

## PROCEEDING OF THE BOARD OF OFFICERS

A meeting of Board of Officers constituted to finalize and recommend the generic requirements/specifications/standards of Vector Signal Generator to be procured in the Directorate through GeM was held on 28/10/2024 at 1500 hrs at DCPW HQRS.

The following officers were present:-

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| (i) Shri Vinay Barthwal, Deputy Director         | - Chairman         |
| (ii) Shri K Saha, Deputy Director (C)            | - Member           |
| (iii) Shri Sunil Kumar, Assistant Director (L&B) | - Member           |
| (iv) Shri Vivek Kumar Gupta, AD (W/S)/Indenter   | - Member Secretary |

2. The case pertaining to procurement of Vector Signal Generator was perused and deliberated.

3. After detailed discussion, Board of Officers have recommended the following QRs/TDs/specifications of Vector Signal Generator:-

### TECHNICAL SPECIFICATIONS OF 6GHz VECTOR SIGNAL GENERATOR

Sl. No.	Parameter	Required Specification
<b>Standard Features:</b>		
1.	Frequency Range	9 kHz to 6 GHz
2.	Frequency Resolution Setting	0.01 Hz or better
3.	Aging	$\leq 1$ ppm/yr
4.	Temperature Effect	$\pm 1$ ppm
5.	Frequency Settling Time	$\leq 5$ ms
6.	RF Output Power Level	-120 dBm to +13 dBm
7.	Level Resolution	0.1 dB or better
8.	Level Accuracy	$\leq 1.8$ dB for 9kHz to 10MHz $\leq 1.4$ dB for 10MHz to 6GHz
9.	VSWR	$< 2$ or better
10.	SSB Phase Noise	$< -95$ dBc/Hz @20 kHz Carrier Offset
11.	Harmonics	$< -30$ dBc @3 dBm CW for frequency $\geq 1$ MHz
12.	Non harmonics	$< -50$ dBc in CW mode
13.	Sweep Modes	Frequency Sweep, Level Sweep and List Mode
14.	Dwell Time Setting for Sweep /List mode	10 ms to 50 s
15.	Dwell Time Setting Resolution	0.1 ms or better
16.	Analog Modulations	AM, FM, Phase Modulation and Pulse Modulation to be supported

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17.	Internal Modulation Tones	AM: Tone: 1Hz to 100KHz, Depth: Up to 100%. FM: Tone: 1Hz to 100KHz, Deviation: Up to 2.5MHz. Phase Modulation: Tone: 1Hz to 100KHz. Pulse Modulation: Pulse width: 50 ns to 40 s, Pulse period: 100 ns to 40 s
18.	Setting Resolution	AM Depth: 1% or better FM Deviation: 1 Hz or better Pulse Modulation Pulse width & Period: 10ns or better.
19.	I/Q Baseband Generator	RF Bandwidth: 60 MHz or better
20.	I/Q Baseband Generator Sample Resolution	16 Bits
21.	I/Q Baseband Memory Depth	$\geq 32$ M Samples
22.	Multi-carrier Generation	$\geq 100$ carriers with configurable carrier spacing
23.	Digital Modulations	BPSK,QPSK,OQPSK,DQPSK,8PSK,16PSK,16QAM,32 QAM,64 QAM,128QAM,256QAM,2FSK,4FSK,MSK
24.	Digital Baseband Data	1.PRBS, External 2.Settling time for baseband frequency change should be in the order of micro seconds
25.	Multicarrier Generation	1. Up to 100 Carriers with option for selection of Wv/ Wav files 2. Possible to generate un-modulated multi carrier signals (minimum 1000 Carriers) in arbitrary waveform mode. Expected carrier spacing is 10Hz (minimum)
26.	Symbol Rate	100 Symbols/sec to 50 M Symbols/sec
27.	Data Sources	Minimum four Pseudo Random Bit Sequences, Manual Bit Pattern, Data List/User File Options to be supported.
28.	Interfaces	LAN (RJ-45), USB 2.0, USB 3.0, Display Port(External Display)
29.	Display	Built-in Display
30.	Reference Frequency Source	Internal, External
31.	Reference Frequency, Impedance	10MHz (IN, OUT), 50 Ohm
32.	RF Output Connector, Impedance	N(Female) Connector, 50 Ohm
33.	Power Supply	220 V AC $\pm 10\%$ , 50 Hz
34.	Protection	OCP,OVP, Short Circuit
35.	EMC Standard	EN 61326-1 or EN 61326-2-1
36.	Safety Standard	EN 61010-1
<b>General:</b>		
37.	Software	Equipment shall be provided with all necessary software. i.e. Operating Software, calibration etc. (Bidder should provide full details), free of cost software updates during the guarantee/ warranty period.
38.	Language	Display and instructions should be in English language only.

39.	(i) Calibration certificate / Manufacturer's Test Certificate  (ii) Calibration Support	(i) Calibration certificate / Manufacturers test Certificate as per ISO/IEC 17025:2017 should be provided.  (ii) Advance Govt/NABL Accredited Lab facilities should be complied in India free of cost during the guarantee/warranty period.  (iii) Calibration Report with measurement uncertainty should be provided.
40.	Data Storage capacity	Internal drive with minimum 32 GB storage capacity or better
41.	Operating temperature and storage temperature Humidity	Operating temperature Equipment shall be able to operate up from 5 to 45° C temperature and storage temperature - 20°C to +70°C
42.	Humidity	95% RH up to 40 <sup>0</sup> C
43.	Altitude	Operation Upto 4600M Transport Upto 4600M
44.	Degree of protection	IP 20
45.	Mechanical Resistance	Vibration , Shocks
46.	Sufficiency Clause	The Supplier as a part of this contract shall ensure completeness of the system as per the specifications for both hardware (All adaptors, connectors & cables) and software. The Supplier shall ensure that all the necessary items supplied.
<b>Other Requirements:</b>		
47.	Demonstration of instrument performance.	The Vendor should demonstrate the standard measurement parameter values as well as required features at the time of acceptance. The acceptance would be subject to meeting the required criterion of all mentioned specifications and required features.
48.	Manuals	1 Set of detailed operation; Servicing and Programming manual, user guide should be provided in both soft form and Printed Copy. Language should be English only.
49.	Installation	The satisfactory installation to the full specifications of the machine with all accessories at DCPW HQ, New Delhi. Any additional equipment/accessory required for the installation of the system should be quoted invariably. DCPW HQ will provide only space and electrical connection and all other required items and accessories will be provided by the seller.
50.	Training	Seller should provide a comprehensive and free training to DCPW Personnel for at least 5 working days in 3 batches of 10 personnel each on operation and preventive maintenance of the Vector Signal Generator.

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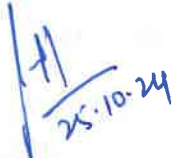
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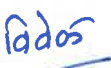
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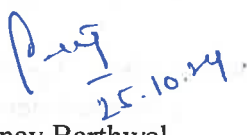
51.	Warranty	<p>5 Years Standard Warranty. (Front line service to be done at customer place &amp; if any cards/ modules are to be replaced can be taken to service centre &amp; back to bench service charges to be borne by Bidder)</p> <p>The original End Manufacturer (OEM) should have Calibration and other maintenance support facility located in India preferably in Delhi. The OEM should have/tie up with NABL accredited calibration Lab in India.</p>
<p>(a) . The Complete system should be compatible to 100V to 230V AC, 50/60 Hz, single phase power supply. The vendor should specify the power requirements for all the components in the technical quotation.</p> <p>(b) Vendor should provide the tools and Spare parts for smooth functioning of the machine for 10 years.</p>		

4. The meeting ended with thanks to chair.

  
Sunil Kumar  
Assistant Director (L&B)  
Member

  
Vivek Kumar Gupta  
AD (W/S)/Indenter  
Member Secretary

  
K Saha  
Deputy Director (C)  
Member

  
Vinay Barthwal  
Deputy Director  
Chairman