6 GHz Network Node Real-Time Spectrum Analyzer

NXM-60

Product Brochure V1.3

2023-10-18

▌9 kHz-6.3 GHz real-time spectrum analyzer

▌Integrated 100 kHz-6.3 GHz analog signal generator (option)

▌100MHz analysis bandwidth, 78 GHz/sec spectrum sweep speed

▌FPGA based digital signal processing

▌Weight 660 grams, size 167 ×117 ×28 mm, power consumption: 14 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 ºC/-40 ºC to 65 ºC (option)

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

▌Built-in 4G data module (option)

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NXM-60 Technical Specifications * (typical value)

Indicator test basis   Hardware Version：R3   API：0.55.12   FPGA：0.55.2   MCU：0.55.5   SAS4：1.55.46

Frequency

Frequency Range	9 kHz~6.3 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;

Spectrum Purity

SSB Phase Noise	dBc/Hz			
Carrier Frequency	500 MHz	1GHz	3GHz	6GHz
1 kHz	-112.8	-107.5	-99.3	-93.1
10 kHz	-120.6	-114.2	-103.6	-101.2
100 kHz	-120.1	-112.5	-101.8	-99.3
1 MHz	-134.1	-132.8	-127.7	-122.7

	Frequency Range	R.L.=0 dBm	R.L.=-20 dBm	R.L.=-50 dBm
Residual Response Spurious rejection on dBm; RBW =1 kHz; Positive Peak Detector	100kHz~100MHz	< -90	< -110	< -104
	100MHz~6.3GHz	< -90	< -110	< -125
Residual Response Spurious rejection off	100kHz~100MHz	< -90	<-100	<-100
	100MHz~6.3GHz	< -77	<-95	<-115

Image Frequency Suppression	>90 dBc (spurious rejection on), >35 dBc (spurious rejection off, typical value)
Local Oscillator Related Spurious	<-65 dBc (Offset Center Frequency +/- (N/M) *125MHz, N/M = 1,2,3,4,5…)

Linearity

IIP3 (dBm) 2MHz interval -6dBFs/Tone	1 GHz	3 GHz	6 GHz
R.L.= 20 dBm	51.8	44.9	40.7
R.L.= 0 dBm	30.8	30.5	27.4
R.L.= -20 dBm	12.3	11.6	7.5
R.L.= -50 dBm	-25.2	-23.6	-25.2
IIP2 (dBm) 2MHz interval -6dBFs/Tone	1 GHz	2 GHz	3 GHz
R.L.= 20 dBm	> 80	> 85	> 85
R.L.= 0 dBm	> 80	> 80	> 80
R.L.= -20 dBm	> 70	> 70	> 70
R.L.= -50 dBm	> 65	> 65	> 70

Signal Processing

Analysis Bandwidth	Maximum 100 MHz, Decimate Factor:1
IQ Data	125MSPS, 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	Not available

Amplitude

Maximum safe input power	26 dBm	30 MHz~6.3 GHz and the preamplifier off (R.L. ≥ 0 dBm)

(CW)	10 dBm	100 kHz~30 MHz or preamplifier on (R.L. <0 dBm)
Maximum DC Voltage	+/-15 VDC	
Display Range	DANL~26 dBm	
Amplitude Accuracy	+/- 1.5 dB	
IF in-band spectrum ripple	+/- 1.75 dB （100 MHz analog IF bandwidth）	
Reference level （R.L.）	-50dBm~23dBm	
RF Preamplifiers	Converting bands (frequency ≥ 30MHz) are equipped with preamplifier that can be set as automatically turn on or forcibly turn off	

VSWR	<1.7:1	30 MHz~6.3 GHz （R.L. ≥ 10 dBm）
	<2.0:1	30 MHz~6.3 GHz （R.L. ≥ 0 dBm）
	<2.5:1	30 MHz~6.3 GHz （R.L. ≥ -40 dBm）

Display Average Noise Level (DANL) dBm/Hz RBW=10kHz RMS detector	Frequency Range	R.L.= 0 dBm （IFGainGrade = 3）	R.L.=-20 dBm （IFGainGrade = 3）	R.L.=-50 dBm （IFGainGrade = 3）
	9 kHz	-106.4	-117.5	-119.0
	100 kHz~100 MHz	-134.1	-139.0	-137.6
	100 MHz~3.0 GHz	-133.2	-151.7	-160.1
	3.0 GHz~6.3 GHz	-127.2	-144.6	-161.7

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		
Sweep speed - Standard Spectrum Analysis	164.8GHz/s	Auto	RBW≥250 kHz, B-Nuttal window, spurious rejection: Standard
	78.8 GHz/s	Auto	RBW=250 kHz, B-Nuttal window, spurious rejection: Enhanced
	9.9 GHz/s	Auto	RBW=30 kHz, B-Nuttal window, spurious rejection: Enhanced
	454.2 MHz/s	Auto	RBW=1 kHz, B-Nuttal window, spurious rejection: Enhanced

Detection Analysis/Zero Span

Highest Time Resolution	8 ns
Maximum Analysis Bandwidth	100 MHz
Trace Detection	Positive peak, Negative peak, RMS, Sampling, Average, 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	32.768 us
	N = 32，D = 1	3,906,250 times /second	0.512 us
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	0.75 dB				
Signal generator (option)					
Frequency range	100 kHz~6.3 GHz，10 Hz for each step				
Power range	--50 dBm~0 dBm, 0.25 dB for each step				
VSWR	<2.0:1		30 MHz~6.3 GHz		
Non-harmonic spurs	<-50 dBc				
Harmonic wave	100 kHz~30 MHz	30 MHz~1.6 GHz	1.6 GHz~3 GHz	3 GHz~3.2 GHz	3 GHz~6.3 GHz
Second harmonic	<-10 dBc	<-10 dBc	<-20 dBc	<-20 dBc	<-20 dBc
Third harmonic and above	<-10 dBc	<-10 dBc	<-20 dBc	<-20 dBc	<-20 dBc
Signal leakage to receiver	100 kHz~30 MHz	>90 dBc			
	30 MHz~3 GHz	>80 dBc			
	3 GHz~6.3 GHz	>70 dBc			
General					

Input and Output	Power Supply	Type-C (1) PD （QC3.0）12V2A or 9V2A
	Data	RJ45 1000Mbps x1, 100Mbps x1
	RF input	SMA (F)(1), Input impedance 50 Ω
	RF output	SMA (F)(2), Input impedance 50 Ω
	External reference clock input	MCX (F)(1), amplitude≥1.5Vpp, input impedance 330 Ω
	External reference clock output	Not available
	External trigger input	MMCX (F)(1), 3.3V CMOS, input: high impedance
	External trigger output	MMCX (F)(2), 3.3V CMOS
	Analog IF output	Not available
	GNSS antenna	MMCX (F)(3)
	4G module antenna	MMCX (F)(4)
	General USB2.0	Type-C (2)
Power Consumption	Peak: 14 W, typical: 12 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)	
Size and Weight	Size: 167x117x28mm weight: 660 g (Including protective case and structural fittings, including connector length)	
Accessories	Flash disk×1, power adaptor×1, USB 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 off; (4) 100 MHz analysis bandwidth and IFGainGrade=3; (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 name	Option	Explanation
01	Built-in OCXO reference clock (hardware opt.)	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.
02	Built-in analog signal generator	100 kHz-6.3 GHz single tone signal output.
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.)	Provides the physical connection to the 4G network
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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