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January 8, 2019

Subject: RF MPE EXPOSURE

Re: FCC ID: PWO 460054

To Whom It May Concern:

The MPE calculations for model 460054 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: ANT000006 | 2. Outside Antenna: 301114 |
|------------------------------|----------------------------|

700 MHz Band 13:

- |                              |                            |
|------------------------------|----------------------------|
| 1. Inside Antenna: ANT000006 | 2. Outside Antenna: 314203 |
|------------------------------|----------------------------|

800 MHz band:

- |                              |                                 |
|------------------------------|---------------------------------|
| 1. Inside Antenna: ANT000006 | 2. Outside Antenna: 314203-5810 |
|------------------------------|---------------------------------|

1900 MHz band:

- |                              |                            |
|------------------------------|----------------------------|
| 1. Inside Antenna: ANT000006 | 2. Outside Antenna: 301114 |
|------------------------------|----------------------------|

1700/2100 MHz band:

- |                              |                            |
|------------------------------|----------------------------|
| 1. Inside Antenna: ANT000006 | 2. Outside Antenna: 301114 |
|------------------------------|----------------------------|

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                  | 0.00331 |
| Duty Cycle Percent          | 100.0%  |
| Ant. Gain dBi               | 2.14    |
| Coax Loss dB                | 0.00    |
| Distance From Antenna In cm | 20.3    |

### RESULTS OF CALCULATIONS

|                                                |        |
|------------------------------------------------|--------|
| Ant. Gain less Coax Loss dBi                   | 2.14   |
| Distance From Antenna In Inches                | 8.00   |
| EIRP (Watts)                                   | 0.0054 |
| FCC Power Density Limit (mw/cm <sup>2</sup> )  | 0.49   |
| Calculated Power Density (mw/cm <sup>2</sup> ) | 0.0010 |

### REFERENCE DATA

|                                         |        |
|-----------------------------------------|--------|
| Pout dBm                                | 5.20   |
| Antenna Gain (non-log)                  | 1.64   |
| 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               | 2.86    |
| Coax Loss dB                | 1.80    |
| 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)                                   | 0.8630 |
| FCC Power Density Limit (mw/cm <sup>2</sup> )  | 0.47   |
| Calculated Power Density (mw/cm <sup>2</sup> ) | 0.1665 |

### REFERENCE DATA

|                                         |        |
|-----------------------------------------|--------|
| Pout dBm                                | 28.30  |
| Antenna Gain (non-log)                  | 1.93   |
| Coax loss (non-log)                     | 0.66   |
| 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               | 2.3     |
| Coax Loss dB                | 0.0     |
| Distance From Antenna In cm | 20.3    |

### RESULTS OF CALCULATIONS

|                                                |        |
|------------------------------------------------|--------|
| Ant. Gain less Coax Loss dBi                   | 2.32   |
| Distance From Antenna In Inches                | 8.00   |
| EIRP (Watts)                                   | 0.0056 |
| FCC Power Density Limit (mw/cm <sup>2</sup> )  | 0.50   |
| Calculated Power Density (mw/cm <sup>2</sup> ) | 0.0011 |

### REFERENCE DATA

|                                         |        |
|-----------------------------------------|--------|
| Pout dBm                                | 5.20   |
| Antenna Gain (non-log)                  | 1.71   |
| 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               | 0.5     |
| Coax Loss dB                | 0.0     |
| Distance From Antenna In cm | 20.3    |

### RESULTS OF CALCULATIONS

|                                                |        |
|------------------------------------------------|--------|
| Ant. Gain less Coax Loss dBi                   | 0.48   |
| Distance From Antenna In Inches                | 8.00   |
| EIRP (Watts)                                   | 0.9078 |
| FCC Power Density Limit (mw/cm <sup>2</sup> )  | 0.52   |
| Calculated Power Density (mw/cm <sup>2</sup> ) | 0.1751 |

### REFERENCE DATA

|                                         |        |
|-----------------------------------------|--------|
| Pout dBm                                | 29.10  |
| Antenna Gain (non-log)                  | 1.12   |
| 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                  | 0.00331 |
| Duty Cycle Percent          | 100.0%  |
| Ant. Gain dBi               | 4.01    |
| Coax Loss dB                | 0.00    |
| Distance From Antenna In cm | 20.3    |

### RESULTS OF CALCULATIONS

|                                                |        |
|------------------------------------------------|--------|
| Ant. Gain less Coax Loss dBi                   | 4.01   |
| Distance From Antenna In Inches                | 8.00   |
| EIRP (Watts)                                   | 0.0083 |
| FCC Power Density Limit (mw/cm <sup>2</sup> )  | 0.58   |
| Calculated Power Density (mw/cm <sup>2</sup> ) | 0.0016 |

### REFERENCE DATA

|                                         |        |
|-----------------------------------------|--------|
| Pout dBm                                | 5.20   |
| Antenna Gain (non-log)                  | 2.52   |
| 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               | 1.82    |
| Coax Loss dB                | 1.32    |
| Distance From Antenna In cm | 20.3    |

### RESULTS OF CALCULATIONS

|                                                |        |
|------------------------------------------------|--------|
| Ant. Gain less Coax Loss dBi                   | 0.50   |
| Distance From Antenna In Inches                | 8.00   |
| EIRP (Watts)                                   | 1.0000 |
| FCC Power Density Limit (mw/cm <sup>2</sup> )  | 0.55   |
| Calculated Power Density (mw/cm <sup>2</sup> ) | 0.1929 |

### REFERENCE DATA

|                                         |        |
|-----------------------------------------|--------|
| Pout dBm                                | 29.50  |
| Antenna Gain (non-log)                  | 1.52   |
| 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               | 4.37    |
| Coax Loss dB                | 0.00    |
| Distance From Antenna In cm | 20.3    |

### RESULTS OF CALCULATIONS

|                                                |        |
|------------------------------------------------|--------|
| Ant. Gain less Coax Loss dBi                   | 4.37   |
| Distance From Antenna In Inches                | 8.00   |
| EIRP (Watts)                                   | 0.0089 |
| FCC Power Density Limit (mw/cm <sup>2</sup> )  | 1.00   |
| Calculated Power Density (mw/cm <sup>2</sup> ) | 0.0017 |

### REFERENCE DATA

|                                         |      |
|-----------------------------------------|------|
| Pout dBm                                | 5.10 |
| Antenna Gain (non-log)                  | 2.74 |
| 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               | 5.01    |
| Coax Loss dB                | 3.46    |
| Distance From Antenna In cm | 20.3    |

### RESULTS OF CALCULATIONS

|                                                |        |
|------------------------------------------------|--------|
| Ant. Gain less Coax Loss dBi                   | 1.55   |
| Distance From Antenna In Inches                | 8.00   |
| EIRP (Watts)                                   | 0.9661 |
| FCC Power Density Limit (mw/cm <sup>2</sup> )  | 1.00   |
| Calculated Power Density (mw/cm <sup>2</sup> ) | 0.1864 |

### REFERENCE DATA

|                                         |       |
|-----------------------------------------|-------|
| Pout dBm                                | 28.30 |
| Antenna Gain (non-log)                  | 3.17  |
| Coax loss (non-log)                     | 0.45  |
| 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               | 4.42    |
| Coax Loss dB                | 0.00    |
| Distance From Antenna In cm | 20.3    |

### RESULTS OF CALCULATIONS

|                                                |        |
|------------------------------------------------|--------|
| Ant. Gain less Coax Loss dBi                   | 4.42   |
| Distance From Antenna In Inches                | 8.00   |
| EIRP (Watts)                                   | 0.0087 |
| FCC Power Density Limit (mw/cm <sup>2</sup> )  | 1.00   |
| Calculated Power Density (mw/cm <sup>2</sup> ) | 0.0017 |

### REFERENCE DATA

|                                         |      |
|-----------------------------------------|------|
| Pout dBm                                | 5.00 |
| Antenna Gain (non-log)                  | 2.77 |
| 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               | 2.78    |
| Coax Loss dB                | 3.17    |
| Distance From Antenna In cm | 20.3    |

### RESULTS OF CALCULATIONS

|                                                |        |
|------------------------------------------------|--------|
| Ant. Gain less Coax Loss dBi                   | -0.39  |
| Distance From Antenna In Inches                | 8.00   |
| EIRP (Watts)                                   | 0.6471 |
| FCC Power Density Limit (mw/cm <sup>2</sup> )  | 1.00   |
| Calculated Power Density (mw/cm <sup>2</sup> ) | 0.1248 |

### REFERENCE DATA

|                                         |       |
|-----------------------------------------|-------|
| Pout dBm                                | 28.50 |
| Antenna Gain (non-log)                  | 1.90  |
| Coax loss (non-log)                     | 0.48  |
| General FCC Limit (mw/cm <sup>2</sup> ) | 1.00  |