Oculii LLC

ADDENDUM TEST REPORT TO 93691-4A

Radar-Based Traffic Surveillance Module
Model: VISDAR-RADAR

Tested To The Following Standards:

FCC Part 15 Subpart C Sections 15.207, 15.245
and
RSS 210 Issue 8

Report No.: 93691-4A

Date of issue: May 29, 2013

ACCREDITED
Testing Certificates:
803.01, 803.02, 803.05, 803.06

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

Testing the Future
CKC LABORATORIES, INC.

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TABLE OF CONTENTS

Administrative Information 3

Test Report Information 3

Revision History 3

Report Authorization 3

Test Facility Information 4

Software Versions 4

Site Registration & Accreditation Information 4

Summary of Results 5

Conditions During Testing 5

Equipment Under Test 6

Peripheral Devices 6

FCC Part 15 Subpart C 7

15.207 AC Conducted Emissions 7

15.247(b) RF Power Output 20

-20dBc & 99% Occupied Bandwidth 26

Bandedge 31

15.245(b)(3) Radiated Spurious Emissions 35

Supplemental Information 43

Measurement Uncertainty 43

Emissions Test Details 43

ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Oculii LLC
830 A Space Dr.
Beavercreek, OH 45434

Representative: Lang Hong / Erin Littell - F Squared
Customer Reference Number: 2322R2

REPORT PREPARED BY:

Dianne Dudley
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 93691

DATE OF EQUIPMENT RECEIPT: November 13, 2012
DATE(S) OF TESTING: November 13, 2012 -February 20, 2013

Revision History

Original: Testing of the Radar-Based Traffic Surveillance Module, Model: VISDAR-RADAR to FCC Part 15 Subpart C Sections 15.207, 15.245 and RSS 210 Issue 8.
Addendum A: 1) Added a note on the Summary of Results page indicating that the range of testing was extended to 100GHz during radiated spurious emissions testing. 2) Corrected the RBW and VBW for the testing done during Occupied Bandwidth.

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.

Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information

Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92823

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.00.14
Immunity	5.00.07

Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Brea D	US0060	SL2-IN-E-1146R	3082D-2	100638	A-0147

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C 15.207, 15.245 and RSS 210 Issue 8

Description	Test Procedure/Method	Results
Conducted Emissions	FCC Part 15 Subpart C Section 15.207 / ANSI C63.4 (2003)	Pass
RF Power Output	FCC Part 15 Subpart C Section 15.245(b) / ANSI C63.4 (2003)	Pass
-20dBc & 99% Occupied Bandwidth	FCC Part 15 Subpart C Section 15.245 & RSS 210 Issue 8	Pass
Bandedge	FCC Part 15 Subpart C / ANSI C63.4 (2003)	Pass
Radiated Spurious Emissions	FCC Part 15 Subpart C Section 15.245(b)(3) / ANSI C63.4 (2003)* See note	Pass

Note: Frequency range of measurement extended to 100GHz.

Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
Modifications: Internal reference PLL disabled via firmware.

EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST

Radar-Based Traffic Surveillance Module
Manuf: Oculii, LLC.
Model: VISDAR-RADAR
Serial: NA

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Power Supply
Manuf: Edac
Model: EA10523C-120
Serial: NA

Laptop
Manuf: Toshiba
Model: NB205
Serial: 794461811C

FCC PART 15 SUBPART C

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) 47 CFR 15C requirements for Unlicensed Radio Frequency Devices, Subpart C - Intentional Radiators.

15.207 AC Conducted Emissions

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • 209-966-5240

Customer:	**Oculii LLC**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**93691**	Date:	1/16/2013
Test Type:	**Conducted Emissions**	Time:	15:44:13
Equipment:	**Radar-based traffic surveillance module**	Sequence#:	5
Manufacturer:	Oculii, LLC.	Tested By:	E. Wong
Model:	VISDAR-RADAR		110V 60Hz
S/N:	NA		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T1	ANP06085	Attenuator	SA18N10W-09	12/14/2012	12/14/2014
T2	AN02610	High Pass Filter	HE9615-150K-50-720B	11/21/2011	11/21/2013
T3	ANP01910	Cable	RG-142	2/6/2012	2/6/2014
T4	AN02128	50uH LISN-L1 (dB)	3816/2NM	8/1/2011	8/1/2013
	AN02128	50uH LISN-L2 (dB)	3816/2NM	8/1/2011	8/1/2013

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Radar-Based Traffic Surveillance Module*	Oculii, LLC.	VISDAR-RADAR	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Edac	EA10523C-120	NA
Laptop	Toshiba	NB205	794461811C

Test Conditions / Notes:

The EUT seeking modular approval is placed on a table lined with Styrofoam of 10 cm thickness.

USB and power connected are connected to support laptop and support power supply.

The Laptop issue transmits command to set the EUT in operational mode, transmitting a modulated signal. The single channel EUT with temperature compensating circuit adjusting the transmit frequency, operating within authorized band of 24075-24175 MHz.

Frequency range of measurement = 9 kHz- 30MHz.

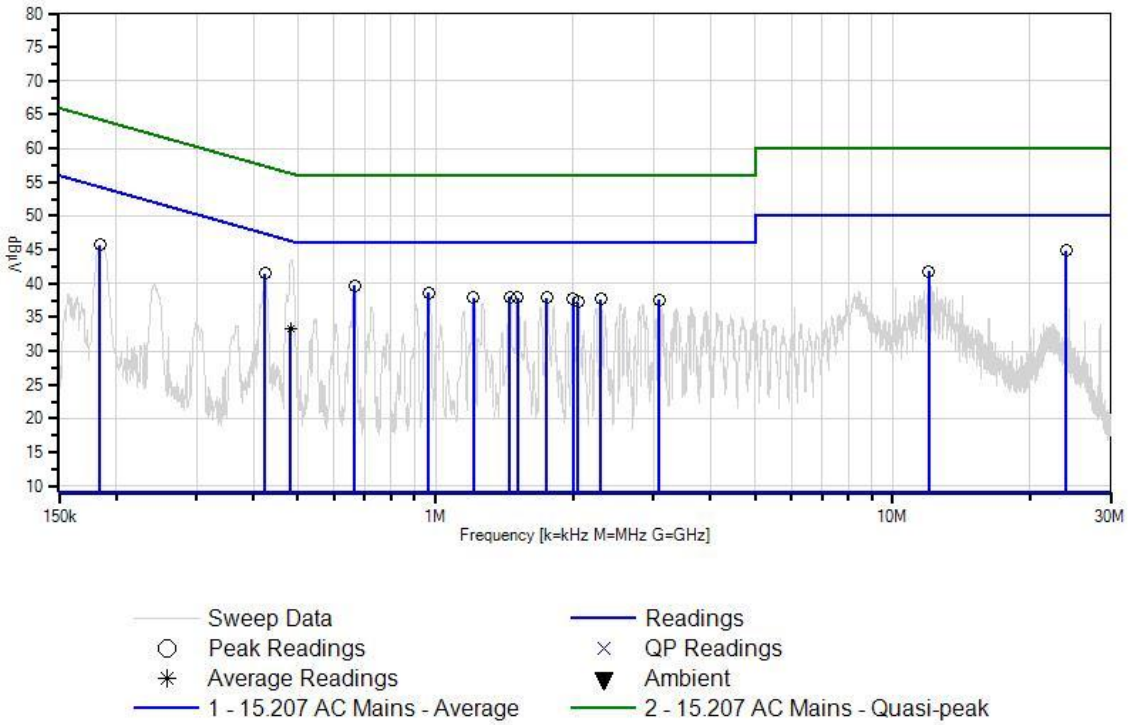
150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz
Test environment conditions: 21°C, 25% relative humidity, 100kPa

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: Black

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	23.998M	37.0	+5.8	+0.2	+0.4	+1.5	+0.0	44.9	50.0	-5.1	Black
2	423.428k	35.5	+5.7	+0.2	+0.1	+0.0	+0.0	41.5	47.4	-5.9	Black
3	665.588k	33.7	+5.7	+0.2	+0.1	+0.0	+0.0	39.7	46.0	-6.3	Black
4	966.512k	32.6	+5.7	+0.2	+0.1	+0.0	+0.0	38.6	46.0	-7.4	Black
5	1.451M	31.9	+5.7	+0.2	+0.1	+0.1	+0.0	38.0	46.0	-8.0	Black
6	1.511M	31.8	+5.7	+0.2	+0.1	+0.1	+0.0	37.9	46.0	-8.1	Black
7	1.749M	31.8	+5.7	+0.2	+0.1	+0.1	+0.0	37.9	46.0	-8.1	Black
8	1.209M	31.8	+5.7	+0.2	+0.1	+0.1	+0.0	37.9	46.0	-8.1	Black
9	2.000M	31.7	+5.7	+0.2	+0.1	+0.1	+0.0	37.8	46.0	-8.2	Black
10	12.004M	34.9	+5.8	+0.2	+0.3	+0.6	+0.0	41.8	50.0	-8.2	Black
11	2.298M	31.5	+5.7	+0.2	+0.2	+0.1	+0.0	37.7	46.0	-8.3	Black
12	3.089M	31.4	+5.7	+0.2	+0.2	+0.1	+0.0	37.6	46.0	-8.4	Black
13	184.178k	39.6	+5.7	+0.3	+0.1	+0.0	+0.0	45.7	54.3	-8.6	Black
14	2.051M	31.2	+5.7	+0.2	+0.1	+0.1	+0.0	37.3	46.0	-8.7	Black
15	482.332k Ave	27.3	+5.7	+0.2	+0.1	+0.0	+0.0	33.3	46.3	-13.0	Black
^	482.332k	37.5	+5.7	+0.2	+0.1	+0.0	+0.0	43.5	46.3	-2.8	Black

Date: 1/16/2013 Time: 15:44:13 Oculii LLC WO#: 93691
15.207 AC Mains - Average Test Lead: Black 110V 60Hz Sequence#: 5 Ext ATTN: 0 dB



Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • 209-966-5240

Customer:	**Oculii LLC**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**93691**	Date:	1/16/2013
Test Type:	**Conducted Emissions**	Time:	15:39:46
Equipment:	**Radar-based traffic surveillance module**	Sequence#:	4
Manufacturer:	Oculii, LLC.	Tested By:	E. Wong
Model:	VISDAR-RADAR		110V 60Hz
S/N:	NA		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T1	ANP06085	Attenuator	SA18N10W-09	12/14/2012	12/14/2014
T2	AN02610	High Pass Filter	HE9615-150K-50-720B	11/21/2011	11/21/2013
T3	ANP01910	Cable	RG-142	2/6/2012	2/6/2014
	AN02128	50uH LISN-L1 (dB)	3816/2NM	8/1/2011	8/1/2013
T4	AN02128	50uH LISN-L2 (dB)	3816/2NM	8/1/2011	8/1/2013

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Radar-Based Traffic Surveillance Module*	Oculii, LLC.	VISDAR-RADAR	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Edac	EA10523C-120	NA
Laptop	Toshiba	NB205	794461811C

Test Conditions / Notes:

The EUT seeking modular approval is placed on a table lined with Styrofoam of 10 cm thickness.

USB and power connected are connected to support laptop and support power supply.

The Laptop issue transmits command to set the EUT in operational mode, transmitting a modulated signal. The single channel EUT with temperature compensating circuit adjusting the transmit frequency, operating within authorized band of 24075-24175 MHz.

Frequency range of measurement = 9 kHz- 30MHz.

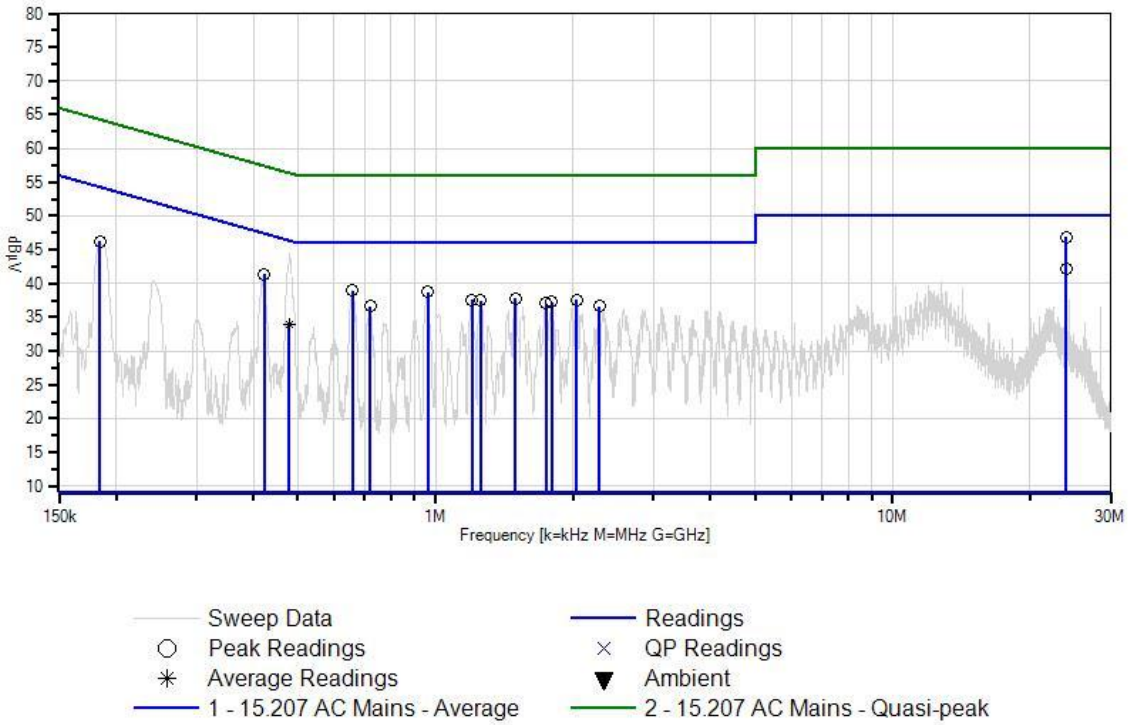
150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz
Test environment conditions: 21°C, 25% relative humidity, 100kPa

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: White

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	23.998M	38.7	+5.8	+0.2	+0.4	+1.8	+0.0	46.9	50.0	-3.1	White
2	421.248k	35.4	+5.7	+0.2	+0.1	+0.0	+0.0	41.4	47.4	-6.0	White
3	659.044k	33.0	+5.7	+0.2	+0.1	+0.0	+0.0	39.0	46.0	-7.0	White
4	962.259k	32.6	+5.7	+0.2	+0.1	+0.1	+0.0	38.7	46.0	-7.3	White
5	23.977M	33.9	+5.8	+0.2	+0.4	+1.8	+0.0	42.1	50.0	-7.9	White
6	184.179k	40.1	+5.7	+0.3	+0.1	+0.0	+0.0	46.2	54.3	-8.1	White
7	1.498M	31.7	+5.7	+0.2	+0.1	+0.1	+0.0	37.8	46.0	-8.2	White
8	1.200M	31.5	+5.7	+0.2	+0.1	+0.1	+0.0	37.6	46.0	-8.4	White
9	2.034M	31.5	+5.7	+0.2	+0.1	+0.1	+0.0	37.6	46.0	-8.4	White
10	1.256M	31.4	+5.7	+0.2	+0.1	+0.1	+0.0	37.5	46.0	-8.5	White
11	1.796M	31.2	+5.7	+0.2	+0.1	+0.1	+0.0	37.3	46.0	-8.7	White
12	1.745M	31.0	+5.7	+0.2	+0.1	+0.1	+0.0	37.1	46.0	-8.9	White
13	2.285M	30.3	+5.7	+0.2	+0.2	+0.2	+0.0	36.6	46.0	-9.4	White
14	719.402k	30.6	+5.7	+0.2	+0.1	+0.0	+0.0	36.6	46.0	-9.4	White
15	478.697k Ave	28.0	+5.7	+0.2	+0.1	+0.0	+0.0	34.0	46.4	-12.4	White
^	478.697k	38.5	+5.7	+0.2	+0.1	+0.0	+0.0	44.5	46.4	-1.9	White

Date: 1/16/2013 Time: 15:39:46 Oculii LLC WO#: 93691
15.207 AC Mains - Average Test Lead: White 110V 60Hz Sequence#: 4 Ext ATTN: 0 dB



Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • 209-966-5240

Customer:	**Oculii LLC**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**93691**	Date:	1/16/2013
Test Type:	**Conducted Emissions**	Time:	15:57:16
Equipment:	**Radar-based traffic surveillance module**	Sequence#:	6
Manufacturer:	Oculii, LLC.	Tested By:	E. Wong
Model:	VISDAR-RADAR		110V 60Hz
S/N:	NA		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T1	ANP06085	Attenuator	SA18N10W-09	12/14/2012	12/14/2014
T2	AN02610	High Pass Filter	HE9615-150K-50-720B	11/21/2011	11/21/2013
T3	ANP01910	Cable	RG-142	2/6/2012	2/6/2014
T4	AN02128	50uH LISN-L1 (dB)	3816/2NM	8/1/2011	8/1/2013
	AN02128	50uH LISN-L2 (dB)	3816/2NM	8/1/2011	8/1/2013

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Radar-Based Traffic Surveillance Module*	Oculii, LLC.	VISDAR-RADAR	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Edac	EA10523C-120	NA
Laptop	Toshiba	NB205	794461811C

Test Conditions / Notes:

The EUT seeking modular approval is placed on a table lined with Styrofoam of 10 cm thickness.

USB and power connected are connected to support laptop and support power supply.

The EUT is in standby mode, transmitting an unmodulated signal. The single channel EUT with temperature compensating circuit adjusting the transmit frequency, operating within authorized band of 24075-24175 MHz.

Frequency range of measurement = 9 kHz- 30MHz.

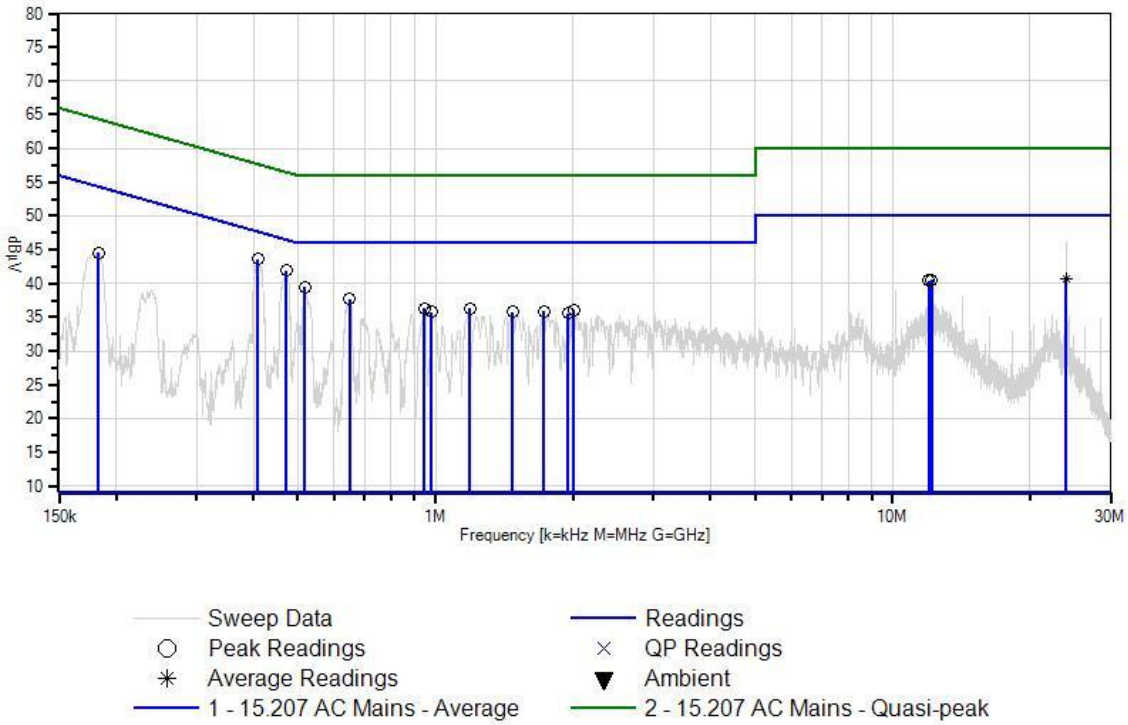
150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz
Test environment conditions: 21°C, 25% relative humidity, 100kPa

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: White

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	408.885k	37.6	+5.7	+0.2	+0.1	+0.0	+0.0	43.6	47.7	-4.1	Black
2	471.425k	35.9	+5.7	+0.2	+0.1	+0.0	+0.0	41.9	46.5	-4.6	Black
3	517.966k	33.5	+5.7	+0.2	+0.1	+0.0	+0.0	39.5	46.0	-6.5	Black
4	648.136k	31.7	+5.7	+0.2	+0.1	+0.0	+0.0	37.7	46.0	-8.3	Black
5	23.999M Ave	32.8	+5.8	+0.2	+0.4	+1.5	+0.0	40.7	50.0	-9.3	Black
^	24.004M	38.3	+5.8	+0.2	+0.4	+1.5	+0.0	46.2	50.0	-3.8	Black
7	12.184M	33.6	+5.8	+0.2	+0.3	+0.6	+0.0	40.5	50.0	-9.5	Black
8	12.004M	33.5	+5.8	+0.2	+0.3	+0.6	+0.0	40.4	50.0	-9.6	Black
9	1.188M	30.2	+5.7	+0.2	+0.1	+0.1	+0.0	36.3	46.0	-9.7	Black
10	945.249k	30.3	+5.7	+0.2	+0.1	+0.0	+0.0	36.3	46.0	-9.7	Black
11	182.724k	38.5	+5.7	+0.3	+0.1	+0.0	+0.0	44.6	54.4	-9.8	Black
12	2.004M	30.0	+5.7	+0.2	+0.1	+0.1	+0.0	36.1	46.0	-9.9	Black
13	1.723M	29.8	+5.7	+0.2	+0.1	+0.1	+0.0	35.9	46.0	-10.1	Black
14	979.270k	29.8	+5.7	+0.2	+0.1	+0.0	+0.0	35.8	46.0	-10.2	Black
15	1.473M	29.7	+5.7	+0.2	+0.1	+0.1	+0.0	35.8	46.0	-10.2	Black
16	1.953M	29.5	+5.7	+0.2	+0.1	+0.1	+0.0	35.6	46.0	-10.4	Black

Date: 1/16/2013 Time: 15:57:16 Oculii LLC WO#: 93691
15.207 AC Mains - Average Test Lead: White 110V 60Hz Sequence#: 6 Ext ATTN: 0 dB



Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • 209-966-5240

Customer:	**Oculii LLC**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**93691**	Date:	1/16/2013
Test Type:	**Conducted Emissions**	Time:	3:57:59 PM
Equipment:	**Radar-based traffic surveillance module**	Sequence#:	7
Manufacturer:	Oculii, LLC.	Tested By:	E. Wong
Model:	VISDAR-RADAR		110V 60Hz
S/N:	NA		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T1	ANP06085	Attenuator	SA18N10W-09	12/14/2012	12/14/2014
T2	AN02610	High Pass Filter	HE9615-150K-50-720B	11/21/2011	11/21/2013
T3	ANP01910	Cable	RG-142	2/6/2012	2/6/2014
	AN02128	50uH LISN-L1 (dB)	3816/2NM	8/1/2011	8/1/2013
T4	AN02128	50uH LISN-L2 (dB)	3816/2NM	8/1/2011	8/1/2013

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Radar-Based Traffic Surveillance Module*	Oculii, LLC.	VISDAR-RADAR	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Edac	EA10523C-120	NA
Laptop	Toshiba	NB205	794461811C

Test Conditions / Notes:

The EUT seeking modular approval is placed on a table lined with Styrofoam of 10 cm thickness.

USB and power connected are connected to support laptop and support power supply.

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Frequency range of measurement = 9 kHz- 30MHz

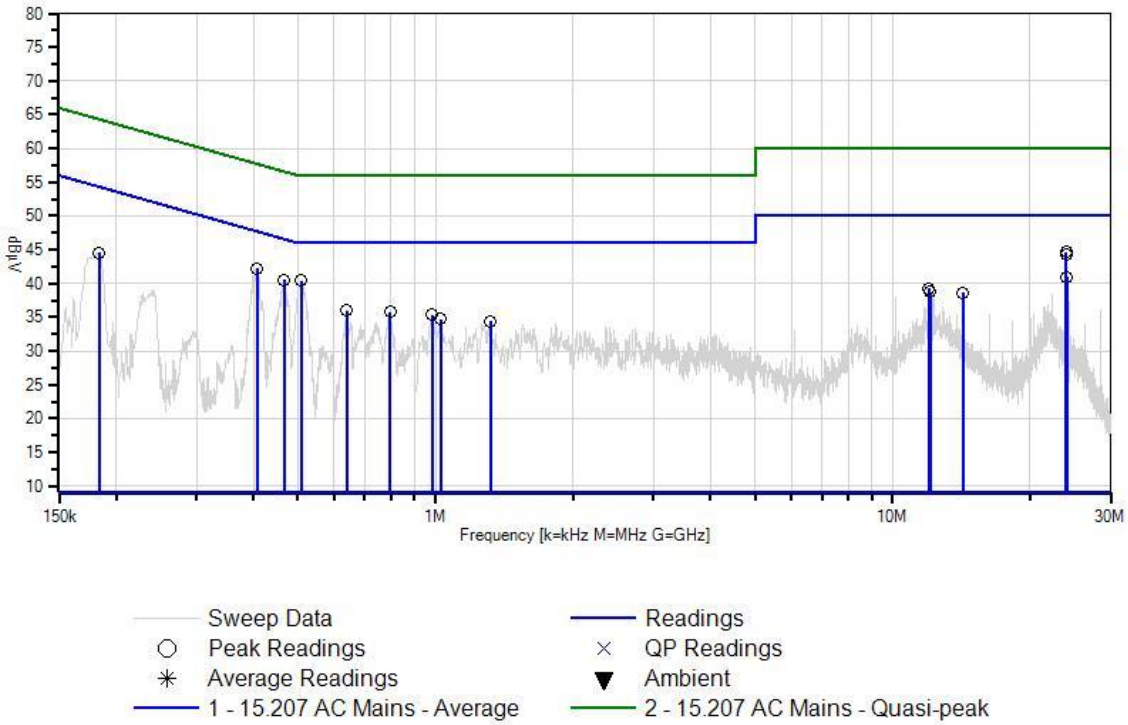
150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz
Test environment conditions: 21°C, 25% relative humidity, 100kPa

Ext Attn: 0 dB

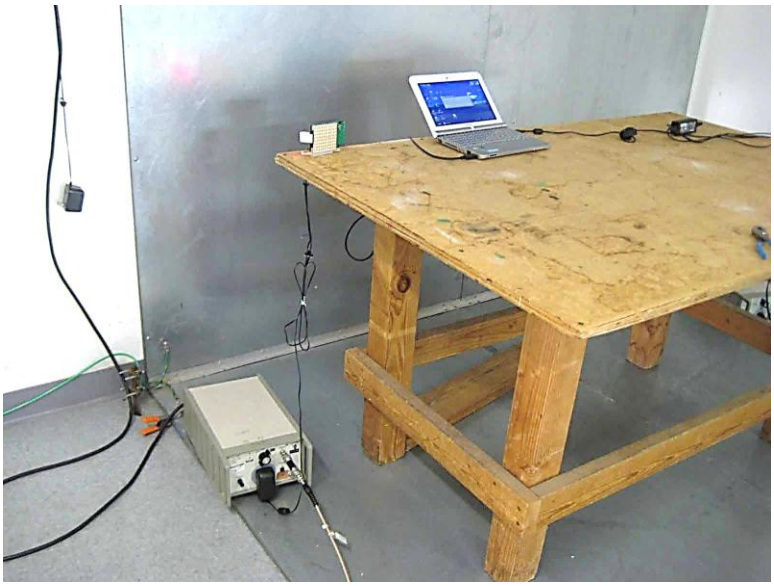
Measurement Data: Reading listed by margin. Test Lead: White

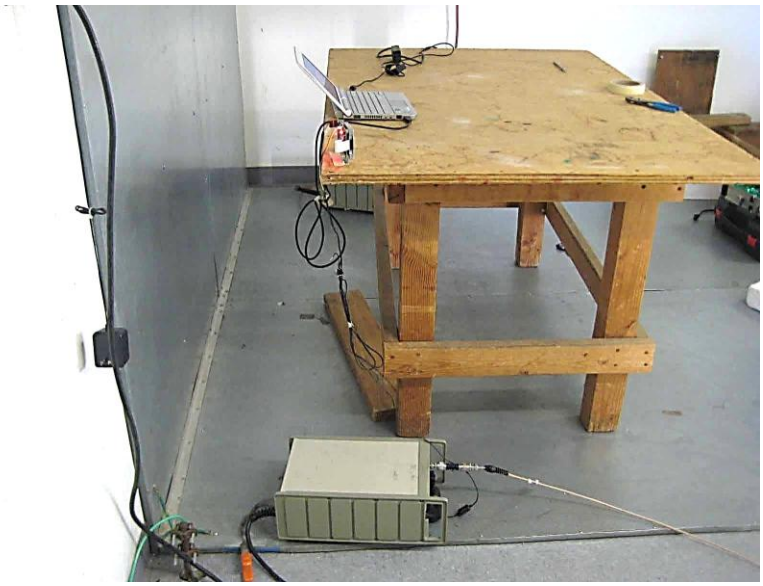
#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	23.998M	36.5	+5.8	+0.2	+0.4	+1.8	+0.0	44.7	50.0	-5.3	White
2	407.430k	36.2	+5.7	+0.2	+0.1	+0.0	+0.0	42.2	47.7	-5.5	White
3	509.239k	34.4	+5.7	+0.2	+0.1	+0.0	+0.0	40.4	46.0	-5.6	White
4	24.018M	36.1	+5.8	+0.2	+0.4	+1.8	+0.0	44.3	50.0	-5.7	White
5	466.334k	34.5	+5.7	+0.2	+0.1	+0.0	+0.0	40.5	46.6	-6.1	White
6	24.039M	32.8	+5.8	+0.2	+0.4	+1.8	+0.0	41.0	50.0	-9.0	White
7	183.450k	38.5	+5.7	+0.3	+0.1	+0.0	+0.0	44.6	54.3	-9.7	White
8	638.681k	30.0	+5.7	+0.2	+0.1	+0.0	+0.0	36.0	46.0	-10.0	White
9	795.031k	29.7	+5.7	+0.2	+0.1	+0.1	+0.0	35.8	46.0	-10.2	White
10	983.523k	29.3	+5.7	+0.2	+0.1	+0.1	+0.0	35.4	46.0	-10.6	White
11	12.004M	32.3	+5.8	+0.2	+0.3	+0.7	+0.0	39.3	50.0	-10.7	White
12	1.026M	28.6	+5.7	+0.2	+0.1	+0.1	+0.0	34.7	46.0	-11.3	White
13	12.094M	31.7	+5.8	+0.2	+0.3	+0.7	+0.0	38.7	50.0	-11.3	White
14	14.238M	31.3	+5.8	+0.2	+0.4	+0.9	+0.0	38.6	50.0	-11.4	White
15	1.319M	28.3	+5.7	+0.2	+0.1	+0.1	+0.0	34.4	46.0	-11.6	White

Date: 1/16/2013 Time: 3:57:59 PM Oculii LLC WO#: 93691
15.207 AC Mains - Average Test Lead: White 110V 60Hz Sequence#: 7 Ext ATTN: 0 dB



Test Setup Photos





15.245(b) RF Power Output

Test Data

Test Location: CKC Laboratories, Inc. • 110 North Olinda Place • Brea, CA 92823• 714-993-6112

Customer: **Oculii LLC**
Specification: **15.245 Carrier and Spurious Emissions**
Work Order #: **93691** Date: 2/19/2013
Test Type: **Radiated Scan** Time: 09:56:51
Equipment: **Radar-based traffic surveillance module** Sequence#: 3
Manufacturer: Oculii, LLC. Tested By: E. Wong
Model: VISDAR-RADAR
S/N: NA

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02947	Cable	32022-29094K-29094K-72TC	8/8/2011	8/8/2013
T2	ANP06153	Cable	16301	10/27/2011	10/27/2013
T3	AN02946	Cable	32022-2-2909K-36TC	8/8/2011	8/8/2013
T4	AN00787	Preamp	83017A	4/8/2011	4/8/2013
T5	AN01413	Horn Antenna-ANSI C63.5 (dB/m)	84125-80008	11/9/2012	11/9/2014
	AN03158	Active Horn Antenna	AMFW-5F-26004000-33-8P	12/18/2012	12/18/2014
	AN02347	Horn Antenna	M19HWA	3/22/2012	3/22/2014
	AN02348	Horn Antenna	M12HWA	3/22/2012	3/22/2014
	AN02349	Horn Antenna	M08HWA	3/22/2012	3/22/2014

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Radar-Based Traffic Surveillance Module*	Oculii, LLC.	VISDAR-RADAR	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Edac	EA10523C-120	NA
Laptop	Toshiba	NB205	794461811C

Test Conditions / Notes:

The EUT seeking modular approval is placed on a table lined with Styrofoam of 10 cm thickness.

USB and DC power port are connected to support laptop and support power supply.

The Laptop issues transmit command to set the EUT in constant transmit, operational mode, transmitting a modulated signal. The single channel EUT with temperature compensating circuit adjusting the transmit frequency operating within authorized band of 24075-24175 MHz. The device transmits a CW in standby mode and modulated signal in Operational mode. Both Transmit and standby mode were evaluated.

Frequency range of measurement = 24 - 100GHz.
1000 MHz-100,000 MHz; RBW=1 MHz, VBW=1 MHz.
Test environment conditions: 21°C, 38% relative humidity, 100kPa

15.31(e) compliance: the supply voltage was varied between 85% and 115% of the nominal rated supply voltage, no change in the Fundamental signal level was observed.

Emission profile of the EUT rotated along three orthogonal axis was investigated. Recorded data represents worse case emission.

Field strength of harmonics was investigated, no emission was found.

Modification: Internal reference PLL disabled via firmware.

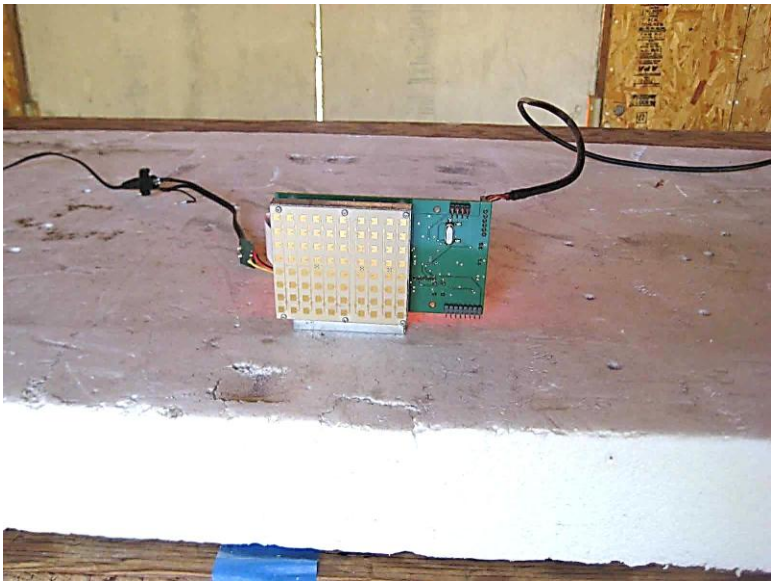
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

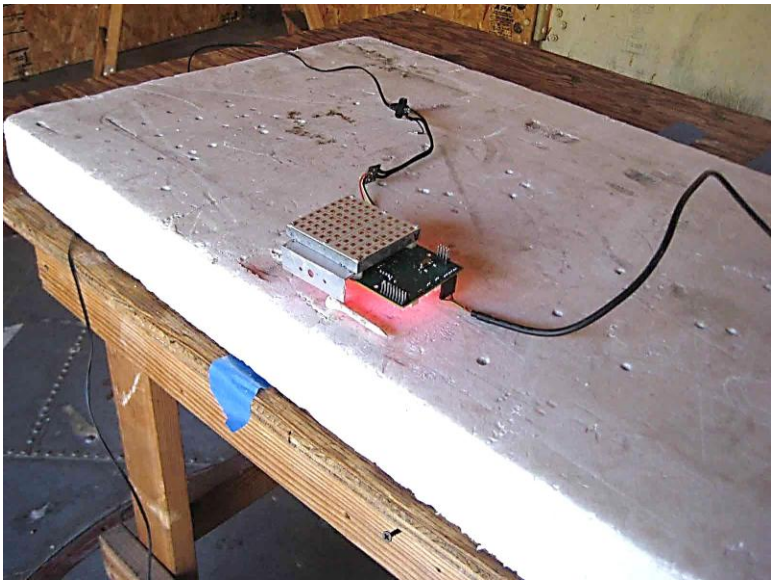
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5								
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	24113.300 M	114.4	+1.8 +40.5	+1.8	+2.5	-33.7	+0.0	127.3	128.0	-0.7	Horiz
	Ave								Fundamental Stanby X		
^	24113.300 M	114.6	+1.8 +40.5	+1.8	+2.5	-33.7	+0.0	127.5	128.0	-0.5	Horiz
									Fundamental Stanby X		
3	24126.580 M	112.7	+1.8 +40.5	+1.8	+2.5	-33.6	+0.0	125.7	128.0	-2.3	Vert
	Ave								Fundamental, stanby, Z		
^	24126.580 M	113.2	+1.8 +40.5	+1.8	+2.5	-33.6	+0.0	126.2	128.0	-1.8	Vert
									Fundamental, stanby, Z		
5	24127.580 M	112.6	+1.8 +40.5	+1.8	+2.5	-33.6	+0.0	125.6	128.0	-2.4	Horiz
									Fundamental, Transmit, X		
6	24145.850 M	112.3	+1.8 +40.5	+1.8	+2.5	-33.6	+0.0	125.3	128.0	-2.7	Vert
	Ave								Fundamental, Transmit, Z		

^	24145.850 M	113.2	+1.8 +40.5	+1.8	+2.5	-33.6	+0.0	126.2	128.0	-1.8	Vert
									Fundamental, Transmit, Z		
8	24128.350 M	112.2	+1.8 +40.5	+1.8	+2.5	-33.6	+0.0	125.2	128.0	-2.8	Horiz
Ave									Fundamental, Transmit, X		
9	24152.270 M	91.9	+1.8 +40.5	+1.8	+2.5	-33.6	+0.0	104.9	128.0	-23.1	Horiz
									Fundamental, Transmit, Z		
10	24124.580 M	89.7	+1.8 +40.5	+1.8	+2.5	-33.6	+0.0	102.7	128.0	-25.3	Horiz
									Fundamental, stanby, Z		
11	24117.250 M	89.6	+1.8 +40.5	+1.8	+2.5	-33.7	+0.0	102.5	128.0	-25.5	Vert
									Fundamental, Transmit, X		
12	24115.600 M	88.8	+1.8 +40.5	+1.8	+2.5	-33.7	+0.0	101.7	128.0	-26.3	Vert
									Fundamental Stanby X		
13	24143.080 M	86.8	+1.8 +40.5	+1.8	+2.5	-33.6	+0.0	99.8	128.0	-28.2	Vert
									Fundamental Transmit Y		
14	24133.920 M	86.0	+1.8 +40.5	+1.8	+2.5	-33.6	+0.0	99.0	128.0	-29.0	Vert
									Fundamental, Stanby, Y		
15	24126.580 M	79.2	+1.8 +40.5	+1.8	+2.5	-33.6	+0.0	92.2	128.0	-35.8	Horiz
									Fundamental, Stanby, Y		
16	24131.920 M	73.8	+1.8 +40.5	+1.8	+2.5	-33.6	+0.0	86.8	128.0	-41.2	Horiz
									Fundamental Transmit Y		

Test Setup Photos



X Axis



Y Axis

Z Axis

-20dBc & 99% Occupied Bandwidth

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 North Olinda Place • Brea, CA 92823• 714-993-6112

Customer: **Oculii LLC**
Specification: **FCC Occupied BW: -20dB BW, RSS210 99%BW**
Work Order #: **93691** Date: 2/19/2013
Test Type: **Radiated Scan** Time: 09:56:51
Equipment: **Radar-based traffic surveillance module** Sequence#: 3
Manufacturer: Oculii, LLC. Tested By: E. Wong
Model: VISDAR-RADAR
S/N: NA

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02947	Cable	32022-29094K-29094K-72TC	8/8/2011	8/8/2013
T2	ANP06153	Cable	16301	10/27/2011	10/27/2013
T3	AN02946	Cable	32022-2-2909K-36TC	8/8/2011	8/8/2013
T4	AN00787	Preamp	83017A	4/8/2011	4/8/2013
T5	AN01413	Horn Antenna-ANSI C63.5 (dB/m)	84125-80008	11/9/2012	11/9/2014

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Radar-Based Traffic Surveillance Module*	Oculii LLC.	VISDAR-RADAR	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Edac	EA10523C-120	NA
Laptop	Toshiba	NB205	794461811C

Test Conditions / Notes:

The EUT seeking modular approval is placed on a table lined with Styrofoam of 10 cm thickness.

USB and DC power port are connected to support laptop and support power supply.

The Laptop issues transmit command to set the EUT in constant transmit, operational mode, transmitting a modulated signal. The single channel EUT with temperature compensating circuit adjusting the transmit frequency operating within authorized band of 24075-24175 MHz. The device transmits a CW in standby mode and modulated signal in Operational mode. Both Transmit and standby mode were evaluated.

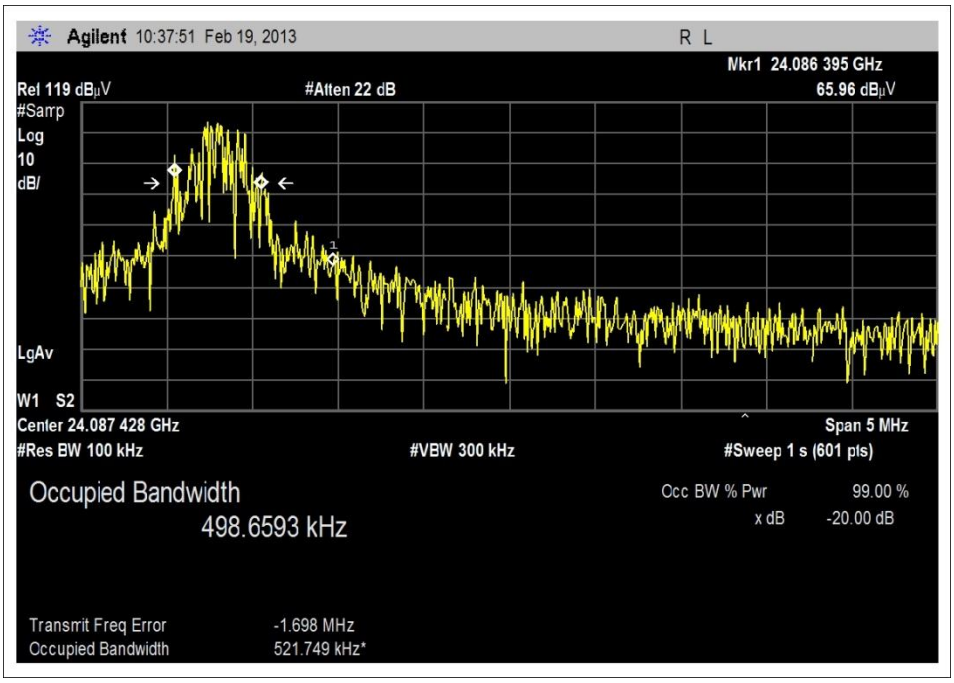
Data plot was captured in single sweep mode to demonstrate the emission bandwidth of the signal and max hold mode with accumulation time of 10 minutes to demonstrate the emission bandwidth with temperature drift.

Frequency range of measurement = Fundamental
RBW= 100kHz , VBW=300 kHz
Test environment conditions: 21°C, 38% relative humidity, 100kPa

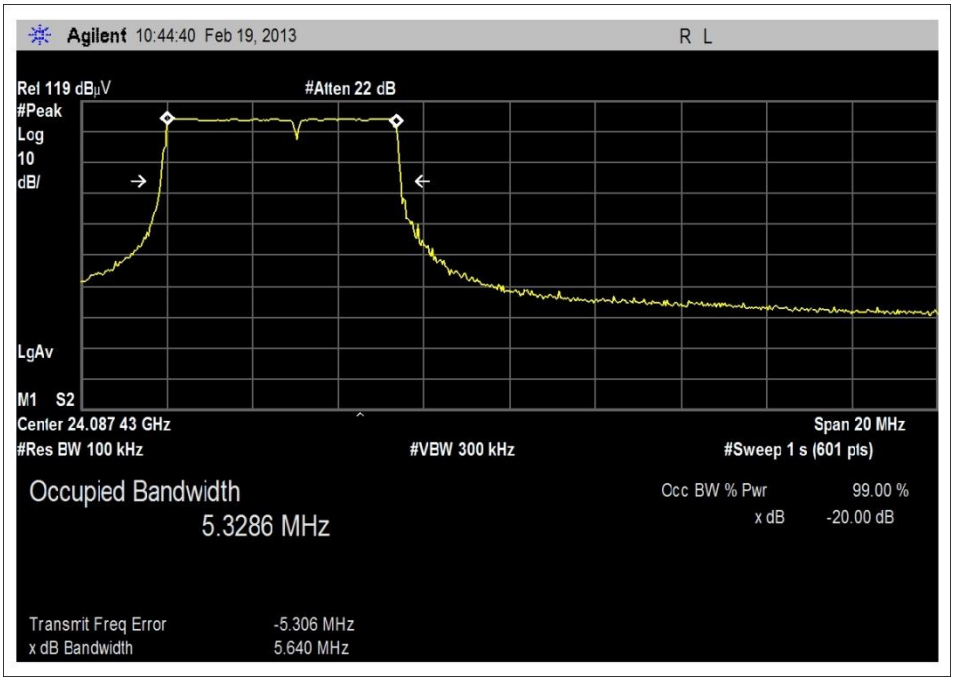
Emission profile of the EUT rotated along three orthogonal axis was investigated. Recorded data represent worse case emission.

Modification: Internal reference PLL disabled via firmware.

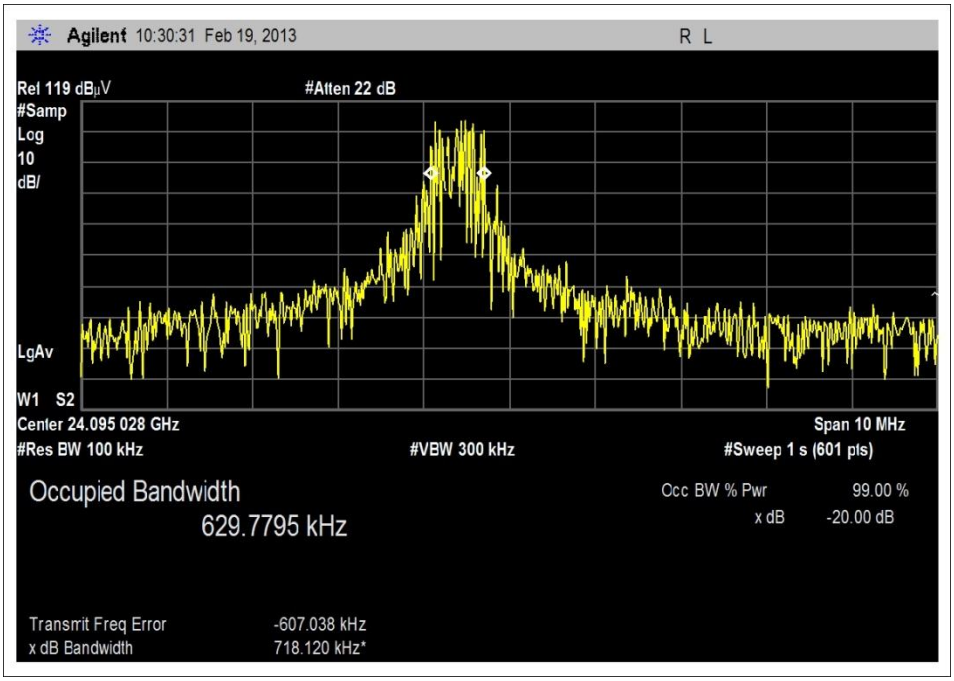
Test Plots



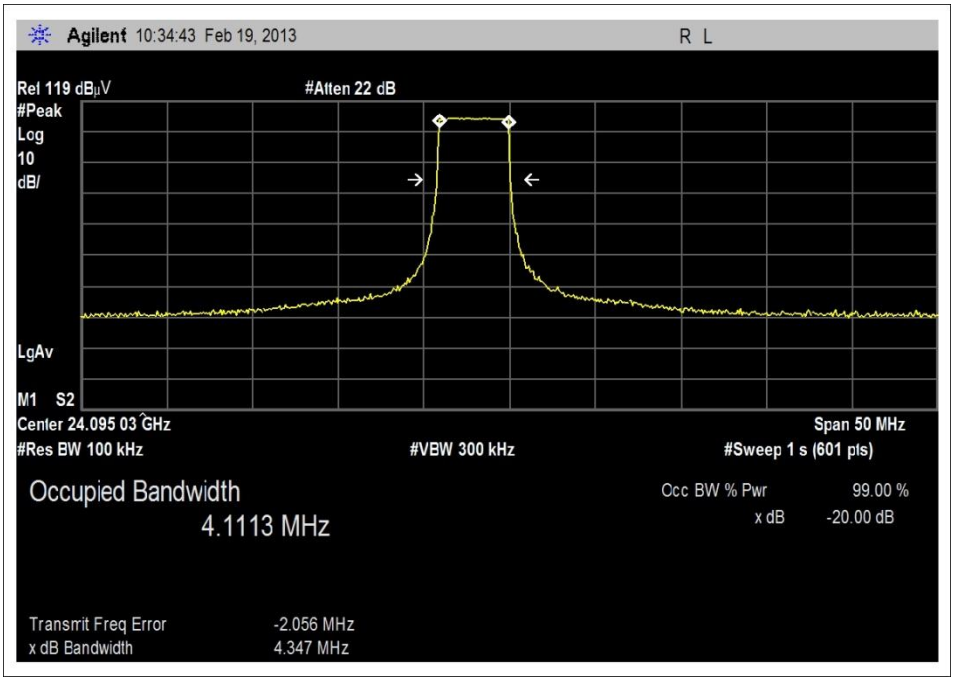
Standby Mode, Single



Standby Mode, Drift

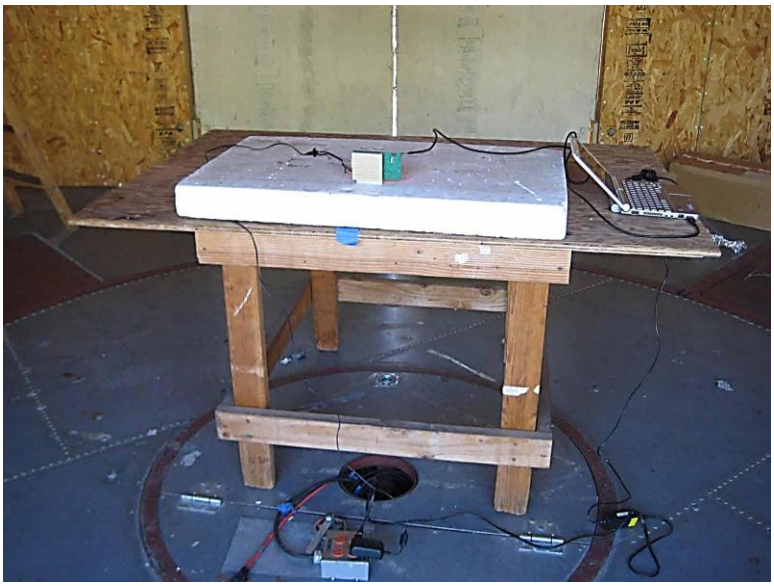


TX Mode, Single



TX Mode, Drift

Test Setup Photos



Bandedge

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 North Olinda Place • Brea, CA 92823• 714-993-6112 • • •

Customer: **Oculii LLC**
Specification: **Bandedge plot**
Work Order #: **93691** Date: 2/19/2013
Test Type: **Radiated Scan** Time: 09:56:51
Equipment: **Radar-based traffic surveillance module** Sequence#: 3
Manufacturer: Oculii, LLC. Tested By: E. Wong
Model: VISDAR-RADAR
S/N: NA

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02947	Cable	32022-29094K-29094K-72TC	8/8/2011	8/8/2013
T2	ANP06153	Cable	16301	10/27/2011	10/27/2013
T3	AN02946	Cable	32022-2-2909K-36TC	8/8/2011	8/8/2013
T4	AN00787	Preamp	83017A	4/8/2011	4/8/2013
T5	AN01413	Horn Antenna-ANSI C63.5 (dB/m)	84125-80008	11/9/2012	11/9/2014

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Radar-Based Traffic Surveillance Module*	Oculii, LLC.	VISDAR-RADAR	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Edac	EA10523C-120	NA
Laptop	Toshiba	NB205	794461811C

Test Conditions / Notes:

The EUT seeking modular approval is placed on a table lined with Styrofoam of 10 cm thickness.

USB and DC power port are connected to support laptop and support power supply.

The Laptop issues transmit command to set the EUT in constant transmit, operational mode, transmitting a modulated signal. The single channel EUT with temperature compensating circuit adjusting the transmit frequency operating within authorized band of 24075-24175 MHz. The device transmits a CW in standby mode and modulated signal in Operational mode. Both Transmit and standby mode were evaluated.

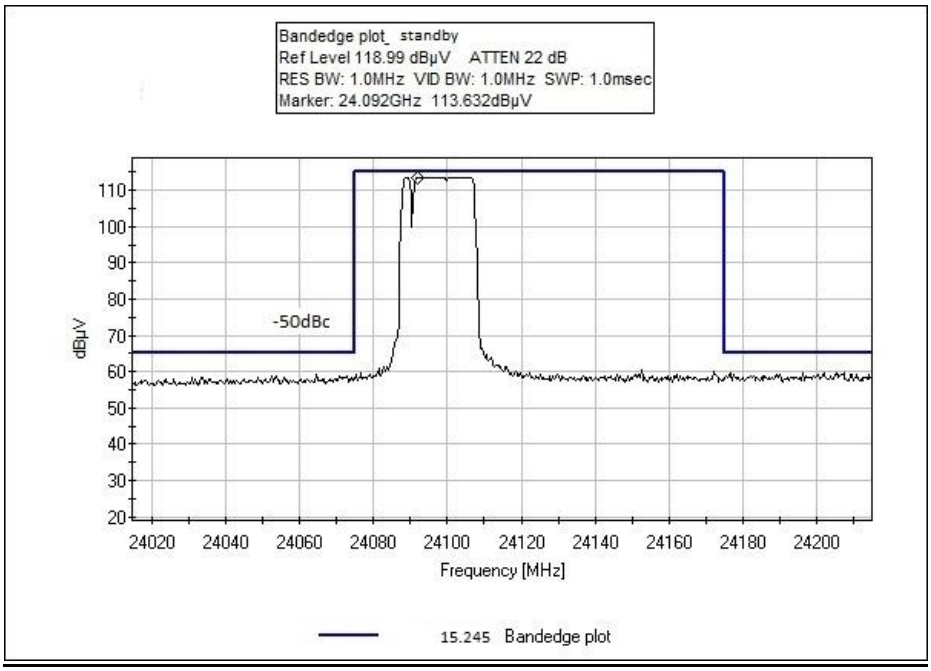
Data plot was captured in max hold mode with accumulation time of 10 minutes to demonstrate the bandedge emissions with temperature drift.

Frequency range of measurement = Fundamental
1000 MHz-100,000 MHz; RBW=1 MHz, VBW=1 MHz.
Test environment conditions: 21°C, 38% relative humidity, 100kPa

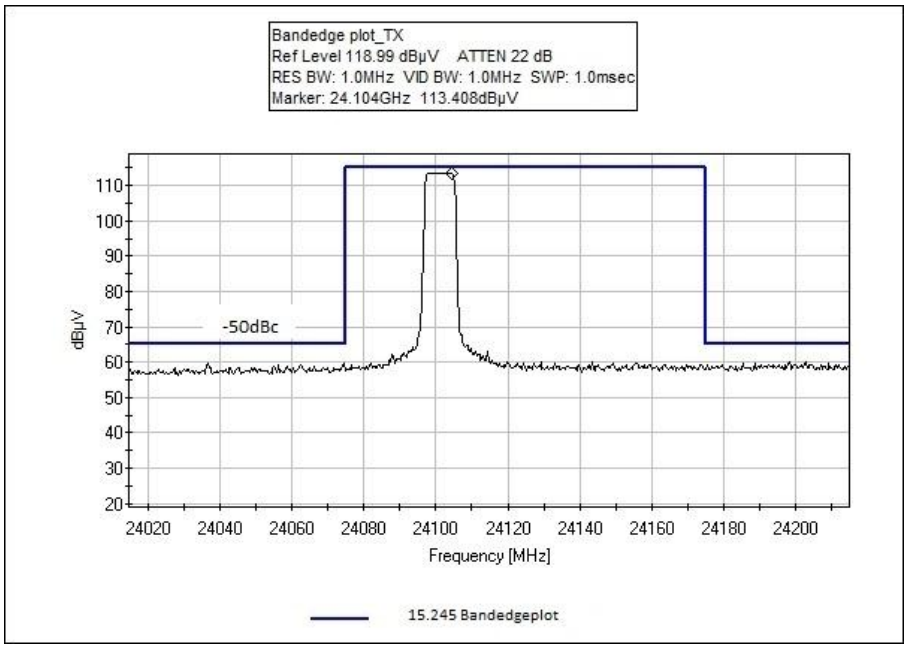
Emission profile of the EUT rotated along three orthogonal axis was investigated. Recorded data represent worse case emission.

Modification: Internal reference PLL disabled via firmware.

Test Data



Standby



TX

Test Setup Photos

15.245(b)(3) Radiated Spurious Emissions

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 110 North Olinda Place • Brea, CA 92823• 714-993-6112 • • •

Customer:	**Oculii LLC**		
Specification:	**15.245 (b)(3) / 15.209 Spurious Emissions**		
Work Order #:	**93691**	Date:	2/19/2013
Test Type:	**Radiated Scan**	Time:	14:25:03
Equipment:	**Radar-based traffic surveillance module**	Sequence#:	4
Manufacturer:	Oculii, LLC.	Tested By:	E. Wong
Model:	VISDAR-RADAR		
S/N:	NA		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T2	AN02947	Cable	32022-29094K-29094K-72TC	8/8/2011	8/8/2013
T3	ANP06153	Cable	16301	10/27/2011	10/27/2013
T4	AN02946	Cable	32022-2-2909K-36TC	8/8/2011	8/8/2013
T5	AN00787	Preamp	83017A	4/8/2011	4/8/2013
T6	ANP04382	Cable	LDF-50	8/30/2012	8/30/2014
T7	ANP06360	Cable	L1-PNMNM-48	8/29/2012	8/29/2014
	AN00314	Loop Antenna	6502	6/29/2012	6/29/2014
T8	AN00851	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
T9	AN01646	Horn Antenna	3115	4/13/2012	4/13/2014
T10	AN01413	Horn Antenna-ANSI C63.5 (dB/m)	84125-80008	11/9/2012	11/9/2014
	AN03158	Active Horn Antenna	AMFW-5F-26004000-33-8P	12/18/2012	12/18/2014
	AN02347	Horn Antenna	M19HWA	3/22/2012	3/22/2014
	AN02348	Horn Antenna	M12HWA	3/22/2012	3/22/2014
	AN02349	Horn Antenna	M08HWA	3/22/2012	3/22/2014
T11	AN00010	Preamp	8447D	3/29/2012	3/29/2014
T12	ANP05555	Cable	RG223/U	6/19/2012	6/19/2014
T13	ANP05569	Cable	RG-214/U	6/19/2012	6/19/2014

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Radar-Based Traffic Surveillance Module*	Oculii, LLC.	VISDAR-RADAR	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Edac	EA10523C-120	NA
Laptop	Toshiba	NB205	794461811C

Test Conditions / Notes:

The EUT seeking modular approval is placed on a table lined with Styrofoam of 10 cm thickness.

USB and DC power port are connected to support laptop and support power supply.

The Laptop issues transmit command to set the EUT in constant transmit, operational mode, transmitting a modulated signal. The single channel EUT with temperature compensating circuit adjusting the transmit frequency, operating within authorized band of 24075-24175 MHz. The device transmits a CW in standby mode and modulated signal in Operational mode. Both Transmit and standby mode were evaluated.

Frequency range of measurement = 9 kHz- 100GHz.
9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz; 150 kHz-30 MHz RBW=9 kHz, VBW=9 kHz; 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz, 1000 MHz-100,000 MHz; RBW=1 MHz, VBW=1 MHz.
Test environment conditions: 21°C, 38% relative humidity, 100kPa

Emission profile of the EUT rotated along three orthogonal axis was investigated. Recorded data represent worse case emission.

Modification: Internal reference PLL disabled via firmware.

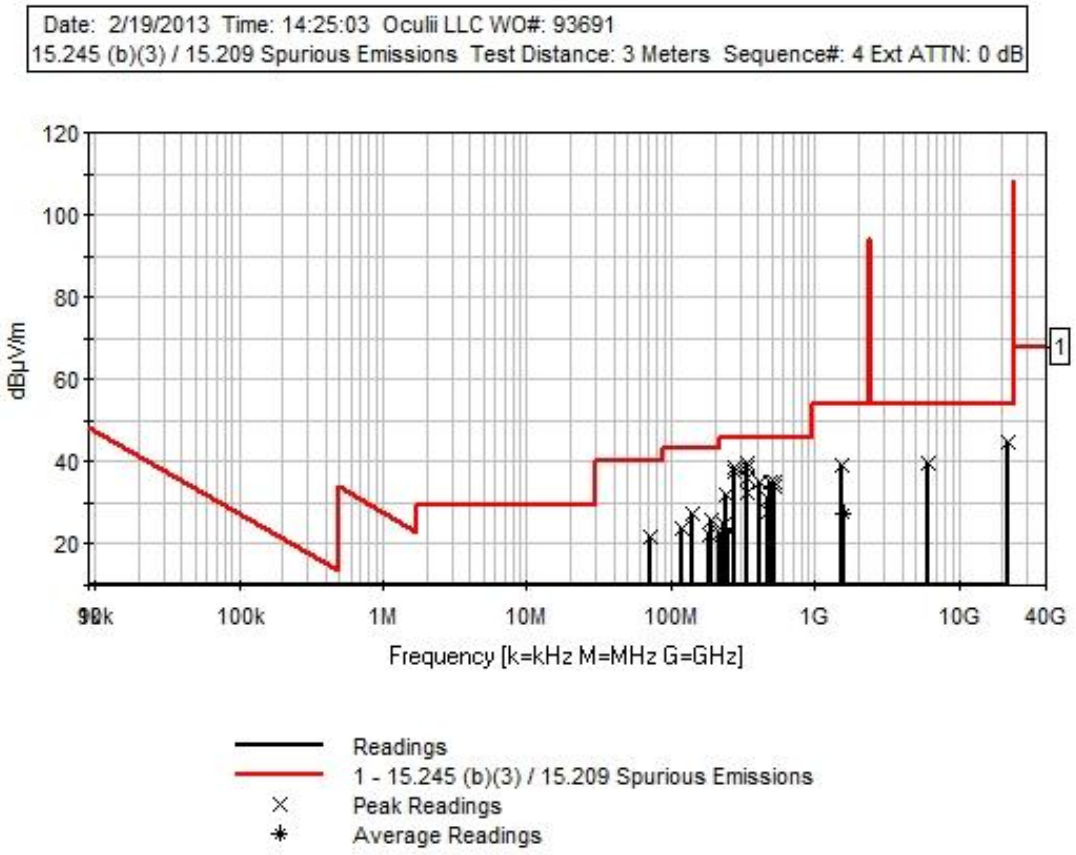
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9 T13	T2 T6 T10	T3 T7 T11	T4 T8 T12	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	339.360M	47.5	+0.0 +0.0 +0.0 +2.0	+0.0 +2.2 +0.0	+0.0 +0.0 -26.7	+0.0 +14.1 +0.4	+0.0	39.5	46.0	-6.5	Horiz
2	335.200M	47.1	+0.0 +0.0 +0.0 +1.9	+0.0 +2.1 +0.0	+0.0 +0.0 -26.7	+0.0 +14.0 +0.4	+0.0	38.8	46.0	-7.2	Horiz
3	279.730M	48.0	+0.0 +0.0 +0.0 +1.7	+0.0 +1.9 +0.0	+0.0 +0.0 -26.4	+0.0 +12.9 +0.3	+0.0	38.4	46.0	-7.6	Vert
4	276.170M	47.0	+0.0 +0.0 +0.0 +1.7	+0.0 +1.9 +0.0	+0.0 +0.0 -26.4	+0.0 +12.9 +0.3	+0.0	37.4	46.0	-8.6	Vert
5	21779.994 M	34.4	+0.0 -35.8 +0.0 +0.0	+1.5 +0.0 +40.5	+1.8 +0.0 +0.0	+2.3 +0.0 +0.0	+0.0	44.7	54.0	-9.3	Vert

6	339.397M	44.1	+0.0 +0.0 +0.0 +2.0	+0.0 +2.2 +0.0	+0.0 +0.0 -26.7	+0.0 +14.1 +0.4	+0.0	36.1	46.0	-9.9	Vert
7	522.730M	39.4	+0.0 +0.0 +0.0 +2.5	+0.0 +2.7 +0.0	+0.0 +0.0 -27.8	+0.0 +18.1 +0.4	+0.0	35.3	46.0	-10.7	Vert
8	480.050M	40.1	+0.0 +0.0 +0.0 +2.4	+0.0 +2.6 +0.0	+0.0 +0.0 -27.7	+0.0 +17.2 +0.4	+0.0	35.0	46.0	-11.0	Horiz
9	414.900M	41.5	+0.0 +0.0 +0.0 +2.2	+0.0 +2.4 +0.0	+0.0 +0.0 -27.3	+0.0 +15.8 +0.4	+0.0	35.0	46.0	-11.0	Horiz
10	519.400M	38.4	+0.0 +0.0 +0.0 +2.5	+0.0 +2.7 +0.0	+0.0 +0.0 -27.8	+0.0 +18.0 +0.4	+0.0	34.2	46.0	-11.8	Vert
11	335.820M	41.0	+0.0 +0.0 +0.0 +1.9	+0.0 +2.1 +0.0	+0.0 +0.0 -26.7	+0.0 +14.0 +0.4	+0.0	32.7	46.0	-13.3	Vert
12	240.000M	43.0	+0.0 +0.0 +0.0 +1.6	+0.0 +1.8 +0.0	+0.0 +0.0 -26.5	+0.0 +11.9 +0.3	+0.0	32.1	46.0	-13.9	Vert
13	6103.500M	29.7	+0.0 -39.4 +33.4 +0.0	+0.8 +9.6 +0.0	+0.0 +5.4 +0.0	+0.0 +0.0 +0.0	+0.0	39.5	54.0	-14.5	Vert
14	1510.500M	45.1	+0.0 -39.5 +26.0 +0.0	+0.4 +4.8 +0.0	+0.0 +2.5 +0.0	+0.0 +0.0 +0.0	+0.0	39.3	54.0	-14.7	Horiz
15	468.550M	36.4	+0.0 +0.0 +0.0 +2.4	+0.0 +2.5 +0.0	+0.0 +0.0 -27.7	+0.0 +17.0 +0.4	+0.0	31.0	46.0	-15.0	Horiz
16	142.153M	39.9	+0.0 +0.0 +0.0 +1.2	+0.0 +1.4 +0.0	+0.0 +0.0 -26.9	+0.0 +11.4 +0.2	+0.0	27.2	43.5	-16.3	Horiz
17	192.087M	40.5	+0.0 +0.0 +0.0 +1.4	+0.0 +1.6 +0.0	+0.0 +0.0 -26.6	+0.0 +8.9 +0.3	+0.0	26.1	43.5	-17.4	Horiz
18	476.900M	33.0	+0.0 +0.0 +0.0 +2.4	+0.0 +2.6 +0.0	+0.0 +0.0 -27.7	+0.0 +17.2 +0.4	+0.0	27.9	46.0	-18.1	Vert

19	71.990M	40.4	+0.0 +0.0 +0.0 +0.8	+0.0 +1.0 +0.0	+0.0 +0.0 -27.0	+0.0 +6.4 +0.2	+0.0	21.8	40.0	-18.2	Horiz
20	119.970M	36.3	+0.0 +0.0 +0.0 +1.1	+0.0 +1.3 +0.0	+0.0 +0.0 -26.8	+0.0 +11.7 +0.2	+0.0	23.8	43.5	-19.7	Horiz
21	231.120M	36.3	+0.0 +0.0 +0.0 +1.5	+0.0 +1.7 +0.0	+0.0 +0.0 -26.5	+0.0 +11.3 +0.3	+0.0	24.6	46.0	-21.4	Horiz
22	184.687M	36.6	+0.0 +0.0 +0.0 +1.4	+0.0 +1.6 +0.0	+0.0 +0.0 -26.7	+0.0 +9.0 +0.2	+0.0	22.1	43.5	-21.4	Horiz
23	251.050M	33.6	+0.0 +0.0 +0.0 +1.6	+0.0 +1.8 +0.0	+0.0 +0.0 -26.5	+0.0 +12.6 +0.3	+0.0	23.4	46.0	-22.6	Horiz
24	221.137M	35.1	+0.0 +0.0 +0.0 +1.5	+0.0 +1.7 +0.0	+0.0 +0.0 -26.5	+0.0 +10.6 +0.3	+0.0	22.7	46.0	-23.3	Horiz
25	1598.083M Ave	32.3	+0.0 -39.5 +26.4 +0.0	+0.4 +4.9 +0.0	+0.0 +2.7 +0.0	+0.0 +0.0 +0.0	+0.0	27.2	54.0	-26.8	Horiz
^	1598.083M	61.8	+0.0 -39.5 +26.4 +0.0	+0.4 +4.9 +0.0	+0.0 +2.7 +0.0	+0.0 +0.0 +0.0	+0.0	56.7	54.0	+2.7	Horiz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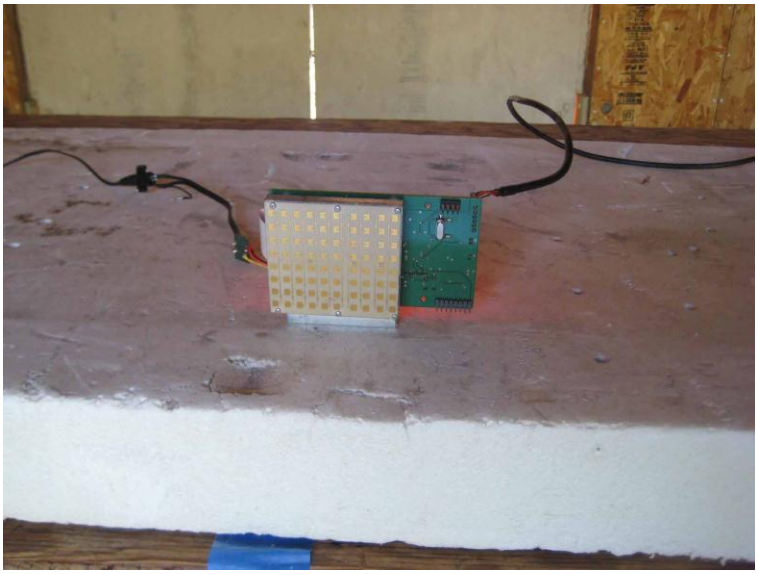
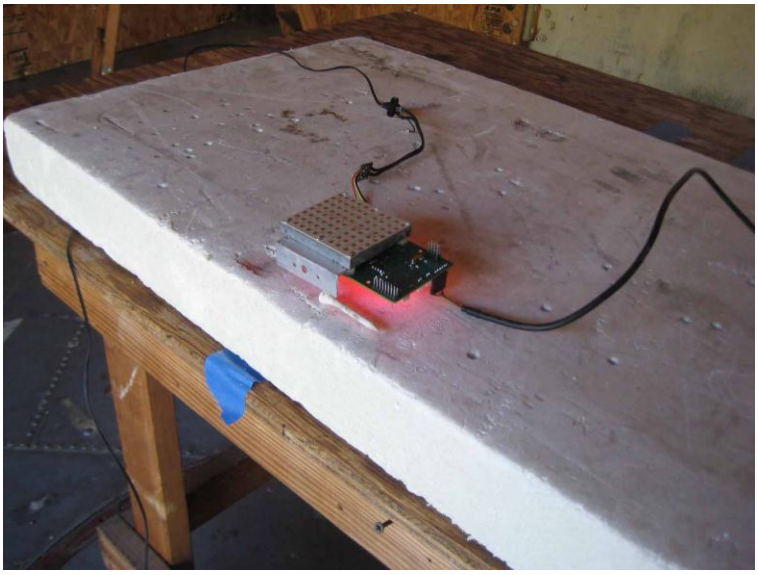
100
80
60
40
20
dBµV/m
1
10k
100k
1M
10M
100M
1G
10G
40G
Frequency [k=kHz M=MHz G=GHz]
Readings
1 - 15.245 (b)(3) / 15.209 Spurious Emissions
Peak Readings
Average Readings

Test Setup Photos



X Axis



Y Axis

Z Axis

SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or carrot ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.