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April 21, 2014

Subject: RF MPE EXPOSURE

Re: FCC ID: PWO460011

To Whom It May Concern:

The MPE calculations for model 460011 signal booster were done for each frequency band: 800 MHz, and 1900 MHz. For each band three calculations were done; these included the different possibilities of antennas that may be connected to this signal booster: mobile outside, fixed outside, and inside antennas. The order of the attached calculations is as follows:

800 MHz band:

1. Mobile Outside Antenna: 311701
2. Fixed Outside Antenna: 311141-0620
3. Inside Antenna: 311155

1900 MHz band:

1. Mobile Outside Antenna: 311130-5810
2. Fixed Outside Antenna: 311201-0620
3. Inside Antenna: 311155

A booster's uplink power must not exceed 1 watt equivalent isotropic radiated power (EIRP) for each band of operation. Composite downlink power must not exceed 0.05 watt EIRP for each band of operation (20.21(e)(8)(i)(D)). The following formula was used to calculate the equivalent isotropic radiated power:

$$\text{EIRP} = \text{Power Out (Watts)} * \text{Duty Cycle Percent} * \text{Antenna Gain (non-log)} * \text{Coax loss (non-log)}$$

The power density (mW/cm^2) is calculated using the following formula:

$$\text{Calculated Power Density} = 1000 * \text{EIRP (Watts)} / (4 * \pi * (\text{Distance from Antenna (cm)})^2)$$

Sincerely,

A handwritten signature in black ink, appearing to read 'Patrick L. Cook', written in a cursive style.

Patrick L. Cook

Senior Research and Development Engineer



Minimum Safe Distance From Antennas

Based upon FCC OET Bulletin 65 and other FCC Sources

INPUT DATA

Frequency MHz	824
Pout Watts	0.79433
Duty Cycle Percent	100.0%
Ant. Gain dBi	2.18
Coax Loss dB	1.40
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	0.78
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.9506
FCC Power Density Limit (mw/cm ²)	0.55
Calculated Power Density (mw/cm ²)	0.1834

REFERENCE DATA

Pout dBm	29.00
Antenna Gain (non-log)	1.65
Coax loss (non-log)	0.72
General FCC Limit (mw/cm ²)	f/1500

Antenna # 311701



Minimum Safe Distance From Antennas

Based upon FCC OET Bulletin 65 and other FCC Sources

INPUT DATA

Frequency MHz	824
Pout Watts	0.79433
Duty Cycle Percent	100.0%
Ant. Gain dBi	1.20
Coax Loss dB	1.70
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	-0.50
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.7079
FCC Power Density Limit (mw/cm ²)	0.55
Calculated Power Density (mw/cm ²)	0.1366

REFERENCE DATA

Pout dBm	29.00
Antenna Gain (non-log)	1.32
Coax loss (non-log)	0.68
General FCC Limit (mw/cm ²)	f/1500

Antenna # 311141-0620



Minimum Safe Distance From Antennas

Based upon FCC OET Bulletin 65 and other FCC Sources

INPUT DATA

Frequency MHz	869
Pout Watts	0.00016
Duty Cycle Percent	100.0%
Ant. Gain dBi	9.77
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	9.77
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0015
FCC Power Density Limit (mw/cm ²)	0.58
Calculated Power Density (mw/cm ²)	0.0003

REFERENCE DATA

Pout dBm	-7.90
Antenna Gain (non-log)	9.48
Coax loss (non-log)	1.00
General FCC Limit (mw/cm ²)	f/1500

Antenna # 311155



Minimum Safe Distance From Antennas

Based upon FCC OET Bulletin 65 and other FCC Sources

INPUT DATA

Frequency MHz	1850
Pout Watts	0.51286
Duty Cycle Percent	100.0%
Ant. Gain dBi	3.57
Coax Loss dB	2.10
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	1.47
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.7194
FCC Power Density Limit (mw/cm ²)	1.00
Calculated Power Density (mw/cm ²)	0.1388

REFERENCE DATA

Pout dBm	27.10
Antenna Gain (non-log)	2.28
Coax loss (non-log)	0.62
General FCC Limit (mw/cm ²)	1.00

Antenna # 311130-5810



Minimum Safe Distance From Antennas

Based upon FCC OET Bulletin 65 and other FCC Sources

INPUT DATA

Frequency MHz	1850
Pout Watts	0.51286
Duty Cycle Percent	100.0%
Ant. Gain dBi	5.10
Coax Loss dB	2.67
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	2.43
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.8974
FCC Power Density Limit (mw/cm ²)	1.00
Calculated Power Density (mw/cm ²)	0.1731

REFERENCE DATA

Pout dBm	27.10
Antenna Gain (non-log)	3.24
Coax loss (non-log)	0.54
General FCC Limit (mw/cm ²)	1.00

Antenna # 311201-0620



Minimum Safe Distance From Antennas

Based upon FCC OET Bulletin 65 and other FCC Sources

INPUT DATA

Frequency MHz	1910
Pout Watts	0.00117
Duty Cycle Percent	100.0%
Ant. Gain dBi	9.77
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	9.77
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0111
FCC Power Density Limit (mw/cm ²)	1.00
Calculated Power Density (mw/cm ²)	0.0021

REFERENCE DATA

Pout dBm	0.70
Antenna Gain (non-log)	9.48
Coax loss (non-log)	1.00
General FCC Limit (mw/cm ²)	1.00

Antenna # 311130-5810