Technical Data Sheet

Spectrum Master™

High Performance Handheld Digital Broadcast Field Analyzer

MS8911B

9 kHz to 7.1 GHz

Introduction

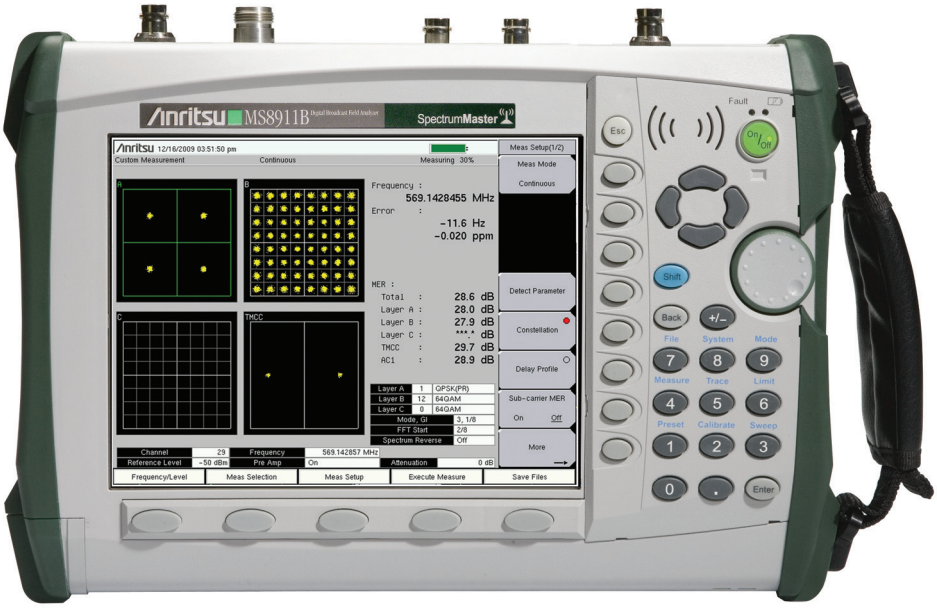
Anritsu's high performance handheld digital broadcast field analyzer provides the broadcast professional the performance needed for the most demanding measurements in harsh RF and physical environments. Whether it is for spectrum monitoring, broadcast proofing, transmitter acceptance or regulatory compliance, the Spectrum Master is the ideal instrument for making fast and reliable measurements.

Spectrum Analyzer Highlights

- Measure: Occupied Bandwidth, Channel Power, ACPR, C/I
- Dynamic Range: > 101 dB in 1 Hz RBW
- DANL: –163 dBm in 1 Hz RBW
- Phase Noise: –95 dBc/Hz @ 10 kHz offset at 1 GHz
- Frequency Accuracy: < ± 25 ppb with GPS On
- 1 Hz to 3 MHz Resolution Bandwidth (RBW)
- Traces: Normal, Max Hold, Min Hold, Average, # of Averages
- Detectors: Peak, Negative, Sample, Quasi-peak, and true RMS
- Markers: 6, each with a Delta Marker, or 1 Reference with 6 Deltas
- Limit Lines: up to 40 segments with one-button envelope creation

Capabilities and Functional Highlights

- ISDB-T
- ISDB-T SFN
- DVB-T/H
- DVB-T/H SFN
- DVB-T/H BER
- AM/FM/SSB Demodulator
- High Accuracy Power Meter
- 4 GHz to 26 GHz USB Sensors
- 8.4" Color Display
- Internal Preamplifier standard
- < 10 minute warm-up time
- 2.3 hour battery operation time
- Ethernet/USB Data Transfer
- MST Remote Access Tool
- GPS tagging of stored traces



Spectrum Master™ MS8911B Digital Broadcast Field Analyzer
Handheld Size: 315 mm x 211 mm x 77 mm (12.4 in x 8.3 in x 3.0 in), Lightweight: 3.1 kg (6.9 lbs)

Spectrum Master™ MS8911B Specifications

Spectrum Analyzer

Measurements	
Smart Measurements	Field Strength (uses antenna calibration tables to measure dBm/m^2 or dBmV/m)
	Occupied Bandwidth (measures 99% to 1% power channel of a signal)
	Channel Power (measures the total power in a specified bandwidth)
	ACPR (adjacent channel power ratio)
	AM/FM/SSB Demodulation (wide/narrow FM, upper/lower SSB), (audio out only)
	C/I (carrier-to-interference ratio)
	Emission Mask (recall limit lines as emission mask)
Setup Parameters	
Frequency	Center/Start/Stop, Span, Frequency Step, Signal Standard, Channel #
Amplitude	Reference Level (RL), Scale, Attenuation Auto/Level, RL Offset, Pre-Amp On/Off, Detection
Span	Span, Span Up/Down (1-2-5), Full Span, Zero Span, Last Span
Bandwidth	RBW, Auto RBW, VBW, Auto VBW, RBW/VBW, Span/RBW
File	Save, Recall, Delete, Directory Management
Save/Recall	Setups, Measurements, Limit Lines, Screen Shots Jpeg (save only), Save-on-Event
Save-on-Event	Crossing Limit Line, Sweep Complete, Save-then-Stop, Clear All
Delete	Selected File, All Measurements, All Mode Files, All Content
Directory Management	Sort Method (Name/Type/Date), Ascend/Descend, Internal/USB CF, Copy
Application Options	Impedance (50 Ω, 75 Ω, Other)
Sweep Functions	
Sweep	Single/Continuous, Manual Trigger, Reset, Detection, Minimum Sweep Time, Trigger Type
Detection	Peak, RMS, Negative, Sample, Quasi-peak
Triggers	Free Run, External, Video, Change Position, Manual
Trace Functions	
Traces	Up to three Traces (A, B, C), View/Blank, Write/Hold, Trace A/B/C Operations
Trace A Operations	Normal, Max Hold, Min Hold, Average, # of Averages, (always the live trace)
Trace B Operations	A→ B, B←→C, Max Hold, Min Hold
Trace C Operations	A → C, B←→C, Max Hold, Min Hold, A – B → C, B – A → C, Relative Reference (dB), Scale
Marker Functions	
Markers	Markers 1-6 each with a Delta Marker, or Marker 1 Reference with Six Delta Markers, Marker Table (On/Off), All Markers Off
Marker Types	Style (Fixed/Tracking), Noise Marker, Frequency Counter Marker
Marker Auto-Position	Peak Search, Next Peak (Right/Left), Peak Threshold %, Set Marker to Channel, Marker Frequency to Center, Delta Marker to Span, Marker to Reference Level
Marker Table	1-6 markers frequency and amplitude plus delta markers frequency offset and amplitude
Limit Line Functions	
Limit Lines	Upper/Lower, On/Off, Edit, Move, Envelope, Advanced, Limit Alarm, Default Limit
Limit Line Edit	Frequency, Amplitude, Add Point, Add Vertical, Delete Point, Next Point Left/Right
Limit Line Move	To Current Center Frequency, By dB or Hz, To Marker 1, Offset from Marker 1
Limit Line Envelope	Create Envelope, Update Amplitude, Number of Points (41), Offset, Shape Square/Slope
Limit Line Advanced	Type (Absolute/Relative), Mirror, Save/Recall
Frequency	
Frequency Range	9 kHz to 7.1 GHz (usable to 0 Hz)
Tuning Resolution	1 Hz
Frequency Reference	Aging: ± 1.0 ppm/10 years Accuracy: ± 0.3 ppm (25 °C ± 25 °C) + aging
Frequency Span	10 Hz to 7.1 GHz including zero span
Span Accuracy	Same as frequency reference accuracy
Sweep Time	10 µs to 600 seconds in zero span, autoset in non-zero span
Bandwidth	
Resolution Bandwidth (RBW)	1 Hz to 3 MHz in 1–3 sequence ±10% (1 MHz max in zero-span) (–3 dB bandwidth)
Video Bandwidth (VBW)	1 Hz to 3 MHz in 1–3 sequence (–3 dB bandwidth)
RBW with Quasi-Peak Detection	200 Hz, 9 KHz, 120 kHz (–6 dB bandwidth)
VBW with Quasi-Peak Detection	Auto VBW is On, RBW/VBW = 1

Spectrum Master™ MS8911B Specifications

Spectrum Analyzer (continued)

Spectral Purity

SSB Phase Noise	–100 dBc/Hz @ 10, 20 and 30 kHz offset from carrier –102 dBc/Hz @ 100 kHz offset from carrier

Amplitude Ranges

Dynamic Range	> 95 dB at 600 MHz, 2/3 (TOI-DANL) in 1 Hz RBW > 96 dB at 3.5 GHz, 2/3 (TOI-DANL) in 1 Hz RBW
Measurement Range	DANL to +30 dBm
Display Range	1 to 15 dB/div in 1 dB steps, ten divisions displayed
Reference Level Range	–120 dBm to +30 dBm
Attenuator Resolution	0 to 65 dB, 5.0 dB steps
Amplitude Units	Log Scale Modes: dBm, dBV, dBmv, dBµV Linear Scale Modes: nV, µV, mV, V, kV, nW, µW, mW, W, kW

Amplitude Accuracy (Power level >-50 dBm)

(Input attenuation)	Preamp Off (≤ 35 dB)	Preamp Off (40 to 55 dB)	Preamp Off (60 to 65 dB)	Preamp On (0 or 10 dB)
9 kHz to ≤10 MHz	± 1.50 dB	± 1.50 dB	± 1.50 dB	—
100 kHz to 4 GHz	—	—	—	± 1.50 dB
>10 MHz to 4 GHz	± 1.25 dB	± 1.75 dB	± 1.75 dB	—
>4 GHz to 6.5 GHz	—	± 1.75 dB	± 1.75 dB	—
>4 GHz to 7.1 GHz	± 1.75 dB	—	—	± 1.75 dB
>6.5 GHz to 7.1 GHz	—	± 2.00 dB	± 3.00 dB	—

Displayed Average Noise Level (DANL)

	Preamp Off (Reference level -20 dBm)		Preamp On (Reference level -50 dBm)	
(DANL in 1 Hz RBW, 0 dB attenuation)	Maximum	Typical	Maximum	Typical
10 MHz to 1 GHz	–137 dBm	–140 dBm	–161 dBm	–163 dBm
> 1 GHz to 2.2 GHz	–133 dBm	–136 dBm	–159 dBm	–160 dBm
> 2.2 GHz to 2.8 GHz	–126 dBm	–130 dBm	–153 dBm	–156 dBm
> 2.8 GHz to 4 GHz	–136 dBm	–139 dBm	–159 dBm	–160 dBm
> 4 GHz to 7.1 GHz	–127 dBm	–131 dBm	–154 dBm	–158 dBm

Spurs

Residual Spurs	Preamp On (RF input terminated, 0 dB input attenuation) –100 dBm. 10 MHz to 7.1 GHz Preamp Off (RF input terminated, 0 dB input attenuation) –90 dBm, 100 kHz to 3.2 GHz –84 dBm, > 3.2 GHz to 7.1 GHz
Exceptions	–85 dBm @ 250, 300, 350 MHz –80 dBm, –90 dBm typical @ ≈ 4010 MHz –70 dBm, –83 dBc typical @ ≈ 5084 MHz –75 dBm, –87 dBm typical @ ≈ 5894 MHz –80 dBm, –92 dBm typical @ ≈ 7028 MHz
Input-Related Spurious	(0 dB attenuation, -30 dBm input, span < 1.7 GHz, carrier offset > 4.5 MHz) –60 dBc, –70 dBc typical
Exceptions	–38 dBc, –48 dBc typical @ 1674 MHz

Third-Order Intercept (TOI) (–20 dBm tones 100 kHz apart, –20 dBm Ref level, 0 dB input attenuation, preamp off)

600 MHz	+7 dBm
3.5 GHz	+9.5 dBm
50 MHz to 300 MHz	> +8 dBm typical
> 300 MHz to 2.2 GHz	> +10 dBm typical
> 2.2 GHz to 2.8 GHz	> +15 dBm typical
> 2.8 GHz to 4 GHz	> +10 dBm typical
> 4 GHz to 7.1 GHz	> +13 dBm typical

Second Harmonic Distortion (0 dB input attenuation, –30 dBm input, preamp off)

50 MHz to 1.4 GHz	–50 dBc
> 1.4 GHz to 2 GHz	–70 dBc
> 2 GHz	–80 dBc

VSWR

> 10 dB input attenuation	2.0:1 max, 1:5:1 typical

GPS Receiver Option (Option 0031) (includes GPS antenna 2000-1410)

Setup	On/Off, GPS Info
GPS Time/Location Indicator	Time, Latitude, Longitude and Altitude on display Time, Latitude, Longitude and Altitude with trace storage
High Frequency Accuracy	Spectrum Analyzer, DVB-T/H Analyzer
when GPS Antenna is connected	< ± 25 ppb with GPS On, 3 minutes after satellite lock in selected mode
GPS Lock – after antenna is disconnected	< ± 50 ppb for 3 days, 0 °C to 50 °C ambient temperature
Connector	BNC, female, reverse polarity

High Accuracy Power Meter (Option 0019) (requires external USB Power Sensor(s))

Amplitude	Maximum, Minimum, Offset, Relative On/Off, Units, Auto Scale
Average	# of Running Averages, Max Hold
Zero/Cal	Zero On/Off, Cal Factor (Center Frequency, Signal Standard)
Limits	Limit On/Off, Limit Upper/Lower

Power Sensor Model	**PSN50**	**MA24105A**	**MA24106A**	**MA24108/18/26A**
Description	High Accuracy RF Power Sensor	Inline Peak Power Sensor	High Accuracy RF Power Sensor	Microwave USB Power Sensor
Frequency Range	50 MHz to 6 GHz	350 MHz to 4 GHz	50 MHz to 6 GHz	10 MHz to 8 GHz (**MA24108A)** 10 MHz to 18 GHz (**MA24118A)** 10 MHz to 26 GHz (**MA24126A)**
Connector	Type N(m), 50 Ω	Type N(f), 50 Ω	Type N(m), 50 Ω	Type N(m), 50 Ω (**MA24108/18A)** Type K(m), 50 Ω (**MA24126A)**
Dynamic Range	–30 dBm to +20 dBm (.001 mW to 100 mW)	+3 dBm to +51.76 dBm (2 mW to 150 W)	–40 dBm to +23 dBm (0.1 µW to 200 mW)	–40 dBm to +20 dBm (0.1 µW to 100 mW)
VBW	100 Hz	100 Hz	100 Hz	50 kHz
Measurand	True-RMS	True-RMS	True-RMS	True-RMS, Slot Power, Burst Average Power
Measurement Uncertainty	± 0.16 dB[1]	± 0.17 dB[2]	± 0.16 dB[1]	± 0.18 dB[3]
Datasheet (for complete specifications)	11410-00414	11410-00621	11410-00424	11410-00504

Notes:
1) Total RSS measurement uncertainty (0 ºC to 50 ºC) for power measurements of a CW signal greater than –20 dBm with zero mismatch errors.
2) Expanded uncertainty with K=2 for power measurements of a CW signal greater than +20 dBm with a matched load. Measurement results referenced to the input side of the sensor.
3) Expanded uncertainty with K=2 for power measurements of a CW signal greater than –20 dBm with zero mismatch errors.

ISDB-T Measurements (Option 0030)

Measurements

ISDB-T RF	ISDB-T Signal Analysis	ISDB-T Measurement Modes	ISDB-T SFN Analysis (Option 0032)
Signal Power Channel Power Termination Voltage Open Terminal Voltage Field Strength Spectrum Monitor Channel Power Zone Center Channel Zone Center Frequency Spectrum Mask Mask (Standard A) Japan Mask (Standard B) Japan Mask (Critical) Brazil Mask (Sub-critical) Brazil Mask (Non-critical) Brazil Phase Noise Spurious Emissions	Constellation (w/zoom) Layer A, B, C, TMCC Sub-carrier MER Delay Profile (w/zoom) Frequency Response Measured Data Frequency Frequency Offset MER (Total, Layer A/B/C, TMCC, AC1) Modulation (Layer A/B/C) Mode, GI Sub-carrier MER w/marker Delay w/marker Frequency Response w/ marker	Custom User specified measurement and setup parameters Easy User specified measurements. Some setup parameters are automatically set or detected Batch User specified measurements and channels for automatic measurement, display of results and storage	Delay Profile (w/zoom) In-band Spectrum Measured Data Channel Power Delay DU Ratio Power Field Strength

Setup Parameters

Frequency Range	35 MHz to 806 MHz
Setting Resolution	1 Hz
Channel Map	UHF (Japan), UHF (Brazil), IF (37.15 MHz), None
Channel Setting Range	13 to 62 (Japan) Center frequency = (channel number -13) x 6 + 473.142857 MHz 14 to 69 (Brazil) Center frequency = (channel number -14) x 6 + 473.142857 MHz
Bandwidths	6 MHz, 8 MHz
Mode	Mode 2, Mode 3 Manual setting or setting by automatic detection
Guard Interval (GI)	1/4, 1/8, 1/16 Manual setting or setting by automatic detection
Modulation Scheme	QPSK, 16QAM, 64QAM Manual setting or setting by automatic detection
Spectrum Reverse	On, Off
Partial Reception	Recognized when layer A segment count is 1
One-Seg	On: synchronizes with single segment transmission (Bandwidth 6 MHz only) Off: synchronizes with normal 13 segment signal
Maximum Input Level	+20 dBm (Preamp Off) –10 dBm (Preamp On)
Reference Level Setting	–25 to +20 dBm/5 dB steps (Preamp Off) –50 to –10 dBm/10 dB steps (Preamp On)

Field Strength, Terminal Voltage, Channel Power (ISDB-T Signal, 1 Channel Input)

Input Level Range	+20 dBm to noise floor (Preamp Off) –20 dBm to noise floor (Preamp On)
Resolution	0.1 dB
Accuracy	Average count 10, VSWR < 1.5, 50 Ω ± 2.0 dB (+20 dBm to –10 dBm, typical), ± 2.0 dB (–10 dBm to –60 dBm) (Preamp Off) ± 2.0 dB (–10 dBm to –84 dBm) (Preamp On)
Displayed Average Noise Level	RF input 50 Ω terminated, Average count 50, + 20 ºC to +30 ºC, 5.6 MHz width ≤ –70 dBm (Pre Amp: Off) ≥ –94 dBm (Pre Amp: On)
Units	dBm, dBµV, dBµV(emf), dVµV/m
Antenna Correction Table	Antenna level correction data table for measuring field strength saved in instrument
Impedance	50 Ω, 75 Ω (requires 12N50-75B, 50 Ω to 75 Ω matching pad)
Measurement Mode	Single, Continuous, Average, Moving average, Max hold, Average count 1 to 100

Spectrum Monitor

Horizontal Display Range	1, 3, 5, 11, 31, 51 channels
Vertical Display Range	100 dB between –150 dBm to 20 dBm
Channel Power Measurement	Channel Zone Marker measures channel power at RF In
Resolution	0.1 dB
Measurement Mode	Single, Continuous

ISDB-T Measurements (Option 0030) (continued)

Modulation Analysis (ISDB-T Signal, 1 Channel Input)

Frequency Lock Range	± 90 kHz
Input Range	+20 dBm to noise floor + 20 dB (Preamp Off) −20 dBm to noise floor + 20 dB (Preamp On)
Displayed MER	Total, Layer A, Layer B, Layer C, TMCC, AC1
Resolution	0.1 dB
Residual MER	Total, Mode 3, GI 1/8, 64 QAM, Average count 10, internal attenuator 0 dB, typical ≥ 42 dB (Preamp Off, Reference level −20 dBm, −20 dBm input) ≥ 37 dB (Preamp On, Reference level −50 dBm, −50 dBm input)
Interference Wave Effect	Total, Mode 3, GI 1/8, 64 QAM, Average count 10, ± 2 channels, 0 dBm interference wave, typical ≥ 30 dB (Preamp Off, −35 dBm input)
Constellation Display	Layer A, Layer B, Layer C, TMCC
Sub-carrier MER Display	± 2.785 MHz from center frequency (Bandwidth 6 MHz) ± 3.714 MHz from center frequency (Bandwidth 8 MHz)
Sub-carrier MER Marker	Reads sub-carrier number, offset frequency, MER
Frequency	Measures center frequency of modulated signal
Units	Hz, ppm
Frequency Resolution	0.1 Hz
Frequency Accuracy	−20 dBm, MER > 40 dB, Preamp Off, Average count 10, Mode 3, GI 1/8, 64 QAM ± (measurement frequency x reference frequency accuracy) ± 0.3 Hz
Measurement Mode	Single, Continuous, Average, Moving average, Overwrite (Constellation only) Average count 1 to 100

Delay Profile (ISDB-T Signal, 1 Channel Input)

Frequency Lock Range	± 90 kHz
Input Range	+20 dBm to noise floor + 20 dB (Preamp Off) −20 dBm to noise floor + 20 dB (Preamp On)
Horizontal Axis	Delay Time, maximum level signal displayed at 0 µs
Display Range	Full display -1/24 of valid symbol length to 7/24 of valid symbol length (0 µs position Left) -4/24 of valid symbol length to 4/24 of valid symbol length (0 µs position Center) -7/24 of valid symbol length to 1/24 of valid symbol length (0 µs position Right) Zoom display Arbitrary 24.6 us width within full display range (Bandwidth 6 MHz) Arbitrary 18.5 us width within full display range (Bandwidth 8 MHz)
Valid Range	0.12 µs to Guard Interval length
Resolution	0.12 µs (Bandwidth 6 MHz) 0.09 µs (Bandwidth 8 MHz)
Vertical Axis	Relative level, displays maximum level signal at 0 dB
Vertical Axis Display Range	5, 10, 25, 50 dB
Display Resolution	0.1 dB
Marker	Reads Delay time, Distance and Relative level from 0 µs response
Measurement Mode	Single, Continuous, Average, Moving average, Average count 1 to 100

Frequency Response (ISDB-T Signal, 1 Channel Input)

Frequency Lock Range	± 90 kHz
Input Range	+20 dBm to noise floor + 20 dB (Preamp Off) −20 dBm to noise floor + 20 dB (Preamp On)
Horizontal Axis	Frequency, displays center frequency as 0 MHz
Display Range	± 2.785 MHz (Bandwidth 6 MHz) ± 3.714 MHz (Bandwidth 8 MHz)
Valid Range	± 2.74 MHz (Mode 2), ± 2.76 MHz (Mode 3) (Bandwidth 6 MHz) ± 3.65 MHz (Mode 2), ± 3.68 MHz (Mode 3) (Bandwidth 8 MHz)
Resolution	1 kHz
Vertical Axis	Level, displays average value of frequency response as 0 dB
Vertical Axis Display Range	5, 10, 25, 50 dB
Display Resolution	0.1 dB
Measurement Mode	Single, Continuous, Average, Moving average, Average count 1 to 100

ISDB-T Measurements (Option 0030) (continued)

Spectrum Mask (ISDB-T Signal, 1 Channel Input)

Input Level Range	+20 dBm to −15 dBm
Resolution Bandwidth	10 kHz
Video Bandwidth	300 Hz
Detection	Peak
Selectable Masks	Channel Map UHF (Japan) Standard A (according to ARIB STD-B31) Standard B (according to ARIB STD-B31) Channel Map UHF (Brazil) Critical (according to ABNT NBR 15601) Sub-critical (according to ABNT NBR 15601) Non-critical (according to ABNT NBR 15601)
Measurement Points	4001 (Standard A) 6001 (Standard B, Critical, Sub-critical, Non-critical)
Pass/Fail Judgment	When measured waveform is below the standard line the result is judged to have passed Pass or Fail indicated accordingly
Margin	Displays frequency and minimum value of the difference between the measured waveform and mask standard line between each break point of the mask standard line
Floor Reduction	Deducts the floor noise from the measured spectrum waveform and displays the result
Antenna Power	For Standard B only Settable when antenna power is > 0.025 W and ≤ 2.5 W Mask automatically adjusted for set antenna power For antenna power ≤ 0.025 W, standard line "≤ 0.025 W" is displayed For antenna power > 2.5 W, standard line > 2.5 W is displayed For antenna power = 0.25 W, standard line "0.25 W" is displayed
Filter Selection	Default, User 1, User 2, User 3 (Critical, Sub-critical, Non-critical only) User memories can be used to download specific transmitter output filter characteristics to compensate measured data
Selectable Displayed Traces	Filter Data, Corrected Data, Uncorrected Data (Critical, Sub-critical, Non-critical only)
Marker Function	Relative level and offset frequency of measured waveform
Occupied Frequency Bandwidth	Displays the frequency bandwidth in which 99% of the total power is received
Resolution	0.01 MHz
Measurement Mode	Single

Phase Noise (ISDB-T Signal, 1 Channel Input)

Frequency Lock Range	±2 kHz
Input Level Range	+20 dBm to -10 dBm
Horizontal Axis Range	100 kHz to 6 MHz
Vertical Axis Range	–40 dBc/Hz to –140 dBc/Hz
Marker	Frequency, phase noise, integrated phase noise between two arbitrary points
Fixed Point Display	Displays phase noise at offset frequencies 1, 10, 100 kHz Displays integrated phase noise from 100 Hz to 6 MHz
Residual Phase Noise	–10 dBm, Average count 10 –100 dBc/Hz (10 kHz offset) –102 dBc/Hz (100 kHz offset)
Frequency Accuracy	–10 dBm, Average count 10 ± (measurement frequency x reference frequency accuracy) ± 0.20 Hz
Frequency Resolution	0.01 Hz
Measurement Mode	Single, Continuous, Average, Average count 1 to 100
Vertical Axis Display Range	5, 10, 25, 50 dB
Display Resolution	0.1 dB
Marker	Delay time, Distance and Relative level read with marker function
Measurement Mode	Single, Continuous, Average, Moving average, Average count 1 to 100

ISDB-T Measurements (Option 0030) (continued)

Spurious Emissions (ISDB-T Signal, 1 Channel Input)

Input Level Range	+20 dBm to 0 dBm
Search Range	5 MHz to 5x main signal frequency
Search Conditions	RBW 10 kHz (5 to 30 MHz), 100 kHz (30 MHz to 1 GHz), 1 MHz (1 GHz to 4 GHz) Detection mode RMS
Measurement Method	5 MHz to 1 GHz, and > 1 GHz (main signal frequency x 5) HPF required to attenuate main signal for measuring > 1 GHz
Results Display	Frequency, Absolute level, Relative level, RBW and Detection mode for five spurious
Measurement Mode	Single

Batch Measurement Mode

Function	Specifies measurement items and channels for continuous measurement and saves each measurement result to JPEG file
Setting Range	UHF (Japan) 13 to 62 channels UHF (Brazil) 14 to 69 channels
Maximum Number of Channels	10
Measured Items	Field strength, Channel power, MER, Frequency error, Spectrum mask evaluation, Occupied frequency bandwidth

ISDB-T Single Frequency Network (SFN) Field Measurements (Option 0032)

Field Strength, Terminal Voltage, Channel Power (ISDB-T Signal, 1 Channel Input)

Input Level Range	+20 dBm to noise floor (Preamp Off) –20 dBm to noise floor (Preamp On)
Resolution	0.1 dB
Accuracy	Average count 10, VSWR <1.5, 50 Ω ± 2.0 dB (+20 dBm to –10 dBm, typical), ± 2.0 dB (–10 dBm to –60 dBm) (Preamp Off) ± 2.0 dB (–10 dBm to –84 dBm) (Preamp On)
Displayed Average Noise Level	RF input 50 Ω terminated, Average count 50, +20 ºC to +30 ºC, 5.6 MHz width ≤ –70 dBm (Pre Amp: Off) ≥ –94 dBm (Pre Amp: On)
Units	dBm, dBµV, dBµV(emf), dVµV/m
Antenna Correction Table	Antenna level correction data table for measuring field strength saved in instrument
Impedance	50 Ω, 75 Ω (requires 12N50-75B, 50 Ω to 75 Ω matching pad)
Measurement Mode	Single, Continuous

Delay Profile (ISDB-T Signal, 1 Channel Input)

Frequency Lock Range	±90 kHz
Input Range	+20 dBm to noise floor + 10 dB (Preamp Off) –20 dBm to noise floor + 10 dB (Preamp On)
Horizontal Axis	Delay Time, maximum level signal displayed at 0 µs
Display Range	Full display: ± 1008 µs Zoom display: arbitrary 74 µs width within full display range
Resolution	0.12 µs
Vertical Axis	Relative level, displays maximum level signal at 0 dB
Vertical Axis Display Range	5, 10, 20, 40 dB
Resolution	0.1 dB
Marker	Reads Delay time, Relative level (DU ratio), absolute power and either field strength (dBµV/m) or termination voltage (dBµV)
Marker Mode	Main wave to center of zoom, path wave to center of zoom, peak search When Active Marker on Zoom graph Normal: Reads 1-point marker Zone: Reads the maximum value within the 1/10 width zone marker
Measurement Mode	Single, Continuous

Delay Profile: Path Level Estimation

Main Wave Level Accuracy 2 Wave Model*1	Mode 3, GI 1/8, VSWR ≤ 1.5, 50 Ω ± 2.5 dB (–10 dBm to –55 dBm, typical, Preamp Off) ± 2.5 dB (–20 dBm to –79 dBm, typical, Preamp On)
3 Wave Model*3,*5	± 2.5 dB (–10 dBm to –55 dBm, typical, Preamp Off) ± 2.5 dB (–20 dBm to –79 dBm, typical, Preamp On)
Delayed Wave Level Accuracy 2 Wave Model*2	Mode 3, GI 1/8, VSWR ≤ 1.5, 50 Ω ± 2.5 dB (–10 dBm to –55 dBm, typical, Preamp Off) ± 2.5 dB (–20 dBm to –79 dBm, typical, Preamp On)
3 Wave Model*4,*5	± 2.5 dB (–10 dBm to –55 dBm, typical, Preamp Off) ± 2.5 dB (–20 dBm to –79 dBm, typical, Preamp On)
DU Ratio Accuracy 2 Wave Model*2	Mode 3, GI 1/8, VSWR ≤ 1.5, 50 Ω ± 1.0 dB (–10 dBm to –55 dBm, typical, Preamp Off) ± 1.0 dB (–20 dBm to –79 dBm, typical, Preamp On)
3 Wave Model*4,*5	± 1.0 dB (–10 dBm to –55 dBm, typical, Preamp Off) ± 1.0 dB (–20 dBm to –79 dBm, typical, Preamp On)
Main Wave Level Accuracy with Interference*6	± 2.5 dB (–35 dBm, typical, Preamp Off) (Mode 3, GI 1/8, 64 QAM, Reference level –25 dBm, ± 2 channels from desired signal, 0 dBm CW interfering wave)
Sidelobe Suppression	Automatically suppresses the sidelobe centered on the main wave

*1 Time difference between main and delayed wave is 5 to 1000 µs, DU ratio is 3 dB or more
*2 Time difference between main and delayed wave is 5 to 1000 µs, DU ratio is 3 dB to 20 dB
*3 Time difference between main and delayed wave is 5 to 500 µs, DU ratio is 6 dB or more
*4 Time difference between main and delayed wave is 5 to 500 µs, DU ratio is 6 dB
*5 When main wave is set to 0 µs
-Delay time (absolute value) of one delayed wave is different from that of the other by 2 µs or more
-When delay time difference between delayed waves is different from delay time (absolute value) by 2 µs or more
*6 Time difference between main and delayed wave is 5 to 1000 µs and DU ratio is 3 dB or more with 2-wave model

ISDB-T Single Frequency Network (SFN) Field Measurements (Option 0032) (continued)

In-band Spectrum

Input Range	+20 dBm to noise floor (Preamp Off) −20 dBm to noise floor (Preamp On)
Horizontal Axis	Frequency, center frequency displayed as 0 MHz
Display Range	± 2.785 MHz
Valid Range	± 2.74 MHz (Mode 2), ± 2.76 MHz (Mode 3)
Display Resolution	1 kHz
Vertical Axis	Level, displays average value of frequency response as 0 dB
Vertical Axis Display Range	5, 10, 25, 50 dB
Display Resolution	0.1 dB
Marker	Reads marker frequency and relative level Delta Marker reads relative level, distance and frequency difference
Measurement Mode	Single, Continuous

DVB-T/H Measurements (Option 0050)

Measurements

DVB-T/H RF (Option 0050)	DVB-T/H Signal Analysis (Option 0050)	DVB-T/H BER (Option 0057)	DVB-T/H SFN Analysis (Option 0052)
Signal Power Channel Power Termination Voltage Open Terminal Voltage Field Strength Spectrum Monitor Channel Power Zone Center Channel Zone Center Frequency	Composite or Individual Views Constellation Impulse Response (w/zoom) Carrier MER (w/zoom) Freq Response (composite view only) Measured Data Mode, GI Modulation Hierarchy Freq Offset Channel Power MER (Total/Data/TPS) TPS Warning Message TPS Info Interleave Type Cell ID Code Rate (HP/LP) Time Slicing (HP/LP) MPE-FEC (HP/LP)	BER Before RS Before Viterbi PER (Packet) Channel Power MER (Quick) Bit Rate TPS Info Length Indicator Mode, GI Modulation Hierarchy Interleave Type Cell ID Code Rate Time Slicing MPE-FEC TPS Warning Message ASI Out	Impulse Response (w/zoom) Inband Spectrum Measured Data Channel Power Delay DU Ratio Power Field Strength

Setup Parameters

Frequency Range	30 MHz to 990 MHz when Channel Map is None
Setting Resolution	1 Hz
Channel Map	UHF (Australia), UHF (Europe), None
Channel	28 to 69 (Australia) Center frequency = (channel number –28) x 7 + 529.5 MHz
	21 to 69 (Europe) Center frequency = (channel number –21) x 8 + 474 MHz
Channel Frequency Offsets	± 166.666 kHz, ± 333.333 kHz, ± 499.999 kHz, None
Bandwidths	5, 6, 7, 8 MHz
Mode	2K, 4K, 8K Manual setting or setting by automatic detection
Guard Interval (GI)	1/4, 1/8, 1/16, 1/32 Manual setting or setting by automatic detection
Modulation Scheme	QPSK, 16 QAM, 64 QAM Manual setting or setting by automatic detection
Hierarchy	None, $\alpha = 1, 2, 4$ Manual setting or setting by automatic detection
Spectrum Reverse	On, Off
Maximum Input Level	+20 dBm (Preamp Off) –10 dBm (Preamp On)
Reference Level Setting	–25 dBm to +20 dBm/5 dB step (Pre-amp Off) –50 dBm to –10 dBm/10 dB step (Pre-amp On)

Field Strength, Terminal Voltage, Channel Power (DVB-T/H Signal, 1 Channel Input)

Input Level Range	+20 dBm to noise floor (Preamp Off) –20 dBm to noise floor (Preamp On)
Resolution	0.1 dB
Accuracy	Channel Map UHF (Europe), Channel 21 to 69, Average count 10, VSWR < 1.5, 50 Ω ± 2.0 dB (+20 dBm to –10 dBm, typical), ± 2.0 dB (–10 to –60 dBm) (Preamp Off) ± 2.0 dB (–10 dBm to –84 dBm) (Preamp On)
Displayed Average Noise Level	Channel Map UHF (Europe), Channel 21 to 69, Bandwidth 8 MHz, RF input 50 Ω terminated, Average count 50, +20 ºC to +30 ºC ≤ –69 dBm (Preamp Off) ≥ –93 dBm (Preamp On)
Units	dBm, dBµV, dBµV(emf), dVµV/m
Antenna Correction Table	Antenna level correction data table for measuring field strength saved in instrument
Impedance	50 Ω, 75 Ω (requires 12N50-75B, 50 Ω to 75 Ω matching pad)
Measurement Mode	Single, Continuous, Average, Moving average, Max hold, Average count 1 to 100

DVB-T/H Measurements (Option 0050) (continued)

Spectrum Monitor

Horizontal Display Range	1, 3, 5, 11, 31, 51 channels
Vertical Display Range	100 dB between –150 dBm to 20 dBm
Channel Power	Channel Zone Marker measures channel power at RF In
Channel Power Resolution	0.1 dB
Measurement Mode	Single, Continuous

Modulation Analysis (DVB-T/H Signal, 1 Channel Input)

Frequency Lock Range	± 90 kHz
Input Level Range	+20 dBm to noise floor + 20 dB (Preamp Off) –20 dBm to noise floor + 20 dB (Preamp On)
Selectable Measurement Views	Composite (comprises Constellation, Impulse Response, Carrier MER, Frequency Response) Individual (Constellation, Impulse Response or Carrier MER)
Center Frequency Offset Accuracy	–20 dBm, MER > 40 dB, Preamp Off, Average count 10, Channel Map UHF (Europe), Channel 21 to 69, Mode 8K, GI 1/8, 64 QAM, Hierarchy None ± (Measurement frequency x Reference frequency accuracy) ± 0.3 Hz
Frequency Offset Resolution	0.1 Hz
Channel Power	Measures channel power at RF In
Channel Power Resolution	0.1 dB
MER Measurement	Total, Data, TPS
MER Resolution	0.1 dB
Residual MER	Total, Average count 10, Channel Map UHF (Europe), Channel 21 to 69, Mode 8K, GI 1/8, 64 QAM, Hierarchy None, typical ≥ 42 dB (Preamp Off, Reference Level –20 dBm, –20 dBm input) ≥ 37 dB (Preamp On, Reference Level –50 dBm, –50 dBm input)
Interference Wave Effect	Total, Average count 10, Channel Map UHF (Europe), Channel 21 to 69, Mode 8K, GI 1/8, 64 QAM, Hierarchy None, ± 2 channels, 0 dBm interference wave, typical ≥ 30 dB (Preamp Off, –35 dBm input)
TPS Information	68 bit TPS data showed in hexadecimal, TPS warning messages
Inner Interleave	Native, In-depth
Cell ID	16 bits displayed in hexadecimal and decimal
Code Rate	HP, LP
Time Slicing	Off, On, HP and LP in hierarchical mode
MPE-FEC	Off, On, HP and LP in hierarchical mode
Constellation Display	Data, TPS
Symbol Decision Annotation	On, Off
Measurement Mode	Single, Continuous, Average, Moving average, Average count 1 to 100

Impulse Response (DVB-T/H Signal, 1 Channel Input)

Frequency Lock Range	± 90 kHz
Input Range	+20 dBm to noise floor + 20 dB (Preamp Off) –20 dBm to noise floor + 20 dB (Preamp On)
Horizontal Axis	Delay Time, maximum level signal displayed at 0 µs
Display Range	Full display –1/24 of valid symbol length to 7/24 of valid symbol length (0 µs position Left) –4/24 of valid symbol length to 4/24 of valid symbol length (0 µs position Center) –7/24 of valid symbol length to 1/24 of valid symbol length (0 µs position Right) Zoom display Arbitrary x µs width within full display range where x is the following 43.75 µs (Bandwidth 8 MHz) 50.00 µs (Bandwidth 7 MHz) 58.33 µs (Bandwidth 6 MHz) 70.00 µs (Bandwidth 5 MHz)
Valid Range	0 µs to Guard Interval length
Resolution	0.11 µs (Bandwidth 8 MHz) 0.13 µs (Bandwidth 7 MHz) 0.15 µs (Bandwidth 6 MHz) 0.18 µs (Bandwidth 5 MHz)
Vertical Axis	Relative level, displays maximum level signal at 0 dB
Vertical Axis Display Range	5, 10, 25, 50 dB
Resolution	0.1 dB
Marker	Reads Delay time, Distance and Relative level from 0 µs response
Delta Marker	Reads Delay time, Distance and Relative level from reference marker
Measurement Mode	Single, Continuous, Average, Moving average, Average count 1 to 100

DVB-T/H Measurements (Option 0050) (continued)

Carrier MER (DVB-T/H Signal, 1 Channel Input)

Frequency Lock Range	± 90 kHz
Input Range	+20 dBm to noise floor + 20 dB (Preamp Off) −20 dBm to noise floor + 20 dB (Preamp On)
Measurement Types	Speed, Accuracy
Horizontal Axis	Frequency offset from center frequency displayed at 0 MHz
Display Range	Full display ± 3.804 (Bandwidth 8 MHz) ± 3.328 (Bandwidth 7 MHz) ± 2.853 (Bandwidth 6 MHz) ± 2.377 (Bandwidth 5 MHz) Zoom display Arbitrary x MHz width within full display range where x is the following Bandwidth 8 MHz Mode 2K: ± 0.893 MHz Mode 4K: ± 0.446 MHz Mode 8K: ± 0.223 MHz Bandwidth 7 MHz Mode 2K: ± 0.781 MHz Mode 4K: ± 0.391 MHz Mode 8K: ± 0.195 MHz Bandwidth 6 MHz Mode 2K: ± 0.670 MHz Mode 4K: ± 0.335 MHz Mode 8K: ± 0.167 MHz Bandwidth 5 MHz Mode 2K: ± 0.558 MHz Mode 4K: ± 0.279 MHz Mode 8K: ± 0.140 MHz
Resolution	Carrier spacing (determined by Mode and Bandwidth)
Vertical Axis	MER
Vertical Axis Display Range	20 dB, 30 dB, 40 dB, 50 dB selectable
Resolution	0.1 dB
Marker	Reads carrier number, offset frequency, MER, peak search
Measurement Mode	Single, Continuous, Average, Moving average, Average count 1 to 100

Frequency Response (DVB-T/H Signal, 1 Channel Input)

Frequency Lock Range	± 90 kHz
Input Range	+20 dBm to noise floor + 20 dB (Preamp Off) −20 dBm to noise floor + 20 dB (Preamp On)
Horizontal Axis	Frequency, displays center frequency as 0 MHz
Display Range	± 3.804 (Bandwidth 8 MHz) ± 3.328 (Bandwidth 7 MHz) ± 2.853 (Bandwidth 6 MHz) ± 2.377 (Bandwidth 5 MHz)
Vertical Axis	Level, displays average value of frequency response as 0 dB
Vertical Axis Display Range	−40 dB to +10 dB
Measurement Mode	Single, Continuous, Average, Moving average, Average count 1 to 100

DVB-T/H BER Measurements (Option 0057)

These specifications become effective when the MS8911B-0057 is installed in the MS8911B. Can only be used when option MS8911B-0050 is also installed. Operating temperature when BER option is installed is restricted to 0 °C to 40 °C

BER

Bit Count Setting	xE+yy x: 1 to 9, setting resolution 1 yy: 6 to 12, setting resolution 1 Range 1E+6 to 1E+12
Service Type	In Service BER measurement of normal in-service data traffic Simultaneous BER measurement Before Viterbi and Before RS error correction Out of Service BER measurement of a PRBS23 data sequence BER measurement point can be selected Before Viterbi, Before RS or After RS
Stream	HP, LP
Result Display	Current: current measured value is continually updated Last: previous measured value is displayed while current measurement is being completed
TS Packet	Measurement point Before RS or After RS 1 + [187] + 16, 4 + [184] + 16 (Out of Service only)
Spectrum Reverse	On, Off
Real Time Monitor Indication	Signal Sync: Locked, Unlocked TPS Parity: OK, NG PRBS Sync (PRBS23): Locked, Unlocked (Out of Service only)
TPS Information	Length indicator: 23, 31, 33 Mode: 2K, 4K, 8K GI: 1/4, 1/8, 1/16, 1/32 Modulation: QPSK, 16 QAM, 64 QAM Hierarchy: None, $\alpha = 1$, $\alpha = 2$, $\alpha = 4$ Inner Interleave: Native, In-depth Cell ID: 0 x 0~0 x FFFF (Hexadecimal, Decimal) Code Rate: 1/2, 2/3, 3/4, 5/6, 7/8 (HP, LP) Time Slicing: On, Off (HP, LP) MPE-FEC: On, Off (HP, LP) It is possible to display TPS warning message details
Elapsed Measurement Time Indication	hh: mm: ss, hh: hour, mm: minute, ss: second
BER Measurement Display	Rate: x.xxE-yy x.xx: Mantissa, display resolution 0.01 yy: Exponent, display resolution 1 In Service: Before Viterbi, Before RS Out of Service: Before Viterbi, Before RS, After RS Error Count: Displays total number of errors In Service: Before RS Out of Service: Before RS, After RS
PER Measurement Display	Rate: x.xxE-yy x.xx: Mantissa, display resolution 0.01 yy: Exponent, display resolution 1 Error Count: Displays total number of packet errors
MER (Quick)	Instant, Maximum, Moving average, Minimum
MER Resolution	0.1 dB
Display Range	< 27 dB
Channel Power at RF In	Instant, Maximum, Moving average, Minimum
Channel Power Resolution	0.1 dB
ASI Output Connector	BNC-J 75 Ω
ASI Output Level	800 mVp-p (typical)
Measurement Mode	Single, Continuous

DVB-T/H Single Frequency Network (SFN) Measurements (Option 0052)

Field Strength, Terminal Voltage, Channel Power (ISDB-T Signal, 1 Channel Input)

Input Level Range	+20 dBm to noise floor (Preamp Off) –20 dBm to noise floor (Preamp On)
Resolution	0.1 dB
Accuracy	Channel Map UHF (Europe), Channel 21 to 69, Average count 10, VSWR < 1.5, 50 Ω ± 2.0 dB (+20 dBm to –10 dBm, typical), ± 2.0 dB (–10 to –60 dBm) (Preamp Off) ± 2.0 dB (–10 dBm to –84 dBm) (Preamp On)
Displayed Average Noise Level	Channel Map UHF (Europe), Channel 21 to 69, Bandwidth 8 MHz, RF input 50 Ω terminated, Average count 50, +20 ºC to +30 ºC ≤ –69 dBm (Preamp Off) ≥ –93 dBm (Preamp On)
Units	dBm, dBµV, dBµV(emf), dVµV/m
Antenna Correction Table	Antenna level correction data table for measuring field strength saved in instrument
Impedance	50 Ω, 75 Ω (requires 12N50-75B, 50 Ω to 75 Ω matching pad)
Measurement Mode	Single, Continuous

Impulse Response (DVB-T/H Signal, 1 Channel Input)

Frequency Lock Range	± 90 kHz
Input Range	+20 dBm to noise floor + 10 dB (Preamp Off) –20 dBm to noise floor + 10 dB (Preamp On)
Horizontal Axis	Delay Time, maximum level signal displayed at 0 µs
Display Range	Full display ± 896 µs (Bandwidth 8 MHz) ± 1024 µs (Bandwidth 7 MHz) ± 1195 µs (Bandwidth 6 MHz) ± 1434 µs (Bandwidth 5 MHz) Zoom display Arbitrary x µs width within full display range where x is the following 66 µs (Bandwidth 8 MHz) 75 µs (Bandwidth 7 MHz) 87 µs (Bandwidth 6 MHz) 105 µs (Bandwidth 5 MHz)
Resolution	0.11 µs (33 m) (Bandwidth 8 MHz) 0.13 µs (37 m) (Bandwidth 7 MHz) 0.15 µs (44 m) (Bandwidth 6 MHz) 0.18 µs (52 m) (Bandwidth 5 MHz)
Vertical Axis	Relative level, displays maximum level signal at 0 dB
Vertical Axis Display Range	5, 10, 20, 40 dB
Resolution	0.1 dB
Marker	Reads Delay time, Relative level (DU ratio), absolute power and either field strength (dBµV/m) or termination voltage (dBµV)
Marker Mode	Main wave to center of zoom, path wave to center of zoom, peak search When Active Marker on Zoom graph Normal: Reads 1-point marker Zone: Reads the maximum value within the 1/10 width zone marker
Measurement Mode	Single, Continuous

DVB-T/H Single Frequency Network (SFN) Measurements (Option 0052) (continued)

Impulse Response: Path Level Estimation

Main Wave Level Accuracy 2 Wave Model*1	Mode 8K, GI 1/8, Bandwidth 8 MHz, VSWR ≤ 1.5, 50 Ω ± 2.5 dB (–10 dBm to –55 dBm, typical, Preamp Off) ± 2.5 dB (–20 dBm to –79 dBm, typical, Preamp On)
3 Wave Model*3,*5	± 2.5 dB (–10 dBm to –55 dBm, typical, Preamp Off) ± 2.5 dB (–20 dBm to –79 dBm, typical, Preamp On)
Delayed Wave Level Accuracy 2 Wave Model*2	Mode 8K, GI 1/8, Bandwidth 8 MHz, VSWR ≤ 1.5, 50 Ω ± 2.5 dB (–10 dBm to –55 dBm, typical, Preamp Off) ± 2.5 dB (–20 dBm to –79 dBm, typical, Preamp On)
3 Wave Model*4,*5	± 2.5 dB (–10 dBm to –55 dBm, typical, Preamp Off) ± 2.5 dB (–20 dBm to –79 dBm, typical, Preamp On)
DU Ratio Accuracy 2 Wave Model*2	Mode 8K, GI 1/8, Bandwidth 8 MHz, VSWR ≤ 1.5, 50 Ω ± 1.0 dB (–10 dBm to –55 dBm, typical, Preamp Off) ± 1.0 dB (–20 dBm to –79 dBm, typical, Preamp On)
3 Wave Model*4,*5	± 1.0 dB (–10 dBm to –55 dBm, typical, Preamp Off) ± 1.0 dB (–20 dBm to –79 dBm, typical, Preamp On)
Main Wave Level Accuracy with Interference*6	± 2.5 dB (–35 dBm, typical, Preamp Off) (Mode 8K, GI 1/8, 64 QAM, Reference level –25 dBm, ±2 channels from desired signal, 0 dBm CW interfering wave)
Sidelobe Suppression	Automatically suppresses the sidelobe centered on the main wave

*1 Time difference between main and delayed wave is 5 to 850 µs, DU ratio is 3 dB or more
*2 Time difference between main and delayed wave is 5 to 850 µs, DU ratio is 3 dB to 20 dB
*3 Time difference between main and delayed wave is 5 to 420 µs, DU ratio is 6 dB or more
*4 Time difference between main and delayed wave is 5 to 420 µs, DU ratio is 6 dB
*5 When main wave is set to 0 µs
-Delay time (absolute value) of one delayed wave is different from that of the other by 2 µs or more
-When delay time difference between delayed waves is different from delay time (absolute value) by 2 µs or more
*6 Time difference between main and delayed wave is 5 to 850 µs and DU ratio is 3 dB or more with 2-wave model

In-band Spectrum

Input Range	+20 dBm to noise floor (Preamp Off) –20 dBm to noise floor (Preamp On)
Horizontal Axis	Frequency, center frequency displayed as 0 MHz
Display Range	± 3.804 MHz (Bandwidth 8 MHz) ± 3.328 MHz (Bandwidth 7 MHz) ± 2.853 MHz (Bandwidth 6 MHz) ± 2.377 MHz (Bandwidth 5 MHz)
Display Resolution	1.116 kHz (Bandwidth 8 MHz) 0.977 kHz (Bandwidth 7 MHz) 0.837 kHz (Bandwidth 6 MHz) 0.698 kHz (Bandwidth 5 MHz)
Vertical Axis	Level, displays average value of frequency response as 0 dB
Vertical Axis Display Range	5, 10, 25, 50 dB
Display Resolution	0.1 dB
Marker	Reads marker frequency and relative level Delta Marker reads relative level, distance and frequency difference
Measurement Mode	Single, Continuous

Spectrum Master™ MS8911B Specifications

General Specifications

Maximum Continuous Input	(≥ 10 dB input attenuation) +30 dBm
Input Damage Level	≥ 10 dB input attenuation, > +43 dBm, ± 50 Vdc. Input protection relay opens at > 30 dBm < 10 dB input attenuation, > +23 dBm, ± 50 Vdc. Limited dV/dt. Input protection relay opens at approximately 10 to 23 dBm
ESD Damage Level	(≥ 10 dB input attenuation) > 10 kV
External Reference Frequencies	1 MHz, 1.2288 MHz, 1.544 MHz, 2.048 MHz, 2.4576 MHz, 4.8 MHz, 4.9152 MHz, 5 MHz, 9.8304 MHz, 10 MHz, 13 MHz and 19.6608 MHz at –10 dBm to +10 dBm
Setup Parameters	
System	Status (Temperature, Battery Info, S/N, Firmware Ver, IP Address, Options Installed) Self Test, Application Self Test GPS (see Option 0031)
System Options	Name, Date and Time, Ethernet Configuration, Brightness, Volume Language (English, French, German, Spanish, Chinese, Japanese, Korean, Italian, User defined) Reset (Factory Defaults, Master Reset, Update Firmware)
File	Save, Recall, Delete, Directory Management
Save/Recall	Setups, Measurements, Screen Shots Jpeg (save only)
Delete	Selected File, All Measurements, All Mode Files, All Content
Directory Management	Sort Method (Name/Type/Date), Ascend/Descend, Internal/USB, Copy, Format USB
Internal Trace/Setup Memory	> 13,000 traces
External Trace/Setup Memory	Limited by size of USB Flash drive or Compact Flash module
Mode Switching	Auto-Stores/Recalls most recently used Setup Parameters in the Mode
Connectors	
RF In	Type N, female, 50 Ω, Maximum Input +30 dBm, ± 50 VDC
GPS	BNC, female, reverse polarity
External Power	5.5 mm barrel connector, 12 to 15 VDC, < 5.0 Amps
LAN Connection	RJ48C, 10/100 Mbps, Connect to PC or LAN for Remote Access
USB Interface (2)	Type A, Connect Flash Drive and Power Sensor
USB Interface	5-pin mini-B, Connect to PC for data transfer
Headset Jack	2.5 mm barrel connector
External Reference In	BNC, female, 50 Ω, Maximum Input +10 VDC
Reference Out	BNC, female, 50 Ω, 10 MHz
Display	
Size	8.4”
Resolution	800 x 600
Battery	
Type	Li-Ion
Battery Operation	2.5 hours, typical
Electromagnetic Compatibility	
European Union	CE Mark, EMC Directive 89/336/EEC, 92/31/EEC, 93/68/EEC and Low Voltage Directive 73/23/EEC, 93/68/EEC
Australia and New Zealand	C-tick N274
Interference	EN 61326-1
Emissions	EN 55011
Immunity	EN 61000-4-2/-4-3/-4-4/-4-5/-4-6/-4-11
Safety	
Safety Class	EN 61010-1 Class 1
Product Safety	IEC 60950-1 when used with Company supplied Power Supply
Environmental	
Operating Temperature	–10 ºC to 55 ºC
Maximum Humidity	85%
Shock	MIL-PRF-28800F Class 2
Storage	–51 ºC to 71 ºC
Altitude	4600 meters, operating and non-operating
Size and Weight	
Size	315 mm x 211 mm x 77 mm, (12.4 in x 8.3 in x 3.0 in)
Weight	3.1 kg, (6.9 lbs) typical, < 3.8 kg. (8.5 lbs) with MS8911B-057 option installed

Spectrum Master™ MS8911B Specifications

Master Software Tools (for your PC)

Database Management	
Full Trace Retrieval	Retrieve all traces from instrument into one PC directory
Trace Catalog	Index all traces into one catalog
Trace Rename Utility	Rename measurement traces
Group Edit	Titles, subtitles, plot scaling, markers and limit lines, simultaneously on similar files
DAT File Converter	Converts HHST files to MST file format and vice-versa
Data Analysis	
Trace Math and Smoothing	Compare multiple traces
Data Converter	Convert from/to Return Loss/ VSWR/ Cable Loss/ DTF and also into Smith Charts
Measurement Calculator	Translates into other units
Report Generation	
Report Generator	Includes GPS, power level, and calibration status along with measurements
Edit Graph	Change scale, limit lines, and markers
Report Format	Create reports in HTML for PDF format
Export Measurements	Export measurements to *.s2p, *.jpg or *.csv format
Notes	Annotate measurements
Mapping (GPS Required)	
Spectrum Analyzer Mode	MapInfo, MapPoint
List/Parameter Editors	
Traces	Add, delete, and modify limit lines and markers
Antennas, Cables, Signal Standards	Modify instrument's Antenna, Cable, and Signal Standard List
Product Updates	Auto-checks Anritsu website for latest revision firmware
Firmware Upload	Upload new firmware into the instrument
Pass/Fail	Create, download, or edit Signal Analysis Pass/Fail Limits
Languages	Add up to two languages or modify non-English language menus
Display	Modify display settings
Connectivity	
Connections	Connect to PC using USB, LAN, or Direct Ethernet connection
Download	Download measurements and live traces to PC for storage and analysis
Upload	Upload measurements from PC to instrument
Firmware Updates	Product Update: download latest firmware version
Remote Access Tool	Remote control and monitoring of instrument (via Ethernet port) over the Internet

Spectrum Master™ MS8911B Ordering Information

Ordering Information

	MS8911B	Description
	9 kHz to 7.1 GHz	Digital Broadcast Field Analyzer
	Options	
	MS8911B-0019	High-Accuracy Power Meter (requires sensor(s))
	MS8911B-0031	GPS Receiver (includes Antenna P/N 2000-1410)
	MS8911B-0030	ISDB-T Measurements
	MS8911B-0032	ISDB-T SFN Field Measurements*
	MS8911B-0050	DVB-T/H Measurements
	MS8911B-0052	DVB-T/H SFN Field Measurements**
	MS8911B-0057	DVB-T/H BER Unit**
		*Requires Option 0030, **Requires Option 0050

Power Sensors (For complete ordering information see the respective datasheets of each sensor)

Part Number	Description
PSN50	High Accuracy RF Power Sensor, 50 MHz to 6 GHz, +20 dBm
MA24106A	High Accuracy RF Power Sensor, 50 MHz to 6 GHz, +23 dBm
MA24105A	Inline Peak Power Sensor, 350 MHz to 4 GHz, +3 dBm to +51.76 dBm
MA24108A	Microwave USB Power Sensor, 10 MHz to 8 GHz, +20 dBm
MA24118A	Microwave USB Power Sensor, 10 MHz to 18 GHz, +20 dBm
MA24126A	Microwave USB Power Sensor, 10 MHz to 26 GHz, +20 dBm

Spectrum Master™ MS8911B Ordering Information

Manuals (soft copy available at www.anritsu.com)

MS8911B	Description
10580-00175	Spectrum Master User Guide (Hard copy included)
10580-00231	Spectrum Analyzer Measurement Guide - Interference Analyzer, Channel Scanner, IF Output, Gated Sweep
10580-00240	Power Meter Measurement Guide - High Accuracy Power Meter
10580-00237	Digital TV Measurement Guide - DVB-T/H, ISDB-T
W2830AE, W2835AE	Programming Manuals
10580-00178	Maintenance Manual

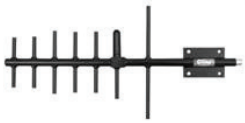
Standard Accessories (included with instrument)

10580-00175	Spectrum Master User Guide
2300-498	MST CD: Master Software Tools, User/Measurement Guides, Programming Manual, Troubleshooting Guides, Application Notes
65729	Soft Carrying Case
633-44	Rechargeable Li-Ion Battery
40-187-R	AC/DC Power Supply
806-141-R	Automotive Cigarette Lighter 12 Volt DC Adapter
3-806-152	Cat 5e Crossover Patch Cable, 7 feet/213 cm
2000-1371-R	Ethernet Cable, 7 feet/213 cm
3-2000-1498	USB A-mini B Cable, 10 feet/305 cm
2000-1567	512 MB Compact Flash Drive
1091-27-R	Type-N male to SMA female adapter
1091-172-R	Type-N male to BNC female adapter
11410-00583	Spectrum Master™ MS8911B Technical Data Sheet One Year Warranty (Including battery, firmware, and software) Certificate of Calibration and Conformance

Spectrum Master™ MS8911B Ordering Information

Optional Accessories

Directional Antennas



Part Number	Description
2000-1411-R	824 MHz to 896 MHz, N(f), 10 dBd, Yagi
2000-1412-R	885 MHz to 975 MHz, N(f), 10 dBd, Yagi
2000-1413-R	1710 MHz to 1880 MHz, N(f), 10 dBd. Yagi
2000-1414-R	1850 MHz to 1990 MHz, N(f), 9.3 dBd, Yagi
2000-1415-R	2400 MHz to 2500 MHz, N(f), 10 dBd, Yagi
2000-1416-R	1920 MHz to 2170 MHz, N(f), 10 dBd, Yagi
2000-1519-R	500 MHz to 3000 MHz, log periodic
2000-1617	600 MHz to 2100 MHz, N(f), 5-8 dBi to 12 GHz, 0-6 dBi to 21 GHz, log periodic

Portable Antennas

2000-1200-R	806 MHz to 866 MHz, SMA(m), 50 Ω
2000-1473-R	870 MHz to 960 MHz, SMA(m), 50 Ω
2000-1035-R	896 MHz to 941 MHz, SMA(m), 50 Ω (1/2 wave)
2000-1030-R	1710 MHz to 1880 MHz, SMA(m), 50 Ω (1/2 wave)
2000-1474-R	1710 MHz to 1880 MHz with knuckle elbow (1/2 wave)
2000-1031-R	1850 MHz to 1990 MHz, SMA(m), 50 Ω (1/2 wave)
2000-1475-R	1920 MHz to 1980 MHz and 2110 MHz to 2170 MHz, SMA(m), 50 Ω
2000-1032-R	2400 MHz to 2500 MHz, SMA(m), 50 Ω (1/2 wave)
2000-1361-R	2400 MHz to 2500 MHz, 5000 MHz to 6000 MHz, SMA(m), 50 Ω
2000-1616	20 MHz to 21000 MHz, N(f), 50 Ω
2000-1636-R	Antenna Kit (Consists of: 2000-1030-R, 2000-1031-R, 2000-1032-R, 2000-1200-R, 2000-1035-R, 2000-1361-R, and carrying pouch)

Bandpass Filters

1030-114-R	806 MHz to 869 MHz, N(m) to SMA(f), 50 Ω
1030-109-R	824 MHz to 849 MHz, N(m) to SMA (f), 50 Ω
1030-110-R	880 MHz to 915 MHz, N(m) to SMA (f), 50 Ω
1030-105-R	890 MHz to 915 MHz Band, 0.41 dB loss, N(m) to SMA(f), 50 Ω
1030-111-R	1850 MHz to 1910 MHz, N(m) - SMA (f), 50 Ω
1030-106-R	1710 MHz to 1790 MHz Band, 0.34 dB loss, N(m) to SMA(f), 50 Ω
1030-107-R	1910 MHz to 1990 MHz Band, 0.41 dB loss, N(m) to SMA(f), 50 Ω
1030-112-R	2400 MHz to 2484 MHz, N(m) to SMA (f), 50 Ω
1030-155-R	2500 MHz to 2700 MHz, N(m) to N(f), 50 Ω

Attenuators

3-1010-122	20 dB, 5 W, DC to 12.4 GHz, N(m) to N(f)
42N50-20	20 dB, 5 W, DC to 18 GHz, N(m) to N(f)
42N50A-30	30 dB, 50 W, DC to 18 GHz, N(m) to N(f)
3-1010-123	30 dB, 50 W, DC to 8.5 GHz, N(m) to N(f)
1010-127-R	30 dB, 150 W, DC to 3 GHz, N(m) to N(f)
3-1010-124	40 dB, 100 W, DC to 8.5 GHz, N(m) to N(f), Uni-directional
1010-121	40 dB, 100 W, DC to 18 GHz, N(m) to N(f), Uni-directional
1010-128-R	40 dB, 150 W, DC to 3 GHz, N(m) to N(f)

Spectrum Master™ MS8911B Ordering Information

Optional Accessories (continued)

Adapters

1091-26-R	SMA(m) to N(m), DC to 18 GHz, 50 Ω
1091-27-R	SMA(f) to N(m), DC to 18 GHz, 50 Ω
1091-80-R	SMA(m) to N(f), DC to 18 GHz, 50 Ω
1091-81-R	SMA(f) to N(f), DC to 18 GHz, 50 Ω
1091-172-R	BNC(f) to N(m), DC to 1.3 GHz, 50 Ω
1091-379-R	7/16 DIN(f) to 7/16 DIN(f), DC to 6 GHz, 50 Ω, w/ Reinforced Grip
510-102-R	N(m) to N(m), DC to 11 GHz, 50 Ω, 90 degrees right angle
12N50-75B	Matching Pad, DC to 3000 MHz, N(m) to N(f), 50 Ω to 75 Ω

Precision Adapters

34NN50A	Precision Adapter, N(m) to N(m), DC to 18 GHz, 50 Ω
34NFNF50	Precision Adapter, N(f) to N(f), DC to 18 GHz, 50 Ω

Miscellaneous Accessories

2000-1410	GPS Antenna, RP-BNC
2000-1520-R	USB Flash Drive
3-200-1567	512 MB Compact Flash Card
2000-1374	External Charger for Li-Ion Batteries

Backpack and Transit Case

67135	Anritsu Backpack (For Handheld Instrument and PC)
760-243-R	Large Transit Case with Wheels and Handle

Notes

MASTER USERS GROUP

The Master Users Group is an organization dedicated to providing training, technical support, networking opportunities and links to Master product development teams. As a member you will receive the Insite Quarterly Newsletter with user stories, measurement tips, new product news and more.

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