



INSTITUTO FEDERAL DE  
TELECOMUNICACIONES

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## **ANEXO 7**

# **HOJAS DE ESPECIFICACIONES DE EQUIPOS UTILIZADOS**

# Spectrum Master™

## Compact Handheld Spectrum Analyzer

**MS2712E**  
9 kHz to 4 GHz

**MS2713E**  
9 kHz to 6 GHz

### Introduction

Anritsu introduces its next generation compact handheld Spectrum Analyzers to meet the needs for portability. Whether it is for spectrum monitoring, broadcast proofing, interference analysis, RF and microwave measurements, or Wi-Fi and wireless network measurements, the Spectrum Master is the ideal instrument for making fast and reliable measurements.

### Spectrum Analyzer Highlights

- Measurements: Occupied Bandwidth, Channel Power, ACPR, C/I
- Interference Analyzer: Spectrogram, Signal Strength, RSSI, Mapping
- Dynamic Range: > 102 dB in 1 Hz RBW
- DANL: -162 dBm in 1 Hz RBW
- Phase Noise: -100 dBc/Hz max @ 10 kHz offset at 1 GHz
- Frequency Accuracy: < ± 50 ppb with GPS On
- 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 41 segments with one-button envelope creation
- Trace Save-on-Event: crossing limit line or sweep complete

### Capabilities and Functional Highlights

- LTE/LTE-A FDD/TDD
- CDMA, EV-DO
- GSM/EDGE
- W-CDMA/HSPA+
- TD-SCDMA/HSPA+
- Fixed, Mobile WiMAX
- EMF Test
- ISDB-T, ISDB-T SFN
- DVB-T/H, DVB-T/H SFN
- Gated Sweep
- Tracking Generator
- Internal Pre-amplifier standard
- Internal Bias-Tee
- Internal Power Meter
- High Accuracy Power Meter
- 4, 6, 8, 18, 26 GHz Power Sensors
- GPS tagging of saved traces
- Channel Scanner
- < 5 minute warm-up time
- 3 hour battery operation time
- New Fast Sweep Speed Mode
- On-Screen Coverage Mapping
- Touchscreen keyboard
- USB & Optional Ethernet (Option 0411) for data transfer and instrument control
- Increase throughput by automating repetitive or operator intensive tasks via Ethernet or USB. Remote programming provided via Ethernet (Option 0411).
- Master Software Tools
- Line Sweep Tools



Spectrum Master™ MS2712E Spectrum Analyzer featuring 8.4 inch Daylight Viewable Touchscreen  
Compact Size: 273 mm x 199 mm x 91 mm (10.7 in x 7.8 in x 3.6 in), Lightweight: 3.45 kg (7.6 lb)

**Spectrum Analyzer****Measurements**

Measurements	Field Strength (uses antenna calibration tables to measure dBm/m <sup>2</sup> , dBmV/m, dBV/m, dBμV/m, Volt/m, Watt/m <sup>2</sup> , dBW/m <sup>2</sup> , A/m, dBA/m and Watt/cm <sup>2</sup> ) 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, USB and LSB), (audio out only) C/I (carrier-to-interference ratio) Emission Mask Coverage Mapping (requires Option 0431)
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**Setup Parameters**

Frequency	Center/Start/Stop, Span, Frequency Step, Signal Standard, Channel #, Channel Increment
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 (.jpg) (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, Copy, Format USB
Application Options	Bias-Tee (On/Off), Impedance (50 Ω, 75 Ω, Other)

**Sweep Functions**

Sweep	Single/Continuous, Sweep Mode (Fast, Performance, No FFT), Reset, Detection, Minimum Sweep Time, Trigger Type, Gated Sweep (see Option 0090)
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 amplitude and offset

**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, Points (41 max), Offset, Shape Square/Slope
Limit Line Advanced	Type (Absolute/Relative), Mirror, Save/Recall

**Frequency**

Frequency Range	9 kHz to 4 GHz (MS2712E), 9 kHz to 6 GHz (MS2713E) (tunable to 0 Hz)
Tuning Resolution	1 Hz
Frequency Reference	Aging: ± 1.0 ppm/year Accuracy: ± 1.5 ppm (25 °C ± 25 °C) + aging, < ± 50 ppb with GPS On
Frequency Span	10 Hz to 4 GHz including zero span (MS2712E), 10 Hz to 6 GHz including zero span (MS2713E)
Sweep Time	Minimum 100 ms, 10 μs to 600 s in zero span
Sweep Time Accuracy	± 2 % in 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) (auto or manually selectable)
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 Analyzer** (Continued)

**Spectral Purity**

SSB Phase Noise @ 1 GHz	-100 dBc/Hz, -110 dBc/Hz typical @ 10 kHz offset -105 dBc/Hz, -112 dBc/Hz typical @ 100 kHz offset -115 dBc/Hz, -121 dBc/Hz typical @ 1 MHz offset
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**Amplitude Ranges**

Dynamic Range	> 102 dB (2.4 GHz), 2/3 (TOI-DANL) in 1 Hz RBW
Measurement Range	DANL to +26 dBm ( $\geq$ 50 MHz) DANL to 0 dBm (< 50 MHz)
Display Range	1 dB to 15 dB/div in 1 dB steps, ten divisions displayed
Reference Level Range	-120 dBm to +30 dBm
Attenuator Range	0 dB to 55 dB in 5 dB steps
Maximum Continuous Input	+30 dBm
Amplitude Units	Log Scale Modes: dBm, dBV, dBmV, dB $\mu$ V, dBW, dBmW, dB $\mu$ W, dBA, dBmA, dB $\mu$ A Linear Scale Modes: nV, $\mu$ V, mV, V, kV, nW, $\mu$ W, mW, W, kW, nA, $\mu$ A, mA, A

**Amplitude Accuracy**

9 kHz to 100 kHz	$\pm$ 2.0 dB typical (Preamp Off)
100 kHz to 4.0 GHz	$\pm$ 1.25 dB, $\pm$ 0.5 dB typical
> 4.0 GHz to 6 GHz	$\pm$ 1.50 dB, $\pm$ 0.5 dB typical

**Displayed Average Noise Level (DANL)**

(RBW = 1 Hz, 0 dB attenuation)	Preamp Off (Reference Level -20 dBm)		Preamp On (Reference Level -50 dBm)	
	Maximum	Typical	Maximum	Typical
10 MHz to 2.4 GHz	-141 dBm	-146 dBm	-157 dBm	-162 dBm
> 2.4 GHz to 4 GHz	-137 dBm	-141 dBm	-154 dBm	-159 dBm
> 4 GHz to 5 GHz	-134 dBm	-138 dBm	-150 dBm	-155 dBm
> 5 GHz to 6 GHz	-126 dBm	-131 dBm	-143 dBm	-150 dBm

**Spurs**

Residual Spurious	< -90 dBm (RF input terminated, 0 dB input attenuation, > 10 MHz)
Input-Related Spurious	< -75 dBc (0 dB attenuation, -30 dBm input, span < 1.7 GHz, carrier offset > 4.5 MHz)
Exceptions, typical	< -70 dBc @ <2.5 GHz, with 2072.5 MHz Input < -68 dBc @ F1 - 280 MHz with F1 Input < -70 dBc @ F1 + 190.5 MHz with F1 Input < -52 dBc @ 7349 - (2F2) MHz, with F2 Input, where F2 < 2437.5 MHz < -55 dBc @ 190.5 $\pm$ (F1/2) MHz, F1 < 1 GHz

**Third-Order Intercept (TOI)**

	Preamp Off (-20 dBm tones 100 kHz apart, 10 dB attenuation)
800 MHz	+16 dBm
2400 MHz	+20 dBm
200-2200 MHz	+25 dBm, typical
> 2.2 GHz to 5.0 GHz	+28 dBm, typical
> 5.0 GHz to 6.0 GHz	+33 dBm, typical

**Second Harmonic Distortion**

	Preamp Off, 0 dB input attenuation, -30 dBm input
50 MHz	-56 dBc
> 50 MHz to 200 MHz	-60 dBc, typical
> 200 MHz to 3000 MHz	-70 dBc, typical

**VSWR**

2:1, typical

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**General Specifications**


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**Setup Parameters**

System	Status (Temperature, Battery Info, Serial Number, Firmware Version, Options Installed) Self Test, Application Self Test GPS (see Option 0031)
System Options	Name, Date and Time, Brightness, Volume Language (English, French, German, Spanish, Chinese, Japanese, Korean, Italian, Russian, User defined) Reset (Factory Defaults, Master Reset, Update Firmware)
File	Save, Recall, Delete, Directory Management
Save/Recall	Setups, Measurements, Screen Shots (.jpg) (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	2,000 Traces, 2,000 Setups
External Trace/Setup Memory	Limited by size of USB Flash drive
Mode Switching	Auto-Stores/Recalls most recently used Setup Parameters in the Mode

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**Connectors**

RF Out	Type N, female, 50 $\Omega$
RF Out Damage Level	23 dBm, $\pm$ 50 VDC
RF In	Type N, female, 50 $\Omega$
RF In Damage Level	+33 dBm peak, $\pm$ 50 VDC, Maximum Continuous Input ( $\geq$ 10 dB attenuation)
GPS	SMA(f)
External Power	5.5 mm barrel connector, 11.0 to 14.5 VDC, < 4.0 Amps
USB Interface (2)	Type A, Connect USB Flash Drive and Power Sensor
USB Interface	5-pin mini-B, Connect to PC for data transfer
Ethernet Interface	RJ45 connector for Ethernet 10-Base T (Available with option 0411 Ethernet)
Headset Jack	3.5 mm mini-phone plug
External Reference In	BNC, female, 50 $\Omega$ , Maximum Input +10 dBm, 1 MHz, 5 MHz, 10 MHz, 13 MHz
External Trigger/Clock Recovery	BNC, female, 50 $\Omega$ , Maximum Input $\pm$ 5 VDC

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**Display**

Type	Resistive Touchscreen
Size	8.4 inch daylight viewable color LCD
Resolution	800 x 600
Pixel Defects	No more than one defective pixel (99.9997% good pixels)

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**Battery**

Type	Li-Ion
Battery Operation	3.0 hours, typical
Battery Charging Limits	0 $^{\circ}$ C to +45 $^{\circ}$ C, Relative Humidity $\leq$ 80 %

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**Electromagnetic Compatibility**

European Union	CE Mark, EMC Directive 2004/108/EC Low Voltage Directive 2006/95/EC
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

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**Safety**

Safety Class	EN 61010-1 Class 1
Product Safety	IEC 60950-1 when used with Company supplied Power Supply

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**Warranty**

Duration	Standard three-year warranty One-year warranty on battery
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**General Specifications** (Continued)

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**Environmental**

Operating Temperature	-10 °C to +55 °C
Maximum Humidity	95 % RH (non-condensing) at 40 °C
Shock	MIL-PRF-28800F Class 2
Storage	-40 °C to +71 °C
Altitude	4600 meters, operating and non-operating
Explosive Atmosphere	MIL-PRF-28800F Section 4.5.6.3 MIL-STD-810G, Method 511.5, Procedure 1

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**ESD**

RF Port Center Pin	Withstands up to ± 15 kV
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**Size and Weight**

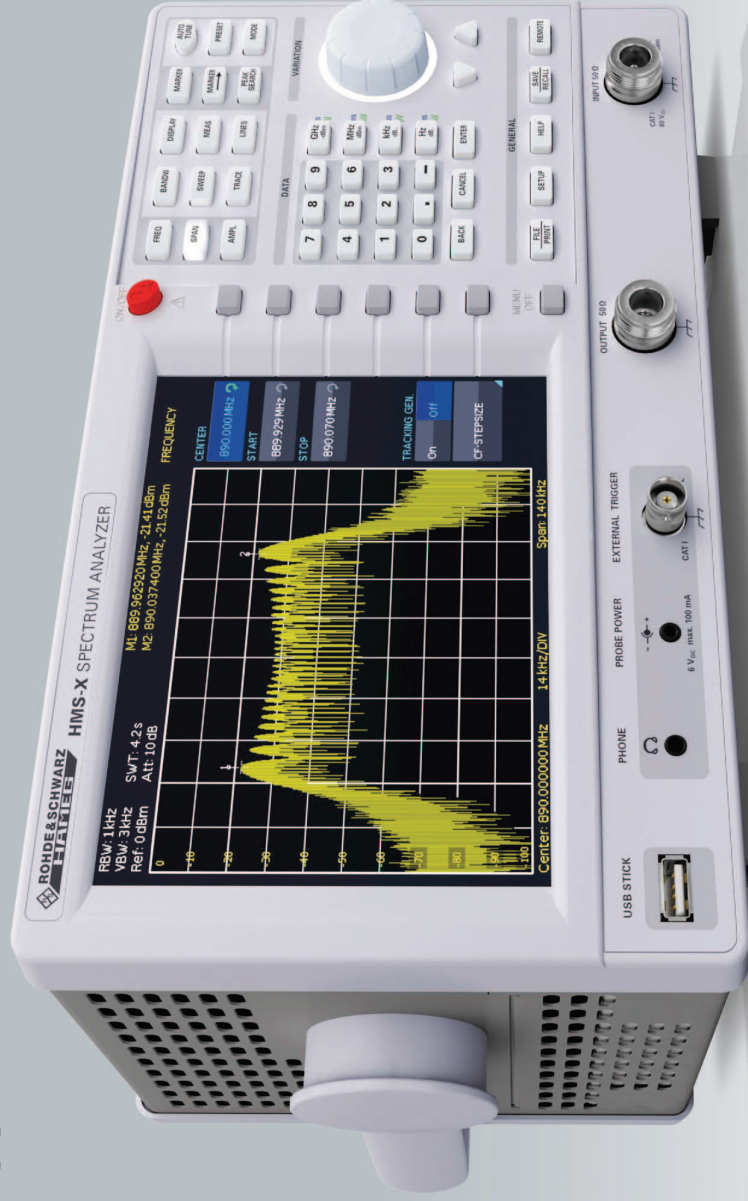
Size	273 mm x 199 mm x 91 mm (10.7 in x 7.8 in x 3.6 in)
Weight	3.45 kg (7.6 lb)

# Spectrum Analyzer

## 1.6 GHz | 3 GHz

### HMS-X

**HAMEG®**  
Instruments  
A Rohde & Schwarz Company





# Your HMS-X Spectrum Analyzer

You can create your HMS spectrum analyzer by combining a basic unit with any of three available options. In case of growing requirements, upgrade vouchers allow you to upgrade your instruments with all options at any point in time.

### Key facts

- Frequency range: 100 kHz to 1.6 GHz/3 GHz\*
- Spectral purity greater than -100 dBc/Hz (at 100 kHz)
- SWEEP from 20 ms to 1000 s
- Detectors: auto-, min/max-, peak, sample, RMS, average, quasi-peak\*\*
- Miscellaneous marker/delta marker and peak functions
- Tracking generator\*\*\*
- Frequency range: 5 MHz to 1.6 GHz/3 GHz\*\*
- Output level: -20 dBm to 0 dBm
- Directly export data to USB flash drive, RS-232/USB dual interface for remote control
- Fanless design and fast boot time

\*1. with HMS-3G (HVZ) D1 option  
 \*\*1. with HMS-3G (HVZ) D1 option  
 \*\*\*with HMS-TG (HVZ) D1 option



Model overview:	HMS-X with EMC option	HMS-X basic unit
Amplitude measurement range	-114 dBm to +20 dBm	-104 dBm to +20 dBm
DANL	typ. -135 dBm	typ. -104 dBm
Resolution bandwidth	100 Hz to 1 MHz, 200 kHz (3 dB), 200 Hz, 9 kHz, 20 kHz, 1 MHz (6 dB)	10 Hz to 1 MHz, 200 kHz (3 dB)
Video bandwidth	10 Hz to 1 MHz	1 kHz to 1 MHz



This option activates the tracking generator in the instrument.

3 GHz



The frequency range is increased from 1.6 GHz to 3 GHz with this option.



This option activates all the functions that are required for EMC precompliance measurements. The preamplifier option has been integrated into the new HMS-EMC option.



We have used the first-class hardware from our largest HMS spectrum analyzer and developed a new and flexible instrument concept. It can be individually configured, combined and upgraded for your applications.

HMS previous models	HMS-X
HMS100G	HMS-X
HMS1000	HMS-X + EMC*
HMS1010	HMS-X + EMC* + TG
HMS3000	HMS-X + EMC* + 3G
HMS3010	HMS-X + EMC* + 3G + TG

\* The preamplifier function is an integral part of the HMS-EMC option.

# 1 Basic Unit + 3 Options



HMS-X upgrade

## Upgrade at any time

You can easily upgrade all three available options at any later point in time with option upgrade vouchers available at your dealer.

The voucher number and the serial number of your HMS-X instrument enable you to generate the respective licence key directly on our web page <http://voucher.hameg.com>.

HMS-X		
<b>HV213</b> Activates EMC option	<b>HV212</b> Upgrade to 3 GHz	<b>HV211</b> Unlocks 3G

HMS-X options	Option code*1	Voucher code*2
EMC option incl. preamplifier	HMS-EMC	HV213
Bandwidth upgrade to 3 GHz	HMS-3G	HV212
Unlock built-in tracking generator	HMS-TG	HV211

\*1: available only with purchase of HMS-X basic unit

\*2: activate HMS-X options at any time after purchase of HMS-X basic unit

4 HAMEG INSTRUMENTS | HMS-X



## EMC Precompliance

Not only do unexpected results in test labs during EMC compliance measurements translate into extra costs, quite often they also cause a substantial delay for your project. HAMEG offers effective and cost-efficient tools for EMC precompliance measurements which allow you to successfully prevent possible surprises before the actual onset of a problem.

Our HMEexplorer software for your EMC measurements is included with every HMS-X spectrum analyzer with activated EMC option.

### EMC precompliance sets

HAMEG offers product sets for your EMC precompliance measurements which include all necessary instruments to analyse typical EMC problems. Depending on your requirements, you can choose between a 1 GHz and a 3 GHz combination.

#### 1 GHz HMS-SET1

- Spectrum analyzer HMS-X incl. HMS-EMC option
- Probe set HZ530
- Line impedance stabilization network (LISN) HM6050-2
- HMEexplorer software

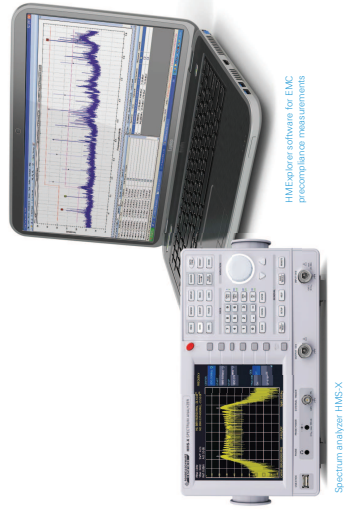
HMS-X	HMS-EMC	HMS-30
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#### 3 GHz HMS-SET2

- Differences to SET1:
  - HMS-3G option, additional
  - 3 GHz probe set HZ540 instead of HZ530

HMS-X	HMS-EMC	HMS-30
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Precompliance



HMEexplorer software for EMC precompliance measurements

Spectrum analyzer HMS-X



1 GHz probe set HZ530



3 GHz probe set HZ540 (fig. similar)



Line impedance stabilization network for line conductor measurements (LISN) HM6050-2

More information | [www.hameg.com](http://www.hameg.com) 5

# Recommended Accessories

### 3 GHz VSWR bridge HZ547

This unit is used to measure the voltage standing wave ratio (VSWR) and reflection coefficient of a device under test with an impedance of 50 Ω. Typical test devices include attenuators, terminations, frequency switches, amplifiers, cables and mixers.



3 GHz VSWR bridge for HMS-X, option HMS-TG required, option HMS-SG recommended

### Near-field probe set 3 GHz HZ540 | HZ550

Near-field probe set for comparative measurements with built-in preamplifier covering frequency ranges from 1 MHz to 3 GHz, designed for the 50 Ω N-connectors of the HMS-X.

- H-field probe
- High impedance probe
- JH-field probe (HZ550)
- Radiation probe (HZ550)



### Alternative version HZ540L | HZ550L

Same specification as HZ540 | HZ550, but with low capacitance probe instead of high impedance probe

### HZ46

4RU 19" rackmount kit



### HZ59

Carrying case for protection and transport



### H0730

Ethernet/USB dual interface card



### H0740

Interface IEEE-488 (GPIB), galvanically isolated



### HZ530

Near-field probe set 1 GHz



## Spectrum analyzer HMS-X Firmware: ≥ 2.022

<b>Frequency</b>	100 kHz to 1.6 GHz
<b>Temperature stability:</b>	±2 ppm @ 30°C
<b>Aging:</b>	± 1 ppm/year
<b>Frequency counter<sup>1)</sup>:</b>	1 Hz
<b>Accuracy:</b>	± frequency x tolerance of reference
<b>Span setting range:</b>	0 Hz (zero span) and 100 Hz to 1.6 GHz
<b>Basic unit:</b>	0 Hz (zero span) and 100 Hz to 3 GHz <sup>2)</sup>
<b>Spectral purity, USB phase noise:</b>	< -88 dBc/Hz <sup>3)</sup>
<b>Dynamic range:</b>	100 MHz to 300 MHz, 30°C
<b>Resolution bandwidth (RBW):</b>	< 100 dB/Hz
<b>Span:</b>	100 MHz from carrier
<b>Resolution bandwidth (RBW):</b>	100 MHz, 20 to 30°C
<b>Span:</b>	1 MHz from carrier
<b>Sweep time:</b>	2 ms to 100 s
<b>Span:</b>	> 0 Hz
<b>Resolution bandwidth (3 dB):</b>	10 kHz to 1 MHz in 1-3 steps, 200 kHz
<b>Resolution bandwidth (3 dB):</b>	100 Hz to 1 MHz in 1-3 steps, 200 kHz <sup>2)</sup>
<b>Tolerance:</b>	±5% typ.
<b>Resolution:</b>	±300 Hz
<b>Resolution:</b>	±10% typ.
<b>Resolution bandwidth (4 dB):</b>	200 Hz, 9 MHz, 200 Hz, 1 MHz <sup>2)</sup>
<b>Video bandwidth:</b>	1 kHz to 1 MHz in 1-3 steps

<b>Amplitude</b>	Average noise level displayed up to ±20 dBm
<b>Display range:</b>	Typ. -100 to +20 dBm
<b>Dynamic range:</b>	Typ. -114 to +20 dBm <sup>2)</sup>
<b>Max. permissible DC at HF input:</b>	80 V
<b>Input impedance:</b>	50 Ω
<b>Input impedance (HF trace):</b>	20 dBm, 30 dBm for max. 3 min.
<b>Input impedance (base range):</b>	500 Ω
<b>TOT products:</b>	2 x ±20 dBm
<b>(at distance between signals):</b>	typ. ±13 dBm third-order intercept
<b>(at distance between signals):</b>	60 dB typ. (±10 dBm TO)
<b>(at distance between signals):</b>	66 dB typ. (typ. ±13 dBm TO)
<b>(at distance between signals):</b>	> 2 MHz

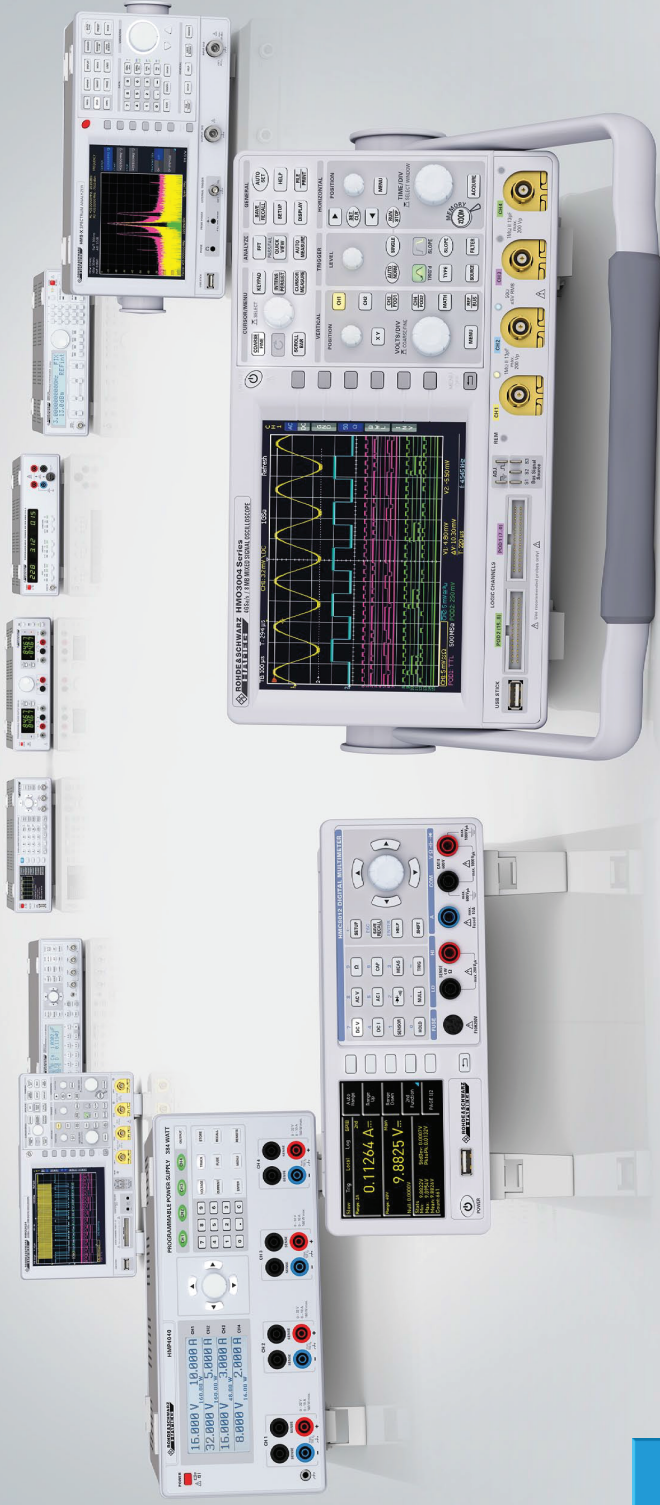
<b>DANL (Displayed average noise level):</b>	95 dBm, typ. -104 dBm
<b>RBW (10 Hz, VSW 1 kHz, 1 MHz, 1.6 GHz):</b>	-115 dBm <sup>2)</sup> , typ. -135 dBm <sup>2)</sup>
<b>Ref. Level &lt; 30 dBm:</b>	100 dBm, typ. -140 dBm <sup>2)</sup>
<b>Ref. Level &gt; 30 dBm:</b>	< 30 dBm
<b>Input related spurious:</b>	-70 dBc typ.
<b>2nd harmonic receive frequency:</b>	-55 dBc <sup>2)</sup>
<b>Level display:</b>	60 dBc typ.
<b>Display range:</b>	80 to ±20 dBm in 1 dB steps
<b>Logarithmic display scaling:</b>	100 dB, 50 dB, 20 dB, 10 dB
<b>Linear display scaling:</b>	linear <sup>2)</sup>
<b>Measured curves:</b>	Percentage of reference level <sup>2)</sup>
<b>Autoscale:</b>	1 curve and 1 memory curve
<b>Autoscale:</b>	Auto: Min, Max, Peak, Samps, RMS, Average
<b>Failure of level display:</b>	Quiet/Peak <sup>2)</sup>
<b>(ref. level 50 dBm, 20 to 30°C)</b>	< 1.5 dB, typ. 0.5 dB

<b>Marker/Denominator</b>	8
<b>Marker functions:</b>	High, step back, minimum, center, marker, frequency, reference level = marker level, all marker on peak
<b>Marker display:</b>	Normal (Hz), frequency counting
<b>HF trace:</b>	N export
<b>Input impedance:</b>	50 Ω
<b>VSWR:</b>	< 1.5 typ.
<b>Output tracking generator<sup>2)</sup>:</b>	500 mW
<b>Frequency range:</b>	5 MHz to 1.6 GHz <sup>2)</sup>
<b>Output level:</b>	-20 to 0 dBm, in 1 dB steps

## Technical data

<b>Trigger input:</b>	BNC, TTL
<b>Trigger voltage:</b>	TTL
<b>Ext. reference input/output:</b>	BNC, TTL
<b>Reference frequency:</b>	10 MHz
<b>Supply cable for field probes:</b>	EMV: max. 10 mA, 0.25 mm DIN jack
<b>Audio output (Phone):</b>	3.5 mm DIN jack
<b>Demodulation:</b>	AM and FM (internal speaker)
<b>Miscellaneous</b>	
<b>Display:</b>	16.5 cm (6.5" TFT) Color, VGA Display
<b>Storage:</b>	10 complete device settings
<b>Memory:</b>	1000 (1000) (1000) (1000)
<b>Trigger:</b>	Visto Trigger <sup>2)</sup>
<b>Interfaces:</b>	Dual-Interface USMR5-232 (H0720), USB-Back (front/rear), DVI-D for ext. monitor
<b>Power supply:</b>	Max. 40 W at 230 V, 50 Hz
<b>Protection class:</b>	Safety class I (EN61010-1)
<b>Operating temperature:</b>	5 to 40°C
<b>Storage temperature:</b>	-20 to 70°C
<b>Rel. humidity:</b>	5 to 90% (non condensing)
<b>Dimensions (W x H x D):</b>	288 x 175 x 220 mm
<b>Weight:</b>	3.6 kg

<b>Accessories supplied:</b>	Line cord, printed operating manual, CD, software
<b>Recommended accessories:</b>	
<b>H0730</b>	Dual-Interface ethernet/USB
<b>H0740</b>	Interface IEEE-488 (GPIB), galvanically isolated
<b>HZ540/550</b>	Near-field probe set 3 GHz for EMV diagnostics
<b>HZ540/550L</b>	Near-field probe set 3 GHz for EMV diagnostics
<b>HZ13</b>	19" rackmount kit, HMS TG option
<b>HZ14</b>	Interface cable (USB) 1.8 m
<b>HZ15</b>	Interface cable (USB) 1.8 m
<b>HZ16</b>	4RU 19" rackmount kit
<b>HZ17</b>	4RU 19" rackmount kit
<b>HZ20</b>	Plug-in antenna with BNC connection
<b>HZ25</b>	50 Ω termination, N plug
<b>HZ26</b>	75 Ω termination, N plug
<b>HZ27</b>	75 Ω termination, N plug



# Guía del usuario



Reproductor portátil HD Radio™ con clip de cinturón

**NS-HD01A**



# Especificaciones

Intervalo de frecuencia	87.5 MHz - 107.9 MHz (pasos de 200 kHz)
Estaciones preestablecidas	FM: 10
Conexión Externa	Estéreo de 3.5 mm
Volumen	15 niveles
Pantalla	Color (128 × 128 píxeles)
Salida de audio	200 mV RMS
Entrada	5 V CC 500 mA, batería 3.7 V 750 mAh de litio ión
Dimensiones Largo × Alto × Ancho	2.26 × 3.2 × 0.76 pulgadas (57.5 × 81.5 × 19.5 mm)

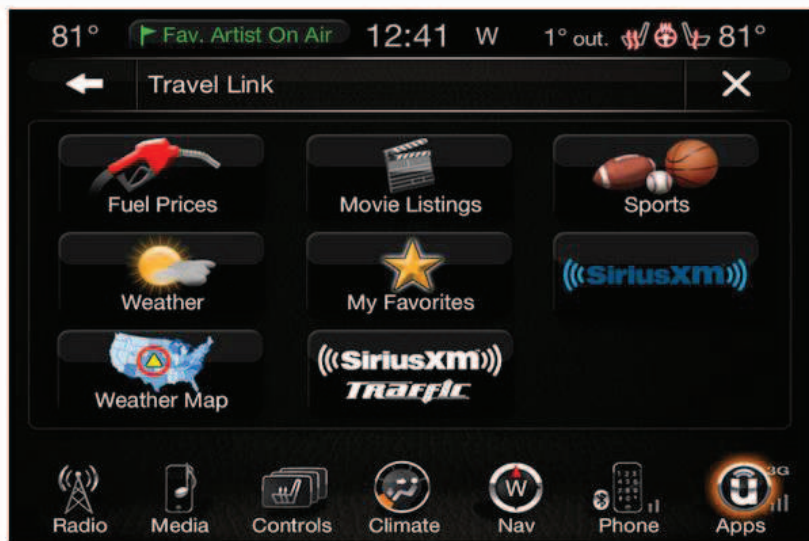
## Avisos legales

### *Información de la FCC*

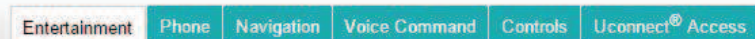
Este equipo ha sido sometido a prueba y se ha determinado que satisface los límites establecidos para ser clasificado como dispositivo digital de Clase B, de acuerdo con la Parte 15 del reglamento FCC. Estos límites están diseñados para proporcionar una protección razonable contra interferencias dañinas en un ambiente residencial. Este equipo genera, utiliza y puede irradiar energía de radiofrecuencia y, si no es instalado y utilizado de acuerdo a las instrucciones, puede causar interferencias perjudiciales en las comunicaciones de radio. Sin embargo, no se garantiza que no ocurrirá interferencia en una instalación particular. Si el equipo causa interferencias perjudiciales en la recepción de la señal de radio o televisión, lo cual puede comprobarse encendiéndolo y apagándolo alternativamente, se recomienda al usuario corregir la interferencia mediante uno de los siguientes procedimientos:

- Cambie la orientación o la ubicación de la antena receptora.
- Aumente la distancia entre el equipo y el receptor.
- Conecte el equipo a un tomacorriente de un circuito distinto de aquel al que está conectado el receptor.





\*Image shown is for illustration purposes only.



### SiriusXM® Satellite Radio — More than 150 channels

Welcome to the world of SiriusXM® Satellite Radio\*. Enjoy over 150 channels, including commercial-free music, plus sports, news, talk, comedy, entertainment and a collection of Spanish-language programming. And with All Access, you can listen online or on the app, so you'll hear the best SiriusXM Satellite Radio has to offer, anywhere life takes you. Learn more about SiriusXM Satellite Radio and Uconnect® Systems.



### USB port

The USB port allows you to connect your compatible media device and play all your favorite music\*. You can also operate your device in multiple ways with controls on your radio or steering wheel.



### Audio input jack

Passengers can plug in an iPhone® mobile device or fully compatible device and share their favorite music through the surround-sound system.

### Bluetooth® Streaming Audio\*

Stream music wirelessly from your compatible media device.

### HD Radio®

Tune in to HD Radio™ for digital sound quality and more AM/FM programming choices.

## INTEGRATED ACCESS SYSTEM

8.4-inch touchscreen, Uconnect® Access\*, Navigation, integrated Uconnect Voice Command and Bluetooth®, SiriusXM® Satellite Radio\*, SiriusXM Traffic\* and SiriusXM Travel Link\*.

### Included Features

- Uconnect® Access\* (includes a 12-month subscription) ▶
- 8.4-inch touchscreen
- HD Radio®
- AM/FM radio
- Aux/USB\* Media Hub with iPod® mobile device integration ▶
- Integrated Uconnect® Voice Command and Bluetooth®, hands-free calling\* and voice text reply\* (not compatible with iPhone® mobile devices)
- Full feature navigation with one-step voice destination entry and 3-D landmarks, city models and terrains ▶
- Sensor-assisted GPS
- Radio screen settings that complement vehicle personality
- Speed-adjusted volume
- SiriusXM® Satellite Radio\* — more than 150 channels (includes a 12-month subscription) ▶
- SiriusXM® Travel Link\* (includes a 5-year subscription) ▶
- SiriusXM® Traffic\* (includes a 5-year subscription)

### Available Features

- ParkView® Rear Back Up Camera\*
- Remote USB port\*
- Built-in WiFi Hotspot\* ▶

### User Guide

Learn more about Uconnect® System features.  
[▶ Download a PDF of Your Manual](#)  
[▶ Download system chart](#)

### Need Support?

Get tips and answers for operating this system.  
[▶ Get Support](#)  
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