

# MX370160A

CMMB waveform generation software

MG3700A

Vector Signal Generator

For MG3700A Vector Signal Generator

# MX370160A

## CMMB waveform generation software

### Product Introduction



Version 3.0

**ANRITSU CORPORATION**

# MG3700A: For Generating Digital Terrestrial Broadcast Signals

The MG3700A Vector Signal Generator outputs **Viterbi-BER data** and **video waveforms** for Digital Terrestrial Broadcasting (CMMB)

\*This software reads your "MFS format" video contents files and generates MG3700A "video" waveform patterns. If you **do not have** "MFS format" video contents files, it generates "Viterbi-BER" waveform patterns.

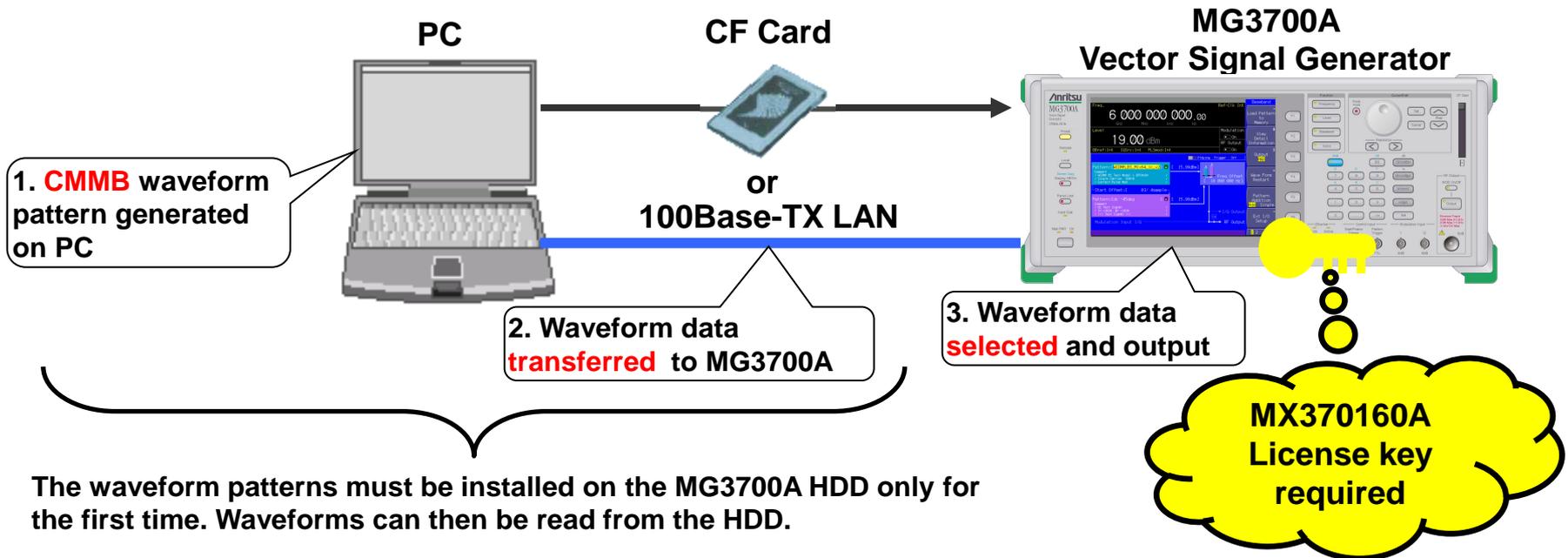
## Key features of MG3700A

Frequency: 250 kHz to 3 GHz (Standard)  
250 kHz to 6 GHz (Option)

Output Level (CW): -140 to +13 dBm (Standard)  
-140 to +19 dBm (Option)

Level Accuracy:  $\pm 0.5$  dBm

**Waveform Combine Function: Two built-in ARB memories support simultaneous output of two signals using one unit.**



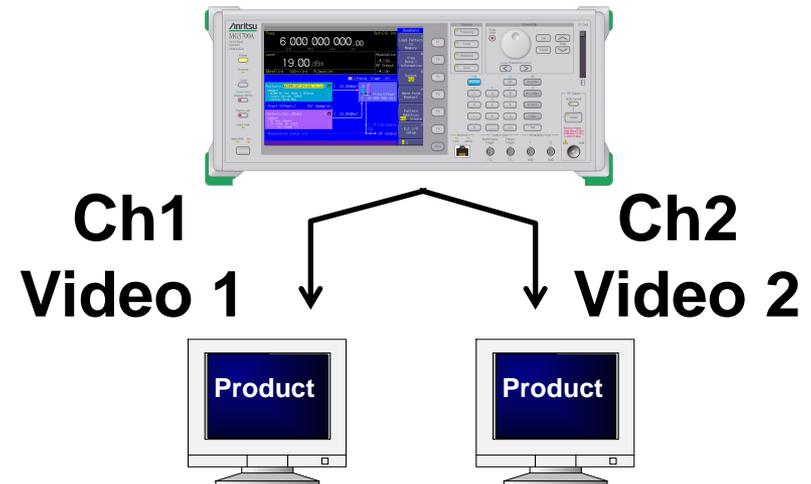
# MG3700A: Key Hardware Features

## ◆ Main Performance

- Frequency Range 250 kHz to 6 GHz  
250 kHz to 3 GHz (Standard)  
250 kHz to 6 GHz (Option)
- Wideband Vector Modulation  
120 MHz (using built-in baseband generator)  
150 MHz (using external IQ)
- High Level Accuracy  
Absolute:  $\pm 0.5$  dB  
Linearity:  $\pm 0.2$  dB typ.
- **Waveform Combine Function**  
**Output two signals of different frequencies\* at separate levels**
- Built-in BER Measurement  
Input Bit Rate: 1 kbps to 20 Mbps (Standard)  
Input Bit Rate: 100 bps to 120Mbps (Option)
- Built-in 40 GB HDD
- Max. 2 GB Arbitrary Waveform Memory  
1 GB = 256 Msamples/ch (Standard)  
2 GB = 512 Msamples/ch (Option)
- Waveform Transfer and Remote Control via 100Base-TX LAN
- Weight:  $\leq 15$  kg (without options)

The MG3700A key features are listed opposite.

**The waveform combine function saves a different signal in each built-in ARB memory and supports frequency offset, as well as output of two different video channels.**



\*The MG3700A has a modulation bandwidth of 120 MHz max. when using frequency offset. There is a limit due to sampling.

# MG3700A: Software Lineup

## ◆ The MG3700A Supports Various Communication Systems

- Built-in Waveform Patterns
  - W-CDMA/HSDPA, - GSM/EDGE, - PDC, - PHS
  - CDMA2000 1x/1xEV-DO, - AWGN
  - *Bluetooth*, - GPS
  - **Broadcasting (ISDB-T/BS/CS/CATV)**
  - Wireless LAN (IEEE802.11a/11b/11g)
- Optional Waveform Patterns (sold separately)
  - TD-SCDMA
  - Public Wireless System (RCR STD-39, ARIB STD-T61/T79/T86)
- Waveform Generation Software: IQproducer (sold separately)
  - W-CDMA, - AWGN, - HSDPA/HSUPA,
  - 3GPP LTE (FDD), - 3GPP LTE (TDD),
  - TDMA (PDC, PHS, Public Wireless)
  - CDMA2000 1xEV-DO, - Multi-carrier
  - Mobile WiMAX, - **DVB-T/H**, - Fading, - **CMMB**
- Arbitrary Waveform Generator  
ASCII system IQ data created using a general EDA tool can be converted and output as waveform pattern for the MG3700A. The quick and easy creation and measurement of waveform patterns increases the development efficiency of new communications systems.

Since the MG3700A uses arbitrary waveform memory (ARB), signals can be output just by preparing waveform patterns.

Anritsu offers various waveform patterns with preset parameters.

Moreover, IQproducer with GUI supports easy generation of waveform patterns by setting parameters at a PC.

The logo for 'Point' is rendered in a 3D, isometric style. The letters are yellow with a gradient and a shadow effect, giving them a three-dimensional appearance as if they are floating or standing on a surface.

### Note:

Anritsu **does not support continuous PN data**, due to memory limits.

This can be used for BER tests with **Simple-BER (Vitabi-BER) or Fixed-BER.**

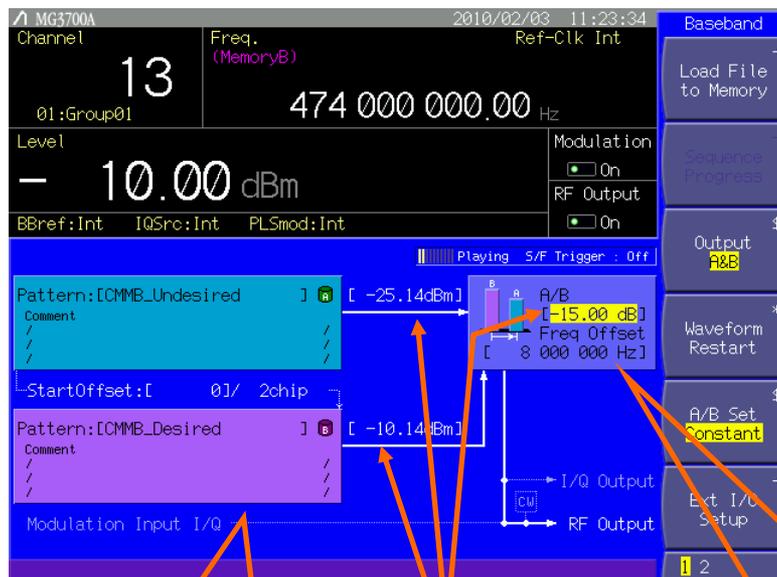
# MG3700A: Waveform Combine Function



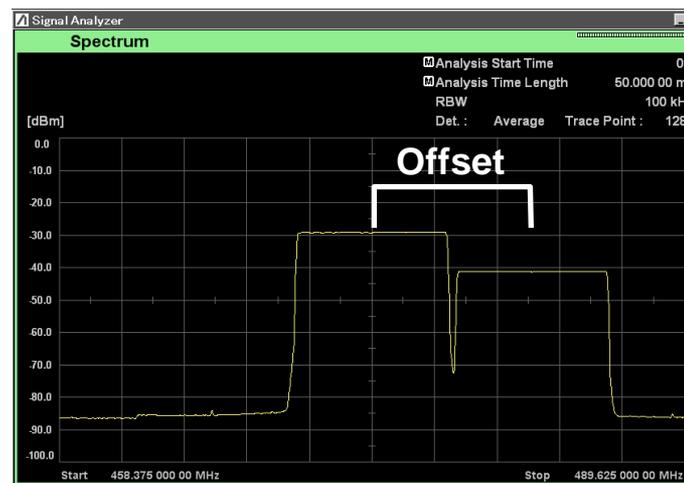
## ◆ Waveform Combine Function (Standard Function)

The single MG3700A unit supports setting and output of different waveform patterns for two ARB memories. It can also set level and frequency offset, and supports output of different channels (frequency) with different video.

[Ex. MG3700A Setting Screen]



One unit outputs two channel signals



Two signals set simultaneously  
Different signals set in memory A and B

Two waveforms set with different level and C/N

Frequency offset setting  
Range depends on waveform pattern sampling rate\*

\*: Example for 20 MHz sampling rate  
Frequency Offset Setting Range  
-60 MHz to +60 MHz

# MG3700A: Memory Capacity and Video Size

Point

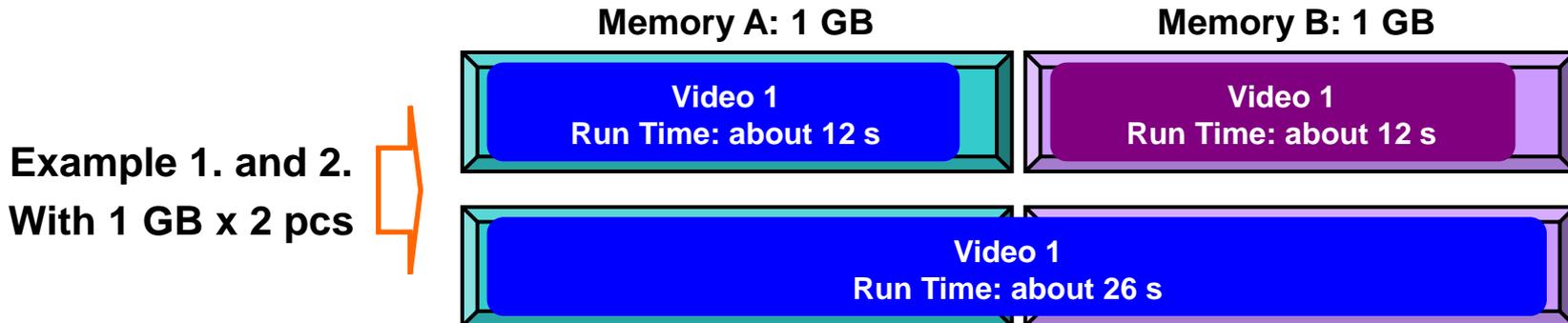
## ◆ Waveform for Video Evaluation

The MG3700A has two ARB memories with the following capacities.

- 512 MB x 2 pc (Standard)
- 1 GB x 2 pc (MG3700A-011 Option) <<Recommended

We recommend increasing the size of the waveform pattern memory using the MG3700A-011 option.

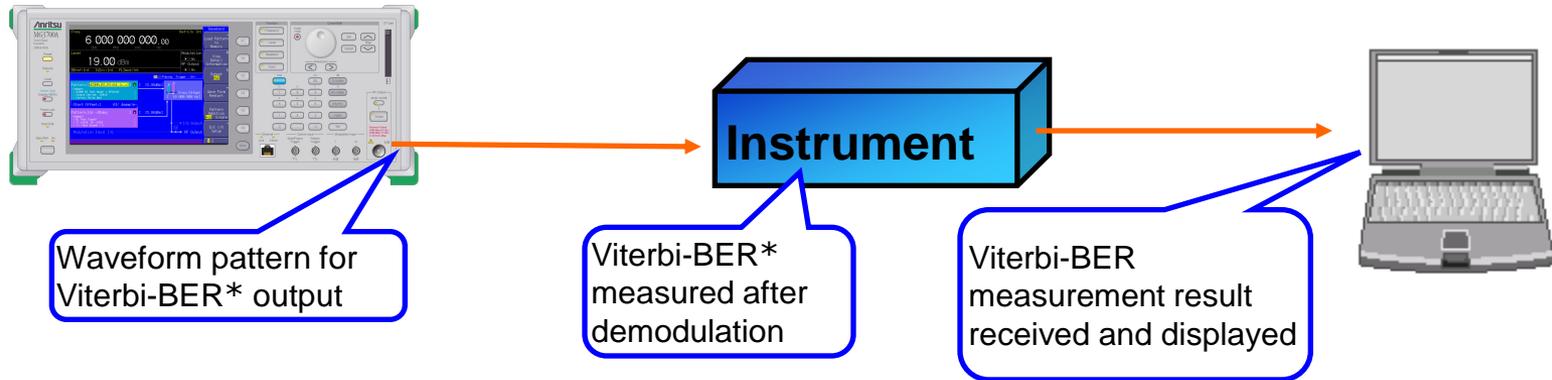
1. Standard memory: 6 s x 2 patterns/12 s x 1 pattern
2. Optional memory : 12 s x 2 patterns/26 s x 1 pattern



\*This software reads your “MFS format” video contents files and generates MG3700A “video” waveform patterns.  
If you **do not have** “MTS format” video contents files, it generates “Viterbi-BER” waveform patterns.

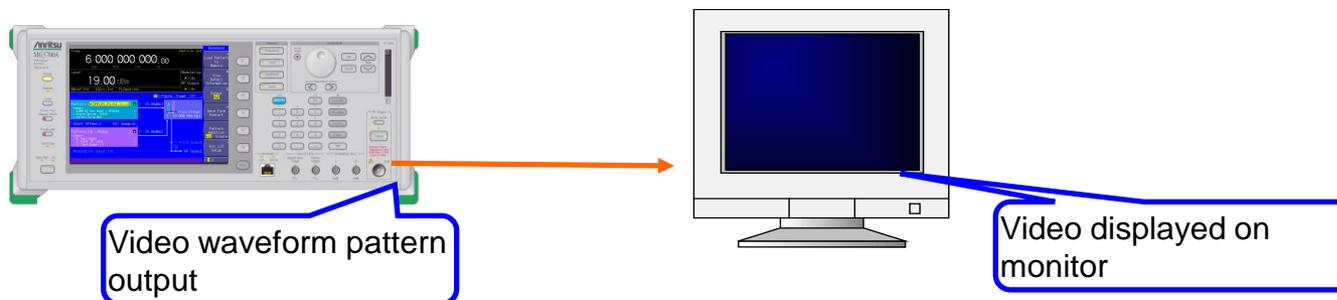
# Rx Performance Measurement

## ◆ Viterbi-BER Measurement (for product with error correction count function)



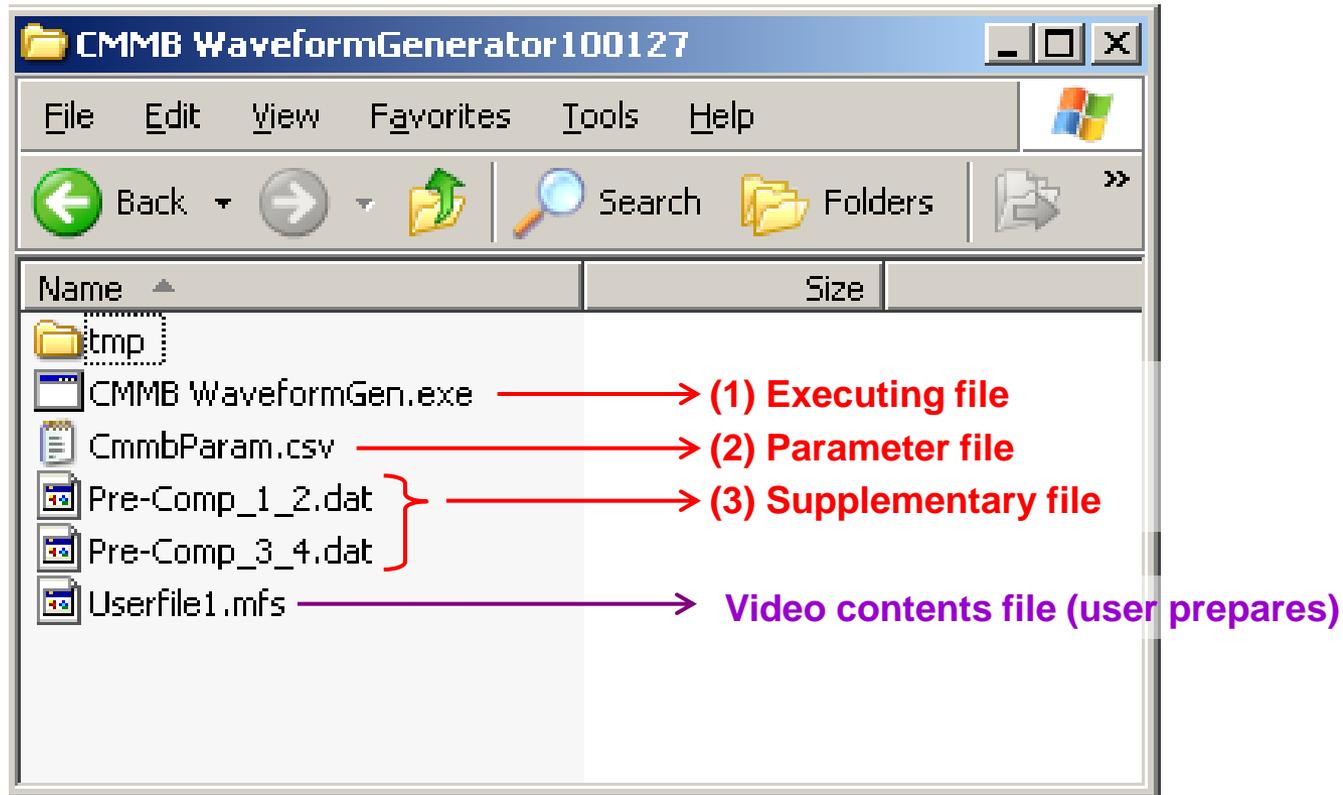
(\*: Viterbi-BER is a method of counting and comparing error bits before and after error correction at the receiver. It can be used to evaluate signals without continuous PN such as PN-BER. The count at the receiver is read at the PC. Since it is not necessary to output the DATA and CLOCK outside the receiver, Viterbi-BER is commonly used to perform the Receiver Sensitivity Test on production lines.)

## ◆ Video Measurement \*Requires MFS format video to generate video waveform pattern



# CMMB Waveform Generation Software –Configuration–

CMMB waveform generating software are consists of below three files.



## [Waveform pattern generation sequence]

1. Set parameter file.
2. Double click .exe file.
3. Move waveform pattern generated in same folder to MG3700A for use.

# CMMB Waveform Generation Software –Parameter Setting Display–

Parameter file and its setting are shown below.

|    | A   | B          | C           | D     | E    | F         | G           | H          | I         | J              | K |
|----|---|------------|-------------|-------|------|-----------|-------------|------------|-----------|----------------|---|
| 1  | #Output File Name   |            |             |       |      |           |             |            |           |                |   |
| 2  | CMMB_Test01 ← Pattern Name (less than 20 characters)                          |            |             |       |      |           |             |            |           |                |   |
| 3  | #Band Width   |            |             |       |      |           |             |            |           |                |   |
| 4  | ( 0=8MHz)   |            |             |       |      |           |             |            |           |                |   |
| 5  | 0 ← Bandwidth (fixed at 8 MHz = 0)  |            |             |       |      |           |             |            |           |                |   |
| 6  | #Frame Length   |            |             |       |      |           |             |            |           |                |   |
| 7  | ( Should be 26 or less when BW=8MHz, and should be 100 or less when BW=2MHz.) |            |             |       |      |           |             |            |           |                |   |
| 8  | 2 ← Frame Length (factor of 2 under 26)                                       |            |             |       |      |           |             |            |           |                |   |
| 9  | #Region Index   |            |             |       |      |           |             |            |           |                |   |
| 10 | ( 0 to 127)   |            |             |       |      |           |             |            |           |                |   |
| 11 | 0 ← Region ID (0 to 127)  |            |             |       |      |           |             |            |           |                |   |
| 12 | #Transmitter Index  |            |             |       |      |           |             |            |           |                |   |
| 13 | ( 128 to 255)   |            |             |       |      |           |             |            |           |                |   |
| 14 | 128 ← Transmitter ID (128 to 255)   |            |             |       |      |           |             |            |           |                |   |
| 15 | #PLCH Param   |            |             |       |      |           |             |            |           |                |   |
| 16 | #RS Coding ( 0=RS(240, 240), 1=RS(240, 224), 2=RS(240, 192), 3=RS(240, 176) ) |            |             |       |      |           |             |            |           |                |   |
| 17 | #LDPC( 0=1/2, 1=3/4 )   |            |             |       |      |           |             |            |           |                |   |
| 18 | #Modulation( 0=BPSK, 1=QPSK, 2=16QAM)   |            |             |       |      |           |             |            |           |                |   |
| 19 | #Scramble( 0 to 7 )   |            |             |       |      |           |             |            |           |                |   |
| 20 |   | #RS Coding | #Interleave | #LDPC | #Mod | #Scramble | #Start Time | #Stop Time | Data Type | User File Name |   |
| 21 | CLCH  | 0          | 1           | 0     | 0    | 0         | 1           | 1          | 0         |                |   |
| 22 | SLCH0   | 0          | 1           | 0     | 1    | 0         | 2           | 3          | 0         |                |   |
| 23 | SLCH1   | 0          | 1           | 0     | 1    | 0         | 4           | 7          | 0         |                |   |
| 24 | SLCH2   | 0          | 1           | 0     | 1    | 0         | 8           | 11         | 0         |                |   |
| 25 | SLCH3   | 0          | 1           | 0     | 1    | 0         | 12          | 15         | 0         |                |   |
| 26 | SLCH4   | 0          | 1           | 0     | 1    | 0         | 16          | 19         | 0         |                |   |
| 27 | SLCH5   | 0          | 1           | 0     | 1    | 0         | 20          | 23         | 0         |                |   |
| 28 | SLCH6   | 0          | 1           | 0     | 1    | 0         | 24          | 27         | 0         |                |   |
| 29 | SLCH7   | 0          | 1           | 0     | 1    | 0         | 28          | 28         | 0         |                |   |
| 30 | SLCH8   | 0          | 1           | 0     | 1    | 0         | 29          | 29         | 0         |                |   |
| 31 | SLCH9   | 0          | 1           | 0     | 1    | 0         | 30          | 30         | 0         |                |   |
| 32 | SLCH10  | 0          | 1           | 0     | 1    | 0         | 31          | 31         | 0         |                |   |
| 33 | SLCH11  | 0          | 1           | 0     | 1    | 0         | 32          | 35         | 0         |                |   |
| 34 | SLCH12  | 0          | 1           | 0     | 1    | 0         | 36          | 39         | 0         |                |   |
| 35 | SLCH13  | 0          | 1           | 0     | 1    | 0         | 40          | 40         | 0         |                |   |

CLCH parameters fixed as below (standardized with specification)  
 RS Coding = 0 [RS (240, 240)],  
 Interleave = 1,  
 LDPC = 0 [1/2],  
 Modulation = 0 [BPSK],  
 Scramble = 0

Each SLCH Parameter

TS Coverage of each SLCH

Data Type of Channel Coding  
 0: PN23 fixed  
 1: User File

# CMMB Waveform Generation Software –Parameter Setting Range–

Parameter items and setting range are shown below.

| Parameter        | Range  |
|------------------|--|
| Band Width       | 8 MHz  |
| Reed-Solomon     | RS(240, 240), RS(240,224),<br>RS(240, 192), RS(240, 176) |
| Interleave Mode  | 1, 2, 3  |
| LDPC             | 1/2, 3/4   |
| Modulation       | BPSK, QPSK, 16QAM  |
| Time Slot        | 0 to 39  |
| Scramble         | 0 to 7   |
| Data             | PN23fix, User File                                       |
| Number of Frames | 2 to 12 (Standard),<br>2 to 26 (with Option 21)          |

## [supplemental remarks]

- ▶ 1 Frame = 1 s
- ▶ This software supports on-air 8 MHz
- ▶ PN23 fixed is discontinuous data for the PN sequence at waveform pattern connection. It can be used simple for BER measurements.  
This cannot be used for PN continuous BER, but high-speed BER measurement function (option) supports BER measurements of any bid line.
- ▶ With User File, the data part of the user's file is read to generate waveform patterns. Generate video waveform patterns with an MFS format video contents file.

# CMMB Waveform Generation Software –How to Use(1)–

## ◆ Start waveform generation

Start waveform generation after setting parameters.

### <Procedure>

1. Check that the following files are in the same folder:  
**Execution file (CMMB WaveformGen.exe)**  
**Parameter file (CmmbParam.csv)**  
**Supporting file (Pre-Comp\_1\_2.dat, Pre-Comp\_3\_4.dat), Folder (tmp)**
2. Double click [**CMMB WaveformGen.exe**]. The DOS command prompt screen opens (see opposite) and waveform generation starts.
3. When waveform pattern generation is completed, [Press return key.] is displayed on the DOS command prompt screen. Press the [**Return**] key to complete.
4. Check that the waveform pattern (wvi/wvd) is generated.
5. Transfer the waveform pattern from the PC to the MG3700A to use.



```
C:\Documents and Settings¥a1195052¥デスクト... - □ ×  
[ Calculation has started. ]  
[ FEC Coding ]  
Phy CH: 15  
[ Frame Structuring ]  
Frame: 1 Time Slot: 40  
Frame: 2 Time Slot: 40  
[ Generating New File ]  
100 per-cent finished.  
Finished Successfully!!  
Press Return Key.
```

# CMMB Waveform Generation Software –How to Use(2)–

## ◆ Downloading waveform pattern to MG3700A

Download the waveform generated by the PC to the MG3700A hard disk.

<Procedure> Using a CF card

1. Copy the waveform pattern to the CF card. Put the waveform pattern in the root directory.
2. Insert the CF card into the MG3700A card slot.
3. Press the **Baseband key**, and then the **F1 key (Load File to Memory)**.
4. Press the **F3 key (File Copy CF to HDD)** to read the CF card file data. Do not remove the CF card from the card slot.
5. The waveform pattern selection window and waveform files in the CF card are displayed. Use the rotary knob or Up/Down keys to **select the waveform files to copy**, and press the Set key to confirm.  
**Select [\*\*\* ALL Install \*\*\*]** to copy all waveforms in the CF card to the internal hard disk.

Note: Read the following pdf for the procedure using a LAN.

MG3700A\_Connection to LAN\_J.pdf

# CMMB Waveform Generation Software –How to Use(3)–

## ◆ Loading waveform pattern into memory

Load waveform patterns from the MG3700A hard disk into memory.

<Procedure>

1. Press the **Baseband key**, and then **F1 key (Load File to Memory)**.
2. Press the **F1 key (Select Package)** to display the package selection window. Use the rotary knob or Up/Down keys to **select the package** and press the Set key.
3. The waveform file selection window and waveform files in the selected package are displayed. Use the rotary knob or UP/Down keys to **select the waveform file to load into memory** and press the Set key to confirm.  
**Select [\*\*\* ALL Load \*\*\*]** to load all waveforms in the package into memory.

## ◆ Selecting waveform pattern

Select a waveform pattern in the MG3700A waveform memory.

### <Procedure>

1. Press the **Baseband key** and move the cursor to **File Select** using the rotary knob or Up/Down keys.
2. Press the Set key to display the package selection window. Select the **package** using the rotary knob or Up/Down keys, and press the Set key.
3. The waveform file selection window and waveform files in the selected package are displayed. Use the rotary knob or Up/Down keys to **select the waveform file to output**, and press the Set key to confirm.

### Usage Notes

1. Cold start the receiver. (Do not leave any previous data remaining.)
2. Check the map display of the receiver while outputting the waveform pattern once.
3. Press F4 (Waveform Restart) to restart (output from top) the waveform pattern.  
(When restarting almost simultaneously with a receiver cold start, the output time can be used effectively.)

# CMMB Waveform Generation Software

## ~Operating Environment~

### ◆ Operating environment

Requires following PC:

- ◆ OS: Windows 2000 Professional or Windows XP
- ◆ CPU: Pentium III 1 GHz or faster
- ◆ Memory: 512 MB
- ◆ Hard disk: >5 GB (required capacity depends on parameters)

## Detailed Information

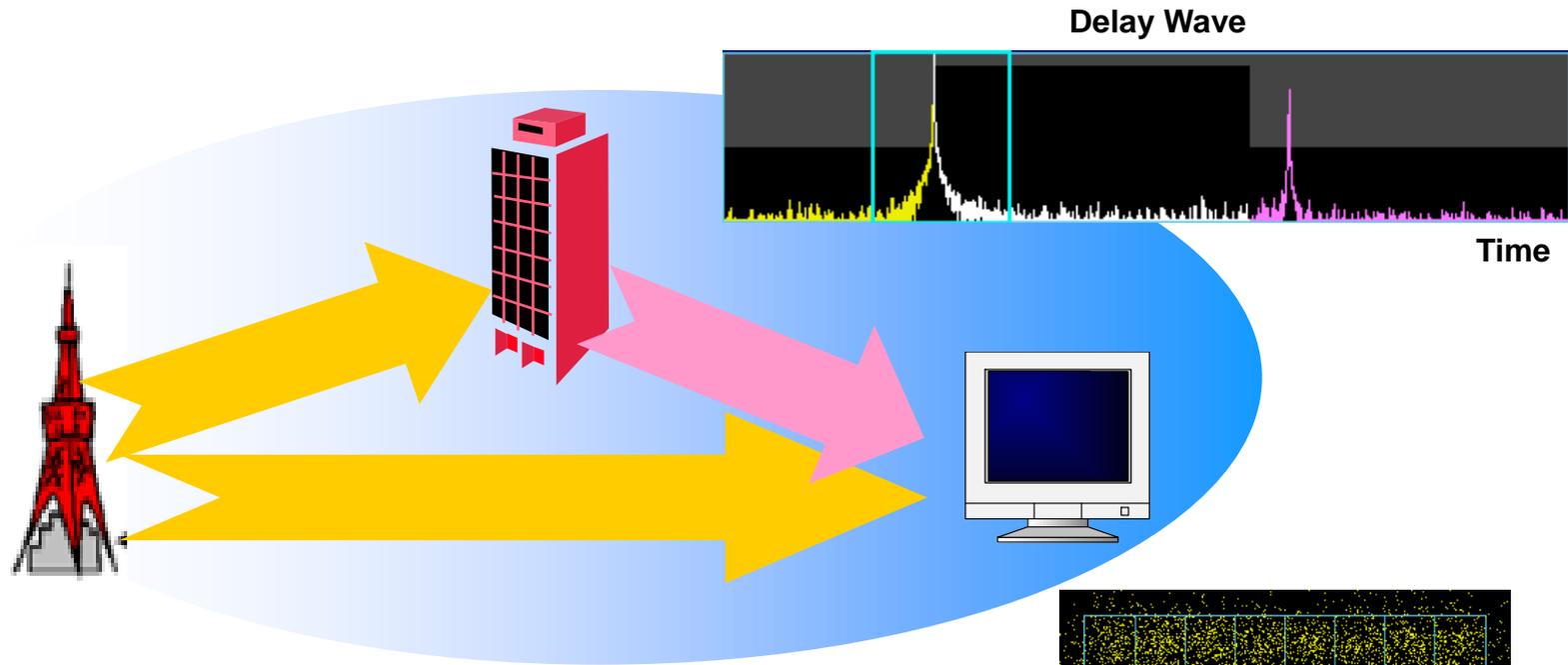
### ◆ MG3700A operation

See the MG3700A Vector Signal Generator instruction manual (main frame) [W2495AW].

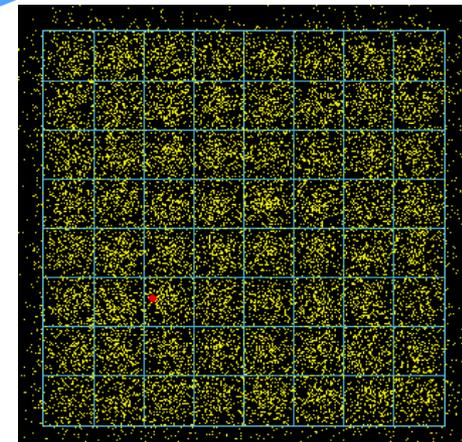
### ◆ IQproducer operation

See the MG3700A Vector Signal Generator instruction manual (IQproducer) [W2496AW].

# Example 1: Delayed Signal Interference Evaluation



**In a real environment, interference occurs due to wave delays caused by reflection from buildings, hills, etc. This wave delay can affect reception, so evaluation of wave delay interference is required.**



**MER Deterioration**

# Example 1: Delayed Signal Interference Evaluation



The MG3700A waveform combine function simulates evaluation of **waveform delay (one waveform)** by outputting the waveform patterns in memory A and B at different timings.

The different timing is set using “Start Offset” shown below.

The screenshot displays the MG3700A settings interface. At the top, Channel 13 is selected with a frequency of 474 000 000.00 Hz. The level is set to -20.00 dBm. The modulation is set to On, and the RF Output is also On. The interface shows two waveform patterns: 'Wanted Signal' and 'Delayed Signal'. Both patterns are set to 'CMMB\_TestPattern' with a level of -20.00 dBm and -50.00 dBm respectively. The 'Delayed Signal' has a 'StartOffset' of 200 symbols. The 'C/N Level setting' is set to 30.00 dB. The interface also shows 'I/Q Output' and 'RF Output' options.

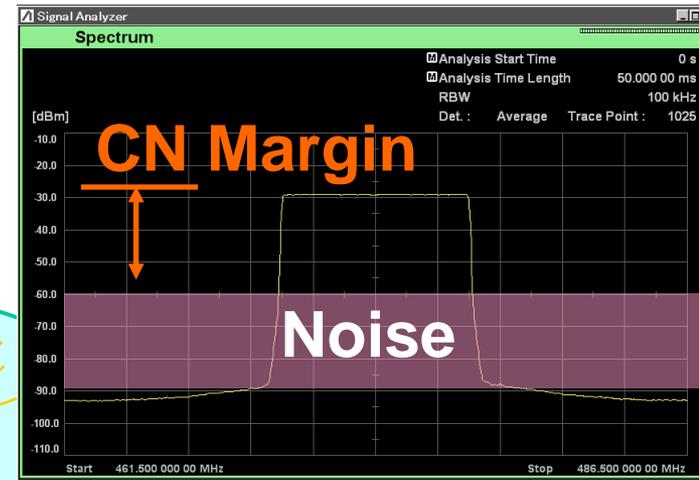
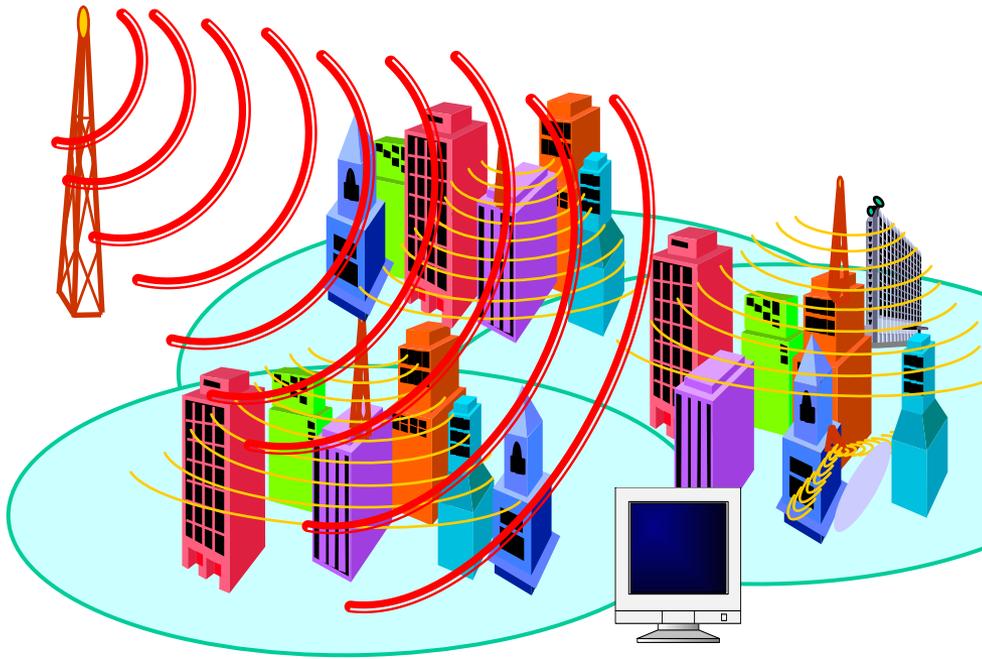
Setting same waveform pattern in memory A and B

Delay setting

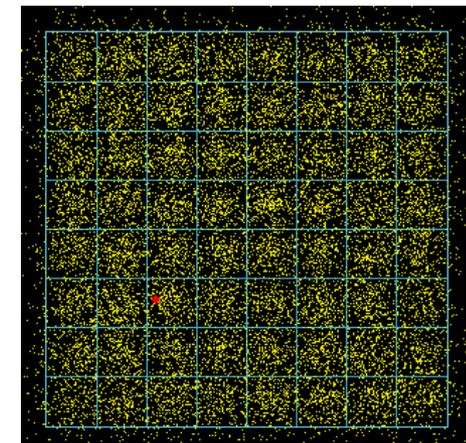
C/N Level setting

[MG3700A Setting Example]

# Example 2: CN Margin Test



In a real environment, interference between signals may cause noise, causing deteriorated MER even when the Rx level is adequate (figure opposite). Testing the CN margin requires addition of white noise (AWGN) to the wanted wave.



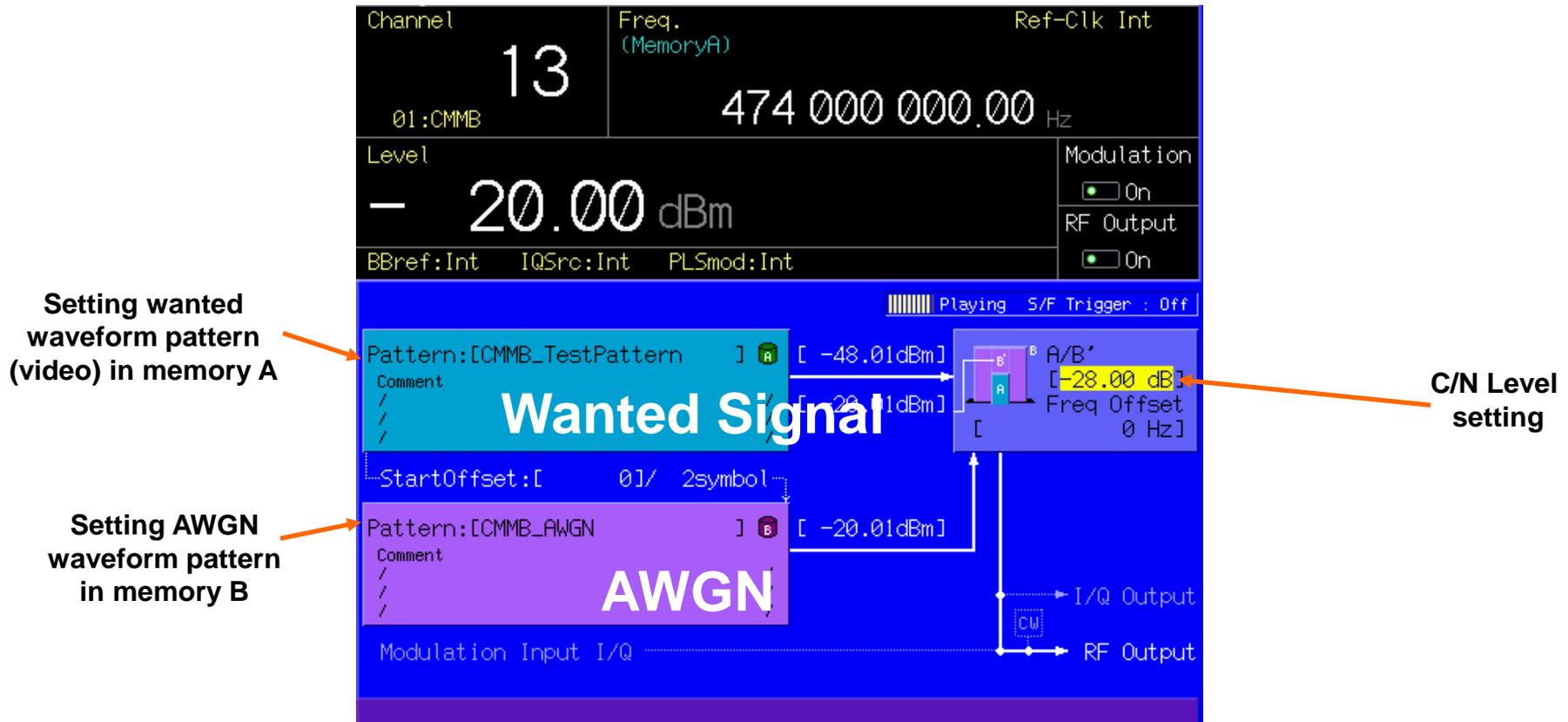
MER Deterioration

# Example 2: CN Margin Test

Point

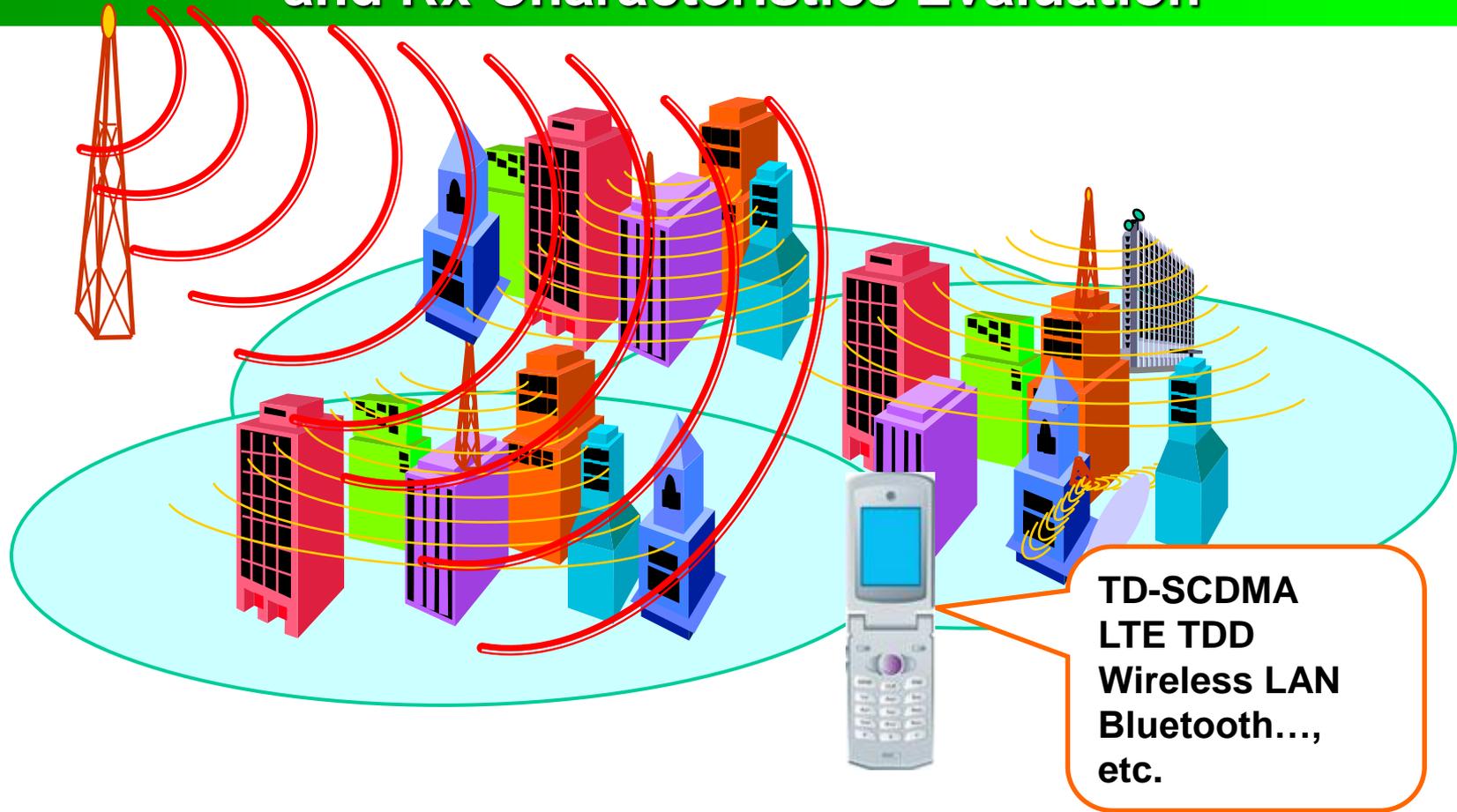
The MG3700A waveform combine function supports evaluation of **CN margin** by setting the wanted signal in memory A, AWGN in memory B, and combining the waveform patterns.

IQproducer supports AWGN generation as a standard function.



[Ex. MG3700A Setting Screen]

# Example 3: Multi-Function Mutual Interference and Rx Characteristics Evaluation



**When wireless systems, such as wireless LAN or Bluetooth, are installed in a receiver, testing with each signal source is required to confirm Rx characteristics and lack of interference.**

# Example 3: Multi-Function Mutual Interference Evaluation

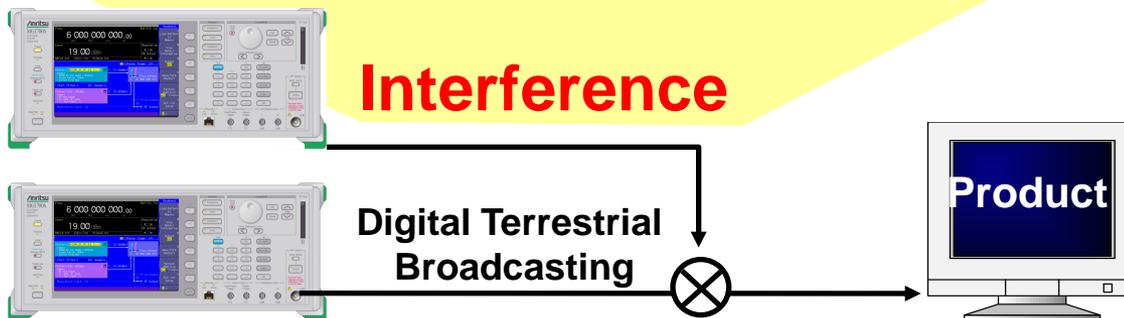
Point

## ◆ Supports Various Communication Systems

- Built-in Waveform Pattern
  - W-CDMA/HSDPA, - GSM/EDGE, - PDC, - PHS, -GPS
  - CDMA2000 1x/1xEV-DO, - AWGN, - Bluetooth
  - Broadcasting (ISDB-T/BS/CS/CATV)
  - Wireless LAN (IEEE802.11a/11b/11g)
- Optional Waveform Patterns (sold separately)
  - TD-SCDMA
  - Public Wireless System (RCR STD-39, ARIB STD-T61/T79/T86)
- Waveform Generating Software: IQproducer (\*sold separately)
  - W-CDMA, - AWGN, - HSDPA/HSUPA\*
  - 3GPP LTE(FDD), - 3GPP LTE(TDD)
  - TDMA\*(PDC, PHS, ARIB)
  - CDMA2000 1xEV-DO\*, - Multi-carrier\*
  - Mobile WiMAX\*, - DVB-T/H\*, - Fading

The MG3700A Vector Signal Generator outputs signals of various communication system.

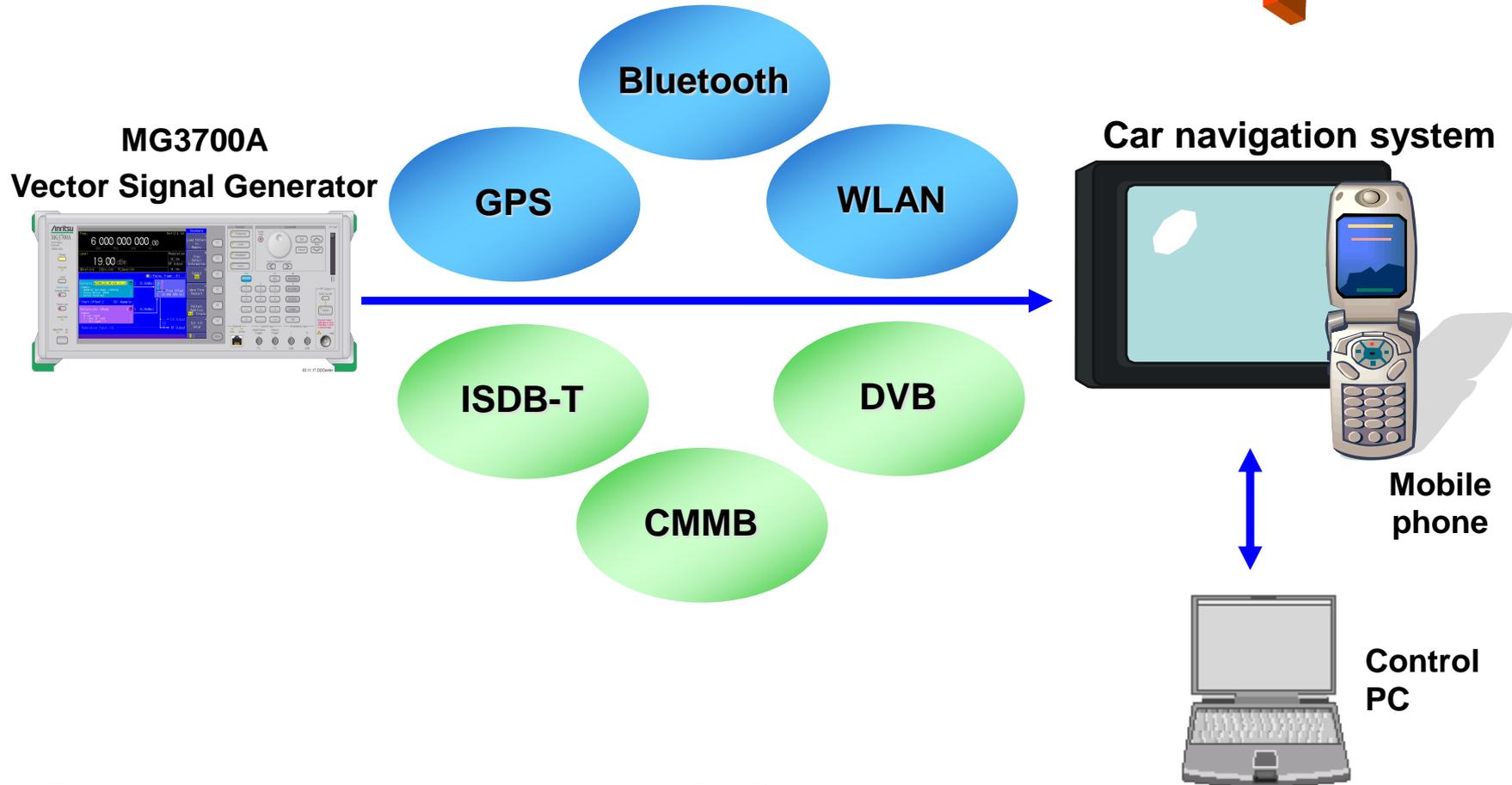
Because it pre-installs key mobile phone signals as well as WLAN and Bluetooth, **it can be used as a signal source for digital terrestrial broadcast interference waves when installing multiple systems.**



# Example 3: Multi Function Rx Characteristics Evaluation

**Point**

## Test System



**This can be used as a signal source for Rx characteristics tests when installing multiple systems.**

# Appendix

# Appendix: CMMB System Outline

**Standard:** CMMB (China Multimedia Mobile Broadcast)

**Standard number:** GY/T 220.1-2006, GY/T 220.2-2006

**Target:** Satellite and terrestrial mobile television

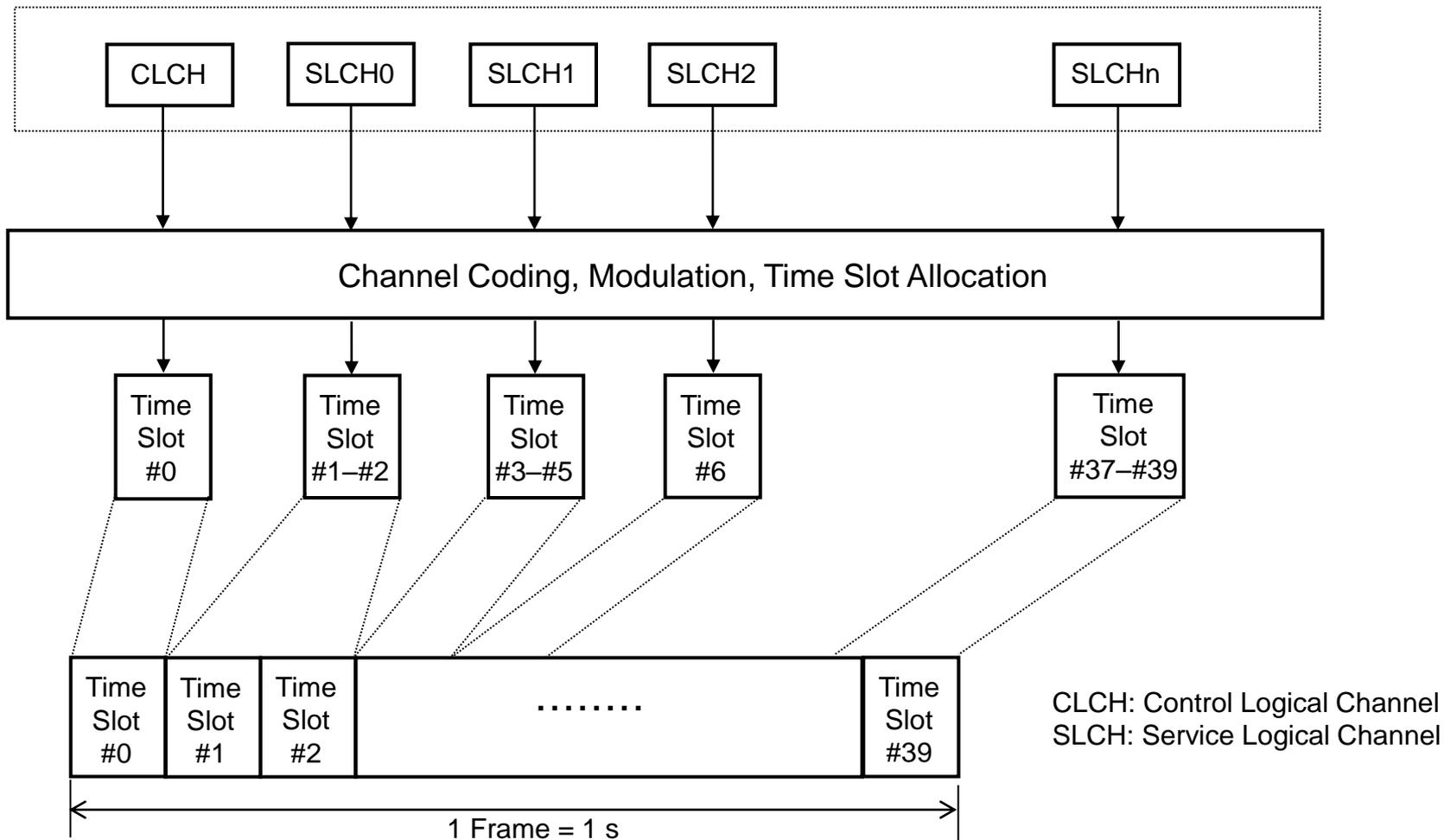
**Frequency (Channel):**

Terrestrial: 474 MHz (13ch) to 562 MHz (24ch),  
610 MHz (25ch) to 794 MHz (48ch)

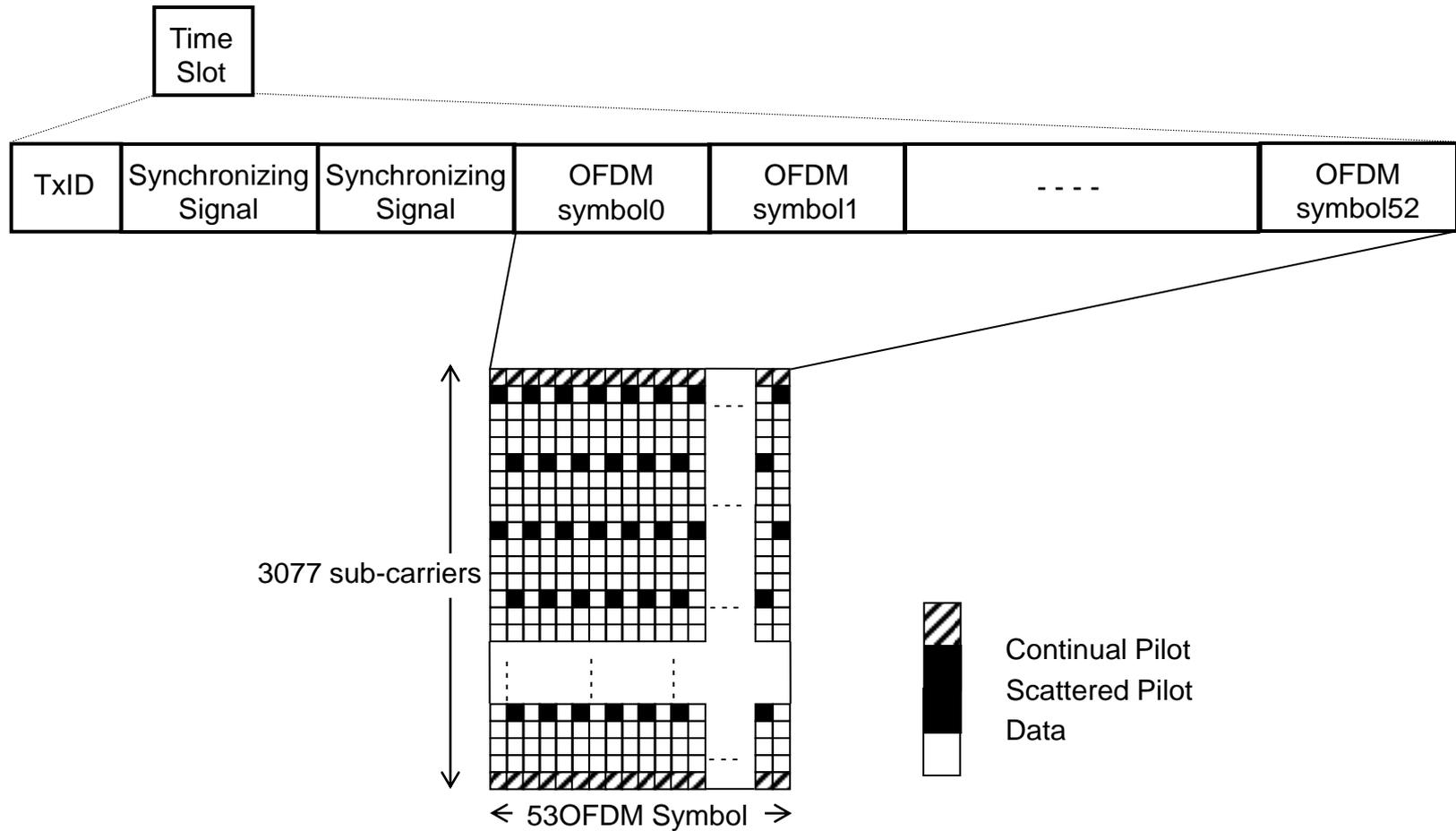
Satellite: 2635 to 2660 MHz

Channel spacing: 8 MHz

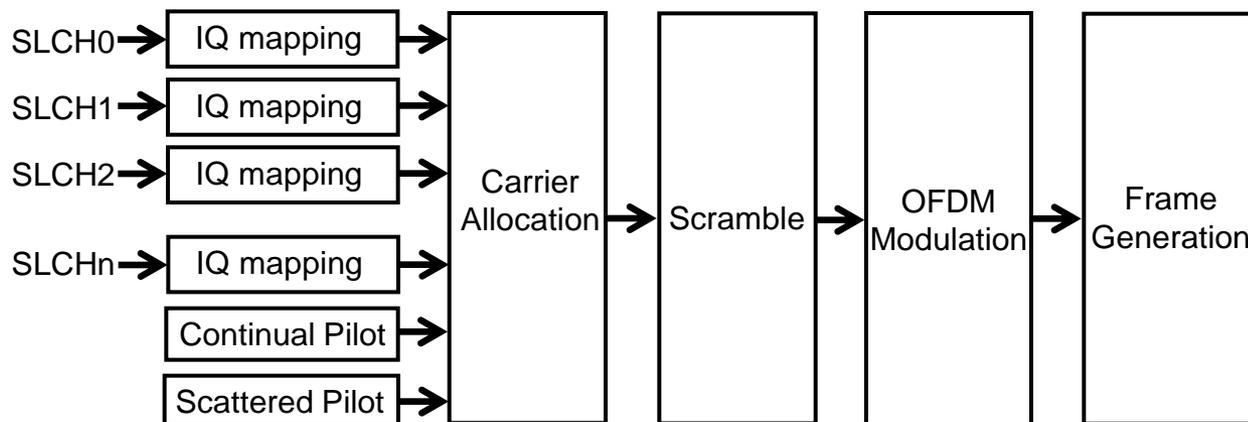
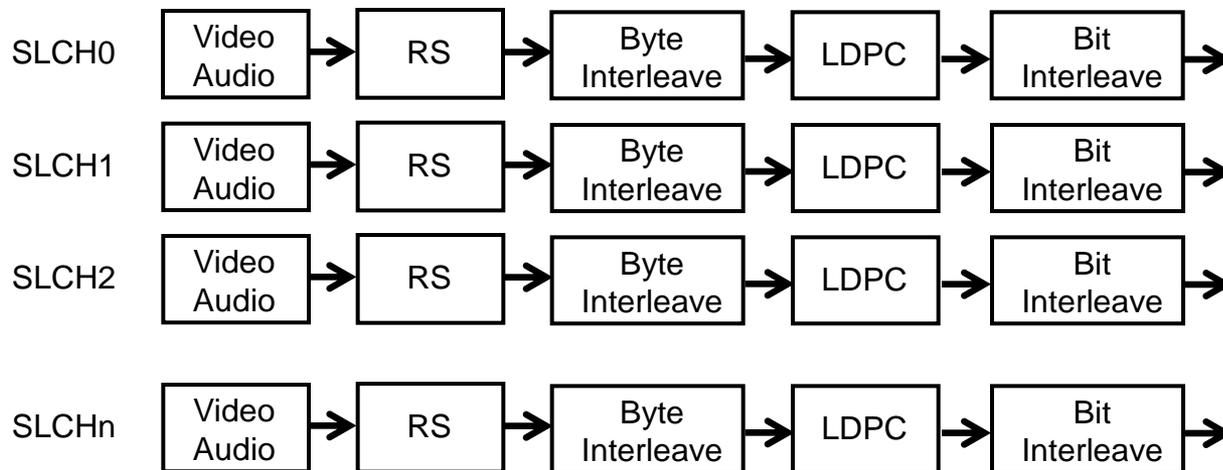
# Appendix: CMMB PHY Layer Structural Outline 1/3



# Appendix: CMMB PHY Layer Structural Outline 2/3



# Appendix: CMMB PHY Layer Structural Outline 3/3



# Appendix: Introduction of MG3700A GPS Patterns 1/3

## ◆ GPS Waveform Patterns

| Pattern Name | Data Overview  |
|--------------|--|
| SYNC_ADJ *1  | TLM, HOW and Default Navigation Data formatted on GSP specification*2 subframe configuration base<br>One cycle is composed of 6 subframes. |
| TLM          | TLM, HOW and Default Navigation Data formatted on GSP specification*2 subframe configuration base  |
| PARITY       | Word format compiled with GSP specification*2<br>1 Word is composed of 24-bit PN9 data and 6-bit parity.                                   |
| TLM_PARITY   | Word format compiled with GPS specification*2<br>1 Word is composed from 24-bit NAV data (1 frame cycle) and 6-bit parity.                 |
| PN9          | PN9 continuous data without subframe format  |

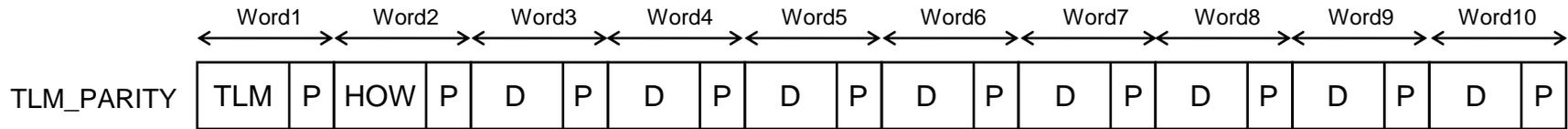
\*1: Since SYNC\_ADJ is used with DATA0, DATA1 and DATA10, you need to select the file. Press the MG3700A Baseband key, set the Pattern Combination in Defined, and select the file.

\*2: GLOBAL POSITIONING SYSTEM STANDARD POSITIONING SERVICE SIGNAL SPECIFICATION

Note: At least four satellites are received at GPS module device evaluation. However, the above-mentioned four waveform patterns are not supported by the GPS evaluation function, because these satellite numbers are fixed at "1". These waveform patterns can be used for performance validation, TRx characteristics evaluation and evaluated mobile synchronizing adjustments.

# Appendix: Introduction of MG3700A GPS Patterns 2/3

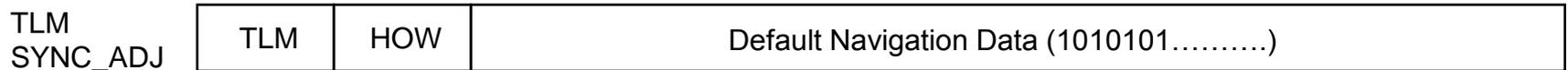
## ◆ GPS Waveform Pattern Frame Format



TLM: Telemetry 24 bits, P: Parity 6 bits, HOW: Hand Over Word 24 bits  
 D: Data 24 bits (Random data)



D: Data 24 bits (PN9 data; PN data is continuous between adjacent WORD) P: Parity 6 bits



Default Navigation Data: 240 bits, Preamble: 8 bits (8BH), TLM: TLM message 14 bits (00H),  
 R: Reserved 2 bits (3H), TOW: Time Of Week 17 bits (00000H – 00005H), AF: Alert Flag 1 bit (0H),  
 ASF: Anti Snoop Flag 1 bit (0H), Subframe ID: 3 bits (0H – 5H), Solved: 2 bits (0H)

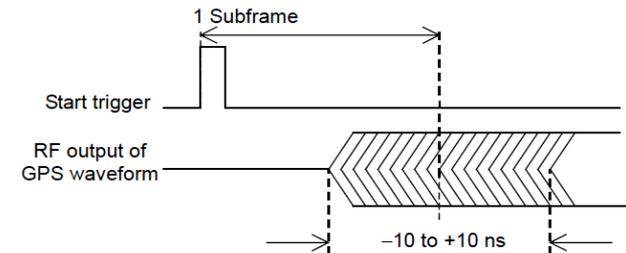
# Appendix: Introduction of MG3700A GPS Patterns 3/3

## ◆ Using GPS Waveform Patterns

| Waveform   | Usage  | Measurement   | Remark   |
|------------|--|---|--|
| SYNC_ADJ   | Synchronization adjustment of CDMA2000 system UE | For synchronization adjustment to GPS *3 (For synchronization to 2PPS signal) | Adjusts mobile with GPS by synchronizing to MT8820A 2 s cycle trigger, and outputting GPS signal |
| TLM        | Rx sensitivity measurements, Operation check     | Rx level measurements<br>Rx data detection                                    | Satellite number and C/N information obtained at operation check using controller*4              |
| TLM_PARITY | Rx sensitivity measurements, Operation check     | Rx level measurements<br>Rx data detection with Default Navi Data             | Satellite number and C/N information obtained at operation check using controller*4              |
| PARITY     | Rx characteristics                               | Parity detection, BER measurements  | Validates parity check function using waveform with data and parity format*4                     |
| PN9        | Rx characteristics                               | BER measurements  | Measures BER using continuous wave without packet format*4                                       |

\*3: The RF subframe output timing is within 10 ns relative to external start trigger input (right diagram)

\*4: The special test mode, which checks GPS performance, is required for mobile function.



SYNC\_ADJ Output Timing

# Appendix: Required Performance of Signal Generator

## Standardized with GD/J020-2008

| Measurement          | Standards  | MG3700A  |
|----------------------|--|--|
| Frequency Resolution | 1 kHz (multi-channel)<br>1 Hz (single channel)   | 0.01 Hz  |
| Frequency Stability  | $1 \times 10^{-7}$ Hz (internal CLK)<br>$1 \times 10^{-10}$ Hz (external CLK)                        | $\pm 1 \times 10^{-9}$ Hz<br>(rubidium reference oscillator)         |
| Frequency Accuracy   | 1 kHz (multi-channel)<br>1 Hz (single channel)   | <0.8 Hz (rubidium reference oscillator)                              |
| Phase Noise          | -85 dBc/Hz @ 1 kHz<br>-95 dBc/Hz @ 10 kHz<br>-110 dBc/Hz @ 100 kHz                                   | -100 dBc/Hz @ 1 kHz<br>-105 dBc/Hz @ 10 kHz<br>-122 dBc/Hz @ 100 kHz |
| Level Accuracy       | $\pm 0.3$ dB   | $\pm 0.2$ dB   |
| Effective Bandwidth  | 7.512 MHz  | 7.512 MHz  |
| Return Loss          | <-26 dB  | -27 dB*  |
| Spectrum Mask        | <-2 dB @ $\pm 3.8$ MHz<br><-37 dB @ $\pm 4.2$ MHz<br><-49 dB @ $\pm 8$ MHz<br><-55 dB @ $\pm 12$ MHz | OK   |
| Band Limitation      | <-36 dB @ $\pm 4.2$ MHz  | <-40 dB @ $\pm 4.2$ MHz  |
| Band Ripple          | < $\pm 0.5$ dB   | < $\pm 0.2$ dB   |
| MER                  | >32 dB   | >40 dB   |
| CCDF                 | Gaussian   | Gaussian   |
| Spurious             | In adjacent channel: <-45 dB<br>Out of adjacent channel: <-60 dB                                     | In adjacent channel: <-55 dB<br>Out of adjacent channel: <-60 dB     |

\*: 5 dB ATT required for RF output terminal

# Ordering Information

|             | Model/<br>Order No.                                      | Name                              | Remarks  |
|-------------|--|-----------------------------------|--|
|             | <b>— Mainframe —</b>                                     |                                   |  |
| Mandatory   | MG3700A  | Vector Signal Generator           |  |
|             | <b>— Standard accessories —</b>                          |                                   |  |
|             | J0017F   | Power cord, 2.6 m                 | 1 pc   |
|             | J1276  | LAN Straight cable                | 1 pc, 10 cm, For back-panel U link connection  |
|             |  | Compact Flash                     | 1 pc   |
|             | J1254  | Compact Flash Adapter             | 1 pc, PCMCIA Adapter   |
|             | Z0742  | MG3700A CD-ROM                    | 1 pc, includes MG3700A Operation Manual, IQproducer Operation Manual, Standard Waveform Pattern Operation Manual, IQproducer Software                                |
|             | <b>— Options —</b>                                       |                                   |  |
|             | MG3700A-002  | Mechanical Attenuator             | Replaces standard electronic attenuator with mechanical attenuator. increases output power from +13 to +19 dBm; improves Adjacent Channel Power by 1 to 2 dB         |
|             | MG3700A-011  | Upper Frequency 6 GHz             | Expands standard frequency range from "250 kHz to 3 GHz" to "250 kHz to 6 GHz".  |
| Recommended | MG3700A-021  | ARB Memory Upgrade 512 M sample   | Expands standard ARB memory size from 128 Msamples/channel x 2 to 256 Msamples/channel x 2. <b>Recommended for video because one 12-s video file requires 256Msa</b> |
|             | MG3700A-031  | High Speed BER Test Function      | Replaces standard built-in BER; recommended for R&D because supports threshold adjustment function and higher error rates  |
|             | <b>— Softwares (License Key for IQproducer system) —</b> |                                   |  |
| Mandatory   | MX370160A  | CMMB waveform generation software | <b>Required when generating CMMB waveform pattern using PC.</b>  |
|             | MX370104A  | Multi-carrier IQproducer          | Required when generating multicarrer waveform pattern using PC.  |
|             | <b>— Optional accessories —</b>                          |                                   |  |
| Recommended | J1261D   | Ethernet Cable (Shield Type)      | <b>Crossover 3 m; required when connecting PC (IQproducer) and MG3700A directly. Can use straight cable for connection via hub.</b>                                  |
|             | J1277  | IQ Output Conversion Adapter      | Required when evaluating using IQ output (Balance); converts MG3700A IQ output D-Sub connector to BNC.   |

• **United States**

**Anritsu Company**

1155 East Collins Blvd., Suite 100, Richardson,  
TX 75081, U.S.A.  
Toll Free: 1-800-267-4878  
Phone: +1-972-644-1777  
Fax: +1-972-671-1877

• **Canada**

**Anritsu Electronics Ltd.**

700 Silver Seven Road, Suite 120, Kanata,  
Ontario K2V 1C3, Canada  
Phone: +1-613-591-2003  
Fax: +1-613-591-1006

• **Brazil**

**Anritsu Eletrônica Ltda.**

Praça Amadeu Amaral, 27 - 1 Andar  
01327-010 - Bela Vista - São Paulo - SP - Brazil  
Phone: +55-11-3283-2511  
Fax: +55-11-3288-6940

• **Mexico**

**Anritsu Company, S.A. de C.V.**

Av. Ejército Nacional No. 579 Piso 9, Col. Granada  
11520 México, D.F., México  
Phone: +52-55-1101-2370  
Fax: +52-55-5254-3147

• **United Kingdom**

**Anritsu EMEA Ltd.**

200 Capability Green, Luton, Bedfordshire, LU1 3LU, U.K.  
Phone: +44-1582-433200  
Fax: +44-1582-731303

• **France**

**Anritsu S.A.**

12 avenue du Québec, Bâtiment Iris 1- Silic 612,  
91140 VILLEBON SUR YVETTE, France  
Phone: +33-1-60-92-15-50  
Fax: +33-1-64-46-10-65

• **Germany**

**Anritsu GmbH**

Nemetschek Haus, Konrad-Zuse-Platz 1  
81829 München, Germany  
Phone: +49-89-442308-0  
Fax: +49-89-442308-55

• **Italy**

**Anritsu S.r.l.**

Via Elio Vittorini 129, 00144 Roma, Italy  
Phone: +39-6-509-9711  
Fax: +39-6-502-2425

• **Sweden**

**Anritsu AB**

Borgarfjordsgatan 13A, 164 40 KISTA, Sweden  
Phone: +46-8-534-707-00  
Fax: +46-8-534-707-30

• **Finland**

**Anritsu AB**

Teknobulevardi 3-5, FI-01530 VANTAA, Finland  
Phone: +358-20-741-8100  
Fax: +358-20-741-8111

• **Denmark**

**Anritsu A/S (Service Assurance)**

**Anritsu AB (Test & Measurement)**

Kay Fiskers Plads 9, 2300 Copenhagen S, Denmark  
Phone: +45-7211-2200  
Fax: +45-7211-2210

• **Russia**

**Anritsu EMEA Ltd.**

**Representation Office in Russia**

Tverskaya str. 16/2, bld. 1, 7th floor.

Russia, 125009, Moscow

Phone: +7-495-363-1694

Fax: +7-495-935-8962

• **United Arab Emirates**

**Anritsu EMEA Ltd.**

**Dubai Liaison Office**

P O Box 500413 - Dubai Internet City

Al Thuraya Building, Tower 1, Suit 701, 7th Floor

Dubai, United Arab Emirates

Phone: +971-4-3670352

Fax: +971-4-3688460

• **India**

**Anritsu India Private Limited**

2nd & 3rd Floor, #837/1, Binnamangla 1st Stage,

Indiranagar, 100ft Road, Bangalore - 560038, India

Phone: +91-80-4058-1300

Fax: +91-80-4058-1301

• **Singapore**

**Anritsu Pte. Ltd.**

60 Alexandra Terrace, #02-08, The Comtech (Lobby A)  
Singapore 118502  
Phone: +65-6282-2400  
Fax: +65-6282-2533

• **P.R. China (Shanghai)**

**Anritsu (China) Co., Ltd.**

Room 1715, Tower A CITY CENTER of Shanghai,

No.100 Zunyi Road, Chang Ning District,

Shanghai 200051, P.R. China

Phone: +86-21-6237-0898

Fax: +86-21-6237-0899

• **P.R. China (Hong Kong)**

**Anritsu Company Ltd.**

Unit 1006-7, 10/F., Greenfield Tower, Concordia Plaza,

No. 1 Science Museum Road, Tsim Sha Tsui East,

Kowloon, Hong Kong, P.R. China

Phone: +852-2301-4980

Fax: +852-2301-3545

• **Japan**

**Anritsu Corporation**

8-5, Tamura-cho, Atsugi-shi, Kanagawa, 243-0016 Japan

Phone: +81-46-296-1221

Fax: +81-46-296-1238

• **Korea**

**Anritsu Corporation, Ltd.**

502, 5FL H-Square N B/D, 681

Sampyeong-dong, Bundang-gu, Seongnam-si,

Gyeonggi-do, 463-400 Korea

Phone: +82-31-696-7750

Fax: +82-31-696-7751

• **Australia**

**Anritsu Pty. Ltd.**

Unit 21/270 Ferntree Gully Road, Notting Hill,

Victoria 3168, Australia

Phone: +61-3-9558-8177

Fax: +61-3-9558-8255

• **Taiwan**

**Anritsu Company Inc.**

7F, No. 316, Sec. 1, NeiHu Rd., Taipei 114, Taiwan

Phone: +886-2-8751-1816

Fax: +886-2-8751-1817

Please Contact: