

Anritsu envision : ensure

Anritsu Mobile InterferenceHunter™

Quick. Reliable. Multi-Emitter.





Applications:

- CATV Leakage location
- Simplified Spectrum Clearing
- Locating interference
 - Even in the presence of uplink signals
- Finding pulsed or bursty signals

Key Features:

- Post-capture analysis
- Sorts out signal reflections, shadowing, and multi-path
- Quick setup in any vehicle
- Much faster than conventional direction finding techniques

Mobile InterferenceHunter™ on Windows® PC Tablet with Spectrum Master™ in Vehicle

Anritsu Mobile InterferenceHunter™

CATV Egress

CATV Egress, or leakage, can be a painful issue for LTE network operators. Legacy CATV systems often degrade over time, leading to multiple egress points. It's not uncommon to encounter several hundred leakage points in a 100 by 100 block area. Since CATV is allowed to transmit on common LTE uplink frequencies, this can have a serious effect on LTE signal quality over a wide area. To further compound the problem, degradation that occurs after an LTE system is installed is partially masked by LTE UE uplink transmissions.

The Mobile InterferenceHunter's Multi-Emitter mode plots received channel power signal versus geographic location, showing power by the color of the plotted measurements. The Min-Hold mode screens out pulsed uplink transmissions, leaving only the constant power of the CATV egress to be measured and recorded.

Once recorded, the peak threshold can be re-adjusted if necessary and the result used to guide the last block signal source locating. It's even possible to use multiple skill levels for these two tasks.

Simplified Spectrum Clearing

Clearing spectrum can be as simple as monitoring spectrum at a tower for 24 hours, or as involved as driving the complete sector while recording spectrum versus location. However, spectrum, once cleared, does not always remain cleared, and if LTE is in service, or even in a test mode, the UE uplink signals make the task more difficult.

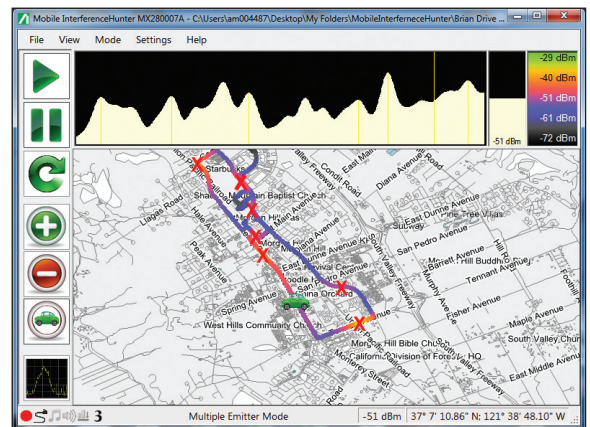


Figure 1. Multi-Emitter mode.

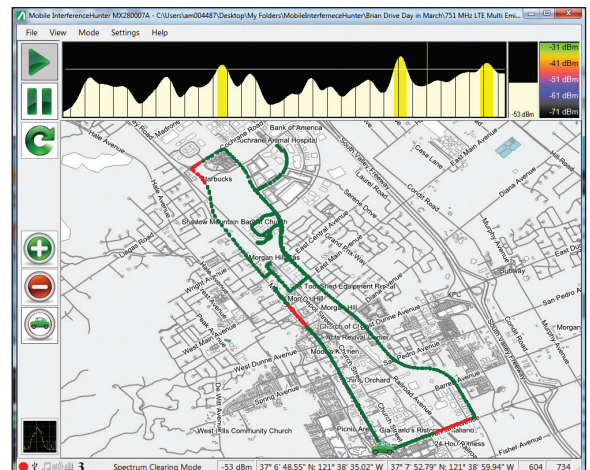


Figure 2. Spectrum Clearing Mode.

Anritsu Mobile Interference Hunting System

In spectrum clearing mode, the Mobile InterferenceHunter allows you to set a go/no-go threshold, which can be calculated based on the width of the spectrum analyzer's channel power measurement. This number, in combination with the min-hold capability, allow efficient localization of both good areas, and areas that need assistance within a sector or town. It's also possible to change this threshold after collecting data, if necessary.

Hunting Equipment Fault or Intentional Interference

The InterferenceHunter is well equipped to locate many types of interference. The power mapping capability, along with the data-generated heat map, enable users to locate interference sources quickly and reliably.

Traditionally, interference hunts are done with a spectrum analyzer and a Yagi antenna. Directional antennas have trouble differentiating between the direct signal and reflections, and can lead even the most experienced user astray. They also have issues with RF shadows caused by buildings or terrain. Multi-path affects them as well, leading to somewhat erratic power measurements as the antenna is moved around.

The InterferenceHunter gets around this problem by taking many measurements per minute, averaging them, and plotting the result. This is done while the user is driving. There is no need to stop the car, get out and take a bearing, drive to a new location and repeat the process. Because so many power measurements are taken, and averaged, multi-path does not affect the results. Reflections tend to be eliminated, because the reflected signal travels a longer path and so has more path loss, as well as loss when reflected. RF shadowing becomes apparent, since areas of low signal power can quickly be spotted, and either allowed for or ignored. Also, since the InterferenceHunter uses channel power for its measurements, it can deal with signals that wander in frequency, such as oscillating cell phone boosters. The InterferenceHunter is a quick and reliable way to hunt many types of interference.

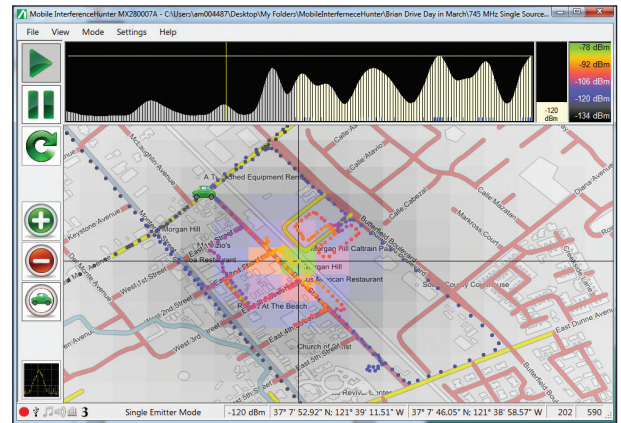


Figure 3. Interference Hunting Mode.

Time-Variant Signals

For finding pulsed signals, the Mobile InterferenceHunter software uses a “max hold” algorithm, capturing the pulsed signal only when it is transmitting. This eliminates the possibility of erroneously measuring a pulsed signal when not active. Timing for the max hold reset time is user settable.

For finding extremely fast signal pulses, an innovative spectrum analyzer feature developed by Anritsu called “Burst Detect” can be used. Using FFT technology, Burst Detect enables the spectrum analyzer to capture and process intermittent signals at receiver-like speeds. Signals as short as 200 μ s can reliably be detected. Burst Detect is available on the MS2720T Spectrum Master™, the MT8220T BTS Master™, and the MS203xC VNA Masters™.

Additional Capabilities

Other features provided by the Anritsu Mobile InterferenceHunter software include:

- Squelch Control to optimize hunting for low-level or obscured signals
- Choice of Google Maps or OpenStreetMap sourced maps
- Zoom In/Out controls provided on the map for desired street level view
- Full-Screen Spectrum View on the laptop or tablet allows easier spectrum viewing
- Ability to capture and store interference hunt log files for later playback and analysis
- Extensive Help Menu for on-site assistance pertaining to Mobile InterferenceHunter operation

Anritsu Mobile Interference Hunting System



Anritsu Handheld Spectrum Analyzer
with GPS Option



Dash-mounted Windows PC® Tablet
with MX280007A Software and
2000-1801-R mounting hardware



2000-1647-R
Broadband Magnet Mount Omnidirectional Antenna
700 MHz to 6 GHz with GPS Antenna in one housing
(recommended antenna for users operating in this frequency range)

Anritsu Mobile Interference Hunting System Overview

Available through Anritsu

- Anritsu Mobile InterferenceHunter software with license key
- Anritsu handheld spectrum analyzer with GPS receiver and Ethernet
- Off-the-shelf magnet mount omnidirectional antenna (Anritsu P/N 2000-1647-R or equivalent)
(This part also contains an integrated GPS antenna.)
- Magnet mount GPS antenna (Anritsu P/N 2000-1528-R or equivalent)
(Required only if omnidirectional antenna used does not incorporate a GPS antenna.)
- Bandpass Filter for the band you are working with, listed below.
- A directional antenna to assist with the interference hunt, listed below:
- An N(m) to N(m) cable for the directional antenna (Anritsu P/N 15NN50-1.5C)
- Mounting hardware for tablet (Anritsu P/N 2000-1801-R or equivalent)

Available through third parties

- Tablet/laptop running Windows 7, 8 or 10 with Wi-Fi capability
- Pocket WiFi router, ZyXEL MWR102 or equivalent for tablet to spectrum analyzer communication

Compatible Spectrum Analyzers

Most Anritsu handheld spectrum analyzers with a GPS receiver will work with the Anritsu Mobile Interference Hunting system. This includes members of the VNA Master™, Spectrum Master™, Site Master™, BTS Master™, LMR Master™ and Cell Master™ platforms. No firmware upgrades are required.



VNA Master™ MS2034B/35B



VNA™ Master MS2036C/37C/38C



Spectrum Master™ MS2720T



Spectrum Master™ MS2721B



Spectrum Master™ MS2722C/23C/24C/25C/26C



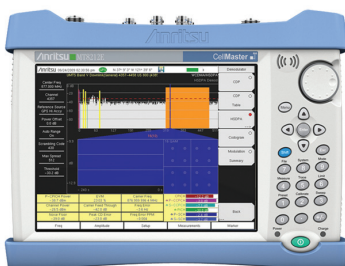
Spectrum Master™ MS2711E/12E/13E



BTS Master™ MT8220T



BTS Master™ MT8221B/22B



Cell Master™ MT8212E/13E



Site Master™ S332E/62E

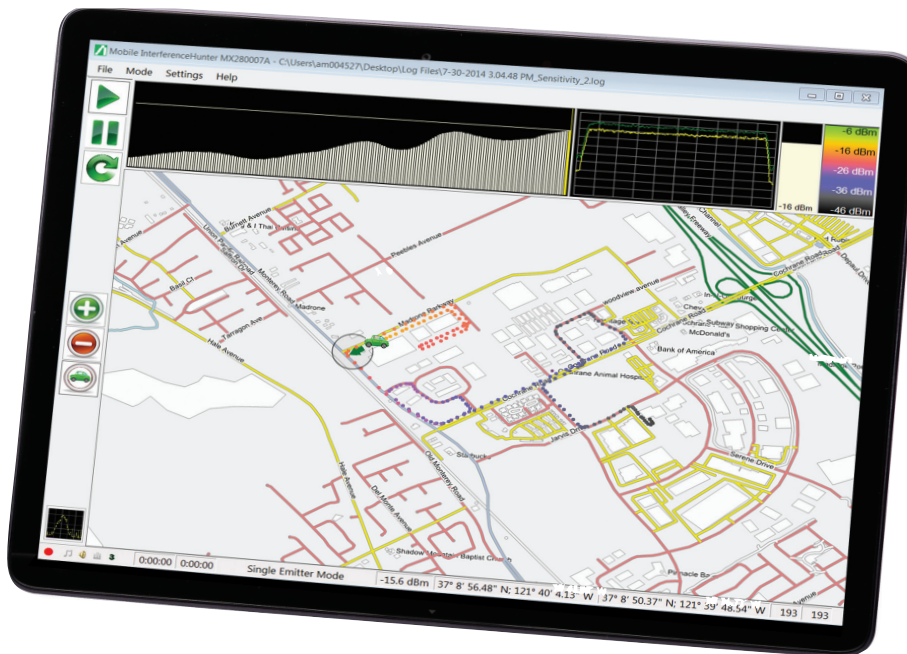


LMR Master™ S412E

Maps

Two types of mapping solutions are available using the Anritsu Mobile Interference Hunting System:

- **Google Maps** – a free service offering the user the flexibility to automatically download maps for many parts of the world. However, an Internet connection must be set up and maintained during the entirety of the interference hunt. In many cases, a cellular USB modem is used for this connection.
- **OpenStreetMap** – an open source database of maps that must be downloaded to the hard drive of the tablet before the interference hunt begins. Users can create their own maps using an easy 4-step process, or Anritsu has provided downloads for many metro areas worldwide at: <http://www.anritsu.com/en-US/Products-Solutions/Products/Maps.aspx>



OpenStreetMap™ Displayed on Windows PC Tablet.
Interference hunt screen capture. Dots shown along drive path are colored according to signal strength.

Summary - Quick. Reliable. Multi-Emitter.

Anritsu's Mobile InterferenceHunter is a quick and reliable way to find multiple emitters, or single emitters even in difficult reception conditions. The ability to work with multiple signal sources, reflections, RF shadows, and multi-path distinguish the Mobile InterferenceHunter from conventional systems that depend solely on directional antennas. The ability to work with signals that are intermittent, bursty, or drift rapidly in frequency separate the Mobile InterferenceHunter from more expensive solutions targeted at a single fixed frequency interferer.

The Mobile InterferenceHunter's post-capture analysis capability allows users to modify search parameters without re-driving the route. This allows re-analysis of the captured data as well as consulting with experts.

The Mobile InterferenceHunter works with the broad array of handheld spectrum analyzers, providing interference hunting and spectrum clearing capability from 9 kHz to 43 GHz. The Mobile InterferenceHunter is a quick, reliable, and multi-emitter enabled solution to your interference hunting and spectrum clearing needs.

Anritsu Mobile Interference Hunting System Ordering Information

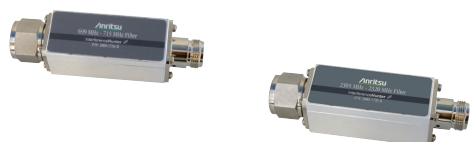
Additional Accessories

Bandpass Filters



Part Number	Description
1030-106-R	1710 MHz to 1790 MHz, N(m) to N(f), 50 Ω
1030-107-R	1910 MHz to 1990 MHz, N(m) to N(f), 50 Ω
1030-109-R	824 MHz to 849 MHz, N(m) to SMA (f), 50 Ω
1030-110-R	880 MHz to 915 MHz, N(m) to SMA (f), 50 Ω
1030-111-R	1850 MHz to 1910 MHz, N(m) to SMA (f), 50 Ω
1030-112-R	2400 MHz to 2484 MHz, N(m) to SMA (f), 50 Ω
1030-114-R	806 MHz to 869 MHz, N(m) to SMA(f), 50 Ω
1030-155-R	2496 MHz to 2690 MHz, N(m) to N(f), 0.8 dB loss, 50 Ω
1030-178-R	1920 MHz to 1980 MHz, N(m) to N(f), 50 Ω
1030-179-R	777 MHz to 798 MHz, N(m) to N(f), 50 Ω
1030-180-R	2500 MHz to 2570 MHz, N(m) to N(f), 50 Ω
2000-1684-R	791 MHz to 821 MHz, N(m) to N(f), 50 Ω

Bandpass Filters (used with MA2700A InterferenceHunter™)



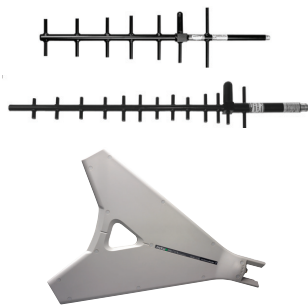
Part Number	Description
2000-1734-R	699 MHz to 715 MHz, 50 Ω, type N(m) and N(f)
2000-1735-R	776 MHz to 788 MHz, 50 Ω, type N(m) and N(f)
2000-1736-R	815 MHz to 850 MHz, 50 Ω, type N(m) and N(f)
2000-1737-R	1711 MHz to 1756 MHz, 50 Ω, type N(m) and N(f)
2000-1738-R	1850 MHz to 1910 MHz, 50 Ω, type N(m) and N(f)
2000-1739-R	880 MHz to 915 MHz, 50 Ω, type N(m) and N(f)
2000-1740-R	1710 MHz to 1785 MHz, 50 Ω, type N(m) and N(f)
2000-1741-R	1920 MHz to 1980 MHz, 50 Ω, type N(m) and N(f)
2000-1742-R	832 MHz to 862 MHz, 50 Ω, type N(m) and N(f)
2000-1743-R	2500 MHz to 2570 MHz, 50 Ω, type N(m) and N(f)
2000-1799-R	2305 MHz to 2320 MHz, 50 Ω, type N(m) and N(f)

Highpass/Lowpass Filters



Part Number	Description
1030-149-R	Hi-Pass, 150 MHz, N(m) to N(f), 50 Ω
1030-150-R	Hi-Pass, 400 MHz, N(m) to N(f), 50 Ω
1030-151-R	Hi-Pass, 700 MHz, N(m) to N(f), 50 Ω
1030-152-R	Lo-Pass, 200 MHz, N(m) to N(f), 50 Ω
1030-153-R	Lo-Pass, 550 MHz, N(m) to N(f), 50 Ω

Directional Antennas



Part Number	Description
2000-1677-R	300 MHz to 3 GHz, SMA(m), Log Periodic
2000-1659-R	698 MHz to 787 MHz, N(f), 8 dBd, Yagi
2000-1411-R	822 MHz to 900 MHz, N(f), 10 dBd, Yagi
2000-1412-R	885 MHz to 975 MHz, N(f), 10 dBd, Yagi
2000-1413-R	1710 MHz to 1880 MHz, N(f), 10 dBd, Yagi
2000-1414-R	1850 MHz to 1990 MHz, N(f), 9.3 dBd, Yagi
2000-1416-R	1920 MHz to 2170 MHz, N(f), 10 dBd, Yagi
2000-1415-R	2400 MHz to 2500 MHz, N(f), 10 dBd, Yagi
2000-1660-R	1425 MHz to 1535 MHz, N(f), 12 dBd, Yagi
2000-1715-R	Directional Antenna, 698 MHz to 2500 MHz N(f), gain of 2 dBi to 10 dBi, typical
2000-1726-R	Antenna, Yagi 2500 MHz to 2700 MHz N(f), 12 dBd
2000-1747-R	Antenna, Log Periodic, 300 MHz to 5000 MHz N(f), 5.1 dBi, typical
2000-1748-R	Antenna, Log Periodic, 1 GHz to 18 GHz, N(f), 6 dBi, typical
2000-1777-R	Portable Directional Antenna, 9 kHz to 20 MHz, N(f)
2000-1778-R	Portable Directional Antenna, 20 MHz to 200 MHz, N(f)
2000-1779-R	Portable Directional Antenna, 200 MHz to 500 MHz, N(f)

Other Accessories



Part Number	Description
2000-1647-R	Magnet mount broadband antenna Cable 1: 698 MHz to 1200 MHz 2 dBi peak gain, 1700 MHz to 2700 MHz 5 dBi peak gain, N(m) 50 Ω, 10 ft Cable 2: 3000 MHz to 6000 MHz 5 dBi peak gain, N(m), 50 Ω, 10 ft Cable 3: GPS 26 dB gain, SMA(m), 50 Ω, 10 ft
2000-1648-R	Magnet mount omnidirectional antenna 1700 MHz to 6000 MHz 3 dBi peak gain, N(m), 50 Ω, 10 ft
2000-1801-R	Hardware for mounting Windows tablet onto car dash
2000-1689	EMI Near Field Probe Kit
2000-1653	Anti-glare Screen Cover (package of 2)
633-75	High Capacity Battery Pack, 7500 mAh
806-141-R	Automotive Power Adapter, 12 VDC, 60 W
MA2700A	Handheld InterferenceHunter (For full specifications, refer to the MA2700A Technical Data Sheet 11410-00692)
2000-1528-R	GPS Antenna, SMA(m) with 5 m (15 ft) cable, 3 dBi gain, requires 5 VDC
3-2000-1498	USB A/5-pin mini-B Cable, 10 ft/305 cm

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