

Waveform File for Small Cell Application Operation Manual

Fifth 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 it before using the equipment.**
- **Keep this manual with the equipment.**

ANRITSU CORPORATION

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Symbols used in manual



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



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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.

Waveform File for Small Cell Application
Operation Manual

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Revision History:

February 29th, 2020

December 17th, 2021

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 flash drive 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.

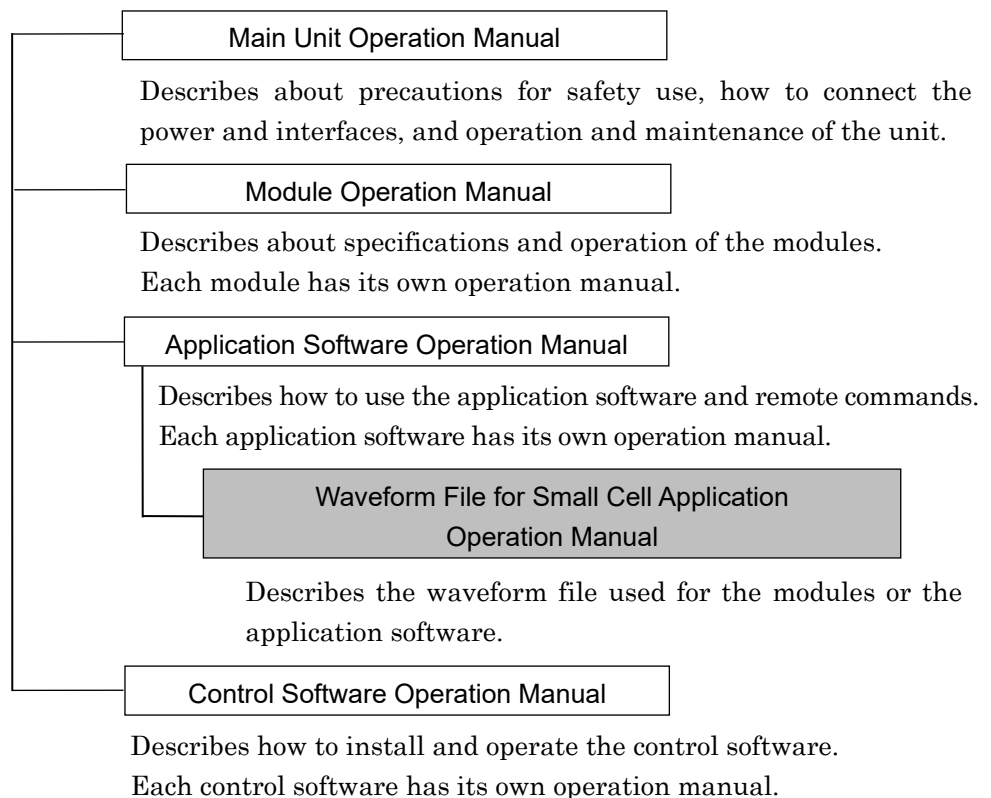
About This Manual

This manual mainly describes the operation of the Waveform File for Small Cell Application.

Products relevant to the MT8870A Universal Wireless Test Set include:

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

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.



Convention Used in This Manual

Except where there is a good reason to do otherwise, this manual assumes the use of MT8870A and MU887000A.

Note that the descriptions in this manual also apply to MT8872A, MU887001A, or MU887002A. MU887000A/01A means the MU887000A or MU887001A.

Additionally, the Anritsu management code of the options described in this manual is “0” unless there is a reason.

The option number: The option number is indicated by three digits.

MU88700XA- x x x

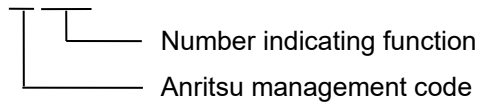


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Appendix

Chapter 1 Outline

This chapter outlines the Small Cell 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 Small Cell Application waveform files provide the IQ data for outputting the modulation signal specified in the mobile communications standards.

The performance of Local Area BS and Home BS (hereafter Small Cells collectively) can be tested by loading Small Cell Application waveform files into the MT8870A and outputting the digital modulation signal.

Table 1.1-1 Small Cell Application Waveform Files

Model/Code	Product Name
MV887021A	W-CDMA/HSPA Uplink Waveform File
MV887023A	LTE FDD Uplink Waveform File

1.2 Product Composition

The Small Cell Application waveform files have the following composition.
All the waveform files are stored on one DVD.

Table 1.2-1 MV887021A Product Composition

Model/Code	Product Name	Qty	Remarks
	DVD	1	
MV887021A	W-CDMA/HSPA Uplink Waveform File		Stored on DVD
W3707AE	Waveform File for Small Cell Application Operation Manual		English, stored on DVD

Table 1.2-2 MV887023A Product Composition

Model/Code	Product Name	Qty	Remarks
	DVD	1	
MV887023A	LTE FDD Uplink Waveform File		Stored on DVD
W3707AE	Waveform File for Small Cell Application Operation Manual		English, stored on DVD

1.3 Abbreviations

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

Table 1.3-1 Abbreviations

Abbreviation	Formal Name
3GPP	Third Generation Partnership Project
BS	Base Station
CDMA	Code Division Multiple Access
DL	Downlink
FDD	Frequency Division Duplex
HSPA	High Speed Packet Access
LTE	Long Term Evolution
UL	Uplink
W-CDMA	Wideband CDMA

Chapter 2 Before Use

This chapter explains the preparations before using the Small Cell Application waveform files.

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2.1 Equipment

The following equipment is required to use the Small Cell Application waveform files.

Table 2.1-1 Required Equipment

Model/Code	Product
MT8870A/72A	Universal Wireless Test Set
MU887000A/01A/02A	TRX Test Module

2.2 Installing Waveform Files

To use the waveform files stored on the DVD, register the waveform licenses in the MT8870A and transfer the waveform files to the MU887000A.

Registering the waveform licenses and transferring the waveform files can be reversed in order.

1. 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.
2. Copy the waveform files and the waveform licenses on the DVD to PC.

When the waveform license to use is already registered in the MT8870A, it is unnecessary to copy the waveform license file.

For how to check the registered licenses, refer to 8.3.11 “Registering license” in *the MU887000A TRX Test Module Operation Manual*.

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*.

4. When the waveform license of the waveform file to use is not registered yet, register the license in the MT8870A by using the License Registration function of Utility Tools.

For how to check the registered licenses and how to register a license, refer to 8.3.11 “Registering license” in *the MU887000A TRX Test Module Operation Manual*.

The waveform files and waveform licenses are saved in non-volatile memory. It is unnecessary to re-transfer them every time the MT8870A is turned Off.

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 MV887023A_LTEFDD_0001 of Group Number 4.

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
"MV887023A_LTEFDD_0001"
4. Query the waveform file group number.
:SOURce:GPRF:GENerator:ARB:WAVEform:PATtern:COUNT?
"MV887023A_LTEFDD_0001"
> 6
5. Query the group title of group number 4.
:SOURce:GPRF:GENerator:ARB:WAVEform:PATtern:NAME?
"MV887023A_LTEFDD_0001", 4
> "BS Test/FRC (UL) : A1-3, UL Wave 10MHz, UL Info : StartRB=0
SizeRB=25 QPSK"
6. Specify the waveform.
:SOURce:GPRF:GENerator:ARB:WAVEform:PATtern:SElect
"MV887023A_LTEFDD_0001", 4, 1

2.3.2 Using from Small Cell Application software

This section explains commands related to use of waveform files. Refer to the following operation manuals for the details of the commands.

MU887000A TRX Test Module Operation Manual

MX887021A W-CDMA/HSPA Downlink TX Measurement Operation Manual

MX887023A LTE FDD Downlink TX Measurement 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 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 number of files
:SOURce:GPRF:GENerator:ARB:WAVEform:COUNT
- To query the file name
:SOURce:GPRF:GENerator:ARB:WAVEform:NAME
- To delete 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 file name
:SOURce:GPRF:GENerator:ARB:WAVEform:NAME
- To query the number of group units
:SOURce:GPRF:GENerator:ARB:WAVEform:PATTERN:COUNT

- To query the group title
:SOURce:GPRF:GENerator:ARB:WAVEform:PATtern:NAME
- To enable SG commands for Small Cell application
SYS SG
:INSTrument:SYSTem SG
- To select the waveform pattern to be played
PAT
:SOURce:RADio:ARB:WAVEform

Usage Example

The following example specifies waveform MV887021A_WCDMA_0002 group number 1.

1. Set the operation mode to Normal mode.
:SOURce:GPRF:GENerator:MODE NORMAL
2. Enable the SG command for Small Cell application.
:INSTrument:SYSTem SG
3. Set modulation (any waveform) to On.
:OUTPut:MODulation:STATe ON
4. Load the waveform file into waveform to memory.
:SOURce:GPRF:GENerator:ARB:FILE:LOAD
"MV887021A_WCDMA_0002"
5. Query the waveform file group number.
:SOURce:GPRF:GENerator:ARB:WAVEform:PATtern:COUNT?
"MV887021A_WCDMA_0002"
> 5
6. Query the group title of group number 1.
:SOURce:GPRF:GENerator:ARB:WAVEform:PATtern:NAME?
"MV887021A_WCDMA_0002",1
> "WCDMA BS Test Model 1 DPCHx64, Single Carrier, OSR=4,
Scrambling Code 0x00"
7. Specify the waveform.
:SOURce:RADio:ARB:WAVEform "MV887021A_WCDMA_0002",1

Chapter 3 Waveform File Details

This chapter explains the detailed specifications of the waveform files for the Small Cell Application.

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3.2.1	MV887023A_LTEFDD_0001.....	3-5
3.2.2	MV887023A_LTEFDD_0002.....	3-5

3.1 W-CDMA/HSPA Waveform File

The specifications of the W-CDMA/HSPA Waveform File are listed in the following table.

Table 3.1-1 W-CDMA/HSPA Waveform File Specifications

Item		Specification	
Waveform File Name		MV887021A_WCDMA_0001	MV887021A_WCDMA_0002
Application		Reception Test (Receiver sensitivity level)	Transmission Test (Transmitter intermodulation)
Waveform type		W-CDMA Uplink	W-CDMA Downlink
Group Number		1	5
Group Title		Refer to Table 3.1.1-1	Refer to Table 3.1.2-1
Waveform Cycle/Group		1022 [Frame]	1 [Frame]
Group Cycle Period		1022 [Frame]	1 [Frame]
Waveform Marker	Marker 1	-	-
	Marker 2	-	-
	Marker 3	-	-

3.1.1 MV887021A_WCDMA_0001

Waveform File Name
MV887021A_WCDMA_0001

Group Number
1

Table 3.1.1-1 MV887021A_WCDMA_0001 Composition

Group (Pattern) No.	Title	Uplink Information
1	WCDMA UL RMC 12.2kbps, Single Carrier, OSR=3, Scrambling Code 0x00	According to 3GPP TS 25.141 A.2 UL reference measurement channel for 12,2 kbps

3.1.2 MV887021A_WCDMA_0002

Waveform File Name
MV887021A_WCDMA_0002

Group Number
5

Table 3.1.2-1 MV887021A_WCDMA_0002 Composition

Group (Pattern) No.	Title	Downlink Information
1	WCDMA BS Test Model 1 DPCHx64, Single Carrier, OSR=4, Scrambling Code 0x00	According to 3GPP TS 25.141 6.1.1.1 Test Model 1
2	WCDMA BS Test Model 1 DPCHx32, Single Carrier, OSR=4, Scrambling Code 0x00	According to 3GPP TS 25.141 6.1.1.1 Test Model 1
3	WCDMA BS Test Model 1 DPCHx16, Single Carrier, OSR=4, Scrambling Code 0x00	According to 3GPP TS 25.141 6.1.1.1 Test Model 1
4	WCDMA BS Test Model 1 DPCHx8, Single Carrier, OSR=8, Scrambling Code 0x00	According to 3GPP TS 25.141 6.1.1.1 Test Model 1
5	WCDMA BS Test Model 1 DPCHx4, Single Carrier, OSR=8, Scrambling Code 0x00	According to 3GPP TS 25.141 6.1.1.1 Test Model 1

3.2 LTE FDD Waveform File

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

Table 3.2-1 LTE FDD Waveform File Specifications

Item		Specification	
Waveform File Name		MV887023A_LTEFDD_0001	MV887023A_LTEFDD_0002
Application		Reception Test (Receiver sensitivity level)	Transmission Test (Transmitter intermodulation)
Waveform type		LTE Uplink	LTE Downlink
Group Number		6	1
Group Title		Refer to Table 3.2.1-1	Refer to Table 3.2.2-1
Waveform Cycle/Group		4 [Frame]	1 [Frame]
Group Cycle Period		4 [Frame]	1 [Frame]
Waveform Marker	Marker 1	Top of Uplink Frame	Top of Downlink Frame
	Marker 2	Top of Uplink Subframe	Top of Downlink Subframe
	Marker 3	Top of Uplink OFDM Symbol	Top of Downlink OFDM Symbol

3.2.1 MV887023A_LTEFDD_0001

Waveform File Name
MV887023A_LTEFDD_0001

Group Number
6

Table 3.2.1-1 MV887023A_LTEFDD_0001 Composition

Group (Pattern) No.	Title	Uplink Information
1	BS Test/FRC(UL) : A1-1, UL Wave 1.4MHz, UL Info : StartRB=0 SizeRB=6 QPSK	According to 3GPP TS 36.141 A.1 Table A.1-1 A1-1
2	BS Test/FRC(UL) : A1-2, UL Wave 3MHz, UL Info : StartRB=0 SizeRB=15 QPSK	According to 3GPP TS 36.141 A.1 Table A.1-1 A1-2
3	BS Test/FRC(UL) : A1-3, UL Wave 5MHz, UL Info : StartRB=0 SizeRB=25 QPSK	According to 3GPP TS 36.141 A.1 Table A.1-1 A1-3
4	BS Test/FRC(UL) : A1-3, UL Wave 10MHz, UL Info : StartRB=0 SizeRB=25 QPSK	According to 3GPP TS 36.141 A.1 Table A.1-1 A1-3
5	BS Test/FRC(UL) : A1-3, UL Wave 15MHz, UL Info : StartRB=0 SizeRB=25 QPSK	According to 3GPP TS 36.141 A.1 Table A.1-1 A1-3
6	BS Test/FRC(UL) : A1-3, UL Wave 20MHz, UL Info : StartRB=0 SizeRB=25 QPSK	According to 3GPP TS 36.141 A.1 Table A.1-1 A1-3

3

Waveform File Details

3.2.2 MV887023A_LTEFDD_0002

Waveform File Name
MV887023A_LTEFDD_0002

Group Number
1

Table 3.2.2-1 MV887023A_LTEFDD_0002 Composition

Group (Pattern) No.	Title	Downlink Information
1	BS Test/E-TM:1.1, DL Wave 5MHz	According to 3GPP TS 36.141 6.1.1.1 E-UTRA Test Model 1.1 (E-TM1.1)

Appendix A MS2830A Waveform File Support

This Appendix lists the waveform files described in this manual and the MS2830A Signal Analyzer support for these files.

A.1	MS2830A Waveform File Support	A-2
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A.1 MS2830A Waveform File Support

This section shows the table that defines the correspondence between the following two items:

- MS2830A Standard Waveform patterns described in the *MS2690A/MS2691A/MS2692A and MS2830A Signal Analyzer Vector Signal Generator Standard Waveform Pattern Ninth Edition Operation Manual*
- MT8870A's waveform files

Table A.1-1 MS2830A Waveform File Support

MT8870A Waveform Files			MS2830A Standard Waveform Patterns
Waveform File Name	Group No.	Group Title	
MV887021A_WCDMA_0001	1	WCDMA UL RMC 12.2kbps, Single Carrier, OSR=3, Scrambling Code 0x00	UL_RMC_12_2kbps
MV887021A_WCDMA_0002	1	WCDMA BS Test Model 1 DPCHx64, Single Carrier, OSR=4, Scrambling Code 0x00	TestModel_1_64DPCH
	2	WCDMA BS Test Model 1 DPCHx32, Single Carrier, OSR=4, Scrambling Code 0x00	TestModel_1_32DPCH
	3	WCDMA BS Test Model 1 DPCHx16, Single Carrier, OSR=4, Scrambling Code 0x00	TestModel_1_16DPCH
	4	WCDMA BS Test Model 1 DPCHx8, Single Carrier, OSR=8, Scrambling Code 0x00	TestModel_1_8DPCH
	5	WCDMA BS Test Model 1 DPCHx4, Single Carrier, OSR=8, Scrambling Code 0x00	TestModel_1_4DPCH