

Waveform File for Z-Wave Application Operation Manual

First Edition

- For safety and warning information, please read this manual before attempting to use the equipment.
- Additional safety and warning information is provided in the MT8870A Universal Wireless Test Set Operation Manual. Please refer to this document before using the equipment.
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These indicate that the marked part should be recycled.

Waveform File for Z-Wave Application
Operation Manual

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1. Product Model

Software: MV887061A Z-Wave Waveforms

2. Applied Directive and Standards

When the MV887061A Z-Wave Waveforms is installed in the MU887000A and MT8870A, the applied directive and standards of this unit conform to those of the MT8870A Universal Wireless Test Set.

PS: About main frame

Please contact Anritsu for the latest information on the MT8870A Universal Wireless Test Set to be used with the MV887061A Z-Wave Waveforms.

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C-Tick marking



1. Product Model

Software: MV887061A Z-Wave Waveforms

2. Applied Directive and Standards

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PS: About main frame


Please contact Anritsu for the latest information on the MT8870A Universal Wireless Test Set to be used with the MV887061A Z-Wave Waveforms.

About This Manual

This manual mainly describes the operation of the Waveform File for Z-Wave Application.

Products relevant to the MT8870A Universal Wireless Test Set include:

- MT8870A Universal Test Set (main unit)
- Modules mounted on the MT8870A Universal Test Set
- Application software installed on the modules
- Control software installed in a PC to control the MT8870A Universal Test Set

These products are referred to as the "Universal Wireless Test Set Series". The operation manuals of the Universal Wireless Test Set Series consist of separate documents for the main unit, module(s), application software, and control software, as shown below.  indicates this manual.

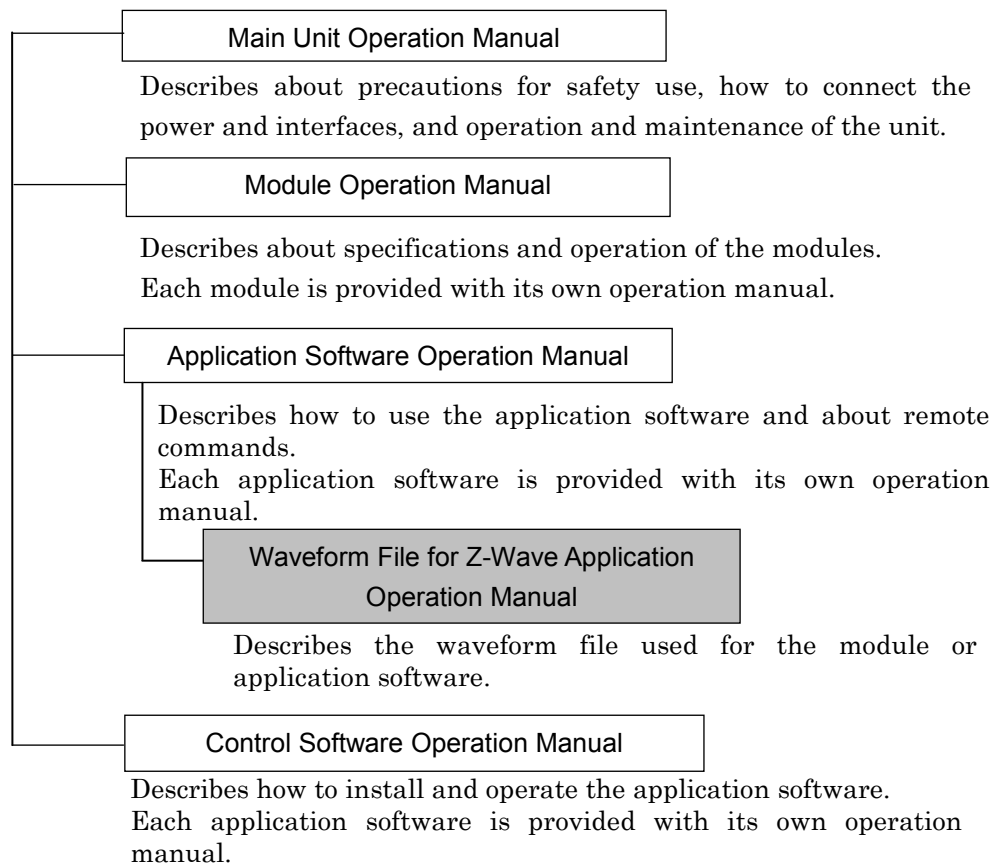


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Chapter 1 Outline

This chapter outlines the Z-Wave Application waveform files and explains the product composition.

1.1	Introduction to Waveform Files	1-2
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1.1 Introduction to Waveform Files

The MT8870A Universal Wireless Test Set (hereafter MT8870A) output digital modulation signals by loading IQ data saved in files.

The Z-Wave Application waveform files provide the IQ data for outputting the modulation signal specified in the mobile communications standards.

The mobile station performance is tested by loading the Z-Wave Application waveform files into the MT8870A and outputting the digital modulation signal.

Table 1.1-1 Z-Wave Application Waveform Files

Model	Product Name
MV887061A	Z-Wave Waveforms

1.2 Product Composition

The Z-Wave Application waveform files have the following composition.
The electronic files are stored in one or more storage media (DVD, etc.).

Table 1.2-1 MV887061A Product Composition

Model/Code	Product Name	Remarks
MV887061A	Z-Wave Waveforms	—
W3790AE	Waveform File for Z-Wave Application Operation Manual	English

1.3 Abbreviations

The abbreviations in this manual are listed in Table 1.3-1.

Table 1.3-1 Abbreviations

Abbreviation	Formal Name
PPDU	PHY Protocol Data Unit
PSDU	PHY Service Data Unit
SHR	Start Header
EHR	End Header
SFD	Start Frame Delimiter
MSDU	MAC Service Data Unit

Chapter 2 Before Use

This chapter explains the preparations before using the Z-Wave Application waveform files.

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2.1 Equipment

The following equipment is required to use the Z-Wave Application waveform files.

Table 2.1-1 Required Equipment

Model	Product
MT8870A	Universal Wireless Test Set
MU887000A	TRX Test Module

2.2 Installing Waveform Files

To use the waveform files stored on the storage media, move the files to the MU887000A.

1. Copy the waveform files on the storage media to PC.
2. Start the MX887900A Utility Tools software provided with the MU887000A.

Refer to Chapter 8 “Utility Tools” in the *MU887000A TRX Test Module Operation Manual* for a description of how to use the MX887900A Utility Tools.

3. Move the waveform files to the MU887000A using the Utility Tools Waveform File Transfer function.

To perform separate transfer of waveform files to MU887000A, refer to 8.3.9 “Transferring files” in the *MU887000A TRX Test Module Operation Manual*.

To perform batch transfer of waveform files to MU887000A, refer to 8.3.12 “Transferring waveform files” in the *MU887000A TRX Test Module Operation Manual*.

Files moved to the MU887000A are saved in non-volatile memory so it is not necessary to move the files when the MT8870A is switched off and on again.

2.3 Using Waveform Files

2.3.1 Using MU887000A commands

This section explains the command for using waveform files. For details of the commands, refer to the *MU887000A TRX Test Module Operation Manual*.

To output the modulation signal by using the waveform files, load the waveform file from non-volatile memory into the waveform memory.

- To load waveform file
:SOURce:GPRF:GENerator:ARB:FILE:LOAD
- To confirm waveform loading status
:SOURce:GPRF:GENerator:ARB:FILE:LOAD:STATus
- To stop loading waveform file
:SOURce:GPRF:GENerator:ARB:FILE:LOAD:CANceL

Waveform files cannot be loaded into waveform memory if the memory has insufficient free space.

In this case, delete waveform files that are not being used from memory to increase the available free space.

- To query the memory free space
:SOURce:GPRF:GENerator:ARB:WAVEform:FREE
- To defragment waveform memory
:SOURce:GPRF:GENerator:ARB:WAVEform:DEFrag
- To query the number of files
:SOURce:GPRF:GENerator:ARB:WAVEform:COUNt
- To query the file name
:SOURce:GPRF:GENerator:ARB:WAVEform:NAME
- To delete the waveform file
:SOURce:GPRF:GENerator:ARB:WAVEform:DELeTe
:SOURce:GPRF:GENerator:ARB:WAVEform:DELeTe:ALL

Specify the waveform to reproduce from the waveform files in the waveform memory.

- To query the waveform file version
:SOURce:GPRF:GENerator:ARB:FILE:VERSIon
- To query the number of group information units
:SOURce:GPRF:GENerator:ARB:WAVEform:PATtern:COUNt
- To query the group number
:SOURce:GPRF:GENerator:ARB:WAVEform:PATtern
- To query the pattern name
:SOURce:GPRF:GENerator:ARB:WAVEform:PATtern:NAME

- To select the waveform data to be played
:SOURce:GPRF:GENerator:ARB:WAVEform:PATtern:SElect
- To restart the waveform
:SOURce:GPRF:GENerator:ARB:WAVEform:REStart

Usage Example

The following example specifies waveform file MV887061A_ZW_R1_0001 of Group Number 1.

1. Set the operation mode to Normal mode.
:SOURce:GPRF:GENerator:MODE NORMAL
2. Set modulation (any waveform) to On.
:SOURce:GPRF:GENerator:BBMode ARB
3. Load the waveform file into waveform to memory.
:SOURce:GPRF:GENerator:ARB:FILE:LOAD
"MV887061A_ZW_R1_0001"
4. Query the waveform file group number.
:SOURce:GPRF:GENerator:ARB:WAVEform:PATtern:COUNT?
"MV887061A_ZW_R1_0001"
> 1
5. Query the group title of group number 1.
:SOURce:GPRF:GENerator:ARB:WAVEform:PATtern:NAME?
"MV887061A_ZW_R1_0001",1
> "Z-Wave, R1, Symbol Rate 19.2ksps, Bit Rate 9.6kbps,
2FSK, PPDU 208 bits, Filter=Gaussian, BT=1.0"
6. Specify the waveform.
:SOURce:GPRF:GENerator:ARB:WAVEform:PATtern:SElect
"MV887061A_ZW_R1_0001",1,1

Chapter 3 Waveform File Details

This chapter explains the detailed specifications of the waveform files for the Z-Wave Application.

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3.1 Z-Wave Waveform File

The specifications of the Z-Wave Waveform File are listed in the following table.

3.1.1 MV887061A_ZW_R1_0001

Table 3.1.1-1 MV887061A_ZW_R1_0001 Composition

Item	Specification
Waveform File Name	MV887061A_ZW_R1_0001
Group Number	1
Standard	Z-Wave
Modulation	2FSK
Data Rate	R1
Bit Rate	9.6 kb/s
Symbol Rate	19.2 kbaud
Filter	Gaussian (BT=1.0)
PPDU	26 bytes (208 bits)
Preamble Sequence	10 bytes
SFD	1 byte
PSDU	14 bytes (With 4 bytes of MPSU included)
PSDU bit Pattern (HEX)	C0 00 00 00 01 01 01 04 02 FF 83 DF 17 8C
EHR	1 byte

3.1.2 MV887061A_ZW_R2_0001

Table 3.1.2-1 MV887061A_ZW_R2_0001 Composition

Item	Specification
Waveform File Name	MV887061A_ZW_R2_0001
Group Number	1
Standard	Z-Wave
Modulation	2FSK
Data Rate	R2
Bit Rate	40 kb/s
Symbol Rate	40 kbaud
Filter	Gaussian (BT=1.0)
PPDU	35 bytes (280 bits)
Preamble Sequence	20 bytes
SFD	1 byte
PSDU	14 bytes (With 4 bytes of MPSU included)
PSDU bit Pattern (HEX)	C0 00 00 00 01 01 01 04 02 FF 83 DF 17 8C

3.1.3 MV887061A_ZW_R3_0001

Table 3.1.3-1 MV887061A_ZW_R3_0001 Composition

Item	Specification
Waveform File Name	MV887061A_ZW_R3_0001
Group Number	1
Standard	Z-Wave
Modulation	2FSK
Data Rate	R3
Bit Rate	100 kb/s
Symbol Rate	100 kbaud
Filter	Gaussian (BT=0.6)
PPDU	40 bytes (320 bits)
Preamble Sequence	24 bytes
SFD	1 byte
PSDU	15 bytes (With 4 bytes of MPSU included)
PSDU bit Pattern (HEX)	C0 00 00 00 01 01 01 04 02 FF 83 DF 17 B9 66

3.1.4 MV887061A_ZW_R1_0002

Table 3.1.4-1 MV887061A_ZW_R1_0002 Composition

Item	Specification
Waveform File Name	MV887061A_ZW_R1_0002
Group Number	1
Standard	Z-Wave
Modulation	2FSK
Data Rate	R1
Bit Rate	9.6 kb/s
Symbol Rate	19.2 kbaud
Filter	Gaussian (BT=1.0)
PPDU	76 bytes (608 bits)
Preamble Sequence	10 bytes
SFD	1 byte
PSDU	64 bytes (With 54 bytes of MPSU included)
PSDU bit Pattern (HEX)	C0 00 00 00 01 01 01 36 02 FF 83 DF 17 32 09 4E D1 E7 CD 8A 91 C6 D5 C4 C4 40 21 18 4E 55 86 F4 DC 8A 15 A7 EC 92 DF 93 53 30 18 CA 34 BF A2 C7 59 67 8F BA 0D 6D D8 2D 7D 54 0A 57 97 70 39 95
EHR	1 byte

3.1.5 MV887061A_ZW_R2_0002

Table 3.1.5-1 MV887061A_ZW_R2_0002 Composition

Item	Specification
Waveform File Name	MV887061A_ZW_R2_0002
Group Number	1
Standard	Z-Wave
Modulation	2FSK
Data Rate	R2
Bit Rate	40 kb/s
Symbol Rate	40 kbaud
Filter	Gaussian (BT=1.0)
PPDU	85 bytes (680 bits)
Preamble Sequence	20 bytes
SFD	1 byte
PSDU	64 bytes (With 54 bytes of MPSU included)
PSDU bit Pattern (HEX)	C0 00 00 00 01 01 01 36 02 FF 83 DF 17 32 09 4E D1 E7 CD 8A 91 C6 D5 C4 C4 40 21 18 4E 55 86 F4 DC 8A 15 A7 EC 92 DF 93 53 30 18 CA 34 BF A2 C7 59 67 8F BA 0D 6D D8 2D 7D 54 0A 57 97 70 39 95

3.1.6 MV887061A_ZW_R3_0002

Table 3.1.6-1 MV887061A_ZW_R3_0002 Composition

Item	Specification
Waveform File Name	MV887061A_ZW_R3_0002
Group Number	1
Standard	Z-Wave
Modulation	2FSK
Data Rate	R3
Bit Rate	100 kb/s
Symbol Rate	100 kbaud
Filter	Gaussian (BT=0.6)
PPDU	211 bytes (1688 bits)
Preamble Sequence	40 bytes
SFD	1 byte
PSDU	170 bytes (With 159 bytes of MPSU included)
PSDU bit Pattern (HEX)	C0 00 00 00 01 01 01 9F 02 FF 83 DF 17 32 09 4E D1 E7 CD 8A 91 C6 D5 C4 C4 40 21 18 4E 55 86 F4 DC 8A 15 A7 EC 92 DF 93 53 30 18 CA 34 BF A2 C7 59 67 8F BA 0D 6D D8 2D 7D 54 0A 57 97 70 39 D2 7A EA 24 33 85 ED 9A 1D E1 FF 07 BE 2E 64 12 9D A3 CF 9B 15 23 8D AB 89 88 80 42 30 9C AB 0D E9 B9 14 2B 4F D9 25 BF 26 A6 60 31 94 69 7F 45 8E B2 CF 1F 74 1A DB B0 5A FA A8 14 AF 2E E0 73 A4 F5 D4 48 67 0B DB 34 3B C3 FE 0F 7C 5C C8 25 3B 47 9F 36 2A 47 1B 57 13 11 00 84 61 39 56 1B D3 72 28 56 9F B2 4B 7E 4D AB 4F

3.2 ZERO Waveform File

The specifications of the ZERO Waveform File are listed in the following table.

3.2.1 ZERO_614400Hz_1000P

Table 3.2.1-1 ZERO_614400Hz_1000P Composition

Item	Specification
Waveform File Name	ZERO_614400Hz_1000P
Group Number	1
Sampling Rate	614.4 kHz
Sample points	1000 point

3.2.2 ZERO_1280000HZ_1000P

Table 3.2.2-1 ZERO_1280000HZ_1000P Composition

Item	Specification
Waveform File Name	ZERO_1280000HZ_1000P
Group Number	1
Sampling Rate	1280 kHz
Sample points	1000 point

3.2.3 ZERO_3200000HZ_1000P

Table 3.2.3-1 ZERO_3200000HZ_1000P Composition

Item	Specification
Waveform File Name	ZERO_3200000HZ_1000P
Group Number	1
Sampling Rate	3200 kHz
Sample points	1000 point