Signal Analyzer MS2830A series

3.6 GHz Signal Analyzer  MS2830A-040
6 GHz Signal Analyzer  MS2830A-041
13.5 GHz Signal Analyzer  MS2830A-043

Product Introduction

MS2830A-040: 9 kHz to 3.6 GHz
MS2830A-041: 9 kHz to 6 GHz
MS2830A-043: 9 kHz to 13.5 GHz
<MS2830A-044: 9 kHz to 26.5 GHz*> <MS2830A-045: 9 kHz to 43 GHz*>  

*: See MS2830A-044/045 Product Introduction.

Version 16.00

ANRITSU CORPORATION
The MS2830A is a high-speed, high-performance, cost-effective Spectrum Analyzer/Signal Analyzer. Not only can it capture wideband signals but FFT technology supports multifunction vector signal analyses (VSA) in both the time and frequency domains. Behavior in the time domain that cannot be handled by a sweep type spectrum analyzer can be checked in the frequency domain. A wide frequency can be analyzed using sweep type spectrum analysis functions while detailed signal analysis of a specific frequency band is supported too. Moreover, the built-in vector signal generator (VSG) function outputs both continuous wave (CW) and modulated signals for use as a reference signal source when testing Tx characteristics of parts and as a signal source for evaluating Rx characteristics.
Key Signal Analyzer MS2830A Features

**Low Cost Plus High Performance**
- High-end RF performance at low-end price
- All-in-one spectrum analyzer and signal generator cuts costs by 30%

**Excellent Expandability Options**
Flexible configuration from basic spectrum analyzer to TRx all-in-one solution using options

**- Analysis Bandwidth Option**
  MS2830A-005: Analysis Bandwidth Extension to 31.25 MHz
  MS2830A-006: Analysis Bandwidth 10 MHz
  MS2830A-077: Analysis Bandwidth Extension to 62.5 MHz
  MS2830A-078: Analysis Bandwidth Extension to 125 MHz

*Note) Opt-077/078: An image response is received when setting the bandwidth to more than 31.25 MHz. This can be used when not inputting a signal frequency outside the MS2830A analysis bandwidth (125 MHz max.). The Signal Analyzer MS2690A/91A/92A series is recommended for other measurement purposes.

**- Low Phase Noise Performance Option**
  MS2830A-066: Low Phase Noise Performance

**- Signal Generator Option**
  MS2830A-020: 3.6 GHz Vector Signal Generator
  MS2830A-021: 6 GHz Vector Signal Generator
  MS2830A-088: 3.6GHz Analog Signal Generator
  MS2830A-052: Internal Signal Generator Control Function

**- Noise Figure Measurement Option**
  MS2830A-017: Noise Figure Measurement Function

**- Audio Analyzer Option**
  MS2830A-018: Audio Analyzer

**- BER Measurement Function Option**
  MS2830A-026: BER Measurement Function

**10 Times Faster**
- Local measurement and display update: 2.1 ms (SWT:1ms)
  : 0.7 ms (SWT:100us)
- Remote measurement and LAN transfer: 4.0 ms
- Marker peak search: 1.5 ms
- Center frequency tune + sweep + sweep data transfer: 12ms (RF/Micro band)

**High RF Performance**
- Displayed Avg. Noise Level: –153 dBm/Hz (30 MHz to 1 GHz)
- TOI : +15 dBm (300 MHz to 3.5 GHz)
- Total Level Accuracy: ±0.3 dB typ. (300 kHz to 4.0 GHz)

**Low Power Consumption**
110 VA (nominal) for 3.6/6 GHz SPA configuration
High Speed Supporting 10 Times Faster Throughput

The Signal Analyzer MS2830A supports very high-speed spectrum analyzer functions, such as sweeping and frequency switching time. Using the VSA mode with advanced DSP and FFT technologies cuts in-band and out-of-band spurious measurement times by 90% (cf previous Anritsu instruments) to greatly improve manufacturing and adjustment throughput.

Cuts tact time and improves adjustment efficiency

Best-of-class measurement speed (SPA Mode)

- Local measurement and display update: 2.1 ms (SWT: 1 ms)
  - 0.7 ms (SWT: 100 us)
- Remote measurement and LAN transfer: 4.0 ms
- Marker peak search: 1.5 ms
- Center frequency tune + sweep + sweep data transfer: 12 ms (RF/Micro band)

Faster speed (VSA Mode)

High-speed, in-band measurements up to 125 MHz bandwidth

The above times are for real measurements based on Anritsu measurement conditions. They are not guaranteed specifications. Actual measurement times vary with the PC and measurement conditions.

The MS2830A performs in-band measurements, such as ACP, OBW and Channel Power, many times faster than sweep spectrum analyzers by using FFT batch capture and analysis over a 125 MHz bandwidth and measurement interval.
Level calibration performance

The MS2830A uses built-in calibrator offers excellent total level accuracy of ±0.3 dB (typ.) at 300 kHz to 4 GHz.
High RF Performance Improves Yield

Excellent ±0.3 dB (typ.) absolute level accuracy and high 168 dB dynamic range improve yield by eliminating false-negative evaluation errors at distortion and spurious measurements.

Good Level accuracy

Bad

Wide Dynamic range

Narrow

Good item judged as NG

Noise floor raise causes measurement value rise and unstable noise power!
[cause]
1. Bad displayed average noise level
2. Bad TOI ⇒ Large ATT required to prevent distortion by high-power input
Low-Cost Plus High-Performance

The all-in-one SA + SG configuration costs 30% less than combining a standalone SA and SG.

Supports easy configuration of measurement systems and saves bench space, initial investment, and running costs (calibration and power consumption).
Optimum Current and Future Capital Investment

The MS2830A has various options to support continuously evolving wireless systems. It supports expansion from the base configuration with the spectrum analyzer to an all-in-one TRx tester as needed. Functions required now and sometime in the future are supported at minimum cost.

- Power
- ACP
- Spurious etc.
- Power
- ACP
- Spurious
- EVM etc.
- Power
- ACP
- Spurious
- EVM
- Rx test etc.

*Note) Opt.077/078:

An image response is received when setting the bandwidth to more than 31.25 MHz. This can be used when not inputting a signal frequency outside the MS2830A analysis bandwidth (125 MHz max.). The Signal Analyzer MS2690A/91A/92A series is recommended for other measurement purposes.
Optimum Current and Future Capital Investment

♦ MS2830A-066 Low Phase Noise Performance Option
Phase noise performance is increasingly important at carrier offsets of 1 kHz to 100 kHz. Spectrum analyzer phase noise performance affects ACLR/MASK measurements at narrowband communications. (Channel bandwidth : <100 kHz)
Add Option 066 when required by the specifications.

Frequency Range:
- 9 kHz to 3.7 GHz
  (Frequency band mode: Normal)
- 9 kHz to 3.5 GHz
  (Frequency band mode: Spurious)
  *: Requires MS2830A-041/043 for setting.

Span:
- 300 Hz to 1 MHz (Spectrum Analyzer)
- 1 kHz to 31.25 MHz (Signal Analyzer)

MS2830A-066 cannot be retrofitted
MS2830A-066 sometimes cannot be installed depending on options.

<table>
<thead>
<tr>
<th></th>
<th>Case 1</th>
<th>Case2</th>
<th>Case 3</th>
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<tbody>
<tr>
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<td>Yes</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>MS2830A-043</td>
<td>Yes</td>
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<td>Yes</td>
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<tr>
<td>MS2830A-066</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Low Power Consumption

The MS2830A consumes just $\leq 110$ W, cutting power by 45% compared to current models and reducing electricity consumption directly and indirectly through lower air conditioning costs. CO$_2$ emissions are reduced too.
Various Measurement Functions and Software

**Options**

- **Analysis Bandwidth Option**-
  - MS2830A-005 Analysis Bandwidth Extension to 31.25 MHz
  - MS2830A-006 Analysis Bandwidth 10 MHz
  - MS2830A-077 Analysis Bandwidth Extension to 62.5 MHz
  - MS2830A-078 Analysis Bandwidth Extension to 125 MHz
  *Note) Opt-077/078: An image response is received when setting the bandwidth to more than 31.25 MHz. This can be used when not inputting a signal frequency outside the MS2830A analysis bandwidth (125 MHz max.). The Signal Analyzer MS2690A/91A/92A series is recommended for other measurement purposes.

- **Signal Generator Option**-
  - MS2830A-020 3.6 GHz Vector Signal Generator
  - MS2830A-021 6 GHz Vector Signal Generator
  - MS2830A-088 3.6 GHz Analog Signal Generator

**Digitize function** (Opt.005/006/077/078)
Saves and input signals as IQ data files for re-analysis with VSA function

**VSA function** (Opt.005/006/077/078)
Seamless signal capture and analysis in multiple domains

**Measurement software** (MX2690xxA)
Covers modulation analysis of various communication systems from cellular systems, such as GSM, WCDMA, and LTE to GP analysis software.

**Vector Signal Generator** (Opt.020/021 and others)
Covers frequency range from 250 kHz to 3.6 GHz/6 GHz with 120-MHz wideband vector modulation bandwidth.

**Other useful functions**
- Measure function (SPA as standard, VSA function via Opt.005/006/077/078)
- Phase Noise Measurement function (Opt.010)
- Noise Figure Measurement function (Opt.017)
- Audio Analyzer function (Opt.018)
- BER Measurement function (Opt.026)
- Internal Signal Generator Control Function (Opt.052)
Digitize: Wideband and High Accuracy Waveform Capture

Captures wideband waveforms up to 125 MHz with accuracy of ±0.3 dB

Based on the excellent level accuracy and wide dynamic range of the MS2830A, a signal with an FFT analysis bandwidth of up to 125 MHz can be captured with a level accuracy of ±0.3 dB typ.

Max. Capture Time: 0.5 s to 2000 s
Max. Number of Samples: 100 Msamples

<table>
<thead>
<tr>
<th>Span*</th>
<th>Sampling Rate</th>
<th>Capture Time</th>
<th>Max. Sampling Data</th>
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</thead>
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<tr>
<td>1 kHz</td>
<td>2 kHz</td>
<td>2000 s</td>
<td>4M</td>
</tr>
<tr>
<td>2.5 kHz</td>
<td>5 kHz</td>
<td>2000 s</td>
<td>10M</td>
</tr>
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<tr>
<td>62.5 MHz</td>
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<tr>
<td>100 MHz</td>
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<td>100M</td>
</tr>
<tr>
<td>125 MHz</td>
<td>200 MHz</td>
<td>500 ms</td>
<td>100M</td>
</tr>
</tbody>
</table>

Opt. 006: 10 MHz max.
(20 MHz max. sampling rate = 50 ns resolution, ADC resolution 16 bits)
Opt. 005*: 31.25 MHz max.
(50 MHz max. sampling rate = 20 ns resolution, ADC resolution 16 bits)
Opt. 077*: 62.5 MHz max.
(100 MHz max. sampling rate = 10 ns resolution, ADC resolution 14 bits)
Opt. 078*: 125 MHz max.
(200 MHz max. sampling rate = 5 ns resolution, ADC resolution 14 bits)

Opt-077/078: An image response is received when setting the bandwidth to more than 31.25 MHz. This can be used when not inputting a signal frequency outside the MS2830A analysis bandwidth (125 MHz max.). The Signal Analyzer MS2690A/91A/92A series is recommended for other measurement purposes.

*: With Opt. 006: 1 kHz to 10 MHz
With Opt. 005/006: 1 kHz to 31.25 MHz
With Opt. 005/006/077: 1 kHz to 62.5 MHz
With Opt. 005/006/077/078: 1 kHz to 125 MHz

*4: 300 kHz ≤ f ≤ 4 GHz, Frequency band mode Normal.
*5: Excluding Guard Band.
Digitize: Calibration-Free Waveform Capture

No need for calibration block at analysis tool side

The MS2830A has built-in amplitude/phase calibration circuits to automatically calibrate internal errors.
Captured waveform data are saved to the built-in hard disk and can be output to an external PC via 1000BASE-T.

Digitize RF signals

Re-analyze with VSA function

High-speed transfer using 1000BASE-T
VSA: Multi-domain Analysis of Captured Signals

Display captured waveforms in various domains

**Frequency vs. Time**
Measures FSK and GMSK modulation wave frequency variation, and VCO frequency switching time

**Spectrum**
Displays waveform of wideband SPAN up to 125 MHz without interruption

**Power vs. Time**
Supports wideband CCDF analysis up to 31.25 MHz; useful for evaluating power amplifiers in wideband communications systems

**Phase vs. Time**
Monitors time fluctuations of phase to check sudden phase shift

**Spectrogram**
Displays spectrum variations with time; useful for understanding waveform transients because supports visual monitoring of frequency and level time variations

**CCDF/APD**
Supports wideband CCDF analysis up to 125 MHz and ideal for evaluating power amps for wideband communication systems
Various VSA analyses can be performed on the main trace by specifying analysis segments on the sub-trace. Intuitive analysis focusing on signal-on/rising/falling, etc., parts is made easy by observing signal distributions on the sub-trace.

**Main Trace**
- Spectrum
- Power vs. Time
- Frequency vs. Time
- Phase vs. time
- CCDF/APD
- Spectrogram

**Sub-trace**
- Power vs. Time
- Spectrogram
VSA: One-Step Observation of Rising/Falling Signals

Changing the analysis segment at the sub-trace permits frame-by-frame replay of the spectrum at the main trace. This function supports troubleshooting by frame-by-frame replay of transient burst responses and generation of unwanted spurious in captured RF signals.

Changing the analysis section supports frame-by-frame replay of the rising signal.
Captured waveforms can be replayed again by using the VSA function to read saved digitize data. This is convenient for comparing performance of each DUT test phase using digitized data as well as for troubleshooting post-shipment product faults.

Digitize Data File Selection Screen

Digitize Data

DUT (A)

DUT (B)

DUT (C)
Captured data can be saved to a file by specifying the Analysis Time range (display range of main trace) or any time. The amount of saved data and later workload are cut because only required segments are captured and saved to a file.

Example: Capture 20 ms and save only one burst (600 µs) of GSM signal to file.
VSA: FFT Analysis for Ultra-High-Speed Advantage

Supports measurements **many times faster** than a sweep spectrum analyzer by using the signal analyzer mode, which performs FFT analysis.

**Spectrum Analyzer**
- SPAN: 25 MHz
- RBW: 30 kHz
- SWT: 95 ms

**Signal Analyzer**
- SPAN: 25 MHz
- RBW: 30 kHz
- Analysis Length: 95 µs

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**20 Averagings**
- Measurement Time: **2.6 s**

**20 Averagings**
- Measurement Time: **0.3 s**

**Batch Capture**
- Measurement Time: **0.04 s**

*: Spectrum Analyzer measurement times measured with the MS269xA.
VSA Function: No Trace Mode

No Trace mode does not execute signal analysis. Therefore, “IQ data output” and “IQ data readout using remote commands” can be executed quickly without the need to wait for completion of analysis.

(1) Analysis Start Time
(1) Analysis Time Length

Displays “Analysis Start Time” and “Analysis Time Length”.

*: As analysis is not executed, Save Waveform function for saving waveform data cannot be used.
Modulation analysis of various communication systems from cellular system, such as GSM, WCDMA, and LTE to GP analysis software is all supported. See each measurement software catalog for more details.

<table>
<thead>
<tr>
<th>Communications Systems</th>
<th>Model</th>
<th>Name</th>
<th>Addition to Main frame (✓: Can be installed, No: Cannot be installed)</th>
<th>Analysis Bandwidth Extension Option (✓: Required, ✓+: Function expansion, Space (no symbol): No specification)</th>
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<tbody>
<tr>
<td>LTE/LTE-Advanced (FDD)</td>
<td>MX269020A</td>
<td>LTE Downlink Measurement Software</td>
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<td>802.11ac (80 MHz) Measurement Software</td>
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</table>
The MS2830A incorporates a Vector Signal Generator option with frequency range from 250 kHz to 3.6 GHz/6.0 GHz, and a 120 MHz vector modulation band. Due to the excellent level accuracy and ACLR performance, it is ideal for using with the spectrum analyzer and signal generator functions to measure amplifiers, filters, and antennas.

**Features**

- **Frequency range**
  - 250 kHz to 3.6 GHz (Opt-020)
  - 250 kHz to 6.0 GHz (Opt-021)

- **Output level range**
  - –40 to +20 dBm (Standard)
  - –136 to +15 dBm (Opt-022)

- **Vector modulation band**: 120 MHz

- **Waveform memory**
  - 64 Msa (Standard), 256 Msa (Opt-027)

- **High level accuracy**
  - Absolute Level Accuracy: ±0.5 dB, Linearity: ±0.2 dB (typ.)

- **Excellent ACLR performance**
  - ≤–64 dBC @ 5 MHz offset
  - ≤–67 dBC @ 10 MHz offset

- **AWGN function** (Opt-028)
The pre-installed standard waveform patterns are bundled free-of-charge. Moreover, optional PC software (IQproducer) generates waveform patterns with any parameter settings.

In addition, any waveform pattern can be created using IQ data output from simulation tools.

**Versatile communication system**

**Built-in waveform patterns**
- W-CDMA - HSDPA - CDMA2000
- CDMA2000 1xEV-DO - GSM/EDGE
- Digital Broadcast (ISDB-T/BS/CS/CATV)
- WLAN (IEEE802.11a/11b/11g) - Bluetooth®

**Option waveform patterns**
- AWGN (Requires MS2830A-028)
- CDMA2000 1xEV-DO (Reverse Link)

**IQproducer (waveform creation software)**
- LTE (FDD)* / LTE-Advanced (FDD)*
- LTE (TDD)* / LTE-Advanced (TDD)*
- HSDPA/HSUPA*
- W-CDMA
- TDMA (Digital LMR/PMR, PHS, etc.)*
- Multi-carrier*
- WLAN (11a/b/g/n/j/p)* / WLAN 11ac*
- TD-SCDMA* *:option

**Arbitrary waveform creation**
Outputs ASCII IQ data from EDA tool converted to waveform pattern for MS2830A-020/021

See each IQproducer catalog for more details.
This all-in-one hardware SG has the performance (6 GHz frequency, 120 MHz modulation band) to output signals for main communication systems.

- **Frequency range up to 6 GHz**
  The frequency range covers 250kHz to 3.6GHz/6.0GHz and 5 GHz band wireless LAN and 4G.

- **120 MHz Vector modulation band**
  The wideband 120 MHz vector modulation is achieved using a built-in baseband signal generator.
The Vector Signal Generator standard option supports high outputs of +20 dBm max. Installing the MS2830A-022 Low Power Extension for Vector Signal Generator supports low-power outputs up to –136 dBm. It is ideal for Rx sensitivity tests.

**Output level range (Standard)**

-40 to +20 dBm

**All-in-one instrument for amplifier tests**

**Output level range (Opt-022)**

–136 to +15 dBm

**Supports simple design of Tx/Rx test system**
SG: ACLR Performance (Vector SG)

◆ Superior ACLR Performance

The superior ACLR performance is useful for device Tx tests of amplifiers, etc. The MX269904A Multi-Carrier IQproducer software generates multiple carrier waveform patterns.

ACLR (measured value)

(W-CDMA, TestModel1 64DPCH, 2 GHz, SG output –10 dBm)

*: Value only data selected at random, and not guaranteed performance
Built-in AWGN Generator for Dynamic Range Tests

This can add AWGN (Additive White Gaussian Noise) to the wanted wave in the arbitrary waveform memory. It is useful for Tx dynamic range tests.

MS2830A-020/021 Vector Signal Generator

Waveform memory (64/256 Msa)

Wanted signal

Signal output

AWGN Generator (Opt-028)

AWGN band set automatically to sampling clock of wanted signal

Example: Wanted signal conditions
- WCDMA
- Bandwidth = 3.84 MHz
- Oversampling = 4 times

AWGN bandwidth = 3.84 MHz x 4 = 15.36 MHz
Captured waveforms are converted to Vector SG waveform patterns using the built-in PC software. These patterns are read by the Vector SG to replay the signal. The field environment is easily reproduced at the bench top to use captured device signals with a stable golden DUT for debugging and higher reliability testing.
Digitizer Function + Vector SG Option

Capture & Playback Function

The MS2830A provides *Capture & Playback* functionality that enables laboratory-grade testing of transceiver systems using real world signals. Using the optional integrated Vector Signal Analyzer and Vector Signal Generator of the MS2830A, *Capture & Playback* allows users to conveniently capture up to 100 MHz of spectrum and play it back at any designated frequency and amplitude, making it easy to determine device performance margins.

- **Bandwidth and Time Limits**
  - Minimum 10 kHz Bandwidth (2000 s maximum duration)*
  - Maximum 100 MHz Bandwidth (500 ms maximum duration)*

  *: Maximum bandwidth depends upon vector signal analyzer options installed (Opt. 006/005/077/078). Maximum playback duration depends upon whether vector signal generator memory upgrade (Opt. 027) is installed.

- **Captured signal may be freely tuned to any output frequency and amplitude supported by the vector signal generator.**

- **Any section of the captured waveform record may be selected and played back.**
  - Enables user to isolate and reproduce specific signal bursts
  - Enables user to change duty cycle of pulsed waveforms
Internal Signal Generator Control Function Option (Opt.052)

The Internal signal generator control function operates in conjunction with the spectrum analyzer (SPA) function and built-in signal generator (SG) option to measure the transmission characteristics of filters, amplifiers, etc.

- Filters
- Attenuators
- Amplifiers
- Isolators
- Switches

The DUT input signal source has a frequency range of 100 kHz to 6 GHz, an output level range of -136 to +15 dBm, a step resolution of 0.01 dB, and a level accuracy of ±0.5 dB to measure both passive and active devices using the built-in high-performance SG.

- Accurate Frequency Characteristics
The SPA function displays the measured frequency characteristics results with an excellent linearity error of just ±0.07 dB to display the frequency characteristics of bandpass filters, etc., accurately.
Useful Measurement Functions for Evaluating Tx Characteristics (1/21)

The MS2830A has all the versatile built-in measurement functions needed for evaluating Tx characteristics. Using functions matching measurements supports simple tests according to specifications.

<table>
<thead>
<tr>
<th>Measure Function</th>
<th>SPA *¹</th>
<th>VSA *²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel Power</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Occupied Bandwidth</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Adjacent Channel Leakage Power</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Spectrum Emission Mask</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Burst Average Power</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Spurious Emission</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>AM Depth</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>FM Deviation</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Multi-marker &amp; Marker List</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Highest 10 Markers</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Limit Line</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Frequency Counter</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>2-tone 3rd-order Intermodulation Distortion</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Annotation Display (On/Off)</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Power Meter</td>
<td>Independent function *³</td>
<td></td>
</tr>
<tr>
<td>Phase Noise</td>
<td>Opt. 010</td>
<td></td>
</tr>
<tr>
<td>Noise Figure</td>
<td>Opt. 017 *⁴</td>
<td></td>
</tr>
</tbody>
</table>

*1: SPA (Spectrum Analyzer)  
*2: VSA (Vector Signal Analyzer), Requires Opt. 005/006/077/078  
*3: Use USB Power Sensors  
*4: Use Noise Sources (Noisecom, NC346 series)
Channel Power

Channel power measurement using three types of filter (Rectangular, Nyquist, Root Nyquist) is supported.

Channel Power Measurement

Measurement function ON/OFF
Channel center frequency
Channel bandwidth

Filter:
Rectangular, Nyquist, Root Nyquist

Bandwidth

Results display

Channel Center: Set value for channel center frequency
Channel Width: Set value for channel bandwidth
Absolute Power: Power per Hz (Density)
In-zone power (Integration)
Useful Measurement Functions for Evaluating Tx Characteristics (3/21)

Occupied Bandwidth

Occupied bandwidth is measured in two modes—N% and X dB.

Occupied Bandwidth Measurement

Measurement function ON/OFF
Measurement mode selection: (See below)
% setting for <N%> mode
Power setting for <X dB> mode

N% mode: Bandwidth containing N% power with total power in display as 100%
X dB mode: Bandwidth X dB down from peak value

OBW: Occupied bandwidth
OBW Lower: Occupied bandwidth left-side frequency
OBW Center: Center frequency of occupied bandwidth
OBW Upper: Occupied bandwidth right-side frequency
Adjacent Channel Leakage Power (ACLR)

This function measures adjacent channel leakage power.

**Adjacent Channel Leakage Power Measurement**

- Reference Power setting: (See below)
- In-band setting
- Offset Channel setting
- Result display switching
- Carrier: In-band, Ofs: Offset Channel,
  All: Both In-band and Offset Channel
- Noise cancellation function ON/OFF
  (subtracts main-frame noise from measurement result)

Reference power setting:
- SPAN TOTAL: Integral power for overall display
- Carrier Total: Total of all carrier power
- Both Sides of Carriers: Out-of-band carrier power
- Carrier Select: Specified carrier power

Relative power for Offset 1 to 3 [dBc] vs. reference power selected with ACP Reference
( ) indicates absolute power [dBm].
Adjacent Channel Leakage Power (ACLR)

In Band can be set from 1 to 12 carriers and switched instantaneously on the screen. Moreover, true ACLR performance is measured using the noise cancellation function to subtract main-frame noise from the measurement result.
Offset channel can be set from 1 to 8 and switched instantaneously on the screen.

ACLR Measurement (12 carriers / 8 offsets)

Offset number switched instantaneously!
Spectrum Emission Mask (SEM)

Offset limit lines can be set for up to 12 segments. The peak frequency and level in each segment are displayed and parts exceeding the limit line are indicated in red. Also, when a limit line is exceeded at just one part, Fail is displayed in red at the Result displays at the bottom left of the screen.

### Spectrum Emission Mask Measurement

- **Measurement function ON/OFF**
- **Reference carrier bandwidth and sweeping method setting**
- **Offset position and sweeping method setting**
- **Limit line setting (orange line)**
- **Measurement target setting: (See below)**
- **Result display switching**
  - Peak: Absolute power
  - Margin: Margin for limit line

**Measurement Target Setting**
- Both: Measures both Lower and Upper
- Lower: Measures Lower
- Upper: Measures Upper

Level (Peak/Margin) and frequency of point closest to limit line per offset.
Limit Lines

Up to six types of Limit line can be set on the spectrum display (frequency domain). In addition to setting the frequency and level of crossover points manually in sequence from the low frequency, after creating the right half of a line, the left half can be created by reversing and copying the right half, to set a symmetric limit line. Additionally, a Limit line that traces the measured waveform can be created using the Limit Envelope function. A margin can be set on the Limit line in the amplitude direction.

When the waveform is above or below the Limit line, it is evaluated automatically as PASS or FAIL. Evaluation is also possible with an added margin. The target evaluation line can be chosen from any of six types.

When the waveform matches the evaluation conditions (Event), it can be saved automatically as a csv format file. Any one of the following five Event types can be selected. (Save on Event Function)

1. Limit Fail: Saves waveform file when evaluation result is Fail
2. Limit Pass: Saves waveform file when evaluation result is Pass
3. Margin Fail: Saves waveform file when evaluation result including Margin is Fail
4. Margin Pass: Saves waveform file when evaluation result including Margin is Pass
5. Sweep Complete: Saves waveform file at every measurement regardless of evaluation result

Line: Limit 1, Limit 2, Limit 3, Limit 4, Limit 5, Limit 6
Evaluation Type: Upper Limit, Lower Limit
Crossover (Point): 1 to 100
Margin: Set Margin line for each Limit 1, 2, 3, 4, 5, 6
Evaluation Result: PASS, FAIL
Result Save: Auto-save as csv format file. (Save on Event Function)
Average In-burst Power Measurement

The average power of specified burst segments is displayed in the time domain. Measurement only requires setting the measurement start and end positions on the screen.

- Measurement function ON/OFF
- Measurement start position
- Measurement stop position
- Noise cancellation function ON/OFF (Subtracts main-frame noise from measurement result)

Displays average power between Start Time and Stop Time
Spurious Emission

The peak frequency and level in each segment and the standard margin are displayed; parts exceeding the limit line are indicated in red. Also, Fail is displayed in red at the bottom left of the Results display even when the limit line is exceeded at only one part. A maximum of 20 segments can be set.

Spurious Emission Measurement

- Time Domain Measurement:
  - Spurious can be swept (detected) for up to 20 segments using the Zero Span measurement function.
  - Different parameters (RBW/VBW) from segment sweeping can be set.
  - Time domain measurements can switched ON/OFF.

Detected spurious: Segment number, frequency, level (Peak/Margin), limit line
Useful Measurement Functions for Evaluating Tx Characteristics (11/21)

AM: Power vs. Time
This function measures the amplitude modulation.

FM Shift Measurement Function: Frequency vs. Time
This function measures frequency shift.

**AM Measurement**

- **Time**
- **Amplitude**

Results Display:
- +Peak, -Peak, (Peak-Peak)/2, average voltage between marker 1 and 2

**FM Shift Measurement**

- **Time**
- **Frequency**

Results Display:
- +Peak, -Peak, (Peak-Peak)/2, average frequency between marker 1 and 2
Phase Fluctuation Display Function: Phase vs. Time

This function displays phase time fluctuations.

Phase Fluctuation Display:

Phase Fluctuation:
Phenomena that are hard to spot using a spectrum analyzer, such as phase drift due to switching and transients, can be evaluated.
Zone Marker Function
This displays the Peak value within the specified range. It is useful for measuring unstable signals with fluctuating frequency and noise.

Multi-Marker/Highest 10 Function
This automatically searches for the ten highest peaks sorted from highest level (Sort Y) or lowest frequency (Sort X).
In addition, setting a threshold eliminates unnecessary searching.
This can be used for IM and harmonic, etc., measurements.

IM Measurement

Harmonic Measurement
Gate Sweeping

This function performs sweeping at the specified gate timing. The spectrum of the burst-on signal is easily displayed, etc., because sub-screens can be displayed simultaneously in the time domain.

Frequency Counter

Set [Freq. Count] to ON to use the frequency counter function. [Gate Time] sets the frequency counter measurement time.

Results Display

Gate Time:
- Sets frequency counter measurement time
2-tone 3rd-order Intermodulation Distortion

By inputting two different frequency CW signals (desired waves), two-tone third order intermodulation distortion is generated close to the desired waves according to non-linear characteristics of DUT. Then, TOI (Third Order Intercept) is calculated from the two-tone third order intermodulation distortion.

### Results Display

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOI (dBm)</td>
<td>Displays the calculated TOI. The Worst value (lower) between two calculated values (lower and upper) is displayed.</td>
</tr>
<tr>
<td>Amplitude (dBc)</td>
<td>Displays the level ratio of two-tone third order intermodulation distortion to the desired wave. The Worst value (larger) between two calculated values (lower and upper) is displayed.</td>
</tr>
<tr>
<td>Lower 3rd</td>
<td>Two-tone third-order intermodulation distortion that occurs at the lower frequency of the desired wave. Frequency, signal level, level ratio to the desired wave, and calculated TOI are displayed.</td>
</tr>
<tr>
<td>Lower Tone</td>
<td>Desired wave that includes the lower frequency component. Frequency and signal level are displayed.</td>
</tr>
<tr>
<td>Upper Tone</td>
<td>Desired wave that includes the upper frequency component. Frequency and signal level are displayed.</td>
</tr>
<tr>
<td>Upper 3rd</td>
<td>Two-tone third-order intermodulation distortion that occurs at the upper frequency of the desired wave. Frequency, signal level, level ratio to the desired wave, and calculated TOI are displayed.</td>
</tr>
</tbody>
</table>
Annotation Display (On/Off)

Screen annotations can be set to On or Off. Annotations about frequency, amplitude, etc., are not displayed at the Off setting.
Power Meter Function

Power meter function can connect a USB power sensor to the MS269xA and read the measurement values.

Measurement Results

- Power: [dBm], [W]
- Relative power: [dB]

Compatible USB power sensors

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency</th>
<th>Dynamic Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA24104A*</td>
<td>600 MHz to 4 GHz</td>
<td>+3 to +51.76 dBm</td>
</tr>
<tr>
<td>MA24105A</td>
<td>350 MHz to 4 GHz</td>
<td>+3 to +51.76 dBm</td>
</tr>
<tr>
<td>MA24106A</td>
<td>50 MHz to 6 GHz</td>
<td>–40 to +23 dBm</td>
</tr>
<tr>
<td>MA24108A</td>
<td>10 MHz to 8 GHz</td>
<td>–40 to +20 dBm</td>
</tr>
<tr>
<td>MA24118A</td>
<td>10 MHz to 18 GHz</td>
<td>–40 to +20 dBm</td>
</tr>
<tr>
<td>MA24126A</td>
<td>10 MHz to 26 GHz</td>
<td>–40 to +20 dBm</td>
</tr>
</tbody>
</table>

*: MA24104A has been discontinued.

Installing the Anritsu PowerXpert™

Installing the Anritsu PowerXpert™ PC application software for the Anritsu USB Power Sensor in the MS2830A supports various measurement functions offered by Anritsu PowerXpert™, as well as use of other USB power sensors by the MS2830A. Anritsu PowerXpert™ for the MS2830A can be downloaded from the MS2830A and MS2830A Microwave product pages at the Anritsu website. When using the Anritsu PowerXpert™ software with a PC, download the latest version from the USB Power Sensor product page at the Anritsu website.
Phase Noise Measurement Function [Opt-010]

This function measures the phase noise over a frequency offset range of 10 Hz to 10 MHz.

- **Normal**: Normal marker. Displays phase noise level at specified frequency offset.
- **Integral Noise**: Calculates Integral Noise for specified integrated bandwidth.
- **RMS Noise**: Calculates RMS Noise for specified integrated bandwidth.
- **Jitter**: Calculates Jitter for specified integrated bandwidth.
- **Residual FM**: Calculates Residual FM for specified integrated bandwidth.

**Carrier Frequency**:
- 10 MHz to main frame upper limit

**Start Offset (lower limit frequency)**: 10 Hz to 1 kHz

**Stop Offset (upper limit frequency)**: 100 kHz to 10 MHz

**Log Scale Line(10/16)**:
- Sets number of Log scale lines to 10 or 16

**Reference Value**: Sets upper limit of vertical axis
- –140 to –50 dBc/Hz (Log Scale Line: 10)
- –170 to –20 dBc/Hz (Log Scale Line: 16)
Noise Figure Measurement Function [Opt.017]

Noise Figure is measured with the measurement method of Y-factor method which uses a Noise Source.

- Frequency Mode: Fixed/List/Sweep
- DUT Mode: Amplifier
- Screen Layout: Graph/Table

Measurement Results Display

- Graph/List/Spot
  - Displays measurement results for each trace (Trace 1/Trace 2).
  - Noise Figure (NF) [dB]
  - Noise Factor (F) [Linear]
  - Gain
  - Y-Factor: Power ratio when Noise Source is turned ON/OFF
  - T effective: Effective noise temperature
  - P Hot: Power measured when Noise Source is On.
  - P Cold: Power measured when Noise Source is Off.

Measurement Result: Example of Graph display
(Frequency Mode: Sweep, Screen Layout: Graph)

Measurement Result: Example of Spot display
(Frequency Mode: Fixed)

Measurement Result: Example of List display
(Frequency Mode: List, Screen Layout: List)
Noise Figure Measurement Function [Opt.017]

Noise Source
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

<table>
<thead>
<tr>
<th>Model</th>
<th>RF Connector</th>
<th>Frequency [GHz]</th>
<th>Output ENR [dB]</th>
<th>VSWR (maximum @ on/off) [GHz]</th>
<th>DC Offset</th>
<th>DC Block</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC346A</td>
<td>SMA (M)</td>
<td>0.01 to 18.0</td>
<td>5 to 7</td>
<td>1.15:1, 1.25:1</td>
<td>—</td>
<td>No</td>
</tr>
<tr>
<td>NC346A Precision</td>
<td>APC3.5 (M)</td>
<td>0.01 to 18.0</td>
<td>5 to 7</td>
<td>1.15:1, 1.25:1</td>
<td>—</td>
<td>No</td>
</tr>
<tr>
<td>NC346A Option 1</td>
<td>N (M)</td>
<td>0.01 to 18.0</td>
<td>5 to 7</td>
<td>1.15:1, 1.25:1</td>
<td>—</td>
<td>No</td>
</tr>
<tr>
<td>NC346A Option 2</td>
<td>APC7</td>
<td>0.01 to 18.0</td>
<td>5 to 7</td>
<td>1.15:1, 1.25:1</td>
<td>—</td>
<td>No</td>
</tr>
<tr>
<td>NC346A Option 4</td>
<td>N (F)</td>
<td>0.01 to 18.0</td>
<td>5 to 7</td>
<td>1.15:1, 1.25:1</td>
<td>—</td>
<td>No</td>
</tr>
<tr>
<td>NC346B</td>
<td>SMA (M)</td>
<td>0.01 to 18.0</td>
<td>14 to 16</td>
<td>1.15:1, 1.25:1</td>
<td>—</td>
<td>No</td>
</tr>
<tr>
<td>NC346B Precision</td>
<td>APC3.5 (M)</td>
<td>0.01 to 18.0</td>
<td>14 to 16</td>
<td>1.15:1, 1.25:1</td>
<td>—</td>
<td>No</td>
</tr>
<tr>
<td>NC346B Option 1</td>
<td>N (M)</td>
<td>0.01 to 18.0</td>
<td>14 to 16</td>
<td>1.15:1, 1.25:1</td>
<td>—</td>
<td>No</td>
</tr>
<tr>
<td>NC346B Option 2</td>
<td>APC7</td>
<td>0.01 to 18.0</td>
<td>14 to 16</td>
<td>1.15:1, 1.25:1</td>
<td>—</td>
<td>No</td>
</tr>
<tr>
<td>NC346B Option 4</td>
<td>N (F)</td>
<td>0.01 to 18.0</td>
<td>14 to 16</td>
<td>1.15:1, 1.25:1</td>
<td>—</td>
<td>No</td>
</tr>
<tr>
<td>NC346D</td>
<td>SMA (M)</td>
<td>0.01 to 18.0</td>
<td>19 to 25**1</td>
<td>1.50:1, 1.50:1</td>
<td>—</td>
<td>No</td>
</tr>
<tr>
<td>NC346D Precision</td>
<td>APC3.5 (M)</td>
<td>0.01 to 18.0</td>
<td>19 to 25**1</td>
<td>1.50:1, 1.50:1</td>
<td>—</td>
<td>No</td>
</tr>
<tr>
<td>NC346D Option 1</td>
<td>N (M)</td>
<td>0.01 to 18.0</td>
<td>19 to 25**1</td>
<td>1.50:1, 1.75:1</td>
<td>—</td>
<td>No</td>
</tr>
<tr>
<td>NC346D Option 2</td>
<td>APC7</td>
<td>0.01 to 18.0</td>
<td>19 to 25**1</td>
<td>1.50:1, 1.50:1</td>
<td>—</td>
<td>No</td>
</tr>
<tr>
<td>NC346D Option 3</td>
<td>N (F)</td>
<td>0.01 to 18.0</td>
<td>19 to 25**1</td>
<td>1.50:1, 1.75:1</td>
<td>—</td>
<td>No</td>
</tr>
<tr>
<td>NC346E</td>
<td>APC3.5 (M)</td>
<td>0.01 to 26.5</td>
<td>13 to 17</td>
<td>1.15:1, 1.25:1, 1.35:1</td>
<td>Yes**3</td>
<td>Required**3</td>
</tr>
<tr>
<td>NC346E Precision</td>
<td>APC3.5 (M)</td>
<td>0.01 to 26.5</td>
<td>19 to 25**1</td>
<td>1.50:1, 1.50:1</td>
<td>Yes**3</td>
<td>Required**3</td>
</tr>
<tr>
<td>NC346ECA</td>
<td>APC3.5 (M)</td>
<td>0.01 to 26.5</td>
<td>19 to 25**1</td>
<td>1.50:1, 1.50:1</td>
<td>Yes**3</td>
<td>Required**3</td>
</tr>
</tbody>
</table>

*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.
### Noise Figure Measurement Function [Opt.017]

#### Specifications outlines of recommended DC Blocks and Adapters

<table>
<thead>
<tr>
<th>Model</th>
<th>Ordering Name</th>
<th>RF Connector</th>
<th>Frequency Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>J0805</td>
<td>DC Block, N type (MODEL 7003)</td>
<td>N (M)-N (F)</td>
<td>10 kHz to 18 GHz</td>
</tr>
<tr>
<td>J1555A</td>
<td>DC Block, SMA type (MODEL 7006-1)</td>
<td>SMA (M)-SMA (F)</td>
<td>9 kHz to 20 GHz</td>
</tr>
<tr>
<td>K261</td>
<td>DC Block</td>
<td>K (M)-K (F)</td>
<td>10 kHz to 40 GHz</td>
</tr>
<tr>
<td>J0004</td>
<td>Coaxial Adapter</td>
<td>N (M)-SMA (F)</td>
<td>DC to 12.4 GHz</td>
</tr>
<tr>
<td>J1398A</td>
<td>N-SMA Adapter</td>
<td>N (M)-SMA (F)</td>
<td>DC to 26.5 GHz</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency Range</th>
<th>RF Connector</th>
<th>Recommended DC Block Order Name</th>
<th>Recommended Adapter Order Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS2830A-040</td>
<td>9 kHz to 3.6 GHz</td>
<td>N (F)</td>
<td>Not required</td>
<td>Not required</td>
</tr>
<tr>
<td>MS2830A-041</td>
<td>9 kHz to 6 GHz</td>
<td>N (F)</td>
<td>Not required</td>
<td>Not required</td>
</tr>
<tr>
<td>MS2830A-043</td>
<td>9 kHz to 13.5 GHz</td>
<td>N (F)</td>
<td>Not required</td>
<td>Not required</td>
</tr>
<tr>
<td>MS2830A-044</td>
<td>9 kHz to 26.5 GHz</td>
<td>N (F)</td>
<td>J1555A (9 kHz to 20 GHz)</td>
<td>J1398A</td>
</tr>
<tr>
<td>MS2830A-045</td>
<td>9 kHz to 43 GHz</td>
<td>K (F)</td>
<td>K261</td>
<td>Not required</td>
</tr>
<tr>
<td>MS2690A</td>
<td>50 Hz to 6 GHz</td>
<td>N (F)</td>
<td>J1555A (from 9 kHz)</td>
<td>J0004</td>
</tr>
<tr>
<td>MS2691A</td>
<td>50 Hz to 13.5 GHz</td>
<td>N (F)</td>
<td>J1555A (from 9 kHz)</td>
<td>J1398A</td>
</tr>
<tr>
<td>MS2692A</td>
<td>50 Hz to 26.5 GHz</td>
<td>N (F)</td>
<td>J1555A (9 kHz to 20 GHz)</td>
<td>J1398A</td>
</tr>
</tbody>
</table>
BER Measurement Function [Opt.026]

Returns Data/Clock/Enable demodulated by DUT to MS2830A BER function

- Input Bit Rate: 100 bps to 10 Mbps
- Input Signal: Data, Clock, Enable
  (Polarity reversal supported)
- Input Level: TTL 3.3V
- Measured Patterns:
  PN9/11/15/20/23, ALL1, ALL0,
  Alternate(0101...), User Data(4,096 bit Max.),
  PN9fix/11fix/15fix/20fix/23fix
- Count Mode:
  Data: Measures until specified Data count
  Error: Measures until specified Error count
- Measurable Bit Count: 1000 to $2^{32} - 1$
  (4,294,967,295 bit)
- Measurable Error Bit Count: 1 to $2^{31} - 1$
  (2,147,483,647 bit)
- Count Mode:
  Single: Measures specified measurement bit count once
  Continuous: Repeats Single measurement
  Endless: Continues measurement to upper limit of measurement bits

This option installs a BER measurement function for measuring error rates between 100 bps and 10 Mbps using the DUT demodulated Data/Clock/Enable signals. The results are displayed on the MS2830A screen.
BER Measurement Function [Opt.026]

**Measure Mode**
- Single: Measures selected data patterns until result reaches specified number of bits or specified number of error bits
- Continuous: Repeats single measurements (default)
- Endless: Measures data until result reaches upper limit of measurement count bit

**Count Mode**
- Data: Specifies number of measurement bits (default)
- Error: Specifies number of measurement error bits

**Data Type**
- PN9/11/15/20/23, ALL1, ALL0, Alternate(0101...), User Data, PN9fix/11fix/15fix/20fix/23fix

**Error Rate**
- 1.008E-002
- 1.008%

**Error Bit**
- 97
- 9620

**Measured Bit**

**Count Clear**

**Data**

**Count Mode**

**Measure Mode**

**Bit Error**

**Sync Loss Count**
- 0

**Stop**

**Synchronizing**

**Measuring**

**Enable Error**

**BER Test Start or Stop**

**Clears measurement result**
BER Measurement Function [Opt.026]

[PN Fix pattern]

At BER measurement, special PN patterns called PN_Fix patterns can be used. A PN Fix pattern consists of repeated parts of PN patterns, and PN patterns with a shorter length than 1 cycle.

Even when the PN data part of the waveform pattern output from vector signal generator has no periodicity, BER measurement is supported by selecting PN Fix at the BER measurement function.

![PN Fix pattern](image)

**Initial Pattern**

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Initial Pattern Setting Range</th>
<th>Resolution</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>PN9Fix</td>
<td>000000000 to 111111111 (9 bits)</td>
<td>000 to 1FF</td>
<td>1</td>
</tr>
<tr>
<td>PN11Fix</td>
<td>000000000000 to 11111111111 (11 bits)</td>
<td>000 to 7FF</td>
<td>1</td>
</tr>
<tr>
<td>PN15Fix</td>
<td>0000000000000000 to 1111111111111 (15 bits)</td>
<td>0000 to 7FFF</td>
<td>1</td>
</tr>
<tr>
<td>PN20Fix</td>
<td>0000000000000000000 to 1111111111111111 (20 bits)</td>
<td>000000 to 7FFFF</td>
<td>1</td>
</tr>
<tr>
<td>PN23Fix</td>
<td>000000000000000000000 to 1111111111111111 (23 bits)</td>
<td>0000000 to 7FFFFFF</td>
<td>1</td>
</tr>
</tbody>
</table>

**Pattern Length**

Setting Range: 96 to 134217728 bit (0 x 8000000)  
Resolution: 1 bit
BER Measurement Function [Opt.026]

[User Defined Pattern]

The BER measurement can use a user-defined pattern, which is an arbitrary binary string that is 8 to 4096 bits long and consists of a data bit string to determine whether synchronization is established plus a data bit string used as measurement data. A PC can be used to create a user-defined pattern in text file format. Load the file from USB memory or MS2830A internal hard disk.

- Length: 8 to 4096 (Binary)
- Extension: *****.bpn
- Saved Folder: the root directory of the USB memory or internal hard disk (Example: D:¥)

Example of User-Defined Pattern

User-Defined Pattern function menu

Loads user-defined patterns from the USB memory or the internal hard disk of the MS2830A.

Selects the media among the USB memory and internal hard disk from which user-defined patterns are to be loaded.
Useful Measurement Functions for Analog Radio (FM, \(\Phi M\), AM)

Combining the 3.6 GHz Analog Signal Generator MS2830A-088, MS2830A-018 Audio Analyzer MS2830A-018 and Analog Measurement Software MX269018A options in the all-in-one MS2830A main frame supports the simultaneous RF and AF signals required for implementing key TRx tests of analog(FM, \(\Phi M\),AM) radio equipment.

Key Measurement Test Items (FM Radio Equipment)

Tx Test: Tx Power, Tx Frequency, FM Deviation, Microphone input sensitivity, Modulation frequency characteristics, Distortion, S/N, Tone frequency, Occupied bandwidth (OBW)/Spurious emission or Unwanted emission strength (White noise (ITU-T G.227) output supported)

Rx Test: Receiving sensitivity (SINAD and NQ method), Bandwidth, AF level, Demodulation frequency characteristics, Distortion, S/N, Squelch sensitivity

By using the spectrum analyzer display it is possible to measure the spurious and occupied bandwidth (OBW) while outputting an AF signal such as white noise (ITU-T G.227) from the Audio Analyzer option.

See MX269018A Product Introduction for more details.
Software Download Service

Software download service
This service, which provides updated versions of firmware and software for downloading by product customers, is available on Anritsu's website.

Download software list

<table>
<thead>
<tr>
<th>Firmware / Software</th>
<th>Contents</th>
<th>Available version</th>
</tr>
</thead>
</table>
| MS2830A Software Installer | **MX269000A Standard Software**  
  This software is installed as standard when shipping the main frame.  
  Spectrum Analyzer function, Signal Analyzer function, etc.  
**MX2690xxA series Measurement Software**  
  Measurement software for various communication systems. | The latest version is available on the website. |
| MX370100A IQproducer Installer | **MX2699xxA series IQproducer**  
  PC application software used for generating waveform pattern for various communication systems | The latest version is available on the website. |
| Standard waveform patterns | **MX269099A Standard waveform pattern**  
  This waveform pattern is installed as standard when shipping the MS2830A-020/021 or MS2830A-189.  
  The latest version is installed when shipping. | Only the updated waveform pattern is available on the website. |

User registration is required for using the software download service.

User registration can be performed on the Anritsu website:
[https://my.anritsu.com/home](https://my.anritsu.com/home)