

SECTION - C**TECHNICAL SPECIFICATIONS OF STORES AND DRAWINGS.****Technical Specifications for Hand Held Spectrum Analyzer with Inbuilt Vector Network Analyzer**

HAND HELD SPECTRUM ANALYZER WITH INBUILT VECTOR NETWORK ANALYZERS		
A.	SPECTRUM ANALYZER SPECIFICATIONS	
1.	Type	Hand Held / Portable
2.	Frequency Range	9 KHz – 20 GHz
3.	Reference Frequency	
	(i) Aging Rate (Yearly)	1 ppm or better
	(ii) Accuracy	0.5 ppm or better
4.	Resolution Bandwidth (Zero Span)	10 Hz to 5 MHz
	Resolution Bandwidth (Non-Zero Span)	1 Hz to 3 MHz
5.	Frequency Counter Resolution	≤ 1 Hz
6.	Frequency Span	0, 10 Hz, 20 GHz
7.	Maximum Input Power Level	≥ 27 dBm (0.5 Watt)
8.	SSB Phase Noise (100 KHz Carrier Offset)	≤ - 100 dBc / Hz
9.	TOI	+ 10 dBm (typ.)
10.	Displayed Average Noise Level (Preamplifier OFF)	
	Up to 1 MHz	≤ - 100 dBm
	1 MHz – 6 GHz	≤ - 135 dBm
	6 GHz – 18 GHz	≤ - 125 dBm
	18 GHz – 20 GHz	≤ - 120 dBm
11.	Displayed Average Noise Level (Preamplifier ON)	
	Up to 1 MHz	≤ - 130 dBm
	1 MHz – 6 GHz	≤ - 150 dBm
	6 GHz – 18 GHz	≤ - 145 dBm
	18 GHz – 20 GHz	≤ - 140 dBm
12.	Total Measurement Uncertainty	< 1.5 dB
13.	RF Input Attenuator (in 5 dB steps)	0 – 30 dB or better
14.	Display Range	DANL to + 25 dBm
15.	Gated Sweep Length	10 μs – 1 second
B.	VECTOR NETWORK ANALYZER SPECIFICATIONS	
1.	Type	Hand Held / Portable

		(In built with Spectrum Analyzer Unit)
2.	Frequency Range	100 KHz – 8 GHz
3.	Dynamic Range	
	100 KHz – 6 GHz	≥ 80 dB
	6 GHz – 8 GHz	≥ 60 dB
4.	Phase Resolution	0.01° or better
5.	Measurement Capability	Magnitude, Phase, VSWR, Reflection Coefficient, Smith Chart, Cable Loss, Group Delay, Electrical Length
6.	VNA Port Output Power	- 40 dBm to 0 dBm or better
7.	Calibration Kit	Must be Provided for the Entire Frequency Band
C.	OTHER SPECIFICATIONS	
1.	Display	Color LCD 6.5” with VGA resolution
2.	Battery Operating Time	3.5 hours or better
3.	Peak & Average USB Power Sensor Support	Required
4.	Remove Viewing	Required
5.	Spectrogram Measurement Application – With record and replay on external PC	Required
6.	Weight	≤ 4 Kg
7.	All the other accessories such as Power Cable, Equipment Carry Bag, Cables, Connectors and Adapters etc. should be provided with the system.	
D.	GENERAL REQUIREMENTS	
1.	Data Sheets	Detailed Technical Datasheet including complete technical details of the Spectrum Analyzer and VNA should be provided with the product.
2.	Operating Manual / Service Manual	Hard and soft copy of Operating Manual and Service Manual should be provided with the product. The operating manual should include details like circuit diagrams, control layout, troubleshooting guide, and calibration procedure of the equipment.
3.	Test Certificate (PRE – DISPATCH CLEARANCE)	Before dispatch of the equipment, Test Certificate should be submitted to IPR confirming that the equipment has been tested for operation as per its printed specifications and calibrated in full frequency range. Upon receiving approval from IPR, the equipment should be shipped from the manufacturer.
4.	Compliance Statement	Point to point Compliance Statement to be attached with technical data and values.
5.	Internal Memory	Vendor should inform about the internal memory available with the instrument.

6.	Warranty	Minimum 3 Years warranty to be provided. All warranty and post warranty services should be provided on-site.
7.	Power Requirement	Working power requirements are 1 phase, 230V (AC) at 50 Hz frequency
8.	Demonstration & Training	Supplier engineer should provide detailed Demonstration and Training of the Equipment at Institute for Plasma Research, Gandhinagar.
9.	Educational Discount	Vendor should provide suitable educational discount to Institute for Plasma Research, Gandhinagar
10.	The Vendor should supply a complete and functional unit with all required cables, connectors and accessories which were not explicitly mentioned in the above specifications. Incomplete offers / proposals are liable to be rejected.	
OPTIONAL ITEM		
Electromagnetic Field (EMF) Measurement Antenna		
1.	Antenna Type	Isotropic Antenna
2.	Frequency Range	700 MHz – 6 GHz
3.	Bands Covered	The Isotropic Antenna should cover the following ISM Radio Bands – (i) LTE Band – 3 : 850 MHz (ii) GSM Band : 900 MHz (iii) GSM Band : 1.8 GHz (iv) LTE Band – 3 : 1.8 GHz (v) WCDMA Band : 2.1 GHz (vi) LTE Band – 40 : 2.35 GHz (vii) Wi – Fi Band : 2.4 GHz (viii) ISM Wi – Fi Band : 5.1 GHz
4.	Interface	The Isotropic Antenna should interface / connect with the Hand Held Spectrum Analyzer with ease.
5.	Other	All the cables, connectors, adapters required to interface the Isotropic Antenna with the Hand Held Spectrum Analyzer should be provided.

Acceptance Criteria at IPR

1. Following parameters needs to be verified by the supplier after the successful installation of “Hand Held Spectrum Analyzer with VNA” at IPR:--
 - (i) Displayed Average Noise Level

Displayed Average Noise Level (Preamplifier OFF)	
Up to 1 MHz	≤ - 100 dBm
1 MHz – 6 GHz	≤ - 135 dBm
6 GHz – 18 GHz	≤ - 125 dBm
18 GHz – 20 GHz	≤ - 120 dBm
Displayed Average Noise Level (Preamplifier ON)	
Up to 1 MHz	≤ - 130 dBm
1 MHz – 6 GHz	≤ - 150 dBm
6 GHz – 18 GHz	≤ - 145 dBm
18 GHz – 20 GHz	≤ - 140 dBm

(ii) Resolution Bandwidth

Resolution Bandwidth (Zero Span)	10 Hz to 5 MHz
Resolution Bandwidth (Non-Zero Span)	1 Hz to 3 MHz

(iii) VNA Dynamic Range :

100 KHz – 6 GHz	≥ 80 dB
6 GHz – 8 GHz	≥ 60 dB

(iv) VNA Phase Resolution : 0.01°

2. Supplier engineer should provide detailed Demonstration and Training of the Equipment at Institute for Plasma Research, Gandhinagar.

3. PRE – DISPATCH CLEARANCE :

Equipment should be supplied along with Test Certificate confirming that the Equipment has been tested and found satisfactory for operation as per its printed specifications and calibrated before shipment.

Compliance Sheet

Compliance Statement for Hand Held Spectrum Analyzer with Inbuilt Vector Network Analyzer

Vendor must filled and submit the compliance statement with official seal and signature with offer.

HAND HELD SPECTRUM ANALYZER WITH INBUILT VECTOR NETWORK ANALYZERS		VENDOR SPECIFICATIONS	REMARKS
A.	SPECTRUM ANALYZER SPECIFICATIONS		
1.	Type	Hand Held / Portable	
2.	Frequency Range	9 KHz – 20 GHz	
3.	Reference Frequency		
	(iii) Aging Rate (Yearly)	1 ppm or better	
	(iv) Accuracy	0.5 ppm or better	
4.	Resolution Bandwidth (Zero Span)	10 Hz to 5 MHz	
	Resolution Bandwidth (Non-Zero Span)	1 Hz to 3 MHz	
5.	Frequency Counter Resolution	≤ 1 Hz	
6.	Frequency Span	0, 10 Hz, 20 GHz	
7.	Maximum Input Power Level	≥ 27 dBm (0.5 Watt)	
8.	SSB Phase Noise (100 KHz Carrier Offset)	≤ - 100 dBc / Hz	
9.	TOI	+ 10 dBm (typ.)	
10.	Displayed Average Noise Level (Preamplifier OFF)		
	Up to 1 MHz	≤ - 100 dBm	
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12.	Total Measurement Uncertainty	< 1.5 dB	
13.	RF Input Attenuator (in 5 dB steps)	0 – 30 dB or better	

14.	Display Range	DANL to + 25 dBm		
15.	Gated Sweep Length	10 μ s – 1 second		
B. VECTOR NETWORK ANALYZER SPECIFICATIONS				
1.	Type	Hand Held / Portable (In built with Spectrum Analyzer Unit)		
2.	Frequency Range	100 KHz – 8 GHz		
3.	Dynamic Range			
	100 KHz – 6 GHz	\geq 80 dB		
	6 GHz – 8 GHz	\geq 60 dB		
4.	Phase Resolution	0.01 or better		
5.	Measurement Capability	Magnitude, Phase, VSWR, Reflection Coefficient, Smith Chart, Cable Loss, Group Delay, Electrical Length		
6.	VNA Port Output Power	- 40 dBm to 0 dBm or better		
7.	Calibration Kit	Must be Provided for the Entire Frequency Band		
C. OTHER SPECIFICATIONS				
1.	Display	Color LCD 6.5” with VGA resolution		
2.	Battery Operating Time	3.5 hours or better		
3.	Peak & Average USB Power Sensor Support	Required		
4.	Remove Viewing	Required		
5.	Spectrogram – With record and replay on external PC	Required		
6.	Weight	\leq 4 Kg		
7.	All the other accessories such as Power Cable, Equipment Carry Bag, Cables, Connectors and Adapters etc. should be provided with the system.			
D. GENERAL REQUIREMENTS				
1.	Data Sheets	Detailed Technical Datasheet including complete technical details of the Spectrum Analyzer and VNA should be provided with the product.		

2.	Operating Manual / Service Manual	Hard and soft copy of Operating Manual and Service Manual should be provided with the product. The operating manual should include details like circuit diagrams, control layout, trouble shooting guide, and calibration procedure of the equipment.		
3.	Test Certificate	Equipment should be supplied along with Test Certificate confirming that the Equipment has been tested and found satisfactory for operation as per its printed specifications and calibrated before shipment.		
4.	Compliance Statement	Point to point Compliance Statement to be attached with technical data and values.		
5.	Internal Memory	Vendor should inform about the internal memory available with the instrument.		
6.	Warranty	Minimum 3 Years warranty to be provided. All warranty and post warranty services should be provided on-site.		
7.	Power Requirement	Working power requirements are 1 phase, 230V (AC) at 50 Hz frequency		
8.	Demonstration & Training	Supplier engineer should provide detailed Demonstration and Training of the Equipment at Institute for Plasma Research, Gandhinagar.		
9.	Educational Discount	Vendor should provide suitable educational discount to Institute for Plasma Research, Gandhinagar		
10.	The Vendor should supply a complete and functional unit with all required cables, connectors and accessories which were not explicitly mentioned in the above specifications. Incomplete offers / proposals are liable to be rejected.			
OPTIONAL ITEM				
Electromagnetic Field (EMF) Measurement Antenna				
1.	Antenna Type	Isotropic Antenna		
2.	Frequency Range	700 MHz – 6 GHz		

3.	Bands Covered	<p>The Isotropic Antenna should cover the following ISM Radio Bands –</p> <ul style="list-style-type: none"> (ix) LTE Band – 3 : 850 MHz (x) GSM Band : 900 MHz (xi) GSM Band : 1.8 GHz (xii) LTE Band–3 : 1.8 GHz (xiii) WCDMA Band : 2.1 GHz (xiv) LTE Band – 40 : 2.35 GHz (xv) Wi – Fi Band : 2.4 GHz (xvi) ISM Wi-Fi Band : 5.1 GHz 		
4.	Interface	<p>The Isotropic Antenna should interface / connect with the Hand Held Spectrum Analyzer with ease.</p>		
5.	Other	<p>All the cables, connectors, adapters required to interface the Isotropic Antenna with the Hand Held Spectrum Analyzer should be provided.</p>		

Authorised Signatory

Official Seal

Date :-