SECTION - C

TECHNICAL SPECIFICATIONS OF STORES AND DRAWINGS.

<u>Technical Specifications for Hand Held Spectrum Analyzer with Inbuilt Vector</u> <u>Network Analyzer</u>

HAND HELD SPECTRUM ANALYZER WITH INBUILT VECTOR NETWORK ANALYZERS					
Α.	A. SPECTRUM ANALYZER SPECIFICATIONS				
1.	Туре	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		≤ - 100 dBc / Hz			
9.	TOI	+ 10 dBm (typ.)			
10.	0. 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			
В.	VECTOR NETWOK	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 Capabilit	У	Magnitude, Phase, VSWR, Reflection Coefficient, Smith Chart, Cable Loss, Group Delay, Electrical Length	
6.	VNA Port Output Power	ſ	- 40 dBm to 0 dBm or better	
7.	Calibration Kit		Must be Provided for the Entire	
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C .	D' 1	OTHER	SPECIFICATIONS	
1.	Display		Color LCD 6.5" with VGA resolution	
2.	Battery Operating Time		3.5 hours or better	
3.	Peak & Average USB Po	ower	Required	
4	Sensor Support		Description 1	
4.	Remove viewing	Λ		
5.	Spectrogram Measurement Application – With record and replay on external PC		Required	
6.	Weight		≤ 4 Kg	
7.	All the other accessories such as Connectors and Adapters etc. should		Power Cable, Equipment Carry Bag, Cables, be provided with the system.	
D.	GENERAL REOUIREMENTS			
1.	Data Sheets	Detailed Tec details of the with the prod	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 CLEARENCE)	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 shou with the inst	ld inform about the internal memory available rument.	

б.	Warranty	Minimum 3 Years warranty to be provided. All warranty and post warranty services should be provided on-site.	
7.	Power Requirement	Vorking power requirements are 1 phase, 230V (AC) at 50 Hz requency	
8.	Demonstration & Training	upplier engineer should provide detailed Demonstration and raining of the Equipment at Institute for Plasma Research, andhinagar.	
9.	Educational Discount	Vendor should provide suitable educational discount to Institute for Plasma Research, Gandhinagar	
10.	The Vendor should sup connectors and access specifications. Incomplet	ply a complete and functional unit with all required cables, sories which were not explicitly mentioned in the above te offers / proposals are liable to be rejected.	
		OPTIONAL ITEM	
	Electromag	netic 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

IPR Tender Note No & Date: IPR/TN/ET/F/18-19/12 Dated 21-05-2018

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 CLEARENCE :

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

<u>Compliance Statement for Hand Held Spectrum Analyzer with Inbuilt Vector</u> <u>Network Analyzer</u>

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

H	AND HELD SPECTRUM AN VECTOR NETWOR	ALYZER WITH INBUILT K ANALYZERS	VENDOR SPECIFICATIONS	REMARKS
A .	SPECTRUM ANALYZ			
1.	Туре	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 L			
	Up to 1 MHz	≤ - 100 dBm		
	1 MHz – 6 GHz	≤ - 135 dBm		
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11.	Displayed Average Noise L	evel (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	
В.	VECTOR NETWOK ANA		
1.	Туре	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,	
		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	
С.	OTHER SPE	CIFICATIONS	
1.	Display	Color LCD 6.5" with VGA	
		resolution	
2.	Battery Operating Time	3.5 hours or better	
2. 3.	Battery Operating Time Peak & Average USB	3.5 hours or better Required	
2. 3.	Battery Operating Time Peak & Average USB Power Sensor Support	3.5 hours or better Required	
2. 3.	Battery Operating Time Peak & Average USB Power Sensor Support Remove Viewing	3.5 hours or better Required	
2. 3. 4.	Battery Operating Time Peak & Average USB Power Sensor Support Remove Viewing Spectrogram – With	3.5 hours or better Required Required Required	
2. 3. 4. 5.	Battery Operating Time Peak & Average USB Power Sensor Support Remove Viewing Spectrogram – With record and replay on	3.5 hours or better Required Required Required	
2. 3. 4. 5.	Battery Operating Time Peak & Average USB Power Sensor Support Remove Viewing Spectrogram – With record and replay on external PC	3.5 hours or better Required Required Required	
2. 3. 4. 5.	Battery Operating Time Peak & Average USB Power Sensor Support Remove Viewing Spectrogram – With record and replay on external PC Weight	3.5 hours or better Required Required Required ≤ 4 Kg	
2. 3. 4. 5. 6. 7.	Battery Operating Time Peak & Average USB Power Sensor Support Remove Viewing Spectrogram – With record and replay on external PC Weight All the other accessorie	3.5 hours or better Required Required Required ≤ 4 Kg s such as Power Cable,	
2. 3. 4. 5. 6. 7.	Battery Operating Time Peak & Average USB Power Sensor Support Remove Viewing Spectrogram – With record and replay on external PC Weight All the other accessorie Equipment Carry Bag,	3.5 hours or better Required Required Required ≤ 4 Kg s such as Power Cable, Cables, Connectors and	
2. 3. 4. 5. 6. 7.	Battery Operating Time Peak & Average USB Power Sensor Support Remove Viewing Spectrogram – With record and replay on external PC Weight All the other accessorie Equipment Carry Bag, Adapters etc. should be pr	3.5 hours or better Required Required ≤ 4 Kg s such as Power Cable, Cables, Connectors and ovided with the system.	
2. 3. 4. 5. 6. 7. D.	Battery Operating Time Peak & Average USB Power Sensor Support Remove Viewing Spectrogram – With record and replay on external PC Weight All the other accessorie Equipment Carry Bag, Adapters etc. should be pr GENERAL RE	3.5 hours or better Required Required ≤ 4 Kg s such as Power Cable, Cables, Connectors and ovided with the system. CQUIREMENTS	
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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.	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.				
	Electromagnetic Field (FMF) Macaurement Antonno				
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 –	
		(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	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.	

Authorised Signatory

Official Seal

Date :-