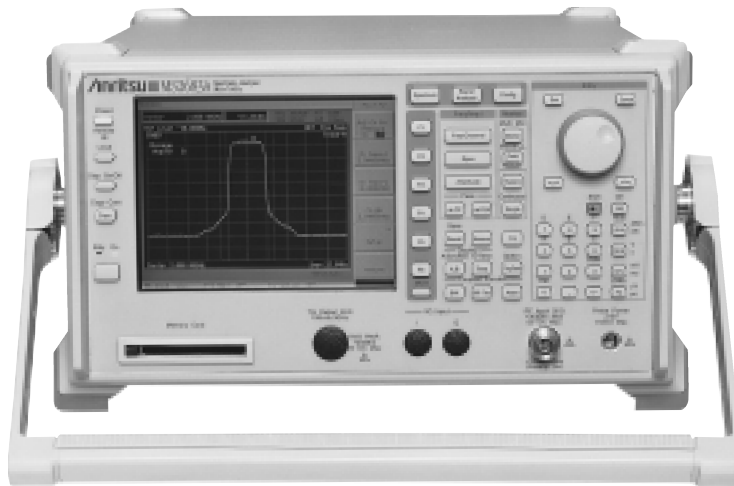


SPECTRUM ANALYZER

MS2683A

9 kHz to 7.8 GHz

For Evaluation of IMT-2000, Bluetooth™, MMAC, and Advanced Radio Communication Devices

Third-generation mobile radio communication systems conforming to IMT-2000 (2 GHz band) will soon enter service and the *Bluetooth* system (2.4 GHz) is also being adopted for short-range radio communications by mobile terminals and peripheral devices. R&D in many countries is focused on MMAC, IEEE802.11a, and Hyper LAN2 (5 GHz band) that allow high-speed radio access to the Internet. The MS2683A has been designed to provide the optimum performance required for evaluation of these advanced radio communication devices. It has a wide dynamic range (156 dB typ.), wide

resolution bandwidth (20 MHz), and high-speed sweep (refresh rate: 20 times/s). The input attenuator can be set in 2 dB steps, permitting reduction of the analyzer mixer distortion and intrinsic noise.

Features

- Wide-resolution bandwidth (20 MHz)
- Low average noise level (≤ -146 dBm/Hz, 1 MHz to 3.2 GHz)
- High-speed sweep (20 times/s)

Specifications

Specified values were obtained after warming up the equipment for 30 minutes at a constant ambient temperature and then performing calibration. Typical and nominal values are given for reference, and are not guaranteed.

Frequency	Frequency range	9 kHz to 7.8 GHz
	Frequency band	Band 0: 9 kHz to 3.2 GHz, Band 1-L: 1.6 to 3.2 GHz (Option 03), Band 1-: 3.15 to 6.3 GHz, Band 1+: 6.2 to 7.8 GHz
	Preselector range	3.15 to 7.8 GHz, 1.6 to 7.8 GHz (Option 03)
	Display frequency accuracy	\pm (display frequency \times reference frequency accuracy + span \times span accuracy + RBW \times 0.15 + 10 Hz)
	Frequency span	Setting range: 0 Hz, 5 kHz to 7.8 GHz, Accuracy: $\pm 1\%$ (single band sweep)
	Resolution bandwidth (RBW) [3 dB BW]	Setting range: 300 Hz to 3 MHz (1, 3 sequence) 5, 10, 20 MHz (0 Band only) *Manually settable, or automatically settable according to frequency span Bandwidth accuracy: $\pm 20\%$ (300 Hz to 10 MHz), $\pm 40\%$ (20 MHz) Selectivity (60 dB: 3 dB): $\leq 15:1$
	Video bandwidth (VBW)	1 Hz to 3 MHz (1, 3 sequence), off *Manually settable, or automatically settable according to RBW
	Signal purity	Single sideband noise: ≤ -108 dBc/Hz (1 GHz, 10 kHz offset), ≤ -120 dBc/Hz (1 GHz, 100 kHz offset)
Amplitude	Reference oscillator	Frequency: 10 MHz Start-up characteristics: $\leq 5 \times 10^{-8}$ (after 10-minute warm-up, referenced to frequency after 24 hour warm-up) Aging rate: $\leq 2 \times 10^{-8}$ /day; $\leq 1 \times 10^{-7}$ /year (referenced to frequency after 24 hour warm-up) Temperature characteristics: $\pm 5 \times 10^{-8}$ (0° to 50°C, referenced to frequency at 25°C)
	Level measurement	Measurement range: Average noise level to +30 dBm Maximum input level CW average power: +30 dBm (RF ATT: ≥ 10 dB) Peak pulse: +47 dBm (pulse width: ≤ 1 μ s, duty ratio: $\leq 1\%$, RF ATT: ≥ 30 dB) DC Voltage: 0 Vdc Displayed average noise level: ≤ -124 dBm + f [GHz] dB (1 MHz to 3.2 GHz, Band 0), ≤ -122 dBm + 0.5f [GHz] dB (3.15 to 7.8 GHz, Band 1) *RBW: 300 Hz, VBW: 1 Hz, RF ATT: 0 dB Residual response: ≤ -100 dBm (1 MHz to 3.2 GHz, Band 0), ≤ -90 dBm (3.15 to 7.8 GHz, Band 1)

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Amplitude	Reference level	<p>Setting range Log scale: -100 to +40 dBm, Linear scale: 2.24 μV to 22.4 V</p> <p>Units Log scale: dBm, dBμV, dBmV, dBμV (emf), V, V, dBμV/m Linear scale: V</p> <p>Reference level accuracy: ± 0.5 dB (-49.9 to 0 dBm), ± 0.75 dB (-69.9 to -50 dBm, 0.1 to +30 dBm), ± 1.5 dB (-80 to -70 dBm) *After calibration, 50 MHz, span: 1 MHz. When RF ATT, RBW, VBW and sweep time set to AUTO. RBW Switching uncertainty: ± 0.3 dB (300 Hz to 5 MHz), ± 0.5 dB (10, 20 MHz) *After calibration, referenced to RBW: 3 kHz Input attenuator (RF ATT) Setting range: 0 to 62 dB (2 dB steps) *Manual settable, or automatically settable according to reference level Accuracy: ± 0.3 dB (10 to 50 dB), ± 0.5 dB (52 to 62 dB) *Frequency: 100 MHz, referenced to RF ATT: 10 dB Input attenuator switching mode: 2, 10 dB step mode</p>
	Frequency response	<p>± 0.6 dB (9 kHz to 3.2 GHz, Band 0, refer to 50 MHz, RF ATT: 10 dB, 18° to 28°C) ± 1.0 dB (3.15 to 7.8 GHz, Band 1, refer to 50 MHz, RF ATT: 10 dB, 18° to 28°C) ± 1.0 dB (Option 03, 1.6 to 7.8 GHz, Band 1, refer to 50 MHz, RF ATT: 10 dB, 18° to 28°C) ± 1.0 dB (9 kHz to 3.2 GHz, Band 0, refer to 50 MHz, RF ATT: 10 to 62 dB) ± 2.0 dB (3.15 to 7.8 GHz, Band 1, refer to 50 MHz, RF ATT: 10 to 62 dB) ± 2.0 dB (Option 03, 1.6 to 7.8 GHz, Band 1, refer to 50 MHz, RF ATT: 10 to 62 dB) *Band 1: after pre-selector tuning</p>
	Waveform display	<p>Scale: 10 div (single scale) Log scale: 10, 5, 2, 1 dB/div Linear scale: 10, 5, 2, 1%/div Linearity (after calibration) Log scale: ± 0.4 dB (0 to -20 dB, RBW: ≤ 1 kHz), ± 1.0 dB (0 to -90 dB, RBW: ≤ 1 kHz) Linear scale: $\pm 4\%$ (compared to reference level) Marker level resolution Log scale: 0.01 dB, Linear scale: 0.02%</p>
	Spurious response	<p>2nd harmonic distortion: ≤ -60 dBc (100 to 200 MHz, mixer input: -30 dBm), ≤ -75 dBc (200 to 850 MHz, Band 0, mixer input: -30 dBm), ≤ -70 dBc (0.85 to 1.6 GHz, Band 0, mixer input: -30 dBm), ≤ -90 dBc (1.6 to 3.9 GHz, Band 1, mixer input: -10 dBm), ≤ -90 dBc (Option 03, 0.8 to 3.9 GHz, Band 1, mixer input: -10 dBm) Two signals 3rd order intermodulation distortion: ≤ -70 dBc (10 to 100 MHz), ≤ -85 dBc (0.1 to 7.8 GHz) Image response: ≤ -70 dBc Multiple response: ≤ -70 dBc (Band 1)</p>
	1 dB gain compression	≥ 0 dBm (≥ 100 MHz), $\geq +3$ dBm (≥ 500 MHz, Band 0), ≥ 0 dBm (≥ 3150 MHz, Band 1), ≥ 0 dBm (Option 03, ≥ 1600 MHz, Band 1)
	Maximum dynamic range	1 dB gain compression level to average noise level: $\geq 124 - f$ [GHz] dB (0.1 to 3.2 GHz, Band 0), ≥ 122 dB - 0.5f [GHz] dB (3.15 to 7.8 GHz, Band 1)
Frequency sweep	Sweep mode	Continuous, single
	Sweep time	<p>Setting range: 10 ms to 1000 s (manual settable, or automatically settable according to span, RBW and VBW) Setting resolution: 5 ms (5 ms to 1 s), upper 3 digits (≥ 1 s) Accuracy: $\pm 3\%$</p>
	Trigger switch	FREERUN, TRIGGERED
	Trigger source	Line, external (± 10 V), external (TTL), wide-band IF video
	Gate mode	<p>Off, random sweep mode Setting range Gate delay: 0 to 65.5 ms (resolution: 1 μs) Gate length: 2 μs to 65.5 ms (resolution: 1 μs) Gate end: Internal, external</p>
	Zone sweep	Sweeps only frequency range indicated by zone marker
	Tracking sweep	Sweeps while tracking peak points within zone marker (zone sweep also possible)
Time sweep	Sweep mode	Continuous, single
	Sweep time	<p>Setting range/resolution: 1 to 50 μs (1, 2, 5 sequence), 100 μs to 4.9 ms (resolution: 100 μs), 5.0 ms to 1 s (resolution: 5 ms), 1 to 1000 s (upper 3 digits setting) Accuracy: $\pm 1\%$ (10 μs to 1000 s)</p>
	Trigger switch	FREERUN, TRIGGERED
	Trigger source	Line, external (± 10 V), external (TTL), wide-band IF video, video
	Trigger delay	<p>Pre-trigger (displays waveform at previous trigger point) Setting range: - time span to 0 s Resolution: time span/500 or 100 ns, whichever larger Post trigger (displays waveform after trigger point) Setting range: 0 to 65.5 ms Resolution: 100 ns (sweep time: ≤ 4.9 ms), 1 μs (sweep time: ≤ 5.0 ms)</p>
Functions	Number of data points	501
	Detection mode	NORMAL, POSITIVE PEAK, NEGATIVE PEAK, SAMPLE, AVERAGE
	Display	<p>Trace A: Displays frequency spectrum Trace B: Displays frequency spectrum Trace Time: Displays time domain waveform at center frequency Trace A/B: Displays Trace A and Trace B simultaneously. Simultaneous sweep of same frequency, alternate sweep of independent frequencies Trace A/BG: Displays frequency region to be observed (background) and object band (foreground) selected from background with zone marker simultaneously, alternate sweep Trace A/Time: Displays frequency spectrum, and time domain waveform at center frequency simultaneously, alternate sweep Trace move/calculation: A \rightarrow B, B \rightarrow A, A \leftrightarrow B, A + B \rightarrow A, A - B \rightarrow A, A - B + DL \rightarrow A</p>
	Storage	NORMAL, VIEW, MAX HOLD, MIN HOLD, AVERAGE, CUMULATIVE, OVERWRITE

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Functions	Marker	Single search: AUTO TUNE, PEAK → CF, SCROLL Zone marker: NORMAL, DELTA Marker → Function: MARKER → CF, MARKER → REF, MARKER → CF STEP SIZE, ΔMARKER → SPAN, ZONE → SPAN Peak search: PEAK, NEXT PEAK, MIN DIP, NEXT DIP Multimarkers Number of markers: Max. 10 (HIGHEST 10, HARMONICS, MANUAL SET)
	Measurement	Noise power: dBm/Hz, dBm/ch, dBμV/√Hz C/N: dBm/Hz, dBm/ch Channel power: dBm, dBm/Hz Occupied bandwidth: power N% method, X-dB down method Adjacent channel power Reference value measurement: Total power, reference and in-band level method Display: Channel designate display (2 channels x 2), graphic method Average power of burst signal: Average power in designated time range of time domain waveform Template comparison waveform: Upper limit x 2, lower limit x 2 (time domain) MASK measurement: Upper limit x 2, lower limit x 2 (frequency domain)
	Correction	Any correction for frequency characteristics, 150 points max.
Others	Display	VGA color LCD Size: 17 cm (6.5" type) Number of colors: 4096 (RGB, each 16-scale settable) Intensity adjustment: 5 steps (including display off) Display items: Scale, waveform data, setting conditions, menu, title
	Save/recall	Save and recall setting conditions and waveform data to internal memory (max. 12) or memory card
	Hard copy	Display data can be hard-copied to printer via parallel interface (printer: only ESC/P equivalent and HP815 compatible models)
	GPIOB	Meets IEEE488.2 recommendation Function: Controlled by external controller (excluding power switch) Interface functions: SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0, E2
	Parallel interface	Centronics for printer, D-sub 25-pin (jack)
I/O connector	PC card interface	Functions: Saving/recalling setting conditions and waveform data; ATA flash card (3.3/5 V) Connector: Type I or Type II PC card
		RF input Connector: N-J, 50 Ω Impedance (VSWR): ≤1.5 (typ., RF ATT: ≥10 dB) IF output Connector: BNC, 50 Ω (nominal) Frequency: 66, 10.69 MHz Level: -10 dBm (typ., 50 MHz, top of display scale, 50 Ω termination) Wide-band IF output Connector: BNC, 50 Ω (nominal) Frequency: 60.69, 66 MHz Gain: 0 dB (typ., 50 MHz, RF ATT: 0 dB, at RF input level) Video output (Y) Connector: BNC Level Log scale: 0 to 0.5 V ±0.1 V (typ.), Linear scale: 0 to 0.4 V ±0.1 V (typ.) *50 MHz, scale: 10 dB/div, from upper edge to lower edge at 10%/div at full scale, 75 Ω termination Video output: Analog RGB, D-sub 15-pin (jack) External reference input Connector: BNC Frequency: 10 MHz ±10 Hz, 13 MHz ±13 Hz Level: ≥0 dBm (50 Ω termination) Buffered output Connector: BNC, Frequency: 10 MHz, Level: 2 to 5 Vp-p (200 Ω termination) Sweep output (X) Connector: BNC Level: 0 to 10 ±1 V (terminated: ≥100 kΩ, from left edge to right on display scale, single band sweep) Sweep state output Connector: BNC, Level: TTL level (low level at sweep) Probe source 4-pin connector, ±12 V (each ±10%), each 110 mA (max.) Trigger/gate input Connector: BNC, Level: ±10 V (resolution: 0.1 V) or TTL level
	Dimensions and mass	320 (W) x 177 (H) x 411 (D) mm (excluding handle, feet, and fan cover), ≤16 kg (nominal, without options)
	Power	100 to 120/200 to 240 Vac (-15/+10%, 250 V max., automatic voltage detected), 50/60 Hz ±5%, ≤400 VA
	Environmental conditions	Operating temperature: 0° to +50°C, Storage temperature: -20° to +60°C, Relative humidity: 85% (no condensation)
	EMC	EN61326: 1997/A1, 1998 (Class A) EN61000-3-2: 1995/A2, 1998 (Class A) EN61326: 1997/A1, 1998 (Annex A)
	LVD	EN610101-1: 1993/A2, 1995 (Installation Category II, Pollution degree 2)
	Others	Vibration: Meets MIL-STD-801D

• Option 01: Precision frequency reference crystal oscillator

Frequency	10 MHz
Start-up characteristics	$\leq \pm 5 \times 10^{-8}$ (≤ 7 minutes, 25°C, typ.)
Aging rate	$\leq \pm 5 \times 10^{-10}$ /day (after power-on, referenced to frequency after 24 h)
Temperature characteristics	$\leq \pm 5 \times 10^{-10}$ (0° to 50°C, reference to 25°C)

• Option 02: Narrow resolution bandwidths (FFT)

Resolution bandwidth setting range	1 Hz to 1 kHz (1, 3 sequence)
Minimum span	100 Hz
Resolution bandwidth switching uncertainty	± 0.5 dB
Resolution bandwidth accuracy	$\pm 7\%$ (RBW = 1, 3, 10, 100 kHz typical), $\pm 10\%$ (RBW = 1, 3, 10, 100 kHz typical)
Selectivity (60 dB : 3 dB)	$\leq 5 : 1$
Average noise level	[Without Option 08] ≤ -146.5 dBm + f [GHz] dB (1 MHz to 2.5 GHz, typical), ≤ -142.5 dBm + f [GHz] dB (2.5 to 3.2 GHz, typical), ≤ -144.5 dBm + 0.5 x f [GHz] dB (3.15 to 7.8 GHz, band 1, typical) [With Option 08] ≤ -144.5 dBm + 1.5 x f [GHz] dB (1 MHz to 2.5 GHz, band 0, typical), ≤ -142.5 dBm + f [GHz] dB (2.5 to 3.2 GHz, band 0, typical), ≤ -144.5 dBm + 0.5 x f [GHz] dB (3.15 to 7.8 GHz, band 1, typical)

• Option 03: Extension of preselector lower limit to 1.6 GHz

Outline	Expands lower frequency limit of pre-selector from 3.15 GHz to 1.6 GHz
Frequency band	0 Band: 9 kHz to 3.2 GHz, 1-L Band: 1.6 to 3.2 GHz, 1- Band: 3.15 to 6.3 GHz, 1+ Band: 6.2 to 7.8 GHz
Pre-selector range	1.6 to 7.8 GHz (band: 1-L, 1-, 1+)
Average noise level	≤ -122 dBm + 0.5f [GHz] dB (1.6 to 7.8 GHz, Band 1, RBW: 300 Hz, VBW: 1 Hz, RF ATT: 0 dB)
Residual response	≤ -90 dBm (1.6 to 7.8 GHz, Band 1, RF ATT: 0 dB, input: 50 Ω termination)
Frequency response	± 1.0 dB (1.6 to 7.8 GHz, Band 1, referenced to 50 MHz, RF ATT: 10 dB, 18° to 28°C) ± 2.0 dB (1.6 to 7.8 GHz, Band 1, RF ATT: 10 to 62 dB) *Band 1: After tuning pre-selector
2nd harmonic distortion	≤ -90 dBc (0.8 to 3.9 GHz, Band 1, mixer input: -10 dBm)
1 dB gain compression	≥ 0 dBm (1.6 to 7.8 GHz, Band 1)
Maximum dynamic range	≥ 122 dB - 0.5f [GHz] dB (1.6 to 7.8 GHz, Band 1)

• Option 04: Digital resolution bandwidth

Detection mode	Normal, positive peak, negative peak, sample, rms (rms: displays average power within burst between sample points)
Resolution bandwidth (RBW)	Range: 10 Hz to 1 MHz (1, 3 sequence) Switching deviation: ± 0.5 dB Accuracy: $\pm 10\%$ (RBW: ≥ 100 Hz), $\pm 10\%$ (RBW: ≤ 30 Hz) *Typical Selectivity (60 dB: 3 dB): $\leq 5 : 1$ (RBW: ≥ 100 Hz), $\geq 5 : 1$ (RBW: ≤ 30 Hz) *Typical
Average power within burst display	Resolution bandwidth: 10 Hz (RF ATT: 0 dB) [without Option 08] ≤ -136.5 dBm + f [GHz] dB (typ., 1 MHz to 2.5 GHz, Band 0), ≤ -132.5 dBm + f [GHz] dB (typ., 2.5 to 3.2 GHz, Band 0), ≤ -134.5 dBm + 0.5 x f [GHz] dB (typ., 3.15 to 7.8 GHz, Band 1) [with Option 08] ≤ -134.5 dBm + 1.5 x f [GHz] dB (typ., 1 MHz to 2.5 GHz, Band 0), ≤ -130.5 dBm + 1.5 x f [GHz] dB (typ., 2.5 to 3.2 GHz, Band 0), ≤ -134.5 dBm + 0.5 x f [GHz] dB (typ., 3.15 to 7.8 GHz, Band 1)
Span	Range: 0 Hz, 1 kHz to 7.9 GHz

• Option 08: Pre-amplifier*1

Frequency range	100 kHz to 3 GHz
Gain	20 dB (typ.)
Noise figure	6.5 dB (typ., ≤ 2 GHz), 12 dB (typ., > 2 GHz)
Level measurement	Level meas. range: Average noise level to +10 dBm Max. input level: +10 dBm Average noise level: -137 dBm + 2.0 x f [GHz] dB (1 MHz to 3.0 GHz, Band 0) *RBW: 300 Hz, VBW: 1 Hz, Input attenuator: 0 dB
Reference level	Setting range Log scale: -120 to +10 dBm or equivalent level Linear scale: 2.24 μ V to 707 mV Reference level accuracy: ± 0.90 dB (-69.9 to +10 dBm), ± 1.5 dB (-90 to -70 dBm) *After calibration, frequency: 50 MHz, span: 1 MHz (when RF ATT, RBW, and sweep time set to AUTO)
Resolution bandwidth switching uncertainty	± 0.5 dB (300 Hz to 5 MHz), ± 0.75 dB (10 MHz, 20 MHz) *After calibration, RBW: 3 kHz as reference
Input attenuation switching uncertainty	± 0.5 dB (10 to 50 dB), ± 0.75 dB (52 to 62 dB) *Frequency: 50 MHz, input attenuator: 10 dB as reference
Frequency response	± 2.0 dB (100 kHz to 3 GHz) *50 MHz reference, input attenuator: 10 to 50 dB, 18° to 28°C

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Waveform display linearity	Log scale: ±0.5 dB (0 to -20 dB, RBW: ≤1 kHz), ±1.0 dB (0 to -60 dB, RBW: ≤1 kHz), ±1.5 dB (0 to -75 dB, RBW: ≤1 kHz) Linear scale: ±5% (at reference level)
Spurious response	2 signal 3rd order distortion: -70 dBc (10 MHz to 3 GHz, frequency difference of two signal: ≥50 kHz, pre-amp input: 55 dBm*2) 1 dB gain compression: ≥-35 dBm (Input frequency: ≥100 MHz*2)

*1: At pre-amp on, above performance separately specified. Noise figure and gain are performance of pre-amp itself.

*2: Pre-amp input level as follows: Pre-amp input level = RF input level – input attenuator setting

• Option 09: Ethernet interface

Control	From external controller (excluding power switch)
Connector	10 Base-T

• Option 17: I/Q balanced input*3

Connector	BNC
Impedance	1 MΩ (shunt capacity: <100 pF), 50 Ω
Input level range	Differential voltage: 0.1 to 1 Vp-p, In-phase voltage: ±2.5 V

*3: Cannot be installed at same time. Requires measurement software

• Option 18: I/Q unbalanced input*3

Connector	BNC
Impedance	1 MΩ (shunt capacity: <100 pF), 50 Ω
Input level range	Voltage: 0.1 to 1 Vp-p

*3: Cannot be installed at same time. Requires measurement software

• Option 34: 4 GHz LO output

Frequency	Range: 4 GHz, Accuracy: ± (4 GHz x reference frequency accuracy) ±1 Hz
Output level	-10 dBm typical
Spurious	≤-40 dBc typical

• Option 46: Auto power recovery

The setting of the power switch on the front panel is disabled and the power is automatically recovered after power failure. The standby switch on the back panel is used to turn the power on and off. The front-panel power switch does not have the latching function, so the MS2683A enters the standby state after power failure at power-on even when the power line recovers.

• Option 47: Rack mount (IEC)

The MS2683A can be mounted in an IEC-compliant rack mount. When using the rack mount, the tilt handles (standard accessories) should be removed.

• Option 48: Rack mount (JIS)

The MS2683A can be mounted in a JIS-compliant rack mount. When using the rack mount, the tilt handles (standard accessories) should be removed.

Ordering information

Please specify the model/order number, name, and quantity when ordering.

Model/Order No.	Name
MS2683A	Main frame Spectrum Analyzer
	Standard accessories Power cord, 2.6 m: 1 pc RS-232C cable: 1 pc PC-ATA card (32 MB): 1 pc Fuse, 6.3 A: 1 pc File Utility Software: 1 pc MS2683A operation manual: 1 copy
J0996B JT32MA3-NT1 F0014 MX268001A W1754AE	Measurement software W-CDMA Measurement Software GSM Measurement Software
MX268301A MX268302A	Options Precision frequency reference oscillator (aging rate: 5 x 10 ⁻¹⁰ /day) Narrow resolution bandwidths (FFT) Extension of preselector lower limit to 1.6 GHz Digital resolution bandwidth Pre-amplifier Ethernet interface I/Q balanced input I/Q unbalanced input 4 GHz LO output Auto power recovery Rack mount (IEC) Rack Mount (JIS)
MS2683A-01 MS2683A-02 MS2683A-03 MS2683A-04 MS2683A-08 MS2683A-09 MS2683A-17 MS2683A-18 MS2683A-34 MS2683A-46 MS2683A-47 MS2683A-48	Maintenance service Extension service 3 years Extension service 5 years
MS2683A-90 MS2683A-91	Optional accessories Coaxial cord (N-P · 5D-2W · N-P), 1 m Coaxial cord (BNC-P · RG-55/U · N-P), 1 m Coaxial cord (N-P · 5D-2W · N-P), 2 m Hard carrying case (with caster) Hard carrying case Coaxial cord (BNC-P · RG-58A/U · BNC-P), 0.5 m Coaxial cord (BNC-P · RG-58A/U · BNC-P), 1 m Fuse Holder Fuse Element DC Block Adapter (50 Ω, ±50 Vdc) DC Block Adapter (50 Ω, 9 kHz to 3 GHz, ±50 V) DC block (N-type, Model 7003, 10 kHz to 18 GHz, Weinschel) 50 Ω ↔ 75 Ω Impedance Transformer 50 Ω ↔ 75 Ω Impedance Transformer (9 kHz to 3 GHz, ±100 V) Four-Point Junction Pad Fixed attenuator for high-power measurement (30 dB, 10 W, DC to 12.4 GHz) Fixed attenuator for high-power measurement (30 dB, 30 W, DC to 8 GHz) Fixed attenuator for high-power measurement (Model 23-20-34, N-type, 20 dB, 10 W, DC to 18 GHz) High Pass Filter (800/900 MHz band, N-type) GPIB cable, 1 m GPIB cable, 2 m Front cover (3/4MW 4U) Coaxial cord (BNC-P · 3C-2WS · NC-3W), 1 m
J0561 J0104A J0576D B0452A B0452B J0127C J0127A MP612A MP613A MA8601A MA2507A J0805 MP614A MA1621A MA1612A J0063 J0395 J0078 MA1601A J0007 J0008 B0329G J0308	