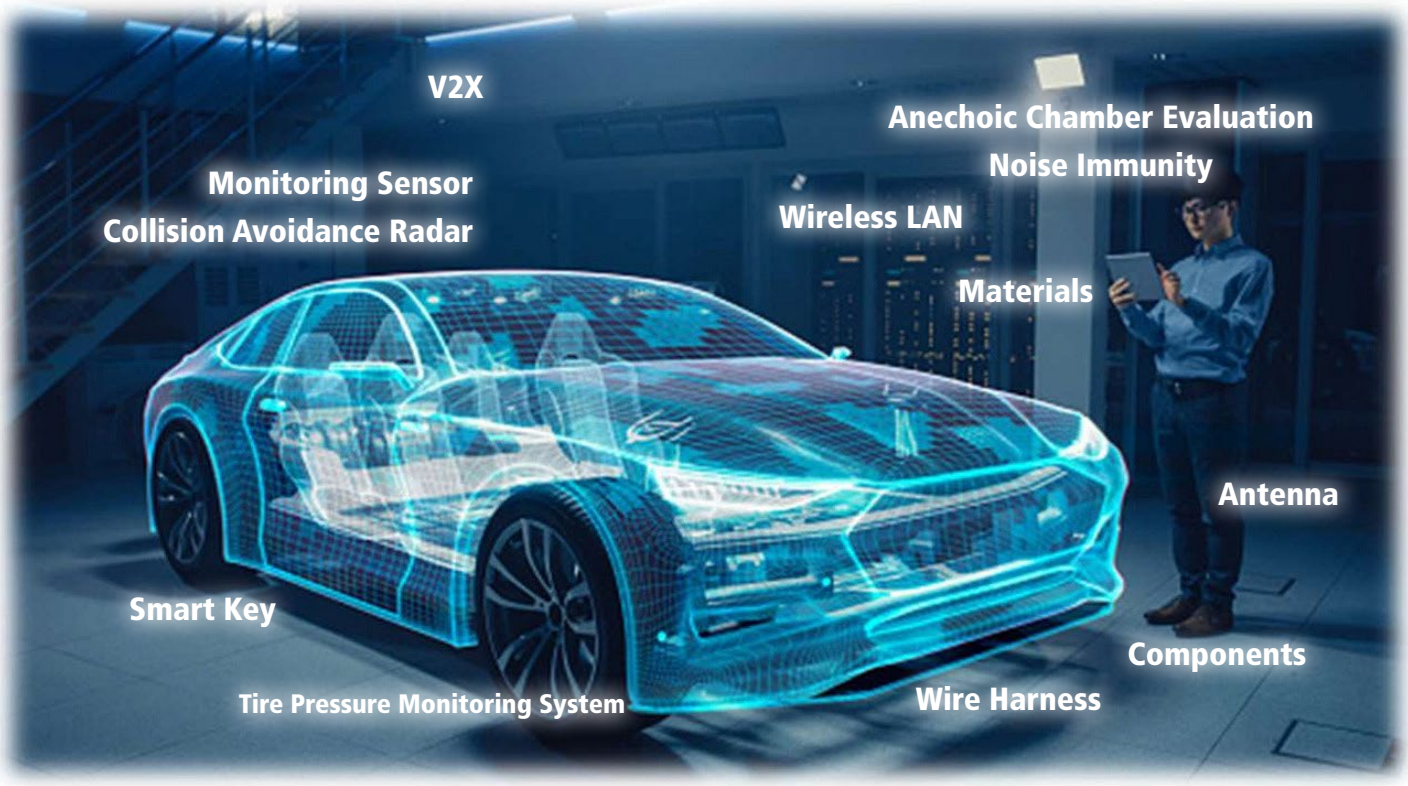
Anritsu Advancing beyond

Automotive Testing & Verification Solutions

Signal Analyzers	MS2830A/MS2840A/MS2850A
Spectrum Analyzers	MS2762A/MS2080A/MS2090A
Vector Signal Generator	MG3710E
Analog Signal Generator	MG3740A
Vector Network Analyzers	MS46121B/MS46131A/MS46524B/ME7869A
Power Sensor	MA24406A
WLAN Tester	MT8862A
eCall Tester	MX703330E

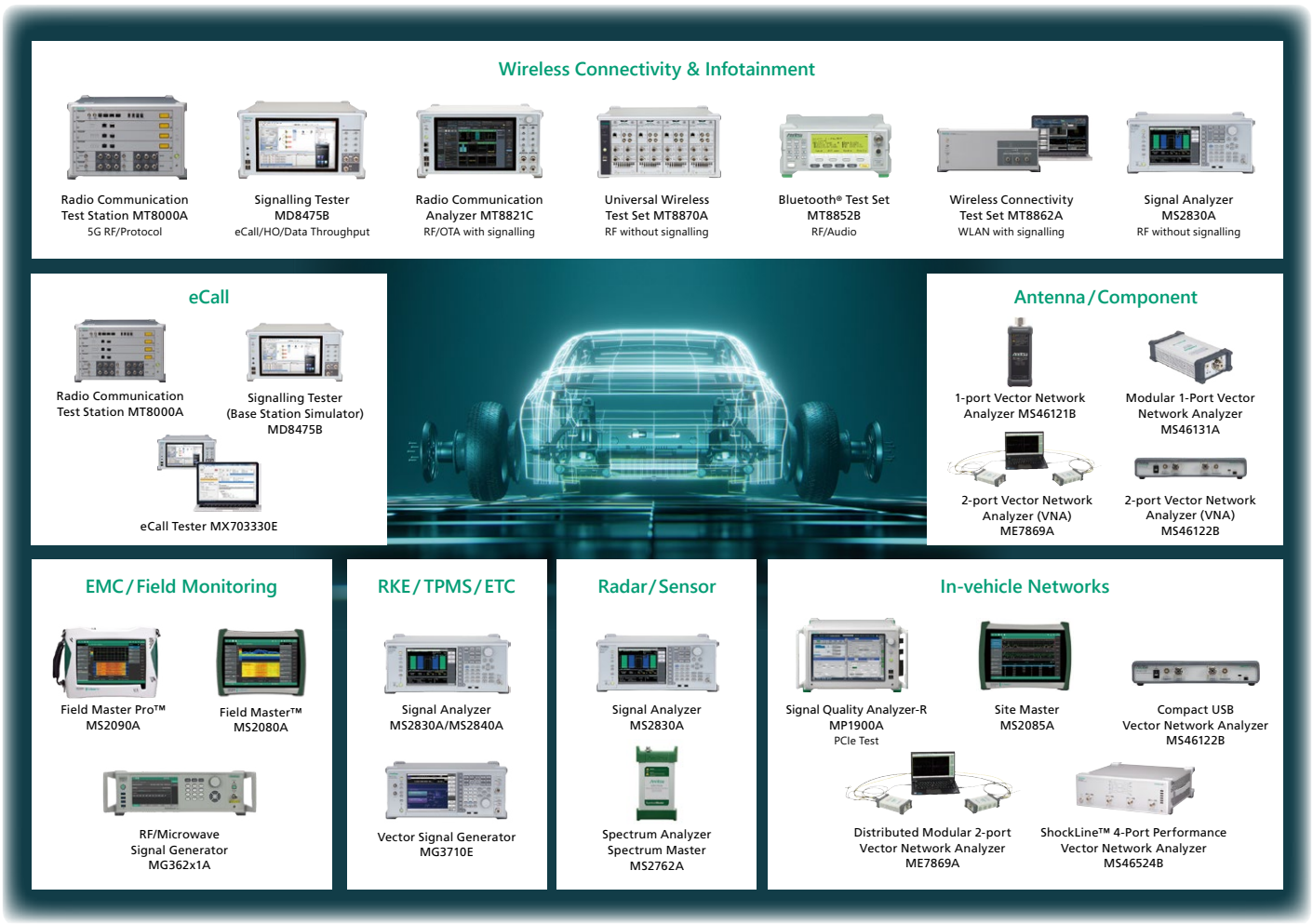
The rapid evolution of automotive electronics technologies is driving the integration of diverse electronic components and in-vehicle communication devices. As a result, automotive developers are required to adopt more sophisticated and flexible test methods and evaluation environments to ensure performance, functionality, and communication quality throughout the development lifecycle.

This leaflet introduces Anritsu's automotive testing and verification solutions, designed to address evolving test requirements and support the development of efficient, reliable vehicle electronics.



Contents

60, 76, and 79 GHz Bands Transmitter Test for Collision Avoidance Radar and Monitoring Sensors p.3
60, 76, and 79 GHz Bands Simple Test of Collision Avoidance Radar and Monitoring Sensors p.4
2.4, 5, and 6 GHz Bands Wireless LAN Test <IEEE 802.11> p.5
300 MHz Band Transmitter/Receiver Test for Smart Key (2FSK) p.6
Output Waveform Verification for Tire Pressure Monitoring Systems (TPMS) p.7
Interference Signals for Noise Immunity Test <AWGN, FM, AM, CW, Pulse> p.7
Radiated Noise: Observation, Capture, and Reproduction p.8
Vector Network Analyzers Lineup p.10
Antenna Impedance Measurements p.11
Antenna Pattern and Large-Scale System Level Test p.12
Multi-Purpose Applications: Cables, Antenna Impedance, Components, and Materials Evaluation p.13
High-Speed Differential Cable and Component Test p.14
76 and 79 GHz Bands Measurement Solutions for Millimeter-Wave Antennas, Components, and Materials p.15
Shielding Performance Tests for Anechoic Chambers and Shielded Rooms p.16
eCall, NG-eCall, Hybrid eCall p.17



60, 76, and 79 GHz Bands Transmitter Tests for Collision Avoidance Radar and Monitoring Sensors

Objective

- This solution enables transmitter testing for collision-avoidance radar and monitoring sensors operating in the 60, 76, and 79 GHz bands, using Signal Analyzers MS2830A, MS2840A, and MS2850A with Eravant/VDI mixers.

Measurement Items

- Frequency, Occupied bandwidth (OBW), peak antenna power

Note: This configuration does not support the measurement of spurious or unwanted emissions nor secondary-emission limit evaluation in the 60, 76, and 79 GHz bands.

Recommended Configuration: MS2830A

Model	Name
MS2830A	Signal Analyzer
MS2830A-044	26.5 GHz Signal Analyzer
MX284090A*1	External Mixer Connection Function

Intermediate

*1: Supported on the MS2830A-045, MS2840A-044/046, and MS2850A-046/047 as well.

Features

- External Mixer Connection Function MX284090A: Compatible with Signal Analyzers MS2830A, MS2840A, and MS2850A.
- Image-free response measurements up to 7.5 GHz bandwidth.
- Easy test setup using LO/IF coaxial cable connections

Recommended Product (Eravant)

Model	Name
STC-N12-15-S1-IDP	V-Band Full Waveguide Band Down-Converter

Recommended Product (VDI*)

*: Virginia diodes, Inc

Model	Name
WR12SAX-Z-M	Spectrum Analyzer Extender (SAX)

Eravant STC-N12-15-S1-IDP
Frequency range: 50 to 75 GHz-band
Waveguide flange: UG-385/U
Waveguide size: WR15

VDI WR12SAX-Z-M
Frequency range: 60 to 90 GHz-band
Waveguide flange: UG-387/U
Waveguide size: WR12

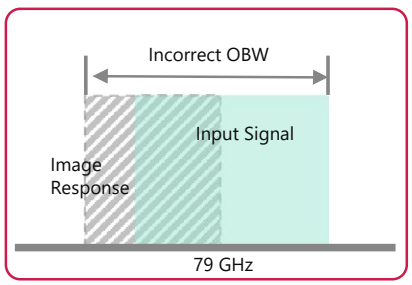
Connection between the External Mixer and the unit:
1 × SMA coaxial cable.

1st local output:
Connector: SMA-J, 50Ω
Output: 5 to 10 GHz, ≥10 dBm typ.
Input: 1.8755 GHz* (IF signal)
* MS2830A: 1.875 GHz

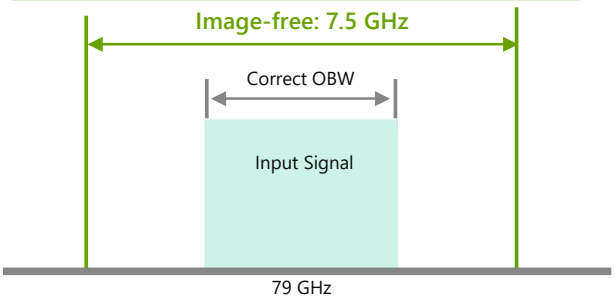
MS2830A/MS2840A/MS2850A & External Mixer Connection Function MX284090A

Conversion loss data included. (Read from USB memory.)

With a low Intermediate Frequency (IF)
The input signal overlaps with the image response, resulting in an incorrect spectrum.



High Intermediate Frequency (IF) and Anritsu's proprietary PS function enable 7.5 GHz-wide image-free operation.



Measurement Example: 79 GHz-band Radar (FM-CW)

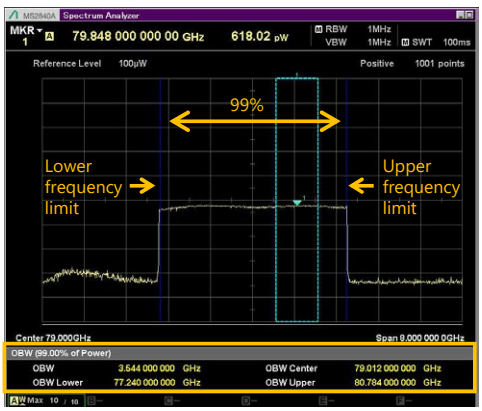
Measurement instrument settings

- Center frequency: 79 GHz
- Span: Approximately 2 × allowable OBW (4 GHz)
- RBW/VBW: 1 MHz
- Detector mode: Positive
- Trace: Max. Hold

Frequency deviation:
Verification that the lower and upper OBW frequencies fall within the specified frequency range

OBW:
Verification that the frequency bandwidth contains 99% of the total power

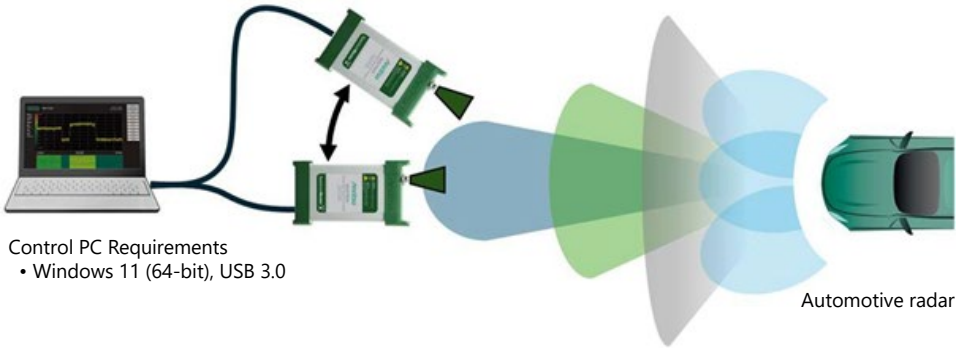
* The figure below is a measurement example for a 79 GHz-band radar. Refer to the applicable standards for measurement conditions and limits.



OBW Measurement Example

60, 76, and 79 GHz Bands Simple Test of Collision Avoidance Radar and Monitoring Sensors

Spectrum Analyzer
Spectrum Master
MS2762A

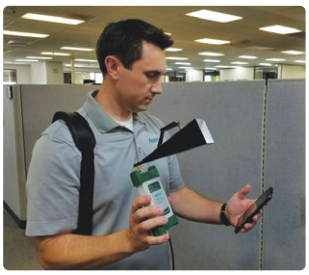


Control PC Requirements
• Windows 11 (64-bit), USB 3.0

Automotive radar

Recommended Configuration: 70 GHz model

Model	Name
MS2762A-0070	Spectrum Master, ultraportable spectrum analyzer, 6 GHz to 70 GHz
MS2762A-0110	Spectrum Master, ultraportable spectrum analyzer, 6 GHz to 110 GHz



Objective

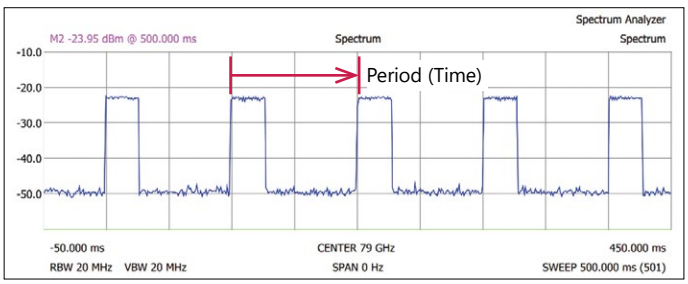
- Simple test of automotive millimeter-wave radar

Measurement Items

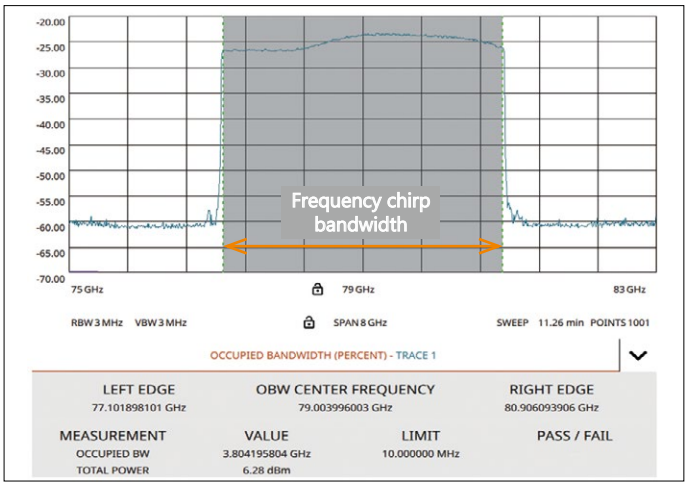
- Signal level variation by position
- Radar waveform verification after vehicle integration

Features

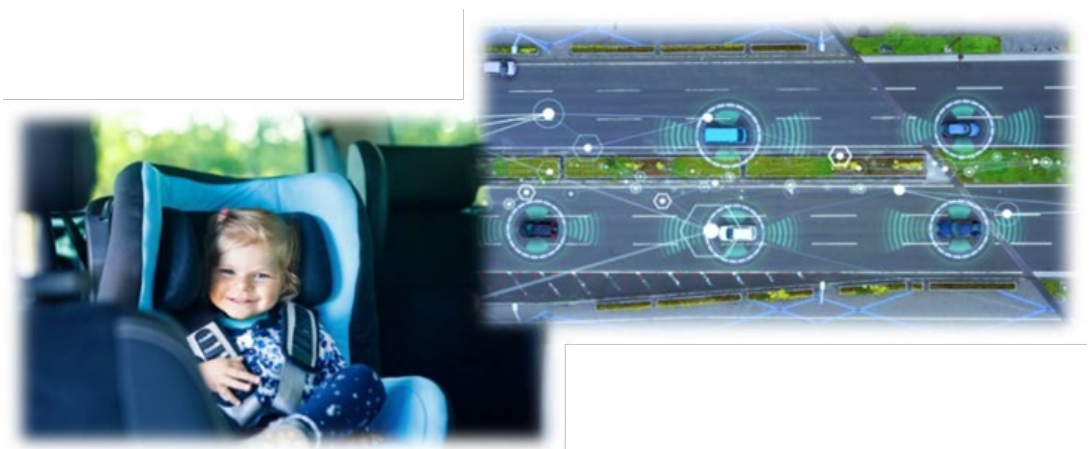
- Ultra-portable spectrum analyzers with PC-powered operation
- Easy measurement at multiple locations around a vehicle using long USB cables
- A floor noise level of –141 dBm (70–90 GHz) is achieved.



Radar signal period measurement example
(output period measured in zero-span mode)



Radar chirp signal measurement example
(signal level, frequency characteristics, bandwidth, upper and lower bandwidth frequencies, and center frequency)



2.4, 5, and 6 GHz Bands Wireless LAN Test <IEEE 802.11>

Wireless Connectivity Test Set
(Wireless LAN Tester)
MT8862A

Basic Configuration:

Model	Name
MT8862A	Wireless Connectivity Test Set
MT8862A-001	RF Frequency 2.4 GHz, 5 GHz
MX886200A	WLAN Measurement Software

Main Unit Expansion:

Model	Name
MT8862A-002	RF Frequency 6GHz
MT8862A-010	Extended RF Hardware
MX886200A-030	160 MHz Bandwidth
MT8862A-011	Extended Bandwidth Hardware
MX886200A-031	320 MHz Bandwidth

Analysis Expansion:

Model	Name
MX886200A-001	WLAN 802.11ac Option
MX886200A-002	WLAN 802.11ax Option
MX886200A-003	WLAN 802.11be Option

Function Expansion:

Model	Name
MX886200A-020	WLAN Security Function
MX886200A-010*	2×2MIMO Measurement Software
MX886200A-011*	2×2MIMO Measurement Software 802.11ax
MX886200A-012*	2×2MIMO Measurement Software 802.11be
J1777A	Expansion Cable

*: 2×2 MIMO evaluation requires two complete sets of the basic configuration, main unit expansion, and analysis expansion.

Objective

- Evaluation of transmitter and receiver characteristics in accordance with IEEE 802.11 a/b/g/n/ac/ax/be

Measurement Items

- Modulation accuracy, frequency, power, spectrum mask, flatness, etc.
- Minimum and maximum receiver sensitivity, bathtub curve, etc.

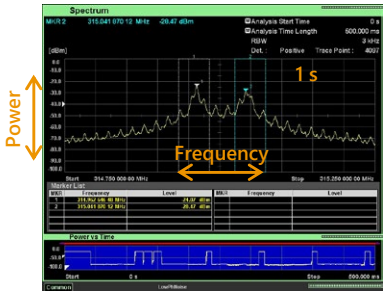
Features

- **Standard**: IEEE 802.11 a/b/g/n/ac/ax/be
- **Frequency band**: 2.4, 5, and 6 GHz bands
- **Bandwidth**: 20, 40, 80, 160, and 320 MHz
- **Security**: WEP, WPA/WPA2-Personal/WPA3-Personal
- **2×2 MIMO**: IEEE 802.11 n/ac/ax/be
- **Network mode and Direct mode**:
  The MT8862A features a “Network mode” that enables connection using the same procedures as those used by general wireless LAN (WLAN) devices. This enables the evaluation of WLAN devices in their final product configurations under actual operating conditions.

300 MHz Band, Transmitter/Receiver Test for Smart Key (2FSK)

Signal Analyzer
MS2830A

Frequency range: 9 kHz to 3.6 GHz



Trace display example
(Frequency vs. Time)

Trace display example
(Frequency vs. Time)

Recommended Configuration (Transmit Evaluation)

Model	Name
MS2830A	Signal Analyzer
MS2830A-040	3.6 GHz Signal Analyzer
MS2830A-006	Analysis Bandwidth 10 MHz

Main Unit Expansion (Receive Evaluation)

Model	Name
MS2830A-020	3.6 GHz Vector Signal Generator
MS2830A-022	Low Power Extension for Vector Signal Generator
MS2830A-002	High Stability Reference Oscillator
MS2830A-026	BER Measurement Function
MS2830A-027	ARB Memory Upgrade 256 MSA for Vector Signal Generator
MX269902A	TDMA IQproducer

Note: This configuration consists of the recommended configuration plus the main unit expansion.

Objective

- Evaluation of transmitter and receiver characteristics of automotive smart key systems using 300 MHz band/2FSK.

Measurement Items

- Frequency, antenna power, occupied bandwidth, spurious emissions, etc.
- Frequency deviation (spectrum and frequency versus time)

Features

The MS2830A evaluates key transmitter characteristics, such as output power, frequency accuracy, and spectral purity — using its spectrum analyzer functionality.
Its signal analyzer functionality enables rapid analysis of time-varying signals and instantaneous frequency deviations that cannot be captured by conventional sweep-based measurements. Furthermore, the built-in signal generator supports receiver testing by replaying captured real-world RF or IQ signals, allowing the MS2830A to operate as a signal source or pseudo counterpart transmitter during system-level evaluations.

Analog Signal Generator MG3740A &
Digital modulation

Recommended Configuration

Model	Name
MG3740A	Analog Signal Generator
MG3740A-020	Digital Modulation
MG3740A-021	BER Test Function
MG3740A-032	1stRF 100kHz to 2.7GHz
MG3740A-050	1stRF Additional Analog Modulation Input

Objective

- Receiver test for the 300 MHz band/2FSK

Measurement Items

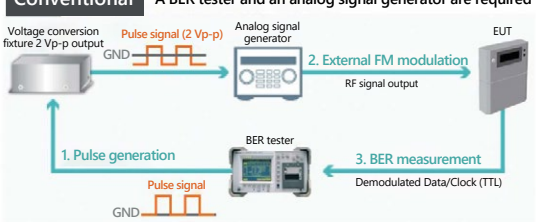
- Receiver sensitivity: Desired signal/2FSK, BER measurement
- Coding scheme: Manchester or NRZ
- Data rate: 1 kbps to 1 Mbps
- Data patterns: PN9, PN15, repetitive 1010, etc. (Please contact us for details)

Leaflet

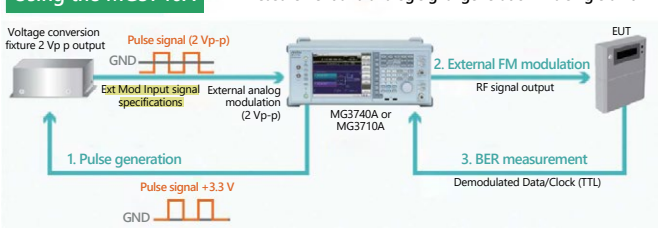
Features

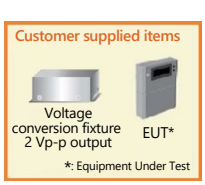
For 2FSK receiver testing, the MG3740A integrates a pattern generator, a BER tester, and an analog signal generator into a single instrument.

Conventional A BER tester and an analog signal generator are required



Using the MG3740A BER measurement and analog signal generation in a single unit





Output Waveform Verification for Tire Pressure Monitoring Systems (TPMS)

Spectrum Analyzer
Field Master
MS2080A

Objective
- Waveforms verification when TPMS connectivity is interrupted

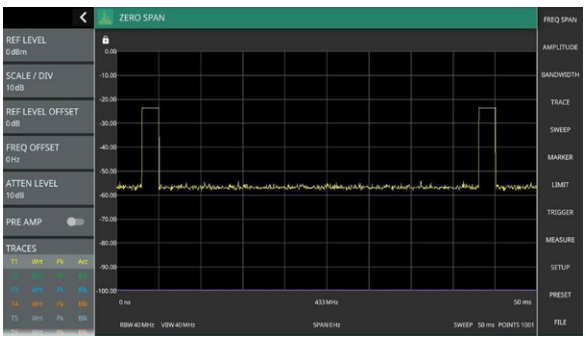
Measurement Items
- TPMS connectivity status
- Transmission activity

Features
- Handheld equipment that is ideal for in-vehicle testing
- Real-time analysis captures short-duration TPMS signals that cannot be detected using conventional sweep-based analyzers

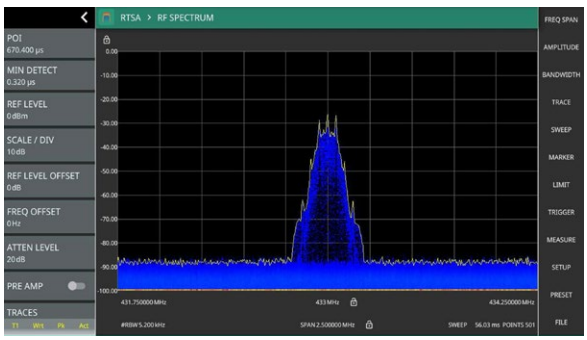
Recommended Configuration

Model	Name
MS2080A	Field Master
MS2080A-0704	9 kHz to 4 GHz Spectrum Analyzer
MS2080A-0199	Real-time Spectrum Analysis (RTSA)

RTSA bandwidth
MS2080A ... 20 MHz (standard), 40 MHz (maximum)



TPMS pulse measurement (zero span)



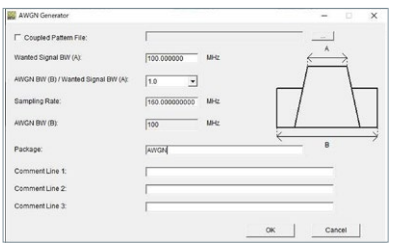
TPMS spectrum analysis (Real-Time Spectrum Analysis)

Interference Signals for Noise Immunity Test <AWGN/FM/AM/CW/Pulse>

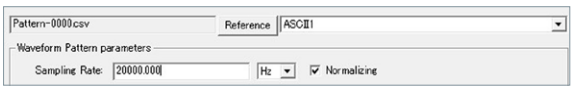
Vector Signal Generator
MG3710E

Frequency range: 100 kHz to 6 GHz
RF bandwidth: 120 MHz max

Standard Function
AWGN IQproducer



Standard Function
Convert IQproducer



Waveform patterns for the MG3710E can be generated using IQ data captured by the Signal Analyzer MS2830A/MS2840A or the Spectrum Master MS2090A.
By recording and replaying actual noise, the Vector Signal Generator MG3710E enables device testing under real-world operating conditions.

Recommended Configuration

Model	Name
MG3710E	Vector Signal Generator
MG3710E-036	1stRF 100 kHz to 6 GHz
MG3710E-041	High Power Extension for 1stRF
MG3710E-050	1stRF Additional Analog Modulation Input
Standard feature	AWGN IQproducer
Standard feature	Convert IQproducer
Built-in (standard)	Waveform pattern (ISDB-T, LTE/4G, IEEE802.11a.b.g etc.)

Objective
- Noise immunity tests of electronic in-vehicle equipment

Measurement Items
- Output of AWGN signals (up to 120 MHz bandwidth)
- Output of FM/AM/CW/Pulse signals, as well as ISDB-T, 4G-LTE, WLAN, etc.

Features
- Wide variety of built-in waveform patterns
- AWGN IQproducer is available

Observation of radiated noise using real-time spectrum analysis (RTSA)

Spectrum Analyzer
Field Master
MS2080A

Spectrum Analyzer
Field Master Pro
MS2090A

RTSA bandwidth

MS2080A ... 20 MHz (standard), up to 40 MHz (maximum)
MS2090A ... 22 MHz (standard), up to 150 MHz (maximum)

Recommended Configuration: MS2080A

Model	Name
MS2080A	Field Master
MS2080A-0704	9 kHz to 4 GHz Spectrum Analyzer
MS2080A-0199	Real-time Spectrum Analysis (RTSA)
MS2080A-0102	40 MHz Analysis Bandwidth

Recommended Configuration: MS2090A

Model	Name
MS2090A	Field Master Pro Spectrum Analyzer
MS2090A-0709	9 kHz to 9 GHz
MS2090A-0199	Real-Time Spectrum Analysis (RTSA)
MS2090A-0103	55 MHz Analysis Bandwidth
MS2090A-0105	150 MHz Analysis Bandwidth

Objective

- Radiated noise test for in-vehicle devices

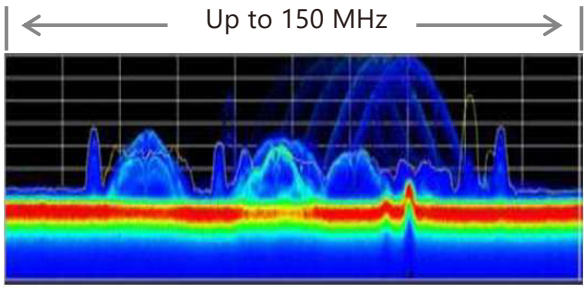
Measurement Items

- Capture and visualization of transient radiated noise using the RTSA

Features

- RTSA bandwidth of up to 150 MHz (option-dependent), enabling the analysis of 100 MHz-wide signals used in 2.4 GHz WLAN and 5G cellular systems
- The minimum POI* of 2.055 µs at a 150 MHz analysis bandwidth
- Overlapping signals are displayed in different colors according to their time of occurrence, enabling intuitive visualization

* POI: The minimum signal duration that can be reliably detected with 100% probability, representing the RTSA response performance



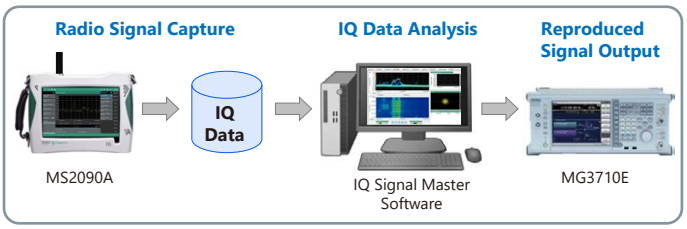
Example of the RTSA Display

Radiated Noise: Observation, Capture, and Reproduction

Radiated noise capture and reproduction using a signal generator in a laboratory

Spectrum Analyzer
Field Master Pro
MS2090A

Vector Signal Generator
MG3710E



IQ Capture, Data Analysis, and Signal Reproduction Workflow

Recommended Configuration: MS2090A

Model	Name
MS2090A	Field Master Pro Spectrum Analyzer
MS2090A-0709	9 kHz to 9 GHz
MS2090A-0199	Real-Time Spectrum Analysis (RTSA)
MS2090A-0105	150 MHz ANALYSIS BANDWIDTH
MS2090A-0124	IQ Waveform Capture
MS2090A-0125	IQ Waveform Streaming
MS2090A-0128	Enable Vector Signal Analysis

Recommended Configuration: MG3710E

Model	Name
MG3710E	Vector Signal Generator
MG3710E-036	1stRF 100 kHz to 6 GHz

Objective

- Verification and reproduction of radiated noise from in-vehicle devices

Measurement Items

- Noise immunity test and reproducing radiated noise

Features

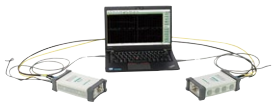
IQ data captured with Field Master Pro MS2090A can be used to generate waveform patterns for signal generators and reproduce real-world noise events in a laboratory environment.

Item	MS2080A	MS2090A
Frequency range	9 kHz to 4, 6 GHz	9 kHz to 9, 14, 20, 26.5, 32, 43.5, 54 GHz
Appearance		
Displayed average noise level @3 GHz, Preamplifier ON, Typical	–146 dBm/Hz	–164 dBm/Hz
Real-Time Spectrum Analyzer Analysis (RTSA) bandwidth	20 MHz (Std.), 40 MHz (Opt.)	22 MHz (Std.), 55 MHz (Opt.), 120 MHz (Opt.), 150 MHz (Opt.)
IQ Capture, Streaming capability	No.	Yes. (Opt.)
Dimensions and mass	290 × 212 × 96 mm, 3.8 kg	314 × 235 × 95 mm, 5.1 to 5.4 kg (depending on the frequency model)

Vector Network Analyzers Lineup

The ShockLine Series Vector Network Analyzers (VNAs) support S-parameter measurements and time-domain analysis for components and devices across RF, microwave, and millimeter-wave frequency ranges.

With a broad product lineup, the series offers compact, cost-effective vector network analyzers that have a common GUI across all models.

Applications			
	Antenna impedance	Antenna impedance	Antenna pattern and large-scale system measurements
Model number	MS46121B	MS46131A	ME7869A
Type	External PC control	External PC control	External PC control
			
Specifications			
Frequency range	150 kHz to 6 GHz	1 MHz to 8, 20, 43.5 GHz	1 MHz to 8, 20, 43.5 GHz
Number of measurement ports	1	1	2
Measurement dynamic range (Typical) 5 GHz, 20 GHz @10 Hz IFBW	—	—	110 dB, 110 dB
Output power (Typical)	150 kHz to 46 MHz: –5 dBm >46 MHz to 4 GHz: 3 dBm >4 GHz to 6 GHz: –5 dBm	1 MHz to 43.5 GHz: 0 dBm (High) 1 MHz to 43.5 GHz: –20 dBm (Low)	1 MHz to 43.5 GHz: 0 dBm (High) 1 MHz to 43.5 GHz: –20 dBm (Low)
Sweep speed (Typical)	140 µs/point	180 µs/point	180 µs/point
Measurement Functions			
S-parameter measurements	Smith chart, Polar, Log magnitude, Phase, Linear magnitude, Real, Imaginary, SWR, Impedance	Smith chart, Polar, Log magnitude, Phase, Group delay, Linear magnitude, Real, Imaginary, SWR, Impedance	Smith chart, Polar, Log magnitude, Phase, Group delay, Linear magnitude, Real, Imaginary, SWR, Benchtop
Time-domain analysis	Optional	Optional	Optional

Applications			
	Cables, antenna impedance, components, and materials	Differential cables and differential components	Millimeter-wave antennas, components, and materials
Model number	MS46122B	MS46524B	MS46522B-082
Type	External PC control	Benchtop	Benchtop
			
Specifications			
Frequency range	1 MHz to 8, 20, 43.5 GHz	50 kHz to 8.5, 20, 43.5 GHz	55 GHz to 92 GHz
Number of measurement ports	2	4	2
Measurement dynamic range (Typical) 5 GHz, 20 GHz @10 Hz IFBW	115 dB, 110 dB	137 dB, 122 dB	111 dB @90 GHz
Output power (Typical)	1 MHz to 8 GHz: 5 dBm > 8 GHz to 43.5 GHz: –3 dBm (High) 1 MHz to 43.5 GHz: –20 dBm (Low)	50 kHz to 300 kHz: –30 to +12 dBm >300 kHz to 6 GHz: –30 to +17 dBm >6 GHz to 8 GHz: –30 to +13 dBm >8 GHz to 8.5 GHz: –30 to +11 dBm >8.5 GHz to 40 GHz: –30 to +9 dBm >40 GHz to 43.5 GHz: –30 to +4 dBm	60 GHz to 69 GHz: –55 to –5 dBm >69 GHz to 88 GHz: –50 to 0 dBm >88 GHz to 90 GHz : –60 to –10 dBm
Sweep speed (Typical)	140 µs/point	30 µs/point	170 µs/point
S-parameter measurements	Smith chart, Polar, Log magnitude, Phase, Group delay, Linear magnitude, Real, Imaginary, SWR, Impedance, KQ, and η Max	Smith chart, Polar, Log magnitude, Phase, Group delay, Linear magnitude, Real, Imaginary, SWR, Impedance, KQ, and η Max	Smith chart, Polar, Log magnitude, Phase, Group delay, Linear magnitude, Real, Imaginary, SWR, Impedance, KQ, and η Max
Time-domain analysis	Optional	Optional	Optional

Antenna Impedance Measurements

1-port Vector Network Analyzer
MS46121B
Frequency range:
150 kHz to 6 GHz

1-port Vector Network Analyzer
MS46131A
Frequency range:
1 MHz to 8, 20, 43.5 GHz

Recommended Configuration: MS46121B

Model	Name
MS46121B	1-port ShockLine Vector Network Analyzer (Requires ordering the main unit together with one frequency option.)
MS46121B-006	Option 6, 150 kHz to 6 GHz VNA
MS46121B-002	Option 2, Low Pass Time Domain

Model	Name
MS46131A	Modular 1-port Vector Network Analyzer (Requires ordering the main unit together with one frequency option.)
MS46131A-010	FREQ OPT, 8 GHz VNA
MS46131A-020	FREQ OPT, 20 GHz VNA
MS46131A-043	FREQ OPT,43.5 GHz VNA
MS46131A-002	Option 2, Time Domain

A PC, calibration kit, conversion adapters, RF cables, and other accessories are required separately.

Objective

- Antenna impedance test

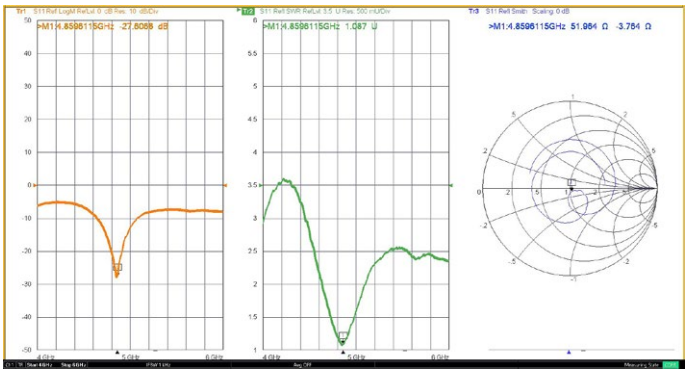
Measurement Items

- SWR
- Return loss (Log magnitude)
- Complex impedance (Smith chart)

Features

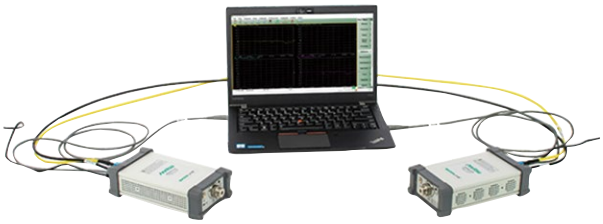
- PC-controlled operations leverage the processing power and user-interface capabilities of an external computer, enabling flexible measurement control and advanced data analysis.
- The compact design allows direct connection to the DUT or the use of short RF cables, minimizing cable-related measurement errors and ensuring a stable measurement environment.

Return loss SWR Smith chart

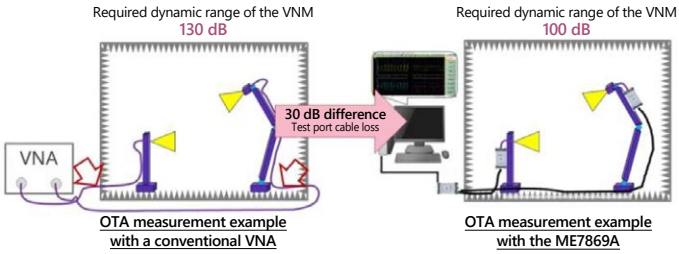


Antenna Pattern and Large-Scale System Measurements

2-port Vector Network Analyzer (VNA) ME7869A
Frequency range: 1 MHz to 8, 20, 43.5 GHz



MS46131A MS46131A



Antenna pattern measurements

Objective

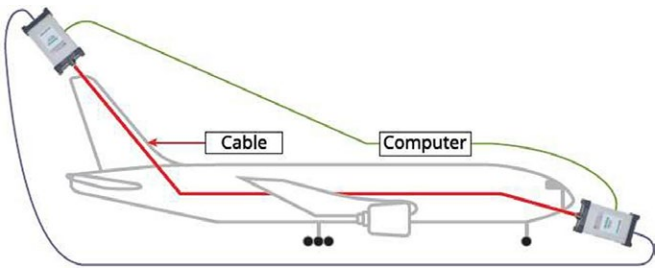
- Antenna pattern test and large-scale system-level test

Measurement Items

- Antenna pattern (Log magnitude)
- Insertion loss (Log magnitude)

Features

- The ME7869A enables flexible placement of measurement ports by synchronizing two single-port Vector Network Analyzer MS46131A.
- By eliminating the need for long coaxial cables, the ME7869A significantly reduces cable-induced phase variations, enabling stable S-parameter measurements.
- For antenna pattern and large-scale system evaluations, the measurement ports can be positioned according to the physical layout and requirements of the DUT.
- Independent measurement ports can be placed up to 100 meters apart, allowing distributed measurements over large structures.



Large-scale system measurements

Recommended Configuration: 8 GHz Model

Model	Name
ME7869A-010	8 GHz Modular 2-port VNA system
ME7869A-020	20 GHz Modular 2-port VNA system
ME7869A-043	43.5 GHz Modular 2-port VNA system
MS46131A-002	Option 2, TIME DOMAIN
MS46131A-025	PhaseLync synchronization to 20 m
MS46131A-050	PhaseLync synchronization to 50 m
MS46131A-100	PhaseLync synchronization to 100 m

Model	Name
2000-2123-R	PhaseLync 2 m cable set
2000-2124-R	PhaseLync 5 m cable set
2000-2125-R	PhaseLync 10 m cable set
2000-2126-R	PhaseLync 25 m cable set
2000-2127-R	PhaseLync 50 m cable set
2000-2128-R	PhaseLync 75 m cable set

A PC, calibration kit, conversion adapters, RF cables, and other accessories are required separately.
Two MS46131A-025 and two PhaseLync cable sets are required.

Multi-Purpose Applications: Cables, Antenna Impedance, Components, and Materials Evaluation

2-port Vector Network Analyzer (VNA) MS46122B
Frequency range: 1 MHz to 8, 20, 43.5 GHz

Objective

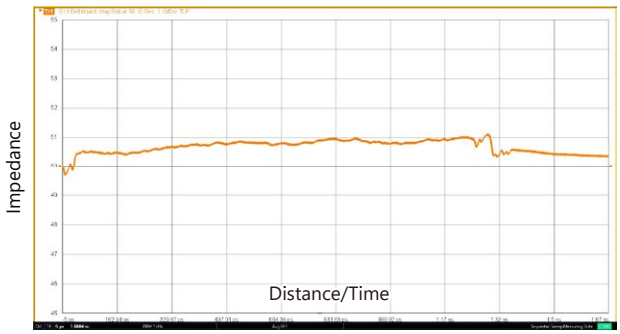
- Evaluation of cables, antenna impedance, components, and materials

Measurement Items

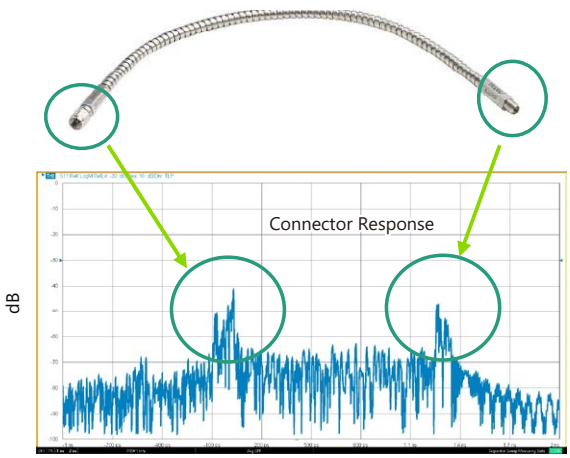
- Input impedance, Output impedance (Log magnitude)
- Transmission loss (Log magnitude)
- SWR
- Characteristic impedance evaluation (Time-domain reflectometry: TDR)
- Fault location analysis (TDR)

Features

- Compact 2-port VNA is designed for a wide range of RF and microwave measurement applications
- PC-controlled operation that leverages the processing power, user interface, and data handling capabilities of an external computer
- Optional TDR that supports characteristic impedance evaluations and fault location analysis of cables and components

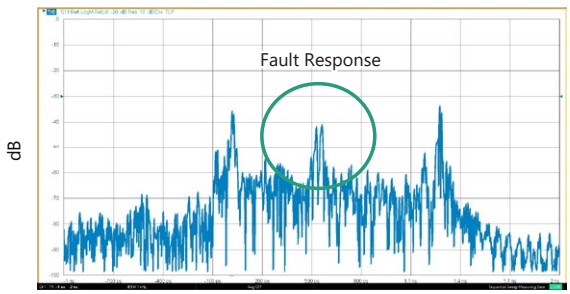


Measurement of input/output impedance and transmission loss, Characteristic impedance evaluation (TDR)



TDR data on a normal cable
Impedance variations are observed only at the input and output connectors.

Fault Location Detection (TDR):
Using the TDR function, responses from locations with impedance discontinuities are displayed, enabling effective identification of fault locations. To achieve high measurement resolution, a wide frequency bandwidth is required.



TDR data on faulty cable
Impedance variations are observed not only at the input and output connectors but also along the cable.

Recommended Configuration: 8 GHz Model

Model	Name
MS46122B	Vector Network Analyzer (Requires ordering the main unit together with one frequency option.)
MS46122B-010	Option 10, 8 GHz Frequency
MS46122B-020	Option 20, 20 GHz Frequency
MS46122B-043	Option 43, 43.5 GHz Frequency
MS46122B-002	Option 2, Time Domain with Time Gating

A PC, calibration kit, conversion adapters, RF cables, and other accessories are required separately.

Measurement Resolution: $^{1}/_{2\Delta f}$ (sec), $^{c}/_{2\Delta f}$ (m)

Δf Sweep Range

Narrow ⟷ Wide

Low Resolution — High Resolution

High-Speed Differential Cable and Component Test

4-port Vector Network Analyzer (VNA) MS46524B
Frequency range: 50 kHz to 8.5, 20, 43.5 GHz

Recommended Configuration: 8.5 GHz Model

Model	Name
MS46524B	Vector Network Analyzer (Requires ordering the main unit together with one frequency option.)
MS46524B-010	Option 10, 8.5 GHz
MS46524B-020	Option 20, 20 GHz Frequency
MS46524B-043	Option 43, 43.5 GHz Frequency
MS46524B-002	Option 2, Time Domain with Time Gating
MS46524B-022	Option 22, Advanced Time Domain

A PC, calibration kit, adapters, RF cables, and other accessories are required separately.

Objective

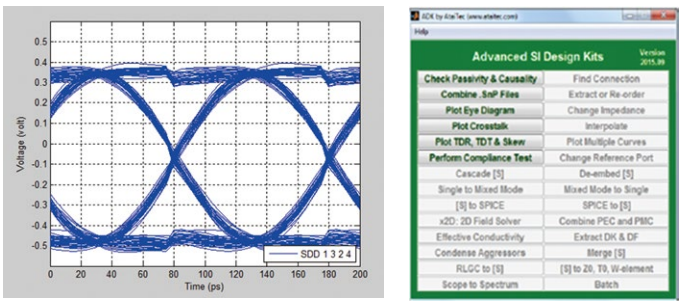
- High-speed differential cable and component test

Measurement Items

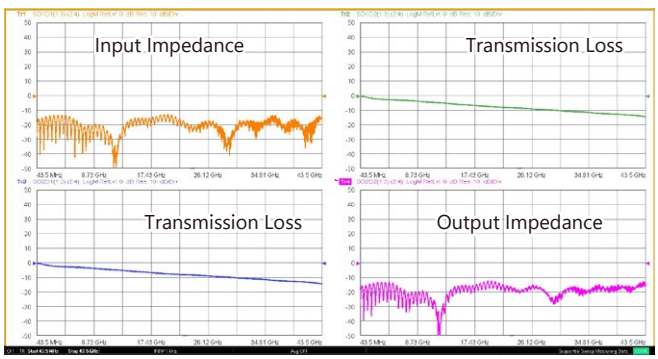
- Input impedance, Output impedance (Log magnitude)
- Transmission loss (Log magnitude)
- SWR
- Eye-diagram simulation
- Characteristic impedance evaluation (TDR)
- Fault location detection (TDR)

Features

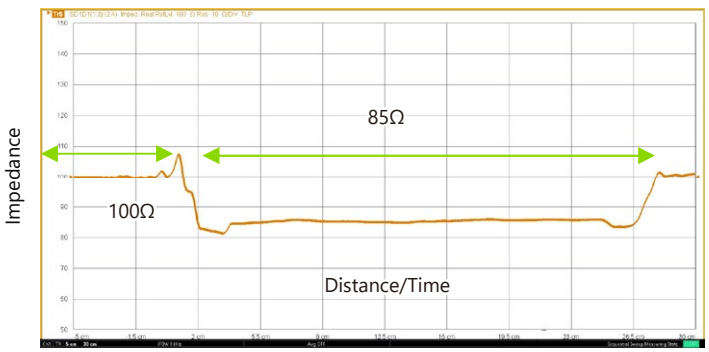
- A 4-port VNA enables evaluation of both single-ended S-parameters and mixed-mode S-parameters for differential device characterization
- Optional functions support not only S-parameter measurements, but also characteristic impedance evaluation and eye-diagram simulation



Advanced time-domain eye simulation

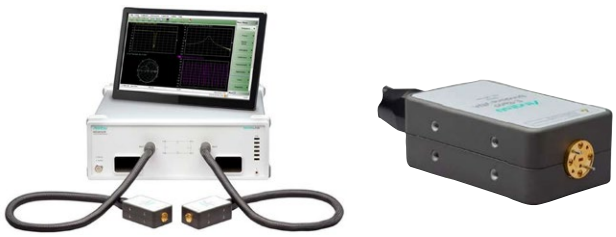


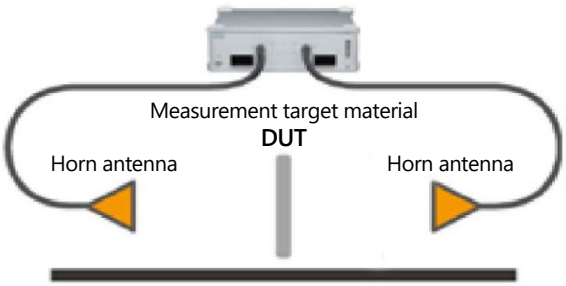
Mixed-mode S-parameters



Characteristic impedance evaluation (TDR)

2-port Vector Network Analyzer (VNA) MS46522B-082
Frequency range: 55 GHz to 92 GHz





Objective

- Millimeter-wave antenna, components, and material tests

Measurement Items

- Input impedance, Output impedance (Log magnitude)
- Transmission loss (Log magnitude)
- SWR

Features

- The integrated design combining a millimeter-wave module and RF cables simplify millimeter-wave measurements. Eliminating complex RF cable connections enables quick and easy measurement setups.
- Optimized for the E-band frequency range (60–90 GHz) to provide a cost-effective E-band VNA solution
- Equipped with a WR-12 waveguide interface for direct and reliable millimeter-wave connectivity

Recommended Configuration

Model	Name
MS46522B	Vector Network Analyzer (Requires ordering the main unit together with one frequency option.)
MS46522B-082	Option 82, E Band
MS46522B-083	Option 83, E-band, 5-meter tethers
MS46522B-002	Option 2, Time Domain with Time Gating

A PC, calibration kit, adapters, RF cables, and other accessories are required separately.

Shielding Performance Test for Anechoic Chambers and Shielded Rooms

Spectrum Analyzer
Field Master Pro
MS2090A

Frequency range:
9 kHz to 9, 14, 20, 26.5, 32, 43.5, 54 GHz

Signal Generator
MG362x1A Series

Frequency range:
9 kHz to 20, 43.5, 70 GHz

Objective

- Shielding performance characterization for anechoic chambers and shielded rooms

Measurement Items

- Radiated attenuation characteristics
- Electric field strength measurement

Features

By controlling Spectrum Analyzer MS2090A and Signal Generator MG362x1A with an automated measurement tool, the attenuation characteristics of anechoic chambers and shielded rooms can be efficiently evaluated.

This automated approach reduces the overall workload of shielding performance evaluation across wide frequency ranges and multiple measurement points.*

Recommended Configuration: MS2090A 20 GHz Model

Model	Name
MS2090A	Field Master Pro Spectrum Analyzer
MS2090A-0720	Option 720, Spectrum analyzer, 20 GHz

Recommended Configuration: MG36221A 20 GHz Model

Model	Name
MG36221A	Signal Generator, 20 GHz
MG36221A-0015	High Power Output

*: The automated measurement tool is provided free.
Excel macros are used to control the measurement instruments, execute measurements, and automatically collect the results.

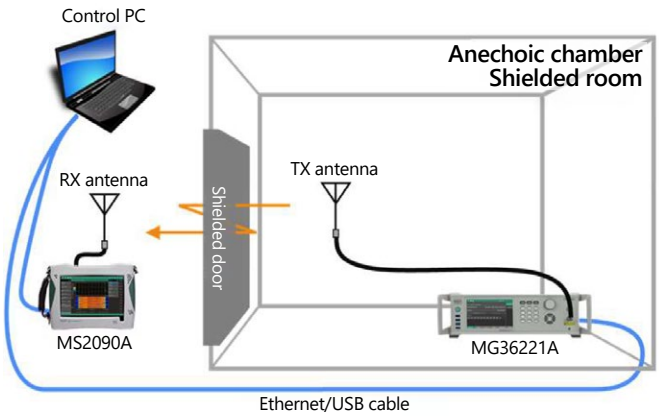
Automated* data acquisition for shielding performance test in anechoic chambers and related facilities

The automated measurement tool configures key instrument settings and captures data automatically, including common settings and display ranges on the MS2090A, as well as output level, start/stop frequency, and measurement step settings on the MG362x1A.

When measurements are performed by switching antennas for different frequency bands, settings can be stored for each antenna, minimizing the work of operators and streamlining the workflow. Measurement results are saved to the control PC as numerical data and MS2090A screen captures, enabling quick reviews and efficient reporting.

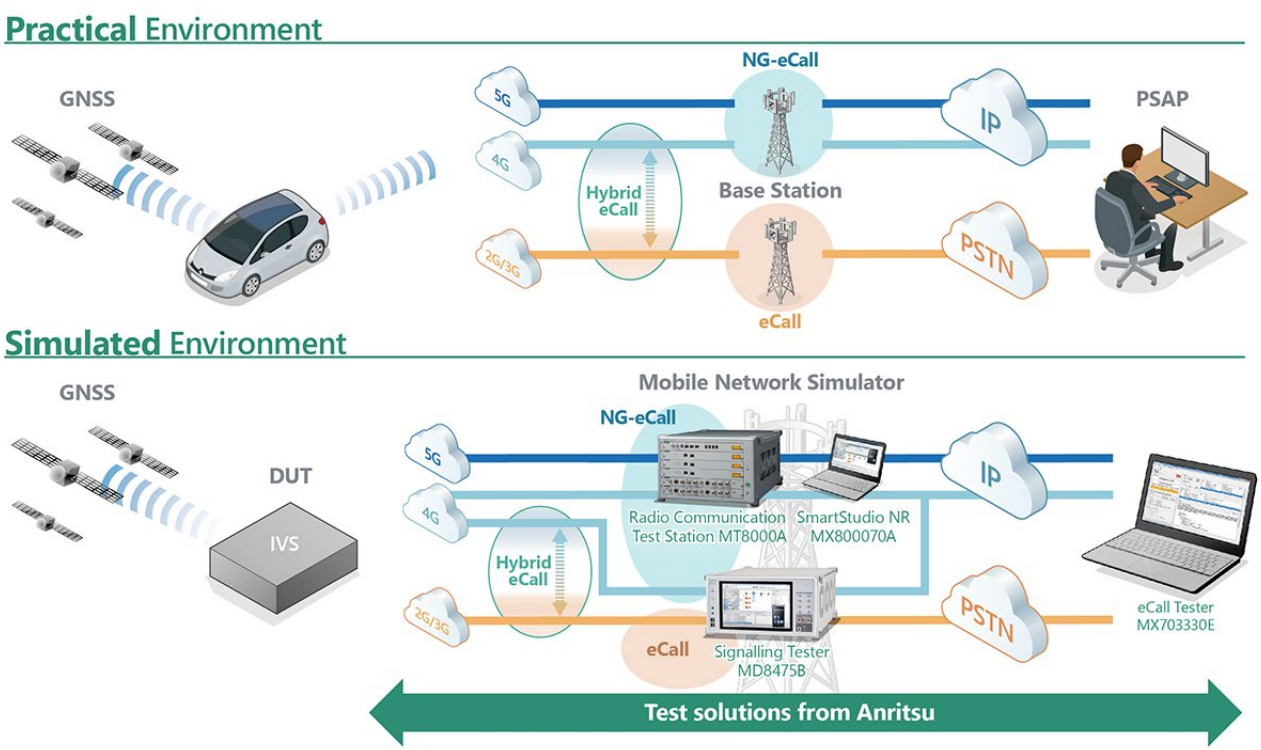
Common Settings	Name
Model name	MS2090A
Reference level [dBm]	AUTO
Attenuator	AUTO
RBW	AUTO
VBW	AUTO
SWEEP	AUTO
TRACE	Average
TRACE count	5

Measurement Parameters	
Antenna setup	
Antenna used	Antenna A
Horizontal/vertical	Vertical
Antenna position	1
Measurement item	Measure
MG36221A setup	
Tx power	–30.0 dBm
Start frequency	0.10 MHz
Stop frequency	1.00 MHz
Measurement step	0.02 MHz
Measurement point	46
MS2090A setup	
Setting method	Start, stop
Start frequency	100.00 MHz
Stop frequency	3.00 MHz



Reference Data				
	Antenna A	Antenna B	Antenna C	Antenna D
MG36221A setup				
Output level	–30.0 dBm	0.0 dBm	0.0 dBm	0.0 dBm
Start frequency	0.10 MHz	250.00 MHz	1000.00 MHz	1000.00 MHz
Stop frequency	1.00 MHz	1000.00 MHz	20000.00 MHz	1100.00 MHz
Measurement step	0.02 MHz	10.00 MHz	100.00 MHz	20.00 MHz
Measurement point	46	76	191	6
MS2090A setup				
Setting method	Start, stop			
Start frequency	100.00 MHz	0.50 MHz	5.00 MHz	500.00 MHz
Stop frequency	3.00 MHz	100.00 MHz	2000.00 MHz	1500.00 MHz

eCall, NG-eCall, Hybrid eCall



Radio Communication Test Station
MT8000A

Signalling Tester (Base Station Simulator)
MD8475B

eCall Tester
MX703330E

Objective

- Supports certification and functional testing for regional eCall standards

Measurement Items

- eCall testing under simulated 3G, 4G, and 5G network environments
- eCall origination testing with cell transitions (handover and cell reselection)
- eCall testing in a multi-cell environment (optional)

Features

- Enables testing under quasi-normal and abnormal mobile-network conditions that are difficult to reproduce on live networks
- Allows the easy creation of complex test environments that emulate wireless power profiles
- Provides laboratory-based emulation of global mobile-network environments
- Offers an intuitive GUI that minimizes the need for detailed knowledge of mobile protocols
- Includes a PSAP* simulator for evaluations of eCall certification tests required by regional regulations and type approvals

*: PSAP: Public Safety Answering Point (emergency call center)