

Enlighted, Inc.

TEST REPORT FOR

BLE Smart Sensor / BLE Ruggedized Sensor Model: SU-4S-H

Tested To The Following Standards:

FCC Part 15 Subpart C Sections:

15.207 & 15.247
(DTS 2400-2483.5 MHz)

Report No.: 98231-11

Date of issue: May 25, 2016



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: PO0003249

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: 98231

April 25, 2016

April 25 – May 12, 2016

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	5.03.02

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 - 15.247 (DTS)

Test Procedure	Description	Modifications	Results
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	Pass
15.247(d)	Radiated Emissions & Band Edge	NA	Pass
15.207	AC Conducted Emissions	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)

The following model has been tested by CKC Laboratories: **SU-4S-H**

The manufacturer states that the following additional model is identical electrically to the one which was tested, or any difference between them does not affect their EMC characteristics, and therefore they meet the level of testing equivalent to the tested model.

- SU-4S-L**
- SU-4S-LRW**
- SU-4S-LRB**
- SU-4S-HRW**
- SU-4S-HRB**

EQUIPMENT UNDER TEST (EUT) - continued

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
BLE Smart Sensor / BLE Ruggedized Sensor	Enlighted, Inc.	SU-4S-H	Unit 1

Support Equipment:

Device	Manufacturer	Model #	S/N
AC/DC Power Adapter for EUT	Enercell	273-332	NA
Ceibal Controller Devices	Texas Instruments	CC Debugger	NA
Laptop	Lenovo	T420	R8-Y5WA3

Configuration 2

Equipment Tested:

Device	Manufacturer	Model #	S/N
BLE Smart Sensor / BLE Ruggedized Sensor	Enlighted, Inc.	SU-4S-H	Unit 2

Support Equipment:

Device	Manufacturer	Model #	S/N
Ceibal Controller Devices	Texas Instruments	CC Debugger	NA
AC/DC Power Adapter for EUT	Enercell	273-332	NA
Laptop	Lenovo	T420	R8-Y5WA3

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	BLE version 4.0 and 802.15.4
Operating Frequency Range:	2402MHz to 2480MHz
Modulation Type(s):	O-QPSK
Maximum Duty Cycle:	100%
Number of TX Chains:	40 for BLE and 16 for 802.15.4
Antenna Type(s) and Gain:	0
Beamforming Type:	NA
Antenna Connection Type:	Integral
Nominal Input Voltage:	12-24VDC
Software used for Test:	PutTy version 0.64 for 802.15.4 Smart RF Studio 7 version 2.1.0 for Bluetooth

FCC Part 15 Subpart C

15.247(a)(2) 6dB Bandwidth

Test Setup/Conditions			
Test Location:	Fremont Lab C3	Test Engineer:	Hieu Song Nguyenpham
Test Method:	ANSI C63.10 (2013), KDB 558074 v03r05 section 8	Test Date(s):	5/2/2016
Configuration:	1		
Test Setup:	The EUT is placed on a non-conducted table. The EUT is connected directly to a Spectrum Analyzer. It is set continuously transmitting as intended.		

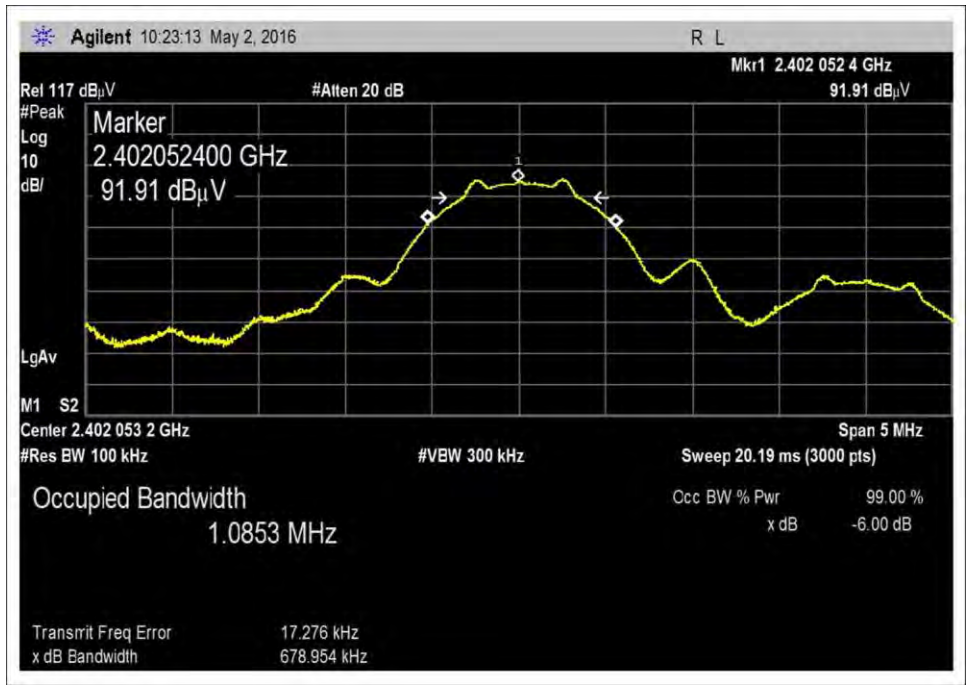
Environmental Conditions			
Temperature (°C)	21.3	Relative Humidity (%):	49

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
P06900	Cable	Astrolab	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
P01211	Attenuator	Aeroflex/Weinschel	23-10-34	3/31/2015	3/31/2017
03471	Spectrum Analyzer	Agilent	E4440A	1/4/2016	1/4/2018

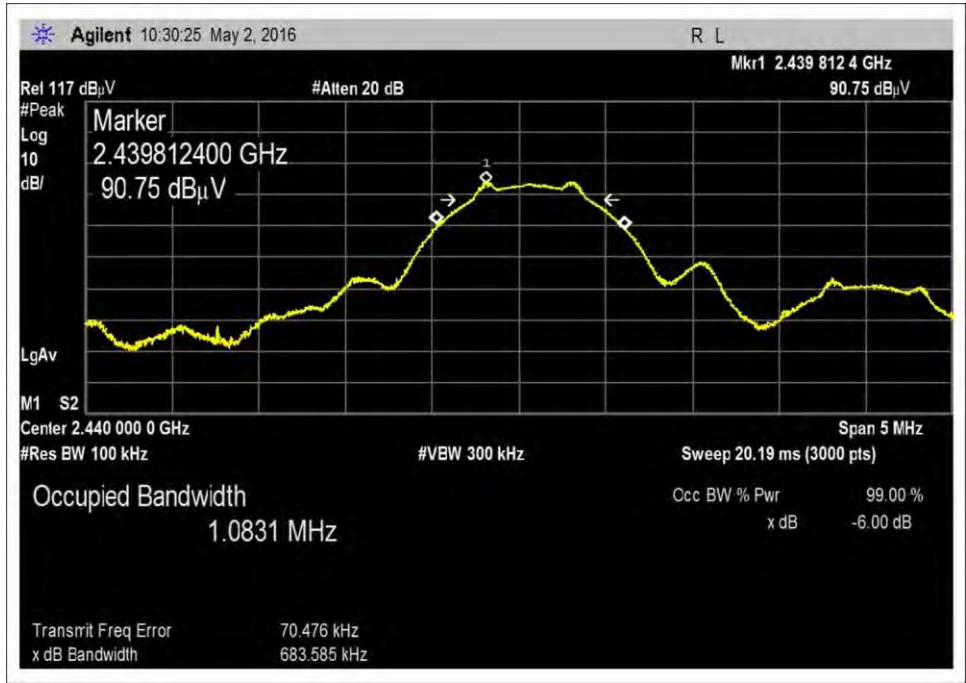
Test Data Summary - BLE					
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
2402	1	O-QPSK	678.954	≥500	Pass
2440	1	O-QPSK	683.585	≥500	Pass
2480	1	O-QPSK	675.766	≥500	Pass

Test Data Summary – 802.15.4					
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
2405	1	O-QPSK	1168	≥500	Pass
2440	1	O-QPSK	1167	≥500	Pass
2480	1	O-QPSK	1171	≥500	Pass

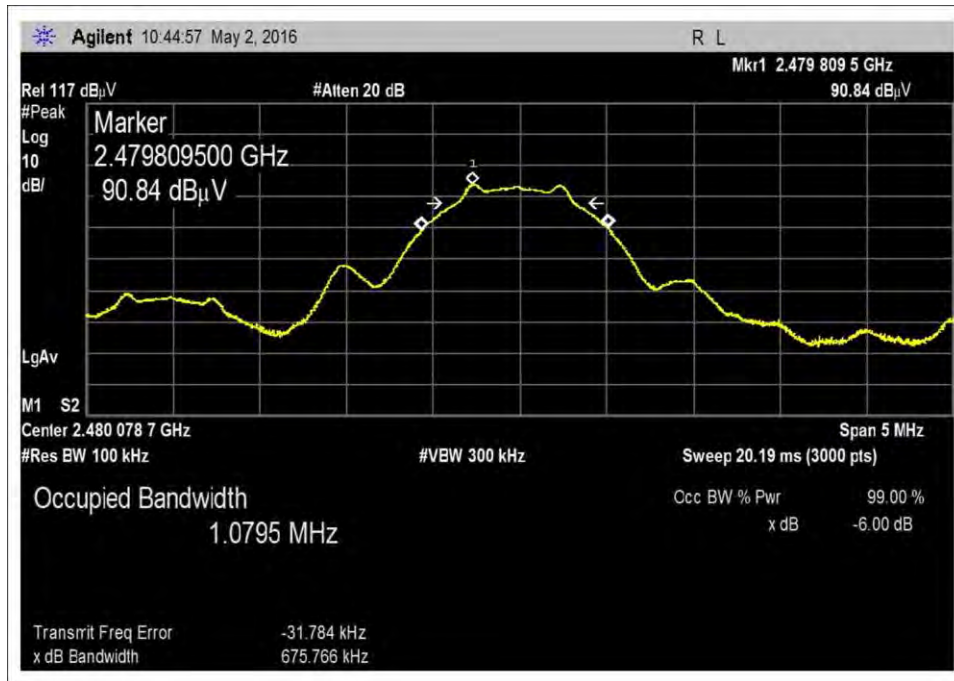
Plots



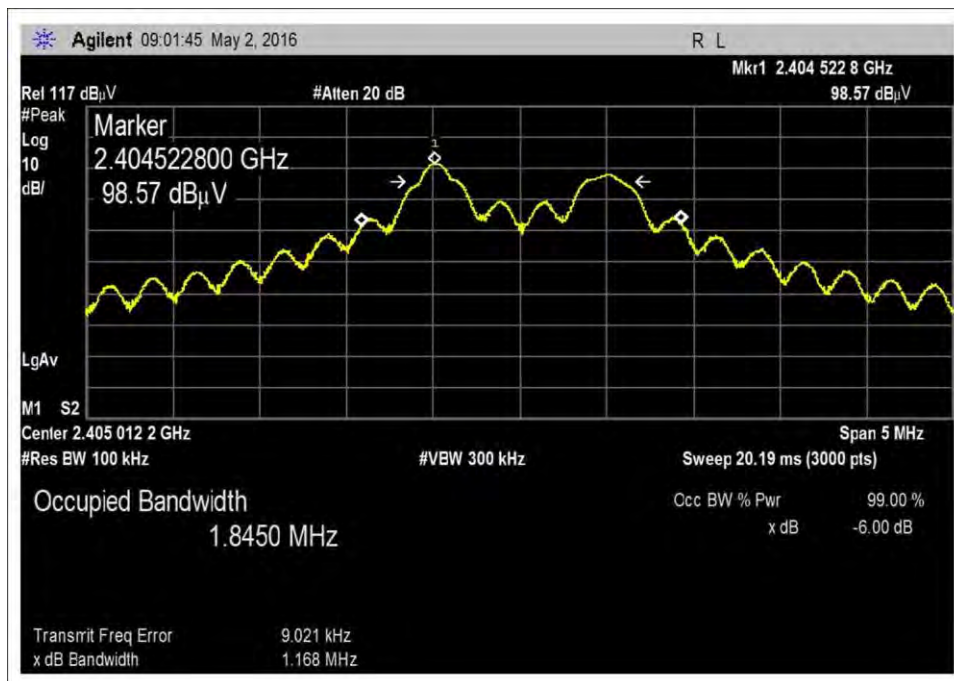
BLE, Low Channel



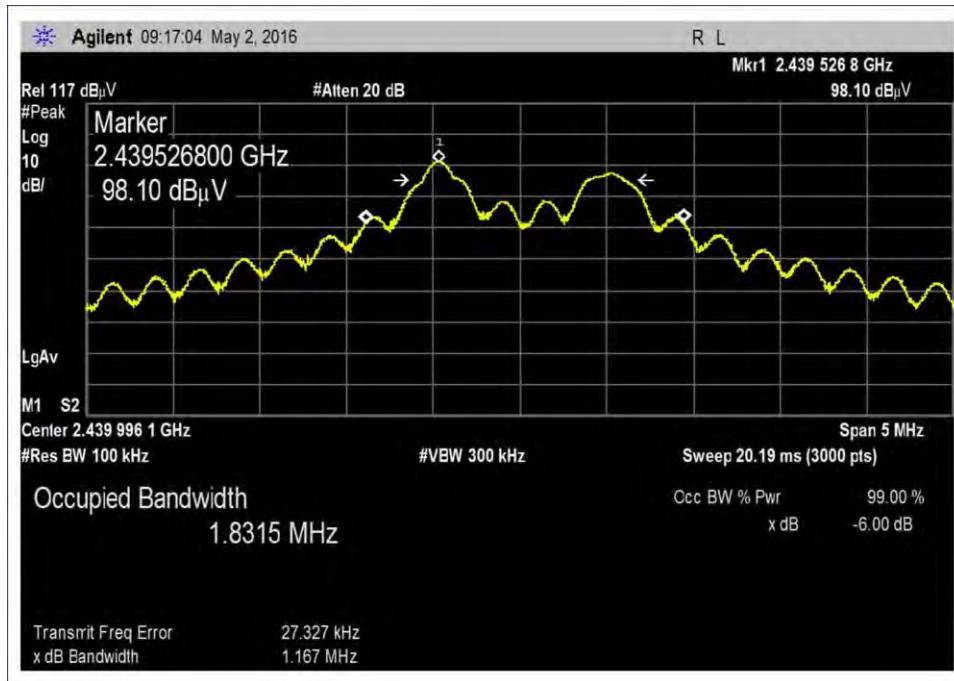
BLE, Middle Channel



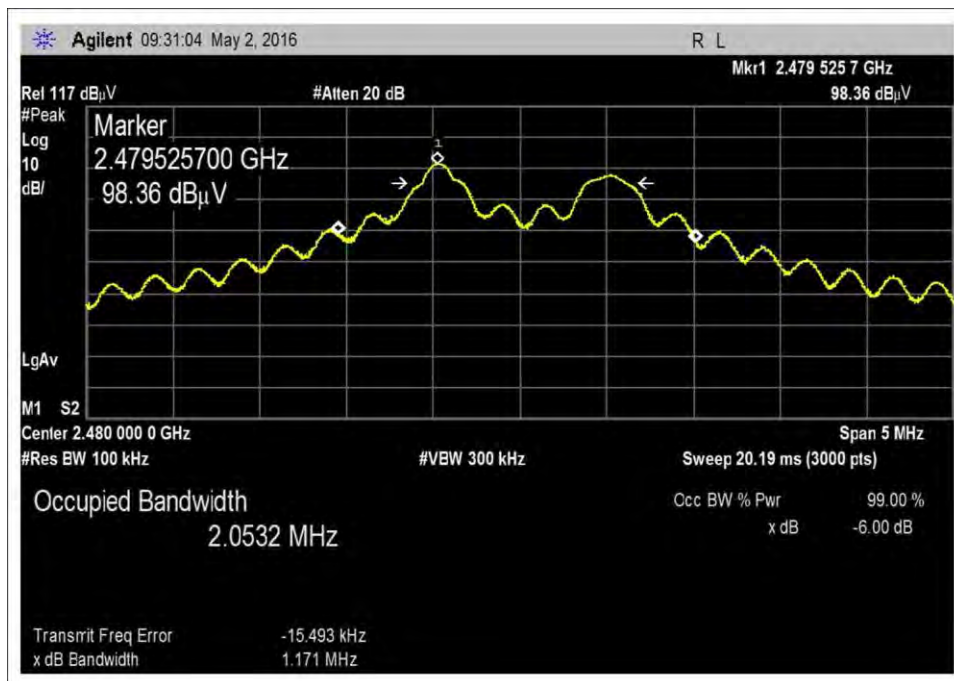
BLE, High Channel



802.15.4, Low Channel



802.15.4, Middle Channel



802.15.4, High Channel

Test Setup Photo



15.247(b)(3) Output Power

Test Data Summary – Voltage Variations – BLE – Configuration 1

Frequency (MHz)	Modulation	V _{Minimum} (dBm)	V _{Nominal} (dBm)	V _{Maximum} (dBm)	Max Deviation from V _{Nominal} (dB)
2402	O-QPSK	-3.51	-3.5	-3.53	0.03

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

Test Data Summary – Voltage Variations – 802.15.4 – Configuration 1

Frequency (MHz)	Modulation	V _{Minimum} (dBm)	V _{Nominal} (dBm)	V _{Maximum} (dBm)	Max Deviation from V _{Nominal} (dB)
2405	O-QPSK	3.53	3.5	3.54	0.04

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

Test Data Summary – Voltage Variations – BLE – Configuration 2

Frequency (MHz)	Modulation	V _{Minimum} (dBm)	V _{Nominal} (dBm)	V _{Maximum} (dBm)	Max Deviation from V _{Nominal} (dB)
2402	O-QPSK	-4.15	-4.1	-4.09	0.05

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

Test Data Summary – Voltage Variations – 802.15.4 – Configuration 2

Frequency (MHz)	Modulation	V _{Minimum} (dBm)	V _{Nominal} (dBm)	V _{Maximum} (dBm)	Max Deviation from V _{Nominal} (dB)
2405	O-QPSK	3.04	3.0	3.03	0.04

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

Parameter Definitions:

Measurements performed at input voltage V_{nominal} ± 15%.

Parameter	Value
V _{Nominal} :	12-24VDC
V _{Minimum} :	10.2VDC
V _{Maximum} :	27.6VDC

Test Data Summary – RF Conducted Measurement – BLE – Configuration 1					
Measurement Option: RBW > DTS Bandwidth					
Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Measured (dBm)	Limit (dBm)	Results
2402	O-QPSK	0	-3.5	≤ 30	Pass
2440	O-QPSK	0	-4.7	≤ 30	Pass
2480	O-QPSK	0	-5.1	≤ 30	Pass

Test Data Summary – RF Conducted Measurement – 802.15.4 – Configuration 1					
Measurement Option: RBW > DTS Bandwidth					
Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Measured (dBm)	Limit (dBm)	Results
2405	O-QPSK	0	3.5	≤ 30	Pass
2440	O-QPSK	0	3.1	≤ 30	Pass
2480	O-QPSK	0	3.3	≤ 30	Pass

Test Data Summary – RF Conducted Measurement – BLE – Configuration 2					
Measurement Option: RBW > DTS Bandwidth					
Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Measured (dBm)	Limit (dBm)	Results
2402	O-QPSK	0	-4.1	≤ 30	Pass
2440	O-QPSK	0	-5.3	≤ 30	Pass
2480	O-QPSK	0	-5.9	≤ 30	Pass

Test Data Summary – RF Conducted Measurement – 802.15.4 – Configuration 2					
Measurement Option: RBW > DTS Bandwidth					
Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Measured (dBm)	Limit (dBm)	Results
2405	O-QPSK	0	3	≤ 30	Pass
2440	O-QPSK	0	2.7	≤ 30	Pass
2480	O-QPSK	0	2.7	≤ 30	Pass

For fixed point-to-point antennas, the limit is calculated in accordance with 15.247€(1):

$$Limit = 30 - Roundup\left(\frac{G-6}{3}\right)$$

For directional beamforming antennas, the limit is calculated in accordance with 15.247€(2) and KDB 662911.

$$P(dBm) = E(dBuV/m) + 20LOG(d) - G - 104.77$$

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 #: **98231** Date: 5/2/2016
 Test Type: **Conducted Measurement** Time: 10:30:58
 Tested By: Hieu Song Nguyenpham Sequence#: 94
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Fundamental

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

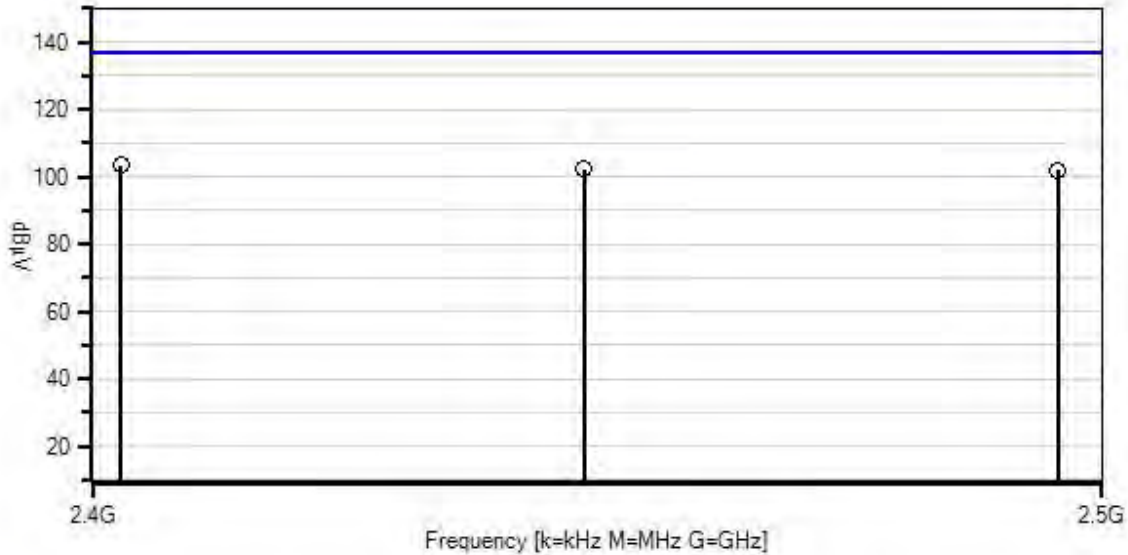
Temperature: 21.3°C
 Humidity: 49 %
 Atmospheric Pressure: 101.4kPa

High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 9.1
 RBW=3MHz
 VBW=8MHz

The EUT is placed on a non-conducted table. It is connected to a spectrum analyzer. It is set continuously transmitting as intended.

TX Mode on BLE

Enlighted, Inc WO#: 98231 Sequence#: 94 Date: 5/2/2016
 15.247(b) Power Output (2400-2483.5 MHz DTS) Test Distance: None None



— Readings
 × QP Readings
 ▼ Ambient
 ○ Peak Readings
 * Average Readings
 Software Version: 5.03.02
 1 - 15.247(b) Power Output (2400-2483.5 MHz DTS)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP01211	Attenuator	23-10-34	3/31/2015	3/31/2017
T2	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	2402.305M	93.0	+10.0	+0.5			+0.0	103.5	137.0	-33.5	None
2	2440.318M	91.8	+10.0	+0.5			+0.0	102.3	137.0	-34.7	None
3	2479.792M	91.4	+10.0	+0.5			+0.0	101.9	137.0	-35.1	None

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 #: **98231** Date: 5/2/2016
 Test Type: **Conducted Measurement** Time: 09:19:18
 Tested By: Hieu Song Nguyenpham Sequence#: 92
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Fundamental
 Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

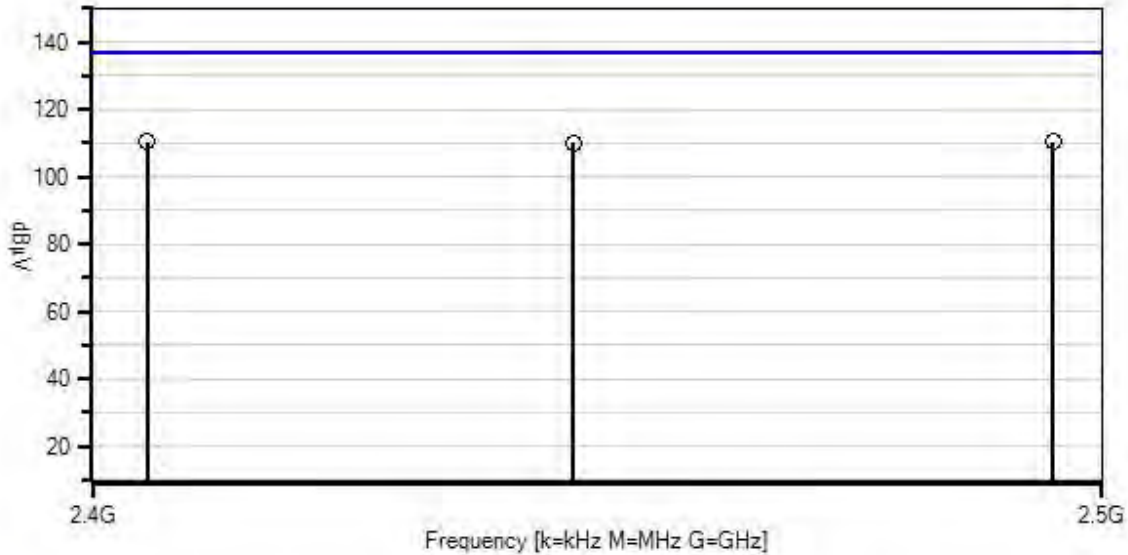
Temperature: 21.3°C
 Humidity: 49 %
 Atmospheric Pressure: 101.4kPa

High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 9.1
 RBW=3MHz
 VBW=8MHz

The EUT is placed on a non-conducted table. It is connected to a spectrum analyzer. It is set continuously transmitting as intended.

TX Mode on 802.15.4

Enlighted, Inc WO#: 98231 Sequence#: 92 Date: 5/2/2016
 15.247(b) Power Output (2400-2483.5 MHz DTS) Test Distance: None None



— Readings
 × QP Readings
 ▼ Ambient
 ○ Peak Readings
 * Average Readings
 Software Version: 5.03.02
 — 1 - 15.247(b) Power Output (2400-2483.5 MHz DTS)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP01211	Attenuator	23-10-34	3/31/2015	3/31/2017
T2	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	2404.515M	100.0	+10.0	+0.5			+0.0	110.5	137.0	-26.5	None
2	2479.368M	99.8	+10.0	+0.5			+0.0	110.3	137.0	-26.7	None
3	2439.415M	99.6	+10.0	+0.5			+0.0	110.1	137.0	-26.9	None

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 #: **98231** Date: 5/5/2016
 Test Type: **Conducted Measurement** Time: 11:45:18
 Tested By: Hieu Song Nguyenpham Sequence#: 110
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Fundamental

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

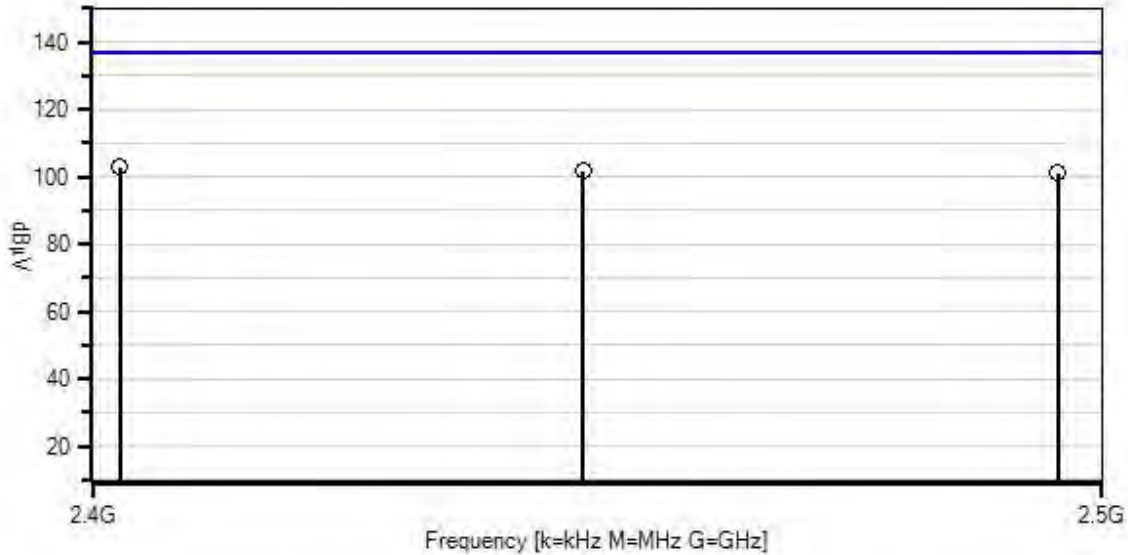
Temperature: 22.1°C
 Humidity: 45 %
 Atmospheric Pressure: 100.7kPa

High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 9.1
 RBW=3MHz
 VBW=8MHz

The EUT is placed on non-conducted table. It is connected to a spectrum analyzer. It is set continuously transmitting as intended.
 The manufacturer declares that the Main Board of the Configuration 2 is similar to the Configuration 1, but it has different cover.
 Measuring the RF output power and choosing the worst case of transmitting operating frequency to test Radiated Spurious Emission only.

TX Mode on BLE

Enlighted, Inc WO#: 98231 Sequence#: 110 Date: 5/5/2016
 15.247(b) Power Output (2400-2483.5 MHz DTS) Test Distance: None None



— Readings
 × QP Readings
 ▼ Ambient
 ○ Peak Readings
 * Average Readings
 Software Version: 5.03.02
 1 - 15.247(b) Power Output (2400-2483.5 MHz DTS)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP01211	Attenuator	23-10-34	3/31/2015	3/31/2017
T2	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	2402.280M	92.4	+10.0	+0.5	+0.0	102.9	137.0	-34.1	None
2	2440.240M	91.2	+10.0	+0.5	+0.0	101.7	137.0	-35.3	None
3	2479.740M	90.6	+10.0	+0.5	+0.0	101.1	137.0	-35.9	None

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 #: **98231** Date: 5/5/2016
 Test Type: **Conducted Measurement** Time: 11:50:31
 Tested By: Hieu Song Nguyenpham Sequence#: 111
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Fundamental

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

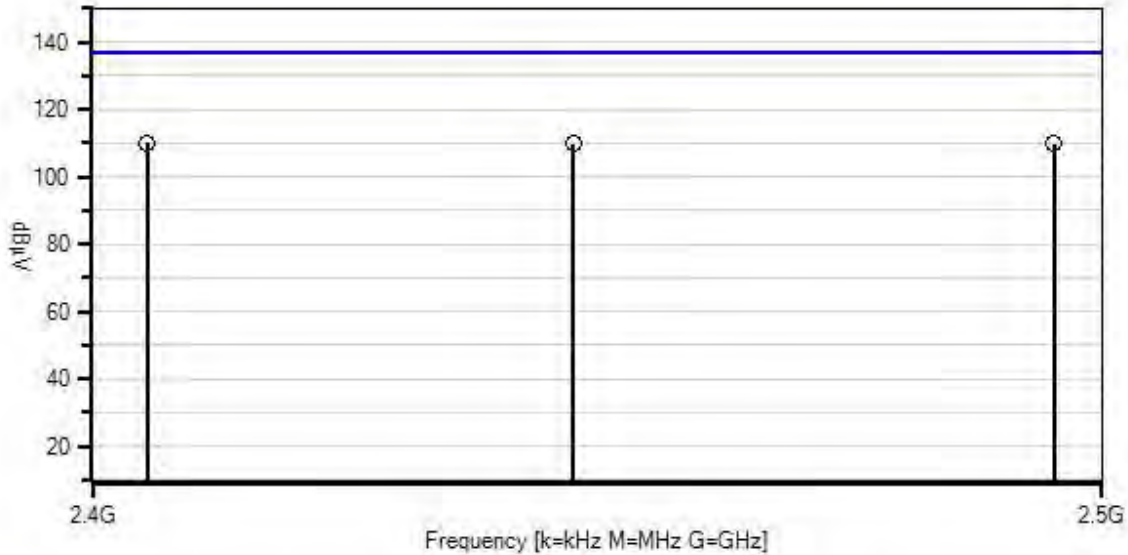
Temperature: 22.1°C
 Humidity: 45 %
 Atmospheric Pressure: 100.7kPa

High Clock: 16MHz
 Transmitting operating frequency= 2402,2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405,2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 9.1
 RBW=3MHz
 VBW=8MHz

The EUT is placed on non-conducted table. It is connected to a spectrum analyzer. It is set continuously transmitting as intended.
 The manufacturer declares that the Main Board of the Configuration 2 is similar to the Configuration 1, but it has different cover. Measuring the RF output power and choosing the worst case of transmitting operating frequency to test Radiated Spurious Emission only.

TX Mode on 802.15.4

Enlighted, Inc WO#: 98231 Sequence#: 111 Date: 5/5/2016
 15.247(b) Power Output (2400-2483.5 MHz DTS) Test Distance: None None



— Readings
 × QP Readings
 ▼ Ambient
 ○ Peak Readings
 * Average Readings
 Software Version: 5.03.02
 1 - 15.247(b) Power Output (2400-2483.5 MHz DTS)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP01211	Attenuator	23-10-34	3/31/2015	3/31/2017
T2	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

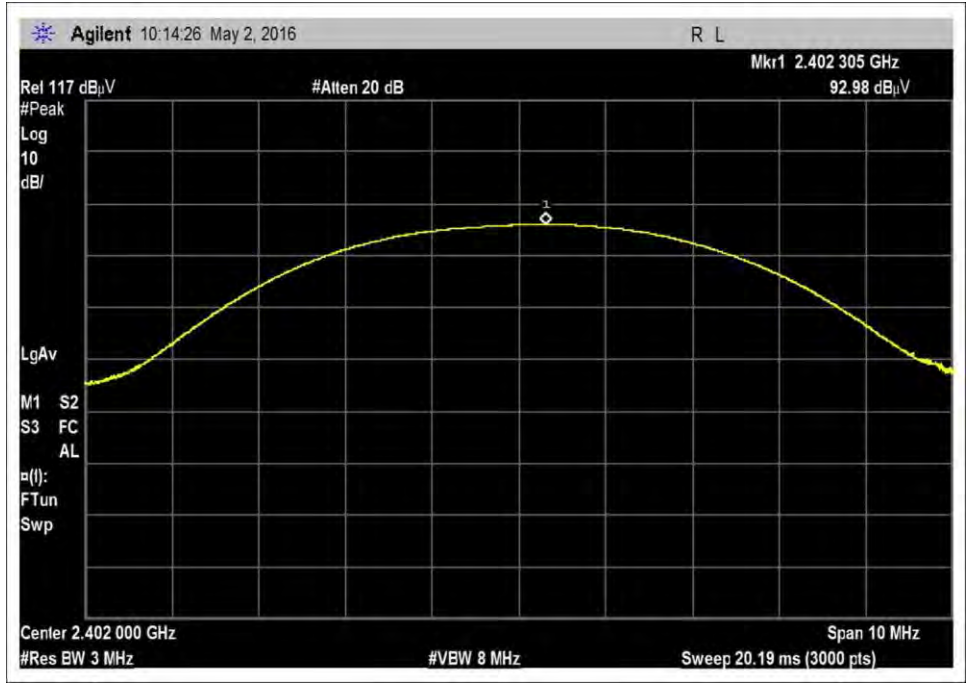
Measurement Data:

Reading listed by margin.

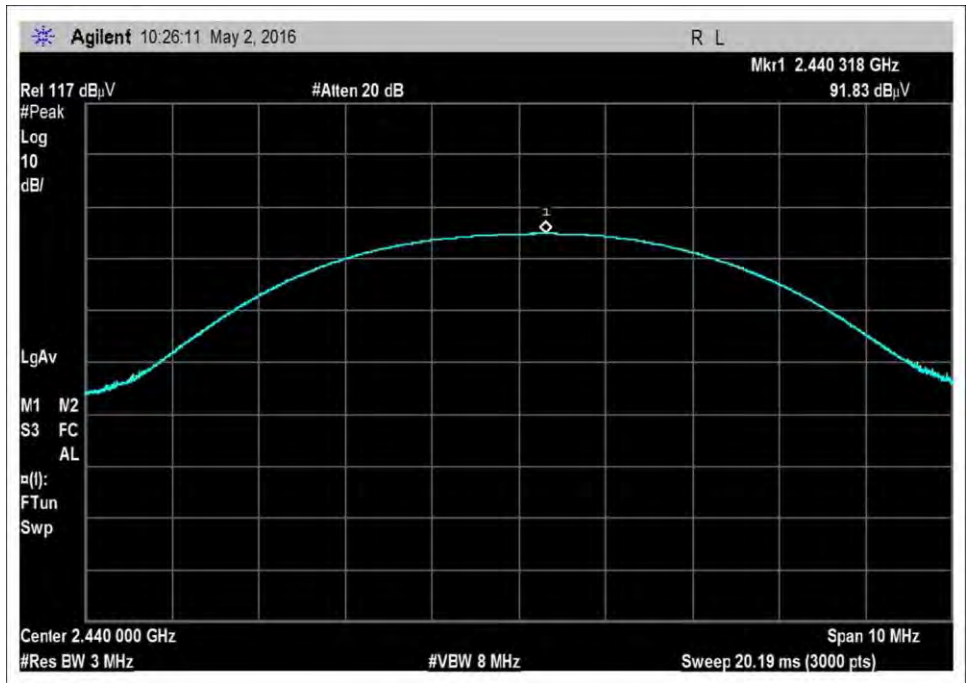
Test Distance: None

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	2404.500M	99.5	+10.0	+0.5			+0.0	110.0	137.0	-27.0	None
2	2439.440M	99.2	+10.0	+0.5			+0.0	109.7	137.0	-27.3	None
3	2479.460M	99.2	+10.0	+0.5			+0.0	109.7	137.0	-27.3	None

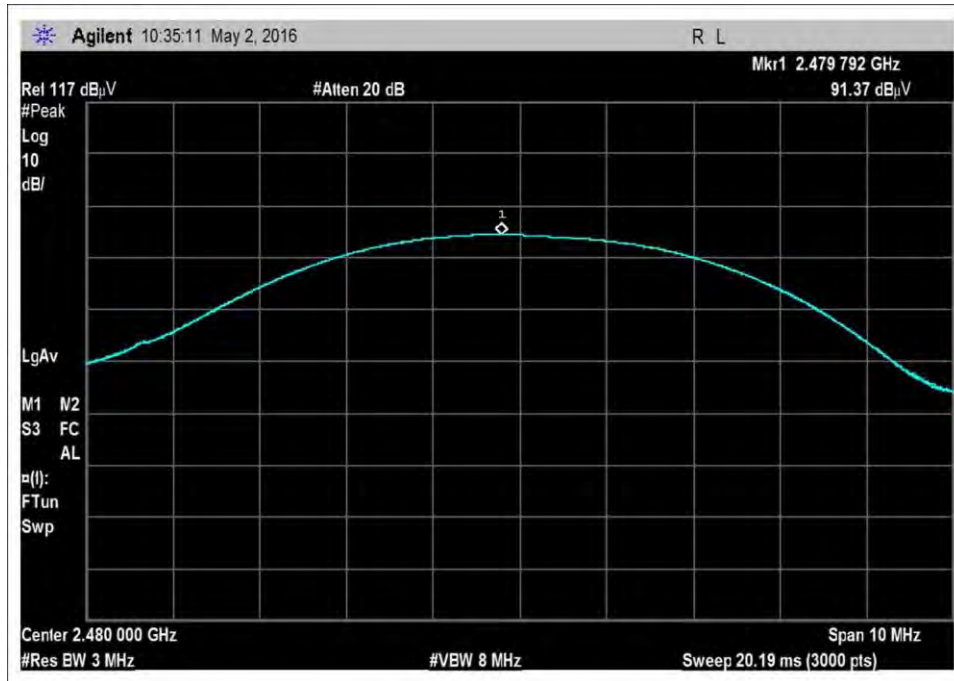
Plots



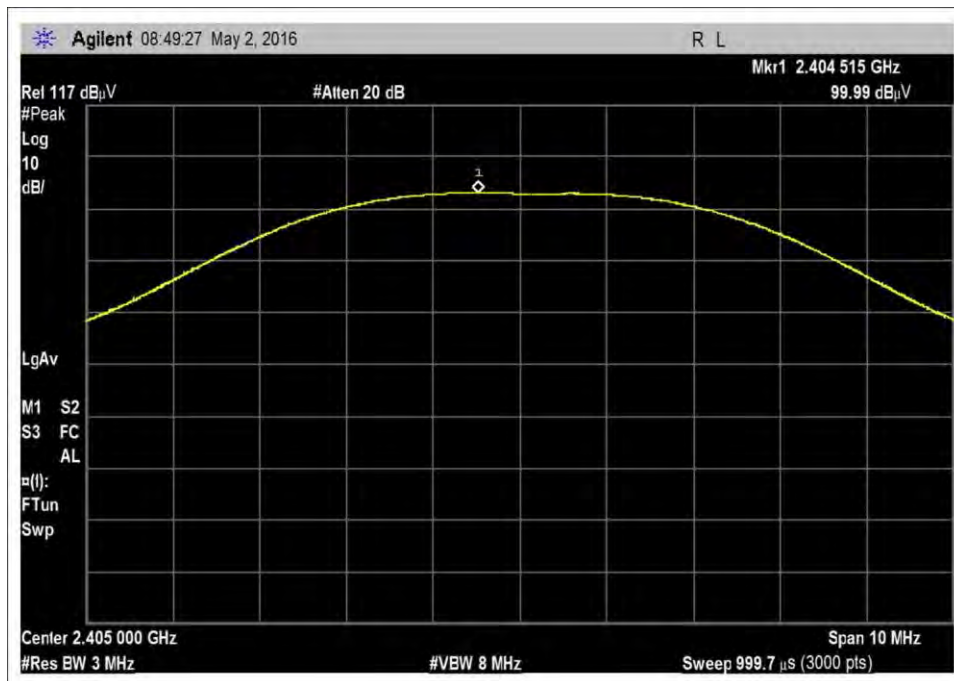
Configuration 1, BLE, Low Channel



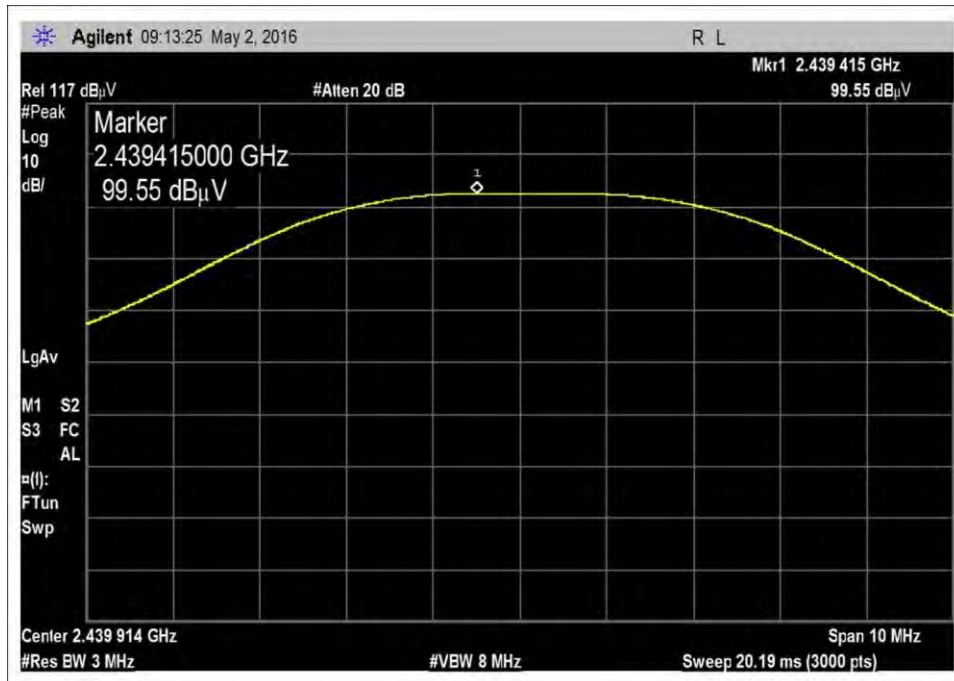
Configuration 1, BLE, Middle Channel



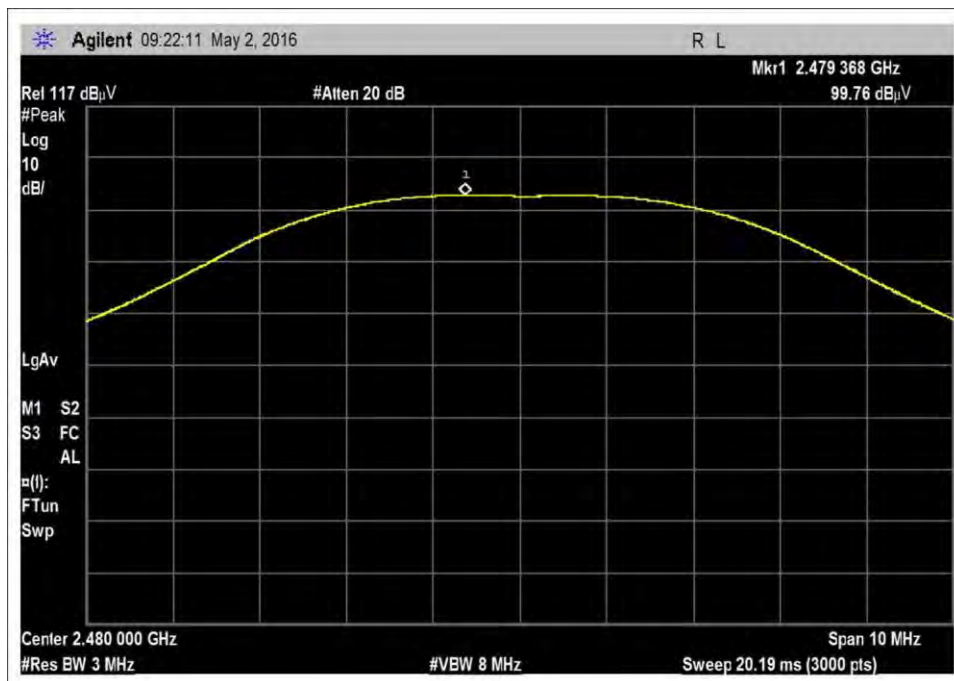
Configuration 1, BLE, High Channel



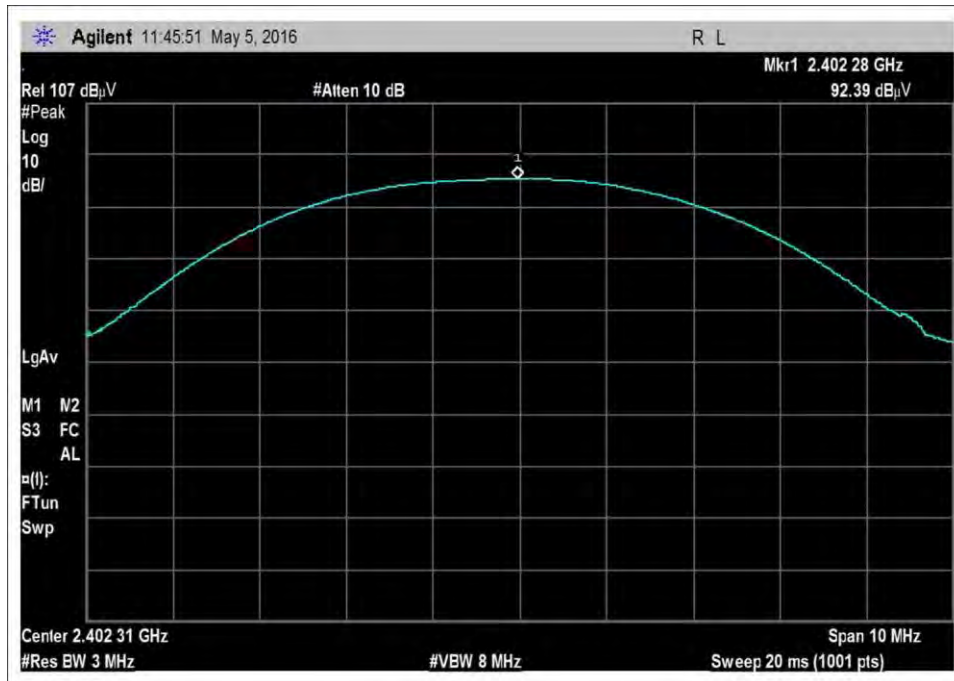
Configuration 1, 802.15.4, Low Channel



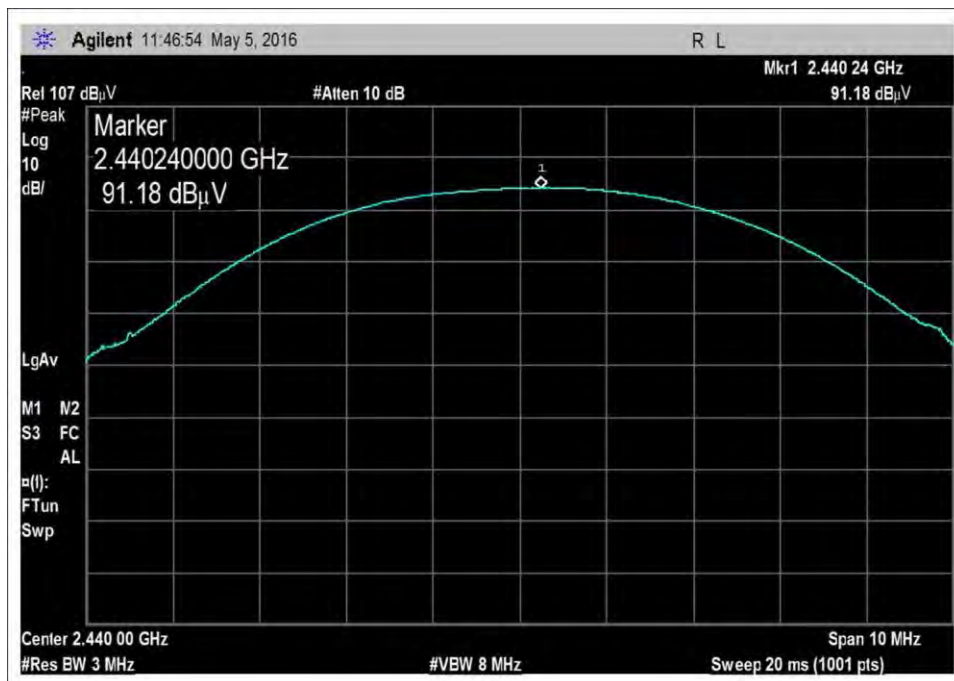
Configuration 1, 802.15.4, Middle Channel



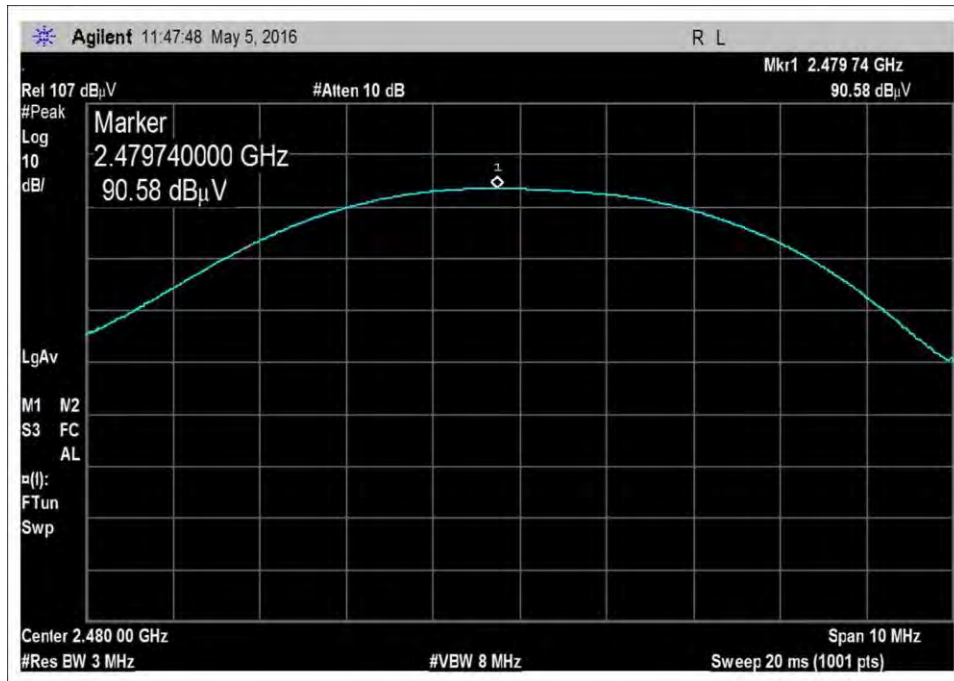
Configuration 1, 802.15.4, High Channel



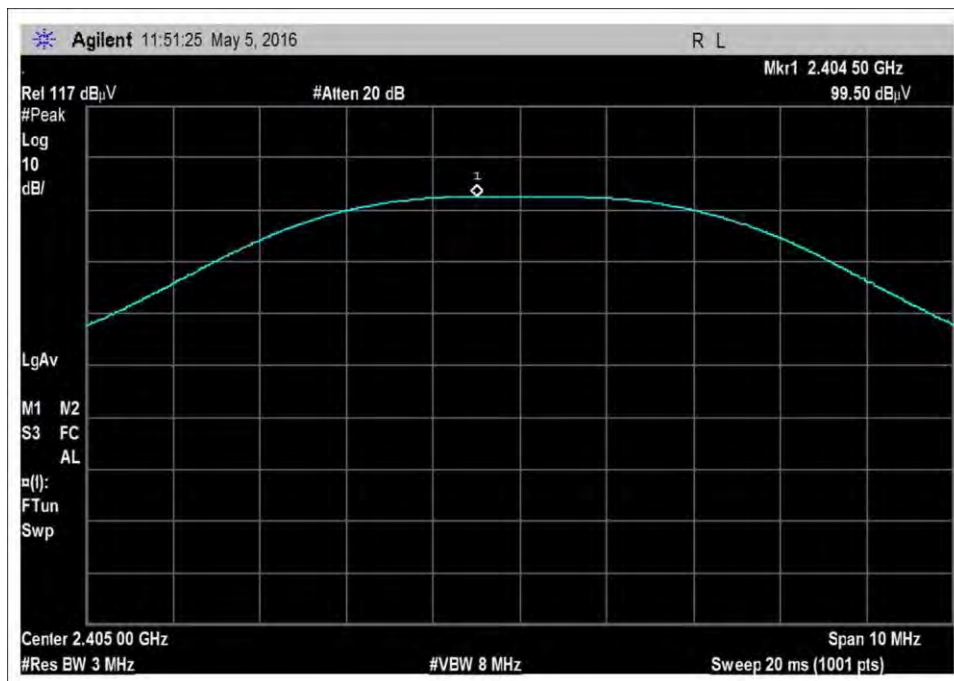
Configuration 2, BLE, Low Channel



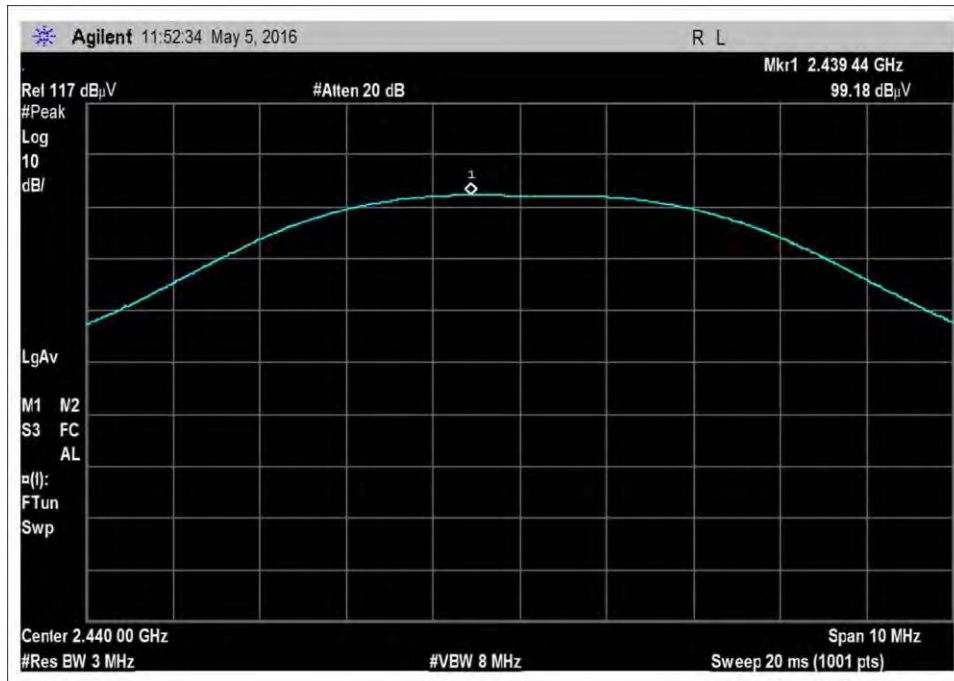
Configuration 2, BLE, Middle Channel



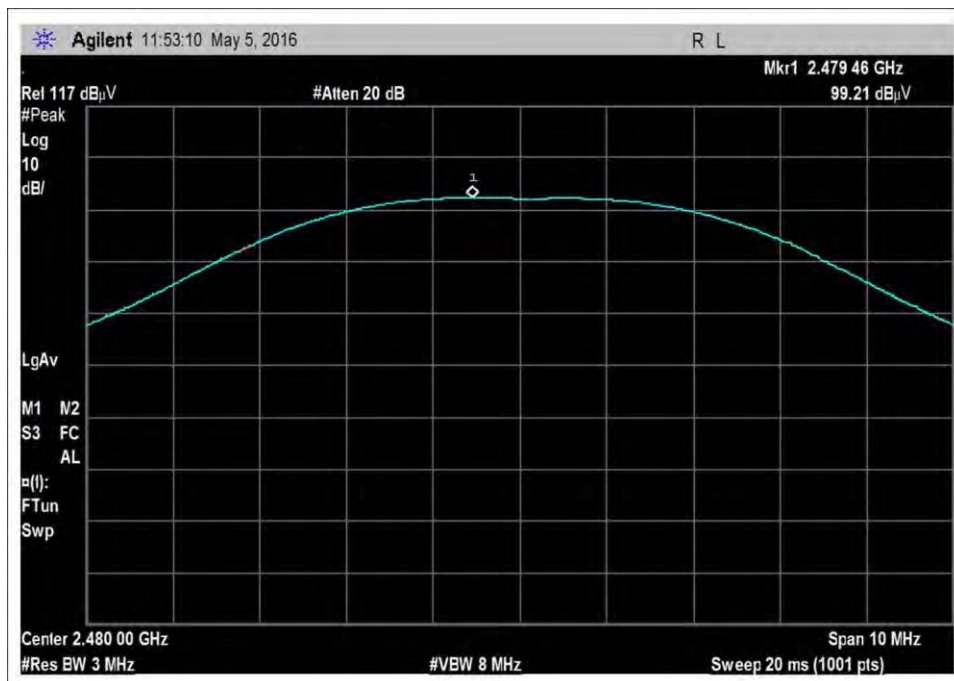
Configuration 2, BLE, High Channel



Configuration 2, 802.15.4, Low Channel

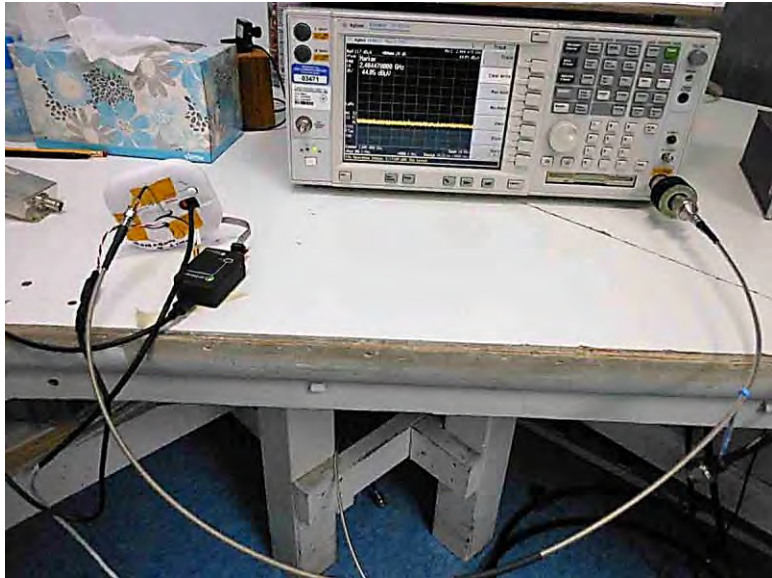


Configuration 2, 802.15.4, Middle Channel



Configuration 2, 802.15.4, High Channel

Test Setup Photos



Configuration 1



Configuration 2

15.247(e) Power Spectral Density

Test Data Summary – RF Conducted Measurement - BLE

Measurement Method: PKPSD

Frequency (MHz)	Modulation	Measured (dBm/3kHz)	Limit (dBm/3kHz)	Results
2402	O-QPSK	-17.1	≤8	Pass
2440	O-QPSK	-17.7	≤8	Pass
2480	O-QPSK	-18.4	≤8	Pass

Test Data Summary – RF Conducted Measurement – 802.15.4

Measurement Method: PKPSD

Frequency (MHz)	Modulation	Measured (dBm/3kHz)	Limit (dBm/3kHz)	Results
2405	O-QPSK	-2.5	≤8	Pass
2440	O-QPSK	-3	≤8	Pass
2480	O-QPSK	-2.7	≤8	Pass

Conducted RF output power calculated in accordance with ANSI C63.10.

$$P(W) = \frac{(E \cdot d)^2}{30 G}$$

Or equivalently, in logarithmic form:

$$P(dBm) = E(dBuV/m) + 20LOG(d) - G - 104.77$$

Test Setup / Conditions / 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 #: **98231** Date: 5/2/2016
 Test Type: **Conducted Measurement** Time: 10:35:03
 Tested By: Hieu Song Nguyenpham Sequence#: 95
 Software: EMITest 5.03.02

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 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 21.3°C
 Humidity: 49 %
 Atmospheric Pressure: 101.4kPa

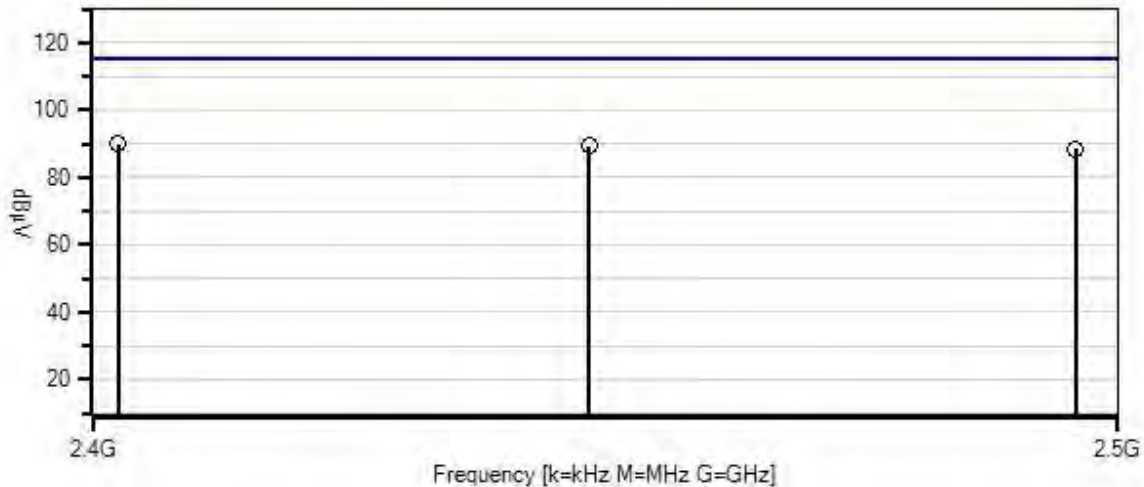
High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 10.2

RBW=3kHz
 VBW=10kHz

The EUT is placed on a non-conducted table. It is connected to a spectrum analyzer. It is set continuously transmitting as intended.

TX Mode on BLE

Enlighted, Inc WO#: 98231 Sequence#: 95 Date: 5/2/2016
 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: 5.03.02
- 1 - 15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP01211	Attenuator	23-10-34	3/31/2015	3/31/2017
T2	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	2402.040M	79.4	+10.0	+0.5	+0.0	89.9	115.0	-25.1	None
2	2440.060M	78.8	+10.0	+0.5	+0.0	89.3	115.0	-25.7	None
3	2479.956M	78.1	+10.0	+0.5	+0.0	88.6	115.0	-26.4	None

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 #: **98231** Date: 5/2/2016
 Test Type: **Conducted Measurement** Time: 09:22:10
 Tested By: Hieu Song Nguyenpham Sequence#: 93
 Software: EMITest 5.03.02

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 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 21.3°C
 Humidity: 49 %
 Atmospheric Pressure: 101.4kPa

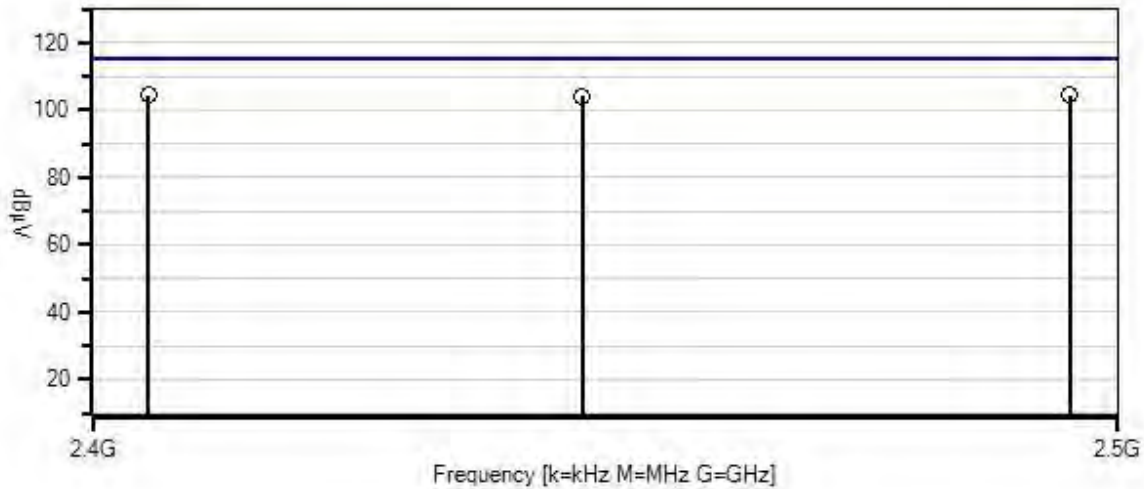
High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 10.2

RBW=3kHz
 VBW=10kHz

The EUT is placed on a non-conducted table. It is connected to a spectrum analyzer. It is set continuously transmitting as intended.

TX Mode on 802.15.4

Enlighted, Inc WO#: 98231 Sequence#: 93 Date: 5/2/2016
 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: 5.03.02
 1 - 15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP01211	Attenuator	23-10-34	3/31/2015	3/31/2017
T2	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

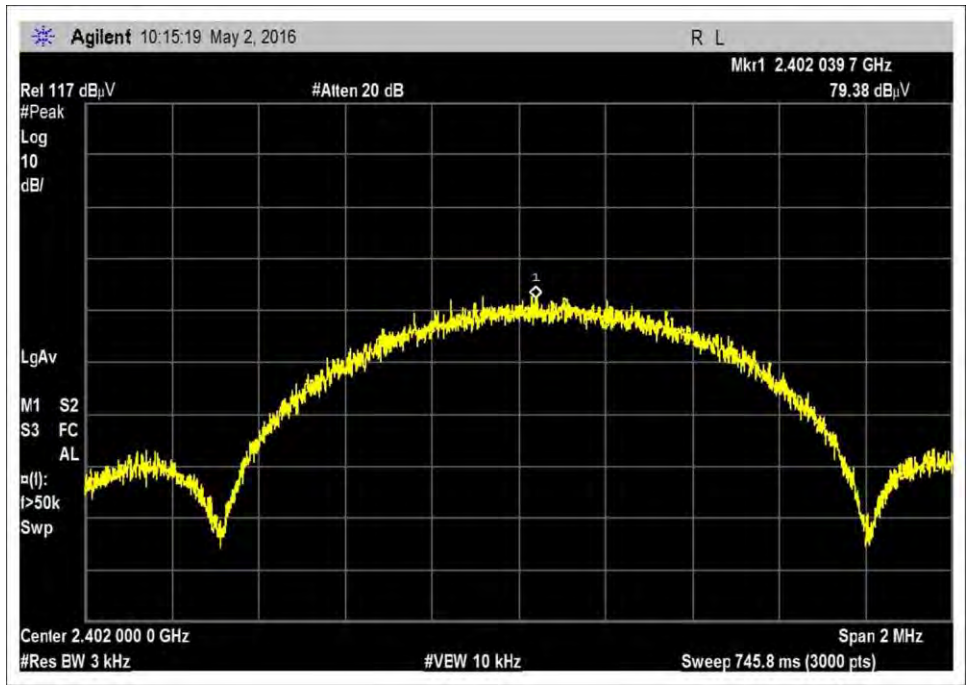
Measurement Data:

Reading listed by margin.

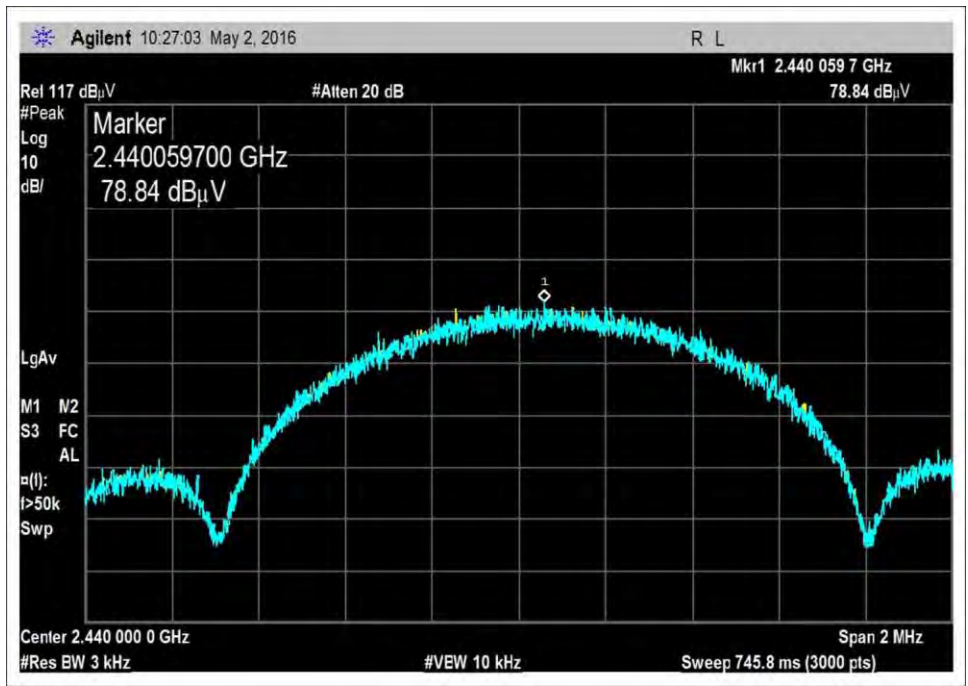
Test Distance: None

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	Dist dB	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	2404.523M	94.0	+10.0	+0.5	+0.0	104.5	115.0	-10.5	None
2	2479.524M	93.8	+10.0	+0.5	+0.0	104.3	115.0	-10.7	None
3	2439.523M	93.5	+10.0	+0.5	+0.0	104.0	115.0	-11.0	None

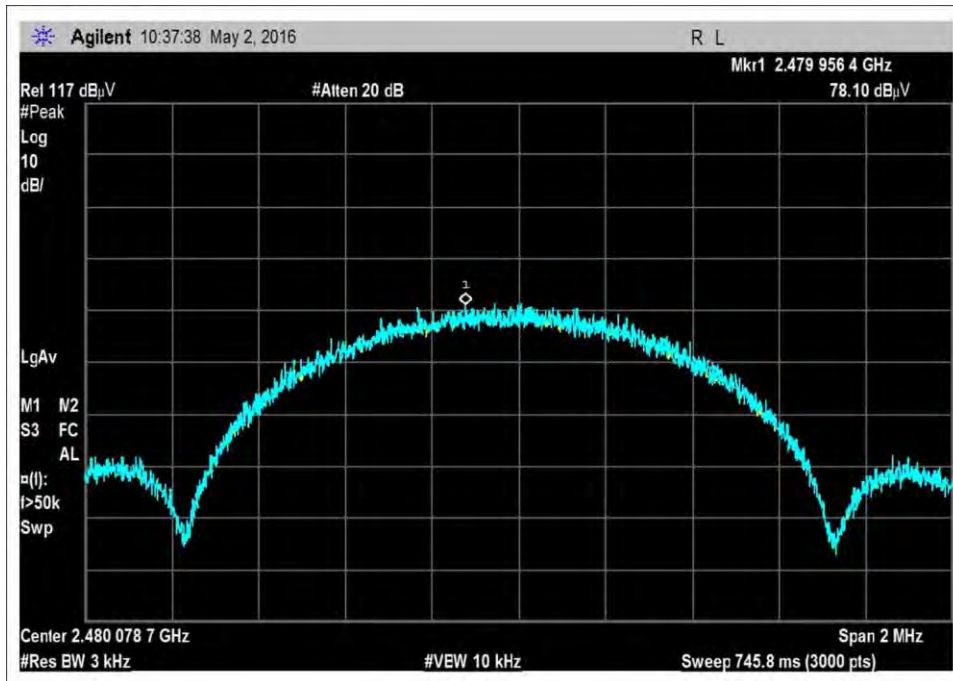
Plots



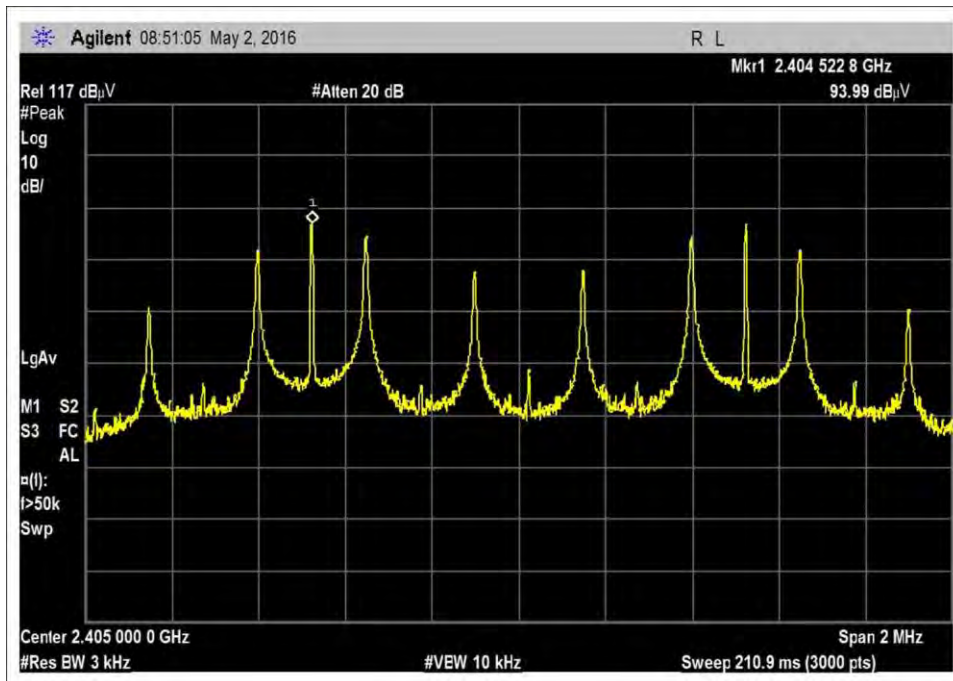
BLE, Low Channel



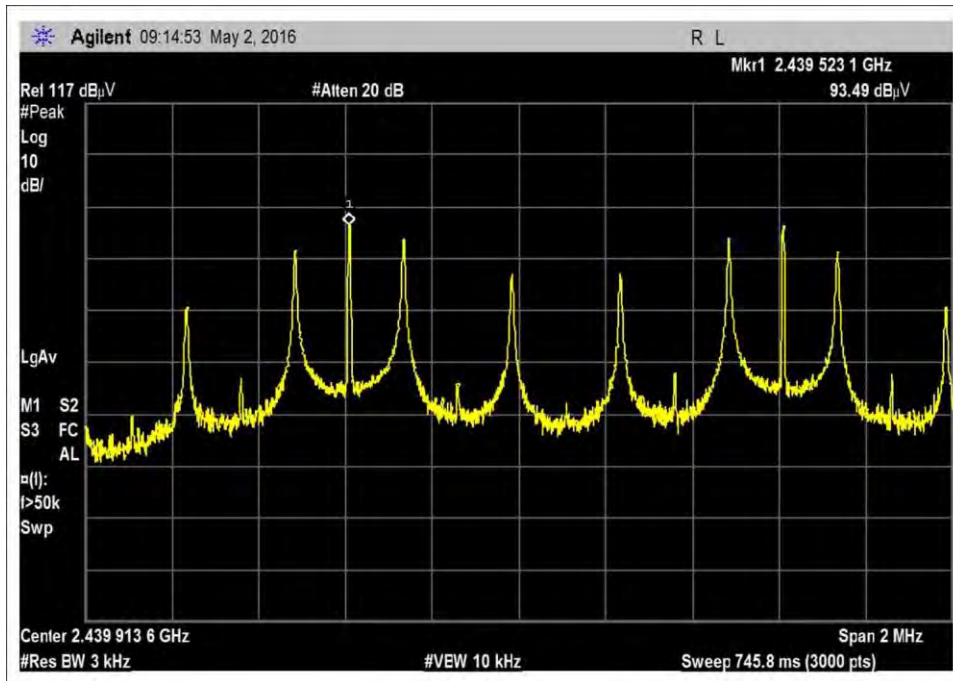
BLE, Middle Channel



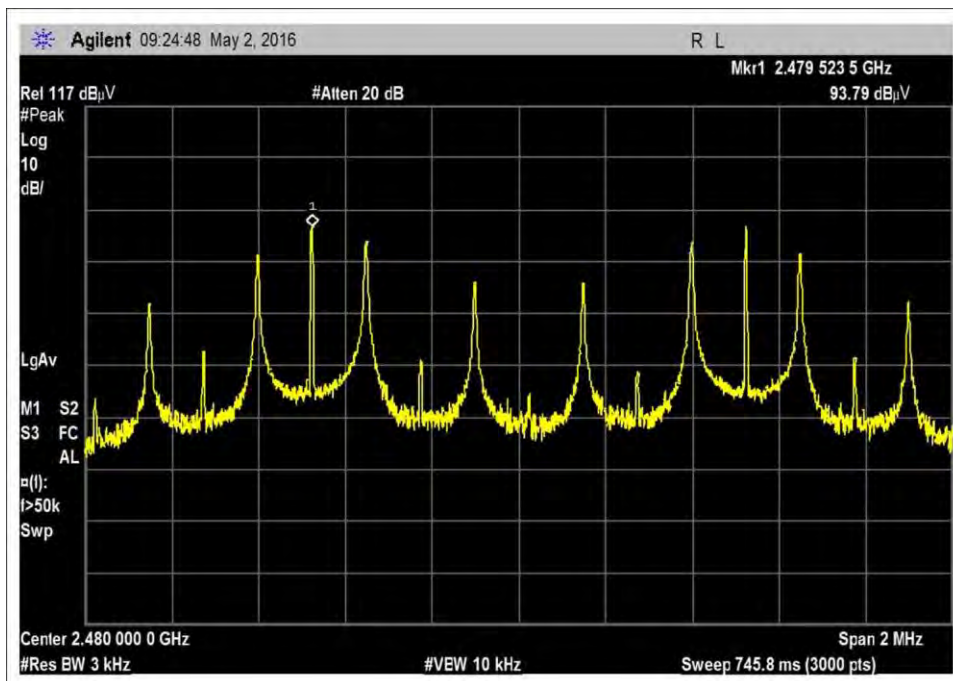
BLE, High Channel



802.15.4, Low Channel

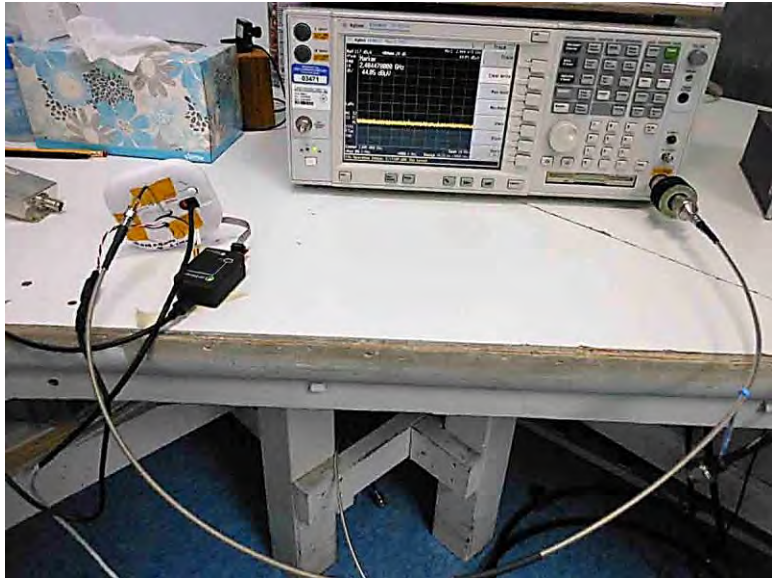


802.15.4, Middle Channel



802.15.4, High Channel

Test Setup Photo



15.247(d) RF Conducted Emissions & Band Edge

Limit Line for Spurious Conducted Emission - BLE

The Reference level measurement for Emission is non restricted frequency bands were made using the methods set out in KDB "558074 D01 DTS Meas Guidance v03r05", 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	103.10	83.10
Middle	101.86	81.86
High	101.32	81.32

Choose the worst reference limit for all the channels.

Limit Line for Spurious Conducted Emission – 802.15.4

The Reference level measurement for Emission is non restricted frequency bands were made using the methods set out in KDB "558074 D01 DTS Meas Guidance v03r05", 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	109.07	89.07
Middle	108.61	88.61
High	108.81	88.81

Choose the worst reference limit for all the channels.

Test Setup / Conditions / 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 #: **98231** Date: 5/2/2016
 Test Type: **Conducted Measurement** Time: 11:23:22 AM
 Tested By: Hieu Song Nguyenpham Sequence#: 98
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Conducted Spurious Emission
 Frequency Range: 9kHz to 25000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 21.3°C
 Humidity: 49 %
 Atmospheric Pressure: 101.4kPa

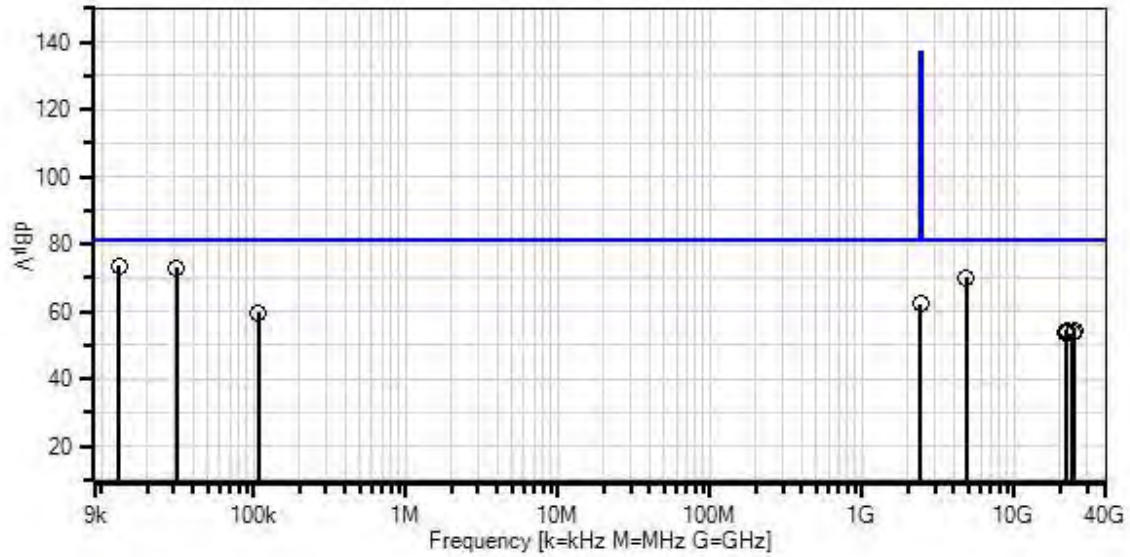
High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 11

RBW=100kHz
 VBW=300kHz

The EUT is placed on a non-conducted table. It is connected to a spectrum analyzer. It is set continuously transmitting as intended.

Low Channel on TX Mode on BLE

Enlighted, Inc WO#: 98231 Sequence#: 98 Date: 5/2/2016
 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: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
T2	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	T2 dB		Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	13.199k	63.8	+0.0	+9.8		+0.0	73.6	81.3	-7.7	None
2	31.444k	63.3	+0.0	+9.8		+0.0	73.1	81.3	-8.2	None
3	4804.480M	59.4	+0.8	+9.9		+0.0	70.1	81.3	-11.2	None
4	2397.773M	51.7	+0.5	+9.9		+0.0	62.1	81.3	-19.2	None
5	107.489k	49.7	+0.0	+9.8		+0.0	59.5	81.3	-21.8	None
6	24842.814 M	42.4	+1.8	+10.0		+0.0	54.2	81.3	-27.1	None
7	21971.556 M	42.4	+1.7	+10.0		+0.0	54.1	81.3	-27.2	None
8	21898.203 M	42.2	+1.7	+10.0		+0.0	53.9	81.3	-27.4	None
9	21751.496 M	42.0	+1.7	+10.0		+0.0	53.7	81.3	-27.6	None
10	24025.449 M	41.5	+1.9	+10.1		+0.0	53.5	81.3	-27.8	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 #: **98231** Date: 5/2/2016
 Test Type: **Conducted Measurement** Time: 11:16:22 AM
 Tested By: Hieu Song Nguyenpham Sequence#: 97
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Conducted Spurious Emission
 Frequency Range: 9kHz to 25000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 21.3°C
 Humidity: 49 %
 Atmospheric Pressure: 101.4kPa

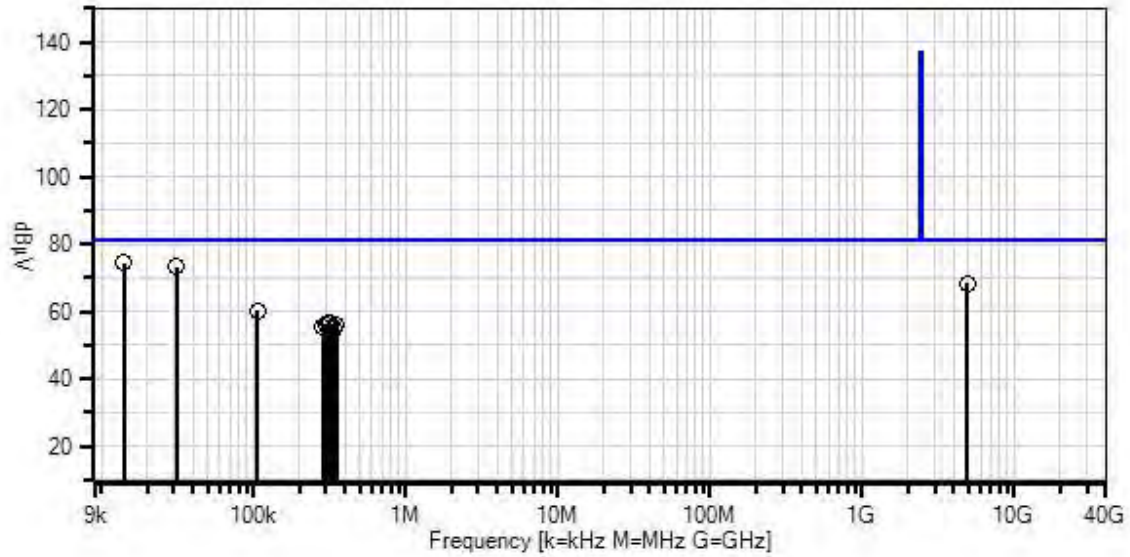
High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 11

RBW=100kHz
 VBW=300kHz

The EUT is placed on a non-conducted table. It is connected to a spectrum analyzer. It is set continuously transmitting as intended.

Middle Channel on TX Mode on BLE

Enlighted, Inc WO#: 98231 Sequence#: 97 Date: 5/2/2016
 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: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
T2	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	T2 dB	dB	dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	14.101k	64.5	+0.0	+9.8			+0.0	74.3	81.3	-7.0	None
2	31.444k	63.5	+0.0	+9.8			+0.0	73.3	81.3	-8.0	None
3	4876.606M	57.6	+0.8	+9.9			+0.0	68.3	81.3	-13.0	None
4	106.707k	50.4	+0.0	+9.8			+0.0	60.2	81.3	-21.1	None
5	310.586k	47.0	+0.0	+9.8			+0.0	56.8	81.3	-24.5	None
6	323.622k	46.7	+0.0	+9.8			+0.0	56.5	81.3	-24.8	None
7	297.551k	46.4	+0.0	+9.8			+0.0	56.2	81.3	-25.1	None
8	349.694k	46.3	+0.0	+9.8			+0.0	56.1	81.3	-25.2	None
9	284.515k	45.8	+0.0	+9.8			+0.0	55.6	81.3	-25.7	None
10	336.658k	45.3	+0.0	+9.8			+0.0	55.1	81.3	-26.2	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 #: **98231** Date: 5/2/2016
 Test Type: **Conducted Measurement** Time: 11:03:49 AM
 Tested By: Hieu Song Nguyenpham Sequence#: 96
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Conducted Spurious Emission
 Frequency Range: 9kHz to 25000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 21.3°C
 Humidity: 49 %
 Atmospheric Pressure: 101.4kPa

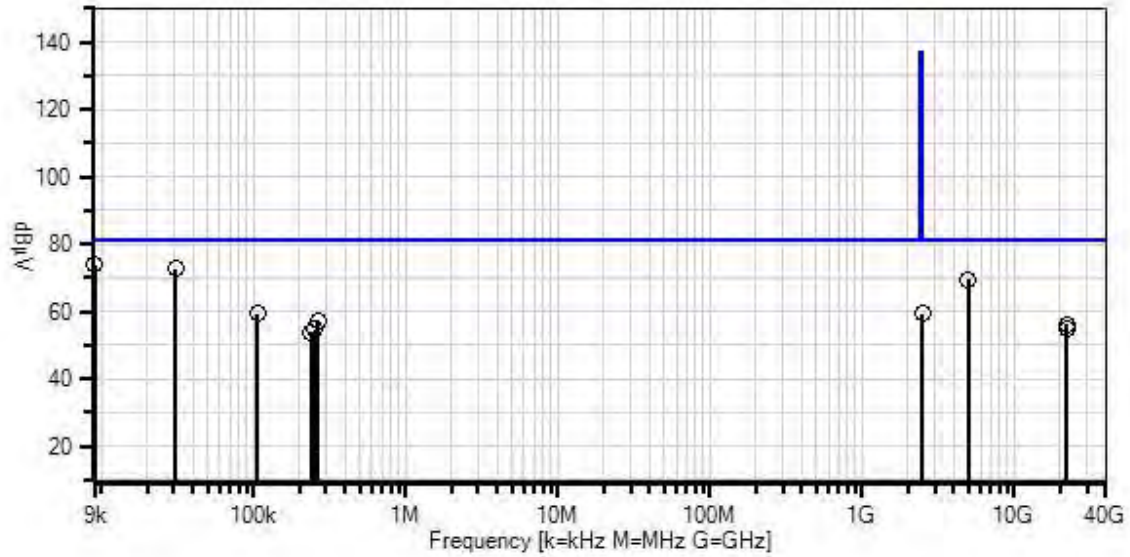
High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 11

RBW=100kHz
 VBW=300kHz

The EUT is placed on a non-conducted table. It is connected to a spectrum analyzer. It is set continuously transmitting as intended.

High Channel on TX Mode on BLE

Enlighted, Inc WO#: 98231 Sequence#: 96 Date: 5/2/2016
 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: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
T2	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	T2 dB		Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	9.131k	64.0	+0.0	+9.8		+0.0	73.8	81.3	-7.5	None
2	30.990k	62.8	+0.0	+9.8		+0.0	72.6	81.3	-8.7	None
3	4959.036M	58.9	+0.8	+9.9		+0.0	69.6	81.3	-11.7	None
4	106.967k	49.6	+0.0	+9.8		+0.0	59.4	81.3	-21.9	None
5	2484.553M	49.0	+0.5	+9.9		+0.0	59.4	81.3	-21.9	None
6	266.004k	47.6	+0.0	+9.8		+0.0	57.4	81.3	-23.9	None
7	22013.472 M	44.5	+1.7	+10.0		+0.0	56.2	81.3	-25.1	None
8	252.707k	45.0	+0.0	+9.8		+0.0	54.8	81.3	-26.5	None
9	21929.640 M	43.1	+1.7	+10.0		+0.0	54.8	81.3	-26.5	None
10	239.672k	44.0	+0.0	+9.8		+0.0	53.8	81.3	-27.5	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 #: **98231** Date: 5/2/2016
 Test Type: **Conducted Measurement** Time: 11:46:32 AM
 Tested By: Hieu Song Nguyenpham Sequence#: 101
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Conducted Spurious Emission
 Frequency Range: 9kHz to 25000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 21.3°C
 Humidity: 49 %
 Atmospheric Pressure: 101.4kPa

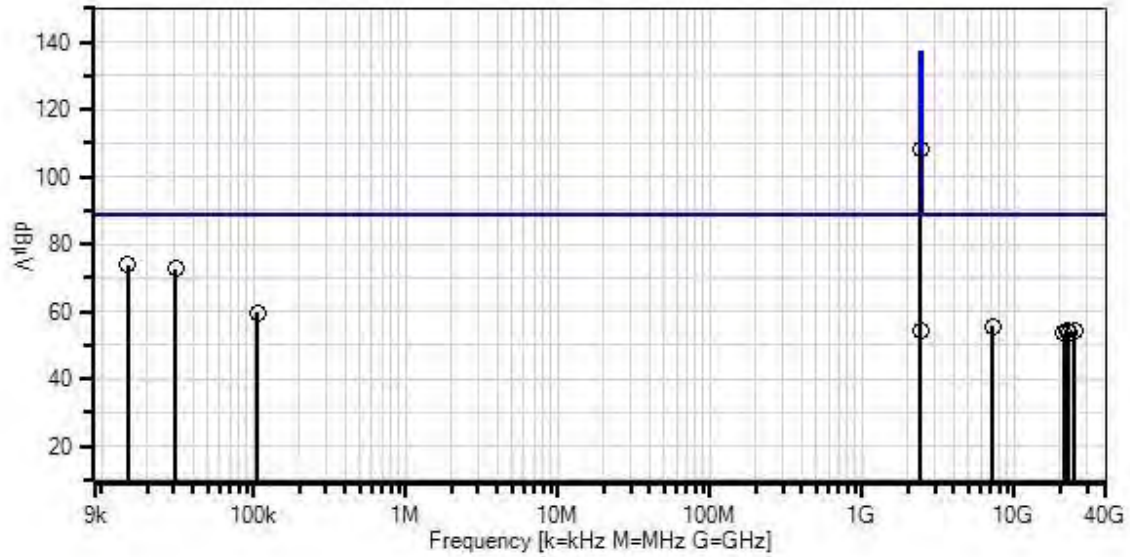
High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 11

RBW=100kHz
 VBW=300kHz

The EUT is placed on a non-conducted table. It is connected to a spectrum analyzer. It is set continuously transmitting as intended.

Low Channel on TX Mode on 802.15.4

Enlighted, Inc WO#: 98231 Sequence#: 101 Date: 5/2/2016
 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: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
T2	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	T2 dB	dB	dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	15.002k	63.9	+0.0	+9.8			+0.0	73.7	88.6	-14.9	None
2	30.990k	63.0	+0.0	+9.8			+0.0	72.8	88.6	-15.8	None
3	2403.758M	98.0	+0.5	+9.9			+0.0	108.4	137.0	-28.6	None
4	106.967k	49.8	+0.0	+9.8			+0.0	59.6	88.6	-29.0	None
5	7215.567M	44.6	+1.0	+9.9			+0.0	55.5	88.6	-33.1	None
6	21929.640 M	42.8	+1.7	+10.0			+0.0	54.5	88.6	-34.1	None
7	2397.773M	43.9	+0.5	+9.9			+0.0	54.3	88.6	-34.3	None
8	24790.419 M	42.2	+1.8	+10.0			+0.0	54.0	88.6	-34.6	None
9	22652.694 M	41.9	+1.8	+10.0			+0.0	53.7	88.6	-34.9	None
10	21164.670 M	41.6	+1.7	+10.1			+0.0	53.4	88.6	-35.2	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 #: **98231** Date: 5/2/2016
 Test Type: **Conducted Measurement** Time: 11:40:52 AM
 Tested By: Hieu Song Nguyenpham Sequence#: 100
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Conducted Spurious Emission
 Frequency Range: 9kHz to 25000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 21.3°C
 Humidity: 49 %
 Atmospheric Pressure: 101.4kPa

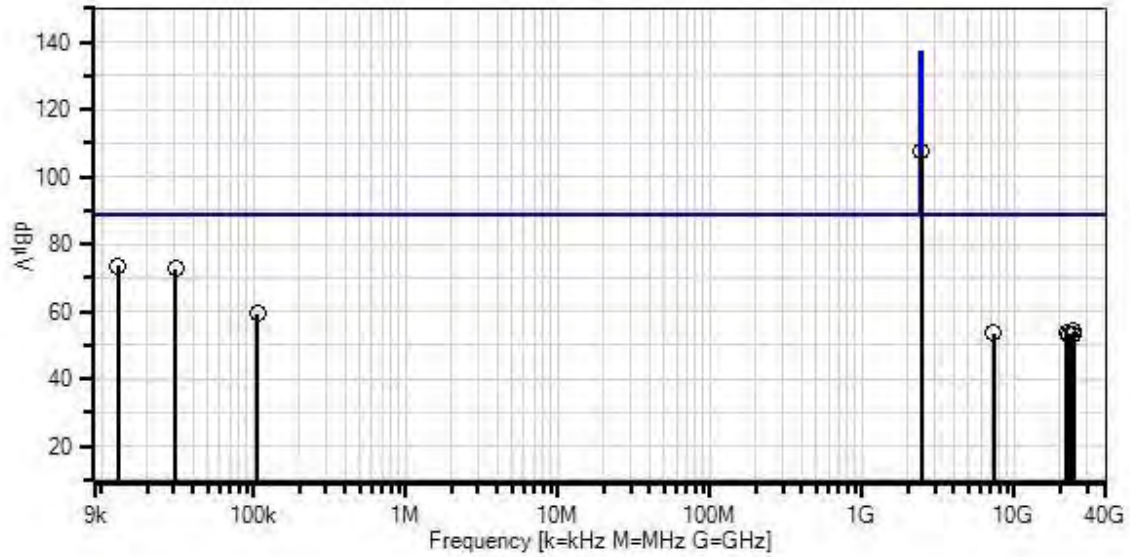
High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 11

RBW=100kHz
 VBW=300kHz

The EUT is placed on a non-conducted table. It is connected to a spectrum analyzer. It is set continuously transmitting as intended.

Middle Channel on TX Mode on 802.15.4

Enlighted, Inc WO#: 98231 Sequence#: 100 Date: 5/2/2016
 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: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
T2	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	T2 dB	dB	dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	12.891k	63.8	+0.0	+9.8			+0.0	73.6	88.6	-15.0	None
2	30.990k	62.9	+0.0	+9.8			+0.0	72.7	88.6	-15.9	None
3	106.967k	49.6	+0.0	+9.8			+0.0	59.4	88.6	-29.2	None
4	2439.667M	97.4	+0.5	+9.9			+0.0	107.8	137.0	-29.2	None
5	24486.527 M	42.2	+1.8	+10.0			+0.0	54.0	88.6	-34.6	None
6	22055.389 M	42.2	+1.7	+10.0			+0.0	53.9	88.6	-34.7	None
7	7318.605M	42.5	+1.0	+9.9			+0.0	53.4	88.6	-35.2	None
8	24413.174 M	41.5	+1.8	+10.0			+0.0	53.3	88.6	-35.3	None
9	22652.694 M	41.4	+1.8	+10.0			+0.0	53.2	88.6	-35.4	None
10	23941.617 M	41.2	+1.9	+10.1			+0.0	53.2	88.6	-35.4	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 #: **98231** Date: 5/2/2016
 Test Type: **Conducted Measurement** Time: 11:35:27 AM
 Tested By: Hieu Song Nguyenpham Sequence#: 99
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Conducted Spurious Emission
 Frequency Range: 9kHz to 25000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 21.3°C
 Humidity: 49 %
 Atmospheric Pressure: 101.4kPa

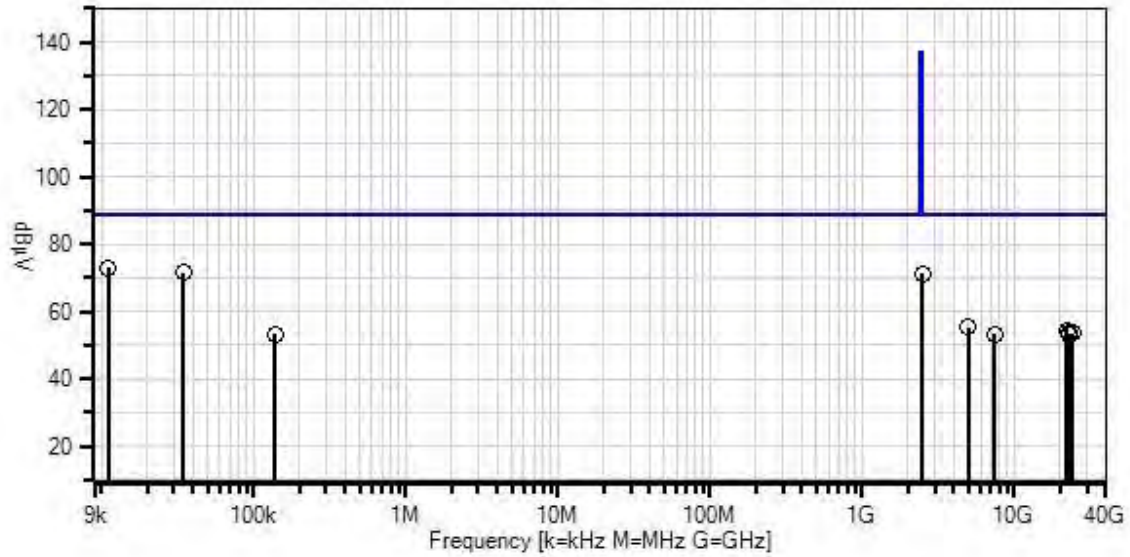
High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 11

RBW=100kHz
 VBW=300kHz

The EUT is placed on a non-conducted table. It is connected to a spectrum analyzer. It is set continuously transmitting as intended.

High Channel on TX Mode on 802.15.4

Enlighted, Inc WO#: 98231 Sequence#: 99 Date: 5/2/2016
 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: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
T2	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	T2 dB		Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	11.131k	63.2	+0.0	+9.8		+0.0	73.0	88.6	-15.6	None
2	34.676k	61.7	+0.0	+9.8		+0.0	71.5	88.6	-17.1	None
3	2484.475M	60.8	+0.5	+9.9		+0.0	71.2	88.6	-17.4	None
4	4956.628M	44.7	+0.8	+9.9		+0.0	55.4	88.6	-33.2	None
5	21929.080 M	42.6	+1.7	+10.0		+0.0	54.3	88.6	-34.3	None
6	22866.906 M	41.8	+1.8	+10.0		+0.0	53.6	88.6	-35.0	None
7	24098.952 M	41.5	+1.9	+10.1		+0.0	53.5	88.6	-35.1	None
8	138.560k	43.5	+0.0	+9.8		+0.0	53.3	88.6	-35.3	None
9	7438.750M	42.4	+1.0	+9.9		+0.0	53.3	88.6	-35.3	None
10	22701.407 M	41.3	+1.8	+10.0		+0.0	53.1	88.6	-35.5	None

Band Edge

Band Edge Summary - BLE

Limit applied: Max Power/100kHz - 20dB

Frequency (MHz)	Modulation	Measured (dBm)	Limit (dBm)	Results
2400.0	O-QPSK	-42.38	<-25.68	Pass
2483.5	O-QPSK	-43.65	<-25.68	Pass

Band Edge Summary - 802.15.4

Limit applied: Max Power/100kHz - 20dB

Frequency (MHz)	Modulation	Measured (dBm)	Limit (dBm)	Results
2400.0	O-QPSK	-41.38	<-18.39	Pass
2483.5	O-QPSK	-41.49	<-18.39	Pass

Band Edge Setup / Conditions / 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 #: **98231** Date: 5/12/2016
 Test Type: **Conducted Measurement** Time: 16:37:10
 Tested By: Hieu Song Nguyenpham Sequence#: 97
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Band Edge

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 21.3°C
 Humidity: 49 %
 Atmospheric Pressure: 101.4kPa

High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 13.2

RBW=100kHz
 VBW=300kHz

The EUT is placed on non-conducted table. It is connected to a spectrum analyzer. It is set continuously transmitting as intended.

TX Mode on BLE

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
	ANP06239	Attenuator	54A-10	7/9/2014	7/9/2016

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 #: **98231** Date: 5/12/2016
 Test Type: **Conducted Measurement** Time: 16:36:10
 Tested By: Hieu Song Nguyenpham Sequence#: 100
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 21.3°C
 Humidity: 49 %
 Atmospheric Pressure: 101.4kPa

High Clock: 16MHz
 Transmitting operating frequency= 2402,2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405,2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and 558074 v03r05 section 13.2

RBW=100kHz
 VBW=300kHz

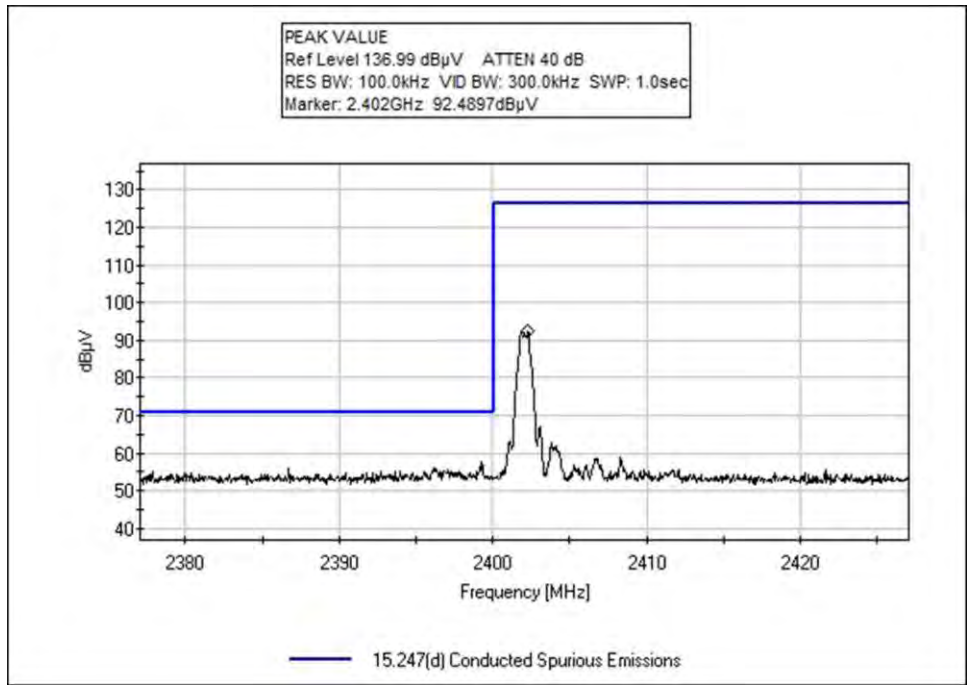
The EUT is placed on non-conducted table. It is connected to a spectrum analyzer. It is set continuously transmitting as intended.

TX on 802.15.4

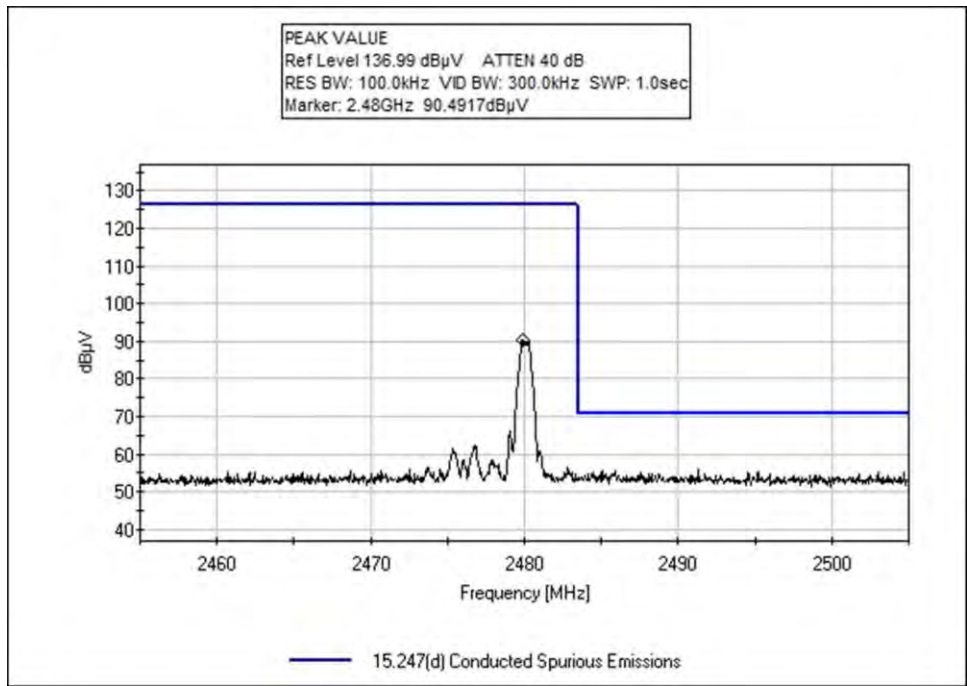
Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
	ANP06239	Attenuator	54A-10	7/9/2014	7/9/2016

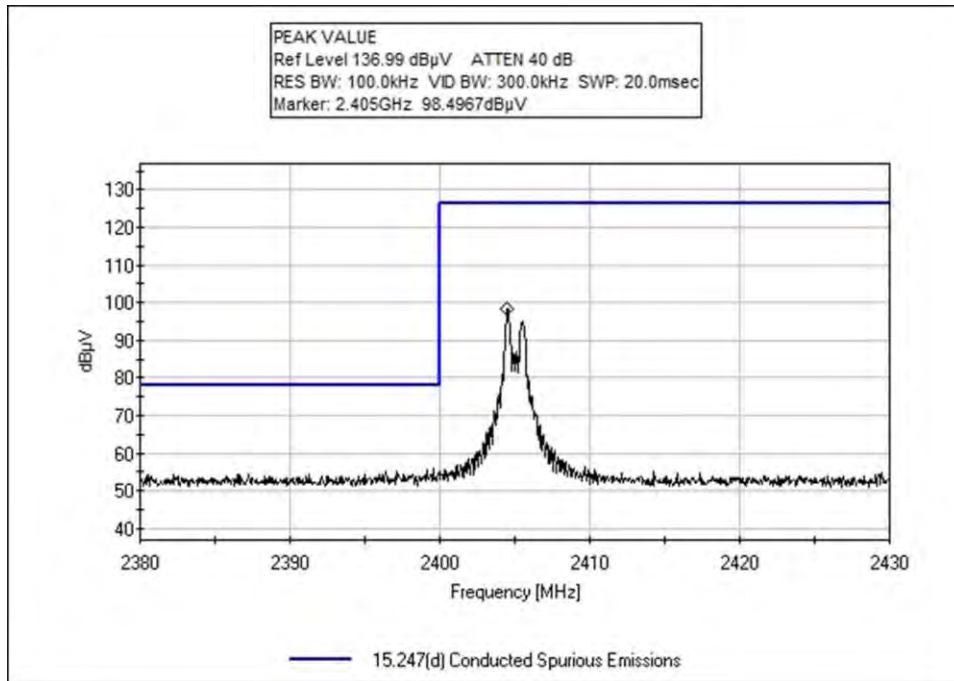
Band Edge Plots



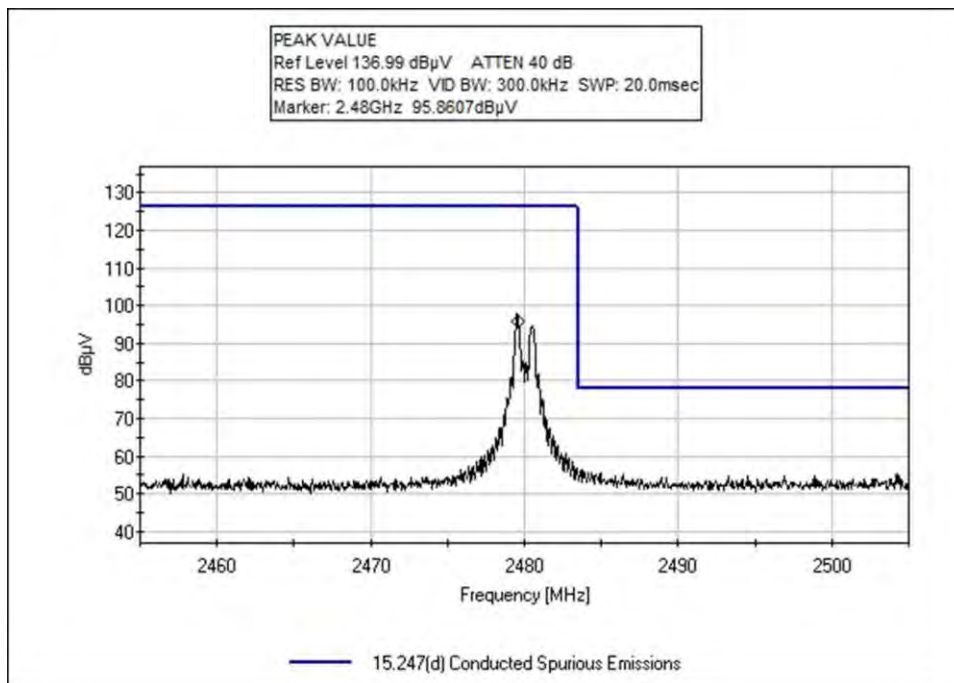
BLE, Low Channel



BLE, High Channel



802.15.4, Low Channel



802.15.4, High Channel

Test Setup Photo



15.247(d) Radiated Emissions & Band Edge

Test Setup / Conditions / 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 #: **98231** Date: 4/28/2016
 Test Type: **Radiated Scan** Time: 10:27:21
 Tested By: Hieu Song Nguyenpham Sequence#: 64
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
 Frequency Range: 9kHz to 1000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

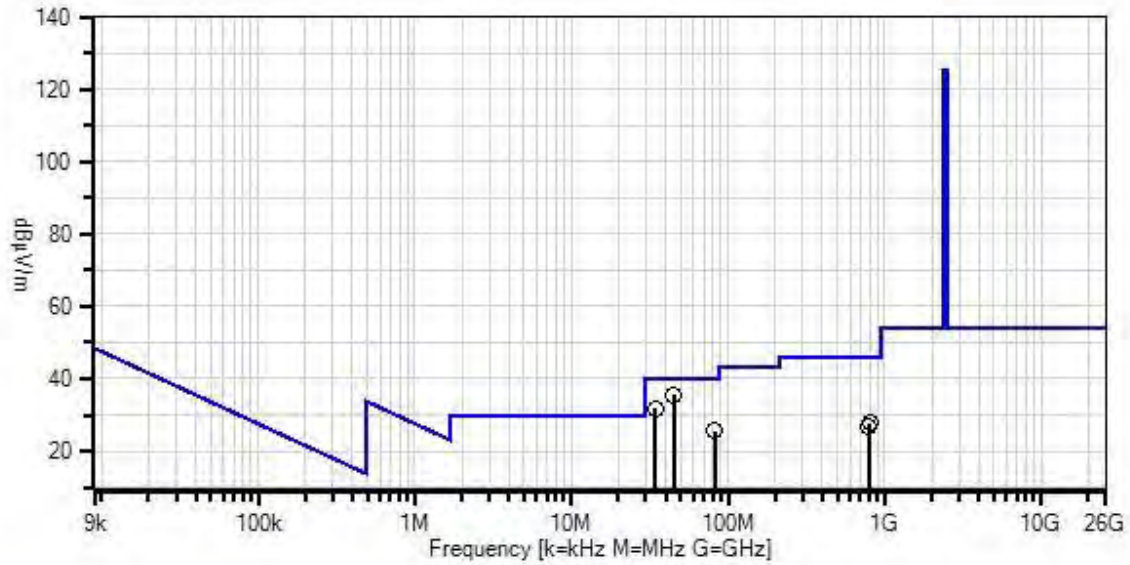
High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 12.2.7

9 kHz -150 kHz; RBW=200 Hz,VBW=200 Hz;
 150 kHz-30 MHz; RBW=9 kHz,VBW=9 kHz;
 30 MHz-1000 MHz; RBW=120 kHz,VBW=120 kHz,
 1000 MHz-25000MHz; RBW=1 MHz,VBW=1 MHz.

The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

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

Enlighted, Inc W/O#: 98231 Sequence#: 64 Date: 4/28/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



- Readings
- × QP Readings
- ▼ Ambient
- 1 - 15.247(d) / 15.209 Radiated Spurious Emissions

- Peak Readings
 - * Average Readings
- Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00971A	Preamp	8447D	2/5/2016	2/5/2018
	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	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T5	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	45.108M	51.3	-27.9 +0.2	+11.3	+0.6	+0.1	+0.0	35.6	40.0	-4.4	Vert
2	34.419M	42.1	-28.0 +0.2	+16.8	+0.5	+0.1	+0.0	31.7	40.0	-8.3	Vert
3	82.298M	44.2	-27.9 +0.3	+7.9	+0.8	+0.2	+0.0	25.5	40.0	-14.5	Vert
4	805.004M	28.7	-28.0 +1.3	+22.0	+3.0	+0.7	+0.0	27.7	46.0	-18.3	Horiz
5	795.663M	28.3	-28.0 +1.3	+21.8	+2.9	+0.7	+0.0	27.0	46.0	-19.0	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 #: **98231** Date: 4/25/2016
 Test Type: **Radiated Scan** Time: 13:55:53
 Tested By: Hieu Song Nguyenpham Sequence#: 13
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
 Frequency Range: 1000MHz to 25000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

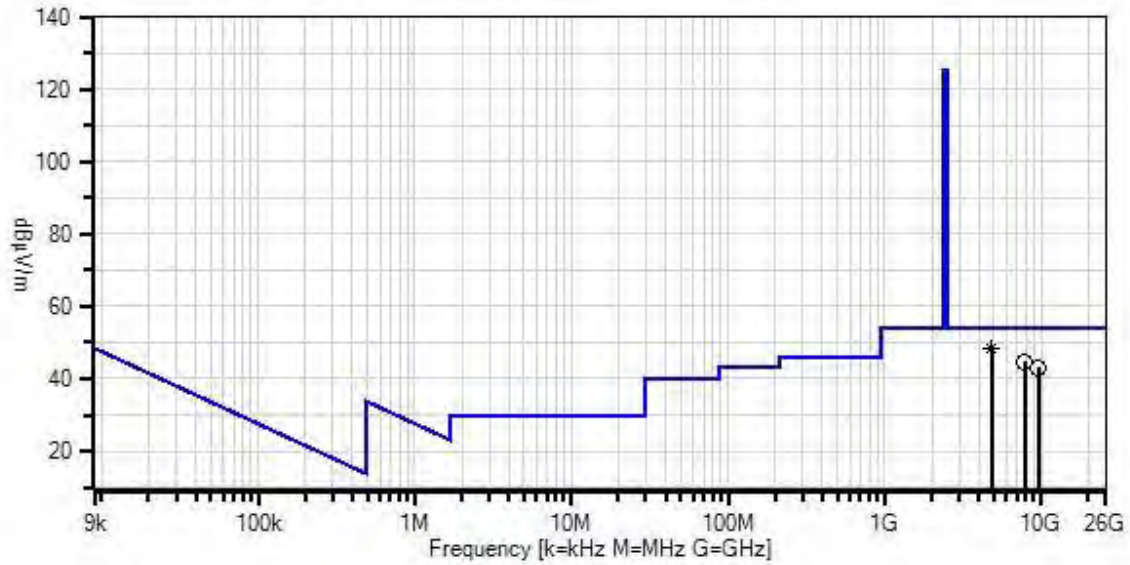
High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 12.2.7

9 kHz -150 kHz; RBW=200 Hz,VBW=200 Hz;
 150 kHz-30 MHz; RBW=9 kHz,VBW=9 kHz;
 30 MHz-1000 MHz; RBW=120 kHz,VBW=120 kHz,
 1000 MHz-25000MHz; RBW=1 MHz,VBW=1 MHz.

The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

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

Enlighted, Inc WO#: 98231 Sequence#: 13 Date: 4/25/2016
 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: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
T2	AN02113	Horn Antenna	3115	2/3/2015	2/3/2017
T3	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
T4	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
T5	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP06138	Cable	32022-29094K-29094K-72TC	3/18/2015	3/18/2017
	ANP00929	Cable	various	1/25/2016	1/25/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

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	4804.503M	68.6	-57.8 +0.8	+30.8 +0.3	+1.8	+3.8	+0.0	48.3	54.0	-5.7	Horiz
^	4804.503M	73.8	-57.8 +0.8	+30.8 +0.3	+1.8	+3.8	+0.0	53.5	54.0	-0.5	Horiz
3	7860.856M	58.7	-57.8 +1.0	+35.2 +0.3	+2.3	+5.1	+0.0	44.8	54.0	-9.2	Vert
4	9608.950M	56.0	-57.2 +1.1	+34.8 +0.3	+2.6	+5.4	+0.0	43.0	54.0	-11.0	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 #: **98231** Date: 4/28/2016
 Test Type: **Radiated Scan** Time: 10:57:17
 Tested By: Hieu Song Nguyenpham Sequence#: 67
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
 Frequency Range: 9kHz to 1000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

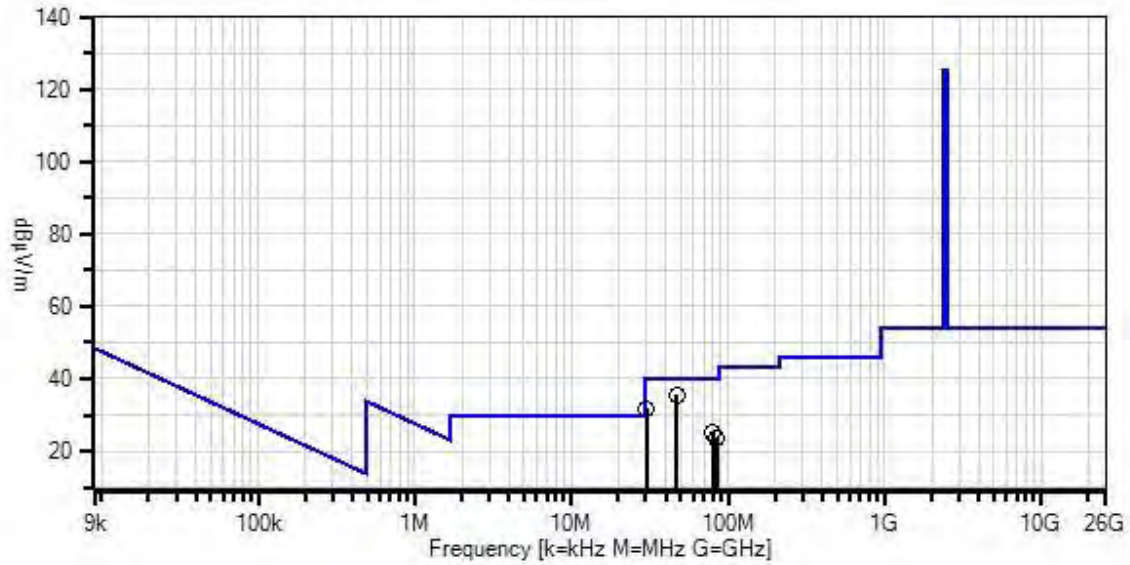
High Clock: 16MHz
 Transmitting operating frequency= 2402,2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405,2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 12.2.7

9 kHz -150 kHz; RBW=200 Hz,VBW=200 Hz;
 150 kHz-30 MHz; RBW=9 kHz,VBW=9 kHz;
 30 MHz-1000 MHz; RBW=120 kHz,VBW=120 kHz,
 1000 MHz-25000MHz; RBW=1 MHz,VBW=1 MHz.

The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

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

Enlighted, Inc W/O#: 98231 Sequence#: 67 Date: 4/28/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



- Readings
 - × QP Readings
 - ▼ Ambient
 - Peak Readings
 - * Average Readings
- 1 - 15.247(d) / 15.209 Radiated Spurious Emissions
- Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00971A	Preamp	8447D	2/5/2016	2/5/2018
	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	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T5	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	46.960M	52.0	-27.9 +0.2	+10.5	+0.6	+0.1	+0.0	35.5	40.0	-4.5	Vert
2	30.210M	40.3	-28.0 +0.2	+18.8	+0.4	+0.1	+0.0	31.8	40.0	-8.2	Vert
3	80.073M	44.4	-27.9 +0.3	+7.5	+0.8	+0.2	+0.0	25.3	40.0	-14.7	Vert
4	85.331M	41.6	-27.9 +0.3	+8.3	+0.8	+0.2	+0.0	23.3	40.0	-16.7	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 #: **98231** Date: 4/25/2016
 Test Type: **Radiated Scan** Time: 14:40:59
 Tested By: Hieu Song Nguyenpham Sequence#: 16
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
 Frequency Range: 1000MHz to 25000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

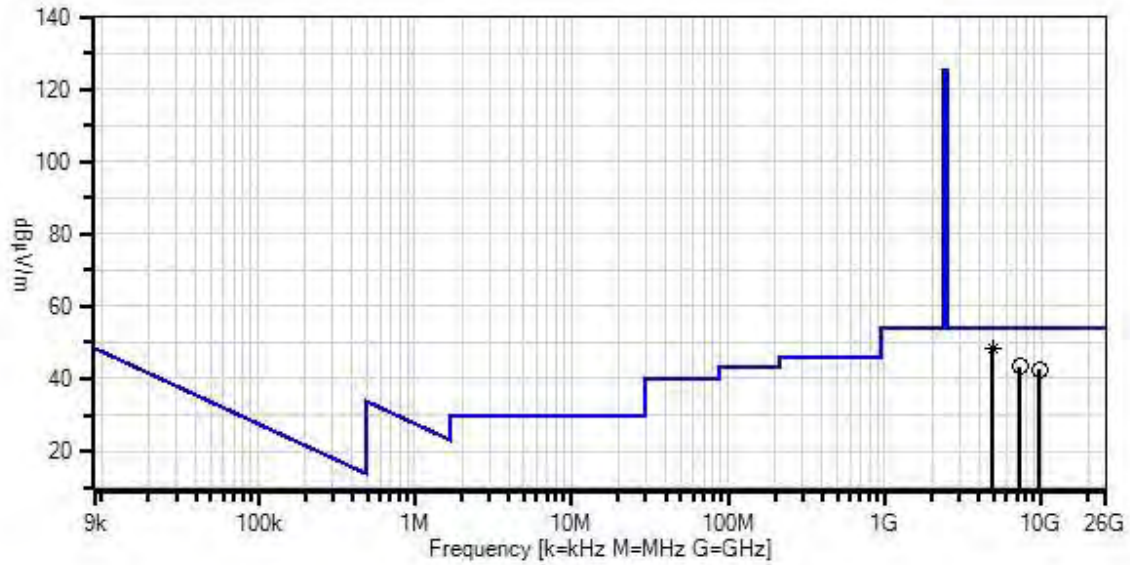
Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa
 High Clock: 16MHz
 Transmitting operating frequency= 2402,2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405,2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 12.2.7

9 kHz -150 kHz; RBW=200 Hz,VBW=200 Hz;
 150 kHz-30 MHz; RBW=9 kHz,VBW=9 kHz;
 30 MHz-1000 MHz; RBW=120 kHz,VBW=120 kHz,
 1000 MHz-25000MHz; RBW=1 MHz,VBW=1 MHz.

The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

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

Enlighted, Inc W/O#: 98231 Sequence#: 16 Date: 4/25/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



- Readings
 - × QP Readings
 - ▼ Ambient
 - Peak Readings
 - * Average Readings
- 1 - 15.247(d) / 15.209 Radiated Spurious Emissions
 Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
T2	AN02113	Horn Antenna	3115	2/3/2015	2/3/2017
T3	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
T4	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
T5	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP06138	Cable	32022-29094K-29094K-72TC	3/18/2015	3/18/2017
	ANP00929	Cable	various	1/25/2016	1/25/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

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	4880.064M	68.1	-57.6 +0.8	+30.9 +0.3	+1.8	+3.8	+0.0	48.1	54.0	-5.9	Horiz
^	4880.064M	72.0	-57.6 +0.8	+30.9 +0.3	+1.8	+3.8	+0.0	52.0	54.0	-2.0	Horiz
3	7319.504M	58.8	-58.3 +1.0	+34.3 +0.3	+2.3	+5.0	+0.0	43.4	54.0	-10.6	Vert
4	9760.549M	55.7	-57.6 +1.1	+34.9 +0.3	+2.6	+5.6	+0.0	42.6	54.0	-11.4	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 #: **98231** Date: 4/28/2016
 Test Type: **Radiated Scan** Time: 11:27:55
 Tested By: Hieu Song Nguyenpham Sequence#: 70
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
 Frequency Range: 9kHz to 1000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

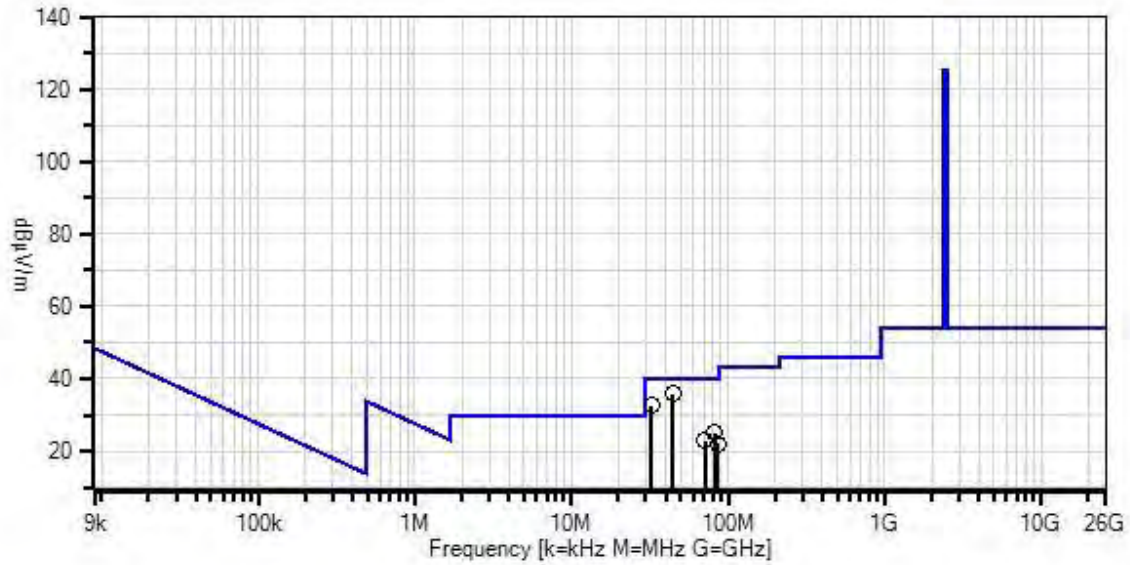
High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 12.2.7

9 kHz -150 kHz; RBW=200 Hz,VBW=200 Hz;
 150 kHz-30 MHz; RBW=9 kHz,VBW=9 kHz;
 30 MHz-1000 MHz; RBW=120 kHz,VBW=120 kHz,
 1000 MHz-25000MHz; RBW=1 MHz,VBW=1 MHz.

The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

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

Enlighted, Inc W/O#: 98231 Sequence#: 70 Date: 4/28/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



- Readings
 - × QP Readings
 - ▼ Ambient
 - 1 - 15.247(d) / 15.209 Radiated Spurious Emissions
 - Peak Readings
 - * Average Readings
- Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00971A	Preamp	8447D	2/5/2016	2/5/2018
	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	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T5	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	44.393M	51.2	-28.0 +0.2	+11.7	+0.6	+0.1	+0.0	35.8	40.0	-4.2	Vert
2	32.483M	42.1	-28.0 +0.2	+17.7	+0.5	+0.1	+0.0	32.6	40.0	-7.4	Vert
3	82.702M	43.8	-27.9 +0.3	+7.9	+0.8	+0.2	+0.0	25.1	40.0	-14.9	Vert
4	71.874M	43.0	-27.8 +0.3	+6.5	+0.7	+0.2	+0.0	22.9	40.0	-17.1	Vert
5	85.837M	40.3	-27.8 +0.3	+8.4	+0.8	+0.2	+0.0	22.2	40.0	-17.8	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 #: **98231** Date: 4/25/2016
 Test Type: **Radiated Scan** Time: 15:25:30
 Tested By: Hieu Song Nguyenpham Sequence#: 19
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
 Frequency Range: 1000MHz to 25000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

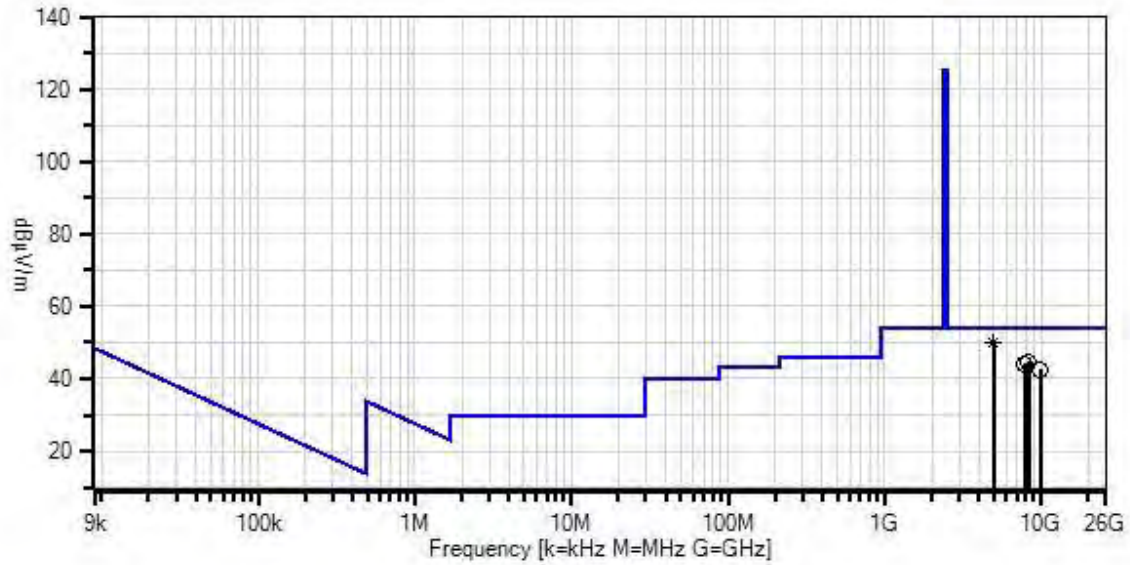
High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 12.2.7

9 kHz -150 kHz; RBW=200 Hz,VBW=200 Hz;
 150 kHz-30 MHz; RBW=9 kHz,VBW=9 kHz;
 30 MHz-1000 MHz; RBW=120 kHz,VBW=120 kHz,
 1000 MHz-25000MHz; RBW=1 MHz,VBW=1 MHz.

The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

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

Enlighted, Inc W/O#: 98231 Sequence#: 19 Date: 4/25/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



- Readings
 - × QP Readings
 - ▼ Ambient
 - 1 - 15.247(d) / 15.209 Radiated Spurious Emissions
 - Peak Readings
 - * Average Readings
- Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
T2	AN02113	Horn Antenna	3115	2/3/2015	2/3/2017
T3	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
T4	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
T5	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP06138	Cable	32022-29094K-29094K-72TC	3/18/2015	3/18/2017
	ANP00929	Cable	various	1/25/2016	1/25/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

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	4960.108M Ave	69.5	-57.3 +0.8	+31.1 +0.3	+1.8	+3.8	+0.0	50.0	54.0	-4.0	Horiz
^	4960.108M	73.2	-57.3 +0.8	+31.1 +0.3	+1.8	+3.8	+0.0	53.7	54.0	-0.3	Horiz
3	8374.369M	56.2	-56.4 +1.0	+35.9 +0.3	+2.4	+5.2	+0.0	44.6	54.0	-9.4	Vert
4	7873.869M	58.0	-57.7 +1.0	+35.2 +0.4	+2.3	+5.1	+0.0	44.3	54.0	-9.7	Vert
5	9920.113M	55.4	-57.7 +1.1	+35.0 +0.4	+2.6	+5.7	+0.0	42.5	54.0	-11.5	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 #: **98231** Date: 4/28/2016
 Test Type: **Radiated Scan** Time: 09:06:25
 Tested By: Hieu Song Nguyenpham Sequence#: 55
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
 Frequency Range: 9kHz to 1000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

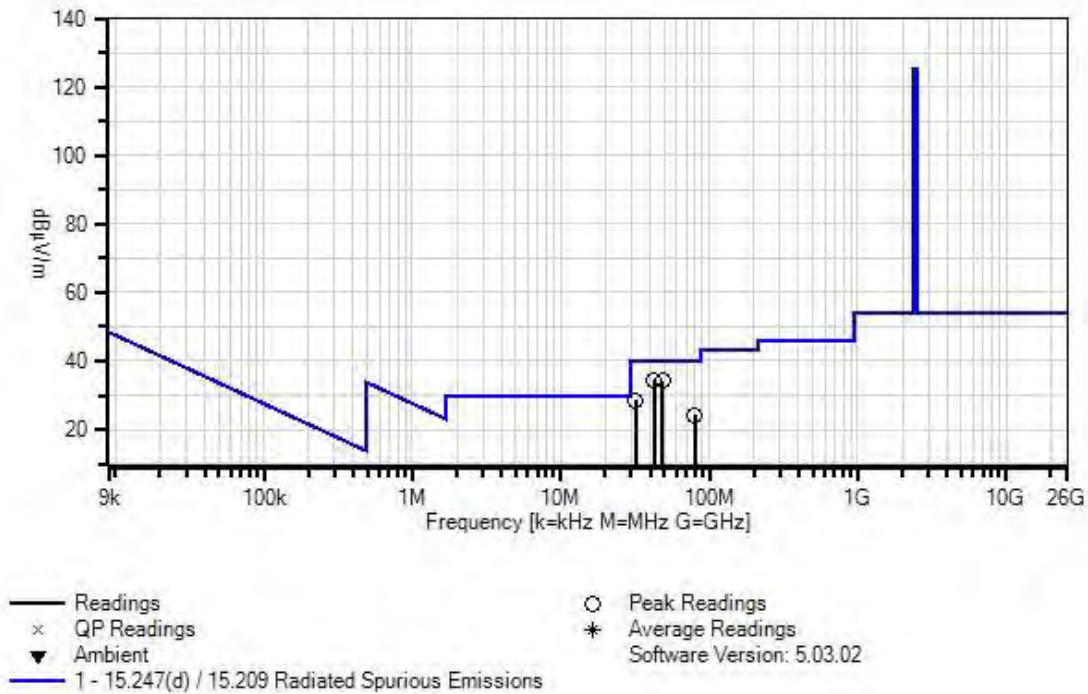
High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 12.2.7

9 kHz -150 kHz; RBW=200 Hz,VBW=200 Hz;
 150 kHz-30 MHz; RBW=9 kHz,VBW=9 kHz;
 30 MHz-1000 MHz; RBW=120 kHz,VBW=120 kHz,
 1000 MHz-25000MHz; RBW=1 MHz,VBW=1 MHz.

The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

X axis- Direct to Antenna is the worst orthogonal
Low Channel on TX mode on 802.15.4

Enlighted, Inc W/O#: 98231 Sequence#: 55 Date: 4/28/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00971A	Preamp	8447D	2/5/2016	2/5/2018
	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	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T5	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	42.794M	49.2	-28.0 +0.2	+12.4	+0.6	+0.1	+0.0	34.5	40.0	-5.5	Vert
2	48.307M	51.2	-27.9 +0.2	+9.9	+0.6	+0.1	+0.0	34.1	40.0	-5.9	Vert
3	32.146M	37.9	-28.0 +0.2	+17.8	+0.5	+0.1	+0.0	28.5	40.0	-11.5	Vert
4	79.770M	43.2	-27.9 +0.3	+7.5	+0.8	+0.2	+0.0	24.1	40.0	-15.9	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 #: **98231** Date: 4/25/2016
 Test Type: **Radiated Scan** Time: 10:49:12
 Tested By: Hieu Song Nguyenpham Sequence#: 4
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
 Frequency Range: 1000MHz to 25000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

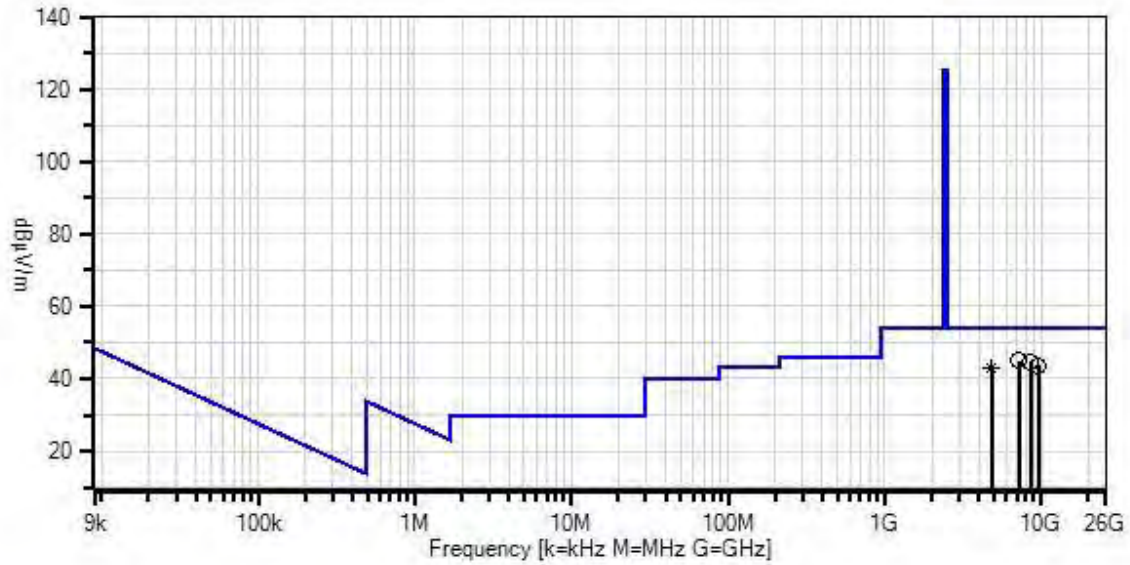
High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 12.2.7

9 kHz -150 kHz; RBW=200 Hz,VBW=200 Hz;
 150 kHz-30 MHz; RBW=9 kHz,VBW=9 kHz;
 30 MHz-1000 MHz; RBW=120 kHz,VBW=120 kHz,
 1000 MHz-25000MHz; RBW=1 MHz,VBW=1 MHz.

The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

X axis- Direct to Antenna is the worst orthogonal
Low Channel on TX mode on 802.15.4

Enlighted, Inc W/O#: 98231 Sequence#: 4 Date: 4/25/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



- Readings
 - × QP Readings
 - ▼ Ambient
 - Peak Readings
 - * Average Readings
- 1 - 15.247(d) / 15.209 Radiated Spurious Emissions
- Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
T2	AN02113	Horn Antenna	3115	2/3/2015	2/3/2017
T3	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
T4	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
T5	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP06138	Cable	32022-29094K-29094K-72TC	3/18/2015	3/18/2017
	ANP00929	Cable	various	1/25/2016	1/25/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

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	7213.209M	60.6	-58.3 +1.0	+34.1 +0.3	+2.2	+5.0	+0.0	44.9	54.0	-9.1	Horiz
2	8583.578M	56.1	-56.1 +1.0	+35.9 +0.4	+2.4	+5.1	+0.0	44.8	54.0	-9.2	Vert
3	9622.045M	56.6	-57.2 +1.1	+34.8 +0.3	+2.6	+5.4	+0.0	43.6	54.0	-10.4	Vert
4	4810.974M Ave	63.1	-57.8 +0.8	+30.8 +0.3	+1.8	+3.8	+0.0	42.8	54.0	-11.2	Vert
^	4810.974M	71.0	-57.8 +0.8	+30.8 +0.3	+1.8	+3.8	+0.0	50.7	54.0	-3.3	Vert
6	4808.969M Ave	63.0	-57.8 +0.8	+30.8 +0.3	+1.8	+3.8	+0.0	42.7	54.0	-11.3	Vert
^	4808.969M	70.5	-57.8 +0.8	+30.8 +0.3	+1.8	+3.8	+0.0	50.2	54.0	-3.8	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 #: **98231** Date: 4/28/2016
 Test Type: **Radiated Scan** Time: 09:36:40
 Tested By: Hieu Song Nguyenpham Sequence#: 58
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
 Frequency Range: 9kHz to 1000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

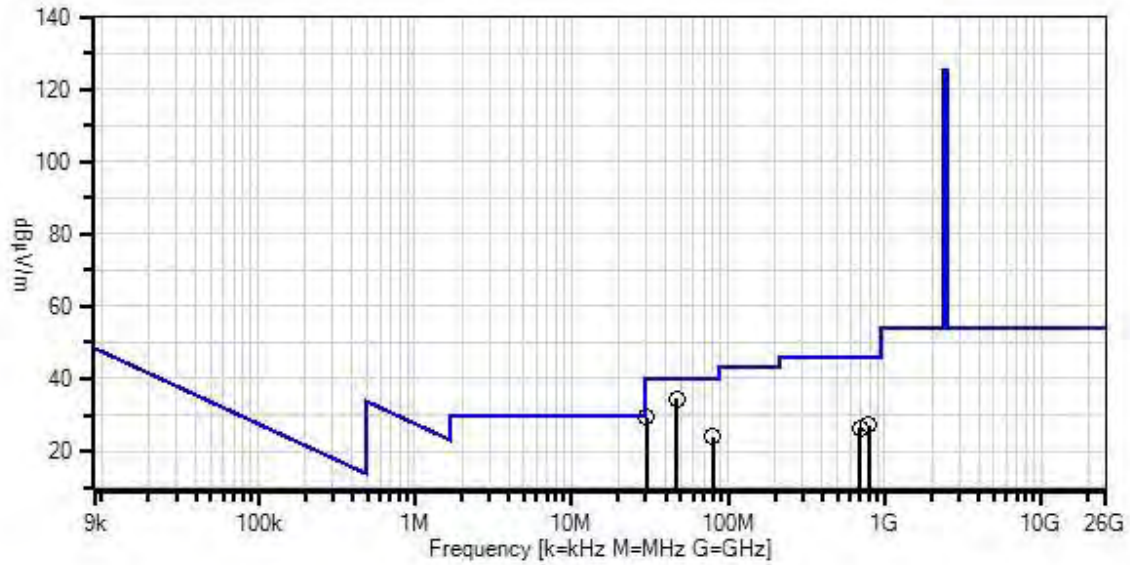
High Clock: 16MHz
 Transmitting operating frequency= 2402,2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405,2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 12.2.7

9 kHz -150 kHz; RBW=200 Hz,VBW=200 Hz;
 150 kHz-30 MHz; RBW=9 kHz,VBW=9 kHz;
 30 MHz-1000 MHz; RBW=120 kHz,VBW=120 kHz,
 1000 MHz-25000MHz; RBW=1 MHz,VBW=1 MHz.

The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

X axis- Direct to Antenna is the worst orthogonal
Middle Channel on TX mode on 802.15.4

Enlighted, Inc W/O#: 98231 Sequence#: 58 Date: 4/28/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



- Readings
 - × QP Readings
 - ▼ Ambient
 - Peak Readings
 - * Average Readings
- 1 - 15.247(d) / 15.209 Radiated Spurious Emissions
- Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00971A	Preamp	8447D	2/5/2016	2/5/2018
	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	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T5	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

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
			dB	dB	dB	dB					
1	47.170M	51.0	-27.9 +0.2	+10.4	+0.6	+0.1	+0.0	34.4	40.0	-5.6	Vert
2	30.084M	37.7	-28.0 +0.2	+18.9	+0.4	+0.1	+0.0	29.3	40.0	-10.7	Vert
3	79.972M	43.1	-27.9 +0.3	+7.5	+0.8	+0.2	+0.0	24.0	40.0	-16.0	Vert
4	797.414M	28.3	-28.0 +1.3	+21.9	+2.9	+0.7	+0.0	27.1	46.0	-18.9	Horiz
5	693.494M	29.5	-28.2 +1.2	+20.4	+2.8	+0.7	+0.0	26.4	46.0	-19.6	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 #: **98231** Date: 4/25/2016
 Test Type: **Radiated Scan** Time: 11:36:36
 Tested By: Hieu Song Nguyenpham Sequence#: 7
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
 Frequency Range: 1000MHz to 25000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

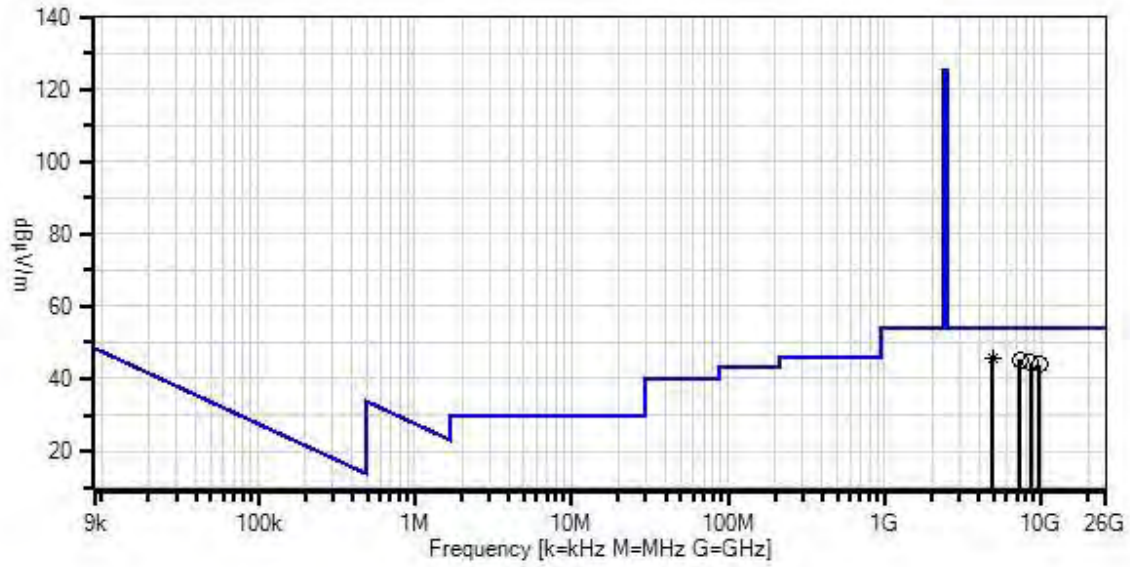
High Clock: 16MHz
 Transmitting operating frequency= 2402,2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405,2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 12.2.7

9 kHz -150 kHz; RBW=200 Hz,VBW=200 Hz;
 150 kHz-30 MHz; RBW=9 kHz,VBW=9 kHz;
 30 MHz-1000 MHz; RBW=120 kHz,VBW=120 kHz,
 1000 MHz-25000MHz; RBW=1 MHz,VBW=1 MHz.

The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

X axis- Direct to Antenna is the worst orthogonal
Middle Channel on TX mode on 802.15.4

Enlighted, Inc W/O#: 98231 Sequence#: 7 Date: 4/25/2016
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



- Readings
- × QP Readings
- ▼ Ambient
- 1 - 15.247(d) / 15.209 Radiated Spurious Emissions

- Peak Readings
 - * Average Readings
- Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
T2	AN02113	Horn Antenna	3115	2/3/2015	2/3/2017
T3	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
T4	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
T5	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP06138	Cable	32022-29094K-29094K-72TC	3/18/2015	3/18/2017
	ANP00929	Cable	various	1/25/2016	1/25/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

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	4879.029M	65.7	-57.6 +0.8	+30.9 +0.3	+1.8	+3.8	+0.0	45.7	54.0	-8.3	Vert
^	4879.029M	72.7	-57.6 +0.8	+30.9 +0.3	+1.8	+3.8	+0.0	52.7	54.0	-1.3	Vert
3	4881.039M	65.4	-57.6 +0.8	+30.9 +0.3	+1.8	+3.8	+0.0	45.4	54.0	-8.6	Vert
^	4881.039M	72.7	-57.6 +0.8	+30.9 +0.3	+1.8	+3.8	+0.0	52.7	54.0	-1.3	Vert
5	7318.314M	60.7	-58.3 +1.0	+34.3 +0.3	+2.3	+5.0	+0.0	45.3	54.0	-8.7	Horiz
6	8590.585M	55.8	-56.1 +1.0	+35.9 +0.4	+2.4	+5.1	+0.0	44.5	54.0	-9.5	Vert
7	9762.080M	57.0	-57.6 +1.1	+34.9 +0.3	+2.6	+5.6	+0.0	43.9	54.0	-10.1	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 #: **98231** Date: 4/28/2016
 Test Type: **Radiated Scan** Time: 09:59:51
 Tested By: Hieu Song Nguyenpham Sequence#: 61
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
 Frequency Range: 9kHz to 1000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

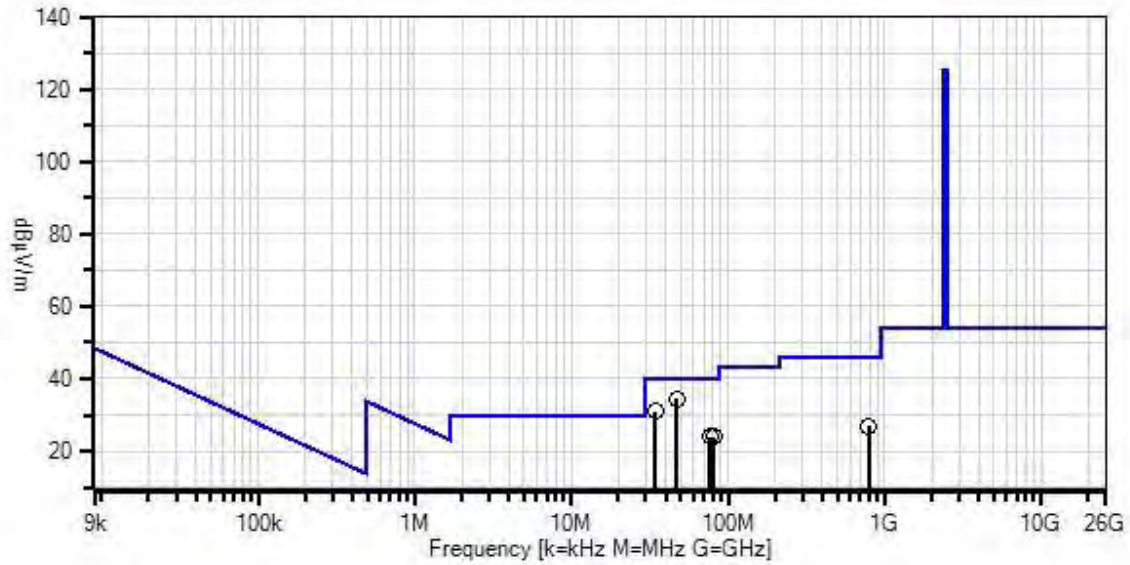
High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 12.2.7

9 kHz -150 kHz; RBW=200 Hz,VBW=200 Hz;
 150 kHz-30 MHz; RBW=9 kHz,VBW=9 kHz;
 30 MHz-1000 MHz; RBW=120 kHz,VBW=120 kHz,
 1000 MHz-25000MHz; RBW=1 MHz,VBW=1 MHz.

The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

X axis- Direct to Antenna is the worst orthogonal
High Channel on TX mode on 802.15.4

Enlighted, Inc W/O#: 98231 Sequence#: 61 Date: 4/28/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



- Readings
 - × QP Readings
 - ▼ Ambient
 - Peak Readings
 - * Average Readings
- 1 - 15.247(d) / 15.209 Radiated Spurious Emissions
- Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00971A	Preamp	8447D	2/5/2016	2/5/2018
	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	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T5	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	47.086M	51.1	-27.9 +0.2	+10.4	+0.6	+0.1	+0.0	34.5	40.0	-5.5	Vert
2	34.166M	41.2	-28.0 +0.2	+16.9	+0.5	+0.1	+0.0	30.9	40.0	-9.1	Vert
3	76.433M	43.5	-27.8 +0.3	+7.1	+0.7	+0.2	+0.0	24.0	40.0	-16.0	Vert
4	81.084M	42.8	-27.9 +0.3	+7.7	+0.8	+0.2	+0.0	23.9	40.0	-16.1	Vert
5	795.663M	28.3	-28.0 +1.3	+21.8	+2.9	+0.7	+0.0	27.0	46.0	-19.0	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 #: **98231** Date: 4/25/2016
 Test Type: **Radiated Scan** Time: 12:06:56
 Tested By: Hieu Song Nguyenpham Sequence#: 10
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
 Frequency Range: 1000MHz to 25000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

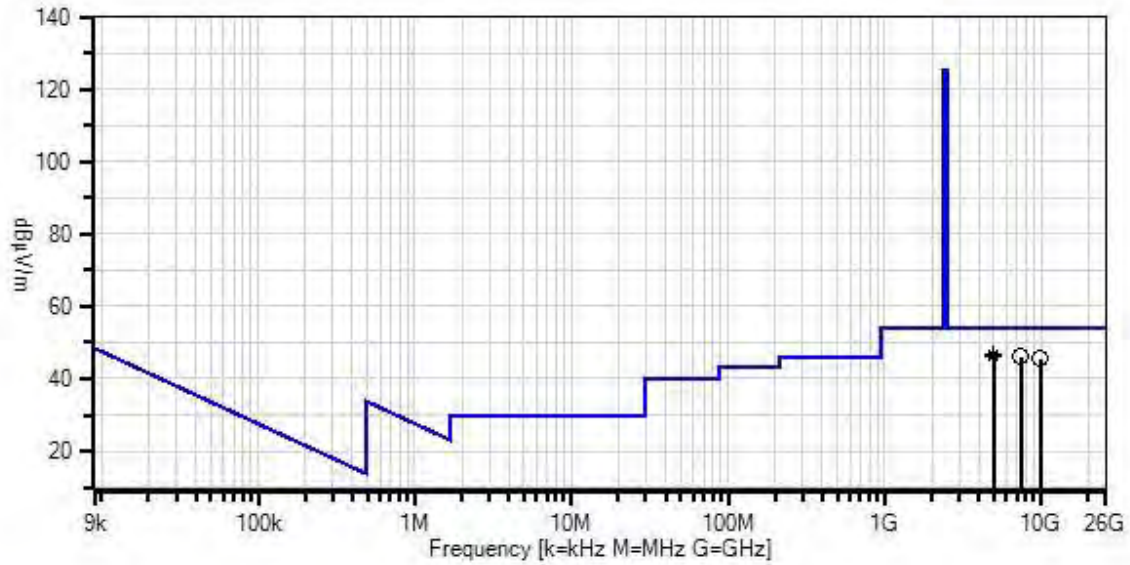
High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 12.2.7

9 kHz -150 kHz; RBW=200 Hz,VBW=200 Hz;
 150 kHz-30 MHz; RBW=9 kHz,VBW=9 kHz;
 30 MHz-1000 MHz; RBW=120 kHz,VBW=120 kHz,
 1000 MHz-25000MHz; RBW=1 MHz,VBW=1 MHz.

The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

X axis- Direct to Antenna is the worst orthogonal
High Channel on TX mode on 802.15.4

Enlighted, Inc W/O#: 98231 Sequence#: 10 Date: 4/25/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



- Readings
 - × QP Readings
 - ▼ Ambient
 - 1 - 15.247(d) / 15.209 Radiated Spurious Emissions
 - Peak Readings
 - * Average Readings
- Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
T2	AN02113	Horn Antenna	3115	2/3/2015	2/3/2017
T3	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
T4	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
T5	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP06138	Cable	32022-29094K-29094K-72TC	3/18/2015	3/18/2017
	ANP00929	Cable	various	1/25/2016	1/25/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

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	4958.972M Ave	66.1	-57.3 +0.8	+31.1 +0.3	+1.8	+3.8	+0.0	46.6	54.0	-7.4	Vert
^	4958.972M	73.0	-57.3 +0.8	+31.1 +0.3	+1.8	+3.8	+0.0	53.5	54.0	-0.5	Vert
3	4960.987M Ave	65.8	-57.3 +0.8	+31.1 +0.3	+1.8	+3.8	+0.0	46.3	54.0	-7.7	Vert
^	4960.987M	72.8	-57.3 +0.8	+31.1 +0.3	+1.8	+3.8	+0.0	53.3	54.0	-0.7	Vert
5	7441.437M	61.2	-58.2 +1.0	+34.4 +0.3	+2.3	+5.1	+0.0	46.1	54.0	-7.9	Vert
6	9921.915M	58.4	-57.7 +1.1	+35.0 +0.4	+2.6	+5.7	+0.0	45.5	54.0	-8.5	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 #: **98231** Date: 4/28/2016
 Test Type: **Radiated Scan** Time: 14:20:00
 Tested By: Hieu Song Nguyenpham Sequence#: 76
 Software: EMITest 5.03.02

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: 9kHz to 1000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 12.2.7

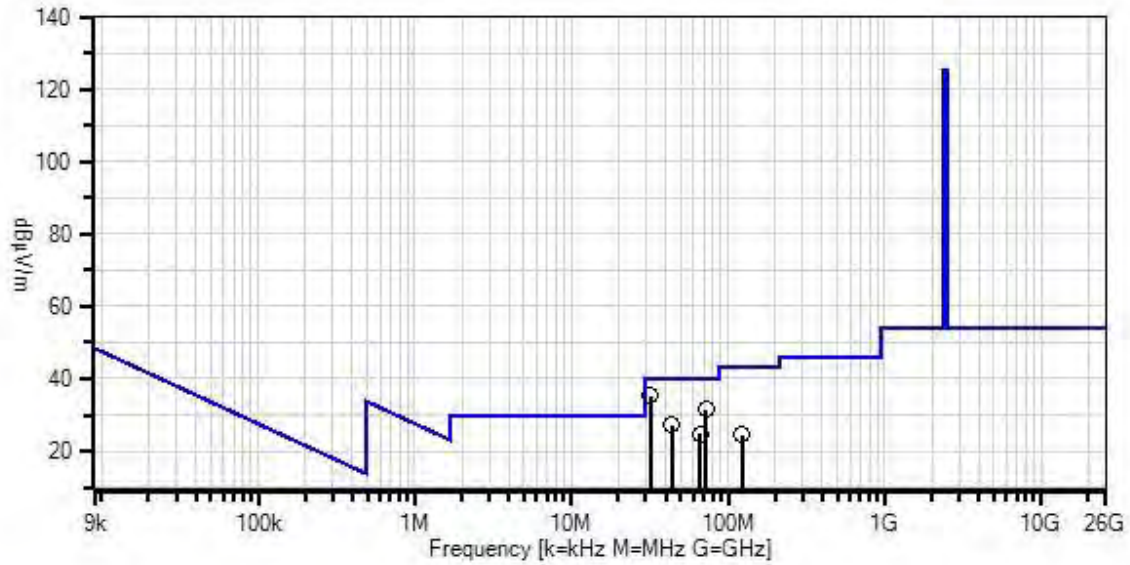
9 kHz -150 kHz; RBW=200 Hz,VBW=200 Hz;
 150 kHz-30 MHz; RBW=9 kHz,VBW=9 kHz;
 30 MHz-1000 MHz; RBW=120 kHz,VBW=120 kHz,
 1000 MHz-25000MHz; RBW=1 MHz,VBW=1 MHz.

The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

The manufacturer declares that the Main Board of the Configuration 2 is similar to the Configuration 1, but it has different cover.
 Measuring the RF output power and choosing the worst case of transmitting operating frequency to test Radiated Spurious Emission.

X axis- Direct to Antenna is the worst orthogonal
Low Channel on TX mode is the worst transmitting operating frequency for BLE

Enlighted, Inc W/O#: 98231 Sequence#: 76 Date: 4/28/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



- Readings
 - × QP Readings
 - ▼ Ambient
 - Peak Readings
 - * Average Readings
- 1 - 15.247(d) / 15.209 Radiated Spurious Emissions
- Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00971A	Preamp	8447D	2/5/2016	2/5/2018
	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	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T5	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	32.188M	44.7	-28.0 +0.2	+17.8	+0.5	+0.1	+0.0	35.3	40.0	-4.7	Vert
2	72.084M	51.7	-27.8 +0.3	+6.5	+0.7	+0.2	+0.0	31.6	40.0	-8.4	Vert
3	44.014M	42.4	-28.0 +0.2	+11.8	+0.6	+0.1	+0.0	27.1	40.0	-12.9	Horiz
4	66.108M	45.5	-27.9 +0.2	+6.2	+0.7	+0.1	+0.0	24.8	40.0	-15.2	Vert
5	122.645M	38.8	-27.7 +0.4	+11.8	+1.0	+0.2	+0.0	24.5	43.5	-19.0	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 #: **98231** Date: 4/26/2016
 Test Type: **Radiated Scan** Time: 15:52:59
 Tested By: Hieu Song Nguyenpham Sequence#: 33
 Software: EMITest 5.03.02

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 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 12.2.7

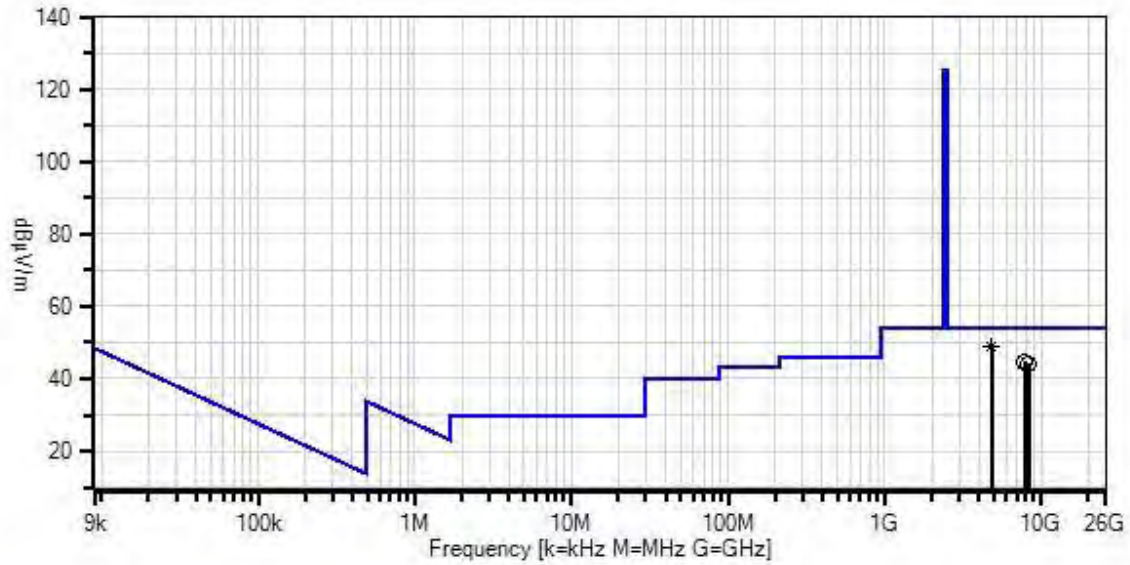
9 kHz -150 kHz; RBW=200 Hz,VBW=200 Hz;
 150 kHz-30 MHz; RBW=9 kHz,VBW=9 kHz;
 30 MHz-1000 MHz; RBW=120 kHz,VBW=120 kHz,
 1000 MHz-25000MHz; RBW=1 MHz,VBW=1 MHz.

The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

The manufacturer declares that the Main Board of the Configuration 2 is similar to the Configuration 1, but it has different cover.
 Measuring the RF output power and choosing the worst case of transmitting operating frequency to test Radiated Spurious Emission.

X axis- Direct to Antenna is the worst orthogonal
Low Channel on TX mode on BLE is the worst transmitting operating frequency for BLE

Enlighted, Inc WO#: 98231 Sequence#: 33 Date: 4/26/2016
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



- Readings
 - × QP Readings
 - ▼ Ambient
 - Peak Readings
 - * Average Readings
- 1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
T2	AN02113	Horn Antenna	3115	2/3/2015	2/3/2017
T3	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
T4	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
T5	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP06138	Cable	32022-29094K-29094K-72TC	3/18/2015	3/18/2017
	ANP00929	Cable	various	1/25/2016	1/25/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

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	T6	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	4804.103M	69.4	-57.8	+30.8	+1.8	+3.8	+0.0	49.1	54.0	-4.9	Horiz
	Ave		+0.8	+0.3							
^	4804.103M	73.1	-57.8	+30.8	+1.8	+3.8	+0.0	52.8	54.0	-1.2	Horiz
			+0.8	+0.3							
3	7860.710M	58.5	-57.8	+35.2	+2.3	+5.1	+0.0	44.6	54.0	-9.4	Vert
			+1.0	+0.3							
4	8365.360M	55.9	-56.4	+35.9	+2.4	+5.2	+0.0	44.3	54.0	-9.7	Vert
			+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 #: **98231** Date: 4/28/2016
 Test Type: **Radiated Scan** Time: 13:15:02
 Tested By: Hieu Song Nguyenpham Sequence#: 73
 Software: EMITest 5.03.02

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: 9kHz to 1000MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 12.2.7

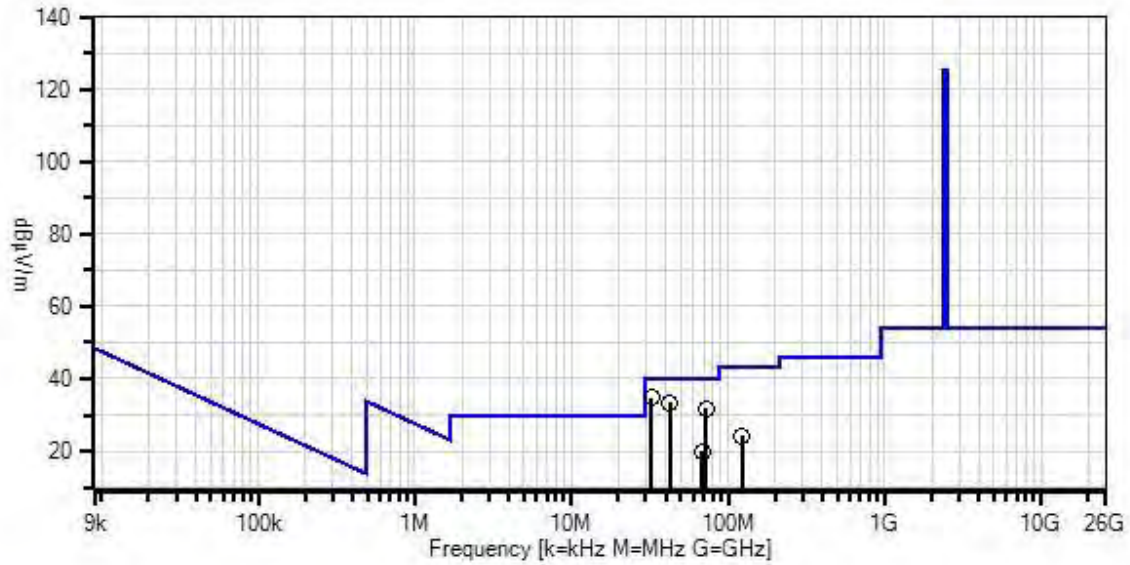
9 kHz -150 kHz; RBW=200 Hz,VBW=200 Hz;
 150 kHz-30 MHz; RBW=9 kHz,VBW=9 kHz;
 30 MHz-1000 MHz; RBW=120 kHz,VBW=120 kHz,
 1000 MHz-25000MHz; RBW=1 MHz,VBW=1 MHz.

The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

The manufacturer declares that the Main Board of the Configuration 2 is similar to the Configuration 1, but it has different cover.
 Measuring the RF output power and choosing the worst case of transmitting operating frequency to test Radiated Spurious Emission.

X axis- Direct to Antenna is the worst orthogonal
High Channel on TX mode is the worst transmitting operating frequency for 802.15.4

Enlighted, Inc W/O#: 98231 Sequence#: 73 Date: 4/28/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



- Readings
 - × QP Readings
 - ▼ Ambient
 - Peak Readings
 - * Average Readings
- 1 - 15.247(d) / 15.209 Radiated Spurious Emissions
- Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00971A	Preamp	8447D	2/5/2016	2/5/2018
	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	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T5	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	32.273M	44.1	-28.0 +0.2	+17.8	+0.5	+0.1	+0.0	34.7	40.0	-5.3	Vert
2	42.667M	48.1	-28.0 +0.2	+12.4	+0.6	+0.1	+0.0	33.4	40.0	-6.6	Vert
3	72.489M	52.0	-27.8 +0.3	+6.5	+0.7	+0.2	+0.0	31.9	40.0	-8.1	Vert
4	122.341M	38.6	-27.7 +0.4	+11.8	+1.0	+0.2	+0.0	24.3	43.5	-19.2	Horiz
5	68.381M	40.5	-27.9 +0.3	+6.2	+0.7	+0.1	+0.0	19.9	40.0	-20.1	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 #: **98231** Date: 4/26/2016
 Test Type: **Radiated Scan** Time: 16:42:21
 Tested By: Hieu Song Nguyenpham Sequence#: 36
 Software: EMITest 5.03.02

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 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

 Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

 High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 12.2.7

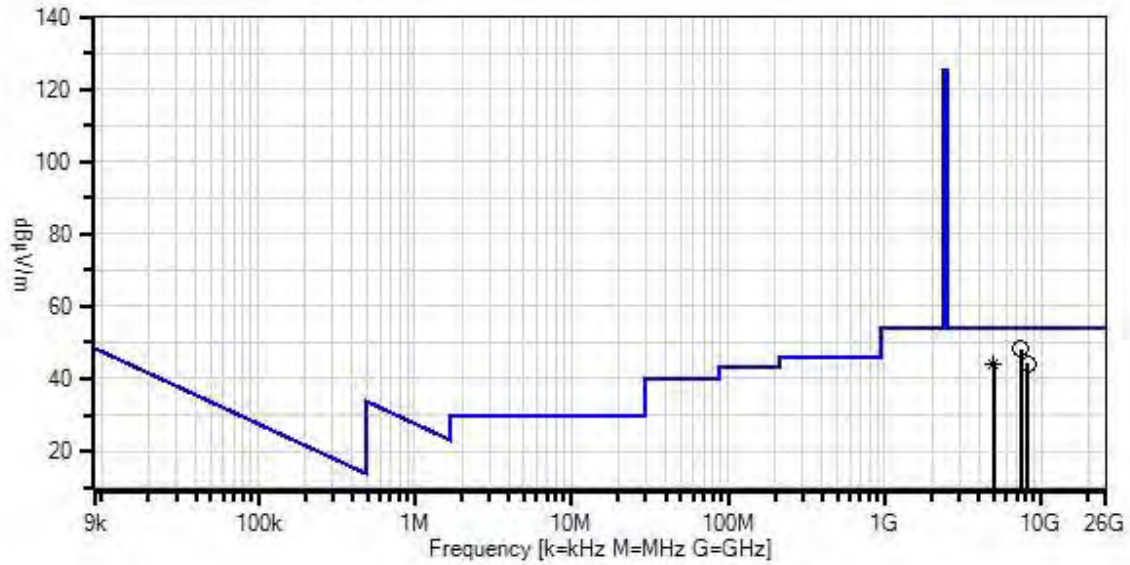
 9 kHz -150 kHz; RBW=200 Hz,VBW=200 Hz;
 150 kHz-30 MHz; RBW=9 kHz,VBW=9 kHz;
 30 MHz-1000 MHz; RBW=120 kHz,VBW=120 kHz,
 1000 MHz-25000MHz; RBW=1 MHz,VBW=1 MHz.

 The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

 The manufacturer declares that the Main Board of the Configuration 2 is similar to the Configuration 1, but it has different cover.
 Measuring the RF output power and choosing the worst case of transmitting operating frequency to test Radiated Spurious Emission.

 X axis- Direct to Antenna is the worst orthogonal
High Channel on TX mode is the worst transmitting operating frequency for 802.15.4

Enlighted, Inc W/O#: 98231 Sequence#: 36 Date: 4/26/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



- Readings
 - × QP Readings
 - ▼ Ambient
 - Peak Readings
 - * Average Readings
- Software Version: 5.03.02
- 1 - 15.247(d) / 15.209 Radiated Spurious Emissions

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
T2	AN02113	Horn Antenna	3115	2/3/2015	2/3/2017
T3	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
T4	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
T5	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP06138	Cable	32022-29094K-29094K-72TC	3/18/2015	3/18/2017
	ANP00929	Cable	various	1/25/2016	1/25/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

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	7438.978M	63.4	-58.2 +1.0	+34.4 +0.3	+2.3	+5.1	+0.0	48.3	54.0	-5.7	Vert
2	4959.088M Ave	63.8	-57.3 +0.8	+31.1 +0.3	+1.8	+3.8	+0.0	44.3	54.0	-9.7	Vert
^	4959.088M	71.0	-57.3 +0.8	+31.1 +0.3	+1.8	+3.8	+0.0	51.5	54.0	-2.5	Vert
4	8201.959M	56.4	-56.8 +1.0	+35.7 +0.4	+2.4	+5.2	+0.0	44.3	54.0	-9.7	Vert
5	4961.028M Ave	63.4	-57.3 +0.8	+31.1 +0.3	+1.8	+3.8	+0.0	43.9	54.0	-10.1	Vert
^	4961.028M	70.9	-57.3 +0.8	+31.1 +0.3	+1.8	+3.8	+0.0	51.4	54.0	-2.6	Vert

Band Edge

Band Edge Summary – BLE – Configuration 1

Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
2400.0	O-QPSK	Integral	43.9	<54	Pass
2483.5	O-QPSK	Integral	42.7	<54	Pass

Band Edge Summary – 802.15.4 – Configuration 1

Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
2400.0	O-QPSK	Integral	42.9	<54	Pass
2483.5	O-QPSK	Integral	43.2	<54	Pass

Band Edge Test Setup / Conditions / 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 #: **98231** Date: 4/25/2016
 Test Type: **Radiated Scan** Time: 13:55:53
 Tested By: Hieu Song Nguyenpham Sequence#: 13
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Band Edge

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

High Clock: 16MHz
 Transmitting operating frequency= 2402,2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405,2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 13

The EUT is placed on Styrofoam on a table. It is set continuously transmitting.

X axis- Direct to Antenna is the worst orthogonal
BLE

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
	AN02113	Horn Antenna	3115	2/3/2015	2/3/2017
	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP06138	Cable	32022-29094K-29094K-72TC	3/18/2015	3/18/2017
	ANP00929	Cable	various	1/25/2016	1/25/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

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 #: **98231** Date: 4/25/2016
 Test Type: **Radiated Scan** Time: 13:55:53
 Tested By: Hieu Song Nguyenpham Sequence#: 13
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Band Edge

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 13

The EUT is placed on Styrofoam on a table. It is set continuously transmitting.

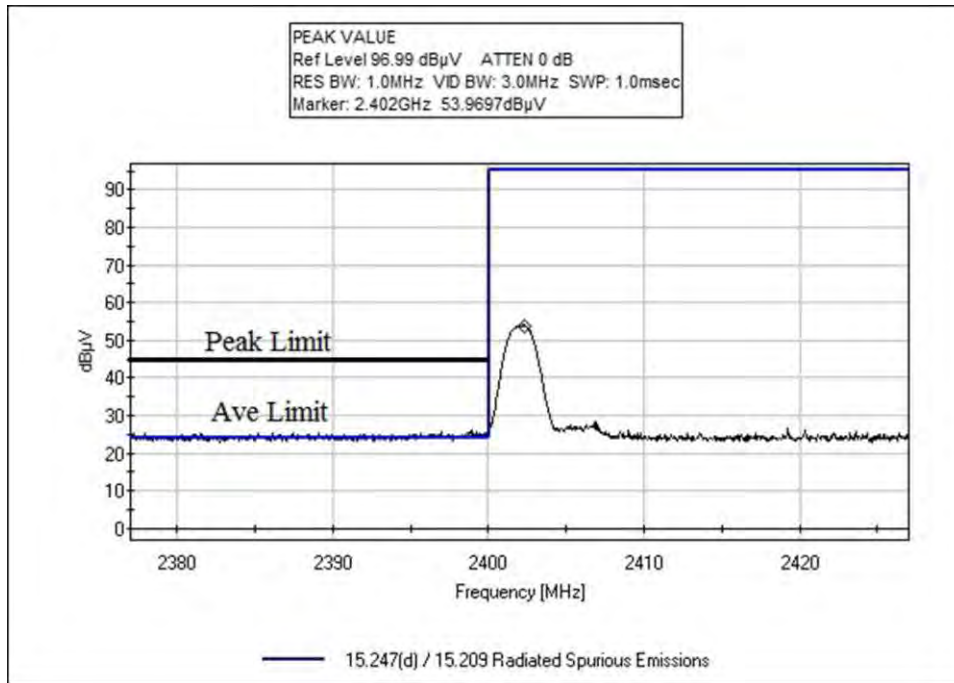
X axis- Direct to Antenna is the worst orthogonal

802.15.4

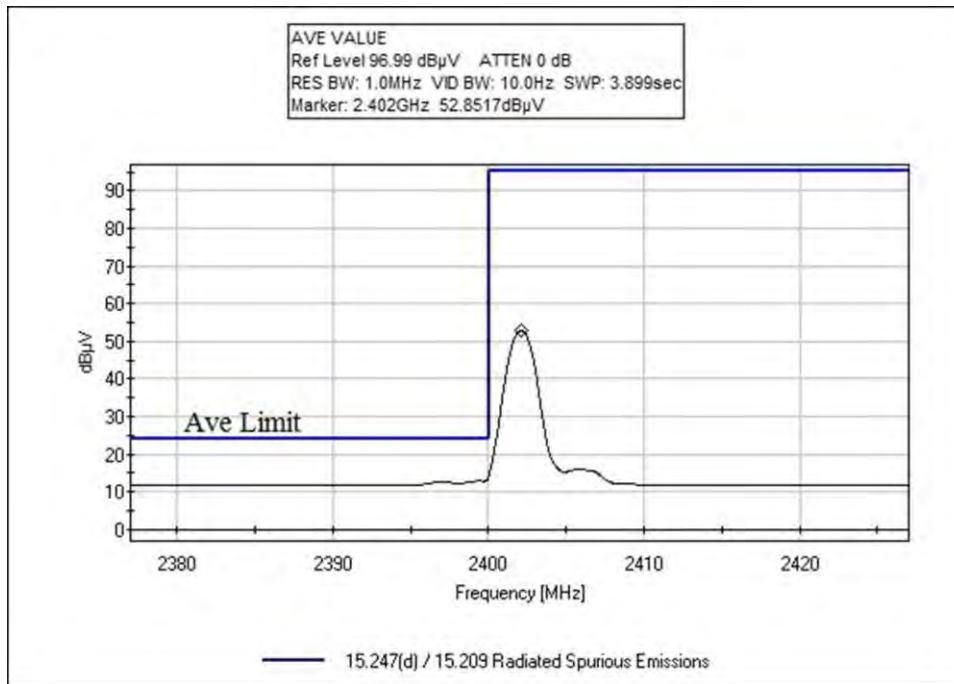
Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
	AN02113	Horn Antenna	3115	2/3/2015	2/3/2017
	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	AN03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP06138	Cable	32022-29094K-29094K-72TC	3/18/2015	3/18/2017
	ANP00929	Cable	various	1/25/2016	1/25/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

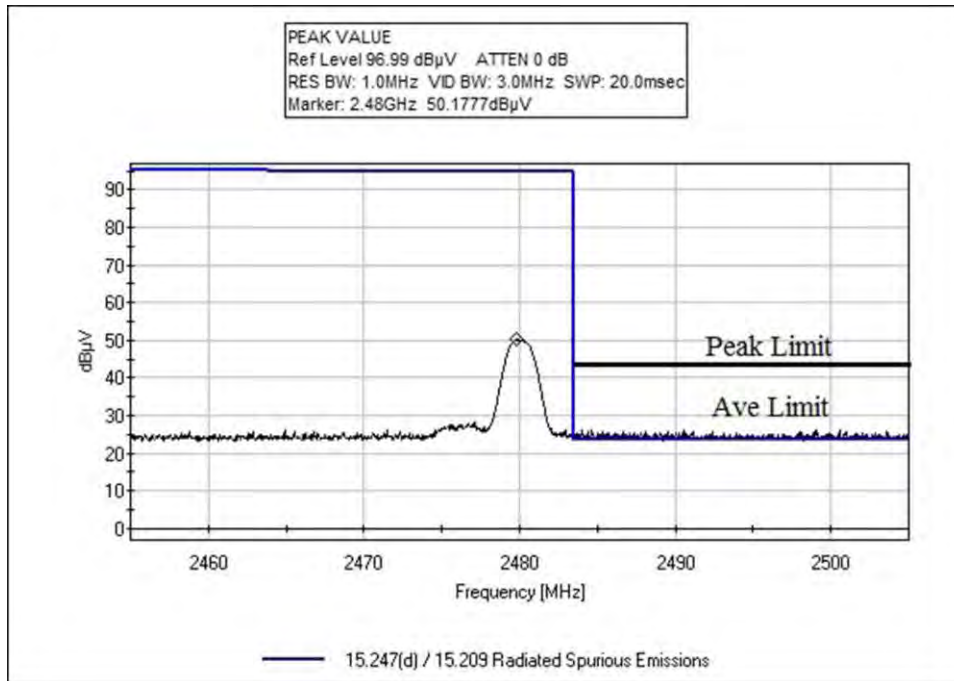
Band Edge Plots



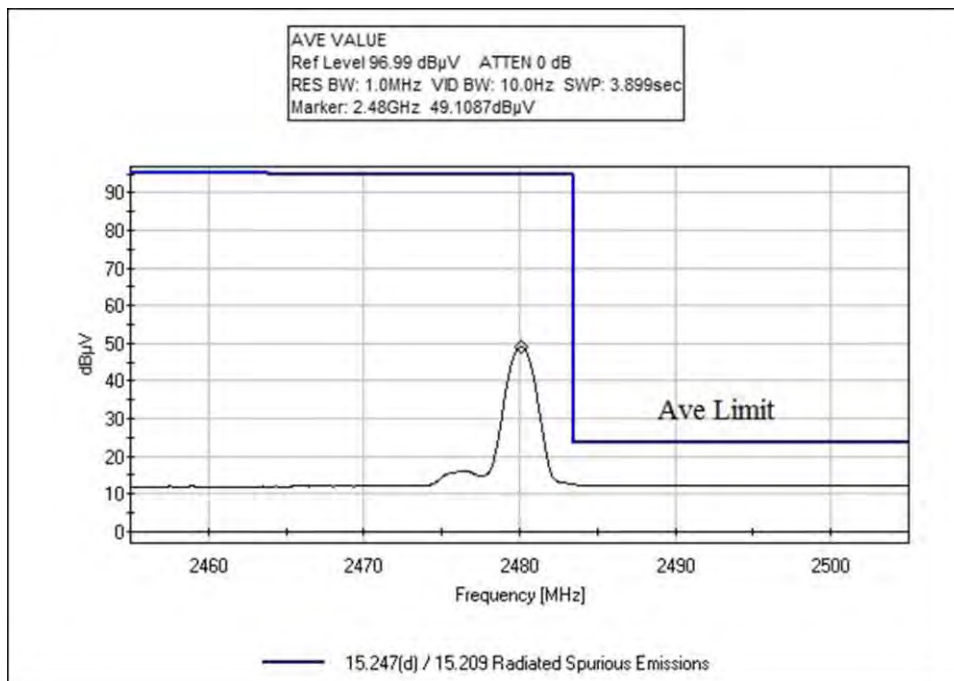
BLE, Low Channel



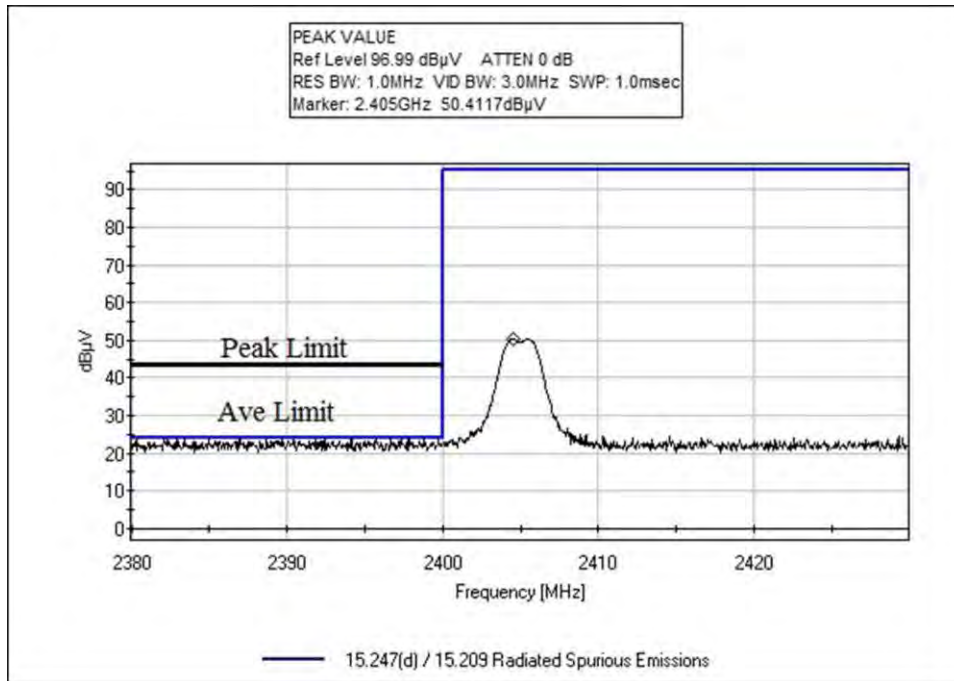
BLE, Low Channel



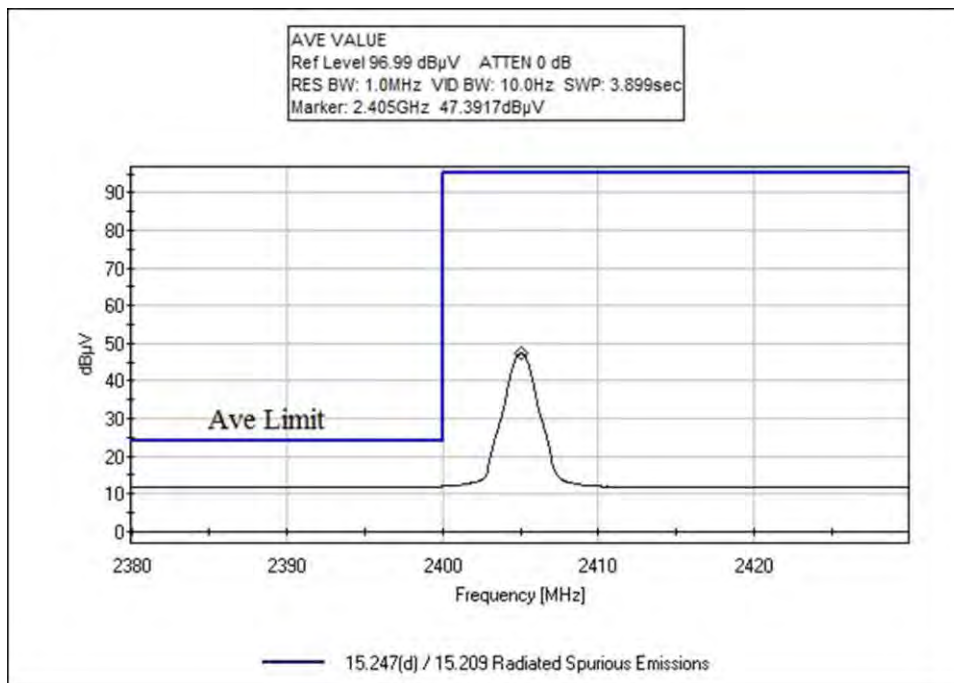
BLE, High Channel



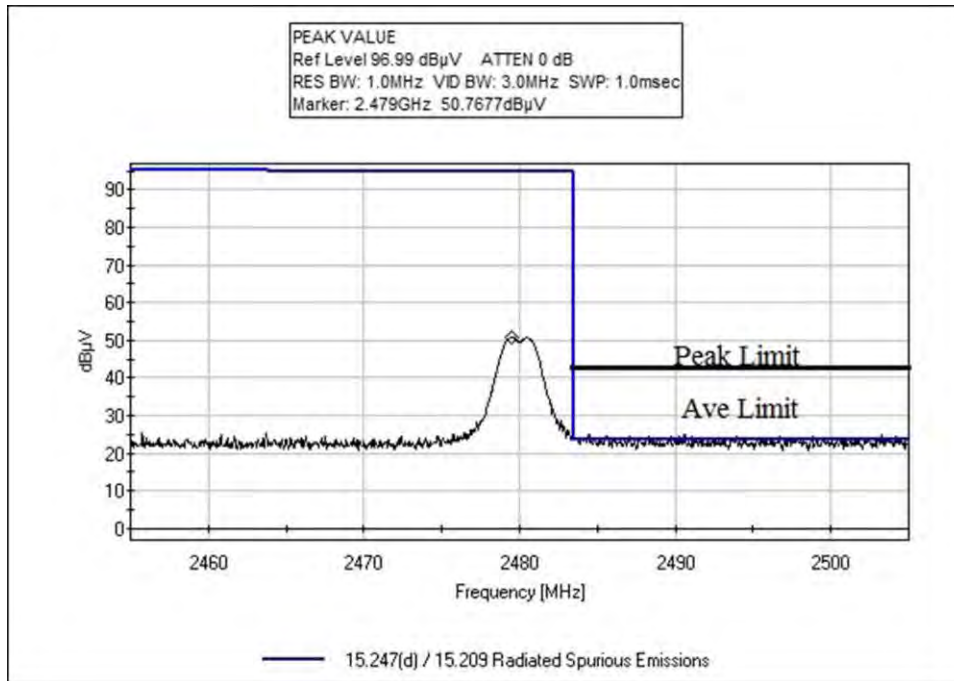
BLE, High Channel



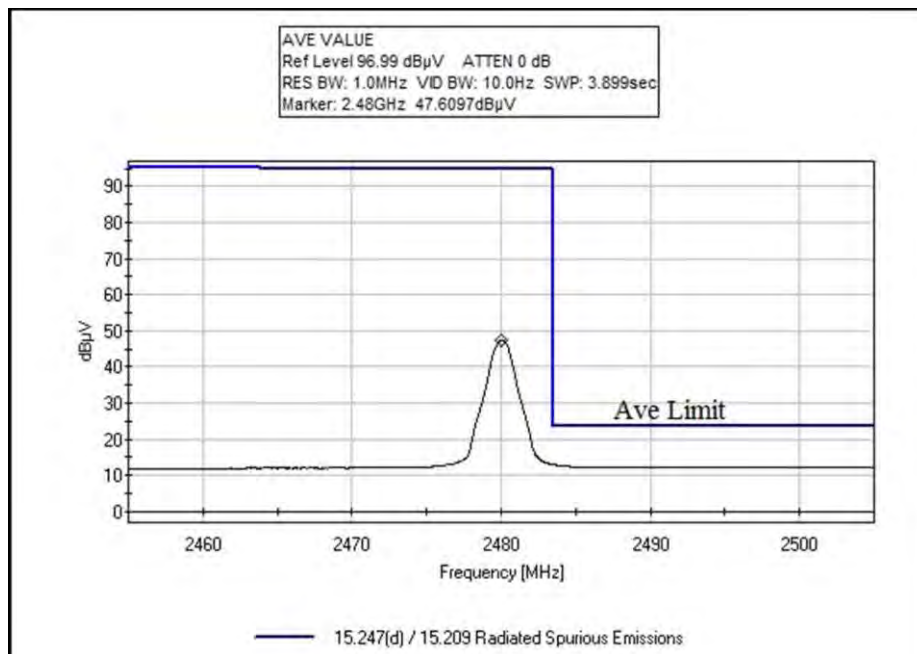
802.15.4, Low Channel



802.15.4, Low Channel

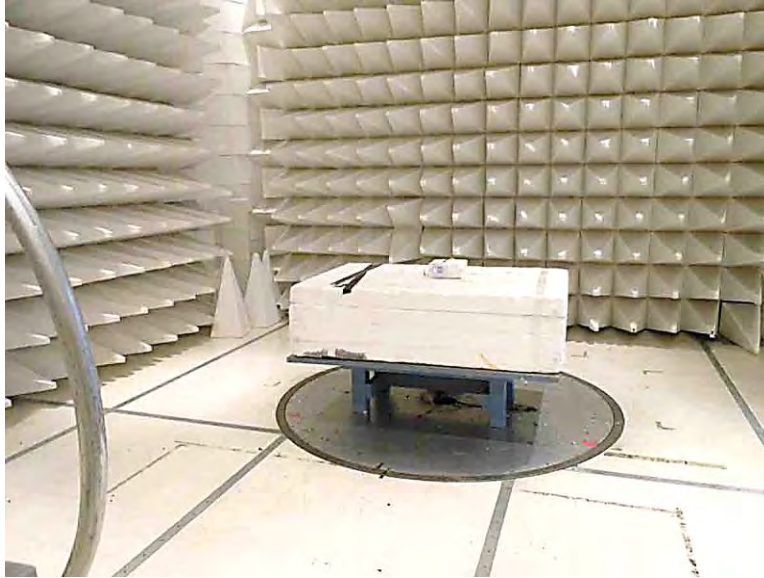


802.15.4, High Channel



802.15.4, High Channel

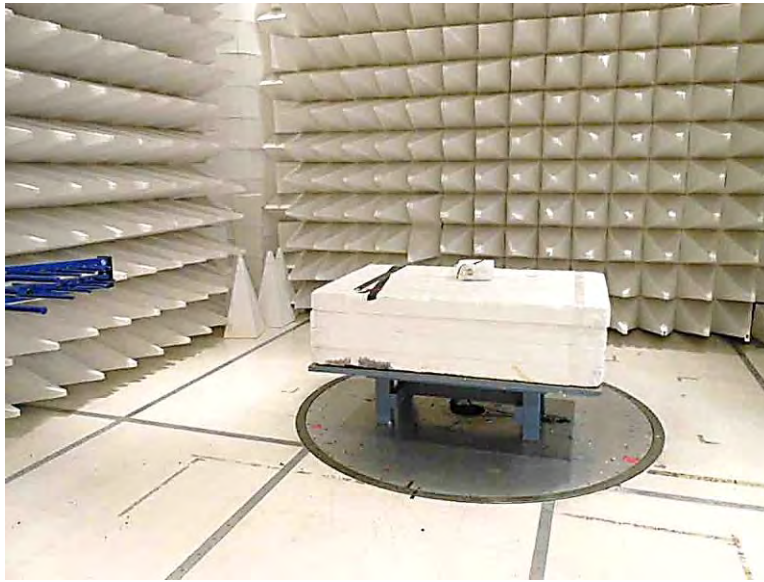
Test Setup Photos



Configuration 1, 9kHz – 30MHz



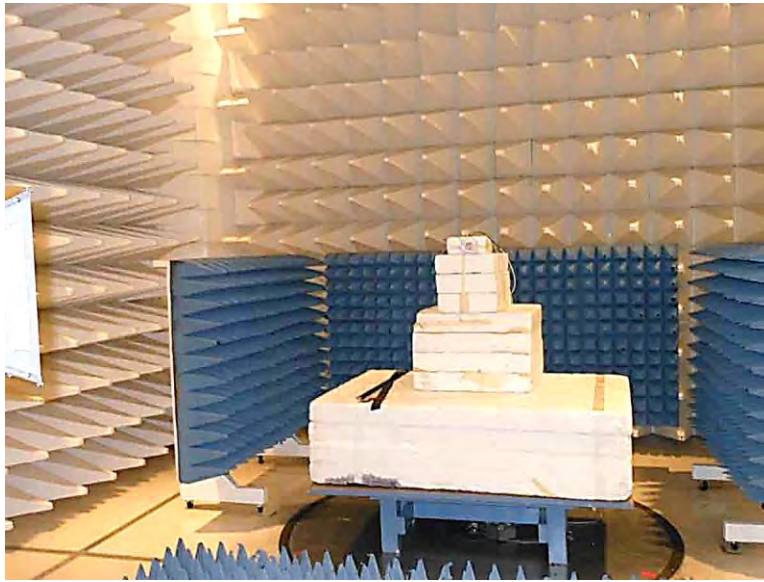
Configuration 1, 9kHz – 30MHz



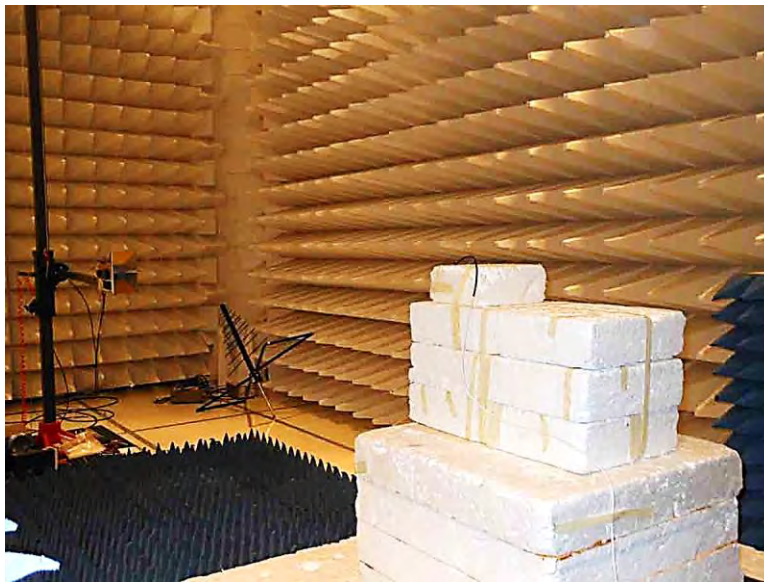
Configuration 1, 30MHz – 1GHz



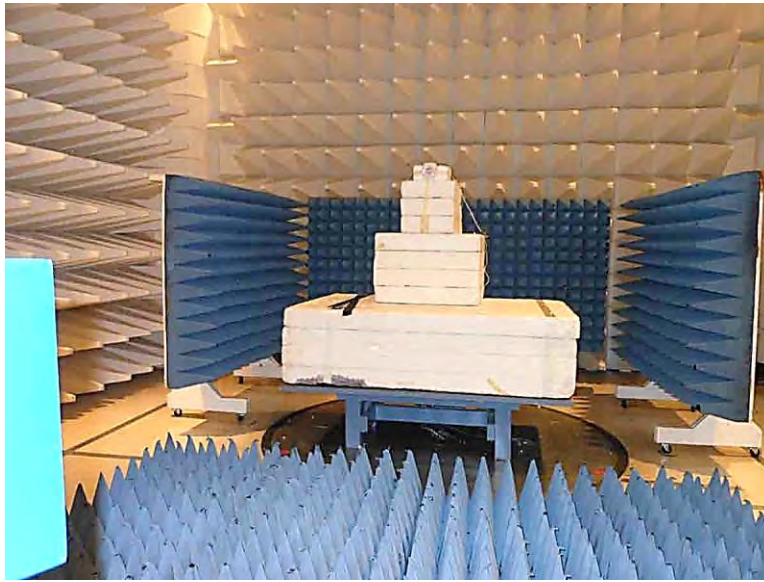
Configuration 1, 30MHz – 1GHz



Configuration 1, 1 – 12GHz



Configuration 1, 1 – 12GHz



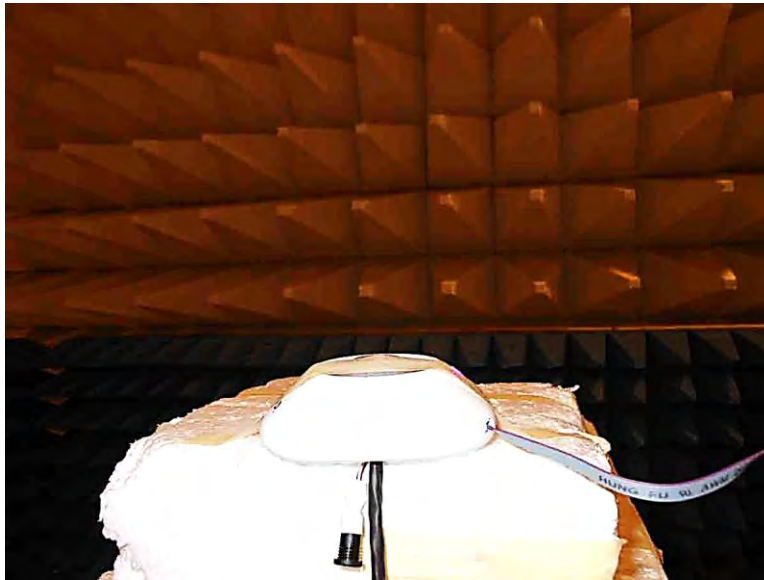
Configuration 1, 12 – 18GHz



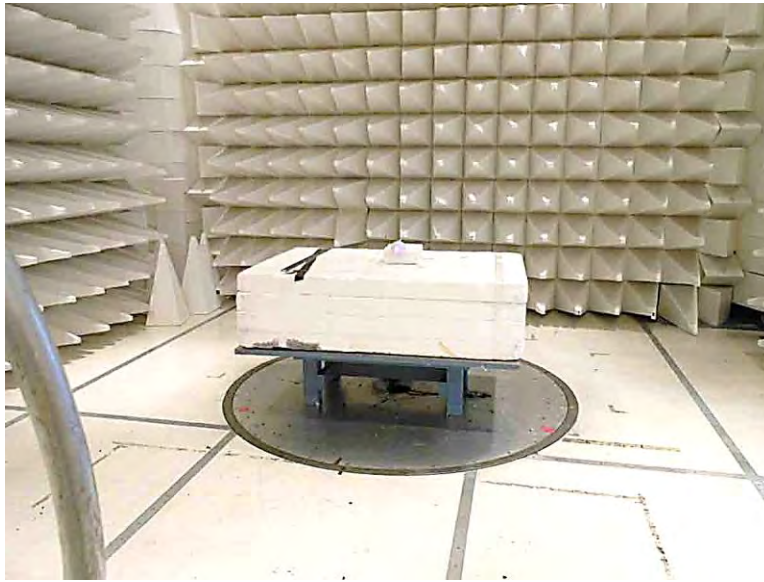
Configuration 1, 12 – 18GHz



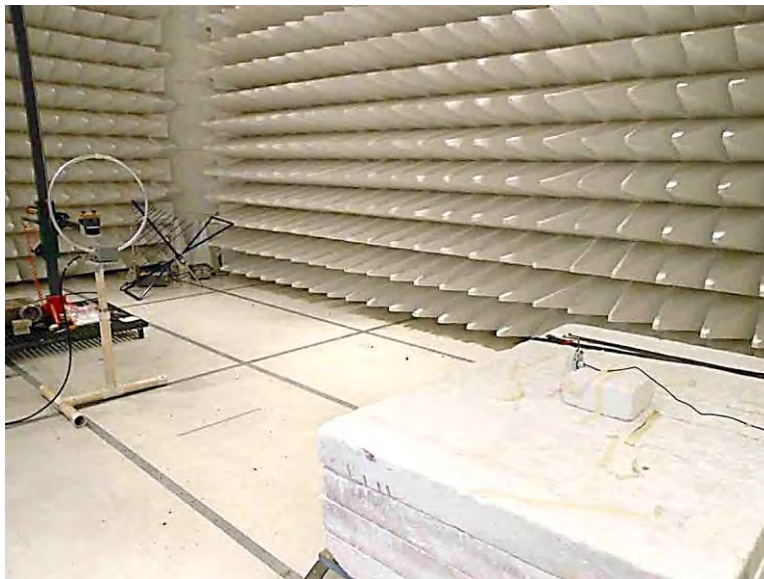
X Axis



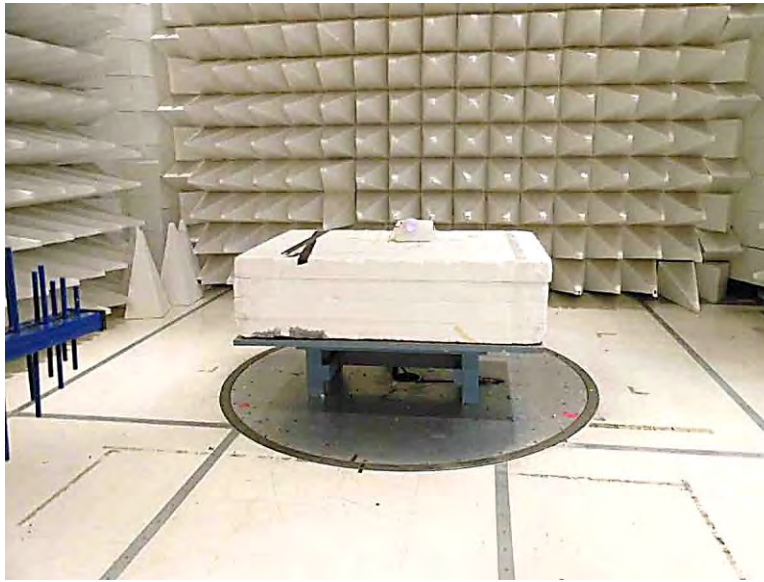
Y Axis



Configuration 2, 9kHz – 30MHz



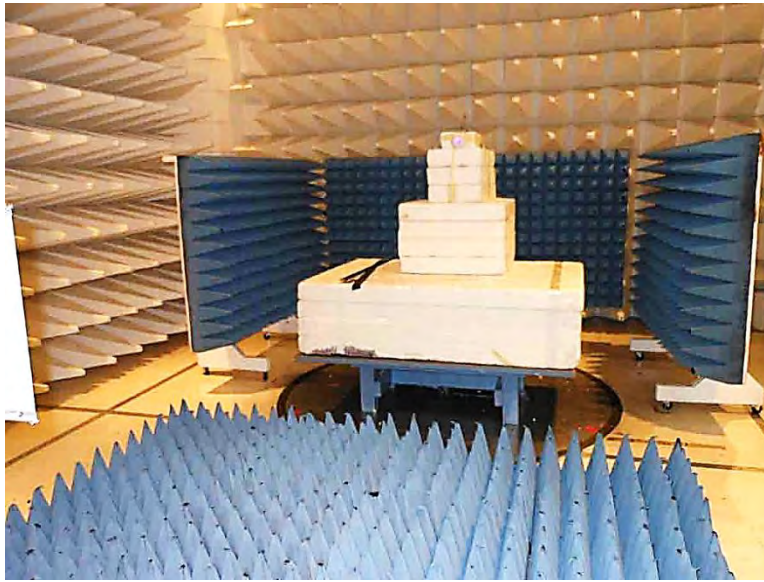
Configuration 2, 9kHz – 30MHz



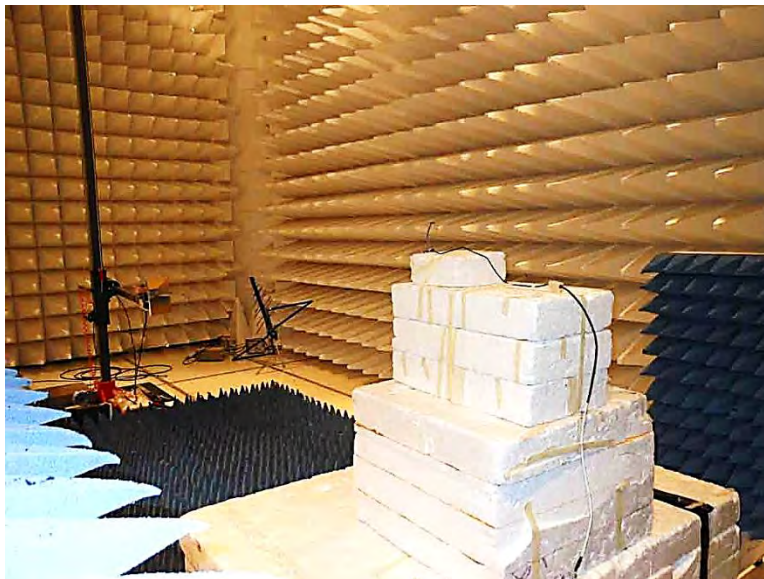
Configuration 2, 30MHz – 1GHz



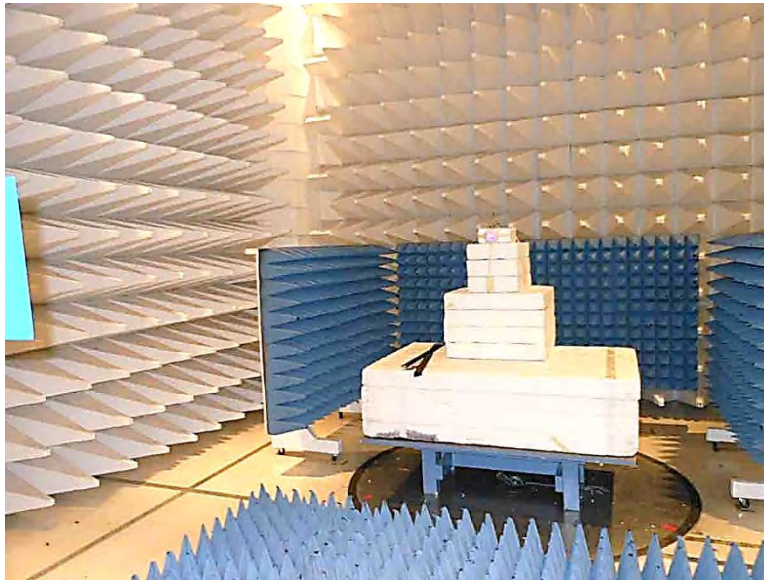
Configuration 2, 30MHz – 1GHz



Configuration 2, 1 – 12GHz



Configuration 2, 1 – 12GHz



Configuration 2, 12 – 25GHz



Configuration 2, 12 – 25GHz



Configuration 2, X Axis

15.207 AC Conducted Emissions

Test Setup / Conditions / 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 #: **98231** Date: 4/28/2016
 Test Type: **Conducted Emissions** Time: 3:33:43 PM
 Tested By: Hieu Song Nguyenpham Sequence#: 80
 Software: EMITest 5.03.02 120V 60Hz

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: 150kHz to 30MHz

 Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

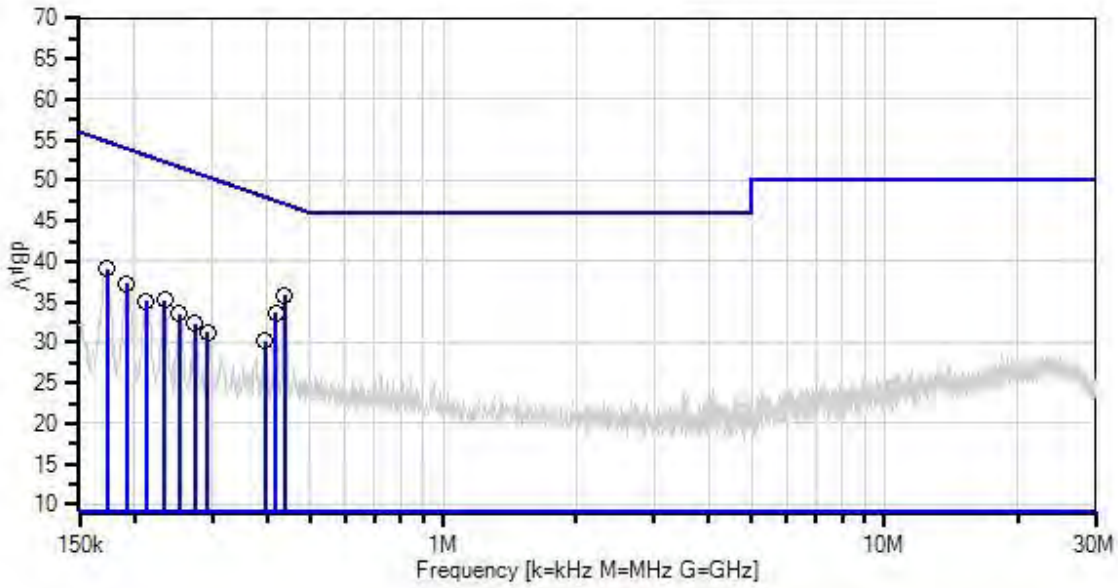
 Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

 High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.4 2014

 The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

BLE on TX mode at Middle Channel

Enlighted, Inc WO#: 98231 Sequence#: 80 Date: 4/28/2016
 15.207 AC Mains - Average Test Lead: 120V 60Hz Line



- Sweep Data
- ◆ QP Readings
- Software Version: 5.03.02
- Readings
- * Average Readings
- 1 - 15.207 AC Mains - Average
- Peak Readings
- ▼ Ambient

Test Equipment:

ID	Asset #	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	AN00494	50uH LISN-Line Loss (dB)	3816/NM	3/4/2015	3/4/2017
	AN00494	50uH LISN-Return Loss (dB)	3816/NM	3/4/2015	3/4/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
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	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	T5 dB	dB	dB	dB	Table	dB μ V	dB μ V	dB	Ant
1	437.245k	25.0	+9.9 +0.1	+0.0	+0.0	+0.8	+0.0	35.8	47.1	-11.3	Line
2	417.610k	23.0	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	33.7	47.5	-13.8	Line
3	173.269k	28.1	+9.9 +0.4	+0.0	+0.0	+0.7	+0.0	39.1	54.8	-15.7	Line
4	192.176k	26.5	+9.9 +0.2	+0.0	+0.0	+0.7	+0.0	37.3	53.9	-16.6	Line
5	233.627k	24.5	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	35.2	52.3	-17.1	Line
6	395.067k	19.5	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	30.2	48.0	-17.8	Line
7	212.538k	24.4	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	35.1	53.1	-18.0	Line
8	252.535k	22.8	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	33.5	51.7	-18.2	Line
9	273.624k	21.6	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	32.3	51.0	-18.7	Line
10	292.531k	20.5	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	31.2	50.5	-19.3	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 #: **98231** Date: 4/28/2016
 Test Type: **Conducted Emissions** Time: 3:47:07 PM
 Tested By: Hieu Song Nguyenpham Sequence#: 81
 Software: EMITest 5.03.02 120V 60Hz

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: 150kHz to 30MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

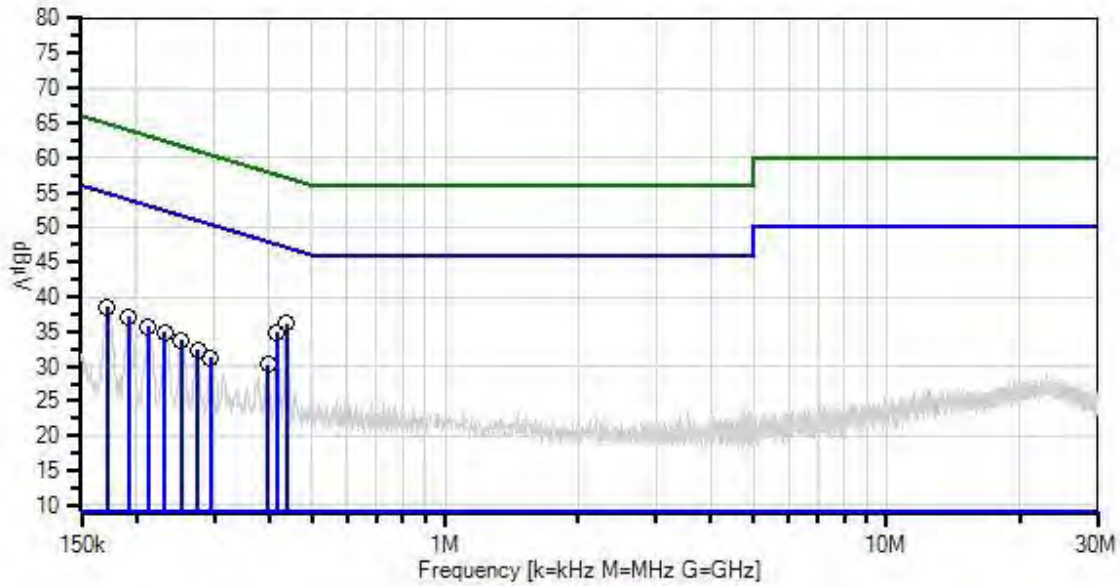
Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.4 2014

The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

BLE on TX mode at Middle Channel

Enlighted, Inc WO#: 98231 Sequence#: 81 Date: 4/28/2016
 15.207 AC Mains - Average Test Lead: 120V 60Hz Neutral



- Sweep Data
- x QP Readings
- Software Version: 5.03.02
- Readings
- * Average Readings
- 1 - 15.207 AC Mains - Average
- Peak Readings
- ▼ Ambient
- 2 - 15.207 AC Mains - Quasi-peak

Test Equipment:

ID	Asset #	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
	AN00494	50uH LISN-Line Loss (dB)	3816/NM	3/4/2015	3/4/2017
T4	AN00494	50uH LISN-Return Loss (dB)	3816/NM	3/4/2015	3/4/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
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	437.246k	25.6	+9.9 +0.1	+0.0	+0.0	+0.6	+0.0	36.2	47.1	-10.9	Neutr
2	416.157k	24.3	+9.9 +0.1	+0.0	+0.0	+0.6	+0.0	34.9	47.5	-12.6	Neutr
3	171.816k	27.6	+9.9 +0.4	+0.0	+0.0	+0.6	+0.0	38.5	54.9	-16.4	Neutr
4	192.177k	26.4	+9.9 +0.2	+0.0	+0.0	+0.6	+0.0	37.1	53.9	-16.8	Neutr
5	212.539k	25.1	+9.9 +0.1	+0.0	+0.0	+0.6	+0.0	35.7	53.1	-17.4	Neutr
6	232.174k	24.3	+9.9 +0.1	+0.0	+0.0	+0.6	+0.0	34.9	52.4	-17.5	Neutr
7	397.250k	19.7	+9.9 +0.1	+0.0	+0.0	+0.6	+0.0	30.3	47.9	-17.6	Neutr
8	252.536k	23.1	+9.9 +0.1	+0.0	+0.0	+0.6	+0.0	33.7	51.7	-18.0	Neutr
9	275.806k	21.8	+9.9 +0.1	+0.0	+0.0	+0.6	+0.0	32.4	50.9	-18.5	Neutr
10	294.713k	20.7	+9.9 +0.1	+0.0	+0.0	+0.6	+0.0	31.3	50.4	-19.1	Neutr

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 #: **98231** Date: 4/28/2016
 Test Type: **Conducted Emissions** Time: 3:53:40 PM
 Tested By: Hieu Song Nguyenpham Sequence#: 82
 Software: EMITest 5.03.02 120V 60Hz

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: 150kHz to 30MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

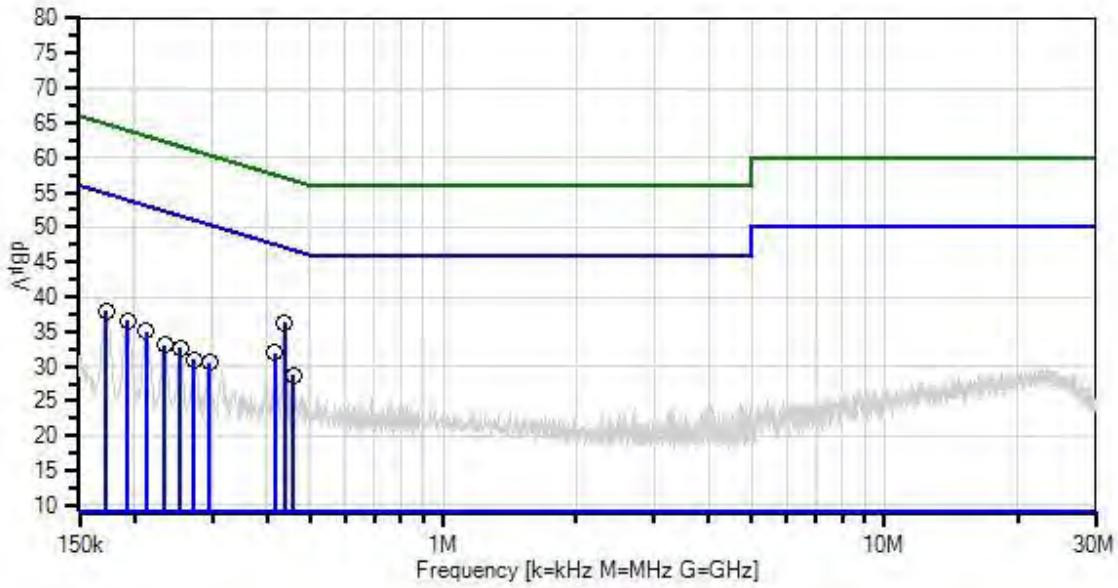
Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.4 2014

The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

802.15.4 on TX mode at Middle Channel

Enlighted, Inc WO#: 98231 Sequence#: 82 Date: 4/28/2016
 15.207 AC Mains - Average Test Lead: 120V 60Hz Line



- Sweep Data
- x QP Readings
- Software Version: 5.03.02
- Readings
- * Average Readings
- 1 - 15.207 AC Mains - Average
- Peak Readings
- ▼ Ambient
- 2 - 15.207 AC Mains - Quasi-peak

Test Equipment:

ID	Asset #	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	AN00494	50uH LISN-Line Loss (dB)	3816/NM	3/4/2015	3/4/2017
	AN00494	50uH LISN-Return Loss (dB)	3816/NM	3/4/2015	3/4/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
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	437.246k	25.5	+9.9 +0.1	+0.0	+0.0	+0.8	+0.0	36.3	47.1	-10.8	Line
2	416.157k	21.2	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	31.9	47.5	-15.6	Line
3	172.543k	27.0	+9.9 +0.4	+0.0	+0.0	+0.7	+0.0	38.0	54.8	-16.8	Line
4	192.905k	25.8	+9.9 +0.2	+0.0	+0.0	+0.7	+0.0	36.6	53.9	-17.3	Line
5	456.880k	17.8	+9.9 +0.2	+0.0	+0.0	+0.8	+0.0	28.7	46.7	-18.0	Line
6	212.539k	24.3	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	35.0	53.1	-18.1	Line
7	253.990k	21.9	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	32.6	51.6	-19.0	Line
8	233.628k	22.4	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	33.1	52.3	-19.2	Line
9	296.168k	19.9	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	30.6	50.3	-19.7	Line
10	272.897k	20.3	+9.9 +0.1	+0.0	+0.0	+0.7	+0.0	31.0	51.0	-20.0	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 #: **98231** Date: 4/28/2016
 Test Type: **Conducted Emissions** Time: 3:58:49 PM
 Tested By: Hieu Song Nguyenpham Sequence#: 83
 Software: EMITest 5.03.02 120V 60Hz

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: 150kHz to 30MHz

Application: PuTTY version 0.64 for 802.15.4
 Application: Smart RF Studio 7 version 2.1.0 for Bluetooth

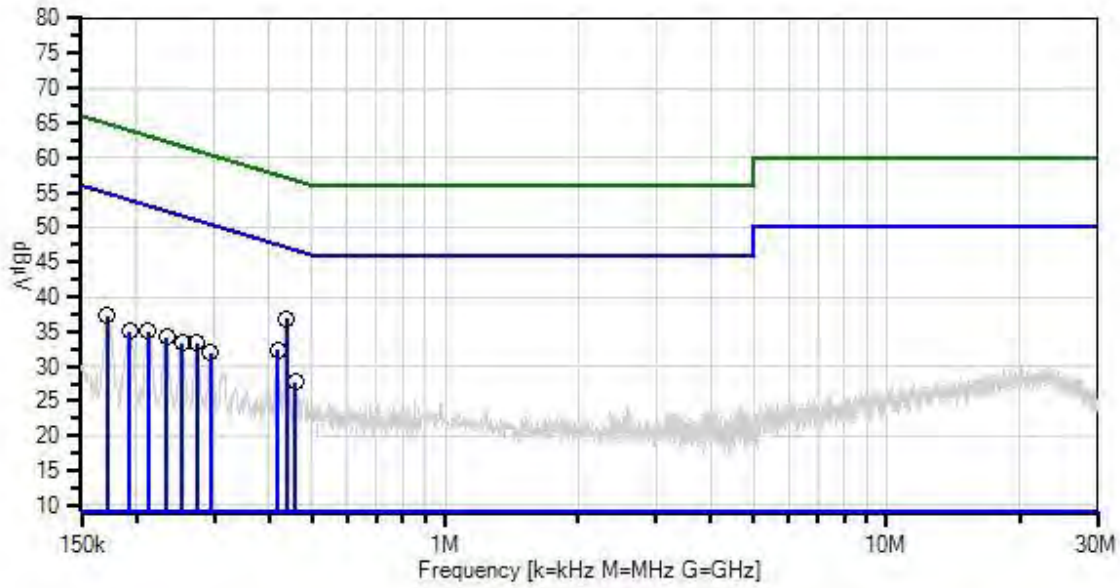
Temperature: 20.1°C
 Humidity: 45 %
 Atmospheric Pressure: 101.4kPa

High Clock: 16MHz
 Transmitting operating frequency= 2402, 2440 and 2480MHz for BLE
 Transmitting operating frequency= 2405, 2440 and 2480MHz for 802.15.4
 Gain of the antenna for Bluetooth= 0dBi
 Gain of the antenna for Zigbee= 0dBi
 Method: ANSI C63.4 2014

The EUT is placed on Styrofoam on a table. It is set continuously transmitting as intended.

802.15.4 on TX mode at Middle Channel

Enlighted, Inc WO#: 98231 Sequence#: 83 Date: 4/28/2016
 15.207 AC Mains - Average Test Lead: 120V 60Hz Neutral



— Sweep Data
 x QP Readings
 Software Version: 5.03.02

— Readings
 * Average Readings
 — 1 - 15.207 AC Mains - Average

○ Peak Readings
 ▼ Ambient
 — 2 - 15.207 AC Mains - Quasi-peak

Test Equipment:

ID	Asset #	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
	AN00494	50uH LISN-Line Loss (dB)	3816/NM	3/4/2015	3/4/2017
T4	AN00494	50uH LISN-Return Loss (dB)	3816/NM	3/4/2015	3/4/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
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	437.246k	26.3	+9.9 +0.1	+0.0	+0.0	+0.6	+0.0	36.9	47.1	-10.2	Neutr
2	416.884k	21.7	+9.9 +0.1	+0.0	+0.0	+0.6	+0.0	32.3	47.5	-15.2	Neutr
3	171.816k	26.4	+9.9 +0.4	+0.0	+0.0	+0.6	+0.0	37.3	54.9	-17.6	Neutr
4	273.625k	22.8	+9.9 +0.1	+0.0	+0.0	+0.6	+0.0	33.4	51.0	-17.6	Neutr
5	233.628k	23.6	+9.9 +0.1	+0.0	+0.0	+0.6	+0.0	34.2	52.3	-18.1	Neutr
6	212.539k	24.4	+9.9 +0.1	+0.0	+0.0	+0.6	+0.0	35.0	53.1	-18.1	Neutr
7	253.990k	22.7	+9.9 +0.1	+0.0	+0.0	+0.6	+0.0	33.3	51.6	-18.3	Neutr
8	294.713k	21.4	+9.9 +0.1	+0.0	+0.0	+0.6	+0.0	32.0	50.4	-18.4	Neutr
9	192.905k	24.3	+9.9 +0.2	+0.0	+0.0	+0.6	+0.0	35.0	53.9	-18.9	Neutr
10	456.880k	17.1	+9.9 +0.2	+0.0	+0.0	+0.6	+0.0	27.8	46.7	-18.9	Neutr

Test Setup Photos



SUPPLEMENTAL INFORMATION

Measurement Uncertainty

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

Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

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

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

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

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBμV/m, the spectrum analyzer reading in dBμV was corrected by using the following formula. This reading was then compared to the applicable specification limit. Individual measurements were compared with the displayed limit value in the margin column. The margin was calculated based on the limit value subtracting the corrected measured value; a negative margin represents a measurement less than the limit while a positive margin represents a measurement exceeding the limit.

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

TEST INSTRUMENTATION AND ANALYZER SETTINGS

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

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

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

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

Peak

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

Quasi-Peak

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

Average

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