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Previously Flom Test Lab
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toll-free: (866) 311-3268
fax: (480) 926-3598
<http://www.ComplianceTesting.com>
info@ComplianceTesting.com

Test Report

Prepared for: G-Way Microwave

Model: BDA-CELLAB/PCSF-2/2W-80-OCA1

Description: RigBooster PRO, Dual Band Outdoor BDA

FCC ID: Q8KCELLPCS2W80N

To

FCC Part 1.1310

Date of Issue: March 24, 2015

On the behalf of the applicant:

G-Way Microwave
38 Leuning Street
South Hackensack, NJ 07606

Attention of:

Gregory Tsvika Blekher, Project Engineer
Ph: (201) 343-3140
E-Mail: t_blekher@gwaymicrowave.com

Prepared By
Compliance Testing, LLC
1724 S. Nevada Way
Mesa, AZ 85204
(480) 926-3100 phone / (480) 926-3598 fax
www.compliancetesting.com
Project No: p1510012

Mike Graffeo
Project Test Engineer

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Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	2/20/15	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.



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N/A

EUT Description

Model: BDA-CELLAB/PCSF-2/2W-80-OCA1

Description: RigBooster PRO, Dual Band Outdoor BDA

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)	506.9
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
0.898	506.9	8.91	20

Power Density (S) =0.898
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)	506.9
Antenna Gain Isotropic	9.5 dBi
Antenna Gain Numeric (G)	8.91
Limit (L)	0.558

R=√(PG/4πL)	Distance (R) cm	Power mW (P)	Numeric Gain (G)	Limit (L)
	25.4	506.9	8.91	0.558

The minimum safe distance with the YAGI antenna is 25.4 cm at 836.5 MHz



MPE Evaluation for 881.50 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	881.50
Power, Conducted, mW (P)	490.9
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
0.870	490.9	8.91	20

Power Density (S) = 0.870
Limit =(from above table) = 0.588

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 881.50 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	881.50
Power, Conducted, mW (P)	490.9
Antenna Gain Isotropic	9.5 dBi
Antenna Gain Numeric (G)	8.91
Limit (L)	0.588

R=√(PG/4πL)		Distance (R) cm	Power mW (P)	Numeric Gain (G)	Limit (L)
		24.3	490.9	8.91	0.588

The minimum safe distance with the YAGI antenna is 24.3 cm at 881.5 MHz



MPE Evaluation for 1880 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	1880
Power, Conducted, mW (P)	483.0
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 mW (P)	Numeric Gain (G)	Distance (r) cm
1.21	483.0	12.59	20

Power Density (S) = 1.21
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 1880 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	1880
Power, Conducted, mW (P)	483.0
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)
	22.0	483.0	12.59	1.0

The minimum safe distance with the YAGI antenna is 22.0 cm at 1880 MHz.



MPE Evaluation for 1960 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	1960
Power, Conducted, mW (P)	464.5
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 mW (P)	Numeric Gain (G)	Distance (r) cm
1.16	464.5	12.59	20

Power Density (S) = 1.16
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 1960 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	1960
Power, Conducted, mW (P)	464.5
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)
	21.6	464.5	12.59	1.0

The minimum safe distance with the YAGI antenna is 21.6 cm at 1960 MHz.

END OF TEST REPORT