

# FieldFox RF Analyzer N9912C

## Carry Precision with you



# FieldFox N9912C Overview

# FieldFox N9912C in brief – single model, endless possibility



Freq Range: 5kHz to 10 GHz

Real time bandwidth: 40MHz

## Device Test

1. Cable and antenna test
2. TDR
3. VNA / Time domain
4. Vector voltmeter
5. Power meter
6. Tracking generator

## Signal Analysis

7. Spectrum analysis
8. Real-time spectrum analysis
9. Time gating
10. Interference analysis
11. Channel scanner
12. Analog demodulation (AM/FM)
13. OTA LTE, 5G OTA
14. Pulse measurement with peak power sensor
15. Frequency counter
16. EMI pre-compliance test
17. EMF measurement



## Utilities

18. GNSS
19. DC voltage source
20. Secure erase
21. Mapping
22. Frequency extender

# N9912C features and key specifications



## Functions:

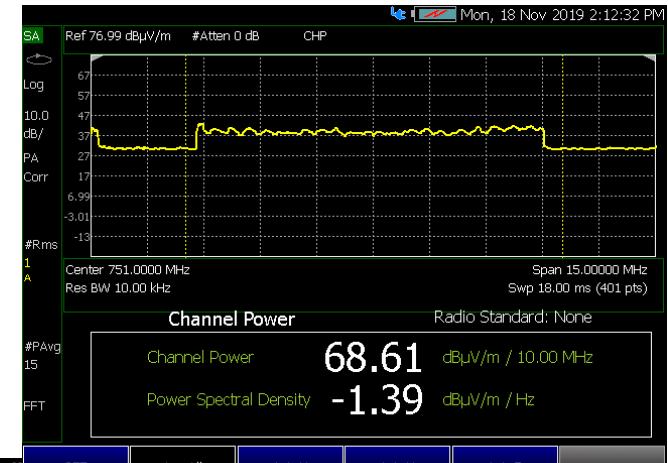
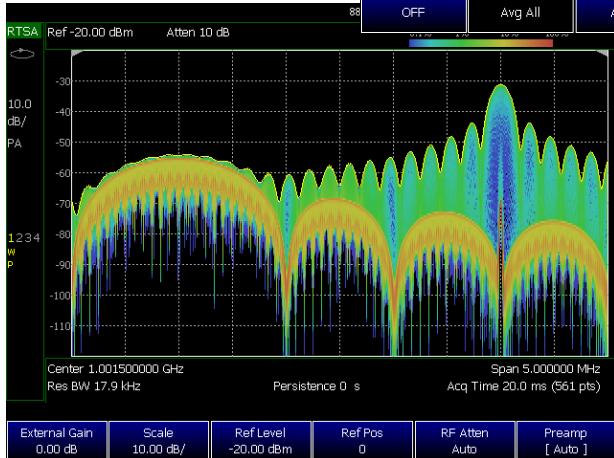
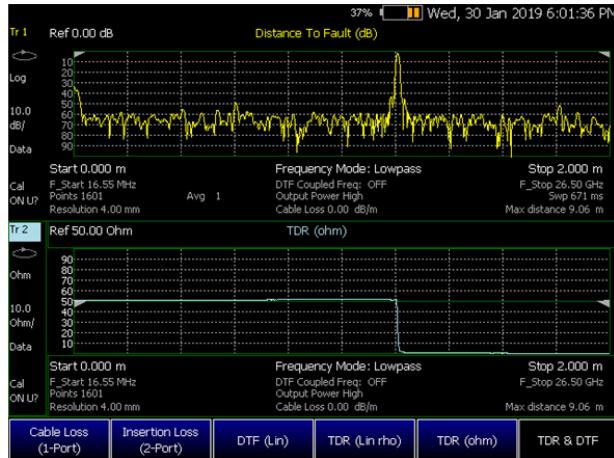
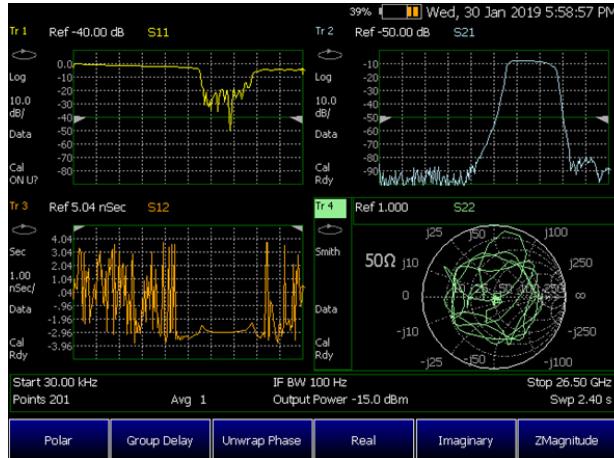
- All in one: VNA, SA, RTSA, OTA 5G/LTE, RF pulse measurement, power meter, signal generator etc..
- Frequency upgradable, allow SA and VNA frequency mix and match
- All options including frequency bands are software keycoded
- Meets MIL standards

## Key specification:

- Frequency: 3kHz to 10GHz
- Real time / demodulation bandwidth: 40 MHz
- VNA dynamic range: 100 to 110 dB;
- SA DANL: -160dBm
- Phase noise: -105dB @ 10 kHz offset

# Product differentiators

- Provide excellent lower frequency measurements for SA and VNA. Broadcasting, DSL, EMI and HF spectrum monitoring
- Frequency is upgradable via software keycode
- SA, CAT and VNA frequency range can be mix and match. Like 10GHz SA + 7GHz VNA etc..



# Fully software defined instrument

N9912C	FieldFox RF Analyzer
N9912C - CA4	cable and antenna analyzer 4 GHz
N9912C - CA6	cable and antenna analyzer 6.5 GHz
N9912C - CAX	cable and antenna analyzer 10 GHz
N9912C- NA4	Vector network analyzer (4GHz)
N9912C-NA6	Vector network analyzer (6.5GHz)
N9912C- NAX	Vector network (10 GHz)
N9912C-SA4	Spectrum analyzer 4 GHz
N9912C-SA6	Spectrum analyzer 6.5 GHz
N9912C-SAX	Spectrum analyzer 10 GHz
N9912C-235	Pre-amplifier 4GHz
N9912C-235	Pre-amplifier 6.5 GHz
N9912C-235	Pre-amplifier 10 GHz
N9912C - 220	Tracking gen

N9912C-010	Vector network analyzer time domain
N9912C-030	Remote control capability
N9912C-208	USB power sensor measurements versus frequency
N9912C-215	TDR cable measurements
N9912C-238	Spectrum analyzer time gating
N9912C-236	Interference analyzer and spectrogram
N9912C-302	USB power sensor support
N9912C-307	GPS receiver
N9912C-308	Vector voltmeter
N9912C-309	DC bias variable-voltage source
N9912C-310	Built-in power meter
N9912C-312	Channel scanner
N9912C-330	Pulse measurements
N9912C-350	Real-time spectrum analyzer (RTSA)
N9912C-352	Indoor and outdoor mapping
N9912C-355	Analog demodulation
N9912C-358	EMF measurements
N9912C-361	EMI measurements
N9912C-370	Over the air LTE FDD measurements
N9912C-371	Over the air LTE TDD measurements
N9912C-378	Over-the-air (OTA) 5G NR measurements
N9912C-B04	Bandwidth, 40 MHz

# Flexible upgrade : frequency, bandwidth and functions

N9912CU	N9912C FieldFox RF analyzer upgrades
N9912CU - CA4	cable and antenna analyzer 4 (including insertion loss)
N9912CU - CA6	cable and antenna analyzer 6.5GHz
N9912CU - CAX	cable and antenna analyzer 10
N9912CU - C46	CAT upgrade to from 4 to 6.5 GHz
N9912CU - C4X	CAT upgrade from 4 to 10GHz
N9912CU - C6X	CAT upgrades from 6.5 to 10GHz
N9912CU- NA4	Vector network analyzer (4GHz) full 2port
N9912CU-NA6	Vector network analyzer (6.5GHz)
N9912CU- NAX	Vector network (10 GHz)
N9912CU - N46	VNA upgrade 4 GHz to 6.5 GHz
N9912CU - N4X	VNA upgrade 4 GHz to 10 GHz
N9912CU - N6X	VNA upgrade 6.5GHz to 10 GHz
N9912CU-SA4	Spectrum analyzer 4
N9912CU-SA6	Spectrum analyzer 6.5GHz
N9912CU-SAX	Spectrum analyzer 10
N9912CU-S46	SA upgrade from 4 GHz to 6.5GHz
N9912CU-S4X	SA upgrade from 4 GHz to 10GHz
N9912CU-S6X	SA upgrade from 6.5 GHz to 10GHz

N9912CU allows

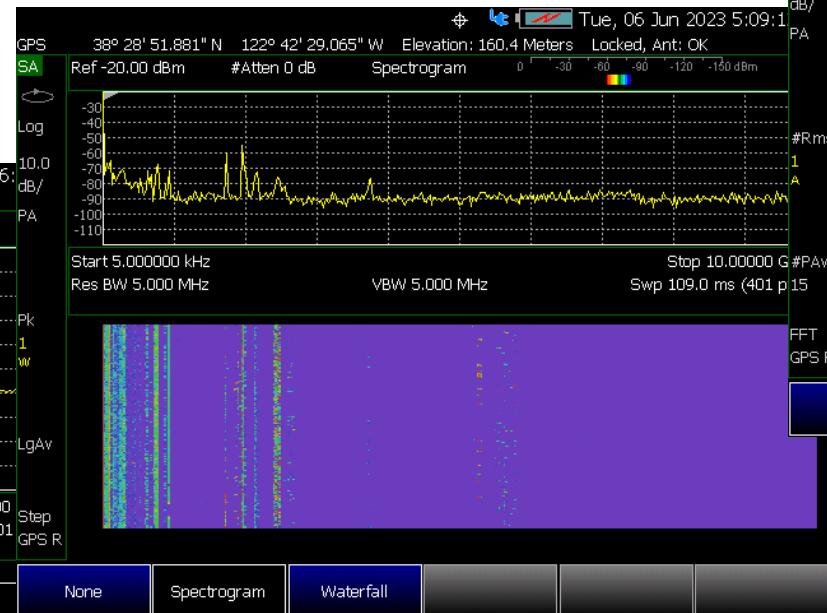
- Upgrades for frequencies;
- Functionality upgrades;
- Bandwidth

# Spectrum analyzer measurements

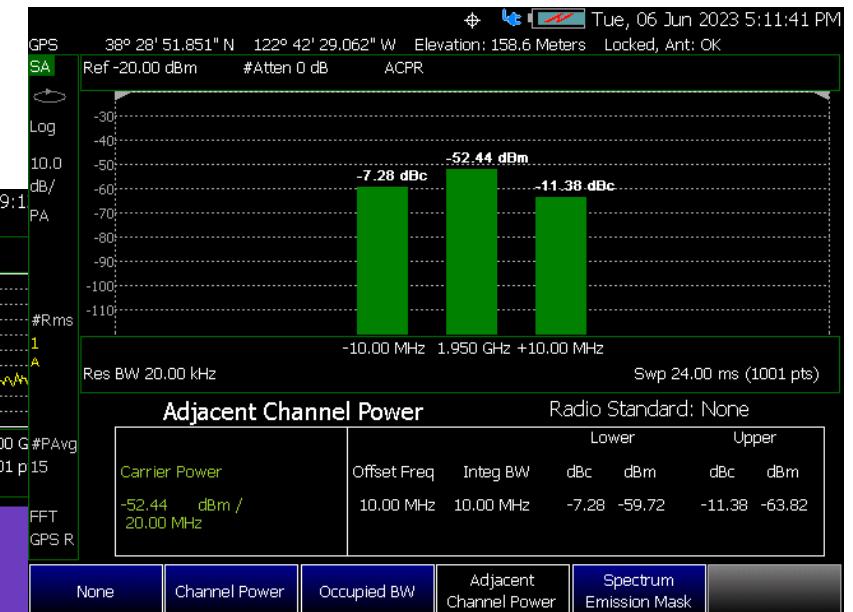
Channel power



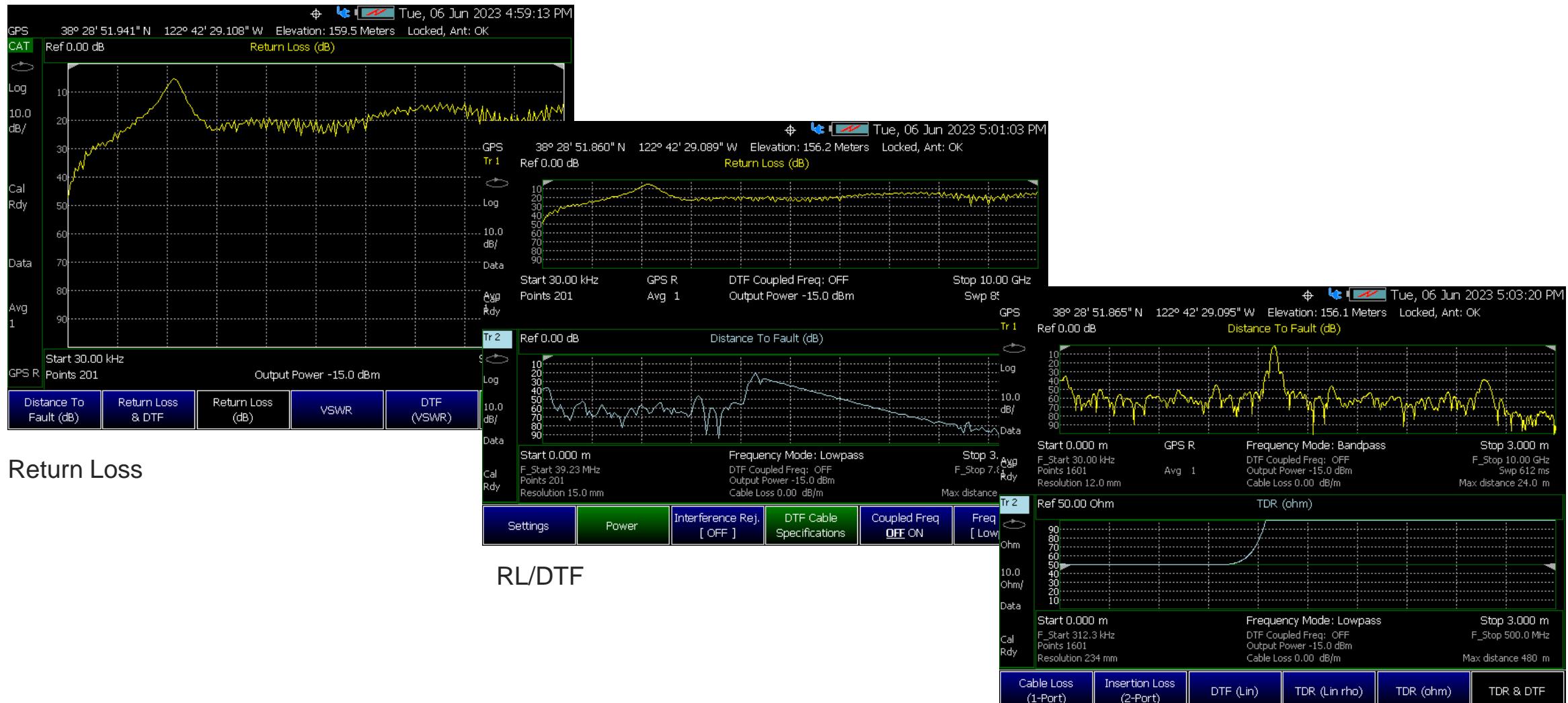
Spectrum and spectrogram



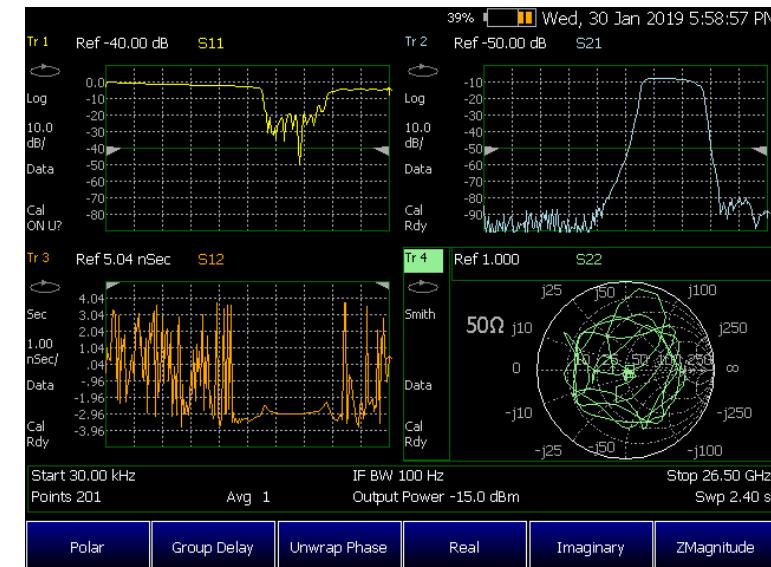
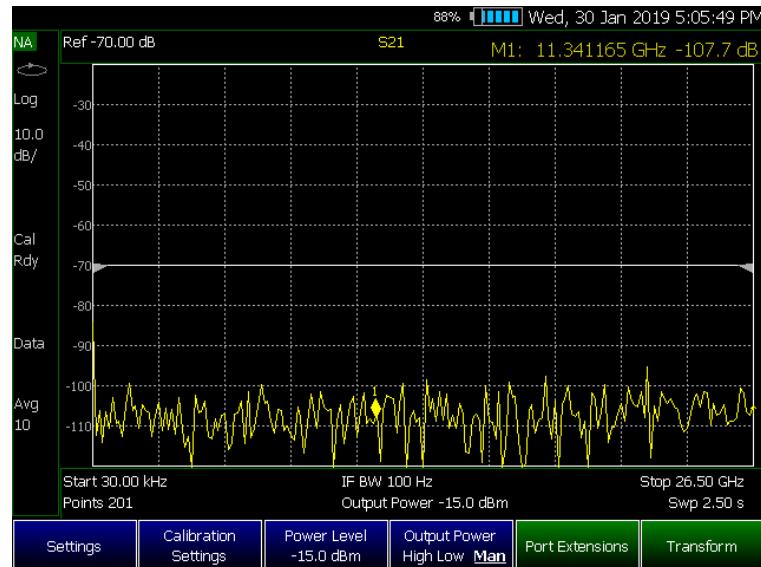
Adjacent Channel Power



# Cable and antenna analyzer



# Vector Network and Cable/Ant Analyzer



S21 system dynamic range > 100 dB

4 S-parameters

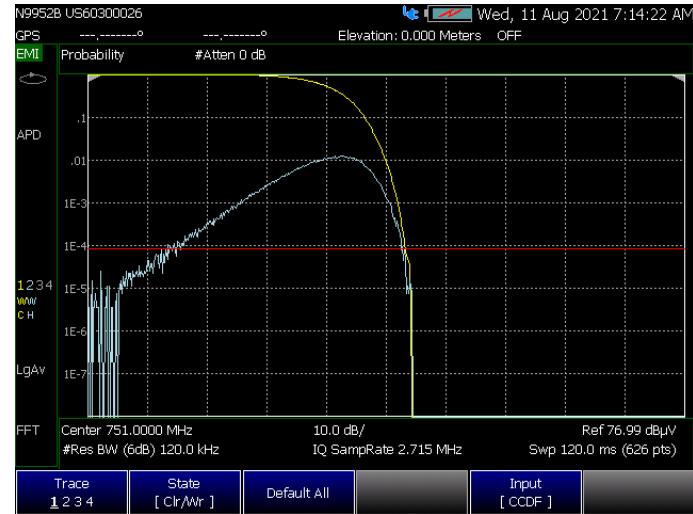


Time domain

# All in one pre-compliance EMI handheld analyzer



- **CISPR bandwidth:** 200Hz, 9kHz, 120kHz and 1MHz
- **CISPR detectors (6dB bandwidth):** peak, quasi-peak and EMI average
- **CISPR bands:** A/B/C/D/E

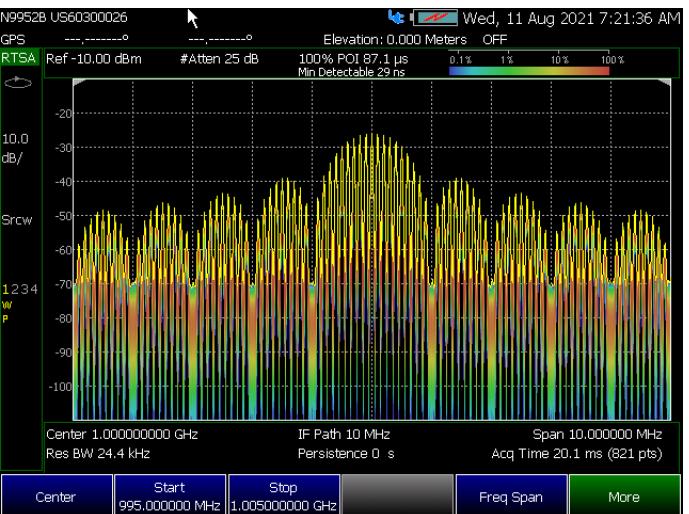


## APD (Amplitude Probability Distribution)

- CCDF
- Histogram
- CISPR and MIL 461 6dB bandwidth

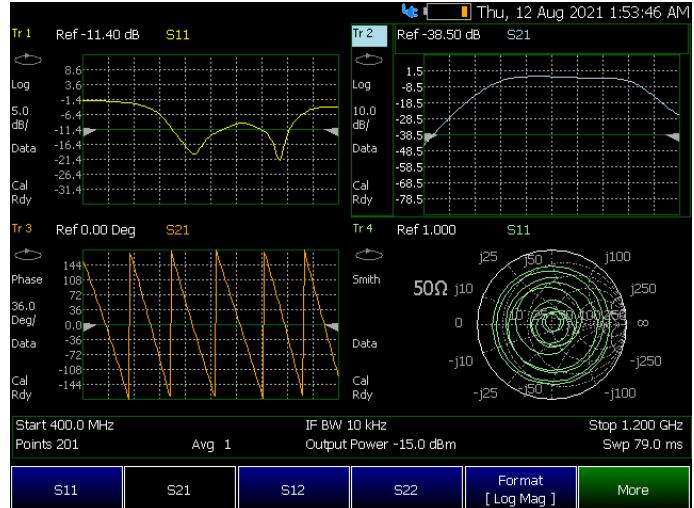
## Real Time SA

- 120MHz real time bandwidth
- POI: 5.5us
- Min. Det. Signal: 47ns
- Density, spectrogram and trace modes



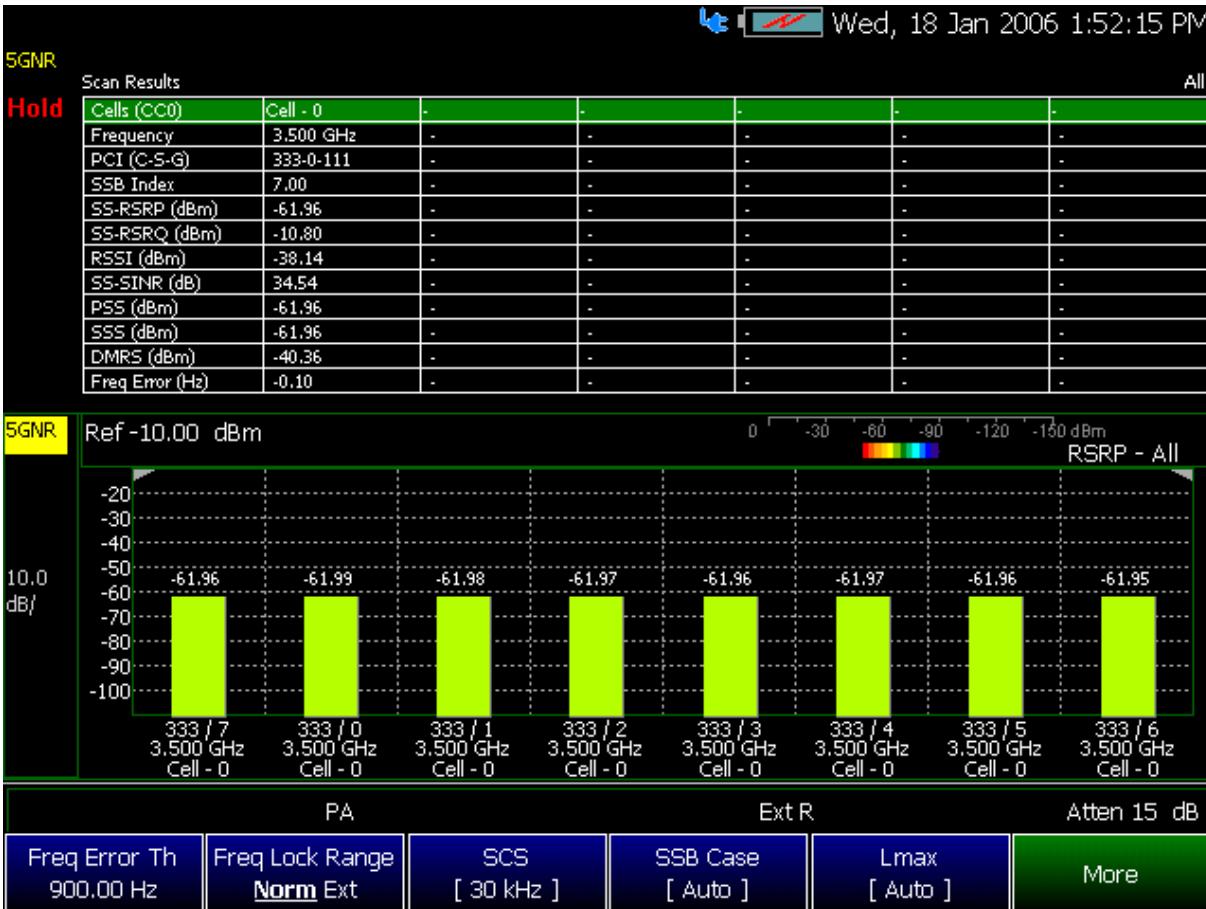
## Full 2 port VNA

- 4 s parameters
- Magnitude and phase
- Group delay
- Impedance
- Smith Chart
- VSWR



# 5G NR OTA

Cell site info



Beam index scanning

- PCI
- RSRP
- RSRQ
- PSS and SSS power
- SINR
- DMRS power and SINR
- SSB index (beam index)
- Frequency error
- EIRP
- SSB location/auto detection
- Top N cell scanning
- Top N component carrier scanning
- Demodulation bandwidth: 100 MHz

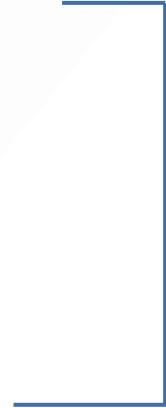
# Dynamic Spectrum Sharing test (5G NR / LTE FDD /TDD)

5G NR

Scan Results (0 - 7)							
<b>5GNR</b>							All
<b>Hold</b>							
Cells (CC0)	Cell - 0	Cell - 1	Cell - 2	Cell - 3	-	-	-
Frequency	882.0 MHz	882.0 MHz	882.0 MHz	882.0 MHz	-	-	-
PCI (C-S-G)	76-1-25	75-0-25	378-0-126	379-1-126	-	-	-
SSB Index	2	2	2	2	-	-	-
RSRP (dBm)	-107.880	-112.290	-113.470	-116.870	-	-	-
RSRQ (dB)	-14.460	-18.870	-19.950	-23.340	-	-	-
RSSI (dBm)	-80.410	-80.410	-80.510	-80.510	-	-	-
SINR (dB)	-0.190	-6.670	-8.270	-12.010	-	-	-
PSS (dBm)	-108.450	-115.730	-116.910	-117.430	-	-	-
SSS (dBm)	-108.070	-113.030	-113.620	-115.480	-	-	-
DMRS (dBm)	-107.710	-111.660	-113.320	-118.920	-	-	-
Scan Results							
<b>LFDD</b>							
Cells (CC0)	Cell - 0	Cell - 1	-	-	-	-	-
Frequency	884.9 MHz	884.9 MHz	-	-	-	-	-
PCI (C-S-G)	76-1-25	75-0-25	-	-	-	-	-
RSRP (dBm)	-111.59	-114.28	-	-	-	-	-
RSRQ (dB)	-15.34	-18.03	-	-	-	-	-
RSSI (dBm)	-88.46	-88.46	-	-	-	-	-
PSS (dBm)	-104.79	-106.02	-	-	-	-	-
SSS (dBm)	-106.78	-107.58	-	-	-	-	-
SINR (dB)	-3.74	-6.76	-	-	-	-	-
PA		Idle			Atten 0 dB		
NSA / DSS OFF <b>ON</b>	LTE Duplex Mode FDD	CC All	Display Type Table	LTE Setup	5G NR Setup		

LTE

## EMF support for 5G NR

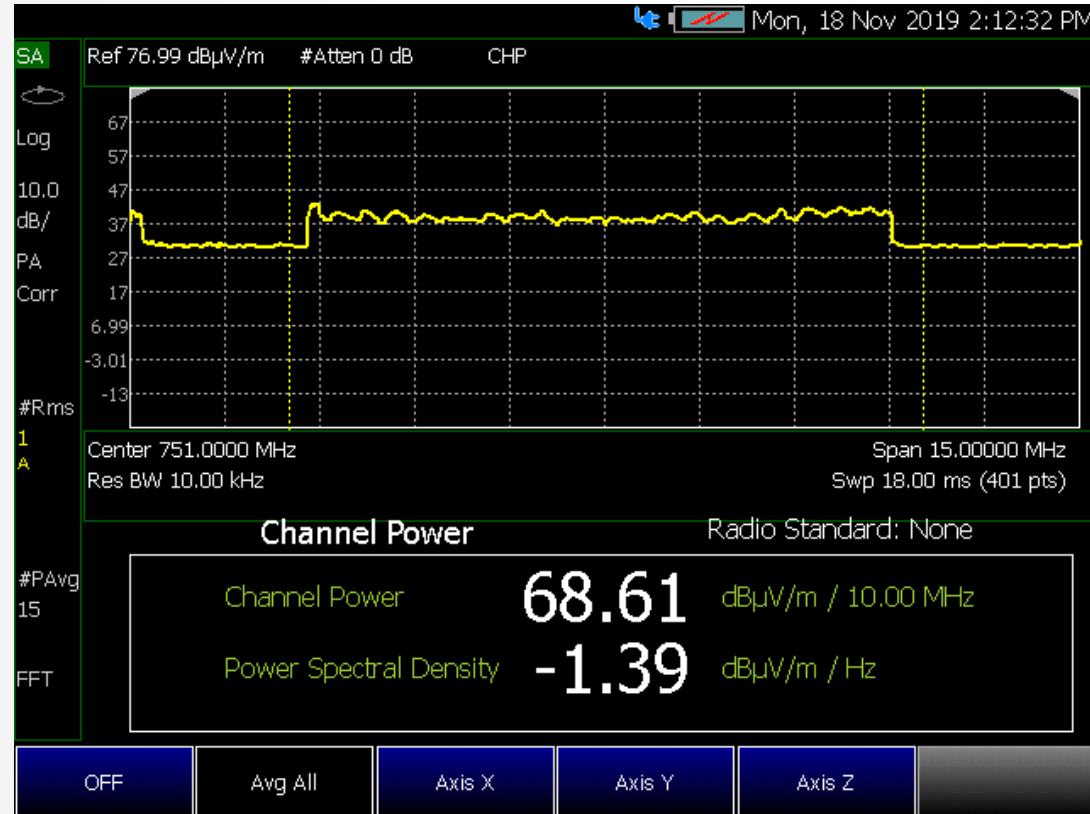


USB to control 3 Axis

- Measure field strength in OTA power report and SA mode
- There is MCU built in, it manages usb port, control which antenna to use (X,Y, Z), antenna factor is saved in the memory.
- USB control

# EMF measurements

## CHANNEL POWER, CHANNEL SCANNER AND 5G NR OTA



Mon, 18 Nov 2019 2:28:22 PM

5GNR Scan Results All

Cells (CC0)	Cell - 0	-	-	-	-	-	-	-
Frequency	3.500 GHz	-	-	-	-	-	-	-
PCI (C-S-G)	333-0-111	-	-	-	-	-	-	-
SSB Index	0.00	-	-	-	-	-	-	-
RSRP (dB $\mu$ V/m)	44.09	-	-	-	-	-	-	-
RSRQ (dB)	-11.96	-	-	-	-	-	-	-
RSSI (dB $\mu$ V/m)	69.07	-	-	-	-	-	-	-
SINR (dB)	5.46	-	-	-	-	-	-	-
PSS (dB $\mu$ V/m)	54.45	-	-	-	-	-	-	-
SSS (dB $\mu$ V/m)	44.24	-	-	-	-	-	-	-
DMRS (dB $\mu$ V/m)	43.91	-	-	-	-	-	-	-
Freq Error (Hz)	387.01	-	-	-	-	-	-	-

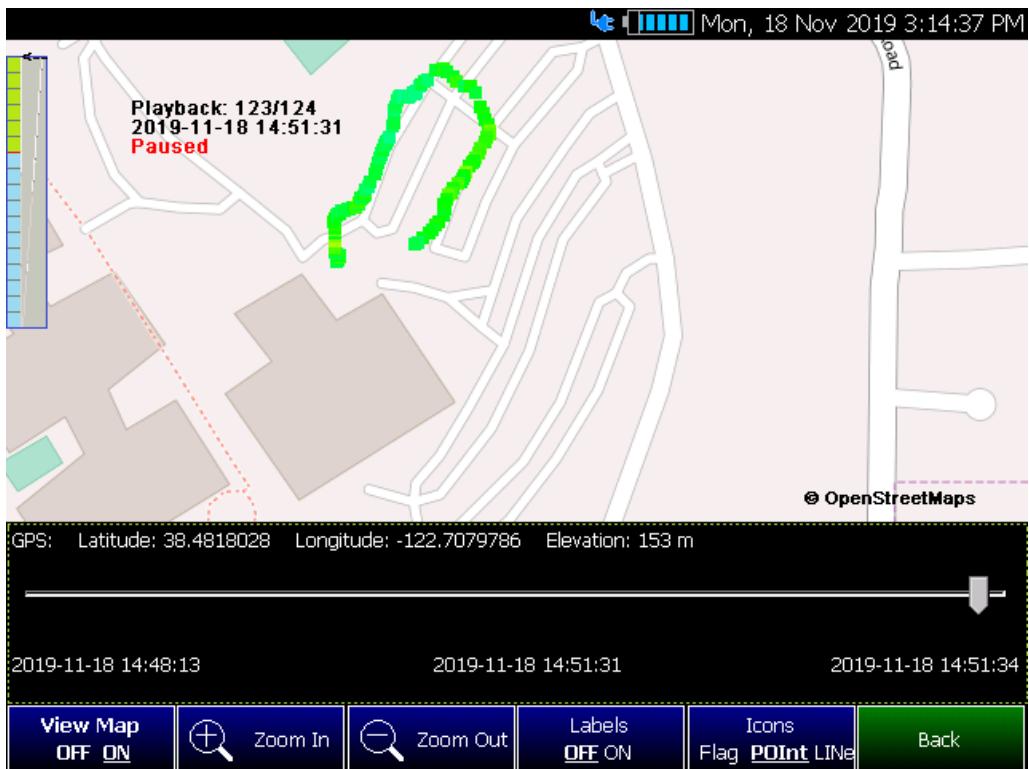
5GNR Scan Results All

Cells (CC0)	Cell - 0							
Frequency	3.500 GHz							
PCI (C-S-G)	333-0-111	333-0-111	333-0-111	333-0-111	333-0-111	333-0-111	333-0-111	333-0-111
SSB Index	0.00	1.00	2.00	3.00	7.00	5.00	4.00	6.00
RSRP (dB $\mu$ V/m)	44.09	43.99	43.96	43.95	43.93	43.88	43.76	43.64
RSRQ (dB)	-11.96	-11.88	-11.98	-11.83	-11.86	-11.87	-11.93	-12.00
RSSI (dB $\mu$ V/m)	69.07	68.89	68.95	68.79	68.80	68.75	68.71	68.65
SINR (dB)	5.46	5.11	5.03	5.24	4.32	5.13	4.85	4.67
PSS (dB $\mu$ V/m)	54.45	54.28	54.19	54.11	53.94	54.06	54.14	53.99
SSS (dB $\mu$ V/m)	44.24	44.19	44.16	44.18	44.45	44.05	44.00	43.79
DMRS (dB $\mu$ V/m)	43.91	43.75	43.72	43.67	43.30	43.67	43.48	43.45
Freq Error (Hz)	387.01	387.01	387.01	387.01	387.01	387.01	387.01	387.01

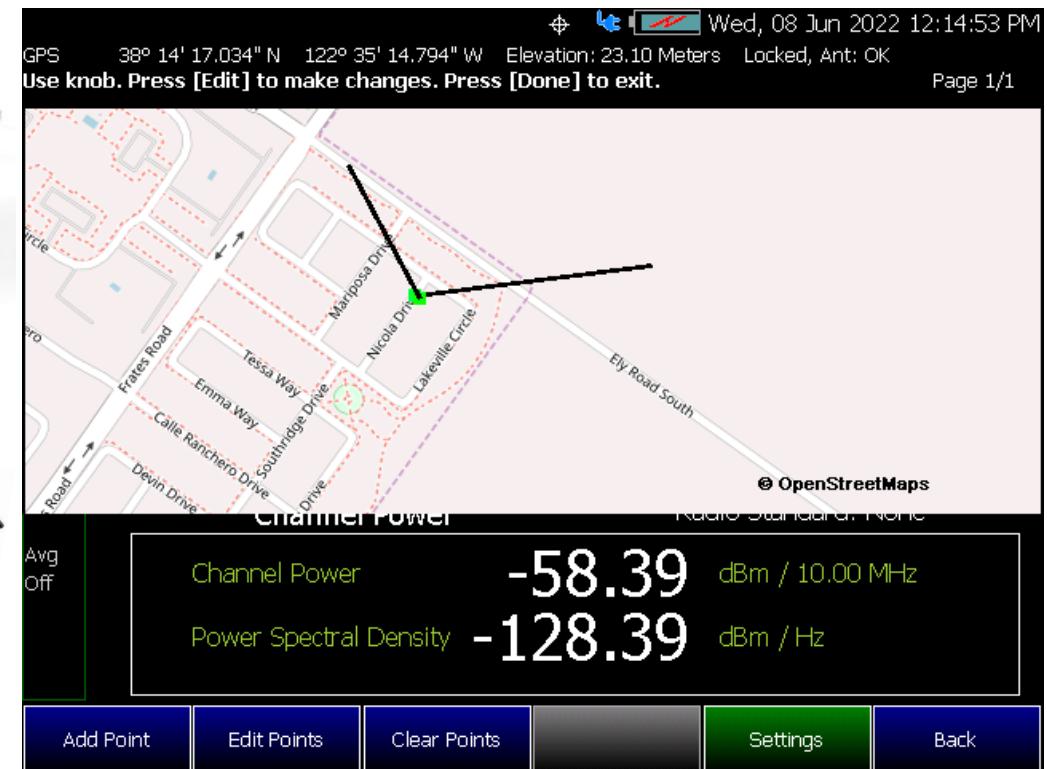
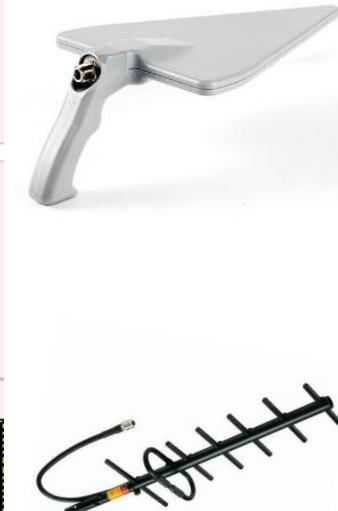
PA #Atten 0 dB

EMF Meas OFF	EMF Units ON dB $\mu$ V/m				Back
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# Manual DF - AoA



Drive or walk around to find hotspot



DF using directional antenna



# Utilities

