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Previously Flom Test Lab

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Test Report

Prepared for: G-Way Microwave

Model: BDA-CELLAB/PCSF-33/33-80-OCMG

Description: RigBooster PRO II, Dual Band Outdoor BDA

To

FCC Part 1.1310

Date of Issue: March 24, 2015

On the behalf of the applicant:

G-Way Microwave
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Attention of:

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Mike Graffeo
Project Test Engineer

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Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	2/20/2015	Mike Graffeo	Original Document
2.0	3/3/2015	Greg Corbin	Updated report to match EIRP and antenna data
3.0	3/11/2015	Greg Corbin	Recalculated RF Exposure to general population limits
4.0	3/24/2015	Greg Corbin	Removed limit table for Controlled Use on pg. 8, Changed Output Power from radiated to conducted and calculated new values on pages 4 – 11.



ILAC / A2LA

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The tests results contained within this test report all fall within our scope of accreditation, unless below

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FCC Site Reg. #349717

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Non-accredited tests contained in this report:

N/A

EUT Description

Model: BDA-CELLAB/PCSF-33/33-80-OCMG

Description: RigBooster PRO II, Dual Band Outdoor BDA

S/N: 15011001

Additional Information:

The EUT is a Part 20 dual band industrial bi-directional amplifier.

The manufacturer specified 3 different antennas for this device.

The antenna with the highest gain was used in the RF Exposure calculations.

Antenna Type	Frequency Range (MHz)	Gain (dBi)
Directional Wall Mount	698 - 960	7
	1700 - 2700	10
Wide Band High Gain Ceiling	698 - 960	2
	1700 - 2700	5
Wide Band log Periodic Yagi	698 - 960	9.5
	1700 - 2700	11



MPE Evaluation for 836.5 MHz

This is a Fixed device evaluated to general population (Uncontrolled Exposure) environment.

Limits Uncontrolled Exposure 47 CFR 1.1310 Table 1, (B)

0.3-1.234 MHz:	Limit [mW/cm ²] = 100
1.34-30 MHz:	Limit [mW/cm ²] = (180/f ²)
30-300 MHz:	Limit [mW/cm ²] = 0.2
300-1500 MHz:	Limit [mW/cm ²] = f/1500
1500-100,000 MHz	Limit [mW/cm ²] = 1.0

Test Data

Test Frequency, MHz	836.5
Power, Conducted, mW (P)	2754
Antenna Gain Isotropic	9.5dBi
Antenna Gain Numeric (G)	8.91
Antenna Type	Yagi
Distance (R)	20 cm

$S = \frac{P * G}{4\pi r^2}$			
Power Density (S) mw/cm ²	Power mW (P)	Numeric Gain (G)	Distance (r) cm
6.898	2754	8.91	20

Power Density (S) =6.898
Limit =(from above table) = 0.558

The EUT does not meet the power spectral density requirements at 20 cm with the YAGI antenna, so the minimum safe distance was calculated on the next page.



Minimum Safe Distance Evaluation for 836.5 MHz

This is a Fixed device evaluated to general population (Uncontrolled Exposure) environment.

Limits Uncontrolled Exposure 47 CFR 1.1310 Table 1, (B)

0.3-1.234 MHz:	Limit [mW/cm ²] = 100
1.34-30 MHz:	Limit [mW/cm ²] = (180/f ²)
30-300 MHz:	Limit [mW/cm ²] = 0.2
300-1500 MHz:	Limit [mW/cm ²] = f/1500
1500-100,000 MHz	Limit [mW/cm ²] = 1.0

Test Data

Test Data for Yagi Antenna

Test Frequency, MHz	836.5
Power, Conducted, mW (P)	2754
Antenna Gain Isotropic	9.5 dBi
Antenna Gain Numeric (G)	8.91
Limit (L)	0.558

$R = \sqrt{(PG/4\pi L)}$			
Distance (R) cm	Power mW (P)	Numeric Gain (G)	Limit (L)
59.2	2754	8.91	0.558

The minimum safe distance with the YAGI antenna is 59.2 cm at 836.5 MHz



MPE Evaluation for 892.75 MHz

This is a Fixed device evaluated to general population (Uncontrolled Exposure) environment.

Limits Uncontrolled Exposure 47 CFR 1.1310 Table 1, (B)

0.3-1.234 MHz:	Limit [mW/cm ²] = 100
1.34-30 MHz:	Limit [mW/cm ²] = (180/f ²)
30-300 MHz:	Limit [mW/cm ²] = 0.2
300-1500 MHz:	Limit [mW/cm ²] = f/1500
1500-100,000 MHz	Limit [mW/cm ²] = 1.0

Test Data

Test Frequency, MHz	892.75
Power, Conducted, mW (P)	2630
Antenna Gain Isotropic	9.5dBi
Antenna Gain Numeric (G)	8.91
Antenna Type	Yagi
Distance (R)	20 cm

$S = \frac{P * G}{4\pi r^2}$			
Power Density (S) mw/cm ²	Power mW (P)	Numeric Gain (G)	Distance (r) cm
4.662	2630	8.91	20

Power Density (S) =4.662
Limit =(from above table) =0.595

The EUT does not meet the power spectral density requirements at 20 cm with the YAGI antenna, so the minimum safe distance was calculated on the next page.



Minimum Safe Distance Evaluation for 892.75 MHz

This is a Fixed device evaluated to general population (Uncontrolled Exposure) environment.

Limits Uncontrolled Exposure 47 CFR 1.1310 Table 1, (B)

0.3-1.234 MHz:	Limit [mW/cm ²] = 100
1.34-30 MHz:	Limit [mW/cm ²] = (180/f ²)
30-300 MHz:	Limit [mW/cm ²] = 0.2
300-1500 MHz:	Limit [mW/cm ²] = f/1500
1500-100,000 MHz	Limit [mW/cm ²] = 1.0

Test Data

Test Data for Yagi Antenna

Test Frequency, MHz	892.75
Power, Conducted, mW (P)	2630
Antenna Gain Isotropic	9.5 dBi
Antenna Gain Numeric (G)	8.91
Limit (L)	0.595

$R = \sqrt{(PG/4\pi L)}$			
Distance (R) cm	Power mW (P)	Numeric Gain (G)	Limit (L)
56.0	2630	8.91	0.595

The minimum safe distance with the YAGI antenna is 56.0 cm at 892.75 MHz



MPE Evaluation for 1908.75 MHz

This is a Fixed device evaluated to general population (Uncontrolled Exposure) environment.

Limits Uncontrolled Exposure 47 CFR 1.1310 Table 1, (B)

0.3-1.234 MHz:	Limit [mW/cm ²] = 100
1.34-30 MHz:	Limit [mW/cm ²] = (180/f ²)
30-300 MHz:	Limit [mW/cm ²] = 0.2
300-1500 MHz:	Limit [mW/cm ²] = f/1500
1500-100,000 MHz	Limit [mW/cm ²] = 1.0

Test Data for Yagi Antenna

Test Frequency, MHz	1908.75
Power, Conducted, mW (P)	2239
Antenna Gain Isotropic	11 dBi
Antenna Gain Numeric (G)	12.59
Antenna Type	Yagi
Distance (R)	20 cm

$S = \frac{P * G}{4\pi r^2}$			
Power Density (S) mw/cm ²	Power mW (P)	Numeric Gain (G)	Distance (r) cm
5.608	2239	12.59	20

Power Density (S) =5.608
Limit =(from above table) =1.0

The EUT does not meet the power spectral density requirements at 20 cm with the YAGI antenna, so the minimum safe distance was calculated on the next page.



Minimum Safe Distance Evaluation for 1908.75 MHz

This is a Fixed device evaluated to general population (Uncontrolled Exposure) environment.

**Limits Uncontrolled Exposure
47 CFR 1.1310
Table 1, (B)**

0.3-1.234 MHz:	Limit [mW/cm ²] = 100
1.34-30 MHz:	Limit [mW/cm ²] = (180/f ²)
30-300 MHz:	Limit [mW/cm ²] = 0.2
300-1500 MHz:	Limit [mW/cm ²] = f/1500
1500-100,000 MHz	Limit [mW/cm ²] = 1.0

Test Data

Test Data for Yagi Antenna

Test Frequency, MHz	1908.75
Power, Conducted, mW (P)	2239
Antenna Gain Isotropic	11 dBi
Antenna Gain Numeric (G)	12.59
Limit (L)	1.0

$R = \sqrt{(PG/4\pi L)}$			
Distance (R) cm	Power mW (P)	Numeric Gain (G)	Limit (L)
47.4	2239	12.59	1.0

The minimum safe distance with the YAGI antenna is 47.4 cm at 1908.75 MHz.



MPE Evaluation for 1988.75 MHz

This is a Fixed device evaluated to general population (Uncontrolled Exposure) environment.

Limits Uncontrolled Exposure 47 CFR 1.1310 Table 1, (B)

0.3-1.234 MHz:	Limit [mW/cm ²] = 100
1.34-30 MHz:	Limit [mW/cm ²] = (180/f ²)
30-300 MHz:	Limit [mW/cm ²] = 0.2
300-1500 MHz:	Limit [mW/cm ²] = f/1500
1500-100,000 MHz	Limit [mW/cm ²] = 1.0

Test Data for Yagi Antenna

Test Frequency, MHz	1988.75
Power, Conducted, mW (P)	2291
Antenna Gain Isotropic	11 dBi
Antenna Gain Numeric (G)	12.59
Antenna Type	Yagi
Distance (R)	20 cm

$S = \frac{P * G}{4\pi r^2}$			
Power Density (S) mw/cm ²	Power mW (P)	Numeric Gain (G)	Distance (r) cm
5.74	2291	12.59	20

Power Density (S) =5.74
Limit =(from above table) =1.0

The EUT does not meet the power spectral density requirements at 20 cm with the YAGI antenna, so the minimum safe distance was calculated on the next page.



Minimum Safe Distance Evaluation for 1988.75 MHz

This is a Fixed device evaluated to general population (Uncontrolled Exposure) environment.

**Limits Uncontrolled Exposure
47 CFR 1.1310
Table 1, (B)**

0.3-1.234 MHz:	Limit [mW/cm ²] = 100
1.34-30 MHz:	Limit [mW/cm ²] = (180/f ²)
30-300 MHz:	Limit [mW/cm ²] = 0.2
300-1500 MHz:	Limit [mW/cm ²] = f/1500
1500-100,000 MHz	Limit [mW/cm ²] = 1.0

Test Data

Test Data for Yagi Antenna

Test Frequency, MHz	1988.75
Power, Conducted, mW (P)	2291
Antenna Gain Isotropic	11 dBi
Antenna Gain Numeric (G)	12.59
Limit (L)	1.0

$R = \sqrt{(PG/4\pi L)}$			
Distance (R) cm	Power mW (P)	Numeric Gain (G)	Limit (L)
47.9	2291	12.59	1.0

The minimum safe distance with the YAGI antenna is 47.9 cm at 1988.75 MHz.

END OF TEST REPORT