

Coax loss measurements

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Tuesday, 23 February 2010 17:51 -

Measurements of several coax jumpers

We have been concerned about the loss in connecting antennas to routers and A/P units. Various cables, adapters and jumpers are available and no one seems to be making claims about signal loss as they are used.

These measurements were done using a frequency counter, signal generator and microwave power meter. Signals are generated by a Polorad 1105 microwave signal generator. This unit covers 800-2400mhz and delivers a maximum of 0 dbm of output. This represents 1.0mw at 50 ohms. An EIP 535 microwave frequency counter measured the test frequency which was always held to 2400mhz. This is the upper limit of the signal source so it is not possible to test at mid-band. Power was measured by an HP-437B with an 8484A sensor head and required attenuators. The range on this head is 0.3 nanowatts to 10 microwatts so it is impossible to use directly.

The procedure is to warm up all equipment for an hour. Next, these steps are used:

- Set reference power on the generator output dial to 0dbm
- Adjust output frequency to 2400mhz via the frequency counter
- Measure the output power at the signal generator using attenuators
- This includes back to back adapters for coax connectors to be tested

- Make minor adjustments to frequency or power attenuator to get it steady
- Turn on "Relative" display on the power meter (sets display to 0.00 db)
- Remove the sensor head from the generator and insert cable to be tested
- Record direct loss reading (example: -4.09db)
- Gently flex and move cable especially near ends to watch for dropouts
- Remove cable and replace sensor head with adapters on source
- Verify reading is very near 0.00 relative reading set before
- Connect frequency counter and verify near 2400mhz

Testing done in this way is a direct reading of loss in db at the frequency of use and includes the coax connectors and adapters. Adapters can be lossy if poorly made. Below are our findings.

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Cable Measurements	Total Loss	Unit Loss
50' Andrew 1/4" Helix-Superflex with N connectors	4.87 dB	0.10 dB/ft
15' length of RG8 style with N connectors	5.95 dB	0.40 dB/ft
Hawking HAC7SS 7' HPP3100 B SMA extension cable	3.49 dB	0.50 dB/ft
Linksys AS2TNC 6' R-TNC to SMA stand	3.45 dB	0.57 dB/ft

Adapter Measurements	Total Loss
Pan Pacific RFA-8892P RJ-SMA/RP-TNC	0.5 dB
Pan Pacific RFA-8893P RP-SMA/RP-TNC	0.5 dB

Connector notes:

- Brass SMA connectors require 4-5 in/lb torque to provide the design impedance