



January 8, 2019  
Subject: RF MPE EXPOSURE  
Re: FCC ID: PWO 460056

To Whom It May Concern:

The MPE calculations for model 460056 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 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. Inside Antenna: 311160
  - 2. Outside Antenna: 304421-5820
- 700 MHz Band 13:
  - 1. Inside Antenna: 311160
  - 2. Outside Antenna: 304421-5820
- 800 MHz band:
  - 1. Inside Antenna: 311160
  - 2. Outside Antenna: 304421-5820
- 1900 MHz band:
  - 1. Inside Antenna: 311160
  - 2. Outside Antenna: 304421-5820
- 1700/2100 MHz band:
  - 1. Inside Antenna: 311160
  - 2. Outside Antenna: 304421-0630

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,

Erin Elder  
IP & Regulatory Compliance Engineer



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

### INPUT DATA

Frequency MHz	728
Pout Watts	0.00316
Duty Cycle Percent	100.0%
Ant. Gain dBi	4.18
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.18
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0083
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.49
Calculated Power Density (mw/cm <sup>2</sup> )	0.0016

### REFERENCE DATA

Pout dBm	5.00
Antenna Gain (non-log)	2.62
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	0.67608
Duty Cycle Percent	100.0%
Ant. Gain dBi	1.94
Coax Loss dB	1.20
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	0.74
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.8022
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.47
Calculated Power Density (mw/cm <sup>2</sup> )	0.1548

### REFERENCE DATA

Pout dBm	28.30
Antenna Gain (non-log)	1.56
Coax loss (non-log)	0.76
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	0.00331
Duty Cycle Percent	100.0%
Ant. Gain dBi	5.8
Coax Loss dB	0.0
Distance From Antenna In cm	20.3

#### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	5.84
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0127
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.50
Calculated Power Density (mw/cm <sup>2</sup> )	0.0025

#### REFERENCE DATA

Pout dBm	5.20
Antenna Gain (non-log)	3.84
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	0.81283
Duty Cycle Percent	100.0%
Ant. Gain dBi	0.0
Coax Loss dB	1.2
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	-1.19
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.6177
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.52
Calculated Power Density (mw/cm <sup>2</sup> )	0.1192

### REFERENCE DATA

Pout dBm	29.10
Antenna Gain (non-log)	1.01
Coax loss (non-log)	0.76
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	0.00331
Duty Cycle Percent	100.0%
Ant. Gain dBi	6.58
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	6.58
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0151
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.58
Calculated Power Density (mw/cm <sup>2</sup> )	0.0029

### REFERENCE DATA

Pout dBm	5.20
Antenna Gain (non-log)	4.55
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	0.89125
Duty Cycle Percent	100.0%
Ant. Gain dBi	1.16
Coax Loss dB	1.34
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	-0.18
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.8561
FCC Power Density Limit (mw/cm <sup>2</sup> )	0.55
Calculated Power Density (mw/cm <sup>2</sup> )	0.1651

### REFERENCE DATA

Pout dBm	29.50
Antenna Gain (non-log)	1.31
Coax loss (non-log)	0.74
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	1930
Pout Watts	0.00324
Duty Cycle Percent	100.0%
Ant. Gain dBi	5.63
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	5.63
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0118
FCC Power Density Limit (mw/cm <sup>2</sup> )	1.00
Calculated Power Density (mw/cm <sup>2</sup> )	0.0023

### REFERENCE DATA

Pout dBm	5.10
Antenna Gain (non-log)	3.66
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	1850
Pout Watts	0.67608
Duty Cycle Percent	100.0%
Ant. Gain dBi	3.81
Coax Loss dB	2.31
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	1.51
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.9561
FCC Power Density Limit (mw/cm <sup>2</sup> )	1.00
Calculated Power Density (mw/cm <sup>2</sup> )	0.1844

### REFERENCE DATA

Pout dBm	28.30
Antenna Gain (non-log)	2.40
Coax loss (non-log)	0.59
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	0.00316
Duty Cycle Percent	100.0%
Ant. Gain dBi	6.57
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	6.57
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0144
FCC Power Density Limit (mw/cm <sup>2</sup> )	1.00
Calculated Power Density (mw/cm <sup>2</sup> )	0.0028

### REFERENCE DATA

Pout dBm	5.00
Antenna Gain (non-log)	4.54
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	0.70795
Duty Cycle Percent	100.0%
Ant. Gain dBi	5.10
Coax Loss dB	3.95
Distance From Antenna In cm	20.3

### RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	1.15
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.9226
FCC Power Density Limit (mw/cm <sup>2</sup> )	1.00
Calculated Power Density (mw/cm <sup>2</sup> )	0.1780

### REFERENCE DATA

Pout dBm	28.50
Antenna Gain (non-log)	3.24
Coax loss (non-log)	0.40
General FCC Limit (mw/cm <sup>2</sup> )	1.00