20 GHz Network Node Real-Time Spectrum Analyzer

NXE-200

Product Brochure V1.3

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▌ 9 kHz-20 GHz real-time spectrum analyzer

▌ Superheterodyne digital receiver architecture, 19 segments pre-selected filter

▌ 9 kHz-9 GHz typical image suppression>90 dB, typical IF rejection>90 dB

▌ 9 GHz~20 GHz typical image suppression>60 dB, typical IF rejection>90 dB

▌ 100 MHz analysis bandwidth with adjustable sampling rate, 320.2 GHz/sec sweep speed

▌ FPGA based digital signal processing

▌ Weight 650 grams, size 167×117×28 mm, power consumption: 13-16 W

▌ 1000M/100M Ethernet interface

▌ Build-in multimode GNSS

▌ Provides 1PPS, latitude and longitude information and timestamp

▌ Highly compatible API interfaces and SAStudio4 GUI

▌ Remote master of ARM and x86 processor are supported

▌ Linux and Windows are supported

▌ Operating temperatures range from -20 ℃/-40 ℃ to 65 ℃ (option)

▌ Built-in OCXO (option) or GNSS disciplined OCXO (option)

▌ Built-in 4G data module (option)

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NXE-200 Technical Specifications * (typical value)

Indicator test basis	Hardware Version: R3	API: 0.50.1	FPGA: 0.50.0	MCU: 0.50.2	SAS4: 4.1.50.40

Frequency

Frequency Range	9 kHz~20 GHz
Initial Frequency Accuracy	<1 ppm, Supporting program manual correction
Reference Clock	Internal or external, program-controlled switching Internal TCXO aging<1 ppm/year, temperature drift<1 ppm; Internal OCXO (option), temperature drift<0.15 ppm

Spectrum Purity

SSB Phase Noise	dBc/Hz			
Carrier Frequency	1 GHz	3 GHz	10 GHz	19.9 GHz
1 kHz	-91.2	-90.0	86.1	-80.6
10 kHz	-99.7	-100.9	-92.5	-90.6
100 kHz	-101.1	-104.2	-94.4	-96.2
1 MHz	-121.6	-123.4	-112.1	-111.5
10 MHz	-134.4	-134.2	-131.9	-129.2

Residual Response Spurious rejection off dBm RBW =1 kHz Positive Peak Detector	Frequency Range	R.L.=0 dBm	R.L.=-20 dBm	R.L.=-50 dBm
	9 kHz~1.0 GHz	< -90	< -100	< -120
	1.0 GHz~3.0 GHz	< -80	< -100	< -120
	3.0 GHz~9.0 GHz	< -90	< -100	< -120
	9.0 GHz~20 GHz	< -90	< -100	< -120

Image Frequency Suppression	9 kHz~9.0 GHz	>90 dBc (spurious rejection off), >90 dBc (spurious rejection on)
	9.0 GHz~20 GHz	>60 dBc (spurious rejection off), >90 dBc (spurious rejection on)

IF rejection (R.L.=0 dB)	>90 dBc (spurious rejection on), >80 dBc (spurious rejection off)
Local Oscillator Related Spurious	<-65 dBc (Offset Center Frequency +/- (N/M)*125MHz, N/M = 1,2,3,4,5…)
Input Related Spurious	<-75 dBc (spurious rejection on), <-50 dBc (spurious rejection off)

Linearity

IIP3（dBm)	1 GHz	3 GHz	10 GHz	19.9 GHz
R.L.= 20 dBm	45.5	47.3	43.6	35.3
R.L.= 0 dBm	27.5	27.2	23.2	21.0
R.L.= -20 dBm	4.7	7.5	-8.9	-3.0

Signal Processing

Analysis Bandwidth	Maximum 100 MHz (IF analog BW set as 1) or 40 MHz (IF analog BW set as 2), Decimate Factor:1
IQ Data	122.88 MSPS, supporting 120 MSPS-125 MSPS program adjustable, 1 Hz step Decimate factor: 1,2,4,8,16,32,64,128,256,512,1024,2048,4096 supported (FPGA)
Storage Depth	The built-in memory depth is 128 Mbytes Supports continuous and uninterrupted storage when the data generation rate is less than the bus bandwidth, and the storage depth is only limited by the hard disk capacity
External Trigger Response	Maximum response frequency 500 times/sec
Analog IF Output	Supporting 307.2 MHz +/-50 MHz

Amplitude

Maximum safe input power (CW)	23 dBm	30 MHz~20 GHz and the preamplifier off (R.L. ≥ 0 dBm)
	10 dBm	100 kHz~30 MHz or preamplifier on (R.L. <0 dBm)
Maximum DC Voltage	+/-12 VDC	
Display Range	DANL~23 dBm	
Amplitude Accuracy	+/- 2.0 dB	
IF in-band spectrum ripple	±1.75 dB (40 MHz analog IF bandwidth); ±2.0 dB (100 MHz analog IF bandwidth)	
Reference level（R.L.）	-50 dBm~23 dBm	
RF Preamplifiers	Converting bands (frequency ≥ 50MHz) are equipped with preamplifier that can be set as automatically turn on or forcibly turn off	

Display Average Noise Level (DANL) dBm/Hz RBW=10kHz RMS detector	Frequency Range	R.L.= 0 dBm (IFGainGrade = 2)	R.L.=-20 dBm (IFGainGrade = 2)	R.L.=-50 dBm (IFGainGrade = 2)
	9 kHz	-123.3	-141.2	-152.3
	100 kHz~100 MHz	-135.2	-152.2	-160.2
	100 MHz~3.0 GHz	-134.1	-147.2	-165.3
	3.0 GHz~9 GHz	-132.2	-139.1	-157.1
	9.0 GHz~20 GHz	-133.1	-138.2	-159.5

Standard Spectrum Analysis

Detector	Positive peak, Negative peak, Sampling, Average, RMS, Max Power
RBW	0.1 Hz~10 MHz
VBW	0.1 Hz~10 MHz
Trace Function	Sample, Positive Peak, Negative Peak, Local average, Maximum hold, Minimum hold, Average
Data Chart	SAStudio4 software provides regular spectrum, waterfall chart, and historical trace
Measurements	Phase noise, Channel power, Occupied bandwidth, X dB bandwidth, Adjacent channel suppression, IM3

Sweep speed - Standard Spectrum Analysis	320.2 GHz/s	FPGA	RBW≥1 MHz, B-Nuttal window, spurious rejection: Bypass
	154.9 GHz/s	FPGA	RBW=250 kHz, B-Nuttal window, spurious rejection: Standard
	65.8 GHz/s	FPGA	RBW=30 kHz, B-Nuttal window, spurious rejection: Bypass
	2.8 GHz/s	CPU	RBW=1 kHz, B-Nuttal window, spurious rejection: Bypass

Detection Analysis/Zero Span

Highest Time Resolution	8 ns
Maximum Analysis Bandwidth	100 MHz
Trace Detection	Positive peak, Negative peak, Sampling, Average, RMS, Max Power

Real Time Spectrum Analysis

FFT Analysis	Variable point FFT engine implemented by FPGA. frame rate compression and trace detection are supported. There is strictly no gap and overlap between FFT frames.		
	FFT refresh rate=10 ^ 9 ns/(N * D * 8 ns); POI = 2*N*D*8ns N is the number of FFT points (2048,1024,512,256,128,64,32), and D is the decimate factor (1, 2, 4, 8...)		
	Typical Settings	FFT Refresh Rate	POI
	N = 2048，D = 1	61,035 times /second	32.768us
	N = 32，D = 1	3,906,250 times /second	0.512us

Real-time Analysis Bandwidth	100 MHz
Window Function	B-Nuttall，FlatTop
RBW	14.73 MHz-3.59 kHz (Flattop window); 7.81 MHz~1.90 kHz（B-Nuttall）;13 grades for each window type

Amplitude Resolution	0.75dB		
General			
Input And Output	Power Supply	Type-C (1) PD　(QC3.0)　12V　2A or 9V2A	
	Data	RJ45 1000Mbps x1, 100Mbps x1	
	RF input	2.92mm (F), Input impedance 50 Ω	
	External reference clock input	MMCX (F)(1), amplitude≥1.5Vpp，input impedance 330 Ω	
	External reference clock output	Integrated in MUXIO，3.3V CMOS, programmable on/off	
	External trigger input	MMCX (F)(2)，3.3V CMOS，input: high impedance	
	External trigger output	MMCX (F)(3)，3.3V CMOS	
	Analog IF Output	MMCX (F)(4), maximum output power – 25 dBm，output impedance 50 Ω	
	GNSS antenna	MMCX (F)(5)	
	4G module antenna	MMCX (F)(6)	
	General USB2.0	Type-C (2)	
Power consumption	Peak: 16 W, typical: 13 W		
Operating Temperature (ambient temperature /core temperature)	0~50 ºC/0~70 ºC (Standard temperature class)		
	-20~65 ºC/-20~85 ºC (Extended Temperature Class Option) (plastic enclosure and fan not included)		
	-40~65 ºC/-40~85 ºC (Wide Temperature Class Option) (plastic enclosure and fan not included)		
Storage Temperature (ambient temperature)	-20~70 ºC (Standard temperature class)		
	-40~85 ºC (Extended temperature class and wide temperature options) (plastic enclosure and fan not included)		
Weight and size	Size: 167x117x28 mm, weight:660 g (Including protective case and structural fittings, including connector length)		
Packaging and Accessories	Flash drive * 1, power adapter * 1, USB data cable*1		

*The typical values of the indicators are applicable for the following conditions: (1) Start up and warm up for 20 minutes; (2) Ambient temperature 25 ℃ (core temperature 50 ℃); (3) standard spectrum sweep Spurious suppression on; (4) 100MHz bandwidth and IFGainGrade=2 (5) The user shall provide the necessary heat dissipation conditions to ensure that the ambient temperature and the core temperature of the equipment are within the rated range at the same time.

Code	Option	Explanation
01	Built-in OCXO reference clock (hardware)	Providing a reference clock with better stability than the standard configuration, with a temperature drift of<0.15 ppm, increasing the overall power consumption by 0.8 W
05	Build-in GNSS disciplined OCXO reference clock (hardware opt.)	Providing GNSS disciplined reference clock and 1PPS, increasing the overall power consumption by 1.1W.
06	Build-in premium GNSS (hardware opt.)	Providing improved positioning and timing capabilities.
09	Build in 4G data module (hardware opt.)	Providing the physical connection to the 4G connection
20	Extended temperature class (hardware opt.)	- 20~65 ℃/- 20~85 ℃(Extended temperature class opt.)
21	Wide temperature class (hardware opt.)	- 40~65 ℃/- 40~85 ℃(Wide temperature class opt.)

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