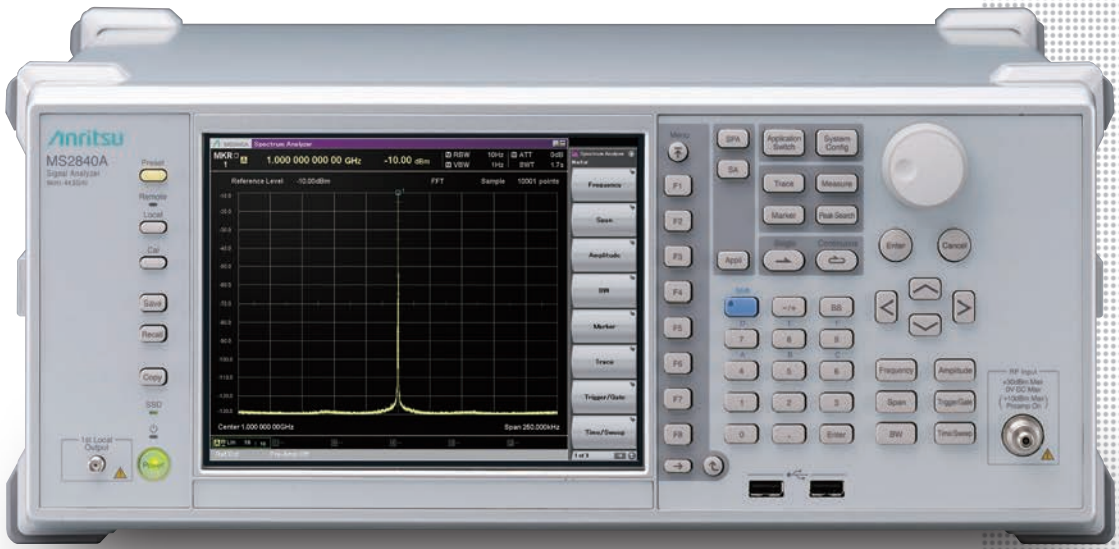
Anritsu envision : ensure

Signal Analyzer

MS2840A

MS2840A-046: 9 kHz to 44.5 GHz



Contents

Contents

Contents

Definitions

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

The conditions are as follows unless specified otherwise.
After 30-minute warm-up (at constant ambient temperature)
Auto Sweep Time Select: Normal
Auto Swp Type Rules: Swept Only
Switching Speed mode: Normal
Attenuator Mode: Mechanical Atten Only
After CAL operation

Frequency

Frequency range

9 kHz to 44.5 GHz

Frequency bands

Frequency range	Band	Mixer harmonics order (N)
9 kHz to 4000 MHz	0	1
3500 MHz to 4400 MHz	1	1/2
4300 MHz to 6000 MHz	1	1
3900 MHz to 8000 MHz	3	1
7900 MHz to 10575 MHz	4	1
10475 MHz to 12200 MHz	5	2
12100 MHz to 18400 MHz	6	2
18300 MHz to 26600 MHz	7	4
26500 MHz to 42100 MHz	8	4
42000 MHz to 44500 MHz	9	8

Pre-selector range

Model	Range	Frequency Band Mode
MS2840A-046	4 GHz to 44.5 GHz	Normal
	3.5 GHz to 44.5 GHz	Spurious

Frequency setting range

Model	Range	Resolution
MS2840A-046	–100 MHz to 45 GHz	1 Hz

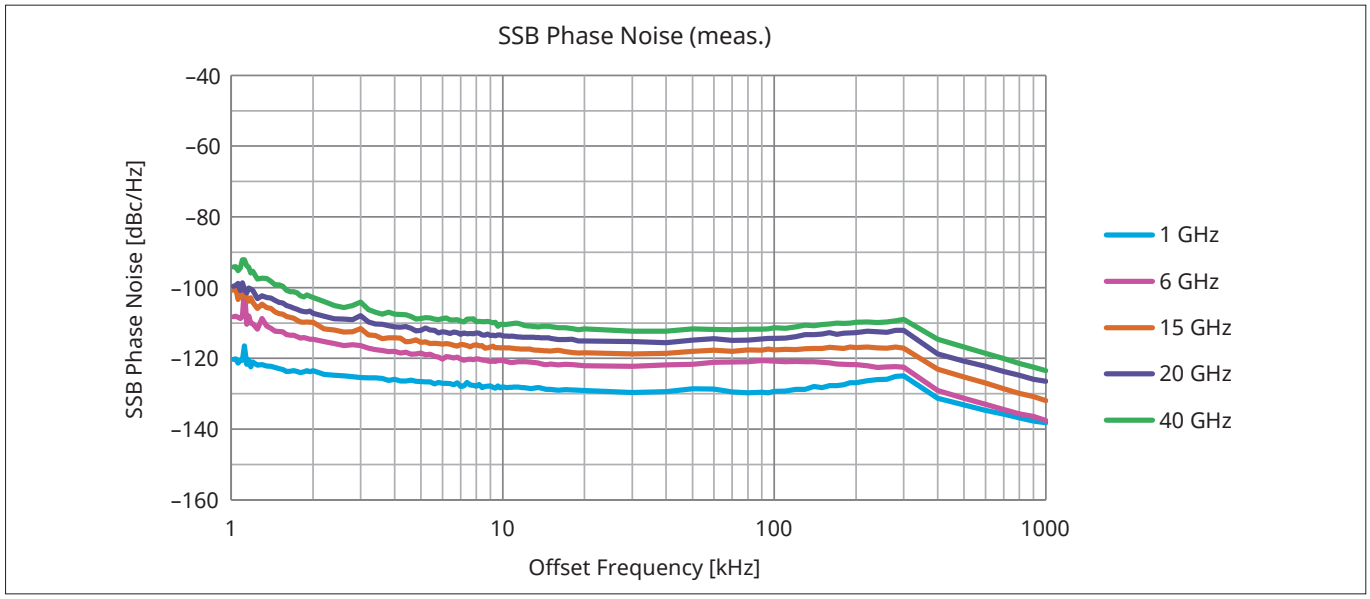
Internal reference oscillator

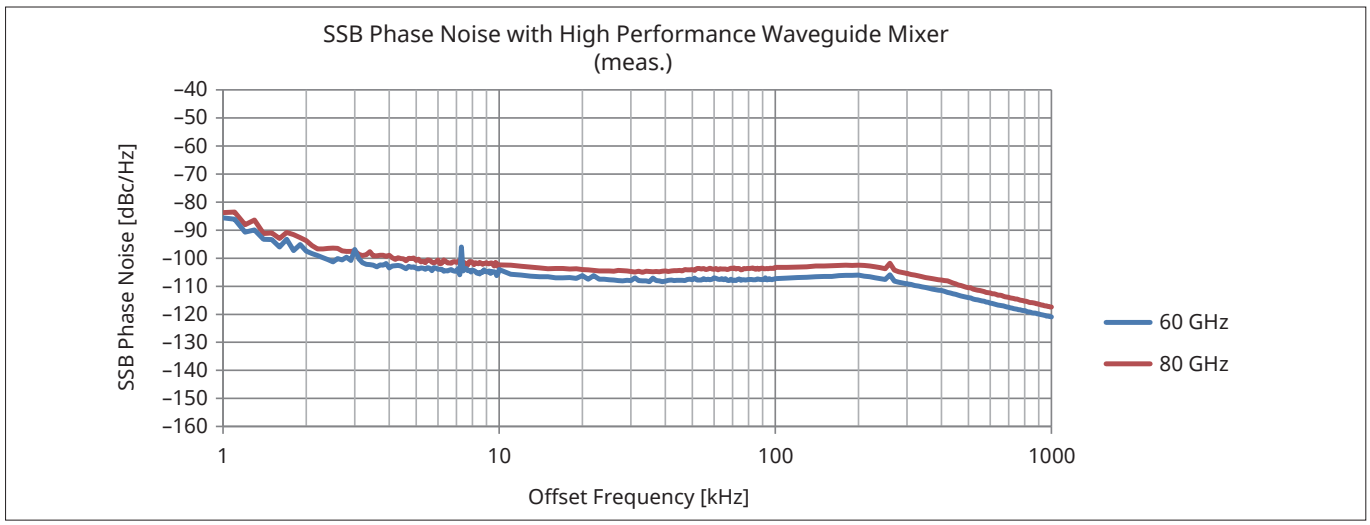
Accuracy	± [(time since last adjustment × aging rate) + temperature stability + calibration accuracy]
Activation characteristics	Based on frequency 24 hours after power application, at 23°C ±5 × 10^{-7} (2 minutes after power on) ±5 × 10^{-8} (5 minutes after power on)
Aging rate	±1 × 10^{-7}/year
Temperature stability	±2 × 10^{-8} (0° to 50°C)
Frequency accuracy at the initial calibration	±2.2 × 10^{-8} (18° to 28°C, 1 hour after power on)

Single side band noise (SSB phase noise)

18° to 28°C, 1000 MHz, Spectrum Analyzer mode

Offset	Specification	Nominal
10 Hz	–	–80 dBc/Hz
100 Hz	–	–92 dBc/Hz
1 kHz	–	–117 dBc/Hz
10 kHz	–123 dBc/Hz	–
100 kHz	–123 dBc/Hz	–
1 MHz	–135 dBc/Hz	–
10 MHz	–	–148 dBc/Hz





Spurious caused by the local signal

10 MHz < frequency ≤ 1 GHz

Offset	Nominal
3 kHz ≤ Freq. Offset < 100 kHz	−70 dBc
100k Hz ≤ Freq. Offset < 10 MHz	−75 dBc

Frequency > 1 GHz

Offset	Standard
3 kHz ≤ Freq. Offset < 100 kHz	−70 + 20 × log(f) dBc f: Receiving frequency [GHz] (nom.)
100k Hz ≤ Freq. Offset < 10 MHz	−75 + 20 × log(N) dBc N: Mixer harmonic order (nom.)

Amplitude

Level measurement range

without MS2840A-068 or Preamp Off	DANL to +30 dBm
with MS2840A-068, and Preamp On	DANL to +10 dBm

Maximum input level

	Average total power	DC voltage
without MS2840A-068 or Preamp Off	+30 dBm (Input attenuator: ≥10 dB) +20 dBm (Input attenuator: 0 dB)	±0 Vdc
with MS2840A-068, and Preamp On	+10 dBm (Input attenuator: 0 dB)	±0 Vdc

Input attenuator range

Attenuator Mode: M-ATT Only or, Attenuator Mode: E-ATT Combined Mode, Stop Frequency ≥ 6 GHz	0 to 60 dB, 10 dB steps
Attenuator Mode: E-ATT Combined Mode, Stop Frequency < 6 GHz	0 to 10 dB, 10 dB steps 10 to 40 dB, 2 dB steps 40 to 60 dB, 10 dB steps

Input attenuator switching uncertainty

18° to 28°C, Referenced to 10 dB, without MS2840A-068 or Preamp Off

Frequency Range, Frequency Band Mode	Specification
300 kHz ≤ frequency < 4 GHz, Frequency Band Mode: Normal	±0.20 dB (10 to 60 dB)
300 kHz ≤ frequency < 3.5 GHz, Frequency Band Mode: Spurious	
4 GHz ≤ frequency ≤ 13.8 GHz, Frequency Band Mode: Normal	±0.75 dB (10 to 60 dB)
3.5 GHz ≤ frequency ≤ 13.8 GHz, Frequency Band Mode: Spurious	
13.8 GHz < frequency ≤ 26.5 GHz	±0.80 dB (10 to 60 dB)
26.5 GHz < frequency ≤ 40 GHz	±1.0 dB (10 to 60 dB)
40 GHz < frequency ≤ 44.5 GHz	±1.0 dB typ. (10 to 60 dB)

Reference level

Setting range

Log scale: –120 to +50 dBm, or Equivalent level
Linear scale: 22.4 µV to 70.7 V, or Equivalent level
Setting resolution: 0.01 dB, or Equivalent level

Scale units

Log scale: dBm, dBµV, dBmV, dBµV (emf), dBµV/m, V, W
Linear scale: V

Linearity error

Excluding the noise floor effect

		Specification
without MS2840A-068, or Preamp Off	Mixer input level ≤–20 dBm	±0.07 dB
	Mixer input level ≤–10 dBm	±0.10 dB
With MS2840A-068 and Preamp On	Preamplifier input level ≤–40 dBm	±0.07 dB
	Preamplifier input level ≤–30 dBm	±0.10 dB
Attenuator Mode: E-ATT Combined, without MS2840A-068, or Preamp Off	Mixer input level ≤–20 dBm, RF input level ≤–10 dBm	±0.07 dB
	Mixer input level ≤–10 dBm, RF input level ≤–10 dBm	±0.10 dB
	Mixer input level ≤–20 dBm, 9 kHz ≤ frequency ≤ 300 MHz, RF input level ≤+5 dBm	±0.07 dB (nom.)
	Mixer input level ≤–20 dBm, 300 MHz < frequency ≤ 6 GHz, RF input level ≤+20 dBm	
	Mixer input level ≤–10 dBm, 9 kHz ≤ frequency ≤ 300 MHz, RF input level ≤+5 dBm	±0.10 dB (nom.)
	Mixer input level ≤–10 dBm, 300 MHz < frequency ≤ 6 GHz, RF input level ≤+20 dBm	

RF frequency characteristics

18° to 28°C, Input attenuator: 10 dB
without MS2840A-068 or Preamp Off, after Preselector Auto Tune

9 kHz ≤ frequency < 300 kHz	±1.0 dB
300 kHz ≤ frequency < 50 MHz	±0.35 dB
50 MHz ≤ frequency < 4 GHz, Frequency Band Mode: Normal 50 MHz ≤ frequency < 3.5 GHz, Frequency Band Mode: Spurious	±0.35 dB
4 GHz ≤ frequency ≤ 6 GHz, Frequency Band Mode: Normal 3.5 GHz ≤ frequency ≤ 4 GHz, Frequency Band Mode: Spurious	±1.50 dB
6 GHz < frequency ≤ 13.8 GHz, Frequency Band Mode: Normal 4 GHz < frequency ≤ 13.8 GHz, Frequency Band Mode: Spurious	±1.50 dB
13.8 GHz < frequency ≤ 26.5 GHz	±2.50 dB
26.5 GHz < frequency ≤ 40 GHz	±2.50 dB
40 GHz < frequency ≤ 44.5 GHz	±2.50 dB (typ.)

With MS2840A-068 and Preamp On, after Preselector Auto Tune

100 kHz ≤ frequency < 300 kHz	±1.0 dB
300 kHz ≤ frequency < 4 GHz, Frequency Band Mode: Normal 300 kHz ≤ frequency < 3.5 GHz, Frequency Band Mode: Spurious	±0.65 dB
4 GHz ≤ frequency ≤ 13.8 GHz, Frequency Band Mode: Normal 3.5 GHz ≤ frequency ≤ 13.8 GHz, Frequency Band Mode: Spurious	±1.8 dB
13.8 GHz < frequency ≤ 26.5 GHz	±2.50 dB
26.5 GHz < frequency ≤ 40 GHz	±3.50 dB
40 GHz < frequency ≤ 44.5 GHz	±3.50 dB (nom.)

1 dB gain compression

without MS2840A-068 or Preamp Off, At Mixer input level

300 MHz ≤ frequency ≤ 4 GHz, Frequency Band Mode: Normal 300 MHz ≤ frequency < 3.5 GHz, Frequency Band Mode: Spurious	≥+3 dBm
3.5 GHz ≤ frequency ≤ 4 GHz, Frequency Band Mode: Spurious	≥+3 dBm
4 GHz < frequency ≤ 13.5 GHz	≥0 dBm
13.5 GHz < frequency ≤ 26.5 GHz	≥–1 dBm
26.5 GHz < frequency ≤ 40 GHz	≥–1 dBm (nom.)

With MS2840A-068 and Preamp On, At Preamplifier input level

300 MHz ≤ frequency ≤ 4 GHz	≥–15 dBm (nom.)
4 GHz < frequency ≤ 13.5 GHz	≥–21 dBm (nom.)
13.5 GHz < frequency ≤ 26.5 GHz	≥–21 dBm (nom.)
26.5 GHz < frequency ≤ 40 GHz	≥–21 dBm (nom.)

Second harmonic distortion

without MS2840A-068, At mixer input level –30 dBm

	Harmonics	SHI
10 MHz ≤ Input frequency ≤ 300 MHz	≤–60 dBc	≥+30 dBm
300 MHz < Input frequency ≤ 1 GHz	≤–65 dBc	≥+35 dBm
1 GHz < Input frequency ≤ 2 GHz, Frequency Band Mode: Normal	≤–65 dBc	≥+35 dBm
1 GHz < Input frequency < 1.75 GHz, Frequency Band Mode: Spurious	≤–65 dBc	≥+35 dBm

without MS2840A-068, At mixer input level –20 dBm

	Harmonics	SHI
2 GHz < Input frequency ≤ 3 GHz, Frequency Band Mode: Normal	≤–80 dBc	≥+60 dBm
1.75 GHz ≤ Input frequency ≤ 2 GHz, Frequency Band Mode: Spurious	≤–80 dBc	≥+60 dBm

without MS2840A-068, At mixer input level –10 dBm

	Harmonics	SHI
2 GHz < Input frequency ≤ 3 GHz, Frequency Band Mode: Spurious	≤–80 dBc	≥+70 dBm
3 GHz < Input frequency ≤ 13.25 GHz	≤–90 dBc	≥+80 dBm
13.25 GHz < Input frequency ≤ 22.25 GHz	≤–90 dBc	≥+80 dBm (nom.)

with MS2840A-068 and Preamp Off, At mixer input level –30 dBm

	Harmonics	SHI
10 MHz ≤ Input frequency ≤ 300 MHz	≤–60 dBc	≥+30 dBm
300 MHz < Input frequency ≤ 1 GHz	≤–65 dBc	≥+35 dBm
1 GHz < Input frequency ≤ 2 GHz, Frequency Band Mode: Normal	≤–65 dBc	≥+35 dBm
1 GHz < Input frequency < 1.75 GHz, Frequency Band Mode: Spurious	≤–65 dBc	≥+35 dBm

with MS2840A-068 and Preamp Off, At mixer input level –20 dBm

	Harmonics	SHI
2 GHz < Input frequency ≤ 3 GHz, Frequency Band Mode: Normal	≤–80 dBc	≥+60 dBm
1.75 GHz ≤ Input frequency ≤ 2 GHz, Frequency Band Mode: Spurious	≤–80 dBc	≥+60 dBm

with MS2840A-068 and Preamp Off, At mixer input level –10 dBm

	Harmonics	SHI
2 GHz < Input frequency ≤ 3 GHz, Frequency Band Mode: Spurious	≤–70 dBc	≥+60 dBm
3 GHz < Input frequency ≤ 13.25 GHz	≤–70 dBc	≥+60 dBm
13.25 GHz < Input frequency ≤ 22.25 GHz	≤–70 dBc (nom.)	≥+60 dBm (nom.)

with MS2840A-068 and Preamp On, At mixer input level –45 dBm

	Harmonics	SHI
10 MHz ≤ Input frequency ≤ 300 MHz	≤–50 dBc (nom.)	≥+5 dBm (nom.)
300 MHz < Input frequency ≤ 2 GHz	≤–55 dBc (nom.)	≥+10 dBm (nom.)
2 GHz < Input frequency ≤ 13.25 GHz	≤–45 dBc (nom.)	≥0 dBm (nom.)
13.25 GHz < Input frequency ≤ 22.25 GHz	≤–40 dBc (nom.)	≥–5 dBm (nom.)

Attenuator Mode: E-ATT Combined, without MS2840A-068 or Preamp Off, At mixer input level –30 dBm

	Harmonics	SHI
10 MHz ≤ Input frequency ≤ 300 MHz, RF Input Level ≤–5 dBm	≤–60 dBc	≥+30 dBm
300 MHz < Input frequency ≤ 1 GHz, RF Input Level ≤–5 dBm	≤–65 dBc	≥+35 dBm
1 GHz < Input frequency ≤ 2 GHz, Frequency Band Mode: Normal, RF Input Level ≤+5 dBm	≤–65 dBc	≥+35 dBm
1 GHz < Input frequency < 1.75 GHz, Frequency Band Mode: Spurious, RF Input Level ≤+5 dBm	≤–65 dBc	≥+35 dBm

Attenuator Mode: E-ATT Combined, without MS2840A-068 or Preamp Off, At mixer input level –20 dBm

	Harmonics	SHI
2 GHz < Input frequency ≤ 3 GHz, Frequency Band Mode: Normal, RF Input Level ≤+5 dBm	≤–80 dBc	≥+60 dBm
1.75 GHz ≤ Input frequency ≤ 3 GHz, Frequency Band Mode: Spurious, RF Input Level ≤+5 dBm	≤–80 dBc	≥+60 dBm

Attenuator Mode: E-ATT Combined, without MS2840A-068 or Preamp Off, At mixer input level –30 dBm

	Harmonics	SHI
10 MHz ≤ Input frequency ≤ 300 MHz, RF Input Level ≤0 dBm	≤–60 dBc (nom.)	≥+30 dBm (nom.)
300 MHz < Input frequency ≤ 1 GHz, RF Input Level ≤+15 dBm	≤–65 dBc (nom.)	≥+35 dBm (nom.)
1 GHz < Input frequency ≤ 2 GHz, Frequency Band Mode: Normal, RF Input Level ≤+15 dBm	≤–65 dBc (nom.)	≥+35 dBm (nom.)
1 GHz < Input frequency < 1.75 GHz, Frequency Band Mode: Spurious, RF Input Level ≤+15 dBm	≤–65 dBc (nom.)	≥+35 dBm (nom.)

Attenuator Mode: E-ATT Combined, without MS2840A-068 or Preamp Off, At mixer input level –20 dBm

	Harmonics	SHI
2 GHz < Input frequency ≤ 3 GHz, Frequency Band Mode: Normal, –5 dBm < RF Input Level ≤+15 dBm	≤–80 dBc (nom.)	≥+60 dBm (nom.)
1.75 GHz ≤ Input frequency ≤ 3 GHz, Frequency Band Mode: Spurious, –5 dBm < RF Input Level ≤+15 dBm	≤–80 dBc (nom.)	≥+60 dBm (nom.)

Residual responses

Frequency ≥1 MHz, Input attenuator 0 dB, 50Ω terminated

	Specification
1 MHz ≤ frequency ≤ 1 GHz	≤–100 dBm
1 GHz < frequency ≤ 6 GHz	≤–90 dBm (typ.)
6 GHz < frequency ≤ 13.6 GHz	≤–90 dBm (nom.)
13.6 GHz < frequency ≤ 26.5 GHz	≤–90 dBm (nom.)
26.5 GHz < frequency ≤ 44.5 GHz	≤–80 dBm (nom.)

Spectrum Analyzer

Frequency

Span

	Setting range
MS2840A-046	0 Hz, 300 Hz to 44.5 GHz

Resolution: 2 Hz
SPAN accuracy: ±0.2% (Trace Point 10,001)

Display frequency accuracy

± (Display frequency × Frequency reference accuracy + Span frequency × Span accuracy + RBW × 0.05 + 2 × N + Span frequency/(Trace points – 1)) Hz
N: Mixer harmonic order

Resolution bandwidth (RBW)

Setting range	1 Hz to 3 MHz (1-3 sequence), 50 kHz, 5 MHz, 10 MHz, 20 MHz, 31.25 MHz 1 Hz to 10 Hz: Can not be set when Span 0 Hz 31.25 MHz: Can be set when Span 0 Hz only When MS2840A-046 is installed, 20 MHz and 31.25 MHz are not available.
Selectivity	(–60 dB/–3 dB) 4.5: 1 (Nominal, 1 Hz to 10 MHz)

Video bandwidth (VBW)

Setting range: 1 Hz to 10 MHz (1-3 sequence), 5 kHz, Off
VBW mode: Video Average/Power Average

Amplitude

Display average noise level (DANL)

18° to 28°C, Detector: Sample, VBW: 1 Hz (Video Average), Input attenuator: 0 dB
without MS2840A-068, Frequency Band Mode: Normal

Frequency	Specification
9 kHz ≤ frequency < 100 kHz	–120 dBm/Hz
100 kHz ≤ frequency < 1 MHz	–134 dBm/Hz
1 MHz ≤ frequency < 10 MHz	–144 dBm/Hz
10 MHz ≤ frequency < 30 MHz	–150 dBm/Hz
30 MHz ≤ frequency < 1 GHz	–153 dBm/Hz
1 GHz ≤ frequency < 2.4 GHz	–150 dBm/Hz
2.4 GHz ≤ frequency ≤ 3.5 GHz	–147 dBm/Hz
3.5 GHz < frequency ≤ 4 GHz	–144 dBm/Hz
4 GHz < frequency ≤ 6 GHz	–144 dBm/Hz
6 GHz < frequency ≤ 13.5 GHz	–151 dBm/Hz
13.5 GHz < frequency ≤ 18.3 GHz	–149 dBm/Hz
18.3 GHz < frequency ≤ 26.5 GHz	–146 dBm/Hz
26.5 GHz < frequency ≤ 34 GHz	–146 dBm/Hz
34 GHz < frequency ≤ 40 GHz	–144 dBm/Hz
40 GHz < frequency ≤ 44.5 GHz	–140 dBm/Hz

with MS2840A-068, Preamp Off, Frequency Band Mode: Normal

Frequency	Specification
9 kHz ≤ frequency < 100 kHz	–120 dBm/Hz
100 kHz ≤ frequency < 1 MHz	–134 dBm/Hz
1 MHz ≤ frequency < 10 MHz	–144 dBm/Hz
10 MHz ≤ frequency < 30 MHz	–150 dBm/Hz
30 MHz ≤ frequency < 1 GHz	–153 dBm/Hz
1 GHz ≤ frequency < 2.4 GHz	–150 dBm/Hz
2.4 GHz ≤ frequency ≤ 3.5 GHz	–147 dBm/Hz
3.5 GHz < frequency ≤ 4 GHz	–144 dBm/Hz
4 GHz < frequency ≤ 6 GHz	–144 dBm/Hz
6 GHz < frequency ≤ 13.5 GHz	–147 dBm/Hz
13.5 GHz < frequency ≤ 18.3 GHz	–145 dBm/Hz
18.3 GHz < frequency ≤ 26.5 GHz	–141 dBm/Hz
26.5 GHz < frequency ≤ 34 GHz	–141 dBm/Hz
34 GHz < frequency ≤ 40 GHz	–135 dBm/Hz
40 GHz < frequency ≤ 44.5 GHz	–132 dBm/Hz

with MS2840A-068, Preamp On, Frequency Band Mode: Normal

Frequency	Specification
100 kHz	–147 dBm/Hz (nom.)
1 MHz	–156 dBm/Hz
30 MHz ≤ frequency < 1 GHz	–166 dBm/Hz
1 GHz ≤ frequency < 2 GHz	–164 dBm/Hz
2 GHz ≤ frequency ≤ 3.5 GHz	–163 dBm/Hz
3.5 GHz < frequency ≤ 4 GHz	–160 dBm/Hz
4 GHz < frequency ≤ 6 GHz	–160 dBm/Hz
6 GHz < frequency ≤ 13.5 GHz	–163 dBm/Hz
13.5 GHz < frequency ≤ 18.3 GHz	–163 dBm/Hz
18.3 GHz < frequency ≤ 26.5 GHz	–160 dBm/Hz
26.5 GHz < frequency ≤ 34 GHz	–160 dBm/Hz
34 GHz < frequency ≤ 40 GHz	–157 dBm/Hz
40 GHz < frequency ≤ 44.5 GHz	–149 dBm/Hz

Total level accuracy

18° to 28°C, Auto Sweep Time Select: Normal, 30 Hz ≤ RBW ≤ 1 MHz, Detection: Positive, CW,
Excluding the noise floor effect and FFT runtime (Display: On)
Preamp Off: Input Attenuator≥10 dB, Mixer input level ≤–10 dBm,
Preamp On: Input Attenuator =10 dB, Preamplifier input level ≤–30 dBm,
The total level accuracy is calculated from an RSS (root summed square) error of the RF frequency characteristics, linearity error and input attenuator switching error.

without MS2840A-068 or Preamp Off

Frequency	Specification
300 kHz ≤ frequency < 4 GHz, Frequency Band Mode: Normal	±0.5 dB
300 kHz ≤ frequency < 3.5 GHz, Frequency Band Mode: Spurious	±0.5 dB
4 GHz ≤ frequency ≤ 6 GHz, Frequency Band Mode: Normal	±1.8 dB
3.5 GHz ≤ frequency ≤ 4 GHz, Frequency Band Mode: Spurious	±1.8 dB
6 GHz < frequency ≤ 13.8 GHz, Frequency Band Mode: Normal	±1.8 dB
4 GHz < frequency ≤ 13.8 GHz, Frequency Band Mode: Spurious	±1.8 dB
13.8 GHz < frequency ≤ 26.5 GHz	±3.0 dB
26.5 GHz < frequency ≤ 40 GHz	±3.0 dB
40 GHz < frequency ≤ 44.5 GHz	±3.5 dB (nom.)

with MS2840A-068 and Preamp On

Frequency	Specification
300 kHz ≤ frequency < 4 GHz, Frequency Band Mode: Normal	±1.0 dB
300 kHz ≤ frequency < 3.5 GHz, Frequency Band Mode: Spurious	±1.0 dB
4 GHz ≤ frequency ≤ 6 GHz, Frequency Band Mode: Normal	±1.8 dB
3.5 GHz ≤ frequency ≤ 4 GHz, Frequency Band Mode: Spurious	±1.8 dB
6 GHz < frequency ≤ 13.8 GHz, Frequency Band Mode: Normal	±2.0 dB
4 GHz < frequency ≤ 13.8 GHz, Frequency Band Mode: Spurious	±2.0 dB
13.8 GHz < frequency ≤ 26.5 GHz	±3.0 dB
26.5 GHz < frequency ≤ 40 GHz	±4.0 dB
40 GHz < frequency ≤ 44.5 GHz	±4.0 dB (nom.)

2-tone 3rd-order intermodulation distortion

without MS2840A-068 or Preamp Off, 18° to 28°C,
Mixer input level: –15 dBm (1 wave), ≥300 kHz separation, RBW ≤30 kHz

	Specification	TOI
30 MHz ≤ frequency < 300 MHz	≤–54 dBc	+12 dBm
300 MHz ≤ frequency < 4 GHz, Frequency Band Mode: Normal	≤–62 dBc	+16 dBm
4 GHz ≤ frequency ≤ 6 GHz, Frequency Band Mode: Normal	≤–60 dBc	+15 dBm
3.5 GHz ≤ frequency ≤ 6 GHz, Frequency Band Mode: Spurious	≤–56 dBc	+13 dBm
6 GHz < frequency ≤ 13.5 GHz	≤–56 dBc	+13 dBm
13.5 GHz < frequency ≤ 26.5 GHz	≤–56 dBc	+13 dBm
26.5 GHz < frequency ≤ 40 GHz	≤–56 dBc (nom.)	+13 dBm (nom.)

with MS2840A-068 and Preamp On, 18° to 28°C,
Preamp input level: –45 dBm (1 wave), ≥300 kHz separation, RBW ≤30 kHz

	Specification	TOI
30 MHz ≤ frequency < 300 MHz	≤–73 dBc (nom.)	–8.5 dBm (nom.)
300 MHz ≤ frequency ≤ 700 MHz	≤–78 dBc (nom.)	–6 dBm (nom.)
700 MHz < frequency < 4 GHz, Frequency Band Mode: Normal	≤–81 dBc (nom.)	–4.5 dBm (nom.)
700 MHz < frequency < 3.5 GHz, Frequency Band Mode: Spurious	≤–81 dBc (nom.)	–4.5 dBm (nom.)
4 GHz ≤ frequency ≤ 6 GHz, Frequency Band Mode: Normal	≤–78 dBc (nom.)	–6 dBm (nom.)
3.5 GHz ≤ frequency ≤ 4 GHz, Frequency Band Mode: Spurious	≤–78 dBc (nom.)	–6 dBm (nom.)
6 GHz < frequency ≤ 13.5 GHz, Frequency Band Mode: Normal	≤–70 dBc (nom.)	–10 dBm (nom.)
4 GHz < frequency ≤ 13.5 GHz, Frequency Band Mode: Spurious	≤–70 dBc (nom.)	–10 dBm (nom.)
13.5 GHz < frequency ≤ 26.5 GHz	≤–70 dBc (nom.)	–10 dBm (nom.)
26.5 GHz < frequency ≤ 40 GHz	≤–70 dBc (nom.)	–10 dBm (nom.)

Attenuator Mode: E-ATT Combined, without MS2840A-068 or Preamp Off, 18° to 28°C,
Mixcer input level: –15 dBm (1 wave), ≥300 kHz separation, RBW ≤30 kHz

	Specification	TOI
30 MHz ≤ frequency < 300 MHz, RF Input Level ≤–5 dBm	≤–54 dBc	+12 dBm
300 MHz ≤ frequency ≤ 1 GHz, RF Input Level ≤–5 dBm	≤–62 dBc	+16 dBm
1 GHz < frequency < 4 GHz, Frequency Band Mode: Normal, RF Input Level ≤+5 dBm	≤–62 dBc	+16 dBm
1 GHz < frequency < 3.5 GHz, Frequency Band Mode: Spurious, RF Input Level ≤+5 dBm	≤–62 dBc	+16 dBm
4 GHz ≤ frequency ≤ 6 GHz, Frequency Band Mode: Normal, RF Input Level ≤+5 dBm	≤–60 dBc	+15 dBm
3.5 GHz ≤ frequency ≤ 4 GHz, Frequency Band Mode: Spurious, RF Input Level ≤+5 dBm	≤–56 dBc	+13 dBm
30 MHz ≤ frequency < 300 MHz, –5 dBm < RF Input Level ≤ 0 dBm	≤–54 dBc (nom.)	+12 dBm (nom.)
300 MHz ≤ frequency < 4 GHz, Frequency Band Mode: Normal, –5 dBm < RF Input Level ≤ +15 dBm	≤–62 dBc (nom.)	+16 dBm (nom.)
300 MHz ≤ frequency < 3.5 GHz, Frequency Band Mode: Spurious, –5 dBm < RF Input Level ≤ +15 dBm	≤–62 dBc (nom.)	+16 dBm (nom.)
4 GHz ≤ frequency ≤ 6 GHz, Frequency Band Mode: Normal, –5 dBm < RF Input Level ≤ +15 dBm	≤–60 dBc (nom.)	+15 dBm (nom.)
3.5 GHz ≤ frequency ≤ 4 GHz, Frequency frequency Mode: Spurious, –5 dBm < RF Input Level ≤ +15 dBm	≤–56 dBc (nom.)	+13 dBm (nom.)

Image response

Frequency Band Mode: Normal

	Specification
10 MHz ≤ frequency < 4 GHz	≤–70 dBc
4 GHz ≤ frequency ≤ 6 GHz	≤–55 dBc
6 GHz< frequency ≤ 13.5 GHz	≤–70 dBc
13.5 GHz< frequency ≤ 26.5 GHz	≤–70 dBc
26.5 GHz< frequency ≤ 44.5 GHz	≤–70 dBc (nom.)

Sweep

Sweep mode

Continuous, Single

Sweep time

SPAN	Range
≥300 Hz	1 ms to 1000 s
0 Hz	1 µs to 1000 s

Waveform display

Detector

Pos&Neg, Positive Peak, Sample, Negative Peak, RMS

Trace points

SPAN	
> 30 GHz	5001, 10001
500 MHz < SPAN ≤ 30 GHz	1001, 2001, 5001, 10001
100 MHz < SPAN ≤ 500 MHz	101, 201, 251, 401, 501, 1001, 2001, 5001, 10001
300 Hz ≤ SPAN ≤ 100 MHz and Sweep Time > 10 s	101, 201, 251, 401, 501, 1001, 2001, 5001, 10001
300 Hz ≤ SPAN ≤ 100 MHz and Sweep Time ≤ 10 s	11, 21, 41, 51, 101, 201, 251, 401, 501, 1001, 2001, 5001, 10001
0 Hz	11, 21, 41, 51, 101, 201, 251, 401, 501, 1001, 2001, 5001, 10001

Scale

Log scale

10 div/12 div: 0.1 to 20 dB/div, 1-2-5 sequence

Lin scale

10 div: 1 to 10%/div, 1-2-5 sequence

Trigger function

Trigger Mode: Free Run (Trig Off), Video, Wide IF Video, External, Frame

Gate function

Gate Mode: Off, Wide IF Video, External, Frame

Measure function

Adjust channel power (ACP)

Reference: Span Total, Carrier Total, Both Sides of Carriers or Carrier Select
Adjust channel specifications: 3 channels × 2 (Normal Mode), 8 channels × 2 (Advanced Mode)

Burst average

Indicates average power of specified time in the time domain mode.

Channel power

Absolute value measurement: dBm, dBm/Hz

Occupied bandwidth (OBW)

N% of Power, X dB Down

Spectrum emission mask (SEM)

Peak/Margin measurement: Pass/fail judgment is performed by Peak/Margin measurement.

Spurious emission

Worst/Peaks measurement: Pass/fail judgment is performed by Worst/Peaks measurement

Frequency counter

Counter accuracy
SPAN ≤ 1 MHz, RBW = 1 kHz, S/N ≥ 50 dB, Gate Time ≥ 100 ms
± (marker frequency × reference frequency accuracy + (0.1 × N/Gate Time [s])) Hz
N: Mixer harmonic order

Two-tone third-order intermodulation distortion

Measures IM3 and TOI from two-tone signal.

Signal Analyzer

Displays the waveforms of Spectrum, Power vs. Time, and others from the data obtained for certain amount of time.

Common

Trace mode

Spectrum, Power vs. Time, Frequency vs. Time, CCDF, Spectrogram, Phase vs. Time, No Trace

Bandwidth

Specifies the capture analysis bandwidth from the center frequency

MS2840A-006	1 kHz to 10 MHz (1-2.5-5 sequence)
MS2840A-009	1 kHz to 25 MHz (1-2.5-5 sequence), 31.25 MHz

Sampling rate

Auto setting depending on analysis bandwidth

MS2840A-006	2 kHz to 20 MHz (1-2-5 sequence)
MS2840A-009	2 kHz to 50 MHz (1-2-5 sequence)

Capture time

Capture time length	Sets the capture time length
Minimum capture time	2 µs to 50 ms (determined depending on analysis bandwidth)
Maximum capture time	2 s to 2000 s (determined depending on analysis bandwidth)
Setting mode	Auto, Manual

The frequency span determines the sampling rate.
The following chart shows the maximum capture time per frequency span.

Span	Sampling Rate	Capture Time	Max. Sampling Data
1 kHz	2 kHz	2000 s	4M
2.5 kHz	5 kHz	2000 s	10M
5 kHz	10 kHz	2000 s	20M
10 kHz	20 kHz	2000 s	40M
25 kHz	50 kHz	2000 s	100M
50 kHz	100 kHz	1000 s	100M
100 kHz	200 kHz	500 s	100M
250 kHz	500 kHz	200 s	100M
500 kHz	1 MHz	100 s	100M
1 MHz	2 MHz	50 s	100M
2.5 MHz	5 MHz	20 s	100M
5 MHz	10 MHz	10 s	100M
10 MHz	20 MHz	5 s	100M
25 MHz	50 MHz	2 s	100M
31.25 MHz	50 MHz	2 s	100M

Trigger

Trigger mode: Free Run (Trig Off), Video, Wide IF Video, Frame, External (TTL)

ADC resolution

16 bits

Spectrum displayed function

Displays the spectrum for arbitrary time length and frequency range in the acquired waveform data.

Analysis time length

Analysis start time	Sets analysis start time point from waveform data header
Analysis time length	Sets analysis time length
Setting mode	Auto, Manual

Frequency

Center frequency and SPAN can be set within the frequency range in waveform data.

Frequency setting

	Range
MS2840A-046	0 MHz to 44.5 GHz

Display frequency accuracy

± (Indicator frequency × reference frequency accuracy + SPAN frequency × reference frequency accuracy + RBW × 0.05 + 2 × N + Span frequency/(Trace points – 1)) Hz

N: Mixer harmonic order

Resolution bandwidth (RBW)

Setting range	1 Hz to 1 MHz (1-3 sequence)
Selectivity	(–60 dB/–3 dB) 4.5: 1 (nom.)

Amplitude

Total level accuracy
18° to 28°C, RBW: Auto, Time Detection: Average, Marker Result: Integration or Peak (Accuracy), Center frequency, CW, excluding the noise floor effect
Preamp Off: Input attenuator ≥10 dB, Mixer Input Level ≤ –10 dBm,
Preamp On: Input attenuator = 10 dB, Preamp Input Level ≤ –30 dBm,
The total level accuracy is calculated from an RSS (root summed square) error of the RF frequency characteristics, linear error and input attenuator switching error.

without MS2840A-068 or Preamp Off

Frequency	Specification
300 kHz ≤ frequency < 4 GHz, Frequency Band Mode: Normal	±0.5 dB
300 kHz ≤ frequency < 3.5 GHz, Frequency Band Mode: Spurious	±0.5 dB
4 GHz ≤ frequency ≤ 6 GHz, Frequency Band Mode: Normal	±1.8 dB
3.5 GHz ≤ frequency ≤ 4 GHz, Frequency Band Mode: Spurious	±1.8 dB
6 GHz < frequency ≤ 13.8 GHz, Frequency Band Mode: Normal	±1.8 dB
4 GHz < frequency ≤ 13.8 GHz, Frequency Band Mode: Spurious	±1.8 dB
13.8 GHz < frequency ≤ 26.5 GHz	±3.0 dB
26.5 GHz < frequency ≤ 40 GHz	±3.0 dB
40 GHz < frequency ≤ 44.5 GHz	±3.5 dB (nom.)

with MS2840A-068 or Preamp On

Frequency	Specification
300 kHz ≤ frequency < 4 GHz, Frequency Band Mode: Normal	±1.0 dB
300 kHz ≤ frequency < 3.5 GHz, Frequency Band Mode: Spurious	±1.0 dB
4 GHz ≤ frequency ≤ 6 GHz, Frequency Band Mode: Normal	±1.8 dB
3.5 GHz ≤ frequency ≤ 4 GHz, Frequency Band Mode: Spurious	±1.8 dB
6 GHz < frequency ≤ 13.8 GHz, Frequency Band Mode: Normal	±2.0 dB
4 GHz < frequency ≤ 13.8 GHz, Frequency Band Mode: Spurious	±2.0 dB
13.8 GHz < frequency ≤ 26.5 GHz	±3.0 dB
26.5 GHz < frequency ≤ 40 GHz	±4.0 dB
40 GHz < frequency ≤ 44.5 GHz	±4.0 dB (nom.)

In-band frequency characteristics

without MS2840A-068 or ≤31.25 MHz bandwidth, 18 to 28°C, Referenced to level at center frequency, Center frequency: ±10 MHz

Range	Specification
300 kHz ≤ frequency < 4 GHz, Frequency Band Mode: Normal	±0.31 dB
300 kHz ≤ frequency < 3.5 GHz, Frequency Band Mode: Spurious	

Displayed average noise level (DANL)

without MS2840A-068, Frequency Band Mode: Normal

Frequency	Specification
100 kHz	–131.5 dBm/Hz
1 MHz	–141.5 dBm/Hz
30 MHz ≤ frequency < 1 GHz	–150.5 dBm/Hz
1 GHz ≤ frequency < 2.4 GHz	–147.5 dBm/Hz
2.4 GHz ≤ frequency ≤ 3.5 GHz	–144.5 dBm/Hz
3.5 GHz < frequency ≤ 4 GHz	–141.5 dBm/Hz
4 GHz < frequency ≤ 6 GHz	–141.5 dBm/Hz
6 GHz < frequency ≤ 13.5 GHz	–148.5 dBm/Hz
13.5 GHz < frequency ≤ 18.3 GHz	–146.5 dBm/Hz
18.3 GHz < frequency ≤ 26.5 GHz	–143.5 dBm/Hz
26.5 GHz < frequency ≤ 34 GHz	–143.5 dBm/Hz
34 GHz < frequency ≤ 40 GHz	–141.5 dBm/Hz
40 GHz < frequency ≤ 44.5 GHz	–137.5 dBm/Hz

with MS2840A-068, Preamp Off, Frequency Band Mode: Normal

Frequency	Specification
100 kHz	–131.5 dBm/Hz
1 MHz	–141.5 dBm/Hz
30 MHz ≤ frequency < 1 GHz	–150.5 dBm/Hz
1 GHz ≤ frequency < 2.4 GHz	–147.5 dBm/Hz
2.4 GHz ≤ frequency ≤ 3.5 GHz	–144.5 dBm/Hz
3.5 GHz < frequency ≤ 4 GHz	–141.5 dBm/Hz
4 GHz < frequency ≤ 6 GHz	–141.5 dBm/Hz
6 GHz < frequency ≤ 13.5 GHz	–144.5 dBm/Hz
13.5 GHz < frequency ≤ 18.3 GHz	–142.5 dBm/Hz
18.3 GHz < frequency ≤ 26.5 GHz	–138.5 dBm/Hz
26.5 GHz < frequency ≤ 34 GHz	–138.5 dBm/Hz
34 GHz < frequency ≤ 40 GHz	–132.5 dBm/Hz
40 GHz < frequency ≤ 44.5 GHz	–129.5 dBm/Hz

with MS2840A-068, Preamp On, Frequency Band Mode: Normal

Frequency	Specification
100 kHz	–144.5 dBm/Hz (nom.)
1 MHz	–153.5 dBm/Hz
30 MHz ≤ frequency < 1 GHz	–163.5 dBm/Hz
1 GHz ≤ frequency < 2 GHz	–161.5 dBm/Hz
2 GHz ≤ frequency ≤ 3.5 GHz	–160.5 dBm/Hz
3.5 GHz < frequency ≤ 4 GHz	–157.5 dBm/Hz
4 GHz < frequency ≤ 6 GHz	–157.5 dBm/Hz
6 GHz < frequency ≤ 13.5 GHz	–160.5 dBm/Hz
13.5 GHz < frequency ≤ 18.3 GHz	–160.5 dBm/Hz
18.3 GHz < frequency ≤ 26.5 GHz	–157.5 dBm/Hz
26.5 GHz < frequency ≤ 34 GHz	–157.5 dBm/Hz
34 GHz < frequency ≤ 40 GHz	–154.5 dBm/Hz
40 GHz < frequency ≤ 44.5 GHz	–146.5 dBm/Hz

Measure function

Adjacent channel power (ACP)
Reference: Span Total, Carrier Total, Both Sides of Carriers, or Carrier Select
Adjacent channel specification: 3 channels × 2

Channel power
Absolute value measurement: dBm, dBm/Hz

Occupied Bandwidth (OBW)
N% of Power, X dB Down

Power vs. Time

Indicates time changes of power for captured waveform data.

Analysis time range

Analysis start time	Sets analysis start time position from beginning of waveform data
Analysis time length	Sets analysis time length
Setting mode	Auto, Manual

Resolution bandwidth

Filter type	Rect, Gaussian, Nyquist, Root Nyquist, Off (default Off)
Roll-off ratio	0.01 to 1 (set for Nyquist, Root Nyquist)
Filter frequency offset	Set center frequency of filter in wavelength data frequency band

Measure function

Peak to Peak measurement
with AM Depth or marker function
+Peak, –Peak, (P-P)/2, Average

Burst Average Power
Measures average power of burst signal.

Frequency vs. Time

Displays frequency time fluctuations of input signal from captured waveform data.

Analysis time range

Analysis start time	Sets analysis start time point from waveform data header
Analysis time length	Sets analysis time length
Setting mode	Auto, Manual

Operating level range

–17 to +30 dBm (Input attenuator ≥10 dB)

Frequency (vertical axis)

Center frequency and SPAN can be set within the frequency range in waveform data
Display frequency range: Selectable from 1/25, 1/10, 1/5 and 1/2 of analysis bandwidth
Input frequency range: 10 MHz to 6 GHz
Displayed frequency accuracy
Input level –17 to +30 dBm, SPAN ≤ 31.25 MHz, Scale = SPAN/25, CW
± (reference oscillator accuracy × center frequency + indicator frequency range × 0.01) Hz

Peak to Peak measurement
Measured using FM Deviation or marker function.
+Peak, –Peak, (P-P)/2, Average

Phase vs. Time

Displayed phase time fluctuation of input signal from captured waveform data

Analysis time range

Analysis start time	Sets analysis start time point from waveform data header
Analysis time length	Sets analysis time length
Setting mode	Auto, Manual

Phase (vertical axis)

Display mode	Wrap, Unwrap
Displayed phase range	0.01 deg./div to 200 G deg./div
Offset	–100 to +100 Mdeg.

CCDF

Displays CCDF and APD of waveform data captured at specific time.

Analysis time range

Analysis start time	Sets analysis start time point from waveform data header
Analysis time length	Sets analysis time length
Setting mode	Auto, Manual

Display

Graphically displays CCDF and APD.
Histogram resolution: 0.01 dB
Numerical value: Average Power, Max Power, Crest Factor

Resolution bandwidth

Filter type: Rectangle, Off (Default Off)
Filter frequency offset: Sets filter center frequency in frequency band of waveform data

Spectrogram

Displayed spectrogram for arbitrary time length in captured waveform data

Analysis time range

Analysis start time	Sets analysis start time point from waveform data header
Analysis time length	Sets analysis time length
Setting mode	Auto, Manual

Frequency

Center frequency and SPAN can be set within the frequency range in waveform data.

Resolution bandwidth (RBW)

Setting range	1 Hz to 1 MHz (1-3 sequence)
Selectivity	(–60 dB/–3 dB) 4.5: 1 (nom.)

Digitize function

Output captured waveform data to internal SSD or external device

Waveform data

Format	I, Q (each 32 bit Float Binary)
Level	0 dBm input is $\sqrt{(I^2 + Q^2)} = 1$
Level accuracy	Same as signal analyzer total level accuracy

External output

Can be output to external PC via Ethernet

Replay function

Analyzes traces of saved waveform data
Conditions for measurable waveform data: I, Q (Binary)

Combination of Span, Sampling rate, and Minimum capture sample

SPAN	Sampling rate	Minimum capture sample (time)
1 kHz	2 kHz	74000 (37 s)
2.5 kHz	5 kHz	160000 (32 s)
5 kHz	10 kHz	310000 (31 s)
10 kHz	25 kHz	610000 (30.5 s)
25 kHz	50 kHz	730000 (14.6 s)
50 kHz	100 kHz	730000 (7.3 s)
100 kHz	200 kHz	730000 (3.65 s)
250 kHz	500 kHz	730000 (1.46 s)
500 kHz	1 MHz	730000 (730 ms)
1 MHz	2 MHz	730000 (365 ms)
2.5 MHz	5 MHz	730000 (146 ms)
5 MHz	10 MHz	730000 (73 ms)
10 MHz	20 MHz	730000 (36.5 ms)
18.6 MHz	20 MHz	730000 (36.5 ms)
20 MHz	25 MHz	730000 (29.2 ms)
25 MHz	50 MHz	730000 (14.6 ms)
31.25 MHz	50 MHz	730000 (14.6 ms)

Connector

RF input

Connector:Front panel, K-J, 50Ω
VSWR: 18° to 28°C, Input attenuator ≥10 dB

40 MHz ≤ frequency ≤ 3 GHz	≤ 1.2 (nom.)
3 GHz < frequency ≤ 6 GHz	≤ 1.3 (nom.)
6 GHz < frequency ≤ 13.6 GHz	≤ 1.3 (nom.)
13.6 GHz < frequency ≤ 26.5 GHz	≤ 1.4 (nom.)
26.5 GHz < frequency ≤ 40 GHz	≤ 1.6 (nom.)
40 GHz < frequency ≤ 44.5 GHz	≤ 1.6 (V-K converter mounted and included)

1st local output

Connector for External Mixer

Connector	Front panel, SMA-J, 50Ω (nom.)
Output	Local signal: frequency 5 GHz to 10 GHz, Output level≥10 dBm (typ.) Bias current: Range 0 to 20.0 mA/Resolution 0.1 mA
Input	IF signal: frequency 1.875 GHz

IF output

Connector for the 1st IF output, Outputs the signal before band filtering.

Connector	Rear panel, SMA-J, 50Ω (nom.)
Output frequency	1.875 GHz
Gain	–10 dB ((nom.) (ATT 0 dB, at input frequency 10 GHz)

External reference input

Connector	Rear panel, BNC-J, 50Ω (nom.)
Frequency	5 MHz/10 MHz/13 MHz
Operating range	±1 ppm
Input level	–15 dBm ≤ level ≤ +20 dBm, 50Ω (AC coupling)

Reference signal output

Connector	Rear panel, BNC-J, 50Ω (nom.)
Frequency	10 MHz
Output level	≥0 dBm (AC coupling)

Sweep status output

Connector	Rear panel, BNC-J
Output level	TTL level (High level at sweep or capture)

SA trigger input

Connector	Rear panel, BNC-J
Input level	TTL level

External controls

Ethernet (10/100/1000Base-T)

Connector: Rear Panel, RJ-45

GPIB

IEEE488.2 compatible

Connector	Rear panel, IEEE488 bus
Interface function	SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT0, C0, E2

USB (B)

USB2.0 compatible
Connector: Rear panel, USB-B Connector

USB

USB2.0 compatible
Enables waveform hard copy to USB compatible external device and saving mainframe setting parameters
Connector: USB-A Connector (front panel 2 port, rear panel 2 port)

Monitor output

Connector: Rear panel, VGA compatible, mini D-SUB 15 pin

AUX

Used for the input/output of an auxiliary device.
Connector: Rear panel, 50 pin (Correspond to DX10A-50S)

Noise source

This is available when the Option 017 is installed.

Connector	Rear panel, BNC-J
Output voltage range	+28 V ± 0.5 V, Pulsed

Supports noise sources from Noisecom NC346 series. NC346 series models and summary specifications are listed below.
See the NC346 series catalog and datasheet for detailed specifications.

NC346 series summary specifications

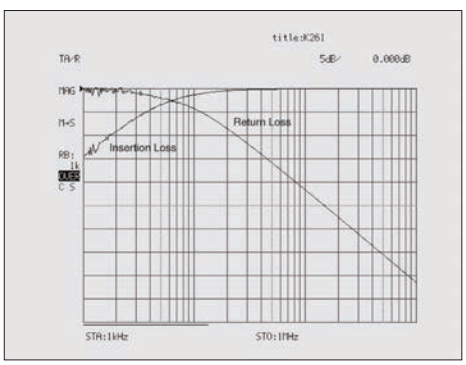
Model	RF Connector	Frequency [GHz]	Output ENR [dB]	VSWR (maximum @ on/off) [GHz]				DC Offset	DC Block
				0.01 to 5	5 to 18	18 to 26.5	26.5 to 40		
NC346A	SMA (M)	0.01 to 18.0	5 to 7	1.15:1	1.25:1	—	—	No	Not required
NC346A Precision	APC3.5 (M)	0.01 to 18.0	5 to 7	1.15:1	1.25:1	—	—	No	Not required
NC346A Option 1	N (M)	0.01 to 18.0	5 to 7	1.15:1	1.25:1	—	—	No	Not required
NC346A Option 2	APC7	0.01 to 18.0	5 to 7	1.15:1	1.25:1	—	—	No	Not required
NC346A Option 4	N (F)	0.01 to 18.0	5 to 7	1.15:1	1.25:1	—	—	No	Not required
NC346B	SMA (M)	0.01 to 18.0	14 to 16	1.15:1	1.25:1	—	—	No	Not required
NC346B Precision	APC3.5 (M)	0.01 to 18.0	14 to 16	1.15:1	1.25:1	—	—	No	Not required
NC346B Option 1	N (M)	0.01 to 18.0	14 to 16	1.15:1	1.35:1	—	—	No	Not required
NC346B Option 2	APC7	0.01 to 18.0	14 to 16	1.15:1	1.25:1	—	—	No	Not required
NC346B Option 4	N (F)	0.01 to 18.0	14 to 16	1.15:1	1.35:1	—	—	No	Not required
NC346D	SMA (M)	0.01 to 18.0	19 to 25*1	1.50:1	1.50:1	—	—	No	Not required
NC346D Precision	APC3.5 (M)	0.01 to 18.0	19 to 25*1	1.50:1	1.50:1	—	—	No	Not required
NC346D Option 1	N (M)	0.01 to 18.0	19 to 25*1	1.50:1	1.75:1	—	—	No	Not required
NC346D Option 2	APC7	0.01 to 18.0	19 to 25*1	1.50:1	1.50:1	—	—	No	Not required
NC346D Option 3	N (F)	0.01 to 18.0	19 to 25*1	1.50:1	1.75:1	—	—	No	Not required
NC346C	APC3.5 (M)	0.01 to 26.5	13 to 17	1.15:1	1.25:1	1.35:1	—	Yes*3	Required*3
NC346E	APC3.5 (M)	0.01 to 26.5	19 to 25*1	1.50:1	1.50:1	1.50:1	—	Yes*3	Required*3
NC346Ka	K (M)*2	0.10 to 40.0	10 to 17	1.25:1	1.30:1	1.40:1	1.50:1	Yes*3	Required*3

*1: Flatness better than ±2 dB
*2: Compatible with SMA and APC3.5
*3: When using noise sources output by DC, always use in combination with a DC block.

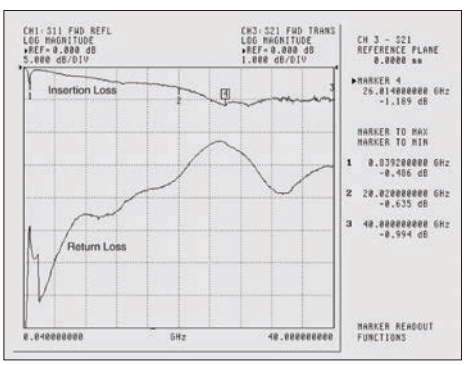
Specifications outlines of recommended DC Blocks and Adapters

	Ordering		RF Connector	Frequency Range	VSWR
	Model	Name			
DC Block	J0805	DC Block, N type (MODEL 7003)	N (M)-N (F)	10 kHz to 18 GHz	1.35 (max.)
	J1555A	DC Block, SMA type (MODEL 7006-1)	SMA (M)-SMA (F)	9 kHz to 20 GHz	1.50 (9 kHz to 10 kHz), 1.50 (11 kHz to 20 kHz), 1.30 (20 kHz to 20 GHz)
	J1554A	DC Block, SMA type (MODEL 7006)	SMA (M)-SMA (F)	9 kHz to 26.5 GHz	1.50 (9 kHz to 20 kHz), 1.35 (20 kHz to 20 GHz), 1.70 (20 GHz to 26.5 GHz)
	K261	DC Block	K (M)-K (F)	10 kHz to 40 GHz	See figure (return loss) below
Adapter	J0004	Coaxial Adapter	N (M)-SMA (F)	DC to 12.4 GHz	≤1.08 (DC to 3 GHz), ≤1.11 (3 GHz to 6 GHz), ≤1.18 (6 GHz to 12.4 GHz)
	J1398A	N-SMA Adapter	N (M)-SMA (F)	DC to 26.5 GHz	≤1.05 (DC to 3 GHz), ≤1.07 (3 GHz to 6 GHz), ≤1.2 (6 GHz to 13.5 GHz), ≤1.3 (13.5 GHz to 20 GHz), ≤1.45 (20 GHz to 26.5 GHz)

DC Block K261 Return Loss



Typical Low Frequency Insertion Loss measured on K261 over the range of 1 kHz to 1 MHz.



Insertion Loss and Return Loss measured on K261 over the range of 40 MHz to 40 GHz.

Recommended DC blocks/Adaptor combinations for MS2840A/MS2830A/MS269xA series signal analyzer

	Model	Frequency Range	RF connector	Recommended DC Block Order Name	Recommended Adapter Order Name
MS2840A series	MS2840A-046	9 kHz to 44.5 GHz	K (F)	K261	Not required
MS2830A series	MS2830A-040	9 kHz to 3.6 GHz	N (F)	Not required	Not required
	MS2830A-041	9 kHz to 6 GHz	N (F)	Not required	Not required
	MS2830A-043	9 kHz to 13.5 GHz	N (F)	Not required	Not required
	MS2830A-044	9 kHz to 26.5 GHz	N (F)	J1554A	J1398A
	MS2830A-045	9 kHz to 43 GHz	K (F)	K261	Not required
MS269xA series	MS2690A	50 Hz to 6 GHz	N (F)	J1555A	J0004
	MS2691A	50 Hz to 13.5 GHz	N (F)	J1555A	J1398A
	MS2692A	50 Hz to 26.5 GHz	N (F)	J1554A	J1398A

Display

XGA color LCD (Resolution: 1024 × 768)
Size: 8.4" (213 mm diagonal)

External Mixer

Frequency

Frequency range: 26.5 GHz to 325 GHz

Frequency bands

Band	Frequency range	Mixer harmonics order (N)
Band VHP	50.0 GHz to 75.0 GHz	8+
Band EHP	60.0 GHz to 90.0 GHz	12–
Band A	26.5 GHz to 40.0 GHz	4+
Band Q	33.0 GHz to 50.0 GHz	5+
Band U	40.0 GHz to 60.0 GHz	6+
Band V	50.0 GHz to 75.0 GHz	8+
Band E	60.0 GHz to 90.0 GHz	9+
Band W	75.0 GHz to 110.0 GHz	11+
Band F	90.0 GHz to 140.0 GHz	14+
Band D	110.0 GHz to 170.0 GHz	17+
Band G	140.0 GHz to 220.0 GHz	22+
Band Y	170.0 GHz to 260.0 GHz	26+
Band J	220.0 GHz to 325.0 GHz	33+

Amplitude

Mixer conversion loss	0 to 99.9 dB
Maximum input level	Depends on external mixer
Average noise level	Depends on external mixer
Frequency response	Depends on external mixer

Input/Output

Applicable mixer	2-port mixer only
Local frequency	5 GHz to 10 GHz
IF frequency	1.875 GHz

High Performance Waveguide Mixer MA2806A/MA2808A

Electrical Characteristics

Model No.		MA2806A	MA2808A
Frequency Range		50 GHz to 75 GHz	60 GHz to 90 GHz
LO Amplitude Range		>+10 dBm	
Multipler		8	12
Conversion Loss*		<15 dB (typ.)	
1 dB Gain Compression (P1dB)*		>0 dBm (typ.)	
LO Leakage		<–30 dBm (nom.)	
RF Input VSWR		≤1.5 (nom.)	
IF/LO Port VSWR	1.875 GHz (IF)	≤2.0 (nom.)	
	5 GHz to 10 GHz (LO)	≤2.4 (nom.)	≤2.0 (nom.)
Maximum Input Level (CW)		+10 dBm	

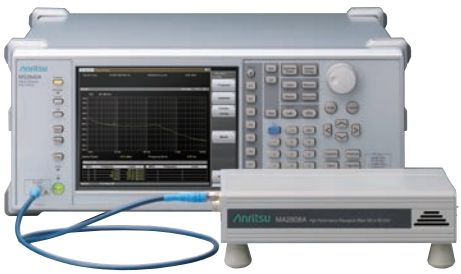
*: At assured performance temperature range

Interface

Model No.	MA2806A	MA2808A
RF	Waveguide, Flange (WR15, UG-385/U)	Waveguide, Flange (WR12, UG-387/U)
IF/LO	SMA-J	

General

Power Supply	100 V(ac) to 120 V(ac)/200 V(ac) to 240 V(ac), 50 Hz/60 Hz, 40 VA
Dimensions and Mass	134 (W) × 51 (H) × 229 (D) mm (excluding projections), <2 kg
Temperature Range	Assured performance range: +18° to +28°C Operating: +5° to +45°C (no condensation) Storage: –20° to +60°C (no condensation)
EMC	EN61326-1, EN61000-3-2

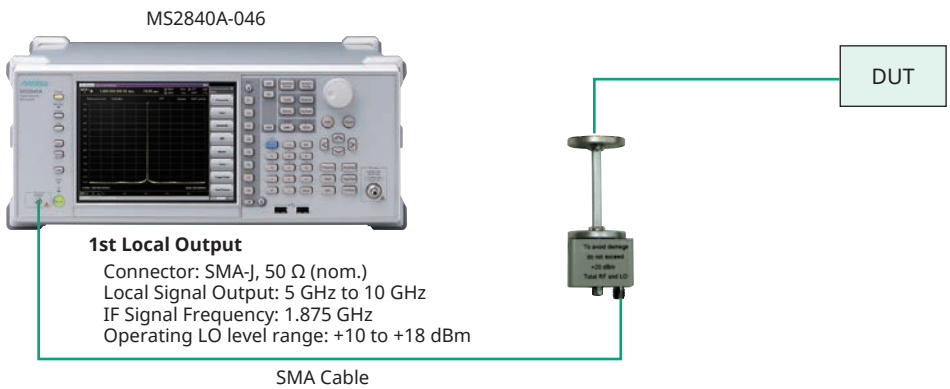


External Mixer MA2740C/MA2750C Series

The MA2740C/MA2750C series of External Mixers (Harmonic Mixers) supports spectrum measurements up to 325 GHz with high sensitivity and fewer LO harmonic order because these mixers output 1st local signals from 5 GHz to 10 GHz.

Model	Name	Frequency Band	Frequency Range	LO Harmonic Order	Mixing Mode	Conversion Loss* (dB)	Waveguide	Flange
MA2741C	External Mixer	A Band	26.5 GHz to 40 GHz	4	+	23	WR28	MIL-DTL-3922/54-003
MA2742C	External Mixer	Q Band	33 GHz to 50 GHz	5	+	26	WR22	MIL-DTL-3922/67D-006
MA2743C	External Mixer	U Band	40 GHz to 60 GHz	6	+	28	WR19	MIL-DTL-3922/67D-007
MA2744C	External Mixer	V Band	50 GHz to 75 GHz	8	+	32	WR15	MIL-DTL-3922/67D-008
MA2745C	External Mixer	E Band	60 GHz to 90 GHz	9	+	36	WR12	MIL-DTL-3922/67D-009
MA2746C	External Mixer	W Band	75 GHz to 110 GHz	11	+	39	WR10	MIL-DTL-3922/67D-010
MA2747C	External Mixer	F Band	90 GHz to 140 GHz	14	+	40	WR08	MIL-DTL-3922/67D-M08
MA2748C	External Mixer	D Band	110 GHz to 170 GHz	17	+	45	WR06	MIL-DTL-3922/67D-M06
MA2749C	External Mixer	G Band	140 GHz to 220 GHz	22	+	50	WR05	MIL-DTL-3922/67D-M05
MA2750C	External Mixer	Y Band	170 GHz to 260 GHz	26	+	65	WR04	MIL-DTL-3922/67D-M04
MA2751C	External Mixer	J Band	220 GHz to 325 GHz	33	+	70	WR03	MIL-DTL-3922/67D-M03

*: The Conversion loss is a typical value near the center frequency of each band but is not a guaranteed specification.



Connection Setup

General

Dimensions and mass

Dimensions	177 (H) × 426 (W) × 390 (D) mm (excluding projections)
Mass	≤15.3 kg (with MS2840A-046, excluding other options)

Power supply

Power voltage	Rated voltage: 100 V(ac) to 120 V(ac) or 200 V(ac) to 240 V(ac)
Frequency	50 Hz to 60 Hz
Power consumption	≤350 VA (including all options, maximum value) 220 VA (nom.) (excluding other options)

Temperature

Operating temperature	0° to +50°C
Storage temperature	–20° to +60°C

Environment performance

Conducted emission	Conforms to EN 61326-1
Radiated emission	Conforms to EN 61326-1
Harmonic current emission	Conforms to EN 61000-3-2: +A1: A2
Electrostatic discharge	Conforms to EN 61326-1
Electromagnetic field immunity	Conforms to EN 61326-1
Fast transient/burst	Conforms to EN 61326-1
Surge	Conforms to EN 61326-1
Conducted RF	Conforms to EN 61326-1
Power frequency magnetic field	Conforms to EN 61326-1
Voltage dips/short interruption	Conforms to EN 61326-1

CPU, OS

CPU	Intel Core i5-4400E, 2.7 GHz
Main memory	8 GB
OS	Windows 7 (64 bit)

Options

Analysis Bandwidth 10 MHz MS2840A-006

This option is a function to analyze 10 MHz bandwidth. (Standard)

Analysis Bandwidth Extension to 31.25 MHz MS2840A-009

This option is a function to analyze 31.25 MHz bandwidth. (Standard)

Phase Noise Measurement Function MS2840A-010

Displays the phase noise characteristics on a logarithmic scale

Frequency

Range	10 MHz to Upper frequency limit
Offset Frequency Range	10 Hz to 10 MHz
Marker Mode	Normal, Integral Noise, RMS Noise, Jitter, Residual FM, Off

Noise Figure Measurement Function MS2840A-017

Frequency

Frequency setting range

MS2840A-046	10 MHz to 44.5 GHz

Frequency range

Without MS2840A-068	10 MHz to 6.0 GHz
With MS2840A-068	10 MHz to 40 GHz

NF measurement

Attenuator: 0 dB, Preamp ON
Range: –20 to +40 dB

ENR	Instrument Uncertainty
4 to 7 dB	±0.02 dB
12 to 17 dB	±0.025 dB
20 to 22 dB	±0.03 dB

Gain measurement

Attenuator: 0 dB, Preamp ON

Range	–20 to +40 dB
Instrument Uncertainty	≤0.07 dB

Resolution bandwidth

Setting range: 100 kHz to 8 MHz

Microwave Preamplifier MS2840A-068

This option amplifies signal prior to 1st mixer to enhance sensitivity.

Frequency

Frequency range

MS2840A-046	100 kHz to 44.5 GHz

Amplitude

Measurement range	Refer to "Measurement range" of Signal Analyzer/Spectrum Analyzer
Maximum input level	Refer to " Maximum input level" of Signal Analyzer/Spectrum Analyzer
Displayed average noise level (Signal Analyzer function)	Refer to " Displayed average noise level" of Signal Analyzer Analyzer
Displayed average noise level (Spectrum analyzer function)	Refer to "Measurement range" of Signal Spectrum Analyzer
RF frequency characteristics	Refer to "RF Frequency Characteristics " of Signal Analyzer/Spectrum Analyzer
Input attenuator switching error	Refer to "Input attenuator switching error " of Signal Analyzer/Spectrum Analyzer
Linearity error	Refer to "Linearity error" of Signal Analyzer/Spectrum Analyzer
Secondary harmonic wave distortion	Refer to "Secondary harmonic wave distortion " of Signal Analyzer/Spectrum Analyzer
1 dB gain compression	Refer to "1 dB gain compression " of Signal Analyzer/Spectrum Analyzer
Two-tone third-order intermodulation distortion	Refer to "Two-tone third-order intermodulation distortion " of Spectrum Analyzer

Anritsu envision : ensure

Specifications are subject to change without notice.

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