MX370110A/MX269910A
LTE TDD IQproducer™
Operation Manual

Eighth 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), or MS2830A 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

Document No.: M-W3221AE-8.0

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.

MX370110A/MX269910A
LTE TDD IQproducer™
Operation Manual

23 June 2009 (First Edition)
30 September 2015 (Eighth 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 can be found on the last page of the printed version of this manual, and is available in a separate file on the CD 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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1. Regardless of whether this Software was purchased from or provided free-of-charge by Anritsu, you agree not to rent, lease, lend, or otherwise distribute this Software to third parties and further agree not to disassemble, recompile, reverse engineer, modify, or create derivative works of this Software.
2. You may make one copy of this Software for backup purposes only.
3. You are not permitted to reverse engineer this software.
4. This EULA allows you to install one copy of this Software on one piece of Equipment.

2. Disclaimers

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.

3. Limitation of Liability

a. If a fault (bug) is discovered in this Software, preventing operation as described in the operation manual or specifications whether or not the customer uses this software as described in the manual, Anritsu shall at its own discretion, fix the bug, or exchange the software, or suggest a workaround, free-of-charge. However, notwithstanding the above, the following items shall be excluded from repair and warranty.
   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: MX370110A/MX269910A LTE TDD IQproducer™

2. Applied Directive and Standards

When the MX370110A/MX269910A LTE TDD IQproducer™ is installed in the MG3710A, MS2690A/MS2691A/MS2692A, or MS2830A, the applied directive and standards of this software conform to those of the MG3710A, MS2690A/MS2691A/MS2692A, or MS2830A main frame.

PS: About main frame
Please contact Anritsu for the latest information on the main frame types that MX370110A/MX269910A 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

1. Product Model

Software: MX370110A/MX269910A LTE TDD IQproducer™

2. Applied Directive and Standards

When the MX370110A/MX269910A LTE TDD IQproducer™ is installed in the MG3710A, MS2690A/MS2691A/MS2692A, or MS2830A, the applied directive and standards of this software conform to those of the MG3710A, MS2690A/MS2691A/MS2692A, or MS2830A main frame.

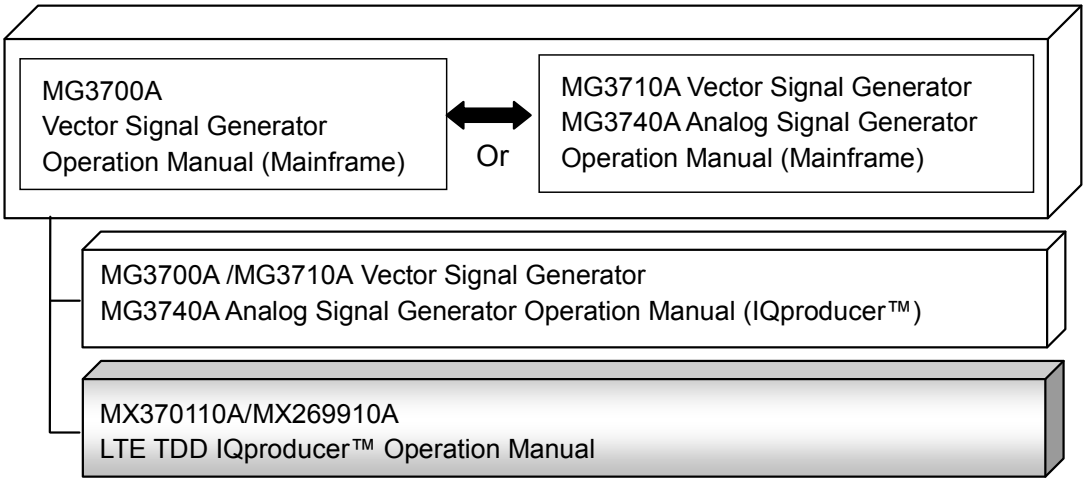
PS: About main frame
Please contact Anritsu for the latest information on the main frame types that MX370110A/MX269910A can be used with.

About This Manual

■Associated Documents

The operation manual configuration of the MX370110A/MX269910A LTE TDD IQproducer™ is shown below.

■If using MG3700A or MG3710A:



- 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.

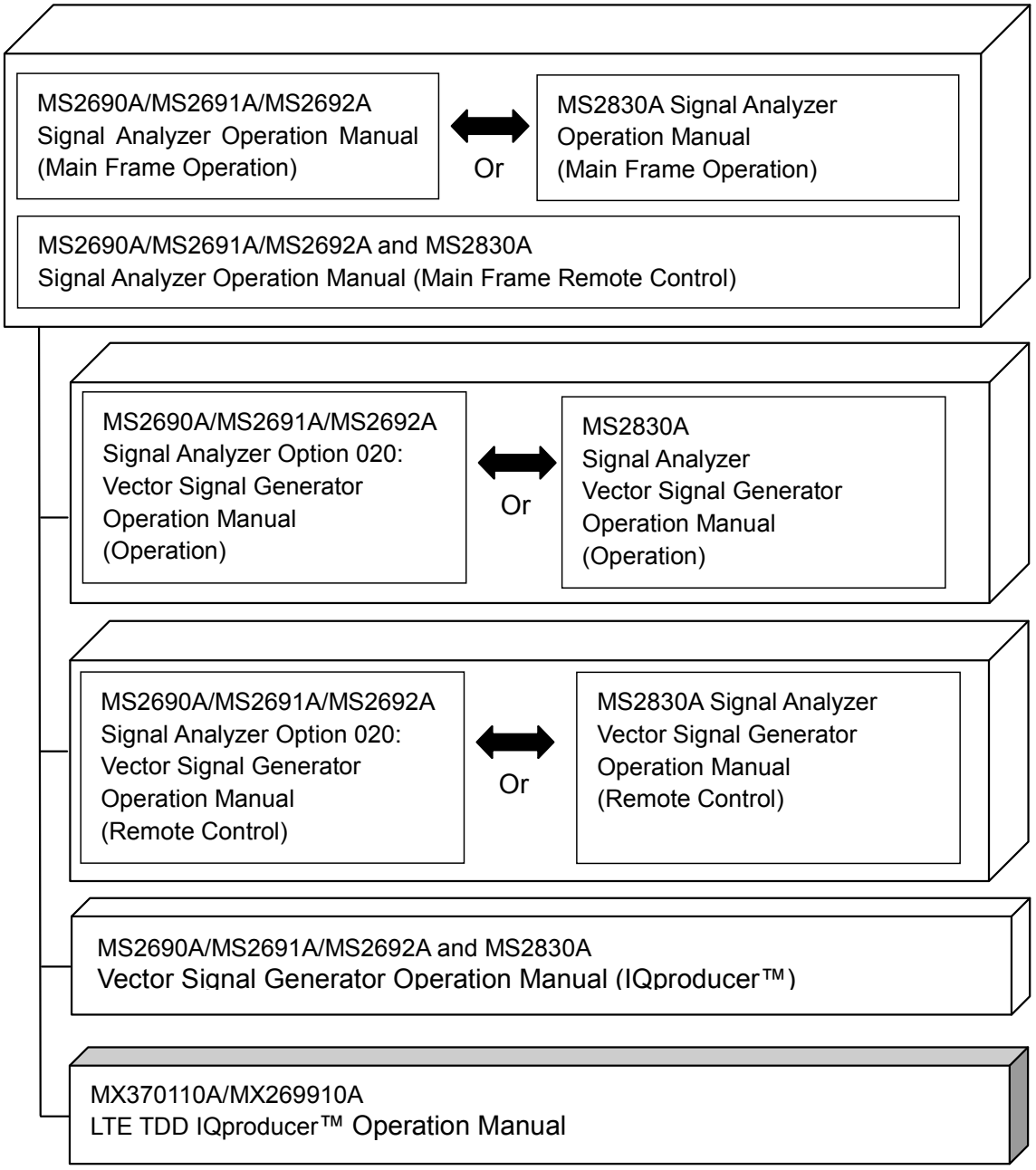
- MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)

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

- LTE TDD IQproducer™ Operation Manual (This document)

This describes basic operations and functions of the LTE TDD IQproducer™.

■If using MS2690A/MS2691A/MS2692A or MS2830A:



- MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe, Operation)

This describes basic operations, maintenance procedure, common functions and common remote functions of the MS2690A/MS2691A/MS2692A.

Or

- MS2830A Signal Analyzer Operation Manual (Mainframe, Operation)

This describes basic operations, maintenance procedure, common functions and common remote functions of the MS2830A.

- MS2690A/MS2691A/MS2692A and MS2830A Signal Analyzer Operation Manual (Mainframe, Remote Control)

These describe basic operations, maintenance procedure, common functions and common remote functions of the MS2690A/MS2691A/MS2692A or MS2830A.

- 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 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 Vector Signal Generator Operation Manual, Remote Control

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

- MS2690A/MS2691A/MS2692A and MS2830A 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.

- LTE TDD IQproducer™ Operation Manual (This document)

This describes basic operations and functions of the LTE TDD IQproducer™.

Table of Contents

Chapter 1 Overview

This chapter provides an overview of the MX370110A/MX269910A LTE TDD IQproducer™.

1.1 Product overview

MX370110A/MX269910A LTE TDD IQproducer™ (hereinafter referred to as “this software”) is software used to generate waveform patterns conforming to the 3GPP LTE TDD specifications. These are:

- TS36.211 V12.5.0 (2015-04)
- TS36.212 V12.4.0 (2015-04)
- TS36.213 V8.5.0 (2008-12)

When the option (MX370110A/MX269910A-001) is installed, this software can generate waveform patterns conforming to the 3GPP LTE-Advanced TDD specifications. The MX370110A/MX269910A-001 is compliant with the following 3GPP specifications. These are:

- TS36.211 V12.5.0 (2015-04)
- TS36.212 V12.4.0 (2015-04)
- TS36.213 V10.6.0 (2012-06)

This software requires either of the following environment:

- MG3710A Vector Signal Generator
- MS2690A/MS2691A/MS2692A or MS2830A Signal Analyzer with Vector Signal Generator option mounted
- Personal computer (hereinafter, “PC”)

This software generates waveform patterns that support the specifications of 3GPP LTE TDD/LTE-Advanced TDD 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 or MS2830A Signal Analyzer with Vector Signal Generator option installed (collectively referred to as “mainframe”, or “this equipment”).

1.2 Product Composition

1.2.1 Restrictions

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

Table 1.2.1-1 Restrictions

Mainframe / Restrictions	MG3700A	MG3710A	MS2690A MS2691A MS2692A	MS2830A
Software name	MX370110A		MX269910A	
Maximum Size of Waveform Patterns	256 M sample 512 M sample*1	64 M sample 128 M sample*5 256 M sample*6 512 M sample*7	256 M sample	64 M sample 256 M sample*4
Transmission method of Waveform Patterns	LAN, CompactFlash Card	External device such as LAN, USB memory*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

*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 or MS2830A, the measurement functions of the MS2690A/MS2691A/MS2692A or MS2830A 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 256 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)

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

1.2.2 Option

Tables 1.2.2-1 lists the option for this software. This is sold separately.

Table 1.2.2-1 Additional Option

Option No.	Product Name	Remarks
MX370110A/MX269910A-001	LTE-Advanced TDD Option	For restrictions, refer to Table 1.2.2-2.

Table 1.2.2-2 Restrictions of MX370110A/MX269910A-001

Mainframe / Restrictions	MG3700A	MG3710A	MS2690A MS2691A MS2692A	MS2830A
Intra-band contiguous Carrier Aggregation	✓	✓	✓	✓
Intra-band non-contiguous Carrier Aggregation	✓	✓	✓	✓
Inter-band non-contiguous Carrier Aggregation	N/A	✓*	N/A	N/A

*: Available only when the 2nd RF option (MG3710A-062/064/066/162/164/166) is installed.

Chapter 2 Preparation

This chapter describes the operating environment for the MX370110A/MX269910A.

2.1 Operating Environment

The following environment is required for operating the MX370110A/MX269910A.

(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 MG3710A Analog Signal Generator Operation Manual (IQproducer™)
  Chapter 2 “Installation”
- MS2690A/MS2691A/MS2692A and MS2830A 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 MG3710A 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 MG3710A 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 or MS2830A with Vector Signal Generator option.

- MS2690A/MS2691A/MS2692A and MS2830A Vector Signal Generator Operation Manual (IQproducer™)
  2.2 “Installation/Uninstallation”

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™.

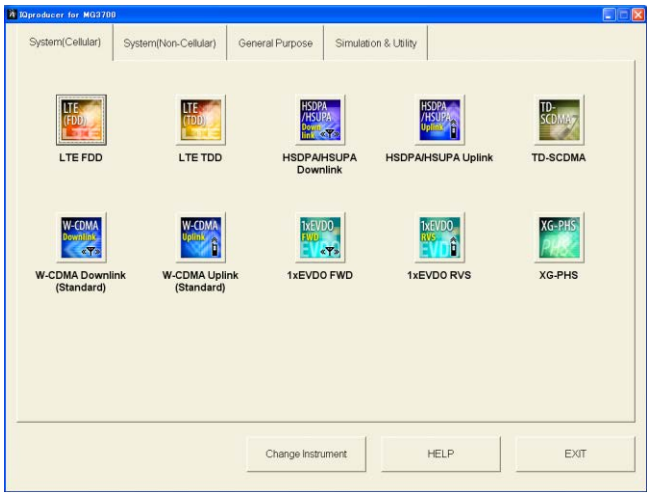


Figure 2.3.1-1 Common Platform Screen

4. Click the **System (Cellular)** tab on the common platform screen, to show the **System (Cellular)** selection screen that supports each telecommunication system.

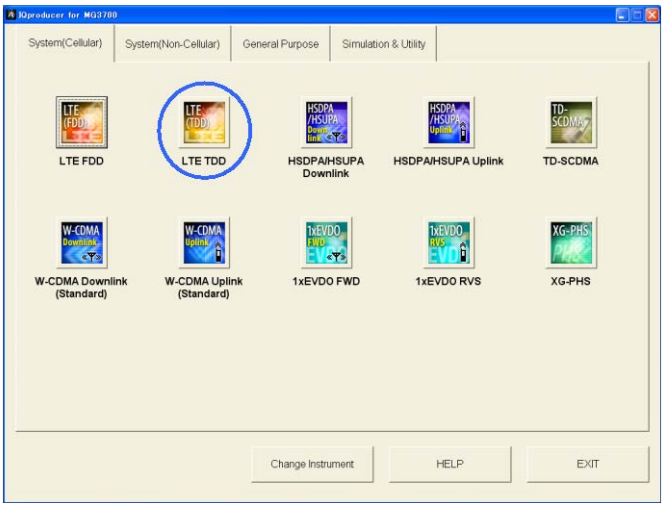


Figure 2.3.1-2 System (Cellular) Selection Screen

5. When installed on other than MG3710A, click **LTE (TDD)** to display the Normal setup main screen. For details of the main screen, refer to Chapter 3 “Normal Setup Screen” or Chapter 4 “Easy Setup Screen”.

Notes:

- When installed on MG3710A, click **LTE (FDD)** to display the Easy setup main screen.
- If Change Instrument is clicked, the Select instrument screen will appear each time the software is loaded.

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™.

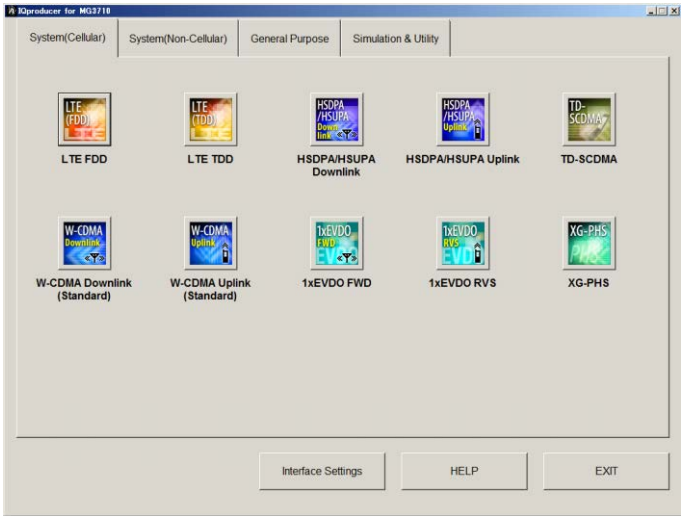


Figure 2.3.2-1 Common Platform Screen

2. Click the **System (Cellular)** tab on the common platform screen, to show the **System (Cellular)** selection screen that supports each telecommunication system.

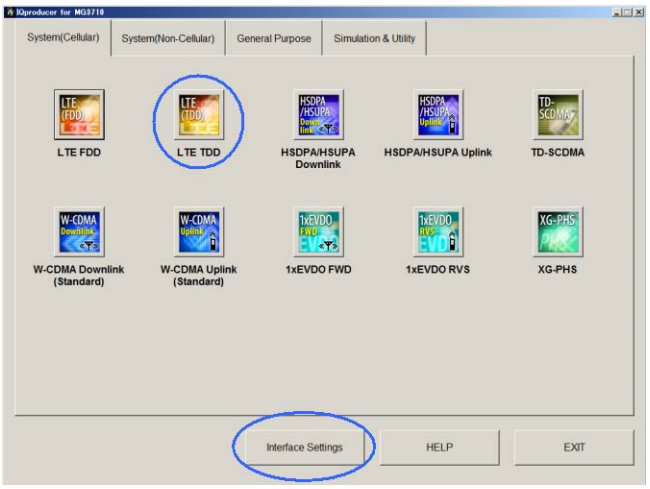


Figure 2.3.2-2 System (Cellular) Selection Screen

3. When installed on MG3710A, click **LTE (TDD)** to display the Easy setup main screen. For details of the main screen, refer to Chapter 3 "Normal Setup Screen" or Chapter 4 "Easy Setup Screen".

Note:

When installed on other than MG3710A, click **LTE (FDD)** to display the Normal setup main screen.

Note:

When this software is installed on MG3710A, **Change Instrument** displays instead of **Interface Settings**. Clicking **Interface Settings** displays the Interface Setting dialog box.

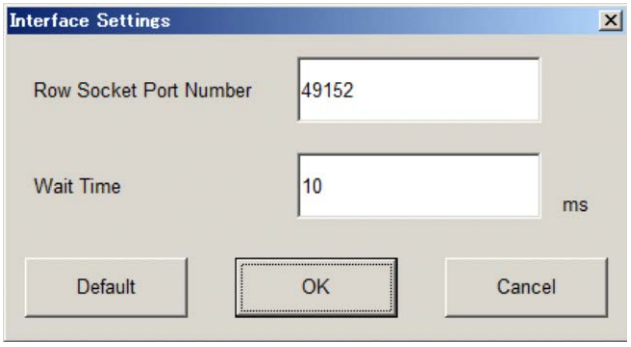


Figure 2.3.2-3 Interface Settings Dialog Box

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.

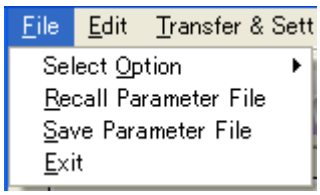


Figure 2.3.3-1 Exiting Software

The operation of the three screen buttons is explained below.

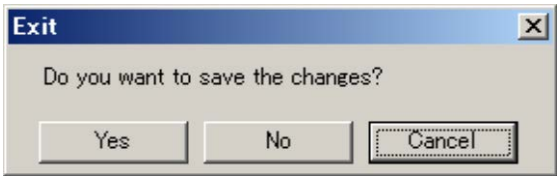


Figure 2.3.3-2 Exit Confirmation Window

- **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.

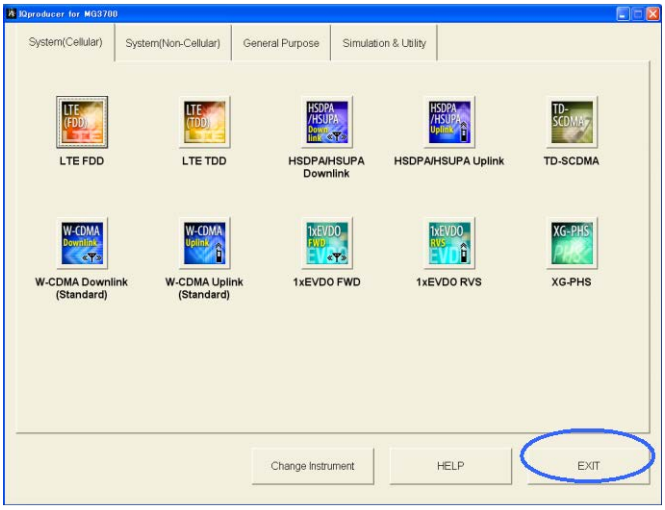


Figure 2.3.3-3 Exiting IQproducer™

Chapter 3 Normal Setup Screen

This chapter describes the detailed functions when this software is used on Normal Setup screen.

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, and MS2830A functions are described as notes in each item.

3.1 Screen Details

3.1.1 Menu and tool button

On common platform screen, click the **System (Cellular)** tab, and then select **LTE (TDD)** to display the Normal setup main screen.

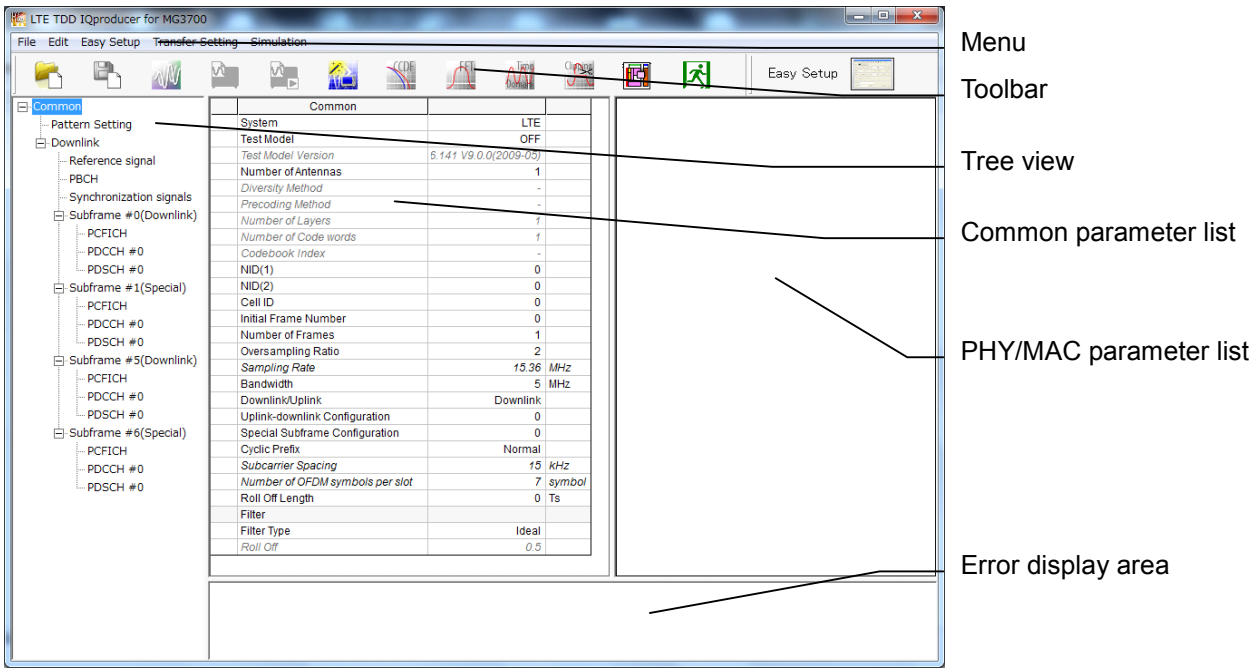


Figure 3.1.1-1 Normal Setup Main screen

■ Basic operations of the main screen

- The window can be maximized, minimized, expanded, and reduced.
- For the fields of the tree view, common parameter list, PHY/MAC parameter list, and error display, splitting position can be changed by dragging their boundaries.
- The leftmost symbol of each item in the tree view is - when the integrated items are open, or + when they are closed. The state can be changed by clicking on the symbol.
- The items in italic cannot be changed. These items are automatically set. The state of each item may change depending on the setting for other items.
- The grayed out items indicate the parameters not related to the generated waveforms in the current setting and cannot be changed. The state of each item may change depending on the setting for other items.

■ Screen transition

Figure 3.1.1-2 shows transition from the main screen that is displayed when the LTE TDD IQproducer™ is started up to other screens (Export File, Calculation, and Frame Structure screens). For details on each of the screens, refer to the sections shown below the corresponding screen.

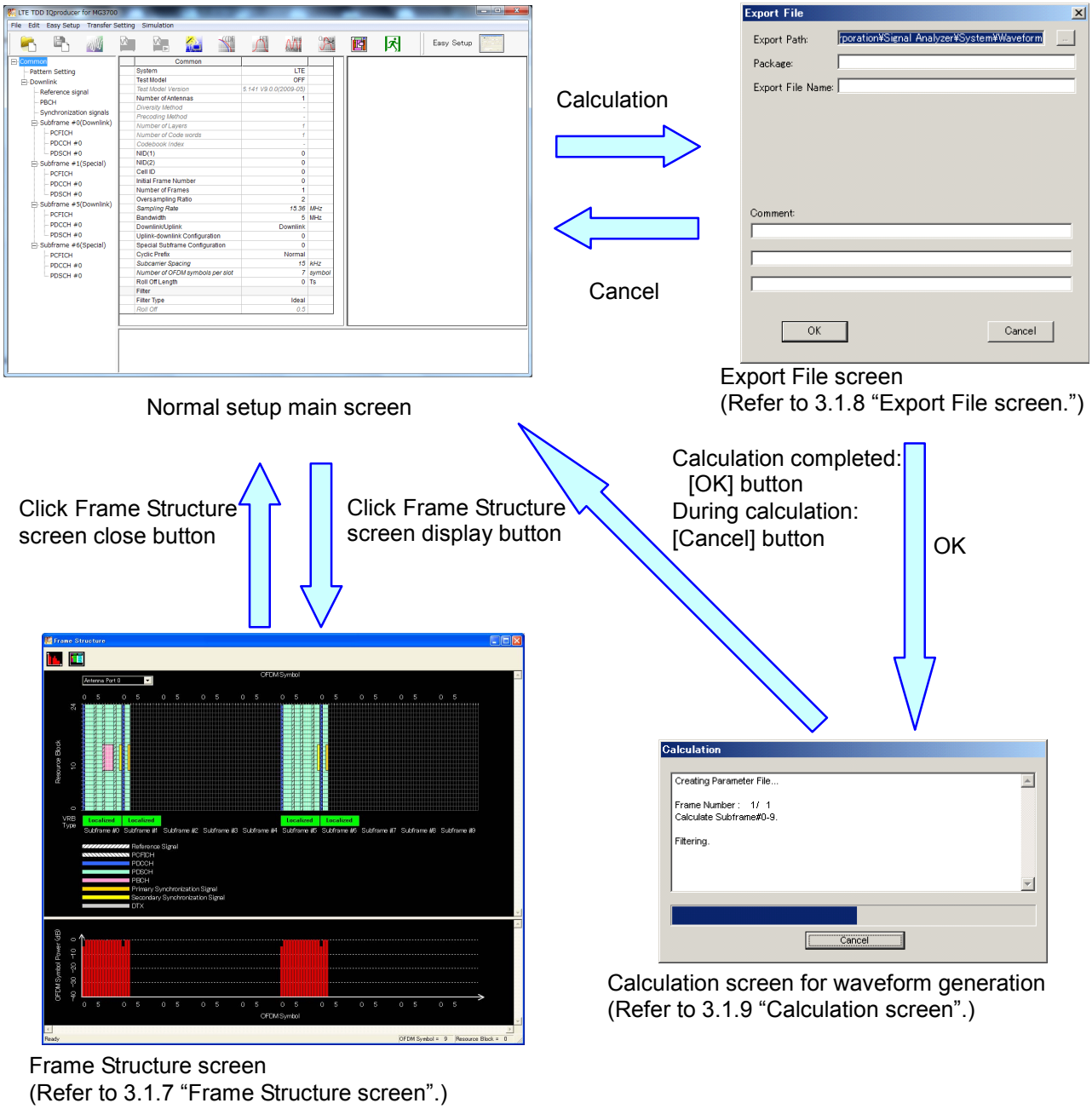


Figure 3.1.1-2 Screen transition

■ **File** menu

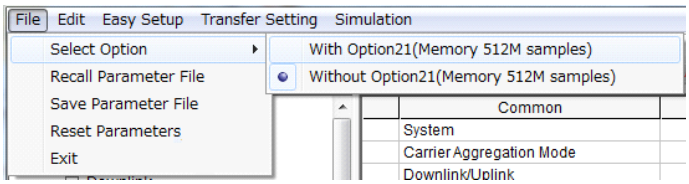


Figure 3.1.1-3 File menu

- **Select Option**

Notes:

- This function is available only when MG3700, MG3710 or MS2830 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 or MS2830A

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 3.1.1-1 Available Options for MG3700A or MS2830A

Model	Items	ARB Memory Expansion
MG3700A	With Option21 (Memory 512M samples)	1 GB x 2 memory
	Without Option21 (Memory 512M samples):	512 MB × 2 Memories
MS2830A	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.

Table 3.1.1-2 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 3.1.1-3 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	512M samples
Memory 1024M samples × 2 (With Option48, 78)	512M samples

- **Recall Parameter File**
  Loads the parameter files saved by the Save Parameter File menu. When the parameter file is loaded, the settings when it was loaded are recovered.
- **Save Parameter File**
  Saves the current setting parameters to a file.
- Reset Parameters
  Initializes the current setup.
- **Exit**
  Exits from this software.

■ **Edit** Menu

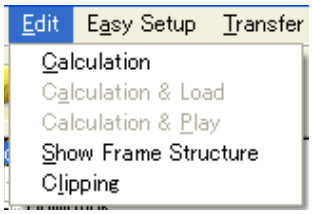


Figure 3.1.1-4 Edit menu

- **Calculation**
  Generates waveform patterns.
- **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.
- **Show Frame Structure**
  Displays the Frame Structure screen.
- **Clipping**
  Displays the Clipping setting screen. In this screen, clipping and filtering processing can be performed for a generated waveform pattern.

■ **Easy Setup** menu

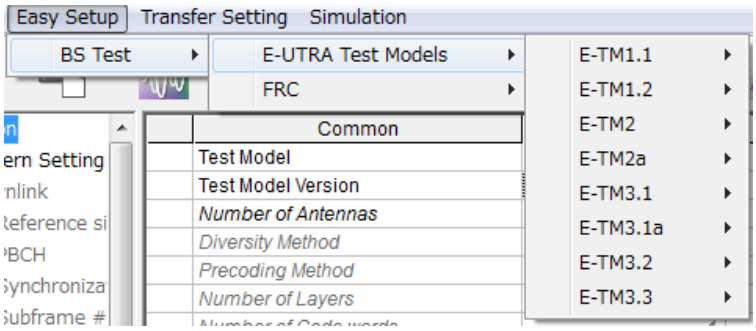


Figure 3.1.1-5 Easy Setup Menu

- BS Test

  This parameter can be set to generate a waveform of E-UTRA Test Models or FRC (Fixed Reference Channels) defined by 3GPP TS36.141 V12.7.0 (2015-04).

Note:

When LTE-Advanced is selected

When System in the common parameter list is set to **LTE-Advanced**, after setting with **Easy Setup** menu, the Select Component Carriers screen is displayed (Figure 3.1.1-6 and 3.1.1-7).
Selecting the selectable Component Carrier number check box reflects the parameters set by Easy Setup.
For details of the Component Carriers, refer to Section 3.1.4 “PHY/MAC parameters (LTE-Advanced)”.

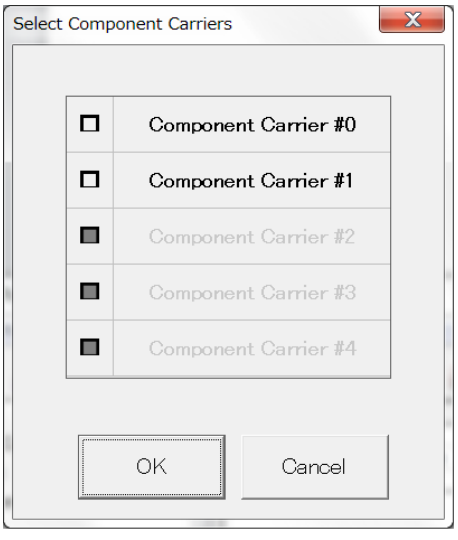


Figure 3.1.1-6 Select Component Carriers (Intra-band) Screen

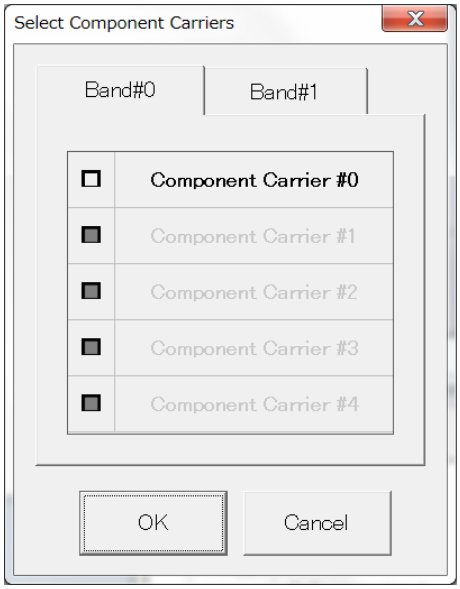


Figure 3.1.1-7 Select Component Carriers (Inter-band) Screen

■ **Transfer Setting menu**

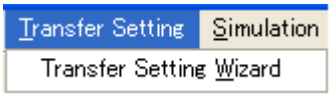


Figure 3.1.1-8 Transfer Setting menu

- **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

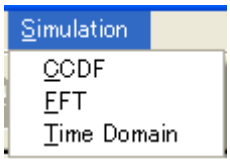


Figure 3.1.1-9 Simulation menu

- **CCDF**
  Displays the CCDF Graph Monitor screen. In this screen, the CCDF of the generated waveform pattern is displayed in a graph.
- **FFT**
  Displays the FFT Graph Monitor 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 Bar

Notes:

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


Show Frame Structure


Exit

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

Easy Setup

Switches GUI to Easy Setup mode. For details refer to Chapter 4 “Easy Setup Screen”.

The setting for Normal Setup will be initialized when switched to Easy Setup mode.

3.1.2 Tree view

The tree view displays the parameter that belongs to the waveform pattern to be created in the hierarchy structure.

Note:

The tree view configuration differs between when **LTE** is selected and when **LTE-Advanced** is selected with System in the common parameter list.

3.1.2.1 Tree view (LTE)

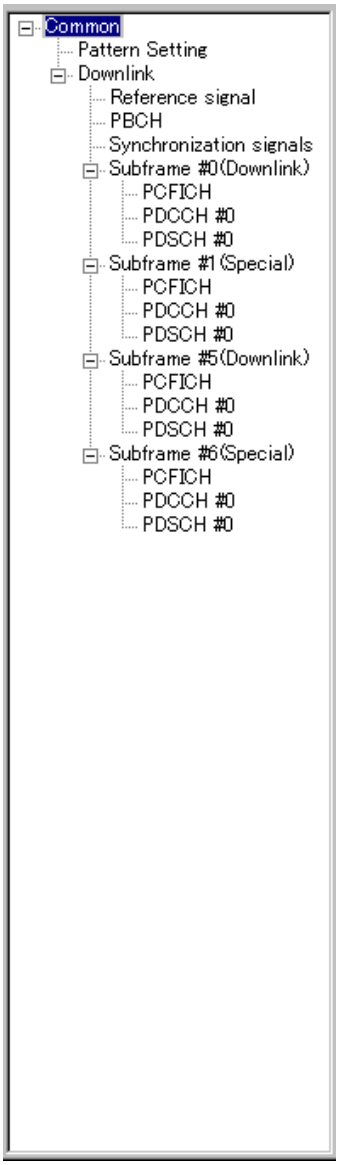


Figure 3.1.2.1-1 Tree view

- The commands in the pop-up menu displayed when Subframe (#0 to #9) is right-clicked are described below.

Copy:	Copies the parameters of the selected subframe.
Paste:	Applies the copied settings to the selected subframe parameter.
Paste all:	Applies the copied settings to the Subframe parameters #0 to #9.

- The PHY/MAC parameter list shows the parameter list for the items selected in the tree view.
- When DL/UL in the common parameter list is switched, the menu displayed in the tree view changes as well. Also, when Data Transmission/PRACH is switched for an uplink PHY/MAC parameter, the menu displayed in the tree view changes as well.

3.1.2.2 Tree view (LTE-Advanced)

When System in the common parameter list is set to **LTE-Advanced** and Carrier Aggregation Mode is **Intra-band**, the **Component Carrier** nodes are added below the **Common** node and above the **Downlink/Uplink** nodes in the tree view.

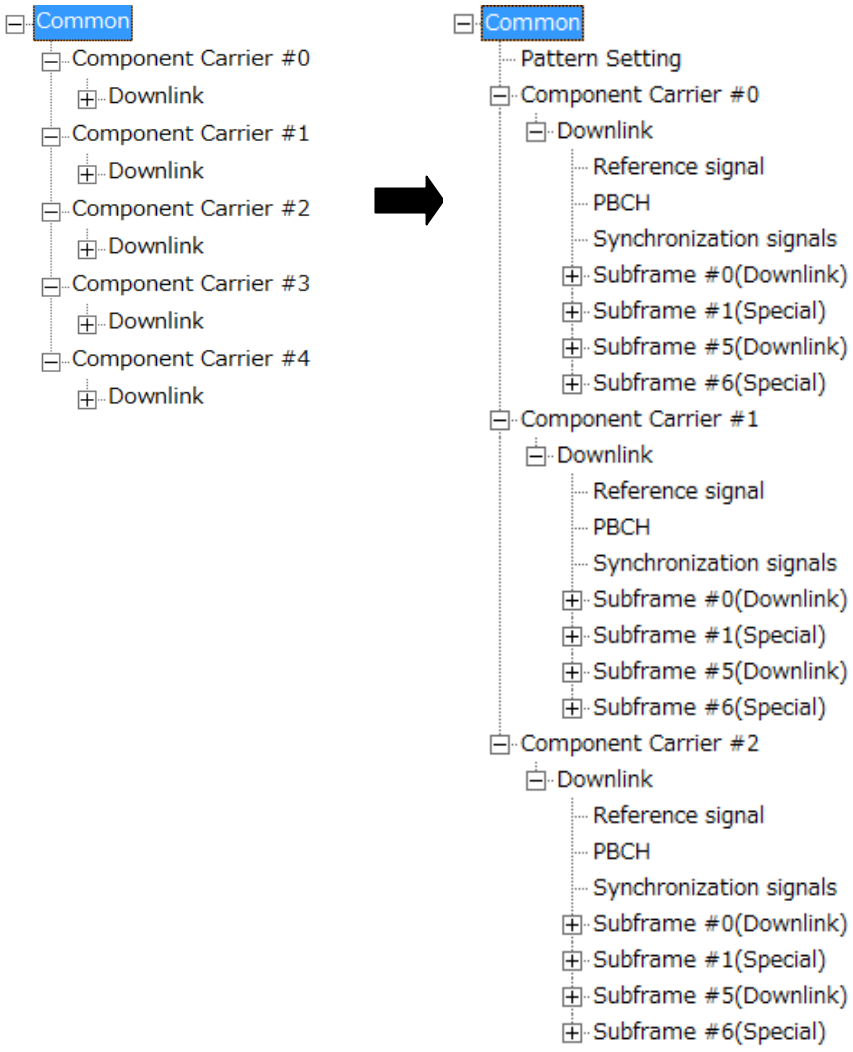


Figure 3.1.2.2-1 Tree View (LTE advanced, Carrier Aggregation Mode = Intra-band)

Carrier Aggregation Mode is **Inter-band**, the **Band** nodes are added respectively below the **Common** node and above the **Component Carrier #0** to **#4** nodes.

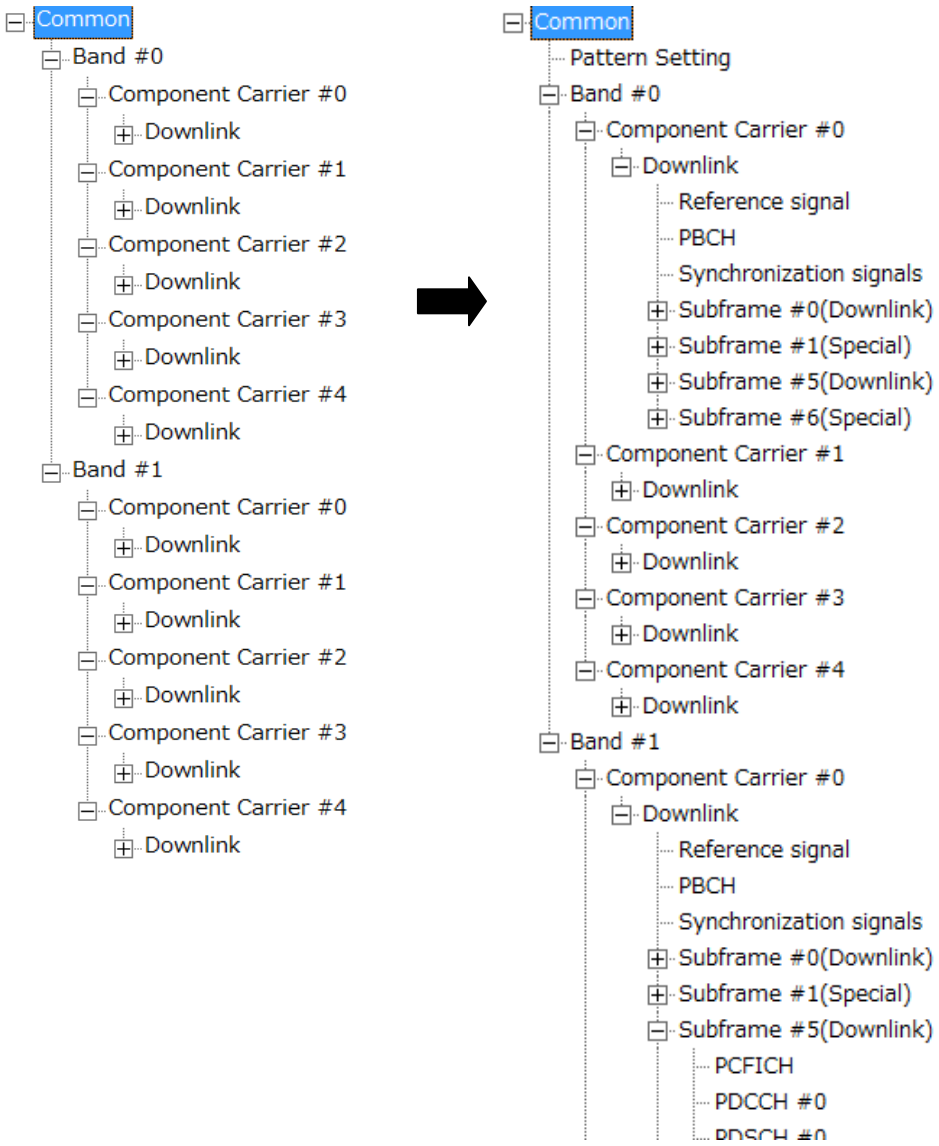


Figure 3.1.2.2-2 Tree View (LTE advanced, Carrier Aggregation Mode = Inter-band)

- The commands in the pop-up menu displayed when **Component Carrier #0** to **Component Carrier #4** is right-clicked are described below.

  Copy: Copies the parameters of the selected Component Carrier.
  Paste: Applies the copied settings to the selected Component Carrier parameter.
  Paste all: Applies the copied settings to the Component Carrier parameters #0 to #4.

Note:

Paste or Paste all cannot be set for Component Carriers with different Bands.

- The commands in the pop-up menu displayed when **Subframe #0** to **Subframe #9** is right-clicked are described below.

  Copy: Copies the parameters of the selected subframe.
  Paste: Applies the copied settings to the selected subframe parameter.
  Paste all: Applies the copied settings to the Subframe parameters #0 to #9.

- The PHY/MAC parameter list shows the parameter list for the items selected in the tree view.
- When Downlink/Uplink in the common parameter list is switched, the menu displayed in the tree view changes as well. Also, when Data Transmission/PRACH is switched for an uplink PHY/MAC parameter, the menu displayed in the tree view changes as well.
- When **Common** is selected in the tree view, the setting parameters are displayed in the PHY/MAC parameter list, which correspond to the Carrier Aggregation Mode.
  For details, refer to Section 3.1.4.1 “Carrier Aggregation”
- When **Component Carrier** is selected in the tree view, the setting parameters for Component Carrier are displayed in the PHY/MAC parameter list.
  For details, refer to Section 3.1.4.2 “Component Carrier”.

3.1.3 List of Common Parameter

The items displayed in the common parameter list are described below. The common parameter list includes parameters that need to be set. The common parameters are displayed under Common.

System

[Function] Switches 3GPP Systems.
[Default] LTE
[Setting range] LTE, LTE-Advanced
[Remarks] When the MX370110A/MX269910A-001 is installed, LTE-Advanced can be selected. Switching the System changes the common parameter list to be displayed.

3.1.3.1 List of Common Parameter (System = LTE)

Test Model

[Function] Sets the Test Model
[Default] OFF
[Setting range] OFF, E-TM1.1, E-TM1.2, E-TM2, E-TM2a, E-TM3.1, E-TM3.1a, E-TM3.2, E-TM3.3
[Remarks] Valid when Downlink/Uplink is set to Downlink. If this parameter is set to a value other than **OFF**, only the parameters Test Model Version, NID(1), NID(2), Cell ID, Over Sampling Ratio, Bandwidth, Roll Off Length, and Filter (Filter Type, Roll Off) can be set. Also, the Show Frame Structure menu and Show Frame Structure tool button are unavailable.

Test Model Version

[Function] This sets the Test Model version of referred specifications.
[Default] 3GPP TS36.141 V9.0.0 (2009-05)
[Setting range] 3GPP TS36.141 V8.2.0 (2009-03)
3GPP TS36.141 V9.0.0 (2009-05)
[Remarks] Available only when Test Model is set other than Off.

Number of Antennas

[Function] Sets the number of antennas.
[Default] 1
[Setting range] 1, 2, 4
[Remarks] This parameter can only be set to 1 if Downlink/Uplink is **Uplink** or Test Model is not **OFF**.
When this parameter is set to 1, Diversity Method, Precoding Method, Number of Layers, Number of Code words, and Codebook Index cannot be set.

Diversity Method

[Function] Sets the diversity method.

[Setting range] Spatial Multiplexing, Tx Diversity

[Remarks] This parameter cannot be set when Number of Antennas is set to 1.

Precoding Method

[Function] Sets the precoding method.

[Setting range] Without CDD, Large-delay CDD,
Large-delay CDD (Cyclic Precoder Index)

[Remarks] This parameter cannot be set when Number of Antennas is set to 1 or Diversity Method is set to Tx Diversity.
Large-delay CDD (Cyclic Precoder Index) can be set if Number of Antennas is 4 and Diversity Method is Spatial Multiplexing, and Codebook index is automatically set internally.

Number of Layers

[Function] Sets the number of layers.

[Default] 1

[Setting range] 1, 2, 3, 4

[Remarks] This parameter cannot be set when Number of Antennas is set to 1 or Diversity Method is set to Tx Diversity.
This parameter can be set only to 2 if Number of Antennas is 2 and Precoding Method is **Large-delay CDD**.
If Precoding Method is **Without CDD**, 1 or 2 can be specified.

Number of Code words

[Function] Displays the number of code words.

[Default] 1

[Setting range] 1, 2

[Remarks] When Number of Antennas is 4 and Diversity Method is Spatial Multiplexing and Number of Layers is 2, ,the setting range is 1 or 2. Otherwise, the value is determined by Number of Antennas, Diversity Method, and Number of Layers and cannot be changed.

Codebook Index

[Function] Sets the Codebook Index.

[Default] 0

[Setting range] When Number of Antennas is 2, the setting range varies according to Number of Layers as follows.
Number of Layers is 1: 0 to 3
Number of Layers is 2: 0 to 2
When Number of Antennas is 4: 0 to 15

[Remarks] When Diversity Method is TX Diversity, this parameter cannot be set.
When Number of Antennas is 4,
Diversity Method is Spatial Multiplexing and
Precoding Method is Large-delay CDD(Cyclic Precoder Index), this parameter cannot be set.

NID (1)

[Function] Sets the physical-layer cell-identity group NID (1).

[Default] 0

[Setting range] 0 to 167

[Remarks] This parameter automatically changes if Cell ID is changed.

NID (2)

[Function] Sets the physical-layer cell-identity group NID (2).

[Default] 0

[Setting range] 0, 1, 2

[Remarks] This parameter automatically changes if Cell ID is changed.

Cell ID

[Function] Sets the Cell ID.

[Default] 0

[Setting range] 0 to 503

[Remarks] This parameter is automatically set according to Physical-layer cell-identity group NID (1) and Physical-layer identity NID (2) as follows.
Cell ID = 3 × NID (1) + NID (2)
When Cell ID is modified, Physical-layer cell-identity group NID (1) and Physical-layer identity NID (2) are automatically set.
If Test Model is set other than **OFF from OFF**, Cell ID is initialized to 1.

Initial Frame Number

[Function] This sets the initial frame number for wave generation.
[Default] 0
[Setting range] 0 to 1023
[Resolution] 1
[Remarks] If Test Model is set other than OFF from OFF, Initial Frame Number is initialized to 1.

Number of Frames

[Function] Sets the number of frames to be generated.
[Default] 1
[Setting range] 1 to the maximum number of frames that can be stored in the equipment's waveform memory.
[Resolution] 1
[Remarks] The maximum number of frames is determined as follows.
Maximum number of frames = Maximum number of samples that can be stored in the equipment's waveform memory / number of samples per frame
Number of samples per frame:
19200 × Oversampling Ratio samples when Bandwidth is 1.4 MHz
38400 × Oversampling Ratio samples when Bandwidth is 3 MHz
76800 × Oversampling Ratio samples when Bandwidth is 5 MHz
153600 × Oversampling Ratio samples when Bandwidth is 10 MHz
153600 × Oversampling Ratio samples when Bandwidth is 15 MHz
307200 × Oversampling Ratio samples when Bandwidth is 20 MHz

Oversampling Ratio

[Function] Sets the oversampling ratio.
[Default] 2
[Setting range] 1, 2, 4
[Remarks] This parameter cannot be set to 1 and 4 in the case of PRACH.

Bandwidth

[Function] Sets the system bandwidth.
[Default] 5 [MHz]
[Setting range] 1.4, 3, 5, 10, 15, 20 [MHz]

Sampling Rate

[Function] Displays the sampling rate.

[Default] 15.36 [MHz]

[Setting range] The setting range varies depending on the Bandwidth setting as follows:

1.92 × Oversampling Ratio [MHz] when Bandwidth is 1.4 MHz
3.84 × Oversampling Ratio [MHz] when Bandwidth is 3 MHz
7.68 × Oversampling Ratio [MHz] when Bandwidth is 5 MHz
15.36 × Oversampling Ratio [MHz] when Bandwidth is 10 MHz
15.36 × Oversampling Ratio [MHz] when Bandwidth is 15 MHz
30.72 × Oversampling Ratio [MHz] when Bandwidth is 20 MHz

[Remarks] This parameter cannot be set. It is automatically set according to the Oversampling Ratio and Bandwidth values.

Downlink/Uplink

[Function] Sets downlink or uplink.

[Default] Downlink

[Setting range] Downlink, Uplink

[Remarks] The setting becomes fixed to Downlink when Test Model is set other than OFF.

Uplink-downlink Configuration

[Function] This command sets the Uplink-downlink Configuration.

[Default] 0

[Setting range] 0, 1, 2, 3, 4, 5, 6

[Remarks] If the setting is switched the menu on the tree view switches as well.
The setting is fixed to 3 when Test Model is set other than OFF.

Special Subframe Configuration

[Function] This command sets the Special Subframe Configuration.

[Default] 0

[Setting range] 0 to 8

[Remarks] The setting range varies depending on the Cyclic Prefix setting as follows:
Cyclic Prefix set to Normal: 0 to 8
Cyclic Prefix set to Extended: 0 to 6
The setting is fixed to 8 when Test Model is set other than OFF.

Cyclic Prefix

[Function] Sets the Cyclic Prefix.
[Default] Normal
[Setting range] Normal, Extended
[Remarks] The setting is fixed to Normal when Test Model is set other than **OFF** or PRACH.

Subcarrier Spacing

[Function] Displays the subcarrier spacing (interval).
[Setting value] 15 [kHz]
[Remarks] In PRACH, the subcarrier spacing is displayed as below.
Preamble Format = 0, 1, 2, 3 : 1.25 [kHz]
Preamble Format = 4 : 7.5 [kHz]

Number of OFDM symbols per slot

[Function] Displays the number of OFDM symbols per slot.
[Default] 7 [Symbol]
[Remarks] The setting is fixed.
When Cyclic Prefix is Normal: 7 [Symbol]
When Cyclic Prefix is Extended: 6 [Symbol]

Roll Off Length

[Function] Sets the length of the ramp time applied to the OFDM symbol.
[Default] 0 [Ts] (Ts = 1 / (15,000 × 2,048) seconds)
[Setting range] 0 to 512 [Ts]
[Resolution] 1 [Ts]
[Remarks] The maximum value of the setting range is 144 when Cyclic Prefix is Normal, 512 when Cyclic Prefix is Extended. Also, the maximum setting range is 432 in the case of PRACH.

Filter

Filter Type

[Function] Sets the filter type.
[Default] Ideal
[Setting range] Nyquist, Root Nyquist, Ideal, None
[Remarks] Can only set to None in PRACH.

Roll Off

[Function] Sets the roll-off factor.
[Default] 0.5
[Setting range] 0.1 to 1.0
[Resolution] 0.1
[Remarks] The setting is fixed when Filter Type is set to Ideal or None.

3.1.3.2 List of Common Parameter (System = LTE-Advanced)

Carrier Aggregation Mode

[Function] Sets Carrier Aggregation Mode.
[Default] Intra-band
[Setting range] Intra-band, Inter-band
[Remarks] Unavailable in PRACH.

Downlink/Uplink

[Function] Sets downlink or uplink.
[Default] Downlink
[Setting range] Downlink, Uplink
[Remarks] If the setting is switched, the menu on the tree view switches as well.

3.1.4 PHY/MAC parameters (LTE-Advanced)

The items displayed in the PHY/MAC parameter list when **LTE Advanced** is selected for System in the common parameter list are described below.

3.1.4.1 Carrier Aggregation

When a **Common** is selected in the tree view, the following items are displayed in the PHY/MAC parameter list. The items are not displayed in the case of PRACH.

Component Carrier

[Function] Displays the Component Carrier number.
[Display range] 0 to 4
[Remarks] When Carrier Aggregation Mode is Inter-band, Component Carrier number (#0 to #4) is displayed for Band#0 and Band#1, respectively.

Status

[Function] Enables or disables the Component Carrier parameter.
[Setting range] Check box selected, or cleared.
[Remarks] When Carrier Aggregation Mode is Intra-band, Component Carrier #0 and #1 check boxes are selected and others are cleared by default.
When Carrier Aggregation Mode is Inter-band, Component Carrier #0 check boxes for Band#0 and Band#1 are selected and others are cleared by default.

Bandwidth

[Function] Displays the system bandwidth for the Component Carrier.
[Default] 5 [MHz]
[Display range] 1.4, 3, 5, 10, 15, 20 [MHz]

Cell ID

[Function] Displays the Cell ID for the Component Carrier.
[Default] 0
[Display range] 0 to 503

Gain

[Function] Sets the level ratio of Component Carrier.
[Default] 0.00 [dB]
[Setting range] –80.00 to 0.00 [dB]
[Resolution] 0.01 [dB]
[Remarks] The level ratio is calculated based on the Component Carrier with the highest level among the Component Carriers.

Freq.Offset

[Function] Sets the frequency offset.

[Default] 0.0000 [MHz]

[Setting range] 0 to $\pm(0.4\times Fs - 0.5\times Band)$ [MHz]

Band : Refer to Remarks.

Fs : 153.6 MHz (sampling rate)

[Resolution] 100 [Hz]

[Default] When Carrier Aggregation Mode is Intra-band,
Component Carrier #0 is –2.4000 [MHz]
Component Carrier #1 is 2.4000 [MHz]
When Carrier Aggregation Mode is Inter-band,
0.0000 [MHz]

[Remarks] The transmission bandwidth (Band) within the setting range is changed as follows, depending on the Component Carrier system bandwidth (Bandwidth).

Table 3.1.4.1-1 Component Carrier Transmission System Bandwidth (Bandwidth) and Transmission Bandwidth (Band)

Bandwidth [MHz]	Band [MHz]
1.4	1.095
3.0	2.715
5.0	4.515
10.0	9.015
15.0	13.515
20.0	18.015

Phase

[Function] Sets the initial phase of the Component Carrier.

[Default] 0 [deg.]

[Setting range] 0 to 359 [deg.]

[Resolution] 1 [deg.]

Delay

[Function] Sets delay of the Component Carrier.

[Default] 0 [Ts]

[Setting range] 0 to 307200 [Ts]

[Resolution] 1 to 16

[Remarks] The resolution changes depending on the Bandwidth as follows. If numeric values other than the resolution are input, the values are changed to the resolution closest to the input values.

Table 3.1.4.1-2 Bandwidth versus Resolution of Delay

Bandwidth [MHz]	Resolution [Ts]	Setting example
1.4	16	0,16,32, …
3	8	0,8,16, …
5	4	0,4,8, …
10	2	0,2,4, …
15	2	0,2,4, …
20	1	0,1,2, …

3.1.4.2 Component Carrier

When **Component Carrier (#0 to #4)** is selected in the tree view, the following items are displayed in the PHY/MAC parameter list.

Changing the **Component Carrier (#0 to #4)** selection in the tree view switches the parameter list.

Test Model

[Function] Sets the Test Model

[Default] OFF

[Setting range] OFF, E-TM1.1, E-TM1.2, E-TM2, E-TM2a, E-TM3.1, E-TM3.1a, E-TM3.2, E-TM3.3

[Remarks] Valid when Downlink/Uplink is set to Downlink. If this parameter is set to a value other than **OFF**, only the parameters Test Model Version, NID(1), NID(2), Cell ID, Over Sampling Ratio, Bandwidth, Roll Off Length (For details, refer to the remarks of the parameter.), and Filter (Filter Type, Roll Off) can be set. Also, the Show Frame Structure menu and Show Frame Structure tool button are unavailable.

If Test Model of one Component Carrier is set to **OFF**, all Test Models of others in the same band are set to **OFF** as well.
If Test Model of one Component Carrier is set from OFF to other than OFF, all Test Models of others in the same band are set to E-TM1.1.

Test Model Version

[Function] This sets the Test Model version of referred specifications.

[Default] 3GPP TS36.141 V9.0.0 (2009-05)

[Setting range] 3GPP TS36.141 V8.2.0 (2009-03)
3GPP TS36.141 V9.0.0 (2009-05)

[Remarks] Available only when Test Model is set other than Off.

Number of Antennas

[Function] Sets the number of antennas.

[Default] 1

[Setting range] 1, 2, 4

[Remarks] This parameter is fixed to 1 when Downlink/Uplink is set to Uplink.
When this parameter is set to 1, Diversity Method, Precoding Method, Number of Layers, Number of Code words, and Codebook index cannot be set.
Setting Number of Antennas of one Component Carrier sets the same Number of Antennas to other Component Carriers of the same Band.

Diversity Method

[Function] Sets the diversity method.

[Default] Spatial Multiplexing

[Setting range] Spatial Multiplexing, Tx Diversity

[Remarks] This parameter cannot be set when Number of Antennas is set to 1.

Precoding Method

[Function] Sets the precoding method.

[Setting range] Without CDD, Large-delay CDD, Large-delay CDD (Cyclic Precoder Index)

[Remarks] This parameter cannot be set when Number of Antennas is set to 1 or Diversity Method is set to Tx Diversity.
Large-delay CDD(Cyclic Precoder Index) can be set if Number of Antennas is 4 and Diversity Method is Spatial Multiplexing, and Codebook index is automatically set internally.

Number of Layers

[Function] Sets the number of layers.

[Setting range] 1, 2, 3, 4

[Remarks] This parameter cannot be set when Number of Antennas is set to 1 or Diversity Method is set to Tx Diversity.
This parameter can be set only to 2 if Number of Antennas is 2 and Precoding Method is Large-delay CDD.
It can be set to either 1 or 2 if Number of Antennas is 2 and Precoding Method is Without CDD

Number of Code words

[Function] Sets the number of code words.

[Setting range] 1, 2

[Remarks] When Number of Antennas is 4 and Diversity Method is Spatial Multiplexing, the setting range is 1 or 2. Otherwise, the value is determined by Number of Antennas, Diversity Method, and Number of Layers and cannot be changed.

Codebook index

[Function] Sets the codebook index.

[Setting range] When Number of Antennas is 2, the setting range varies according to Number of Layers as follows.
Number of Layers is 1: 0 to 3
Number of Layers is 2: 0 to 2
When Number of Antennas is 4: 0 to 15

[Remarks] When Diversity Method is Tx Diversity, or Number of Antennas = 4, this parameter cannot be set.
When Diversity Method is Spatial Multiplexing and Precoding Method is Large-delay CDD (Cyclic Precoder Index), this parameter cannot be set.

NID (1)

[Function] Sets the NID (1).

[Default] 0

[Setting range] 0 to 167

[Remarks] This parameter automatically changes if Cell ID is changed.

NID (2)

[Function] Sets the NID (2).

[Default] 0

[Setting range] 0, 1, 2

[Remarks] This parameter automatically changes if Cell ID is changed.

Cell ID

[Function] Sets the Cell ID.

[Default] 0

[Setting range] 0 to 503

[Remarks] This parameter is automatically set according to NID (1) and NID (2) as follows.
Cell ID = 3 × NID (1) + NID (2)

When Cell ID is modified, NID (1) and NID (2) are automatically set.
If Test Model is set other than OFF from OFF, Cell ID is initialized to 1.

Initial Frame Number

[Function] This sets the initial frame number for wave generation.
[Default] 0
[Setting range] 1 to 1023
[Resolution] 1
[Remarks] If Test Model is set other than OFF from OFF, Initial Frame Number is initialized to 1.

Number of Frames

[Function] Sets the number of frames to be generated.
[Default] 1
[Setting range] 1 to the maximum number of frames that can be stored in the equipment's waveform memory.
[Resolution] 1
[Remarks] Setting Number of Frames of one Component Carrier sets the same Number of Frames to other Component Carriers of the same Band.

The maximum number of frames is determined as follows.
Maximum number of frames = Maximum number of samples that can be stored in the main unit's waveform memory / number of samples per frame

Number of samples per frame:

19200 × Oversampling Ratio samples when Bandwidth is 1.4 MHz
38400 × Oversampling Ratio samples when Bandwidth is 3 MHz
76800 × Oversampling Ratio samples when Bandwidth is 5 MHz
153600 × Oversampling Ratio samples when Bandwidth is 10 MHz
153600 × Oversampling Ratio samples when Bandwidth is 15 MHz
307200 × Oversampling Ratio samples when Bandwidth is 20 MHz

When two or more Component Carriers are enabled or Freq Offset of Component Carrier is not 0.0000 [MHz], Oversampling Ratio is determined as follows:

When Bandwidth is 1.4 MHz	80
When Bandwidth is 3 MHz	40
When Bandwidth is 5 MHz	20
When Bandwidth is 10 MHz	10
When Bandwidth is 15 MHz	10
When Bandwidth is 20 MHz	5

Oversampling Ratio

[Function] Sets the oversampling ratio.

[Default] 2

[Setting range] 1, 2, 4

[Remarks] It is recommended that you set the value of 2 or greater. This parameter cannot be set to 1 and 4 in the case of PRACH.
When two or more Component Carriers are enabled, Oversampling Ratio of each Component Carrier is fixed to 1.
When Freq Offset of Component Carrier is not 0.0000 [MHz], Oversampling Ratio of each Component Carrier is Fixed to 1.

Sampling Rate

[Function] Displays the sampling rate.

[Default] 15.36 [MHz]

[Setting range] The setting range differs depending on the bandwidth.
1.92 × Oversampling Ratio [MHz] when Bandwidth is 1.4 MHz
3.84 × Oversampling Ratio [MHz]s when Bandwidth is 3 MHz
7.68 × Oversampling Ratio [MHz]s when Bandwidth is 5 MHz
15.36 × Oversampling Ratio [MHz] when Bandwidth is 10 MHz
15.36 × Oversampling Ratio [MHz] when Bandwidth is 15 MHz
30.72 × Oversampling Ratio [MHz] when Bandwidth is 20 MHz

[Remarks] This parameter cannot be set. It is automatically set according to the Oversampling Ratio and Bandwidth values.

Bandwidth

[Function] Sets the system bandwidth.

[Default] 5 [MHz]

[Setting range] 1.4, 3, 5, 10, 15, 20 [MHz]

[Remarks] The 1.6 and 3.2 MHz settings are not available for IQproducer Version 10.00 or later. In addition, parameter files for versions earlier than IQproducer Version 10.00 in which 1.6 or 3.2 MHz is specified cannot be read.

Uplink-downlink Configuration

[Function] This command sets the Uplink-downlink Configuration.
[Default] 0
[Setting range] 0, 1, 2, 3, 4, 5, 6
[Remarks] The setting is fixed to 3 when Test Model is set other than OFF.

Special Subframe Configuration

[Function] This command sets the Special Subframe Configuration.
[Default] 0
[Setting range] 0 to 8
[Remarks] The setting range varies depending on the Cyclic Prefix setting as follows:
Cyclic Prefix set to Normal: 0 to 8
Cyclic Prefix set to Extended: 0 to 6
The setting is fixed to 8 when Test Model is set other than OFF.

Cyclic Prefix

[Function] Sets the cyclic prefix.
[Default] Normal
[Setting range] Normal, Extended
[Remarks] The setting is fixed to Normal when Test Model is set other than OFF or PRACH.

Subcarrier Spacing

[Function] Displays the subcarrier spacing (interval).
[Default] 15 [kHz]
[Remarks] When PRACH and Preamble Format is 0, 1, 2, 3:
1.25 [kHz]
When PRACH and Preamble Format is 4:
7.5 [kHz]

Number of OFDM symbols per slot

[Function] Sets the number of OFDM symbols per slot.
[Default] 7 [Symbol]
[Display range] 6, 7 [Symbol]
[Remarks] This parameter cannot be set.
When Cyclic Prefix is Normal: 7 [Symbol]
When Cyclic Prefix is Extended: 6 [Symbol]

Roll off length

[Function] Sets the length of the ramp time applied to the OFDM symbol.

[Default] 0 [Ts] (Ts = 1/ (15,000 × 2,048) seconds)

[Setting range] 0 to 3152 [Ts]

[Resolution] 1 [Ts]

[Remarks] The maximum value of the setting range is 144 when Cyclic Prefix is Normal, 512 when Cyclic Prefix is Extended. Also the maximum value of the setting range is 432 in the case of PRACH.

Filter

Filter Type

[Function] Sets the filter type.

[Default] Ideal

[Setting range] Nyquist, Root Nyquist, Ideal, None

[Remarks] This parameter is fixed to None in the case of PRACH.

Roll Off

[Function] Sets the roll-off factor.

[Default] 0.5

[Setting range] 0.1 to 1.0

[Resolution] 0.1

[Remarks] This parameter cannot be set when Filter Type is set to Ideal or None.

3.1.5 PHY/MAC parameters (Downlink)

The items displayed in the PHY/MAC parameter list when Downlink is selected for Downlink/Uplink in the common parameter list are described below.

3.1.5.1 Downlink

When a Downlink is selected in the tree view, the following item is displayed in the PHY/MAC parameter list.

PHICH duration

[Function] Sets the PHICH area.

[Setting range] Normal, Extended

[Remarks] When the setting of Subframe is the following, PHICH duration is fixed to Normal.

■Subframe is 1, 6

Number of OFDM symbols for PDCCH = 1

■Subframe is not 1, 6

Number of OFDM symbols for PDCCH = 1, 2

Ng

[Function] Sets the parameter (Ng) for determining the PHICH arrangement.

[Default] 1/6

[Setting range] 1/6, 1/2, 1, 2

[Remarks] If Test Model is not OFF, this parameter is set to 1/6 and cannot be changed.

3.1.5.2 Reference signal

When Reference signal is selected in the tree view, the following items are displayed in the PHY/MAC parameter list.

Frequency Shift Value

[Function] Displays the amount of frequency shift.
[Default] 0
[Setting range] 0, 1, 2, 3, 4, 5
[Remarks] The value of this parameter is automatically set depending on the Cell ID setting as follows:
Frequency Shift Value = Cell ID mod 6

Power Boosting

[Function] Sets the transmission power.
[Default] 0.000 [dB]
[Setting range] –20.000 to +20.000 [dB]
[Resolution] 0.001 [dB]

3.1.5.3 PBCH

When PBCH is selected in the tree view, the following items are displayed in the PHY/MAC parameter list.

Data Status

[Function] Enables or disables the PBCH parameter.
[Default] Enable
[Setting range] Disable, Enable
[Remarks] When Disable is selected, all PBCH parameters are disabled.

Data Type

[Function] Sets the Data type.
[Default] PN9fix
[Setting range] PN9fix, PN15fix, 16 bit repeat, User File, BCH
[Remarks] BCH is displayed when only BCH is at Data Type.

Data Type Repeat Data

[Function] Sets the 16-bit repeat data to be inserted into the PBCH.
[Default] 0000
[Setting range] 0000 to FFFF
[Remarks] This parameter is displayed only when 16 bit repeat is selected for Data Type.

Data Type User File
[Function] Sets the user file to be inserted into the PBCH.
[Setting range] Any file can be selected.
[Remarks] This parameter is displayed only when User File is selected for Data Type. Refer to Appendix B "User File Format" for details on the user file format.

Power Boosting
[Function] Sets the transmission power.
[Default] 0.000 [dB]
[Setting range] –20.000 to +20.000 [dB]
[Resolution] 0.001 [dB]

BCH

When BCH is selected for Data Type of PBCH, BCH can be set as the payload data of PBCH.

Transport Block Size
[Function] Sets the transport block size of BCH.
[Default] 0 [bit]
[Setting range] When Cyclic Prefix is set to Normal: 0 to 1920 [bit]
When Cyclic Prefix is set to Extended: 0 to 1728 [bit]
When BCCH is selected for BCH Data Type, the setting is fixed to 24 [bit].

Data Type
[Function] Sets the BCH Data type.
[Default] PN9fix
[Setting range] PN9fix, PN15fix, 16 bit repeat, User File, BCCH

Data Type Repeat Data
[Function] Sets the 16-bit repeat data to be inserted into the BCH.
[Default] 0000
[Setting range] 0000 to FFFF
[Remarks] This parameter is displayed only when 16 bit repeat is selected for Data Type.

Data Type User File
[Function] Sets the user file to be inserted into the BCH.
[Setting range] Any file can be selected.
[Remarks] This parameter is displayed only when User File is selected for Data Type. Refer to Appendix B "User File Format" for details on the user file format.

DL Bandwidth

[Function] Displays data mapped to BCCH.

[Setting range] n6, n15, n25, n50, n75, n100

[Remarks]

When Bandwidth is 1.4 MHz	n6
When Bandwidth is 3 MHz	n15
When Bandwidth is 5 MHz	n25
When Bandwidth is 10 MHz	n50
When Bandwidth is 15 MHz	n75
When Bandwidth is 20 MHz	n100

This is only displayed when BCCH is selected for Data Type of BCH.

PHICH duration

[Function] Displays the PHICH duration mapped to BCCH.

[Setting range] Normal, Extended

[Remarks] This is only displayed when BCCH is selected for Data Type of BCH.

Ng

[Function] Displays the Ng value mapped to BCCH.

[Setting range] 1/6, 1/2, 1, 2

[Remarks] This is only displayed when BCCH is selected for Data Type of BCH.

3.1.5.4 Synchronization signals

When Synchronization signal is selected in the tree view, the following items are displayed in the PHY/MAC parameter list.

Primary synchronization signal

Data Status

[Function] Enables or disables the Primary synchronization signal parameter.
[Default] Enable
[Setting range] Disable, Enable
[Remarks] If Number of Antennas is set to 2 or 4, the settings are displayed for each antenna port. For antenna ports for which **Disable** is selected, all parameters except Data Status are disabled.

Power Boosting

[Function] Sets the transmission power.
[Default] 0.000 [dB]
[Setting range] –20.000 to +20.000 [dB]
[Resolution] 0.001 [dB]
[Remarks] If Number of Antennas is set to 2 or 4, the settings are displayed for each antenna port.

Secondary synchronization signal

Data Status

[Function] Enables or disables the Secondary synchronization signal parameter.
[Default] Enable
[Setting range] Disable, Enable
[Remarks] If Number of Antennas is set to 2 or 4, the settings are displayed for each antenna port. For antenna ports for which **Disable** is selected, all parameters except Data Status are disabled.

Power Boosting

[Function] Sets the transmission power.
[Default] 0.000 [dB]
[Setting range] –20.000 to +20.000 [dB]
[Resolution] 0.001 [dB]
[Remarks] If Number of Antennas is set to 2 or 4, the settings are displayed for each antenna port.

3.1.5.5 Subframe #0 to #9

When Subframe #0 to #9 is selected in the tree view, the following item is displayed in the PHY/MAC parameter list.

Subframe Type

[Function] Displays the Subframe type.

[Default] See Table 3.1.5.5-1.

[Setting range] Downlink, Uplink, Special

[Remarks] This parameter is fixed and cannot be altered.

Figure 3.1.5.5-1 Subframe Type

Subframe	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
0	D	D	D	D	D	D	D
1	S	S	S	S	S	S	S
2	U	U	U	U	U	U	U
3	U	U	D	U	U	D	U
4	U	D	D	U	D	D	U
5	D	D	D	D	D	D	D
6	S	S	S	D	D	D	S
7	U	U	U	D	D	D	U
8	U	U	D	D	D	D	U
9	U	D	D	D	D	D	D

D indicates Downlink Subframe, U indicates Uplink Subframe, and S indicates Special Subframe. Downlink Subframe is displayed when Downlink/Uplink is set to Downlink, Uplink Subframe is displayed when Downlink/Uplink is set to Uplink.

Virtual Resource Block type

[Function] Sets the Virtual Resource Block Type.

[Default] Localized

[Setting range] Localized, Distributed

[Remarks] If Virtual Resource Block type is Localized, Gap, Gap value, and Number of VRBs cannot be set.

Gap

[Function] Sets Gap.

[Default] 1st Gap

[Setting range] 1st Gap, 2nd Gap

[Remarks] If Bandwidth is 1.4 MHz, 3 MHz, or 5 MHz, 1st Gap is displayed and Gap cannot be set.
If Bandwidth is 10 MHz, 15 MHz, or 20 MHz, 1st Gap or 2nd Gap can be set.

Gap value

[Function] Displays Gap value.

[Setting range] 3 to 48

Number of VRBs

[Function] Displays the number of VRB.

[Setting range] 6 to 96

PHICH

[Function] Enables or disables the PHICH.

[Default] OFF

[Setting range] ON, OFF

[Remarks] According to the Uplink-downlink Configuration setting, this parameter is set to **OFF** for the following subframes and these subframes are disabled.

Table 3.1.5.5-2 Disabled Subframes

Uplink-downlink Configuration	Disabled Subframes
0	—
1	0, 5
2	0, 1, 4, 5, 6, 9
3	1, 5, 6, 7
4	0, 1, 4, 5, 6, 7
5	0, 1, 3, 4, 5, 6, 7, 9
6	—

Number of PHICH Groups

[Function] Displays the number of PHICH groups per subframe.

[Remarks] This value is determined by the combination of the Bandwidth, Ng, and Cyclic Prefix settings. This parameter is fixed to 0 if PHICH is **OFF**.

Number of OFDM symbols for PDCCH

[Function] This command sets the number of symbols for PDCCH.

[Default] 1[Symbol]

[Setting range] 1 to 4[Symbol]

[Remarks] Changing this parameter automatically changes the value of CFI of PCFICH.

The setting range varies depending on the Bandwidth setting as follows:

If Bandwidth is 1.4 MHz:

For Subframes #1 and #6: 2 (symbols)

For other subframes: 2 to 4 (symbols)

If Bandwidth is not 1.4 MHz:

For Subframes #1 and #6: 1 or 2 (symbols)

For other subframes: 1 to 3 (symbols)

Total Number of CCEs

[Function] Displays a total number of CCE in the controlled area in subframe.

[Remarks] This parameter cannot be changed because the total number of CCE is determined by the setting of Bandwidth and Number of OFDM symbols for PDCCH.

Number of PDCCHs

[Function] Sets the number of PDCCHs.

[Default] 1

[Setting range] 1 to 64

[Resolution] 1

[Remarks] The maximum value of setting range is a total number of CCEs. However, the maximum value of the setting range is 64 when a total number of CCEs is above 64.

CCE arrangement

[Function] Sets the CCE allocation.

[Setting range] PDCCH#0 to (Number of PDCCHs – 1), dummy

[Remarks] Double-clicking the PHY/MAC parameter list area displays the CCE arrangement setting window (see Figure 3.1.4.5-1). On this window, PDCCH which is assigned to each CCE is set. The number of CCE to be allocated varies according to the PDCCH format. PDCCHs which are not assigned are set to “dummy”. PDCCHs which are not assigned are not mapped onto Resource Element even if the PDCCH parameter is set using the PHY/MAC parameter list.

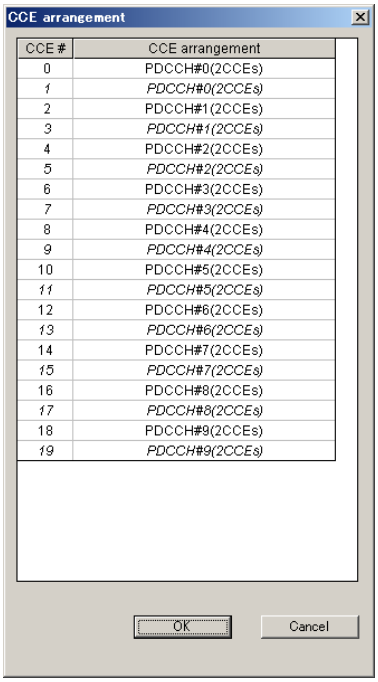


Figure 3.1.5.5-1 CCE arrangement setting window

Number of PDSCHs

[Function] Sets the number of PDSCHs.

[Default] 1

[Setting range] 1 to 64

[Resolution] 1

[Remarks] The setting range differs depending on the bandwidth.
The maximum settable value must be the total number of resource blocks for each bandwidth, but it is 64 if the total number of resource blocks exceeds 64.
Table 3.1.4.4-3 shows the total number of resource blocks for each bandwidth.

Table 3.1.5.5-3 Total number of resource blocks

Bandwidth	Total number of resource blocks
1.4 MHz	6
3 MHz	15
5 MHz	25
10 MHz	50
15 MHz	75
20 MHz	100

RB arrangement

[Function] Sets the PDSCH allocation to RB.

[Setting range] PDSCH#0 to (Number of PDSCHs – 1)

[Remarks] Double-clicking the PHY/MAC parameter list area displays the RB arrangement setting window (see Figure 3.1.4.5-2). In this window, PDSCH can be assigned to each RB from the list box. Note that each PDSCH that can be selected from the list box must be assigned to at least one RB.

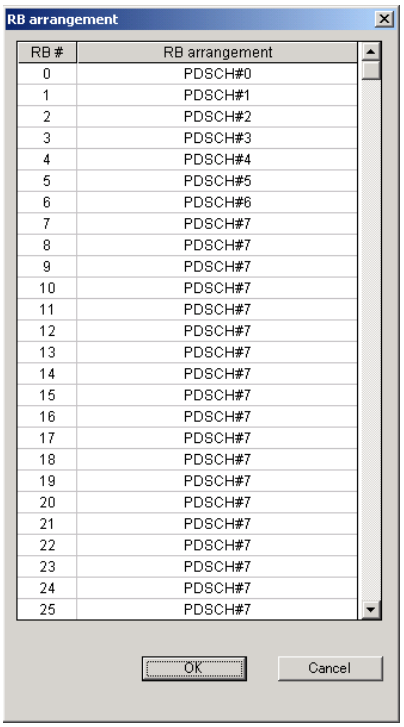


Figure 3.1.5.5-2 RB arrangement setting window

3.1.5.6 PCFICH

When a PCFICH is selected in the tree view, the following items are displayed in the PHY/MAC parameter list. The setting items are common to Subframes #0 to #9.

Data Status

[Function] Enables or disables the PCFICH parameter.
[Default] Enable
[Setting range] Disable, Enable
[Remarks] When Disable is selected, all PCFICH parameters are disabled.

Data Type

[Function] Sets the type of data to map to PCFICH.
[Default] CFI codeword
[Setting range] CFI codeword, PN9fix, PN15fix, 16 bit repeat, User File

CFI

[Function] Sets the CFI codeword type.
[Default] 1
[Setting range] 1, 2, 3
[Remarks] This parameter is displayed only when CFI codeword is selected for Data Type.
It changes automatically according to Number of OFDM symbols for PDCCH of PDCCH and cannot be altered.
■ When Bandwidth is 1.4 MHz:
When Number of OFDM symbols for PDCCH is 2: 1
When Number of OFDM symbols for PDCCH is 3: 2
When Number of OFDM symbols for PDCCH is 4: 3
■ When Bandwidth is other than 1.4 MHz:
When Number of OFDM symbols for PDCCH is 1: 1
When Number of OFDM symbols for PDCCH is 2: 2
When Number of OFDM symbols for PDCCH is 3: 3

Data Type Repeat Data

[Function] Sets the 16-bit repeat data to be inserted into the PCFICH.
[Default] 0000
[Setting range] 0000 to FFFF
[Remarks] This parameter is displayed only when 16 bit repeat is selected for Data Type.

Data Type User File

[Function] Sets the user file to be inserted into the PCFICH.

[Setting range] Any file can be selected.

[Remarks] This parameter is displayed only when User File is selected for Data Type. Refer to the description of "Binary data" in Appendix B "User File Format" for details on the user file format.

Power Boosting

[Function] Sets the transmission power.

[Default] 0.000 [dB]

[Setting range] –20.000 to +20.000 [dB]

[Resolution] 0.001 [dB]

3.1.5.7 PDCCH

When a PDCCH is selected in the tree view, the following items are displayed in the PHY/MAC parameter list. The setting items are common to Subframes #0 to #9.

Data Status
[Function] Enables or disables the PDCCH parameter.
[Default] Enable
[Setting range] Disable, Enable
[Remarks] When Disable is selected, all PDCCH parameters are disabled.

PDCCH format
[Function] Sets the PDCCH format.
[Default] 0
[Setting range] 0, 1, 2, 3

Data Type
[Function] Sets the type of data to map to PDCCH.
[Default] PN9fix
[Setting range] PN9fix, PN15fix, 16 bit repeat, User File, DCI

Data Type Repeat Data
[Function] Sets the 16-bit repeat data to be inserted into the PDCCH.
[Default] 0000
[Setting range] 0000 to FFFF
[Remarks] This parameter is displayed only when 16 bit repeat is selected for Data Type.

Data Type User File
[Function] Sets the user file to be inserted into the PDCCH.
[Setting range] Any file can be selected.
[Remarks] This parameter is displayed only when User File is selected for Data Type. Refer to the description of “Binary data” in Appendix B “User File Format” for details on the user file format.

Power Boosting
[Function] Sets the transmission power.
[Default] 0.000 [dB]
[Setting range] –20.000 to +20.000 [dB]
[Resolution] 0.001 [dB]

DCI

When DCI is selected for Data Type of PDCCH, DCI can be set as the data of PDCCH.

Transport Block Size

[Function] Displays the transport block size of DCI.
[Default] 0 [bit]
[Setting range] 0 to 576
[Remarks] The setting range varies depending on the PDCCH format setting as shown in Table 3.1.5.7-1 below:

Table 3.1.5.7-1 Setting ranges for Transport Block Size

PDCCH Format	Setting Ranges for Transport Block Size
0	0 to 72
1	0 to 144
2	0 to 288
3	0 to 576

Data Type

[Function] Sets the Data type to be inserted into the DCI.
[Default] PN9fix
[Setting range] PN9fix, PN15fix, 16 bit repeat, User File

Data Type Repeat Data

[Function] Sets the 16-bit repeat data to be inserted into the DCI.
[Default] 0000
[Setting range] 0000 to FFFF
[Remarks] This parameter is displayed only when 16 bit repeat is selected for Data Type.

Data Type User File

[Function] Sets the user file to be inserted into the DCI.
[Setting range] Any file can be selected.
[Remarks] This parameter is displayed only when User File is selected for Data Type. Refer to Appendix B “User File Format” for details on the user file format.

nRNTI

[Function] Sets the radio network temporary identifier.
[Default] 0000
[Setting range] 0000 to FFFF

3.1.5.8 PDSCH

When PDSCH is selected in the tree view, the following items are displayed in the PHY/MAC parameter list. Among these parameters, the settings for Modulation Scheme, Data Type, Data Type Repeat Data, Data Type User File, and DL-SCH are displayed for each code word. The setting items are common to Subframes #0 to #9.

Data Status

[Function] Enables or disables the PDSCH.
[Default] Enable
[Setting range] Disable, Enable
[Remarks] When Disable is selected, all PDSCH parameters are disabled.

nRNTI

[Function] Sets the radio network temporary identifier.
[Default] 0000
[Setting range] 0000 to FFFF

Power Boosting

[Function] Sets the transmission power.
[Default] 0.000 [dB]
[Setting range] –20.000 to +20.000 [dB]
[Resolution] 0.001 [dB]

Modulation Scheme

[Function] Sets the modulation scheme.
[Default] QPSK
[Setting range] QPSK, 16QAM, 64QAM, 256QAM

Data Type

[Function] Sets the Data type.
[Default] PN9fix
[Setting range] PN9fix, PN15fix, 16 bit repeat, User File, DL-SCH

Data Type Repeat Data

[Function] Sets the 16-bit repeat data to be inserted into the PDSCH.
[Default] 0000
[Setting range] 0000 to FFFF
[Remarks] This parameter is displayed only when 16 bit repeat is selected for Data Type.

Data Type User File
[Function] Sets the user file to be inserted into the PDSCH.
[Setting range] Any file can be selected.
[Remarks] This parameter is displayed only when User File is selected for Data Type. Refer to Appendix B "User File Format" for details on the user file format.

DL-SCH

When selecting DL-SCH at Data Type of PDSCH, DL-SCH can be set as the data of PDSCH.

Transport Block Size
[Function] Displays the transport block size of DL-SCH.
[Default] 0 [bit]
[Setting range] 0 to 150000 [bit]
[Remarks] The setting range varies depending on the PDSCH setting.

Data Type
[Function] Sets the Data type to be mapped on the DCI.
[Default] PN9fix
[Setting range] PN9fix, PN15fix, 16 bit repeat, User File

Data Type Repeat Data
[Function] Sets the 16-bit repeat data to be inserted into the DL-SCH.
[Default] 0000
[Setting range] 0000 to FFFF
[Remarks] This parameter is displayed only when 16 bit repeat is selected for Data Type.

Data Type User File
[Function] Sets the user file to be inserted into the DL-SCH.
[Setting range] Any file can be selected.
[Remarks] This parameter is displayed only when User File is selected for Data Type. Refer to Appendix B "User File Format" for details on the user file format.

UE Category
[Function] Sets the UE category.
[Default] 1
[Setting range] 1, 2, 3, 4, 5

RV Index

[Function] Sets the redundancy version index.

[Default] 0

[Setting range] 0, 1, 2, 3

3.1.5.9 PHICH Group

When PHICH is set to **On**, the items PHICH Group and PHICH are added to the tree view. When PHICH Group or PHICH is selected, the following items are displayed in the PHY/MAC parameter list.

Data Status

[Function] Enables or disables the PHICH group.

[Default] Enable

[Setting range] Disable, Enable

[Remarks] If **Disable** is selected, all PHICH Group parameters except Data Status are disabled. All PHICHs in the PHICH group are also disabled.

Number of PHICHs

[Function] Sets the number of PHICHs included in the PHICH group.

[Default] 1

[Setting range] 1 to 8 (Cyclic Prefix = Normal)
1 to 4 (Cyclic Prefix = Extended)

Power Boosting

[Function] Displays the transmission power of the PHICH group.

[Remarks] This parameter displays the total transmission power of the PHICHs in the PHICH group.

PHICH #0 to # (Number of PHICHs - 1)

The following items are displayed in the PHY/MAC parameter list when the PHICH group is selected in the tree view.

Data Status

[Function] Enables or disables the PHICH.
[Default] Enable
[Setting range] Disable, Enable
[Remarks] If **Disable** is selected, all PHICH parameters except Data Status are disabled.

Orthogonal Sequence Index

[Function] Sets the orthogonal sequence.
[Default] Same number as PCICH
[Setting range] 0 to 7 (Cyclic Prefix = Normal)
0 to 3 (Cyclic Prefix = Extended)
[Remarks] The default value of an orthogonal sequence index is the corresponding PHICH number. When a PHICH is added, however, if the number of the added PHICH is already used as the orthogonal sequence index for another PHICH, the smallest unused number is applied as the orthogonal sequence index of the added PHICH.
Also, when the orthogonal sequence index for one PHICH is changed to a value that is already used by a second PHICH, the orthogonal sequence index before change is applied as the orthogonal sequence index of the second PHICH.

Data Type

[Function] Displays type of PHICH data.
[Setting range] HI
[Remarks] Always fixed at HI.

HI

[Function] Sets the HI (HARQ indicator) code word.
[Default] 000
[Setting range] 000, 111

Power Boosting

[Function] Sets the transmission power.
[Default] 0.000 [dB]
[Setting range] –20.000 to +20.000 [dB]
[Resolution] 0.001 [dB]

3.1.6 PHY/MAC parameters (Uplink)

The items displayed in the PHY/MAC parameter list when Uplink is selected for Downlink/Uplink in the common parameter list are described below.

Data Transmission/PRACH

[Function] Selects Data Transmission or PRACH.
[Default] Data Transmission
[Setting range] Data Transmission, PRACH
[Remarks] The tree view changes depending on the selection. When System in the common parameter list is set to **LTE-Advanced**, PRACH can be set, only if Carrier Aggregation Mode is Intra-band and only Component Carrier #0 is enabled.

DMRS Parameters

[Function] Sets the calculation method of Demodulation RS parameter.
[Default] Auto
[Setting range] Auto, Manual

PUCCH Parameters

Delta PUCCH shift

[Function] Sets Delta PUCCH shift.
[Default] 1
[Setting range] 1, 2, 3

N_CS(1)

[Function] Sets the value of N_CS(1), which is the number of cyclic shifts used in the PUCCH formats 1, 1a, and 1b.
[Default] 1
[Setting range] 0 to 7

N_RB(2)

[Function] Sets the value of N_CS(2), which is the number of resource blocks used in the PUCCH formats 2, 2a, and 2b.

[Default] 1

[Setting range] 0 to 63

[Remarks] The setting range varies depending on the Bandwidth setting as follows.

Table 3.1.6-1 Setting Ranges for N_RB(2)

Bandwidth	Setting Ranges for N_RB(2)
1.4	0 to 6
3	0 to 15
5	0 to 25
10	0 to 50
15	0 to 63
20	0 to 63

3.1.6.1 Subframe #0 to #9

When Subframe #0 to #9 is selected in the tree view, the following item is displayed in the PHY/MAC parameter list.

Number of PUCCHs

[Function] Sets the number of PUCCH.
[Default] 0
[Setting range] 0 to 8
[Remarks] This parameter is always 0 for special subframes.

Number of PUSCHs

[Function] Sets the number of PUSCH.
[Default] 1
[Setting range] 0 to 8

3.1.6.2 PUCCH #0 to #7

When PUCCH #0 to #7 is selected in the tree view, the following items are displayed in the PHY/MAC parameter list.

Data Status
[Function] Enables or disables the PUCCH.
[Default] Enable
[Setting range] Disable, Enable
[Remarks] When Disable is selected, all PUCCH parameters except Data Status are disabled.

n(1)_PUCCH
[Function] Sets the resource number for PUCCH 1, 1a, and 1b.
[Default] 0
[Setting range] 0 to 764
[Remarks] The maximum setting is determined by the combination of the Bandwidth, Cyclic Shift, N_RB(2), and delta PUCCH shift settings.

n(2)_PUCCH
[Function] Sets the resource number for PUCCH 2, 2a, and 2b.
[Default] 0
[Setting range] 0 to 764
[Remarks] The maximum setting is determined by the combination of the Bandwidth, Cyclic Shift, N_CS(1), and N_RB(2) settings.

nRNTI
[Function] Sets the radio network temporary identifier.
[Default] 0000
[Setting range] 0000 to FFFF
[Remarks] This becomes available when PUCCH format is set to 2, 2a, or 2b.

PUCCH format
[Function] Sets the PUCCH format.
[Default] 1
[Setting range] 1, 1a, 1b, 2, 2a, 2b
[Remarks] 2a and 2b cannot be selected when Cyclic Prefix is Extended.

Data Type

[Function] Sets the Data type.

[Default] PN9fix

[Setting range] PN9fix, PN15fix, 16 bit repeat, User File, UCI

[Remarks] This parameter is displayed when the PUCCH format is set to 1.

Data Type Repeat Data

[Function] Sets the 16-bit repeat data to be inserted into the PUCCH.

[Default] 0000

[Setting range] 0000 to FFFF

[Remarks] This parameter is displayed only when 16 bit repeat is selected for Data Type.

Data Type User File

[Function] Sets the user file to be inserted into the PUCCH.

[Setting range] Any file can be selected.

[Remarks] This parameter is displayed only when User File is selected for Data Type. Refer to the description of “Binary data” in Appendix B “User File Format” for details on the user file format.

Group Hopping

[Function] Enables or disables group hopping.

[Default] Disable

[Setting range] Disable, Enable

Base Sequence Group Number u

[Function] Sets the base sequence group number.

[Default] 0

[Setting range] 0 to 29

[Remarks] When Group Hopping is enabled this parameter becomes invalid and cannot be set.
When DMRS Parameters is Auto, only calculated value displays and nothing can be set.

Base Sequence Number v

[Function] Displays the base sequence number.

[Setting Value] 0

[Remarks] This parameter cannot be set (fixed to 0).

Power Boosting
[Function] Sets the transmission power.
[Default] 0.000[dB]
[Setting range] –20.000 to +20.000[dB]
[Resolution] 0.001[dB]

UCI

The following items are displayed when Data Type is set to UCI.

Transport Block Size
[Function] Sets the transport block size for UCI.
[Default] 0
[Setting range] When PUCCH format is 1a: Fixed to 1
When PUCCH format is 1b: Fixed to 2
When PUCCH format is 2: 1 to 13
When PUCCH format is 2a: 2 to 14
When PUCCH format is 2b: 3 to 15

Data Type
[Function] Sets the data type.
[Default] PN9fix
[Setting range] PN9fix, PN15fix, 16 bit repeat, User File

Data Type Repeat Data
[Function] Sets the 16-bit repeat data to be inserted into the UCI.
[Default] 0000
[Setting range] 0000 to FFFF
[Remarks] This parameter is displayed only when 16 bit repeat is selected for Data Type.

Data Type User File
[Function] Sets the user file to be inserted into the UCI.
[Setting range] Any file can be selected.
[Remarks] This parameter is displayed only if User File is selected for Data Type. For details about the user file format, refer to the description of “Binary data” in Appendix B “User File Format”.

3.1.6.3 Demodulation RS for PUCCH

When Demodulation RS for PUCCH is selected in the tree view, the following items are displayed in the PHY/MAC parameter list.

Group Hopping

[Function] Enables or disables group hopping.
[Default] Disable
[Setting range] Disable, Enable

Base Sequence Group Number u

[Function] Displays the base sequence group number.
[Default] 0
[Setting range] 0 to 29
[Remarks] This parameter can be set when Group Hopping is Disable.
When DMRS Parameters is Auto, only calculated value displays and nothing can be set.

Base Sequence Number v

[Function] Displays the base sequence group number.
[Default] 0
[Remarks] This parameter cannot be set (fixed to 0).

3.1.6.4 PUSCH #0 to #7

When PUSCH #0 to #7 is selected in the tree view, the following items are displayed in the PHY/MAC parameter list.

Data Status
[Function] Enables or disables the PUSCH.
[Default] Enable
[Setting range] Disable, Enable
[Remarks] When Disable is selected, all PUSCH parameters, except for Start Number of RB and Number of RBs, are disabled.

nRNTI
[Function] Sets the radio network temporary identifier.
[Default] 0000
[Setting range] 0000 to FFFF

Modulation Scheme
[Function] Sets the modulation scheme.
[Default] QPSK
[Setting range] QPSK, 16QAM, 64QAM

Data Type
[Function] Sets the Data type to be mapped on the PUSCH.
[Default] PN9fix
[Setting range] PN9fix, PN15fix, 16 bit repeat, User File, UL-SCH

Data Type Repeat Data
[Function] Sets the 16-bit repeat data to be inserted into the PUSCH.
[Default] 0000
[Setting range] 0000 to FFFF
[Remarks] This parameter is displayed only when 16 bit repeat is selected for Data Type.

Data Type User File
[Function] Sets the user file to be inserted into the PUSCH.
[Setting range] Any file can be selected.
[Remarks] This parameter is displayed only when User File is selected for Data Type. Refer to the description of “Binary data” in Appendix B “User File Format” for details on the user file format.

Resource allocation type

[Function] Sets the Resource allocation type.

[Default] type0

[Setting range] type0, type1

[Remarks] This parameter is displayed when **System** in the common parameter list is set to **LTE-Advanced**.
When type1 is selected, the clustered PUSCH is set, and Start Number of RB and Number of RBs cannot be set.

Start Number of RB

[Function] Sets the start position of the RB to which the PUSCH is assigned.

[Default] 0

[Setting range] When Bandwidth is 1.4 MHz: 0 to 5
When Bandwidth is 3 MHz: 0 to 14
When Bandwidth is 5 MHz: 0 to 24
When Bandwidth is 10 MHz: 0 to 49
When Bandwidth is 15 MHz: 0 to 74
When Bandwidth is 20 MHz: 0 to 99

[Remarks] While **System** in the common parameter list is set to **LTE-Advanced, this parameter can be set when** Resource allocation type is type0.

Number of RBs

[Function] Sets the number of RBs for which to allocate PUSCHs.

[Default] 25
The default value is 1 if a new PUSCH is added.

[Setting range] When Bandwidth is 1.4 MHz: 1 to 6
When Bandwidth is 3 MHz: 1 to 15
When Bandwidth is 5 MHz: 1 to 25
When Bandwidth is 10 MHz: 1 to 50
When Bandwidth is 15 MHz: 1 to 75
When Bandwidth is 20 MHz: 1 to 100

[Remarks] While **System** in the common parameter list is set to **LTE-Advanced, this parameter can be set when** Resource allocation type is type0.

Note:

RBs to which PUSCH will be assigned may overlap in a subframe, depending on the settings of Start Number of RB and Number of RBs. In this event, "PUSCHs are overlapping." is displayed in the error display area and waveform pattern generation is disabled.

Start Number of RBG for 1st

[Function] Sets the start position of the RBG for 1st.

[Default] 1

[Setting range] The setting range varies depending on the Bandwidth setting as follows.

Table 3.1.6.4-1 Setting Range of Start Number of RBG for 1st

Bandwidth (Number of RBs)	Setting range*
1.4 MHz (6)	1 to 4
3 MHz (15)	1 to 6
5 MHz (25)	1 to 11
10 MHz (50)	1 to 15
15 MHz (75)	1 to 17
20 MHz (100)	1 to 23

*: The maximum value of the setting range is smaller than End Number of RBG for 1st + 1.

[Remarks] This parameter can be set when **System** in the common parameter list is set to **LTE-Advanced and** Resource allocation type is type1.
The RBG Size (number of RBs to be mapped) for each bandwidth is as follows.

Table 3.1.6.4-2 Bandwidth versus RBG Size

Bandwidth (Number of RBs)	RBG Size
1.4 MHz (6)	1
3 MHz (15)	2
5 MHz (25)	2
10 MHz (50)	3
15 MHz (75)	4
20 MHz (100)	4

End Number of RBG for 1st

[Function] Sets the end position of the RBG for 1st.

[Default] The default varies depending on the Bandwidth setting as follows.

[Setting range] The setting range varies depending on the Bandwidth setting as follows.

Table 3.1.6.4-3 Default and Setting Range of End Number of RBG for 1st

Bandwidth (Number of RBs)	Setting range*	Default
1.4 MHz (6)	1 to 4	3
3 MHz (15)	1 to 6	3
5 MHz (25)	1 to 11	6
10 MHz (50)	1 to 15	8
15 MHz (75)	1 to 17	8
20 MHz (100)	1 to 23	12

*: The maximum value of the setting range is smaller than End Number of RBG for 1st – 1.

[Remarks] This parameter can be set when **System** in the common parameter list is set to **LTE-Advanced and** Resource allocation type is type1.

Start Number of RBG for 2nd

[Function] Sets the start position of the RBG for 2nd.

[Default] The default varies depending on the Bandwidth setting as follows.

[Setting range] The setting range varies depending on the Bandwidth setting as follows.

Table 3.1.6.4-4 Default and Setting Range of Start Number of RBG for 2nd

Bandwidth (Number of RBs)	Setting range*	Default
1.4 MHz (6)	3 to 6	5
3 MHz (15)	3 to 8	5
5 MHz (25)	3 to 13	8
10 MHz (50)	3 to 17	10
15 MHz (75)	3 to 19	10
20 MHz (100)	3 to 25	14

*: The maximum value of the setting range is smaller than End Number of RBG for 2nd + 1.

[Remarks] This parameter can be set when **System** in the common parameter list is set to **LTE-Advanced and** Resource allocation type is type1.

End Number of RBG for 2nd

[Function] Sets the end position of the RBG for 2nd.

[Default] The default varies depending on the Bandwidth setting as follows.

[Setting range] The setting range varies depending on the Bandwidth setting as follows.

Table 3.1.6.4-5 Default and Setting Range of End Number of RBG for 2nd

Bandwidth (Number of RBs)	Setting range	Default
1.4 MHz (6)	3 to 6	6
3 MHz (15)	3 to 8	8
5 MHz (25)	3 to 13	13
10 MHz (50)	3 to 17	17
15 MHz (75)	3 to 19	19
20 MHz (100)	3 to 25	25

[Remarks] This parameter can be set when **System** in the common parameter list is set to **LTE-Advanced and** Resource allocation type is type1.

Power Boosting
[Function] Sets the transmission power.
[Default] 0.000[dB]
[Setting range] –20.000 to +20.000[dB]
[Resolution] 0.001[dB]

UL-SCH

When selecting UL-SCH for Data Type of PUSCH, UL-SCH can be set as the PUSCH data.

Transport Block Size
[Function] Sets the UL-SCH Transport Block size.
[Default] 0
[Setting range] 0 to 86400
[Remarks] The setting range varies depending on the PUSCH setting.

Data Type
[Function] Sets the Data type to be mapped on the UL-SCH.
[Default] PN9fix
[Setting range] PN9fix, PN15fix, 16 bit repeat, User File

Data Type Repeat Data
[Function] Sets the 16-bit repeat data to insert into UL-SCH.
[Default] 0000
[Setting range] 0000 to FFFF
[Remarks] This parameter is displayed only if 16 bit repeat is selected for Data Type.

Data Type User File
[Function] Sets the user file to insert into UL-SCH.
[Setting range] Any file can be selected.
[Remarks] This parameter is displayed only when User File is selected for Data Type. For details about the user file format, refer to the description of “Binary data” in Appendix B “User File Format”.

RV Index
[Function] Sets the redundancy version index.
[Default] 0
[Setting range] 0, 1, 2, 3

HARQ-ACK

Data Status
[Function] This enables or disables HARQ-ACK.
[Default] Disable
[Setting range] Disable, Enable
[Remarks] When Disable is selected, HARQ-ACK parameters are disabled.

Data Type
[Function] Sets the Data type to be inserted into the HARQ-ACK.
[Default] ACK
[Setting range] ACK, NACK, ACK-ACK, ACK-NACK, NACK-ACK, NACK-NACK

Total Number of Coded Bits
[Function] Sets the number of bits after HARQ-ACK encoding.
[Default] 2
[Setting range] 0 to Number of RBs × 288

RI

Data Status
[Function] Enables or disables the RI.
[Default] Disable
[Setting range] Disable, Enable
[Remarks] When Disable is selected, all RI parameters are disabled.

Data Type
[Function] Sets the Data type to be inserted into the RI.
[Default] 1(1bit)
[Setting range] 1(1bit), 2(1bit), 1(2bits), 2(2bits), 3(2bits), 4(2bits)

Total Number of Coded Bits
[Function] Sets the number of bits after RI encoding.
[Default] 2
[Setting range] 0 to Number of RBs × 288

CQI/PMI

Data Status
[Function] Enables or disables the CQI/PMI.
[Default] Disable
[Setting range] Disable, Enable
[Remarks] When Disable is selected, CQI/PMI parameters are disabled.

Data Type
[Function] Sets the Data type to be inserted into the CQI/PMI.
[Default] PN9fix
[Setting range] PN9fix, PN15fix, 16 bit repeat, User File

Data Type Repeat Data
[Function] Sets the 16-bit repeat data to be inserted into the CQI/PMI.
[Default] 0000
[Setting range] 0000 to FFFF
[Remarks] This parameter is displayed only when 16 bit repeat is selected for Data Type.

Data Type User File
[Function] Sets the User type to be inserted into the CQI/PMI.
[Setting range] Any file can be selected.
[Remarks] This parameter is displayed only when User File is selected for Data Type. Refer to Appendix B "User File Format" for details on the user file format.

Total Number of Coded Bits
[Function] Sets the number of bits after CQI/PMI encoding.
[Default] 32
[Setting range] 0 to 86400

3.1.6.5 Demodulation RS for PUSCH

When Demodulation RS for PUSCH is selected in the tree view, the following items are displayed in the PHY/MAC parameter list. Note, however, that these items are not displayed for special subframes.

Group Hopping
[Function] Enables or disables group hopping.
[Default] Disable
[Setting range] Disable, Enable

Sequence Hopping
[Function] Enables or disables Sequence Hopping.
[Default] Disable
[Setting range] Disable, Enable
[Remarks] This parameter is valid if Number of RBs is 6 or more for PUSCH. However, this parameter is invalid if Group Hopping is **Enable**.

Delta ss

[Function] Sets Delta ss.

[Default] 0

[Setting range] 0 to 29

[Remarks] This parameter can be set if either Group Hopping or Sequence Hopping is **Enable**.
When DMRS Parameters is Auto, only calculated value displays and nothing can be set.

Base Sequence Group Number u

[Function] Sets the base sequence group number.

[Default] 0

[Setting range] 0 to 29

[Remarks] This parameter can be set when Group Hopping is Disable.
When DMRS Parameters is Auto, only calculated value displays and nothing can be set.

Base Sequence Number v

[Function] Sets the base sequence number.

[Default] 0

[Setting range] 0, 1

[Remarks] This parameter is fixed to 0 if Number of RBs is set to a value smaller than 6.
This parameter can be set to 0 or 1 if Number of RBs is 6 or more. However, this parameter cannot be set if Group Hopping is **Enable**.
Also, this parameter is invalid if Sequence Hopping is **Enable**.

Cyclic Shift 1st slot

n_cs

[Function] Sets n_{cs} for the first slot of Demodulation RS.

[Default] 0

[Setting range] 0 to 11

[Remarks] When DMRS Parameters is Auto, only calculated value displays and nothing can be set.

alpha

[Function] Displays the cyclic shift of the first slot of Demodulation RS.

[Remarks] The alpha value is calculated using the following equation, and the result is displayed to the 5th decimal point.
alpha = 2 × pi × n_cs/12

Cyclic Shift 2nd slot

n_cs

[Function] Sets ncs for the second slot of Demodulation RS.

[Default] 0

[Setting range] 0 to 11

[Remarks] When DMRS Parameters is Auto, only calculated value displays and nothing can be set.

alpha

[Function] Displays the cyclic shift of the second slot of Demodulation RS.

[Remarks] The alpha value is calculated using the following equation, and the result is displayed to the 5th decimal point.
alpha = 2 × pi × n_cs/12

3.1.6.6 PRACH

When **PRACH** is selected in the tree view, the following items are displayed in the PHY/MAC parameter list.

PRACH Configuration

[Function] Sets the transmission timing for PRACH.

[Default] 0

[Setting range] 0 to 57

[Remarks] The settable values for PRACH Configuration are determined according to Uplink-downlink Configuration as the table below.
However, the setup of PRACH Configuration from 48 to 57 is only available in the following conditions:
Special Subframe Configuration is from 5 to 8.
Additionally, if the Uplink-downlink Configuration is changed, it is automatically initialized to 0.

Table 3.1.6.6-1 Settable values for PRACH Configuration

Uplink-downlink Configuration	Settable values for PRACH Configuration
0	0 to 10, 12 to 18, 20 to 57
1	0 to 7, 9 to 12, 15 to 39, 48 to 57
2	0 to 4, 6, 9, 10, 12, 15, 16, 18, 48 to 57
3	0 to 9, 12 to 18, 20, 21, 23, 25 to 31, 33, 35 to 41, 43, 45 to 49, 51, 53 to 57
4	0 to 4, 6, 9, 10, 12, 15, 16, 18, 20, 21, 23, 25 to 31, 33, 35 to 39, 48, 49, 51, 53 to 57
5	0, 1, 3, 6, 9, 12, 15, 18, 48, 49, 51, 53 to 57
6	0 to 15, 18 to 41, 43, 45 to 57

Number of PRACH Resources

[Function] Displays the number of PRACH Resources.

[Default] 1

[Remarks] Number of PRACH Resources is depending on the PRACH Configuration. For setting conditions for PRACH Configuration, refer to the remarks of this parameter.
Refer to Appendix C “PRACH Parameter” for details of Number of PRACH Resources.

3.1.6.7 PRACH Resource #0 to #5

Data Status

[Function] Enables or disables the PRACH Resource #.

[Default] Enable

[Setting range] Disable, Enable

[Remarks] When Disable is selected, all PRACH Resource parameters except Data Status are disabled.

Preamble Format

[Function] Displays the Preamble Format which decides the length in the time axis of PRACH Resource #.

[Default] 0

[Display range] 0 to 4

[Remarks] Preamble Format is depending on the PRACH Configuration. For setting conditions for PRACH Configuration, refer to the remarks of this parameter. Refer to Appendix C “PRACH Parameter” for details of Preamble Format.

Frequency Resource Index

[Function] Displays Frequency Resource Index which decides the position in the frequency axis of PRACH Resource #.

[Default] 0

[Remarks] Frequency Resource Index is depending on the PRACH Configuration, Uplink-downlink Configuration, PRACH Resource#. For setting conditions for PRACH Configuration, refer to the remarks of this parameter. Refer to Appendix C “PRACH Parameter” for details of Frequency Resource Index.

Transmit Frame

[Function] Displays Transmit Frame which decides the arrangement method of PRACH Resource# in the frame.

[Default] Even

[Display range] Even, Odd, All

[Remarks] Transmit Frame is depending on the PRACH Configuration, Uplink-downlink Configuration, PRACH Resource#. For setting conditions for PRACH Configuration, refer to the remarks of this parameter. Refer to Appendix C “PRACH Parameter” for details of Transmit Frame.

Subframe Number

[Function] Displays the subframe number that PRACH Resource# transmits.

[Default] 4

[Remarks] Subframe Number is depending on the PRACH Configuration, Uplink-downlink Configuration, PRACH Resource#. For setting conditions for PRACH Configuration, refer to the remarks of this parameter. Refer to Appendix C "PRACH Parameter" for details of Subframe Number.

Logical Root Sequence Number

[Function] Sets Logical Root Sequence Number that decides the value of Physical Root Sequence Number.

[Default] 0

[Setting range] When Preamble Format is 0, 1, 2, 3: 0 to 837
When Preamble Format is 4: 0 to 137

[Remarks] When Preamble Format is changed, it is initialized to 0.

Physical Root Sequence Number

[Function] Displays Physical Root Sequence Number used to calculate Cyclic Shift value.

[Default] 129

[Remarks] Physical Root Sequence Number is depending on the Logical Root Sequence Number.
Refer to Appendix C "PRACH Parameter" for details.

Cyclic Shift Set

[Function] Sets how to calculate Cyclic Shift value.

[Default] Unrestricted

[Setting range] Unrestricted, Restricted

v

[Function] Sets v value used to calculate Cyclic Shift value.

[Default] 0

[Setting range] 0 to 63

[Remarks] The maximum v value changes according to Preamble Format, Cyclic Shift, and Zero Correlation Zone Config. If the maximum v value is 0, the setting is unavailable.

Zero Correlation Zone Config

[Function] Sets Zero Correlation Zone Config used to calculate Cyclic Shift value.

[Default] 0

[Setting range] When Preamble Format is 0, 1, 2, 3 and Cyclic Shift Set is Unrestricted: 0 to 15
When Preamble Format is 0, 1, 2, 3 and Cyclic Shift Set is Restricted: 0 to 14
When Preamble Format is 4: 0 to 6

[Remarks] When Preamble Format or Cyclic Shift Set is changed, it is initialized to 0.

Cyclic Shift Value

[Function] Displays the Cyclic Shift Value.

[Default] 0

[Display range] 0 to 838

[Remarks] Cyclic Shift Value is depending on the Cyclic Shift Set, v, Zero Correlation Zone Config, Logical Root Sequence Number.

Frequency Offset

[Function] Sets the Frequency Offset of the PRACH Resource #.

[Default] 0

[Setting range]

When Bandwidth is 1.4 MHz	0
When Bandwidth is 3 MHz	0 to 9
When Bandwidth is 5 MHz	0 to 19
When Bandwidth is 10 MHz	0 to 44
When Bandwidth is 15 MHz	0 to 69
When Bandwidth is 20 MHz	0 to 94

[Remarks] When Bandwidth is changed, it is initialized to 0.
This parameter cannot be set if Preamble Format is set to 4.

Initial Power Boosting

[Function] Sets the initial power of PRACH Resource #.

[Default] 0.000 [dB]

[Setting range] –10.000 to 10.000 [dB]

[Resolution] 0.001 [dB]

Power Ramping Step Size

[Function] Sets the amount of power to be increased each time a PRACH is transmitted.

[Default] 0.000 [dB]

[Setting range] –10.000 to 10.000 [dB]

[Resolution] 0.001 [dB]

3.1.7 Frame Structure screen

Note:

The Frame Structure screen is not available when Test Model is not set to OFF.

When Show Frame Structure is selected from the **Edit** menu or the  tool button is clicked on the main screen, the Frame Structure screen shown in Figure 3.1.6-1 is displayed. The Frame Structure screen displays a diagram showing which resource element is currently assigned for each of the channels. However, when Number of Antennas is 2 or 4, the Frame Structure and Power Graph of Antenna Port selected with the Antenna Port select button. Each channel is represented with a different color and on a UE basis for PDSCH and PUSCH. Also, a red frame indicates channels with which an error has occurred, such as when the same resource block is assigned to different uplink PUSCHs.

When System in the common parameter list is set to **LTE-Advanced**, the Frame Structure screen and Power graph screen display the data specified by Antenna Port select button, Band select button, and Component Carrier select button.

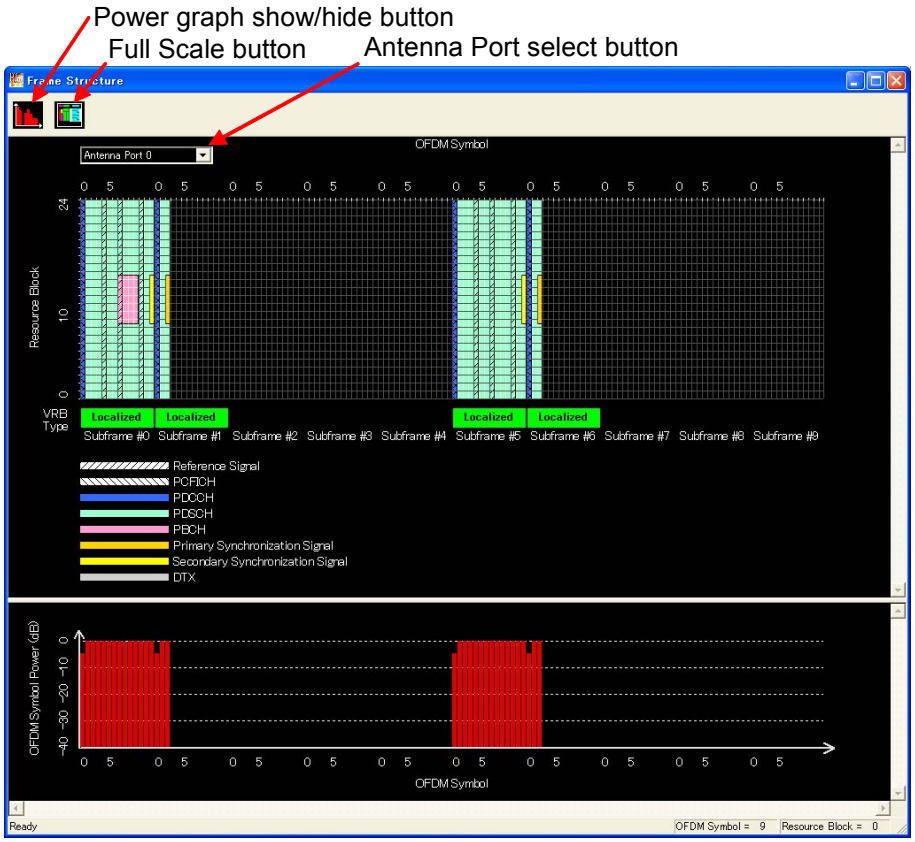


Figure 3.1.7-1 Frame Structure screen and power graph

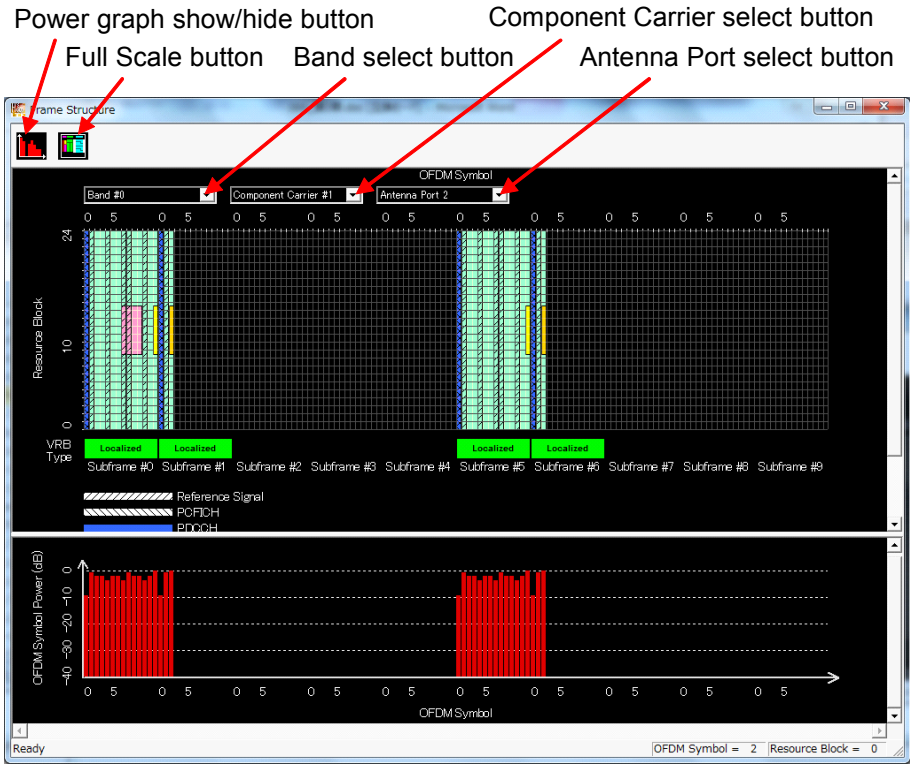


Figure 3.1.7-2 Frame Structure screen and power graph (LTE-Advanced)

3.1.7.1 Frame Structure screen

On the Frame Structure screen, the vertical axis represents the frequency in resource block units, and the horizontal axis represents the time in OFDM symbol units. In the Full Scale mode, the structure of one frame (Subframes #0 to #9) is displayed, and the scale can be enlarged by selecting the desired area with the cursor (see Figure 3.1.7.1-1). Clicking the Full Scale button returns the scale to the original one-frame display. The settings and other information concerning each of the channels can be displayed by right-clicking the channel with the cursor and selecting **Properties** from the pop-up menu.

Power graph

The power graph can be shown and hidden by clicking the show/hide button on the upper left corner of the Frame Structure screen. The vertical axis of the power graph represents the power, relative to the OFDM Symbol at the maximum power that is given a value of 0 dB. The horizontal axis represents the time, in accordance with the time axis of the Frame Structure screen.

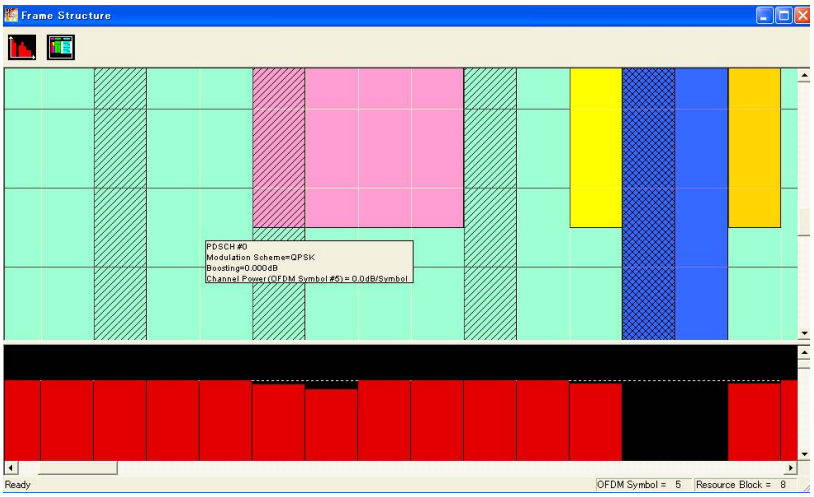


Figure 3.1.7.1-1 Enlarged display of Frame Structure screen

Random Access Preamble

Figure 3.1.7.1-2 shows Frame Structure screen in Uplink PRACH.

The frame number can be selected from the drop-down list at the upper left of the screen.

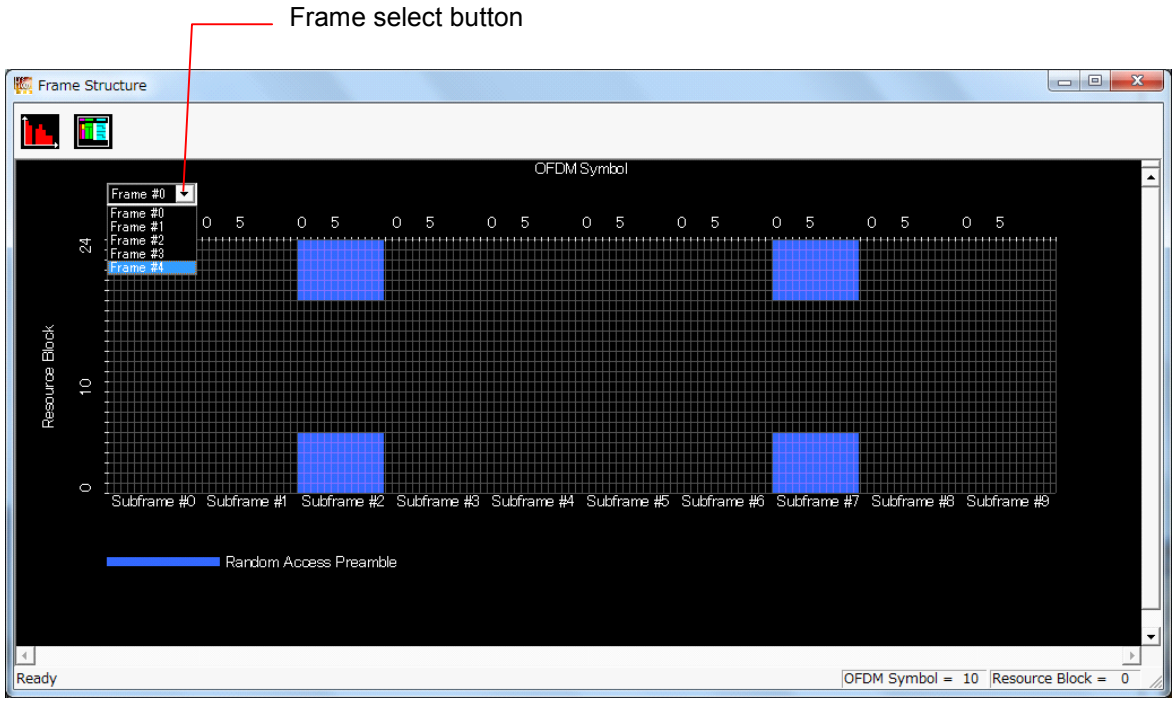


Figure 3.1.7.1-2 Random Access Preamble Setting Screen

3.1.8 Export File screen

When "Calculation" is selected from the **Edit** menu or the  tool button is clicked on the main screen, the Export File screen is displayed. The Export File screen is displayed when generating a waveform pattern. In this screen, the output destination folder, package name, file name, and comment for the waveform pattern to be generated can be specified.

Notes:

- The number of waveform patterns (Tx Antenna) to be generated and the setting items in the Export File screen change depending on the setting of Number of Antennas (refer to Figures. 3.1.8-1).
  If the antenna number is 2 or more, the file to be generated has underscore and antenna number at its name end.
- When System in the common parameter list is set to LTE-Advanced and Carrier Aggregation Mode is set to Inter-band, the number of waveform patterns to be generated for one Tx Antenna is two. (Refer to Figure 3.1.8-2, 3.1.8-3, and 3.1.8-4.)
  At the end of 2 waveform patterns generated in Inter-band, "_B0" and "_B1" are added respectively according to the band number.

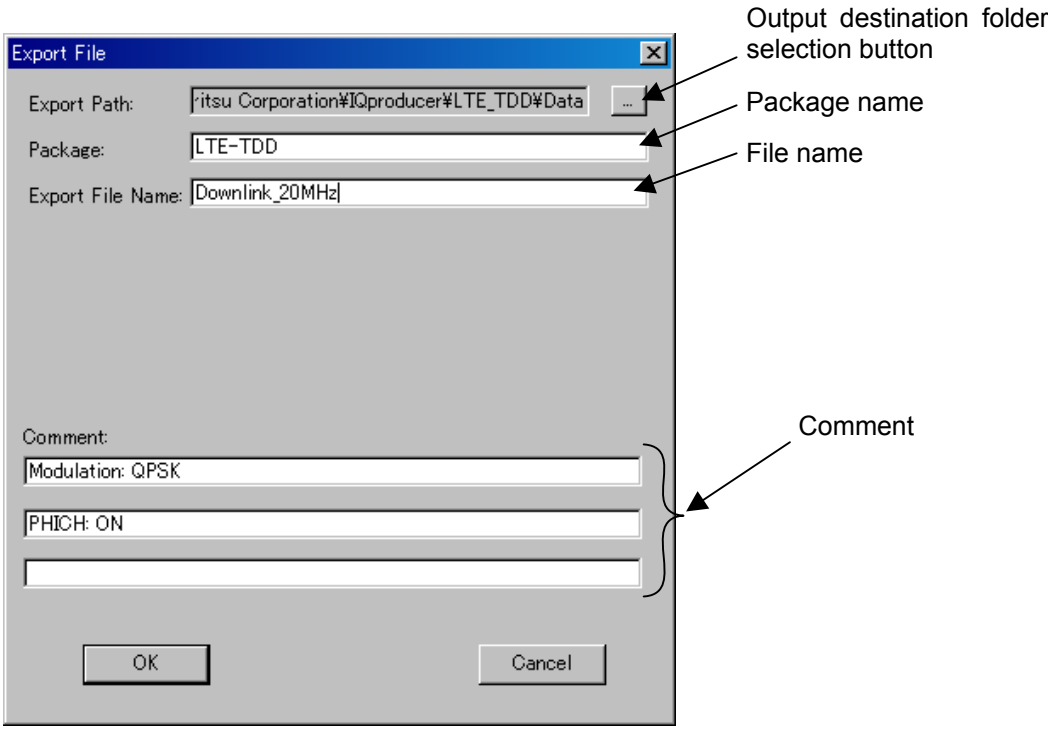


Figure 3.1.8-1 Export File screen (when Number of Antennas = 1)

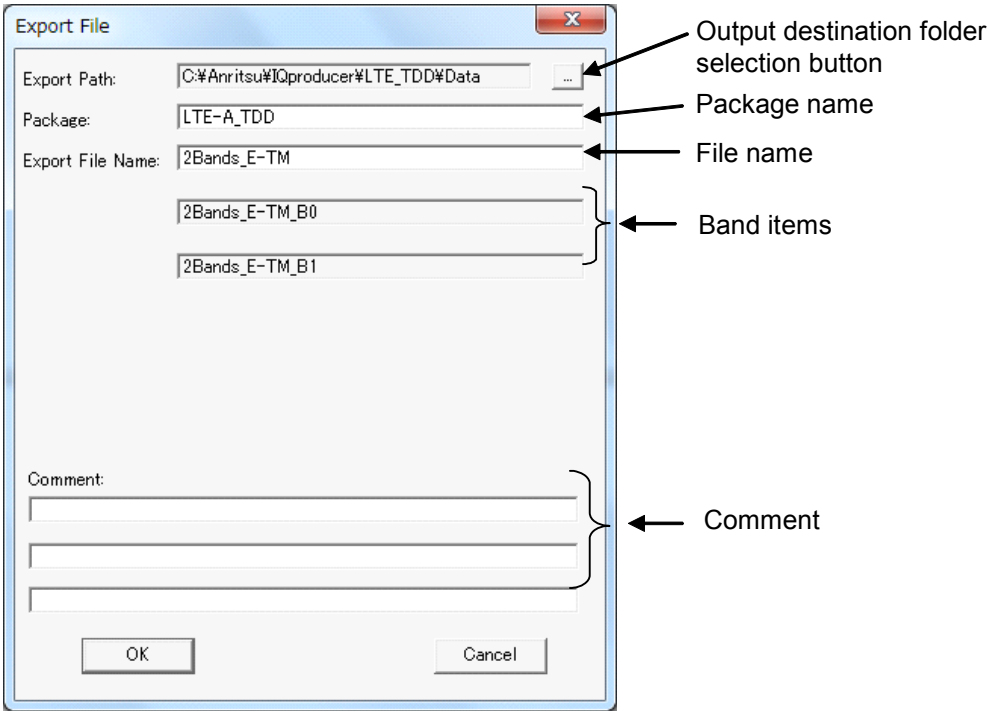


Figure 3.1.8-2 Export File screen
(When Carrier Aggregation Mode = Inter-band, Number of Antennas = 1)

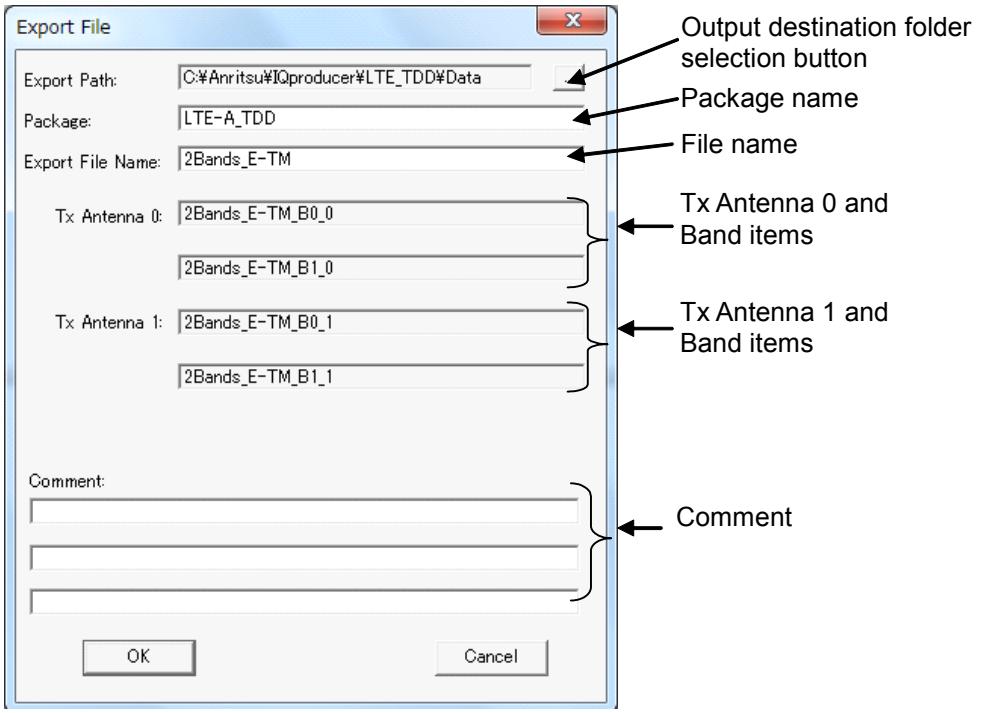


Figure 3.1.8-3 Export File screen
(When Carrier Aggregation Mode = Inter-band, Number of Antennas = 2)

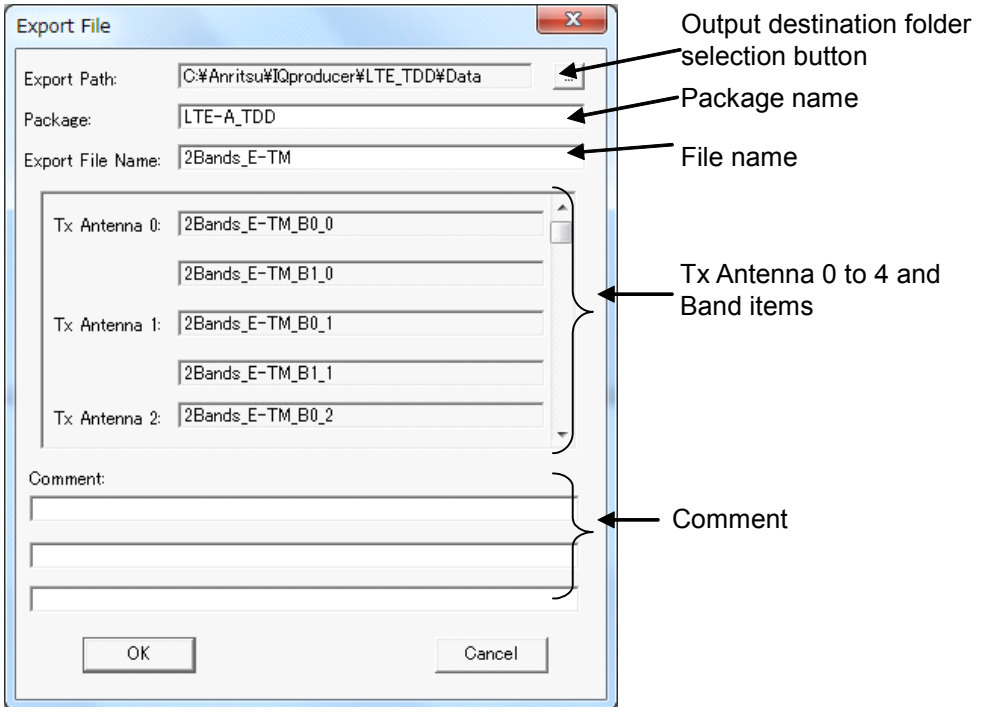


Figure 3.1.8-4 Export File screen
(When Carrier Aggregation Mode = Inter-band, Number of Antennas = 4)

Only alphanumeric characters and the following symbols can be used for a file name.
! % & ( ) + = ‘ { } _ - ^ @ [ ]

After setting the package name, file name, and comment for the waveform pattern to be generated, click **OK** on the Export File screen. The Calculation screen shown in Figure 3.1.9-1 is displayed and waveform pattern generation starts (the package name and file name must be set to start waveform pattern generation).

When started with MS269x or MS2830A and when **MS269x** or **MS2830** 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, the files are saved in the following directory:
C:\Anritsu\MG3710A\User Data\Waveform

In other cases, the output destination folder can be selected from the Browse for Folder screen shown in Figure 3.1.7-2, which is displayed by clicking the output destination folder selection button on the Export File screen.

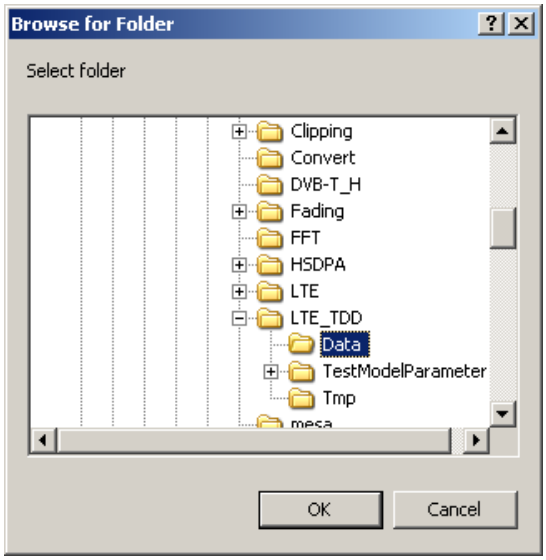


Figure 3.1.8-5 Browse for Folder screen

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

3.1.9 Calculation screen

Clicking **Calculation & Load**, **Calculation & Play**, or the **OK** button on the Export File screen 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.

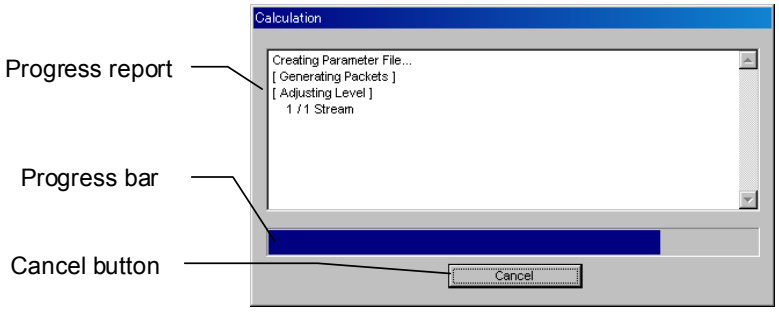


Figure 3.1.9-1 Calculation Screen (In Progress)

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.

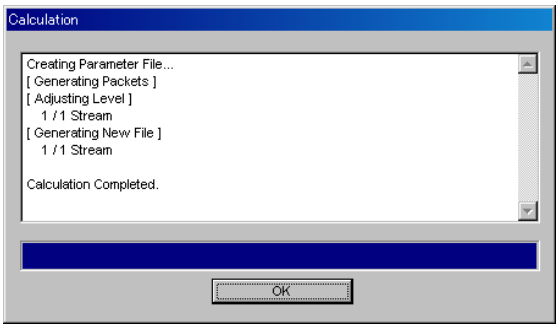


Figure 3.1.9-2 Calculation Screen (Completed)

Note:

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

3.1.10 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.

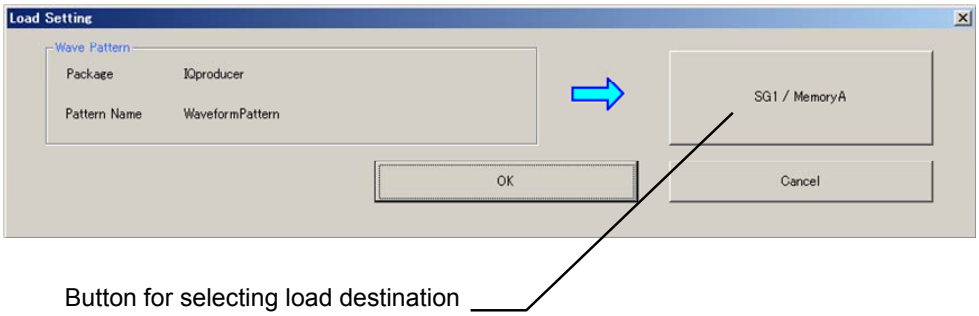


Figure 3.1.10-1 Load Setting Screen

When System in the common parameter list is set to **LTE-Advanced** and Carrier Aggregation Mode is set to Inter-band, selecting **Calculation & Load** displays the Load Setting screen as shown below after completion of waveform generation.

Note:

This function is available only when the 2nd RF (option) is installed

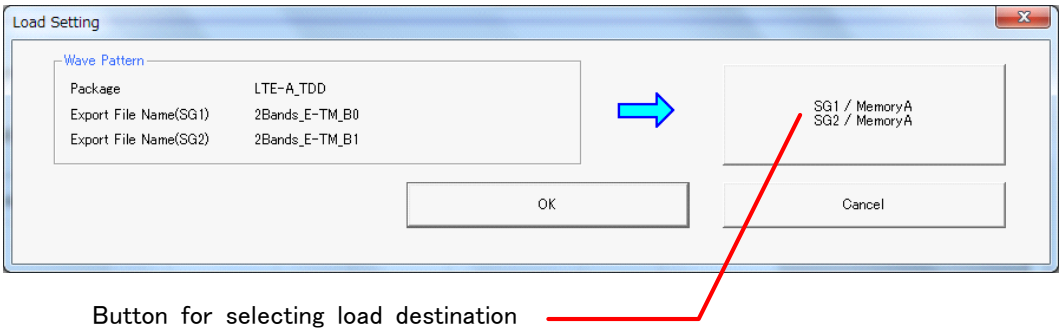


Figure 3.1.10-2 Load Setting Screen (Carrier Aggregation Mode = Inter-band)

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

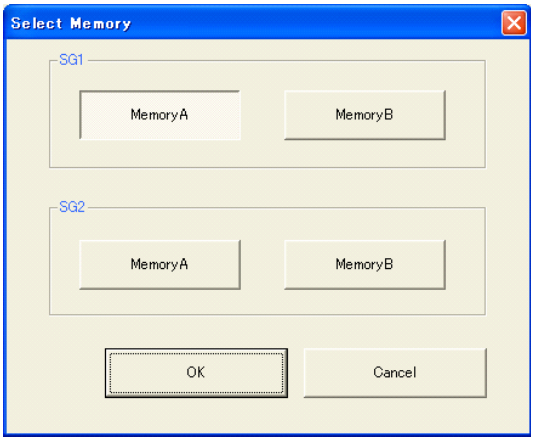


Figure 3.1.10-3 Select Memory Screen

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

Note:

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

3.1.11 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.

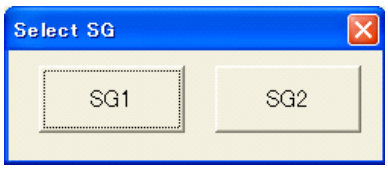


Figure 3.1.11-1 Select SG Screen

When System in the common parameter list is set to **LTE-Advanced** and Carrier Aggregation Mode is set to **Inter-band**, selecting **Calculation & Play** displays the SG Setting screen before starting waveform generation. In the SG Setting screen, Frequency and Amplitude for each SG1 and SG2 can be set.

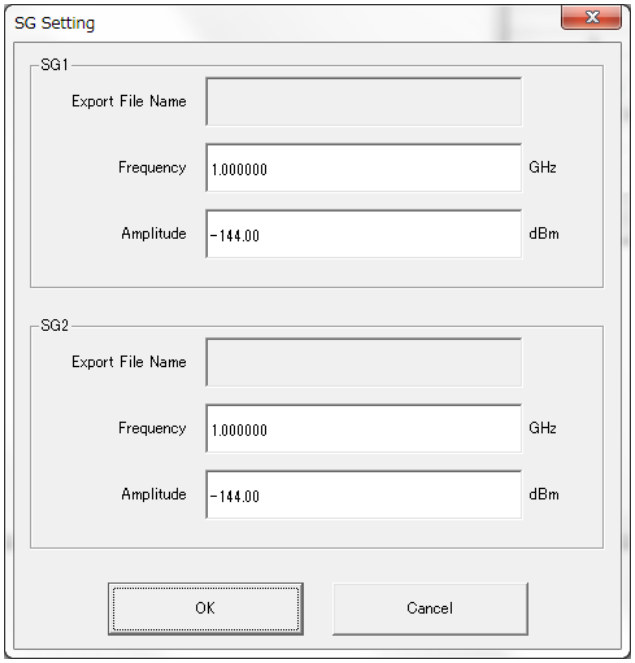


Figure 3.1.11-2 Select SG Screen

3.2 PRACH setting methods

This software can be used to generate a waveform pattern in which multiple PRACH are transmitted while performing power ramping and power boosting. As the figure below, PRACH position can be changed on the frequency axis by giving Frequency Offset, and PRACH is disabled by setting PRACH Data Status to Disable.
Number of PRACH Resources (PRACH number) and Frequency Resource Index and Subframe Number (frequency axis and time axis respectively) are set by PRACH Configuration and Uplink-downlink Configuration.

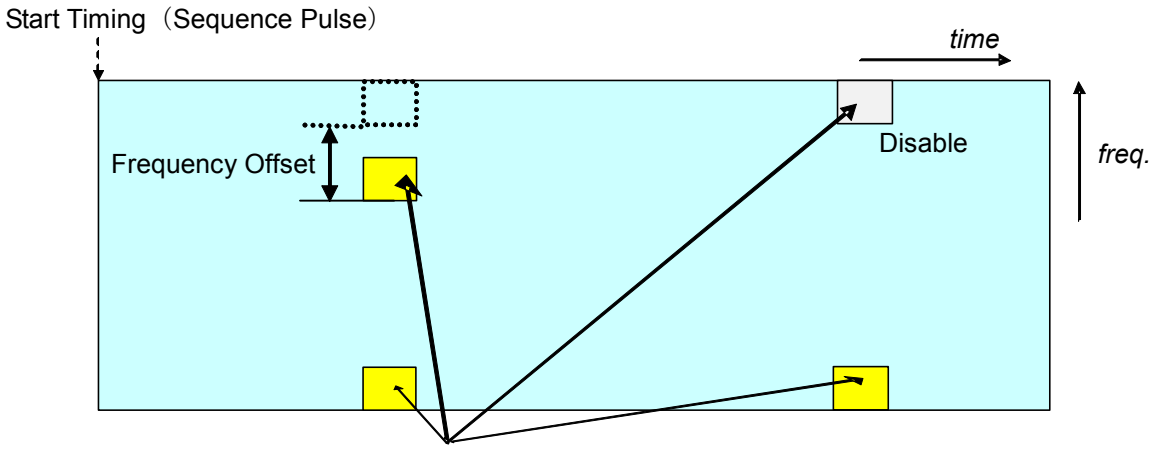


Figure 3.2-1 Parameters for PRACH in 1 Frame

PRACH arrangement method to the frame to transmit PRACH is determined by Transmit Frame as the figure below.

If Transmit Frame is set to Even, PRACH is arranged for only even number frames. If it is set to Odd, PRACH is arranged for only odd number frames. If it is set to All, PRACH is arranged for all frames.

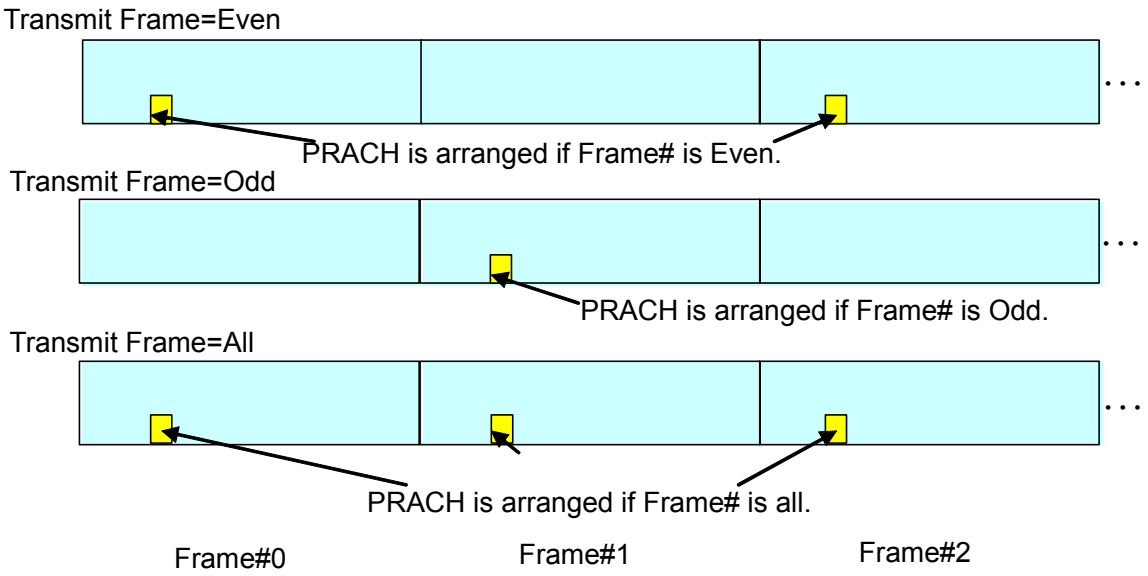


Figure 3.2-2 PRACH Frame Arrangement by Transmit Frame

When a waveform pattern generated by the LTE IQproducer™ is output from the mainframe, it is usually output repeatedly. To output PRACH waveform pattern only once, refer to the information below.

Method for single output of PRACH waveform pattern

Activate the Combination File Edit function from the Transfer & Setting Panel screen, and then create a combination file with Sequence Repeat Mode set to Single. A waveform pattern can be transmitted a single time by using this combination file. For details, refer to 4.8 “Combining Waveform Patterns by Combination File Edit Function” in MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™).

3.3 Waveform Pattern Generation Procedure

3.3.1 LTE

This section describes the waveform pattern generation procedure when System in the common parameter list is set to **LTE**.

3.3.1.1 Downlink

This section shows a procedure for creating a waveform pattern, using an LTE TDD downlink waveform pattern as an example.

<Procedure>

1. Start this software.
2. Set the common parameters as shown in Table 3.3.1.1-1. The parameters that are not shown below are used with their default values, or are automatically set according to other parameter settings.

Table 3.3.1.1-1 Settings for common parameters

Common	
Test Model	OFF
Number of Antennas	1
Cell ID	1
Number of Frames	1
Oversampling Ratio	2
Sampling Rate	15.36
Bandwidth	5
Downlink/Uplink	Downlink
Uplink-downlink Configuration	3
Special Subframe Configuration	8
Cyclic Prefix	Normal
Subcarrier Spacing	15
Number of OFDM symbols per slot	7
Roll Off Length	0
Filter	
Filter Type	Ideal

3. Click Reference signal in the tree view and set the PHY/MAC parameters as shown in Table 3.3.1.1-2.

Table 3.3.1.1-2 Settings for Reference signal

Reference signal	
Frequency Shift Value	1
Power Boosting	0.000

4. Click PBCH in the tree view and set the PHY/MAC parameters as shown in Table 3.3.1.1-3.

Table 3.3.1.1-3 Settings for PBCH

PBCH	
Data Status	Enable
Data Type	16 bit repeat
Data Type Repeat Data	0000
Power Boosting	0.000

5. Click Synchronization signal in the tree view and set the PHY/MAC parameters as shown in Table 3.3.1.1-4.

Table 3.3.1.1-4 Settings for Synchronization signal

Synchronization signal	
Primary synchronization signal	
Data Status	Enable
Power Boosting	0.000
Secondary synchronization signal	
Data Status	Enable
Power Boosting	0.000

6. Click Subframe #0 in the tree view and set the PHY/MAC parameters as shown in Table 3.3.1.1-5. Set the CCE arrangement in step 9.

Table 3.3.1.1-5 Settings for Subframe #0

Subframe #0	
PHICH	ON
PHICH duration	Normal
Number of PHICH Groups	1
Number of OFDM Symbols for PDCCH	1
Total Number of CCEs	4
Number of PDCCHs	2
CCE arrangement	0, 0, 1, 1
Number of PDSCHs	1
RB arrangement	All PDSCH #0

7. Click PDSCH in Subframe #0 in the tree view and set the PHY/MAC parameters as shown in Table 3.3.1.1-6.

Table 3.3.1.1-6 Settings for PCFICH

PCFICH	
Data Status	Enable
Data Type	CFI codeword
CFI	1
Power Boosting	0.000

8. Click PDCCH#0 and PDCCH#1 in Subframe #0 in the tree view and set the PHY/MAC parameters as shown in Table 3.3.1.1-7.

Table 3.3.1.1-7 Settings for PDCCH

PDCCH	
Data Status	Enable
PDCCH format	1
Data Type	16 bit repeat
Data Type Repeat Data	0000
Power Boosting	1.880

9. tree view, and then specify the settings shown in Figure 3.3.1.1-1.

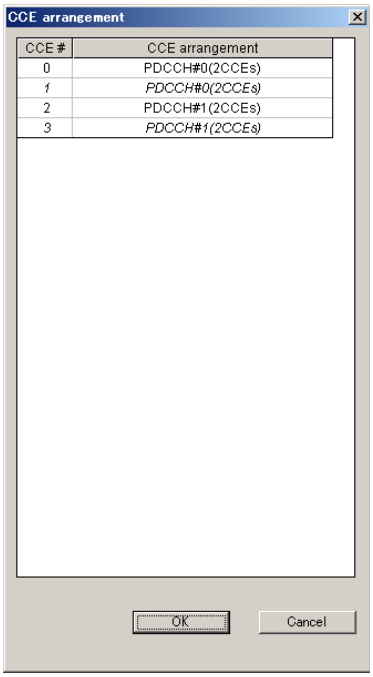


Figure 3.3.1.1-1 CCE arrangement

10. Click PDSCH#0 in Subframe #0 in the tree view and set the PHY/MAC parameters as shown in Table 3.3.1.1-8.

Table 3.3.1.1-8 Settings for PDSCH

PDSCH	
Data Status	Enable
nRNTI	0000
Power Boosting	0.000
Modulation Scheme	QPSK
Data Type	16 bit repeat
Data Type Repeat Data	0000

11. Click PHICH group#0 in Subframe #0 in the tree view and set the PHY/MAC parameters as shown in Table 3.3.1.1-9. The power boosting of the PHICH group is automatically calculated after specifying the settings in step 12.

Table 3.3.1.1-9 Settings for PHICH group

PHICH group	
Data Status	Enable
Number of PHICHs	2
Power Boosting	0.000

12. Set the PHY/MAC parameters as listed in Table 3.3.1.1-10 by clicking PHICH#0 in PHICH group#0 in the tree view of Subframe#0. Set PHICH#1 as listed in Table 3.3.1.1-11.

Table 3.3.1.1-10 Settings for PHICH#0

PHICH#0	
Data Status	Enable
Orthogonal Sequence Index	0
Data Type	HI codeword
HI	000
Power Boosting	–3.010

Table 3.3.1.1-11 Settings for PHICH#1

PHICH#1	
Data Status	Enable
Orthogonal Sequence Index	4
Data Type	HI codeword
HI	000
Power Boosting	–3.010

13. Right-click Subframe #0 in the tree view # and select Copy. Then, right-click Subframes #1, 5, 6, 7, 8, 9 and select **Paste**. Select **Paste all** to apply the same settings to all of Subframes #1, 5, 6, 7, 8, 9. Note, however, that PHICH is OFF for Subframes #1, #5, #6, and #7, and PHICH Group and PHICH cannot be set.
14. Click the Calculation tool button to display the Export File screen. Enter LTE TDD and Downlink_5MHz for the Package name and File name, respectively. Then click **OK**.
15. The Calculation screen is displayed and waveform pattern generation starts. After the calculation is completed, click **OK** to finish the waveform generation.
16. The following files are output in the folder specified in 3.1.7 “Export File screen”:

    `Downlink_5MHz.wvi`

    `Downlink_5MHz.wvd`

3.3.1.2 Uplink

This section shows a procedure to create a LTE TDD uplink waveform pattern for example.

<Procedure>
Procedure for generating Uplink waveform

1. Start this software.
2. Set the common parameters as shown in Table 3.3.1.2-1. The parameters that are not shown below are used with their default values, or are automatically set according to other parameter settings.

Table 3.3.1.2-1 Settings for common parameters

Common	
Number of Antennas	1
Cell ID	0
Number of Frames	1
Oversampling Ratio	2
Sampling Rate	15.36
Bandwidth	5
Downlink/Uplink	Uplink
Uplink-downlink Configuration	0
Special Subframe Configuration	0
Cyclic Prefix	Normal
Subcarrier Spacing	15
Number of OFDM symbols per slot	7
Roll Off Length	0
Filter	
Filter Type	Ideal

3. Click Uplink in the tree view and set the PHY/MAC parameters as shown in Table 3.3.1.2-2.

Table 3.3.1.2-2 Settings for Uplink

Uplink	
delta PUCCH shift	1
N_CS(1)	1
N_RB(2)	1

4. Click Subframe #1, 6 in the tree view and set the PHY/MAC parameters as shown in Table 3.3.1.2-3.

Table 3.3.1.2-3 Settings for Subframe #1, 6

Subframe #1, 6	
Number of PUCCHs	0
Number of PUSCHs	0

5. Click Subframe #2 in the tree view and set the PHY/MAC parameters as shown in Table 3.3.1.2-4.

Table 3.3.1.2-4 Settings for Subframe #2

Subframe #2	
Number of PUCCHs	0
Number of PUSCHs	1

6. Click PUSCH#0 in Subframe #2 in the tree view and set the PHY/MAC parameters as shown in Table 3.3.1.2-5.

Table 3.3.1.2-5 Settings for PUSCH #0

PUSCH #0	
Data Status	Enable
nRNRI	0000
Modulation Scheme	QPSK
Data Type	UL-SCH
Start Number of RB	0
Number of RBs	25
Power Boosting	0.000
UL-SCH	
Transport Block Size	2216
Data Type	PN9fix
RV Index	0

7. Click Demodulation RS for PUSCH in Subframe #2 in the tree view and set the PHY/MAC parameters as shown in Table 3.3.1.2-6.

Table 3.3.1.2-6 Settings for Demodulation RS for PUSCH

Demodulation RS for PUSCH	
Group Hopping	Enable
Sequence Hopping	Disable
Delta ss	0
Base Sequence Group Number u	0
Base Sequence Number v	0

8. Right-click Subframe #2 in the tree view and select **Copy**. Then, right-click Subframes #3, 4, 7, 8, 9, and select **Paste**.
9. Click the **Calculation** tool button to display the Export File screen. Enter LTE_TDD and Uplink_5MHz for the Package name and File name, respectively. Then click **OK**.
10. The Calculation screen is displayed and waveform pattern generation starts. After the calculation is completed, click **OK** to finish the waveform generation.
11. The following files are output in the folder specified in 3.1.7 “Export File screen”: `Uplink_5MHz.wvi` `Uplink_5MHz.wvd`

3.3.2 LTE-Advanced

This section describes the waveform pattern generation procedure when System in the common parameter list is set to **LTE-Advanced**.

3.3.2.1 Carrier Aggregation

This section describes the waveform pattern generation procedure, using as an example the LTE-Advanced waveform pattern for which the parameters are set as shown in Table 3.3.2.1-1.

Table 3.3.2.1-1 Settings for Common Parameters

Common	
System	LTE-Advanced
Carrier Aggregation Mode	Intra-band
Downlink/Uplink	Downlink

<Procedure>

<Procedure for generating Carrier Aggregation waveform>

1. Start this software.
2. Set the common parameters as shown in Table 3.3.2.1-1.
3. Click **Common** in the tree view and set the PHY/MAC parameters as shown in Table 3.3.2.1-2.

Table 3.3.2.1-2 Setting for Carrier Aggregation

Carrier Aggregation	
Component Carrier #0	
Status	On
Gain (dB)	0.000
Freq Offset (MHz)	–39.600
Phase (deg)	0
Delay (Ts)	0
Component Carrier #1	
Status	On
Gain (dB)	0.000
Freq Offset (MHz)	–19.800
Phase (deg)	0
Delay (Ts)	0
Component Carrier #2	
Status	On
Gain (dB)	0.000
Freq Offset (MHz)	0.000
Phase (deg)	0
Delay (Ts)	0
Component Carrier #3	
Status	On
Gain (dB)	0.000
Freq Offset (MHz)	19.800
Phase (deg)	0
Delay (Ts)	0
Component Carrier #4	
Status	On
Gain (dB)	0.000
Freq Offset (MHz)	39.600
Phase (deg)	0
Delay (Ts)	0

4. Click **Component Carrier#0** in the tree view and set the PHY/MAC parameters as shown in Table 3.3.2.1-3.

Table 3.3.2.1-3 Setting for Component Carrier #0

Component Carrier #0	
Bandwidth	20
Cell ID	1

5. Click **Component Carrier#1** in the tree view and set the PHY/MAC parameters as shown in Table 3.3.2.1-4.

Table 3.3.2.1-4 Setting for Component Carrier #1

Component Carrier #1	
Bandwidth	20
Cell ID	2

6. Click **Component Carrier#2** in the tree view and set the PHY/MAC parameters as shown in Table 3.3.2.1-5.

Table 3.3.2.1-5 Setting for Component Carrier #2

Component Carrier #2	
Bandwidth	20
Cell ID	3

7. Click **Component Carrier#3** in the tree view and set the PHY/MAC parameters as shown in Table 3.3.2.1-6.

Table 3.3.2.1-6 Setting for Component Carrier #3

Component Carrier #3	
Bandwidth	20
Cell ID	4

8. Click **Component Carrier#4** in the tree view and set the PHY/MAC parameters as shown in Table 3.3.2.1-7.

Table 3.3.2.1-7 Setting for Component Carrier #4

Component Carrier #4	
Bandwidth	20
Cell ID	5

9. Click the **Calculation** tool button to display the Export File screen. Enter LTE-A and 5CCs_20MHz for the Package name and File name, respectively. Then click the **OK** button.

10. The Calculation screen is displayed and waveform pattern generation starts. After the calculation is completed, click the **OK** button to finish the waveform generation.
11. Check that 5CCs_20MHz.wvi, 5CCs_20MHz.wvd and 5CCs_20MHz.xml are output to the following folder where this software is installed:
X:\IQproducer\LTE\Data
("X:\IQproducer" indicates the folder where the IQproducer™ is installed.)

3.4 Saving/Reading Parameters

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

3.4.1 Saving a parameter file

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

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

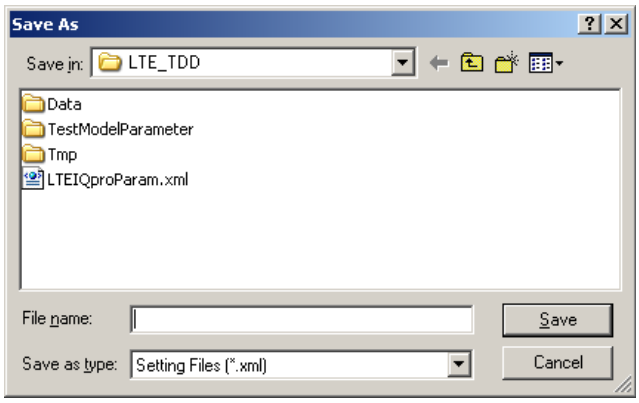


Figure 3.4.1-1 Parameter file saving screen

2. Specify **Save in**, enter a file name in the **File** name text box, and click **Save** to save the parameter file.

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.

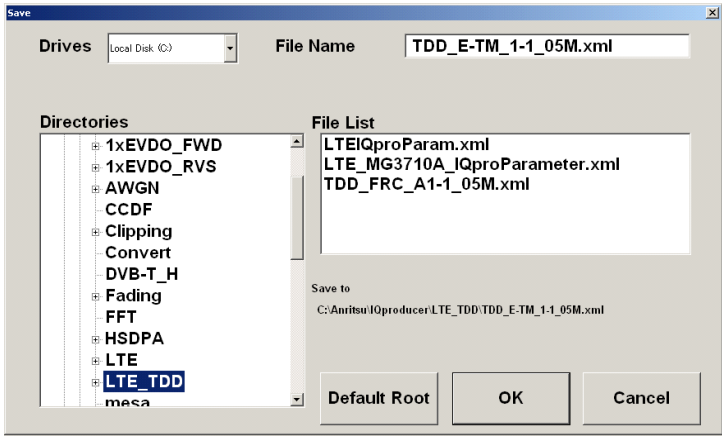


Figure 3.4.1-2 Parameter file saving screen (MG3710A)

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.

3.4.2 Reading a parameter file

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

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

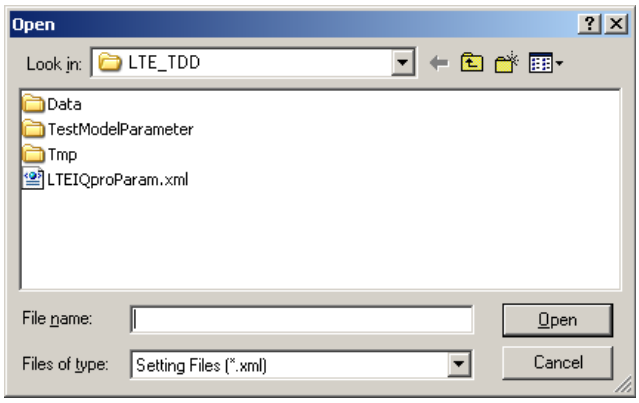


Figure 3.4.2-1 Parameter file reading screen

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

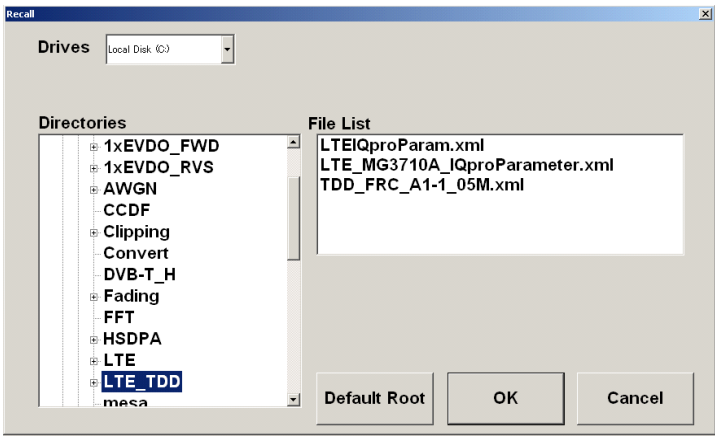


Figure 3.4.2-2 Parameter file reading screen (MG3710A)

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.

3.5 User File Reading Screen

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

1. When **User File** is selected in each layer, the user file reading screen as shown in is displayed.

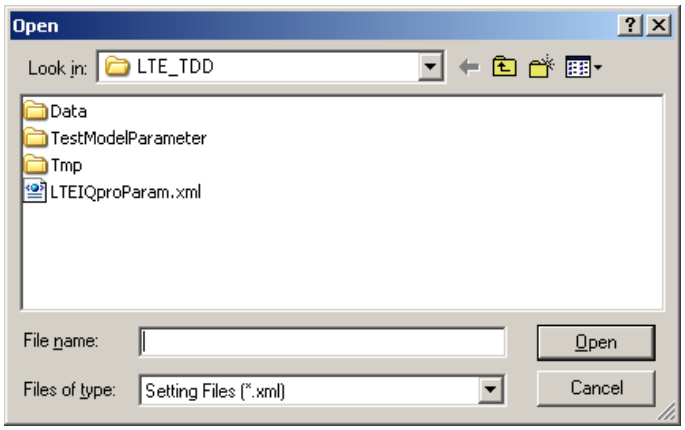


Figure 3.5-1 User file reading screen

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

An error dialog box is displayed when an invalid file is selected. Refer to Appendix B "User File Format" for details on the user file format.

When running on MG3710A

1. When **User File** is selected for **Data Type** setting in the Channel Setting screen, the user file reading screen is displayed.

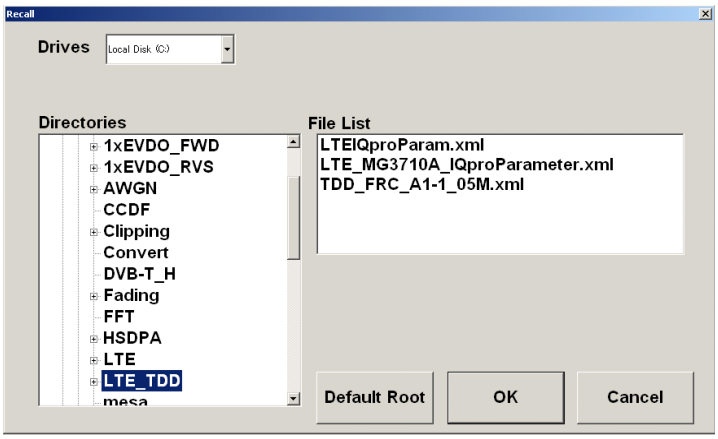


Figure 3.5-2 User file reading screen (MG3710A)

2. Select the directory where the user 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.

If an unsupported User File is selected, an error is displayed. Refer to Appendix B “User File Format” for details on the user file format.

3.6 Displaying Graph

The generated waveform pattern can be displayed in a CCDF, FFT, and Time Domain graph by using this software. For details of each graph display, refer to each one of the following:

- MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)
  4.3 “CCDF Graph Display”, 4.4 “FFT Graph Display”, 4.13 “Time Domain Graph Display”
- MS2690A/MS2691A/MS2692A or MS2830A Vector Signal Generator Operation Manual (IQproducer™)
  4.3 “CCDF Graph Display”, 4.4 “FFT Graph Display”, 4.9 “Time Domain Graph Display”

Displaying CCDF graph

1. Generate a waveform pattern menu by executing “Calculation”.
2. Select **CCDF** from the **Simulation** menu or click the  tool button. The CCDF Graph Monitor screen shown in Figure 3.5-1 is displayed with the trace of the generated waveform pattern.

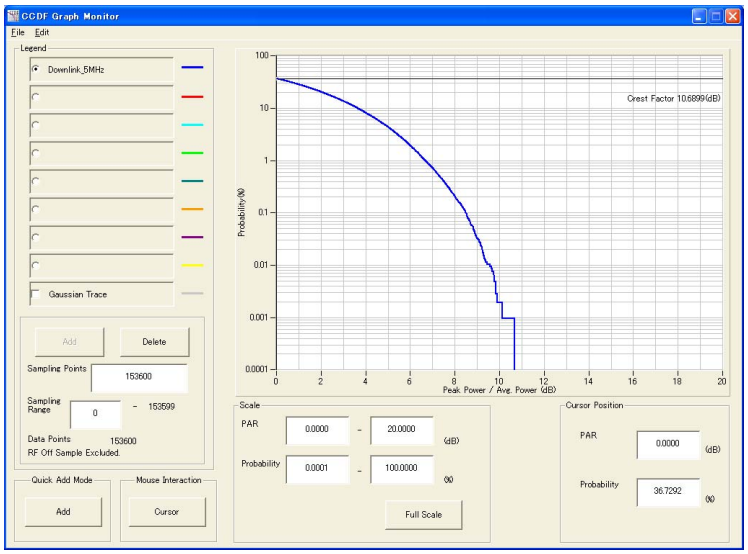


Figure 3.6-1 CCDF Graph Monitor screen

When a waveform pattern is generated by changing parameters and executing “Calculation” while other traces are displayed in the CCDF Graph Monitor screen, the trace of the waveform pattern newly generated can be displayed in either of the following two methods:

- Displaying the new trace in the same screen as the previous traces
- Deleting the previous traces to display the new trace

Note:

The CCDF, FFT, and Time Domain graphs cannot be generated at the same time. When displaying one graph while another graph is being displayed, execute the graph generation of the former after that of the latter is completed.

■ Displaying the new trace in the same screen as the previous traces

1. Set **Add** for **Quick Add Mode** on the lower-left of the CCDF Graph Monitor screen.
2. Select **CCDF** from the **Simulation** menu or click the  tool button. The trace of the waveform pattern newly generated is additionally displayed in the CCDF Graph Monitor screen.
   Up to eight traces can be displayed by repeating this procedure.

■ When deleting the previous traces to display a new trace:

1. Set **Clear** for **Quick Add Mode** on the lower-left of the CCDF Graph Monitor screen.
2. Select **CCDF** from the **Simulation** menu or click the  tool button. The confirmation message shown in Figure 3.5-2 below appears:

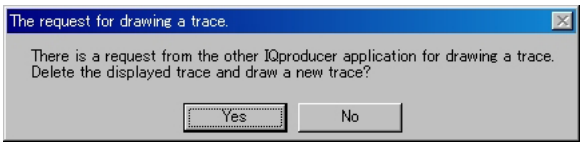


Figure 3.6-2 Confirmation message

Click **Yes**. The previous traces are deleted, and the trace of the waveform pattern newly generated is displayed.

Displaying FFT graph

1. Generate a waveform pattern by executing “Calculation”.
2. Select **FFT** from the **Simulation** menu or click the  tool button. The FFT Graph Monitor screen shown in Figure 3.5-3 is displayed with the trace of the generated waveform pattern.

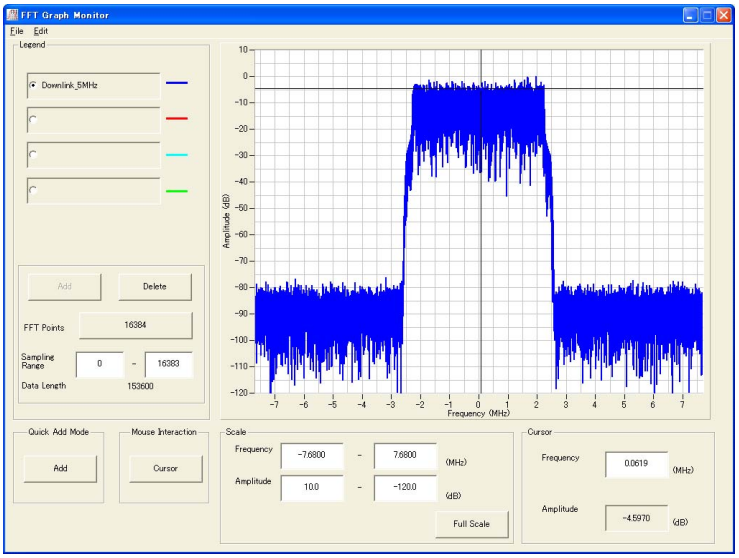


Figure 3.6-3 FFT Graph Monitor screen

When a waveform pattern is generated by changing parameters and executing “Calculation” while other traces are displayed in the FFT Graph Monitor screen, the trace of the waveform pattern newly generated can be displayed in either of the following two methods:

- Displaying the new trace in the same screen as the previous traces
- Deleting the previous traces to display the new trace

Note:

The CCDF, FFT, and Time Domain graphs cannot be generated at the same time. When displaying one graph while another graph is being displayed, execute the graph generation of the former after that of the latter is completed.

■ Displaying the new trace in the same screen as the previous traces

1. Set **Add** for **Quick Add Mode** on the lower-left of the FFT Graph Monitor screen.
2. Select **FFT** from the **Simulation** menu or click the  tool button. The trace of the waveform pattern newly generated is additionally displayed in the FFT Graph Monitor screen.
   Up to four traces can be displayed by repeating this procedure.

■ When deleting the previous traces to display a new trace:

1. Set **Clear** for **Quick Add Mode** on the lower-left of the FFT Graph Monitor screen.
2. Select **FFT** from the **Simulation** menu or click the  tool button. The confirmation message shown in Figure 3.5-4 below appears:

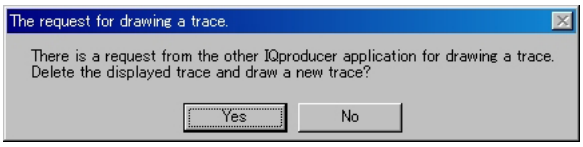


Figure 3.6-4 Confirmation message

Click **Yes**. The previous traces are deleted, and the trace of the waveform pattern newly generated is displayed.

Displaying the Time Domain graph

1. Generate a waveform pattern by executing “Calculation”.
2. Select **Time Domain** from the **Simulation** menu or click the  tool button. The Time Domain Graph Monitor screen shown in Figure 3.5-5 is displayed with the trace of the generated waveform pattern.

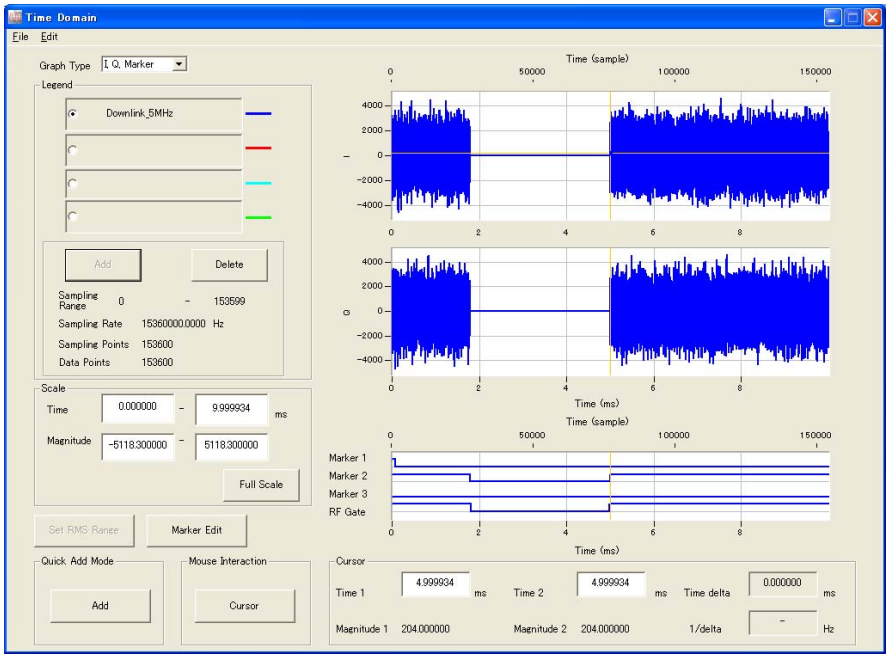


Figure 3.6-5 Time Domain screen

When a waveform pattern is generated by changing parameters and executing “Calculation” while other traces are displayed in the Time Domain Graph Monitor screen, the trace of the waveform pattern newly generated can be displayed in either of the following two methods:

- Displaying the new trace in the same screen as the previous traces
- Deleting the previous traces to display the new trace

Note:

The CCDF, FFT, and Time Domain graphs cannot be generated at the same time. When displaying one graph while another graph is being displayed, execute the graph generation of the former after that of the latter is completed.

■ Displaying the new trace in the same screen as the previous traces

1. Set **Add** for **Quick Add Mode** on the lower-left of the Time Domain Graph Monitor screen.
2. Select **Time Domain** from the **Simulation** menu or click the  tool button. The trace of the waveform pattern newly generated is additionally displayed in the Time Domain Graph Monitor screen.
   Up to four traces can be displayed by repeating this procedure.

■ When deleting the previous traces to display a new trace:

1. Set **Clear** for **Quick Add Mode** on the lower-left of the Time Domain Graph Monitor screen.
2. Select **Time Domain** from the **Simulation** menu or click the  tool button. The confirmation message shown in Figure 3.6-6 below appears:

Figure 3.6-6 Confirmation message

Click **Yes**. The previous traces are deleted, and the trace of the waveform pattern newly generated is displayed.

3.7 Auxiliary Signal Output

Select a waveform pattern generated by the LTE TDD IQproducer™ on this equipment to output the marker that is synchronized with the RF signal as an auxiliary signal from the AUX on the rear panel of this equipment. Markers described below are automatically set for the waveform patterns when they are generated. By using the Marker Edit function which is a peripheral function of the Time Domain graph, a waveform pattern can be generated with these markers edited.

For details of Marker Edit function, refer to each one of the following:

- MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)
  4.13.12 “Marker edit function”
- MS2690A/MS2691A/MS2692A or MS2830A Vector Signal Generator Operation Manual (IQproducer™)
  4.9.12 “Marker edit function”

As auxiliary signal, Frame Pulse (Connector 1) and Subframe Pulse (Connector 2) are output. Connector 3 is not used.

- Frame Pulse
  A pulse that is synchronized with the symbol at the beginning of the subframe is output from Connector 1. Change Polarity for Marker 1 to change the signal polarity.
- Downlink Transmission/ Uplink Transmission
  A pulse synchronized with the downlink or uplink signal transmission cycle is output from Connector 2. Change Polarity for Marker 2 to change the signal polarity.

For the error range of the auxiliary signals against the RF output, refer to each one of the following:

- MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)
  4.5.6 “Input file format”
- MS2690A/MS2691A/MS2692A or MS2830A Vector Signal Generator Operation Manual (IQproducer™)
  4.5.6 “Input file format”

Chapter 4 Easy Setup Screen

This chapter explains the Easy Setup screens that are displayed when this software is installed and running on the MG3710A. The Easy Setup screens support touch-panel operations.

Note:

In the operation explanations in this chapter, touching the touch panel and clicking the mouse are both described as “click”.

Though the Easy Setup screens can be used on other than the MG3710A, this chapter describes the Easy Setup screens on the MG3710A as examples.

4.1 Basic Operation

4.1.1 Data input method

The measurement item selections, numeric data, alphabetic characters, etc., are input at the panel displayed on the screen.
The displayed panel differs according to the input data type.

■Numeric keypad

Clicking the numeric input text box displays numeric input panel. The displayed keys, units and input range differ according to the data.

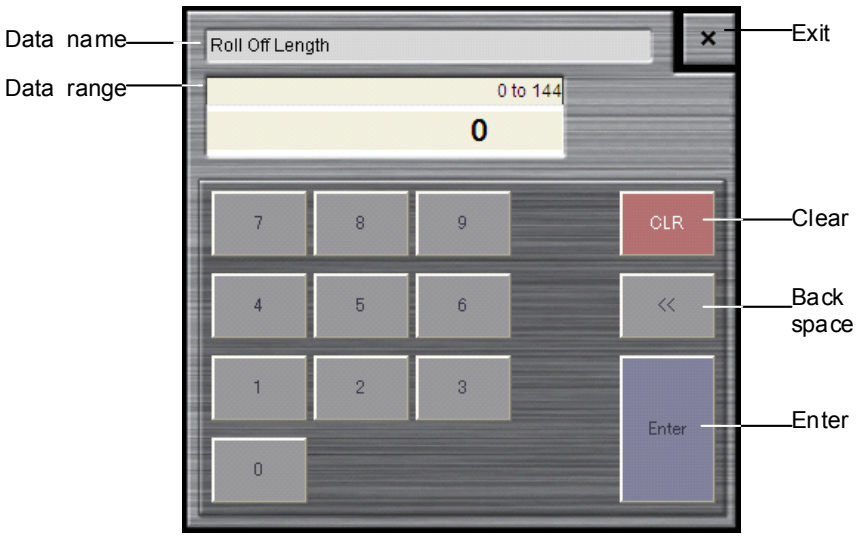


Figure 4.1.1-1 Numeric Keypad

■Software keyboard

Character data such as file names are input by clicking the character input text box. Characters are input by clicking the keys of the soft keyboard shown in Figure 4.1.1-2. Click the **Shift** + **Caps** keys to lock the keyboard; click them again to unlock the keyboard.

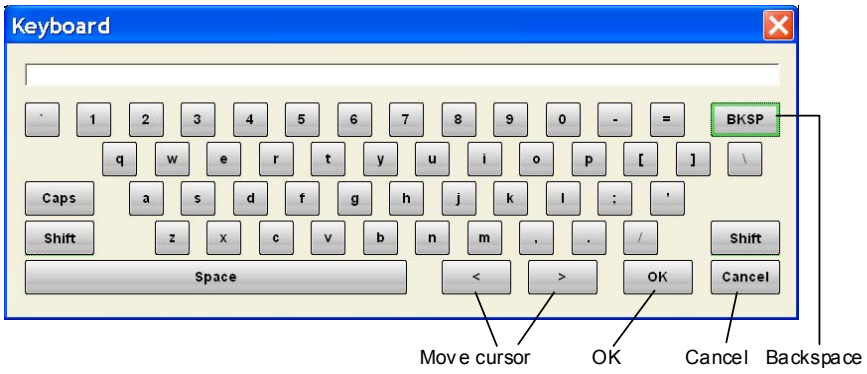


Figure 4.1.1-2 Software Keyboard

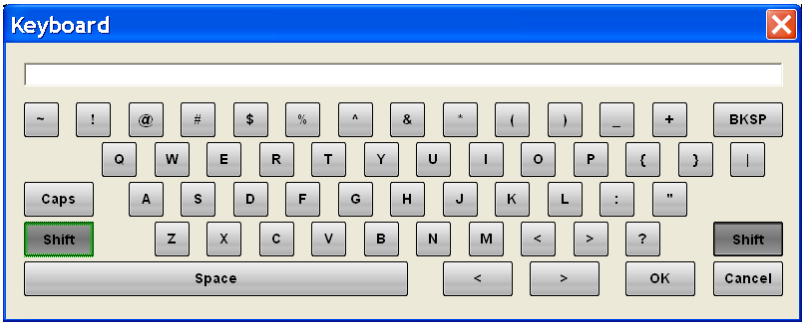


Figure 4.1.1-3 Software Keyboard (With Shift Key Locked)

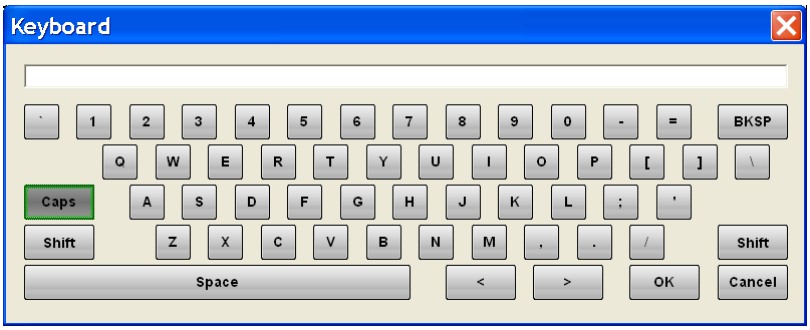


Figure 4.1.1-4 Software Keyboard (With Caps Key Locked)

4.2 Screen Details

4.2.1 Menu and tool buttons

Select the **System (Cellular)** tab on the common platform screen, and then select **LTE (TDD)** to display the Easy Setup main screen.

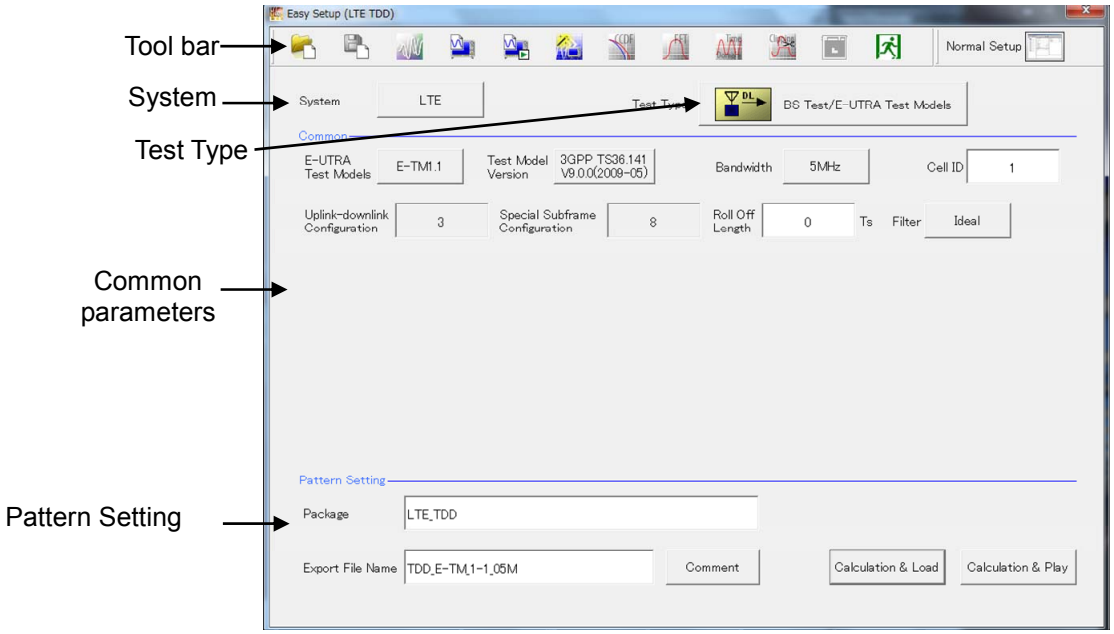


Figure 4.2.1-1 Easy Setup Main Screen

Note:

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

Clicking the **System** button on the main screen displays the System selection screen where System can be switched with the **LTE** button or **LTE-Advanced** button.

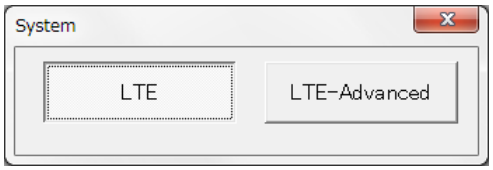


Figure 4.2.1-2 System Selection Screen

System

[Function] Switches 3GPP Systems.

[Default] LTE

[Setting range] LTE, LTE-Advanced

[Remarks] When the MX370110A/MX269910A-001 is installed, LTE-Advanced can be selected. Switching the System changes the displayed common parameter list.

■Screen transition

The screen hierarchy from the Main screen to (Easy Setup) the sub-screens (Normal Setup and Calculation) after LTE TDD IQproducer starts is shown below.

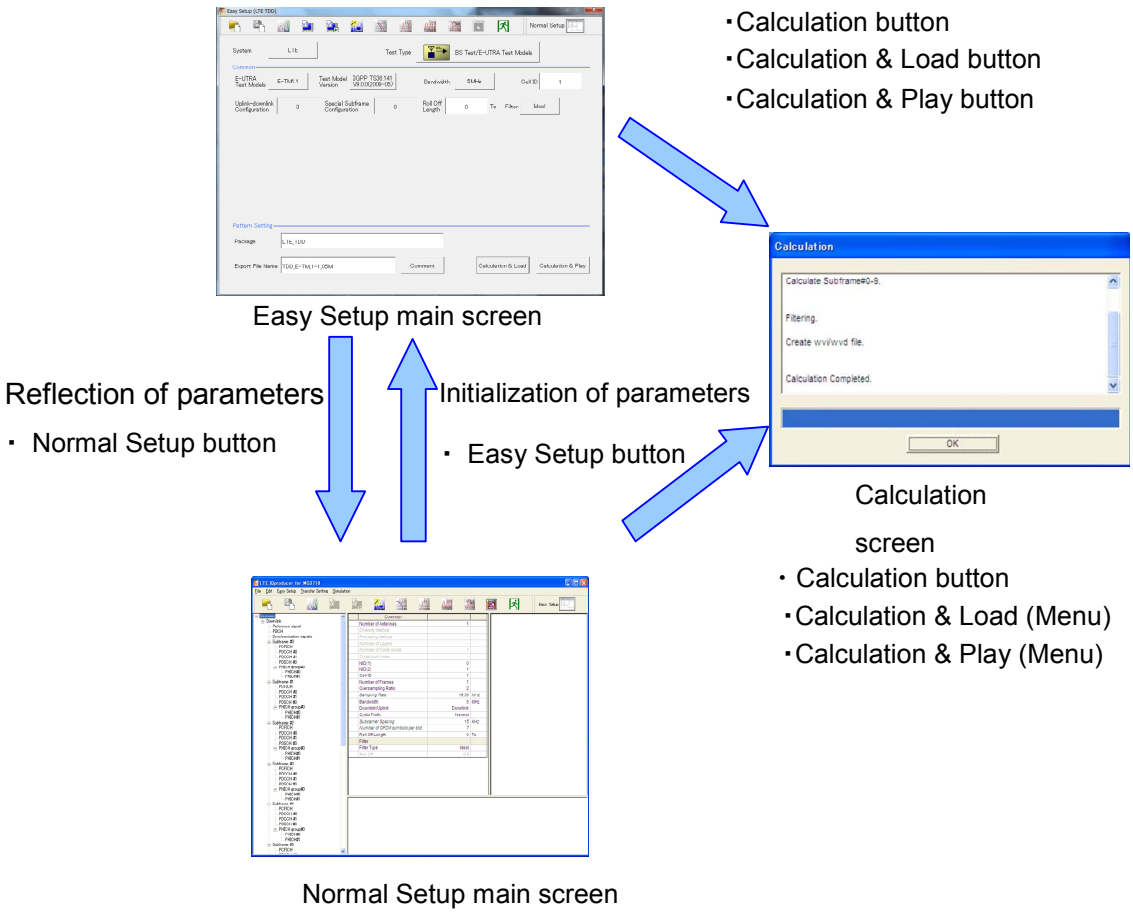


Figure 4.2.1-3 Screen Transition

4.2.2 Tool bar

The tool bar ribbon at the top of the Main screen has various operation buttons.

Figure 4.2.2-1 Tool Bar

■ Buttons on Tool Bar

Button	Name	Description
	Recall Parameter File	Displays Recall dialog for loading parameter file (Figure 4.2.2-2)
	Save Parameter File	Displays Save dialog for saving parameter file (Figure 4.2.2-3)
	Calculation	Performs waveform pattern generation.
	Calculation & Load	After waveform generation is finished, the created waveform pattern is loaded into the MG3710A waveform memory.
	Calculation & Play	After waveform generation is finished, the created waveform pattern is loaded and selected at the MG3710A waveform memory.
	Transfer & Setting Wizard	Every operation ranging from connecting the PC and MG3700A/MG3710A and transferring the waveform pattern to the MG3700A/MG3710A, to loading the waveform pattern into the MG3700A/MG3710A ARB memory is performed at this screen.
	CCDF	Fetches CCDF graph screen and displays CCDF of created waveform pattern.
	FFT	Fetches FFT graph screen and displays spectrum of FFT transformed waveform data.
	Time Domain	Displays the Time Domain screen. In this screen, the time domain waveform of a generated waveform pattern is displayed in a graph.
	Clipping	Displays the Clipping setting screen. In this screen, clipping and filtering processing can be performed for a generated waveform pattern.
	Frame Structure	Displays created waveform pattern file channel mapping.
	Exit	Quits software.
	Normal Setup	Switches GUI to Normal Setup mode; for details of Normal Setup, refer to Chapter 3 Normal Setup Screen.

Note:

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

Calculation & Load button, and Calculation & Play button become active only when operated on MG3710A.

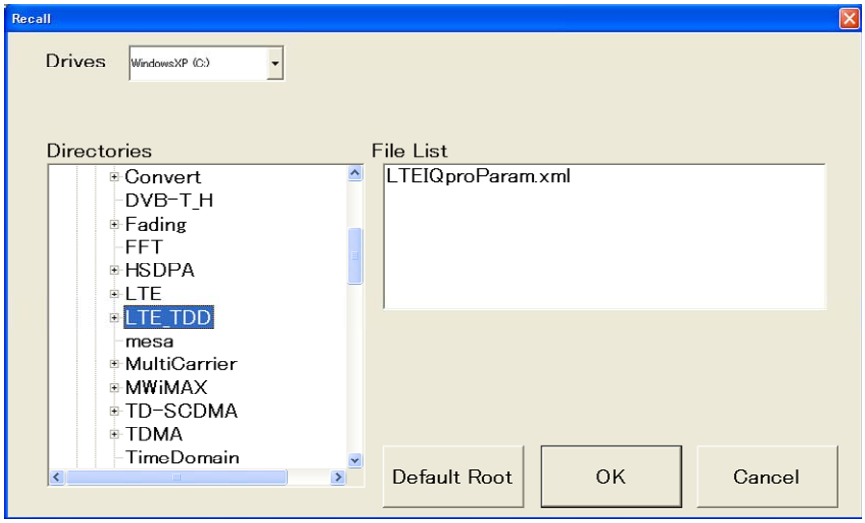


Figure 4.2.2-2 Recall Dialog

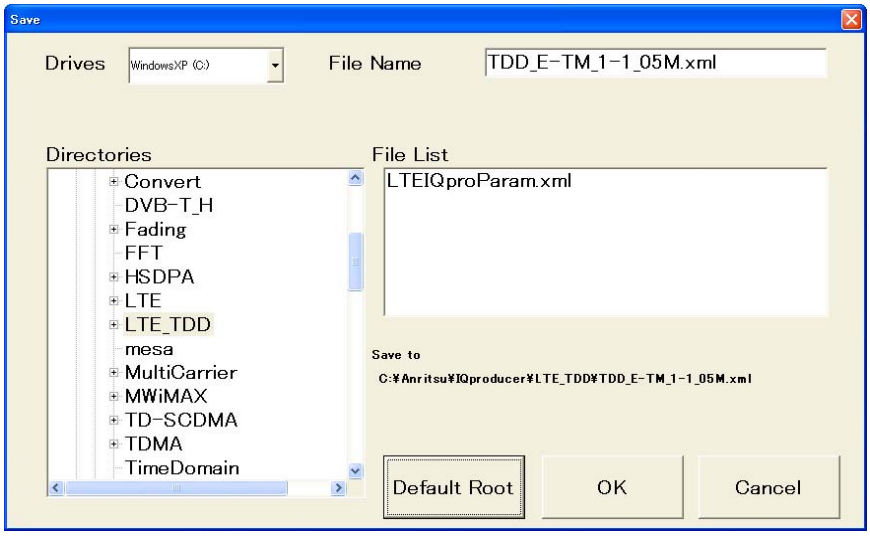


Figure 4.2.2-3 Save Dialog

Note:

The Normal Setup and Easy Setup parameter files are different. To read the Normal Setup parameter file on the Easy Setup screen, switch to the Normal Setup screen.

4.3 Waveform Creation Function Details (LTE)

This section describes the waveform creation function when **LTE** is selected with **System** button on the main screen.

4.3.1 Test Type

When the LTE FDD IQproducer is started and System is set to **LTE**, the BS Test/E-UTRA Test Models setting screen is displayed as the Main screen. Clicking **Test Type** displays the Test Type selection screen. Either **E-UTRA Test Models** or **FRC(UL)** can be selected. The screen switches to the relevant Test Type setting screen according to the clicked button.

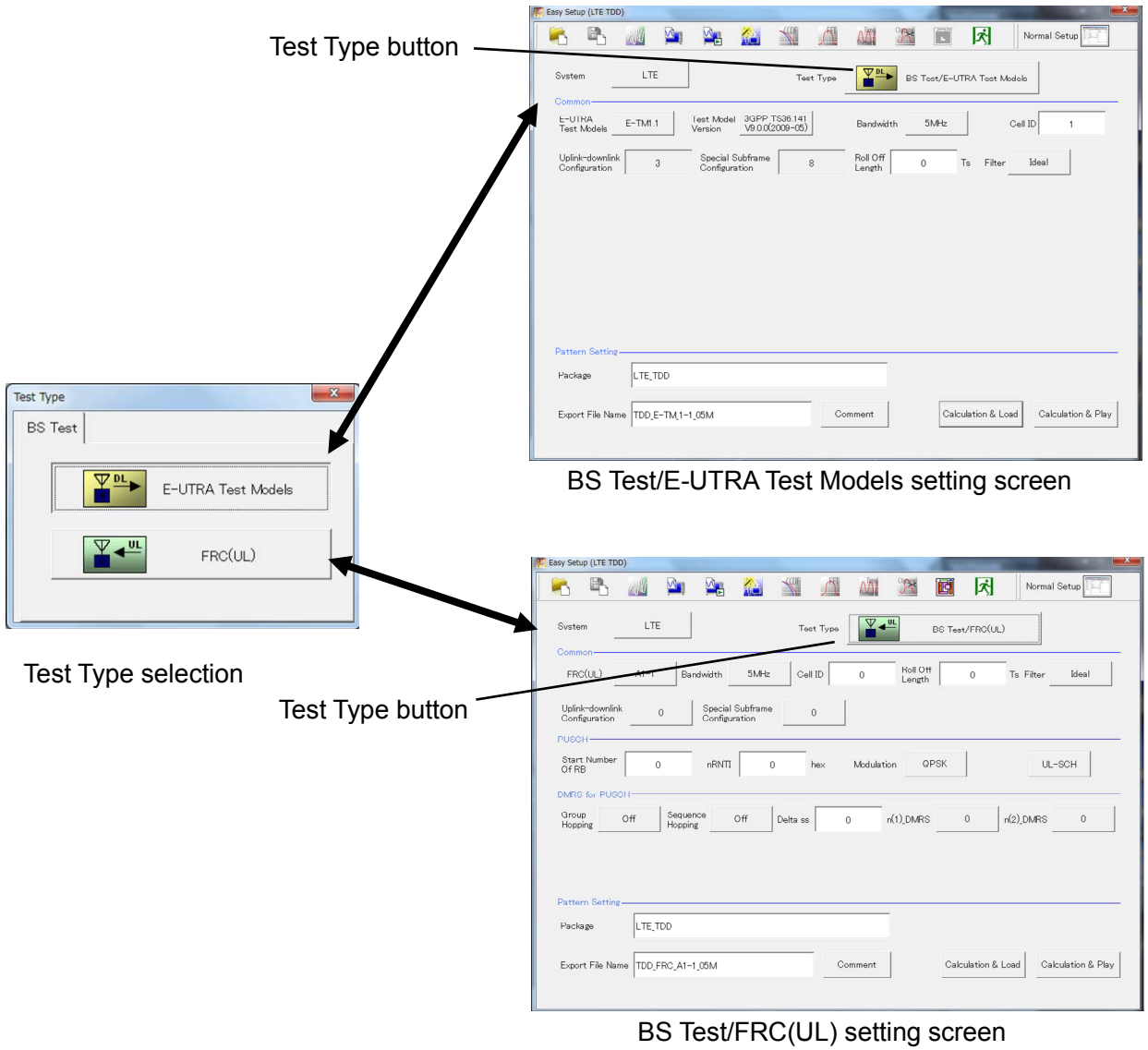


Figure 4.3.1-1 TestType

Test Type

[Function] Sets the Test Type.

[Default] E-UTRA Test Models

[Options] E-UTRA Test Models, FRC (UL)

4.3.2 BS Test/E-UTRA test models

This screen is used to create the Test Model waveform pattern used by the LTE BS Tx test.

4.3.2.1 Common parameters

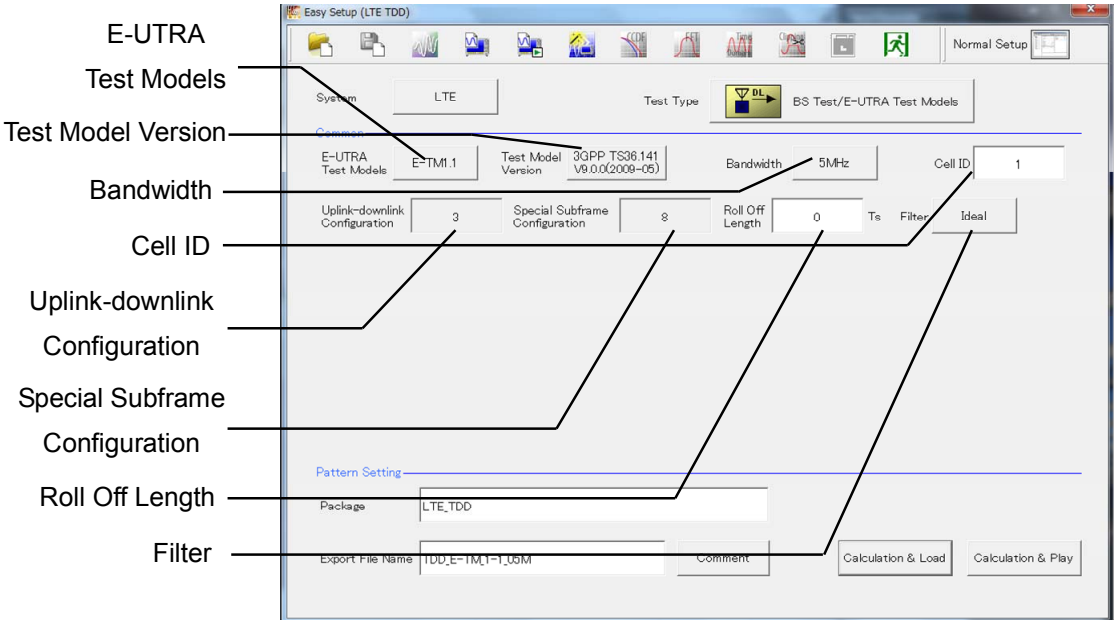


Figure 4.3.2.1-1 BS Test/E-UTRA Test Models Common Setting Screen

E-UTRA Test Models

[Function] Sets the E-UTRA Test Models.

[Default] E-TM1.1

[Options] E-TM1.1, E-TM1.2, E-TM2, E-TM2a, E-TM3.1, E-TM3.1a, E-TM3.2, E-TM3.3

[Remarks] Clicking **E-UTRA Test Models** displays the following dialog box. Click the relevant Test Model to change to it.

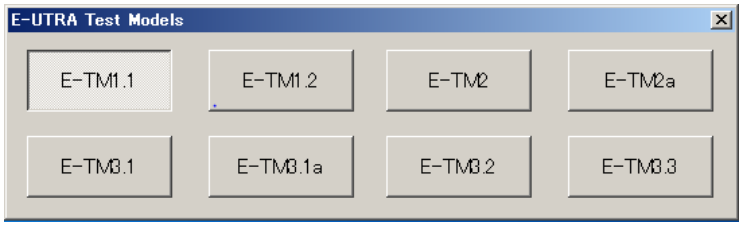


Figure 4.3.2.1-2 Test Models Selection Dialog Box

Test Model Version

[Function] Sets the Test Model version of referred specifications.

[Default] 3GPP TS36.141 V9.0.0 (2009-05)

[Options] 3GPP TS36.141 V8.2.0 (2009-03)
3GPP TS36.141 V9.0.0 (2009-05)

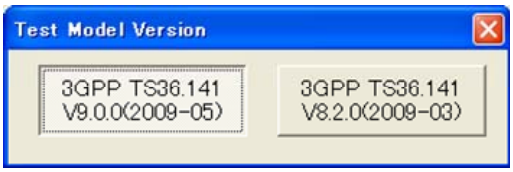


Figure 4.3.2.1-3 Test Model Version Selection Dialog Box

Bandwidth

[Function] Sets the system bandwidth.

[Default] 5 MHz

[Options] 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz

[Remarks] Clicking **Bandwidth** displays the following dialog box. Click the relevant Bandwidth to change to it.

Figure 4.3.2.1-4 Bandwidth Selection Dialog Box

Cell ID

[Function] Sets the Cell ID.

[Default] 1

[Setting range] 0 to 503

Uplink-downlink Configuration

[Function] Sets the Uplink-downlink Configuration.

[Default] 3

[Remarks] The value is fixed to 3 when Test Type is BS Test/E-UTRA TestModels.

Special Subframe Configuration

[Function] Sets the Special Subframe Configuration.

[Default] 8

[Remarks] The value is fixed to 8 when Test Type is BS Test/E-UTRA TestModels.

Roll Off Length

[Function] Sets the length of the ramp time applied to the OFDM symbol.

[Default] 0 Ts

[Setting range] 0 to 144

[Remarks] In the Easy Setup mode, Cyclic Prefix is fixed to Normal and the maximum setting is 144.

Filter

[Function] Sets filter.

[Default] Ideal

[Options] Ideal, None

[Remarks] Clicking **Filter** displays the following dialog box. The filter type can be changed by selecting and clicking the filter type.

Figure 4.3.2.1-5 Filter Setting Dialog Box

4.3.2.2 Pattern Setting

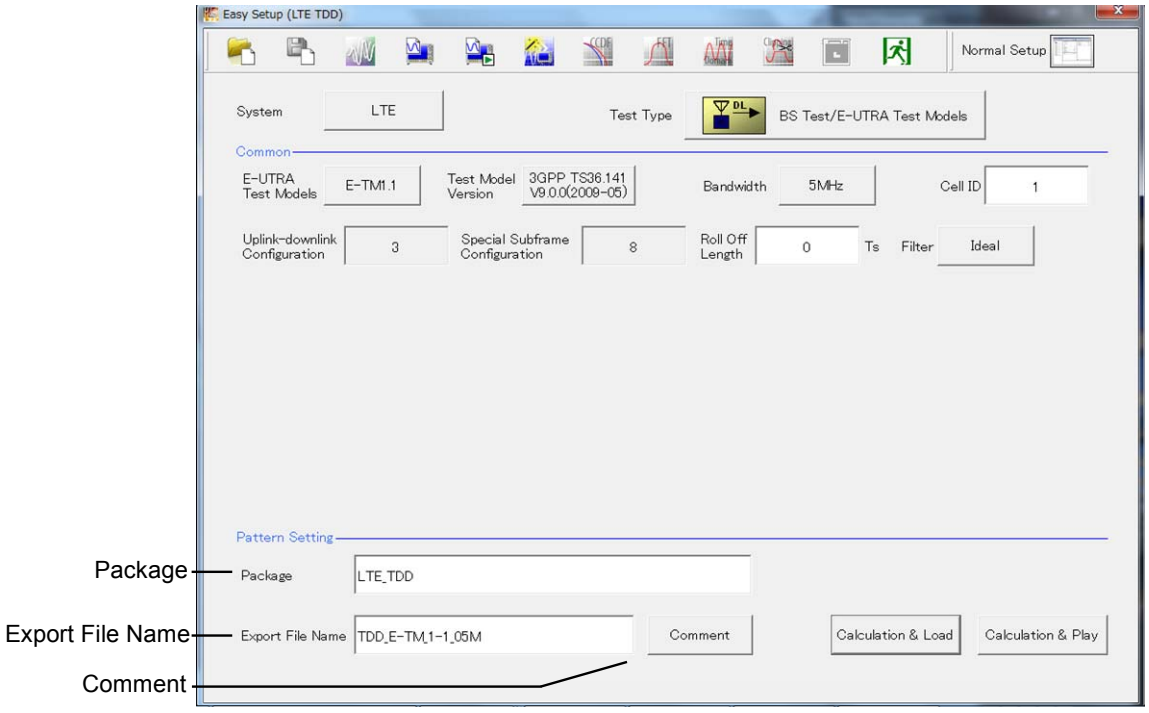


Figure 4.3.2.2-1 Pattern Setting Screen

Package

[Function] Enters waveform pattern package name.

[Default] LTE_TDD

[Setting range] Up to 31 single-byte English alphanumeric characters.

Export File Name

[Function] Enters waveform pattern file name.

[Default] TDD_E-TM_1-1_05M

[Setting range] Up to 18 single-byte English alphanumeric characters.

Comment

[Function] Inputs comments to the waveform pattern.

[Default] Blank

[Setting range] Up to 38 single-byte English alphanumeric characters × 3 lines.

[Remarks] Clicking **Comment** displays the following Comment dialog box. Input the comment and click **OK** to set the comment.

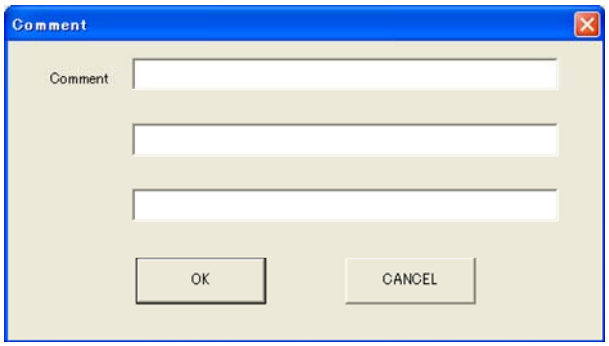


Figure 4.3.2.2-2 Comment Dialog Box

4.3.3 BS Test/FRC (UL)

This screen is used to create the FRC (Fixed Reference Channel) waveform pattern used by the LTE BS Rx test.

4.3.3.1 Common parameters

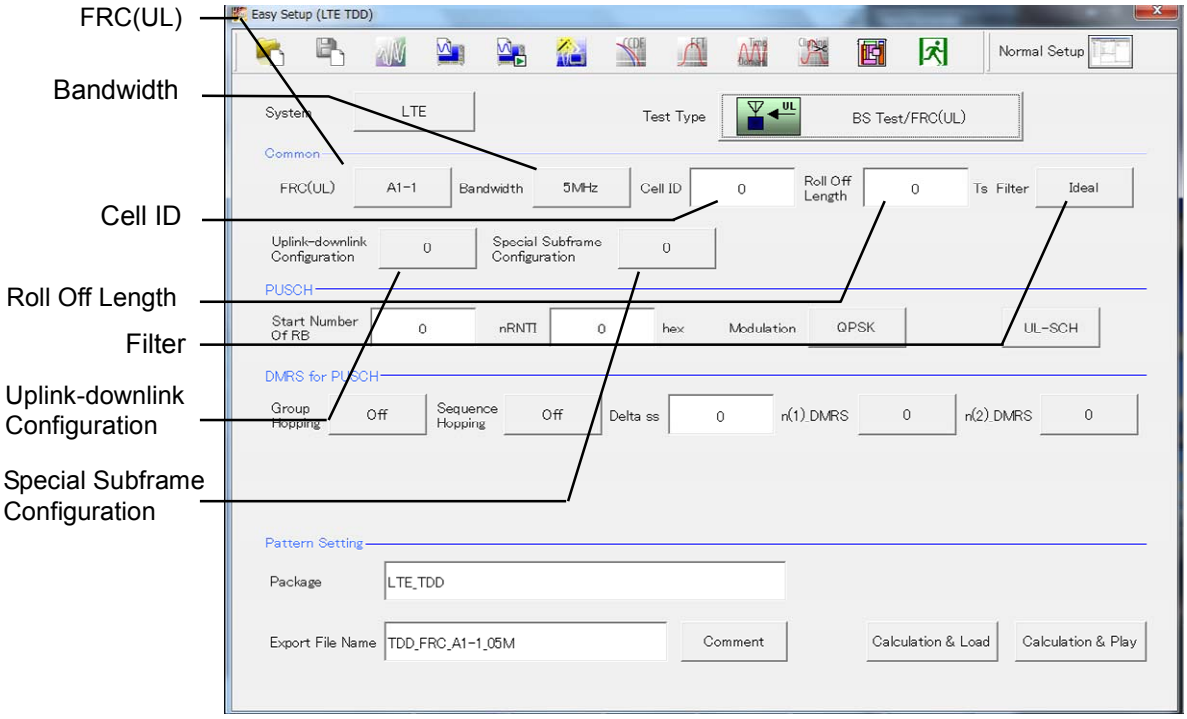


Figure 4.3.3.1-1 BS Test/FRC (UL) Common Setting Screen

FRC(UL)

[Function] Selects the setting items described in 3GPP TS36.141 Annex A and automatically sets the parameters.

[Default] A1-1

[Options] A1-1, A1-2, A1-3, A1-4, A1-5, A2-1, A2-2, A2-3

[Remarks] Clicking the **FRC (UL)** button displays the following dialog screen. Clicking each button changes the FRC9 UL) type according to the list displayed for each button.

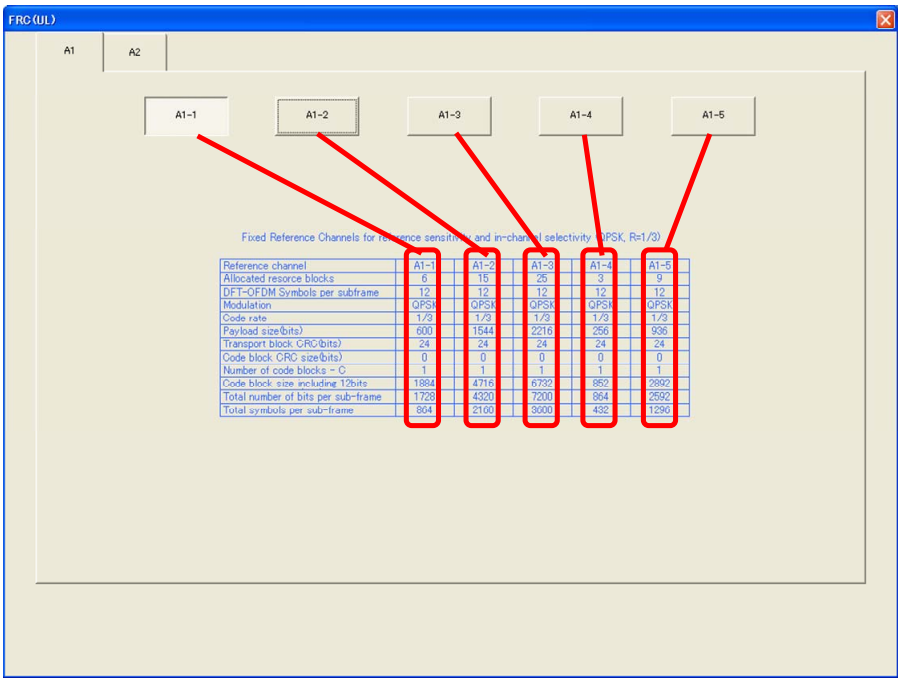


Figure 4.3.3.1-2 FRC (UL) Selection Dialog Box

Bandwidth

[Function] Sets the system bandwidth.

[Default] 5 MHz

[Options] Refer to table 4.3.3.1-1.

[Remarks] Clicking **Bandwidth** displays the following dialog box. Click the relevant Bandwidth to change to it.
The settable bandwidth changes according to the selected FRC (UL).

Figure 4.3.3.1-3 Bandwidth Selection Dialog Box

Table 4.3.3.1-1 Available Bandwidth

FRC(UL)	Available Bandwidth
A1-1	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz
A1-2	3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz
A1-3	5 MHz, 10 MHz, 15 MHz, 20 MHz
A1-4	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz
A1-5	3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz
A2-1	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz
A2-2	3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz
A2-3	5 MHz, 10 MHz, 15 MHz, 20 MHz

Cell ID

[Function] Sets the Cell ID.

[Default] 0

[Setting range] 0 to 503

Roll Off Length

[Function] Sets the length of the ramp time applied to the OFDM symbol.

[Default] 0 Ts

[Setting range] 0 to 144

[Remarks] In the Easy Setup mode, Cyclic Prefix is fixed to Normal and the maximum setting is 144.

Filter

[Function] Sets the filter type.

[Default] Ideal

[Options] Ideal, None

[Remarks] Clicking **Filter** displays the following dialog box. The filter type can be changed by selecting and clicking the filter type.

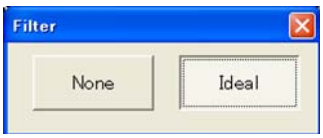


Figure 4.3.3.1-4 Filter Setting Dialog Box

Uplink-downlink configuration

[Function] Sets the Uplink-downlink Configuration.

[Default] 0

[Options] 0, 1, 2, 3, 4, 5, 6

Special Subframe Configuration

[Function] Sets the Special Subframe Configuration.

[Default] 0

[Setting range] 0 to 8

4.3.3.2 PUSCH parameters

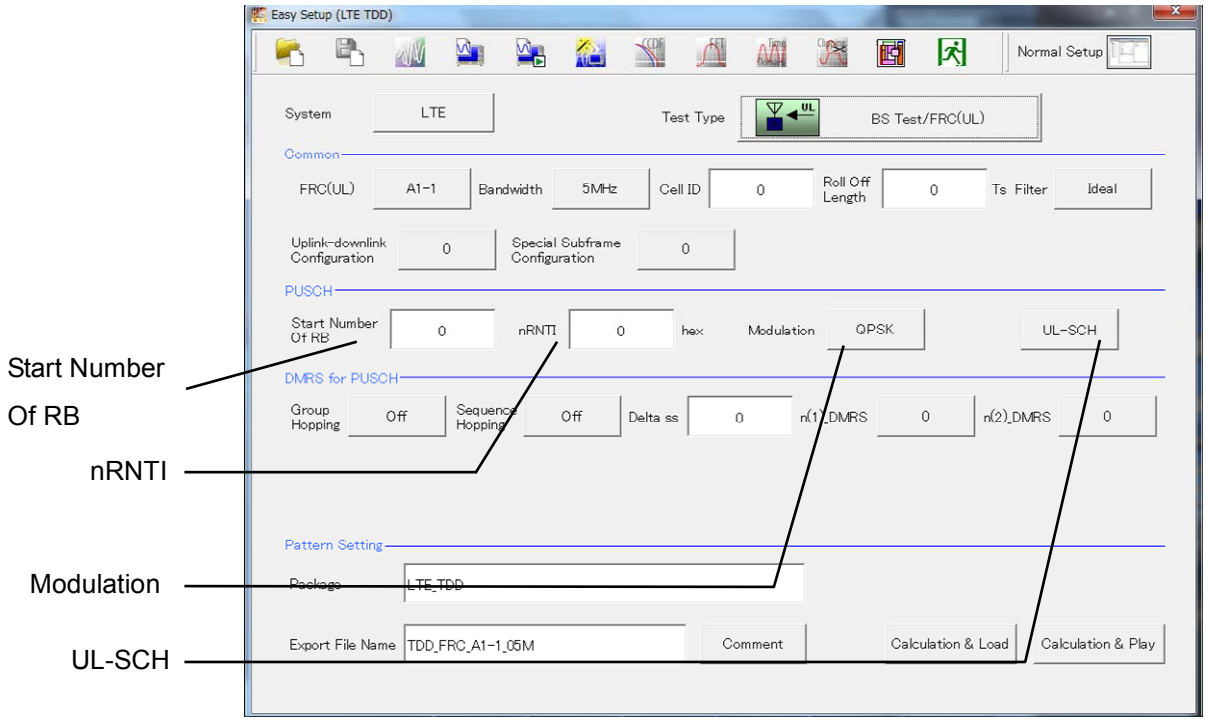


Figure 4.3.3.2-1 PUSCH Parameter Setting Screen

Start Number of RB

[Function] Sets the start position of the RB to which the PUSCH is assigned.

[Default] 0

[Options] Bandwidth = 1.4 MHz: 0 to (6-allocated resource block)
Bandwidth = 3 MHz: 0 to (15-allocated resource block)
Bandwidth = 5 MHz: 0 to (25-allocated resource block)
Bandwidth = 10 MHz: 0 to (50-allocated resource block)
Bandwidth = 15 MHz: 0 to (75-allocated resource block)
Bandwidth = 20 MHz: 0 to (100-allocated resource block)

[Remarks] The Allocated resource block depends on FRC (UL). For details of Allocated resource block values, refer to the items in the FRC (UL) Selection Dialog Box in Figure 4.3.3.1-2.

nRNTI

[Function] Sets the radio network temporary identifier.
[Default] 0
[Setting range] 0 to FFFF

Modulation

[Function] Sets the modulation mode.
[Default] QPSK
[Options] QPSK, 16QAM, 64QAM
[Remarks] Clicking Modulation displays the following dialog box. The modulation method is changed by clicking the relevant button.

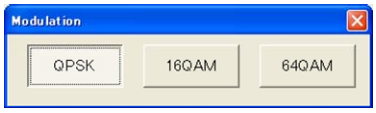


Figure 4.3.3.2-2 Modulation Setting Dialog Box

UL-SCH

Clicking **UL-SCH** displays the following dialog box.

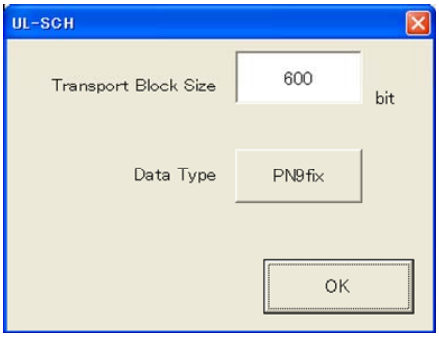


Figure 4.3.3.2-3 UL-SCH Setting Dialog Box

Transport Block Size

[Function] Sets the transport block size for UL-SCH.

[Default] The initial value changes according to the FRC (UL) setting, as shown below.

FRC (UL) Setting	Default
A1-1	600
A1-2	1544
A1-3	2216
A1-4	256
A1-5	936
A2-1	2344
A2-2	5992
A2-3	9912

[Setting range] 0 to 86400

[Remarks] Since the PUSCH range is limited by the Resource Block allocation, errors may sometimes occur depending on the settings. If an error occurs, neither Calculation processing nor graph display is executed. In addition, the UL-SCH button and Transport Block Size display an error (red).

Data Type

[Function] Sets the Data type.

[Default] PN9fix

[Options] PN9fix, PN15fix, All0, All1

[Remarks] Clicking **Data Type** displays the following dialog box. The Data Type can be changed by clicking Data Type.

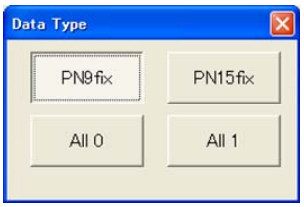


Figure 4.3.3.2-4 Data Type Setting Dialog Box

4.3.3.3 DMRS for PUSCH parameters

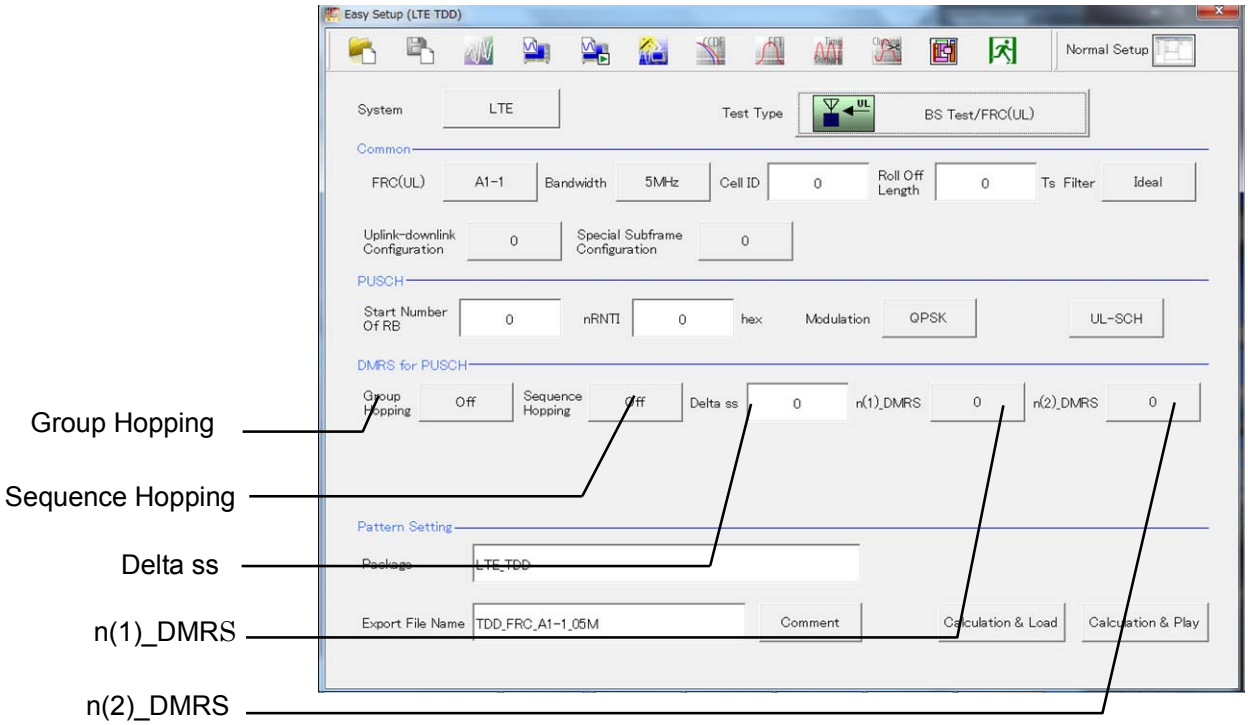


Figure 4.3.3.3-1 DMRS for PUSCH Parameter Setting Screen

Group Hopping

[Function] Enables or disables group hopping.

[Default] Off

[Options] Off, On

[Remarks] Clicking Group Hopping toggles Group Hopping On and Off.

Sequence Hopping

[Function] Enables or disables Sequence Hopping.

[Default] Off

[Options] Off, On

[Remarks] Clicking **Sequence Hopping** toggles Sequence Hopping On and Off. However, this parameter is invalid if Group Hopping is Enable.

Delta ss

[Function] Sets Delta ss.

[Default] 0

[Setting range] 0 to 29

n(1)_DMRS

[Function] Sets the value used for automatic n_cs calculation.

[Default] 0

[Options] 0, 2, 3, 4, 6, 8, 9, 10

[Remarks] Clicking **n(1)_DMRS** displays the following dialog box. n(1)_DMRS can be changed by selecting and clicking n(1)_DMRS.

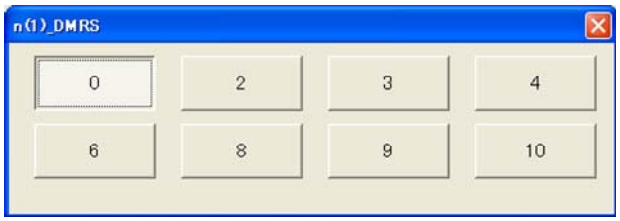


Figure 4.3.3.3-2 n(1)_DMRS Selection Dialog Box

n(2)_DMRS

[Function] Sets the value used for automatic n_cs calculation.

[Default] 0

[Options] 0, 2, 3, 4, 6, 8, 9, 10

[Remarks] Clicking **n(2)_DMRS** displays the following dialog box. n(2)_DMRS can be changed by selecting and clicking n(2)_DMRS.

Figure 4.3.3.3-3 n(2)_DMRS Selection Dialog Box

4.3.3.4 Pattern setting

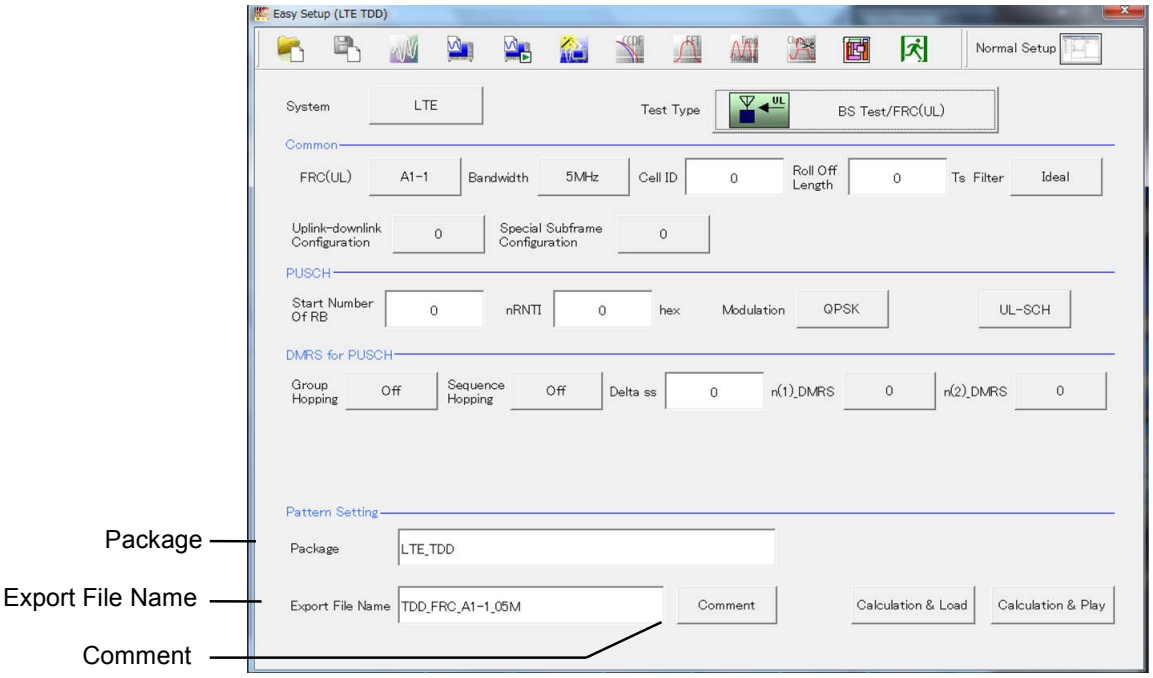


Figure 4.3.3.4-1 Pattern Setting Screen

Package

[Function] Enters waveform pattern package name.

[Default] LTE_TDD

[Setting range] Up to 31 single-byte English alphanumeric characters.

Export File Name

[Function] Enters waveform pattern file name.

[Default] TDD_FRC_A1-1_05M

[Setting range] Up to 18 single-byte English alphanumeric characters.

Comment

[Function] Inputs comments to the waveform pattern.

[Default] Blank

[Setting range] Up to 38 single-byte English alphanumeric characters × 3 lines.

[Remarks] Clicking **Comment** displays the following Comment dialog box. Input the comment and click **OK** to set the comment.

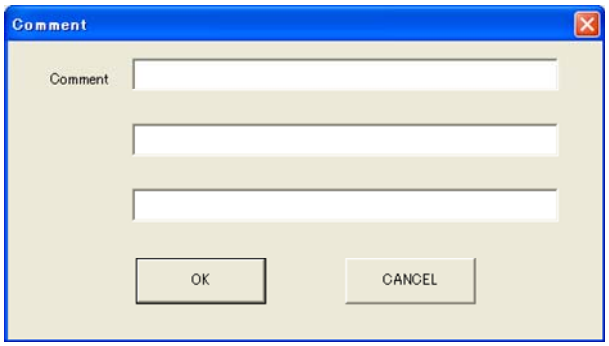


Figure 4.3.3.4-2 Comment Dialog Box

4.3.4 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.

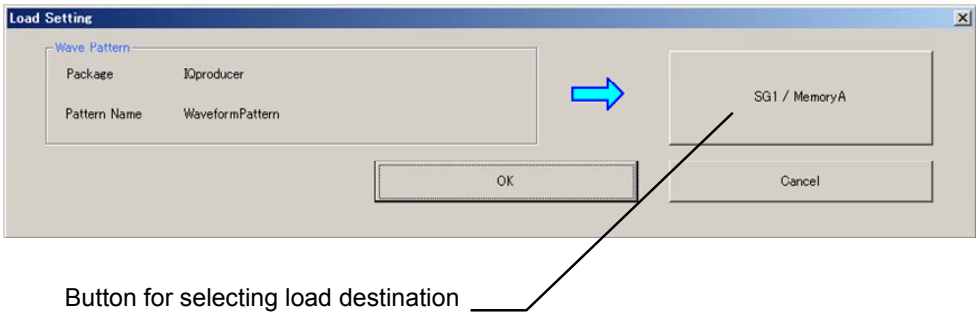


Figure 4.3.4-1 Load Setting Screen

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

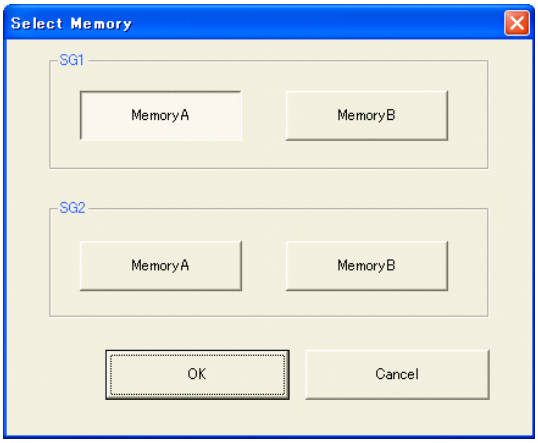


Figure 4.3.4-2 Select Memory Screen

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

Note:

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

4.3.5 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.

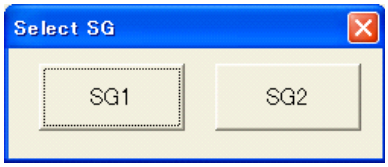


Figure 4.3.5-1 Select SG Screen

4.3.6 Frame Structure screen

Clicking  on the tool bar ribbon of the Main screen displays the Frame Structure screen. For details, refer to section 3.1.7 “Frame Structure screen”.

Note:

The Frame Structure screen is not available when BS Test/E-UTRA Test Model is set for Test Type.

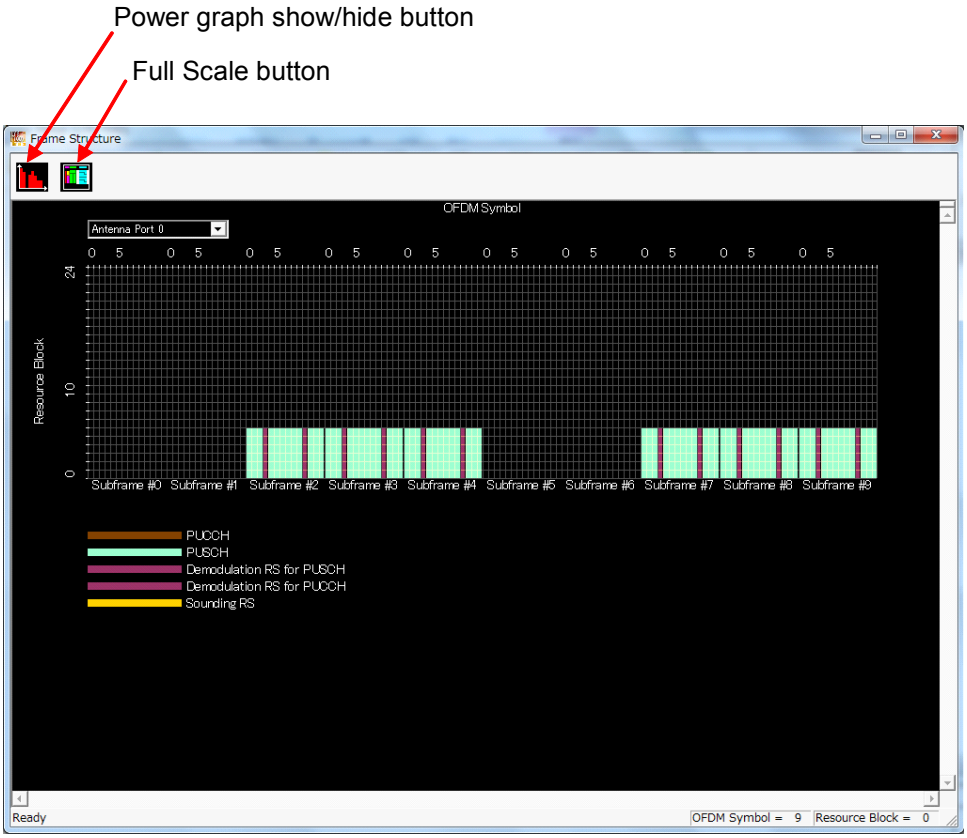


Figure 4.3.6-1 Frame Structure Screen

The following operations can be performed at the MG3710A touch panel.

- Boundary between Resource Block and OFDM Symbol Power
- Frame Structure zoom display

4.4 Waveform Creation Function Details (LTE-Advanced)

When **LTE-Advanced** is selected with the **System** button on the main screen, the Carrier Aggregation Mode = Intra-band Setting screen is displayed as the main screen.

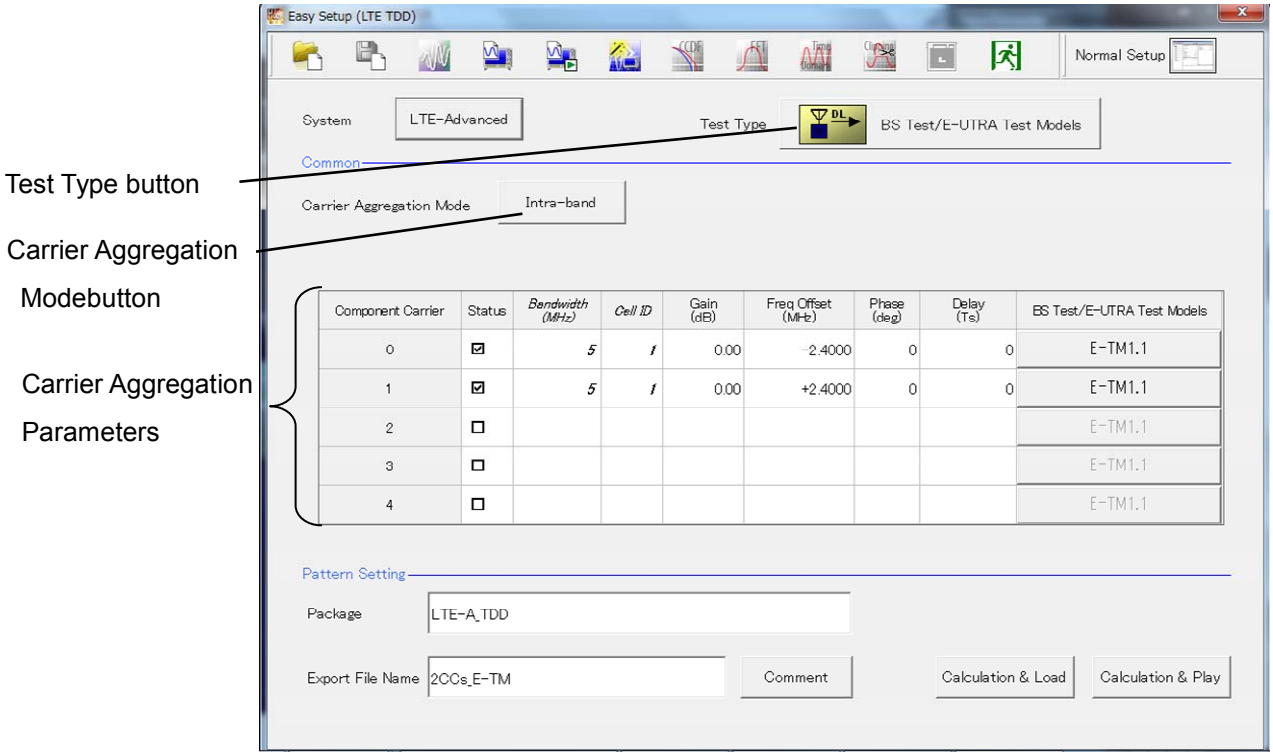
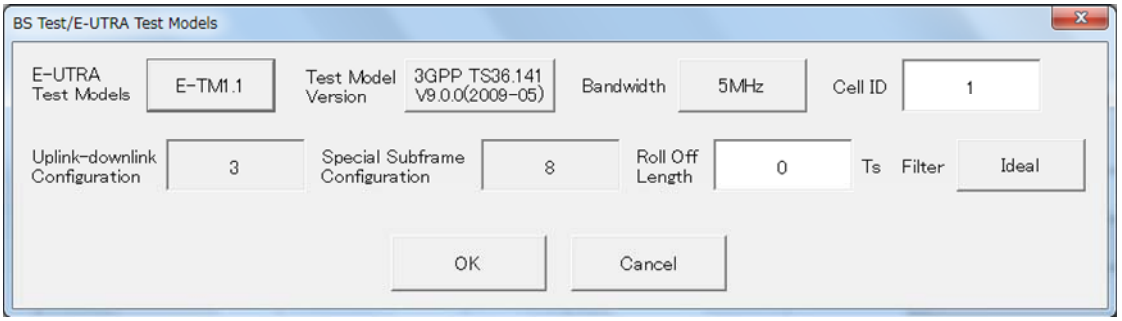


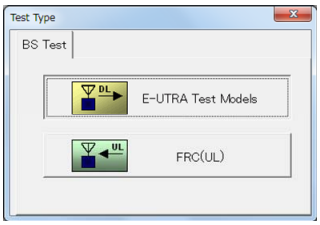
Figure 4.4-1 Main Screen (LTE-Advanced)

4.4.1 Test Type

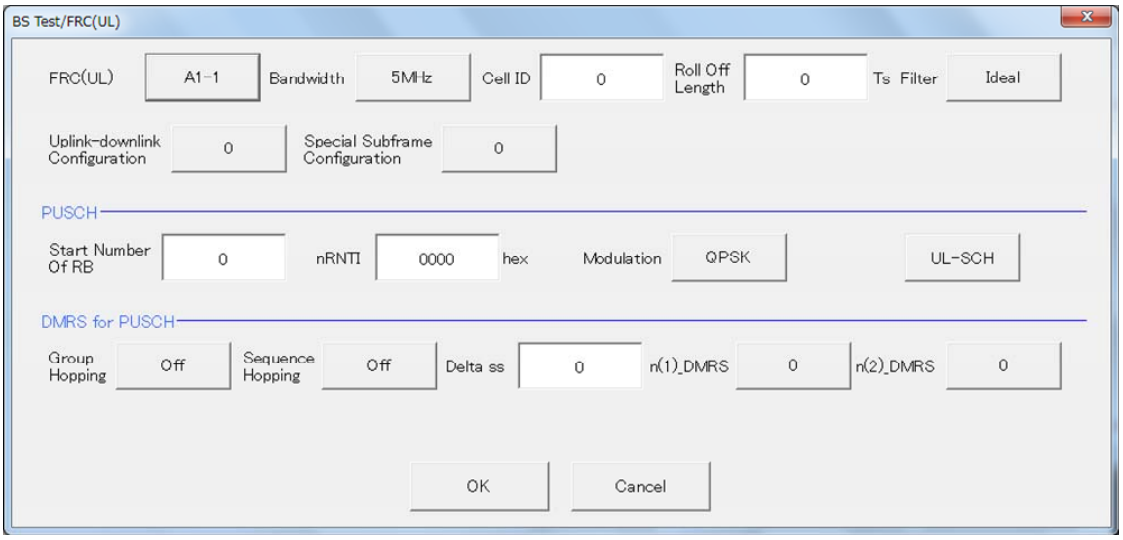
Clicking **Test Type** on the main screen displays the Test Type selection screen. Either **E-UTRA Test Models** or **FRC(UL)** can be selected. The screen switches to the relevant Test Type setting screen according to the clicked button.



BS Test/E-UTRA Test Models Setting Screen



Test Type Selection Screen



BS Test/FRC(UL) Setting Screen

Figure 4.4.1-1 Test Type

Test Type

[Function] Sets the Test Type.

[Default] E-UTRA Test Models

[Options] E-UTRA Test Models, FRC (UL)

4.4.2 BS Test/E-UTRA Test Models

This screen is used to create the Test Model waveform pattern used by the LTE BS Tx test. To save the new settings, click **OK**. To cancel the settings and exit the screen, click **Cancel**.

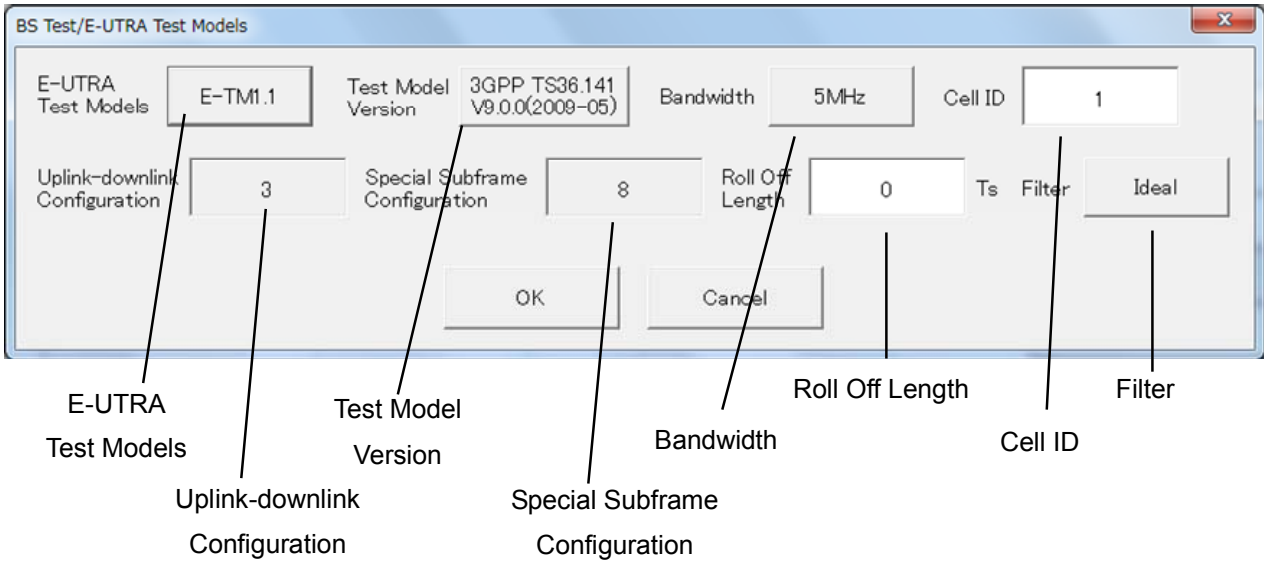


Figure 4.4.2-1 BS Test/E-UTRA Test Models Setting Screen

E-UTRA Test Models

[Function] Sets the E-UTRA Test Models.

[Default] E-TM1.1

[Options] E-TM1.1, E-TM1.2, E-TM2, E-TM2a, E-TM3.1, E-TM3.1a, E-TM3.2, E-TM3.3

[Remarks] Clicking **E-UTRA Test Models** displays the following dialog box. Click the relevant Test Model to change to it.

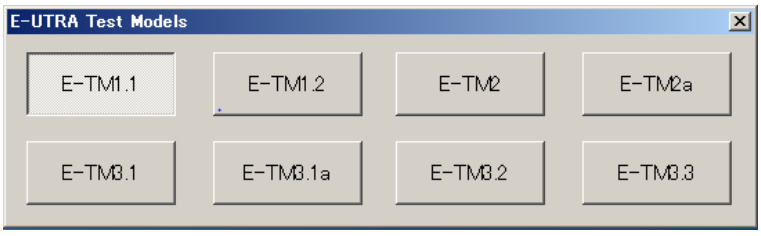


Figure 4.4.2-2 E-UTRA Test Models Selection Dialog Box

Test Model Version

[Function]

Sets the Test Model version of referred specifications.

[Default] 3GPP TS36.141 V9.0.0(2009-05)

[Options] 3GPP TS36.141 V8.2.0(2009-03)

3GPP TS36.141 V9.0.0(2009-05)

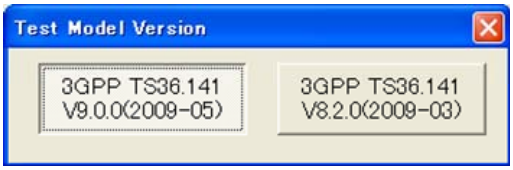


Figure 4.4.2-3 Test Model Version Selection Dialog Box

Bandwidth

[Function] Sets the system bandwidth.

[Default] 5 MHz

[Options] 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz

[Remarks] Clicking **Bandwidth** displays the following dialog box. Click the relevant Bandwidth to change to it.

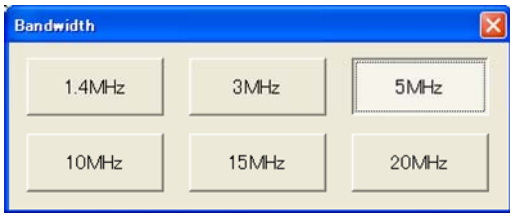


Figure 4.4.2-4 Bandwidth Selection Dialog Box

Cell ID

[Function] Sets the Cell ID.

[Default] 1

[Setting range] 0 to 503

Uplink-downlink Configuration

[Function] Sets the Uplink-downlink configuration.

[Default] 3

[Remarks] When the Test Type is BS Test/E-UTRA TestModels, the Uplink-downlink configuration is fixed to 3.

Special Subframe Configuration

[Function] Sets the Special Subframe Configuration.

[Default] 8

[Remarks] When the Test Type is BS Test/E-UTRA TestModels, the Special Subframe Configuration is fixed to 8.

Roll Off Length

[Function] Sets the length of the ramp time applied to the OFDM symbol.

[Default] 0 Ts

[Setting range] 0 to 144

[Remarks] In the Easy Setup mode, Cyclic Prefix is fixed to Normal and the maximum setting is 144.

Filter

[Function] Sets filter.

[Default] Ideal

[Options] Ideal, None

[Remarks] Clicking **Filter** displays the following dialog box. The filter type can be changed by selecting and clicking the filter type.

Figure 4.4.2-5 Filter Setting Dialog Box

4.4.3 BS Test/FRC(UL)

This screen is used to create the FRC (Fixed Reference Channel) waveform pattern used by the LTE BS Rx test. To save the new settings, click **OK**. To cancel the settings and exit the screen, click **Cancel**.

4.4.3.1 Common Parameters

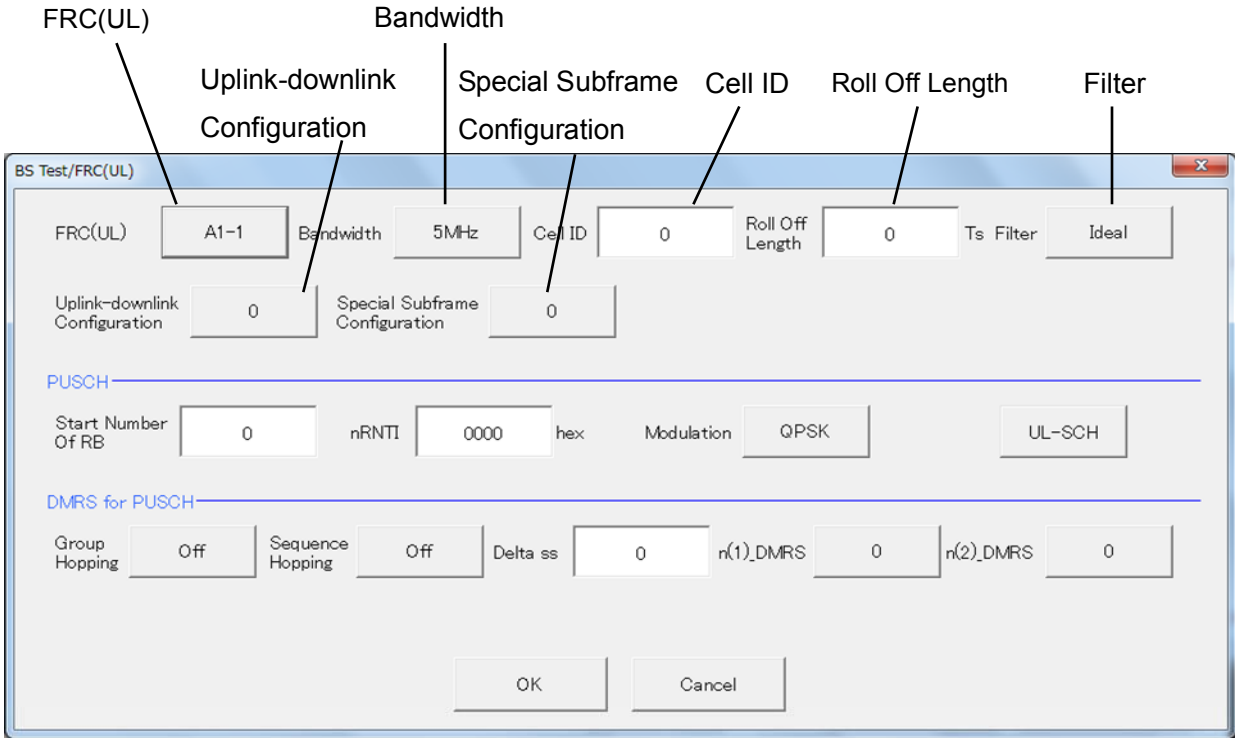


Figure 4.4.3.1-1 BS Test/FRC(UL) Common Parameter Setting Screen

FRC(UL)

[Function] Selects the setting items described in 3GPP TS36.141 Annex A and automatically sets the parameters.

[Default] A1-1

[Options] A1-1, A1-2, A1-3, A1-4, A1-5, A2-1, A2-2, A2-3

[Remarks] Clicking the **FRC (UL)** button displays the following dialog screen. Clicking each button changes the FRC9 UL) type according to the list displayed for each button.

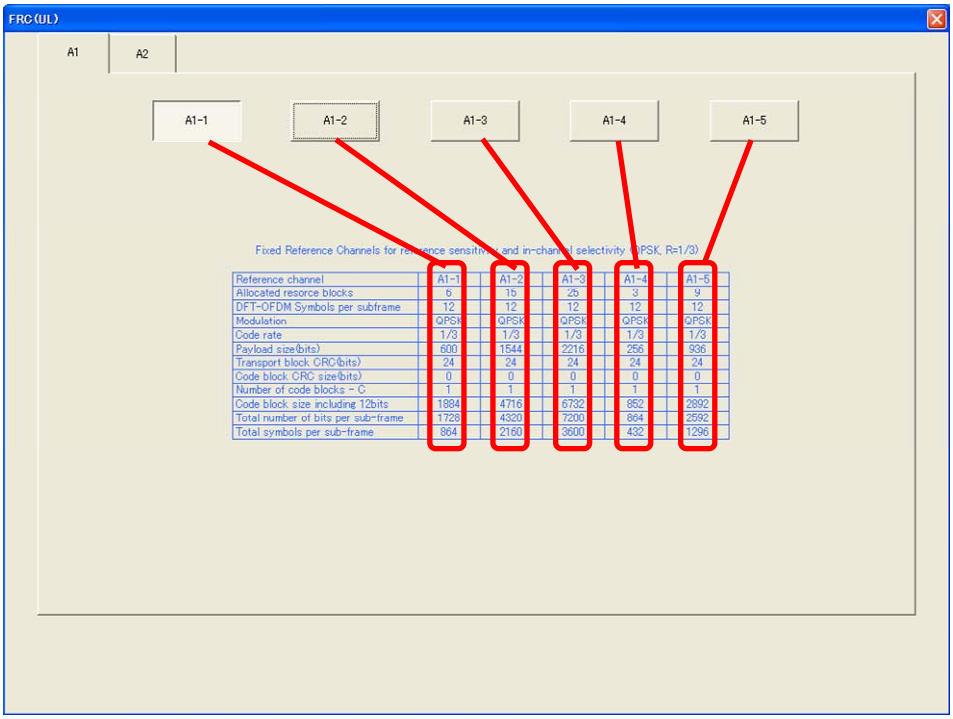


Figure 4.4.3.1-2 FRC (UL) Selection Dialog Box

Bandwidth

[Function] Sets the system bandwidth.

[Default] 5 MHz

[Options] Refer to table 4.4.3.1-1.

[Remarks] Clicking **Bandwidth** displays the following dialog box. Click the relevant Bandwidth to change to it. The settable bandwidth changes according to the selected FRC (UL).

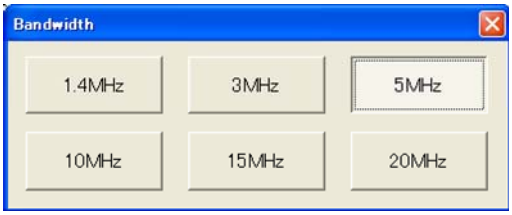


Figure 4.4.3.1-3 Bandwidth Selection Dialog Box

Table 4.4.3.1-1 Available Bandwidth

FRC(UL)	Available Bandwidth
A1-1	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz
A1-2	3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz
A1-3	5 MHz, 10 MHz, 15 MHz, 20 MHz
A1-4	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz
A1-5	3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz
A2-1	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz
A2-2	3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz
A2-3	5 MHz, 10 MHz, 15 MHz, 20 MHz

Cell ID
[Function] Sets the Cell ID.
[Default] 0
[Setting range] 0 to 503

Roll Off Length
[Function] Sets the length of the ramp time applied to the OFDM symbol.
[Default] 0 Ts
[Setting range] 0 to 144
[Remarks] In the Easy Setup mode, Cyclic Prefix is fixed to Normal and the maximum setting is 144.

Filter
[Function] Sets the filter type.
[Default] Ideal
[Options] Ideal, None
[Remarks] Clicking **Filter** displays the following dialog box. The filter type can be changed by selecting and clicking the filter type.

Figure 4.4.3.1-4 Filter Setting Dialog Box

Uplink-downlink Configuration
[Function] Sets the Uplink-downlink Configuration.
[Default] 0
[Setting range] 0, 1, 2, 3, 4, 5, 6

Special Subframe Configuration

[Function] Sets the Special Subframe Configuration.

[Default] 0

[Setting range] 0 to 8

4.4.3.2 PUSCH Parameters

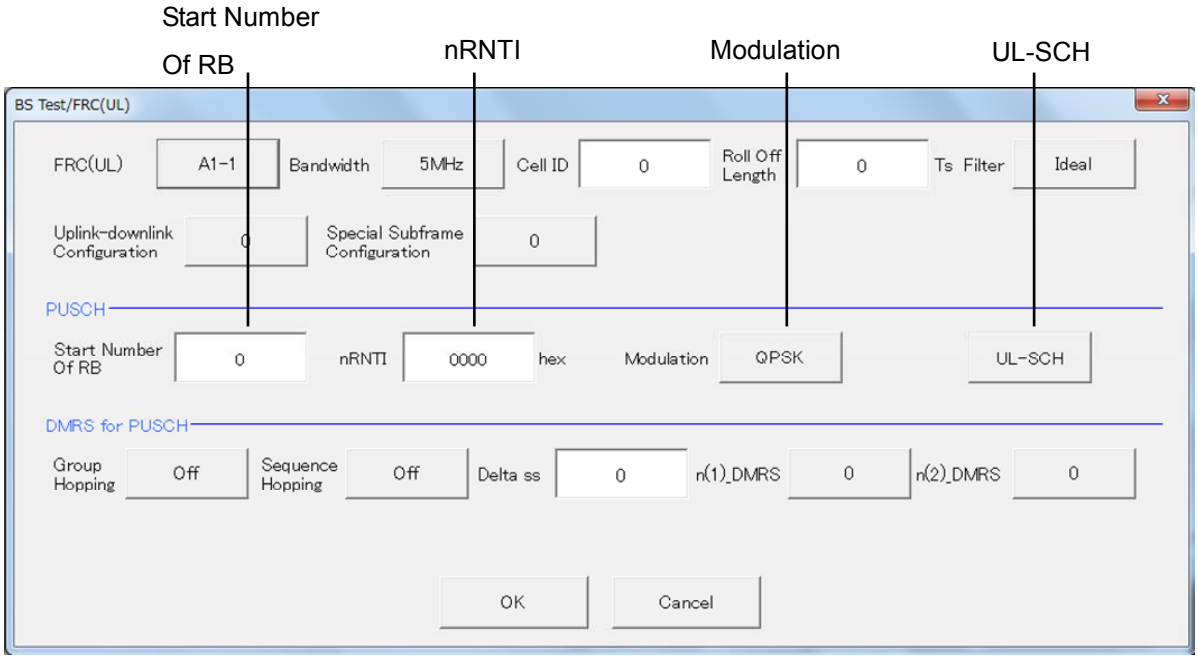


Figure 4.4.3.2-1 PUSCH Parameter Setting Screen

Start Number of RB

[Function] Sets the start position of the RB to which the PUSCH is assigned.

[Default] 0

[Options] Bandwidth = 1.4 MHz: 0 to (6–allocated resource block)
Bandwidth = 3 MHz: 0 to (15–allocated resource block)
Bandwidth = 5 MHz: 0 to (25–allocated resource block)
Bandwidth = 10 MHz: 0 to (50–allocated resource block)
Bandwidth = 15 MHz: 0 to (75–allocated resource block)
Bandwidth = 20 MHz: 0 to (100–allocated resource block)

[Remarks] The Allocated resource block depends on FRC (UL).
For details of Allocated resource block values, refer to the items in the FRC (UL) Selection Dialog Box in Figure 4.4.3.2-2.

nRNTI

[Function] Sets the radio network temporary identifier.
[Default] 0
[Setting range] 0 to FFFF

Modulation

[Function] Sets the modulation mode.
[Default] QPSK
[Options] QPSK, 16QAM, 64QAM
[Remarks] Clicking **Modulation** displays the following dialog box. The modulation method is changed by clicking the relevant button.

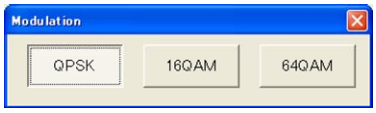


Figure 4.4.3.2-2 Modulation Setting Dialog Box

UL-SCH

Clicking **UL-SCH** displays the following dialog box.

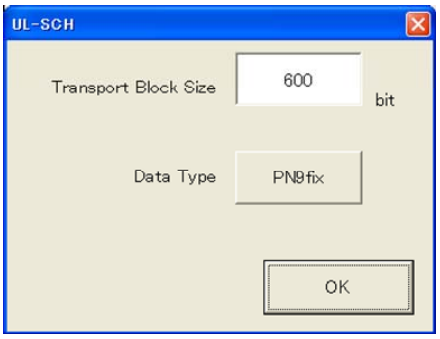


Figure 4.4.3.2-3 UL-SCH Setting Dialog Box

Transport Block Size

[Function] Sets the transport block size for UL-SCH.

[Default] The initial value changes according to the FRC (UL) setting, as shown below.

Table 4.4.3.2-1 Default of the Transport Block Size

FRC (UL) Setting	Default
A1-1	600
A1-2	1544
A1-3	2216
A1-4	256
A1-5	936
A2-1	2344
A2-2	5992
A2-3	9912

[Setting range] 0 to 86400

[Remarks] Since the PUSCH range is limited by the Resource Block allocation, errors may sometimes occur depending on the settings. If an error occurs, neither Calculation processing nor graph display is executed. In addition, the **UL-SCH** button and Transport Block Size display an error (red).

Data Type

[Function] Sets the Data type.

[Default] PN9fix

[Options] PN9fix, PN15fix, All0, All1

[Remarks] Clicking **Data Type** displays the following dialog box. The Data Type can be changed by clicking Data Type.

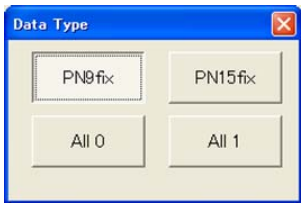


Figure 4.4.3.2-4 Data Type Setting Dialog Box

4.4.3.3 DMRS for PUSCH Parameters

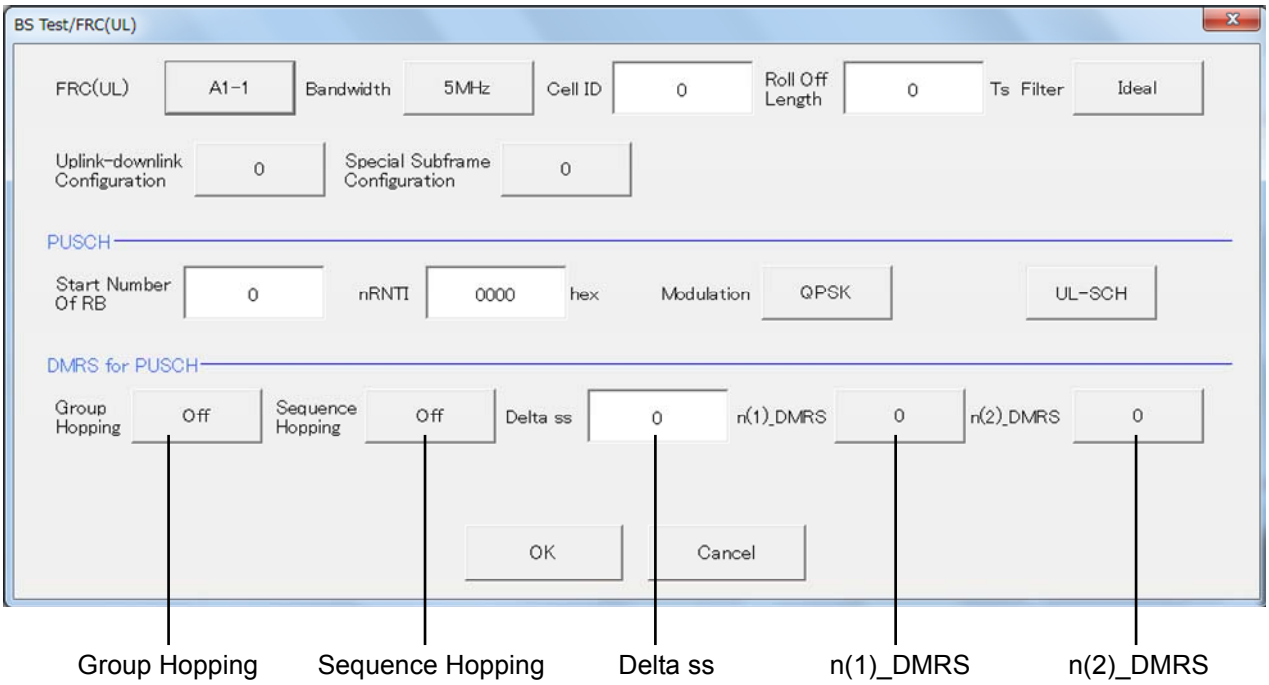


Figure 4.4.3.3-1 DMRS for PUSCH Parameters Setting Screen

Group Hopping

[Function] Enables or disables group hopping.

[Default] Off

[Options] Off, On

[Remarks] Clicking Group Hopping toggles **Group Hopping** On and Off.

Sequence Hopping

[Function] Enables or disables Sequence Hopping.

[Default] Off

[Options] Off, On

[Remarks] Clicking **Sequence Hopping** toggles Sequence Hopping On and Off.

Delta ss

[Function] Sets Delta ss.

[Default] 0

[Setting range] 0 to 29

n(1)_DMRS

[Function] Sets the value used for automatic n_cs calculation.

[Default] 0

[Options] 0, 2, 3, 4, 6, 8, 9, 10

[Remarks] Clicking **n(1)_DMRS** displays the following dialog box. n(1)_DMRS can be changed by selecting and clicking n(1)_DMRS.

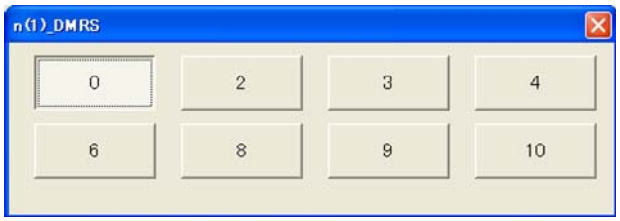


Figure 4.4.3.3-2 n(1)_DMRS Selection Dialog Box

n(2)_DMRS

[Function] Sets the value used for automatic n_cs calculation.

[Default] 0

[Options] 0, 2, 3, 4, 6, 8, 9, 10

[Remarks] Clicking **n(2)_DMRS** displays the following dialog box. n(2)_DMRS can be changed by selecting and clicking n(2)_DMRS.

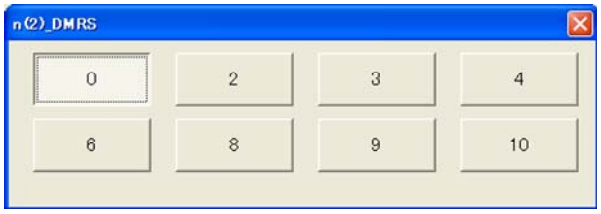


Figure 4.4.3.3-3 n(2)_DMRS Selection Dialog Box

4.4.4 Carrier Aggregation Mode

When the LTE TDD IQproducer is running and **LTE-Advanced** is selected with the **System** button, Carrier Aggregation Mode is displayed as the main screen for Intra-band. Clicking **Carrier Aggregation Mode** displays the Carrier Aggregation Mode selection screen. Either **Intra-band** or **Inter-band** can be selected. The screen switches to the relevant Carrier Aggregation Mode setting screen according to the clicked button.

Carrier Aggregation Mode

[Function] Sets the Carrier Aggregation Mode.
[Default] Intra-band
[Options] Intra-band, Inter-band

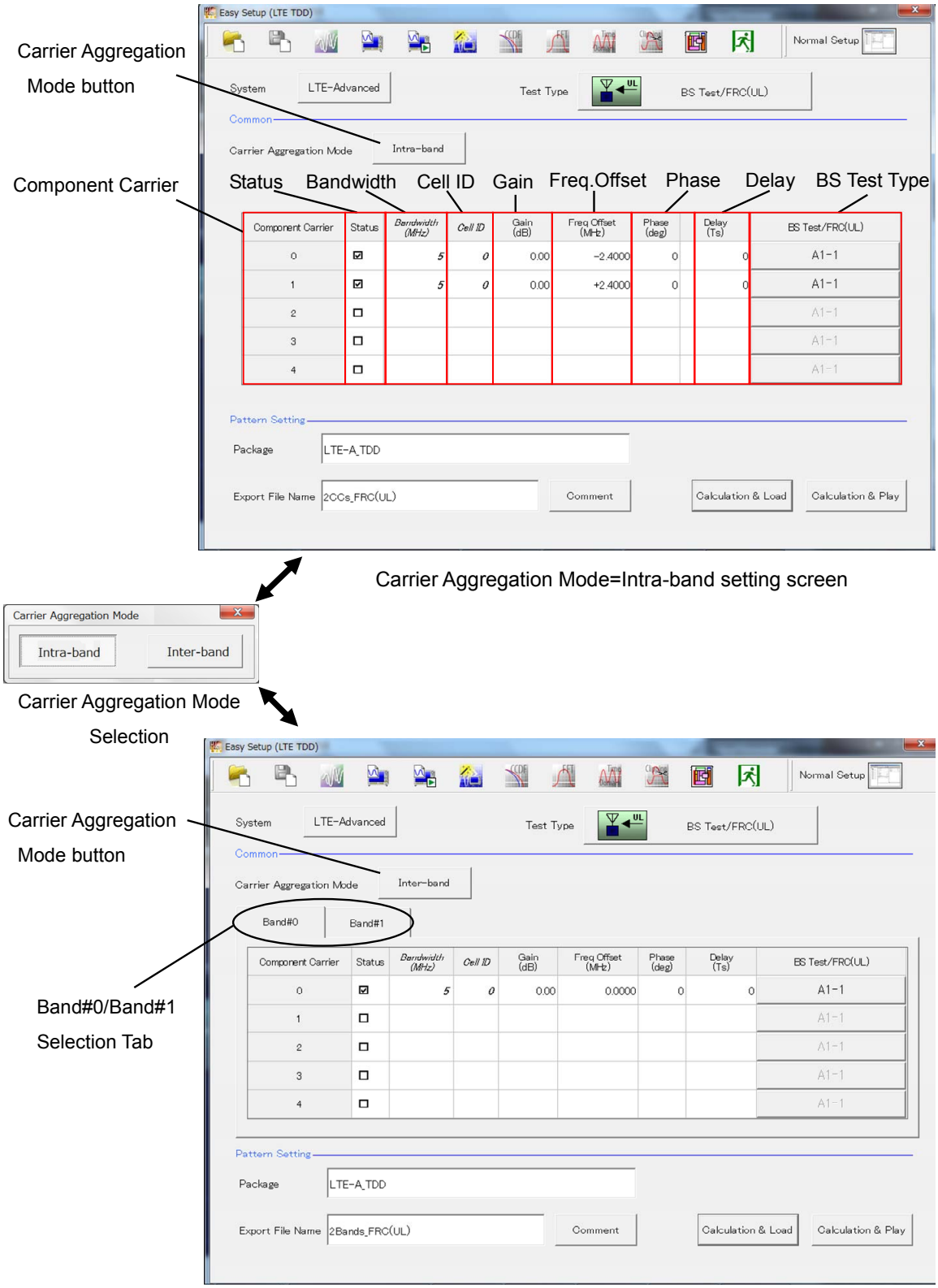


Figure 4.4.4-1 Carrier Aggregation Mode

4.4.4.1 Parameters

Component Carrier

[Function] Displays the Component Carrier number.

[Display range] 0 to 4

[Remarks] When Carrier Aggregation Mode is Inter-band, Component Carrier number (#0 to #4) is displayed for Band#0 and Band#1, respectively.

Status

[Function] Enables or disables the Component Carrier parameter.

[Setting range] Check box selected, or cleared.

[Remarks] When Carrier Aggregation Mode is Intra-band, Component Carrier #0 and #1 check boxes are selected and others are cleared by default.
When Carrier Aggregation Mode is Inter-band, Component Carrier #0 check boxes for Band#0 and Band#1 are selected and others are cleared by default.

Bandwidth

[Function] Displays the system bandwidth for the Component Carrier.

[Default] 5 [MHz]

[Display range] 1.4, 3, 5, 10, 15, 20 [MHz]

[Remarks] The bandwidth set with BS Test is displayed. This cannot be changed.

Cell ID

[Function] Displays the cell ID for the Component Carrier.

[Default] 0

[Display range] 0 to 503

Gain

[Function] Sets the level ratio of Component Carrier.

[Default] 0.00 [dB]

[Setting range] –80.00 to 0.00 [dB]

[Resolution] 0.01 [dB]

[Remarks] Clicking **Gain** displays the numeric keypad where values can be input.

Freq.Offset

[Function] Sets the frequency offset.

[Setting range] 0 to $\pm(0.4 \times Fs - 0.5 \times Band)$ [MHz]

Band : Refer to Remarks.

Fs : 153.6 MHz (sampling rate)

[Resolution] 100 [Hz]

[Default] When the Carrier Aggregation Mode is Intra-band,

–2.4000 [MHz] at Component Carrier #0

2.4000 [MHz] at Component Carrier #1

When the Carrier Aggregation Mode is Inter-band,

0.0000 [MHz]

[Remarks] Clicking **Freq.Offset** displays the numeric keypad where values can be input.

The transmission bandwidth (Band) within the setting range is changed as follows, depending on the Component Carrier# transmission system bandwidth (Bandwidth).

Table 4.4.4.1-1 Bandwidth versus Band

Bandwidth [MHz]	Band [MHz]
1.4	1.095
3.0	2.715
5.0	4.515
10.0	9.015
15.0	13.515
20.0	18.015

Phase

[Function] Sets the initial phase of the Component Carrier.

[Default] 0 [deg.]

[Setting range] 0 to 359 [deg.]

[Resolution] 1 [deg.]

[Remarks] Clicking **Phase** displays the numeric keypad where values can be input.

Delay

[Function] Sets delay of the Component Carrier.

[Default] 0 [Ts]

[Setting range] 0 to 307200 [Ts]

[Resolution] 1 to 16

[Remarks] Clicking **Phase** displays the numeric keypad where values can be input.
The resolution changes depending on the Bandwidth as follows. If values other than the resolution are input, the values are changed to the resolution closest to the input values.

Table 4.4.4.2-1 Bandwidth versus Resolution of the Delay

Bandwidth [MHz]	Resolution [Ts]	Setting example
1.4	16	0,16,32, …
3	8	0,8,16, …
5	4	0,4,8, …
10	2	0,2,4, …
15	2	0,2,4, …
20	1	0,1,2, …

BS Test Type

[Function] Sets the details of BS Test Type of Component Carriers.

[Default] BS Test/E-UTRA Test Models

[Remarks] Clicking **BS Test Type** displays the screen shown in Figure 4.4.2-1 when BS Test/E-UTRA Test Models is selected for Test Type and displays the screen shown in Figure 4.4.3.1-1 when BS Test/FRC(UL) is selected for Test Type.
For details of Test Type, refer to Section 4.4.2 “BS Test/E-UTRA Test Models” and Section 4.4.3 “BS Test/FRC (UL)”.

4.4.5 Pattern Setting

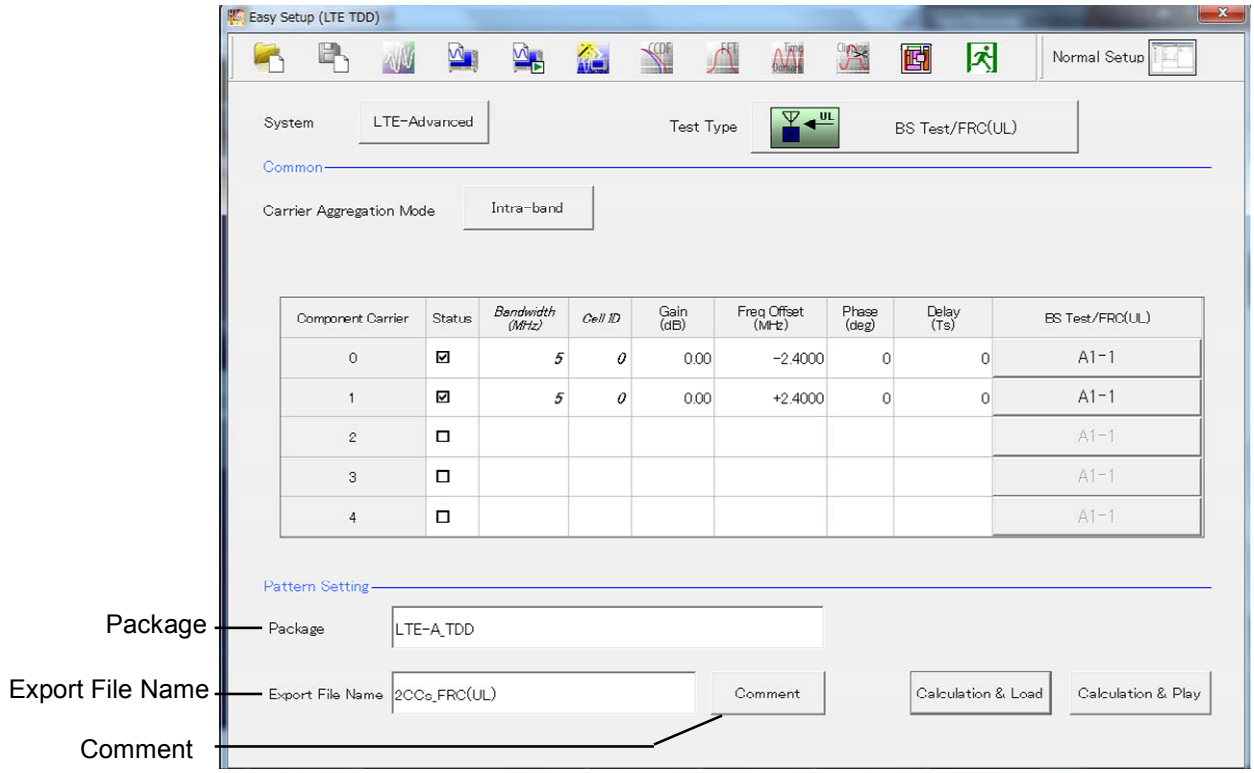


Figure 4.4.5-1 Pattern Setting Screen

Package

[Function] Enters waveform pattern package name.

[Default] LTE_TDD

[Setting range] Up to 31 single-byte English alphanumeric characters.

Export File Name

[Function] Enters waveform pattern file name.

[Default] The file name depends on the selected parameter.

- Carrier Aggregation Mode = Intra-band

  Number of Component Carriers = n,

  When BS Test Type = FRC(UL)

  1CC_FRC(UL) n=1

  nCCs_FRC(UL) n=2 to 5

  Number of Component Carriers = n,

  When BS Test Type = E-UTRA Test Models

  1CC_E-TM n=1

  nCCs_E-TM n=2 to 5

• Carrier Aggregation Mode = Inter-band
(n : number of Bands, # : Band number)
When BS Test Type = FRC(UL)
nBands_FRC(UL)_B#
When BS Test Type = E-UTRA Test Models
nBands_E-TM_B#

[Setting range] • Carrier Aggregation Mode = Intra-band
Up to 18 single-byte English alphanumeric characters
• Carrier Aggregation Mode = Inter-band
Up to 15 single-byte English alphanumeric characters

Comment

[Function] Inputs comments to the waveform pattern.

[Default] Blank

[Setting range] Up to 38 single-byte English alphanumeric characters × 3 lines.

[Remarks] Clicking **Comment** displays the following Comment dialog box. Input the comment and click **OK** to set the comment.

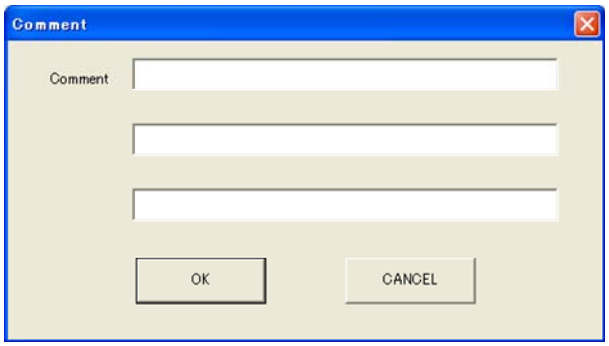


Figure 4.4.5-2 Comment Dialog Box

4.4.6 Calculation & Load

Note:

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

When the Carrier Aggregation Mode sets Inter-band and Calculation & Load is selected, the Load Setting screen will display after waveform generation.

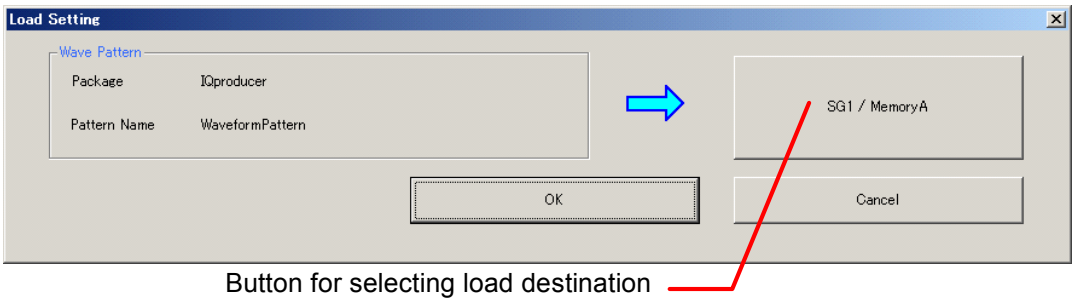


Figure 4.4.6-1 Load Setting Screen

When Carrier Aggregation Mode is set to Inter-band, selecting **Calculation & Load** displays the Load Setting screen as shown below after completion of waveform generation.
For Inter-band, two waveforms for SG1 and SG2 are output; therefore, two Export File Names are displayed.

Note:

This function is available only when the 2nd RF (option) is installed

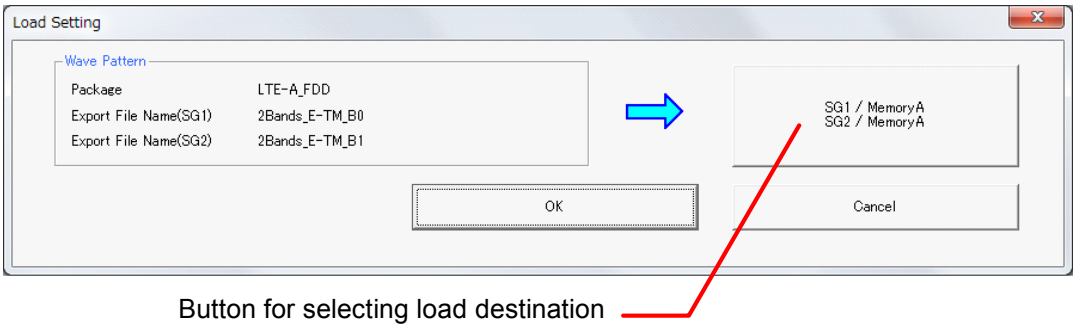


Figure 4.4.6-2 Load Setting Screen (Carrier Aggregation Mode = Inter-band)

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

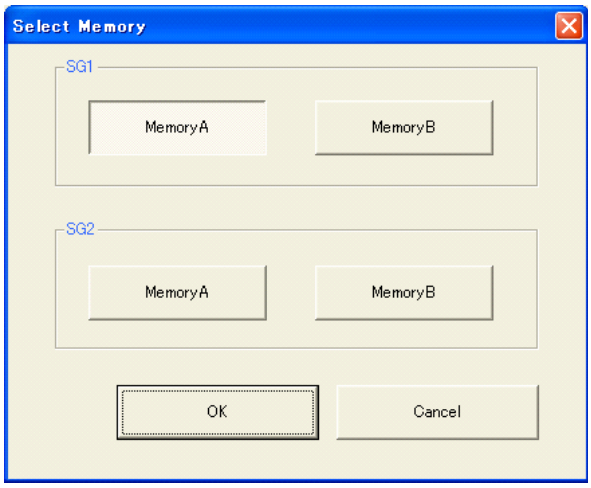


Figure 4.4.6-3 Select Memory Screen

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.

Note:

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

4.4.7 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 RF (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.

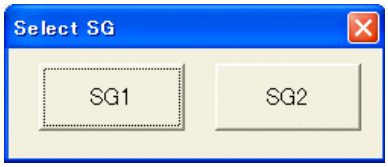


Figure 4.4.7-1 Select SG Screen

When Carrier Aggregation Mode is set to Inter-band, selecting **Calculation & Play** displays the SG Setting screen before starting waveform generation. In the SG Setting screen, Frequency and Amplitude for each SG1 and SG2 can be set.

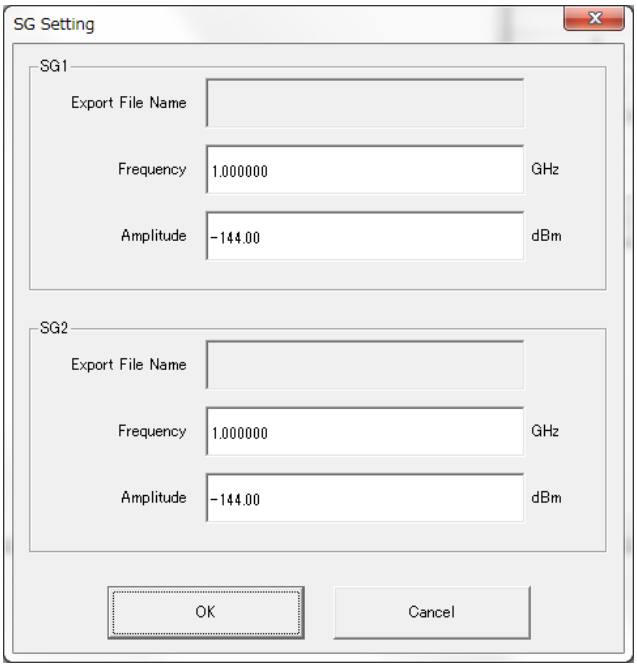


Figure 4.4.7-2 SG Setting Screen

4.4.8 Frame Structure Screen

Clicking  on the tool bar ribbon of the Main screen displays the Frame Structure screen. For details, refer to section 3.1.7 “Frame Structure screen”.

When **LTE-Advanced** is selected with the **System** button, the Frame Structure screen and Power graph screen display the data specified by Antenna Port select button, Band select button, and Component Carrier select button.

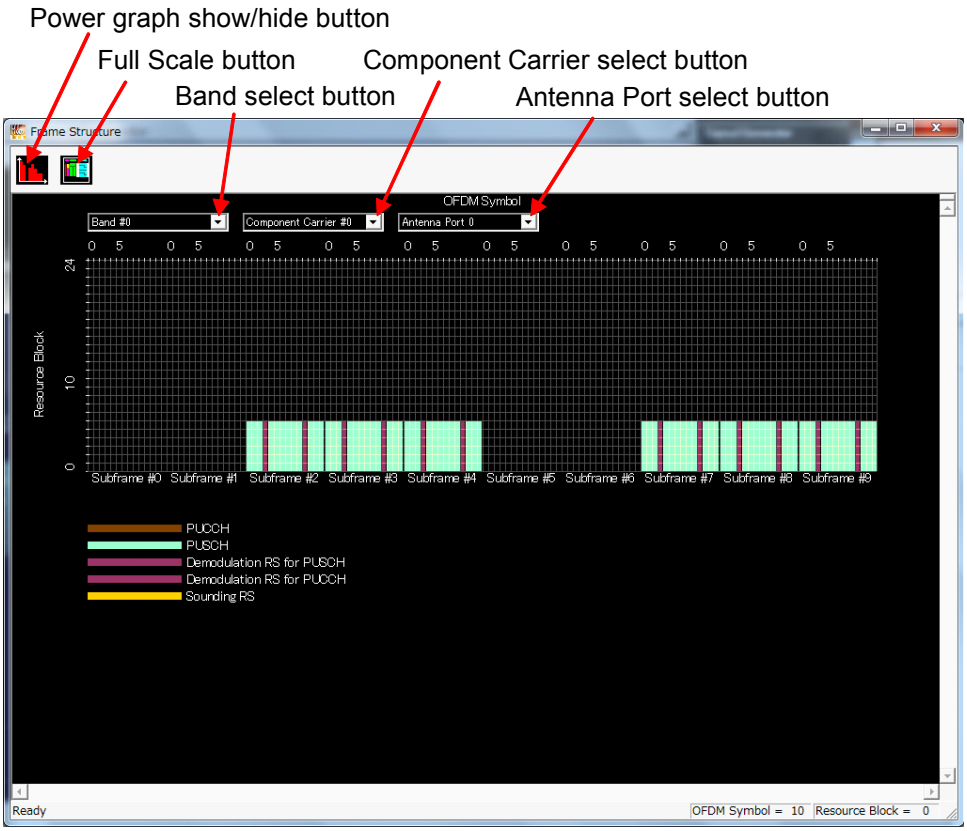


Figure 4.4.8-1 Frame Structure Screen

The following operations can be performed at the MG3710A touch panel.

- Boundary between Resource Block and OFDM Symbol Power
- Frame Structure zoom display

4.5 Graph Display

The generated waveform pattern can be displayed in a CCDF, FFT, and Time Domain graph by using this software.

To display CCDF graph:

1. Generate a waveform pattern menu by executing “Calculation”.
2. Click  on the tool bar to display the CCDF graph screen and the generated waveform pattern trace.

Displaying FFT graph

1. Generate a waveform pattern menu by executing “Calculation”.
2. Click  on the tool bar to display the FFT graph screen and the generated waveform pattern trace.

Displaying the Time Domain graph

1. Generate a waveform pattern menu by executing “Calculation”.
2. Click  on the tool bar to display the Time Domain graph screen and the generated waveform pattern trace.

For details of the graph screens, refer to sections 4.3 “CCDF Graph Display” , 4.4 “FFT Graph Display” and 4.13 “Time Domain Graph Display” in the MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™).

4.6 Auxiliary Signal Output

Select a waveform pattern generated by the LTE TDD IQproducer ™ on the mainframe to output the marker that is synchronized with the RF signal as an auxiliary signal from the AUX Input/Output on the rear panel of the mainframe. Markers described below are automatically set for the waveform patterns when they are generated. By using the Marker Edit function which is a peripheral function of the Time Domain graph, a waveform pattern can be generated with these markers edited.
For Marker Edit function, refer to :

- 4.13.11 “Marker edit function” in MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™).
- 4.9.12 “Marker edit function” in MS2690A/MS2691A/MS2692A and MS2830A Signal Analyzer Vector Signal Generator Operation Manual IQ Producer™.

As auxiliary signal, Frame Pulse (Connector 1) and Subframe Pulse (Connector 2) are output. Connector 3 is not used.

- Frame Pulse Change Polarity for Marker 1 to change the signal polarity.
- Downlink Transmission/ Uplink Transmission
  A pulse synchronized with the downlink or uplink signal transmission cycle is output from Connector 2. Change Polarity for Marker 2 to change the signal polarity.

For the error range of the auxiliary signals against the RF output, refer to either of the manuals below:

- 4.5.6 “Input file format” in MG3700A/MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™).
- 4.5.6 “Input file format” in MS2690A/MS2691A/MS2692A and MS2830A Signal Analyzer Vector Signal Generator Operation Manual IQ Producer™.

Chapter 5 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 hard disk
- Loading waveform patterns from the hard disk to the waveform memory
- Selecting a waveform pattern to be output from this equipment

This chapter explains the details of these operations.

5.1 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.

5.1.1 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)*.

5.1.2 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 5.1.1 "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™)*.

5.1.3 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 5.1.2 "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™)*.

5.2 For MS2690A/MS2691A/MS2692A or MS2830A

This section describes how to download a waveform pattern created for the MS2690A/MS2691A/MS2692A or MS2830A to the hard disk of the MS2690A/MS2691A/MS2692A or MS2830A and output the pattern.

5.2.1 Transferring waveform pattern to internal hard disk

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

- Section 2.4.4 “Copying waveform file(s) to hard disk” in the *MS2690A/MS2691A/MS2692A Signal Analyzer Option 020: Vector Signal Generator Operation Manual (Operation)*
- Section 2.4.4 “Copying waveform file(s) to hard disk” in the *MS2830A Signal Analyzer Vector Signal Generator Operation Manual (Operation)*

Note:

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

5.2.2 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 hard disk 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 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 Signal Analyzer Vector Signal Generator Operation Manual (Remote Control)

5.2.3 Selecting Waveform Pattern

Select waveform patterns to be used for modulation from those loaded in the waveform memory as described in Section 5.2.1 "Transferring waveform pattern to internal hard disk" 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 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 Signal Analyzer Vector Signal Generator Operation Manual (Remote Control)

Appendix A Error Messages

A list of error messages is shown below. In this list, *x*, n_1, and n_2 indicate a numeric value, and *s* indicates a character string.

Table A-1 Error messages

Error Message	Description
All component carriers are disabled.	—
All PDSCHs shown in the tree view must be assigned to one or more RBs.	—
Available memory is low.	—
Calculation cannot start because of setting error.	—
Calculation cannot start since all component carriers are disabled.	—
Cannot open file	—
Cannot read file	—
Cannot read file("*s*")	—
Cannot write file	—
Cannot write file("*s*").	—
Channel confliction has occurred between PUCCH and PUSCH.	—
Data size is too large.	—
Input a value that fulfills 2^a×3^b×5^c where a, b, c, is a set of non-negative integers.	—
Input Export File Name.	—
Input Package Name.	—
Invalid file format	When loading complex data, this message is also displayed if binary data is loaded by mistake.
Invalid value is set.	—
Operation disabled when 2nd vector SG (Opt-062, 064, 066) not installed.	—
PUSCHs are overlapping.	—
The Setting value is out of range.("*s* = *x*(n_1 – n_2)")	The value of *x* set in parameter *s* is out of the setting range between n_1 and n_2.
PDCCH#n cannot be allocated in this CCE.	—
This PDCCH Format value cannot be set.	—
There are no resource blocks that are available for use by PUCCH format 1/1a/1b transmission.	—
There are no resource blocks that are available for use by PUCCH format 2/2a/2b transmission.	
Channel confliction has occurred between PUCCH and PUSCH.	—

A list of warning message is shown below.

Table A-2 Warning message

Warning Message	Description
Clipping was done.	—
There are some PDCCHs not allocated	—
PDCCH format was set to "0".	—
PUCCH format was set to "1".	—
Orthogonal Sequence Index was set to "0".	—
By this operation, Oversampling Ratio is set to 2 and Filter Type is set to None.	—
Do you want to reset all parameters?	—

Appendix B User File Format

This section shows example of the user file format that can be used in this software. A user file must be a text file. It is not necessarily required to specify an extension to user files. Note that an error occurs if a user file that does not conform to the format is read.

Be sure to write an unmodulated binary sequence into a user file. An error occurs if a user file that contains characters other than 0, 1, line feed, comma, period, and space is read. All line feeds, commas, periods, and spaces in a user file are ignored when the user file is read.
A user file format example is shown below.

User file format example

```
11111111100000111101111100010111001100100000100101001110110100011
11100111110011011000101010010001110001101101010111000100110001000
00100000000100001000110000100111001010101100001101111010011011
10010001010000101011010011111110110010010010110111111001001101010
00110011000000001100011001010001101001011111110100010110001110101
11001011001111000111110111010000011010110110111011011000001011010
11110101010100000010100101011110010111011100000011100111010010011
11101011101010001001000011001110000101111011011001101000011101
1110000
```

0s and 1s in a user file are sequentially read from the leftmost of the first line.
When the number of data to be processed is larger than that in the user file, the user file is read again from the top. If the user file contains more data than that to be processed, data reading terminates halfway.

Appendix C PRACH Parameter

Some parameter values of PRACH are determined by dependency relationship of plural parameters.
The details of dependency relationship of PRACH parameters are explained below.

C.1 Number of PRACH Resources

The display values of Number of PRACH Resources are determined according to PRACH Configuration as below.

Table C.1-1 Number of PRACH Resources Display Values

PRACH Configuration	Number of PRACH Resources	PRACH Configuration	Number of PRACH Resources	PRACH Configuration	Number of PRACH Resources
0	1	20	1	40	1
1	1	21	1	41	1
2	1	22	1	42	1
3	1	23	1	43	1
4	1	24	1	44	1
5	1	25	2	45	2
6	2	26	3	46	3
7	2	27	4	47	4
8	2	28	5	48	1
9	3	29	6	49	1
10	3	30	1	50	1
11	3	31	1	51	1
12	4	32	1	52	1
13	4	33	1	53	2
14	4	34	1	54	3
15	5	35	2	55	4
16	5	36	3	56	5
17	5	37	4	57	6
18	6	38	5	---	---
19	6	39	6	---	---

C.2 Preamble Format

The display values of Preamble Format are determined according to PRACH Configuration as below.

Table C.2-1 Preamble Format Display Values

PRACH Configuration	Preamble Format
0 to 19	0
20 to 29	1
30 to 39	2
40 to 47	3
48 to 57	4

C.3 Frequency Resource Index

The display values of Frequency Resource Index are determined according to PRACH Configuration, Uplink-downlink Configuration, and PRACH Resource# as below.

However, when PRACH Resource# is 0, the display value of Frequency Resource Index is always 0.

Table C.3-1 Frequency Resource Index Display Value (PRACH Resource#1)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
0	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-
6	0	0	0	0	0	1	0
7	0	0	-	0	-	-	0
8	0	-	-	0	-	-	0
9	0	0	0	0	0	1	0
10	0	0	0	-	0	-	0
11	-	0	-	-	-	-	0
12	0	0	0	0	0	1	0
13	0	-	-	0	-	-	0
14	0	-	-	0	-	-	0
15	0	0	0	0	0	1	0
16	0	0	0	0	0	-	-
17	0	0	-	0	-	-	-
18	0	0	0	0	0	1	0
19	-	0	-	-	-	-	0
20	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-
25	0	0	-	1	1	-	0
26	0	0	-	1	1	-	0
27	0	0	-	1	1	-	0
28	0	0	-	1	1	-	0
29	0	0	-	1	1	-	0
30	-	-	-	-	-	-	-

Table C.3-1 Frequency Resource Index Display Value (PRACH Resource#1) (Cont'd)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
31	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-
35	0	0	-	1	1	-	0
36	0	0	-	1	1	-	0
37	0	0	-	1	1	-	0
38	0	0	-	1	1	-	0
39	0	0	-	1	1	-	0
40	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-
45	0	-	-	1	-	-	1
46	0	-	-	1	-	-	1
47	0	-	-	1	-	-	1
48	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-
53	0	0	0	1	1	1	0
54	0	0	0	1	1	1	0
55	0	0	0	1	1	1	0
56	0	0	0	1	1	1	0
57	0	0	0	1	1	1	0

Table C.3-2 Frequency Resource Index Display Value (PRACH Resource#2)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
0	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-
9	0	0	1	0	1	2	0
10	0	0	1	-	1	-	0
11	-	0	-	-	-	-	0
12	0	0	1	0	1	2	0
13	0	-	-	0	-	-	0
14	0	-	-	0	-	-	0
15	0	0	1	0	1	2	0
16	0	0	1	0	1	-	-
17	0	0	-	0	-	-	-
18	0	0	1	0	1	2	0
19	-	0	-	-	-	-	0
20	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-
26	1	1	-	2	2	-	1
27	1	1	-	2	2	-	1
28	1	1	-	2	2	-	1
29	1	1	-	2	2	-	1
30	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-
36	1	1	-	2	2	-	1
37	1	1	-	2	2	-	1
38	1	1	-	2	2	-	1
39	1	1	-	2	2	-	1

Table C.3-2 Frequency Resource Index Display Value (PRACH Resource#2) (Cont'd)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
40	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-
46	1	-	-	2	-	-	2
47	1	-	-	2	-	-	2
48	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-
53	-	-	-	-	-	-	-
54	1	1	1	2	2	2	1
55	1	1	1	2	2	2	1
56	1	1	1	2	2	2	1
57	1	1	1	2	2	2	1

Table C.3-3 Frequency Resource Index Display Value (PRACH Resource#3)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
0	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-
12	0	0	1	1	1	3	0
13	0	-	-	1	-	-	0
14	0	-	-	1	-	-	0
15	0	0	1	1	1	3	0
16	0	0	1	1	1	-	-
17	0	0	-	1	-	-	-

Table C.3-3 Frequency Resource Index Display Value (PRACH Resource#3) (Cont'd)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
18	0	0	1	1	1	3	0
19	-	0	-	-	-	-	0
20	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-
27	1	1	-	3	3	-	1
28	1	1	-	3	3	-	1
29	1	1	-	3	3	-	1
30	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-
37	1	1	-	3	3	-	1
38	1	1	-	3	3	-	1
39	1	1	-	3	3	-	1
40	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-
46	-	-	-	-	-	-	-
47	1	-	-	3	-	-	3
48	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-
53	-	-	-	-	-	-	-
54	-	-	-	-	-	-	-
55	1	1	1	3	3	3	1
56	1	1	1	3	3	3	1
57	1	1	1	3	3	3	1

Table C.3-4 Frequency Resource Index Display Value (PRACH Resource#4)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
0	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-
15	0	1	2	1	2	4	0
16	0	1	2	1	2	-	-
17	0	1	-	1	-	-	-
18	0	1	2	1	2	4	0
19	-	1	-	-	-	-	0
20	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-
28	2	2	-	4	4	-	2
29	2	2	-	4	4	-	2
30	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-
37	-	-	-	-	-	-	-
38	2	2	-	4	4	-	2
39	2	2	-	4	4	-	2

Table C.3-4 Frequency Resource Index Display Value (PRACH Resource#4) (Cont'd)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
40	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-
46	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-
48	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-
53	-	-	-	-	-	-	-
54	-	-	-	-	-	-	-
55	-	-	-	-	-	-	-
56	2	2	2	4	4	4	2
57	2	2	2	4	4	4	2

Table C.3-5 Frequency Resource Index Display Value (PRACH Resource#5)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
0	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-
18	0	1	2	1	2	5	1
19	-	1	-	-	-	-	1
20	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-
29	2	2	-	5	5	-	2
30	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-
37	-	-	-	-	-	-	-
38	-	-	-	-	-	-	-
39	2	2	-	5	5	-	2

Table C.3-5 Frequency Resource Index Display Value (PRACH Resource#5) (Cont'd)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
40	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-
46	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-
48	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-
53	-	-	-	-	-	-	-
54	-	-	-	-	-	-	-
55	-	-	-	-	-	-	-
56	-	-	-	-	-	-	-
57	2	2	2	5	5	5	2

C.4 Transmit Frame

The display values of Transmit Frame are determined according to PRACH Configuration, Uplink-downlink Configuration, and PRACH Resource# as below.

Table C.4-1 Transmit Frame Display Value (PRACH Resource#0)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
0	Even	Even	Even	Even	Even	Even	Even
1	Odd	Odd	Odd	Odd	Odd	Odd	Odd
2	Even	Even	Even	Even	Even	-	Even
3	All	All	All	All	All	All	All
4	All	All	All	All	All	-	All
5	All	All	-	All	-	-	All
6	All	All	All	All	All	All	All
7	All	All	-	All	-	-	All
8	All	-	-	All	-	-	All
9	All	All	All	All	All	All	All
10	All	All	All	-	All	-	All
11	-	All	-	-	-	-	All
12	All	All	All	All	All	All	All
13	All	-	-	All	-	-	All
14	All	-	-	All	-	-	All
15	All	All	All	All	All	All	All
16	All	All	All	All	All	-	-
17	All	All	-	All	-	-	-
18	All	All	All	All	All	All	All
19	-	All	-	-	-	-	All
20	Even	Even	-	Even	Even	-	Even
21	Odd	Odd	-	Odd	Odd	-	Odd
22	Even	Even	-	-	-	-	Even
23	All	All	-	All	All	-	All
24	All	All	-	-	-	-	All
25	All	All	-	All	All	-	All
26	All	All	-	All	All	-	All
27	All	All	-	All	All	-	All
28	All	All	-	All	All	-	All
29	All	All	-	All	All	-	All
30	Even	Even	-	Even	Even	-	Even
31	Odd	Odd	-	Odd	Odd	-	Odd
32	Even	Even	-	-	-	-	Even
33	All	All	-	All	All	-	All

Table C.4-1 Transmit Frame Display Value (PRACH Resource#0) (Cont'd)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
34	All	All	-	-	-	-	All
35	All	All	-	All	All	-	All
36	All	All	-	All	All	-	All
37	All	All	-	All	All	-	All
38	All	All	-	All	All	-	All
39	All	All	-	All	All	-	All
40	Even	-	-	Even	-	-	Even
41	Odd	-	-	Odd	-	-	Odd
42	Even	-	-	-	-	-	-
43	All	-	-	All	-	-	All
44	All	-	-	-	-	-	-
45	All	-	-	All	-	-	All
46	All	-	-	All	-	-	All
47	All	-	-	All	-	-	All
48	Even	Even	Even	Even	Even	Even	Even
49	Odd	Odd	Odd	Odd	Odd	Odd	Odd
50	Even	Even	Even	-	-	-	Even
51	All	All	All	All	All	All	All
52	All	All	All	-	-	-	All
53	All	All	All	All	All	All	All
54	All	All	All	All	All	All	All
55	All	All	All	All	All	All	All
56	All	All	All	All	All	All	All
57	All	All	All	All	All	All	All

Table C.4-2 Transmit Frame Display Value (PRACH Resource#1)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
0	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-
6	All	All	All	All	All	All	All
7	All	All	-	All	-	-	All
8	All	-	-	All	-	-	All
9	All	All	All	All	All	All	All
10	All	All	All	-	All	-	All
11	-	All	-	-	-	-	All
12	All	All	All	All	All	All	All
13	All	-	-	All	-	-	All
14	All	-	-	All	-	-	All
15	All	All	All	All	All	All	All
16	All	All	All	All	All	-	-
17	All	All	-	All	-	-	-
18	All	All	All	All	All	All	All
19	-	All	-	-	-	-	All
20	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-
25	All	All	-	All	All	-	All
26	All	All	-	All	All	-	All
27	All	All	-	All	All	-	All
28	All	All	-	All	All	-	All
29	All	All	-	All	All	-	All
30	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-
35	All	All	-	All	All	-	All
36	All	All	-	All	All	-	All
37	All	All	-	All	All	-	All
38	All	All	-	All	All	-	All
39	All	All	-	All	All	-	All

Table C.4-2 Transmit Frame Display Value (PRACH Resource#1) (Cont'd)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
40	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-
45	All	-	-	All	-	-	All
46	All	-	-	All	-	-	All
47	All	-	-	All	-	-	All
48	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-
53	All	All	All	All	All	All	All
54	All	All	All	All	All	All	All
55	All	All	All	All	All	All	All
56	All	All	All	All	All	All	All
57	All	All	All	All	All	All	All

Table C.4-3 Transmit Frame Display Value (PRACH Resource#2)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
0	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-
9	All	All	All	All	All	All	All
10	All	All	All	-	All	-	All
11	-	All	-	-	-	-	All
12	All	All	All	All	All	All	All
13	All	-	-	All	-	-	All
14	All	-	-	All	-	-	All
15	All	All	All	All	All	All	All
16	All	All	All	All	All	-	-
17	All	All	-	All	-	-	-

Table C.4-3 Transmit Frame Display Value (PRACH Resource#2) (Cont'd)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
18	All	All	All	All	All	All	All
19	-	All	-	-	-	-	All
20	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-
26	All	All	-	All	All	-	All
27	All	All	-	All	All	-	All
28	All	All	-	All	All	-	All
29	All	All	-	All	All	-	All
30	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-
36	All	All	-	All	All	-	All
37	All	All	-	All	All	-	All
38	All	All	-	All	All	-	All
39	All	All	-	All	All	-	All
40	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-
46	All	-	-	All	-	-	All
47	All	-	-	All	-	-	All
48	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-
53	-	-	-	-	-	-	-
54	All	All	All	All	All	All	All
55	All	All	All	All	All	All	All
56	All	All	All	All	All	All	All
57	All	All	All	All	All	All	All

Table C.4-4 Transmit Frame Display Value (PRACH Resource#3)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
0	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-
12	All	All	All	All	All	All	All
13	All	-	-	All	-	-	All
14	All	-	-	All	-	-	All
15	All	All	All	All	All	All	All
16	All	All	All	All	All	-	-
17	All	All	-	All	-	-	-
18	All	All	All	All	All	All	All
19	-	All	-	-	-	-	All
20	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-
27	All	All	-	All	All	-	All
28	All	All	-	All	All	-	All
29	All	All	-	All	All	-	All
30	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-
37	All	All	-	All	All	-	All
38	All	All	-	All	All	-	All
39	All	All	-	All	All	-	All

Table C.4-4 Transmit Frame Display Value (PRACH Resource#3) (Cont'd)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
40	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-
46	-	-	-	-	-	-	-
47	All	-	-	All	-	-	All
48	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-
53	-	-	-	-	-	-	-
54	-	-	-	-	-	-	-
55	All	All	All	All	All	All	All
56	All	All	All	All	All	All	All
57	All	All	All	All	All	All	All

Table C.4-5 Transmit Frame Display Value (PRACH Resource#4)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
0	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-
15	All	All	All	All	All	All	All
16	All	All	All	All	All	-	-
17	All	All	-	All	-	-	-

Table C.4-5 Transmit Frame Display Value (PRACH Resource#4) (Cont'd)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
18	All	All	All	All	All	All	All
19	-	All	-	-	-	-	All
20	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-
28	All	All	-	All	All	-	All
29	All	All	-	All	All	-	All
30	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-
37	-	-	-	-	-	-	-
38	All	All	-	All	All	-	All
39	All	All	-	All	All	-	All
40	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-
46	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-
48	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-
53	-	-	-	-	-	-	-
54	-	-	-	-	-	-	-
55	-	-	-	-	-	-	-
56	All	All	All	All	All	All	All
57	All	All	All	All	All	All	All

Table C.4-6 Transmit Frame Display Value (PRACH Resource#5)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
0	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-
18	All	All	All	All	All	All	All
19	-	All	-	-	-	-	All
20	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-
29	All	All	-	All	All	-	All
30	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-
37	-	-	-	-	-	-	-
38	-	-	-	-	-	-	-

Table C.4-6 Transmit Frame Display Value (PRACH Resource#5) (Cont'd)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
39	All	All	-	All	All	-	All
40	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-
46	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-
48	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-
53	-	-	-	-	-	-	-
54	-	-	-	-	-	-	-
55	-	-	-	-	-	-	-
56	-	-	-	-	-	-	-
57	All	All	All	All	All	All	All

C.5 Subframe Number

The display values of Subframe Number are determined according to PRACH Configuration, Uplink-downlink Configuration, and PRACH Resource# as below.

Table C.5-1 Subframe Number Display Value (PRACH Resource#0)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
0	4	3	2	4	3	2	4
1	4	3	2	4	3	2	4
2	9	8	7	3	2	-	8
3	4	3	2	4	3	2	4
4	9	8	7	3	2	-	8
5	3	2	-	2	-	-	3
6	4	3	2	3	2	2	4
7	3	2	-	2	-	-	3
8	2	-	-	2	-	-	2
9	3	2	2	2	2	2	3
10	2	3	2	-	2	-	2
11	-	2	-	-	-	-	3
12	3	2	2	2	2	2	3
13	2	-	-	2	-	-	2
14	2	-	-	2	-	-	2
15	2	2	2	2	2	2	2
16	3	2	2	2	2	-	-
17	2	2	-	2	-	-	-
18	2	2	2	2	2	2	2
19	-	2	-	-	-	-	2
20	3	2	-	3	2	-	3
21	3	2	-	3	2	-	3
22	8	7	-	-	-	-	7
23	3	2	-	3	2	-	3
24	8	7	-	-	-	-	7
25	3	2	-	3	2	-	3
26	3	2	-	3	2	-	3
27	3	2	-	3	2	-	3
28	3	2	-	3	2	-	3
29	3	2	-	3	2	-	3
30	3	2	-	3	2	-	3
31	3	2	-	3	2	-	3
32	8	7	-	-	-	-	7
33	3	2	-	3	2	-	3

Table C.5-1 Subframe Number Display Value (PRACH Resource#0) (Cont'd)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
34	8	7	-	-	-	-	7
35	3	2	-	3	2	-	3
36	3	2	-	3	2	-	3
37	3	2	-	3	2	-	3
38	3	2	-	3	2	-	3
39	3	2	-	3	2	-	3
40	2	-	-	2	-	-	2
41	2	-	-	2	-	-	2
42	7	-	-	-	-	-	-
43	2	-	-	2	-	-	2
44	7	-	-	-	-	-	-
45	2	-	-	2	-	-	2
46	2	-	-	2	-	-	2
47	2	-	-	2	-	-	2
48	1	1	1	1	1	1	1
49	1	1	1	1	1	1	1
50	6	6	6	-	-	-	6
51	1	1	1	1	1	1	1
52	6	6	6	-	-	-	6
53	1	1	1	1	1	1	1
54	1	1	1	1	1	1	1
55	1	1	1	1	1	1	1
56	1	1	1	1	1	1	1
57	1	1	1	1	1	1	1

Table C.5-2 Subframe Number Display Value (PRACH Resource#1)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
0	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-
6	9	8	7	4	3	2	8
7	8	7	-	4	-	-	7
8	7	-	-	3	-	-	8
9	4	3	7	3	3	2	4
10	7	7	7	-	3	-	4
11	-	3	-	-	-	-	7
12	4	3	7	3	3	2	4
13	4	-	-	3	-	-	3
14	3	-	-	3	-	-	4
15	3	3	7	3	3	2	3
16	4	3	7	3	3	-	-
17	3	3	-	3	-	-	-
18	3	3	7	3	3	2	3
19	-	3	-	-	-	-	3
20	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-
25	8	7	-	3	2	-	7
26	8	7	-	3	2	-	7
27	8	7	-	3	2	-	7
28	8	7	-	3	2	-	7
29	8	7	-	3	2	-	7
30	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-
35	8	7	-	3	2	-	7
36	8	7	-	3	2	-	7
37	8	7	-	3	2	-	7
38	8	7	-	3	2	-	7
39	8	7	-	3	2	-	7

Table C.5-2 Subframe Number Display Value (PRACH Resource#1) (Cont'd)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
40	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-
45	7	-	-	2	-	-	2
46	7	-	-	2	-	-	2
47	7	-	-	2	-	-	2
48	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-
53	6	6	6	1	1	1	6
54	6	6	6	1	1	1	6
55	6	6	6	1	1	1	6
56	6	6	6	1	1	1	6
57	6	6	6	1	1	1	6

Table C.5-3 Subframe Number Display Value (PRACH Resource#2)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
0	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-
9	9	8	2	4	3	2	8
10	8	8	7	-	2	-	7
11	-	7	-	-	-	-	8
12	8	7	2	4	2	2	7
13	7	-	-	4	-	-	4
14	7	-	-	4	-	-	7
15	4	7	2	4	2	2	4
16	7	7	2	4	2	-	-

Table C.5-3 Subframe Number Display Value (PRACH Resource#2)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
17	4	7	-	4	-	-	-
18	4	7	2	4	2	2	4
19	-	7	-	-	-	-	4
20	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-
26	3	2	-	3	2	-	3
27	3	2	-	3	2	-	3
28	3	2	-	3	2	-	3
29	3	2	-	3	2	-	3
30	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-
36	3	2	-	3	2	-	3
37	3	2	-	3	2	-	3
38	3	2	-	3	2	-	3
39	3	2	-	3	2	-	3
40	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-
46	2	-	-	2	-	-	2
47	2	-	-	2	-	-	2
48	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-
53	-	-	-	-	-	-	-
54	1	1	1	1	1	1	1
55	1	1	1	1	1	1	1
56	1	1	1	1	1	1	1
57	1	1	1	1	1	1	1

Table C.5-4 Subframe Number Display Value (PRACH Resource#3)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
0	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-
12	9	8	7	4	3	2	8
13	9	-	-	3	-	-	8
14	8	-	-	2	-	-	8
15	8	8	7	3	3	2	7
16	8	8	7	2	3	-	-
17	7	8	-	2	-	-	-
18	7	8	7	2	3	2	7
19	-	8	-	-	-	-	7
20	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-
27	8	7	-	3	2	-	7
28	8	7	-	3	2	-	7
29	8	7	-	3	2	-	7
30	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-
37	8	7	-	3	2	-	7
38	8	7	-	3	2	-	7
39	8	7	-	3	2	-	7

Table C.5-4 Subframe Number Display Value (PRACH Resource#3) (Cont'd)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
40	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-
46	-	-	-	-	-	-	-
47	7	-	-	2	-	-	2
48	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-
53	-	-	-	-	-	-	-
54	-	-	-	-	-	-	-
55	6	6	6	1	1	1	6
56	6	6	6	1	1	1	6
57	6	6	6	1	1	1	6

Table C.5-5 Subframe Number Display Value (PRACH Resource#4)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
0	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-
15	9	3	2	4	3	2	8
16	9	8	7	4	2	-	-
17	9	2	-	3	-	-	-
18	8	3	2	3	2	2	8
19	-	2	-	-	-	-	8
20	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-
28	3	2	-	3	2	-	3
29	3	2	-	3	2	-	3
30	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-
37	-	-	-	-	-	-	-
38	3	2	-	3	2	-	3
39	3	2	-	3	2	-	3

Table C.5-5 Subframe Number Display Value (PRACH Resource#4) (Cont'd)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
40	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-
46	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-
48	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-
53	-	-	-	-	-	-	-
54	-	-	-	-	-	-	-
55	-	-	-	-	-	-	-
56	1	1	1	1	1	1	1
57	1	1	1	1	1	1	1

Table C.5-6 Subframe Number Display Value (PRACH Resource#5)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
0	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-

Table C.5-6 Subframe Number Display Value (PRACH Resource#5) (Cont'd)

PRACH Configuration	Uplink-downlink Configuration						
	0	1	2	3	4	5	6
17	-	-	-	-	-	-	-
18	9	8	7	4	3	2	4
19	-	7	-	-	-	-	8
20	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-
29	8	7	-	3	2	-	7
30	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-
37	-	-	-	-	-	-	-
38	-	-	-	-	-	-	-
39	8	7	-	3	2	-	7
40	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-
46	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-
48	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-
53	-	-	-	-	-	-	-
54	-	-	-	-	-	-	-
55	-	-	-	-	-	-	-
56	-	-	-	-	-	-	-
57	6	6	6	1	1	1	6

C.6 Physical Root Sequence Number

The display values of Physical Root Sequence Number are determined according to Logical Root Sequence Number and Preamble Format.

Table C.6-1 Transmit Frame Display Value (Preamble Format=0, 1, 2, 3)

Logical root sequence number	Physical root sequence number
0 to 23	129, 710, 140, 699, 120, 719, 210, 629, 168, 671, 84, 755, 105, 734, 93, 746, 70, 769, 60, 779, 2, 837, 1, 838
24 to 29	56, 783, 112, 727, 148, 691
30 to 35	80, 759, 42, 797, 40, 799
36 to 41	35, 804, 73, 766, 146, 693
42 to 51	31, 808, 28, 811, 30, 809, 27, 812, 29, 810
52 to 63	24, 815, 48, 791, 68, 771, 74, 765, 178, 661, 136, 703
64 to 75	86, 753, 78, 761, 43, 796, 39, 800, 20, 819, 21, 818
76 to 89	95, 744, 202, 637, 190, 649, 181, 658, 137, 702, 125, 714, 151, 688
90 to 115	217, 622, 128, 711, 142, 697, 122, 717, 203, 636, 118, 721, 110, 729, 89, 750, 103, 736, 61, 778, 55, 784, 15, 824, 14, 825
116 to 135	12, 827, 23, 816, 34, 805, 37, 802, 46, 793, 207, 632, 179, 660, 145, 694, 130, 709, 223, 616
136 to 167	228, 611, 227, 612, 132, 707, 133, 706, 143, 696, 135, 704, 161, 678, 201, 638, 173, 666, 106, 733, 83, 756, 91, 748, 66, 773, 53, 786, 10, 829, 9, 830
168 to 203	7, 832, 8, 831, 16, 823, 47, 792, 64, 775, 57, 782, 104, 735, 101, 738, 108, 731, 208, 631, 184, 655, 197, 642, 191, 648, 121, 718, 141, 698, 149, 690, 216, 623, 218, 621
204 to 263	152, 687, 144, 695, 134, 705, 138, 701, 199, 640, 162, 677, 176, 663, 119, 720, 158, 681, 164, 675, 174, 665, 171, 668, 170, 669, 87, 752, 169, 670, 88, 751, 107, 732, 81, 758, 82, 757, 100, 739, 98, 741, 71, 768, 59, 780, 65, 774, 50, 789, 49, 790, 26, 813, 17, 822, 13, 826, 6, 833
264 to 327	5, 834, 33, 806, 51, 788, 75, 764, 99, 740, 96, 743, 97, 742, 166, 673, 172, 667, 175, 664, 187, 652, 163, 676, 185, 654, 200, 639, 114, 725, 189, 650, 115, 724, 194, 645, 195, 644, 192, 647, 182, 657, 157, 682, 156, 683, 211, 628, 154, 685, 123, 716, 139, 700, 212, 627, 153, 686, 213, 626, 215, 624, 150, 689
328 to 383	225, 614, 224, 615, 221, 618, 220, 619, 127, 712, 147, 692, 124, 715, 193, 646, 205, 634, 206, 633, 116, 723, 160, 679, 186, 653, 167, 672, 79, 760, 85, 754, 77, 762, 92, 747, 58, 781, 62, 777, 69, 770, 54, 785, 36, 803, 32, 807, 25, 814, 18, 821, 11, 828, 4, 835
384 to 455	3, 836, 19, 820, 22, 817, 41, 798, 38, 801, 44, 795, 52, 787, 45, 794, 63, 776, 67, 772, 72, 767, 76, 763, 94, 745, 102, 737, 90, 749, 109, 730, 165, 674, 111, 728, 209, 630, 204, 635, 117, 722, 188, 651, 159, 680, 198, 641, 113, 726, 183, 656, 180, 659, 177, 662, 196, 643, 155, 684, 214, 625, 126, 713, 131, 708, 219, 620, 222, 617, 226, 613

Table C.6-1 Transmit Frame Display Value (Preamble Format=0, 1, 2, 3) (Cont'd)

Logical root sequence number	Physical root sequence number
456 to 513	230, 609, 232, 607, 262, 577, 252, 587, 418, 421, 416, 423, 413, 426, 411, 428, 376, 463, 395, 444, 283, 556, 285, 554, 379, 460, 390, 449, 363, 476, 384, 455, 388, 451, 386, 453, 361, 478, 387, 452, 360, 479, 310, 529, 354, 485, 328, 511, 315, 524, 337, 502, 349, 490, 335, 504, 324, 515
514 to 561	323, 516, 320, 519, 334, 505, 359, 480, 295, 544, 385, 454, 292, 547, 291, 548, 381, 458, 399, 440, 380, 459, 397, 442, 369, 470, 377, 462, 410, 429, 407, 432, 281, 558, 414, 425, 247, 592, 277, 562, 271, 568, 272, 567, 264, 575, 259, 580
562 to 629	237, 602, 239, 600, 244, 595, 243, 596, 275, 564, 278, 561, 250, 589, 246, 593, 417, 422, 248, 591, 394, 445, 393, 446, 370, 469, 365, 474, 300, 539, 299, 540, 364, 475, 362, 477, 298, 541, 312, 527, 313, 526, 314, 525, 353, 486, 352, 487, 343, 496, 327, 512, 350, 489, 326, 513, 319, 520, 332, 507, 333, 506, 348, 491, 347, 492, 322, 517
630 to 659	330, 509, 338, 501, 341, 498, 340, 499, 342, 497, 301, 538, 366, 473, 401, 438, 371, 468, 408, 431, 375, 464, 249, 590, 269, 570, 238, 601, 234, 605
660 to 707	257, 582, 273, 566, 255, 584, 254, 585, 245, 594, 251, 588, 412, 427, 372, 467, 282, 557, 403, 436, 396, 443, 392, 447, 391, 448, 382, 457, 389, 450, 294, 545, 297, 542, 311, 528, 344, 495, 345, 494, 318, 521, 331, 508, 325, 514, 321, 518
708 to 729	346, 493, 339, 500, 351, 488, 306, 533, 289, 550, 400, 439, 378, 461, 374, 465, 415, 424, 270, 569, 241, 598
730 to 751	231, 608, 260, 579, 268, 571, 276, 563, 409, 430, 398, 441, 290, 549, 304, 535, 308, 531, 358, 481, 316, 523
752 to 765	293, 546, 288, 551, 284, 555, 368, 471, 253, 586, 256, 583, 263, 576
766 to 777	242, 597, 274, 565, 402, 437, 383, 456, 357, 482, 329, 510
778 to 789	317, 522, 307, 532, 286, 553, 287, 552, 266, 573, 261, 578
790 to 795	236, 603, 303, 536, 356, 483
796 to 803	355, 484, 405, 434, 404, 435, 406, 433
804 to 809	235, 604, 267, 572, 302, 537
810 to 815	309, 530, 265, 574, 233, 606
816 to 819	367, 472, 296, 543
820 to 837	336, 503, 305, 534, 373, 466, 280, 559, 279, 560, 419, 420, 240, 599, 258, 581, 229, 610

Table C.6-2 Transmit Frame Display Value (Preamble Format=4)

Logical root sequence number	Physical root sequence number																			
0 to 19	1	138	2	137	3	136	4	135	5	134	6	133	7	132	8	131	9	130	10	129
20 to 39	11	128	12	127	13	126	14	125	15	124	16	123	17	122	18	121	19	120	20	119
40 to 59	21	118	22	117	23	116	24	115	25	114	26	113	27	112	28	111	29	110	30	109
60 to 79	31	108	32	107	33	106	34	105	35	104	36	103	37	102	38	101	39	100	40	99
80 to 99	41	98	42	97	43	96	44	95	45	94	46	93	47	92	48	91	49	90	50	89
100 to 119	51	88	52	87	53	86	54	85	55	84	56	83	57	82	58	81	59	80	60	79
120 to 137	61	78	62	77	63	76	64	75	65	74	66	73	67	72	68	71	69	70	-	-

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