MX370084A
ISDB-Tmm Waveform Pattern Pattern
Operation Manual

Third 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), or MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe Operation). Please also refer to this document before using the equipment.
- Keep this manual with the equipment.

ANRITSU CORPORATION
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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.

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⚠️ **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.

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

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- 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 DVD version.
<table>
<thead>
<tr>
<th>Notes On Export Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
</tr>
</tbody>
</table>
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   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.

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   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.
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: MX370084A ISDB-Tmm Waveform Pattern

2. Applied Directive and Standards
   When the MX370084A ISDB-Tmm Waveform Pattern is installed in the MG3700A, MG3710A, or MS2690A/MS2691A/MS2692A, the applied directive and standards of this unit conform to those of the MG3700A, MG3710A, or MS2690A/MS2691A/MS2692A main frame.

PS: About main frame
    Please contact Anritsu for the latest information on the main frame types that MX370084A can be used with.
C-Tick Conformity Marking

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

C-Tick marking

N274

1. Product Model

   Software: MX370084A ISDB-Tmm Waveform Pattern

2. Applied Directive and Standards

   When the MX370084A ISDB-Tmm Waveform Pattern is installed in the MG3700A, MG3710A, or MS2690A/MS2691A/MS2692A, the applied directive and standards of this unit conform to those of the MG3700A, MG3710A, or MS2690A/MS2691A/MS2692A main frame.

   PS: About main frame

   Please contact Anritsu for the latest information on the main frame types that MX370084A can be used with.
About This Manual

Associated Documents

The operation manuals for the MX370084A ISDB-Tmm Waveform Pattern are comprised as shown in the figure 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.

- 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.

- MG3700A/MG3710A 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.

- MX370084A ISDB-Tmm Waveform Pattern Operation Manual <This document>
  This describes basic operations and functions of the ISDB-Tmm Waveform Pattern.
- MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual (Mainframe, Operation)
  This describes basic operations, maintenance procedure, and common functions of MS2690A/MS2691A/MS2692A.

- 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.

- 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.
• MS2690A/MS2691A/MS2692A Signal Analyzer 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.

• MX370084A ISDB-Tmm Waveform Patter Operation Manual <This
document>
This describes basic operations and functions of the ISDB-Tmm
Waveform Pattern.
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This chapter outlines the MX370084A ISDB-Tmm Waveform Pattern software.

1.1 Product Overview ...................................................... 1-2
1.2 Product Configuration ................................................ 1-3
1.1 Product Overview

The MX370084A ISDB-Tmm Waveform Pattern (this software hereafter) is a software option with a library of standard waveform patterns meeting the ARIB STD-B46 recommendations.

- ISDB-Tmm waveform patterns
- ISDB-TSB waveform patterns

Note:

ISDB-TSB waveform patterns are available only in the MG3710A.

A waveform pattern created by this software can be output using an RF signal after being downloaded into the following. Hereafter, each Vector Signal Generator is collectively called “this equipment, or the mainframe”.

- MG3700A Vector Signal Generator
- MG3710A Vector Signal Generator
- MS2690A/MS2691A/MS2692A Signal Analyzer with Vector Signal Generator option mounted
1.2 Product Configuration

At unpacking, check that all items listed in Table 1.2-1 are included. If any item is missing, contact your Anritsu sales representative immediately.

Table 1.2-1  Product Composition

<table>
<thead>
<tr>
<th>Items</th>
<th>Model/ Symbol</th>
<th>Product Name</th>
<th>Q'ty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main unit</td>
<td>MX370084A</td>
<td>ISDB-Tmm Waveform Pattern</td>
<td>1</td>
<td>License file and manual on accessory DVD</td>
</tr>
</tbody>
</table>

■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/3710A Vector 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”
In order to output ISDB-Tmm waveform pattern from the mainframe, the following operations are required:

- 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.

2.1 For MG3700A or MG3710A
   2.1.1 Installing waveform license
   2.1.2 Transferring waveform pattern to internal hard disk
   2.1.3 Loading to Waveform Memory
   2.1.4 Selecting waveform pattern

2.2 For MS2690A/MS2691A/MS2692A
   2.2.1 Installing waveform license
   2.2.2 Transferring waveform pattern to internal hard disk
   2.2.3 Loading to Waveform Memory
   2.2.4 Selecting waveform pattern
2.1 For MG3700A or MG3710A

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

2.1.1 Installing waveform license

To load the waveform pattern to the memory, the license file corresponding to each pattern must be installed. Refer to the following for installation of the license file.

For MG3700A
- *MG3700A Vector Signal Generator Operation Manual (Mainframe)*
  3.10.10 “Install”

For MG3710A
- *MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe)*
  9.4.4 “Install”, “Adding/deleting waveform licenses: Waveform Licenses”

2.1.2 Transferring waveform pattern to internal hard disk

The generated waveform pattern can be transferred to the mainframe’s internal hard disk in the following ways:

*Note:*

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

For MG3700A
- LAN
- CompactFlash Card

For MG3710A
- LAN
- External device such as USB Memory
2.1 For MG3700A or MG3710A

- Transferring from PC to MG3700A via LAN (MG3700A, MG3710A)
  Two IQproducer™ tools can be used to transfer a waveform pattern to the
  MG3700A 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 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 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 mainframe to the root directory of a CF card.

  Insert the CF card into the card slot on the front panel of the mainframe,
  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 how to transfer a waveform pattern to the internal hard disk of the
  mainframe, refer to “Copying external waveform pattern: Copy” in
  Section 7.3.6 of the MG3710A Vector Signal Generator MG3740A Analog
  Signal Generator Operation Manual (Mainframe).
2.1.3 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 2.1.2 “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 MG3700A/MG3710A
  A waveform pattern can be loaded into the waveform memory by using the instruction panel of the mainframe or by using a remote command.

For operation using the front panel, refer below:

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

For operation using remote commands, refer below:

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

- 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 Operation Manual (IQproducer™).
2.1.4 Selecting waveform pattern

Select a waveform pattern to use for modulation from the waveform patterns loaded into the waveform memory of the mainframe according to Section 2.1.3 “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:
  - MG3700A Vector Signal Generator Operation Manual (Mainframe)  
    Section 3.5.2 (4), “To output the pattern loaded into Memory A for modulation in Edit mode”
  - MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe)  
    Section 7.3.5, “Selecting output waveform pattern: Select”

  For operation using remote commands, refer below:
  - MG3700A Vector Signal Generator Operation Manual (Mainframe)  
    Section 4 Remote Control
  - MG3710A Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe)  
    Section 7.3.5, “Selecting output waveform pattern: Select”

- 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 Operation Manual (IQproducer™).
2.2 For MS2690A/MS2691A/MS2692A

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

2.2.1 Installing waveform license

To load the waveform pattern to the memory, the license file corresponding to each pattern must be installed. Refer to the following for installation of the license file.

- For details, refer to the 3.8 “Installing and Uninstalling” in MS2690A/MS2691A/MS2692A Signal Analyzer Operation Manual.

2.2.2 Transferring waveform pattern to internal hard disk

The generated waveform pattern can be transferred to the mainframe’s internal hard disk in the following ways:

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

Note:

Transferring waveform patterns is not required if the patterns are created using this software on the MS2690A/MS2691A/MS2692A.
2.3 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 MS2690A-020/MS2691A-020/MS2692A-020 internal hard disk to the waveform memory.

For operation using the front panel, refer below:

- **MS2690A/MS2691A/MS2692A Signal Analyzer Option 020: Vector Signal Generator Operation Manual (Operation)**
  - Section 2.4.1 “Loading waveform file in memory”

For operation using remote commands, refer below:

- **MS2690A/MS2691A/MS2692A Signal Analyzer Option 020: Vector Signal Generator Operation Manual (Remote Control)
2.2.4 Selecting waveform pattern

Select waveform patterns to be used for modulation from those loaded in the waveform memory of the MS2690A/MS2691A/MS2692A as described in Section 2.2.1 “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:

- *MS2690A/MS2691A/MS2692A Signal Analyzer Option 020: Vector Signal Generator Operation Manual (Operation)*
  
  Section 2.4.2 “Selecting waveform pattern”

For operation using remote commands, refer below:

- *MS2690A/MS2691A/MS2692A Signal Analyzer Option 020: Vector Signal Generator Operation Manual (Remote Control)*
Chapter 3  Waveform Pattern Details

This chapter explains the details of the MX370084A ISDB-Tmm Waveform Pattern software.

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  3.1.2  ISDB-TSB waveform patterns ................................. 3-7

3.2 Waveform Pattern Format ............................................ 3-9
  3.2.1  ISDB-Tmm waveform patterns ................................. 3-9
  3.2.2  ISDB-TSB waveform patterns ................................. 3-11
3.1 Waveform Pattern

This waveform pattern contains the following ISDB-Tmm waveform patterns and ISDB-TSB waveform patterns in accordance with the ARIB STD-B46 standards.

3.1.1 ISDB-Tmm waveform patterns

<table>
<thead>
<tr>
<th>Waveform Pattern Name</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>QPSK_1_2_TI0_A,</td>
<td>Mode: 3, GI: 1/4</td>
</tr>
<tr>
<td>QPSK_1_2_TI0_A_8M</td>
<td>Super segment 1</td>
</tr>
<tr>
<td></td>
<td>Partial reception: ON</td>
</tr>
<tr>
<td></td>
<td>A layer: 1seg, Mod=QPSK, CR=1/2, TI=0</td>
</tr>
<tr>
<td></td>
<td>B layer: 12seg, Mod=16 QAM, CR=1/2, TI=0</td>
</tr>
<tr>
<td></td>
<td>Super segment 2</td>
</tr>
<tr>
<td></td>
<td>No. of concatenated segments: 7</td>
</tr>
<tr>
<td></td>
<td>A layer: 1seg, Mod=QPSK, CR=1/2, TI=0</td>
</tr>
<tr>
<td></td>
<td>B layer: 12seg, Mod=16 QAM, CR=1/2, TI=0</td>
</tr>
</tbody>
</table>

| QPSK_2_3_TI0_A,       | Mode: 3, GI: 1/4  |
| QPSK_2_3_TI0_A_8M    | Super segment 1  |
|                       | Partial reception: ON  |
|                       | A layer: 1seg, Mod=QPSK, CR=2/3, TI=0  |
|                       | B layer: 12seg, Mod=16 QAM, CR=1/2, TI=0  |
|                       | Super segment 2  |
|                       | No. of concatenated segments: 7  |
|                       | A layer: 1seg, Mod=QPSK, CR=2/3, TI=0  |
|                       | B layer: 12seg, Mod=16 QAM, CR=1/2, TI=0  |
### Table 3.1.1-1  ISDB-Tmm Waveform Pattern List (cont’d)

<table>
<thead>
<tr>
<th>Waveform Pattern Name</th>
<th>Parameter</th>
</tr>
</thead>
</table>
| 16QAM_1_2_TI0_A, 16QAM_1_2_TI0_A_8M | Mode: 3, GI: 1/4  
Super segment 1  
Partial reception: ON  
A layer: 1seg, Mod=16 QAM, CR=1/2, TI=0  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=0  
Super segment 2  
No. of concatenated segments: 7  
A layer: 1seg, Mod=16 QAM, CR=1/2, TI=0  
Super segment 3  
Partial reception: ON  
A layer: 1seg, Mod=16 QAM, CR=1/2, TI=0  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=0 |
| QPSK_1_2_TI4_A, QPSK_1_2_TI4_A_8M | Mode: 3, GI: 1/4  
Super segment 1  
Partial reception: ON  
A layer: 1seg, Mod=QPSK, CR=1/2, TI=4  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=4  
Super segment 2  
No. of concatenated segments: 7  
A layer: 1seg, Mod=QPSK, CR=1/2, TI=4  
Super segment 3  
Partial reception: ON  
A layer: 1seg, Mod=QPSK, CR=1/2, TI=4  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=4 |
| QPSK_2_3_TI4_A, QPSK_2_3_TI4_A_8M | Mode: 3, GI: 1/4  
Super segment 1  
Partial reception: ON  
A layer: 1seg, Mod=QPSK, CR=2/3, TI=4  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=4  
Super segment 2  
No. of concatenated segments: 7  
A layer: 1seg, Mod=QPSK, CR=2/3, TI=4  
Super segment 3  
Partial reception: ON  
A layer: 1seg, Mod=QPSK, CR=2/3, TI=4  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=4 |
### Table 3.1.1-1  ISDB-Tmm Waveform Pattern List (cont’d)

<table>
<thead>
<tr>
<th>Waveform Pattern Name</th>
<th>Parameter</th>
</tr>
</thead>
</table>
| 16QAM_1_2_TI4_A, 16QAM_1_2_TI4_A_8M | Mode: 3, GI: 1/4  
Super segment 1  
Partial reception: ON  
A layer: 1seg, Mod=16 QAM, CR=1/2, TI=4  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=4  
Super segment 2  
No. of concatenated segments: 7  
A layer: 1seg, Mod=16 QAM, CR=1/2, TI=4  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=4 |
| QPSK_1_2_TI4_C, QPSK_1_2_TI4_C_8M | Mode: 3, GI: 1/4  
Super segment 1  
Partial reception: ON  
A layer: 1seg, Mod=QPSK, CR=1/2, TI=4  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=4  
Super segment 2  
Partial reception: ON  
A layer: 1seg, Mod=QPSK, CR=1/2, TI=4  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=4  
Super segment 3  
No. of concatenated segments: 7  
A layer: 1seg, Mod=QPSK, CR=1/2, TI=4 |
| QPSK_2_3_TI4_C, QPSK_2_3_TI4_C_8M | Mode: 3, GI: 1/4  
Super segment 1  
Partial reception: ON  
A layer: 1seg, Mod=QPSK, CR=2/3, TI=4  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=4  
Super segment 2  
Partial reception: ON  
A layer: 1seg, Mod=QPSK, CR=2/3, TI=4  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=4  
Super segment 3  
No. of concatenated segments: 7  
A layer: 1seg, Mod=QPSK, CR=2/3, TI=4 |
### 3.1 Waveform Pattern

<table>
<thead>
<tr>
<th>Waveform Pattern Name</th>
<th>Parameter</th>
</tr>
</thead>
</table>
| **16QAM_1_2_TI4_C, 16QAM_1_2_TI4_C_8M** | Mode: 3, GI: 1/4  
Super segment 1  
Partial reception: ON  
A layer: 1seg, Mod=16 QAM, CR=1/2, TI=4  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=4  
Super segment 2  
Partial reception: ON  
A layer: 1seg, Mod=16 QAM, CR=1/2, TI=4  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=4  
No. of concatenated segments: 7  
A layer: 1seg, Mod=16 QAM, CR=1/2, TI=4 |
| **QPSK_1_2_TI4_C, QPSK_1_2_TI4_C_8M** | Mode: 3, GI: 1/4  
Super segment 1  
Partial reception: ON  
A layer: 1seg, Mod=QPSK, CR=1/2, TI=4  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=4  
Super segment 2  
Partial reception: ON  
A layer: 1seg, Mod=QPSK, CR=1/2, TI=4  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=4  
No. of concatenated segments: 7  
A layer: 1seg, Mod=QPSK, CR=1/2, TI=4 |
| **QPSK_2_3_TI4_C, QPSK_2_3_TI4_C_8M** | Mode: 3, GI: 1/4  
Super segment 1  
Partial reception: ON  
A layer: 1seg, Mod=QPSK, CR=2/3, TI=4  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=4  
Super segment 2  
Partial reception: ON  
A layer: 1seg, Mod=QPSK, CR=2/3, TI=4  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=4  
No. of concatenated segments: 7  
A layer: 1seg, Mod=QPSK, CR=2/3, TI=4 |
Table 3.1.1-1  ISDB-Tmm Waveform Pattern List (cont’d)

<table>
<thead>
<tr>
<th>Waveform Pattern Name</th>
<th>Parameter</th>
</tr>
</thead>
</table>
| 16QAM _1_2_TI4_C, 16QAM_1_2_TI4_C_8M | Mode: 3, GI: 1/4  
Super segment 1  
Partial reception: ON  
A layer: 1seg, Mod=16 QAM, CR=1/2, TI=4  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=4  
Super segment 2  
Partial reception: ON  
A layer: 1seg, Mod=16 QAM, CR=1/2, TI=4  
B layer: 12seg, Mod=16 QAM, CR=1/2, TI=4  
Super segment 3  
No. of concatenated segments: 7  
A layer: 1seg, Mod=16 QAM, CR=1/2, TI=4 |

Note:  
A super segment is arranged in the sequence 1, 2, and 3 from the low-frequency side. In addition, the super segment 2 sub-channel number is arranged in the sequence 1, 4, 7, 10, 13, 16, 19 from the low-frequency side.  
Since a waveform pattern with the name XXXX_8M has an 8 MHz offset from the XXXX waveform pattern, the TMCC and segment arrangement parameters for the two waveform patterns are the same.
### 3.1.2 ISDB-T<sub>S</sub>B waveform patterns

*Note:*

ISDB-T<sub>S</sub>B waveform patterns are available only in the MG3710A.

<table>
<thead>
<tr>
<th>Waveform Pattern Name</th>
<th>Parameter</th>
</tr>
</thead>
</table>
| A-1_16QAM_1_2_TI0    | Mode: 3, GI: 1/4  
For 3 segment format  
Partial reception: ON  
A layer: Mod=16 QAM, CR=1/2, TI=0  
B layer: Mod=16 QAM, CR=1/2, TI=0  
1 segment format  
No. of concatenated segments: 3  
M Mod=16 QAM, CR=1/2, TI=0 |
| A-1_QPSK_1_2_TI0    | Mode: 3, GI: 1/4  
For 3 segment format  
Partial reception: ON  
A layer: Mod=QPSK, CR=1/2, TI=0  
B layer: Mod=QPSK, CR=1/2, TI=0  
1 segment format  
No. of concatenated segments: 3  
Mod=QPSK, CR=1/2, TI=0 |
| A-1_QPSK_2_3_TI0    | Mode: 3, GI: 1/4  
For 3 segment format  
Partial reception: ON  
A layer: Mod=QPSK, CR=2/3, TI=0  
B layer: Mod=QPSK, CR=2/3, TI=0  
1 segment format  
No. of concatenated segments: 3  
Mod=QPSK, CR=2/3, TI=0 |
### Table 3.1.2-1  ISDB-Tsb Waveform Pattern List (cont’d)

<table>
<thead>
<tr>
<th>Waveform Pattern Name</th>
<th>Parameter</th>
</tr>
</thead>
</table>
| B_16QAM_1_2_TI0        | Mode: 3, GI: 1/4  
3 segment format  
Partial reception: ON  
A layer: Mod=16 QAM, CR=1/2, TI=0  
B layer: Mod=16 QAM, CR=1/2, TI=0 |
| B_QPSK_1_2_TI0         | Mode: 3, GI: 1/4  
3 segment format  
Partial reception: ON  
A layer: Mod=QPSK, CR=1/2, TI=0  
B layer: Mod=QPSK, CR=1/2, TI=0 |
| B_QPSK_2_3_TI0         | Mode: 3, GI: 1/4  
3 segment format  
Partial reception: ON  
A layer: Mod=QPSK, CR=2/3, TI=0  
B layer: Mod=QPSK, CR=2/3, TI=0 |

**Note:**
The sub-channel number of each segment is arranged in the sequence 1, 4, 7, 10, 13, 16, 19, 22, and 25 from the low-frequency side.
3.2 Waveform Pattern Format

The format and setting details for ISDB-Tmm waveform patterns are described below.

3.2.1 ISDB-Tmm waveform patterns

- OFDM segment
  This software incorporates a library of A and C type patterns based on the super segment arrangement standardized in ARIB STD-B46 Part 1 Annex 2.4.
  The ISDB-Tmm waveform pattern is composed of three super segments. The super segments are arranged in the sequence super segment 1, super segment 2, and super segment 3 from the low frequency side. Figure 3.2.1-1 and 3.2.1-2 show the spectrum.
  In A-type waveform patterns, super segments 1 and 3 are type A super segments and super segment 2 is a type B super segment.
  In C-type waveforms, super segments 1 and 2 are type A super segments. Super segment 3 is a type B super segment. The type B super segment is composed of seven concatenated segments. In addition, this super segment sub channel number is arranged in the sequence 1,4,7,10,13,16,19 from the low-frequency side.

![Figure 3.2.1-1 Type A ISDB-Tmm Spectrum Image](image1)

![Figure 3.2.1-2 Type C ISDB-Tmm Spectrum Image](image2)
3-10

Chapter 3  Waveform Pattern Details

Frame composition
Figure 3.2.1-3 shows the frame composition. First, transmission path encoding is performed for each super frame. Next, the type-B super frame is a concatenated frame of seven segments. In addition, the three super frames are composed of re-concatenated frames. IFFT is performed and the whole is topped up with a guard interval to create the OFDM symbol.

Figure 3.2.1-3  ISDB-Tmm Frame Composition
3.2 Waveform Pattern Format

3.2.2 ISDB-Tsb waveform patterns

*Note:*
ISDB-Tsb waveform patterns are available only in the MG3710A.

- **OFDM segment**

This software incorporates a library of A-1 and B type patterns based on the segment arrangement standardized in ARIB STD-B46 Part 2 Annex 2.4.

A-1 type ISDB-Tsb waveform pattern consists of two 3 segment formats and three 1 segment formats in connection.

B type ISDB-Tsb waveform pattern consists of three 3 segment formats. Figure 3.2.2-1 and 3.2.2-2 show the spectrum.

The sub-channel number of each segment is arranged in the sequence 1, 4, 7, 10, 13, 16, 19, 22, and 25 from the low-frequency side.

![A-1 type ISDB-Tsb Spectrum Image](image1)

**Figure 3.2.2-1** A-1 type ISDB-Tsb Spectrum Image

![B type ISDB-Tsb Spectrum Image](image2)

**Figure 3.2.2-2** B type ISDB-Tsb Spectrum Image
Frame composition

Figure 3.2.2-3 shows the frame composition. First, transmission path encoding is performed for every 3 segment format and 1 segment format. Next, these are composed of re-concatenated frames. IFFT is performed and the whole is topped up with a guard interval to create the OFDM symbol.

Figure 3.2.2-3 ISDB-TSB Frame Composition
Appendix A  ISDB Waveform Generation Software

This chapter explains functional details of the ISDB Waveform Generation Software (this sample software hereafter).

Note:
This sample software is not on the DVD, but it is available on the Anritsu download site. Registration is required to use the website.

A.1 Operating Environment.................................................A-2
A.2 Preparation ...................................................................A-3
A.3 List of Parameters..........................................................A-4
A.4 Waveform Pattern Generation.................................A-8
A.5 PN23 Data Default...........................................................A-9
A.1 Operating Environment

To run this sample software the operating environment must satisfy the following conditions.

(1) PC

<table>
<thead>
<tr>
<th>Items</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>Windows 2000 Professional/Windows XP</td>
</tr>
<tr>
<td>CPU</td>
<td>At least 1 GHz or faster Pentium III or equivalent</td>
</tr>
<tr>
<td>Memory</td>
<td>1 GB or more</td>
</tr>
<tr>
<td>Hard disk</td>
<td>5 GB or more free space in the drive where this sample software is to be installed. The free hard disk space necessary to create waveform pattern varies depending on the waveform pattern size.</td>
</tr>
</tbody>
</table>

(2) Displays with a resolution of 1024×768 pixels are best viewed using a small font setting.

Although this sample software can be installed and run in the MS2690A/MS2691A/MS2692A, the measurement functions of the MS2690A/MS2691A/MS2692A are not guaranteed while this software is running.
A.2 Preparation

This sample software is composed of an executable (.ECE) file and a parameter file. To use this sample software, these two files must be located in the same folder as shown in Figure A-2.1.

Figure A-2.1 Composition of Sample Software
### A.3 List of Parameters

This section explains each of the items indicated in the parameter list. The parameter list lists each of the parameters required to generate the ISDB-Tmm waveform pattern.

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Function</th>
<th>Setting options</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output File Name</td>
<td>This sets the name of the created waveform pattern.</td>
<td>On, Off</td>
<td>Up to 20 characters can be set for the waveform pattern name: supported characters are English alphanumeric characters and the following special symbols: <code>! % &amp; ( ) + - * . ^ @ [ ]</code></td>
</tr>
<tr>
<td>System</td>
<td>This sets the system.</td>
<td>0, 1, 2, 3</td>
<td>Settings 0 to 3 correspond to ISDB-T, ISDB-Tmm, Area-Oneseg, and ISDB-T_S respectively.</td>
</tr>
<tr>
<td>Instrument</td>
<td>This sets the supported instrument.</td>
<td>0, 1, 3</td>
<td>Settings 0, 1, 3 correspond to the MG3700A, MS269xA, and MG3710A respectively.</td>
</tr>
<tr>
<td>Frame Length</td>
<td>This sets the frame length.</td>
<td>2 to (Refer to the value in Table A.3-1.)</td>
<td>The maximum value may change depending on the TI setting.</td>
</tr>
</tbody>
</table>
### Table A.3-1 Maximum Frame Length Value

<table>
<thead>
<tr>
<th>System</th>
<th>Guard Interval</th>
<th>2 GB Memory</th>
<th>1 GB Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISDB-T</td>
<td>1/32</td>
<td>2492</td>
<td>1246</td>
</tr>
<tr>
<td></td>
<td>1/16</td>
<td>2418</td>
<td>1208</td>
</tr>
<tr>
<td></td>
<td>1/8</td>
<td>2284</td>
<td>1142</td>
</tr>
<tr>
<td></td>
<td>1/4</td>
<td>2056</td>
<td>1028</td>
</tr>
<tr>
<td>ISDB-Tmm</td>
<td>1/32</td>
<td>154</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>1/16</td>
<td>150</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>1/8</td>
<td>142</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>1/4</td>
<td>128</td>
<td>64</td>
</tr>
<tr>
<td>Area-Oneseg</td>
<td>1/32</td>
<td>78</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>1/16</td>
<td>74</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>1/8</td>
<td>70</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>1/4</td>
<td>64</td>
<td>32</td>
</tr>
</tbody>
</table>

**Over Sampling Ratio**
- **Function**: This sets the oversampling ratio.
- **Setting options**: 2, 4
- **Remarks**: Settings 2 and 4 correspond to 2 and 4, respectively.

**Frequency Offset**
- **Function**: This enables and disables the frequency offset.
- **Setting options**: 0, 1
- **Remarks**: Settings 0 and 1 enable and disable the frequency offset respectively. When frequency offset is enabled and ISDB-T, ISDB-Tmm and Area-Oneseg is set at System, the frequency offset size is +8.0 MHz, +4.0 MHz, and +250 kHz, respectively.

**Mode**
- **Function**: This sets the Mode.
- **Setting options**: 0, 1, 2
- **Remarks**: Settings 0, 1 and 2 correspond to Mode1, Mode2, and Mode3, respectively.

**Guard Interval**
- **Function**: This sets the guard interval.
- **Setting options**: 0, 1, 2, 3
- **Remarks**: Settings 0, 1, 2 and 3 correspond to 1/4, 1/8, 1/16, and 1/32, respectively.
### Emergency Flag
**Function**
This sets the emergency flag operation.

**Setting options**
0, 1

**Remarks**
Settings 0 and 1 correspond to OFF and ON.

### Mobile Receive
**Function**
This sets the Mobile Receive flag.

**Setting options**
0, 1

**Remarks**
Settings 0 and 1 correspond to OFF and ON. This is enabled for 13-segment format channels. When the Rx part flag is ON, set Number of segments for Layer A of the 13-segment format channel to 1.

### Number of segments
**Function**
This sets the number of segments for each layer.

**Setting range**
1 to 13

**Remarks**
The setting range for each system is as follows:
- System = 0: 1 to 13 (However, the sum of the segments for each layer is 13. Moreover, the Number of segments for Layer A is 1 or more.)
- System = 1: 1 or 1 to 13 (However, the sum of the segments for each layer is either 1 or 13.)
- System = 2: 1
- When the sum of the segments for each layer must be 1, set Number of segments for Layer A to 1.

### Mod
**Function**
This sets the modulation method for each layer.

**Setting options**
1, 2, 3

**Remarks**
Settings 1, 2, and 3 correspond to QPSK, 16QAM, and 64QAM, respectively. When System is set to 3, 64QAM is invalid.

### CR
**Function**
This sets the encoding ratio for each layer.

**Setting options**
0, 1, 2, 3, 4

**Remarks**
Settings 0, 1, 2, 3, and 4 correspond to 1/2, 2/3, 3/4, 5/6, and 7/8, respectively.
### A.3 List of Parameters

**TI**

**Function**  
This sets the time interleave for each layer.

**Setting options**  
0, 1, 2, 3

**Remarks**  
Settings 0, 1, 2, and 3 correspond to 0, 4, 8, and 16 in Mode 1, 0, 2, 4, and 8 in Mode 2, and 0, 1, 2 and 3 in Mode 3.

**Subchannel Number**

**Function**  
This sets the subchannel number for each channel.

**Setting range**  
0 to 41

**Remarks**  
This is enabled only for channels for which the total of segments for each layer is 1; it is disabled for other settings.

**Data Type**

**Function**  
This sets the transmission TSP data type.

**Setting options**  
0, 1

**Remarks**  
Settings 0, and 1, correspond to PN23fix, and User File, respectively. The selected data transmission path is encoded. PN23fix indicates that the PN23 data is truncated at the length set at Frame Length and is not cyclic.

**User File Name**

**Function**  
This sets the name of the user file for transmission path encoding.

**Remarks**  
This is enabled only when 1 is set at Data Type. The User File requires a Sync Byte (0x47) every 204 bytes.
A.4 Waveform Pattern Generation

This section explains the procedure for creating waveform patterns using this sample software.

1. Open the parameter file using spreadsheet or text editor software, and set the parameter file.
2. Save and close the parameter file.
3. Double-click the .exe file.
A.5 PN23 Data Default

When PN23fix is selected at Data Type of the parameter file, transmission path encoding of the PN23 data is performed. The defaults for the PN23 data when creating a waveform for ISDB-Tmm is as follows:

0x7FFFFF, 0x50FFFF, 0x51FFFF, 0x52FFFF, 0x53FFFF, 0x54FFFF, 0x55FFFF, 0x56FFFF, 0x57FFFF, 0x58FFFF, 0x59FFFF, 0x5AFFFF, 0x5BFFFF, 0x5CFFFF, 0x5DFFFF, 0x5EFFFF, 0x5FFFFF, 0x60FFFF, 0x61FFFF, 0x62FFFF, 0x63FFFF, 0x64FFFF, 0x65FFFF, 0x66FFFF, 0x67FFFF, 0x68FFFF, 0x69FFFF, 0x6AFFFF, 0x6BFFFF, 0x6CFFFF, 0x6DFFFF, 0x6EFFFF, 0x6FFFFF

The PN23 data default values are arranged with the header value at super segment 1, the second value at super segment 2, and the next value at the next super segment, sequentially, etc. However, the contiguous super segment with segment 1 uses the default for the PN23 data from the low-frequency side segment.

For example, in the example in Figure A.5-1, the default value for the PN23 data of super segment 1 is 0x7FFFFF. The default values for the PN23 data of super segment 2 are 0x50FFFF, 0x51FFFF, and 0x52FFFF sequentially from segment 1 of the subchannel number. The default value for the PN23 data of super segment 3 is 0x57FFFF.

The same defaults are used at each layer at layer 2 and above transmissions.

The defaults for PN23 data when creating waveform patterns for ISDB-T and Area-Oneseg are 0x7FFFFF.

![Figure A.5-1 Segment Arrangement](image_url)
References are to page numbers.

**C**
- CR ................................................................. A-6

**D**
- Data Type ........................................................ A-7

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- Emergency Flag ........................................... A-6

**F**
- Frame Length ................................................ A-4
- Frequency Offset ........................................... A-5

**G**
- Guard Interval ................................................ A-5

**I**
- Instrument .................................................... A-4

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- Mod ............................................................... A-6
- Mode ............................................................ A-5

**N**
- Number of segments ..................................... A-6

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- Over Sampling Ratio ..................................... A-5

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- Product Overview ......................................... 1-2

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- System ........................................................ A-4

**T**
- TI ................................................................. A-7

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- User File Name .............................................. A-7

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  - Loading to ............................................. 2-7
- Waveform Memory
  - Loading to ............................................. 2-4
- Waveform pattern
  - Selecting .................................................. 2-5, 2-8
  - Transferring to internal hard disk ............. 2-6
  - Transferring to internal hard disk ............. 2-2