SPEC SHEET

5GPro Spectrum Analyzer

RF SPECTRUM ANALYZER

- Simple to use, accurate, built specifically for field techs. EXFO's portable RF spectrum analyzer provides visibility into 4G LTE and 5G RF environments with the industry's only modular RF testing solution.

COMPATIBLE WITH

KEY FEATURES AND BENEFITS

- FR1 (450 MHz – 6 GHz)
- FR2 (24.25 GHz – 40 GHz)
- Real-time spectrum and signal analysis bandwidth up to 100 MHz
- 5G NR signal and beam analysis
- LTE signal analysis
- Digital RF power measurements
- Multi-PCI analysis (up to 12 PCI)
- Audible tone for RF interference hunting
- 5G secondary synchronization block (SSB) blind scanner (frequency, GSCN, ARFCN, 3GPP bands)
- TDD gated sweep with patent-pending sync functionality
- OTDR, RF over CPRI, CPRI/eCPRI, timing and synchronization, Ethernet up to 100G

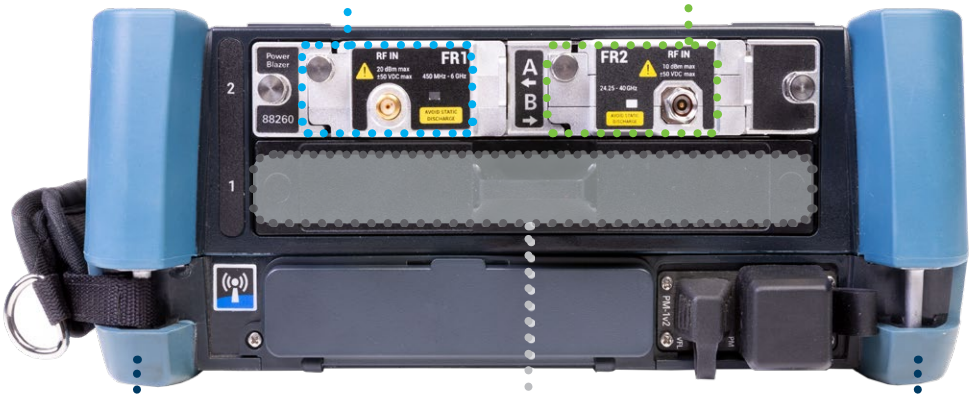
RF MODULES AND PLATFORM

The 5GPro Spectrum Analyzer provides visibility into 4G LTE and 5G RF environments through an easy-to-use, compact and portable solution. Ready to adapt as your network transforms, our flexible, modular and field upgradeable solution lets field techs analyze FR1 (450 MHz – 6 GHz) or FR2 (24.25 GHz – 40 GHz) bands with the same solution.

FTBx-88260 MODULE INCLUDING FR1 AND FR2

FR1	
Frequency range	450 MHz to 6 GHz
Connector	SMA (female)
Max safe level input	30 dBm

FR2	
Frequency range	24.25 GHz to 40 GHz
Connector	2.92 mm (K-male)
Max safe level input	20 dBm



Supported on the FTB-1 Pro dual-carrier and FTB-1 Pro high-power, dual-carrier configurations

Additional empty slot for the ability to combine other EXFO testing solutions together with the 5GPro Spectrum Analyzer

Windows-based architecture supporting cloud connectivity and third-party software tools

APPLICATIONS

Real-time spectrum analysis (RTSA)

The 5GPro Spectrum Analyzer is a real-time spectrum analyzer (RTSA) that provides continuous acquisition of RF signals with 100 MHz of analysis bandwidth. Quick characterization of wireless signals and detection of intermittent interference is now possible with the combination of the RTSA persistence and spectrogram view (see Figure 1).

EXFO brings innovation to RF testing with the new patent-pending Snap-to-Peak feature (see Figure 2). By using the touch screen, field techs can identify interferers through a movable window which allows them to search for the highest amplitude interferer and attach a marker.

Field techs can enable the audible-tone feature which allows for customizable thresholds to help pinpoint interferers and external PIM and helps operate the instrument hands-free when the user has one hand busy holding a directional antenna.

Figure 1. Real-time persistence spectrum and spectrogram.

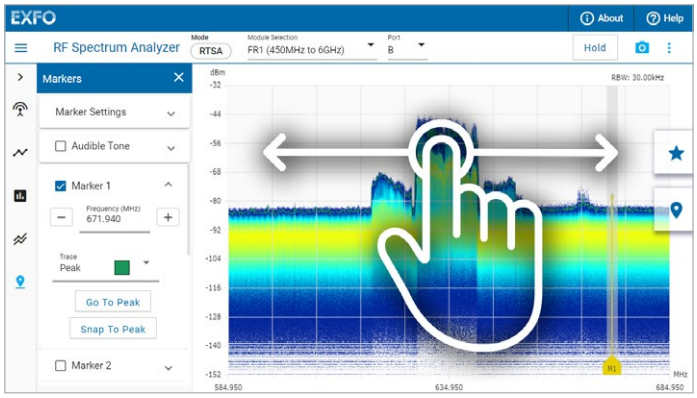


Figure 2. Patent pending Snap-to-Peak feature.

5GNR signal analyzer

A 5GNR signal analyzer supports the demodulation of 5GNR signals validating over-the-air (OTA) performance of cell sites and ensures smooth communication with user equipment. This application provides beamforming metrics and will analyze up to 64 beams and display the 12 strongest beams with the corresponding power measurements.

- Physical Cell ID (PCI), Beam ID and SSB periodicity.
- Auto-detection of subcarrier spacing (SCS).
- Secondary synchronization – reference signal received power (SS-RSRP): linear average received power of each secondary synchronization signal (SSS) resource element.
- Secondary synchronization – reference signal received quality (SS-RSRQ): ratio of SSS power over the total power of a given number of resource blocks.
- Secondary synchronization – signal to interference and noise ratio (SS-SINR): ratio of SSS over all noise sources, including interferers.
- Multi-PCI – filter by strongest and specific PCIs (up to 12 PCI's)

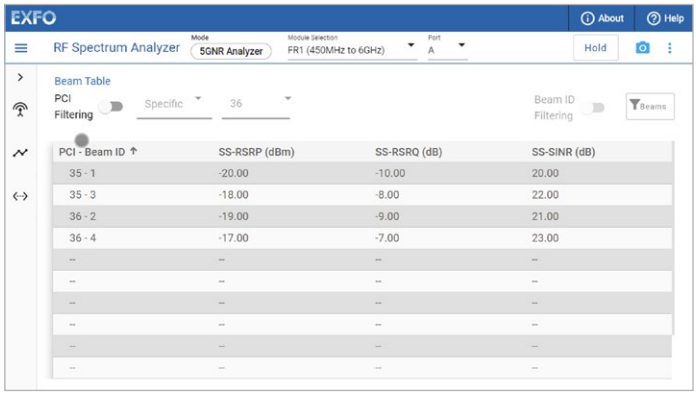


Figure 3. 5GNR beam analysis.

Spectrum analysis (TDD gated sweep)

Time division duplexing (TDD) is a transmission technique whereby the uplink and downlink signals are transmitted on the same frequency using synchronized timed intervals. Both spectrum analysis and interference analysis for TDD require the use of a measurement technique called gated sweep. This technique facilitates the visualization of uplink or downlink spectrum by displaying that data within a specified range of timeslots.

This technique allows the visualization of the symbol and slots in a frame, within a power vs. time graph, and the selection of uplink or downlink timeframes to further facilitate the visualization of uplink or downlink spectrum (see Figure 4). EXFO's patent-pending TDD gated sweep feature synchronizes with the 5G or LTE frame and prevents from the use of external GNSS references to avoid synchronization errors between the gating and the frame.

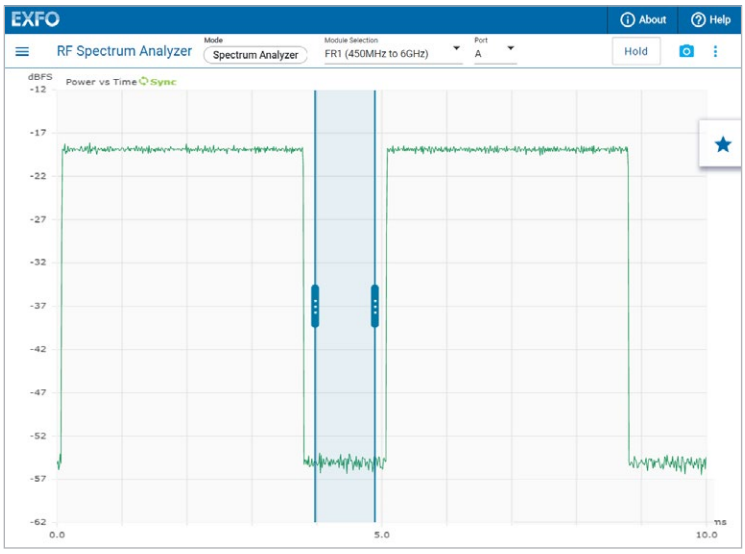


Figure 4. Patent-pending TDD Sync gated sweep feature.

LTE analysis

LTE analyzer (see Figure 5) supports the demodulation of 4G/LTE signals validating over-the-air (OTA) performance of cell sites and providing key metrics including:

- Sector and group ID
- Physical cell ID (PCI)
- Duplexing mode (FDD or TDD)
- RSRP (dBm)
- RSRQ (dB)
- RSSI (dBm)
- Multi-PCI – filter by strongest and specific PCIs

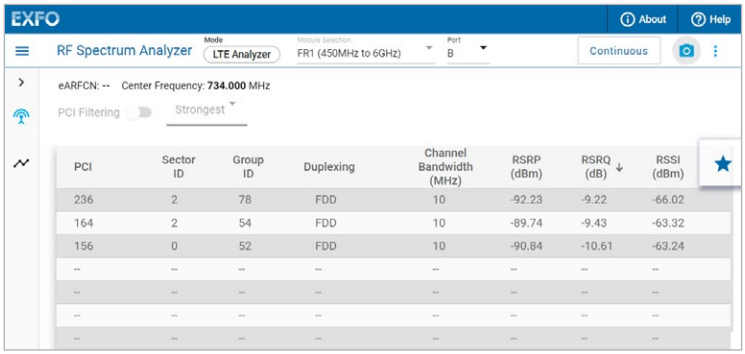


Figure 5. LTE analysis.

5G SSB blind scanner

The 5GPro Spectrum Analyzer provides an automated 5G blind scanner within the 5GNR signal analyzer application. This scanner allows the user to scan for 5G frequencies, GSCN values and PCIs without any manual configuration. Scanning can be done for bands, current span or a specific customizable frequency range.

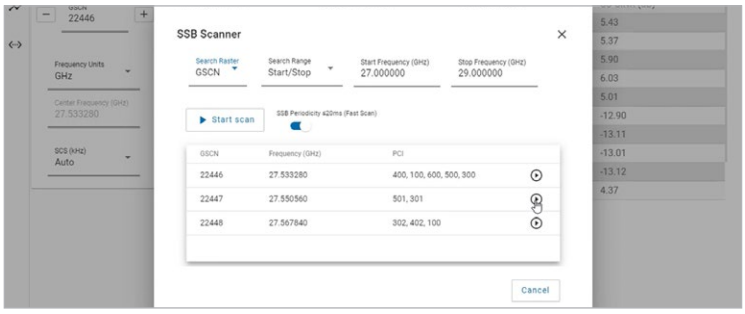


Figure 6. 5G SSB blind scanner.

RF absolute time error

Absolute time error measurements can be made with the 5GPro Spectrum Analyzer by demodulating the radio signal and locating the position of the primary sync aequence (PSS) within the SSB. The absolute time position of the PSS is determined using EXFO's current TA-SYNC module that can be inserted into EXFO's FTBx-88260 1G-100G network test module. By doing so, it is possible to determine the Absolute Time Error of the base station.

TA-SYNC module

SMA, SMB (EXT CLK and 1PPS)

- Built-in GNSS/GPS
- Ready for next-gen timing applications

FTB 5GPRO TEST SOLUTION: NOW WITH RF SPECTRUM ANALYSIS

The already comprehensive FTB 5GPro now includes RF spectrum analysis, making it the true all-in-one solution for validating coexisting 4G and 5G networks

Leveraging the powerful and intelligent FTB-1Pro handheld test platform, the FTB 5GPro is a complete and future-proof solution that takes the guesswork out of test set-up, execution and analysis.

The FTB 5GPro is designed to boost field-testing efficiency and deliver high-quality 5G and 4G/LTE networks, on time:

- Follows standardized, field-proven test procedures
- Enables technicians of any skill level to instantly interpret results and accelerate outcomes
- Addresses any potential issues when installing, activating and maintaining mobile networks

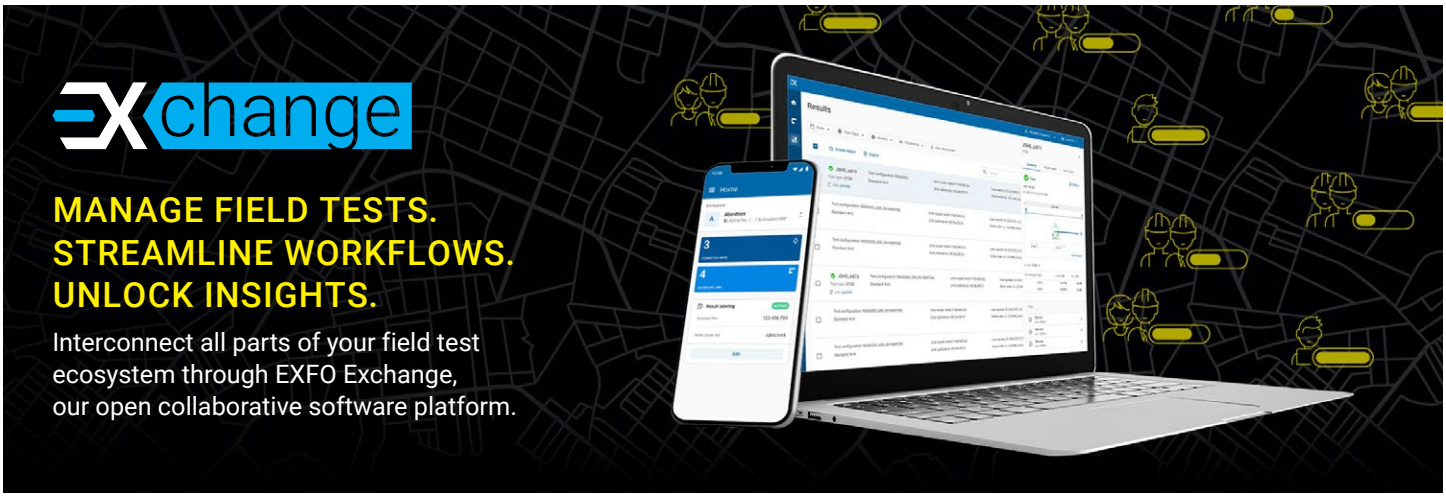
RF spectrum analysis on the FTB 5GPro

With the addition of real-time RF spectrum analysis with over-the-air measurements (OTA), EXFO's modular FTB 5GPro becomes the industry's only complete, fully integrated solution for 5G RAN validation: Ethernet testing up to 100G, timing and synchronization, eCPRI and CPRI protocol testing, intelligent RF spectrum analysis over CPRI (iORF) and optical transceiver validation (iOptics).

Portable tool

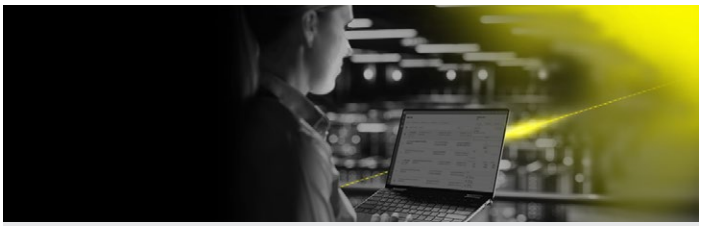
With the FTB 5GPro, field technicians no longer need to carry 3-4 heavy test sets to get the job done.

Flexible design ready for now and for what comes next



KEY BENEFITS

- **Connect operations with real-time visibility**
- **Increase collaboration and build trust with business partners**
- **Boost efficiency with automated processes**
- **Reduce maintenance costs**
- **Unlock insights to see what matters**



From the office

Invite your workforce and contractors to join your organization's workspace on EXFO Exchange. This will help you better organize projects and gain unprecedented visibility in real time over job progress and MoP compliance. Optimize closeout package generation to close jobs rapidly and monetize/get paid faster.

From the field

Request an invitation from your team manager to complete jobs faster and better, save results automatically and share them in real time.

KEY FEATURES

Centralized and organized data | **Easy integration** | **Consolidated reporting service** | **Process automation** | **Collaboration**

Get **started >**

SPECIFICATIONS

RF AND GENERAL			
		TA-FR1	**TA-FR2**
Frequency range		450 MHz to 6 GHz	24.25 GHz to 40 GHz
Analysis bandwidth (MHz)		100	100
RF max safe level input		30 dBm peak typical, ±50 VDC (≥ 10 dB attenuation)	20 dBm peak typical, ±50 VDC (≥ 10 dB attenuation)
Preamplifier		Yes	Yes
Attenuator (auto/manual)		0 to 30 dB, 10 dB steps	0 to 30 dB, 10 dB steps
Connector		RF IN SMA female connector	RF IN 2.92 mm (K) male connector
Platform		Interfaces: RJ45 LAN 10/100/1000 Mbit/s WiFi connectivity USB 2.0 ports (2) USB 3.0 port (1) Micro SD card slot 3.5 mm headset/microphone port	
Battery autonomy	Dual carrier (FTB-1v2 Pro) High-power dual carrier (FTB-1v2 Pro)	> 2h > 4h	
Certification		MIL-PRF-28800F – Class 2 (shock, vibration and drop)	
Mainframe and storage		Quad-core processor / 4 GB RAM / Windows 10 with 128 GB internal flash memory MicroSD slot for external storage	
Screen		Touchscreen, color, 1280 × 800 TFT 203 mm (8 in)	
Temperature	Operating Storage	0 °C to 50 °C (32 °F to 122 °F) –40 °C to 70 °C (–40 °F to 158 °F)	
Size (H x W x D)	Double-depth module back / Dual carrier High-power dual carrier:	210 mm x 254 mm x 96 mm (8 ¼ in x 10 in x 3 ⅞ in) 210 mm x 254 mm x 122 mm (8 ¼ in x 10 in x 4 ¾ in)	
Weight	Dual carrier High-power dual carrier	2.9 kg (6.4 lb) 3.7 kg (8.2 lb)	

SPECTRUM ANALYZER

	TA-FR1	TA-FR2
Traces	Max, Sample, Max Hold, Min Hold Displays all traces at the same time	
Frequency	450 MHz to 6 GHz	24.25 GHz to 40 GHz
Frequency reference (accuracy)	±0.35 ppm (including aging for 2.5 years)	±0.35 ppm (including aging for 2.5 years)
Markers	Display 12 markers Apply on Max, Sample, Max Hold, Min Hold traces Go to Peak, Snap to Peak (patent-pending)	
Audible tone	Audible tone	Audible tone linked to each marker for interference hunting (configurable level-limit lines)
Persistence spectrogram	Apply on Max, Sample, Max Hold, Min Hold traces 30 seconds, amplitude scale user selectable, 2D and 3D	
RBW/VBW	58 Hz to 120 kHz / 1:1, 3:1, 10:1, 30:1, 100:1	
Gated sweep	Zero span and gate configuration to visualize TDD signals Patent-pending synchronization with 5GNR and LTE frames SSB scanner to scan, detect and sync onto 5G signals	
Spectral purity (SSB phase noise at 1 GHz)	Offset / SSB phase noise 10 KHz / −98 dBc/Hz 100 KHz / −105 dBc/Hz 1 MHz / −125 dBc/Hz	Contact factory for more information
Spurs Typical values	Residuals < −100dBm (50 ohms termination, 0 dB attenuation, preamp off)	Contact factory for more information
TOI Typical values	450 MHz to 3 GHz: 8.2 dBm 3 GHz to 6 GHz: 8.4 dBm	Contact factory for more information
Amplitude ranges (1 GHz)	DR: 2/3* (TOI-DANL at 1Hz RBW): > 104 dB Measurement range: DANL to 30 dBm	Contact factory for more information
Displayed average noise level (DANL typical values)	Preamp ON / Preamp OFF 1 GHz: −168 dBm/Hz / −151 dBm/Hz 2 GHz: −167 dBm/Hz / −149 dBm/Hz 3 GHz: −167 dBm/Hz / −150 dBm/Hz 4 GHz: −167 dBm/Hz / −151 dBm/Hz 5 GHz: −167 dBm/Hz / −151 dBm/Hz 6 GHz: −166 dBm/Hz / −151 dBm/Hz	Typical 27 GHz: Preamp ON −154 dBm / Preamp OFF −140 dBm
Input VSWR	1.3:1 (nominal)	Contact factory for more information

REAL-TIME SPECTRUM ANALYZER (RTSA)

RTSA bandwidth (MHz)	6.25, 12.5, 25, 50, 100
Traces	Persistent real-time spectrum with variable decay (0 - 10 seconds) and infinite decay Max, Sample, Average, Max Hold, Min Hold Displays all traces at the same time
Markers	Display 12 markers Apply on Max, Sample, Average, Max Hold, Min Hold traces Go to Peak, Snap to Peak
Audible tone	Audible tone linked to each marker for interference hunting (configurable level limit lines)
Persistence spectrogram	Apply on Max, Sample, Average, Max Hold, Min Hold traces 30 seconds, amplitude scale user selectable, 2D and 3D
POI (probability of intercept)	50 µs (100 MHz BW)
FFT rate (FFT/s)	60000

5G SIGNAL ANALYZER	
Frequency range	450 MHz to 6 GHz (FR1) and 24.25 GHz to 40 GHz (FR2)
Analysis bandwidth	Up to 100 MHz
Band configuration	Manual or selectable band number, absolute radio frequency channel number (ARFCN), auto subcarrier spacing (SCS)
Multi-beam view	Physical-layer cell ID, beam index, SCS, SSB periodicity (auto-detected), SS-RSRP (dBm), SS-RSRQ (dB), SS-SINR (dB)
SSB blind scanner	Scan and detect 5G NR signals by searching through GSCN and ARFCN. Predefined search in SPAN, frequency range and 3GPP band.
Amplitude	Auto range, reference level offset, attenuation level (auto/manual), preamp
Multi-PCI	Filter by strongest and specific PCIs (up to 12 PCIs)

LTE SIGNAL ANALYZER	
Frequency range	450 MHz to 6 GHz (FR1)
Analysis bandwidth (MHz)	Auto, 1.4, 3, 5, 10, 15, 20
Band configuration	Manual or selectable band number, absolute radio frequency channel number (ARFCN)
Cell view	Physical cell ID (PCI), SectorID, GroupID, duplexing, RSRP (dBm), RSRQ (dB), RSSI (dBm)
Amplitude	Auto range, reference level offset, attenuation level (auto/manual), preamp
Multi-PCI	Filter by strongest and specific PCIs (up to 12 PCIs)

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