INCH-POUND

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COMMERCIAL ITEM DESCRIPTION

ANALYZER, SPECTRUM, 2.9 GHZ RF WITH INTERNAL TRACKING GENERATOR

The General Services Administration has authorized the use of this Commercial Item Description (CID) for all federal agencies.

1. SCOPE.

This Commercial item Description (CID), describes a fully synthesized 2.9 GHz RF Spectrum Analyzer with a built-in tracking generator and a receiver mode with AM and FM demodulation. This CID is meant as a minimum requirement for the 2.9 GHz RF Spectrum Analyzer with Internal Tracking Generator in which only those manufacturers that meet or surpass the following requirements are to be supplied per this CID.

2. CLASSIFICATION. Equipment covered by this CID shall be commercially available equipment and may be modified to the extent necessary to meet this description. The equipment shall be Class 3 in accordance with MIL-PRF-28800, except as specified herein.

3. SALIENT CHARACTERISTICS. The equipment shall be capable of operation within the accuracies, limits, and specifications herein.

3.1 Safety and Environmental. The equipment shall meet all safety and environmental requirements as specified in MIL-PRF-28800 for the classification as stated herein.

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any other data that may improve this document should be sent to 742 CBSG/LEEC, 460 Richard Ray Blvd, Suite 200, Robins AFB, GA 31098-1813. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.daps.dla.mil/ .

AMSC N/A FSC 6625

DISTRIBUTION STATEMENT A. Approved for public release: distribution is unlimited.

3.1.1 Temperature Rate of Change. The equipment shall meet its performance and accuracy requirements while operating in temperature changes of less than 1°C/minute.

3.1.2 Altitude, Operating. The equipment shall meet its performance and accuracy requirements operating as specified in MIL-PRF-28800, except the maximum required operating altitude shall be 10000 feet (3048 meters).

3.2 Electrical Power Sources. The equipment shall operate from nominal single-phase commercial, military, and shipboard power sources of 120 volts AC (±10%) or 240 volts AC (±10%) at line frequencies of 47.5 Hz to 52.5 Hz, 57 Hz to 63 Hz, or 380 Hz to 420 Hz. Transient state conditions shall meet MIL-PRF-28800 requirements for the classification specified herein.

3.3 Reliability. The design of the equipment shall be such that under normal use and operation the equipment does not fail within 1500 hours of operation with a statistical certainty of 95%.

3.4 Calibration and Maintenance Adjustments. The design of the system shall provide for readily accessible calibration adjustments and maintenance adjustments. The calibration adjustments, wherever possible, shall be accessible without removal of the equipment case or modules. The calibration interval shall be a period of one year or greater based on an operating time of 2000 hours. No special tools shall be required for alignment or adjustment except those furnished with the equipment.

3.5 Performance Requirements. The equipment shall meet all requirements specified herein, after the warm-up period specified in MIL-PRF-28800, under all combinations of input power conditions, output signal conditions and operating service condition as specified in MIL-PRF-28800.

3.5.1 Frequency.

3.5.1.1 Frequency Range. The equipment frequency range shall include 9 kHz to 2.9 GHz.

3.5.1.2 External Mixing Capability. The equipment shall operate with external mixers in the frequency range of 3 GHz to 300 GHz.

3.5.1.3 Frequency Readout Accuracy. The frequency readout accuracy of the equipment shall be within ± (3% of Span Width + Frequency Standard Accuracy + 50 % of RBW).

3.5.1.4 Frequency Span.

3.5.1.4.1 Frequency Span Range. The frequency span range of the equipment shall include 10 Hz/div to 290 MHz/div with continuously variable span and zero span (0 Hz).

3.5.1.4.2 Frequency Span Accuracy. The equipment frequency span accuracy shall be within ± 5% of indicated span.

3.5.1.5 Frequency Counter. The equipment shall include frequency counting capability.

3.5.1.5.1 Frequency Counter Resolution. The frequency counter shall include selectable resolution settings of 1 Hz, 10 Hz, 100 Hz, 1 kHz.

3.5.1.5.2 Frequency Counter Accuracy. The frequency counter shall be accurate to within ± (Frequency Standard Accuracy + Counter Resolution).

3.5.1.5.3 Frequency Counter Sensitivity. The frequency counter sensitivity shall be (at 120 MHz with 0 dB attenuation) <-85 dBm with 3 kHz RBW and <-65 dBm with 5 MHz RBW.

3.5.1.6 Frequency Standard. The equipment shall have an internal frequency standard.

3.5.1.6.1 Frequency Standard Temperature Stability. The temperature stability of the internal frequency standard shall be within ±0.2 ppm for the operational temperature range of the equipment.

3.5.1.6.2 Frequency Standard Aging. The aging stability of the internal frequency standard shall be within ±2 ppm for the first year. Thereafter it shall be within ±1 ppm/year.

3.5.1.7 Residual FM. The residual FM for the equipment shall be < 10 Hz for: peak to peak in 20 msec, frequency spans <1 MHz/div with 100 Hz video filter.

3.5.1.8 Noise Sidebands. The noise sidebands shall be less than (with span <100 kHz/div)

	10 kHz offset	30 kHz offset
0.1 to 1.0 GHz	-97 dBc/Hz	-101 dBc/Hz
1.0 to 2.8 GHz	-92 dBc/Hz	-95 dBc/Hz
2.8 to 2.9 GHz	-93 dBc/Hz	-100 dBc/Hz

3.5.2 Sweep.

3.5.2.1 Sweep Time Range. The equipment sweep time shall be settable in a range from 1 ms/div to 10 sec./div, at a span of >200 Hz/div. The equipment sweep time shall be settable in a range from 200 ns/div to 10s/div, at zero span.

3.5.2.2 Sweep Time Accuracy. The equipment sweep accuracy shall be within ±1% for a setting of >1 µsec./div.

3.5.2.3 Sweep Trigger Source. The equipment sweep shall be capable of being triggered from internal (video), external, or line (AC input).

3.5.2.4 Sweep Trigger Mode. The equipment sweep trigger modes shall include free run and single.

3.5.3 Amplitude. 3.5.3.1 Maximum Input Level. The equipment shall have at least the following maximum input levels: +20 dBm; +30 dBm CW >0 dB input attenuation; +50 dBm peak; 10 µsec., <1% duty cycle, >0 dB input attenuation; DC: 0 volts.

3.5.3.2 Displayed Average Noise Level. The equipment shall have the following displayed average noise level in 10 Hz Video Resolution Bandwidth.

	3 Hz RBW	300 Hz RBW
9 kHz to 100 kHz	<-115 dBm	<-95 dBm
100 kHz to 2.9 GHz	<-135 dBm	<-115 dBm

3.5.3.3 Gain Compression. The equipment shall have a 1 dB gain compression at -5 dBm (0 dB attenuation).

3.5.3.4 Display Linearity.

3.5.3.4.1 Log Displays. The equipment display linearity for log displays shall be:

5 or 10 dB/div	±0.15 dB/dB, ≤1.5 dB over 8 divisions
1 or 2 dB/div	±0.5 dB over 8 divisions

3.5.3.4.2 Linear Displays. The equipment display linearity for linear displays shall be:

<10 MHz RBW	±2% of Reference Level over 8 divisions
10 MHz and 30 MHz RBW	±10% of Reference Level over 8 divisions (<10 dB IF Gain)

3.5.3.5 Frequency Response (With 10 dB Attenuation, Relative To Ref Out). The equipment frequency response shall be within ±1.5 dB from 9 kHz to 2.9 GHz.

3.5.3.6 Resolution Bandwidth (RBW).

3.5.3.6.1 Resolution Bandwidth Range. The resolution bandwidth range settings for the equipment shall include 3 Hz, 10 Hz, 30 Hz, 100 Hz, 300 Hz, 3 kHz, 30 kHz, 300 kHz, 5 MHz, 10 MHz 30 MHz.

3.5.3.6.2 Resolution Bandwidth Accuracy. The resolution bandwidth accuracy for the equipment shall be within ±20%, for the range of 300 Hz to 30 kHz; ±30%, for the range of 300 kHz to 30 MHz.

3.5.3.6.3 Resolution Bandwidth Selectivity. The resolution bandwidth selectivity shall be, for a 60 dB/3 dB bandwidth ratio; <5:1, 3 kHz, 30 kHz, 300 kHz, 1 MHz, 5 MHz; <12:1, 1 kHz.

3.5.3.6.4 Resolution Bandwidth Switching Uncertainty. The resolution bandwidth switching uncertainty shall be within ±0.5 dB, 1 kHz to 5 MHz; ±1.0 dB, <1 kHz; and ±2.0 dB, 10 MHz, 30 MHz.

3.5.3.7 Video Bandwidth Filter. The equipment shall have a video bandwidth filter which includes the following selectable ranges: 10 Hz to 1 MHz and NONE (with no Video Filter activated).

3.5.3.8 Input Attenuator. The equipment shall have an input attenuator.

3.5.3.8.1 Input Attenuator Range. The input attenuation shall be selectable in the range of: 0 to 60 dB in 10 dB steps.

3.5.3.8.2 Input Attenuator Accuracy. The input attenuator accuracy shall be within the greater of ±0.5 dB or ±2%, for 9 kHz to 2.9 GHz.

3.5.3.9 Reference Level. The equipment reference level shall be adjustable in the following ranges:

<10 MHz RBW	-95 to +30 dBm in 0.1 dB steps
10 MHz, 30 MHz, RBW	-50 to +30 dBm in 0.2 steps

3.5.3.10 Spurious Responses.

3.5.3.10.1 Harmonic Distortion. Harmonic distortion shall be <-70 dBc, for 9 kHz to 2.9 GHz with -30 dBm input and 10 dB attenuation; <-100 dBc, for 2.9 GHz with -10 dBm input and 10 dB attenuation.

3.5.3.10.2 Third Order Intermodulation Distortion. Third order intermodulation distortion shall be <-80 dBc for -30 dBm input and 10 dB attenuation.

3.5.3.10.3 Residual Response. Residual response, with the input terminated with 50 Ω, shall be <-90 dBm for 9 to 100 kHz; <-100 dBm for 100 kHz to 2.9 GHz.

3.5.3.10.4 Other Input Related Spurious. Other input related spurious, with -30 dBm input and -10 dB attenuation, shall be < -70 dBc.

3.5.4 Receiver.

3.5.4.1 Frequency Range. The receiver frequency range shall include 9 kHz to 2.9 GHz.

3.5.4.2 Receiver Sensitivity. The receiver sensitivity shall be 5 µV at 100 MHz for 30 kHz RBW, 3 kHz Video Bandwidth, 5 kHz FM deviation at 1 kHz rate, and 10 dB SINAD with 10 dB IF Gain.

3.5.4.3 Receiver Selectivity. The receiver selectivity shall be the available analyzer RBW between 200 Hz and 300 MHz.

3.5.4.4 Receiver Demodulation. The receiver shall demodulate AM and FM.

3.5.5 Oscilloscope Input. The equipment shall have an oscilloscope function with an external connector. The external connector shall be BNC female. The input impedance characteristics shall be 1 MΩ and 27 pF. The coupling options shall be AC, DC, and GND. The input voltage display range shall include 5 mV/div to 5 V/div. The input frequency range shall include DC to greater than 5 MHz.

3.5.6 FFT Analyzer. The equipment shall have an FFT analyzer function which operates on the same input as the oscilloscope function.

3.5.6.1 FFT Amplitude.

3.5.6.1.1 FFT Amplitude Attenuation. The FFT function shall include an attenuator with the range of 0 dB to 60 dB in 20 dB steps

3.5.6.1.2 FFT Reference Level Range. The FFT function shall include a reference level range of 2.23 mV to 22.3 V, or -40 to +40 dBm, into 50 ohms.

3.5.6.1.3 FFT Amplitude Response. The FFT function amplitude response shall be within +0/-3 dB (0 Hz to 20 kHz).

3.5.6.2 Dynamic Range. The FFT function shall have a dynamic range of greater than 80 dB, with an average noise level of less than 1 µV, and spurious noise of less than 7 µV.

3.5.6.3 Frequency.

3.5.6.3.1 Range. The FFT function shall have a frequency range of 0 to 20 kHz.

3.5.6.3.2 Span. The FFT function shall have a frequency span of 10 to 200 Hz/div continuously variable.

3.5.6.3.3 Bandwidth. The FFT function shall have a selectable frequency bandwidth which includes 3, 10, 30, 100 Hz.

3.5.6.4 Trigger Function. The FFT function shall have selectable external trigger (time-gate) capabilities.

3.5.7 Optional External Mixers. The equipment shall be capable of having its frequency range extended to 300 GHz by the use of optional external mixers. The equipment shall have an external local oscillator (LO) output connector and an external intermediate frequency (IF) input connector for connecting to an external mixer.

3.5.8 Input/Output.

3.5.8.1 Input Connector. The equipment input connector shall be a precision type N female.

3.5.8.2 Input VSWR. The input VSWR, with >0 dB input attenuation, shall be less than 1.5:1 for input frequencies less than 2.9 GHz.

3.5.8.3 External Trigger Input. The equipment shall have an external trigger input.

3.5.8.4 External Reference Input. The equipment shall have an external frequency reference input. The external reference input shall have a BNC female connector. The input frequency shall be 10 MHz.

3.5.8.5 Audio Output. The equipment shall have an audio output connector. The audio output function shall be compatible with standard earphones.

3.5.8.6 Reference Out (Calibrator). The equipment shall have a calibration reference output. The calibrator output shall have a BNC female connector. The calibrator shall have the same accuracy as the internal frequency standard.

3.5.8.7 Video Output. The equipment shall have a video output connector..

3.5.8.8 IEEE-488. The equipment shall be compatible with optional IEEE-488 or EIA/TIA-232-F capability.

3.5.9 Tracking Generator. The equipment shall include a tracking generator function.

3.5.9.1 Frequency Range. The tracking generator frequency range shall include 100 kHz to 2.9 GHz .

3.5.9.2 Flatness. The tracking generator output at -10 dBm shall be flat to ±2.0 dB.

3.5.9.3 Output Level. The tracking generator shall have the capability to output in a range to include 0 to -70 dBm in steps of 1 dB.

3.5.9.4 Attenuator Accuracy. The tracking generator output attenuator accuracy shall be within ±1 dB or 0.05 dB/dB.

3.5.9.5 Nonharmonic Spurious. The tracking generator nonharmonic spurious noise shall be less than -30 dBc.

3.5.9.6 Harmonics. The tracking generator harmonic content shall be less than -20 dBc.

3.5.9.7 Leakage. The tracking generator leakage shall be less than -120 dBm.

3.5.10 Waveform Transfer. The equipment shall have the capability to store waveforms and to transfer the stored waveforms to an external device.

3.5.11 Accessories. The equipment shall include the following accessories or equivalent capabilities.

3.5.11.1 Near Field Probe Set. The equipment shall include a near field probe set.

3.5.11.2 Active Probe. The equipment shall include an active probe for measurements from 50 kHz to 1.25 GHz to measure HF and UHF devices without loading the circuit under test.

3.5.11.3 UHF Antenna. The equipment shall include a UHF antenna.

3.5.12 Physical Characteristics. The size and weight of the equipment shall be consistent with current commercial practices. The equipment shall be portable with the following physical characteristics.

3.5.12.1 Dimensions. The maximum height of the equipment shall not exceed eight inches. The maximum width shall not exceed 19 inches. The maximum depth shall not exceed 24 inches.

3.5.12.2 Weight. The total weight of the equipment, excluding accessories and manuals, shall not exceed a one-person lift of 37 pounds (or 16.8 kilograms).

3.5.13 Manuals. The equipment shall be delivered with operator, maintenance, and illustrated parts manuals. Format and quantity shall be as specified in the contract or order. Level of maintenance philosophy, as defined in MIL-PRF-28800, shall be as specified in the contract or order.

4. REGULATORY REQUIREMENTS

4.1 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs. The offeror/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR). However, used, rebuilt, or remanufactured components, pieces, and parts shall not be incorporated.

4.2 Green Procurement Program. Green Procurement Program. Green Procurement Program (GPP) is a mandatory federal acquisition program that focuses on the purchase and use of environmentally preferable products and services. GPP requirements apply to all acquisitions using appropriated funds, including services and new requirements. FAR 23.404(b) applies and states the GPP requires 100% of EPA designated product purchase that are included in the Comprehensive Procurement Guidelines list that contains recovered materials, unless the item cannot be acquired: a) competitively within a reasonable timeframe; b) meet appropriate performance standards, or c) at a reasonable price. The prime contractor is responsible for ensuring that all subcontractors comply with this requirement.

5. PRODUCT CONFORMANCE PROVISIONS.

5.1 Product Conformance. The products provided shall meet the salient characteristics of this CID, conform to the producer's own drawings, specifications, standards and quality assurance practices, and be the same product offered for sale in the commericial market. The government reserves the right to require proof of such conformance.

5.2 Metric Products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch-pound units, provided they fall within the specified tolerances using conversion tables contained in the latest revision of Federal Standard No. 376, and all other requirements of this CID are met. If a product manufactured to metric dimensions exceeds the tolerances specified in the inch/pound units, a request should be made to the contracting officer to determine if the product is acceptable.

5.3 The contracting officer has the option of accepting or rejecting the product.

6. PACKAGING. Preservation, packing, and marking shall be as specified in the contract or order.

7. NOTES.

7.1 Sources of documents.

7.1.1 Military Specifications, Standards, and Handbooks referenced herein may be obtained online at https://assist.daps.dla.mil/ or from the Standardization Document Order Desk, Building 4, Section D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

7.1.2 FAR and DFARS may be obtained from the Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. Electronic copies of the FAR may be obtained from https://www.acquisition.gov/far/ . Electronic copies of the DFARS may be obtained from http://www.acq.osd.mil/dpap/dars/dfars/index.htm .

7.1.3 Electronics Industry Alliance (EIA). Hardcopy of EIA standards and technical publications are available from Global Engineering Documents, the exclusive distributor of EIA standards or at http://global.ihs.com . Phone number: 1-800-854-7179.

7.1.4 Institute of Electrical and Electronics Engineers (IEEE) standards products may be obtained at http://www.ieee.org or available from IEEE Operations Center. Phone: (800)678-IEEE. Mail: IEEE Operations Center, Sales Office, 445 Hoes Lane, PO Box 1331, Piscataway, NJ, 08855-1331, USA.

7.2 Key Words.

AM demodulation
FM demodulation
Synthesized

MILITARY INTEREST

Custodians:
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Preparing Activity:
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