# Spectrum Master™

## High Performance Handheld Spectrum Analyzer

## MS2725C

9 kHz to 32 GHz

### Introduction

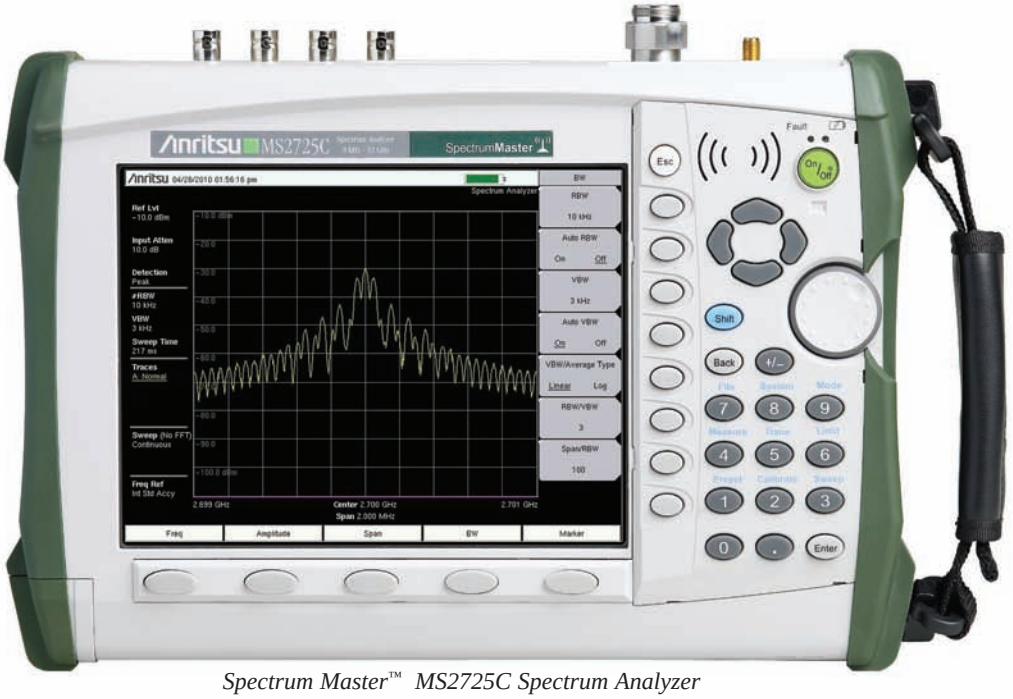
Anritsu's high performance handheld spectrum analyzer provides the wireless professional the performance needed for the most demanding measurements in harsh RF and physical environments. Whether it is for spectrum monitoring, broadcast proofing, interference analysis, RF and microwave measurements, regulatory compliance, or Wi-Fi and wireless network measurements, the Spectrum Master is the ideal instrument to making fast and reliable measurements.

*Spectrum and Interference Analyzer Highlights*

- Measure: Occupied Bandwidth, Channel Power, ACPR, C/I
- Interference Analyzer: Spectrogram, Signal Strength, RSSI
- Dynamic Range: > 104 dB in 1 Hz RBW
- DANL: –160 dBm in 1 Hz RBW @ 1 GHz, –145 dBm @ 30 GHz
- Phase Noise: –100 dBc/Hz @ 10 kHz offset at 1 GHz
- Frequency Accuracy: ± 25 ppb with GPS On
- 1 Hz to 10 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
- Trace Save-on-Event: crossing limit line or sweep complete

*Capabilities and Functional Highlights*

- LTE, GSM/EDGE
- W-CDMA/HSDPA
- TD-SCDMA/HSDPA
- CDMA, EV-DO
- WiMAX - Fixed, Mobile
- AM/FM/SSB Demodulator
- Zero-span IF Output
- GPS tagging of stored traces
- Internal Preamplifier standard
- High Accuracy Power Meter
- 4, 6, 8, 18, 26 GHz USB Sensors
- Channel Scanner
- 8.4 inch Display
- < 5 minute warm-up time
- 2.5 hour battery operation time
- Ethernet/USB Data Transfer
- MST Remote Access Tool




*Spectrum Master™ MS2725C Spectrum Analyzer*
*Handheld Size: 315 mm x 211 mm x 77 mm (12.4 in x 8.3 in x 3.0 in), Lightweight: 3.8 kg (8.5 lbs)*

# Spectrum Master™ MS2725C Spectrum Analyzer Specifications



## Spectrum Analyzer

| | |
|---|---|
| **Measurements** | |
| Smart Measurements | Field Strength (uses antenna calibration tables to measure dBm/m² 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, Copy |
| Application Options | Impedance (50 Ω, 75 Ω, Other) |
| **Sweep Functions** | |
| Sweep | Single/Continuous, Manual Trigger, Reset, Detection, Minimum Sweep Time, Trigger Type |
| Sweep Mode | Fast, Performance, No FFT |
| Detection | Peak, RMS/Avg, Negative, Sample, Quasi-peak |
| Triggers | Free Run, External, Video, Delay, Level, Slope, Hysteresis, Holdoff, Force Trigger Once |
| **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/Large), 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 32 GHz (usable to 0 Hz), Preamp 100 kHz to 32 GHz |
| Tuning Resolution | 1 Hz |
| Frequency Reference | Aging: ± 1.0 ppm/10 years<br>Accuracy: ± 0.3 ppm (25 °C ± 25 °C) + aging |
| External Reference Frequencies | 1, 1.2288, 1.544, 2.048, 2.4576, 4.8, 4.9152, 5, 9.8304, 10, 13, 19.6608 MHz |
| Frequency Span | 10 Hz to 32 GHz including zero span |
| Sweep Time | 10 µs to 600 seconds in zero span |
| Sweep Time Accuracy | ± 2% in zero span |
| **Bandwidth** | |
| Resolution Bandwidth (RBW) | 1 Hz to 10 MHz in 1–3 sequence ± 10% (1 MHz max in zero-span) (–3 dB bandwidth) |
| Video Bandwidth (VBW) | 1 Hz to 10 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 Analyzer (continued)

| | |
|---|---|
| **Spectral Purity** | |
| SSB Phase Noise at 1 GHz | –100 dBc/Hz @ 10 kHz offset from carrier (–104 dBc/Hz typical) |
| | –102 dBc/Hz @ 100 kHz offset from carrier (–107 dBc/Hz typical) |
| | –107 dBc/Hz @ 1 MHz offset from carrier (–114 dBc/Hz typical) |
| | –120 dBc/Hz @ 10 MHz offset from carrier (–129 dBc/Hz typical) |
| **Amplitude Ranges** | |
| Dynamic Range | > 104 dB @ 2.4 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 dB steps |
| Amplitude Units | Log Scale Modes: dBm, dBV, dBmv, dBµV<br>Linear Scale Modes: nV, µV, mV, V, kV, nW, µW, mW, W, kW |
| Maximum Continuous Input | +30 dBm Peak, ± 50 VDC (≥ 10 dB Attn)<br>+23 dBm Peak, ± 50 VDC (< 10 dB Attn)<br>+13 dBm Peak, ± 50 VDC (Preamp On) |
| **Amplitude Accuracy** (single sine wave input < Ref level, and > DANL, auto attenuation) | |
| 20 °C to 30 °C after 30 minute warm-up | Typical: ± 0.5 dB, 100 kHz to 32 GHz<br>Maximum: ± 1.3 dB, 100 kHz to 20 GHz, Add ± 1.0 dB, 20 GHz to 32 GHz |
| –10 °C to 50 °C after 60 minute warm-up | Add ± 1.0 dB, 100 kHz to 32 GHz |
| **Displayed Average Noise Level (DANL)** (RMS detection, VBW/Avg type = Log., Ref Level = –20 dBm for preamp Off and –50 dBm for preamp On) | |
| (DANL in 1 Hz RBW, 0 dB attenuation) | Preamp Off |
| 10 MHz to 4 GHz | –141 dBm |
| > 4 GHz to 9 GHz | –134 dBm |
| > 9 GHz to 13 GHz | –129 dBm |
| > 13 GHz to 20 GHz | –123 dBm |
| > 20 to 32 GHz | –134 dBm |
| | Preamp On |
| 10 MHz to 4 GHz | –160 dBm |
| > 4 GHz to 9 GHz | –156 dBm |
| > 9 GHz to 13 GHz | –152 dBm |
| 13 GHz to 20 GHz | –145 dBm |
| > 20 GHz to 32 GHz | –154 dBm |
| **Spurs** | |
| Residual Spurs | Preamp Off (RF input terminated, 0 dB input attenuation)<br>–90 dBm 9 KHz to 13 GHz, –85 dBm 13 GHz to 20 GHz, –80 dBm 20 GHz to 32 GHz<br>Preamp On (RF input terminated, 0 dB input attenuation)<br>–100 dBm 1 MHz to 32 GHz |
| Input-Related Spurs | (0 dB attenuation, –30 dBm input, span < 1.7 GHz)<br>–60 dBc, –70 dBc typical |
| **Third-Order Intercept (TOI)** (–20 dBm tones 100 kHz apart, –20 dBm Ref level, 0 dB input attenuation, preamp Off) | |
| 2.4 GHz | +15 dBm |
| 50 MHz to 20 GHz | +20 dBm typical |
| 20 GHz to 32 GHz | +15 dBm typical |
| **P1dB** | |
| < 4 GHz | +5 dBm typical |
| 4 GHz to 20 GHz | +12 dBm typical |
| 20 GHz to 32 GHz | +7 dBm typical |
| **Second Harmonic Distortion** | |
| 50 MHz | –54 dBc |
| < 4 GHz | –60 dBc typical |
| > 4 GHz | –75 dBc typical |
| **VSWR** | |
| > 10 dB input attenuation | |
| < 20 GHz | 1:5:1 typical |
| > 20 GHz to 32 GHz | 2:0:1 typical |

## GPS Receiver Option (Option 0031)

| | |
|---|---|
| Setup | On/Off, Antenna Voltage 3.3/5.0 V, GPS Info |
| GPS Time/Location Indicator | Time, Latitude, Longitude and Altitude on display<br>Time, Latitude, Longitude and Altitude with trace storage |
| High Frequency Accuracy | Spectrum Analyzer, Interference Analyzer, Signal Analyzers |
| 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 | SMA, female |

## Secure Data Option (Option 0007)

For highly secure data handling requirements, this software option prevents the storing of measurement setup or data information onto any internal file storage location. Instead, setup and measurement information is stored ONLY to the external USB memory location. A simple factory preset prepares the Spectrum Master for transportation while the USB memory remains behind in the secure environment. The Spectrum Master cannot be switched between secure and non-secure operation by the user once configured for secure data operation.



## 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** | **MA24104A** | **MA24106A** | **MA24108/18/26A** |
|---|---|---|---|---|
| Description | High Accuracy RF Power Sensor | Inline High Power Sensor | High Accuracy RF Power Sensor | Microwave USB Power Sensor |
| Frequency Range | 50 MHz to 6 GHz | 600 MHz to 4 GHz | 50 MHz to 6 GHz | 10 MHz to 8 GHz (**MA24108A)**<br>10 MHz to 18 GHz (**MA24118A)**<br>10 MHz to 26 GHz (**MA24126A)** |
| Connector | Type N(m), 50 Ω | Type N(m), 50 Ω | Type N(m), 50 Ω | Type N(m), 50 Ω (**MA24108/18A)**<br>Type K(m), 50 Ω (**MA24126A)** |
| Dynamic Range | –30 dBm to +20 dBm (0.001 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 |
| Measurands | 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 | 11410-00483 | 11410-00424 | 11410-00504 |

Notes:
1) Total RSS measurement uncertainty (0 °C to 50 °C) 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.

# Spectrum Master™ MS2725C Spectrum Analyzer Specifications

## Interference Analyzer (Option 0025)

| | |
|---|---|
| Measurements | Spectrum<br>Field Strength<br>Occupied Bandwidth<br>Channel Power<br>Adjacent Channel Power (ACPR)<br>AM/FM/SSB Demodulation (Wide/Narrow FM, Upper/Lower SSB), (audio out only)<br>Carrier-to-Interference ratio (C/I)<br>Spectrogram (Collect data up to 72 hours)<br>Signal Strength (Gives visual and aural indication of signal strength)<br>Received Signal Strength Indicator (RSSI) (collect data up to one week)<br>Gives visual and aural indication of signal strength<br>Signal ID (up to 12 signals)<br>Center Frequency<br>Bandwidth<br>Signal Type (FM, GSM, W-CDMA, CDMA, Wi-Fi)<br>Closest Channel Number<br>Number of Carriers<br>Signal-to-Nose Ratio (SNR) > 10 dB<br>Interference Mapping<br>Save current point location and direction<br>Save/Recall points/map<br>Delete last saved point<br>Delete all points<br>Speaker on/off<br>Volume<br>Reset Max/Min hold |
| Application Options | Impedance (50 Ω, 75 Ω, Other) |

## Channel Scanner (Option 0027)

| | |
|---|---|
| Number of Channels | 1 to 20 Channels (Power Levels) |
| Measurements | Graph/Table, Max Hold (On/5 sec/Off), Frequency/Channel, Current/Maximum, Dual Color |
| Scanner | Scan Channels, Scan Frequencies, Scan Customer List, Scan Script Master™ |
| Amplitude | Reference Level, Scale |
| Custom Scan | Signal Standard, Channel, # of Channels, Channel Step Size, Custom Scan |
| Frequency Range | 9 kHz to 32 GHz |
| Frequency Accuracy | ± 10 Hz + Time base error |
| Measurement Range | –110 dBm to +30 dBm |
| Application Options | Impedance (50 Ω, 75 Ω, Other) |

## Zero Span IF Output (Option 0089)

| | |
|---|---|
| Mode | Spectrum Analyzer/Span/Zero Span |
| Center Frequency | 140 MHz |
| Output Level | –40 dBm to –20 dBm typical<br>For a signal at Reference Level: –43 dBm to +30 dBm (Preamp Off)<br>or –60 dBm to –40 dBm (Preamp On) |
| IF Bandwidths | Up to 30 MHz (3 dB bandwidth) |
| RF Attenuation | Auto |
| Connector | BNC female |

## GSM/GPRS/EDGE Signal Analyzers (Options 0040, 0041)

**Measurements**

| RF (Option 0040) | Demodulation (Option 0041) | Over-the-Air (OTA) | Pass/Fail (User Editable) |
|---|---|---|---|
| Channel Spectrum<br>Channel Power<br>Occupied Bandwidth<br>Burst Power<br>Average Burst Power<br>Frequency Error<br>Modulation Type<br>BSIC (NCC, BCC)<br>Multi-channel Spectrum<br>Power vs. Time (Frame/Slot)<br>Channel Power<br>Occupied Bandwidth<br>Burst Power<br>Average Burst Power<br>Frequency Error<br>Modulation Type<br>BSIC (NCC, BCC) | Phase Error<br>EVM<br>Origin Offset<br>C/I<br>Modulation Type<br>Magnitude Error<br>BSIC (NCC, BCC) | RF Measurements and Demodulation can be made OTA.<br><br>There are no additional OTA Measurements. | Measurements<br>Channel Power<br>Occupied Bandwidth<br>Burst Power<br>Average Burst power<br>Frequency Error<br>Phase Error<br>EVM<br>Origin Offset<br>C/I<br>Magnitude Error<br>Script Master™ |

**Setup Parameters**

| | |
|---|---|
| GSM/EDGE Select | Auto, GSM, EDGE |
| Frequency | Center, Signal Standard, Channel #, Closest Channel, Decrement/Increment Channel |
| Amplitude | Power Offset, Auto Range, Adjust Range |
| Sweep | Single/Continuous, Trigger Sweep |
| Save/Recall | Setup, Measurement, Screen Shot (save only), to Internal/External Memory |
| Measurement Summary Screen | Overall Measurements |

**RF Measurements (Option 0040)**

| | |
|---|---|
| Frequency Error | ± 10 Hz + time base error, 99% confidence level |
| Occupied Bandwidth | Bandwidth within which 99% of the power transmitted on a single channel lies |
| Burst Power Error | ± 1.5 dB, ± 1 dB typical, (–50 dBm to +20 dBm) |

**Demodulation (Option 0041)**

| | |
|---|---|
| GSMK Modulation Quality (RMS Phase) Measurement Accuracy | ± 1 deg |
| Residual Error (GSMK) | 1 deg |
| 8 PSK Modulation Quality (EVM) Measurement Accuracy | ± 1.5% |
| Residual Error (8 PSK) | 2.5% |

## W-CDMA/HSDPA Signal Analyzers (Options 0044, 0045 or 0065, 0035)

**Measurements**

| RF (Option 0044) | Demodulation (Option 0045 or 0065) | Over-the-Air (OTA) (Option 0035) | Pass/Fail (User Editable) |
|---|---|---|---|
| Band Spectrum<br>Channel Spectrum<br>  Channel Power<br>  Occupied Bandwidth<br>  Peak-to-Average Power<br>Spectral Emission Mask<br>Single carrier ACLR<br>Multi-carrier ACLR<br>RF Summary | Code Domain Power Graph<br>  P-CPICH Power<br>  Channel Power<br>  Noise Floor<br>  EVM<br>  Carrier Feed Through<br>  Peak Code Domain Error<br>  Carrier Frequency<br>  Frequency Error<br>  Control Channel Power<br>  Abs/Rel/Delta Power<br>  CPICH, P-CCPCH<br>  S-CCPCH, PICH<br>  P-SCH, S-SCH<br>HSDPA<br>  Power vs. Time<br>  Constellation<br>Code Domain Power Table<br>  Code, Status<br>  EVM, Modulation Type<br>  Power, Code Utilization<br>  Power Amplifier Capacity<br>Codogram<br>Modulation Summary | Scrambling Code Scanner (Six)<br>  Scrambling Codes<br>  CPICH<br>  $E_c/I_o$<br>  $E_c$<br>  Pilot Dominance<br>  OTA Total Power<br>Multipath Scanner (Six)<br>  Six Multipaths<br>  Tau<br>  Distance<br>  RSCP<br>  Relative Power<br>  Multipath Power | Measurements<br>  Max Output Power<br>  Frequency Error<br>  EVM<br>  CPICH<br>  Occupied Bandwidth<br>  Spectral Mask<br>  ACLR<br>  PCDE<br>  P-CCPCH<br>  S-CCPCH<br>  Code Spread 3<br>  PICH<br>  Code 128<br>Script Master™<br><br>Test Models<br>  1 (16), (32), (64)<br>  2<br>  3 (16), (32)<br>  4 (+CPICH), (-CIPCH)<br>  5 (2 HS), (4 HS), (8 HS) |

**Setup Parameters**

| | |
|---|---|
| Scrambling Code, Threshold | Auto, Manual |
| User Selectable | Scrambling Code, S-CCPCH Spread, S-CCPCH Code, PICH Code, Threshold, Max Amp Power, CPICH Power, Frequency Error Average |
| Maximum Spreading Factor | 256, 512 |
| Frequency | Center, Signal Standard, Channel #, Closest Channel, Decrement/Increment Channel |
| Amplitude | Scale/Division, Power Offset, Auto Range, Adjust Range, Units (dBm/Watts) |
| Marker | Six Markers, Table On/Off |
| Sweep | Single/Continuous, Trigger Sweep |
| Save/Recall | Setup, Measurement, Screen Shot (save only), to Internal/External Memory |
| Measurement Summary Screens | Overall Measurements, RF Measurements, Signal Quality Measurements |

**RF Measurements (Option 0044)**

| | |
|---|---|
| RF Channel Power Accuracy | ± 1.25 dB, ± 0.7 dB typical, (temperature range 15 °C to 35 °C) |
| Occupied Bandwidth Accuracy | ± 100 kHz |
| Adjacent Channel Leakage Ratio (ACLR) | –54 dB/–59 dB ± 0.8 dB @ 5 MHz/10 MHz offset, typical, Bands I – VI, VIII – XIV, XVII<br>–54 dB/–57 dB ± 1.0 dB @ 5 MHz/10 MHz offset, typical, Band VII |

**Demodulation (Option 0045 for W-CDMA only or 0065 for W-CDMA and HSDPA)**

| | |
|---|---|
| W-CDMA Modulations | QPSK, QPSK-DTX (Codecs: AMR 4.75, 5.9, 7.4, 12.2 kbps, DTX 7.4, 12,2 kbps) |
| HSDPA Modulations | QPSK, 16 QAM, 64 QAM |
| EVM Accuracy | ± 2.5%, 6% ≤ EVM ≤ 25% |
| Residual EVM | 2.5% typical |
| Code Domain Power | ± 0.5 dB for code channel power > –25 dB,<br>16, 32, 64 DCPH (test model 1), 16, 32 DCPH (test model 2, 3) |
| CPICH (dBm) Accuracy | ± 0.8 dB typical |

**Over-the-Air (OTA) Measurements (Option 0035)**

| | |
|---|---|
| Scrambling Code Scanner | Six strongest Scrambling Codes |
| Multipath Scanner | Multipath power of six signals relative to strongest pilot |

## cdmaOne/CDMA2000 1X Signal Analyzers (Option 0042, 0043, 0033)

**Measurements**

| RF (Option 0042) | Demodulation (Option 0043) | Over-the-Air (OTA) (0ption 0033) | Pass/Fail (User Editable) |
|---|---|---|---|
| Channel Spectrum<br>Channel Power<br>Occupied Bandwidth<br>Peak-to-Average Power<br>Spectral Emission Mask<br>Multi-carrier ACPR<br>RF Summary | Code Domain Power Graph<br>Pilot Power<br>Channel Power<br>Noise Floor<br>Rho<br>Carrier Feed Through<br>Tau<br>RMS Phase Error<br>Frequency Error<br>Abs/Rel/ Power<br>Pilot<br>Page<br>Sync<br>Q Page<br>Code Domain Power Table<br>Code<br>Status<br>Power<br>Multiple Codes<br>Code Utilization<br>Modulation Summary | Pilot Scanner (Nine)<br>PN<br>$E_c/I_o$<br>Tau<br>Pilot Power<br>Channel Power<br>Pilot Dominance<br>Multipath Scanner (Six)<br>$E_c/I_o$<br>Tau<br>Channel Power<br>Multipath Power<br>Limit Test – 10 Tests Averaged<br>Rho<br>Adjusted Rho<br>Multipath<br>Pilot Dominance<br>Pilot Power<br>Pass/Fail Status | Measurements<br>Channel Power<br>Occupied Bandwidth<br>Peak-to-Average Power<br>Spectral Mask Test<br>Frequency Error<br>Channel Frequency<br>Frequency error<br>Pilot Power<br>Noise Floor<br>Rho<br>Carrier Feed Through<br>Tau<br>RMS Phase Error<br>Code Utilization<br>Measured PN<br>Pilot Dominance<br>Multipath Power |

| | |
|---|---|
| **Setup Parameters** | |
| PN Setup | PN Trigger (No Trigger, GPS, External), PN Search Type (Auto, Manual), PN Offset |
| Walsh Codes | 64, 128 |
| Measurement Speed | Fast, Normal, Slow |
| External Trigger Polarity | Rising, Falling |
| Number of Carriers | 1 to 5 |
| Carrier Bandwidth | 1.23, 1.24, 1.25 MHz |
| Frequency | Center, Signal Standard, Channel #, Closest Channel, Decrement/Increment Channel |
| Amplitude | Scale/Division, Power Offset, Auto Range, Adjust Range, Units (dBm/Watts) |
| Sweep | Single/Continuous, Trigger Sweep |
| Save/Recall | Setup, Measurement, Screen Shot (save only), to Internal/External Memory |
| Measurement Summary Screens | Overall Measurements, RF Measurements, Signal Quality Measurements |
| **RF Measurements (Option 0042)** | |
| RF Channel Power Accuracy | ± 1.5 dB, ± 1.0 dB typical, (RF input –50 dBm to +20 dBm) |
| **Demodulation (Option 0043)** | |
| Frequency Error | ± 10 Hz + time base error, 99% confidence level (in slow mode) |
| Rho Accuracy | ± 0.005, for Rho > 0.9 |
| Residual Rho | > 0.995, typical, > 0.99 maximum, (RF input –50 dBm to +20 dBm) |
| PN Offset | 1 x 64 chips |
| Pilot Power Accuracy | ± 1.0 dB typical, relative to channel power |
| Tau | ± 0.5 µs typical, ± 1.0 µs maximum |
| **Over-the-Air (OTA) Measurements (Option 0033)** | |
| Pilot Scanner | Nine strongest pilots |
| Multipath Scanner | Multipath power of six signals relative to strongest pilot |
| Limit Test | Average of ten tests compared to limit |

## CDMA2000 1xEV-DO Signal Analyzers (Option 0062, 0063, 0034)

**Measurements**

| RF (Option 0062) | Demodulation (Option 0063) | Over-the-Air (OTA) (Option 0034) | Pass/Fail (User Editable) |
|---|---|---|---|
| Channel Spectrum<br>Channel Power<br>Occupied Bandwidth<br>Peak-to-Average Power<br>Power vs. Time<br>Pilot & MAC Power<br>Channel Power<br>Frequency Error<br>Idle Activity<br>On/Off Ratio<br>Spectral Emission Mask<br>Multi-carrier ACPR<br>RF Summary | MAC Code Domain Power Graph<br>Pilot & MAC Power<br>Channel Power<br>Frequency Error<br>Rho Pilot<br>Rho Overall<br>Data Modulation<br>Noise Floor<br>MAC Code Domain Power Table<br>Code<br>Status<br>Power<br>Code Utilization<br>Data Code Domain Power<br>Active Data Power<br>Data Modulation<br>Rho Pilot<br>Rho Overall<br>Maximum Data CDP<br>Minimum Data CDP<br>Modulation Summary | Pilot Scanner (Nine)<br>PN<br>$E_C/I_O$<br>Tau<br>Pilot Power<br>Channel Power<br>Pilot Dominance<br>Mulitpath Scanner (Six)<br>$E_C/I_O$<br>Tau<br>Channel Power<br>Multipath Power | Measurements<br>Channel Power<br>Occupied Bandwidth<br>Peak-to-Average Power<br>Carrier Frequency<br>Frequency Error<br>Spectral Mask<br>Noise Floor<br>Pilot Power<br>RMS Phase Error<br>Tau<br>Code Utilization<br>Measured PN<br>Pilot Dominance<br>Mulitpath Power |

**Setup Parameters**

| | |
|---|---|
| PN Setup | PN Trigger (No Trigger, GPS, External), PN Search Type (Auto, Manual), PN Offset |
| Walsh Codes | 64, 128 |
| Measurement Speed | Fast, Normal, Slow |
| External Trigger Polarity | Rising, Falling |
| Slot Type | Auto, Active, Idle |
| Number of Carriers | 1 to 5 |
| Carrier Bandwidth | 1.23, 1.24, 1.25 MHz |
| Frequency | Center, Signal Standard, Channel #, Closest Channel, Decrement/Increment Channel |
| Amplitude | Scale/Division, Power Offset, Auto Range, Adjust Range, Units (dBm/Watts) |
| Sweep | Single/Continuous, Trigger Sweep |
| Save/Recall | Setup, Measurement, Screen Shot (save only), to Internal/External Memory |
| Measurement Summary Screens | Overall Measurements, RF Measurements, Signal Quality Measurements |

**RF Measurements (Option 0062)**

| | |
|---|---|
| RF Channel Power Accuracy | ± 1.5 dB, ± 1.0 dB typical, (RF input –50 dBm to +20 dBm) |

**Demodulation (Option 0063)**

| | |
|---|---|
| EV-DO Compatibility | Rev 0 and Rev A |
| Frequency Error | ± 20 Hz + time base error, 99% confidence level |
| Rho Accuracy | ± 0.01, for Rho > 0.9 |
| Residual Rho | > 0.995 typical, > 0.99, maximum (RF input –50 dBm to +20 dBm) |
| PN Offset | Within 1 x 64 chips |
| Pilot Power Accuracy | ± 1.0 dB typical, relative to channel power |
| Tau | ± 0.5 µs typical, ± 1.0 µs maximum |

**Over-the-Air (OTA) Measurements (Option 0034)**

| | |
|---|---|
| Pilot Scanner | Nine strongest pilots |
| Multipath Scanner | Multipath power of six signals relative to strongest pilot |

## LTE Signal Analyzers (Options 0541, 0542, 0543, 0546)

**Measurements**

| RF (Option 0541) | Modulation (Option 0542) | Over-the-Air (OTA) (Option 0546) | Pass/Fail (User Editable) |
|---|---|---|---|
| Channel Spectrum<br>Channel Power<br>Occupied Bandwidth<br>ACPR<br>RF Summary | Constellation<br>Reference Signal Power<br>Sync Signal Power<br>EVM<br>Frequency Error<br>Carrier Frequency<br>Cell ID<br>Sector ID<br>Group ID<br>Control Channel Power<br>RS<br>P-SS<br>S-SS<br>PBCH<br>PCFICH<br>Modulation Summary | Synch Signal Power<br>(Six Strongest)<br>Power<br>Cell ID<br>Sector ID<br>Group ID<br>Dominance | Pass Fail All<br>Pass/Fail RF<br>Pass Fail Demod<br>Measurements<br>Channel Power<br>Occupied Bandwidth<br>ACLR<br>Frequency Error<br>Carrier Frequency<br>Dominance<br>EVM (peak)<br>EVM (rms)<br>RS Power<br>SS Power<br>P-SS Power<br>S-SS Power<br>PBCH Power<br>PCFICH Power<br>Cell ID<br>Group ID<br>Sector ID |

| | |
|---|---|
| **Setup Parameters** | |
| Bandwidth | 10 MHz |
| Span | 1.4, 3, 5, 10, 15, 20, 30 MHz |
| Frame Length | 2.5, 5.0, 10.0 msec |
| Frequency | Center, Signal Standard, Channel #, Closest Channel, Decrement/Increment Channel |
| Amplitude | Scale/Division, Power Offset, Auto Range, Adjust Range |
| Sweep | Single/Continuous, Trigger Sweep |
| Save/Recall | Setup, Measurement, Screen Shot (save only), to Internal/External Memory |
| Measurement Summary Screens | Overall Measurements, RF Measurements, Signal Quality Measurements |
| **RF Measurements (Option 0541)** | |
| RF Channel Power Accuracy | ± 1.5 dB, ± 1.0 dB typical, (RF input –50 dBm to +10 dBm) |
| **Modulation (Option 0542)** | |
| Frequency Error | ± 10 Hz + time base error, 99% confidence level |
| Residual EVM (rms) | 2.5% typical (E-UTRA Test Model 3.1) (RF Input –50 dBm to +10 dBm) |
| **Bandwidth = 15 MHz, 20 MHz (Option 0543) (Requires Option 0541 or 0542)** | |
| Bandwidths | 15 MHz, 20 MHz |
| **Over-the-Air (OTA) Measurements (Option 0546)** | |
| Scanner | Six strongest Sync Signals |
| Auto Save | Yes |
| GPS Tagging and Logging | Yes |

# Spectrum Master™ MS2725C Spectrum Analyzer Specifications




## Fixed and Mobile WiMAX Signal Analyzers (Options 0046, 0047, 0066, 0067, 0037)

**Measurements**

| RF (Option 0046 - Fixed) (Option 0066 - Mobile) | Demodulation (Option 0047 - Fixed) (Option 0067 - Mobile) | Over-the-Air (OTA) (Option 0037 - Mobile) | Pass/Fail (User Editable) |
|---|---|---|---|
| Channel Spectrum<br>Channel Power<br>Occupied Bandwidth<br>Power vs. Time<br>Channel Power<br>Preamble Power<br>Downlink Burst Power (Mobile)<br>Uplink Burst Power (Mobile)<br>Data Burst Power (Fixed)<br>Crest Factor (Fixed)<br>ACPR<br>RF Summary | Constellation<br>RCE (RMS/Peak)<br>EVM (RMS/Peak)<br>Frequency Error<br>CINR<br>Base Station ID<br>Sector ID<br>Spectral Flatness<br>Adjacent Subcarrier Flatness<br>EVM vs. Subcarrier/Symbol<br>RCE (RMS/Peak)<br>EVM (RMS/Peak)<br>Frequency Error<br>CINR (Mobile)<br>Base Station ID<br>Sector ID (Mobile)<br>DL-MAP (Tree View) (Mobile)<br>Modulation Summary | Channel Power Monitor<br>Preamble Scanner (Six)<br>Preamble<br>Relative Power<br>Cell ID<br>Sector ID<br>PCINR<br>Dominant Preamble<br>Base Station ID | Pass Fail All<br>Pass/Fail RF<br>Pass Fail Demod<br>Measurements<br>Channel Power<br>Occupied Bandwidth<br>Downlink Bust Power<br>Uplink Burst Power<br>Preamble Power<br>Crest Factor<br>Frequency Error<br>Carrier Frequency<br>EVM<br>RCE<br>Sector ID (Mobile) |

**Setup Parameters**

| | |
|---|---|
| Fixed WiMAX Bandwidth | 1.25, 1.50, 2.50, 3.50, 5.00, 5.50, 6.00, 7.00, 10.00 MHz |
| Fixed WiMAX Cyclic Prefix Ratio (CP) | 1/4, 1/8, 1/16, 1/32 |
| Fixed WiMAX Span | 5, 10, 15, 20 MHz |
| Fixed WiMAX Frame Length | 2.5, 5.0, 10.0 msec |
| Mobile WiMAX Zone Type | PUSC |
| Mobile WiMAX DL-MAP Auto Decoding | Convolutional Coding (CC), Convolutional Turbo Coding (CTC) |
| Mobile WiMAX Bandwidths | 3.50, 5.00, 7.00, 8.75, 10.00 MHz |
| Mobile WiMAX Cyclic Prefix Ratio (CP) | 1/8 |
| Mobile WiMAX Span | 5, 10, 20, 30 MHz |
| Mobile WiMAX Frame Lengths | 5, 10 msec |
| Mobile WiMAX Demodulation | Auto, Manual, FCH |
| Frequency | Center, Signal Standard, Channel #, Closest Channel, Decrement/Increment Channel |
| Amplitude | Scale/Division, Power Offset, Auto Range, Adjust Range |
| Sweep | Single/Continuous, Trigger Sweep |
| Save/Recall | Setup, Measurement, Screen Shot (save only), to Internal/External Memory |
| Measurement Summary Screens | Overall Measurements, RF Measurements, Signal Quality Measurements |

**RF Measurements (Option 0046 – Fixed, Option 0066 - Mobile)**

| | |
|---|---|
| RF Channel Power Accuracy | ± 1.5 dB, ± 1.0 dB typical, (RF input –50 dBm to +20 dBm) |

**Demodulated Signal Analyzer (Option 0047 – Fixed, Option 0067 – Mobile)**

| | |
|---|---|
| Frequency Error | ± 10 Hz + time base error, 99% confidence level |
| Fixed WiMAX Residual EVM (rms) | 3% typical, 3.5% maximum (RF Input –50 dBm to +20 dBm) |
| Mobile WiMAX Residual EVM (rms) | 2.5% typical, 3.0% maximum, (RF Input –50 dBm to +20 dBm) |

**Over-the-Air (OTA) Measurements (Option 0037)**

| | |
|---|---|
| Channel Power Monitor | Over time (one week), measurement time interval 1 to 60 sec |
| Preamble Scanner | Six Strongest Preambles |
| Auto Save | Yes |
| GPS Tagging and Logging | Yes |

## TD-SCDMA/HSDPA Signal Analyzers (Options 0060, 0061, 0038)

**Measurements**

| RF (Option 0060) | Demodulation (Option 0061) | Over-the-Air (OTA) (Option 0038) | Pass/Fail (User Editable) |
|---|---|---|---|
| Channel Spectrum<br>Channel Power<br>Occupied Bandwidth<br>Left Channel Power<br>Left Channel Occ B/W<br>Right Channel Power<br>Right Channel Occ B/W<br>Power vs. Time<br>Six Slot Powers<br>Channel Power (RRC)<br>DL-UL Delta Power<br>UpPTS Power<br>DwPTS Power<br>On/Off Ratio<br>Slot Peak-to-Average Power<br>Spectral Emission<br>RF Summary | Code Domain Power/Error<br>(QPSK/8 PSK/16 QAM)<br>Slot Power<br>DwPTS Power<br>Noise Floor<br>Frequency Error<br>Tau<br>Scrambling Code<br>EVM<br>Peak EVM<br>Peak Code Domain Error<br>CDP Marker<br>Modulation Summary | Code Scan (32)<br>Scrambling Code Group<br>Tau<br>$E_C/I_O$<br>Pilot Dominance<br>Tau Scan (Six)<br>Sync-DL#<br>Tau<br>$E_C/I_O$<br>DwPTS Power<br>Pilot Dominance<br>Record<br>Run/Hold | Pass Fail All<br>Pass/Fail RF<br>Pass Fail Demod<br>Measurements<br>Occupied Bandwidth<br>Channel Power<br>Channel Power RCC<br>On/Off Ratio<br>Peak-to-Average Ratio<br>Frequency Error<br>EVM<br>Peak EVM<br>Peak Code Domain Error<br>Tau<br>Carrier Feedthrough<br>Noise Floor |

**Setup Parameters**

| | |
|---|---|
| Slot Selection | Auto, 0-6 |
| Trigger | Trigger Type (No Trigger/GPS/External), External Trigger (Rising/Falling), Tau Offset |
| SYNC-DL Code | Auto, 0-31 |
| Scrambling/Midamble Code | Auto, 0-127 |
| Maximum Users | Auto, 2, 4, 6, 8, 10, 12, 14, 16 |
| Measurement Speed | Fast, Normal, Slow |
| User Selectable | Uplink Switch Point, Number of Carriers (1, 3), Tau Offset |
| Demodulation Type | Auto, QPSK, 8 PSK, 16 QAM |
| Frequency | Center, Signal Standard, Channel #, Closest Channel, Decrement/Increment Channel |
| Amplitude | Scale/Division, Power Offset, Auto Range, Adjust Range, Units (dBm/Watts) |
| Sweep | Hold/Run, Trigger Sweep |
| Save/Recall | Setup, Measurement, Screen Shot (save only), to Internal/External Memory |
| Measurement Summary Screens | Overall Measurements, RF Measurements, Signal Quality Measurements |

**RF Measurements (Option 0060)**

| | |
|---|---|
| RF Channel Power Accuracy (RRC) | ± 1.5 dB, ± 1.0 dB typical, (slot power –40 to +10 dBm) |
| Frequency Error | ± 20 Hz + time base error, in the presence of a downlink slot |

**Demodulation (Option 0061)**

| | |
|---|---|
| Supported Modulation | QPSK, 8 PSK, 16 QAM, MBMS |
| Residual EVM (rms) | 3% typical, P-CCPH slot power >-50 dBm |
| PN Offset | Within 1 x 64 chips |
| Pilot Power Accuracy | ± 1.0 dB typical |
| Timing Error (Tau) for Dominant SYNC-DL | ± 0.2 µs (external trigger) |
| Spreading Factor | 1, 16 |

**Over-the-Air (OTA) Measurements (Option 0038)**

| | |
|---|---|
| Code Scanner | 32 Sync Codes and associated Scrambling Code Groups |
| Tau Scanner | Six strongest Sync Codes |
| Auto Save | Yes |
| GPS Tagging and Logging | Yes |

# Spectrum Master™ MS2725C Spectrum Analyzer Specifications

## General Specifications

All specifications and characteristics apply under the following conditions, unless otherwise stated: 1) After 5 minutes of warm-up time, where the instrument is left in the ON state; 2) Apply when using internal reference and performance sweep mode; 3) Subject to change without notice; 4) Typical performance is the measured performance of an average unit; 5) Recommended calibration cycle is 12 months.

| | |
|---|---|
| **Setup Parameters** | |
| System | Status (Temperature, Battery Info, S/N, Firmware Ver, IP Address, Options Installed)<br>Self Test, Application Self Test<br>GPS (see Option 0031) |
| System Options | Name, Date and Time, Ethernet Configuration, Display, Volume<br>Display (Brightness, Default Colors, Black and White, Night Vision, High Contrast)<br>Language (English, French, German, Spanish, Chinese, Japanese, Korean, Italian, User defined)<br>Share Center Frequency and Power Offset between Modes<br>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 K, male, 50 Ω, Maximum Input +30 dBm, ± 50 VDC |
| GPS | SMA Female |
| 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 dBm |
| External Reference Out | BNC, female, 50 Ω, 10 MHz |
| External Trigger | BNC, female, 50 Ω, Maximum Input ± 5 VDC |
| IF Out | BNC, female, 50 Ω, 140 MHz |
| **Display** | |
| Size | 8.0 inch |
| 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<br>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/-3/-4/-5/-6/-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 °C to 55 °C |
| 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 | 3.8 kg, (8.5 lbs) |

## 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 |
| Mobile WiMAX OTA Option | Google Earth, Google Maps, MapInfo |
| **Folder Spectrogram** (Spectrum Monitoring for Interference Analysis and Spectrum Clearing) | |
| Folder Spectrogram – 2D View | Creates a composite file of multiple traces<br>Peak Power, Total Power, Peak Frequency, Histogram, Average Power (Max/Min)<br>File Filter (Violations over limit lines or deviations from averages)<br>Playback |
| Video Folder Spectrogram – 2D View | Create AVI file to export for management review/reports |
| Folder Spectrogram – 3D View | Views (Set Threshold, Markers)<br>- 3D (Rotate X, Y, Z Axis, Level Scale, Signal ID)<br>- 2D View (Frequency or Time Domain, Signal ID)<br>- Top Down<br>Playback (Frequency and/or Time Domain) |
| **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 |
| VSG Pattern Converter | Import user-defined patterns (ASCII text or MATLAB file format required) |
| Languages | Add up to two languages or modify non-English language menus |
| Mobile WiMAX | DL-MAP Parameters |
| Display | Modify display settings |
| **Script Master™** | |
| Channel Scanner Mode | Automate scan up to 1200 channels, repeat for sets of 20 channels, repeat all channels |
| GSM/GPRS/EDGE or W-CDMA/HSDPA Mode | Automate Signal Analysis testing requirements with annotated how-to pictures |
| **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™ MS2725C Spectrum Analyzer Specifications

## Ordering Information

| MS2725C | Description |
|---|---|
| 9 kHz to 32 GHz | Spectrum Analyzer |
| **Options** | |
| MS2725C-0007 | Secure Data Operation |
| MS2725C-0031 | GPS Receiver (requires Antenna P/N 2000-1528-R) |
| MS2725C-0019 | High-Accuracy Power Meter |
| MS2725C-0025 | Interference Analyzer |
| MS2725C-0027 | Channel Scanner |
| MS2725C-0089 | Zero-Span IF Output |
| MS2725C-0009 | I/Q Demodulation Hardware |
| MS2725C-0040 | GSM/GPRS/EDGE RF Measurements* |
| MS2725C-0041 | GSM/GPRS/EDGE Demodulation* |
| MS2725C-0044 | W-CDMA/HSDPA RF Measurements* |
| MS2725C-0045 | W-CDMA Demodulation* |
| MS2725C-0065 | W-CDMA/HSDPA Demodulation* |
| MS2725C-0035 | W-CDMA/HSDPA Over-the-Air (OTA) Measurements** |
| MS2725C-0060 | TD-SCDMA/HSDPA Measurements* |
| MS2725C-0061 | TD-SCDMA/HSDPA Demodulation* |
| MS2725C-0038 | TD-SCDMA/HSDPA Over-the-Air (OTA) Measurements* |
| MS2725C-0541 | LTE RF Measurements* |
| MS2725C-0542 | LTE Modulation Measurements* |
| MS2725C-0543 | LTE BW = 15 MHz, 20 MHz (requires Option 0541 or 0542) |
| MS2725C-0546 | LTE Over-the-Air (OTA) Measurements* |
| MS2725C-0042 | cdmaOne/CDMA2000 1X RF Measurements* |
| MS2725C-0043 | cdmaOne/CDMA2000 1X Demodulation* |
| MS2725C-0033 | cdmaOne/CDMA2000 1X Over-the-Air (OTA) Measurements** |
| MS2725C-0062 | CDMA2000 1xEV-DO RF Measurements* |
| MS2725C-0063 | CDMA2000 1xEV-DO Demodulation* |
| MS2725C-0034 | CDMA2000 1xEV-DO Over-the-Air (OTA) Measurements** |
| MS2725C-0046 | IEEE 802.16 Fixed WiMAX RF Measurements* |
| MS2725C-0047 | IEEE 802.16 Fixed WiMAX Demodulation* |
| MS2725C-0066 | IEEE 802.16 Mobile WiMAX RF Measurements* |
| MS2725C-0067 | IEEE 802.16 Mobile WiMAX Demodulation* |
| MS2725C-0037 | IEEE 802.16 Mobile WiMAX Over-the-Air (OTA) Measurements* |
| MS2725C-0098 | Standard Calibration (ANSI Z540-1-1994) |
| MS2725C-0099 | Premium Calibration (ANSI Z540-1-1994 plus test data) |

*Requires Option 0009, **Requires Option 0009, and Option 0031

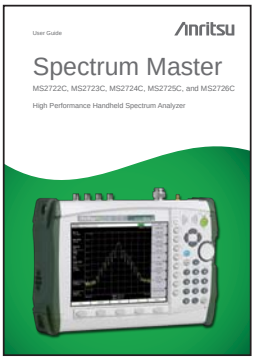
## **Power Sensors** (For complete ordering information see the respective datasheets of each sensor)



| Part Number | Description |
|---|---|
| PSN50 | High Accuracy RF Power Sensor, 50 MHz to 6 GHz, +20 dBm |
| MA24104A | Inline High Power Sensor, 600 MHz to 4 GHz, 150 W |
| MA24106A | High Accuracy RF Power Sensor, 50 MHz to 6 GHz, +23 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 |

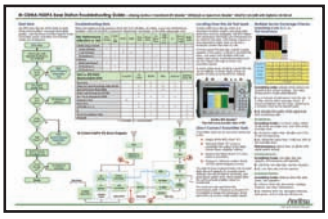
# Spectrum Master™ MS2725C Spectrum Analyzer Specifications

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




| Part Number | Description |
|---|---|
| 10580-00277 | Spectrum Master User Guide (Hard copy included)<br>- Bias-Tee, GPS Receiver |
| 10580-00244 | Spectrum Analyzer Measurement Guide<br>- Interference Analyzer, Channel Scanner, IF Output |
| 10580-00240 | Power Meter Measurement Guide<br>- High Accuracy Power Meter |
| 10580-00234 | 3GPP Signal Analyzer Measurement Guide<br>- GSM/EDGE, W-CDMA/HSDPA, TD-SCDMA/HSDPA, LTE |
| 10580-00235 | 3GPP2 Signal Analyzer Measurement Guide<br>- CDMA, EV-DO |
| 10580-00236 | WiMAX Signal Analyzer Measurement Guide<br>- Fixed WiMAX, Mobile WiMAX |
| 10580-00278 | Programming Manual |
| 10580-00279 | Maintenance Manual |

## **Troubleshooting Guides** (soft copy included on MST CD and at www.anritsu.com)



| | |
|---|---|
| 11410-00551 | Spectrum Analyzers |
| 11410-00472 | Interference |
| 11410-00466 | GSM/GPRS/EDGE Base Stations |
| 11410-00566 | LTE eNodeB Testing |
| 11410-00463 | W-CDMA/HSDPA Base Stations |
| 11410-00465 | TD-SCDMA/HSDPA Base Stations |
| 11410-00467 | cdmaOne/CDMA2000 1X Base Stations |
| 11410-00468 | CDMA2000 1xEV-DO Base Stations |
| 11410-00470 | Fixed WiMAX Base Stations |
| 11410-00469 | Mobile WiMAX Base Stations |

## **Standard Accessories** (included with instrument)



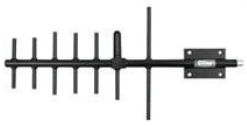


| | |
|---|---|
| 10580-00277 | Spectrum Master User Guide (includes Bias-Tee and GPS Receiver) |
| 2300-498 | MST CD: Master Software Tools, User/Measurement Guides, Programming Manual, Troubleshooting Guides, Application Notes |
| 65729 | Soft Carrying Case |
| 633-44 | Rechargeable Li-Ion Battery |
| 40-168-R | AC/DC Power Supply |
| 806-141-R | Automotive Cigarette Lighter 12 Volt DC Adapter |
| 2000-1371-R | Ethernet Cable, 7 feet/213 cm |
| 3-2000-1498 | USB A-mini B Cable, 10 feet/305 cm |
| 11410-00529 | MS2722C Spectrum Master Technical Data Sheet |
| 11410-00524 | MS2723C Spectrum Master Technical Data Sheet |
| 11410-00525 | MS2724C Spectrum Master Technical Data Sheet |
| 11410-00526 | MS2725C Spectrum Master Technical Data Sheet |
| 11410-00527 | MS2726C Spectrum Master Technical Data Sheet |
| | One Year Warranty (Including battery, firmware, and software) |
| | Certificate of Calibration and Conformance |

# Spectrum Master™ MS2725C Spectrum Analyzer Specifications

## 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 21000 MHz, N(f), 5-8 dBi to 12 GHz, 0-6 dBi to 21 GHz, log periodic |

**Portable Antennas**



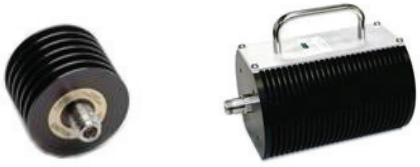
| | |
|---|---|
| 2000-1200-R | 806 MHz to 866 MHz, SMA(m), 50 Ω |
| 2000-1473-R | 870 MHz to 960 MHz, SMA(m), 50 Ω |
| 2000-1035-R | 896 MHz to 941 MHz, SMA(m), 50 Ω (1/4 wave) |
| 2000-1030-R | 1710 MHz to 1880 MHz, SMA(m), 50 Ω (1/2 wave) |
| 2000-1474-R | 1710 MHz to 1880 MHz with knuckle elbow (1/2 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) to 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, 5 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) |

## 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 | 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 |
| 71693-R | Ruggedized K(f) to Type N(f) |
| 510-102-R | N(m) to N(m), DC to 11 GHz, 50 Ω, 90 degrees right angle |

**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**



| | |
|---|---|
| 2000-1528-R | GPS Antenna, SMA(m) |
| 69793 | CW Signal Generator Kit |
| 2000-1520-R | USB Flash Drive |
| 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

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