Enlighted, Inc.

ADDENDUM TO EMC TEST REPORT 96813-12

Compact Sensor
Model: CS-D2

Tested To The Following Standards:

FCC Part 15 Subpart C Section(s)
15.207 & 15.247
(DTS 2400-2483.5 MHz)

Report No.: 96813-12A

Date of issue: August 19, 2015

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.

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Testing the Future
CKC LABORATORIES, INC.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Enlighted, Inc.
930 Benecia Ave.
Sunnyvale, CA 94085

Representative: Deepak Kumar
Customer Reference Number: 0002183

REPORT PREPARED BY:

Joyce Walker
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 96813

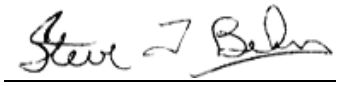
DATE OF EQUIPMENT RECEIPT: June 25, 2015
DATE(S) OF TESTING: June 25 - July 2, 2015

Revision History

Original: Testing of the Compact Sensor, Model, CS-D2 to FCC Part 15 Subpart C Section(s) 15.207 & 15.247 (DTS 2400-2483.5 MHz).
Addendum A: A statement in Test Notes was added for clarification for compliance to 15.31(e).

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.
1120 Fulton Place
Fremont, CA 94539

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.02.00
EMITest Immunity	5.02.00

Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Fremont	US0082	SL2-IN-E-1148R	3082B-1	958979	A-0149

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C

Test Procedure	Description	Modifications*	Results
15.31e	Voltage Variations	NA	Pass
15.207	AC Conducted Emissions	NA	Pass
15.247(a)(2)	6dB Bandwidth	NA	Pass
15.247(b)(3)	Output Power	NA	Pass
15.247(e)	Power Spectral Density	NA	Pass
15.247(d)	RF Conducted Emissions & Band Edge	NA	NA
15.247(d)	Radiated Emissions & Band Edge	NA	Pass

NA = Not applicable.

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 2

Equipment Tested:

Device	Manufacturer	Model #	S/N
Compact Sensor	Enlighted, Inc.	CS-D2	03

Support Equipment:

Device	Manufacturer	Model #	S/N
AC/DC Power Adapter for EUT	Enercell	273-332	None
Laptop	Dell	E5450	36810358094
AC/ DC Adaptor for Laptop	Dell	HA65NM130	CN-06TFFF-75661-53L-01ZO-A01
Cebal Controller Devices	Texas Instruments	CC Debugger	None
Communication Board	ATMEL	None	None

FCC PART 15 SUBPART C

15.31e Voltage Variations

Test Data

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
Customer: **Enlighted, Inc.**
Specification: **15.31e**
Work Order #: **96813** Date: 6/26/2015
Test Type: **Radiated Measurement** Time: 09:59:39
Tested By: Hieu Song Nguyenpham Sequence#: 2
Software: EMITest 5.02.00

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5	3115	1/23/2013	1/23/2015
T2	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

15.31e set up
Application: Putty version 0.64 for ZigBee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C, Relative Humidity: 39 %, Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for ZigBee= 0dBi
The EUT is a Compact Sensor. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note: BLE on TX Mode
15.31(e): the RF output power was not changed when adjusting the voltage to 10.2VDC (-15%) and up to 16.1 (+ 15%) of the voltage range 12VDC to 14VDC.

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.31e**		
Work Order #:	**96813**	Date:	6/26/2015
Test Type:	**Radiated Measurement**	Time:	09:59:39
Tested By:	Hieu Song Nguyenpham	Sequence#:	2
Software:	EMITest 5.02.00		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5	3115	1/23/2013	1/23/2015
T2	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

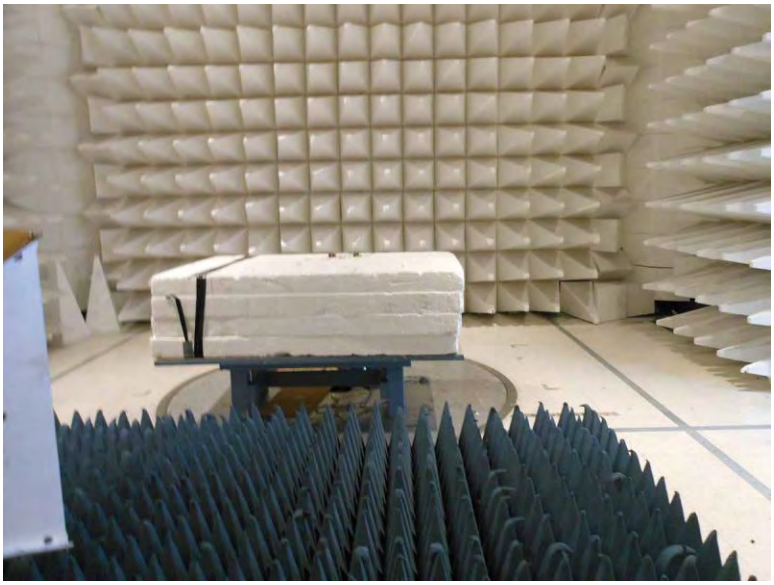
15.31e set up

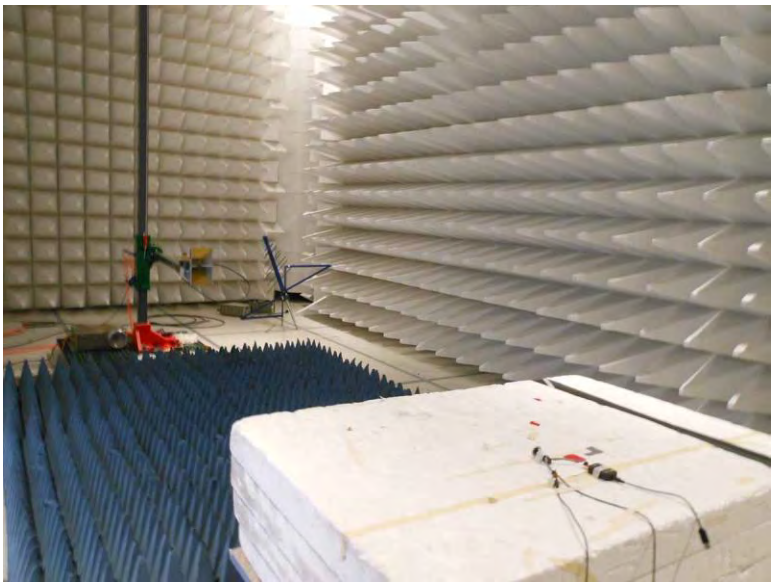
Application: Putty version 0.64 for ZigBee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for ZigBee= 0dBi
The EUT is a Compact Sensor. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note: Zigbee on TX Mode

15.31(e): the RF output power was not changed when adjusting the voltage to 10.2VDC (-15%) and up to 16.1 (+ 15%) of the voltage range 12VDC to 14VDC.

Test Setup Photo(s)





15.207 AC Conducted Emissions

Test Data

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**96813**	Date:	6/25/2015
Test Type:	**Conducted Emissions**	Time:	2:10:57 PM
Tested By:	Hieu Song Nguyenpham	Sequence#:	19
Software:	EMITest 5.02.00		120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

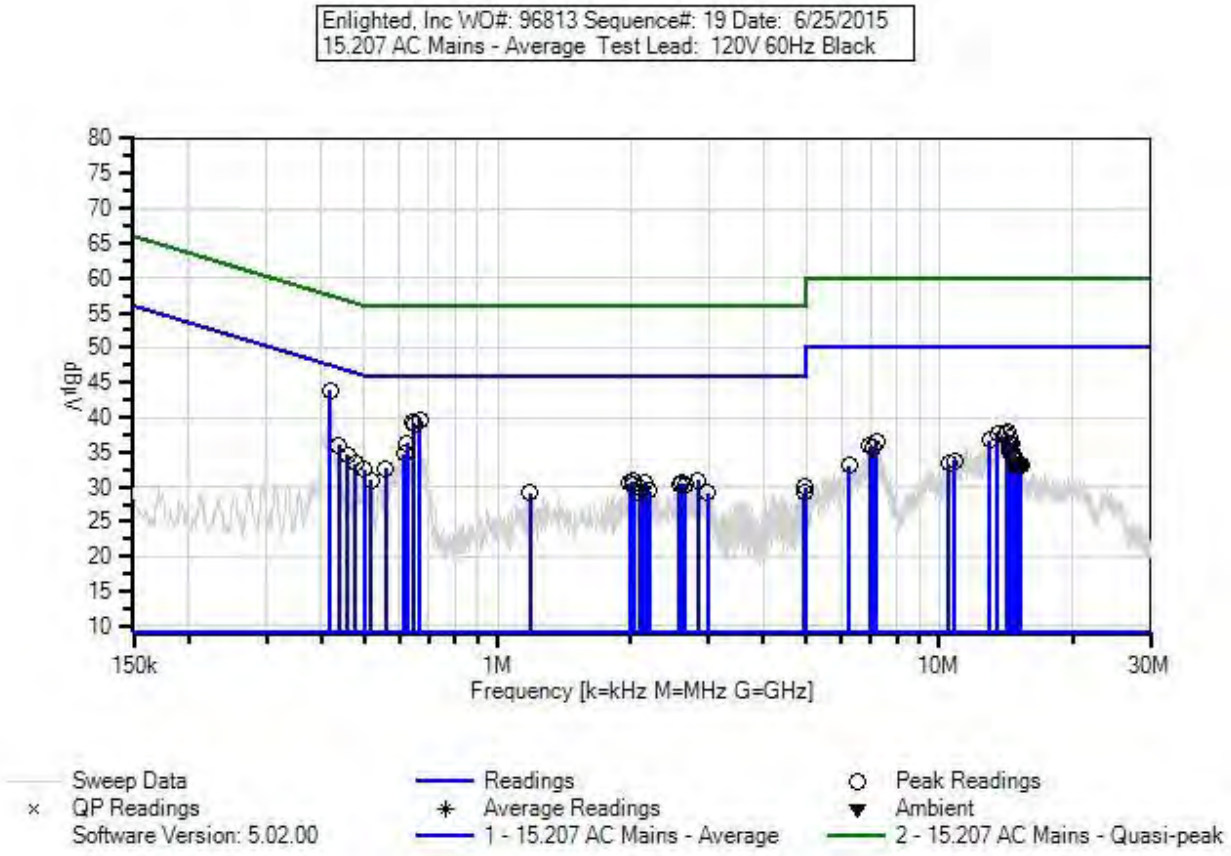
Test Conditions / Notes:

Conducted Emission
Frequency Range: 150kHz to 30MHz

Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: ANSI C 63.4 2009

The EUT is a Compact Sensor. It is powered by AC/DC adapter which sits next to it. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note: Bluetooth was transmitted on Middle channel constantly.


Enlighted, Inc WO#: 96813 Sequence#: 19 Date: 6/25/2015
15.207 AC Mains - Average Test Lead: 120V 60Hz Black
dBµV
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
150k
1M
10M
30M
Frequency [k=kHz M=MHz G=GHz]
Sweep Data
QP Readings
Software Version: 5.02.00
Readings
Average Readings
1 - 15.207 AC Mains - Average
Peak Readings
Ambient
2 - 15.207 AC Mains - Quasi-peak

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	ANP01211	Attenuator	23-10-34	3/31/2015	3/31/2017
T2	ANP00880	Cable	RG214U	6/13/2014	6/13/2016
T3	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
T4	AN00493	50uH LISN-L1 (L) Loss W/O European Adapter	3816/NM	3/4/2015	3/4/2017
	AN00493	50uH LISN-L(2) N Loss W/O European Adapter	3816/NM	3/4/2015	3/4/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T5	ANP05258	High Pass Filter	HE9615-150K-50-720B	11/14/2014	11/14/2016

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	417.611k	33.7	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	43.8	47.5	-3.7	Black
2	667.043k	29.7	+9.8 +0.1	+0.0	+0.0	+0.1	+0.0	39.7	46.0	-6.3	Black
3	643.045k	29.3	+9.8 +0.1	+0.0	+0.0	+0.1	+0.0	39.3	46.0	-6.7	Black
4	645.954k	29.1	+9.8 +0.1	+0.0	+0.0	+0.1	+0.0	39.1	46.0	-6.9	Black
5	624.865k	26.2	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	36.3	46.0	-9.7	Black
6	437.246k	25.9	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	36.0	47.1	-11.1	Black
7	615.411k	24.7	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	34.8	46.0	-11.2	Black
8	457.608k	24.4	+9.9 +0.2	+0.0	+0.0	+0.1	+0.0	34.6	46.7	-12.1	Black
9	14.274M	27.3	+9.9 +0.2	+0.3	+0.1	+0.1	+0.0	37.9	50.0	-12.1	Black
10	13.571M	27.0	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	37.5	50.0	-12.5	Black
11	14.139M	27.0	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	37.5	50.0	-12.5	Black
12	14.391M	26.6	+9.9 +0.2	+0.3	+0.1	+0.1	+0.0	37.2	50.0	-12.8	Black
13	477.242k	23.2	+9.9 +0.2	+0.0	+0.0	+0.1	+0.0	33.4	46.4	-13.0	Black
14	12.977M	26.2	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	36.7	50.0	-13.3	Black

15	559.416k	22.5	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	32.6	46.0	-13.4	Black
16	498.331k	22.3	+9.9 +0.2	+0.0	+0.0	+0.1	+0.0	32.5	46.0	-13.5	Black
17	7.193M	26.2	+9.9 +0.1	+0.2	+0.0	+0.1	+0.0	36.5	50.0	-13.5	Black
18	14.364M	25.6	+9.9 +0.2	+0.3	+0.1	+0.1	+0.0	36.2	50.0	-13.8	Black
19	14.580M	25.6	+9.9 +0.2	+0.3	+0.1	+0.1	+0.0	36.2	50.0	-13.8	Black
20	6.968M	25.6	+9.9 +0.1	+0.2	+0.0	+0.1	+0.0	35.9	50.0	-14.1	Black
21	7.085M	25.5	+9.9 +0.1	+0.2	+0.0	+0.1	+0.0	35.8	50.0	-14.2	Black
22	14.463M	25.0	+9.9 +0.2	+0.3	+0.1	+0.1	+0.0	35.6	50.0	-14.4	Black
23	14.481M	24.5	+9.9 +0.2	+0.3	+0.1	+0.1	+0.0	35.1	50.0	-14.9	Black
24	518.693k	20.7	+9.9 +0.2	+0.0	+0.0	+0.1	+0.0	30.9	46.0	-15.1	Black
25	2.846M	20.7	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	30.9	46.0	-15.1	Black
26	2.017M	20.6	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	30.8	46.0	-15.2	Black
27	2.162M	20.4	+9.9 +0.2	+0.1	+0.0	+0.1	+0.0	30.7	46.0	-15.3	Black
28	1.996M	20.4	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	30.6	46.0	-15.4	Black
29	2.621M	20.4	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	30.6	46.0	-15.4	Black
30	2.578M	20.2	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	30.4	46.0	-15.6	Black
31	2.663M	20.2	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	30.4	46.0	-15.6	Black
32	14.761M	23.8	+9.9 +0.2	+0.3	+0.1	+0.1	+0.0	34.4	50.0	-15.6	Black
33	2.034M	20.1	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	30.3	46.0	-15.7	Black
34	4.964M	19.7	+9.9 +0.1	+0.2	+0.0	+0.1	+0.0	30.0	46.0	-16.0	Black
35	14.932M	23.4	+9.9 +0.2	+0.3	+0.1	+0.1	+0.0	34.0	50.0	-16.0	Black
36	14.661M	23.3	+9.9 +0.2	+0.3	+0.1	+0.1	+0.0	33.9	50.0	-16.1	Black
37	2.119M	19.5	+9.9 +0.2	+0.1	+0.0	+0.1	+0.0	29.8	46.0	-16.2	Black
38	10.815M	23.3	+9.9 +0.2	+0.2	+0.0	+0.1	+0.0	33.7	50.0	-16.3	Black
39	14.860M	23.0	+9.9 +0.2	+0.3	+0.1	+0.1	+0.0	33.6	50.0	-16.4	Black
40	2.200M	19.2	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	29.4	46.0	-16.6	Black

41	2.098M	19.0	+9.9 +0.2	+0.1	+0.0	+0.1	+0.0	29.3	46.0	-16.7	Black
42	10.517M	22.8	+9.9 +0.2	+0.2	+0.0	+0.2	+0.0	33.3	50.0	-16.7	Black
43	1.183M	19.0	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	29.2	46.0	-16.8	Black
44	4.947M	18.9	+9.9 +0.1	+0.2	+0.0	+0.1	+0.0	29.2	46.0	-16.8	Black
45	2.991M	18.9	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	29.1	46.0	-16.9	Black
46	14.824M	22.5	+9.9 +0.2	+0.3	+0.1	+0.1	+0.0	33.1	50.0	-16.9	Black
47	15.058M	22.4	+9.9 +0.2	+0.3	+0.1	+0.1	+0.0	33.0	50.0	-17.0	Black
48	6.238M	22.6	+9.9 +0.2	+0.2	+0.0	+0.1	+0.0	33.0	50.0	-17.0	Black
49	15.265M	22.5	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	33.0	50.0	-17.0	Black
50	15.112M	22.5	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	33.0	50.0	-17.0	Black

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**96813**	Date:	6/25/2015
Test Type:	**Conducted Emissions**	Time:	14:26:39
Tested By:	Hieu Song Nguyenpham	Sequence#:	20
Software:	EMITest 5.02.00		120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

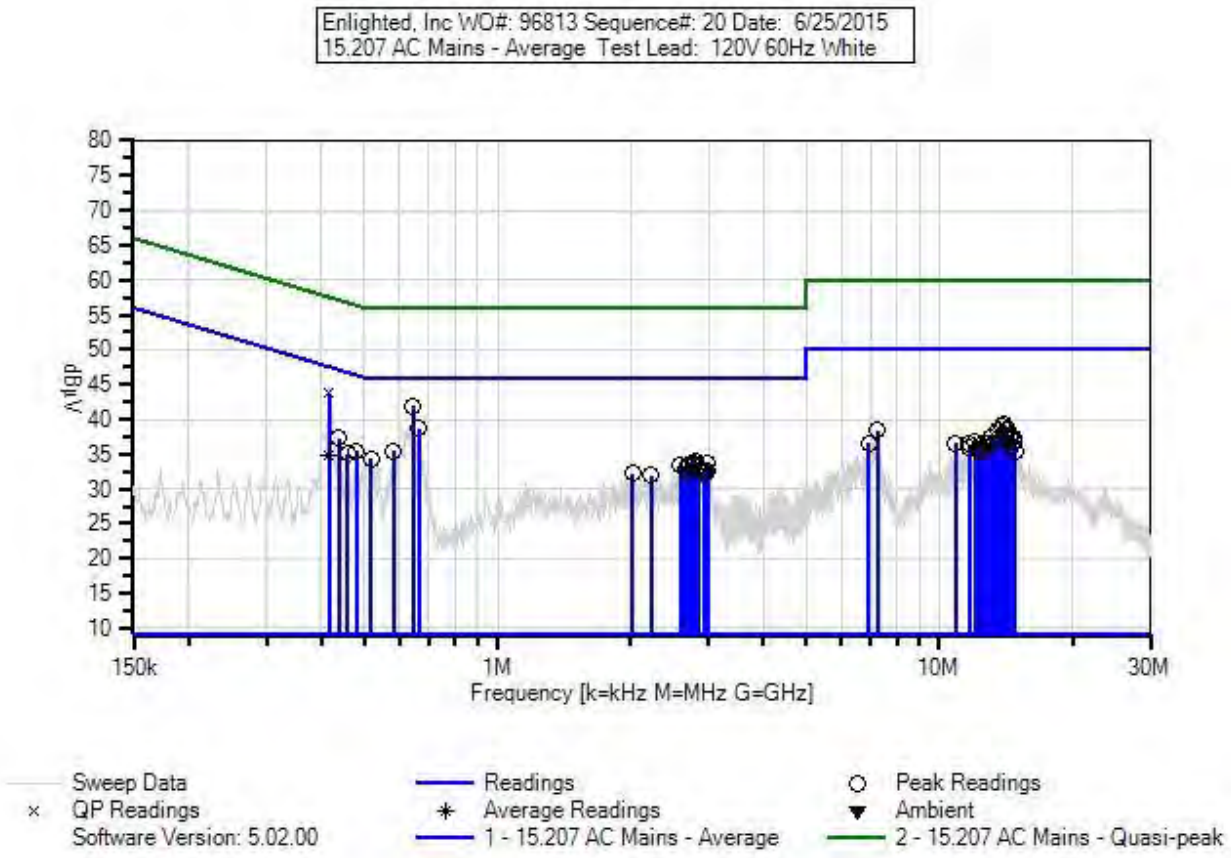
Test Conditions / Notes:

Conducted Emission
Frequency Range: 150kHz to 30MHz

Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: ANSI C 63.4 2009

The EUT is a Compact Sensor. It is powered by AC/DC adapter which sits next to it. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note: Bluetooth was transmitted on Middle channel constantly.


Enlighted, Inc WO#: 96813 Sequence#: 20 Date: 6/25/2015
15.207 AC Mains - Average Test Lead: 120V 60Hz White
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
dBµV
150k
1M
10M
30M
Frequency [k=kHz M=MHz G=GHz]
Sweep Data
QP Readings
Software Version: 5.02.00
Readings
Average Readings
1 - 15.207 AC Mains - Average
Peak Readings
Ambient
2 - 15.207 AC Mains - Quasi-peak

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	ANP01211	Attenuator	23-10-34	3/31/2015	3/31/2017
T2	ANP00880	Cable	RG214U	6/13/2014	6/13/2016
T3	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN00493	50uH LISN-L1 (L) Loss W/O European Adapter	3816/NM	3/4/2015	3/4/2017
T4	AN00493	50uH LISN-L(2) N Loss W/O European Adapter	3816/NM	3/4/2015	3/4/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T5	ANP05258	High Pass Filter	HE9615-150K-50-720B	11/14/2014	11/14/2016

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	642.318k	31.3	+9.8 +0.1	+0.0	+0.0	+0.7	+0.0	41.9	46.0	-4.1	White
2	663.407k	28.1	+9.8 +0.1	+0.0	+0.0	+0.7	+0.0	38.7	46.0	-7.3	White
3	437.246k	26.6	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	37.3	47.1	-9.8	White
4	580.505k	24.8	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	35.5	46.0	-10.5	White
5	14.013M	28.2	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	39.3	50.0	-10.7	White
6	478.697k	24.6	+9.9 +0.2	+0.0	+0.0	+0.7	+0.0	35.4	46.4	-11.0	White
7	13.824M	27.9	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	39.0	50.0	-11.0	White
8	14.139M	27.4	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	38.5	50.0	-11.5	White
9	14.238M	27.3	+9.9 +0.2	+0.3	+0.1	+0.7	+0.0	38.5	50.0	-11.5	White
10	7.229M	27.4	+9.9 +0.1	+0.2	+0.0	+0.8	+0.0	38.4	50.0	-11.6	White
11	13.508M	27.3	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	38.4	50.0	-11.6	White
12	457.608k	24.2	+9.9 +0.2	+0.0	+0.0	+0.7	+0.0	35.0	46.7	-11.7	White
13	517.966k	23.5	+9.9 +0.2	+0.0	+0.0	+0.7	+0.0	34.3	46.0	-11.7	White
14	2.808M	23.1	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	33.9	46.0	-12.1	White

15	2.765M	22.9	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	33.7	46.0	-12.3	White
16	14.067M	26.6	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	37.7	50.0	-12.3	White
17	2.991M	22.8	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	33.6	46.0	-12.4	White
18	14.409M	26.4	+9.9 +0.2	+0.3	+0.1	+0.7	+0.0	37.6	50.0	-12.4	White
19	2.723M	22.7	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	33.5	46.0	-12.5	White
20	2.782M	22.7	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	33.5	46.0	-12.5	White
21	14.490M	26.3	+9.9 +0.2	+0.3	+0.1	+0.7	+0.0	37.5	50.0	-12.5	White
22	14.193M	26.3	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	37.4	50.0	-12.6	White
23	14.652M	26.2	+9.9 +0.2	+0.3	+0.1	+0.7	+0.0	37.4	50.0	-12.6	White
24	2.706M	22.5	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	33.3	46.0	-12.7	White
25	13.040M	26.2	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	37.3	50.0	-12.7	White
26	2.600M	22.5	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	33.3	46.0	-12.7	White
27	416.045k Ave	24.0	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	34.7	47.5	-12.8	White
28	2.825M	22.4	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	33.2	46.0	-12.8	White
29	2.663M	22.1	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	32.9	46.0	-13.1	White
30	14.770M	25.5	+9.9 +0.2	+0.3	+0.1	+0.7	+0.0	36.7	50.0	-13.3	White
31	2.978M	21.9	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	32.7	46.0	-13.3	White
32	12.040M	25.6	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	36.7	50.0	-13.3	White
33	12.761M	25.5	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	36.6	50.0	-13.4	White
34	6.905M	25.6	+9.9 +0.1	+0.2	+0.0	+0.8	+0.0	36.6	50.0	-13.4	White
35	10.878M	25.5	+9.9 +0.2	+0.2	+0.0	+0.8	+0.0	36.6	50.0	-13.4	White
36	13.328M	25.5	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	36.6	50.0	-13.4	White
37	12.869M	25.5	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	36.6	50.0	-13.4	White
38	2.850M	21.7	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	32.5	46.0	-13.5	White
39	2.680M	21.6	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	32.4	46.0	-13.6	White
40	11.652M	25.3	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	36.4	50.0	-13.6	White

41	12.391M	25.2	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	36.3	50.0	-13.7	White
42	2.931M	21.5	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	32.3	46.0	-13.7	White
43	2.021M	21.4	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	32.2	46.0	-13.8	White
44	2.948M	21.4	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	32.2	46.0	-13.8	White
45	416.045k QP	33.0	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	43.7	57.5	-13.8	White
^	416.045k	34.2	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	44.9	47.5	-2.6	White
47	14.589M	24.9	+9.9 +0.2	+0.3	+0.1	+0.7	+0.0	36.1	50.0	-13.9	White
48	11.706M	24.9	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	36.0	50.0	-14.0	White
49	2.221M	21.1	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	31.9	46.0	-14.1	White
50	12.202M	24.6	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	35.7	50.0	-14.3	White
51	14.842M	24.3	+9.9 +0.2	+0.3	+0.1	+0.7	+0.0	35.5	50.0	-14.5	White
52	12.409M	24.4	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	35.5	50.0	-14.5	White

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**96813**	Date:	6/25/2015
Test Type:	**Conducted Emissions**	Time:	16:04:14
Tested By:	Hieu Song Nguyenpham	Sequence#:	31
Software:	EMITest 5.02.00		120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

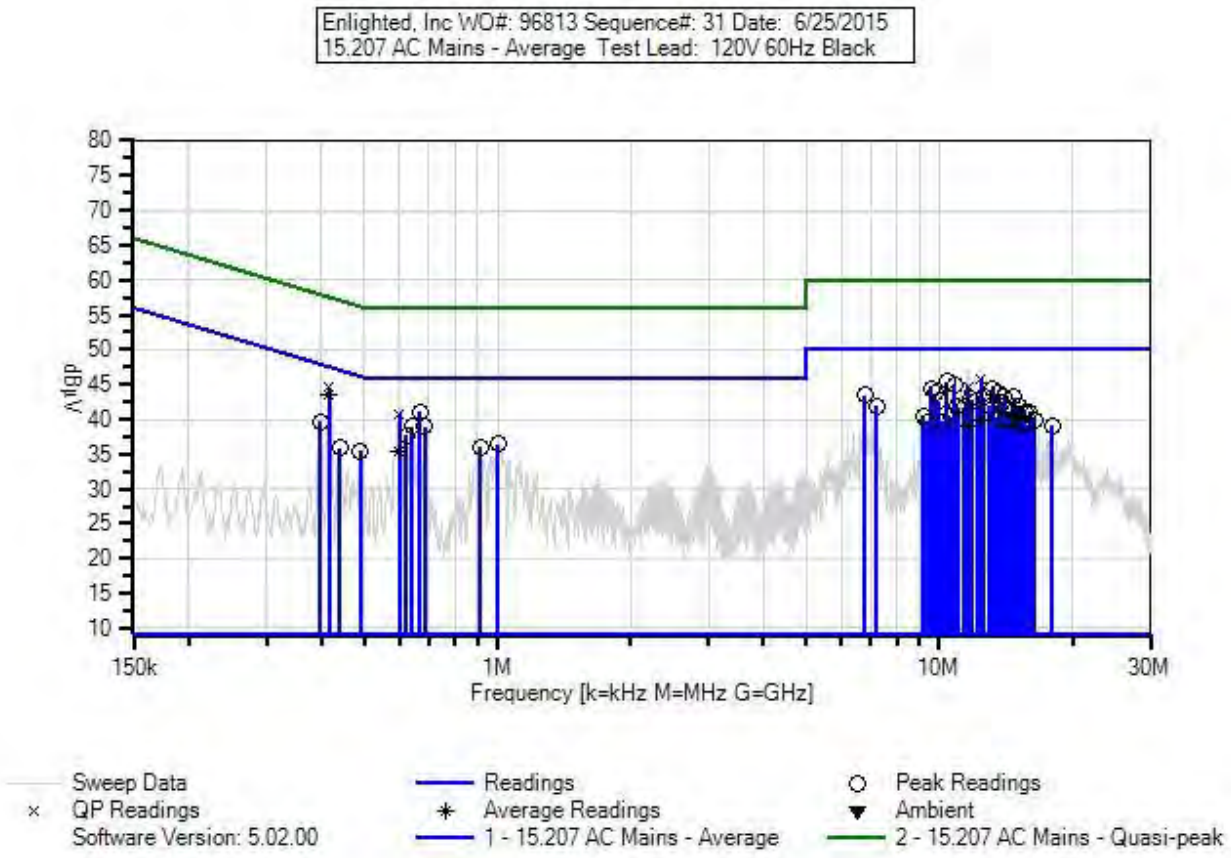
Test Conditions / Notes:

Conducted Emission
Frequency Range: 150kHz to 30MHz

Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: ANSI C 63.4

The EUT is a Compact Sensor. It is powered by AC/DC adapter which sits next to it. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note: Zigbee on TX


Enlighted, Inc WO#: 96813 Sequence#: 31 Date: 6/25/2015
15.207 AC Mains - Average Test Lead: 120V 60Hz Black
80
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15
10
dBµV
150k
1M
10M
30M
Frequency [k=kHz M=MHz G=GHz]
Sweep Data
QP Readings
Software Version: 5.02.00
Readings
Average Readings
1 - 15.207 AC Mains - Average
Peak Readings
Ambient
2 - 15.207 AC Mains - Quasi-peak

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	ANP01211	Attenuator	23-10-34	3/31/2015	3/31/2017
T2	ANP00880	Cable	RG214U	6/13/2014	6/13/2016
T3	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
T4	AN00493	50uH LISN-L1 (L) Loss W/O European Adapter	3816/NM	3/4/2015	3/4/2017
	AN00493	50uH LISN-L(2) N Loss W/O European Adapter	3816/NM	3/4/2015	3/4/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T5	ANP05258	High Pass Filter	HE9615-150K-50-720B	11/14/2014	11/14/2016

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	415.890k Ave	33.5	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	43.6	47.5	-3.9	Black
2	10.391M	34.9	+9.9 +0.2	+0.2	+0.0	+0.2	+0.0	45.4	50.0	-4.6	Black
3	665.588k	31.0	+9.8 +0.1	+0.0	+0.0	+0.1	+0.0	41.0	46.0	-5.0	Black
4	10.797M	34.6	+9.9 +0.2	+0.2	+0.0	+0.1	+0.0	45.0	50.0	-5.0	Black
5	9.598M	33.9	+9.9 +0.2	+0.2	+0.0	+0.2	+0.0	44.4	50.0	-5.6	Black
6	13.193M	33.9	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	44.4	50.0	-5.6	Black
7	13.589M	33.2	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	43.7	50.0	-6.3	Black
8	9.797M	33.2	+9.9 +0.2	+0.2	+0.0	+0.2	+0.0	43.7	50.0	-6.3	Black
9	6.797M	33.1	+9.9 +0.1	+0.2	+0.0	+0.1	+0.0	43.4	50.0	-6.6	Black
10	12.598M	32.7	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	43.2	50.0	-6.8	Black
11	14.797M	32.6	+9.9 +0.2	+0.3	+0.1	+0.1	+0.0	43.2	50.0	-6.8	Black
12	13.995M	32.6	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	43.1	50.0	-6.9	Black
13	641.590k	29.0	+9.8 +0.1	+0.0	+0.0	+0.1	+0.0	39.0	46.0	-7.0	Black
14	684.495k	28.9	+9.8 +0.1	+0.0	+0.0	+0.1	+0.0	38.9	46.0	-7.1	Black

15	11.797M	32.4	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	42.9	50.0	-7.1	Black
16	12.193M	32.3	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	42.8	50.0	-7.2	Black
17	9.995M	32.1	+9.9 +0.2	+0.2	+0.0	+0.2	+0.0	42.6	50.0	-7.4	Black
18	13.797M	31.9	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	42.4	50.0	-7.6	Black
19	7.193M	31.6	+9.9 +0.1	+0.2	+0.0	+0.1	+0.0	41.9	50.0	-8.1	Black
20	12.995M	31.4	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	41.9	50.0	-8.1	Black
21	15.193M	31.4	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	41.9	50.0	-8.1	Black
22	10.995M	31.3	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	41.8	50.0	-8.2	Black
23	11.391M	31.3	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	41.8	50.0	-8.2	Black
24	397.249k	29.5	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	39.6	47.9	-8.3	Black
25	621.228k	27.6	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	37.7	46.0	-8.3	Black
26	14.400M	30.6	+9.9 +0.2	+0.3	+0.1	+0.1	+0.0	41.2	50.0	-8.8	Black
27	15.995M	30.6	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	41.1	50.0	-8.9	Black
28	15.589M	30.5	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	41.0	50.0	-9.0	Black
29	14.995M	30.2	+9.9 +0.2	+0.3	+0.1	+0.1	+0.0	40.8	50.0	-9.2	Black
30	1.001M	26.2	+9.9 +0.2	+0.1	+0.0	+0.1	+0.0	36.5	46.0	-9.5	Black
31	9.193M	30.1	+9.9 +0.1	+0.2	+0.0	+0.2	+0.0	40.5	50.0	-9.5	Black
32	10.589M	29.9	+9.9 +0.2	+0.2	+0.0	+0.1	+0.0	40.3	50.0	-9.7	Black
33	13.391M	29.7	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	40.2	50.0	-9.8	Black
34	915.479k	25.8	+9.9 +0.1	+0.1	+0.0	+0.1	+0.0	36.0	46.0	-10.0	Black
35	12.396M Ave	29.5	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	40.0	50.0	-10.0	Black
36	14.589M	29.4	+9.9 +0.2	+0.3	+0.1	+0.1	+0.0	40.0	50.0	-10.0	Black
37	14.193M	29.5	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	40.0	50.0	-10.0	Black
38	16.391M	29.4	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	39.9	50.0	-10.1	Black
39	9.391M	29.2	+9.9 +0.1	+0.2	+0.0	+0.2	+0.0	39.6	50.0	-10.4	Black
40	10.193M	29.1	+9.9 +0.2	+0.2	+0.0	+0.2	+0.0	39.6	50.0	-10.4	Black

41	599.825k Ave	25.3	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	35.4	46.0	-10.6	Black
42	15.797M	28.8	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	39.3	50.0	-10.7	Black
43	489.604k	25.3	+9.9 +0.2	+0.0	+0.0	+0.1	+0.0	35.5	46.2	-10.7	Black
44	15.391M	28.7	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	39.2	50.0	-10.8	Black
45	11.597M Ave	28.6	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	39.1	50.0	-10.9	Black
46	17.995M	28.3	+9.9 +0.2	+0.3	+0.1	+0.3	+0.0	39.1	50.0	-10.9	Black
47	438.699k	25.8	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	35.9	47.1	-11.2	Black
48	415.890k QP	34.4	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	44.5	57.5	-13.0	Black
^	415.890k	35.0	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	45.1	47.5	-2.4	Black
50	12.396M QP	35.3	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	45.8	60.0	-14.2	Black
^	12.396M	38.0	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	48.5	50.0	-1.5	Black
52	599.825k QP	30.7	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	40.8	56.0	-15.2	Black
^	599.825k	33.6	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	43.7	46.0	-2.3	Black
54	11.597M QP	34.2	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	44.7	60.0	-15.3	Black
^	11.597M	36.8	+9.9 +0.2	+0.3	+0.0	+0.1	+0.0	47.3	50.0	-2.7	Black

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**96813**	Date:	6/25/2015
Test Type:	**Conducted Emissions**	Time:	16:13:24
Tested By:	Hieu Song Nguyenpham	Sequence#:	32
Software:	EMITest 5.02.00		120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

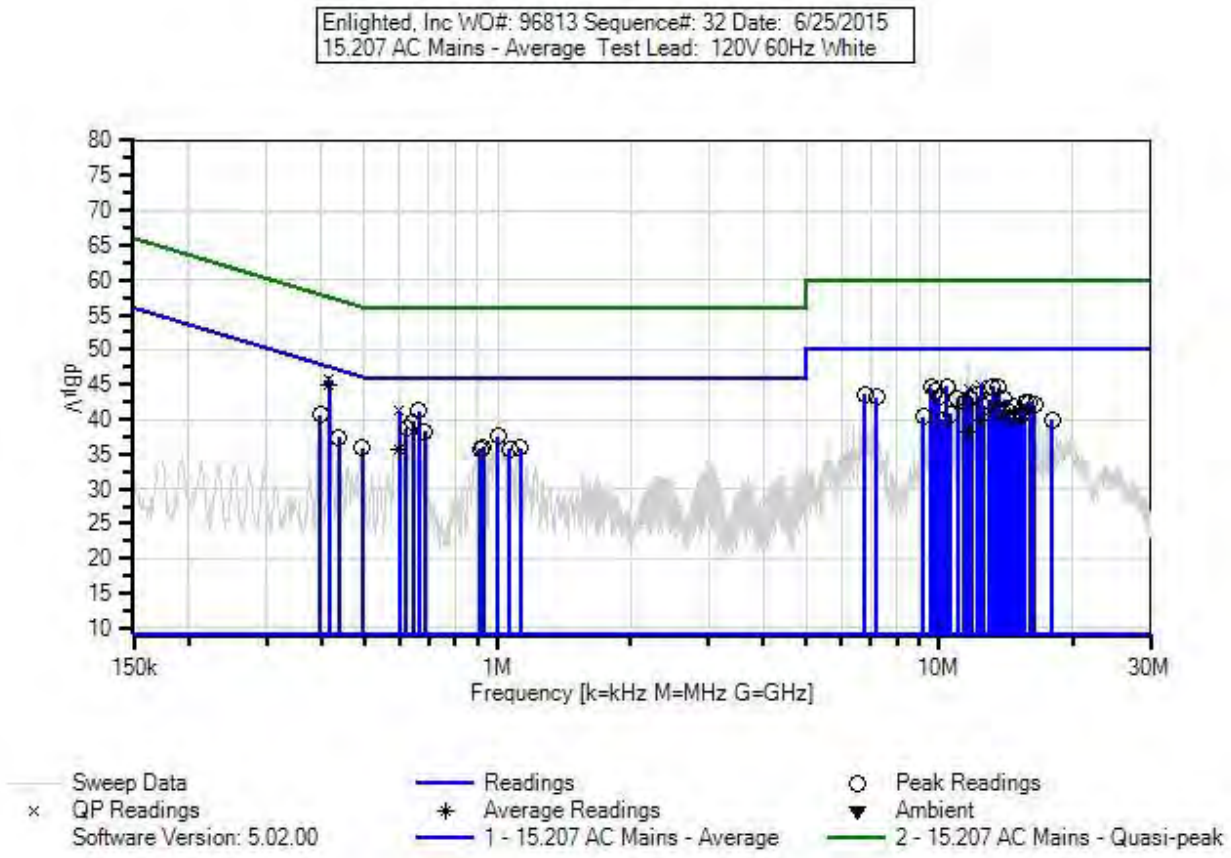
Test Conditions / Notes:

Conducted Emission
Frequency Range: 150kHz to 30MHz

Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: ANSI C 63.4

The EUT is a Compact Sensor. It is powered by AC/DC adapter which sits next to it. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note: Zigbee on TX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15.207 AC Mains - Average Test Lead: 120V 60Hz White
80
75
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45
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20
15
10
dBµV
150k
1M
10M
30M
Frequency [k=kHz M=MHz G=GHz]
Sweep Data
QP Readings
Software Version: 5.02.00
Readings
Average Readings
1 - 15.207 AC Mains - Average
Peak Readings
Ambient
2 - 15.207 AC Mains - Quasi-peak

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	ANP01211	Attenuator	23-10-34	3/31/2015	3/31/2017
T2	ANP00880	Cable	RG214U	6/13/2014	6/13/2016
T3	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN00493	50uH LISN-L1 (L) Loss W/O European Adapter	3816/NM	3/4/2015	3/4/2017
T4	AN00493	50uH LISN-L(2) N Loss W/O European Adapter	3816/NM	3/4/2015	3/4/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T5	ANP05258	High Pass Filter	HE9615-150K-50-720B	11/14/2014	11/14/2016

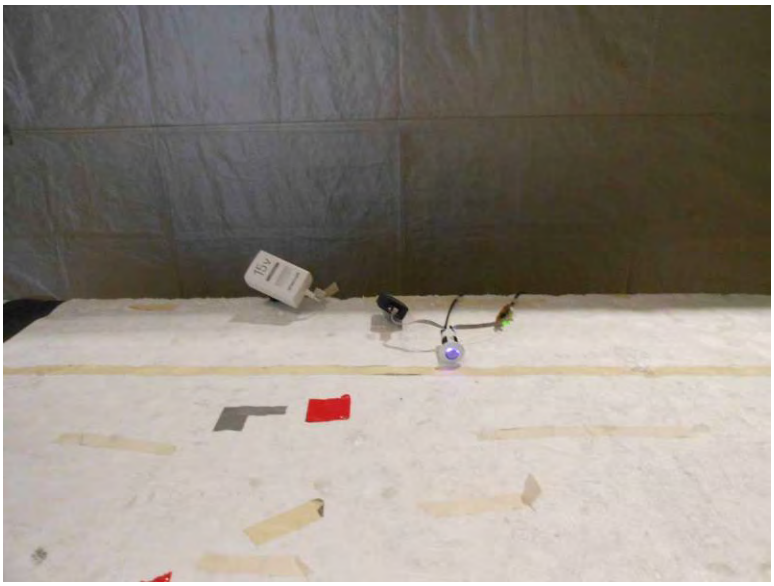
Measurement Data: Reading listed by margin. Test Lead: White

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	415.244k Ave	34.2	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	44.9	47.5	-2.6	White
2	664.860k	30.6	+9.8 +0.1	+0.0	+0.0	+0.7	+0.0	41.2	46.0	-4.8	White
3	13.193M	33.6	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	44.7	50.0	-5.3	White
4	10.400M	33.6	+9.9 +0.2	+0.2	+0.0	+0.8	+0.0	44.7	50.0	-5.3	White
5	9.598M	33.5	+9.9 +0.2	+0.2	+0.0	+0.8	+0.0	44.6	50.0	-5.4	White
6	13.589M	33.4	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	44.5	50.0	-5.5	White
7	9.797M	33.0	+9.9 +0.2	+0.2	+0.0	+0.8	+0.0	44.1	50.0	-5.9	White
8	643.771k	29.1	+9.8 +0.1	+0.0	+0.0	+0.7	+0.0	39.7	46.0	-6.3	White
9	6.797M	32.6	+9.9 +0.1	+0.2	+0.0	+0.8	+0.0	43.6	50.0	-6.4	White
10	12.193M	32.4	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	43.5	50.0	-6.5	White
11	7.193M	32.1	+9.9 +0.1	+0.2	+0.0	+0.8	+0.0	43.1	50.0	-6.9	White
12	9.995M	32.0	+9.9 +0.2	+0.2	+0.0	+0.8	+0.0	43.1	50.0	-6.9	White
13	10.995M	31.8	+9.9 +0.2	+0.3	+0.0	+0.8	+0.0	43.0	50.0	-7.0	White
14	11.797M	31.9	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	43.0	50.0	-7.0	White

15	13.995M	31.8	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	42.9	50.0	-7.1	White
16	397.249k	29.9	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	40.6	47.9	-7.3	White
17	620.501k	28.0	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	38.7	46.0	-7.3	White
18	15.995M	31.4	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	42.5	50.0	-7.5	White
19	11.391M	31.3	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	42.4	50.0	-7.6	White
20	12.995M	31.3	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	42.4	50.0	-7.6	White
21	683.040k	27.7	+9.8 +0.1	+0.0	+0.0	+0.7	+0.0	38.3	46.0	-7.7	White
22	15.598M	31.2	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	42.3	50.0	-7.7	White
23	16.391M	31.0	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	42.1	50.0	-7.9	White
24	12.589M	30.8	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	41.9	50.0	-8.1	White
25	14.797M	30.5	+9.9 +0.2	+0.3	+0.1	+0.7	+0.0	41.7	50.0	-8.3	White
26	1.001M	26.6	+9.9 +0.2	+0.1	+0.0	+0.7	+0.0	37.5	46.0	-8.5	White
27	13.391M	30.2	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	41.3	50.0	-8.7	White
28	13.788M	30.1	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	41.2	50.0	-8.8	White
29	14.391M	29.8	+9.9 +0.2	+0.3	+0.1	+0.7	+0.0	41.0	50.0	-9.0	White
30	15.193M	29.9	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	41.0	50.0	-9.0	White
31	10.598M	29.7	+9.9 +0.2	+0.2	+0.0	+0.8	+0.0	40.8	50.0	-9.2	White
32	15.391M	29.5	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	40.6	50.0	-9.4	White
33	437.972k	26.7	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	37.4	47.1	-9.7	White
34	9.193M	29.3	+9.9 +0.1	+0.2	+0.0	+0.8	+0.0	40.3	50.0	-9.7	White
35	14.995M	29.1	+9.9 +0.2	+0.3	+0.1	+0.7	+0.0	40.3	50.0	-9.7	White
36	14.589M	29.0	+9.9 +0.2	+0.3	+0.1	+0.7	+0.0	40.2	50.0	-9.8	White
37	12.395M Ave	28.9	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	40.0	50.0	-10.0	White
38	928.237k	25.2	+9.9 +0.1	+0.1	+0.0	+0.7	+0.0	36.0	46.0	-10.0	White
39	1.124M	25.1	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	35.9	46.0	-10.1	White
40	17.995M	28.6	+9.9 +0.2	+0.3	+0.1	+0.8	+0.0	39.9	50.0	-10.1	White

41	10.193M	28.8	+9.9 +0.2	+0.2	+0.0	+0.8	+0.0	39.9	50.0	-10.1	White
42	915.479k	25.0	+9.9 +0.1	+0.1	+0.0	+0.7	+0.0	35.8	46.0	-10.2	White
43	495.421k	25.1	+9.9 +0.2	+0.0	+0.0	+0.7	+0.0	35.9	46.1	-10.2	White
44	1.064M	24.9	+9.9 +0.2	+0.1	+0.0	+0.7	+0.0	35.8	46.0	-10.2	White
45	599.780k Ave	25.0	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	35.7	46.0	-10.3	White
46	415.244k QP	35.0	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	45.7	57.5	-11.8	White
^	415.244k	35.6	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	46.3	47.5	-1.2	White
48	11.595M Ave	27.0	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	38.1	50.0	-11.9	White
49	599.780k QP	30.5	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	41.2	56.0	-14.8	White
^	599.780k	33.7	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	44.4	46.0	-1.6	White
51	12.395M QP	33.8	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	44.9	60.0	-15.1	White
^	12.395M	37.5	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	48.6	50.0	-1.4	White
53	11.595M QP	33.1	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	44.2	60.0	-15.8	White
^	11.595M	35.3	+9.9 +0.2	+0.3	+0.0	+0.7	+0.0	46.4	50.0	-3.6	White

Test Setup Photo(s)



15.247(a)(2) 6dB Bandwidth

Test Conditions / Setup

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**OBW Set up**		
Work Order #:	**96813**	Date:	6/26/2015
Test Type:	**Radiated Measurement**	Time:	09:59:39
Tested By:	Hieu Song Nguyenpham	Sequence#:	2
Software:	EMITest 5.02.00		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5	3115	1/23/2013	1/23/2015
T2	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

OBW set up
Application: Putty version 0.64 for ZigBee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C, Relative Humidity: 39 %, Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for ZigBee= 0dBi
Method: KDB 558074 v03r02 section 8.1

RBW=100kHz
VBW=300kHz

The EUT is a Compact Sensor. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note: BLE on TX Mode

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**OBW Set up**		
Work Order #:	**96813**	Date:	6/26/2015
Test Type:	**Radiated Measurement**	Time:	09:59:39
Tested By:	Hieu Song Nguyenpham	Sequence#:	2
Software:	EMITest 5.02.00		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5	3115	1/23/2013	1/23/2015
T2	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

OBW set up

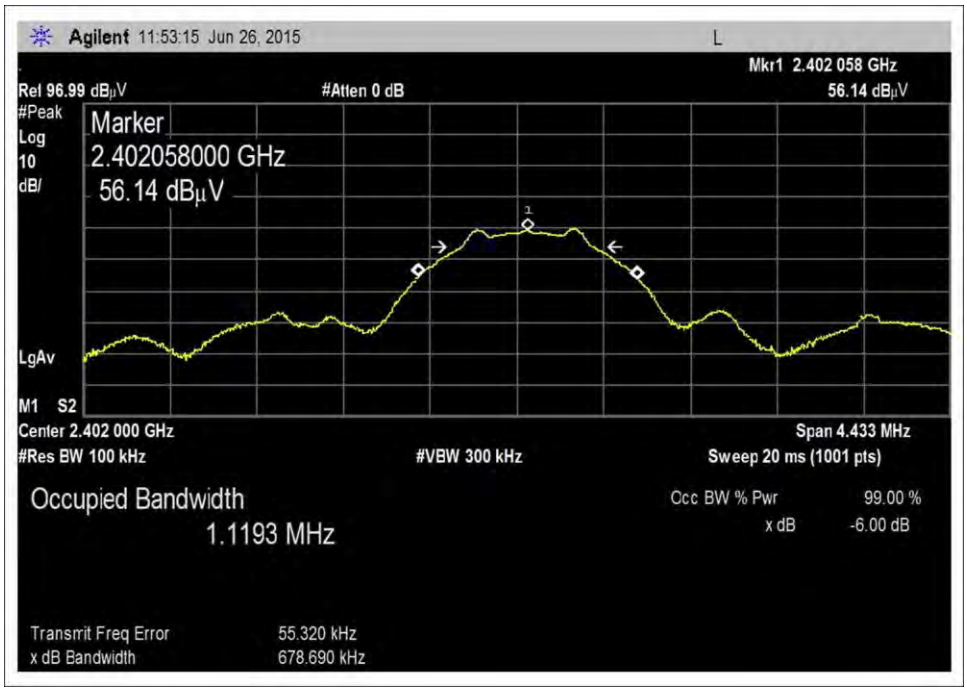
Application: Putty version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for ZigBee= 0dBi
Method: KDB 558074 v03r02 section 8.1

RBW=100kHz
VBW=300kHz

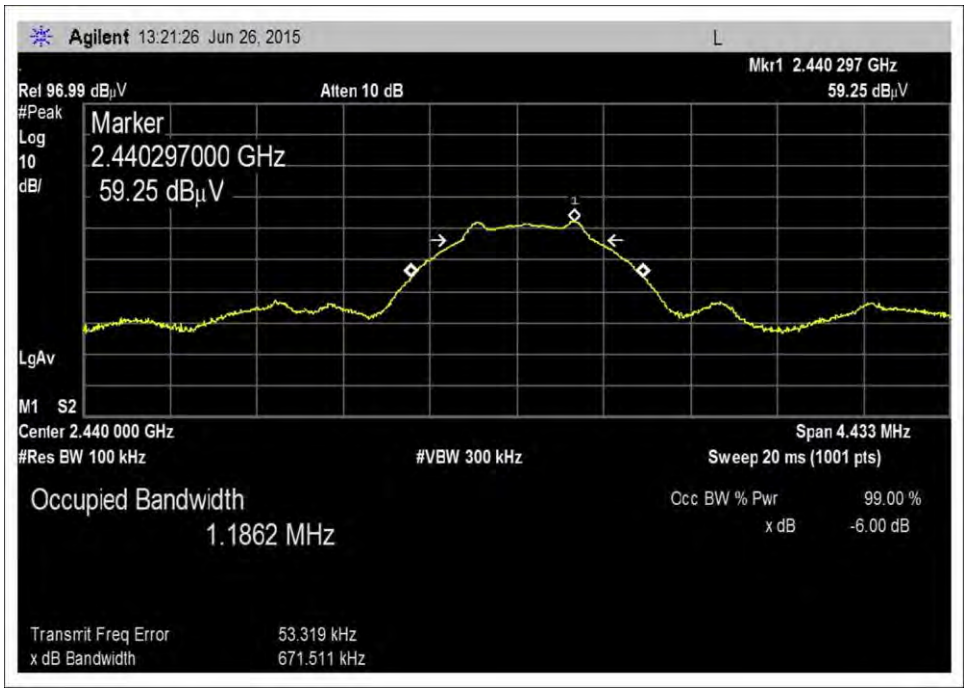
The EUT is a Compact Sensor. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note: Zigbee on TX Mode

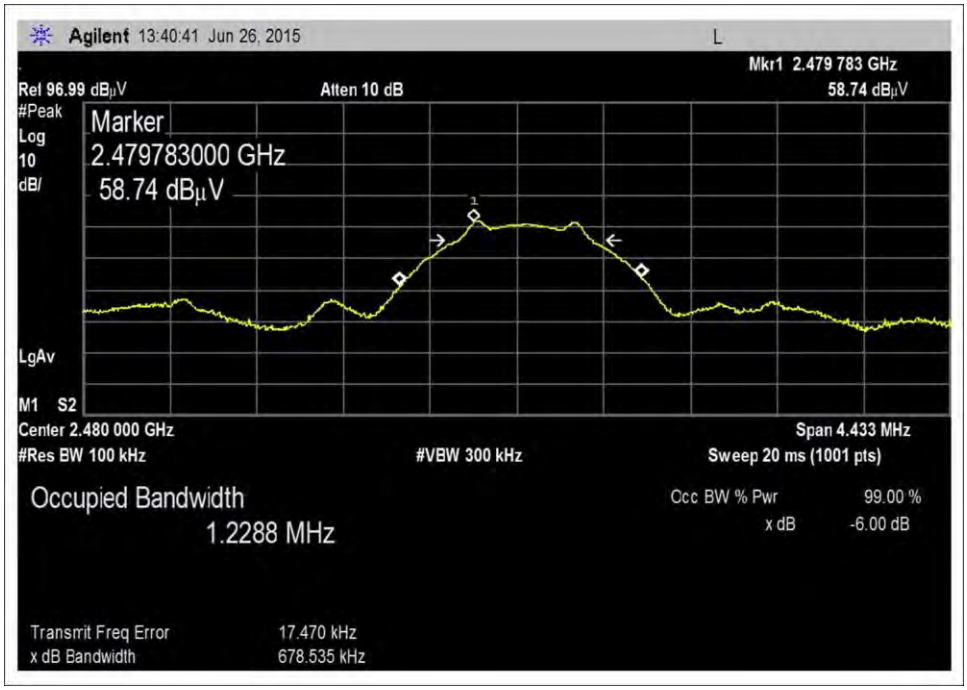
Test Data



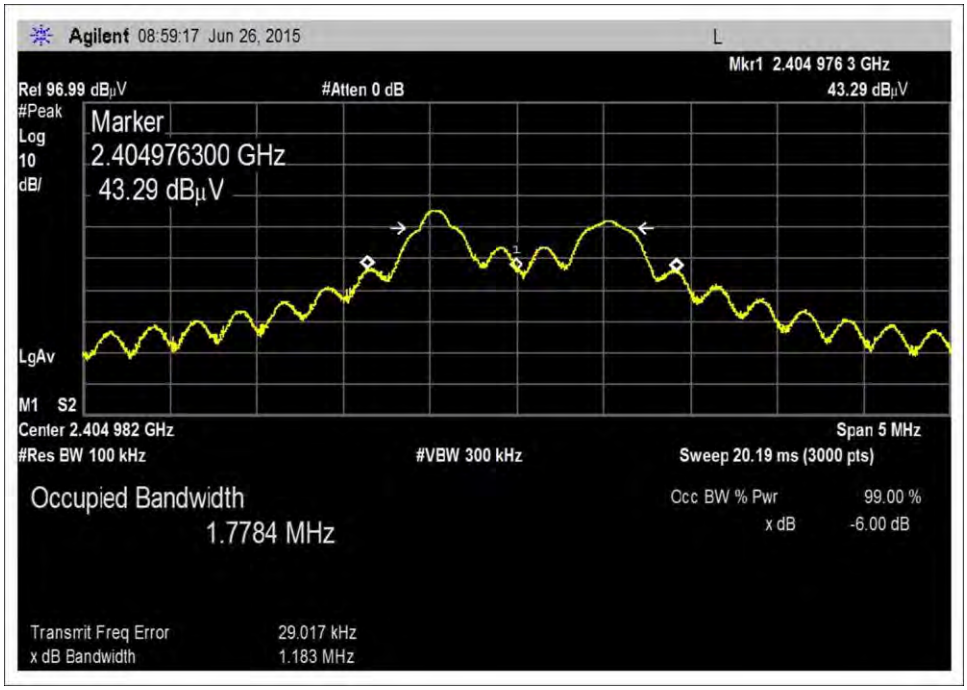
Low Channel, Bluetooth



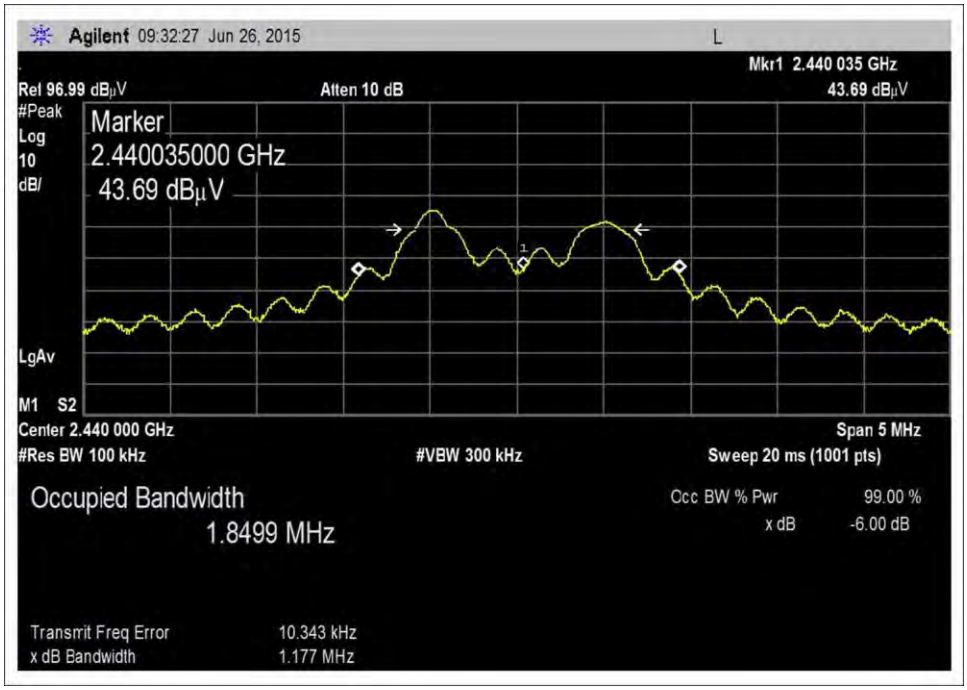
Middle Channel, Bluetooth



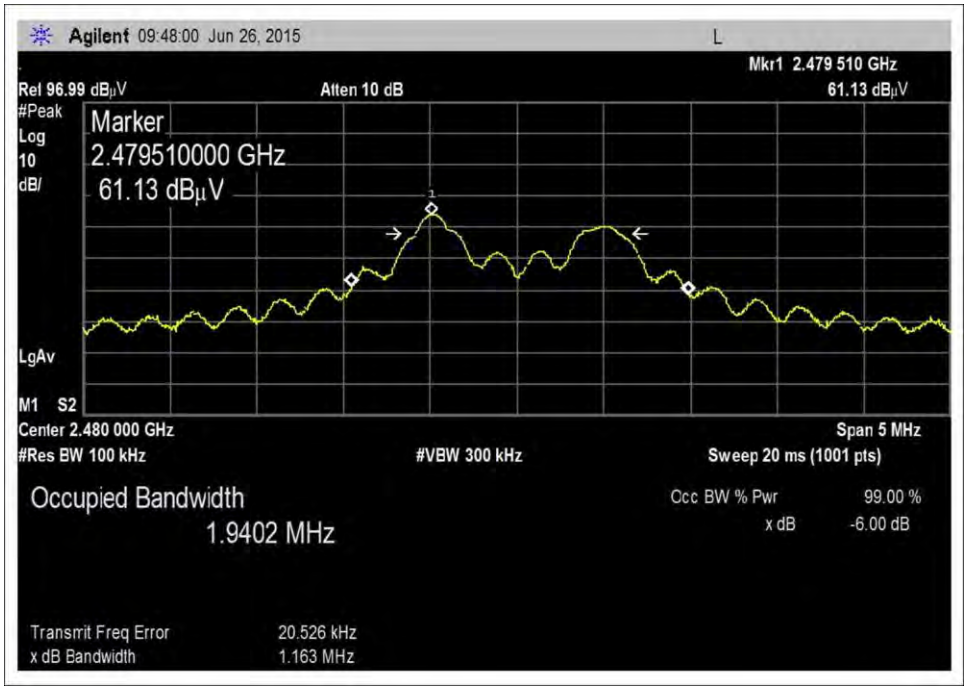
High Channel, Bluetooth



Low Channel, Zigbee

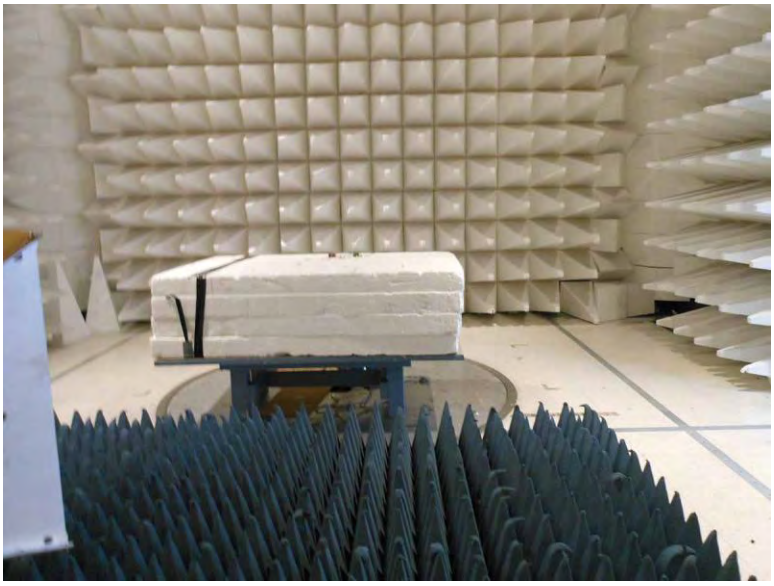


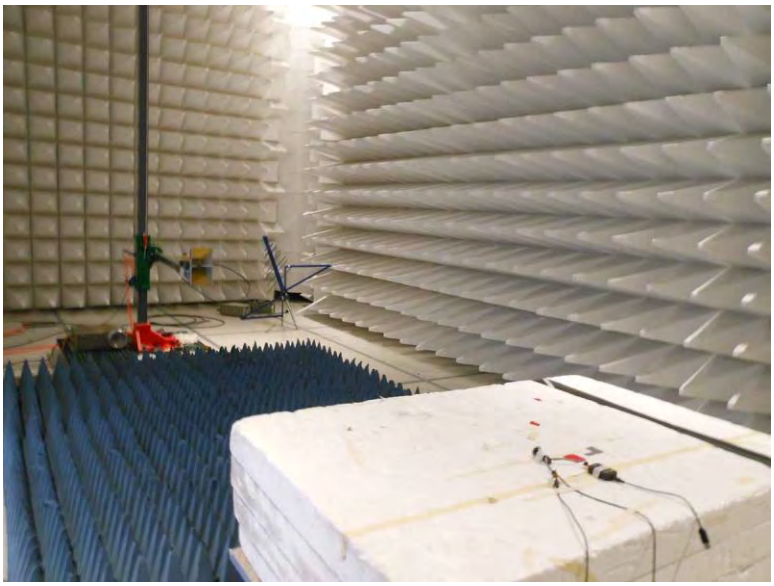
Middle Channel, Zigbee



High Channel, Zigbee

Test Setup Photo(s)





15.247(b)(3) Output Power

Test Data

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
Customer: **Enlighted, Inc.**
Specification: **15.247(b)(3) Output Power**
Work Order #: **96813** Date: 6/26/2015
Test Type: **Radiated Scan** Time: 13:49:13
Tested By: Hieu Song Nguyenpham Sequence#: 36
Software: EMITest 5.02.00

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Fundamental of the EUT

Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: 558074 D01 DTS Meas Guidance v03r02 section 9.1.1

RBW=3MHz
VBW=8MHz

The EUT is a Compact Sensor. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving. The EUT is ceiling-mounted equipment. There is only a requirement to measure two orthogonals.

Note:
BLE on TX
X axis- Direct to Antenna

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	2440.276M	60.2	+28.7	+1.2	+2.6		+0.0	92.7	125.2	-32.5	Horiz
2	2479.580M	59.9	+28.8	+1.2	+2.6		+0.0	92.5	125.2	-32.7	Horiz
3	2402.360M	57.6	+28.6	+1.2	+2.6		+0.0	90.0	125.2	-35.2	Horiz
4	2440.276M	54.2	+28.7	+1.2	+2.6		+0.0	86.7	125.2	-38.5	Vert
5	2479.580M	53.8	+28.8	+1.2	+2.6		+0.0	86.4	125.2	-38.8	Vert
6	2402.360M	49.2	+28.6	+1.2	+2.6		+0.0	81.6	125.2	-43.6	Vert

Convert equivalent electric field strength to the resultant power level

Frequency (MHz)	Measured Power in Watt	Power Limit in Watt	Pass/Fail
2402.360 Low Channel (Horizontal)	3.0000E-04	1.00	Pass
2402.360 Low Channel (Vertical)	4.3363E-05	1.00	Pass
2440.276 Middle Channel (Horizontal)	5.5863E-04	1.00	Pass
2440.276 Middle Channel (Vertical)	1.4032E-04	1.00	Pass
2479.580 High Channel (Horizontal)	5.3348E-04	1.00	Pass
2479.580 High Channel (Vertical)	1.3095E-04	1.00	Pass

A formula converts Radiated Method to Conducted Method

dBm (conducted power) = dBuV/m +20*LOG D -104.77 – Gain (dBi)

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.247(b)(3) Output Power**		
Work Order #:	**96813**	Date:	6/26/2015
Test Type:	**Radiated Scan**	Time:	11:21:51
Tested By:	Hieu Song Nguyenpham	Sequence#:	35
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Emission
Fundamental of the EUT

Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: 558074 D01 DTS Meas Guidance v03r02 section 9.1.1

RBW=3MHz
VBW=8MHz

The EUT is a Compact Sensor. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving. The EUT is ceiling-mounted equipment. There is only a requirement to measure two orthogonals.

Note:
BLE on TX
Y axis- Upward to Ceiling

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	2440.036M	57.2	+28.7	+1.2	+2.6		+0.0	89.7	125.2	-35.5	Vert
2	2440.036M	56.1	+28.7	+1.2	+2.6		+0.0	88.6	125.2	-36.6	Horiz
3	2479.784M	55.8	+28.8	+1.2	+2.6		+0.0	88.4	125.2	-36.8	Vert
4	2402.132M	55.9	+28.6	+1.2	+2.6		+0.0	88.3	125.2	-36.9	Vert
5	2479.784M	55.1	+28.8	+1.2	+2.6		+0.0	87.7	125.2	-37.5	Horiz
6	2402.132M	54.8	+28.6	+1.2	+2.6		+0.0	87.2	125.2	-38.0	Horiz

Convert equivalent electric field strength to the resultant power level

Frequency (MHz)	Measured Power in Watt	Power Limit in Watt	Pass/Fail
2402.132 Low Channel (Horizontal)	1.5744E-04	1.00	Pass
2402.132 Low Channel (Vertical)	2.0282E-04	1.00	Pass
2440.036 Middle Channel (Horizontal)	2.1733E-04	1.00	Pass
2440.036 Middle Channel (Vertical)	2.7998E-04	1.00	Pass
2479.784 High Channel (Horizontal)	1.7665E-04	1.00	Pass
2479.784 High Channel (Vertical)	2.0755E-04	1.00	Pass

A formula converts Radiated Method to Conducted Method

dBm (conducted power) = dBuV/m +20*LOG D -104.77 – Gain (dBi)

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.247(b)(3) Output Power**		
Work Order #:	**96813**	Date:	6/26/2015
Test Type:	**Radiated Scan**	Time:	09:58:09
Tested By:	Hieu Song Nguyenpham	Sequence#:	31
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Fundamental of the EUT

Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: 558074 D01 DTS Meas Guidance v03r02 section 9.1.1

RBW=3MHz
VBW=8MHz

The EUT is a Compact Sensor. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving. The EUT is ceiling-mounted equipment. There is only a requirement to measure two orthogonals.

Note:
Zigbee on TX
X axis- Direct to Antenna

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	2404.628M	64.3	+28.6	+1.2	+2.6		+0.0	96.7	125.2	-28.5	Horiz
2	2439.424M	64.1	+28.7	+1.2	+2.6		+0.0	96.6	125.2	-28.6	Horiz
3	2439.424M	63.8	+28.7	+1.2	+2.6		+0.0	96.3	125.2	-28.9	Vert
4	2479.580M	63.0	+28.8	+1.2	+2.6		+0.0	95.6	125.2	-29.6	Horiz
5	2404.628M	62.5	+28.6	+1.2	+2.6		+0.0	94.9	125.2	-30.3	Vert
6	2479.580M	61.5	+28.8	+1.2	+2.6		+0.0	94.1	125.2	-31.1	Vert

Convert equivalent electric field strength to the resultant power level

Frequency (MHz)	Measured Power in Watt	Power Limit in Watt	Pass/Fail
2404.628 Low Channel (Horizontal)	1.4032E-03	1.00	Pass
2404.628 Low Channel (Vertical)	9.2709E-04	1.00	Pass
2439.424 Middle Channel (Horizontal)	1.3713E-03	1.00	Pass
2439.424 Middle Channel (Vertical)	1.2797E-03	1.00	Pass
2479.580 High Channel (Horizontal)	1.0892E-03	1.00	Pass
2479.580 High Channel (Vertical)	7.7112E-04	1.00	Pass

A formula converts Radiated Method to Conducted Method

dBm (conducted power) = dBuV/m +20*LOG D -104.77 – Gain (dBi)

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.247(b)(3) Output Power**		
Work Order #:	**96813**	Date:	6/26/2015
Test Type:	**Radiated Scan**	Time:	10:42:09
Tested By:	Hieu Song Nguyenpham	Sequence#:	34
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Fundamental of the EUT

Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: 558074 D01 DTS Meas Guidance v03r02 section 9.1.1

RBW=3MHz
VBW=8MHz

The EUT is a Compact Sensor. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving. The EUT is ceiling-mounted equipment. There is only a requirement to measure two orthogonals.

Note:
Zigbee on TX
Y axis- Upward to Ceiling

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	2439.340M	62.2	+28.7	+1.2	+2.6		+0.0	94.7	125.2	-30.5	Horiz
2	2404.592M	61.9	+28.6	+1.2	+2.6		+0.0	94.3	125.2	-30.9	Horiz
3	2479.388M	61.0	+28.8	+1.2	+2.6		+0.0	93.6	125.2	-31.6	Vert
4	2439.340M	60.8	+28.7	+1.2	+2.6		+0.0	93.3	125.2	-31.9	Vert
5	2479.388M	59.7	+28.8	+1.2	+2.6		+0.0	92.3	125.2	-32.9	Horiz
6	2404.592M	59.7	+28.6	+1.2	+2.6		+0.0	92.1	125.2	-33.1	Vert

Convert equivalent electric field strength to the resultant power level

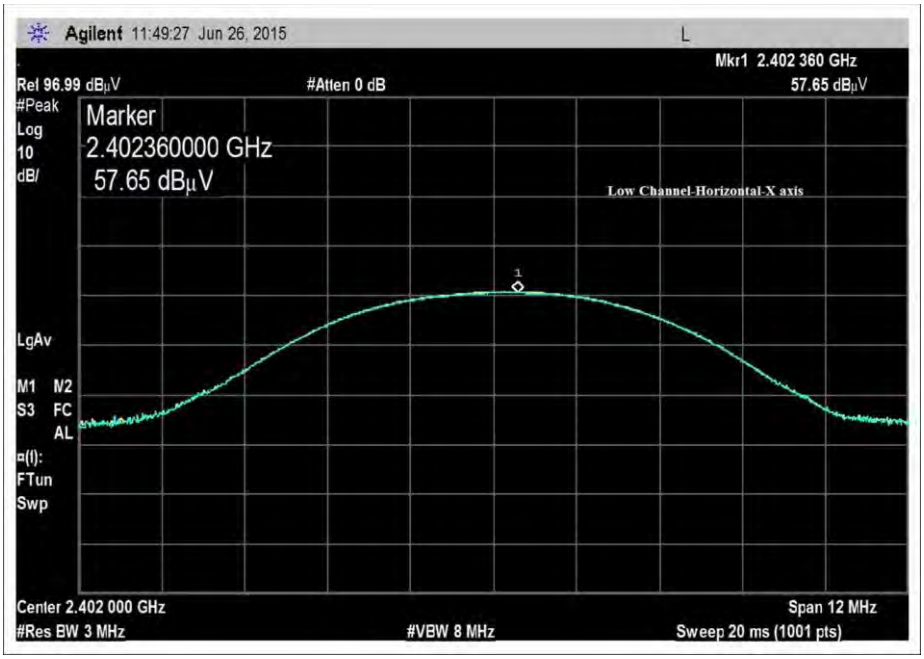
Frequency (MHz)	Measured Power in Watt	Power Limit in Watt	Pass/Fail
2404.592 Low Channel (Horizontal)	8.0746E-04	1.00	Pass
2404.592 Low Channel (Vertical)	4.8654E-04	1.00	Pass
2439.340 Middle Channel (Horizontal)	8.8536E-04	1.00	Pass
2439.340 Middle Channel (Vertical)	6.4139E-04	1.00	Pass
2479.388 High Channel (Horizontal)	5.0947E-04	1.00	Pass
2479.388 High Channel (Vertical)	6.8726E-04	1.00	Pass

A formula converts Radiated Method to Conducted Method

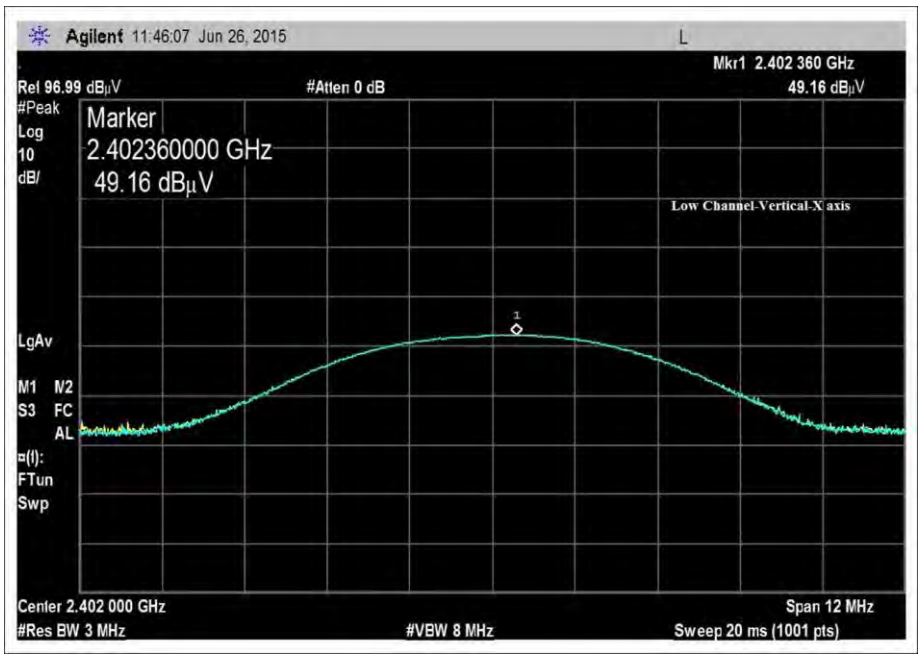
dBm (conducted power) = dBuV/m +20*LOG D -104.77 – Gain (dBi)

Test Plot(s)

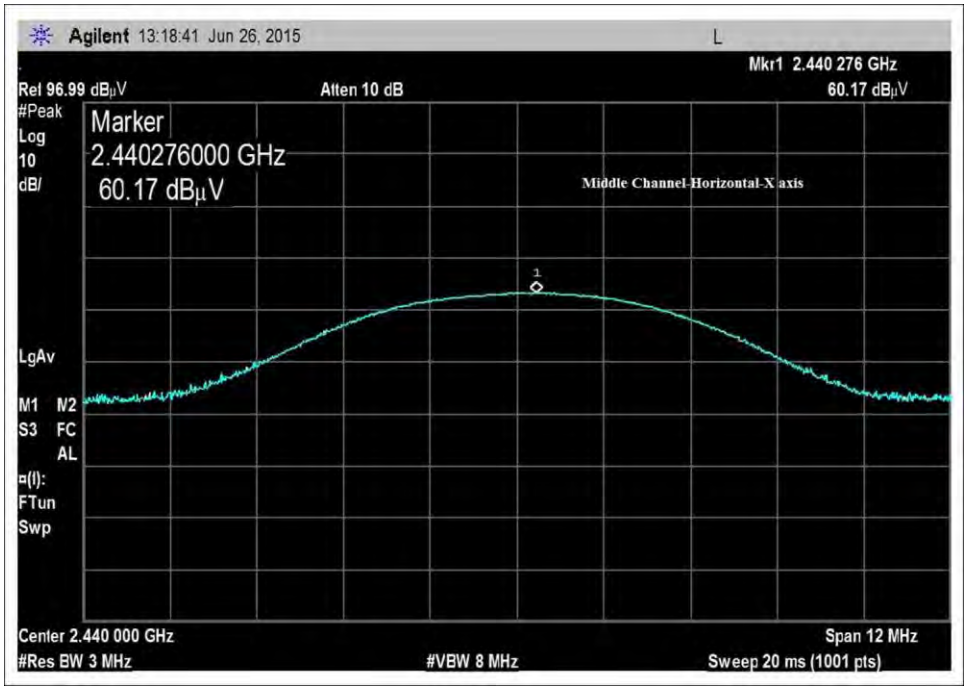
Bluetooth



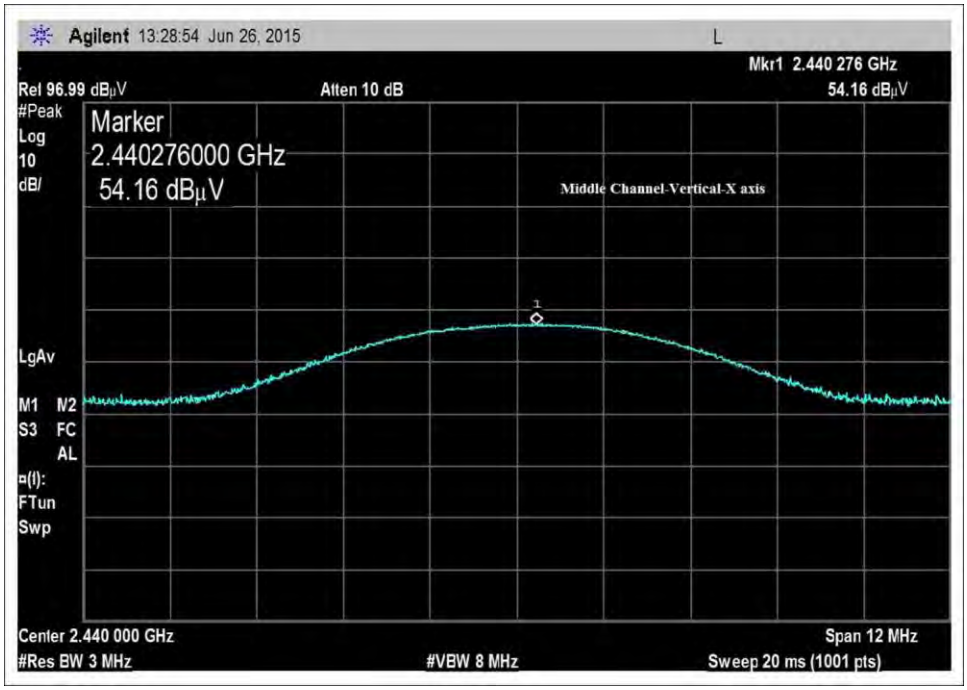
Low Channel-Horizontal Polarization, X-Axis



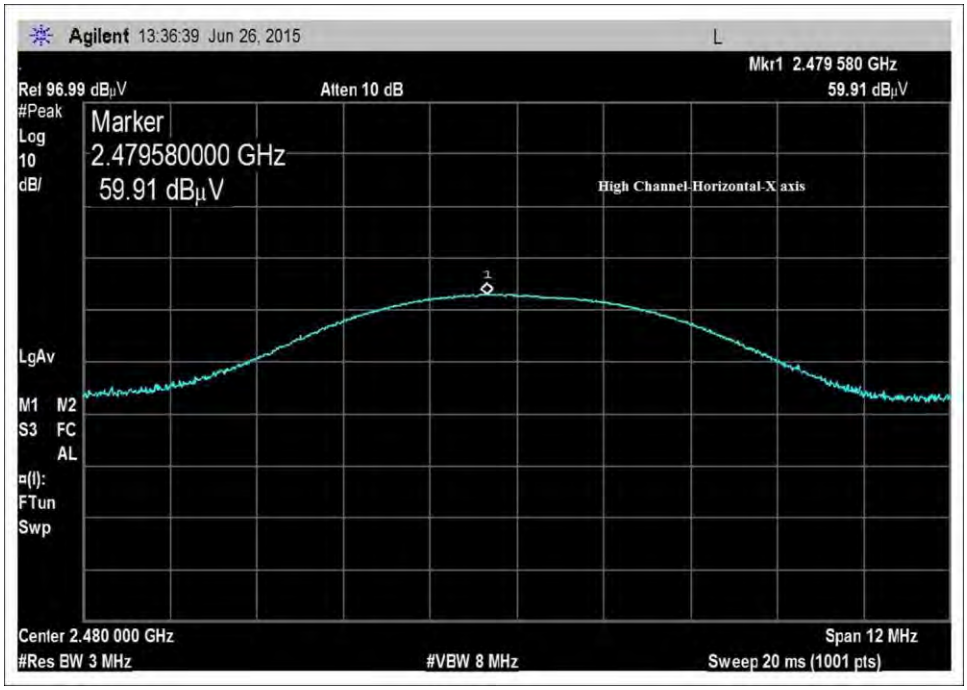
Low Channel-Vertical Polarization, X-Axis



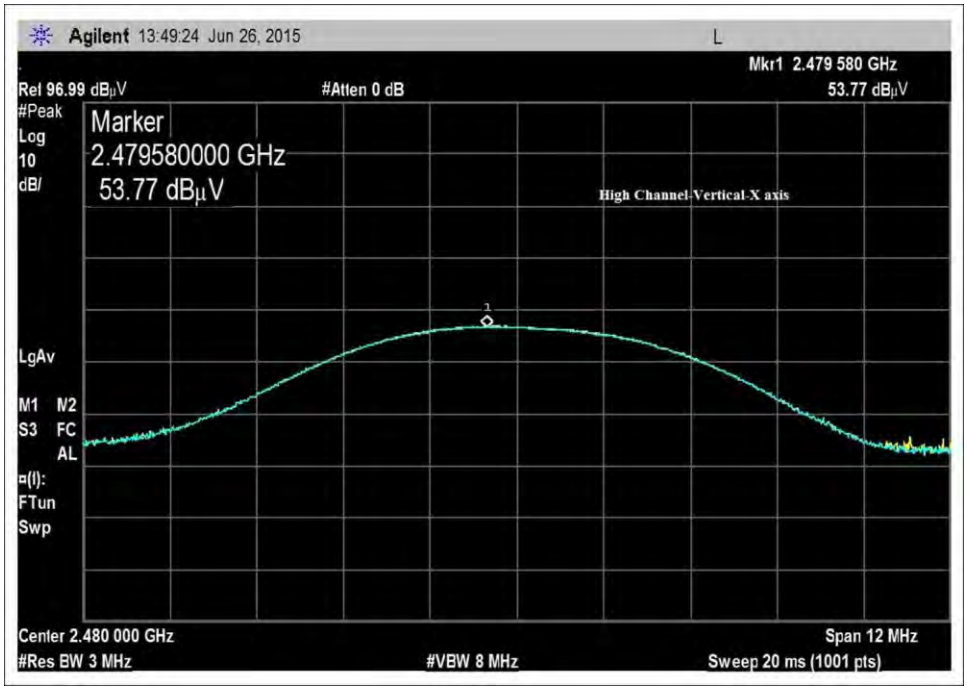
Middle Channel-Horizontal Polarization, X-Axis



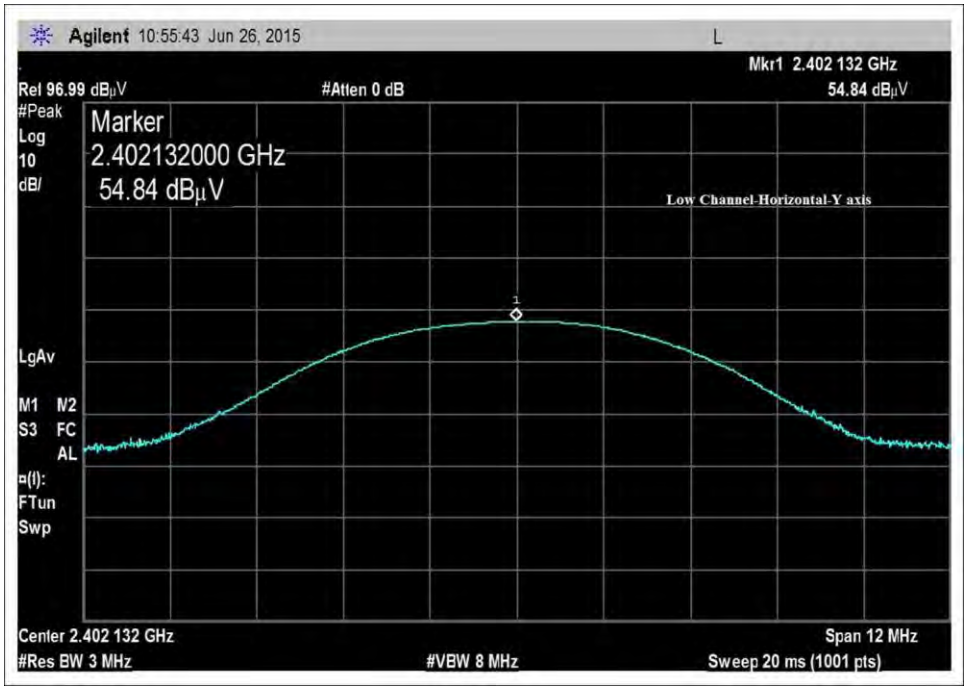
Middle Channel-Vertical Polarization, X-Axis



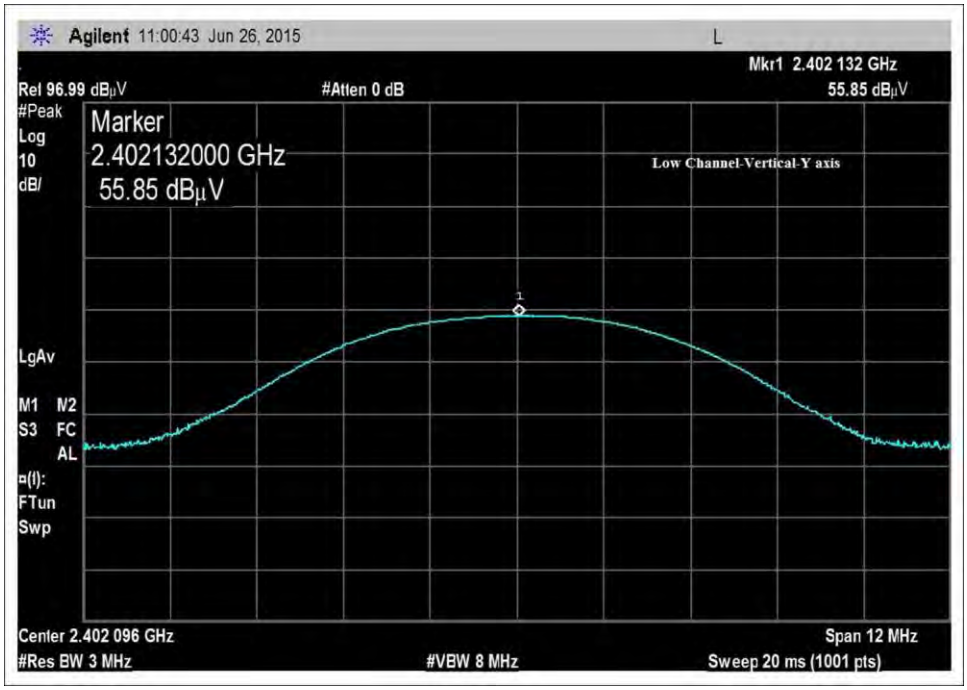
High Channel-Horizontal Polarization, X-Axis



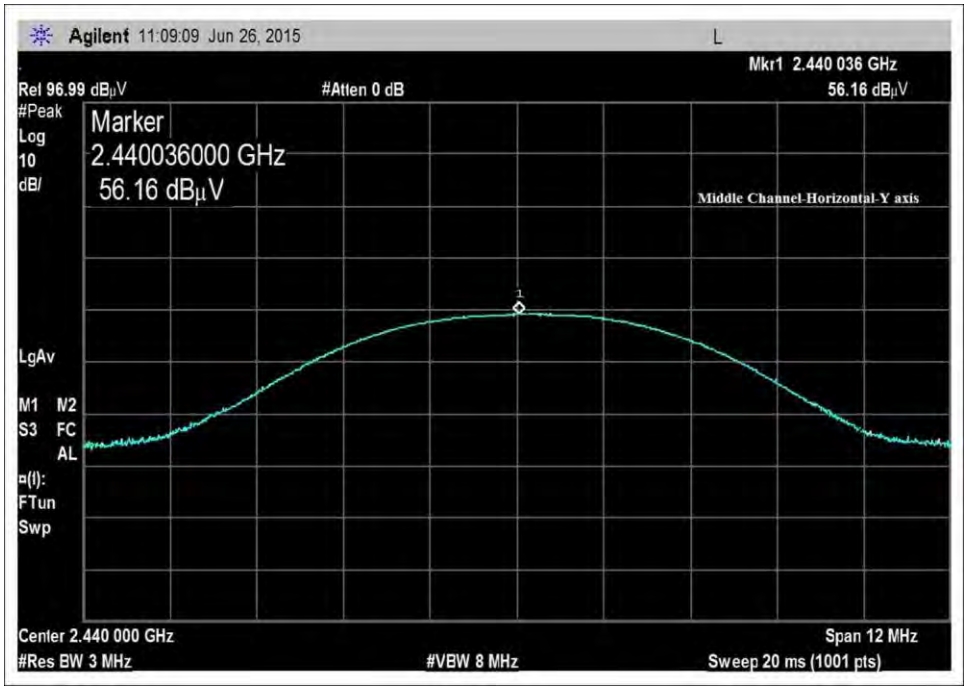
High Channel-Vertical Polarization, X-Axis



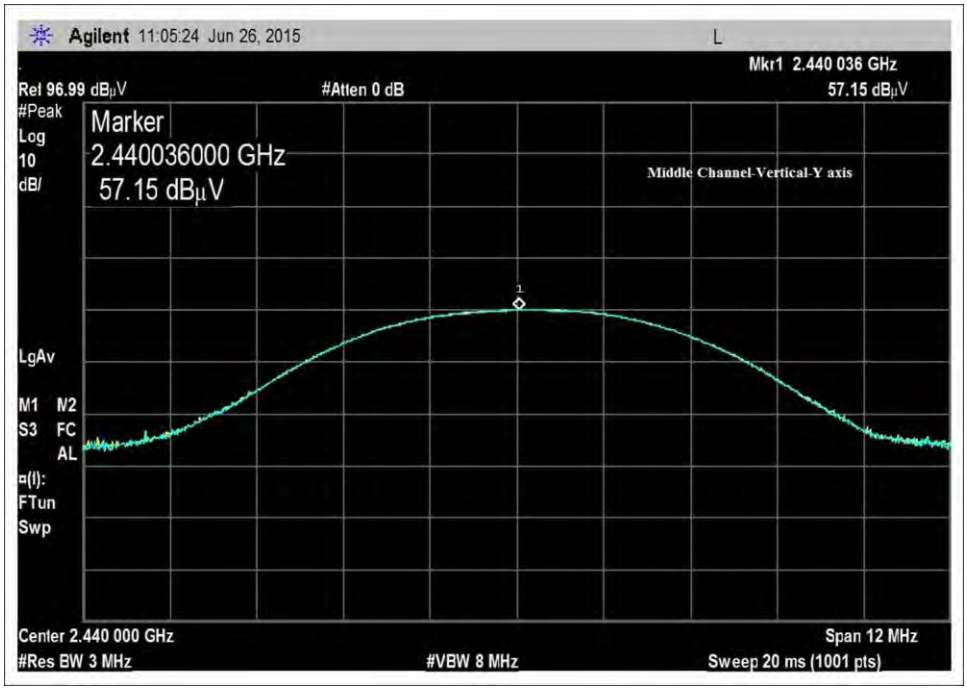
Low Channel-Horizontal Polarization, Y-Axis



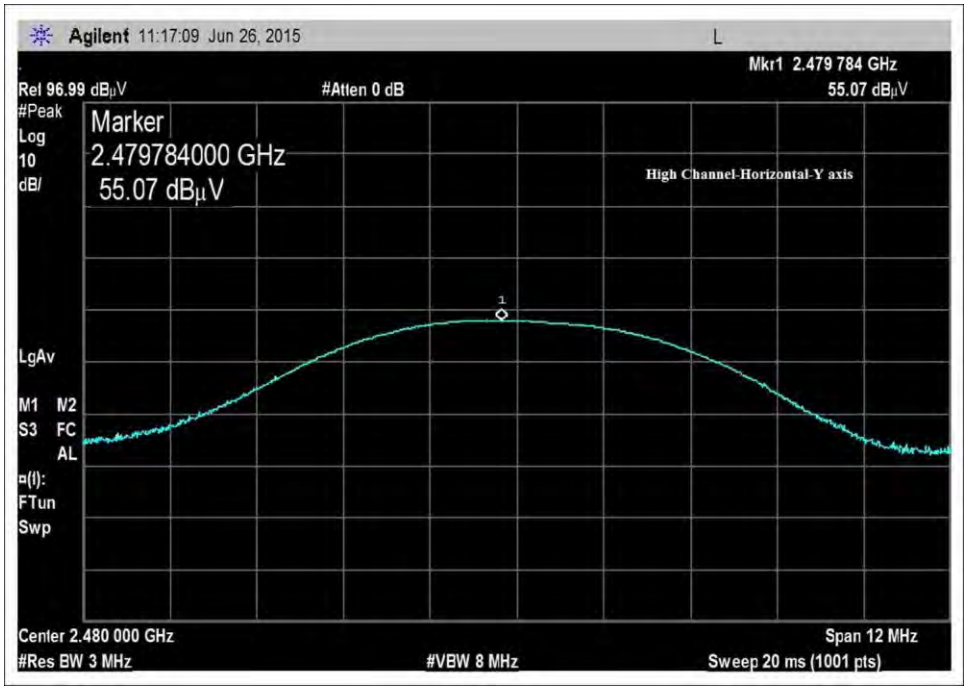
Low Channel-Vertical Polarization, Y-Axis



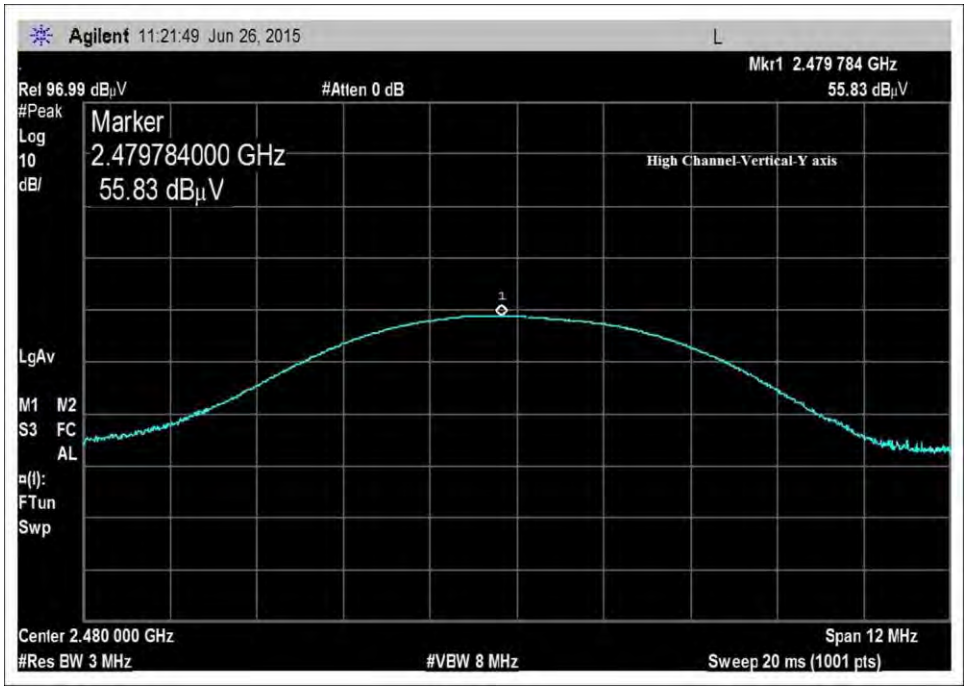
Middle Channel-Horizontal Polarization, Y-Axis



Middle Channel-Vertical Polarization, Y-Axis

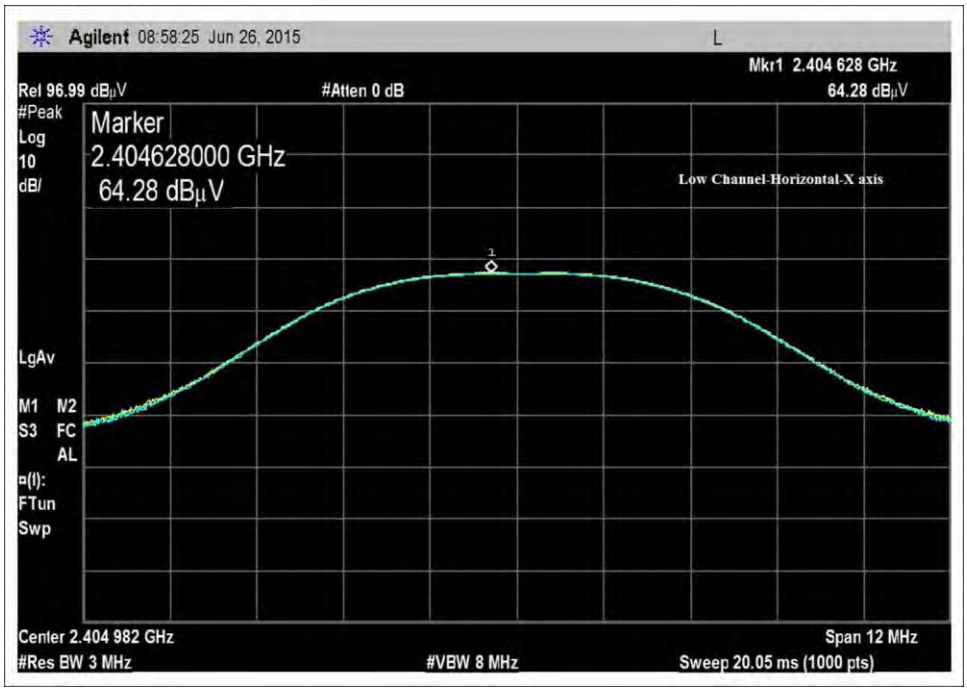


High Channel-Horizontal Polarization, Y-Axis

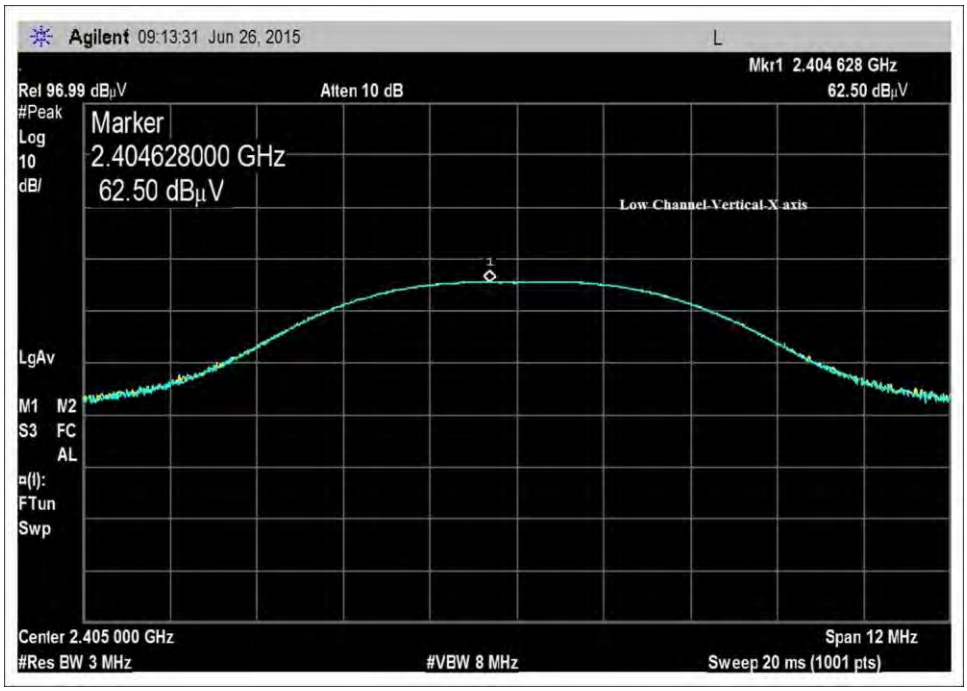


High Channel-Vertical Polarization, Y-Axis

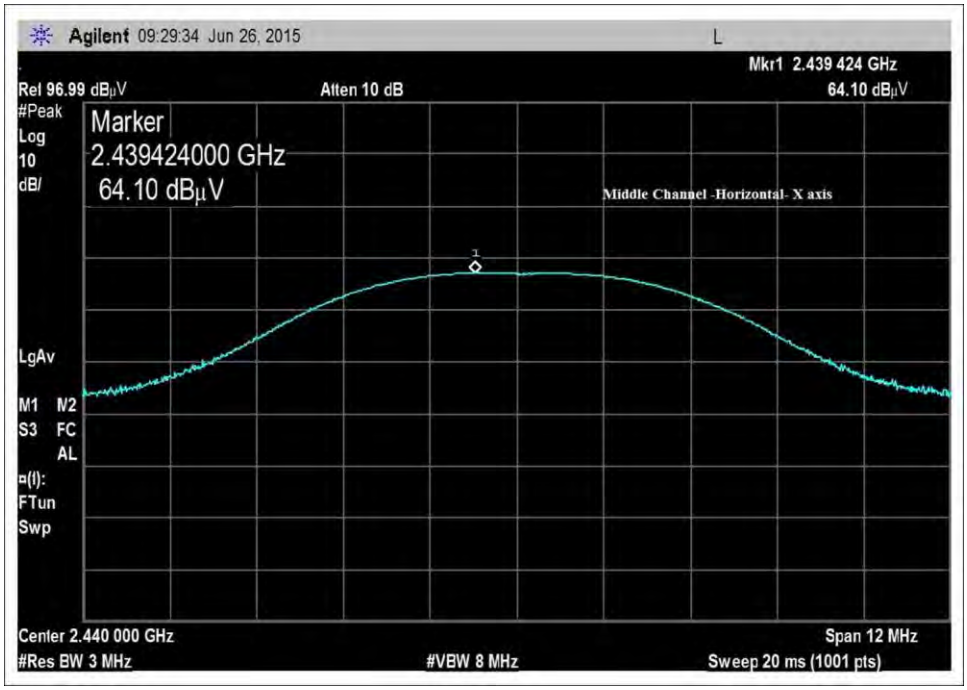
Zigbee



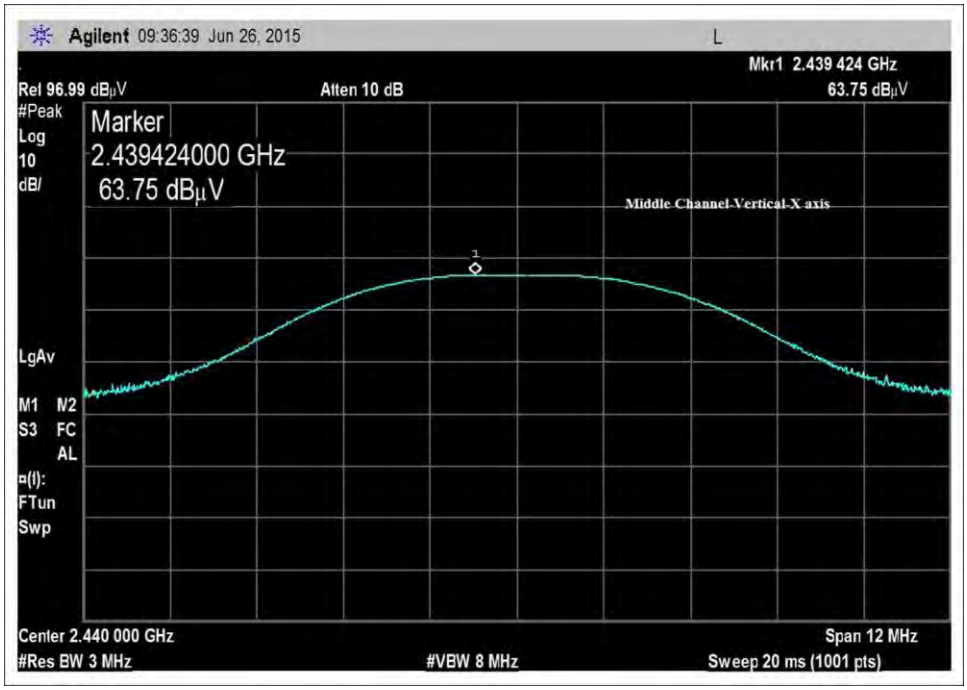
Low Channel-Horizontal Polarization, X Axis



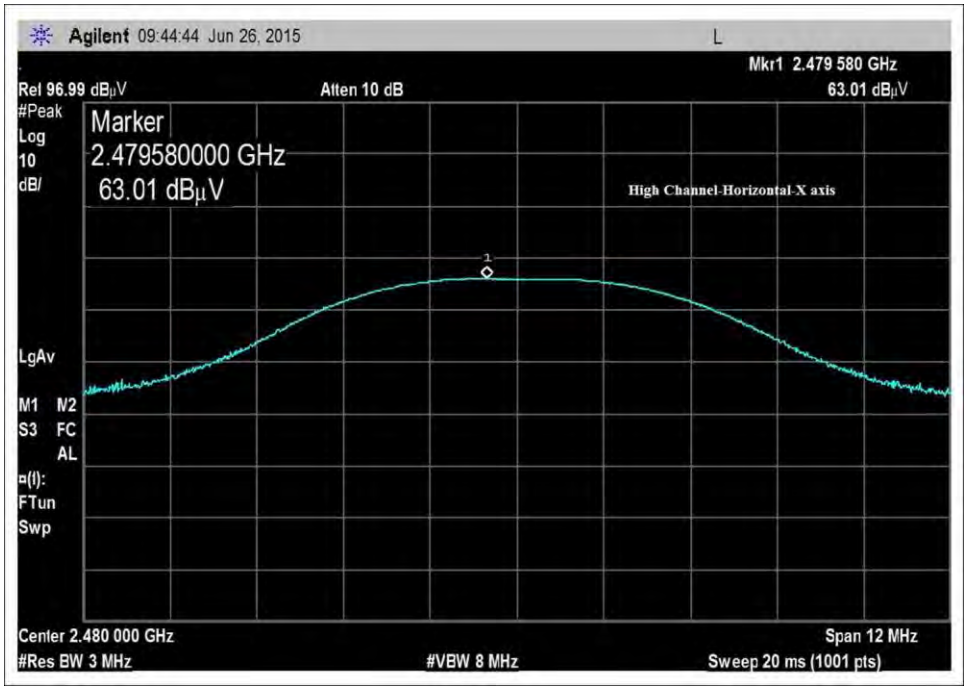
Low Channel-Vertical Polarization, X-Axis



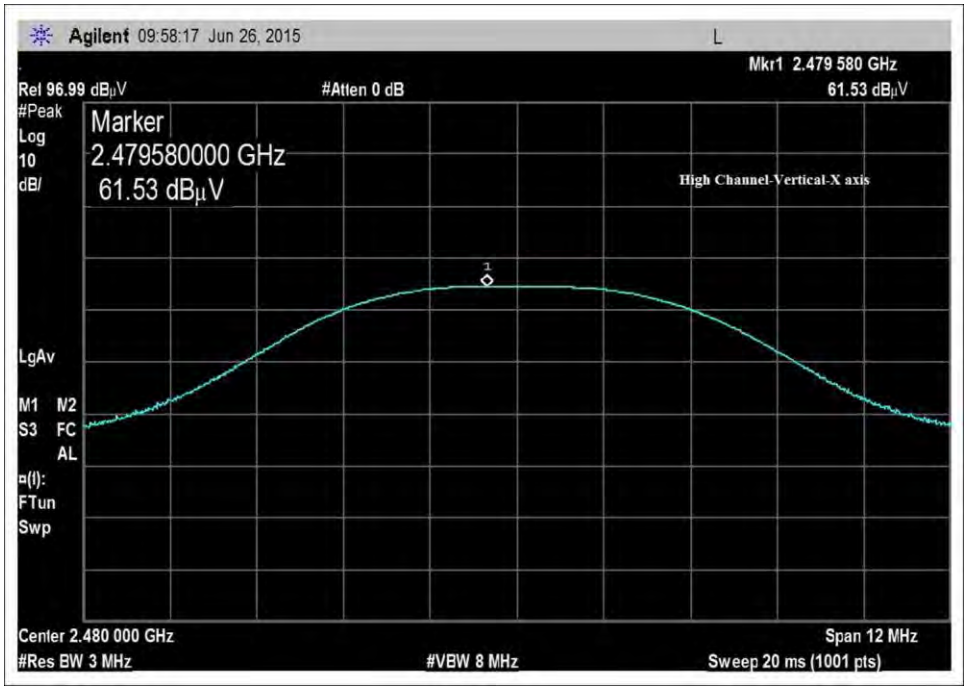
Middle Channel-Horizontal, X-Axis



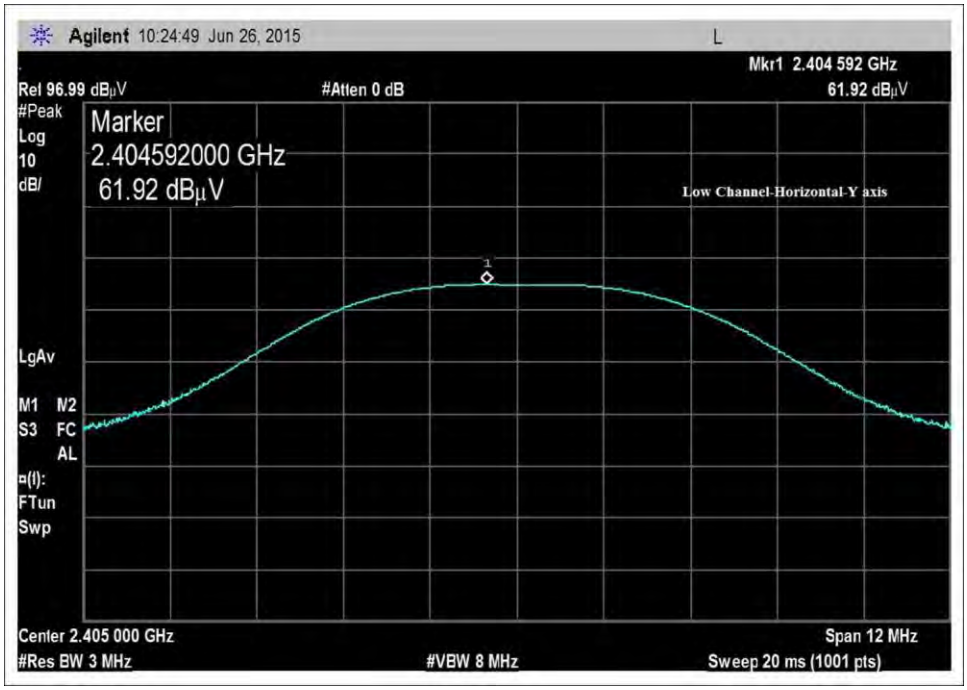
Middle Channel – Vertical Polarization, X-Axis



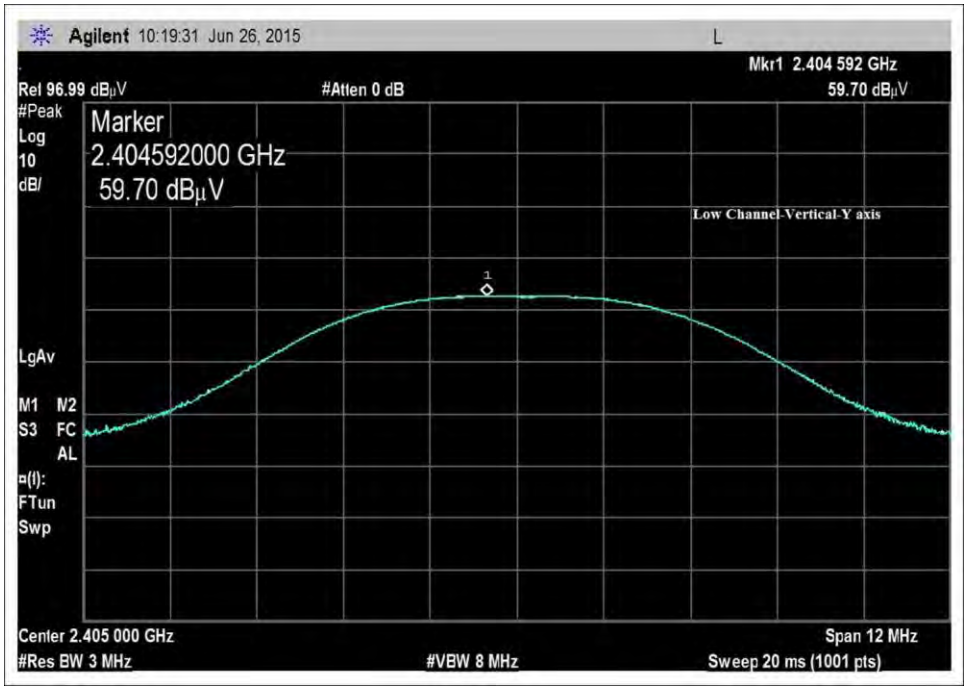
High Channel-Horizontal Polarization, X-Axis



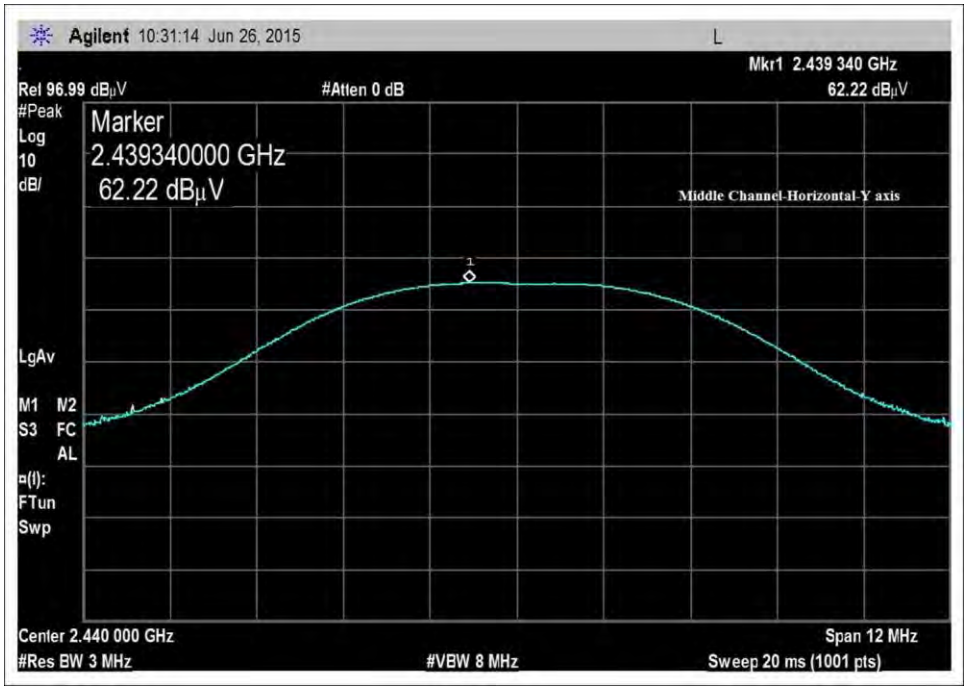
High Channel-Vertical Polarization, X-Axis



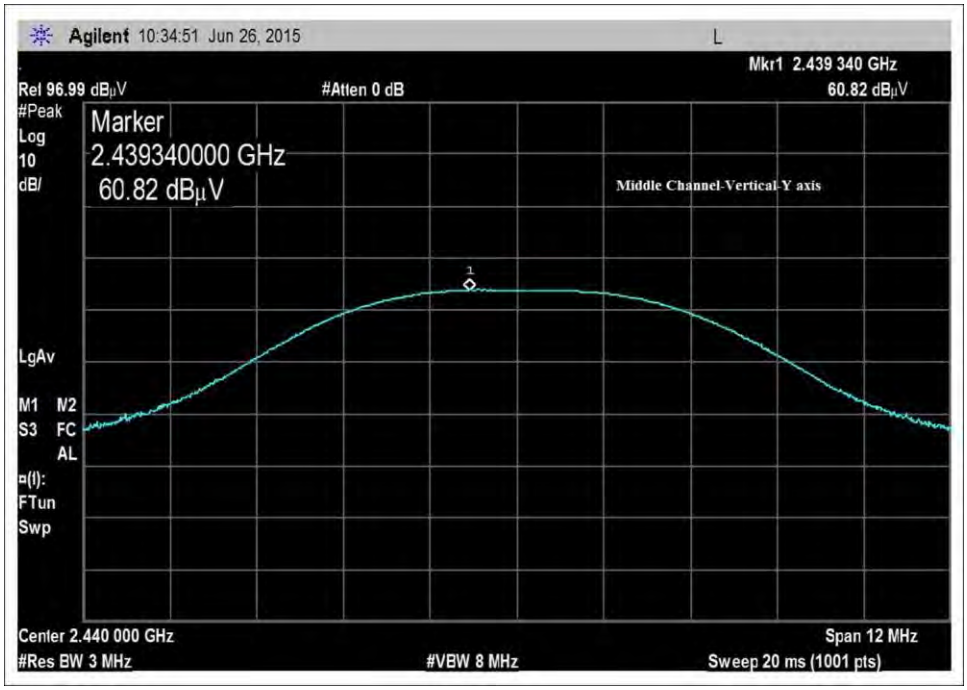
Low Channel-Horizontal Polarization, Y-Axis



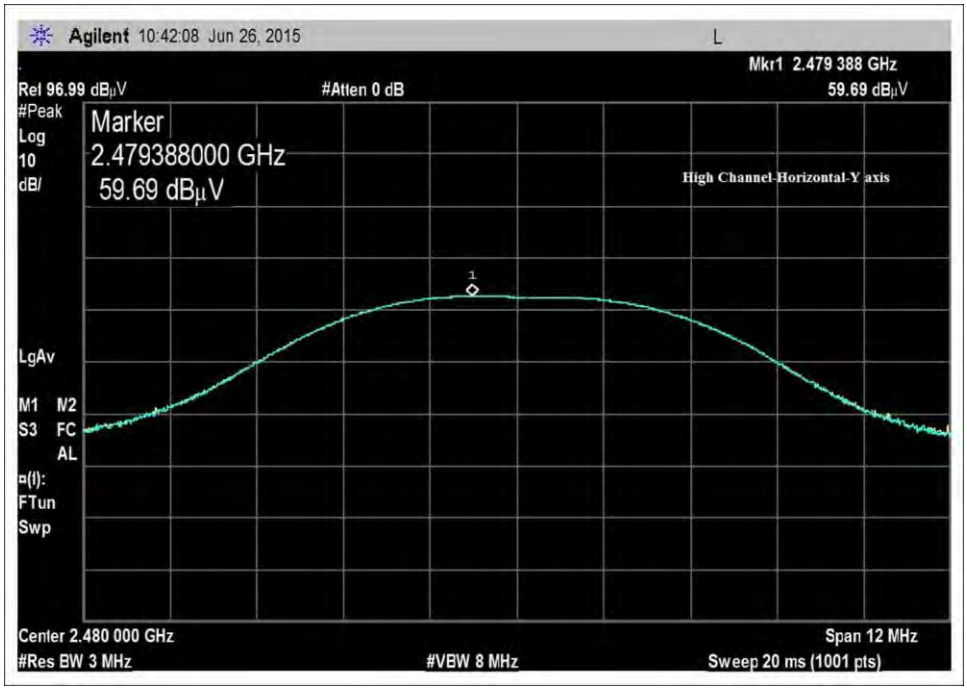
Low Channel-Vertical Polarization, Y-Axis



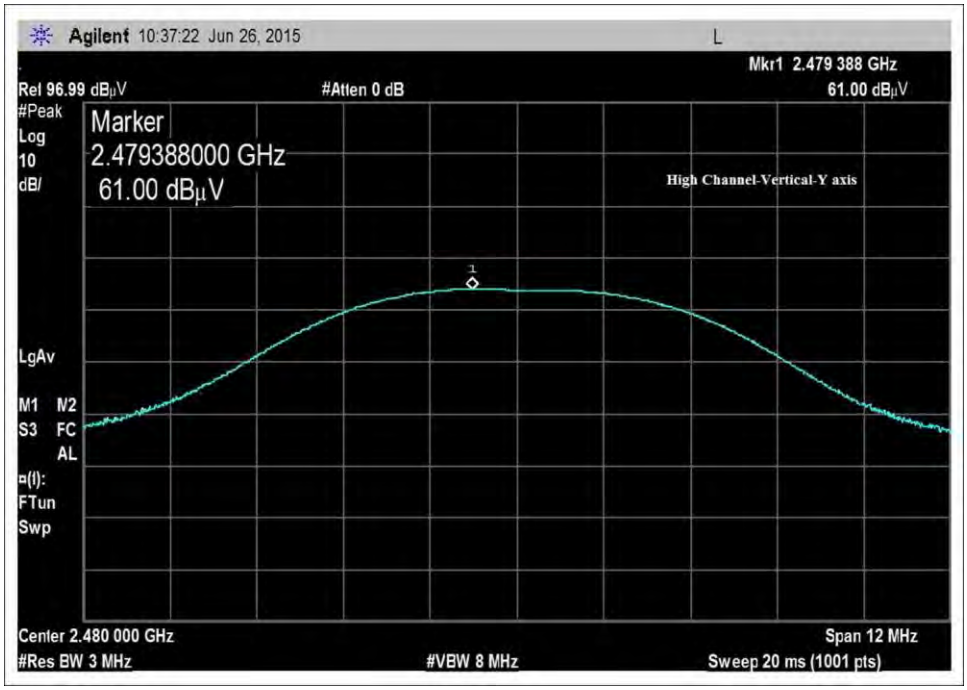
Middle Channel-Horizontal Polarization, Y-Axis



Middle Channel-Vertical Polarization, Y-Axis

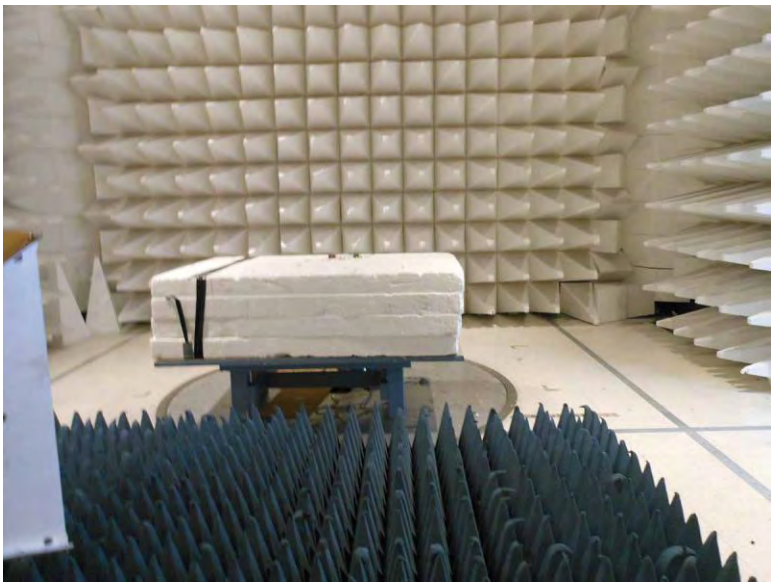


High Channel-Horizontal Polarization, Y-Axis

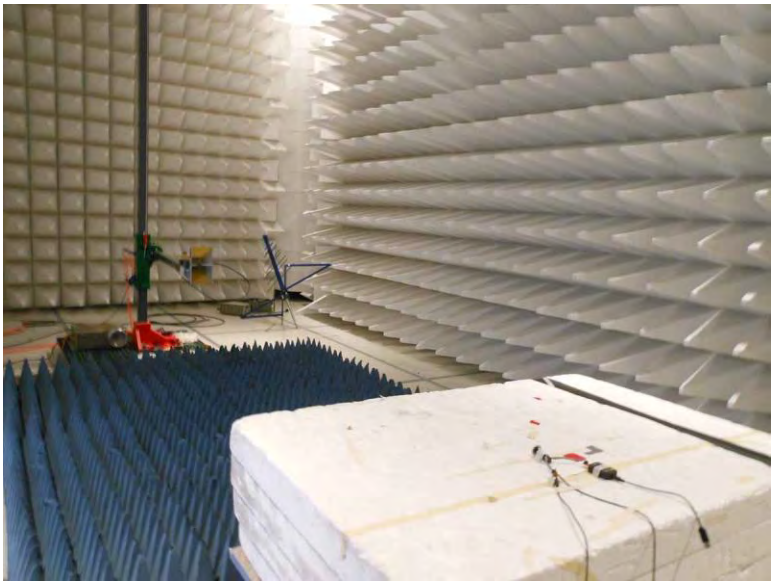


High Channel-Vertical Polarization, Y-Axis

Test Setup Photo(s)

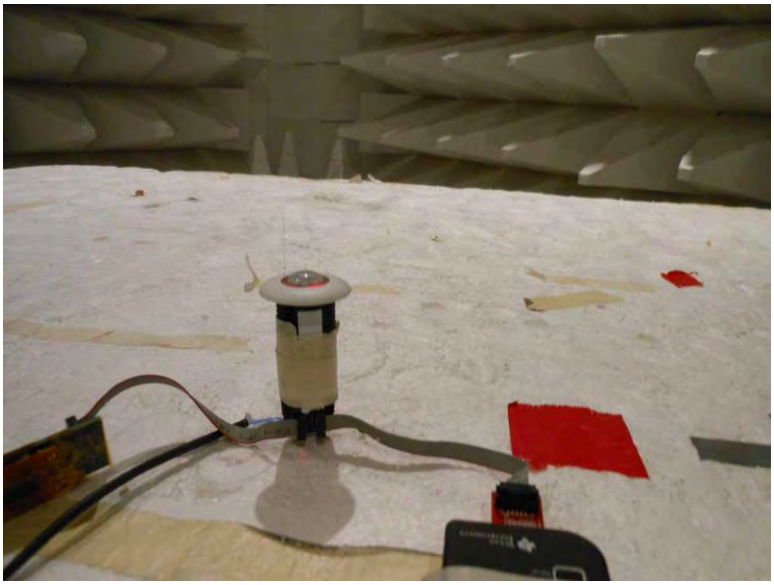


Front View



Back View

X-Axis



Y-Axis

15.247(e) Power Spectral Density

Test Data

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)**		
Work Order #:	**96813**	Date:	6/26/2015
Test Type:	**Radiated Scan**	Time:	13:51:22
Tested By:	Hieu Song Nguyenpham	Sequence#:	37
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Power Spectrum Density

Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C, Relative Humidity: 39 %, Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: KDB 558074 v03r02 section 10.2

RBW= 100kHz
VBW= 300kHz

The EUT is a Compact Sensor. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note:
BLE on TX
X axis- Direct to Antenna is the worst orthogonal.

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2440.303M	59.2	+28.7	+1.2	+2.6		+0.0	91.7	103.2	-11.5	Horiz
2	2479.806M	59.0	+28.8	+1.2	+2.6		+0.0	91.6	103.2	-11.6	Horiz
3	2402.291M	57.1	+28.6	+1.2	+2.6		+0.0	89.5	103.2	-13.7	Horiz
4	2479.806M	52.9	+28.8	+1.2	+2.6		+0.0	85.5	103.2	-17.7	Vert
5	2440.303M	52.4	+28.7	+1.2	+2.6		+0.0	84.9	103.2	-18.3	Vert
6	2402.291M	48.1	+28.6	+1.2	+2.6		+0.0	80.5	103.2	-22.7	Vert

Convert equivalent electric field strength to the resultant power level

Frequency (MHz)	Measured Power in dBm/100kHz	Power Limit in dBm/3kHz	Pass/Fail
2402.291 Low Channel (Horizontal)	-5.729	8.00	Pass
2402.291 Low Channel (Vertical)	-14.729	8.00	Pass
2440.303 Middle Channel (Horizontal)	-4.129	8.00	Pass
2440.303 Middle Channel (Vertical)	-10.329	8.00	Pass
2479.806 High Channel (Horizontal)	-3.629	8.00	Pass
2479.806 High Channel (Vertical)	-9.729	8.00	Pass

A formula converts Radiated Method to Conducted Method

dBm (conducted power) = dBuV/m +20*LOG D -104.77 – Gain (dBi)

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)**		
Work Order #:	**96813**	Date:	6/26/2015
Test Type:	**Radiated Scan**	Time:	09:59:39
Tested By:	Hieu Song Nguyenpham	Sequence#:	33
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Power Spectrum Density

Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: KDB 558074 v03r02 section 10.2

RBW=100kHz
VBW=300kHz

The EUT is a Compact Sensor. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving

Note:
Zigbee on TX
X axis- Direct to Antenna is the worst orthogonal

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2439.512M	62.4	+28.7	+1.2	+2.6		+0.0	94.9	103.2	-8.3	Horiz
2	2404.510M	62.4	+28.6	+1.2	+2.6		+0.0	94.8	103.2	-8.4	Horiz
3	2439.512M	61.9	+28.7	+1.2	+2.6		+0.0	94.4	103.2	-8.8	Vert
4	2479.518M	61.1	+28.8	+1.2	+2.6		+0.0	93.7	103.2	-9.5	Horiz
5	2404.510M	60.7	+28.6	+1.2	+2.6		+0.0	93.1	103.2	-10.1	Vert
6	2479.518M	60.0	+28.8	+1.2	+2.6		+0.0	92.6	103.2	-10.6	Vert

Convert equivalent electric field strength to the resultant power level

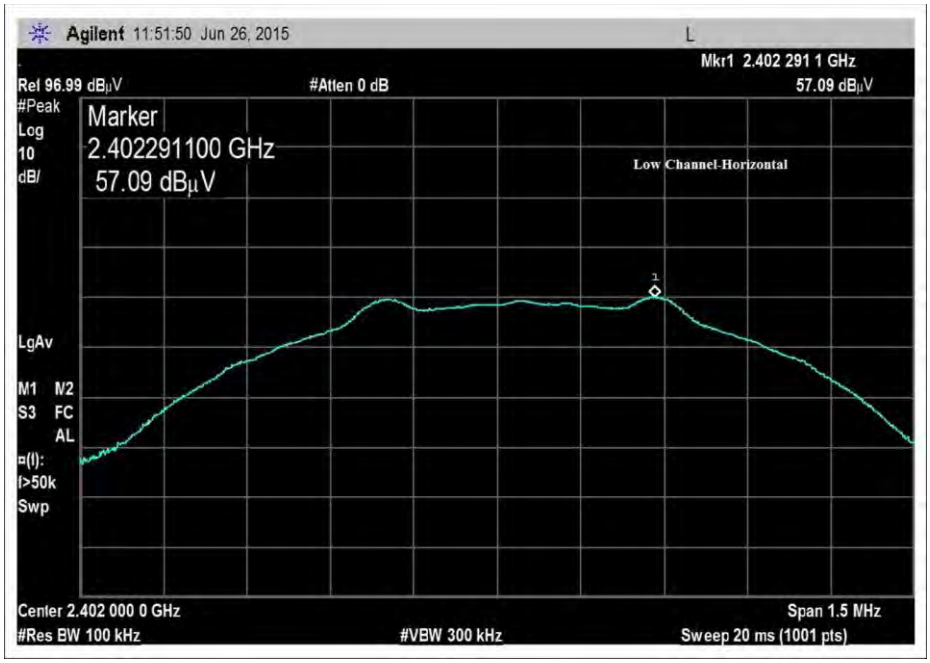
Frequency (MHz)	Measured Power in dBm/100kHz	Power Limit in dBm/3kHz	Pass/Fail
Low Channel (Horizontal)	-0.429	8.00	Pass
Low Channel (Vertical)	-2.129	8.00	Pass
Middle Channel (Horizontal)	-0.329	8.00	Pass
Middle Channel (Vertical)	-0.829	8.00	Pass
High Channel (Horizontal)	-1.529	8.00	Pass
High Channel (Vertical)	-2.629	8.00	Pass

A formula converts Radiated Method to Conducted Method

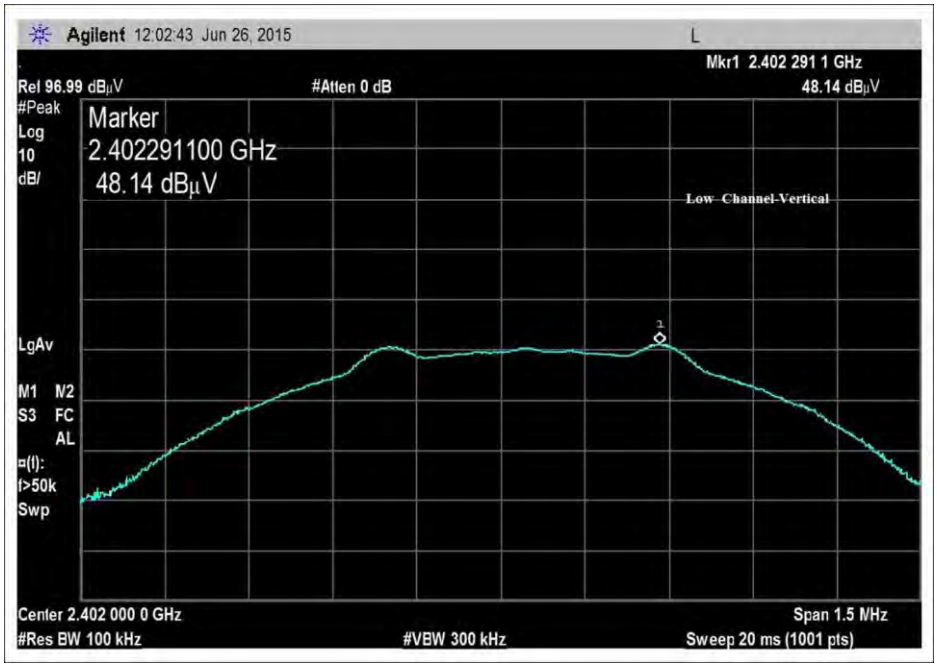
dBm (conducted power) = dBuV/m +20*LOG D -104.77 – Gain (dBi)

Test Plot(s)

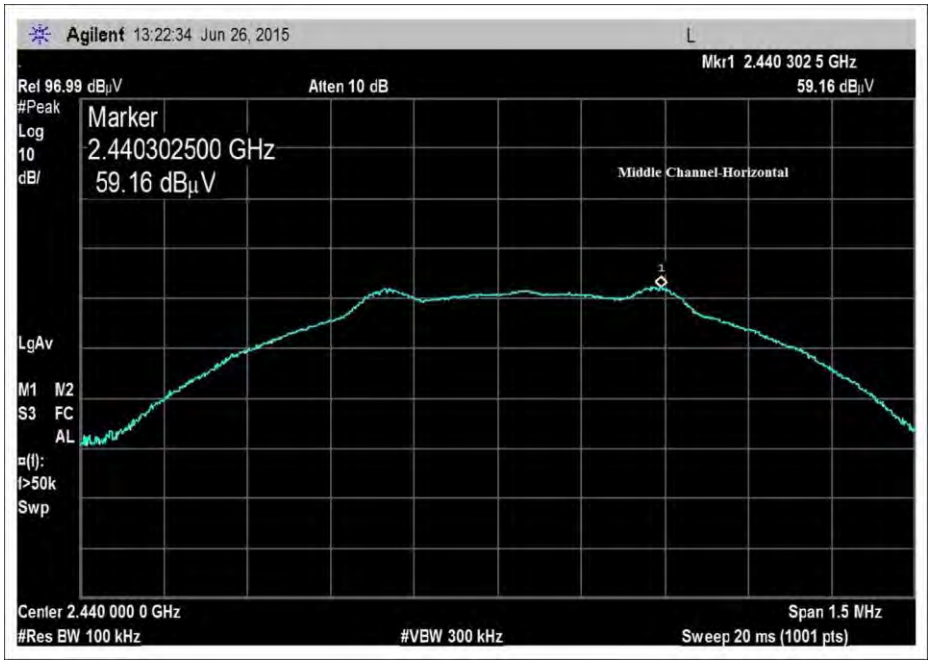
Bluetooth



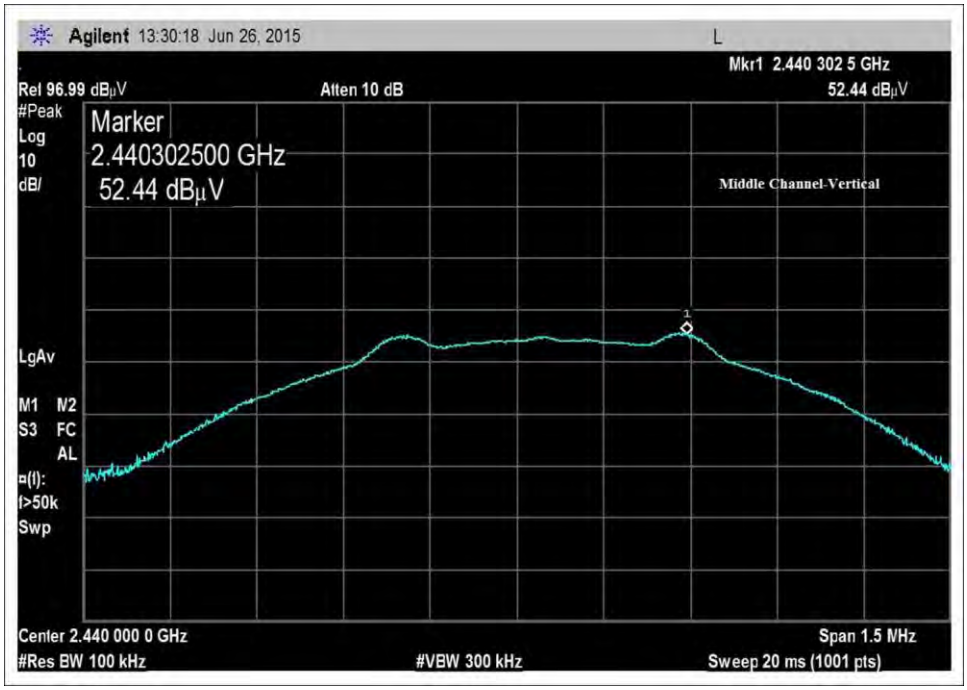
Low Channel-Horizontal Polarization



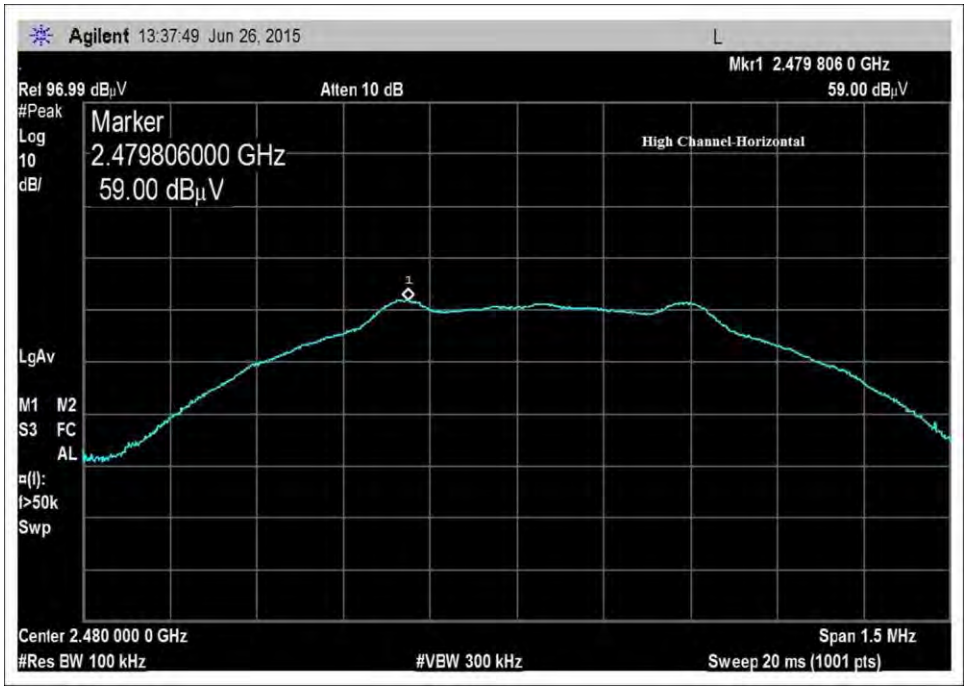
Low Channel-Vertical Polarization



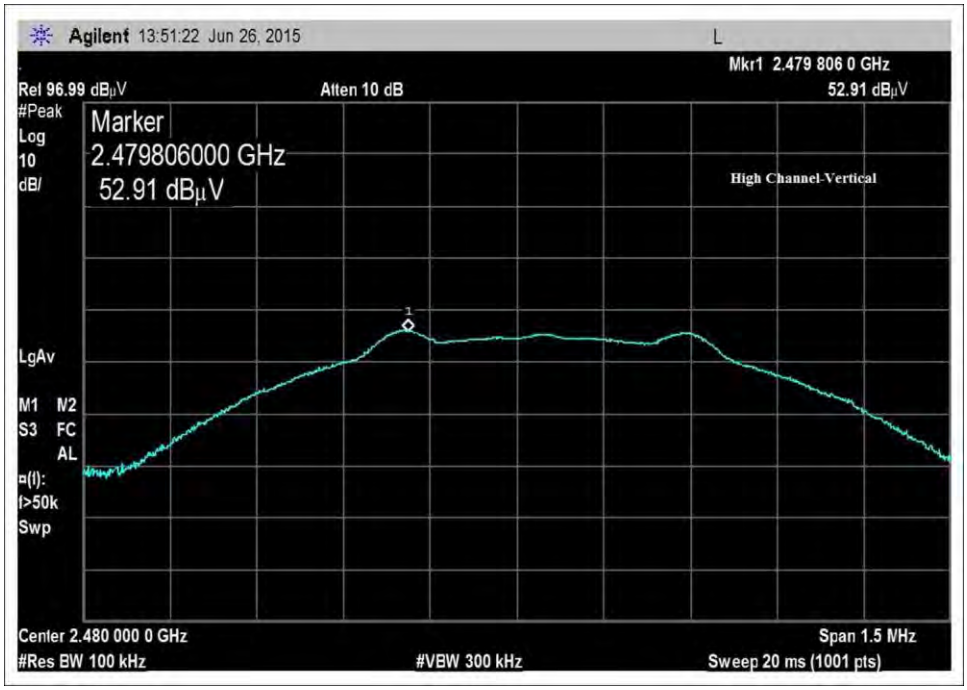
Middle Channel-Horizontal Polarization



Middle Channel-Vertical Polarization

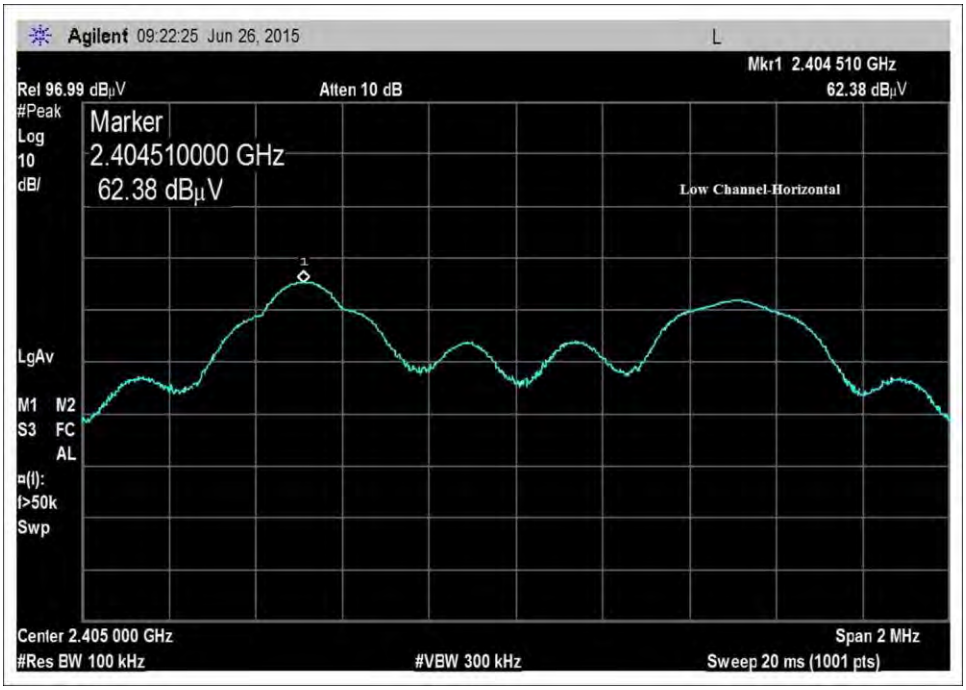


High Channel-Horizontal Polarization

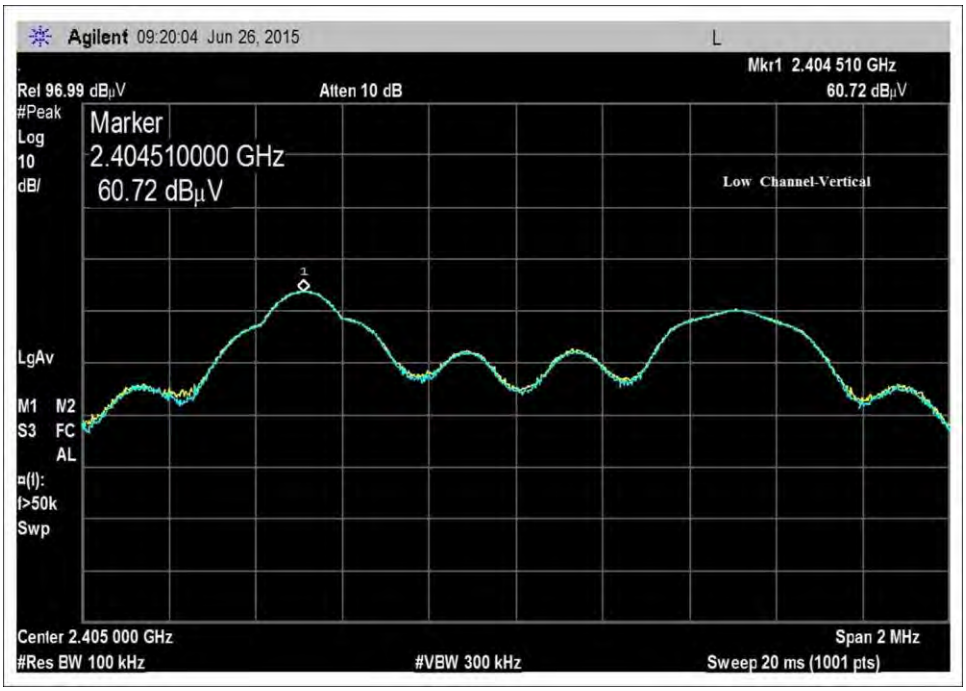


High Channel-Vertical Polarization

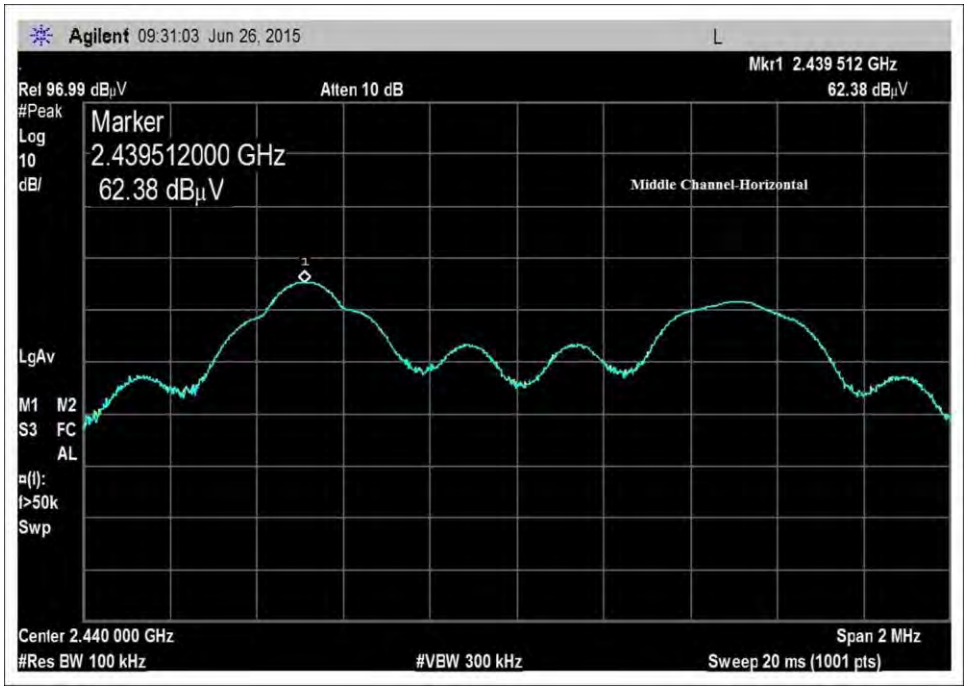
Zigbee



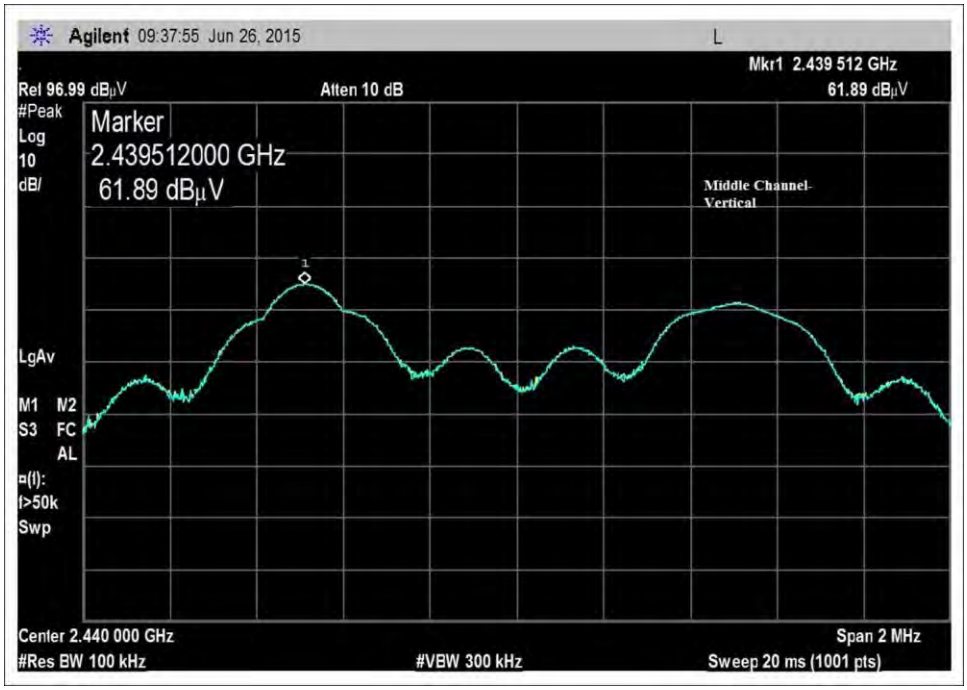
Low Channel-Horizontal Polarization



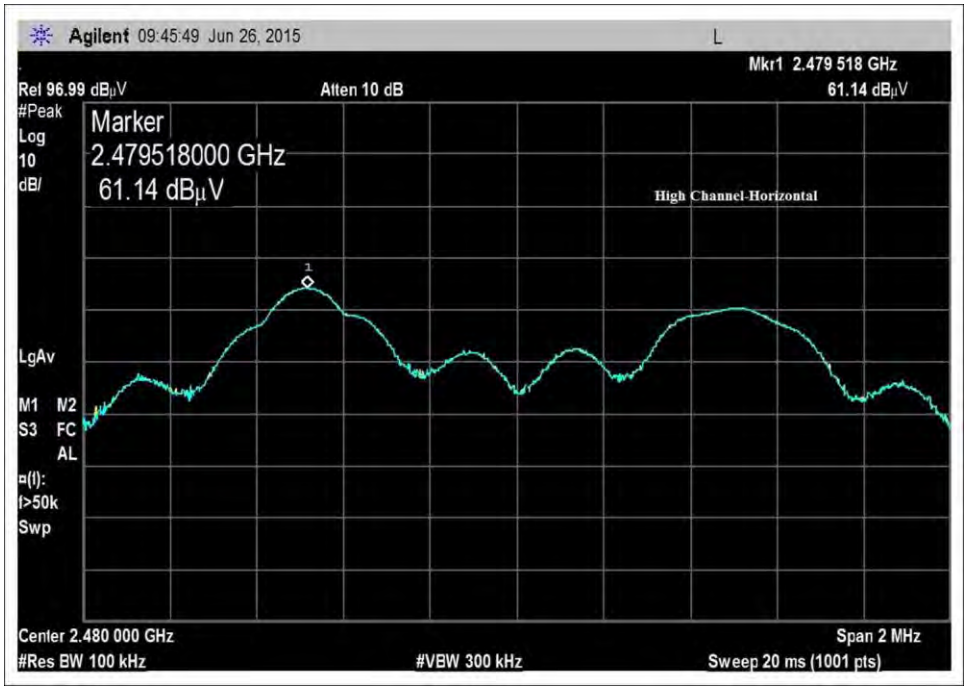
Low Channel-Vertical Polarization



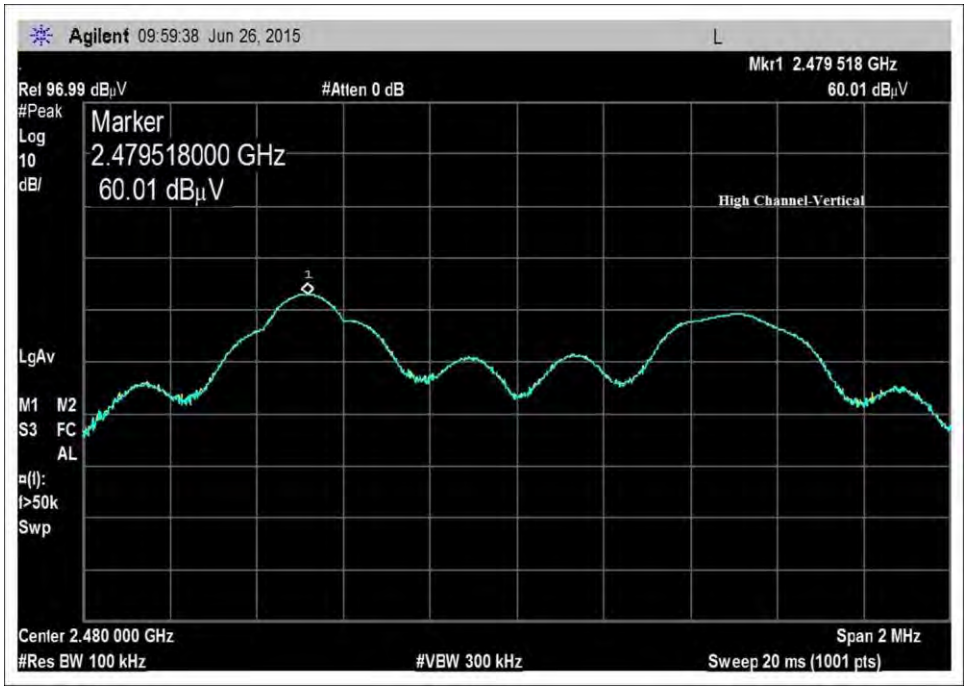
Middle Channel-Horizontal Polarization



Middle Channel-Vertical Polarization

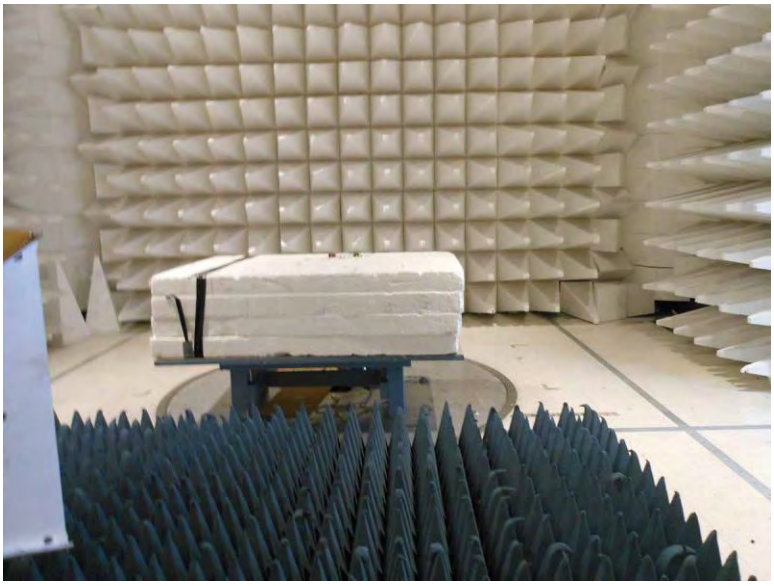


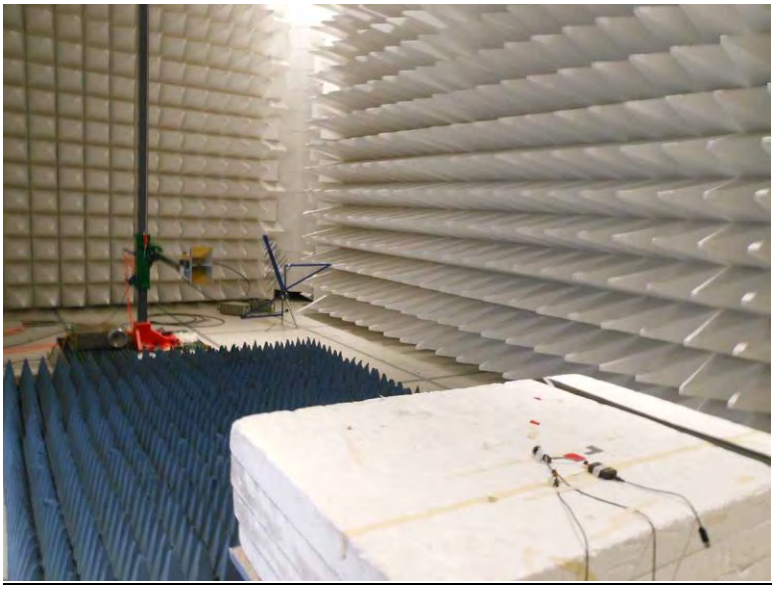
High Channel-Horizontal Polarization



High Channel-Vertical Polarization

Test Setup Photo(s)





15.247(d) RF Conducted Emissions & Band Edge

Note: The EUT has an integral antenna.

15.247(d) Radiated Emissions & Band Edge

Test Data

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**96813**	Date:	7/2/2015
Test Type:	**Radiated Scan**	Time:	09:46:37
Tested By:	Hieu Song Nguyenpham	Sequence#:	110
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Frequency Emission
Frequency Range: 9kHz to 1000MHz
Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: KDB 558074 v03r02 section 12.1 and ANSI C63.4 2009

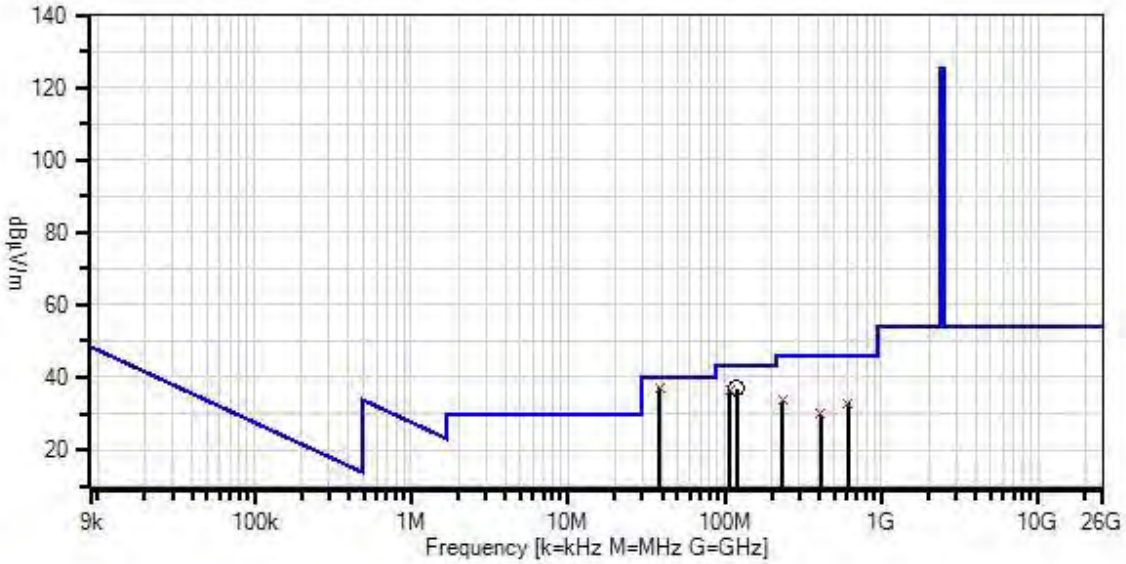
Frequency range of measurement = 9 kHz- 1GHz.

9 kHz	- 150 kHz ->	RBW=200 Hz	VBW=200 Hz
150 kHz	- 30 MHz ->	RBW=9 kHz	VBW=9 kHz
30 MHz	- 1000MHz ->	RBW=120 kHz	VBW=120 kHz

The EUT is a Compact Sensor. The EUT is placed on 80cm Styrofoam table. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note:
BLE on TX
X axis- Direct to Antenna is the worst orthogonal
Low Channel

Enlighted, Inc WO#: 96813 Sequence#: 110 Date: 7/2/2015
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.02.00

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN00686	Preamp	8447D Opt 010	5/27/2014	5/27/2016
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017
T2	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T3	ANP00880	Cable	RG214U	6/13/2014	6/13/2016
T4	ANP01183	Cable	CNT-195	9/3/2013	9/3/2015
T5	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

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	38.431M QP	51.0	-29.3 +0.2	+14.5	+0.5	+0.2	+0.0	37.1	40.0	-2.9	Vert
^	38.431M	60.5	-29.3 +0.2	+14.5	+0.5	+0.2	+0.0	46.6	40.0	+6.6	Vert
3	120.044M	52.5	-29.1 +0.4	+11.8	+1.0	+0.3	+0.0	36.9	43.5	-6.6	Vert
4	108.084M QP	53.1	-29.1 +0.4	+10.9	+0.9	+0.2	+0.0	36.4	43.5	-7.1	Vert
^	108.084M	59.4	-29.1 +0.4	+10.9	+0.9	+0.2	+0.0	42.7	43.5	-0.8	Vert
6	233.561M QP	48.0	-28.5 +0.6	+11.7	+1.4	+0.5	+0.0	33.7	46.0	-12.3	Horiz
^	233.561M	61.5	-28.5 +0.6	+11.7	+1.4	+0.5	+0.0	47.2	46.0	+1.2	Horiz
8	615.296M QP	38.3	-29.8 +1.1	+19.7	+2.5	+1.0	+0.0	32.8	46.0	-13.2	Horiz
^	615.296M	52.1	-29.8 +1.1	+19.7	+2.5	+1.0	+0.0	46.6	46.0	+0.6	Horiz
10	408.553M QP	38.8	-29.1 +0.9	+16.6	+2.0	+0.7	+0.0	29.9	46.0	-16.1	Horiz
^	408.553M	58.7	-29.1 +0.9	+16.6	+2.0	+0.7	+0.0	49.8	46.0	+3.8	Horiz

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**96813**	Date:	7/1/2015
Test Type:	**Radiated Scan**	Time:	09:05:23
Tested By:	Hieu Song Nguyenpham	Sequence#:	72
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Spurious Emission
Frequency Range: 1000MHz to 25000MHz

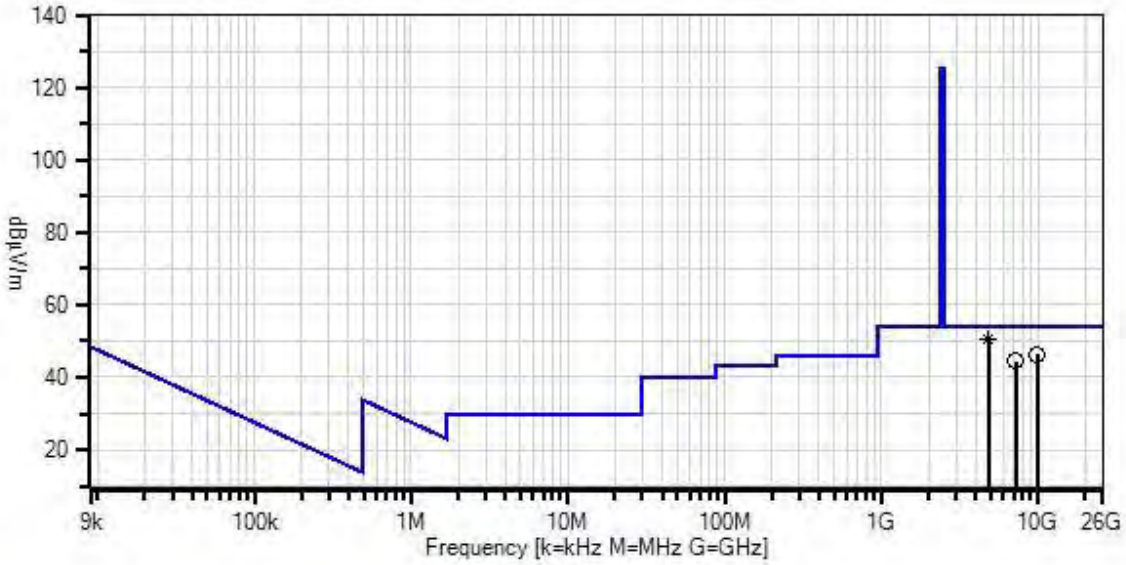
Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: KDB 558074 v03r02 section 12.1 and ANSI C63.4 2009

RBW=1MHz
VBW=1MHz

The EUT is a Compact Sensor. The EUT is placed on 80cm Styrofoam table. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note:
BLE on TX
X axis- Direct to Antenna is the worst orthogonal
Low Channel

Enlighted, Inc WO#: 96813 Sequence#: 72 Date: 7/1/2015
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.02.00

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T3	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
T4	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017
	ANP00928	Cable	various	1/23/2014	1/23/2016
	ANP00929	Cable	various	1/23/2014	1/23/2016
T5	ANP06126	Cable	32022-29094K-29094K-168TC	3/18/2015	3/18/2017
T6	ANP06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
T7	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	4/2/2014	4/2/2016
	AN02741	Active Horn Antenna	AMFW-5F-12001800-20-10P	1/14/2015	1/14/2017
	AN02742	Active Horn Antenna	AMFW-5F-18002650-20-10P	1/14/2015	1/14/2017

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	4804.616M	65.4	+33.2	+1.7	-57.8	+2.9	+0.0	50.3	54.0	-3.7	Horiz
	Ave		+3.6	+1.1	+0.2						
^	4804.616M	71.6	+33.2	+1.7	-57.8	+2.9	+0.0	56.5	54.0	+2.5	Horiz
			+3.6	+1.1	+0.2						
3	9834.933M	50.6	+39.2	+2.4	-57.6	+4.3	+0.0	46.2	54.0	-7.8	Horiz
			+5.4	+1.7	+0.2						
4	7209.860M	55.3	+35.9	+2.0	-58.3	+3.6	+0.0	44.5	54.0	-9.5	Horiz
			+4.5	+1.3	+0.2						

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**96813**	Date:	7/2/2015
Test Type:	**Radiated Scan**	Time:	10:24:09
Tested By:	Hieu Song Nguyenpham	Sequence#:	113
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

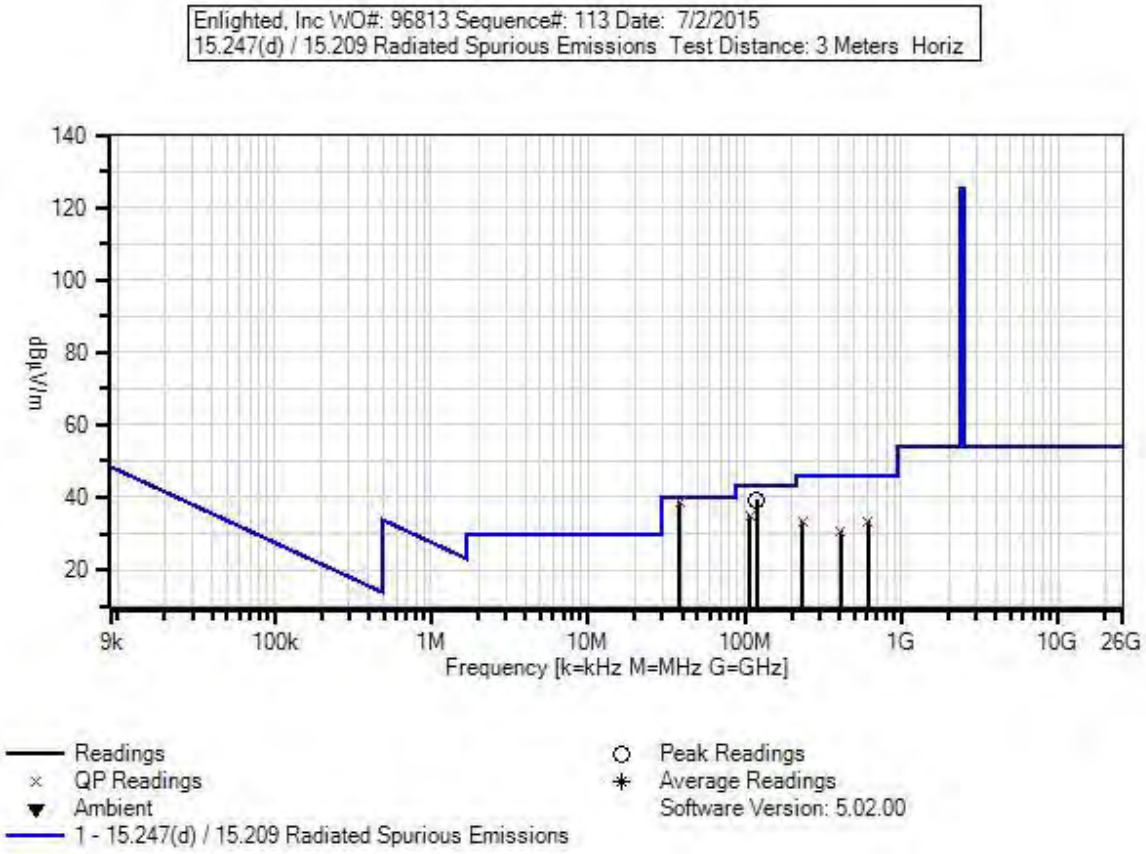
Radiated Spurious Emission
Frequeny Range: 9kHz to 1000MHz

Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: KDB 558074 v03r02 section 12.1 and ANSI C63.4 2009

Frequency range of measurement = 9 kHz- 1GHz.
9 kHz - 150 kHz -> RBW=200 Hz VBW=200 Hz
150 kHz - 30 MHz -> RBW=9 kHz VBW=9 kHz
30 MHz - 1000MHz -> RBW=120 kHz VBW=120 kHz

The EUT is a Compact Sensor. The EUT is placed on 80cm Styrofoam table. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note:
BLE on TX
X axis- Direct to Antenna is the worst orthogonal
Middle Channel


Enlighted, Inc WO#: 96813 Sequence#: 113 Date: 7/2/2015
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
10G
26G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.02.00

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN00686	Preamp	8447D Opt 010	5/27/2014	5/27/2016
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017
T2	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T3	ANP00880	Cable	RG214U	6/13/2014	6/13/2016
T4	ANP01183	Cable	CNT-195	9/3/2013	9/3/2015
T5	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

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	38.513M QP	52.6	-29.3 +0.2	+14.5	+0.5	+0.2	+0.0	38.7	40.0	-1.3	Vert
^	38.513M	60.0	-29.3 +0.2	+14.5	+0.5	+0.2	+0.0	46.1	40.0	+6.1	Vert
3	120.139M	54.8	-29.1 +0.4	+11.8	+1.0	+0.3	+0.0	39.2	43.5	-4.3	Vert
4	108.043M QP	51.6	-29.1 +0.4	+10.9	+0.9	+0.2	+0.0	34.9	43.5	-8.6	Vert
^	108.043M	58.5	-29.1 +0.4	+10.9	+0.9	+0.2	+0.0	41.8	43.5	-1.7	Vert
6	615.212M QP	38.9	-29.8 +1.1	+19.7	+2.5	+1.0	+0.0	33.4	46.0	-12.6	Horiz
^	615.212M	51.6	-29.8 +1.1	+19.7	+2.5	+1.0	+0.0	46.1	46.0	+0.1	Horiz
8	233.589M QP	47.7	-28.5 +0.6	+11.7	+1.4	+0.5	+0.0	33.4	46.0	-12.6	Horiz
^	233.589M	61.8	-28.5 +0.6	+11.7	+1.4	+0.5	+0.0	47.5	46.0	+1.5	Horiz
10	408.536M QP	39.6	-29.1 +0.9	+16.6	+2.0	+0.7	+0.0	30.7	46.0	-15.3	Horiz
^	408.536M	57.9	-29.1 +0.9	+16.6	+2.0	+0.7	+0.0	49.0	46.0	+3.0	Horiz

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**96813**	Date:	7/1/2015
Test Type:	**Radiated Scan**	Time:	09:53:15
Tested By:	Hieu Song Nguyenpham	Sequence#:	75
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Spurious Emission
Frequeny Range: 1000MHz to 25000MHz

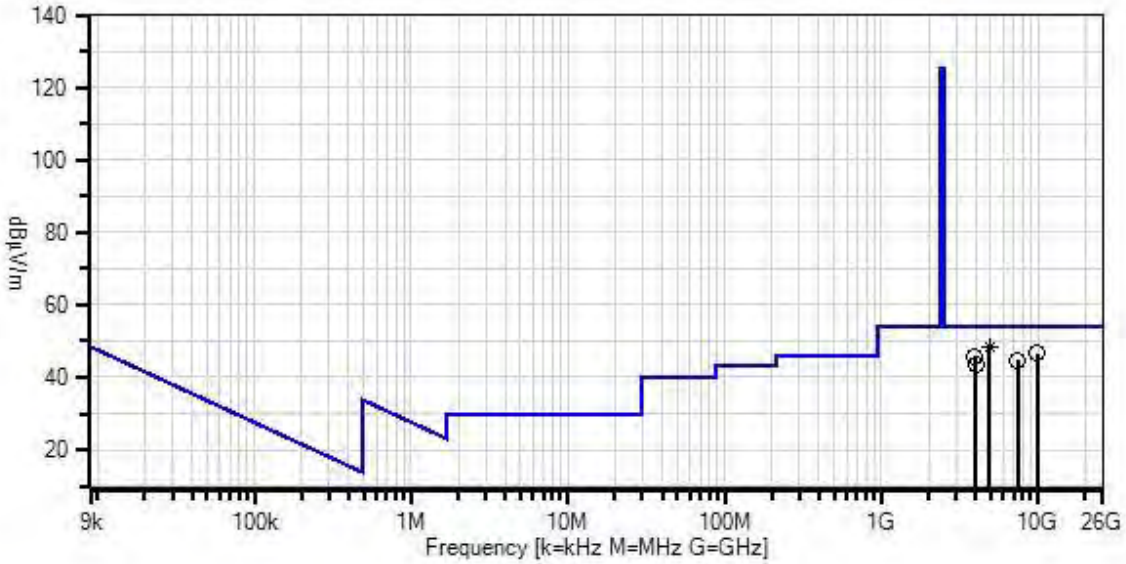
Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: KDB 558074 v03r02 section 12.1 and ANSI C63.4 2009

RBW=1MHz
VBW=1MHz

The EUT is a Compact Sensor. The EUT is placed on 80cm Styrofoam table. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving

Note:
BLE on TX
X axis- Direct to Antenna is the worst orthogonal
Middle Channel

Enlighted, Inc WO#: 96813 Sequence#: 75 Date: 7/1/2015
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.02.00

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T3	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
T4	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017
	ANP00928	Cable	various	1/23/2014	1/23/2016
	ANP00929	Cable	various	1/23/2014	1/23/2016
T5	ANP06126	Cable	32022-29094K-29094K-168TC	3/18/2015	3/18/2017
T6	ANP06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
T7	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	4/2/2014	4/2/2016
	AN02741	Active Horn Antenna	AMFW-5F-12001800-20-10P	1/14/2015	1/14/2017
	AN02742	Active Horn Antenna	AMFW-5F-18002650-20-10P	1/14/2015	1/14/2017

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	4880.562M	62.9	+33.4	+1.7	-57.6	+2.9	+0.0	48.2	54.0	-5.8	Horiz
	Ave		+3.6	+1.1	+0.2						
^	4880.562M	69.5	+33.4	+1.7	-57.6	+2.9	+0.0	54.8	54.0	+0.8	Horiz
			+3.6	+1.1	+0.2						
3	9813.845M	51.0	+39.1	+2.4	-57.6	+4.3	+0.0	46.5	54.0	-7.5	Horiz
			+5.4	+1.7	+0.2						
4	3923.282M	63.5	+32.5	+1.5	-58.9	+2.5	+0.0	45.6	54.0	-8.4	Vert
			+3.2	+1.0	+0.3						
5	7384.302M	54.4	+36.6	+2.1	-58.3	+3.6	+0.0	44.6	54.0	-9.4	Horiz
			+4.6	+1.4	+0.2						
6	4015.237M	61.6	+32.3	+1.5	-59.0	+2.6	+0.0	43.5	54.0	-10.5	Vert
			+3.2	+1.0	+0.3						

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**96813**	Date:	7/2/2015
Test Type:	**Radiated Scan**	Time:	10:51:08
Tested By:	Hieu Song Nguyenpham	Sequence#:	116
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Spurious Emission
Frequeny Range: 9kHz to 1000MHz

Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: KDB 558074 v03r02 section 12.1 and ANSI C63.4 2009

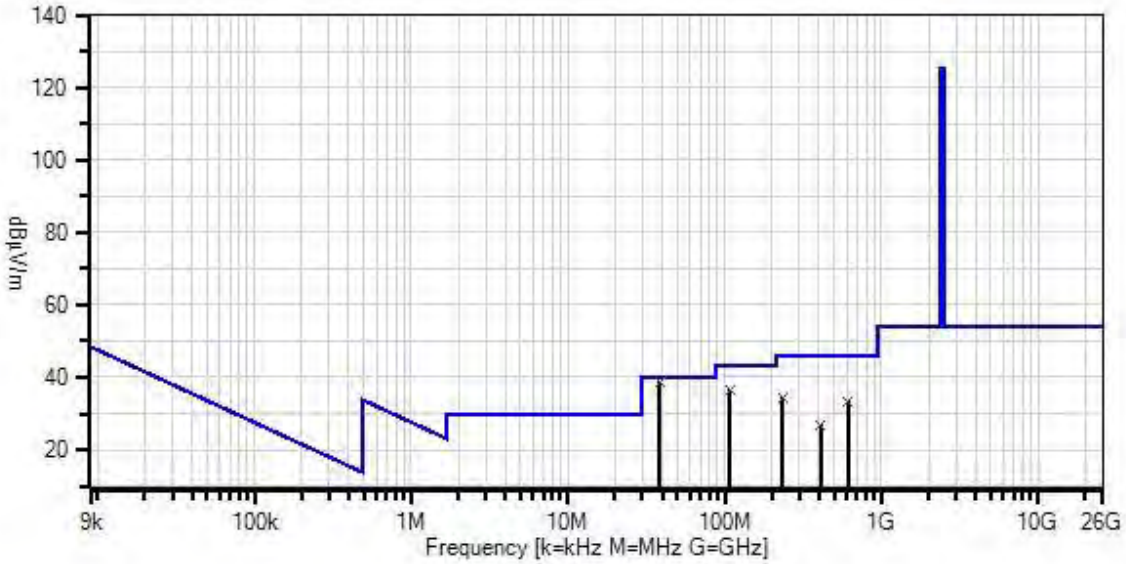
Frequency range of measurement = 9 kHz- 1GHz.

9 kHz - 150 kHz ->	RBW=200 Hz	VBW=200 Hz
150 kHz - 30 MHz ->	RBW=9 kHz	VBW=9 kHz
30 MHz - 1000MHz ->	RBW=120 kHz	VBW=120 kHz

The EUT is a Compact Sensor. The EUT is placed on 80cm Styrofoam table. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note:
BLE on TX
X axis- Direct to Antenna is the worst orthogonal
High Channel

Enlighted, Inc WO#: 96813 Sequence#: 116 Date: 7/2/2015
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.02.00

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN00686	Preamp	8447D Opt 010	5/27/2014	5/27/2016
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017
T2	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T3	ANP00880	Cable	RG214U	6/13/2014	6/13/2016
T4	ANP01183	Cable	CNT-195	9/3/2013	9/3/2015
T5	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

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	38.513M QP	52.7	-29.3 +0.2	+14.5	+0.5	+0.2	+0.0	38.8	40.0	-1.2	Vert
^	38.513M	60.2	-29.3 +0.2	+14.5	+0.5	+0.2	+0.0	46.3	40.0	+6.3	Vert
3	108.083M QP	53.4	-29.1 +0.4	+10.9	+0.9	+0.2	+0.0	36.7	43.5	-6.8	Vert
^	108.083M	58.7	-29.1 +0.4	+10.9	+0.9	+0.2	+0.0	42.0	43.5	-1.5	Vert
5	233.688M QP	48.9	-28.5 +0.6	+11.7	+1.4	+0.5	+0.0	34.6	46.0	-11.4	Horiz
^	233.688M	61.9	-28.5 +0.6	+11.7	+1.4	+0.5	+0.0	47.6	46.0	+1.6	Horiz
7	615.159M QP	38.8	-29.8 +1.1	+19.7	+2.5	+1.0	+0.0	33.3	46.0	-12.7	Horiz
^	615.159M	50.8	-29.8 +1.1	+19.7	+2.5	+1.0	+0.0	45.3	46.0	-0.7	Horiz
9	409.099M QP	35.7	-29.1 +0.9	+16.6	+2.0	+0.7	+0.0	26.8	46.0	-19.2	Vert
^	409.099M	54.7	-29.1 +0.9	+16.6	+2.0	+0.7	+0.0	45.8	46.0	-0.2	Vert

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**96813**	Date:	7/1/2015
Test Type:	**Radiated Scan**	Time:	10:26:17
Tested By:	Hieu Song Nguyenpham	Sequence#:	78
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Spurious Emission
Frequeny Range: 1000MHz to 25000MHz

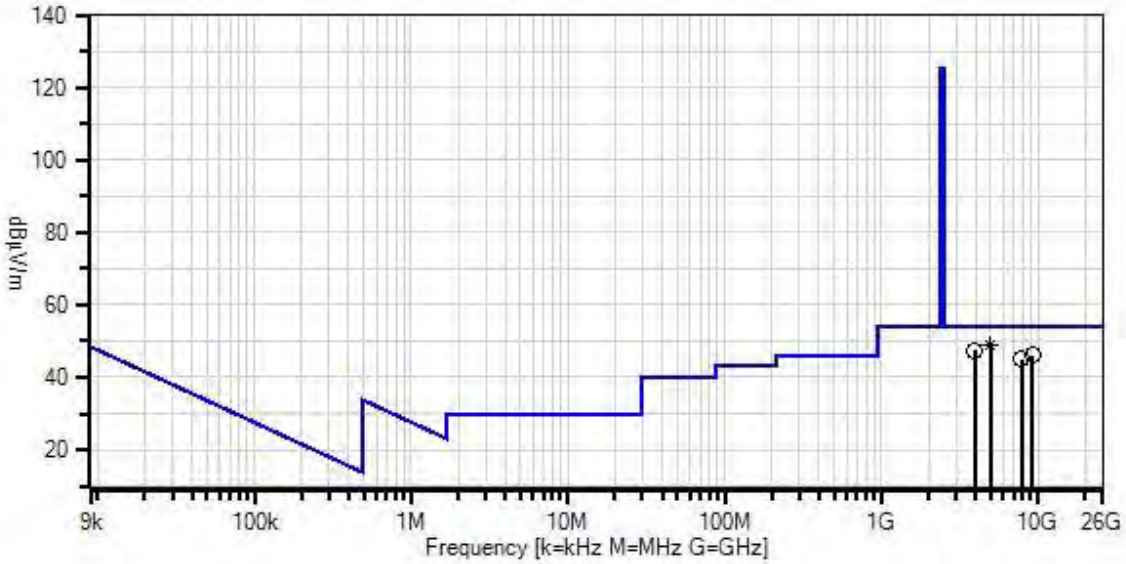
Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: KDB 558074 v03r02 section 12.1 and ANSI C63.4 2009

RBW=1MHz
VBW=1MHz

The EUT is a Compact Sensor. The EUT is placed on 80cm Styrofoam table. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note:
BLE on TX
X axis- Direct to Antenna is the worst orthogonal
High Channel

Enlighted, Inc WO#: 96813 Sequence#: 78 Date: 7/1/2015
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.02.00

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T3	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
T4	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017
	ANP00928	Cable	various	1/23/2014	1/23/2016
	ANP00929	Cable	various	1/23/2014	1/23/2016
T5	ANP06126	Cable	32022-29094K-29094K-168TC	3/18/2015	3/18/2017
T6	ANP06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
T7	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	4/2/2014	4/2/2016
	AN02741	Active Horn Antenna	AMFW-5F-12001800-20-10P	1/14/2015	1/14/2017
	AN02742	Active Horn Antenna	AMFW-5F-18002650-20-10P	1/14/2015	1/14/2017

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	4959.570M	63.3	+33.5	+1.7	-57.3	+2.9	+0.0	49.0	54.0	-5.0	Horiz
	Ave		+3.6	+1.1	+0.2						
^	4959.570M	66.6	+33.5	+1.7	-57.3	+2.9	+0.0	52.3	54.0	-1.7	Horiz
			+3.6	+1.1	+0.2						
3	3955.591M	65.3	+32.4	+1.5	-58.9	+2.5	+0.0	47.3	54.0	-6.7	Horiz
			+3.2	+1.0	+0.3						
4	9156.593M	50.8	+38.2	+2.3	-56.6	+4.2	+0.0	46.0	54.0	-8.0	Horiz
			+5.2	+1.6	+0.3						
5	7854.020M	53.9	+36.6	+2.2	-57.8	+3.8	+0.0	45.0	54.0	-9.0	Horiz
			+4.7	+1.4	+0.2						

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**96813**	Date:	7/1/2015
Test Type:	**Radiated Scan**	Time:	15:07:47
Tested By:	Hieu Song Nguyenpham	Sequence#:	93
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Spurious Emission
Frequeny Range: 9kHz to 1000MHz

Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: KDB 558074 v03r02 section 12.1 and ANSI C63.4 2009

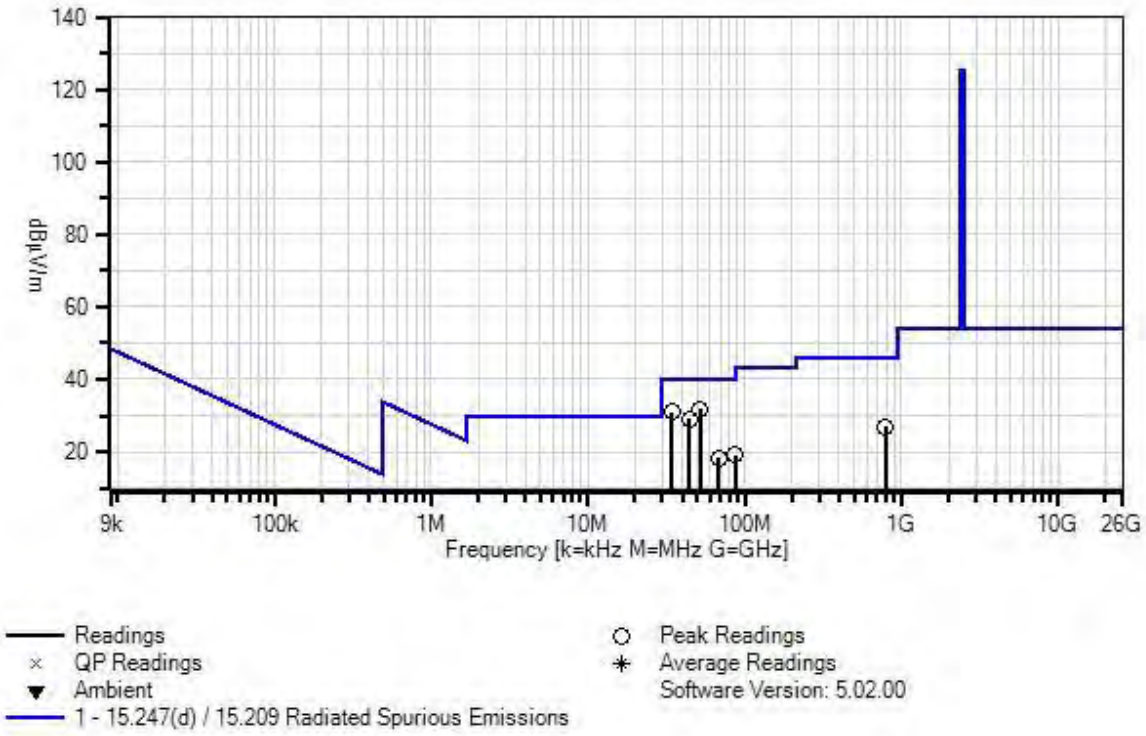
Frequency range of measurement = 9 kHz- 1GHz.

9 kHz - 150 kHz ->	RBW=200 Hz	VBW=200 Hz
150 kHz - 30 MHz ->	RBW=9 kHz	VBW=9 kHz
30 MHz - 1000MHz ->	RBW=120 kHz	VBW=120 kHz

The EUT is a Compact Sensor. The EUT is placed on 80cm Styrofoam table. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note:
Zigbee on TX
X axis- Direct to Antenna is the worst orthogonal
Low Channel

Enlighted, Inc WO#: 96813 Sequence#: 93 Date: 7/1/2015
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN00686	Preamp	8447D Opt 010	5/27/2014	5/27/2016
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017
T2	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T3	ANP00880	Cable	RG214U	6/13/2014	6/13/2016
T4	ANP01183	Cable	CNT-195	9/3/2013	9/3/2015
T5	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

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	51.968M	51.6	-29.3 +0.2	+8.5	+0.6	+0.2	+0.0	31.8	40.0	-8.2	Vert
2	34.166M	42.5	-29.3 +0.2	+16.9	+0.5	+0.2	+0.0	31.0	40.0	-9.0	Vert
3	44.561M	45.7	-29.3 +0.2	+11.6	+0.6	+0.3	+0.0	29.1	40.0	-10.9	Vert
4	797.414M	29.0	-29.5 +1.3	+21.9	+2.9	+1.2	+0.0	26.8	46.0	-19.2	Horiz
5	87.859M	38.3	-29.2 +0.3	+8.7	+0.8	+0.3	+0.0	19.2	40.0	-20.8	Horiz
6	67.918M	40.1	-29.3 +0.3	+6.2	+0.7	+0.2	+0.0	18.2	40.0	-21.8	Horiz

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**96813**	Date:	7/1/2015
Test Type:	**Radiated Scan**	Time:	11:03:42
Tested By:	Hieu Song Nguyenpham	Sequence#:	81
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Spurious Emission
Frequeny Range: 1000MHz to 25000MHz

Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: KDB 558074 v03r02 section 12.1 and ANSI C63.4 2009

RBW=1MHz
VBW=1MHz

The EUT is a Compact Sensor. The EUT is placed on 80cm Styrofoam table. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note:
Zigbee on TX
X axis- Direct to Antenna is the worst orthogonal
Low Channel

Enlighted, Inc WO#: 96813 Sequence#: 81 Date: 7/1/2015
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz

Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.02.00

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T3	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
T4	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017
	ANP00928	Cable	various	1/23/2014	1/23/2016
	ANP00929	Cable	various	1/23/2014	1/23/2016
T5	ANP06126	Cable	32022-29094K-29094K-168TC	3/18/2015	3/18/2017
T6	ANP06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
T7	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	4/2/2014	4/2/2016
	AN02741	Active Horn Antenna	AMFW-5F-12001800-20-10P	1/14/2015	1/14/2017
	AN02742	Active Horn Antenna	AMFW-5F-18002650-20-10P	1/14/2015	1/14/2017

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	7496.139M	54.5	+36.6 +4.6	+2.1 +1.4	-58.3 +0.2	+3.7	+0.0	44.8	54.0	-9.2	Horiz
2	9618.035M Ave	48.2	+38.6 +5.3	+2.4 +1.6	-57.2 +0.2	+4.3	+0.0	43.4	54.0	-10.6	Horiz
^	9618.035M	57.5	+38.6 +5.3	+2.4 +1.6	-57.2 +0.2	+4.3	+0.0	52.7	54.0	-1.3	Horiz
4	4811.028M Ave	57.2	+33.2 +3.6	+1.7 +1.1	-57.8 +0.2	+2.9	+0.0	42.1	54.0	-11.9	Horiz
^	4811.028M	64.5	+33.2 +3.6	+1.7 +1.1	-57.8 +0.2	+2.9	+0.0	49.4	54.0	-4.6	Horiz

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**96813**	Date:	7/1/2015
Test Type:	**Radiated Scan**	Time:	15:31:24
Tested By:	Hieu Song Nguyenpham	Sequence#:	96
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Spurious Emission
Frequeny Range: 9kHz to 1000MHz

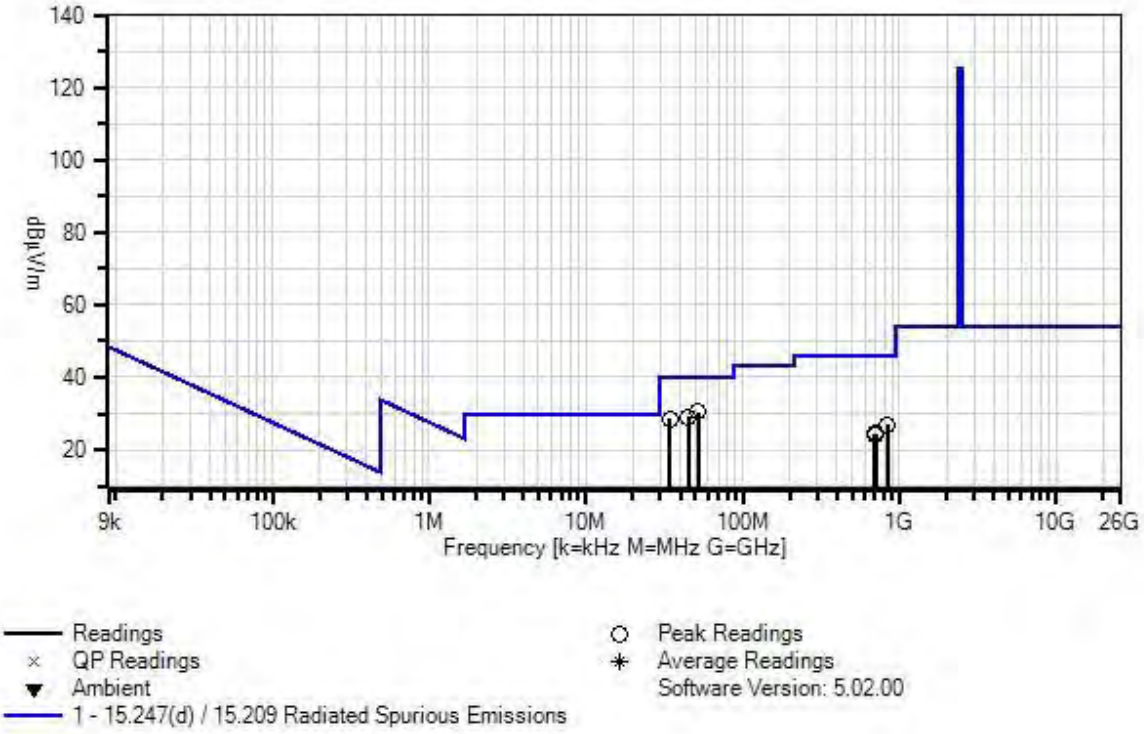
Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: KDB 558074 v03r02 section 12.1 and ANSI C63.4 2009

Frequency range of measurement = 9 kHz- 1GHz.
9 kHz - 150 kHz -> RBW=200 Hz VBW=200 Hz
150 kHz - 30 MHz -> RBW=9 kHz VBW=9 kHz
30 MHz - 1000MHz -> RBW=120 kHz VBW=120 kHz

The EUT is a Compact Sensor. The EUT is placed on 80cm Styrofoam table. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note:
Zigbee on TX
X axis- Direct to Antenna is the worst orthogonal
Middle Channel

Enlighted, Inc WO#: 96813 Sequence#: 96 Date: 7/1/2015
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN00686	Preamp	8447D Opt 010	5/27/2014	5/27/2016
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017
T2	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T3	ANP00880	Cable	RG214U	6/13/2014	6/13/2016
T4	ANP01183	Cable	CNT-195	9/3/2013	9/3/2015
T5	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

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	52.305M	50.2	-29.3 +0.2	+8.4	+0.6	+0.2	+0.0	30.3	40.0	-9.7	Vert
2	45.066M	45.9	-29.3 +0.2	+11.4	+0.6	+0.3	+0.0	29.1	40.0	-10.9	Vert
3	34.503M	40.3	-29.3 +0.2	+16.7	+0.5	+0.2	+0.0	28.6	40.0	-11.4	Vert
4	837.114M	28.7	-29.4 +1.3	+22.4	+3.0	+1.0	+0.0	27.0	46.0	-19.0	Horiz
5	698.748M	28.7	-29.7 +1.2	+20.5	+2.8	+1.0	+0.0	24.5	46.0	-21.5	Horiz
6	703.419M	28.3	-29.7 +1.2	+20.6	+2.9	+1.0	+0.0	24.3	46.0	-21.7	Horiz

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**96813**	Date:	7/1/2015
Test Type:	**Radiated Scan**	Time:	11:25:14
Tested By:	Hieu Song Nguyenpham	Sequence#:	84
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Spurious Emission
Frequeny Range: 1000MHz to 25000MHz

Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: KDB 558074 v03r02 section 12.1 and ANSI C63.4 2009

RBW=1MHz
VBW=1MHz

The EUT is a Compact Sensor. The EUT is placed on 80cm Styrofoam table. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note:
Zigbee on TX
X axis- Direct to Antenna is the worst orthogonal
Middle Channel

Enlighted, Inc WO#: 96813 Sequence#: 84 Date: 7/1/2015
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz

Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.02.00

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T3	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
T4	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017
	ANP00928	Cable	various	1/23/2014	1/23/2016
	ANP00929	Cable	various	1/23/2014	1/23/2016
T5	ANP06126	Cable	32022-29094K-29094K-168TC	3/18/2015	3/18/2017
T6	ANP06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
T7	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	4/2/2014	4/2/2016
	AN02741	Active Horn Antenna	AMFW-5F-12001800-20-10P	1/14/2015	1/14/2017
	AN02742	Active Horn Antenna	AMFW-5F-18002650-20-10P	1/14/2015	1/14/2017

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	4878.805M	62.7	+33.4 +3.6	+1.7 +1.1	-57.6 +0.2	+2.9	+0.0	48.0	54.0	-6.0	Horiz
2	7394.243M	54.4	+36.6 +4.6	+2.1 +1.4	-58.3 +0.2	+3.7	+0.0	44.7	54.0	-9.3	Vert
3	9762.150M Ave	47.9	+39.0 +5.4	+2.4 +1.6	-57.6 +0.2	+4.3	+0.0	43.2	54.0	-10.8	Horiz
^	9762.150M	57.0	+39.0 +5.4	+2.4 +1.6	-57.6 +0.2	+4.3	+0.0	52.3	54.0	-1.7	Horiz

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**96813**	Date:	7/1/2015
Test Type:	**Radiated Scan**	Time:	15:54:10
Tested By:	Hieu Song Nguyenpham	Sequence#:	99
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Spurious Emission
Frequeny Range: 9kHz to 1000MHz

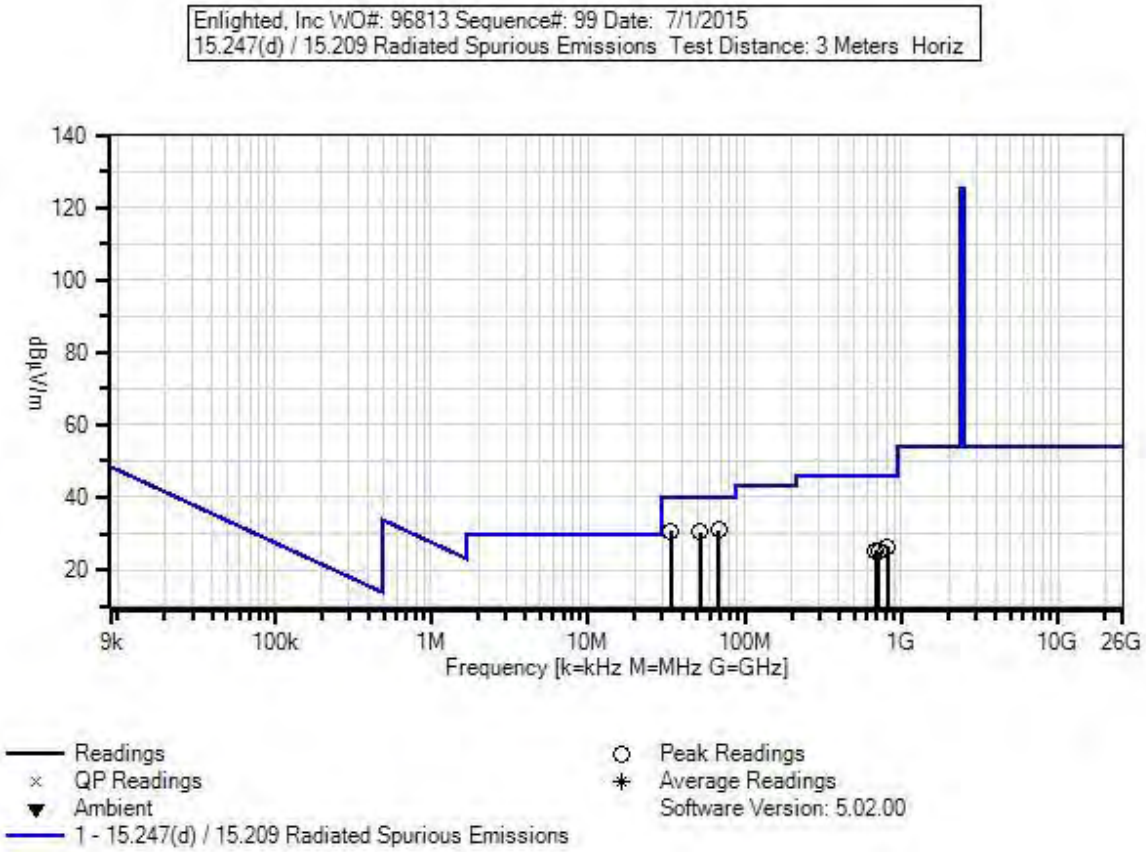
Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: KDB 558074 v03r02 section 12.1 and ANSI C63.4 2009

Frequency range of measurement = 9 kHz- 1GHz.

9 kHz - 150 kHz ->	RBW=200 Hz	VBW=200 Hz
150 kHz - 30 MHz ->	RBW=9 kHz	VBW=9 kHz
30 MHz - 1000MHz ->	RBW=120 kHz	VBW=120 kHz

The EUT is a Compact Sensor. The EUT is placed on 80cm Styrofoam table. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note:
Zigbee on TX
X axis- Direct to Antenna is the worst orthogonal
High Channel


Enlighted, Inc WO#: 96813 Sequence#: 99 Date: 7/1/2015
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
10G
26G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.02.00

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN00686	Preamp	8447D Opt 010	5/27/2014	5/27/2016
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017
T2	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T3	ANP00880	Cable	RG214U	6/13/2014	6/13/2016
T4	ANP01183	Cable	CNT-195	9/3/2013	9/3/2015
T5	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

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	68.507M	52.8	-29.3 +0.3	+6.2	+0.7	+0.2	+0.0	30.9	40.0	-9.1	Vert
2	33.956M	42.0	-29.3 +0.2	+17.0	+0.5	+0.2	+0.0	30.6	40.0	-9.4	Vert
3	51.884M	50.3	-29.3 +0.2	+8.5	+0.6	+0.2	+0.0	30.5	40.0	-9.5	Vert
4	821.935M	28.3	-29.4 +1.3	+22.2	+3.0	+1.1	+0.0	26.5	46.0	-19.5	Horiz
5	691.743M	29.5	-29.7 +1.2	+20.4	+2.8	+1.1	+0.0	25.3	46.0	-20.7	Horiz
6	715.095M	28.9	-29.6 +1.2	+20.7	+2.9	+1.0	+0.0	25.1	46.0	-20.9	Horiz

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**96813**	Date:	7/1/2015
Test Type:	**Radiated Scan**	Time:	11:49:54
Tested By:	Hieu Song Nguyenpham	Sequence#:	87
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Spurious Emission
Frequeny Range: 1000MHz to 25000MHz

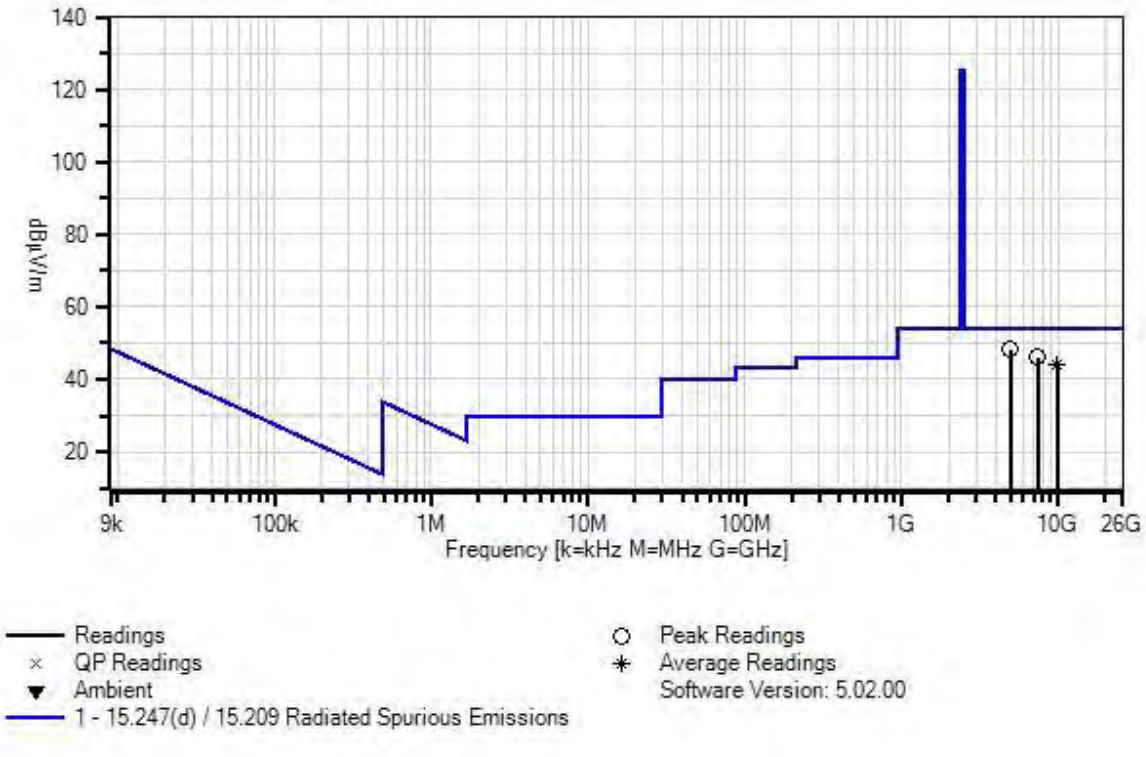
Application: PuTTy version 0.64 for Zigbee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for Zigbee= 0dBi
Method: KDB 558074 v03r02 section 12.1 and ANSI C63.4 2009

RBW=1MHz
VBW=1MHz

The EUT is a Compact Sensor. The EUT is placed on 80cm Styrofoam table. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note:
Zigbee on TX
X axis- Direct to Antenna is the worst orthogonal
High Channel

Enlighted, Inc WO#: 96813 Sequence#: 87 Date: 7/1/2015
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T3	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
T4	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017
	ANP00928	Cable	various	1/23/2014	1/23/2016
	ANP00929	Cable	various	1/23/2014	1/23/2016
T5	ANP06126	Cable	32022-29094K-29094K-168TC	3/18/2015	3/18/2017
T6	ANP06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
T7	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	4/2/2014	4/2/2016
	AN02741	Active Horn Antenna	AMFW-5F-12001800-20-10P	1/14/2015	1/14/2017
	AN02742	Active Horn Antenna	AMFW-5F-18002650-20-10P	1/14/2015	1/14/2017

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	4959.643M	62.5	+33.5 +3.6	+1.7 +1.1	-57.3 +0.2	+2.9	+0.0	48.2	54.0	-5.8	Horiz
2	7441.463M	55.6	+36.6 +4.6	+2.1 +1.4	-58.2 +0.2	+3.7	+0.0	46.0	54.0	-8.0	Horiz
3	9917.927M Ave	48.0	+39.5 +5.4	+2.4 +1.7	-57.7 +0.2	+4.3	+0.0	43.8	54.0	-10.2	Horiz
^	9917.927M	56.3	+39.5 +5.4	+2.4 +1.7	-57.7 +0.2	+4.3	+0.0	52.1	54.0	-1.9	Horiz

Band Edge

Test Conditions/Setup

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**Band edge**		
Work Order #:	**96813**	Date:	6/26/2015
Test Type:	**Radiated Measurement**	Time:	09:59:39
Tested By:	Hieu Song Nguyenpham	Sequence#:	2
Software:	EMITest 5.02.00		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5	3115	1/23/2013	1/23/2015
T2	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Band edge set up
Application: Putty version 0.64 for ZigBee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for ZigBee= 0dBi
Method: KDB 558074 v03r02 section 13.2

The EUT is a Compact Sensor. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

Note: BLE on TX Mode

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Enlighted, Inc.**		
Specification:	**Band edge**		
Work Order #:	**96813**	Date:	6/26/2015
Test Type:	**Radiated Measurement**	Time:	09:59:39
Tested By:	Hieu Song Nguyenpham	Sequence#:	2
Software:	EMITest 5.02.00		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5	3115	1/23/2013	1/23/2015
T2	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Band edge set up

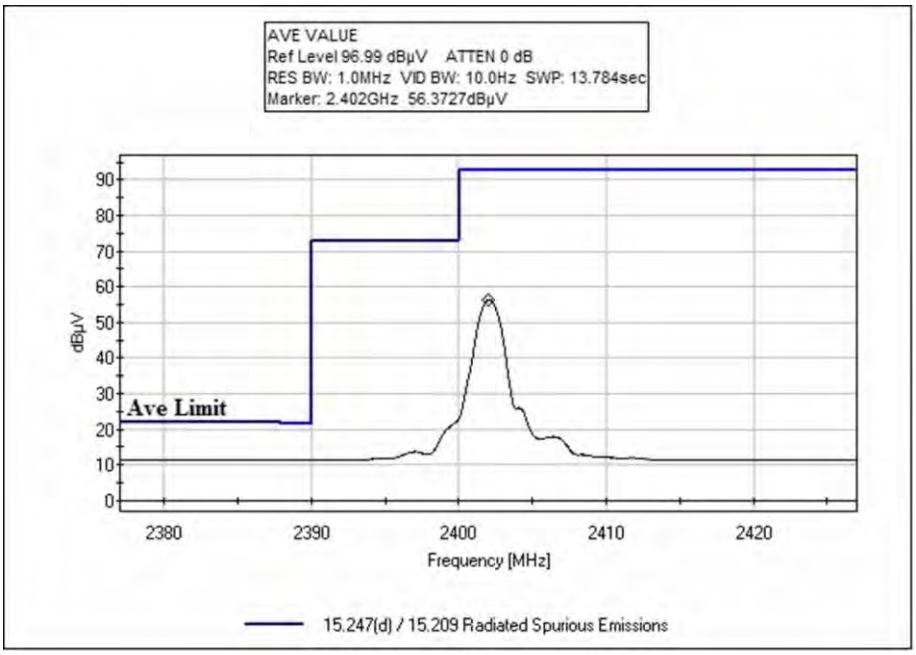
Application: Putty version 0.64 for ZigBee
Application: Smart RF Studio 7 version 2.1.0 for Bluetooth
Temperature: 22.3°C
Humidity: 39 %
Atmospheric Pressure: 100.4 kPa
High Clock: 16MHz
Transmit freq, Bluetooth = 2402MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Transmit freq, Zigbee = 2405MHz (Low Channel), 2440MHz (Middle Channel), 2480MHz (High Channel)
Gain of the antenna for Bluetooth= 0dBi
Gain of the antenna for ZigBee= 0dBi
Method: KDB 558074 v03r02 section 13.2

The EUT is a Compact Sensor. In order to monitor the EUT and control the EUT, the EUT is connected to the Laptop which is outside the chamber through the USB cable and use an application "PuTTy" for Zigbee and "Smart RF Studio 7" for Bluetooth. The EUT is set continuously transmitting or receiving.

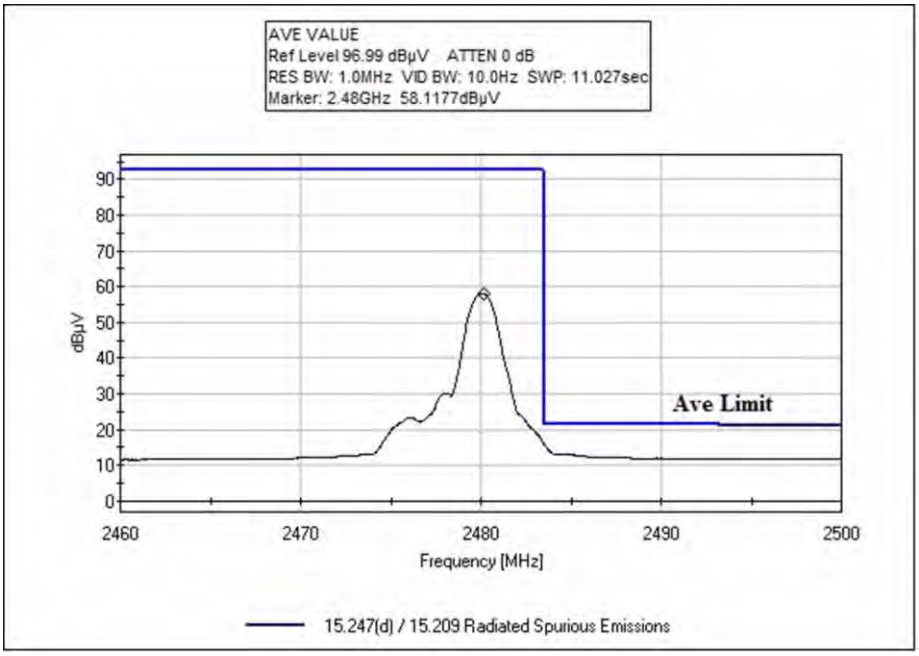
Note: Zigbee on TX Mode

Test Data

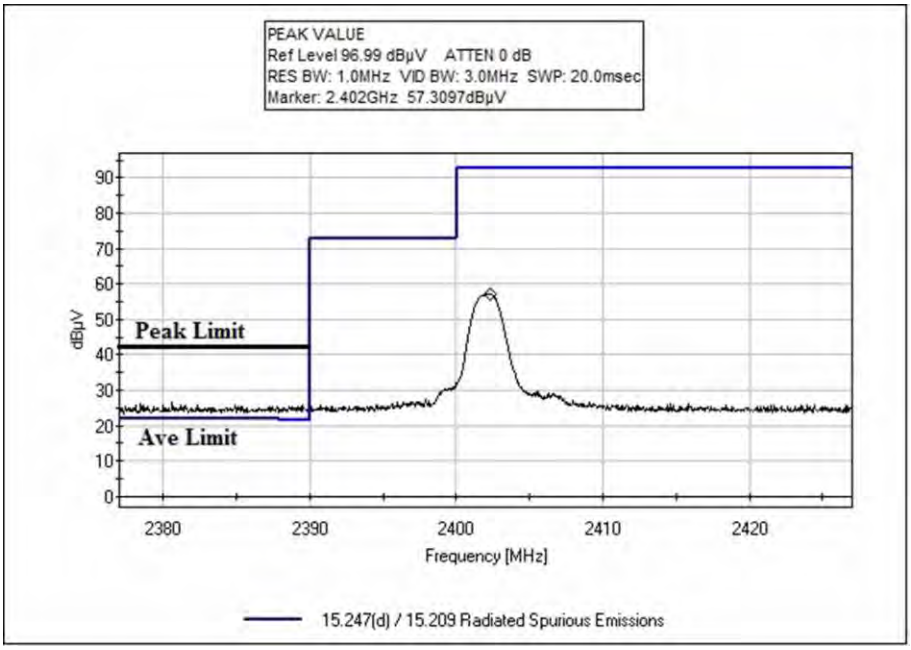
Bluetooth



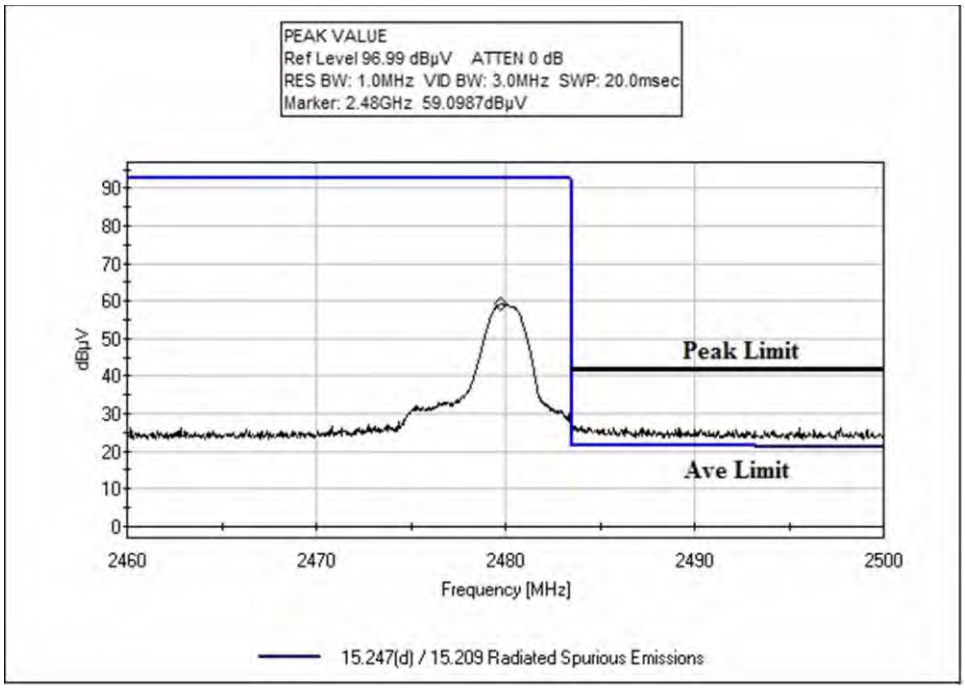
Low Channel



High Channel

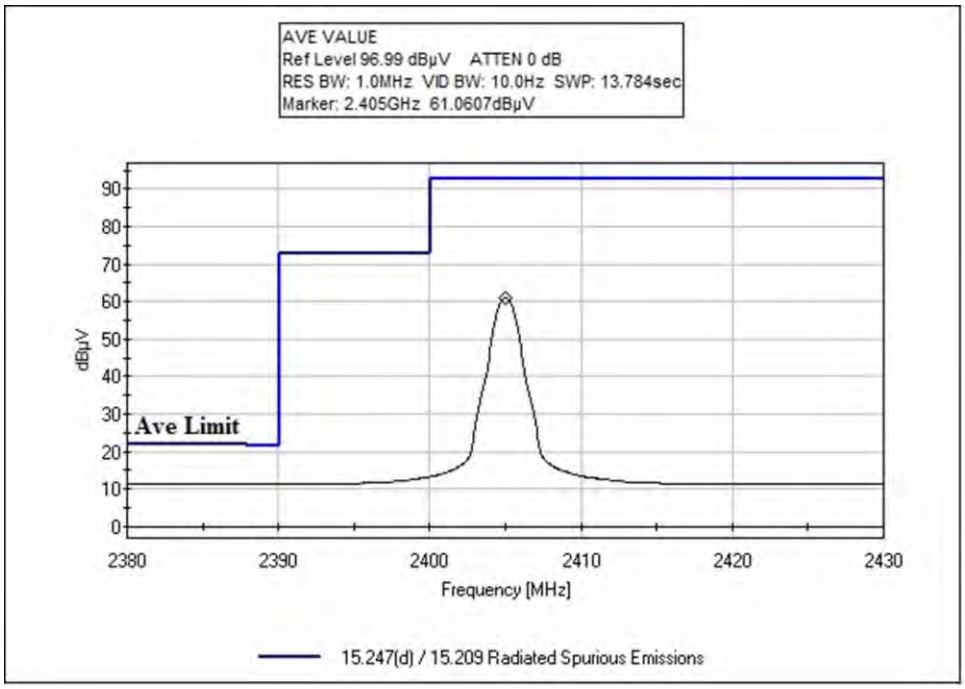


Low Channel

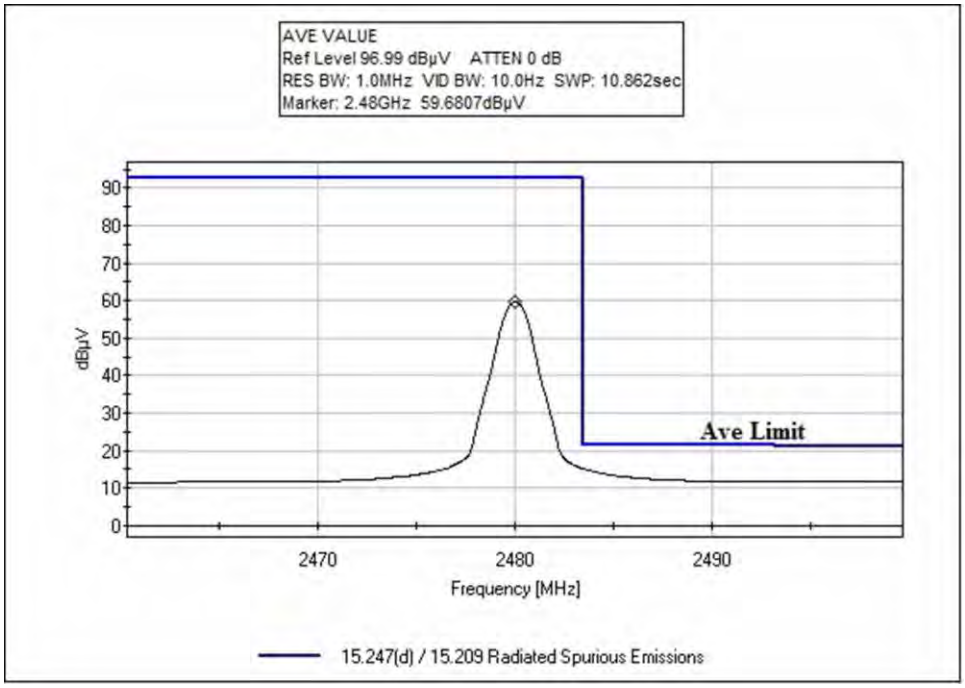


High Channel

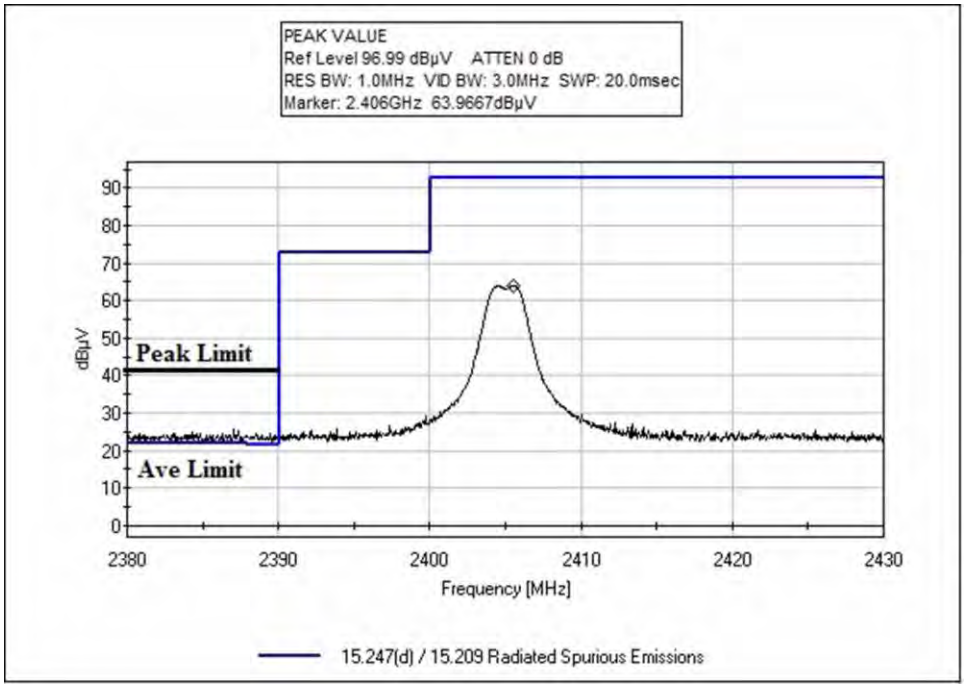
Zigbee



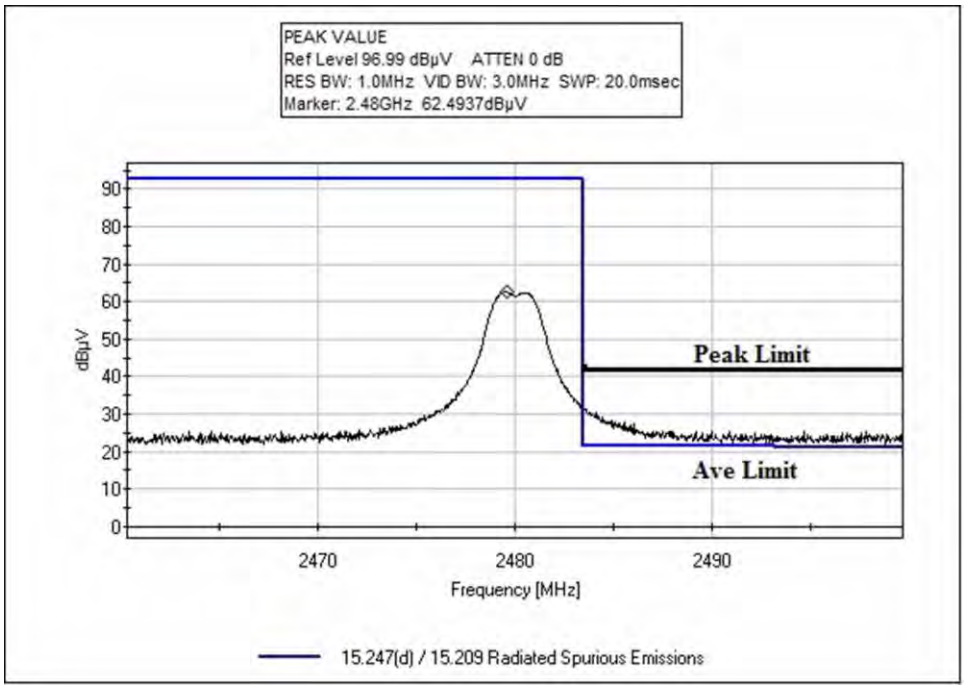
Low Channel



High Channel

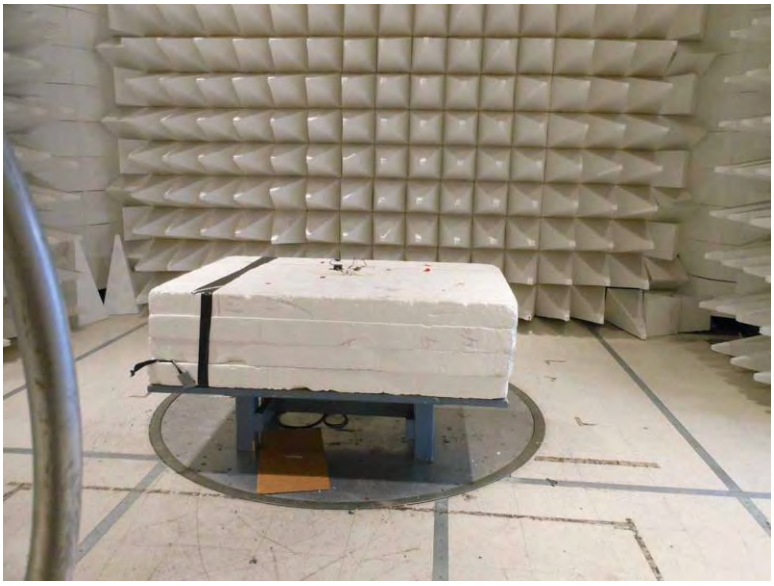


Low Channel

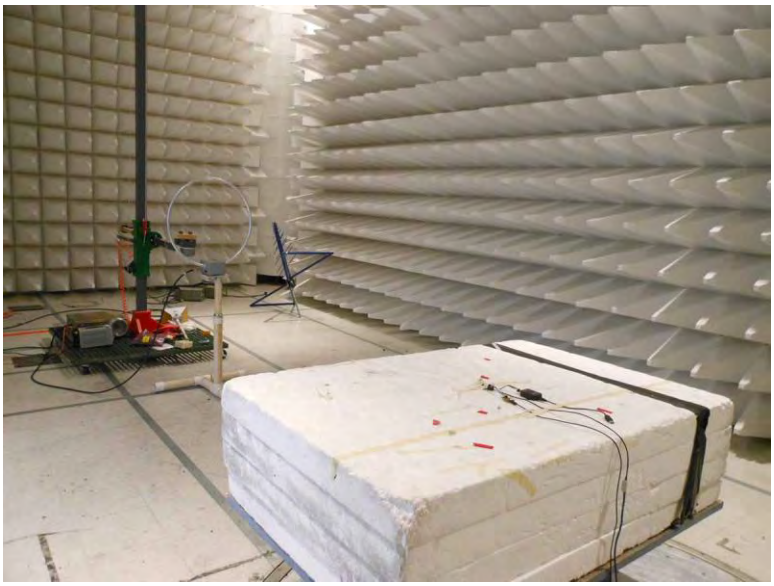


High Channel

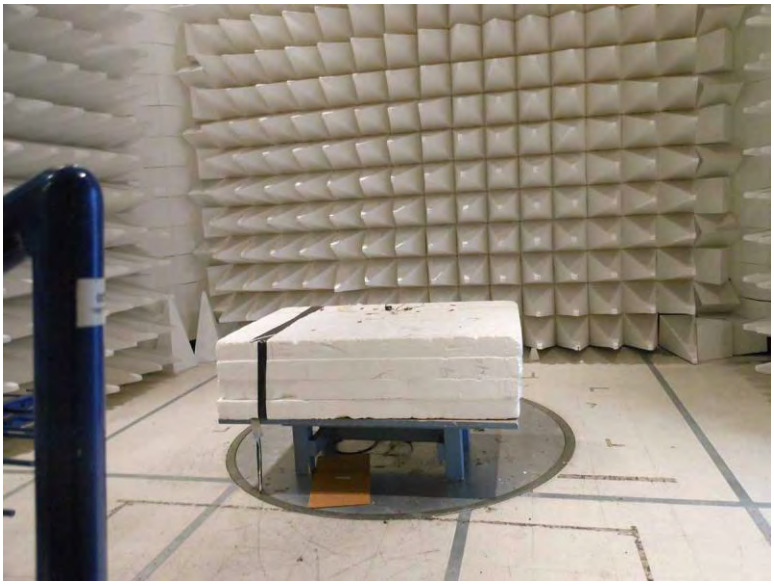
Test Setup Photo(s)



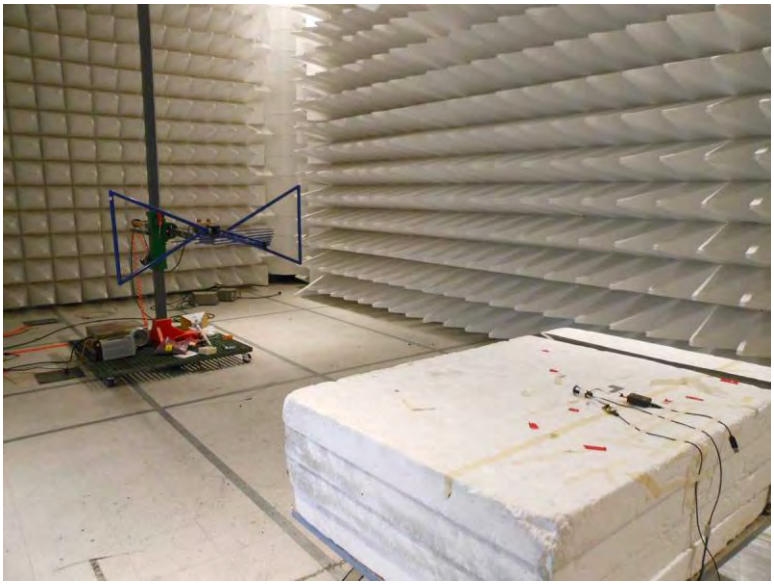
Front View, 9kHz-30MHz



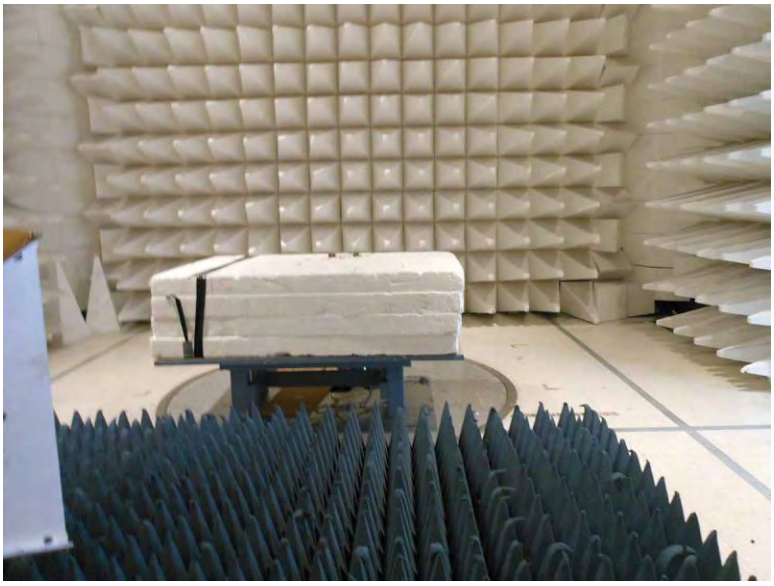
Back View, 9kHz-30MHz



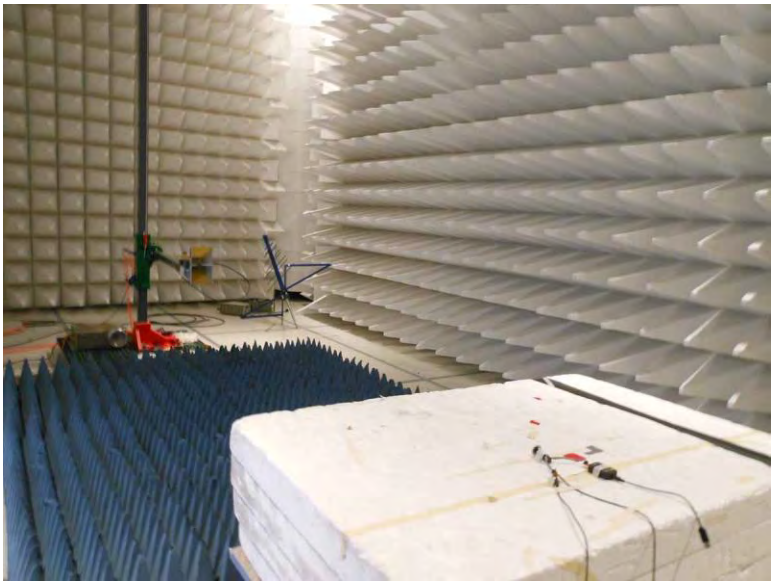
Front View, 30MHz-1GHz



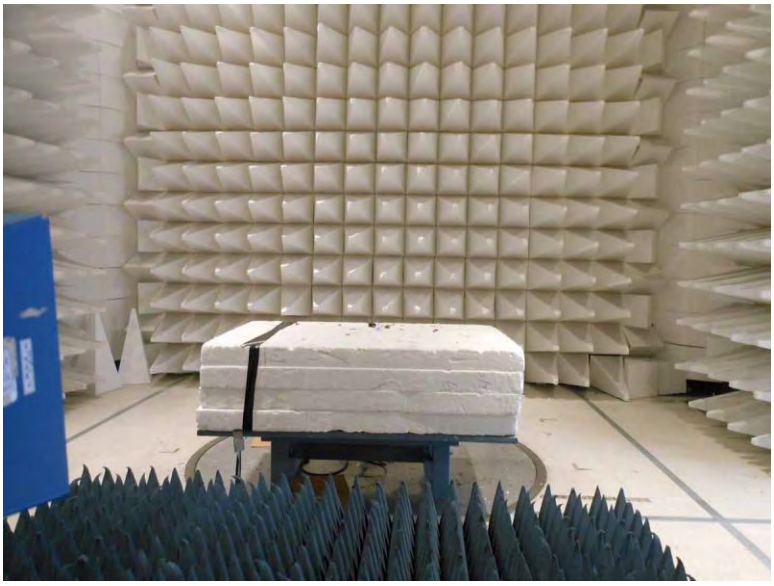
Back View, 30MHz-1GHz



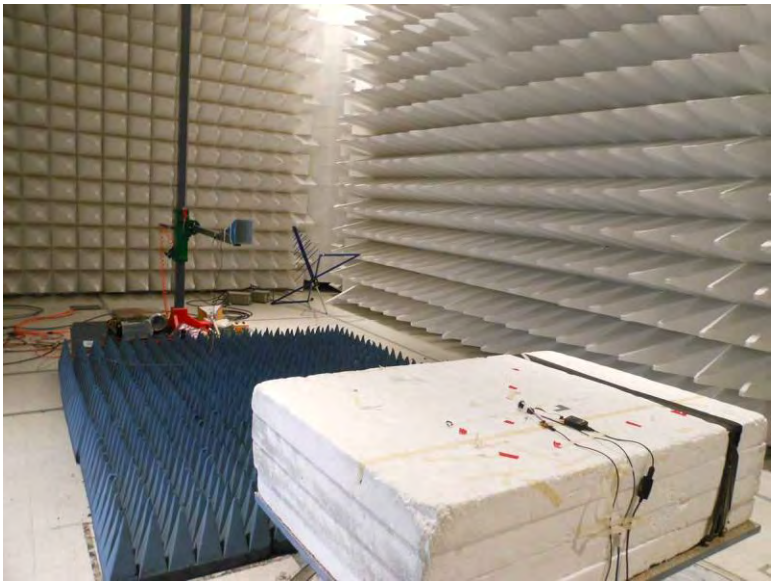
Front View, 1-12GHz



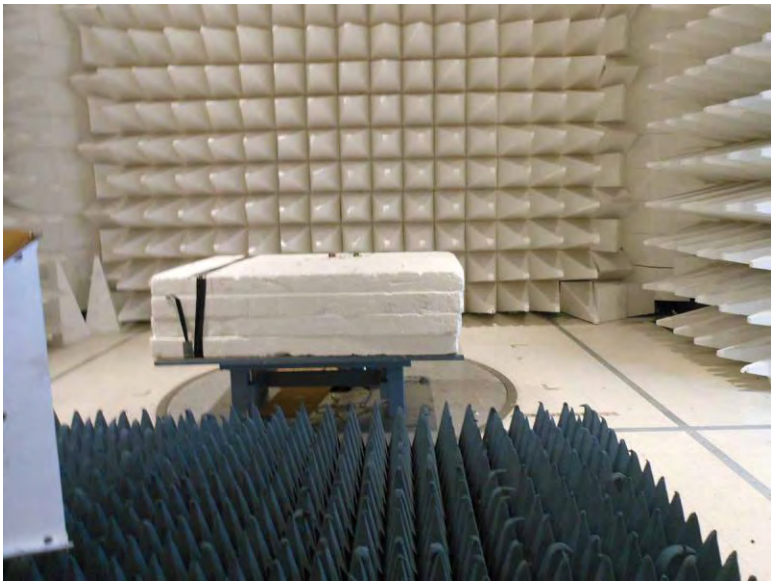
Back View, 1-12GHz



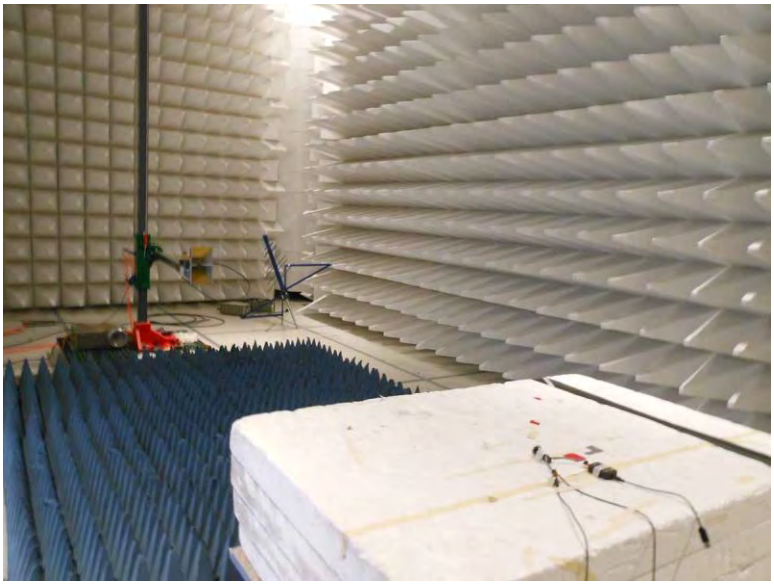
Front View, 12-25GHz



Back View, 12-25GHz



Front View, Band Edge



Back View, Band Edge

SUPPLEMENTAL INFORMATION

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.