

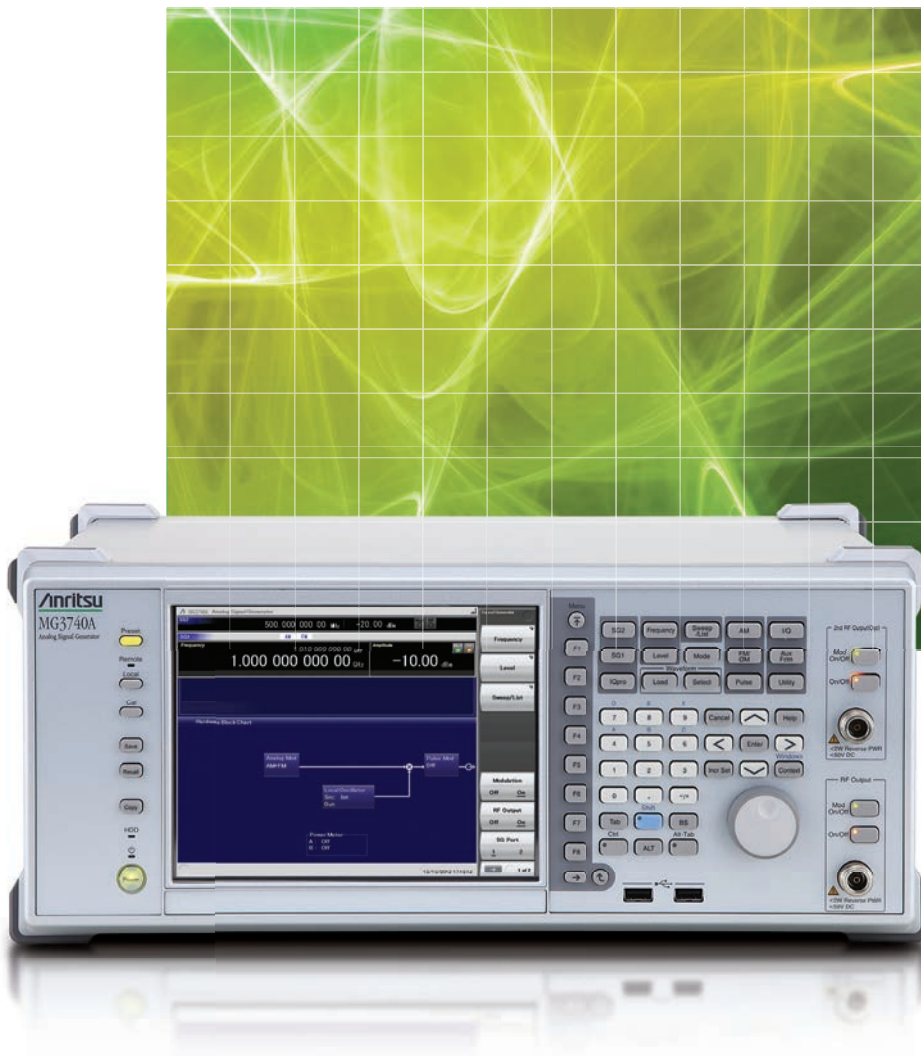
# MG3740A

## Analog Signal Generator

100 kHz to 2.7 GHz

100 kHz to 4.0 GHz

100 kHz to 6.0 GHz



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## Definitions

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### Typical (typ.)

Performance not warranted. Must products meet typical performance.

### Nominal (nom.)

Values not warranted. Included to facilitate application of product.

### Measured (meas)

Performance not warranted. Data actually measured by randomly selected measuring instruments.

## Conditions of Specifications

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The conditions are as follows unless specified otherwise.

### CW/Modulation Mode

After 30-minute warm-up (at constant ambient temperature)

Pulse Modulation: Off

ATT Hold: Off

Optimize S/N Mode: Off

\*: f > 2.7 GHz: Use MG3740A-034/036, MG3740A-064/066

f > 4 GHz: Use MG3740A-036, MG3740A-066

### Modulation Mode only

Waveform pattern RMS value: At RMSw (Linear value) and each combination less than following ranges:

$-3.00 \text{ dB} \leq \text{RMSnom} \leq +3.00 \text{ dB}$

$\text{RMSnom} = 20 \cdot \log(\text{RMSw}/4628)$  (16-bit Data)

$\text{RMSnom} = 20 \cdot \log(\text{RMSw}/2314)$  (15-bit Data)

$\text{RMSnom} = 20 \cdot \log(\text{RMSw}/1157)$  (14-bit Data)

after CAL

\*: Applies to MG3740A-062/064/066

# Frequency

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## Setting Range

### 1st SG

9 kHz to 2.7 GHz [MG3740A-032]

9 kHz to 4 GHz [MG3740A-034]

9 kHz to 6 GHz [MG3740A-036]

### 2nd SG

9 kHz to 2.7 GHz [MG3740A-062]

9 kHz to 4 GHz [MG3740A-064]

9 kHz to 6 GHz [MG3740A-066]

Resolution: 0.01 Hz

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## Switching Speed

≤600 μs

(Frequency: >187.5 MHz, Phase Noise Optimization: Offset <200 kHz, Time from trigger input to final frequency ±0.1 ppm or within 100 Hz when executing List function.)

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## Internal Reference Oscillator

without MG3740A-001/002

Aging rate:  $\pm 1 \times 10^{-6}$ /year

Temperature characteristics:  $\pm 2.5 \times 10^{-6}$  (5° to 45°C)

with MG3740A-001

Start-up characteristics: 23°C, Referenced to frequency at 24 hours after power-on  
 $\pm 1 \times 10^{-9}$  (7.5 minutes after power-on)

Aging rate:  $\pm 1 \times 10^{-10}$ /month

Temperature characteristics:  $\pm 2 \times 10^{-9}$  (5° to 45°C)

with MG3740A-002

Start-up characteristics: 23°C, Referenced to frequency at 24 hours after power-on  
 $\pm 5 \times 10^{-7}$  (2 minutes after power-on)  
 $\pm 5 \times 10^{-8}$  (5 minutes after power-on)

Aging rate:  $\pm 1 \times 10^{-7}$ /year

Temperature characteristics:  $\pm 2 \times 10^{-8}$  (5° to 45°C)

# Output Level

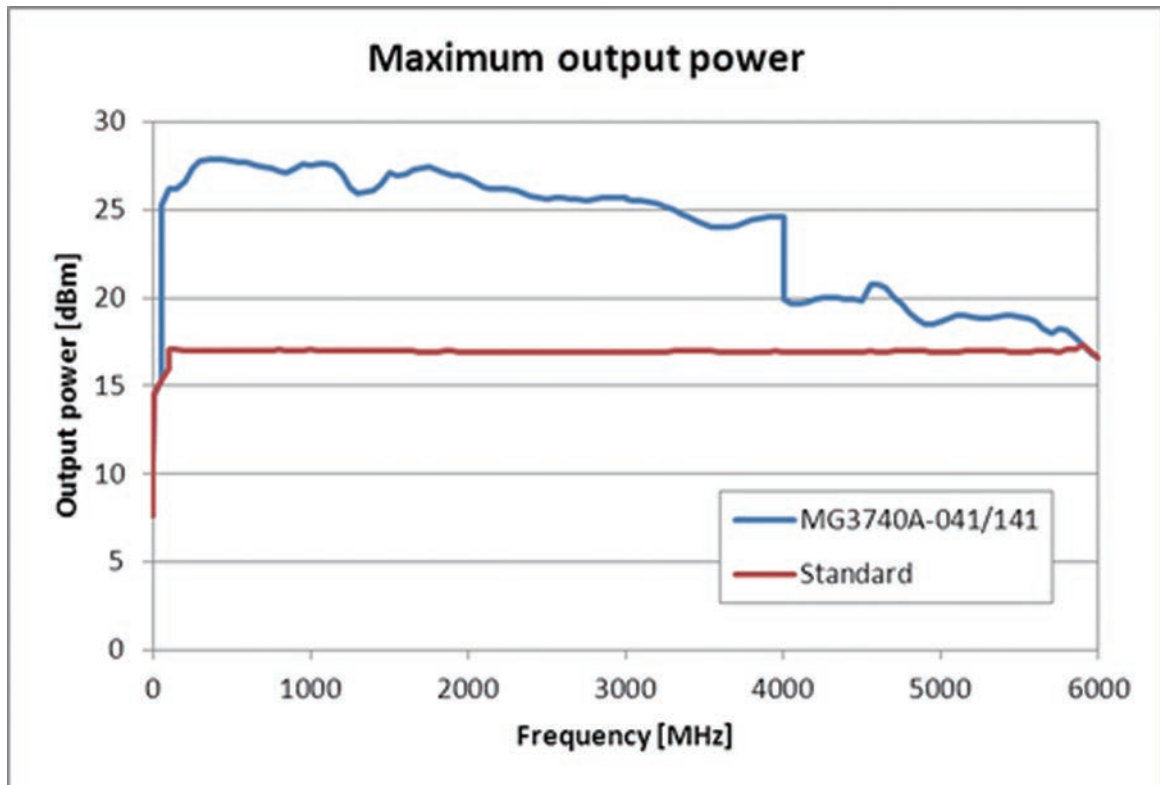
## Setting Range

without MG3740A-043/073

- 110 to +17 dBm [without MG3740A-041/042], [without MG3740A-071/072]
- 110 to +30 dBm [with MG3740A-041, without MG3740A-042], [with MG3740A-071, without MG3740A-072]
- 144 to +17 dBm [without MG3740A-041, with MG3740A-042], [without MG3740A-071, with MG3740A-072]
- 144 to +30 dBm [with MG3740A-041/042], [with MG3740A-071/072]

with MG3740A-043/073

- 110 to +17 dBm [without MG3740A-041/042], [without MG3740A-071/072]
- 110 to +25 dBm [with MG3740A-041, without MG3740A-042], [with MG3740A-071, without MG3740A-072]
- 144 to +17 dBm [without MG3740A-041, with MG3740A-042], [without MG3740A-071, with MG3740A-072]
- 144 to +25 dBm [with MG3740A-041/042], [with MG3740A-071/072]



(meas)

## Unit

dBm, dB $\mu$ V (Terminated, Open)

## Resolution

0.01 dB

## Switching Speed

$\leq 600 \mu\text{s}$

(When frequency is  $> 187.5$  MHz within output level accuracy specification range)

However, the output level is  $\leq +7$  dBm when neither the MG3740A-041 nor MG3740A-071 is installed.

This is defined as the period from detection of the List function execution trigger until the time when the frequency is within  $\pm 0.2$  dB of the final output level.

## Level Accuracy

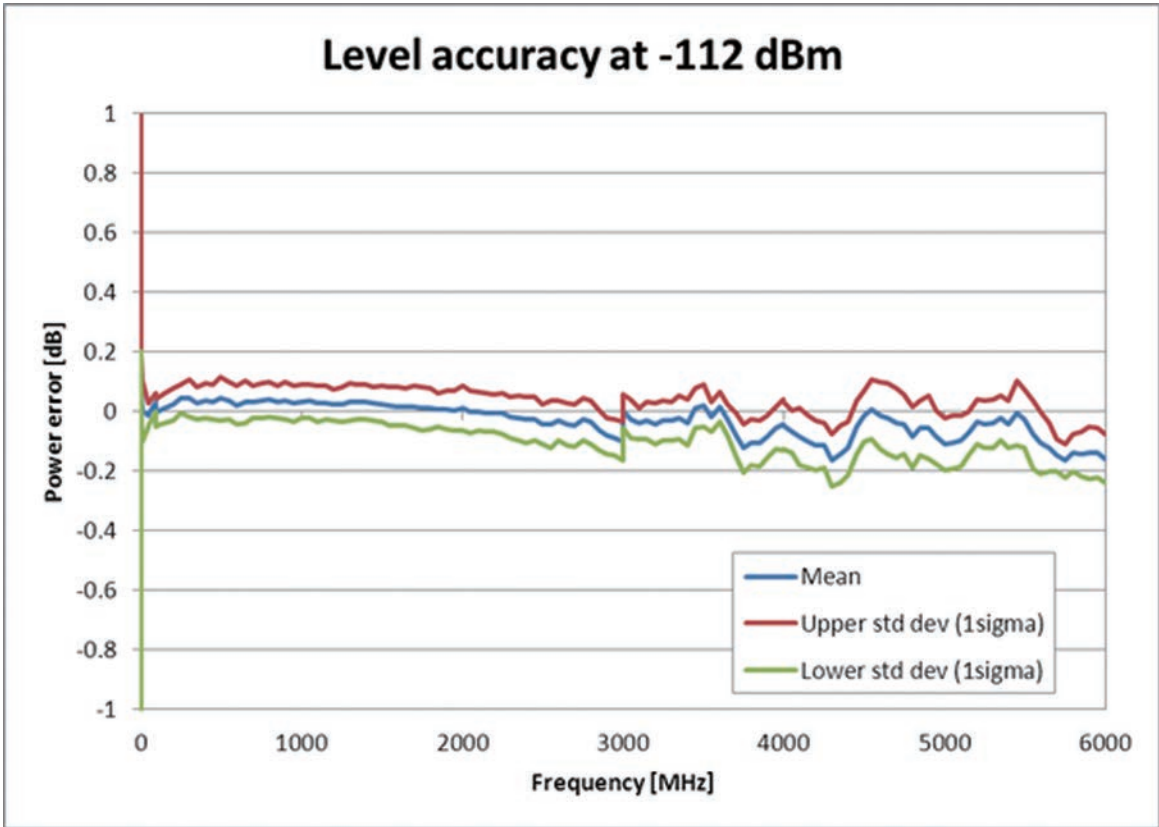
18° to 28°C, CW

without Reverse Power Protection [without MG3740A-043], [without MG3740A-073]

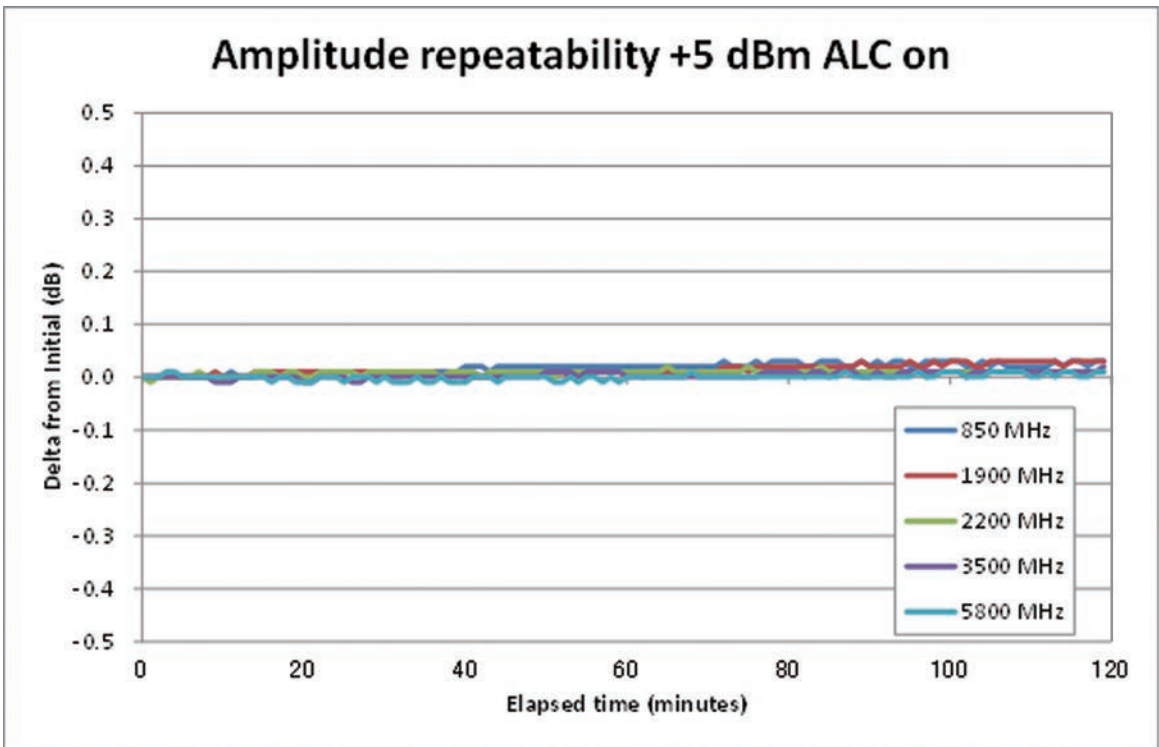
Frequency range	Low Power Extension MG3740A-042/072		High Power Extension MG3740A-041/071		≤+23 dBm >+20 dBm	≤+20 dBm >+13 dBm	≤+13 dBm >+11 dBm	≤+11 dBm >+10 dBm	≤+10 dBm >+5 dBm	≤+5 dBm >-100 dBm	≤-100 dBm >-110 dBm	≤-110 dBm >-120 dBm	≤-120 dBm >-127 dBm	≤-127 dBm >-136 dBm	
	without	with	without	with											
100 kHz ≤ f < 1 MHz	without	without	—	—	—	—	—	—	—	±0.5 dB (typ.)	—	—	—	—	
	without	with	—	—	—	—	—	—	—		—	—	—	—	—
	with	with	—	—	—	—	—	—	—		—	—	—	—	—
1 MHz ≤ f < 10 MHz	without	without	—	—	—	—	—	—	—	±0.5 dB (typ.)	—	—	—	—	
	without	with	—	—	—	—	—	—	—		±0.5 dB (typ.)	—	—	—	—
	with	with	—	—	—	—	—	—	—		—	—	—	—	—
10 MHz ≤ f < 50 MHz	without	without	—	—	—	—	—	—	±0.7 dB (typ.)	±0.5 dB (typ.)	—	—	—	—	
	without	with	—	—	—	—	—	±0.5 dB (typ.)			—	—	—	—	—
	with	with	—	—	—	—	—	—			—	—	—	—	—
50 MHz ≤ f < 400 MHz	without	without	—	—	—	—	—	—	±0.5 dB	—	—	—	—	—	
	without	with	—	±0.6 dB	—	—	—	—		±0.5 dB	±0.7 dB	±1.5 dB (typ.)	—	—	
	with	with	—	±0.6 dB	—	—	—	—		—	—	—	—	—	
400 MHz ≤ f ≤ 3 GHz	without	without	—	±0.6 dB	—	—	—	—	±0.5 dB	—	—	—	—	—	
	without	with	—	±0.6 dB	—	—	—	—		±0.5 dB	±0.7 dB	±1.5 dB (typ.)	—	—	
	with	with	—	±0.6 dB	—	—	—	—		—	—	—	—	—	
3 GHz < f ≤ 4 GHz	without	without	—	±0.7 dB	—	—	—	—	±0.7 dB	—	—	—	—	—	
	without	with	—	±0.7 dB	—	—	—	—		±0.7 dB	±2.5 dB (typ.)	—	—	—	
	with	with	—	±0.7 dB	—	—	—	—		—	—	—	—	—	
4 GHz < f ≤ 5 GHz	without	without	—	—	—	—	—	—	±0.8 dB	—	—	—	—	—	
	without	with	—	—	—	—	—	—		±1.0 dB	±2.5 dB (typ.)	—	—	—	
	with	with	—	—	—	—	—	—		—	—	—	—	—	
5 GHz < f ≤ 6 GHz	without	without	—	—	—	—	—	—	±0.8 dB	—	—	—	—	—	
	without	with	—	—	—	—	—	—		±1.0 dB	±2.5 dB (typ.)	—	—	—	
	with	with	—	—	—	—	—	—		—	—	—	—	—	

with Reverse Power Protection [with MG3740A-043], [with MG3740A-073]

Frequency range	Low Power Extension MG3740A-042/072		High Power Extension MG3740A-041/071		≤+20 dBm >+17 dBm	≤+17 dBm >+10 dBm	≤+10 dBm >+8 dBm	≤+8 dBm >+7 dBm	≤+7 dBm >+2 dBm	≤+2 dBm >-2 dBm	≤-2 dBm >-100 dBm	≤-100 dBm >-110 dBm	≤-110 dBm >-120 dBm	≤-120 dBm >-127 dBm	≤-127 dBm >-136 dBm
	without	with	without	with											
100 kHz ≤ f < 1 MHz	without	without	—	—	—	—	—	—	±0.5 dB (typ.)	—	—	—	—	—	—
	without	with	—	—	—	—	—	—		—	—	—	—	—	—
	with	with	—	—	—	—	—	—		—	—	—	—	—	—
1 MHz ≤ f < 10 MHz	without	without	—	—	—	—	—	—	±0.5 dB (typ.)	—	—	—	—	—	—
	without	with	—	—	—	—	—	—		±0.5 dB (typ.)	—	—	—	—	—
	with	with	—	—	—	—	—	—		—	—	—	—	—	—
10 MHz ≤ f < 50 MHz	without	without	—	—	—	—	—	±0.7 dB (typ.)	±0.5 dB (typ.)	—	—	—	—	—	
	without	with	—	—	—	—	—			±0.5 dB (typ.)	—	—	—	—	—
	with	with	—	—	—	—	—			—	—	—	—	—	—
50 MHz ≤ f < 400 MHz	without	without	—	—	—	—	—	—	±0.5 dB	—	—	—	—	—	
	without	with	—	±0.6 dB	—	—	—	±0.6 dB		±0.5 dB	±0.7 dB	±1.5 dB (typ.)	—	—	
	with	with	—	±0.6 dB	—	—	—	—		±0.5 dB	—	—	—	—	
400 MHz ≤ f ≤ 3 GHz	without	without	—	±0.6 dB	—	—	—	—	±0.5 dB	—	—	—	—	—	
	without	with	—	±0.6 dB	—	—	—	—		±0.7 dB	±1.0 dB	±1.5 dB (typ.)	—	—	
	with	with	—	±0.6 dB	—	—	—	—		—	—	—	—	—	
3 GHz < f ≤ 4 GHz	without	without	—	±0.7 dB	—	—	—	—	±0.7 dB	±0.8 dB	—	—	—	—	
	without	with	—	±0.7 dB	—	—	—	±1.0 dB			±2.5 dB (typ.)	—	—	—	
	with	with	—	±0.7 dB	—	—	—	—			—	—	—	—	
4 GHz < f ≤ 5 GHz	without	without	—	—	—	—	—	—	±0.8 dB	—	—	—	—	—	
	without	with	—	—	—	—	—	±1.0 dB		±2.5 dB (typ.)	—	—	—		
	with	with	—	—	—	—	—	—		—	—	—	—		
5 GHz < f ≤ 6 GHz	without	without	—	—	—	—	—	—	±0.8 dB	—	—	—	—	—	
	without	with	—	—	—	—	—	±1.0 dB		±2.5 dB (typ.)	—	—	—		
	with	with	—	—	—	—	—	—		—	—	—	—		



(meas)



(meas)

## Level Linearity

18° to 28°C, CW

without Reverse Power Protection [without MG3740A-043], [without MG3740A-073]

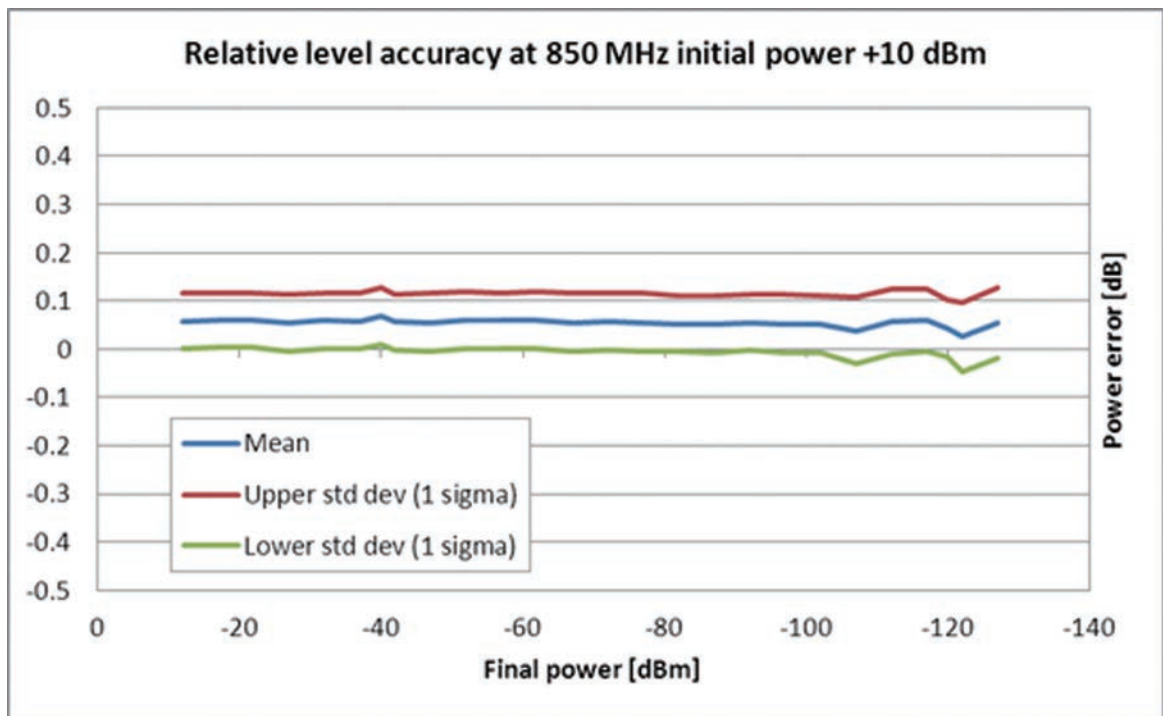
Referenced to level: -7 dBm

Frequency range	Low Power Extension MG3740A-042/072	High Power Extension MG3740A-041/071	<+1 dBm >-110 dBm	≤-110 dBm >-120 dBm
50 MHz ≤ f < 400 MHz	without	without/with	±0.2 dB (typ.)	—
	with			±0.2 dB (typ.)
400 MHz ≤ f ≤ 3 GHz	without		±0.2 dB (typ.)	—
	with		±0.2 dB (typ.)	±0.2 dB (typ.)
3 GHz < f ≤ 4 GHz	without		±0.3 dB (typ.)	—
	with		±0.3 dB (typ.)	±0.3 dB (typ.)
4 GHz < f ≤ 6 GHz	without	±0.3 dB (typ.)	—	
	with	—	—	

with Reverse Power Protection [with MG3740A-043], [with MG3740A-073]

Referenced to level: -10 dBm

Frequency range	Low Power Extension MG3740A-042/072	High Power Extension MG3740A-041/071	<-2 dBm >-100 dBm	≤-100 dBm >-110 dBm
50 MHz ≤ f < 400 MHz	without/with	without/with	±0.2 dB (typ.)	
400 MHz ≤ f ≤ 3 GHz			±0.2 dB (typ.)	
3 GHz < f ≤ 4 GHz			±0.3 dB (typ.)	±0.4 dB (typ.)
4 GHz < f ≤ 6 GHz			±0.3 dB (typ.)	±0.4 dB (typ.)



(meas)



## ATT Hold Function

When ATT Hold is set to ON, level adjustment is supported for continuous signal generation.

Setting Range: -10 to +10 dB (However, each upper and lower limit of the adjustment range is restricted by the signal output range.)

Resolution: 0.01 dB

## Output Connector

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### Connector

N-J Connector, 50Ω (Front panel)

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### VSWR

without MG3740A-043

(Output Level: ≤-7 dBm)

≤1.45 (50 MHz ≤ f ≤ 3 GHz)

≤1.65 (3 GHz < f ≤ 4 GHz)

≤1.9 (4 GHz < f ≤ 6 GHz)

with MG3740A-043

(Output Level: ≤-10 dBm)

≤1.45 (50 MHz ≤ f ≤ 3 GHz)

≤1.65 (3 GHz < f ≤ 4 GHz)

≤1.9 (4 GHz < f ≤ 6 GHz)

without MG3740A-073

(Output Level: ≤-7 dBm)

≤1.45 (50 MHz ≤ f ≤ 3 GHz)

≤1.65 (3 GHz < f ≤ 4 GHz)

≤1.9 (4 GHz < f ≤ 6 GHz)

with MG3740A-073

(Output Level: ≤-10 dBm)

≤1.45 (50 MHz ≤ f ≤ 3 GHz)

≤1.65 (3 GHz < f ≤ 4 GHz)

≤1.9 (4 GHz < f ≤ 6 GHz)

## Maximum Reverse Input Power

±50 VDC (max.)

without MG3740A-043

2 W (nom.)

with MG3740A-043

20 W (1 MHz < Frequency of Reverse Input Power ≤ 2 GHz) (nom.)

10 W (2 GHz < Frequency of Reverse Input Power ≤ 6 GHz) (nom.)

without MG3740A-073

2 W (nom.)

with MG3740A-073

20 W (1 MHz < Frequency of Reverse Input Power ≤ 2 GHz) (nom.)

10 W (2 GHz < Frequency of Reverse Input Power ≤ 6 GHz) (nom.)

## Signal Purity

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### Harmonic Spurious

(CW, Optimize S/N: Off)

without MG3740A-043, or MG3740A-073

without MG3740A-041

<-30 dBc (Output Level: ≤+4 dBm, 10 MHz ≤ f ≤ 3 GHz)

<-30 dBc (Output Level: ≤+4 dBm, f >3 GHz)

with MG3740A-041

<-30 dBc (Output Level: ≤+4 dBm, 10 MHz ≤ f < 50 MHz)

<-30 dBc (Output Level: ≤+12 dBm, 50 MHz ≤ f ≤ 3 GHz)

<-30 dBc (Output Level: ≤+4 dBm, f >3 GHz)

with MG3740A-043, or MG3740A-073

without MG3740A-041

<-30 dBc (Output Level: ≤+1 dBm, 10 MHz ≤ f ≤ 3 GHz)

<-30 dBc (Output Level: ≤+1 dBm, f >3 GHz)

with MG3740A-041

<-30 dBc (Output Level: ≤+1 dBm, 10 MHz ≤ f < 50 MHz)

<-30 dBc (Output Level: ≤+9 dBm, 50 MHz ≤ f ≤ 3 GHz)

<-30 dBc (Output Level: ≤+1 dBm, f >3 GHz)

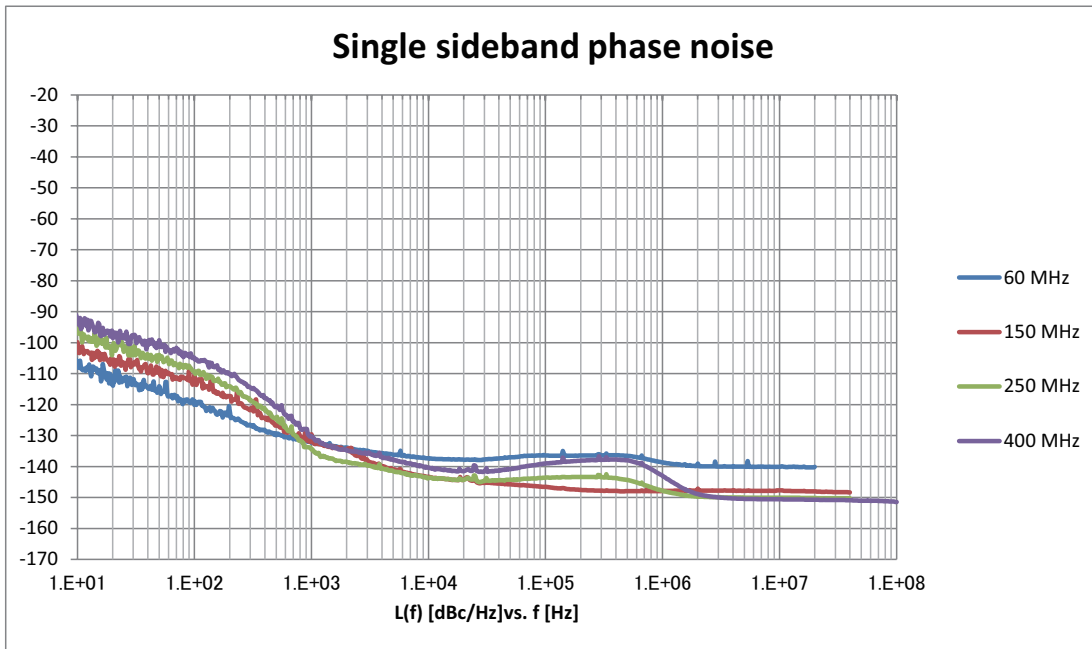
## Non-harmonic Spurious

- (CW,  $-30 \text{ dBm} \leq \text{Output Level} \leq +5 \text{ dBm}$ , Offset:  $\geq 10 \text{ kHz}$ )
- $< -62 \text{ dBc}$ ,  $-70 \text{ dBc}$  (typ.) ( $100 \text{ kHz} \leq f \leq 187.5 \text{ MHz}$ )
- $< -68 \text{ dBc}$ ,  $-76 \text{ dBc}$  (typ.) ( $187.5 \text{ MHz} < f \leq 750 \text{ MHz}$ )
- $< -62 \text{ dBc}$ ,  $-76 \text{ dBc}$  (typ.) ( $750 \text{ MHz} < f \leq 1.5 \text{ GHz}$ )
- $< -56 \text{ dBc}$ ,  $-70 \text{ dBc}$  (typ.) ( $1.5 \text{ GHz} < f \leq 3 \text{ GHz}$ )
- $< -50 \text{ dBc}$ ,  $-64 \text{ dBc}$  (typ.) ( $3 \text{ GHz} < f \leq 6 \text{ GHz}$ )

## SSB Phase Noise

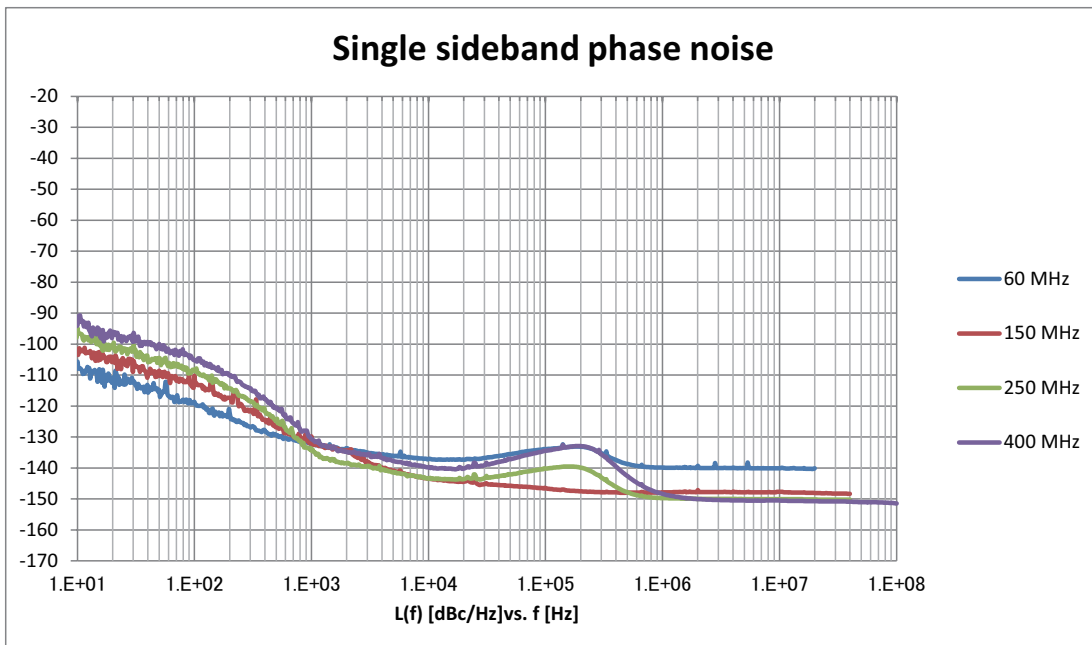
- (CW, Phase Noise Optimization:  $< 200 \text{ kHz}$ , Offset:  $20 \text{ kHz}$ )
- $< -140 \text{ dBc/Hz}$  (nom.) ( $100 \text{ MHz}$ )
- $< -131 \text{ dBc/Hz}$  (typ.) ( $1 \text{ GHz}$ )
- $< -125 \text{ dBc/Hz}$  (typ.) ( $2 \text{ GHz}$ )

- 60/150/260/400 MHz, CW, Optimize S/N: Off, with MG3740A-002



Phase Noise Optimization:  $< 200 \text{ kHz}$

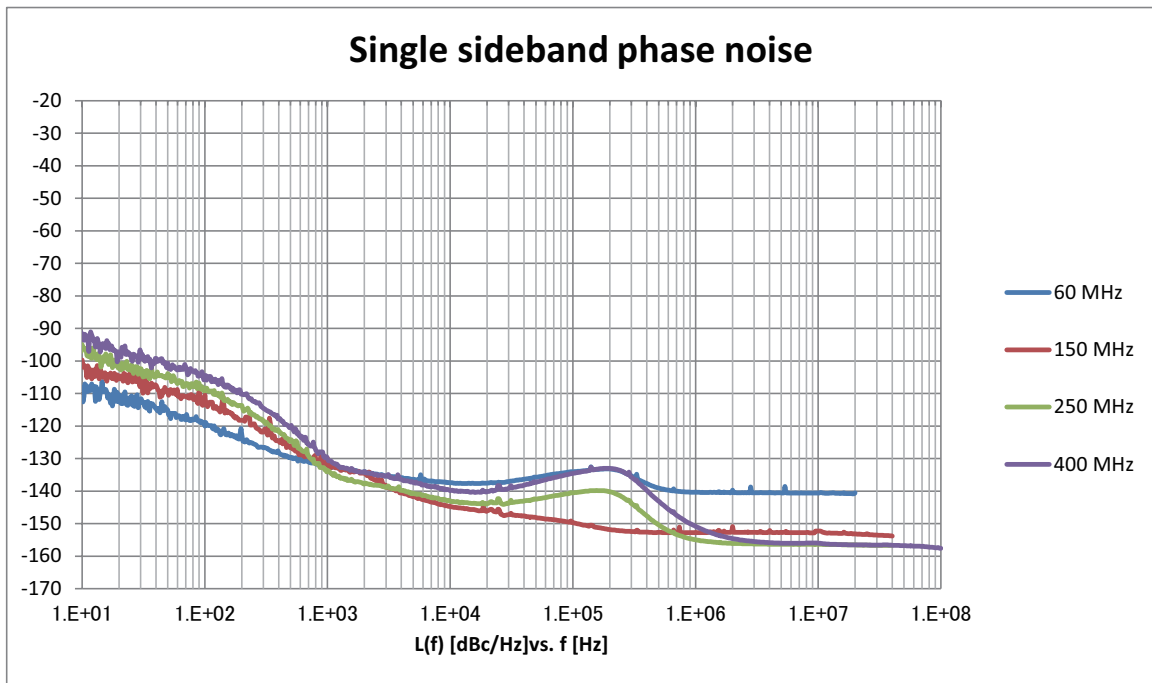
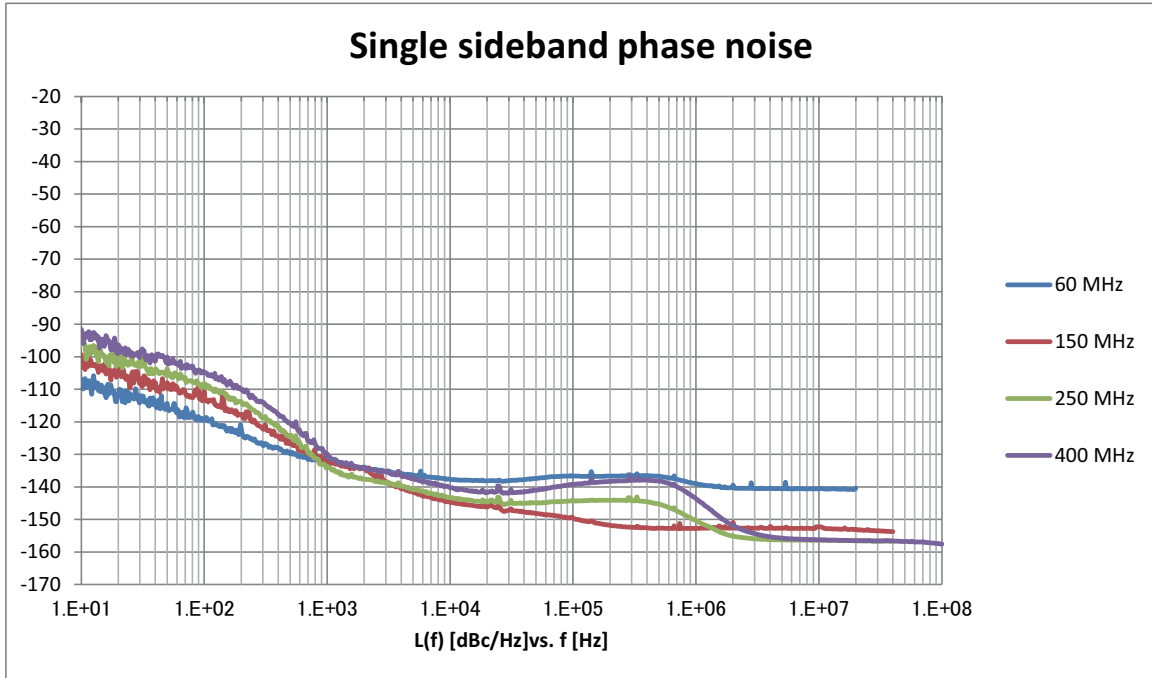
(meas)



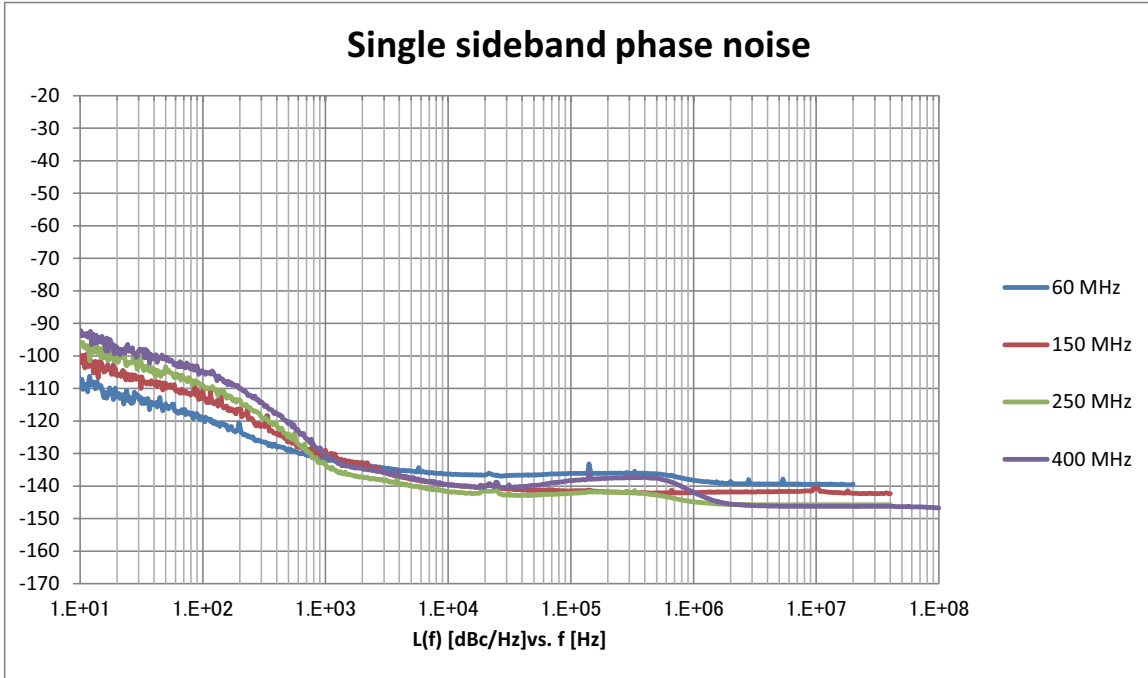
Phase Noise Optimization:  $> 300 \text{ kHz}$

(meas)

■ 60/150/260/400 MHz, CW, Optimize S/N: On, with MG3740A-002

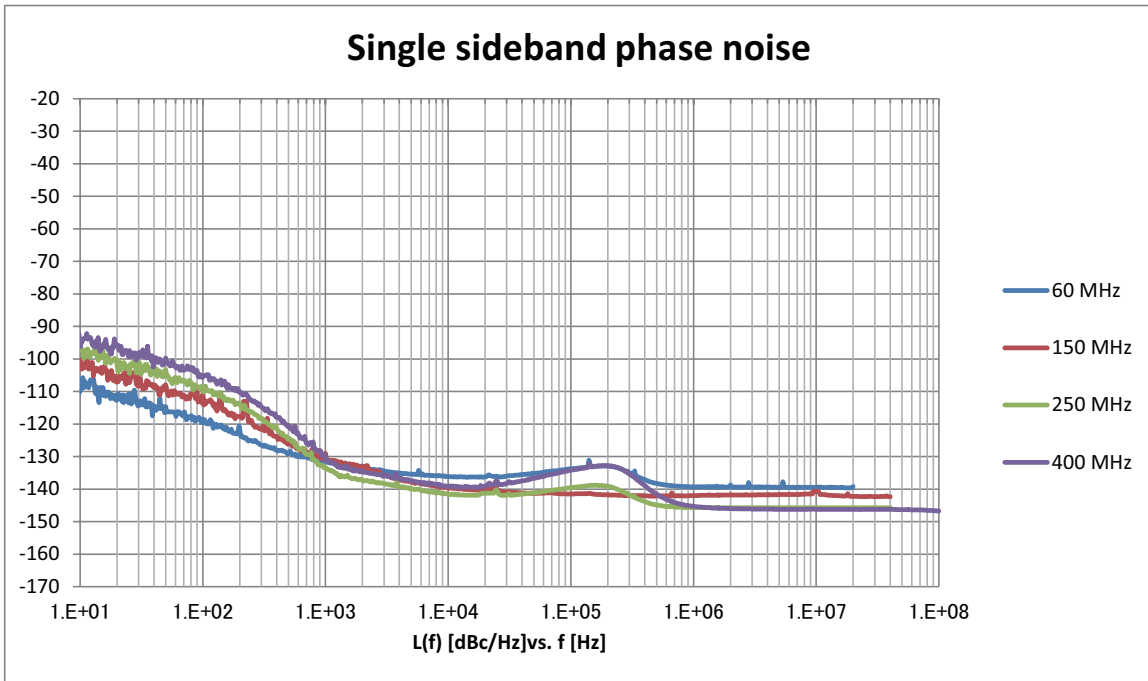


■ 60/150/260/400 MHz, Mod = On, with MG3740A-002



Phase Noise Optimization: <math><200\text{ kHz}</math>

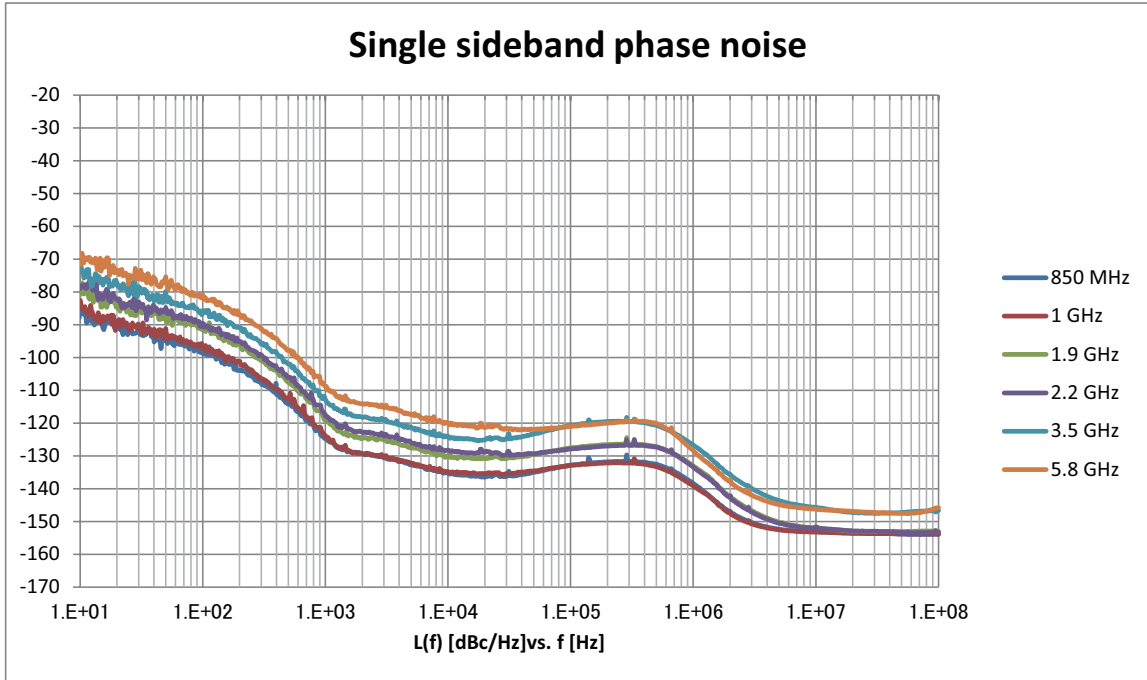
(meas)



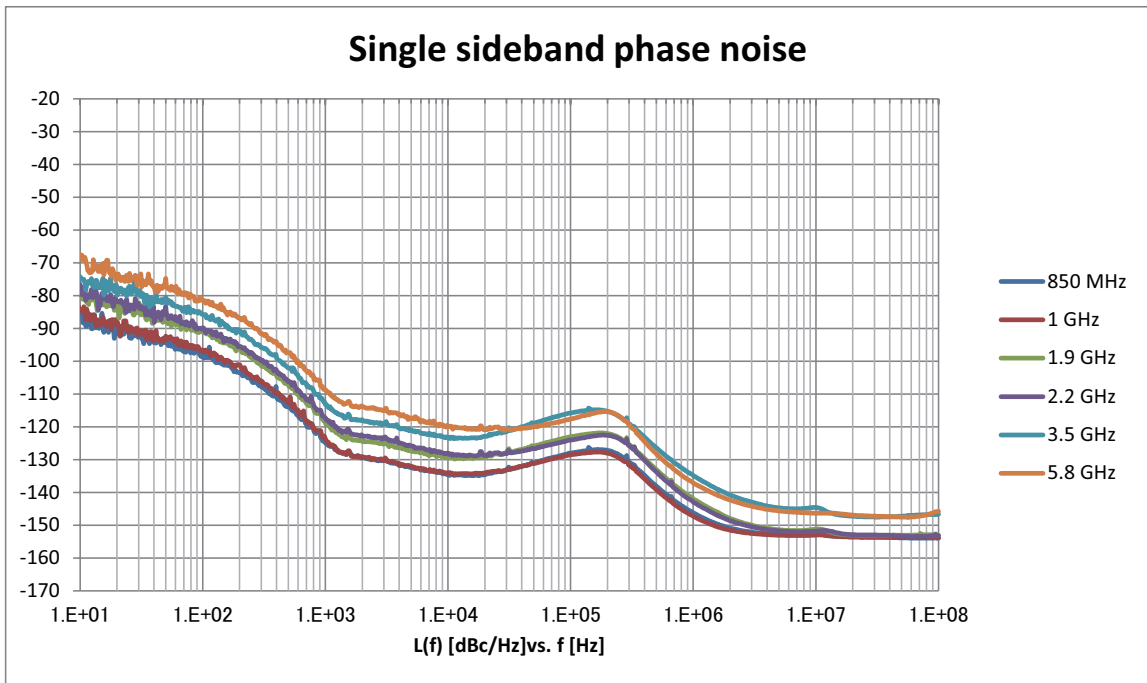
Phase Noise Optimization: <math>>300\text{ kHz}</math>

(meas)

■ 850 MHz, 1/1.9/2.2/3.5/5.8 GHz, CW, Optimize S/N: Off, with MG3740A-002

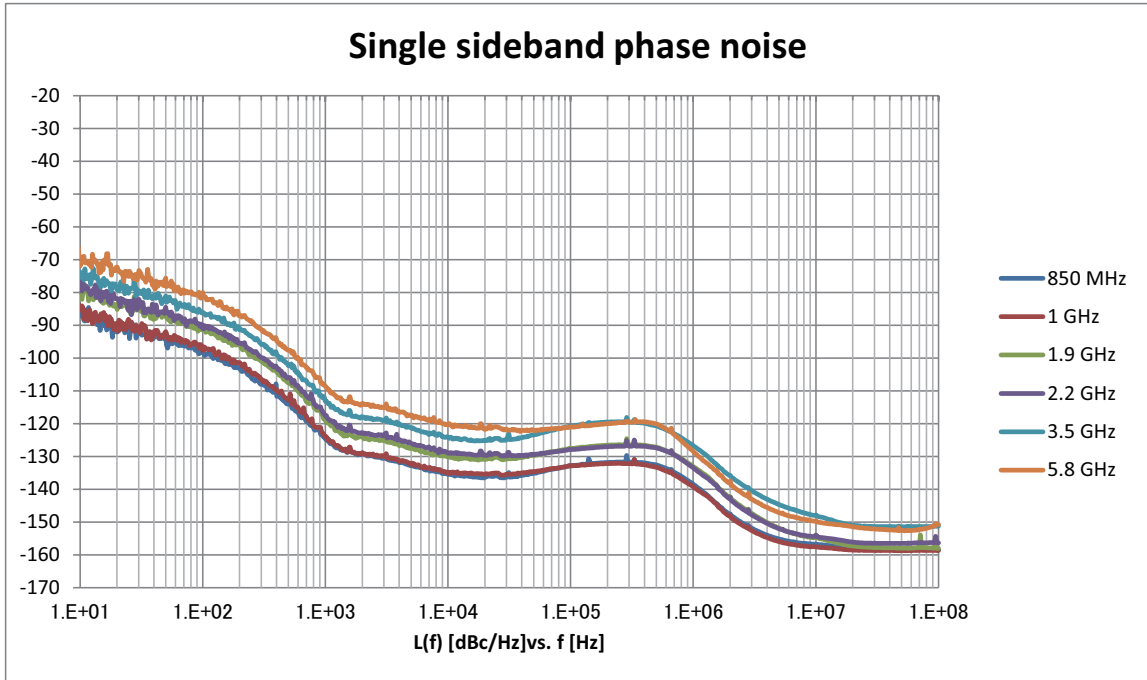


(meas)



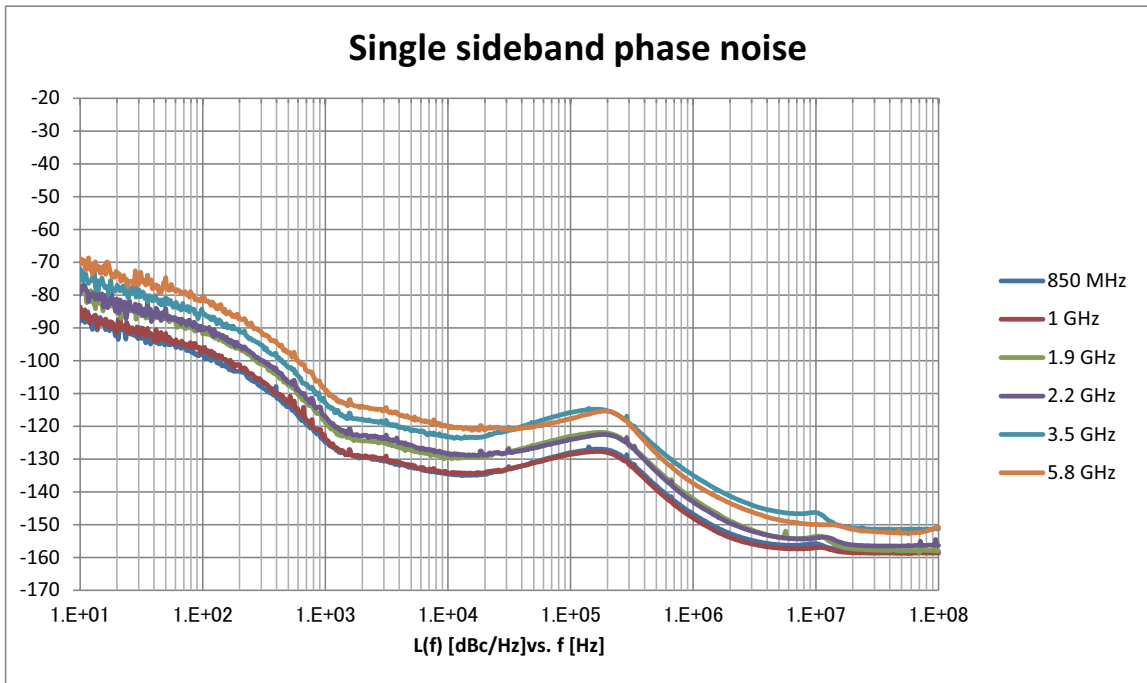
(meas)

■ 850 MHz, 1/1.9/2.2/3.5/5.8 GHz, CW, Optimize S/N: On, with MG3740A-002



Phase Noise Optimization: <200 kHz

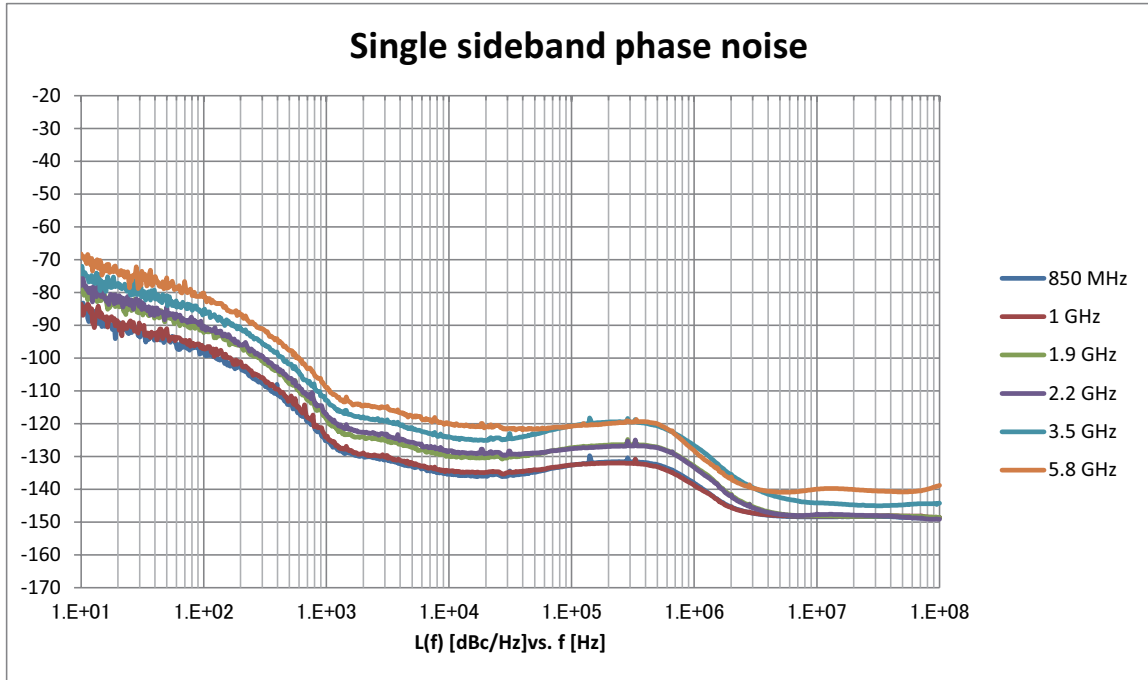
(meas)



Phase Noise Optimization: >300 kHz

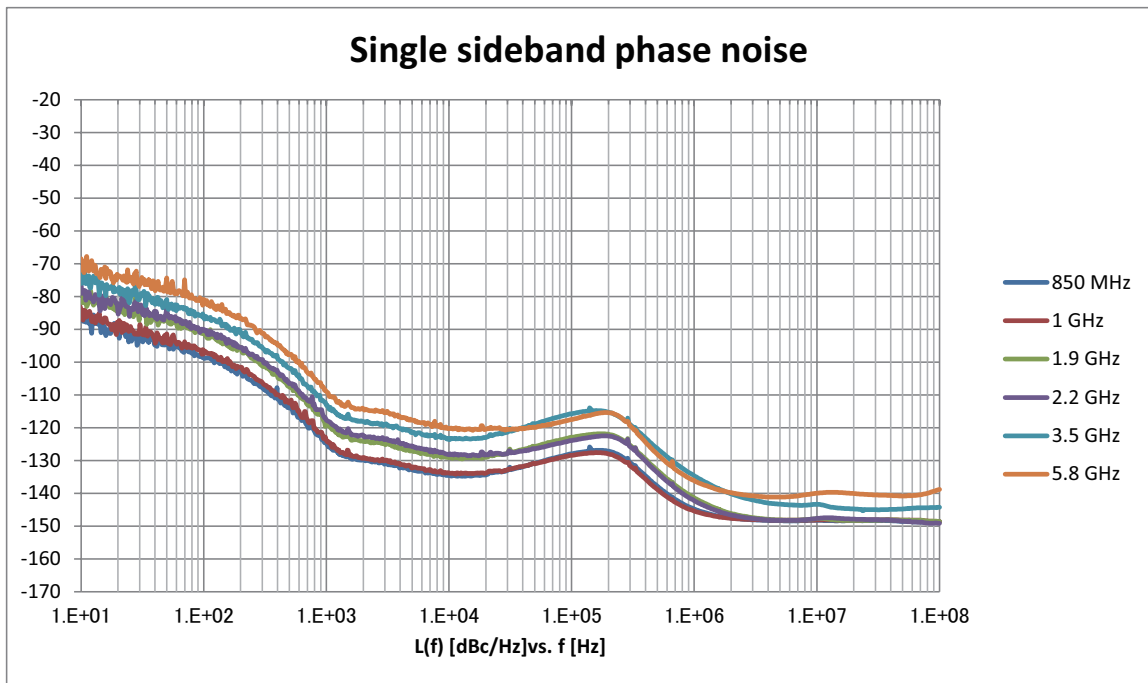
(meas)

■ 850 MHz, 1/1.9/2.2/3.5/5.8 GHz, Mod = On, with MG3740A-002



Phase Noise Optimization: <math><200</math> kHz

(meas)



Phase Noise Optimization: >300 kHz

(meas)

# Analog Modulation

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## Optimize Function

### Spurious Mode

Mode to control spurious problem. Controls spurious generated by the modulator.

### Distortion Mode

Mode to control distortion problem. Optimizes the setting automatically to avoid distortions.  
This mode can be used when the output frequency is 7 MHz or higher .

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## Amplitude Modulation (AM)

Internal modulation only; Specifications for modulated CW signal, Optimization mode: Distortion

### AM Depth Type

Lin: Displays the AM depth type in linear.

Exp: Displays the AM depth type into the log format.

### AM Depth

Range: 0 to 100%

Resolution: 0.1%

Peak Level:  $\leq +4$  dBm, AM Depth Type: Lin, after CAL

### AM Depth Error

$< 3\%$  of setting + 2% (nom.) ( $100 \text{ kHz} \leq f < 98 \text{ MHz}$ , Modulation Rate: 1 kHz, AM Source: Sine, AM Depth m:  $\leq 90\%$ )

$< 2\%$  of setting + 1% (nom.) ( $98 \text{ MHz} \leq f \leq 2.7 \text{ GHz}$ , Modulation Rate: 1 kHz, AM Source: Sine, AM Depth m:  $< 20\%$ )

$< 2\%$  of setting + 1% ( $98 \text{ MHz} \leq f \leq 2.7 \text{ GHz}$ , Modulation Rate: 1 kHz, AM Source: Sine,  $20\% \leq \text{AM Depth m} \leq 90\%$ )

### Distortion

$< 2\%$  (nom.) ( $100 \text{ kHz} \leq f < 7 \text{ MHz}$ , Modulation Rate: 1 kHz, AM Source: Sine, AM Depth m: 30%)

$< 2.5\%$  (nom.) ( $100 \text{ kHz} \leq f < 7 \text{ MHz}$ , Modulation Rate: 1 kHz, AM Source: Sine, AM Depth m: 90%)

$< 2\%$  ( $7 \text{ MHz} \leq f < 98 \text{ MHz}$ , Modulation Rate: 1 kHz, AM Source: Sine, AM Depth m: 30%)

$< 2.5\%$  ( $7 \text{ MHz} \leq f < 98 \text{ MHz}$ , Modulation Rate: 1 kHz, AM Source: Sine, AM Depth m: 90%)

$< 1\%$  ( $98 \text{ MHz} \leq f \leq 2.7 \text{ GHz}$ , Modulation Rate: 1 kHz, AM Source: Sine, AM Depth m: 30%)

$< 1\%$  ( $98 \text{ MHz} \leq f \leq 2.7 \text{ GHz}$ , Modulation Rate: 1 kHz, AM Source: Sine, AM Depth m: 90%)

### Modulation Frequency Response

$100 \text{ kHz} \leq f < 98 \text{ MHz}$ ,  $\pm 1.5$  dB Bandwidth

Modulation Ratio m: 30%

$0.1 \text{ Hz} \leq \text{Modulation Rate} \leq 20 \text{ kHz}$  (nom.)

Modulation Ratio m: 90%

$0.1 \text{ Hz} \leq \text{Modulation Rate} \leq 20 \text{ kHz}$  (nom.)

$98 \text{ MHz} \leq f \leq 2.7 \text{ GHz}$ ,  $\pm 1$  dB Bandwidth

Modulation Ratio m: 30%

$0.1 \text{ Hz} \leq \text{Modulation Rate} < 50 \text{ Hz}$  (nom.),  $50 \text{ Hz} \leq \text{Modulation Rate} \leq 100 \text{ kHz}$  (typ.)

Modulation Ratio m: 90%

$0.1 \text{ Hz} \leq \text{Modulation Rate} < 50 \text{ Hz}$  (nom.),  $50 \text{ Hz} \leq \text{Modulation Rate} \leq 100 \text{ kHz}$  (typ.)

---

## Frequency Modulation (FM)

Internal modulation only; Specifications for modulated CW signal, Optimization mode: Distortion

### FM Deviation

Range: 0 Hz to 40 MHz, or [50 MHz – Modulation Rate] (smaller value)

Resolution: 0.1 Hz

Output Level:  $\leq +4$  dBm, after CAL

### Deviation Accuracy

$< 2\%$  of setting + 20 Hz (nom.) (Modulation Rate: 1 kHz, FM Source: Sine,

$100 \text{ kHz} + 2 \times (\text{Modulation Rate} + 2 \times \text{FM Deviation}) \leq f \leq 2.7 \text{ GHz}$ ,  $20 \text{ Hz} \leq \text{FM Deviation} \leq 200 \text{ Hz}$ )

$< 3\%$  of setting + 20 Hz,  $< 1.26\%$  of setting + 20 Hz (typ.) (Modulation Rate: 1 kHz, FM Source: Sine,  $250 \text{ kHz} + 2 \times$

$(\text{Modulation Rate} + 2 \times \text{FM Deviation}) \leq f \leq 2.7 \text{ GHz}$ ,  $200 \text{ Hz} \leq \text{FM Deviation} \leq 40 \text{ kHz}$ ,  $(\text{Deviation} + \text{modulation rate}) > 0.2$ )

$< 3\%$  of setting + 20 Hz,  $< 1.84\%$  of setting + 20 Hz (typ.) (Modulation Rate: 1 kHz, FM Source: Sine,  $250 \text{ kHz} + 2 \times$

$(\text{Modulation Rate} + 2 \times \text{FM Deviation}) \leq f \leq 2.7 \text{ GHz}$ ,  $200 \text{ Hz} \leq \text{FM Deviation} \leq 40 \text{ kHz}$ ,  $(\text{Deviation} + \text{modulation rate}) > 1.2$ )



### Distortion

- <0.5% (nom.) (Modulation Rate: 1 kHz, FM Source: Sine,  $100 \text{ kHz} + 2 \times (\text{Modulation Rate} + 2 \times \text{FM Deviation}) \leq f < 1 \text{ MHz}$ , FM Deviation: 22.5 kHz)
- <0.4% (Modulation Rate: 1 kHz, FM Source: Sine,  $1 \text{ MHz} + 2 \times (\text{Modulation Rate} + 2 \times \text{FM Deviation}) \leq f \leq 2.7 \text{ GHz}$ , FM Deviation: 22.5 kHz)
- <1% (nom.) (Modulation Rate: 1 kHz, FM Source: Sine,  $100 \text{ kHz} + 2 \times (\text{Modulation Rate} + 2 \times \text{FM Deviation}) \leq f < 1 \text{ MHz}$ , FM Deviation: 3.5 kHz)
- <0.5% (Modulation Rate: 1 kHz, FM Source: Sine,  $1 \text{ MHz} + 2 \times (\text{Modulation Rate} + 2 \times \text{FM Deviation}) \leq f \leq 2.7 \text{ GHz}$ , FM Deviation: 3.5 kHz)

### Modulation Frequency Response

- $100 \text{ kHz} + 2 \times (\text{Modulation Rate} + 2 \times \text{FM Deviation}) \leq f < 10 \text{ MHz}$ , Deviation: 40 kHz,  $\pm 1 \text{ dB}$  Bandwidth  
20 Hz  $\leq$  Modulation Rate  $\leq$  20 kHz (nom.)
- $10 \text{ MHz} \leq f \leq 2.7 \text{ GHz}$ , Deviation: 40 kHz,  $\pm 1 \text{ dB}$  Bandwidth  
20 Hz  $\leq$  Modulation Rate  $\leq$  20 kHz (nom.)

---

## Phase Modulation (PM)

Internal modulation only; Specifications for modulated CW signal, Optimization mode: Distortion

### PM Deviation

- Range: 0 rad. to 160 rad., or  $[40 \text{ MHz} \div \text{Modulation Rate}]$  (smaller value)
- Resolution: 0.001 rad.

Output Level:  $\leq +4 \text{ dBm}$ ,  $100 \text{ kHz} + 2 \times (\text{Modulation Rate} + 2 \times \text{PM Deviation} \times \text{Modulation Rate}) \leq f \leq 2.7 \text{ GHz}$ , after CAL

### Deviation Accuracy

- <2% of setting + 0.02 rad. (nom.) (Modulation Rate: 1 kHz,  $\Phi\text{M}$  Source: Sine, 0 rad. < PM Deviation:  $\leq 0.7 \text{ rad.}$ )
- <3% of setting + 0.02 rad., <1.84% of setting + 0.02 rad. (typ.) (Modulation Rate: 1 kHz,  $\Phi\text{M}$  Source: Sine, 0.7 rad. < PM Deviation:  $\leq 20 \text{ rad.}$ )

### Distortion

- <0.2% (typ.) (Modulation Rate: 1 kHz,  $\Phi\text{M}$  Source: Sine, PM Deviation: 20 rad.)

### Modulation Frequency Response

- Deviation: 2 rad.,  $\pm 1 \text{ dB}$  Bandwidth
- 20 Hz  $\leq$  Modulation Rate  $\leq$  20 kHz (nom.)

---

## Pulse Modulation

### On/Off Ratio

- >70 dB ( $50 \text{ MHz} \leq f \leq 3 \text{ GHz}$ )
- >60 dB ( $3 \text{ GHz} < f \leq 6 \text{ GHz}$ )

### Minimum Pulse width

- 1  $\mu\text{s}$  (nom.)

### Rise/Fall Time

- $\leq 50 \text{ ns}$  (10 to 90%) (nom.)

### Pulse Repetition Frequency

- DC to 1 MHz (Duty: 50%)

### External Pulse Modulation Input

- AUX Connector (Rear panel), TTL
- H: RF On, L: RF Off

---

## Internal Modulation Signal

### Waveform

- Sine wave, Triangular wave, Square wave, Ramp wave (Positive or Negative)

### Modulation Rate

- Sine wave: 0.01 Hz to 40 MHz or (50 MHz – FM Deviation)
- Triangular wave, Square wave, Ramp wave: 0.01 Hz to 4 MHz or (5 MHz – FM Deviation)

### Frequency Resolution

- 0.1 Hz

### Phase

- 180 deg to 180 deg

### Phase Resolution

- 0.1 deg

---

## Additional Analog Modulation Input

When MG3740A-050/080 is installed and for 1st SG and 2nd SG respectively

Internal modulation only; Specifications for modulated CW signal, Optimization mode: Distortion

### Modulation Type

AM, FM,  $\Phi$ M

### Input Impedance

50 $\Omega$ /600 $\Omega$ /Hi-Z (100 k $\Omega$ /70 pF) (nom.)

### Coupling

DC or AC is alternatively selectable.

### Input Level

For set value, 2 V<sub>p-p</sub> (nom.)

### Input Frequency

DC Coupling: DC to 1 MHz (nom.)

AC Coupling: 20 Hz (typ.) to 1 MHz (nom.)

### Simultaneous Modulation

AM + FM

AM +  $\Phi$ M

Internal 1 + Internal 2

Internal + External

FM and  $\Phi$ M cannot be enabled simultaneously.

### Modulation Frequency Response (AM)

Peak Level:  $\leq +4$  dBm, 100 kHz  $\leq f < 98$  MHz, AM Depth Type: Lin,  $\pm 1.5$  dB Bandwidth, after CAL

Depth m: 30%

DC Coupling: DC  $\leq$  Modulation Rate  $\leq 20$  kHz (nom.)

AC Coupling: 20 Hz  $\leq$  Modulation Rate  $\leq 20$  kHz (nom.)

Depth m: 90%

DC Coupling: DC  $\leq$  Modulation Rate  $\leq 20$  kHz (nom.)

AC Coupling: 20 Hz  $\leq$  Modulation Rate  $\leq 20$  kHz (nom.)

Peak Level:  $\leq +4$  dBm, 98 MHz  $\leq f \leq 2.7$  GHz, AM Depth Type: Lin,  $\pm 1$  dB Bandwidth, after CAL

Depth m: 30%

DC Coupling: DC  $\leq$  Modulation Rate  $< 50$  Hz (nom.)

50 Hz  $\leq$  Modulation Rate  $\leq 100$  kHz (typ.)

AC Coupling: 20 Hz  $\leq$  Modulation Rate  $< 50$  Hz (nom.)

50 Hz  $\leq$  Modulation Rate  $\leq 100$  kHz (typ.)

Depth m: 90%

DC Coupling: DC  $\leq$  Modulation Rate  $< 50$  Hz (nom.)

50 Hz  $\leq$  Modulation Rate  $\leq 100$  kHz (typ.)

AC Coupling: 20 Hz  $\leq$  Modulation Rate  $< 50$  Hz (nom.)

50 Hz  $\leq$  Modulation Rate  $\leq 100$  kHz (typ.)

### Modulation Frequency Response (FM)

Output Level:  $\leq +4$  dBm, 100 kHz + 2  $\times$  (Modulation Rate + 2  $\times$  FM Deviation)  $\leq f \leq 10$  MHz, FM Deviation: 40 kHz,  $\pm 1$  dB Bandwidth, after CAL

DC Coupling: DC  $\leq$  Modulation Rate  $\leq 20$  kHz (nom.)

AC Coupling: 20 Hz  $\leq$  Modulation Rate  $\leq 20$  kHz (nom.)

Output Level:  $\leq +4$  dBm, 10 MHz  $\leq f \leq 10$  MHz, FM Deviation: 40 kHz,  $\pm 1$  dB Bandwidth, after CAL

DC Coupling: DC  $\leq$  Modulation Rate  $< 50$  Hz (nom.)

50 Hz  $\leq$  Modulation Rate  $\leq 200$  kHz (typ.)

AC Coupling: 20 Hz  $\leq$  Modulation Rate  $< 50$  Hz (nom.)

50 Hz  $\leq$  Modulation Rate  $\leq 200$  kHz (typ.)

### Modulation Frequency Response (PM)

Output Level:  $\leq +4$  dBm, 100 kHz + 2  $\times$  (Modulation Rate + 2  $\times$  PM Deviation  $\times$  Modulation Rate)  $\leq f \leq 2.7$  GHz,

PM Deviation: 2 rad.,  $\pm 1$  dB Bandwidth, after CAL

DC Coupling: DC  $\leq$  Modulation Rate  $< 200$  Hz (nom.)

200 Hz  $\leq$  Modulation Rate  $\leq 20$  kHz (typ.)

AC Coupling: 20 Hz  $\leq$  Modulation Rate  $< 200$  Hz (nom.)

200 Hz  $\leq$  Modulation Rate  $\leq 20$  kHz (typ.)

---

## Carrier Leak

with MG3740A-020

(18° to 28°C, RMS Value: 0 dB, after CAL)

$\leq -55$  dBc (100 MHz  $\leq f < 4$  GHz)

$\leq -45$  dBc ( $f \geq 4$  GHz)

---

## Image Rejection

with MG3740A-020  
(18° to 28°C, RMS Value: 0 dB, Complex CW at 1 MHz or less, after CAL)  
≤-50 dBc (200 MHz ≤ f < 4 GHz)  
≤-43 dBc (f ≥ 4 GHz)

---

## I and Q Input/Output

### Baseband I/Q Adjustment

with MG3740A-020

### DC Offset

Range: -20.000% to +20.000%  
Resolution: 0.025%

### Gain Balance

(Gain adjustment of I-phase for Q-phase)  
Range: -1.000 dB to +1.000 dB  
Resolution: 0.001 dB

### Quadrature Adjustment

Range: -10.00 deg. to +10.00 deg.  
Resolution: 0.01 deg.

### Phase Adjustment

Range: -360.00 deg. to +360.00 deg.  
Resolution: 0.01 deg.

### Skew Adjustment

Range: -800.000 ns to +800.000 ns  
Resolution: 1 ps

### Delay Adjustment

Range: -400.000 ns to +400.000 ns  
Resolution: 1 ps

---

## Arbitrary Waveform Generator

with MG3740A-020

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### Waveform Resolution

14, 15, 16 bits for each I/Q

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### Modulation Bandwidth

2 MHz  
(When Over sampling rate = 4. The maximum number of Sampling rate = 8 MHz)

---

### Reconstruction Filter

80 MHz

---

### Baseband Level Adjustment (RMS Value Tuning)

Adjustable Input Level to Quadrature Modulator  
Decrease level: Decreases distortion  
Increase level: Improves noise floor  
Variable Range: ±8 dB  
Resolution: 0.01 dB

---

### Marker Output

Waveform Resolution  
14 bits: Waveform Pattern: 3 signals, or Internal Generated: 3 signals  
15 bits: Waveform Pattern: 1 signal, or Internal Generated: 3 signals  
16 bits: Internal Generated: 3 signals  
Supports switching Positive/Negative logic pulse outputs

---

### Internal Baseband Reference Clock

Range: 20 kHz to 200 MHz  
Resolution: 0.001 Hz

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## Waveform Memory

### 1stRF

When MG3740A-048 is installed, both memory A and memory B must have the same capacity. A combination of different capacities is not available.

- without MG3740A-045
  - 64 Msamples
- with MG3740A-045
  - 256 Msamples

### 2ndRF

When MG3740A-078 is installed, both memory A and memory B must have the same capacity. A combination of different capacities is not available.

- without MG3740A-075
  - 64 Msamples
- with MG3740A-075
  - 256 Msamples

### Number of loadable files

The following numbers of waveform patterns are available per waveform memory:

Max. Package Count: 4096

Max. Patterns per Package: 4096

The maximum number of patterns in total: 4096/waveform memory

The minimum number of samples per pattern: 128

### Combination of Baseband Signal Function

1st VSG: with MG3740A-048

This function synthesizes the signals of two memories to generate a baseband waveform.

2nd VSG: with MG3740A-078

This function synthesizes the signals of two memories to generate a baseband waveform.

---

## Frequency Offset

$\pm (8 \text{ MHz} \times 0.8 - \text{waveform data bandwidth}) \div 2$  (max.)

---

## Sequences Function

Selecting combination file supports following functions:

- Pattern switching method (manual, auto)
- Pattern switching position (frame end, pattern end)
- External trigger signal switches pattern at manual pattern switching
- Sequence restart function
- Maximum element: 200
- Lowest number of point by pattern: 1000

Level Ratio Setting Range: Two signal level ratio <80 dB or Off

Level Setting Resolution: 0.01 dB

Frequency Offset

Frequency Setting Resolution: 1 Hz

Pattern Trigger

External trigger switches pattern when using waveform pattern for sequence

Input Connector

Connector: Either of BNC-J connector (Start Frame TRIG Input, Pattern TRIG1 Input) or AUX connector can be used

Input Level: TTL

Logic: Select Rise/Fall Polarity

---

## Trigger Input

Function: Synchronizes with trigger signals and starts waveform pattern output; Switches start Trigger/Frame trigger

Start Trigger

Starts waveform output

Frame Trigger

Outputs signals at burst timing

Outputs data for burst length at frame trigger timing and waits for next frame trigger

Trigger Event

The following trigger events can be detected

No Retrigger, Buffered Trigger, Restart on Trigger

Input Connector

Function switching: Start trigger or frame trigger can be selected

Connector: Either of BNC-J connector (Start Frame TRIG Input, Pattern TRIG1 Input) or AUX connector can be used

Input Level: TTL

Logic: Select Rise/Fall Polarity

## Sweep/List Function

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### Sweep Function

Function: Sets frequency and level sweep at 1000-point resolution

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### List Function

Function: Sets sweep points for both frequency and level individually to 500 points

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## BER Measurement Function

with MG3740A-021

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### Connector

Connector: AUX Connector (Rear panel)  
Level: TTL

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### Input Signal

Data, Clock, Enable

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### Input Bit Rate

100 bps to 40 Mbps

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### Measurable Pattern

Repeat PN9, PN11, PN15, PN20, PN23, ALL0, ALL1, 01  
PN9fix, PN11fix, PN15fix, PN20fix, PN23fix, User Define

---

### Synchronization Establishing Condition

PN Signal: PN order × 2-bit error free  
PNfix Signal: Syncs with PN signal at PN order × 2-bit error free;  
Syncs with Pnfix signal at PN order error free from Pnfix signal header bit  
Repeat ALL0, ALL1, 01: 10-bit Error Free  
UserDefine: 8-bit to 1024-bit (variable) error free;can select header bit for Sync detection

---

### Re-synchronization Judgment

x/y  
x: Number of error bits in y bit (Setting range: 1 to y/2)  
y: Number of measurement bits (select from 500, 5000 and 50000)

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### Measurable Bit

$\leq 2^{32} - 1$  bit

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### Measurable Error Bit Count

$\leq 2^{32} - 1$  bit

---

### Measurement End

Number of measurement bits, Number of measurement error bits

---

### Automatic Re-synchronization

Can be toggled on and off

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### Re-synchronization

Count Clear, Count Keep

---

### Measurement Mode

Single, Endless, Continuous

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### Display

Status, Error, Error Rate, Error Count, SyncLoss Count, Measurement Bit Number

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## Polarity Reversal Function

Supports polarity reversal for Data, Clock, Enable

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## Measured Result Reset Function

At BER measurement, hold sync status, clears measured value and measures from 0

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# Connector

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## External Reference Input

Connector: BNC-J (Rear panel), 50 $\Omega$  (nom.)  
Frequency: 5, 10, 13 MHz  
Operating Range:  $\pm 1$  ppm  
Input Level:  $-15$  dBm  $\leq$  Level  $\leq$   $+20$  dBm (AC coupled)

---

## Reference Signal Output

Connector: BNC-J (Rear panel), 50 $\Omega$  (nom.)  
Frequency: 10 MHz  
Output Level:  $\geq 0$  dBm (AC coupled)

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## Sweep Output

with MG3740A-017  
Connector: BNC-J (Rear panel),  $< 1\Omega$  (Drive Capacity: 2 k $\Omega$ )  
Output Level: 0 to 10 V (10 V Sweep Signal Function), 0/5 V (Sweep Status)

---

## Additional Analog Modulation Input

When MG3740A-050/080 is installed:  
Connector: Rear panel, BNC-J  
Input Impedance: 50 $\Omega$ , 600 $\Omega$ , or Hi-Z (100 k $\Omega$ /70 pF) (nom.)  
Input Level: For set value, 2 Vp-p (nom.), Absolute maximum ratings:  $\pm 5$  V

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## External Controller

Control from external controller (excluding power-on/off)  
Ethernet (10/100/1000Base-T): RJ-45 (Rear panel)  
GPIO: IEEE488 Bus connector (IEEE488.2, Rear panel)  
Interface Function: SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT0, C0, E2  
USB (B): USB-B connector (USB2.0, Rear panel)

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## USB

Hard copies waveform to external device and saves main-frame basic parameters  
USB-A connector (USB2.0, Front panel: 2 ports, Rear panel: 2 ports)

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## Monitor Output

Mini D-Sub connector (compatible with VGA, Rear panel)

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## AUX

50-pin (for DX10A-50S) (Rear panel)  
Input/Output Level: TTL  
with MG3740A-017/021: with AUX-BNC Conversion Cable

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## Display

8.4-inch, XGA-color LCD (Diagonal: 213 mm, Resolution: 1024 × 768)

## General

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### Dimensions and Mass

426 (W) × 177 (H) × 390 (D) mm (excluding projections)  
≤13.7 kg (MG3740A-032, 034, or 036, excluding other options)  
≤17 kg (including all options)

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### Power Supply

Power Voltage: 100 V(ac) to 120 V(ac), 200 V(ac) to 240 V(ac)  
Frequency: 50 Hz/60 Hz  
Power Consumption: ≤350 VA (including all options)  
180 VA (nom.)  
(with MG3740A-032, 034, or 036, with MG3740A-041/042, excluding other options)  
260 VA (nom.)  
(with MG3740A-032, 034, or 036, with MG3740A-041/042, with MG3740A-062, 064, or 066,  
with MG3740A-071/072, excluding other options)  
280 VA (nom.)  
(with MG3740A-032, 034, or 036, with MG3740A-041/042, with MG3740A-062, 064, or 066,  
with MG3740A-071/072, with MG3740A-001/021, excluding other options)

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### Temperature Range

Operating: +5° to +45°C, Storage: -20° to +60°C

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### EMC

EN61326-1, EN61000-3-2

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### LVD

EN61010-1

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● **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 Eletronica Ltda.**

Praça Amadeu Amaral, 27 - 1 Andar  
01327-010 - Bela Vista - Sao 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**

Kistagången 20B, 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**

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.  
Moscow, 125009, Russia  
Phone: +7-495-363-1694  
Fax: +7-495-935-8962

● **Spain**

**Anritsu EMEA Ltd.**

**Representation Office in Spain**

Edificio Cuzco IV, Po. de la Castellana, 141, Pta. 5  
28046, Madrid, Spain  
Phone: +34-915-726-761  
Fax: +34-915-726-621

● **United Arab Emirates**

**Anritsu EMEA Ltd.**

**Dubai Liaison Office**

902, Aurora Tower,  
P O Box: 500311- Dubai Internet City  
Dubai, United Arab Emirates  
Phone: +971-4-3758479  
Fax: +971-4-4249036

● **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.**

11 Chang Charn Road, #04-01, Shriro House  
Singapore 159640  
Phone: +65-6282-2400  
Fax: +65-6282-2533

● **P.R. China (Shanghai)**

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

Room 2701-2705, Tower A,  
New Caohejing International Business Center  
No. 391 Gui Ping Road Shanghai, 200233, 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: +81-46-296-6509  
Fax: +81-46-225-8359

● **Korea**

**Anritsu Corporation, Ltd.**

5FL, 235 Pangyoyeok-ro, Bundang-gu, Seongnam-si,  
Gyeonggi-do, 13494 Korea  
Phone: +82-31-696-7750  
Fax: +82-31-696-7751

● **Australia**

**Anritsu Pty. Ltd.**

Unit 20, 21-35 Ricketts Road,  
Mount Waverley, Victoria 3149, 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: