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June 9, 2016

Subject: RF MPE EXPOSURE  
Re: FCC ID: PWO460020

To Whom It May Concern:

The MPE calculations for model 460020 signal booster were done for each frequency band: 1700/2100 MHz, 800 MHz, 700 MHz Band 13, 700 MHz Band 12, and 1900 MHz. For each band two calculations were done; these included the worst case scenario for each of the different types of antennas that may be connected to this signal booster: outside and inside antennas. The order of the attached calculations is as follows:

1700/2100 MHz band:

1. Outside Antenna: 314453-40075
2. Inside Antenna: 309904-75F

800 MHz band:

1. Outside Antenna: 311129-400100
2. Inside Antenna: 311155-1150

700 MHz Band 13:

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

700 MHz Band 12:

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

1900 MHz band:

1. Outside Antenna: 314473-0640
2. Inside Antenna: 309904-75F

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 ( $\text{mW}/\text{cm}^2$ ) 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  
Chief Technology Officer



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

### INPUT DATA

Frequency MHz	1710
Pout Watts	0.28510
Duty Cycle Percent	100.0%
Ant. Gain dBi	8.21
Coax Loss dB	4.50
Distance From Antenna In cm	20.0

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	3.71
Distance From Antenna In Inches	7.87
EIRP (Watts)	0.6699
FCC Power Density Limit (mw/cm <sup>2</sup> )	1.00
Calculated Power Density (mw/cm <sup>2</sup> )	0.1333

### REFERENCE DATA

Pout dBm	24.55
Antenna Gain (non-log)	6.62
Coax loss (non-log)	0.35
General FCC Limit (mw/cm <sup>2</sup> )	1.00



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

### INPUT DATA

Frequency MHz	2110
Pout Watts	0.01560
Duty Cycle Percent	100.0%
Ant. Gain dBi	6.66
Coax Loss dB	3.17
Distance From Antenna In cm	20.0

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	3.49
Distance From Antenna In Inches	7.87
EIRP (Watts)	0.0348
FCC Power Density Limit (mw/cm <sup>2</sup> )	1.00
Calculated Power Density (mw/cm <sup>2</sup> )	0.0069

### REFERENCE DATA

Pout dBm	11.93
Antenna Gain (non-log)	4.63
Coax loss (non-log)	0.48
General FCC Limit (mw/cm <sup>2</sup> )	1.00



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

### INPUT DATA

Frequency MHz	824
Pout Watts	0.22336
Duty Cycle Percent	100.0%
Ant. Gain dBi	9.64
Coax Loss dB	4.74
Distance From Antenna In cm	20.0

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.90
Distance From Antenna In Inches	7.87
EIRP (Watts)	0.6902
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.55
Calculated Power Density (mw/cm <sup>2</sup> )	0.1373

### REFERENCE DATA

Pout dBm	23.49
Antenna Gain (non-log)	9.20
Coax loss (non-log)	0.34
General FCC Limit (mw/cm <sup>2</sup> )	f/1500



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

### INPUT DATA

Frequency MHz	869
Pout Watts	0.01614
Duty Cycle Percent	100.0%
Ant. Gain dBi	6.09
Coax Loss dB	2.36
Distance From Antenna In cm	20.0

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	3.73
Distance From Antenna In Inches	7.87
EIRP (Watts)	0.0381
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.58
Calculated Power Density (mw/cm <sup>2</sup> )	0.0076

### REFERENCE DATA

Pout dBm	12.08
Antenna Gain (non-log)	4.06
Coax loss (non-log)	0.58
General FCC Limit (mw/cm <sup>2</sup> )	f/1500



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

### INPUT DATA

Frequency MHz	776
Pout Watts	0.26242
Duty Cycle Percent	100.0%
Ant. Gain dBi	7.20
Coax Loss dB	3.00
Distance From Antenna In cm	20.0

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.20
Distance From Antenna In Inches	7.87
EIRP (Watts)	0.6902
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.52
Calculated Power Density (mw/cm <sup>2</sup> )	0.1373

### REFERENCE DATA

Pout dBm	24.19
Antenna Gain (non-log)	5.25
Coax loss (non-log)	0.50
General FCC Limit (mw/cm <sup>2</sup> )	f/1500



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

### INPUT DATA

Frequency MHz	746
Pout Watts	0.01556
Duty Cycle Percent	100.0%
Ant. Gain dBi	4.16
Coax Loss dB	0.00
Distance From Antenna In cm	20.0

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.16
Distance From Antenna In Inches	7.87
EIRP (Watts)	0.0406
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.50
Calculated Power Density (mw/cm <sup>2</sup> )	0.0081

### REFERENCE DATA

Pout dBm	11.92
Antenna Gain (non-log)	2.61
Coax loss (non-log)	1.00
General FCC Limit (mw/cm <sup>2</sup> )	f/1500



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

### INPUT DATA

Frequency MHz	698
Pout Watts	0.24774
Duty Cycle Percent	100.0%
Ant. Gain dBi	7.30
Coax Loss dB	2.80
Distance From Antenna In cm	20.0

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.50
Distance From Antenna In Inches	7.87
EIRP (Watts)	0.6982
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.47
Calculated Power Density (mw/cm <sup>2</sup> )	0.1389

### REFERENCE DATA

Pout dBm	23.94
Antenna Gain (non-log)	5.37
Coax loss (non-log)	0.52
General FCC Limit (mw/cm <sup>2</sup> )	f/1500





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

### INPUT DATA

Frequency MHz	728
Pout Watts	0.01459
Duty Cycle Percent	100.0%
Ant. Gain dBi	4.16
Coax Loss dB	0.00
Distance From Antenna In cm	20.0

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.16
Distance From Antenna In Inches	7.87
EIRP (Watts)	0.0380
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.49
Calculated Power Density (mw/cm <sup>2</sup> )	0.0076

### REFERENCE DATA

Pout dBm	11.64
Antenna Gain (non-log)	2.61
Coax loss (non-log)	1.00
General FCC Limit (mw/cm <sup>2</sup> )	f/1500



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

### INPUT DATA

Frequency MHz	1850
Pout Watts	0.22961
Duty Cycle Percent	100.0%
Ant. Gain dBi	10.04
Coax Loss dB	5.12
Distance From Antenna In cm	20.0

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.92
Distance From Antenna In Inches	7.87
EIRP (Watts)	0.7129
FCC Power Density Limit (mw/cm <sup>2</sup> )	1.00
Calculated Power Density (mw/cm <sup>2</sup> )	0.1418

### REFERENCE DATA

Pout dBm	23.61
Antenna Gain (non-log)	10.09
Coax loss (non-log)	0.31
General FCC Limit (mw/cm <sup>2</sup> )	1.00



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

### INPUT DATA

Frequency MHz	1930
Pout Watts	0.01084
Duty Cycle Percent	100.0%
Ant. Gain dBi	6.60
Coax Loss dB	0.00
Distance From Antenna In cm	20.0

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	6.60
Distance From Antenna In Inches	7.87
EIRP (Watts)	0.0495
FCC Power Density Limit (mw/cm <sup>2</sup> )	1.00
Calculated Power Density (mw/cm <sup>2</sup> )	0.0099

### REFERENCE DATA

Pout dBm	10.35
Antenna Gain (non-log)	4.57
Coax loss (non-log)	1.00
General FCC Limit (mw/cm <sup>2</sup> )	1.00