Installation and Maintenance of Vehicular Satellite Communication Systems Using the Agilent N9340B handheld RF Spectrum Analyzer

Reprinted courtesy Agilent Technologies

Introduction

In satellite communication systems, the vehicular satellite communication plays a major role in many emergency communications such as live TV, anti-terrorism, fire and rescue as well as industrial applications like petroleum exploration, because of features like fast and easy setup, simple operation and flexible mobility. To establish the communication quickly and reliably, the spectrum analyzer is used to accomplish antenna alignment to the satellite and monitoring the spectrum. However, because the primary working environment for the emergency communication vehicle is in the field, the interior vehicle space is very precious and when a lot of professional equipment is required for installation and maintenance, the small, handheld spectrum analyzer is viewed as advantageous.

For the installation and maintenance of mobile satellite communication systems, the Agilent N9340B handheld spectrum analyzer can help engineers accomplish these tasks efficiently.

Professional Installation, Maintenance And Spectrum Monitoring

For the installation and maintenance of satellite communication systems, the N9340B analyzer is mainly used for antenna alignment to the satellite, monitoring the spectrum and fault location in the field. The N9340B can help provide superior performance, excellent maneuverability and high reliability.

More Rapid Antenna To Satellite Alignment

For the process of installation, maintenance and setup of communication links between the emergency communication vehicle and the satellite, the first key task is to align the antenna to the satellite, which directly impacts whether the whole communication system can be setup rapidly and the quality of communication.

Begin by viewing the level of the satellite beacon signal as displayed by the spectrum analyzer, and then adjust the direction and polarization angle of the antenna for maximum amplitude to accurately align it towards the satellite, to establish communication. For the task of antenna alignment, the measurement speed of the handheld spectrum analyzer is a key efficiency factor.

Compared to other similar grade handheld spectrum analyzers, the N9340A/B has lower sweep times which directly lead to faster measurement speed.

- 10 ms -1000 s, sweep time for spans >1 kHz
- ≤120 ms, full span sweep times
- 6 us - 200 s, zero span sweep time

For example: when parameters are set to a 10MHz span, RBW 1MHz, and VBW 1MHz, the sweep time of the N9340B is 31.99 ms, while those of other similar grade handheld spectrum analyzers are usually more than 90 ms, almost three times slower.

Therefore, regardless of whether the antenna alignment to the satellite is done in the frequency domain or time domain, the N9340B can effectively help engineers to accomplish the task quickly and accurately, which establishes a solid foundation for high quality communication.

More Accurate And Real-Time Spectrum Monitoring

Routine spectrum monitoring is usually accomplished automatically by remote control software driving the spectrum analyzer, with the following two main purposes:

- To understand the spectrum occupancy in time to allocate the spectrum resource rationally.
- To monitor the spectral parameters, such as bandwidth, frequency and level of the signal, to identify interference quickly.

To accomplish this and ensure the communication system works reliably over the long-term, spectrum monitoring also requires the handheld spectrum analyzer to possess a low phase noise, narrow resolution bandwidth, low displayed average noise level (DANL or sensitivity), high amplitude accuracy, high data rate transfer and convenient remote programmable control interface, etc. in addition to the fast sweep times.

Compared to other similar grade handheld spectrum analyzers, the N9340B provides the following outstanding performance and advanced programmable control interface:

Resolution Bandwidths:
30 Hz to 1 MHz, in 1,3 & 10 series of steps
The minimum resolution bandwidth of other similar grade handheld spectrum analyzers usually is 100Hz, thus with less sensitivity and resolving power.

SSB Phase Noise:
-87dBc/Hz, 30 kHz offset

Displayed Average Noise Level (maximum sensitivity, 30Hz RBW):
-124 dBm (Preamplifier Off)
-144 dBm (Preamplifier On)
The displayed average noise level of other similar grade handheld spectrum analyzers usually is > -105 dBm (Preamplifier Off) and > -125 dBm (Preamplifier On)

Amplitude Accuracy: ±1.5 dB

USB/LAN Interface
The programmable interface of other similar grade handheld spectrum analyzers usually is only RS232. The features of the N9340B mentioned above, when used for spectrum monitoring, can help engineers to view the spectrum occupancy faster with more accuracy and rapidly identify interference. This allows the allocation of the spectrum resources more rationally, the location and elimination of faults quickly, and finally make the system more stable and reliable in the long term.

More efficient fault location in the field
Convenient "one-button" measurements

- Occupied Bandwidth (OBW)
- Channel Power (CHP)
- Adjacent-Channel Power Ratio (ACPR)

Test pass/fail limit testing

Other Useful Features

- Maximum hold, minimum hold
- Frequency counter with resolution of 1Hz
- Eleven selectable localized languages for user interface.
- Up to 4 hours of battery time

Figure 1 View of the satellite signal in one of the polarization directions

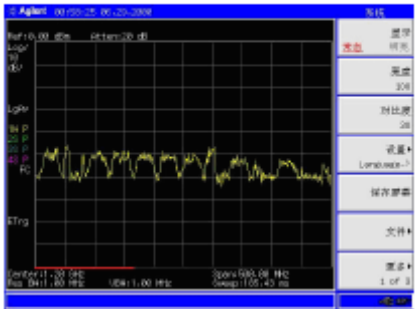
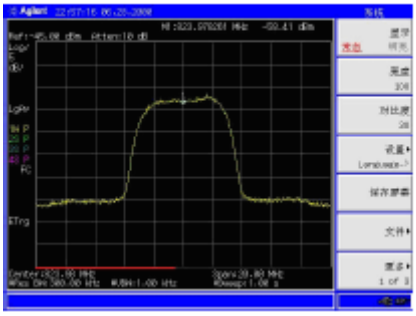


Figure 2 Spectral view of the transmitter signal



Click here to view our full line of Agilent Spectrum Analyzers.

Agilent Technologies
Authorized Distributor

1547 N. Trooper Road • P. O. Box 1117 • Worcester, PA 19490-1117 USA
Corporate Phone: 610-825-4990 • Sales: 800-832-4866 or 610-941-2400
Fax: 800-854-8665 or 610-828-5623 • Web: www.techni-tool.com