

From: John Stevenson

To: Behnam Ghaffari

Date: November 02, 2009

Subject:

Message:

Dear Mr. James Burtle,

Our records indicate that a response to the request for additional information was provided on October 1, 2009. All questions were addressed and a link budget was provided. This correspondence was provided via your website as indicated. If the information was never received may we re-submit our response for further review? Below I have provided the information which was sent in response to the request for information. Please reconsider this request given the information provided. Feel free to contact me should you need any additional information and thank you in advance for your assistance in this matter.

Regards,

Vasko Lingurovski

Test Engineering Project Manager

Defense and Aerospace Services
2007 Gandy Blvd Dock X
St. Petersburg, FL 33702
Desk (727)-803-3956
Cell (727)-637-4989
Fax (727)-803-5398
Vasko_Lingurovski@Jabil.com

Response sent 10/1/09:

Mr. Ghaffari,

In response to your e-mail (9-30-09 @ 11.24AM Eastern Time Zone).

I have a questions as to whether or not my company is even eligible to own and operate a GPS reradiate antenna?

We are an OEM provider for GOV subcontractors and I don't know if this classifies us to perform this level of GPS (wireless) functional testing. My current test configuration is an active receive antenna (L1 and L2 band) mounted on the roof that is run through an amplified splitter and hardwired to the product under test. The demand for a GPS signal as well as the 1PPS derived from it has increased significantly over the last two years and my thinking was that a wireless solution would alleviate the demand.

Below is the standard link budget for the product we would like to install if we are allowed and I am in the process of correcting some errors that were on the application (i.e. I put the whole range from L2 to L1 instead of two independent frequencies and some of my power factors were calculated incorrectly). One other point of interest is that the reradiate antenna would be mounted inside of the manufacturing building above our functional testers.

GPS L1 Link Budget

Satellite Transmitter

Transmitter Power (25 Watts) 14.25 dBW
RF Losses in transmitter path -1.25 dB
Antenna Gain (with respect to an isotrope) 13.5 dBi
Satellite EIRP (wrt isotropic radiator) 26.50 dBW 446.68 Watts

Propagation

Atmospheric and Polarization Losses -0.5 dB

where d = distance from antenna = 2.52E+07 meters
c = speed of light = 3.00E+08 m/sec
f = frequency = 1.58E+09 Hz
lambda = wavelength = c/f = 1.90E-01 meters

$$= -10\log_{10} \frac{3.17E+08}{1.90E-01}$$

$$= -10\log_{10} 1.67E+09$$

Free Space Path Loss over Distance -184.43 dB

Received Power on Earth -158.43 dBW
-128.43 dBm 1.44E-04 pW

Gain of Receive Antenna 38 dBic

RF losses in 300 feet of LMR400UF cabling and connectors from Receive Antenna to Line Amplifier -6.7 dB

Gain of Line Amplifier 20 dB

RF Power at Input to Re-Radiating Antenna -77.13 dBm 19.36 pW

Gain of Passive Re-Radiating Antenna 3 dBic

Re-Radiated EIRP (wrt isotropic radiator) -74.13 dBm 38.64 pW

Re-Radiated ERP (wrt dipole radiator) -76.28 dBm 23.55 pW

where d = distance from antenna = 100 feet

$$= -10\log_{10} \frac{383.0229763}{1.90E-01}$$

$$= -10\log_{10} 2.01E+03$$

Free Space Path Loss over Distance -66.07 dB
RF power level at 100 ft distance = -140.20 dBm wrt isotropic antenna
 -142.35 dBm wrt dipole antenna

John Stevenson
Test Engineer
Jabil Circuit Inc. (JDAS)
Desk Phone 727-803-3682
Cell Phone 727-458-4132
