

Nextivity, Inc.

TEST REPORT FOR

Bluetooth LE Module Model: MBL

Tested To The Following Standards:

FCC Part 15 Subpart C Sections
15.207 & 15.247

Report No.: 96100-13

Date of issue: October 29, 2014



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.

TABLE OF CONTENTS

Administrative Information	3
Test Report Information	3
Report Authorization	3
Test Facility Information	4
Software Versions	4
Site Registration & Accreditation Information	4
Summary of Results	5
Modifications/Conditions During Testing	5
Equipment Under Test	6
Peripheral Devices	6
15.207 Conducted Emissions	7
15.247(a)(2) -6dB bandwidth	14
15.247(b)(3) RF Power Output	17
15.247(d) Radiated Spurious Emissions and Band Edge	20
15.247(e) Power Spectral Density	27
Supplemental Information	31
Measurement Uncertainty	31
Emissions Test Details	31

ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Nextivity, Inc.
12230 World Trade Dr.
San Diego, CA 92128

Representative: Chiu Keung Li
Customer Reference Number: 002066

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: 96100

September 25, 2014

September 25-30 and October 1-2, 2014

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.

A handwritten signature in black ink that reads "Steve Behm".

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.
110 Olinda Place
Brea, CA 92823

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.00.14

Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Brea A	US0060	SL2-IN-E-1146R	3082D-1	90473	A-0147

SUMMARY OF RESULTS

Standard / Specification: FCC Part(s) 15.247

Test Procedure/Method	Description	Modifications*	Results
15.207 / ANSI C63.4	Conducted Emissions	NA	Pass
15.247(a)(2) / KDB 558074 D01 DTS Measurement Guidance v03r02	6 dB Bandwidth	NA	Pass
15.247(b)(3) / KDB 558074 D01 DTS Measurement Guidance v03r02	RF Power Output	NA	Pass
15.247(d) / KDB 558074 D01 DTS Measurement Guidance v03r02 / ITU-R 55/1 DA 00-705	Radiated Spurious Emissions and Bandedge	NA	Pass
15.247(e) / KDB 558074 D01 DTS Measurement Guidance v03r02	Power Spectral Density	NA	Pass

NA=Not Applicable

Modifications*/Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
A laptop and mouse were used for programming the EUT via the service port of the EUT. The laptop and mouse appear in the setup photo for convenience purposes only. During testing, the laptop and mouse were NOT exercising the EUT.
No modifications were made during testing.

***Modifications listed above must be incorporated into all production units.**

EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST

Bluetooth LE Module

Manuf: Nextivity, Inc.

Model: MBLE

Serial: NA

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Power Supply

Manuf: Hon-Kwang

Model: HK-AB-120A250

Serial: E30000147

Smart Signal Booster

Manuf: Nextivity, Inc.

Model: Cel-Fi-P34-2/4/5/12CU

Serial: 901422000008

15.207 Conducted Emissions

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) CFR 47 Section 15 Subpart C requirements for Intentional Radiators.

Test Data

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92821 • 714 993 6112

Customer: **Nextivity, Inc.**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **96100** Date: 10/2/2014
 Test Type: **Conducted Emissions** Time: 13:24:13
 Equipment: **Bluetooth LE Module** Sequence#: 3
 Manufacturer: Nextivity, Inc. Tested By: E. Wong
 Model: MBLE 110V 60Hz
 S/N: NA

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02672	Spectrum Analyzer	E4446A	8/14/2013	8/14/2015
T1	ANP06084	Attenuator	SA18N10W-06	12/14/2012	12/14/2014
T2	ANP04358	Cable	RG142	3/12/2014	3/12/2016
T3	AN02610	High Pass Filter	HE9615-150K-50-720B	9/25/2013	9/25/2015
T4	AN00847.1	50uH LISN-Line 1 (dB)	3816/2NM	6/26/2014	6/26/2015
	AN00847.1	50uH LISN-Line 2 (dB)	3816/2NM	6/26/2014	6/26/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Bluetooth LE Module*	Nextivity, Inc.	MBLE	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Hon-Kwang	HK-AB-120A250	E30000147
Smart Signal Booster	Nextivity, Inc.	Cel-Fi-P34-2/4/5/12CU	901422000008

Test Conditions / Notes:

The EUT seeking Modular Approval is installed in a support Signal booster placed on test bench, the orientation of the booster is positioned as intended.

The EUT is pre-programmed to transmit in the test frequency prior to installation.

Protocol : Bluetooth LE

Freq: 2400MHz

Smart Signal Booster Turned on.

Protocol: Maximum noise level

Freq: 1989MHz

Frequency range of measurement = 150kHz- 30MHz.

150 kHz-30 MHz;RBW=9 kHz,VBW=9kHz

Test environment conditions:

Temperature: 28°C

Relative Humidity: 54%

Pressure: 101kPa

Ext Attn: 0 dB

Measurement Data:

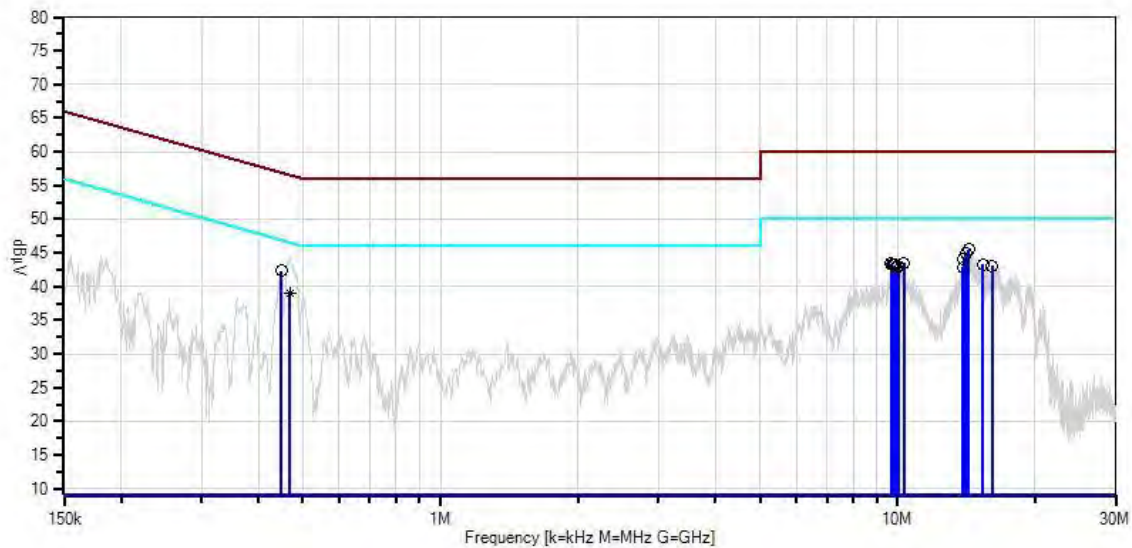
Reading listed by margin.

Test Lead: Black

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	14.301M	39.2	+5.8	+0.3	+0.1	+0.1	+0.0	45.5	50.0	-4.5	Black
2	448.153k	36.1	+5.8	+0.1	+0.3	+0.0	+0.0	42.3	46.9	-4.6	Black
3	14.130M	38.6	+5.8	+0.3	+0.1	+0.1	+0.0	44.9	50.0	-5.1	Black
4	13.941M	37.8	+5.8	+0.3	+0.1	+0.1	+0.0	44.1	50.0	-5.9	Black
5	10.319M	37.1	+5.8	+0.3	+0.1	+0.2	+0.0	43.5	50.0	-6.5	Black
6	9.670M	37.0	+5.8	+0.3	+0.1	+0.2	+0.0	43.4	50.0	-6.6	Black
7	15.400M	37.0	+5.8	+0.3	+0.1	+0.1	+0.0	43.3	50.0	-6.7	Black
8	9.725M	36.8	+5.8	+0.3	+0.1	+0.2	+0.0	43.2	50.0	-6.8	Black
9	9.815M	36.8	+5.8	+0.3	+0.1	+0.2	+0.0	43.2	50.0	-6.8	Black
10	9.860M	36.8	+5.8	+0.3	+0.1	+0.2	+0.0	43.2	50.0	-6.8	Black

11	10.040M	36.7	+5.8	+0.3	+0.1	+0.2	+0.0	43.1	50.0	-6.9	Black
12	16.085M	36.8	+5.8	+0.3	+0.1	+0.1	+0.0	43.1	50.0	-6.9	Black
13	9.968M	36.5	+5.8	+0.3	+0.1	+0.2	+0.0	42.9	50.0	-7.1	Black
14	13.914M	36.6	+5.8	+0.3	+0.1	+0.1	+0.0	42.9	50.0	-7.1	Black
15	467.788k	32.8	+5.8	+0.1	+0.3	+0.0	+0.0	39.0	46.6	-7.6	Black
Ave											
^	467.788k	38.1	+5.8	+0.1	+0.3	+0.0	+0.0	44.3	46.6	-2.3	Black

CKC Laboratories, Inc. Date: 10/2/2014 Time: 13:24:13 Nextivity, Inc. WO#: 96100
15.207 AC Mains - Average Test Lead: Black 110V 60Hz Sequence#: 3 Ext ATTN: 0 dB



— Sweep Data
○ Peak Readings
* Average Readings
— Readings
× QP Readings
▼ Ambient
— 1 - 15.207 AC Mains - Average
— 2 - 15.207 AC Mains - Quasi-peak

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92821 • 714 993 6112

Customer: **Nextivity, Inc.**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **96100**
 Test Type: **Conducted Emissions**
 Equipment: **Bluetooth LE Module**
 Manufacturer: Nextivity, Inc.
 Model: MBLE
 S/N: NA

Date: 10/2/2014
 Time: 13:32:29
 Sequence#: 4
 Tested By: E. Wong
 110V 60Hz

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02672	Spectrum Analyzer	E4446A	8/14/2013	8/14/2015
T1	ANP06084	Attenuator	SA18N10W-06	12/14/2012	12/14/2014
T2	ANP04358	Cable	RG142	3/12/2014	3/12/2016
T3	AN02610	High Pass Filter	HE9615-150K-50-720B	9/25/2013	9/25/2015
	AN00847.1	50uH LISN-Line 1 (dB)	3816/2NM	6/26/2014	6/26/2015
T4	AN00847.1	50uH LISN-Line 2 (dB)	3816/2NM	6/26/2014	6/26/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Bluetooth LE Module*	Nextivity, Inc.	MBLE	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Hon-Kwang	HK-AB-120A250	E30000147
Smart Signal Booster	Nextivity, Inc.	Cel-Fi-P34-2/4/5/12CU	901422000008

Test Conditions / Notes:

The EUT seeking Modular Approval is installed in a support Signal booster placed on test bench, the orientation of the booster is positioned as intended.

The EUT is pre-programmed to transmit the test frequency prior to installation.

Protocol : Bluetooth LE
 Freq: 2402MHz

Smart Signal Booster Turned on.
 Protocol: Maximum noise level
 Freq: 1989MHz
 Frequency range of measurement = 150kHz- 30MHz.
 150kHz-30MHz;RBW=9kHz,VBW=9kHz

Test environment conditions:
 Temperature: 28°C
 Relative Humidity: 54%
 Pressure: 101kPa

Ext Attn: 0 dB

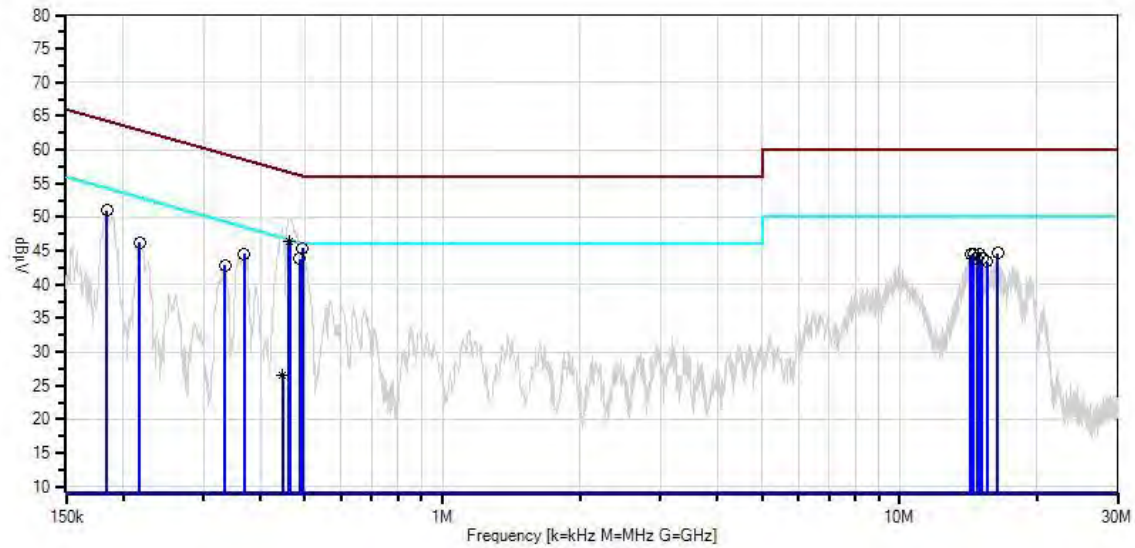
Measurement Data:

Reading listed by margin.

Test Lead: White

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	462.699k	40.2	+5.8	+0.1	+0.3	+0.0	+0.0	46.4	46.6	-0.2	White
Ave											
2	462.040k	40.1	+5.8	+0.1	+0.3	+0.0	+0.0	46.3	46.7	-0.4	White
Ave											
^	462.699k	44.0	+5.8	+0.1	+0.3	+0.0	+0.0	50.2	46.6	+3.6	White
4	494.696k	39.2	+5.8	+0.1	+0.3	+0.0	+0.0	45.4	46.1	-0.7	White
5	487.424k	37.6	+5.8	+0.1	+0.3	+0.0	+0.0	43.8	46.2	-2.4	White
6	184.179k	44.9	+5.8	+0.1	+0.2	+0.0	+0.0	51.0	54.3	-3.3	White
7	368.162k	38.4	+5.8	+0.1	+0.3	+0.0	+0.0	44.6	48.5	-3.9	White
8	16.391M	38.3	+5.8	+0.3	+0.1	+0.2	+0.0	44.7	50.0	-5.3	White
9	14.959M	38.2	+5.8	+0.3	+0.1	+0.2	+0.0	44.6	50.0	-5.4	White
10	14.499M	38.2	+5.8	+0.3	+0.1	+0.2	+0.0	44.6	50.0	-5.4	White
11	14.310M	38.0	+5.8	+0.3	+0.1	+0.2	+0.0	44.4	50.0	-5.6	White
12	14.788M	37.5	+5.8	+0.3	+0.1	+0.2	+0.0	43.9	50.0	-6.1	White
13	15.130M	37.4	+5.8	+0.3	+0.1	+0.2	+0.0	43.8	50.0	-6.2	White
14	334.710k	36.7	+5.8	+0.1	+0.3	+0.0	+0.0	42.9	49.3	-6.4	White
15	15.517M	37.0	+5.8	+0.3	+0.1	+0.2	+0.0	43.4	50.0	-6.6	White
16	217.630k	40.1	+5.8	+0.1	+0.2	+0.0	+0.0	46.2	52.9	-6.7	White
17	447.427k	20.3	+5.8	+0.1	+0.3	+0.0	+0.0	26.5	46.9	-20.4	White
Ave											
^	447.427k	42.2	+5.8	+0.1	+0.3	+0.0	+0.0	48.4	46.9	+1.5	White

CKC Laboratories, Inc. Date: 10/2/2014 Time: 13:32:29 Nextivity, Inc. WO#: 96100
 15.207 AC Mains - Average Test Lead: White 110V 60Hz Sequence#: 4 Ext ATTN: 0 dB



— Sweep Data	— Readings
○ Peak Readings	× QP Readings
* Average Readings	▼ Ambient
— 1 - 15.207 AC Mains - Average	— 2 - 15.207 AC Mains - Quasi-peak

Test Setup Photos



15.247(a)(2) -6dB bandwidth

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92821 • 714 993 6112

Customer: **Nextivity, Inc.**
 Specification: 15.247(a)(2) -6dB bandwidth
 Work Order #: **96100** Date: 9/26/2014
 Test Type: **Conducted Emissions** Time: 10:47:13
 Equipment: **Bluetooth LE Module** Sequence#: 2
 Manufacturer: Nextivity, Inc. Tested By: E. Wong
 Model: MBLE 110V 60Hz
 S/N: NA

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03430	Attenuator	75A-10-12	9/5/2013	9/5/2015
T2	AN02946	Cable	32022-2-2909K-36TC	7/31/2013	7/31/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Bluetooth LE Module*	Nextivity, Inc.	MBLE	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Hon-Kwang	HK-AB-120A250	E30000147
Smart Signal Booster	Nextivity, Inc.	Cel-Fi-P34-2/4/5/12CU	901422000008

Test Conditions / Notes:

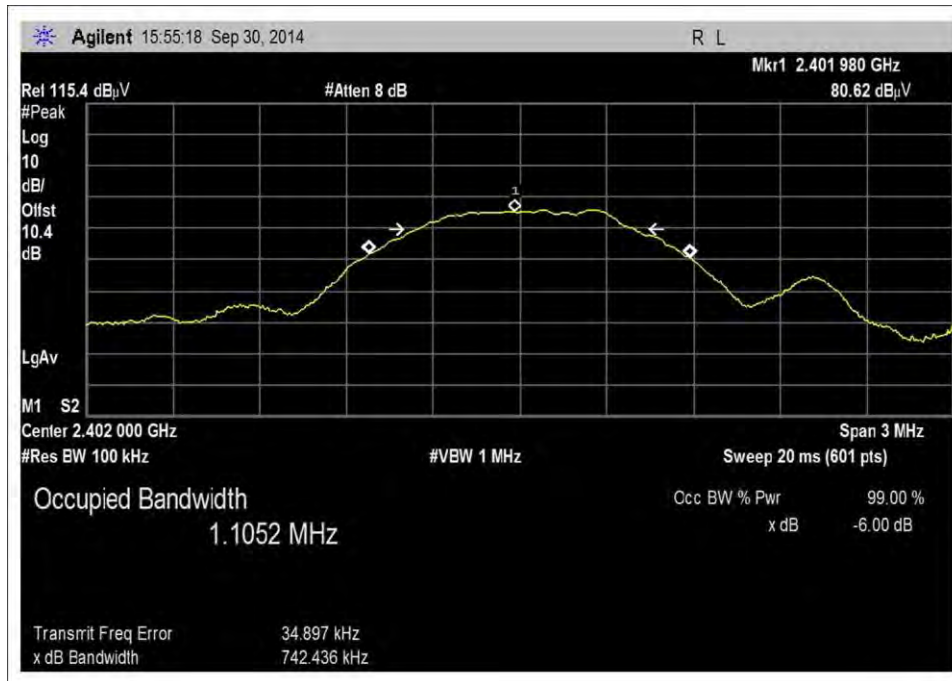
The EUT seeking Modular Approval is installed in a support Signal booster placed on the test bench.

The EUT is pre-programmed to transmit in the test frequency prior to installation.

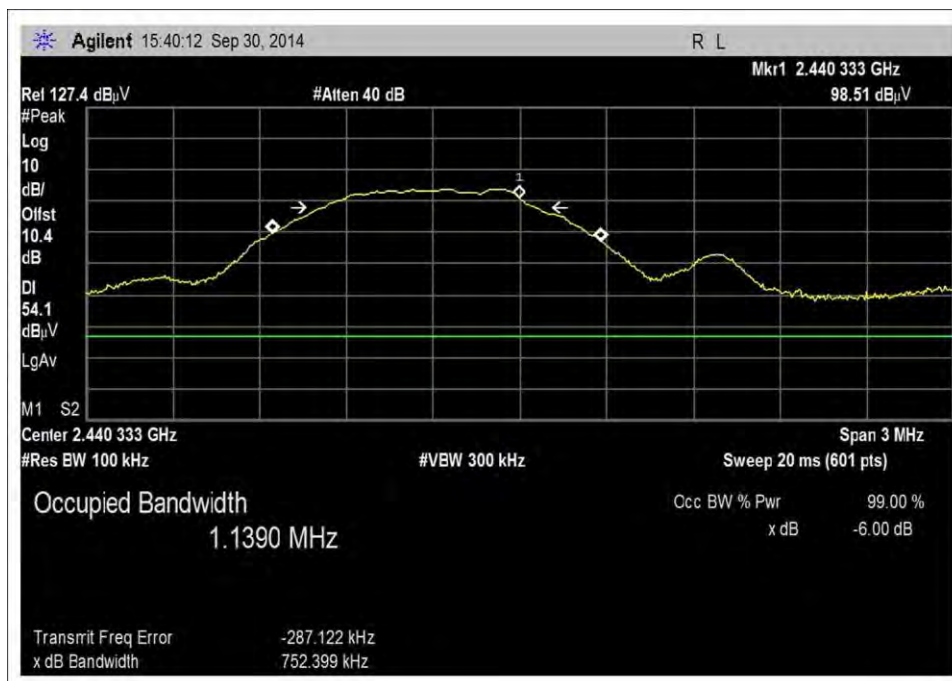
Protocol : Bluetooth LE
 Freq: 2402MHz, 2440MHz, 2480MHz
 Measurement performed IAW:
 KDB 558074 D01 DTS Meas Guidance v03r02 dated June 5, 2014, Claus: 8.1 DTS bandwidth, 8.1 Option1

Test environment conditions:
 Temperature: 28°C
 Relative Humidity: 54%
 Pressure: 101kPa

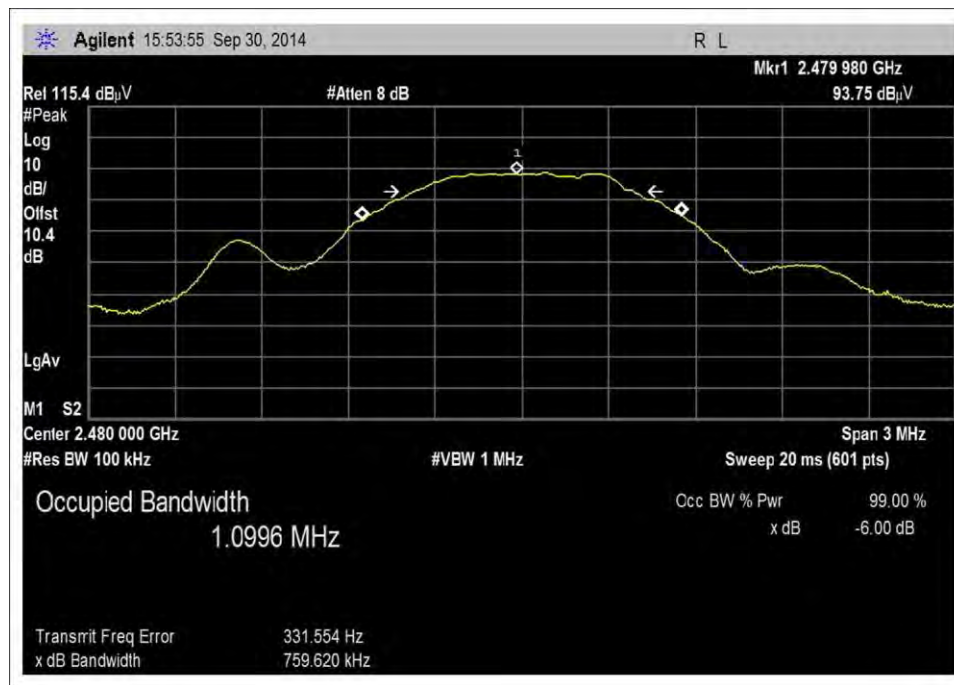
Test Data



-6dB, 2402MHz

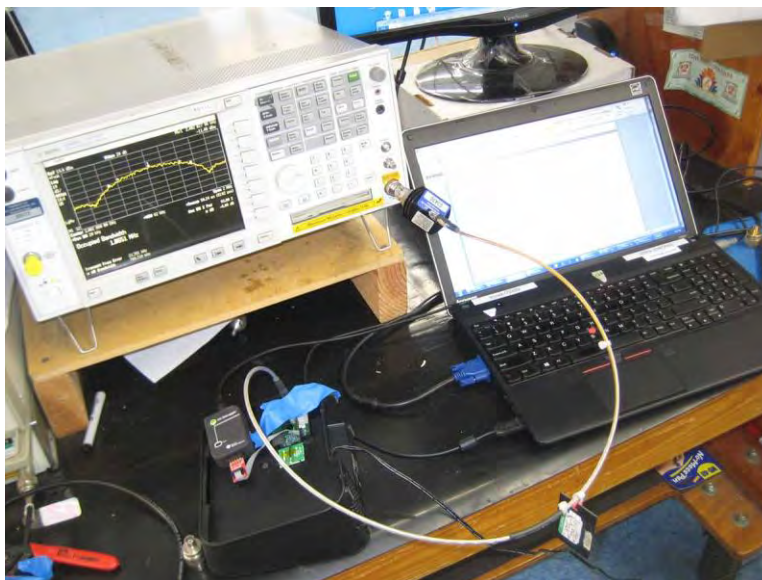


-6dB, 2440MHz



-6dB, 2480MHz

Test Setup Photo



15.247(b)(3) RF Power Output

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92821 • 714 993 6112

Customer: **Nextivity, Inc.**
 Specification: FCC15.247(b)(3) - RF Power Output
 Work Order #: **96100** Date: 9/26/2014
 Test Type: **Conducted Emissions** Time: 10:47:13
 Equipment: **Bluetooth LE Module** Sequence#: 2
 Manufacturer: Nextivity, Inc. Tested By: E. Wong
 Model: MBLE 110V 60Hz
 S/N: NA

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03430	Attenuator	75A-10-12	9/5/2013	9/5/2015
T2	AN02946	Cable	32022-2-2909K-36TC	7/31/2013	7/31/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Bluetooth LE Module*	Nextivity, Inc.	MBLE	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Hon-Kwang	HK-AB-120A250	E30000147
Smart Signal Booster	Nextivity, Inc.	Cel-Fi-P34-2/4/5/12CU	901422000008

Test Conditions / Notes:

The EUT seeking Modular Approval is installed in a support Signal booster placed on the test bench.

The EUT is pre-programmed to transmit in the test frequency prior to installation.

Protocol : Bluetooth LE

Freq: 2402MHz, 2440MHz, 2480MHz

Measurement performed IAW:

KDB 558074 D01 DTS Meas Guidance v03r02 dated June 5, 2014 , Claus : 9.1.1 RBW>= DTS bandwidth

15.31(e) compliance: the DC supply voltage of the varied between 85% of the nominal rated supply voltage and maximum declared voltage of 3.6 V, no change in the Fundamental signal level was observed.

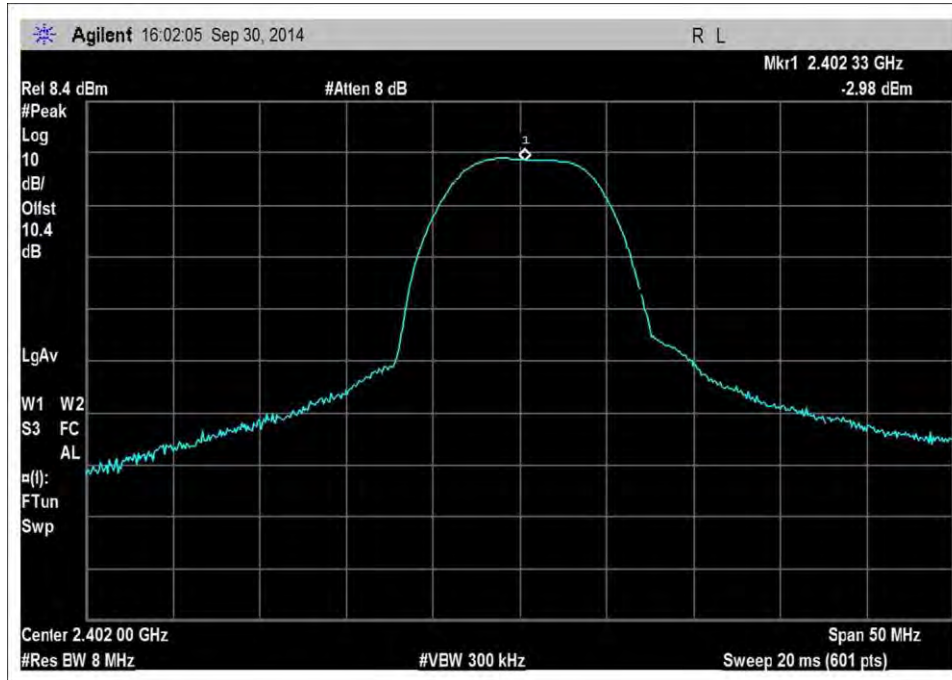
Test environment conditions:

Temperature: 28°C

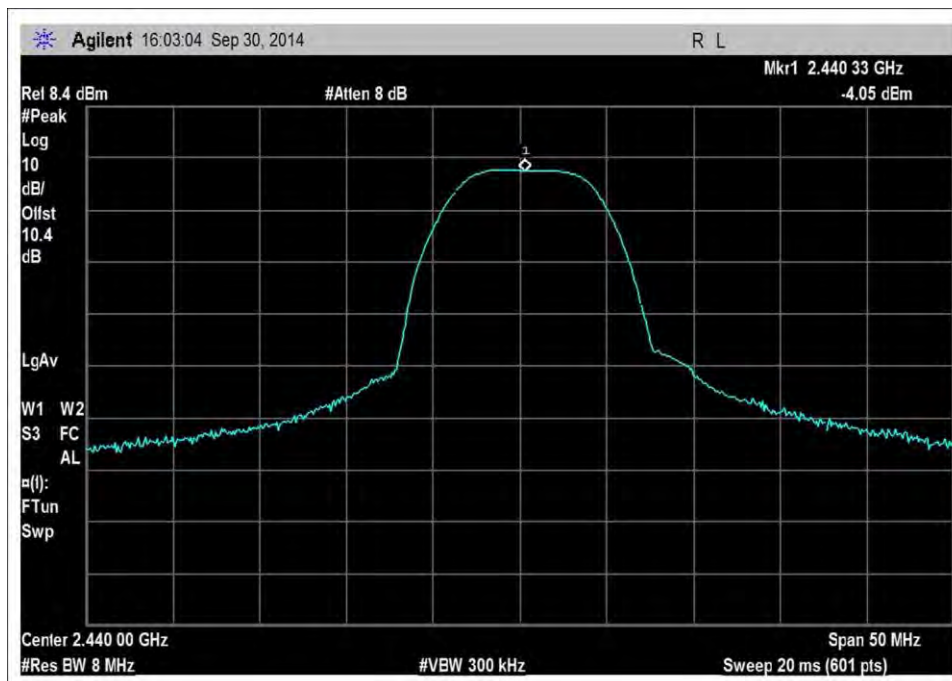
Relative Humidity: 54%

Pressure: 101kPa

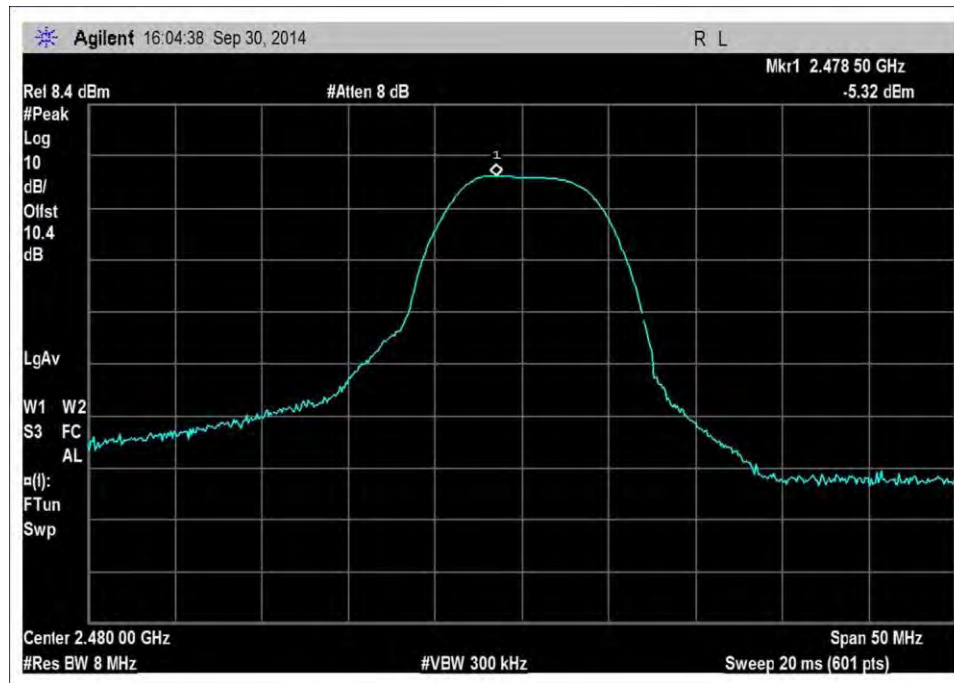
Test Data



RF Output Power, 2402MHz

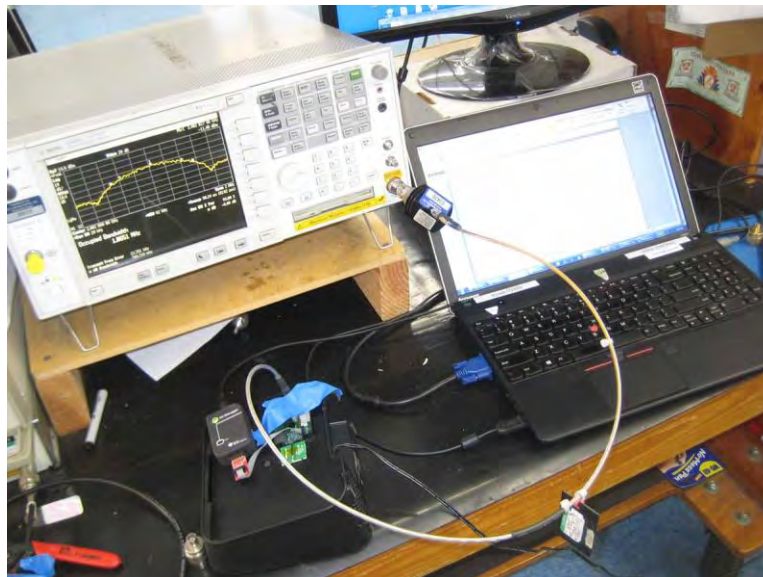


RF Output Power, 2440MHz



RF Output Power, 2480MHz

Test Setup Photo



15.247(d) Radiated Spurious Emissions and Band Edge

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92821 • 714 993 6112

Customer: **Nextivity, Inc.**

Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**

Work Order #: **96100**

Date: 9/30/2014

Test Type: **Radiated Scan**

Time: 14:16:34

Equipment: **Bluetooth LE Module**

Sequence#: 1

Manufacturer: Nextivity, Inc.

Tested By: E. Wong

Model: MBLE

S/N: NA

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	8/14/2013	8/14/2015
T2	AN00786	Preamp	83017A	4/25/2014	4/25/2016
T3	AN00849	Horn Antenna	3115	3/18/2014	3/18/2016
T4	ANP05421	Cable	Sucoflex 104A	1/8/2014	1/8/2016
T5	ANP06661	Cable	LDF1-50	4/15/2014	4/15/2016
T6	ANP06543	Cable	32022-29094K-29094K-24TC	11/20/2013	11/20/2015
T7	AN03385	High Pass Filter	11SH10-3000/T10000-O/O	6/5/2013	6/5/2015
T8	AN00309	Preamp	8447D	3/12/2014	3/12/2016
T9	AN01995	Biconilog Antenna	CBL6111C	4/30/2014	4/30/2016
T10	ANP05050	Cable	RG223/U	1/21/2013	1/21/2015
T11	ANP05198	Cable-Amplitude 15 to 45degC (dB)	8268	12/11/2012	12/11/2014
	AN00314	Loop Antenna	6502	7/2/2014	7/2/2016
	AN01413	Horn Antenna-ANSI C63.5 (dB/m)	84125-80008	11/9/2012	11/9/2014

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Bluetooth LE Module*	Nextivity, Inc.	MBLE	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Hon-Kwang	HK-AB-120A250	E30000147
Smart Signal Booster	Nextivity, Inc.	Cel-Fi-P34-2/4/5/12CU	901422000008

Test Conditions / Notes:

The EUT seeking Modular Approval is installed in a support Signal booster placed on Styrofoam block, the orientation of the booster is positioned as intended.

The EUT is pre-programmed to transmit in the test frequency prior to installation.

Freq range: 2402MHz - 2480MHz

Protocol: Bluetooth LE

Freq: 2402MHz, 2440MHz, 2480MHz

Frequency range of measurement = 9kHz- 25GHz.

9kHz-150kHz;RBW=200Hz,VBW=200Hz;150kHz-30MHz;RBW=9kHz,VBW=9kHz;30MHz-1000MHz;
RBW=120kHz,VBW=120 kHz,1000MHz-2500MHz;RBW=1 MHz,VBW=1MHz.

Test environment conditions:

Temperature: 28°C

Relative Humidity: 54%

Pressure: 101kPa

Ext Attn: 0 dB

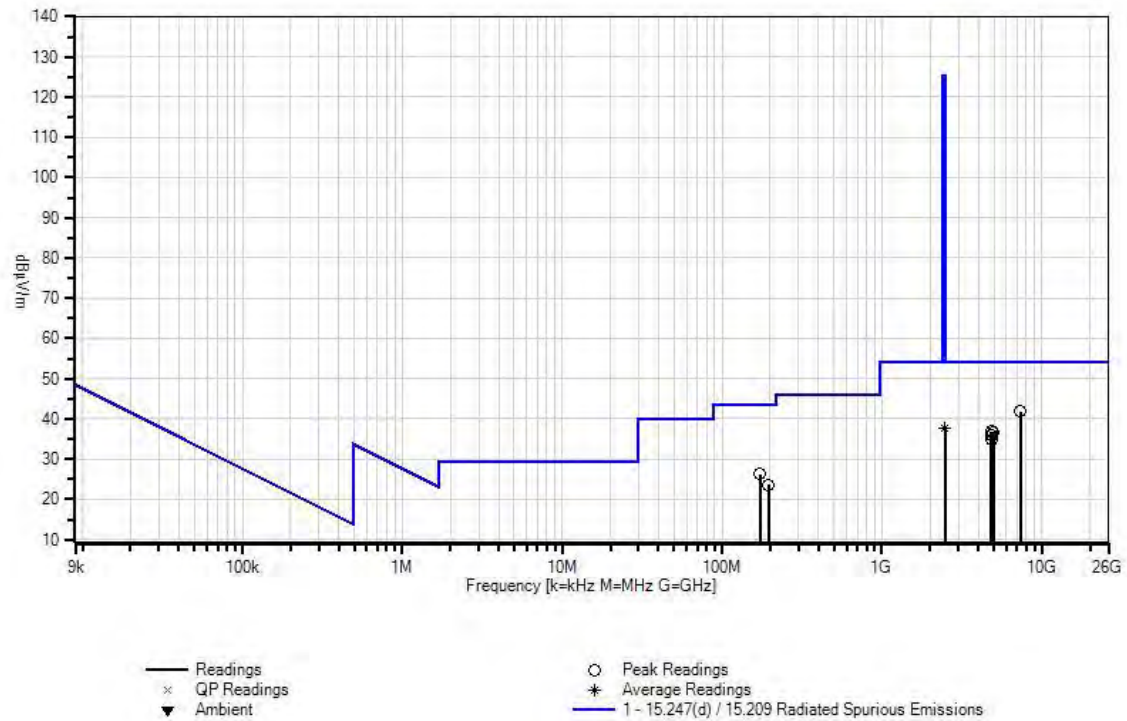
Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9	T2 T6 T10	T3 T7 T11	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	dB	dB	dB	dB	Table	dBμV/m	dBμV/m	dB	Ant
1	7320.000M	34.8	+0.0 +7.8 +0.0	-37.4 +0.8 +0.0	+33.2 +0.2 +0.0	+2.4 +0.0	+0.0	41.8	54.0	-12.2	Vert
2	2483.500M Ave	45.0	+0.0 +4.2 +0.0	-38.6 +0.4 +0.0	+25.4 +0.0 +0.0	+1.3 +0.0	+0.0	37.7	54.0	-16.3	Vert
^	2483.500M	54.7	+0.0 +4.2 +0.0	-38.6 +0.4 +0.0	+25.4 +0.0 +0.0	+1.3 +0.0	+0.0	47.4	54.0	-6.6	Vert
4	4804.000M	36.1	+0.0 +6.1 +0.0	-37.8 +0.6 +0.0	+29.9 +0.1 +0.0	+1.9 +0.0	+0.0	36.9	54.0	-17.1	Horiz
5	172.270M	42.4	+0.0 +0.0 +9.4	+0.0 +0.0 +0.2	+0.0 +0.0 +2.3	+0.0 -28.0	+0.0	26.3	43.5	-17.2	Vert
6	4960.000M	36.0	+0.0 +6.0 +0.0	-38.1 +0.6 +0.0	+30.1 +0.1 +0.0	+2.0 +0.0	+0.0	36.7	54.0	-17.3	Horiz
7	4804.000M	35.1	+0.0 +6.1 +0.0	-37.8 +0.6 +0.0	+29.9 +0.1 +0.0	+1.9 +0.0	+0.0	35.9	54.0	-18.1	Vert
8	4880.000M	34.1	+0.0 +6.0 +0.0	-38.0 +0.6 +0.0	+30.0 +0.2 +0.0	+2.0 +0.0	+0.0	34.9	54.0	-19.1	Horiz
9	195.267M	39.8	+0.0 +0.0 +9.1	+0.0 +0.0 +0.2	+0.0 +0.0 +2.5	+0.0 -28.0	+0.0	23.6	43.5	-19.9	Vert

CKC Laboratories, Inc. Date: 9/30/2014 Time: 14:16:34 Nextivity, Inc. WO#: 96100
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Sequence#: 1 Ext ATTN: 0 dB



Test Setup Photos



Band Edge

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92821 • 714 993 6112

Customer: **Nextivity, Inc.**

Specification: Bandedge plot

Work Order #: **96100**

Date: 9/26/2014

Test Type: **Conducted Emissions**

Time: 10:47:13

Equipment: **Bluetooth LE Module**

Sequence#: 2

Manufacturer: Nextivity, Inc.

Tested By: E. Wong

Model: MBLE

110V 60Hz

S/N: NA

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03430	Attenuator	75A-10-12	9/5/2013	9/5/2015
T2	AN02946	Cable	32022-2-2909K-36TC	7/31/2013	7/31/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Bluetooth LE Module*	Nextivity, Inc.	MBLE	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Hon-Kwang	HK-AB-120A250	E30000147
Smart Signal Booster	Nextivity, Inc.	Cel-Fi-P34-2/4/5/12CU	901422000008

Test Conditions / Notes:

The EUT seeking Modular Approval is installed in a support Signal booster placed on the test bench.

The EUT is pre-programmed to transmit in the test frequency prior to installation.

Protocol : Bluetooth LE

Freq: 2402MHz, 2440MHz, 2480MHz

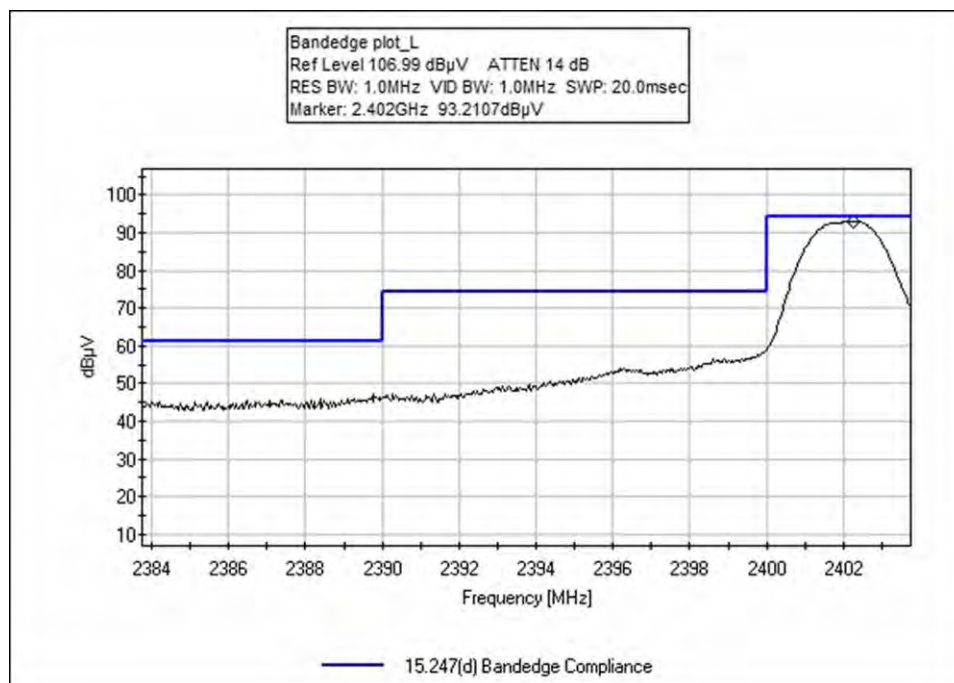
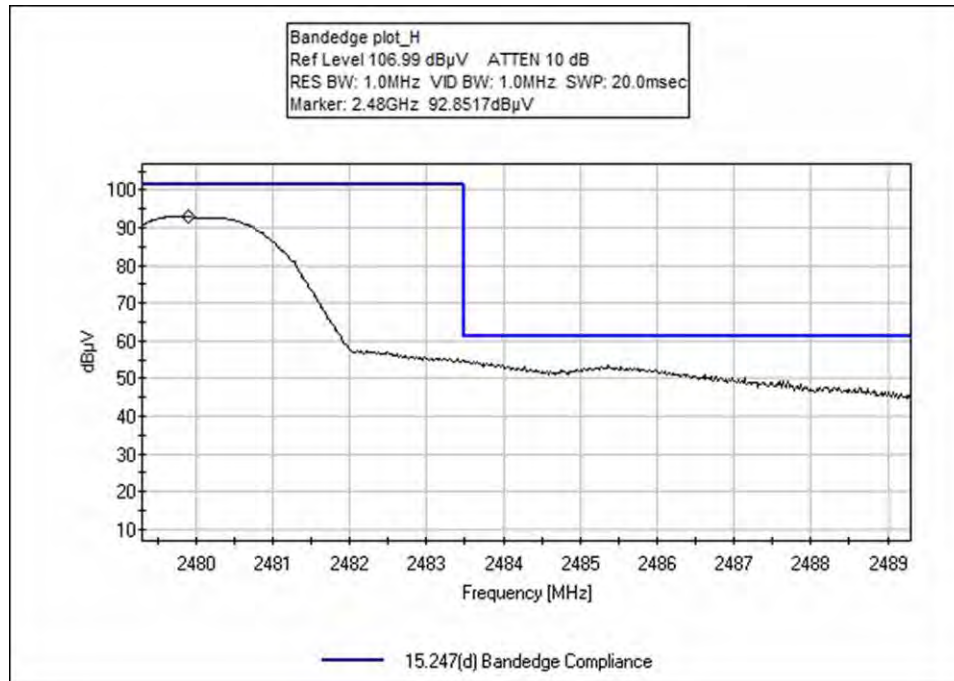
Test environment conditions:

Temperature: 28°C

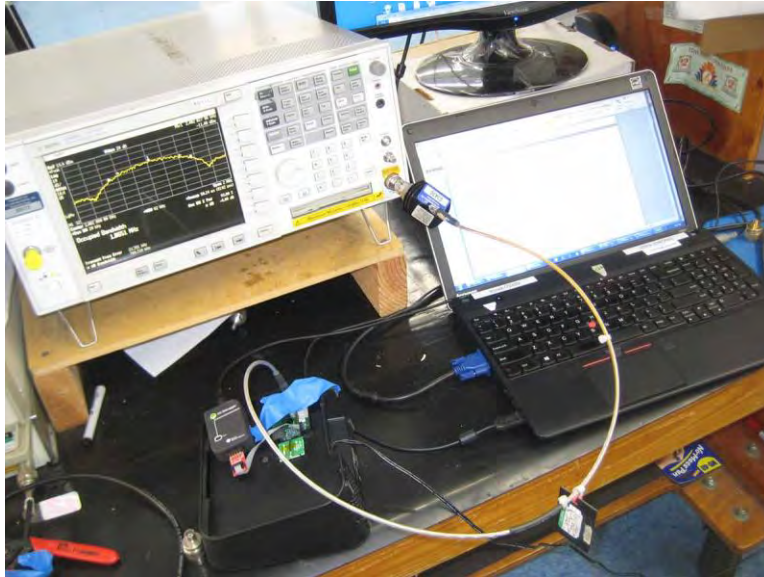
Relative Humidity: 54%

Pressure: 101kPa

Test Data



Test Setup Photo



15.247(e) Power Spectral Density

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92821 • 714 993 6112

Customer: **Nextivity, Inc.**
 Specification: FCC15.247(e) Power Spectral Density
 Work Order #: **96100** Date: 9/26/2014
 Test Type: **Conducted Emissions** Time: 10:47:13
 Equipment: **Bluetooth LE Module** Sequence#: 2
 Manufacturer: Nextivity, Inc. Tested By: E. Wong
 Model: MBLE 110V 60Hz
 S/N: NA

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03430	Attenuator	75A-10-12	9/5/2013	9/5/2015
T2	AN02946	Cable	32022-2-2909K-36TC	7/31/2013	7/31/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Bluetooth LE Module*	Nextivity, Inc.	MBLE	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Hon-Kwang	HK-AB-120A250	E30000147
Smart Signal Booster	Nextivity, Inc.	Cel-Fi-P34-2/4/5/12CU	901422000008

Test Conditions / Notes:

The EUT seeking Modular Approval is installed in a support Signal booster placed on the test bench..

The EUT is pre-programmed to transmit in the test frequency prior to installation.

Protocol : Bluetooth LE

Freq: 2402MHz, 2440MHz, 2480MHz

Measurement performed IAW :

KDB 558074 D01 DTS Meas Guidance v03r02 dated June 5, 2014 , Claus : 10.0 Maximum power spectral density level in the fundamental emission, 10.2 Method PKPSD (peak PSD).

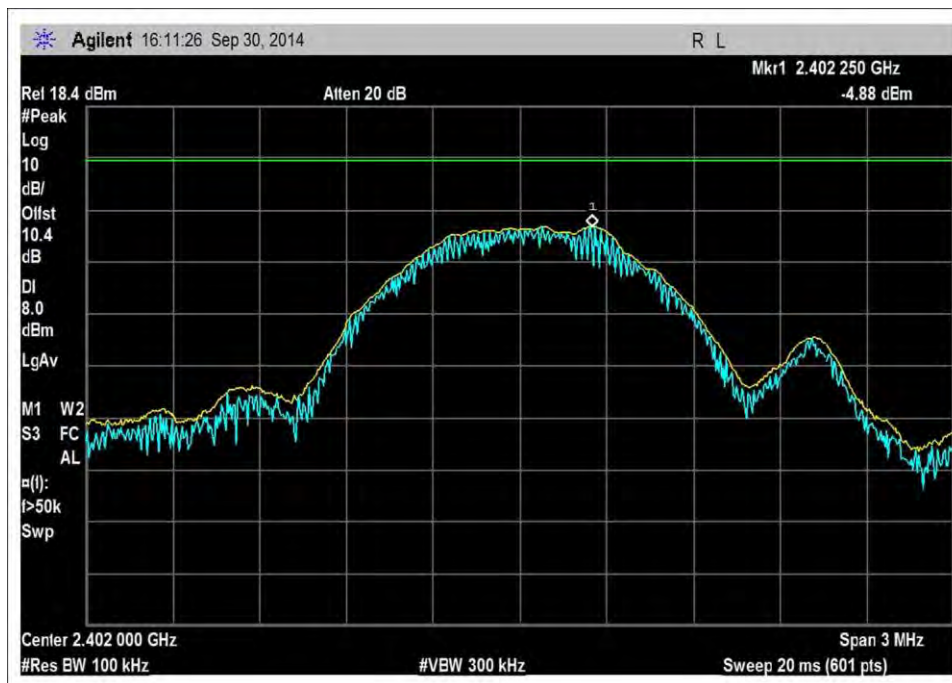
Test environment conditions:

Temperature: 28°C

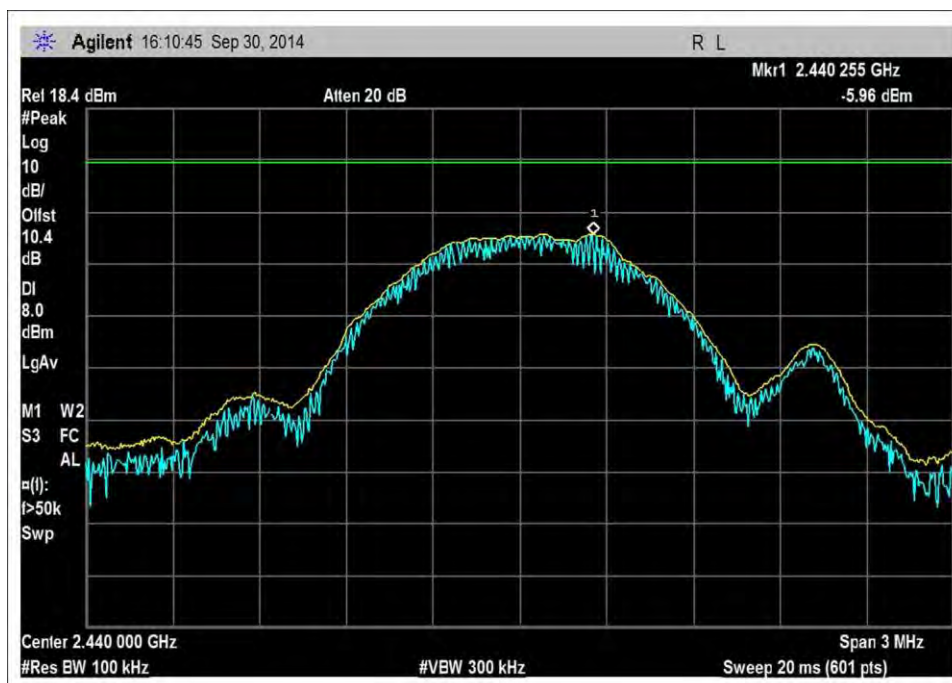
Relative Humidity: 54%

Pressure: 101kPa

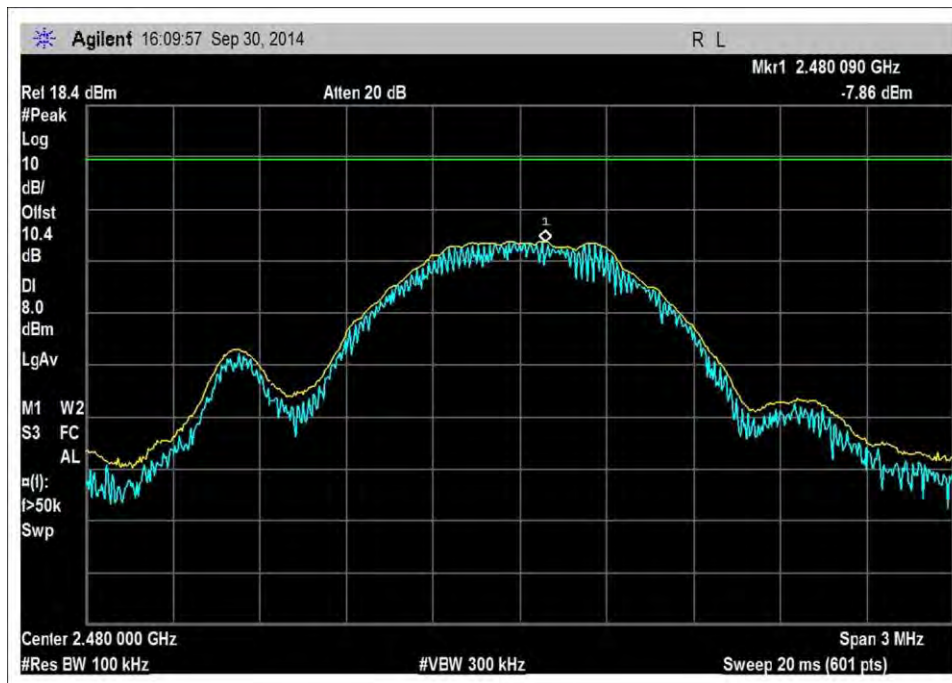
Test Data



PSD, 2402MHz

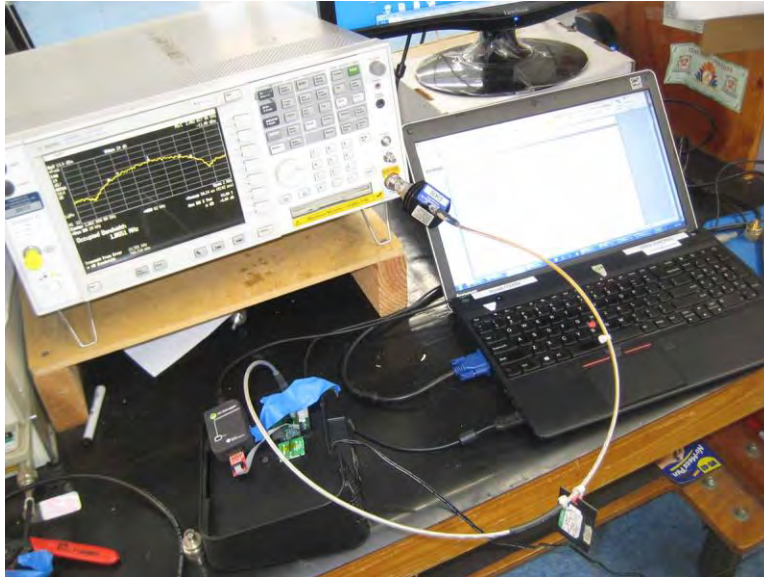


PSD, 2440MHz



PSD, 2480MHz

Test Setup Photo



SUPPLEMENTAL INFORMATION

Measurement Uncertainty

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

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. 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 dB μ V/m, the spectrum analyzer reading in dB μ V was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS		
	Meter reading	(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.