**VI∧VI**
VIAVI Solutions

Radio Access Network Coverage with OneAdvisor 800 Wireless

VIAVI wireless field test solution for radio access networks (RAN), OneAdvisor 800, has been designed for the installation, maintenance and optimization of cell sites, including spectrum and interference analysis, validation of 4G-LTE and 5G-NR technologies, as well as concurrent analysis of signals transmitted over Dynamic Spectrum Sharing (DSS) and in Non-Standalone (NSA).

OneAdvisor 800

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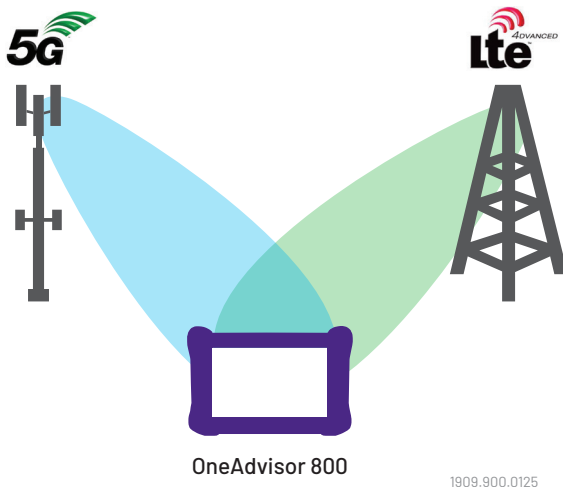
VIAVI OneAdvisor 800 is an all-in-one solutions for cell technicians and RF engineers to effectively verify RF conditions, including signal analysis route mapping.

There are two main applications of signal analysis route mapping:

- Outdoor coverage, performing signal analysis route mapping through drive testing
- Indoor coverage, performing signal analysis route mapping through walk testing

Key Benefits

- 5G signal analysis including carrier aggregation
- DSS analysis performing concurrent analysis of LTE and 5G carriers to quickly identify signal availability and performance issues
- Interference analysis, detecting interference impairments which may affect coverage and service quality
- Remote control and cloud services allowing remote assistance
- Real-time spectrum analysis for better representation of LTE and 5G TDD carriers
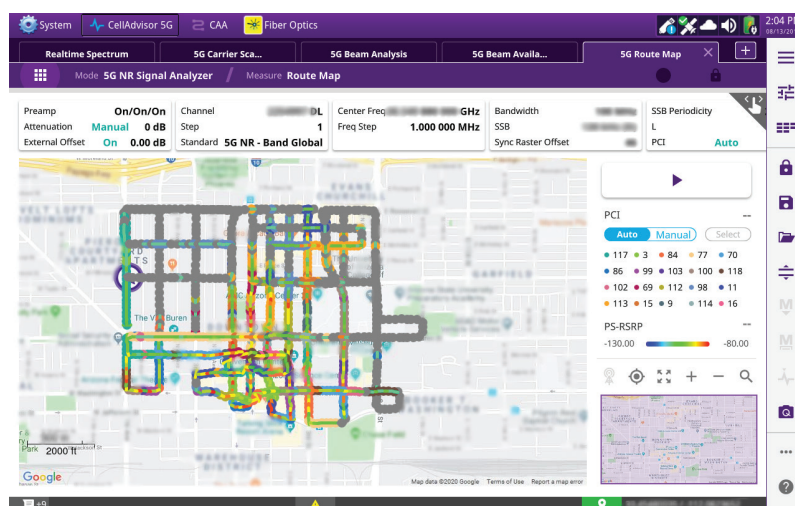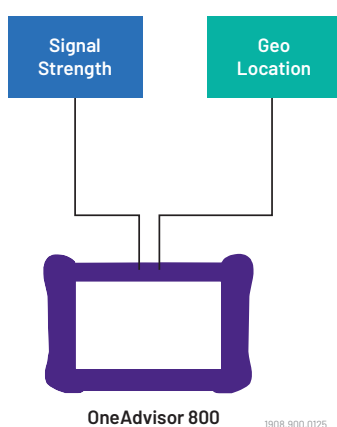

OneAdvisor 800
All-in-one 5G-NR and 4G-LTE test solution offering the best total cost of ownership

Radio Access Outdoor Coverage

Outdoor coverage can be affected by shadowing in the case of mm-wave signals that experience high penetration loss through materials such as concrete, steel or reflective glass; as well as the effects from interfering signals that collide with the radio's transmission or reception bands, which in cases despite of acceptable signal levels the throughput is limited or might even cause call drops.

VIAVI OneAdvisor 800 is equipped with route map test functions that performs coverage testing in real-time, by plotting signal strength, with different color scheme based on the received power level, in a geographical map obtaining location from GPS. The resulting route map shows coverage levels and dead-zones or areas with no coverage which might cause service impairments such as call drops.

Coverage test data can be saved as a mapping test result allowing post-analyze with the RAN analyzer displaying signal analysis parameters for each data point including originating physical cell identification or PCI, as well as beamforming profile including beam index and beam power level. In addition, coverage test data can also be saved as comma separated files for post-processing analysis.

OneAdvisor 800 – 5G Signal Analysis Route Mapping

Radio Access Indoor Coverage

Indoor coverage can be affected by many factors, including reflections and attenuation caused by building materials including concrete walls, steel, and reflective windows, as well as for potential interfering signals that collide with signals of small cells or customer premise equipment.

Therefore, it is essential in the deployment of indoor networks to verify the spectrum is clear, verifying no other signals are present, avoiding service quality impairments; and subsequently the network is not causing interference to other networks.

VIAVI OneAdvisor 800 is a versatile solution designed to address indoor coverage mapping challenges, overcoming the lack of GPS location information. This is achieved through the instrument's user interface, which allows for manual geo-location selection. By manually assigning locations and correlating them with signal strength measurements, the OneAdvisor 800 can effectively create detailed coverage maps. The signal strength is color-coded based on its power level, providing a clear and intuitive visual representation of coverage quality.
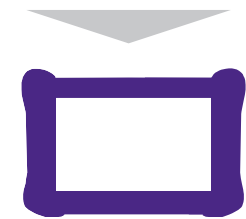
Indoor Coverage with Manual Geo-Location

Indoor coverage mapping with manual geo-location is achieved by a
 simple test process:

1. Indoor map creation, with VIAVI JDMapCreator software that converts picture files of indoor layouts or floor plans into a file format readable by the OneAdvisor 800
2. Perform signal analysis route mapping with the OneAdvisor 800 and setting map configuration plot point by time or position
3. Manually select the location on the map displayed in the RAN OneAdvisor 800
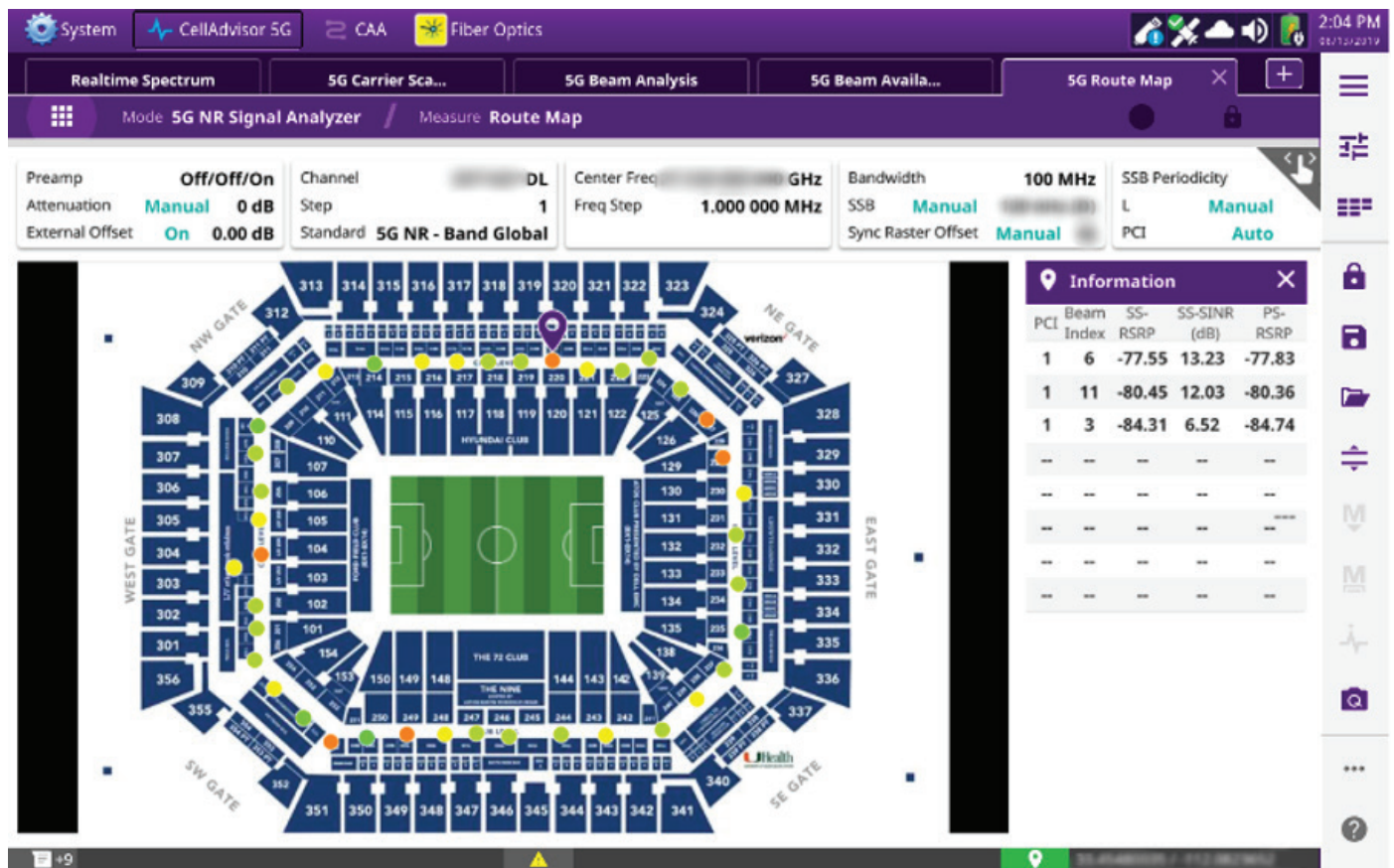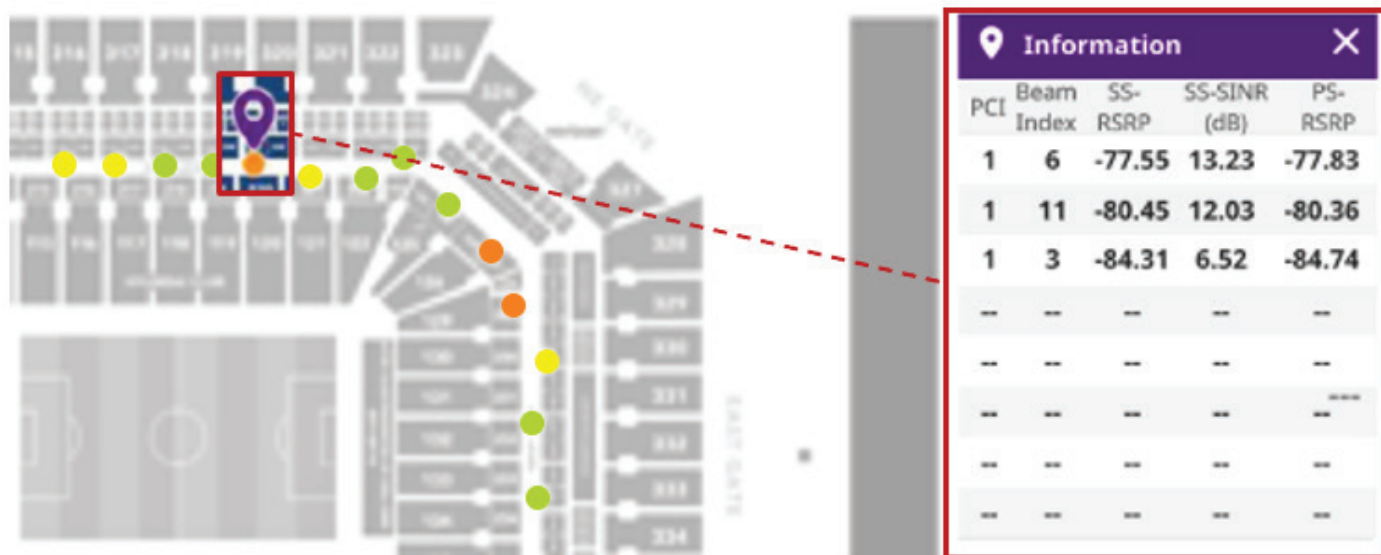
JDMapCreator
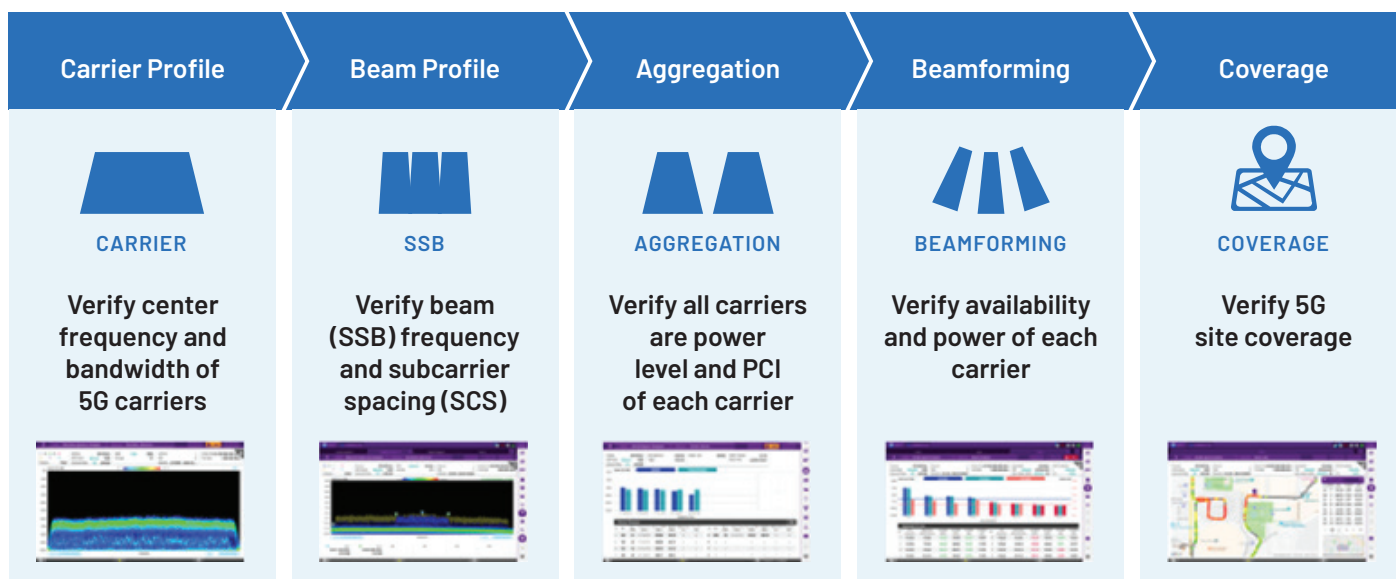
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OneAdvisor 800 - Indoor – Signal Analysis Route Map 5G-NR

PCI	Beam Index	SS-RSRP	SS-SINR (dB)	PS-RSRP
1	6	-77.55	13.23	-77.83
1	11	-80.45	12.03	-80.36
1	3	-84.31	6.52	-84.74
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OneAdvisor 800 - Indoor – Signal Analysis Route Map 5G-NR Beam Profile

Solving Network Coverage Issues

VIAVI OneAdvisor 800 solves network coverage and improves user experience through the following cell site deployment best practices:
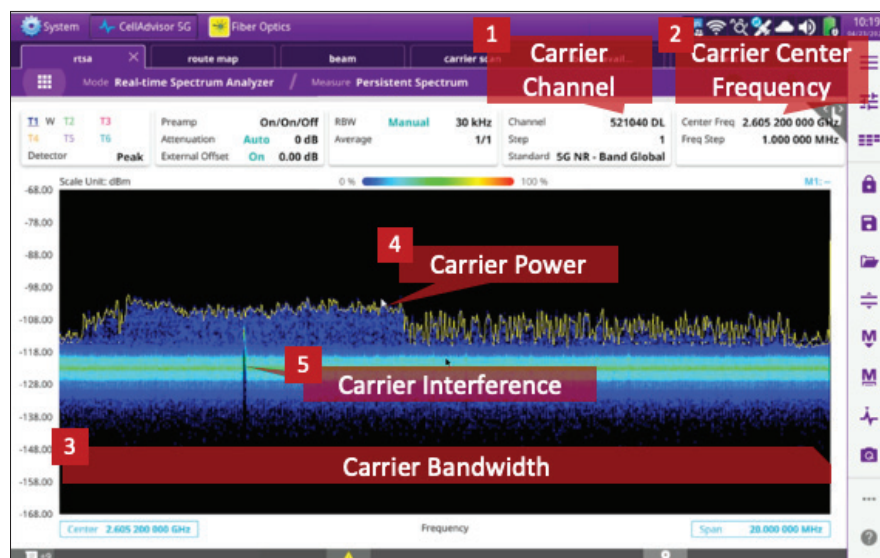
Carrier Profile	Beam Profile	Aggregation	Beamforming	Coverage
CARRIER	SSB	AGGREGATION	BEAMFORMING	COVERAGE
Verify center frequency and bandwidth of 5G carriers	Verify beam (SSB) frequency and subcarrier spacing (SCS)	Verify all carriers are power level and PCI of each carrier	Verify availability and power of each carrier	Verify 5G site coverage

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RAN Troubleshooting Best Practices

Carrier Profile

5G carrier profile verification is needed to validate over-the-air characteristics including spectrum clearance.

1. Carrier Channel: compliant with 3GPP ARFCN.

2. Carrier Center Frequency: verify the channel frequency corresponds to the center frequency of the transmitted signal.

3. Carrier bandwidth: verify the signal bandwidth correspond to the defined carrier bandwidth.

4. Carrier Power: verify the transmitted signal has proper signal strength (e.g., level ≥ –90 dBm).

5. Carrier Interference: verify the signal transmitted is not affected by any interfering signal.
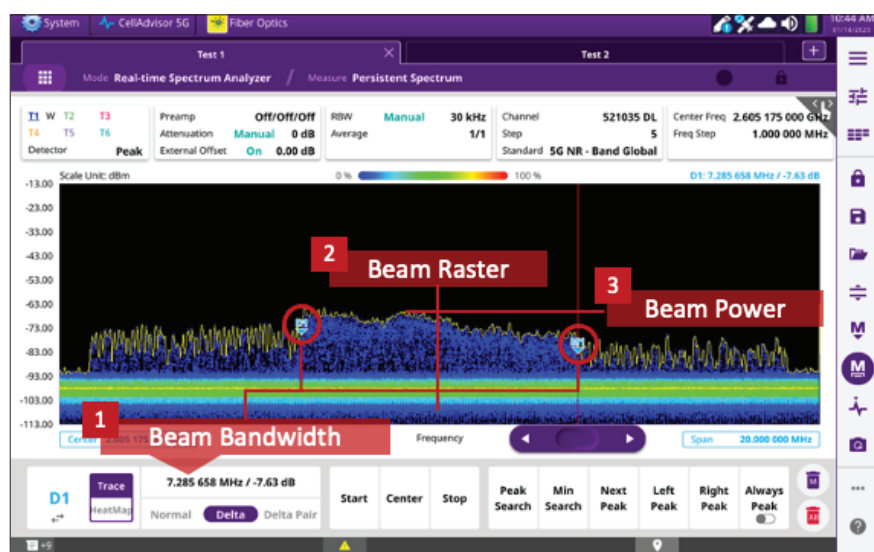

OneAdvisor 800 – Carrier Profile

Beam Profile

5G beam profile verification is needed to validate over-the-air characteristics and radio configuration of the beam numerology.

1. Beam Bandwidth: validate the radio's 5G beam numerology (μ) of sub-carrier spacing (Δf): 15 KHz to 240 KHz.

2. Beam Raster: verify the 5G beam (SSB) frequency offset relative to the 5G channel.

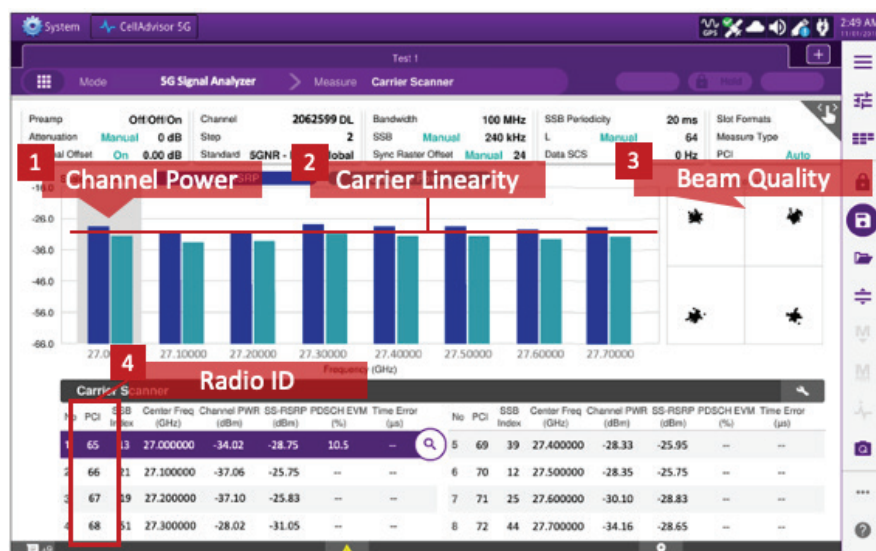3. Beam Power: verify the 5G beam (SSB) transmitted power level (e.g., level ≥ –90 dBm).

OneAdvisor 800 – Beam Profile Verification

Carrier Aggregation

5G carrier aggregation verification is needed to validate power level, linearity and quality of the 5G radio.

1. Channel Power: verify signal strength of the transmitted carrier.
2. Carrier Linearity: verify the carriers transmitted by the radio have the same power level.
3. Beam Quality: verify 5G beam quality (constellation) performance.
4. 5G Radio ID: verify the radio ID (PCI).

OneAdvisor 800 – Carrier Aggregation

Beamforming

5G beamforming verification is needed to validate beams transmitted by the radio, beam power, and quality.

1. Beams Transmitted: verify the individual beams transmitted.
2. Beam Power: verify the power level of the individual beams.
3. Beam Quality: verify 5G beam quality performance (constellation and error vector magnitude).
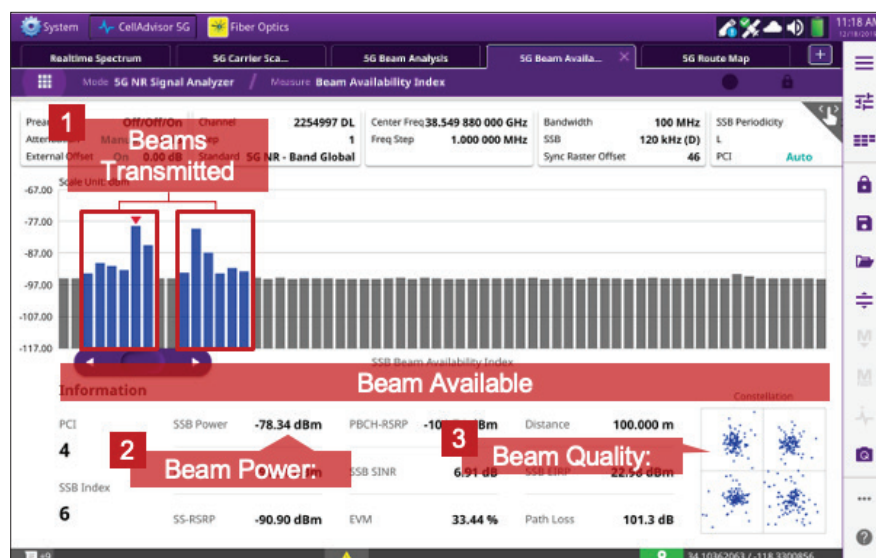
OneAdvisor 800 – Beamforming

Signal Coverage

5G coverage verification is needed to validate proper power levels in different location suitable for 5G service.

1. 5G coverage: Assess signal strength by geo-location.
2. Beam availability: verify the availability of multiple beams by geo-location.

5G Coverage data done in real-time and available for post-processing
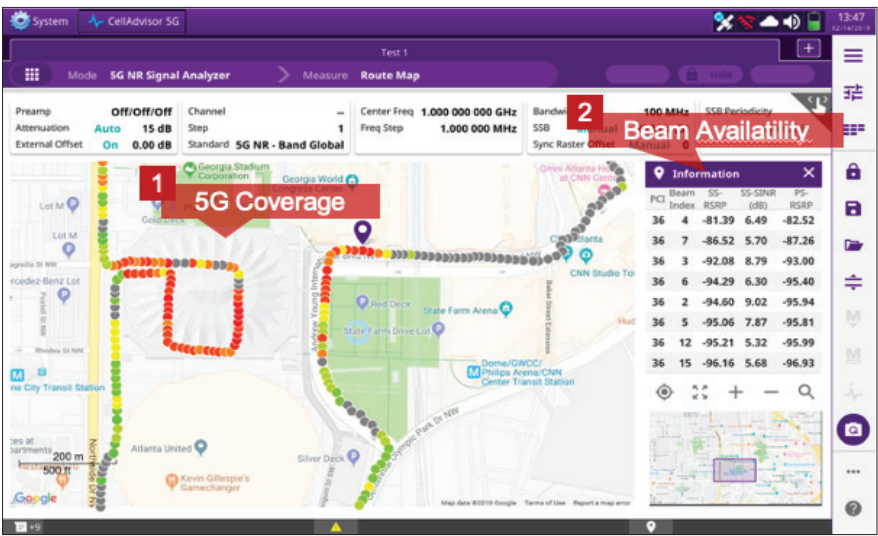
OneAdvisor 800 – Signal Coverage

Summary

VIAVI OneAdvisor 800 is the ideal all-in-one test solution for radio access networks, its portability allows conducting field tests in the front-haul, and over-the-air, including spectrum and interference analysis, as well as LTE and 5G signal analysis and coverage testing for indoors and outdoors.
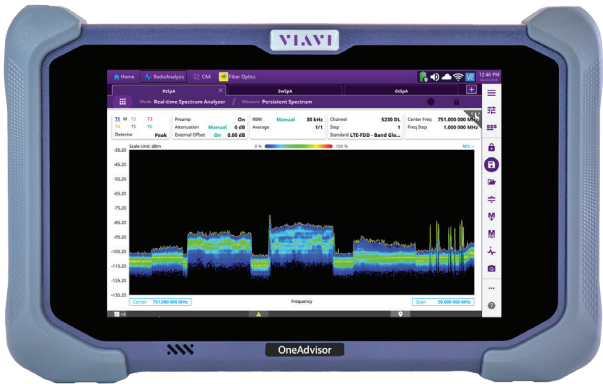
Ordering Information

OneAdvisor

Part Number	Description
ONA800A-SP0	OneAdvisor 800, Frequency for 5G NR FR1 up to 6 GHz
ONA-SP-LTEFDOTA	OneAdvisor 800 option, LTE/LTE-Adv FDD signal analysis
ONA-SP-LTETDOTA	OneAdvisor 800 option, LTE/LTE-Adv TDD signal analysis
ONA-SP-5GOTA	OneAdvisor 800 option, 5GNR beamforming analyzer

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