Product Introduction

MX370103A

1xEV-DO IQproducer

MG3710A
Vector Signal Generator

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MG3710A
Vector Signal Generator

Version 1.00

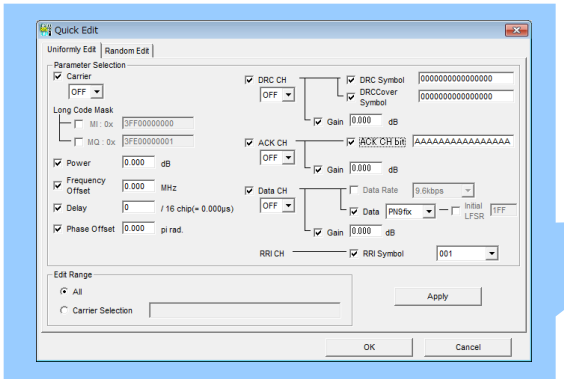
ANRITSU CORPORATION

What is 1xEV-DO IQproducer?

MX370103A CDMA2000 1xEV-DO IQproducer is PC application software equipped for performing parameter setup and waveform pattern generation which meet the CDMA2000_1xEV-DO system (1xEV-DO forward and 1xEV-DO reverse).
It runs under Windows installed in the MG3710A, MS2690A/91A/92A-020 and MS2830A-020/021 and outputs modulation signals by selecting generated waveform patterns. A license is required for the main frame to output signals. Conversely, it can also generate multi-user signals with any adjusted frequency, phase, level and delay.

***Read the "MX3701xxA IQproducer" brochure for detail parameter setting range.**

1xEV-DO IQproducer



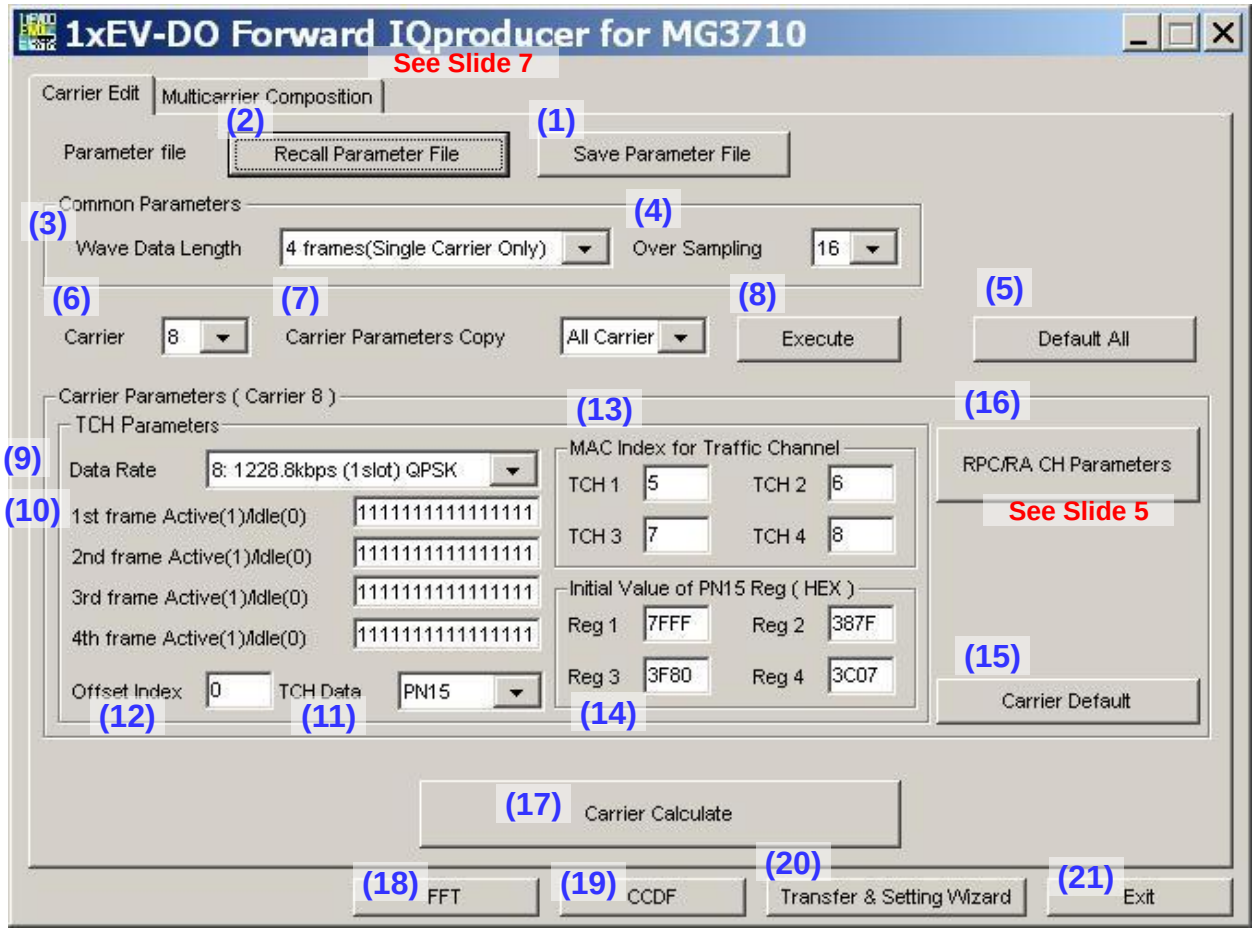
Install

- **Generating waveform patterns using 1xEV-DO 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**

Forward: Main screen

The following screen will be displayed if 1xEV-DO_FWD is chosen. In forward, the multi-carrier signal (up to 9 carriers) and the Idle-Active integrated signal can be generated.

Forward Main screen: Carrier Edit sheet



(9) Data Rate
1: 38.4 kbps (16 slots)QPSK
2: 76.8 kbps (8 slots)QPSK
3: 153.6 kbps (4 slots) QPSK
4: 307.2 kbps (2 slots) QPSK
5: 614.4 kbps (1 slot) QPSK
6: 307.2 kbps (4 slots) QPSK
7: 614.4 kbps (2 slots) QPSK
8: 1228.8 kbps (1 slot) QPSK
9: 921.6 kbps (2 slots)8-PSK
10: 1843.2 kbps (1 slot) 8-PSK
11: 1228.8 kbps (2 slots)16QAM
12: 2457.6 kbps (1 slot) 16QAM
13: Idle Slot

Forward: The parameter setting range of a Carrier Edit sheet

(1) Save Parameter File
A parameter file is saved.

(2) Recall Parameter File
A parameter file is recalled.

(3) Wave Data Length
The number of frames can be specified up to a maximum of 4 frames. Only 3 frames can be specified when creating multi-carrier.

(4) Over Sampling: 4/8/16
It is over sampling rate of a waveform pattern.

(5) Default All
The setting value of all single carriers is returned to an initial value.

(6) Carrier: 1 to 9
The single carrier edited is chosen.

(7) Carrier Parameters Copy : Carrier 1 to Carrier 9/All
The contents of the specified single carrier are copied to other single carriers.

(8) Execute
The copy of (7) is performed.

(9) Data Rate
The data rate and transmitting slot of a single carrier to be created are set up.

(10) 1st to 4th Frame Active(1)/Idle(0)
Active/idol of a traffic channel are set up for every slot.

(11) TCH Data: All'0'/All'1'/PN15
The payload data of a traffic channel is set up.

(12) Offset Index: 0 to 511
PN_Offset_Index of the single carrier to be created is specified.

(13) TCH1 to TCH4: 5 to 63
MAC Index used for the scrambling sequence of a traffic channel and the Walsh cover of preamble is specified.

(14) Reg1 to Reg4: 0 to 7FFF, HEX
By changing the initial value of a shift register when setting TCH Data to PN15, offset can be added to PN15 series of each TCH.

(15) Carrier Default
The setting value of the specified single carrier is returned to an initial value.

(16) RPC/RA CH Parameters
The RPC/RA CH Parameters screen is opened.

(17) Carrier Calculate
The waveform pattern of nine single carriers is created in the current setting. Click the Multi-carrier Composition tab to open a Multi-carrier Composition sheet and create multi-carrier.

(18) FFT
The FFT graph screen is displayed. This screen shows a FFT-processed graph of the spectrum of the created waveform pattern data.

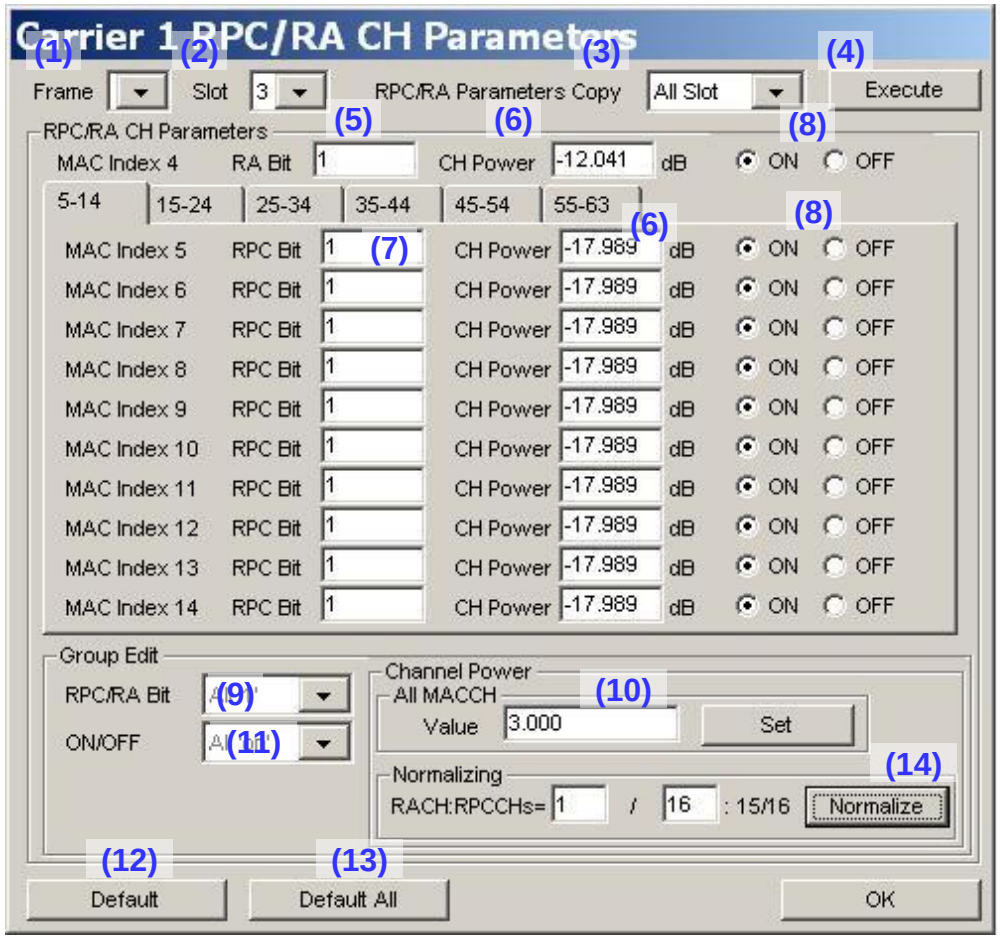
(19) CCDF
The CCDF graph screen is displayed. This screen shows a graph of CCDF of the created waveform pattern data.

(20) Transfer & Setting Wizard
The Transfer & Setting Wizard screen is displayed.
The three-step operation below is performed on this screen.
- Connection between a computer and MG3710A.
- Transmission of the waveform pattern data to MG3710A.
- Loading of the waveform pattern data to the arbitrary waveform memory of MG3710A.

(21) Exit
The software program is terminated.

Forward: RPC/RA CH parameters sheet

RPC/RA CH Parameters are set up on this screen.



Forward: The parameter setting range of a RPC/RA CH parameters sheet

(1) Frame
The frame edited can be chosen.

(2) Slot
The slot edited can be chosen.

(3) RPC/RA Parameters Copy: Slot 1 to Slot 16, All Slot, All frame
The parameter setting of a RPC/RA channel is copied to other slots.

(4) Execute
The copy of (3) is performed.

(5) RA Bit: 0 or 1
It is RA bit of RA channel.

(6) CH Power: -40dB to +40dB
It is the channel gain (relative value from a pilot channel) of a MAC channel.

(7) RPC Bit: 0 or 1
It is the RPC bit of a RPC channel.

(8) ON/OFF
ON/OFF of each MAC channel can be set up.

(9) RPC/RA Bit (Group Edit)
All specified RPC bits are set to 0 or 1.
All'0': Set all RPC bits in a slot to 0.
All'1': Set all RPC bits in a slot to 1.

(10) Channel Power (Group Edit)
The channel gain (relative value from a pilot channel) of the MAC channel in a slot is set up collectively.

(11) ON/OFF (Group Edit)
ON/OFF of the MAC channel in a slot is set up in a batch.
All'OFF': Turn OFF all MAC channels.
All'ON': Turn ON all MAC channels.

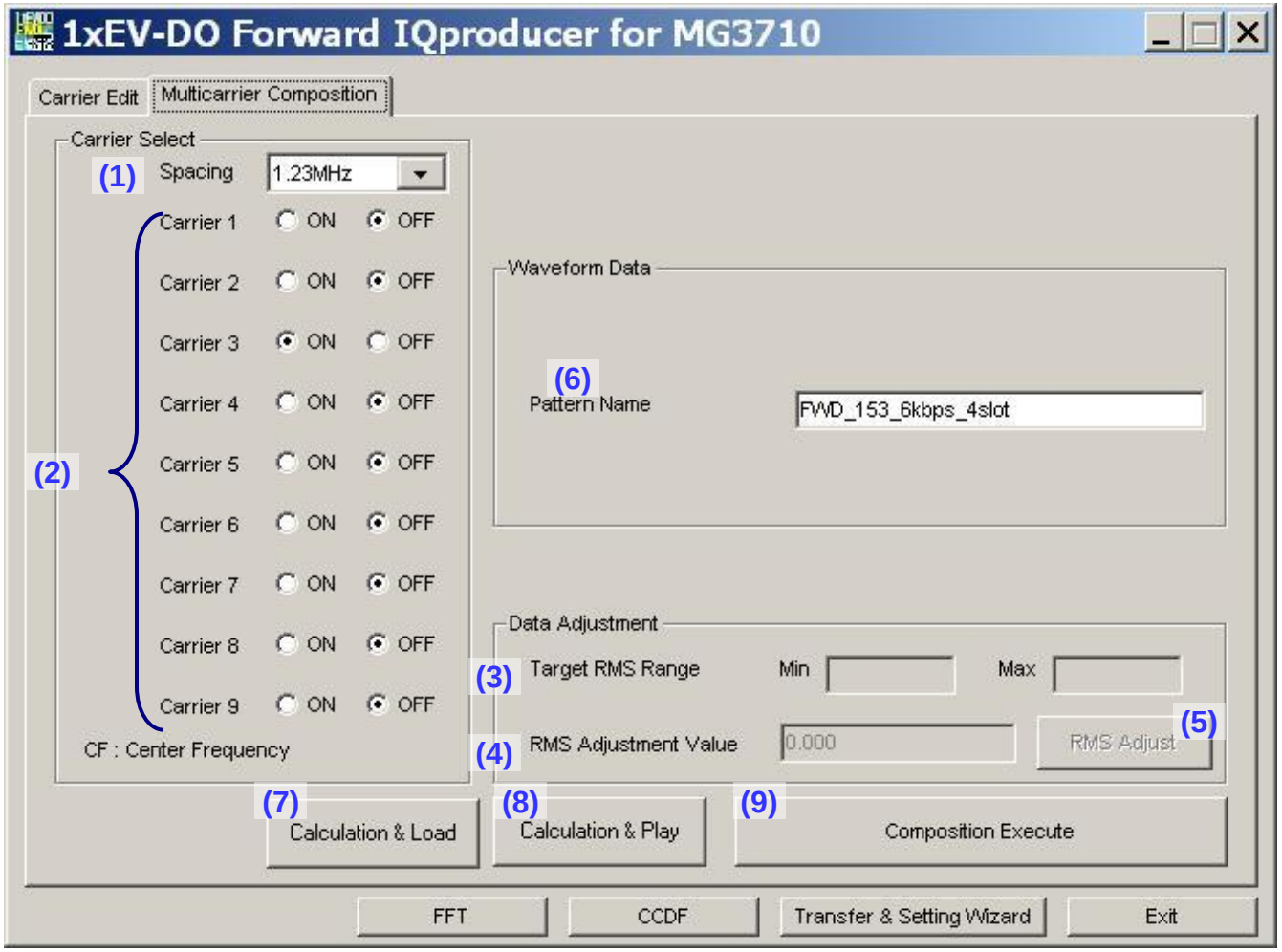
(12) Default
Only the specified slot is returned to the default state.

(13) Default All
The RPC/RA CH Parameters setting of the specified carrier is returned to the default state.

(14) Normalize
The channel gain of the RPC channel / RA channel of the specified slot is set in a batch according to the rate shown by a fraction.
The rate is set up by the equality on the left of the Normalize button. The numerator of the ratio of RA channel can be set up in the range of 1 to "denominator-1." Also, the denominator can be set up in the range of 2 to 99.

Forward: Multi carrier composition sheet

On this screen, waveform pattern creation of multi-carrier (single carrier) is performed using the waveform pattern of each single carrier created in Carrier Edit.



Forward: The parameter setting range of a Multi carrier composition sheet

(1) Spacing: 1.20/1.23/1.25/1.35 MHz
The frequency interval between carriers is set up.

(2) Carrier Select
ON/OFF of the single carrier used for multi-carrier creation is set up.

(3) Target RMS Range
"RMS" means the RMS value of a waveform pattern.

(4) RMS Adjustment Value
The RMS value of multi-carrier (single carrier) waveform pattern is set up. Generally, the floor noise becomes lower although the modulation signal of output becomes more susceptible to distortion when the RMS value of a waveform pattern is increased. On the contrary, the floor noise becomes higher although the modulation signal of output becomes less susceptible to distortion when the RMS value is decreased.

(5) RMS Adjust
A click of this RMS Adjust button converts "the waveform pattern created by a click of the Composition Execute button" into "a waveform pattern with the closest RMS value to the value entered in RMS Adjustment Value."

(6) Pattern name
The file name of a waveform pattern is set up. (Up to 20 one-byte characters can be entered.)

(7) Calculation & Load
Loads generated waveform pattern into memory.

(8) Calculation & Play
Loads generated waveform pattern into memory and selects.

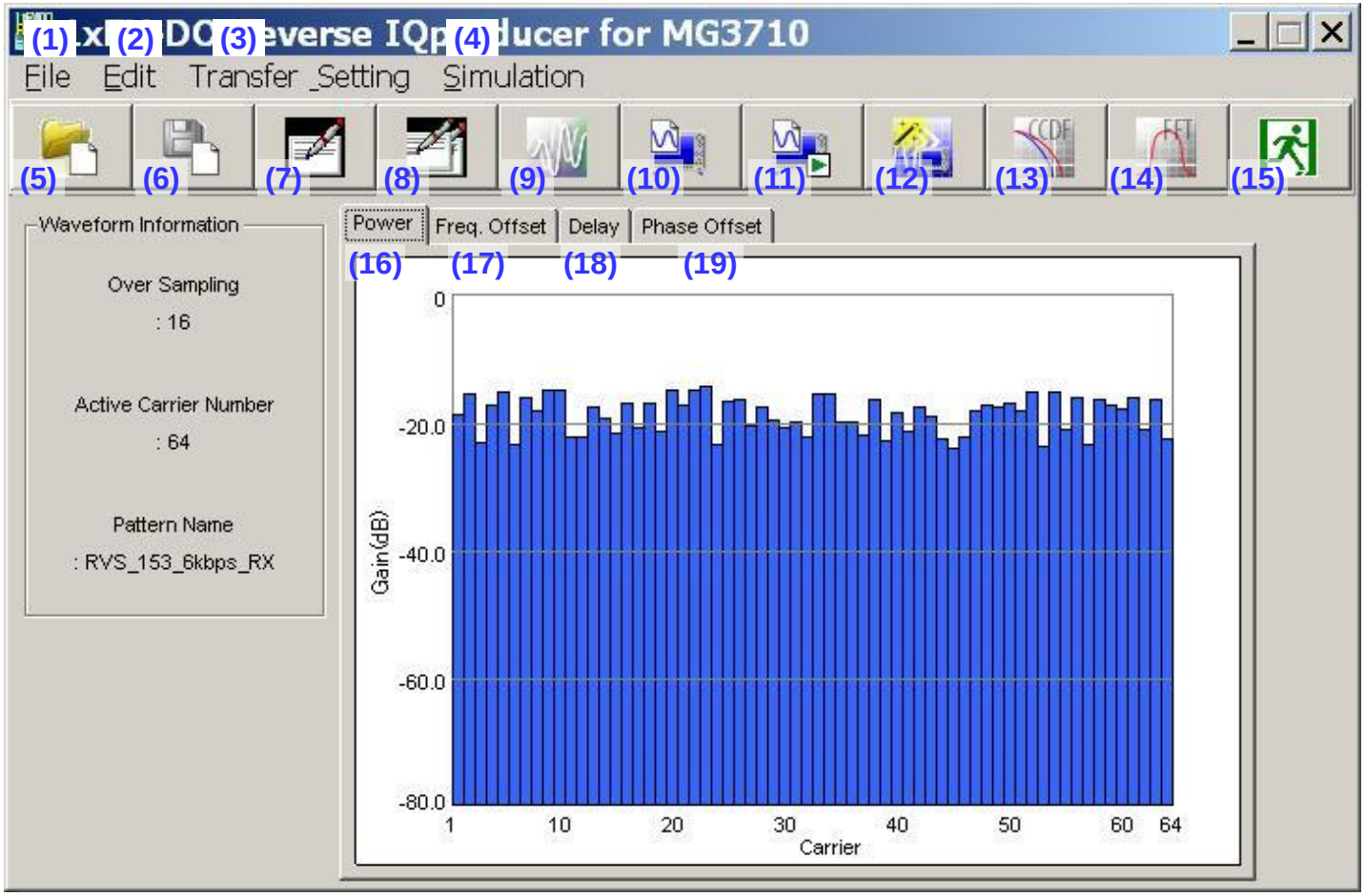
(9) Composition Execute
A waveform pattern is created. A wvd file and a wvi file are created as a waveform pattern.

Reverse: Main screen

The following screen will be displayed if 1xEV-DO RVS is chosen. Starting of each functional screen and the display of graph are performed.

Reverse Main screen:

(7) See Slide 11
(8) See Slide 13



Reverse: The parameter setting range of the Main screen

(1) File menu
Recall/Save of a parameter file and closing of application can be performed by choosing [Recall Parameter File], [Save parameter File] and [Exit].

(2) Edit menu
Starting of the Waveform Pattern Edit screen and starting of the Quick Edit screen can be performed.

(3) Transfer Setting menu
The Transfer & Setting Wizard screen can be started.

(4) Simulation menu
Starting of the CCDF Graph Monitor screen and starting of the FFT Graph Monitor screen can be performed.

(5) Recall Parameter File button
A Parameter File is recalled.

(6) Save Parameter File button
A Parameter File is saved.

(7) Edit Waveform Pattern button
The Edit Waveform Pattern screen to set up each carrier is displayed.

(8) Quick Edit button
The Quick Edit screen to set up each carrier is displayed.

(9) Calculate Waveform Pattern button
Creation of a waveform pattern is started based on the preset parameter.

(10) Calculation & Load
Loads generated waveform pattern into memory.

(11) Calculation & Play
Loads generated waveform pattern into memory and selects.

(12) Transfer Setting Wizard button
The Transfer & Setting Wizard for waveform pattern transmission is started.

(13) CCDF Simulation button
Trace of the last-created waveform pattern is displayed on the CCDF Graph Monitor.

(14) FFT Simulation button
Trace of the last-created waveform pattern is displayed on the FFT Graph Monitor.

(15) Exit button
1xEV-DO Reverse IQproducer is terminated.

(16) Power graph
The power of the On carrier is displayed.

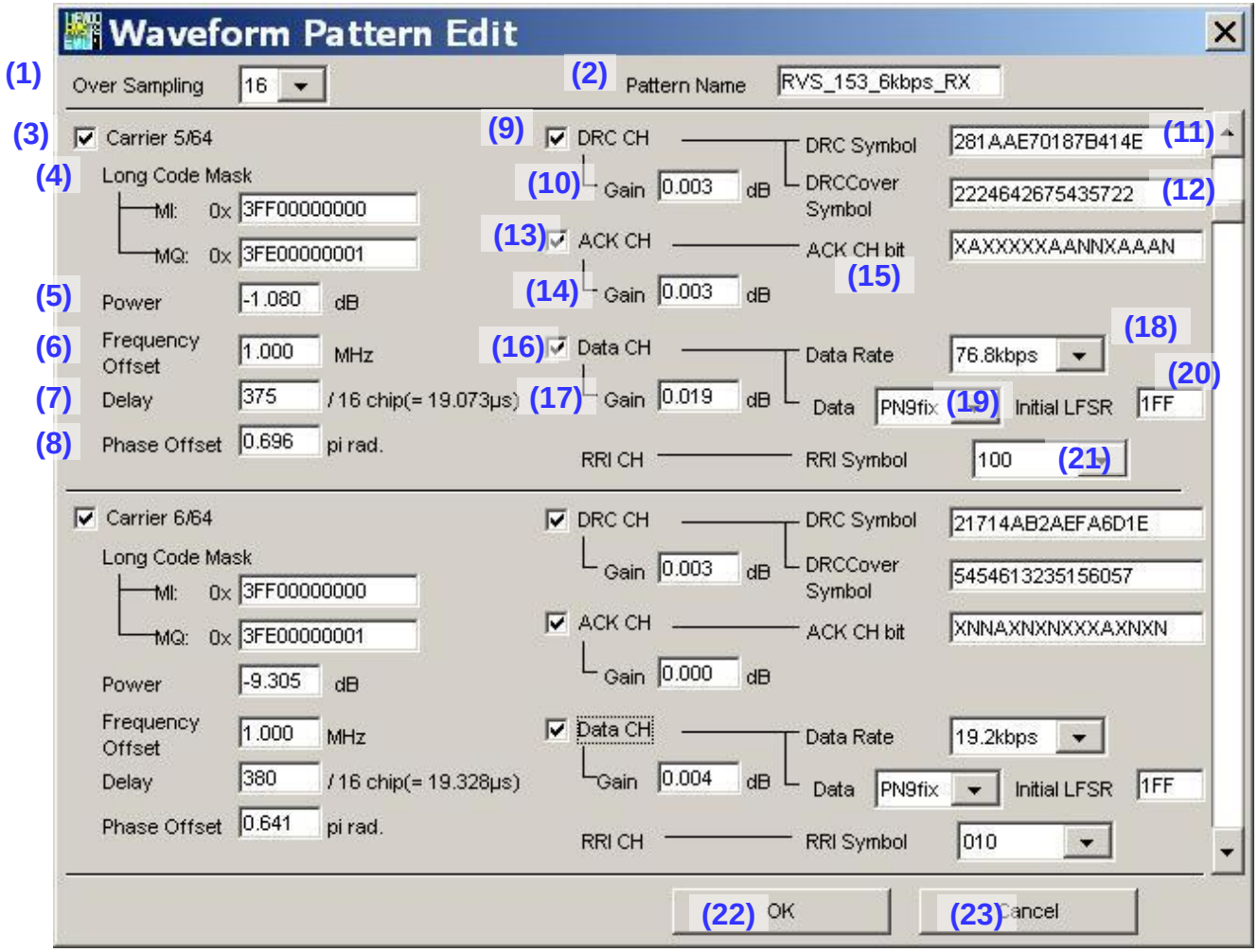
(17) Freq. Offset graph
The frequency offset of the On carrier is displayed.

(18) Delay graph
The delay of the On carrier is displayed.

(19) Phase Offset graph
The phase offset of the On carrier is displayed.

Reverse: Waveform Pattern Edit sheet

The modulation parameter of each carrier can be set up on this screen. The carrier number is displayed on the screen's left, and all carriers can be displayed and set up with the scroll bar on the screen's right.



Reverse: The parameter setting range of a Waveform Pattern Edit sheet

(1) Over Sampling : 4, 8, 16
These numbers mean the ratio of the sampling rate and the chip rate of a waveform pattern.

(2) Pattern Name : 1 to 20 characters
It is the file name of waveform pattern data.

(3) Carrier On/Off :Checked = On
On/Off of a carrier is set up.

(4) Long Code Mask : 0x0 to 0x3FFFFFFFFF (MI, MQ)
I and Q long code mask are set up.

(5) Power : -80.000 to 0.000 dB
The power of a carrier is set up.

(6) Frequency Offset : -5.000 to 5.000MHz
The frequency offset of a carrier is set up.

(7) Delay : 0/16 chip to 524287/16 chip
The delay of a carrier is set up.

(8) Phase Offset : 0.000 to 2.000 pi rad.
The phase offset of a carrier is set up.

(9) DRC CH On/Off :Checked = On
On/Off of a DRC channel is set up.

(10) DRC CH Gain : -80.000 to 20.000 dB
The channel gain of a DRC channel is set up.

(11) DRC Symbol :
0000000000000000 to FFFFFFFFFFFFFFFF (HEX)
DRC channel symbol data is set up in HEX.

(12) DRC Cover Symbol :
0000000000000000 to 7777777777777777 (OCT)
DRC cover symbol data is set up in OCT.

(13) ACK CH On/Off : Checked = On
On/Off of an ACK channel is set up.

(14) ACKCH Gain : -80.000 to 20.000 dB
The channel gain of an ACK channel is set up.

(15) ACKCH Bit : A(ACK), N(NACK), X(DTX)
An ACK channel bit is set up.

(16) Data CH On/Off
On/Off of a Data channel is set up.

(17) DataCH Gain : -80.000 to 20.000 dB
The channel gain of a Data channel is set up.

(18) Data Rate : 9.6, 19.2, 38.4, 76.8, 153.6kbps
The data rate of a Data channel is set up.

(19) Data : PN9fix, All '0', All '1'
The payload data of a Data channel is set up.

(20) Initial LFSR : 0 to 1FF(HEX)
When PN9fix is chosen for Data, the initial value of the shift register of PN9 generator is set up in HEX.

(21) RRI Symbol : 000 to 101(BIN)
A RRI symbol is set up in BIN.

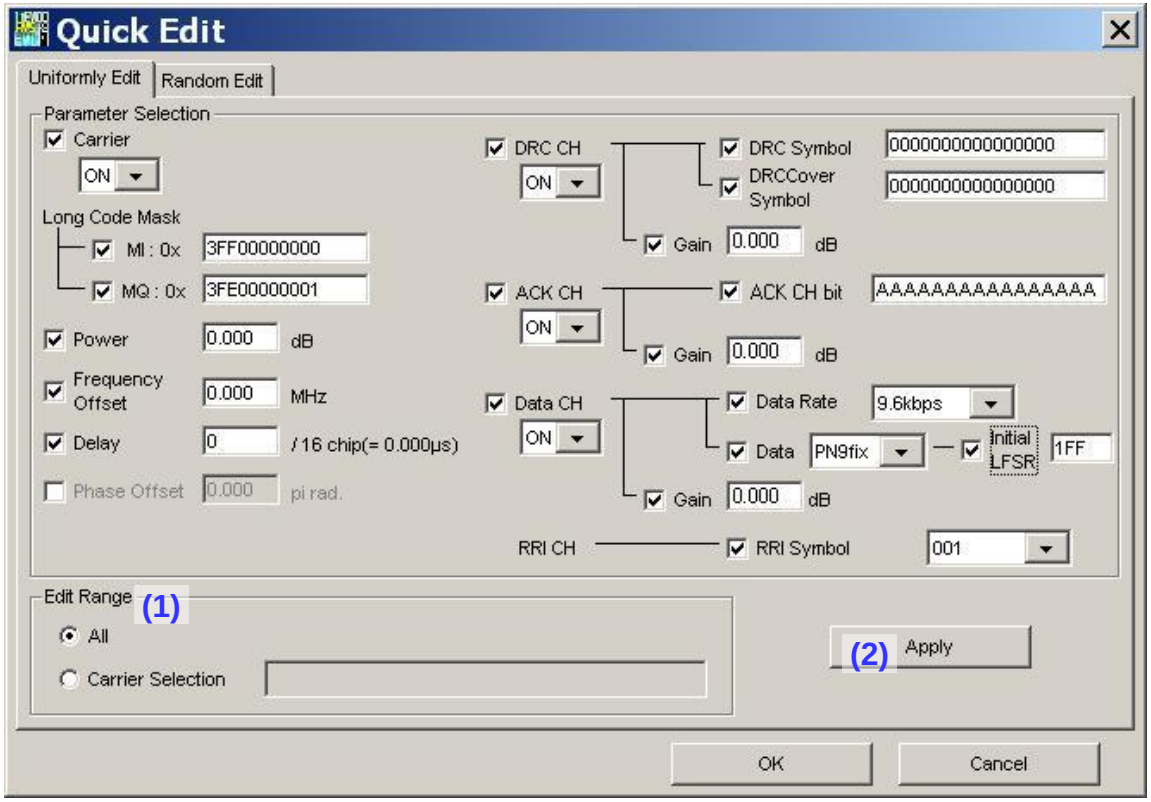
(22) OK
The Waveform Pattern Edit screen is closed. The contents changed on the Waveform Pattern Edit screen are maintained.

(23) Cancel
The Waveform Pattern Edit screen is closed. The contents changed in Waveform Pattern Edit are canceled.

Reverse: Quick Edit sheet

The Quick Edit screen has the Uniformly Edit sheet and the Random Edit sheet.
On the Uniformly Edit screen, multiple parameters of the specified carriers can be set up in a batch.

Uniformly Edit sheet:



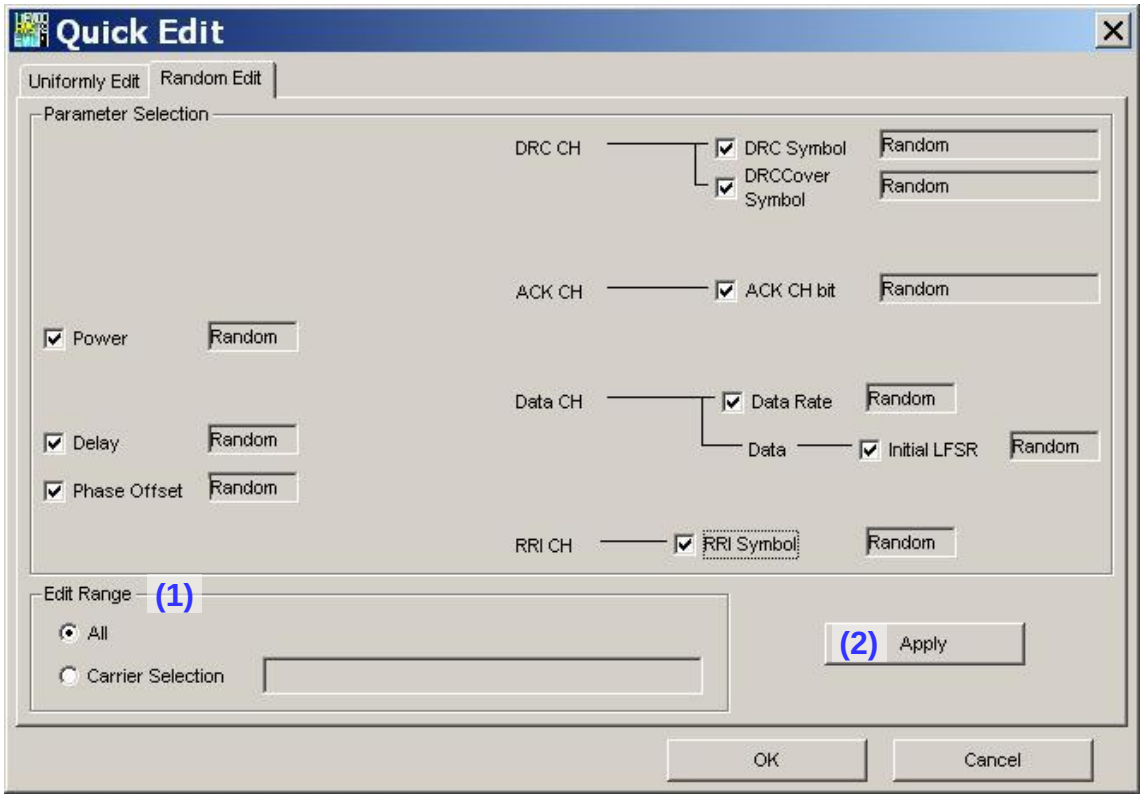
(1) Edit Range
If the Apply button is clicked when the radio button of [All] is clicked on, setup will be performed for all carriers. Also, if the Apply button is clicked when the radio button of [Carrier Selection] is clicked on, setup will be performed for the carrier applicable to the conditions specified in the right edit box.

(2) Apply
The parameter of items checked in Parameter Selection is set up for the carrier specified in Edit Range.

Reverse: Quick Edit sheet

The Random Edit sheet offers batch setting of random values for multiple parameters of the specified carriers.

Random Edit sheet:

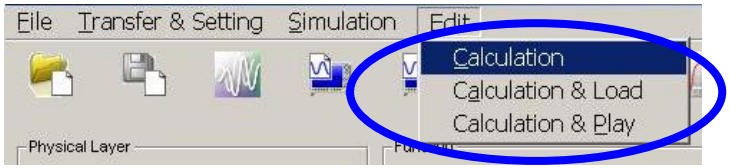


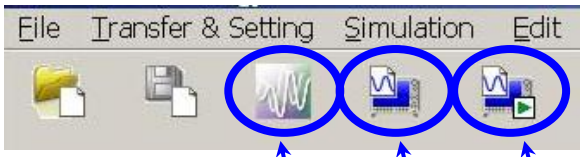
(1) Edit Range
If the Apply button is clicked when the radio button of [All] is clicked on, setup will be performed for all carriers. Also, if the Apply button is clicked when the radio button of [Carrier Selection] is clicked on, setup will be performed for the carrier applicable to the conditions specified in the right edit box.

(2) Apply
The parameter of items checked in Parameter Selection is set up for the carrier specified in Edit Range.

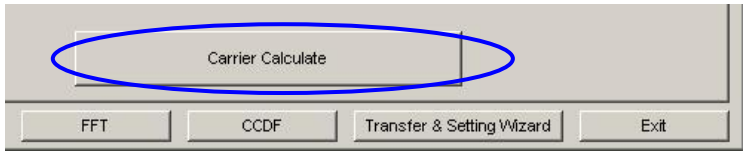
Calculation & Load & Play

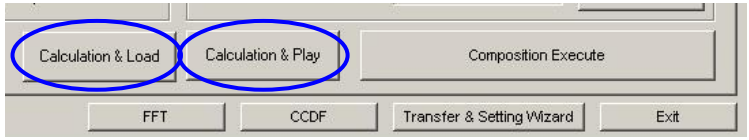
Based on the preset parameter, the waveform pattern file for MG3710A is generated.





Forward Link:





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

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Specifications are subject to change without notice.

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