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October 22, 2013

Subject: RF MPE EXPOSURE
Re: FCC ID: PWO460004

To Whom It May Concern:

The MPE calculations for model 460004 signal booster were done for each frequency band: 1700/2100 MHz, 800 MHz, 700 MHz Band 13, 700 MHz Band 17, and 1900 MHz. For each band two calculations were done; these included the different possibilities of antennas that may be connected to this signal booster: fixed outside and inside antennas. The order of the attached calculations is as follows:

1700/2100 MHz band:

1. Fixed Outside Antenna Kit: 311129-400100
2. Inside Antenna: 311155

800 MHz band:

1. Fixed Outside Antenna Kit: 314411-5825
2. Inside Antenna: 311155

700 MHz Band 13:

1. Fixed Outside Antenna: 314411-40075
2. Inside Antenna Kit: 311155

700 MHz Band 17:

1. Fixed Outside Antenna: 314411-40075
2. Inside Antenna: 311155

1900 MHz band:

1. Fixed Outside Antenna: 314473-0640
2. 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,

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	1710
Pout Watts	0.17780
Duty Cycle Percent	100.0%
Ant. Gain dBi	9.10
Coax Loss dB	5.80
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	3.30
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.3801
FCC Power Density Limit (mw/cm ²)	1.00
Calculated Power Density (mw/cm ²)	0.0733

REFERENCE DATA

Pout dBm	22.50
Antenna Gain (non-log)	8.13
Coax loss (non-log)	0.26
General FCC Limit (mw/cm ²)	1.00

Antenna # 311129-400100



Minimum Safe Distance From Antennas Based upon FCC OET Bulletin 65 and other FCC Sources

INPUT DATA

Frequency MHz	2110
Pout Watts	0.00123
Duty Cycle Percent	100.0%
Ant. Gain dBi	6.70
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	6.70
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0058
FCC Power Density Limit (mw/cm ²)	1.00
Calculated Power Density (mw/cm ²)	0.0011

REFERENCE DATA

Pout dBm	0.90
Antenna Gain (non-log)	4.68
Coax loss (non-log)	1.00
General FCC Limit (mw/cm ²)	1.00

Antenna # 311155



Minimum Safe Distance From Antennas Based upon FCC OET Bulletin 65 and other FCC Sources

INPUT DATA

Frequency MHz	824
Pout Watts	0.33110
Duty Cycle Percent	100.0%
Ant. Gain dBi	7.80
Coax Loss dB	3.20
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.60
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.9549
FCC Power Density Limit (mw/cm ²)	0.55
Calculated Power Density (mw/cm ²)	0.1842

REFERENCE DATA

Pout dBm	25.20
Antenna Gain (non-log)	6.03
Coax loss (non-log)	0.48
General FCC Limit (mw/cm ²)	f/1500

Antenna # 314411-5825



Minimum Safe Distance From Antennas Based upon FCC OET Bulletin 65 and other FCC Sources

INPUT DATA

Frequency MHz	869
Pout Watts	0.00063
Duty Cycle Percent	100.0%
Ant. Gain dBi	6.10
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	6.10
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0026
FCC Power Density Limit (mw/cm ²)	0.58
Calculated Power Density (mw/cm ²)	0.0005

REFERENCE DATA

Pout dBm	-2.00
Antenna Gain (non-log)	4.07
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	776
Pout Watts	0.23990
Duty Cycle Percent	100.0%
Ant. Gain dBi	7.2
Coax Loss dB	3.00
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.2
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.6310
FCC Power Density Limit (mw/cm ²)	0.52
Calculated Power Density (mw/cm ²)	0.1217

REFERENCE DATA

Pout dBm	23.80
Antenna Gain (non-log)	5.25
Coax loss (non-log)	0.50
General FCC Limit (mw/cm ²)	f/1500

Antenna # 314411-40075



Minimum Safe Distance From Antennas Based upon FCC OET Bulletin 65 and other FCC Sources

INPUT DATA

Frequency MHz	746
Pout Watts	0.00062
Duty Cycle Percent	100.0%
Ant. Gain dBi	4.20
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.20
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0016
FCC Power Density Limit (mw/cm ²)	0.50
Calculated Power Density (mw/cm ²)	0.0003

REFERENCE DATA

Pout dBm	-2.10
Antenna Gain (non-log)	2.63
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	698
Pout Watts	0.20890
Duty Cycle Percent	100.0%
Ant. Gain dBi	7.30
Coax Loss dB	2.80
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.50
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.5888
FCC Power Density Limit (mw/cm ²)	0.47
Calculated Power Density (mw/cm ²)	0.1136

REFERENCE DATA

Pout dBm	23.20
Antenna Gain (non-log)	5.37
Coax loss (non-log)	0.52
General FCC Limit (mw/cm ²)	f/1500

Antenna # 314411-40075



Minimum Safe Distance From Antennas Based upon FCC OET Bulletin 65 and other FCC Sources

INPUT DATA

Frequency MHz	728
Pout Watts	0.00091
Duty Cycle Percent	100.0%
Ant. Gain dBi	7.20
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	7.20
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0048
FCC Power Density Limit (mw/cm ²)	0.49
Calculated Power Density (mw/cm ²)	0.0009

REFERENCE DATA

Pout dBm	-0.40
Antenna Gain (non-log)	5.25
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	0.16220
Duty Cycle Percent	100.0%
Ant. Gain dBi	10.0
Coax Loss dB	5.30
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.74
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.4831
FCC Power Density Limit (mw/cm ²)	1.00
Calculated Power Density (mw/cm ²)	0.0932

REFERENCE DATA

Pout dBm	22.10
Antenna Gain (non-log)	10.09
Coax loss (non-log)	0.30
General FCC Limit (mw/cm ²)	1.00

Antenna # 314473-0640



Minimum Safe Distance From Antennas Based upon FCC OET Bulletin 65 and other FCC Sources

INPUT DATA

Frequency MHz	1930
Pout Watts	0.00072
Duty Cycle Percent	100.0%
Ant. Gain dBi	9.80
Coax Loss dB	0.00
Distance From Antenna In cm	20.0

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	9.80
Distance From Antenna In Inches	7.87
EIRP (Watts)	0.0069
FCC Power Density Limit (mw/cm ²)	1.00
Calculated Power Density (mw/cm ²)	0.0014

REFERENCE DATA

Pout dBm	-1.40
Antenna Gain (non-log)	9.55
Coax loss (non-log)	1.00
General FCC Limit (mw/cm ²)	1.00

Antenna # 311155