristics of this equipment. Besides the traditional receiver tests such as sensitivity and compression, additional testing must be done to ensure that the receiver characteristics of one technology are not degraded by the presence of a signal from another technology.
The MG3700A supports all major telecommunication modulation schemes. It can be used alone or as part of a system as shown below.



- One MG3700A can output the wanted signal for evaluating receiver characteristic of various communication systems.
- It can also be used to generate interference signal for evaluating degraded receiver characteristics caused by mutual interference.

Supports R&D of Evolving Communication Systems

The IQproducer data conversion function can be used to convert customized waveform files created common EDA tools.
For example, an IQ sample data file simulated by MATLAB can be converted to the waveform pattern file used by the MG3700A, so the MATLAB simulation result can be compared with an actual measurement result.



Specifications

• MG3700A Vector Signal Generator

The following conditions are applied unless otherwise specified. Common to CW mode and modulation mode. [Continuous mode: Off, External ALC: Off, Frequency switching speed: Normal, Pulse modulation: Off], Only during modulation mode [Input level to DAC (RMS): Full scale 14 dB to full scale 17 dB, Sampling rate: >100 kHz, Memory mode: Except combining two waveform, IQ Output: Off, After CAL execution, During internal modulation]

<table>
<tr><td rowspan="7">Frequency</td><td>Range</td><td>250 kHz to 3 GHz (Standard), 250 kHz to 6 GHz (Option)</td></tr>
<tr><td>Resolution</td><td>0.01 Hz</td></tr>
<tr><td>Internal reference oscillator</td><td>Frequency: 10 MHz, Aging rate: ±1 × 10^{-8}/day, ±1 × 10^{-7}/year, Temperature stability: ±2 × 10^{-8} (0˚ to 50°C),
Start-up characteristics (at 23°C):
±5 × 10^{-8} (After 5 min, compared to frequency after 24 h warm-up)
With Rubidium Reference Oscillator Option
Frequency: 10 MHz, Aging rate: ±1 × 10^{-10}/Month, Temperature stability: ±1 × 10^{-9} (0˚ to 50°C),
Start-up characteristics (at 23°C):
±1 × 10^{-9} (After 7 min, compared to frequency after 24 h warm-up)</td></tr>
<tr><td>External reference input</td><td>Frequency: 5 MHz/10 MHz (auto-switching), Operating range: ±1 ppm,
Input level:≥0.7 Vp-p/50 Ω (AC coupled), Connector: BNC-J (rear panel, Ref Input)</td></tr>
<tr><td>Buffer output (Reference output)</td><td>Frequency: 10 MHz, Output level: TTL (DC-coupled), Connector: BNC-J (rear panel, Buffered Output)</td></tr>
<tr><td>Switching time</td><td>Response time from final command to ±0.1˚ ppm of set frequency on GPIB
*: (When set frequency is 1 GHz or less, response time from final command to ±100 Hz)
When Frequency change speed = Normal:
≤40 ms (When exceeding 3 GHz)
≤15 ms (When the amount of frequency change is less than 1 GHz without exceeding 3 GHz)
≤20 ms (When the amount of frequency change is 1 GHz or more without exceeding 3 GHz)
When Frequency change speed = Fast:
≤40 ms (When exceeding 3 GHz)
≤10 ms (When not exceeding 3 GHz)
With Mechanical Attenuator Option
Regardless of frequency change speed.:
≤100 ms (When exceeding 3 GHz)
≤80 ms (When not exceeding 3 GHz)</td></tr>
<tr><td>Frequency setup and Display</td><td>Direct setup: Absolute value of frequency is set up and displayed.
Setup by CH: CH assigned to frequency. Separate CH tables can be assigned to two or more systems (groups). Group names and CH numbers are set and displayed. Furthermore, the corresponding frequency is displayed simultaneously.</td></tr>
<tr><td rowspan="5">Output level</td><td>Settable range</td><td>–140 to +13 dBm (At CW, accuracy range: –136 to +6 dBm)
With Mechanical Attenuator Option
–140 to +19 dBm (At CW, accuracy range: –136 to +10 dBm)
*: Refer to Vector modulation. At vector modulation, level error in compared with CW for level accuracy at vector modulation.</td></tr>
<tr><td>Unit</td><td>Power: dBm
Voltage: dBµV (terminate voltage display), dBµV (open voltage display)</td></tr>
<tr><td>Resolution</td><td>0.01 dB (dBm, dBµV)</td></tr>
<tr><td>Accuracy</td><td>At CW and 23 ±5°C:
<table>
<tr><th rowspan="2">Level (p) [dBm]</th><th colspan="3">Frequency (f) [Hz]</th></tr>
<tr><th>250 k ≤ f < 25 M</th><th>25 M ≤ f ≤ 3 G</th><th>3 G < f ≤ 6 G*</th></tr>
<tr><td>+3 < p ≤ +6</td><td>—</td><td>±0.5 dB</td><td>—</td></tr>
<tr><td>–1 < p ≤ +3</td><td>—</td><td>±0.5 dB</td><td>±0.8 dB</td></tr>
<tr><td>–120 ≤ p ≤ –1</td><td>±0.5 dB typ.</td><td>±0.5 dB</td><td>±0.8 dB</td></tr>
<tr><td>–127 ≤ p < –120</td><td>—</td><td>±0.7 dB</td><td>±2.5 dB typ.</td></tr>
<tr><td>–136 ≤ p < –127</td><td>—</td><td>±1.5 dB typ.</td><td>—</td></tr>
</table>
*: Upper frequency 6 GHz option required for 3 GHz < f ≤ 6 GHz.

With Mechanical Attenuator Option
<table>
<tr><th rowspan="2">Level (p) [dBm]</th><th colspan="3">Frequency (f) [Hz]</th></tr>
<tr><th>250 k ≤ f < 25 M</th><th>25 M ≤ f ≤ 3 G</th><th>3 G < f ≤ 6 G*</th></tr>
<tr><td>+7 < p ≤ +10</td><td>±0.5 dB typ.</td><td>±0.5 dB</td><td>—</td></tr>
<tr><td>–100 ≤ p ≤ +7</td><td>±0.5 dB typ.</td><td>±0.5 dB</td><td>±0.8 dB</td></tr>
<tr><td>–120 ≤ p < –100</td><td>±0.5 dB typ.</td><td>±0.5 dB</td><td>±1.0 dB</td></tr>
<tr><td>–127 ≤ p < –120</td><td>—</td><td>±0.7 dB</td><td>±2.5 dB typ.</td></tr>
<tr><td>–136 ≤ p < –127</td><td>—</td><td>±1.5 dB typ.</td><td>—</td></tr>
</table>
*: Upper frequency 6 GHz options required for 3 GHz < f ≤ 6 GHz.</td></tr>
<tr><td>Linearity</td><td>At CW, –11 dBm and at 23 ±5°C:
±0.2 dB typ. (at –120 to –11 dBm, 25 MHz ≤ f ≤ 3 GHz)
±0.3 dB typ. (at –120 to –11 dBm, 3 GHz < f ≤ 6 GHz)
With Mechanical Attenuator Option
At CW, –7 dBm and at 23 ±5°C:
±0.2 dB typ. (at –120 to –7 dBm, 25 MHz ≤ f ≤ 3 GHz)
±0.3 dB typ. (at –120 to –7 dBm, 3 GHz < f ≤ 6 GHz)</td></tr>
<tr><td>Switching time</td><td>Response time from final command to ±0.1 dB of final level on GPIB.
f < 25 MHz: ≤15 ms (Normal mode), ≤10 ms (Continuous mode)
f ≥ 25 MHz: ≤10 ms (Not based on mode)
With Mechanical Attenuator Option
≤80 ms (Normal mode), ≤10 ms (Continuous mode)</td></tr>
</table>

Output level	VSWR	At ≤–11 dBm output level: 1.3 (250 kHz ≤ f ≤ 3 GHz), 1.55 (3 GHz < f ≤ 6 GHz) With Mechanical Attenuator Option At ≤–7 dBm output level: 1.25 (250 kHz ≤ f ≤ 3 GHz), 1.35 (3 GHz < f ≤ 6 GHz)
	Special setting mode	Continuous mode and EXT ALC mode are exclusive modes
	Continuous mode	By switching to the Continuous mode, the reference output level can be adjusted continuously in 0.01 dB steps over the range of +3 to –10 dB.
	EXT ALC mode	Output level is changed according to DC voltage input externally Variable range: –8/+3 dB, Input impedance: 600 Ω (nominal), Connector: BNC-J (rear panel, Ext. ALC)
	Output connector	50 Ω, N-J (front panel, RF Output)
	Maximum reverse input	Reverse input power: 1 Wpeak (≥300 MHz), 0.25 Wpeak (<300 MHz), DC: 0 V With Mechanical Attenuator Option Reverse input power: 1 Wpeak, DC: 0 V
Signal purity	Spurious	At CW, ≤–1 dBm (With Mechanical Attenuator Option: ≤+3 dBm)
	Harmonics	<–30 dBc (f ≥300 MHz @E-ATT, f ≥250 kHz @M-ATT)
	Non harmonic	<–60 dBc (Expect the intersection spurious* of 2.4 GHz, 25 MHz to 3 GHz) <–54 dBc (Expect the intersection spurious* of 4.4 GHz, 3 to 6 GHz) *: Intersection spurious: 4.8 GHz – [output frequency] (at 25 MHz to 3 GHz), 8.8 GHz – [output frequency] (at 3 to 6 GHz)
	Power supply relation	<–50 dBc (250 kHz to 3 GHz), <–44 dBc (3 to 6 GHz)
Vector modulation	EVM	At 23 ±5°C and Output level ≤–1 dBm (With Mechanical Attenuator Option: ≤+3 dBm) ≤2% rms., ≤1% rms typ. (at W-CDMA Downlink 1 code modulation, Output frequency: 800 to 1000 MHz, 1800 to 2400 MHz) At 23 ±5°C and Output level ≤–4 dBm (With Mechanical Attenuator Option: ≤0 dBm) ≤1% rms. (at OFDM modulation equal to IEEE802.11a/g, Output frequency: 2400 to 2497 MHz, 4,900 to 5,925 MHz) ≤5% peak (at modulation equal to IEEE802.11b, Output frequency: 2,400 to 2,497 MHz)
	ACLR (5 MHz offset)	At 23 ±5°C when using signal of W-CDMA (Test Model1 64DPCH): –61 dBc/3.84 MHz, –63 dBc/3.84 MHz typ. (≤–4 dBm, 800 to 1000 MHz, 1800 to 2400 MHz) With Mechanical Attenuator Option –62 dBc/3.84 MHz, –64 dBc/3.84 MHz typ. (≤0 dBm, 800 to 1000 MHz, 1800 to 2400 MHz)
	ACLR (10 MHz offset)	At 23 ±5°C when using signal of W-CDMA (Test Model1 64DPCH): –66 dBc/3.84 MHz typ. (≤–1 dBm, 800 to 1000 MHz, 1800 to 2400 MHz) With Mechanical Attenuator Option –67 dBc/3.84 MHz typ. (≤+3 dBm, 800 to 1000 MHz, 1800 to 2400 MHz)
	At vector modulation, level error in comparison with CW (At modulation mode, ALC: Off)	±0.2 dB [when outputting W-CDMA Downlink 1 code, 1 carrier] At guaranteed range (Level) of level accuracy under following modulation conditions 50 MHz ≤ f ≤ 3 GHz: Level ≤+2 dBm 3 GHz < f ≤ 6 GHz: Level ≤–1 dBm With Mechanical Attenuator Option 50 MHz ≤ f ≤ 3 GHz: Level ≤+7 dBm 3 GHz < f ≤ 6 GHz: Level ≤+4 dBm
	Carrier leakage	≤–40 dBc (at 23 ±5°C)
	Image rejection	≤–40 dBc (at 23 ±5°C. When using complex sine wave of 10 MHz or less)
	External modulation	Input level: $\sqrt{(I^2 + Q^2)}$ = 0.5 V (rms.), Maximum input level: –5 V (peak) ≤I, Q ≤+5 V (peak), Input impedance: 50 Ω, Input connector: BNC-J (Front panel, Modulation Input IQ)
	RF Spectrum invert	I, Q signal changeable when internal modulation. Spectrum Normal: Usual spectrum output Spectrum Reverse: Inverted spectrum output
Pulse modulation	Internal modulation	ON/OFF ratio: >60 dB, Rise/fall time: <90 ns (10 to 90%), Pulse repetition frequency: DC to 1 MHz, (Duty 50%)
	External modulation	Input range: 0 to 5 V, Input level threshold: about 1 V, ON/OFF ratio: >60 dB, Rise/Fall time: <90 ns (10 to 90%), Pulse repetition frequency: DC to 1 MHz, (Duty 50%), Input connector: 50 Ω BNC-J (rear panel, Ext Pulse Mod Input)
IQ Output	Output voltage range	When output open. Output voltage amplitude + DC offset: –3.5 to +3.5 V
	Output voltage amplitude	When output open. Amplitude change: • I and $\overline{I}$ changes simultaneously • Q and $\overline{Q}$ changes simultaneously • I/$\overline{I}$ and Q/$\overline{Q}$ changes independently Amplitude variable range: 0 to 120% (100% = 640 mV rms, rms = 1634) Variable step: 0.1% Accuracy: ±0.5 dB (1 kHz sine wave, Amplitude variable range ≥10%)
	DC Offset variable range	In-phase DC offset: Variable range: –1 to +3 V, Resolution: 10 mV Differential DC offset: Variable range: –50 to +50 mV, Resolution: 50 µV
	Output connector	50 Ω, D-Sub 15-J (rear panel, IQ Output, differential), Pin assignment (10 = I, 11 = $\overline{I}$, 13 = Q, 14 = $\overline{Q}$, other = GND)
Arbitrary function generation	Waveform resolution	14 bit
	LPF	Automatic selection and manual selection 100, 300 kHz, 1, 3, 10, 30, 70 MHz, Through

Marker output	Function	When a signal is allotted to a marker signal bit at waveform generation, up to three signals, such as pulse modulation signal (for internal modulation), frame timing signal, etc., can be output. The polarity can also be reversed.
	Number of ports	3 ports
	Connector	TTL, BNC-J (rear panel, AUX Input/Output Connector 1/2/3)
Baseband reference clock signal	Internal clock signal	Range: 20 kHz to 160 MHz, Resolution: 0.001 Hz
	External clock input signal	Input frequency range: 20 kHz to 40 MHz Divide and multiply functions: Signal of 1, 2, 4, 8, 16, 1/2, 1/4, 1/8, 1/16 times of input frequency generated internally, and used as DAC sampling clock Connector: BNC-J (rear panel, Baseband Reference Clock) Input level:≥0.7 V (p-p)/50 Ω (AC coupled)
Waveform memory	Memory capacity	Waveform memories. A and B. 128 Msamples/channel × 2, 256 Msamples/channel Max. With ARB Memory Upgrade 512 Msample option 256 Msamples/channel × 2, 512 Msamples/channel Max.
	Number of opened files	Up to 4096 waveform patterns opened per waveform memory (A/B) 100 packages per waveform memory, 100 patterns in one package. Minimum number of samples per pattern: 100
	Memory mode	Defined Mode Selection of a single waveform pattern to be used in either waveform memory A or B, selection of waveform patterns using a combination file that defines addition of multiple waveform patterns, and the addition level ratio can be set in this mode. If a combination file that specifies two or more waveform patterns in waveform memory A is selected, the following sequence operations become enabled. • Selection of pattern switching mode (Auto/Manual) • Selection of pattern switching point (Frame end/Pattern end) • Switching of pattern by an external trigger signal (enabled when the pattern switching mode is Manual) • Restart of sequence • Maximum number of elements: 200 • Minimum number of points per pattern: 1000 Level ratio setting range: Two-signal level ratio <80 dB or OFF Level setting resolution: 0.01 dB Frequency offset variable width: ± (0.8 × Sampling Clock × 2^n – Bandwidth)/2 (n: Maximum integer that satisfying Sampling Clock × 2^n ≤80 MHz when sampling clock greater than 20 MHz.) Frequency setting resolution: 1 Hz In this mode, two waveform memories can be connected for use as a 256 Msamples long memory (512 Msamples long when ARB Memory Upgrade 512 Msample option installed). Edit Mode One waveform each is selected from waveform memory A and waveform memory B, these two waveforms are added and then output. Two signal levels, the waveform memory B start offset and frequency offset, can be set. Level ratio setting range: Two-signal level ratio <80 dB or OFF Level setting resolution: 0.01 dB Frequency offset variable width: ± (0.8 × Sampling Clock × 2^n – Bandwidth)/2 (n: Maximum integer that satisfying Sampling Clock × 2^n ≤80 MHz when sampling clock greater than 20 MHz.) Frequency setting resolution: 1 Hz
Start/Frame trigger	Function	Switchable between continuous output and burst output.
	Input connector	Functional change: Connector shared by Start trigger and Frame trigger; switched depending on situation Connector: BNC-J (Front panel, Start/Frame Trigger), Input level: TTL, Logic: Polarity Rise/Fall selected.
	Start trigger	Starts waveform output
	Frame trigger	Searches for burst timing at burst output Burst length data output and timing of frame trigger and waits for next frame trigger
Pattern trigger	Function	When using the sequence mode, the pattern trigger will force a pattern switch.
	Input connector	Connector: Front panel, Pattern Trigger, BNC-J connector Input level: TTL Logic: Rising or falling polarity
BER Measurement function (Standard)	Function	BER Measurement of demodulated data sequence
	Input connector	TTL, BNC-J (rear panel, BER Input)
	Input signal	Data, Clock, Enable (Polarity reversal supported.)
	Input level	TTL
	Input threshold level	Matches threshold (0.8 to 2.4 V) of TTL
	Input bit rate	1 kbps to 20 Mbps
	Measurable patterns	PN 9, 11, 15, 20, 23, ALL0, ALL1, ALT (alternating 0 and 1)
	Measurable BER	0 to 1% (Reference value; changes with system conditions and data rate)
	Measurable time	≤359999.0 sec
	Mode	Single, Endless, Continuous.
	Display	BitError, SyncLoss, ClockError, EnableError, Error Rate, Error Count
	Measurable bit count	1000 to 4294967295 (2^{32} – 1) bit
	Auto Resync function	Switched between enable/disable

BER Measurement function (Option: MG3700A-031, MG3700A-131)	Function	BER Measurement of demodulated data
	Connector	Rear panel, BER Input, BNC-J connector
	Input signal	Data, Clock, Enable (Polarity reversal supported)
	Input level	0 to 5 V
	Input threshold level	0.20 to 3.00 V (0.05 V step)
	Input impedance	50 Ω, High impedance
	Adjustable range of input timing	–1 to +15 clock (Data/Enable adjusted for input Clock)
	Input bit rate	100 bps to 120 Mbps
	Measurable patterns	PN 9, 11, 15, 20, 23, ALL0, ALL1, ALT (alternating 0 and 1) PN 9fix, 11fix, 15fix, 20fix, 23fix, UserDefine
	Measurable BER	0 to 10% (Reference value; changes with system conditions and data rate)
	Measurable bit count	1000 to 4294967295 (2^{32} – 1) bit
	Measurable error bit	1 to 2147483647 (2^{31} – 1) bit
	Auto Resync	ON/OFF: Select ON when SyncLoss and Threshold error detecting is used to control the measurement cycle. Measurement will stop when the SyncLoss or Threshold error criteria is satisfied. Select OFF when SyncLoss and Threshold error detecting is not to be performed. Threshold setting range: [numerator/denominator] Choose from denominator = 500, 5000, 50000, numerator = 1 to denominator/2, (Default: 200/500)
	Measurement mode	Single, Continuous, Endless
	Display	BitError, SyncLoss, ClockError, Enable Error, SyncLoss Count, Overflow Data Count, Overflow SyncLoss, Error Rate, Error Count
External interface	GPIB	Control target: All functions except MAIN PWR switch, [Local] key, and screen contrast keys. Interface: SH1, AH1, T6, L4, TE0, SR1, RL1, PP0, DC1, DT1, C0, E2 Connector: GPIB (rear panel, GPIB)
	100BASE-TX Ethernet	Function: Waveform pattern transfer and control. Connector: RJ45 jack (front panel and rear panel, Ethernet) In order to use the Ethernet jack on the front panel, it is necessary to jumper the two Ethernet jacks on the rear panel using the straight-through cable (standard accessory).
	Memory card	Function: Waveform pattern, memory parameters, software, and CH table can be saved or recalled to/ from CompactFlash card Connector: Slot (front panel, CF Card)
Display	Size	8.4-inch, 640 × 480 dots, color TFT LCD
	On/Off setting	Panel display On/Off
	Screen save	Currently displayed screen saved to HDD/CF card as bitmap file
Power supply	Voltage	100 to 120 V, 200 to 240 Vac (–15/+10%, 250 V Max.)
	Frequency	47.5 to 63 Hz
	Power consumption	≤200 VA
Temperature range	Operating temperature	+5˚ to +45°C
	Storage temperature	–20˚ to +60°C
Dimensions and mass	Dimensions	426 (W) × 177 (H) × 451 (D) mm
	Mass	≤15 kg (excluding option)
EMC		EN61326-1, EN61000-3-2
LVD		EN61010-1

Configuration Guide

The MG3700A Vector Signal Generator supports a variety of general hardware and software as standard equipment.
Use the chart below to select options when higher performance than provided by the standard configuration is desired.

Classification	Outline	Standard	Option	Note
Frequency range	250 kHz to 3 GHz	√		
	250 kHz to 6 GHz		√	6 GHz Frequency Extension Option
Reference oscillator	Standard	√		Frequency: 10 MHz, Aging rate: ±1 × 10^{-8}/day, ±1 × 10^{-7}/year
	Rubidium Reference Oscillator		√	Rubidium Reference Oscillator Option Frequency: 10 MHz, Aging rate: ±1 × 10^{-10}/Month
Attenuator	Electron Attenuator	√		
	Mechanical Attenuator		√	Mechanical Attenuator Option Changes electronic attenuator to mechanical attenuator
Memory	1 GB = 256 Msamples/channel	√		128 Msamples/channel × 2 Maximum of 256 Msamples/channel
	2 GB = 512 Msamples/channel		√	ARB Memory Upgrade 512 Msample Option 256 Msamples/channel × 2 Maximum of 512 Msamples/channel
Baseband generator	Internal/External	√		Vector modulation bandwidth (Internal): 120 MHz Vector modulation bandwidth (External): 150 MHz
BER Analyzer		√		Input bit rate: 1 kbps to 20 Mbps Measurable Patterns: PN 9/11/15/20/23, ALL0, ALL1, repetition of 0 and 1
			√	High speed BER Test function Input bit rate: 100 bps to 120 Mbps Measurable Patterns: PN 9/11/15/20/23, ALL0, ALL1, repetition of 0 and 1 PN9fix/11fix/15fix/20fix/23fix, UserDefine
Hard disk	40 GB	√		Hard disk for saving waveform patterns and parameters
Waveform patterns software*	W-CDMA	√		Waveform patterns saved hard disk License required
	GSM/EDGE	√		
	CDMA2000 1X/1xEV-DO	√		
	W-LAN (IEEE802.11a/b/g)	√		
	PDC	√		
	PHS	√		
	Bluetooth	√		
	GPS	√		
	Digital Broadcast (ISDB-T 1 segment, BS, CS, CATV)	√		
	AWGN	√		
	TD-SCDMA		√	License required (Model: MX370001A)
	Public Radio System (ARIB STD-T61/T79/T86)		√	License required (Model: MX370002A)
IQproducer License for each system*	HSDPA/HSUPA		√	License required (Model: MX370101A)
	Universal TDMA		√	License required (Model: MX370102A)
	CDMA2000 1xEV-DO		√	License required (Model: MX370103A)
	Multi-carrier		√	License required (Model: MX370104A)
	Mobile WiMAX		√	License required (Model: MX370105A)
	DVB-T/H		√	License required (Model: MX370106A)
	Fading		√	License required (Model: MX370107A)
	LTE FDD		√	License required (Model: MX370108A)
	Next generation PHS (XGP)		√	License required (Model: MX370109A)
	LTE TDD		√	License required (Model: MX370110A)
IQproducer (PC application software)*	Parameter setting function	√		Various parameters of waveform pattern edited easily Parameter edit results saved as a setting file and can recalled
	Data converter function	√		Setting files converted to MG3700A waveform pattern License required for each system Setting file programmed in C or MATLAB converted to a waveform pattern without license
	Data transfer function	√		Waveform patterns, display copy files, and update programs transferred from PC to MG3700A via Ethernet
	Simulator function	√		For checking waveform pattern before transferring to MG3700A
Warranty service	1 year	√		
	2 years		√	Standard 1 year + 1 year
	3 years		√	Standard 1 year + 2 years
	5 years		√	Standard 1 year + 4 years

*: Read the waveform pattern and IQproducer data sheet for details.

Ordering Information

Please specify model/order number, name, and quantity when ordering.
The names listed in the chart below are Order Names. The actual name of the item may differ from the Order Name.

Model/Order No.	Name		Remarks
	— Main frame —		
MG3700A	Vector Signal Generator		
	— Standard accessories —		
J0017F	Power Cord, 2.6 m:	1 pc	
J1276	LAN Straight Cable:	1 pc	10 cm, For U link connection on Rear panel
	CompactFlash:	1 pc	64 MB or more
J1254	CompactFlash Adapter:	1 pc	
Z0742	MG3700A CD-ROM:	1 pc	Main frame operation manual, IQproducer operation manual, Standard waveform operation manual, IQproducer software
	— Options —		
MG3700A-001	Rubidium Reference Oscillator		Aging rate: ±1 × 10^{-10}/Month
MG3700A-002	Mechanical Attenuator		Changes standard electronic attenuator to mechanical attenuator
MG3700A-011	Upper Frequency 6 GHz		250 kHz to 3 GHz extended to 250 kHz to 6 GHz
MG3700A-021	ARB Memory Upgrade 512 Msample		Extends standard 128 Msample/channel × 2 to 256 Msample/channel × 2
MG3700A-031	High Speed BER Test Function		Extends standard BER test function
MG3700A-101	Rubidium Reference Oscillator Retrofit		Retrofitted to shipped MG3700A
MG3700A-102	Mechanical Attenuator Retrofit		Retrofitted to shipped MG3700A
MG3700A-103	Electronic Attenuator Retrofit		Retrofitted to shipped MG3700A
MG3700A-111	Upper Frequency 6 GHz Retrofit		Retrofitted to shipped MG3700A
MG3700A-121	ARB Memory Upgrade 512 Msample Retrofit		Retrofitted to shipped MG3700A
MG3700A-131	High Speed BER Test Function Retrofit		Retrofitted to shipped MG3700A
	— Maintenance service —		
MG3700A-ES210	Extended Warranty Service		2 years
MG3700A-ES310	Extended Warranty Service		3 years
MG3700A-ES510	Extended Warranty Service		5 years
	— Softwares (Waveform pattern) —		
MX370001A	TD-SCDMA Waveform Pattern		
MX370002A	Public Radio System Waveform Pattern		RCR STD-39, ARIB STD-T61/T79/T86
	— Softwares (License key for IQproducer system) —		
MX370101A	HSDPA/HSUPA IQproducer		
MX370102A	TDMA IQproducer		
MX370103A	CDMA2000 1xEV-DO IQproducer		
MX370104A	Multi-carrier IQproducer		
MX370105A	Mobile WiMAX IQproducer		
MX370106A	DVB-T/H IQproducer		
MX370107A	Fading IQproducer		
MX370108A	LTE IQproducer		
MX370109A	XG-PHS IQproducer		
MX370110A	LTE TDD IQproducer		
	— Optional accessories —		
Z0777	Standard Waveform Pattern Upgrade Kit		DVD 4 piece sets
W2495AE	MG3700A Operation Manual		
W2496AE	MG3700A IQproducer Operation Manual		
W2539AE	MG3700A Standard Waveform Pattern Operation Manual		
W2533AE	MX370001A TD-SCDMA Waveform Pattern Operation Manual		
W2503AE	MX370101A HSDPA/HSUPA IQproducer Operation Manual		
W2504AE	MX370102A TDMA IQproducer Operation Manual		
W2505AE	MX370103A CDMA2000 1xEV-DO IQproducer Operation Manual		
W2633AE	MX370104A Multi-carrier IQproducer Operation Manual		
W2734AE	MX370105A Mobile WiMAX IQproducer Operation Manual		
W2798AE	MX370106A DVB-T/H IQproducer Operation Manual		
W2995AE	MX370107A Fading IQproducer Operation Manual		
W3022AE	MX370108A LTE IQproducer Operation Manual		
W3152AE	MX370109A XG-PHS IQproducer Operation Manual		
W3221AE	MX370110A LTE TDD IQproducer Operation Manual		
G0141	HDD ASSY		Hard disk
K240B	Power Divider (K connector)		DC to 26.5 GHz, K-J, 50 Ω, 1 Wmax
MA1612A	Four-port Junction Pad		5 MHz to 3 GHz, N-J
MP752A	Termination		DC to 12.4 GHz, 50 Ω, N-P
MA2512A	Band Pass Filter		For W-CDMA, pass band: 1.92 to 2.17 GHz

Model/Order No.	Name	Remarks
J0576B	Coaxial Cord, 1.0 m	N-P · 5D-2W · N-P
J0576D	Coaxial Cord, 2.0 m	N-P · 5D-2W · N-P
J0127A	Coaxial Cord, 1.0 m	BNC-P · RG-58A/U · BNC-P
J0127B	Coaxial Cord, 2.0 m	BNC-P · RG-58A/U · BNC-P
J0127C	Coaxial Cord, 0.5 m	BNC-P · RG-58A/U · BNC-P
J0322A	Coaxial Cord, 0.5 m	SMA-P · SMA-P, DC to 18 GHz, 50 Ω
J0322B	Coaxial Cord, 1.0 m	SMA-P · SMA-P, DC to 18 GHz, 50 Ω
J0322C	Coaxial Cord, 1.5 m	SMA-P · SMA-P, DC to 18 GHz, 50 Ω
J0322D	Coaxial Cord, 2.0 m	SMA-P · SMA-P, DC to 18 GHz, 50 Ω
J0004	Coaxial Adapter	N-P · SMA-J Conversion Adapter, DC to 12.4 GHz
J1261B	Ethernet Cable (Shield Type)	Straight-through, 3 m
J1261D	Ethernet Cable (Shield Type)	Cross, 3 m
J0008	GPIB Cable, 2.0 m	
J1277	IQ Output Conversion Adapter	D-Sub/BNC
B0329C	Front Cover for 1MW 4U	
B0331C	Front Panel Handle Kit	2 pcs/set
B0332	Joint Plate	4 pcs/set
B0333C	Rack Mount Kit	
B0334C	Hardtype Carrying Case	With front cover and a casters
P0021	CompactFlash 128 MB	
P0022	CompactFlash 256 MB	
P0023	CompactFlash 512 MB	

Typical (typ):
Performance not warranted. Must products meet typical performance.
Nominal:
Values not warranted. Included to facilitate application of product.
Example:
Performance not warranted. Data actually measured by randomly selected measuring instruments.

Note:

Note:

Anritsu

Specifications are subject to change without notice.

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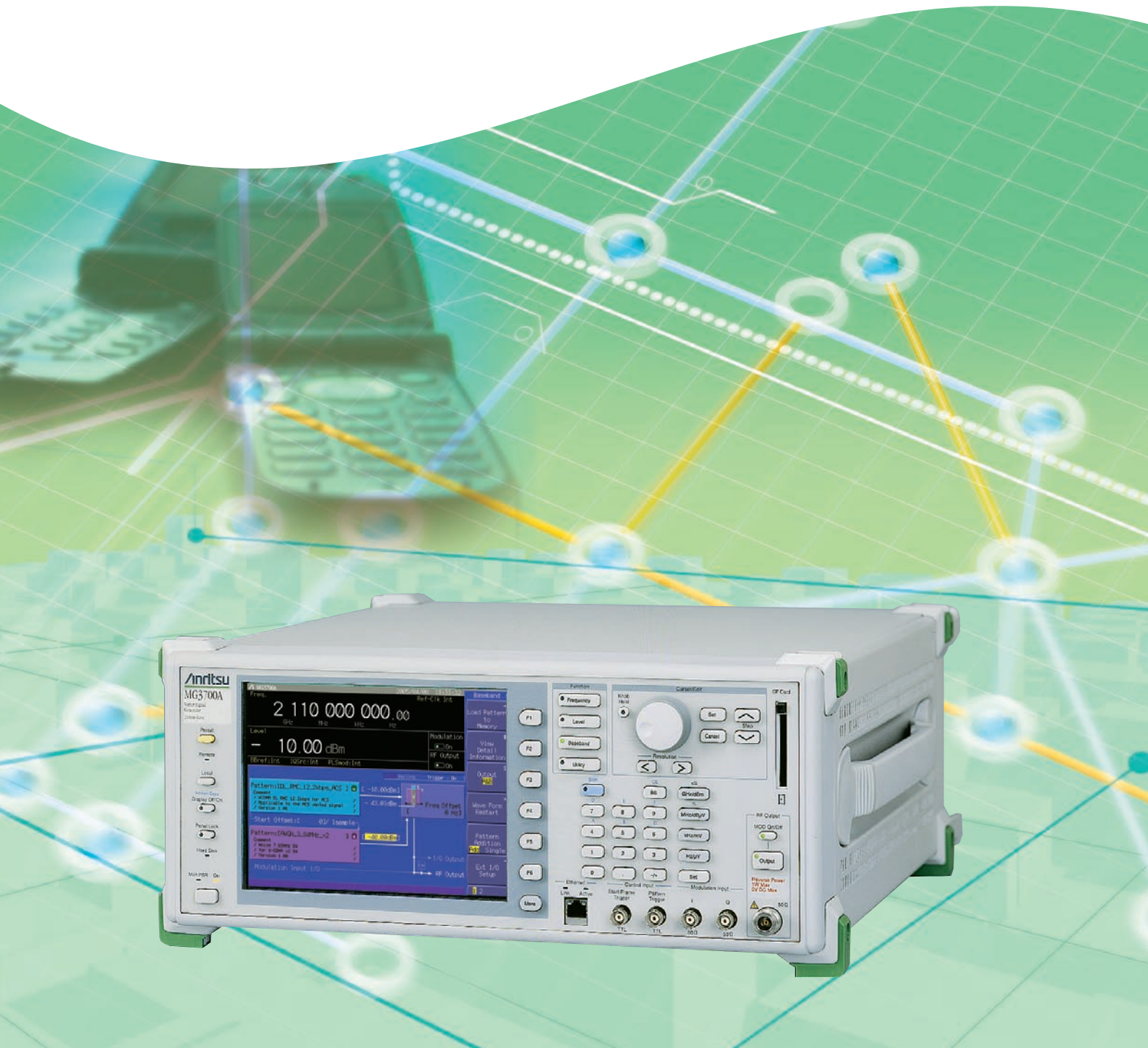
Product Brochure

MG3700A Vector Signal Generator

MX370x series software

MX3700xxA Waveform Pattern



MX370x Series Software

The MG3700A Vector Signal Generator features a 160-MHz high-speed ARB baseband generator, broadband vector modulation, and large-capacity ARB memory to support digital modulation signals used by most communication systems. Its excellent cost performance offers the ideal solution for generating signals used by the new and growing field of wireless broadband technology, as well as for mobile telecommunications systems and wireless LANs.
Because the MG3700 has a built-in ARB generator, signals are output easily just by selecting the waveform pattern matching the required communication system.

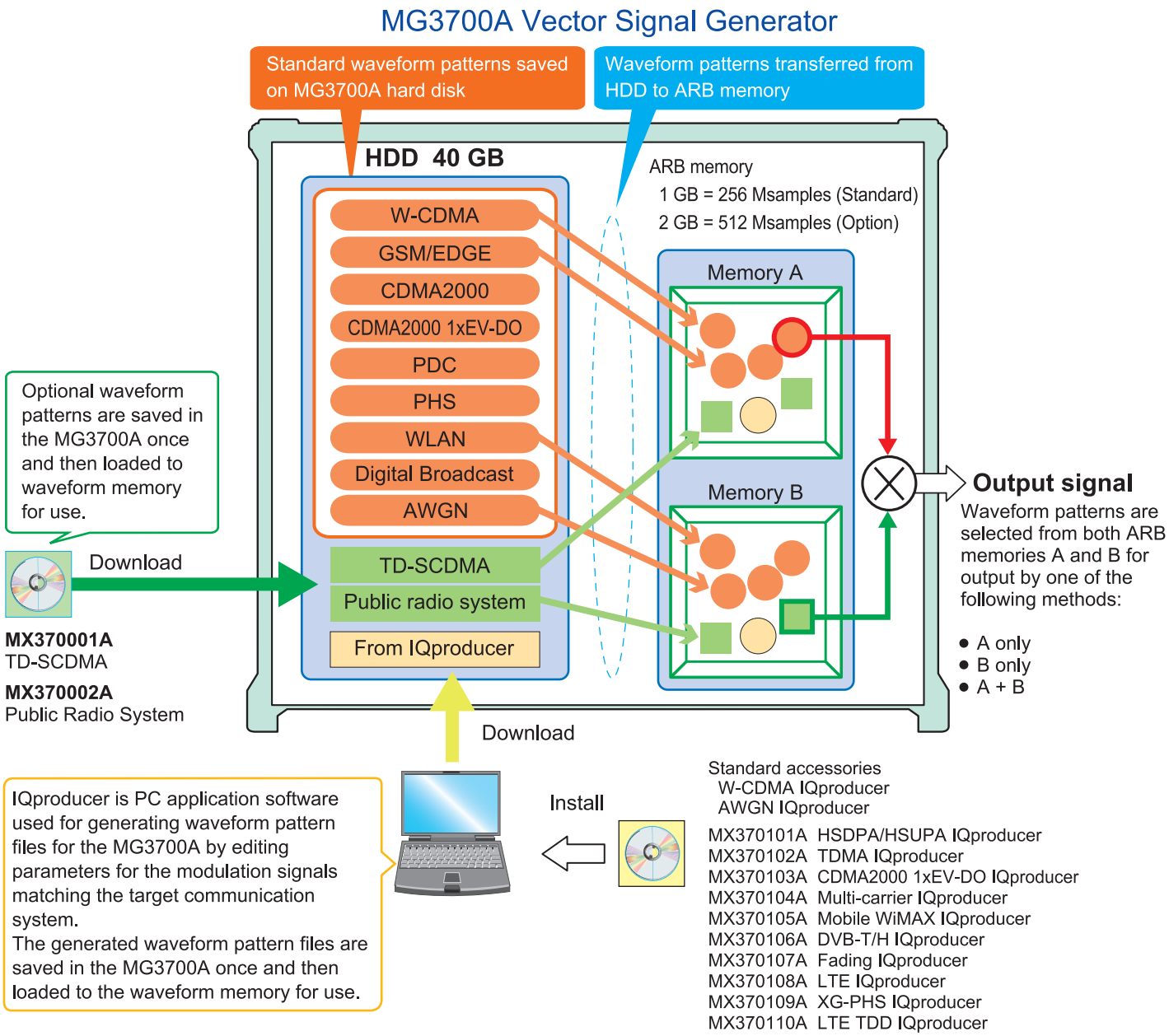
The following four categories of waveform patterns are supported:
- Standard waveform patterns
- Waveform patterns generated by optional MX3700xxA Waveform Pattern software
- Waveform patterns generated by optional MX3701xxA IQproducer software
- Waveform patterns converted from data generated by common signal-generation software

Each category contains multiple waveform pattern files each with preset parameters for each system.
These default waveform patterns are saved on the MG3700A hard disk for easy access, but other waveform patterns are supported using the IQproducer waveform generation software.
Parameters for the waveform for the target communication system are set using a GUI to a generate a waveform pattern file for the MG3700A. After the generated waveform pattern is downloaded to the MG3700A via LAN or CompactFlash (CF) card, the MG3700A outputs the signal just by choosing the waveform pattern file.
In addition, a user-generated custom IQ sample file in ASCII format created by common EDA (Electronic Design Automation) software such as MATLAB, can be converted into a custom waveform pattern file for the MG3700A.

Selection guide

Communication system		AWGN	W-CDMA	HSDPA (Test Model5)	HSDPA/HSUPA	CDMA2000 1xEV-DO	CDMA2000	GSM/EDGE	Next-generation PHS (XGP)	Advanced-PHS	PHS	PDC	ETC/DSRC	Digital Broadcast (BS/CS/CATV/ISDB-T)	Digital Broadcast (DVB-T/H)	WLAN (IEEE802.11a/b/g)	Mobile WiMAX (IEEE802.16e)	*Bluetooth*	GPS	TD-SCDMA	RCR STD-39	ARIB STD-T61/T79/T86	Multi-carrier	Fading	3GPP LTE (FDD)	3GPP LTE (TDD)
Page		4	6	6		10	12	13			14	15, 16		17		18		19	20	21	24					
Waveform pattern	Preinstalled	√	√	√		√	√	√			√	√		√		√		√	√							
	MX370001A TD-SCDMA																			√						
	MX370002A Public Radio System																				√	√				
IQproducer*	Standard accessories AWGN	√																								
	Standard accessories W-CDMA		√																							
	MX370101A HSDPA/HSUPA		√		√																					
	MX370102A TDMA									√	√	√	√								√	√				
	MX370103A CDMA2000 1xEV-DO					√																				
	MX370104A Multi-carrier	Multi-carrier IQproducer is software that generates the multi carrier signal based on waveform pattern of various telecommunications systems.																								
	MX370105A Mobile WiMAX																√									
	MX370106A DVB-T/H														√											
	MX370107A Fading	Fading IQproducer is software that generates the Fading signal based on waveform pattern of various telecommunication systems.																								
	MX370108A LTE FDD																								√	
	MX370109A XG-PHS								√																	
	MX370110A LTE TDD																									√

*: Read the MX3701xxA IQproducer series catalog.


MG3700A Vector Signal Generator
Standard waveform patterns saved on MG3700A hard disk
Waveform patterns transferred from HDD to ARB memory
HDD 40 GB
ARB memory
1 GB = 256 Msamples (Standard)
2 GB = 512 Msamples (Option)
W-CDMA
GSM/EDGE
CDMA2000
CDMA2000 1xEV-DO
PDC
PHS
WLAN
Digital Broadcast
AWGN
TD-SCDMA
Public radio system
From IQproducer
Memory A
Memory B
Optional waveform patterns are saved in the MG3700A once and then loaded to waveform memory for use.
Download
MX370001A
TD-SCDMA
MX370002A
Public Radio System
Output signal
Waveform patterns are selected from both ARB memories A and B for output by one of the following methods:
A only
B only
A + B
Download
IQproducer is PC application software used for generating waveform pattern files for the MG3700A by editing parameters for the modulation signals matching the target communication system.
The generated waveform pattern files are saved in the MG3700A once and then loaded to the waveform memory for use.
Install
Standard accessories
W-CDMA IQproducer
AWGN IQproducer
MX370101A HSDPA/HSUPA IQproducer
MX370102A TDMA IQproducer
MX370103A CDMA2000 1xEV-DO IQproducer
MX370104A Multi-carrier IQproducer
MX370105A Mobile WiMAX IQproducer
MX370106A DVB-T/H IQproducer
MX370107A Fading IQproducer
MX370108A LTE IQproducer
MX370109A XG-PHS IQproducer
MX370110A LTE TDD IQproducer

Additive White Gaussian Noise (AWGN) Waveform Patterns

Standard

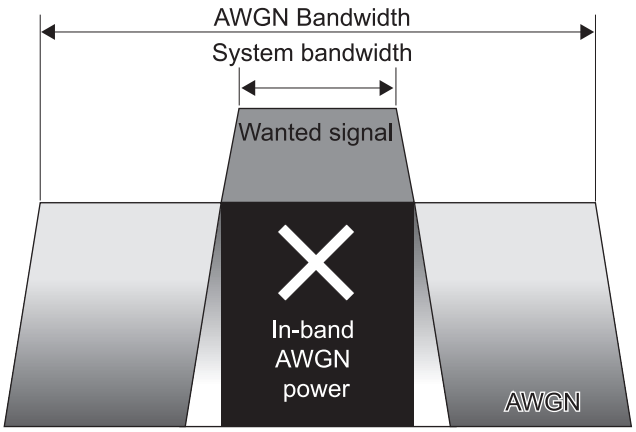
■ AWGN Waveform Patterns

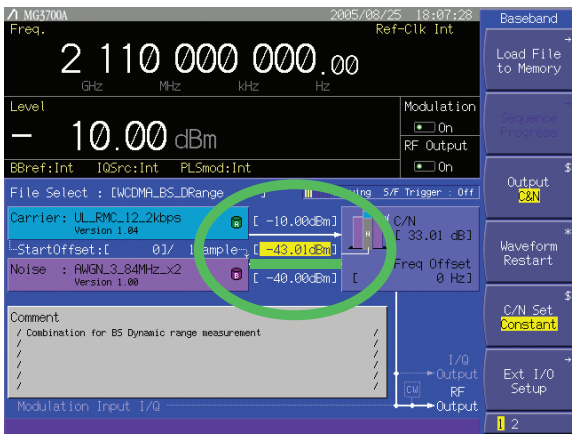
The AWGN waveform patterns listed in the table below are stored on the MG3700A internal hard disk.
Signals for evaluating the UE receiver and transmitter performance and modules, etc., are output by selecting one of these AWGN waveform patterns.

Waveform Pattern Screen

Waveform Patterns	MAX Peak/ RMS Ratio	3 dB Bandwidth (MHz)	In-band Power Conversion Ratio (dB)*	Evaluation
AWGN_3_84MHz_x2	>12 dB	7.68	3.01	Added with W-CDMA UL signal to test dynamic range
AWGN_3_84MHz_x1_5	>12 dB	5.76	1.76	Added with W-CDMA UL signal to test dynamic range
AWGN_1.23MHz_x2	>12 dB	2.46	3.01	Added with reverse signals of CDMA2000 or CDMA2000 1xEV-DO to test dynamic range
AWGN_1.23MHz_x1_5	>12 dB	3.69	1.76	Added with reverse signals of CDMA2000 or CDMA2000 1xEV-DO to test dynamic range

*: The in-band power conversion ratio is the ratio of the system bandwidth of each communication system to the total power of the MG3700A output measured with a power meter or equivalent device.



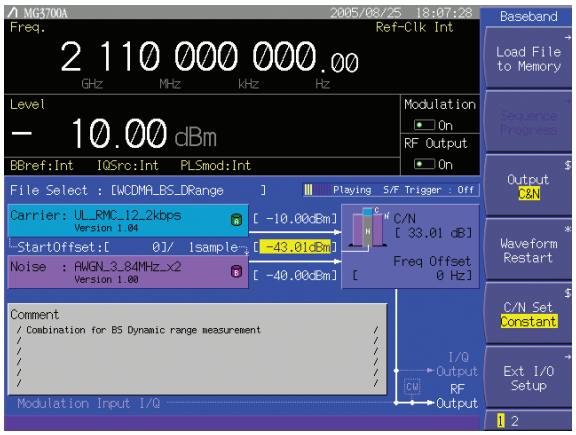


In-band AWGN Power Screen

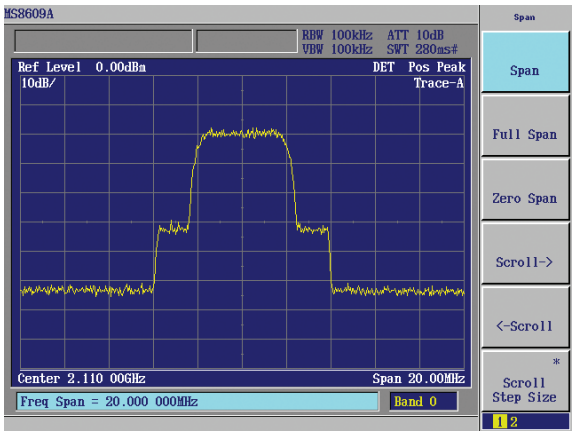
Using MG3700A Combine Function to Output Wanted Signal + Interference Signal (such as Modulation Signal + AWGN)

Because the MG3700A internal ARB memory can be partitioned into two areas, separate waveforms can be saved in each memory partition for either separate or combined output.
For example, if the Wanted Signal (W-CDMA, CDMA2000) waveform is saved in one memory and the Interference Signal (AWGN) is saved in the other, a signal combining both signals can be output (top screens) from just one MG3700A unit.

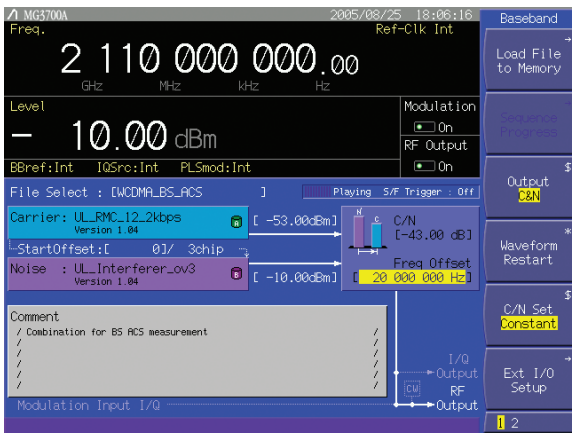
Similarly, if a modulation signal is selected as the Interference Signal, a single MG3700A can output a signal combining the wanted signal and modulation signal (bottom screens).
Furthermore, digital signal processing of the S/N adjustments and computations supports a superior level ratio.



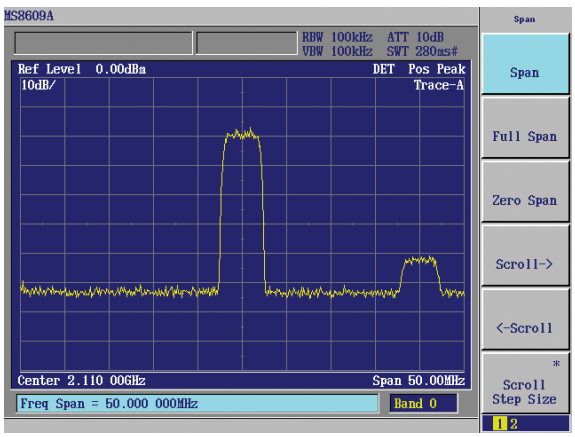
Wanted Signal + AWGN Screen



Wanted Signal + AWGN Output Waveform



Wanted Signal + Interference Signal Screen



Wanted Signal + Interference Signal Screen Output Waveform

W-CDMA Waveform Patterns

Standard

■ W-CDMA Waveform Patterns

The following W-CDMA waveform patterns are installed on the internal hard disk when MG3700A Vector Signal Generator is installed. Details for each pattern file is given on the next page.

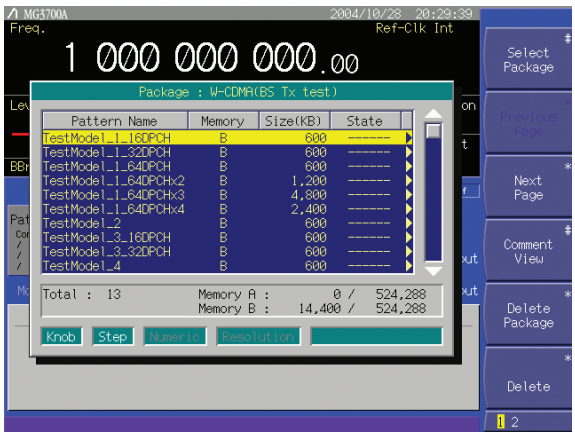
- For Evaluating Base Station Transmitter Devices (TS 25.141 Test Model 1 to 4)
  - TestModel_1_16DPCH
  - TestModel_1_32DPCH
  - TestModel_1_64DPCH
  - TestModel_1_64x2_10M
  - TestModel_1_64x2_15M
  - TestModel_2
  - TestModel_3_16DPCH
  - TestModel_3_32DPCH
  - TestModel_4
  - TestModel_5_2HSPDSCH
  - TestModel_5_4HSPDSCH
  - TestModel_5_8HSPDSCH
  - TestModel_6_8HSPDSCH
  - TestModel_1_64DPCHx2
  - TestModel_1_64DPCHx3
  - TestModel_1_64DPCHx4
  - DL_CPICH

- For Testing BS Receiver Performance (TS 25.101/ 25.104 UL RMC 12.2 to 384 kbps)
  - UL_RMC_12_2kbps
  - UL_RMC_12_2kbps_ACS
  - UL_RMC_64kbps
  - UL_RMC_144kbps
  - UL_RMC_384kbps
  - UL_AMR_TFCS1
  - UL_AMR_TFCS2
  - UL_AMR_TFCS3
  - UL_ISDN
  - UL_64kbps_Packet
  - UL_Interfere
  - UL_Interfere_ov3

- For Evaluating UE Transmitter Devices (TS 25.101 A2.1)
  - UL_RMC_12_2kbps_TX

- For Testing UE Receiver Performance (TS 25.101 DL RMC 12.2 to 384 kbps)
  - DL_RMC_12_2kbps_RX
  - DL_RMC_12_2kbps
  - DL_RMC_12_2kbps_MIL
  - DL_RMC_12_2kbps_ACS
  - DL_RMC_64kbps
  - DL_RMC_144kbps
  - DL_RMC_384kbps
  - DL_AMR_TFCS1
  - DL_AMR_TFCS2
  - DL_AMR_TFCS3
  - DL_ISDN
  - DL_384kbps_Packet
  - DL_Interfere
  - DL_Interfere_ov3
  - P_CCPCH

Uplink and downlink W-CDMA modulation signals conforming to the 3GPP (FDD) standards can be output simply by selecting the waveform from the patterns on the MG3700A internal hard disk without setting any complex 3GPP-compliant parameters.



Selecting Waveform Pattern

• W-CDMA Waveform Patterns List

Waveform Patterns	UL/DL	Channel	3GPP (Release1999)	Evaluation
UL_RMC_12_2kbps	UL	DPCCH, DPDCH	TS25.141 A.2	BS RX Test
UL_RMC_12_2kbps_ACS*1		DPCCH, DPDCH		
UL_RMC_64kbps*1		DPCCH, DPDCH	TS25.141 A.3	
UL_RMC_144kbps*1		DPCCH, DPDCH	TS25.141 A.4	
UL_RMC_384kbps*1		DPCCH, DPDCH	TS25.141 A.5	
UL_AMR_TFCS1		DPCCH, DPDCH	TS25.944 4.1.2	
UL_AMR_TFCS2		DPCCH, DPDCH		
UL_AMR_TFCS3		DPCCH, DPDCH		
UL_ISDN*1		DPCCH, DPDCH		
UL_64kbps_Packet		DPCCH, DPDCH		
UL_Interfere		DPCCH, DPDCH	TS25.141 I	
UL_Interfere_ov3		DPCCH, DPDCH		
UL_RMC_12_2kbps_TX		DPCCH, DPDCH	TS25.101 A.2.1	UE TX Device Test
P_CCPCH*2	DL	P-CCPCH	TS25.944 4.1.1*3	UE RX Test
DL_RMC_12_2kbps_RX*2		P-CPICH, SCH, PICH, DPCH	TS25.101 A.3.1 TS25.101 C.3.1	
DL_RMC_12_2kbps_ACS*1		P-CPICH, SCH, PICH, DPCH, P-CCPCH		
DL_RMC_12_2kbps_MIL*2		P-CPICH, SCH, PICH, DPCH, OCNS		
DL_RMC_12_2kbps*2		P-CPICH, SCH, PICH, DPCH, OCNS	TS25.101 A.3.1/C3.2	
DL_RMC_64kbps*2		P-CPICH, SCH, PICH, DPCH, OCNS	TS25.101 A.3.2/C3.2	
DL_RMC_144kbps*2		P-CPICH, SCH, PICH, DPCH, OCNS	TS25.101 A.3.3/C3.2	
DL_RMC_384kbps*2		P-CPICH, SCH, PICH, DPCH, OCNS	TS25.101 A.3.4/C3.2	
DL_AMR_TFCS1*2		P-CPICH, SCH, PICH, DPCH, OCNS	TS25.944 4.1.1.3 TS25.101 C.3.2	
DL_AMR_TFCS2*2		P-CPICH, SCH, PICH, DPCH, OCNS		
DL_AMR_TFCS3*2		P-CPICH, SCH, PICH, DPCH, OCNS		
DL_ISDN*2		P-CPICH, SCH, PICH, DPCH, OCNS		
DL_384kbps_Packet*2		P-CPICH, SCH, PICH, DPCH, OCNS		
DL_Interfere		P-CPICH, P-CCPCH, SCH, PICH, OCNS	TS25.101 C.4	
DL_Interfere_ov3*6		P-CPICH, P-CCPCH, SCH, PICH, OCNS		
DL_CPICH		P-CPICH	–	BS TX Device Test
TestModel_1_16DPCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 16DPCH	TS25.141 6.1.1	
TestModel_1_32DPCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 32DPCH		
TestModel_1_64DPCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 64DPCH		
TestModel_1_64DPCHx2*4		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 64DPCH		
TestModel_1_64DPCHx3*4		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 64DPCH		
TestModel_1_64DPCHx4*4		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 64DPCH		
TestModel_1_64x2_10M*4, *5		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 64DPCH		
TestModel_1_64x2_15M*4, *5		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 64DPCH		
TestModel_2		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 3DPCH		
TestModel_3_16DPCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 16DPCH		
TestModel_3_32DPCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 32DPCH		
TestModel_4		P-CCPCH, SCH		
TestModel_5_2HSPDSCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 6DPCH, HS-SCCH, 2HS-PDSCH		
TestModel_5_4HSPDSCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 14DPCH, HS-SCCH, 4HS-PDSCH		
TestModel_5_8HSPDSCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 30DPCH, HS-SCCH, 8HS-PDSCH		
TestModel_6_8HSPDSCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 30DPCH, HS-SCCH, 8HS-PDSCH	TS25.141 8.2.0	

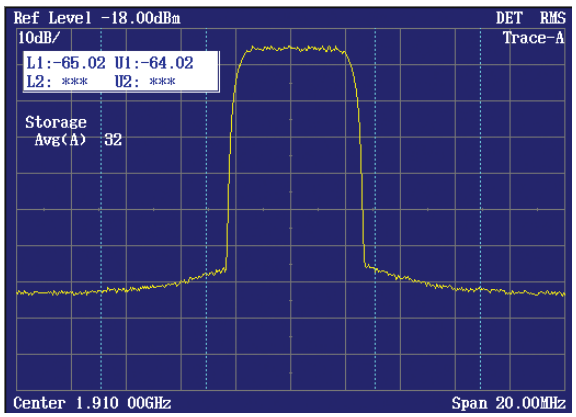
∗1: The UL_RMC_12_2kbps_ACS, UL_RMC_64kbps, UL_RMC_144kbps, UL_RMC_384kbps, UL_ISDN and DL_RMC_12_2kbps_ACS patterns can be added to the standard AWGN waveform pattern only when the optional ARB Memory Expansion 512 Msamples (Option 021/121) is installed.
∗2: Since waveform patterns (excluding DL_RMC12_2kbps_ACS) for the UE RX test do not include P-CCPCH, they must be used in combination with a P-CCPCH waveform pattern.
∗3: A 12-bit SFN is added to the head of each BCH Transport block.
∗4: x2, x3, and x4 indicate multi-carrier 2, 3, and 4, respectively.
∗5: 10 M and 15 M indicate the multi-carrier interfrequency gap.
∗6: Select a waveform pattern generated using the W-CDMA waveform pattern generation function of the MG3700A IQproducer or by the MX370101A HSDPA IQproducer (only the waveform patterns that can be configured using only one memory) for memory A on the MG3700A while selecting this pattern for memory B to output a signal that is generated by adding the desired signal and the interference signal using baseband.

W-CDMA Waveform Patterns

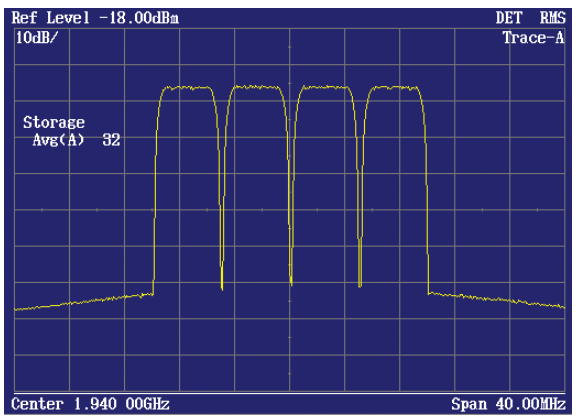
Standard

Adjacent Channel Leakage Power Ratio (ACPR)

The ACPR of a Vector Signal Generator is an important function for testing device distortion and receiver interference.

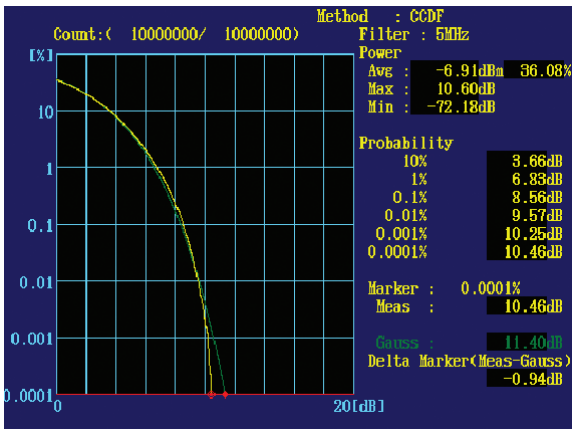


W-CDMA ACPR (Test Model 1, 64 DPCH, 1 Carrier)
Waveform Pattern [Test_Model_1_64DPCH]

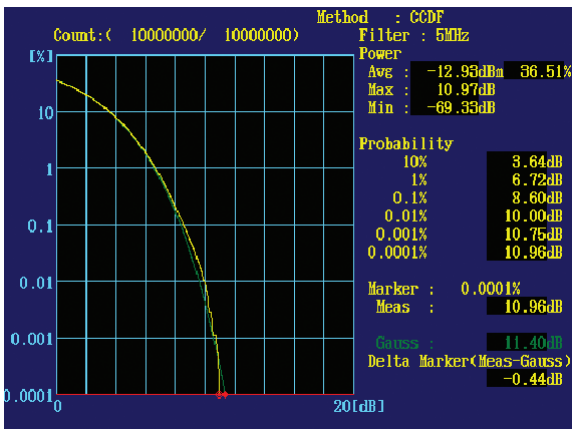


W-CDMA ACPR (Test Model 1, 64 DPCH, 4 Carrier)
Waveform Pattern [Test_Model_1_64DPCHx4]

Complementary Cumulative Distribution Function (CCDF)



CCDF (Test Model 1, 64 DPCH, 1 Carrier)
Waveform Pattern [Test_Model_1_64DPCH]

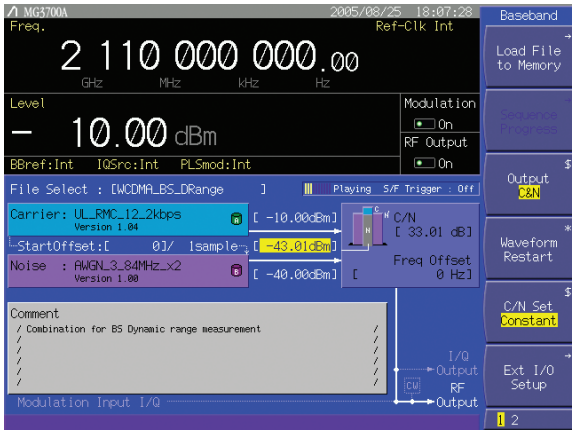


CCDF (Test Model 1, 64 DPCH, 4 Carrier)
Waveform Pattern [Test_Model_1_64DPCHx4]

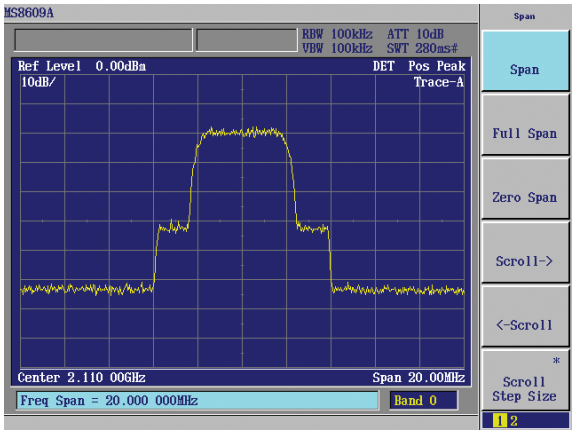
■ AWGN Supports Dynamic Range Testing

The 3GPP specifications for testing receiver dynamic range require a AWGN + W-CDMA modulation signal.
Either of the AWGN_3_84MHz_x2 or AWGN_3_84MHz_x1_5 waveform patterns stored on the MG3700A internal hard disk can be used for the AWGN signal.

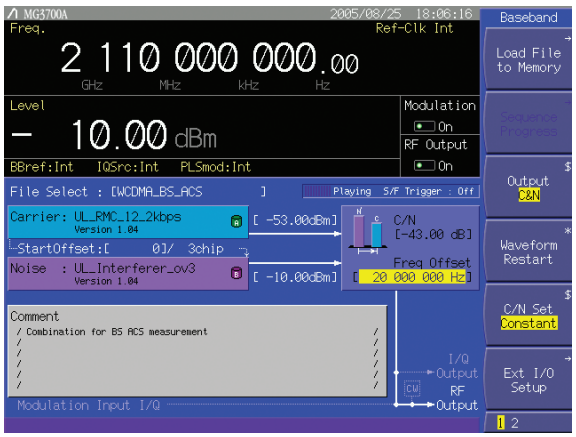
Since one MG3700A unit can output a combined W-CDMA uplink modulation signal + AWGN signal, it is useful for simple dynamic-range tests of base station receivers.



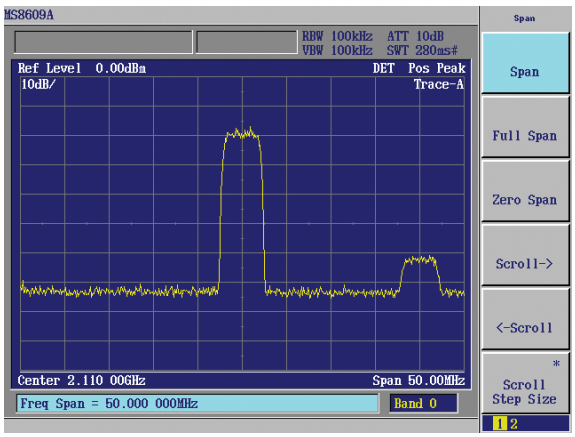
Wanted Signal + AWGN Screen



Wanted Signal + AWGN Output Waveform



Wanted Signal + Interference Signal Screen



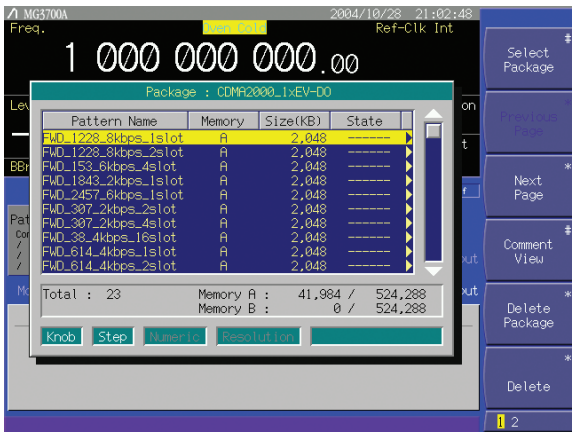
Wanted Signal + Interference Signal Output Waveform

CDMA2000 1xEV-DO Waveform Patterns

Standard

■ CDMA2000 1xEV-DO Waveform Patterns

The CDMA2000 1xEV-DO waveform patterns listed opposite are stored on the MG3700A internal hard disk.
The 3GPP2 signals specified for testing receivers and transmitters of CDMA2000 1xEV-DO access networks (base station) and access terminal (AT) are output by selecting one of the 13 forward and 10 reverse data rate patterns.
When multi-carrier signals, mixed idle and active signals and/or multi-user signals are required, the optional MX370103A CDMA2000 1xEV-DO IQproducer application, software can be used to set parameters and generate waveform patterns.



Selecting Waveform Pattern

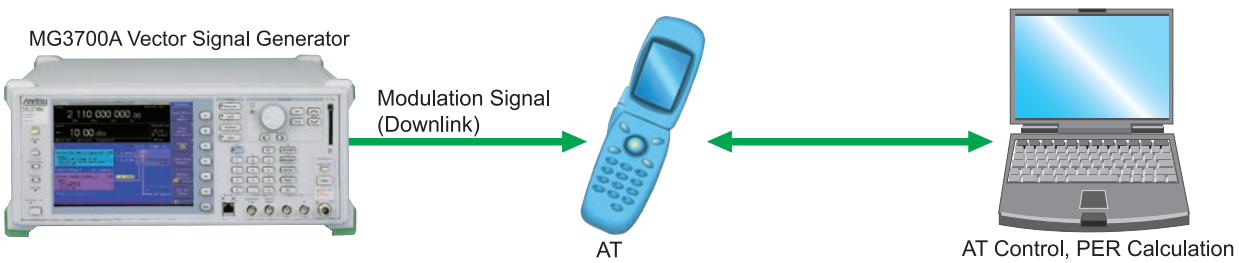
- Access Terminal (AT) Receiver Test
  CDMA2000 1xEV-DO forward
  Baseband filter: IS-95 SPEC +EQ
  Data: PN15 fix* (excluding FWD-Idle)
  - FWD_38_4kbps_16slot
  - FWD_76_8kbps_8slot
  - FWD_153_6kbps_4slot
  - FWD_307_2kbps_2slot
  - FWD_614_4kbps_1slot
  - FWD_307_2kbps_4slot
  - FWD_614_4kbps_2slot
  - FWD_1228_8kbps_1slot
  - FWD_921_6kbps_2slot
  - FWD_1843_2kbps_1slot
  - FWD_1228_8kbps_2slot
  - FWD_2457_6kbps_1slot
  - FWD_Idle

- Access Network (AN) Receiver Test
  CDMA2000 1xEV-DO Reverse
  Baseband filter: IS-95 SPEC
  Data: PN9 fix*
  - RVS_9_6kbps_RX
  - RVS_19_2kbps_RX
  - RVS_38_4kbps_RX
  - RVS_76_8kbps_RX
  - RVS_153_6kbps_RX
  - RVS_9_6kbps_TX
  - RVS_19_2kbps_TX
  - RVS_38_4kbps_TX
  - RVS_76_8kbps_RT
  - RVS_153_6kbps_RT

*: This displays the delimited PN sequence for each packet. Therefore, the PN sequence is discontinuous between the end data of one packet and the header data of the next packet.

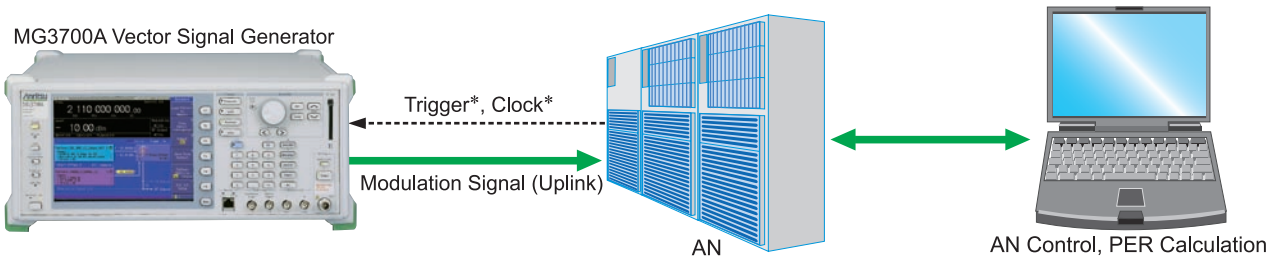
- Access Terminal (AT) Receiver Test

3GPP2 C.S0033 standard receiver tests (PER: Packet Error Rate) can be performed by selecting a forward signal pattern for testing the AT. Since protocols are not supported for the access network simulator and all transmission channels are traffic, while all other channels (Sync, etc.) are unsupported., an external controller (PC) must be used to control the AT and calculate the PER.



• Access Network (AN) Receiver Test

GPP2 C.S0032 standard receiver tests (PER: Packet Error Rate) can be performed by selecting a reverse signal pattern required for testing the AN. Since access terminal simulator protocols are unsupported, an external controller must be used to control the AN and calculate PER.

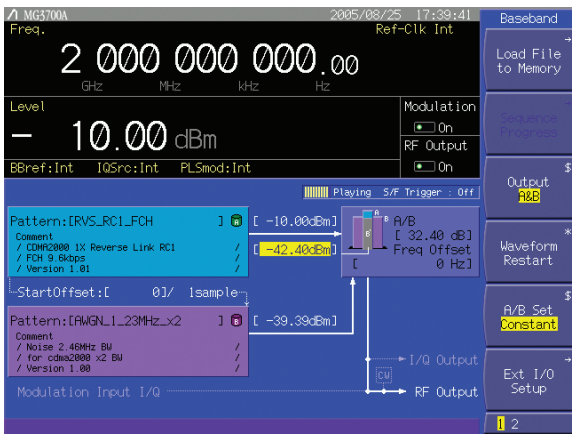


∗ Trigger: Timing for synchronizing start of frame (frame trigger)
∗ Clock: Clock for synchronizing chip rate of 1.2288 Mcps (11 x 1.2288 MHz or 5 MHz/10 MHz)

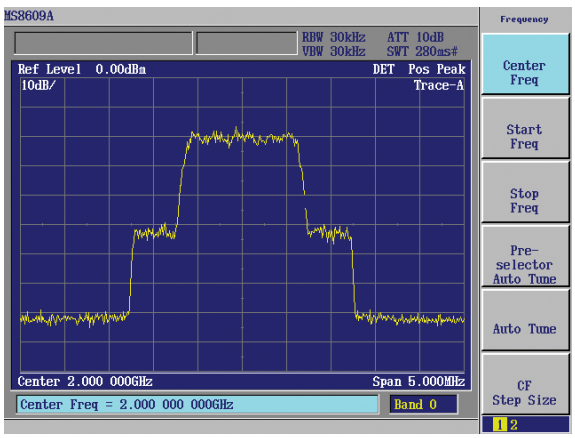
■ AWGN Supports Dynamic Range Testing

The 3GPP2 specifications require a 1xEV-DO modulation signal + AWGN for performing the receiver dynamic range test.
Either of the AWGN_1.23MHz_x2 or AWGN_1.23MHz_x1_5 waveform patterns stored on the MG3700A internal hard disk can be used for the AWGN signal.

Since one MG3700A unit can output a combined CDMA2000 uplink modulation signal + AWGN signal, it is useful for simple dynamic-range tests of an AN receiver.



Wanted Signal + AWGN Screen



Wanted Signal + AWGN Output Waveform

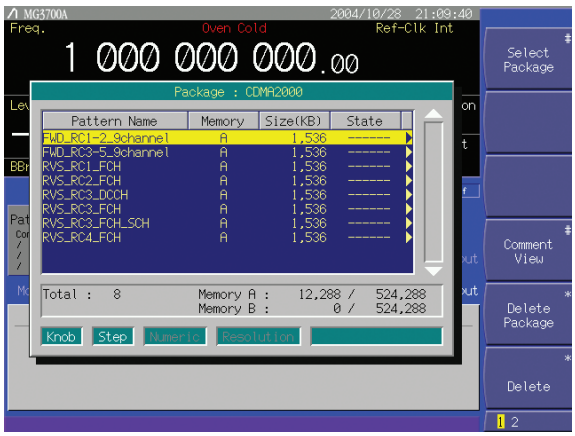
CDMA2000 Waveform Patterns

Standard

■ CDMA2000 Waveform Patterns

The CDMA2000 waveform patterns listed in the table below are stored on the MG3700A internal hard disk.
The 3GPP2 C.S0002-0-2-specified CDMA2000 modulation signals are output by selecting one of these CDMA2000 waveform patterns.
Reverse channel signals are output by channel coding (convolutional coding, etc.) 4-frame length PN9 fix*1 data, which is useful for measuring the Frame Error Rate (FER)*2 of base stations and evaluating devices.

*1: Since the data length is not an integer multiple of the PN sequence length (511 bits for PN9), the PN sequence becomes discontinuous at the end.
*2: This is the case when the timing signal and 1.2288 Mcps x 11 clock signal (or 5 or 10 MHz reference clock) can be input from the test target base station to the MG3700A in order to synchronize the frame start point and chip clock.



Selecting Waveform Pattern

Waveform Patterns	System	Frame Coding	Symbol Data
RVS_RC1_FCH	CDMA2000 1XRTT RC1 Reverse	Coded	FCH 9.6 kbps
RVS_RC2_FCH	CDMA2000 1XRTT RC2 Reverse	Coded	FCH 14.4 kbps
RVS_RC3_FCH	CDMA2000 1XRTT RC3 Reverse	Coded	PICH, FCH 9.6 kbps
RVS_RC3_FCH_SCH	CDMA2000 1XRTT RC3 Reverse	Coded	PICH, FCH 9.6 kbps, SCH 9.6 kbps
RVS_RC3_DCCH	CDMA2000 1XRTT RC3 Reverse	Coded	PICH, DCCH 9.6 kbps
RVS_RC4_FCH	CDMA2000 1XRTT RC4 Reverse	Coded	PICH, FCH 14.4 kbps
FWD_RC1-2_9channel	CDMA2000 1XRTT RC1, RC2 Forward	Spreading only	PICH, SyncCH, PagingCH, FCH 19.2 ksps x 6
FWD_RC3-5_9channel	CDMA2000 1XRTT RC3, RC4, RC5 Forward	Spreading only	PICH, SyncCH, PagingCH, FCH 38.4 ksps x 6

Waveform Patterns		Walsh Code	Code Power	Data Rate	Data
RVS_RC1_FCH	R-FCH			9.6 kbps	PN9fix*
RVS_RC2_FCH	R-FCH			14.4 kbps	PN9fix*
RVS_RC3_FCH	R-PICH	0	–5.278 dB	N/A	All"0"
	R-FCH	4	–1.528 dB	9.6 kbps	PN9fix*
RVS_RC3_FCH_SCH	R-PICH	0	–7.5912 dB	N/A	All"0"
	R-FCH	4	–3.8412 dB	9.6 kbps	PN9fix*
	R-SCH	2	–3.8412 dB	9.6 kbps	PN9fix*
RVS_RC3_DCCH	R-PICH	0	–5.278 dB	N/A	All"0"
	R-DCCH	8	–1.528 dB	9.6 kbps	PN9fix*
RVS_RC4_FCH	R-PICH	0	–5.278 dB	N/A	All"0"
	R-FCH	4	–1.528 dB	14.4 kbps	PN9fix*
Waveform Patterns		**Walsh Code**	**Code Power**	**Symbol Rate**	**Symbol Data**
FWD_RC1-2_9channel	F-PICH	0	–7.0 dB	N/A	All"0"
	F-SyncCH	32	–13.3 dB	4.8 kbps	PN9fix*
	PagingCH	1	–7.3 dB	19.2 kbps	PN9fix*
	F-FCH x6	8–13	–10.3 dB	19.2 kbps	PN9fix*
FWD_RC3-5_9channel	F-PICH	0	–7.0 dB	N/A	All"0"
	F-SyncCH	32	–13.3 dB	4.8 kbps	PN9fix*
	PagingCH	1	–7.3 dB	19.2 kbps	PN9fix*
	F-FCH x6	8–13	–10.3 dB	38.4 kbps	PN9fix*

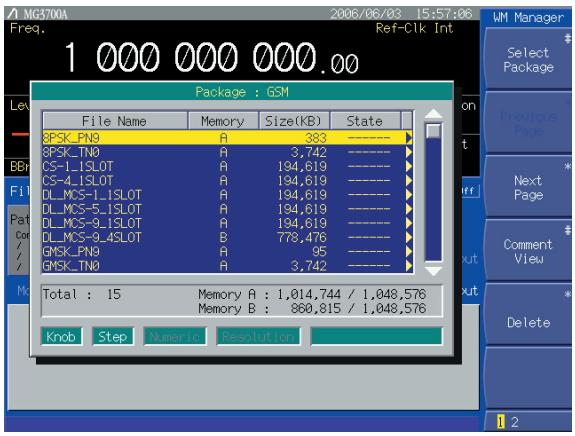
R-PICH (Reverse Pilot Channel)
R-FCH (Reverse Fundamental Channel)
R-SCH (Reverse Supplemental Channel)
R-DCCH (Reverse Dedicated Control Channel)
F-PICH (Forward Pilot Channel)
F-SyncCH (Forward Sync Channel)
PagingCH (Paging Channel)
F-FCH (Forward Fundamental Channel)

GSM/EDGE Waveform Patterns

Standard

■ GSM/EDGE Waveform Patterns

The GSM/EDGE waveform patterns listed in the table below are installed on the internal hard disk when MG3700A Vector Signal Generator is installed. Details for the pattern files are given below. Signals for testing receivers and for evaluating devices in a GSM/EDGE system are output by selecting one of these GSM/EDGE waveform patterns.



Selecting Waveform Pattern

• GMSK_PN9, 8PSK_PN9
PN9 data which doesn't have slot format is inserted.

• GMSK_TN0, 8PSK_TN0
PN9 data is inserted into the entire area of the slots, except the guard. The PN9 data in each slot is continuous.

• NB_GMSK, NB_ALL_GMSK, NB_8PSK, NB_ALL_8PSK
PN9 data is inserted into the normal burst encrypted bit area. The PN9 data in the slots is continuous.

• TCH_FS
Supports Speech channel at full rate (TCH/FS) specified in Section 3.1 of 3GPP TS05.03

• CS-1_1 (4)_SLOT (_4SLOT)
Supports packet data block type 1 (CS-4) and 4 (CS-1) specified in Section 5.1 of 3GPP TS05.03

• DL (UL)_MCS-1 (5, 9)_1SLOT (_4SLOT)
Supports packet data block types 5 (MCS-1), 9 (MCS-5), and 13 (MCS-9) specified in Section 5.1 of 3GPP TS05.03

Waveform Patterns	Uplink/Downlink	Data	Output Slot	Communications
GMSK_PN9	Uplink/Downlink	PN9*1	–	–
8PSK_PN9	Uplink/Downlink		–	–
GMSK_TN0	Uplink/Downlink	PN9*2	TN0	–
8PSK_TN0	Uplink/Downlink		TN0	–
NB_GMSK	Uplink/Downlink	PN9*3	TN0	GSM
NB_ALL_GMSK	Uplink/Downlink		All Slots	
NB_8PSK	Uplink/Downlink		TN0	
NB_ALL_8PSK	Uplink/Downlink		All Slots	
TCH_FS	Uplink/Downlink	PN9*4	TN0	
CS-1_1SLOT	Uplink/Downlink		TN0	
CS-4_1SLOT	Uplink/Downlink		TN0	
DL_MCS-1_1SLOT	Downlink		TN0	GPRS
UL_MCS-1_1SLOT	Uplink		TN0	
DL_MCS-5_1SLOT	Downlink		TN0	EDGE
UL_MCS-5_1SLOT	Uplink		TN0	
DL_MCS-9_1SLOT	Downlink		TN0	
UL_MCS-9_1SLOT	Uplink		TN0	
DL_MCS-9_4SLOT	Downlink		TN0, 1, 2, 3	
UL_MCS-9_4SLOT	Uplink		TN0, 1, 2, 3	

∗1: PN9 data is inserted into the entire area that does not have the slot format.
∗2: PN9 data is inserted into the entire area of the slots, except the guard.
∗3: PN9 data is inserted into the normal burst encrypted bit area.
∗4: The bit string channel-coded for PN9 data is inserted into the normal burst encrypted bit area.

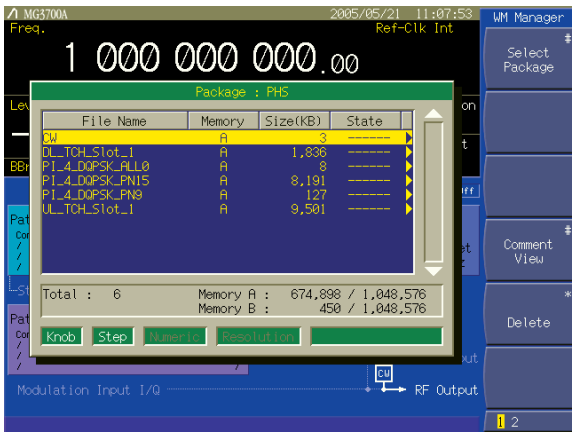
PHS Waveform Patterns

Standard

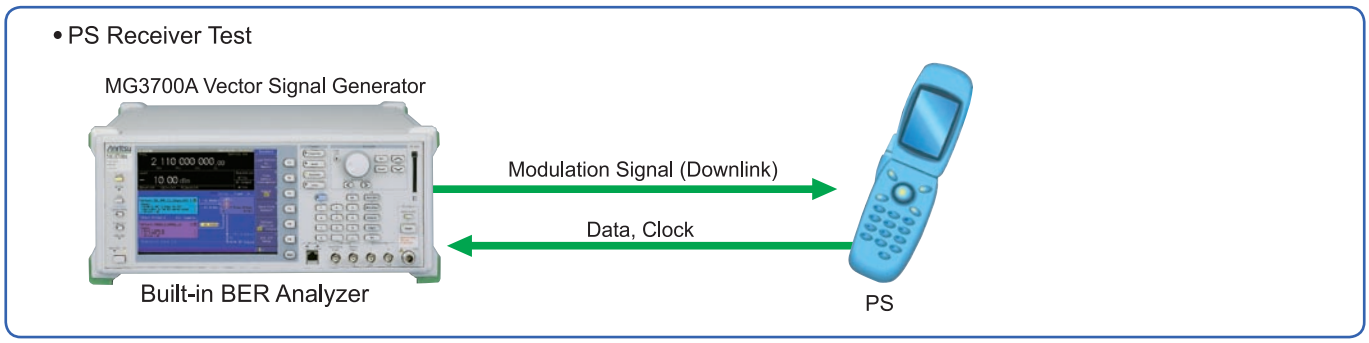
■ PHS Waveform Patterns

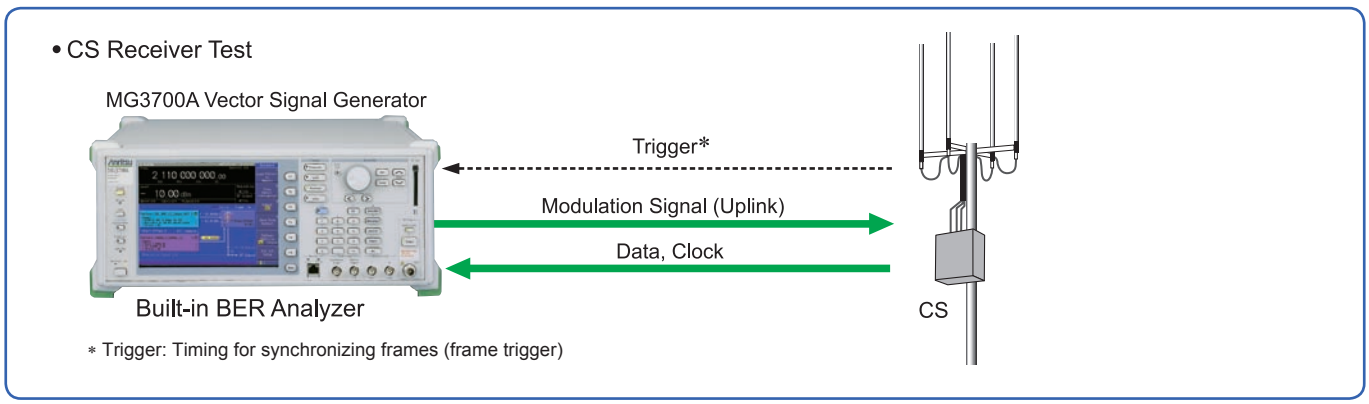
The PHS waveform patterns listed in the table below are stored on the MG3700A internal hard disk.
The RCR STD-28-specified signals for testing CS (base station) and PS (mobile station) receivers are output by selecting one of these PHS waveform patterns without setting any complex RCR STD-28 parameters.
When a signal with different parameters is required, the optional MX370102A TDMA IQproducer can be used to set parameters and generate waveforms.

Waveform Patterns	Uplink/Downlink	Scramble	Output Slot
PI_4_DQPSK_PN9	–	OFF	No frame
PI_4_DQPSK_PN15	–	OFF	No frame
PI_4_DQPSK_ALL0	–	OFF	No frame
DL_TCH_Slot_1	Downlink	OFF	Slot 1: TCH Slot 2 to 4: off
UL_TCH_Slot_1	Uplink	OFF	Slot 1: TCH Slot 2 to 4: off
CW	–	–	–



Selecting Waveform Pattern



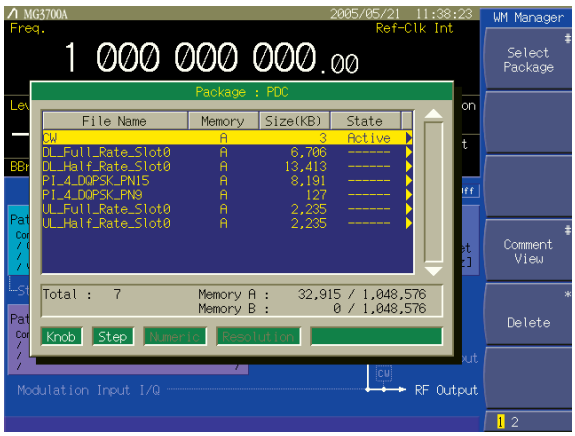


PDC Waveform Patterns

Standard

■ PDC Waveform Patterns

Waveform patterns for the Wanted Signals and Interference Signals required to execute the ARIB STD-27-specified transmission and reception tests are stored on the MG3700A internal hard disk. and can be output without requiring options (but check the parameters on the next page first).
Waveform patterns to output uplink/downlink Slot 0 data only and unframed waveform pattern for interference signals are provided for full rate and half rate.
When a signal with different parameters is required, the optional MX370102A TDMA IQproducer can be used to set parameters and generate waveforms.



Selecting Waveform Pattern

Waveform Patterns	Uplink/Downlink	Half Rate/Full Rate	Output Slot	Evaluation
PI_4_DQPSK_PN9	–	–	No frame	TX Device Test
PI_4_DQPSK_PN15	–	–	No frame	Interfering Signal
DL_Full_Rate_Slot0	Downlink	Full rate	Slot 0 only	Wanted Signal for Receiver Test
DL_Half_Rate_Slot0	Downlink	Half rate	Slot 0 only	
UL_Full_Rate_Slot0	Uplink	Full rate	Slot 0 only	
UL_Half_Rate_Slot0	Uplink	Half rate	Slot 0 only	
CW	–	–	–	Interfering Signal

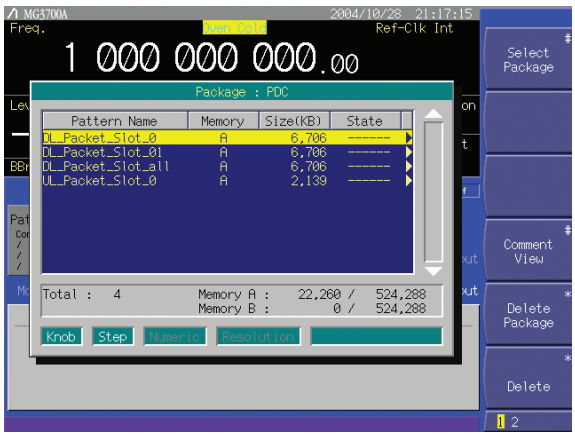
PDC Packet Waveform Patterns

Standard

■ PDC Packet Waveform Patterns

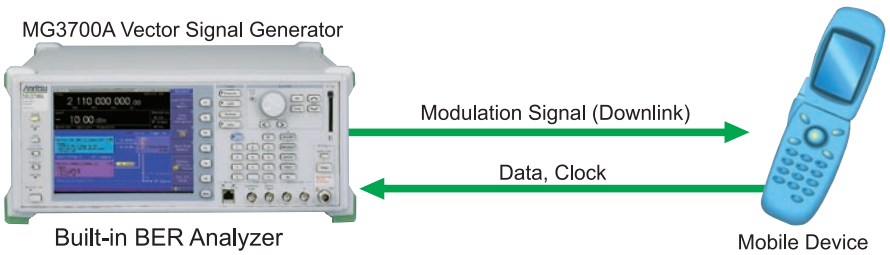
The four waveform patterns listed in the table below are stored on the MG3700A internal hard disk.
The RCR STD-27-specified signals for testing base station and mobile station receivers for UPCH communications can be output by selecting one of these waveform patterns without setting any complex RCR STD-27 parameters.
In addition, the Downlink3 data rate UPCH pattern and Uplink1 UPCH pattern can be switched.
When a signal with different parameters is required, the optional MX370102A TDMA IQproducer can be used to set parameters and generate waveforms.

Waveform Patterns	Uplink/Downlink	Output Slot
DL_Packet_Slot_0	Downlink	Slot 0=UPCH Slot 1=IDLE (all "1") Slot 2=IDLE (all "1")
DL_Packet_Slot_01	Downlink	Slot 0=UPCH Slot 1=UPCH Slot 2=IDLE (all "1")
DL_Packet_Slot_all	Downlink	Slot 0=UPCH Slot 1=UPCH Slot 2=UPCH
UL_Packet_Slot_0	Uplink	Slot 0=UPCH Slot 1=Transmit off Slot 2=Transmit off

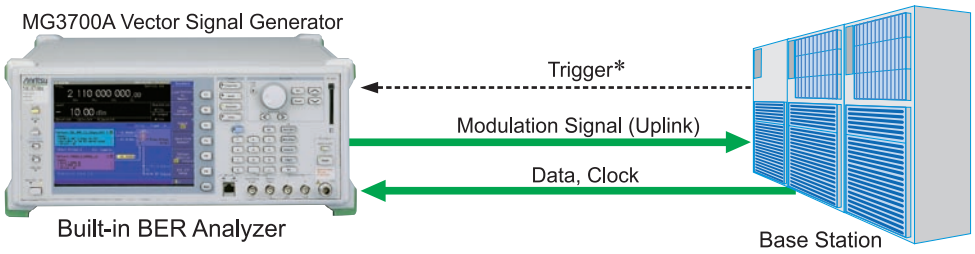


Selecting Waveform Pattern

• Mobile Station Test



• Base Station Test



* Trigger: Timing for synchronizing sub frames (frame trigger)

Digital Broadcast Waveform Patterns

Standard

■ Digital Broadcast Waveform Patterns

The BS/CS/CATV/ISDB-T waveform patterns listed in the table below are stored on the MG3700A internal hard disk and signals for testing devices are output by selecting one of these waveform patterns.
There is also a pattern for evaluating ISDB-T video and audio as well as for simple BER measurements.

Waveform Patterns	Outline		Parameter
BS_1ch	Physical layer waveform pattern of digital BS broadcast For device evaluation	1channel PN23fix*1 Modulation only	Roll-off factor: 0.35 Nyquist Bandwidth: 28.86 MHz Modulation: QPSK
CS_1ch	Physical layer waveform pattern of digital CS broadcast For device evaluation		Roll-off factor: 0.35 Nyquist Bandwidth: 21.096 MHz Modulation: QPSK
CATV_AnnexC_1ch	Physical layer waveform pattern for CATV (ITU-T J83 Annex C) For device evaluation		Roll-off factor: 0.13 Nyquist Bandwidth: 5.274 MHz Modulation: 64QAM
ISDBT_1layer_1ch	Physical layer waveform pattern for ISDB-T For device evaluation	1 channel PN23fix*1 Pilot Signal With TMCC	Mode: 3, GI: 1/8 A-Layer: 13seg, 64QAM
ISDBT_2layer_1ch			Mode: 3, GI: 1/8 A-Layer: 1seg, QPSK B-Layer: 12seg, 64QAM
ISDBT_2layer_Movie	Waveform pattern for ISDB-T partial reception For evaluating video and audio data of terminals 40-frame waveform length	1 channel For video and audio	Mode: 3, GI: 1/8 A-Layer: 1seg, QPSK, CR=2/3, TI=2 B-Layer: 12seg, 64QAM, CR=7/8, TI=2
ISDBT_2layer_Movie2			Mode: 3, GI: 1/8 A-Layer: 1seg, QPSK, CR=2/3, TI=4 B-Layer: 12seg, 64QAM, CR=3/4, TI=2
ISDBT_2layer_Coded	Waveform pattern for ISDB-T partial reception For simple BER measurement. 4-frame waveform length	1 channel For simple BER	Mode: 3, GI: 1/8 A-Layer: 1seg, QPSK, CR=2/3, TI=2 B-Layer: 12seg, 64QAM, CR=7/8, TI=2
ISDBT_QPSK_1_2			Mode: 3, GI: 1/8 A-Layer: 1seg, QPSK, CR=1/2, TI=0 B-Layer: 12seg, 64QAM, CR=7/8, TI=1
ISDBT_QPSK_2_3			Mode: 3, GI: 1/8 A-Layer: 1seg, QPSK, CR=2/3, TI=0 B-Layer: 12seg, 64QAM, CR=7/8, TI=1
ISDBT_16QAM_1_2			Mode: 3, GI: 1/8 A-Layer: 1seg, 16QAM, CR=1/2, TI=0 B-Layer: 12seg, 64QAM, CR=7/8, TI=1
ISDBT_QPSK_2_3_TI4			Mode: 3, GI: 1/8 A-Layer: 1seg, QPSK, CR=2/3, TI=4 B-Layer: 12seg, 64QAM, CR=3/4, TI=2
ISDBTsb_Movie	Waveform pattern for ISDB-Tsb partial reception*2 For evaluation video and audio data of terminals. 68-frame waveform length	1 channel For video and audio	Mode: 3, GI: 1/8 A/B-Layer: QPSK, CR=1/2, TI=4 Seg#1 to #5: 8-segment concatenation transmission in 1-segment format Seg#6 to #8: 8-segment concatenation transmission in 3-segment format
ISDBTsb_QPSK_1_2	Waveform pattern for ISDB-Tsb partial reception*2 For simple BER measurement. 4-frame waveform length	1 channel For simple BER	Mode: 3, GI: 1/8 A/B-Layer: QPSK, CR=1/2, TI=0 Seg#1 to #5: 8-segment concatenation transmission in 1-segment format Seg#6 to #8: 8-segment concatenation transmission in 3-segment format
ISDBTsb_QPSK_2_3			Mode: 3, GI: 1/8 A/B-Layer: QPSK, CR=2/3, TI=0 Seg#1 to #5: 8-segment concatenation transmission in 1-segment format Seg#6 to #8: 8-segment concatenation transmission in 3-segment format
ISDBTsb_16QAM_1_2			Mode: 3, GI: 1/8 A/B-Layer: 16QAM, CR=1/2, TI=0 Seg#1 to #5: 8-segment concatenation transmission in 1-segment format Seg#6 to #8: 8-segment concatenation transmission in 3-segment format

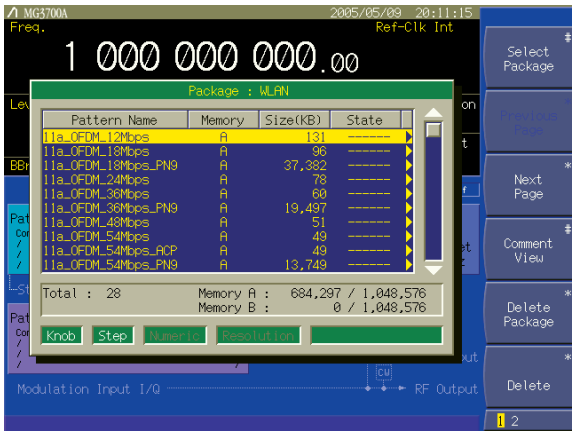
*1: The PN sequence is discontinuous at the waveform pattern connection.
This cannot be used to measure BER (PN23) although it can be used for simple BER measurement.
*2: It is not guaranteed that any receiver can receive a waveform with this length.

WLAN Waveform Patterns

Standard

■ WLAN Waveform Patterns

The WLAN (IEEE802.11a/b/g) waveform patterns listed in the table below are stored on the MG3700A internal hard disk.
Signals for testing the receiver and transmitter of a terminal or module can be output by selecting one of these patterns.
The waveform patterns shown below are the signals for one packet. When a waveform pattern is selected, the signal is output in an endless loop. To stop the signal at a fixed number of packets, use the IQproducer Combination File Edit function to generate the sequence file first and select it using the MG3700A (see Section 4.8 of the IQproducer manual).



Selecting Waveform Pattern

• IEEE_802.11a/802.11g (ERP-OFDM) Waveform Patterns List

Waveform Patterns	Data Rate (Mbps)	Modulation	Coding Rate	Coding Bits per Sub-carrier	Coding Bits per OFDM Symbol	Data Bits per OFDM Symbol
11a_OFDM_6Mbps	6	BPSK	1/2	1	48	24
11a_OFDM_9Mbps	9	BPSK	3/4	1	48	36
11a_OFDM_9Mbps_PN9*1	9	BPSK	3/4	1	48	36
11a_OFDM_12Mbps	12	QPSK	1/2	2	96	48
11a_OFDM_18Mbps	18	QPSK	3/4	2	96	72
11a_OFDM_18Mbps_PN9*1	18	QPSK	3/4	2	96	72
11a_OFDM_24Mbps	24	16QAM	1/2	4	192	96
11a_OFDM_36Mbps	36	16QAM	3/4	4	192	144
11a_OFDM_36Mbps_PN9*1	36	16QAM	3/4	4	192	144
11a_OFDM_48Mbps	48	64QAM	2/3	6	288	192
11a_OFDM_54Mbps	54	64QAM	3/4	6	288	216
11a_OFDM_54Mbps_PN9*1	54	64QAM	3/4	6	288	216
11a_OFDM_54Mbps_ACP*2	54	64QAM	3/4	6	288	216

*1: Continuous PN9 data between PSDUs
*2: Improved ACPR

• IEEE_802.11b Waveform Patterns List

Waveform Patterns	Spreading, Coding	Modulation
11b_DSSS_1Mbps	DSSS, 11 chip Barker Code	DBPSK
11b_DSSS_2Mbps	DSSS, 11 chip Barker Code	DQPSK
11b_DSSS_2Mbps_PN9*1	DSSS, 11 chip Barker Code	DQPSK
11b_CCK_5_5Mbps	CCK	DQPSK
11b_CCK_11Mbps	CCK	DQPSK
11b_CCK_11Mbps_PN9*1	CCK	DQPSK
11b_CCK_11Mbps_ACP*2	CCK	DQPSK

• IEEE_802.11g (DSSS-OFDM) Waveform Patterns List

Waveform Patterns	Data Rate (Mbps)	Modulation	Coding Rate	Coding Bits per Sub-carrier	Coding Bits per OFDM Symbol	Data Bits per OFDM Symbol
11g_DSSS_OFDM_6Mbps	6	BPSK	1/2	1	48	24
11g_DSSS_OFDM_9Mbps	9	BPSK	3/4	1	48	36
11g_DSSS_OFDM_12Mbps	12	QPSK	1/2	2	96	48
11g_DSSS_OFDM_18Mbps	18	QPSK	3/4	2	96	72
11g_DSSS_OFDM_24Mbps	24	16QAM	1/2	4	192	96
11g_DSSS_OFDM_36Mbps	36	16QAM	3/4	4	192	144
11g_DSSS_OFDM_48Mbps	48	64QAM	2/3	6	288	192
11g_DSSS_OFDM_54Mbps	54	64QAM	3/4	6	288	216

Bluetooth Waveform Patterns

Standard

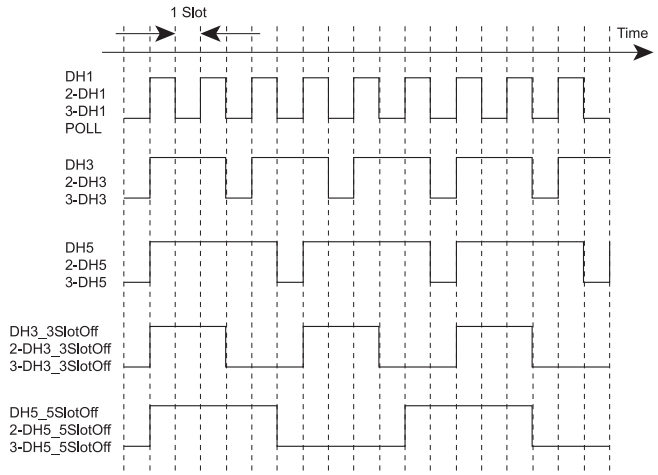
■ *Bluetooth* Waveform Patterns

The *Bluetooth* waveform patterns listed in the table below are stored on the MG3700A internal hard disk.
Selecting one of these waveform patterns outputs the best signal for the evaluation.

• POLL:
This is used for operation checks and PER measurement of mobile terminals with *Bluetooth*.

• No Packet Format (PN9, PN15):
This is used for BER measurement of mobile terminals and modules with *Bluetooth*.

• DH1, DH3, DH5:
This is used in combination with an external demodulator for loopback tests (no FEC) of mobile terminals and modules with *Bluetooth*.



Waveform Timing Chart

Waveform Patterns	Data rate (Mbps)	Payload Modulation	Filter	Packet type
DH1*1	1	GFSK*4	Gaussian*5	DH1
DH3*1	1	GFSK*4	Gaussian*5	DH3
DH5*1	1	GFSK*4	Gaussian*5	DH5
DH3_3SlotOff*1	1	GFSK*4	Gaussian*5	DH3
DH5_5SlotOff*1	1	GFSK*4	Gaussian*5	DH5
POLL	1	GFSK*4	Gaussian*5	POLL
2-DH1*1	2	π/4-DQPSK	Root Nyquist*6	2-DH1
2-DH3*1	2	π/4-DQPSK	Root Nyquist*6	2-DH3
2-DH5*1	2	π/4-DQPSK	Root Nyquist*6	2-DH5
2-DH3_3SlotOff*1	2	π/4-DQPSK	Root Nyquist*6	2-DH3
2-DH5_5SlotOff*1	2	π/4-DQPSK	Root Nyquist*6	2-DH5
3-DH1*1	3	8-DPSK	Root Nyquist*6	3-DH1
3-DH3*1	3	8-DPSK	Root Nyquist*6	3-DH3
3-DH5*1	3	8-DPSK	Root Nyquist*6	3-DH5
3-DH3_3SlotOff*1	3	8-DPSK	Root Nyquist*6	3-DH3
3-DH5_5SlotOff*1	3	8-DPSK	Root Nyquist*6	3-DH5
GFSK-PN9*2	1	GFSK*4	Gaussian*5	No packet format
GFSK-PN15*3	1	GFSK*4	Gaussian*5	No packet format
PI_4_DQPSK-PN9*2	2	π/4-DQPSK	Root Nyquist*6	No packet format
PI_4_DQPSK-PN15*3	2	π/4-DQPSK	Root Nyquist*6	No packet format
8DPSK-PN9*2	3	8-DPSK	Root Nyquist*6	No packet format
8DPSK-PN15*3	3	8-DPSK	Root Nyquist*6	No packet format

∗1: PN9 data is inserted into the payload body.
∗2: PN9 data is inserted into all areas that do not have a packet format.
∗3: PN15 data is inserted into all areas that do not have a packet format.
∗4: Modulation index=0.32
∗5: Bandwidth time (BT)=0.5
∗6: Roll-off rate ß=0.4

The Dirty Signal required for evaluating reception characteristics is supplied as a software download from the Anritsu website.Use of this software download requires free user registration first.

- Software download site address
  https://www1.anritsu.co.jp/Download/MService/Login.asp

GPS Waveform Patterns

Standard

GPS Waveform Patterns

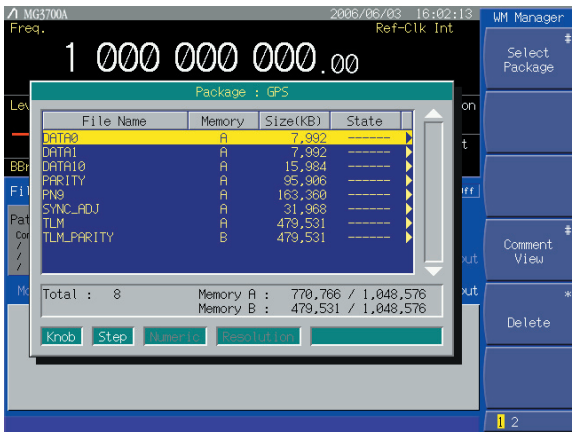
The four GPS waveform patterns listed below are stored on the MG3700A internal hard disk.
Selecting one of these waveform patterns outputs the best signal for the evaluation.

- SYNC_ADJ
This is used for synchronization adjustment of mobile terminals with GPS.

- TLM, TLM_PARITY
This is used for receiver sensitivity measurement and operation checks of mobile terminals with GPS.

- PARITY
This is used for detecting the parity of mobile terminals with GPS.

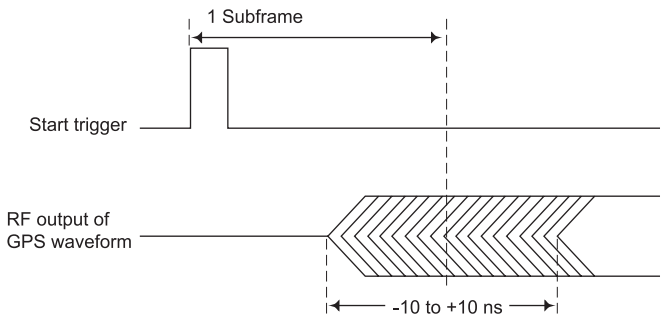
- PN9
This is used for BER measurement during device evaluation.



Selecting Waveform Pattern

Waveform Patterns	Main Usage	Outline of Data
SYNC_ADJ*1	Synchronization adjustment*2	Consists of TLM, HOW, and default navigation data, formatted according to subframe configuration prescribed in GLOBAL POSITIONING SYSTEM STANDARD POSITIONING SERVICE SIGNAL SPECIFICATION
TLM*3	Sensitivity test	Consists of TLM, HOW, and default navigation data, formatted according to subframe configuration prescribed in GLOBAL POSITIONING SYSTEM STANDARD POSITIONING SERVICE SIGNAL SPECIFICATION
PN9	BER measurement	Consecutive PN9 data not configured in subframe format
PARITY	Parity detection	Configured in Word format prescribed in GLOBAL POSITIONING SYSTEM STANDARD POSITIONING SERVICE SIGNAL SPECIFICATION One Word consists of 24-bit PN9 fix data and 6-bit parity bit data.
TLM_PARITY	Sensitivity test	Consists of TLM, HOW, and Nav Data, formatted according to subframe configuration prescribed in GLOBAL POSITIONING SYSTEM STANDARD POSITIONING SERVICE SIGNAL SPECIFICATION. Random data is inserted into the Nav Data part of Word3 to Word10. One period is configured with 5 subframes.
Data0, Data1, Data10, Data1C	Synchronization adjustment	Used in combination with SYNC_ADJ. These waveform patterns are automatically loaded into the memory when SYNC_ADJ is loaded into the memory. Users do not have to perform loading and selecting of these waveform patterns, because these waveform patterns are automatically selected when SYNC_ADJ is selected.

∗1: Use SYNC_ADJ in combination with Data0, Data1, and Data10. When selecting a file, press the Baseband key on the MG3700A to set Pattern Combination to Defined. Refer to the MG3700A Vector Signal Generator Operation Manual (main frame) for details about how to make the settings.
∗2: The repeatability of the subframe output timing of the RF output versus external start trigger input is reduced to 10 ns max.
∗3: When executing a Doppler test, change the RF frequency and sampling clock at the same rate.The sampling clock when the Doppler frequency is 0 Hz is 4.092 MHz. For example, when applying a +4 kHz Doppler frequency, the following expression establishes (providing the sampling clock as "CLK"): (1575.42 MHz + 4 kHz)/1575.42MHz = CLK/4.092 MHz then: CLK = 4.09201039 MHz.
Refer to the MG3700A Operation Manual (Mainframe) for RF frequency and sampling clock settings.



SYNC_ADJ output timing

MX370001A TD-SCDMA Waveform Pattern

Optional

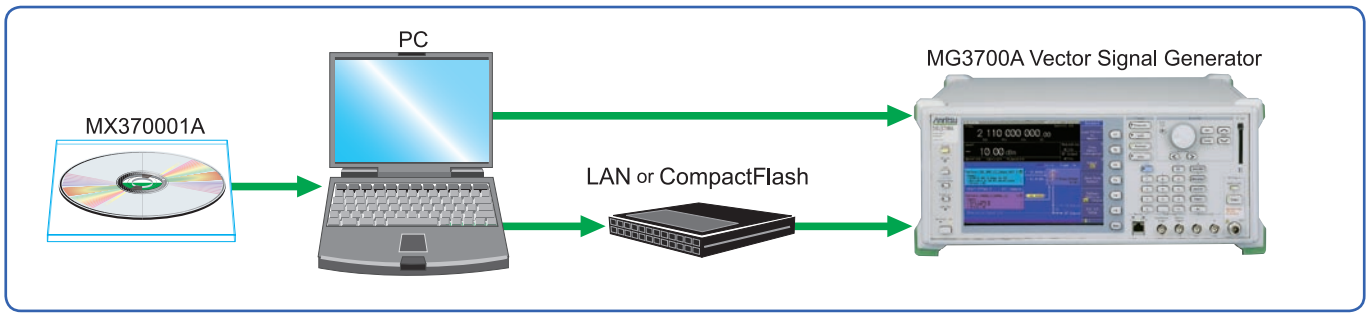
■ TD-SCDMA Waveform Patterns

Signals for the 3GPP 1.28 Mcps TDD options can be output by installing the MX370001A TD-SCDMA Waveform Pattern option in the MG3700A.

- For Evaluating BS Transmitter
  - BS_DL RMC 1Code
  - BS_DL RMC 1Code+P-CCPCH
  - BS_DL RMC 8Code
  - BS_DL RMC 10Code
- For Evaluating UE Receiver
  - UE_DL RMC 12.2kbps
  - UE_DL RMC 12.2kbps+OCNS
  - UE_DL RMC 64kbps+OCNS
  - UE_DL RMC 144kbps+OCNS
  - UE_DL RMC 384kbps
- For Evaluating BS Receiver
  - BS_UL RMC 12.2kbps (Single)
  - BS_UL RMC 12.2kbps+OCNS
  - BS_UL RMC 64kbps+OCNS
  - BS_UL RMC 144kbps+OCNS
  - BS_UL RMC 384kbps

■ Simple Operation and Fast Signal Pattern Change

Typical waveforms specified in 3GPP, such as the reference management channel, are output just by selecting the waveform pattern stored on the MG3700A internal hard disk without setting any complex TD-SCDMA parameters.



- Waveform Patterns for Evaluating BS Transmitters

Target	BS Transmitter Test (DL)			
	BS			
Test Signal	BS-DL RMC			
Waveform Patterns	rmc_1 code_bs_dl	rmc_P-CCPCH_bs_dl	rmc_8 code_bs_dl	rmc_10 code_bs_dl
Test	Freq/Power Ctrl/ Minimum Pwr	P-CCPCH Pwr	OBW/OnOffRatio/ Max Pwr/spurious/ ACLR/TxIM	EVM/ Peak code domain err
Standard	TS25.142			
DwPTS/UpPTS SYNC_DL/UL NUMBER (quadruples)	SYNC_DL #0 (S1)	SYNC_DL #0 (S1)	SYNC_DL #0 (S1)	SYNC_DL #0 (S1)
P-CCPCH	–	add	–	–
Scrambling Code	0	0	0	0
Midamble ID	0	0	0	0
Maximum User (user number)	2 (1)	8 (1)	2 (1)	2 (1)
Spread Factor	16	16	16	16
TimeSlot Number	4, 5, 6	0	4, 5, 6	4, 5, 6
Number of DPCH0	–	–	0	0
DPCH Channelizaton Codes	C (i, 16), i=1	C (i, 16), i=1, 2	C (i, 16),1≤i≤8	C (i, 16), 1≤i≤10
DPCH0 Channelizaton Codes	–	–	–	–
Data: DPCH0	PN9	–	PN9	PN9
Data: other channel	–	P-CCPCH: All 0	–	–
Σ DPCH_Ec/Ior [dB]	0	–	0	0
DPCH0_Ec/Ior [dB]	–	–	–	–
DPCH Channelizaton Codes Power [dB]/1 ch	0	–	–9	–10
DPCH0 Channelizaton Codes Power [dB]/1 ch	–	–	–	–

MX370001A TD-SCDMA Waveform Pattern

Optional

• Waveform Patterns for Evaluating BS Receivers

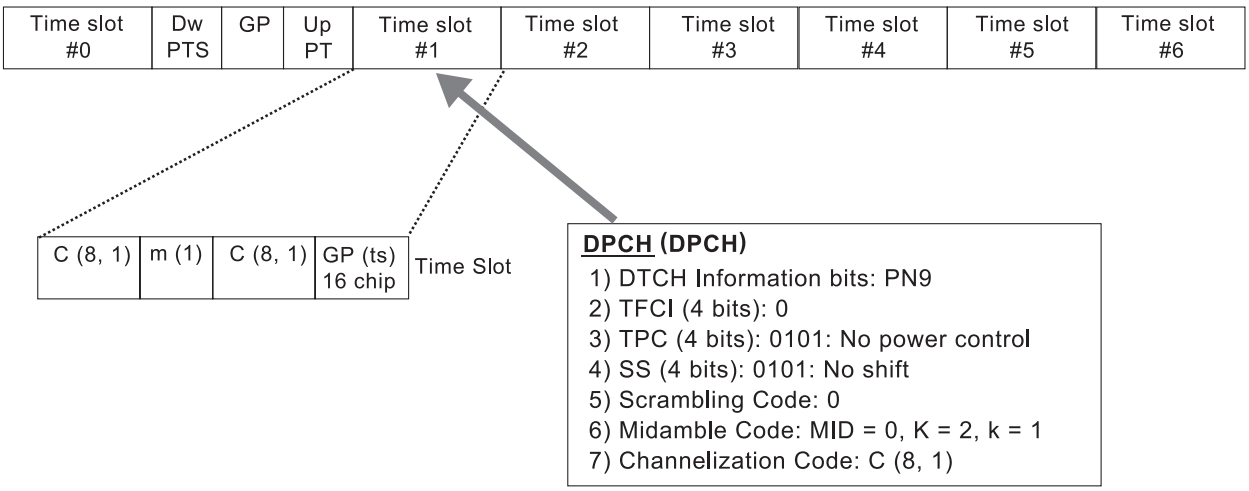
Target	BS Receive Test (UL)				
	BS				
Test Signal	BS-UL RMC				
Waveform Patterns	rmc12_2k_bs_ul	rmc12k_ocns_bs_ul	rmc64k_ocns_bs_ul	rmc144k_bs_ul	rmc384k_bs_ul
Test	RS/Min. Input Lev./ Dynamic range/ACS/ Blocking/Rx IM	Performance Req.	Performance Req.	Performance Req.	Performance Req.
Standard	TS25.142				
DwPTS/UpPTS/SYNC_DL/ UL NUMBER (quadruples)	–	–	–	–	–
P-CCPCH	–	–	–	–	–
Scrambling Code	0	0	0	0	0
Midamble ID	0	0	0	0	0
Maximum User (user number)	2 (1)	2 (1)	2 (1)	2 (1)	2 (1)
Spread Factor	8	8	2, 8	2, 8	8, 2
TimeSlot Number	1	1	1	1, 2	1, 2, 3, 4
Number of DPCH	0	4	1	1	0
DPCH Channelizaton Codes	C (i, 8), i=1	C (i, 8), i=1	C (i, 2), i=1	C (i, 2), i=1	C (i, 2), i=1 C (i, 8), i=5
DPCH0 Channelizaton Codes	–	C (i, 8), 2≤i≤5	C (i, 8), i=5	C (i, 8), i=5	–
Data: DPCH0	PN9	PN9	PN9	PN9	PN9
Data: other channel	–	PN9	PN9	PN9	–
Σ DPCH_Ec/Ior [dB]	0	–	–	–	0
DPCH0_Ec/Ior [dB]	–	–7	–7	–7	–
DPCH Channelizaton Codes Power [dB]/1ch	0	–7	–0.97	–0.97	C (i, 2)=−6.99 C (i, 8)=−0.97
DPCH0 Channelizaton Codes Power [dB]/1ch	–	–7	–7	–7	–

• Waveform Patterns for Evaluating UE Receivers

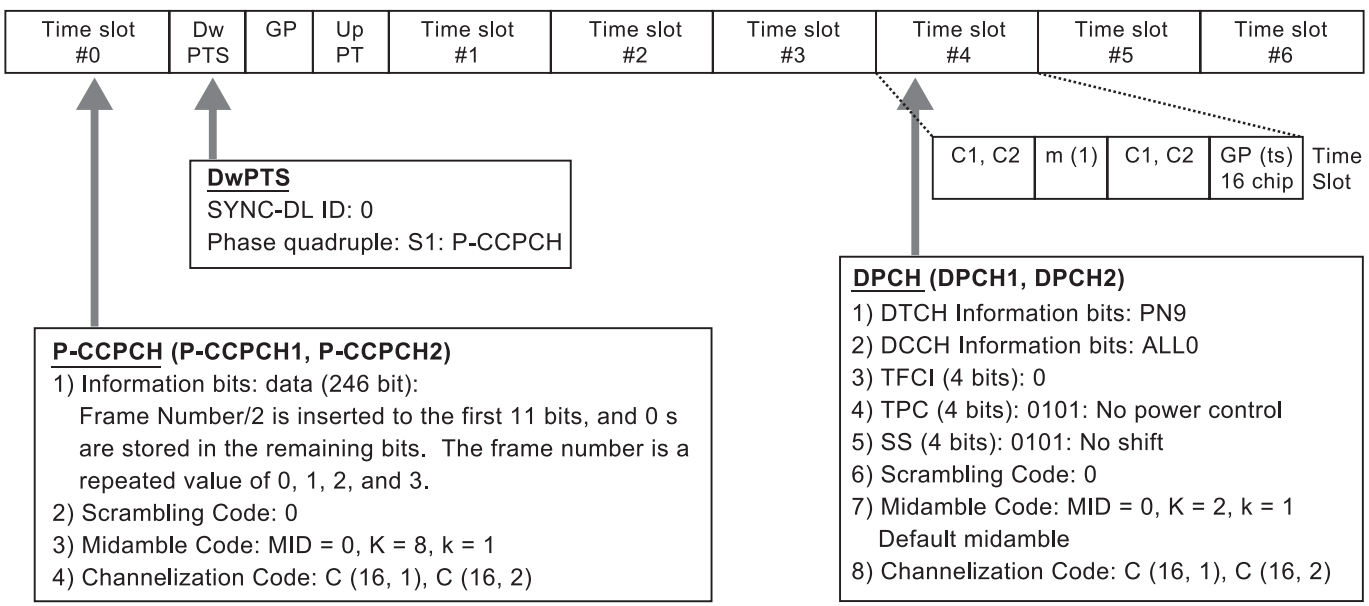
Target	UE Receiver Test (DL)				
	UE				
Test Signal	UE-DL RMC				
Waveform Patterns	rmc12_2k_ue_dl	rmc12k_ocns_ue_dl	rmc64k_ocns_ue_dl	rmc144k_ocns_ue_dl	rmc384k_ue_dl
Test	RS/Min. Input Lev./ ACS/Blocking/ Spur.Resp. /Inter Mod	Maximum input level test/ RMC 12.2k	Performance Req.	Performance Req.	Performance Req.
Standard	TS25.102				
DwPTS/UpPTS SYNC_DL/UL NUMBER (quadruples)	SYNC_DL #0 (S1)	SYNC_DL #0 (S1)	SYNC_DL #0 (S1)	SYNC_DL #0 (S1)	SYNC_DL #0 (S1)
P-CCPCH	Add	Add	Add	Add	Add
Scramblng Code	0	0	0	0	0
Midamble ID	0	0	0	0	0
Maximum User (user number)	8 (1)	8 (1)	8 (1)	8 (1)	8 (1)
Spread Factor	16	16	16	16	16
TimeSlot Number	4	4	4	4, 5	3, 4, 5, 6
Number of DPCH0	0	8	2	2	0
DPCH Channelizaton Codes	C (i, 16), i=1,2	C (i,16), i=1, 2	C (i, 16), i=1, …, 8	C (i, 16), i=1, …, 8	C (i, 16), i=1, …, 10
DPCH0 Channelizaton Codes	–	C (i, 16) 3≤i≤10	C (i, 16) 9≤i≤10	C (i, 16) 9≤i≤10	–
Data: DPCH0	PN9	PN9	PN9	PN9	PN9
Data: other channel	–	PN9	PN9	PN9	–
Σ DPCH_Ec/Ior [dB]	0	–7	–	–	–
DPCH0_Ec/Ior [dB]	–	–10	–10	–10	0
DPCH Channelizaton Codes Power [dB]/1ch	–3.01	–10.00	–10.00	–10.00	−10
DPCH0 Channelizaton Codes Power [dB]/1ch	–	–10.00	–10.00	–10.00	–

Frame Configuration

• UL-RMC12.2 kbps: For BS receiver test (Uplink)
TS-25.142: BS UL reference measurement channel p132, A2.1.2, 1.28 Mcps, SF = 8
Test items: 7.2 Reference sensitivity level
7.3 Dynamic range
7.4 Adjacent Channel Selectivity (ACS)
7.5 Blocking characteristics
7.6 Intermodulation characteristics



• DL-RMC12.2 kbps: For UE receiver test (Downlink)
TS-25.102: UE DL reference measurement channel p58, A.2.2.2.1, 1.28 Mcps, 12.2 kbps, SF = 16
Test items: 7.3 Reference sensitivity level
7.4 Maximum input level
7.5 Adjacent Channel selectivity (ACS)
7.6 Blocking characteristics
7.7 Spurious response
7.8 Intermodulation characteristics



MX370002A Public Radio System Waveform Pattern

Optional

■ Public Radio System Waveform Patterns

The downlink and uplink modulation signals for the following ARIB standards can be output by installing the MX370002A Public Radio System Waveform Pattern option in the MG3700A.

• RCR STD-39

Waveform Patterns	Uplink/Downlink	Transmit Frame
UpLink	Uplink	0, x, x, x
DownLink 1	Downlink	0, x, x, x
DownLink 4	Downlink	0, 1, 2, 3
DownCCH 4	Downlink	0, 1, 2, 3
PN9	–	–
PN15	–	–

Sampling Rate 128 kHz
Symbol Rate 16 ksps

• ARIB STD-T61

Waveform Patterns	Uplink/Downlink	Transmit Frame
UpDownLink	Uplink/Downlink	0
40ms_Burst_all	Uplink/Downlink	0, 1, 2, 3
20ms_Burst_all	Uplink/Downlink	0, 1, 2, 3, 4, 5, 6, 7
40ms_Burst_1_4	Uplink/Downlink	0, x, x, x,
20ms_Burst_1_8	Uplink/Downlink	0, x, x, x, x, x, x, x
40ms_Burst_all_Ramp*	Uplink/Downlink	0, 1, 2, 3
20ms_Burst_all_Ramp*	Uplink/Downlink	0, 1, 2, 3, 4, 5, 6, 7
40ms_Burst_1_4_Ramp*	Uplink/Downlink	0, x, x, x,
20ms_Burst_1_8_Ramp*	Uplink/Downlink	0, x, x, x, x, x, x, x
PN9	–	–
PN15	–	–

Sampling Rate 153.6 kHz
Symbol Rate 4.8 ksps

*: Waveform pattern names to which _Ramp is appended are in accordance with the ARIB STD-T61 standard. Appending _Ramp to waveforms patterns improves the adjacent-channel leakage-power ratio by lengthening the rise and fall times of the guard time transient response.

■ Simple Operation and Fast Signal Pattern Change

Signals for the ARIB-specified receiver and transmitter tests are output by selecting the waveform pattern stored on the MG3700A internal hard disk without setting complex ARIB standard parameters.
The TCH/CCH, PN9, and PN15 continuous modulation patterns can be switched quickly.

• ARIB STD-T79

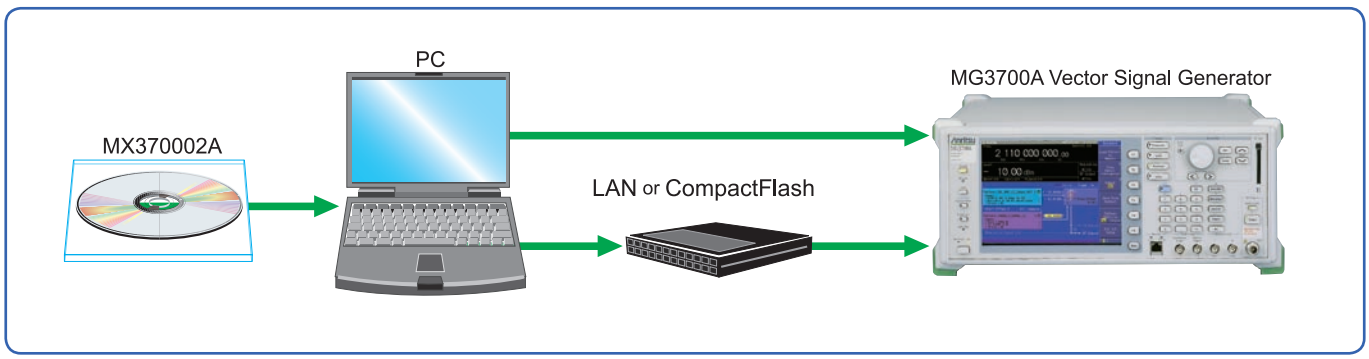
Waveform Patterns	Uplink/Downlink	Transmit Frame
UpLink	Uplink	0, x, x, x
DownLink 1	Downlink	0, x, x, x
DownLink 4	Downlink	0, 1, 2, 3
Direct	Uplink/Downlink	1, x, x, x
PN9	–	–
PN15	–	–

Sampling Rate 128 kHz
Symbol Rate 16 ksps

• ARIB STD-T86

Waveform Patterns	Uplink/Downlink	Transmit Frame
Up_cch	Uplink	x, x, x, 3, x, x
Up_tch	Uplink	x, x, x, 3, x, x
Down_tch_all	Downlink	0, 1, 2, 3, 4, 5
Down_cch	Downlink	0, x, x, x, x, x
Down_tch	Downlink	0, 1, 2, x, 4, 5
PN9	–	–
PN15	–	–

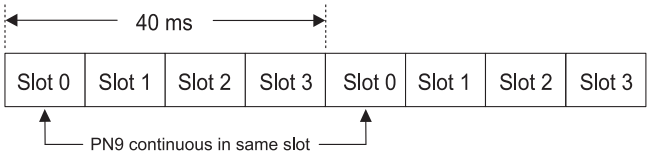
Sampling Rate 90 kHz
Symbol Rate 11.25 ksps



■ Frame Configuration

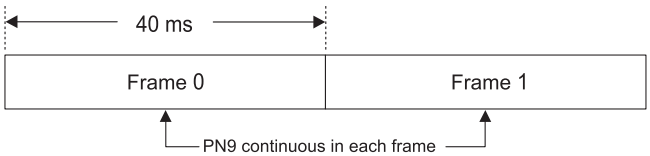
• RCR STD-39, ARIB STD-T79 Frame Configuration

The uplink frame (TDMA) and downlink frame (TDM) both generate data in 4 slots length frame cycles (40 ms) defined as a basic frame length. The PN9 pseudorandom pattern of the traffic channel (TCH) in a slot is independent per slot and has continuity.

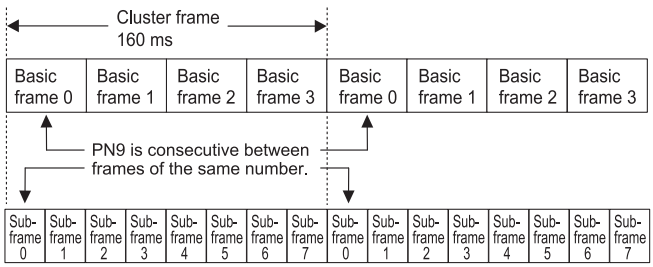


• ARIB STD-T61 Frame Configuration

The uplink and downlink frames both generate data in 40-ms cycles as the basic frame length. The TCH PN9 pseudorandom pattern in a frame is continuous in each frame.

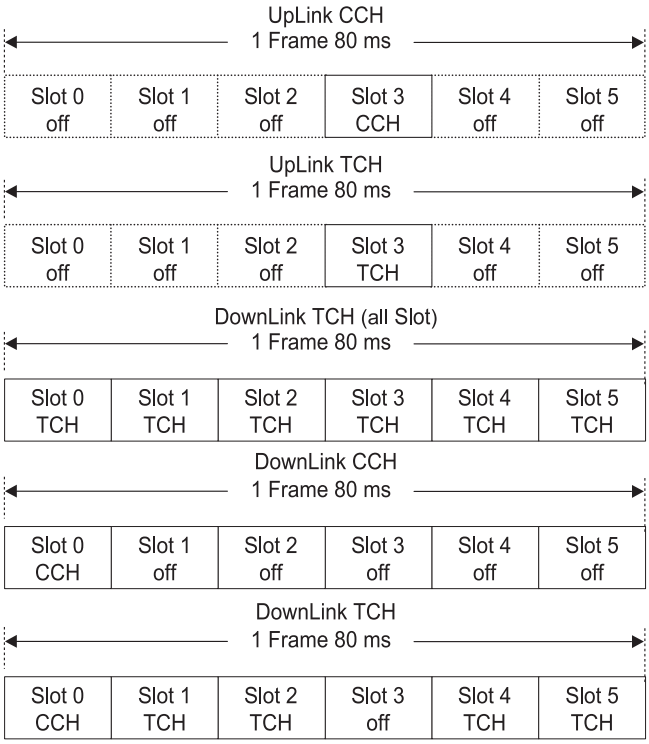


A Tx burst sends data based on a 40-ms basic frame as a cluster frame composed of four 40-ms frames (160 ms). One cluster frame is composed of eight sub-frames when there are 20-ms sub-frames. The TCH PN9 pseudorandom pattern is continuous within one frame.



• ARIB STD-T86 Frame Configuration

One frame consists of 6 slots and the data is generated in this frame cycle. The TCH PN9 pseudorandom pattern in a slot is continuous in all slots.



■ Signal Formats in Each System

♦ RCR STD-39, Slot format

The uplink/downlink signal formats are as follows:

• Uplink

R	P	TCH	SW	I	CC	SACCH	TCH	G
6	2	148	20	2	6	20	108	8

R	: Guard time for burst transient response	00_H (6 bit)
P	: Preamble	2_H (2 bit)
TCH	: Traffic channel	Continuous PN9
SW	: Sync word	$785B4_H$ (Slot 0) (20 bits)
I	: Idle bit (all "0")	0_H (2 bits)
CC	: Color code (Counter interference code)	00_H (6 bits)
SACCH	: Slow ACCH	00000_H (20 bits)
G	: Guard time	00_H (8 bits)

• Downlink

R	P	TCH	SW	CI	CC	SACCH	TCH	B/I
6	2	112	20	2	6	20	144	8

R	: Guard time for burst transient response	00_H (6 bits)
P	: Preamble	2_H (2 bits)
TCH	: Traffic channel	Continuous PN9
SW	: Sync word	$87A4B_H$ (Slot 0), $9D236_H$ (Slot 1), $81D75_H$ (Slot 2), $A94EA_H$ (Slot 3) (20 bits)
CI	: Control channel communication information	3_H (2 bits)
CC	: Color code (Counter interference code)	00_H (6 bits)
SACCH	: Slow ACCH	00000_H (20 bits)
B/I	: Busy/Idle bit	FF_H (8 bits)

MX370002A Public Radio System Waveform Pattern

Optional

• Downlink control channel

R	P	CAC	SW	CC	TCH	I
6	2	112	20	8	168	4

R : Guard time for burst transient response 00_H (6 bit)
P : Preamble 2_H (2 bit)
CAC : Control signal Continuous PN9
SW : Sync word $87A4B_H$ (Slot 0), $9D236_H$ (Slot 1), $81D75_H$ (Slot 2), $A94EA_H$ (Slot 3) (20 bits)
CC : Color code (Counter interference code) 00_H (6 bit)
I : Idle bit 0_H (4 bit)

♦ ARIB STD-T61, Frame format

The uplink/downlink signal formats are as follows:

LP+R	Pa	TCH	RI	SW	undefined	TCH
30	2	96	56	20	20	160

LP+R : Preamble for linearizer and guard time for burst transient response 00000000_H (30 bits)
Pa : Preamble 2_H (2 bits)
TCH : Traffic channel Continuous PN9
RI : Radio information channel 00000000000000_H (56 bits)
SW : Sync word $1E56F_H$ (20 bits)
Undefined: 00000_H (20 bits)

• Burst signal (40 ms)

R	SW1	RICH	TCH1	R	G
8	20	52	292	8	4

R : Guard time for burst transient response 00_H (8 bit)
SW1 : Sync word 1 $1E56F_H$ (20 bit)
RICH : Radio information channel 0000000000000_H (52 bit)
TCH1 : Traffic channel 1 Continuous PN9
G : Guard time 0_H (4 bit)

• Burst signal (20 ms)

R	SW2	TCH2	R	G
8	20	152	8	4

R : Guard time for burst transient response 00_H (8 bit)
SW2 : Sync word 2 $31BAF_H$ (20 bit)
TCH2 : Traffic channel 2 Continuous PN9
G : Guard time 0_H (4 bit)

♦ ARIB STD-T79, Slot format

The uplink/downlink and direct communication signal formats between mobile stations are as follows:

• Uplink

R	P	TCH	SW	I	CC	SACCH	TCH	G
6	2	148	20	2	6	20	108	8

R : Guard time for burst transient response 00_H (6 bits)
P : Preamble 2_H (2 bits)
TCH : Traffic channel Continuous PN9
SW : Sync word $785B4_H$ (Slot 0) (20 bits)
I : Idle bit (all "0") 0_H (2 bits)
CC : Color code (Counter interference code) 00_H (6 bits)
SACCH: Slow ACCH 00000_H (20 bits)
G : Guard time for transient response 00_H (8 bits)

• Downlink

R	P	TCH	SW	CI	CC	SACCH	TCH	B/I
6	2	112	20	2	6	20	144	8

R : Guard time for burst transient response 00_H (6 bits)
P : Preamble 2_H (2 bits)
TCH : Traffic channel Continuous PN9
SW : Sync word $87A4B_H$ (Slot 0), $9D236_H$ (Slot 1), $81D75_H$ (Slot 2), $A94EA_H$ (Slot 3) (20 bits)
CI : Control channel communication information 3_H (2 bits)
CC : Color code (Counter interference code) 00_H (6 bits)
SACCH: Slow ACCH 00000_H (20 bits)
B/I : Busy/Idle bit FF_H (8 bits)

• Direct communication between mobile stations

G	R	P	TCH	SW	PICH	TCH	G
8	6	2	140	20	12	116	16

G : Guard time for transient response 00_H (8 bits), 0000_H (16 bits)
R : Guard time for burst transient response 00_H (6 bits)
P : Preamble 2_H (2 bits)
TCH : Traffic channel Continuous PN9
SW : Sync word $4D9DE_H$ (20 bits)
PICH : Parameter information channel 000_H (12 bits)

♦ ARIB STD-T86, Slot format

There are four types of slots: uplink/downlink traffic channels and uplink/downlink control channels.

• Uplink/Downlink traffic channel

R	TCH	P	TCH	SW	C	TCH	P	TCH	G
16	24	4	232	40	4	232	4	24	20

R : Ramp time for transient response 0_H (16 bits)
P : Pilot symbol A_H (4 bits)
SW : Sync word Uplink=$00A000000A_H$ (40 bits) Downlink=$00A000AAAA_H$ (40 bits)
C : Channel identification 8_H (4 bits)
TCH : Information channel PN9 pseudo random pattern (The TCH PN pattern is continuous in all slots.)
G : Guard time for transient response 00000_H (20 bits)

• Uplink/Downlink control channel

R	AP	P	AP	SW	C	CAC	P	CAC	G
16	24	4	232	40	4	232	4	24	20

R : Ramp time for transient response 0_H (16 bits)
AP : Repetition of AGC preamble $20A800080A_H$
P : Pilot symbol A_H (4 bits)
SW : Sync word Uplink=$000A0AA00A_H$ (40 bits) Downlink=$000A0A00A0_H$ (40 bits)
C : Channel identification A_H (4 bits)
CAC : Information channel random pattern
G : Guard time for transient response 00000_H (20 bits)

Ordering Information

Please specify the model/order number, name and quantity when ordering.
The names listed in the chart below are Order Names. The actual name of the item may differ from the Order Name.

Model/Order No.	Name	Remarks
	- Main frame -	
MG3700A	Vector Signal Generator	
	- Standard accessories -	
J0017F	Power Cord, 2.6 m : 1 pc	
J1276	LAN Straight Cable : 1 pc	10 cm, For U link connection on Rear panel
	CompactFlash : 1 pc	64 MB or more
J1254	CompactFlash Adapter : 1 pc	
Z0742	MG3700A CD-ROM : 1 pc	Main frame operation manual, IQproducer operation manual, Standard waveform operation manual, IQproducer software
	- Options -	
MG3700A-001	Rubidium Reference Oscillator	Aging rate: ±1 x 10^{-10}/Month
MG3700A-002	Mechanical Attenuator	Changes standard electronic attenuator to mechanical attenuator
MG3700A-011	Upper Frequency 6 GHz	250 kHz to 3 GHz extended to 250 kHz to 6 GHz
MG3700A-021	ARB Memory Upgrade 512 Msample	Extends standard 128 Msample/channel x 2 to 256 Msample/channel x 2
MG3700A-031	High Speed BER Test Function	Extends standard BER test function
MG3700A-101	Rubidium Reference Oscillator Retrofit	Retrofitted to shipped MG3700A
MG3700A-102	Mechanical Attenuator Retrofit	Retrofitted to shipped MG3700A
MG3700A-103	Electronic Attenuator Retrofit	Retrofitted to shipped MG3700A
MG3700A-111	Upper Frequency 6 GHz Retrofit	Retrofitted to shipped MG3700A
MG3700A-121	ARB Memory Upgrade 512 Msample Retrofit	Retrofitted to shipped MG3700A
MG3700A-131	High Speed BER Test Function Retrofit	Retrofitted to shipped MG3700A
	- Maintenance service -	
MG3700A-ES210	Extended Warranty Service	2 years
MG3700A-ES310	Extended Warranty Service	3 years
MG3700A-ES510	Extended Warranty Service	5 years
	- Softwares (Waveform pattern) -	
MX370001A	TD-SCDMA Waveform Pattern	
MX370002A	Public Radio System Waveform Pattern	RCR STD-39, ARIB STD-T61/T79/T86
	- Softwares (License key for IQproducer system) -	
MX370101A	HSDPA/HSUPA IQproducer	
MX370102A	TDMA IQproducer	
MX370103A	CDMA2000 1xEV-DO IQproducer	
MX370104A	Multi-carrier IQproducer	
MX370105A	Mobile WiMAX IQproducer	
MX370106A	DVB-T/H IQproducer	
MX370107A	Fading IQproducer	
MX370108A	LTE IQproducer	LTE FDD
MX370109A	XG-PHS IQproducer	
MX370110A	LTE TDD IQproducer	
	- Optional accessories -	
Z0777	Standard Waveform Pattern Upgrade Kit	(DVD 4 piece sets)
W2495AE	MG3700A Operation Manual	
W2496AE	MG3700A Operation Manual (IQproducer)	
W2539AE	MG3700A Operation Manual (Standard Waveform Pattern)	
W2533AE	MX370001A Operation Manual	TD-SCDMA Waveform Pattern
W2503AE	MX370101A Operation Manual	HSDPA/HSUPA IQproducer
W2504AE	MX370102A Operation Manual	TDMA IQproducer
W2505AE	MX370103A Operation Manual	CDMA2000 1xEV-DO IQproducer
W2633AE	MX370104A Operation Manual	Multi-carrier IQproducer
W2734AE	MX370105A Operation Manual	Mobile WiMAX IQproducer
W2798AE	MX370106A Operation Manual	DVB-T/H IQproducer
W2995AE	MX370107A Operation Manual	Fading IQproducer
W3022AE	MX370108A Operation Manual	LTE IQproducer
W3152AE	MX370109A Operation Manual	XG-PHS IQproducer
W3221AE	MX370110A Operation Manual	LTE TDD IQproducer
G0141	HDD ASSY	Hard disk
K240B	Power Divider (K connector)	DC to 26.5 GHz, K-J, 50 Ω, 1 Wmax
MA1612A	Four-Port Junction Pad	5 MHz to 3 GHz, N-J
MP752A	Termination	DC to 12.4 GHz, 50 Ω, N-P
MA2512A	Band Pass Filter	For W-CDMA, pass band: 1.92 to 2.17 GHz
J0576B	Coaxial Cord, 1.0 m	N-P • 5D-2W • N-P
J0576D	Coaxial Cord, 2.0 m	N-P • 5D-2W • N-P
J0127A	Coaxial Cord, 1.0 m	BNC-P • RG-58A/U • BNC-P
J0127B	Coaxial Cord, 2.0 m	BNC-P • RG-58A/U • BNC-P
J0127C	Coaxial Cord, 0.5 m	BNC-P • RG-58A/U • BNC-P
J0322A	Coaxial Cord, 0.5 m	SMA-P • SMA-P, DC to 18 GHz, 50 Ω
J0322B	Coaxial Cord, 1.0 m	SMA-P • SMA-P, DC to 18 GHz, 50 Ω
J0322C	Coaxial Cord, 1.5 m	SMA-P • SMA-P, DC to 18 GHz, 50 Ω
J0322D	Coaxial Cord, 2.0 m	SMA-P • SMA-P, DC to 18 GHz, 50 Ω
J0004	Coaxial Adapter	N-P • SMA-J Conversion Adapter, DC to 12.4 GHz
J1261B	Ethernet Cable (Shield Type)	Straight-through, 3 m
J1261D	Ethernet Cable (Shield Type)	Cross, 3 m
J0008	GPIB Cable, 2.0 m	
J1277	IQ Output Conversion Adapter	D-Sub/BNC

Ordering Information

Model/Order No.	Name	Remarks
B0329C	Front Cover for 1MW 4U	
B0331C	Front Panel Handle Kit	2 pcs/set
B0332	Joint Plate	4 pcs/set
B0333C	Rack Mount Kit	
B0334C	Hardtype Carrying Case	With front cover and a casters
P0021	CompactFlash 128 MB	
P0022	CompactFlash 256 MB	
P0023	CompactFlash 512 MB	

Anritsu

Specifications are subject to change without notice.

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Product Brochure

Anritsu

MG3700A Vector Signal Generator

MX370x series software

MX3701xxA IQproducer

MX370x Series Software

The MG3700A Vector Signal Generator features a 160 MHz high-speed ARB baseband generator, broadband vector modulation, and large-capacity ARB memory to support digital modulation signals used by most communication systems.
Its excellent cost performance offers the ideal solution for generating signals used by the new and growing field of wireless broadband technology, as well as for mobile telecommunications systems and wireless LANs.
Because the MG3700 has a built-in ARB generator, signals are output easily just by selecting the waveform pattern matching the required communication system.

The following four categories of waveform patterns are supported:
- Standard waveform patterns
- Waveform patterns generated by optional MX3700xxA Waveform Pattern software
- Waveform patterns generated by optional MX3701xxA IQproducer software
- Waveform patterns converted from data generated by common signal-generation software

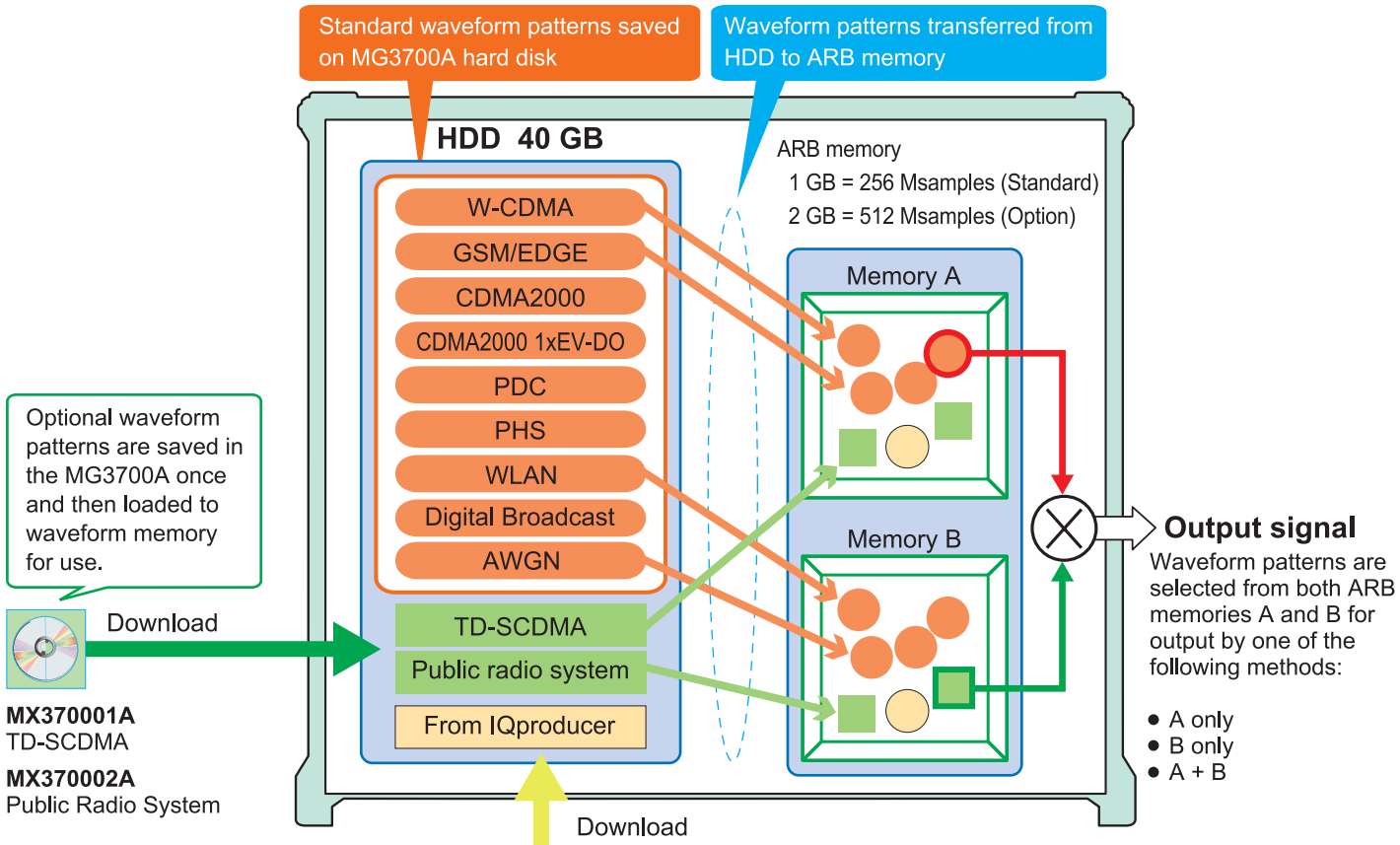
Each category contains multiple waveform pattern files each with preset parameters for each system.
These default waveform patterns are saved on the MG3700A hard disk for easy access, but other waveform patterns are supported using the IQproducer waveform generation software.
Parameters for the waveform for the target communication system are set using a GUI to a generate a waveform pattern file for the MG3700A. After the generated waveform pattern is downloaded to the MG3700A via LAN or CompactFlash (CF) card, the MG3700A outputs the signal just by choosing the waveform pattern file.
In addition, a user-generated custom IQ sample file in ASCII format created by common EDA (Electronic Design Automation) software such as MATLAB, can be converted into a custom waveform pattern file for the MG3700A.

Selection guide

Communication system		AWGN	W-CDMA	HSDPA (Test Model5)	HSDPA/HSUPA	CDMA2000 1xEV-DO	CDMA2000	GSM/EDGE	Next-generation PHS (XGP)	Advanced-PHS	PHS	PDC	ETC/DSRC	Digital Broadcast (BS/CS/CATV/ISDB-T)	Digital Broadcast (DVB-T/H)	WLAN (IEEE802.11a/b/g)	Mobile WiMAX (IEEE802.16e)	*Bluetooth*	GPS	TD-SCDMA	RCR STD-39	ARIB STD-T61/T79/T86	Multi-carrier	Fading	3GPP LTE (FDD)	3GPP LTE (TDD)
Page		4	6		8	13			39	11	11	11	11		28		18				11	11	16	31	34	42
Waveform pattern*	Preinstalled	√	√	√		√	√	√			√	√		√		√		√	√							
	MX370001A TD-SCDMA																			√						
	MX370002A Public Radio System																				√	√				
IQproducer	Standard accessories AWGN	√																								
	Standard accessories W-CDMA		√																							
	MX370101A HSDPA/HSUPA		√		√																					
	MX370102A TDMA									√	√	√	√								√	√				
	MX370103A CDMA2000 1xEV-DO					√																				
	MX370104A Multi-carrier	Multi-carrier IQproducer is software that generates the multi carrier signal based on waveform pattern of various telecommunications systems.																								
	MX370105A Mobile WiMAX																√									
	MX370106A DVB-T/H														√											
	MX370107A Fading	Fading IQproducer is software that generates the Fading signal based on waveform pattern of various telecommunication systems.																								
	MX370108A LTE FDD																								√	
	MX370109A XG-PHS								√																	
	MX370110A LTE TDD																									√

* : Read the MX3700xxA Waveform Pattern series catalog.

MG3700A Vector Signal Generator

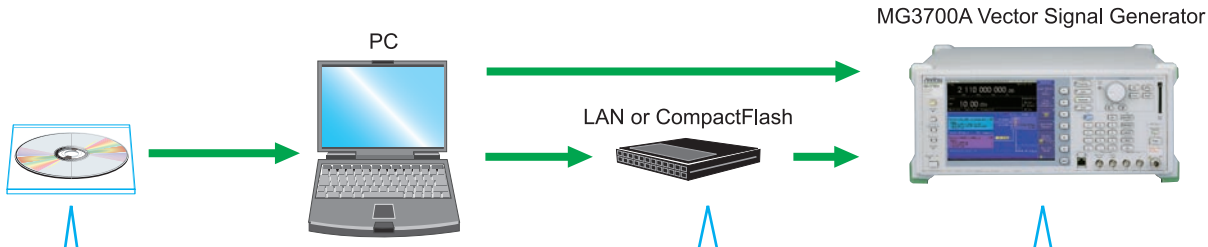


IQproducer is PC application software used for generating waveform pattern files for the MG3700A by editing parameters for the modulation signals matching the target communication system.
The generated waveform pattern files are saved in the MG3700A once and then loaded to the waveform memory for use.

Install

Standard accessories
W-CDMA IQproducer
AWGN IQproducer

MX370101A HSDPA/HSUPA IQproducer
MX370102A TDMA IQproducer
MX370103A CDMA2000 1xEV-DO IQproducer
MX370104A Multi-carrier IQproducer
MX370105A Mobile WiMAX IQproducer
MX370106A DVB-T/H IQproducer
MX370107A Fading IQproducer
MX370108A LTE IQproducer
MX370109A XG-PHS IQproducer
MX370110A LTE TDD IQproducer



- IQproducer Operating Environment

CPU	Pentium III, 1 GHz or faster
Memory	≥512 MB
HDD	≥5 GB
Display	1024 x 768 pixels min.
OS	Windows 2000 Professional, Windows XP

Additive White Gaussian Noise (AWGN) IQproducer

Standard accessory

This GUI-based application software is used to generate AWGN waveform pattern files optimized for each communication system for the Dynamic Range Test, etc.
The AWGN waveform pattern file is created by setting the same bandwidth and sampling rate as the combined waveform pattern (Wanted Signal) and a multiplier of the Wanted Signal.
Specifying the combined waveform pattern (Wanted Signal) from the waveform pattern for the desired communication method automatically sets the Wanted Signal bandwidth and sampling rate.
The resultant AWGN waveform pattern and an existing waveform pattern can be combined, which is useful for measuring base-station dynamic range.

<Configurable Parameters>
(With Specified Wanted Signal)
AWGN BW/Wanted Signal BW ratio
(With Unspecified Wanted Signal)
Wanted Signal BW,
AWGN BW,
Sampling Rate

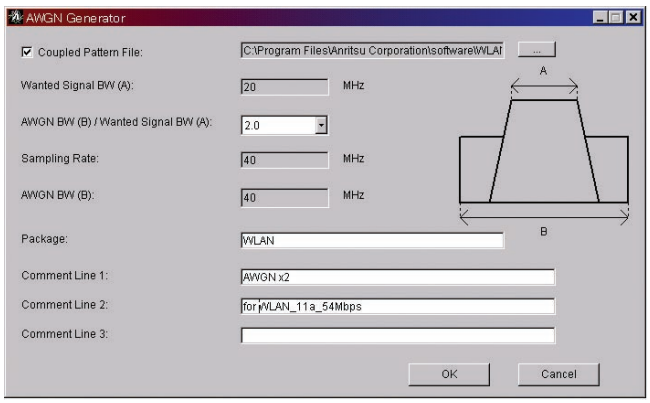
Main Parameter Settings
(1) Wanted Signal BW: Wanted Signal bandwidth
Setting range: 0.0010 to 120.0000 MHz

(2) AWGN BW (B)/Wanted Signal BW (A):
Magnification of AWGN to Wanted Signal
Setting range: 1.0, 1.5, 2.0, 2.5

(3) Sampling Rate:
Setting range: 0.0200 to 160.0000 MHz
Becomes same value as Wanted Signal

(4) AWGN BW (B): Bandwidth of AWGN
Calculated automatically from (1) and (2) with following limitation:
Limit range: 0.001 to 20.000 MHz and Sampling rate/2 max., 20.001 to 120.000 MHz and Sampling rate max.

IQproducer Main Screen

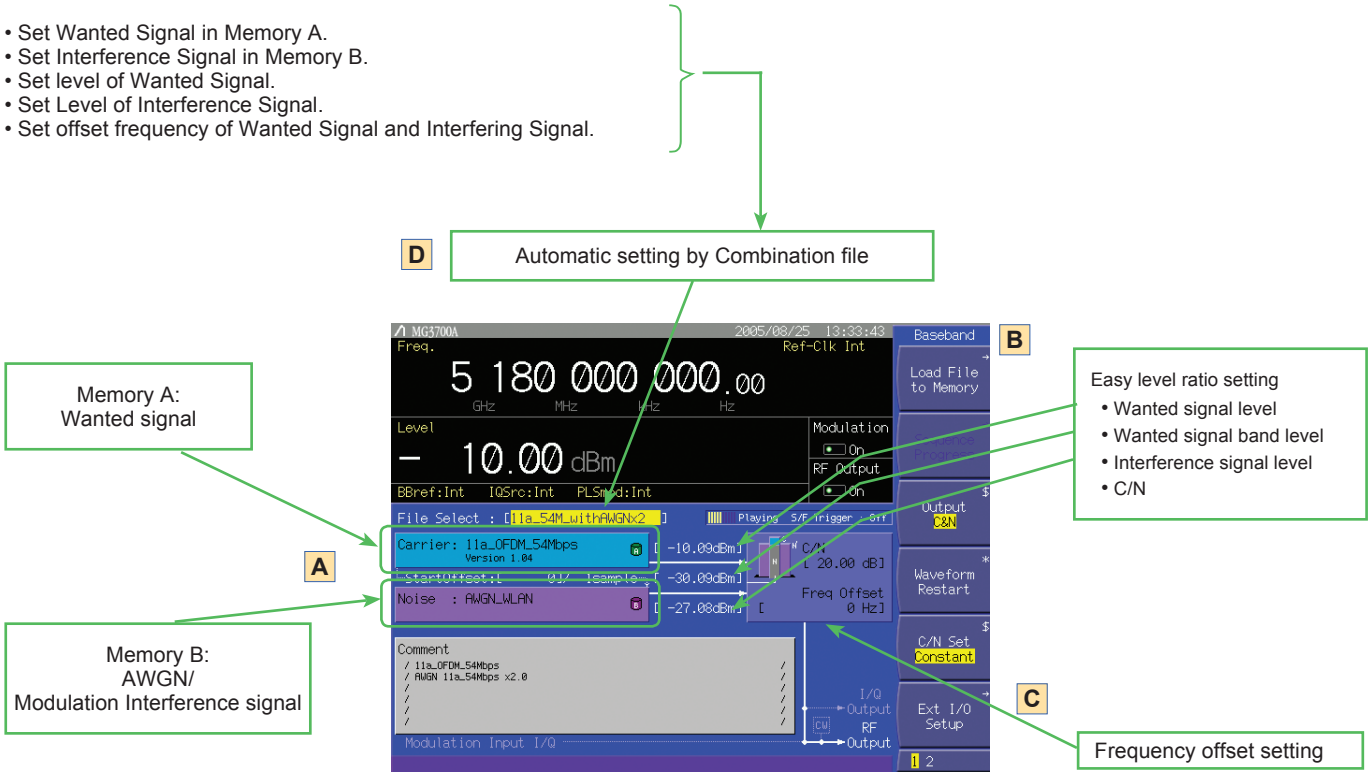


AWGN IQproducer Setting Screen

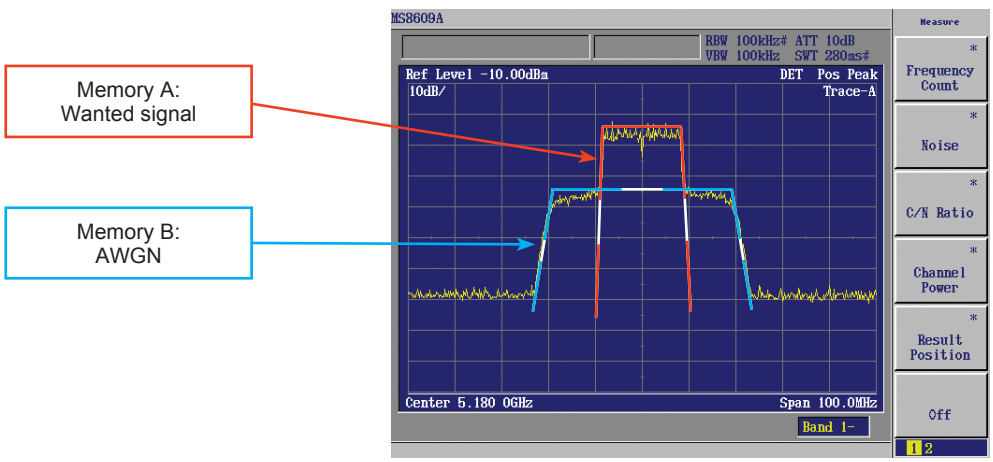
Because the MG3700A internal ARB memory can be partitioned in two, the Wanted Signal can be saved in one partition while the Interference Signal is saved in the other (Fig. A).
The two signals are output after combination in the MG3700A internal baseband block. The signal levels can be set independently and the C/N value can be set too (Fig. B).
In addition, the frequency offset of the Wanted Signal and Interference Signal can be set on-screen (Fig. C).
The built-in Combination function automatically sets the following (Fig. D):

- Set Wanted Signal in Memory A.
- Set Interference Signal in Memory B.
- Set level of Wanted Signal.
- Set Level of Interference Signal.
- Set offset frequency of Wanted Signal and Interfering Signal.

The Combination function supports full auto-setting of parameters for the Wanted Signal, Interference Signal, Level Ratio, and Frequency Offset simply by selecting the Combination File.
Each parameter can also be set separately on-screen after auto-setting, if necessary.
Combination files for W-CDMA_BS, PDC, and PHS are pre-installed on the MG3700A hard disk and the customer can customize these files as necessary using the bundled free tools.



WLAN Wanted Signal + AWGN



WLAN Wanted Signal + AWGN Spectrum

W-CDMA IQproducer

Standard accessory

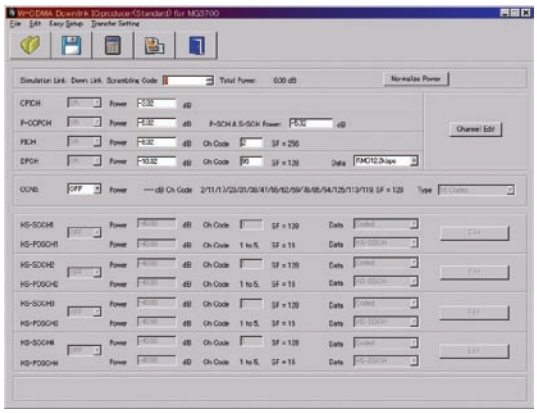
W-CDMA IQproducer is GUI-based, PC application software for generating waveform patterns used in W-CDMA Rx sensitivity measurement. Once created, the waveform pattern file is downloaded to the MG3700A hard drive.
Using the MG3700A, Vector Signal Generator functionality, the files are loaded, selected, and output as a modulated RF signal.
By changing the Scrambling Code Number and Channelization Code Number, waveform patterns can be created that support the evaluation of W-CDMA terminals.
If complete control of all W-CDMA parameters is required, the MX370101A HSDPA/HSUPA IQproducer software (sold separately) can be used. For details, see the MX370101A HSDPA/HSUPA IQproducer section of this document.

- Downlink Settings

Downlink sets parameters including Scrambling code, CPICH/P-CCPCH/PICH/DPCH power, Channelization code, DPCH_PhyCH TFCI and Timing Offset, and DPCH_TrCH Data to create the waveform pattern. (For details, see the Downlink Parameter Setting Range table described later.)
Additionally, the Downlink Easy Setup function supports the Reference Measurement Channel (RMC) items specified by 3GPP TS25.101 and TS25.104. Parameter setting is easy just by selecting the items to create the waveform pattern.

Easy Setup Items include:

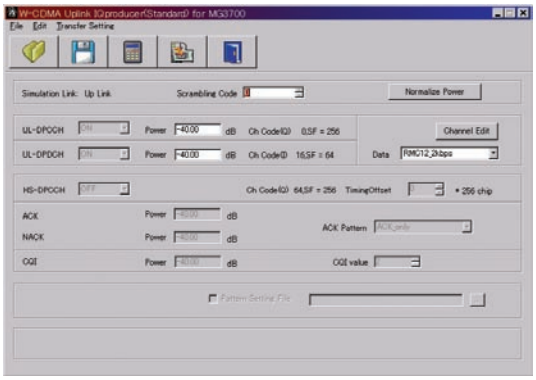
RMC: RMC 12.2 kbps (RX test)
RMC 12.2 kbps (Performance test)
RMC 64 kbps (Performance test)
RMC 144 kbps (Performance test)
RMC 384 kbps (Performance test)



Downlink Main screen

- Uplink Settings

Uplink sets parameters including Scrambling code, UL-DPCCH/UL-DPDCH power, DPCH_PhyCH TFCI and Timing Offset, and DPCH_TrCH Data to create the waveform pattern. (For details, see the Uplink Parameter Setting Range table described later.)



Uplink Main screen

• Downlink Parameter Setting Range

Display		Setting range
Scrambling Code		0 to 8191
CPICH	ON/OFF	ON or OFF
	Power	−40.00 to 0.00 dB, Resolution 0.01 dB
P-CCPCH	ON/OFF	ON or OFF
	Power	−40.00 to 0.00 dB, Resolution 0.01 dB
	P-SCH & S-SCH Power	−40.00 to 0.00 dB, Resolution 0.01 dB
PICH	ON/OFF	ON or OFF
	Power	−40.00 to 0.00 dB, Resolution 0.01 dB
	Channelization Code	0 to 255
DPCH	ON/OFF	ON or OFF
	Power	−40.00 to 0.00 dB, Resolution 0.01 dB
	Channelization Code	0 to SF −1 The spreading factor (SF) varies with the [Data] setting as follows: RMC 12.2 kbps = 128 RMC 64 kbps = 32 RMC 144 kbps = 16 RMC 384 kbps = 8 AMR1, AMR2, AMR3 = 128 ISDN = 32 384 kbps Packet = 8
	Data	RMC 12.2 kbps, RMC 64 kbps, RMC 144 kbps, RMC 384 kbps, AMR1, AMR2, AMR3, ISDN, 384 kbps Packet
OCNS	ON/OFF	ON or OFF
	Type	16 Codes
P-CCPCH Edit	SFN Cycle	Short or 4096
DPCH Edit (Phy CH)	TFCI	0 to 1023
	Timing Offset	0 to 149
DPCH Edit (TrCH Edit)	Data	PN9, PN9fix, PN15fix, 16bit repeat

• Uplink Parameter Setting Range

Display		Setting range
Scrambling Code		0 to 16777215
UL-DPCCH, UL-DPDCH	Power	−40.00 to 0.00 dB
	Data	RMC 12.2 kbps, RMC 64 kbps, RMC 144 kbps, RMC 384 kbps, AMR1, AMR2, AMR3, ISDN, 64 kbps Packet
DPCH Edit (Phy CH)	TFCI	0 to 1023
	Timing Offset	0 to 149
DPCH Edit (TrCH Edit)	Data	PN9, PN9fix, PN15fix, 16bit repeat
Channel Gain	Beta c	0 to 15
	Beta d	0 to 15

MX370101A HSDPA/HSUPA IQproducer

Optional

This optional GUI-based PC application software is used to set parameters and generate waveform patterns for 3GPP HSDPA (Uplink/Downlink) systems.
Once created, the waveform pattern file is downloaded to the MG3700A hard drive.
Using the MG3700A, Vector Signal Generator functionality, the files are loaded, selected, and output as a modulated RF signal.
The HS-PDSCH and HS-DPCCH parameters specified in TS25.212 can be set.
The Downlink Easy Setup function assigns default values to some parameters and sets other items to typical values, making the creation of an accurate waveform pattern fast and easy.

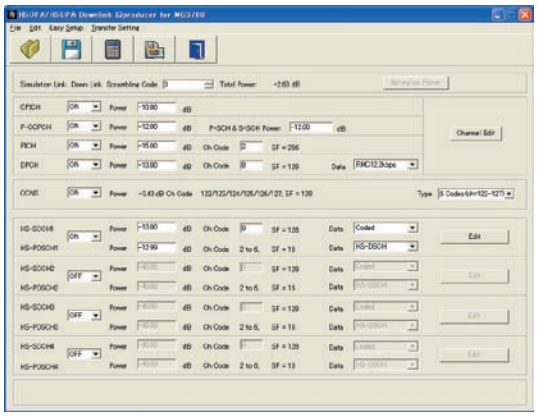
● Downlink Settings

Various downlink parameters can be set. (For details, see the Downlink Parameter Setting table described later.)
The Downlink Easy Setup function supports the HSDPA Fixed Reference Channel (FRC) items specified in 3GPP TS25.101, and the Reference Measurement Channel (RMC) items specified in 3GPP TS25.101 and TS25.104.

Easy Setup Items include:

FRC: H-Set1 (QPSK), H-Set1 (16QAM), H-Set2 (QPSK), H-Set2 (16QAM), H-Set3 (QPSK), H-Set3 (16QAM), H-Set4, H-Set5

RMC: RMC 12.2 kbps (RX test)
RMC 12.2 kbps (Performance test)
RMC 64 kbps (Performance test)
RMC 144 kbps (Performance test)
RMC 384 kbps (Performance test)

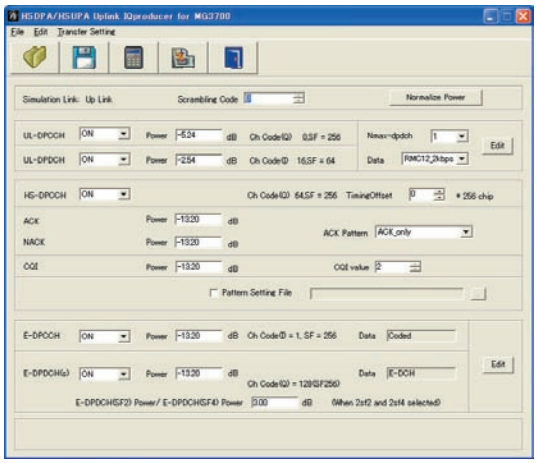


Downlink Main screen

● Uplink Settings

Uplink sets parameters for UL-DPCCH/UL-DPDCH and HS-DPCCH channels and generates waveform patterns.
(For details, see the Uplink Parameter Setting Range table described later).

HS-DPCCH (ACK, NACK, CQI)
UL-DPCCH
UL-DPDCH
E-DPCCH
E-DPDCH (s)



Uplink Main screen

● Parameter Save/Recall

The numeric values and settings for each item can be saved in a parameter file. Enter the file name in the [File name] field and click the [Save] button to save the parameter file.
A saved parameter file is recalled by selecting it in the file list and clicking the [Open] button.

• Downlink Parameter Setting Range

Display	Setting range	
Scrambling Code		0 to 8191
CPICH	ON/OFF	ON or OFF
	Power	−40.00 to 0.00 dB, Resolution 0.01 dB
P-CCPCH	ON/OFF	ON or OFF
	Power	−40.00 to 0.00 dB, Resolution 0.01 dB
PICH	ON/OFF	ON or OFF
	Power	−40.00 to 0.00 dB, Resolution 0.01 dB
	Channelization Code	0 to 255
DPCH	ON/OFF	ON or OFF
	Power	−40.00 to 0.00 dB, Resolution 0.01 dB
	Channelization Code	0 to SF −1 The spreading factor (SF) varies with the [Data] setting as follows: RMC 12.2 kbps = 128, RMC 64 kbps = 32, RMC 144 kbps = 16, RMC 384 kbps = 8, AMR1, AMR2, AMR3 = 128, ISDN = 32, 384 kbps Packet = 8
	Data	RMC 12.2 kbps, RMC 64 kbps, RMC 144 kbps, RMC 384 kbps, AMR1, AMR2, AMR3, ISDN, 384 kbps Packet, User Edit TrCH
OCNS	ON/OFF	ON or OFF
	Type	16 Codes or 6 Codes
HS-SCCH1/2/3/4	ON/OFF	ON or OFF
	Power	−40.00 to 0.00 dB
	Channelization Code	0 to 127
	Data	PN9, PN9fix, PN15fix, 16bit repeat, Coded
HS-PDSCH1/2/3/4	ON/OFF	ON or OFF
	Power	−40.00 to 0.00 dB
	Channelization Code	0 to 127
	Data	PN9, PN9fix, PN15fix, 16bit repeat, HS-DSCH ([PN9] can be set only when all four HSDPA channels are set to [OFF].)
P-CCPCH Edit	SFN Cycle	Short or 4096
DPCH Edit (Phy CH)	DPCH Data	PN9, PN9fix, PN15fix, 16bit repeat, TrCH
	TFCI	0 to 1023
	Spreading Factor	4, 8, 16, 32, 64, 128, 256, 512
	BER	0.0 to 100.0%
	Slot Format	#0 to #16
	Timing Offset	0 to 149
	TPC Edit	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 to 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111
DPCH Edit (TrCH Edit)	TrCH Number	1 to 8
	DTX	Fix/Flex
	Data	PN9, PN9fix, PN15fix, 16bit repeat
	TTI	10, 20, 40, 80 ms
	Max. TrBk Size	0 to 5000
	TrBk Size	0 to 5000
	Max TrBk Set No.	0 to 64
	TrBk Set No.	0 to 64
	CRC	0, 8, 12, 16, 24 bit
	Coder	CC1/2, CC1/3, TC
	RM attribute	1 to 256
	BER	0.0% to 100.0%
	BLER	0% to 100%
HSDPA transport channel (HS-SCCH, HS-PDSCH parameters)	Channelization Code Offset	1 to (16 − Number of Physical Channel Code)
	Number of Physical Channel Code	1 to (16 − Channelization Code Offset)
	Modulation	QPSK or 16QAM
	Transport Block Size Information	0 to 63
	RV Information	0 to 7
	UE Identity	0 to 65535
	CRC Error Insertion	Correct or Fail (CRC error of all)
	Number of HARQ Processes	0 to 8
	Virtual IR Buffer Size	800 to 304000 (Resolution 800)
	Payload Data	PN9, PN9fix, PN15fix, 16bit repeat
Transmitting Pattern Edit	HARQ Process Cycle	1 to 16 (Note ranges from 1 to 6 when PN9 set for Payload Data)
	Inter-TTI Distance	1 to 8
	TTI Start Offset	0 to 7
	Process Setting File	Used or Not used

MX370101A HSDPA/HSUPA IQproducer

Optional

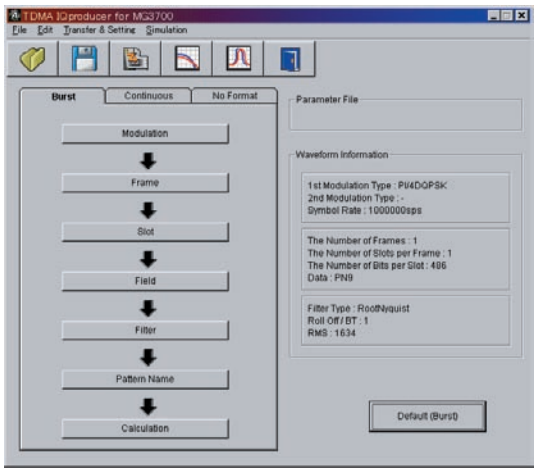
- Uplink Parameter Setting Range

Display	Setting range	
Scrambling Code		0 to 16777215
UL-DPCCH, UL-DPDCH	Channel ON/OFF	ON or OFF
	Power	−40.00 to 0.00 dB
	Nmax-dpdch	0, 1
	Data	RMC 12.2 kbps, RMC 64 kbps, RMC 144 kbps, RMC 384 kbps, AMR1, AMR2, AMR3, ISDN, 64 kbps Packet, User Edit TrCH
HS-DPCCH	ON/OFF	ON or OFF
	Timing Offset	0 to 149
	ACK Power	−40.00 to 0.00 dB
	NACK Power	−40.00 to 0.00 dB
	CQI Power	−40.00 to 0.00 dB
	ACK Pattern	ACK_only, NACK_only, alt_ACK_NACK_DTX
	CQI value	0 to 30
	Pattern Setting File	Used or Not used
E-DPCCH, E-DPDCH	E-DPCCH ON/OFF	ON or OFF
	E-DPDCH ON/OFF	ON or OFF
	E-DPCCH Power	−40.00 to 0.00 dB
	E-DPDCH Power	−40.00 to 0.00 dB
	E-DPDCH (SF2) Power/ E-DPDCH (SF4) Power	−10.00 to +10.00 dB
DPCH Edit (Phy CH)	UL-DPDCH Data	PN9, PN9fix, PN15fix, 16bit repeat, TrCH
	TFCI	0 to 1023
	Spreading Factor	4, 8, 16, 32, 64, 128, 256
	BER	0.0% to 100.0% (Enabled when [Data] set to [PN9])
	Slot Format	#0 to #1 (Only enabled when [UL-DPDCH Data] set to [TrCH])
	Timing Offset	0 to 149
	TPC Edit	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 to 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111
DPCH Edit (TrCH Edit)	TrCH Number	1 to 8
	Data	PN9, PN9fix, PN15fix, 16bit repeat
	TTI	10, 20, 40, 80 ms
	Max. TrBk Size	0 to 5000
	TrBk Size	0 to 5000
	Max TrBk Set No.	0 to 64
	TrBk Set No.	0 to 64
	CRC	0, 8, 12, 16, 24 bit
	Coder	CC1/2, CC1/3, TC
	RM attribute	1 to 256
	BER	0.0% to 100.0% (Enabled when [Data] set to [PN9])
	BLER	0% to 100% (Enabled when [Data] set to [PN9])
E-DPDCH and E-DPCCH Edit (Phy CH)	HARQ Process Setting File	Common dialog opens when the check box is checked. HARQ Process Setting File can be selected.
	E-DPCCH Data	PN9, PN9fix, PN15fix, 16bit repeat, Coded
	E-DPDCH Data	PN9, PN9fix, PN15fix, 16bit repeat, E-DCH
	HS-DSCH Configured	Yes, No
	E-DPDCH Channel Codes	SF256, SF128, SF64, SF32, SF16, SF8, SF4, 2SF4, 2SF2, 2SF2and2SF4
E-DPDCH and E-DPCCH Edit (Tr CH)	E-DCH TTI	2 ms, 10 ms
	Information Bit Payload	18 to 11484 (at E-DCH TTI = 2 ms) 18 to 20000 (at E-DCH TTI = 10 ms)
	E-DCH Payload Data	PN9, PN9fix, PN15fix, 16bit repeat
	E-TFCI Information	0 to 127
	RSN	0 to 3
	Pattern Length	Display only
	E-DCH RV Index	0 to 3
	CRC Error Insertion	Correct, Error
	"Happy" Bit	0, 1

MX370102A TDMA IQproducer

Optional

This optional GUI-based PC application software is used to set the parameters and generate waveform patterns for TDMA systems. Once created, the waveform pattern file is downloaded to the MG3700A hard drive.
Using the MG3700A, Vector Signal Generator functionality, the files are loaded, selected, and output as a modulated RF signal.
In addition to signals supporting PDC, PHS, ARIB STD-T61/T79/T86, Advanced-PHS, ETC and DSRC systems, signals for other systems can also be generated.

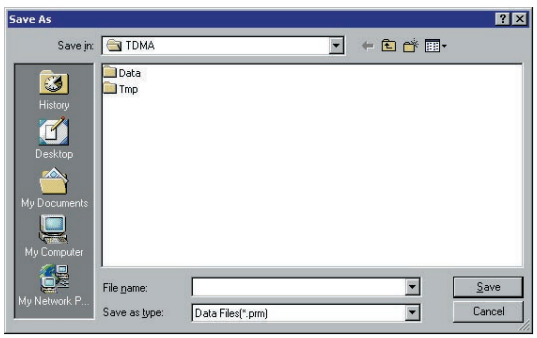


Main Screen

• Parameter Setting Items List

Setting	Parameter Setting Sheet		
	Burst	Continuous	No Format
Modulation	√	√	√
Frame	√	√	–
Slot	√	√	–
Field	√	√	–
Data	–	–	√
Filter	√	√	√
Pattern Name	√	√	√
Calculation	√	√	√

• Parameter Save/Recall



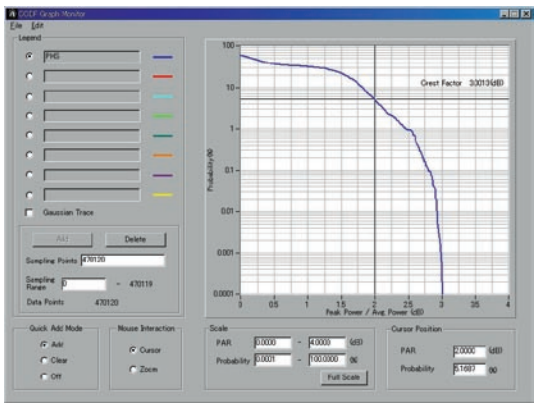
The numeric values and settings for each item can be saved in a parameter file. Enter the file name in the [File name] field and click the [Save] button to save the parameter file.
A saved parameter file is recalled by selecting it in the file list and clicking the [Open] button.

• Graphical Simulation Displays

This function displays a generated waveform as a Complementary Cumulative Distribution Function (CCDF) and Fast Fourier Transform (FFT) on the PC.
It is useful for checking or reviewing waveforms.

CCDF Graph

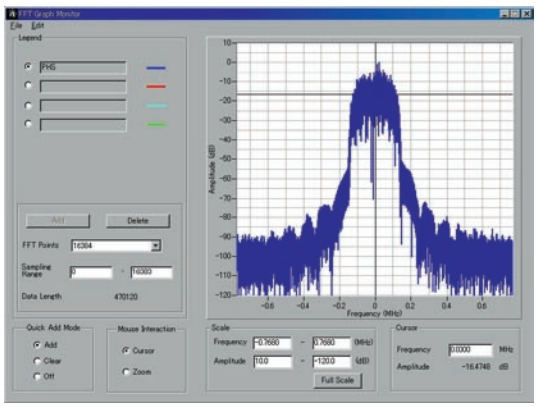
Up to eight generated waveform patterns can be read and displayed as CCDF graphs.



CCDF Graph Screen

FFT Graph

Up to four generated waveform patterns can be read and displayed as FFT graphs.



FFT Graph Screen

MX370102A TDMA IQproducer

Optional

Parameter Setting Items List

Items	Display	Outline	Setting range
Modulation	Modulation Type (1st Modulation Type)	1st Modulation Type	BPSK, DBPSK, PI/2DBPSK, QPSK, DQPSK, PI/4DQPSK, 8PSK*1, D8PSK*1, 16QAM*1, 32QAM*1, 64QAM*1, 256QAM*1, ASK, FSK
	Modulation Type (2nd Modulation Type)	2nd Modulation Type	BPSK, DBPSK, PI/2DBPSK, QPSK, DQPSK, PI/4DQPSK, 8PSK, D8PSK, 16QAM, 32QAM, 64QAM, 256QAM
	Symbol Rate	Symbol Rate	1 ksps to 80 Msps (can be set in the 1 sps units)
	Over Sampling	Over Sampling Rate	2, 3, 4, 8, 16, 32
	Sampling Rate	Sampling Rate	20 kHz to 160 MHz (The value of symbol rate x oversampling rate is set automatically. However, when the Manchester code setting enabled, the value of symbol rate x oversampling rate × 2 is set automatically.)
	GSM	GSM Setting	Enable/disable automatic setting in accordance with GSM (Enabled when 8PSK or FSK set as modulation type)
	Modulation Index	Modulation Index	0.00 to 1.00 (for ASK), 0.20 to 10.00 (for FSK)
	Manchester Code	Manchester Code	The Manchester code is selected when this checkbox is selected, and NRZ is selected when this checkbox is cleared. NRZ is always selected for modulation types other than ASK.
Frame	Number of Frames	Frame number	1 to 4088, Auto
	Number of Slots per Frame	Slot numbers in one frame	1 to 20
Slot (Burst)	1, 24 field	Guard field	Set the number of bits listed in the separate table according to Modulation Type.
	2, 23 field	Ramp field	Set the number of bits listed in the separate table according to Modulation Type.
	3 to 22 field	Fixed (Fixed data) field	Set integer from 0 to 128.
	3 to 22 field	Data (PN9, PN15) field	Set integer from 0 to 1024.
	4 to 22 field	CRC (Cyclic Redundancy Check character) field	0, 8, 12, 16, 24, 32
Slot (Continuous)	1 to 24 field	Fixed (Fixed data) field	Set integer from 0 to 128.
	1 to 24 field	Data (PN9, PN15) field	Set integer from 0 to 1024.
	2 to 24 field	CRC (Cyclic Redundancy Check character) field	0, 8, 12, 16, 24, 32
Field (Burst/ Continuous)	Fixed	Sets hexadecimal fixed data	0 to maximum value of number of bits set
	CRC	Sets CRC calculation field as integer	1 to number of bits in field on left to CRC (except Guard and Ramp fields)
	Data Field	Selects continuous pattern	PN9, PN15, 16 bit Pattern, ALL0, ALL1, UserFile*2 Input any hexadecimal number for 16 bit Pattern.
Data (No Format)	Data	Selects continuous pattern	PN9, PN15, 16 bit Pattern, ALL0, ALL1, UserFile*2
Filter	Filter	Filter type	Root Nyquist, Nyquist, Gaussian, IdealLowpass, None
	Roll Off/BT	Roll off rate/BT product	0.10 to 1.00 (When Nyquist/Root Nyquist/Gaussian is set.)
	Passband	Passband of filter	Fs/2, Fs/3, Fs/4, Fs/8, Fs/16, Fs/32 (This item is displayed and can be set only when IdealLowpass is set as the filter type. The setting range varies with the oversampling rate.)
	RMS	RMS value of waveform pattern data	651 to 4104
Pattern Name	Package	Package name	Within 31 characters
	Pattern Name	Waveform pattern file name	Within 20 characters
	Comment	Comment	Within 38 characters
Calculation	Starts waveform pattern data generation after setting parameters.		

∗ 1: Decimal numbers for each symbol point are changed by selecting a user file for IQ mapping.
∗ 2: When "UserFile" is set, the binary sequence is read from a text file. Up to 9,600,000 bits can be loaded and then modulated.

Guard Field Setting Range

(1st/2nd) Modulation Type	Number of Bits in 1st Field	Number of Bits in 24th Field
BPSK, DBPSK, PI/2DBPSK, ASK, FSK	Integer between 0 and 16	Integer between 1 and 16
QPSK, DQPSK, PI/4DQPSK	Multiples of 2 between 0 and 32	Multiples of 2 between 2 and 32
8PSK, D8PSK	Multiples of 3 between 0 and 48	Multiples of 3 between 3 and 48
16QAM	Multiples of 4 between 0 and 64	Multiples of 4 between 4 and 64
32QAM	Multiples of 5 between 0 and 80	Multiples of 5 between 5 and 80
64QAM	Multiples of 6 between 0 and 96	Multiples of 6 between 6 and 96
256QAM	Multiples of 8 between 0 and 128	Multiples of 8 between 8 and 128

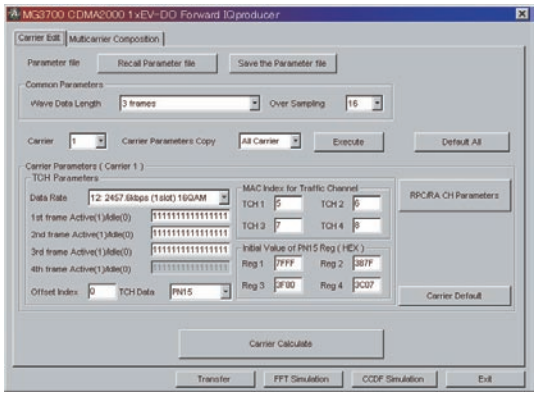
Ramp Field Setting Range

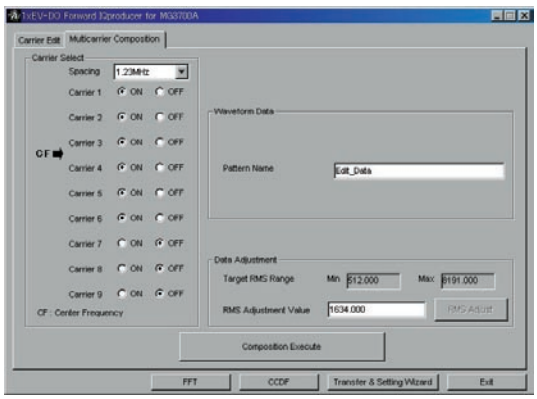
(1st/2nd) Modulation Type	Number of Bits
BPSK, DBPSK, PI/2DBPSK, ASK, FSK	Integer number between 1 and 16
QPSK, DQPSK, PI/4DQPSK	Multiples of 2 between 2 and 32
8PSK, D8PSK	Multiples of 3 between 3 and 48
16QAM	Multiples of 4 between 4 and 64
32QAM	Multiples of 5 between 5 and 80
64QAM	Multiples of 6 between 6 and 96
256QAM	Multiples of 8 between 8 and 128

MX370103A CDMA2000 1xEV-DO IQproducer

Optional

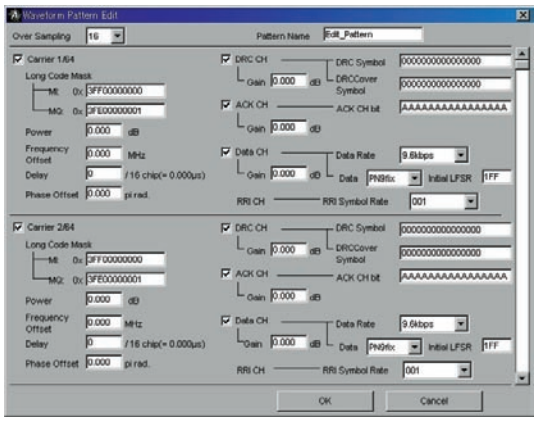
This optional GUI-based PC application software is used to set parameters and generate waveform pattern files for CDMA2000 1xEV-DO systems (1xEV-DO forward and 1xEV-DO Reverse). Once created, the waveform pattern file is downloaded to the MG3700A hard drive. Using the MG3700A, Vector Signal Generator functionality, the files are loaded, selected, and output as a modulated RF signal.
Forward generates multi-carrier signals for up to nine carriers and Idle and Active mixed signals.
Reverse generates multi-user signals with freely adjustable frequency, phase, level, and delay.





1xEV-DO Forward Setting Screen

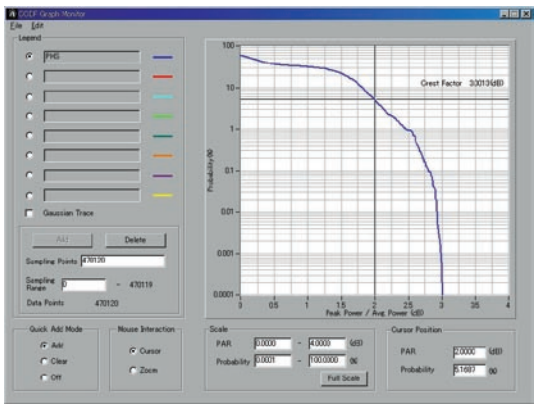
● Parameter Save/Recall
The numeric values and settings for each item can be saved in a parameter file. Enter the file name in the [File name] field and click the [Save] button to save the parameter file.
A saved parameter file is recalled by selecting it in the file list and clicking the [Open] button.



1xEV-DO Reverse Setting Screen

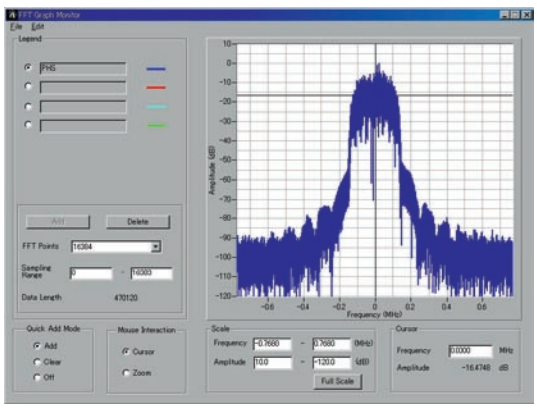
● Graphical Simulation Displays
This function displays a generated waveform as a Complementary Cumulative Distribution Function (CCDF) and Fast Fourier Transform (FFT) on the PC.
It is useful for checking or reviewing waveforms.

CCDF Graph
Up to eight generated waveform patterns can be read and displayed as CCDF graphs.



CCDF Graph Screen

FFT Graph
Up to four generated waveform patterns can be read and displayed as FFT graphs.



FFT Graph Screen

MX370103A CDMA2000 1xEV-DO IQproducer

Optional

- 1xEV-DO Forward Setting Range

Carrier Edit Sheet

Set the modulation parameters for single carriers (associated with carrier numbers 1 to 9) constituting the multi-carrier on the Carrier Edit sheet.

Display	Setting Range
Wave Data Length	Number of frames of generated waveform pattern. Specify up to 4 frames. Specify 3 frames when generating multi-carrier.
Over Sampling	Over sampling rate for waveform patterns. Set 4, 8, or 16.
Default All	Restores settings of all single carriers to initial values.
Carrier	Select single carrier to be edited from 1 to 9.
Carrier Parameters Copy	Specify single carrier where settings for currently-set single carrier to be copied (copy destination). Set Carrier 1 to Carrier 9 or All Carrier.
Execute	Copies settings of currently-set single carrier (corresponding to carrier number displayed in Carrier) to copy destination specified by Carrier Parameters Copy. Copied settings include contents of RPC/RA CH Parameter screen.
Data Rate	Set data rate and transmission slot for generated single carrier from following: 38.4 kbps (16 slots) QPSK, 76.8 kbps (8 slots) QPSK, 153.6 kbps (4 slots) QPSK, 307.2 kbps (2 slots) QPSK, 614.4 kbps (1 slot) QPSK, 307.2 kbps (4 slots) QPSK, 614.4 kbps (2 slots) QPSK, 1228.8 kbps (1 slot) QPSK, 921.6 kbps (2 slots) 8-PSK, 1843.2 kbps (1 slot) 8-PSK, 1228.8 kbps (2 slots) 16QAM, 2457.6 kbps (1 slot) 16QAM, Idle Slot
1st to 4th Frame Active (1)/Idle (0)	Set traffic channel active/idle for each slot.
TCH Data	Set traffic channel payload data. All '0': Sets payload data to all 0 s. All '1': Sets payload data to all 1s. PN15: Sets payload data to discontinuous PN15 sequence. PN15 is continuous within a frame.
Offset Index	Specify PN Offset Index of generated single carrier from 0 to 511.
TCH1 to TCH4	Specify MAC Index used for scrambling sequence of traffic channel and preamble Walsh cover as integer from 5 to 63.
Reg1 to Reg4	Initial value of linear feedback shift register used to generate PN15 sequence when TCH Data set to PN15. Set hexadecimal number from 0 to 7FFF. The offset can be added to the PN15 sequence of each TCH by changing this initial value.
Carrier Default	Restores settings of single carrier currently set on screen to initial values. (The corresponding carrier number is displayed in Carrier.) The settings in the Carrier Parameters frame are restored to the initial values of the single carrier.
RPC/RA CH Parameters	Opens the RPC/RA CH Parameters screen setting parameters of RPC and RA channels.
Carrier Calculate	Generates waveform patterns for 9 single carriers with current settings. After clicking this button, the entire process on the Carrier Edit sheet is completed when "Complete" is displayed on the Execution and Result screen.

RPC/RA CH Parameters Sheet

Display	Setting Range
Frame	Selects frame where RPC and RA channels to be edited.
Slot	Selects slot where RPC and RA channels to be edited.
RA Bit	RA bit of RA channel. Set 0 or 1.
CH Power	Channel gain of MAC channel (relative value to pilot channel). Set from −40 to +40 dB.
RPC Bit	RPC bit of RPC channel. Set 0 or 1.
ON/OFF	Turns each MAC channel on/off.
Normalize	Sets all channel gains of RPC and RA channels in currently-set slot collectively to ratio expressed as fraction. The numerator of the RA channel ratio can be set from 1 to denominator −1. The denominator can be set from 2 to 99.

Multi-carrier Composition Sheet

Generates multi-carrier or single carrier waveform pattern from single carrier waveform patterns generated in Carrier Edit sheet

Display	Setting Range
Spacing	Sets frequency interval between carriers with consecutive carrier numbers from 1.20, 1.23, or 1.25 MHz.
Carrier Select	Turns on single carrier used to generate multi-carrier (or single carrier, if only one single carrier turned on with all others turned off) in single carrier generated in Carrier Edit sheet.
Target RMS Range	"RMS" indicates waveform pattern RMS value. Set the maximum value to "Max" when adjusting the waveform pattern RMS value.
RMS Adjustment Value	Sets RMS value of multi-carrier or single-carrier waveform pattern.
RMS Adjust	Converts waveform pattern generated by clicking Composition Execute button into waveform pattern with RMS value close to value input in RMS Adjustment Value.

- 1xEV-DO Reverse Setting Range

Display	Description	Setting Range
Over Sampling	Ratio of waveform pattern sampling rate and chip rate.	4, 8, 16
Carrier On/Off	Set carrier On/Off. On when checked.	On, Off
Long Code Mask	Set I and Q long code masks. MQ set automatically when MI set by user.	MI, MQ: 0x0 to 0x3FFFFFFFFF
Power	Set carrier power.	−80.000 to 0.000 dB
Frequency Offset	Set carrier frequency offset from center frequency setting of MG3700A.	−5.000 to +5.000 MHz
Delay	Set carrier delay. The delay is the time interval from when a frame trigger is output from the rear panel of the MG3700A to when the first frame of the carrier is output.	0 to 32768 chip
Phase Offset	Set carrier phase offset.	0.000 to 2.000 pai rad.
DRC CH On/Off	Set DRC channel On/Off. "On" when checked.	On, Off
DRC CH Gain	Set channel gain of DRC channel by value relative to pilot channel.	−80.000 to +20.000 dB
DRC Symbol	Set DRC channel symbol data in hexadecimal.	0000000000000000 to FFFFFFFFFFFFFFFF (HEX)
DRC Cover Symbol	Set DRC cover symbol data in octal.	0000000000000000 to 7777777777777777 (OCT)
ACK CH On/Off	Set ACK channel On/Off. "On" when checked.	On, Off
ACK CH Gain	Set channel gain of ACK channel by value relative to pilot channel.	−80.000 to +20.000 dB
ACK CH Bit	Set ACK channel bit.	A (ACK), N (NACK), X (DTX)
Data CH On/Off	Set Data channel On/Off. "On" when checked.	On, Off
Data CH Gain	Set channel gain of Data channel by value relative to pilot channel.	−80.000 to +20.000 dB
Data Rate	Set Data channel data rate.	9.6, 19.2, 38.4, 76.8, 153.6 kbps
Data	Set Data channel payload data. The "PN9fix" selection item specifies a discontinuous PN9 code sequence.	PN9fix, All '0', All '1'
Initial LFSR	When PN9fix set for Data, set initial value of PN9 generation shift register in hexadecimal.	0 to 1FF (HEX)
RRI Symbol	Set RRI symbol in binary.	000 to 101 (BIN)

MX370104A Multi-carrier IQproducer

Optional

This GUI-driven PC application software is used to create a multi-carrier waveform pattern for modulated signals and tone signals of communications systems.
Once created, the waveform pattern file is downloaded to the MG3700A hard drive. Using the MG3700A, Vector Signal Generator functionality, the files are loaded, selected, and output as a multi-carrier RF signal.
W-CDMA downlink multi-carrier signals are supported as well as various types of clipping.

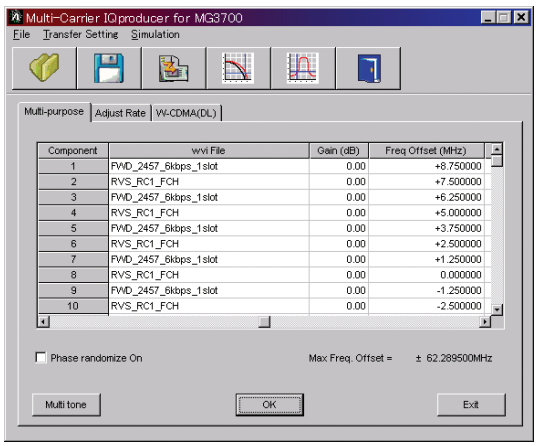
● Multi-purpose Function

By using the multi-carrier function, a signal with up to 32 carriers can be converted to a single waveform pattern. While it may not be possible to set 32 carriers due to the frequency offset and the waveform pattern, it is possible to create a waveform pattern with more than 32 carriers by combining multi-carrier waveform patterns.

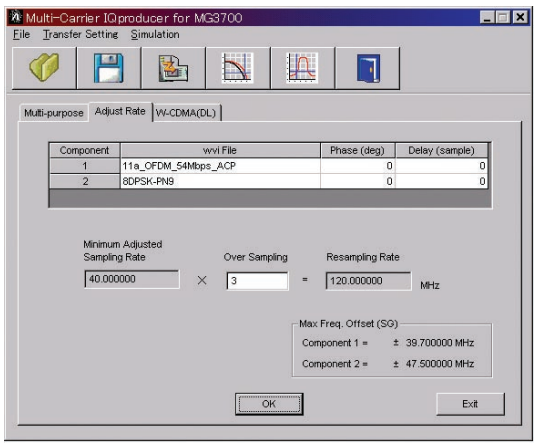
● Adjust Rate Function

The Adjust Rate function converts two waveform patterns with different sampling rates into two waveforms patterns with the same sampling rate.
By using the MG3700A Two-signal Combining function, combining waveform patterns with different sampling rates causes the bandwidth to change because the waveform pattern in memory B is output at the sampling rate of the waveform pattern in memory

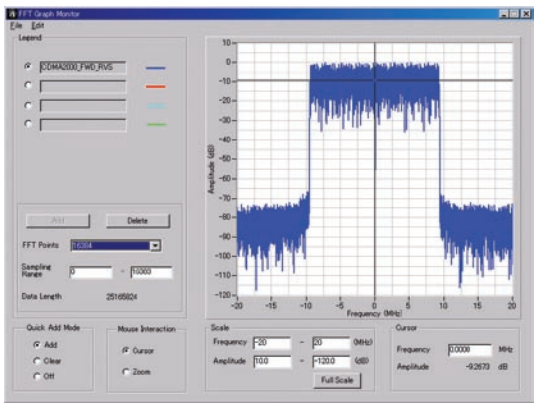
A. Using the Adjust Rate function, it is possible to combine the Wanted Signal and Interference Signal for various communication systems with the same sampling rate.
By matching the sampling rates of the two waveform patterns using this function, it is even possible to output a signal for different communication systems using the Two-signal Combining function.



Multi-carrier Setting Screen

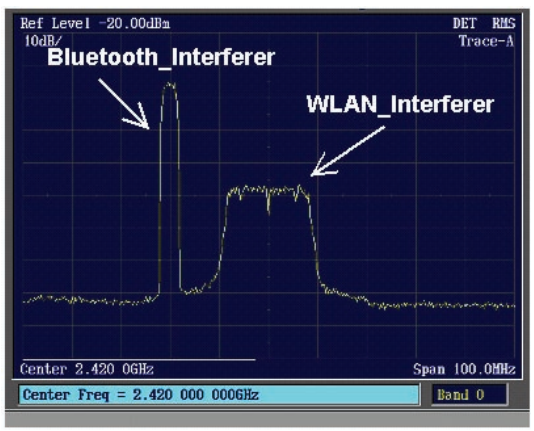


Multi-carrier Setting Screen



FFT Analysis Screen

Mixed CDMA2000 Forward and Reverse Signal



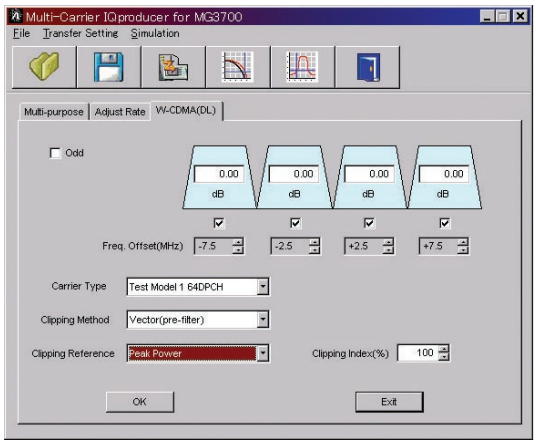
FFT Analysis Screen

WLAN and *Bluetooth* Sampling Rate Adjustment

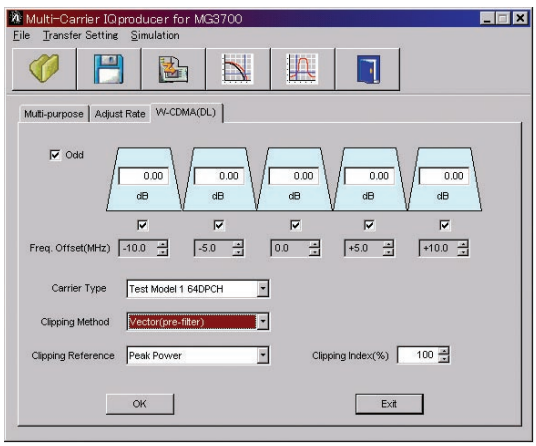
● W-CDMA (DL) Function

This function is used to create a waveform pattern by setting any of the 4 or 5 carriers of the W-CDMA Downlink ON/OFF, as well as by setting the Clipping Method, Clipping Reference Level, and Clipping Ratio.

• Clipping Method
  Non, Vector (pre-filter), Vector (post-filter),
  Scalar (pre-filter), Scalar (post-filter)
• Clipping Reference level
  Peak Power, RMS Power



Multi-carrier Setting Screen



Multi-carrier Setting Screen

MX370105A Mobile WiMAX IQproducer

Optional

This GUI-driven PC application software is used to set parameters and generate waveform patterns based on the IEEE 802.16e-2005 WirelessMAN-OFDMA standard. Signals that comply with this particular specification are also knows as mobile WiMAX signals. Once created, the waveform pattern file is downloaded to the MG3700A hard drive. The files are loaded, selected, and output as a modulated WiMAX signal. Permutation zones and user bursts are easy to configure in a frame using drop-and-drag functionality in a user-friendly GUI. Modulation, coding type, and coding rate can be set for each user burst. Most receiver tests described in IEEE 802.16e-2005 (Section 8.4.13, Receiver Requirement) can be performed except those functional tests requiring equipment other than a Signal Generator.

● Recommended Options

MG3700A-021 ARB Memory Upgrade 512 Msamples

The IEEE802.16e Receiver Requirement has an item for checking whether specifications are met by adding an Interference Signal to the Wanted Signal. This check requires two signals but by using the Two-signal Combine function, one MG3700A unit can output both the Wanted and Interference signals. In addition, if the memory is increased, several waveform patterns for different communication methods can be saved in memory for instant recall when required.

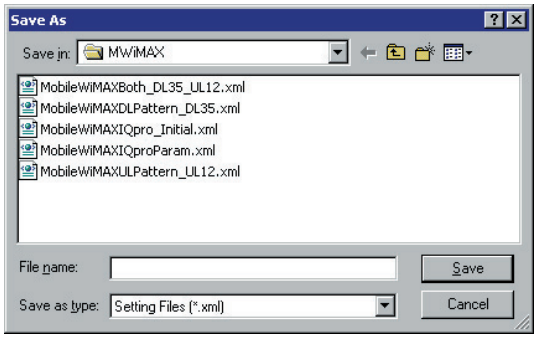
MG3700A-031 High-Speed BER Test Function

The IEEE802.16e Receiver Requirement has a BER measurement test that uses a Fixed pattern. The optional MG3700A-031 High-Speed BER test function* supports BER measurement using a Fixed pattern.

* : The standard BER function does not support Fixed-pattern measurement.

● Parameter Save/Recall

The numeric values and settings for each item can be saved in a parameter file. Enter the file name in the [File name] field and click the [Save] button to save the parameter file.
A saved parameter file is recalled by selecting it in the file list and clicking the [Open] button.



● Graphical Simulation Displays

Clipping, filtering, and checking can be performed for created waveform patterns by displaying CCDF, FFT, and Time Domain graphs.

CCDF Graph

Up to eight generated waveform patterns can be read and displayed as CCDF graphs.

FFT Graph

Up to four generated waveform patterns can be read and displayed as FFT graphs.

Time Domain Graph Display

Up to four types of Time Domain graph can be displayed when reading created waveform patterns.

Clipping Function

Clipping and filtering can be performed for created waveform patterns.

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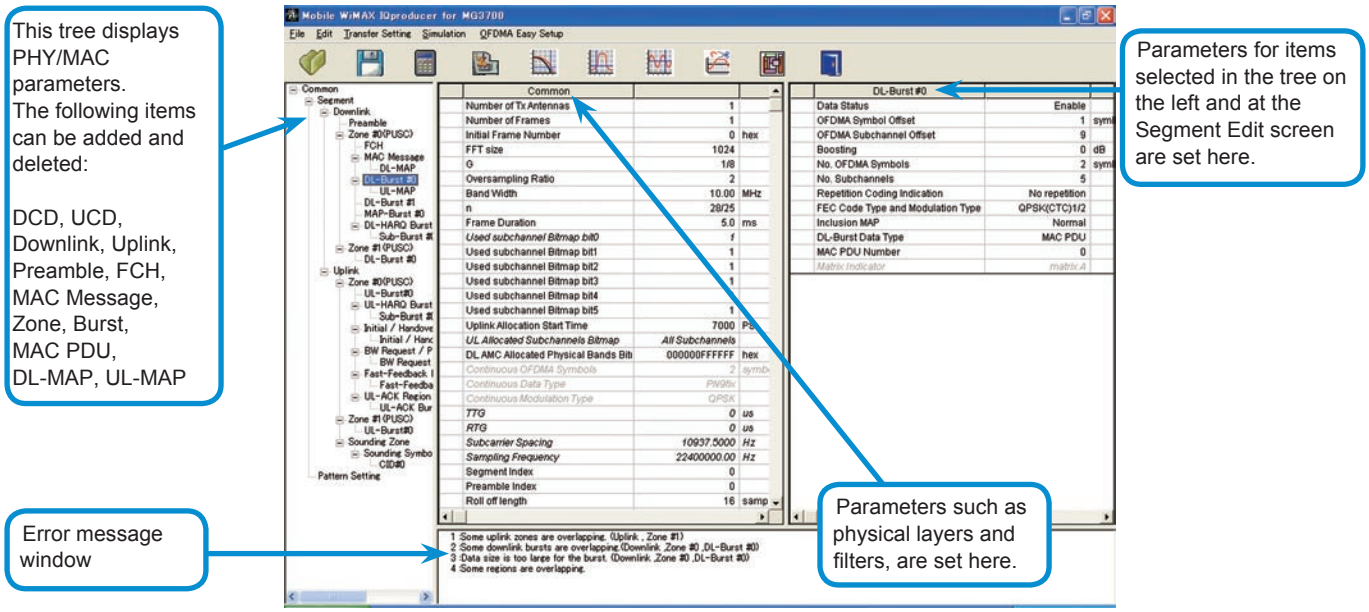
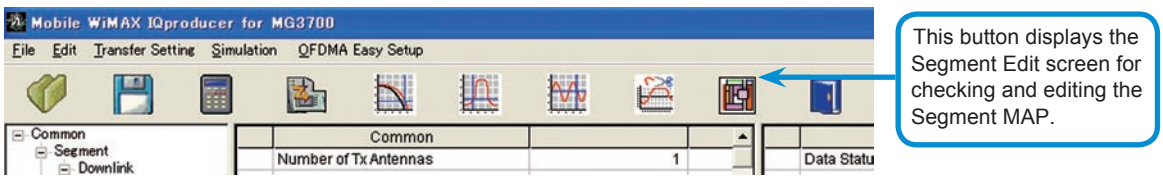
Optional



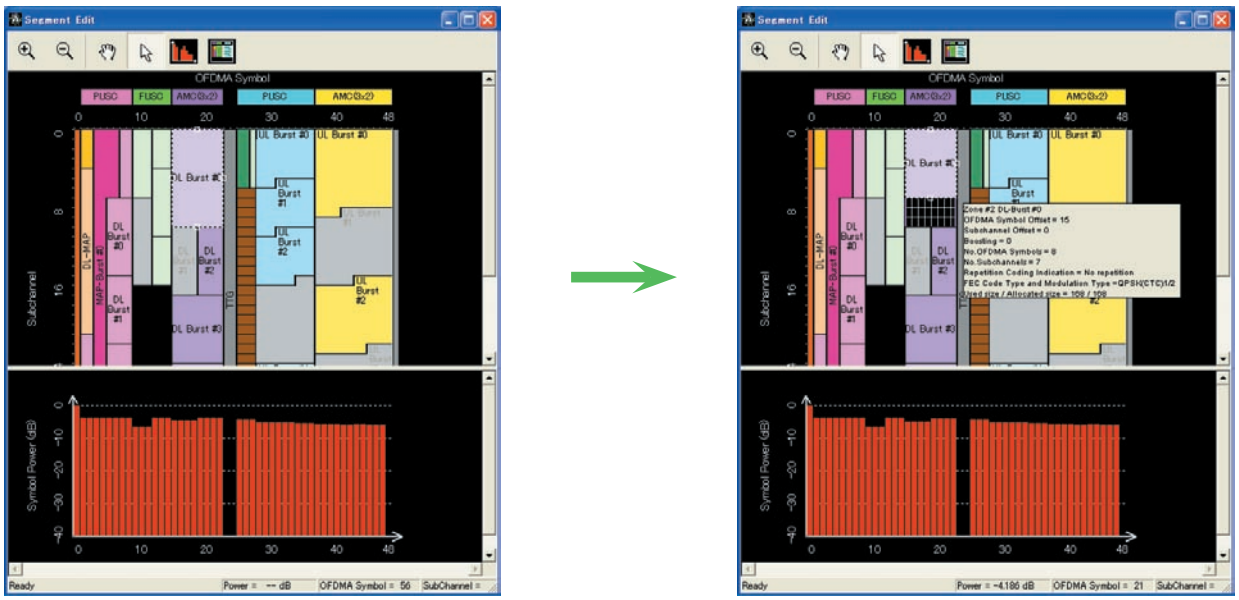
Mobile WiMAX IQproducer Main Screen

Excellent Operability: Segment Edit Screen

- The magnified or reduced Zone or Burst can be edited drop-and-drag techniques.
- The editing result is reflected in the Main screen parameters.
- An information window opens to describe parameters of any selected area.
- Parameters for the selected area are displayed on the Main screen.



Mobile WiMAX IQproducer Main Screen



Segment Edit Screen **Segment Edit Screen**

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Optional

- Parameter Setting Items

Tree	Items	Setting Range	Frame Duration = Continuous
Common	Number of Tx Antennas	1, 2	
	Number of Frames	1 to Maximum number of Frame saved in memory	Can not be set.
	Initial Frame Number	000000 to FFFFFF (HEX)	Can not be set.
	FFT size	128, 512, 1024, 2048	
	G (CP Time Ratio)	1/4, 1/8, 1/16, 1/32	
	Oversampling Ratio	2, 4, 8	
	Band Width	1.25, 1.50, 1.75, 2.50, 3.00, 3.50, 5.00, 6.00, 7.00, 8.75, 10.00, 12.00, 14.00, 15.00, 17.50, 20.00, 24.00, 28.00 MHz	
	n (Sampling Factor)	8/7, 28/25	
	Frame Duration	2.0, 2.5, 4.0, 5.0, 8.0, 10.0, 12.5, 20.0 ms, Continuous	
	Used subchannel Bitmap bit0 to bit5	1, 0: When FFT Size = 128, 512, bit 0/2/4 = 0. When Segment Index = 0, bit0 = 1; when Segment Index = 1, bit 2 = 1, when Segment Index = 2, bit 4 = 1. Cannot be set when DL Use All SC Indicator = All.	
	Uplink Allocation Start Time	0 to Frame EndPS (Cannot be set when neither of Downlink/Uplink not in tree)	Can not be set.
	Uplink Allocation Subchannels Bitmap	All Subchannels	
	DL AMC Allocated Physical Bands Bitmap	FFT Size = 2048 000000000000 to FFFFFFFFFFFF FFT Size = 1024 000000000000 to 000000FFFFFF FFT Size = 512 000000000000 to 000000000FFF FFT Size = 128 000000000000 to 000000000007	
	Continuous OFDMA Symbols	2 to maximum number of OFDMA Symbol in memory (2 symbol step):	Can be set
	Continuous Data Type	16 bit repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, User File: Coding, and Randomization cannot be set at data selected here.	Can be set
	Continuous Data Type Repeat Data	0000 to FFFF (HEX): Can be set when Continuous Data Type = 16 bit repeat	Can be set
	Continuous Data Type User File	User File selected: Can be set when Continuous Data Type = User File	Can be set
	Continuous Modulation Type	QPSK, 16QAM, 64QAM: Can be set when Frame Duration = Continuous	Can be set
	TTG	Display only: Gap interval between Downlink and Uplink displayed	
	RTG	Display only: Gap interval between Uplink and Frame End displayed	
	Subcarrier Spacing	Display only	
	Sampling Frequency	Display only: Depends on bandwidth, n (Sampling Factor), and Oversampling Ratio	
	Segment Index	0, 1, 2	Can not be set.
	Preamble Index	<Table 1>	Can not be set.
	Roll off length	0 to 32	
	Filter		
	Filter Type	Non, Gaussian, Root Nyquist, Nyquist, Ideal	
	Roll Off/BT	0.1 to 1.0: Cannot be set when Filter Type = Non, Ideal	
	Filter Length	1 to 1024: Cannot be set when Filter Type = Non, Ideal	
	DLFP		
	Repetition Coding Indication	No repetition, 2, 4, 6	Can not be set.
	Coding Indication	CC, CTC	Can not be set.
	DIUC Setting	Auto, Manual	
	DIUC List	QPSK (CC) 1/2, QPSK (CC) 3/4, 16QAM (CC) 1/2, 16QAM (CC) 3/4, 64QAM (CC) 1/2, 64QAM (CC) 2/3, 64QAM (CC) 3/4, QPSK (CTC) 1/2, QPSK (CTC) 3/4, 16QAM (CTC) 1/2, 16QAM (CTC) 3/4, 64QAM (CTC) 1/2, 64QAM (CTC) 2/3, 64QAM (CTC) 3/4, 64QAM (CTC) 5/6	
	UIUC Setting	Auto, Manual	
	UIUC List	QPSK (CC) 1/2, QPSK (CC) 3/4, 16QAM (CC) 1/2, 16QAM (CC) 3/4, 64QAM (CC) 1/2, 64QAM (CC) 2/3, 64QAM (CC) 3/4, QPSK (CTC) 1/2, QPSK (CTC) 3/4, 16QAM (CTC) 1/2, 16QAM (CTC) 3/4, 64QAM (CTC) 1/2, 64QAM (CTC) 2/3, 64QAM (CTC) 3/4, 64QAM (CTC) 5/6	
Segment	Multi-Path Setting	Enable, Disable	
	Tx Antenna0, 1	Multi-Path Number: 1 to 20 Delay: 0.0 to 10000.0 ns Gain: –80.0 to 0.0 dB Phase: 0.0° to 359.9°	

Table 1: Preamble Index Setting Range

When Segment Index = 0	When Segment Index = 1	When Segment Index = 2
0(IDcell=0), 1(IDcell=1), 2(IDcell=2), 3(IDcell=3), 4(IDcell=4), 5(IDcell=5), 6(IDcell=6), 7(IDcell=7), 8(IDcell=8), 9(IDcell=9), 10(IDcell=10), 11(IDcell=11), 12(IDcell=12), 13(IDcell=13), 14(IDcell=14), 15(IDcell=15), 16(IDcell=16), 17(IDcell=17), 18(IDcell=18), 19(IDcell=19), 20(IDcell=20), 21(IDcell=21), 22(IDcell=22), 23(IDcell=23), 24(IDcell=24), 25(IDcell=25), 26(IDcell=26), 27(IDcell=27), 28(IDcell=28), 29(IDcell=29), 30(IDcell=30), 31(IDcell=31), 96(IDcell=0), 99(IDcell=3), 102(IDcell=6), 105(IDcell=9), 108(IDcell=12), 111(IDcell=15)	32(IDcell=0), 33(IDcell=1), 34(IDcell=2), 35(IDcell=3), 36(IDcell=4), 37(IDcell=5), 38(IDcell=6), 39(IDcell=7), 40(IDcell=8), 41(IDcell=9), 42(Idcell=10), 43(IDcell=11), 44(IDcell=12), 45(IDcell=13), 46(IDcell=14), 47(IDcell=15), 48(IDcell=16), 49(IDcell=17), 50(IDcell=18), 51(IDcell=19), 52(IDcell=20), 53(IDcell=21), 54(IDcell=22), 55(IDcell=23), 56(IDcell=24), 57(IDcell=25), 58(IDcell=26), 59(IDcell=27), 60(IDcell=28), 61(IDcell=29), 62(IDcell=30), 63(IDcell=31), 97(IDcell=1), 100(IDcell=4), 103(IDcell=7), 106(IDcell=10), 109(IDcell=13), 112(IDcell=16)	64(IDcell=0), 65(IDcell=1), 66(IDcell=2), 67(IDcell=3), 68(IDcell=4), 69(IDcell=5), 70(IDcell=6), 71(IDcell=7), 72(IDcell=8), 73(IDcell=9), 74(IDcell=10), 75(IDcell=11), 76(IDcell=12), 77(IDcell=13), 78(IDcell=14), 79(IDcell=15), 80(IDcell=16), 81(IDcell=17), 82(IDcell=18), 83(IDcell=19), 84(IDcell=20), 85(IDcell=21), 86(IDcell=22), 87(IDcell=23), 88(IDcell=24), 89(IDcell=25), 90(IDcell=26), 91(IDcell=27), 92(IDcell=28), 93(IDcell=29), 94(IDcell=30), 95(IDcell=31), 98(IDcell=2), 101(IDcell=5), 104(IDcell=8), 107(IDcell=11), 110(IDcell=14), 113(IDcell=17)

● Downlink [PHY/MAC] Parameter Setting Range

Tree	Items	Setting Range
Downlink	Data Status	Enable, Disable
Preamble	Data Status	Enable, Disable
	Preamble Index	Display only: Set at Common.
	IDcell	Display only: Depends on Preamble Index setting
Zone#0 to #7	Data Status	Enable, Disable
	Permutation	PUSC, PUSC (all SC), FUSC, AMC (6×1), AMC (3×2), AMC (2×3), AMC (1×6)
	Pilot Position	Hopping, Center
	Dedicated Pilot	0, 1
	Pilot Boosting	OFF, ON
	STC/MIMO	No transmit diversity, 2 Antenna Matrix A (STTD), 2 Antenna Matrix B vertical encoding
	OFDMA Symbol Offset	<Zone#0> Display only <Zone#1 to #7) 0 to 255 symbol (without Preamble), 1 to 255 symbol (with Preamble)
	No. OFDMA Symbols	2 to 254 symbol (when PUSC), 2 to 254 symbol (when PUSC1 (all SC)), 1 to 255 symbol (when FUSC), 1 to 255 symbol (when AMC (6x1)), 2 to 254 symbol (when AMC (3x2)), 3 to 255 symbol (when AMC (2x3)), 6 to 252 symbol (when AMC (1x6))
	DL-PermBase	0 to 31 (Cannot be set at Zone#0)
	DL-Burst Number	1 to 16
	PRBS_ID	0 to 3 (Cannot be set at Zone#0)
FCH	Data Status	Enable, Disable
	FCH Type	16bit repeat, PN9fix, PN15fix, DLFP, User File
	FCH Type Repeat Data	0000 to FFFF (HEX): Can be set when FCH Type = 16 bit repeat
	FCH Type User File	User File selected: Can be set when FCH Type = User File
	Used subchannel Bitmap bit0 to 5	Display only: Set at Common
	Repetition Coding Indication	Display only: Set at Common
	Coding Indication	Display only: Set at Common
	DL-MAP Length	Display only: Set at DL-MAP
MAC Message	Data Status	Enable, Disable
DL-MAP	Data Status	Enable, Disable
	DL-MAP Type	16bit repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, DL-MAP, Compressed DL-MAP, User File
	DL-MAP Type Repeat Data	0000 to FFFF (HEX): Can be set DL-MAP Type = 16 bit repeat
	DL-MAP Type User File	User File selected: Can be set when DL-MAP Type = User File
	DL-MAP Length	0 to 255 slot: The calculation value is displayed when DL-MAP Type = DL-MAP or Compressed DL-MAP. The length of DL-MAP can be set in other cases.
	DCD Count	0 to 255: Can be set when DL-MAP Type = DL-MAP or Compressed DL-MAP
	Base Station ID	0000 0000 0000 to FFFF FFFF FFFF (HEX): Can be set when DL-MAP Type = DL-MAP or Compressed DL-MAP
	DL-MAP PHY Synchronization Field	
	Frame Duration	Display only: Set at Common
	Initial Frame Number	Display only: Set at Common
	Zone# DL-MAP IE #	
	DIUC (Downlink Interval Usage Code)	0 to 12
	OFDMA Symbol Offset	Display only: Set at DL-Burst
	OFDMA Subchannel Offset	Display only: Set at DL-Burst
	Boosting	Display only: Set at DL-Burst
	No. OFDMA Symbol	Display only: Set at DL-Burst
	No. Subchannels	Display only: Set at DL-Burst
	Repetition Coding Indication	Display only: Set at DL-Burst
	Zone# STC/Zone switch IE	
	OFDMA Symbol Offset	Enable, Disable
	Permutation	Display only: Set at DL-Zone.
	DL Use All SC Indicator	Display only
	DL-PermBase	Display only: Set at DL-Zone.
SUB-DL-UL-MAP	Data Status	Enable, Disable
	OFDMA Symbol Offset	Display only
	OFDMA Subchannel Offset	Display only
	Length	Display only
	FEC Code Type and Modulation Type	<Table 2>
	Repetition Coding Indication	No repetition, 2, 4, 6
	RCID Type	Normal CID, RCID11, RCID7, RCID3
	HARQ ACK offset indicator	0, 1
	DL HARQ ACK offset	0 to 255
	UL HARQ ACK offset	DL IE Count
	OFDMA Symbol Offset	0 to 255
	OFDMA Subchannel Offset	0 to 127

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Optional

Tree	Items	Setting Range
DL-Burst 0 to 15	Data Status	Enable, Disable
	OFDMA Symbol Offset	<Table 3>
	OFDMA Subchannel Offset	0 to 63 (when AMC (2×3), AMC (1×6) excluded) 0 to 255 (when AMC (2×3), AMC (1×6))
	Boosting	−12, −9, −6, −3, 0, +3, +6, +9 dB
	No. OFDMA Symbols	2 to 126 symbol (when PUSC), 2 to 126 symbol (when PUSC (all SC)), 1 to 127 symbol (when FUSC), 1 to 127 symbol (when AMC (6×1)), 2 to 126 symbol (AMC (3×2)), 3 to 93 symbol (when AMC (2×3)), 6 to 90 symbol (when AMC (1×6))
	No. Subchannels	1 to 63
	Repetition Coding Indication	No repetition, 2, 4, 6: Can be set when FEC Code Type and Modulation Type = QPSK (CC) 1/2, QPSK (CC) 3/4, QPSK (CTC) 1/2, QPSK (CTC) 3/4, QPSK (No Ch Coding); no repetition fixed in other cases
	FEC Code Type and Modulation Type	<Table 2>
	Inclusion MAP	Normal, SUB-DL-UL-MAP#n (n = 0 to 2)
	DL-Burst Data Type	16 bit repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, MAC PDU, User File
	DL-Burst Data Type Repeat Data	0000 to FFFF (HEX): Can be set when DL-Burst Data Type = 16 bit repeat
	DL-Burst Data Type User File	User File selected: Can be set when DL-Burst Data Type = User File
	MAC PDU Number	0 to 32
	Matrix Indicator	Matrix A, Matrix B
UL-MAP	Data Status	Enable, Disable
	UL-MAP Type	16bit repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, UL-MAP, Compressed UL-MAP, User File
	UL-MAP Type Repeat Data	0000 to FFFF (HEX): Can be set when UL-MAP Type = 16 bit repeat
	UL-MAP Type User File	User File selected: Can be set when UL-MAP Type = User File
	UL-MAP Length	0 to 2037 byte: The calculation value is displayed when UL-MAP Type = UL-MAP or Compressed UL-MAP. The length of payload data for UL-MAP can be set in other cases.
	UCD Count	0 to 255: Can be set when UL-MAP Type = UL-MAP or Compressed UL-MAP
	Uplink Allocation Start Time	Display only: Set at Common
	Zone# UL-MAP IE #	
	CID	0 to 65535
	UIUC (Uplink Interval Usage Code)	1 to 10
	UL-Burst Duration	Display only: Set at UL-Burst.
	Repetition Coding Indication	Display only: Set at UL-Burst.
DCD	Data Status	Enable, Disable
	DCD Offset	0 to (Number of Frames −1)
	DCD Interval	0 to Number of Frames
	DCD Length	0 to 2037 (without DCD Data Type = TLV) Display only (when DCD Data Type = TLV)
	DCD Data Type	16bit repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, User File, TLV
	Configuration Change Count	0 to 255
	TLV encoded information	
	Frequency	0 to 6000000kHz
	Base Station ID	000000000000 to FFFFFFFFFFFF
	MAC version	1 to 6
	BS EIRP	−32768 to +32767
	TTG	Display only
	RTG	Display only
	EIRxP_IR_MAX	−32768 to +32767
	HO Type Support	HO, MDHO, FBSS HO
	Paging Group ID	0000 to FFFF
	Trigger Type	0 to 3
	Trigger Function	0 to 6
	Trigger Action	1 to 3
	Trigger Value	00 to FF
	Trigger averaging Duration	0 to 255
	BS Restart Count	00 to FF
	Default RSSI and CINR averaging parameter	00 to FF
	DL AMC Allocated Physical Bands Bitmap	Display only
	Hysteresis margin	00 to FF
	Time to trigger duration	00 to FF
	DL-Burst Profile (DIUC = 0 to 12)	
	FEC Type	Display only

Tree	Items	Setting Range
UCD	Data Status	Enable, Disable
	UCD Offset	0 to (Number of Frames −1)
	UCD Interval	0 to Number of Frames
	UCD Length	0 to 2037 (without UCD Data Type = TLV), Display only (when UCD Data Type = TLV)
	UCD Data Type	16bit repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, User File, TLV
	Configuration Change Count	0 to 255
	Ranging Backoff Start	0 to 255
	Ranging Backoff End	0 to 255
	Request Backoff Start	0 to 255
	Request Backoff End	0 to 255
	TLV encoded information	
	Frequency	0 to 6000000kHz
	Contention-based Reservation Timeout	00 to FF
	Start of Ranging Coded Group	00 to FF
	Band AMC Allocation Threshold	00 to FF
	Band AMC Release Threshold	00 to FF
	Band AMC Allocation Timer	00 to FF
	Band AMC Release Timer	00 to FF
	Band AMC Status Reporting Max Period	00 to FF
	Band AMC Retry Timer	00 to FF
	Normalized C/N Override-2	0000000000000000 to FFFFFFFFFFFFFFFF
	Use CQICH Indication Flag	00 to FF
	Handover Ranging Code	00 to FF
	Initial Ranging Codes	00 to FF
	Initial Ranging Interval	00 to FF
	Tx Power Report	0000 to FFFF
	Normalized C/N for channel Sounding	00 to FF
	Initial Ranging backoff start	00 to FF
	Initial Ranging backoff end	00 to FF
	Bandwidth request backoff start	00 to FF
	Bandwidth request backoff end	00 to FF
	Permutation Base	00 to FF
	UL Allocated Subchannels Bitmap	Display only
	HARQ Ack Delay for DL burst	00 to FF
	UL AMC Allocated Physical Bands Bitmap	000000000000 to FFFFFFFFFFFF
	Size of CQICH-ID field	00 to FF
	Band-AMC entry average CINR	00 to FF
	HO ranging start	00 to FF
	HO ranging end	00 to FF
	Periodic Ranging Codes	00 to FF
	Bandwidth Request Codes	00 to FF
	Periodic Ranging Backoff Start	00 to FF
	Periodic Ranging Backoff End	00 to FF
	CQICH Band AMC Transition Delay	00 to FF
	UL-Burst Profile (UIUC = 1 to 10)	
	FEC Type	Display only
	Ranging Data ratio	00 to FF
MAC PDU 0 to 31	Data Status	Enable, Disable
	MAC PDU Length	Display only
	Payload Data Length	0 to 2041 byte (when CI = No CRC), 0 to 2037 byte (when CI = With CRC), 0 to 2047 byte (when CI = Without Header & CRC)
	CID (Connection Identifier)	0 to 65535
	CI	With CRC, No CRC, Without Header & CRC
	CRC Error Insertion	Correct, Error
	Payload Type	16bit repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, User File
	Payload Type Repeat Data	0000 to FFFF: Can be set when Payload Type = 16 bit repeat
	Payload Type User File	User File selected: Can be set when Payload Type = User File
MAP-Burst	Data Status	Enable, Disable
	OFDMA Symbol Offset	<Table 3>
	OFDMA Subchannel Offset	0 to (Number of Subchannel at Zone)
	Length	1 to 255 slot
	Repetition Coding Indication	No Repetition, 2, 4, 6
	FEC Code Type and Modulation Type	<Table 2>

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Optional

Tree	Items	Setting Range
MAP-Burst	MAP-Burst Data Type	16bit repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, MAC PDU, User File
	MAP-Burst Data Type Repeat Data	0000 to FFFF: Can be set when MAP-Burst Data Type = 16 bit repeat
	MAP-Burst Data Type User File	User File selected: Can be set when MAP-Burst Data Type = User File
	MAC PDU Number	0 to 32: Display when MAP-Burst Data Type = MAC PDU.
DL-HARQ Burst	Data Status	Enable, Disable
	RCID_Type	Normal CID, RCID11, RCID7, RCID3
	OFDMA Symbol Offset	<Table 3>
	OFDMA Subchannel Offset	0 to (Number of Subchannel at Zone)
	Boosting	−12, −9, −6, −3, 0, +3, +6, +9 dB
	Rectangular Sub-Burst Indicator	0, 1
	No. OFDMA Symbols	2 to 126 symbol (when PUSC), 2 to 126 symbol (when PUSC (all SC)), 1 to 127 symbol (when FUSC), 1 to 127 symbol (when AMC (6×1)), 2 to 126 symbol (when AMC (3×2)), 3 to 126 symbol (when AMC (2×3)), 6 to 126 symbol (when AMC (1×6))
	No. Subchannels	1 to 127
	Mode	Chase HARQ, MIMO Chase HARQ
	N sub Burst	1 to 16
	N ACK Channel	0 to 15
	Inclusion MAP	Normal, SUB-DL-UL-MAP#n (n = 0 to 2)
Sub-Burst	Data Status	Enable, Disable
	CID	0 to 65535
	Sub-Burst Duration	1 to 1023
	Sub-Burst DIUC Indication	0, 1
	Repetition Coding Indication	No repetition, 2, 4, 6
	FEC Code Type and Modulation Type	<Table 2>
	Sub-Burst Data Type	16bit repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, MAC PDU, User File
	Sub-Burst Data Type Repeat Data	0x0000 to 0xFFFF
	Sub-Burst Data Type User File	User File selected when Sub-Burst Data Type = User File
	MAC PDU Number	0 to 32
	MU Indicator	0, 1
	Dedicated MIMO DL Control Indicator	0, 1
	Matrix Indicator	Matrix A, Matrix B
	CRC Error Insertion	Correct, Error
	ACID	0 to 15
	AI_SN	0, 1
	ACK disable	0, 1
	Dedicated DL Control Indicator	00, 01, 10, 11
	Duration (d)	0 to 15
	Allocation Index	0 to 63
	Period (p)	0 to 7
	Frame Offset	0 to 7
	Dedicated DL Control IE	0 to 1
	No. SDMA layers	1 to 4

Table 2: FEC Code Type and Modulation Type Setting Range

QPSK (CC) 1/2, QPSK (CC) 3/4, 16QAM (CC) 1/2, 16QAM (CC) 3/4, 64QAM (CC) 1/2, 64QAM (CC) 2/3, 64QAM (CC) 3/4, QPSK (CTC) 1/2, QPSK (CTC) 3/4, 16QAM (CTC) 1/2, 16QAM (CTC) 3/4, 64QAM (CTC) 1/2, 64QAM (CTC) 2/3, 64QAM (CTC) 3/4, 64QAM (CTC) 5/6, QPSK (No Ch Coding), 16QAM (No Ch Coding), 64QAM (No Ch Coding)

Table 3: OFDMA Symbol Offset Setting Range

• 0 to 254 symbol without Preamble at Zone#0 (Select by even symbol.)
• 1 to 255 symbol with Preamble at Zone#0 (Select by odd symbol.)
• (OFDMA Symbol Offset at Zone) to 255 symbol when PUSC Zone from Zone#1 to #7
• (OFDMA Symbol Offset at Zone) to 255 symbol when PUSC (all SC) Zone
• (OFDMA Symbol Offset at Zone) to 255 symbol when FUSC Zone
• (OFDMA Symbol Offset at Zone) to 255 symbol when AMC (6×1) Zone
• (OFDMA Symbol Offset at Zone) to 255 symbol when AMC (3×2) Zone
• (OFDMA Symbol Offset at Zone) to 255 symbol when AMC (2×3) Zone
• (OFDMA Symbol Offset at Zone) to 255 symbol when AMC (1×6) Zone

● Uplink [PHY/MAC Parameter]

Tree	Items	Setting Range
Uplink	Data Status	Enable, Disable
Zone 0 to 7	Data Status	Enable, Disable
	Permutation	PUSC, PUSC (without SC rotation), AMC (6×1), AMC (3×2), AMC (2×3), AMC (1×6)
	Pilot Position	Hopping, Center
	STC/MIMO	Display only
	OFDMA Symbol Offset	0 to 255 symbol (Zone#0 = 0)
	No. OFDMA Symbols	3 to 255 symbol (when PUSC), 3 to 255 symbol (when PUSC (without SC rotation)), 1 to 255 symbol (when AMC (6×1)), 2 to 254 symbol (when (AMC (3×2)), 3 to 255 symbol (when AMC (2×3)), 6 to 252 symbol (AMC (1×6))
	UL-PermBase	0 to 69
	UL-Burst Number	1 to 16
UL-Burst 0 to 15	Data Status	Enable, Disable
	ODFMA Symbol Offset	<Table 4>
	OFDMA Subchannel Offset	Subchannel −1 at 0 to Zone
	UL Burst Duration	3 to 3069 symbol (when PUSC), 3 to 3069 symbol (when PUSC (without SC rotation)), 1 to 1023 symbol (when AMC (6×1)), 2 to 2046 symbol (when AMC (3×2)), 3 to 3069 symbol (when AMC (2×3)), 6 to 6138 symbol (when AMC (1×6))
	Burst Power Offset	−10.00 to +10.00 dB
	Pilot Pattern	Normal, PatternA, PatternB
	Repetition Coding Indication	No repetition, 2, 4, 6: Can be set when FEC Code Type and Modulation Type = QPSK (CC) 1/2, QPSK (CC) 3/4, QPSK (CTC) 1/2, QPSK (CTC) 3/4, QPSK (No Ch Coding); no repetition fixed in other cases
	FEC Code Type and Modulation Type	<Table 5>
	Inclusion MAP	Normal, SUB-DL-UL-MAP#n (n = 0 to 2)
	UL-Burst Data Type	16bit repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, MAC PDU, User File
	UL-Burst Data Type Repeat Data	0000 to FFFF: Can be set when UL-Burst Data Type = 16 bit repeat
	UL-Burst Data Type User File	User File selected: Can be set when UL-Burst Data Type = User File
	MAC PDU Number	0 to 32
MAC PDU 0 to 31	<See MAC PDU on Downlink>	
UL-HARQ Burst	Data Status	Enable, Disable
	RCID_Type	Normal CID, RCID11, RCID7, RCID3
	OFDMA Symbol Offset	<Table 4>
	OFDMA Subchannel Offset	0 to (Subchannel number –1 at Zone)
	Mode	Chase HARQ (Display only)
	Allocation Start Indication	0, 1
	N sub Burst	1 to 16
	Inclusion MAP	Normal, SUB-DL-UL-MAP#n (n = 0 to 2)
Sub-Burst	Data Status	Enable, Disable
	CID	0 to 65535
	FEC Code Type and Modulation Type	<Table 5>
	Repetition Coding Indication	No repetition, 2, 4, 6
	Sub-Burst Duration	1 to 1023 (slot)
	Sub-Burst Data Type	16bit repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, MAC PDU, User File
	Sub-Burst Data Type Repeat Data	0x0000 to 0xFFFF
	Sub-Burst Data Type User File	Display only when Sub-Burst Data Type = User File
	MAC PDU Number	0 to 32
	CRC Error Insertion	Correct, Error
	Dedicated UL Control Indicator	0, 1
	SDMA Control Info bit	0, 1
	Num SDMA layers	0 to 3
	Pilot Pattern	Pattern A, Pattern B, Pattern C, Pattern D
	ACID	0 to 15
	AI_SN	0, 1
	ACK disable	0, 1

MX370105A Mobile WiMAX IQproducer

Optional

Tree	Items	Setting Range
Initial/ Handover Ranging Region	Data Status	Enable, Disable
	OFDMA Symbol Offset	<Table 6>
	OFDMA Subchannel Offset	0 to 126 (when PUSC, PUSC (without SC rotation)) 0 to 120 (without PUSC, PUSC (without SC rotation))
	No. OFDMA Symbols	3 to 126 symbol (when PUSC), 3 to 126 symbol (when PUSC (without SC rotation)), 1 to 127 symbol (when AMC (6×1)), 2 to 126 symbol (when AMC (3×2)), 3 to 126 symbol (when AMC (2×3)), 6 to 126 symbol (when AMC (1×6))
	No. Subchannels	6 to 126 (when PUSC, PUSC (without SC rotation)) 8 to 120 (without PUSC, PUSC (without SC rotation))
	Initial/Handover Ranging Symbols	2, 4
	Initial/Handover Ranging Burst Number	1 to 16
	Ranging Region Combination	Non, Combine
	BW Request/Periodic Ranging Offset	0 to No. OFDMA Symbols at Initial/Handover Ranging Region
	BW Request/Periodic Ranging Symbols	1, 3
	BW Request/Periodic Ranging Burst Number	0 to 16
Initial/ Handover Ranging Burst	Data Status	Enable, Disable
	OFDMA Symbol Offset	• When Initial/Handover Ranging Symbols = 2, 0 to 254 symbol setting resolution = 2 • When Initial/Handover Ranging Symbols = 4, 0 to 252 symbol
	OFDMA Subchannel Offset	0 to 126 (when PUSC, PUSC (without SC rotation)) 0 to 120 (without PUSC, PUSC (without SC rotation))
	No. OFDMA Symbols	Display only
	No. Subchannels	Display only
	Ranging Power Offset	−10.00 to +10.00 dB
	Ranging Code Number	0 to 255
BW Request/ Periodic Ranging Region	Data Status	Enable, Disable
	OFDMA Symbol Offset	<Table 6>
	OFDMA Subchannel Offset	0 to 126 (when PUSC, PUSC (without SC rotation)) 0 to 120 (without PUSC, PUSC (without SC rotation))
	No. OFDMA Symbols	3 to 126 symbol (when (PUSC)), 3 to 126 symbol (when PUSC (without SC rotation)), 1 to 127 symbol (when AMC (6×1)), 2 to 126 symbol (when AMC (3×2)), 3 to 126 symbol (when AMC (2×3)), 6 to 126 symbol (when AMC (1×6))
	No. Subchannels	6 to 126 (when PUSC, PUSC (without SC rotation)) 8 to 120 (without PUSC, PUSC (without SC rotation))
	BW Request/Periodic Ranging Symbols	1, 3
	BW Request/Periodic Ranging Burst Number	1 to 16
BW Request/ Periodic Ranging Burst	Data Status	Enable, Disable
	OFDMA Symbol Offset	0 to 255
	OFDMA Subchannel Offset	0 to 126 (when PUSC, PUSC (without SC rotation)) 0 to 120 (without PUSC, PUSC (without SC rotation))
	No. OFDMA Symbols	Display only
	No. Subchannels	Display only
	Ranging Power Offset	−10.00 to +10.00 dB
	Ranging Code Number	0 to 255
Fast-Feedback Region	Data Status	Enable, Disable
	OFDMA Symbol Offset	OFDMA Symbol Offset at Zone to 255 symbol
	OFDMA Subchannel Offset	0 to 127
	No. OFDMA Symbols	3 to 126
	No. Subchannels	1 to 127
	Fast-Feedback Type	Display only
	Fast-Feedback Burst Number	1 to 32
Fast-Feedback Burst	Data Status	Enable, Disable
	OFDMA Symbol Offset	0 to 255
	OFDMA Subchannel Offset	0 to 127
	No. OFDMA Symbols	Display only
	No. Subchannels	Display only
	Ranging Power Offset	−10.00 to +10.00 dB
	Payload	000000 to 111111

Tree	Items	Setting Range
UL-ACK Region	Data Status	Enable, Disable
	OFDMA Symbol Offset	(OFDMA Symbol Offset at Zone) to 255 symbol
	OFDMA Subchannel Offset	0 to 127
	No. OFDMA Symbols	3 to 126 symbol
	No. Subchannels	1 to 127
	UL-ACK Burst Number	1 to 32
UL-ACK Burst	Data Status	Enable, Disable
	OFDMA Symbol Offset	0 to 255 symbol
	OFDMA Subchannel Offset	0 to 127
	No. OFDMA Symbols	Display only
	No. Subchannels	Display only
	Occupied half subchannel	even, odd
	UL-ACK Burst Power Offset	−10.0 to +10.0 dB
	Payload	ACK, NACK
Sounding Zone	Data Status	Enable, Disable
	OFDMA Symbol Offset	0 to 255 symbol
	No. OFDMA Symbols	1 to 8
	Sounding Type	Type A (Display only)
	Send Sounding Report Flag	0, 1
	Sounding Relevance Flag	0, 1
	Sounding Relevance	0, 1
	Include additional feedback	No additional feedback, Channel coefficients, Received pilot coefficients, Feedback message
	Shift Value	0 to 127
Sounding Symbol	Data Status	Enable, Disable
	Separability Type	All subcarriers, Decimated subcarriers
	Max. Cyclic Shift Index P	4, 8, 16, 32, 9, 18
	Decimated Value D	2, 4, 8, 16, 32, 64, 128, 5
	Decimated offset randomization	No randomization, Pseudo-randomly
	Sounding Symbol Index	1 to 8
	Number of CIDs	1 to 128
CID	Data Status	Enable, Disable
	Shorted Basic CID	0 to 4095
	Power Assignment Method	Equal power, Per subcarrier power limit, Total power limit
	Power Boost	No power boost, Power boost
	Multi-Antenna Flag	First antenna only, All antennas
	Allocation Mode	Normal, Band
	Start Frequency Band	0 to 95 (when FFT Size = 2048), 0 to 47 (when FFT Size = 1024), 0 to 23 (when FFT Size = 512), 0 to 5 (when FFT Size = 128)
	No. Frequency Bands	1 to 96 (when FFT Size = 2048), 1 to 48 (when FFT Size = 1024), 1 to 24 (when FFT Size = 512), 1 to 6 (when FFT Size = 128)
	Band Bitmap	0 to FFF (when FFT Size = 2048, 1024, 512), 0 to 7 (when FFT Size = 128)
	Sounding Relevance	0, 1
	Cyclic time shift index m	0 to (Max Cyclic Shift Index P−1 at Sounding Symbol that CID belongs to)
	Decimated Offset d	0 to (Decimated Value D−1 at Sounding Symbol that CID belongs to)
	Use same symbol for additional feedback	0, 1
	Periodicity	Single, 1, 2, 4

Table 4: OFDMA Symbol Offset Setting Range

When PUSC Zone, PUSC (without SC rotation) Zone, AMC (6×1) Zone, AMC (3×2) Zone, AMC (2×3) Zone, AMC (1×6) Zone: (OFDMA Symbol Offset at Zone) to (OFDMA Symbol Offset at Zone + No. OFDMA Symbols at Zone) symbol

Table 5: FEC Code Type and Modulation Type Setting Range

QPSK (CC) 1/2, QPSK (CC) 3/4, 16QAM (CC) 1/2, 16QAM (CC) 3/4, 64QAM (CC) 1/2, 64QAM (CC) 2/3, 64QAM (CC) 3/4, QPSK (CTC) 1/2, QPSK (CTC) 3/4, 16QAM (CTC) 1/2, 16QAM (CTC) 3/4, 64QAM (CTC) 1/2, 64QAM (CTC) 2/3, 64QAM (CTC) 3/4, 64QAM (CTC) 5/6, QPSK (No Ch Coding), 16QAM (No Ch Coding), 64QAM (No Ch Coding)

Table 6: OFDMA Symbol Offset Setting Range

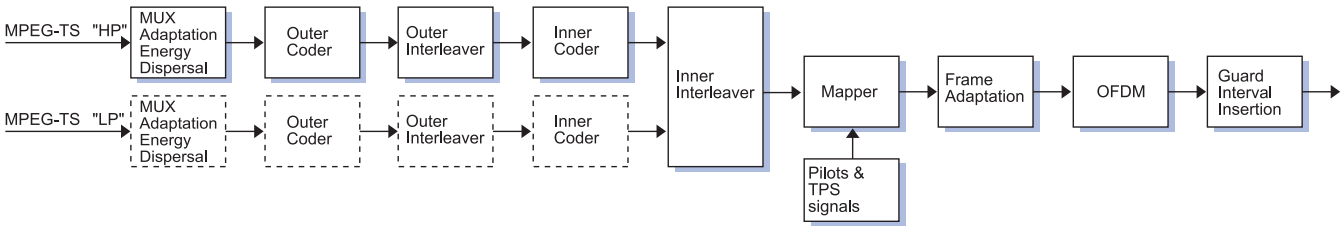
When PUSC Zone, PUSC (without SC rotation) Zone, AMC (6×1) Zone, AMC (3×2) Zone, AMC (2×3) Zone, AMC (1×6) Zone: (OFDMA Symbol Offset at Zone) to 255 symbol

MX370106A DVB-T/H IQproducer

Optional

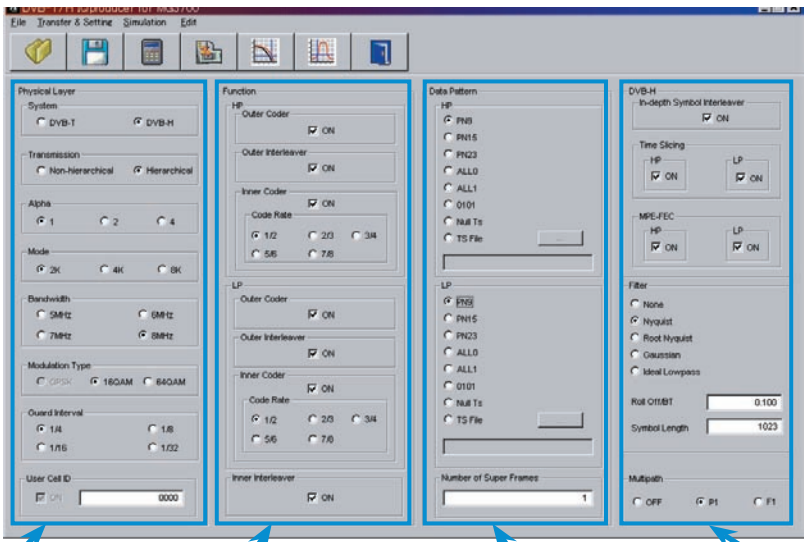
The MX370106A DVB-T/H IQproducer is GUI-driven PC application software supporting the ETSI EN 300 744 V1.5.1 (2004-11) Physical Layer standard. The generated waveform patterns are downloaded to the MG3700A and used to output DVB-T/H Modulation baseband signals and RF signals using the MG3700A ARB generation function.

This software processes the DVB-T/H Physical Layer shown in the Signal Generation Block Diagram below.
When all of Outer Coder, Outer Interleaver, Inner Coder, and Inner Interleaver are ON, the data selected by Data Pattern is input to the MPEG-TS part shown in the figure below.
When each function is turned OFF, all the blocks of the front side are turned OFF. The data selected by Data Pattern is inserted by jumping over blocks that are OFF.



● DVB-T/H IQproducer Main Screen

Parameters are set easily by selecting buttons on one screen.



Physical Layer:
Sets System, Transmission, Mode, Sub-carrier number, Bandwidth, Modulation Type and Guard Interval

Function:
Sets
• Outer Coder
• Outer Interleaver
• Inner Coder
• Code Rate
• Inner Interleaver

Data Pattern:
Sets data
When "TS File" is selected, an arbitrary MPEG-2TS file (binary data with remultiplexed video and audio) is loaded to generate a waveform pattern. It is used for video evaluation.

DVB-H:
Sets
• In-depth Symbol Interleaver
• Time Slicing
• MPE-FEC
Filter:
Multipath:

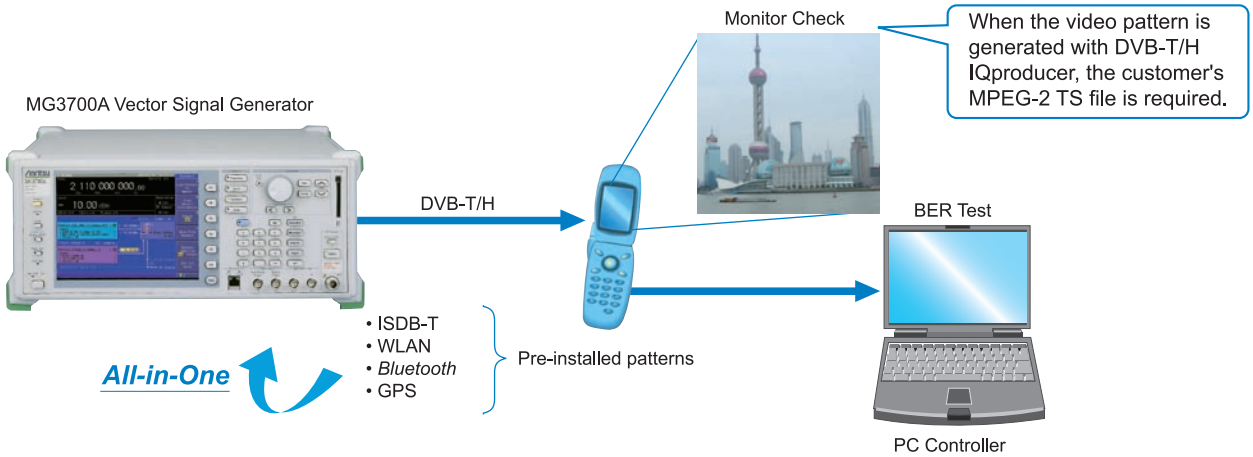
● Recommended options

MG3700A-021 ARB Memory Upgrade 512 Msamples

The DVB-T/H evaluation checks integrated operation from the signal input to the display by using the video file. The size of the video waveform pattern is very large and requires addition of the expanded memory option.

• DVB-T/H Measurement Image

The generated waveform pattern supports the following measurements.
(1) Visual check using video pattern — General check of signal received from antenna to output at monitor
(2) BER test based on ETSI TR 101 290 using module built into terminal — Receiver Sensitivity Test



• Parameter Save/Recall

The numeric values and settings for each item can be saved in a parameter file. Enter the file name in the [File name] field and click the [Save] button to save the parameter file.
A saved parameter file is recalled by selecting it in the file list and clicking the [Open] button.

• Graphical Simulation Displays

This function displays a generated waveform as a Complementary Cumulative Distribution Function (CCDF) and Fast Fourier Transform (FFT) on the PC.
It is useful for checking or reviewing waveforms.

CCDF Graph

Up to eight generated waveform patterns can be read and displayed as CCDF graphs.

FFT Graph

Up to four generated waveform patterns can be read and displayed as FFT graphs.

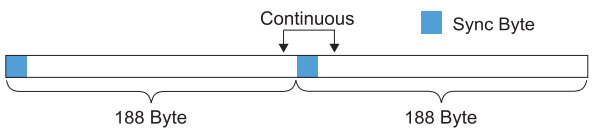
MX370106A DVB-T/H IQproducer

Optional

• Parameter Setting Items

No.	Segment	Items	Setting Range	Restriction*1
1	Physical Layer	System	DVB-T, DVB-H	
2		Transmission	Non-hierarchical, Hierarchical	
3		Alpha	1, 2, 4	1: When No.2 = Non-hierarchical
4		Mode	(Sub-carrier of OFDM) 2K, 4K, 8K	"4K" cannot be set when No.1 = DVB-T.
5		Bandwidth	5 MHz, 6 MHz, 7 MHz, 8 MHz	"5 MHz" cannot be set when No.1 = DVB-T.
6		Modulation Type	QPSK, 16QAM, 64QAM	"QPSK" cannot be set when No.2 = Hierarchical
7		Guard Interval	1/4, 1/8, 1/16, 1/32	
8		User Cell ID	ON: 0000 to FFFF (HEX), OFF	"ON": When No.1 = DVB-H
9	Function	Outer Coder	ON, OFF	"LP" cannot be set when No.2 = Non-hierarchical.OFF: When No.10 = OFF
10		Outer Interleaver	ON, OFF	"LP" cannot be set when No.2 = Non-hierarchical. ON: When No.9 = ON OFF: When No.11 = OFF
11		Inner Coder	ON, OFF	"LP" cannot be set when No.2 = Non-hierarchical. ON: When No.10 = ON OFF: When No.13 = OFF
12		Code Rate	1/2, 2/3, 3/4, 5/6, 7/8	"LP" cannot be set when No.2 = Non-hierarchical. Cannot be set when No.11 = OFF
13		Inner Interleaver	ON, OFF	ON: When No.11 = ON
14	Data Pattern	(Data)	PN9, PN15, PN23, ALL0, ALL1, 0101, Null TS, TS File	"LP" cannot be set when No.2 = Non-hierarchical.
			When TS File is selected, the external TS file is read. The TS file is composed of several packets with 188 bytes/ packet. The first one byte of the packet becomes the Sync Byte and is set to 47 (HEX). If a TS file that does not follow the format of this TS data is selected, an error is displayed when the Calculation button is clicked. When all of "Outer Coder," "Outer Interleaver," "Inner Coder," and "Inner Interleaver" are set to ON, Sync Byte is set to the data of "PN9/PN15/PN23/ALL0/ALL1/0101". At this time, the continuity of data is kept between the "last data of the packet" and the "first data of the next packet except the Sync Byte." *2	
15		Number of Super Frames	1 to 384	(See following for details.)
16	DVB-H	In-depth Symbol Interleaver	ON, OFF	OFF: When No.1 = DVB-T OFF: When No.4 = 8K OFF: When No.13 = OFF
17		Time Slicing	ON, OFF: When Time Slicing = ON, the 49th bit of the TPS data is set to "1". When Data Pattern = TS File, Time Slicing processing is required in the selected TS file.	OFF: No.1 = DVB-T "LP" cannot be set when No.2 = Non-hierarchical.
18		MPE-FEC	ON, OFF: When MPE-FEC = ON, the 50th bit of the TPS data is set to "1". When Data Pattern = TS File, MPE-FEC processing is required in the selected TS file.	OFF: When No.1 = DVB-T "LP" cannot be set when No.2 = Non-hierarchical.
19	Filter	(Type)	None, Nyquist, Root Nyquist, Gaussian, Ideal Lowpass	
20		Roll Off/BT	0.100 to 1.000	Cannot be set when No.19 = None/Ideal Lowpass
21		Symbol Length	1 to 1023	Cannot be set when No.19 = None/Ideal Lowpass 1: When No.19 = None 1023: When No.19 = Ideal Lowpass
22	Multipath		OFF, F1, P1	

* 1: Other parameter setting conditions limited by setting range restrictions
* 2: Packet continuity shown in following figure



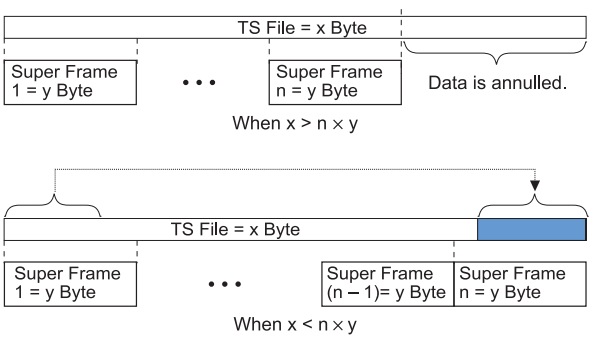
• Number of Super Frame Setting

The "Number of Super Frame" setting range changes according to the "Mode" setting and "MG3700A main frame memory option" as shown in the following table.

Maximum Number of Super Frame	Memory Option	Mode
384	With Option 021 (ARB Memory Upgrade 512 Msamples)	2 k
192		4 k
96		8 k
192	Without Option 021	2 k
96		4 k
48		8 k

The data selected by "Data Pattern" is annulled in the terminal of the final super frame set here.

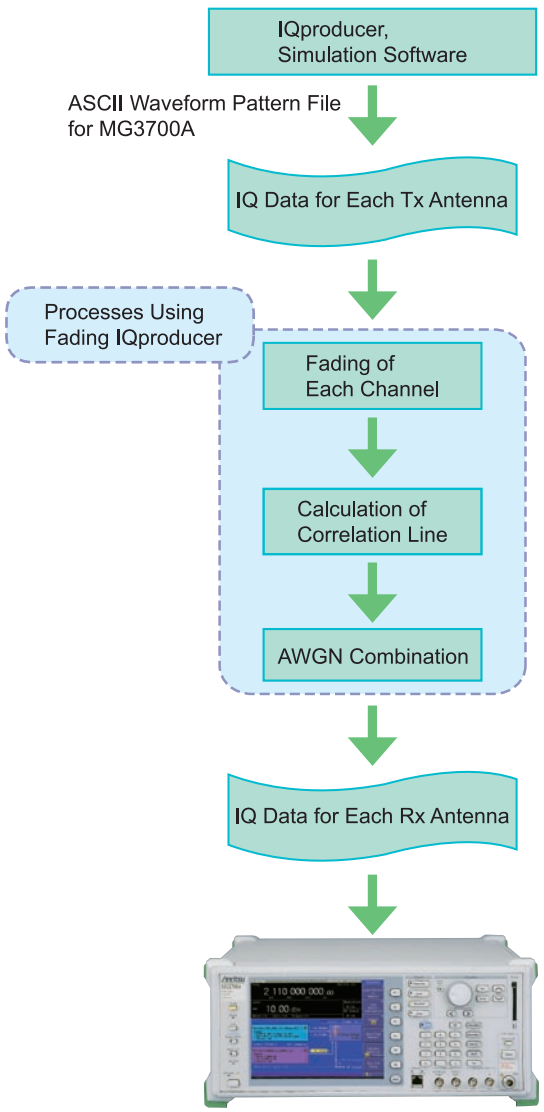
The data processing changes according to the "Size of TS File" and "Setting of Number of Super Frames" when TS File is selected at "Data Pattern". The TS File data is annulled when the "TS File data number" is greater than the "Data number equivalent to the set number of super frames." When the "TS File data number" is smaller than the "Data number equivalent to the set number of super frames", the same TS File data is repeated from the header.



MX370107A Fading IQproducer

Optional

The MX370107A Fading IQproducer is GUI-driven PC application software to set fading parameters and to generate waveform patterns by reading the waveform patterns for the MG3700A.
The generated waveform patterns are downloaded to the MG3700A and used to output fading baseband signals and RF signals using the MG3700A ARB generation function.
The MX370107A supports the processes inside the dotted line of the block diagram on the right (fading of each IQ channel, calculation of correlation line, AWGN combination).
Either waveform patterns created by another IQproducer or IQ data (ASCII) created by general simulation tools can be selected as the input data file.



MG3700A

● Recommended Options

MG3700A-021 ARB Memory Upgrade 512 Msamples

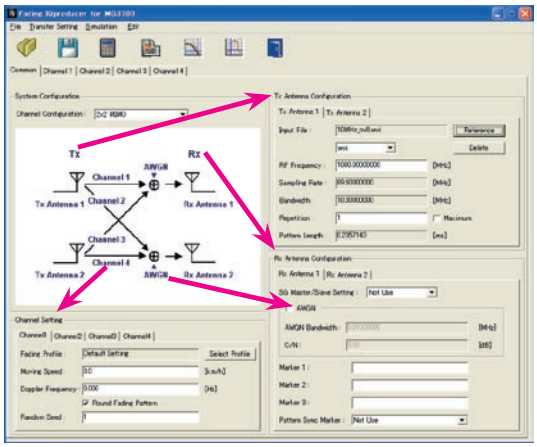
Since the length of the fading waveform pattern is limited by the memory size, we recommend more memory.
The standard ARB memory of 1 GB can be extended to 2 GB as an option.

● Fading IQproducer Main Screen

The Tx, Rx, Channel, and AWGN are set at the common screen shown on the right.
The channel configuration can be selected from:

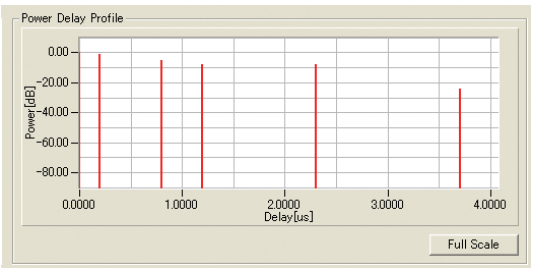
- 1x1 SISO
- 2x1 MISO
- 1x2 SIMO
- 2x2 MIMO

Each channel path number (1 to 20), fading type, delay, and power is set at the Channel 1 to Channel 4 tabs.



Common Sheet Screen

The power delay profile graph on the channel screen displays delay on the horizontal axis and power on the vertical axis.



Power Delay Profile Graph

● Parameter Save/Recall

The numeric values and settings for each item can be saved in a parameter file. Enter the file name in the [File name] field and click the [Save] button to save the parameter file.
A saved parameter file is recalled by selecting it in the file list and clicking the [Open] button.

● Graphical Simulation Displays

This function displays a generated waveform as a Complementary Cumulative Distribution Function (CCDF) and Fast Fourier Transform (FFT) on the PC.
It is useful for checking or reviewing waveforms.

CCDF Graph

Up to eight generated waveform patterns can be read and displayed as CCDF graphs.

FFT Graph

Up to four generated waveform patterns can be read and displayed as FFT graphs.

MX370107A Fading IQproducer

Optional

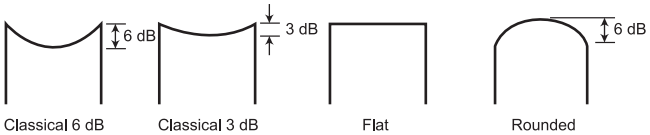
- Common Parameter Setting Range

Items	Outline	Setting Range
System Configuration		
Channel Configuration	Number of Input/Output antenna	1x1 SISO, 1x2 SIMO, 2x1 MISO, 2x2 MIMO
Tx Antenna Configuration		
Input File	Input pattern file	Display only
	Input file type	wvi, ASCII1, ASCII2, ASCII3
RF Frequency	Center frequency	0.25000000 to 6000.00000000 MHz, Resolution 0.00000001 MHz
Sampling Rate	Sampling Rate	When wvi file is selected: Display only When ASCII1/ASCII2/ASCII3 is selected: 0.02000000 to 160.00000000 MHz, Resolution 0.00000001 MHz
Bandwidth	Bandwidth of waveform pattern	When wvi file is selected: Display only When ASCII1/ASCII2/ASCII3 is selected: 0.02000000 to Sampling Rate MHz, Resolution 0.00000001 MHz
Repetition	Repetition number of waveform pattern	1 to maximum, Maximum (at maximum, waveform patterns repeated up to memory size)
Pattern Length	Pattern length of waveform pattern	Display only
Channel Setting		
Fading Profile	Display of Fading Profile	<Table 7>
Moving Speed	Moving Speed	0.0 to 5000.0 km/h, Resolution 0.1km/h
Doppler Frequency	Doppler Frequency	0.000 to "Sampling Rate/2 or Following Equation: smaller" Resolution 0.001 Hz Equation: 5000 x 1000/3600 x [RF Frequency]/c (c: velocity of light)
Round Fading Pattern	Continuity of faded waveform pattern	With/Without check (setting check makes sequential)
Random Seed	Random seed for fading	1 to 255, Resolution 1
Rx Antenna Configuration		
SG Master/Slave Setting	Master/Slave setting when connecting two SG units at SIMO/MIMO	Not Use, Master, Slave
AWGN	ON/OFF	With check (= ON)/Without check (= OFF)
AWGN Bandwidth	AWGN Bandwidth	0.01000000 to Sampling Rate/2 MHz, Resolution 0.00000001 MHz
C/N	Setting of C/N	−40.00 to +40.00 dB, Resolution 0.01 dB
Marker1 to 3	Marker name	31 characters max
Pattern Sync Marker	Marker for output of Pattern Sync Marker	Not Use, Marker1, Marker2, Marker3

Table 7: Fading Profile Channel Model

System	Channel Model
GSM	Rural Area 6tap, Rural Area 4tap, Hilly Terrain 12 tap-1, Hilly Terrain 12 tap-2, Hilly Terrain 6 tap-1, Hilly Terrain 6 tap-2, Urban Area 12 tap-1, Urban Area 12 tap-2, Urban Area 6 tap-1, Urban Area 6 tap-2, Equalisation Test 6 tap, Typical small cell 2 tap
W-CDMA (MS)	Case1, Case2, Case3, Case4, Case5, Case6, Moving propagation, Birth-Death propagation
W-CDMA (BS)	Case1, Case2, Case3, Case4, Moving propagation, Birth-Death propagation
HSDPA	Case1, Case2, Case3, Case4, Case5, Case6, Case8, ITU Pedestrian A, ITU Pedestrian B, ITU Vehicular A
HSUPA	Case1, Case2, Case3, Case4, ITU Pedestrian A, ITU Pedestrian B, ITU Vehicular A
CDMA2000 (MS)	Case1, Case2, Case3, Case4, Case5, Case6
CDMA2000 (BS)	Case1, Case2, Case3, Case4
TD-SCDMA	Case1, Case2, Case3, ITU Pedestrian A, ITU Pedestrian B, ITU Vehicular A
1xEV-DO	Configuration1, Configuration2, Configuration3, Configuration4, Configuration5
WLAN	Model A, Model B, Model C, Model D, Model E
Mobile WiMAX	ITU Pedestrian B, ITU Vehicular A
DVB-T	Typical Urban (TU6), Typical Rural Area (RA6)

● Channel 1 to 4 Parameter Setting Range

Items	Outline	Setting Range
Channel n parameters (n = 1 to 4)		
Input File	Input File	Display only
Fading Profile	Fading Profile	Display only
RF Frequency	Center Frequency	Display only
Sampling Rate	Sampling Rate	Display only
Bandwidth	Bandwidth of waveform pattern	Display only
Pattern Length	Pattern Length of waveform pattern	Display only
Path (1 to 20)		
Path	Display of Path No., ON/OFF	With check (= ON)/Without check (OFF)
Fading Type	Kinds of single path fading	Rayleigh, Rice, Constant Rayleigh: Environment in which many scattering waves arrive. The Rx level is changed according to the Rayleigh distribution. Rice: Environment in which many scattering and direct waves arrive. The Rx level is changed according to the Rice distribution. Constant: Rx level not changed
Delay	Delay	0.0000 to 2000.0000 µs, Resolution 0.0001 µs
Power	Power of path	−80.00 to 0.00 dB, Resolution 0.01 dB
Moving Speed	Moving Speed	0.0 to 5000.0 km/h, Resolution 0.1 km/h
Doppler Frequency	Doppler Frequency	0.000 to Sampling Rate/2 or smaller, Resolution 0.001 Hz Equation: 5000 x 1000/3600 x [RF Frequency]/c (c: velocity of light)
Rician K factor	Power ratio between direct wave and scattering wave	−40.00 to +40.00 dB, Resolution 0.01 dB Can be set when Fading Type = Rice.
Angle of Arrival	Direct wave arrival angle	0.0 to 180.0 deg, Resolution 0.1 deg Can be set when Fading Type = Rice.
Phase Shift	Phase Shift	0.0 to 359.9 deg, Resolution 0.1 deg
Spectrum Shape	Doppler spectrum shape	Classical 6 dB, Classical 3 dB, Flat, Rounded Can not be set when Fading Type = Constant. 
Correlation Setting	Setting correlation matrix	Edit, Not Use, Path number setting at Edit
Path Correlation Matrix	Path Correlation Matrix	−1.0000 −j1.0000 to 1.0000 +j1.0000 Resolution both real and imaginary parts = 0.0001 Set when Correlation Setting = Edit Only top-right elements of opposite angle can be edited

● Moving Propagation Parameter Setting Range

Can be set when "System Configuration = 1x1 SISO" and "Fading Profile = Moving Propagation".

Items	Outline	Setting Range
Power	Power of path	−80.00 to 0.00 dB, Resolution 0.01 dB
A (Offset)	Offset of Path2	0 to 500 µs, Resolution 1 µs
B (Variation)	Change of delay at Path 2	0 to 500 µs, Resolution 1 µs
Omega	Setting of Omega	0.00 to 1.00 Hz, Resolution 0.01 Hz

● Birth-Death propagation Parameter Setting Range

Can be set when "System Configuration = 1x1 SISO" and "Fading Profile = Birth-Death Propagation".

Items	Outline	Setting Range
Power	Power of path	−80.00 to 0.00 dB, Resolution 0.01 dB
Maximum Delay	Maximum Delay	1 to 400 µs, Resolution "Delay Resolution"
Delay Resolution	Delay Resolution	1 to Maximum Delay µs, Resolution 1 µs
Dwell time	Dwell time	0.001 to 200.000 ms, Resolution 0.001 ms
Path Alternate setting	Path Alternate setting	Random, Sequence Random: Path 1 and Path 2 switched randomly Sequence: Delay and path switched by setting sequence
Path	Path setting	1, 2, Termination Can be set when Path Alternate Setting = Sequence.
Delay	Delay of path	0 to Maximum Delay Enabled when Path Alternate = Sequence and previous element ≠ Termination

MX370108A LTE IQproducer

Optional

The MX370108A LTE IQproducer is PC application software with a GUI for generating waveform patterns in compliance with the 3GPP LTE FDD specifications in the 3GPP TS36.211, TS36.212, and TS25.81 standards.
Once created, the waveform pattern file is downloaded to the MG3700A hard drive.
Using the MG3700A, Vector Signal Generator functionality, the files are loaded, selected, and output as a modulated LTE signal.

• Generated Channels

LTE Downlink
- Reference Signal
- Primary Synchronization Signal
- Secondary Synchronization Signal
- PBCH (P-BCH)
- PCFICH
- PDCCH (Downlink control channel information)
- PDSCH (DL-SCH)

LTE Uplink
- Reference Signal
- PUCCH (Uplink control channel information)
- PUSCH (UL-SCH)

• Parameter Save/Recall

The numeric values and settings for each item can be saved in a parameter file. Enter the file name in the [File name] field and click the [Save] button to save the parameter file.
A saved parameter file is recalled by selecting it in the file list and clicking the [Open] button.

• Graphical Simulation Displays

This function displays a generated waveform as a Complementary Cumulative Distribution Function (CCDF), Fast Fourier Transform (FFT) and Time Domain graph on the PC. It is useful for checking or reviewing waveforms.

CCDF Graph

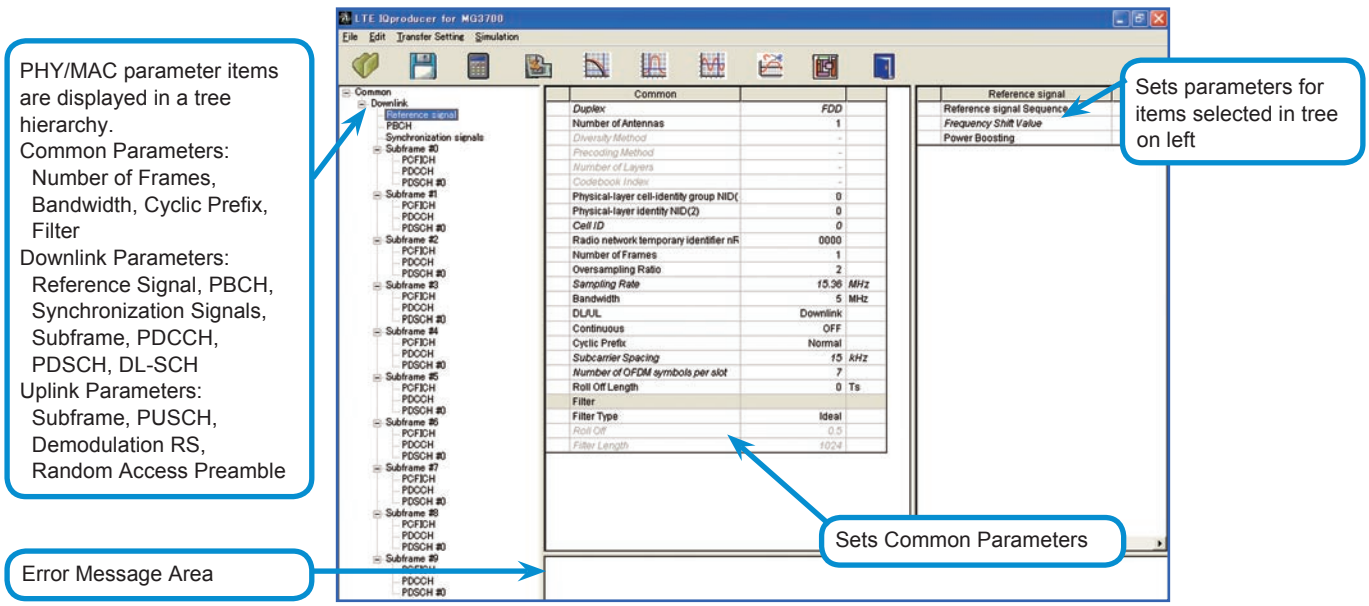
Up to eight generated waveform patterns can be read and displayed as CCDF graphs.

FFT Graph

Up to four generated waveform patterns can be read and displayed as FFT graphs.

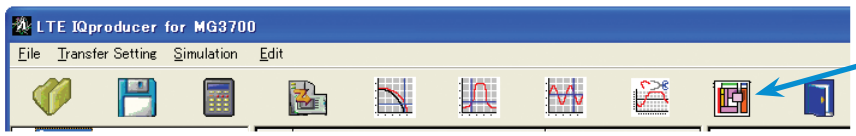
Time Domain Graph

Up to four generated waveform patterns can be read and displayed as a Time Domain Graph.



LTE IQproducer Main Screen

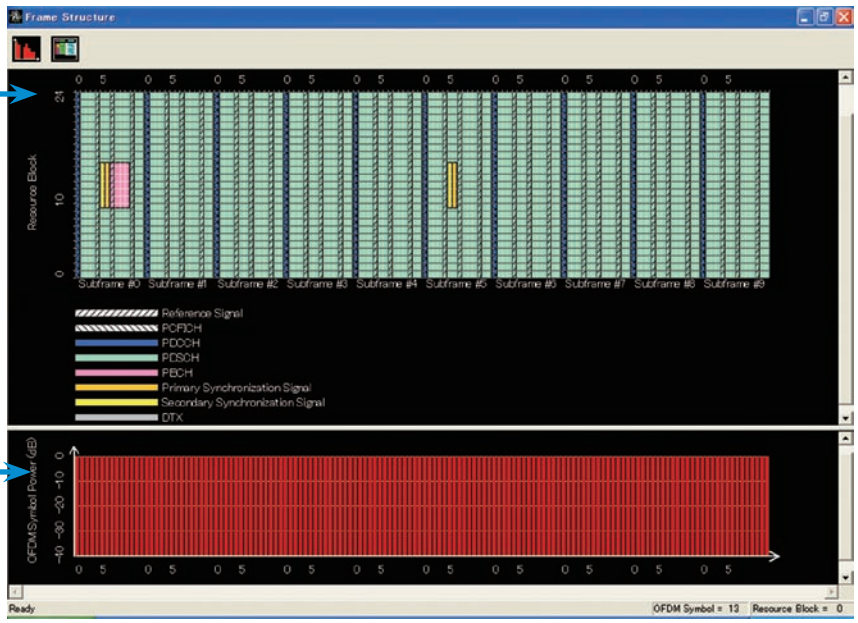
- Visual Check on Frame Structure Screen



Displays Frame Structure screen for confirming channel allocation status and power of each OFDM Symbol

Display Resource Element allocation graphically with each channel color-coded.
Y-axis: Frequency (Resource Block units)
X-axis: Time (OFDM Symbol units)

Display power relative levels of OFDM Symbols with maximum power of 0 dB.
Y-axis: OFDM Symbol Power
X-axis: Time (OFDM Symbol units)



Frame Structure Screen

- Common Parameter Setting Range

Display	Outline	Setting Range
Common		
Duplex	Displays duplex	Display only: FDD
Number of Antennas	Sets number of antennas	1, 2, 4 (2 and 4 only at Downlink)
Diversity Method	Sets diversity method	Spatial Multiplexing, Tx Diversity
Precoding Method	Sets precoding method	Without CDD, Large-delay CDD
Number of Layers	Sets number of layers	1, 2, 3, 4
Number of Code words	Sets number of Code word	1, 2
Codebook index	Sets codebook index	0 to 15
Physical-layer Cell-identity Group NID (1)	Sets physical-layer cell-identity group NID (1)	0 to 167
Physical-layer Identity NID (2)	Sets physical-layer identity NID (2)	0, 1, 2
Cell ID	Displays cell ID	0 to 503
PHICH	Sets ON/OFF of PHICH	ON, OFF
Ng	Sets parameter (Ng) that decides the arrangement of PHICH	1/6, 1/2
Number of Frames	Sets number of frames	1 to max. number of frames in memory
Over Sampling Ratio	Sets over sampling ratio	2, 4
Sampling Rate	Displays sampling rate	Display only: Autosetting using oversampling ratio and bandwidth
Bandwidth	Sets system bandwidth	1.4, 1.6, 3.0, 3.2, 5, 10, 15, 20 MHz
DL/UL	Sets downlink/uplink settings	Downlink, Uplink
Cyclic Prefix	Sets cyclic prefix	Normal, Extended
Subcarrier Spacing	Displays subcarrier spacing	Display only
Number of OFDM symbols per slot	Displays number of OFDM symbols per slot	7 (only when Cyclic Prefix = Normal), 6 (only when Cyclic Prefix = Extended)
Roll Off Length	Sets roll-off length for OFDM symbol	0 to 3152 Ts (when Random Access Preamble) 0 to 144 Ts (when Cyclic Prefix = Normal) 0 to 512 Ts (when Cyclic Prefix = Extended)
Filter		
Filter Type	Sets filter type	Nyquist, Root Nyquist, Ideal, None
Roll Off	Sets roll-off rate	0.1 to 1.0 (only enabled for Nyquist, Root Nyquist)
Filter Length	Set filter tap count in sample units	1 to 1024 (only enabled for Nyquist, Root Nyquist)

MX370108A LTE IQproducer

Optional

- PHY/MAC Parameter (Downlink) Setting Range

Display	Outline	Setting Range
Reference Signal		
Reference Signal Sequence	Sets data used as reference signal sequence	Gold Sequence, PN9, PN15, 16 bit repeat, User File
Reference Signal Sequence Repeat Data	Sets 16 bit repeat data installed in reference signal sequence	0000 to FFFF (only when reference signal sequence = 16 bit repeat)
Reference Signal Sequence User File	Sets user file installed in reference signal sequence	Select any file (only when random sequence = User File).
Frequency Shift Value	Displays frequency shift	0, 1, 2, 3, 4, 5
Power Boosting	Sets power boosting	–20.000 to +20.000 dB
PBCH		
Data Status	Enables/disables PBCH parameter	Disable, Enable
Data Type	Sets data type	PN9, PN15, 16 bit repeat, User File, BCH
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Power Boosting	Sets power boosting	–20.000 to +20.000 dB
BCH		
Data Type	Sets data type	PN9, PN15, 16 bit repeat, User File
Data Type Repeat Data	Sets 16 bit repeat data installed in DCI	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file to install in BCH	Select any file.
Transport Block Size	Sets number of bits required for BCH	When Cyclic Prefix = Normal, Max. 1920 When Cyclic Prefix = Extended, Max. 1728
Synchronization Signals		
Primary Synchronization Signal		
Data Status	Enables/disables primary synchronization signal parameter	Disable, Enable
Data Type	Sets data type	Zadoff-chu Sequence, User File
Data Type User File	Sets user file to install in primary synchronization signal	Select any file (only when Data Type = User File).
Zadoff-chu Sequence index u	Displays Zadoff-chu Sequence index u	25, 29, 34
Power Boosting	Sets power boosting	–20.000 to +20.000 dB
Secondary Synchronization Signal		
Data Status	Enables/disables secondary synchronization signal parameter	Disable, Enable
Data Type	Sets data type	Concatenated sequence, PN9, PN15, 16 bit repeat, User File
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Power Boosting	Sets power boosting	–20.000 to +20.000 dB
Subframe#0 to #9		
Virtual Resource Block type	Display Virtual Resource Block	Localized
PHICH duration	Sets PHICH duration	Normal, Extended
Number of PHICH Groups	Sets PHICH Groups in one subframe	Display only
Number of OFDM symbols for PDCCH	Sets number of OFDM symbols for PDCCH	1 to 4
Total Number of CCEs	Display Total Number of CCE	Display only
Number of PDCCHs	Sets number of PDCCHs	1 to 64
CCE arrangement	Sets CCE arrangement	PDCCH#0 to (Number of PDCCHs – 1), dummy
Number of PDSCHs	Sets number of PDSCHs	1 to 64
RB Arrangement	Sets RB configuration	PDSCH#0 to Number of PDSCHs – 1
PCFICH		
Data Status	Enables/disables PCFICH parameter	Disable, Enable
Data Type	Sets data type	CFI codeword, PN9, PN15, 16 bit repeat, User File
CFI	Sets CFI codeword type	1, 2, 3
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Power Boosting	Sets power boosting	–20.000 to +20.000 dB
PDCCH		
Data Status	Enables/disables PDCCH Parameter	Disable, Enable
PDCCH format	Sets PDCCH format	0, 1, 2, 3
Data Type	Sets data type	PN9, PN15, 16 bit repeat, User File, DCI
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Power Boosting	Sets power boosting	–20.000 to +20.000 dB
DCI		
Data Type	Sets data type	PN9, PN15, 16 bit repeat, User File
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Transport Block Size	Sets number of bits required for DCI	0 to 576
nRNTI	Sets Radio network temporary identifier	0000 to FFFF
UE Identity	Sets UE identity	0000 to FFFF

Display	Outline	Setting Range
PDSCH		
Data Status	Enables/disables PDSCH parameter	Disable, Enable
nRNTI	Sets Radio network temporary identifier	0000 to FFFF
Modulation Scheme	Sets modulation system	QPSK, 16QAM, 64QAM
Data Type	Sets data type	PN9, PN15, 16 bit repeat, User File, DL-SCH
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Power Boosting	Sets power boosting	–20.000 to +20.000 dB
DL-SCH		
Data Type	Sets data type	PN9, PN15, 16 bit repeat, User File
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Transport Block Size	Sets number of bits required for DL-SCH	Changes max. value of setting range by number of Resource Blocks
UE Category	Sets UE Category	1, 2, 3, 4, 5
RV Index	Sets redundancy version index	0, 1, 2, 3
PHICH		
Data Status	Enable/disables PHICH parameter	Disable, Enable
PHICH Group number	Display PHICH Group number	Display only
Number of PHICHs	Sets Number of PHICHs	1 to 8 (Cyclic Prefix = Normal) 1 to 4 (Cyclic Prefix = Extended)
Power Boosting	Set power boosting	Display only
PHICH#0 to # (Number of PHICHs–1)		
Data Status	Enable/disable PHICH parameter	Disable, Enable
Orthogonal Sequence Index	Sets orthogonal sequence index	0 to 7 (When Cyclic Prefix = Normal) 0 to 3 (When Cyclic Prefix = Extended)
Data Type	Display data type	Display only: HI codeword
HI	Sets code word of HI (HARQ indicator)	000, 111
Power Boosting	Set power boosting	–20.000 to +20.000 dB

- PHY/MAC Parameter (Uplink) Setting Range

Display	Outline	Setting Range
Data Transmission/Random Access Preamble		
Data Transmission/Random Access Preamble	Sets data transmission and random access preamble	Data Transmission, Random Access Preamble
PUCCH shift	Sets PUCCH shift	1, 2, 3
PUCCH offset	Sets PUCCH offset	0, 1, 2
N	Set N	1 to 12
Subframe#0 to #9 (Data Transmission)		
Number of PUCCHs	Sets number of PUCCH	0, 1, 2, 3, 4, 5, 6, 7, 8
Number of PUSCHs	Sets number of PUSCH	0, 1, 2, 3, 4, 5, 6, 7, 8
PUCCH#0 to #7 (Data Transmission)		
Data Status	Enables/disables PUCCH parameter	Disable, Enable
nRNTI	Sets Radio network temporary identifier	0000 to FFFF
PUCCH format	Sets PUCCH format	1, 1a, 1b, 2, 2a, 2b
Data Type	Sets data type	PN9, PN15, 16 bit repeat, User File, UCI
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Base Sequence Group Number u	Sets base sequence group number	0 to 29
Base Sequence Number v	Displays base sequence group number	0 fixed
Orthogonal Sequence Index	Sets orthogonal sequence index	0, 1, 2 (Displays only when PUCCH Format = 1, 1a, 1b)
Power Boosting	Sets power boosting	–20.000 to +20.000 dB
Cyclic Shift		
n	Set n	0 to 35
UCI		
Transport Block Size	Sets transport block size of UCI	1 (When PUCCH format = 1a) 2 (When PUCCH format = 1b) 1 to 13 (When PUCCH format = 2) 2 to 14 (When PUCCH format = 2a) 3 to 15 (When PUCCH format = 2b)
Data Type	Sets data type	PN9, PN15, 16bit repeat, User File
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).

MX370108A LTE IQproducer

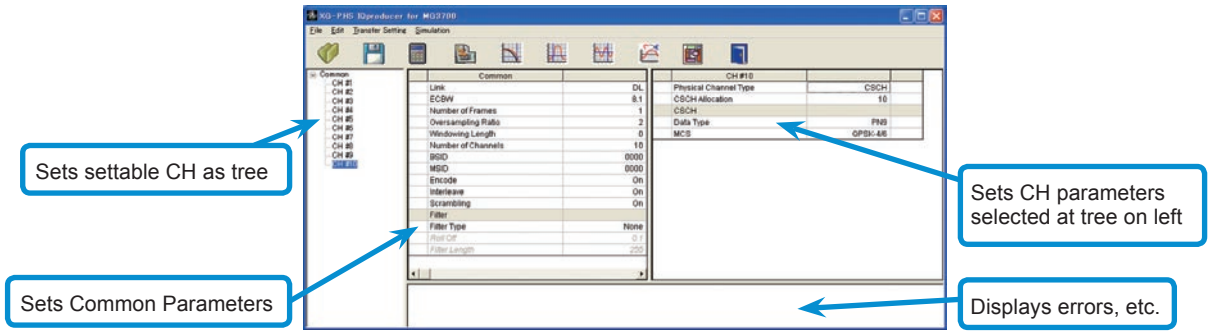
Optional

Display	Outline	Setting Range
Demodulation RS for PUCCH		
Data Type	Sets data type	Base Sequence, User File
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Group Hopping	Enable/disable Group Hopping parameter	Disable, Enable
Orthogonal Sequence Index	Sets orthogonal sequence index	0, 1, 2
Base Sequence Group Number u	Sets base sequence group number	0 to 29
Base Sequence Number v	Displays base sequence group number	0 Fixed
Cyclic Shift		
n	Displays n	0 to 35
PUSCH#0 to #7 (Data Transmission)		
Data Status	Enables/disables PUSCH parameter	Disable, Enable
nRNTI	Sets Radio network temporary identifier	0000 to FFFF
Modulation Scheme	Modulation system	QPSK, 16QAM, 64QAM
Data Type	Sets data type	PN9, PN15, 16 bit repeat, User File, UL-SCH
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Start Number of RB	Start position of RB	0 to 99
Number of RBs	Total number of RB	1 to 100
Power Boosting	Sets power boosting	–20.000 to +20.000 dB
UL-SCH		
Transport Block Size	Sets transport block size of UL-SCH	Changes max. value of the setting range by number of Resource Blocks
Data Type	Sets mapping data type	PN9, PN15, 16 bit repeat, User File
Data Type Repeat Data	Sets 16bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
RV Index	Sets rebundancy version index	0, 1, 2, 3
Demodulation RS for PUSCH		
Data Type	Sets data installed in demodulation RS for PUSCH	Base Sequence, User File
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Group Hopping	Enable/disable Group Hopping parameter	Disable, Enable
Delta ss	Sets Delta ss	0 to 29
Base Sequence Group Number u	Sets base sequence group number	0 to 29
Base Sequence Number v	Displays base sequence group number	0, 1
Cyclic Shift		
n	Sets n for Cyclic Shift (α = 2*pi*n/12)	0 to 11
2*pi*n/12	Displays Cyclic Shift α	Display only
Random Access Preamble		
PRACH Configuration	Sets transmission timing of PRACH	0 to 63 (Except 30, 46, 60, 61, 62)
Preamble Format	Displays preamble format	Display only
Data Type	Sets data type	Root Zadoff-chu Sequence, User File
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Root Zadoff-chu Sequence	Sets Root Zadoff-chu sequence	1 to 839 (only when Data Type = Root Zadoff-chu Sequence)
Cyclic Shift Value	Sets cyclic shift value	0 to 838 (only when Data Type = Root Zadoff-chu Sequence)
Random Access Preamble Length	Displays length for random access preamble	Display only
Hopping Pattern Length	Sets frequency hopping pattern	1 to 10 frames
Hopping Pattern	Sets frequency hopping pattern for random access preamble in RB units	0 to 94, OFF
Power Ramping Step Size	Sets power increase step at each random access preamble transmission	0.0 to 10.0 dB

MX370109A XG-PHS IQproducer

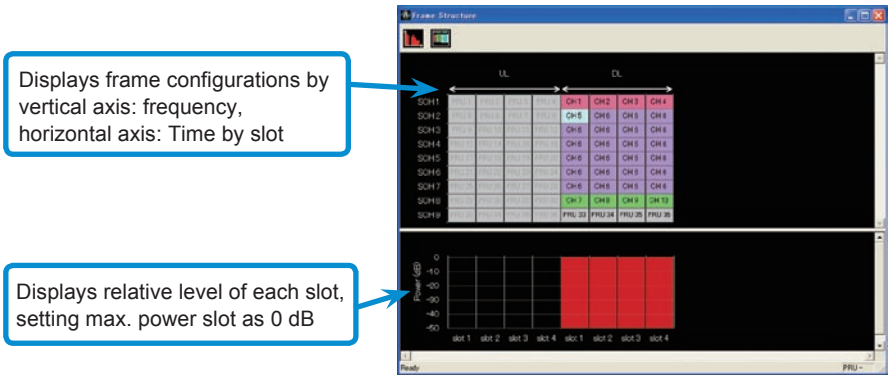
Optional

The MX370109A XG-PHS IQproducer is a PC application for generating downlink and uplink waveform patterns for next-generation PHS (XGP:eXtended Global Platform).
The generated waveform patterns are output using the MG3700A Vector Generator.



XG-PHS IQproducer Main Screen

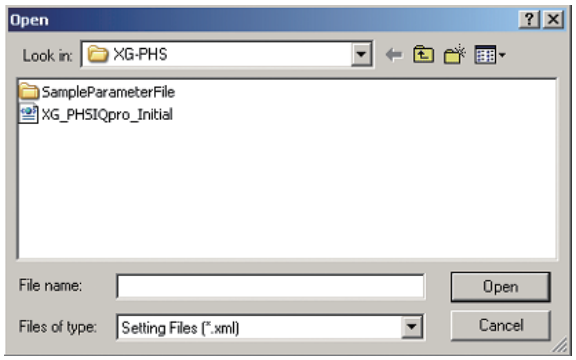
- Visual Check on Frame Structure Screen



Frame Structure Screen and Power Graph (Downlink Signal Generation)

- Parameter Save/Recall

The numeric values and settings for each item can be saved in a parameter file. Enter the file name in the [File name] field and click the [Save] button to save the parameter file.
A saved parameter file is recalled by selecting it in the file list and clicking the [Open] button.



- Graphical Simulation Displays

This function displays a generated waveform as a Complementary Cumulative Distribution Function (CCDF), Fast Fourier Transform (FFT) and Time Domain graph on the PC. It is useful for checking or reviewing waveforms.

CCDF Graph

Up to eight generated waveform patterns can be read and displayed as CCDF graphs.

FFT Graph

Up to four generated waveform patterns can be read and displayed as FFT graphs.

Time Domain Graph

Up to four generated waveform patterns can be read and displayed as a Time Domain Graph.

Clipping Function

Clipping and filtering can be performed for created waveform patterns.

MX370109A XG-PHS IQproducer

Optional

• Common Parameter Setting Range

Display	Outline	Setting Range
Common		
Link	Sets Uplink and Downlink signals	UL, DL
ECBW	Sets effective channel bandwidth	8.1, 9.0, 16.2, 17.1, 18.0 MHz
Number of Frames	Sets Uplink and Downlink signals	When Oversampling Ratio = 2 ECBW = 8.1, 9.0 MHz, 1 to 2796 ECBW = 16.2, 17.1, 18.0 MHz, 1 to 1398 When Oversampling Ratio = 4 ECBW = 8.1, 9.0 MHz, 1 to 1398 ECBW = 16.2, 17.1, 18.0 MHz, 1 to 699
Oversampling Ratio	Sets oversampling ratio	2, 4
Windowing Length	Sets windowing length	0 to 2000 ns
Filter Type	Sets filtering	Nyquist, Root Nyquist, Ideal, None
Number of Channels	Sets channel number	ECBW = 8.1 MHz, 1 to 36 ECBW = 9.0 MHz, 1 to 40 ECBW = 16.2 MHz, 1 to 72 ECBW = 17.1 MHz, 1 to 76 ECBW = 18.0 MHz, 1 to 80
BSID	Sets ID for Base Station	0x0000 to 0x7FFF
MSID	Sets ID for Mobile Station	0x0000 to 0x7FFF
Scrambling	Sets ON/OFF for Scrambling	ON, OFF
Encode	Sets ON/OFF for Encode	ON, OFF
Interleave	Sets ON/OFF for Interleave	ON, OFF

• Physical Channel Parameter (Downlink/Uplink) Setting Range

Display	Outline	Setting Range
CCCH		
CCCH Allocation	Sets PRU number deploying CCCH	1 to 80
Physical Channel Data Type	Sets data inserted in CRC Calculation Area	PN9, PN15, PN23, 16 bit repeat, User File, Function Channel
Physical Channel 16 bit repeat	Sets 16 bit repeat data inserted in CRC Calculation Area	0000 to FFFF
Physical Channel User File	Sets user file inserted in CRC Calculation Area	Select any file
Function Channel Data Type	Sets data inserted in BCCH or PCH	PN9, PN15, PN23, 16 bit repeat, User File
Function Channel 16 bit repeat	Sets 16 bit repeat data inserted in BCCH or PCH	0000 to FFFF
Function Channel User File	Sets user file inserted in BCCH or PCH	Select any file
ANCH		
ANCH Allocation	Sets PRU number deploying ANCH	1 to 80
Physical Channel Data Type	Sets data inserted in CRC Calculation Area	PN9, PN15, PN23, 16 bit repeat, User File, ECCH, ICCH
Physical Channel 16 bit repeat	Sets 16 bit repeat data inserted in CRC Calculation Area	0000 to FFFF
Physical Channel User File	Sets user file inserted in CRC Calculation Area	Select any file
RCH*1	Sets RCH value	0x00 to 0x7F
MAP Origin*2	Sets MAP start position	ECBW = 8.1 MHz, 0 to 8 ECBW = 9.0 MHz, 0 to 9 ECBW = 16.2 MHz, 0 to 17 ECBW = 17.1 MHz, 0 to 18 ECBW = 18.0 MHz, 0 to 19
MAP*2	Displays MAP value	0x000000000000000000 to 0x7FFFFFFFFFFFFFFFFF
SD*2	Sets Shift Direction	Stay, One Step Backward, Two Steps Forward, One Step Forward
ANCH PC	Sets ANCH Power Control value	0x0000 0000 to 0xFFFF FFFF
EXCH PC	Sets EXCH Power Control value	0x0000 0000 to 0xFFFF FFFF
PC	Sets Power Control value	0x0000 0000 to 0xFFFF FFFF
ACK	Sets ACK value	0x0 0000 0000 to 0xF FFFF FFFF
V	Sets Validity value	0 to 80
MI	Sets MI value	BPSK-1, BPSK-3/4, QPSK-1, QPSK-4/6, 16QAM-1, 16QAM-4/6, 64QAM-3/4, 64QAM-6/10, 256QAM-4/6, 256QAM-8/14
MR	Sets MR value	BPSK-1, BPSK-3/4, QPSK-1, QPSK-4/6, 16QAM-1, 16QAM-4/6, 64QAM-3/4, 64QAM-6/10, 256QAM-4/6, 256QAM-8/14
HC	Sets HARQ Cancel	0, 1
Function Channel Data Type	Sets data inserted in MAC Frame	PN9, PN15, PN23, 16 bit repeat, User File
Function Channel 16 bit repeat	Sets 16 bit repeat data inserted in MAC Frame	0000 to FFFF
Function Channel User File	Sets user file inserted in MAC Frame	Select any file

Display	Outline	Setting Range
EXCH		
EXCH PRU Number	Displays PRU number deploying EXCH	1 to 80
EXCH Allocation	Sets PRU deploying EXCH	ECBW = 8.1 MHz, 1 to 36 ECBW = 9.0 MHz, 1 to 40 ECBW = 16.2 MHz, 1 to 72 ECBW = 17.1 MHz, 1 to 76 ECBW = 18.0 MHz, 1 to 80
Physical Channel Data Type	Sets data inserted in CRC Calculation Area	PN9, PN15, PN23, 16 bit repeat, User File, EDCH
Physical Channel 16 bit repeat	Sets 16 bit repeat data inserted in CRC Calculation Area	0000 to FFFF
Physical Channel User File	Sets data file inserted in CRC Calculation Area	Select any file
Function Channel Data Type	Sets data type inserted in MAC Frame	PN9, PN15, PN23, 16 bit repeat, User File
Function Channel 16 bit repeat	Sets 16 bit repeat data inserted in MAC Frame	0000 to FFFF
Function Channel User File	Sets user file inserted in MAC Frame	Select any file
MCS	Sets MCS	BPSK-1, BPSK-3/4, QPSK-1, QPSK-4/6, 16QAM-1, 16QAM-4/6, 64QAM-3/4, 64QAM-6/10, 256QAM-4/6, 256QAM-8/14
PRU Concatenation*2	Sets PRU Concatenation	ON, OFF
Validity	Sets effective PRU of EXCH	0 to EXCH PRU Number
CSCH		
CSCH Allocation	Sets PRU number deploying CSCH	1 to 80
Physical Channel Data Type	Sets data inserted in CRC Calculation Area	PN9, PN15, PN23, 16 bit repeat, User File, TCH, CDCH
Physical Channel 16 bit repeat	Sets 16 bit repeat data inserted in CRC Calculation Area	0000 to FFFF
Physical Channel User File	Sets data file inserted in CRC Calculation Area	Select any file
MCS	Sets MCS	BPSK-1, BPSK-3/4, QPSK-1, QPSK-4/6, 16QAM-1, 16QAM-4/6, 64QAM-3/4, 64QAM-6/10, 256QAM-4/6, 256QAM-8/14
MI	Sets MI value	BPSK-1, BPSK-3/4, QPSK-1, QPSK-4/6, 16QAM-1, 16QAM-4/6, 64QAM-3/4, 64QAM-6/10, 256QAM-4/6, 256QAM-8/14
MR	Sets MR value	BPSK-1, BPSK-3/4, QPSK-1, QPSK-4/6, 16QAM-1, 16QAM-4/6, 64QAM-3/4, 64QAM-6/10, 256QAM-4/6, 256QAM-8/14
SD*2	Sets Shift Direction	Stay, One Step Backward, Two Steps Forward, One Step Forward
PC	Sets Power Control value	0x0000 0000 to 0xFFFF FFFF
ACK	Sets ACK value	0, 1
Function Channel Data Type	Function Channel Data Type	PN9, PN15, PN23, 16 bit repeat, User File
Function Channel 16 bit repeat	Sets 16 bit repeat data inserted in MAC Frame	0000 to FFFF
Function Channel User File	Sets user file inserted in MAC Frame	Select any file

* 1: UL only
* 2: DL only

MX269910A LTE TDD IQproducer

Optional

The MX269910A LTE TDD IQproducer is PC application software with a GUI for generating waveform patterns in compliance with the 3GPP LTE TDD specifications in the 3GPP TS36.211, TS36.212, TS36.213, and TS25.814 standards.
Once created, the waveform pattern file is downloaded to the MG3700A hard drive.
Using the MG3700A, Vector Signal Generator functionality, the files are loaded, selected, and output as a modulated LTE signal.

● Generated Channels

Downlink
- Reference Signal
- Primary Synchronization Signal
- Secondary Synchronization Signal
- PBCH (P-BCH)
- PDCCH (Downlink control channel information)
- PDSCH (DL-SCH)

Uplink
- Reference Signal
- PUCCH (Uplink control channel information)
- PUSCH (UL-SCH)

● Parameter Save/Recall

The numeric values and settings for each item can be saved in a parameter file. Enter the file name in the [File name] field and click the [Save] button to save the parameter file.
A saved parameter file is recalled by selecting it in the file list and clicking the [Open] button.

● Graphical Simulation Displays

This function displays a generated waveform as a Complementary Cumulative Distribution Function (CCDF), Fast Fourier Transform (FFT) and Time Domain graph on the PC. It is useful for checking or reviewing waveforms.

CCDF Graph

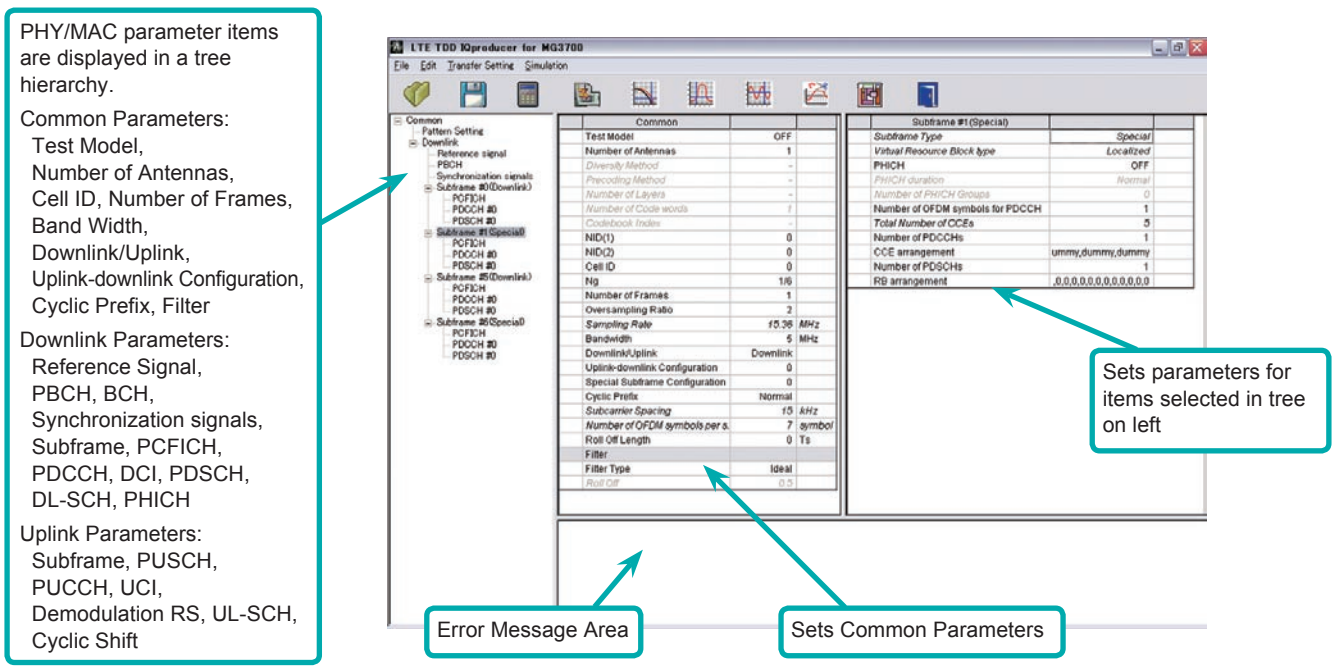
Up to eight generated waveform patterns can be read and displayed as CCDF graphs.

FFT Graph

Up to four generated waveform patterns can be read and displayed as FFT graphs.

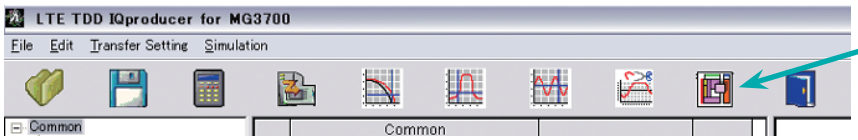
Time Domain Graph

Up to four generated waveform patterns can be read and displayed as a Time Domain Graph.



LTE TDD IQproducer Main Screen

- Visual Check at Frame Structure Screen



Displays Frame Structure screen for confirming channel allocation status and power of each OFDM Symbol

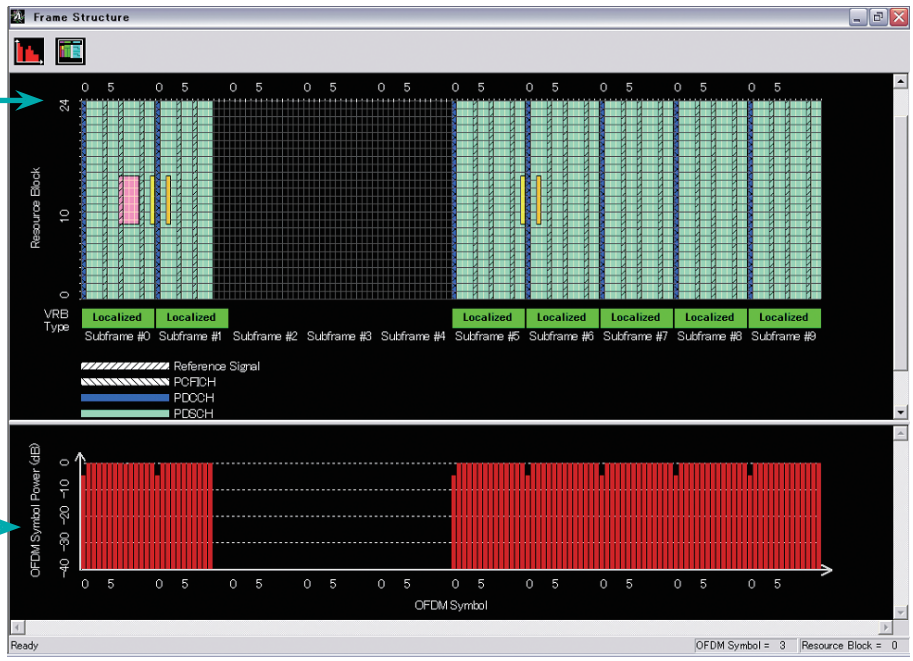
The Frame Structure Screen shows the resource element allocation graphically with each channel color-coded.

Y-axis: Frequency (Resource Block units)
X-axis: Time (OFDM Symbol units)

In the Full Scale display, one frame (Subframe#0 to 9) is displayed.
The zoom can be done by selecting the area with the cursor. When the Full Scale button is pushed, one frame is displayed. Moreover, when the cursor is set in each channel, and "Properties" is selected by right-clicking, information on the setting of the channel etc. is displayed.

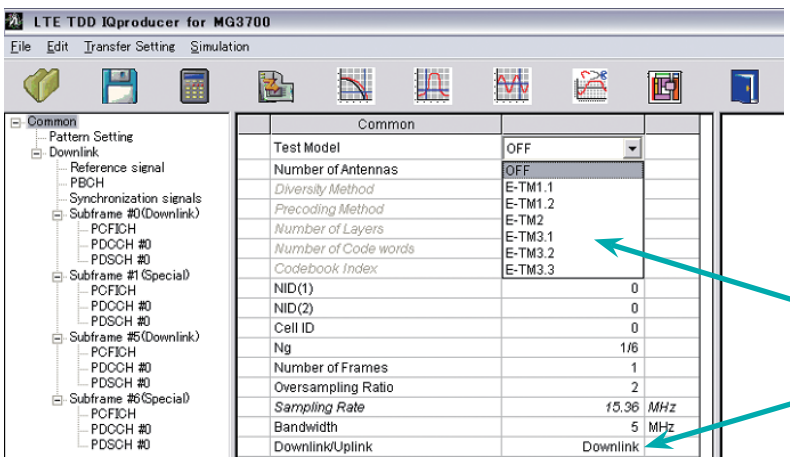
The Power Graph shows the power relative levels of OFDM Symbols with maximum power of 0 dB.

Y-axis: OFDM Symbol Power
X-axis: Time (OFDM Symbol units)



Frame Structure Screen

- Easy Setup Items include for Test Model



The parameter of Test Model along the standard can be easily set only by selecting "Test Model" for Downlink. When the setting is "OFF", a detailed parameter can be arbitrarily set.

MX370110A LTE TDD IQproducer

Optional

• Common Parameter Setting Range

Display	Outline	Setting Range
Common		
Test Model	Sets test model	OFF, E-TM1.1, E-TM1.2, E-TM2, E-TM3.1, E-TM3.2, E-TM3.3
Number of Antennas	Sets number of antennas	1, 2, 4 (2 and 4 only at Downlink)
Diversity Method	Sets diversity method	Spatial Multiplexing, Tx Diversity
Precoding Method	Sets precoding method	Without CDD, Large-delay CDD
Number of Layers	Sets number of layers	1, 2, 3, 4
Number of Code words	Sets number of code words	1, 2
Codebook Index	Sets codebook index	0 to 3 (When Number of Layers = 1) 0 to 2 (When Number of Layers = 2) 0 to 15 (When Number of Antennas = 4)
NID (1)	Sets physical-layer cell-identity group NID (1)	0 to 167
NID (2)	Sets physical-layer identity NID (2)	0, 1, 2
Cell ID	Sets cell ID	0 to 503
Ng	Sets parameter (Ng) that decides the arrangement of PHICH	1/6, 1/2
Number of Frames	Sets number of frames	1 to max. number of frames in memory
Oversampling Ratio	Sets over sampling ratio	2, 4
Sampling Rate	Displays sampling rate	1.92∗Oversampling Ratio [MHz] (When Bandwidth = 1.4 MHz) 3.84∗Oversampling Ratio [MHz] (When Bandwidth = 3 MHz) 7.68∗Oversampling Ratio [MHz] (When Bandwidth = 5 MHz) 15.36∗Oversampling Ratio [MHz] (When Bandwidth = 10 MHz) 15.36∗Oversampling Ratio [MHz] (When Bandwidth = 15 MHz) 30.72∗Oversampling Ratio [MHz] (When Bandwidth = 20 MHz)
Bandwidth	Sets system bandwidth	1.4, 3, 5, 10, 15, 20 MHz
Downlink/Uplink	Sets downlink/uplink settings	Downlink, Uplink
Uplink-downlink Configuration	Sets uplink-downlink Configuration	0, 1, 2, 3, 4, 5, 6
Special Subframe Configuration	Sets special subframe Configuration	0 to 8
Cyclic Prefix	Sets cyclic prefix	Normal, Extended
Subcarrier Spacing	Displays subcarrier spacing	15 kHz
Number of OFDM symbols per slot	Displays number of OFDM symbols per slot	7 Symbol
Roll Off Length	Sets roll-off length for OFDM symbol	0 to 512 Ts
Filter		
Filter Type	Sets filter type	Nyquist, Root Nyquist, Ideal, None
Roll Off	Sets roll-off rate	0.1 to 1.0 (only enabled for Nyquist, Root Nyquist)

• Pattern Setting Parameter Setting Range

Display	Outline	Setting Range
Reference signal		
Package	Set package name of waveform pattern	31 characters or less
Export File Name	Set pattern name of waveform pattern	18 characters or less
Line1	Set comment of waveform pattern	38 characters or less
Line2	Set comment of waveform pattern	38 characters or less
Line3	Set comment of waveform pattern	38 characters or less

Table 1

Subframe	UL/DL Configuration						
	0	1	2	3	4	5	6
0	D	D	D	D	D	D	D
1	S	S	S	S	S	S	S
2	U	U	U	U	U	U	U
3	U	U	D	U	U	D	U
4	U	D	D	U	D	D	U
5	D	D	D	D	D	D	D
6	S	S	S	D	D	D	S
7	U	U	U	D	D	D	U
8	U	U	D	D	D	D	U
9	U	D	D	D	D	D	D

Table 2

UL/DL Configuration	Subframe turned "off"
0	–
1	0, 5
2	0, 1, 4, 5, 6, 9
3	1, 5, 6, 7
4	0, 1, 4, 5, 6, 7
5	0, 1, 3, 4, 5, 6, 7, 9
6	–

● PHY/MAC Parameter (Downlink) Setting Range

Display	Outline	Setting Range
Reference Signal		
Frequency Shift Value	Displays frequency shift	0, 1, 2, 3, 4, 5
Power Boosting	Sets power boosting	–20.000 to +20.000 dB
PBCH		
Data Status	Enable/disables PBCH parameter	Disable, Enable
Data Type	Sets data type	PN9fix, PN15fix, 16 bit repeat, User File, BCH
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Power Boosting	Sets power boosting	–20.000 to +20.000 dB
BCH		
Data Type	Sets data type	PN9fix, PN15fix, 16 bit repeat, User File
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Transport Block Size	Sets number of bits required for BCH	0 to 1920 (When Cyclic Prefix = Normal), 0 to 1728 (When Cyclic Prefix = Extended)
Synchronization Signals		
Primary Synchronization Signal		
Data Status	Enable/disables primary synchronization signal parameter	Disable, Enable
Power Boosting	Sets power boosting	–20.000 to +20.000 dB
Secondary Synchronization Signal		
Data Status	Enable/disables secondary synchronization signal parameter	Disable, Enable
Power Boosting	Sets power boosting	–20.000 to +20.000 dB
Subframe #0 to #9		
Subframe Type	Display subframe type	<Table1> (Downlink, Uplink, Special)
Virtual Resource Block Type	Display virtual resource block type	Localized
PHICH	Sets ON/OFF of PHICH	ON, OFF (Subframe in Table 2 is turned off by setting UL/DL Configuration.)
PHICH duration	Sets PHICH duration	Normal, Extended
Number of PHICH Groups	Sets number of PHICH groups in one subframe	
Number of OFDM symbols for PDCCH	Sets number of OFDM symbols for PDCCH	1 to 4 Symbol
Total Number of CCEs	Display total number of CCEs of control area in subframe	
Number of PDCCHs	Sets number of PDCCHs	1 to 64
CCE Arrangement	Sets CCE arrangement	PDCCH#0 to (Number of PDCCHs–1), dummy
Number of PDSCHs	Sets number of PDSCHs	1 to 64
RB Arrangement	Sets RB arrangement of PDSCH	PDSCH#0 to (Number of PDSCHs–1)
PCFICH		
Data Status	Enable/disables PCFICH parameter	Disable, Enable
Data Type	Sets data type	CFI codeword, PN9fix, PN15fix, 16 bit repeat, User File
CFI	Sets CFI codeword type	1, 2, 3
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Power Boosting	Sets power boosting	–20.000 to +20.000 dB
PDCCH		
Data Status	Enable/disables PDCCH parameter	Disable, Enable
PDCCH format	Sets PDCCH format	0, 1, 2, 3
Data Type	Sets data type	PN9fix, PN15fix, 16 bit repeat, User File, DCI
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Power Boosting	Set power boosting	–20.000 to +20.000 dB
DCI		
Data Type	Sets data type	PN9fix, PN15fix, 16 bit repeat, User File
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Transport Block Size	Sets number of bits required for DCI	0 to 576
nRNTI	Sets radio network temporary identifier	0000 to FFFF
PDSCH		
Data Status	Enable/disables PDSCH parameter	Disable, Enable
nRNTI	Sets radio network temporary identifier	0000 to FFFF
Modulation Scheme	Sets modulation system	QPSK, 16QAM, 64QAM
Data Type	Sets data type	PN9fix, PN15fix, 16 bit repeat, User File, DL-SCH
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Power Boosting	Sets power boosting	–20.000 to +20.000 dB
DL-SCH		
Data Type	Sets data type	PN9fix, PN15fix, 16 bit repeat, User File
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Transport Block Size	Sets number of bits required for DL-SCH	0 to 150000 bit
UE Category	Sets UE category	1, 2, 3, 4, 5
RV Index	Sets redundancy version index	0, 1, 2, 3
PHICH Group		
Data Status	Enable/disables PHICH parameter	Disable, Enable
Number of PHICHs	Sets number of PHICH	1 to 8 (Cyclic Prefix=Normal), 1 to 4 (Cyclic Prefix=Extended)
Power Boosting	Display power boosting of PHICH group	
PHICH #0 to # (Number of PHICHs–1)		
Data Status	Enable/disables PHICH parameter	Disable, Enable
Orthogonal Sequence Index	Sets orthogonal sequence index	0 to 7 (When Cyclic Prefix = Normal), 0 to 3 (When Cyclic Prefix = Extended)
Data Type	Display data type	HI
HI	Sets code word of HI (HARQ indicator)	000, 111
Power Boosting	Set power boosting	–20.000 to +20.000 dB

MX370110A LTE TDD IQproducer

Optional

- PHY/MAC Parameter (Uplink) Setting Range

Display	Outline	Setting Range
Uplink		
delta PUCCH shift	Sets delta PUCCH shift	1, 2, 3
N_CS(1)	Sets number of cyclic shift for PUCCH format 1/1a/1b	0 to 7
N_RB(2)	Sets number of resource block for PUCCH format 2/2a/2b	0 to 63
Subframe #0 to #9		
Subframe Type	Display subframe type	<Table 1> (Downlink, Uplink, Special)
Number of PUCCHs	Sets number of PUCCHs	0 to 8
Number of PUSCHs	Sets number of PUSCHs	0 to 8
PUCCH #0 to #7		
Data Status	Enables/disables PUCCH parameter	Disable, Enable
n(1)_PUCCH	Sets resource number of PUCCH 1/1a/1b	0 to 764
n(2)_PUCCH	Sets resource number of PUCCH 2/2a/2b	0 to 764
nRNTI	Sets radio network temporary identifier	0000 to FFFF
PUCCH format	Sets PUCCH format	1, 1a, 1b, 2, 2a, 2b
Data Type	Sets data type	PN9fix, PN15fix, 16 bit repeat, User File, UCI
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Group Hopping	Sets enable/disables	Disable, Enable
Base Sequence Group Number u	Sets base sequence group number	0 to 29
Base Sequence Number v	Displays base sequence group number	0 fixed
Power Boosting	Sets power boosting	–20.000 to +20.000 dB
UCI		
Transport Block Size	Sets transport block size of UCI	1 (When PUCCH format = 1a) 2 (When PUCCH format = 1b) 1 to 13 (When PUCCH format = 2) 2 to 14 (When PUCCH format = 2a) 3 to 15 (When PUCCH format = 2b)
Data Type	Sets data type	PN9fix, PN15fix, 16 bit repeat, User File
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Demodulation RS for PUCCH		
Group Hopping	Sets enable/disables	Disable, Enable
Base Sequence Group Number u	Sets base sequence group number	0 to 29
Base Sequence Number v	Displays base sequence group number	0 fixed
PUSCH #0 to #7		
Data Status	Enables/disables PUSCH parameter	Disable, Enable
nRNTI	Sets radio network temporary identifier	0000 to FFFF
Modulation Scheme	Modulation system	QPSK, 16QAM, 64QAM
Data Type	Sets data type	PN9fix, PN15fix, 16 bit repeat, User File, UL-SCH
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
Start Number of RB	Start position of RB	0 to 5 (When Bandwidth = 1.4 MHz) 0 to 14 (When Bandwidth = 3 MHz) 0 to 24 (When Bandwidth = 5 MHz) 0 to 49 (When Bandwidth = 10 MHz) 0 to 74 (When Bandwidth = 15 MHz) 0 to 99 (When Bandwidth = 20 MHz)
Number of RBs	Total number of RB	1 to 6 (When Bandwidth = 1.4 MHz) 1 to 15 (When Bandwidth = 3 MHz) 1 to 25 (When Bandwidth = 5 MHz) 1 to 50 (When Bandwidth = 10 MHz) 1 to 75 (When Bandwidth = 15 MHz) 1 to 100 (When Bandwidth = 20 MHz)
Power Boosting	Set power boosting	–20.000 to +20.000 dB
UL-SCH		
Transport Block Size	Sets transport block size of UL-SCH	0 to 86400
Data Type	Sets data type	PN9fix, PN15fix, 16 bit repeat, User File
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only when Data Type = 16 bit repeat)
Data Type User File	Sets user file	Select any file (only when Data Type = User File).
RV Index	Sets redundancy version index	0, 1, 2, 3
Demodulation RS for PUSCH		
Group Hopping	Sets enable/disables	Disable, Enable
Sequence Hopping	Sets enable/disables	Disable, Enable
Delta ss	Sets delta ss	0 to 29
Base Sequence Group Number u	Sets base sequence group number	0 to 29
Base Sequence Number v	Displays base sequence group number	0, 1
Cyclic Shift 1st slot		
n_cs	Sets ncs of first slot of demodulation RS	0 to 11
alpha	Sets cyclic shift of first slot of demodulation RS	Alpha is calculated by the following expression. Five digits below the decimal are displayed. alpha = 2×pi×n_cs/12
Cyclic Shift 2nd slot		
n_cs	Sets ncs of second slot of demodulation RS	0 to 11
alpha	Sets cyclic shift of second slot of demodulation RS	Alpha is calculated by the following expression. Five digits below the decimal are displayed. alpha = 2×pi×n_cs/12

Ordering Information

Please specify the model/order number, name and quantity when ordering.
The names listed in the chart below are Order Names. The actual name of the item may differ from the Order Name.

Model/Order No.	Name		Remarks
	- Main frame -		
MG3700A	Vector Signal Generator		
	- Standard accessories -		
J0017F	Power Cord, 2.6 m:	1 pc	
J1276	LAN Straight Cable:	1 pc	10 cm, For U link connection on Rear panel
	CompactFlash:	1 pc	64 MB or more
J1254	CompactFlash Adapter:	1 pc	
Z0742	MG3700A CD-ROM:	1 pc	Main frame operation manual, IQproducer operation manual, Standard waveform operation manual, IQproducer software
	- Options -		
MG3700A-001	Rubidium Reference Oscillator		Aging rate: ±1 × 10^{-10}/Month
MG3700A-002	Mechanical Attenuator		Changes standard electronic attenuator to mechanical attenuator
MG3700A-011	Upper Frequency 6 GHz		250 kHz to 3 GHz extended to 250 kHz to 6 GHz
MG3700A-021	ARB Memory Upgrade 512 Msample		Extends standard 128 Msample/channel × 2 to 256 Msample/channel × 2
MG3700A-031	High Speed BER Test Function		Extends standard BER test function
MG3700A-101	Rubidium Reference Oscillator Retrofit		Retrofitted to shipped MG3700A
MG3700A-102	Mechanical Attenuator Retrofit		Retrofitted to shipped MG3700A
MG3700A-103	Electronic Attenuator Retrofit		Retrofitted to shipped MG3700A
MG3700A-111	Upper Frequency 6 GHz Retrofit		Retrofitted to shipped MG3700A
MG3700A-121	ARB Memory Upgrade 512 Msample Retrofit		Retrofitted to shipped MG3700A
MG3700A-131	High Speed BER Test Function Retrofit		Retrofitted to shipped MG3700A
	- Maintenance service -		
MG3700A-ES210	Extended Warranty Service		2 years
MG3700A-ES310	Extended Warranty Service		3 years
MG3700A-ES510	Extended Warranty Service		5 years
	- Softwares (Waveform pattern) -		
MX370001A	TD-SCDMA Waveform Pattern		
MX370002A	Public Radio System Waveform Pattern		RCR STD-39, ARIB STD-T61/T79/T86
	- Softwares (License key for IQproducer system) -		
MX370101A	HSDPA/HSUPA IQproducer		
MX370102A	TDMA IQproducer		
MX370103A	CDMA2000 1xEV-DO IQproducer		
MX370104A	Multi-carrier IQproducer		
MX370105A	Mobile WiMAX IQproducer		
MX370106A	DVB-T/H IQproducer		
MX370107A	Fading IQproducer		
MX370108A	LTE IQproducer		
MX370109A	XG-PHS IQproducer		
MX370110A	LTE TDD IQproducer		
	- Optional accessories -		
Z0777	Standard Waveform Pattern Upgrade Kit		(DVD 4 piece sets)
W2495AE	MG3700A Operation Manual		
W2496AE	MG3700A Operation Manual (IQproducer)		
W2539AE	MG3700A Operation Manual (Standard Waveform Pattern)		
W2533AE	MX370001A Operation Manual		TD-SCDMA Waveform Pattern
W2503AE	MX370101A Operation Manual		HSDPA/HSUPA IQproducer
W2504AE	MX370102A Operation Manual		TDMA IQproducer
W2505AE	MX370103A Operation Manual		CDMA2000 1xEV-DO IQproducer
W2633AE	MX370104A Operation Manual		Multi-carrier IQproducer
W2734AE	MX370105A Operation Manual		Mobile WiMAX IQproducer
W2798AE	MX370106A Operation Manual		DVB-T/H IQproducer
W2995AE	MX370107A Operation Manual		Fading IQproducer
W3022AE	MX370108A Operation Manual		LTE IQproducer
W3152AE	MX370109A Operation Manual		XG-PHS IQproducer
W3221AE	MX370110A Operation Manual		LTE TDD IQproducer
G0141	HDD ASSY		Hard disk
K240B	Power Divider (K connector)		DC to 26.5 GHz, K-J, 50 Ω, 1 Wmax
MA1612A	Four-Port Junction Pad		5 MHz to 3 GHz, N-J
MP752A	Termination		DC to 12.4 GHz, 50 Ω, N-P
MA2512A	Band Pass Filter		For W-CDMA, pass band: 1.92 to 2.17 GHz
J0576B	Coaxial Cord, 1.0 m		N-P • 5D-2W • N-P
J0576D	Coaxial Cord, 2.0 m		N-P • 5D-2W • N-P
J0127A	Coaxial Cord, 1.0 m		BNC-P • RG-58A/U • BNC-P
J0127B	Coaxial Cord, 2.0 m		BNC-P • RG-58A/U • BNC-P
J0127C	Coaxial Cord, 0.5 m		BNC-P • RG-58A/U • BNC-P
J0322A	Coaxial Cord, 0.5 m		SMA-P • SMA-P, DC to 18 GHz, 50 Ω
J0322B	Coaxial Cord, 1.0 m		SMA-P • SMA-P, DC to 18 GHz, 50 Ω
J0322C	Coaxial Cord, 1.5 m		SMA-P • SMA-P, DC to 18 GHz, 50 Ω
J0322D	Coaxial Cord, 2.0 m		SMA-P • SMA-P, DC to 18 GHz, 50 Ω
J0004	Coaxial Adapter		N-P • SMA-J Conversion Adapter, DC to 12.4 GHz
J1261B	Ethernet Cable (Shield Type)		Straight-through, 3 m
J1261D	Ethernet Cable (Shield Type)		Cross, 3 m
J0008	GPIB Cable, 2.0 m		
J1277	IQ Output Conversion Adapter		D-Sub/BNC
B0329C	Front Cover for 1MW 4U		
B0331C	Front Panel Handle Kit		2 pcs/set
B0332	Joint Plate		4 pcs/set
B0333C	Rack Mount Kit		
B0334C	Hardtype Carrying Case		With front cover and a casters
P0021	CompactFlash 128 MB		
P0022	CompactFlash 256 MB		
P0023	CompactFlash 512 MB		

Anritsu

Specifications are subject to change without notice.

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