

May. 09, 2017

Subject: **RF MPE Exposure**

Re: FCC ID: 2ALGRPLX-G8519

The MPE calculation for model PLX-G8519 signal booster were done for frequency band 824-849MHz and band 1850-1910MHz. For each 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 antenna. The order of the attached calculations is as follows:

850MHz band and 1900 MHz band:

1. Outside antenna: Opinion 10(Reference to antenna kitting)
2. Inside antenna: Opinion 4(Reference to antenna kitting)

A booster's uplink power must not exceed 1 Watt equivalent isotropic power for each band of operation, Composite downlink power must not exceed 0.05 watt EIRP for each band of operation. 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/c m<sup>2</sup>) is calculated using the following formula:

$$\text{Calculated Power density} = 1000 * \text{EIRP(Watts)} / (4 * \pi * (\text{Distance from antenna(cm)}^2))$$

Minimum Safe Distance From Antennas

Based upon FCC OET Bulletin 65 and other FCC Sources

#### **Uplink\_824-849MHz:**

##### **Input data**

|                             |        |
|-----------------------------|--------|
| Frequency MHz               | 843.26 |
| Pout Watts                  | 0.0416 |
| Duty cycle percent          | 100%   |
| Ant. Gain dBi               | 10     |
| Coax Loss dB                | 3.22   |
| Distance From Antenna In cm | 20.0   |

##### **Results of calculations**

|                                                 |      |
|-------------------------------------------------|------|
| Ant. Gain less Coax Loss dBi                    | 6.78 |
| Distance From Antenna In Inches                 | 7.87 |
| EIRP(Watts)                                     | 0.87 |
| FCC Power Density Limit (mW/c m <sup>2</sup> )  | 0.56 |
| Calculated Power Density (mW/c m <sup>2</sup> ) | 0.17 |

##### **Reference data**

|                                          |        |
|------------------------------------------|--------|
| Pout dBm                                 | 16.19  |
| Antenna Gain (non-log)                   | 10     |
| Coax loss (non-log)                      | 2.1    |
| General FCC Limit (mW/c m <sup>2</sup> ) | F/1500 |

**Downlink\_869-894MHz:****Input data**

|                             |        |
|-----------------------------|--------|
| Frequency MHz               | 877.40 |
| Pout Watts                  | 0.0065 |
| Duty cycle percent          | 100%   |
| Ant. Gain dBi               | 8.45   |
| Coax Loss dB                | 3.98   |
| Distance From Antenna In cm | 20.0   |

**Results of calculations**

|                                                 |       |
|-------------------------------------------------|-------|
| Ant. Gain less Coax Loss dBi                    | 4.47  |
| Distance From Antenna In Inches                 | 7.87  |
| EIRP(Watts)                                     | 0.018 |
| FCC Power Density Limit (mW/c m <sup>2</sup> )  | 0.58  |
| Calculated Power Density (mW/c m <sup>2</sup> ) | 0.004 |

**Reference data**

|                                          |        |
|------------------------------------------|--------|
| Pout dBm                                 | 8.10   |
| Antenna Gain (non-log)                   | 7      |
| Coax loss (non-log)                      | 0.4    |
| General FCC Limit (mW/c m <sup>2</sup> ) | F/1500 |

**Uplink\_1850-1910MHz:****Input data**

|                             |         |
|-----------------------------|---------|
| Frequency MHz               | 1871.12 |
| Pout Watts                  | 0.0422  |
| Duty cycle percent          | 100%    |
| Ant. Gain dBi               | 10.41   |
| Coax Loss dB                | 4.31    |
| Distance From Antenna In cm | 20.0    |

**Results of calculations**

|                                                 |      |
|-------------------------------------------------|------|
| Ant. Gain less Coax Loss dBi                    | 6.1  |
| Distance From Antenna In Inches                 | 7.87 |
| EIRP(Watts)                                     | 0.12 |
| FCC Power Density Limit (mW/c m <sup>2</sup> )  | 1.25 |
| Calculated Power Density (mW/c m <sup>2</sup> ) | 0.02 |

**Reference data**

|                                          |        |
|------------------------------------------|--------|
| Pout dBm                                 | 16.25  |
| Antenna Gain (non-log)                   | 11     |
| Coax loss (non-log)                      | 2.7    |
| General FCC Limit (mW/c m <sup>2</sup> ) | F/1500 |

**Downlink\_1930-1990MHz:****Input data**

|                             |         |
|-----------------------------|---------|
| Frequency MHz               | 1950.40 |
| Pout Watts                  | 0.0066  |
| Duty cycle percent          | 100%    |
| Ant. Gain dBi               | 9.54    |
| Coax Loss dB                | 2.22    |
| Distance From Antenna In cm | 20.0    |

**Results of calculations**

|                                                 |       |
|-------------------------------------------------|-------|
| Ant. Gain less Coax Loss dBi                    | 7.32  |
| Distance From Antenna In Inches                 | 7.87  |
| EIRP(Watts)                                     | 0.018 |
| FCC Power Density Limit (mW/c m <sup>2</sup> )  | 1.30  |
| Calculated Power Density (mW/c m <sup>2</sup> ) | 0.004 |

**Reference data**

|                                          |        |
|------------------------------------------|--------|
| Pout dBm                                 | 8.21   |
| Antenna Gain (non-log)                   | 9      |
| Coax loss (non-log)                      | 0.6    |
| General FCC Limit (mW/c m <sup>2</sup> ) | F/1500 |

**Results: PASS**