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May 2, 2019
Subject: RF MPE EXPOSURE
Re: FCC ID: PWO 460053

To Whom It May Concern:

The MPE calculations for model 460053 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 an outside antenna, and an 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: 314440-0630
2. Outside Antenna: 314411-952300

700 MHz Band 13:

1. Inside Antenna: 314440-1160

800 MHz Band 5:

1. Inside Antenna: 314440-0630

1900 MHz Band 25:

1. Inside Antenna: 309902-75F

1700/2100 MHz Band 4:

1. Inside Antenna: 304412-40010

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/cm²) is calculated using the following formula:

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

Sincerely,

Patrick Cook CTO

Minimum Safe Distance From Antennas

Based upon FCC OET Bulletin 65 and other FCC Sources

700 Band 12 Downlink

INPUT DATA

Frequency MHz	728
Pout Watts	0.01514
Duty Cycle Percent	100.0%
Ant. Gain dBi	3.76
Coax Loss dB	0.00
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	3.76
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0360
FCC Power Density Limit (mw/cm ²)	0.49
Calculated Power Density (mw/cm ²)	0.0069

REFERENCE DATA

Pout dBm	11.80
Antenna Gain (non-log)	2.38
Coax loss (non-log)	1.00
General FCC Limit (mw/cm ²)	f/1500

Minimum Safe Distance From Antennas

Based upon FCC OET Bulletin 65 and other FCC Sources

700 Band 12 Uplink

INPUT DATA

Frequency MHz	698
Pout Watts	0.32359
Duty Cycle Percent	100.0%
Ant. Gain dBi	7.30
Coax Loss dB	2.80
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.50
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.9120
FCC Power Density Limit (mw/cm ²)	0.47
Calculated Power Density (mw/cm ²)	0.1759

REFERENCE DATA

Pout dBm	25.10
Antenna Gain (non-log)	5.37
Coax loss (non-log)	0.52
General FCC Limit (mw/cm ²)	f/1500

Minimum Safe Distance From Antennas

Based upon FCC OET Bulletin 65 and other FCC Sources

700 Band 13 Downlink

INPUT DATA

Frequency MHz	746
Pout Watts	0.00871
Duty Cycle Percent	100.0%
Ant. Gain dBi	4.1
Coax Loss dB	0.0
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.13
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0225
FCC Power Density Limit (mw/cm ²)	0.50
Calculated Power Density (mw/cm ²)	0.0043

REFERENCE DATA

Pout dBm	9.40
Antenna Gain (non-log)	2.59
Coax loss (non-log)	1.00
General FCC Limit (mw/cm ²)	f/1500

Minimum Safe Distance From Antennas

Based upon FCC OET Bulletin 65 and other FCC Sources

700 Band 13 Uplink

INPUT DATA

Frequency MHz	777
Pout Watts	0.26915
Duty Cycle Percent	100.0%
Ant. Gain dBi	7.1
Coax Loss dB	2.6
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.50
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.7586
FCC Power Density Limit (mw/cm ²)	0.52
Calculated Power Density (mw/cm ²)	0.1463

REFERENCE DATA

Pout dBm	24.30
Antenna Gain (non-log)	5.08
Coax loss (non-log)	0.55
General FCC Limit (mw/cm ²)	f/1500

Minimum Safe Distance From Antennas

Based upon FCC OET Bulletin 65 and other FCC Sources

800 Band 5 Downlink

INPUT DATA

Frequency MHz	869
Pout Watts	0.01585
Duty Cycle Percent	100.0%
Ant. Gain dBi	7.25
Coax Loss dB	2.48
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.77
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0475
FCC Power Density Limit (mw/cm ²)	0.58
Calculated Power Density (mw/cm ²)	0.0092

REFERENCE DATA

Pout dBm	12.00
Antenna Gain (non-log)	5.31
Coax loss (non-log)	0.56
General FCC Limit (mw/cm ²)	f/1500

Minimum Safe Distance From Antennas

Based upon FCC OET Bulletin 65 and other FCC Sources

800 Band 5 Uplink

INPUT DATA

Frequency MHz	824
Pout Watts	0.24547
Duty Cycle Percent	100.0%
Ant. Gain dBi	10.80
Coax Loss dB	6.30
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.50
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.6918
FCC Power Density Limit (mw/cm ²)	0.55
Calculated Power Density (mw/cm ²)	0.1335

REFERENCE DATA

Pout dBm	23.90
Antenna Gain (non-log)	12.02
Coax loss (non-log)	0.23
General FCC Limit (mw/cm ²)	f/1500

Minimum Safe Distance From Antennas

Based upon FCC OET Bulletin 65 and other FCC Sources

2100 Band 4 Downlink

INPUT DATA

Frequency MHz	2110
Pout Watts	0.01622
Duty Cycle Percent	100.0%
Ant. Gain dBi	5.45
Coax Loss dB	0.90
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.55
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0462
FCC Power Density Limit (mw/cm ²)	1.00
Calculated Power Density (mw/cm ²)	0.0089

REFERENCE DATA

Pout dBm	12.10
Antenna Gain (non-log)	3.51
Coax loss (non-log)	0.81
General FCC Limit (mw/cm ²)	1.00

Minimum Safe Distance From Antennas

Based upon FCC OET Bulletin 65 and other FCC Sources

1700 Band 4 Uplink

INPUT DATA

Frequency MHz	1710
Pout Watts	0.32734
Duty Cycle Percent	100.0%
Ant. Gain dBi	8.21
Coax Loss dB	4.40
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	3.81
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.7870
FCC Power Density Limit (mw/cm ²)	1.00
Calculated Power Density (mw/cm ²)	0.1518

REFERENCE DATA

Pout dBm	25.15
Antenna Gain (non-log)	6.62
Coax loss (non-log)	0.36
General FCC Limit (mw/cm ²)	1.00

Minimum Safe Distance From Antennas

Based upon FCC OET Bulletin 65 and other FCC Sources

1900 Band 25 Downlink

INPUT DATA

Frequency MHz	1930
Pout Watts	0.01585
Duty Cycle Percent	100.0%
Ant. Gain dBi	7.8
Coax Loss dB	3.0
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.8
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.0481
FCC Power Density Limit (mw/cm ²)	1.00
Calculated Power Density (mw/cm ²)	0.0093

REFERENCE DATA

Pout dBm	12.00
Antenna Gain (non-log)	6.05
Coax loss (non-log)	0.50
General FCC Limit (mw/cm ²)	1.00

Minimum Safe Distance From Antennas

Based upon FCC OET Bulletin 65 and other FCC Sources

1900 Band 25 Uplink

INPUT DATA

Frequency MHz	1850
Pout Watts	0.31623
Duty Cycle Percent	100.0%
Ant. Gain dBi	10.04
Coax Loss dB	5.30
Distance From Antenna In cm	20.3

RESULTS OF CALCULATIONS

Ant. Gain less Coax Loss dBi	4.74
Distance From Antenna In Inches	8.00
EIRP (Watts)	0.9419
FCC Power Density Limit (mw/cm ²)	1.00
Calculated Power Density (mw/cm ²)	0.1817

REFERENCE DATA

Pout dBm	25.00
Antenna Gain (non-log)	10.09
Coax loss (non-log)	0.30
General FCC Limit (mw/cm ²)	1.00