

## Data Sheet

# Handheld Spectrum Analyzers

## Models 2650 and 2658



### Features and Benefits

- Channel power measurement
- Adjacent channel power measurement
- Occupied bandwidth measurement
- Electric field strength measurement (with optional dipole antennas)
- Magnetic field strength measurement (with optional magnetic field probe)
- Min/Max hold
- Average and overwrite mode
- Marker measurement
- Switchable 50 or 75 ohm input impedance
- Peak search
- Auto tuning
- Auto range
- Save/Load
- Hard copy of display (with optional printer accessory)
- cUL approved

The 2650 and 2658 are high-performance handheld spectrum analyzers providing excellent performance and functions perfect for many different applications. It is a compact, lightweight and cost-effective unit that is ideal for testing W-CDMA, CDMA, GSM, PDC, PHS, Wireless LAN and Bluetooth systems.

Many different accessories are available for use with the 2650 and 2658 spectrum analyzers, which may be necessary for your application. These accessories include a wide selection of dipole antennas, a magnetic field probe, printer, PC software, and coaxial cable and adapter kits.

Model	2650	2658
Frequency Range	50 kHz - 3.3 GHz	50 kHz - 8.5 GHz

# Specifications

Specifications	
<b>Frequency Section</b>	
Frequency Range	50 kHz to 3.3 GHz (2650) 50 kHz to 8.5 GHz (2658)
Center Frequency	
Setting resolution	100 kHz
Accuracy	within $\pm(30+20T)$ kHz $\pm 1$ dot T: Sweep time(s) (frequency span: 200 kHz to 10 MHz, RBW: 30 kHz, $23\pm 5^\circ\text{C}$ ) within $\pm(100+700T)$ kHz $\pm 1$ dot T: Sweep time(s) (2650) (frequency span: 20 MHz to 3.3 GHz (2650), RBW: 100 kHz, $23\pm 5^\circ\text{C}$ ) within $\pm(60+300T)$ kHz $\pm 1$ dot T: Sweep time(s) (2658) (frequency span: 20 MHz to 8.5 GHz (Model 2658), RBW: 100 kHz, $23\pm 5^\circ\text{C}$ )
RBW frequency error	within $\pm 6\%$ of RBW (RBW: 3 kHz, 30 kHz) within $\pm 30\%$ of RBW (RBW: 100 kHz to 3 MHz)
Frequency Span	
Setting range	0 Hz (zero span), 200 kHz to 2 GHz (2650) (1-2-5-step) or 200 kHz to 5 GHz (2658) (1-2-5-step), and 3.3 GHz (full span/ 2650) or 8.5 GHz (full span/ 2658)
Accuracy	within $\pm 3\% \pm 20T$ kHz $\pm 1$ dot (frequency span: 200 kHz to 10 MHz, $23\pm 5^\circ\text{C}$ ) within $\pm 3\% \pm 200T$ kHz $\pm 1$ dot (frequency span: 20 MHz to 3.3 GHz (2650), 20 MHz to 8.5 GHz (2658) $23\pm 5^\circ\text{C}$ ) T: Sweep time(s)
Display resolution	Frequency span/250 Frequency span/1000 (only measurement by RS-232C communication)
Display dot number	251 dots, 1001 dots (only measurement by RS-232C communication) (The unit displays data in 251 horizontal dots, but it internally captures the trace in 1001 dots)
Resolution bandwidth	3 dB bandwidth
Setting range	3 kHz to 3 MHz (1-3-step) and AUTO
Accuracy	within $\pm 20\%$
Selectivity	1:12 (typical, 3 dB : 60 dB)
Video bandwidth	100Hz to 1MHz (1-3-step), and AUTO
SSB phase noise	-90 dBc/Hz (typical, 100 kHz offset, RBW: 3 kHz, VBW: 100 Hz, Sweep time: 0.3s)
Spurious response	less than -60 dBc
Harmonics	less than -40 dBc (100 MHz to 3.3GHz/2650), (100 MHz to 8.5 GHz/2658)
<b>Amplitude Section</b>	
Reference level	
Setting range	+ 10 to -60 dBm (1 dB step)
Accuracy	within $\pm 0.8$ dB $\pm 1$ dot, (center frequency: 100 MHz, RBW: 3 MHz, VBW: 1 MHz, ATT: 0 dB, $23\pm 5^\circ\text{C}$ ) dBm, dBV, dBmV, dB $\mu$ V, dB $\mu$ V/m, dB $\mu$ A/m
Unit	(dB $\mu$ V/m and dB $\mu$ A/m using the measuring function)
Average noise level	-110 dBm (typical, center frequency: 100 MHz, RBW: 3 kHz, VBW: 100 Hz)
Frequency Characteristic	within $\pm 2.0$ dB $\pm 1$ dot (100 kHz to 100 MHz) within $\pm 1.0$ dB $\pm 1$ dot (100 MHz to 3.3 GHz/2650), (100 MHz to 8.5 GHz/2658)
Input impedance	50 $\Omega$
Input VSWR	less than 2.0
Input Attenuator	
Operating range	0 to 25 dB (1 dB step), coupled with reference level
Switching error	within $\pm 0.6$ dB
RBW switching error	within $\pm 0.6$ dB
Display dot number	200 dots
Display Scale	
Scale	10 dB/div, 2 dB/div
Accuracy	within $\pm 0.8$ dB/10 dB $\pm 1$ dot, within $\pm 0.2$ dB/2 dB $\pm 1$ dot, within $\pm 1.6$ dB/ 70 dB $\pm 1$ dot
Input damage level	+23 dBm(CW average power), 25 VDC

<b>Sweep Section</b>	
Sweep time	
Setting range	10 ms to 30 s (1-3 step, frequency span: 0 to 2 GHz) and AUTO, 30 ms to 30 s (1-3 step, frequency span: full span) and AUTO (2650) 30 ms to 30 s (1-3 step, frequency span: 5 GHz) and AUTO (2658)
Accuracy	within $\pm 0.1\% \pm 1$ dot (frequency span: 0 to 2 GHz) (2650), within $\pm 0.1\% \pm 1$ dot (frequency span: 0 to 5 GHz) (2658), within $\pm 1.5\% \pm 1$ dot (frequency span: full span) (2650), within $\pm 2.5\% \pm 1$ dot (frequency span: full span) (2658)
Trigger mode	AUTO (frequency span: zero span)
Detection mode	Positive peak, Negative peak, Sample (When sweep time is 10 ms or 30 ms, only Sample can be set)
<b>Functions</b>	
Marker	NORM: displays frequency (7 digits max) and level (4 digits max) at marker point. DELTA: displays differential frequency and level between 2 markers.
Peak search	NORM: searches a peak point within 10 div. Available NEXT peak (10 max). ZONE: searches a peak point within a zone designated by center and width. Marker moves to a peak point each sweep.
Calculation	NORM, MAX HOLD, MIN HOLD, AVERAGE, OVER WRITE MAX/MIN HOLD: 2 to 1024 times, AVERAGE: 2 to 256
Measuring	Channel power, Adjacent channel leakage power, Occupied frequency bandwidth, Electric field strength (needs antenna), Magnetic field strength (needs optional magnetic field probe) measurement.
AUTO tuning	When pushing AUTO TUNE key, the maximum level spectrum within 3.3 GHz (2650), 8.5 GHz (2658) bandwidth is adjusted to center, and reference level, RBW, VBW and sweep time are adjusted to optimum values.
Save/Load	
Save	Saves 100 traces and 100 setups
Load	Loads 1 trace and 1 setup
<b>General</b>	
Input connector	SMA(I)
Communication Interface	RS-232C
Baud rate	2400 to 38400 bps
Hard copy	Allows direct hard copy with an optional printer.
Display	LCD
Backlight	CFL backlight
Resolution	240 (V) x 320 (H) dots
Battery	Ni-MH battery (optional)
External DC source	DC jack, +4.75 to +5.25 VDC/4 A
Operating temperature	0 to 40 $^\circ\text{C}$ (Guaranteed at $23\pm 10^\circ\text{C}$ , without soft carrying case)
Operating humidity	less than 40 $^\circ\text{C}/80\%$ RH (Guaranteed at less than 33 $^\circ\text{C}/70\%$ RH, without soft carrying case)
Storage temperature	-20 to 60 $^\circ\text{C}$ , less than 60 $^\circ\text{C}/70\%$ RH
Dimensions	162 (W) x 70 (H) x 260 (D) mm (exclude projections and stand)
Weight	approx. 1.8 kg (include battery), approx. 1.5 kg (without battery)
<b>Two Year Warranty</b>	
Supplied Accessories	AC adapter (BC 2650), Soft carrying case (LC 2650), Accessory pouch, Operating manual, Ni-MH Battery (BP 2650)
Optional Accessories:	Dipole antennas (AN 301, AN 302, AN 303, AN 304, AN 305, AN 306), Magnetic field probe (PR 26M) with a dedicated double shielded coaxial cable, PC software (AK 2650), Printer (PT 2650) with AC adapter, 4pcs of AA batteries, and roll paper, Roll paper refill (PX 2650) for optional printer PT 2650 (10 rolls), 1 GHz coaxial adapter kit for RF test instru- ments (CT 2701), Deluxe spectrum accessory kits (CC265 and CC560)

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