Product Brochure

MG3710A

Vector Signal Generator

100 kHz to 2.7 GHz
100 kHz to 4.0 GHz
100 kHz to 6.0 GHz

Excellent Eco Product

Multi-Band Multi-System Multi-Channel

Cut Costs for New Wireless Tests

Dual RF

One unit supports two RF outputs! Ideal for Multi-band, MIMO and MSR evaluations.

Dual Waveform Memory

One RF output supports two waveform memories! Combine wanted and interference signals in baseband and output at one RF.

RF Modulation Bandwidth: 160 MHz*/120 MHz

Can generate and output signals for 160-MHz bandwidth max. wireless LAN (IEEE802.11ac) and for 120-MHz bandwidth.

The MG3710A is a vector signal generator with 6-GHz upper frequency limit and 160-MHz*/120-MHz wide RF modulation baseband generator. It outputs various radio systems signals for cellular communications, such as LTE FDD/TDD, W-CDMA, GSM as well as narrowband communications, such as WLAN, WiMAX, *Bluetooth* and GPS.

Cuts Equipment Costs

The dual waveform memory cuts equipment costs for tests, such as ACS, Blocking and IM, which require two modulation signal sources.
The dual RF cuts MIMO equipment costs and reduces workloads for phase synchronization between equipment. It is important for tests using separate signals, such as MSR and multi-band.

Improves Yield

The excellent signal generator ACLR and SSB phase noise reduces the effect on wideband and narrow-band measurements to improve test margins and yields.

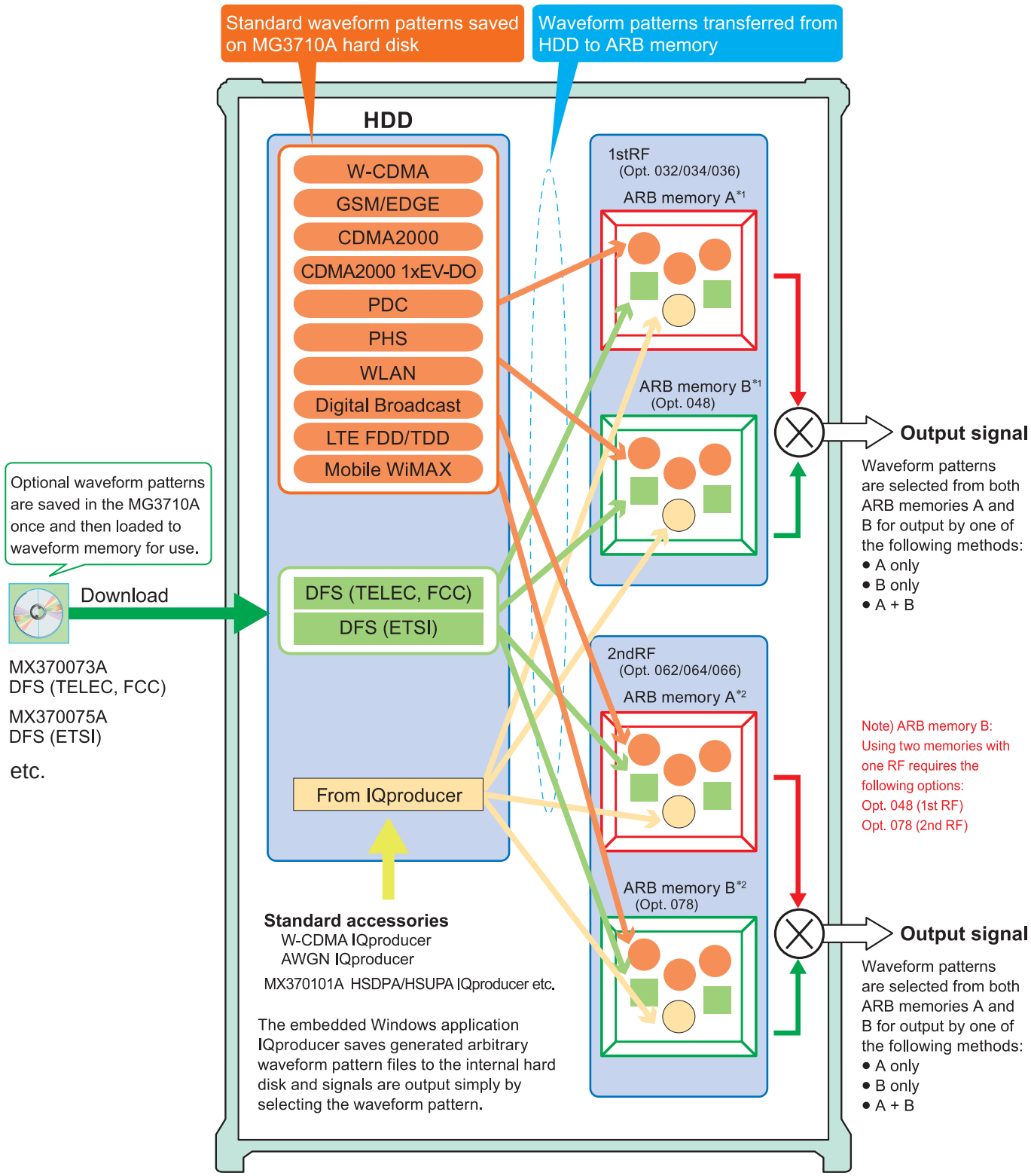
–71 dBc @W-CDMA, TestModel1, 64DPCH, 2 GHz
<–140 dBc/Hz (nom.) @100 MHz, 20 kHz offset, CW

Cuts Tact Time

The List/Sweep mode switches the frequency and level faster than 600 µs. Moreover, the 4-GB waveform memory upgrade can load many waveform patterns while instantaneous switching eliminates time wasted reloading waveform patterns.

*: Supports firmware version 2.00.00 and later. Can generate 160-MHz bandwidth signals (Wireless LAN IEEE802.11ac) only when using MX370111A WLAN IQproducer and MX370111A-002 802.11ac (160 MHz) option.
The latest version can be downloaded from the Anritsu homepage.
<https://www1.anritsu.co.jp/Download/MService/Login.asp>

MG3710A Vector Signal Generator



∗1: 1stRF ARB memory size
256 MB × 1 pc = 64 Msamples (Std.)
1 GB × 1 pc = 256 Msamples × 1 pc (Opt. 045)
1 GB × 2 pcs = 256 Msamples × 2 pcs (Opt. 045 + Opt. 048)
4 GB × 1 pc = 1024 Msamples × 1 pc (Opt. 046)
4 GB × 2 pcs = 1024 Msamples × 2 pcs (Opt. 046 + Opt. 048)

∗2: 2ndRF ARB memory size
256 MB × 1 pc = 64 Msamples (Std.)
1 GB × 1 pc = 256 Msamples × 1 pc (Opt. 075)
1 GB × 2 pcs = 256 Msamples × 2 pcs (Opt. 075 + Opt. 078)
4 GB × 1 pc = 1024 Msamples × 1 pc (Opt. 076)
4 GB × 2 pcs = 1024 Msamples × 2 pcs (Opt. 076 + Opt. 078)

Key Features

Dual RF & Dual Waveform Memory

● One Unit Supports Two RF Outputs Max.

• Frequency Range
1stRF: 100 kHz to 2.7/4.0/6.0 GHz [Opt. 032/034/036]
2ndRF: 100 kHz to 2.7/4.0/6.0 GHz [Opt. 062/064/066]

• Independent Baseband and RF Outputs

● Output Two Signals from One RF Out [Opt. 048/078]

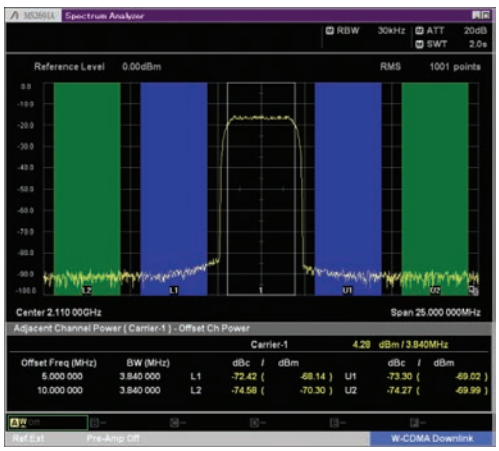
The baseband signal combine option installs two waveform memories for either the 1stRF (or 2ndRF) SG to combine two waveform patterns as the baseband for output, eliminating the need for two separate and expensive vector signal generators.

Wanted Signal + Interfere Signal
Wanted Signal + Delayed Signal, etc.

Basic Performance

● ACLR Performance

–71 dBc @W-CDMA, TestModel1, 64 DPCH, 2 GHz



W-CDMA ACLR (1 Carrier)
Waveform Pattern (TestModel1, 64DPCH)

● High-power Output [Opt. 041/071]

+23 dBm @CW, 400 MHz to 3 GHz

● High-speed Switching

< 600 µs @List/Sweep mode

● High Level Accuracy

Absolute Level Accuracy: ±0.5 dB
Linearity: ±0.2 dB (typ.)

● Choice of Reference Oscillators

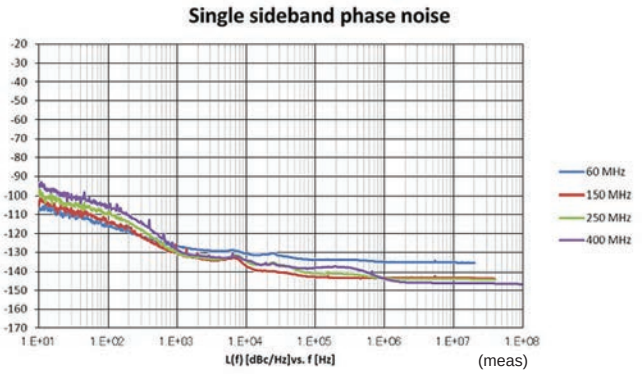
• Standard
Aging rate ±1 × 10^{-6}/year, ±1 × 10^{-7}/day

• High Stability Reference Oscillator [Opt. 002]
Aging rate ±1 × 10^{-7}/year, ±1 × 10^{-8}/day

• Rubidium Reference Oscillator [Opt. 001]
Aging rate ±1 × 10^{-10}/month

● SSB Phase Noise Performance

<–140 dBc/Hz (nom.) @100 MHz, 20-kHz offset, CW
<–131 dBc/Hz (typ.) @1 GHz, 20-kHz offset, CW
<–125 dBc/Hz (typ.) @2 GHz, 20-kHz offset, CW



(meas)

High All-purpose Baseband Performance

● Wide Vector Modulation Bandwidth

160 MHz*/120 MHz (using Internal baseband signal generator)
160 MHz (using External IQ input)

*: Supports firmware version 2.00.00 and later. Can generate 160-MHz bandwidth signals (Wireless LAN IEEE802.11ac) only when using MX370111A WLAN IQproducer and MX370111A-002 802.11ac (160 MHz) option.

● Large-capacity Waveform Memory

64 Msamples [with 1stRF, 2ndRF]
256 Msamples [Opt. 045/075]
1024 Msamples [Opt. 046/076]

● Arbitrary Waveform Generation

ASCII IQ sample data created using general-purpose signal generation software (such as MATLAB) can be converted to waveform patterns for the MG3710A. Data produced during R&D simulations can be converted using IQproducer.

Expandability

● BER Test Function [Opt. 021]

This option measures BER using Data/Clock/Enable demodulated at the DUT to display the results on the MG3710A screen.

• Input bit rate: 100 bps to 40 Mbps

● Analog/Pulse Modulation Functions [Standard]

*: Supports built-in analog modulation (AM/FM/ΦM) functions and pulse modulation (PM) functions.
Adding additional analog modulation input options (Opt. 050/080) supports modulation by external signal input.

● AWGN Generator [Opt. 049/079]

This options generates AWGN internally for the required waveform.

• Absolute CN Ratio: ≤40 dB

● USB Power Sensors [Sold separately]

Up to two USB power sensors can be connected to the MG3710A and the results are displayed on the MG3710A screen.

• Frequency Range: 50 MHz to 6 GHz [MA24106A]
10 MHz to 18 GHz [MA24118A]
10 MHz to 26 GHz [MA24126A] etc.

● Local Signal I/O for MIMO Signal Source [Opt. 017]

Local signals, baseband clocks and trigger signals can be shared between up to four MG3710A units to output phase coherency signals with synchronized signal output timing for configuring even 8×8 MIMO systems.

Operability

● Simple Touch-panel Operation
Touching the easy-to-use GUI with hierarchical menus fetches related function and numeric input keys for simple fast settings.

● Signal Flowcharts with Signal Block Diagrams
Two intuitive Hardware Block Chart and ARB Info screens make it easy to grasp settings, data and signal paths at a glance.

● Frequency Channel Table
A built-in channel table with presettings for popular communications systems simplifies frequency settings by using channel numbers.

Connections with External Equipment

● Remote Control Interfaces
GPIB, Ethernet (1000BASE-T), and USB (Type B) interfaces on the rear panel offer versatile choices for operation by remote control.

● USB Connections
Two Type A USB2.0 connectors on each of the front and rear panels offer convenient connections for keyboard , mouse and USB memory.

● Analog IQ Input/Output [Opt. 018]
This option installs analog IQ input and output connectors on the front and rear panels, respectively.
Input: I Input, Q Input
Output: I Output, $\overline{\text{I}}$ Output, Q Output, $\overline{\text{Q}}$ Output,

● Trigger Input
Start and Frame trigger connectors are built-in in as standard for outputting waveform patterns synchronized with externally input trigger signals.

● Marker Output Editing
Marker 1 output [Standard]
Marker 2 and 3 output
[Requires J1539A AUX Conversion Adapter]
This standard function outputs trigger signals at specific positions in the waveform pattern (Frame header, Burst header, etc.) for synchronizing and measuring signal generator waveform patterns with external equipment. Preset markers can be set at both the pre-installed waveform patterns and waveforms generated using IQproducer and any set markers can be output with the MG3710A marker editing function.

Security

● Windows 7 OS Upgrade [Opt. 029]
The shipped MG3710A runs the Windows XP OS but this can be upgraded at ordering to Windows 7 (32 bit, Professional).

Note: This option can only applied at ordering and cannot be retrofitted.

● User Data Storage on 2ndary HDD [Opt. 011]
This option is useful for saving sensitive waveform pattern data, etc., used at evaluation that cannot be allowed to leave the laboratory, workplace, factory, etc. The 2ndary HDD can be removed from/installed in the rear-panel slot when wanting to keep this saved data secure when the MG3710A is sent for service, used by third parties, etc.

● Removable HDD [Opt. 313]
User exchangeable HDD with Windows XP Embedded OS. Data security is assured by removing this HDD when the instrument leaves the factory for calibration, etc.

∗: Opt. 029 cannot be applied to this HDD option.

Pre-installed Key Waveform Patterns

● Waveform Patterns [Pre-installed]
Waveform patterns for the world's main communications systems (below) are pre-installed in the MG3710A for license-free use.

- LTE FDD (E-TM1.1 to E-TM3.3)
- LTE TDD (E-TM1.1 to E-TM3.3)
- W-CDMA/HSDPA
- GSM/EDGE
- CDMA2000 1X/1xEV-DO
- *Bluetooth*® • GPS • PDC • PHS
- Digital Broadcast (ISDB-T/BS/CS/CATV)
- WLAN (IEEE802.11a/11b/11g)

Waveform Pattern Options and Generation

● Optional Waveform Pattern [Optional License]

- DFS Radar Pattern (For TELEC & FCC)
- DFS (ETSI) Waveform Pattern
- ISDB-Tmm Waveform Pattern

● IQproducer Waveform Generation Software [Optional License]

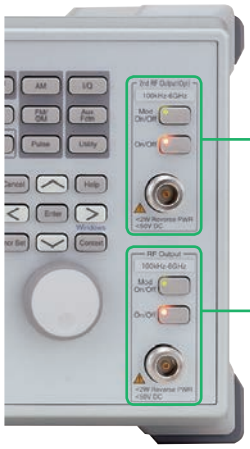
- LTE FDD/LTE-Advanced FDD
- LTE TDD/LTE-Advanced TDD
- HSDPA/HSUPA/W-CDMA
- TD-SCDMA
- CDMA2000 1xEV-DO
- Mobile WiMAX
- WLAN 11a/b/g/n/j/p/ac
- TDMA (PDC, PHS, Public Radio System.)
- DVB-T/H
- Multi-carrier
- Fading

Dual RF & Dual Waveform Memory

Dual VSG: Two RF Outputs

The MG3710A supports two RF outputs (1stRF/2ndRF) max. in one unit. Moreover, different frequencies can be set independently at 1stRF and 2ndRF.
Not only different frequencies but also different levels and waveform patterns can be set independently at each SG while each is tracking the other. This is convenient in the R&D phase for evaluating interference between two different systems using different frequency bands.

Notes: Supported frequency bands cannot be changed after shipment.
IQ input is supported only by SG1 (1stRF) and requires Opt. 017.



2ndRF
Frequency Range:
2ndRF 100 kHz to 2.7 GHz [Opt. 062]
2ndRF 100 kHz to 4.0 GHz [Opt. 064]
2ndRF 100 kHz to 6.0 GHz [Opt. 066]
∗ Whether or not install and the frequency model can be selected at any time.

1stRF
Frequency Range:
1stRF 100 kHz to 2.7 GHz [Opt. 032]
1stRF 100 kHz to 4.0 GHz [Opt. 034]
1stRF 100 kHz to 6.0 GHz [Opt. 036]
∗ Must install any one of these.

Dual Waveform Memory: Four Waveform Outputs Max.

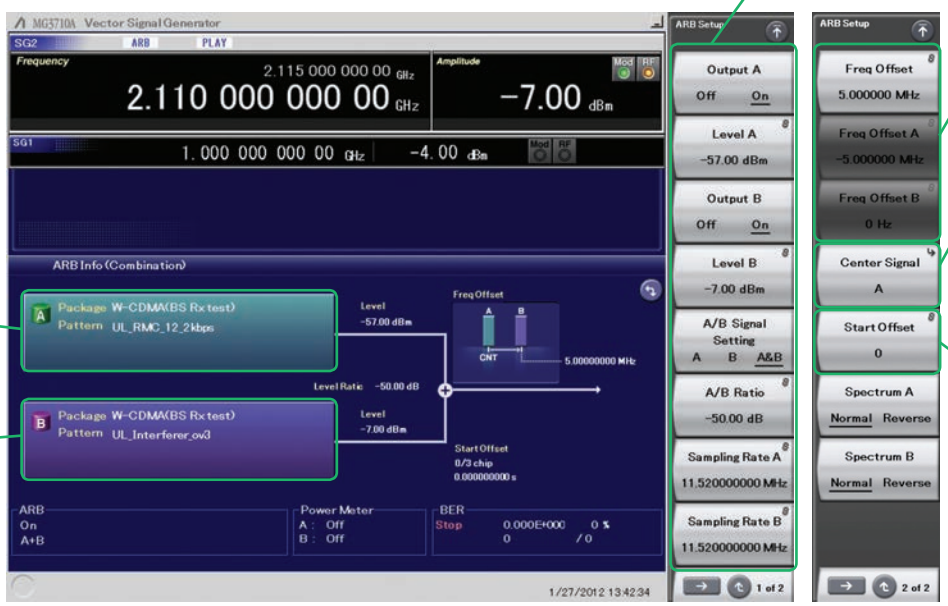
In the standard configuration, one VSG (1stRF or 2ndRF) has one waveform memory. However, adding the baseband signal combine option (Opt. 048/078) upgrades to two memories for one VSG. In other words, models with two VSGs (1stRF and 2ndRF) installed can have a maximum of four waveform memories. Two waveform patterns can be set easily on-screen for one VSG, each with different frequency offset, level offset and delay time settings to output a combined baseband RF signal. With this setup, one MG3710A supports the following test environment — a setup that previously required two expensive signal generators:

Wanted Signal + Interference Signal
Wanted Signal + Delayed Signal

Synthesizing Signals with Different Sampling Rates ~ Rate Matching Function ~

When signals with different sampling rates are set in memory A and memory B, a synthesized signal maintaining each of the different sampling rates can be output. This is useful when synthesizing signals for standards with different rates, such as multi-standard signals.
However, depending on the combination of waveform sampling rates, sometimes it may not be possible to match rates due to internal operation clock limitations. The Mismatch warning dialog is displayed in this case.

Level Setting
Setting Range: –80 to +80 dB
Resolution: 0.01 dB



Waveform Pattern A
Example:
Wanted Signal

Waveform Pattern B
Example:
Interference Signal, Delayed Signal

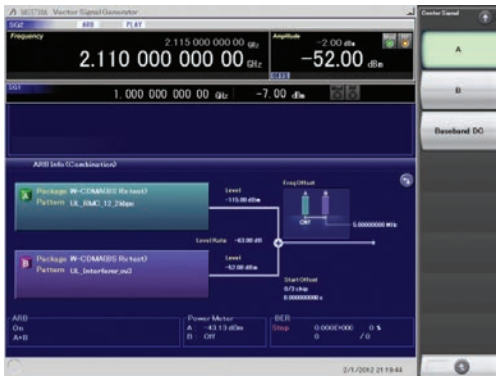
Frequency Offset Setting
Setting Range:
–100 to +100 MHz
Resolution: 1 Hz

Center Frequency Selection
A: Pattern A center
B: Pattern B center
Baseband DC:
Centered at baseband DC position

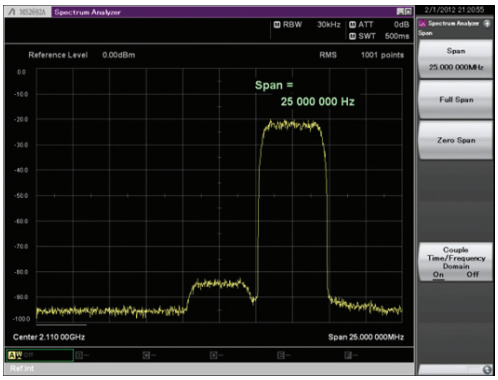
Time Offset Setting
Setting Range:
0 ~ pattern B sampling data count – 1

Baseband Signal Combine Example

Example of Baseband Signal Combine Output

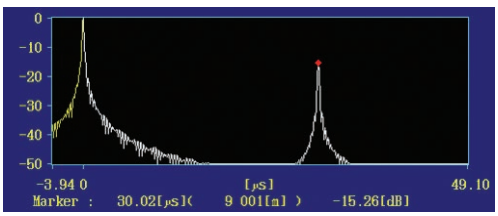


Wanted + Modulated Interference Signals



Spectrum of
Wanted + Modulated Interference Signals

Wanted + Delayed Signals



Delay Profile of
Wanted + Delayed Signals

Basic Performance

ACLR Performance

–71 dBc/3.84 MHz @W-CDMA, TestModel1, 64DPCH, 2 GHz

Evaluation of base station amplifiers, etc., requires excellent adjacent channel leakage power (ACLR) performance. Normally, the signal from the vector signal generator is inserted to an amplifier, and the amplifier output signal ACLR characteristics, etc., are measured with a spectrum analyzer. Instruments for these measurements require high ACLR performance.

W-CDMA ACLR, 1 Carrier
(TestModel1, 64DPCH)

W-CDMA ACLR, 4 Carrier
(TestModel1, 64DPCH, 4 Carrier)

LTE FDD ACLR, 1 Carrier
(E-TM1.1, Bandwidth 20 MHz)

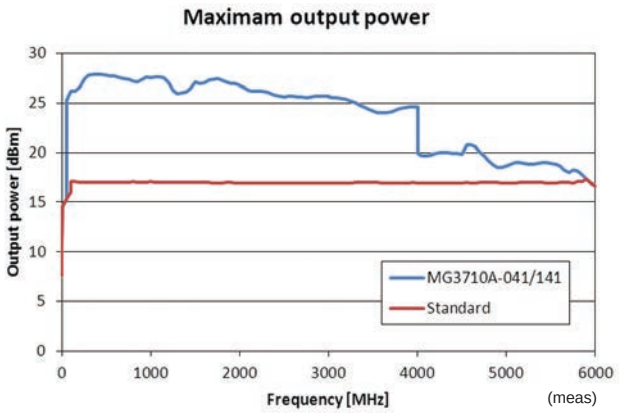
High-power Output [Opt. 041*1/071*2]

*1: High Power Extension for 1stRF [Opt. 041]
*2: High Power Extension for 2ndRF [Opt. 071]

Level Accuracy is assured at high levels (CW)

Frequency Range	Standard	Opt. 041/071
100 kHz ≤ f < 10 MHz	+5 dBm	+5 dBm
10 MHz ≤ f < 50 MHz	+10 dBm	+10 dBm
50 MHz ≤ f < 400 MHz	+13 dBm	**+20 dBm**
400 MHz ≤ f ≤ 3 GHz		**+23 dBm**
3 GHz < f ≤ 4 GHz		**+20 dBm**
4 GHz < f ≤ 5 GHz		+13 dBm
5 GHz < f ≤ 6 GHz	+11 dBm	+11 dBm

These options expand the MG3710A RF output upper limit.
They are used when compensating for level losses of parts in the measurement path.

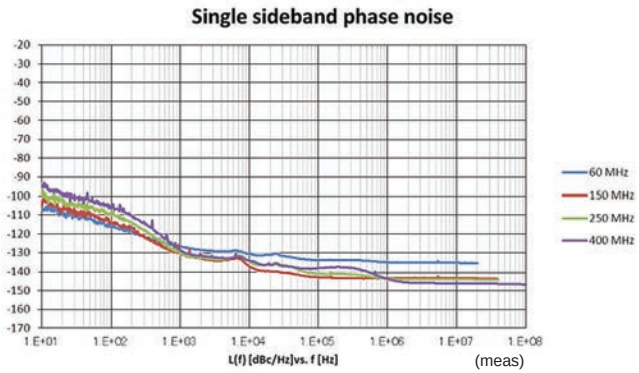


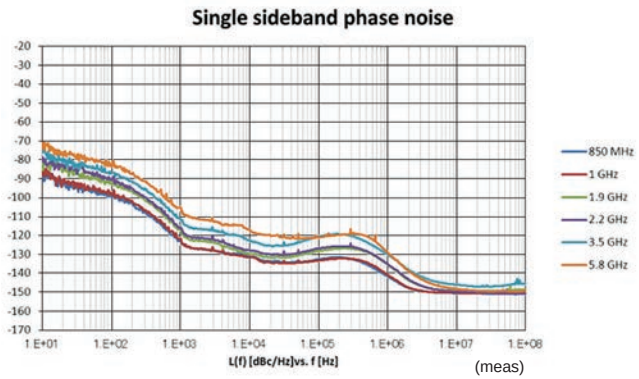
SSB Phase Noise

<–140 dBc/Hz (nom.) @100 MHz, 20-kHz offset, CW
<–131 dBc/Hz (typ.) @1 GHz, 20-kHz offset, CW
<–125 dBc/Hz (typ.) @2 GHz, 20-kHz offset, CW

SSB phase noise is an important performance index for signal generators. For example, when using a signal generator for the following purposes, it is important to pre-confirm that the signal generator performance satisfies the measurement specifications.

- Communications with narrow bandwidth of several kHz
- OFDM Signals with narrow subcarrier gap
- CW interference waveforms





SSB Phase Noise
(Phase Noise Optimization <200 kHz, CW, Optimize S/N Off, with Opt. 002)

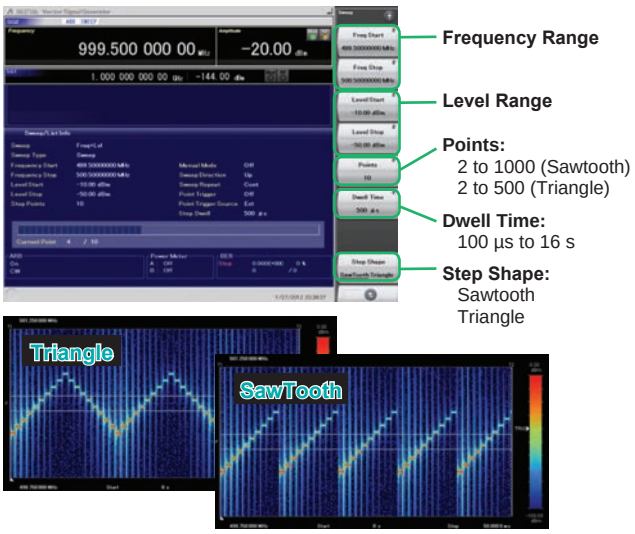
High-speed Switching

<600 µs @List/Sweep mode

To shorten tact times on production lines the MG3710A supports two standard modes each with high-speed frequency and level switching.

● Sweep Mode

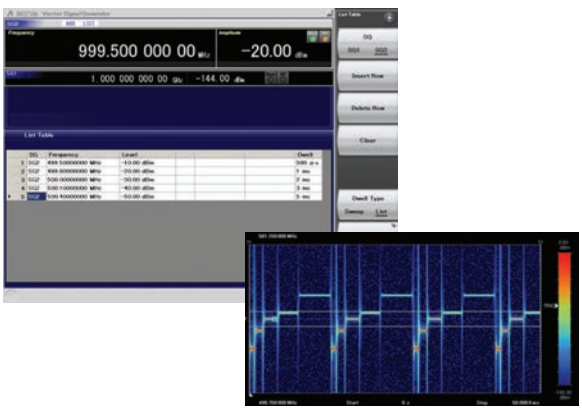
In this mode, the dwell time per point or number of points is split between the frequency range and level range (Start/Stop).
This mode is used when matching dwell time per point and frequency/level steps.



10 points, 500-µs Dwell Time

● List Mode

In this mode, the frequency, level and dwell time can be set for each of up to 500 points. This mode is used when wanting to set any dwell time, and frequency/level step per point.



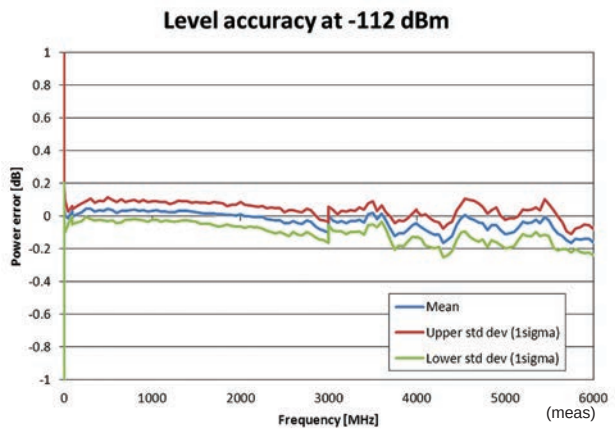
5 points, Any Dwell Time

High Level Accuracy

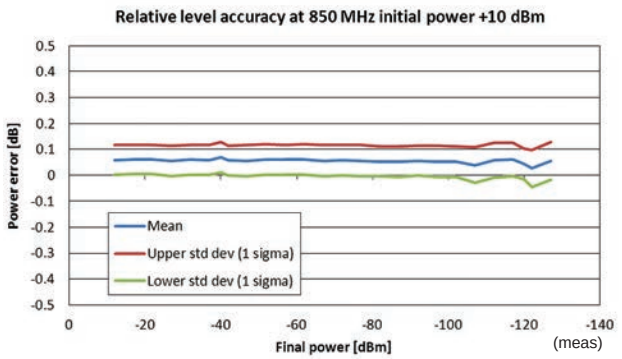
Absolute Level Accuracy: ±0.5 dB*1
Linearity: ±0.2 dB (typ.)*2

∗1: 400 MHz to 3 GHz, –110 to +10 dBm
∗2: 50 MHz to 3 GHz, –110 to –1 dBm

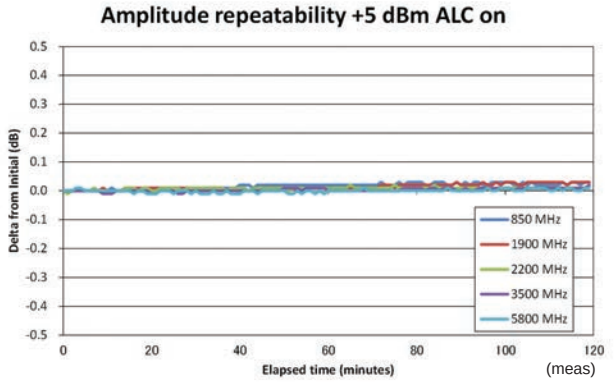
Excellent level accuracy and linearity are key factors with a large impact on measurement accuracy.



Frequency Characteristic



Linearity



Aging

Supports Rubidium Reference Oscillator (Option)

Three reference oscillator options are supported. Select the high-stability reference oscillator option [Opt. 002] when requiring high accuracy depending on the measurement conditions; for even higher accuracy, select the rubidium reference oscillator [Opt. 001]. However, if external high-accuracy reference signals are available, selecting the standard reference oscillator option helps reduce unnecessary costs.

- **Reference Oscillator**
  - **Standard**
    Aging Rate: ±1 × 10^{-6}/year, ±1 × 10^{-7}/day
    Temperature Stability: ±2.5 × 10^{-6} (5° to 45°C)
  - **High Stability Reference Oscillator [Opt. 002]**
    Aging Rate: ±1 × 10^{-7}/year, ±1 × 10^{-8}/day
    Temperature Stability: ±2 × 10^{-8} (5° to 45°C)
    Start-up Characteristics*: ±5 × 10^{-7} (2 minutes after power-on)
    ±5 × 10^{-8} (5 minutes after power-on)
- **Rubidium Reference Oscillator [Opt. 001]**
  Aging Rate: ±1 × 10^{-10}/month
  Temperature Stability: ±2 × 10^{-9} (5° to 45°C)
  Start-up Characteristics*: ±1 × 10^{-9} (7.5 minutes after power-on)

∗: Compared to frequency after 24-h warm-up at 23°C

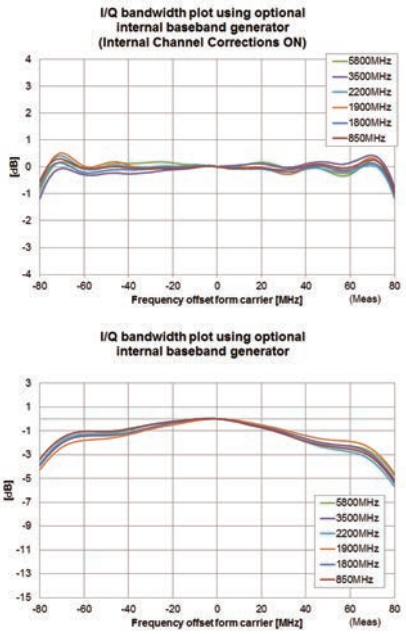
High All-purpose Baseband Performance

Wide Vector Modulation Bandwidth

160 MHz*/120 MHz (using Internal baseband signal generator)
160 MHz (using External IQ input)

Using the standard internal baseband signal generator offers a wide vector modulation bandwidth of 160 MHz.

*: Supports firmware version 2.00.00 and later. Can generate 160-MHz bandwidth signals (Wireless LAN IEEE802.11ac) only when using MX370111A WLAN IQproducer and MX370111A-002 802.11ac (160 MHz) option.
The latest version can be downloaded from the Anritsu homepage.
<https://www1.anritsu.co.jp/Download/MService/Login.asp>



Point:

One unit supports WLAN IEEE802.11ac signal generation and output !
- Upper Frequency Limit: 6 GHz
- RF Modulation Bandwidth: 160 MHz
- Dual RF: Two RF Outputs
- Waveform Generation Software
- WLAN IQproducer (MX370111A & MX370111A-002)

The MG3710A supports output from 160-MHz bandwidth signals to non-contiguous 80 MHz + 80 MHz signals in one unit, which generally requires two signal generators.

Example: Support IEEE802.11ac signal generation and output

11ac Bandwidth	20/40/80/160 MHz	80 MHz + 80 MHz (non-contiguous)
MG3710A*1	✓	✓*2

*1: MX370111A WLAN IQproducer and MX370111A-002 802.11ac (160 MHz) option installed. For detail, refer to the IQproducer catalog.

*2: 2ndRF option MG3710A-062 (2.7 GHz)/064 (4 GHz)/066 (6 GHz) installed.

Free Waveform Generation

ASCII-format IQ sample data files created by other general-purpose EDA tools, such as MATLAB, can be converted into MG3710A waveform pattern files. Support for customer waveform pattern file creation makes the MG3710A ideal for R&D simulation applications too.

Large-capacity Waveform Memory

64 Msamples (256 MB) [with 1stRF, 2ndRF]
256 Msamples (1 GB) [Opt. 045*1/075*2]
1024 Msamples (4 GB) [Opt. 046*1/076*2]

*1: ARB Memory Upgrade 256 Msample for 1stRF [Opt. 045]
ARB Memory Upgrade 1024 Msample for 1stRF [Opt. 046]
*2: ARB Memory Upgrade 256 Msample for 2ndRF [Opt. 075]
ARB Memory Upgrade 1024 Msample for 2ndRF [Opt. 076]

Memory size is the most important specification for arbitrary waveform memory. If the memory is small, large waveform patterns cannot be handled and the number of cases when multiple waveform patterns cannot be loaded increases. When this happens, the time to reload another waveform pattern wastes evaluation time and lowers efficiency. The MG3710A has a large 64 Msamples memory as standard and this can be upgraded to either 4 times (256 Msamples) or 16 times (1024 Msamples) by adding these options.

Point:

Adding the baseband signal combine function (Opt. 048/078) supports waveform memories which can either be used separately or linked to multiply the memory size.

*: When attempting to load a waveform pattern exceeding the size of one memory, the memories are linked automatically to load the large pattern. However, in this case, other waveform patterns cannot be loaded into any remaining free space.
When dealing with many waveform patterns, we recommend upgrading the ARB memory size. If the waveform pattern can be handled by one memory, other waveform patterns can be loaded into the remaining free space and the other memory.
The maximum size per waveform pattern supported by the MG3710A varies with the IQproducer version.

Maximum Waveform Pattern Size and Required Options for Simultaneous Use

1stRF (Opt. 032/034/036)

Combination of Baseband Signal (Opt. 048)	ARB Memory Upgrade 256 Msample (Opt. 045) ARB Memory Upgrade 1024 Msample (Opt. 046)		
	W/O	With Opt. 045	With Opt. 046
W/O	64 Msamples × 1 pc	256 Msamples × 1 pc	1024 Msamples × 1 pc*1
With Opt. 048*2	64 Msamples × 2 pcs 128 Msamples × 1 pc	256 Msamples × 2 pcs 512 Msamples × 1 pc	1024 Msamples × 2 pcs*1

2ndRF (Opt. 062/064/066)

Combination of Baseband Signal (Opt. 078)	ARB Memory Upgrade 256 Msample (Opt. 075) ARB Memory Upgrade 1024 Msample (Opt. 076)		
	W/O	With Opt. 075	With Opt. 076
W/O	64 Msamples × 1 pc	256 Msamples × 1 pc	1024 Msamples × 1 pc*1
With Opt. 078*2	64 Msamples × 2 pcs 128 Msamples × 1 pc	256 Msamples × 2 pcs 512 Msamples × 1 pc	1024 Msamples × 2 pcs*1

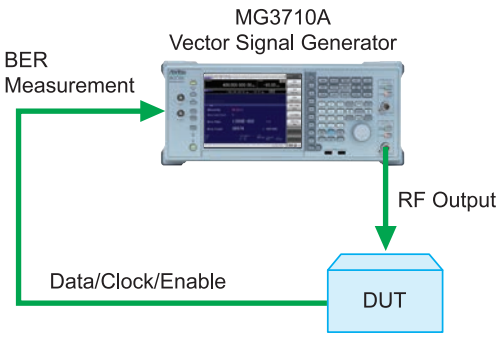
*1: The maximum size per waveform pattern supported by the MG3710A varies with the IQproducer version.
*2: The Baseband Signal Combine option supports two ARB memories and can either set two different waveform patterns or combine them as one memory to support one large waveform pattern.

Expandability

BER Test Function [Opt. 021]

This option installs a BER measurement function for measuring error rates between 100 bps and 40 Mbps using the DUT demodulated Data/Clock/Enable signals. The results are displayed on the MG3710A screen.

- **Input Bit Rate: 100 bps to 40 Mbps**
- **Input Signal: Data, Clock, Enable**
  (Polarity reversal supported)
- **Input Level: TTL**
- **Measured Patterns:**
  PN9/11/15/20/23, ALL1, ALL0,
  Alternate (0101...), User Data,
  PN9fix/11fix/15fix/20fix/23fix
- **Count Mode**
  Data: Measures until specified Data count
  Error: Measures until specified Error count
- **Measurable Bit Count: $\leq 2^{32} - 1$ (4,294,967,295 bits)**
- **Measurement Mode**
  Single: Measures specified measurement bit count once
  Continuous: Repeats Single measurement
  Endless: Continues measurement to upper limit of measurement bits

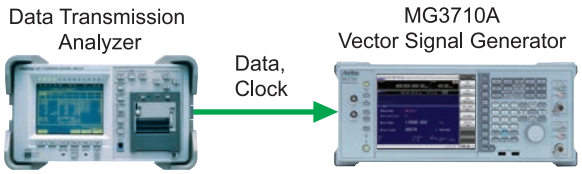


The BER can be measured using the DUT-demodulated Data/Clock/Enable.

- **BER Measurement Upper Limit**

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

Error Rate	PN9	PN11	PN15	PN20	PN23
6.0%	–	–	–	–	–
5.0%	ok	–	–	–	–
4.0%	ok	ok	–	–	–
3.0%	ok	ok	ok	–	–
2.5%	ok	ok	ok	–	–
2.0%	ok	ok	ok	ok	ok
1.0%	ok	ok	ok	ok	ok



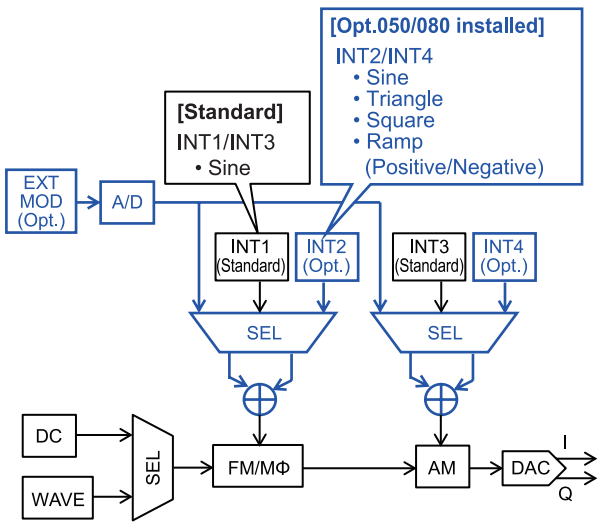
AM/FM/ΦM/PM Function

This option supports the following modulation functions as standard. Analog modulations (AM/FM/ΦM) are performed on CW signals or arbitrary (ARB) waveform pattern signals.
Pulse modulation can be performed at any cycle or timing and also supports modulation using an external input signal.

- **Amplitude Modulation**
  - Depth: 0 to 100% (Linear)
    0 to 10 dB (Exponential)
  - Modulation Frequency: 0.1 Hz to 50 MHz
- **Frequency Modulation**
  - Deviation: 0 to 40 MHz
  - Modulation Frequency: 0.1 Hz to 40 MHz, or (50 MHz-FM Rate), whichever smaller
- **Φ-Modulation**
  - Deviation angle: 0 to 160 rad.
    or (40 MHz/ΦM Rate) rad., whichever smaller
  - Modulation Frequency: 0.1 Hz to 40 MHz, or (40 MHz/ΦM Deviation), whichever smaller
- **Pulse Modulation**
  - Modulation Frequency: 0.1 Hz to 10 MHz
  - Modulation Period: 10 ns to 20 s
- **Additional Analog Modulation Input [Opt. 050/080]**

Adding additional analog modulation input options (Opt. 050/080) extends to two internal modulation sources (AM/FM/ΦM) and one external modulation source supporting simultaneous two-signal modulation.
- AM + FM
- AM + ΦM
- Internal 1 + Internal 2
- Internal + External

∗: FM + ΦM does not support.

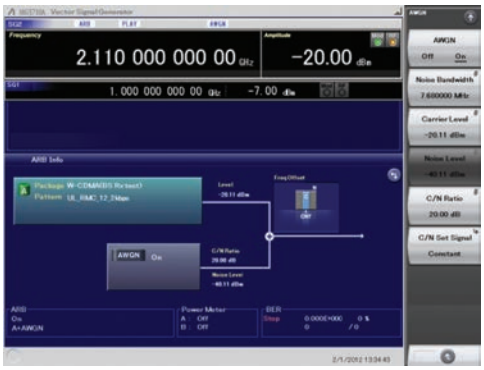


AWGN Generator [Opt. 049*1/079*2]

∗1: AWGN for 1stRF [Opt. 049]
∗2: AWGN for 2ndRF [Opt. 079]

This option adds internally generated AWGN to the wanted signal. The AWGN output is switched on and off just by pressing the On/Off button.

● Absolute C/N Ratio: ≤40 dB



AWGN Signal Addition Screen

USB Power Sensors [Sold separately]

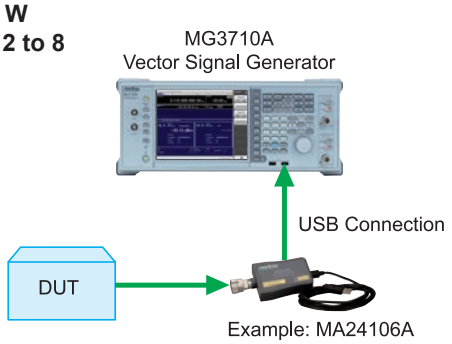
Up to two USB power sensors can be connected to the MG3710A to display the measurement results on the MG3710A screen.

● USB Power Sensor

Model	Frequency Range	Dynamic Range
MA24104A*	600 MHz to 4 GHz	+3 to +51.76 dBm
MA24105A	350 MHz to 4 GHz	+3 to +51.76 dBm
MA24106A	50 MHz to 6 GHz	–40 to +23 dBm
MA24108A	10 MHz to 8 GHz	–40 to +20 dBm
MA24118A	10 MHz to 18 GHz	–40 to +20 dBm
MA24126A	10 MHz to 26 GHz	–40 to +20 dBm

∗: MA24104A has been discontinued. Replacement model is MA24105A.

Level Offset: –100 to +100 dB
Average: 1 to 2048
Unit: dBm, W
COM Port: 2 to 8



Power Meter Measurement Screen

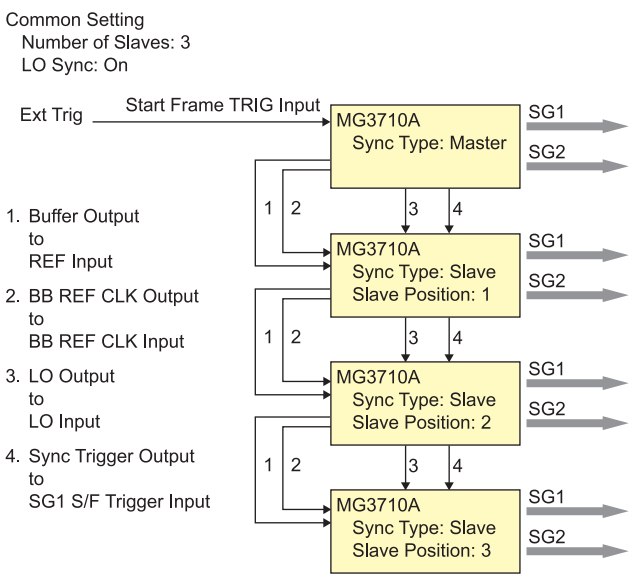
Checking Com Port:

1. Display Windows
   Press [Shift] + [Context (Windows)] or
   Right-click mouse > Show Desktop
2. Display Device Manager
   Start > My Computer > Properties >
   Hardware > Device Manager
3. Check Ports (COM & LPT)

Local Signal I/O for MIMO Signal Source [Opt. 017]

The Sync Multi SG function shares local, baseband and trigger signals between multiple MG3710A units to output phase coherency signals synchronized with the signal output timing.
An 8×8 MIMO test system is configured easily from four MG3710A units composed of one master and three slaves.

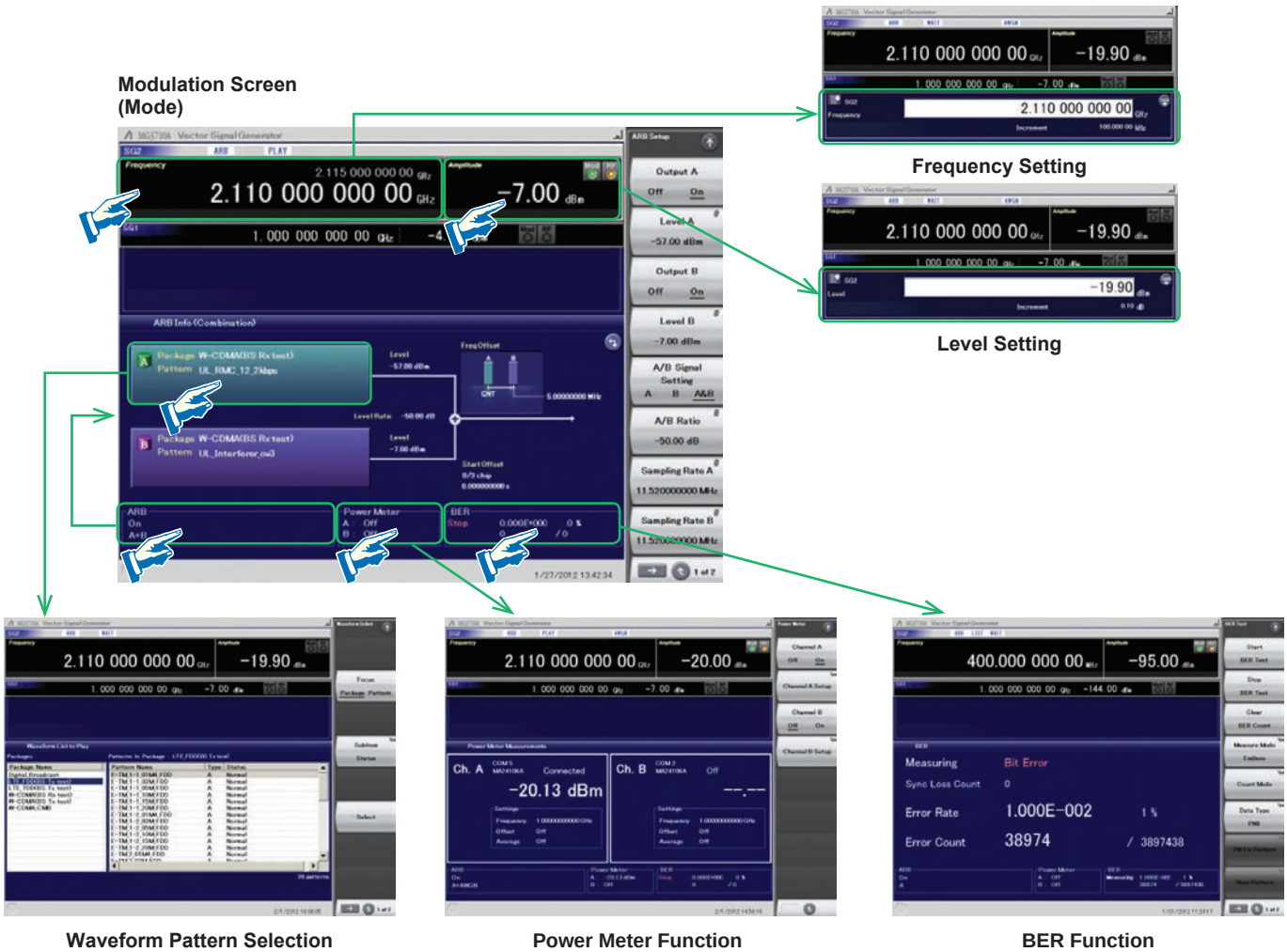
Synchronization mode: Master, Slave, SG1 & 2
Number of Slaves: 1 to 3
Slave Position: 1 to 3
Local Synchronization: On/Off
IQ Phase Adjustment: –360 deg. to +360 deg., Resolution 0.01 deg.
IQ Delay: –400 ns to +400 ns, Resolution 1 ps



Operability

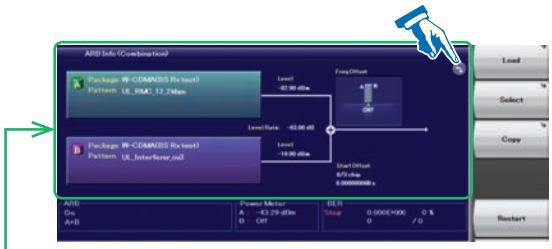
Easy Touch-panel Operation

Simply touching parts of the screen display with a finger fetches related function keys and numeric inputs, offering a fast and easy way of navigating through multilayer menus.

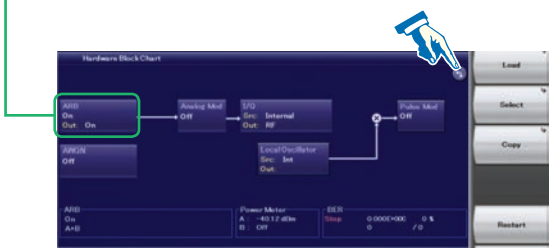


Two Signal Flowcharts

Pressing the on-screen button toggles instantly between the Hardware Block Chart and the ARB Info screens.
The Hardware Block Chart is a quick-and-easy way to grasp the status of each block (ARB, AWGN, I/Q, Analog Mod, Pulse Mod, Local) at a glance.
The ARB Info screen displays more details about the ARB/AWGN block showing the baseband signal combine status of memory A + memory B, memory A + AWGN, etc.

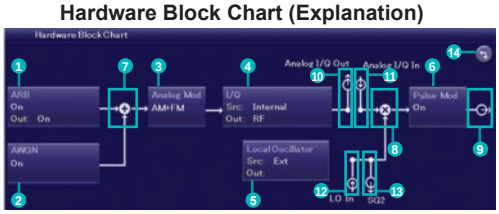


ARB Info Screen



Hardware Block Chart Screen

Hardware Block Chart (Explanation)



Hardware Block Chart Display Contents (Explanation)

No.	Display Example	Display	Description
1		ARB	ARB block
		On/Off	Indicates On/Off of ARB (function to generate modulated signals with arbitrary waveform patterns)
		Out	Indicates On/Off of the arbitrary waveform pattern output
2		AWGN	AWGN block
		On/Off	Indicates On/Off of AWGN addition
3		Analog Mod	Analog Modulation block
		AM/FM/ΦM	Indicates the analog modulation (AM/FM/ΦM) during modulation
4		I/Q	I/Q block
		Src: Internal/ Analog I/Q In	Indicates the I/Q signal source
		Out: RF/Analog I/Q Out	Indicates the output destination for baseband signals
5		Local Oscillator	Local Oscillator block
		Src: Int/Ext/Sync	Indicates the Local signal source
		Out: –/On/Off	Indicates On/Off of the Local signal external output
6		Pulse Mod	Pulse Modulation block
		On/Off	Indicates On/Off of Pulse modulation
7		–	Indicates that inputs from two function blocks of the left side and bottom side are combined and output to the function block of the right side
8		–	Indicates that the input Local signal from the bottom side is modulated with the input signal from the left side and output to the function block of the right side
9		–	Indicates the RF Output is On
10		Analog I/Q Out	Indicates the Analog I/Q signal is set to the external output
11		Analog I/Q In	Indicates the Analog I/Q signal is set to the external input
12		LO In (For SG1)	Indicates the SG1 Local signal source is set to Ext (input from the rear LO Input connector)
		SG1 (For SG2)	Indicates the SG2 Local signal source is set to Sync and the signal is input from SG1
13		SG2 (For SG1)	Indicates the SG1 Local signal external output setting is On and the signal is output to SG2. If SG2 is not installed, "LO Out" (output from the rear LO Output connector) is displayed
		LO Out (For SG2)	Indicates the Local signal external output setting (output from the rear LO Output connector) is On
14		–	Click to switch Hardware Block Chart and ARB Info display

Frequency Channel Table

Sometimes frequencies need setting by Channel No. The built-in frequency channel table where frequencies are set by channel number is ideal for this application. Once set and saved, these pre-settings can be read whenever needed.

Channel Table Setting

- Group: 1 to 19
- Start Channel: 0 to 20000
- End Channel: (Start Channel) to 20000
- Start Frequency
- Channel Spacing

Channel Table Setting Screen

Connection with External Equipment

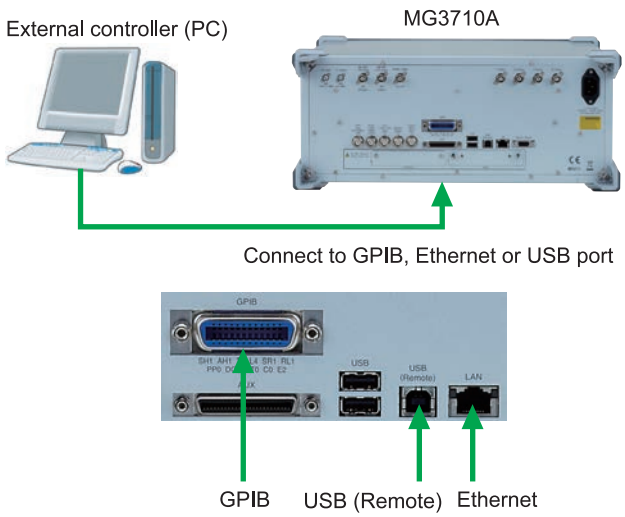
Remote Control Interfaces

The MG3710A has GPIB, Ethernet and USB interfaces as standard, supporting the following functions:

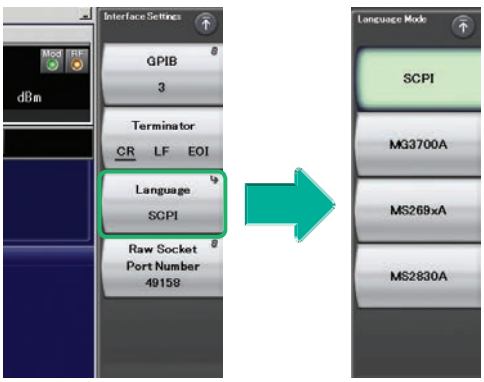
- Control all functions, except power switch
- Read all status conditions and settings
- Interrupts and serial polls

While in the Local status, the interface is determined automatically by the communication start command from the external controller (PC). To change the interface, put the MG3710A into the Local status again by pressing the Local key on the front panel and then send a command via the desired interface.

- **GPIB: Conforms to IEEE488.1/IEEE488.2 standards**
  SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT0, C0, E2
- **Ethernet: Conforms to VXI-11 protocol using TCP/IP Control programs**
  SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT0, C0
- **USB: Conforms to USBTMC-USB488 protocols**
  SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT0, C0n



To remotely control the MG3710A, either select the SCPI mode command format defined by the SCPI Consortium, or select backwards compatible modes supporting earlier MG3700A, MS269xA, and MS2830A commands



Command Format Setting Example

USB Connections

The two type-A USB2.0 connectors on the front and rear panels support keyboard, mouse and USB memory connections. Supported USB power sensors can be connected too.

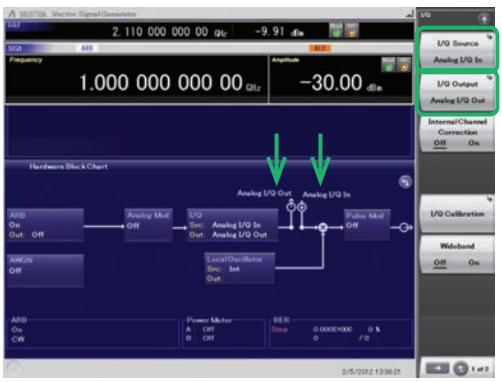
- **USB Power Sensor [Sold separately]**
  Frequency Range: 600 MHz to 4 GHz [MA24104A]*
  350 MHz to 4 GHz [MA24105A]
  50 MHz to 6 GHz [MA24106A]
  10 MHz to 8 GHz [MA24108A]
  10 MHz to 18 GHz [MA24118A]
  10 MHz to 26 GHz [MA24126A]

*: MA24104A has been discontinued. Replacement model is MA24105A.

Analog IQ Input/Output [Opt. 018]

This option adds analog IQ input and output connectors to the front and rear panels, respectively. It only supports SG1 (1stRF).

Input: I Input, Q Input
Output: I Output, $\overline{I}$ Output, Q Output, $\overline{Q}$ Output,



Analog IQ I/O Setting Screen

- **Analog IQ Input Adjustment**
  Setting Range: –100 mV to +100 mV
- **Analog IQ Output Adjustment**
  Output Voltage: 0.0 to 120.0%
  In-phase DC offset: –2.5 V to +5.0 V
  Differential DC offset: –50 mV to +50 mV

Trigger Input

Start and Frame triggers are installed as standard for outputting waveform patterns synchronized with externally input trigger signals.

● Start Trigger Operation

At Start Trigger operation, after the waveform pattern is selected, output is started and continued by the rise timing of the first external trigger signal. Second and subsequent input external trigger signals are disabled. This is used when receiving a Start Trigger signal and reference frequency signal from the DUT at the MG3710A.

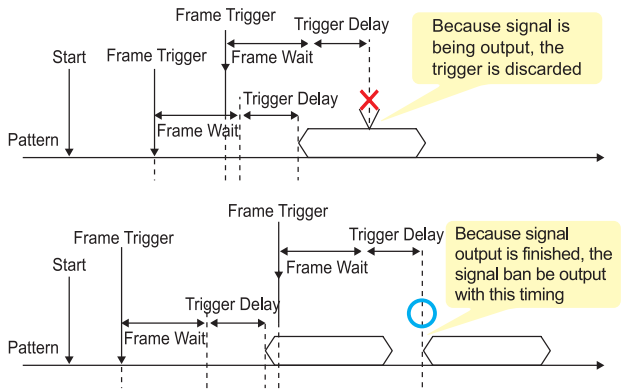
● Frame Trigger Operation

At Frame Trigger operation, one frame of the waveform pattern is output at the rise timing of the external trigger signal. When frame output is finished, the trigger wait state is returned. This is used when receiving a Frame Trigger signal from the DUT at the MG3710A.

Frame Trigger supports three operations as follows:

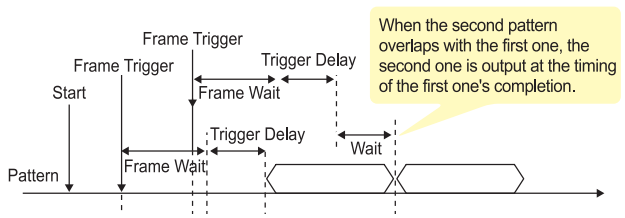
(1) No Retrigger

Ignores triggers received during pattern output (default setting)



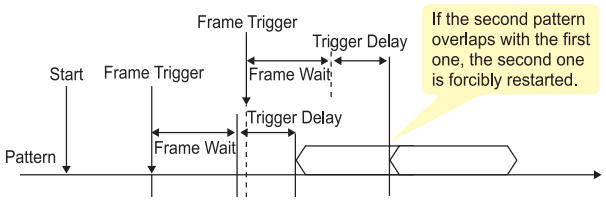
(2) Buffered Trig

Holds triggers received during pattern output until current pattern output completed and then outputs next frame



(3) Restart on Trig

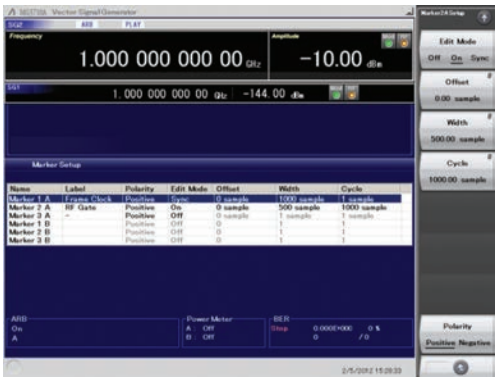
Immediately restarts pattern when trigger received during pattern output



Marker Output Editing

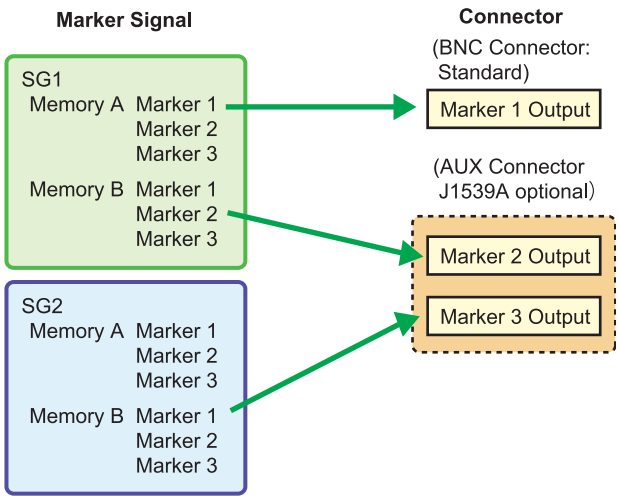
Marker 1 Output [Standard]
Marker 2 & Marker 3 Output
[Requires J1539A AUX Conversion Adapter]

When the Marker Setup function Edit Mode is Off, a marker signal combining the preset waveform pattern with marker information is output. When the Edit Mode is On, any marker for output can be set at the MG3710A screen. Up to 12 markers can be set for SG1/SG2, memory A/B and Marker 1 to 3.



SG2 Marker Setup Screen
Memory A (1A/2A/3A), Memory B (1B/2B/3B)

There are three output connectors: Marker 1 Output on the rear panel and the AUX connector (Marker 2 Output and Marker 3 Output). The connector output signal layout can be selected freely.



The defaults are as follows:

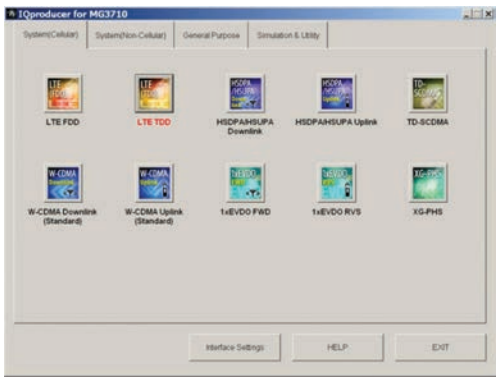
Marker Signal	Connector
SG1/Memory A/Marker 1	Marker 1 Output
SG1/Memory A/Marker 2	Marker 2 (@AUX)
SG1/Memory A/Marker 3	Marker 3 (@AUX)

IQproducer Waveform Generation Software

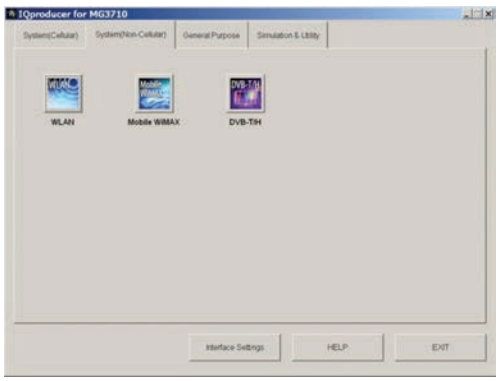
Waveform Generation Software (Separate license)

The IQproducer system provides an easy-to-use GUI for setting parameters according to each communications method.
The parameter setting results file can be saved as a file for easy recall later.

∗ For detail, refer to the IQproducer catalog.



IQproducer Main Screen
System (Cellular)



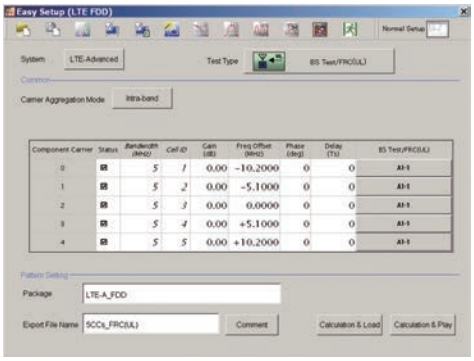
IQproducer Main Screen
System (Non-Cellular)

If a license is not installed in the MG3710A, characters are displayed in red. Without a license, the IQproducer functions can still be tested but a license must be installed to actually output created waveform patterns.

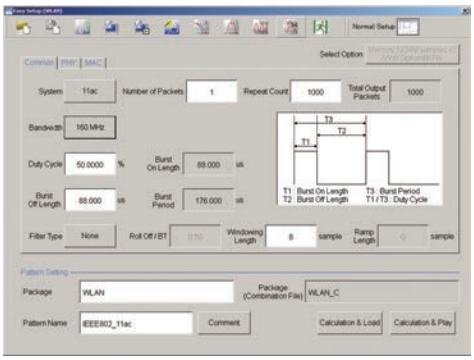
IQproducer Options

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
MX370108A-001*1	LTE-Advanced FDD Option
MX370109A	XG-PHS IQproducer
MX370110A	LTE TDD IQproducer
MX370110A-001*2	LTE-Advanced TDD Option
MX370111A	WLAN IQproducer
MX370111A-002*3	802.11ac (160 MHz) Option
MX370112A	TD-SCDMA IQproducer

∗1: Requires MX370108A
∗2: Requires MX370110A
∗3: Requires MX370111A. Only for MG3710A



MX370108A LTE IQproducer/MX370108A-001 LTE-Advanced FDD Option
LTE-Advanced Easy Setup Screen



MX370111A WLAN IQproducer/MX370111A-002 802.11ac (160 MHz) Option
WLAN IEEE802.11ac Easy Setup Screen

The following table shows the maximum size for each waveform pattern generated using IQproducer.
The maximum usable size (load) depends on the ARB memory expansion option installed in the main frame.

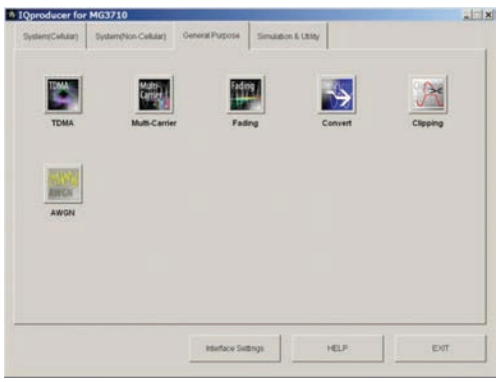
IQproducer Model/Name		MG3710A	MG3700A	MS269xA	MS2830A	MG3740A
****01A	HSDPA/HSUPA	512 Msamples	512 Msamples	256 Msamples	256 Msamples	—
****02A	TDMA					512 Msamples
****03A	CDMA2000 1xEV-DO			—	—	—
****04A	Multi-carrier	1024 Msamples		256 Msamples	256 Msamples	—
****05A	Mobile WiMAX	512 Msamples				—
****06A	DVB-T/H			—	—	—
****07A	Fading	1024 Msamples		—	—	512 Msamples
****08A	LTE	512 Msamples		256 Msamples	256 Msamples	—
****09A	XG-PHS				—	—
****10A	LTE TDD				256 Msamples	—
****11A	WLAN					—
****12A	TD-SCDMA					—

****: MX3701__ or MX2699__

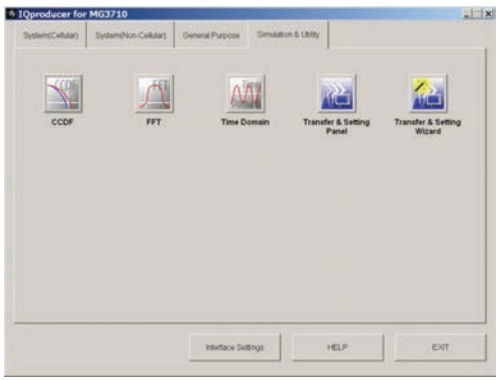
IQproducer

IQproducer supports the following functions free-of-charge as secondary waveform pattern creation functions.

- **Convert**
- **AWGN**
- **Clipping**
- **CCDF/FFT/Time Domain**
- **Transfer & Setting/Transfer & Setting Wizard Combination File Edit**



IQproducer Main Screen
General Purpose



IQproducer Main Screen
Simulation & Utility

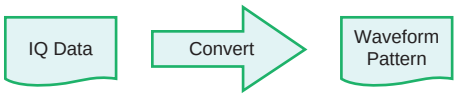
Operating Environment

PC	
OS	Windows 2000 Professional*1, Windows XP, Windows Vista*2, Windows 7 Enterprise (32-bit)*2, Windows 7 Professional (32-bit/64-bit)*2
CPU	Pentium III 1 GHz equivalent or faster
Memory	512 MB or more
Hard Disk	5 GB or more free space on the drive where this software is to be installed.
Peripheral Device	
Display	Displays with a resolution of 1024 × 768 pixels are best viewed using a small font setting

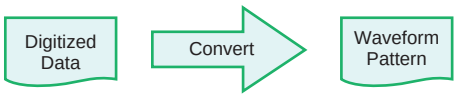
∗1: Does not support IQproducer Version 13.00 and later
∗2: Supports IQproducer Version 12.00 and later

Convert: Data Format Conversion

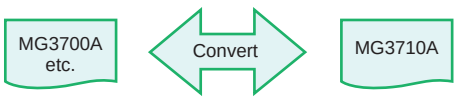
(1) ASCII-format IQ data created with other software, such as simulation software, can be converted to waveform pattern files used by the MG3710A.

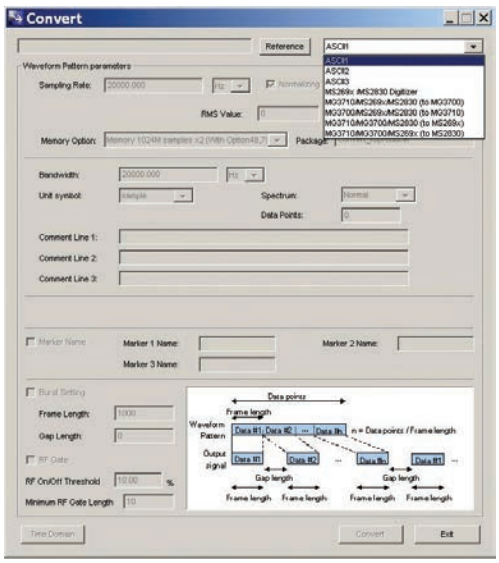


(2) Data files captured with Anritsu MS269xA Signal Analyzers and the capture function of the MS2830A Signal Analyzer can be converted to waveform pattern files used by the MG3710A.



(3) Waveform patterns created by other Anritsu vector signal generators (MG3700A, MS269xA-020, MS2830A-020/021) can be converted to waveform pattern files used by the MG3710A and *vice versa*.

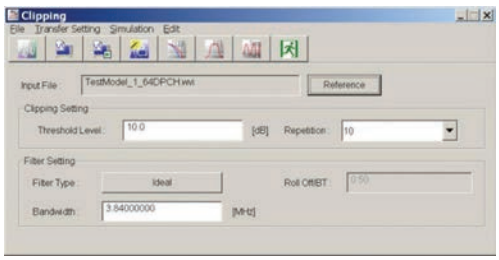




Convert Screen

Clipping

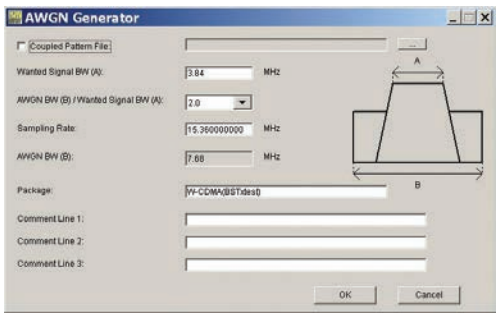
This function clips each type of waveform pattern. The clipped waveform pattern is created by setting the filter, bandwidth, and repetition times.



Clipping Screen

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.



AWGN Screen

Main setting parameters

(1) Wanted Signal Bandwidth:
Setting range: 0.0010 MHz 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

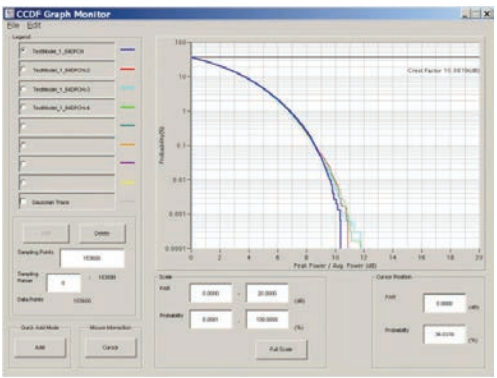
(3) Sampling Rate:
Setting range: 0.0200 MHz to 160.0000 MHz
Note: Same value as wanted signal

(4) AWGN Bandwidth (B):
Calculated automatically from (1) and (2) under following items:

Limit range:
0.001 MHz to 20.000 MHz: Sampling rate/2 max.
20.001 MHz to 120.000 MHz: Sampling rate max.

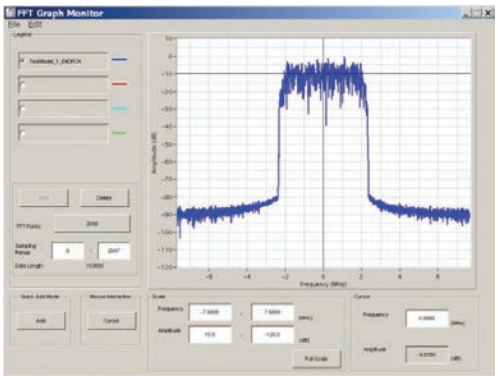
CCDF/FFT/Time Domain Graphical Displays

● CCDF (Complementary Cumulative Distribution Function)
Up to 8 created waveform patterns are read and displayed simultaneously as CCDF graphs.



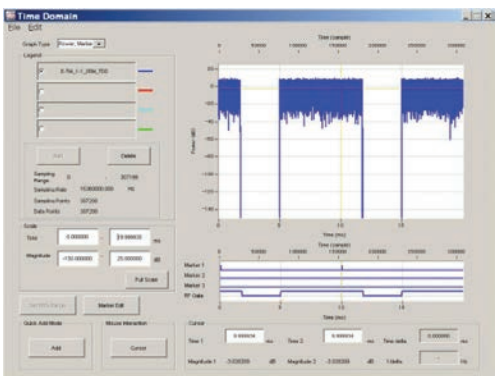
CCDF Screen

● FFT (Fast Fourier Transform)
Up to 4 created waveform patterns are read, FFT-processed and displayed simultaneously as FFT graphs.



FFT Screen

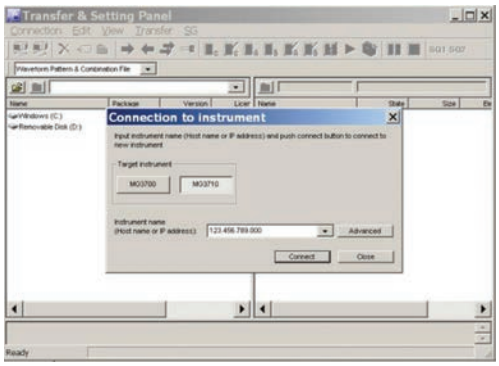
● Time Domain
Up to 4 created waveform patterns are read, and displayed simultaneously as Time Domain graphs.



Time Domain Screen

Transfer and Settings: Data Transfer

Waveform pattern files, graphics files, firmware version upgrades, etc., can be moved between a LAN-connected PC and MG3710A. When several MG3710A units are connected via LAN, waveform patterns can be transferred by a single operation, helping cut work times. Moreover, waveform pattern files saved on the hard disk of a remote- controlled MG3710A can be opened in arbitrary waveform memory to select and output the waveform pattern.



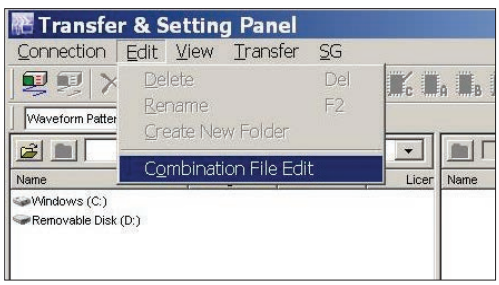
Transfer & Setting Screen

● Combination File Edit Function

The Combination File Edit function is a Transfer & Setting Edit function. 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 B added
- Level ratio (This value represents CN when memory A and B are added, or the relative level between elements when using only memory A.)

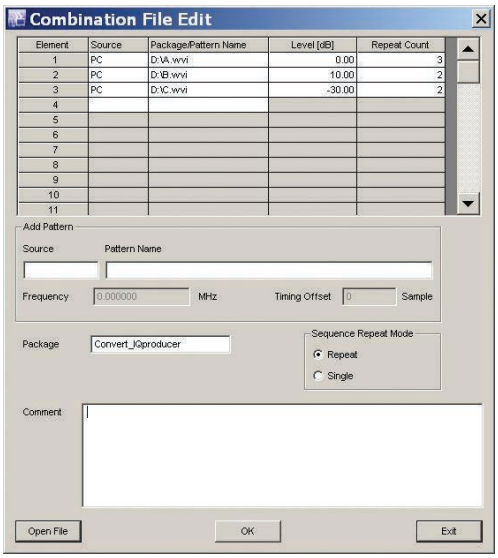
Using Combination Files that place the wanted and interference waveforms in separate memories makes it easy to measure receiver characteristics.



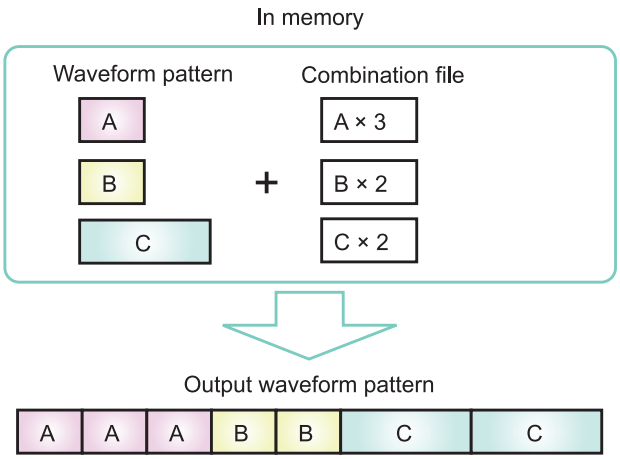
Transfer & Setting Screen
Combination File Edit Selection

Combination files can also be used to create waveform sequences. Receive signal status transitions can be verified by using Sequence Mode Combination files defining switching and repetition times for multiple waveform patterns.
Required waveform patterns and combination are saved to memory. Moreover, external triggers can be used to repeat each waveform pattern any number of times.

⇒ Efficient memory use
⇒ Validate response status transitions
⇒ Manual control of sequences



Combination File Edit Screen



Options (Hardware)

Hardware (Common)

MG3710A-001 Rubidium Reference Oscillator
MG3710A-101 Rubidium Reference Oscillator Retrofit
Installs 10 MHz reference crystal oscillator with excellent frequency stability startup characteristics of ±1 × 10^{-9} at 7.5 minutes after power-on.

Aging Rate: ±1 × 10^{-10}/month
Temperature stability: ±2 × 10^{-9} (5° to 45°C)
Start-up characteristics*: ±1 × 10^{-9} (7.5 minutes after power-on)
*: at 23°C, compared to frequency after 24 h warm-up

MG3710A-002 High Stability Reference Oscillator
MG3710A-102 High Stability Reference Oscillator Retrofit
Installs 10 MHz reference oscillator with better frequency stability as follows:.

Aging Rate: ±1 × 10^{-7}/year, ±1 × 10^{-8}/day
Temperature stability: ±2 × 10^{-8} (5° to 45°C)
Start-up characteristics*: ±5 × 10^{-7} (2 minutes after power-on)
±5 × 10^{-8} (5 minutes after power-on)
*: at 23°C, compared to frequency after 24 h warm-up

MG3710A-011 2ndary HDD
MG3710A-111 2ndary HDD Retrofit
User installable/removable HDD

MG3710A-017 Universal Input/Output
MG3710A-117 Universal Input/Output Retrofit
Installs following signal I/O connectors on rear panel of main frame. Required for local frequency sync for MIMO applications

Baseband Reference Clock Input/Output
Sweep Output (only supports SG1)
Local Signal Input/Output

* Also provides J1539A AUX Conversion Adapter for Opt. 017/117 to use rear-panel AUX connector

MG3710A-021 BER Test Function
MG3710A-121 BER Test Function Retrofit
Installs BER measurement function

* Also provides J1539A AUX Conversion Adapter for Opt. 021/121 to use rear-panel AUX connector

MG3710A-029 OS Upgrade to Windows 7 (no retrofit)
Upgrades embedded Windows XP OS to Windows 7 (32 bit, Professional)

* This option cannot be retrofitted due to license restrictions.

MG3710A-313 Removable HDD
User exchangeable HDD with Windows XP OS

* Opt. 029 cannot be applied to this HDD option.

Hardware (For 1stRF)

MG3710A-032 1stRF 100 kHz to 2.7 GHz
MG3710A-034 1stRF 100 kHz to 4 GHz
MG3710A-036 1stRF 100 kHz to 6 GHz
Selects 1stRF frequency range
The frequency range cannot be changed after installation.

MG3710A-018 Analog IQ Input/Output
MG3710A-118 Analog IQ Input/Output Retrofit
Installs analog I/Q input connector on front panel and output connector on rear panel of main unit

MG3710A-041 High Power Extension for 1stRF
MG3710A-141 High Power Extension for 1stRF Retrofit
Extends signal output setting range upper limit

Opt. 041/141 installed and Opt. 043/143 not installed
Level setting range: Hi limit +30 dBm (Standard +17 dBm)
Opt. 041/141 not installed and Opt. 043/143 not installed
Level setting range: Hi limit +25 dBm (Standard +17 dBm)

MG3710A-042 Low Power Extension for 1stRF
MG3710A-142 Low Power Extension for 1stRF Retrofit
Extends signal output setting range lower limit

Level setting range: Lo limit –144 dBm (Standard –110 dBm)

MG3710A-043 Reverse Power Protection for 1stRF
MG3710A-143 Reverse Power Protection for 1stRF Retrofit
Protects signal output connector against reverse input power
(Standard: 2 W nom.)

Max reverse input: 20 W (nom.) (1 MHz < f ≤ 2 GHz)
10 W (nom.) (2 GHz < f ≤ 6 GHz)

MG3710A-045 ARB Memory Upgrade 256 Msample for 1stRF
MG3710A-145 ARB Memory Upgrade 256 Msample for 1stRF Retrofit
Upgrades ARB size to 256 Msamples (1 GB)
(standard is 64 Msamples/256 MB)

With Opt. 048/148 not installed, installs 1 × 256 Msamples
With Opt. 048/148 installed, installs 2 × 256 Msamples

MG3710A-046 ARB Memory Upgrade 1024 Msample for 1stRF
MG3710A-146 ARB Memory Upgrade 1024 Msample for 1stRF Retrofit
Upgrades ARB size to 1024 Msamples (4 GB)
(standard is 64 Msamples/256 MB)

With Opt. 048/148 not installed, installs 1 × 1024 Msamples
With Opt. 048/148 installed, installs 2 × 1024 Msamples

MG3710A-048 Combination of Baseband Signal for 1stRF
MG3710A-148 Combination of Baseband Signal for 1stRF Retrofit
Two internal waveform memories. Selects two waveform patterns per one RF output for setting mutual frequency offset, level offset, delay time, etc., to output 2 signals from 1 RF connector

MG3710A-049 AWGN for 1stRF
MG3710A-149 AWGN for 1stRF Retrofit
Internal AWGN addition function. Adjusts AWGN bandwidth range setting as follows for selected waveform pattern:

Band limit: waveform pattern sampling rate × 0.2
to waveform pattern sampling rate × 0.8
CN: ≤40 dB

MG3710A-050 Additional Analog Modulation Input for 1st RF
MG3710A-150 Additional Analog Modulation Input for 1st RF Retrofit
Adds additional analog modulation inputs function for 1stRF. Extends to two internal modulation sources (AM/FM/ΦM), and one external modulation source supporting simultaneous two-signal modulation.
Installs external signal input connector on rear panel of main unit.

Hardware (For 2ndRF)

MG3710A-062 2ndRF 100 kHz to 2.7 GHz
MG3710A-064 2ndRF 100 kHz to 4 GHz
MG3710A-066 2ndRF 100 kHz to 6 GHz
MG3710A-162 2ndRF 100 kHz to 2.7 GHz Retrofit
MG3710A-164 2ndRF 100 kHz to 4 GHz Retrofit
MG3710A-166 2ndRF 100 kHz to 6 GHz Retrofit
Selects 2ndRF frequency range
The frequency range cannot be changed after installation.
Can only be retrofitted when 2ndRF not installed.

MG3710A-071 High Power Extension for 2ndRF
MG3710A-171 High Power Extension for 2ndRF Retrofit
Extends signal output setting range upper limit
Opt. 071/171 installed and Opt. 073/173 not installed
Level setting range: Hi limit +30 dBm (Standard +17 dBm)
Opt. 071/171 not installed and Opt. 073/173 not installed
Level setting range: Hi limit +25 dBm (Standard +17 dBm)

MG3710A-072 Low Power Extension for 2ndRF
MG3710A-172 Low Power Extension for 2ndRF Retrofit
Extends signal output setting range lower limit
Level setting range: Lo limit –144 dBm (Standard –110 dBm)

MG3710A-073 Reverse Power Protection for 2ndRF
MG3710A-173 Reverse Power Protection for 2ndRF Retrofit
Protects signal output connector against reverse input power
(Standard: 2 W nom.)
Max reverse input: 20 W (nom.) (1 MHz < f ≤ 2 GHz),
10 W (nom.) (2 GHz < f ≤ 6 GHz)

MG3710A-075 ARB Memory Upgrade 256 Msample for 2ndRF
MG3710A-175 ARB Memory Upgrade 256 Msample for 2ndRF Retrofit
Upgrades ARB size to 256 Msamples (1 GB)
(standard is 64 Msamples/256 MB)
With Opt. 078/178 not installed, installs 1 × 256 Msamples
With Opt. 078/178 installed, installs 2 × 256 Msamples

MG3710A-076 ARB Memory Upgrade 1024 Msample for 2ndRF
MG3710A-176 ARB Memory Upgrade 1024 Msample for 2ndRF Retrofit
Upgrades ARB size to 1024 Msamples (4 GB)
(standard is 64 Msamples/256 MB)
With Opt. 078/178 not installed, installs 1 × 1024 Msamples
With Opt. 078/178 installed, installs 2 × 1024 Msamples

MG3710A-078 Combination of Baseband Signal for 2ndRF
MG3710A-178 Combination of Baseband Signal for 2ndRF Retrofit
Two internal waveform memories. Selects two waveform patterns per one RF output for setting mutual frequency offset, level offset, delay time, etc., to output 2 signals from 1 RF connector

MG3710A-079 AWGN for 2ndRF
MG3710A-179 AWGN for 2ndRF Retrofit
Internal AWGN addition function. Adjusts AWGN bandwidth range setting as follows for selected waveform pattern:
Band limit: waveform pattern sampling rate × 0.2
to waveform pattern sampling rate × 0.8
CN: ≤40 dB

MG3710A-080 Additional Analog Modulation Input for 2nd RF
MG3710A-180 Additional Analog Modulation Input for 2nd RF Retrofit
Adds additional analog modulation inputs function for 2ndRF.
Extends to two internal modulation sources (AM/FM/ΦM), and one external modulation source supporting simultaneous two-signal modulation.
Installs external signal input connector on rear panel of main unit.

Options (Software)

Waveform Patterns & License

Model: MX370073A
Name: DFS Radar Pattern
Sets pulse signals for testing 5-GHz band WLAN DFS functions. The MX370073A supports the waveform patterns for the TELEC and FCC test specifications. Pulse signals are output simply by selecting the pattern.

Model: MX370075A
Name: DFS (ETSI) Waveform Pattern
Sets pulse signals for testing 5-GHz band WLAN DFS functions. The MX370075A supports the waveform patterns for the ETSI specifications. Pulse signals are output simply by selecting the pattern.

What is DFS?

5-GHz band wireless LAN devices like meteorological radar, marine radar, etc., have a Dynamic Frequency Selection (DFS) function for switching to an empty channel when detecting a radio wave. At testing, pulse, chirping and hopping signals like those used by radar are output from the SG to the WLAN equipment to check that it does not output signals in that channel.

Model: MX370084A
Name: ISDB-Tmm Waveform Pattern
Archive of ARIB STD-B46 waveform patterns. Supports MER and spectrum evaluation of Tx characteristics tests and sensitivity/ simple BER tests at Rx characteristics tests.

IQproducer License

IQproducer is PC application software for generating waveform patterns. The parameters are set using IQproducer and the waveform pattern is created to output the signal by selection at the MG3710A. This one software application includes all the following systems.
Since it runs on any PC, the supported functions and parameter range can be verified before purchase.

When outputting a waveform pattern from the MG3710A, no signal is output unless a license for that system is installed in the main frame.

∗ Read the “IQproducer catalog” for details.

Model: MX370101A
Name: HSDPA/HSUPA IQproducer
Sets parameters according to HSDPA/HSUPA (Uplink and Downlink) specifications, and generates HSDPA/HSUPA waveform patterns including Fixed Reference Channel (3GPP TS 25.101 Annex A.7).

Model: MX370102A
Name: TDMA IQproducer
Sets required parameters for TDMA waveform patterns and generates various waveform patterns. Setting parameters include Modulation, Frame, Slot, Data, Filter, etc. Supports wide application range including public wireless.

Model: MX370103A
Name: CDMA2000 1xEV-DO IQproducer
Sets parameters according to CDMA2000 1xEV-DO Forward/ Reverse specifications and generates 1xEV-DO waveform patterns.

Model: MX370104A
Name: Multi-carrier IQproducer
Generates multi-carrier waveform patterns combination files using MG3710A Baseband Signal Combine function (requires Opt. 048/078).

Model: MX370105A
Name: Mobile WiMAX IQproducer
Sets parameters according to IEEE 802.16e-2005, IEEE P802.16Rev2/D3 WirelessMAN-OFDMA MAC, PHY specifications and generates waveform patterns. Supports WirelessMAN-OFDMA specification used by 802.16e mobile standard.

Model: MX370106A
Name: DVB-T/H IQproducer
Sets parameters according to ETSI EN 300 744 V1.5.1 (2004-11) physical layer standard and generates DVB-T/H waveform patterns. Generated waveform patterns can be used for device TRx characteristics evaluation tests (Error Correction, BER graphics).

Model: MX370107A
Name: Fading IQproducer
Performs IQ channel fading processing, correlation matrix calculation, AWGN combination. Input data file created by selecting waveform pattern file created with other IQproducer software, and IQ data (ASCII) created with other general-purpose simulation tools.

Model: MX370108A
Name: LTE IQproducer
Generates wanted waveform patterns with parameters modified according to 3GPP TS 36.211, TS 36.212, TS 36.213 LTE FDD specifications.

Model: MX370108A-001
Name: LTE-Advanced FDD Option
Installing in the MX370108A supports simple generation of carrier aggregation signals added by 3GPP Rel. 10. Additionally, clustered SC-FDMA signals can be generated at Uplink.
∗: Requires MX370108A

Model: MX370109A
Name: XG-PHS IQproducer
Generates wanted waveform patterns with parameters modified according to Next Generation PHS Specification PHS (XGP: eXtended Global Platform) specifications.

Model: MX370110A
Name: LTE TDD IQproducer
Generates wanted waveform patterns with parameters modified according to 3GPP TS 36.211, TS 36.212, TS 36.213 LTE TDD specifications.

Model: MX370110A-001
Name: LTE-Advanced TDD Option
Installing in the MX370110A supports simple generation of carrier aggregation signals added by 3GPP Rel. 10. Additionally, clustered SC-FDMA signals can be generated at Uplink.
∗: Requires MX370110A

Model: MX370111A
Name: WLAN IQproducer
Generates waveform patterns for IEEE Std 802.11-2007 and IEEE Std 802.11n-2009 IEEE 802.11a/b/g/j/n/p specifications.

Model: MX370111A-002
Name: 802.11ac (160 MHz) Option
Installing in the MX370111A supports waveform patterns generation compliant with IEEE802.11ac specifications.
∗: Requires MX370111A. Only for MG3710A.

Model: MX370112A
Name: TD-SCDMA IQproducer
Generates wanted waveform patterns with parameters modified according to TD-SCDMA specifications standardized by TRx characteristics evaluation tests (excluding performance tests) for 3GPP TS 25.221, TS 25.222, TS 25.223, TS 25.105, TS 25.142

● Vector Signal Generator series

Supported LTE-Advanced Carrier Aggregation Modes

Vector Signal Generator Series / Carrier Aggregation Mode	Vector Signal Generator		Vector Signal Generator Option for Signal Analyzer	
	MG3710A*1	MG3700A*1	MS2690A series Opt. 020*2	MS2830A Opt. 020/021*2
Intra-band contiguous Carrier Aggregation, Intra-band non-contiguous Carrier Aggregation	✓ (1 unit)	✓ (1 unit)	✓ (1 unit)	✓ (1 unit)
Inter-band non-contiguous Carrier Aggregation	✓ (2 RF 1 unit*3, or 1 RF 2 units)	✓ (2 units)	✓ (2 units)	✓ (2 units)

∗1: MX370108A LTE IQproducer and MX370108A-001 LTE-Advanced FDD Option installed.
MX370110A LTE TDD IQproducer and MX370110A-001 LTE-Advanced TDD Option installed.
∗2: MX269908A LTE IQproducer and MX269908A-001 LTE-Advanced FDD Option installed.
MX269910A LTE TDD IQproducer and MX269910A-001 LTE-Advanced TDD Option installed.
∗3: MG3710A-062 (2.7 GHz)/064 (4 GHz)/066 (6 GHz) 2ndRF Option installed.

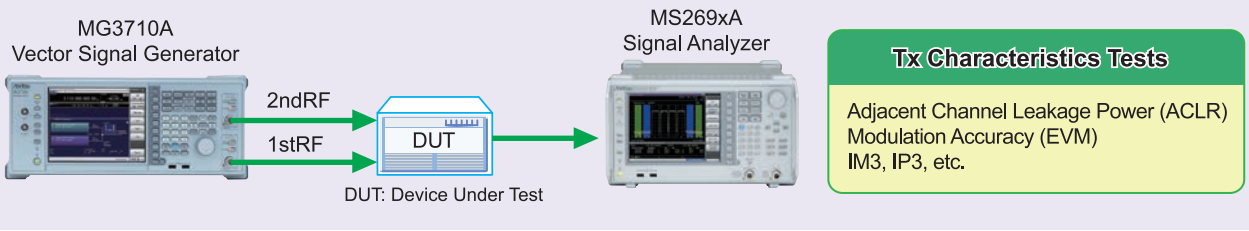
● Vector Signal Generator series

Supported WLAN IEEE802.11ac Signal Bandwidth

Vector Signal Generator Series / IEEE802.11ac Signal Bandwidth	Vector Signal Generator		Vector Signal Generator Option for Signal Analyzer	
	MG3710A*1	MG3700A*2	MS2690A series Opt. 020*3	MS2830A Opt. 020/021*3
20 MHz/40 MHz/80 MHz	✓ (1 unit)	✓ (1 unit)	✓ (1 unit)	✓ (1 unit)
160 MHz	✓ (1 unit)	—	—	—
80 MHz + 80 MHz (non-contiguous)	✓ (2 RF 1 unit*4, or 1 RF 2 units)	✓ (2 units)	✓ (2 units)	✓ (2 units)

∗1: MX370111A WLAN IQproducer and MX370111A-002 802.11ac (160 MHz) Option installed.
∗2: MX370111A WLAN IQproducer and MX370111A-001 802.11ac (80 MHz) Option installed.
∗3: MX269911A WLAN IQproducer and MX269911A-001 802.11ac (80 MHz) Option installed.
∗4: MG3710A-062 (2.7 GHz)/064 (4 GHz)/066 (6 GHz) 2ndRF Option installed.

Reference Signal Source for Tx Characteristics Tests of Amplifiers, etc.



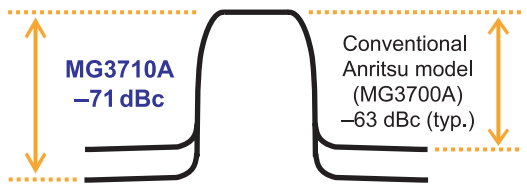
Large Measurement Margin → Stable Measurements / Improves Yield

No External Amp → Stable Level Accuracy / Cuts Risk of Damage to DUT

• Supports –71 dBc* ACLR Performance

High ACLR performance increases specification margin and improves stable measurement and yield.

*: W-CDMA, TestModel1, 64DPCH, 2 GHz



Dual RF Outputs → Cuts Costs / Cuts Workload

• Supports Maximum Two RF Outputs

In general, two signal generators are required to output CW × 2 waveforms with IM3 or modulation signals with different communication methods. Not only is the cost for two signal generators high, but two separate software licenses are required to output modulation signals. In addition, setting two separate signal generators doubles the work load.
The MG3710A supports two signal generators (RF output) in one unit cutting equipment costs. And only one license is required to use modulation signals at two RF outputs.
Moreover, the frequency and level synchronization function cuts work loads.

• High-power Output Option (Opt. 041/071) Supports CW Levels of +23 dBm

In general, an external amp is required when the output of a signal generator is insufficient, such as covering the measurement system transmission path loss and inputting high-level modulation signals for amp distortion characteristics tests. Since the output of an external amp cannot be assured, it must be checked with a power meter each time the frequency and level are changed. Moreover, when using an external amp, sometimes the DUT may be damaged by mishandling errors. The MG3710A high-power output supports signals required for measuring path loss. In addition, stable measurement is assured when used within the guaranteed setting range. And the risk of mistakenly damaging the DUT is reduced, even at the output limit.

Pre-installed Waveform Patterns → Cuts Costs

License-free Pre-installed Waveform Patterns

LTE FDD/TDD (E-TM1.1 to E-TM3.3), W-CDMA/HSPA, GSM, CDMA2000/1xEV-DO, WLAN 11a/b/g, Mobile WiMAX, etc.

Optional waveform generation tools are also available (license sold separately):

LTE FDD	(MX370108A)
LTE-Advanced FDD	(MX370108A-001)
LTE TDD	(MX370110A)
LTE-Advanced TDD	(MX370110A-001)
Mobile WiMAX	(MX370105A)
WLAN 11a/b/g/n/j/p	(MX370111A)
WLAN 11ac	(MX370111A-002)
TD-SCDMA	(MX370112A) (etc.)

USB Power Sensor → Efficient Equipment Investment

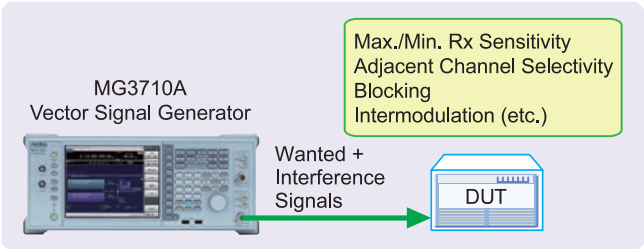
Up to two USB power sensors (separately sold) can be connected to the MG3710A.
USB connectors to display the measurement results on the MG3710A screen.

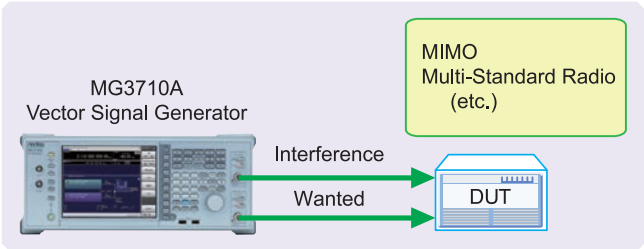
USB Power Sensor

Frequency Range:	600 MHz to 4 GHz	[MA24104A]*
	350 MHz to 4 GHz	[MA24105A]
	50 MHz to 6 GHz	[MA24106A]
	10 MHz to 8 GHz	[MA24108A]
	10 MHz to 18 GHz	[MA24118A]
	10 MHz to 26 GHz	[MA24126A]

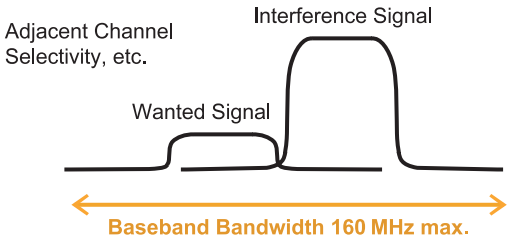
*: MA24104A has been discontinued. Replacement model is MA24105A.

Wanted and Interference Waveforms for Rx Characteristics Evaluations of Cellular Base Station, etc.





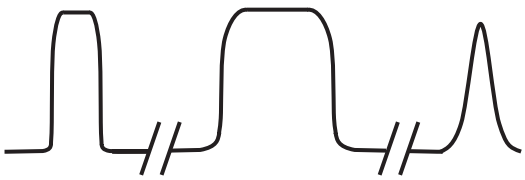
Two modulation signals can be output from one RF output using the baseband signal combine function (Opt. 048/078). The level ratio (CN = 80 dB) and the frequency offset (±80 MHz max.) can be set as well.
Tests using two modulation signals, such as Adjacent Channel Selectivity (ACS), Blocking, and Intermodulation (IM), etc., require two separate signal generators and a license for each, greatly increasing equipment costs and setting work loads.
The MG3710A has two waveform memories for each RF output for setting and outputting different waveform data. One RF outputs the combined wanted + interference signals for a baseband bandwidth. Not only are equipment costs greatly reduced, but fewer external equipment, such as couplers, level adjusters, etc., as well as less setup time are required. In comparison to previous Anritsu instruments, frequency offsets can be set for both memory A and B, and the sampling rate for memory A and B can be adjusted automatically.



Installing the BER measurement (Opt. 021) and AWGN Generation (Opt. 049/079) options supports the extra functions required for Rx tests of each type of communications system.

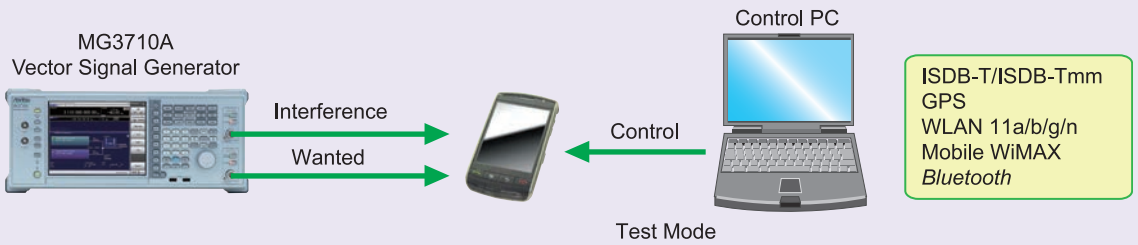
Two RF outputs can be installed as an option.
A different frequency, level and waveform pattern/CW can be set for each RF output, which is ideal for Rx tests using two signals for frequency offset that cannot be set using the baseband combine function. For example, sometimes at MSR, multiple signals must be output simultaneously in the 200-MHz band, requiring two RF outputs.

Multi-Standard Radio Rx Characteristics Tests



Installing two RF units in one MG3710A unit makes it easy to synchronize between channels. And adding the Universal Input/Output option (Opt. 017) supports Local Signal I/O for synchronizing with other MG3710A units.
The IQproducer waveform generation software can be used with one license when when two RF units are installed. For example, for LTE 2×2 MIMO tests, LTE IQproducer can generate two patterns for the Tx antenna signals and Fading IQproducer can generate two patterns with spatial multiplexing for the Rx antennas. Previously, using two signal generators required two separate licenses for LTE and fading, but now only one license is required to use IQproducer with the MG3710A with two RF units installed, helping cut software costs too.

Rx Sensitivity Tests for Multi-system Mobile Terminals, etc.



Large 4-GB Memory Max. ⇒ **Reduces Reload Times**, **Cuts Test Times**

The MG3710A can save up to 1024 Msamples (4 GB) per RF. Memory size is one of the most important specifications for an arbitrary waveform signal generator. Small memory cannot save multiple waveform data and requires time-wasting reloading and measurement to output different signals each time.

With large waveform memory
- Switch loaded waveform data instantaneously
- Load multiple test waveforms
  ⇒ Reduce number of reloads ⇒ Cuts times

Pre-installed Waveform Patterns ⇒ **Cuts Costs**

License-free Pre-installed Waveform Patterns

WLAN 11a/b/g, *Bluetooth*, GPS, etc.

The following waveform patterns are available as options.

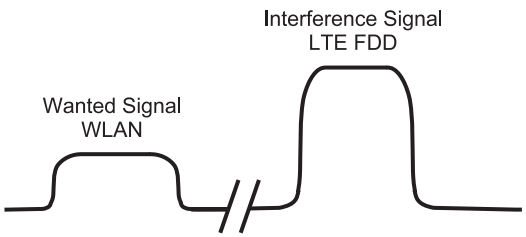
ISDB-Tmm	(MX370084A)

Optional waveform generation tools are also available (license separately sold):

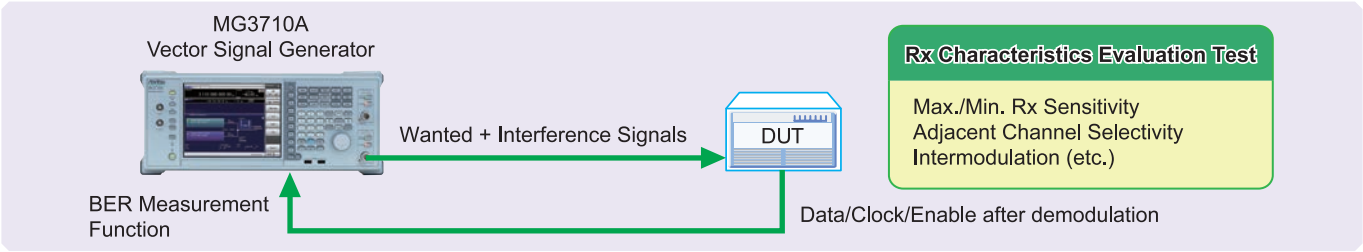
DVB-T/H	(MX370106A)
Mobile WiMAX	(MX370105A)
WLAN 11a/b/g/n/j/p	(MX370111A)
WLAN 11ac	(MX370111A-002)

Dual RF outputs ⇒ **Cuts Costs**

Two RF outputs can be installed as an option.
Additionally, two RF output models with different frequencies can be installed. For example, if WLAN 11b/g are the wanted waveforms, mobile signals for LTE FDD, LTE TDD, W-CDMA, GSM, etc., are considered interference signals. Generally, these tests have high hardware and software costs because two separate signal generators are required. Using the MG3710A, the total investment costs for interference tests under simulated service conditions, such as WLAN + LTE FDD, or ISDB-T + W-CDMA, are reduced by selecting models with different frequencies for the 1stRF and 2ndRF outputs.



Rx Characteristics Evaluation Tests for Digital Narrowband Communications, Public Safety, etc.



Large Measurement Margin → Stable Measurements, Improves Yield

One RF Outputs Two Wanted + Interference Signals → Cuts Costs, Cuts Workload

- **Supports SSB Phase Noise Performance –140 dBc/Hz nom. (@100 MHz)**

Phase noise performance affects measurement results at narrow bandwidths of several kHz. In particular, high phase-noise performance is required for interference waveforms.
Improved SSB phase noise supports wider specification margins and stable measurements to improve yields.

<–140 dBc/Hz (nom.)	@100 MHz, 20-kHz offset, CW
<–131 dBc/Hz (typ.)	@1 GHz, 20-kHz offset, CW
<–125 dBc/Hz (typ.)	@2 GHz, 20-kHz offset, CW

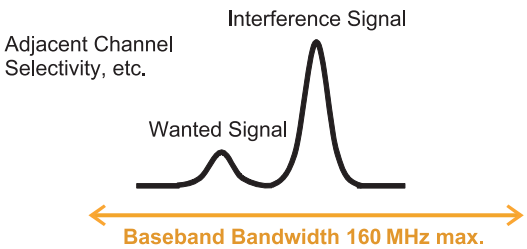
Supports Various Modulation Methods → Cuts Costs

- **TDMA IQproducer [MX370102A] Supports Following Modulation Methods**

BPSK, DBPSK, PI/2DBPSK, QPSK, DQPSK, PI/4DQPSK, 8PSK, D8PSK, 16QAM, 32QAM, 256QAM, ASK, 2FSK, 4FSK,

The TDMA IQproducer PC software generates waveform patterns with any frame format or filter settings. One software package supports various narrowband digital communications.

Two modulation signals can be output from one RF output using the baseband signal combine function (Opt. 048/078). The level ratio (CN = 80 dB) and the frequency offset (±80 MHz max.) can be set as well. Usually, tests using two modulation signals, such as adjacent channel selectivity (ACS) and intermodulation characteristics (IM) require two signal generators as well as a software license for each signal generator.
The MG3710A has two waveform memories for each RF output for setting and outputting different waveform data. One RF outputs the combined wanted + interference signals for a baseband bandwidth. Not only are equipment costs greatly reduced, but fewer external equipment, such as couplers, level adjusters, etc., as well as less setup time are required.



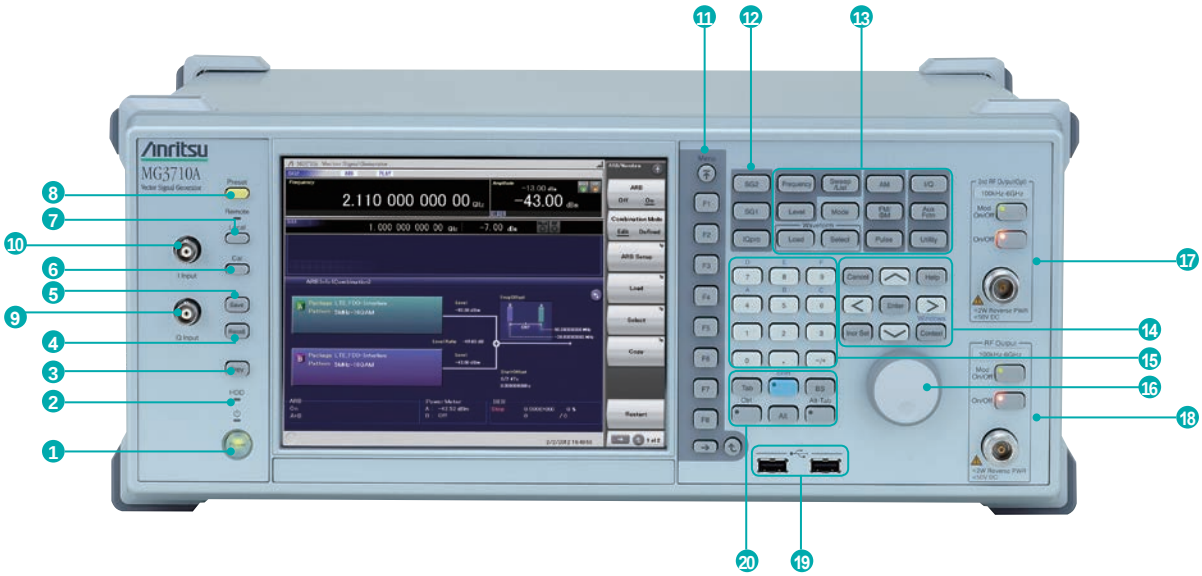
BER Measurement Function → Efficient Equipment Investment

- **Supports BER Measurement Function [Opt. 021]**

The BER can be measured using the DUT-demodulated Data/Clock/Enable. The measurement results are displayed on the MG3710A screen.

- Input Bit Rate: 100 bps to 40 Mbps

Easy-to-use Panel



1 Power Switch
Switches between standby status in which AC power is supplied, and operating power-on status. At standby the key lamp is orange; at power-on it is green. To supply power press the switch for 2 seconds or more.

2 HDD Lamp
Lit when internal hard disk being accessed.

3 Copy Key
Copies screen display to file.

4 Recall Key
Displays menu for recalling parameter files.

5 Save Key
Displays menu for saving parameter files.

6 Cal Key
Displays menu for performing calibration.

7 Local Key/Remote Lamp
Local Key: Return remote control via GPIB, Ethernet, USB (B) to local control and enables panel setting.
Remote Lamp: Lit while MG3710A under remote control.

8 Preset Key
Displays Preset menu to initialize parameter settings.

9 Q Input Connector
Input for external Q phase signal. Requires Opt. 018 and only supports SG1 (1stRF); does not support SG2 (2ndRF).

10 I Input Connector
Input for external I phase signal. Requires Opt. 018 and only supports SG1 (1stRF); does not support SG2 (2ndRF).

11 Function Keys
Select and execute functions displayed at right edge of display. Displayed functions menus are multi-level with page hierarchy.

12 SG1/SG2/IQpro Keys
SG1: Switches setting target to SG1
SG2: Switches setting target to SG2
IQpro: Starts IQproducer on main frame. IQproducer may not start running for a few seconds to minutes after pressing this key.

13 Main Function Keys
Displays menus for setting and executing main functions: [Frequency], [Level], [Sweep/List], [Mode], [AM], [FM/ΦM], [Pulse], [I/Q], [Load], [Select], [AUX Fctn], [Utility]

14 Arrow/Enter/Cancel/Help/Incr Set/Context/ Windows Keys
Help: Pressing function key after Help key displays help for pressed function key
Incr Set: Sets increment/decrement steps for each parameter
Context: Performs same operation and right mouse click
Windows: Performs same operation as Windows key

15 Ten Key Pad
Input numeric values for each parameter setting screen.

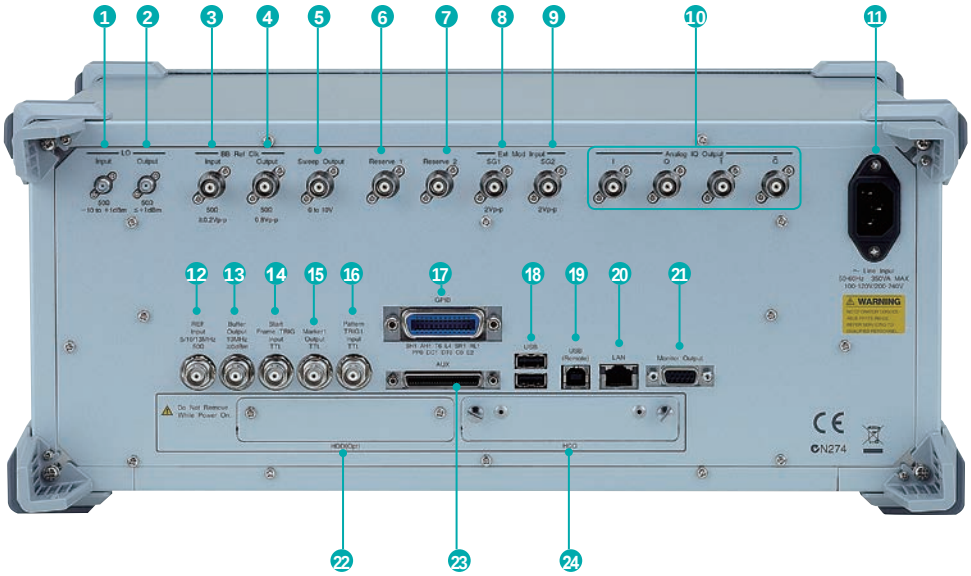
16 Rotary Knob
Selects and sets displayed items.

17 2nd RF Output [Opt. 062/064/066]
Mod On/Off: Switched 1stRF/2ndRF modulation On/Off. Lamp lit during modulation.
On/Off: Switches RF output On/Off.

18 RF Output [Opt. 032/034/036]

19 USB Connector (Type A)

20 Tab/Alt/BS/Ctrl/Shift/Alt-Tab Key
Shift key: Executes panel operation indicated by blue characters. Press Shift key and then required key.



1 LO Input
Connector for inputting external Local signal.
Requires Opt. 017.

2 LO Output
Outputs Local signal. Requires Opt. 017.

3 BB REF CLK Input
Connector for inputting reference clock signal for sampling clock of built-in arbitrary waveform generator.
Requires Opt. 017.

4 BB REF CLK Output
Connector for outputting arbitrary waveform generator sampling clock signal. Requires Opt. 017.

5 Sweep Output
Connector for outputting either 10 V Sweep Signal synchronized with Sweep or Sweep Status signal.
Requires Opt. 017.

6 Reserve 1
Terminal for future extension.

7 Reserve 2
Terminal for future extension.

8 Ext Mod Input SG1
Option connector for inputting external signal for additional analog modulation input for the SG1.
Requires Opt. 050.

9 Ext Mod Input SG2
Option connector for inputting external signal for additional analog modulation input for the SG2.
Requires Opt. 080.

10 I Output/Q Output/$\overline{\text{I}}$ Output/$\overline{\text{Q}}$ Output
Connector for outputting internal baseband I/Q signal or inverse I/Q signal. Requires Opt. 018.

11 AC Inlet

12 REF Input
Connector for inputting external reference frequency signal (5/10/13 MHz).

13 Buffer Output
Connector for outputting built-in reference frequency signal (10 MHz).

14 Start Frame TRIG Input
Connector (pulled up internally) for inputting external trigger signal.

15 Marker 1 Output
Connector for outputting Marker 1 signal. (Marker 2/3 output from AUX connector).
Requires J1539A AUX Conversion Adapter.

16 Pattern TRIG 1 Input
Connector (pulled up internally) for inputting external trigger signal.

17 GPIB
Connector Connector used for remote control via GPIB.

18 USB Connector (Type A)
Connector for USB memory, keyboard, mouse, etc.

19 USB Connector (Type B)
Connector used for remote control via USB.

20 LAN
Connector for personal computer and network.

21 Monitor Output
RGB connector for external display.

22 HDD (Opt)
Slot for hard disk option. Requires Opt. 011.

23 AUX
Connector for following I/O signals.
Requires J1539A AUX Conversion Adapter.
- BER Measurement Signal (Input): Data, CLK, Enable
- Marker Signal (Output): Marker 2, Marker 3
- Pulse Signal for external Pulse Modulation (Input): Pulse Mod
- Signal synchronized with Pulse Modulation signal at PM (Output): Pulse Sync, Pulse Video Out
- Trigger signal at timing of internal Baseband Ref Clock based on Start/Frame trigger (Out): Sync Trigger Out

24 HDD
Hard disk slot

Specifications

Refer to the Data Sheet for specification details such as guaranteed setting ranges, etc.

● Frequency Setting Range

• 1stRF

MG3710A-032 9 kHz to 2.7 GHz
MG3710A-034 9 kHz to 4 GHz
MG3710A-036 9 kHz to 6 GHz

• 2ndRF

MG3710A-062 9 kHz to 2.7 GHz
MG3710A-064 9 kHz to 4 GHz
MG3710A-066 9 kHz to 6 GHz

● Switching Speed (List Mode)

Frequency ≤600 µs
Level ≤600 µs

● Amplitude Setting Range

Options	Setting Range [dBm]	
	without Reverse Power Protection	with Reverse Power Protection
Standard	–110 to +17	–110 to +17
with High-power Extension	–110 to +30	–110 to +25
with Low-power Extension	–144 to +17	–144 to +17
with High-power Extension and Low-power Extension	–144 to +30	–144 to +25

Level Accuracy is assured at high levels (CW)

Frequency Range	Standard	Opt. 041/071
100 kHz ≤ f < 10 MHz	+5 dBm	+5 dBm
10 MHz ≤ f < 50 MHz	+10 dBm	+10 dBm
50 MHz ≤ f < 400 MHz	+13 dBm	**+20 dBm**
400 MHz ≤ f ≤ 3 GHz		**+23 dBm**
3 GHz < f ≤ 4 GHz		**+20 dBm**
4 GHz < f ≤ 5 GHz		+13 dBm
5 GHz < f ≤ 6 GHz	+11 dBm	+11 dBm

● Absolute Level Accuracy (at CW, 18° to 28°C, –110 to +5 dBm)

±0.5 dB (typ.) (100 kHz ≤ f < 50 MHz)
±0.5 dB (10 MHz ≤ f ≤ 3 GHz)
±0.7 dB (3 GHz < f ≤ 4 GHz)
±0.8 dB (4 GHz < f ≤ 6 GHz)

● Harmonics

<–30 dBc

● Non-Harmonics

Output level ≤+5 dBm, CW, Frequency offset ≥10 kHz
<–62 dBc (100 kHz ≤ f ≤ 187.5 MHz)
<–68 dBc (187.5 MHz < f ≤ 750 MHz)
<–62 dBc (750 MHz < f ≤ 1.5 GHz)
<–56 dBc (1.5 GHz < f ≤ 3 GHz)
<–50 dBc (3 GHz < f ≤ 6 GHz)

● Single Sideband Phase Noise (at CW, 20 kHz offset)

<–140 dBc/Hz (nom.) (100 MHz)
<–131 dBc/Hz (typ.) (1 GHz)
<–125 dBc/Hz (typ.) (2 GHz)

● Analog Modulation

• Amplitude Modulation

Depth: 0 to 100% (Linear)
0 to 10 dB (Log)
Modulation Frequency: 0.1 Hz to 50 MHz

• Frequency Modulation

Deviation: 0 Hz to 40 MHz
Modulation Frequency: 0.1 Hz to 40 MHz, or (50-MHz FM Rate), whichever smaller

• Φ-Modulation

Deviation angle: 0 to 160 rad., or (40 MHz/ΦM Rate) rad., whichever smaller
Modulation Frequency: 0.1 Hz to 40 MHz, or (40 MHz/ΦM Deviation), whichever smaller

• Pulse Modulation

Modulation Frequency: 0.1 Hz to 10 MHz
Modulation Period: 10 ns to 20 s

● Baseband Performance

• RF Modulation Bandwidth

160 MHz*/120 MHz (using Internal baseband signal generator)

• ARB Memory Size

64 Msamples (256 MB) [with 1stRF, 2ndRF]
256 Msamples (1 GB) [Opt. 045/075]
1024 Msamples (4 GB) [Opt. 046/076]

• Sampling Rate

20 kHz to 200 MHz*/160 MHz

• DAC Resolution

14/15/16 bits

*: Supports firmware version 2.00.00 and later. Only when using MX370111A WLAN IQproducer and MX370111A-002 802.11ac (160 MHz) option.

● EVM Performance

≤0.6%rms (typ.) (W-CDMA, TestModel4)
≤0.8%rms (typ.) (GSM)
≤0.8%rms (typ.) (EDGE)
≤0.8%rms (typ.) (LTE TestModel3.1)

● Dimensions, Weight

177 (H) × 426 (W) × 390 (D) mm
≤13.7 kg (with 1stRF, excluding other option)

● Power Requirements

100 V(ac) to 120 V(ac), 200 V(ac) to 240 V(ac)
50 Hz to 60 Hz

Options Configuration Guide

The following table shows the recommended option combinations.

Type	Opt. No	Retrofit	Name	032	034	036	018	041	042	043	045	046	048	049	050	062	064	066	071	072	073	075	076	078	079	080	001	002	011	017	021	029	313
1stRF	MG3710A-032		1stRF 100 kHz to 2.7 GHz		∗1	∗1																											
1stRF	MG3710A-034		1stRF 100 kHz to 4 GHz	∗1		∗1																											
1stRF	MG3710A-036		1stRF 100 kHz to 6 GHz	∗1	∗1																												
1stRF	MG3710A-018	118	Analog IQ Input/Output																														
1stRF	MG3710A-041	141	High Power Extension for 1stRF																														
1stRF	MG3710A-042	142	Low Power Extension for 1stRF																														
1stRF	MG3710A-043	143	Reverse Power Protection for 1stRF																														
1stRF	MG3710A-045	145	ARB Memory Upgrade 256 Msample for 1stRF									∗3																					
1stRF	MG3710A-046	146	ARB Memory Upgrade 1024 Msample for 1stRF								∗3																						
1stRF	MG3710A-048	148	Combination of Baseband Signal for 1stRF																														
1stRF	MG3710A-049	149	AWGN for 1stRF																														
1stRF	MG3710A-050	150	Additional Analog Modulation Input for 1stRF																														
2ndRF	MG3710A-062	162	2ndRF 100 kHz to 2.7 GHz														∗2	∗2															
2ndRF	MG3710A-064	164	2ndRF 100 kHz to 4 GHz													∗2		∗2															
2ndRF	MG3710A-066	166	2ndRF 100 kHz to 6 GHz													∗2	∗2																
2ndRF	MG3710A-071	171	High Power Extension for 2ndRF																														
2ndRF	MG3710A-072	172	Low Power Extension for 2ndRF																														
2ndRF	MG3710A-073	173	Reverse Power Protection for 2ndRF																														
2ndRF	MG3710A-075	175	ARB Memory Upgrade 256 Msample for 2ndRF																				∗3										
2ndRF	MG3710A-076	176	ARB Memory Upgrade 1024 Msample for 2ndRF																			∗3										
2ndRF	MG3710A-078	178	Combination of Baseband Signal for 2ndRF																														
2ndRF	MG3710A-079	179	AWGN for 2ndRF																														
2ndRF	MG3710A-080	180	Additional Analog Modulation Input for 2ndRF																														
Common	MG3710A-001	101	Rubidium Reference Oscillator																														
Common	MG3710A-002	102	High Stability Reference Oscillator																														
Common	MG3710A-011	111	2ndary HDD																														
Common	MG3710A-017	117	Universal Input/Output																														
Common	MG3710A-021	121	BER Test Function																														
Common	MG3710A-029		OS Upgrade to Windows 7																														∗4
Common	MG3710A-313	313	Removable HDD																													∗4	

∗1: Only one of 2.7 GHz, 4 GHz, and 6 GHz options. Install any one 1stRF option. Retrofitting one of these options disables previously installed option.
∗2: Only one of 2.7 GHz, 4 GHz, and 6 GHz options. Retrofitting one of these options disables previously installed option. Install any one 2ndRF option. Can be retrofitted only when 2ndRF not installed.
∗3: Select any one. Selected memory size enabled and all others disabled.
∗4: Removable HDD (Opt. 313) cannot be upgraded to Windows 7. Opt. 313 can only be applied to MG3710A with Opt. 029 (Windows 7) applied.

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 -	
MG3710A	Vector Signal Generator	
	- Standard accessories -	
	Power Cord: 1 pc	
P0031A	USB Memory	USB2.0 Flash Driver, ≥256 MB
	Install CD-ROM	Operation manual (PDF) and application software (IQproducer)
	- Options -	
	(Common Parts)	
MG3710A-001	Rubidium Reference Oscillator	Select when ordering main frame, aging rate: ±1 × 10^{-10}/month
MG3710A-002	High Stability Reference Oscillator	Select when ordering main frame, aging rate: ±1 × 10^{-7}/year
MG3710A-011	2ndary HDD	Select when ordering main frame, spare HDD for saving user data without Windows OS
MG3710A-017	Universal Input/Output	Select when ordering main frame, Adds BNC connectors for following signals to rear panel of main frame, includes J1539A AUX Conversion Adapter (Baseband Reference Clock Input/Output, Sweep Output, Local Signal Input/Output)
MG3710A-021	BER Test Function	Select when ordering main frame, Built-in BER measurement, Bit Rate: 100 bps to 40 Mbps J1539A AUX Conversion Adapter required for Data/Clock/Enable signal input
MG3710A-029	OS Upgrade to Windows 7	Select when ordering main frame, Upgrades MG3710A OS to Windows 7 (32 bit, Professional) (retrofit not supported)
MG3710A-101	Rubidium Reference Oscillator Retrofit	Retrofitted to shipped MG3710A
MG3710A-102	High Stability Reference Oscillator Retrofit	Retrofitted to shipped MG3710A
MG3710A-111	2ndary HDD Retrofit	Retrofitted to shipped MG3710A
MG3710A-117	Universal Input/Output Retrofit	Retrofitted to shipped MG3710A
MG3710A-121	BER Test Function Retrofit	Retrofitted to shipped MG3710A
MG3710A-313	Removable HDD	Spare HDD for storing user data with Windows OS MG3710A with Opt. 029 (Windows 7) cannot apply Opt. 313.
	(For 1stRF)	
MG3710A-032	1stRF 100 kHz to 2.7 GHz	Select when ordering main frame, select 1stRF frequency range, frequency cannot be changed after installation
MG3710A-034	1stRF 100 kHz to 4 GHz	Select when ordering main frame, select 1stRF frequency range, frequency cannot be changed after installation
MG3710A-036	1stRF 100 kHz to 6 GHz	Select when ordering main frame, select 1stRF frequency range, frequency cannot be changed after installation
MG3710A-041	High Power Extension for 1stRF	Select when ordering main frame, increases upper limit of output signal power setting range
MG3710A-042	Low Power Extension for 1stRF	Select when ordering main frame, increases lower limit of output signal power setting range
MG3710A-043	Reverse Power Protection for 1stRF	Select when ordering main frame, prevents damage caused by reverse input to output connector
MG3710A-045	ARB Memory Upgrade 256 Msample for 1stRF	Select when ordering main frame, expands ARB memory capacity
MG3710A-046	ARB Memory Upgrade 1024 Msample for 1stRF	Select when ordering main frame, expands ARB memory capacity
MG3710A-048	Combination of Baseband Signal for 1stRF	Select when ordering main frame, adds baseband combine function
MG3710A-049	AWGN for 1stRF	Select when ordering main frame, adds AWGN combine function
MG3710A-050	Additional Analog Modulation Input for 1stRF	Select when ordering main frame, Adds BNC connector for inputting external signals to rear panel of mainframe.
MG3710A-018	Analog IQ Input/Output	Select when ordering main frame, installs IQ input/output BNC connector in main frame
MG3710A-141	High Power Extension for 1stRF Retrofit	Retrofitted to shipped MG3710A
MG3710A-142	Low Power Extension for 1stRF Retrofit	Retrofitted to shipped MG3710A
MG3710A-143	Reverse Power Protection for 1stRF Retrofit	Retrofitted to shipped MG3710A
MG3710A-145	ARB Memory Upgrade 256 Msample for 1stRF Retrofit	Retrofitted to shipped MG3710A
MG3710A-146	ARB Memory Upgrade 1024 Msample for 1stRF Retrofit	Retrofitted to shipped MG3710A
MG3710A-148	Combination of Baseband Signal for 1stRF Retrofit	Retrofitted to shipped MG3710A
MG3710A-149	AWGN for 1stRF Retrofit	Retrofitted to shipped MG3710A
MG3710A-150	Additional Analog Modulation Input for 1stRF Retrofit	Retrofitted to shipped MG3710A
MG3710A-118	Analog IQ Input/Output Retrofit	Retrofitted to shipped MG3710A
	(For 2ndRF)	
MG3710A-062	2ndRF 100 kHz to 2.7 GHz	Select when ordering main frame, select 2ndRF frequency range, frequency cannot be changed after installation
MG3710A-064	2ndRF 100 kHz to 4 GHz	Select when ordering main frame, select 2ndRF frequency range, frequency cannot be changed after installation
MG3710A-066	2ndRF 100 kHz to 6 GHz	Select when ordering main frame, select 2ndRF frequency range, frequency cannot be changed after installation
MG3710A-071	High Power Extension for 2ndRF	Select when ordering main frame, increases upper limit of output signal power setting range
MG3710A-072	Low Power Extension for 2ndRF	Select when ordering main frame, increases lower limit of output signal power setting range
MG3710A-073	Reverse Power Protection for 2ndRF	Select when ordering main frame, prevents damage caused by reverse input to output connector
MG3710A-075	ARB Memory Upgrade 256 Msample for 2ndRF	Select when ordering main frame, expands ARB memory capacity
MG3710A-076	ARB Memory Upgrade 1024 Msample for 2ndRF	Select when ordering main frame, expands ARB memory capacity
MG3710A-078	Combination of Baseband Signal for 2ndRF	Select when ordering main frame, adds baseband combine function
MG3710A-079	AWGN for 2ndRF	Select when ordering main frame, adds AWGN combine function
MG3710A-080	Additional Analog Modulation Input for 2ndRF	Select when ordering main frame, Adds BNC connector for inputting external signals to rear panel of mainframe.
MG3710A-162	2ndRF 100 kHz to 2.7 GHz Retrofit	Retrofitted to shipped MG3710A when 2ndRF not installed
MG3710A-164	2ndRF 100 kHz to 4 GHz Retrofit	Retrofitted to shipped MG3710A when 2ndRF not installed
MG3710A-166	2ndRF 100 kHz to 6 GHz Retrofit	Retrofitted to shipped MG3710A when 2ndRF not installed
MG3710A-171	High Power Extension for 2ndRF Retrofit	Retrofitted to shipped MG3710A
MG3710A-172	Low Power Extension for 2ndRF Retrofit	Retrofitted to shipped MG3710A
MG3710A-173	Reverse Power Protection for 2ndRF Retrofit	Retrofitted to shipped MG3710A
MG3710A-175	ARB Memory Upgrade 256 Msample for 2ndRF Retrofit	Retrofitted to shipped MG3710A
MG3710A-176	ARB Memory Upgrade 1024 Msample for 2ndRF Retrofit	Retrofitted to shipped MG3710A
MG3710A-178	Combination of Baseband Signal for 2ndRF Retrofit	Retrofitted to shipped MG3710A
MG3710A-179	AWGN for 2ndRF Retrofit	Retrofitted to shipped MG3710A
MG3710A-180	Additional Analog Modulation Input for 2ndRF Retrofit	Retrofitted to shipped MG3710A
	- Maintenance service -	
MG3710A-ES210	2 Years Extended Warranty Service	
MG3710A-ES310	3 Years Extended Warranty Service	
MG3710A-ES510	5 Years Extended Warranty Service	

Model/Order No.	Name	Remarks
	- Softwares -	
	(Waveform pattern)	(License for waveform patterns)
MX370073A	DFS Radar Pattern	WLAN 5.3/5.6 GHz band DFS tests (for TELEC and FCC) waveform pattern, license for main frame, manual (PDF)
MX370075A	DFS (ETSI) Waveform Pattern	WLAN 5.3/5.6 GHz DFS test (ETSI) waveform pattern, license for main frame, manual (PDF)
MX370084A	ISDB-Tmm Waveform Pattern	ISDB-Tmm Waveform Patterns, license for main frame, manual (PDF)
	- Softwares -	
	(IQproducer)	(License for IQproducer)
MX370101A	HSDPA/HSUPA IQproducer	IQproducer software, license for main frame, manual (PDF)
MX370102A	TDMA IQproducer	IQproducer software, license for main frame, manual (PDF)
MX370103A	CDMA2000 1xEV-DO IQproducer	IQproducer software, license for main frame, manual (PDF)
MX370104A	Multi-carrier IQproducer	IQproducer software, license for main frame, manual (PDF)
MX370105A	Mobile WiMAX IQproducer	IQproducer software, license for main frame, manual (PDF)
MX370106A	DVB-T/H IQproducer	IQproducer software, license for main frame, manual (PDF)
MX370107A	Fading IQproducer	IQproducer software, license for main frame, manual (PDF)
MX370108A	LTE IQproducer	IQproducer software, license for main frame, manual (PDF)
MX370108A-001	LTE-Advanced FDD Option	IQproducer software, license for main frame, manual (PDF). Requires MX370108A.
MX370109A	XG-PHS IQproducer	IQproducer software, license for main frame, manual (PDF)
MX370110A	LTE TDD IQproducer	IQproducer software, license for main frame, manual (PDF)
MX370110A-001	LTE-Advanced TDD Option	IQproducer software, license for main frame, manual (PDF). Requires MX370110A.
MX370111A	WLAN IQproducer	IQproducer software, license for main frame, manual (PDF)
MX370111A-002	802.11ac (160 MHz) Option	IQproducer software, license for main frame, manual (PDF) Only for MG3710A. Requires MX370111A
MX370112A	TD-SCDMA IQproducer	IQproducer software, license for main frame, manual (PDF)
	- Optional accessories -	
W3580AE	MG3710A/MG3740A Operation Manual (Main Unit)	Booklet, for MG3710A/MG3740A Main Frame (Operation, Remote Control)
W2496AE	MG3710A/MG3740A Operation Manual (IQproducer)	Booklet, for IQproducer (Operation for Common Parts)
W3581AE	MG3710A Operation Manual (Pre-installed Waveform Patterns)	Booklet, for Pre-installed Waveform Patterns (Usage, Detailed Parameters)
W3596AE	MX370073A Operation Manual	Booklet, for DFS (TELEC and FCC) Waveform Patterns
W3597AE	MX370075A Operation Manual	Booklet, for DFS (ETSI) Waveform Patterns
W3508AE	MX370084A Operation Manual	Booklet, for ISDB-Tmm Waveform Patterns
W2915AE	MX370101A Operation Manual	Booklet, for HSDPA/HSUPA IQproducer
W2916AE	MX370102A Operation Manual	Booklet, for TDMA IQproducer
W2505AE	MX370103A Operation Manual	Booklet, for CDMA2000 1xEV-DO IQproducer
W2917AE	MX370104A Operation Manual	Booklet, for Multi-carrier IQproducer
W2918AE	MX370105A Operation Manual	Booklet, for Mobile WiMAX IQproducer
W2798AE	MX370106A Operation Manual	Booklet, for DVB-T/H IQproducer
W2995AE	MX370107A Operation Manual	Booklet, for Fading IQproducer
W3023AE	MX370108A Operation Manual	Booklet, for LTE IQproducer/LTE-Advanced FDD Option
W3153AE	MX370109A Operation Manual	Booklet, for XG-PHS IQproducer
W3221AE	MX370110A Operation Manual	Booklet, for LTE TDD IQproducer/LTE-Advanced TDD Option
W3488AE	MX370111A Operation Manual	Booklet, for WLAN IQproducer/802.11ac Option
W3582AE	MX370112A Operation Manual	Booklet, for TD-SCDMA IQproducer
J1539A	AUX Conversion Adapter	Converts MG3710A rear-panel AUX connector to BNC connector
Z1594A	Standard Waveform Pattern for Backup	Latest MG3710A Pre-installed waveform pattern set for backup
MA24105A	Inline Peak Power Sensor	350 MHz to 4 GHz, Inline type, with USB A to micro-B Cable
MA24106A	USB Power Sensor	50 MHz to 6 GHz, with USB A to mini-B Cable
MA24108A	Microwave USB Power Sensor	10 MHz to 8 GHz, with USB A to micro-B Cable
MA24118A	Microwave USB Power Sensor	10 MHz to 18 GHz, with USB A to micro-B Cable
MA24126A	Microwave USB Power Sensor	10 MHz to 26 GHz, with USB A to micro-B Cable
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, passband: 1.92 GHz 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)	Crossover, 3 m
J0008	GPIB Cable, 2.0 m	
B0635A	Rack Mount Kit	EIA
B0657A	Rack Mount Kit (JIS)	JIS
B0636C	Carrying Case	Hard Type. With Casters and B0671A Front Cover
B0645A	Soft Carrying Case	Soft Type
B0671A	Front Cover for 1MW4U	
Z0975A	Keyboard (USB)	
Z0541A	USB Mouse	

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

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J1539A AUX Conversion Adapter

MA24106A USB Power Sensor

B0636C Carrying Case (Hard type, with casters)

B0645A Soft Carrying Case

MG3710A with Front Cover

B0671A Front Cover for 1MW4U

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Specifications are subject to change without notice.

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