Product Introduction

P25-Phase 2 Rx Test Solution

MG3710A
Vector Signal Generator
P25-Phase 2
Rx Test Solution

P25 Phase 2 Technical Specifications
Physical Layer Protocol Specification
TIA-102.BBAB (Jul 2009)
Transceiver Performance Recommendations
TIA-102.CCBA (Oct 2011)
Transceiver Measurement Methods
TIA-102.CCAA (Aug 2011)

Note: For details, refer to the TIA-102 standard.

Version 1.00
May 2014
Anritsu Corporation
For Rx Evaluation

Output multi-signals with one unit!

MG3710A Vector Signal Generator

Single

Wanted Signal

Single memory in one RF port

Normal

Dual

Wanted Signal +
Unwanted Signal (Mod)

Dual memory*

in one RF port

+ Opt-048

Triple

Wanted Signal +
Unwanted Signal (Mod) +
Unwanted Signal (CW)

Dual memory*

& two RF ports

+ Opt-062 (2.7 GHz)

*Combination of Baseband Signal option: (Two internal ARB memories)
Selects two waveform patterns per RF output for setting mutual frequency offset, level offset, delay time, etc., to output two signals from one RF port.
Frequency (recommended range: ±60 MHz) and level (CN: ±80 dB) can also be set at the screen.
### TIA-102 Receiver test items vs. Signal Generator

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</table>

**Note:** For details, refer to the TIA-102 standard.

**Faded STTP:**
User can create a Faded pattern by using Fading IQproducer (Option).

**FM:**
User can output an FM signal by using the analog function of the main frame.

**CW:**
User can output a CW signal by using the non-modulation mode of the main frame.

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**MG3710A Vector Signal Generator**

- **One RF port**
  - Single
- **Two RF ports**
  - Dual
  - Dual or Triple

| STTP: | Standard Tone Test Pattern |
| SITP: | Standard Interference Test Pattern |
| STP:  | Silence Test Pattern |
### Anritsu P25-Phase 2 Rx Test Solution

#### TIA-102.CCAA

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</tr>
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<td>Tone1031Hz</td>
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<tr>
<td>Alternate</td>
<td>Tone1031Hz-Alt</td>
</tr>
<tr>
<td>P25_Phase2_IB</td>
<td>Tone1031Hz-0ch</td>
</tr>
<tr>
<td>STTP</td>
<td>P25_Phase2_IB</td>
</tr>
<tr>
<td></td>
<td>Tone1031Hz-1ch</td>
</tr>
<tr>
<td>Alternate</td>
<td>Tone1031Hz-0ch-Alt</td>
</tr>
<tr>
<td>STTP</td>
<td>P25_Phase2_IB</td>
</tr>
<tr>
<td></td>
<td>Tone1031Hz-1ch-Alt</td>
</tr>
<tr>
<td><strong>Outbound</strong></td>
<td>Silence</td>
</tr>
<tr>
<td>P25_Phase2_OB</td>
<td>Silence-Alt</td>
</tr>
<tr>
<td>Alternate</td>
<td>Silence-0ch</td>
</tr>
<tr>
<td>P25_Phase2_OB</td>
<td>Silence-0ch-Alt</td>
</tr>
<tr>
<td>Inbound</td>
<td>Silence-1ch</td>
</tr>
<tr>
<td>P25_Phase2_IB</td>
<td>Silence-1ch-Alt</td>
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<tr>
<td>Symmetrical</td>
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</tr>
<tr>
<td><strong>Outbound</strong></td>
<td>P25_Phase2_OB</td>
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<tr>
<td>Calibration</td>
<td>Calibration</td>
</tr>
<tr>
<td>P25_Phase2_IB</td>
<td>Calibration-0ch</td>
</tr>
<tr>
<td>Calibration</td>
<td>Calibration-1ch</td>
</tr>
<tr>
<td>Inbound</td>
<td>Interference</td>
</tr>
<tr>
<td>P25_Phase2_IB</td>
<td>TxLowDeviation</td>
</tr>
<tr>
<td>Inbound</td>
<td>TxHighDeviation</td>
</tr>
<tr>
<td><strong>Outbound</strong></td>
<td>Standard Tone Test Pattern</td>
</tr>
<tr>
<td>P25_Phase2_OB</td>
<td>Tone1031Hz</td>
</tr>
<tr>
<td>Alternate</td>
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</tr>
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<td>STTP</td>
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<td>Tone1031Hz-1ch</td>
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<tr>
<td>Alternate</td>
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<tr>
<td><strong>Inbound</strong></td>
<td>Silence</td>
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<tr>
<td>P25_Phase2_OB</td>
<td>Silence-Alt</td>
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<td>TxLowDeviation</td>
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<tr>
<td>Alternate</td>
<td>TxHighDeviation</td>
</tr>
</tbody>
</table>

**Note:** For details, refer to the TIA-102 standard.

### TDMA IQproducer:

These patterns are uploaded in the Anritsu website. The user only purchases a license (TDMA IQproducer) and may omit work to create these patterns.

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**STTP:** Standard Tone Test Pattern  
**SITP:** Standard Interference Test Pattern  
**STP:** Silence Test Pattern
Reference Sensitivity

Measures input level when BER = 5%

The Vector SG is supported as an MG2830A option.

The MS2830A is recommended when only “Reference Sensitivity” is included in the manufacturing Rx test.

Expected Value: BER of 5% when 360 ms or more (4320 bits)

Limits:

<table>
<thead>
<tr>
<th>Radio Application</th>
<th>Mobile</th>
<th>Portable</th>
<th>Base Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>–116 dBm</td>
<td>–116 dBm</td>
<td>–116 dBm</td>
</tr>
<tr>
<td>Class B</td>
<td>–113 dBm</td>
<td>–113 dBm</td>
<td>–113 dBm</td>
</tr>
</tbody>
</table>
Receiver Performance Measurement Methods

Reference Sensitivity

Choose P25 Phase2 signal you want from the list.
Faded Reference Sensitivity

Measures input level when BER = 5%.

**Fading IQproducer:** “Fading (Flat/Rayleigh)” pattern created by Fading IQproducer. This is supported only by the MG3710A.

**Expected Value:** BER of 5% over time interval of ≥10 s (120,000 bits)

**Limits:**

<table>
<thead>
<tr>
<th>Radio Application</th>
<th>Mobile</th>
<th>Portable</th>
<th>Base Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>-108 dBm</td>
<td>-108 dBm</td>
<td>-108 dBm</td>
</tr>
<tr>
<td>Class B</td>
<td>-108 dBm</td>
<td>-108 dBm</td>
<td>-108 dBm</td>
</tr>
</tbody>
</table>

**Note:** For details, refer to the TIA-102 standard.

**Radio Application:**
- Mobile
- Portable
- Base Station

**Class A:**
- Mobile: -108 dBm
- Portable: -108 dBm
- Base Station: -108 dBm

**Class B:**
- Mobile: -108 dBm
- Portable: -108 dBm
- Base Station: -108 dBm
Receiver Performance Measurement Methods

Faded Reference Sensitivity

Wanted Signal (Faded)

Load to Memory

User creates Fading pattern using Fading IQproducer

Fading IQproducer: “Fading (Flat/Rayleigh)” pattern created by Fading IQproducer. This is supported only by the MG3710A.

Load to Fading IQproducer

Standard Tone Test Pattern
Receiver Performance Measurement Methods

Signal Delay Spread Capability

Measures delay time between two paths when BER = 5%

**Dual Memory:**
One RF port has two memories. Two signals are output at one RF port. The Frequency, Level and Delay-Time can be set. This is supported only by the MG3710A.

**Faded Standard Tone Test Pattern**
RF Signal (Faded) x 2
-47 dBm

**Faded Standard Tone Test Pattern**
Fading conditions
- Single path
- Flat Rayleigh fading
- Doppler frequency 30 Hz

Expected Value: BER of 5% over time interval ≥10 s (120,000 bits)

**Limits:**

<table>
<thead>
<tr>
<th>Modulation Type</th>
<th>Delay Spread</th>
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</thead>
<tbody>
<tr>
<td>H-CPM</td>
<td>35 µs</td>
</tr>
<tr>
<td>H-DQPSK</td>
<td>65 µs</td>
</tr>
</tbody>
</table>

Note: For details, refer to the TIA-102 standard.
Receiver Performance Measurement Methods

Signal Delay Spread Capability

Wanted Signal (Faded)

Delayed Signal (Faded)

User creates Fading pattern using Fading IQproducer

Load to Memory

Fading IQproducer:
“Fading (Flat/Rayleigh)” pattern created by Fading IQproducer. This is supported only by the MG3710A.

Load to Fading IQproducer

Merit of Dual Memory:
- Two signals of “Wanted signal” and “Unwanted signal” are output by one RF-port.
- Both Level and C/N set for each level
- Frequency offset set by direct input.

1 point = 0.326 µs
200 points = 65.1 µs
Symbol Rate = 6000 sps
Oversampling = 512
1 s/6000 symbols = 167 µs
167 µs/512 = 0.326 µs
Adjacent Channel Rejection

Measure the capability to reject an unwanted signal applied to adjacent channels.

---

**Dual Memory:**
One RF port has two memories. Two signals are output at one RF port. The Frequency, Level and Delay-Time can be set. This is supported only by the MG3710A.

![Diagram](image)

**Standard Tone Test Pattern**
- RF1 signal @1stRF
- RF2 signal @1stRF

**Standard Interference Test Pattern**
- Frequency: [RF1 Freq] ± [12.5 kHz]

**RF1 = Wanted signal (Standard Tone Test Pattern)**
- Level: 3 dB above reference sensitivity

**RF2 = Unwanted signal (Standard Interference Test Pattern)**
- Frequency: [RF1 Freq] ± [12.5 kHz]

**Expected Value:** BER of 5%

**Limits:** Adjacent Channel Rejection Limits

<table>
<thead>
<tr>
<th>Radio Application</th>
<th>Mobile</th>
<th>Portable</th>
<th>Base Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>60 dB</td>
<td>60 dB</td>
<td>60 dB</td>
</tr>
<tr>
<td>Class B</td>
<td>50 dB</td>
<td>50 dB</td>
<td>50 dB</td>
</tr>
</tbody>
</table>

Note: For details, refer to the TIA-102 standard.
Receiver Performance Measurement Methods

Adjacent Channel Rejection

Merit of Dual Memory:

- Two signals of “Wanted signal” and “Unwanted signal” are output by one RF-port.
- Both Level and C/N set for each level
- Frequency offset set by direct input.

Wanted Signal Level

Wanted/Unwanted Level Ratio

Unwanted Signal Level

Wanted Signal

Unwanted Signal

12.5 kHz

Memory B

Memory A

Memory B

Unwanted Signal

Wanted Signal

Unwanted Signal

Level -113.00 dBm

Level -60.00 dB

Level -53.00 dBm

Frequency Offset

Output A

Freq Offset

-12.500 kHz

Output B

Level A

-110.00 dBm

Start Offset

0 Hz

Freq Offset A

-12.500 kHz

Center Signal

A

Sampling Rate A

48.000000 kHz

A/B Ratio

-60.00 dB

A/B Signal

A

Power Meter

A

A & B

B

OFF

BER

0.000000 0 %
Receiver Performance Measurement Methods

Digital Offset Adjacent Channel Rejection

Measures capability to reject unwanted signal applied to adjacent channels

**Dual Memory:**
One RF port has two memories. Two signals are output at one RF port. The Frequency, Level and Delay-Time can be set. This is supported only by the MG3710A.

RF1 = Wanted signal (Standard Tone Test Pattern)
- Level: 3 dB above reference sensitivity
RF2 = Unwanted signal (Standard Interference Test Pattern)
- Frequency: \([RF1 \text{ Freq}] \pm [\text{Max. Frequency Tolerance of DUT}]\)

**Expected Value:** BER of 5%

**Limits:** Digital Offset Adjacent Channel Rejection Limits

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<thead>
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<th>Radio Application</th>
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<th>Portable</th>
<th>Base Station</th>
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</thead>
<tbody>
<tr>
<td>Class A</td>
<td>47 dB</td>
<td>47 dB</td>
<td>47 dB</td>
</tr>
<tr>
<td>Class B</td>
<td>37 dB</td>
<td>37 dB</td>
<td>37 dB</td>
</tr>
</tbody>
</table>

Note: For details, refer to the TIA-102 standard.
Receiver Performance Measurement Methods

Digital Offset Adjacent Channel Rejection

Two RF Ports:
The MG3710A supports two RF ports in one unit, cutting equipment costs.

Wanted Signal

Unwanted Signal (Interference)

Unwanted Signal

Wanted Signal

Two RF Ports: 1stRF 2ndRF

Two RF Ports: 1stRF 2ndRF
Receiver Performance Measurement Methods

Co-channel Rejection

Measure of the capability to reject an unwanted signal applied to the same channel.

\[ \text{Dual Memory:} \]
One RF port has two memories. Two signals are output at one RF port. The Frequency, Level and Delay-Time can be set. This is supported only by the MG3710A.

\[ \text{RF1 = Wanted signal (Standard Tone Test Pattern)} \]
- Level: 3 dB above reference sensitivity

\[ \text{RF2 = Unwanted signal (Standard Interference Test Pattern)} \]
- Frequency: Same as [RF1 Freq]

\[ \text{Standard Tone Test Pattern} \]
- RF1 signal @1stRF
- RF2 signal @1stRF

\[ \text{Standard Interference Test Pattern*} \]
- *C4FM modulation

Expected Value: BER of 5%

Limits: \( \leq 9 \) dB

Note: For details, refer to the TIA-102 standard.
Co-channel Rejection

Merit of Dual Memory:
- Two signals of “Wanted signal” and “Unwanted signal” are output by one RF-port.
- Both Level and C/N set for each level
- Frequency offset set by direct input.

![Diagram showing wanted and unwanted signals in memory A and B with Level and C/N settings](image)

**Wanted Signal**

**Unwanted Signal**

**Wanted Signal Level**

**Unwanted Signal Level**

**Wanted/Unwanted Level Ratio**
Spurious Response Rejection

Measures ability to reject specified unwanted signal applied to receiver under test. The frequency of the unwanted signal is varied over a range from half of the lowest IF frequency of the receiver under test to twice the highest receiver frequency or 1000 MHz, whichever is higher. Exclude all responses within ±50 kHz of the receiver frequency.

**Two RF Ports:**
The MG3710A supports two RF ports in one unit, cutting equipment costs.

RF1 = Wanted signal (Standard Tone Test Pattern)
- Level: 3 dB above reference sensitivity
RF2 = Unwanted signal (FM)
- FM with 400 Hz tone
- 1500 Hz deviation

Measures ability to reject specified unwanted signal applied to receiver under test. The frequency of the unwanted signal is varied over a range from half of the lowest IF frequency of the receiver under test to twice the highest receiver frequency or 1000 MHz, whichever is higher. Exclude all responses within ±50 kHz of the receiver frequency.

**Expected Value:** BER of 5%

**Limits:**

<table>
<thead>
<tr>
<th>Radio Application</th>
<th>Mobile</th>
<th>Portable</th>
<th>Base Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>80 dB</td>
<td>70 dB</td>
<td>90 dB</td>
</tr>
<tr>
<td>Class B</td>
<td>70 dB</td>
<td>60 dB</td>
<td>70 dB</td>
</tr>
</tbody>
</table>

**Note:** For details, refer to the TIA-102 standard
Receiver Performance Measurement Methods

Spurious Response Rejection

Two RF Ports:
The MG3710A supports two RF ports in one unit, cutting equipment costs.

Wanted Signal

Unwanted Signal
(FM)

1stRF

2ndRF

MG3710A

Exclude
±50 kHz

Lowest IF Freq
2

Receiver Freq x2 or 1000 MHz (whichever greater)
Receiver Performance Measurement Methods

Intermodulation Rejection

Measures ability to reject intermodulation caused by unwanted signals with offset frequency of +50 kHz/+100 kHz or −50 kHz/−100 kHz

**Dual Memory:**
One RF port has two memories. Two signals are output by one RF port. The Frequency, Level and Delay-Time can be set. This is supported only by the MG3710A.

**Two RF Ports:**
The MG3710A supports two RF ports in one unit, cutting equipment costs.

---

**Expected Value:** BER of 5%

**Limits:**

<table>
<thead>
<tr>
<th>Radio Application</th>
<th>Mobile</th>
<th>Portable</th>
<th>Base Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>75 dB</td>
<td>70 dB</td>
<td>80 dB</td>
</tr>
<tr>
<td>Class B</td>
<td>70 dB</td>
<td>50 dB</td>
<td>70 dB</td>
</tr>
</tbody>
</table>

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*Note: For details, refer to the TIA-102 standard.*
Receiver Performance Measurement Methods

Intermodulation Rejection

**MG3710A**

- **Wanted Signal**
- **Unwanted Signal** (Standard Interference Test Pattern)

**Merit of Dual Memory:**
- Two signals of “Wanted signal” and “Unwanted signal” are output by one RF-port.
- Both Level and C/N set for each level
- Frequency offset set by direct input.

**Two RF Ports:**
The MG3710A supports two RF ports in one unit, cutting equipment costs.

**Combination of Baseband Signal option:** (Two internal ARB memories)
Frequency (recommended range: ±60 MHz) and **level (CN: ±80 dB)** can also be set at the screen.
Signal Displacement Bandwidth

Measures ability to reject signal in standard modulation state with specified offset frequency from nominal frequency.

**RF Signal (Static)**

- **RF1** = Wanted signal (Standard Tone Test Pattern)
  - Level: 6 dB above reference sensitivity
  - Frequency: Shift until BER = 5%.

**Expected Value:** BER of 5% over at least 360 ms (4320 bits)

**Limits:** Minimum signal displacement bandwidth of 1000 Hz.

**Note:** For details, refer to the TIA-102 standard.
Audio Output Distortion

Measures audio distortion factor under audio frequency load

**Limits:** Maximum audio output distortion of 5% when tested at both rated audio power, and 17 dB below rated audio power

*Note: For details, refer to the TIA-102 standard.*
Residual Audio Noise Ratio

Measures audio output level in three states (Tone/Silence/Mute)

\[
\text{residual audio noise ratio (silence): } 20 \log_{10} \left( \frac{V_{\text{REF}}}{V_S} \right)
\]

\[
\text{residual audio noise ratio (mute): } 10 \log_{10} \left( 1000 \frac{V_{\text{MUTE}}}{R_{\text{ROAD}}} \right)
\]

Limits:

<table>
<thead>
<tr>
<th>Radio Application</th>
<th>Silence Pattern</th>
<th>Muted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>45 dB</td>
<td>--35 dB</td>
</tr>
<tr>
<td>Class B</td>
<td>35 dB</td>
<td>--27 dB</td>
</tr>
</tbody>
</table>
Average Radiation Sensitivity

Measures power received by half-wave dipole antenna

Limits:

<table>
<thead>
<tr>
<th>Frequency Range (25 MHz to 1 GHz)</th>
<th>Equipment with External Antennas</th>
<th>Equipment with Internal Antennas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>–98 dbm</td>
<td>–80 dBm</td>
</tr>
<tr>
<td>Class B</td>
<td>–95 dBm</td>
<td>–77 dBm</td>
</tr>
</tbody>
</table>
Acoustic Audio Output

Measures reading of sound level meter

Limits: This requirement applies only to units with a speaker. The measured C weighted level shall not be less than \[80 + 10 \log_{10} \text{(rated audio output power, in watts)}\] dB_{SPL}
Bit Error Rate Floor

Measures resulting bit error rate

Expected Value: Over time interval of ≥10 s (120,000 bits)

Limits: The maximum bit error rate shall be ≤0.01%.
**Blocking Rejection**

Measures the ratio of the level of an unwanted input signal to the reference sensitivity.

**Dual Memory:**
One RF port has two memories. Two signals are output at one RF port. The Frequency, Level and Delay-Time can be set. This is supported only by the MG3710A.

**Standard Tone Test Pattern**
- RF1 signal @1stRF
- RF2 signal @2ndRF
- Unwanted Signal (CW)

**Expected Value:** BER of 5%

**Limits:**

<table>
<thead>
<tr>
<th>Radio Application</th>
<th>Mobile</th>
<th>Portable</th>
<th>Base Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>90 dB</td>
<td>80 dB</td>
<td>90 dB</td>
</tr>
<tr>
<td>Class B</td>
<td>80 dB</td>
<td>70 dB</td>
<td>80 dB</td>
</tr>
</tbody>
</table>

**Note:** For details, refer to the TIA-102 standard.
Receiver Performance Measurement Methods

Blocking Rejection

Two RF Ports:
The MG3710A supports two RF ports in one unit, cutting equipment costs.

MG3710A

1stRF

2ndRF

Wanted Signal

Unwanted Signal (CW)

Unwanted Signal (CW) @2nd RF

1MHz, 2MHz, 5MHz, 10MHz

1MHz, 2MHz, 5MHz, 10MHz

Memory A

Memory B

Memory B

Unwanted Signal

Unwanted Signal

Wanted Signal

(CW: Mod = Off)
Two-Slot TDMA Modulation

- Uplink Modulation: H-CPM (Harmonized Continuous Phase Modulation)
- Downlink Modulation: Pi/4-DQPSK
- Data Rate: 12 kbps
- Symbol Rate: 6000 sps

Note: For details, refer to the TIA-102 standard.
Two-Slot TDMA Transmission Format

Outbound (DL) H-DQPSK
- ISCH
- 8 bits Pilot
- 12 bits Ramp
- Outbound
  - H-DQPSK
  - 20 bits (10 symbols)
  - 320 bits (160 symbols)
  - 30 ms

Inbound (UL) H-CPM
- ISCH
- 8 bits Pilot
- 12 bits Ramp
- Inbound
  - H-CPM
  - 20 bits (10 symbols)
  - 30 ms

Outbound 1
- 1 2 1 2 1

Inbound 1

Inbound 2

Note: For details, refer to the TIA-102 standard.
Select SG2.

Set FM conditions.

[F1: FM/\phi M]
  [F1: FM] = On
  [F2: FM Deviation] = 1500 Hz
  [F3: FM Rate] = 400 Hz
  [F4: Setup FM Source]
    [F1: FM Source] = Int
    [F2: Waveform] = Sine
[Appendix] How to Set FM Signal  2/2

Set ARB for disable.
[Mode]
[F1: ARB] = Off

Set Modulation and RF output condition.
[Menu]
[F1: FM/φM Setup]
[F6: Modulation] = On
[F7: RF Output] = On

Finish
Start Fading IQproducer.

[IQpro]
Click [General Purpose] tab.
Click [Fading] icon.

Set Fading parameter.
(Tx Antenna Configuration)
Click [Reference].
Select [Tone1031Hz-ov512].
(C:\Anritsu\MG3710A\User Data\Waveform\P25_Phase2_OB) in MG3710A HDD

Set RF Frequency (ex: 483 MHz).

Create different patterns for each evaluated frequency
Set Fading parameter (Channel condition).
Click [Channel 1] tab.
Set [Fading Type] = Rayleigh.
Set [Doppler Frequency] = 30 Hz.
Set [Spectrum Shape] = Flat.

Create pattern (Calculation).
Click [Calculation].
Input [Package] name.
(Ex: P25_Phase2_Faded-483MHz)
Input [Pattern] name.
(Ex: Tone1031Hz-67kmh)
Click [OK].

Finish
### Ordering Information

#### Base Configuration

<table>
<thead>
<tr>
<th>Model</th>
<th>Product Name</th>
<th>One RF port</th>
<th>Two RF ports</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Single</td>
<td>Dual</td>
</tr>
<tr>
<td>MG3710A</td>
<td>Vector Signal Generator</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>MG3710A-032</td>
<td>1stRF 100 kHz to 2.7 GHz</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>MG3710A-042</td>
<td>Low Power Extension for 1stRF</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>MG3710A-048</td>
<td>Combination of Baseband Signal for 1stRF</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>MG3710A-062</td>
<td>2ndRF 100 kHz to 2.7 GHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MX370102A</td>
<td>TDMA IQproducer</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

#### Additional Recommended Options

<table>
<thead>
<tr>
<th>Model</th>
<th>Product Name</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>MG3710A-002</td>
<td>High Stability Reference Oscillator</td>
<td>Aging Rate: $±1 \times 10^{-7}$/year, $±1 \times 10^{-8}$/day</td>
</tr>
<tr>
<td>MG3710A-043/073</td>
<td>Reverse Power Protection</td>
<td>Protects signal output connector against reverse input power. 20W@&lt;2 GHz (Standard 2 W nominal)</td>
</tr>
<tr>
<td>MG3710A-045/075</td>
<td>ARB Memory Upgrade 256Msample</td>
<td>Upgrades ARB size to 256 Msamples (1 GB)</td>
</tr>
<tr>
<td>MX370107A</td>
<td>Fading IQproducer</td>
<td>Create Faded signal</td>
</tr>
</tbody>
</table>

Required for Reference Sensitivity (Faded)
Specifications are subject to change without notice.