MX370104A/MX269904A
Multi-carrier IQproducer^{TM}
Operation Manual

Seventh Edition

- For safety and warning information, please read this manual before attempting to use the equipment.
- Additional safety and warning information is provided within the MG3700A Vector Signal Generator Operation Manual (Mainframe), MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe), MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe Operation), MS2830A Signal Analyzer Operation Manual (Mainframe Operation), or MS2840A Signal Analyzer Operation Manual (Mainframe Operation). Please also refer to either of these documents before using the equipment.
- Keep this manual with the equipment.

ANRITSU CORPORATION

Safety Symbols

To prevent the risk of personal injury or loss related to equipment malfunction, Anritsu Corporation uses the following safety symbols to indicate safety-related information. Ensure that you clearly understand the meanings of the symbols BEFORE using the equipment. Some or all of the following symbols may be used on all Anritsu equipment. In addition, there may be other labels attached to products that are not shown in the diagrams in this manual.

Symbols used in manual

⚠ **DANGER**   This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.

⚠ **WARNING**   This indicates a hazardous procedure that could result in serious injury or death if not performed properly.

⚠ **CAUTION**   This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manual

The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Ensure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.

⃠   This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.

◯   This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.

△   This indicates a warning or caution. The contents are indicated symbolically in or near the triangle.

▢   This indicates a note. The contents are described in the box.

♻ 🗑   These indicate that the marked part should be recycled.

MX370104A/MX269904A
Multi-carrier IQproducer™
Operation Manual

27   April   2007 (First Edition)
13   May   2016 (Seventh Edition)

Equipment Certificate

Anritsu Corporation guarantees that this equipment was inspected at shipment and meets the published specifications.

Anritsu Warranty

- During the warranty period, Anritsu Corporation will repair or exchange this software free-of-charge if it proves defective when used as described in the operation manual.
- The warranty period is 6 months from the purchase date.
- The warranty period after repair or exchange will remain 6 months from the original purchase date, or 30 days from the date of repair or exchange, depending on whichever is longer.
- This warranty does not cover damage to this software caused by Acts of God, natural disasters, and misuse or mishandling by the customer.

In addition, this warranty is valid only for the original equipment purchaser. It is not transferable if the equipment is resold.

Anritsu Corporation shall assume no liability for injury or financial loss of the customer due to the use of or a failure to be able to use this equipment.

Anritsu Corporation Contact

In the event that this equipment malfunctions, contact an Anritsu Service and Sales office. Contact information is available in a separate file (for the PDF version), and on the last page of this manual (for the printed version).

Notes On Export Management

This product and its manuals may require an Export License/Approval by the Government of the product's country of origin for re-export from your country.

Before re-exporting the product or manuals, please contact us to confirm whether they are export-controlled items or not.

When you dispose of export-controlled items, the products/manuals need to be broken/shredded so as not to be unlawfully used for military purpose.

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Please read this Software End-User License Agreement (hereafter this EULA) carefully before using (includes executing, copying, registering, etc.) this software (includes programs, databases, scenarios, etc., used to operate, set, etc., Anritsu electronic equipment). By reading this EULA and using this software, you are agreeing to be bound by the terms of its contents and Anritsu Corporation (hereafter Anritsu) hereby grants you the right to use this Software with the Anritsu-specified equipment (hereafter Equipment) for the purposes set out in this EULA.

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To the extent not prohibited by law, in no event shall Anritsu be liable for personal injury, or any incidental, special, indirect or consequential damages whatsoever, including, without limitation, damages for loss of profits, loss of data, business interruption or any other commercial damages or losses, arising out of or related to your use or inability to use this Software.

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   i) If this Software is deemed to be used for purposes not described in the operation manual or specifications.

   ii) If this Software is used in conjunction with other non-Anritsu-approved software.

   iii) Recovery of lost or damaged data.

   iv) If this Software or the Equipment has been modified, repaired, or otherwise altered without Anritsu's prior approval.

   v) For any other reasons out of Anritsu's direct control and responsibility, such as but not limited to, natural disasters, software virus infections, etc.

b. Expenses incurred for transport, hotel, daily allowance, etc., for on-site repairs by Anritsu engineers necessitated by the above faults shall be borne by you.

c. The warranty period for faults listed in article 3a above covered by this EULA shall be either 6 months from the date of purchase of this Software or 30 days after the date of repair, whichever is longer.

4. Export Restrictions

You may not use or otherwise export or re-export directly or indirectly this Software except as authorized by Japanese and United States law. In particular, this software may not be exported or re-exported (a) into any Japanese or US embargoed countries or (b) to anyone on the Japanese or US Treasury Department's list of Specially Designated Nationals or the US Department of Commerce Denied Persons List or Entity List. By using this Software, you warrant that you are not located in any such country or on any such list. You also agree that you will not use this Software for any purposes prohibited by Japanese and US law, including, without limitation, the development, design and manufacture or production of missiles or nuclear, chemical or biological weapons of mass destruction.

5. Termination

Anritsu shall deem this EULA terminated if you violate any conditions described herein. This EULA shall also be terminated if the conditions herein cannot be continued for any good reason, such as violation of copyrights, patents, or other laws and ordinances.

6. Reparations

If Anritsu suffers any loss, financial or otherwise, due to your violation of the terms of this EULA, Anritsu shall have the right to seek proportional damages from you.

7. Responsibility after Termination

Upon termination of this EULA in accordance with item 5, you shall cease all use of this Software immediately and shall as directed by Anritsu either destroy or return this Software and any backup copies, full or partial, to Anritsu.

8. Dispute Resolution

If matters of dispute or items not covered by this EULA arise, they shall be resolved by negotiations in good faith between you and Anritsu.

9. Court of Jurisdiction

This EULA shall be interpreted in accordance with Japanese law and any disputes that cannot be resolved by negotiation described in Article 8 shall be settled by the Japanese courts.

Cautions against computer virus infection

- Copying files and data
  Only files that have been provided directly from Anritsu or generated using Anritsu equipment should be copied to the instrument.
  All other required files should be transferred by means of USB or CompactFlash media after undergoing a thorough virus check.
- Adding software
  Do not download or install software that has not been specifically recommended or licensed by Anritsu.
- Network connections
  Ensure that the network has sufficient anti-virus security protection in place.

Protection Against Computer Virus Infections

Prior to the software installation

Before installing this software or any other software recommended or approved by Anritsu, run a virus scan on your computer, including removable media (e.g. USB memory stick and CF memory card) you want to connect to your computer.

When using this software and connecting with the measuring instrument
- Copying files and data
  On your computer, do not save any copies other than the following:
  • Files and data provided by Anritsu
  • Files created by this software
  • Files specified in this document
  Before copying these files and/or data, run a virus scan, including removable media (e.g. USB memory stick and CF memory card).
- Connecting to network
  Connect your computer to the network that provides adequate protection against computer viruses.

Cautions on Proper Operation of Software

This software may not operate normally if any of the following operations are performed on your computer:
- Simultaneously running any software other than that recommended or approved by Anritsu
- Closing the lid (Laptop computer)
- Turning on the screen saver function
- Turning on the battery-power saving function (Laptop computer)

For how to turn off the functions, refer to the operation manual that came with your computer.

CE Conformity Marking

Anritsu affixes the CE conformity marking on the following product(s) in accordance with the Council Directive 93/68/EEC to indicate that they conform to the EMC and LVD directive of the European Union (EU).

CE marking

1. Product Model

Software: MX370104A/MX269904A Multi-carrier IQproducer^{TM}

2. Applied Directive and Standards

When the MX370104A/MX269904A Multi-carrier IQproducer^{TM} is installed in the MG3710A, MS2690A/MS2691A/MS2692A, MS2830A, or MS2840A, the applied directive and standards of this software conform to those of the MG3710A, MS2690A/MS2691A/MS2692A, MS2830A, or MS2840A main frame.

PS: About main frame

Please contact Anritsu for the latest information on the main frame types that MX370104A/MX269904A can be used with.

C-tick Conformity Marking

Anritsu affixes the C-tick mark on the following product(s) in accordance with the regulation to indicate that they conform to the EMC framework of Australia/New Zealand.

C-tick marking

◔N274

1. Product Model

Software: MX370104A/MX269904A Multi-carrier IQproducer[TM]

2. Applied Directive and Standards

When the MX370104A/MX269904A Multi-carrier IQproducer[TM] is installed in the MG3710A, MS2690A/MS2691A/MS2692A, MS2830A, or MS2840A, the applied directive and standards of this software conform to those of the MG3710A, MS2690A/MS2691A/MS2692A, MS2830A, or MS2840A main frame.

PS: About main frame
    Please contact Anritsu for the latest information on the main frame types that MX370104A/MX269904A can be used with.

About This Manual

■ Associated Documents

The operation manual configuration of the MX370104A/MX269904A Multi-carrier IQproducer™ is shown below.

■ If using MG3700A or MG3710A:
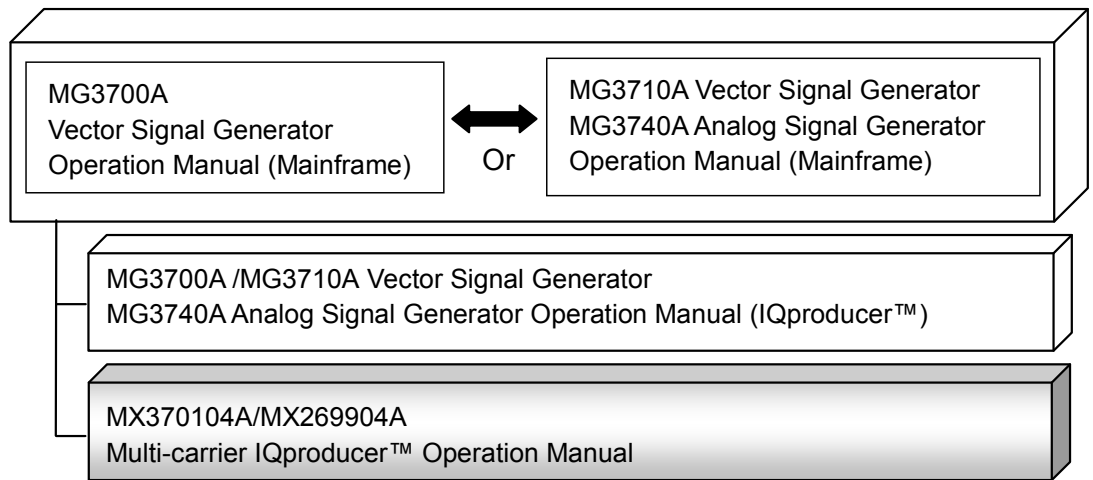
| MG3700A Vector Signal Generator Operation Manual (Mainframe) | Or | MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe) |

MG3700A /MG3710A Vector Signal Generator
MG3740A Analog Signal Generator Operation Manual (IQproducer™)

MX370104A/MX269904A
Multi-carrier IQproducer™ Operation Manual

- ● MG3700A Vector Signal Generator Operation Manual (Mainframe)

This describes basic operations, maintenance procedure, and remote functions of the MG3700A Vector Signal Generator.

Or

- ● MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe)

This describes basic operations, maintenance procedure, and remote functions of the MG3710A Vector Signal Generator and the MG3740A Analog Signal Generator.

- ● MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)

This describes the functions and how to use the IQproducer, which is Windows software for the Vector Signal Generator and the Analog Signal Generator.

- ● Multi-carrier IQproducer™ Operation Manual (This document)

This describes basic operations and functions of the Multi-carrier IQproducer™.

■ **If using MS2690A/MS2691A/MS2692A, MS2830A or MS2840A:**

MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual
(Main Frame Operation)

Or

MS2830A Signal Analyzer Operation Manual
(Main Frame Operation)

MS2840A Signal Analyzer Operation Manual
(Main Frame Operation)

MS2690A/MS2691A/MS2692A and MS2830A/MS2840A
Signal Analyzer Operation Manual (Main Frame Remote Control)

MS2690A/MS2691A/MS2692A
Signal Analyzer Option 020:
Vector Signal Generator
Operation Manual
(Operation)

Or

MS2830A/MS2840A
Signal Analyzer
Vector Signal Generator
Operation Manual
(Operation)

MS2690A/MS2691A/MS2692A
Signal Analyzer Option 020:
Vector Signal Generator
Operation Manual
(Remote Control)

Or

MS2830A/MS2840A
Signal Analyzer
Vector Signal Generator
Operation Manual
(Remote Control)

MS2690A/MS2691A/MS2692A and MS2830A/MS2840A
Vector Signal Generator Operation Manual (IQproducer™)

MX370104A/MX269904A
Multi-carrier IQproducer™ Operation Manual

- Signal Analyzer Operation Manual (Mainframe, Operation)

This describes basic operations, maintenance procedure, common functions

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- Signal Analyzer Operation Manual (Mainframe, Remote Control)

These describe common remote functions

- MS2690A/MS2691A/MS2692A Signal Analyzer Option 020: Vector Signal Generator Operation Manual, Operation

This describes the functions and how to use the Vector Signal Generator option.

Or

- MS2830A/MS2840A Vector Signal Generator Operation Manual, Operation

This describes the functions and how to use the Vector Signal Generator option.

- MS2690A/MS2691A/MS2692A Signal Analyzer Option 020: Vector Signal Generator Operation Manual, Remote Control

This describes how to remotely control the Vector Signal Generator option.

Or

- MS2830A/MS2840A Vector Signal Generator Operation Manual, Remote Control

This describes how to remotely control the Vector Signal Generator option.

- MS2690A/MS2691A/MS2692A and MS2830A/MS2840A Vector Signal Generator Operation Manual (IQproducer™)

This describes the functions and how to use the IQproducer, which is Windows software for the Vector Signal Generator option.

- Multi-carrier IQproducer™ Operation Manual (This document)

This describes basic operations and functions of the Multi-carrier IQproducer™.

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Appendix

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VI.

Chapter 1   Overview

This chapter provides an overview of the MX370104A/MX269904A Multi-carrier IQproducer™.

1

Overview

1.1 Product overview

MX370104A/MX269904A Multi-carrier IQproducer™ (hereinafter referred to as "this software") is software used to generate waveform patterns conforming to the multi-carrier specifications. These are:

This software requires either of the following environment:

- MG3710A Vector Signal Generator
- MS2690A/MS2691A/MS2692A, MS2830A, or MS2840A Signal Analyzer with Vector Signal Generator option installed
- Personal computer (hereinafter, "PC")

This software generates waveform patterns that support the specifications of multi-carrier with various characteristics. This is made possible by the editing/customizing of parameters according to its use.

A waveform pattern created by this software can be output using an RF signal after being downloaded into the MG3700A Vector Signal Generator, MG3710A Vector Signal Generator, or an MS2690A/MS2691A/MS2692A,MS2830A or MS2840A Signal Analyzer with Vector Signal Generator option installed (collectively referred to as "mainframe", or "this equipment").

1.2 Product Composition

The following table lists the model name and specifications of this software according to the equipment.

Table 1.2-1 Restrictions

Restrictions \\ Mainframe	MG3700A	MG3710A	MS2690A MS2691A MS2692A	MS2830A	MS2840A
Software name	MX370104A		MX269904A		
Maximum Size of Waveform Patterns [Msample]	256 512*1	64 128*5 256*6 512*7 1024*8	256	64 256*4	64 256*4
Transmission method of Waveform Patterns	LAN, Compact Flash Card	External device such as LAN, USB memory*2	USB Memory and other external device*2	USB Memory and other external device*2	USB Memory and other external device*2
Installation of this software to this equipment	N/A	Possible	Possible*3	Possible*3	Possible*3

*1: The ARB memory expansion 512M sample (optional) must be installed into the MG3700A to use waveform patterns that exceed 256 M samples.

*2: Transferring waveform patterns is not required if the waveform patterns are created on the equipment using this software.

*3: Although this software can be installed and run in the MS2690A/MS2691A/MS2692A, MS2830A, or MS2840A the measurement functions of the MS2690A/MS2691A/MS2692A, MS2830A, or MS2840A are not guaranteed while this software runs.

*4: The ARB memory expansion 256M sample (optional) must be installed into the Vector Signal Generator option to use waveform patterns that exceed 64 M samples.

*5: The Combination of Baseband Signal (optional) must be installed into the MG3710A to use waveform patterns of maximum 128 M samples.

*6: The ARB memory expansion 256M sample (optional) must be installed into the MG3710A to use waveform patterns of maximum 256 M samples.

*7: To use waveform patterns of maximum 512 M samples, either of the following must be installed into MG3710A:

- ARB memory expansion 1024 M sample (optional)
- ARB memory expansion 256 M (optional) and Combination of Baseband Signal (optional)

*8: The ARB memory expansion 1024M sample (optional) must be installed into the MG3710A to use waveform patterns of maximum 1024 M samples.

■ Notes on waveform pattern conversion

The waveform patterns generated with this software varies according to the main unit type. If using the waveform pattern to the different main unit, you need to convert the waveform pattern.

For details about how to convert a waveform pattern, refer to each one of the following manuals.

- *MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)*
  4.5 "File Conversion on Convert Screen"
- *MS2690A/MS2691A/MS2692A and MS2830A/MS2840A Vector Signal Generator Operation Manual (IQproducer™)*
  4.5 "File Conversion on Convert Screen"

Chapter 2 Preparation

This chapter describes the operating environment for the MX370104A/MX269904A.

2

Preparation

2.1 Operating Environment

The following environment is required for operating the MX370104A/MX269904A.

(1) PC that meets the following conditions

OS	Windows XP/Windows Vista/Windows 7
CPU	Pentium III 1 GHz equivalent or faster
Memory	512 MB or more
Hard disk space	5 GB or more free space in the drive where this software is to be installed. The free hard disk space necessary to create waveform pattern varies depending on the waveform pattern size. The free disk space of 27 GB or greater is required to create four maximum (512 Msample) waveform patterns.

(2) If viewing on PC, displays with a resolution of 1024 × 768 pixels are best viewed using a small font setting.

2.2 Installation/Uninstallation

This software is included in the IQproducer™ installer. It is automatically installed by installing the IQproducer™ that is supplied with this equipment or this software. When using a waveform pattern created using this software in the equipment, the license file must be installed in advance.

■ Installing/Uninstalling IQproducer™

For how to install and uninstall IQproducer™, refer to each of the following manuals:

- *MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)*
  Chapter 2 "Installation"
- *MS2690A/MS2691A/MS2692A and MS2830A/MS2840A Vector Signal Generator Operation Manual (IQproducer™)*
  Chapter 2 "Installation"

■ Installing/Uninstalling IQproducer™ license file

For how to install license file to MG3700A/MG3710A, refer to the following manual:

- *MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)*
  5.1 "Installing License File"

For how to uninstall license file from MG3700A/MG3710A, refer to each one of the following manuals:

- *MG3700A Vector Signal Generator Operation Manual (Mainframe)*
  3.10.10 "Install"
- *MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe)*
  9.4.4 "Install"

Refer to the following manual for details of how to install/uninstall license file to MS2690A/MS2691A/MS2692A, MS2830A or MS2840A with Vector Signal Generator option.

- *MS2690A/MS2691A/MS2692A and MS2830A/MS2840A Vector Signal Generator Operation Manual (IQproducer™)*
  2.2 "Installation/Uninstallation"

2

Preparation

2.3 Starting up and exiting the software

This section explains how to start and stop this software.

Note:

> The following explanation assumes the use of Windows XP. The screen image may differ slightly if not using Windows XP.

2.3.1 Starting Software: When installed on other than MG3710A

Start this software using the following procedure.
The example assumes that it is a PC operation.

\<Procedure>

1. Click **Start** on the task bar, and point to **All Programs**. Next, point to **Anritsu Corporation**, point to **IQproducer**, and then click **IQproducer**.

2. When IQproducer™ starts, the **Select instrument** screen is displayed.

    On the **Select instrument** screen, select the model of the main unit that uses the waveform patterns created by IQproducer™.

Notes:

- This software does not support MG3740A.

- To hide this screen and to start with the selected mainframe's screen from the next time, select the **Don't show this window next time** check box.

3. The common platform screen is displayed when OK is clicked in the Select instrument screen.

    The common platform screen is a screen used to select each function of the IQproducer™.
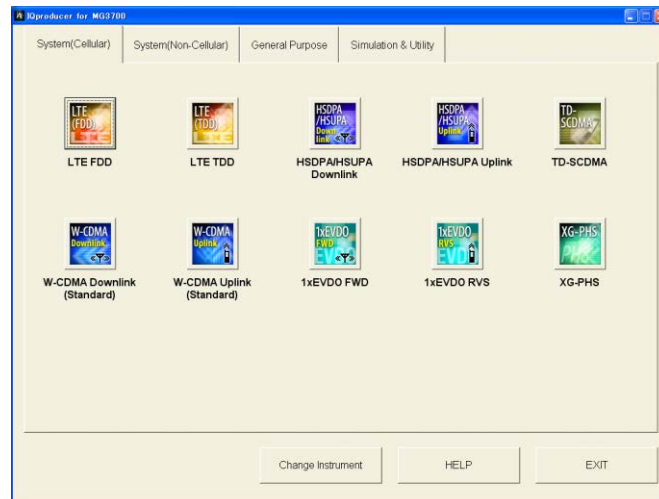
Figure 2.3.1-1   Common Platform Screen

4. Click the **General Purpose** tab on the common platform screen, to show the **General Purpose** selection screen that supports each telecommunication system.
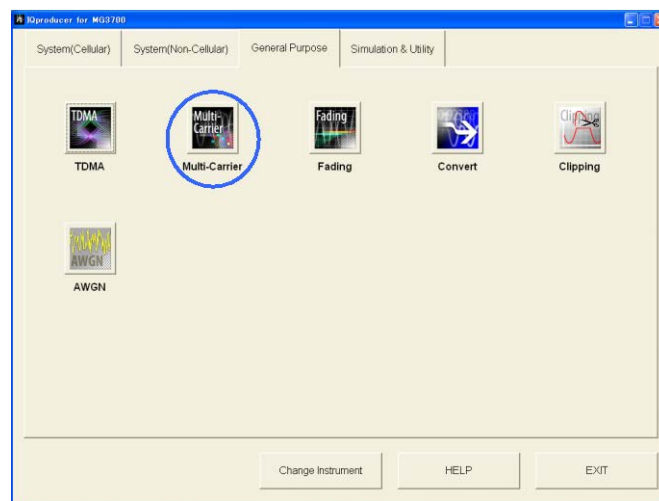
Figure 2.3.1-2   General Purpose Selection Screen

5. Click **Multi-Carrier** to display the main screen. For details of the main screen, refer to Chapter 3 "Detailed Description of Functions".

Note:

If **Change Instrument** is clicked, the **Select instrument** screen will appear each time the software is loaded.

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Preparation

2.3.2   Starting Software: When installed on MG3710A

Start this software using the following procedure.

<Procedure>

1.   Press [IQpro] on the MG3710A front panel to display the common platform screen.

The common platform screen is a screen used to select each function of the IQproducer™.
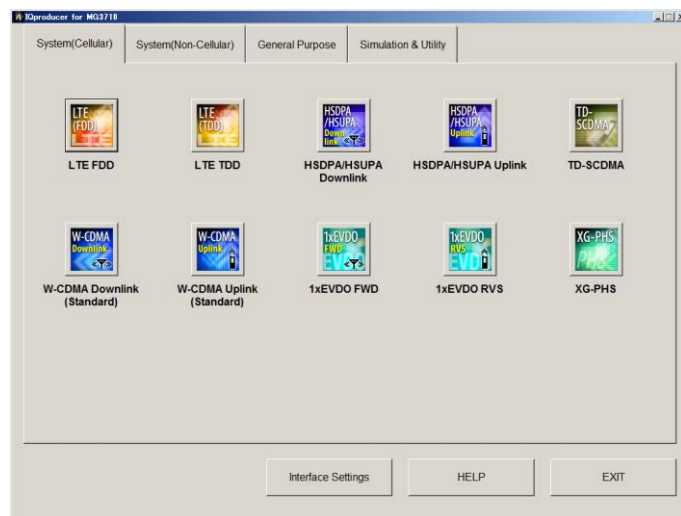
Figure 2.3.2-1   Common Platform Screen

2.   Click the **General Purpose** tab on the common platform screen, to show the **General Purpose** selection screen that supports each telecommunication system.
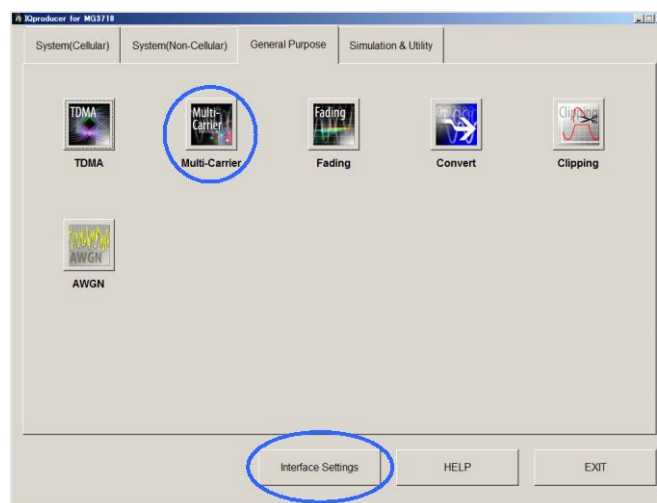
Figure 2.3.2-2   General Purpose Selection Screen

3. Click **Multi-Carrier** to display the main screen. For details of the main screen, refer to Chapter 3 "Detailed Description of Functions".

Note:

When this software is installed on MG3710A, **Change Instrument** displays instead of **Interface Settings**. Clicking **Interface Settings** displays the Interface Setting dialog box.
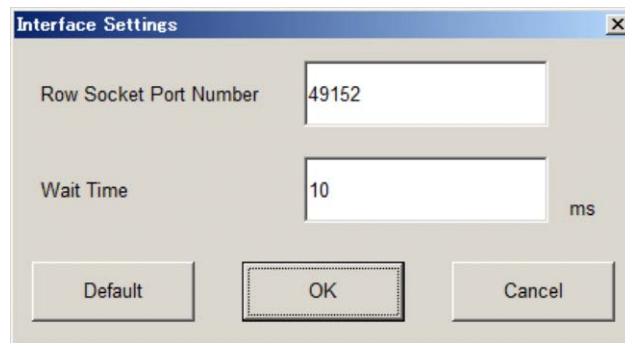
Figure 2.3.2-3　Interface Settings Dialog Box

Here, you can configure interface-related settings of IQproducer and MG3710A. To return to factory defaults, click **Default**.

- Row Socket Port Number

  Sets Row Socket port number. Set the same value as that for MG3710A.

- Wait Time

  Sets the wait time between commands.

2.3.3　Exiting Software

Stop this software using the following procedure.

■ When exiting only this software

To exit only this software without closing the Common Platform screen, or other IQproducer™ tools, do one of these below:

- Click the Exit button ( ) on the tool bar.
- Select Exit from the File menu.
- Click the button on the upper right screen.
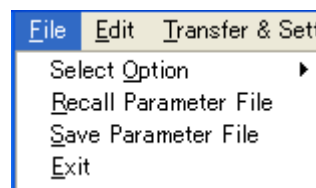
Figure 2.3.3-1　Exiting Software

The operation of the three screen buttons is explained below.
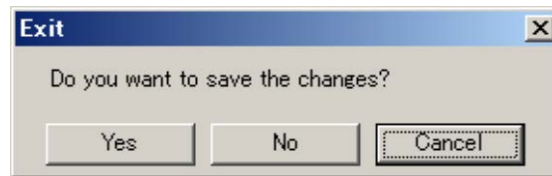
Figure 2.3.3-2   Exit Confirmation Window

- **Yes**   Saves current parameters to file and stops this software.
- **No**   Stops this software without saving current parameters to file.
- **Cancel** or ☒   Cancels the process and returns to the main screen.

When stopping this software using the **Yes** button, the saved parameters are read at the next start and reset for each parameter.

■ When exiting entire IQproducer™ application

To exit all tools of IQproducer™ that are running, select **Exit** on the Common Platform Screen. In this case, a dialog is displayed to confirm stopping of each running tool.
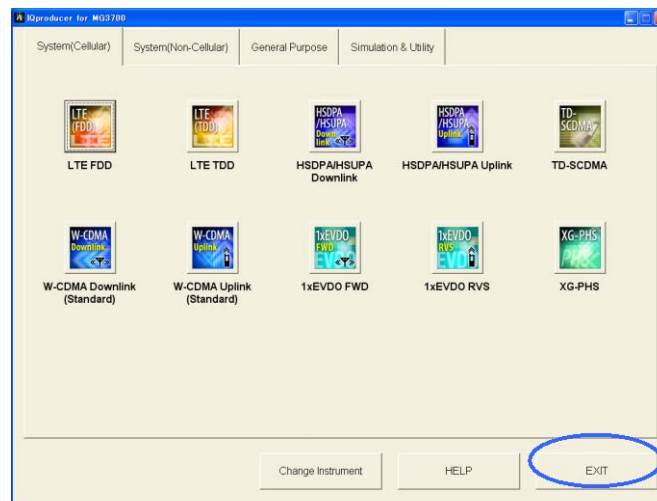
Figure 2.3.3-3   Exiting IQproducer™

Chapter 3   Detailed Description of Functions

This chapter describes in detail the functions of IQproducer™ and application examples using the software.

Notes:

- The examples and screens used throughout this chapter are based on the assumption that the IQproducer™ is activated with the MG3700A.

- The MG3710A, MS2690A/MS2691A/MS2692A, MS2830A, and MS2840A functions are described as notes in each item.

3.1 Main Screen

On common platform screen, click the **General Purpose** tab, and then click **Multi-Carrier** to display the main screen.
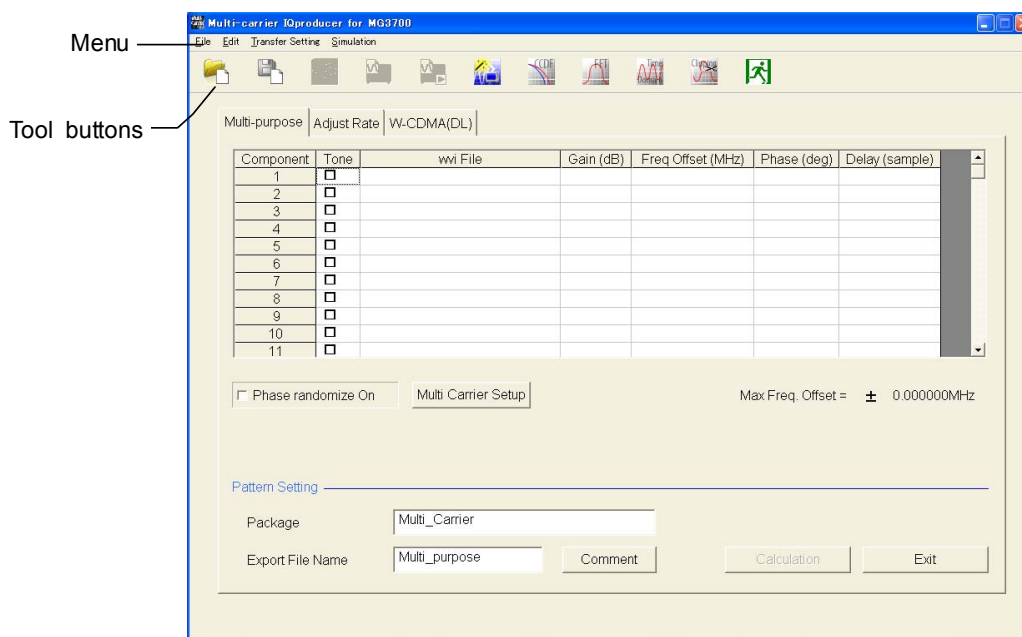
Figure 3.1-1   Multi-Carrier IQproducer Main Screen

Note：

When this software is running on MG3710A, the **Calculation** button in the **Pattern Setting** field changes to **Calculation & Load**, and the **Exit** button changes to **Calculation & Play**, respectively.

■ **[File]** menu
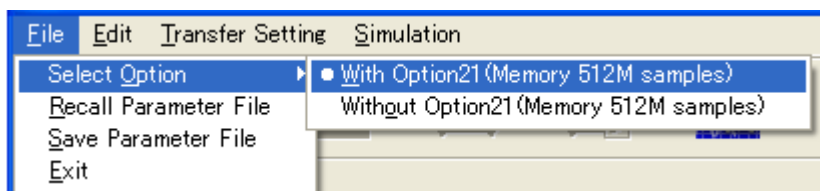
Figure 3.1-2   Select Memory Option

● Select Option
Notes:
   ● This function is available only when **MG3700**, **MG3710**, **MS2830** or **MS2840** is selected in the **Select instrument** screen.

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

■ When using MG3700A, MS2830A, or MS2840A

Select whether the ARB memory expansion option 256Msamples is installed. Selecting **With Option21 (Memory 512M samples)/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 256Msamples or 64M samples when **Without Option21 (Memory 512M samples)/Without Option27 (Memory 256M samples)** is selected. Select either according to the presence of ARB memory expansion option.

Table 3.1-1   Available Options for MG3700A, MS2830A, or MS2840A

Model	Items	ARB Memory Expansion
MG3700A	With Option21 (Memory 512M samples)	1 GB × 2 memories
	Without Option21 (Memory 512M samples):	512 MB × 2 memories
MS2830A	With Option27 (Memory 256M samples)	1 GB
	Without Option27 (Memory 256M samples)	256 MB
MS2840A	With Option27 (Memory 256M samples)	1 GB
	Without Option27 (Memory 256M samples)	256 MB

■ When using MG3710A

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.

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Detailed Description of Functions

Table 3.1-2   Available Options for MG3710A

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.

Table 3.1-3   Waveform Pattern Maximum Size

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	1024M samples
Memory 1024M samples × 2 (With Option48, 78)	1024M samples

- Recall Parameter File
  Loads the parameter files saved by Save Parameter File. Setting can be facilitated by using the loaded parameters.

- Save Parameter File
  Saves the setting parameters to a file.

- Exit
  Exits this software.

■ **[Edit]** menu
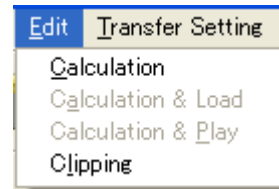
Figure 3.1-3   Edit Menu

- Calculation

  Performs waveform pattern generation.

- Calculation & Load

  Note:

  > This function is available only when this software is used on MG3710A.

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

- Calculation & Play

  Note:

  > This function is available only when this software is used on MG3710A.

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

- Clipping

  Displays the Clipping screen. In this screen, clipping and filtering processing can be performed for a generated waveform pattern.

3

Detailed Description of Functions

■ **[Transfer Setting]** menu
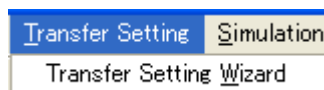
Figure 3.1-4   Transfer Setting Menu

- Transfer Setting Wizard
    Note:
    This function is available only when **MG3700** or **MG3710** is selected in the **Select instrument** screen.

Displays the Transfer Setting Wizard screen. Every operation ranging from connecting the PC and MG3700A or MG3710A and transferring the waveform pattern to the MG3700A or MG3710A, to loading the waveform pattern into the MG3700A or MG3710A ARB memory is performed at this screen.

■ **[Simulation]** menu
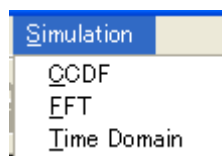
Figure 3.1-5   Simulation Menu

- CCDF
    Displays the CCDF graph display screen. In this screen, the CCDF of the generated waveform pattern is displayed in a graph.

- FFT
    Displays the FFT graph display screen. In this screen, the FFT-processed spectrum of the generated waveform pattern is displayed in a graph.

- Time Domain
    Displays the Time Domain screen. In this screen, the time domain waveform of a generated waveform pattern is displayed in a graph.

■ **Tool buttons**
  Notes:

- Transfer&Setting Wizard is available only when **MG3700** or **MG3710** is selected in the **Select instrument** screen.

- Calculation & Load and Calculation & Play is available only when this software is used on MG3710A.

Recall Parameter File

Save Parameter File

Calculation

Calculation & Load

Calculation & Play

Transfer & Setting Wizard

CCDF

FFT

Time Domain

Clipping

Exit

Clicking a tool button operates the same as the corresponding commands in the menu.

3.2 Pattern Generation Procedure

Given below are the setting procedures of the items to be set on the main screen of Multi-carrier IQproducer™.

3.2.1 Multi-purpose

First, set Tone or wvi File for each Component.
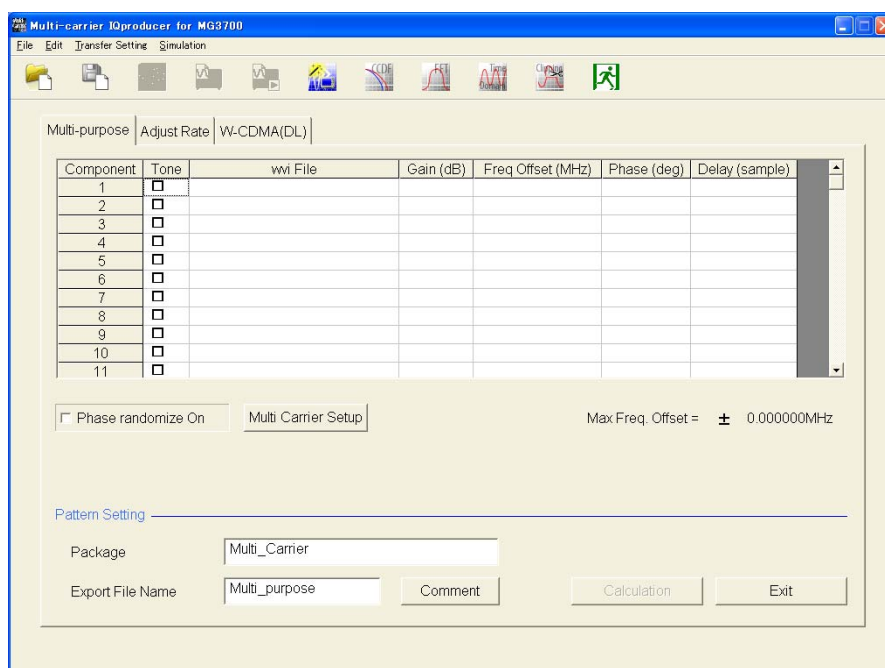
Figure 3.2.1-1   Multi-purpose Setup screen

Note:

> When this software is running on MG3710A, the **Calculation** button in the **Pattern Setting** field changes to **Calculation**, and the **Exit** button changes to **Calculation & Play**, respectively.

Tone
Selects whether to use the tone signal or the waveform pattern file for generating multi-carrier signals. If you select Tone, enter a check. When you select Tone, the wvi File text box is disabled, and you cannot select wvi File.

wvi File
If you click the domain without checking Tone, the Select wvi file screen appears. Selects/Deletes the waveform pattern file which will be the source for generating the multi-carrier signal to be set in Component.
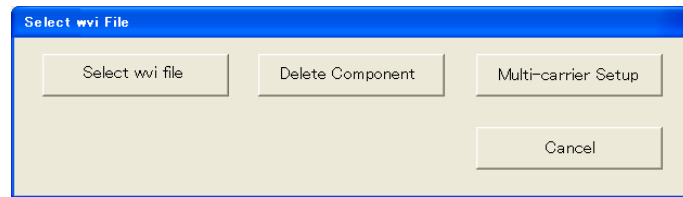
Figure 3.2.1-2   Select wvi File Screen

Click the **Select wvi file** button on the Select wvi File screen, and then the wvi File selecting screen appears.

In order to transfer to the mainframe and practically use the waveform pattern generated using IQproducer™, the waveform pattern selected on this screen or the license file of IQproducer™ used to create the waveform pattern is required to be installed on the mainframe.
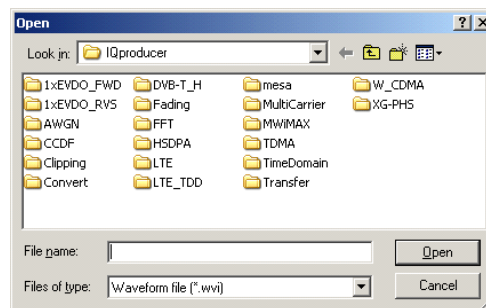

Figure 3.2.1-3   Selecting wvi File

After selecting the wvi File, entering a check mark in the check box makes the wvi File invalid. Removing the check makes the wvi File valid. You can set up to 32 Components.

However, there may be cases where only less than 32 carriers can be generated depending on the set value of Freq. Offset and the combination of wvi files.

Set **Gain, Freq Offset**, **Phase**, and **Delay.** Click each box of the Component, and then you can enter respective parameters.

Click the **Delete Component** button on the Select wvi File screen, and the wvi File of the selected Component is cleared.

3

Detailed Description of Functions

■ Details on Component parameters

(1)   Gain
  [Overview] Sets the Gain of each Component.
  [Default]   0.00 dB
  [Setting range] 0.00 to –80.00 dB, setting resolution: 0.01 dB

(2)   Freq Offset
  [Overview] Sets the frequency offset of each Component.
  [Default]   0
  [Setting range] 0 to $\pm 0.4 \times Fs - 0.5 \times BWmax$
        (Fs represents a sampling frequency; BWmax
        represents all band.)

(3)   Phase
  [Overview] Sets the initial phase of each Component.
  [Default]   0
  [Setting range] 0 to 359 degree, setting resolution: 1 degree

(4)   Delay
  [Overview] Sets the initial delay of each Component.
  [Default]   0
  [Setting range] 0 to N-1 (N is the Data Points of the source wvi. file)

■ Details on common parameters among tabs

(1)   [Phase Randomize On]   check box
  The function to randomize the phase of each carrier. Entering a
  check enables the function. Then the value of Phase becomes invalid.

(2)   Multi Carrier Setup button
  This button is enabled where Component is selected and affects the
  Components following the Component selected. If you click the
  Multi-carrier Setup button on the Multi-purpose Setup screen or the
  Select wvi File screen, the Multi-carrier Setup screen appears. For
  details, refer to 3.2.2 "Multi-carrier Setup".

(3)   Max/Min Freq. Offset
  The maximum value and the minimum value of the available
  frequency offset are displayed at the right bottom of the screen. You
  can set the frequency offset of each carrier within the range
  displayed in this Freq.Offset.

(4)   Package
  [Overview] Sets the package.
  [Default]   Multi_Carrier

(5)   Export File Name
  [Overview] Sets the Export File Name.
  [Default]   Multi_purpose

(6)   Comment
  [Overview] Displays the Comment setting screen.

(7) Calculation & Load button

[Overview]   Displays **Calculation & Load** when running on MG3710A. Generates waveform and loads the waveform patterns to memory.

When not running on MG3710A, **Calculation** will display and only the generation of waveform pattern is performed.

(8) Calculation & Play button

[Overview]   Displays **Calculation & Play** when running on MG3710A. Generates waveform and loads the waveform patterns to memory. You can then select the waveform pattern to output (playback).

Displays **Exit** when not running on MG3710A. This command exits this application.

3

Detailed Description of Functions

3.2.2   Multi-carrier Setup

Multi-carrier Setup is the function to generate Tone signals or waveform pattern signals at given frequency intervals. If you click the **Multi-carrier Setup** button on the Multi-purpose Setup screen in Figure 3.2.1-1, the Multi-carrier Setup dialog is activated. The function is enabled where Component is selected and sets the Tone signals or the waveform pattern signals from the Component number currently selected up to the Component number set in Carrier Number. Where the wvi file has already been selected for the corresponding Component, it will be replaced by the Tone signal or the waveform pattern signal set on the Multi-carrier Setup screen. Where two or more Components are selected, the Tone signal or the waveform pattern signal will be placed from the top Component currently selected.

Figure 3.2.2-4   Multi-carrier Setup Dialog Box

Configure Multi-carrier Setup with the following steps.

(1)   Enter: Tone, wvi File, Carrier Allocation, Initial Frequency Offset, Carrier Spacing, Carrier Number, Power Step, Phase Step, Delay Step

(2)   If you click the **Apply** button, the setup content of this screen will be reflected on the Multi-purpose Setup screen.

(3)   To end without reflecting the setup, click the **Close** button.

The content of this screen is retained only when the Multi-carrier screen is displayed. The parameters of this screen will not be reflected on the Recall/Save Parameter File.

■ Details on Multi-carrier Setup parameters

(1) Tone

[Overview]   Sets the Tone signal in the carrier.

[Default]   Check box selected.

[Options]   When selected: Tone signal, when cleared: wvi File

(2) wvi File

[Overview]   Selects the wvi file to be used as the carrier.

(3) Carrier Allocation

If you click the **Carrier Allocation** button, the Carrier Allocation Selection dialog appears.
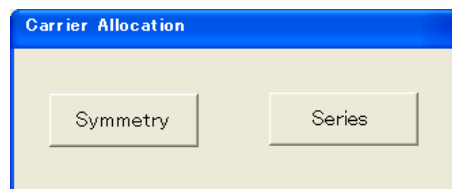

Figure 3.2.2-5   Carrier Allocation Dialog Box

[Overview]   Sets how to allocate carriers.

[Default]   Symmetry

[Options]   Symmetry (Default)/ Series

Illustrated below is the allocation of Symmetry and Series.
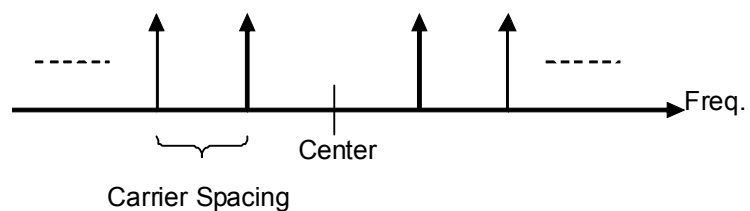
Figure 3.2.2-6   Symmetry Allocation
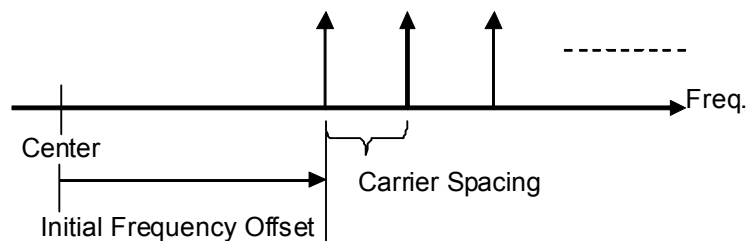
Figure 3.2.2-7   Series Allocation

(4)   Initial Frequency Offset

[Overview]   Sets the first frequency offset for allocating carriers.

[Default]   1 MHz

[Options]   When Tone is selected: 0 to ±60 MHz, resolution: 1 Hz

When Tone is cleared: 0 to ±(0.4 × Fs − 0.5 × BW) MHz

(Fs: Sampling rate, BW: Bandwidth value in the wvi. file)

(5)   Carrier Spacing

[Overview]   Sets the frequency intervals of the signal to be generated in multi-carrier format.

[Default]   1 MHz

[Options]   When Tone is selected: 0.000001 to 120 MHz, resolution: 1 Hz

When Tone is cleared: 0 to ±(0.4 × Fs − 0.5 × BW)

(Fs: Sampling rate, BW: Bandwidth value in the wvi. file)

(6)   Carrier Number

[Overview]   Sets the number of the signals to be generated in multi-carrier format.

[Default]   1

[Setting range] 1 to 32

(The number of available signals to be set changes depending on the set value of Carrier Spacing.)

(7)   Power Step

[Overview]   Sets the level ratio of the signal to be generated in multi-carrier format.

[Default]   0 dB

[Setting range] −80.00 to 80.00 dB

(8)   Phase Step

[Overview]   Sets the amount of phase change of Component.

[Default]   0 deg

[Setting range] 0 to 359 degree, setting resolution: 1 degree

(9)   Delay Step

[Overview]   Sets the amount of delay change of Component.

[Default]   0 sample

[Setting range] 0 to N–1 (where N is Data Points of source wvi. file.)

3.2.3 Adjust Rate

If you select the Adjust Rate tab on the Main screen, the display switches to the Adjust Rate Setup screen. This function is for converting the different Sampling Rates of two waveform patterns into an identical one.
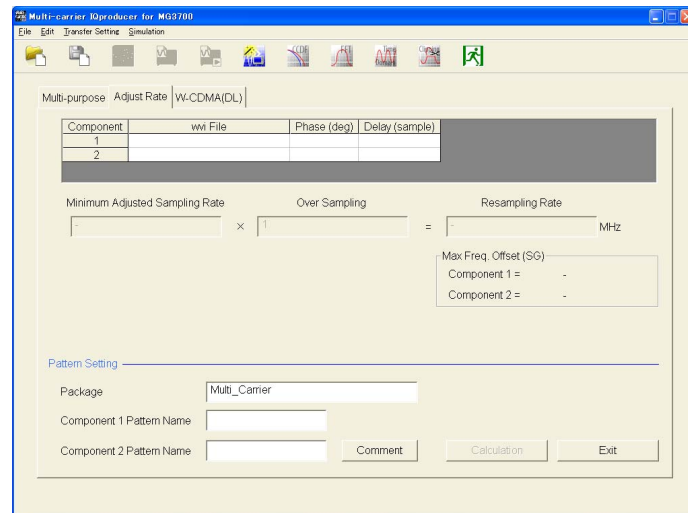

Figure 3.2.3-1   Adjust Rate Setup Screen

Note:

> When this software is running on MG3710A, the **Calculation** button in the **Pattern Setting** field changes to **Calculation**, and the **Exit** button changes to **Calculation & Play**, respectively.

The procedure to select waveform patterns and to set their phases and delays are as same as those for Multi-purpose.

In order to transfer to the mainframe and practically use the waveform pattern generated using IQproducer™, the waveform pattern selected on this screen or the license file of IQproducer™ used to create the waveform pattern is required to be installed on the mainframe.

When transferring to the mainframe and selecting a waveform pattern for output, the maximum value of the frequency offset when using two wave synthesizer function is decided by the bandwidth and sampling frequency of the waveform pattern. The sampling frequency of the waveform pattern generated by this function (Resampling Rate) will be the sampling frequency obtained from the combination of wvi files (Minimum Adjusted Sampling Frequency) multiplied by the entered value for Over Sampling. Thus, the maximum value of the frequency offset when using the two wave synthesizer function can be adjusted with Over Sampling. Max Freq. Offset displays the maximum value of the frequency offset.

Note:

It may take longer time for calculation depending on the combination of the wvi files set in Component 1 and 2 or the set value of Over Sampling.

Over Sampling and Max Freq. Relationship of Offset (SG)

If you convert the sampling frequencies of the waveform patterns of Component1 and Component2 using this function, waveform patterns Component1_m and Component2_m having an identical sampling frequency (Resampling Rate) will be generated.

Resampling Rate displays the value obtained by multiplying Minimum Adjusted Sampling Rate by the set value of Over Sampling. Here, the Minimum Adjusted Sampling Rate is the minimum sampling frequency that can be converted by the sampling frequency conversion.

If using MG3700A:

Max Freq. Offset (SG) can be obtained by using the following equation based on Resampling Rate and the bandwidth (BW) of the waveform pattern.

- Where Resampling Rate ≤ 20 MHz:
  Max Freq. Offset(SG) = $0.4 \times$ Resampling Rate $\times 2^k - 0.5 \times$ BW
  (the largest positive integer that gives k: Resampling Rate $\times 2^k \leq 200$ MHz)
  In this case, the range of the frequency offset is extended by the interpolation function of the mainframe.

- Where Resampling Rate > 20 MHz:
  Max Freq. Offset(SG) = $0.4 \times$ Resampling Rate $- 0.5 \times$ BW

Therefore, since the interpolation function of the mainframe does not work where Resampling Rate > 20 MHz, adjust the value of Over Sampling to obtain the required value for Max Freq. Offset (SG).

If using MG3710A:

The Max Freq. Offset (SG) is always ±80 MHz. However, sometimes signal dropouts and loopback distortion might occur when the output modulation frequency exceeds the equipment modulation band. When using frequency offset, ensure that the used frequency band does not exceed the modulation band.

wvi File

If you click the domain, the Select wvi file screen appears.

Selects/Deletes the waveform pattern file which will be the source for generating the multi-career signal to be set on the Component.
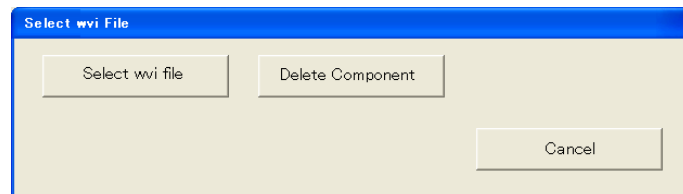

Figure 3.2.3-2   Select wvi File Screen

Select wvi File screen

Click the **Select wvi file** button, and then the wvi File selecting screen appears. Similarly as 3.2.1 "Multi-purpose", select the waveform pattern file (wvi file) to be set in Component.

Click **Delete Component** and the selected wvi File of Component becomes unselected.

3

Detailed Description of Functions

■　Details on Adjust Rate Setup parameters

(1)　Phase
　　　[Overview]　　Sets the initial phase of each Component.
　　　[Default]　　0
　　　[Setting range]　0 to 359 degree, setting resolution: 1 degree

(2)　Delay
　　　[Overview]　　Sets the initial delay of each Component.
　　　[Default]　　0
　　　[Setting range]　0 to N–1 (where N is Data Points of source wvi. file.)

(3)　Over Sampling
　　　[Overview]　　Sets Over Sampling of the waveform.
　　　[Default]　　1
　　　[Setting range]　1 to floor (160 MHz/Minimum Adjusted Sampling
　　　　　　　　　　　Rate) floor (x) is the function for finding the
　　　　　　　　　　　minimum integer that does not exceed x.

(4)　Package
　　　[Overview]　　Sets the package.
　　　[Default]　　Multi_carrier

(5)　Component 1 Pattern Name
　　　[Overview]　　Sets Pattern Name of Component 1.
　　　[Default]　　Waveform pattern name set in Component + "_m"

Note:

　　Where the name exceeds 20 characters, delete the characters from
　　the last one of the original pattern name to make the string of 20
　　characters including "_m" (two characters).

(6)　Component 2 Pattern Name
　　　[Overview]　　Sets Pattern Name of Component 2.
　　　[Default]　　Same as that for Pattern Name of Component 1.

(7)　Comment
　　　[Overview]　　Displays the Comment setting screen.

(8)　Calculation & Load button
　　　Displays **Calculation & Load** when running on MG3710A. Generates
　　　waveform and loads the waveform patterns to memory.

　　　When not running on MG3710A, **Calculation** will display and only
　　　the generation of waveform pattern is performed.

(9)　Calculation & Play button
　　　Displays **Calculation & Play** when running on MG3710A. Generates
　　　waveform and loads the waveform patterns to memory. You can then
　　　select the waveform pattern to output (playback).

　　　Displays **Exit** when not running on MG3710A. This command exits
　　　this application.

3.2.4   W-CDMA (DL)

Selecting the **W-CDMA (DL)** tab on the startup screen switches the screen display as shown.

Carrier allocation selection

Test model selection

Clipping selection

Clipping reference selection

Level setting

Carrier selection

Frequency offset

Clipping value
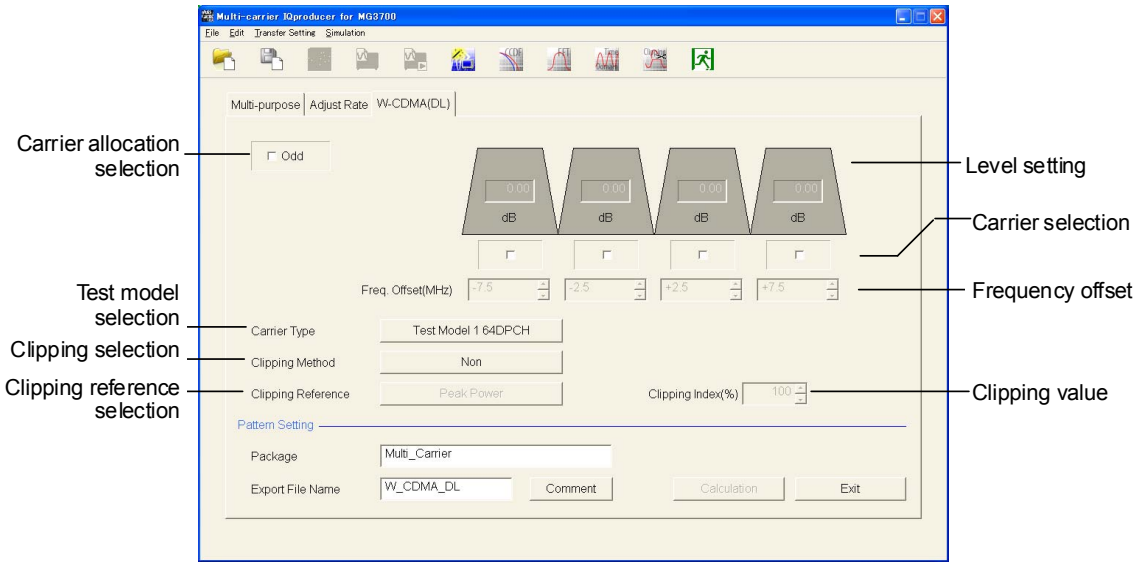
Figure 3.2.4-1   W-CDMA (DL) Setting Screen

Note:

When this software is running on MG3710A, the **Calculation** button in the **Pattern Setting** field changes to **Calculation**, and the **Exit** button changes to **Calculation & Play**, respectively.

(1) Carrier allocation selection
Select the carrier allocation. Figure 3.2.4-1 shows the screen when this item is not selected. The center frequency is between the second and third carriers from the left. When this item is selected, the screen shown in Figure 3.2.4-2 appears.
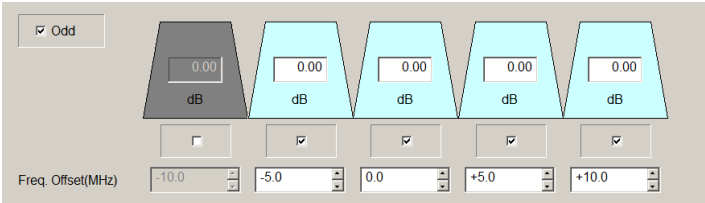
Figure 3.2.4-2   Screen When "Carrier Selection" Is Selected

(2) Carrier selection
Select the carrier to be output. Select the check box to enable the corresponding carrier.

(3) Level setting
Set the level for each carrier. This can only be set for the enabled carriers.

(4) Frequency offset setting
This can only be set for the enabled carriers.
When running on PC, MS2690A/MS2691A/MS2692A, MS2830A, or MS2840A frequency offset of each carrier is adjusted by step key.
When running on MG3710A, frequency offset of each carrier is adjusted using the step key dialog shown below.
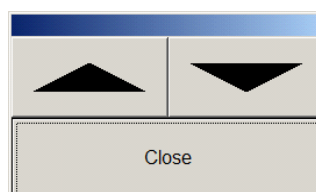
(5) Carrier Type selection
Select the W-CDMA test model.
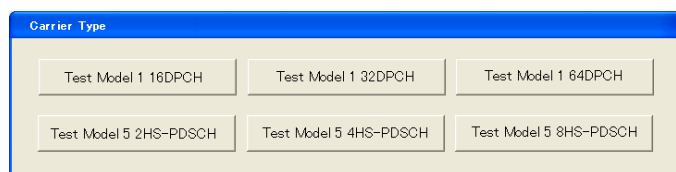
(6) Clipping Method selection
Select the clipping method for the clipping function.
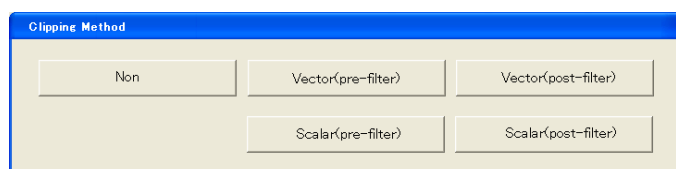
(7) Clipping Reference selection
Set the reference value of the clipping ratio for each carrier.
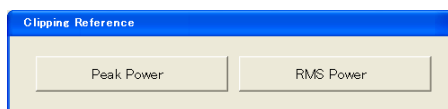
(8) Clipping Index setting
When Peak Power is selected, set the ratio to the maximum peak of the waveform being used in % units. When RMS Power is selected, set the ratio to the RMS Power of the waveform being used in dB unit.

■ Details on W-CDMA (DL) parameters

(1) Carrier allocation selection

[Overview]　Select the carrier allocation from the types shown in Figures 3.2.4-1 and 3.2.4-2.

[Default]　Not selected

[Options]　Selected/not selected

(2) Carrier selection

[Overview]　Select the carrier to be output. Select the check box to enable the corresponding carrier.

[Default]　All is disabled

[Options]　Enabled/disabled

(3) Level

[Overview]　Set the level for each carrier to be output.

[Default]　0.00

[Setting range]　0.00 to −80.00 dB, setting resolution: 0.01 dB

(4) Frequency offset

[Overview]　Set the frequency offset for each carrier to be output.

[Default]　When Odd is cleared
(starting from the leftmost　carrier　shown in Figure 3.2.4-1):
−7.5, −2.5, +2.5, +7.5 MHz
When Odd is selected
(starting from the leftmost　carrier　shown in Figure 3.2.4-2):
−10.0, −5.0, 0, +5.0, +10.0 MHz

[Setting range]　Frequency offset for each carrier ±1.0 MHz, resolution:　0.1 MHz

(5) Carrier Type

[Overview]　Select the W-CDMA test model. The scrambling code and frame offset of these modulated signals are automatically set according to 6.1.1.6.3 in TS25.141 "Primary Scrambling Code and SCH."

[Default]　Test Model1 64DPCH

[Options]　Test Model1 16DPCH, Test Model1 32DPCH, Test Model1 64DPCH, Test Model5 2HS-PDSCH, Test Model5 4HS-PDSCH, Test Model5 8HS-PDSCH

3

Detailed Description of Functions

(6)   Clipping Method

[Overview]   Specify the clipping method. As shown in Figure 3.2.4-3, both pre-filter and post-filter perform clipping before and after filtering. For Vector, the size of $\sqrt{I^2 + Q^2}$ is clipped using the set value. For Scalar, the sizes of I and Q are clipped using the set value. For Non, clipping is not performed.

[Default]   Non

[Options]   Non, Vector (pre-filter), Vector (post-filter), Scalar (pre-filter), Scalar (post-filter)

(7)   Clipping Reference

[Overview]   Select the reference for clipping processing. When Peak Power is selected, the maximum value of $\sqrt{I^2 + Q^2}$ is the reference (100%). When RMS Power is selected, the RMS value $\sqrt{I^2 + Q^2}$ of before clipping processing is the reference (0 dB).

[Default]   Peak Power

[Options]   Peak Power, RMS Power
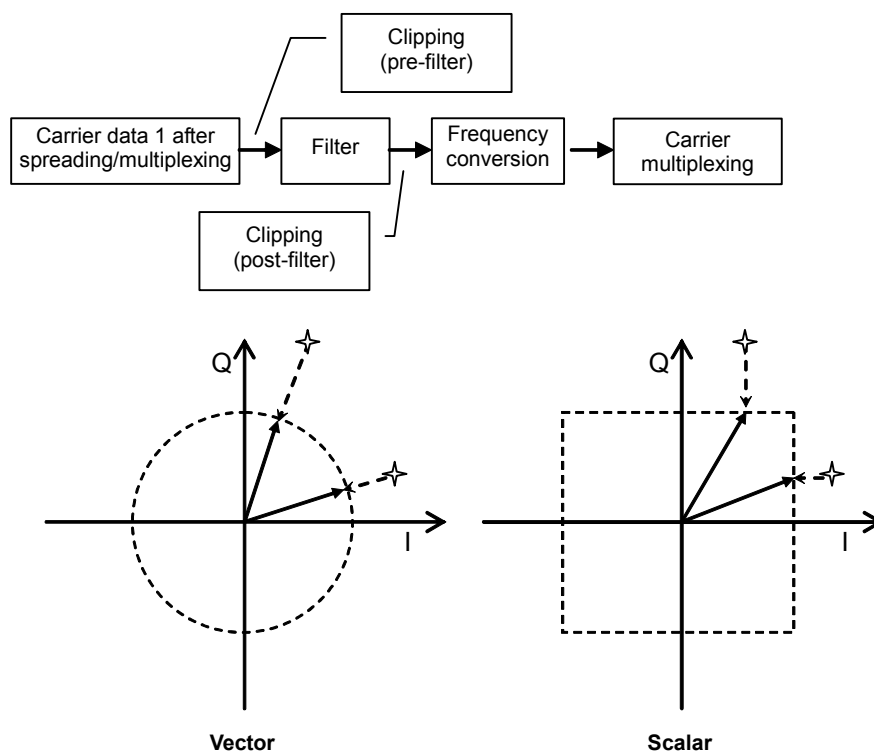
Figure 3.2.4-3   Conceptual Diagram Of Clipping Processing

(8) Clipping Index

[Overview]   When Clipping Method is not set to Non, input the ratio to the clipping reference. Input in % units for Peak Power or in dB units for RMS Power.

[Default]   When Clipping Reference is set to Peak Power: 100 %
When Clipping Reference is set to RMS Power, and Clipping Method = Vector (pre-filter), Vector (post-filter): 14.00 dB
When Clipping Method = Scalar (pre-filter), Scalar (post-filter): 17.00 dB

[Setting range]   When Clipping Reference is set to Peak Power:
0 to 100 %, Resolution 1 %
When Clipping Reference is set to RMS Power, and Clipping Method = Vector (pre-filter), Vector (post-filter):
3.00 to 14.00 dB, Resolution 0.05 dB
When Clipping Method = Scalar (pre-filter), Scalar (post-filter):
3.00 to 17.00 dB, Resolution 0.05 dB

(9) Package setting

[Overview]   Sets the package.

[Default]   Multi_Carrier

(10) Export File Name

[Overview]   Sets the Export File Name.

[Default]   W_CDMA_DL

(12) Comment

[Overview]   Displays the Comment setting screen.

(13) Calculation & Load button

Displays **Calculation & Load** when running on MG3710A. Generates waveform and loads the waveform patterns to memory.

When not running on MG3710A, **Calculation** will display and only the generation of waveform pattern is performed.

(14) Calculation & Play button

Displays **Calculation & Play** when running on MG3710A. Generates waveform and loads the waveform patterns to memory. You can then select the waveform pattern to output (playback).

Displays **Exit** when not running on MG3710A. This command exits this application.

3

Detailed Description of Functions

3.2.5   Baseband combination

Note:

This function is available only when **MG3710** is selected in the **Select instrument** screen.

If you select the **Baseband Combination** tab on the main screen, the display switches to the Baseband Combination Setup screen.
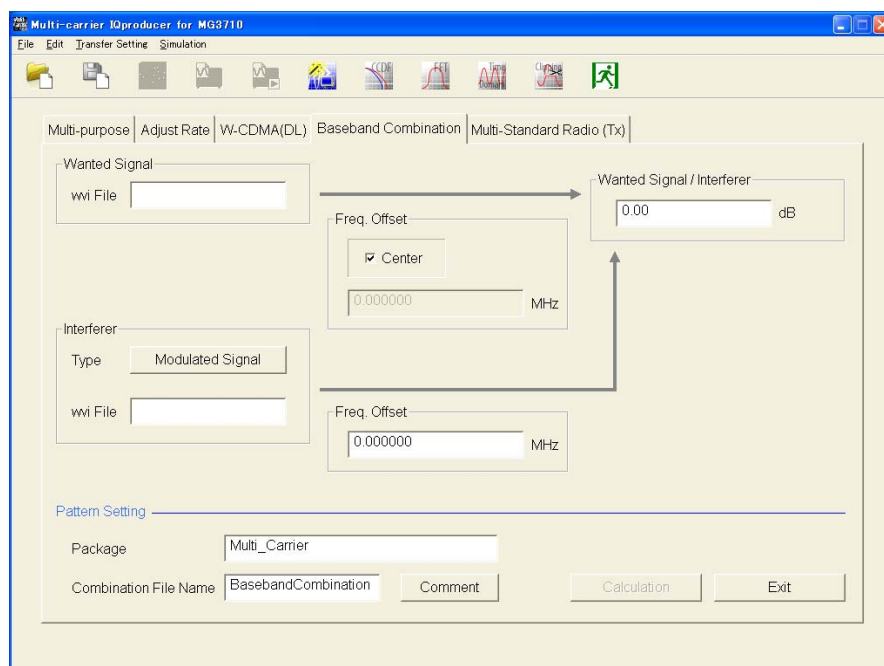
Figure 3.2.5-1   Baseband Combination Setup Screen

Note：

When this software is running on MG3710A, the **Calculation** button in the **Pattern Setting** field changes to **Calculation & Load**, and the **Exit** button changes to **Calculation & Play**, respectively.

(1)　Click wvi File (Wanted Signal) and the following dialog appears. Selects/Deletes the waveform pattern file to be used as the wanted wave.
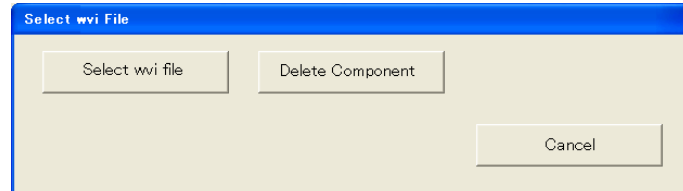
Figure 3.2.5-2　Select wvi File Dialog Box

Select wvi File Dialog Box

Click the **Select wvi file** button, and then the wvi File selecting screen appears. Select the waveform pattern file (wvi file) to be set in Wanted Signal.

If you click the **Delete Component** button, the wvi File of Wanted Signal is cleared.

(2)　Type (Interferer)

Click the **Type** button, and the following dialog appears.

Figure 3.2.5　Type Setup Dialog

When Modulated Signal is selected

Modulated Signal is used as an interference signal.

When AWGN is selected

AWGN is used as an interference signal.

Note:

When no AWGN option (049, 149, 079, and 179) is installed when IQproducer™ is running on the MG3710A, AWGN is displayed as invalid.
When a parameter file in which AWGN is set is loaded while IQproducer™ is running on the MG3710A on which no AWGN option is installed, it is loaded as a Modulated Signal.

When Tone is selected

Tone is used as an interference waveform.

(3)   wvi File (Interferer)

Sets a waveform pattern file as same as wvi File (Wanted Signal).

> ***Note***：
>
> > When Type is set to a parameter other than Modulated Signal, it is displayed as invalid.
> > However, the wvi file names which have already been set are retained, even if Type is set to a parameter other than Modulated Signal.

(4)   Center Check box (Wanted Signal)

Sets whether or not to set Wanted Signal to the frequency set on the MG3710A.

(5)   Freq Offset text box (Wanted Signal)

[Overview]   Sets the frequency offset of Wanted Signal.

[Default]   0.000000

[Setting range] 0.000000 to $\pm(0.4 \times \text{Fs} - 0.5 \times \text{BW})$

(Fs: Sampling rate, BW: Bandwidth value in the wvi. file)

(6)   Freq Offset text box (Interferer)

[Overview]   Sets the frequency offset of Interferer.

[Default]   0.000000

[Setting range] 0.000000 to $\pm(0.4 \times \text{Fs} - 0.5 \times \text{BW})$

(Fs: Sampling rate, BW: Bandwidth value in the wvi. file)

(7)   Wanted Signal/Interferer

[Overview]   Sets the level ratio of Wanted Signal and Interferer.

[Default]   0.00 dB

[Setting range] When it is other than Type = AWGN: 0.00 to ± 80.00 dB

When Type = AWGN: 0.00 to ± 40.00 dB

(8)   Package

[Overview]   Sets the package.

[Default]   Multi_Carrier

(9)   Combination File Name

[Overview]   Sets the Combination File Name.

[Default]   BasebandCombination

(10) Comment

[Overview]   Displays the Comment setting screen.

(11) Calculation & Load button

Displays **Calculation & Load** when running on MG3710A. Generates waveform and loads the waveform patterns to memory.

When not running on MG3710A, **Calculation** will display and only the generation of waveform pattern is performed.

(12) Calculation & Play button

Displays **Calculation & Play** when running on MG3710A. Generates waveform and loads the waveform patterns to memory. You can then select the waveform pattern to output (playback).

Displays **Exit** when not running on MG3710A. This command exits this application.

(13) **Export File** Dialog Box
Export File Name(Wanted Signal/Interferer)

When sampling rate conversion is required to generate a waveform by clicking the **Calculation & Load** and **Calculation & Play** buttons, the following dialog box appears. The dialog box does not appear.
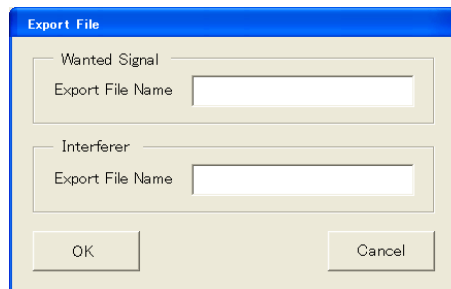
Figure 3.2.5-4   Export File Dialog Box

The following character string is set in Export File Name as default.

Wanted Signal

The wvi file name set in Wanted Signal + "m"

Interferer

Type = Modulated Signal

The wvi file name set in Interferer + "m"

Where Type = Tone:

The file name set in Export File Name + "tone"

Note:

Where the name exceeds the maximum number of characters settable for the wave pattern name (20 characters), delete two characters from the last character of the character string that makes the file name in the case of "m" and five characters in the case of "tone" to make the string of 20 characters.

3.2.6 Multi-Standard Radio (Tx)

Note:

This function is available only when **MG3710** is selected in the **Select instrument** screen.

If you select the **Multi-Standard Radio (Tx)** tab on the main screen, the display switches to the Multi-Standard Radio (Tx) Setup screen.
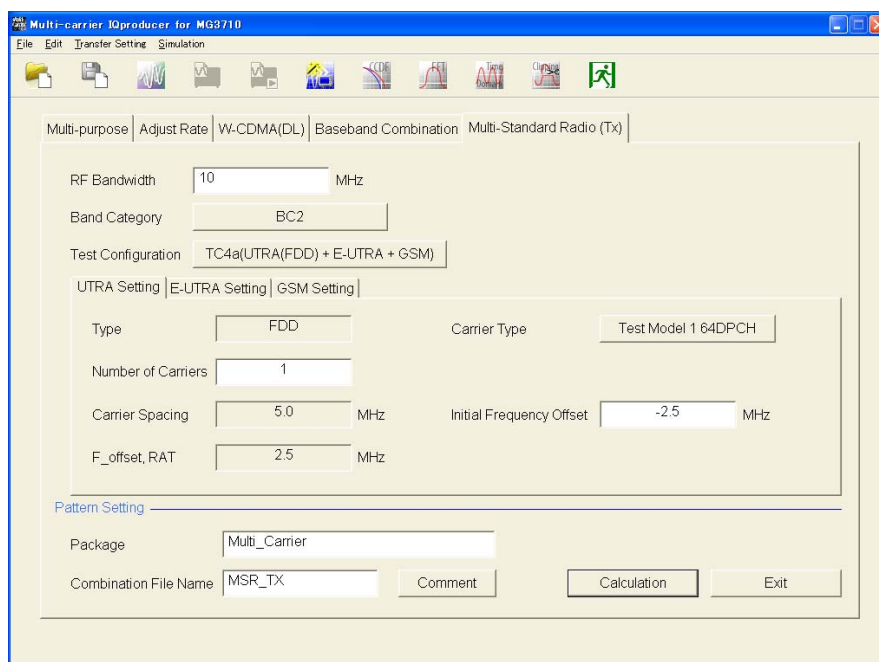
Figure 3.2.6-1 Multi-Standard Radio (Tx) Setup Screen (When Selecting UTRA Setting)
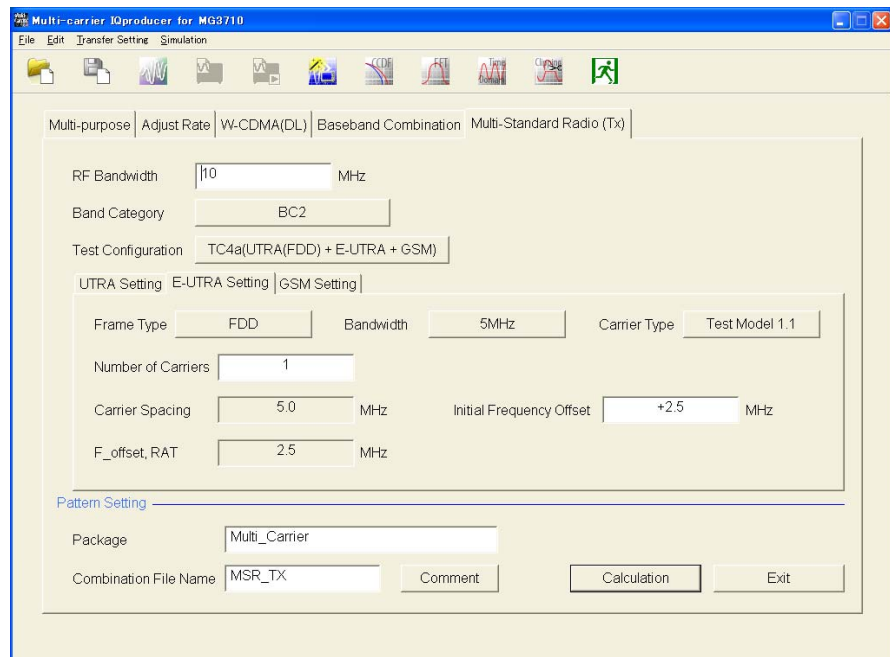
Figure 3.2.6-2   Multi-Standard Radio (Tx) Setup screen (when selecting E-UTRA Setting)
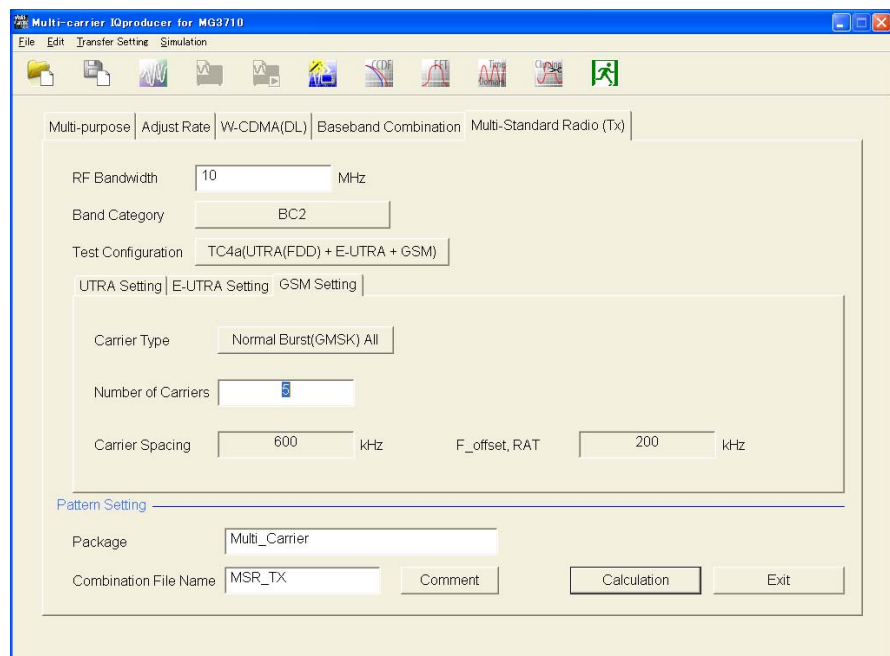
Figure 3.2.6-3   Multi-Standard Radio (Tx) Setup Screen (When Selecting GSM Setting)

Note:

When this software is running on MG3710A, the **Calculation** button in the **Pattern Setting** field changes to **Calculation & Load**, and the **Exit** button changes to **Calculation & Play**, respectively.

(1) RF Bandwidth
[Overview]   Sets RF Bandwidth.
[Default]   10 MHz
[Setting range] 10 to 120 MHz

(2) Band Category
[Overview]   When this button is clicked, the following screen will display.
Set Band Category here.
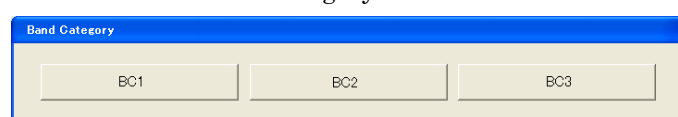
Figure 3.2.6-4   Band Category Setting Dialog Box

[Default]   BC1
[Options]   BC1, BC2, BC3

(3) Test Configuration
[Overview]   When this button is clicked, the following screen will display.
Set Test Configuration here.
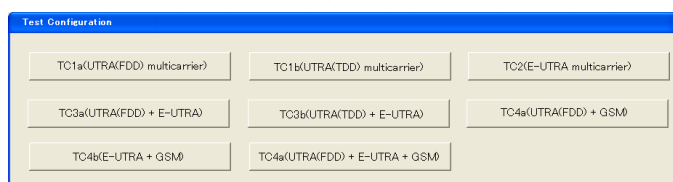
Figure 3.2.6-5   Test Configuration Dialog Box

[Options]   See the table below.

Table 3.2.6-1   Setting Range By Band Category

Test Configuration	Band Category		
	BC1	**BC2**	**BC3**
TC1a (UTRA (FDD) multicarrier)	Yes	Yes	No
TC1b (UTRA (TDD) multicarrier)	No	No	Yes
TC2 (E-UTRA multicarrier)	Yes	Yes	No
TC3a (UTRA (FDD) + E-UTRA)	Yes	Yes	No
TC3b (UTRA (TDD) + E-UTRA)	No	No	Yes
TC4a (UTRA (FDD) + GSM)	No	Yes	No
TC4b (E-UTRA + GSM)	No	Yes	No
TC4c (UTRA (FDD) + E-UTRA + GSM)	No	Yes	No

Note:

When the value of the set Test Configuration becomes
beyond Setting range due to the change in setting for Band
Category, re-set the value to the following values.
When changed to BC1/BC2:TC1a (UTRA (FDD)
multicarrier)
When changed to BC3:   TC1b (UTRA (TDD) multicarrier)

(4)   UTRA Setting, E-UTRA Setting, and GSM Setting tabs
The Multi-Standard Radio (Tx) Setup screen has three tabs: UTRA
Setting, E-UTRA Setting, and GSM Setting.
The result display type of the tab depends on Test Configuration and
switches as follows.

Table 3.2.6-2   Test Configuration, the list of result display types

Test Configuration	Result display type		
	UTRA Setting	**E-UTRA Setting**	**GSM Setting**
TC1a (UTRA (FDD) multicarrier)	Yes	No	No
TC1b (UTRA (TDD) multicarrier)	Yes	No	No
TC2 (E-UTRA multicarrier)	No	Yes	No
TC3a (UTRA (FDD) + E-UTRA)	Yes	Yes	No
TC3b (UTRA (TDD) + E-UTRA)	Yes	Yes	No
TC4a (UTRA (FDD) + GSM)	Yes	No	Yes
TC4b (E-UTRA + GSM)	No	Yes	Yes
TC4c (UTRA (FDD) + E-UTRA + GSM)	Yes	Yes	Yes

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Detailed Description of Functions

Allocation of carriers

The carrier allocation procedure differs by Test Configuration as described below.

■ TC1a (UTRA (FDD) multicarrier)

TC1a (UTRA(FDD) multicarrier) is the UTRA FDD multi-career signal allocated as follows. The number of the allocatable carriers within RF Bandwidth is applied on this allocation.

Carriers are allocated alternately; on the lowest position, the highest position, next to the lowest position, next to the highest position and so on as follows.
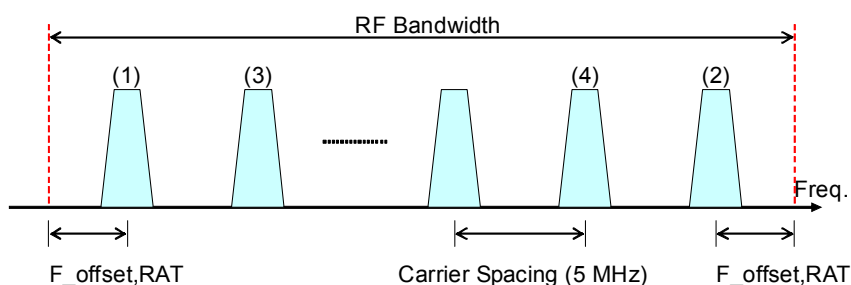
Figure 3.2.6-6   Carrier Allocation Of TC1a (UTRA (FDD) Multicarrier)

■ TC1b (UTRA(TDD) multicarrier)

TC1b (UTRA(TDD) multicarrier) is the TDD version of TC1a (UTRA (FDD) multicarrier). All the same except for F_offset, RAT, and Carrier Spacing.
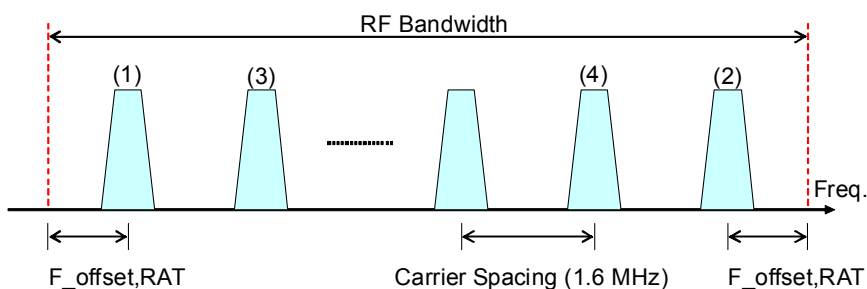
Figure 3.2.6-7   Carrier Allocation Of TC1a (UTRA (TDD) Multicarrier)

■ TC2 (E-UTRA multicarrier)

TC2 (E-UTRA multicarrier) is the multi-career signal consisting of E-UTRA and the carriers are allocated as follows. The number of the allocatable carriers within RF Bandwidth is applied on this allocation. Carriers are allocated sequentially from the highest position of RF Bandwidth.
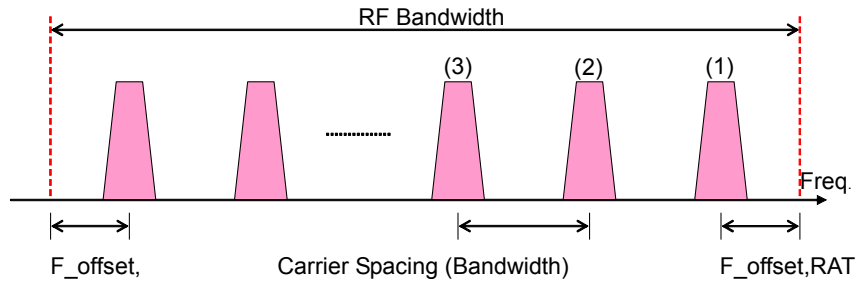
Figure 3.2.6-8   Carrier Allocation Of TC2 (E-UTRA multicarrier)

■ TC3a (UTRA(FDD) + E-UTRA)

TC3a (UTRA(FDD) + E-UTRA) is the multi-carrier signal consisting of UTRA FDD and E-UTRA and the carriers are allocated as follows. The number of the allocatable carriers within RF Bandwidth is applied on this allocation. UTRA FDD carriers are allocated from the Low side and E-UTRA carriers from the High side. Carriers are allocated alternately; on the lowest position, the highest position, next to the lowest position, next to the highest position and so on as follows.
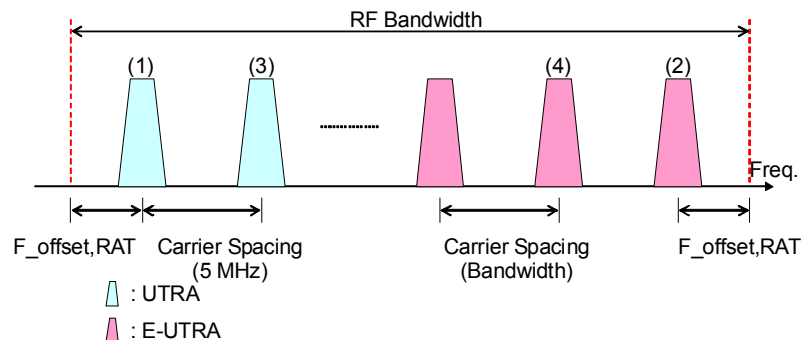
Figure 3.2.6-9   Carrier Allocation Of TC3a (UTRA (FDD) + E-UTRA)

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Detailed Description of Functions

■ TC3b (UTRA(TDD) + E-UTRA)

TC3b (UTRA(TDD) + E-UTRA) is the TDD version of TC3a (UTRA(FDD) + E-UTRA). All the same except for F_offset, RAT and Carrier Spacing.
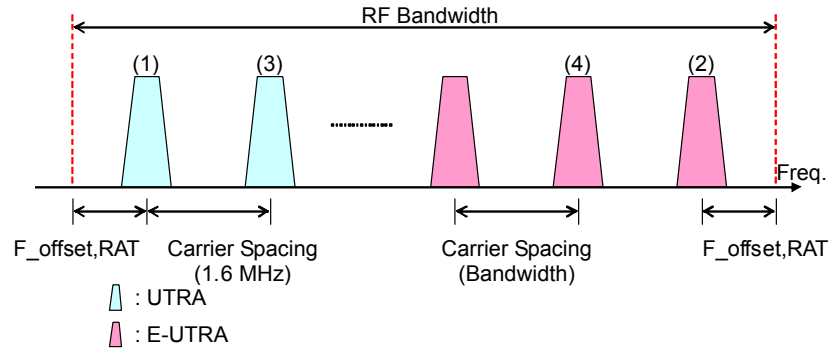
Figure 3.2.6-10   Carrier Allocation Of TC3b (UTRA (TDD) + E-UTRA)

■ TC4a (UTRA (FDD) + GSM)

TC4a (UTRA (FDD) + GSM) is the multi-carrier signal consisting of UTRA FDD and GSM and the carriers are allocated as follows. GSM carriers are allocated on the Low and High sides and an UTRA FDD carrier at the center of RF Bandwidth. Then follows allocation of GSM carriers.
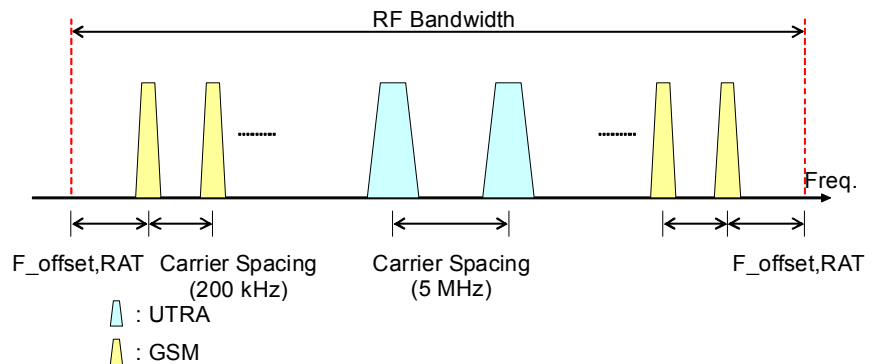
Figure 3.2.6-11   Carrier Allocation Of TC4a (UTRA (FDD) + GSM)

■ TC4b (E-UTRA + GSM)

TC4b (E-UTRA + GSM) is the multi-carrier signals consisting of E-UTRA and GSM and the carriers are allocated as follows. The GSM carriers are allocated on the Low and High sides and an E-UTRA carrier at the center of RF Bandwidth. Then follows allocation of GSM carriers.
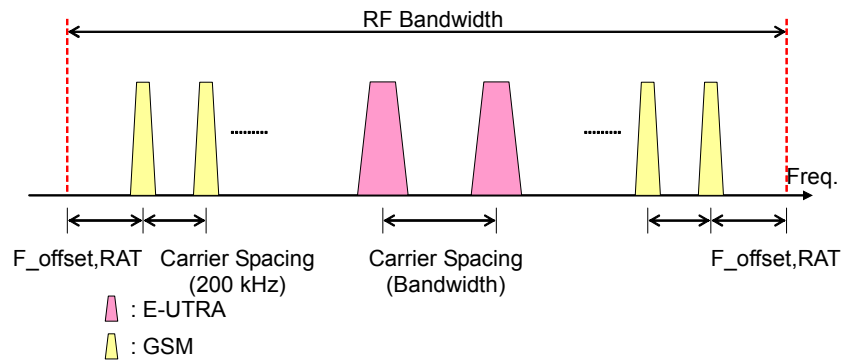
Figure 3.2.6-12   Carrier Allocation Of TC4b

■ TC4c (UTRA(FDD) + E-UTRA + GSM)

TC4c (UTRA (FDD) + E-UTRA + GSM) is the multi-carrier signal consisting of UTRA, E-UTRA, and GSM and its carriers are allocated as follows. GSM carriers are allocated on the Low and High sides and an UTRA and an E-UTRA carriers at the center of RF Bandwidth. Then follows allocation of GSM carriers.

The allocation of UTRA and E-UTRA is decided by setting the initial frequency offset portion of the carrier.
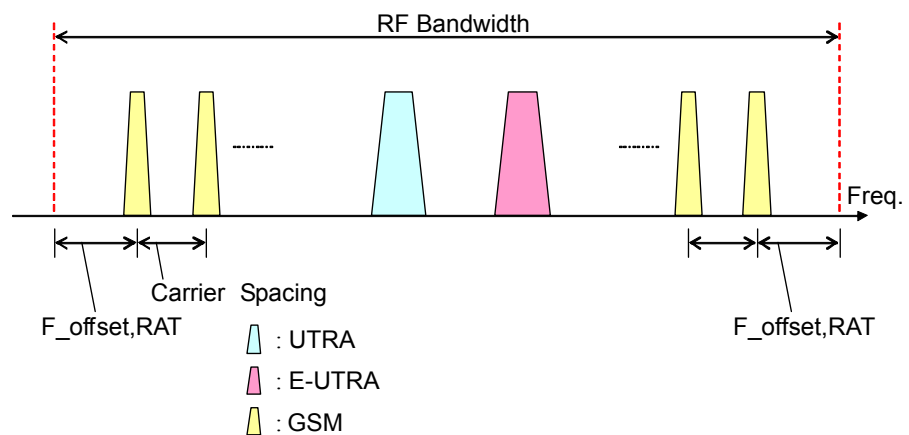
Figure 3.2.6-13   Carrier Allocation Of TC4c

File configuration using Test Configuration

The file configuration of the waveform pattern to be output includes the case with only wvi/wvi files and the case including wick files depending on Test Configuration (type of waveforms to be combined) as follows.

Table 3.2.6-3   File Configuration By Test Configuration

Test Configuration	File Configuration
TC1a (UTRA (FDD) multicarrier)	wvi/wvd
TC1b (UTRA (TDD) multicarrier)	wvi/wvd
TC2 (E-UTRA multicarrier)	wvi/wvd
TC3a (UTRA (FDD) + E-UTRA)	wvi/wvd
TC3b (UTRA (TDD) + E-UTRA)	wvi/wvd
TC4a (UTRA (FDD) + GSM)	wvi/wvd/wvc
TC4b (E-UTRA + GSM)	wvi/wvd/wvc
TC4c (UTRA (FDD) + E-UTRA + GSM)	wvi/wvd/wvc

UTRA Setting tab

(5) Type

[Overview]   Displays whether the type of the UTRA signal is FDD (W-CDMA) or TDD (TD-SCDMA).

[Default]   When Band Category = BC1 and BC2: FDD
When Band Category = BC3: TDD

(6) Carrier Type

[Overview]   Selects the type of the UTRA signal. The type of the signals selectable depends on Type. Click the Carrier Type button, and the following dialog appears.

When Type = FDD:
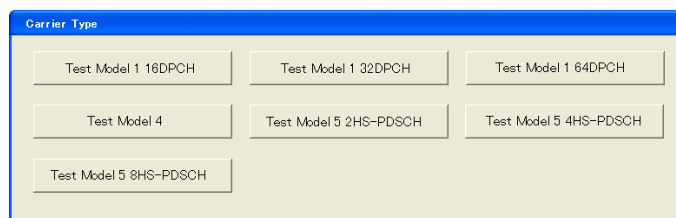
Figure 3.2.6-14   Carrier Type (When Type = FDD)

When Type = TDD:
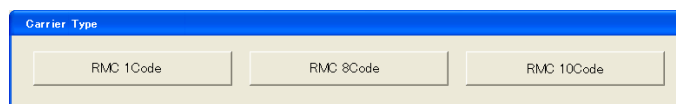
Figure 3.2.6-15   Carrier Type (When Type = TDD)

Note:

> The following value is set if Carrier Type goes beyond the setting range due to changes in Default and Type.

> When Type = FDD: Test Model 1 64DPCH
> When Type = TDD: RMC 8 Code

(7) Number of Carriers

[Overview]   Sets the number of UTRA carriers.

[Default]   1

[Setting range]   The number of carriers not exceeding the bandwidth of 1 to RF Bandwidth

Note:

> 1 is set if the set value goes beyond the setting range due to changes in other parameters.

(8) Carrier Spacing

[Overview]   Sets Carrier Spacing.

[Default]   When Type is FDD: 5 MHz
             When Type is TDD: 1.6 MHz

(9) Initial Frequency Offset

[Overview]   Sets Initial Frequency Offset.

[Default]   −2.5 MHz

[Setting range]   0.0 to ±RF Bandwidth/2 Resolution 0.1 MHz

Note:

> Displayed only when Test Configuration = TC4a (UTRA (FDD) + E-UTRA + GSM)

(10) F_offset,RAT

[Overview]   Displays the F_offset, RAT values as specified in TS 37.141.

[Setting range]   When Type is FDD: 2.5 MHz
                   When Type is TDD: 1.0 MHz

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Detailed Description of Functions

E-UTRA tab

(11) Frame Type

[Overview]   Selects the Frame type (FDD or TDD) of E-UTRA.
When this button is clicked, the following screen will display.
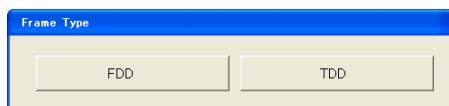
Figure 3.2.6-16   Frame Type Dialog Box

[Default]   FDD

(12) Bandwidth

[Overview]   Selects Bandwidth of E-UTRA.
When this button is clicked, the following screen will display.
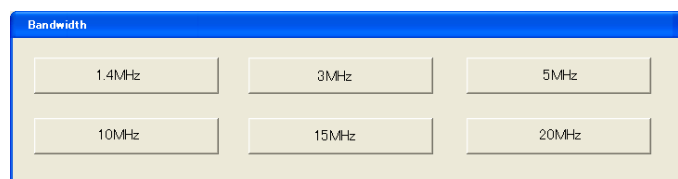
Figure 3.2.6-17   Bandwidth Dialog Box

[Default]   5 MHz

(13) Carrier Type

[Overview]   Selects the type (Test Model) of the E-UTRA signal.
When this button is clicked, the following screen will display.
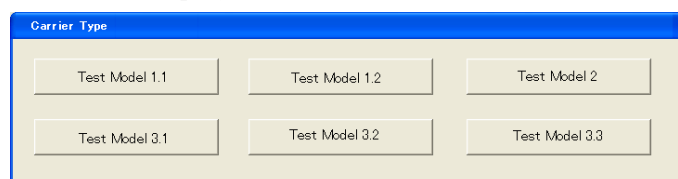
Figure 3.2.6-18   Carrier Type Dialog Box

[Default]   Test Model 1.1

(14) Number of Carriers

[Overview]   Sets the number of E-UTRA carriers.

[Default]   1

[Setting range] The number of carriers not exceeding the bandwidth of 1 to RF Bandwidth

Note：

> 1 is set if the set value goes beyond the setting range due to changes in other parameters.

(15) Carrier Spacing

[Overview]   Sets Carrier Spacing.
Will be the same value with the setting value of Bandwidth.

(16) Initial Frequency Offset

[Overview]   Sets Initial Frequency Offset.
[Default]   Bandwidth/2
[Setting range]   0.0 to ±RF Bandwidth/2 Resolution 0.1 MHz

Note:

> Displayed only when Test Configuration = TC4a (UTRA (FDD) + E-UTRA + GSM).

(17) F_offset,RAT

Displays the F_offset, RAT values as specified in TS 37.141.

The displayed value depends on the setting of Band Category and Bandwidth as shown in the table below.

Table 3.2.6-4   F_offset, RAT value

Band Category	Bandwidth					
	1.4MHz	**3MHz**	**5MHz**	**10MHz**	**15MHz**	**20MHz**
BC1	0.9 MHz	1.7 MHz	2.5 MHz	5 MHz	7.5 MHz	10 MHz
BC2	0.7 MHz	1.5 MHz	2.5 MHz	5 MHz	7.5 MHz	10 MHz
BC3	0.9 MHz	1.7 MHz	2.5 MHz	5 MHz	7.5 MHz	10 MHz

GSM Setting tab

(18) Carrier Type

[Overview]   Selects the type of the GSM signal.
When this button is clicked, the following screen will display.
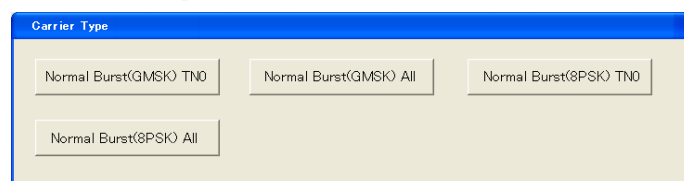
Figure 3.2.6-19   Carrier Type Dialog Box

[Default]   Normal Burst(GMSK) All

(19) Number of Carriers

[Overview]   Sets the number of GSM carriers.

[Default]   1

[Setting range] The number of carriers not exceeding the bandwidth of 1 to RF Bandwidth

(20) Carrier Spacing

Displays Carrier Spacing. Always displays the following value:

600 kHz

(21) F_offset,RAT

Displays the F_offset, RAT values as specified in TS 37.141.

The following value is always displayed:

200 kHz

Common to all tabs

(22) Package

[Overview]   Sets the package.

[Default]   Multi_Carrier

(23) Combination File Name

[Overview]   Sets the Combination File Name.

[Default]   MSR_TX

(24) Comment

[Function]   Displays the Comment setting screen.

(25) Calculation & Load button

Displays **Calculation & Load** when running on MG3710A. Generates waveform and loads the waveform patterns to memory.

When not running on MG3710A, **Calculation** will display and only the generation of waveform pattern is performed.

(26) Calculation & Play button

Displays **Calculation & Play** when running on MG3710A. Generates waveform and loads the waveform patterns to memory. You can then select the waveform pattern to output (playback).

Displays **Exit** when not running on MG3710A. This command exits this application.

(27) Output file name

Under the condition that wvc files are to be generated, the two file names combined using the wvc file will be as follows:

PackageA, Pattern NameA

The file name set in Export File Name + "_A"

PackageB, Pattern NameB

The file name set in Export File Name + "_B"

Note:

Where the name exceeds the maximum number of characters settable for the wave pattern name (20 characters), delete two characters from the last character of the character string that makes the file name in the case of both "_A" and "_B" to make the string of 20 characters.

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Detailed Description of Functions
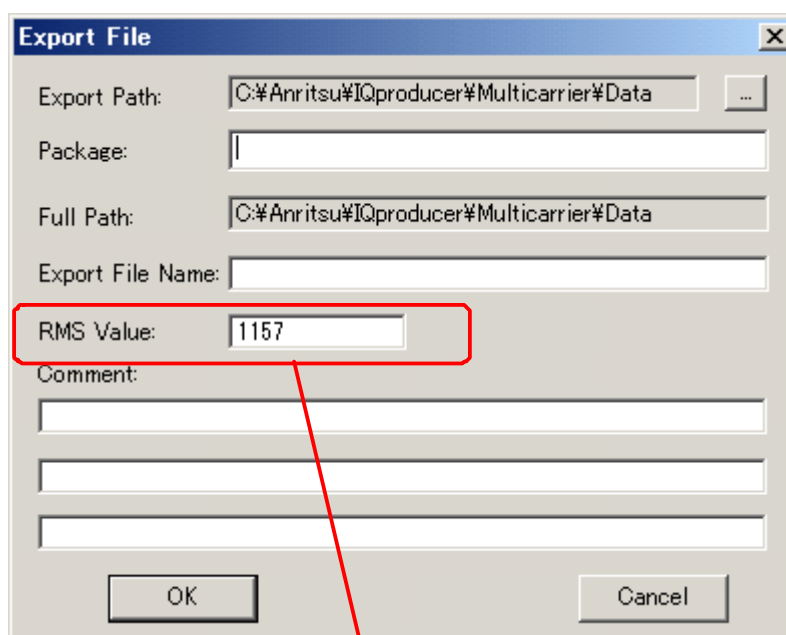
3.2.7   Waveform pattern generation when running on equipment other than MG3710A

Export File screen

The **Calculation & Load** and **Calculation & Play** buttons displayed at the right bottom of the screen while running on the MG3710A change to **Calculation** and **Exit** respectively when running on equipment other than the MG3710A. The **Calculation** button functions similarly as Calculation and the **Exit** button functions to exit IQproducer™.

Set on the Multi-purpose, Adjust Rate, W-CDMA (DL), Baseband Combination, and Multi-Standard Radio (Tx) Setup screens and click the **OK** button. Then the screens shown in Figure 3.2.7-1 to Figure 3.2.7-4 will be activated.

■ Multi-Purpose/W-CDMA (DL)

Displays only when in MG3700 mode

Figure 3.2.7-1   Export File Dialog Box (Multi-Purpose/W-CDMA(DL))

■ Adjust Rate

If you set on the Adjust Rate screen and click the **Calculation** button, the screen shown in Figure 3.2.7-2 is activated. You will find boxes for entering the file names after conversion of Component1 and Component2. Each of the **Export File Name** boxes displays the character string consisting of the file name of the original waveform pattern plus "_m". Where the file name of the original waveform consists of 19 or 20 characters, the character string consisting of the initial 18 characters with "_m" is displayed.

Displays only when in MG3700 mode

Figure 3.2.7-2   Export File Dialog Box (Adjust Rate)

■ Baseband Combination
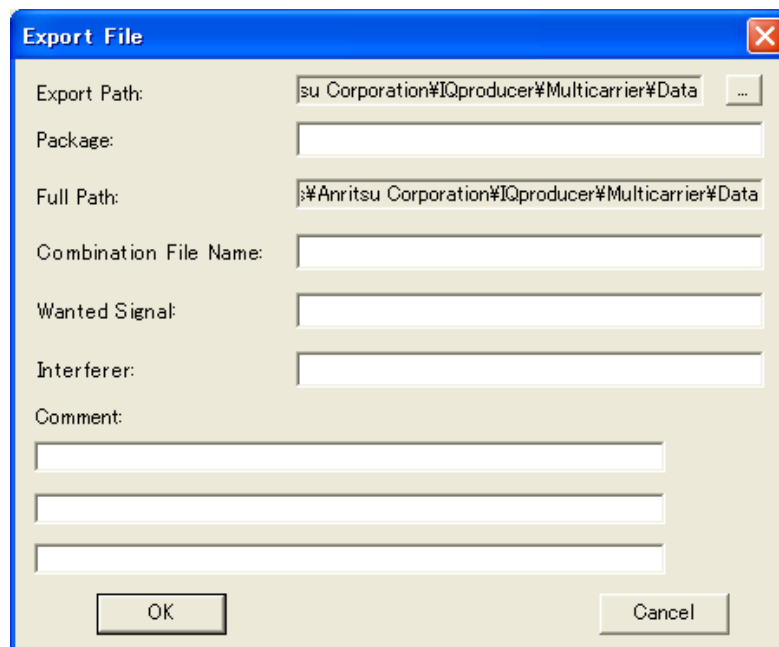
Figure 3.2.7-3   Export File Dialog Box (Baseband Combination)

■ Multi-Standard Radio (Tx)
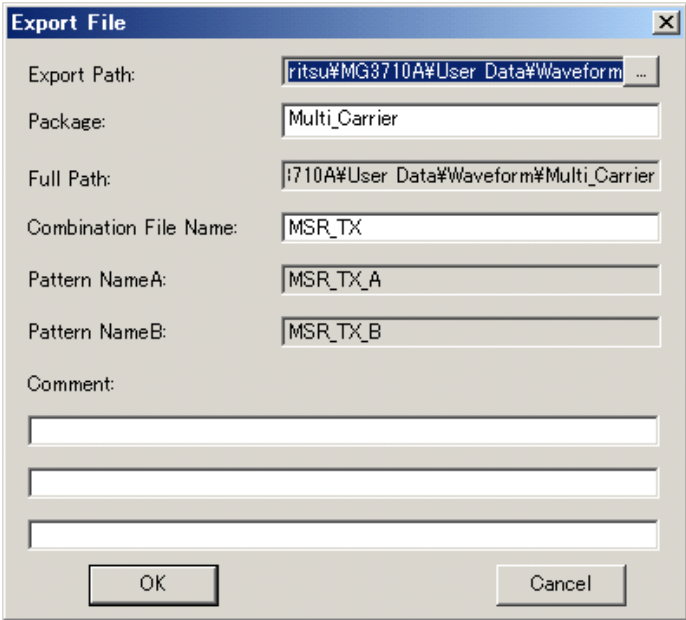
Figure 3.2.7-4 Export File Dialog Box (Multi-Standard Radio (TX))

The waveform pattern generated with this software will be saved to the following directory:

- When started with MS269xA, MS2830A, or MS2840A and when **MS269x, MS2830,** or **MS2840** is selected in the **Select instrument** screen, waveform pattern files generated by this application are saved in the following directory:

Installed OS	Export destination folder
Windows Embedded Standard 7	C:\Anitsu\Signal Analyzer\ System\Waveform
Other than above	C:\Program Files\Anritsu Corporation\ Signal Analyzer\System\Waveform

- When used with MG3710A, waveform pattern files generated by this application are saved in the following directory: C:\Anritsu\MG3710A\User Data\Waveform

- In other cases, refer to (1) "Setting Export Path".

(1) Setting Export Path
    In other cases, click the output destination folder selecting button and the following folder selecting screen appears. Select the output destination folder.
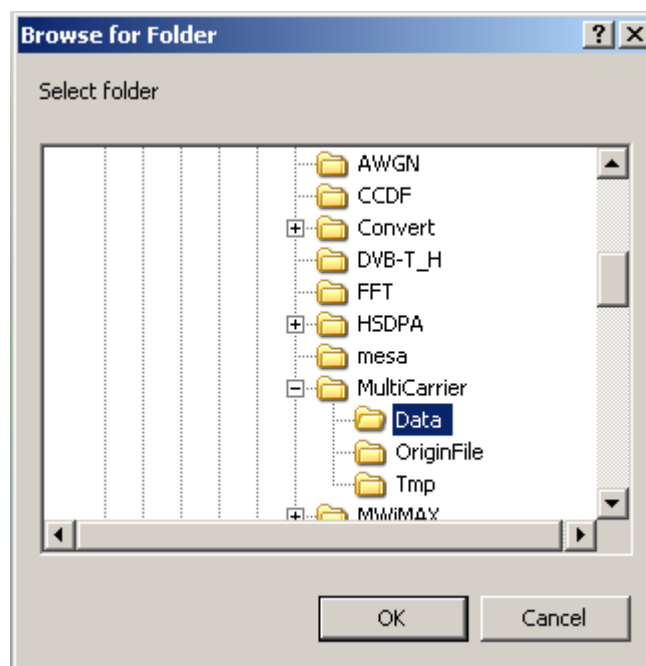
Figure 3.2.7-5　Browse For Folder Screen

When the output destination folder is not specified, waveform
pattern files are saved in the following directory:
X:\IQproducer\Multi-carrier\Data
("X:\IQproducer" indicates the folder where the IQproducer™ is
installed.)

(2)   Package setting
Click the **Package** box to input the package name to be stored
when the waveform pattern is transferred to the mainframe. Up to 31
characters can be used for a package name. Alphanumeric
characters and the following symbols may be used:
! % & ( ) + = ` { } _ - ^ @ [ ]

(3)   Export File Name setting
Export File Name (Multi-purpose, W-CDMA(DL)
Export File Name From Component1/ Component2 (Adjust Rate)
Combination File Name
(Baseband Combination/Multi-Standard Radio)
Wanted Signal (Baseband Combination)
Interferer (Baseband Combination)
Click the **Export File Name** box and enter the name of the file to be
output. Up to 18 alphanumeric characters and the following
symbols may be used:
! % & ( ) + = ` { } _ - ^ @ [ ]

(4)   Setting RMS (settable when selecting the use on the MG3700 upon
activation)
Click the **RMS Value** box using the mouth, and then enter from the
keyboard the RMS value of the post-conversion waveform that is
actually used on the MG3700A. The RMS value can be set from
651 to 1634 (the setting range for the MG3700A). The default is
1157.

(5)   Comment setting (Line1, 2, 3)
Click the **Comment** box and enter a comment from the keyboard.
The text entered here is displayed on the screen when the
mainframe selects the corresponding waveform. Up to 38
characters can be input for each line. 1-byte alphanumeric
characters and symbols can be used for comments. Leave this text
box blank if unnecessary.

 (6)   OK button
Displays the Calculation screen and starts waveform generation.

3

Detailed Description of Functions

3.2.8 Calculation screen

Clicking **Calculation & Load**, **Calculation & Play**, or the **OK** button on the Export File dialog box will start the waveform generation.

The Calculation screen is displayed while a waveform pattern is being generated. On this screen, the progress bar is displayed indicating the generation process of the waveform pattern and the progress of the waveform pattern generation. The generation of the waveform pattern can be stopped by clicking Cancel. When cancelled, it returns to the main screen.
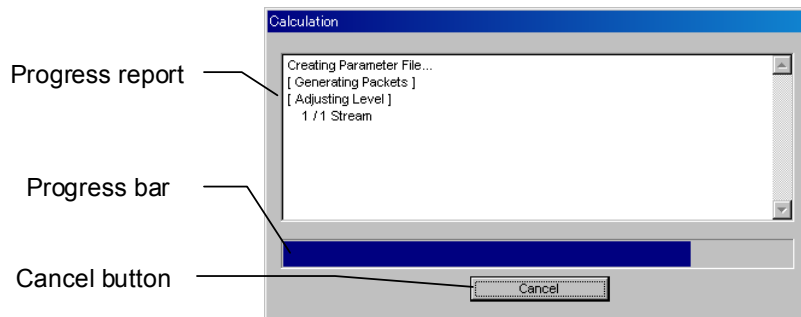
Figure 3.2.8-1   Calculation Screen (In Progress)

After waveform pattern generation is finished, the message "Calculation Completed." is displayed in the progress window and the **Cancel** button changes to the **OK** button.

When the generation is complete, you can return to the setting screen by clicking the **OK** button. After waveform generation, two files with .wvi and .wvd extension are output.
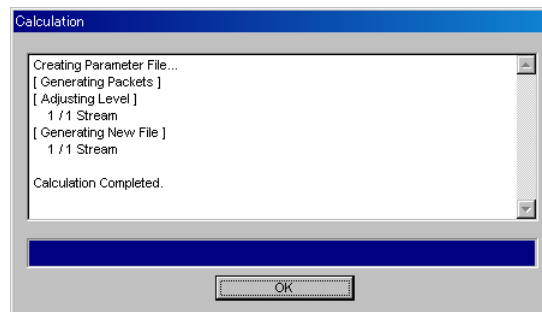
Figure 3.2.8-2   Calculation Screen (Completed)

Note:

When using this software on MG3710A, and selecting Calculation & Load or Calculation & Play, the waveform generation ends without displaying the above screen.

3.2.9   Calculation & Load

Note:

This function is available only when this software is used on MG3710A.

When **Calculation & Load** is selected, the Load Setting screen will display after waveform generation.
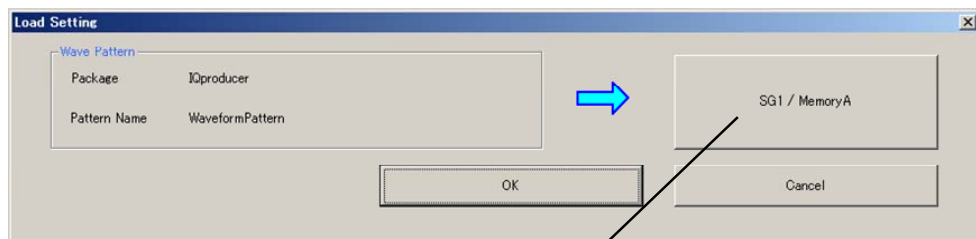
Button for selecting load destination

Figure 3.2.9-1   Load Setting Screen

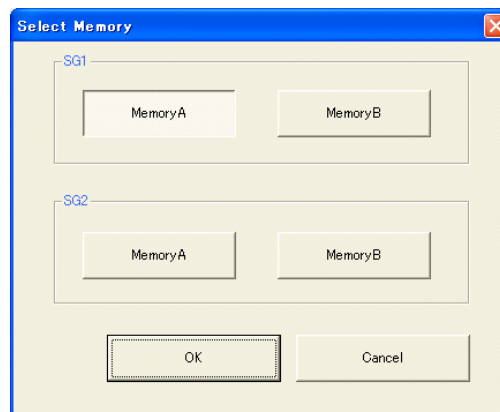The Select Memory screen will display after clicking the load destination in the Load Setting screen.

Figure 3.2.9-2   Select Memory Screen

After selecting the load destination of generated waveform in the Select Memory screen and clicking the **OK** button, the Load Setting screen will be shown again. Click the **OK** button in the Load Setting screen, and then the loading of waveform starts.

Notes:

● To exit this screen without loading the waveform pattern, click the **Cancel** button in the Load Setting screen.

● As with **Calculation & Play**, the Select SG screen will display when **Calculation & Load** is selected in the following conditions:

- When in the Baseband Combination setting screen,

- When in the Multi-Standard Radio (Tx) setting screen, the parameters TC4a (UTRA(FDD)+ GSM), TC4b (E-UTRA + GSM), or TC4c (UTRA(FDD) + E-UTRA + GSM) is selected for Test Configuration.

3.2.10 Calculation & Play

Note:

This function is available only when this software is used on MG3710A.

When **Calculation & Play** is selected, after waveform creation is completed, the created waveform is loaded into memory, selected and output.

When the 2nd Vector Signal Generator (option) is installed, the Select SG screen is displayed before the start of waveform generation. This screen is used to select the signal generator for outputting the created waveform pattern.
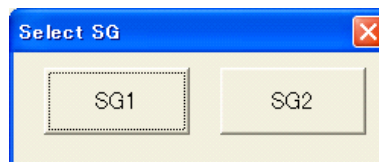
Figure 3.2.10-1   Select SG Screen

3.3 Saving/Reading Parameter File

This numeric values and settings for each item can be saved in a parameter file by using this software.

3.3.1 Saving parameter file

When running on PC, MS2690A/MS2691A/MS2692A, MS2830A, or MS2840A

1. Select **Save Parameter File** from the **File** menu or click the tool button to display the parameter file saving screen.
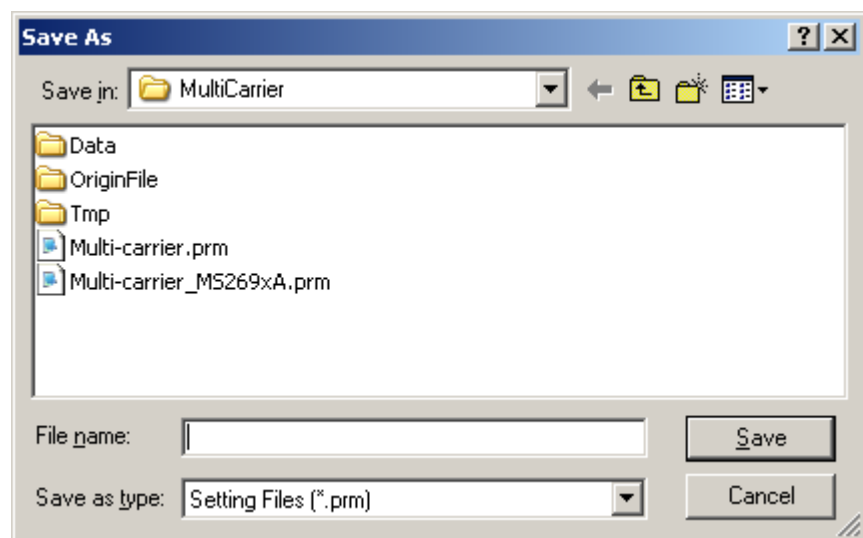
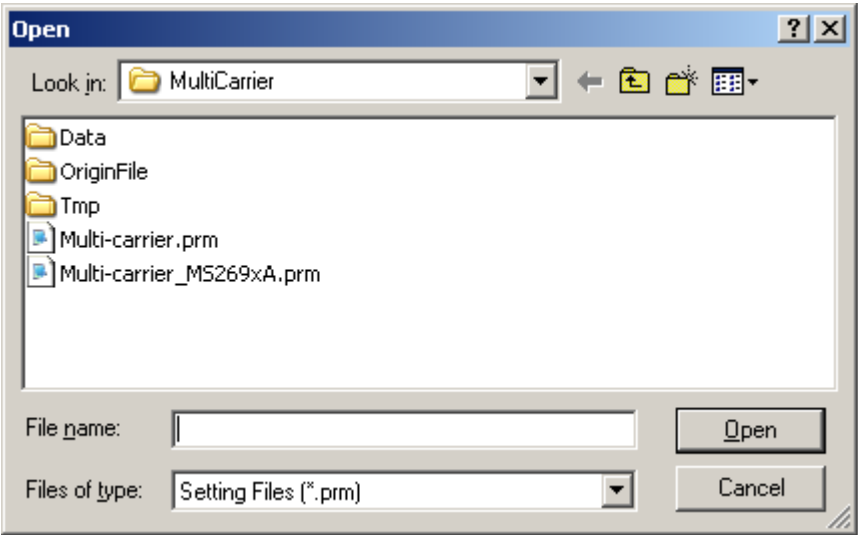**Figure 3.3.1-1   Parameter File Saving Screen**

2. Enter any file name in the **File name** text box and click the **Save** button to save the parameter file.
   When the save destination is not changed in the **Save in** box, the parameter file is saved in the following directory with the entered file name:
   X:\IQproducer\Multi-carrier*Entered file name*.prm
   ("X:\IQproducer" indicates the folder where the IQproducer™ is installed.)

When running on MG3710A

1. Click the **Save Parameter File** button in **File** menu or click the button to display the parameter file saving screen.
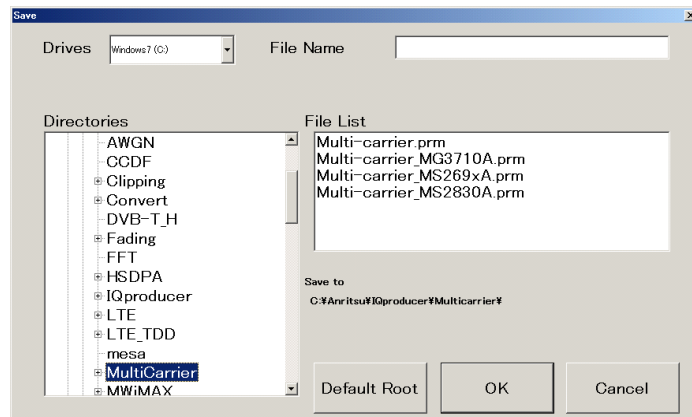
Figure 3.3.1-2   Parameter File Saving Screen (MG3710A)

2.   Select the folder to store the file in the **Directories** field, and then enter the name of the file using the **File Name** box. Click **OK** to save the parameter file. To initialize the setting in the **Directories** field, click the **Default Root** button.

3.3.2   Reading parameter file

When running on PC, MS2690A/MS2691A/MS2692A, MS2830A, or MS2840A

1.   Select **Recall Parameter File** from the **File** menu or click the
tool button to display the parameter file reading screen.

Figure 3.3.2-1   Parameter File Reading Screen

2.   Select a parameter file to be read from the file list, and then click
the **Open** button to read the selected parameter file.

When running on MG3710A

1.   Select **Recall Parameter File** from the **File** menu or click the
tool button to display the parameter file reading screen.
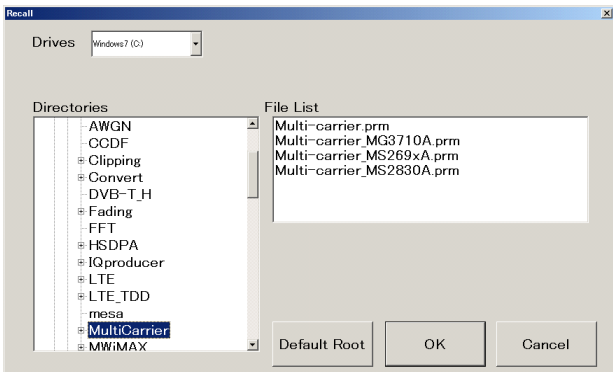
Figure 3.3.2-2   Parameter File Reading Screen (MG3710A)

2.   Select the directory where the files to be loaded is stored in the
Directories field. Click the desired file from the **File List**, and click
OK. To initialize the setting in the **Directories** field, click the **Default
Root** button.

3.4   Application Example of Multi-purpose

The Multi-purpose function is a function that generates multi-carrier of the existing waveform pattern and a tone signal. It is also possible to select two or more patterns or expand the frequency offset that has been limited in the mainframe.

3.4.1   WLAN multi-carrier signal

As an example of WLAN waveform pattern, the following describes the operation procedure from generation of multi-carrier waveform pattern to the output of a signal using the mainframe.

\<Procedure\>

1.   Select "11a_OFDM_12Mbps.wvi" that is WLAN waveform pattern from component 1 to 4.
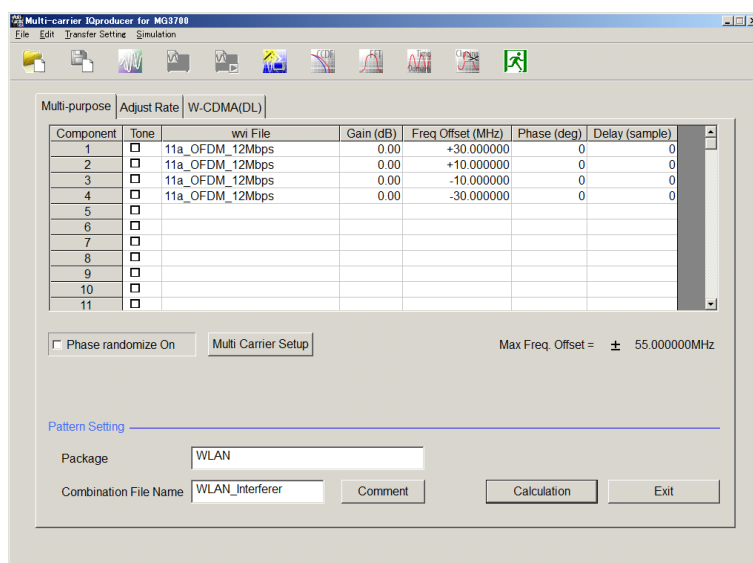
Figure 3.4.1-1   Multi-Purpose Operation Screen

2.   Click the **OK** button to display the Export File screen, and then enter the package, export file name and the RMS value of the waveform pattern.
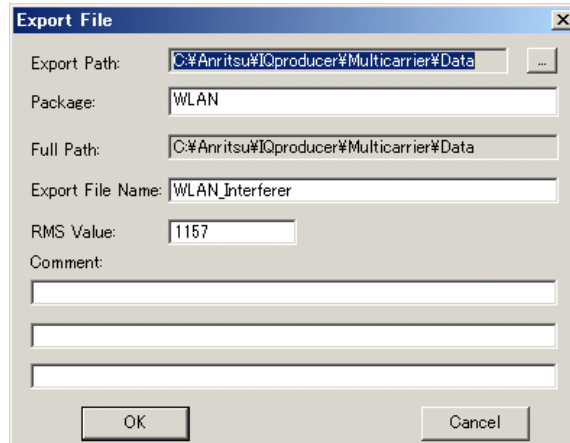

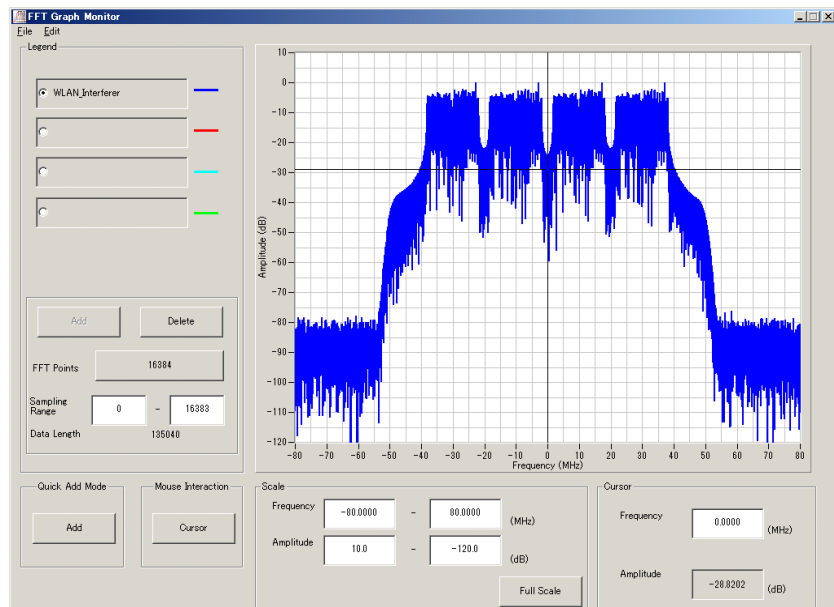**Figure 3.4.1-2   Export File Screen**

Figure 3.4.1-3   FFT Analyzing Screen

3.   Confirm the spectrum on the FFT analyzing screen.

4.   After transferring to the mainframe and loading to the memory, output the generated waveform pattern. The figure shows a spectrum measurement example.
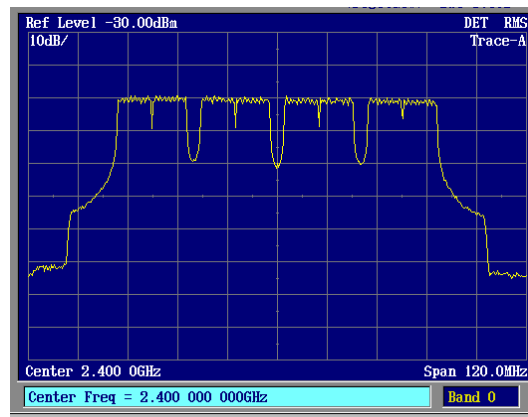

Figure 3.4.1-4   FFT Analyzing Screen

3.4.2 Multi-carrier signals of FWD and RVS for CDMA2000

As an example of CDMA2000 waveform pattern, the following describes the operation procedure from generation of multi-carrier waveform pattern to the output of a signal using the mainframe.

<Procedure>

1. Select the waveform pattern to be allocated to each component and then set Gain, Frequency Offset, Phase, and Delay. The figure below shows an example when FWD_2457_6kbps_1slot.wvi is selected for Component1, 3, 5, 7, 9, 11, 13, 15 and while RVS_RC1_FCH.wvi for Component 2, 4, 6, 8, 10, 12, 14 respectively.
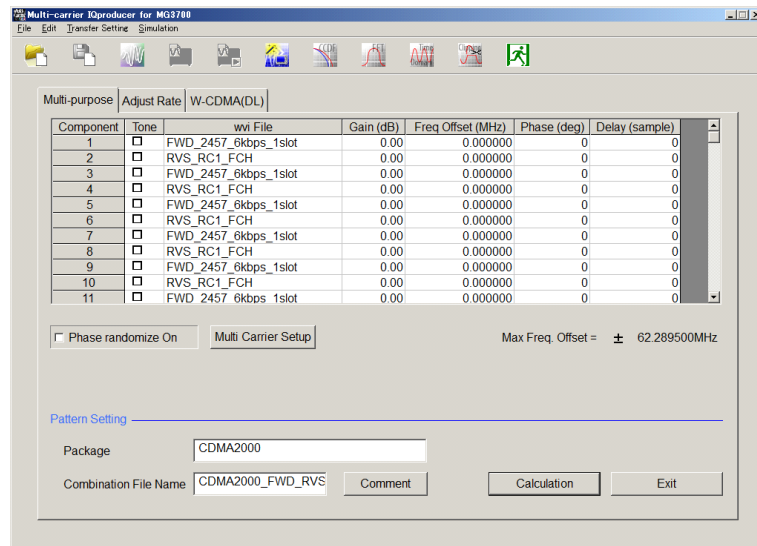

Figure 3.4.2-1　Multi-Carrier Setting Screen

2. Click the **OK** button, and then enter the package, export file name and the RMS value of the waveform pattern.

3

Detailed Description of Functions

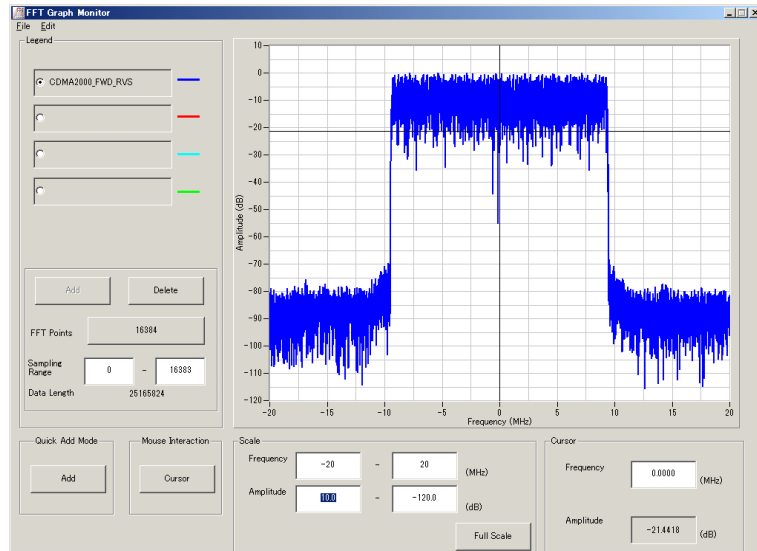3.   Confirm the spectrum on the FFT analyzing screen.

Figure 3.4.2-2   CDMA2000 Multi-Carrier FFT Analyzing Screen

4.   After transferring to the mainframe and loading to the memory, output the generated waveform pattern. The figure shows a spectrum measurement example.
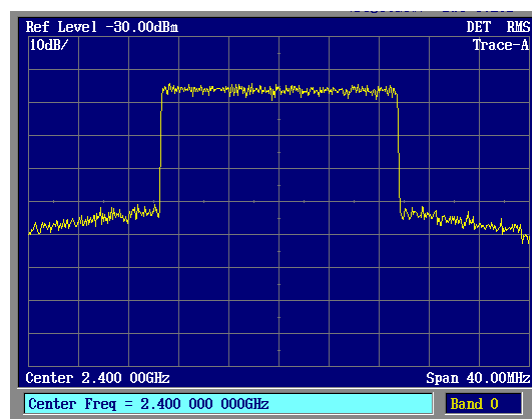

Figure 3.4.2-3   Spectrum Measurement Example Of CDMA2000 Multi-Carrier Waveform

3.5 Applied Adjust Rate function

Multi-carrier generation of the waveform pattern in with different Sampling Rate and Data Points fails since the volume of the waveform pattern becomes too big. On the other hand, the patterns with different Sampling Rate cannot use the two wave synthesizer function of the mainframe. Thus, it is possible to use the Adjust Rate function to respectively convert the two waveform patterns having different Sampling Rates to have an identical Sampling Rate and simultaneously output the converted two waveform patterns using the two wave synthesizer function of the mainframe. In this case, the frequency offset and level ratio will be variable even while the signal is being output.

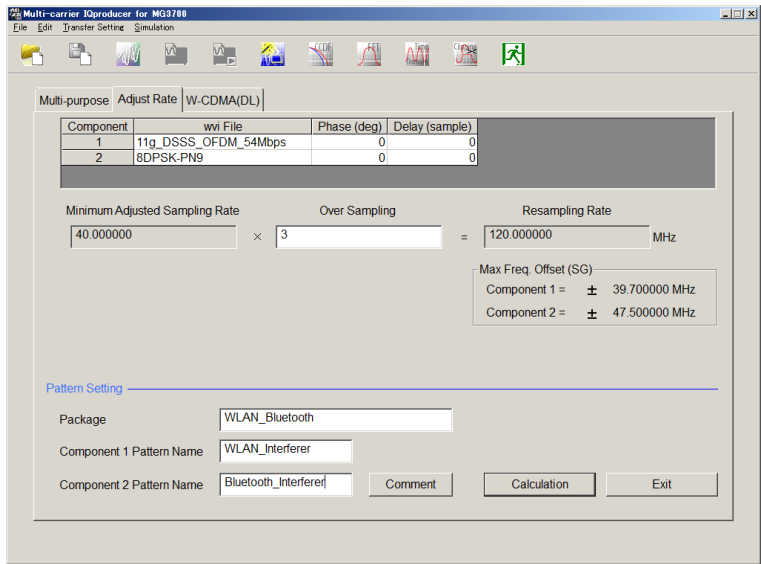## 3.5.1 Sampling frequency matching of WLAN and Bluetooth

Figure 3.5.1-1 Adjust Rate Operation Screen

Described below is the procedure for this operation with the waveform patterns of WLAN and Bluetooth as examples.

<Procedure>

1. On the Adjust Rate screen, select the 11g_DSSS_54Mbps WLAN waveform pattern and the GFSK-PN9 Bluetooth waveform pattern.
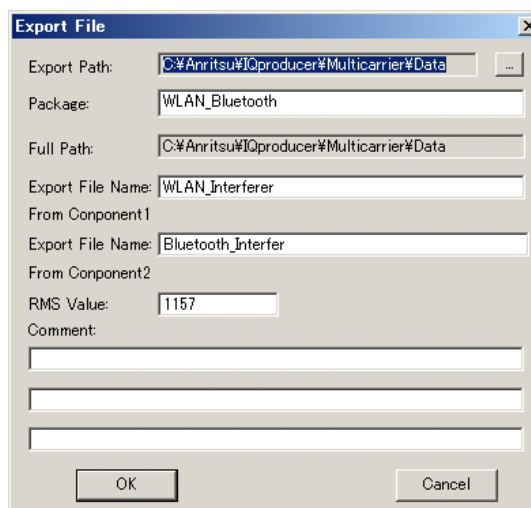

Figure 3.5.1-2   Adjust Rate Screen

2. Enter the Package name to be stored when transferred to the mainframe and the two converted file names. Click the **OK** button to generate the waveform patterns.

3. Transfer the pattern to the mainframe, use the two wave synthesizer function, and output Bluetooth_Interferer to 2400 MHz and WLAN_Interferer to 2420 MHz. Given in Figure 3.5.1-3 is an example of spectrum measurement.
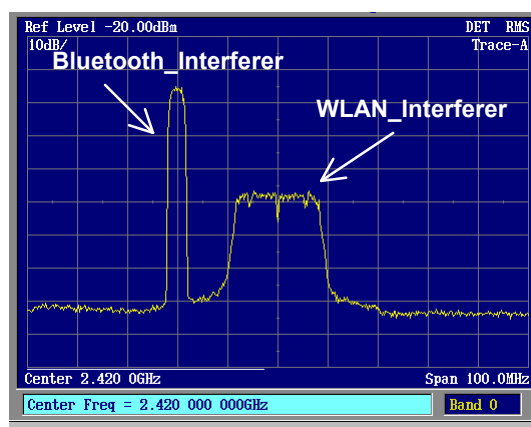

Figure 3.5.1-3   Example Of Synthesizing The Waveform Pattern For Bluetooth And That For WLAN

Chapter 4 How to Use Waveform Patterns

The following operations are required to output a modulated signal from this equipment using the waveform pattern generated by this software:

- Transferring waveform pattern to internal HDD/SSD
- Loading waveform patterns from the HDD/SSD to the waveform memory
- Selecting a waveform pattern to be output from this equipment

This chapter explains the details of these operations.

4

How to Use Waveform Patterns

4.1 For MG3700A or MG3710A

This section describes how to download a waveform pattern created for the MG3700A/MG3710A to the hard disk of the MG3700A/MG3710A and output the pattern.

4.1.1 Transferring waveform pattern to internal hard disk

The waveform pattern created with this software can be transferred to the internal hard disk in the following ways:

Note:

> This operation is not necessary if you are using MG3710A and have generated waveform patterns on MG3710A.

For MG3700A
- LAN
- CompactFlash Card

For MG3710A
- LAN
- External device such as USB Memory

■ Transferring from PC via LAN (MG3700A, MG3710A)

Two IQproducer™ tools can be used to transfer a waveform pattern to the MG3700A/MG3710A via a LAN.

- Transfer & Setting Wizard
  Start this wizard by clicking the **Transfer & Setting Wizard** button of this software or by selecting **Simulation & Utility** tab → **Transfer & Setting Wizard** from the IQproducer™ after creating a waveform pattern. For details, refer to Section 4.7 "File Transfer and Loading to Memory Using Transfer & Setting Wizard" in the *MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)*.
  Transferring a waveform pattern to the internal hard disk of the MG3700A/MG3710A, loading the waveform from the hard disk to the waveform memory, and then outputting the waveform pattern can be done using this wizard.

- Transfer & Setting Panel
  This function is loaded by selecting **Transfer & Setting Panel** in the **Simulation & Utility** tab of the IQproducer™. For details, refer to Section 5.2 "Transferring Waveform Pattern" in the *MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual IQproducer™*.
  Specify the folder that contains the waveform pattern to transfer to the MG3700A/MG3710A in the PC-side tree of **Transfer & Setting Panel**.

■ Transferring using a CF card (MG3700A)

Copy the waveform pattern (***.wvi and ***.wvd files) to be downloaded to the MG3700A to the root directory of a CF card.

Insert the CF card into the card slot on the front panel of the MG3700A, and then copy the file to the hard disk. For details about how to use a CF card to transfer a waveform pattern, refer to (1) Loading waveform file in memory in Section 3.5.2 of the *MG3700A Vector Signal Generator Operation Manual (Mainframe)*.

■ Transferring via external device such as USB memory (MG3710A)

For details about how to transfer a waveform pattern created using this software to the hard disk of the MG3710A, refer to Section 7.3.6 "Copying external waveform pattern: Copy" in the *MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe)*.

4

How to Use Waveform Patterns

4.1.2   Loading to Waveform Memory

To output a modulated signal using a waveform pattern, it is necessary to load the waveform pattern that was transferred to the internal hard disk of the MG3700A/MG3710A (described in Section 4.1.1 "Transferring waveform pattern to internal hard disk") to the waveform memory. A waveform pattern can be loaded into the waveform memory in the following two ways.

■ Configuring using the mainframe

A waveform pattern can be loaded into the waveform memory by using the instruction panel of the MG3700A/MG3710A or by using a remote command.

For operation using the front panel, refer below:

- Section 3.5.2 (1) "Loading waveform file in memory" in the *MG3700A Vector Signal Generator Operation Manual (Mainframe)*
- Section 7.3.4 "Loading waveform pattern: Load" in the *MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe)*

For operation using remote commands, refer below:

- Chapter 4 "Remote Control" in the *MG3700A Vector Signal Generator Operation Manual (Mainframe)*
- Section 7.3.4 "Loading waveform pattern: Load" in the *MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe)*

■ Using Transfer & Setting Panel of IQproducer™

A waveform pattern can be loaded from the LAN-connected PC to the memory by using **Transfer & Setting Panel**, which can be opened from the **Simulation & Utility** tab. For details, refer to Section 4.6 "File Transfer and Loading to Memory Using Transfer & Setting Panel" in the *MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)*.

4.1.3   Selecting Waveform Pattern

Select a waveform pattern to use for modulation from the waveform patterns loaded into the waveform memory of the MG3700A/MG3710A according to Section 4.1.2 "Loading to waveform memory". A waveform pattern can be selected in the following two ways.

■ Configuring using the MG3700A/MG3710A

Waveform patterns to be used for modulation can be selected by operating the equipment panel or by using a remote command.

For operation using the front panel, refer below:

- Section 3.5.2 (4) "Outputting pattern loaded in Memory A for modulation in Edit mode" in the *MG3700A Vector Signal Generator Operation Manual (Mainframe)*
- Section 7.3.5 "Selecting output waveform pattern: Select" in the *MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe)*

For operation using remote commands, refer below:

- Chapter 4 "Remote Control" in the *MG3700A Vector Signal Generator Operation Manual (Mainframe)*
- Section 7.3.5 "Selecting output waveform pattern: Select" in the *MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe)*

■ Using Transfer & Setting Panel of IQproducer™

A waveform pattern can be loaded from the LAN-connected PC to the memory, and also selected for modulation. This is done by using **Transfer & Setting Panel**, which can be opened from the **Simulation & Utility** tab. For details, refer to Section 4.6 "File Transfer and Loading to Memory Using Transfer & Setting Panel" in the *MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)*.

4.2 For MS2690A/MS2691A/MS2692A, MS2830A, or MS2840A

This section describes how to download a waveform pattern created for the MS2690A/MS2691A/MS2692A, MS2830A or MS2840A to the HDD/SSD of the MS2690A/MS2691A/MS2692A, MS2830A or MS2840A and output the pattern.

4.2.1 Transferring waveform pattern to internal HDD/SSD

For details about how to transfer a waveform pattern created using this software to the HDD/SSD of the MS2690A/MS2691A/MS2692A, MS2830A, or MS2840A refer below:

- Section 2.4.4 "Copying waveform file(s) to HDD/SSD" in the *MS2690A/MS2691A/MS2692A Signal Analyzer Option 020: Vector Signal Generator Operation Manual (Operation)*
- Section 2.4.4 "Copying waveform file(s) to HDD/SSD" in the *MS2830A/MS2840A Signal Analyzer Vector Signal Generator Operation Manual (Operation)*

Note:

Transferring waveform patterns is not required if the patterns are created using this software.

4.2.2 Loading to Waveform Memory

In order to output a modulated signal using the waveform pattern, it is necessary to load the waveform patterns stored in the internal HDD/SSD to the waveform memory.

■ Loading to Waveform Memory

Waveform patterns can be loaded to waveform memories by operating the panel or by using a remote command.

For operation using the front panel, refer below:

- Section 2.4.1 "Loading waveform file in memory" in the *MS2690A/MS2691A/MS2692A Signal Analyzer Option 020: Vector Signal Generator Operation Manual (Operation)*
- Section 2.4.1 "Loading waveform pattern(s) to memory" in the *MS2830A/MS2840A Signal Analyzer Vector Signal Generator Operation Manual (Operation)*

For operation using remote commands, refer below:

- *MS2690A/MS2691A/MS2692A Signal Analyzer Option 020: Vector Signal Generator Operation Manual (Remote Control)*
- *MS2830A/MS2840A Signal Analyzer Vector Signal Generator Operation Manual (Remote Control)*

4.2.3　Selecting Waveform Pattern

Select waveform patterns to be used for modulation from those loaded in the waveform memory as described in Section 4.2.1 "Transferring waveform pattern to internal HDD/SSD" above.

■ Selecting waveform pattern

Waveform patterns to be used for modulation can be selected by operating the equipment panel or by using a remote command.

For operation using the front panel, refer below:

- Section 2.4.2 "Loading waveform file in memory" in the *MS2690A/MS2691A/MS2692A Signal Analyzer Option 020: Vector Signal Generator Operation Manual (Operation)*
- Section 2.4.2 "Loading waveform pattern(s) to memory" in the *MS2830A/MS2840A Signal Analyzer Vector Signal Generator Operation Manual (Operation)*

For operation using remote commands, refer below:

- *MS2690A/MS2691A/MS2692A Signal Analyzer Option 020: Vector Signal Generator Operation Manual (Remote Control)*
- *MS2830A/MS2840A Signal Analyzer Vector Signal Generator Operation Manual (Remote Control)*

4

How to Use Waveform Patterns

Appendix A   Error Messages

The error messages are listed below.

Table A-1   Error messages

Error Message	Description
Can not open file.	The file cannot be opened.
Can not read file.	Reading from the file is disabled.
Can not write file.	Writing to the file is disabled.
The setting value is out of range. ("s"=X1 (X2 to X3)	The set value X1 is out of range for parameter "s." Input a value from X2 to X3.
Frequency range must be within 120 MHz.	Frequency band error. Perform settings so that the Tone frequency difference between the minimum and maximum frequencies falls within 120 MHz.
Power range must be within 80 dB.	Level error. Set the Component level to –80 dB or more.
Spectrum must be same for all patterns.	A pattern consisting of different spectrum settings cannot be used for a wvi file.
This waveform pattern can't compose multi-carrier.	A pattern in which InternalFIR is set to ON cannot be used for a wvi file.
Data points are over with this combination of wvi files.	The total size of waveforms to be generated exceeds the specified size. Change the combination of waveforms.
Gap Length must be zero.	A wvi file in which Gap Length is not set to 0 cannot be used.
Input File Name.	Input the file name before starting calculation.
Input Package Name.	Input the package name before starting calculation.
Calculation Error (Multi-purpose): Wave Data Error.	An incorrect parameter exists in a wvi file specified in Component. Check the parameter.
Calculation Error (Multi-purpose/Adjust rate): Can not read wvi file.	A wvd file corresponding to the wvi file specified in Component cannot be read. Store the wvi file and wvd file in the same folder.
Data points of the waveform data to be created is too large.	The number of waveform data to generate is too large.

Appendix

Appendix A

The warning messages are listed below.

Table A-2   Warning messages

Warning Message	Description
Cannot calculate. HDD/SSD free space is not enough.	The intermediate file size exceeds the free HDD/SSD space. Calculation is not started.
This process makes about XX G Byte temporary files. Do you calculate?	The intermediate file size is XX GBytes. Start calculation?
Overwrite "s" ?	A file "s" has already existed. Overwrite?
Input waveform patterns include some licensed patterns.	A wave form pattern necessary for charged license in the specified wvi file is included. To use with this instrument, install the licensed file corresponding to the serial number of the mainframe.
Memory option cannot be turned on in MS269x mode.	The memory option is not available for the IQproducer™ for MS269x. ***Note:*** This message is available only when **MS269x** is selected in the Select instrument screen at startup.

References are to page numbers.

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