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November 26, 2014

Subject: RF MPE EXPOSURE  
Re: FCC ID: PWO460019

To Whom It May Concern:

The MPE calculations for model 460019 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 antennas. The order of the attached calculations is as follows:

1700/2100 MHz band:

1. Outside Antenna: 314453-40075

800 MHz band:

2. Outside Antenna: 311129-400100

700 MHz Band 13:

3. Outside Antenna: 314411-40075

700 MHz Band 12:

4. Outside Antenna: 314411-40075

1900 MHz band:

5. Outside Antenna: 314473-0640

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,

A handwritten signature in black ink, appearing to read 'Patrick L. Cook', written in a cursive style.

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                  | 0.36224 |
| Duty Cycle Percent          | 100.0%  |
| Ant. Gain dBi               | 8.20    |
| Coax Loss dB                | 4.49    |
| 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)                                   | 0.8511 |
| FCC Power Density Limit (mw/cm <sup>2</sup> )  | 1.00   |
| Calculated Power Density (mw/cm <sup>2</sup> ) | 0.1693 |

#### REFERENCE DATA

|                                         |       |
|-----------------------------------------|-------|
| Pout dBm                                | 25.59 |
| Antenna Gain (non-log)                  | 6.61  |
| Coax loss (non-log)                     | 0.36  |
| General FCC Limit (mw/cm <sup>2</sup> ) | 1.00  |

**Antenna # 314453-40075**



## Minimum Safe Distance From Antennas

### Based upon FCC OET Bulletin 65 and other FCC Sources

#### INPUT DATA

|                             |         |
|-----------------------------|---------|
| Frequency MHz               | 824     |
| Pout Watts                  | 0.25410 |
| Duty Cycle Percent          | 100.0%  |
| Ant. Gain dBi               | 9.60    |
| Coax Loss dB                | 4.70    |
| 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)                                   | 0.7852 |
| FCC Power Density Limit (mw/cm <sup>2</sup> )  | 0.55   |
| Calculated Power Density (mw/cm <sup>2</sup> ) | 0.1562 |

#### REFERENCE DATA

|                                         |        |
|-----------------------------------------|--------|
| Pout dBm                                | 24.05  |
| Antenna Gain (non-log)                  | 9.12   |
| Coax loss (non-log)                     | 0.34   |
| General FCC Limit (mw/cm <sup>2</sup> ) | f/1500 |

**Antenna # 311129-400100**



## Minimum Safe Distance From Antennas

### Based upon FCC OET Bulletin 65 and other FCC Sources

#### INPUT DATA

|                             |         |
|-----------------------------|---------|
| Frequency MHz               | 776     |
| Pout Watts                  | 0.31117 |
| 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)                                   | 0.8185 |
| FCC Power Density Limit (mw/cm <sup>2</sup> )  | 0.52   |
| Calculated Power Density (mw/cm <sup>2</sup> ) | 0.1628 |

#### REFERENCE DATA

|                                         |        |
|-----------------------------------------|--------|
| Pout dBm                                | 24.93  |
| Antenna Gain (non-log)                  | 5.25   |
| Coax loss (non-log)                     | 0.50   |
| General FCC Limit (mw/cm <sup>2</sup> ) | f/1500 |

**Antenna # 314411-40075**



## Minimum Safe Distance From Antennas

### Based upon FCC OET Bulletin 65 and other FCC Sources

#### INPUT DATA

|                             |         |
|-----------------------------|---------|
| Frequency MHz               | 698     |
| Pout Watts                  | 0.29717 |
| Duty Cycle Percent          | 100.0%  |
| Ant. Gain dBi               | 9.60    |
| Coax Loss dB                | 5.10    |
| 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)                                   | 0.8375 |
| FCC Power Density Limit (mw/cm <sup>2</sup> )  | 0.47   |
| Calculated Power Density (mw/cm <sup>2</sup> ) | 0.1666 |

#### REFERENCE DATA

|                                         |        |
|-----------------------------------------|--------|
| Pout dBm                                | 24.73  |
| Antenna Gain (non-log)                  | 9.12   |
| Coax loss (non-log)                     | 0.31   |
| General FCC Limit (mw/cm <sup>2</sup> ) | f/1500 |

**Antenna # 314411-40075**



## Minimum Safe Distance From Antennas

### Based upon FCC OET Bulletin 65 and other FCC Sources

#### INPUT DATA

|                             |         |
|-----------------------------|---------|
| Frequency MHz               | 1850    |
| Pout Watts                  | 0.31623 |
| Duty Cycle Percent          | 100.0%  |
| Ant. Gain dBi               | 10.00   |
| Coax Loss dB                | 5.26    |
| Distance From Antenna In cm | 20.0    |

#### RESULTS OF CALCULATIONS

|                                                |        |
|------------------------------------------------|--------|
| Ant. Gain less Coax Loss dBi                   | 4.74   |
| Distance From Antenna In Inches                | 7.87   |
| EIRP (Watts)                                   | 0.9419 |
| FCC Power Density Limit (mw/cm <sup>2</sup> )  | 1.00   |
| Calculated Power Density (mw/cm <sup>2</sup> ) | 0.1874 |

#### REFERENCE DATA

|                                         |       |
|-----------------------------------------|-------|
| Pout dBm                                | 25.00 |
| Antenna Gain (non-log)                  | 10.00 |
| Coax loss (non-log)                     | 0.30  |
| General FCC Limit (mw/cm <sup>2</sup> ) | 1.00  |

**Antenna # 314473-0640**