IRIS – FCC Form 442: Exhibit 3

Calculation of Maximum Equivalent Isotropically Radiated Power

IRIS seeks to operate a GPS re-radiating system that re-radiates a GPS L1 (1575.42 MHz) signal. Pursuant to Section 8.3.28 of the NTIA Manual, below is the calculation of the maximum equivalent isotropically radiated power. As required by section 8.3.28, the calculated emissions are "no greater than -140 dBm/24 MHz at a distance of 100 feet (30 meters) from the building where the test is being conducted." Building attenuation has been ignored.

Calculation of the maximum equivalent isotropically radiated power:

A = Receive antenna gain (max) = 40 dB
B = Cable insertion loss = -6 dB
C = Repeater amp gain (max) = 26 dB
D = Repeater antenna gain (max) = 3 dBi
E = Repeater antenna gain attenuator = -20 dB
Therefore:
Total system gain = A + B + C + D + E = 40 - 6 + 26 + 3 - 20 = 43 dBm

Average receive power L1 North America = -130 dBm
Therefore:
Radiated Power (dBm) = -130 + 43 = -87 dBm

F = GPS action frequency = 1575.42 Mhz
R = Range = 100' = 0.02 miles
Therefore:
Free space loss with isotropic antenna = $-(36.6+(20*\log_{10}(F*R)))$ = -66.09 dBm
Therefore:
Maximum equivalent isotropic radiated power = -66.09 - 87 = -153.09 dBm

Effective radiated power = -87 – 30 = -117 dBW
Effective radiated power = $10^{(-117 / 10)}$ = 2 pW
Transmitted power = $10^{((-117 - 3) / 10)}$ = 1 pW