

Lucent/Avaya Resistive Prototype

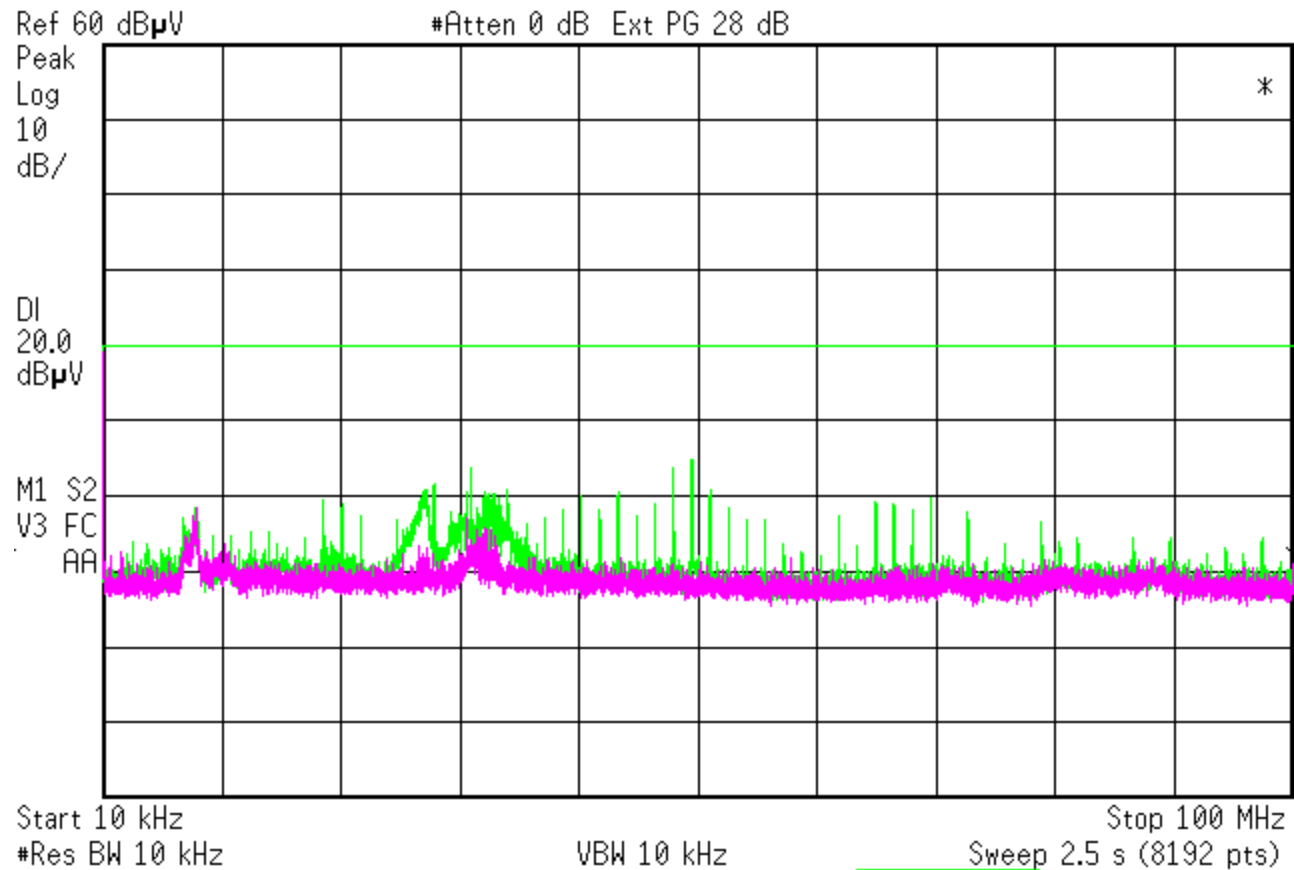
Conducted, Radiated Emissions ESD and Hipot

IEEE802.3af Plenary Meeting
November 2000

Rick Brooks, ribrooks@nortelnetworks.com

Acknowledgments:
Bob Leonowich (Lucent),
Don Stewart, Dieter Knollman, John Jetzt (Avaya)

Conducted Emission Tests



Lucent/Avaya Discovery Prototype with a “clean” Lab Power Supply

100 meter CAT-3 cable open load

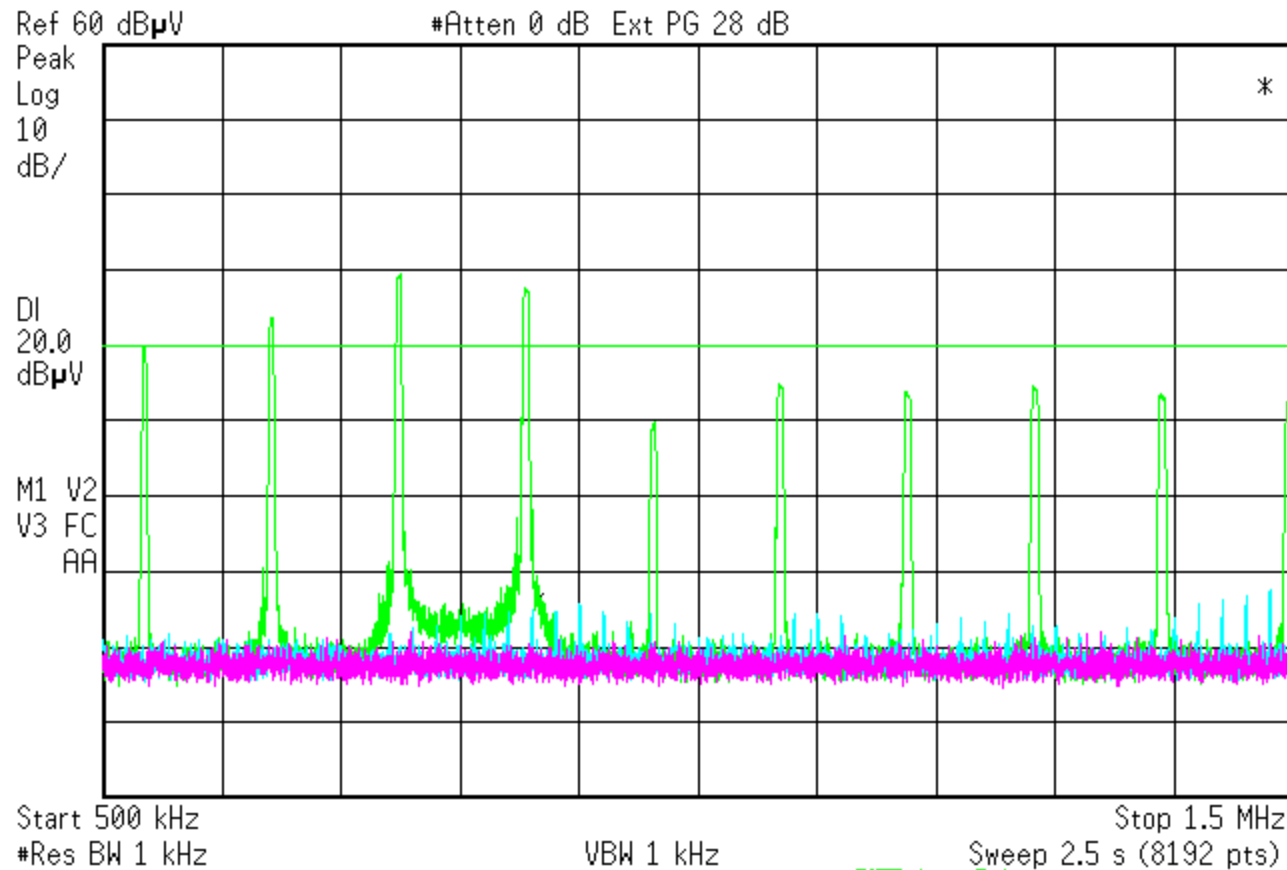
Each Trace taken with Max Hold, 5 minutes of acquisition

FCC F-35A cable clamp, 28 dB preamp, Spectrum Analyzer with preamp gain compensation

Common Mode Current (0 dBuV = 0 dBuA)
baseline

light green
magenta

Conducted Emissions, Common Mode



AM Frequency Band Interference

Lucent Resistive Discovery Prototype, 100 meter CAT-3, open load continuous discovery
(each trace taken with Max Hold, 5 - 10 minutes of acquisition)

FCC F-35A cable clamp, 28 dB preamp, Spectrum Analyzer with preamp gain compensation

Lucent Prototype with a "clean" lab power supply

light blue

Lucent Prototype with integral power supply

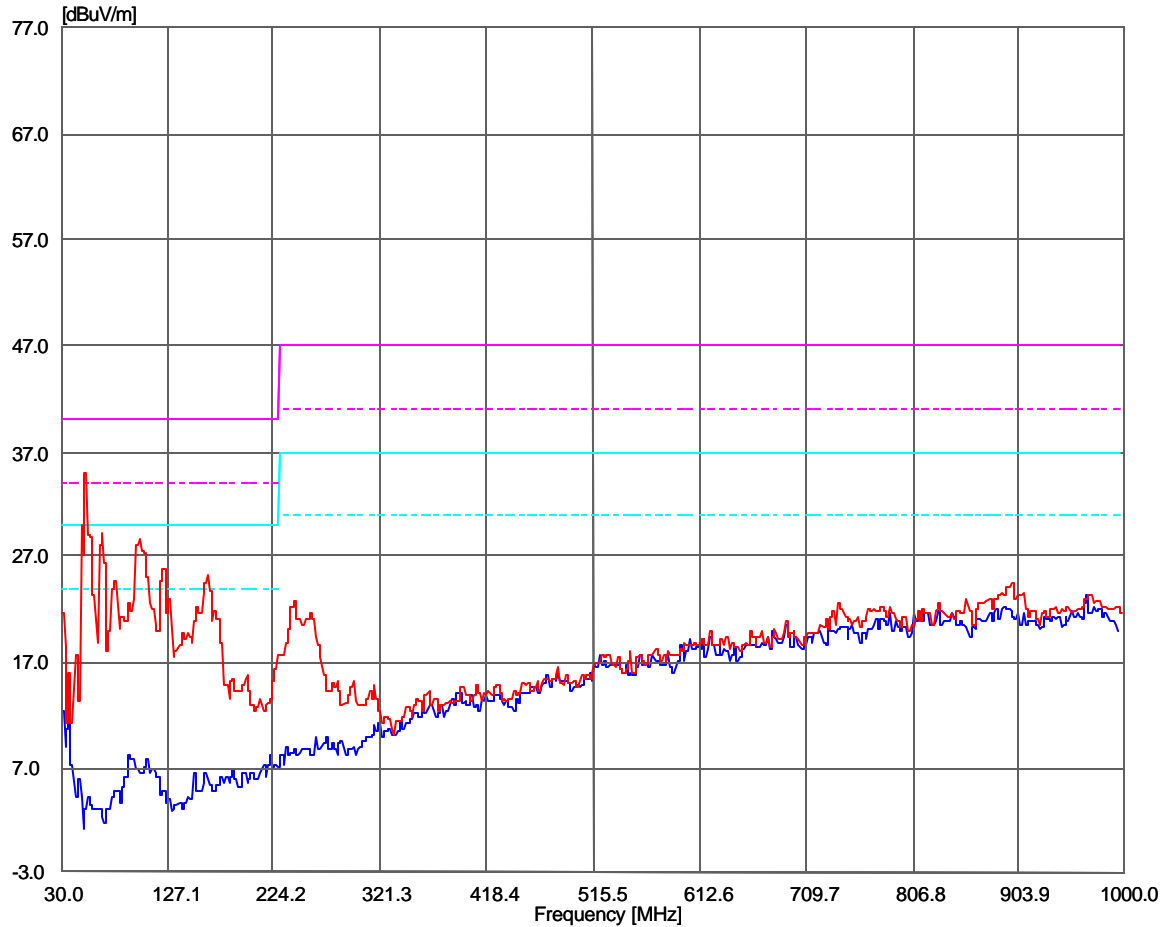
light green

Baseline

magenta

Conducted Emissions, Common Mode

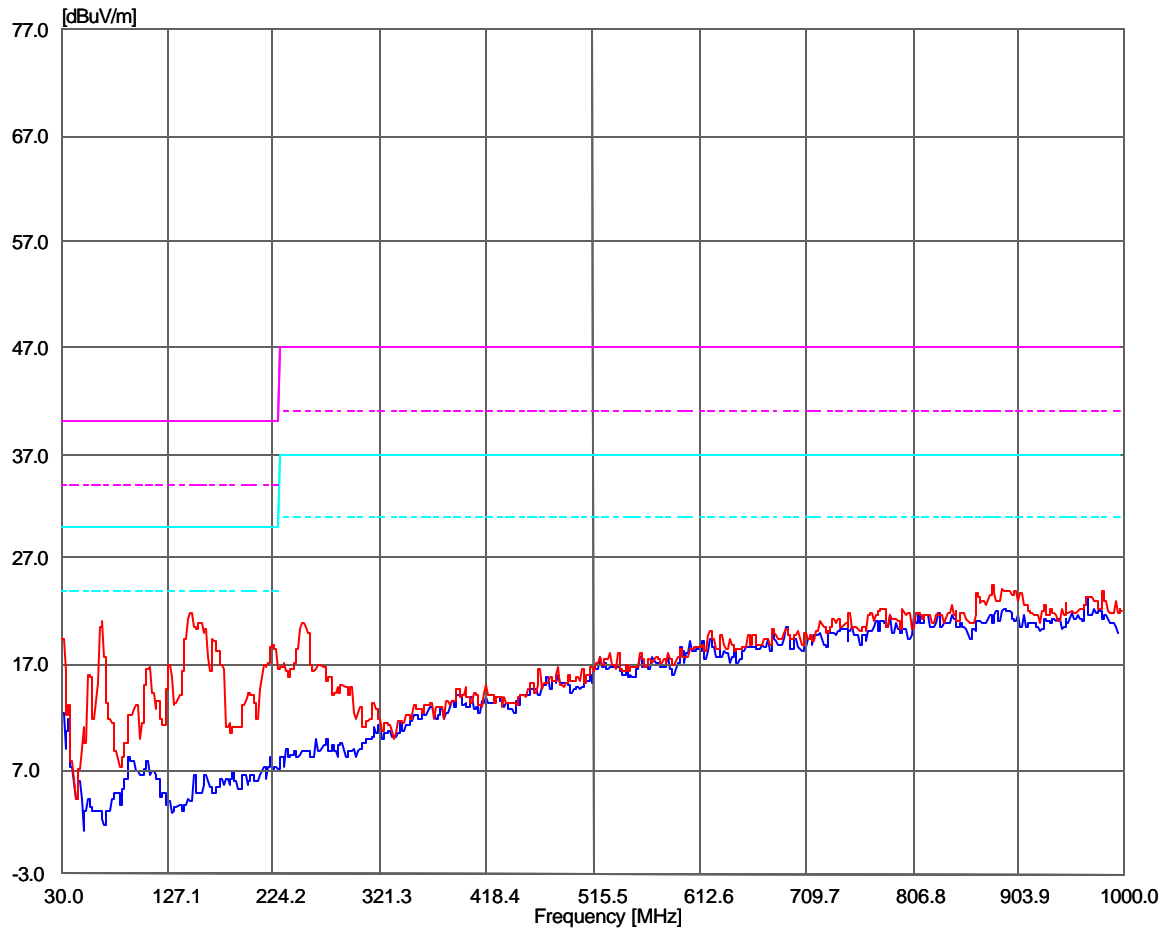
Radiated Emissions Tests



10 meter Anechoic Chamber, maximized scan of 4 different antenna heights, vert/horiz, and full rotation
 Lucent/Avaya Resistive Discovery Prototype with Lucent Power Supply

100 meter CAT-3, open load discovery
 Chamber/Equipment Noise Floor

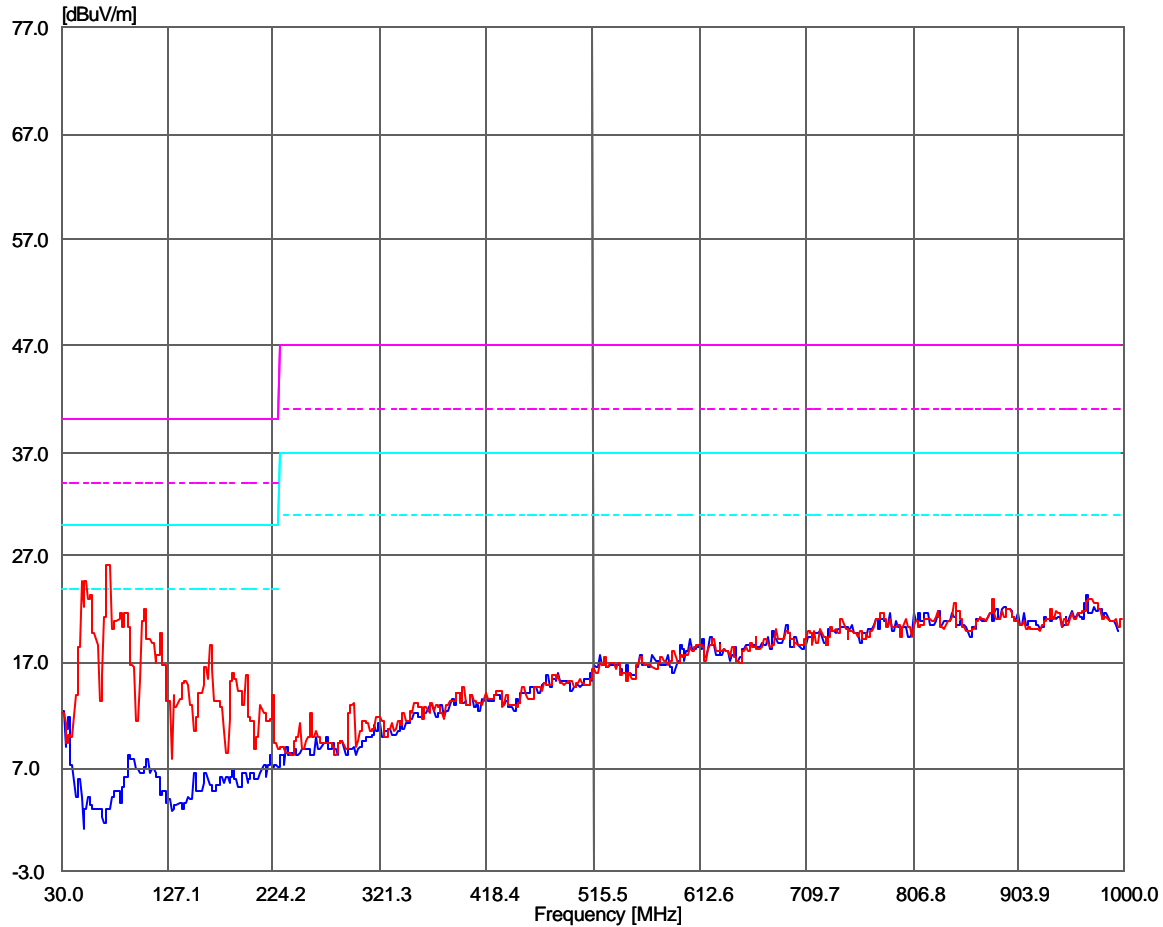
red trace
 blue trace



10 meter Anechoic Chamber, maximized scan of 4 different antenna heights, vert/horiz, and full rotation
 Lucent Power Supply Unit Alone directly driving 100m CAT-3 cable

100 meter CAT-3, open load
 Chamber/Equipment Noise Floor

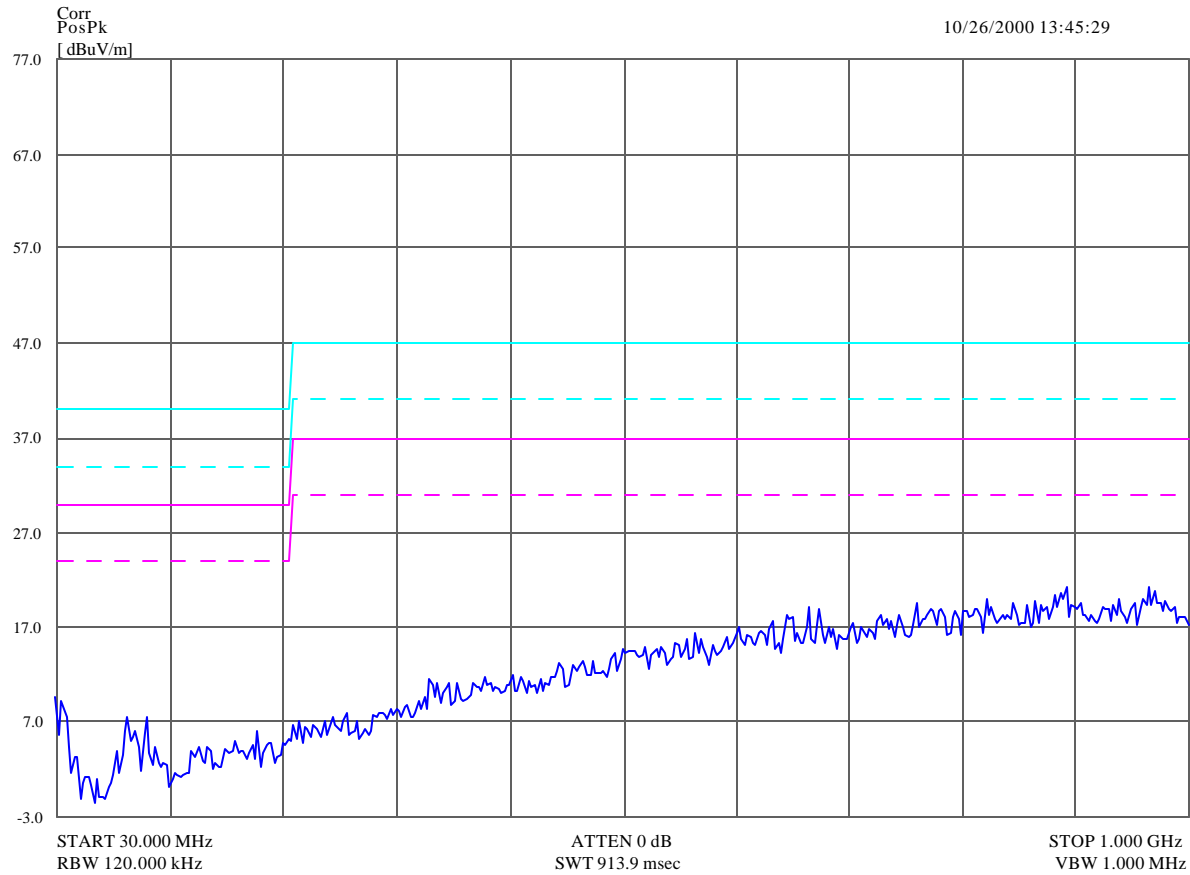
red trace
 blue trace



10 meter Anechoic Chamber, maximized scan of 4 different antenna heights, vert/horiz, and full rotation
 Lucent/Avaya Discovery Prototype powered with “very clean” 48VDC power

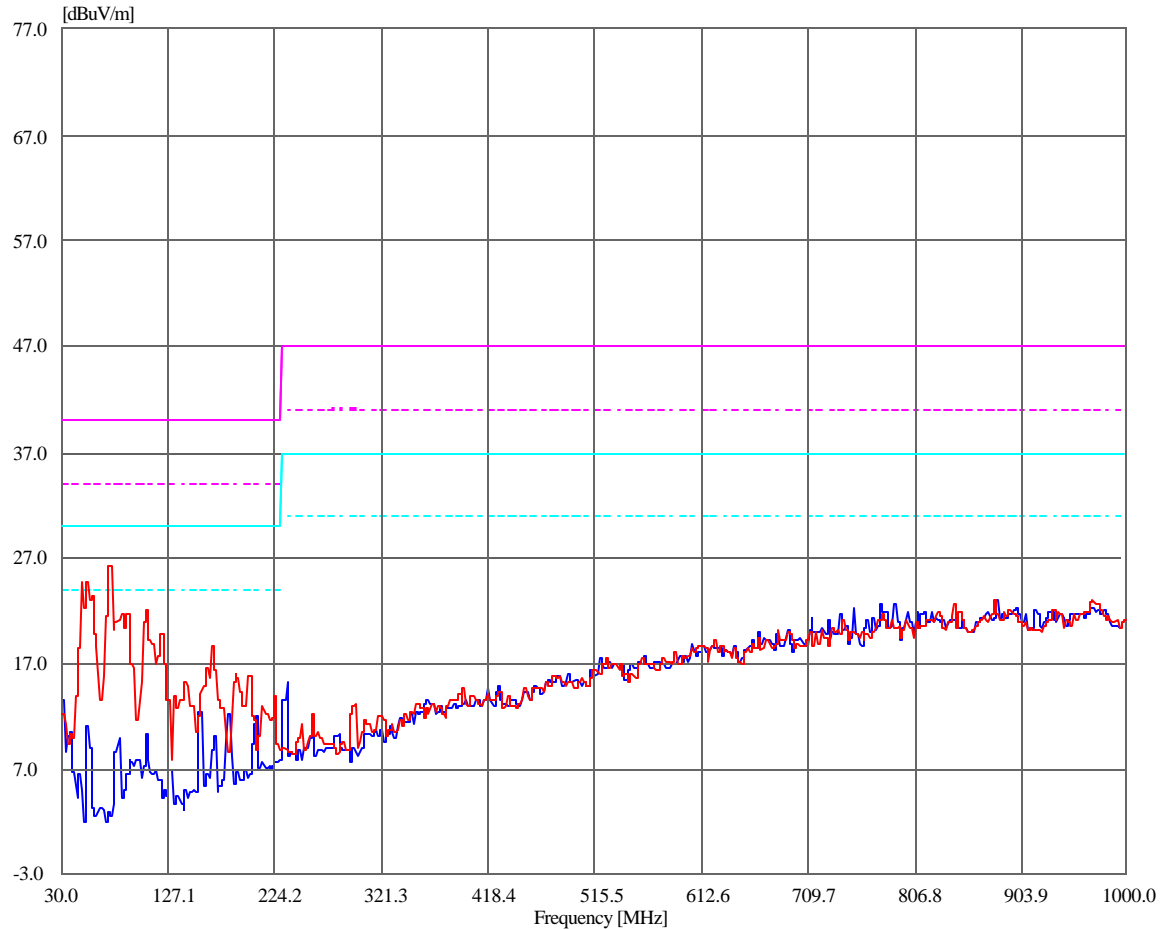
100 meter CAT-3, open load discovery
 Chamber/Equipment Noise Floor

red trace
 blue trace



10 meter Anechoic Chamber, maximized scan of 4 different antenna heights, vert/horiz, and full rotation

Spectrum of the “very clean” 48VDC power driving the CAT-3 cable



10 meter Anechoic Chamber, maximized scan of 4 different antenna heights, vert/horiz, and full rotation
 Comparison of Lucent with “clean” power and Nortel with no box or Faraday cage

Lucent/Avaya Prototype,	100 meter CAT-3, open load Discovery	red trace
Nortel Prototype exposed PC board without a box,	100 meter CAT-3, open load Discovery	blue trace

ESD and Hipot Test Results

ESD:

The prototype unit was subjected to 50 applications of 15 kV ESD in the following ways:

- Direct contact
- Horizontal plane
- Vertical plane

Finally, the attached power supply unit failed (powered off).

It did not recover immediately, but did recover after about 20 minutes, or so.

The prototype was then fully operational again.

I noted that when the unit is delivering power, i.e. the PD unit is plugged in, each ESD event briefly turns off the power. The power then turns on again automatically.

Overall, the prototype is robust.

It is housed in a completely plastic box.

More testing would be useful if it is housed in a metal box.

Hipot:

Evidently, the attached DC power supply unit will not handle the Hipot requirements.

- The Hipot test failed at a very low voltage (in the 100 volt range)