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December 22, 2016

Subject: RF MPE EXPOSURE  
Re: FCC ID: PWO460036

To Whom It May Concern:

The MPE calculations for model 460036 signal booster were done for each frequency band: 700 MHz Band 12, 700 MHz Band 13, 800 MHz, 1900 MHz, and 1700/2100 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:

700 MHz Band 12:

1. Outside Antenna: 314411-40075
2. Inside Antenna: 311135-5840

700 MHz Band 13:

1. Outside Antenna: 314411-40075
2. Inside Antenna: 304419-1175

800 MHz band:

1. Outside Antenna: 311129-400100
2. Inside Antenna: 311135-5840

1900 MHz band:

1. Outside Antenna: 314473-0640
2. Inside Antenna: 311135-5840

1700/2100 MHz band:

1. Outside Antenna: 314453-40075
2. Inside Antenna: 311135-400150

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<sup>2</sup>) 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	698
Pout Watts	0.33884
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)	0.9550
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.47
Calculated Power Density (mw/cm <sup>2</sup> )	0.1842

### REFERENCE DATA

Pout dBm	25.30
Antenna Gain (non-log)	5.37
Coax loss (non-log)	0.52
General FCC Limit (mw/cm <sup>2</sup> )	f/1500

**Antenna # 301126**



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

### INPUT DATA

Frequency MHz	728
Pout Watts	0.03548
Duty Cycle Percent	100.0%
Ant. Gain dBi	4.20
Coax Loss dB	4.80
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	-0.60
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0309
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.49
Calculated Power Density (mw/cm <sup>2</sup> )	0.0060

### REFERENCE DATA

Pout dBm	15.50
Antenna Gain (non-log)	2.63
Coax loss (non-log)	0.33
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	0.37154
Duty Cycle Percent	100.0%
Ant. Gain dBi	7.20
Coax Loss dB	3.00
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)	0.9772
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.52
Calculated Power Density (mw/cm <sup>2</sup> )	0.1885

### REFERENCE DATA

Pout dBm	25.70
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	0.03090
Duty Cycle Percent	100.0%
Ant. Gain dBi	2.10
Coax Loss dB	3.20
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	-1.10
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0240
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.50
Calculated Power Density (mw/cm <sup>2</sup> )	0.0046

### REFERENCE DATA

Pout dBm	14.90
Antenna Gain (non-log)	1.62
Coax loss (non-log)	0.48
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	824
Pout Watts	0.28184
Duty Cycle Percent	100.0%
Ant. Gain dBi	9.60
Coax Loss dB	4.90
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.70
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.8318
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.55
Calculated Power Density (mw/cm <sup>2</sup> )	0.1605

### REFERENCE DATA

Pout dBm	24.50
Antenna Gain (non-log)	9.12
Coax loss (non-log)	0.32
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	0.03236
Duty Cycle Percent	100.0%
Ant. Gain dBi	4.20
Coax Loss dB	4.80
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	-0.60
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0282
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.58
Calculated Power Density (mw/cm <sup>2</sup> )	0.0054

### REFERENCE DATA

Pout dBm	15.10
Antenna Gain (non-log)	2.63
Coax loss (non-log)	0.33
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	0.32359
Duty Cycle Percent	100.0%
Ant. Gain dBi	10.00
Coax Loss dB	5.26
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)	0.9638
FCC Power Density Limit (mw/cm <sup>2</sup> )	1.00
Calculated Power Density (mw/cm <sup>2</sup> )	0.1859

### REFERENCE DATA

Pout dBm	25.10
Antenna Gain (non-log)	10.00
Coax loss (non-log)	0.30
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	0.03467
Duty Cycle Percent	100.0%
Ant. Gain dBi	6.70
Coax Loss dB	9.20
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	-2.50
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0195
FCC Power Density Limit (mw/cm <sup>2</sup> )	1.00
Calculated Power Density (mw/cm <sup>2</sup> )	0.0038

### REFERENCE DATA

Pout dBm	15.40
Antenna Gain (non-log)	4.68
Coax loss (non-log)	0.12
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	1710
Pout Watts	0.40738
Duty Cycle Percent	100.0%
Ant. Gain dBi	8.20
Coax Loss dB	4.49
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	3.71
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.9572
FCC Power Density Limit (mw/cm <sup>2</sup> )	1.00
Calculated Power Density (mw/cm <sup>2</sup> )	0.1847

### REFERENCE DATA

Pout dBm	26.10
Antenna Gain (non-log)	6.61
Coax loss (non-log)	0.36
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	0.03388
Duty Cycle Percent	100.0%
Ant. Gain dBi	6.70
Coax Loss dB	10.00
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)	0.0158
FCC Power Density Limit (mw/cm <sup>2</sup> )	1.00
Calculated Power Density (mw/cm <sup>2</sup> )	0.0031

### REFERENCE DATA

Pout dBm	15.30
Antenna Gain (non-log)	4.68
Coax loss (non-log)	0.10
General FCC Limit (mw/cm <sup>2</sup> )	1.00