

Product Launch

New Site Master™ MS2089A Cable and Antenna Analyzer with Spectrum Analyzer

Raymond Chan

Product Manager
Anritsu Company

May 2024

Doc No. 11420-00052A



1. Introduction

The New Models

Model	CAA	S-Param	SPA	Note
S331L	2 MHz to 4 GHz	S11	X	Light budget-friendly self-contained unit, but slow and limited functions built in. (low performance)
S331P	150 kHz to 6 GHz	S11	X	Small, easy-to-carry CAA, but limited functions and needs a PC.
S331E	2 MHz to 4 GHz	S11,S21	X	EOL 6 months after launch-Replace by MS2085A
S332E	2 MHz to 4 GHz	S11,S21	9 kHz to 4 GHz	EOL 6 months after launch-Replace by MS2085A
S361E	2 MHz to 4 GHz	S11,S21	9 kHz to 4 GHz	EOL 6 months after launch-Replaced by MS2089A
S362E	2 MHz to 6 GHz	S11,S21	9 kHz to 6 GHz	EOL 6 months after launch-Replaced by MS2089A
S820E	1MHz to 40 GHz	Full S parm	X	Self-contained VNA up to 40GHz but does not have SPA function.
MS2090	X	X	9 kHz to 54 GHz	Powerful SPA that goes up to 54Ghz but no VNA.
MS2090 and S820E	1MHz to 40 GHz	Full S parm	9 kHz to 54 GHz	For users who need high freq VNA + SPA
MS2080A	X	X	9 kHz to 6 GHz	Great general SPA for 6 GHz below application.
MS2080A+S331P	150 kHz to 6 GHz	S11	9 kHz to 6 GHz	Great general SPA with limited function CAA
MS2085A	5 kHz to 6 GHz	S11,S21	X	Full of function CAA but no SPA
MS2089A	5 kHz to 6 GHz	S11,S21	9 kHz to 6 GHz	Great General SPA with full function CAA

MS2085A:

- Is a 5 kHz to 4/6 GHz CAA only.
- Option 21 (transition measurement) requires hardware. This means it can not be upgraded with SW only.

MS2089A:

- Is a CAA+SPA (there is no mixing and matching of frequencies). All options are SW options. The unit has all the hardware.
 - 5 kHz -6 GHz CAA + 9 kHz-6 GHz SPA
 - 5 kHz -4 GHz CAA + 9 kHz-4 GHz SPA

MS2085A and MS2089A

MS2089A:

SPA Port

CAA RF Port 1

CAA RF Port 2



MS2085A:

CAA RF Port 1

CAA RF Port 2 (option 21)



Tag Line For MS2085A/MS2089A

“Tested, Trusted, and Supported”

Tested - The Site Master Brand is well-known in the I&M world. The Site Master is well-tested in the field, with close to 30 years of customer usage (the first Site Master was launched in 1995). There are B series units that are still being used in the field. There are stories of Site Masters that keep on working.

Trusted - The Site Master is a well trusted brand in the I&M world. They not only last a long time, but they work well and make good measurements. They are proven to be reliable units and easy to use.

Supported - Not only is the instrument well known for its robustness but for the level of support we provide. Anritsu has provided certified training for line sweeping. Most ask for a Site Master when they are talking to rental companies, they are not looking for a CAA.

Site Master has been traditionally known only as a CAA, but it is much more. It is a powerful CAA+SPA, and we will be adding the VNA option in the future. Anritsu has decades of making best-in-class SPA. Site Master is a tool that plays in ANY market.

Continues to be Durable

The MS2085A and the MS2089A is tested to the same standards as our older models. It has undergone the same environmental testing as all our models. It will be rated for an explosive atmosphere environment. The screen is IK08 rated, making it very durable. Further, it will be IP52 with the case.

The CAA battery life is 5 hours typical with the SPA being 3 hours typical.

Regulatory Compliance	
European Union	EMC 2014/30/EU, EN 61326-1:2013 CISPR 11/EN 55011, IEC/EN 61000-4-2/3/4/5/6/8/11 Low Voltage Directive 2014/35/EU Safety EN 61010-1:2010 RoHS Directive 2011/65/EU & 2015/863
United Kingdom	EMC SI 2016/1091; BS EN 55011 & BS 61000-4-2/3/4/5/6/8/11 Consumer Protection (Safety) SI 2016/1101; BS EN 61010-1:2010 Environmental Protection SI 2012/3032; 2011/65/EU & 2015/863
Australia and New Zealand	RCM AS/NZS 4417:2012
South Korea	KCC-R-R-A2J-1002
Canada	ICES-3(A)/NMB-3(A)
United States	FCC 15.247, 15.249, 15.251, 15.253, 15.255, 15.257, 15.259, 15.261, 15.263, 15.265, 15.267, 15.269, 15.271, 15.273, 15.275, 15.277, 15.279, 15.281, 15.283, 15.285, 15.287, 15.289, 15.291, 15.293, 15.295, 15.297, 15.299, 15.301, 15.303, 15.305, 15.307, 15.309, 15.311, 15.313, 15.315, 15.317, 15.319, 15.321, 15.323, 15.325, 15.327, 15.329, 15.331, 15.333, 15.335, 15.337, 15.339, 15.341, 15.343, 15.345, 15.347, 15.349, 15.351, 15.353, 15.355, 15.357, 15.359, 15.361, 15.363, 15.365, 15.367, 15.369, 15.371, 15.373, 15.375, 15.377, 15.379, 15.381, 15.383, 15.385, 15.387, 15.389, 15.391, 15.393, 15.395, 15.397, 15.399, 15.401, 15.403, 15.405, 15.407, 15.409, 15.411, 15.413, 15.415, 15.417, 15.419, 15.421, 15.423, 15.425, 15.427, 15.429, 15.431, 15.433, 15.435, 15.437, 15.439, 15.441, 15.443, 15.445, 15.447, 15.449, 15.451, 15.453, 15.455, 15.457, 15.459, 15.461, 15.463, 15.465, 15.467, 15.469, 15.471, 15.473, 15.475, 15.477, 15.479, 15.481, 15.483, 15.485, 15.487, 15.489, 15.491, 15.493, 15.495, 15.497, 15.499, 15.501, 15.503, 15.505, 15.507, 15.509, 15.511, 15.513, 15.515, 15.517, 15.519, 15.521, 15.523, 15.525, 15.527, 15.529, 15.531, 15.533, 15.535, 15.537, 15.539, 15.541, 15.543, 15.545, 15.547, 15.549, 15.551, 15.553, 15.555, 15.557, 15.559, 15.561, 15.563, 15.565, 15.567, 15.569, 15.571, 15.573, 15.575, 15.577, 15.579, 15.581, 15.583, 15.585, 15.587, 15.589, 15.591, 15.593, 15.595, 15.597, 15.599, 15.601, 15.603, 15.605, 15.607, 15.609, 15.611, 15.613, 15.615, 15.617, 15.619, 15.621, 15.623, 15.625, 15.627, 15.629, 15.631, 15.633, 15.635, 15.637, 15.639, 15.641, 15.643, 15.645, 15.647, 15.649, 15.651, 15.653, 15.655, 15.657, 15.659, 15.661, 15.663, 15.665, 15.667, 15.669, 15.671, 15.673, 15.675, 15.677, 15.679, 15.681, 15.683, 15.685, 15.687, 15.689, 15.691, 15.693, 15.695, 15.697, 15.699, 15.701, 15.703, 15.705, 15.707, 15.709, 15.711, 15.713, 15.715, 15.717, 15.719, 15.721, 15.723, 15.725, 15.727, 15.729, 15.731, 15.733, 15.735, 15.737, 15.739, 15.741, 15.743, 15.745, 15.747, 15.749, 15.751, 15.753, 15.755, 15.757, 15.759, 15.761, 15.763, 15.765, 15.767, 15.769, 15.771, 15.773, 15.775, 15.777, 15.779, 15.781, 15.783, 15.785, 15.787, 15.789, 15.791, 15.793, 15.795, 15.797, 15.799, 15.801, 15.803, 15.805, 15.807, 15.809, 15.811, 15.813, 15.815, 15.817, 15.819, 15.821, 15.823, 15.825, 15.827, 15.829, 15.831, 15.833, 15.835, 15.837, 15.839, 15.841, 15.843, 15.845, 15.847, 15.849, 15.851, 15.853, 15.855, 15.857, 15.859, 15.861, 15.863, 15.865, 15.867, 15.869, 15.871, 15.873, 15.875, 15.877, 15.879, 15.881, 15.883, 15.885, 15.887, 15.889, 15.891, 15.893, 15.895, 15.897, 15.899, 15.901, 15.903, 15.905, 15.907, 15.909, 15.911, 15.913, 15.915, 15.917, 15.919, 15.921, 15.923, 15.925, 15.927, 15.929, 15.931, 15.933, 15.935, 15.937, 15.939, 15.941, 15.943, 15.945, 15.947, 15.949, 15.951, 15.953, 15.955, 15.957, 15.959, 15.961, 15.963, 15.965, 15.967, 15.969, 15.971, 15.973, 15.975, 15.977, 15.979, 15.981, 15.983, 15.985, 15.987, 15.989, 15.991, 15.993, 15.995, 15.997, 15.999
Environmental	
Operating Temperature Range	-10°C to 55°C
Storage Temperature Range	-51°C to 71°C
Maximum Relative Humidity	95 % RH at 30°C, non-condensing
Vibration, Sinusoidal	5 Hz to 55 Hz
Vibration, Random	10 Hz to 500 Hz
Half Sine Shock	30 g _n
Altitude	4600 meters, operating and non-operating
Explosive Atmosphere	MIL-PRF-28800F Section 4.5.6.3 MIL-STD-810G, Method 511.5, Procedure 1
Ingress Protection Rating	Complies with IP52 when installed in soft carrying case



The New Site Master is the New Swiss Army Knife

- The new Site Master MS2089A has all the CAA features built-in. This allows users to perform CAA (VNA options to come) measurements, which means filter measurements, sweep cables, and much more.
 - The VNA option (SW upgrade) will be a 2 port 1 path VNA (Coming end of FY24). We plan on adding additional features by end of FY24, such as Option 7, Secure Data Operation.
 - The Site Master is known for line sweeping, and if there are lines to sweep, remind the users of our legacy in line sweeping.
- The Site Master MS2089A has the **same** powerful SPA as the MS2080A. It has new features specifically for the GP and MIL/GOV market.
 - Secure Communication (Option 17), which allows users to connect the unit to their network to use the unit as an RSM or to control it remotely.
 - The Site Master has the same powerful RTSA (Option 199) that the MS2080A has, allowing the user to catch everything.
 - IQ capture (Option 126) and Streaming (Option 127) can be used for multiple applications. It can be used to integrated into third-party software such as SIGINT, R&D, and much much more.



1. SPA Related Features

MS2089A Smarter Measurements – Greater Productivity



Interference Hunting
Polar Plot



Interference Hunting
Geolocation



Passive Intermodulation



Channel Power



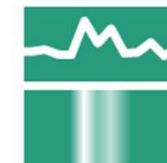
Cable &
Antenna Analyzer



AM/FM
Demodulation



Zero Span



Spectrogram



Limit Lines
Save on Event



SEM

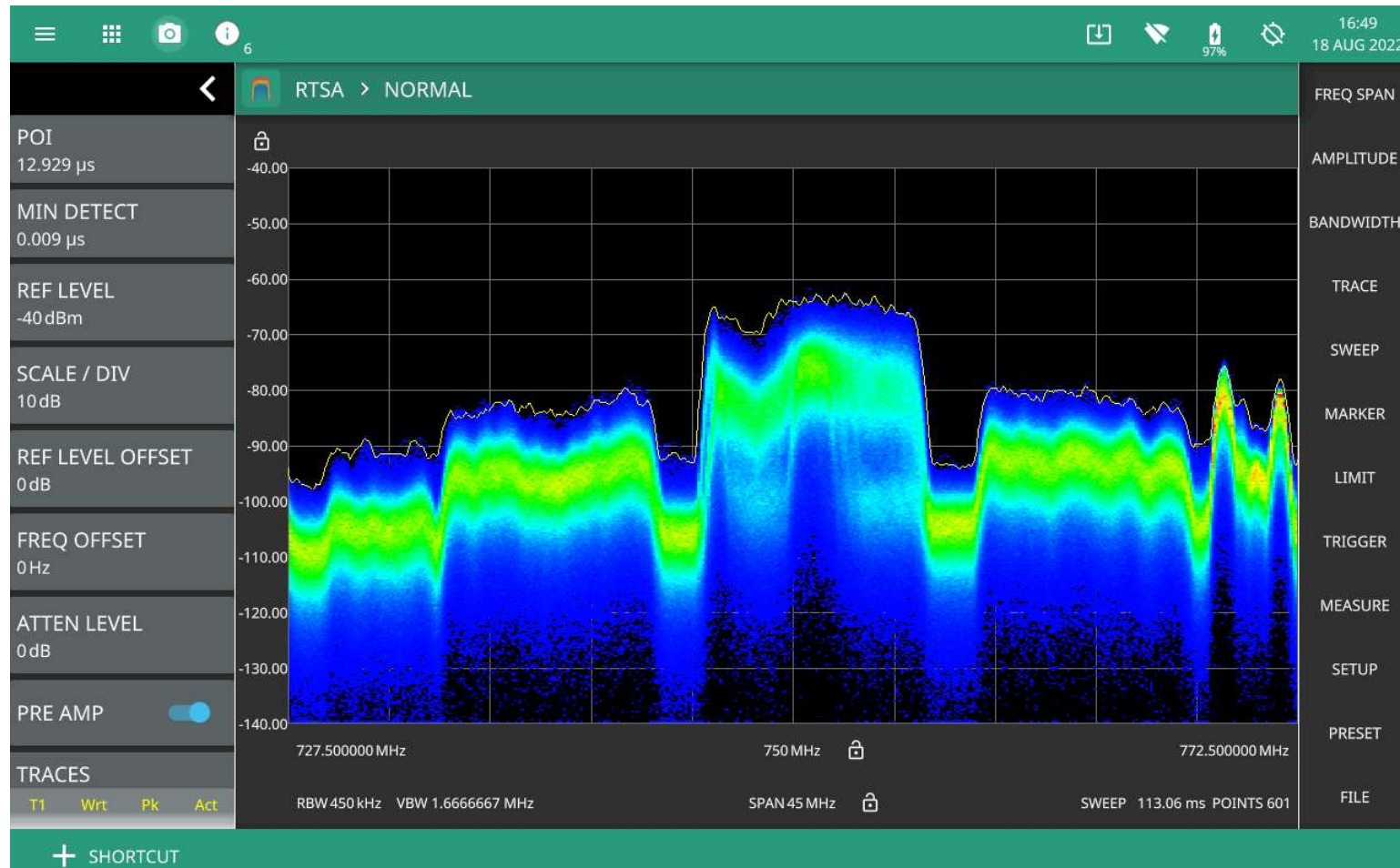


ACPR



OBW

Faster, Better, and Smarter



The MS2089A has the powerful SPA (same SPA as the MS2080A) that we all love, with 40 MHz of analyses BW.

It comes with RTSA, allowing customers to catch everything. Perfect for interference hunting.

IQ capture, and IQ streaming has multiple applications.

Secure Communication (Option 17)

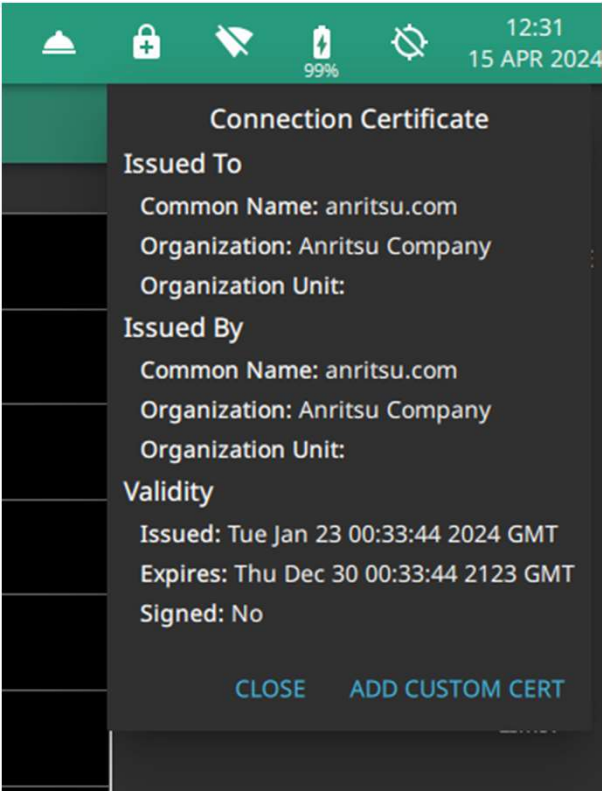
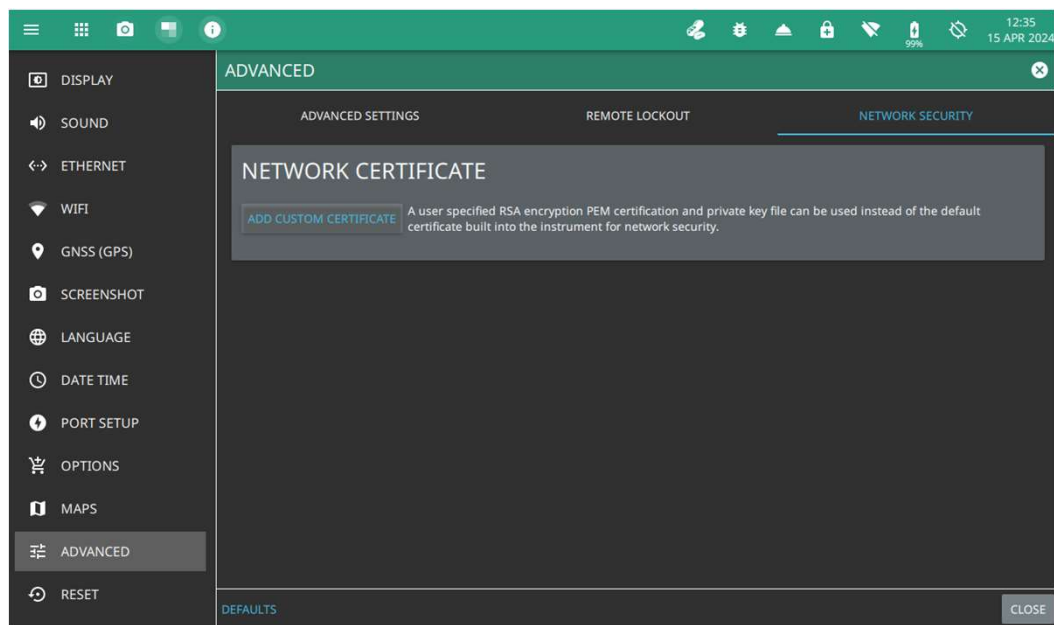
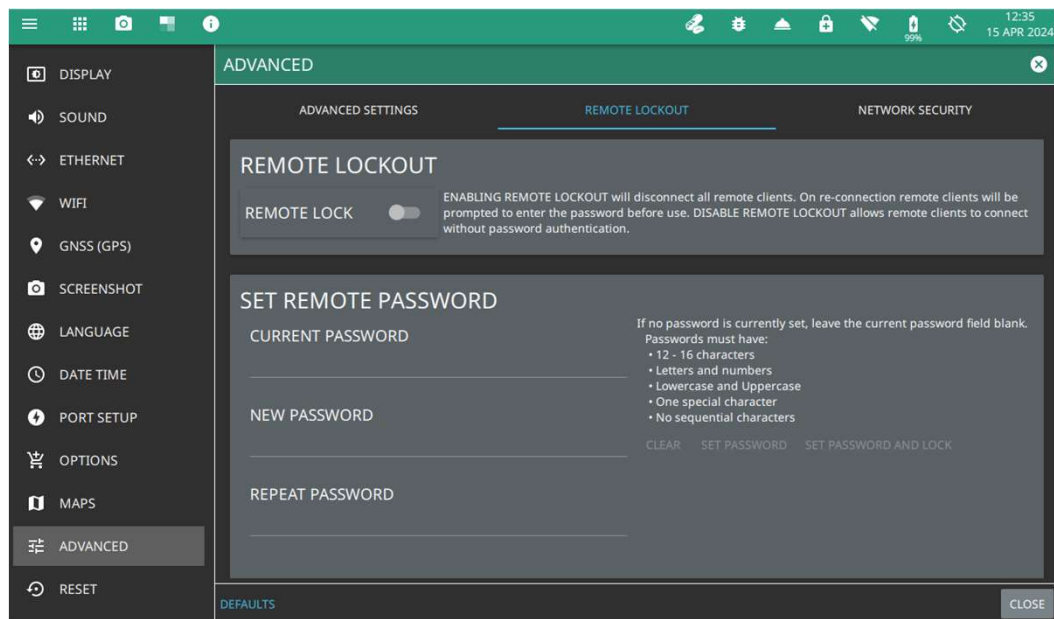
Port	Service	Default State	With Option 17
21(tcp)	ftp	Open	Closed
22(tcp)	ssh	Open	Open
80(tcp)	http	Open	Closed
111(tcp)	rpcbind	Open	Open
443(tcp)	https	Open	Open
8001(tcp)	vcom-tunnel	Open	Closed
8002(tcp)	vcom-tunnel	Closed	Open(encrypted)
9001(tcp)	tor-orport	Open	Closed
9002(tcp)	dynamid	Open	Closed
9003(tcp)	tor-orport	Closed	Open(Encrypted)
9004(tcp)	dynamid	Closed	Open(Encrypted)
24001(tcp)	med-fsp-rx	Open	Closed
24002(tcp)	med-fsps-rx	Closed	Open(Encrypted)
111(udp)	rpcbind	Open	Open
123(udp)	ntp	Open	Open
5353(udp)	zerocong	Open	Open

The MS2089A can be used as a node in an RSM network, with Option 400, which allows secure communication. This option closes ports and encrypts information.

Option 7 will be coming soon (FY24). Frequency blanking and external storage saving only.

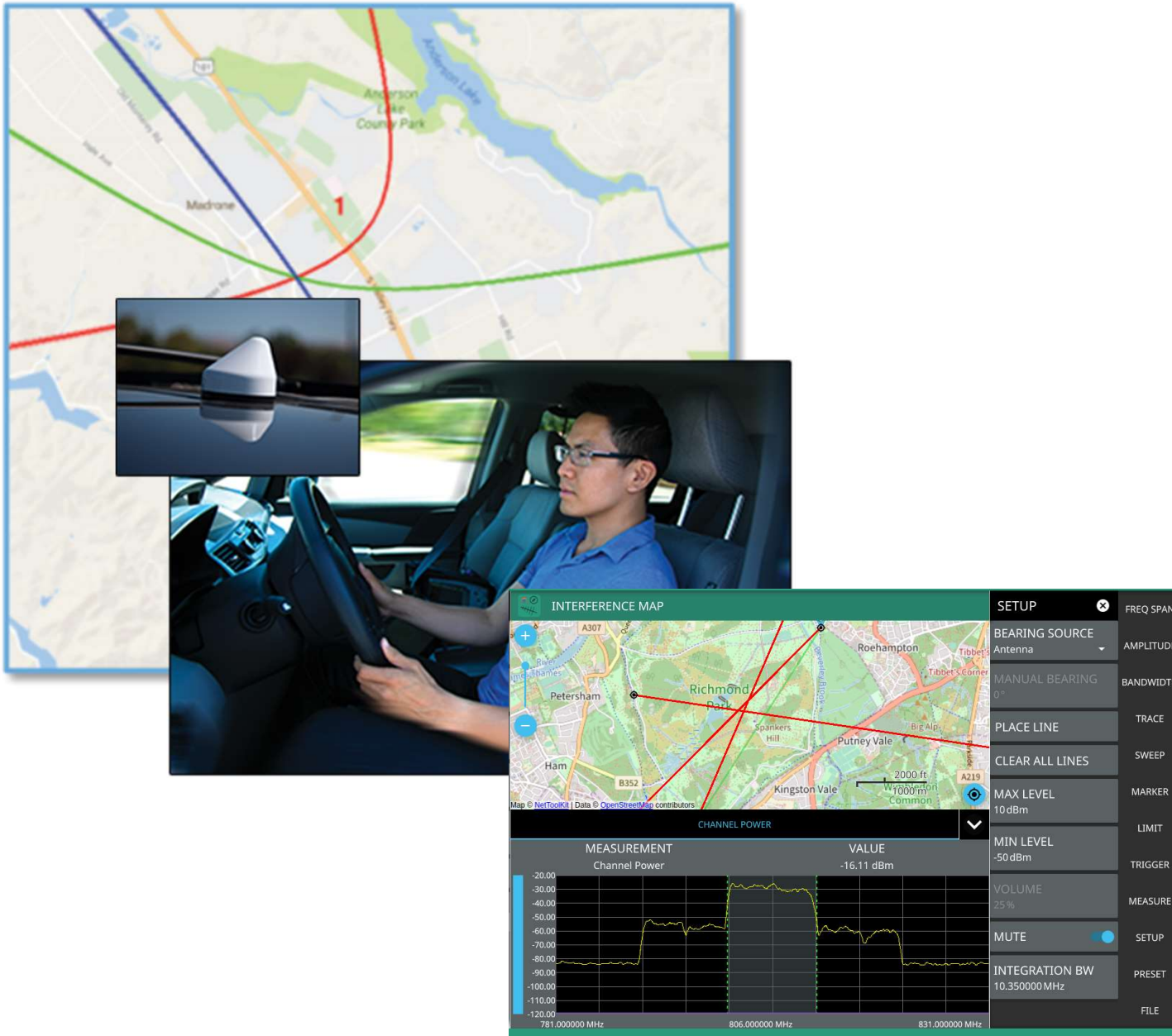
This new option is going to be available for the MS2090A, MS2080A, and MS27201A as well!

Secure Communication (Option 17)



This also allows the user to upload certificates to authenticate communications.

Remote Spectrum Monitoring – Macro to Last Leg



The new Site Master can be one or all the nodes for POA when it comes to RSM. This means the unit can be used to locate interference from a macro scale. The MS2090A, MS080A, and MS2089A can do this with Option 400.

The same unit can be used for MIH (MX280007A) in vehicles by connecting it to a computer and to an antenna.

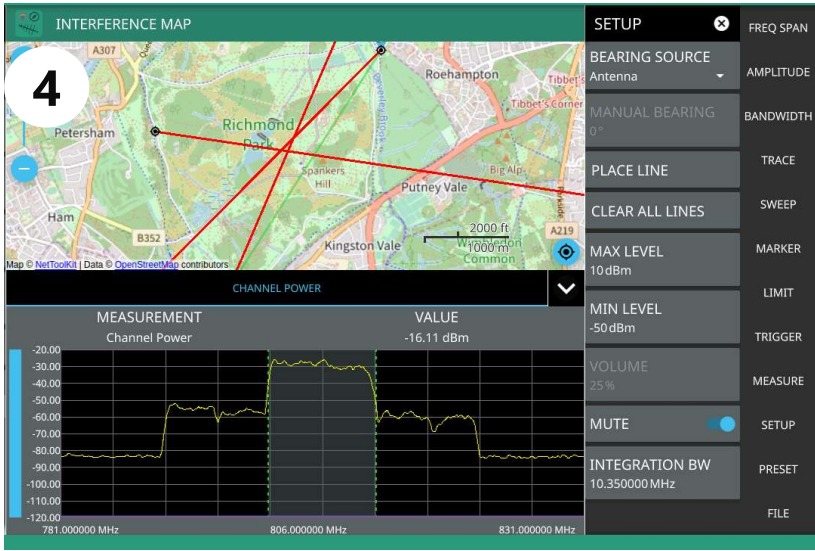
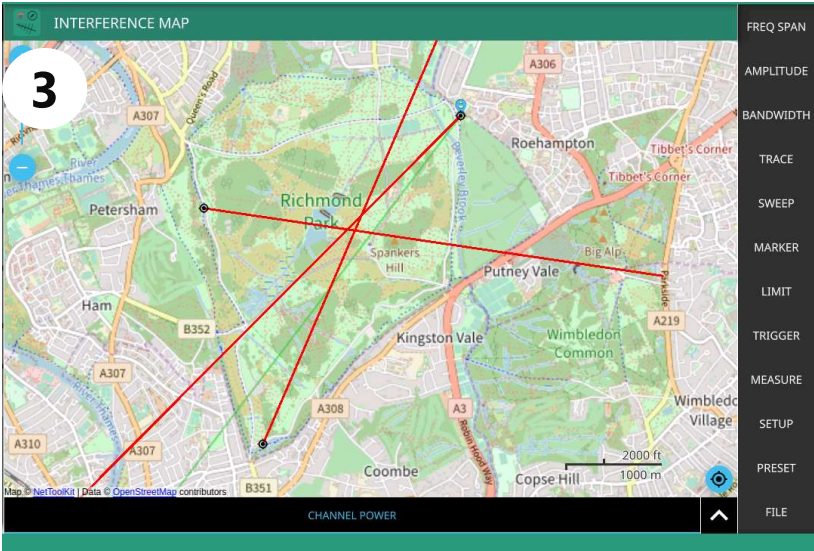
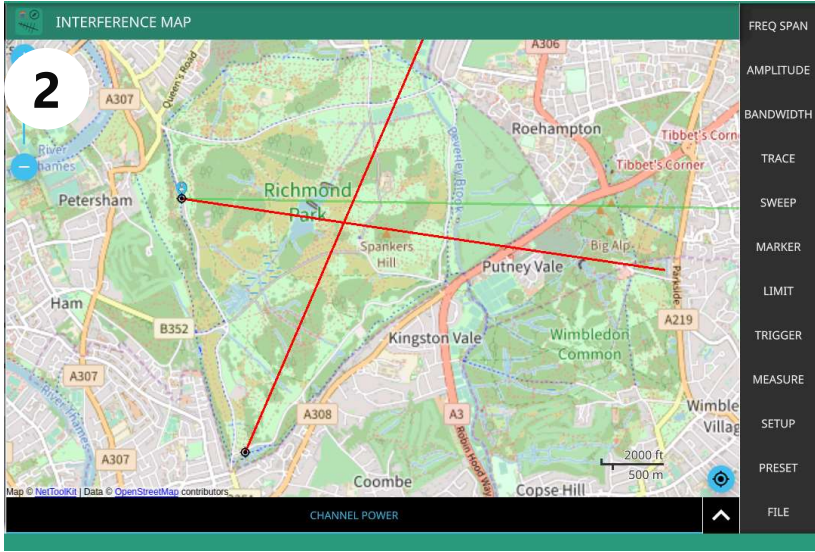
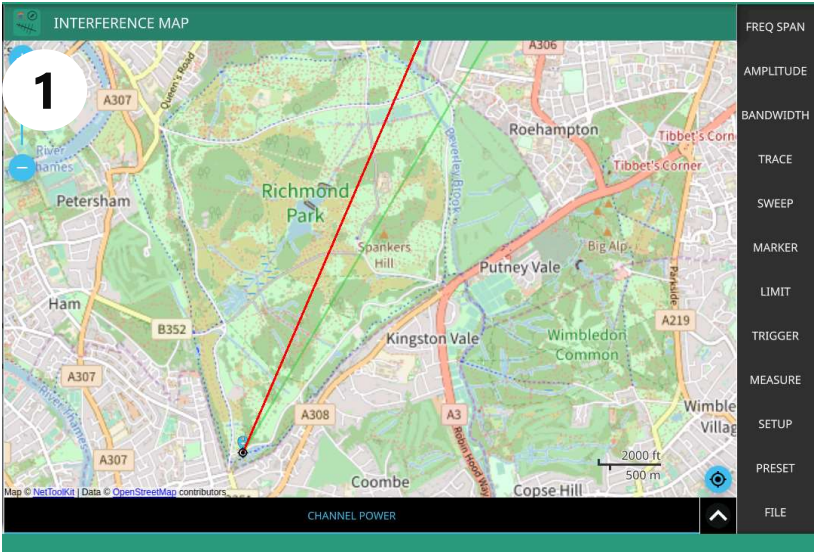
Since the Site Master is hand-held, it can be used for the last leg (Option 24).

Integrates with Mobile InterferenceHunter Software

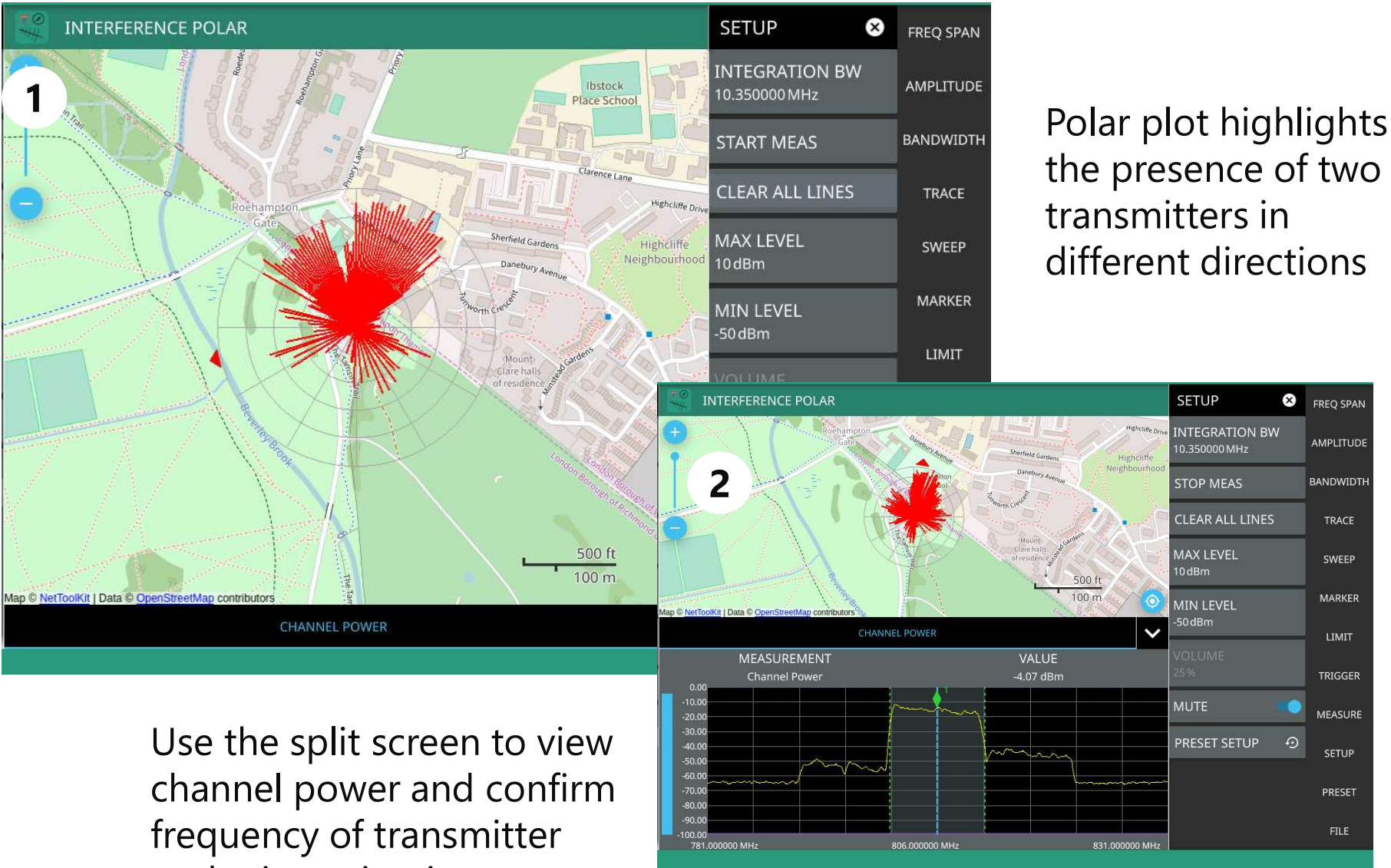


Compatible with Mobile InterferenceHunter software for active drive location of interfering signals over a wide area

Field Master MS2089A – Interference Mapping

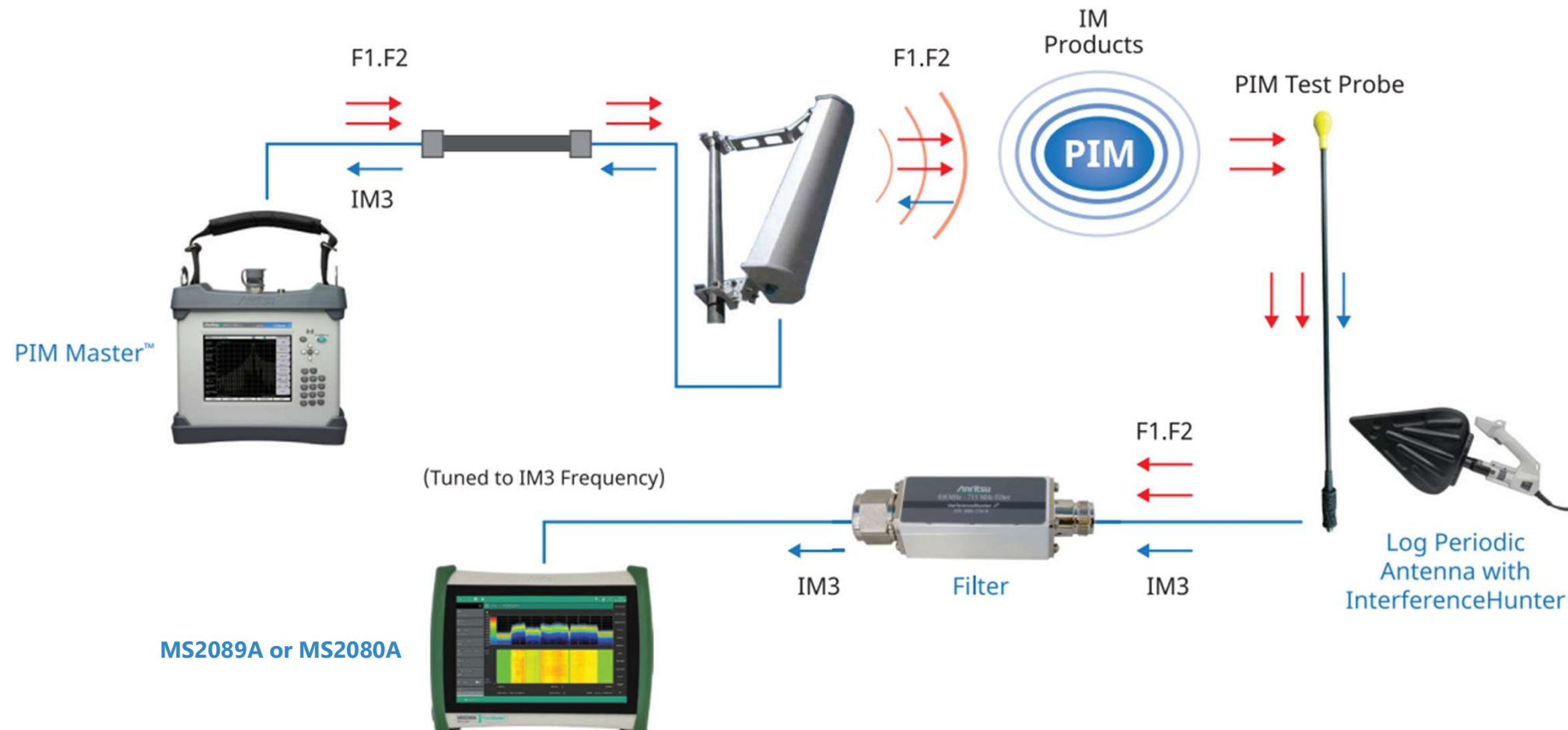


Field Master MS2089A – Polar Plot



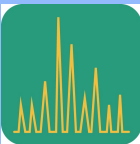
PIM Hunting with the MS2089A

PIM is just another form of interference. Within the MS2080A and the MS2089A, we have PIM interference hunting (Option 24, with Option 199 for best results).



5GNR (option 888)

Transmitter Quality



Spectrum Based Measurements

Channel Power
Adjacent Channel Power
Occupied Bandwidth
Spectral Emission mask
EIRP

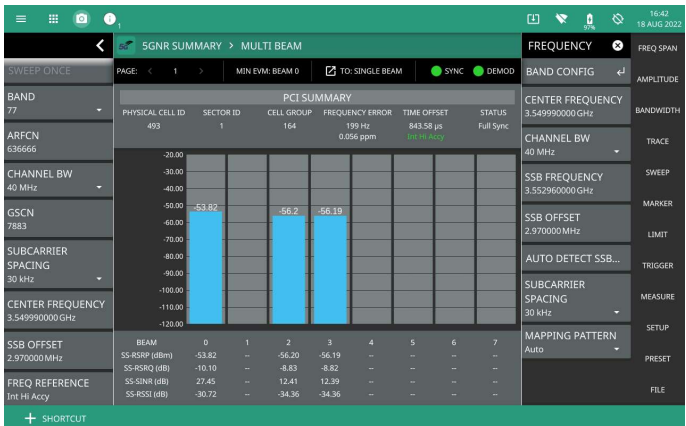


Modulation Quality

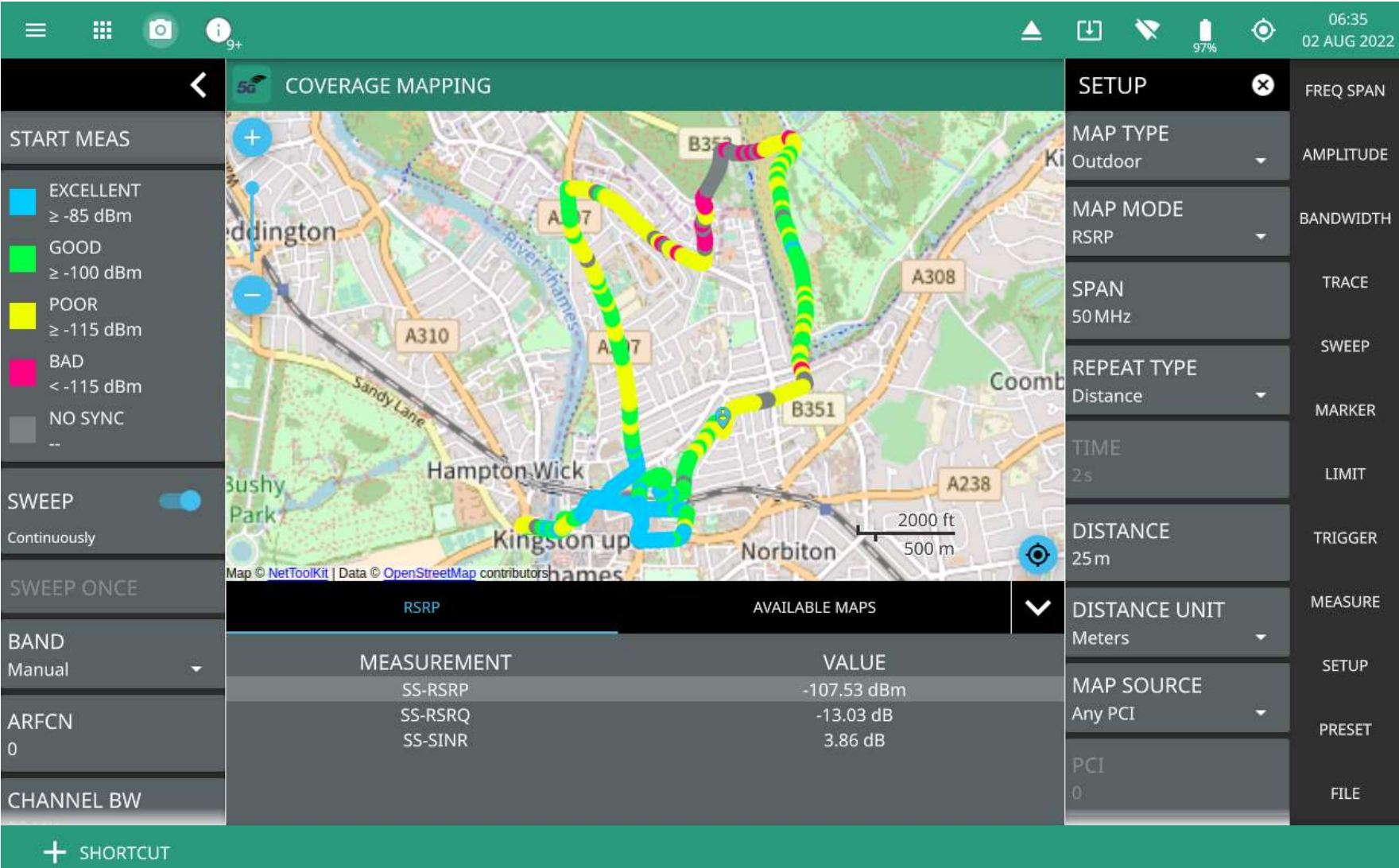


Vector Signal Analyzer Based Measurements

PCI
Frequency Error
Time Offset
RSRP / RSRQ / SINR / RSSI
Constellation
Error Vector Magnitude

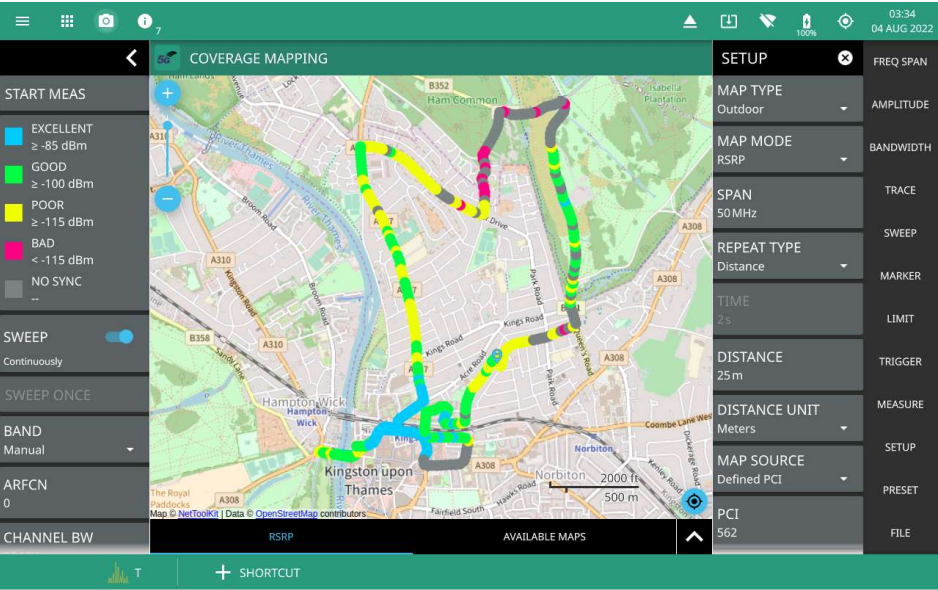


LTE / 5G Coverage Mapping (Option 431)

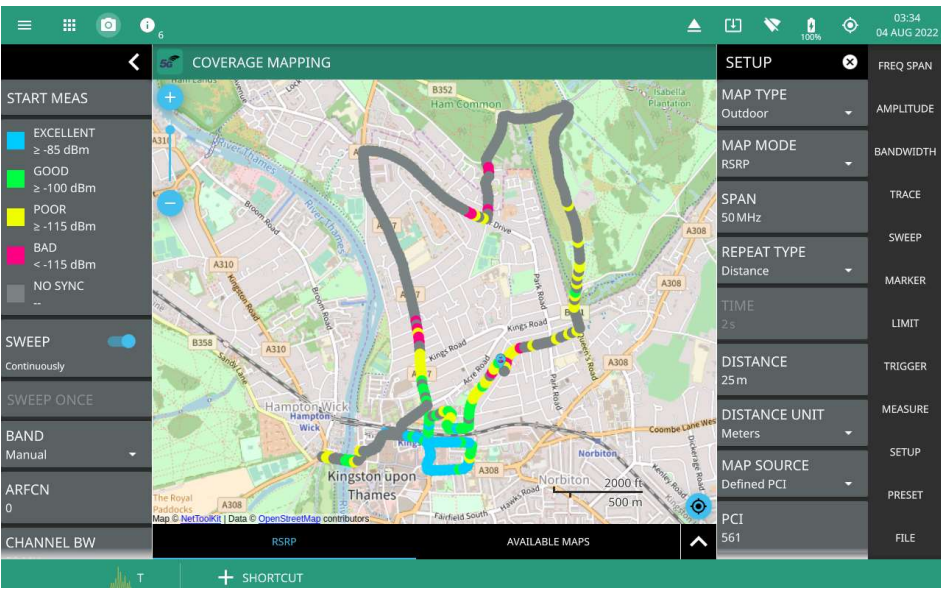


In LTE/5G mode, coverage mapping is performed on modulation quality measurements such as RSRP/RSRQ/SINR.

LTE / 5G Coverage Mapping – PCI Filter



Filter on PCI = 561



Filter on PCI = 562

Filter by individual PCI, even on a saved file.

LTE / 5G Coverage Mapping – Google Earth View



Open files in Google Earth and view full data for any measurement point.

Many More Applications

As you can see, the new Site Master has a multitude of applications and uses. The important fact is that the below 6 GHz of the new Site Master is the Swiss Army knife.

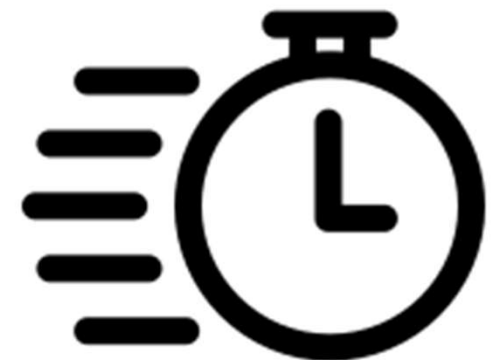
Some key points are:

- Leverage the Site Master brand.
- It is an instrument that can be used by installers and engineers alike.
- For the MS2089A, all options are SW; users can upgrade the units with SW only.
- The New Site Master MS2085A & MS2089A are faster instruments with Line Sweep Function built into the unit. It allows the user to be more efficient and accurate.
- The Site Master is robust, even though it looks like an iPad.
- IQ Capture/Streaming can be used for various third-party software and is useful for the GP/Mil/Gov market.
- The Site Master will be perfect for secure locations with Option 17, secure communication. Option 7, which will only save to an external drive and frequency blanking will be coming soon (FY 24).

1. CAA Features

The New Site Master is Faster

- 350 μ s/pt in fast sweep mode (10,049 points), compared to the E series' 1 ms/pt.
- Switching between modes took significant time in the past (E series took minutes to switch between CAA/SPA). The New Site Master is significantly faster; Option 21 is not a mode and is just another type of measurement.
- Line Sweep Tools built into the unit
 - Built-in report generation for fast close-out reports. The ability to add and edit markers in the report generation tool on the unit. More to come in later slides.
 - New and improved cable list. Users can search by name, manufacturer, and description. They can also add and edit the cable list on the instrument itself. More to come in later slides.
- Intuitive touch screen UI, just like the MS2090A and the MS2080A.
- Fast and Stable Calibration
 - ReadyCal – The units are calibrated from the factory. Great for trouble shooting and to verify equipment. Examples would be to test port extension cables or damaged calibration kits.
 - InstaCal (ICN51A) – The new InstaCal allows for fast calibration.



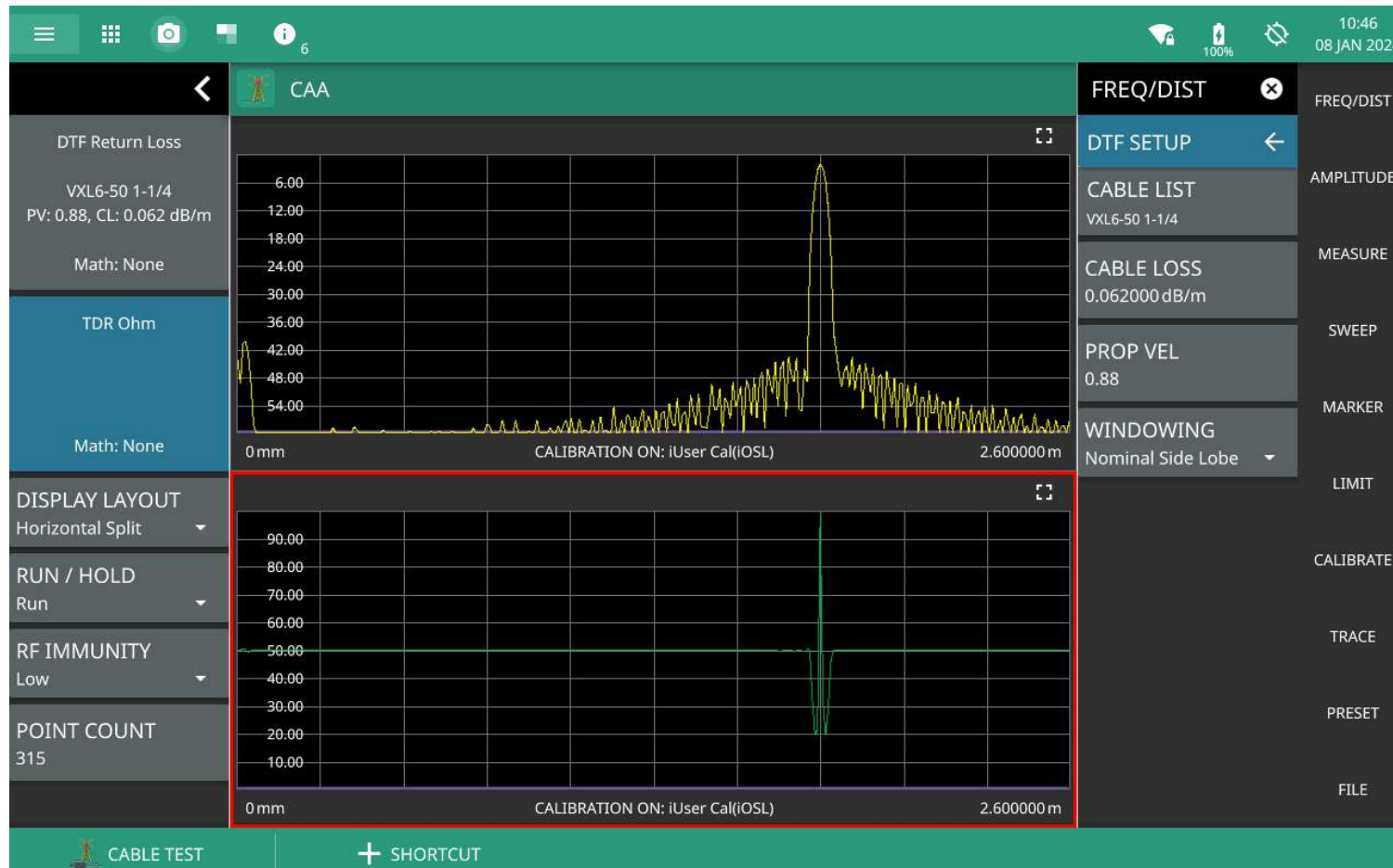
Enhancements and New Features

The Site Master will have all the same features as our older models, as seen in the table below. In addition, we have made some enhancements and added new features.

- Time Domain Reflectometry (Option 3)
- Built-in PDF Report Generator (standard)
- Enhanced DTF Measurements (standard)
- Enhanced Dynamic Range (standard)
- Enhanced Cable List (standard)

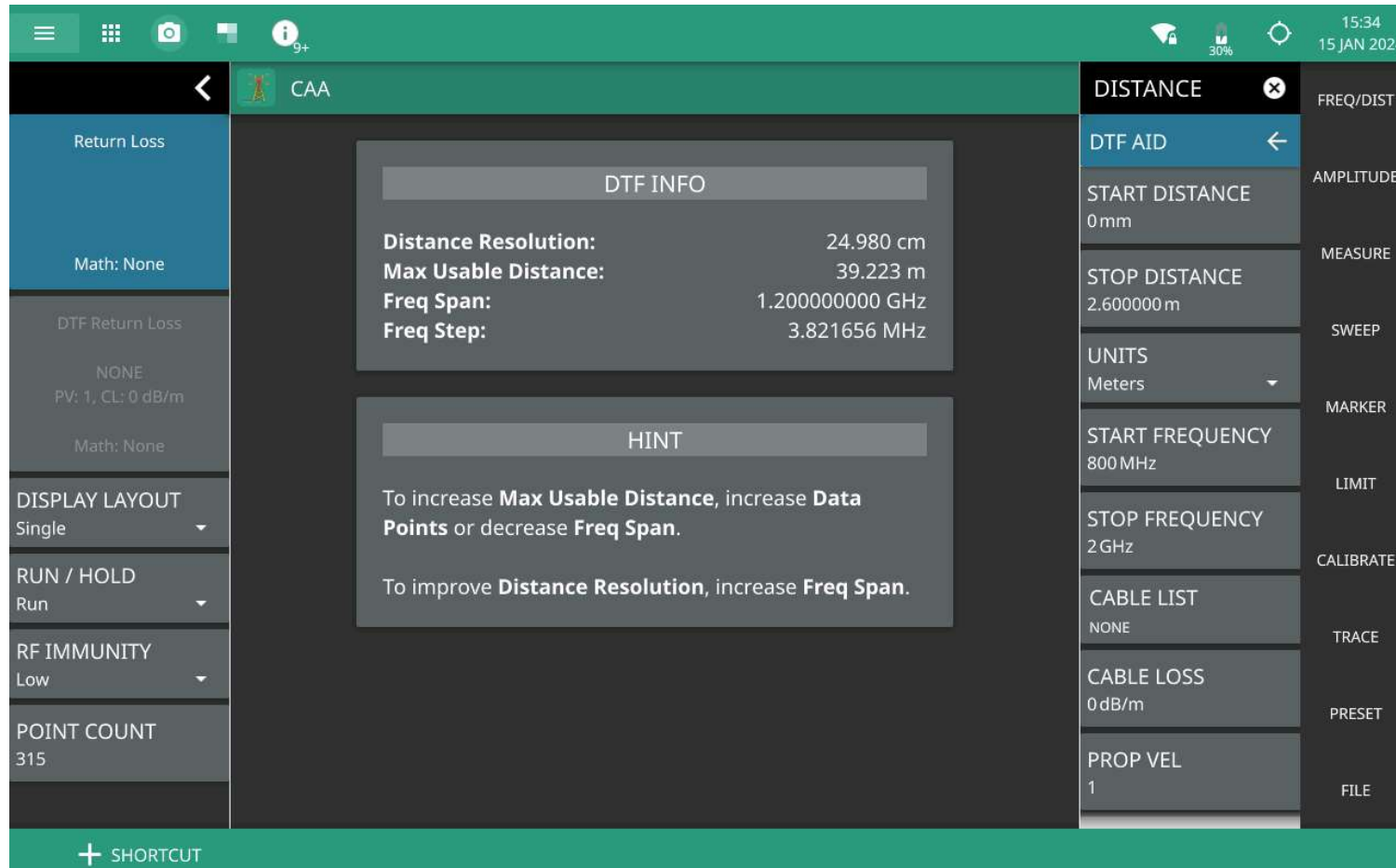
Feature	Comment
Reflection Measurements	Return Loss VSWR 1-Port Cable Loss 1-Port Phase Smith Chart
Transmission Measurements	Transmission (USB Sensor) Transmission (2-Ports Receiver, Option 21)
Distance To Fault (DTF)	Return Loss VSWR
High Accuracy Power Meter (Option 19)	Accurate power measurements with USB Power Sensors
Filter measurements (with option 21)	Validation of frequency response and rejection of bandpass and notch filters
Biasing of tower mount amplifiers	Bias voltage for accessory bias tee to test with in line TMAs
Comprehensive calibration options	ReadyCal for immediate results with factory data. Standard Open/Short/Load user calibration. InstaCal accessory for automated calibration.
Split screen display	For simultaneous Return Loss and DTF view or DTF and TDR view
Line Sweep Tools PC post processing application	For report generation and data analysis
RF immunity mode	Testing even when antennas are exposed to external RF sources
Integrated GNSS module	Site locations verified when creating close out reports
Environmentally hardened	Built to withstand the demands of an instrument designed for use in challenging environments

Time Domain Reflectometry (Option 3)



We now offer a time domain measurement right out of the box, with a push of a button. TDR provides additional information that DTF can not. DTF tells you where the issue is, but TDR tells you what could be the cause. In a single screen, a user can do both DTF and TDR in the same view.

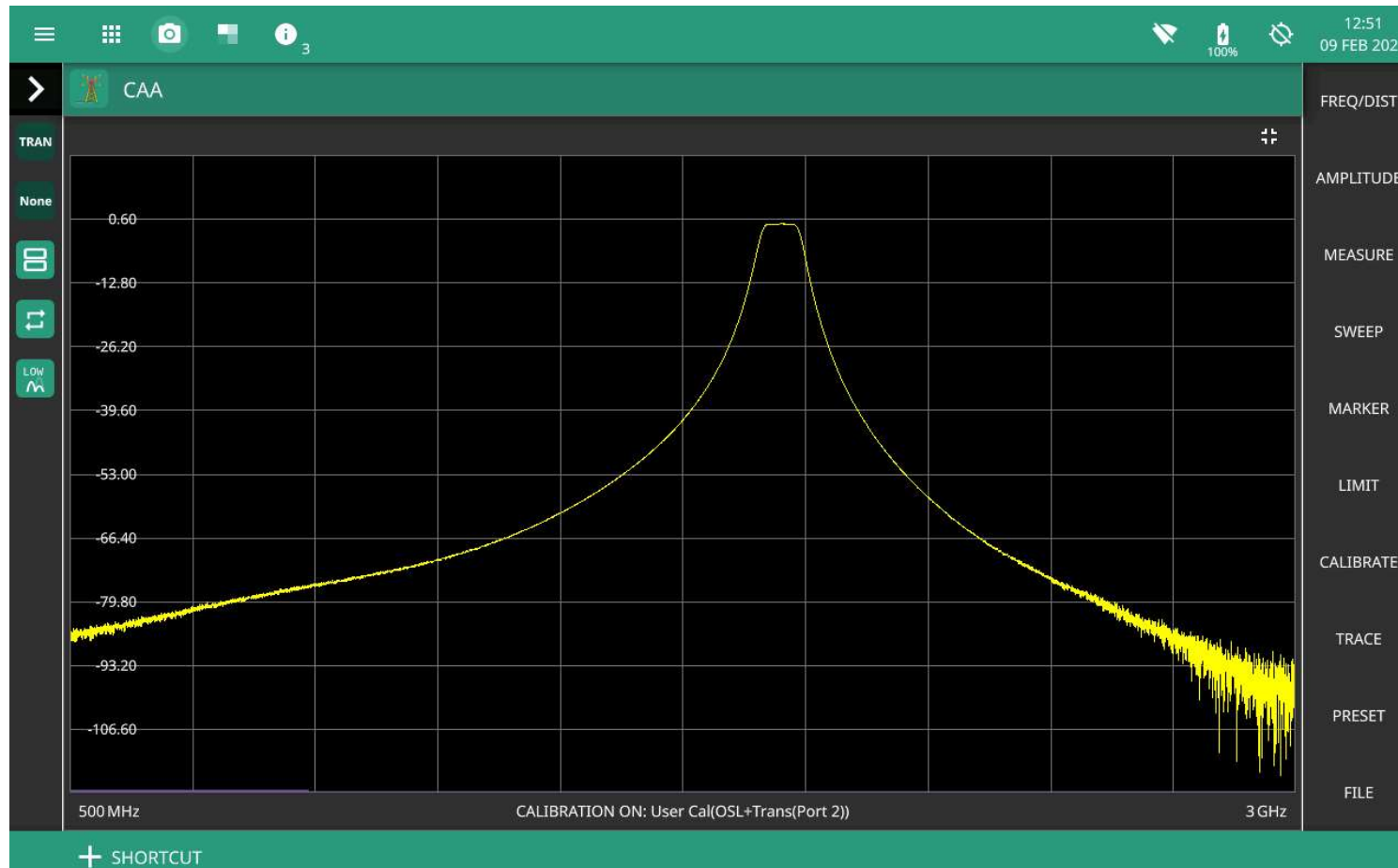
Enhancements DTF



With 10,049 points and a starting frequency of 5 kHz, the new Site Master can perform longer DTF measurements compared to our older models. This is useful for customers such as train operators who must do 1 km long DTF measurements.

The enhancements to the cable list also helps the user with setting up their DTF measurements effectively without the need for ART (the new LST).

Enhanced Dynamic Range -Filter Measurements (with Option 21)



Option 21 adds a second RF port for receiver-based scalar transmission measurements. The use of a receiver provides excellent dynamic range of over 100 dB compared to 80 dB in the older Site Master.

Older Site Master models might have trouble with their dynamic range when measuring highly reflective filters; the new Site Master does not.

Built in Report Generator

REPORT GENERATOR - CONFIG

LOAD TEMPLATE... SAVE TEMPLATE... CLEAR TEMPLATE

REPORT FOLDER REPORT NAME BLACK & WHITE GRAPHS

TITLE

SITE INFORMATION

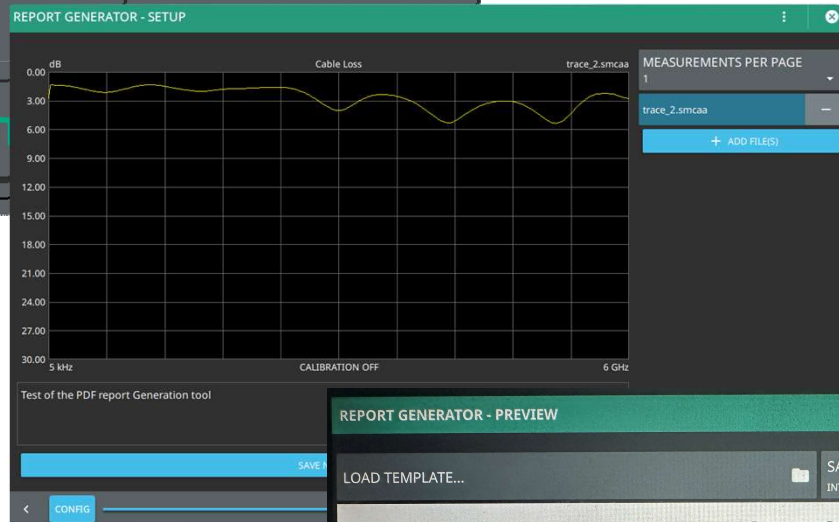
SITE LOCATION

LOGO

LOGO ALIGNMENT

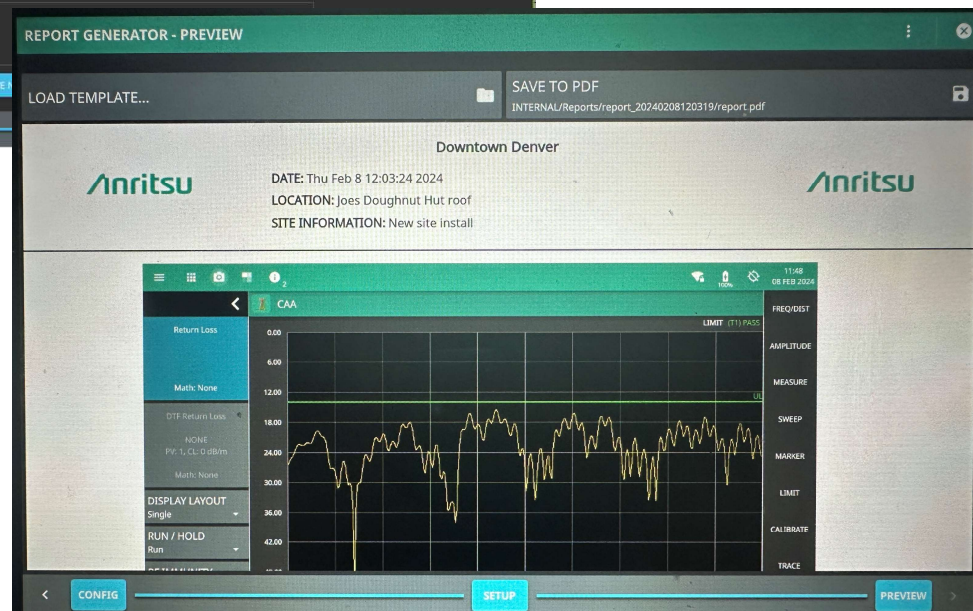
CONFIG

CONFIG



SETUP

REPORT

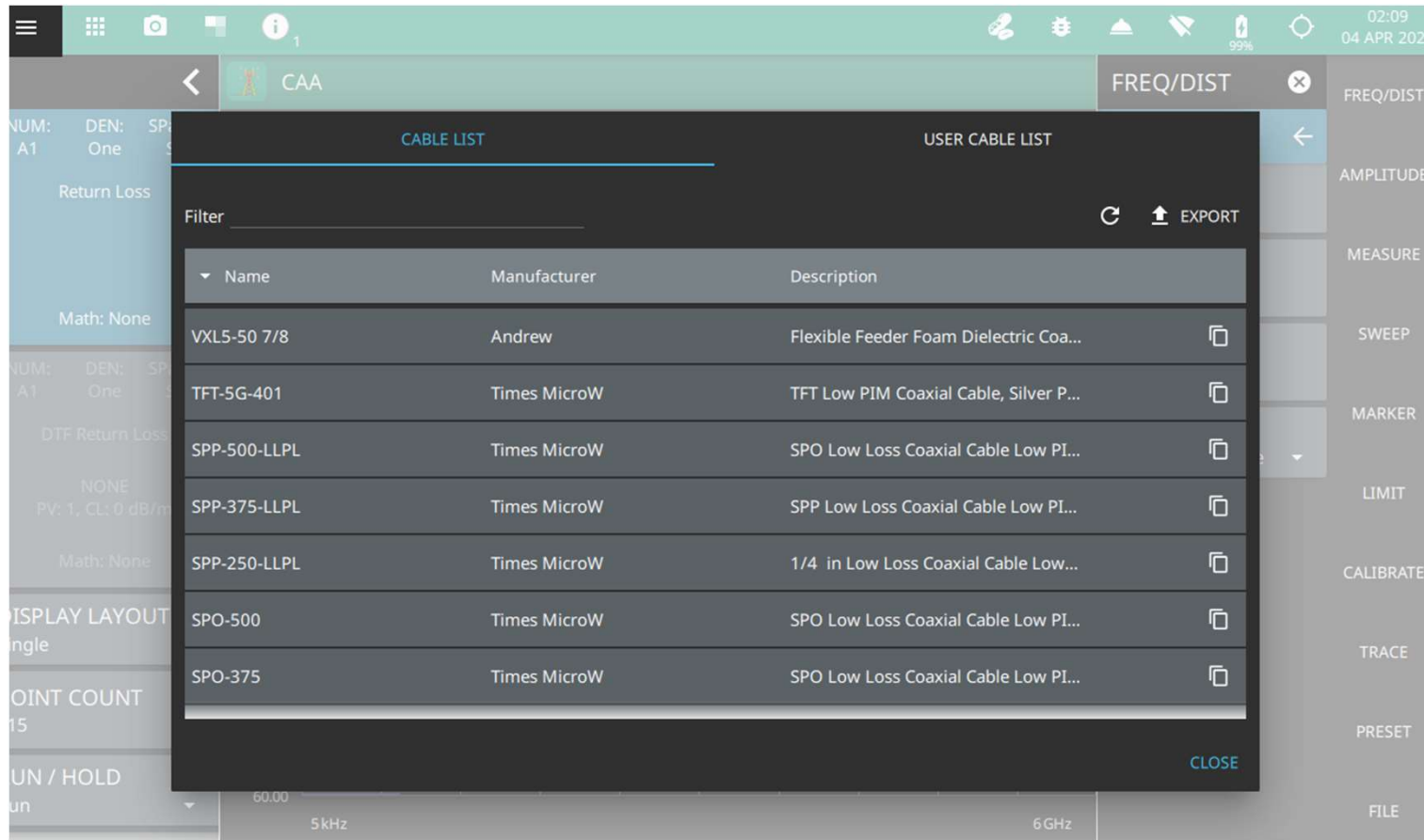


The built-in report generator creates PDF close-out reports that include trace files with Pass/Fail status plus screen images and photographs.

Users create their own template with fields including full site information, job number, and technician details to speed up and simplify the building of reports on site.

Submit reports before leaving the site for customer validation and eliminate follow-up truck rolls.

Cable List (1/2)



Distance to fault measurements require the entry of the attenuation and velocity factor information of the specific cable to deliver accurate results.

Users can now search by name, manufacturer, and description. New cables can be added to the user cable list (like a favorites list). Furthermore, users can add, delete, export, and create new cables all on the instrument.

In the older Site Master, the only way to add, edit, or change the list was to use LST. Now, the user can do it all on the instrument.

Cable List (2/2)

NUM: A1 DEN: One SP: S

Transmission (Port

Math: None

NUM: A1 DEN: One SP: S

DTF Return Loss

NONE

PV: 1, CL: 0 dB/m

Math: None

DISPLAY LAYOUT

Single

POINT COUNT

1257

RUN / HOLD

Run

12:29

15 APR 2024

CAA

DISTANCE

FREQ/DIST

AMPLITUDE

MEASURE

SWEEP

MARKER

LIMIT

CABLE LIST

USER CABLE LIST

ADD CABLE

NAME

Test cable

MANUFACTURER

Andrew

PROPAGATION VELOCITY

0.88

FREQUENCY

1

FREQUENCY VALUE(S) UNSET

100

Hz

CABLE LOSS

1

CABLE VALUE(S) UNSET

0.013000

dB/m

DESCRIPTION

Test cable description goes here

APPLY

CLOSE

NUM: A1 DEN: One SP: S

Transmission (Port

Math: None

NUM: A1 DEN: One SP: S

DTF Return Loss

NONE

PV: 1, CL: 0 dB/m

Math: None

DISPLAY LAYOUT

Single

POINT COUNT

1257

RUN / HOLD

Run

12:29

15 APR 2024

CAA

DISTANCE

FREQ/DIST

AMPLITUDE

MEASURE

SWEEP

MARKER

LIMIT

CALIBRATE

TRACE

PRESET

FILE

CABLE LIST

USER CABLE LIST

Filter

+ ADD

IMPORT

EXPORT

CLEAR

Name

Manufacturer

Description

test cable

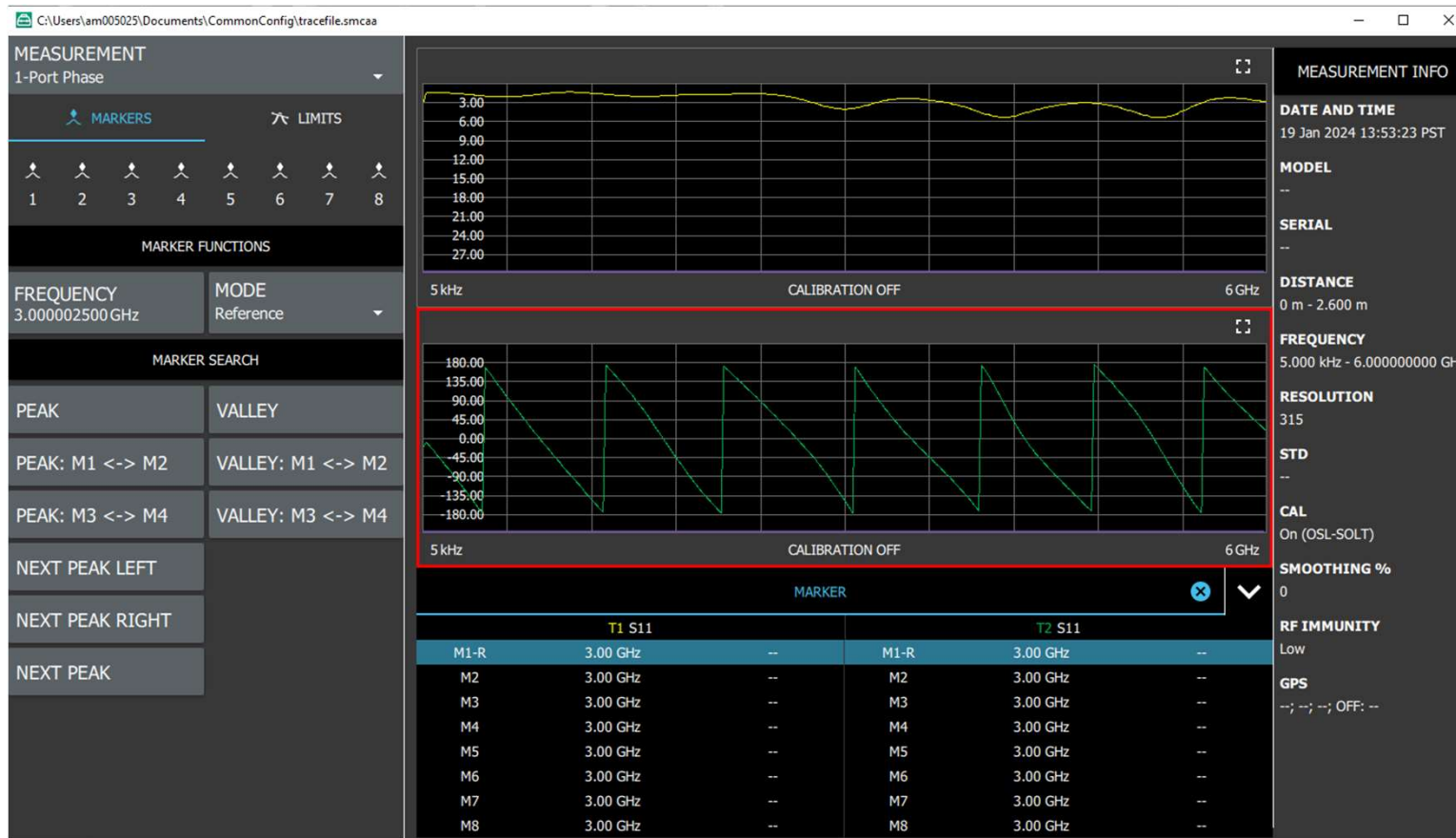
Andrew

Flexible Feeder Foam Dielectric Coa...

APPLY

CLOSE

ARRT (Anritsu Remote and Report Tools) PC Software Application



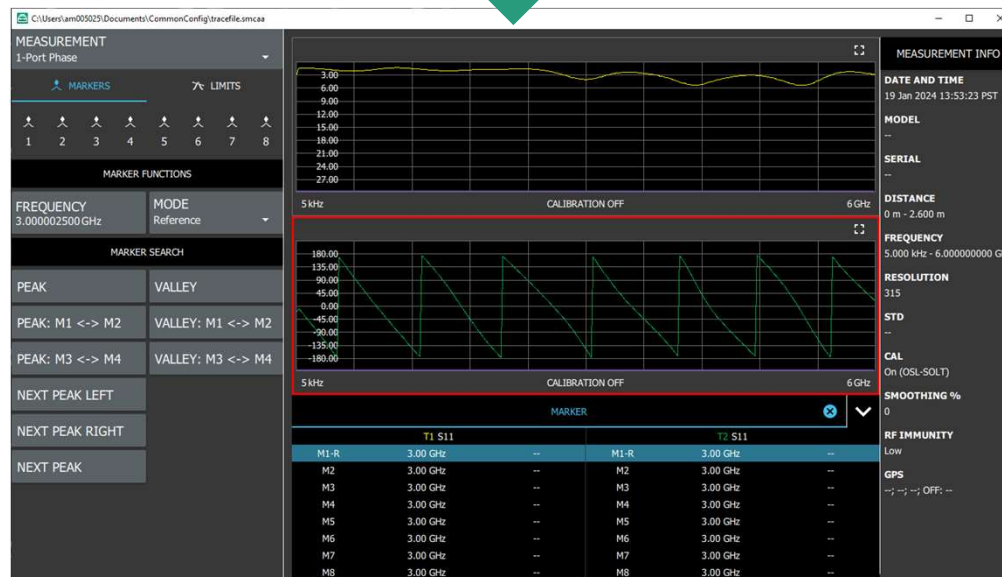
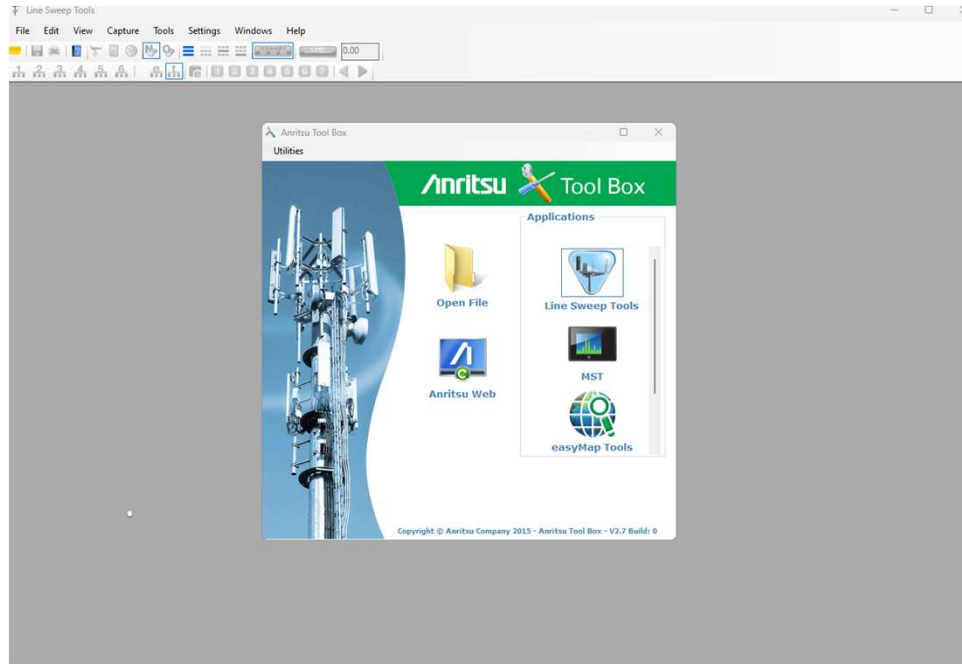
The NEW ARRT PC application replaces the Line Sweep Tools (LST) remote GUI applications.

The freely downloadable report software is designed to enable the rapid creation of site close-out reports for customers who prefer to work on a standard PC.

Most of the features from LST are in ART. We will continue to update ART with new features and enhancements such as:

- Database
- Overlay
- Calculator

ART File Format



The MS2089A and MS2085 file format can be seen here. ART will be able to open these files.

ART can open the following files:

- .limcaa
- .smcaa
- .fmcausb (331p)
- .smvna (when VNA option is released)

ART will not be able to open E-, L- or D-series Site Master files upon release. It will not open:

- .dat
- .scaa
- .svna
- .s2p

ART vs. LST

At launch, the older Site Master's (E- & L-series) files can only be opened in LST. ART will only work with the new Site Master (MS2085A/MS2089A) and S331P with Field Master series. S331P can also save .dat and files that LST can read.

We plan on making ART compatible with older files by FY24.

