Davis Instruments

EMC TEST REPORT FOR

Enviromonitor Gateway
Model: 6800

Tested To The Following Standards:

FCC Part 15 Subpart C Section: 15.247
(DTS 2400-2483.5 MHz)

Report No.: 97540-28

Date of issue: November 11, 2015

ACCREDITED
Testing Certificates:
803.01, 803.02, 803.05, 803.06

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

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

Testing the Future
CKC LABORATORIES, INC.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Davis Instruments
3465 Diablo Avenue
Hayward, CA 94545

Representative: Perry Dillon
Customer Reference Number: 85378

REPORT PREPARED BY:

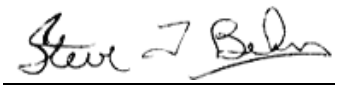
Dianne Dudley
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 97540

DATE OF EQUIPMENT RECEIPT: October 13, 2015
DATE(S) OF TESTING: October 13-16, 2015

Report Authorization

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



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

Test Facility Information

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

TEST LOCATION(S):
CKC Laboratories, Inc.
1120 Fulton Place
Fremont, CA 94539

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.02.00
EMITest Immunity	5.02.00

Site Registration & Accreditation Information

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

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C

Test Procedure	Description	Modifications	Results
15.247(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

NA = Not applicable

Modifications During Testing

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

Summary of Conditions
No modifications were made during testing.

Modifications listed above must be incorporated into all production units.

Conditions During Testing

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

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

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

Configuration 1

EQUIPMENT UNDER TEST

Equipment Tested:

Device	Manufacturer	Model #	S/N
Enviromonitor Gateway	Davis Instruments	6800	002

Support Equipment:

Device	Manufacturer	Model #	S/N
Laptop Computer	Fujitsu	C1410 Dual-Core TS600	R6Z16003

FCC PART 15 SUBPART C

15.247(a)(2) 6dB Bandwidth

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
Customer: **Davis Instrument**
Specification: **OBW**
Work Order #: **97540** Date: 10/16/2015
Test Type: **Conducted Power Measurement** Time:
Tested By: Hieu Song Nguyenpham Sequence#:
Software: EMITest 5.02.00

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	P06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
T2	P01211	Attenuator	23-10-34	3/31/2015	3/31/2017
	03471	Spectrum Analyzer	E4440A	12/19/2013	12/19/2015

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

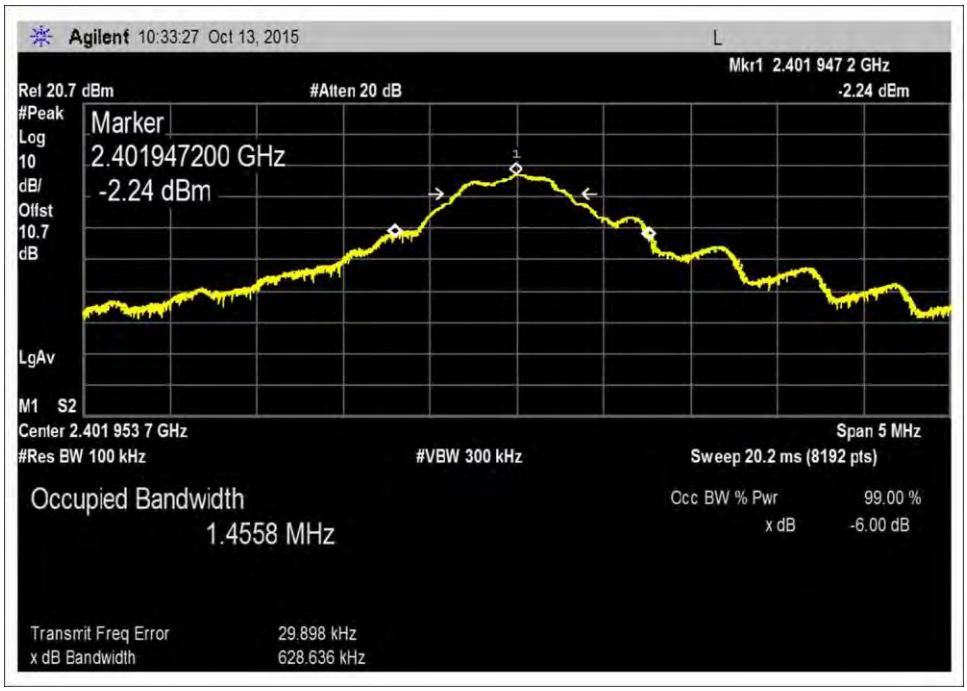
Application: Tera-Term version 4.68 as a terminal Program for ISM radio and Nordic Master Control panel version 1.17 for BTLE module.
Temperature: 22.3°C
Relative Humidity: 39 %
Atmospheric Pressure: 101.2kPa
High Clock: 40MHz
Transmitting operating frequency= 2402, 2440 and 2480MHz for Bluetooth
Transmitting operating frequency= 902.5, 915 and 927MHz for ISM
Gain of the antenna for Bluetooth= 1dBi
Gain of the antenna for ISM= 2dBi
Method: KDB 558074 v03r03 section 8.1

RBW=100kHz
VBW=300kHz

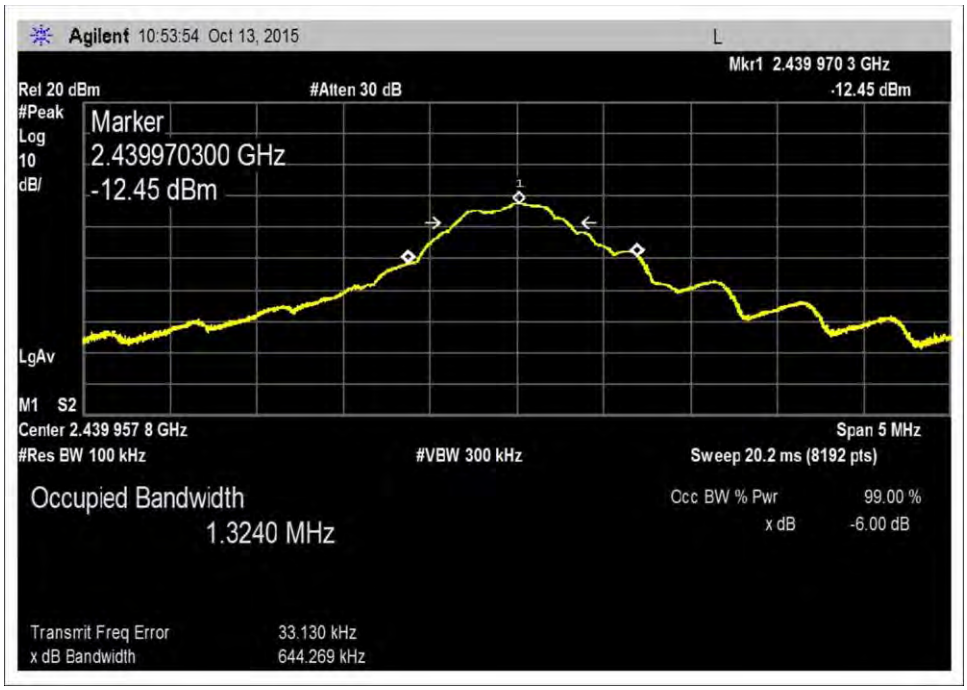
The EUT is placed on the table and set to continuously transmitting or receiving as intended.

Note: BLE Band on TX Mode.

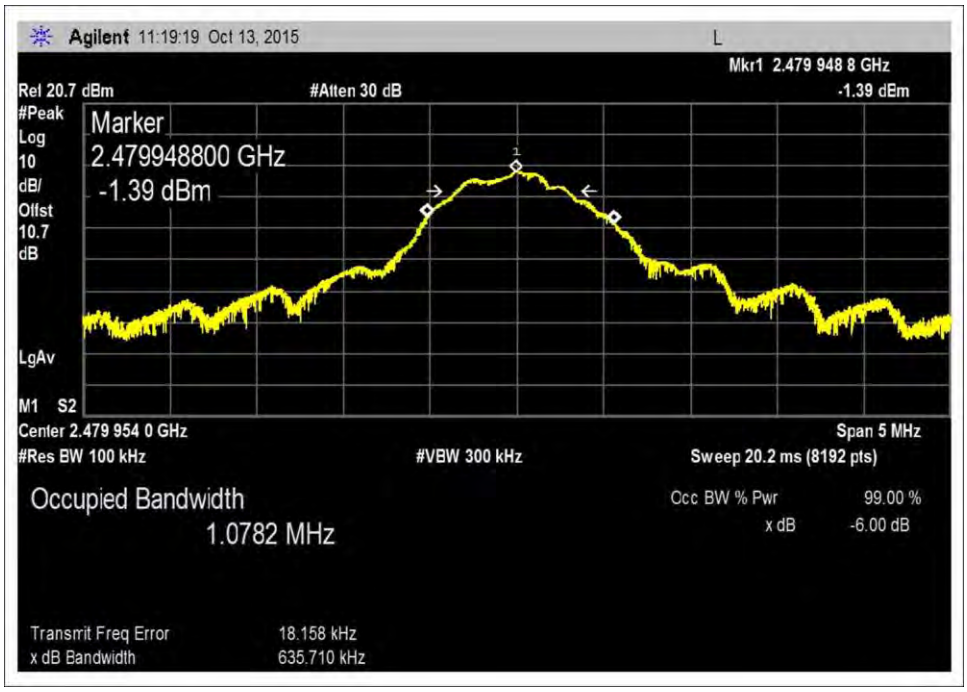
Plot(s)



Low Channel

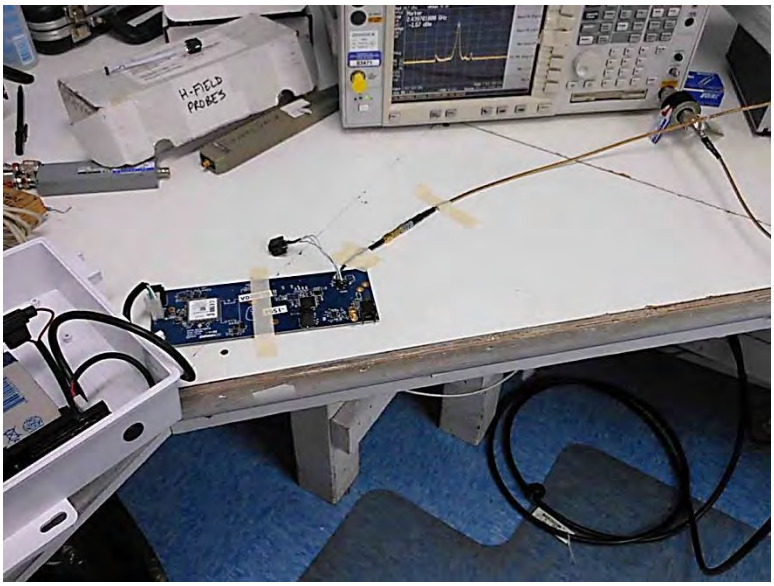


Middle Channel



High Channel

Test Setup Photo(s)



15.247(b)(3) Output Power

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
Customer: **Davis Instrument**
Specification: **15.247(b) Power Output (2400-2483.5 MHz DTS)**
Work Order #: **97540** Date: 10/16/2015
Test Type: **Conducted Power Measurement** Time:
Tested By: Hieu Song Nguyenpham Sequence#:
Software: EMITest 5.02.00

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	P06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
T2	P01211	Attenuator	23-10-34	3/31/2015	3/31/2017
	03471	Spectrum Analyzer	E4440A	12/19/2013	12/19/2015

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Fundamental of the EUT
Application: Tera-Term version 4.68 as a terminal Program for ISM radio and Nordic Master Control panel version 1.17 for BTLE module.
Temperature: 22.3°C
Relative Humidity: 39 %
Atmospheric Pressure: 101.2 kPa
High Clock: 40MHz
Transmitting operating frequency= 2402, 2440 and 2480MHz for Bluetooth
Transmitting operating frequency= 902.5, 915 and 927MHz for ISM
Gain of the antenna for Bluetooth= 1dBi
Gain of the antenna for ISM= 2dBi
Method: KDB 558074 v03r03 section 9.2.2.7

RBW=3MHz
VBW=8MHz

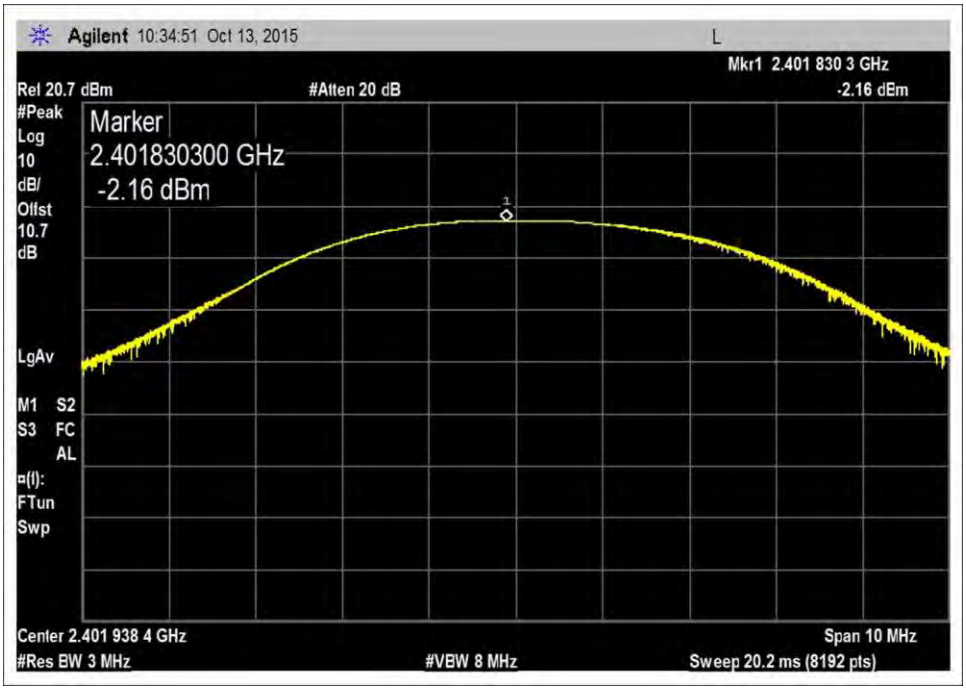
The EUT is placed on the table and set to continuously transmitting or receiving as intended.

Note: BLE Band on TX Mode.

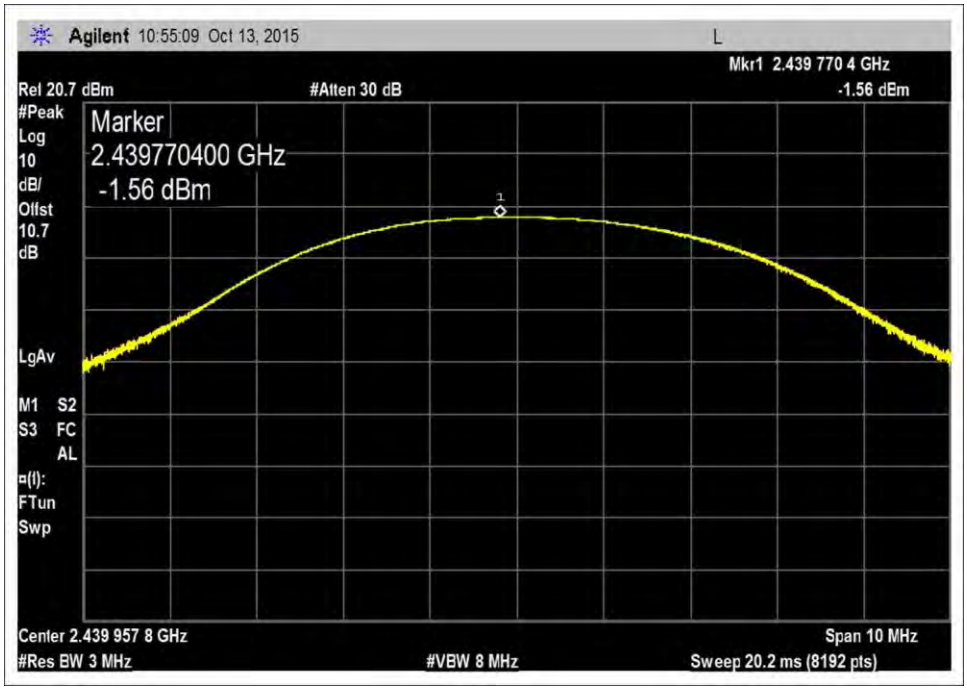
15.31e: Using a new 6V battery.

Test Data Summary - RF Conducted Measurement			
Frequency (MHz)	**Measured Power in Watt**	**Power Limit in Watt**	**Pass/Fail**
Low Channel 2402	0.000608135	1.00	Pass
Middle Channel 2440	0.000698232	1.00	Pass
High Channel 2480	0.000749894	1.00	Pass

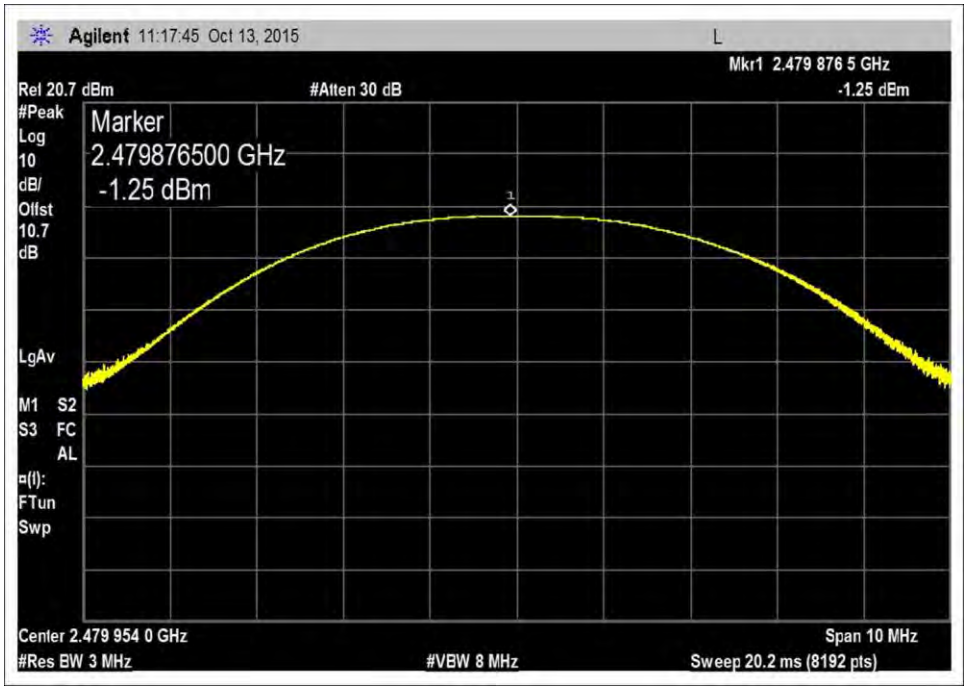
Test Data



Low Channel

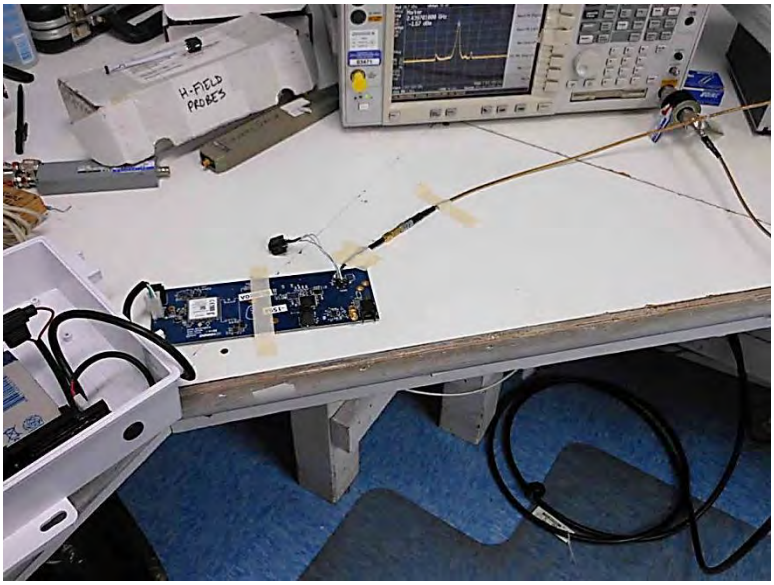


Middle Channel



High Channel

Test Setup Photo(s)



15.247(e) Power Spectral Density

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
Customer: **Davis Instrument**
Specification: **15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)**
Work Order #: **97540** Date: 10/16/2015
Test Type: **Conducted Power Measurement** Time:
Tested By: Hieu Song Nguyenpham Sequence#:
Software: EMITest 5.02.00

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	P06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
T2	P01211	Attenuator	23-10-34	3/31/2015	3/31/2017
	03471	Spectrum Analyzer	E4440A	12/19/2013	12/19/2015

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

PSD Set up

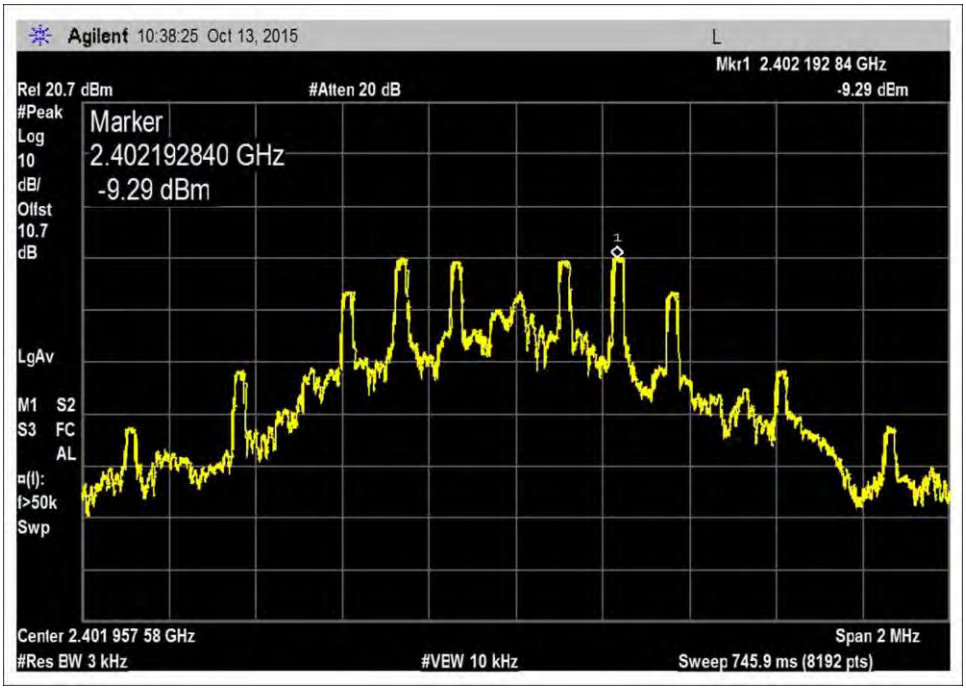
Application: Tera-Term version 4.68 as a terminal Program for ISM radio and Nordic Master Control panel version 1.17 for BTLE module.
Temperature: 22.3°C
Relative Humidity: 39 %
Atmospheric Pressure: 101.2kPa
High Clock: 40MHz
Transmitting operating frequency= 2402, 2440 and 2480MHz for Bluetooth
Transmitting operating frequency= 902.5, 915 and 927MHz for ISM
Gain of the antenna for Bluetooth= 1dBi
Gain of the antenna for ISM= 2dBi
Method: KDB 558074 v03r03 section 10.2
RBW=3 kHz and VBW=10 kHz

The EUT is placed on the table and set to continuously transmitting or receiving as intended.

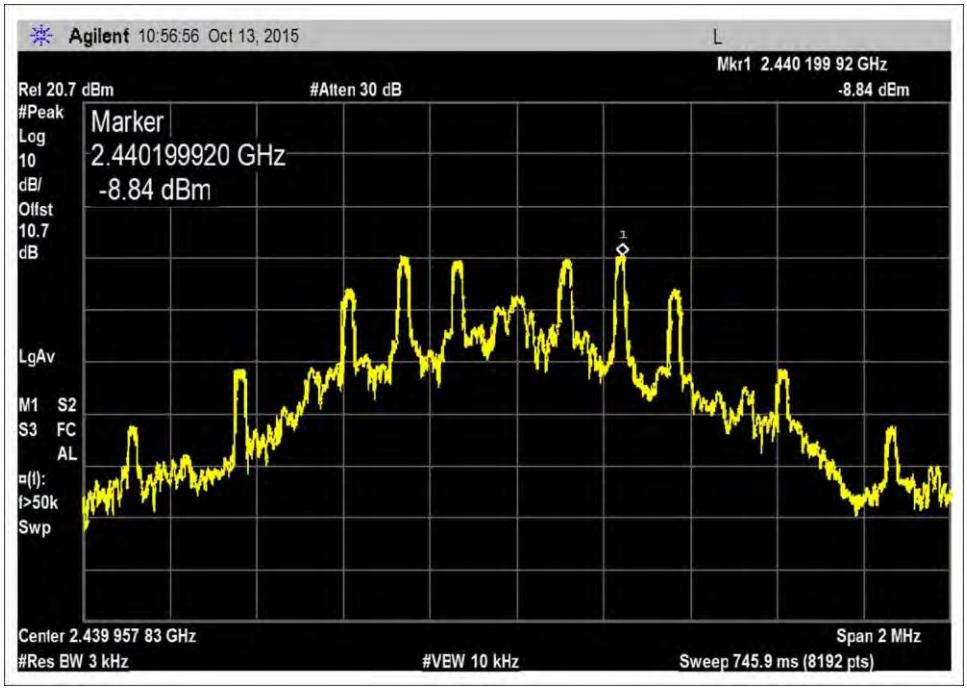
Note: BLE Band on TX Mode.

Test Data Summary - RF Conducted Measurement			
Frequency (MHz)	**Measured Power in (dBm/3kHz)**	**Power Limit in (dBm/kHz)**	**Pass/Fail**
Low Channel 2402	-9.29	8	Pass
Middle Channel 2440	-8.84	8	Pass
High Channel 2480	-8.48	8	Pass

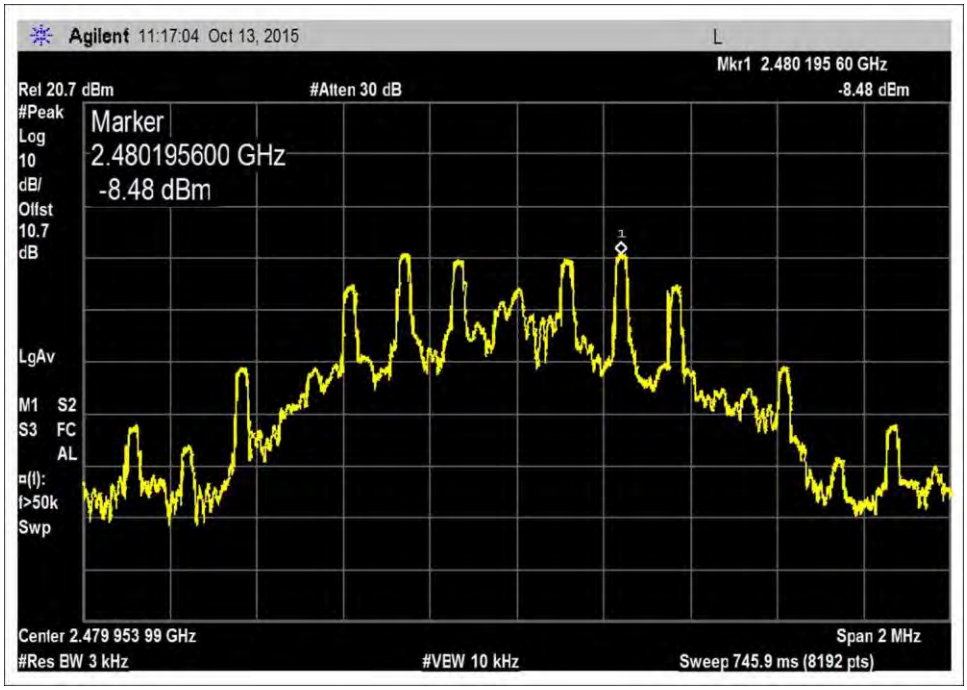
Test Data



Low Channel

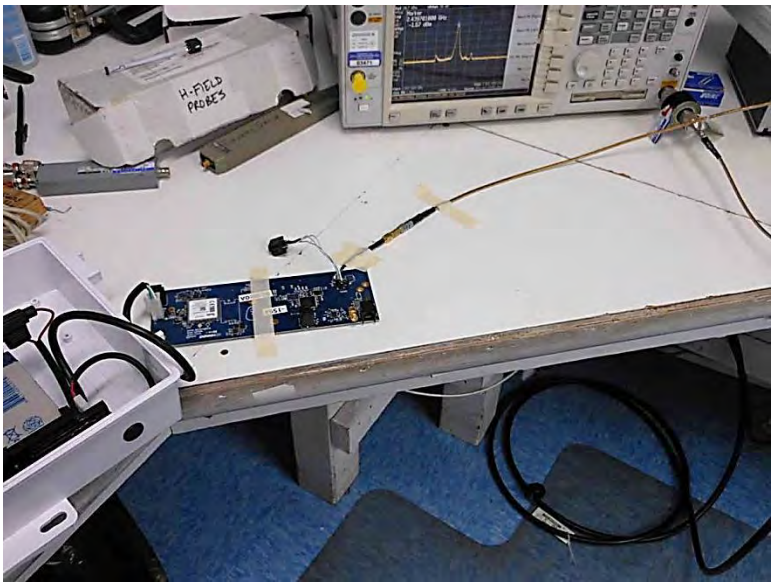


Middle Channel



High Channel

Test Setup Photo(s)



15.247(d) RF Conducted Emissions & Band Edge

Test Conditions / Setup / Test Data

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 v03r03", Section 11 Emissions in non-restricted frequency band.
NOTE: The Reference Level is the limit line for Conducted Spurious Emission for Non-Restricted Frequency Band.

Reference Limit in 100kHz			
Channel			
	dBm in 100kHz	dBuV in 100kHz	Reference Limit dBuV
Low	-2.22	104.78	84.78
Middle	-1.71	105.29	85.29
High	-1.39	105.61	85.61

Choose the worst case for the limit 84.78

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
Customer: **Davis Instruments**
Specification: **15.247(d) Conducted Spurious Emissions**
Work Order #: **97540** Date: 10/13/2015
Test Type: **Conducted Spurious Emission** Time: 2:43:25 PM
Tested By: Hieu Song Nguyenpham Sequence#: 24
Software: EMITest 5.02.00

Equipment Tested:

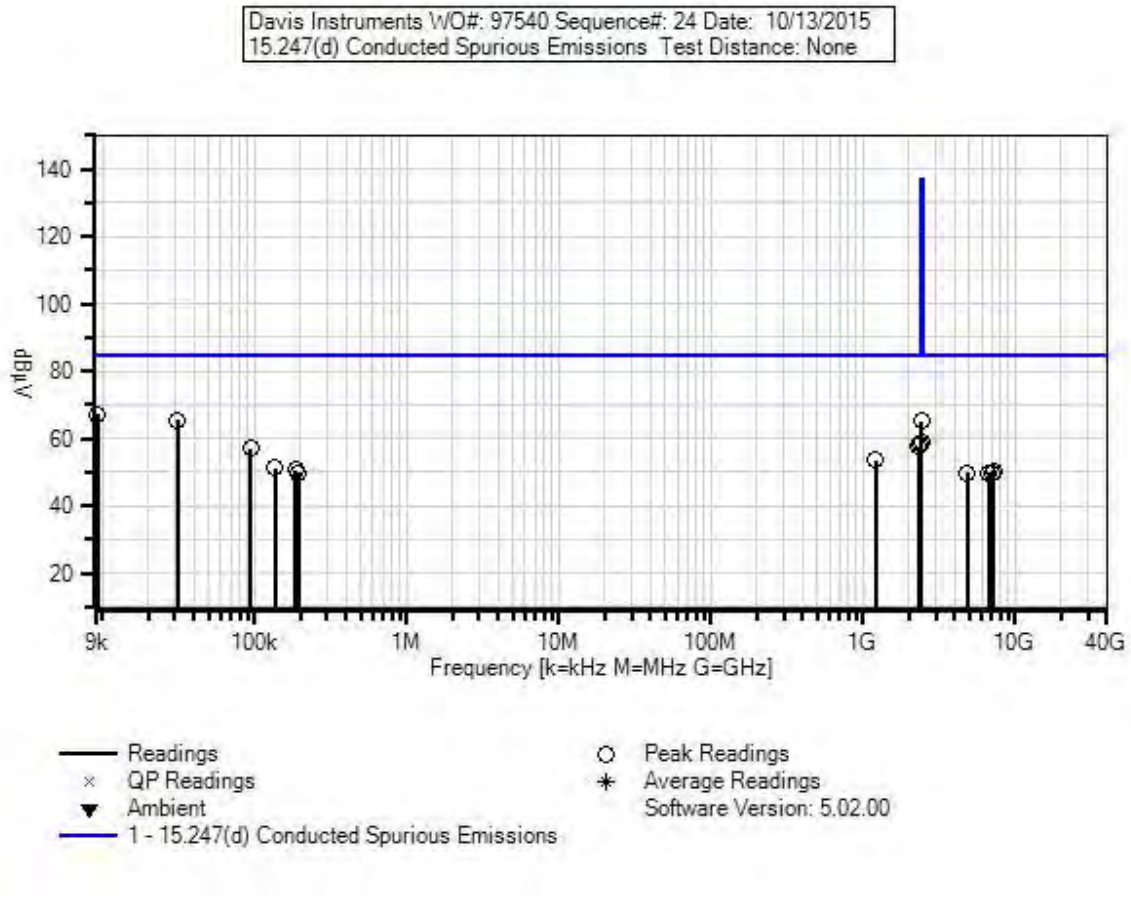
Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Conducted Spurious Emission
Frequency Range: 9kHz to 10000MHz
Application: Tera-Term version 4.68 as a terminal Program for ISM radio and Nordic Master Control panel version 1.17 for BTLE module.
Temperature: 22.3°C, Relative Humidity: 39 %, Atmospheric Pressure: 101.2 kPa
High Clock: 40MHz
Transmitting operating frequency= 2402, 2440 and 2480MHz for Bluetooth
Transmitting operating frequency= 902.5, 915 and 927MHz for ISM
Gain of the antenna for Bluetooth= 1dBi
Gain of the antenna for ISM= 2dBi
Method: KDB "558074 D01 DTS Meas Guidance v03r03", Section 11
RBW =100kHz, VBW = 300kHz
The EUT is connected straight to the spectrum analyzer and set to continuously transmitting as intend. The EUT is not connected to support devices.
Note: BLE on TX Mode
Low Channel


Davis Instruments WO#: 97540 Sequence#: 24 Date: 10/13/2015
15.247(d) Conducted Spurious Emissions Test Distance: None
140
120
100
80
60
40
20
dBµV
9k
100k
1M
10M
100M
1G
10G
40G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) Conducted Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.02.00

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T2	ANP01211	Attenuator	23-10-34	3/31/2015	3/31/2017

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	9.275k	57.2	+0.0	+9.9			+0.0	67.1	84.8	-17.7	None
2	31.352k	55.6	+0.0	+9.9			+0.0	65.5	84.8	-19.3	None
3	2399.001M	54.4	+0.7	+10.0			+0.0	65.1	84.8	-19.7	None
4	2392.601M	48.0	+0.7	+10.0			+0.0	58.7	84.8	-26.1	None
5	2362.736M	47.8	+0.7	+10.0			+0.0	58.5	84.8	-26.3	None
6	2305.138M	46.9	+0.7	+10.0			+0.0	57.6	84.8	-27.2	None
7	95.004k	47.0	+0.0	+9.9			+0.0	56.9	84.8	-27.9	None
8	1200.126M	43.1	+0.5	+9.9			+0.0	53.5	84.8	-31.3	None
9	137.132k	41.2	+0.0	+9.9			+0.0	51.1	84.8	-33.7	None
10	187.484k	40.6	+0.0	+9.9			+0.0	50.5	84.8	-34.3	None
11	7224.470M	39.1	+1.3	+9.9			+0.0	50.3	84.8	-34.5	None
12	4801.765M	38.8	+1.1	+10.0			+0.0	49.9	84.8	-34.9	None
13	194.907k	40.0	+0.0	+9.9			+0.0	49.9	84.8	-34.9	None
14	6986.283M	38.7	+1.3	+9.9			+0.0	49.9	84.8	-34.9	None
15	6714.069M	38.7	+1.3	+9.9			+0.0	49.9	84.8	-34.9	None

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Davis Instruments**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**97540**	Date:	10/13/2015
Test Type:	**Conducted Spurious Emission**	Time:	2:50:07 PM
Tested By:	Hieu Song Nguyenpham	Sequence#:	25
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Conducted Spurious Emission
Frequency Range: 9kHz to 10000MHz

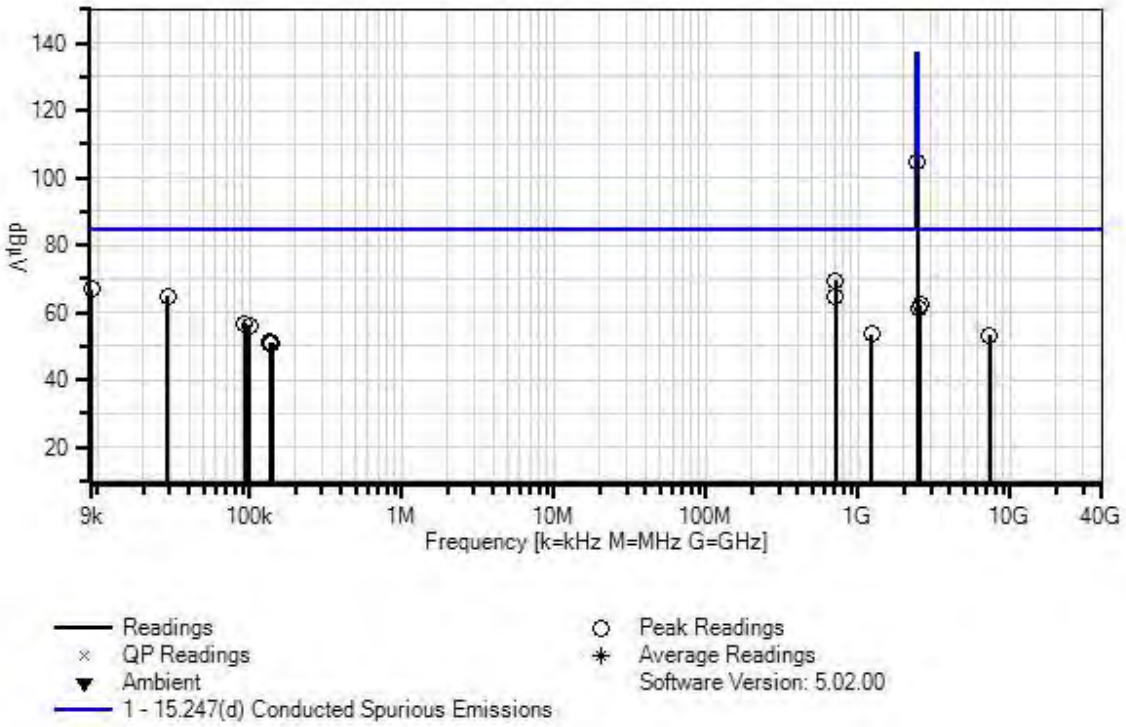
Application: Tera-Term version 4.68 as a terminal Program for ISM radio and Nordic Master Control panel version 1.17 for BTLE module.
Temperature: 22.3°C
Relative Humidity: 39 %
Atmospheric Pressure: 101.2kPa
High Clock: 40MHz
Transmitting operating frequency= 2402, 2440 and 2480MHz for Bluetooth
Transmitting operating frequency= 902.5, 915 and 927MHz for ISM
Gain of the antenna for Bluetooth= 1dBi
Gain of the antenna for ISM= 2dBi
Method: KDB "558074 D01 DTS Meas Guidance v03r03", Section 11

RBW =100kHz
VBW = 300kHz

The EUT is connected straight to the spectrum analyzer and set to continuously transmitting as intended. The EUT is not connected to support devices.

Note: BLE on TX Mode
Middle Channel

Davis Instruments WO#: 97540 Sequence#: 25 Date: 10/13/2015
15.247(d) Conducted Spurious Emissions Test Distance: None



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T2	ANP01211	Attenuator	23-10-34	3/31/2015	3/31/2017

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	709.872M	59.0	+0.4	+10.0			+0.0	69.4	84.8	-15.4	None
2	9.255k	57.0	+0.0	+9.9			+0.0	66.9	84.8	-17.9	None
3	28.899k	54.9	+0.0	+9.9			+0.0	64.8	84.8	-20.0	None
4	704.522M	54.4	+0.4	+10.0			+0.0	64.8	84.8	-20.0	None
5	2556.859M	51.4	+0.7	+10.0			+0.0	62.1	84.8	-22.7	None
6	2486.463M	50.5	+0.7	+10.0			+0.0	61.2	84.8	-23.6	None
7	92.797k	46.9	+0.0	+9.9			+0.0	56.8	84.8	-28.0	None
8	99.618k	46.3	+0.0	+9.9			+0.0	56.2	84.8	-28.6	None
9	1219.325M	43.0	+0.5	+9.9			+0.0	53.4	84.8	-31.4	None
10	7319.745M	41.9	+1.3	+9.9			+0.0	53.1	84.8	-31.7	None
11	2439.532M	94.1	+0.7	+10.0			+0.0	104.8	137.0	-32.2	None
12	136.530k	41.3	+0.0	+9.9			+0.0	51.2	84.8	-33.6	None
13	137.332k	41.1	+0.0	+9.9			+0.0	51.0	84.8	-33.8	None
14	135.727k	40.9	+0.0	+9.9			+0.0	50.8	84.8	-34.0	None
15	140.742k	40.9	+0.0	+9.9			+0.0	50.8	84.8	-34.0	None

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Davis Instruments**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**97540**	Date:	10/13/2015
Test Type:	**Conducted Spurious Emission**	Time:	2:56:54 PM
Tested By:	Hieu Song Nguyenpham	Sequence#:	26
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

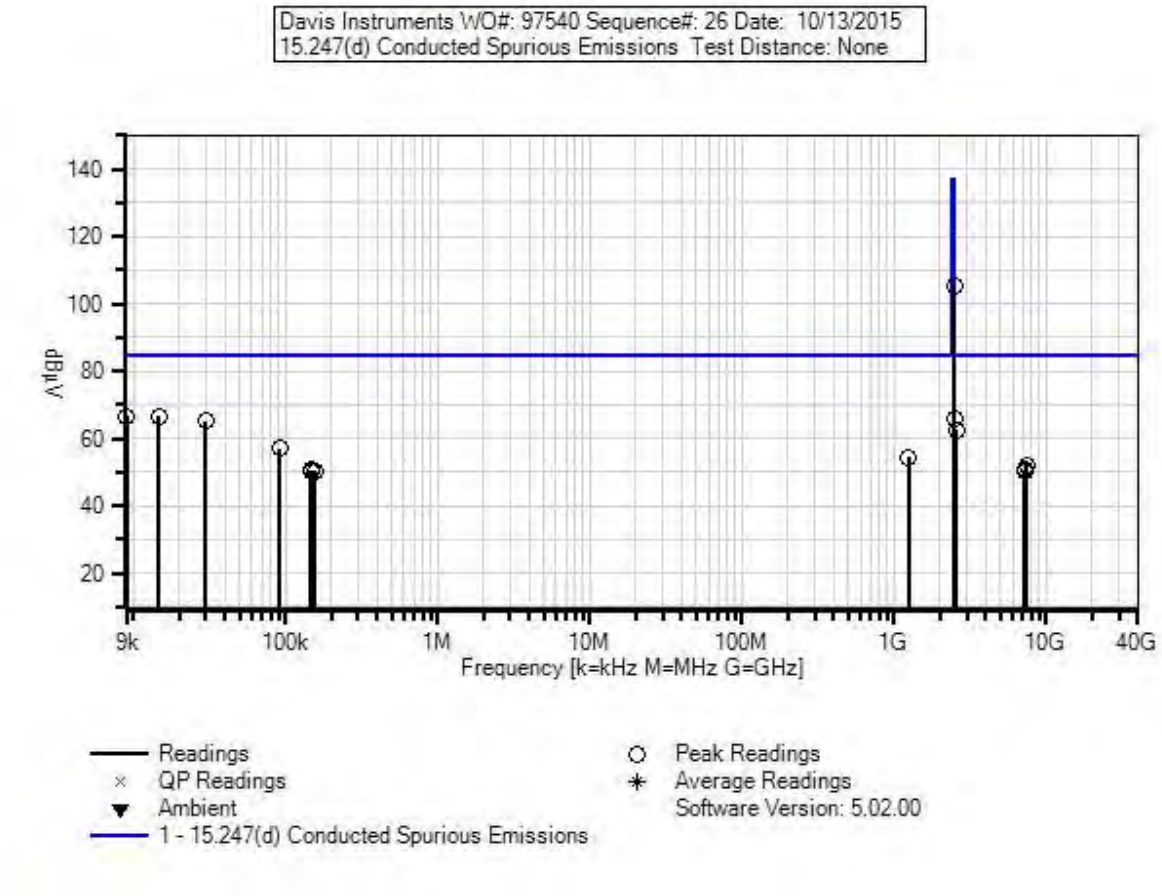
Conducted Spurious Emission
Frequency Range: 9kHz to 10000MHz

Application: Tera-Term version 4.68 as a terminal Program for ISM radio and Nordic Master Control panel version 1.17 for BTLE module.
Temperature: 22.3°C
Relative Humidity: 39 %
Atmospheric Pressure: 101.2 kPa
High Clock: 40MHz
Transmitting operating frequency= 2402, 2440 and 2480MHz for Bluetooth
Transmitting operating frequency= 902.5, 915 and 927MHz for ISM
Gain of the antenna for Bluetooth= 1dBi
Gain of the antenna for ISM= 2dBi
Method: KDB "558074 D01 DTS Meas Guidance v03r03", Section 11

RBW =100kHz
VBW = 300kHz

The EUT is connected straight to the spectrum analyzer and set to continuously transmitting as intended. The EUT is not connected to support devices.

Note: BLE on TX Mode
High Channel


Davis Instruments WO#: 97540 Sequence#: 26 Date: 10/13/2015
15.247(d) Conducted Spurious Emissions Test Distance: None
140
120
100
80
60
40
20
dBµV
9k
100k
1M
10M
100M
1G
10G
40G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) Conducted Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.02.00

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T2	ANP01211	Attenuator	23-10-34	3/31/2015	3/31/2017

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	9.000k	56.6	+0.0	+9.9			+0.0	66.5	84.8	-18.3	None
2	14.854k	56.6	+0.0	+9.9			+0.0	66.5	84.8	-18.3	None
3	2486.463M	55.0	+0.7	+10.0			+0.0	65.7	84.8	-19.1	None
4	29.780k	55.1	+0.0	+9.9			+0.0	65.0	84.8	-19.8	None
5	2556.859M	51.9	+0.7	+10.0			+0.0	62.6	84.8	-22.2	None
6	92.396k	47.1	+0.0	+9.9			+0.0	57.0	84.8	-27.8	None
7	1240.657M	44.0	+0.5	+9.9			+0.0	54.4	84.8	-30.4	None
8	2480.063M	94.7	+0.7	+10.0			+0.0	105.4	137.0	-31.6	None
9	7442.241M	40.9	+1.4	+9.9			+0.0	52.2	84.8	-32.6	None
10	150.171k	40.7	+0.0	+9.9			+0.0	50.6	84.8	-34.2	None
11	7326.550M	39.4	+1.3	+9.9			+0.0	50.6	84.8	-34.2	None
12	148.967k	40.4	+0.0	+9.9			+0.0	50.3	84.8	-34.5	None
13	157.192k	40.4	+0.0	+9.9			+0.0	50.3	84.8	-34.5	None
14	7217.665M	39.1	+1.3	+9.9			+0.0	50.3	84.8	-34.5	None
15	148.165k	40.3	+0.0	+9.9			+0.0	50.2	84.8	-34.6	None

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Davis Instruments**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**97540**	Date:	10/13/2015
Test Type:	**Conducted Spurious Emission**	Time:	3:20:08 PM
Tested By:	Hieu Song Nguyenpham	Sequence#:	27
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Conducted Spurious Emission
Frequency Range: 10000MHz to 25000MHz

Application: Tera-Term version 4.68 as a terminal Program for ISM radio and Nordic Master Control panel version 1.17 for BTLE module.
Temperature: 22.3°C
Relative Humidity: 39 %
Atmospheric Pressure: 101.2 kPa
High Clock: 40MHz
Transmitting operating frequency= 2402, 2440 and 2480MHz for Bluetooth
Transmitting operating frequency= 902.5, 915 and 927MHz for ISM
Gain of the antenna for Bluetooth= 1dBi
Gain of the antenna for ISM= 2dBi
Method: KDB "558074 D01 DTS Meas Guidance v03r03", Section 11

RBW =100kHz
VBW = 300kHz

The EUT is connected straight to the spectrum analyzer and set to continuously transmitting as intended. The EUT is not connected to support devices.

Note: BLE on TX Mode
Low Channel


Davis Instruments WO#: 97540 Sequence#: 27 Date: 10/13/2015
15.247(d) Conducted Spurious Emissions Test Distance: None
140
120
100
80
60
40
20
dBµV
9k
100k
1M
10M
100M
1G
10G
40G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) Conducted Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.02.00

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T2	ANP05411	Attenuator	54A-10	1/15/2014	1/15/2016

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	21990.619 M	43.1	+2.4	+10.2			+0.0	55.7	84.8	-29.1	None
2	22273.278 M	42.9	+2.4	+10.2			+0.0	55.5	84.8	-29.3	None
3	21873.128 M	42.8	+2.4	+10.2			+0.0	55.4	84.8	-29.4	None
4	21798.206 M	42.5	+2.4	+10.2			+0.0	55.1	84.8	-29.7	None
5	22578.073 M	42.4	+2.5	+10.2			+0.0	55.1	84.8	-29.7	None
6	22159.192 M	42.4	+2.4	+10.2			+0.0	55.0	84.8	-29.8	None
7	24790.482 M	42.0	+2.6	+10.4			+0.0	55.0	84.8	-29.8	None
8	24455.988 M	41.9	+2.6	+10.4			+0.0	54.9	84.8	-29.9	None
9	21847.586 M	42.3	+2.4	+10.2			+0.0	54.9	84.8	-29.9	None
10	21927.616 M	42.3	+2.4	+10.2			+0.0	54.9	84.8	-29.9	None
11	22487.826 M	42.2	+2.5	+10.2			+0.0	54.9	84.8	-29.9	None

12	22082.568 M	42.2	+2.4	+10.2		+0.0	54.8	84.8	-30.0	None
13	22765.377 M	41.9	+2.5	+10.3		+0.0	54.7	84.8	-30.1	None
14	21885.047 M	42.0	+2.4	+10.2		+0.0	54.6	84.8	-30.2	None
15	24522.152 M	41.6	+2.6	+10.4		+0.0	54.6	84.8	-30.2	None

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Davis Instruments**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**97540**	Date:	10/13/2015
Test Type:	**Conducted Spurious Emission**	Time:	3:26:25 PM
Tested By:	Hieu Song Nguyenpham	Sequence#:	28
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

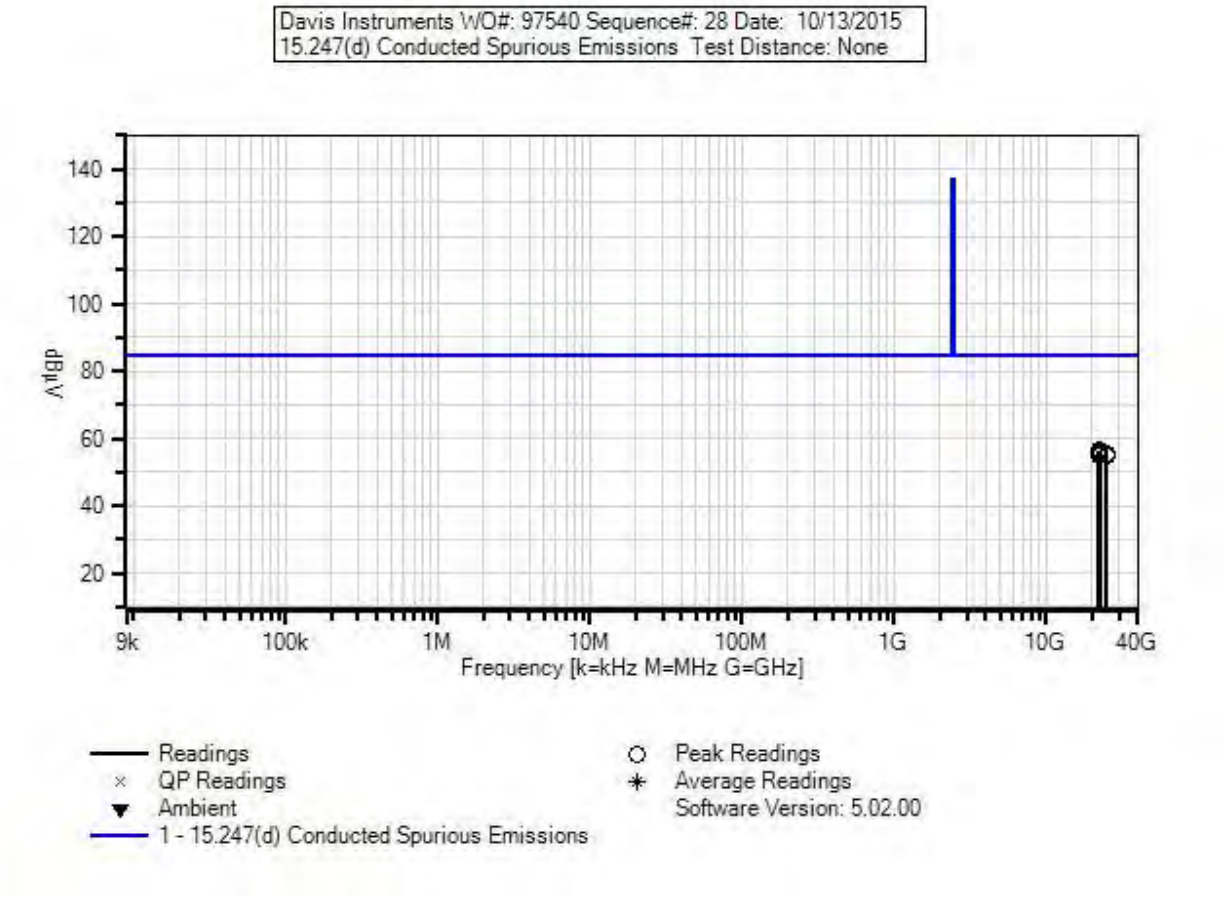
Conducted Spurious Emission
Frequency Range: 10000MHz to 25000MHz

Application: Tera-Term version 4.68 as a terminal Program for ISM radio and Nordic Master Control panel version 1.17 for BTLE module.
Temperature: 22.3°C
Relative Humidity: 39 %
Atmospheric Pressure: 101.2kPa
High Clock: 40MHz
Transmitting operating frequency= 2402, 2440 and 2480MHz for Bluetooth
Transmitting operating frequency= 902.5, 915 and 927MHz for ISM
Gain of the antenna for Bluetooth= 1dBi
Gain of the antenna for ISM= 2dBi
Method: KDB "558074 D01 DTS Meas Guidance v03r03", Section 11

RBW =100kHz
VBW = 300kHz

The EUT is connected straight to the spectrum analyzer and is set to continuously transmitting as intend. The EUT is not connected to support devices.

Note: BLE on TX Mode
Middle Channel


Davis Instruments WO#: 97540 Sequence#: 28 Date: 10/13/2015
15.247(d) Conducted Spurious Emissions Test Distance: None
140
120
100
80
60
40
20
dBµV
9k
100k
1M
10M
100M
1G
10G
40G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) Conducted Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.02.00

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T2	ANP05411	Attenuator	54A-10	1/15/2014	1/15/2016

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	22255.503 M	43.7	+2.4	+10.2			+0.0	56.3	84.8	-28.5	None
2	21963.197 M	43.5	+2.4	+10.2			+0.0	56.1	84.8	-28.7	None
3	21948.489 M	43.2	+2.4	+10.2			+0.0	55.8	84.8	-29.0	None
4	21882.307 M	42.8	+2.4	+10.2			+0.0	55.4	84.8	-29.4	None
5	24810.180 M	42.4	+2.6	+10.4			+0.0	55.4	84.8	-29.4	None
6	21878.630 M	42.8	+2.4	+10.2			+0.0	55.4	84.8	-29.4	None
7	24790.199 M	42.1	+2.6	+10.4			+0.0	55.1	84.8	-29.7	None
8	22137.845 M	42.4	+2.4	+10.2			+0.0	55.0	84.8	-29.8	None
9	22216.897 M	42.4	+2.4	+10.2			+0.0	55.0	84.8	-29.8	None
10	22220.574 M	42.3	+2.4	+10.2			+0.0	54.9	84.8	-29.9	None

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Davis Instruments**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**97540**	Date:	10/13/2015
Test Type:	**Conducted Spurious Emission**	Time:	3:34:31 PM
Tested By:	Hieu Song Nguyenpham	Sequence#:	29
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

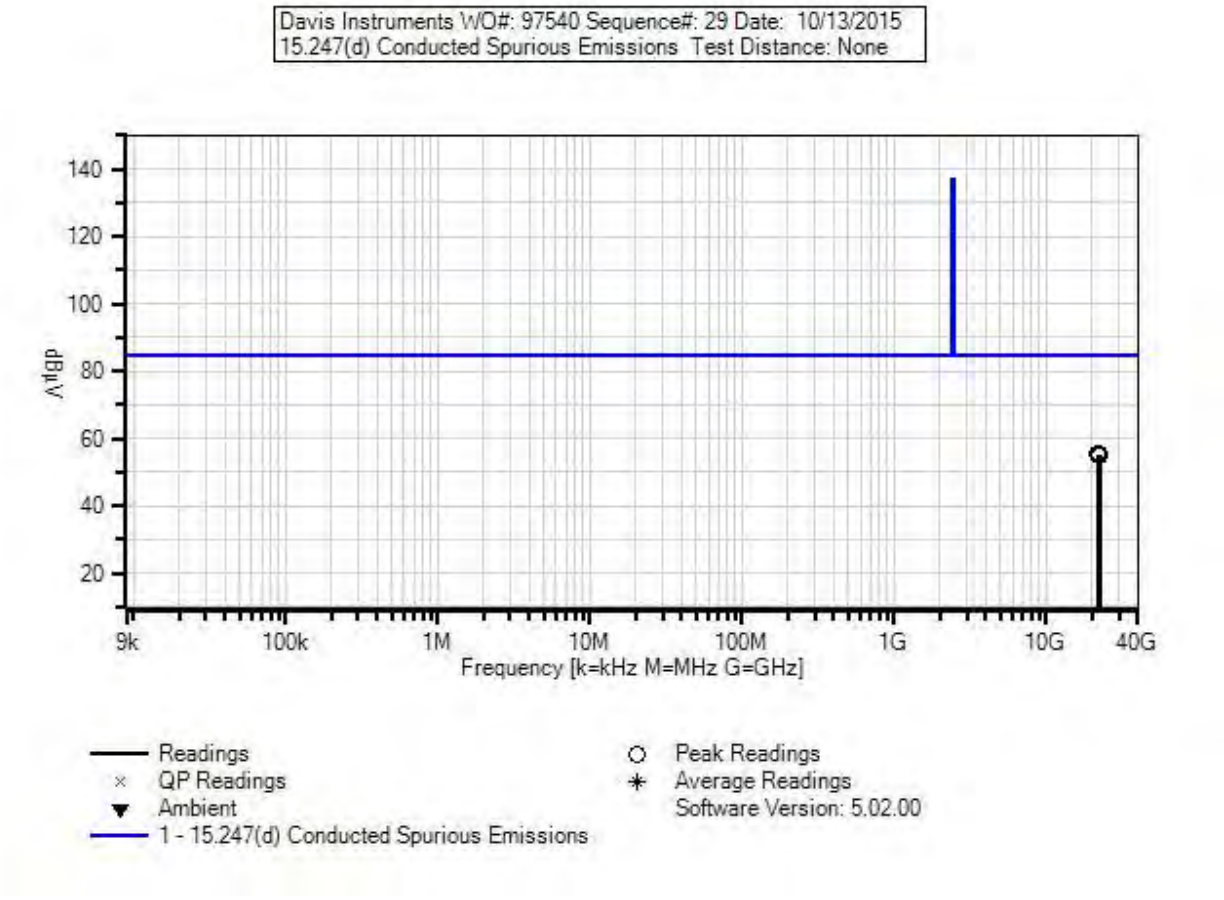
Conducted Spurious Emission
Frequency Range: 10000MHz to 25000MHz

Application: Tera-Term version 4.68 as a terminal Program for ISM radio and Nordic Master Control panel version 1.17 for BTLE module.
Temperature: 22.3°C
Relative Humidity: 39 %
Atmospheric Pressure: 101.2 kPa
High Clock: 40MHz
Transmitting operating frequency= 2402, 2440 and 2480MHz for Bluetooth
Transmitting operating frequency= 902.5, 915 and 927MHz for ISM
Gain of the antenna for Bluetooth= 1dBi
Gain of the antenna for ISM= 2dBi
Method: KDB "558074 D01 DTS Meas Guidance v03r03", Section 11

RBW =100kHz
VBW = 300kHz

The EUT is connected straight to the spectrum analyzer and set to continuously transmitting as intended. The EUT is not connected to support devices.

Note: BLE on TX Mode
High Channel


Davis Instruments WO#: 97540 Sequence#: 29 Date: 10/13/2015
15.247(d) Conducted Spurious Emissions Test Distance: None
140
120
100
80
60
40
20
dBµV
9k
100k
1M
10M
100M
1G
10G
40G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) Conducted Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.02.00

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T2	ANP05411	Attenuator	54A-10	1/15/2014	1/15/2016

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	21908.886 M	42.7	+2.4	+10.2			+0.0	55.3	84.8	-29.5	None
2	21886.750 M	42.7	+2.4	+10.2			+0.0	55.3	84.8	-29.5	None
3	22036.593 M	42.7	+2.4	+10.2			+0.0	55.3	84.8	-29.5	None
4	21954.860 M	42.7	+2.4	+10.2			+0.0	55.3	84.8	-29.5	None
5	21665.390 M	42.7	+2.4	+10.2			+0.0	55.3	84.8	-29.5	None
6	22145.570 M	42.7	+2.4	+10.2			+0.0	55.3	84.8	-29.5	None
7	22005.943 M	42.6	+2.4	+10.2			+0.0	55.2	84.8	-29.6	None
8	22373.741 M	42.5	+2.5	+10.2			+0.0	55.2	84.8	-29.6	None
9	21988.916 M	42.5	+2.4	+10.2			+0.0	55.1	84.8	-29.7	None
10	22080.865 M	42.4	+2.4	+10.2			+0.0	55.0	84.8	-29.8	None

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Davis Instrument**		
Specification:	**Band Edge Set up**		
Work Order #:	**97540**	Date:	10/16/2015
Test Type:	**Conducted Power Measurement**	Time:	
Tested By:	Hieu Song Nguyenpham	Sequence#:	
Software:	EMITest 5.02.00		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	P06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
T2	P01211	Attenuator	23-10-34	3/31/2015	3/31/2017
	03471	Spectrum Analyzer	E4440A	12/19/2013	12/19/2015

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

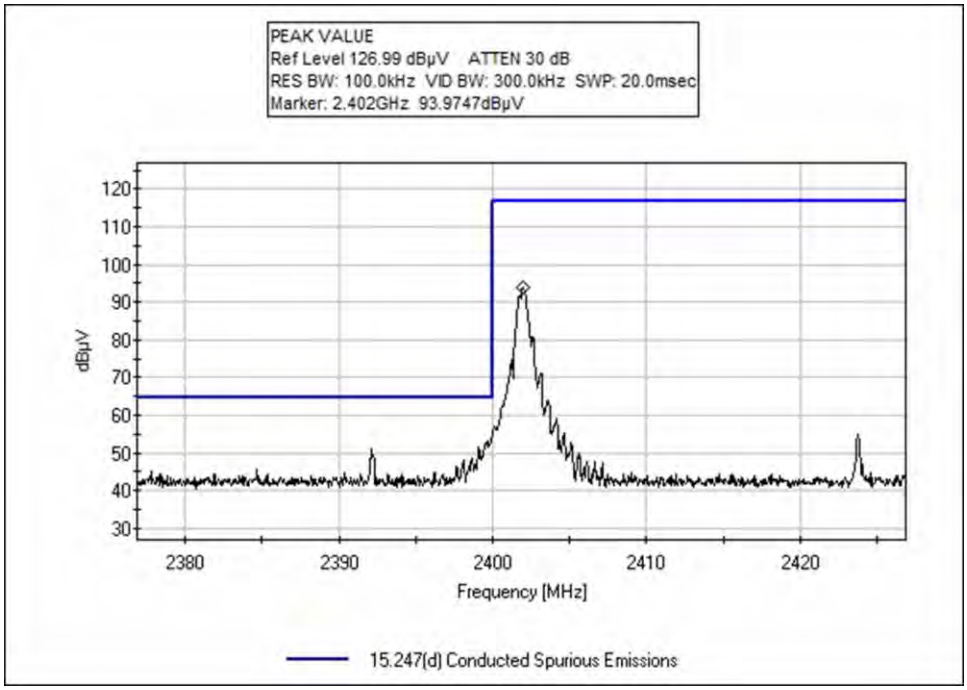
Band edge Set up

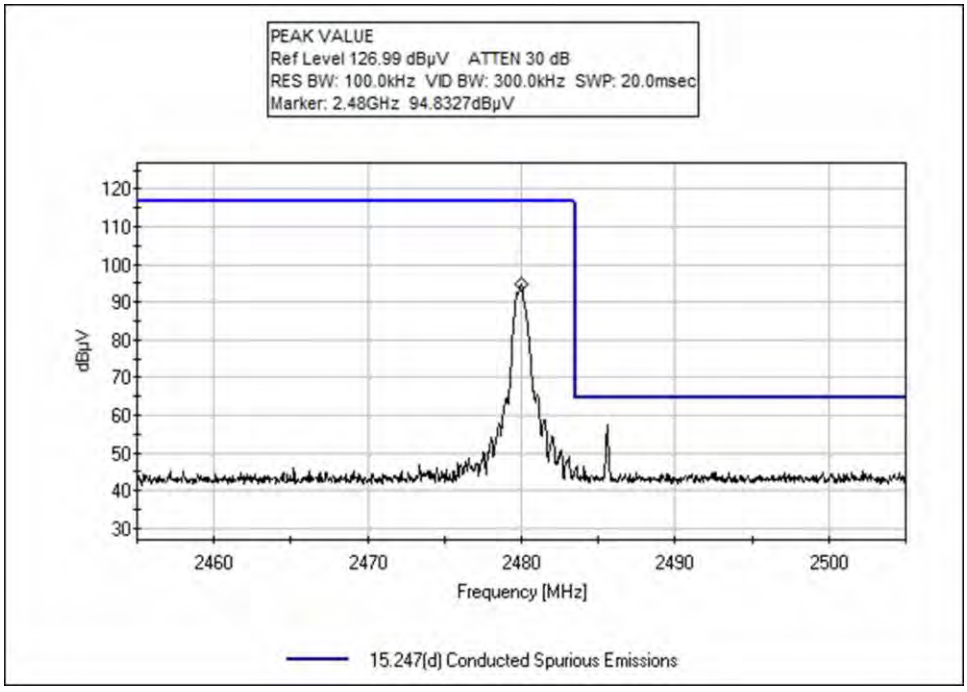
Application: Tera-Term version 4.68 as a terminal Program for ISM radio and Nordic Master Control panel version 1.17 for BTLE module.
Temperature: 22.3°C
Relative Humidity: 39 %
Atmospheric Pressure: 101.2kPa
High Clock: 40MHz
Transmitting operating frequency= 2402, 2440 and 2480MHz for Bluetooth
Transmitting operating frequency= 902.5, 915 and 927MHz for ISM
Gain of the antenna for Bluetooth= 1dBi
Gain of the antenna for ISM= 2dBi
Method: KDB 558074 v03r03 section 13.2

The EUT is placed on the table and set to continuously transmitting or receiving as intended.

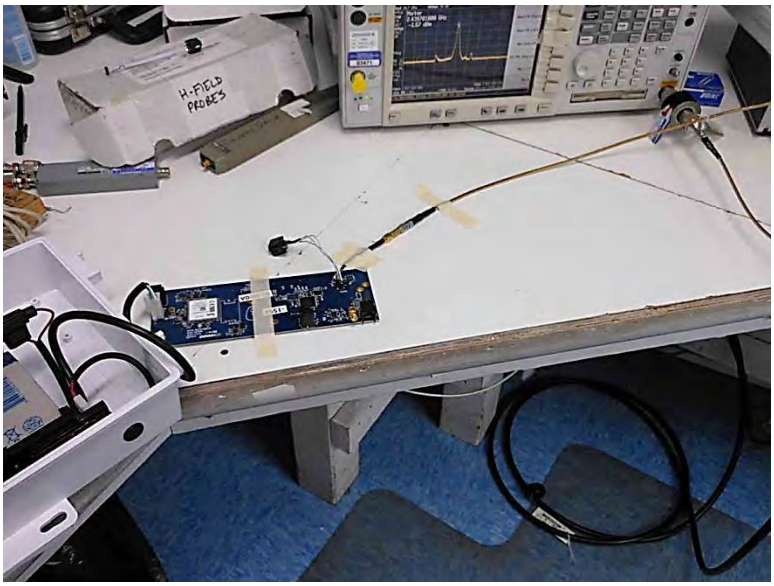
Note: BLE Band on TX Mode

Band Edge Plots

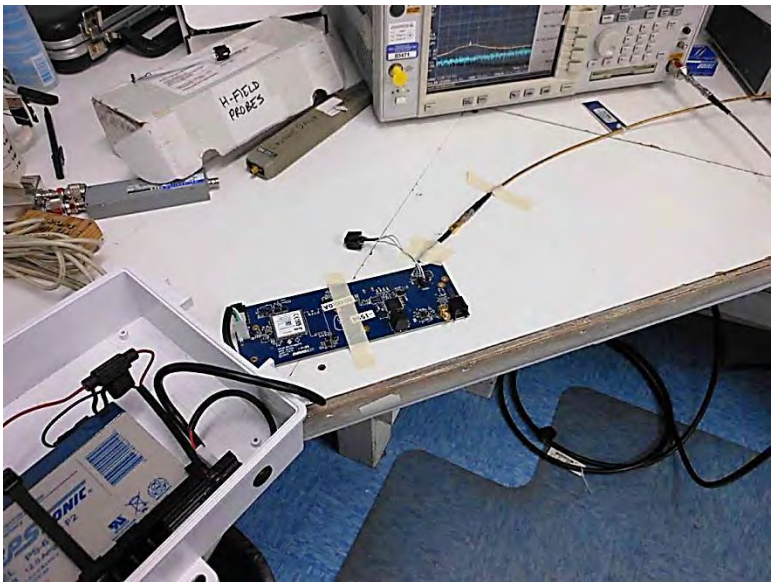




Test Setup Photo(s)



9kHz-10GHz & Band Edge Test Setup



10-25GHz

15.247(d) Radiated Emissions & Band Edge

Test Conditions / Setup / Test Data

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Davis Instruments**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**97540**	Date:	10/14/2015
Test Type:	**Radiated Scan**	Time:	16:00:54
Tested By:	Hieu Song Nguyenpham	Sequence#:	59
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
Frequency Range: 9kHz to 1000MHz

Application: Agriculture for Bluetooth and ISM
Temperature: 22.3°C
Relative Humidity: 39 %
Atmospheric Pressure: 101.2kPa
High Clock: 40MHz
Transmitting operating frequency= 2402, 2440 and 2480MHz for Bluetooth
Transmitting operating frequency= 902.5, 915 and 927MHz for ISM
Gain of the antenna for Bluetooth= 1dBi
Gain of the antenna for ISM= 2dBi
Method: ANSI C 63.4 2009

Frequency range of measurement = 9 kHz- 25GHz.
9 kHz - 150 kHz -> RBW=200 Hz VBW=200 Hz
150 kHz - 30 MHz -> RBW=9 kHz VBW=9 kHz
30 MHz - 1000MHz -> RBW=120 kHz VBW=120 kHz
1000MHz to 25000MHz-> RBW =1MHz VBW=1MHz

The EUT is operated at 6 VDC by Battery and set to continuously transmitting as intended. The EUT is not connected to any support devices.

Note: BLE on TX Mode
Low Channel


Davis Instruments WO#: 97540 Sequence#: 59 Date: 10/14/2015
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
10G
26G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.02.00

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017
T1	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T2	ANP00880	Cable	RG214U	6/13/2014	6/13/2016
T3	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T4	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T5	AN00567	Preamp	8447D	1/2/2015	1/2/2017

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	818.710M	28.0	+22.2 -28.0	+3.0	+0.7	+1.3	+0.0	27.2	46.0	-18.8	Vert
2	30.200M	29.4	+18.8 -27.9	+0.4	+0.1	+0.2	+0.0	21.0	40.0	-19.0	Vert
3	793.846M	28.0	+21.8 -28.0	+2.9	+0.7	+1.3	+0.0	26.7	46.0	-19.3	Vert
4	138.711M	31.7	+11.6 -27.8	+1.1	+0.2	+0.5	+0.0	17.3	43.5	-26.2	Vert

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Davis Instruments**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**97540**	Date:	10/14/2015
Test Type:	**Radiated Scan**	Time:	16:20:23
Tested By:	Hieu Song Nguyenpham	Sequence#:	62
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
Frequency Range: 9kHz to 1000MHz

Application: Tera-Term version 4.68 as a terminal Program for ISM radio and Nordic Master Control panel version 1.17 for BTLE module.
Temperature: 22.3°C
Relative Humidity: 39 %
Atmospheric Pressure: 101.2 kPa
High Clock: 40MHz
Transmitting operating frequency= 2402, 2440 and 2480MHz for Bluetooth
Transmitting operating frequency= 902.5, 915 and 927MHz for ISM
Gain of the antenna for Bluetooth= 1dBi
Gain of the antenna for ISM= 2dBi
Method: ANSI C 63.4 2009

Frequency range of measurement = 9 kHz- 25GHz.
9 kHz - 150 kHz -> RBW=200 Hz VBW=200 Hz
150 kHz - 30 MHz -> RBW=9 kHz VBW=9 kHz
30 MHz - 1000MHz -> RBW=120 kHz VBW=120 kHz
1000MHz to 25000MHz-> RBW =1MHz VBW=1MHz

The EUT is operated at 6 VDC by Battery and set to continuously transmitting as intended. The EUT is not connected to any support devices.

Note: BLE on TX Mode
Middle Channel


Davis Instruments WO#: 97540 Sequence#: 62 Date: 10/14/2015
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
10G
26G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.02.00

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017
T1	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T2	ANP00880	Cable	RG214U	6/13/2014	6/13/2016
T3	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T4	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T5	AN00567	Preamp	8447D	1/2/2015	1/2/2017

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	771.726M	28.7	+21.5 -28.0	+2.9	+0.7	+1.3	+0.0	27.1	46.0	-18.9	Vert
2	630.441M	29.1	+19.9 -28.0	+2.5	+0.6	+1.1	+0.0	25.2	46.0	-20.8	Vert
3	34.882M	29.3	+16.6 -27.9	+0.5	+0.1	+0.2	+0.0	18.8	40.0	-21.2	Vert
4	42.247M	33.1	+12.6 -27.9	+0.5	+0.1	+0.2	+0.0	18.6	40.0	-21.4	Vert

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Davis Instruments**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**97540**	Date:	10/14/2015
Test Type:	**Radiated Scan**	Time:	16:48:23
Tested By:	Hieu Song Nguyenpham	Sequence#:	65
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
Frequency Range: 9kHz to 1000MHz

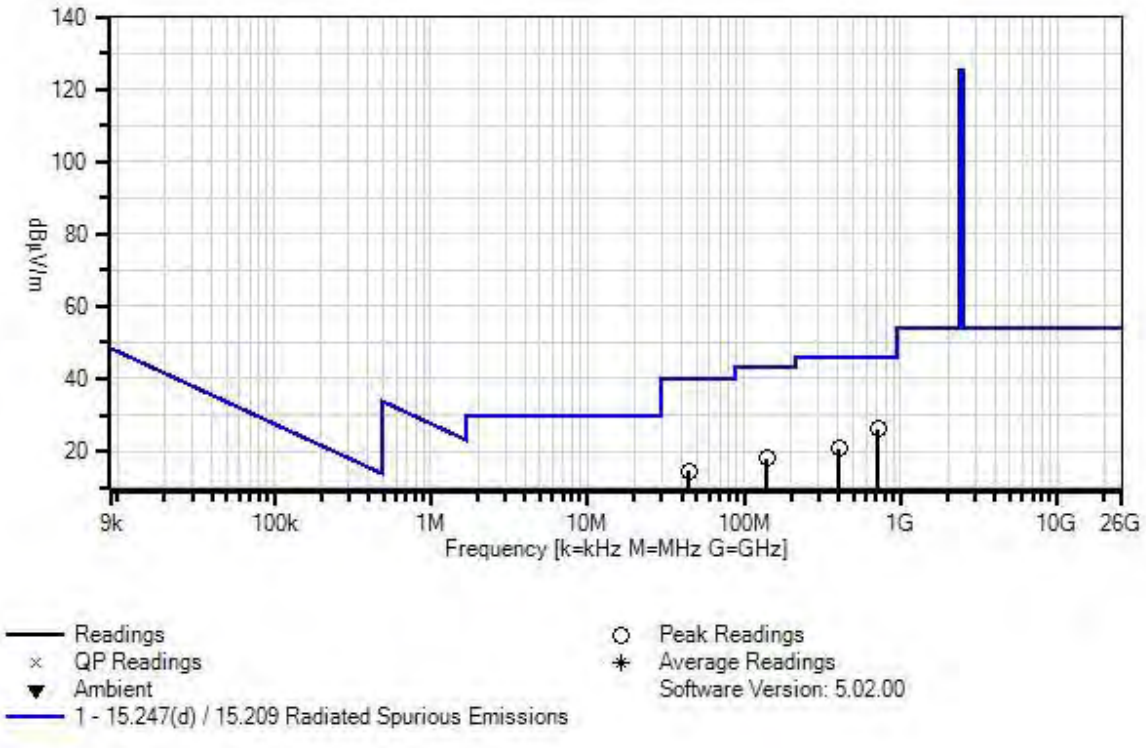
Application: Tera-Term version 4.68 as a terminal Program for ISM radio and Nordic Master Control panel version 1.17 for BTLE module.
Temperature: 22.3°C
Relative Humidity: 39 %
Atmospheric Pressure: 101.2kPa
High Clock: 40MHz
Transmitting operating frequency= 2402, 2440 and 2480MHz for Bluetooth
Transmitting operating frequency= 902.5, 915 and 927MHz for ISM
Gain of the antenna for Bluetooth= 1dBi
Gain of the antenna for ISM= 2dBi
Method: ANSI C 63.4 2009

Frequency range of measurement = 9 kHz- 25GHz.
9 kHz - 150 kHz -> RBW=200 Hz VBW=200 Hz
150 kHz - 30 MHz -> RBW=9 kHz VBW=9 kHz
30 MHz - 1000MHz -> RBW=120 kHz VBW=120 kHz
1000MHz to 25000MHz-> RBW =1MHz VBW=1MHz

The EUT is operated at 6 VDC by Battery and set to continuously transmitting as intended. The EUT is not connected to any support devices.

Note: BLE on TX Mode
High Channel

Davis Instruments WO#: 97540 Sequence#: 65 Date: 10/14/2015
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017
T1	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T2	ANP00880	Cable	RG214U	6/13/2014	6/13/2016
T3	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T4	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
T5	AN00567	Preamp	8447D	1/2/2015	1/2/2017

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	714.512M	28.6	+20.7 -28.0	+2.9	+0.7	+1.2	+0.0	26.1	46.0	-19.9	Vert
2	401.844M	29.2	+16.4 -28.0	+2.0	+0.4	+0.8	+0.0	20.8	46.0	-25.2	Vert
3	140.745M	32.5	+11.6 -27.8	+1.1	+0.2	+0.5	+0.0	18.1	43.5	-25.4	Vert
4	44.435M	29.8	+11.6 -27.9	+0.6	+0.1	+0.2	+0.0	14.4	40.0	-25.6	Vert

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Davis Instruments**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**97540**	Date:	10/13/2015
Test Type:	**Radiated Scan**	Time:	18:24:26
Tested By:	Hieu Song Nguyenpham	Sequence#:	34
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
Frequency Range: 1000MHz to 25000MHz

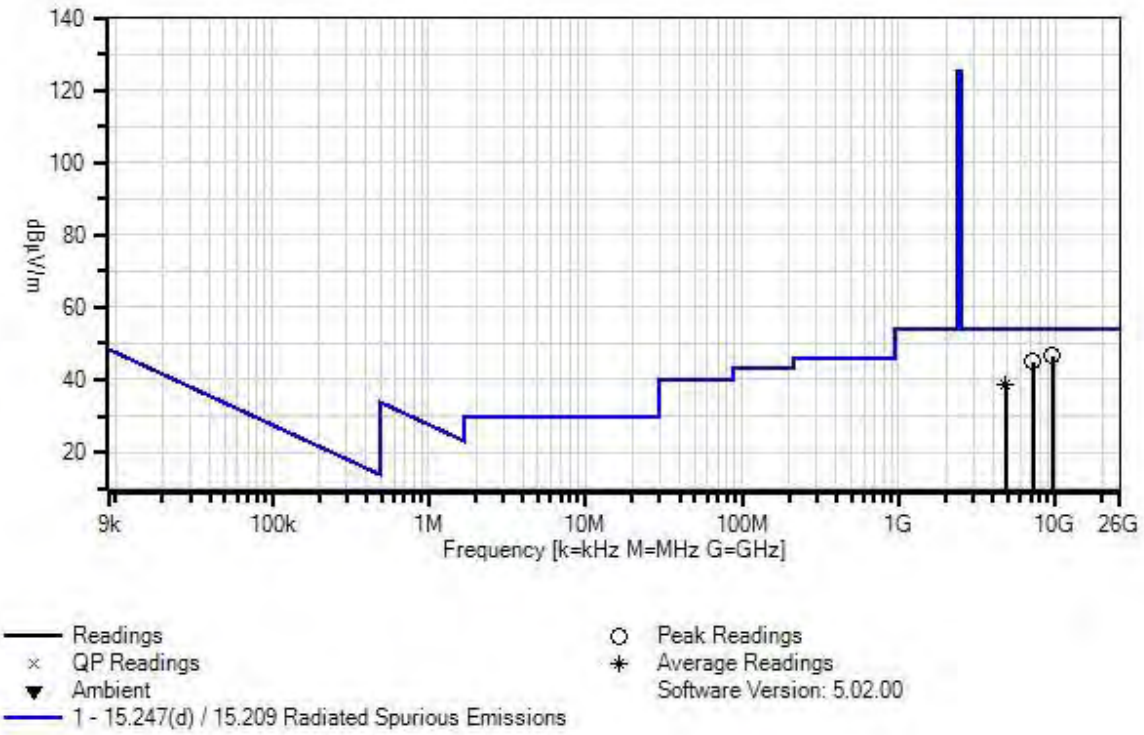
Application: Tera-Term version 4.68 as a terminal Program for ISM radio and Nordic Master Control panel version 1.17 for BTLE module.
Temperature: 22.3°C
Relative Humidity: 39 %
Atmospheric Pressure: 101.2kPa
High Clock: 40MHz
Transmitting operating frequency= 2402, 2440 and 2480MHz for Bluetooth
Transmitting operating frequency= 902.5, 915 and 927MHz for ISM
Gain of the antenna for Bluetooth= 1dBi
Gain of the antenna for ISM= 2dBi
Method: ANSI C63. 10 2009

Frequency range of measurement = 9 kHz- 25GHz.
9 kHz - 150 kHz -> RBW=200 Hz VBW=200 Hz
150 kHz - 30 MHz -> RBW=9 kHz VBW=9 kHz
30 MHz - 1000MHz -> RBW=120 kHz VBW=120 kHz
1000MHz to 25000MHz-> RBW =1MHz VBW=1MHz

The EUT is operated at 6 VDC by Battery and set to continuously transmitting as intended. The EUT is not connected to any support devices.

Note: BLE on TX Mode
Low Channel

Davis Instruments WO#: 97540 Sequence#: 34 Date: 10/13/2015
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters



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	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T3	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
T4	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
T5	ANP06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
	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	1/23/2014	1/23/2016
	ANP00929	Cable	various	1/23/2014	1/23/2016
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	4/2/2014	4/2/2016
	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 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	9607.505M	55.7	-57.2 +1.6	+38.6 +0.2	+2.4	+5.4	+0.0	46.7	54.0	-7.3	Vert
2	7206.290M	58.9	-58.3 +1.3	+35.9 +0.2	+2.0	+5.0	+0.0	45.0	54.0	-9.0	Vert
3	4803.170M Ave	56.4	-57.8 +1.1	+33.2 +0.2	+1.7	+3.8	+0.0	38.6	54.0	-15.4	Vert
^	4803.170M	73.2	-57.8 +1.1	+33.2 +0.2	+1.7	+3.8	+0.0	55.4	54.0	+1.4	Vert

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Davis Instruments**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**97540**	Date:	10/13/2015
Test Type:	**Radiated Scan**	Time:	19:09:31
Tested By:	Hieu Song Nguyenpham	Sequence#:	37
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

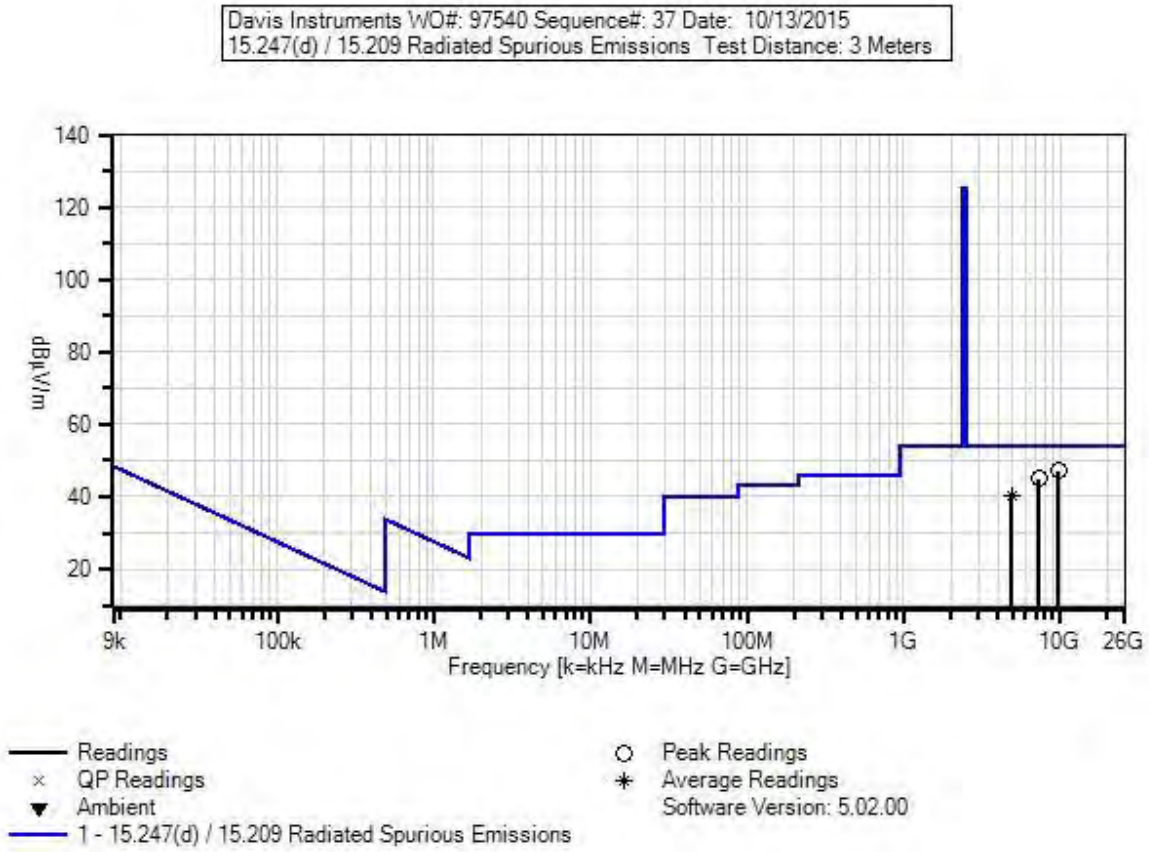
Radiated Spurious Emission
Frequency Range: 1000MHz to 25000MHz

Application: Tera-Term version 4.68 as a terminal Program for ISM radio and Nordic Master Control panel version 1.17 for BTLE module.
Temperature: 22.3°C
Relative Humidity: 39 %
Atmospheric Pressure: 101.2 kPa
High Clock: 40MHz
Transmitting operating frequency= 2402, 2440 and 2480MHz for Bluetooth
Transmitting operating frequency= 902.5, 915 and 927MHz for ISM
Gain of the antenna for Bluetooth= 1dBi
Gain of the antenna for ISM= 2dBi
Method: ANSI C63. 10 2009

Frequency range of measurement = 9 kHz- 25GHz.
9 kHz - 150 kHz -> RBW=200 Hz VBW=200 Hz
150 kHz - 30 MHz -> RBW=9 kHz VBW=9 kHz
30 MHz - 1000MHz -> RBW=120 kHz VBW=120 kHz
1000MHz to 25000MHz-> RBW =1MHz VBW=1MHz

The EUT is operated at 6 VDC by Battery and set to continuously transmitting as intended. The EUT is not connected to any support devices.

Note: BLE on TX Mode
Middle Channel


Davis Instruments WO#: 97540 Sequence#: 37 Date: 10/13/2015
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
10G
26G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.02.00

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
T2	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T3	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
T4	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
T5	ANP06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
	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	1/23/2014	1/23/2016
	ANP00929	Cable	various	1/23/2014	1/23/2016
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	4/2/2014	4/2/2016
	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 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	9810.330M	55.7	-57.6 +1.7	+39.1 +0.2	+2.4	+5.6	+0.0	47.1	54.0	-6.9	Vert
2	7320.525M	58.2	-58.3 +1.3	+36.4 +0.2	+2.1	+5.0	+0.0	44.9	54.0	-9.1	Vert
3	4879.873M Ave	57.5	-57.6 +1.1	+33.4 +0.2	+1.7	+3.8	+0.0	40.1	54.0	-13.9	Vert
^	4879.873M	71.7	-57.6 +1.1	+33.4 +0.2	+1.7	+3.8	+0.0	54.3	54.0	+0.3	Vert

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Davis Instruments**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**97540**	Date:	10/13/2015
Test Type:	**Radiated Scan**	Time:	19:29:41
Tested By:	Hieu Song Nguyenpham	Sequence#:	40
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

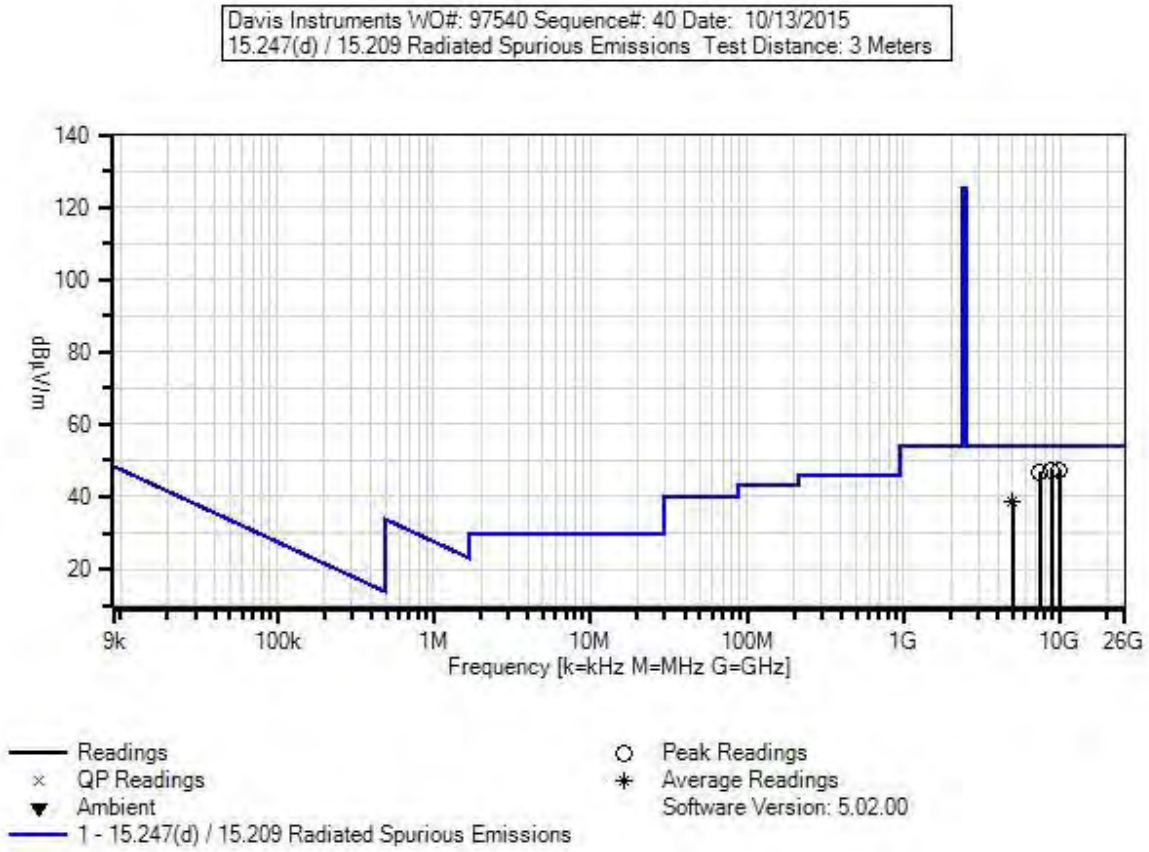
Radiated Spurious Emission
Frequency Range: 1000MHz to 25000MHz

Application: Tera-Term version 4.68 as a terminal Program for ISM radio and Nordic Master Control panel version 1.17 for BTLE module.
Temperature: 22.3°C
Relative Humidity: 39 %
Atmospheric Pressure: 101.2kPa
High Clock: 40MHz
Transmitting operating frequency= 2402, 2440 and 2480MHz for Bluetooth
Transmitting operating frequency= 902.5, 915 and 927MHz for ISM
Gain of the antenna for Bluetooth= 1dBi
Gain of the antenna for ISM= 2dBi
Method: ANSI C63. 10 2009

Frequency range of measurement = 9 kHz- 25GHz.
9 kHz - 150 kHz -> RBW=200 Hz VBW=200 Hz
150 kHz - 30 MHz -> RBW=9 kHz VBW=9 kHz
30 MHz - 1000MHz -> RBW=120 kHz VBW=120 kHz
1000MHz to 25000MHz-> RBW =1MHz VBW=1MHz

The EUT is operated at 6 VDC by Battery and set to continuously transmitting as intended. The EUT is not connected to any support devices.

Note: BLE on TX Mode
High Channel


Davis Instruments WO#: 97540 Sequence#: 40 Date: 10/13/2015
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
10G
26G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.02.00

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
T2	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T3	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
T4	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
T5	ANP06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
	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	1/23/2014	1/23/2016
	ANP00929	Cable	various	1/23/2014	1/23/2016
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	4/2/2014	4/2/2016
	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 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	9898.198M	55.7	-57.7 +1.7	+39.4 +0.2	+2.4	+5.7	+0.0	47.4	54.0	-6.6	Vert
2	8829.724M	56.2	-56.2 +1.6	+38.0 +0.3	+2.3	+5.1	+0.0	47.3	54.0	-6.7	Vert
3	7438.978M	59.7	-58.2 +1.4	+36.6 +0.2	+2.1	+5.1	+0.0	46.9	54.0	-7.1	Vert
4	4959.888M Ave	55.5	-57.3 +1.1	+33.5 +0.2	+1.7	+3.8	+0.0	38.5	54.0	-15.5	Vert
^	4959.888M	69.7	-57.3 +1.1	+33.5 +0.2	+1.7	+3.8	+0.0	52.7	54.0	-1.3	Vert

Band Edge Test Conditions / Setup

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	**Davis Instrument**		
Specification:	**Band Edge Set up**		
Work Order #:	**97540**	Date:	10/16/2015
Test Type:	**Radiated Measurement**	Time:	
Tested By:	Hieu Song Nguyenpham	Sequence#:	
Software:	EMITest 5.02.00		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna - ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
T3	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
	03471	Spectrum Analyzer	E4440A	12/19/2013	12/19/2015

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

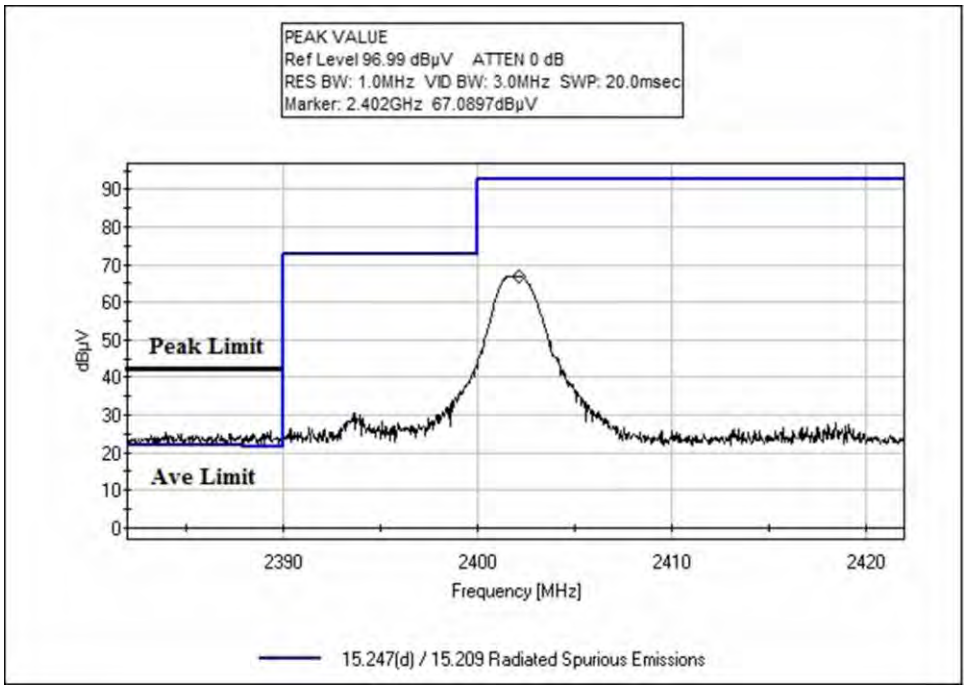
Band edge Set up

Application: Tera-Term version 4.68 as a terminal Program for ISM radio and Nordic Master Control panel version 1.17 for BTLE module.
Temperature: 22.3°C
Relative Humidity: 39 %
Atmospheric Pressure: 101.2kPa
High Clock: 40MHz
Transmitting operating frequency= 2402, 2440 and 2480MHz for Bluetooth
Transmitting operating frequency= 902.5, 915 and 927MHz for ISM
Gain of the antenna for Bluetooth= 1dBi
Gain of the antenna for ISM= 2dBi
Method: KDB 558074 v03r03 section 13.2

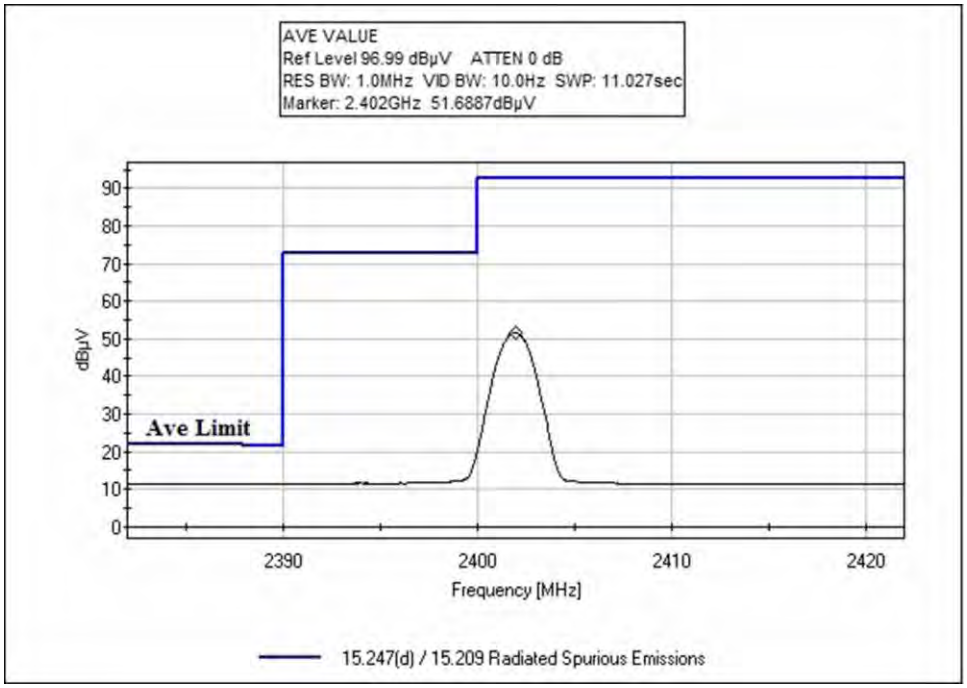
The EUT is placed on the table and set to continuously transmitting or receiving as intended.

Note: BLE Band on TX Mode.

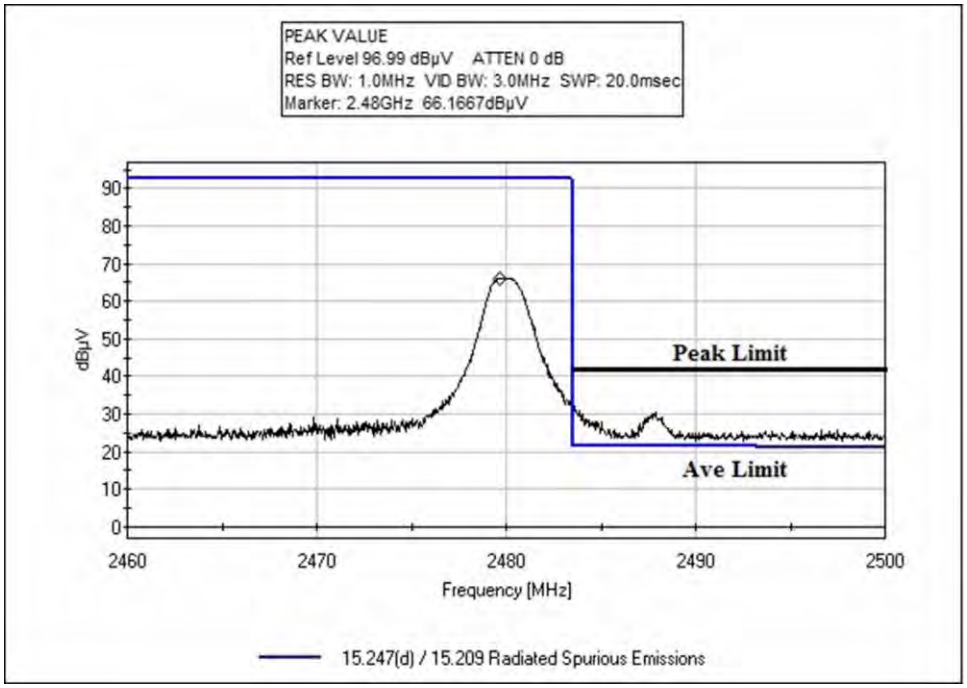
Band Edge Plots



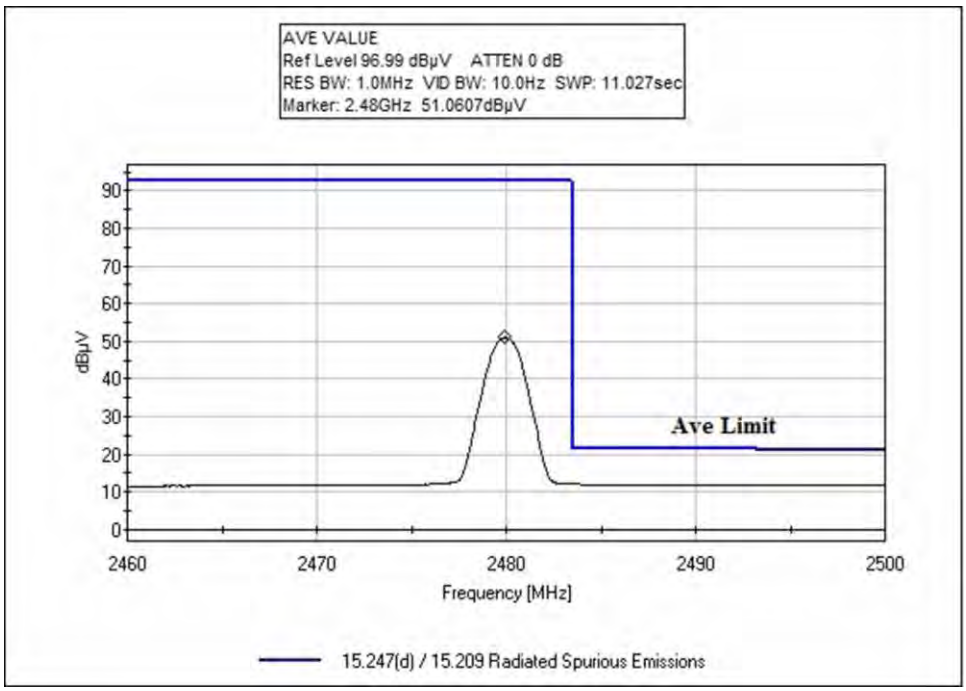
Low Channel



Low Channel



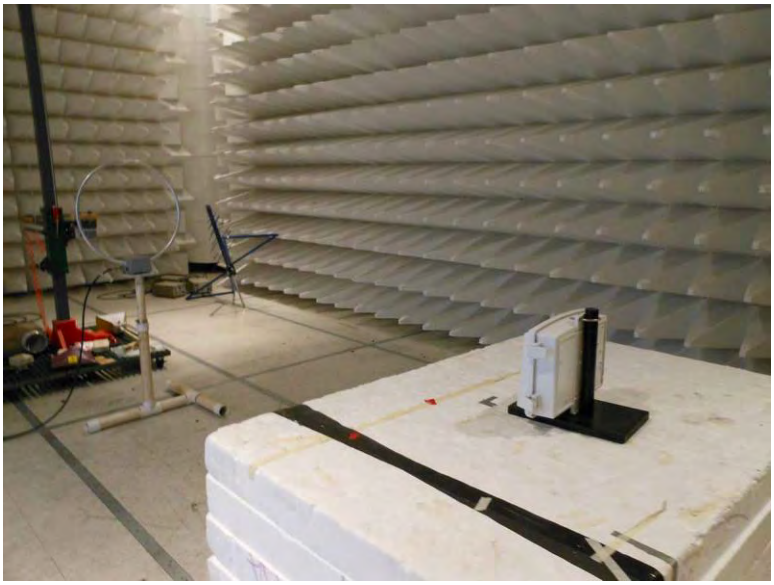
High Channel



High Channel

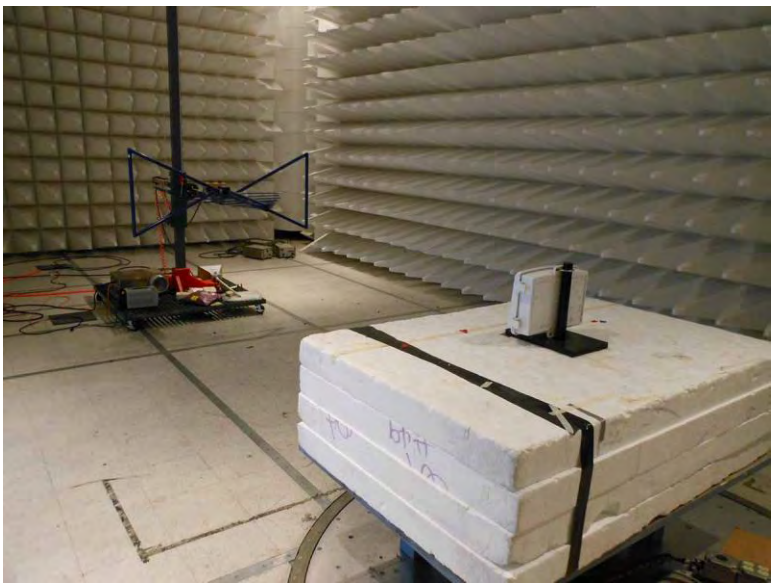
Test Setup Photo(s)

9kHz-30MHz

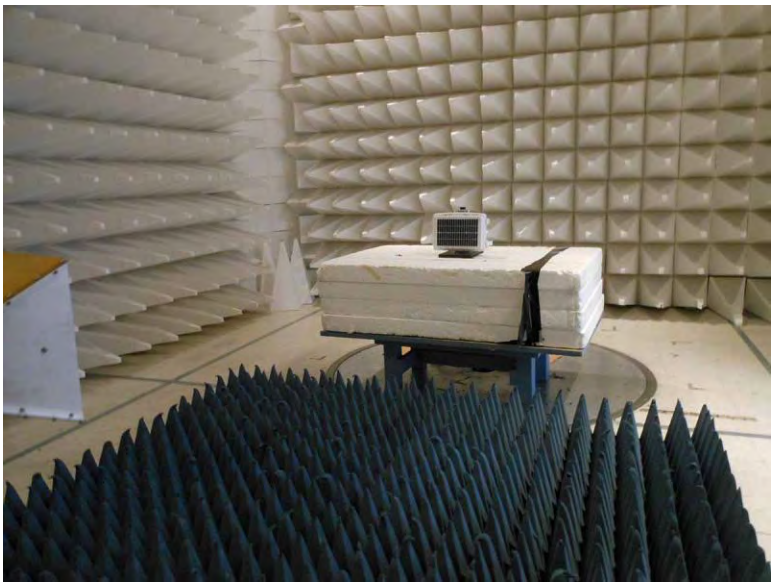


9kHz-30MHz

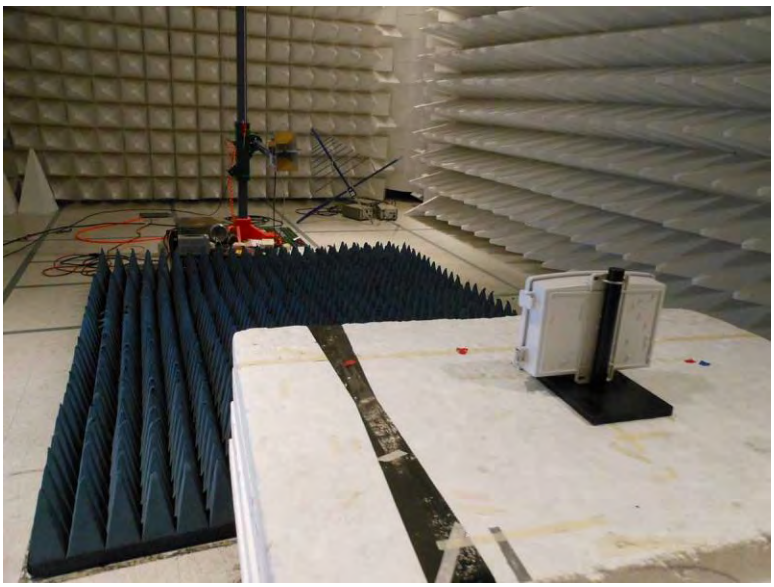
30MHz-1GHz



30MHz-1GHz

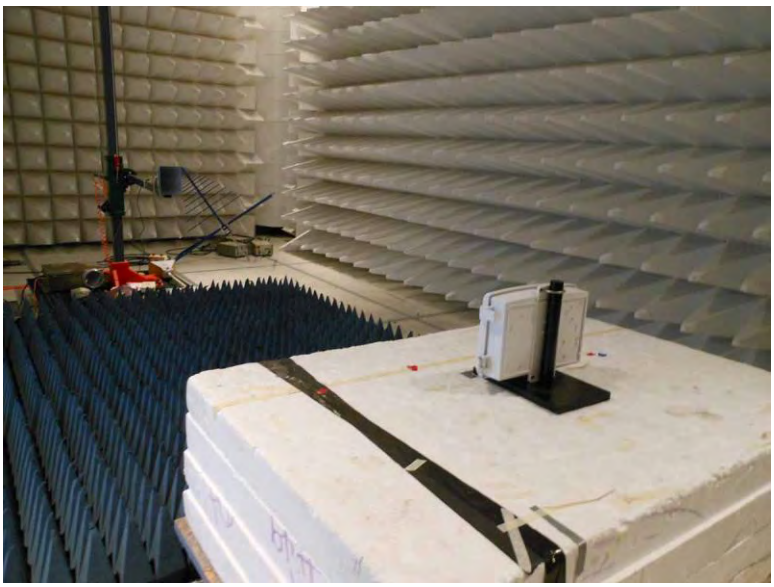


1-12GHz



1-12GHz

12-25GHz



12-25GHz

SUPPLEMENTAL INFORMATION

Emissions Test Details

TESTING PARAMETERS

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

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

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

CORRECTION FACTORS

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

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

TEST INSTRUMENTATION AND ANALYZER SETTINGS

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

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

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

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

Peak

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

Quasi-Peak

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

Average

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