

MX370105A/MX269905A

Mobile WiMAX IQproducer

MG3710A

Vector Signal Generator

MS269xA/MS2830A

Signal Analyzer

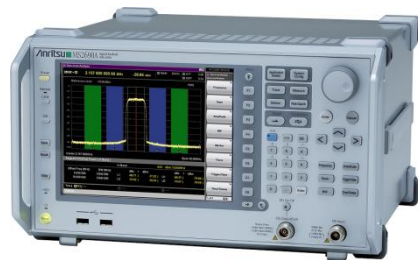
MG3710A Vector Signal Generator

**MS269xA-020, MS2830A-020/021 Vector Signal Generator option
for MS269xA/MS2830A Signal Analyzer**

**MX370105A/MX269905A
Mobile WiMAX IQproducer
Product Introduction**



**MG3710A
Vector Signal Generator**



**MS269xA
Signal Analyzer**



**MS2830A
Signal Analyzer**

Version 1.00

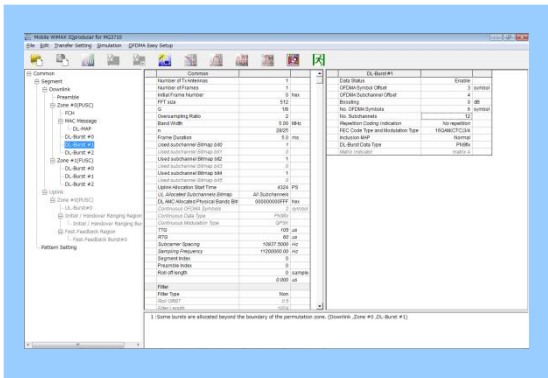
ANRITSU CORPORATION

What is Mobile WiMAX IQproducer?

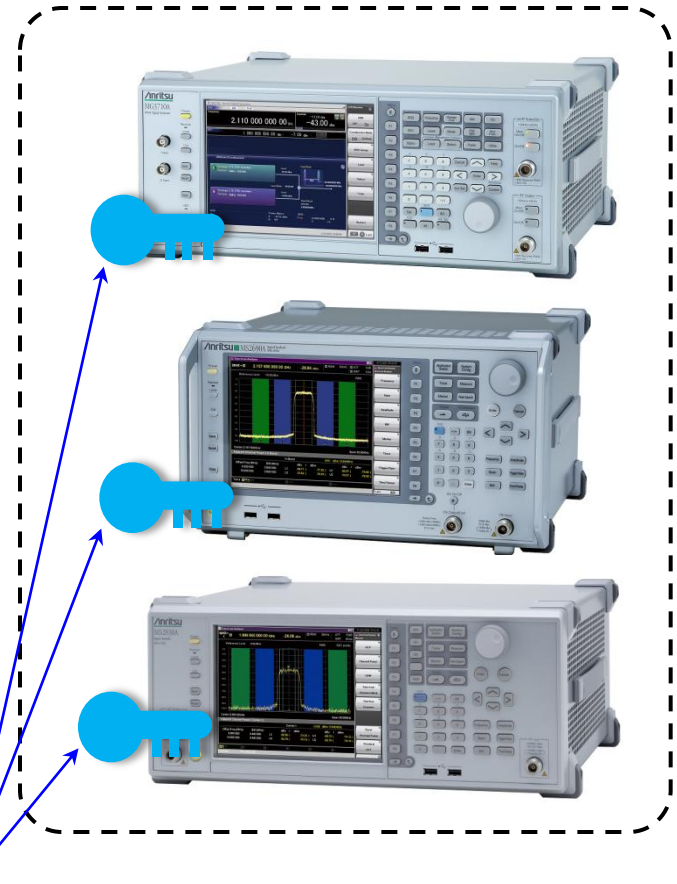
The Mobile WiMAX IQproducer is PC software for setting parameters and generating waveform patterns in accordance with the IEEE 802.16e-2005 Wireless MAN-OFDMA MAC/PHY standards.

The software runs under the Windows OS installed in the MG3710A, MS2690A/91A/92A-020, and MS2830A-020/021. It outputs modulation signals by selecting generated waveform patterns.

Mobile WiMAX IQproducer



Install



- **Generating waveform patterns using Mobile WiMAX IQproducer => [The main frame requires a license.](#)**

The unlicensed software will run on the PC to test waveform pattern generation but an unlicensed SG cannot output signals because it does not recognize the waveform patterns.

- **Generating waveform patterns using EDA Tools (C, MATLAB, Microwave Office) => [Free license](#)**

- WiMAX® is a trademark or registered trademark of WiMAX Forum.
- MATLAB® is a registered trademark of The MathWorks, Inc.
- Windows® is a registered trademark of Microsoft Corporation in the USA and other countries.

Mobile WiMAX IQproducer Features

- **Supports STC/MIMO (Matrix A/B)**
 - Matrix A/B setting in burst units
- **Supports Collaborative MIMO**
- **Supports multi-path generation**
 - Number of paths and Delay, Gain and Phase for each path
- **Easy Zone/Burst area setting at Segment Edit screen**
- **Versatile displays**
 - CCDF display
 - Spectrum display
 - Time Domain display
- **Easy and convenient Clipping and Filtering functions**

***Read the “MX3701xxA IQproducer” and “MX269xxxA series Software” Brochure for detail parameter setting range.**

Main Screen

When Mobile WiMAX is selected, the following main screen is displayed.

The screenshot shows the 'Mobile WiMAX IQproducer for MG3710' application window. The interface is divided into three main sections:

- Tree View (Left):** A hierarchical tree structure showing the configuration for a 'Segment'. It includes 'Downlink' and 'Uplink' sections, each with 'Zone #0 (PUSC)' and 'Zone #1 (FUSC)'. Under 'Downlink Zone #0 (PUSC)', 'DL-Burst #1' is selected and highlighted in blue.
- Common Parameter List (Center):** A list of parameters for the selected 'DL-Burst #1'. Parameters include 'Number of Tx Antennas', 'Number of Frames', 'Initial Frame Number', 'FFT size', 'G', 'Oversampling Ratio', 'Band Width', 'n', 'Frame Duration', and various 'Used subchannel Bitmap' bits. Other parameters include 'Uplink Allocation Start Time', 'UL Allocated Subchannels Bitmap', 'DL AMC Allocated Physical Bands Bitr', 'Continuous OFDMA Symbols', 'Continuous Data Type', 'Continuous Modulation Type', 'TTG', 'RTG', 'Subcarrier Spacing', 'Sampling Frequency', 'Segment Index', 'Preamble Index', 'Roll off length', 'Filter', and 'Filter Type'.
- DL-Burst #1 Parameter Table (Right):** A detailed table for the selected DL-Burst #1. The table has two columns: the parameter name and its value. Parameters include 'Data Status' (Enable), 'OFDMA Symbol Offset' (3 symbol), 'OFDMA Subchannel Offset' (4), 'Boosting' (0 dB), 'No. OFDMA Symbols' (6 symbol), 'No. Subchannels' (12), 'Repetition Coding Indication' (No repetition), 'FEC Code Type and Modulation Type' (16QAM(CTC)3/4), 'Inclusion MAP' (Normal), 'DL-Burst Data Type' (PN9fix), and 'Matrix Indicator' (matrix A).

Shortcut to Segment Edit Screen:
This is for Easy MAP checking and editing using a GUI.

PHY/MAC Parameter List:
Details of parameters for items selected at the Tree View or Segment Edit screen are set here.

Tree View: This tree displays PHY/MAC parameters.

Error Display: Setting errors, etc., are displayed here.

Common Parameter List:
Common parameters are displayed here for setting parameters such as PHY layers and filters.

Multi-pass STC/MIMO Functions

STC/MIMO (Matrix A/B) can be set at the Downlink signal Zone or Burst units by setting Number of Tx Antennas to 2 at Common Parameter Setting.

Common Parameter Setting

Common	
Number of Tx Antennas	1
Number of Frames	1
Initial Frame Number	2 hex
FFT size	512
G	1/8
Oversampling Ratio	2
Band Width	5.00 MHz

*STC (Space Time Coding): Tx diversity technology for stabilizing communications in fading environment

Zone Setting

Zone #1	
Data Status	Enable
Permutation	PUSC
Pilot Position	Hopping
Dedicated Pilot	0
Pilot Boosting	OFF
STC/MIMO	No transmit diversity
OFDMA Symbol Offset	No transmit diversity symbol
No. OFDMA Symbols	2 antenna matrixA(STTD) symbol
DL-PermBase	2 antenna matrixB vertical encoding
DL-Burst Number	3
PRBS_ID	0

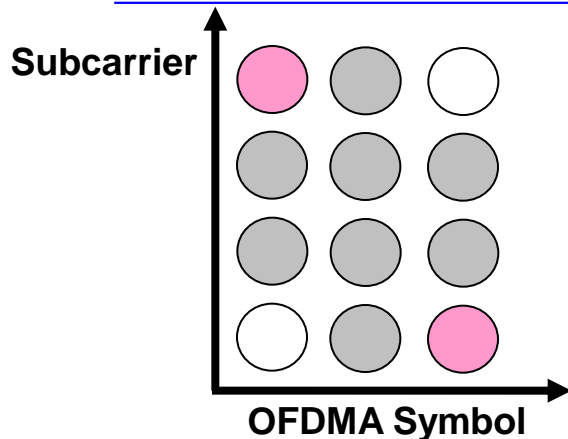
Burst Setting

DL-Burst #0	
Data Status	Enable
OFDMA Symbol Offset	13 symbol
OFDMA Subchannel Offset	0
Boosting	0 dB
No. OFDMA Symbols	6 symbol
No. Subchannels	8
Repetition Coding Indication	No repetition
FEC Code Type and Modulation	QPSK(CTC)3/4
Inclusion MAP	Normal
DL-Burst Data Type	PN9fix
Matrix Indicator	matrix A
	matrix A
	matrix B

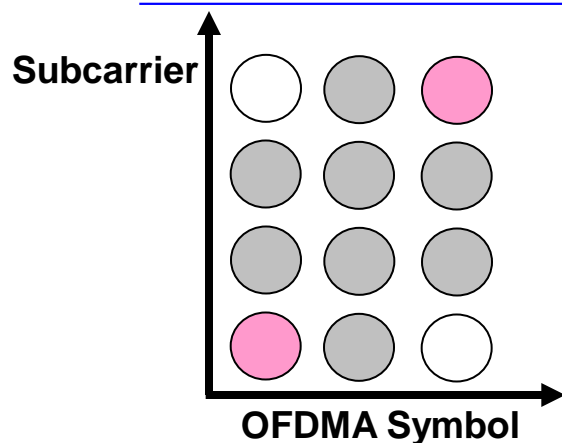
Collaborative MIMO Function Setting




Uplink signals supporting collaborative MIMO can be generated by editing Pilot Pattern (A/B) for UL-Burst.

Pilot Pattern for Pattern A



Pilot Pattern for Pattern B



-  Data Subcarrier
-  Pilot Subcarrier
-  Null Subcarrier

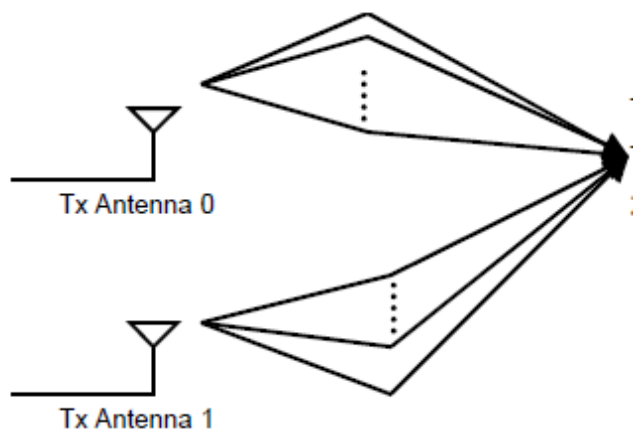
UL-Burst Setting

UL-Burst#0		
Data Status	Enable	
OFDMA Symbol Offset	3	symbol
OFDMA Subchannel Offset	0	
UL-Burst Duration	255	symbol
	85	slot
Burst Power Offset	0.00	dB
Pilot Pattern	Normal	
Repetition Coding Indicatic	Normal	
FEC Code Type and Modul	Pattern A	
Inclusion MAP	Pattern B	
UL-Burst Data Type	PN9fix	

Multi-path Function Setting

Up to 20 multi-path signals can be generated with any Delay, Gain and Phase at the Multi-Path Setting Screen.

Generating up to 20 multi-path multiplex signals



Multi-Path Setting

Segment			
Multi-Path Setting			
	Data Status	Enable	
Tx Antenna 0			
	Multi-Path Number	3	
	Delay (ns)	Gain (dB)	Phase (deg)
Path1	0.0	0.0	0.0
Path2	0.0	0.0	0.0
Path3	0.0	0.0	0.0
Tx Antenna 1			
	Multi-Path Number	20	
	Delay (ns)	Gain (dB)	Phase (deg)
Path1	0.0	0.0	0.0
Path2	0.0	0.0	0.0
Path3	0.0	0.0	0.0
Path4	0.0	0.0	0.0
Path5	0.0	0.0	0.0
Path6	0.0	0.0	0.0
Path7	0.0	0.0	0.0
Path8	0.0	0.0	0.0
Path9	0.0	0.0	0.0
Path10	0.0	0.0	0.0
Path11	0.0	0.0	0.0
Path12	0.0	0.0	0.0
Path13	0.0	0.0	0.0
Path14	0.0	0.0	0.0
Path15	0.0	0.0	0.0
Path16	0.0	0.0	0.0
Path17	0.0	0.0	0.0
Path18	0.0	0.0	0.0
Path19	0.0	0.0	0.0
Path20	0.0	0.0	0.0

Set Delay, Gain and Phase for each Tx Antenna 0 and 1.

Permutation Setting

The following Permutation can be set at the Zone Setting Screen.

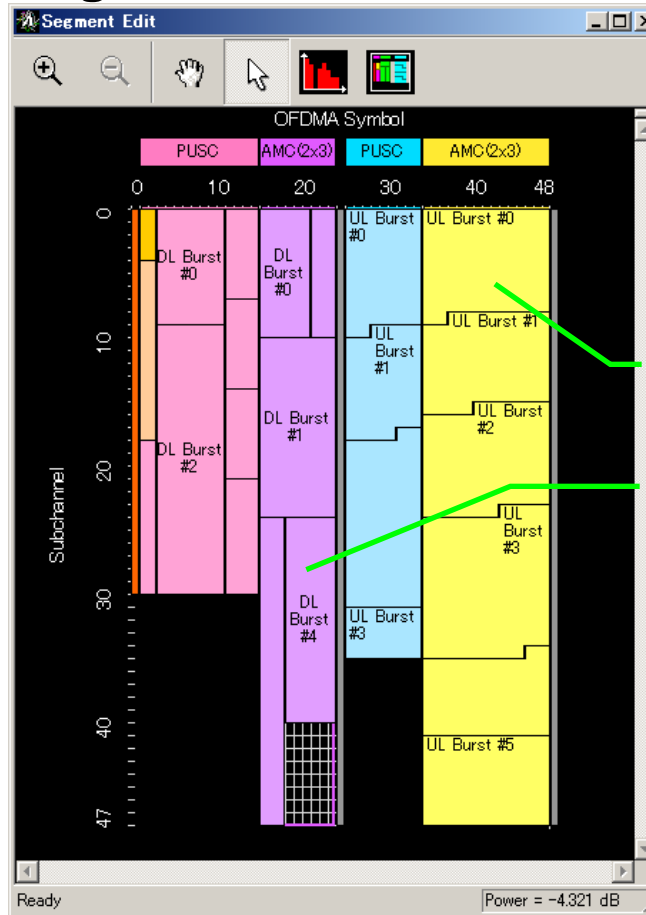
Downlink:

- PUSC**
- PUSC (all SC)**
- FUSC**
- AMC (6x1)**
- AMC (3x2)**
- AMC (2x3)**
- AMC (1x6)**

Uplink:

- PUSC**
- PUSC (w/o SC rotation)**
- AMC (6x1)**
- AMC (3x2)**
- AMC (2x3)**
- AMC (1x6)**

Segment Edit Screen



Uplink Zone AMC (2x3)

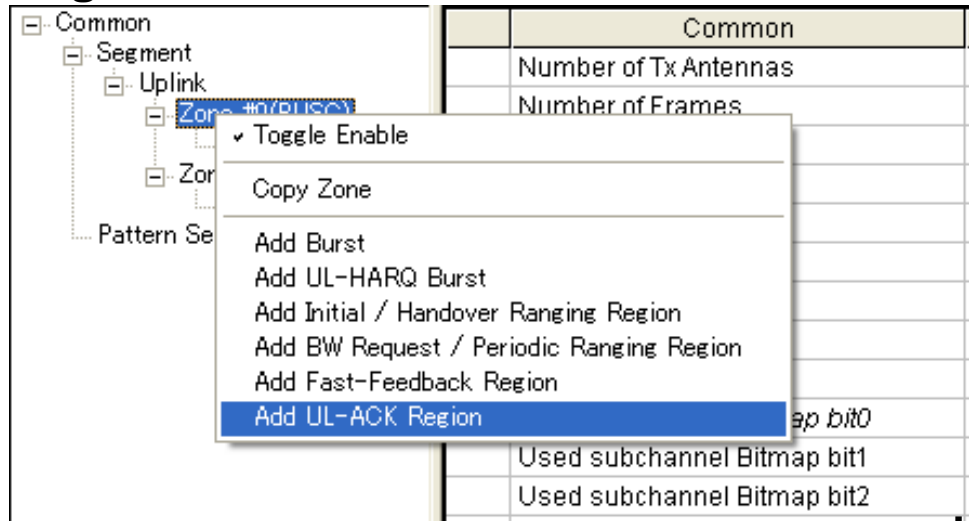
Downlink Zone AMC (2x3)

Blue parts: Permutation required by system profile

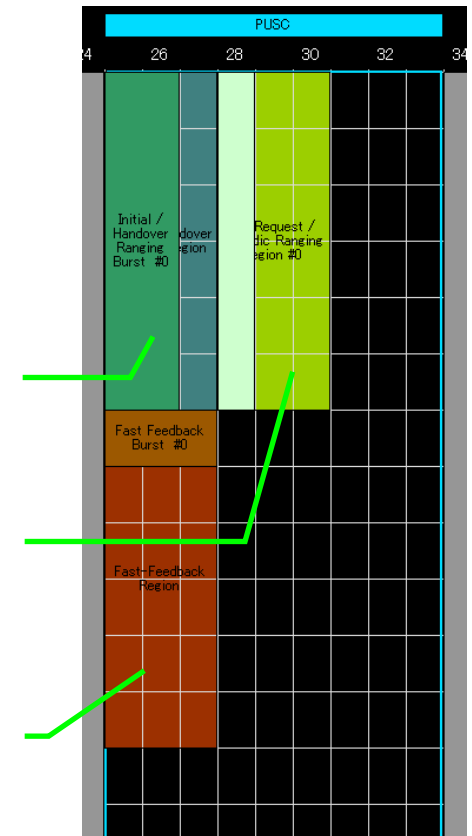
Region Addition Setting

Regions such as Ranging and Fast-Feedback can be added by setting the Uplink Zone parameter.

Segment Edit Screen



Segment Edit Screen



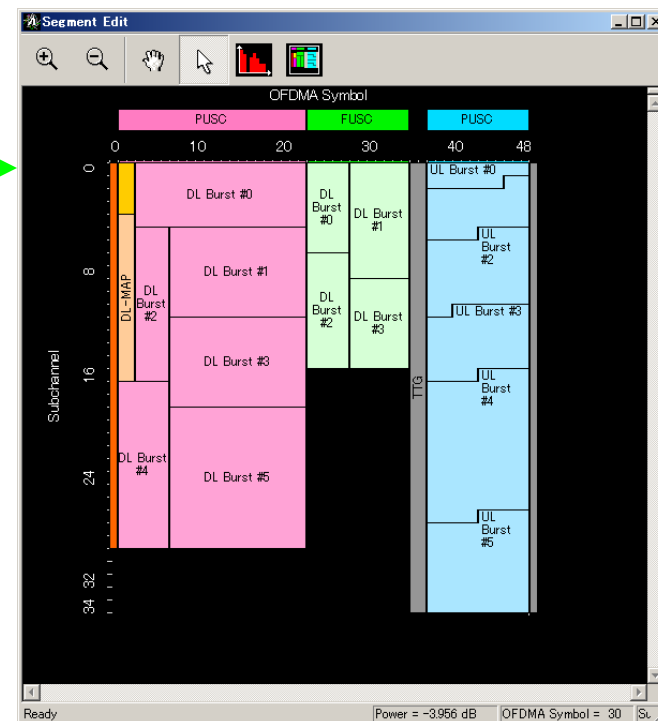
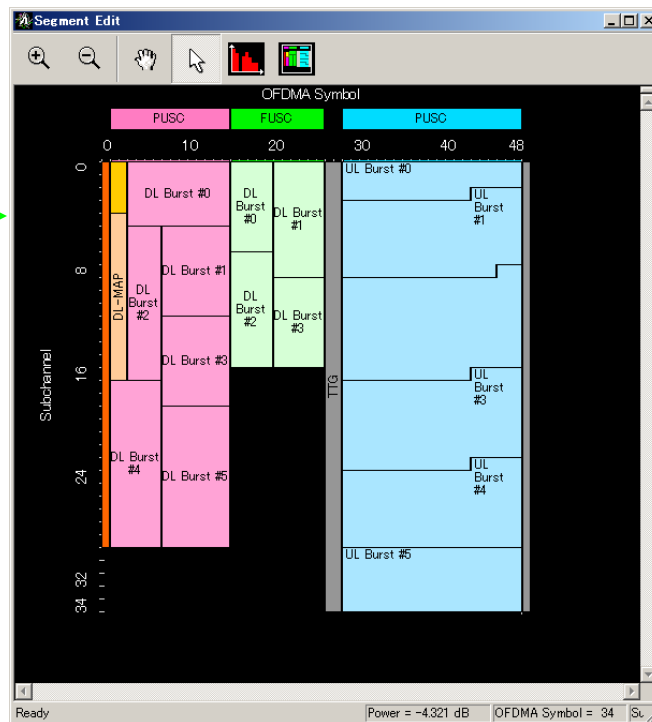
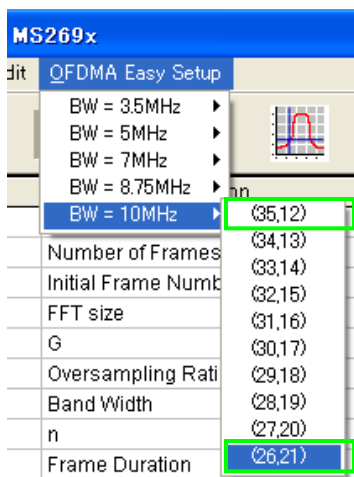
**Initial/Handover
Ranging Region, Burst**

**BW Request/Periodic
Ranging Region, Burst**

**Fast-Feedback
Region, Burst**

Easy Setup Function

The Easy Setup function makes it easy to set the number of Downlink/Uplink symbols specified by System Profile. The Uplink start position can be set automatically using this function.

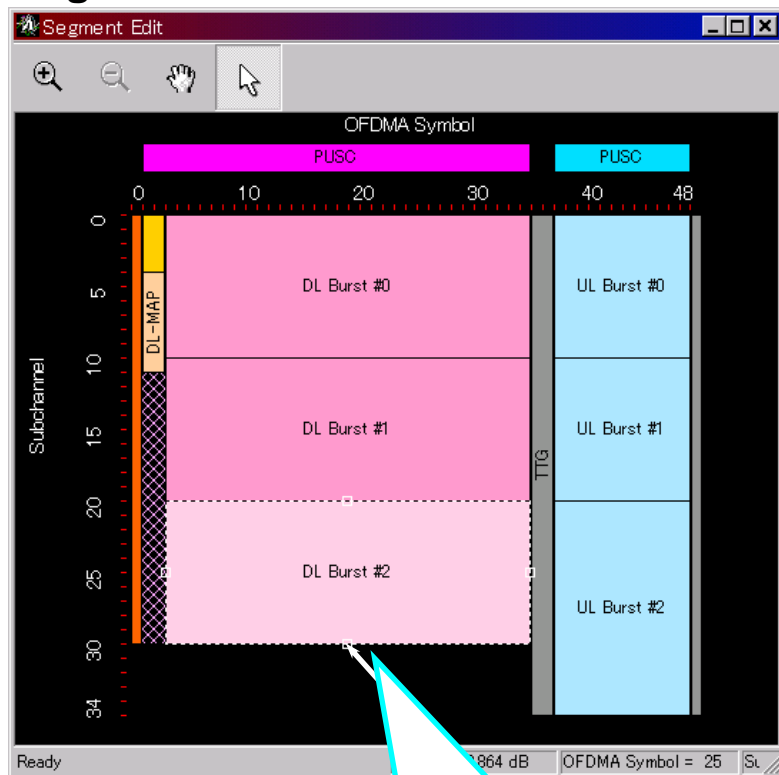


Segment Edit Screen (1/4)

Excellent Operability (1)

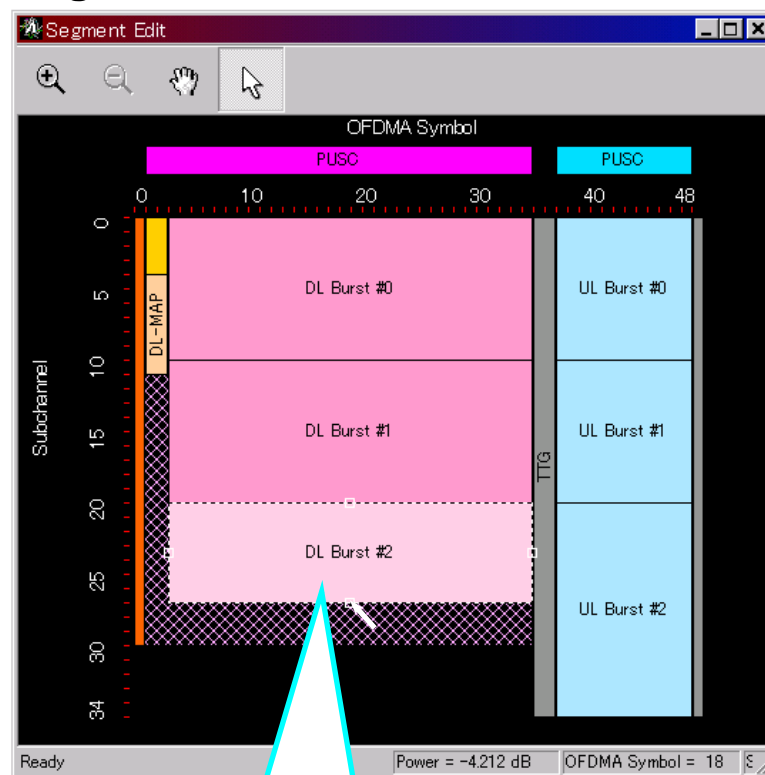
- The Zone, Burst, etc., are set easily using a mouse.

Segment Edit Screen



Mouse click

Segment Edit Screen

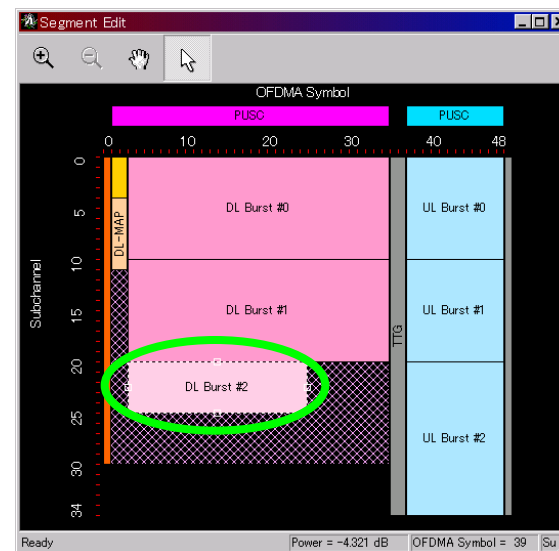
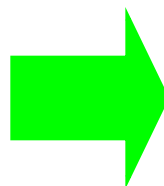
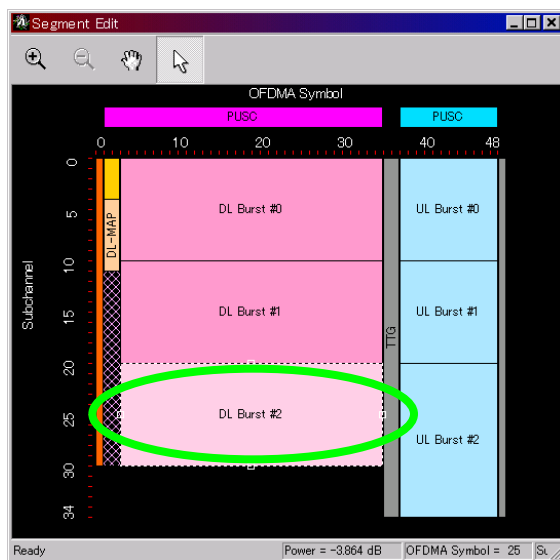


Magnified/Reduced

Segment Edit Screen (2/4)

Excellent Operability (2)

- The editing results are reflected immediately at the Main Screen parameters.



DL-Burst #2	
OFDMA Symbol Offset	3 symbol
OFDMA Subchannel Offset	20
Boosting	0 dB
No. OFDMA Symbols	32 symbol
No. Subchannels	10
Repetition Coding Indication	No repetition
FEC Code Type and Modulation Type	64QAM(CC)1/2
DL-Burst Data Type	PN9fix

DL-Burst #2	
OFDMA Symbol Offset	3 symbol
OFDMA Subchannel Offset	20
Boosting	0 dB
No. OFDMA Symbols	22 symbol
No. Subchannels	5
Repetition Coding Indication	No repetition
FEC Code Type and Modulation Type	64QAM(CC)1/2
DL-Burst Data Type	PN9fix

Segment Edit Screen (3/4)

Excellent Operability (3)

- Parameters clicked at the Segment Edit Screen are displayed on the Main Screen.

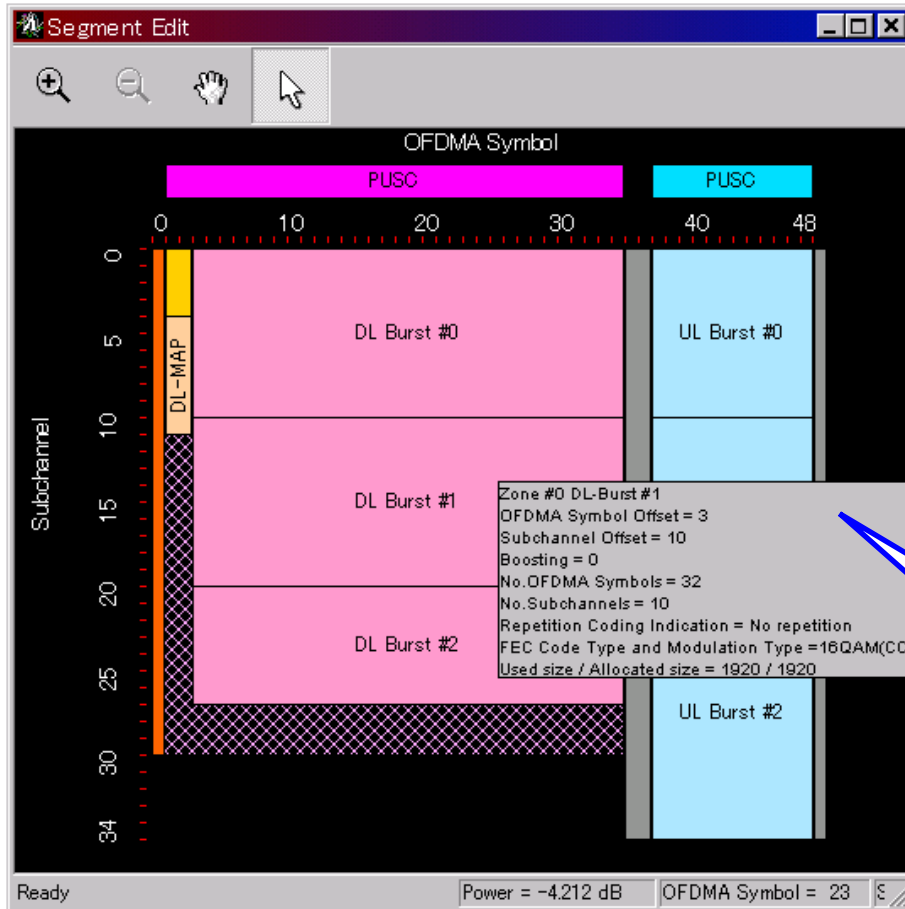
Common		DL-Burst #0	
Number of Tx Antennas	1	Data Status	Enable
Number of Frames	1	OFDMA Symbol Offset	3 symbol
Initial Frame Number	0 hex	OFDMA Subchannel Offset	0
FFT size	1024	Boosting	0 dB
G	1/8	No. OFDMA Symbols	6 symbol
Oversampling Ratio	2	No. Subchannels	12
Band Width	10.00 MHz	Repetition Coding Indicatio	No repetition
n	28/25	FEC Code Type and Modul	QPSK(CTC)3/4
Frame Duration	5.0 ms	Inclusion MAP	Normal
Used subchannel Bitmap bit0	1	DL-Burst Data Type	PN9fix
Used subchannel Bitmap bit1	1	Matrix Indicator	matrix A

Segment Edit Screen (4/4)

Excellent Operability (4)

➤ Pointing with the mouse opens a Help Pop-up.

Segment Edit Screen



How to display Help Pop-up

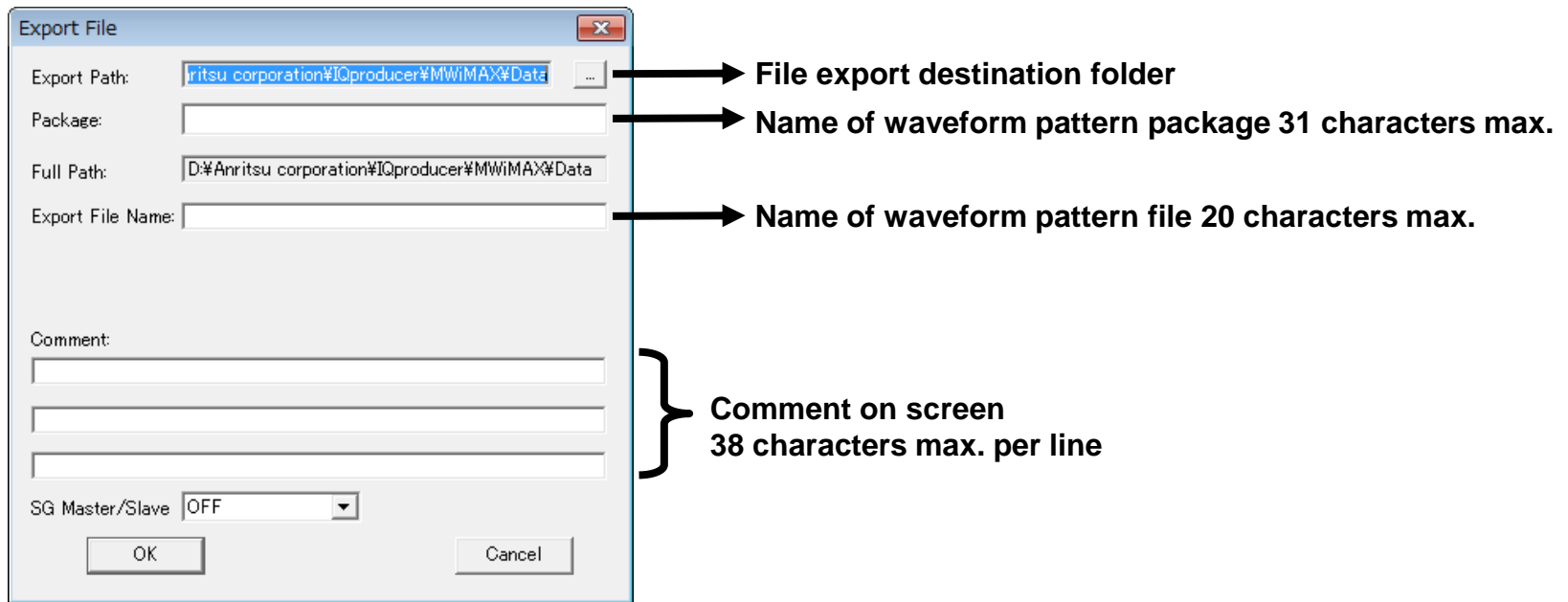
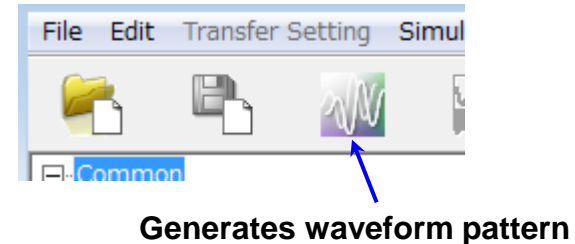
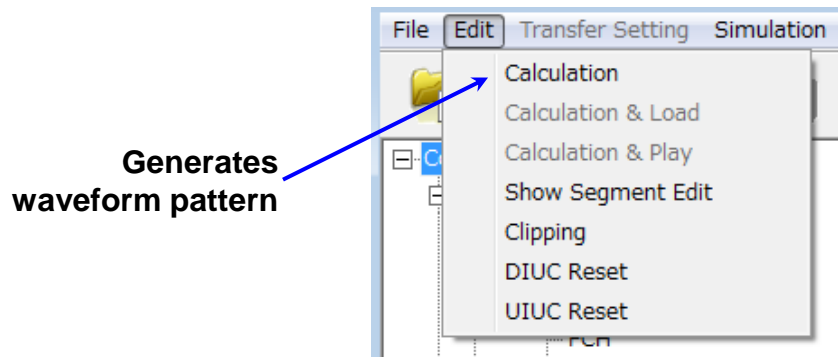
- (1) Move the mouse cursor over the required position on the screen for moment.
- (2) Right-click the mouse, and select [Property] at the pop-up.



Help Pop-up

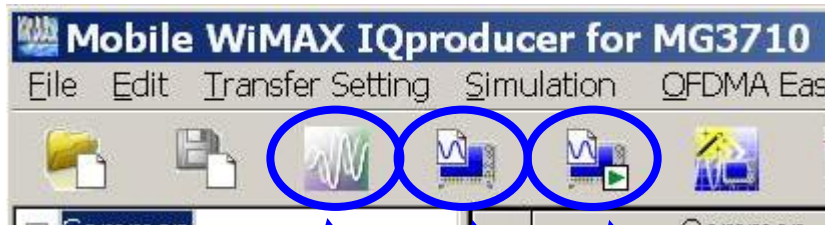
Waveform Generation: Calculation

After setting parameters, click the [Calculation] icon to generate the waveform pattern.



Calculation & Load & Play

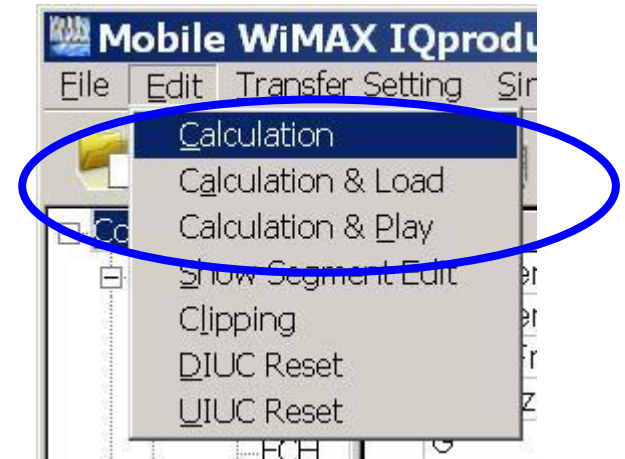
After setting parameters, click the [Calculation] icon to generate the waveform pattern.



Calculation

Calculation & Load

Calculation & Play



Calculation:

Generates a waveform pattern after parameters are set.

/Calculation/

Calculation & Load:

After waveform generation is finished, the created waveform pattern is loaded into the MG3710A waveform memory.

/Calculation/ > /Load/

Calculation & Play:

After waveform generation is finished, the created waveform pattern is loaded and selected at the MG3710A waveform memory.

/Calculation/ > /Load/ > /Select/

File size of waveform patterns

The presence/absence of the ARB Memory Expansion (option) and Baseband Signal Combination Function (option) is selected. Selecting the ARB Memory Expansion (option) and the Baseband Signal Combination Function (option) generates a bigger waveform pattern, while selecting the Baseband Signal Combination Function (option) generates a waveform pattern. If an uninstalled option is selected, sometimes the created waveform pattern may not be usable. Set the combination of installed options based on the following setting items.

Items	Combinations of Options
Memory 64M samples	None
Memory 64M samples × 2	Option48 and Option 78
Memory 256M samples	Option45 or Option 75
Memory 256M samples × 2	Option 45 and Option 48 or Option 75 and Option 78
Memory 1024M samples	Option46 or Option 76
Memory 1024M samples × 2	Option 46 and Option 48 or Option 76 and Option 78

The maximum size of the generated waveform pattern for each of the setting items is shown below.

Items	Maximum Size
Memory 64M samples	64M samples
Memory 64M samples × 2 (With Option48, 78)	128M samples
Memory 256M samples	256M samples
Memory 256M samples × 2 (With Option48, 78)	512M samples
Memory 1024M samples	512M samples
Memory 1024M samples × 2 (With Option48, 78)	512M samples

File size of waveform patterns

MS2830A:

Select whether the ARB memory expansion option 256Msamples is installed.

Selecting With Option27 (Memory 256M samples) supports creation of larger waveform patterns. If the ARB memory expansion option is not installed, the generated waveform pattern may not be able to be used. Waveform patterns cannot be created with a size greater than 64M samples when Without Option27 (Memory 256M samples) is selected. Select either according to the presence of ARB memory expansion option.

Model	Items	ARB Memory Expansion
MS2830A	With Option27 (Memory 256M samples)	1 GB
	Without Option27 (Memory 256M samples)	256 MB

MS269xA:

ARB Memory Expansion (option) is not available for MS269xA. Only Memory 256M samples, 1 GB is available.

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