Product Brochure

MS2690A/MS2691A/MS2692A Signal Analyzer
MS2690A-020/MS2691A-020/MS2692A-020 Vector Signal Generator

MX269xxx series software

MX2690xxA Waveform Pattern
MX2699xxA IQproducer

MX269xxx Series Software

MS269xA Signal Analyzer family supports a built-in Vector Signal Generator. The addition of the MS269xA-020, Vector Signal Generator option to the MS269xA Signal Analyzer creates a powerful one-box tester that can be configured to support various communication technologies. From R&D to the factory floor, this powerful combination of Signal Analyzer and Signal Generator can meet and exceed test and measurement needs. Files containing waveform patterns corresponding to either well-known standards or theoretical simulations can be loaded, selected, and played to create an endless number of waveforms.

Waveform patterns from various sources can be used by the MS269xA-020, Vector Signal Generator Option. These sources include:

• Data created by general signal generation software
IQ sample data files (in ASCII format) generated by common Electronic Design Automation (EDA) tools can be converted to waveform pattern files using the IQproducer conversion function.

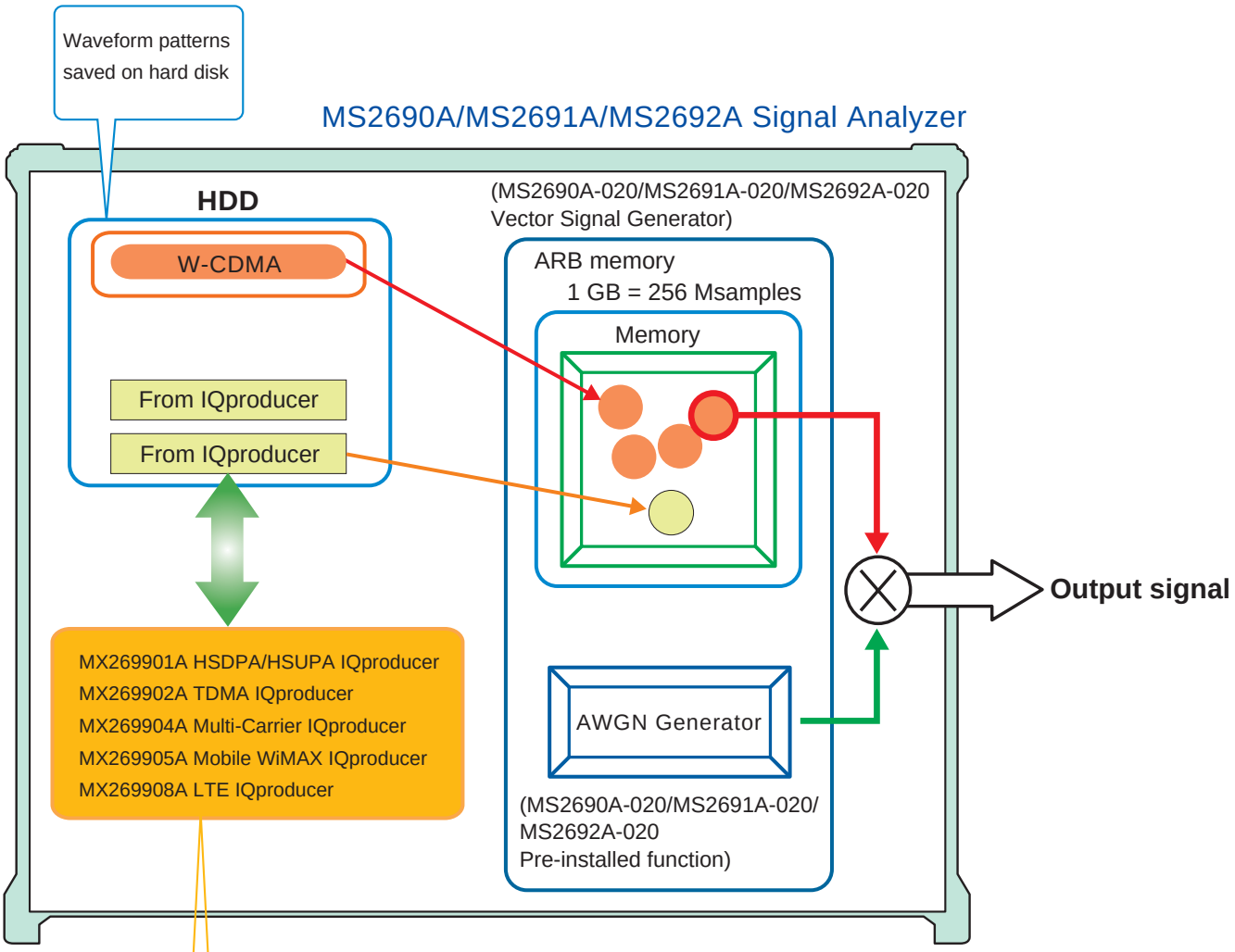
• Standard Built-in Waveform Patterns
Waveform patterns are pre-installed on the hard disk of MS269xA when the MS269xA-020, Vector Signal Generator option is installed. These files include waveforms for W-CDMA, HSDPA (Test Model 5), GSM/EDGE, and AWGN (using the AWGN generator function).

• Optional Waveform Patterns
Many arbitrary waveform pattern files are available pre-recorded. Anritsu can supply TD-SCDMA and Public Radio System (RCR STD-39, ARIB STD-T61/T79/T86) waveform patterns as optional software packages.

• IQproducer Waveform Generation Software
The optional IQproducer waveform generation software provides standards-based waveforms. With complete flexibility, the user may use the waveforms as defined by the standard or modify them to suit the application. Once created, the files are transferred to the MG3700A using a LAN connection or Compact Flash memory card. Available packages are described in this brochure.

Selection guide

Communication system		AWGN	W-CDMA	HSDPA (Test Model5)	HSDPA/HSUPA	GSM/EDGE	Advanced-PHS	PHS	PDC	ETC/DSRC	Mobile WiMAX (IEEE802.16e)	Multi-Carrier	3GPP LTE (FDD)
Page		4	6, 10	6	12	9	16	16	16	16	21	19	27
AWGN generator		✓											
Waveform pattern	Preinstalled		✓	✓		✓							
IQproducer	Standard accessories W-CDMA		✓										
	MX269901A HSDPA/HSUPA		✓		✓								
	MX269902A TDMA						✓	✓	✓	✓			
	MX269904A Multi-Carrier	Multi-carrier IQproducer is software that generates the multi-carrier signal based on waveform patterns of various telecommunications systems.											
	MX269905A Mobile WiMAX										✓		
	MX269908A LTE												✓



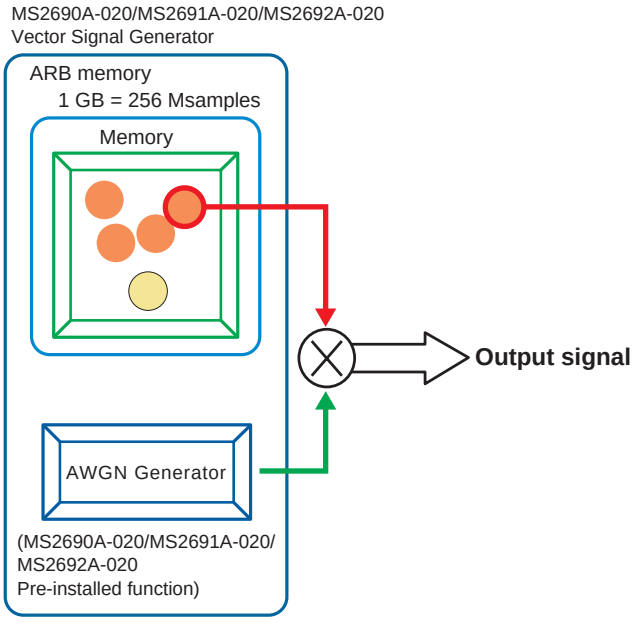
IQproducer is PC application software used for generating waveform pattern files for the MS2690A/MS2691A/MS2692A by editing parameters for the modulation signals matching the target communication system.
The generated waveform pattern files are saved in the MS2690A/MS2691A/MS2692A once and then loaded to the waveform memory for use.

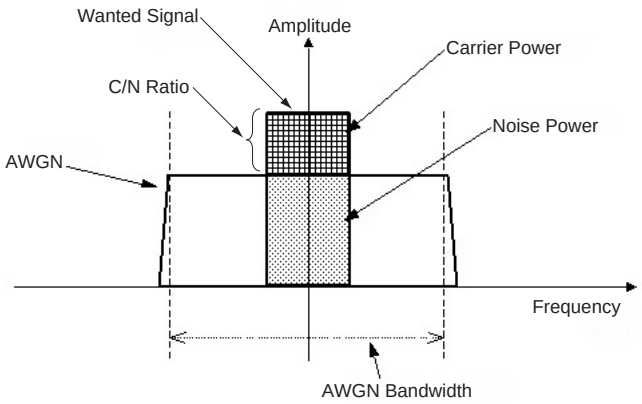
Additive White Gaussian Noise (AWGN) Generator

MS2690A-020/MS2691A-020/MS2692A-020 pre-installed function

AWGN Generator

The noise signal of the AWGN generator can be added to the wanted signal of the arbitrary waveform memory.





Carrier Power: Output level of wanted signal
Noise Power: Output level value of AWGN converted by bandwidth of wanted signal
(It is not displayed on the screen.)
C/N Ratio: Level ratio of Carrier Power and Noise Power.
Amplitude: Combination of wanted signal level and AWGN level.

• AWGN Bandwidth

The bandwidth of AWGN is the same as the sampling clock of the wanted signal.

Sample:

When the condition of the wanted signal is the following

- W-CDMA
- BW = 3.84 MHz
- Over sampling rate = 4

Calculation:

AWGN bandwidth
= 3.84 MHz x 4 = 15.36 MHz

• Condition of Parameter Setting Range

The parameter of the AWGN generator has the following restriction.

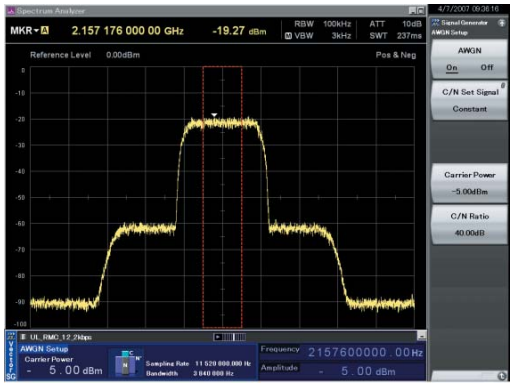
- –40 dB ≤C/N Ratio ≤+40 dB
- Amplitude ≤0 dBm

• Parameter Setting Range

Display	Function
AWGN On/Off	On, Off
C/N Set Signal	Carrier, Noise, Constant Carrier: Noise Power is a fixed value. Carrier Power is set. Noise: Carrier Power is a fixed value. Noise Power is set. Constant: Amplitude is a fixed value. Level ratio of C/N is set.
Carrier Power	The output level of Carrier Power is set.
C/N Ratio	Level ratio of Carrier Power and converted Noise Power is set. –40 dB ≤ C/N Ratio ≤ +40 dB

• AWGN Supports Dynamic Range Testing

The 3GPP specifications for testing receiver dynamic range require a AWGN + W-CDMA modulation signal.
The Internal AWGN generator can be used to produce the AWGN signal.



Wanted Signal + AWGN Output Waveform

W-CDMA Waveform Patterns

Standard

W-CDMA Waveform Patterns

The following W-CDMA waveform patterns are installed on the internal hard disk when MS269xA-020, Vector Signal Generator Option is installed. Details for each pattern file is given on the next page.

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

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

- 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_64kbps
  - DL_RMC_144kbps
  - DL_RMC_384kbps
  - DL_AMR_TFCS1
  - DL_AMR_TFCS2
  - DL_AMR_TFCS3
  - DL_ISDN
  - DL_384kbps_Packet
  - DL_Interfere

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 internal hard disk without setting any complex 3GPP-compliant parameters.

• W-CDMA Waveform Patterns List

Waveform Patterns	Uplink/ Downlink	Channel	3GPP (Release1999)	Evaluation
UL_RMC_12_2kbps	Uplink	DPCCH, DPDCH	TS25.104 A.2	BS RX Test
UL_RMC_64kbps		DPCCH, DPDCH	TS25.104 A.3	
UL_RMC_144kbps		DPCCH, DPDCH	TS25.104 A.4	
UL_RMC_384kbps		DPCCH, DPDCH	TS25.104 A.5	
UL_AMR_TFCS1		DPCCH, DPDCH	TS25.944 4.1.2	
UL_AMR_TFCS2		DPCCH, DPDCH		
UL_AMR_TFCS3		DPCCH, DPDCH		
UL_ISDN		DPCCH, DPDCH		
UL_64kbps_Packet		DPCCH, DPDCH		
UL_Interfere		DPCCH, DPDCH	TS25.141 I	
UL_RMC_12_2kbps_TX		DPCCH, DPDCH	TS25.101 A.2.1	UE TX Device Test
DL_RMC_12_2kbps_RX	Downlink	P-CPICH, SCH, PICH, DPCH	TS25.101 A.3.1 TS25.101 C.3.1	UE RX Test
DL_RMC_12_2kbps_MIL		P-CCPCH, SCH, PICH, DPCH, OCNS		
DL_RMC_12_2kbps		P-CCPCH, SCH, PICH, DPCH, OCNS	TS25.101 A.3.1 TS25.101 C.3.2	
DL_RMC_64kbps		P-CCPCH, SCH, PICH, DPCH, OCNS		
DL_RMC_144kbps		P-CCPCH, SCH, PICH, DPCH, OCNS	TS25.101 A.3.3/C.3.2	
DL_RMC_384kbps		P-CCPCH, SCH, PICH, DPCH, OCNS	TS25.101 A.3.4/C.3.2	
DL_AMR_TFCS1		P-CCPCH, SCH, PICH, DPCH, OCNS	TS25.944 4.1.1.3 TS25.101 C.3.2	
DL_AMR_TFCS2		P-CCPCH, SCH, PICH, DPCH, OCNS		
DL_AMR_TFCS3		P-CCPCH, SCH, PICH, DPCH, OCNS		
DL_ISDN		P-CCPCH, SCH, PICH, DPCH, OCNS		
DL_384kbps_Packet		P-CCPCH, SCH, PICH, DPCH, OCNS		
DL_Interfere		P-CPICH, P-CCPCH, SCH, PICH, OCNS	TS25.101 C.4	
DL_CPICH		P-CPICH	—	
TestModel_1_16DPCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 16 DPCH	TS25.141 6.1.1	BS TX Device Test
TestModel_1_32DPCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 32 DPCH		
TestModel_1_64DPCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 64 DPCH		
TestModel_2		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, DPCH		
TestModel_3_16DPCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 16 DPCH		
TestModel_3_32DPCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 32 DPCH		
TestModel_4		P-CCPCH, SCH		
TestModel_5_2HSPDSCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 6DPCH, HS-SCCH, 2HS-PDSCH		
TestModel_5_4HSPDSCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 14DPCH, HS-SCCH, 4HS-PDSCH		
TestModel_5_8HSPDSCH		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 30DPCH, HS-SCCH, 8HS-PDSCH		
TestModel_1_64DPCHx2 *1		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 64 DPCH		
TestModel_1_64DPCHx3 *1		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 64 DPCH		
TestModel_1_64DPCHx4 *1		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 64 DPCH		
TestModel_1_64x2_10M *1,*2		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 64 DPCH		
TestModel_1_64x2_15M *1,*2		P-CPICH, P-CCPCH, SCH, PICH, S-CCPCH, 64 DPCH		

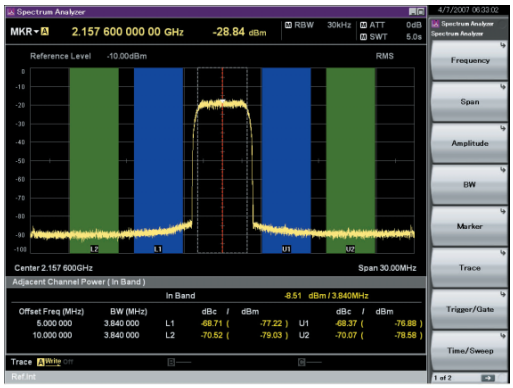
∗1: x2, x3, and x4 indicate multi-carrier 2, 3, and 4, respectively.
∗2: 10M and 15M indicate the multi-carrier interfrequency gap.

W-CDMA Waveform Patterns

Standard

• Adjacent Channel Leakage Power Ratio (ACPR)

The ACPR 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 x 4]

• AWGN Supports Dynamic Range Testing

The 3GPP specifications for testing receiver dynamic range require a AWGN + W-CDMA modulation signal.
The Internal AWGN generator can be used to produce the AWGN signal.

Wanted Signal + AWGN Output Waveform

• 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 x 4]

GSM/EDGE Waveform Patterns

Standard

GSM/EDGE Waveform Patterns

The GSM/EDGE waveform patterns listed in the table below are installed on the internal hard disk when the MS269xA-020, Vector Signal Generator Option is installed. Details for the pattern files are given below.
Signals for testing receivers and for evaluating devices in a GSM/EDGE system are output by selecting one of these GSM/EDGE waveform patterns.

- GMSK_PN9, 8PSK_PN9

PN9 data is inserted into the entire area that does not have the slot format. The PN9 data in each slot is continuous.

- GMSK_TN0, 8PSK_TN0

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

- NB_GMSK, NB_ALL_GMSK, NB_8PSK, NB_ALL_8PSK

PN9 data is inserted into the normal burst encrypted bit area. The PN9 data in the slots is continuous.

- TCH_FS

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

- CS-1_1 (4)_SLOT (_4SLOT)

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

- DL (UL)_MCS-1 (5, 9)_1SLOT (_4SLOT)

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

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

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

W-CDMA IQproducer

Standard accessory

W-CDMA IQproducer

W-CDMA IQproducer is GUI-based, PC application software for generating waveform patterns used in W-CDMA Rx sensitivity measurement. Once created, the waveform pattern file is downloaded to the MS269xA hard drive. Using the MS269xA-020, Vector Signal Generator Option functionality, the files are loaded, selected, and output as a modulated RF signal.
By changing the Scrambling Code Number and Channelization Code Number, waveform patterns can be created that support the evaluation of W-CDMA terminals.
If complete control of all W-CDMA parameters is required, the MX269901A HSDPA/HSUPA IQproducer software (sold separately) can be used. For details, see the MX269901A HSDPA/HSUPA IQproducer section of this document.

• IQproducer Operating Environment

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

• Downlink Settings

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

Easy Setup Items include:
RMC 12.2 kbps (RX test)
RMC 12.2 kbps (Performance test)
RMC 64 kbps (Performance test)
RMC 144 kbps (Performance test)
RMC 384 kbps (Performance test)

• Uplink Settings

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

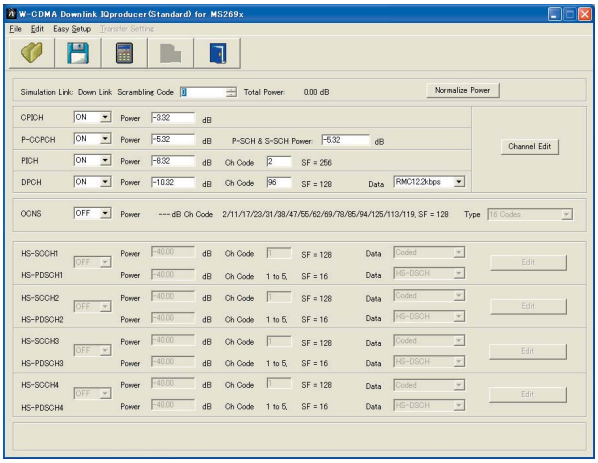
• Downlink Parameter Setting Range

Display	Setting range	
Scrambling Code		0 to 8191
CPICH	ON/OFF	ON or OFF
	Power	–40.00 to 0.00 dB, Resolution 0.01 dB
P-CCPCH	ON/OFF	ON or OFF
	Power	–40.00 to 0.00 dB, Resolution 0.01 dB
	P-SCH & S-SCH Power	–40.00 to 0.00 dB, Resolution 0.01 dB
PICH	ON/OFF	ON or OFF
	Power	–40.00 to 0.00 dB, Resolution 0.01 dB
	Channelization Code	0 to 255
DPCH	ON/OFF	ON or OFF
	Power	–40.00 to 0.00 dB, Resolution 0.01 dB
	Channelization Code	0 to SF –1 The spreading factor (SF) varies with the [Data] setting as follows: RMC 12.2 kbps = 128 RMC 64 kbps = 32 RMC 144 kbps = 16 RMC 384 kbps = 8 AMR1/AMR2/AMR3 = 128 ISDN = 32 384 kbps Packet = 8
	Data	RMC12.2 kbps, RMC 64 kbps, RMC 144 kbps, RMC 384 kbps, AMR1, AMR2, AMR3, ISDN, 384 kbps Packet
OCNS	ON/OFF	ON or OFF
	Type	16 Codes
P-CCPCH Edit	SFN Cycle	Short
DPCH Edit (Phy CH)	TFCI	0 to 1023
	Timing Offset	0 to 149
DPCH Edit (TrCH Edit)	Data	PN9, PN9fix, PN15fix, 16 bit Repeat

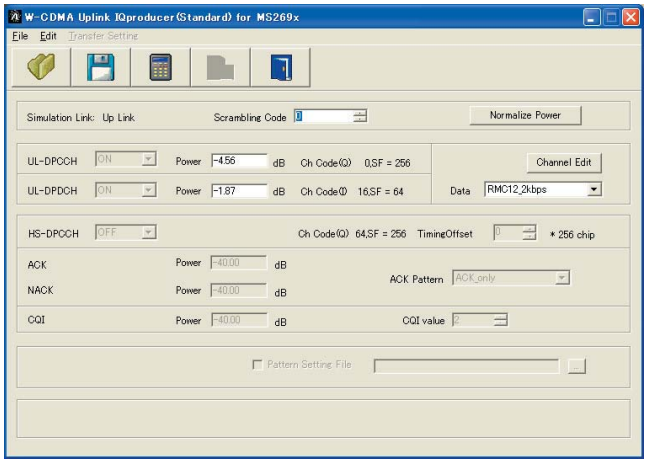
• Uplink Parameter Setting Range

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

Downlink Main screen



Uplink Main screen



MX269901A HSDPA/HSUPA IQproducer

Optional

HSDPA/HSUPA IQproducer

This optional GUI-based PC application software is used to set parameters and generate waveform patterns for 3GPP HSDPA/HSUPA (Uplink/Downlink) systems.
If complete control of all W-CDMA parameters is required, the MX269901A HSDPA/HSUPA IQproducer software (sold separately) can be used. For details, see the MX269901A HSDPA/HSUPA IQproducer section of this document.
Once created, the waveform pattern file is downloaded to the MS269xA hard drive. Using the MS269xA-020, Vector Signal Generator Option functionality, the files are loaded, selected, and output as a modulated RF signal.
The HS-PDSCH and HS-DPCCH parameters specified in TS25.212 can be set. The Downlink Easy Setup function assigns default values to some parameters and sets other items to typical values, making the creation of an accurate waveform pattern fast and easy.

• IQproducer Operating Environment

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

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

Easy Setup Items include:
FRC: H-Set1 (QPSK)
H-Set1 (16QAM)
H-Set2 (QPSK)
H-Set2 (16QAM)
H-Set3 (QPSK)
H-Set3 (16QAM)
H-Set4
H-Set5
RMC: RMC 12.2 kbps (RX test)
RMC 12.2 kbps (Performance test)
RMC 64 kbps (Performance test)
RMC 144 kbps (Performance test)
RMC 384 kbps (Performance test)

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

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

• Downlink Parameter Setting Range

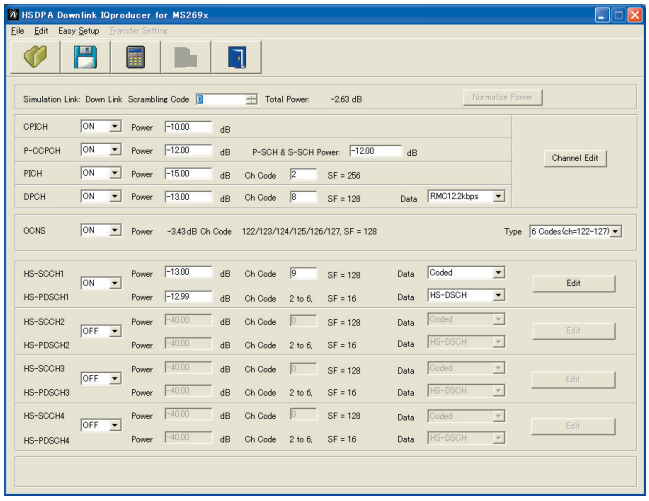
Display	Setting range	
Scrambling Code		0 to 8191
CPICH	ON/OFF	ON or OFF
	Power	–40.00 to 0.00 dB, Resolution 0.01 dB
P-CCPCH	ON/OFF	ON or OFF
	Power	–40.00 to 0.00 dB, Resolution 0.01 dB
	P-SCH & S-SCH Power	–40.00 to 0.00 dB, Resolution 0.01 dB
PICH	ON/OFF	ON or OFF
	Power	–40.00 to 0.00 dB, Resolution 0.01 dB
	Channelization Code	0 to 255
DPCH	ON/OFF	ON or OFF
	Power	–40.00 to 0.00 dB, Resolution 0.01 dB
	Channelization Code	0 to SF –1 The spreading factor (SF) varies with the [Data] setting as follows: RMC 12.2 kbps = 128 RMC 64 kbps = 32 RMC 144 kbps = 16 RMC 384 kbps = 8 AMR1/AMR2/AMR3 = 128 ISDN = 32 384 kbps Packet = 8 User Edit TrCH = Spreading Factor of Channel Edit screen
	Data	RMC12.2 kbps, RMC 64 kbps, RMC 144 kbps, RMC 384 kbps, AMR1, AMR2, AMR3, ISDN, 384 kbps Packet, User Edit TrCH
OCNS	ON/OFF	ON or OFF
	Type	16 Codes or 6 Codes (ch = 122 to 127) or 6 Codes (ch = 2 to 7)
HS-SCCH1/2/3/4	ON/OFF	ON or OFF
	Power	–40.00 to 0.00 dB, Resolution 0.01 dB
	Channelization Code	0 to 127
	Data	PN9, PN9fix, PN15fix, 16 bit Repeat, Coded
HS-PDSCH1/2/3/4	ON/OFF	ON or OFF
	Power	–40.00 to 0.00 dB
	Channelization Code	0 to 15
	Data	PN9, PN9fix, PN15fix, 16 bit Repeat, HS-DSCH
P-CCPCH Edit	SFN Cycle	Short
DPCH Edit (Phy CH)	DPCH Data	PN9, PN9fix, PN15fix, 16 bit Repeat, TrCH
	TFCI	0 to 1023
	Spreading Factor	4, 8, 16, 32, 64, 128, 256, 512
	BER	0.0 to 100.0%, Resolution 0.1%
	Slot Format	#0 to #16
	Timing Offset	0 to 149
	TPC Edit	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 to 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111

MX269901A HSDPA/HSUPA IQproducer

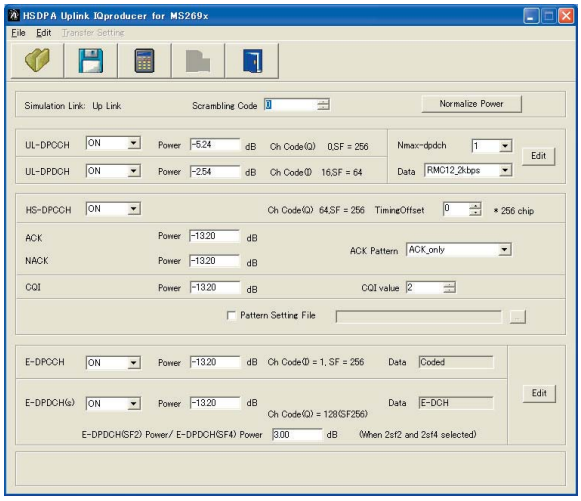
Optional

Display	Setting range	
DPCH Edit (TrCH Edit)	TrCH Number	1 to 8
	DTX	Fix/Flex
	Data	PN9, PN9fix, PN15fix, 16 bit Repeat
	TTI	10, 20, 40, 80 ms
	Max. TrBk Size	0 to 5000
	TrBk Size	0 to 5000
	Max TrBk Set No.	0 to 64
	TrBk Set No.	0 to 64
	CRC	0, 8, 12, 16, 24 bit
	Coder	CC1/2, CC1/3, TC
	RM attribute	1 to 256
	BER	0.0% to 100.0%, Resolution 0.1%
	BLER	0% to 100%, Resolution 1%
HSDPA transport channel (HS-SCCH, HS-PDSCH parameters)	Channelization Code Offset	1 to (16 - Number of Physical Channel Code)
	Number of Physical Channel Code	1 to (16 - Channelization Code Offset)
	Modulation	QPSK or 16QAM
	Transport Block Size Information	0 to 63
	RV Information	0 to 7
	UE Identity	0 to 65535
	CRC Error Insertion	Correct or Fail
	Number of HARQ Processes	0 to 8
	Virtual IR Buffer Size	800 to 304000
	Payload Data	PN9, PN9fix, PN15fix, 16 bit Repeat
Transmitting Pattern Edit	HARQ Process Cycle	1 to 16 (Note ranges from 1 to 6 when PN9 set for Payload Data)
	Inter-TTI Distance	1 to 8
	TTI Start Offset	0 to 7
	Process Setting File	Used or Not used

Downlink Main screen



Uplink Main screen



• Uplink Parameter Setting Range

Display	Setting range	
Scrambling Code		0 to 16777215
UL-DPCCH, UL-DPDCH	Channel ON/OFF	ON or OFF
	Power	–40.00 to 0 dB, Resolution 0.01 dB
	Nmax-dpdch	0, 1
	Data	RMC 12.2 kbps, RMC 64 kbps, RMC 144 kbps, RMC 384 kbps, AMR1, AMR2, AMR3, ISDN, 64 kbps Packet, User Edit TrCH
HS-DPCCH	ON/OFF	ON or OFF
	Timing Offset	0 to 149
	ACK Power	–40.00 to 0 dB, Resolution 0.01 dB
	NACK Power	–40.00 to 0 dB, Resolution 0.01 dB
	CQI Power	–40.00 to 0 dB, Resolution 0.01 dB
	ACK Pattern	ACK_only, NACK_only, alt_ACK_NACK_DTX
	CQI value	0 to 30
	Pattern Setting File	Used or Not used
E-DPCCH, E-DPDCH	E-DPCCH ON/OFF	ON or OFF
	E-DPDCH ON/OFF	ON or OFF
	E-DPCCH Power	–40.00 to 0 dB, Resolution 0.01 dB
	E-DPDCH Power	–40.00 to 0 dB, Resolution 0.01 dB
	E-DPDCH (SF2) Power/ E-DPDCH (SF4) Power	–10.00 to 10.00 dB, Resolution 0.01 dB
DPCH Edit (Phy CH)	UL-DPDCH Data	PN9, PN9fix, PN15fix, 16 bit Repeat, TrCH
	TFCI	0 to 1023
	Spreading Factor	4, 8, 16, 32, 64, 128, 256
	BER	0.0% to 100.0%
	Slot Format	#0 to #1
	Timing Offset	0 to 149
	TPC Edit	0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 to 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111 1111
DPCH Edit (TrCH Edit)	TrCH Number	1 to 8
	Data	PN9, PN9fix, PN15fix, 16 bit Repeat
	TTI	10, 20, 40, 80 ms
	Max. TrBk Size	0 to 5000
	TrBk Size	0 to 5000
	Max TrBk Set No.	0 to 64
	TrBk Set No.	0 to 64
	CRC	0, 8, 12, 16, 24 bit
	Coder	CC1/2, CC1/3, TC
	RM attribute	1 to 256
	BER	0.0% to 100.0%, Resolution 0.1%
	BLER	0% to 100%, Resolution 1%
E-DPDCH and E-DPCCH Edit (Phy CH)	HARQ Process Setting File	Common dialog opens when the check box is checked. HARQ Process Setting File can be selected.
	E-DPCCH Data	PN9, PN9fix, PN15fix, 16 bit Repeat, Coded
	E-DPDCH Data	PN9, PN9fix, PN15fix, 16 bit Repeat, E-DCH
	HS-DSCH Configured	Yes, No
	E-DPDCH Channel Codes	SF256, SF128, SF64, SF32, SF16, SF8, SF4, 2SF4, 2SF2, 2SF2and2SF4
E-DPDCH and E-DPCCH Edit (Tr CH)	E-DCH TTI	2 ms, 10 ms
	Information Bit Payload	18 to 11484 (at E-DCH TTI = 2 ms) 18 to 20000 (at E-DCH TTI = 10 ms)
	E-DCH Payload Data	PN9, PN9fix, PN15fix, 16 bit Repeat
	E-TFCI Information	0 to 127
	RSN	0 to 3
	Pattern Length	Display only
	E-DCH RV Index	0 to 3
	CRC Error Insertion	Correct, Error
	"Happy" Bit	0, 1

MX269902A TDMA IQproducer

Optional

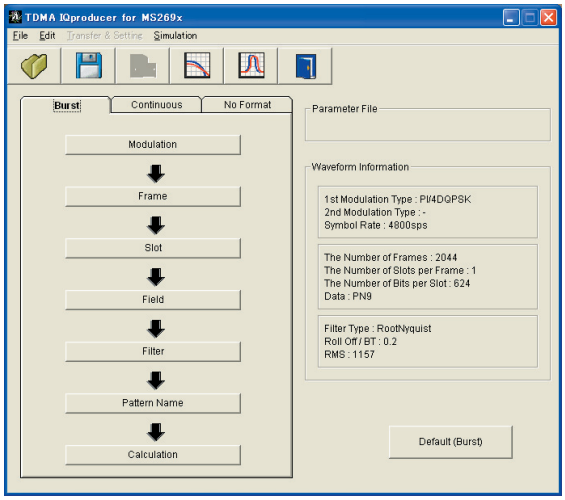
TDMA IQproducer

This optional GUI-based PC application software is used to set the parameters and generate waveform patterns for TDMA systems. Once created, the waveform pattern file is downloaded to the MS269xA hard drive. Using the MS269xA-020, Vector Signal Generator Option functionality, the files are loaded, selected, and output as a modulated RF signal. In addition to signals supporting PDC, PHS, ARIB STD-T61/T79/T86, Advanced-PHS, ETC and DSRC systems, signals for other systems can also be generated.

- IQproducer Operating Environment

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

Main Screen



- Parameter Setting Items List

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

• Parameter Setting Items List

Items	Display	Outline	Setting range
Modulation	Modulation Type (1st Modulation Type)	1st Modulation Type	BPSK, DBPSK, PI/2DBPSK, QPSK, DQPSK, PI/4DQPSK, 8PSK*, D8PSK*, 16QAM*, 32QAM*, 64QAM*, 256QAM*, ASK, FSK (* Decimal numbers for each symbol point are changed by selecting a user file for IQ mapping.)
	Modulation Type (2nd Modulation Type)	2nd Modulation Type	BPSK, DBPSK, PI/2DBPSK, QPSK, DQPSK, PI/4DQPSK, 8PSK, D8PSK, 16QAM, 32QAM, 64QAM, 256QAM
	Symbol Rate	Symbol Rate	1 ksps to 80 Msps (can be set in the 1 sps units)
	Over Sampling	Over Sampling Rate	2, 3, 4, 8, 16, 32
	Sampling Rate	Sampling Rate	20 kHz to 160 MHz (The value of symbol rate x oversampling rate is set automatically. However, when the Manchester code setting enabled, the value of symbol rate x oversampling rate x 2 is set automatically.)
	GSM	GSM Setting	Enable/disable automatic setting in accordance with GSM (Enabled when 8PSK or FSK set as modulation type)
	Modulation Index	Modulation Index	0.00 to 1.00 (for ASK), 0.20 to 10.00 (for FSK)
	Manchester Code	Manchester Code	The Manchester code is selected when this checkbox is selected, and NRZ is selected when this checkbox is cleared. NRZ is always selected for modulation types other than ASK.
Frame	Number of Frames	Frame number	1 to 4088, Auto
	Number of Slots per Frame	Slot numbers in one frame	1 to 20
Slot (Burst)	1, 24 field	Guard field	Set the number of bits listed in the separate table according to Modulation Type.
	2, 23 field	Ramp field	Set the number of bits listed in the separate table according to Modulation Type.
	3 to 22 field	Fixed (Fixed data) field	Set integer from 0 to 128.
	3 to 22 field	Data (PN9, PN15) field	Set integer from 0 to 1024.
	4 to 22 field	CRC (Cyclic Redundancy Check character) field	0, 8, 12, 16, 24, 32
Slot (Continuous)	1 to 24 field	Fixed (Fixed data) field	Set integer from 0 to 128.
	1 to 24 field	Data (PN9, PN15) field	Set integer from 0 to 1024.
	2 to 24 field	CRC (Cyclic Redundancy Check character) field	0, 8, 12, 16, 24, 32
Field (Burst/ Continuous)	Fixed	Sets hexadecimal fixed data	0 to maximum value of number of bits set
	CRC	Sets CRC calculation field as integer	1 to number of bits in field on left to CRC (except Guard and Ramp fields)
	Data Field	Selects continuous pattern	PN9, PN15, 16 bit Pattern, ALL0, ALL1, UserFile** Input any hexadecimal number for 16 bit Pattern.
Data (No Format)	Data	Selects continuous pattern	PN9, PN15, 16 bit Pattern, ALL0, ALL1, UserFile**
Filter	Filter	Filter type	Root Nyquist, Nyquist, Gaussian, IdealLowpass, None
	Roll Off/BT	Roll off rate/BT product	0.10 to 1.00 (When Nyquist/Root Nyquist/Gaussian is set.)
	Passband	Passband of filter	Fs/2, Fs/3, Fs/4, Fs/8, Fs/16, Fs/32 (This item is displayed and can be set only when IdealLowpass is set as the filter type. The setting range varies with the oversampling rate.)
	RMS	RMS value of waveform pattern data	1157
Pattern Name	Package	Package name	Within 31 characters
	Pattern Name	Waveform pattern file name	Within 20 characters
	Comment	Comment	Within 38 characters
Calculation	Starts waveform pattern data generation after setting parameters.		

** When "UserFile" is set, the binary sequence is read from a text file. Up to 9,600,000 bits can be loaded and then modulated.

• Guard Field Setting Range

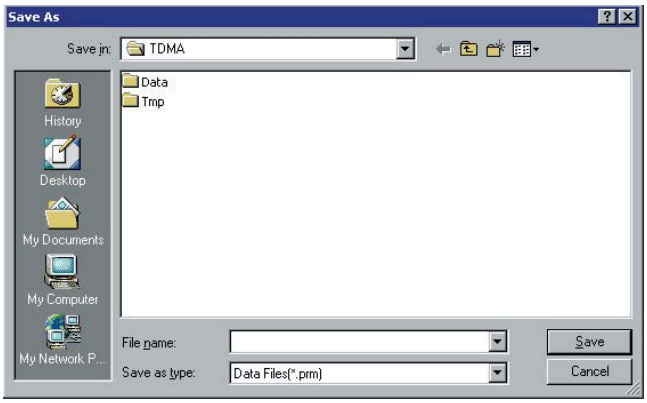
(1st/2nd) Modulation Type	Number of Bits in 1st Field	Number of Bits in 24th Field
BPSK, DBPSK, PI/2DBPSK, ASK, FSK	Integer between 0 and 9960	Integer between 0 and 9960
QPSK, DQPSK, PI/4DQPSK	Multiples of 2 between 0 and 9960	Multiples of 2 between 0 and 9960
8PSK, D8PSK	Multiples of 3 between 0 and 9960	Multiples of 3 between 0 and 9960
16QAM	Multiples of 4 between 0 and 9960	Multiples of 4 between 0 and 9960
32QAM	Multiples of 5 between 0 and 9960	Multiples of 5 between 0 and 9960
64QAM	Multiples of 6 between 0 and 9960	Multiples of 6 between 0 and 9960
256QAM	Multiples of 8 between 0 and 9960	Multiples of 8 between 0 and 9960

Optional

• Ramp Field Setting Range

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

• Parameter Save/Recall



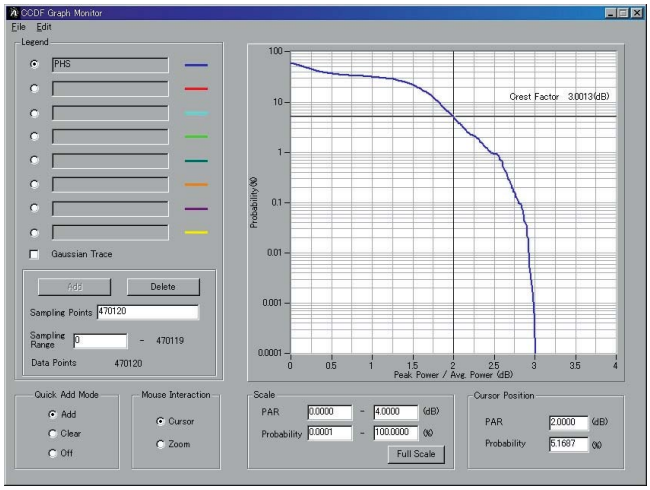
The numeric values and settings for each item can be saved in a parameter file. Enter the file name in the [File name] field and click the [Save] button to save the parameter file.
A saved parameter file is recalled by selecting it in the file list and clicking the [Open] button.

• Graphical Simulation Displays

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

CCDF Graph

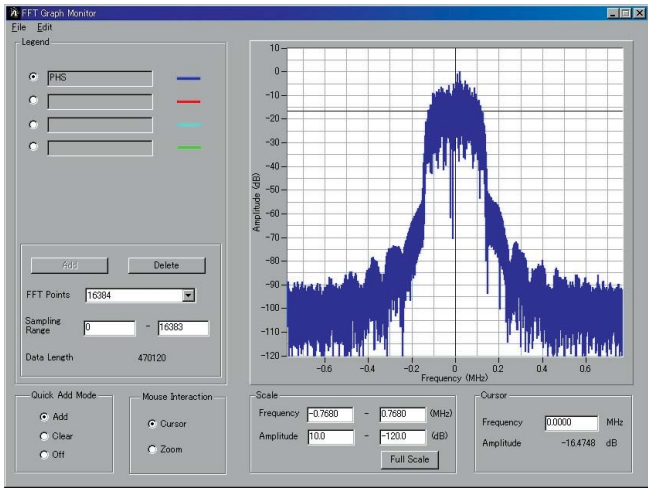
Up to eight generated waveform patterns can be read and displayed as CCDF graphs.



CCDF Graph Screen

FFT Graph

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



FFT Graph Screen

MX269904A Multi-Carrier IQproducer

Optional

Multi-Carrier IQproducer

This GUI-driven PC application software is used to create a multi-carrier waveform pattern for modulated signals and tone signals of communications systems. Once created, the waveform pattern file is downloaded to the MS269xA hard drive. Using the MS269xA-020, Vector Signal Generator Option functionality, the files are loaded, selected, and output as a multi-carrier RF signal. W-CDMA downlink multi-carrier signals are supported as well as various types of clipping.

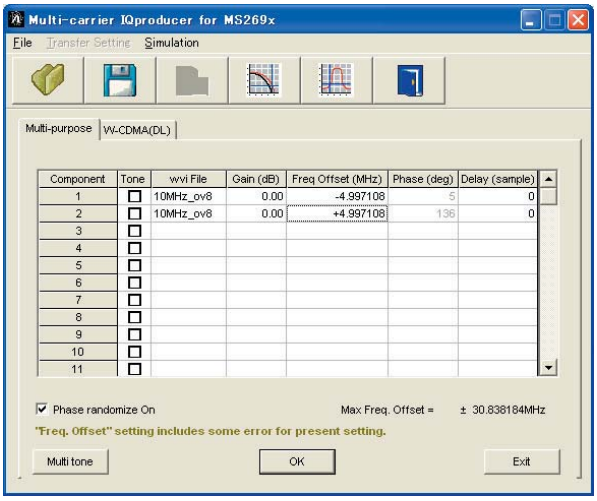
• IQproducer Operating Environment

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

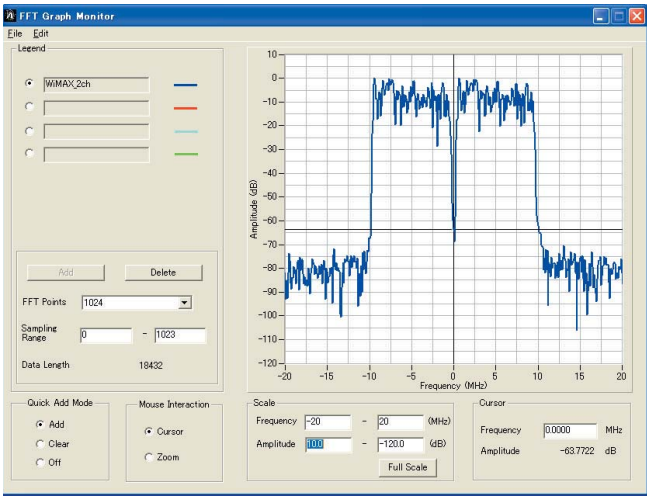
• Multi-purpose Function

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

Ex) 10 MHz Bandwidth WiMAX x 2 carrier



Multi-carrier Setting Screen



FFT Analysis Screen

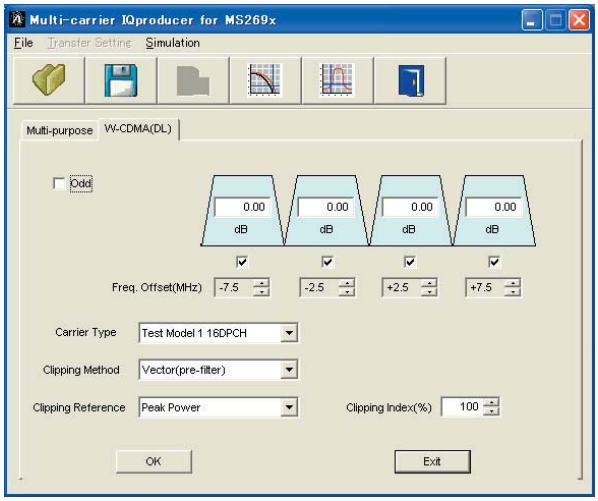
MX269904A Multi-Carrier IQproducer

Optional

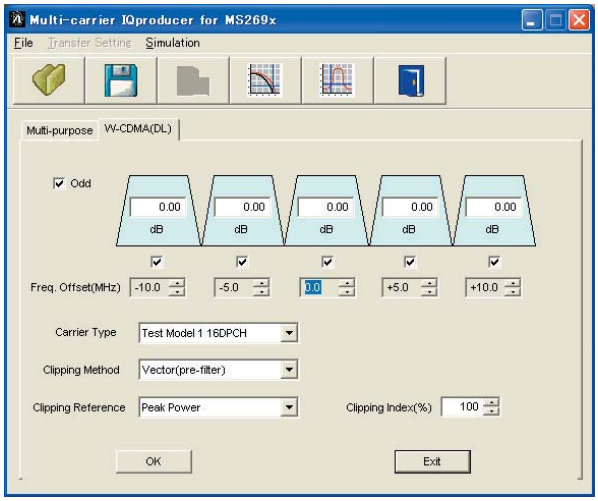
• W-CDMA (DL) Function

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

- Carrier Type
  Test Model 1 16DPCH, Test Model 1 32DPCH,
  Test Model 1 64DPCH,
  Test Model 5 2HS-PDSCH, Test Model 5 4HS-PDSCH,
  Test Model 5 8HS-PDSCH
- Clipping Method
  Non, Vector (pre-filter), Vector (post-filter),
  Scalar (pre-filter), Scalar (post-filter)
- Clipping Reference level
  Peak Power, RMS Power



Multi-carrier Setting Screen



Multi-carrier Setting Screen

MX269905A Mobile WiMAX IQproducer

Optional

Mobile WiMAX IQproducer

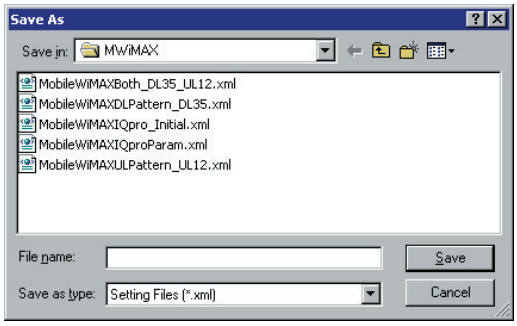
This GUI-driven PC application software is used to set parameters and generate waveform patterns based on the IEEE 802.16e-2005 WirelessMAN-OFDMA standard. Signals that comply with this particular specification are also knows as mobile WiMAX signals. Once created, the waveform pattern file is downloaded to the MS269xA hard drive. Using the MS269xA-020, Vector Signal Generator Option functionality, the files are loaded, selected, and output as a modulated WiMAX signal. Permutation zones and user bursts are easy to configure in a frame using drop-and-drag functionality in a user-friendly GUI. Modulation, coding type, and coding rate can be set for each user burst. Most receiver tests described in IEEE 802.16e-2005 (Section 8.4.13, Receiver Requirement) can be performed except those functional tests requiring equipment other than a Signal Generator.

- IQproducer Operating Environment

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

- Parameter Save/Recall

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



- Graphical Simulation Displays

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

CCDF Graph

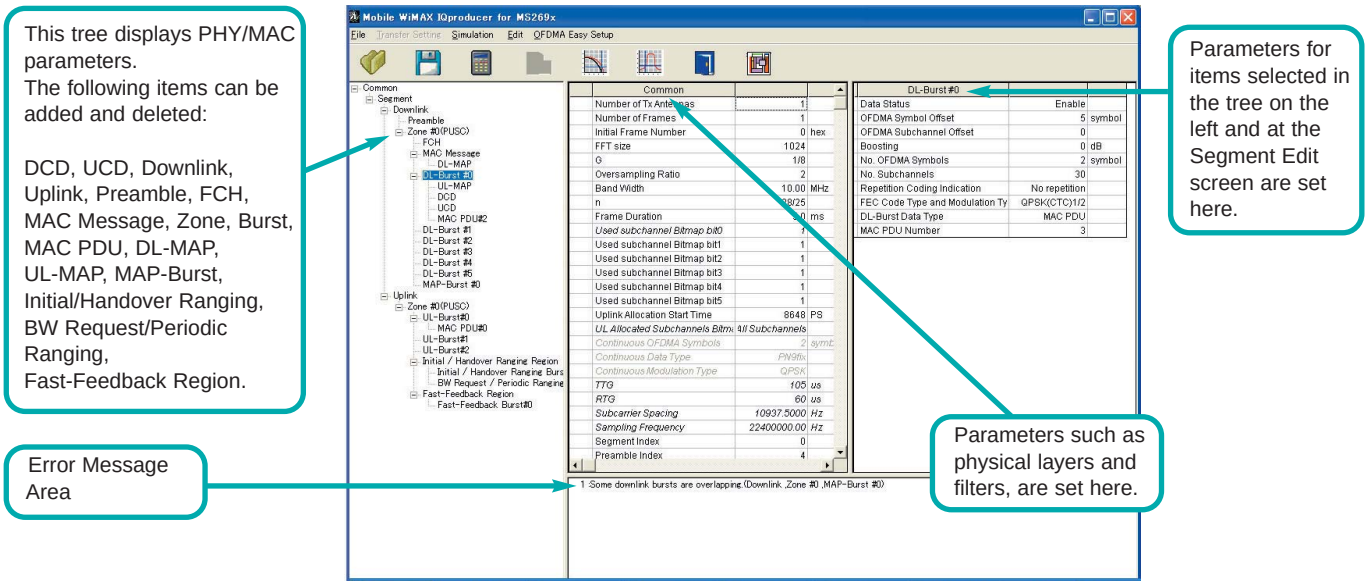
Up to eight generated waveform patterns can be read and displayed as CCDF graphs.

FFT Graph

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

MX269905A Mobile WiMAX IQproducer

Optional

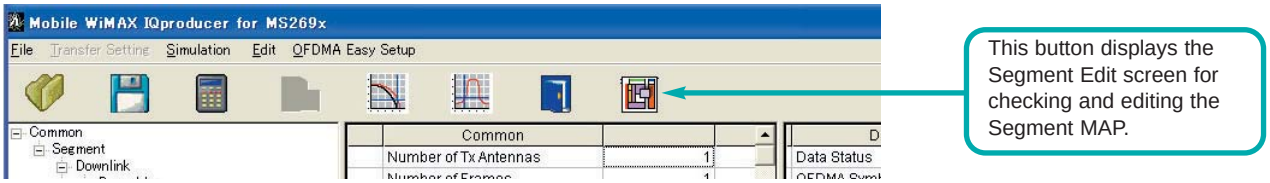


Mobile WiMAX IQproducer Main Screen

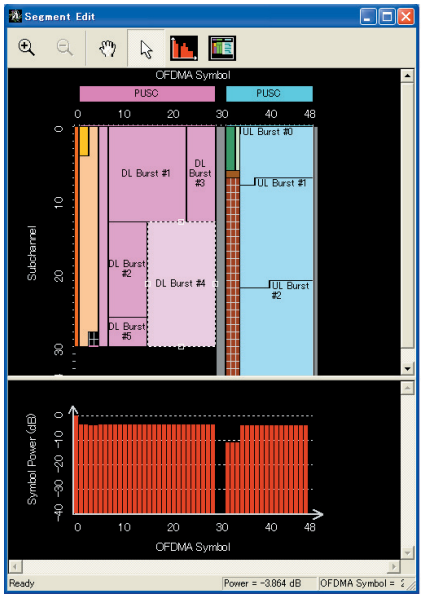
Excellent Operability: Segment Edit Screen

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

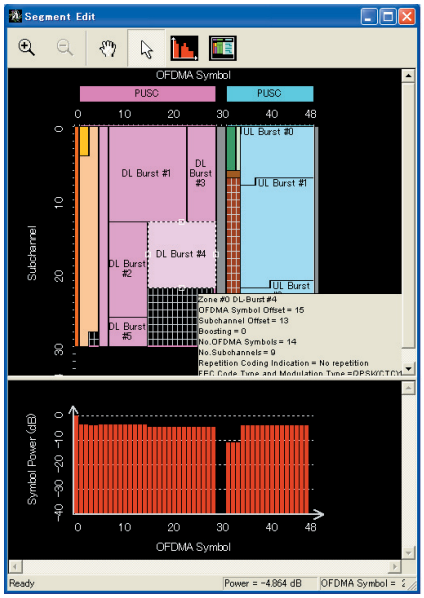
Mobile WiMAX IQproducer Main Screen



Segment Edit Screen



Segment Edit Screen



• Parameter Setting Items

Tree	Items	Setting Range	Frame Duration = Continuous
Common	Number of Tx Antennas	1, 2	
	Number of Frames*1	1 to maximum number of Frames saved in memory	Can not be set.
	Initial Frame Number	000000 to FFFFFF (hex)	Can not be set.
	FFT size	128, 512, 1024, 2048	
	G (CP Time Ratio)	1/4, 1/8, 1/16, 1/32	
	Oversampling Ratio	2, 4, 8	
	Bandwidth	1.25, 1.50, 1.75, 2.50, 3.00, 3.50, 5.00, 6.00, 7.00, 8.75, 10.00, 12.00, 14.00, 15.00, 17.50, 20.00, 24.00, 28.00 MHz	
	n (Sampling Factor)	8/7, 28/25	
	Frame Duration	2.0, 2.5, 4.0, 5.0, 8.0, 10.0, 12.5, 20.0 ms, Continuous	
	Used Subchannel Bitmap bit0 to bit5*1	1, 0	
	Uplink Allocation Start Time*1	0 to Frame EndPS	Can not be set.
	Uplink Allocation Subchannels Bitmaps	All Subchannels	
	Continuous OFDMA Symbols*1	2 to maximum number of OFDMA Symbols saved in memory (2-symbol steps)	Can be set.
	Continuous Data Type	16 bit Repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, User File	Can be set.
	Continuous Data Type Repeat Data	0000 to FFFF (hex): When Continuous Data Type = 16 bit Repeat	Can be set.
	Continuous Data Type User File	User File is selected: When Continuous Data Type = User File	Can be set.
	Continuous Modulation Type	QPSK, 16QAM, 64QAM: Can be set when Frame Duration = Continuous	Can be set.
	TTG	Display only: Gap interval between Downlink and Uplink displayed	
	RTG	Display only: Gap interval between Uplink and Frame End displayed	
	Subcarrier Spacing	Display only	
	Sampling Frequency	Display only: Depends on Bandwidth, n (Sampling Factor), and Oversampling Ratio settings	
	Segment Index	0, 1, 2	Can not be set.
	Preamble Index	<Table 1>	Can not be set.
	Roll Off Length	0 to 32	
	Filter		
	Filter Type	Non, Gaussian, Root Nyquist, Nyquist, Ideal	
	Roll-Off/BT	0.1 to 1.0: Cannot be set when Filter Type = Non, Ideal.	
	Filter Length	1 to 1024: Cannot be set when Filter Type = Non, Ideal.	
	DLFP		
	Repetition Coding Indication	No repetition, 2, 4, 6	Can not be set.
	Coding Indication	CC, CTC	Can not be set.
Segment	Multi-Path Setting	Enable, Disable	
	Tx Antenna0, 1	Multi-Path Number: 1 to 20 Delay: 0.0 to 10000.0 ns Gain: –80.0 to 0.0 dB Phase: 0.0 to 359.9 deg	

*1: Read the product introduction materials for details of parameter settings.

Table 1: Preamble Index Setting Range

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

Optional

- Downlink [PHY/MAC] Parameter Setting Range

Tree	Items	Setting Range
Downlink	Data Status	Enable, Disable
Preamble	Data Status	Enable, Disable
	Preamble Index	Display only: Set at Common.
	IDcell	Display only: Depends on Preamble Index settings
Zone 0 to 7	Data Status	Enable, Disable
	Permutation	PUSC, PUSC (all SC), FUSC, AMC (6 x 1), AMC (3 x 2), AMC (2 x 3), AMC (1 x 6)
	STC/MIMO	No transmit diversity, 2 Antenna MatrixA (STTD), 2 Antenna MatrixB vertical encoding
	OFDMA Symbol Offset	<Zone#0> 0 (Without Preamble), 1 (With Preamble) <Zone#1 to 7> 0 to 255 symbol (Without Preamble), 1 to 255 symbol (With Preamble)
	No. OFDMA Symbols	1 to 255 symbol [when FUSC and AMC (6 x 1)], 2 to 254 symbol [when PUSC, PUSC (all SC) and AMC (3 x 2)], 3 to 255 symbol [when AMC (2 x 3)], 6 to 252 symbol [when AMC (1 x 6)]
	DL-PermBase	0 to 31 (Cannot be set at Zone#0)
	DL-Burst Number	1 to 16
	PRBS_ID	0 to 3 (Cannot be set at Zone#0)
FCH	Data Status	Enable, Disable
	FCH Type	16 bit Repeat, PN9fix, PN15fix, DLFP, User File
	FCH Type Repeat Data	0000 to FFFF (hex): Can be set when FCH Type = 16 bit Repeat
	FCH Type User File	User File selected: Can be set when FCH Type = User File
	Used Subchannel Bitmap bit0 to 5	Display only: Set at Common.
	Repetition Coding Indication	Display only: Set at Common.
	Coding Indication	Display only: Set at Common.
	DL-MAP Length	Display only: Set at DL-MAP.
MAC Message	Data Status	Enable, Disable
DL-MAP	Data Status	Enable, Disable
	DL-MAP Type*1	16 bit Repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, DL-MAP, Compressed DL-MAP, User File
	DL-MAP Type Repeat Data	0000 to FFFF (hex): Can be set when DL-MAP Type = 16 bit Repeat
	DL-MAP Type User File	User File selected: Can be set when DL-MAP Type = User File
	DL-MAP Length*1	0 to 255 slot
	DCD Count	0 to 255: Can be set when DL-MAP Type = DL-MAP or Compressed DL-MAP
	Base Station ID	0000 0000 0000 to FFFF FFFF FFFF (hex): Can be set when DL-MAP Type = DL-MAP or Compressed DL-MAP
	DL-MAP PHY Synchronization Field	
	Frame Duration	Display only: Set at Common.
	Initial Frame Number	Display only: Set at Common.
	Zone # DL-MAP IE #	
	DIUC (Downlink Interval Usage Code)	0 to 12
	OFDMA Symbol Offset	Display only: Set at DL-Burst.
	OFDMA Subchannel Offset	Display only: Set at DL-Burst.
	Boosting	Display only: Set at DL-Burst.
	No. OFDMA Symbol	Display only: Set at DL-Burst.
	No. Subchannels	Display only: Set at DL-Burst.
	Repetition Coding Indication	Display only: Set at DL-Burst.
	Zone # STC/Zone switch IE	
	OFDMA Symbol Offset	Display only: Set at DL-Zone.
	Permutation	Display only: Set at DL-Zone.
	DL Use All SC Indicator	Display only
	DL-PermBase	Display only: Set at DL-Zone.
DL-Burst 0 to 15	Data Status	Enable, Disable
	OFDMA Symbol Offset*1	0 to 255
	OFDMA Subchannel Offset	0 to 63 [without AMC (2 x 3) and AMC (1 x 6)], 0 to 255 [when AMC (2 x 3) and AMC (1 x 6)]
	Boosting	–12, –9, –6, –3, 0, +3, +6, +9 dB
	No. OFDMA Symbols	1 to 127 symbol
	No. Subchannels	1 to 63
	Repetition Coding Indication*1	No repetition, 2, 4, 6
	FEC Code Type and Modulation Type	QPSK (CC) 1/2, QPSK (CC) 3/4, 16QAM (CC) 1/2, 16QAM (CC) 3/4, 64QAM (CC) 1/2, 64QAM (CC) 2/3, 64QAM (CC) 3/4, QPSK (CTC) 1/2, QPSK (CTC) 3/4, 16QAM (CTC) 1/2, 16QAM (CTC) 3/4, 64QAM (CTC) 1/2, 64QAM (CTC) 2/3, 64QAM (CTC) 3/4, 64QAM (CTC) 5/6, QPSK (No Ch Coding), 16QAM (No Ch Coding) , 64QAM (No Ch Coding)
	DL-Burst Data Type	16 bit Repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, MAC PDU, User File
	DL-Burst Data Type Repeat Data	0000 to FFFF (hex): Can be set when DL-Burst Data Type = 16 bit Repeat
	DL-Burst Data Type User File	User File selected: Can be set when DL-Burst Data Type = User File
	MAC PDU Number	0 to 32
UL-MAP	Data Status	Enable, Disable
	UL-MAP Type	16 bit Repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, UL-MAP, Compressed UL-MAP, User File
	UL-MAP Type Repeat Data	0000 to FFFF (hex): Can be set when UL-MAP Type = 16 bit Repeat.
	UL-MAP Type User File	User File selected: Can be set when UL-MAP Type = User File.
	UL-MAP Length*1	0 to 2037 bytes
	UCD Count	0 to 255: Can be set when UL-MAP Type = UL-MAP or Compressed UL-MAP
	Uplink Allocation Start Time	Display only: Set at Common.

Tree	Items	Setting Range
UL-MAP	Zone# UL-MAP IE #	
	CID	0 to 65535
	UIUC (Uplink Interval Usage Code)	1 to 10
	UL-Burst Duration	Display only: Set at UL-Burst.
	Repetition Coding Indication	Display only: Set at UL-Burst.
MAC PDU 0 to 31	Data Status	Enable, Disable
	MAC PDU Length	Display only
	Payload Data Length	0 to 2041 byte (when CI = No CRC), 0 to 2037 bytes (when CI = With CRC), 0 to 2047 byte (when CI = Without Header & CRC)
	CID (Connection Identifier)	0 to 65535
	CI	With CRC, No CRC, Without Header & CRC
	Payload Type	16 bit Repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, User File
	Payload Type Repeat Data	0000 to FFFF: Can be set when Payload Type = 16 bit Repeat.
	Payload Type User File	User File selected: Can be set when Payload Type = User File.
DCD	Data Status	Enable, Disable
	DCD Length*1	Display only
	Configuration Change Count	0 to 255
	TLV encoded information for Overall Type	16 bit Repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, User File (Discontinuous between Frames)
	TLV encoded information for Overall Type Repeat Data	0000 to FFFF (hex): Can be set when TLV encoded information for overall Type = 16 bit Repeat
	TLV encoded information for Overall Type User File	User File selected: Can be set when TLV encoded information for overall Type = User File
	TLV encoded information for Overall Length	0 to 2037 bytes
	Zone # DL-Burst Profile	
	DL-Burst Profile Length	Display only
	DIUC	0 to 12
	TLV Encoded Information Type	16 bit Repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, User File (Discontinuous between Frames)
	TLV Encoded Information Type Repeat Data	0000 to FFFF (hex): Can be set when TLV encoded information Type = 16 bit Repeat
	TLV Encoded Information Type User File	User File selected: Can be set when TLV encoded information Type = User File
	TLV Encoded Information Length	0 to 254 bytes
UCD	Data Status	Enable, Disable
	UCD Length*1	Display only
	Configuration Change Count	0 to 255
	Ranging Backoff Start	0 to 255
	Ranging Backoff End	0 to 255
	Request Backoff Start	0 to 255
	Request Backoff End	0 to 255
	TLV Encoded Information for Overall Type	16 bit Repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, User File (Discontinuous between Frames)
	TLV Encoded Information for Overall Type Repeat Data	0000 to FFFF (hex): Can be set when TLV encoded information for overall Type = 16 bit Repeat
	TLV Encoded Information for Overall Type User File	User File selected: Can be set when TLV encoded information for overall Type = User File
	TLV Encoded Information for Overall Length*1	0 to 2037 bytes
	Zone # UL-Burst Profile #	
	UL-Burst Profile Length	Display only
	UIUC	1 to 10
	TLV Encoded Information Type	16 bit Repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, User File (Discontinuous between Frames)
	TLV Encoded Information Type Repeat Data	0000 to FFFF: Can be set when TLV encoded information Type = 16 bit Repeat
	TLV Encoded Information Type User File	User File selected: Can be set when TLV encoded information Type = User File
	TLV Encoded Information Length	0 to 254 bytes
MAP-Burst	Data Status	Enable, Disable
	OFDMA Symbol Offset	0 to 255
	OFDMA Subchannel Offset	0 to Number of Subchannel in Zone
	Length	1 to 255 slot
	Repetition Coding Indication	No Repetition, 2, 4, 6
	FEC Code Type and Modulation Type	QPSK (CC) 1/2, QPSK (CC) 3/4, 16QAM (CC) 1/2, 16QAM (CC) 3/4, 64QAM (CC) 1/2, 64QAM (CC) 2/3, 64QAM (CC) 3/4, QPSK (CTC) 1/2, QPSK (CTC) 3/4, 16QAM (CTC) 1/2, 16QAM (CTC) 3/4, 64QAM (CTC) 1/2, 64QAM (CTC) 2/3, 64QAM (CTC) 3/4, 64QAM (CTC) 5/6, QPSK (No Ch Coding) , 16QAM (No Ch Coding) , 64QAM (No Ch Coding)
	MAP-Burst Data Type	16 bit Repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, MAC PDU, User File
	MAP-Burst Data Type Repeat Data	0000 to FFFF: Can be set when MAP-Burst Data Type = 16 bit Repeat.
	MAP-Burst Data Type User File	User File selected: Can be set when MAP-Burst Data Type = User File.
	MAC PDU Number	0 to 32: Can be set when MAP-Burst Data Type = MAC PDU.

*1: Read the product introduction materials for details of parameter settings.

• Uplink [PHY/MAC] Parameter Setting Range

Tree	Items	Setting Range
Uplink	Data Status	Enable, Disable
Zone 0 to 7	Data Status	Enable, Disable
	Permutation	PUSC, PUSC (w/o SC rotation), AMC (6 x 1), AMC (3 x 2), AMC (2 x 3), AMC (1 x 6)
	STC/MIMO	Display only
	OFDMA Symbol Offset	0 to 255 symbol (at Zone#0: 0)
	No. OFDMA Symbols	1 to 255 symbol
	UL-PermBase	0 to 69
	UL-Burst Number	1 to 16
UL-Burst 0 to 15	Data Status	Enable, Disable
	ODFMA Symbol Offset	Zone OFDMA Symbol Offset to “Zone OFDMA Symbol Offset + Zone No. OFDMA Symbol”
	OFDMA Subchannel Offset	0 to Zone Subchannel-1
	UL Burst Duration	1 to 1023 [when AMC (6 x 1)], 2 to 2046 [when AMC (3 x 2)], 3 to 3069 [when PUSC, PUSC (w/o SC rotation) and AMC (2 x 3)], 6 to 6138 [when AMC (1 x 6)]
	Burst Power Offset	–10.00 to 10.00 dB
	Repetition Coding Indication*1	No repetition, 2, 4, 6
	FEC Code Type and Modulation Type	QPSK (CC) 1/2, QPSK (CC) 3/4, 16QAM (CC) 1/2, 16QAM (CC) 3/4, 64QAM (CC) 1/2, 64QAM (CC) 2/3, 64QAM (CC) 3/4, QPSK (CTC) 1/2, QPSK (CTC) 3/4, 16QAM (CTC) 1/2, 16QAM (CTC) 3/4, 64QAM (CTC) 1/2, 64QAM (CTC) 2/3, 64QAM (CTC) 3/4, 64QAM (CTC) 5/6, QPSK (No Ch Coding) , 16QAM (No Ch Coding) , 64QAM (No Ch Coding)
	UL-Burst Data Type	16 bit Repeat, PN9fix, PN15fix, S_QPSK, S_16QAM, S_64QAM, MAC PDU, User File
	UL-Burst Data Type Repeat Data	0000 to FFFF: Can be set when UL-Burst Data Type = 16 bit Repeat
	UL-Burst Data Type User File	User File selected: Can be set when UL-Burst Data Type = User File
	MAC PDU Number	0 to 32: Can be set when UL-Burst Data Type = MAC PDU
MAC PDU 0 to 31	<Refer to MAC PDU of Downlink. >	
Initial/Handover Ranging Region	Data Status	Enable, Disable
	OFDMA Symbol Offset	“OFDMA Symbol Offset at Zone” to 255 symbol
	OFDMA Subchannel Offset	0 to 126 [when PUSC and PUSC (w/o SC rotation).], 0 to 120 [without PUSC and PUSC (w/o SC rotation)]
	No. OFDMA Symbols	1 to 127 [when AMC (6 x 1)], 2 to 126 [when AMC (3 x 2)], 3 to 126 [when PUSC, PUSC (w/o SC rotation) and AMC (2 x 3)], 6 to 126 [when AMC (1 x 6)]
	No. Subchannels	6 to 126 [when PUSC and PUSC (w/o SC rotation)], 8 to 120 [without PUSC and PUSC (w/o SC rotation)]
	Initial/Handover Ranging Symbols	2, 4
	Initial/Handover Ranging Burst Number	1 to 16
	Ranging Region Combination	Non, Combine
	BW Request/Periodic Ranging Offset	0 to “No.OFDMA Symbols at Initial/Handover Ranging Region”
	BW Request/Periodic Ranging Symbols	1, 3
	BW Request/Periodic Ranging Burst Number	0 to 16
Initial/Handover Ranging Burst	Data Status	Enable, Disable
	OFDMA Symbol Offset	0 to 254
	OFDMA Subchannel Offset	0 to 126 [when PUSC and PUSC (w/o SC rotation)], 0 to 120 [without PUSC and PUSC (w/o SC rotation)]
	No. OFDMA Symbols	Display only
	No. Subchannels	Display only
	Ranging Power Offset	–10.00 to 10.00 dB
	Ranging Code Number	0 to 255
BW Request/ Periodic Ranging Region	Data Status	Enable, Disable
	OFDMA Symbol Offset	“OFDMA Symbol Offset at Zone” to 255 symbol
	OFDMA Subchannel Offset	0 to 126 [when PUSC and PUSC (w/o SC rotation)], 0 to 120 [without PUSC and PUSC (w/o SC rotation)]
	No. OFDMA Symbols	1 to 127 [when AMC (6 x 1)], 2 to 126 [when AMC (3 x 2)], 3 to 126 [when PUSC, PUSC (w/o SC rotation) and AMC (2 x 3)], 6 to 126 [when AMC (1 x 6)]
	No. Subchannels	6 to 126 [when PUSC and PUSC (w/o SC rotation)], 8 to 120 [without PUSC and PUSC (w/o SC rotation)]
	BW Request/Periodic Ranging Symbols	1, 3
	BW Request/Periodic Ranging Burst Number	1 to 16
BW Request/ Periodic Ranging Burst	Data Status	Enable, Disable
	OFDMA Symbol Offset	0 to 255
	OFDMA Subchannel Offset	0 to 126 [when PUSC and PUSC (w/o SC rotation)], 0 to 120 [without PUSC and PUSC (w/o SC rotation)]
	No. OFDMA Symbols	Display only
	No. Subchannels	Display only
	Ranging Power Offset	–10.00 to 10.00 dB
	Ranging Code Number	0 to 255
Fast-Feedback Region	Data Status	Enable, Disable
	OFDMA Symbol Offset	“OFDMA Symbol Offset at Zone” to 255 symbol
	OFDMA Subchannel Offset	0 to 127
	No. OFDMA Symbols	3 to 126
	No. Subchannels	1 to 127
	Fast-Feedback Type	Display only
	Fast-Feedback Burst Number	1 to 32
Fast-Feedback Burst	Data Status	Enable, Disable
	OFDMA Symbol Offset	0 to 255
	OFDMA Subchannel Offset	0 to 127
	No. OFDMA Symbols	Display only
	No. Subchannels	Display only
	Ranging Power Offset	–10.00 to 10.00 dB
	Payload	000000 to 111111

*1: Read the product introduction materials for details of parameter settings.

MX269908A LTE IQproducer

Optional

LTE IQproducer

The MX269908A LTE IQproducer is PC application software with a GUI for generating waveform patterns in compliance with the 3GPP LTE FDD specifications in the 3GPP TS36.211, TS36.212, and TS25.81 standards.
Once created, the waveform pattern file is downloaded to the MS269xA hard drive. Using the MS269xA-020, Vector Signal Generator Option functionality, the files are loaded, selected, and output as a modulated LTE signals.

• IQproducer Operating Environment

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

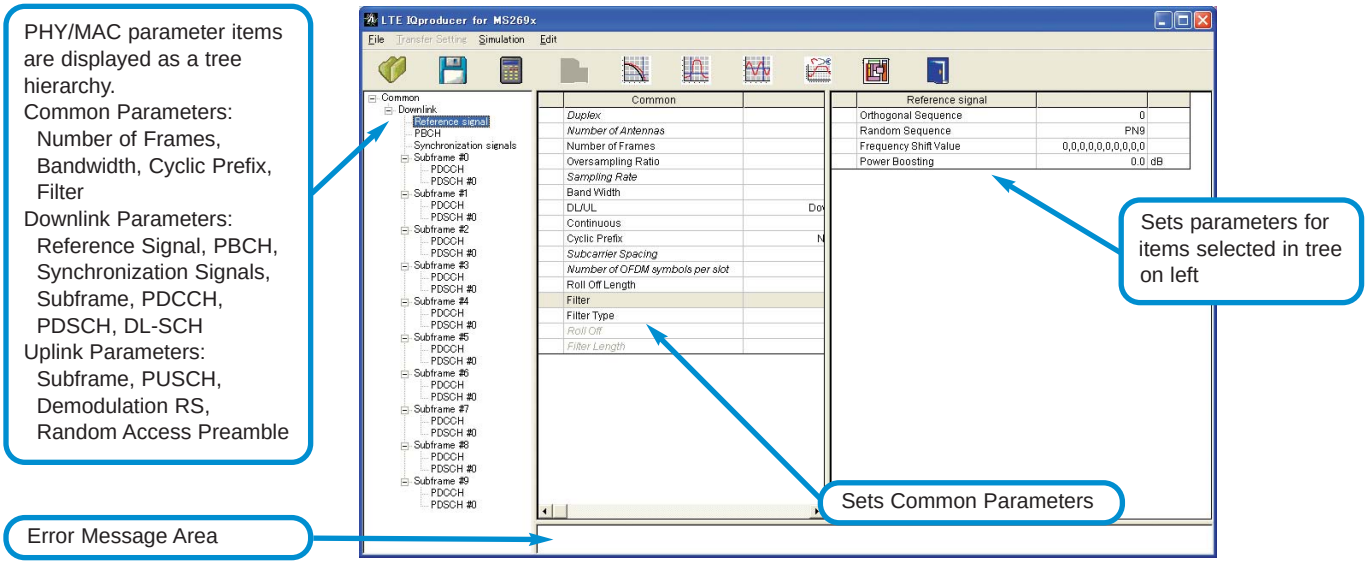
• Generated Channels

LTE Downlink

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

LTE Uplink

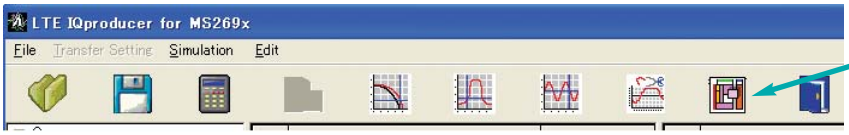
- Reference Signal
- PUCCH (Uplink control channel information)
- PUSCH (UL-SCH)



LTE IQproducer Main Screen

Optional

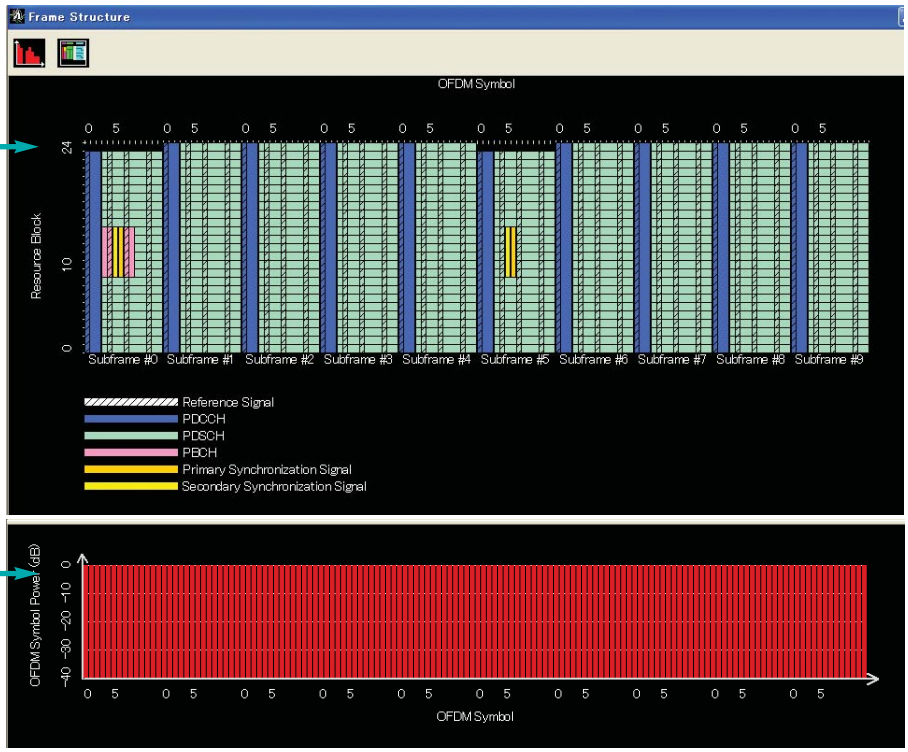
- Visual Check at Frame Structure Screen



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

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

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



Frame Structure Screen

- Parameter Save/Recall

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

- Graphical Simulation Displays

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

CCDF graph

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

FFT graph

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

Time Domain graph

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

• Common Parameter Setting Range

Items	Outline	Setting Range
Common		
Duplex		Display only: FDD
Number of Antennas		Display only: 1
Number of Frames	Number of created frames	1 to Max. number of frames in memory
Oversampling Ratio		2, 4
Sampling Rate		Display only: Sets automatically using Oversampling Ratio and Bandwidth
Bandwidth		1.4, 1.6, 3.0, 3.2, 5, 10, 15, 20 MHz
DL/UL	Downlink/Uplink settings	Downlink, Uplink
Continuous	Continuous ON/OFF	ON, OFF (OFF is only used for the Uplink)
Cyclic Prefix		Normal, Extended
Subcarrier Spacing		Display only: 15 kHz
Number of OFDM Symbols per Slot		7 (only when Cyclic Prefix = Normal) 6 (only when Cyclic Prefix = Extended)
Roll Off Length		0 to 3152 Ts (only when Random Access Preamble) 0 to 144 Ts (only when Cyclic Prefix = Normal) 0 to 512 Ts (only when Cyclic Prefix = Extended)
Filter		
Filter Type		Nyquist, Root Nyquist, Ideal, None
Roll Off		0.1 to 1.0 (only enabled for Nyquist, Root Nyquist)
Filter Length	Set filter tap count in sample units.	1 to 1024 (only enabled for Nyquist, Root Nyquist)

• PHY/MAC Parameter (Uplink) Setting Range

Items	Outline	Setting Range
Data Transmission/Random Access Preamble		
Data Transmission/ Random Access Preamble	Sets Data Transmission and Preamble Random Access	Data Transmission, Random Access Preamble
Subframe #0 to #9 (Data Transmission)		
Number of PUCCHs	Sets Number of PUCCHs	Only display: 0
Number of PUSCHs	Sets Number of PUSCHs	0, 1, 2, 3, 4, 5, 6, 7, 8
PUSCH #0 to #7 (Data Transmission)		
Data Status	Enables/Disables PUSCH parameters	Disable, Enable
Modulation Scheme		QPSK, 16QAM, 64QAM
Data Type		PN9, PN15, 16 bit repeat, User File
Data Type Repeat Data	Sets data for 16 bit repeat	0000 to FFFF (only enabled for Data Type = 16 bit repeat)
Data Type User File	User File setting	Select any file (only enabled for Data Type = User)
Start Number of RB	RB Start position	0 to 99
Number of RBs		1 to 100
Power Boosting	Tx Power	–20.0 to +20.0 dB
Demodulation RS (Data Transmission)		
Data Type	Data type	Zadoff-Chu Sequence, User File
Zadoff-Chu Sequence	Sets Zadoff-Chu Sequence	1 to 4096 (only enabled for Data Type = Zadoff-Chu Sequence)
Zadoff-Chu Sequence Length		1 to 4096 (only enabled for Data Type = Zadoff-Chu Sequence)
Data Type User File	User File setting	Select any file (only enabled for Data Type = User File)
Power Boosting	Tx Power	–20.0 to +20.0 dB
Random Access Preamble		
Burst Type	Burst Type display	Only display: Normal
Data Type		Root Zadoff-Chu Sequence, User File
Root Zadoff-Chu Sequence	Sets Root Zadoff-Chu	1 to 839 (only enabled for Data Type = Root Zadoff-Chu Sequence)
Cyclic Shift Value	Cyclic Shift setting	0 to 839 (only enabled for Data Type = Root Zadoff-Chu Sequence)
Data Type User File	User File setting	Select any file (only enabled for Data Type = User File)
Slot Interval	Random Access Preamble resend interval	1 to 40 ms
Hopping Pattern Length	Hopping Pattern cycle	1 to 10 frames
Hopping Pattern	Sets Random Access Preamble Frequency Hopping Pattern in RB units	0 to 94
Power Ramping Step Size		0.0 to 10.0 dB

Optional

- PHY/MAC Parameter (Downlink) Setting Range

Items	Outline	Setting Range
Reference Signal		
Orthogonal Sequence	Sets Orthogonal Sequence	0, 1, 2
Random Sequence	Sets used data to Random Sequence	PN9, PN15, 16 bit repeat, User File
Random Sequence Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only enabled for Random Sequence = 16 bit repeat)
Random Sequence User File	User File setting	Select any file (only enabled for Random Sequence = User File)
Frequency Shift Value		0, 1, 2, 3, 4, 5
Power Boosting	Tx Power	–20.0 to +20.0 dB
PBCH		
Data Status	Enables/Disables PBCH parameter	Disable, Enable
Data Type		PN9, PN15, 16 bit repeat, User File
Data Type Repeat Data	Sets 16 bit repeat data	0000 to FFFF (only enabled for Data Type = 16 bit repeat)
Data Type User File	User File setting	Select any file (only enabled for Data Type = User File)
Power Boosting	Tx Power	–20.0 to +20.0 dB
Synchronization Signals		
Primary Synchronization Signal		
Data Status	Enables/Disables Primary Synchronization Signal parameter	Disable, Enable
Data Type		Zadoff-Chu Sequence, User File
Zadoff-Chu Sequence	Sets Zadoff-Chu Sequence	1 to 128 (only enabled for Data Type = Zadoff-Chu Sequence)
Zadoff-Chu Sequence Length	Sets Zadoff-Chu Sequence Length	1 to 128 (only enabled for Data Type = Zadoff-Chu Sequence)
Data Type User File	User File setting	Select any file (only enabled Data Type = User File)
Power Boosting	Tx Power	–20.0 to +20.0 dB
Secondary Synchronization Signal		
Data Status	Enables/Disables Secondary Synchronization Signal parameter	Disable, Enable
Data Type		PN9, PN15, 16 bit repeat, User File
Data Type Repeat Data	16 bit repeat data setting	0000 to FFFF (only enabled for Data Type = 16 bit repeat0
Data Type User File	User File setting	Select any file (only enabled for Data Type = User File)
Power Boosting	Tx Power	–20.0 to +20.0 dB
Subframe #0 to #9		
Number of PDSCHs	Sets Number of PDSCHs	1 to 64
RB Arrangement		PDSCH#0 to Number of PDSCHs –1
PDCCH		
Data Status	Enables/Disables PDCCH parameter	Disable, Enable
Number of OFDM Symbols for PDCCH		1, 2, 3 Symbol
Data Type		PN9, PN15, 16 bit repeat, User File
Data Type Repeat Data	16 bit repeat data setting	0000 to FFFF (only enabled for Data Type = 16 bit repeat)
Data Type User File	User File setting	Select any file (only enabled for Data Type = User File)
Power Boosting	Tx Power	–20.0 to +20.0 dB
PDSCH		
Data Status	Enables/Disables PDSCH parameter	Disable, Enable
Modulation Scheme		QPSK, 16QAM, 64QAM
Data Type		PN9, PN15, 16 bit repeat, User File
Data Type Repeat Data	16 bit repeat setting	0000 to FFFF (only enabled for Data Type = 16 bit repeat)
Data Type User File	User File setting	Select any file (only enabled for Data Type = User File)
Power Boosting	Tx Power	–20.0 to +20.0 dB
DL-SCH		
Transport Block Size	Number of bits required by DL-SCH	Only display: 0 bit
Data Type		Only display: PN9

Ordering Information

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

Model/Order No.	Name
	- Main Frame -
MS2690A	Signal Analyzer (50 Hz to 6.0 GHz)
MS2691A	Signal Analyzer (50 Hz to 13.5 GHz)
MS2692A	Signal Analyzer (50 Hz to 26.5 GHz)
	- Standard Accessories -
J0017F	Power Cord (2.6 m long 100 Vac, 3 core, gray): 1 pc
J0266	Conversion Adapter (3-pin to 2-pin power adapter): 1 pc
P0031A	USB Memory (256 MB USB2.0 Flash Driver): 1 pc
Z0541A	USB Mouse: 1 pc
	Install CD-ROM
	(Application software, instruction manual CD-ROM): 1 disc
	Windows XP Professional (English)
	(English OS CD-ROM): 1 pc
	- Options -
MS2690A-001	Rubidium Reference Oscillator (Aging rate ±1 x 10^{-10}/month)
MS2690A-004	Wideband Analysis Hardware
	(Extends the Analysis Bandwidth to 120 MHz)
MS2690A-008	6 GHz Preamplifier (100 kHz to 6 GHz)
MS2690A-020	Vector Signal Generator (125 MHz to 6 GHz)
MS2690A-030	W-CDMA RNC Simulator (ATM1.5M/2M)
	(Supports ATM 1.5M and 2M)
MS2691A-001	Rubidium Reference Oscillator (Aging rate ±1 x 10^{-10}/month)
MS2691A-003	Extension of Preselector Lower Limit to 3 GHz
	(Extends lower limit of pre-selector to 3 GHz)
MS2691A-004	Wideband Analysis Hardware
	(Extends the Analysis Bandwidth to 120 MHz)
MS2691A-008	6 GHz Preamplifier (100 kHz to 6 GHz)
MS2691A-020	Vector Signal Generator (125 MHz to 6 GHz)
MS2691A-030	W-CDMA RNC Simulator (ATM 1.5 M/2 M)
	(Supports ATM 1.5 M and 2 M)
MS2692A-001	Rubidium Reference Oscillator (Aging rate ±1 x 10^{-10}/month)
MS2692A-003	Extension of Preselector Lower Limit to 3 GHz
	(Extends lower limit of pre-selector to 3 GHz)
MS2692A-004	Wideband Analysis Hardware
	(Extends the Analysis Bandwidth to 120 MHz)
MS2692A-008	6 GHz Preamplifier (100 kHz to 6 GHz)
MS2692A-020	Vector Signal Generator (125 MHz to 6 GHz)
MS2692A-030	W-CDMA RNC Simulator (ATM1.5M/2M)
	(Supports ATM 1.5M and 2M)
	- Retrofit Options -
MS2690A-101	Rubidium Reference Oscillator Retrofit (Aging rate ±1 x 10^{-10}/month)
MS2690A-104	Wideband Analysis Hardware Retrofit
	(Extends the Analysis Bandwidth to 120 MHz)
MS2690A-108	6 GHz Preamplifier Retrofit (100 kHz to 6 GHz)
MS2690A-120	Vector Signal Generator Retrofit (125 MHz to 6 GHz)
MS2690A-130	W-CDMA RNC Simulator (ATM1.5M/2M) Retrofit
	(Supports ATM 1.5M and 2M)
MS2691A-101	Rubidium Reference Oscillator Retrofit (Aging rate ±1 x 10^{-10}/month)
MS2691A-103	Extension of Preselector Lower Limit to 3 GHz Retrofit
	(Extends lower limit of pre-selector to 3 GHz)
MS2691A-104	Wideband Analysis Hardware Retrofit
	(Extends the Analysis Bandwidth to 120 MHz)
MS2691A-108	6 GHz Preamplifier Retrofit (100 kHz to 6 GHz)
MS2691A-120	Vector Signal Generator Retrofit (125 MHz to 6 GHz)
MS2691A-130	W-CDMA RNC Simulator (ATM1.5M/2M) Retrofit
	(Supports ATM 1.5M and 2M)
MS2692A-101	Rubidium Reference Oscillator Retrofit (Aging rate ±1 x 10^{-10}/month)
MS2692A-103	Extension of Preselector Lower Limit to 3 GHz Retrofit
	(Extends lower limit of pre-selector to 3 GHz)
MS2692A-104	Wideband Analysis Hardware Retrofit
	(Extends the Analysis Bandwidth to 120 MHz)
MS2692A-108	6 GHz Preamplifier Retrofit (100 kHz to 6 GHz)
MS2692A-120	Vector Signal Generator Retrofit (125 MHz to 6 GHz)
MS2692A-130	W-CDMA RNC Simulator (ATM1.5M/2M) Retrofit
	(Supports ATM 1.5M and 2M)
	- Software Options -
MX269010A	Mobile WiMAX Measurement Software
	(CD-ROM, license and instruction manual)
MX269020A	LTE Downlink Measurement Software
	(CD-ROM, license and instruction manual)
MX269021A	LTE Upnlink Measurement Software
	(CD-ROM, license and instruction manual)
MX269030A	W-CDMA BS Measurement Software
	(CD-ROM, license and instruction manual)
MX269901A	HSDPA/HSUPA IQproducer
	(CD-ROM, license and instruction manual)
MX269902A	TDMA IQproducer (CD-ROM, license and instruction manual)
MX269904A	Multi-Carrier IQproducer (CD-ROM, license and instruction manual)
MX269905A	Mobile WiMAX IQproducer
	(CD-ROM, license and instruction manual)
MX269908A	LTE IQproducer (CD-ROM, license and instruction manual)

	- Warranty Service -
MS2690A-ES210	2-year Extended Warranty Service
MS2690A-ES310	3-year Extended Warranty Service
MS2690A-ES510	5-year Extended Warranty Service
MS2691A-ES210	2-year Extended Warranty Service
MS2691A-ES310	3-year Extended Warranty Service
MS2691A-ES510	5-year Extended Warranty Service
MS2692A-ES210	2-year Extended Warranty Service
MS2692A-ES310	3-year Extended Warranty Service
MS2692A-ES510	5-year Extended Warranty Service
	- Application Parts -
W2850AE	MS2690A/MS2691A/MS2692A Operation Manual
	(Main frame Operation, Printed version)
W2851AE	MS2690A/MS2691A/MS2692A Operation Manual
	(Main frame Remote Control, Printed version)
W2852AE	MS2690A/MS2691A/MS2692A Operation Manual
	(Signal Analyzer Function Operation, Printed version)
W2853AE	MS2690A/MS2691A/MS2692A Operation Manual
	(Signal Analyzer Function Remote Control, Printed version)
W2854AE	MS2690A/MS2691A/MS2692A Operation Manual
	(Spectrum Analyzer Function Operation, Printed version)
W2855AE	MS2690A/MS2691A/MS2692A Operation Manual
	(Spectrum Analyzer Function Remote Control, Printed version)
W2856AE	MS2690A/MS2691A/MS2692A-020 Operation Manual
	(Operation, Printed version)
W2857AE	MS2690A/MS2691A/MS2692A-020 Operation Manual
	(Remote Control, Printed version)
W2914AE	MS2690A/MS2691A/MS2692A-020 Operation Manual
	(IQproducer, Printed version)
W2929AE	MS2690A/MS2691A/MS2692A-020 Operation Manual
	(Standard Waveform Pattern, Printed version)
W2858AE	MS2690A/MS2691A/MS2692A-030 Operation Manual
	(Operation, Printed version)
W2859AE	MS2690A/MS2691A/MS2692A-030 Operation Manual
	(Remote Control, Printed version)
W2919AE	MX269010A Operation Manual (Printed version)
W3014AE	MX269020A Operation Manual (Operation, Printed version)
W3015AE	MX269021A Operation Manual (Operation, Printed version)
W2860AE	MX269030A Operation Manual (Operation, Printed version)
W2861AE	MX269030A Operation Manual (Remote control, Printed version)
W2915AE	MX269901A Operation Manual (Printed version)
W2916AE	MX269902A Operation Manual (Printed version)
W2917AE	MX269904A Operation Manual (Printed version)
W2918AE	MX269905A Operation Manual (Printed version)
W3023AE	MX269908A Operation Manual (Printed version)
K240B	Power Divider (K connector, DC to 26.5 GHz, 50 Ω, K-J, 1 W max)
MA1612A	Four-Port Junction Pad (5 MHz to 3 GHz, N-J)
MP752A	Termination (DC to 12.4 GHz, 50 Ω, N-P)
MA2512A	Band Pass Filter (for W-CDMA, 1.92 to 2.17 GHz)
J0576B	Coaxial Cord (N-P · 5D-2W · N-P), 1 m
J0576D	Coaxial Cord (N-P · 5D-2W · N-P), 2 m
J0127A	Coaxial Cord (BNC-P · RG58A/U · BNC-P), 1 m
J0127B	Coaxial Cord (BNC-P · RG58A/U · BNC-P), 2 m
J0127C	Coaxial Cord (BNC-P · RG58A/U · BNC-P), 0.5 m
J0322A	Coaxial Cord (SMA-P · 50 Ω SUCOFLEX104 · SMA-P), 0.5 m
	(DC to 18 GHz)
J0322B	Coaxial Cord (SMA-P · 50 Ω SUCOFLEX104 · SMA-P), 1 m
	(DC to 18 GHz)
J0322C	Coaxial Cord (SMA-P · 50 Ω SUCOFLEX104 · SMA-P), 1.5 m
	(DC to 18 GHz)
J0322D	Coaxial Cord (SMA-P · 50 Ω SUCOFLEX104 · SMA-P), 2 m
	(DC to 18 GHz)
J1264	SMA-N Conversion Adapter (50 Ω N-P · SMA-J, DC to 18 GHz)
J1398A	N-SMA ADAPTOR (DC to 26.5 GHz, 50 Ω, N-P · SMA-J)
J0911	Coaxial Cord, 1.0 M (for 40 GHz)
	(DC to 40 GHz, approx. 1 m length) (SF102A, 11K254/K254/1.0M)
J0912	Coaxial Cord, 0.5 M (for 40 GHz)
	(DC to 40 GHz, approx. 0.5 m length) (SF102A, 11K254/K254/0.5M)
41KC-3	Fixed Attenuator, 3 dB (DC to 40 GHz, 3 dB)
J1261A	Ethernet Cable (Shield type, straight), 1 m
J1261B	Ethernet Cable (Shield type, straight), 3 m
J1261C	Ethernet Cable (Shield type, cross), 1 m
J1261D	Ethernet Cable (Shield type, cross), 3 m
J0008	GPIB Connection Cable, 2.0 m
J1373A	AUX Conversion Adapter
	(AUX → BNC, for vector signal generator option)
B0597A	Rack Mount Kit
B0589A	Carrying Case (Hard type, with casters)

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