Product Introduction



MX283027A Wireless Network Device Test Software

MS2830A Signal Analyzer MS2830A Signal Analyzer MX283027A Wireless Network Device Test Software MX283027A-001 WLAN Test Software MX283027A-002 Bluetooth Test Software Product Introduction



MS2830A

Version 2.00 ANRITSU CORPORATION

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What is MX283027A Wireless Network Device Software?

Although recent mobile terminals include more applications, such as WLAN, Bluetooth, FM, GPS, and mobile broadcasting, makers are still demanding shorter test times. Most important is a dedicated tester for WLAN and Bluetooth to cut evaluation time and costs.

The MX283027A Wireless Network Device Test Software, MX283027A-001 WLAN Test Software, and MX283027A-002 Bluetooth Test Software are for measuring the RF characteristics of WLAN, Bluetooth.

Installing these options in the MS2830A Signal Analyzer with MS2830A-020/021 Vector Signal Generator option supports Tx and Rx tests of WLAN and Bluetooth devices/ modules using one measurement unit.

Shortening test times by eliminating measurement screens helps facilitate high-speed, high-accuracy measurements on production lines.

In addition, investment costs are cut by utilizing expandability of the MS2830A for applications such as LTE and WiMAX Tx evaluation thru addition of analysis software as well as Rx evaluation by output of W-CDMA, GSM, cdma2000 and Mobile broadcast ISDB-T signals from the built-in signal generator.

High-speed measurement	
Expandability & Versatility	

		Combined	
	Dedicated	with general-	MS2830A+
	Tester	purpose	MX283027A
		instrument	
Cost	Bad	Good	Good
Test speed	Good	Bad	Good

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Ex

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What is MX283027A Wireless Network Device Software?

Purpose

•High-speed Tx & Rx measurements

Features

MX283027A-001 WLAN Test Software
 One software package supporting IEEE802.11n/a/b/g

MX283027A-002 Bluetooth Test Software

One software package supporting Basic Rate/Enhanced Data Rate/ Bluetooth Low Energy

 One hardware unit supporting high-speed Tx & Rx measurements (with vector signal generator option (MS2830A-020/021))

Points for high-speed measurement

- Eliminate measurement screen to cut processing time
- Batch measurements minimize signal loading and process multiple measurements
- Simplified batch measurements by remote commands

MX283027A-001 WLAN Test Software?

One unit supports high-speed measurements of TRx characteristics of devices and modules based on WLAN standards.

Installing the Vector Signal Generator option (MS2830A-020/021) outputs WLAN signals and measures Rx characteristics.

No measurement screen is displayed at the main frame.

Measurement setting and execution, and reading of numerical results are under remote control.

Measurement Signals

- IEEE802.11n (HT-Mixed, HT-Greenfield)
- IEEE802.11a
- IEEE802.11b
- IEEE802.11g ERP-DSSS/CCK
- IEEE802.11g ERP-OFDM

Tx Characteristics Tests

Batch measurements are executed to measure the following items and read the numerical results by remote control.

- Modulation Analysis
- Tx Power Measurements
- Spectrum Mask Measurements
- Occupied Bandwidth Measurements

Rx Characteristics Tests

Installing the Vector Signal Generator option (MS2830A-020/021) supports the following WLAN signal outputs:

Tx Characteristics Measurement Items

Modulation Analysis	Tx Spectrum Mask Measurement
Vector error (EVM) [rms value/peak value]	Peak PSD at reference channel
Vector error (EVM) [rms value/peak value] pass/fail	Absolute value of spectrum density at frequency
	where margin from limit line becomes minimum within
Frequency error pass/fail judgement result	Offset frequency range [positive/negative side]
Center frequency leakage power	Margin from limit line at frequency where margin is
Center frequency leakage power pass/fail judgement result	minimum for limit line within Offset frequency range [positive/negative side]
IQ Offset	Frequency where margin from limit line becomes
IQ Offset pass/fail judgement result	minimum
Spectrum flatness pass/fail judgement result	within Offset frequency range [positive/negative side]
IQ Gain imbalance	Pss/fail judgement result within Offset frequency range
Quadrature error	Count of Tx spectrum mask measurements
Symbol clock error	Absolute value of spectrum density
Symbol clock error pass/fail judgement result	at start frequency of Offset [positive/negative side]
Chip clock error	Absolute value of spectrum density
Chip clock error pass/fail judgement result	at end frequency of Offset [positive/negative side]
Count of modulation accuracy measurements	Occupied Bandwidth Measurement
Tx Power Measurement	Occupied Bandwidth
Tx Power	Occupied Bandwidth pass/fail judgement result
Tx Power pass/fail judgement result	Count of occupied bandwidth measurements
Peak power spectrum density (PSD)	
Peak power spectrum density (PSD) pass/fail judgement result	
Burst waveform rise time	
Burst waveform fall time]
Rise and fall time pass/fail judgement result	
Count of Tx Power Measurement]

- WLAN Waveform Patterns (IEEE802.11a/b/g) pre-installed in the MS2830A-020/021 Vector Signal Generator option
- Generation Waveform Patterns (IEEE802.11n/p/a/b/g/j) by WLAN IQproducer^{*} pre-installed in MX283027A-001
- WLAN Test Software

*: Please do not order MX269911A WLAN IQproducer separately.

MX283027A-001 WLAN Test Software Usage

Example of WLAN module TRx characteristics measurement system



*5: Evaluate Rx characteristics with DUT or control PC.

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MX283027A-001 WLAN Test Software Features (1/3)

High-speed measurements (1/2)

- Achieve faster measurement speeds than dedicated instruments by combining MX283027A software with MS2830A, which already has world's fastest speed as generalpurpose instrument
- Shorten total measurement times for WLAN standard measurements (multi condition)



11b/11g 1ch each, Tx/Rx Measurement Time Comparison

♦ Actual measurement values vary with measurement conditions and parameters.

MX283027A-001 WLAN Test Software Features (2/3) High-speed measurements (2/2)

Example

System: 11b, 11g Test: Tx only Frequency: 2 CH each (total 4 channels)

Measurements (Tx only)

- EVM
- Tx Power
- Tx Spectrum mask
- Occupied bandwidth

	Detection
	1 imit and MPm1 0.00.00.38
Level	Anritsu MX283027A Measurement Tool
evel	Initialize SG Initialize DUT FW Download
age) (d) (dBm) smit Pov smit Pov (dBm/M p/MHz)	One Measure Full Measure Measurement Time 1631 ms
	1631 ms/4ch
	Tx only: About 410 ms/ch

Actual measurement values vary with measurement conditions and parameters.

MX283027A-001 WLAN Test Software Features (3/3) • Measurement result comparison

Supports similar measurements at <u>higher speeds</u> than conventional MS8609A + WLAN measurement software for common signal source



+ WLAN Measurement Software

• Actual measurement values vary with measurement conditions and parameters.

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MX283027A-001 WLAN Test Software Measurement Functions (1/4) • Support for IEEE Std 802.11-2007 and IEEE Std 802.11n-2009 test items

• IEEE 802.11a (IEEE 802.11a-1999)

IEEE	Test Item	Supporting Function	Supplement
17.3.9.1	Transmit power levels	Transmit Power Level	
17.3.9.2	Transmit spectrum mask	Transmit Spectrum Mask	
17.3.9.3	Transmission spurious	-	Measures with SPA function
17.3.9.4	Transmit center frequency tolerance	Modulation Analysis	
17.3.9.5	Symbol clock frequency tolerance	Modulation Analysis	
17.3.9.6.1	Transmitter center frequency leakage	Modulation Analysis	
17.3.9.6.2	Transmitter spectral flatness	Modulation Analysis	
17.3.9.6.3	Transmitter constellation error	Modulation Analysis	
17.3.9.7	Transmit modulation accuracy test	Modulation Analysis	
17.3.8.4	Transmit and receive in-band and out-of-band spurious emissions	_	Measures with SPA function
_	Occupied bandwidth	Occupied Bandwidth	

MX283027A-001 WLAN Test Software Measurement Functions (2/4) • Support for IEEE Std 802.11-2007 and IEEE Std 802.11n-2009 test items

• IEEE 802.11b (IEEE 802.11b-1999)

IEEE	Test Item	Supporting Function	Supplement
18.4.7.1	Transmit power levels	Transmit Power Level	
18.4.7.2	Transmit power level control	Transmit Power Level	
18.4.7.3.	Transmit spectrum mask	Transmit Spectrum Mask	
18.4.7.4	Transmit center frequency tolerance	Modulation Analysis	
18.4.7.5	Chip clock frequency tolerance	Modulation Analysis	
18.4.7.6	Transmit power-on and power-down ramp	Transmit Power Level	
18.4.7.7	RF carrier suppression	_	Calculated from IQ Offset
18.4.7.8	Transmit modulation accuracy	Modulation Analysis	
18.4.6.8	Transmit and receive in-band and out-of-band spurious emissions	—	
_	Occupied bandwidth	Occupied Bandwidth	

MX283027A-001 WLAN Test Software Measurement Functions (3/4) • Support for IEEE Std 802.11-2007 and IEEE Std 802.11n-2009 test items

• IEEE 802.11g (IEEE 802.11g-2003)

IEEE	Test Item	Supporting Function	Supplement
19.4.3	Transmit and receive in-band and out-of-band — — — spurious emissions		Measures with SPA function
19.4.7 PMD transmit specifications follow 17.3.9 (802.11a) except measurement items below. Transmit power level (17.3.9.1), Transmit center frequency tolerance (17.3.9.4), Symbol clock frequency tolerance (17.3.9.5)			
19.4.7.1	.7.1 Transmit power levels Transmit Power Level		
19.4.7.2	.4.7.2 Transmit center frequency tolerance Modulation An		
19.4.7.3	4.7.3 Symbol clock frequency tolerance Modulation Analysis		
19.5.4	Transmit spectral mask Transmit Spe		
_	Occupied bandwidth	Occupied Bandwidth	

MX283027A-001 WLAN Test Software Measurement Functions (4/4) • Support for IEEE Std 802.11-2007 and IEEE Std 802.11n-2009 test items

• IEEE 802.11n (IEEE 802.11n-2009)

IEEE	Test Item	Supporting Function	Supplement
20.3.21.1	Transmit Spectrum Mask	Transmit Spectrum Mask	
20.3.21.2	Spectral Flatness	Modulation Analysis	
20.3.21.3	Transmit Power	Transmit Output Power	
20.3.21.4	Transmit Center Frequency Tolerance	Modulation Analysis	
20.3.21.5	_	_	
20.3.21.6	Symbol Clock Frequency Tolerance	Modulation Analysis	
20.3.21.7.1	Introduction to modulation accuracy tests	Modulation Analysis	
20.3.21.7.2	Transmit Center Frequency Leakage	Modulation Analysis	
20.3.21.7.3	Transmit Constellation Error	Modulation Analysis	
20.3.21.7.4	Transmitter Modulation Accuracy (EVM)	Modulation Analysis	
_	Occupied bandwidth	Occupied Bandwidth	

What is MX283027A-002 Bluetooth Test Software?

One unit supports measurement of high-speed Tx&Rx characteristics of Bluetooth devices and modules. Installing the Vector Signal Generator option (MS2830A-020/021) outputs Bluetooth signals and measures Rx characteristics.

No measurement screen is displayed on the main frame.

Measurement settings and execution, and reading of numerical results are executed by remote control.

Measurement Signals

- Basic Rate
- Enhanced Data Rate
- Bluetooth Low Energy

Tx Characteristics Tests

Batch measurements are executed to measure the following items and read the numerical results by remote control.

- •Output Power Measurements
- Modulation Characteristics Measurements
- ICFT Measurements
- Carrier Frequency Drift
- •EDR Frequency Stability/Modulation Accuracy Measurements
- •EDR Relative Tx Power Measurements
- •EDR Differential Phase Decode Measurements
- •Demodulation Data Measurements

Rx Characteristics Tests

Installing the Vector Signal Generator option (MS2830A-020/021) supports the following Bluetooth signal outputs:

 Bluetooth waveform pattern pre-installed in the MS2830A-020/021 Vector Signal Generator option

Tx Characteristics Measurement Numerical Results
Output Power Measurements
GFSK average power, peak power
GFSK average power pass/fail judgement result
Count of output power measurements
Modulation Characteristics Measurements
⊿f1 (payload data: 11110000/00001111)
Average frequency error
⊿f2 (payload data: 10101010/01010101)
Average frequency error
⊿f1 maximum frequency error
⊿f2 maximum frequency error
⊿f2 maximum frequency error > lower limit ratio
⊿f2 average frequency error/⊿f1 average frequency error
⊿f1 average frequency error pass/fail judgem ent result
⊿f2 maximum frequency error>Lower limit ratio pass/fail
judgem ent result
⊿f2 average frequency error/⊿f1 average frequency error
pass/fail judgement result
Count of modulation characteristics measurements
Initial Center Frequency Torelance (ICFT) Measurements
ICFT
ICFT pass/fail judgement result
Count of ICFT measurements
Carrier Frequency Drift Measurements
Frequency drift
Maximum drift rate
Frequency drift pass/fail judgement result
Maxim um drift rate pass/fail judgem ent result
Count of carrier frequency drift measurements
EDR Relative Tx Power Measurements
GFSK average power
DPSK average power
Relative power (difference between GFSK and DPSK average
power)
Relative power pass/fail judgement result
Count of EDR relative Tx power measurements

Measurement Items

Rx Characteristics Measurement Numerical Results
EDR Differential Phase Encording Measurements
Bit error rate (BER)
Bit error
Packet error rate (PER)
Packet error rate (PER) pass/fail judgement result
Count of EDR differential phase encording measurements
Demodulation Data Measurements
Packet type
Payload length
Payload

♦ Bluetooth Waveform Patterns pre-installed in MS2830-020/021 Vector Signal Generator

Packet format
DH1, DH3, DH5 [Clean/Dirty/Dirty withFM]
DH3_3SlotOff, DH5_5SlotOff
2-DH1, 2-DH3, 2-DH5 [Clean/Dirty/Dirty withFM]
3-DH1, 3-DH3, 3-DH5 [Clean/Dirty/Dirty withFM]
2-DH3_3SlotOff, 2-DH5_5SlotOff
3-DH3_3SlotOff, 3-DH5_5SlotOff
BLE, BLE_Dirty, BLE_Dirty_withFM, BLE_CRC_corruped
No packet format
GFSK-PN9, GFSK-PN15
PI_4_DQPSK-PN9, PI_4_DQPSK-PN15
8DPSK-PN9, 8DPSK-PN15
GMSK-PN15_BLE

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MX283027A-002 Bluetooth Test Software Usage

Example of Bluetooth module TRx characteristics measurement system



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MX283027A-002 Bluetooth Test Software Measurement Functions

• Support for BLUETOOTH TEST SPECIFICATION test items

• IEEE 802.15.1

IEEE	Test Item	Supporting Function
TRM/CA/01/C	Output Power	Output Power
TRM/CA/07/C	Modulation Characteristics	Modulation Characteristics
TRM/CA/08/C	Initial Carrier Frequency Tolerance	ICFT
TRM/CA/09/C	Carrier Frequency Drift	Carrier Frequency Drift
TRM/CA/10/C	EDR Relative Transmit Power	EDR Relative Transmit Power
TRM/CA/11/C	EDR Carrier Frequency Stability and	EDR Carrier Frequency Stability and
	Modulation Accuracy	Modulation Accuracy
TRM/CA/12/C	EDR Differential Phase Encoding	EDR Differential Phase Encoding
TRM-LE/CA/01/C	Output power at NOC	Output Power
TRM-LE/CA/02/C	Output power at EOC	Output Power
TRM-LE/CA/05/C	Modulation Characteristics	Modulation Characteristics
TRM-LE/CA/06/C	Carrier frequency offset and drift at NOC	ICFT/Carrier Frequency Drift
TRM-LE/CA/07/C	Carrier frequency offset and drift at EOC	ICFT/Carrier Frequency Drift

MX283027A-001 WLAN Test Software Specifications (1/3)

Common Setup Key Parameter

Item	Setting	Description
WLAN Standard	IEEE 802.11n, 11a, 11b, 11g ERP-DSSS/CCK, 11g ERP- OFDM	
Data Rate	Auto, 6, 9, 12, 18, 24, 36, 48, 54 Mbps	For 11a or 11g ERP-OFDM
Modulation	Auto, DSSS 1Mbps, DSSS 2Mbps, CCK 5.5 Mbps, CCK 11Mbps	For 11b or 11g ERP-DSSS/CCK
Preamble	Auto, Long, Short	For 11b or 11g ERP-DSSS/CCK
PPDU Format	HT-Mixed, HT-Greenfield	For 11n
Channel Bandwidth	20, 40, 40 [Upper], 40 [Lower] MHz	For 11n

Specifications

The following specifications are guaranteed after 30-minute warm-up at a stable ambient temperature. Typical values are for reference only and are not guaranteed. Values are guaranteed after executing CAL at 18° to 28°C, and the measured signal is within the measurement level range and is less than or equal to Input Level.

Standard		IEEE 802.11a				
	Frequency Range	5180 to 5320 MHz (channel No. 36 to 64) 5500 to 5700 MHz (channel No. 100 to 140) 5745 to 5825 MHz (channel No. 149 to 165)				
Modulation/	Measurement Level Range	–12 to +30 dBm (MS2830A-045 not installed) – 6 to +30 dBm (MS2830A-045 installed)				
Frequency Measurements	Carrier Frequency Accuracy	Burst length ≥ 250 µs ± (Accuracy of reference frequency x carrier frequency + 16) Hz				
	Residual Vector Error	Channel Estimation: SEQ, Phase Tracking: On, Amplitude Tracking: Off $\leq 1.6\%$ (rms)				
	Center Frequency Leakage Floor	≤ –50 dBc (nominal)				
Amplitude Measurement	Tx Power Accuracy	Input attenuator≥ 10 dB ± 1.9 dB				
Spectrum Measurement	Tx Spectrum Mask Dynamic Range	 ≥ 68 dB (11 MHz Offset from carrier frequency) ≥ 68 dB (20 MHz Offset from carrier frequency) ≥ 68 dB (30 MHz Offset from carrier frequency) The dynamic range refers to the transmitted power ratio for specified frequency offset. It is applied if RBW = 100 kHz and Mixer Level = -19 to -14 dBm. 				

*: This is found from root sum of squares (RSS) of absolute amplitude accuracy and in-band frequency characteristics of main frame.

MX283027A-001 WLAN Test Software Specifications (2/3)

Standard		IEEE 802.11b, IEEE 802.11g ERP-DSSS/CCK			
Modulation/ Frequency Measurements	Frequency Range	2412 to 2472 MHz (channel No.1 to 13) 2484 (channel No.14)			
	Measurement Level Range	 -15 to +30 dBm (MS2830A-045 not installed) - 9 to +30 dBm (MS2830A-045 installed) 			
	Carrier Frequency Accuracy	Burst length ≥ 400 μs ± (Accuracy of reference frequency x carrier frequency + 21) Hz			
	Residual Vector Error	Specify filter with same characteristics as used for measured signal. ≤ 1.9 % (rms)			
	Center Frequency Leakage Floor	≤ –50 dBc (nominal)			
Amplitude Measurement	Tx Power Accuracy	Input attenuator≥ 10 dB ± 0.6 dB			
Spectrum Tx Spectrum Mask Measurement Dynamic Range		 ≥ 68 dB (11 MHz Offset from carrier frequency) ≥ 68 dB (22 MHz Offset from carrier frequency) ≥ 68 dB (33 MHz Offset from carrier frequency) The dynamic range refers to the transmitted power ratio for specified frequency offset. It is applied if RBW = 100 kHz and Mixer Level = -19 to -14 dBm. 			

Standard		IEEE 802.11g ERP-OFDM			
Modulation/ Frequency Measurements	Frequency Range	2412 to 2472 MHz (channel No.1 to 13) 2484 (channel No.14)			
	Measurement Level Range	–15 to +30 dBm (MS2830A-045 not installed) – 9 to +30 dBm (MS2830A-045 installed)			
	Carrier Frequency Accuracy	Burst length ≥ 250 µs ± (Accuracy of reference frequency x carrier frequency + 13) Hz			
	Residual Vector Error	Channel Estimation: SEQ, Phase Tracking: On, Amplitude Tracking: Off ≤ 1.2 % (rms)			
	Center Frequency Leakage Floor	≤ –50 dBc (nominal)			
Amplitude Measurement	Tx Power Accuracy	Input attenuator≥ 10 dB ± 0.6 dB			
Spectrum Measurement	Tx Spectrum Mask Dynamic Range	 ≥ 68 dB (11 MHz Offset from carrier frequency) ≥ 68 dB (20 MHz Offset from carrier frequency) ≥ 68 dB (30 MHz Offset from carrier frequency) The dynamic range refers to the transmitted power ratio for the specified frequency offset. It is applied if RBW = 100 kHz and Mixer Level = -19 to -4 dBm. 			

*: This is found from root sum of squares (RSS) of absolute amplitude accuracy and in-band frequency characteristics of main frame.

MX283027A-001 WLAN Test Software Specifications (3/3)

Standard			IEEE 802.11n HT Mixed, HT Greenfield, (STBC, MIMO not supported), MCS = 0 to 7, 32 supported Channel bandwidth: 20 MHz, 40 MHz				
	Frequency Range		2.4 GHz band 2412 to 2472 MHz (channel No.1 to 13), 2484 MHz (channel No.14) 5 GHz band 5180 to 5320 MHz (channel No.36 to 64), 5500 to 5700 MHz (channel No.100 to 140), 5745 to 5825 MHz (channel No.149 to 165)				
	Measurement Level Range		2.4 GHz band –15 to +30 dBm (MS2830A-045 not installed), -9 to +30 dBm (MS2830A-045 installed) 5 GHz band –12 to +30 dBm (MS2830A-045 not installed), -6 to +30 dBm (MS2830A-045 installed)				
Modulation/ Frequency Measurements	Carrier	20 MHz channel	Burst length≥250 µs ± (Accuracy of reference frequency x carrier frequency + 13) Hz (2.4 GHz band) ± (Accuracy of reference frequency x carrier frequency + 16) Hz (5 GHz band)				
	Accuracy	40 MHz channel	Burst length≥250 μs ± (Accuracy of reference frequency x carrier frequency + 62) Hz (2.4 GHz band) ± (Accuracy of reference frequency x carrier frequency + 102) Hz (5 GHz band)				
	Residual	20 MHz channel	Channel Estimation SEQ, Phase Tracking On, Amplitude Tracking Off ≤ 1.2 % (rms) (2.4 GHz band), ≤ 1.6 % (rms) (5 GHz band)				
	Vector Error	40 MHz channel	Channel Estimation SEQ, Phase Tracking On, Amplitude Tracking Off ≤ 1.6 % (rms) (2.4 GHz band), ≤ 2.0 % (rms) (5 GHz band)				
Center Frequency Leakage Floor		y Leakage Floor	≤–50 dBc (nominal)				
Amplitude	20 MHz channel		Input attenuator ≥ 10 dB ± 0.6 dB (2.4 GHz band), ±1.9 dB (5 GHz band)				
Measurement	Accuracy*	40 MHz channel	Input attenuator ≥ 10 dB ± 0.8 dB (2.4 GHz band), ± 2.0 dB (5 GHz band)				
Spectrum Tx Ma Measurement Ra	Tx Spectrum Mask Dynamic Range	20 MHz channel	2.4 GHz band ≥68 dB (11 MHz Offset from carrier frequency), ≥68 dB (20 MHz Offset from carrier frequency) ≥68 dB (30 MHz Offset from carrier frequency) 5 GHz band ≥68 dB (11 MHz Offset from carrier frequency), ≥68 dB (20 MHz Offset from carrier frequency) ≥68 dB (30 MHz Offset from carrier frequency) The dynamic range refers to the transmitted power ratio for the specified frequency offset. It is applied if RBW = 100 kHz and Mixer Level = −19 to −14 dBm.				
		40 MHz channel	2.4 GHz band ≥60 dB (21 MHz Offset from carrier frequency), ≥69 dB (40 MHz Offset from carrier frequency) ≥69 dB (60 MHz Offset from carrier frequency) 5 GHz band ≥60 dB (21 MHz Offset from carrier frequency), ≥69 dB (40 MHz Offset from carrier frequency) ≥69 dB (60 MHz Offset from carrier frequency) The dynamic range refers to the transmitted power ratio for the specified frequency offset. It is applied if RBW = 100 kHz and Mixer Level = −19 to −14 dBm.				

*: This is found from root sum of squares (RSS) of absolute amplitude accuracy and in-band frequency characteristics of main frame.

Note: Support 40MHz BW for IEEE802.11n



*: FPGA: Field Programmable Gate Array

• MS2830A: Signal Analysis Function

- Filtering process using FPGA circuit
- High speed processing
- Flexible analysis bandwidth upto31.25 MHz

MX283027A-001: Modulation Analysis for WLAN signal

- Filtering process using WLAN Test software
- Optimized filtering for WLAN measurement
- Upto40 MHz analysis bandwidth
 - => Remove spurious caused by dithering and aliasing
 - => Highly accurate EVM measurement

MX283027A-002 Bluetooth Test Software Specifications

The following specifications are guaranteed after 30-minute warm-up at a stable ambient temperature. Typical values are for reference only and are not guaranteed. Values are guaranteed after executing CAL at 18° to 28°C, and the measured signal is within the measurement level range and is less than or equal to Input Level.

Target Signal		Basic Rate, Bluetooth Low Energy			
Modulation/ Frequency Measurements	Measurement Frequency Range	2402 to 2480 MHz (channel No. 0 to 78)			
	Measurement Level Range	–15 to +30 dBm			
	Initial Carrier Frequency Stability Tolerance	'acket type: DH1, DH3, DH5, BLE Reference Packet 'ayload data: All feasurement range: 0 to ±100 kHz (nominal) feasurement accuracy: ±(Accuracy of reference frequency x carrier frequency + 2 kHz)			
	Modulation Characteristics	Packet type: DH1, DH3, DH5, BLE Reference Packet Payload data: 0xF0, 0x0F, 0xAA, 0x55 Frequency error measurement accuracy: ±1 kHz (nominal)			
	Carrier Frequency Drift	Packet type: DH1, DH3, DH5, BLE Reference Packet Payload data: 0xAA, 0x55 Measurement accuracy: ± 2 kHz (nominal)			
Amplitude Measurement	Tx Power Accuracy*	Input attenuator≥ 10 dB ± 0.6 dB			

Target Signal		Enhanced Data Rate		
	Measurement Frequency Range	2402 to 2480 MHz (channel No. 0 to 78)		
Madulation	Measurement Level Range	–15 to +30 dBm		
Modulation/ Frequency Measurements	EDR Modulation Accuracy	Packet type: 2-DH1, 2-DH3, 2-DH5, 3-DH1, 3-DH3, 3-DH5 Payload data: All DEVM floor ≤1.2% (rms)		
	EDR Carrier Frequency Stability	Packet type: 2-DH1, 2-DH3, 2-DH5, 3-DH1, 3-D3, 3-DH5 Payload data: All Measurement accuracy: ± (Accuracy of reference frequency x carrier frequency + 2 kHz)		
Amplitude Measurement	Tx Power Accuracy*	Input attenuator≥ 10 dB ± 0.6 dB		

*: This is found from root sum of squares (RSS) of absolute amplitude accuracy and in-band frequency characteristics of main frame.

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MS2830A - Features -

Expandability & Versatility

In addition, investment costs are cut by utilizing expandability of the MS2830A for applications such as cellular Tx evaluation thru addition of analysis software as well as Rx evaluation by output of LTE and W-CDMA signals from the built-in signal generator.



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EVM Comparison - WLAN Measurement Instrument - (1/5)



Slide 22 MX283027A-E-L-1

EVM Comparison - WLAN Measurement Instrument - (2/5)

♦ MS2830A / MT8860C EVM Comparison < 11n, 40 MHz BW, 3 ch >



This measurement data shows the example data of a measuring instrument chosen at random and is not guaranteed performance.

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EVM Comparison - WLAN Measurement Instrument - (3/5) MS2830A / MS8609A EVM Comparison < 11a, 54 Mbps, 5320 MHz >



This measurement data shows the example data of a measuring instrument chosen at random and is not guaranteed performance.

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EVM Comparison - WLAN Measurement Instrument - (4/5) MS2830A / MT8860C / MS8609A EVM Comparison < 11g, 54 MHz, 2452 MHz >



This measurement data shows the example data of a measuring instrument chosen at random and is not guaranteed performance.

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EVM Comparison - WLAN Measurement Instrument - (5/5) MS2830A/MT8860C/MS8609A EVM Comparison < 11b, 11 Mbps, 2452 MHz >



This measurement data shows the example data of a measuring instrument chosen at random and is not guaranteed performance.

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Ordering Information

Model/Ordaring No.	Name	Description	
MS2830A-040		9 kHz to 3.6 GHz	
MS2830A-041		9 kHz to 6 GHz	
MS2830A-043	Signal Analyzer	9 kHz to 13.5 GHz	
MS2830A-044		9 kHz to 26.5 GHz	
MS2830A-045		9 kHz to 43 GHz	
MS2830A-002	High Stability Reference Oscillator	Aging rate: 1x10 ⁻⁸ /day	
MS2830A 005	Analysis Bandwidth Extension to 31.25 MHz	Required for MX283027A-001	
IVIS2030A-005		Requires MS2830A-006, For MS2830A-040/041/043/044	
MS2830A-006	Analysis Bandwidth 10 MHz	Required for MX283027A-001/002	
MS28304-000	Bandwidth Extension to 31 25MHz for Millimeter-wave	Required for MX283027A-001	
IVIO2030A-009		Requires MS2830A-006, For MS2830A-045	
Vector Signal Genere	etor Options (MS2830A-044/045 cannot install MS2830A-020/021)		
Model/Ordaring No.	Name	Description	
MS2830A-020	3.6 GHz Vector Signal Generator	250 kHz to 3.6 GHz	
MS2830A-021	6 GHz Vector Signal Generator	250 kHz to 6 GHz	
MS2830A-022	Low Power Extension for Vector Signal Generator	–136 to +15 dBm (>25 MHz), –136 to –3 dBm (≤25 MHz)	
1000000 007*1	APR Momeny Lingrade 256 Maa for Vector Signal Constant	Memory: 64 Msamples (without MS2830A-027)	
IVIO203UA-U27		256 Msamples (with MS2830A-027)	
MS2830A-028	AWGN	CN Ratio absolute value: ≤ 40 dB	

*1: Must be installed to use the pre-installed IEEE802.11b

"11b_DSSS_2Mbps_PN9 (Continuous PN9 data between PSDUs) " waveform pattern.

Installing the Vector Signal Generator option (MS2830A-020/021) supports the following WLAN signal outputs:

•WLAN (IEEE802.11a/b/g) and Bluetooth (BR/EDR/BLE) Waveform Patterns pre-installed in the MS2830A-020/021 Vector Signal Generator option •Generation Waveform Patterns (IEEE802.11n/p/a/b/g/j) by WLAN IQproducer* pre-installed in MX283027A-001 WLAN Test Software

Ordering Information

Software Options

Model/Order No.	Name	Description	
MX283027A	Wireless Network Device Test Software	Required for MX283027A-001/002	
	WLAN Test Software	Requires MS283027A, MS2830A-006,005/009	
MX283027A-001	WLAN IQproducer (Standard attachment of MX283027A-001) [*]	Waveform Patterns Generation (IEEE802.11n/p/a/b/g/j)	
		Requires MS2830A-020/021	
MX283027A-002	Bluetooth Test Software	Requires MX283027A, MS2830A-006	

*: Please do not order MX269911A WLAN IQproducer separately.

Application Parts

Model/Order No.	Name
W3471AE	MX283027A Wireless Network Device Operation Manual (Operation)
W3473AE	MX283027A-001A WLAN Test Software Operation Manual (Operation)
W3474AE	MX283027A-001A WLAN Test Software Operation Manual (Remort Control)
W3488AE	MX370111A/MX269911A WLAN IQproducer Operation Manual and
	MX283027A-001A WLAN Test Software Operation Manual (WLAN IQproducer)
W3516AE	MX283027A-002 Bluetooth Test Software Operation Manual (Operation)
W3517AE	MX283027A-002 Bluetooth Test Software Operation Manual (Remort Control)

Configuration table

	MS2830A-040	MS2830A-041	MS2830A-043	MS2830A-044	MS2830A-045	
MS2830A-002	0	0	0	Standard		
MS2830A-005	0	0	0	O X ^{*1}		
MS2830A-006	0	0	0	0	0	
MS2830A-009		Selects MS	S2830A-005		O ^{*1}	
MS2830A-020	0	0	0			
MS2830A-021	0	0	0	MS2830A-044/045 cannot install		
MS2830A-022	0	0	0			
MS2830A-027	0	0	0	these options		
MS2830A-028	0	0	0	1		
MX269028A	0	0	0	0	0	
MX283027A	0	0	0	0 0		
MX283027A-001	0	0	0	0 0		
MX283027A-002	0	0	0	0 0		

O: Selects X: Not selects

*1: MS2830A-045 cannot install MS2830A-005.

Please Install MS2830A-009 for analysis bandwidth extension to 31.25 MHz.

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Recommended Configuration

MX283027A-001 WLAN Test Software

					√√: Required √:	Selected X: Not selected
	2.4 GHz band			5 GHz band		
Test target	Tx Test		Rx Test	Tx Te	st	Rx Test
	Not for Spurious Test	For Spurious Test	(Signal Generator*1)	Not for Spurious Test	For Spurious Test	(Signal Generator*1)
Main Frame						
MS2830A-040			alal	×		×
MS2830A-041		^	(Opt.020/021)		×	11
MS2830A-043	~~		(Opt-020/021)	22		(Opt-21)
MS2830A-044		11	v	1	22	v
MS2830A-045			<u>^</u>		ŶŶ	×
Hardware Options						
MS2830A-002	1	1		1	1	
MS2830A-005/009	المل	alal alal		22	اداد	
MS2830A-006		**				
Vector Signal Generator (Options (MS2830A-020/021 ca	annot be installed in MS28	30A-044/045.)			
MS2830A-020						x
MS2830A-021			√√			22
MS2830A-022						
MS2830A-027			2			2
MS2830A-028						
Software Options						
MX283027A	22	22	22	22	22	22
MX283027A-001*2			**			

*1: Installing the Vector Signal Generator option (MS2830A-020/021) outputs WLAN signals. MS2830A-020/021 can use as a reference signal source of the Rx test. MS2830A main functions sets the pattern send count.

*2: MX283027A-001 includes MX269911A WLAN IQproducer (Cannot order MX283027A-001 and MX269911A at same time).

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Recommended Configuration

MX283027A-002 Bluetooth Test Software

		√√: Required √:	Selected ×: Not selected	
	Basic Rate, Enhanced Data Rate, Bluetooth Low Energy			
Test target	Tx Test		Rx Test	
	Not for Spurious Test	For Spurious Test	(Signal Generator*)	
Main Frame				
MS2830A-040		~	ala/	
MS2830A-041		^	(Opt-020/021)	
MS2830A-043	$\sqrt{\sqrt{1}}$		(Opt-020/021)	
MS2830A-044		$\sqrt{\sqrt{2}}$	~	
MS2830A-045			^	
Hardware Options				
MS2830A-002	√	\checkmark		
MS2830A-005/009	√	\checkmark		
MS2830A-006	11	$\sqrt{1}$		
Vector Signal Generator Options (MS2830A-020/021 cannot be installed in MS2830A-044/045.)				
MS2830A-020				
MS2830A-021			$\sqrt{\sqrt{2}}$	
MS2830A-022				
MS2830A-027			2	
MS2830A-028			Y	
Software Options				
MX283027A	22	22	22	
MX283027A-002	**	N N	¥ Ÿ	

*: Installing the Vector Signal Generator option (MS2830A-020/021) outputs *Bluetooth* signals. MS2830A-020/021 can use as a reference signal source of the Rx test. MS2830A main functions sets the pattern send count.

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