The Most Portable 5G Cell-site Testing Solution

5G PRO™ & 5G SMART™

Handheld Spectrum Analyzers

– 5G PRO™ : 9 kHz to 43 GHz
– 5G SMART™ : 9 kHz to 15 GHz

THE MOST PORTABLE HANDHELD SPECTRUM ANALYZERS

The INNO Instrument's 5G-series high-performance handheld spectrum analyzer is rugged, handy and designed for use in the field; it can be used for maintaining or installing cell site transmitter systems, checking and assessing wireless telecommunications signal quality and service for outdoor applications, ranging from RF characterization to modulation quality include P-SS, S-SS and decode physical cell ID and beam ID, which are key parameters to verify 5G coverage.

ULTRA-LIGHT HANDHELD SPECTRUM ANALYZERS

The 5G SMART Spectrum Analyzer, compact full-featured is the industry's most advanced and versatile handheld instrument for base station deployment and troubleshooting. Its weighing only 3.3 kg but it provides the most important RF analysis and signal analysis functions that requires Base station installation and maintenance team.

HIGH PERFORMANCE HANDHELD SPECTRUM ANALYZER

The 5G PRO high-performance mmWave Spectrum Analyzer is the industry's most advanced and versatile handheld instrument for base station deployment and troubleshooting. Its excellent RF performance of DANL -160 dBm, the 5G PRO is designed to suit for indoor and outdoor environments for locating, identifying, recording, and solving cell sites problems without sacrificing measurement accuracy.

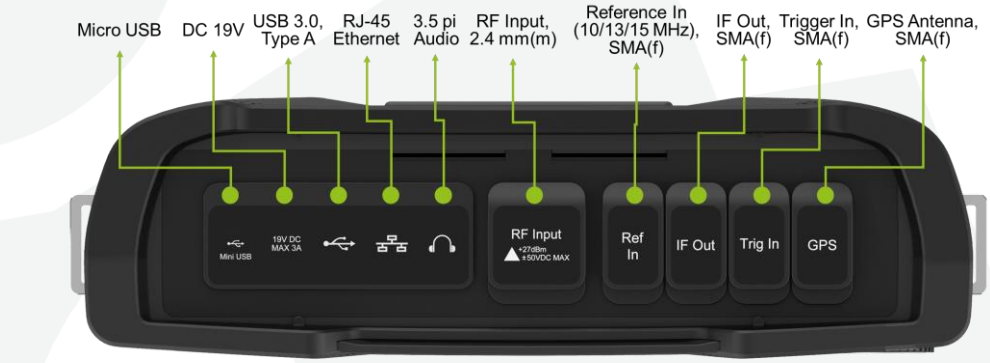
OPTIMAL TOOL FOR 5G SPECTRUM ANALYSIS

The 5G PRO, its continuous frequency coverage, 9 kHz to 43 GHz for sub-6 GHz and mmWave 5GNR measurements provides the cell-site maintenance professional the best performance need for a large number of applications from the legacy technologies and the most demanding measurements for 5G NR testing (FR1 & FR2 frequency bands).

KEY FEATURES

- Spectrum Analyzer 9 kHz to 15 GHz (5G SMART), a9 kHz to 43 GHz (5G PRO)
- Real-time Spectrum Analyzer up to 100 MHz realtime bandwidth
- Continuous frequency support for 5G NR FR1 & FR2 bands (5G PRO)
- 5G NR Signal Analysis include transmitter spurious measurement to 12.75 GHz with Over-The-Air transmitter testing
- LTE / LTE-A FDD Signal Analysis
- LTE / LTE-A TDD Signal Analysis

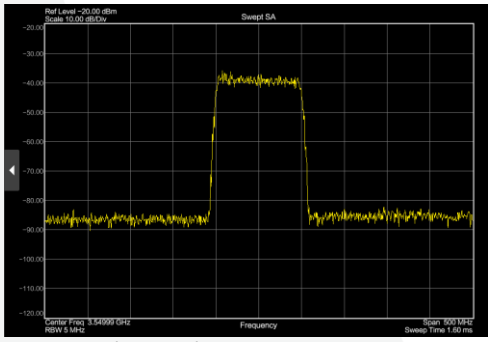
5G PRO & 5G SMART OVERVIEW



HIGHLIGHTS

SPECTRUM ANALYZER (SWEPT SA)

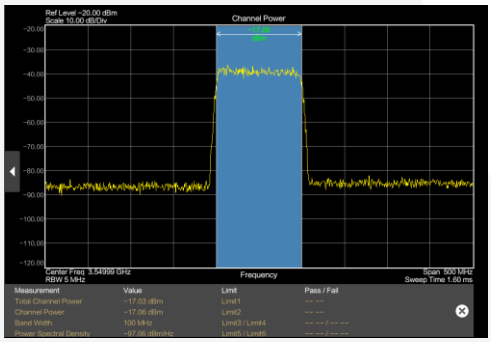
- Standard option
- Measurement accuracy of ± 0.5 dB (typical)
- Wide dynamic range down to -160 dBm (typical)
- Supports Channel power (CP), Occupied bandwidth (OBW), Spectrum emission mask (SEM), Adjacent channel power (ACP) and Transmitter spurious emissions



Spectrum analyzer mode

CHANNEL POWER (CP)

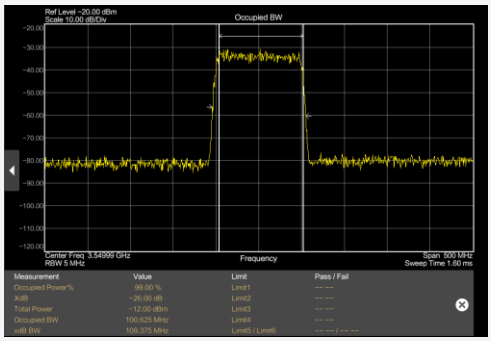
- Standard option
- Accurately measure the power of digitally modulated signals
- Easier measurement setup and fast measurement per wireless telecommunication standards
- Supports pass or fail limit test



Channel power measurement

SPECTRUM EMISSION MASK (SEM)

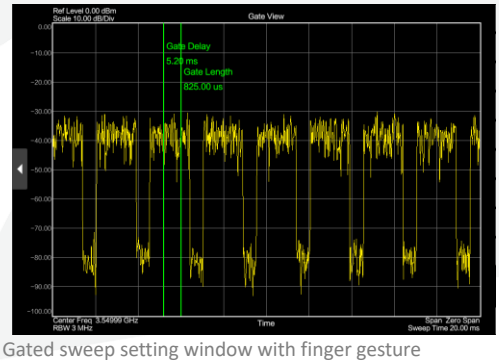
- Standard option
- Characterizing transmitting power from in-band and out-of-band emissions at specified frequency bandwidths and at specific offsets relative to the total carrier power
- Supports pass or fail mask with absolute or relative limit lines



Occupied bandwidth measurement

GATED SWEEP (SPECTRUM ANALYZER)

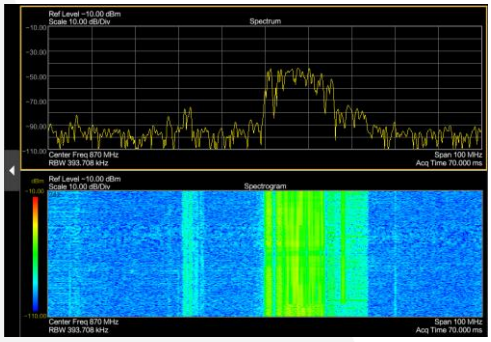
- Optional
- Quickly detect pulses in the time and frequency domains using gate settings
- Support periodic trigger synchronized with GPS to precisely capture 5G TDD signal to differentiate uplink and downlink signals



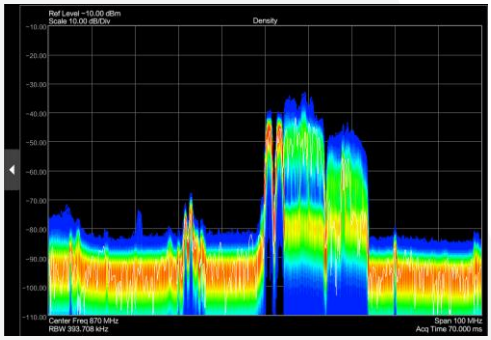
Gated sweep setting window with finger gesture

REAL-TIME SPECTRUM ANALYZER (RTSA)

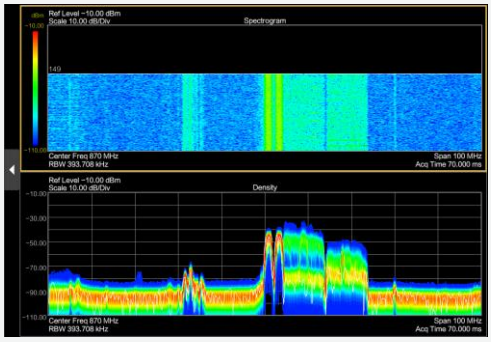
- Optional
- Two-dimensional display that contains a line trace that shows the power levels for each frequency for a particular bandwidth or span with the horizontal and vertical axis representing frequency and amplitude
- Detect signals as short as 18.6 µs (@100 MHz Span) with 100% POI with full amplitude accuracy
- The spectrogram provides an easy way to monitor the changes of a signal's frequency and amplitude over time. Typically, it is used for measurements in which time is a factor
- The persistence spectrum is a three-dimensional histogram that shows the statistical frequency of any frequency and level combinations for every pixel on the display ('hits' per pixel)
- The persistent spectrogram is a combination of spectrogram which is an easy way to monitor the changes of a signal's frequency and amplitude over time and persistent density include how frequent a certain level and frequency combination has occurred during the measurement



Realtime spectrogram view



Persistent density view



Persistent spectrogram view

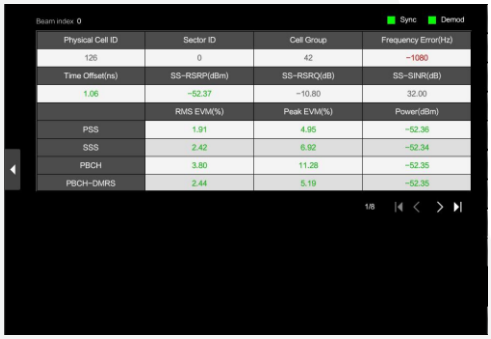
Signal Analyzers

- Optional
- The signal analyzer mode is the ideal tool to verify and troubleshoot signal quality degradation
- Supports LTE/LTE-A FDD/TDD RF analysis & Modulation analysis
- Support 5G NR RF analysis & Beam analysis

5G NR Multi-beam measurement

Beam Analysis for 5G NR

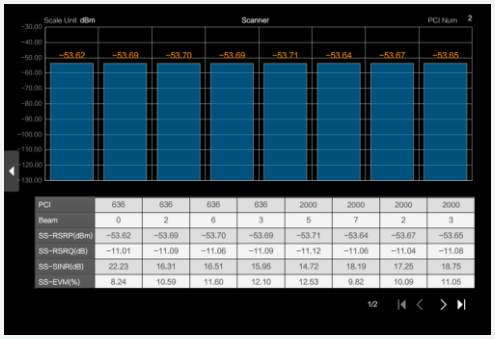
- Optional (included in 5G NR Signal Analyzer option)
- 5G NR signal analysis can measure P-SS, S-SS and decode cell ID, which are key parameters to verify 5G coverage
- Detect and measure beam IDs and individual power level in Multi-beam and Single-beam measurement
- Supporting a total of 8 beam IDs in a single page that can be measured at same time



5G NR Single-beam measurement

PCI Scanner for 5G NR

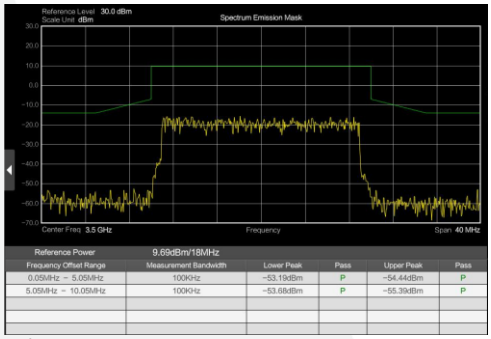
- Optional (included in 5G NR Signal Analyzer option)
- Quickly scan multiple Cell IDs, and provide the beam ID, signal strength of individual beam with the detected PCI.



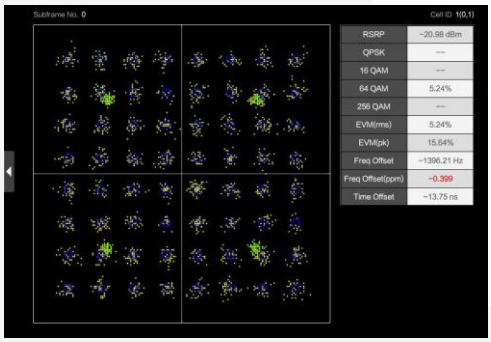
5G NR PCI Scanner

LTE / LTE-A FDD & TDD WITH OTA MEASUREMENTS

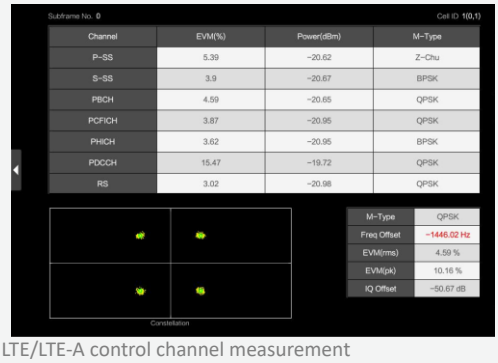
- Optional
- Supports 3GPP based RF characterization such as Channel power (CP), Occupied bandwidth (OBW), Spectrum emission mask (SEM), and Adjacent channel power (ACP)
- Demodulation measures and decodes cell ID, RSRP, RSRQ, RSSI, PSS, SSS, SINR and frequency error
- Supports Carrier Aggregation



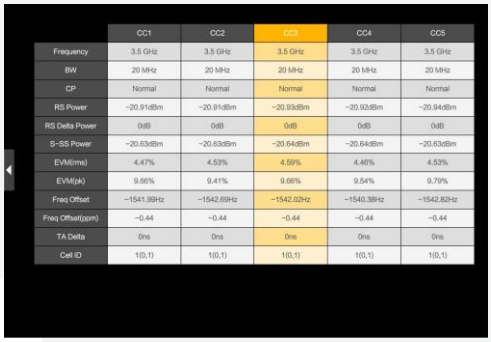
LTE/LTE-A SEM measurement



LTE/LTE-A constellation measurement



LTE/LTE-A control channel measurement



LTE /LTE-A carrier aggregation measurement

Built-in GPS

- Standard Option
- A built-in GPS receiver provides the measurement with time, latitude, longitude, and an external reference to improve frequency accuracy

USB keyboard and mouse support

- Standard Option
- 5G-series spectrum analyzers support use of USB keyboards and mice to simplify the input of text

SPECIFICATIONS IN BRIEF

GENERAL	5G PRO	5G SMART
Frequency Range	9 kHz to 43 GHz	9 kHz to 15 GHz
Frequency Span	100 MHz real-time	100 MHz real-time
	9 kHz - 43 GHz swept	9 kHz - 15 GHz swept
Display	10.1"	10.1"
Battery Operating Time	2.5 hours	2.5 hours
Weight	≤ 3.9 kg (include battery)	≤ 3.3 kg (include battery)

SPECTRUM MEASUREMENTS	
Channel Power	Total Channel Power (dBm), Bandwidth (MHz), PSD (dBm/Hz), Limit Test (Pass/Fail test)
Occupied Bandwidth	Occupied Power (%), Total Power (dBm), Occupied Bandwidth (MHz), X dB Power (dB), X dB Bandwidth (MHz), Limit Test (Pass/Fail test)
Adjacent Channel Power	Main / Adjacent / Alternate Channel Power (Absolute (dBm) / Relative (dBc)), Main / Adjacent / Alternate Channel Bandwidth (MHz)
Spectrum Emission mask	Pre-defined Mask Setting, Limit Test (Pass/Fail test)
Spurious Emissions	Frequency Range, Peak Power (dBm), Peak Frequency (MHz), Limit Test (Pass/Fail test),
Gated Sweep	Gate Delay, Gate Length, Trigger Source, Time View

LTE FDD/TDD MEASUREMENTS	
Constellation	RSRP, EVM RMS / Peak, Data EVM (QPSK,16QAM, 64QAM, 256QAM), Frequency Offset (Hz, ppm), Time Offset (ns)
Data Channel	RB Power Diagram, Constellation, Modulation Type, RB Power, EVM RMS / Peak, IQ Offset (dB)
Control Channel	P-SS, S-SS, PBCH, PCFICH, PHICH, PDCCH, RS Power (dBm), EMV (%), Modulation Type, Frequency Offset
Power vs. Time	Frame Average Power (dBm), Frequency Offset (Hz), OFDM Symbol Power (dBm), IQ Offset (dB), EVM RMS / Peak, Data EVM RMS / Peak
OTA	Channel Scanner, ID Scanner, Control Channel, Datagram
Carrier Aggregation	Frequency, Bandwidth, Channel Power, RS Power, RS Delta Power, S-SS Power, EVM RMS / Peak, Frequency Offset, Time Error, Cell ID of each Carrier Component
RF Analysis	Channel Power, Occupied Bandwidth, Spectrum Emission Mask (SEM), Adjacent Channel Leakage power Ratio (ACLR)

5G NR MEASUREMENTS

Channel Power	Total Channel Power, Peak to Average Power Ratio, Total PSD, Limit Test
Occupied Bandwidth	Occupied Bandwidth, Peak to Average Power Ratio, Total Power, xXdB Bandwidth, Limit Test
Multi-Beam Analysis	Physical Cell ID, Sector ID, Cell Group, Frequency Error, Time Offset, SS-RSRP (dBm), SS-RSRQ (dB),
	SS-SINR (dB), Sync and Demodulation Status Indicators, Power (dBm)
Single-Beam Analysis	Physical Cell ID, Sector ID, Cell Group, Frequency Error, Time Offset, SS-RSRP (dBm), SS-RSRQ (dB),
	SS-SINR (dB), Sync and Demodulation Status Indicators, Average EVM, Peak EVM (@subcarrier/symbol), Power (dBm)
PCI Scanner	Multiple PCI, Beam Index, SS-RSRP, SS-RSRQ, SS-SINR, SS-EVM of each Beam
EIRP	Rx Antenna Gain, Rx Cable Loss, Distance, Path Loss, Max Hold Count, Channel Bandwidth, EIRP, Max EIRP
	Limit Test

REAL-TIME SPECTRUM MEASUREMENTS

Realtime Spectrogram	Provides spectrum and spectrogram
Persistent Density	Two-dimensional histogram that shows the statistical frequency of any frequency and level combinations for every pixel on the display with a probability distribution
Persistent Spectrogram	Combines persistent density and spectrogram display

NOTE:

For more information on 5G PRO & 5G SMART specifications, refer to Technical Datasheet

ORDERING INFORMATION

PART NUMBER	OPTION	DESCRIPTION
TM04300001	Base platform	Spectrum Analyzer, base platform (Must be ordered with ONE frequency option)
TM04300015	Spectrum Analyzer, 15 GHz frequency option	5G SMART Spectrum Analyzer, 9 kHz to 15 GHz frequency
TM04300043	Spectrum Analyzer, 43 GHz frequency option	5G PRO Spectrum Analyzer, 9 kHz to 43 GHz frequency
TM04300010	Real time spectrum analyzer	Real time spectrum analyzer
TM04300011	Gated sweep	Gated sweep to capture time-varying signal and display it onto time-domain (gate delay, gate length, gate period, etc)
TM04300013	5G NR signal analyzer	5G NR signal analyzer include RF analysis, Beam analysis, and EIRP
TM04300014	LTE/LTE-A FDD analyzer	LTE/LTE-A FDD demodulation include RF analysis, Modulation analysis, OTA analysis, and Carrier Aggregation
TM04300015	LTE/LTE-A TDD analyzer	LTE/LTE-A FDD demodulation include RF analysis, Modulation analysis, OTA analysis, and Carrier Aggregation
TM04300018	100 MHz analysis bandwidth	100 MHz analysis bandwidth
TM04300100	Warranty Extension of 1yr for Asia and North America	Warranty Extension of 1yr for Asia and North America
TM04300101	Warranty Extension of 1yr for Latin America and EMEA	Warranty Extension of 1yr for Latin America and EMEA
TM04300200	Calibration Services for Asia and North America	Calibration Services for Asia and North America
TM04300201	Calibration Services for Latin America and EMEA	Calibration Services for Latin America and EMEA
TM04300300	Soft Carrying Case	Soft carrying case for 5G-series spectrum analyzer
TM04300301	Backpack	Backpack for 5G-series spectrum analyzer
TM04300302	Hard Carrying Case	Hard carrying case for 5G-series spectrum analyzer
TM04300303	Stylus Pen	Stylus Pen
TM04300304	Power Adapter	AC/DC Power Supply
TM04300305	Ethernet Cable	Ethernet Cable, 1m
TM04300400	Li-ion Battery	Li-ion battery, 7800 mAh
TM04300402	GPS Antenna (Active)	GPS Miniature Active Antenna, SMA, 1.5 VDC to 3.7 VDC
TM04300403	GPS Antenna (Passive)	GPS Miniature Passive Antenna, SMA
TM04300700	RF cable Type-N(m) to SMA(m) x 0.8 m	RF cable Type-N (m) to SMA (m) x 0.8 m, DC to 18 GHz
TM04300701	RF cable 2.4mm(m) to 2.4mm(m) x 0.6 m	RF cable 2.4mm(m) to 2.4mm(m) x 0.6 m, DC to 40 GHz
TM04300702	RF cable 2.4mm(f) to 2.4mm(f) x 0.6 m	RF cable 2.4 mm(f) to 2.4 mm(f) x 0.6 m, DC to 40 GHz
TM04300703	RF cable 2.4mm(f) to 2.4mm(m) x 0.6 m	RF cable 2.4 mm(f) to 2.4 mm(m) x 0.6 m, DC to 40 GHz
TM04300704	RF cable 2.4mm(m) to 2.92mm(m) x 0.6 m	RF cable 2.4 mm(m) to 2.92 mm(m) x 0.6 m, DC to 40 GHz
TM04300705	RF cable 2.92mm(m) to 2.92mm(m) x 0.6 m	RF cable 2.92 mm(m) to 2.92 mm(m) x 0.6 m, DC to 40 GHz

TM00900700	RF cable Type-N(m) to Type-N(f) x 1.5 m	RF cable Type-N(m) to Type-N(f) x 0.6 m, DC to 8 GHz
TM00900701	RF cable SMA(m) to SMA(f) x 1.5 m	RF cable SMA(m) to SMA(f) x 0.6 m, DC to 8 GHz
TM04300800	Adapter, SMA(f) to BNC(m)	Adapter, SMA(f) to BNC(m)
TM04300801	Adapter, 2.4 mm(f) to 2.92 mm(m)	Adapter, 2.4 mm(f) to 2.92 mm(m)
TM04300802	Adapter, SMA(f) to SMA(m)	Adapter (Miniature Active GPS Antenna), SMA(f) to SMA(m)

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