

From: Brad Irish

To: Nimesh Sangani

Date: April 26, 2019

Subject: Additional Information Request

Message:

Link Budget Calculations

Equipment

Part	Description	Gain or Loss
L1/L2GPSA-T	Active Roof Antenna	40dBm
L1/L2GRRKPA-T	Passive Antenna.	dBi depends on angle 3 dBi to -6 dBi
RRKAMP	Line Amplifier	30 dBm
RG214/U	Cabling	10.3 dB per 100ft

Formulas

The formula for the maximum EIRP in dBm as given in NTIA Redbook 8.3.27.f:

$$P_{\text{max}} = P_R + 20 \log_{10} f + 20 \log_{10} (30 + d) - 27.55$$

Where: P_{max} is the maximum permissible EIRP in dBm

P_R is the power received at 30 meters from the building (-140 dBm/24 Mhz)

f is the frequency in MHz

d is the distance between the radiator and the closest exterior wall of the building in meters.

The formula for the system's radiated broadcast power in dBm is:

$$R_p = G_R + L_C + G_A + G_P + R_A$$

Where: R_p is the radiated power in dBm

G_R is the gain provided by the roof antenna

L_C is the loss caused by cable and adapters

G_A is the gain from the reradiating amplifier

G_P is the gain provided by the passive antenna

R_A is the average receive power for a given frequency in North America

