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November 2, 2017

Subject: RF MPE EXPOSURE  
Re: FCC ID: PWO 460033

To Whom It May Concern:

The MPE calculations for model 460033 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 one calculation was done; this included the only scenario for both the mobile outside antenna, and mobile inside antenna that may be connected to this signal booster. The order of the attached calculations is as follows:

700 MHz Band 12:

1. Outside Antenna
2. Inside Antenna

700 MHz Band 13:

1. Outside Antenna
2. Inside Antenna

800 MHz band:

1. Outside Antenna
2. Inside Antenna

1900 MHz band:

1. Outside Antenna
2. Inside Antenna

1700/2100 MHz band:

1. Outside Antenna
2. Inside Antenna

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	0.14125
Duty Cycle Percent	100.0%
Ant. Gain dBi	-0.19
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	-0.19
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.1352
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.47
Calculated Power Density (mw/cm <sup>2</sup> )	0.0261

### REFERENCE DATA

Pout dBm	21.50
Antenna Gain (non-log)	0.96
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	729
Pout Watts	0.00380
Duty Cycle Percent	100.0%
Ant. Gain dBi	-1.33
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	-1.33
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0028
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.49
Calculated Power Density (mw/cm <sup>2</sup> )	0.0005

### REFERENCE DATA

Pout dBm	5.80
Antenna Gain (non-log)	0.74
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	777
Pout Watts	0.30200
Duty Cycle Percent	100.0%
Ant. Gain dBi	-1.06
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	-1.06
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.2366
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.52
Calculated Power Density (mw/cm <sup>2</sup> )	0.0456

### REFERENCE DATA

Pout dBm	24.80
Antenna Gain (non-log)	0.78
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	746
Pout Watts	0.00631
Duty Cycle Percent	100.0%
Ant. Gain dBi	-1.33
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	-1.33
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0046
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.50
Calculated Power Density (mw/cm <sup>2</sup> )	0.0009

### REFERENCE DATA

Pout dBm	8.00
Antenna Gain (non-log)	0.74
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	824
Pout Watts	0.25704
Duty Cycle Percent	100.0%
Ant. Gain dBi	0.52
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	0.52
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.2897
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.55
Calculated Power Density (mw/cm <sup>2</sup> )	0.0559

### REFERENCE DATA

Pout dBm	24.10
Antenna Gain (non-log)	1.13
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	869
Pout Watts	0.01023
Duty Cycle Percent	100.0%
Ant. Gain dBi	0.52
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	1.91
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0115
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.58
Calculated Power Density (mw/cm <sup>2</sup> )	0.0022

### REFERENCE DATA

Pout dBm	10.10
Antenna Gain (non-log)	1.13
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	0.39811
Duty Cycle Percent	100.0%
Ant. Gain dBi	1.03
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	1.91
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.5047
FCC Power Density Limit (mw/cm <sup>2</sup> )	1.00
Calculated Power Density (mw/cm <sup>2</sup> )	0.0974

### REFERENCE DATA

Pout dBm	26.00
Antenna Gain (non-log)	1.27
Coax loss (non-log)	1.00
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	0.00071
Duty Cycle Percent	100.0%
Ant. Gain dBi	-0.38
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	1.91
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0006
FCC Power Density Limit (mw/cm <sup>2</sup> )	1.00
Calculated Power Density (mw/cm <sup>2</sup> )	0.0001

### REFERENCE DATA

Pout dBm	-1.50
Antenna Gain (non-log)	0.92
Coax loss (non-log)	1.00
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	0.24547
Duty Cycle Percent	100.0%
Ant. Gain dBi	2.92
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	1.91
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.4808
FCC Power Density Limit (mw/cm <sup>2</sup> )	1.00
Calculated Power Density (mw/cm <sup>2</sup> )	0.0928

### REFERENCE DATA

Pout dBm	23.90
Antenna Gain (non-log)	1.96
Coax loss (non-log)	1.00
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	0.00380
Duty Cycle Percent	100.0%
Ant. Gain dBi	-2.40
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	1.91
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0022
FCC Power Density Limit (mw/cm <sup>2</sup> )	1.00
Calculated Power Density (mw/cm <sup>2</sup> )	0.0004

### REFERENCE DATA

Pout dBm	5.80
Antenna Gain (non-log)	0.58
Coax loss (non-log)	1.00
General FCC Limit (mw/cm <sup>2</sup> )	1.00