

Enlighted, Inc.

ADDENDUM TO TEST REPORT 97407-6

Enlighted USB Commissioning Key
Model: UK-01

Tested To The Following Standards:

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

Report No.: 97407-6A

Date of issue: October 23, 2015



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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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

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

REPRESENTATIVE: Deepak Kumar
Customer Reference Number: 0002755

DATE OF EQUIPMENT RECEIPT:

DATE(S) OF TESTING:

REPORT PREPARED BY:

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

Project Number: 97407

August 26, 2015

August 26 – September 1, 2015

Revision History

Original: Testing of Enlighted USB Commissioning Key, Model: UK-01 to FCC Part 15 Subpart C Section(s) 15.207 & 15.247 (DTS 2400-2483.5 MHz).

Addendum A: To add a statement clarifying worst orientation in Section 15.247(d) Radiated Emissions.

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
15.207	AC Conducted Emissions	NA	Pass
15.247(a)(2)	6dB Bandwidth	NA	Pass
15.247(b)(3)	Output Power	NA	Pass
15.31(e)	Voltage Variation	NA	Pass
15.247(e)	Power Spectral Density	NA	Pass
15.247(d)	RF Conducted Emissions & Band Edge	NA	Pass
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 1

Equipment Tested:

Device	Manufacturer	Model #	S/N
Enlighted USB Commissioning Key	Enlighted, Inc.	UK-01	02

Support Equipment:

Device	Manufacturer	Model #	S/N
Laptop	Lenovo	T420	NA
AC/DC Power Adapter for Laptop	Lenovo	92P1156	11S92P11562DXN17B5GG

Configuration 2

Equipment Tested:

Device	Manufacturer	Model #	S/N
Enlighted USB Commissioning Key	Enlighted, Inc.	UK-01	01

Support Equipment:

Device	Manufacturer	Model #	S/N
Headphone	Panasonic	NA	NA
Mouse	Microsoft	1405	0204609660401
Keyboard	Microsoft	KU-0462	7687601047661
Prosafe 8 port10/100Mbps Switch with PoE	NETGEAR	FS108p	3BN14871809C2
Laptop	Lenovo	T420	NA
AC/DC Power Adapter for Laptop	Lenovo	92P1156	11S92P11562DXN17B5GG

Configuration 3

Equipment Tested:

Device	Manufacturer	Model #	S/N
Enlighted USB Commissioning Key	Enlighted, Inc.	UK-01	02

Support Equipment:

Device	Manufacturer	Model #	S/N
DC Power Supply	Protek	3006B	AG4070
AC/DC Power Adapter for Laptop	Lenovo	92P1156	11S92P11562DXN17B5GG
Laptop	Lenovo	T420	NA

FCC PART 15 SUBPART C

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 #: **97407** Date: 8/26/2015
 Test Type: **Conducted Emissions** Time: 10:20:32
 Tested By: Hieu Song Nguyenpham Sequence#: 14
 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

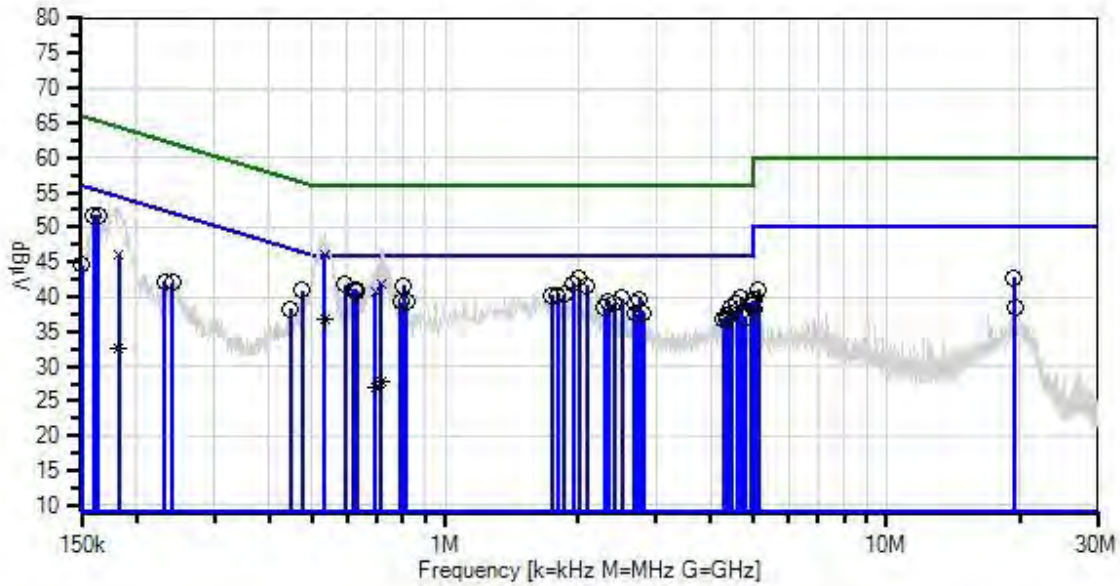
 Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa

 High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi
 Method: ANSI C 63.4 2009

 The EUT is an Enlighted USB Commissioning Key.
 The EUT is powered by a laptop and connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intended.
 The laptop is connected to a keyboard, mouse, headphones and Prosafe 8 port 10/100Mbps Switch as setting up for the host EUT requirements.

TX Mode on Middle Channel

Enlighted, Inc WO#: 97407 Sequence#: 14 Date: 8/26/2015
 15.207 AC Mains - Average Test Lead: 120V 60Hz Line



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: Line

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	2.008M	32.4	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	42.6	46.0	-3.4	Line
2	163.816k	41.3	+9.9 +0.4	+0.0	+0.0	+0.1	+0.0	51.7	55.3	-3.6	Line
3	159.453k	41.2	+9.9 +0.5	+0.0	+0.0	+0.1	+0.0	51.7	55.5	-3.8	Line
4	1.949M	31.6	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	41.8	46.0	-4.2	Line
5	593.595k	31.6	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	41.7	46.0	-4.3	Line
6	805.939k	31.5	+9.8 +0.2	+0.0	+0.0	+0.1	+0.0	41.6	46.0	-4.4	Line
7	2.098M	31.3	+9.9 +0.2	+0.1	+0.0	+0.1	+0.0	41.6	46.0	-4.4	Line
8	620.502k	30.9	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	41.0	46.0	-5.0	Line
9	628.501k	31.0	+9.8 +0.1	+0.0	+0.0	+0.1	+0.0	41.0	46.0	-5.0	Line
10	629.955k	30.8	+9.8 +0.1	+0.0	+0.0	+0.1	+0.0	40.8	46.0	-5.2	Line
11	475.061k	30.7	+9.9 +0.2	+0.0	+0.0	+0.1	+0.0	40.9	46.4	-5.5	Line
12	1.868M	30.1	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	40.3	46.0	-5.7	Line
13	1.741M	30.0	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	40.2	46.0	-5.8	Line
14	1.796M	29.9	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	40.1	46.0	-5.9	Line
15	4.666M	29.6	+9.9 +0.1	+0.2	+0.0	+0.1	+0.0	39.9	46.0	-6.1	Line

16	2.510M	29.6	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	39.8	46.0	-6.2	Line
17	2.753M	29.5	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	39.7	46.0	-6.3	Line
18	791.395k	29.2	+9.8 +0.2	+0.0	+0.0	+0.1	+0.0	39.3	46.0	-6.7	Line
19	817.575k	29.2	+9.8 +0.2	+0.0	+0.0	+0.1	+0.0	39.3	46.0	-6.7	Line
20	2.340M	29.0	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	39.2	46.0	-6.8	Line
21	4.968M	28.9	+9.9 +0.1	+0.2	+0.0	+0.1	+0.0	39.2	46.0	-6.8	Line
22	2.417M	28.9	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	39.1	46.0	-6.9	Line
23	4.581M	28.8	+9.9 +0.1	+0.1	+0.0	+0.1	+0.0	39.0	46.0	-7.0	Line
24	2.689M	28.7	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	38.9	46.0	-7.1	Line
25	4.951M	28.5	+9.9 +0.1	+0.2	+0.0	+0.1	+0.0	38.8	46.0	-7.2	Line
26	19.436M	31.8	+9.9 +0.2	+0.3	+0.1	+0.5	+0.0	42.8	50.0	-7.2	Line
27	2.293M	28.2	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	38.4	46.0	-7.6	Line
28	4.428M	28.1	+9.9 +0.2	+0.1	+0.0	+0.1	+0.0	38.4	46.0	-7.6	Line
29	4.990M	27.9	+9.9 +0.1	+0.2	+0.0	+0.1	+0.0	38.2	46.0	-7.8	Line
30	2.812M	27.5	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	37.7	46.0	-8.3	Line
31	2.706M	27.4	+9.8 +0.2	+0.1	+0.0	+0.1	+0.0	37.6	46.0	-8.4	Line
32	4.454M	27.3	+9.9 +0.2	+0.1	+0.0	+0.1	+0.0	37.6	46.0	-8.4	Line
33	4.360M	27.1	+9.9 +0.2	+0.1	+0.0	+0.1	+0.0	37.4	46.0	-8.6	Line
34	445.972k	28.1	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	38.2	46.9	-8.7	Line
35	4.794M	26.9	+9.9 +0.1	+0.2	+0.0	+0.1	+0.0	37.2	46.0	-8.8	Line
36	5.126M	30.7	+9.9 +0.1	+0.2	+0.0	+0.1	+0.0	41.0	50.0	-9.0	Line
37	4.335M	26.6	+9.9 +0.2	+0.1	+0.0	+0.1	+0.0	36.9	46.0	-9.1	Line
38	532.510k Ave	26.6	+9.9 +0.2	+0.0	+0.0	+0.1	+0.0	36.8	46.0	-9.2	Line
39	4.258M	26.5	+9.9 +0.2	+0.1	+0.0	+0.1	+0.0	36.8	46.0	-9.2	Line
40	241.627k	32.0	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	42.1	52.0	-9.9	Line
41	532.510k QP	35.8	+9.9 +0.2	+0.0	+0.0	+0.1	+0.0	46.0	56.0	-10.0	Line

^	532.510k	38.7	+9.9 +0.2	+0.0	+0.0	+0.1	+0.0	48.9	46.0	+2.9	Line
43	231.447k	32.1	+9.9 +0.1	+0.0	+0.0	+0.1	+0.0	42.2	52.4	-10.2	Line
44	5.024M	29.2	+9.9 +0.1	+0.2	+0.0	+0.1	+0.0	39.5	50.0	-10.5	Line
45	150.727k	31.9	+9.9 +2.7	+0.0	+0.0	+0.1	+0.0	44.6	56.0	-11.4	Line
46	19.499M	27.6	+9.9 +0.2	+0.3	+0.1	+0.5	+0.0	38.6	50.0	-11.4	Line
47	717.948k QP	31.9	+9.8 +0.1	+0.0	+0.0	+0.1	+0.0	41.9	56.0	-14.1	Line
48	696.132k QP	30.6	+9.8 +0.1	+0.0	+0.0	+0.1	+0.0	40.6	56.0	-15.4	Line
49	717.948k Ave	17.9	+9.8 +0.1	+0.0	+0.0	+0.1	+0.0	27.9	46.0	-18.1	Line
^	717.948k	37.0	+9.8 +0.1	+0.0	+0.0	+0.1	+0.0	47.0	46.0	+1.0	Line
51	181.997k QP	35.8	+9.9 +0.3	+0.0	+0.0	+0.1	+0.0	46.1	64.4	-18.3	Line
52	696.132k Ave	16.9	+9.8 +0.1	+0.0	+0.0	+0.1	+0.0	26.9	46.0	-19.1	Line
^	696.132k	34.5	+9.8 +0.1	+0.0	+0.0	+0.1	+0.0	44.5	46.0	-1.5	Line
54	181.997k Ave	22.3	+9.9 +0.3	+0.0	+0.0	+0.1	+0.0	32.6	54.4	-21.8	Line
^	181.997k	41.6	+9.9 +0.3	+0.0	+0.0	+0.1	+0.0	51.9	54.4	-2.5	Line

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 #: **97407** Date: 8/26/2015
 Test Type: **Conducted Emissions** Time: 10:27:29
 Tested By: Hieu Song Nguyenpham Sequence#: 15
 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

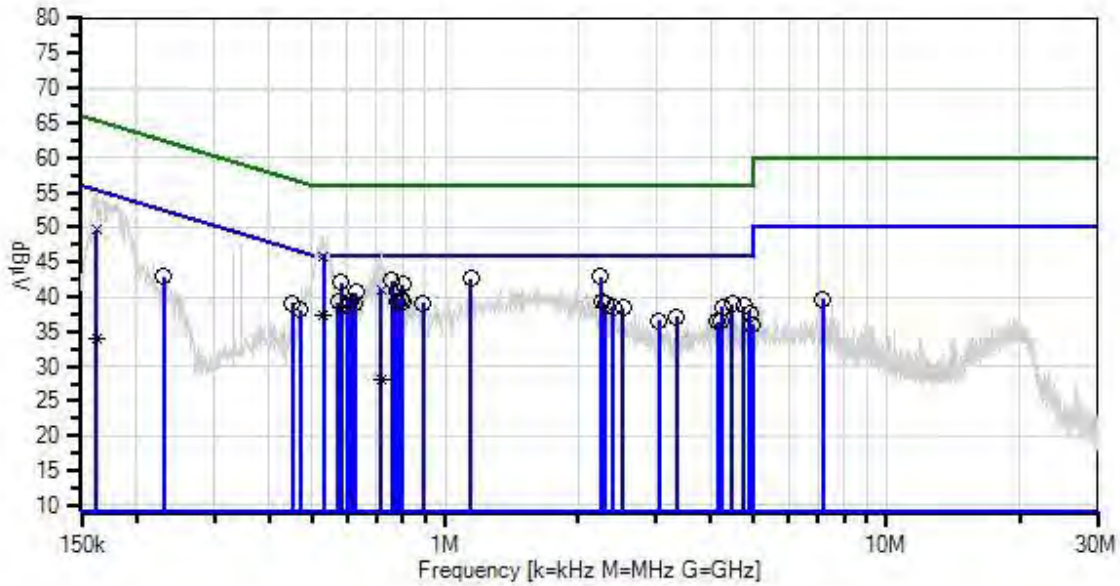
 Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa

 High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi
 Method: ANSI C 63.4 2009

 The EUT is an Enlighted USB Commissioning Key.
 The EUT is powered by a laptop and connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intended.
 The laptop is connected to a keyboard, mouse, headphones and Prosafe 8 port 10/100Mbps Switch as setting up for the host EUT requirements.

TX Mode on Middle Channel

Enlighted, Inc WO#: 97407 Sequence#: 15 Date: 8/26/2015
 15.207 AC Mains - Average Test Lead: 120V 60Hz Neutral



- Sweep Data
- x 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: Neutral

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	2.251M	32.1	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	42.9	46.0	-3.1	Neutr
2	1.145M	31.8	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	42.6	46.0	-3.4	Neutr
3	756.489k	31.5	+9.9 +0.2	+0.0	+0.0	+0.7	+0.0	42.3	46.0	-3.7	Neutr
4	580.505k	31.4	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	42.1	46.0	-3.9	Neutr
5	803.030k	31.1	+9.8 +0.2	+0.0	+0.0	+0.7	+0.0	41.8	46.0	-4.2	Neutr
6	777.578k	30.0	+9.8 +0.2	+0.0	+0.0	+0.7	+0.0	40.7	46.0	-5.3	Neutr
7	628.501k	30.0	+9.8 +0.1	+0.0	+0.0	+0.7	+0.0	40.6	46.0	-5.4	Neutr
8	796.486k	28.8	+9.8 +0.2	+0.0	+0.0	+0.7	+0.0	39.5	46.0	-6.5	Neutr
9	609.594k	28.7	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	39.4	46.0	-6.6	Neutr
10	779.760k	28.7	+9.8 +0.2	+0.0	+0.0	+0.7	+0.0	39.4	46.0	-6.6	Neutr
11	799.394k	28.6	+9.8 +0.2	+0.0	+0.0	+0.7	+0.0	39.3	46.0	-6.7	Neutr
12	573.233k	28.5	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	39.2	46.0	-6.8	Neutr
13	2.268M	28.4	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	39.2	46.0	-6.8	Neutr
14	620.502k	28.4	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	39.1	46.0	-6.9	Neutr
15	889.963k	28.3	+9.9 +0.1	+0.1	+0.0	+0.7	+0.0	39.1	46.0	-6.9	Neutr

16	4.467M	28.0	+9.9 +0.2	+0.1	+0.0	+0.8	+0.0	39.0	46.0	-7.0	Neutr
17	2.310M	28.1	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	38.9	46.0	-7.1	Neutr
18	599.413k	28.0	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	38.7	46.0	-7.3	Neutr
19	605.958k	28.0	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	38.7	46.0	-7.3	Neutr
20	4.743M	27.7	+9.9 +0.1	+0.2	+0.0	+0.8	+0.0	38.7	46.0	-7.3	Neutr
21	2.408M	27.8	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	38.6	46.0	-7.4	Neutr
22	4.237M	27.5	+9.9 +0.2	+0.1	+0.0	+0.8	+0.0	38.5	46.0	-7.5	Neutr
23	2.532M	27.6	+9.8 +0.2	+0.1	+0.0	+0.7	+0.0	38.4	46.0	-7.6	Neutr
24	451.063k	28.3	+9.9 +0.2	+0.0	+0.0	+0.7	+0.0	39.1	46.9	-7.8	Neutr
25	4.900M	26.7	+9.9 +0.1	+0.2	+0.0	+0.8	+0.0	37.7	46.0	-8.3	Neutr
26	470.697k	27.3	+9.9 +0.2	+0.0	+0.0	+0.7	+0.0	38.1	46.5	-8.4	Neutr
27	530.329k Ave	26.6	+9.9 +0.2	+0.0	+0.0	+0.7	+0.0	37.4	46.0	-8.6	Neutr
28	3.352M	26.3	+9.8 +0.2	+0.1	+0.0	+0.8	+0.0	37.2	46.0	-8.8	Neutr
29	3.055M	25.7	+9.8 +0.2	+0.1	+0.0	+0.8	+0.0	36.6	46.0	-9.4	Neutr
30	229.992k	32.2	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	42.9	52.4	-9.5	Neutr
31	4.135M	25.4	+9.9 +0.2	+0.1	+0.0	+0.8	+0.0	36.4	46.0	-9.6	Neutr
32	4.228M	25.4	+9.9 +0.2	+0.1	+0.0	+0.8	+0.0	36.4	46.0	-9.6	Neutr
33	4.981M	25.0	+9.9 +0.1	+0.2	+0.0	+0.8	+0.0	36.0	46.0	-10.0	Neutr
34	530.329k QP	34.9	+9.9 +0.2	+0.0	+0.0	+0.7	+0.0	45.7	56.0	-10.3	Neutr
^	530.329k	38.0	+9.9 +0.2	+0.0	+0.0	+0.7	+0.0	48.8	46.0	+2.8	Neutr

36	7.166M	28.6	+9.9 +0.1	+0.2	+0.0	+0.8	+0.0	39.6	50.0	-10.4	Neutr
37	716.493k QP	30.5	+9.8 +0.1	+0.0	+0.0	+0.7	+0.0	41.1	56.0	-14.9	Neutr
38	162.363k QP	38.5	+9.9 +0.5	+0.0	+0.0	+0.7	+0.0	49.6	65.3	-15.7	Neutr
39	716.493k Ave	17.4	+9.8 +0.1	+0.0	+0.0	+0.7	+0.0	28.0	46.0	-18.0	Neutr
^	716.493k	35.7	+9.8 +0.1	+0.0	+0.0	+0.7	+0.0	46.3	46.0	+0.3	Neutr
41	162.363k Ave	22.8	+9.9 +0.5	+0.0	+0.0	+0.7	+0.0	33.9	55.3	-21.4	Neutr
^	162.363k	44.1	+9.9 +0.5	+0.0	+0.0	+0.7	+0.0	55.2	55.3	-0.1	Neutr

Test Setup Photos



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 #: **97407** Date: 08/25/15
 Test Type: **Conducted Measurement** Time: 09:59:39
 Tested By: Hieu Song Nguyenpham Sequence#: 1
 Software: EMITest 5.02.00

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	P01211	Attenuator	23-10-34	3/31/2015	3/31/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

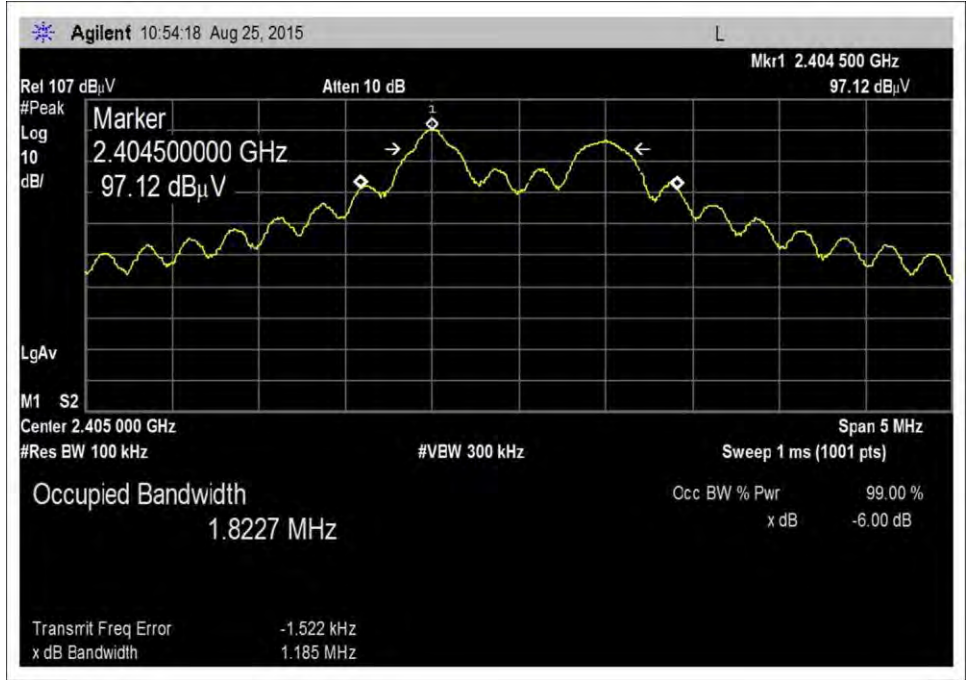
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

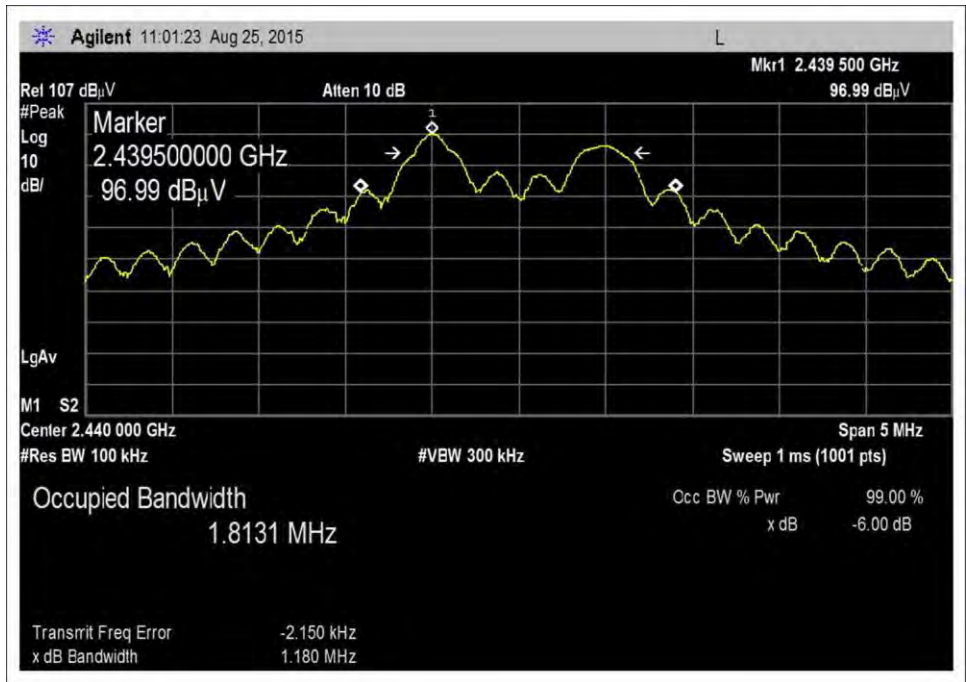
Test Conditions / Notes:

OBW set up
 Application: PuTTy version 0.64 for Zigbee
 Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa
 High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi
 Method: KDB 558074 v03r03 section 8.1
 RBW=100kHz
 VBW=300kHz
 The EUT is an Enlighted USB Commissioning Key.
 The EUT is powered by a laptop and connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intended.

Plots



Low Channel

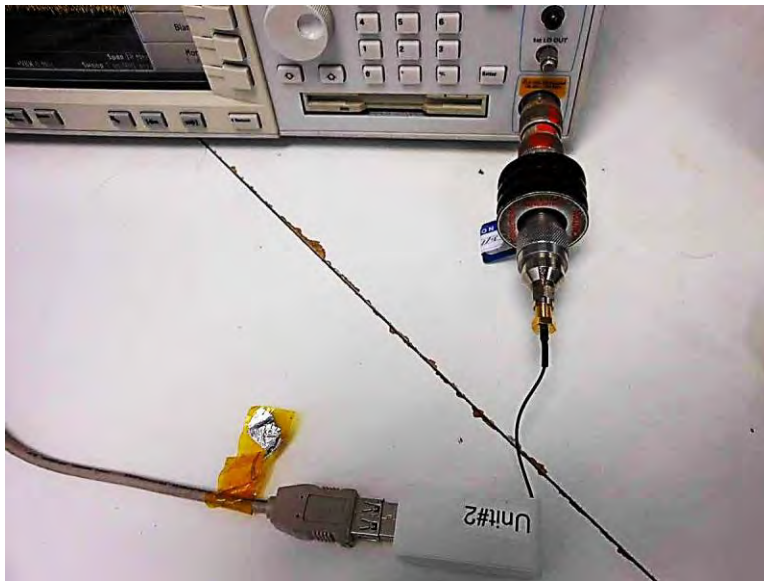
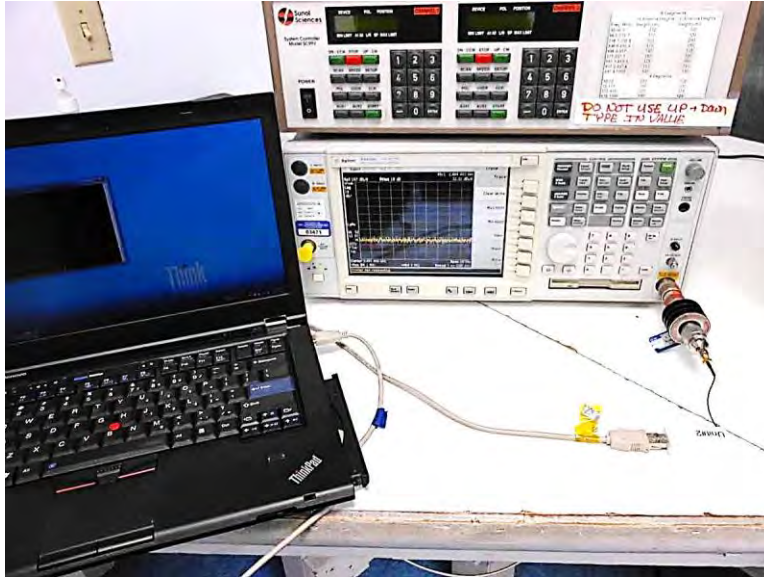


Middle Channel



High Channel

Test Setup Photos



15.247(b)(3) Output Power

Test Conditions / Setup / Data

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Enlighted, Inc.**
 Specification: **15.247(b) Power Output (2400-2483.5 MHz DTS)**
 Work Order #: **97407** Date: 8/25/2015
 Test Type: **Conducted Power Measurement** Time: 11:08:29
 Tested By: Hieu Song Nguyenpham Sequence#: 2
 Software: EMITest 5.02.00

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Fundamental of the EUT

 Application: PuTTY version 0.64 for Zigbee

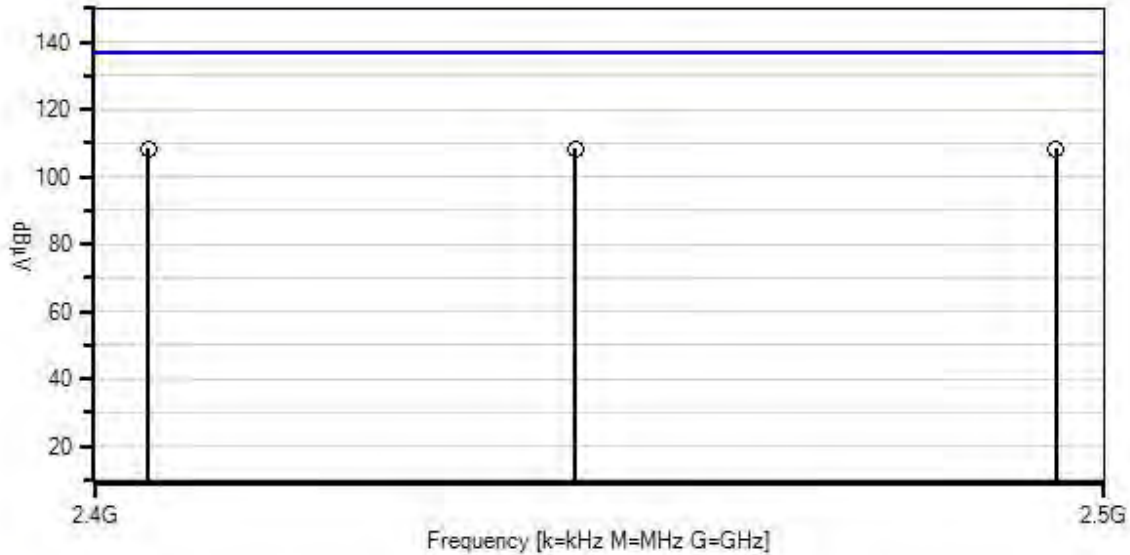
 Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa

 High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi
 Method: 558074 D01 DTS Meas Guidance v03r03 section 9.1.1

 RBW=3MHz
 VBW=8MHz

 The EUT is an Enlighted USB Commissioning Key.
 The EUT is powered by a laptop and connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intended.

Enlighted, Inc WO#: 97407 Sequence#: 2 Date: 8/25/2015
 15.247(b) Power Output (2400-2483.5 MHz DTS) Test Distance: None None



— Readings
 × QP Readings
 ▼ Ambient
 ○ Peak Readings
 * Average Readings
 Software Version: 5.02.00
 1 - 15.247(b) Power Output (2400-2483.5 MHz DTS)

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	ANP01211	Attenuator	23-10-34	3/31/2015	3/31/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

Measurement Data:

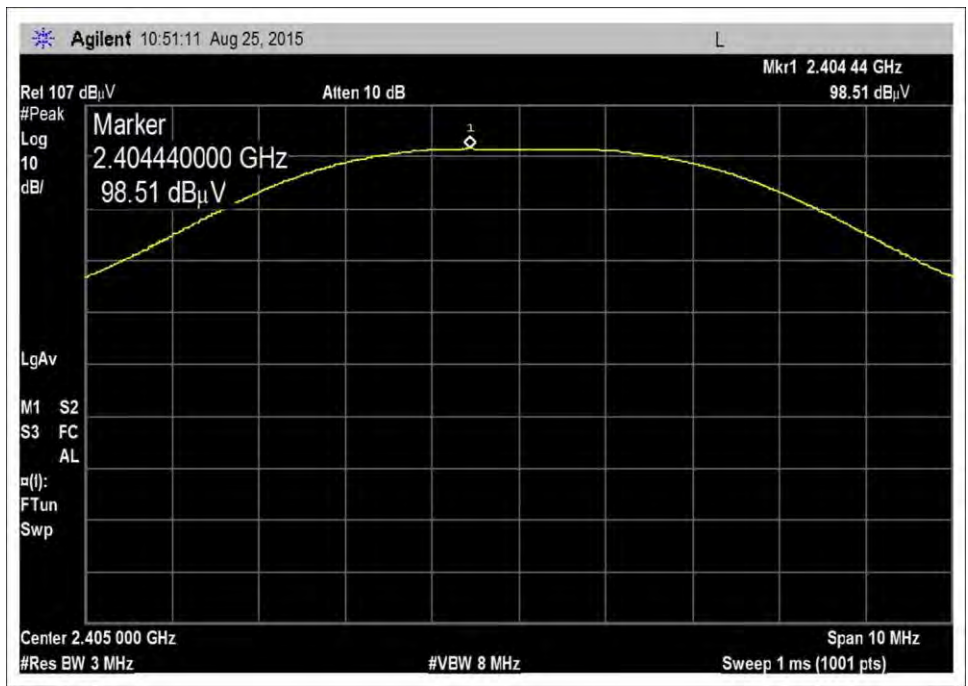
Reading listed by margin.

Test Distance: None

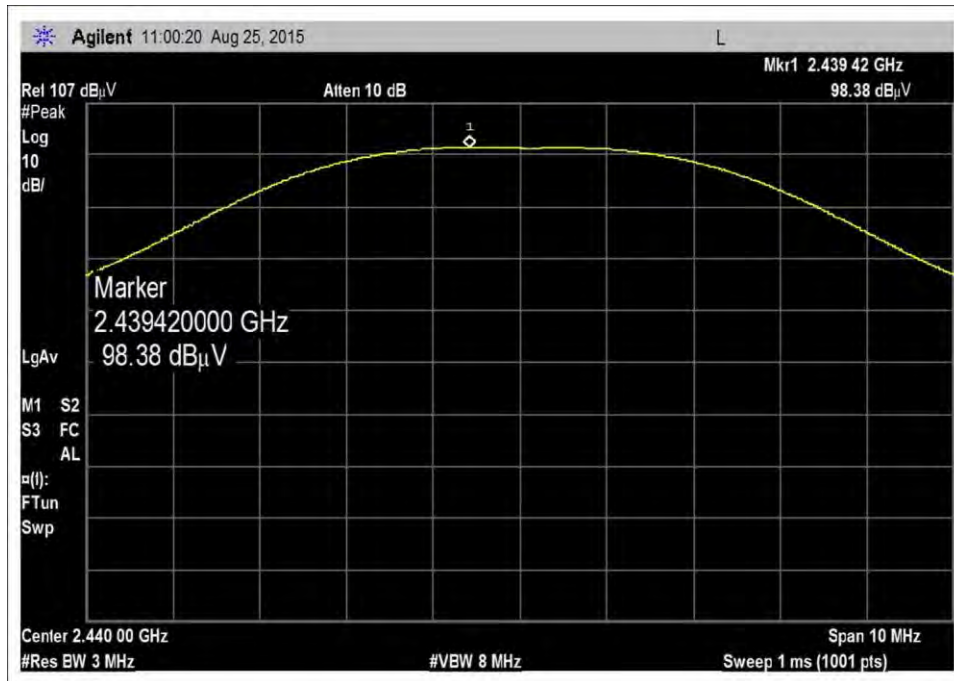
#	Freq MHz	Rdng dBµV	T1 dB	T1 dB	T1 dB	T1 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2404.440M	98.5	+10.0				+0.0	108.5	137.0	-28.5	None
2	2439.420M	98.4	+10.0				+0.0	108.4	137.0	-28.6	None
3	2479.440M	98.3	+10.0				+0.0	108.3	137.0	-28.7	None

Frequency (MHz)	Measured Power in Watt	Power Limit in Watt	Pass/Fail
Low Channel 2405	0.001412538	1.00	Pass
Middle Channel 2440	0.001380384	1.00	Pass
High Channel 2480	0.001348963	1.00	Pass

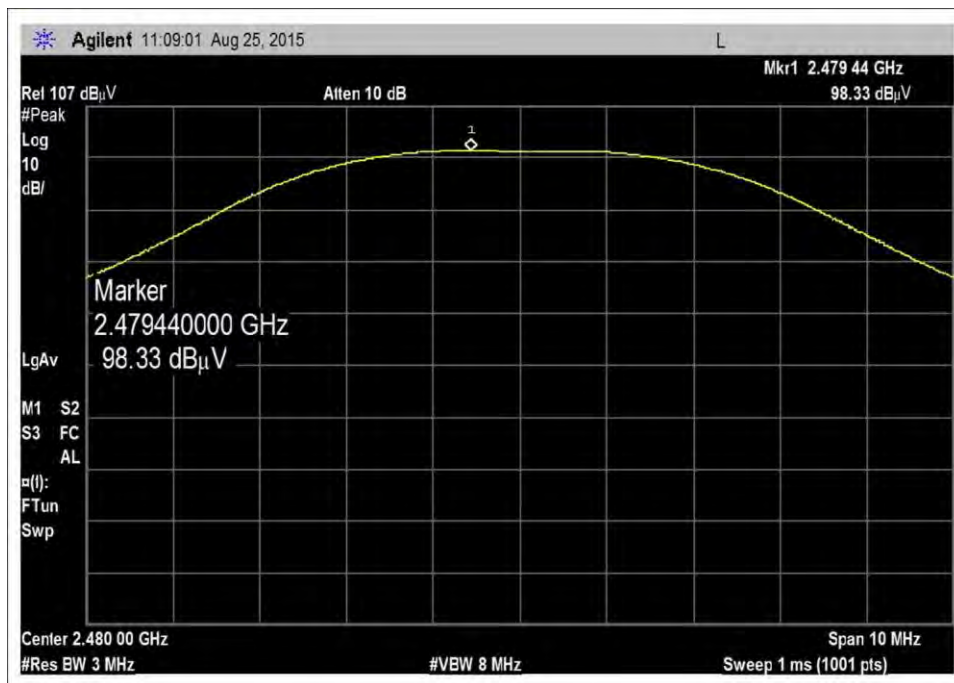
Plots



Low Channel

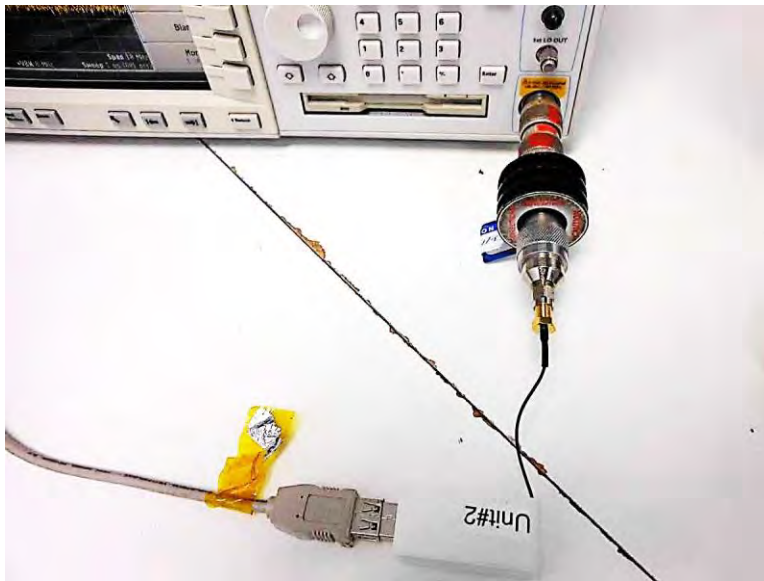
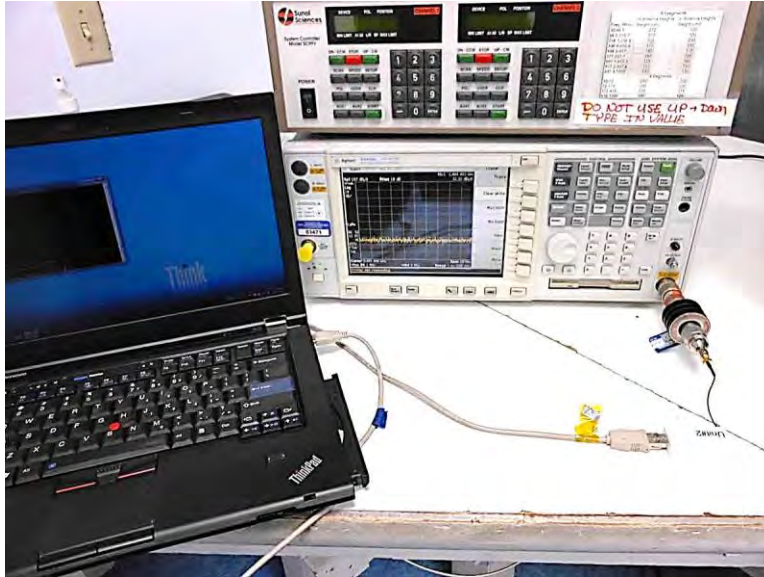


Middle Channel



High Channel

Test Setup Photos



15.31(e) Voltage Variation

Test Conditions / Setup / Data

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Enlighted, Inc.**
 Specification: **15.31 Set up**
 Work Order #: **97407** Date: 08/25/15
 Test Type: **Conducted Measurement** Time: 09:59:39
 Tested By: Hieu Song Nguyenpham Sequence#: 1
 Software: EMITest 5.02.00

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	P01211	Attenuator	23-10-34	3/31/2015	3/31/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

15.31e Set up

Application: PuTTY version 0.64 for Zigbee

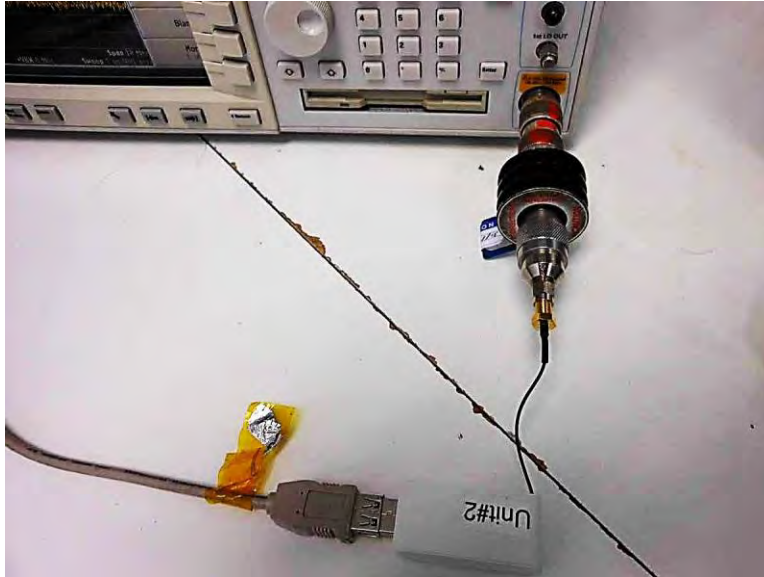
Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa

High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi

The EUT is an Enlighted USB Commissioning Key.
 The EUT is powered by a DC power supply to adjust the voltage.
 The EUT is connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intended.

15.31(e) the RF output power was not changed when adjusting the voltage 5VDC down to 85% (4.25VDC) and up to 115% (5.75VDC).

Test Setup Photo



15.247(e) Power Spectral Density

Test Conditions / Setup / 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 #: **97407** Date: 8/25/2015
 Test Type: **Conducted Power Measurement** Time: 11:36:13
 Tested By: Hieu Song Nguyenpham Sequence#: 3
 Software: EMITest 5.02.00

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

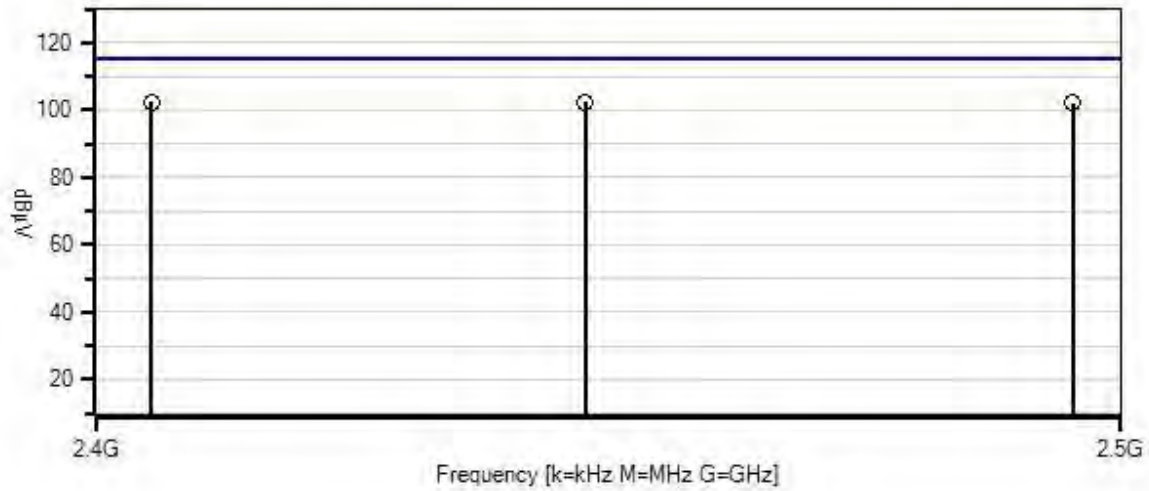
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Power Spectral Density
 Application: PuTTY version 0.64 for Zigbee
 Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa
 High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi
 Method: KDB 558074 v03r03 section 10.2
 RBW=3kHz
 VBW=10kHz
 The EUT is an Enlighted USB Commissioning Key.
 The EUT is powered by a laptop and connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intended.

Enlighted, Inc WO#: 97407 Sequence#: 3 Date: 8/25/2015
15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS) Test Distance: None None



- Readings
 - Peak Readings
 - × QP Readings
 - * Average Readings
 - ▼ Ambient
- Software Version: 5.02.00
- 1 - 15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	ANP01211	Attenuator	23-10-34	3/31/2015	3/31/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

Measurement Data:

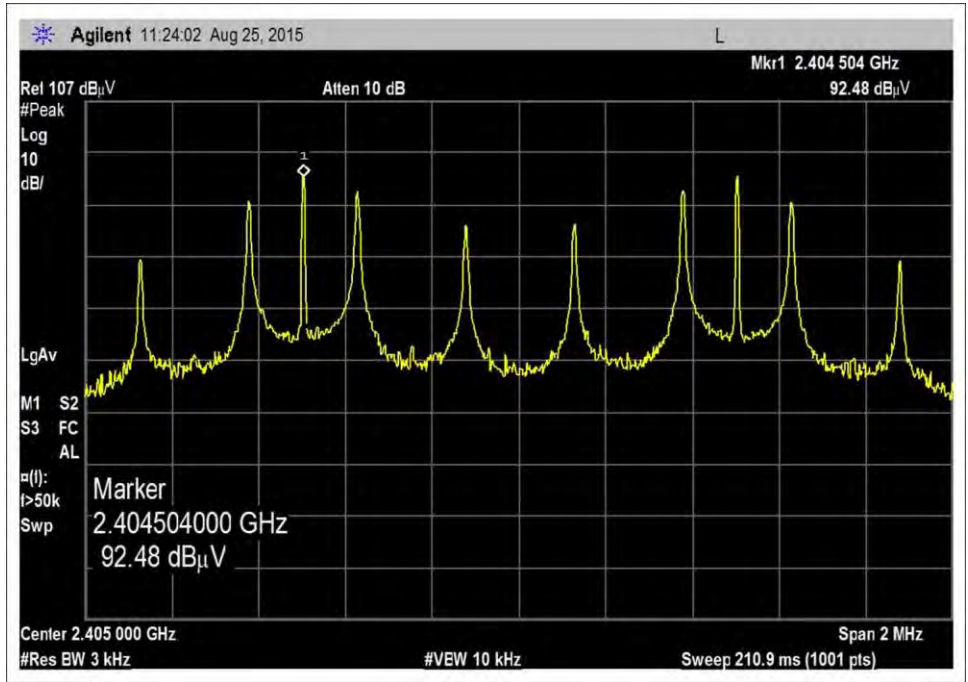
Reading listed by margin.

Test Distance: None

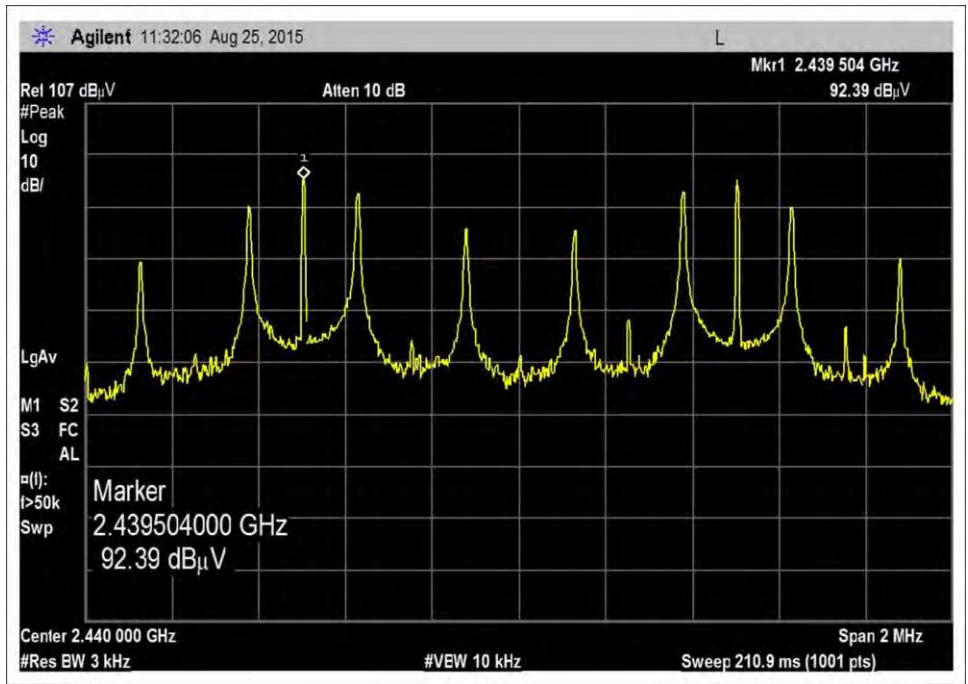
#	Freq MHz	Rdng dB μ V	T1 dB				Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	2404.504M	92.5	+10.0				+0.0	102.5	115.0	-12.5	None
2	2439.504M	92.4	+10.0				+0.0	102.4	115.0	-12.6	None
3	2479.504M	92.2	+10.0				+0.0	102.2	115.0	-12.8	None

Frequency (MHz)	Measured Power in dBm/3kHz	Power Limit in dBm/3kHz	Pass/Fail
Low Channel	-4.5	8.00	Pass
Middle Channel	-4.6	8.00	Pass
High Channel	-4.8	8.00	Pass

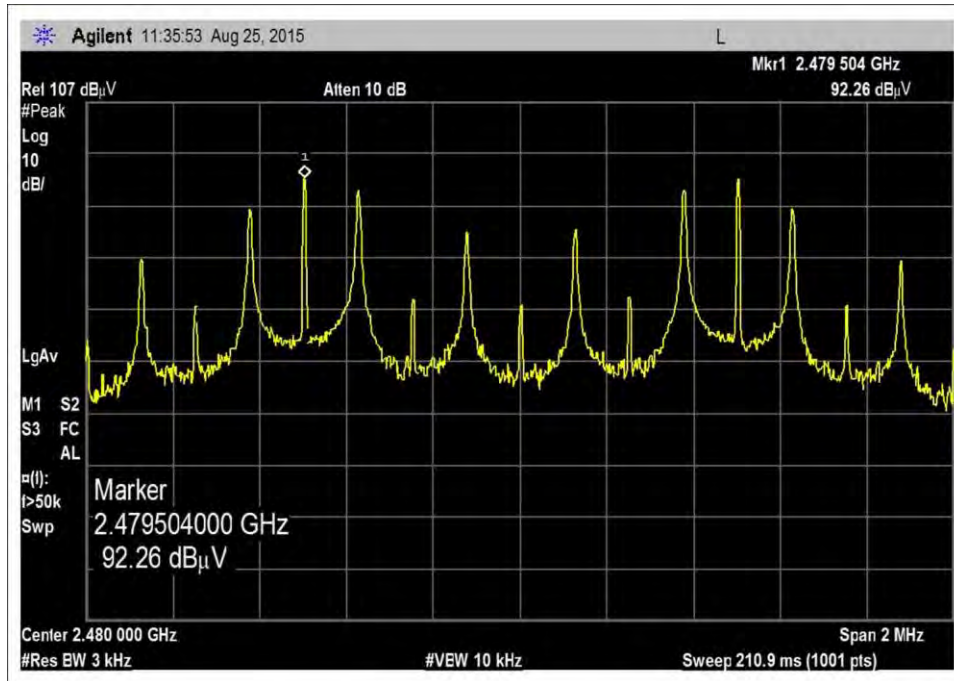
Plots



Low Channel

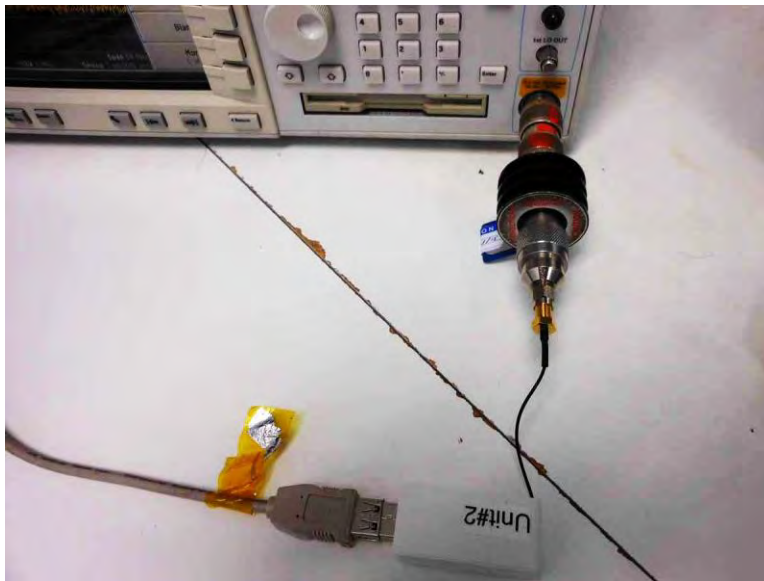
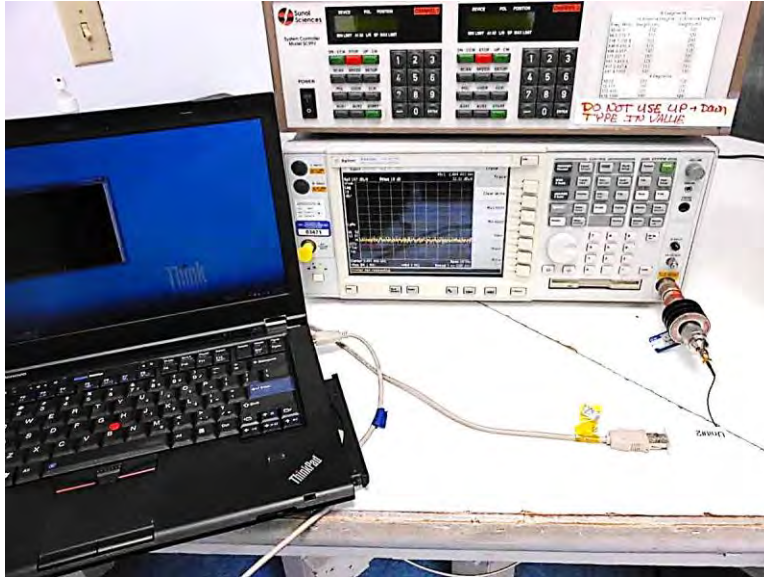


Middle Channel



High Channel

Test Setup Photos



15.247(d) RF Conducted Emissions & Band Edge

Test Conditions

The Reference level measurement for Emission in non-restricted frequency bands were made using the methods set out in KDB "558074 D01 DTS Meas Guidance v03r03", Section 11 Emissions in non-restricted frequency band.
NOTE: The Reference Level is the limit line for Conducted Spurious Emission for Non-Restricted Frequency Band

Reference Limit in 100kHz		
Channel	dBuV in 100kHz	Reference Limit dBuV
Low	107.07	87.07
Middle	106.92	86.92
High	106.89	86.89

Choose the worst reference limit for all the channels.

Test Conditions / Setup / Data

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Enlighted, Inc.**
 Specification: **15.247(d) Conducted Spurious Emissions**
 Work Order #: **97407** Date: 8/25/2015
 Test Type: **Conducted Power Measurement** Time: 1:43:30 PM
 Tested By: Hieu Song Nguyenpham Sequence#: 4
 Software: EMITest 5.02.00

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

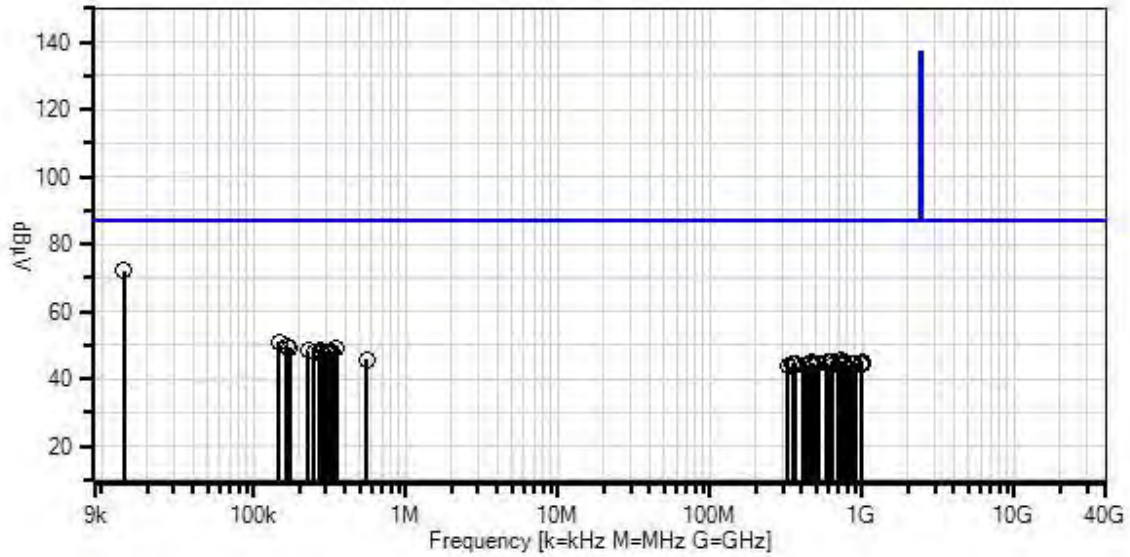
Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Conducted Emission
 Frequency Range: 9kHz to 1000MHz
 Application: PuTTY version 0.64 for Zigbee
 Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa
 High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi
 Method: 558074 D01 DTS Meas Guidance v03r03 section 11
 RBW=100kHz
 VBW=300kHz
 The EUT is an Enlighted USB Commissioning Key.
 The EUT is powered by a laptop and connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intended.

Low Channel

Enlighted, Inc WO#: 97407 Sequence#: 4 Date: 8/25/2015
15.247(d) Conducted Spurious Emissions Test Distance: None None



- Readings
 - × QP Readings
 - ▼ Ambient
 - Peak Readings
 - * Average Readings
- 1 - 15.247(d) Conducted Spurious Emissions
- Software Version: 5.02.00

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T1	ANP01211	Attenuator	23-10-34	3/31/2015	3/31/2017

Measurement Data:

Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dB μ V	T1 dB	dB			Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	14.084k	62.3	+9.9				+0.0	72.2	86.9	-14.7	None
2	146.271k	41.1	+9.9				+0.0	51.0	86.9	-35.9	None
3	165.336k	39.9	+9.9				+0.0	49.8	86.9	-37.1	None
4	173.809k	39.4	+9.9				+0.0	49.3	86.9	-37.6	None
5	170.420k	39.3	+9.9				+0.0	49.2	86.9	-37.7	None
6	352.177k	39.0	+9.9				+0.0	48.9	86.9	-38.0	None
7	272.102k	38.5	+9.9				+0.0	48.4	86.9	-38.5	None
8	229.735k	38.4	+9.9				+0.0	48.3	86.9	-38.6	None
9	250.071k	38.2	+9.9				+0.0	48.1	86.9	-38.8	None
10	287.778k	38.2	+9.9				+0.0	48.1	86.9	-38.8	None
11	278.457k	38.1	+9.9				+0.0	48.0	86.9	-38.9	None
12	313.199k	38.1	+9.9				+0.0	48.0	86.9	-38.9	None
13	306.420k	38.0	+9.9				+0.0	47.9	86.9	-39.0	None
14	298.370k	38.0	+9.9				+0.0	47.9	86.9	-39.0	None
15	330.146k	38.0	+9.9				+0.0	47.9	86.9	-39.0	None
16	322.943k	38.0	+9.9				+0.0	47.9	86.9	-39.0	None
17	324.638k	37.7	+9.9				+0.0	47.6	86.9	-39.3	None
18	309.809k	37.6	+9.9				+0.0	47.5	86.9	-39.4	None
19	554.883k	35.8	+9.9				+0.0	45.7	86.9	-41.2	None
20	725.195M	35.4	+10.0				+0.0	45.4	86.9	-41.5	None

21	741.611M	34.8	+10.0	+0.0	44.8	86.9	-42.1	None
22	588.658M	34.9	+9.9	+0.0	44.8	86.9	-42.1	None
23	468.838M	34.8	+9.9	+0.0	44.7	86.9	-42.2	None
24	627.897M	34.8	+9.9	+0.0	44.7	86.9	-42.2	None
25	994.610M	34.8	+9.9	+0.0	44.7	86.9	-42.2	None
26	359.429M	34.7	+9.9	+0.0	44.6	86.9	-42.3	None
27	891.060M	34.5	+10.0	+0.0	44.5	86.9	-42.4	None
28	850.320M	34.5	+10.0	+0.0	44.5	86.9	-42.4	None
29	983.831M	34.6	+9.9	+0.0	44.5	86.9	-42.4	None
30	348.218M	34.5	+9.9	+0.0	44.4	86.9	-42.5	None
31	863.132M	34.4	+10.0	+0.0	44.4	86.9	-42.5	None
32	366.536M	34.5	+9.9	+0.0	44.4	86.9	-42.5	None
33	998.411M	34.5	+9.9	+0.0	44.4	86.9	-42.5	None
34	472.943M	34.5	+9.9	+0.0	44.4	86.9	-42.5	None
35	736.206M	34.3	+10.0	+0.0	44.3	86.9	-42.6	None
36	701.771M	34.3	+10.0	+0.0	44.3	86.9	-42.6	None
37	458.228M	34.4	+9.9	+0.0	44.3	86.9	-42.6	None
38	513.984M	34.4	+9.9	+0.0	44.3	86.9	-42.6	None
39	481.952M	34.4	+9.9	+0.0	44.3	86.9	-42.6	None
40	876.846M	34.2	+10.0	+0.0	44.2	86.9	-42.7	None
41	835.805M	34.2	+10.0	+0.0	44.2	86.9	-42.7	None

42	772.041M	34.2	+10.0	+0.0	44.2	86.9	-42.7	None
43	449.219M	34.3	+9.9	+0.0	44.2	86.9	-42.7	None
44	447.417M	34.3	+9.9	+0.0	44.2	86.9	-42.7	None
45	361.331M	34.3	+9.9	+0.0	44.2	86.9	-42.7	None
46	411.982M	34.2	+9.9	+0.0	44.1	86.9	-42.8	None
47	323.493M	34.2	+9.9	+0.0	44.1	86.9	-42.8	None
48	415.485M	34.2	+9.9	+0.0	44.1	86.9	-42.8	None
49	623.393M	34.2	+9.9	+0.0	44.1	86.9	-42.8	None
50	473.243M	34.2	+9.9	+0.0	44.1	86.9	-42.8	None

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Enlighted, Inc.**
 Specification: **15.247(d) Conducted Spurious Emissions**
 Work Order #: **97407** Date: 8/25/2015
 Test Type: **Conducted Power Measurement** Time: 2:06:22 PM
 Tested By: Hieu Song Nguyenpham Sequence#: 7
 Software: EMITest 5.02.00

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Conducted Emission
 Frequency Range: 1000MHz to 25000MHz

 Application: PuTTY version 0.64 for Zigbee

 Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa

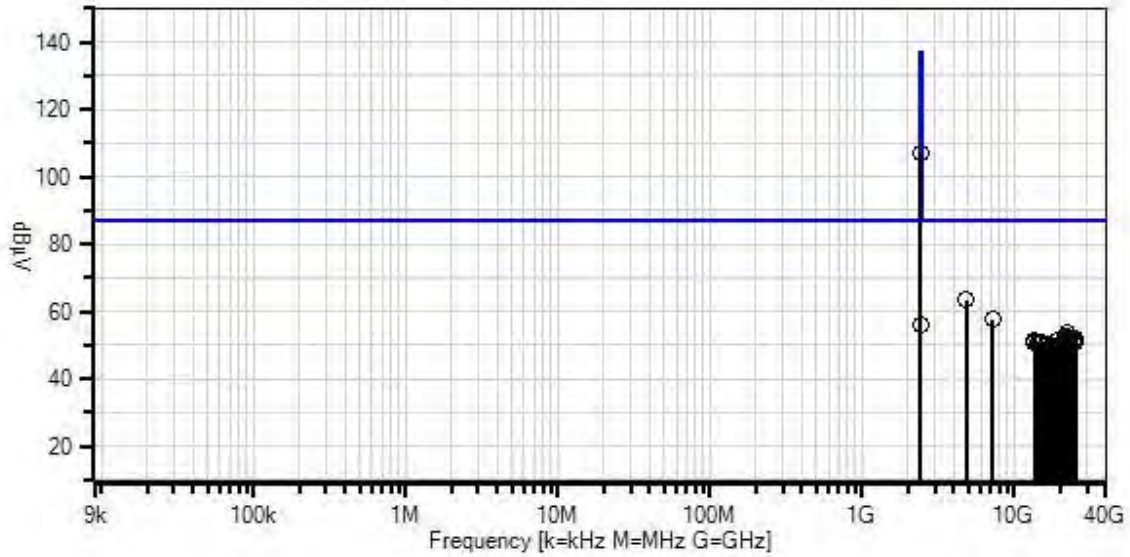
 High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi
 Method: 558074 D01 DTS Meas Guidance v03r03 section 11

 RBW=100kHz
 VBW=300kHz

 The EUT is an Enlighted USB Commissioning Key.
 The EUT is powered by a laptop and connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intention

Low Channel

Enlighted, Inc WO#: 97407 Sequence#: 7 Date: 8/25/2015
 15.247(d) Conducted Spurious Emissions Test Distance: None None



- Readings
 - × QP Readings
 - ▼ Ambient
 - 1 - 15.247(d) Conducted Spurious Emissions
 - Peak Readings
 - * Average Readings
- Software Version: 5.02.00

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T1	ANP06239	Attenuator	54A-10	7/9/2014	7/9/2016

Measurement Data:

Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dB μ V	T1 dB	dB			Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	4809.427M	53.6	+9.9				+0.0	63.5	86.9	-23.4	None
2	7214.192M	47.7	+9.9				+0.0	57.6	86.9	-29.3	None
3	2404.616M	97.4	+9.9				+0.0	107.3	137.0	-29.7	None
4	2399.800M	46.2	+9.9				+0.0	56.1	86.9	-30.8	None
5	21864.954 M	43.4	+10.0				+0.0	53.4	86.9	-33.5	None
6	22094.347 M	42.6	+10.0				+0.0	52.6	86.9	-34.3	None
7	21829.663 M	42.4	+10.0				+0.0	52.4	86.9	-34.5	None
8	22841.347 M	42.2	+10.0				+0.0	52.2	86.9	-34.7	None
9	22182.576 M	42.1	+10.0				+0.0	52.1	86.9	-34.8	None
10	22217.867 M	42.1	+10.0				+0.0	52.1	86.9	-34.8	None
11	22570.780 M	41.8	+10.0				+0.0	51.8	86.9	-35.1	None
12	24847.071 M	41.7	+10.0				+0.0	51.7	86.9	-35.2	None
13	23917.733 M	41.5	+10.1				+0.0	51.6	86.9	-35.3	None
14	13588.164 M	41.5	+10.0				+0.0	51.5	86.9	-35.4	None
15	19059.638 M	41.1	+10.0				+0.0	51.1	86.9	-35.8	None

16	21235.592 M	41.0	+10.1	+0.0	51.1	86.9	-35.8	None
17	24676.496 M	41.1	+10.0	+0.0	51.1	86.9	-35.8	None
18	23941.260 M	40.9	+10.1	+0.0	51.0	86.9	-35.9	None
19	24988.236 M	41.0	+10.0	+0.0	51.0	86.9	-35.9	None
20	14468.740 M	40.8	+10.0	+0.0	50.8	86.9	-36.1	None
21	14203.879 M	40.7	+10.0	+0.0	50.7	86.9	-36.2	None
22	14417.144 M	40.5	+10.0	+0.0	50.5	86.9	-36.4	None
23	13526.249 M	40.5	+10.0	+0.0	50.5	86.9	-36.4	None
24	14970.935 M	40.5	+10.0	+0.0	50.5	86.9	-36.4	None
25	14844.990 M	40.5	+10.0	+0.0	50.5	86.9	-36.4	None
26	15893.029 M	40.4	+10.0	+0.0	50.4	86.9	-36.5	None
27	14620.089 M	40.4	+10.0	+0.0	50.4	86.9	-36.5	None
28	21417.930 M	40.4	+10.0	+0.0	50.4	86.9	-36.5	None
29	21382.639 M	40.4	+10.0	+0.0	50.4	86.9	-36.5	None
30	21441.458 M	40.3	+10.0	+0.0	50.3	86.9	-36.6	None
31	16338.334 M	40.1	+10.0	+0.0	50.1	86.9	-36.8	None
32	16378.816 M	40.1	+10.0	+0.0	50.1	86.9	-36.8	None

33	16252.871 M	39.9	+10.0	+0.0	49.9	86.9	-37.0	None
34	17813.685 M	39.8	+10.0	+0.0	49.8	86.9	-37.1	None
35	18974.176 M	39.8	+10.0	+0.0	49.8	86.9	-37.1	None
36	20617.994 M	39.8	+10.0	+0.0	49.8	86.9	-37.1	None
37	19459.262 M	39.7	+10.0	+0.0	49.7	86.9	-37.2	None
38	18488.389 M	39.7	+9.9	+0.0	49.6	86.9	-37.3	None
39	19565.136 M	39.6	+10.0	+0.0	49.6	86.9	-37.3	None
40	18299.472 M	39.6	+9.9	+0.0	49.5	86.9	-37.4	None
41	19288.687 M	39.4	+10.0	+0.0	49.4	86.9	-37.5	None
42	21276.765 M	39.3	+10.1	+0.0	49.4	86.9	-37.5	None
43	17296.413 M	39.3	+10.0	+0.0	49.3	86.9	-37.6	None

44	19829.821 M	39.3	+9.9	+0.0	49.2	86.9	-37.7	None
45	19671.010 M	39.3	+9.9	+0.0	49.2	86.9	-37.7	None
46	20482.710 M	39.2	+10.0	+0.0	49.2	86.9	-37.7	None
47	20406.246 M	39.2	+10.0	+0.0	49.2	86.9	-37.7	None
48	17004.041 M	39.1	+10.0	+0.0	49.1	86.9	-37.8	None
49	19318.096 M	39.1	+10.0	+0.0	49.1	86.9	-37.8	None
50	19912.167 M	39.1	+9.9	+0.0	49.0	86.9	-37.9	None

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Enlighted, Inc.**
 Specification: **15.247(d) Conducted Spurious Emissions**
 Work Order #: **97407** Date: 8/25/2015
 Test Type: **Conducted Power Measurement** Time: 1:50:34 PM
 Tested By: Hieu Song Nguyenpham Sequence#: 5
 Software: EMITest 5.02.00

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Conducted Emission
 Frequency Range: 9kHz to 1000MHz

 Application: PuTTY version 0.64 for Zigbee

 Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa

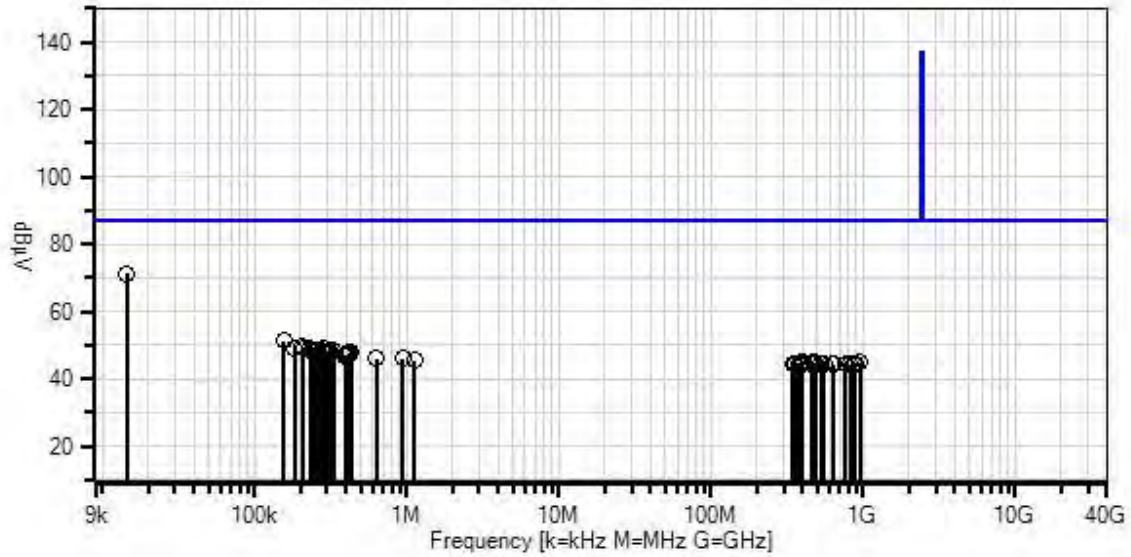
 High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi
 Method: 558074 D01 DTS Meas Guidance v03r03 section 11

 RBW=100kHz
 VBW=300kHz

 The EUT is an Enlighted USB Commissioning Key.
 The EUT is powered by a laptop and connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intended.

Middle Channel

Enlighted, Inc WO#: 97407 Sequence#: 5 Date: 8/25/2015
 15.247(d) Conducted Spurious Emissions Test Distance: None None



- Readings
 - × QP Readings
 - ▼ Ambient
 - Peak Readings
 - * Average Readings
- 1 - 15.247(d) Conducted Spurious Emissions
- Software Version: 5.02.00

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T1	ANP01211	Attenuator	23-10-34	3/31/2015	3/31/2017

Measurement Data:

Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dB μ V	T1 dB				Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	14.507k	61.3	+9.9				+0.0	71.2	86.9	-15.7	None
2	155.168k	41.4	+9.9				+0.0	51.3	86.9	-35.6	None
3	205.585k	39.7	+9.9				+0.0	49.6	86.9	-37.3	None
4	182.283k	39.4	+9.9				+0.0	49.3	86.9	-37.6	None
5	282.271k	39.2	+9.9				+0.0	49.1	86.9	-37.8	None
6	208.975k	39.1	+9.9				+0.0	49.0	86.9	-37.9	None
7	233.548k	38.9	+9.9				+0.0	48.8	86.9	-38.1	None
8	237.785k	38.8	+9.9				+0.0	48.7	86.9	-38.2	None
9	332.688k	38.7	+9.9				+0.0	48.6	86.9	-38.3	None
10	258.121k	38.6	+9.9				+0.0	48.5	86.9	-38.4	None
11	274.644k	38.5	+9.9				+0.0	48.4	86.9	-38.5	None
12	241.598k	38.4	+9.9				+0.0	48.3	86.9	-38.6	None
13	251.766k	38.4	+9.9				+0.0	48.3	86.9	-38.6	None
14	309.386k	38.4	+9.9				+0.0	48.3	86.9	-38.6	None
15	293.710k	38.2	+9.9				+0.0	48.1	86.9	-38.8	None
16	250.495k	38.2	+9.9				+0.0	48.1	86.9	-38.8	None
17	431.404k	38.2	+9.9				+0.0	48.1	86.9	-38.8	None
18	310.233k	38.2	+9.9				+0.0	48.1	86.9	-38.8	None
19	300.065k	38.0	+9.9				+0.0	47.9	86.9	-39.0	None
20	244.563k	37.9	+9.9				+0.0	47.8	86.9	-39.1	None
21	421.236k	37.7	+9.9				+0.0	47.6	86.9	-39.3	None

22	416.999k	37.3	+9.9	+0.0	47.2	86.9	-39.7	None
23	408.526k	37.2	+9.9	+0.0	47.1	86.9	-39.8	None
24	397.510k	36.9	+9.9	+0.0	46.8	86.9	-40.1	None
25	403.866k	36.9	+9.9	+0.0	46.8	86.9	-40.1	None
26	636.356k	36.2	+9.8	+0.0	46.0	86.9	-40.9	None
27	941.879k	36.1	+9.9	+0.0	46.0	86.9	-40.9	None
28	1.125M	35.5	+9.8	+0.0	45.3	86.9	-41.6	None
29	393.964M	35.2	+9.9	+0.0	45.1	86.9	-41.8	None
30	481.351M	34.9	+9.9	+0.0	44.8	86.9	-42.1	None
31	946.240M	34.9	+9.9	+0.0	44.8	86.9	-42.1	None
32	401.171M	34.8	+9.9	+0.0	44.7	86.9	-42.2	None
33	464.634M	34.8	+9.9	+0.0	44.7	86.9	-42.2	None
34	757.927M	34.6	+10.0	+0.0	44.6	86.9	-42.3	None
35	399.569M	34.6	+9.9	+0.0	44.5	86.9	-42.4	None
36	375.045M	34.6	+9.9	+0.0	44.5	86.9	-42.4	None
37	453.924M	34.6	+9.9	+0.0	44.5	86.9	-42.4	None
38	867.036M	34.5	+10.0	+0.0	44.5	86.9	-42.4	None
39	456.426M	34.6	+9.9	+0.0	44.5	86.9	-42.4	None
40	472.842M	34.5	+9.9	+0.0	44.4	86.9	-42.5	None
41	554.524M	34.5	+9.9	+0.0	44.4	86.9	-42.5	None

42	380.050M	34.4	+9.9	+0.0	44.3	86.9	-42.6	None
43	400.370M	34.4	+9.9	+0.0	44.3	86.9	-42.6	None
44	346.216M	34.4	+9.9	+0.0	44.3	86.9	-42.6	None
45	352.222M	34.4	+9.9	+0.0	44.3	86.9	-42.6	None
46	531.501M	34.4	+9.9	+0.0	44.3	86.9	-42.6	None
47	823.493M	34.3	+10.0	+0.0	44.3	86.9	-42.6	None
48	890.560M	34.3	+10.0	+0.0	44.3	86.9	-42.6	None
49	625.395M	34.4	+9.9	+0.0	44.3	86.9	-42.6	None
50	642.912M	34.4	+9.9	+0.0	44.3	86.9	-42.6	None

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Enlighted, Inc.**
 Specification: **15.247(d) Conducted Spurious Emissions**
 Work Order #: **97407** Date: 8/25/2015
 Test Type: **Conducted Power Measurement** Time: 2:13:51 PM
 Tested By: Hieu Song Nguyenpham Sequence#: 8
 Software: EMITest 5.02.00

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Conducted Emission
 Frequency Range: 1000MHz to 25000MHz

 Application: PuTTY version 0.64 for Zigbee

 Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa

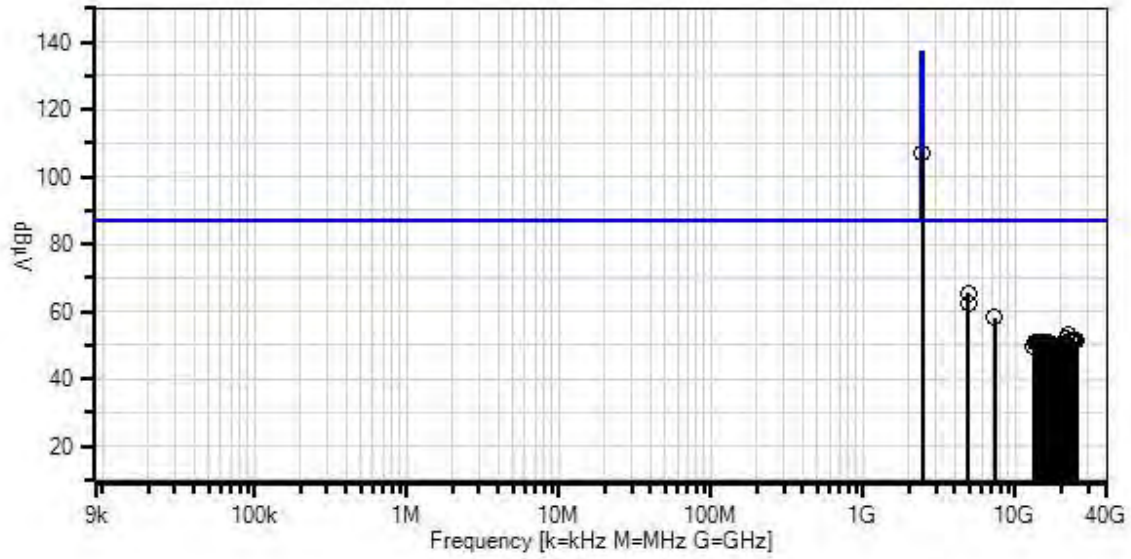
 High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi
 Method: 558074 D01 DTS Meas Guidance v03r03 section 11

 RBW=100kHz
 VBW=300kHz

 The EUT is an Enlighted USB Commissioning Key.
 The EUT is powered by a laptop and connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intention

Middle Channel

Enlighted, Inc WO#: 97407 Sequence#: 8 Date: 8/25/2015
15.247(d) Conducted Spurious Emissions Test Distance: None None



- Readings
 - × QP Readings
 - ▼ Ambient
 - 1 - 15.247(d) Conducted Spurious Emissions
 - Peak Readings
 - * Average Readings
- Software Version: 5.02.00

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T1	ANP06239	Attenuator	54A-10	7/9/2014	7/9/2016

Measurement Data:

Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dB μ V	T1 dB	dB			Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	4878.833M	55.6	+9.9				+0.0	65.5	86.9	-21.4	None
2	4881.186M	52.4	+9.9				+0.0	62.3	86.9	-24.6	None
3	7318.794M	48.2	+9.9				+0.0	58.1	86.9	-28.8	None
4	2439.701M	97.4	+9.9				+0.0	107.3	137.0	-29.7	None
5	22012.001 M	43.0	+10.0				+0.0	53.0	86.9	-33.9	None
6	21964.946 M	42.9	+10.0				+0.0	52.9	86.9	-34.0	None
7	22106.111 M	42.9	+10.0				+0.0	52.9	86.9	-34.0	None
8	21764.962 M	42.1	+10.0				+0.0	52.1	86.9	-34.8	None
9	21700.261 M	41.9	+10.0				+0.0	51.9	86.9	-35.0	None
10	23164.851 M	41.6	+10.0				+0.0	51.6	86.9	-35.3	None
11	23141.323 M	41.4	+10.0				+0.0	51.4	86.9	-35.5	None
12	23447.182 M	41.3	+10.0				+0.0	51.3	86.9	-35.6	None
13	24123.599 M	41.2	+10.1				+0.0	51.3	86.9	-35.6	None
14	24811.780 M	41.2	+10.0				+0.0	51.2	86.9	-35.7	None
15	24752.961 M	41.1	+10.0				+0.0	51.1	86.9	-35.8	None

16	24988.236 M	41.1	+10.0	+0.0	51.1	86.9	-35.8	None
17	14124.765 M	41.0	+10.0	+0.0	51.0	86.9	-35.9	None
18	14907.962 M	40.9	+10.0	+0.0	50.9	86.9	-36.0	None
19	13595.044 M	40.8	+10.0	+0.0	50.8	86.9	-36.1	None
20	13677.598 M	40.7	+10.0	+0.0	50.7	86.9	-36.2	None
21	13536.568 M	40.7	+10.0	+0.0	50.7	86.9	-36.2	None
22	15690.618 M	40.7	+10.0	+0.0	50.7	86.9	-36.2	None
23	14606.330 M	40.7	+10.0	+0.0	50.7	86.9	-36.2	None
24	16396.808 M	40.6	+10.0	+0.0	50.6	86.9	-36.3	None
25	14135.084 M	40.5	+10.0	+0.0	50.5	86.9	-36.4	None
26	20923.852 M	40.2	+10.1	+0.0	50.3	86.9	-36.6	None
27	21488.513 M	40.3	+10.0	+0.0	50.3	86.9	-36.6	None
28	14638.081 M	40.2	+10.0	+0.0	50.2	86.9	-36.7	None
29	14777.520 M	40.2	+10.0	+0.0	50.2	86.9	-36.7	None
30	14818.002 M	40.1	+10.0	+0.0	50.1	86.9	-36.8	None
31	15663.630 M	40.1	+10.0	+0.0	50.1	86.9	-36.8	None
32	21323.820 M	40.1	+10.0	+0.0	50.1	86.9	-36.8	None

33	21076.781 M	39.9	+10.1	+0.0	50.0	86.9	-36.9	None
34	18798.753 M	39.9	+10.0	+0.0	49.9	86.9	-37.0	None
35	15915.519 M	39.9	+10.0	+0.0	49.9	86.9	-37.0	None
36	19518.081 M	39.9	+10.0	+0.0	49.9	86.9	-37.0	None
37	19082.128 M	39.9	+10.0	+0.0	49.9	86.9	-37.0	None
38	15978.492 M	39.8	+10.0	+0.0	49.8	86.9	-37.1	None
39	15762.587 M	39.8	+10.0	+0.0	49.8	86.9	-37.1	None
40	17809.187 M	39.8	+10.0	+0.0	49.8	86.9	-37.1	None
41	20606.230 M	39.8	+10.0	+0.0	49.8	86.9	-37.1	None
42	18353.448 M	39.9	+9.9	+0.0	49.8	86.9	-37.1	None
43	17827.180 M	39.7	+10.0	+0.0	49.7	86.9	-37.2	None
44	17881.156 M	39.7	+10.0	+0.0	49.7	86.9	-37.2	None

45	16896.089 M	39.6	+10.0	+0.0	49.6	86.9	-37.3	None
46	18551.361 M	39.5	+10.0	+0.0	49.5	86.9	-37.4	None
47	18722.286 M	39.5	+10.0	+0.0	49.5	86.9	-37.4	None
48	19388.679 M	39.5	+10.0	+0.0	49.5	86.9	-37.4	None
49	13110.039 M	39.4	+10.0	+0.0	49.4	86.9	-37.5	None
50	18996.666 M	39.4	+10.0	+0.0	49.4	86.9	-37.5	None

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Enlighted, Inc.**
 Specification: **15.247(d) Conducted Spurious Emissions**
 Work Order #: **97407** Date: 8/25/2015
 Test Type: **Conducted Power Measurement** Time: 1:57:26 PM
 Tested By: Hieu Song Nguyenpham Sequence#: 6
 Software: EMITest 5.02.00

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Conducted Emission
 Frequency Range: 9kHz to 1000MHz

 Application: PuTTY version 0.64 for Zigbee

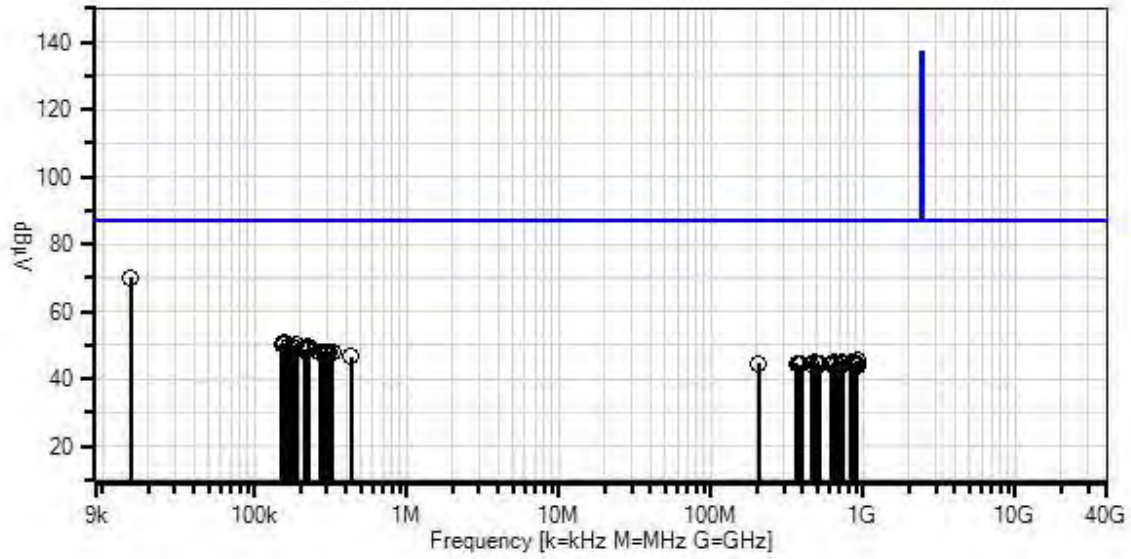
 Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa

 High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi
 Method: 558074 D01 DTS Meas Guidance v03r03 section 11
 RBW=100kHz
 VBW=300kHz

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High Channel

Enlighted, Inc WO#: 97407 Sequence#: 6 Date: 8/25/2015
15.247(d) Conducted Spurious Emissions Test Distance: None None



- Readings
 - × QP Readings
 - ▼ Ambient
 - Peak Readings
 - * Average Readings
 - 1 - 15.247(d) Conducted Spurious Emissions
- Software Version: 5.02.00

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T1	ANP01211	Attenuator	23-10-34	3/31/2015	3/31/2017

Measurement Data:

Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dB μ V	T1 dB	dB			Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	15.355k	60.2	+9.9				+0.0	70.1	86.9	-16.8	None
2	158.557k	40.7	+9.9				+0.0	50.6	86.9	-36.3	None
3	152.626k	40.4	+9.9				+0.0	50.3	86.9	-36.6	None
4	159.404k	40.3	+9.9				+0.0	50.2	86.9	-36.7	None
5	189.909k	40.1	+9.9				+0.0	50.0	86.9	-36.9	None
6	167.878k	39.8	+9.9				+0.0	49.7	86.9	-37.2	None
7	178.470k	39.8	+9.9				+0.0	49.7	86.9	-37.2	None
8	226.769k	39.8	+9.9				+0.0	49.7	86.9	-37.2	None
9	228.887k	39.4	+9.9				+0.0	49.3	86.9	-37.6	None
10	183.554k	39.3	+9.9				+0.0	49.2	86.9	-37.7	None
11	219.143k	39.0	+9.9				+0.0	48.9	86.9	-38.0	None
12	221.685k	38.8	+9.9				+0.0	48.7	86.9	-38.2	None
13	211.517k	38.7	+9.9				+0.0	48.6	86.9	-38.3	None
14	311.928k	38.2	+9.9				+0.0	48.1	86.9	-38.8	None
15	288.202k	38.0	+9.9				+0.0	47.9	86.9	-39.0	None
16	325.909k	37.9	+9.9				+0.0	47.8	86.9	-39.1	None
17	281.847k	37.8	+9.9				+0.0	47.7	86.9	-39.2	None
18	269.984k	37.7	+9.9				+0.0	47.6	86.9	-39.3	None
19	292.439k	37.7	+9.9				+0.0	47.6	86.9	-39.3	None
20	303.454k	37.7	+9.9				+0.0	47.6	86.9	-39.3	None
21	432.675k	36.6	+9.9				+0.0	46.5	86.9	-40.4	None

22	904.874M	35.4	+10.0	+0.0	45.4	86.9	-41.5	None
23	476.246M	35.3	+9.9	+0.0	45.2	86.9	-41.7	None
24	635.605M	34.9	+9.9	+0.0	44.8	86.9	-42.1	None
25	834.203M	34.8	+10.0	+0.0	44.8	86.9	-42.1	None
26	727.697M	34.7	+10.0	+0.0	44.7	86.9	-42.2	None
27	859.228M	34.7	+10.0	+0.0	44.7	86.9	-42.2	None
28	205.475M	34.7	+9.9	+0.0	44.6	86.9	-42.3	None
29	363.433M	34.7	+9.9	+0.0	44.6	86.9	-42.3	None
30	453.924M	34.7	+9.9	+0.0	44.6	86.9	-42.3	None
31	497.167M	34.6	+9.9	+0.0	44.5	86.9	-42.4	None
32	499.569M	34.5	+9.9	+0.0	44.4	86.9	-42.5	None
33	454.224M	34.5	+9.9	+0.0	44.4	86.9	-42.5	None
34	501.871M	34.5	+9.9	+0.0	44.4	86.9	-42.5	None
35	885.455M	34.4	+10.0	+0.0	44.4	86.9	-42.5	None
36	864.634M	34.4	+10.0	+0.0	44.4	86.9	-42.5	None
37	508.578M	34.4	+9.9	+0.0	44.3	86.9	-42.6	None
38	496.166M	34.4	+9.9	+0.0	44.3	86.9	-42.6	None
39	395.365M	34.4	+9.9	+0.0	44.3	86.9	-42.6	None
40	518.989M	34.4	+9.9	+0.0	44.3	86.9	-42.6	None
41	738.408M	34.3	+10.0	+0.0	44.3	86.9	-42.6	None

42	630.700M	34.4	+9.9	+0.0	44.3	86.9	-42.6	None
43	609.079M	34.4	+9.9	+0.0	44.3	86.9	-42.6	None
44	626.796M	34.3	+9.9	+0.0	44.2	86.9	-42.7	None
45	375.545M	34.3	+9.9	+0.0	44.2	86.9	-42.7	None
46	665.835M	34.2	+10.0	+0.0	44.2	86.9	-42.7	None
47	739.409M	34.2	+10.0	+0.0	44.2	86.9	-42.7	None
48	721.891M	34.2	+10.0	+0.0	44.2	86.9	-42.7	None
49	891.961M	34.1	+10.0	+0.0	44.1	86.9	-42.8	None
50	909.278M	34.1	+10.0	+0.0	44.1	86.9	-42.8	None

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Enlighted, Inc.**
 Specification: **15.247(d) Conducted Spurious Emissions**
 Work Order #: **97407** Date: 8/25/2015
 Test Type: **Conducted Power Measurement** Time: 2:21:52 PM
 Tested By: Hieu Song Nguyenpham Sequence#: 9
 Software: EMITest 5.02.00

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Conducted Emission
 Frequency Range: 1000MHz to 25000MHz

 Application: PuTTY version 0.64 for Zigbee

 Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa

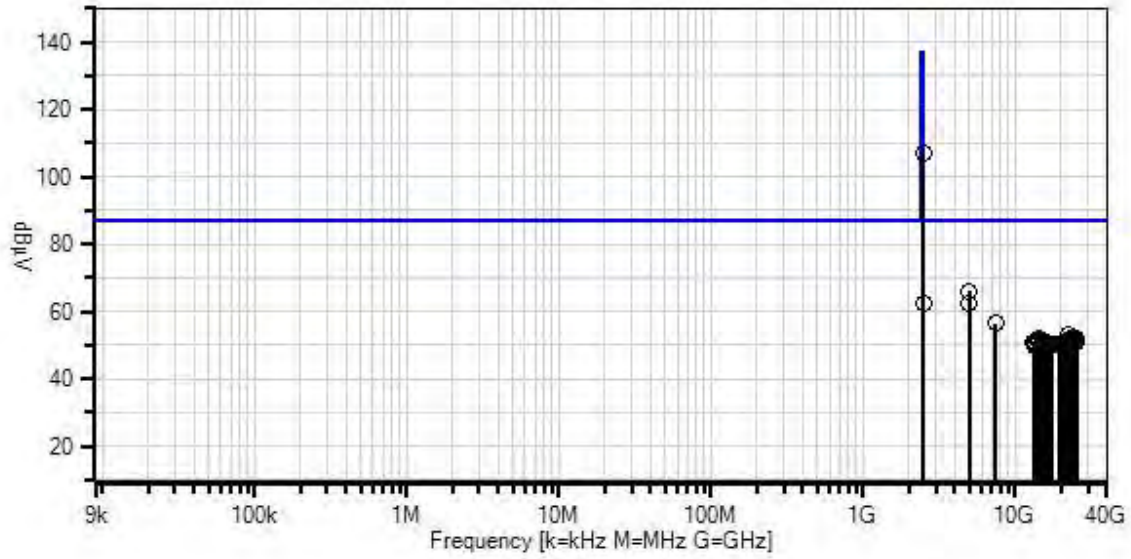
 High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi
 Method: 558074 D01 DTS Meas Guidance v03r03 section 11

 RBW=100kHz
 VBW=300kHz

 The EUT is an Enlighted USB Commissioning Key.
 The EUT is powered by a laptop and connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intention

Middle Channel

Enlighted, Inc WO#: 97407 Sequence#: 9 Date: 8/25/2015
15.247(d) Conducted Spurious Emissions Test Distance: None None



- Readings
 - × QP Readings
 - ▼ Ambient
 - 1 - 15.247(d) Conducted Spurious Emissions
 - Peak Readings
 - * Average Readings
- Software Version: 5.02.00

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T1	ANP06239	Attenuator	54A-10	7/9/2014	7/9/2016

Measurement Data:

Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dBμV	T1 dB	dB	dB	dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	4958.827M	56.1	+9.9				+0.0	66.0	86.9	-20.9	None
2	4961.180M	52.7	+9.9				+0.0	62.6	86.9	-24.3	None
3	2483.730M	52.3	+9.9				+0.0	62.2	86.9	-24.7	None
4	2479.602M	97.3	+9.9				+0.0	107.2	137.0	-29.8	None
5	7439.489M	46.4	+9.9				+0.0	56.3	86.9	-30.6	None
6	22012.001 M	42.9	+10.0				+0.0	52.9	86.9	-34.0	None
7	14231.397 M	41.9	+10.0				+0.0	51.9	86.9	-35.0	None
8	22617.835 M	41.8	+10.0				+0.0	51.8	86.9	-35.1	None
9	24788.252 M	41.7	+10.0				+0.0	51.7	86.9	-35.2	None
10	24164.772 M	41.5	+10.1				+0.0	51.6	86.9	-35.3	None
11	22588.426 M	41.6	+10.0				+0.0	51.6	86.9	-35.3	None
12	24988.236 M	41.6	+10.0				+0.0	51.6	86.9	-35.3	None
13	24752.961 M	41.6	+10.0				+0.0	51.6	86.9	-35.3	None
14	22464.906 M	41.5	+10.0				+0.0	51.5	86.9	-35.4	None
15	24176.536 M	41.3	+10.1				+0.0	51.4	86.9	-35.5	None

16	22335.505 M	41.3	+10.0	+0.0	51.3	86.9	-35.6	None
17	14186.680 M	41.1	+10.0	+0.0	51.1	86.9	-35.8	None
18	14430.903 M	41.1	+10.0	+0.0	51.1	86.9	-35.8	None
19	13588.164 M	41.0	+10.0	+0.0	51.0	86.9	-35.9	None
20	21388.521 M	41.0	+10.0	+0.0	51.0	86.9	-35.9	None
21	24382.402 M	41.0	+10.0	+0.0	51.0	86.9	-35.9	None
22	13560.646 M	40.9	+10.0	+0.0	50.9	86.9	-36.0	None
23	23917.733 M	40.8	+10.1	+0.0	50.9	86.9	-36.0	None
24	24400.047 M	40.9	+10.0	+0.0	50.9	86.9	-36.0	None
25	24635.323 M	40.8	+10.0	+0.0	50.8	86.9	-36.1	None
26	23323.662 M	40.7	+10.0	+0.0	50.7	86.9	-36.2	None
27	24647.087 M	40.7	+10.0	+0.0	50.7	86.9	-36.2	None
28	14210.759 M	40.6	+10.0	+0.0	50.6	86.9	-36.3	None
29	15857.045 M	40.6	+10.0	+0.0	50.6	86.9	-36.3	None
30	23870.678 M	40.5	+10.1	+0.0	50.6	86.9	-36.3	None
31	21147.364 M	40.4	+10.1	+0.0	50.5	86.9	-36.4	None
32	13223.551 M	40.5	+10.0	+0.0	50.5	86.9	-36.4	None

33	24117.717 M	40.4	+10.1	+0.0	50.5	86.9	-36.4	None
34	23423.654 M	40.5	+10.0	+0.0	50.5	86.9	-36.4	None
35	19323.978 M	40.3	+10.0	+0.0	50.3	86.9	-36.6	None
36	15069.891 M	40.2	+10.0	+0.0	50.2	86.9	-36.7	None
37	14921.456 M	40.2	+10.0	+0.0	50.2	86.9	-36.7	None
38	21012.080 M	40.1	+10.1	+0.0	50.2	86.9	-36.7	None
39	20870.915 M	40.2	+10.0	+0.0	50.2	86.9	-36.7	None
40	15146.357 M	40.1	+10.0	+0.0	50.1	86.9	-36.8	None
41	14835.994 M	40.1	+10.0	+0.0	50.1	86.9	-36.8	None
42	15533.187 M	40.1	+10.0	+0.0	50.1	86.9	-36.8	None
43	17323.401 M	40.1	+10.0	+0.0	50.1	86.9	-36.8	None
44	16257.369 M	40.1	+10.0	+0.0	50.1	86.9	-36.8	None

45	14678.563 M	40.0	+10.0	+0.0	50.0	86.9	-36.9	None
46	14957.440 M	39.9	+10.0	+0.0	49.9	86.9	-37.0	None
47	15042.903 M	39.9	+10.0	+0.0	49.9	86.9	-37.0	None
48	15947.006 M	39.9	+10.0	+0.0	49.9	86.9	-37.0	None
49	13371.460 M	39.8	+10.0	+0.0	49.8	86.9	-37.1	None
50	16419.298 M	39.8	+10.0	+0.0	49.8	86.9	-37.1	None

Band Edge

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Enlighted, Inc.**
 Specification: **Band Edge Set up**
 Work Order #: **97407** Date: 08/25/15
 Test Type: **Conducted Measurement** Time: 09:59:39
 Tested By: Hieu Song Nguyenpham Sequence#: 1
 Software: EMITest 5.02.00

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	P01211	Attenuator	23-10-34	3/31/2015	3/31/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Band edge set up

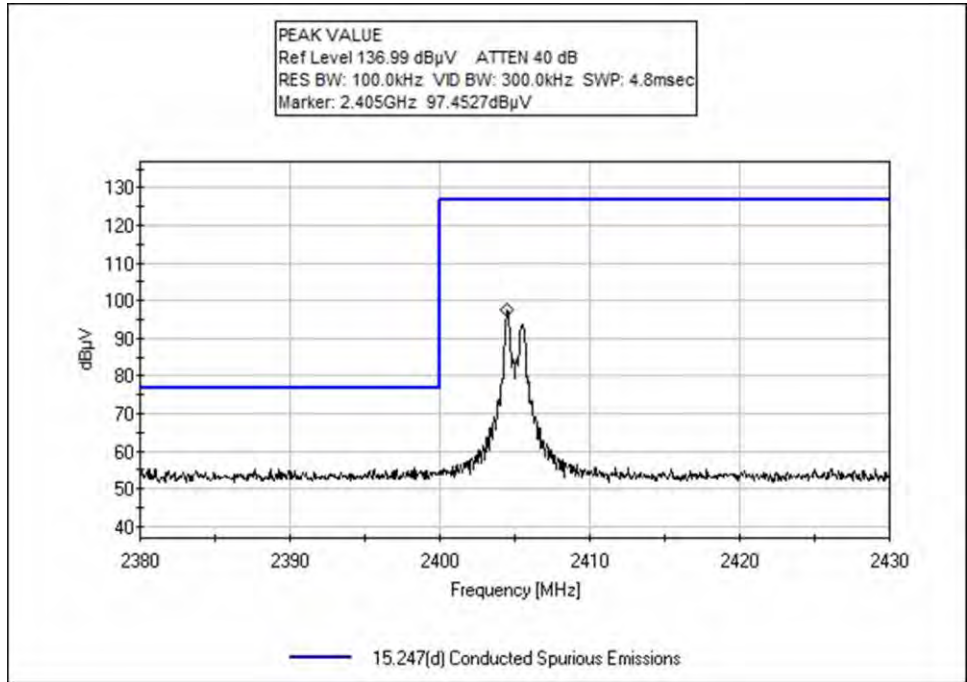
Application: PuTTY version 0.64 for Zigbee

Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa

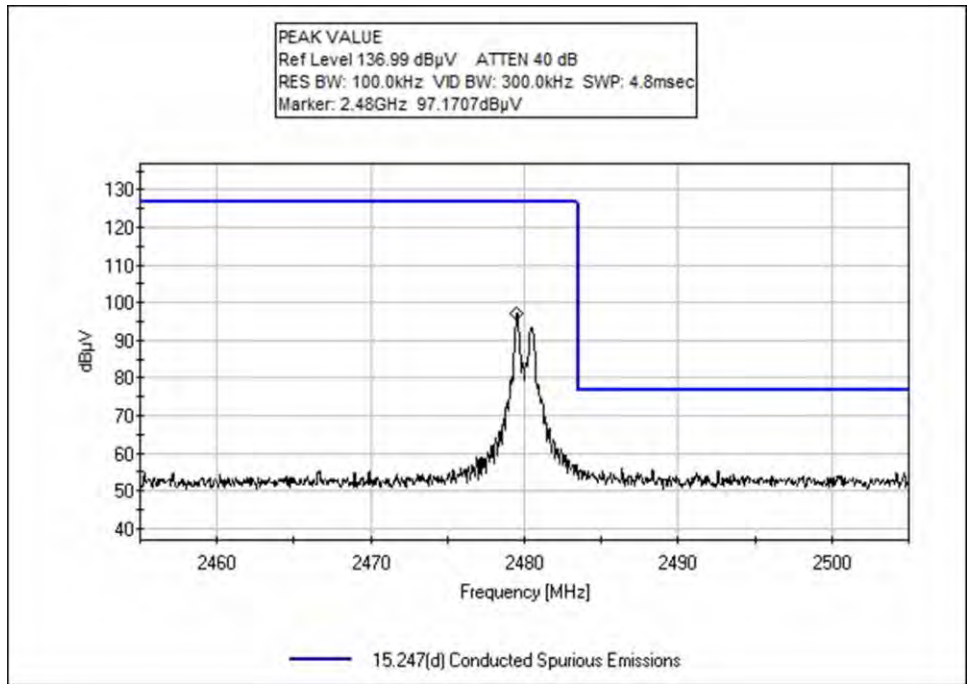
High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi
 Method: KDB 558074 v03r03 section 13.2

The EUT is an Enlighted USB Commissioning Key.
 The EUT is powered by a laptop and connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intended.

Band Edge Plots

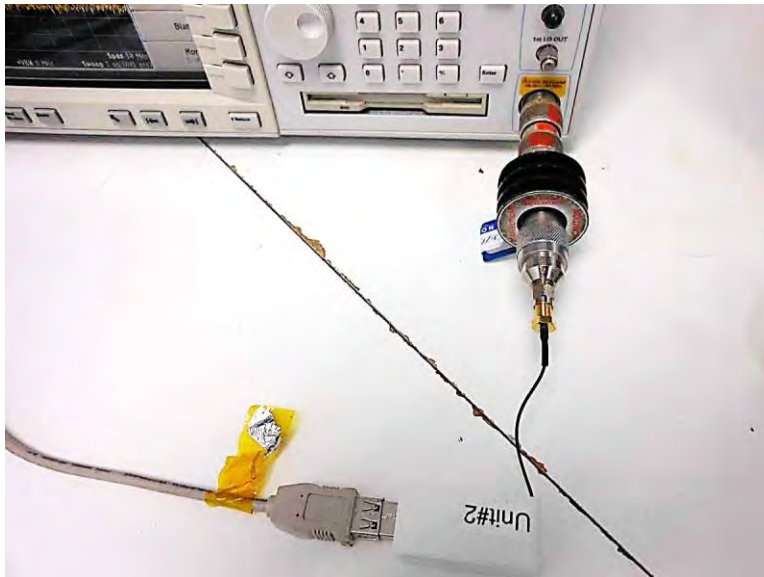
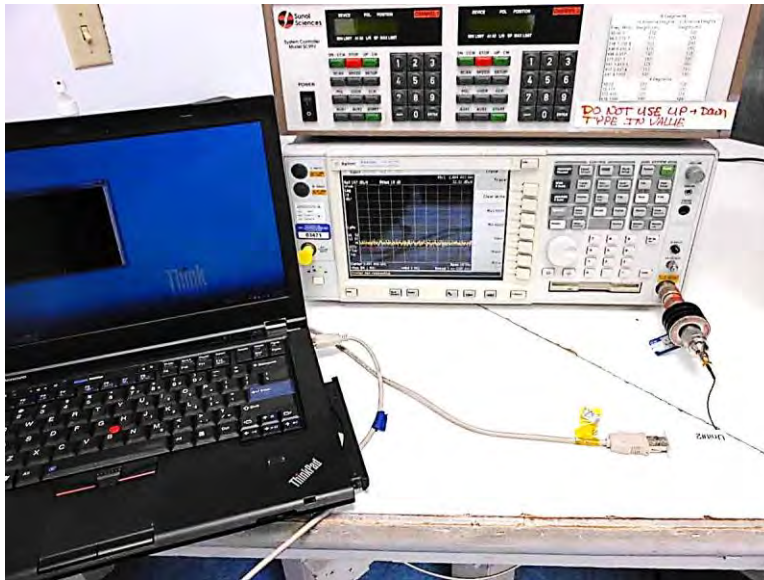


Low Channel



High Channel

Test Setup Photos



15.247(d) Radiated Emissions & Band Edge

Test Conditions / Setup / 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 #: **97407** Date: 9/1/2015
 Test Type: **Radiated Scan** Time: 13:47:03
 Tested By: Hieu Song Nguyenpham Sequence#: 57
 Software: EMITest 5.02.00

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

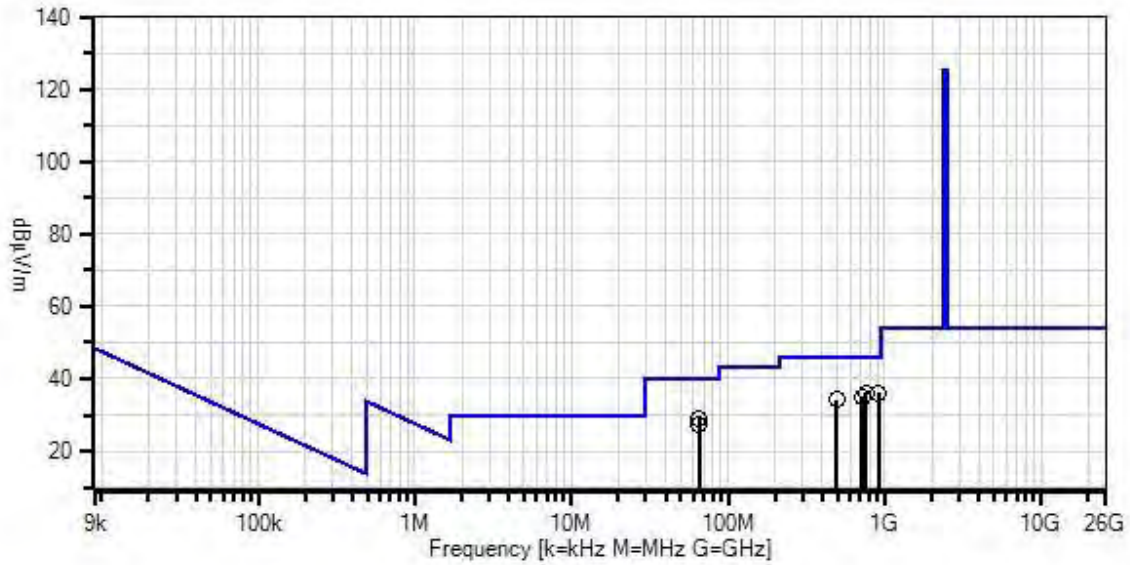
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Emission
 Frequency Range: 9kHz to 1000MHz
 Application: PuTTY version 0.64 for Zigbee
 Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa
 High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 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 an Enlighted USB Commissioning Key.
 The EUT is powered by a laptop and is connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intended.
 The laptop is connected to a keyboard, mouse, headphones and Prosafe 8 port10/100Mbps Switch as setting up for the host EUT requirements.
 The Z-orthogonal is the worst orthogonal which is set in the similarly orientation when the USB Dongle was plugged directly to the laptop. Therefore, the EUT was set in the worst orthogonal when Radiated Spurious Emission was performed.
Low Channel

Enlighted, Inc WO#: 97407 Sequence#: 57 Date: 9/1/2015
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters



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

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T2	ANP00880	Cable	RG214U	6/13/2014	6/13/2016
T3	ANP01183	Cable	CNT-195	9/3/2013	9/3/2015
T4	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T5	AN00567	Preamp	8447D	1/2/2015	1/2/2017
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	T5				Table	dB μ V/m	dB μ V/m	dB	Ant
1	912.884M	35.0	+23.4 -28.0	+3.2	+1.1	+1.4	+0.0	36.1	46.0	-9.9	Vert
2	763.095M	37.3	+21.4 -28.0	+2.9	+1.2	+1.3	+0.0	36.1	46.0	-9.9	Vert
3	65.537M	49.6	+6.2 -27.8	+0.7	+0.3	+0.2	+0.0	29.2	40.0	-10.8	Horiz
4	719.852M	37.0	+20.8 -28.0	+2.9	+1.1	+1.2	+0.0	35.0	46.0	-11.0	Horiz
5	491.984M	40.2	+17.9 -28.0	+2.2	+0.8	+1.0	+0.0	34.1	46.0	-11.9	Horiz
6	65.537M	47.9	+6.2 -27.8	+0.7	+0.3	+0.2	+0.0	27.5	40.0	-12.5	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 #: **97407** Date: 8/26/2015
 Test Type: **Radiated Scan** Time: 14:45:42
 Tested By: Hieu Song Nguyenpham Sequence#: 24
 Software: EMITest 5.02.00

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

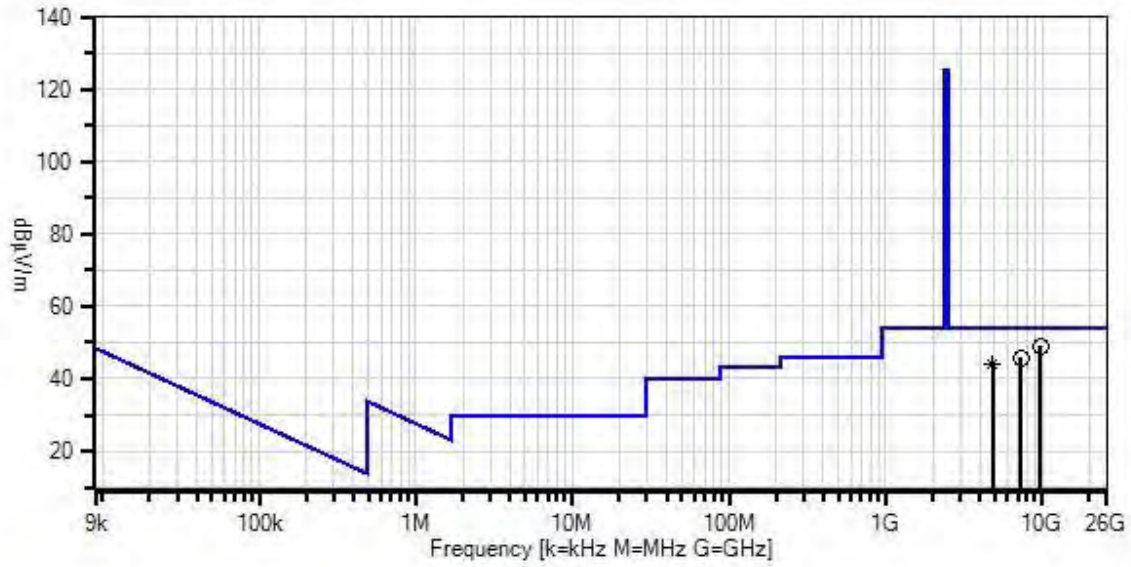
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Emission
 Frequency Range: 1000MHz to 25000MHz
 Application: PuTTY version 0.64 for Zigbee
 Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa
 High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi
 Method: KDB 558074 v03r03 section 12.1 and ANSI C63.4 2009
 RBW=1MHz
 VBW=1MHz
 The EUT is an Enlighted USB Commissioning Key.
 The EUT is powered by a laptop and connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intended.
 The laptop is connected to a keyboard, mouse, headphones and Prosafe 8 port 10/100Mbps Switch as setting up for the host EUT requirements.
 The Z-orthogonal is the worst orthogonal which is set in the similarly orientation when the USB Dongle was plugged directly to the laptop. Therefore, the EUT was set in the worst orthogonal when Radiated Spurious Emission was performed.
Low Channel

Enlighted, Inc WO#: 97407 Sequence#: 24 Date: 8/26/2015
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters



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

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
T4	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
	ANP00928	Cable	various	1/23/2014	1/23/2016
	ANP00929	Cable	various	1/23/2014	1/23/2016
T5	ANP06710	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	4/2/2014	4/2/2016
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017
	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	9749.743M	57.2	+38.9 +2.2	+2.4 +0.2	+5.6	-57.6	+0.0	48.9	54.0	-5.1	Vert
2	7271.267M	58.7	+36.2 +1.9	+2.1 +0.2	+5.0	-58.3	+0.0	45.8	54.0	-8.2	Horiz
3	4810.969M Ave	61.6	+33.2 +1.5	+1.7 +0.2	+3.8	-57.8	+0.0	44.2	54.0	-9.8	Horiz
^	4810.969M	69.5	+33.2 +1.5	+1.7 +0.2	+3.8	-57.8	+0.0	52.1	54.0	-1.9	Horiz
5	4808.969M Ave	61.5	+33.2 +1.5	+1.7 +0.2	+3.8	-57.8	+0.0	44.1	54.0	-9.9	Horiz
^	4808.969M	69.3	+33.2 +1.5	+1.7 +0.2	+3.8	-57.8	+0.0	51.9	54.0	-2.1	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 #: **97407** Date: 9/1/2015
 Test Type: **Radiated Scan** Time: 14:08:42
 Tested By: Hieu Song Nguyenpham Sequence#: 60
 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
 Frequency Range: 9kHz to 1000MHz

 Application: PuTTY version 0.64 for Zigbee

 Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa

 High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi
 Method: KDB 558074 v03r02 section 12.1 and ANSI C63.4 2009

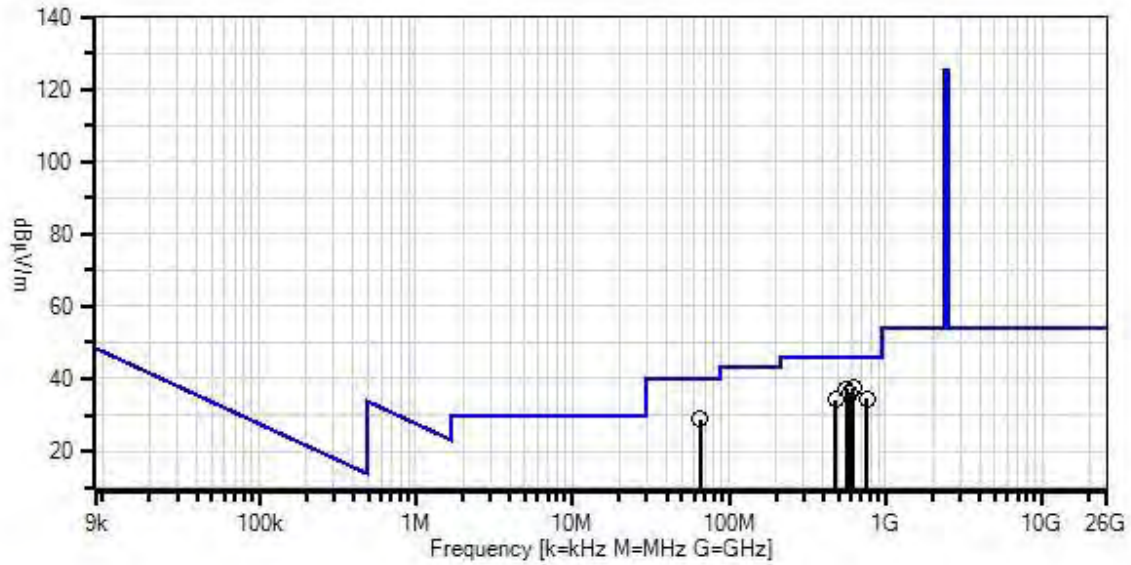
 Frequency range of measurement = 9 kHz- 1GHz.
 9 kHz - 150 kHz -> RBW=200 Hz VBW=200 Hz
 150 kHz - 30 MHz -> RBW=9 kHz VBW=9 kHz
 30 MHz - 1000MHz -> RBW=120 kHz VBW=120 kHz

 The EUT is an Enlighted USB Commissioning Key.
 The EUT is powered by a laptop and connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intended.
 The laptop is connected to a keyboard, mouse, headphones and Prosafe 8 port 10/100Mbps Switch as setting up for the host EUT requirements.

 The Z-orthogonal is the worst orthogonal which is set in the similarly orientation when the USB Dongle was plugged directly to the laptop. Therefore, the EUT was set in the worst orthogonal when Radiated Spurious Emission was performed.

Middle Channel

Enlighted, Inc WO#: 97407 Sequence#: 60 Date: 9/1/2015
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters



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

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T2	ANP00880	Cable	RG214U	6/13/2014	6/13/2016
T3	ANP01183	Cable	CNT-195	9/3/2013	9/3/2015
T4	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T5	AN00567	Preamp	8447D	1/2/2015	1/2/2017
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	T5				Table	dB μ V/m	dB μ V/m	dB	Ant
1	623.436M	41.0	+19.8 -28.0	+2.5	+1.0	+1.1	+0.0	37.4	46.0	-8.6	Horiz
2	564.470M	41.7	+19.1 -28.0	+2.4	+0.8	+1.1	+0.0	37.1	46.0	-8.9	Vert
3	587.822M	39.7	+19.4 -28.0	+2.5	+1.0	+1.1	+0.0	35.7	46.0	-10.3	Horiz
4	65.561M	49.3	+6.2 -27.8	+0.7	+0.3	+0.2	+0.0	28.9	40.0	-11.1	Horiz
5	762.969M	35.6	+21.4 -28.0	+2.9	+1.2	+1.3	+0.0	34.4	46.0	-11.6	Vert
6	479.816M	40.5	+17.7 -28.0	+2.2	+0.8	+1.0	+0.0	34.2	46.0	-11.8	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 #: **97407** Date: 8/26/2015
 Test Type: **Radiated Scan** Time: 16:21:05
 Tested By: Hieu Song Nguyenpham Sequence#: 27
 Software: EMITest 5.02.00

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

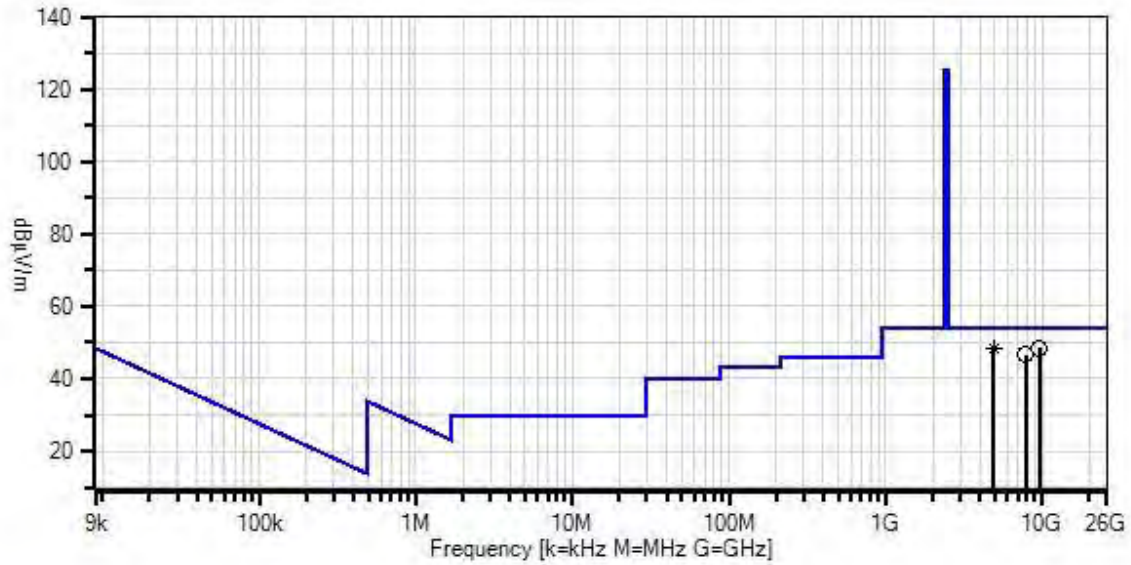
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Emission
 Frequency Range: 1000MHz to 25000MHz
 Application: PuTTY version 0.64 for Zigbee
 Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa
 High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi
 Method: KDB 558074 v03r03 section 12.1 and ANSI C63.4 2009
 RBW=1MHz
 VBW=1MHz
 The EUT is an Enlighted USB Commissioning Key.
 The EUT is powered by a laptop and is connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intended.
 The laptop is connected to a keyboard, mouse, headphones and Prosafe 8 port 10/100Mbps Switch as setting up for the host EUT requirements.
 The Z-orthogonal is the worst orthogonal which is set in the similarly orientation when the USB Dongle was plugged directly to the laptop. Therefore, the EUT was set in the worst orthogonal when Radiated Spurious Emission was performed.
Middle Channel

Enlighted, Inc WO#: 97407 Sequence#: 27 Date: 8/26/2015
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters



- Readings
 - × QP Readings
 - ▼ Ambient
 - Peak Readings
 - * Average Readings
- 1 - 15.247(d) / 15.209 Radiated Spurious Emissions
 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
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T4	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
	ANP00928	Cable	various	1/23/2014	1/23/2016
	ANP00929	Cable	various	1/23/2014	1/23/2016
T5	ANP06710	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	4/2/2014	4/2/2016
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017
	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	9641.635M	56.7	+38.7 +2.2	+2.4 +0.2	+5.5	-57.3	+0.0	48.4	54.0	-5.6	Vert
2	4881.007M Ave	65.3	+33.4 +1.5	+1.7 +0.2	+3.8	-57.6	+0.0	48.3	54.0	-5.7	Horiz
^	4881.007M	72.6	+33.4 +1.5	+1.7 +0.2	+3.8	-57.6	+0.0	55.6	54.0	+1.6	Horiz
4	4878.927M Ave	65.3	+33.4 +1.5	+1.7 +0.2	+3.8	-57.6	+0.0	48.3	54.0	-5.7	Horiz
^	4878.927M	72.4	+33.4 +1.5	+1.7 +0.2	+3.8	-57.6	+0.0	55.4	54.0	+1.4	Horiz
6	7837.833M	58.4	+36.6 +2.0	+2.2 +0.2	+5.1	-57.8	+0.0	46.7	54.0	-7.3	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 #: **97407** Date: 9/1/2015
 Test Type: **Radiated Scan** Time: 14:36:30
 Tested By: Hieu Song Nguyenpham Sequence#: 63
 Software: EMITest 5.02.00

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

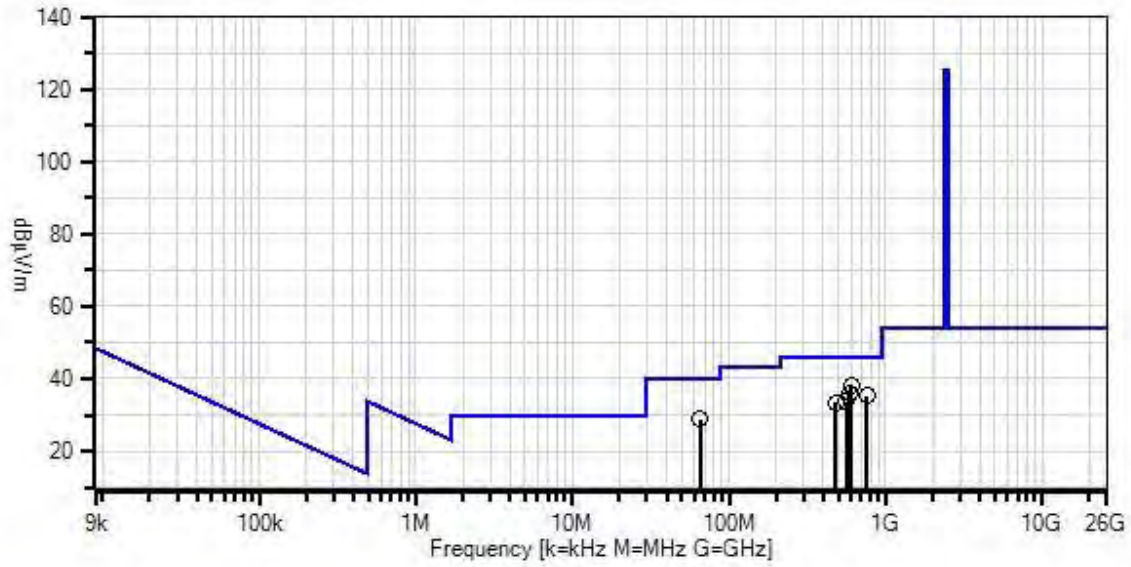
Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Emission
 Frequency Range: 9kHz to 1000MHz
 Application: PuTTY version 0.64 for Zigbee
 Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa
 High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi
 Method: KDB 558074 v03r03 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 an Enlighted USB Commissioning Key.
 The EUT is powered by a laptop and connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intended.
 The laptop is connected to a keyboard, mouse, headphones and Prosafe 8 port 10/100Mbps Switch as setting up for the host EUT requirements.
 The Z-orthogonal is the worst orthogonal which is set in the similarly orientation when the USB Dongle was plugged directly to the laptop. Therefore, the EUT was set in the worst orthogonal when Radiated Spurious Emission was performed.

High Channel

Enlighted, Inc WO#: 97407 Sequence#: 63 Date: 9/1/2015
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters



- 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	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T2	ANP00880	Cable	RG214U	6/13/2014	6/13/2016
T3	ANP01183	Cable	CNT-195	9/3/2013	9/3/2015
T4	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T5	AN00567	Preamp	8447D	1/2/2015	1/2/2017
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	T5				Table	dB μ V/m	dB μ V/m	dB	Ant
1	600.667M	41.7	+19.6 -28.0	+2.5	+1.0	+1.1	+0.0	37.9	46.0	-8.1	Horiz
2	587.822M	39.8	+19.4 -28.0	+2.5	+1.0	+1.1	+0.0	35.8	46.0	-10.2	Horiz
3	760.050M	36.6	+21.4 -28.0	+2.9	+1.2	+1.3	+0.0	35.4	46.0	-10.6	Vert
4	65.561M	49.2	+6.2 -27.8	+0.7	+0.3	+0.2	+0.0	28.8	40.0	-11.2	Horiz
5	563.886M	38.2	+19.1 -28.0	+2.4	+0.8	+1.1	+0.0	33.6	46.0	-12.4	Vert
6	479.816M	39.7	+17.7 -28.0	+2.2	+0.8	+1.0	+0.0	33.4	46.0	-12.6	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 #: **97407** Date: 8/26/2015
 Test Type: **Radiated Scan** Time: 16:40:47
 Tested By: Hieu Song Nguyenpham Sequence#: 30
 Software: EMITest 5.02.00

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

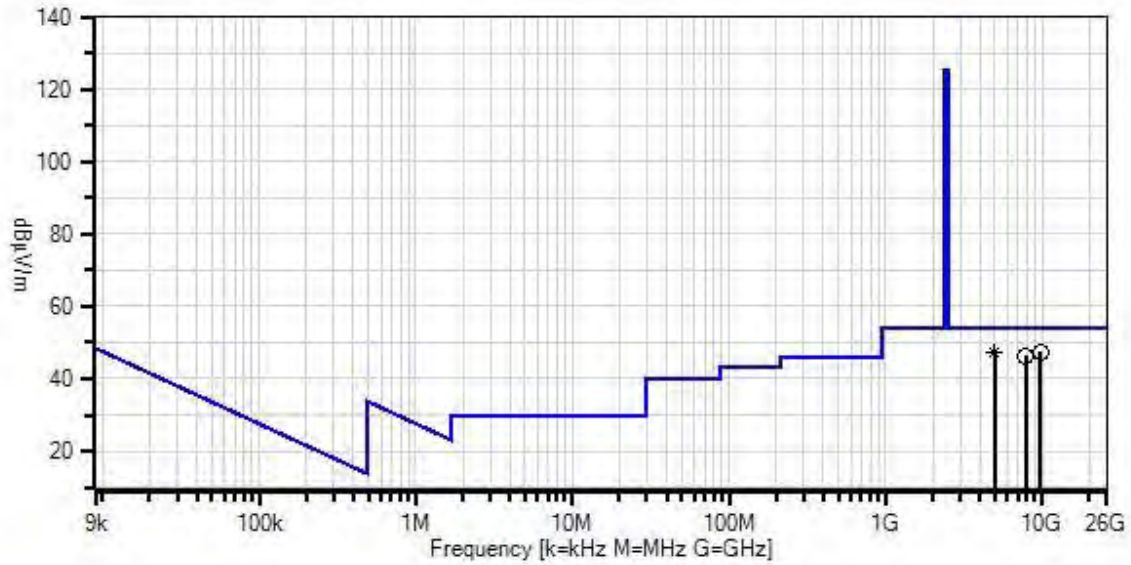
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Emission
 Frequency Range: 1000MHz to 25000MHz
 Application: PuTTY version 0.64 for Zigbee
 Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa
 High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi
 Method: KDB 558074 v03r03 section 12.1 and ANSI C63.4 2009
 RBW=1MHz
 VBW=1MHz
 The EUT is an Enlighted USB Commissioning Key.
 The EUT is powered by a laptop and connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intended.
 The laptop is connected to a keyboard, mouse, headphones and Prosafe 8 port 10/100Mbps Switch as setting up for the host EUT requirements.
 The Z-orthogonal is the worst orthogonal which is set in the similarly orientation when the USB Dongle was plugged directly to the laptop. Therefore, the EUT was set in the worst orthogonal when Radiated Spurious Emission was performed.
High Channel

Enlighted, Inc WO#: 97407 Sequence#: 30 Date: 8/26/2015
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters



- Readings
 - × QP Readings
 - ▼ Ambient
 - Peak Readings
 - * Average Readings
- 1 - 15.247(d) / 15.209 Radiated Spurious Emissions
 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
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T4	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
	ANP00928	Cable	various	1/23/2014	1/23/2016
	ANP00929	Cable	various	1/23/2014	1/23/2016
T5	ANP06710	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	4/2/2014	4/2/2016
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017
	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	9743.551M	55.8	+38.9 +2.2	+2.4 +0.2	+5.6	-57.6	+0.0	47.5	54.0	-6.5	Vert
2	4959.073M Ave	63.7	+33.5 +1.6	+1.7 +0.2	+3.8	-57.3	+0.0	47.2	54.0	-6.8	Horiz
^	4959.073M	70.8	+33.5 +1.6	+1.7 +0.2	+3.8	-57.3	+0.0	54.3	54.0	+0.3	Horiz
4	4961.043M Ave	63.7	+33.5 +1.6	+1.7 +0.2	+3.8	-57.3	+0.0	47.2	54.0	-6.8	Horiz
^	4961.043M	71.2	+33.5 +1.6	+1.7 +0.2	+3.8	-57.3	+0.0	54.7	54.0	+0.7	Horiz
6	7841.593M	57.9	+36.6 +2.0	+2.2 +0.2	+5.1	-57.8	+0.0	46.2	54.0	-7.8	Horiz

Band Edge

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Enlighted, Inc.**
 Specification: **Band edge**
 Work Order #: **97407** Date: 08/26/2015
 Test Type: **Radiated Measurement** Time: 08:59:39
 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

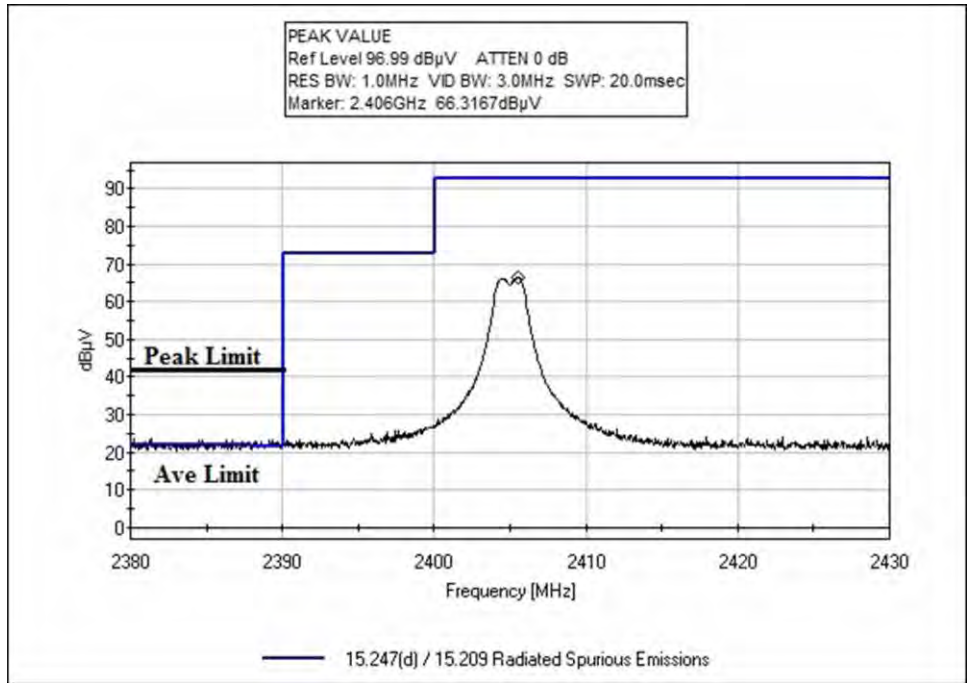
 Application: PuTTY version 0.64 for Zigbee

 Temperature: 22.5°C
 Humidity: 45 %
 Atmospheric Pressure: 101.6 kPa

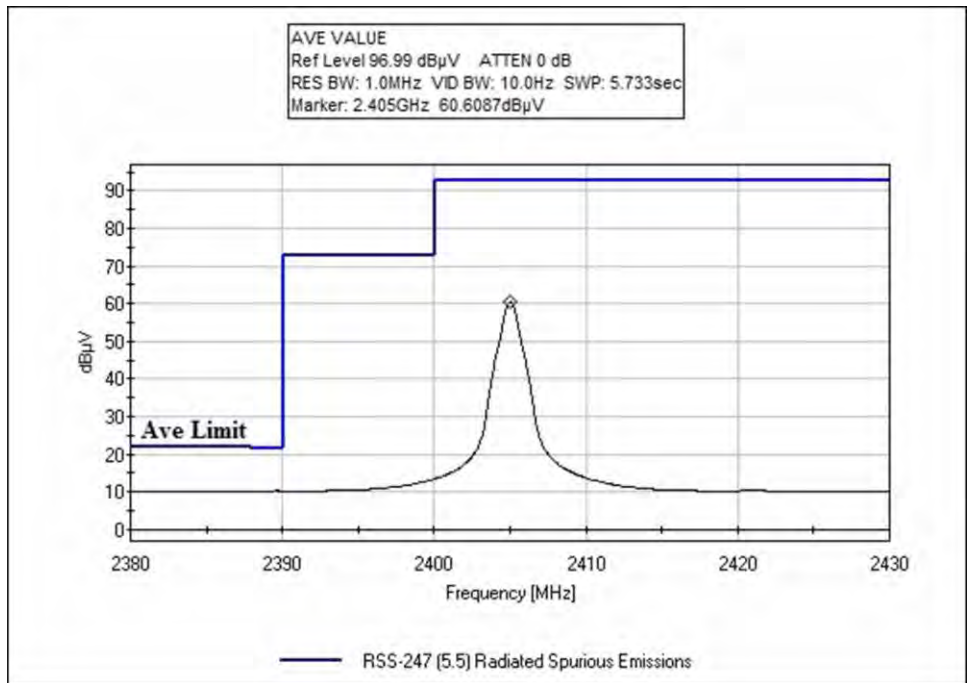
 High Clock: 16MHz
 Transmitting operating frequency= 2405MHz, 2440MHz and 2480MHz
 Gain of the antenna= 0dBi
 Method: KDB 558074 v03r03 section 13.2

 The EUT is an Enlighted USB Commissioning Key.
 The EUT is powered by a laptop and connected to a laptop in order to control the EUT for testing purposes.
 The EUT is set in continuously transmitting as intended.
 The laptop is connected to a keyboard, mouse, headphones and Prosafe 8 port 10/100Mbps Switch as setting up for the host EUT Requirements.

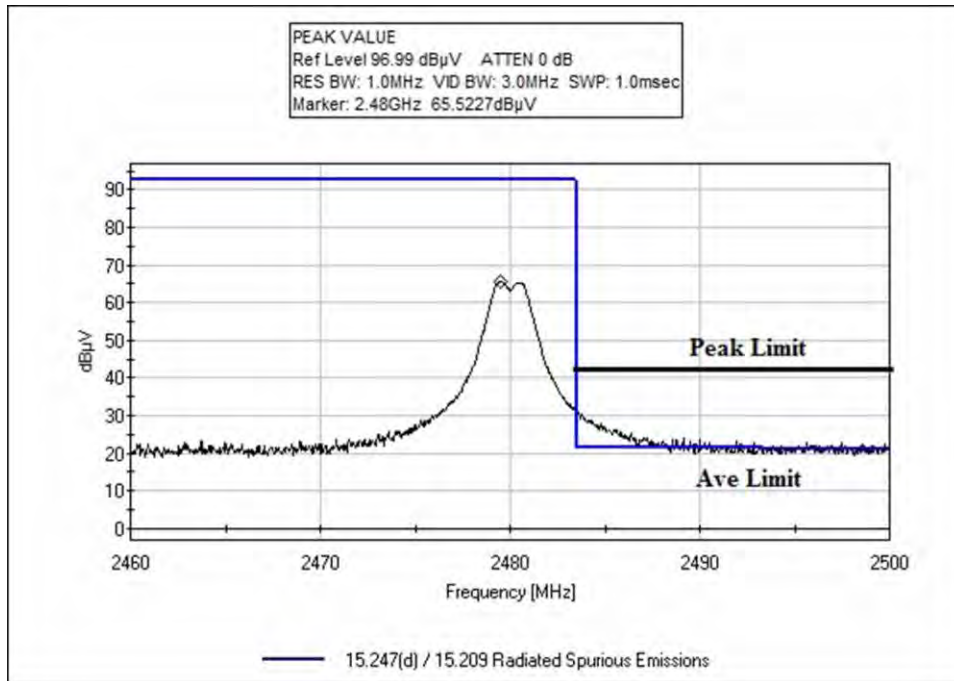
Band Edge Plots



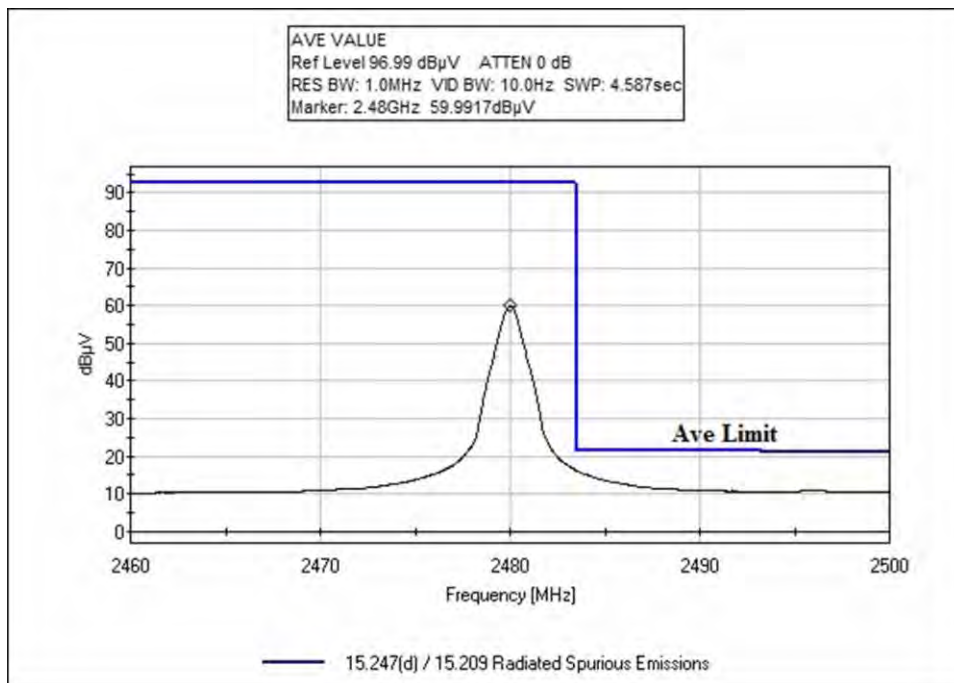
Low Channel



Low Channel

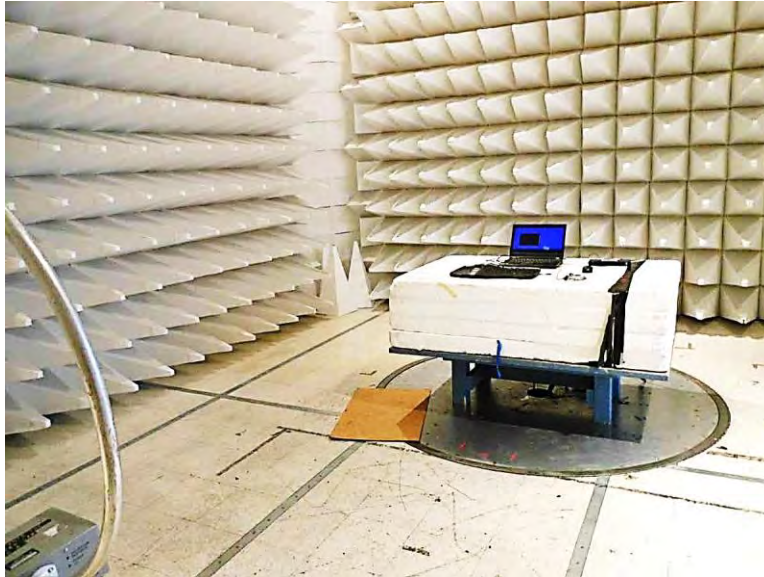


High Channel

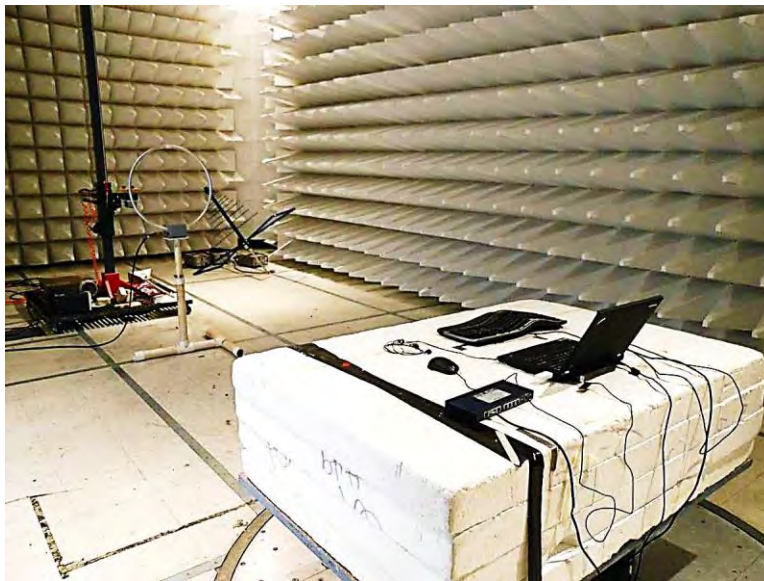


High Channel

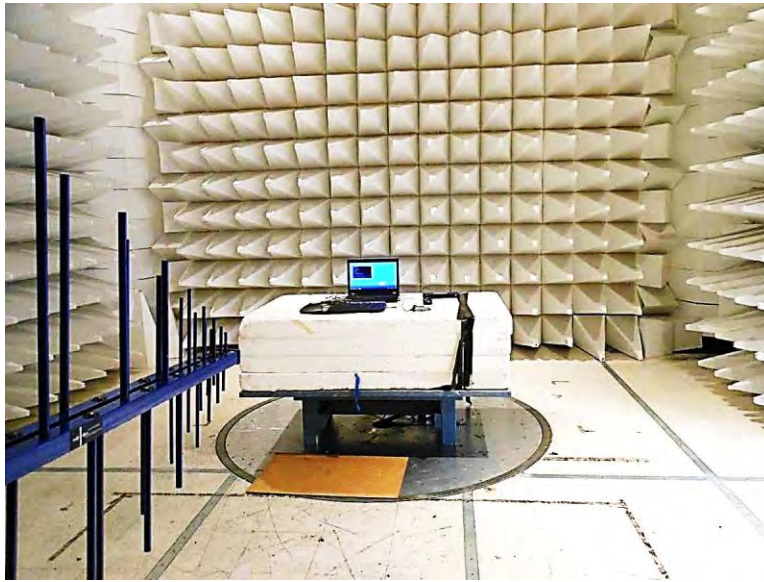
Test Setup Photos



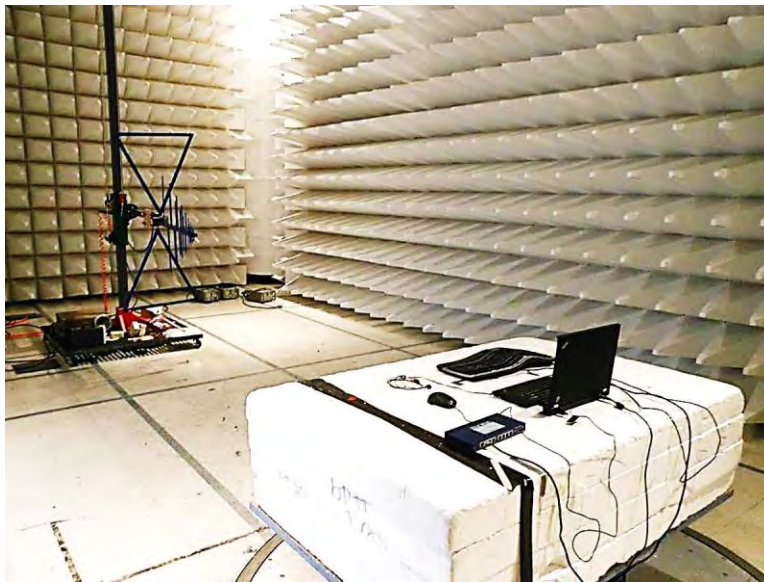
9kHz – 30MHz



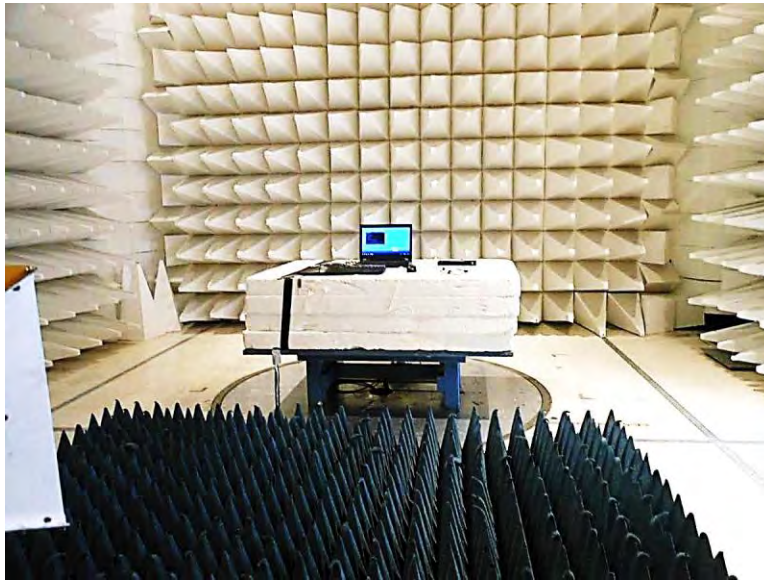
9kHz – 30MHz



30MHz – 1GHz



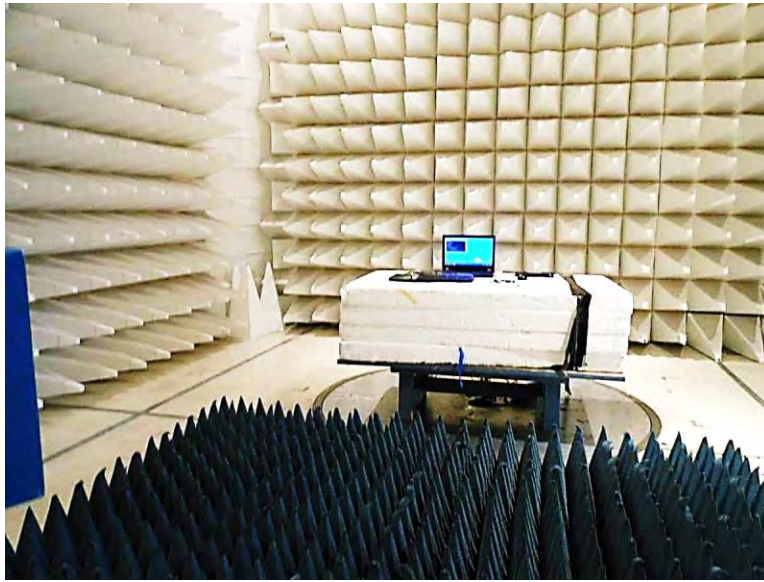
30MHz – 1GHz



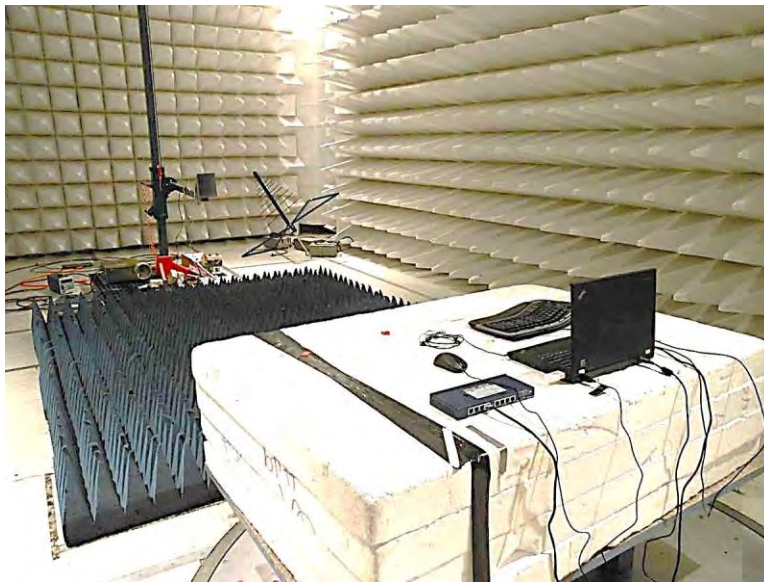
1 – 12GHz



1 – 12GHz



12 – 25GHz



12 – 25GHz

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 dB μ V/m, the spectrum analyzer reading in dB μ V was corrected by using the following formula. This reading was then compared to the applicable specification limit.

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