

# 20 GHz Network Node Real-Time Spectrum Analyzer

Distribution in the UK & Ireland

## NXE-200

### Product Brochure V1.3

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**Lambda**

[www.lambdaphoto.co.uk](http://www.lambdaphoto.co.uk)

- 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 SASstudio4 GUI
- Remote master of ARM and x86 processor are supported
- Linux and Windows are supported
- Operating temperatures range from -20 °C/-40 °C to 65 °C (option)
- Built-in OCXO (option) or GNSS disciplined OCXO (option)
- Built-in 4G data module (option)



## 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<br>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<br>dBm<br>RBW =1 kHz<br>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<br>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<br>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= $10^9 \text{ ns}/(N * D * 8 \text{ ns})$ ; POI = $2 * N * D * 8 \text{ ns}$<br>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<br>(ambient temperature /core temperature) | 0~50 °C/0~70 °C (Standard temperature class)  |   |
|  | -20~65 °C/-20~85 °C (Extended Temperature Class Option) (plastic enclosure and fan not included)                  |   |
|  | -40~65 °C/-40~85 °C (Wide Temperature Class Option) (plastic enclosure and fan not included)                      |   |
| Storage Temperature<br>(ambient temperature)                     | -20~70 °C (Standard temperature class)  |   |
|  | -40~85 °C (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 °C (core temperature 50 °C); (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 °C/- 20~85 °C(Extended temperature class opt.)   |
| 21   | Wide temperature class (hardware opt.)                         | - 40~65 °C/- 40~85 °C(Wide temperature class opt.)   |

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