

OneAdvisor 800 EMF Analyzer

The next generation selective test solution for Electro-Magnetic Field safety validation.



Mobile service providers and regulatory agencies must continuously perform measurements to ensure compliance and personal safety of the public. VIAVI OneAdvisor 800 EMF Analyzer performs simple, effective, and accurate radiation and emissions measurements of radio signals.

Fast evolution of wireless technology accelerates the densification of cellular networks in line with the increasing demand for higher data throughputs. The evolution of these cellular networks and proliferation of transmitting antennas everywhere is significantly increasing human exposure to electromagnetic fields (EMF) from radio cellular signals.

VIAVI OneAdvisor 800 Wireless test set has been adopted by major mobile operators worldwide due to its comprehensive measurement capabilities of the radio access network (RAN) including the operation and performance of cell sites and the radio frequency (RF) environment, dealing with transmission, interference issues and EMF analysis.

OneAdvisor 800 EMF analyzer option detects the RF field strength and EMF levels of radio signals over the air. With the use of an isotropic antenna, it can perform simple and accurate radiation measurements on site, with clear PASS/FAIL indications based on a comparison of the radiation levels to different standardized permissible limits.

Besides the traditional frequency selective method, in spectrum view and scanner mode, the OneAdvisor 800 EMF Analyzer also features a code selective method for 4G/LTE and 5G radio technologies. For 5G specifically, this solution is capable of 5G NR Beam Analysis that shows the EMF power of the control beams over a multiple PCI measurement including extrapolation with full matching factor for the entire 5G channel width.

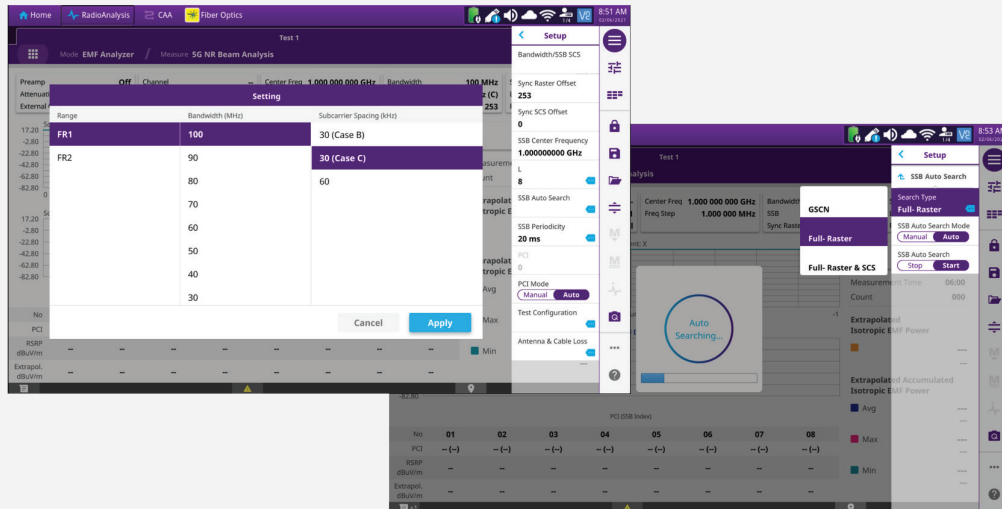
Furthermore, VIAVI has introduced a new variant of the code selective method for 5G NR EMF verification. This allows now to also verify the power emission levels of the traffic or user beams, which may increase the level of radiation onto the user during a high-speed data session.



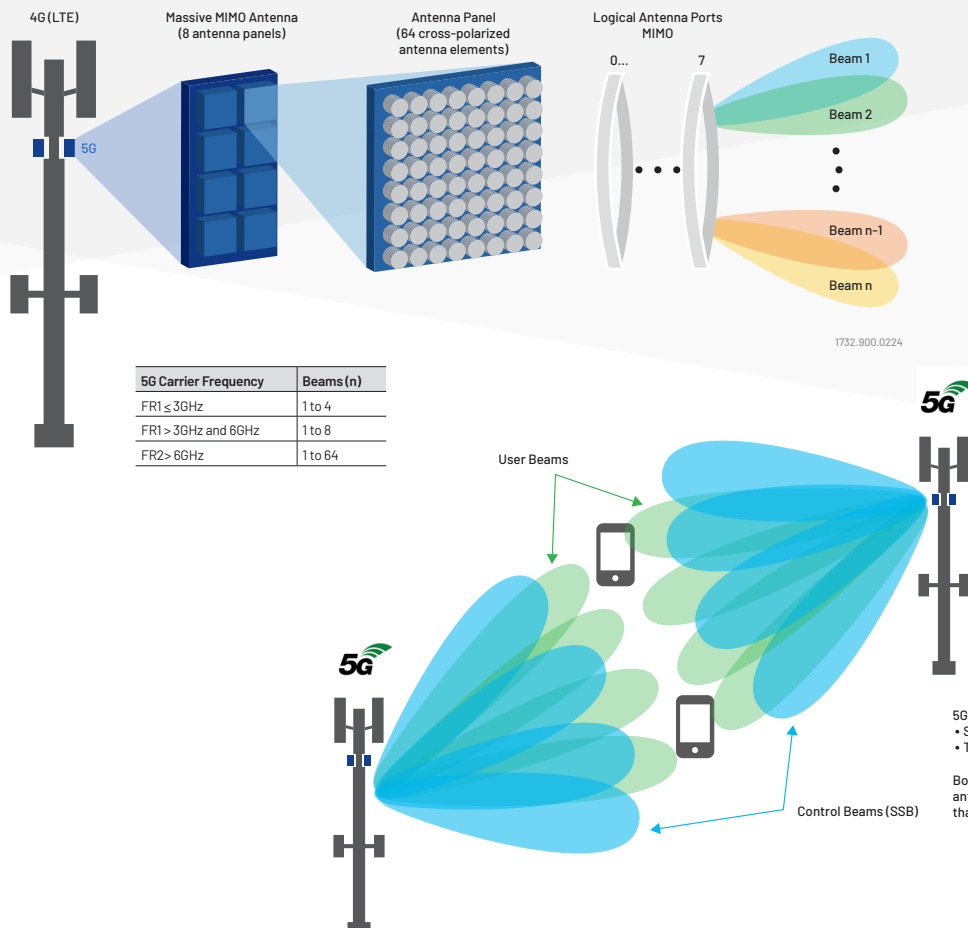
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Benefits

- The VIAVI OneAdvisor 800 Wireless platform combines in a single solution a general-purpose EMF spectrum selective analysis method with different EMF code selective analysis methods for 4G and 5G NR networks.



5G NR Carrier Configuration and SSB Auto Search



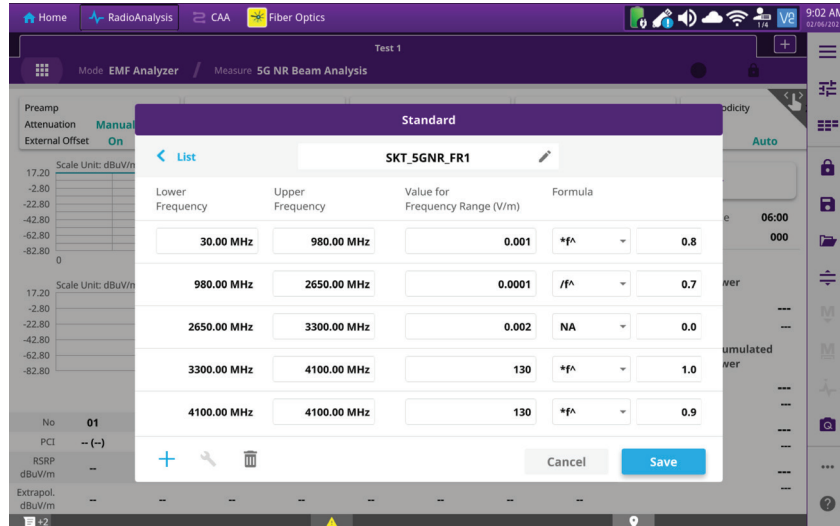
5G transmits two types of beams:

- SSB or Reference Beams (for coverage)
- Traffic Beams (for user data)

Both types of beam originate from the same 5G antenna, but traffic beams may carry more power than control beams.

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- Compliant with the Independent Commission on Non-Ionizing Radiation Protection (ICNIRP) reference limits (other standards are also supported and user configurable)



EMF Limit edit screen

- Supports 3GPP 36.113 standards for Base Station and Repeater Electromagnetic Compatibility (EMC), including IEC 62232 and ITU-T K.91 guidelines and recommendations for assessment, evaluation and monitoring of human exposure to Radio Frequency Electromagnetic Fields (RF EMF)
- Effective PASS/FAIL and Alarm settings to identify any excess of radiation
- Supports a variety of isotropic and directional antenna model options, pre-defined in the instrument settings

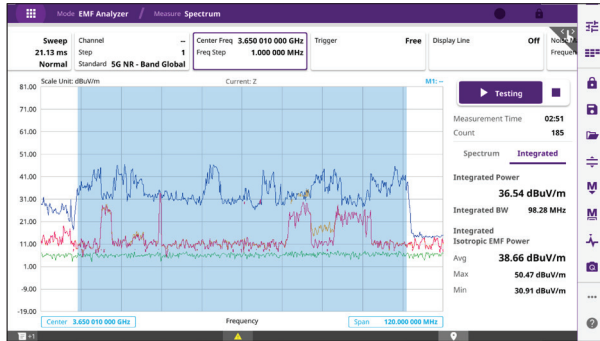
Antenna List			
	Part Number	Frequency (MHz)	Type
Standard	G700050381	30 - 6000	Isotropic E Field (AGOS)
	G700050382	30 - 8000	Isotropic E Field (WaveControl)
Custom	G700050370	26500 - 40000	Directional Horn (VIAVI)
	G700050371	22000 - 33000	Directional Horn (VIAVI)
	G700050366	200 - 4000	Log Periodic Broadband (VIAVI)
	G700050367	300 - 6000	Log Periodic Broadband (VIAVI)
	USLP_9143	300 - 7000	Log Periodic Broadband (Schwarzbeck)
	USLP_9143B	450 - 8000	Log Periodic Broadband (Schwarzbeck)
	USLP_9142	800 - 5000	Log Periodic Broadband (Schwarzbeck)
	G700050340	24000 - 40000	Omni (VIAVI)
	G700050342	24000 - 40000	Omni (VIAVI)

Standard Antenna List

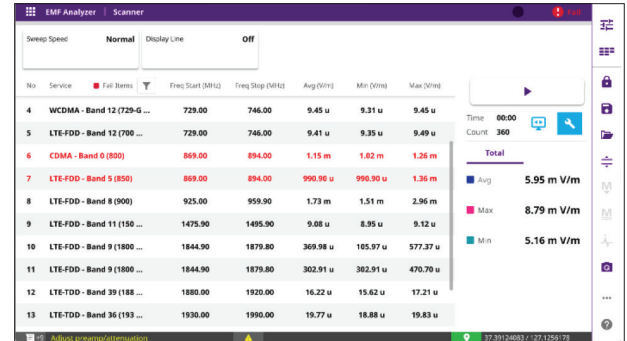
- The OneAdvisor 800 EMF testing solution can be combined with other measurement capabilities, including a Real-time Spectrum Analyzer (RTSA) with 50 MHz, 100 MHz or even up to 110 MHz of instantaneous analysis bandwidth, integrated in the same tool

Features

- Frequency selective EMF emission measurement with Trace statistics including Average, Max, and Min Isotropic EMF power accumulated over a measurement period of selectable duration. Spectrum and Scanner views (tabular and bar mode) are supported.



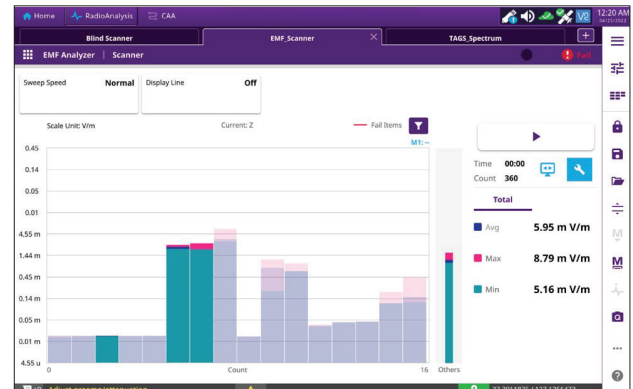
Spectrum view EMF power measurements



Scanner view EMF power measurements

- The solution features RMS and Peak detectors and can display the measurements in a variety of units, including V/m, A/m, W/m2, mW/cm2, dBV/m, dBmV/m, dBA/m, dBuV/m, and percentage (%) to standard of choice.

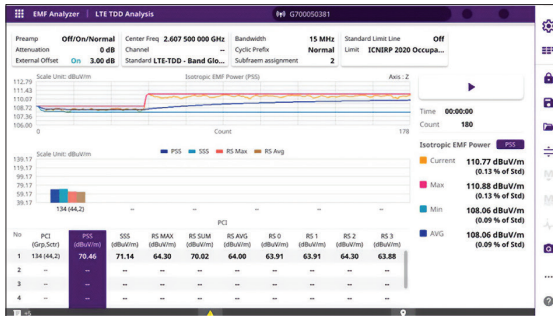
Quickly identify any RF bands or channels that have faulty EMF power values using the Threshold filters in Scanner Mode. This easy way of identifying bands or individual channels, which might be transmitting excessive power, dramatically reduces the time technicians need to spend in the field.



Scanner view EMF power measurements with Filter enabled

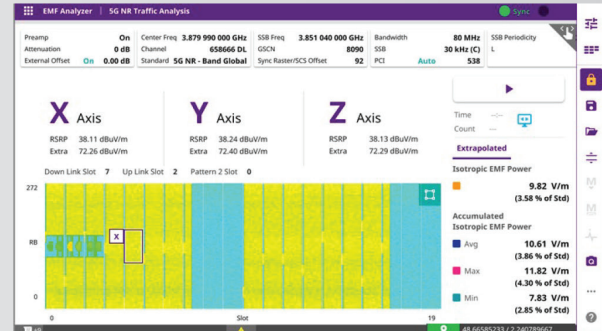


- Code selective EMF emission measurements for 4G supports both LTE-TDD and LTE-FDD technology variants and can measure on cell specific (via PCI identification) and traffic independent cell signals: PSS, SSS or RS as it averages the power levels of any 4G/LTE signal per resource element, up to four Reference Signals (R0...R3)



For LTE-TDD technology, the solution features a special auto-configuration function to search through a TDD subframe and automatically apply a correction factor that depends on the UL/DL configuration being assigned.

- Code selective EMF emission measurements on 5G NR channels are available on both control (SSB) beams or on traffic (user) beams. This solution supports multi-beam analysis and multi-PCI decoding, showing EMF levels of RSRP for multiple beams with an extrapolated value to the full bandwidth of the 5G channel.



The VIAVI OneAdvisor 800 analyzer can decode continuously the 5G NR frames over the air, also showing the dynamic allocation of Resource Blocks per time slot, and with the possibility to manually or automatically select the given group of RBs that corresponds to a high-speed data session initiated by the user. A measurement over the entire frame is also available to validate smart power lock controls available in modern cellular base stations.



EMF power measurements on a 5G NR frame
for Traffic Analysis

Summary

The Frequency selective method has been commonly used to verify radiation levels of any type of radio signals, including non-cellular ones. This methodology remains valid also, especially for FDD signals in the cellular industry. With the use of an isotropic antenna, this method in spectrum mode allows for a very complete analysis of the radiation levels in any frequency range – and in scanner mode allows for a detailed comparison of radiation levels produced by multiple frequency ranges, down to a single cellular band or individual channel.

The Code selective method addresses the shortcomings of the frequency-based methodology for certain types of cellular signals like TDD ones and is particularly suitable for 4G/LTE-TDD and for 5G NR channels that operate in high-frequency ranges with beamforming through the SSB transmission. This method requires demodulation of the 4G or the 5G reference signals and makes use of a signal synchronization mode, based on the individual transmission of a single radio identified by its PCI number. While in 5G NR, this methodology has been typically applied to verify EMF emissions from SSB beams, also known as control, reference or coverage beams, VIAVI has introduced a new variant of this method that also allows to verify the power emission levels of traffic or user beams, which may increase the level of radiation onto the user during a high-speed data transfer from the radio base-station down to the user equipment, i.e., a personal smartphone or to any other type of user equipment.



Ordering Information

Description	Part Number
OneAdvisor 800 Wireless	ONA-800A
Mainframe integrated with one of the VIAVI Radio Analysis modules, available in a choice of frequency ranges from 9 kHz to 6 GHz, 9 GHz, 18.5 GHz, 32 GHz and 44 GHz.	SPA06MA or SPA06MA-O
	RA09MA-O
	RA18MA-O
	RA32MA-O
	RA44MA-O
EMF Analysis (Spectrum Analysis base)	ONA-SP-EMF-SA
EMF Analysis for LTE FDD	ONA-SP-EMF-LTEFDD
EMF Analysis for LTE TDD	ONA-SP-EMF-LTETDD
EMF Analysis (NR Beam Analysis base, incl. Traffic beam analysis)	ONA-SP-EMF-NR
Isotropic Antenna (30 MHz – 8 GHz) with 2 m RF cable kit	G700050382
Isotropic Antenna (30 MHz – 8 GHz) with 3 m RF cable kit	G700050383

G700050382 Isotropic Antenna Specification (supplied by Wavecontrol)

Parameter	
Antenna Type	Triaxial Isotropic E-Field
Frequency Range	30 MHz to 8 GHz
Frequency Correction Factors	Stored in EEPROM
Sensor Type	Three (X, Y, Z) orthogonal axes. Polarization selection by means of internal RF solid state switching
Axis Selection	USB-controlled axis selection
Dynamic Range	3.0 mV/m – 400 V/m (30 MHz – 75 MHz)
	1.0 mV/m – 400 V/m (75 MHz – 400 MHz)
	0.3 mV/m – 300 V/m (400 MHz to 6 GHz)
	2.0 mV/m – 400 V/m (6 GHz – 8 GHz)
Max Applicable Field Strength	600 V/m
Isotropic Deviation	< ±1.0 dB (30 MHz to 3 GHz)
	< ±2.0 dB (3 GHz to 5 GHz)
	< ±2.8 dB (5 GHz to 6 GHz)
	< ±4.0 dB (6 GHz to 8 GHz)
Dimensions	Antenna radome ø120 mm, total length 455 mm
Antenna Weight	560 g
Rf Connector	N type Male, 50Ω
Protection Class	IP 45
Temperature Range	-10°C to +50°C
Recommended Calibration Interval	2 years
Standard Accessories	
Included with the Isotropic Antenna	2 m or 3 m extension RF and control USB cable (selectable option)
	Vertical, horizontal and tilting support for fixing to ¼" thread
	Hard transit case
	Manufacturer calibration certificate



References

- CEPT – Electronic Communications Committee – WG Frequency Management – FM 22 Monitoring and Management – FM22(23)07 EMF measurement of 5G base stations using AAS
- IEEE C95-1; Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines for limiting exposure to electromagnetic fields (100 kHz to 300 GHz)
- 3 GPP TS 38.104; 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; NR; Base Station (BS) radio transmission and reception (Release 16)
- Kamil Bechta; Christophe Grangeat; Jinfeng Du; Marcin Rybakowski, “Analysis of 5G Base Station RF EMF Exposure Evaluation Methods in Scattering Environments”, IEEE Access, vol. 10, pp. 7196-7206, 2022.
- IEC 62232:2022 (Annex B.8, E.7, E.8) / ITU-T K.91

For more information, visit our [OneAdvisor 800 Wireless](#) page.



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