



EXHIBIT 2

GPS SIGNAL LEVEL CALCULATIONS

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SYSTEM 7
USAF PLANT 42 SITE 2
BUILDING 210 EYEBROWS
U-2 PROGRAM
IDENTIFIERS: 210T1/T4

The following calculations are for System 7 transmit identifiers 210T1 and 210T4. All transmitter locations are equal distance from the nearest exterior wall. Calculations are based upon an average re-transmitted receive power for L1 and L2 of -130 dBm at the unit under test.

The attenuation of the GPS signal while traveling through free space is calculated with the following formula:

$$\text{FSL} = K1 + 20 \cdot \text{LOG}(D) + 20 \cdot \text{LOG}(F)$$

Where:

K1 = the constant factor (-37.87) for the desired units (feet),

F = the frequency in MHz; and

D = the slant range distance from the transmitter antenna to 100 feet beyond the nearest exterior wall in feet.

The GPS Re-radiation device transmits at two frequencies: 1575.42 MHz for L1 and 1227.6 MHz for L2.

Therefore, the Free Space Path Loss (FSL) equals:

1. For L1: $\text{FSL} = -37.87 + 20 \cdot \text{LOG}(152.1) + 20 \cdot \text{LOG}(1575.42) = 69.7 \text{ dB}$

2. For L2: $\text{FSL} = -37.87 + 20 \cdot \text{LOG}(152.1) + 20 \cdot \text{LOG}(1227.6) = 67.6 \text{ dB}$

The calculated signal at 100 feet beyond the nearest exterior wall from the transmit antenna is as follows:

1. L1 Transmitted Power = 10.5 picowatts EIRP = -79.8 dBm/24 MHz

At 100 feet = $-79.8 - 69.7 = -149.5 \text{ dBm/24 MHz}$

2. L2 Transmitted Power = 10.0 picowatts EIRP = -80.0 dBm/24 MHz

At 100 feet = $-80.0 - 67.6 = -147.6 \text{ dBm/24 MHz}$

2 NOV 06

System 7



SYSTEM 7
USAF PLANT 42 SITE 2
BUILDING 210 HANGAR
U-2 PROGRAM
IDENTIFIERS: 210T2/T3

The following calculations are for System 7 transmit identifiers 210T2 and 210T3. All transmitter locations are equal distance from the nearest exterior wall. Calculations are based upon an average re-transmitted receive power for L1 and L2 of -130 dBm at the unit under test.

The attenuation of the GPS signal while traveling through free space is calculated with the following formula:

$$\text{FSL} = K1 + 20 \cdot \text{LOG}(D) + 20 \cdot \text{LOG}(F)$$

Where:

K1 = the constant factor (-37.87) for the desired units (feet),

F = the frequency in MHz; and

D = the slant range distance from the transmitter antenna to 100 feet beyond the nearest exterior wall in feet.

The GPS Re-radiation device transmits at two frequencies: 1575.42 MHz for L1 and 1227.6 MHz for L2.

Therefore, the Free Space Path Loss (FSL) equals:

1. For L1: $\text{FSL} = -37.87 + 20 \cdot \text{LOG}(209.8) + 20 \cdot \text{LOG}(1575.42) = 72.5 \text{ dB}$

2. For L2: $\text{FSL} = -37.87 + 20 \cdot \text{LOG}(209.8) + 20 \cdot \text{LOG}(1227.6) = 70.4 \text{ dB}$

The calculated signal at 100 feet beyond the nearest exterior wall from the transmit antenna is as follows:

1. L1 Transmitted Power = 30.0 picowatts EIRP = -75.2 dBm/24 MHz

At 100 feet = $-75.2 - 72.5 = -147.7 \text{ dBm/24 MHz}$

2. L2 Transmitted Power = 29.4 picowatts EIRP = -75.3 dBm/24 MHz

At 100 feet = $-75.3 - 70.4 = -145.7 \text{ dBm/24 MHz}$

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System 7



SYSTEM 7
USAF PLANT 42 SITE 2
BUILDING 210
U-2 PROGRAM
IDENTIFIERS: 210T1/T2/T3/T4
BUILDING DIMENSION: 562' X 345'

L1 = -149.5 dBm/24 MHz (2 PLCS)
L2 = -147.6 dBm/24MHz (2 PLCS)

100'

100'

EXTERIOR

210T4

210T1

L1 = -147.7 dBm/24 MHz
L2 = -145.7 dBm/24MHz

100'

210T3

210T2

L1 = -147.7 dBm/24 MHz
L2 = -145.7 dBm/24MHz

100'

2 NOV 06

System 7