



# Site Testing

## What's important about Site Testing?

Congratulations! You've decided to take the next step in finding out whether Wireless WAN can help you more quickly and easily manage your connected resources in the field. But how do you know it will work? How do you know there is a wireless signal present; and that it's strong enough to maintain a persistent connection? Assuming it is, will the connection be fast enough and support your applications' network requirements such as latency, packet loss and throughput (upload and download speed)? The answer is to test it. Put a WWAN device at your location, take measurements and compare them to your requirements.

But couldn't that be figured out with a smartphone? Yes, and no. One could determine whether an appropriate WWAN signal (4G/LTE, 3G, etc.) is present at the location and get a rough idea of its strength. Measuring network performance is trickier; and results can be both inconsistent and provide a poor representation of how the connection will behave in production. Enter AWSS, GNCI's site suitability testing service. AWSS gives you a mechanism to survey the site.

Surveys are made up of a series of tests. Each test measures metrics under specific conditions, such as locked to the 4G network with amplifier, locked to 4G without amp, locked to 3G with amp, etc. The table below describes the tests run for a Base survey:

Metric	Description	Duration	Result
Signal Strength	Received Signal Strength Indication (RSSI) measured in Decibel Millimeters (dBm) at one second intervals. Higher measurements are better.	10 Minutes per test	Letter Grade
Signal Quality	Signal Quality Indicator expressed as a percentage. Measured at one second intervals. Higher is better.	10 Minutes per test	
Interference	Signal to Noise Ratio (SNR and/or Ec/Io) compares signal strength to interference and is measured at one second intervals. Higher is better.	10 Minutes per test	
Packet Loss	The number of packets sent to a destination and returned to their source within a specific timeframe. Expressed as a percentage. Higher is better.	5000 (4G)/2500 (3G) Packets per test	
Latency	The time it takes for data packets to reach their destination and return to the source. Measured ms (milliseconds). Lower is better.	5000 (4G)/2500 (3G) Packets per test	Pass/Fail

The results are laid out as such:

Results

Full Report	Grid Edit	Email	More	8 Results														
Test Location	Kit	Carrier	Testing	Connected	Completed	Score	Grade	RSSI	SNR	ECIO	Latency	Successful Packets	Latency	Download	Upload	Recommendation	Amplifier	
✓ Harris Teeter #00209	AWSS-V01	Verizon	4G	4G	03-27-2015 05:38 AM	112	A	-49	11	134	100.00%	Pass				Verizon - 4G	✓	
✓ Harris Teeter #00209	AWSS-A01	AT&T	4G	4G	03-27-2015 05:38 AM	112	A	-51	19	102	99.98%	Pass					✓	
✓ Harris Teeter #00209	AWSS-A02	AT&T	4G	4G	03-27-2015 05:38 AM	111	A	-57	20	103	100.00%	Pass					<input type="checkbox"/>	
✓ Harris Teeter #00209	AWSS-V02	Verizon	4G	4G	03-27-2015 05:48 AM	111	A	-76	23	132	100.00%	Pass					<input type="checkbox"/>	
✓ Harris Teeter #00209	AWSS-A01	AT&T	3G	3G	03-27-2015 05:44 AM	101	A-	-63		124	100.00%	Pass					✓	
✓ Harris Teeter #00209	AWSS-A02	AT&T	3G	3G	03-27-2015 05:44 AM	100	A-	-79		122	100.00%	Pass					<input type="checkbox"/>	
✓ Harris Teeter #00209	AWSS-V01	Verizon	3G	3G	03-27-2015 05:44 AM	96	B+	-59	8	-5	169	100.00%	Pass				✓	
✓ Harris Teeter #00209	AWSS-V02	Verizon	3G	3G	03-27-2015 05:54 AM	95	B+	-69	8	-3	191	100.00%	Pass				<input type="checkbox"/>	

The letter grade gives you an indication of the wireless performance; the Pass/Fail is determined by comparing the average latency to your applications' maximum latency thresholds. If the latency is within your applications' latency threshold and the letter grade is acceptable, the survey is Passed and is recommended for a wireless connection. This is done for two carriers and test with signal amplifiers can be added as an option. Throughput measurements, both upload and download, can (and should) be added if you are considering WWAN as a branch office primary or backup connection. When the survey is complete you will have a good idea of just how the WWAN connection will perform in production.

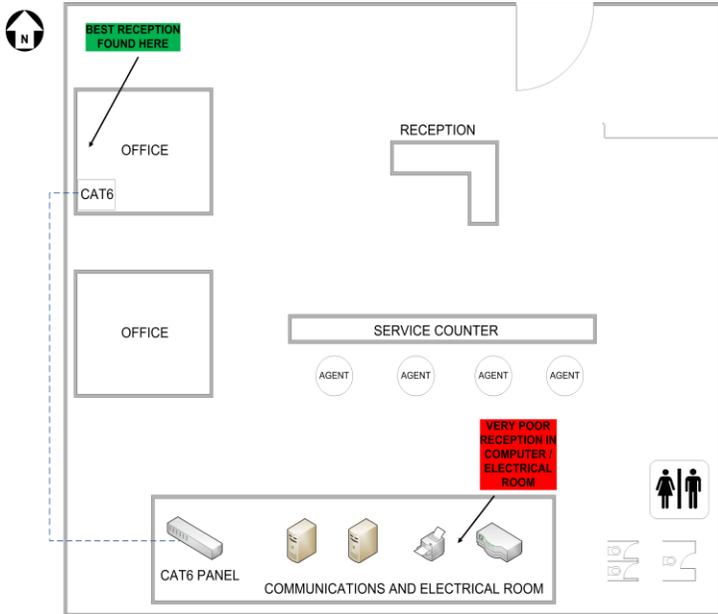
The Wireless WAN devices used to conduct Base Surveys support Verizon and AT&T. Tests are run individually for different carrier networks; and include distinct testing of both 4G and 3G on both carriers. Fallback networks can be important in the event the primary network becomes unavailable for any reason (think cell towers struck by lightning, maintenance, etc.). Our devices feature an integrated battery back up capable of maintaining the wireless connection for up to seven hours in the event of a power failure (and will alert via SNMP trap when the unit changes from AC to battery power). While this may not sound critical when conducting a site survey, it does give you a good deal of flexibility. Surveys can be completed in a new location that may not have power service established. Alternate locations within the site can be easily tested without the inconvenience of being tethered to a short AC adapter or a long extension cord. The LEDs on the device act like signal bars on a mobile phone so you can get a rough idea where at the site might be best before starting the actual survey.

## Survey Logistics

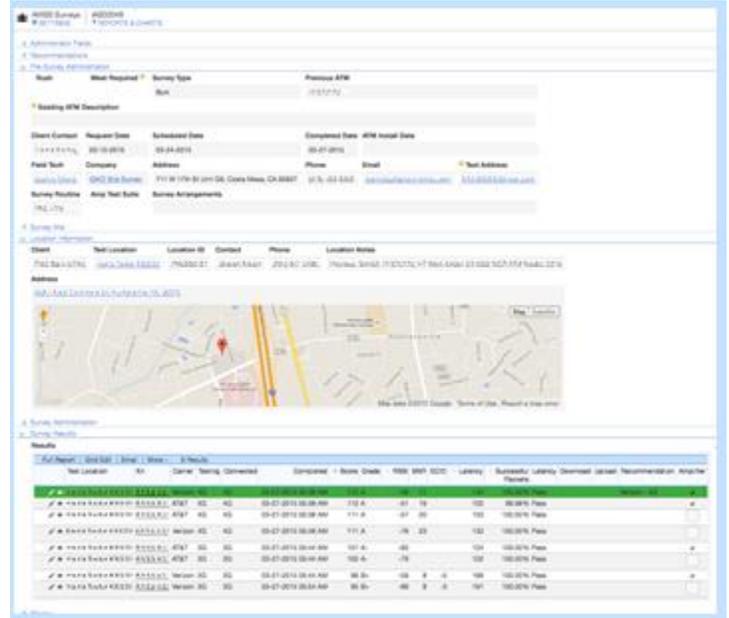
GNCI provides surveys in two ways: Base and Managed. Essentially the difference amounts to who does the work at the test site. For Base Surveys, GNCI will ship test devices to you or your representative; and your people will conduct the survey. Managed Surveys are conducted by GNCI representatives. We will dispatch a field tech with the appropriate equipment and they will conduct the survey.

## Base Surveys

Work at the site for AWSS Site Surveys is a snap. GNCI ships you the test devices with illustrated instructions. Plug in the test devices (if power is available – otherwise run off the battery) and call GNCI to kick off the survey. If you have some flexibility on where your WWAN device will be located when in production, walk around with the device to the various options and see which location within the site has the strongest signal. Place the test devices at that location, place the call to GNCI and that's it. If you've given us your mobile number; our system will notify you when action is needed and when the survey is complete.



Best Reception Diagram



Completed AWSS Survey

## Managed Surveys

Managed Surveys are the paradigm of convenience. Provide us with a list of locations you want surveyed, site contacts and authorization to access those sites; we'll take care of the rest. Our survey planners will reach out to the contact at each site, give them a brief overview of what will happen during the survey and schedule a convenient time. Our field techs will reach out to your site contacts to confirm the appointment before arriving.

## Survey Options

GNCI's Base survey tests two carriers (AT&T and Verizon) on one network (4G, or 3G) with a standard antenna, as described in the table above. Latency and Packet Loss tests are run to locations publicly available on the internet. But let's say you want to know what kind of throughput you can expect at the site; or you'd like to run tests to your own network infrastructure so they better represent the production environment. These options and more are available with AWSS.

Throughput Tests	Testing on Your Network	Amplifiers
Using iPerf (preferred)	Latency & Packet Loss	Using amplifiers at every site
Using FTP	Throughput	Testing both with and without Amplifiers

\*\*The AWSS: Survey toolset is modular and was built with flexibility in mind. If there are other tests or tools you'd like to use, just ask.

If it's important to you to know how your Wireless WAN connection will perform in production before making your deployment, GNCI's AWSS can make that happen. Contact GNCI at:

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(949) 515-1960