Annexure-1

Technical Specification of 1GHz Mixed Domain Oscilloscope

Sl.No	Parameter	Specifications	Vendor Compliance	Vendor Remarks
1	Bandwidth	1GHz		
2	No of Analog input channels	4 Channels		
3	Rise time (10-90%)	500 ps		
4	Input Coupling	AC, DC		
5	Input Impedance	1 MΩ ±2%, 50 Ω ±2%		
6	Input Sensitivity Range,1 MΩ	1 mV/div to 10 V/div		
7	Input Sensitivity Range, 50 Ω	1 mV/div to 1 V/div		
8	Vertical Resolution	12 bits		
9	Maximum Input Voltage, 1 MΩ	300 VRMS CAT II with peaks ≤ ±425 V		
10	Maximum Input Voltage, 50 Ω	5 VRMS with peaks ≤ ±20 V		
11	No of Digital input channels	16 Digital channels or more with maximum input frequency 250MHz		
12	Maximum Input Voltage	±30V Peak		
13	**Horizontal System Analog Channels**			
14	Maximum Sample Rate (all channels)	5 GS/s or more on all the channels		
15	Maximum Record Length (all channels)	10 M points		
16	Maximum Duration of Time Captured at Highest Sample Rate (all channels)	4 ms		

17	Time-base Range (s/div)	200 ps/div to 1000 s/div		
18	Fast Acquisition	Fast Acquisition to optimize the instrument for analysis of dynamic signals and capture of infrequent events. The scope should be able to automatically save all displayed waveforms, oscilloscope setup file, and a screen image with a single button press, thereby eliminating the need to navigate between multiple menus to save all files independently.		
19	Channel-to-Channel Deskew Range	± 125 ns		
20	Time-base Accuracy	±10 ppm over any ≥1 ms interval		
21	Trigger System			
22	Main Trigger Modes	Auto, Normal, and Single		
23	Trigger Coupling	DC, AC, HF reject, LF reject		
24	Trigger types	Edge, Pulse width, Timeout, Runt, Logic, Rise/fall		
25	Trigger Hold off Range	20 ns to 8 s		
26	Waveform Measurements			
	Cursors	Waveform and Screen		

27	Automatic Measurements	30, of which up to 8 can be displayed on-screen at any one time. Measurements include: Period, Frequency, Delay, Rise Time, Fall Time, Positive Duty Cycle, Negative Duty Cycle, Positive Pulse Width, Negative Pulse Width, Burst Width, Phase, Positive Overshoot, Negative Overshoot, Total Overshoot, Peak to Peak, Amplitude, High, Low, Max, Min, Mean, Cycle Mean, RMS, Cycle RMS, Positive Pulse Count, Negative Pulse Count, Rising Edge Count, Falling Edge Count, Area and Cycle Area. 3, of which one can be displayed on-screen at any one time. Measurements include Channel Power, Adjacent Channel Power Ratio (ACPR), and Occupied Bandwidth (OBW).		
28	MeasurementStatistics	Mean, Min, Max, and Standard Deviation.		
29	Reference Levels	User-definable reference levels for automaticmeasurements can be specified in either percentor units.		
30	Arithmetic	Add, subtract, multiply, and divide waveforms. Ax+B, Squared, square root, absolute value, common logarithm, natural logarithm, exponential, base 10 exponential Filters: Low-pass, High-pass, Average value, Smoothening, Envelope Visualizations: - Magnify, Max and		

		Min hold, measurement trend. Ch1-Ch2 Ch2-Ch1 Ch1+Ch2 Ch1xCh2		
31	Math Functions	Integrate, Differentiate, FFT.		
32	FFT	Spectral magnitude. Set FFT Vertical Scale to Linear RMS or dBV RMS, and FFT Window to Rectangular, Hamming, Hanning, or Blackman-Harris.		
33	Advanced Math	Define extensive algebraic expressions including waveforms, reference waveforms, math functions (FFT, Intg, Diff, Log, Exp, Sqrt, Abs, Sine, Cosine, Tangent, Rad, Deg), scalars, up to two user-adjustable variables and results of parametric measurements (Period, Freq, Delay, Rise, Fall, PosWidth, NegWidth, BurstWidth, Phase, osDutyCycle, NegDutyCycle, Pos Over Shoot, NegOverShoot, TotalOverShoot, PeakPeak, Amplitude, RMS, CycleRMS, High, Low, Max, Min, Mean, CycleMean, Area, CycleArea, and trend plots).		
34	**Display Characteristics**			
35	Display Type	11 inch or more		
36	USB Host Ports	USB 3.1 and USB 2.0 ports		
37	**Input / Output Ports**			

38	USB 2.0 High-speed Host Port and USB 3.1 High-speed Device Port	Oscilloscope to support USB mass storage devices, printers, and keyboards. Two ports to be available on rear panel and two on front panel		
39	LAN port (Ethernet)	RJ-45 port, To support 10/100/1000 Mb/s Base – T Ethernet Interface		
40	Mixed Signal capability	Oscilloscope should be capable of displaying both analog and digital signals together at the same time base		
41	Serial protocol Analysis	Following Digital protocol analysis should be possible – I2C, SPI, RS232, USB and CAN		
42	Operating System	Microsoft Windows® 10		
43	Software Data Capture	Data/file save: Setup/Image, Waveform data(.csv), Application data, analysis results(.csv)		
44	HDMI Port	1 HDMI port		
45	Power Source Voltage	100 to 240 VAC ±10%		
46	Power Source Frequency	50 to 60 Hz at 100 to 240 V 400 Hz ±10% at 115 V		
47	Power Consumption	350 W maximum		
48	Probes	One passive voltage probe per analog channel. 1 set of spare probes to be provided per analog. 1set of probes for digital channel. All standard accessories should be provided.		
49	Preferred Make	Keysight, LeCroy, Tektronix		
50	Documents	Following documents to be provided Getting Started guide ,NIST Traceable Calibration Certificate, Manuals,		

		CD/Software's, Power cables and Protective Front Cover		
51	Warranty	3 years on Oscilloscope & 1 year on probes		

Terms and conditions

1.	Training: Training for at least 2 people from CMTI, operations and maintenance should be provided.			**Vendor Compliance**	**Vendor Remarks**
2.	Documents and manuals: Operation manual Maintenance manual Service manual Programming manual Spares parts list with source of supply and prices	Hard copies in English language	1 sets		
		Soft copy in CD/DVD - English language	1 set		
3.	Acceptance: The capabilities of the instrument, part accuracies must be proved by supplier as per CMTI's acceptance criteria which are mutually agreed upon by CMTI, at CMTI after installation, free of cost. Working and demonstration of the instrument to be given at CMTI during installation & commissioning.				
4.	Installation: Installation and commissioning at CMTI must be done by OEM trained personnel				
5.	Safety and Certifications:				

	All the necessary safety regulations such as CE compliance, low voltage directive, EMC regulations compliance details must be provided. The necessary calibration and test certificates must be provided.			
6.	Service Support: The supplier should support the system minimum for 10 years (post warranty, with all spares and services). Exact lifecycle of the offered unit has to be specified.			
7.	Warranty: The complete system and its associated hardware / software should have a standard warranty of 36 months from the date of installation, commissioning and acceptance of the system at CMTI. Maintenance/ repair /replacement of any hardware or software component of the system during warranty period to be done free of cost (including expenses of Engineer from OEM). Supplier modification(s) / Software upgrades shall be intimated and same will be made available free of cost during the warranty period.			