

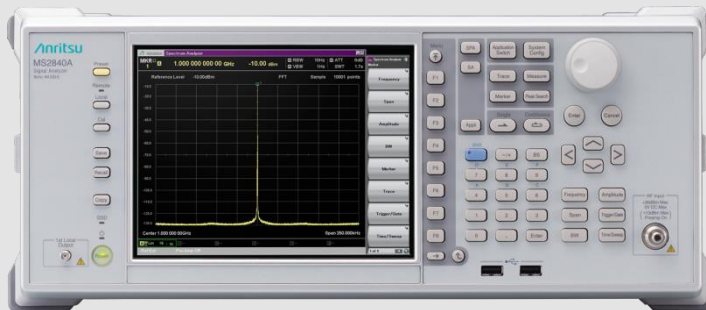


Spectrum Analyzer/Signal Analyzer with Excellent Phase Noise Performance

Signal Analyzer

MS2840A

9 kHz to 3.6 GHz/6 GHz/26.5 GHz/44.5 GHz



With its unbelievable and unbeatable high cost-performance The MS2840A is IDEAL for R&D and manufacturing of wireless communications equipment, radar, sensors and signal source using the shortwave to mm-Wave bands.

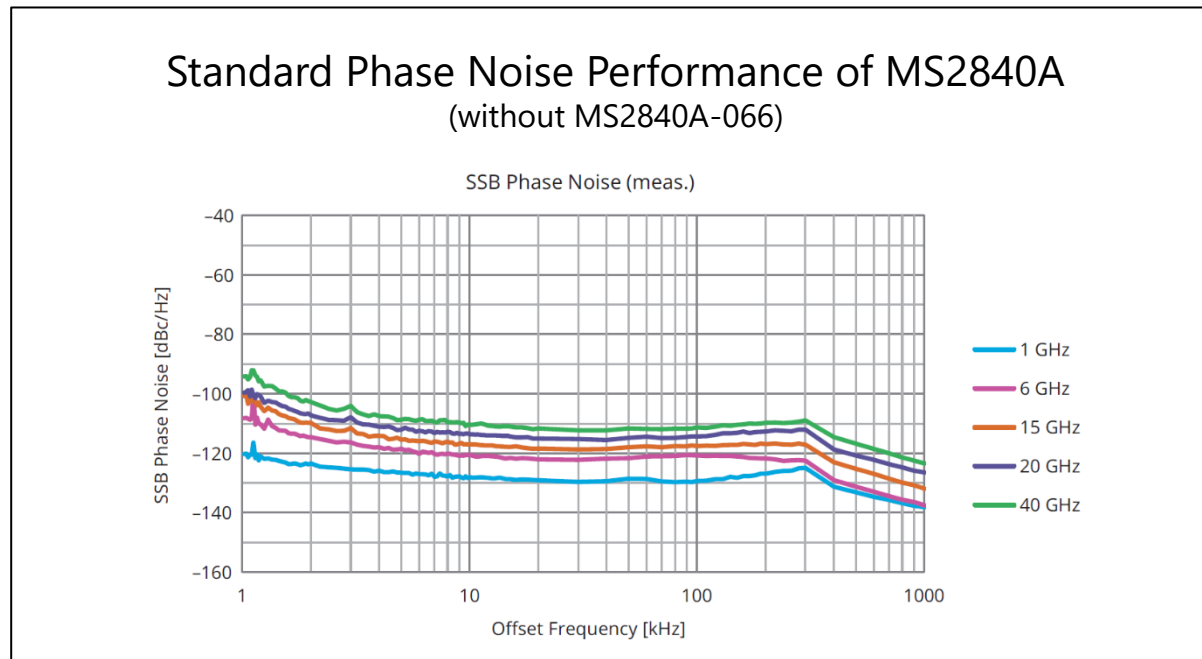
- **Phase Noise Performance supporting high-performance wireless terminals**
 - ✓ -140 dBc/Hz @ 10 kHz Offset, CF = 150 MHz, with Opt-066 (meas.)
 - ✓ -138 dBc/Hz @ 10 kHz Offset, CF = 1 GHz, with Opt-066 (meas.)
 - ✓ -123 dBc/Hz @ 10 kHz Offset, CF = 1 GHz (spec)
 - ✓ -108 dBc/Hz @ 10 kHz Offset, CF = 40 GHz (meas.)
- **Displayed Average Noise Level (DANL) for low-level signal detection**
 - ✓ -165 dBm/Hz @ CF = 1 GHz, Preamplifier On (spec)
 - ✓ -157 dBm/Hz @ CF = 40 GHz, Preamplifier On (spec)
- **Improved measurement and test efficiency: Faster CPU, SSD, more RAM**
 - ✓ Faster display drawing and file read/write

Outstanding Close-in Phase Noise Performance

The MS2840A with superior close-in phase noise performance is ideal for accurate measurements aimed at improving the performance of wireless equipment and signal sources as well as for improving phase noise, which is the key to upgrading the measurement resolution of microwave and mm-Wave radar and sensors.

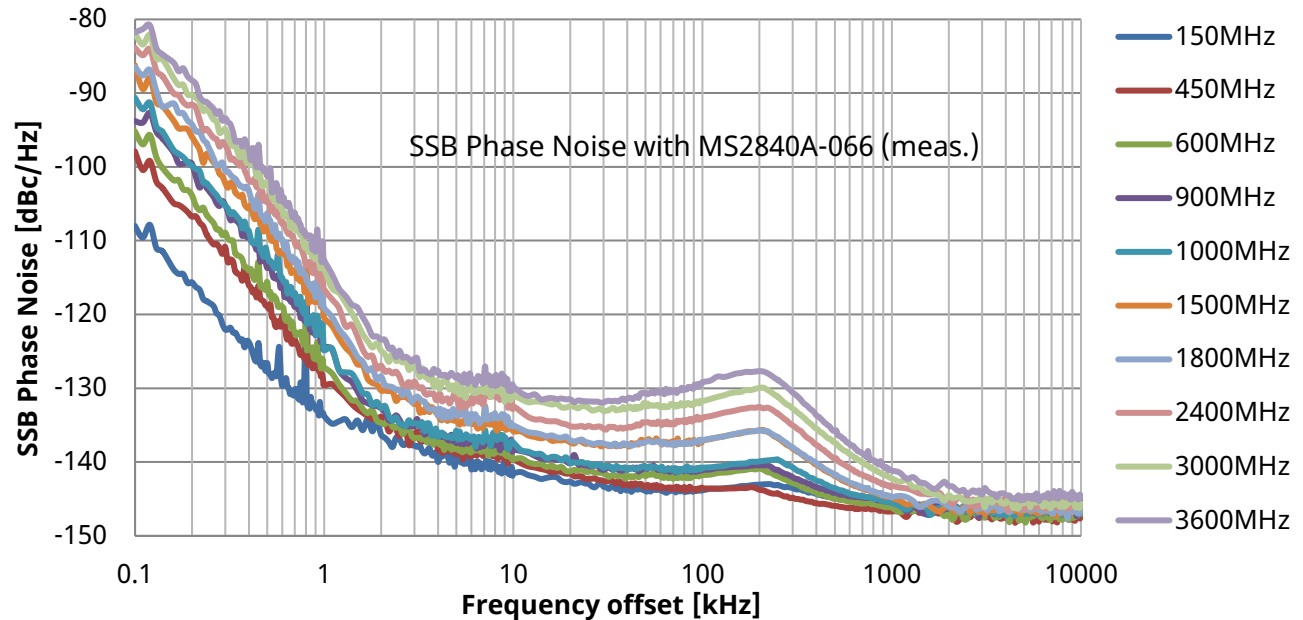
Installing the **Low Phase Noise Performance MS2840A-066** option in the 3.6 GHz and 6GHz models takes the MS2840A phase noise performance to even higher levels.

Using the phase noise measurement function makes it easy to measure phase noise components at typical frequency offsets.

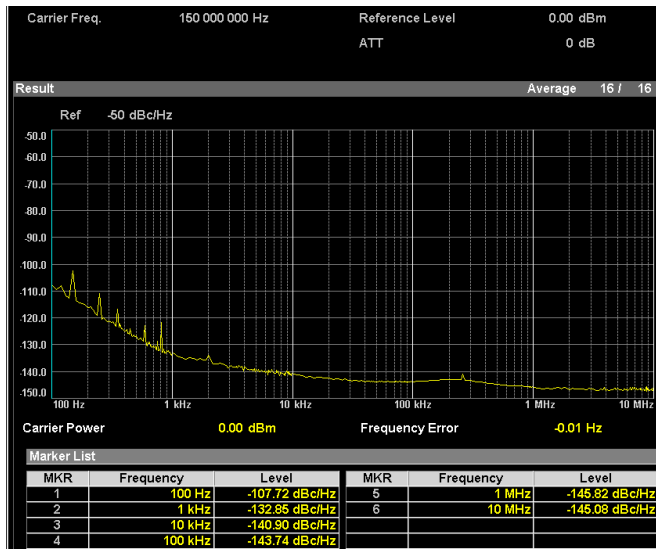


Low Phase Noise Performance MS2840A-066

The Low Phase Noise Performance MS2840A-066 option in the 3.6 GHz and 6 GHz models greatly increases phase noise performance for RF input signals of 3.7 GHz or less at frequency offsets of 1 kHz to 1 MHz from the main carrier wave. Setting the span to a range of either 300 Hz to 1 MHz (spectrum analyzer function) or 1 kHz to 31.25 MHz (signal analyzer function) enables the function.



Actual Phase Noise Measurement Function Results



Frequency
150 MHz

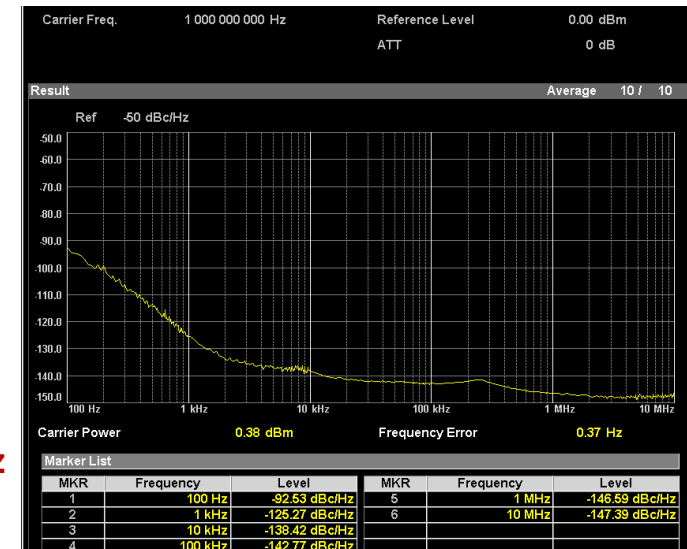
Offset Frequency
10 kHz

Phase Noise
-140 dBc/Hz
(meas.)

Frequency
1 GHz

Offset Frequency
10 kHz

Phase Noise
-138 dBc/Hz
(meas.)



Wide Application Range using Versatile Functions

Versatile Measurement Functions

Frequency Error

Channel Power

Occupied Bandwidth

Adjacent Channel Leakage Power

Spectrum Emission Mask

Spurious Emission

Noise Figure Measurement

Phase Noise Measurement

Vector Modulation Analysis (EVM, etc.)

Analog Modulation Analysis (AM/FM/ Φ M)

RF Signal Save/Replay

Others



Main Applications

Parts/Module Function Evaluation

Measurement of basic functions such as spectrum and phase noise

Final Product General Quality Inspection

Inspection of TRx characteristics based on system standards

Legal Compliance Inspection

Measurement of frequency error, unwanted spurious, etc.

Production Line Inspection

Automated testing under remote-control

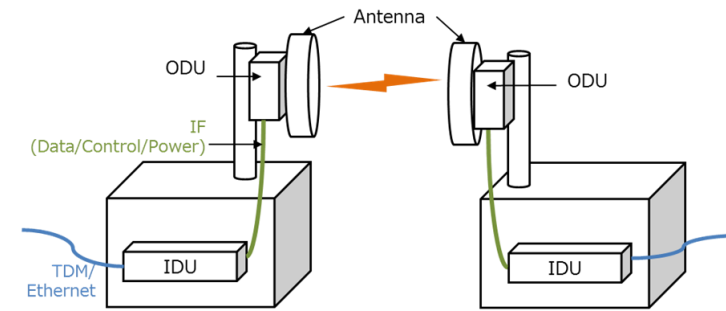
Maintenance Work

Saving/replay of problem signal waveforms

Application Example: Wireless Backhaul

More technologies are using multi-dimension modulation and the wideband mmWave technology. The phase noise performance of the local signal generator in the transmitter plays a key role in determining system performance and cost.

The Signal Analyzer MS2840A covers frequencies from sub-6 GHz to 44.5 GHz.



Wireless Backhaul Transceiver

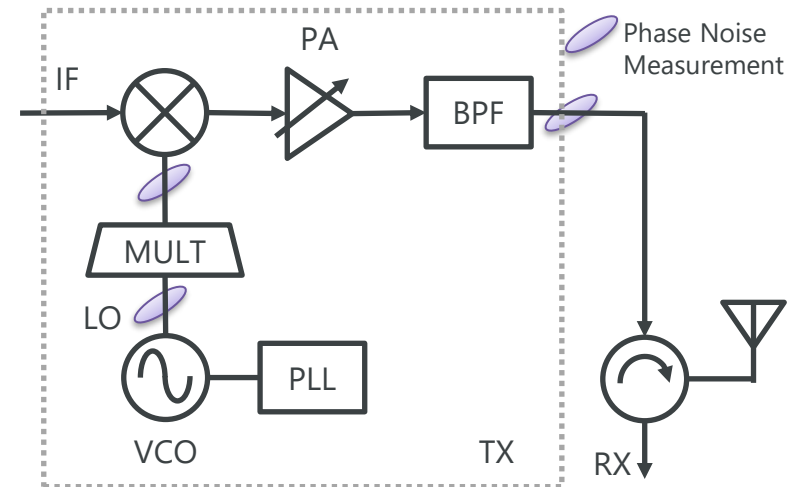
■ Solution

• Excellent Phase Noise Performance

- 112 dBc/Hz @ 10 kHz Offset, CF = 20 GHz (meas.)
- 113 dBc/Hz @ 100 kHz Offset, CF = 20 GHz (meas.)

• Low Noise Floor for Detecting Low-level Spurious

DANL -157 dBm/Hz @ CF = 40 GHz, Preamp On (spec)



Transmitter Block Diagram

Application Example: Pulse Radar

Radar systems for meteorology, aerospace, maritime, air-traffic control applications, etc., are part of the infrastructure supporting a safe, secure society, so they must operate correctly and stably.

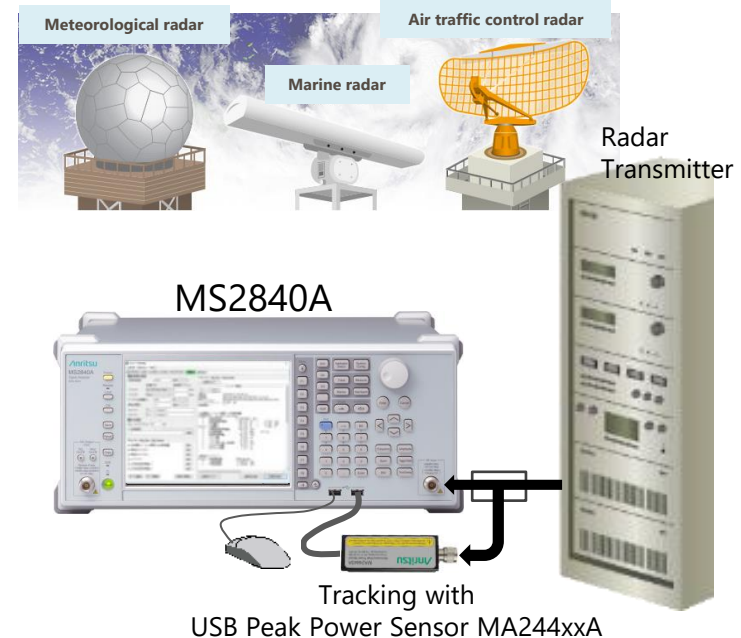
Essential maintenance inspection to secure stable operation of radar transmitters uses various test equipment, including signal analyzers, oscilloscopes, power meters, frequency counters, etc.

Easy and efficient, mistake-free measurement is a key point at maintenance inspection.

■ Solution

• Automated Pass/Fail evaluation of S-, C-, X and Ku-band (3 to 17 GHz) pulse radar transmitter inspection items

- ✓ Pulse Radar Measurement Function MX284059B
- ✓ Built-in MS2840A automated measurement functions
- ✓ Automated all-in-one multiple test equipment functions
- ✓ Tx power, Tx frequency, Pulse width, rise/fall time, pulse repetition frequency, emission, etc., measurement Pass/Fail evaluation



Emissions Measurement Example
(Plotting On-screen Mask)

Application Example: Signal Source Evaluation

Wireless functions are being built into a wider range of products, such as household equipment and automobiles.

The signal source performing frequency conversion is a key element in wireless transceivers.

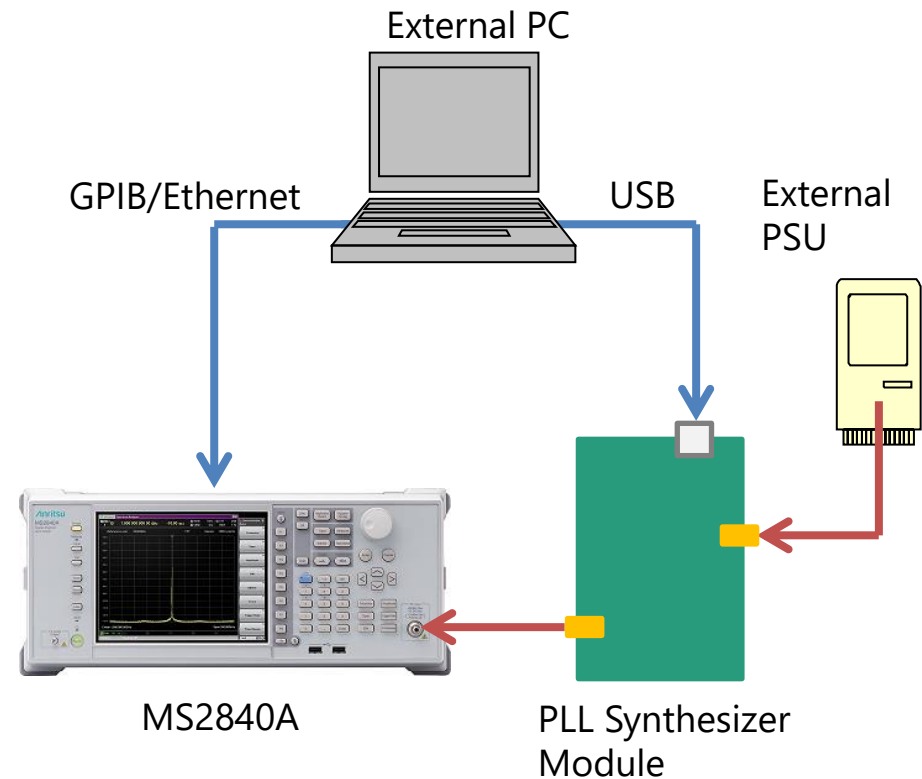
PLL synthesizer ICs are now commonly used as low-cost, high-performance signal sources.

The Signal Analyzer/Spectrum Analyzer MS2840A has the phase noise performance needed to support wide-ranging evaluation of signal sources, especially PLL synthesizer ICs.

It offers all-in-one support for measurements and evaluations ranging from the purity of unmodulated CW signals generated by signal sources to the modulation accuracy of modulated signals, spectrum, and out-of-band spurious measurements.

Key Measurement Items

- ✓ Phase Noise
- ✓ Frequency
- ✓ Frequency Switching Time



Measurement Example

Accessories Expand Measurement Functions

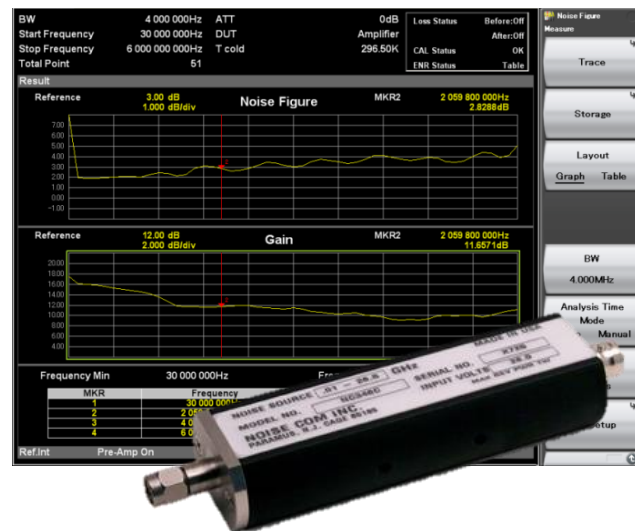
• USB Power Sensor MA241xx Series

- Connect to USB port of MS2840A for power meter function
- MA24106A 50 MHz to 6 GHz
- MA24118A 10 MHz to 18 GHz



• Noise Sources

- Measure NF of receivers, amplifiers, converters using Y-factor method
- Supported noise source: Noisecom NC346 series
- NC346C 0.01 GHz to 26.5 GHz
- NC346Ka 0.10 GHz to 40.0 GHz



Main Configuration

Type	Name	Notes
MS2840A	Signal Analyzer	Opt-040: 9 kHz to 3.6 GHz Opt-041: 9 kHz to 6 GHz Opt-044: 9 kHz to 26.5 GHz Opt-046: 9 kHz to 44.5 GHz
MS2840A-001	Rubidium Reference Oscillator	
MS2840A-008	Preamplifier	Opt-008: For all frequency models Opt-069: For 26.5 GHz model Opt-068: For 44.6 GHz model
MS2840A-010	Phase Noise Measurement Function	
MS2840A-017	Noise Figure Measurement Function	
MS2840A-021	6 GHz Vector Signal Generator	For 3.6/6 GHz models
MS2840A-066	Low Phase Noise Performance	For 3.6/6 GHz models
MS2840A-067	Microwave Preselector Bypass	For 26.5/44.5 GHz models
MS2840A-078	Analysis Bandwidth Extension to 125 MHz	
MX269017A	Vector Modulation Analysis Software	
MX269018A	Analog Measurement Software	
MX284059B	Pulse Radar Measurement Function	For 26.5/44.5 GHz models

Main Features and Configurations

	Standard	Option	Accessories
Spectrum Analyzer	✓	–	–
Signal Analyzer (Analysis BW 31.25 MHz)	✓	–	–
Frequency Counter	✓	–	–
Channel Power (Frequency Domain)	✓	–	–
Burst Average Power (Time Domain)	✓	–	–
Occupied Bandwidth	✓	–	–
ACLR/ACP	✓	–	–
Spectrum Emission Mask	✓	–	–
Spurious Emissions	✓	–	–
AM Modulation • FM Deviation	✓	–	–
Digitize and Replay	✓		
Phase Noise Measurement	–	✓ MS2840A-010	–
Noise Figure Measurement	–	✓ MS2840A-017	Noise Source
Vector Signal Modulation Analysis	–	✓ MX269017A	–
Analog Signal Modulation Analysis	–	✓ MA269018A	–
Power Meter	✓	–	USB Power Sensor

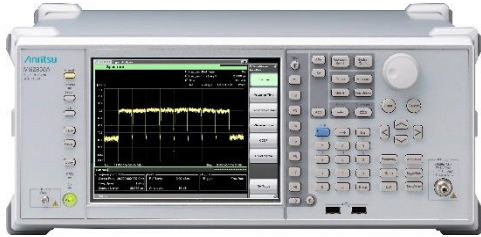


Anritsu Bench-top Signal Analyzers



Anritsu Bench-top Signal Analyzers

MS2850A



9 kHz to 44.5 GHz

Analysis BW 1 GHz (max.)

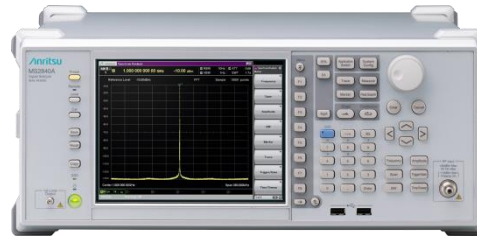
**R&D/Mfg.
for**

**micro/millimeter-wave and
wideband communications
systems, such as 5G and
satellite communication**

**Wideband analysis
excellent amplitude/phase
flatness**

Faster CPU/SSD/
more memory
High Speed Data Transfer

MS2840A



9 kHz to 44.5 GHz

Analysis BW 125 MHz (max.)

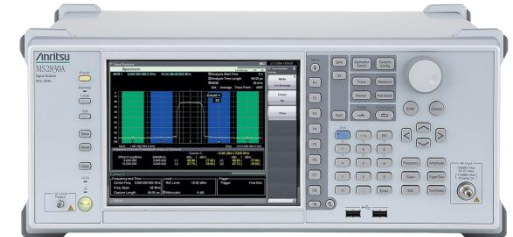
**R&D/Mfg.
for**

**shortwave to mm-Wave
band wireless equipment/
radar/sensors/Local
Oscillator/Signal Source**

**Excellent phase noise
performance and DANL**

Faster CPU/SSD/
more memory
Built-in Vector/Analog SG

MS2830A



9 kHz to 43 GHz

Analysis BW 125 MHz (max.)

**R&D/Mfg./maintenance
for**

**cellular/WLAN/
narrow-band digital and
analog communications
systems**

**Wide-coverage
measurement software**

Cost effective
Built-in Audio Analyzer
Built-in Vector/Analog SG

Anritsu
Advancing beyond

14

Anritsu Signal Analyzer Configuration Comparison

	MS2850A	MS2840A	MS2830A
Rubidium Ref. Oscillator	–	✓ MS2840A-001	✓ MS2830A-001
High-Stability Ref. Oscillator	✓ Standard	✓ MS2840A-002 For 3.6/6 GHz models Standard on 26.5/44.5 GHz models	✓ MS2830A-002 For 3.6/6/13.5 GHz models Standard on 26.5/43 GHz models
Analysis Bandwidth 10 MHz	–	✓ Standard	✓ MS2830A-006
Analysis Bandwidth 31.25 MHz	–	✓ Standard	✓ MS2830A-005/009
Analysis Bandwidth 62.5 MHz	–	✓ MS2840A-077	✓ MS2830A-077
Analysis Bandwidth 125 MHz	–	✓ MS2840A-078	✓ MS28300A-078
Analysis Bandwidth 255 MHz	✓ Standard	–	–
Analysis Bandwidth 510 MHz	✓ MS2850A-033	–	–
Analysis Bandwidth 1 GHz	✓ MS2850A-034	–	–
Built-in Vector/Analog Signal Generator	–	✓ MS2840A-020/021/088 For 3.6/6 GHz models	✓ MS2830A-020/021/088 For 3.6/6/13.5 GHz models
Low Phase Noise Performance	–	✓ MS2840A-066	✓ MS2830A-066
BER Measurement Function	–	✓ MS2840A-026	✓ MS2830A-026
6 GHz Preamplifier	–	✓ MS2840A-008	✓ MS2830A-008
Microwave Preamplifier	✓ MS2850A-068	✓ MS2840A-068 ✓ MS2840A-069	✓ MS2830A-068
Microwave Preselector Bypass	✓ Standard	✓ MS2840A-067	✓ MS2830A-067
Phase Noise Measurement	✓ MS2850A-010	✓ MS2840A-010	✓ MS2830A-010
Noise Figure Measurement	✓ MS2850A-017	✓ MS2840A-017	✓ MS2830A-017
Built-in Audio Analyzer	–	–	✓ MS2830A-018
Power Meter (connected to USB Power Sensor)	✓	✓	✓

