Ossia, Inc.

REVISED TEST REPORT TO 102446-2A

Cota WPT Client
Model: VenusRx

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)

15.249

Report No.: 102446-2B

Date of issue: May 31, 2019

Test Certificate # 803.05

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 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.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Ossia, Inc.
1100 112th Ave NE Suite 301
Bellevue, WA 98004

Representative: Bob McDonald
Customer Reference Number: 13041

REPORT PREPARED BY:

Terri Rayle
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 102446

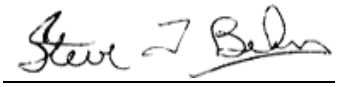
DATE OF EQUIPMENT RECEIPT: April 6, 2019
DATE(S) OF TESTING: April 6, 2019

Revision History

Original: Testing of the Cota WPT Client, Model: VenusRx to FCC Part 15 Subpart C Section(s) 15.249.
Revision A: To update the customer address.
Revision B: To add a Measurement Procedure Deviation declaration to section 15.215(c) Occupied Bandwidth.

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the equipment provided by the client, 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.
Canyon Park
22116 23rd Drive S.E., Suite A
Bothell, WA 98021

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.12

Site Registration & Accreditation Information

Location	*NIST CB #	FCC	JAPAN
Canyon Park, Bothell, WA	US0081	US1022	A-0148

*CKC's list of NIST designated countries can be found at: https://standards.gov/cabs/designations.html

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C - 15.249

Test Procedure	Description	Modifications	Results
15.215(c)	Occupied Bandwidth	NA	Pass
15.249(a)	Field Strength of Fundamental	NA	Pass
15.249(a)	Field Strength of Spurious Emissions or Radiated Emissions and Band Edge	NA	Pass
15.207	AC Conducted Emissions	NA	NA1

NA = Not Applicable
NA1 = Not applicable because the EUT will not charge and transmit simultaneously.

ISO/IEC 17025 Decision Rule
The declaration of pass or fail herein is based upon assessment to the specification(s) listed above, including where applicable, assessment of measurement uncertainties. For performance related tests, equipment was monitored for specified criteria identified in that section of testing.

Modifications During Testing

This list is a summary of the modifications made to the equipment during testing.

Summary of Conditions
No modifications were made during testing.

Modifications listed above must be incorporated into all production units.

Conditions During Testing

This list is a summary of the conditions noted to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

During testing, numerous configurations may have been utilized. The configurations listed below support compliance to the standard(s) listed in the Summary of Results section.

Configuration 1

Equipment Tested:

Device	Manufacturer	Model #	S/N
Cota WPT Client	Ossia, Inc.	VenusRx	126

Support Equipment:

Device	Manufacturer	Model #	S/N
Laptop (Programming)	Apple	MacBook Pro A1398	NA

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Modulation Type(s):	OOK
Maximum Duty Cycle:	1.5%
Antenna Type(s) and Gain:	2x2 patch array / 12 dBi
Antenna Connection Type:	Integral
Nominal Input Voltage:	Battery
Firmware / Software used for Test:	0x32B1CCD

FCC Part 15 Subpart C

15.215(c) Occupied Bandwidth (20dB BW)

Test Setup/Conditions			
Test Location:	Canyon Park Lab C3	Test Engineer:	M. Harrison
Test Method:	ANSI C63.10 (2013)	Test Date(s):	4/6/2019
Declaration:	Measurement Procedure Deviation: Due to the very low duty cycle of the equipment and the CW nature of the signal, it was deemed appropriate to utilize a higher resolution bandwidth in order increase measurement sweep time to ensure accurate capture of emissions related to the transmitter. Because there is no limit on emissions bandwidth within this section and because the product demonstrates compliance with 15.215(c) using a higher resolution bandwidth than otherwise required, ensuring measurement integrity was selected over strict adherence to the traditional 1-5% RBW requirement of ANSI C63.10.		
Configuration:	1		

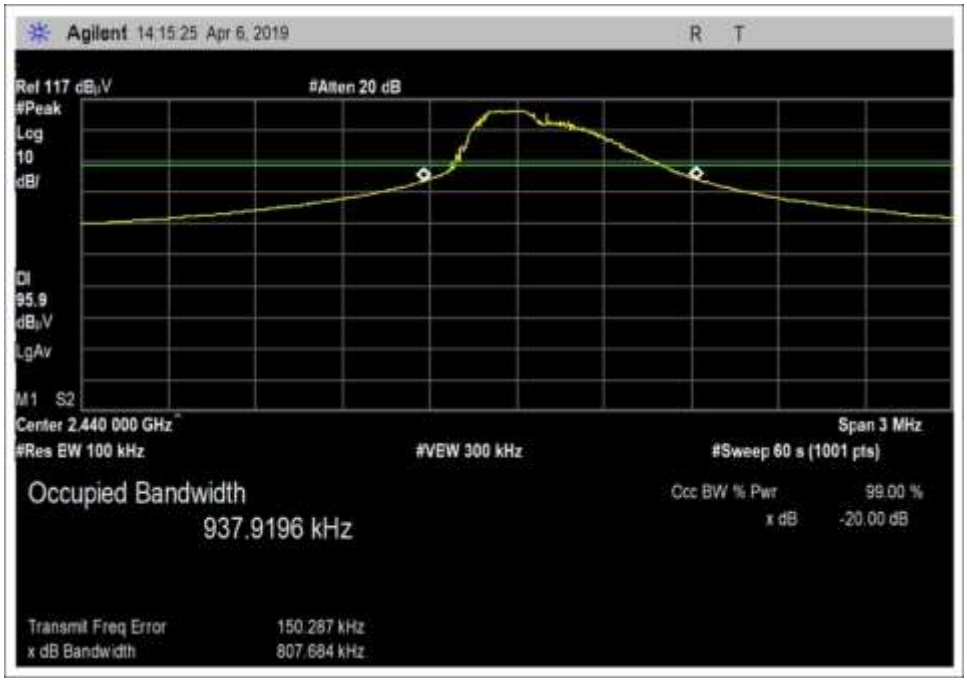
Environmental Conditions			
Temperature (ºC)	20	Relative Humidity (%):	35

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
01467	Horn Antenna	EMCO	3115	7/21/2017	7/21/2019
02871	Spectrum Analyzer	Agilent	E4440A	1/9/2019	1/9/2021
P06503	Cable	Astrolab	32026-29801-29801-36	3/13/2018	3/13/2020
P06515	Cable	Andrews	Heliax	6/29/2018	6/29/2020
P06540	Cable	Andrews	Heliax	10/30/2017	10/30/2019
03540	Preamp	HP	83017A	3/25/2019	3/25/2021

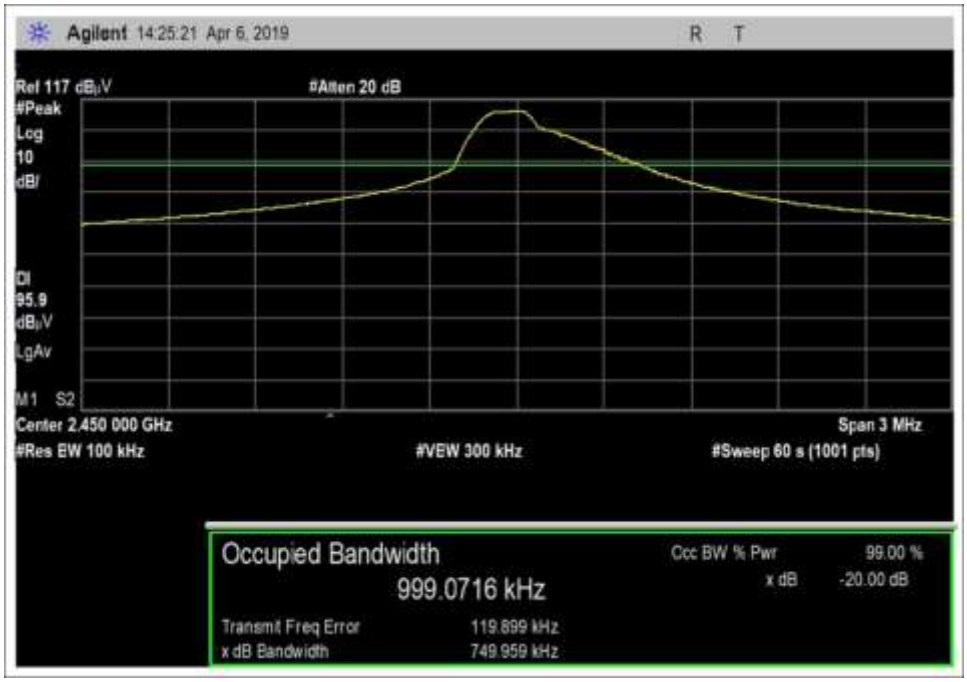
Test Data Summary					
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
2440	NA	OOK	807.68	NA	NA
2450	NA	OOK	749.96	NA	NA
2460	NA	OOK	738.30	NA	NA

NA = Not applicable, because FCC 15.215 does not give any limits so there are no criteria for pass or fail.

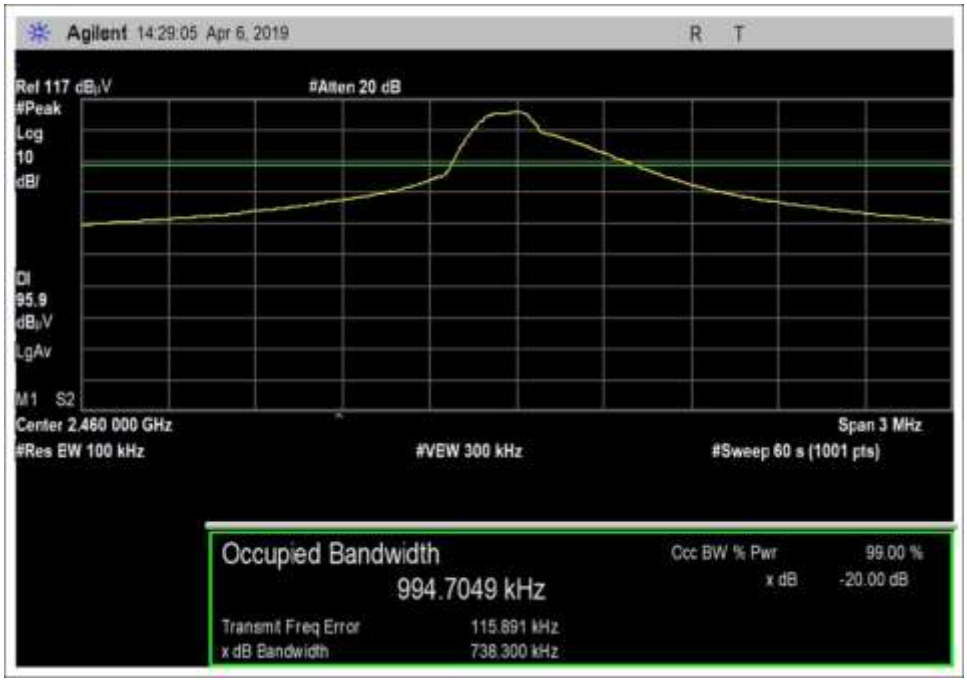
Plot(s)



Low Channel

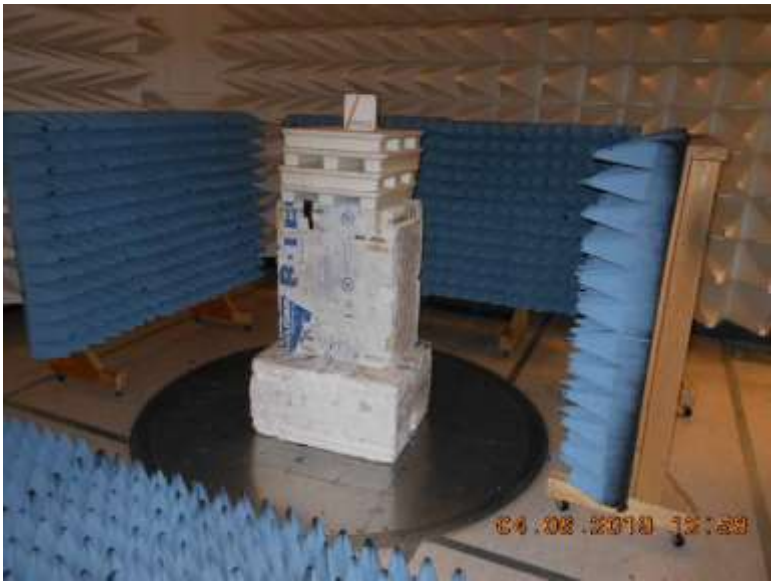


Middle Channel



High Channel

Test Setup Photo(s)



15.249(a) Field Strength of Fundamental

Test Data Summary - Voltage Variations

This equipment is battery powered. Power output tests were performed using a fresh battery.

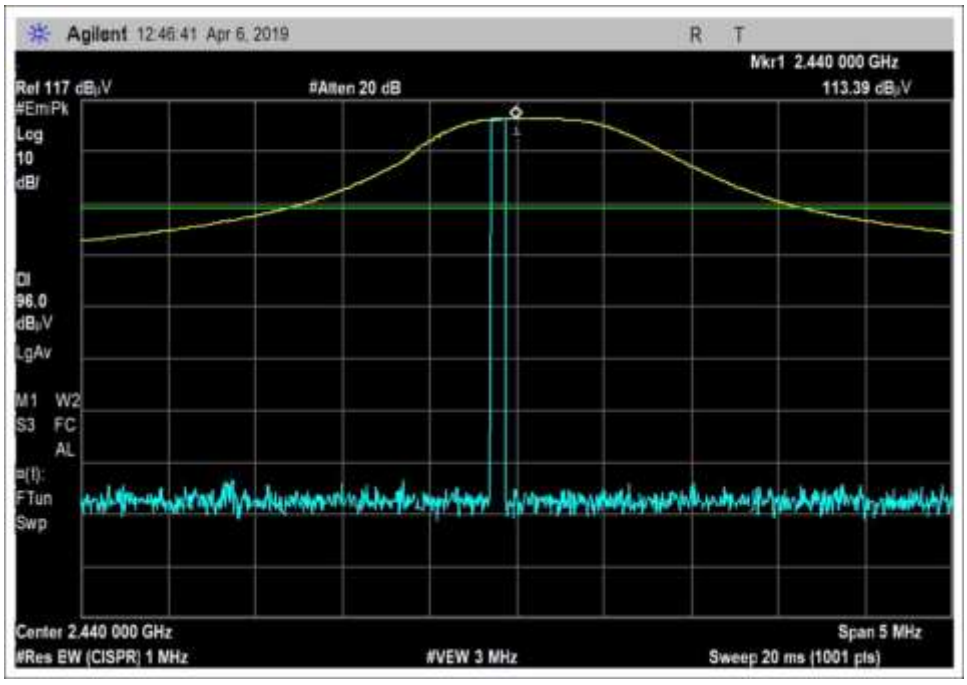
Test Data Summary – Radiated Field Strength Measurement

Data plots show uncorrected peak data.
Corrected readings for peak and average field strengths are in tabular data.

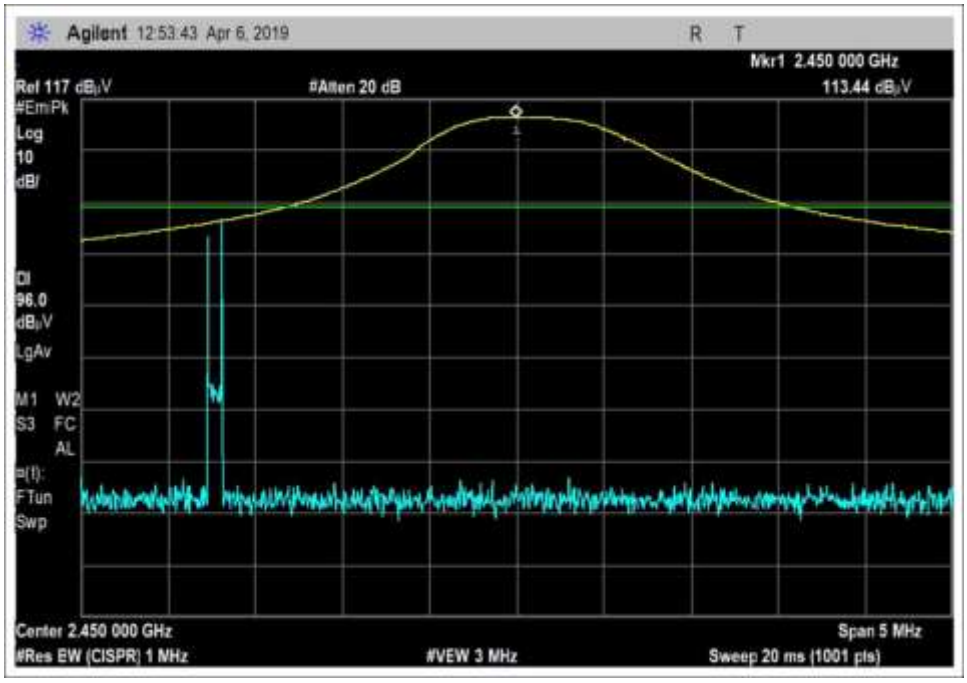
Frequency (MHz)	Modulation	Ant. Type	Measured (dBuV/m @ 3m)	Limit (dBuV/m @ 3m)	Results
2440	OOK	Integral	75.8	≤94	Pass
2450	OOK	Integral	75.5	≤94	Pass
2460	OOK	Integral	75.3	≤94	Pass

Note: The peak limit is 20dB above the 94dBuv/m average limit.

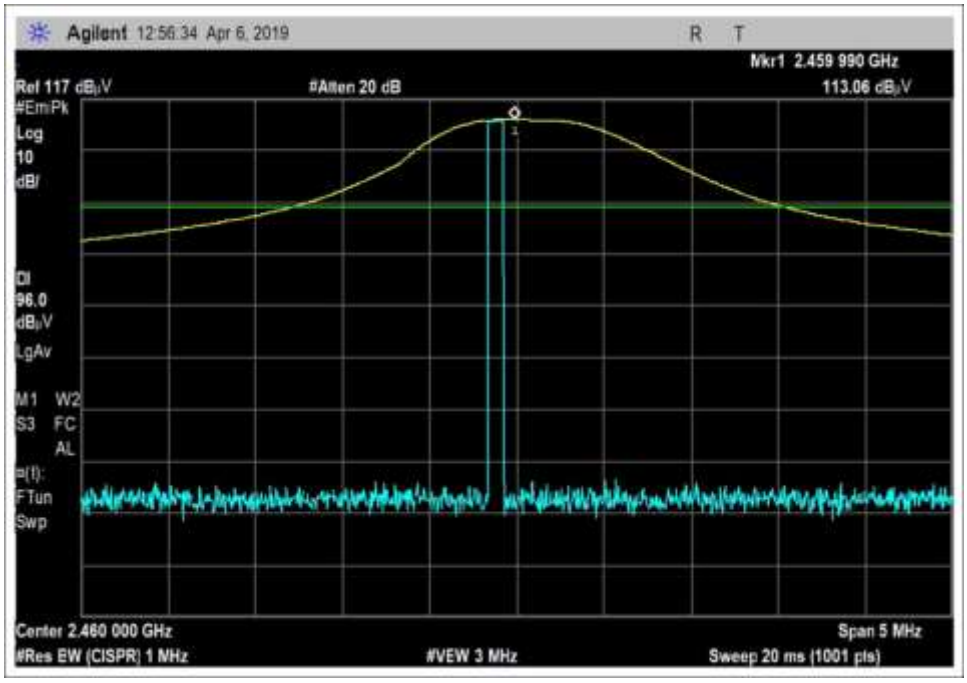
Plot(s)



Low Channel



Middle Channel



High Channel

Test Setup / Conditions / Data

Test Location:	CKC Labs • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Ossia, Inc.**		
Specification:	**15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter)**		
Work Order #:	**102446**	Date:	4/6/2019
Test Type:	**Radiated Scan**	Time:	12:58:18
Tested By:	Matthew Harrison	Sequence#:	12
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

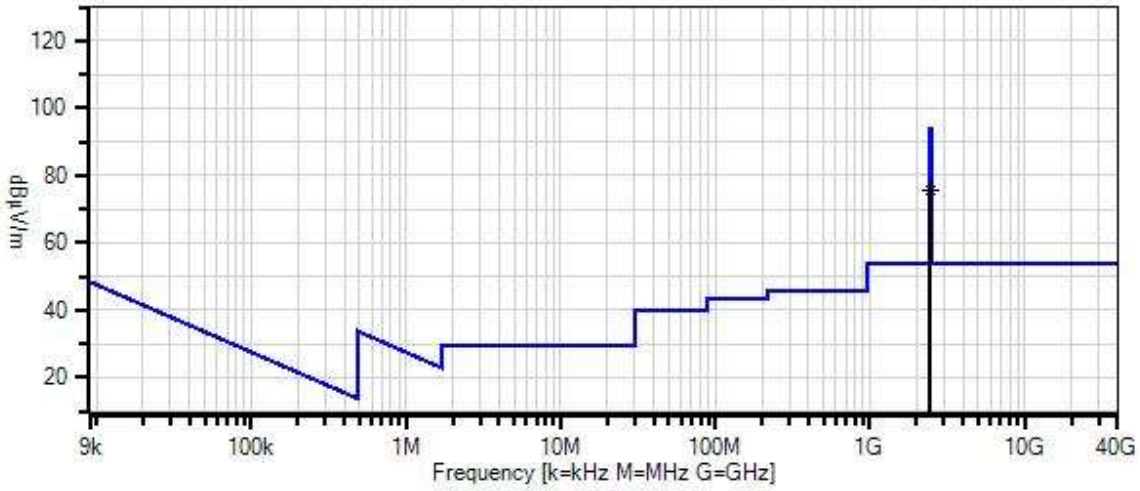
Test Conditions / Notes:

Atmospheric Pressure: 101.8kPa
Temperature: 20°C
Relative Humidity: 35
Frequency: 2440-2460MHz

Test Method: ANSI 63.10 (2013)

The EUT is investigated in Low, Middle, and High Channels, X, Y, & Z Axis with only the worst case reported.
Vertical and Horizontal polarities investigated

Ossia, Inc. WO#: 102446 Sequence#: 12 Date: 4/6/2019
15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter) Test Distance: 3 Meters Vert



Readings
Peak Readings
QP Readings
Average Readings
Ambient
Software Version: 5.03.12
1 - 15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter)

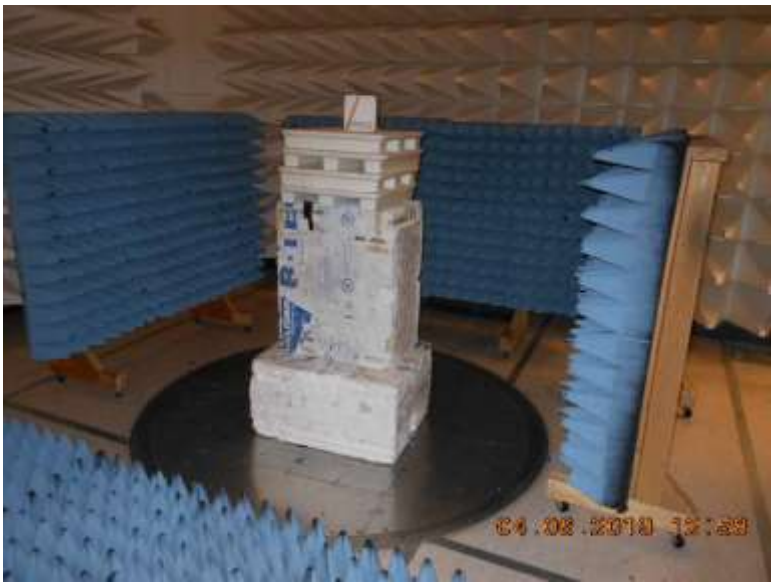
Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02307	Preamp	8447D	1/15/2018	1/15/2020
	AN03628	Biconilog Antenna	3142E	6/7/2017	6/7/2019
	ANP06123	Attenuator	18N-6	5/5/2017	5/5/2019
	ANP05305	Cable	ETSI-50T	10/24/2017	10/24/2019
	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T1	ANP06540	Cable	Heliax	10/30/2017	10/30/2019
	AN02871	Spectrum Analyzer	E4440A	1/9/2019	1/9/2021
	AN00052	Loop Antenna	6502	5/7/2018	5/7/2020
T2	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T3	AN03540	Preamp	83017A	3/25/2019	3/25/2021
T4	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	7/21/2017	7/21/2019
T5	ANP06503	Cable	32026-29801-29801-36	3/13/2018	3/13/2020

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2440.000M	77.8	+0.4 +1.0	+2.6	-34.1	+28.1	+0.0	75.8	94.0	-18.2	Vert
	Ave										
^	2440.000M	113.4	+0.4 +1.0	+2.6	-34.1	+28.1	+0.0	111.4	94.0	+17.4	Vert
3	2450.000M	77.5	+0.4 +1.0	+2.6	-34.1	+28.1	+0.0	75.5	94.0	-18.5	Vert
	Ave										
^	2450.000M	113.4	+0.4 +1.0	+2.6	-34.1	+28.1	+0.0	111.4	94.0	+17.4	Vert
5	2460.000M	77.2	+0.4 +1.0	+2.7	-34.1	+28.1	+0.0	75.3	94.0	-18.7	Vert
	Ave										
^	2459.990M	113.1	+0.4 +1.0	+2.7	-34.1	+28.1	+0.0	111.2	94.0	+17.2	Vert

Test Setup Photo(s)



X-Axis

Y-Axis


OSSO
Thoroughly Tested
MOLD RESISTANT
RIGID INSULATION
04.05.2010 12:50

Z-Axis

15.249(a) Radiated Emissions and Band Edge

Test Setup / Conditions / Data

Test Location:	CKC Labs • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Ossia, Inc.**		
Specification:	**15.209 Radiated Emissions**		
Work Order #:	**102446**	Date:	4/6/2019
Test Type:	**Radiated Scan**	Time:	12:25:42
Tested By:	Matthew Harrison	Sequence#:	2
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

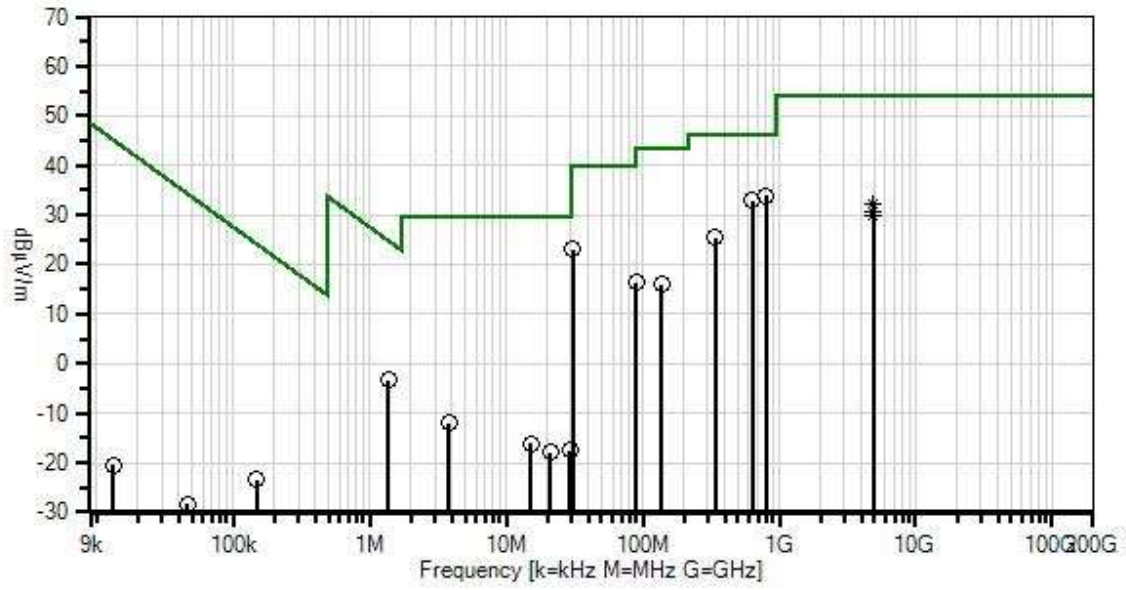
Test Conditions / Notes:

Atmospheric Pressure: 101.8kPa
Temperature: 20°C
Relative Humidity: 35%
Frequency: 9kHz-25GHz

Test Method: ANSI 63.10 (2013)

The EUT is investigated in Low, Middle, and High Channels, X, Y, & Z Axis with only the worst case reported.
Vertical and Horizontal polarities investigated

Ossia, Inc. WO#: 102446 Sequence#: 2 Date: 4/6/2019
15.209 Radiated Emissions Test Distance: 3 Meters Horiz



Readings
Average Readings
1 - 15.209 Radiated Emissions
Peak Readings
Ambient
QP Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02307	Preamp	8447D	1/15/2018	1/15/2020
T2	AN03628	Biconilog Antenna	3142E	6/7/2017	6/7/2019
T3	ANP06123	Attenuator	18N-6	5/5/2017	5/5/2019
T4	ANP05305	Cable	ETSI-50T	10/24/2017	10/24/2019
T5	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T6	ANP06540	Cable	Heliax	10/30/2017	10/30/2019
	AN02871	Spectrum Analyzer	E4440A	1/9/2019	1/9/2021
T7	AN00052	Loop Antenna	6502	5/7/2018	5/7/2020
T8	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T9	AN03540	Preamp	83017A	3/25/2019	3/25/2021
T10	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	7/21/2017	7/21/2019
T11	ANP06503	Cable	32026-29801-29801-36	3/13/2018	3/13/2020
T12	ANP07563	High Pass Filter	VHF-2700A+	3/15/2019	3/15/2021

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

#	Freq	Rdng	T1 T5 T9	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	803.100M	28.7	-27.8 +1.8 +0.0	+23.4 +0.3 +0.0	+5.9 +0.0 +0.0	+1.5 +0.0 +0.0	+0.0	33.8	46.0	-12.2	Horiz
2	631.400M	30.1	-28.2 +1.5 +0.0	+21.9 +0.3 +0.0	+5.9 +0.0 +0.0	+1.3 +0.0 +0.0	+0.0	32.8	46.0	-13.2	Horiz
3	31.000M	29.1	-28.0 +0.3 +0.0	+15.4 +0.1 +0.0	+5.9 +0.0 +0.0	+0.3 +0.0 +0.0	+0.0	23.1	40.0	-16.9	Horiz
4	341.400M	29.8	-27.2 +1.1 +0.0	+14.7 +0.2 +0.0	+5.9 +0.0 +0.0	+0.9 +0.0 +0.0	+0.0	25.4	46.0	-20.6	Horiz
5	4879.975M Ave	26.6	+0.0 +0.0 -33.4	+0.0 +0.5 +32.4	+0.0 +0.0 +1.6	+0.0 +4.2 +0.3	+0.0	32.2	54.0	-21.8	Horiz
^	4879.975M	46.8	+0.0 +0.0 -33.4	+0.0 +0.5 +32.4	+0.0 +0.0 +1.6	+0.0 +4.2 +0.3	+0.0	52.4	54.0	-1.6	Horiz
7	4900.000M Ave	24.8	+0.0 +0.0 -33.4	+0.0 +0.5 +32.5	+0.0 +0.0 +1.6	+0.0 +4.2 +0.3	+0.0	30.5	54.0	-23.5	Horiz
^	4900.000M	47.1	+0.0 +0.0 -33.4	+0.0 +0.5 +32.5	+0.0 +0.0 +1.6	+0.0 +4.2 +0.3	+0.0	52.8	54.0	-1.2	Horiz

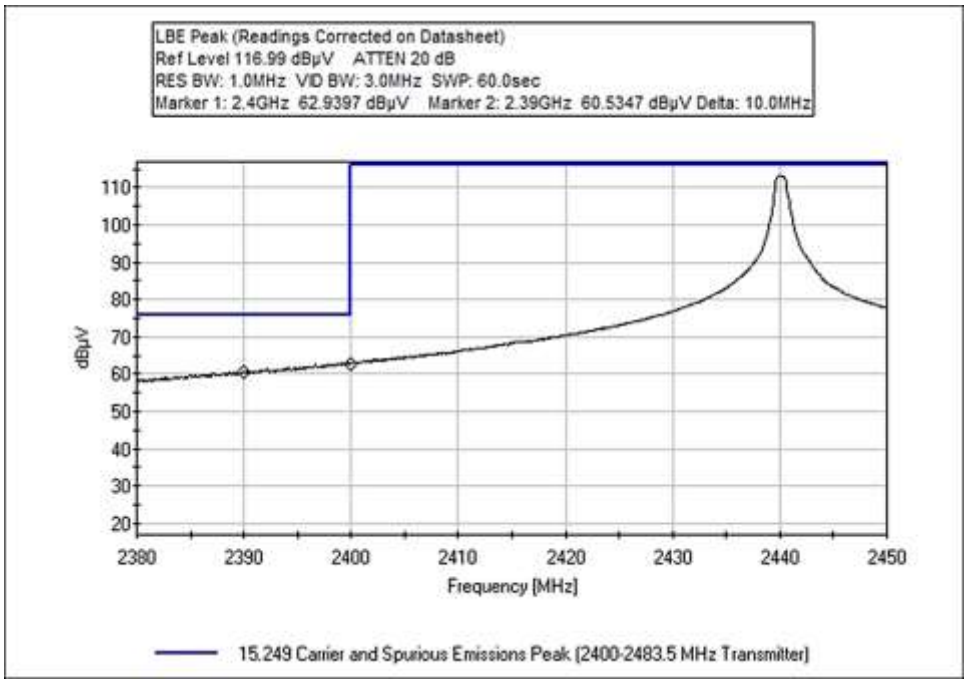
9	4920.000M	24.3	+0.0	+0.0	+0.0	+0.0	+0.0	29.9	54.0	-24.1	Horiz
	Ave		+0.0	+0.5	+0.0	+4.2					
			-33.4	+32.5	+1.6	+0.2					
^	4920.000M	47.7	+0.0	+0.0	+0.0	+0.0	+0.0	53.3	54.0	-0.7	Horiz
			+0.0	+0.5	+0.0	+4.2					
			-33.4	+32.5	+1.6	+0.2					
11	90.100M	30.3	-27.8	+6.9	+5.9	+0.5	+0.0	16.4	43.5	-27.1	Horiz
			+0.5	+0.1	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
12	137.700M	28.1	-27.6	+8.0	+5.9	+0.6	+0.0	15.9	43.5	-27.6	Horiz
			+0.7	+0.2	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
13	1.374M	26.8	+0.0	+0.0	+0.0	+0.0	-40.0	-3.3	24.8	-28.1	Para
			+0.0	+0.0	+9.8	+0.1					
			+0.0	+0.0	+0.0	+0.0					
14	3.822M	18.4	+0.0	+0.0	+0.0	+0.0	-40.0	-11.9	29.5	-41.4	Para
			+0.0	+0.0	+9.6	+0.1					
			+0.0	+0.0	+0.0	+0.0					
15	15.075M	14.6	+0.0	+0.0	+0.0	+0.0	-40.0	-16.1	29.5	-45.6	Para
			+0.0	+0.0	+9.1	+0.2					
			+0.0	+0.0	+0.0	+0.0					
16	29.104M	16.3	+0.0	+0.0	+0.0	+0.0	-40.0	-17.5	29.5	-47.0	Para
			+0.0	+0.1	+5.8	+0.3					
			+0.0	+0.0	+0.0	+0.0					
17	21.045M	14.2	+0.0	+0.0	+0.0	+0.0	-40.0	-17.8	29.5	-47.3	Perp
			+0.0	+0.0	+7.8	+0.2					
			+0.0	+0.0	+0.0	+0.0					
18	150.000k	46.9	+0.0	+0.0	+0.0	+0.0	-80.0	-23.4	24.1	-47.5	Para
			+0.0	+0.0	+9.7	+0.0					
			+0.0	+0.0	+0.0	+0.0					
19	98.701k	35.6	+0.0	+0.0	+0.0	+0.0	-80.0	-34.7	27.7	-62.4	Perp
			+0.0	+0.0	+9.7	+0.0					
			+0.0	+0.0	+0.0	+0.0					
20	45.993k	41.4	+0.0	+0.0	+0.0	+0.0	-80.0	-28.3	34.3	-62.6	Para
			+0.0	+0.0	+10.3	+0.0					
			+0.0	+0.0	+0.0	+0.0					
21	13.280k	46.3	+0.0	+0.0	+0.0	+0.0	-80.0	-20.5	45.1	-65.6	Perp
			+0.0	+0.0	+13.2	+0.0					
			+0.0	+0.0	+0.0	+0.0					

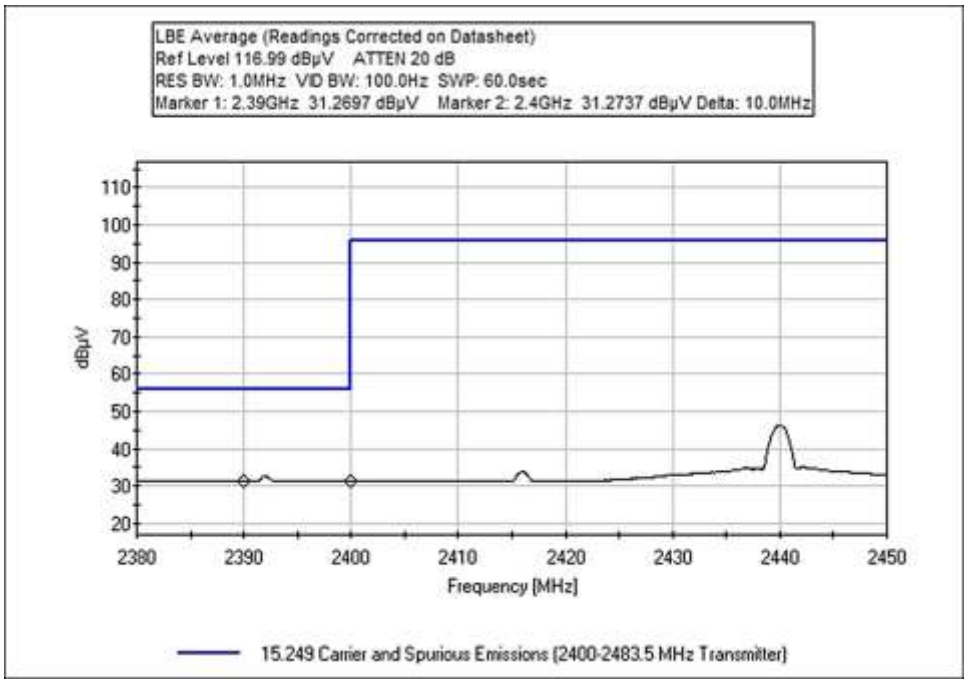
Band Edge

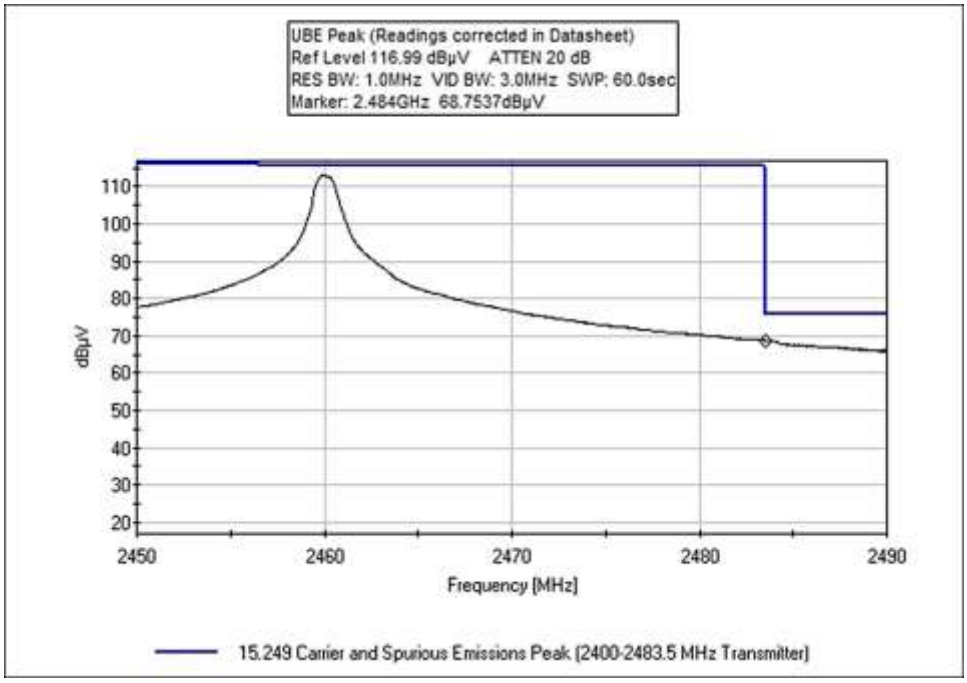
Band Edge Summary					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
2400	OOK	Integral	29.3	<54	Pass
2483.5	OOK	Integral	31.7	<54	Pass

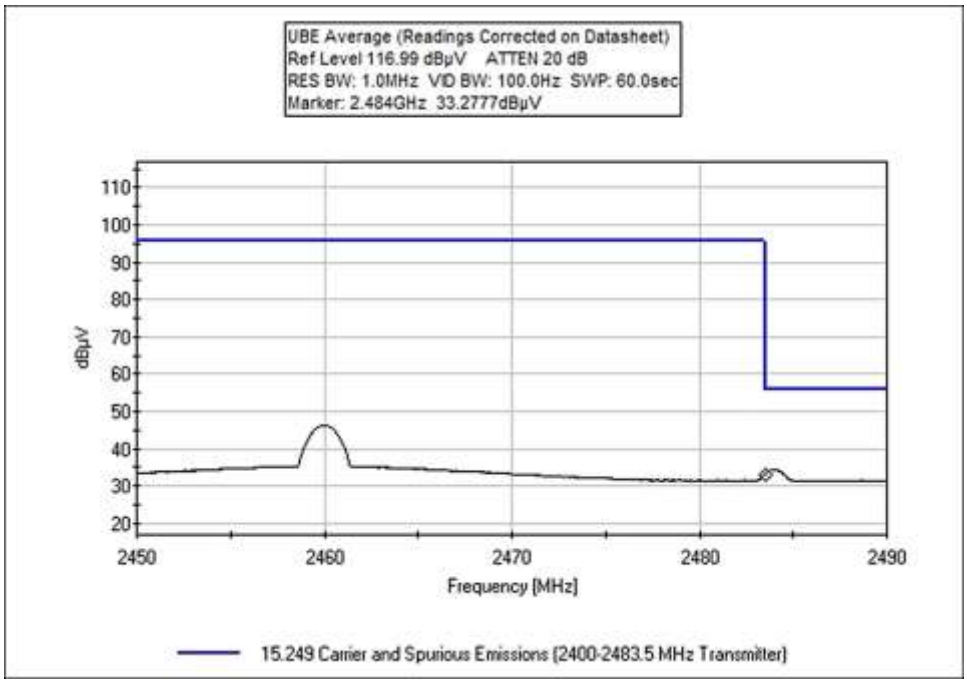
Test performed using operational mode with the highest output power, representing worst case

Band Edge Plots






UBE Peak (Readings corrected in Datasheet)
Ref Level 116.99 dBµV ATTEN 20 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 60.0sec
Marker: 2.484GHz 68.7537dBµV
dBµV
110
100
90
80
70
60
50
40
30
20
2450
2460
2470
2480
2490
Frequency [MHz]
15.249 Carrier and Spurious Emissions Peak (2400-2483.5 MHz Transmitter)


UBE Average (Readings Corrected on Datasheet)
Ref Level 116.99 dBµV ATTEN 20 dB
RES BW: 1.0MHz VID BW: 100.0Hz SWP: 60.0sec
Marker: 2.484GHz 33.2777dBµV
dBµV
110
100
90
80
70
60
50
40
30
20
2450
2460
2470
2480
2490
Frequency [MHz]
15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter)

Test Setup / Conditions / Data

Test Location:	CKC Labs • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Ossia, Inc.**		
Specification:	**15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter)**		
Work Order #:	**102446**	Date:	4/6/2019
Test Type:	**Radiated Scan**	Time:	13:40:50
Tested By:	Matthew Harrison	Sequence#:	13
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Atmospheric Pressure: 101.8kPa
Temperature: 20°C
Relative Humidity: 35%
Frequency: 2390-2483.5MHz

Test Method: ANSI 63.10 (2013)

The EUT is investigated in Low, Middle, and High Channels, X, Y, & Z Axis with only the worst case reported.
Vertical and Horizontal polarities investigated

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02307	Preamp	8447D	1/15/2018	1/15/2020
	AN03628	Biconilog Antenna	3142E	6/7/2017	6/7/2019
	ANP06123	Attenuator	18N-6	5/5/2017	5/5/2019
	ANP05305	Cable	ETSI-50T	10/24/2017	10/24/2019
	ANP05360	Cable	RG214	1/31/2018	1/31/2020
T1	ANP06540	Cable	Heliax	10/30/2017	10/30/2019
T2	AN02871	Spectrum Analyzer	E4440A	1/9/2019	1/9/2021
	AN00052	Loop Antenna	6502	5/7/2018	5/7/2020
T3	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T4	AN03540	Preamp	83017A	3/25/2019	3/25/2021
T5	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	7/21/2017	7/21/2019
T6	ANP06503	Cable	32026-29801-29801-36	3/13/2018	3/13/2020

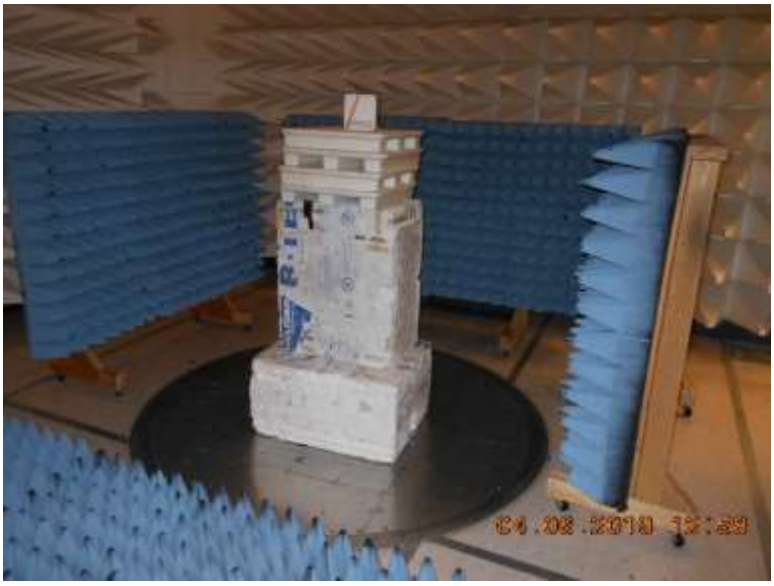
Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2483.500M	33.6	+0.4	+0.0	+2.7	-34.1	+0.0	31.7	54.0	-22.3	Vert
	Ave		+28.1	+1.0							
^	2483.500M	68.8	+0.4	+0.0	+2.7	-34.1	+0.0	66.9	74.0	-7.1	Vert
			+28.1	+1.0							
3	2400.000M	31.3	+0.4	+0.0	+2.6	-34.1	+0.0	29.3	54.0	-24.7	Vert
	Ave		+28.1	+1.0							
^	2400.000M	62.9	+0.4	+0.0	+2.6	-34.1	+0.0	60.9	74.0	-13.1	Vert
			+28.1	+1.0							
5	2390.000M	31.3	+0.4	+0.0	+2.6	-34.1	+0.0	29.3	54.0	-24.7	Vert
	Ave		+28.1	+1.0							
^	2390.000M	60.2	+0.4	+0.0	+2.6	-34.1	+0.0	58.2	74.0	-15.8	Vert
			+28.1	+1.0							

Test Setup Photo(s)

Below 1GHz

Below 1GHz



Above 1GHz

Above 1GHz

X-Axis

Y-Axis


OSB
Thoroughly Tested
MOLD RESISTANT
RIGID INSULATION
04.05.2010 12:50

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

Uncertainties reported are worst case for all CKC Laboratories' sites and 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. Individual measurements were compared with the displayed limit value in the margin column. The margin was calculated based on subtracting the limit value from the corrected measurement value; a positive margin represents a measurement exceeding the limit, while a negative margin represents a measurement less than the limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB/m)
+	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 caret ("^") 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.