Anritsu Advancing beyond

Vector Signal Generator MG3710A/MG3710E

MX370x/MX371x series software

MX3700xxA Waveform Pattern
MX3710xxA Waveform Pattern

The MG3710A/MG3710E Vector Signal Generator supports up to two RF output connectors each with two waveform memories.
One RF output connector can output two combined modulation signals, while two connectors can output four modulation signals. As a result, one MG3710A/MG3710E can output wanted + interference signals, wanted + delay signals, and multicarrier signals, which normally requires two vector signal generators, helping cut setup and operation times.
The MG3710A/MG3710E has a wide vector modulation bandwidth, large arbitrary waveform memory, and outputs digital modulation signals for major mobile communications technologies. Today's mobile communications are focused mainly on mobile telephones and wireless LAN and the MG3710A/MG3710E offers the ideal signal-generation functions and performance needed for the latest wideband wireless communications.
The built-in arbitrary waveform generator outputs modulation signals simply by selecting the waveform pattern matching the required communication method.

The following four categories of waveform patterns are supported:

- Standard waveform patterns
- Waveform patterns generated by optional MX3700xxA/MX3710xxA Waveform Pattern software
- Waveform patterns generated by optional MX3701xxA IQproducer software
- Waveform patterns converted from data generated by common signal-generation software

Each category contains multiple waveform pattern files each with preset parameters for each system.
These default waveform patterns are saved on the MG3710A/MG3710E hard disk for easy access, but other waveform patterns are supported using the IQproducer waveform generation software.

Parameters for the waveform for the target communication system are set using a GUI to a generate a waveform pattern file for the MG3710A/MG3710E. The embedded Windows application IQproducer saves generated arbitrary waveform pattern files to the internal hard disk and signals are output simply by selecting the waveform pattern. In addition, a user-generated custom IQ sample file in ASCII format created by common Electronic Design Automation (EDA) software such as MATLAB, can be converted into a custom waveform pattern file for the MG3710A/MG3710E.

Maximum Waveform Pattern Size and Required Options for Simultaneous Use

1stRF (Option 032/034/036)

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

2ndRF (Option 062/064/066)

Combination of Baseband Signal (Option 078)	ARB Memory Upgrade 256 Msample (Option 075) ARB Memory Upgrade 1024 Msample (Option 076)		
	W/O	With Option 075	With Option 076
W/O	64 Msamples × 1 pc	256 Msamples × 1 pc	1024 Msamples × 1 pc*1
With Option 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/MG3710E varies with the IQproducer version.
*2: The Baseband Signal Combine option supports two arbitrary waveform memories and can either set two different waveform patterns or combine them as one memory to support one large waveform pattern.

MX370x Series Software

Selection Guide

	Communication System	Page	5G NR TDD sub-6 GHz	5G NR FDD sub-6 GHz	LTE (FDD)	LTE-Advanced (FDD)	LTE (TDD)	LTE-Advanced (TDD)	W-CDMA	HSDPA (Test Model5)	HSDPA/HSUPA	1xEV-DO	CDMA2000	GSM/EDGE	TD-SCDMA	Advanced-PHS	PHS	PDC	ETC/DSRC	Digital Broadcast (BS/CS/CATV/ISDB-T)	Digital Broadcast (DVB-T/H)	WLAN (IEEE802.11a/b/g)	WLAN (IEEE802.11n/p/a/b/g/j)	WLAN (IEEE802.11ac)	DFS (FCC, Japan MIC)	DFS (ETSI)	Mobile WiMAX (IEEE802.16e)	Bluetooth	GPS, GLONASS, QZSS	RCR STD-39 ARIB STD-T61/T79/T86	ARIB STD-T98/T102/B54	APCO P25, NXDN, DMR, TETRA
Waveform Pattern	MX371099A Preinstalled				✓		✓		✓	✓		✓	✓	✓			✓	✓		✓		✓					✓	✓	✓			
Waveform Pattern	MX370073B DFS (FCC, Japan MIC)	28																							✓							
Waveform Pattern	MX370075A DFS (ETSI)	30																								✓						
Waveform Pattern	MX371054A Interference Signal (LTE UE receiver test)	32			✓	✓	✓	✓																								
Waveform Pattern	MX371055A Interference Signal (5G UE receiver test)	33	✓	✓																												
IQproducer*1	Standard accessories AWGN																															
IQproducer*1	Standard accessories W-CDMA								✓																							
IQproducer*1	MX370101A HSDPA/HSUPA								✓		✓																					
IQproducer*1	MX370102A TDMA															✓	✓	✓	✓											✓*5	✓*5	✓*6
IQproducer*1	MX370104A Multi-carrier		Multi-carrier IQproducer is software that generates the multi carrier signal based on waveform pattern of various telecommunications systems.																													
IQproducer*1	MX370106A DVB-T/H																				✓											
IQproducer*1	MX370107A Fading		Fading IQproducer is software that generates the Fading signal based on waveform pattern of various telecommunication systems.																													
IQproducer*1	MX370108A LTE FDD				✓																											
IQproducer*1	MX370108A-001*2 LTE-Advanced FDD					✓																										
IQproducer*1	MX370110A LTE TDD						✓																									
IQproducer*1	MX370110A-001*3 LTE-Advanced TDD							✓																								
IQproducer*1	MX370111A WLAN																						✓									
IQproducer*1	MX370111A-002*4 802.11ac (160 MHz)																							✓								
IQproducer*1	MX370112A TD-SCDMA														✓																	
IQproducer*1	MX370113A 5G NR TDD sub-6 GHz		✓																													
IQproducer*1	MX370114A 5G NR FDD sub-6 GHz			✓																												

*1: Read the MX3701xxA IQproducer series brochure.
*2: Requires MX370108A.
*3: Requires MX370110A.
*4: Requires MX370111A.
*5: Sample waveform patterns for each communication system can be downloaded from the Anritsu software download site (requires user and MG3740A product registration). <https://my.anritsu.com/home>
*6: Sample waveform patterns for each communication system can be downloaded from the Anritsu software download site (requires user and MG3710A/MG3710E product registration). <https://my.anritsu.com/home>

IQproducer Support Systems

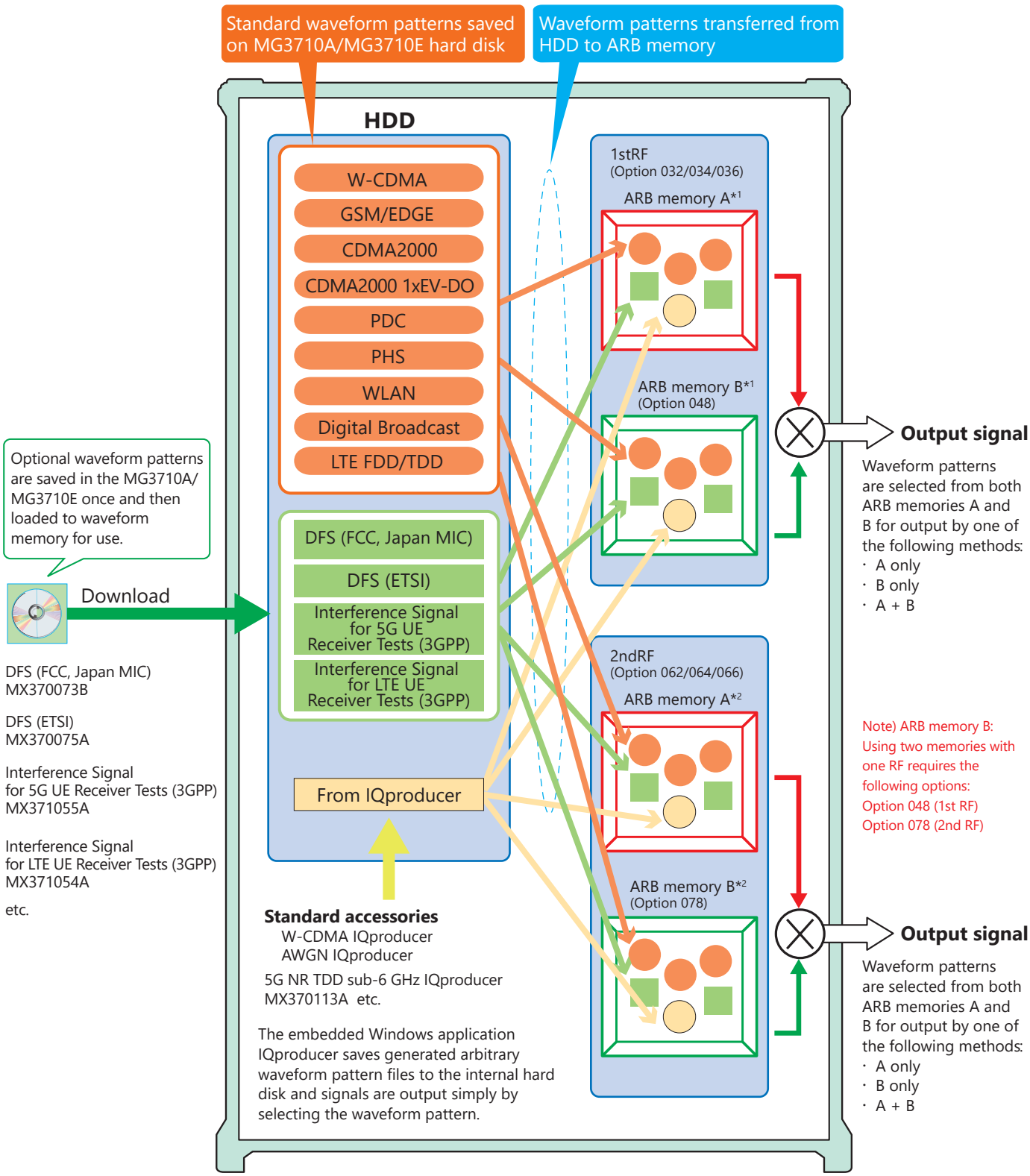
Standard Accessories	W-CDMA IQproducer	
	AWGN IQproducer	
Option	HSDPA/HSUPA IQproducer	MX370101A
	TDMA IQproducer	MX370102A
	Multi-carrier IQproducer	MX370104A
	DVB-T/H IQproducer	MX370106A
	Fading IQproducer	MX370107A
	LTE IQproducer	MX370108A
	LTE-Advanced FDD Option	MX370108A-001
	LTE TDD IQproducer	MX370110A
	LTE-Advanced TDD Option	MX370110A-001
	WLAN IQproducer	MX370111A
	802.11ac (160 MHz) Option	MX370111A-002
	TD-SCDMA IQproducer	MX370112A
	5G NR TDD sub-6 GHz IQproducer	MX370113A
	5G NR FDD sub-6 GHz IQproducer	MX370114A

IQproducer Operating Environment

OS	Windows 2000 Professional*1, Windows XP*2, Windows Vista*3, Windows 7 Enterprise (32-bit)*2, Windows 7 Professional (32-bit/ 64-bit)*2 Windows 10*4
CPU	Pentium III 1 GHz equivalent or faster
Memory	512 MB or more
Hard Disk	5 GB or more free space in the drive where this software is to be installed. The free hard disk space necessary to create waveform pattern varies depending on the waveform pattern size. The free disk space of 27 GB or greater is requires to create four maximum (512 Msamples) waveform patterns.

*1: Does not support IQproducer Version 13.00 and later
*2: Supports IQproducer Version 12.00 and later
*3: Supports IQproducer Version 12.00 to Version 16.01
*4: Supports IQproducer Version 17.00 and later

Vector Signal Generator MG3710A/MG3710E



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

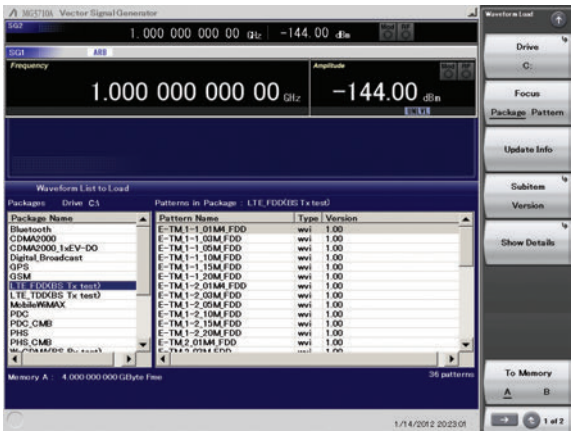
*2: 2ndRF ARB memory size
256 MB × 1 pc = 64 Msamples (Std.)
1 GB × 1 pc = 256 Msamples × 1 pc (Option 075)
1 GB × 2 pcs = 256 Msamples × 2 pcs (Option 075 + Option 078)
4 GB × 1 pc = 1024 Msamples × 1 pc (Option 076)
4 GB × 2 pcs = 1024 Msamples × 2 pcs (Option 076 + Option 078)

LTE Waveform Patterns

Standard

LTE Waveform Patterns

The LTE FDD and LTE TDD waveform patterns listed in the table below are stored on the MG3710A/MG3710E internal hard disk. Modulation signals for evaluating the Tx characteristics of a base station amplifier are output simply by selecting a pre-saved standard waveform pattern. If another signal is required, use the LTE IQproducer MX370108A (for FDD) or LTE TDD IQproducer MX370110A to create and save the custom waveform pattern.



Selecting Waveform Pattern

LTE FDD Waveform Patterns List

Waveform Patterns	Bandwidth	Test Model	Evaluation	File Size [MB]
E-TM_1-1_01M4_FDD	1.4 MHz	E-TM1.1	BS Tx Test	0.2
E-TM_1-1_03M_FDD	3 MHz			0.3
E-TM_1-1_05M_FDD	5 MHz			0.6
E-TM_1-1_10M_FDD	10 MHz			1.2
E-TM_1-1_15M_FDD	15 MHz			1.2
E-TM_1-1_20M_FDD	20 MHz			2.4
E-TM_1-2_01M4_FDD	1.4 MHz	E-TM1.2		0.2
E-TM_1-2_03M_FDD	3 MHz			0.3
E-TM_1-2_05M_FDD	5 MHz			0.6
E-TM_1-2_10M_FDD	10 MHz			1.2
E-TM_1-2_15M_FDD	15 MHz			1.2
E-TM_1-2_20M_FDD	20 MHz			2.4
E-TM_2_01M4_FDD	1.4 MHz	E-TM2		0.2
E-TM_2_03M_FDD	3 MHz			0.3
E-TM_2_05M_FDD	5 MHz			0.6
E-TM_2_10M_FDD	10 MHz			1.2
E-TM_2_15M_FDD	15 MHz			1.2
E-TM_2_20M_FDD	20 MHz			2.4
E-TM_3-1_01M4_FDD	1.4 MHz	E-TM3.1		0.2
E-TM_3-1_03M_FDD	3 MHz			0.3
E-TM_3-1_05M_FDD	5 MHz			0.6
E-TM_3-1_10M_FDD	10 MHz			1.2
E-TM_3-1_15M_FDD	15 MHz			1.2
E-TM_3-1_20M_FDD	20 MHz			2.4
E-TM_3-2_01M4_FDD	1.4 MHz	E-TM3.2		0.2
E-TM_3-2_03M_FDD	3 MHz			0.3
E-TM_3-2_05M_FDD	5 MHz			0.6
E-TM_3-2_10M_FDD	10 MHz			1.2
E-TM_3-2_15M_FDD	15 MHz			1.2
E-TM_3-2_20M_FDD	20 MHz			2.4
E-TM_3-3_01M4_FDD	1.4 MHz	E-TM3.3		0.2
E-TM_3-3_03M_FDD	3 MHz			0.3
E-TM_3-3_05M_FDD	5 MHz			0.6
E-TM_3-3_10M_FDD	10 MHz			1.2
E-TM_3-3_15M_FDD	15 MHz			1.2
E-TM_3-3_20M_FDD	20 MHz			2.4

LTE TDD Waveform Patterns List

Waveform Patterns	Bandwidth	Test Model	Evaluation	File Size [MB]
E-TM_1-1_01M4_TDD	1.4 MHz	E-TM1.1	BS Tx Test	0.3
E-TM_1-1_03M_TDD	3 MHz			1.2
E-TM_1-1_05M_TDD	5 MHz			1.2
E-TM_1-1_10M_TDD	10 MHz			2.4
E-TM_1-1_15M_TDD	15 MHz			2.4
E-TM_1-1_20M_TDD	20 MHz			4.7
E-TM_1-2_01M4_TDD	1.4 MHz	E-TM1.2		0.3
E-TM_1-2_03M_TDD	3 MHz			1.2
E-TM_1-2_05M_TDD	5 MHz			1.2
E-TM_1-2_10M_TDD	10 MHz			2.4
E-TM_1-2_15M_TDD	15 MHz			2.4
E-TM_1-2_20M_TDD	20 MHz			4.7
E-TM_2_01M4_TDD	1.4 MHz	E-TM2		0.3
E-TM_2_03M_TDD	3 MHz			1.2
E-TM_2_05M_TDD	5 MHz			1.2
E-TM_2_10M_TDD	10 MHz			2.4
E-TM_2_15M_TDD	15 MHz			2.4
E-TM_2_20M_TDD	20 MHz			4.7
E-TM_3-1_01M4_TDD	1.4 MHz	E-TM3.1		0.3
E-TM_3-1_03M_TDD	3 MHz			1.2
E-TM_3-1_05M_TDD	5 MHz			1.2
E-TM_3-1_10M_TDD	10 MHz			2.4
E-TM_3-1_15M_TDD	15 MHz			2.4
E-TM_3-1_20M_TDD	20 MHz			4.7
E-TM_3-2_01M4_TDD	1.4 MHz	E-TM3.2		0.3
E-TM_3-2_03M_TDD	3 MHz			1.2
E-TM_3-2_05M_TDD	5 MHz			1.2
E-TM_3-2_10M_TDD	10 MHz			2.4
E-TM_3-2_15M_TDD	15 MHz			2.4
E-TM_3-2_20M_TDD	20 MHz			4.7
E-TM_3-3_01M4_TDD	1.4 MHz	E-TM3.3		0.3
E-TM_3-3_03M_TDD	3 MHz			1.2
E-TM_3-3_05M_TDD	5 MHz			1.2
E-TM_3-3_10M_TDD	10 MHz			2.4
E-TM_3-3_15M_TDD	15 MHz			2.4
E-TM_3-3_20M_TDD	20 MHz			4.7

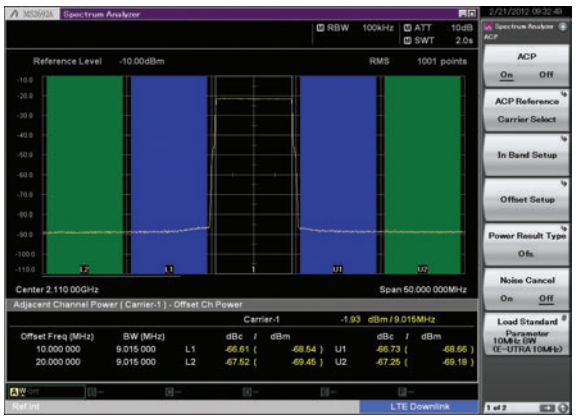
* Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller.
  Consider this when selecting the ARB memory upgrade option.

LTE Waveform Patterns

Standard

Adjacent Channel Leakage Power Ratio (ACPR)

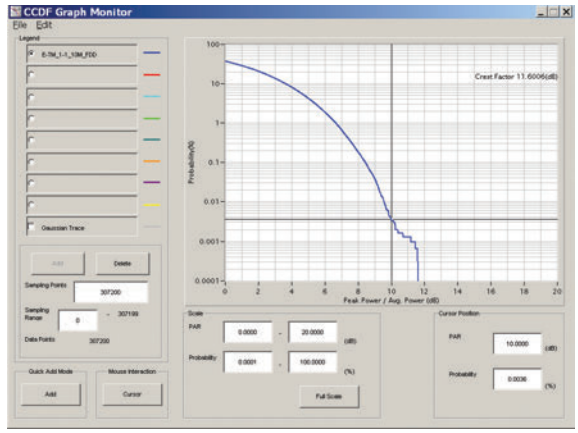
The ACPR of a Vector Signal Generator is an important function for testing device distortion and receiver interference.



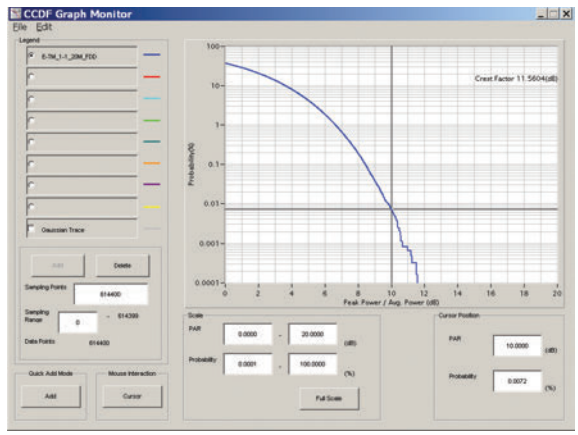
LTE FDD ACPR
(E-TM1-1, 1 Carrier, 10 MHz BW)
Waveform Pattern: E-TM_1-1_10M_FDD

LTE FDD ACPR
(E-TM1-1, 1 Carrier, 20 MHz BW)
Waveform Pattern: E-TM_1-1_20M_FDD

Complementary Cumulative Distribution Function (CCDF)



LTE FDD CCDF
(E-TM1-1, 1 Carrier, 10 MHz BW)
Waveform Pattern: E-TM_1-1_10M_FDD



LTE FDD CCDF
(E-TM1-1, 1 Carrier, 20 MHz BW)
Waveform Pattern: E-TM_1-1_20M_FDD

W-CDMA Waveform Patterns

Standard

W-CDMA Waveform Patterns

The following W-CDMA waveform patterns are stored on the MG3710A/MG3710E internal hard disk. Details for each pattern file is given on the next page.

For Evaluating Base Station Transmitter Devices (TS 25.141 Test Model 1 to 6)

TestModel_1_16DPCH
TestModel_1_32DPCH
TestModel_1_64DPCH
TestModel_1_64x2_10M
TestModel_1_64x2_15M
TestModel_2
TestModel_3_16DPCH
TestModel_3_32DPCH
TestModel_4
TestModel_5_2HSPDSCH
TestModel_5_4HSPDSCH
TestModel_5_8HSPDSCH
TestModel_6_8HSPDSCH
TestModel_1_64DPCHx2
TestModel_1_64DPCHx3
TestModel_1_64DPCHx4

For Testing BS Receiver Performance (TS 25.101/ 25.104 UL RMC 12.2 to 384 kbps)

UL_RMC_12_2kbps
UL_RMC_12_2kbps_ACS
UL_RMC_64kbps
UL_RMC_144kbps
UL_RMC_384kbps
UL_AMR_TFCS1
UL_AMR_TFCS2
UL_AMR_TFCS3
UL_ISDN
UL_64kbps_Packet
UL_Interfere
UL_Interfere_ov3

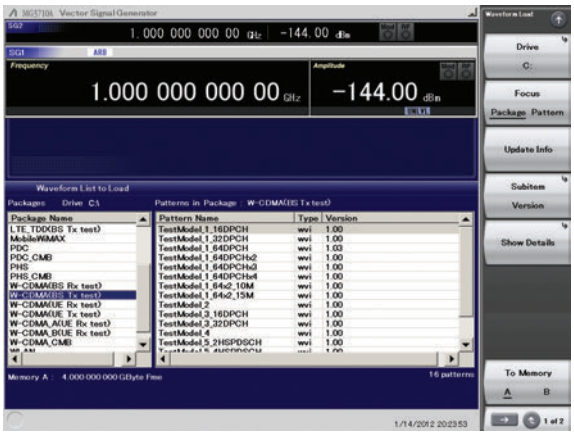
For Evaluating UE Transmitter Devices (TS 25.101 A2.1)

UL_RMC_12_2kbps_TX

For Testing UE Receiver Performance (TS 25.101 DL RMC 12.2 to 384 kbps)

DL_RMC_12_2kbps_RX
DL_RMC_12_2kbps
DL_RMC_12_2kbps_MIL
DL_RMC_12_2kbps_ACS
DL_RMC_64kbps
DL_RMC_144kbps
DL_RMC_384kbps
DL_AMR_TFCS1
DL_AMR_TFCS2
DL_AMR_TFCS3
DL_ISDN
DL_384kbps_Packet
DL_Interfere
DL_Interfere_ov3
DL_CPICH
P_CCPCH

Uplink and downlink W-CDMA modulation signals conforming to the 3GPP (FDD) standards can be output simply by selecting the waveform from the patterns on the MG3710A/MG3710E internal hard disk without setting any complex 3GPP-compliant parameters.



Selecting Waveform Pattern

W-CDMA Waveform Patterns

Standard

W-CDMA Waveform Patterns List

Waveform Patterns	UL/DL	Channel	3GPP (Release1999)	Evaluation	File Size [MB]
UL_RMC_12_2kbps*1	UL	DPCCH, DPDCH	TS 25.141 A.2	BS Rx Test	449.2
UL_RMC_12_2kbps_ACS*2		DPCCH, DPDCH			598.9
UL_RMC_64kbps*2		DPCCH, DPDCH	TS 25.141 A.3		898.3
UL_RMC_144kbps*2		DPCCH, DPDCH	TS 25.141 A.4		898.3
UL_RMC_384kbps*2		DPCCH, DPDCH	TS 25.141 A.5		898.3
UL_AMR_TFCS1*1		DPCCH, DPDCH	TS 25.944 4.1.2		449.2
UL_AMR_TFCS2*1		DPCCH, DPDCH			449.2
UL_AMR_TFCS3*1		DPCCH, DPDCH			449.2
UL_ISDN*2		DPCCH, DPDCH			898.3
UL_64kbps_Packet*1		DPCCH, DPDCH			449.2
UL_Interfere		DPCCH, DPDCH	TS 25.141 I		0.6
UL_Interfere_ov3*3		DPCCH, DPDCH			0.5
UL_RMC_12_2kbps_TX*2		DPCCH, DPDCH	TS 25.101 A.2.1	UE Tx Device Test	449.2
P_CCPCH*2	DL	P-CCPCH	TS 25.944 4.1.1*4	UE Rx Test	150.0
DL_RMC_12_2kbps_RX*3		P-CPICH, SCH, PICH, DPCH	TS 25.101 A.3.1 TS 25.101 C.3.1		149.8
DL_RMC_12_2kbps_ACS*2		P-CPICH, SCH, PICH, DPCH, P-CCPCH			598.9
DL_RMC_12_2kbps_MIL*3		P-CPICH, SCH, PICH, DPCH, OCNS			149.8
DL_RMC_12_2kbps*3		P-CPICH, SCH, PICH, DPCH, OCNS	TS 25.101 A.3.1/C3.2		149.8
DL_RMC_64kbps*3		P-CPICH, SCH, PICH, DPCH, OCNS	TS 25.101 A.3.2/C3.2		149.8
DL_RMC_144kbps*3		P-CPICH, SCH, PICH, DPCH, OCNS	TS 25.101 A.3.3/C3.2		149.8
DL_RMC_384kbps*3		P-CPICH, SCH, PICH, DPCH, OCNS	TS 25.101 A.3.4/C3.2		74.9
DL_AMR_TFCS1*3		P-CPICH, SCH, PICH, DPCH, OCNS	TS 25.944 4.1.1.3 TS 25.101 C.3.2		149.8
DL_AMR_TFCS2*3		P-CPICH, SCH, PICH, DPCH, OCNS			149.8
DL_AMR_TFCS3*3		P-CPICH, SCH, PICH, DPCH, OCNS			149.8
DL_ISDN*1, *3		P-CPICH, SCH, PICH, DPCH, OCNS			299.5
DL_384kbps_Packet*3		P-CPICH, SCH, PICH, DPCH, OCNS			74.9
DL_Interfere		P-CPICH, P-CCPCH, SCH, PICH, OCNS	TS 25.101 C.4		0.6
DL_Interfere_ov3*7		P-CPICH, P-CCPCH, SCH, PICH, OCNS			0.5
DL_CPICH		P-CPICH	—		0.6
TestModel_1_16DPCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 16DPCH	TS 25.141 6.1.1	BS Tx Device Test	0.6
TestModel_1_32DPCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 32DPCH			0.6
TestModel_1_64DPCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 64DPCH			0.6
TestModel_1_64DPCHx2*5		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 64DPCH			1.2
TestModel_1_64DPCHx3*6		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 64DPCH			4.7
TestModel_1_64DPCHx4*6		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 64DPCH			2.4
TestModel_1_64x2_10M*5, *6		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 64DPCH			2.0
TestModel_1_64x2_15M*5, *6		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 64DPCH			2.0
TestModel_2		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 3DPCH			0.6
TestModel_3_16DPCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 16DPCH			0.6
TestModel_3_32DPCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 32DPCH			0.6
TestModel_4		P-CCPCH, SCH			0.6
TestModel_5_2HSPDSCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 6DPCH, HS-SCCH, 2HS-PDSCH			0.6
TestModel_5_4HSPDSCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 14DPCH, HS-SCCH, 4HS-PDSCH			0.6
TestModel_5_8HSPDSCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 30DPCH, HS-SCCH, 8HS-PDSCH			0.6
TestModel_6_8HSPDSCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 30DPCH, HS-SCCH, 8HS-PDSCH	TS 25.141 8.2.0		0.6

*1: To use this waveform pattern, Combination of Baseband Signal (option), ARB Memory Upgrade 256 Msample (option), or ARB Memory Upgrade 1024 Msample (option), is required.
*2: To use this waveform pattern, ARB Memory Upgrade 256 Msample (option) or ARB Memory Upgrade 1024 Msample (option), is required.
*3: Since waveform patterns (excluding DL_RMC12_2kbps_ACS) for the UE RX test do not include P-CCPCH, they must be used in combination with a P-CCPCH waveform pattern.
*4: An 11-bit SFN is added to the head of each BCH Transport block.
*5: ×2, ×3, and ×4 indicate the number of multicarriers 2, 3, and 4, respectively.
*6: 10M and 15M indicate the frequency spacing values of the multi-carrier.
*7: When the Combination of Baseband Signal option is installed in MG3710A/MG3710E, select a waveform pattern generated using the W-CDMA waveform pattern generation function of the MG3710A/MG3710E IQproducer or by the HSDPA IQproducer MX370101A (only the waveform patterns that can be configured using only one memory) for memory A on the MG3710A/MG3710E while selecting this pattern for memory B to output a signal that is generated by adding the desired signal and the interference signal using baseband.

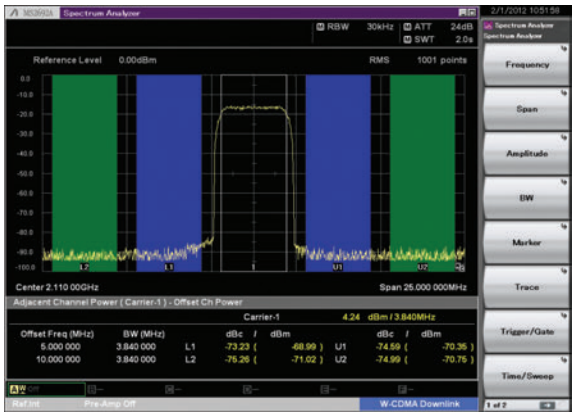
* Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller.
Consider this when selecting the ARB memory upgrade option.

W-CDMA Waveform Patterns

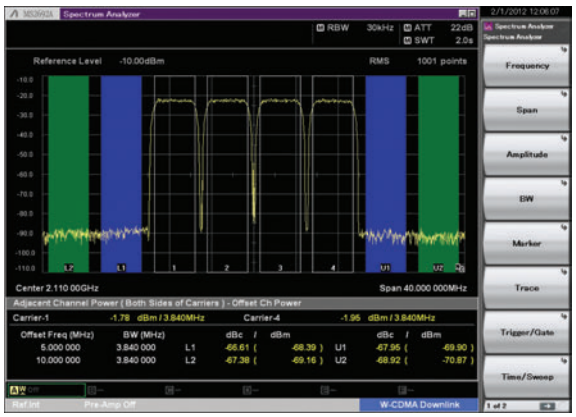
Standard

Adjacent Channel Leakage Power Ratio (ACPR)

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

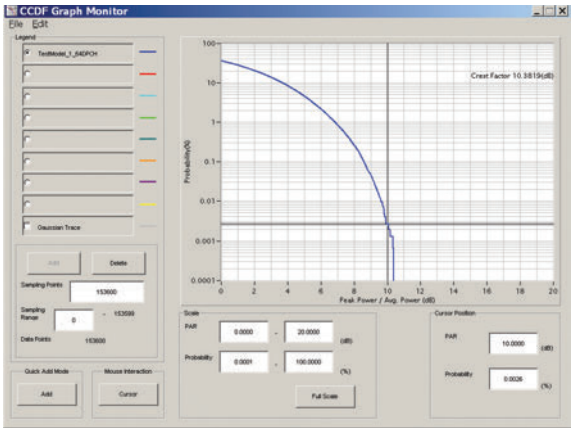


W-CDMA ACPR
(Test Model 1, 64 DPCH, 1 Carrier)
Waveform Pattern: Test_Model_1_64DPCH

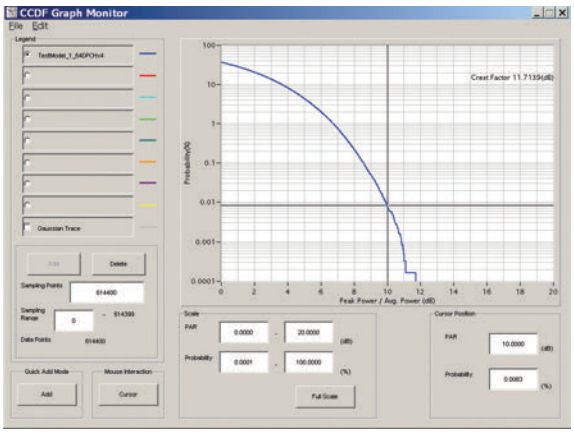


W-CDMA ACPR
(Test Model 1, 64 DPCH, 4 Carrier)
Waveform Pattern: Test_Model_1_64DPCH×4

Complementary Cumulative Distribution Function (CCDF)



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



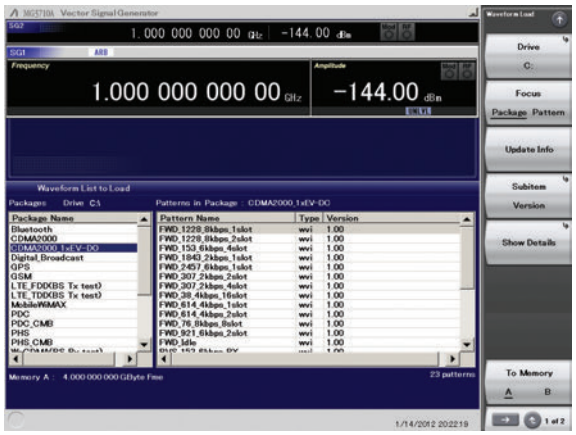
CCDF
(Test Model 1, 64 DPCH, 4 Carrier)
Waveform Pattern: Test_Model_1_64DPCH×4

CDMA2000 1xEV-DO Waveform Patterns

Standard

CDMA2000 1xEV-DO Waveform Patterns

The CDMA2000 1xEV-DO waveform patterns listed opposite are stored on the MG3710A/MG3710E internal hard disk.
The 3GPP2 signals specified for testing receivers and transmitters of CDMA2000 1xEV-DO access networks (base station) and access terminal (AT) are output by selecting one of the 13 forward and 10 reverse data rate patterns.
When multi-carrier signals, mixed idle and active signals and/or multi-user signals are required, the optional CDMA2000 1xEV-DO IQproducer MX370103A application, software can be used to set parameters and generate waveform patterns.



Selecting Waveform Pattern

Access Terminal (AT) Receiver Test
CDMA2000 1xEV-DO forward

Baseband filter: IS-95 SPEC +EQ
Data: PN15 fix*1 (excluding FWD-Idle)

FWD_38_4kbps_16slot
FWD_76_8kbps_8slot
FWD_153_6kbps_4slot
FWD_307_2kbps_2slot
FWD_614_4kbps_1slot
FWD_307_2kbps_4slot
FWD_614_4kbps_2slot
FWD_1228_8kbps_1slot
FWD_921_6kbps_2slot
FWD_1843_2kbps_1slot
FWD_1228_8kbps_2slot
FWD_2457_6kbps_1slot
FWD_Idle*2

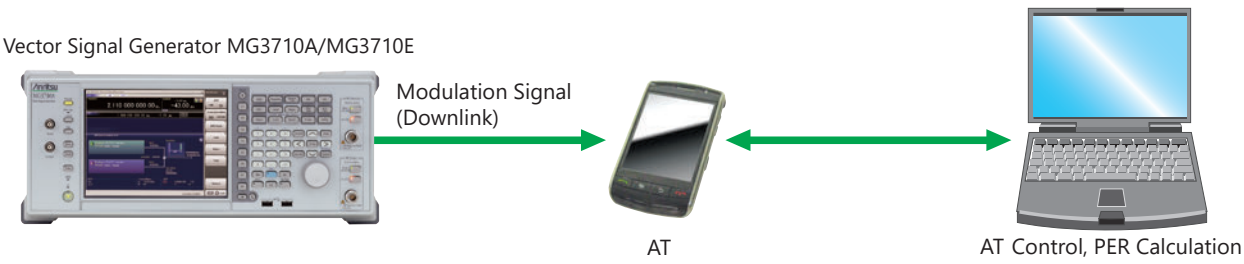
Access Network (AN) Receiver Test
CDMA2000 1xEV-DO Reverse

Baseband filter: IS-95 SPEC
Data: PN9 fix*1

RVS_9_6kbps_RX
RVS_19_2kbps_RX
RVS_38_4kbps_RX
RVS_76_8kbps_RX
RVS_153_6kbps_RX
RVS_9_6kbps_TX
RVS_19_2kbps_TX
RVS_38_4kbps_TX
RVS_76_8kbps_TX
RVS_153_6kbps_TX

*1: This displays the delimited PN sequence for each packet.
Therefore, the PN sequence is discontinuous between the end data of one packet and the header data of the next packet.
*2: File size 2 MB

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



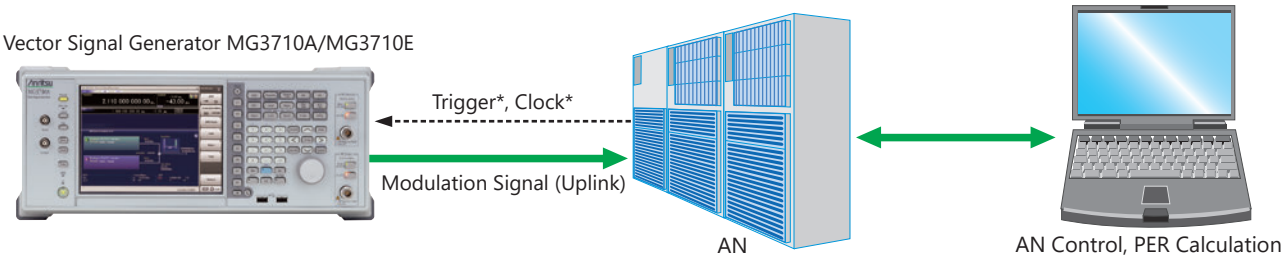
CDMA2000 1xEV-DO Waveform Patterns

Standard

Access Network (AN) Receiver Test

3GPP2 C.S0032 standard receiver tests (PER: Packet Error Rate) can be performed by selecting a reverse signal pattern required for testing the AN.

Since access terminal simulator protocols are unsupported, an external controller must be used to control the AN and calculate PER.



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

List of Traffic Channel Parameters for Forward Link Patterns

1xEV-DO Waveform Patterns	Data Rate (kbps)	Slot	Packet (Bit)	Preamble (Chip)	Modulation Type	File Size [MB]
FWD_38_4kbps_16slot	38.4	16	1024	1024	QPSK	2.0
FWD_76_8kbps_8slot	76.8	8	1024	512	QPSK	2.0
FWD_153_6kbps_4slot	153.6	4	1024	256	QPSK	2.0
FWD_307_2kbps_2slot	307.2	2	1024	128	QPSK	2.0
FWD_614_4kbps_1slot	614.4	1	1024	64	QPSK	2.0
FWD_307_2kbps_4slot	307.2	4	2048	128	QPSK	2.0
FWD_614_4kbps_2slot	614.4	2	2048	64	QPSK	2.0
FWD_1228_8kbps_1slot	1228.8	1	2048	64	QPSK	2.0
FWD_921_6kbps_2slot	921.6	2	3072	64	8-PSK	2.0
FWD_1843_2kbps_1slot	1843.2	1	3072	64	8-PSK	2.0
FWD_1228_8kbps_2slot	1228.8	2	4096	64	16QAM	2.0
FWD_2457_6kbps_1slot	2457.6	1	4096	64	16QAM	2.0

List of Modulation Parameters for Reverse Waveform Pattern

1xEV-DO Waveform Patterns	Data Rate (kbps)	RRI Symbol	DRC Value	DRC Cover	ACK ChannelBit	Long Code Mask	Data/Pilot	RRI/Pilot	DRC/ Pilot	ACK/ Pilot	File Size [MB]
RVS_9_6kbps_RX	9.6	001	0×01	W08	0	MI=0×3FF00000000 MQ=0×3FE00000001	3.75 dB	0 dB	3.0 dB	0.0 dB	1.5
RVS_19_2kbps_RX	19.2	010	0×01	W08	0		6.75 dB	0 dB	3.0 dB	0.0 dB	1.5
RVS_38_4kbps_RX	38.4	011	0×01	W08	0		9.75 dB	0 dB	3.0 dB	0.0 dB	1.5
RVS_76_8kbps_RX	76.8	100	0×01	W08	0		13.25 dB	0 dB	3.0 dB	0.0 dB	1.5
RVS_153_6kbps_RX	153.6	101	0×01	W08	0		18.50 dB	0 dB	3.0 dB	0.0 dB	1.5
RVS_9_6kbps_TX	9.6	001	0×01	W08	0		3.75 dB	0 dB	3.0 dB	3.0 dB	1.5
RVS_19_2kbps_TX	19.2	010	0×01	W08	0		6.75 dB	0 dB	3.0 dB	3.0 dB	1.5
RVS_38_4kbps_TX	38.4	011	0×01	W08	0		9.75 dB	0 dB	3.0 dB	3.0 dB	1.5
RVS_76_8kbps_TX	76.8	100	0×01	W08	0		13.25 dB	0 dB	3.0 dB	3.0 dB	1.5
RVS_153_6kbps_TX	153.6	101	0×01	W08	0		18.50 dB	0 dB	3.0 dB	3.0 dB	1.5

* Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller.
Consider this when selecting the ARB memory upgrade option.

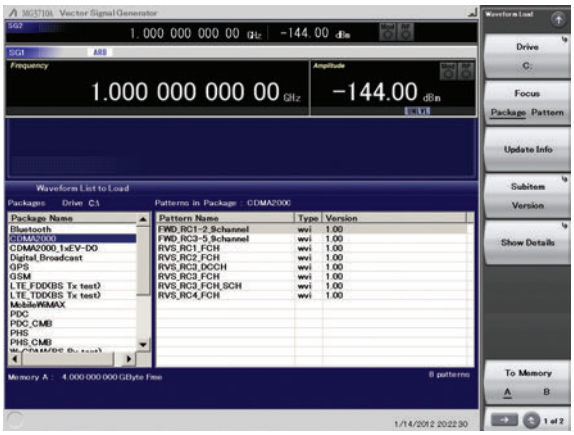
CDMA2000 Waveform Patterns

Standard

CDMA2000 Waveform Patterns

The CDMA2000 waveform patterns listed in the table below are stored on the MG3710A/MG3710E internal hard disk.
The 3GPP2 C.S0002-0-2-specified CDMA2000 modulation signals are output by selecting one of these CDMA2000 waveform patterns.
Reverse channel signals are output by channel coding (convolutional coding, etc.) 4-frame length PN9 fix*1 data, which is useful for measuring the Frame Error Rate (FER)*2 of base stations and evaluating devices.

*1: Since the data length is not an integer multiple of the PN sequence length (511 bits for PN9), the PN sequence becomes discontinuous at the end.
*2: This is the case when the timing signal and 1.2288 Mcps × 11 clock signal (or 5 or 10 MHz reference clock) can be input from the test target base station to the MG3710A/MG3710E in order to synchronize the frame start point and chip clock.



Selecting Waveform Pattern

Waveform Patterns	System	Frame Coding	Symbol Data	File Size [MB]
RVS_RC1_FCH	CDMA2000 1XRTT RC1 Reverse	Coded	FCH 9.6 kbps	1.5
RVS_RC2_FCH	CDMA2000 1XRTT RC2 Reverse	Coded	FCH 14.4 kbps	1.5
RVS_RC3_FCH	CDMA2000 1XRTT RC3 Reverse	Coded	PICH, FCH 9.6 kbps	1.5
RVS_RC3_FCH_SCH	CDMA2000 1XRTT RC3 Reverse	Coded	PICH, FCH 9.6 kbps, SCH 9.6 kbps	1.5
RVS_RC3_DCCH	CDMA2000 1XRTT RC3 Reverse	Coded	PICH, DCCH 9.6 kbps	1.5
RVS_RC4_FCH	CDMA2000 1XRTT RC4 Reverse	Coded	PICH, FCH 14.4 kbps	1.5
FWD_RC1-2_9channel	CDMA2000 1XRTT RC1, RC2 Forward	Spreading only	PICH, SyncCH, PagingCH, FCH 19.2 ksps × 6	1.5
FWD_RC3-5_9channel	CDMA2000 1XRTT RC3, RC4, RC5 Forward	Spreading only	PICH, SyncCH, PagingCH, FCH 38.4 ksps × 6	1.5

* Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller.
Consider this when selecting the ARB memory upgrade option.

Waveform Patterns		Walsh Code	Code Power	Data Rate	Data
RVS_RC1_FCH	R-FCH			9.6 kbps	PN9fix*
RVS_RC2_FCH	R-FCH			14.4 kbps	PN9fix*
RVS_RC3_FCH	R-PICH	0	−5.278 dB	N/A	All"0"
	R-FCH	4	−1.528 dB	9.6 kbps	PN9fix*
RVS_RC3_FCH_SCH	R-PICH	0	−7.5912 dB	N/A	All"0"
	R-FCH	4	−3.8412 dB	9.6 kbps	PN9fix*
	R-SCH	2	−3.8412 dB	9.6 kbps	PN9fix*
RVS_RC3_DCCH	R-PICH	0	−5.278 dB	N/A	All"0"
	R-DCCH	8	−1.528 dB	9.6 kbps	PN9fix*
RVS_RC4_FCH	R-PICH	0	−5.278 dB	N/A	All"0"
	R-FCH	4	−1.528 dB	14.4 kbps	PN9fix*
Waveform Patterns		Walsh Code	Code Power	Symbol Rate	Symbol Data
FWD_RC1-2_9channel	F-PICH	0	−7.0 dB	N/A	All"0"
	F-SyncCH	32	−13.3 dB	4.8 kbps	PN9fix*
	PagingCH	1	−7.3 dB	19.2 kbps	PN9fix*
	F-FCH × 6	8−13	−10.3 dB	19.2 kbps	PN9fix*
FWD_RC3-5_9channel	F-PICH	0	−7.0 dB	N/A	All"0"
	F-SyncCH	32	−13.3 dB	4.8 kbps	PN9fix*
	PagingCH	1	−7.3 dB	19.2 kbps	PN9fix*
	F-FCH × 6	8−13	−10.3 dB	38.4 kbps	PN9fix*

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

GSM/EDGE Waveform Patterns

Standard

GSM/EDGE Waveform Patterns

The GSM/EDGE waveform patterns listed in the table below are stored on the MG3710A/MG3710E internal hard disk. Details for the pattern files are given below.
Signals for testing receivers and for evaluating devices in a GSM/EDGE system are output by selecting one of these GSM/EDGE waveform patterns.

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

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

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

TCH_FS
Supports Speech channel at full rate (TCH/FS) specified in Section 3.1 of 3GPP TS 05.03
The table below shows channel coding parameters:

Type of Channel	Bits/Block Data + Parity + Tail1	Convolutional Code Rate	Coded Bits per Block	Interleaving Depth
TCH/FS			456	8
class I	182+3+4	1/2	378	
class II	78+0+0	—	78	

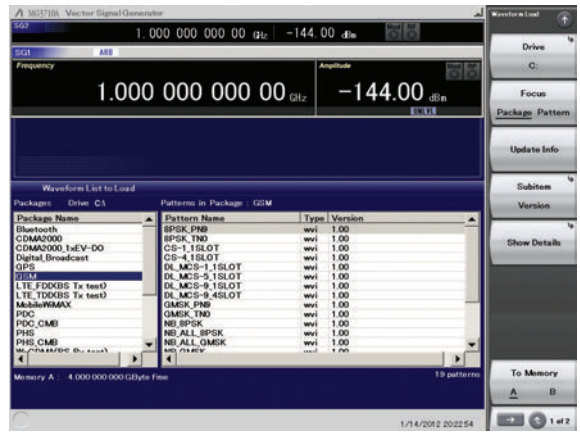
CS-1_1 (4)_SLOT (_4SLOT)
Supports packet data block type 1 (CS-4) and 4 (CS-1) specified in Section 5.1 of 3GPP TS 05.03
The table below shows channel coding parameters:

Scheme	Code Rate	USF	Pre-coded USF	Radio Block excl. USF and BCS	BCS	Tail	Coded Bits	Punctured Bits
CS-1	1/2	3	3	181	40	4	456	0
CS-4	1	3	12	428	16	—	456	—

DL (UL)_MCS-1 (5, 9)_1SLOT (_4SLOT)
Supports packet data block types 5 (MCS-1), 9 (MCS-5), and 13 (MCS-9) specified in Section 5.1 of 3GPP TS 05.03
The table below shows channel coding parameters:

Scheme	Code Rate	Header Code Rate*	Modulation	RLC Blocks per Radio Block (20 ms)	Raw Data within One Radio Block	Family	BCS	Tail Payload	HCS	Data Rate kb/s
MCS-9	1.0	0.36	8PSK	2	2×592	A	2×12	2×6	8	59.2
MCS-5	0.37	1/3		1	448	B	12	6		22.4
MCS-1	0.53	0.53	GMSK	1	176	C				8.8

*: The Header data is all "0."



Selecting Waveform Pattern

Waveform Patterns	Uplink/Downlink	Data	Output Slot	Communi-cations	File Size [MB]
GMSK_PN9	Uplink/Downlink	PN9*1	—	—	0.1
8PSK_PN9	Uplink/Downlink		—	—	0.4
GMSK_TN0	Uplink/Downlink	PN9*2	TN0	—	3.7
8PSK_TN0	Uplink/Downlink		TN0	—	3.7
NB_GMSK	Uplink/Downlink	PN9*3	TN0	GSM	3.7
NB_ALL_GMSK	Uplink/Downlink		All Slots		29.3
NB_8PSK	Uplink/Downlink		TN0		3.7
NB_ALL_8PSK	Uplink/Downlink		All Slots		29.3
TCH_FS	Uplink/Downlink	PN9*4	TN0		47.6
CS-1_1SLOT	Uplink/Downlink		TN0		190.1
CS-4_1SLOT	Uplink/Downlink		TN0		190.1
DL_MCS-1_1SLOT	Downlink		TN0	GPRS	190.1
UL_MCS-1_1SLOT	Uplink		TN0		190.1
DL_MCS-5_1SLOT	Downlink		TN0	EDGE	190.1
UL_MCS-5_1SLOT	Uplink		TN0		190.1
DL_MCS-9_1SLOT	Downlink		TN0		190.1
UL_MCS-9_1SLOT	Uplink		TN0		190.1
DL_MCS-9_4SLOT*5	Downlink		TN0, 1, 2, 3		760.3
UL_MCS-9_4SLOT*5	Uplink		TN0, 1, 2, 3		760.3

*1: PN9 data is inserted into the entire area that does not have the slot format.
*2: PN9 data is inserted into the entire area of the slots, except the guard.
*3: PN9 data is inserted into the normal burst encrypted bit area.
*4: The bit string channel-coded for PN9 data is inserted into the normal burst encrypted bit area.
*5: To use this waveform pattern, ARB Memory Upgrade 256 Msample (option) or ARB Memory Upgrade 1024 Msample (option), is required.

* Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller.
Consider this when selecting the ARB memory upgrade option.

GSM/EDGE Waveform Patterns

Standard

Frame Configuration

Each frame is composed of eight slots. TCH/FS consist of 26 multiframes, and other channels consist of 52 multiframes.

Slot Configuration

GMSK_TN0 and 8PSK_TN0 consist of the data field and guard field only as shown in the figures below:

PN	G
148	8.25

Unit: bit

PN:	Data	PN9 pseudo random pattern (continuous between transmitted slots)
G:	Guard bit	FF_H

PN	G
444	24.75

Unit: bit

PN:	Data	PN9 pseudo random pattern (continuous between transmitted slots)
G:	Guard bit	FF_H

The slot configuration for those other than GMSK_PN9, 8PSK_PN9, GMSK_TN0, and 8PSK_TN0 is normal burst as shown in the figure below:

Normal Burst (GMSK)

T	E	S	TSC	S	E	T	G
3	57	1	26	1	57	3	8.25

Unit: bit

T:	Tail bit	0_H (4 bits)
E:	Encrypted bit	Channel-coded* PN9 pseudo random pattern (continuous between transmitted slots)
S:	Stealing bit	Steal flag
TSC:	Training sequence bit	$097\ 0897_H$
T:	Tail bit	0_H (4 bits)
G:	Guard bit	FF_H

Normal Burst (8PSK)

T1	E	TSC	E	T2	G
9	174	78	174	9	24.75

Unit: bit

T1:	Tail bit	$1FF_H$ (9 bits)
E:	Encrypted bit	Channel-coded* PN9 pseudo random pattern (continuous between transmitted slots)
TSC:	Training sequence bit	$3F3F\ 9E29\ FFF3\ FF3F\ 9E49_H$
T2:	Tail bit	$1FF_H$ (9 bits)
G:	Guard bit	FF_H

*: When the waveform pattern is NB, PN9 data that has not been channel-coded is inserted directly.

PHS Waveform Patterns

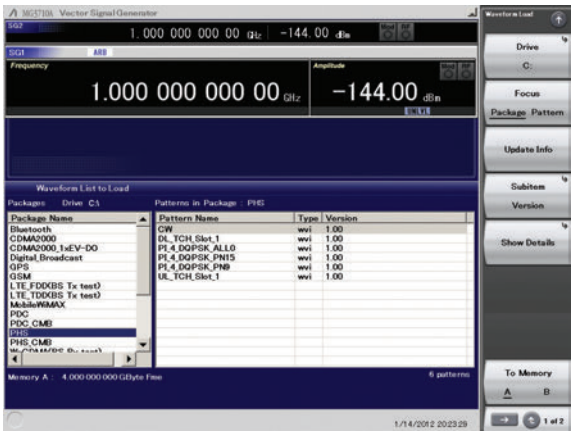
Standard

PHS Waveform Patterns

The PHS waveform patterns listed in the table below are stored on the MG3710A/MG3710E internal hard disk.
The RCR STD-28-specified signals for testing CS (base station) and PS (mobile station) receivers are output by selecting one of these PHS waveform patterns without setting any complex RCR STD-28 parameters. When a signal with different parameters is required, the optional TDMA IQproducer MX370102A can be used to set parameters and generate waveforms.

Waveform Patterns	Uplink/Downlink	Scramble	Output Slot	File Size [MB]
PI_4_DQPSK_PN9	—	OFF	No frame	0.2
PI_4_DQPSK_PN15	—	OFF	No frame	8.0
PI_4_DQPSK_ALL0	—	OFF	No frame	0.1
DL_TCH_Slot_1	Downlink	OFF	Slot 1: TCH Slot 2 to 4: off	1.8
UL_TCH_Slot_1	Uplink	OFF	Slot 1: TCH Slot 2 to 4: off	9.3
CW	—	—	—	0.1

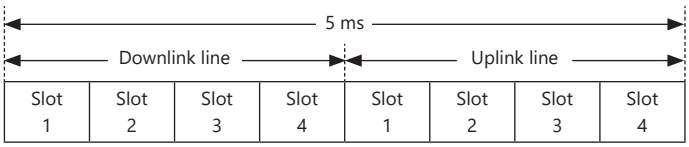
* Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller.
Consider this when selecting the ARB memory upgrade option



Selecting Waveform Pattern

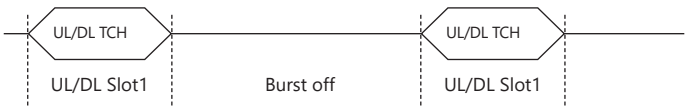
Frame Configuration

Each PHS frame is composed of four uplink slots and four downlink slots (eight slots in total), and data is generated cyclically based on one PHS frame. Only Slot 1 is transmitted, and subsequent Slots 2 through 4 are not transmitted (transmission off). A PN9 pseudo random pattern in the TCH field of each slot is independent within the slot has continuity between frames.



PHS Frame Configuration

In a waveform pattern other than PI_4_DQPSK_PN9, PI_4_DQPSK_PN15 and PI_4_DQPSK_ALL0, a communication channel is allocated to uplink or downlink Slot 1. Other slots are burst off output.



PHS Frame Configuration

Slot Configuration

There are two types of slot configurations: downlink traffic channel and uplink traffic channel. The scramble function is always Off.

Uplink/Downlink Traffic Channel

R	SS	PR	UW	CI	SA	TCH	CRC	G
4	2	6	16	4	16	160	16	16

R:	Ramp time for transient response	0_H (4 bits)
SS:	Start symbol	2_H (2 bits)
PR:	Preamble	19_H (6 bits)
UW:	Sync word	Uplink = $E149_H$ (16 bits) Downlink = $3D4C_H$ (16 bits)
CI:	Channel identification	0_H (4 bits)
SA:	SACCH	8000_H (16 bits)
TCH:	Information channel	PN9 pseudo random pattern independent in each slot (PN pattern is continuous in TCH of a slot).
CRC:	Cyclic redundancy check code	CRC bits for CI, SA, TCH
G:	Guard time for transient response	0000_H (16 bits)

PDC Waveform Patterns

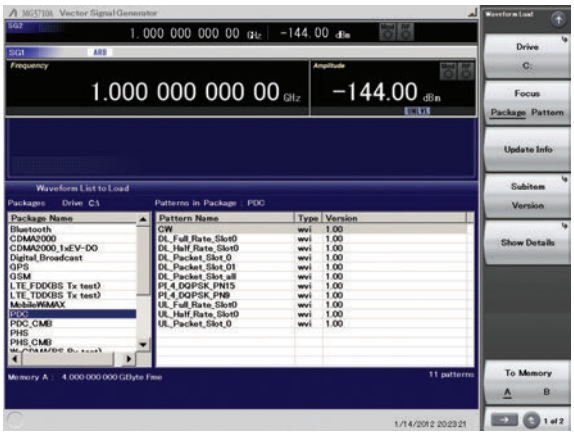
Standard

PDC Waveform Patterns

Waveform patterns for the Wanted Signals and Interference Signals required to execute the RCR STD-27-specified transmission and reception tests are stored on the MG3710A/MG3710E internal hard disk. and can be output without requiring options (but check the parameters below).
Waveform patterns to output uplink/downlink Slot 0 data only and unframed waveform pattern for interference signals are provided for full rate and half rate.
When a signal with different parameters is required, the optional TDMA IQproducer MX370102A can be used to set parameters and generate waveforms.

Waveform Patterns	Uplink/ Downlink	Half Rate/ Full Rate	Output Slot	Evaluation	File Size [MB]
PI_4_DQPSK_PN9	–	–	No frame	Tx Device Test	0.2
PI_4_DQPSK_PN15	–	–	No frame	Interfering Signal	8.0
DL_Full_Rate_Slot0	Downlink	Full rate	Slot 0 only	Wanted Signal for Receiver Test	6.6
DL_Half_Rate_Slot0	Downlink	Half rate	Slot 0 only		13.1
UL_Full_Rate_Slot0	Uplink	Full rate	Slot 0 only		2.2
UL_Half_Rate_Slot0	Uplink	Half rate	Slot 0 only		2.2
CW	–	–	–	Interfering Signal	0.1

* Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller.
Consider this when selecting the ARB memory upgrade option

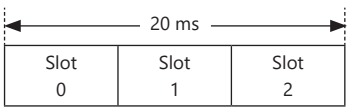


Selecting Waveform Pattern

Frame Configuration

At Full Rate

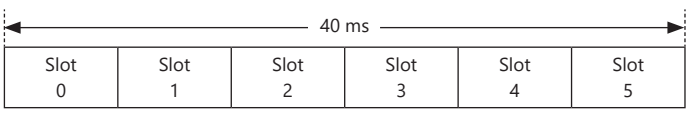
The PDC system consists of TDMA frames that are composed of three slots, and data is generated cyclically based on one TDMA frame. A PN9 pseudo random pattern in each slot is independent within the slot and has continuity. In downlink, all 1 data are output for the bit sequence in Slots 1 and 2. In uplink, Slots 1 and 2 are burst off.



Frame Configuration at Full Rate

At Half Rate

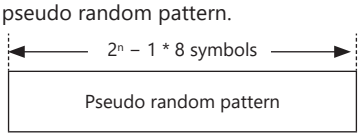
The PDC system consists of TDMA frames that are composed of six slots, and data is generated cyclically based on one TDMA frame. A PN9 pseudo random pattern in each slot is independent within the slot and has continuity. In downlink, all 1 data are output for the bit sequence in Slots 1 through 5. In uplink, Slots 1 through 5 are burst off.



Frame Configuration at Half Rate

Unframed Waveform Pattern

For interference signals, unframed pseudo random patterns are output for which /4 DQPSK modulation was performed. At this time, the positions of the first and last symbol points of the arbitrary waveform pattern are changed to adjust the data length, so as to retain the continuity of the pseudo random pattern.



Unframed Waveform Pattern Configuration

Slot Configuration

There are four types of slot configurations according to the communication channels (Uplink/Downlink).

Uplink Communication Channel (UP TCH)

R	P	TCH	SW	CC	SF	SACCH	TCH	G
4	2	112	20	8	1	15	112	6

R:	Guard time for burst transient response	0_H (4 bits)
P:	Preamble	2_H (2 bits)
TCH:	For user information transfer	PN pseudo random pattern independent in each slot (PN pattern is continuous in TCH of a slot).
SW:	Sync word	Slot 0 = $785B4_H$ (20 bits) Slot 1 = $62DC9_H$ (20 bits) Slot 2 = $7E28A_H$ (20 bits)
CC:	Color code	00_H (8 bits)
SF:	Steal flag	0_H (1 bit)
SACCH:	Low-speed associated control channel	0000_H (15 bits)
G:	Guard time for burst transient response	0_H (6 bits)
Scramble function (TCH, SF, SACCH):		Off

Downlink Communication Channel (DOWN TCH)

R	P	TCH	SW	CC	SF	SACCH	TCH
4	2	112	20	8	1	21	112

R:	Guard time for burst transient response	0_H (4 bits)
P:	Preamble	2_H (2 bits)
TCH:	For user information transfer	PN pseudo random pattern independent in each slot (PN pattern is continuous in TCH of a slot).
SW:	Sync word	Slot 0 = $87A4B_H$ (20 bits) Slot 1 = $9D236_H$ (20 bits) Slot 2 = $81D75_H$ (20 bits)
CC:	Color code	00_H (8 bits)
SF:	Steal flag	0_H (1 bit)
SACCH:	Low-speed associated control channel	000000_H (21 bits)
Scramble function (TCH, SF, SACCH):		Off

PDC Packet Waveform Patterns

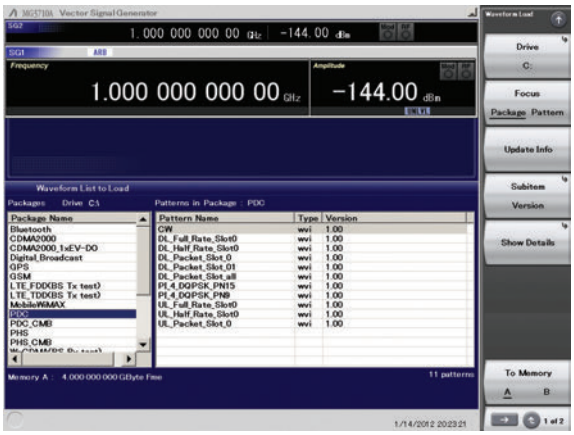
Standard

PDC Packet Waveform Patterns

The four waveform patterns listed in the table below are stored on the MG3710A/MG3710E internal hard disk.
The RCR STD-27-specified signals for testing base station and mobile station receivers for UPCH communications can be output by selecting one of these waveform patterns without setting any complex RCR STD-27 parameters.
In addition, the Downlink3 data rate UPCH pattern and Uplink1 UPCH pattern can be switched.
When a signal with different parameters is required, the optional TDMA IQproducer MX370102A can be used to set parameters and generate waveforms.

Waveform Patterns	Uplink/Downlink	Output Slot	File Size [MB]
DL_Packet_Slot_0	Downlink	Slot 0=UPCH Slot 1=IDLE (all "1") Slot 2=IDLE (all "1")	6.6
DL_Packet_Slot_01	Downlink	Slot 0=UPCH Slot 1=UPCH Slot 2=IDLE (all "1")	6.6
DL_Packet_Slot_all	Downlink	Slot 0=UPCH Slot 1=UPCH Slot 2=UPCH	6.6
UL_Packet_Slot_0	Uplink	Slot 0=UPCH Slot 1=Transmit off Slot 2=Transmit off	2.1

* Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller.
Consider this when selecting the ARB memory upgrade option



Selecting Waveform Pattern

Frame Configuration

There are four types of TDMA frame configurations for PDC Packet waveform patterns: downlink 1-slot transmission, downlink 2-slot transmission, downlink 3-slot transmission, and uplink 1-slot transmission. Each TDMA frame is composed of three slots, and data is generated cyclically based on one TDMA frame.
A PN9 pseudo random pattern in the CAC field of each slot has continuity. In downlink UPCH 2-slot transmission, for example, the end of the CAC field in Slot 0 and the start of the CAC field in Slot 1 are continuing. Also, the end of the CAC field in Slot 1 and the start of the CAC field in Slot 0 of the next frame are continuing in this case.

Downlink UPCH 1-slot Transmission (DL_Packet_Slot_0)

20 ms

Slot 0 UPCH	Slot 1 IDLE (All "1")	Slot 2 IDLE (All "1")

Downlink UPCH 2-slot Transmission (DL_Packet_Slot_01)

20 ms

Slot 0 UPCH	Slot 1 UPCH	Slot 2 IDLE (All "1")

Downlink UPCH 3-slot Transmission (DL_Packet_Slot_all)

20 ms

Slot 0 UPCH	Slot 1 UPCH	Slot 2 UPCH

Uplink UPCH 1-slot Transmission (UL_Packet_Slot_0)

20 ms

Slot 0 UPCH	Slot 1 Transmission Off	Slot 2 Transmission Off

Slot Configuration

There are two types of slot configurations: downlink user packet channel and uplink user packet channel. The scramble function is always Off.

Downlink User Packet Channel (DOWN UPCH)

R	P	CAC	SW	CC	CAC	E
4	2	112	20	8	112	22

R: Guard time for burst transient response 0_H (4 bits)
P: Preamble 2_H (2 bits)
CAC: Control signals (UPCH) PN9 pseudo random pattern (continuous between transmitted slots)
SW: Sync word Slot 0 = $87A4B_H$ (20 bits)
Slot 1 = $9D236_H$ (20 bits)
Slot 2 = $81D75_H$ (20 bits)
CC: Color code 00_H (8 bits)
E: Collision control bits $3FFFFF_H$ (22 bits)

Uplink User Packet Channel (UP UPCH)

R	P	CAC	SW	CC	CAC	G
4	2	112	20	8	116	18

R: Guard time for burst transient response 0_H (4 bits)
P: Preamble 2_H (2 bits)
CAC: Control signals (UPCH) PN9 pseudo random pattern (continuous between transmitted slots)
SW: Sync word Slot 0 = $785B4_H$ (20 bits)
CC: Color code 00_H (8 bits)
E: Collision control bits 00000_H (18 bits)

Digital Broadcast Waveform Patterns

Standard

Digital Broadcast Waveform Patterns

The BS/CS/CATV/ISDB-T waveform patterns listed in the table below are stored on the MG3710A/MG3710E internal hard disk and signals for testing devices are output by selecting one of these waveform patterns.
There is also a pattern for evaluating ISDB-T video and audio as well as for simple BER measurements.

Waveform Patterns	Outline		Parameter	File Size [MB]
BS_1ch	Physical layer waveform pattern of digital BS broadcast For device evaluation	1 channel PN23fix*1 Modulation only	Roll-off factor: 0.35 Nyquist Bandwidth: 28.86 MHz Modulation: QPSK	3.9
CS_1ch	Physical layer waveform pattern of digital CS broadcast For device evaluation		Roll-off factor: 0.35 Nyquist Bandwidth: 21.096 MHz Modulation: QPSK	5.7
CATV_AnnexC_1ch	Physical layer waveform pattern for CATV (ITU-T J83 Annex C) For device evaluation		Roll-off factor: 0.13 Nyquist Bandwidth: 5.274 MHz Modulation: 64QAM	6.5
ISDBT_1layer_1ch	Physical layer waveform pattern for ISDB-T For device evaluation	1 channel PN23fix*1 Pilot Signal With TMCC	Mode: 3, GI: 1/8 A-Layer: 13seg, 64QAM	28.7
ISDBT_2layer_1ch			Mode: 3, GI: 1/8 A-Layer: 1seg, QPSK B-Layer: 12seg, 64QAM	28.7
ISDBT_2layer_Movie*2	Waveform pattern for ISDB-T partial reception*3 For evaluating video and audio data of terminals 40-frame waveform length	1 channel For video and audio	Mode: 3, GI: 1/8 A-Layer: 1seg, QPSK, CR=2/3, TI=2 B-Layer: 12seg, 64QAM, CR=7/8, TI=2	573.8
ISDBT_2layer_Movie2*2			Mode: 3, GI: 1/8 A-Layer: 1seg, QPSK, CR=2/3, TI=4 B-Layer: 12seg, 64QAM, CR=3/4, TI=2	573.8
ISDBT_2layer_Coded	Waveform pattern for ISDB-T partial reception*3 For simple BER measurement. 4-frame waveform length	1 channel For simple BER	Mode: 3, GI: 1/8 A-Layer: 1seg, QPSK, CR=2/3, TI=2 B-Layer: 12seg, 64QAM, CR=7/8, TI=2	57.4
ISDBT_QPSK_1_2			Mode: 3, GI: 1/8 A-Layer: 1seg, QPSK, CR=1/2, TI=0 B-Layer: 12seg, 64QAM, CR=7/8, TI=1	57.4
ISDBT_QPSK_2_3			Mode: 3, GI: 1/8 A-Layer: 1seg, QPSK, CR=2/3, TI=0 B-Layer: 12seg, 64QAM, CR=7/8, TI=1	57.4
ISDBT_16QAM_1_2			Mode: 3, GI: 1/8 A-Layer: 1seg, 16QAM, CR=1/2, TI=0 B-Layer: 12seg, 64QAM, CR=7/8, TI=1	57.4
ISDBT_QPSK_2_3_TI4			Mode: 3, GI: 1/8 A-Layer: 1seg, QPSK, CR=2/3, TI=4 B-Layer: 12seg, 64QAM, CR=3/4, TI=2	57.4
ISDBTsb_Movie*4	Waveform pattern for ISDB-TSB partial reception*3 For evaluation video and audio data of terminals. 68-frame waveform length	1 channel For video and audio	Mode: 3, GI: 1/8 A/B-Layer: QPSK, CR=1/2, TI=4 Seg#1 to #5: 8-segment concatenation transmission in 1-segment format Seg#6 to #8: 8-segment concatenation transmission in 3-segment format	487.7
ISDBTsb_QPSK_1_2	Waveform pattern for ISDB-TSB partial reception*3 For simple BER measurement. 4-frame waveform length	1 channel For simple BER	Mode: 3, GI: 1/8 A/B-Layer: QPSK, CR=1/2, TI=0 Seg#1 to #5: 8-segment concatenation transmission in 1-segment format Seg#6 to #8: 8-segment concatenation transmission in 3-segment format	28.7
ISDBTsb_QPSK_2_3			Mode: 3, GI: 1/8 A/B-Layer: QPSK, CR=2/3, TI=0 Seg#1 to #5: 8-segment concatenation transmission in 1-segment format Seg#6 to #8: 8-segment concatenation transmission in 3-segment format	28.7
ISDBTsb_16QAM_1_2			Mode: 3, GI: 1/8 A/B-Layer: 16QAM, CR=1/2, TI=0 Seg#1 to #5: 8-segment concatenation transmission in 1-segment format Seg#6 to #8: 8-segment concatenation transmission in 3-segment format	28.7

*1: The PN sequence is discontinuous at the waveform pattern connection.
This cannot be used to measure BER (PN23) although it can be used for simple BER measurement.
*2: To use this waveform pattern, ARB Memory Upgrade 256 Msample (option) or ARB Memory Upgrade 1024 Msample (option), is required.
*3: It is not guaranteed that any receiver can receive a waveform with this length.
*4: To use this waveform pattern, Combination of Baseband Signal (option), ARB Memory Upgrade 256 Msample (option), or ARB Memory Upgrade 1024 Msample (option), is required.

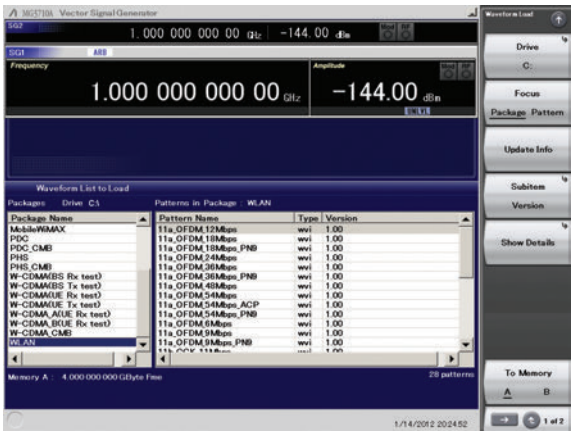
* Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller.
Consider this when selecting the ARB memory upgrade option

WLAN Waveform Patterns

Standard

WLAN Waveform Patterns

The WLAN (IEEE802.11a/b/g) waveform patterns listed in the table below are stored on the MG3710A/MG3710E internal hard disk.
Signals for testing the receiver and transmitter of a terminal or module can be output by selecting one of these patterns.
The waveform patterns shown below are the signals for one packet.
When a waveform pattern is selected, the signal is output in an endless loop. To stop the signal at a fixed number of packets, use the IQproducer Combination File Edit function to generate the sequence file first and select it using the MG3710A/MG3710E.



Selecting Waveform Pattern

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

Waveform Patterns	Data Rate (Mbps)	Modulation	Coding Rate	Coding Bits per Sub-carrier	Coding Bits per OFDM Symbol	Data Bits per OFDM Symbol	File Size [MB]
11a_OFDM_6Mbps	6	BPSK	1/2	1	48	24	0.3
11a_OFDM_9Mbps	9	BPSK	3/4	1	48	36	0.2
11a_OFDM_9Mbps_PN9*1	9	BPSK	3/4	1	48	36	71.5
11a_OFDM_12Mbps	12	QPSK	1/2	2	96	48	0.2
11a_OFDM_18Mbps	18	QPSK	3/4	2	96	72	0.1
11a_OFDM_18Mbps_PN9*1	18	QPSK	3/4	2	96	72	36.6
11a_OFDM_24Mbps	24	16QAM	1/2	4	192	96	0.1
11a_OFDM_36Mbps	36	16QAM	3/4	4	192	144	0.1
11a_OFDM_36Mbps_PN9*1	36	16QAM	3/4	4	192	144	19.1
11a_OFDM_48Mbps	48	64QAM	2/3	6	288	192	0.1
11a_OFDM_54Mbps	54	64QAM	3/4	6	288	216	0.1
11a_OFDM_54Mbps_PN9*1	54	64QAM	3/4	6	288	216	13.5
11a_OFDM_54Mbps_ACP*2	54	64QAM	3/4	6	288	216	0.1

*1: Waveform pattern having continuous PN9 data. For the waveform patterns without *1 affixed, the PN9 data does not have continuity. A gap period of 4 samples is secured at the start of the waveform pattern, followed by a PLCP preamble. When using an external trigger, set the trigger delay to −4 samples to match the rising of the external trigger and the starting point of the PLCP preamble.
*2: Improved ACPR

IEEE_802.11b Waveform Patterns List

Waveform Patterns	Spreading, Coding	Modulation	File Size [MB]
11b_DSSS_1Mbps	DSSS, 11 chip Barker Code	DBPSK	1.6
11b_DSSS_2Mbps	DSSS, 11 chip Barker Code	DQPSK	0.9
11b_DSSS_2Mbps_PN9*1, *2	DSSS, 11 chip Barker Code	DQPSK	368.2
11b_CCK_5_5Mbps	CCK	DQPSK	0.4
11b_CCK_11Mbps	CCK	DQPSK	0.3
11b_CCK_11Mbps_PN9*1	CCK	DQPSK	80.7
11b_CCK_11Mbps_ACP*3	CCK	DQPSK	0.3

*1: Waveform pattern having continuous PN9 data. For the waveform patterns without *1 affixed, the PN9 data does not have continuity.
*2: To use this waveform pattern, Combination of Baseband Signal (option), ARB Memory Upgrade 256 Msample (option), or ARB Memory Upgrade 1024 Msample (option), is required.
*3: Waveform pattern having improved ACPR with spectrum sidelobes cut down.

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

Waveform Patterns	Data Rate (Mbps)	Modulation	Coding Rate	Coding Bits per Sub-carrier	Coding Bits per OFDM Symbol	Data Bits per OFDM Symbol	File Size [MB]
11g_DSSS_OFDM_6Mbps	6	BPSK	1/2	1	48	24	0.4
11g_DSSS_OFDM_9Mbps	9	BPSK	3/4	1	48	36	0.3
11g_DSSS_OFDM_12Mbps	12	QPSK	1/2	2	96	48	0.3
11g_DSSS_OFDM_18Mbps	18	QPSK	3/4	2	96	72	0.2
11g_DSSS_OFDM_24Mbps	24	16QAM	1/2	4	192	96	0.2
11g_DSSS_OFDM_36Mbps	36	16QAM	3/4	4	192	144	0.2
11g_DSSS_OFDM_48Mbps	48	64QAM	2/3	6	288	192	0.2
11g_DSSS_OFDM_54Mbps	54	64QAM	3/4	6	288	216	0.2

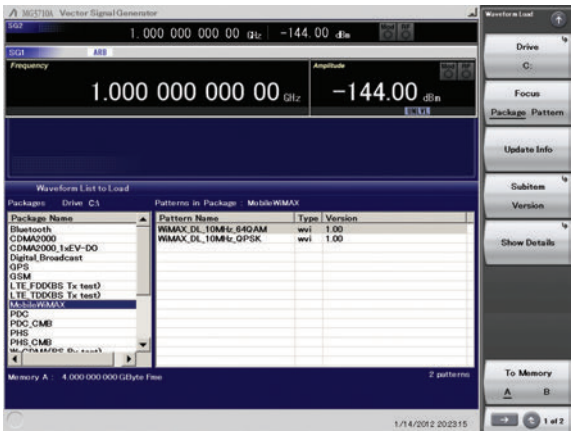
* Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller.
Consider this when selecting the ARB memory upgrade option

Mobile WiMAX Waveform Patterns

Standard

Mobile WiMAX Waveform Patterns

The Mobile WiMAX patterns listed in the table below are stored on the MG3710A/MG3710E internal hard disk. Signals for evaluating devices and interference signals are output simply by selecting a pre-saved standard waveform pattern.



Selecting Waveform Pattern

Mobile WiMAX Waveform Patterns List

Waveform Patterns	Evaluation	Outline	File Size [MB]
WiMAX_DL_10MHz_QPSK	BS Tx Device Test	Includes Preamble, FCH, and DL-MAP Modulation method is QPSK DL-Burst mapped waveform pattern	0.5
WiMAX_DL_10MHz_64QAM		Includes Preamble, FCH, and DL-MAP Modulation method is 64QAM BL-Burst mapped waveform pattern	0.5

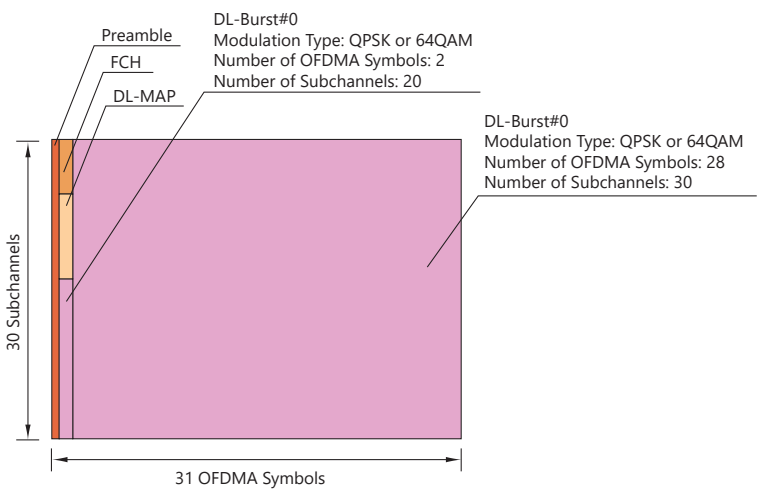
* Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller.
  Consider this when selecting the ARB memory upgrade option

Parameter

The parameters for this waveform pattern are listed in the following table. The channel-coded data corresponding to the PN9Fix data is mapped at DL-Burst.

	WiMAX_DL_10MHz_QPSK	WiMAX_DL_10MHz_64QAM
Parameter	Settings	
Bandwidth	10 MHz	
Fame Duration	5 ms	
Preamble Index	0	
Number of OFDMA Symbols	31 symbols (Including Preamble)	
FCH	Yes	
DL-MAP	Yes	
DL-Burst FEC Type	CTC (1/2)	
DL-Burst Modulation Type	QPSK	64QAM

Frame Composition



Bluetooth Waveform Patterns

Standard

Bluetooth Waveform Patterns

The Bluetooth waveform patterns listed in the table below are stored on the MG3710A/MG3710E internal hard disk.
Selecting one of these waveform patterns outputs the best signal for the evaluation.

POLL

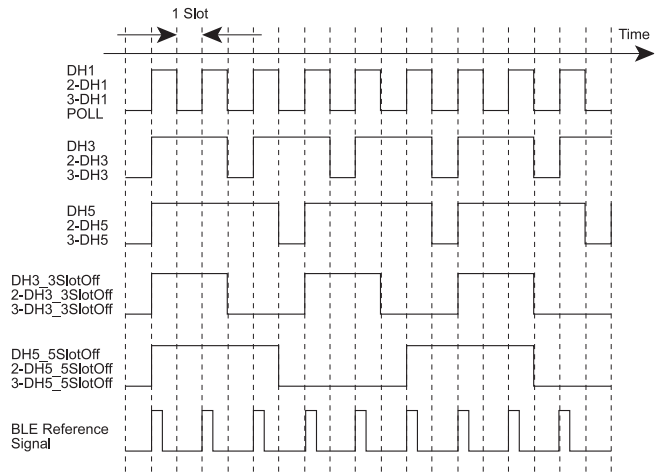
This is used for operation checks and PER measurement of mobile terminals with Bluetooth.

No Packet Format (PN9, PN15)

This is used for BER measurement of mobile terminals and modules with Bluetooth.

DH1, DH3, DH5

This is used in combination with an external demodulator for loop-back tests (no FEC) of mobile terminals and modules with Bluetooth.



Waveform Timing Chart

Waveform Pattern Name	Data Rate (Mbits/s)	Modulation for Payload	Filter	Packet Type	Dirty, FM	File Size [MB]
DH1*1	1	GFSK*4	Gaussian*5	DH1	—	0.1
DH3*1	1	GFSK*4	Gaussian*5	DH3	—	0.2
DH5*1	1	GFSK*4	Gaussian*5	DH5	—	0.3
DH3_3SlotOff*1	1	GFSK*4	Gaussian*5	DH3	—	0.2
DH5_5SlotOff*1	1	GFSK*4	Gaussian*5	DH5	—	0.3
POLL	1	GFSK*4	Gaussian*5	POLL	—	0.1
2-DH1*1	2	π/4-DQPSK	Root Nyquist*6	2-DH1	—	0.1
2-DH3*1	2	π/4-DQPSK	Root Nyquist*6	2-DH3	—	0.2
2-DH5*1	2	π/4-DQPSK	Root Nyquist*6	2-DH5	—	0.3
2-DH3_3SlotOff*1	2	π/4-DQPSK	Root Nyquist*6	2-DH3	—	0.2
2-DH5_5SlotOff*1	2	π/4-DQPSK	Root Nyquist*6	2-DH5	—	0.3
3-DH1*1	3	8-DPSK	Root Nyquist*6	3-DH1	—	0.1
3-DH3*1	3	8-DPSK	Root Nyquist*6	3-DH3	—	0.2
3-DH5*1	3	8-DPSK	Root Nyquist*6	3-DH5	—	0.3
3-DH3_3SlotOff*1	3	8-DPSK	Root Nyquist*6	3-DH3	—	0.2
3-DH5_5SlotOff*1	3	8-DPSK	Root Nyquist*6	3-DH5	—	0.3
GFSK-PN9*2	1	GFSK*4	Gaussian*5	No Packet Format	—	0.6
GFSK-PN15*3	1	GFSK*4	Gaussian*5	No Packet Format	—	37.5
PI_4_DQPSK-PN9*2	2	π/4-DQPSK	Root Nyquist*6	No Packet Format	—	0.1
PI_4_DQPSK-PN15*3	2	π/4-DQPSK	Root Nyquist*6	No Packet Format	—	6.0
8DPSK-PN9*2	3	8-DPSK	Root Nyquist*6	No Packet Format	—	0.2
8DPSK-PN15*3	3	8-DPSK	Root Nyquist*6	No Packet Format	—	12.0
DH1_dirty*1	1	GFSK*4	Gaussian*5	DH1	Dirty	9.2
DH3_dirty*1	1	GFSK*4	Gaussian*5	DH3	Dirty	9.2
DH5_dirty*1	1	GFSK*4	Gaussian*5	DH5	Dirty	9.2
2-DH1_dirty*1	2	π/4-DQPSK	Root Nyquist*6	2-DH1	Dirty	3.5
2-DH3_dirty*1	2	π/4-DQPSK	Root Nyquist*6	2-DH3	Dirty	10.3
2-DH5_dirty*1	2	π/4-DQPSK	Root Nyquist*6	2-DH5	Dirty	17.2
3-DH1_dirty*1	3	8-DPSK	Root Nyquist*6	3-DH1	Dirty	3.5
3-DH3_dirty*1	3	8-DPSK	Root Nyquist*6	3-DH3	Dirty	10.3
3-DH5_dirty*1	3	8-DPSK	Root Nyquist*6	3-DH5	Dirty	17.2
DH1_Dirty_withFM*1	1	GFSK*4	Gaussian*5	DH1	Dirty, FM	9.2
DH3_Dirty_withFM*1	1	GFSK*4	Gaussian*5	DH3	Dirty, FM	9.2
DH5_Dirty_withFM*1	1	GFSK*4	Gaussian*5	DH5	Dirty, FM	9.2
2-DH1_Dirty_withFM*1	2	π/4-DQPSK	Root Nyquist*6	2-DH1	Dirty, FM	3.5
2-DH3_Dirty_withFM*1	2	π/4-DQPSK	Root Nyquist*6	2-DH3	Dirty, FM	10.3
2-DH5_Dirty_withFM*1	2	π/4-DQPSK	Root Nyquist*6	2-DH5	Dirty, FM	17.2
3-DH1_Dirty_withFM*1	3	8-DPSK	Root Nyquist*6	3-DH1	Dirty, FM	3.5
3-DH3_Dirty_withFM*1	3	8-DPSK	Root Nyquist*6	3-DH3	Dirty, FM	10.3
3-DH5_Dirty_withFM*1	3	8-DPSK	Root Nyquist*6	3-DH5	Dirty, FM	17.2
BLE*1	1	GFSK*8	Gaussian*5	BLE Reference Signal	—	0.1
BLE_Dirty*1	1	GFSK*8	Gaussian*5	BLE Reference Signal	Dirty	28.7
BLE_Dirty_withFM*1	1	GFSK*8	Gaussian*5	BLE Reference Signal	Dirty, FM	28.7
BLE_CRC_corrupted*1, *7	1	GFSK*8	Gaussian*5	BLE Reference Signal	—	0.2
GFSK-PN15_BLE*3	1	GFSK*8	Gaussian*5	No Packet Format	—	6.0

*1: PN9 data is inserted into the payload body.
*2: PN9 data is inserted into all areas that do not have a packet format.
*3: PN15 data is inserted into all areas that do not have a packet format.
*4: Modulation index = 0.32
*5: Bandwidth time (BT) = 0.5
*6: Roll-off rate ß = 0.4
*7: Use in RF-PHY.TS/4.0.0 RCV-LE/CA/07/C (PER Report Integrity) with intentional CRC errors in every other packet is assumed.
*8: Modulation index = 0.5

* Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller.
Consider this when selecting the ARB memory upgrade option

GPS Waveform Patterns

Standard

GPS Waveform Patterns

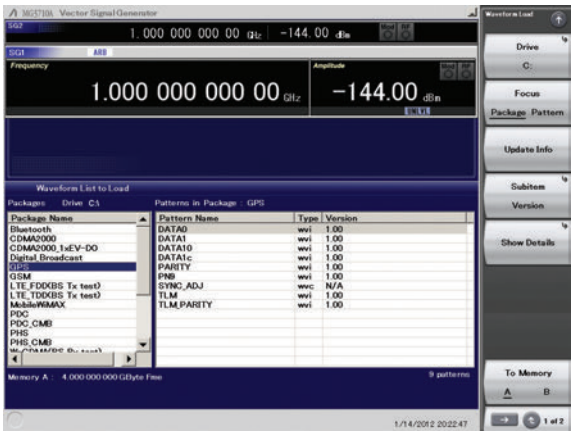
The four GPS waveform patterns listed below are stored on the MG3710A/MG3710E internal hard disk.
Selecting one of these waveform patterns outputs the best signal for the evaluation.

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

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

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

PN9
This is used for BER measurement during device evaluation.

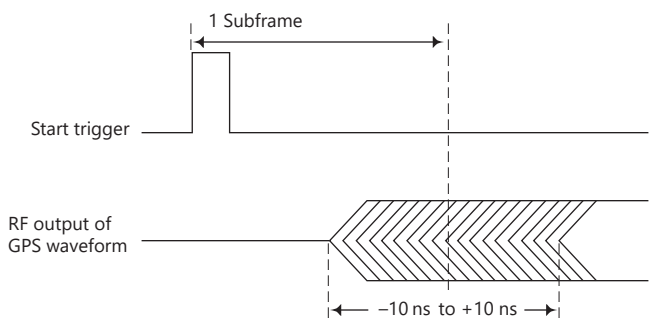


Selecting Waveform Pattern

Waveform Patterns	Main Usage	Outline of Data	File Size [MB]
SYNC_ADJ*1	Synchronization adjustment*2	Consists of TLM, HOW, and default navigation data, formatted according to subframe configuration prescribed in GLOBAL POSITIONING SYSTEM STANDARD POSITIONING SERVICE SIGNAL SPECIFICATION One period is configured with 1 subframes.	—
DATA0	Synchronization adjustment	Used in combination with SYNC_ADJ. These waveform patterns are automatically loaded into the memory when SYNC_ADJ is loaded into the memory. Users do not have to perform loading and selecting of these waveform patterns, because these waveform patterns are automatically selected when SYNC_ADJ is selected.	7.9
DATA1			7.9
DATA10			15.7
DATA1c			7.9
TLM*3	Sensitivity test	Consists of TLM, HOW, and default navigation data, formatted according to subframe configuration prescribed in GLOBAL POSITIONING SYSTEM STANDARD POSITIONING SERVICE SIGNAL SPECIFICATION	93.7
PN9	BER measurement	Consecutive PN9 data not configured in subframe format	159.6
PARITY	Parity detection	Configured in Word format prescribed in GLOBAL POSITIONING SYSTEM STANDARD POSITIONING SERVICE SIGNAL SPECIFICATION One Word consists of 24-bit PN9 fix data and 6-bit parity bit data.	93.7
TLM_PARITY*4	Sensitivity test	Consists of TLM, HOW, and Nav Data, formatted according to subframe configuration prescribed in GLOBAL POSITIONING SYSTEM STANDARD POSITIONING SERVICE SIGNAL SPECIFICATION. Random data is inserted into the Nav Data part of Word3 to Word10. One period is configured with 5 subframes.	468.3

*1: Use SYNC_ADJ in combination with DATA0, DATA1, DATA10, and DATA1c. When selecting a file, press the Baseband key on the MG3710A/MG3710E to set Pattern Combination to Defined. Refer to the MG3710A/MG3710E Vector Signal Generator Operation Manual (main frame) for details about how to make the settings.
*2: The repeatability of the subframe output timing of the RF output versus external start trigger input is reduced to 10 ns max.
*3: When executing a Doppler test, change the RF frequency and sampling clock at the same rate.
The sampling clock when the Doppler frequency is 0 Hz is 4.092 MHz. For example, when applying a + 4 kHz Doppler frequency, the following expression establishes (providing the sampling clock as "CLK"): (1575.42 MHz + 4 kHz)/1575.42 MHz = CLK/4.092 MHz then: CLK = 4.09201039 MHz.
Refer to the MG3710A/MG3710E Operation Manual (Mainframe) for RF frequency and sampling clock settings.
*4: To use this waveform pattern, Combination of Baseband Signal (option), ARB Memory Upgrade 256 Msample (option), or ARB Memory Upgrade 1024 Msample (option), is required.

* Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller.
Consider this when selecting the ARB memory upgrade option



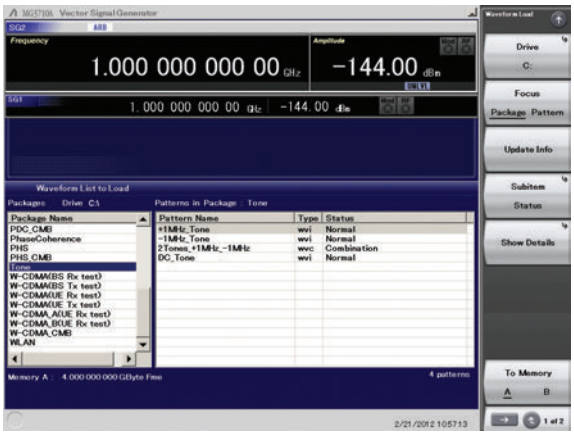
SYNC_ADJ Output Timing

Tone Signal Waveform Pattern

Standard

Tone Signal Waveform Pattern

The following table lists the waveform patterns and combination file that are available as tone signal waveform pattern.



Selecting Waveform Pattern

Tone Signal Waveform Pattern

Waveform Pattern Name	Main Use	Data Summary	File Size [MB]
Package name: Tone			
+1MHz_Tone	Device Test	Tone signal with +1 MHz frequency offset	0.1
−1MHz_Tone		Tone signal with −1 MHz frequency offset	0.1
DC_Tone		Tone signal without any frequency offset	0.1

* Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller.
  Consider this when selecting the ARB memory upgrade option

Tone Signal Combination File

Waveform Pattern Name	Main Use	Data Summary
Package name: Tone		
2Tones_+1MHz_−1MHz	Device Test	Signal that combines tone signal with +1 MHz frequency offset and tone signal with −1 MHz frequency offset.

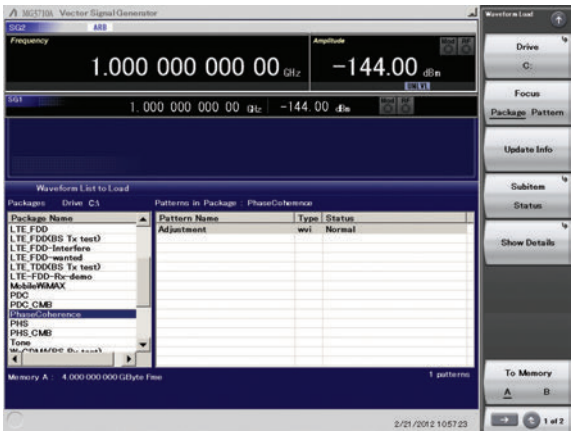
To use this combination file, Combination of Baseband Signal (option) is required.

Waveform Pattern for Phase Adjustment

Standard

Waveform Pattern for Phase Adjustment

The following table lists the waveform patterns that are available for MG3710A/MG3710E's phase adjustment.



Selecting Waveform Pattern

Waveform Pattern for Phase Adjustment

Waveform Pattern Name	Main Use	Data Summary	File Size [MB]
Package name: PhaseCoherence			
Adjustment	For phase adjustment of MG3710A/MG3710E	This is used to adjust phase and timing when outputting MIMO signal from MG3710A/MG3710E.	0.1

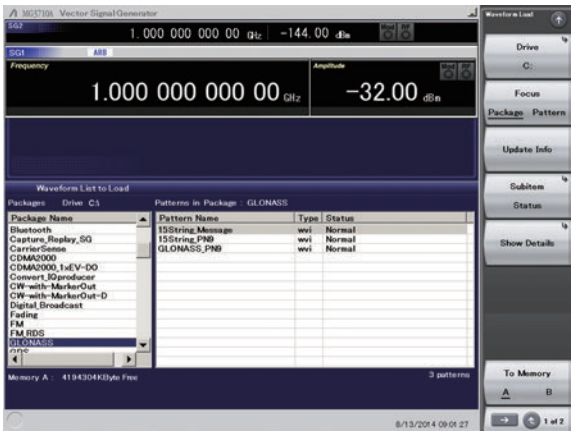
* Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller.
  Consider this when selecting the ARB memory upgrade option

GLONASS Waveform Patterns

Standard

GLONASS Waveform Patterns

The GLONASS waveform patterns listed in the table below are stored on the MG3710A/MG3710E internal hard disk.
Selecting one of these waveform patterns outputs the modulation signal for the GLONASS receiver Rx test.



Selecting Waveform Pattern

GLONASS Waveform Patterns

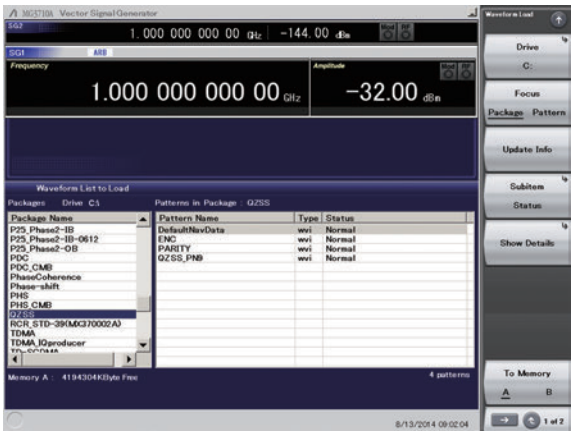
Waveform Pattern Name	Main Use	Data Summary	File Size [MB]
15String_Message	Sensitivity test Check bit detection	Consists of String Structure prescribed in Global Navigation Satellite System (GLONASS) Interface Control Document.	122
15String_PN9			
GLONASS_PN9	BER measurement	Consecutive PN9 data not configured in String and Frame format.	20

QZSS Waveform Patterns

Standard

QZSS Waveform Patterns

The QZSS waveform patterns listed in the table below are stored on the MG3710A/MG3710E internal hard disk.
Selecting one of these waveform patterns outputs the modulation signal for the QZSS receiver Rx test.



Selecting Waveform Pattern

QZSS Waveform Patterns

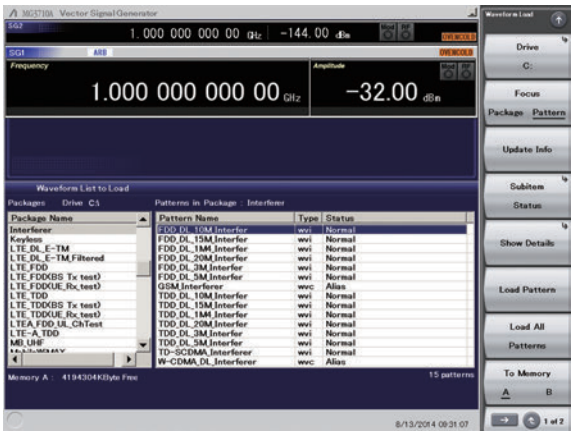
Waveform Pattern Name	Main Use	Data Summary	File Size [MB]
DefaultNavData	Sensitivity test	Consists of TLM, HOW, and default navigation data, formatted according to subframe configuration prescribed in Global Positioning System (GPS) Standard Positioning Service (SPS) Signal Specification.	98
ENC	Parity detection	Configured in word format prescribed in Global Positioning System Standard Positioning Service Signal Specification. One word consists of 24-bit PN9fix data and 6-bit parity bit data.	491
PARITY		Configured in word format prescribed in Global Positioning System Standard Positioning Service Signal Specification. One word consists of 24-bit random data and 6-bit parity bit data.	98
QZSS_PN9	BER measurement	Consecutive PN9 data not configured in subframe format	167

Interference Waveform Patterns

Standard

Interference Waveform Patterns

The following Rx test interference waveform patterns are stored on the MG3710A/MG3710E internal hard disk.



Selecting Waveform Pattern

Interference Waveform Patterns

System	Waveform Pattern Name	File Size [MB]
W-CDMA	W-CDMA_DL_Interferer	153
LTE FDD	FDD_DL_1M4_Interfer	0.1
	FDD_DL_3M_Interfer	0.3
	FDD_DL_5M_Interfer	0.6
	FDD_DL_10M_Interfer	1.2
	FDD_DL_15M_Interfer	1.2
	FDD_DL_20M_Interfer	2.5
LTE TDD	TDD_DL_1M4_Interfer	0.1
	TDD_DL_3M_Interfer	0.3
	TDD_DL_5M_Interfer	0.6
	TDD_DL_10M_Interfer	1.2
	TDD_DL_15M_Interfer	1.2
	TDD_DL_20M_Interfer	2.5
GSM	GMSK_PN9	0.1
TD-SCDMA	TD-SCDMA_Interferer	0.1

DFS Radar Pattern MX370073B

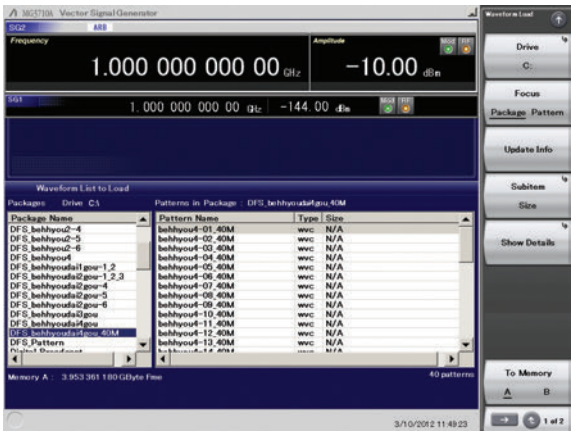
Optional

DFS Radar Patterns

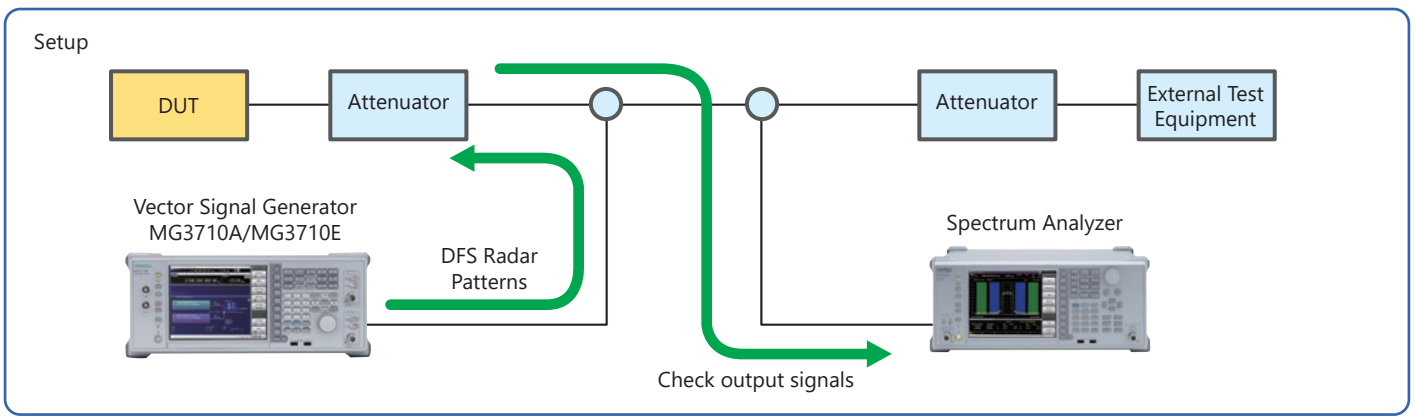
Installing the DFS Radar Pattern MX370073B option in the MG3710E Vector Signal Generator supports output of FCC06-96, FCC 13-22 and Japan MIC (Reference: TELEC-T403) standards DFS test signals.
Output of complex combinations of pulse, chirp and hopping signals required to support DFS tests is made easy just by selecting combination files supplied with the MX370073B.

* DFS: Dynamic Frequency Selection

- One MG3710A/MG3710E supports pulse, chirp and hopping signals.
- External PC not required. Simply selecting prepared waveform pattern outputs various signals using MG3710E built-in Sequence function.
- Offers 5.3-GHz band waveform patterns adopted by Japan MIC standard in July 2019.



Selecting Waveform Pattern
(Example: Japan MIC Standard Waveform Patterns)



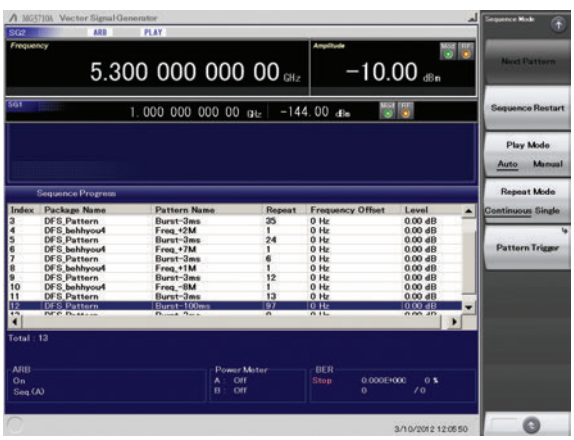
Difference between MX370073A and MX370073B

✓: Supported

Model	Vector Signal Generator			Note
	MG3710E	MG3710A (discontinued)	MG3700A (discontinued)	
MX370073A (discontinued)		✓	✓	• Does not include 5.3-GHz band waveform patterns adopted by Japan MIC standard in July 2019
MX370073B	✓	✓		• Includes all waveform patterns offered by MX370073A • Includes 5.3-GHz band waveform patterns adopted by Japan MIC standard in July 2019

Sequence Function

This standard function switches and outputs multiple waveform patterns continuously.
Standards-compliant test signals can be created by selecting a combination file combining complex patterns of pulse, chirp, hopping, and null signal waveforms.



Sequence Function Display

DFS Radar Pattern MX370073B

Optional

Japan MIC standard Test Waveform Patterns

Specification No. (Reference: TELEC-T403)		Package	Combination File Name	Note	File Size [MB]*4
Appended Table 1*1	Type 1	DFS_behhyoudai1gou-1_2	behhyou_dai1gou-1	Fixed Pulse Radar Signals 1 pattern each	830 (All MX370073B)
	Type 2		behhyou_dai1gou-2		
Appended Table 1*2	Type 1	W53_DFS_Radar_Pattern	CN_V11_variable_W53 to CN_V16_variable_W53	Radar Radio Waves 6 patterns	
	Type 2		CN_V21_variable_W53	Radar Radio Waves 1 patterns	
	Type 3		CN_V31_chirp_W53 to CN_V37_chirp_W53	Radar Radio Waves 7 patterns	
	Type 4		CN_V41_chirp_W53 to CN_V46_chirp_W53	Radar Radio Waves 6 patterns	
	Type 5		CN_F01_chirp_W53	Radar Radio Waves 1 pattern each	
	Type 6		CN_F02_chirp_W53		
	Type 7		CN_F03_chirp_W53		
	Type 8		CN_F04_chirp_W53		
Appended Table 2	Type 1	DFS_behhyoudai2gou-1_2_3	behhyou_dai2gou-1	Fixed Pulse Radar Signals 1 pattern each	
	Type 2		behhyou_dai2gou-2		
	Type 3		behhyou_dai2gou-3		
	Type 4	DFS_behhyoudai2gou-4	behhyou2-4-1 to behhyou2-4-40	Variable Pulse Radar Signals 40 patterns each	
	Type 5	DFS_behhyoudai2gou-5	behhyou2-5-1 to behhyou2-5-40		
	Type 6	DFS_behhyoudai2gou-6	behhyou2-6-1 to behhyou2-6-40		
Appended Table 3	Type 1	DFS_behhyoudai3gou	behhyou3-1 to behhyou3-40	Variable Chirp Radar Signals 40 patterns each	
Appended Table 4	Type 1	DFS_behhyoudai4gou	behhyou4-01 to behhyou4-40	Frequency Hopping Radar Signals 40 patterns each For DUT 20 MHz detection bandwidth	
		DFS_behhyoudai4gou_40M	behhyou4-01_40M to behhyou4-40_40M	Frequency Hopping Radar Signals 40 patterns each For DUT 40 MHz detection bandwidth	
		DFS_behhyoudai4gou_80M	behhyou4-01_80M to behhyou4-40_80M	Frequency Hopping Radar Signals 40 patterns each For DUT 80 MHz detection bandwidth	
		DFS_behhyoudai4gou_160M*3	behhyou4-01_160M to behhyou4-40_160M	Frequency Hopping Radar Signals 40 patterns each For DUT 160 MHz detection bandwidth	

FCC Test Waveform Patterns

Specification No.		Package	Combination File Name	Note	File Size [MB]*4
Short Pulse Radar	Type 0	RadarType0	ShortPulse0	Fixed Pulse Radar Signals 1 pattern	830 (All MX370073B)
	Type 1	RadarType1	Test A: ShortPulse1A-01 to ShortPulse1A-23	Variable Pulse Radar Signals 23 patterns each	
			Test B: ShortPulse1B-01 to ShortPulse1B-15	Variable Pulse Radar Signals 15 patterns each	
	Type 2	RadarType2	ShortPulse2-01 to ShortPulse2-40	Variable Pulse Radar Signals 40 patterns each	
	Type 3	RadarType3	ShortPulse3-01 to ShortPulse3-40		
	Type 4	RadarType4	ShortPulse4-01 to ShortPulse4-40		
Long Pulse Radar	Type 5	RadarType5	LongPulse-01 to LongPulse-40	Variable Chirp Radar Signals 40 patterns each	
Frequency Hopping Radar	Type 6	RadarType6_20M	Hopping_20M-01 to Hopping_20M-40	Frequency Hopping Radar Signals 40 patterns each For 20 MHz DUT detection bandwidth	
		RadarType6_40M	Hopping_40M-01 to Hopping_40M-40	Frequency Hopping Radar Signals 40 patterns each For 40 MHz DUT detection bandwidth	
		RadarType6_80M	Hopping_80M-01 to Hopping_80M-40	Frequency Hopping Radar Signals 40 patterns each For 80 MHz DUT detection bandwidth	
		RadarType6_160M*3	Hopping_160M-01 to Hopping_160M-40	Frequency Hopping Radar Signals 40 patterns each For 160 MHz DUT detection bandwidth	

*1: Uses waveform patterns prior to July 2019 Japan MIC Standard revision
*2: Uses new waveform patterns adopted by July 2019 Japan MIC Standard revision
*3: Available for MG3710A/MG3710E
*4: Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller.
Consider this when selecting the ARB memory upgrade option. ARB Memory Upgrade 256 Msample for 1stRF MG3710E-045/MG3710A-045 is required for this option.

DFS (ETSI) Waveform Pattern MX370075A

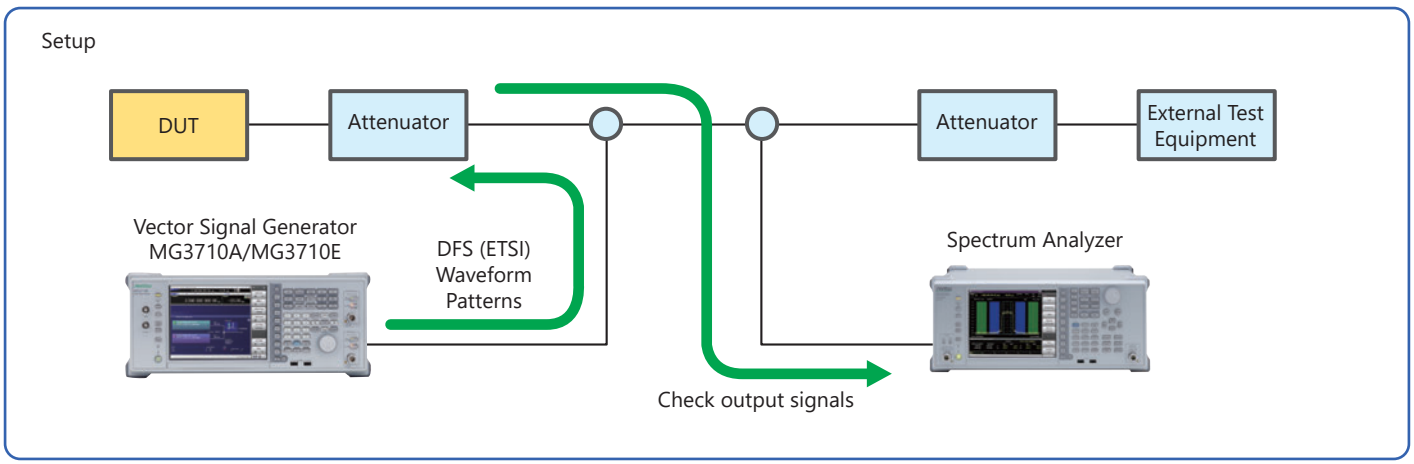
Optional

DFS (ETSI) Waveform Patterns

Installing the DFS (ETSI) Waveform Pattern MX370075A option in the MG3710E Vector Signal Generator supports output of ETSI EN 301 893 DFS test signals.
Output of complex combinations of pulse and chirp signals required to support DFS tests is made easy just by selecting combination files supplied with the MX370075A.

* DFS: Dynamic Frequency Selection

- One unit supports pulse and chirp signals.
- PC not required. Simply selecting prepared waveform pattern outputs various signals.



Sequence Function

This standard function switches and outputs multiple waveform patterns continuously.
Standards-compliant test signals can be created by combining complex patterns of pulse, chirp, and null signal waveforms.
Users can output pulse and chirp signals for DFS tests easily just by selecting a combination file with this sequence information.

DFS (ETSI) Waveform Pattern MX370075A

Optional

ETSI Test Waveform Patterns

Specification No.		Package	Combination File Name	Note	File Size [MB]
Reference Signal		ReferenceDFSSignal	ReferenceDFSsignal	Fixed Pulse Radar Signals One pattern	600
Radar Test Signal	1	TestSignal-1_Single	TestSignal-1_S_00 to TestSignal-1_S_19	Variable Pulse Radar Signals for single burst Twenty patterns	
			TestSignal-1B_S_00 to TestSignal-1B_S_19	Variable Pulse Radar Signals for single burst Twenty patterns Used from 5600 MHz to 5650 MHz	
		TestSignal-1_Multi	TestSignal-1_M_00 to TestSignal-1_M_19	Variable Pulse Radar Signals for multi-burst Twenty patterns	
			TestSignal-1B_M_00 to TestSignal-1B_M_19	Variable Pulse Radar Signals for multi-burst Twenty patterns Used from 5600 MHz to 5650 MHz	
	2	TestSignal-2_Single	TestSignal-2_S_00 to TestSignal-2_S_19	Variable Pulse Radar Signals for single burst Twenty patterns	
			TestSignal-2B_S_00 to TestSignal-2B_S_19	Variable Pulse Radar Signals for single burst Twenty patterns Used from 5600 MHz to 5650 MHz	
		TestSignal-2_Multi	TestSignal-2_M_00 to TestSignal-2_M_19	Variable Pulse Radar Signals for multi-burst Twenty patterns	
			TestSignal-2B_M_00 to TestSignal-2B_M_19	Variable Pulse Radar Signals for multi-burst Twenty patterns Used from 5600 MHz to 5650 MHz	
	3	TestSignal-3_Single	TestSignal-3_S_00 to TestSignal-3_S_19	Variable Pulse Radar Signals for single burst Twenty patterns	
		TestSignal-3_Multi	TestSignal-3_M_00 to TestSignal-3_M_19	Variable Pulse Radar Signals for multi-burst Twenty patterns	
	4	TestSignal-4_Single	TestSignal-4_S_00 to TestSignal-4_S_19	Variable Chirp Radar Signals for multi-burst Twenty patterns	
		TestSignal-4_Multi	TestSignal-4_M_00 to TestSignal-4_M_19	Variable Chirp Radar Signals for multi-burst Twenty patterns	
	5	TestSignal-5_Single	TestSignal-5_S_00 to TestSignal-5_S_19	Variable Pulse Radar Signals for single burst Twenty patterns	
			TestSignal-5B_S_00 to TestSignal-5B_S_19	Variable Pulse Radar Signals for single burst Twenty patterns Used from 5600 MHz to 5650 MHz	
		TestSignal-5_Multi	TestSignal-5_M_00 to TestSignal-5_M_19	Variable Pulse Radar Signals for multi-burst Twenty patterns	
			TestSignal-5B_M_00 to TestSignal-5B_M_19	Variable Pulse Radar Signals for multi-burst Twenty patterns Used from 5600 MHz to 5650 MHz	
	6	TestSignal-6_Single	TestSignal-6_S_00 to TestSignal-6_S_19	Variable Pulse Radar Signals for single burst Twenty patterns.	
			TestSignal-6B_S_00 to TestSignal-6B_S_19	Variable Pulse Radar Signals for single burst Twenty patterns Used from 5600 MHz to 5650 MHz	
		TestSignal-6_Multi	TestSignal-6_M_00 to TestSignal-6_M_19	Variable Pulse Radar Signals for multi-burst Twenty patterns	
			TestSignal-6B_M_00 to TestSignal-6B_M_19	Variable Pulse Radar Signals for multi-burst Twenty patterns Used from 5600 MHz to 5650 MHz	

* Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller.
Consider this when selecting the ARB memory upgrade option. ARB Memory Upgrade 256 Msample for 1stRF MG3710E-045/MG3710A-045 is required for this option.

Interference Waveform Pattern for LTE Receiver Test MX371054A

Optional

Interference Waveform Pattern for LTE Receiver Test

Installing the Interference Waveform Pattern for LTE Receiver Test MX371054A software in the MG3710A/MG3710E outputs the 3GPP standard interference waveform patterns (modulated) used for receiver tests of LTE UE/modules.

This is useful for evaluating UE/modules in-house before official conformance testing by certification organizations as well as for developing UE/modules with high-throughput performance by suppressing degraded receiver sensitivity even in noisy environments.

- Outputs interference waveform patterns (modulated) for 3GPP-compliant Rx tests of LTE UE/modules
- Immediate output of selected signal
- Supports wide range of UE/module test items by combining RF Signaling Call Box (such as Radio Communication Analyzer MT8821C) with MG3710A/MG3710E with this installed software
- Software and interference waveform patterns also support LTE RF Conformance Test System ME7873L

3GPP Standard

3GPP TS 36.521-1 V16

UE conformance specification, Radio transmission and reception, Part 1: Conformance testing

Table

Table A.3.2-1 Fixed Reference Channel for Receiver Requirements (FDD)

Table A.3.2-2 Fixed Reference Channel for Receiver Requirements (TDD)

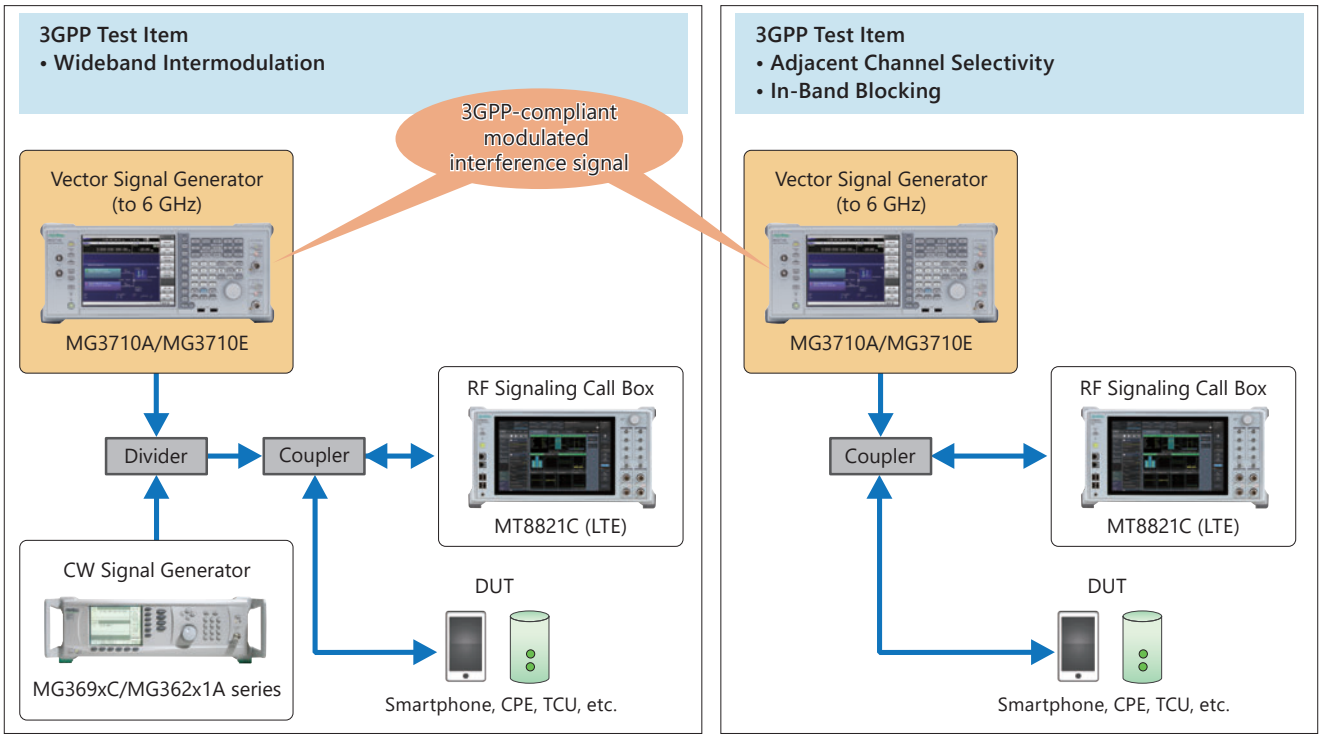
Receiver Test Items

7.5 Adjacent Channel Selectivity

7.6.1 In-band blocking

7.8.1 Wide band Intermodulation

Measurement Setup (Outline)



Waveform Patterns

Waveform Pattern Name	Channel bandwidth [MHz]	SCS [kHz]	Allocated resource blocks	Modulation	File Size [MB]
DL_Interferer_1_4M	1.4	15	6	QPSK	4.6
DL_Interferer_3M	3	15	15		
DL_Interferer_5M	5	15	25		
DL_Interferer_10M	10	15	50		
DL_Interferer_20M	20	15	100		

*: Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller. Consider this when selecting the ARB memory upgrade option.

Minimum Required Configuration (MG3710E)

Model	Name
MG3710E	Vector Signal Generator
MG3710E-036	1stRF 100 kHz to 6 GHz
MX371054A	Interference Waveform Pattern for LTE Receiver Test

*: The MX371055A and MX371054A can be retrofitted to the current MG3710A/MG3710E.

Interference Waveform Pattern for 5G NR Receiver Test MX371055A

Optional

Interference Waveform Pattern for 5G NR Receiver Test

Installing the Interference Waveform Pattern for 5G NR Receiver Test MX371055A software in the MG3710A/MG3710E outputs 3GPP standard interference waveform patterns (modulated) used for receiver tests of Sub-6 GHz 5G UE/modules.

This is useful for evaluating UE/modules in-house before official conformance testing by certification organizations as well as for developing UE/modules with high-throughput performance by suppressing degraded receiver sensitivity even in noisy environments.

- Outputs interference waveform patterns (modulated) for 3GPP-compliant Rx tests of Sub-6 GHz 5G UE/modules
- Immediate output of selected signal
- Supports wide range of UE/module test items by combining RF Signaling Call Box (such as Radio Communication Analyzer MT8821C) with MG3710A/MG3710E with this installed software
- Software and interference waveform patterns also support RF Regulatory Test System ME7803NR

3GPP Standard

3GPP TS 38.521-1 V17

UE conformance specification, Radio transmission and reception, Part 1: Conformance testing

Table

Table A.3.2.2-1 Fixed reference channel for receiver requirements (SCS 15 kHz, FDD, QPSK 1/3)

Table A.3.2.2-3 Fixed reference channel for receiver requirements (SCS 30 kHz, FDD, QPSK 1/3)

Table A.3.3.2-1 Fixed reference channel for receiver requirements (SCS 15 kHz, TDD, QPSK 1/3)

Table A.3.3.2-2 Fixed reference channel for receiver requirements (SCS 30 kHz, TDD, QPSK 1/3)

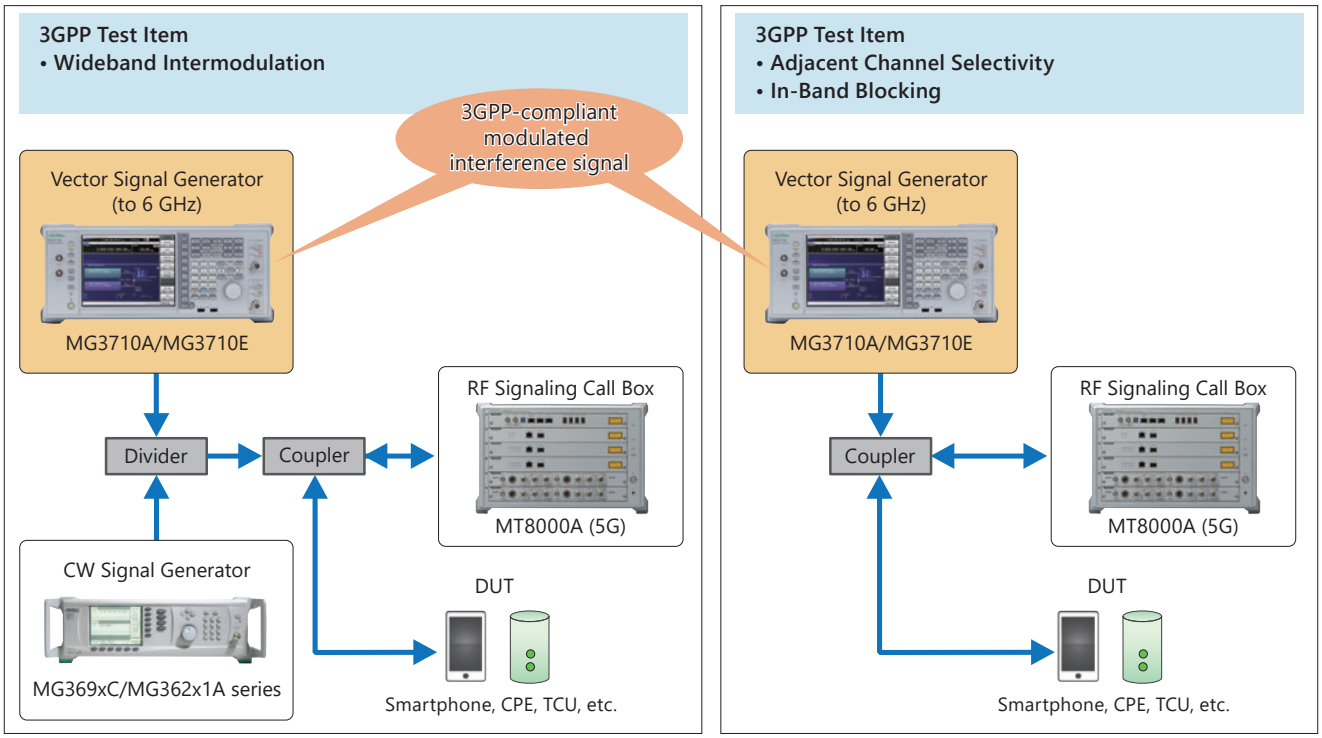
Receiver Test Items

7.5 Adjacent Channel Selectivity

7.6.2 In-band blocking

7.8.2 Wide band Intermodulation

Measurement Setup (Outline)



Interference Waveform Pattern for 5G NR Receiver Test MX371055A

Optional

Waveform Patterns

Waveform Pattern Name	Channel bandwidth [MHz]	SCS [kHz]	Allocated resource blocks	Modulation	File Size [MB]
DL_SCS15_BW5_FullRB	5	15	25	QPSK	34.4
DL_SCS15_BW10_FullRB	10	15	52		
DL_SCS15_BW15_FullRB	15	15	79		
DL_SCS15_BW20_FullRB	20	15	106		
DL_SCS15_BW40_FullRB	40	15	216		
DL_SCS15_BW50_FullRB	50	15	270		
DL_SCS30_BW10_FullRB	10	30	24		
DL_SCS30_BW15_FullRB	15	30	38		
DL_SCS30_BW20_FullRB	20	30	51		
DL_SCS30_BW40_FullRB	40	30	106		
DL_SCS30_BW50_FullRB	50	30	133		
DL_SCS30_BW60_FullRB	60	30	162		
DL_SCS30_BW80_FullRB	80	30	217		
DL_SCS30_BW90_FullRB	90	30	245		
DL_SCS30_B100_FullRB	100	30	273		

*: Since the recorded file size is rounded up to the nearest 0.1 MB, the true file size may be smaller. Consider this when selecting the ARB memory upgrade option.

Minimum Required Configuration (MG3710E)

Model	Name
MG3710E	Vector Signal Generator
MG3710E-036	1stRF 100 kHz to 6 GHz
MX371055A	Interference Waveform Pattern for 5G NR Receiver Test

*: The MX371055A and MX371054A can be retrofitted to the current MG3710A/MG3710E.

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.

MG3710E Main Frame and Hardware Options

Model/Order No.	Name	Remarks
	Main Frame	
MG3710E	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)	
MG3710E-001	Rubidium Reference Oscillator	Select when ordering main frame, aging rate: ±1 × 10^{-10}/month
MG3710E-002	High Stability Reference Oscillator	Select when ordering main frame, aging rate: ±1 × 10^{-7}/year
MG3710E-011	2ndary HDD	Select when ordering main frame, spare HDD for saving user data without Windows OS
MG3710E-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)
MG3710E-021	BER Test Function	Select when ordering main frame, Built-in BER measurement, Bit Rate: 100 bps to 40 Mbps AUX Conversion Adapter J1539A required for Data/Clock/Enable signal input
MG3710E-101	Rubidium Reference Oscillator Retrofit	Retrofitted to shipped MG3710E
MG3710E-102	High Stability Reference Oscillator Retrofit	Retrofitted to shipped MG3710E
MG3710E-111	2ndary HDD Retrofit	Retrofitted to shipped MG3710E
MG3710E-117	Universal Input/Output Retrofit	Retrofitted to shipped MG3710E
MG3710E-121	BER Test Function Retrofit	Retrofitted to shipped MG3710E
	(For 1stRF)	
MG3710E-032	1stRF 100 kHz to 2.7 GHz	Select when ordering main frame, select 1stRF frequency range, frequency cannot be changed after installation
MG3710E-034	1stRF 100 kHz to 4 GHz	Select when ordering main frame, select 1stRF frequency range, frequency cannot be changed after installation
MG3710E-036	1stRF 100 kHz to 6 GHz	Select when ordering main frame, select 1stRF frequency range, frequency cannot be changed after installation
MG3710E-041	High Power Extension for 1stRF	Select when ordering main frame, increases upper limit of output signal power setting range
MG3710E-042	Low Power Extension for 1stRF	Select when ordering main frame, increases lower limit of output signal power setting range
MG3710E-043	Reverse Power Protection for 1stRF	Select when ordering main frame, prevents damage caused by reverse input to output connector
MG3710E-045	ARB Memory Upgrade 256 Msample for 1stRF	Select when ordering main frame, expands ARB memory capacity
MG3710E-046	ARB Memory Upgrade 1024 Msample for 1stRF	Select when ordering main frame, expands ARB memory capacity
MG3710E-048	Combination of Baseband Signal for 1stRF	Select when ordering main frame, adds baseband combine function
MG3710E-049	AWGN for 1stRF	Select when ordering main frame, adds AWGN combine function
MG3710E-050	Additional Analog Modulation Input for 1stRF	Select when ordering main frame, Adds BNC connector for inputting external signals to rear panel of mainframe.
MG3710E-018	Analog IQ Input/Output	Select when ordering main frame, installs IQ input/output BNC connector in main frame
MG3710E-141	High Power Extension for 1stRF Retrofit	Retrofitted to shipped MG3710E
MG3710E-142	Low Power Extension for 1stRF Retrofit	Retrofitted to shipped MG3710E
MG3710E-143	Reverse Power Protection for 1stRF Retrofit	Retrofitted to shipped MG3710E
MG3710E-145	ARB Memory Upgrade 256 Msample for 1stRF Retrofit	Retrofitted to shipped MG3710E
MG3710E-146	ARB Memory Upgrade 1024 Msample for 1stRF Retrofit	Retrofitted to shipped MG3710E
MG3710E-148	Combination of Baseband Signal for 1stRF Retrofit	Retrofitted to shipped MG3710E
MG3710E-149	AWGN for 1stRF Retrofit	Retrofitted to shipped MG3710E
MG3710E-150	Additional Analog Modulation Input for 1stRF Retrofit	Retrofitted to shipped MG3710E
MG3710E-118	Analog IQ Input/Output Retrofit	Retrofitted to shipped MG3710E

Ordering Information

Model/Order No.	Name	Remarks
	(For 2ndRF)	
MG3710E-062	2ndRF 100 kHz to 2.7 GHz	Select when ordering main frame, select 2ndRF frequency range, frequency cannot be changed after installation
MG3710E-064	2ndRF 100 kHz to 4 GHz	Select when ordering main frame, select 2ndRF frequency range, frequency cannot be changed after installation
MG3710E-066	2ndRF 100 kHz to 6 GHz	Select when ordering main frame, select 2ndRF frequency range, frequency cannot be changed after installation
MG3710E-071	High Power Extension for 2ndRF	Select when ordering main frame, increases upper limit of output signal power setting range
MG3710E-072	Low Power Extension for 2ndRF	Select when ordering main frame, increases lower limit of output signal power setting range
MG3710E-073	Reverse Power Protection for 2ndRF	Select when ordering main frame, prevents damage caused by reverse input to output connector
MG3710E-075	ARB Memory Upgrade 256 Msample for 2ndRF	Select when ordering main frame, expands ARB memory capacity
MG3710E-076	ARB Memory Upgrade 1024 Msample for 2ndRF	Select when ordering main frame, expands ARB memory capacity
MG3710E-078	Combination of Baseband Signal for 2ndRF	Select when ordering main frame, adds baseband combine function
MG3710E-079	AWGN for 2ndRF	Select when ordering main frame, adds AWGN combine function
MG3710E-080	Additional Analog Modulation Input for 2ndRF	Select when ordering main frame, Adds BNC connector for inputting external signals to rear panel of mainframe.
MG3710E-162	2ndRF 100 kHz to 2.7 GHz Retrofit	Retrofitted to shipped MG3710E when 2ndRF not installed
MG3710E-164	2ndRF 100 kHz to 4 GHz Retrofit	Retrofitted to shipped MG3710E when 2ndRF not installed
MG3710E-166	2ndRF 100 kHz to 6 GHz Retrofit	Retrofitted to shipped MG3710E when 2ndRF not installed
MG3710E-171	High Power Extension for 2ndRF Retrofit	Retrofitted to shipped MG3710E
MG3710E-172	Low Power Extension for 2ndRF Retrofit	Retrofitted to shipped MG3710E
MG3710E-173	Reverse Power Protection for 2ndRF Retrofit	Retrofitted to shipped MG3710E
MG3710E-175	ARB Memory Upgrade 256 Msample for 2ndRF Retrofit	Retrofitted to shipped MG3710E
MG3710E-176	ARB Memory Upgrade 1024 Msample for 2ndRF Retrofit	Retrofitted to shipped MG3710E
MG3710E-178	Combination of Baseband Signal for 2ndRF Retrofit	Retrofitted to shipped MG3710E
MG3710E-179	AWGN for 2ndRF Retrofit	Retrofitted to shipped MG3710E
MG3710E-180	Additional Analog Modulation Input for 2ndRF Retrofit	Retrofitted to shipped MG3710E
	Maintenance service	
MG3710E-ES210	2 Years Extended Warranty Service	
MG3710E-ES310	3 Years Extended Warranty Service	
MG3710E-ES510	5 Years Extended Warranty Service	

Software

Model/Order No.	Name	Remarks
	Waveform pattern	(License for waveform patterns)
MX370073B	DFS Radar Pattern	For MG3710A/MG3710E, WLAN 5.3/5.6 GHz band DFS tests (for FCC and Japan MIC) waveform pattern, license for main frame, manual (PDF)
MX370075A	DFS (ETSI) Waveform Pattern	For MG3710A/MG3710E, WLAN 5.3/5.6 GHz DFS test (ETSI) waveform pattern, license for main frame, manual (PDF)
MX370084A	ISDB-Tmm Waveform Pattern	For MG3710A/MG3710E, ISDB-Tmm Waveform Patterns, license for main frame, manual (PDF)
MX371054A	Interference Waveform Pattern for LTE Receiver Test	For MG3710A/MG3710E, 3GPP-compliant modulated interference signal for LTE UE receiver sensitivity and throughput tests, license for main frame, manual (PDF)
MX371055A	Interference Waveform Pattern for 5G NR Receiver Test	For MG3710A/MG3710E, 3GPP-compliant modulated interference signal for 5G UE receiver sensitivity and throughput tests, license for main frame, manual (PDF)
	IQproducer	(License for IQproducer)
MX370101A	HSDPA/HSUPA IQproducer	For MG3710A/MG3710E, IQproducer software, license for main frame, manual (PDF)
MX370102A	TDMA IQproducer	For MG3710A/MG3710E/MG3740A, IQproducer software, license for main frame, manual (PDF)
MX370104A	Multi-carrier IQproducer	For MG3710A/MG3710E, IQproducer software, license for main frame, manual (PDF)
MX370106A	DVB-T/H IQproducer	For MG3710A/MG3710E, IQproducer software, license for main frame, manual (PDF)
MX370107A	Fading IQproducer	For MG3710A/MG3710E/MG3740A, IQproducer software, license for main frame, manual (PDF)
MX370108A	LTE IQproducer	For MG3710A/MG3710E, IQproducer software, license for main frame, manual (PDF)
MX370108A-001	LTE-Advanced FDD Option	For MG3710A/MG3710E, IQproducer software, license for main frame, manual (PDF). Requires MX370108A.
MX370110A	LTE TDD IQproducer	For MG3710A/MG3710E, IQproducer software, license for main frame, manual (PDF)
MX370110A-001	LTE-Advanced TDD Option	For MG3710A/MG3710E, IQproducer software, license for main frame, manual (PDF). Requires MX370110A.
MX370111A	WLAN IQproducer	For MG3710A/MG3710E, IQproducer software, license for main frame, manual (PDF)
MX370111A-002	802.11ac (160 MHz) Option	For MG3710A/MG3710E, IQproducer software, license for main frame, manual (PDF). Requires MX370111A
MX370112A	TD-SCDMA IQproducer	For MG3710A/MG3710E, IQproducer software, license for main frame, manual (PDF)
MX370113A	5G NR TDD sub-6 GHz IQproducer	For MG3710A/MG3710E, IQproducer software, license for main frame, manual (PDF)
MX370114A	5G NR FDD sub-6 GHz IQproducer	For MG3710A/MG3710E, IQproducer software, license for main frame, manual (PDF)

Optional Accessories

Model/Order No.	Name	Remarks
W3580AE	MG3710E/MG3710A/MG3740A Operation Manual (Main Unit)	Booklet, for MG3710E/MG3710A/MG3740A Main Frame (Operation, Remote Control)
W2496AE	MG3710E/MG3710A/MG3740A Operation Manual (IQproducer)	Booklet, for IQproducer (Operation for Common Parts)
W3581AE	MG3710E/MG3710A Operation Manual (Pre-installed Waveform Patterns)	Booklet, for Pre-installed Waveform Patterns (Usage, Detailed Parameters)
W3986AE	MX370073B Operation Manual	Booklet, for DFS (for FCC and Japan MIC) Waveform Patterns
W3597AE	MX370075A Operation Manual	Booklet, for DFS (ETSI) Waveform Patterns
W3508AE	MX370084A Operation Manual	Booklet, for ISDB-Tmm Waveform Patterns
W4073AE	MX371054A Operation Manual	Booklet, for Interference Waveform Pattern for LTE Receiver Test
W4074AE	MX371055A Operation Manual	Booklet, for Interference Waveform Pattern for 5G NR Receiver Test
W2915AE	MX370101A Operation Manual	Booklet, for HSDPA/HSUPA IQproducer
W2916AE	MX370102A Operation Manual	Booklet, for TDMA IQproducer
W2917AE	MX370104A Operation Manual	Booklet, for Multi-carrier 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
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
W3984AE	MX370113A Operation Manual	Booklet, for 5G NR TDD sub-6 GHz IQproducer
W4033AE	MX370114A Operation Manual	Booklet, for 5G NR FDD sub-6 GHz IQproducer
J1539A	AUX Conversion Adapter	Converts MG3710E/MG3710A/MG3740A rear-panel AUX connector to BNC connector
Z1572A	Installation Kit	Required when retrofitting hardware options or installing IQproducer (MX3701xxA)
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, 50Ω, 1 Wmax
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, 50Ω
J0322B	Coaxial Cord, 1.0 m	SMA-P · SMA-P, DC to 18 GHz, 50Ω
J0322C	Coaxial Cord, 1.5 m	SMA-P · SMA-P, DC to 18 GHz, 50Ω
J0322D	Coaxial Cord, 2.0 m	SMA-P · SMA-P, DC to 18 GHz, 50Ω
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
B0671A	Front Cover for 1MW4U	
Z0975A	Keyboard (USB)	
Z0541A	USB Mouse	

MG3710A main frame was discontinued in June 2019. However, MX3700xxA/B Waveform pattern and MX3701xxA IQproducer can be installed on the existing MG3710A.

The following option is installed as standard when ordering the MG3710A. It does not require a separate order.
MX371099A MG3710A Standard Waveform Pattern

Ordering Information

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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