

# BluStor PMC

## TEST REPORT FOR

**Powered Smart Card  
Model: DFM2.0A**

**Tested To The Following Standards:**

**FCC Part 15 Subpart C Section 15.249**

**Report No.: 98130-7**

**Date of issue: April 18, 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:**

BluStor PMC  
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Kenosha WI 53142

**REPORT PREPARED BY:**

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Mariposa, CA 95338

Representative: Mark Bennett

Project Number: 98130

**DATE OF EQUIPMENT RECEIPT:**

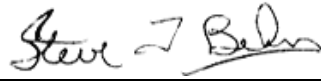
April 7, 2016

**DATE(S) OF TESTING:**

April 7-8/2016

### 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.  
110 Olinda Place  
Brea, CA 92623

## Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.02

## Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Brea D	US0060	SL2-IN-E-1146R	3082D-2	100638	A-0147

## SUMMARY OF RESULTS

### Standard / Specification: FCC Part 15 Subpart C - 15.249

Test Procedure	Description	Modifications	Results
15.215(c)	Occupied Bandwidth	NA	Pass
15.249(a)	Field Strength of Fundamental	NA	Pass
15.249(a)	Field Strength of Spurious Emissions	NA	Pass
15.207	AC Conducted Emissions	NA	NA <sup>1</sup>

NA = Not applicable

NA<sup>1</sup> = Not applicable because this equipment is battery powered and the manufacturer declares the equipment cannot operate while charging.

### Modifications During Testing

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

Summary of Conditions
No modifications were made during testing.

Modifications listed above must be incorporated into all production units.

### Conditions During Testing

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

Summary of Conditions
None

## EQUIPMENT UNDER TEST (EUT)

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

### Configuration 1

#### Equipment Tested:

Device	Manufacturer	Model #	S/N
Powered Smart Card	BluStor PMC	DFM2.0A	NA

#### Support Equipment:

Device	Manufacturer	Model #	S/N
USB Charger	Samsung	EP-TA20JWE	NA

### General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Rated Transmit Power:	+2dBm
Operating Frequency Range:	2402-2480MHz
OBW and Emissions Type(s):	1.2MHz, G7W
Modulation Type(s):	Bluetooth V4 modulation: GFSK, 8DPSK, pi/4-DQPSK BLE modulation: GFSK
Maximum Duty Cycle:	25%
Frequency Stability Info:	Remains within band in accordance with FCC 215(c)
Antenna Type(s) and Gain:	Taiyo Uden chip antenna, 1.9dBi
Antenna Connection Type:	Integral
Nominal Input Voltage:	3.7VDC
Firmware / Software used for Test:	99.1

## FCC Part 15 Subpart C

### 15.215(c) Occupied Bandwidth (20dB BW)

Test Setup/Conditions			
Test Location:	Brea Lab D	Test Engineer:	Don Nguyen
Test Method:	ANSI C63.10 (2013)	Test Date(s):	4/7/2016
Configuration:	1		
Test Setup:	<p>The EUT is placed on Styrofoam platform at 1.5m height. The EUT is set to transmit continuously at 99% duty cycle. USB charge is connected to the EUT during test. The manufacturer declares that the EUT will not be marketed with the USB charger.</p> <p>Operating frequency: 2402-2480MHz  Bluetooth V4 modulation: GFSK, 8DPSK, and pi/4-DQPSK  BLE modulation: GFSK</p> <p>Tested frequency: 2402MHz, 2441MHz, 2480MHz  RBW=VBW=1MHz  Note: The EUT is tested in three orthogonal axes</p>		

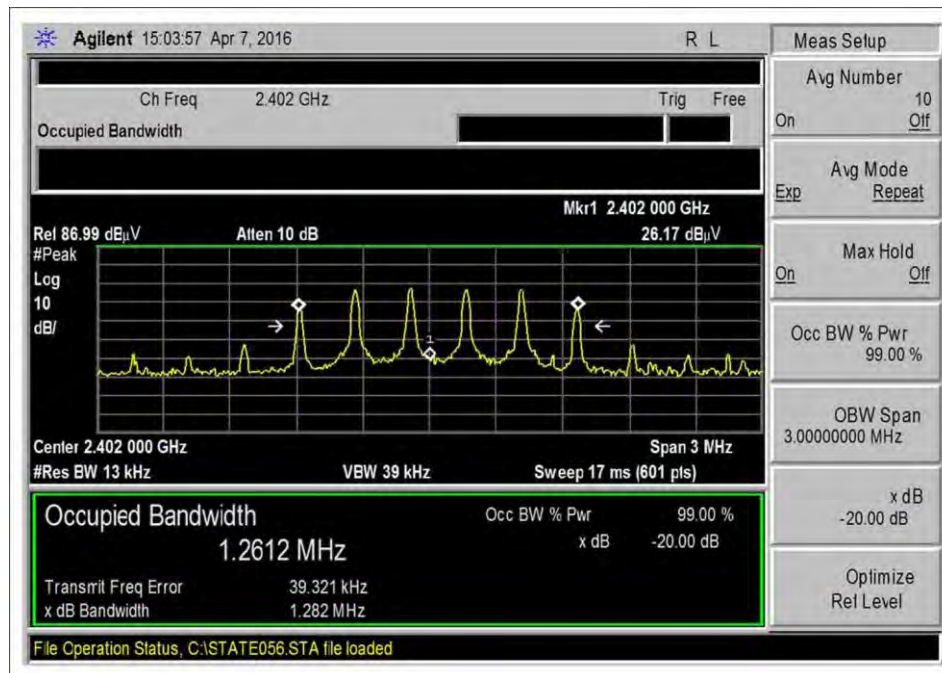
Environmental Conditions			
Temperature (°C)	17	Relative Humidity (%):	45

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
AN00787	Preamplifier	HP	83017A	6/10/2015	6/10/2017
AN01646	Horn Antenna	Emco	3115	3/4/2016	3/4/2018
ANP04382	Cable	Andrew	LDF-50	7/30/2014	7/30/2016
ANP06360	Cable	Andrew	L1-PNMMN-48	7/29/2014	7/29/2016
AN02869	Spectrum Analyzer	Agilent	E4440A	7/17/2015	7/17/2016
AN02946	Cable	Astrolab Inc.	32022-2-2909K-36TC	11/2/2015	11/2/2017

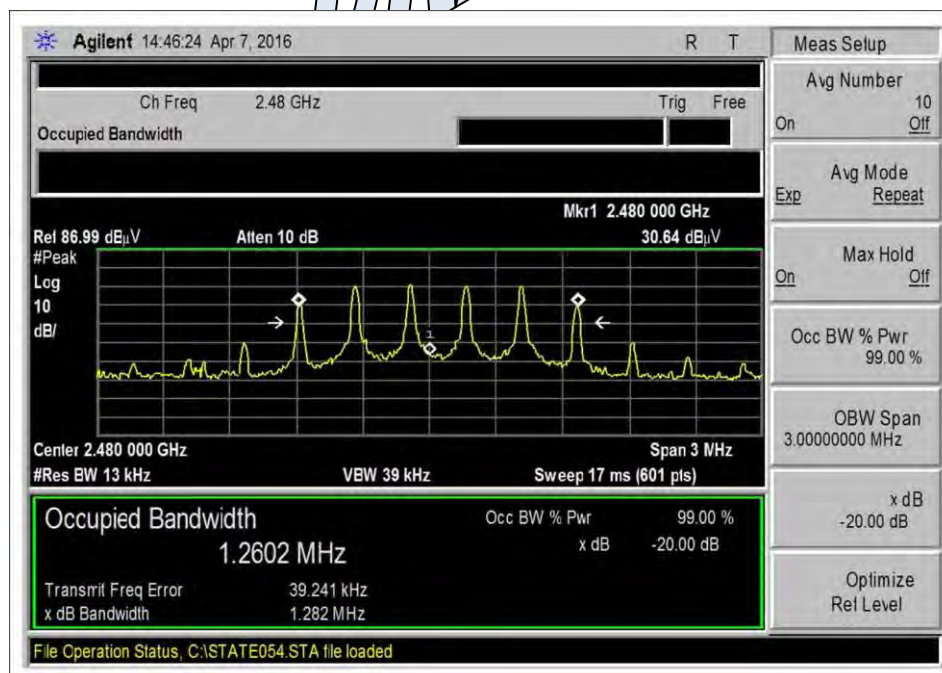
Test Data Summary					
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
2402	NA	Bluetooth V4, pi4-DQPSK	1282	None	Pass
2480	NA	Bluetooth V4, pi4-DQPSK	1282	None	Pass
2402	NA	Bluetooth V4, GFSK	523.2	None	Pass
2480	NA	Bluetooth V4, GFSK	523.1	None	Pass
2402	NA	Bluetooth V4, 8DPSK	1269	None	Pass
2480	NA	Bluetooth V4, 8DPSK	1270	None	Pass
2402	NA	BLE, GFSK	777.3	None	Pass
2480	NA	BLE, GFSK	777.0	None	Pass



## Plot(s)



Bluetooth V4, pi4-DQPSK, 2402MHz

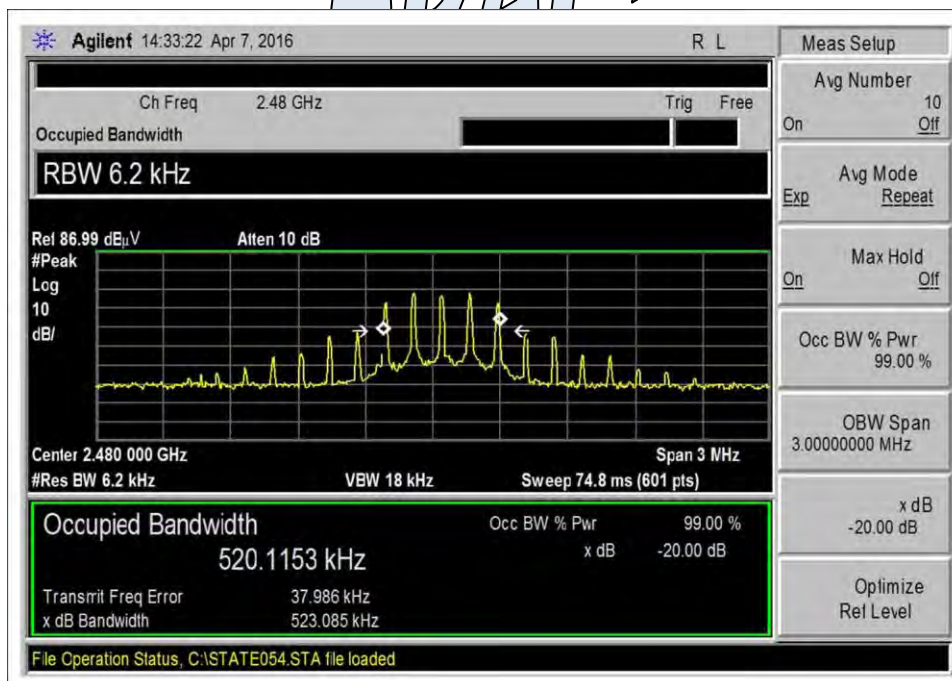


Bluetooth V4, pi4-DQPSK, 2480MHz

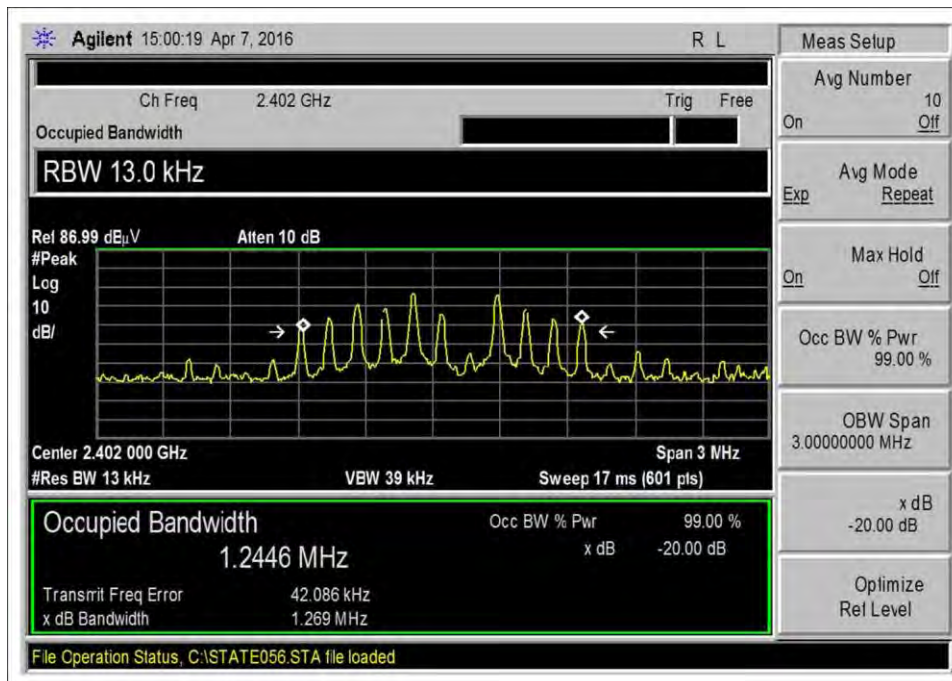




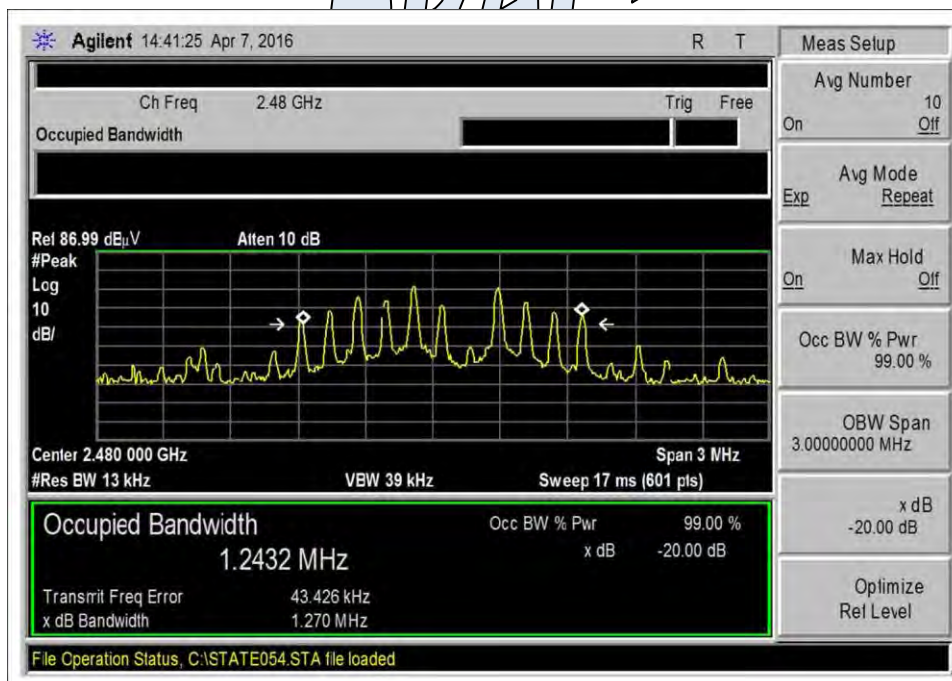
Bluetooth V4, GFSK, 2402MHz



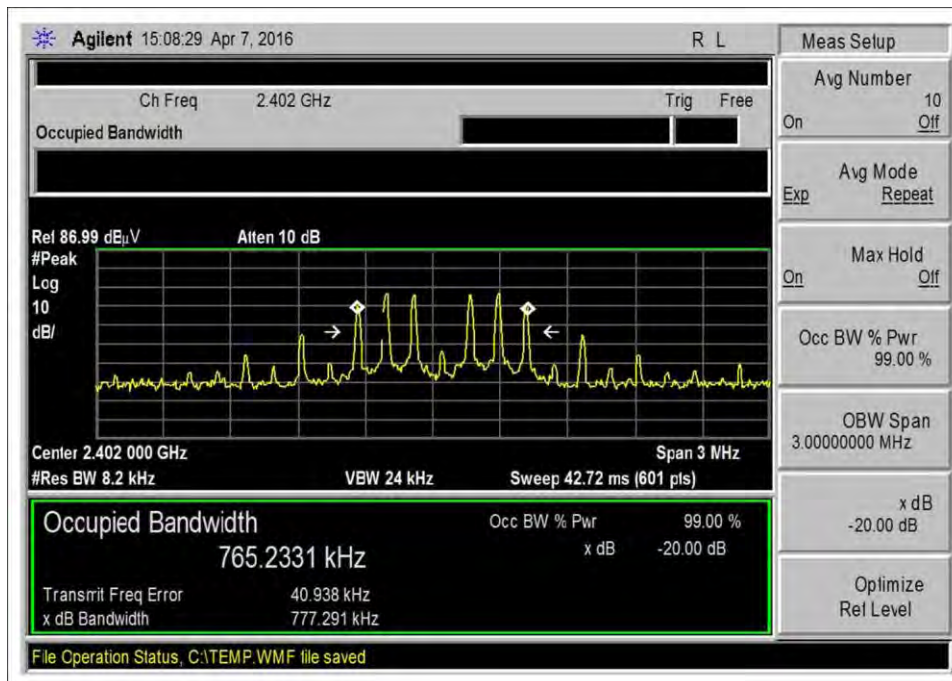
Bluetooth V4, GFSK, 2480MHz



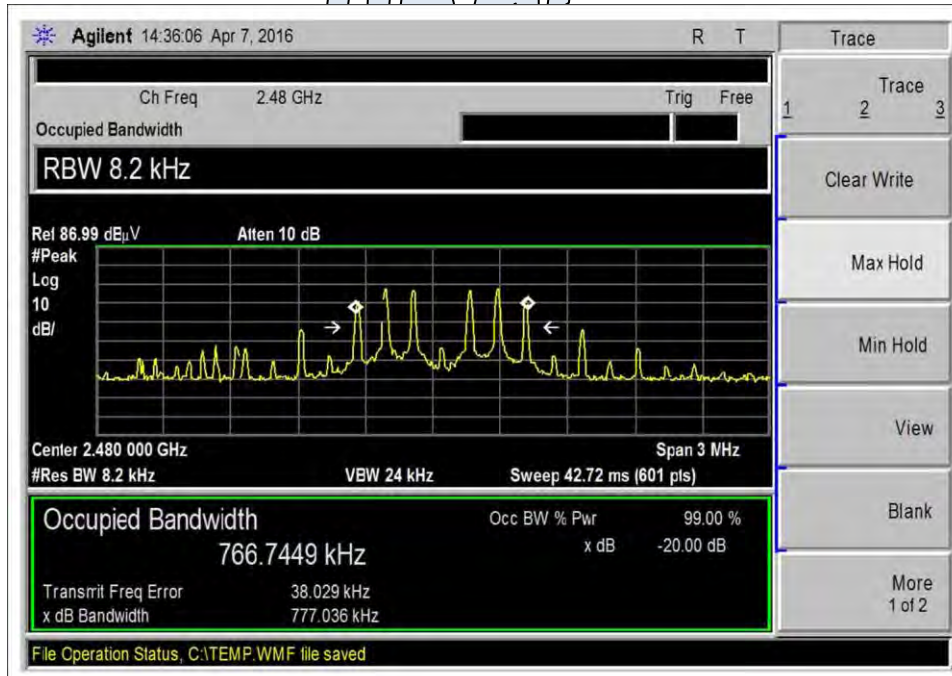
Bluetooth V4, 8DPSK, 2402MHz



Bluetooth V4, 8DPSK, 2480MHz



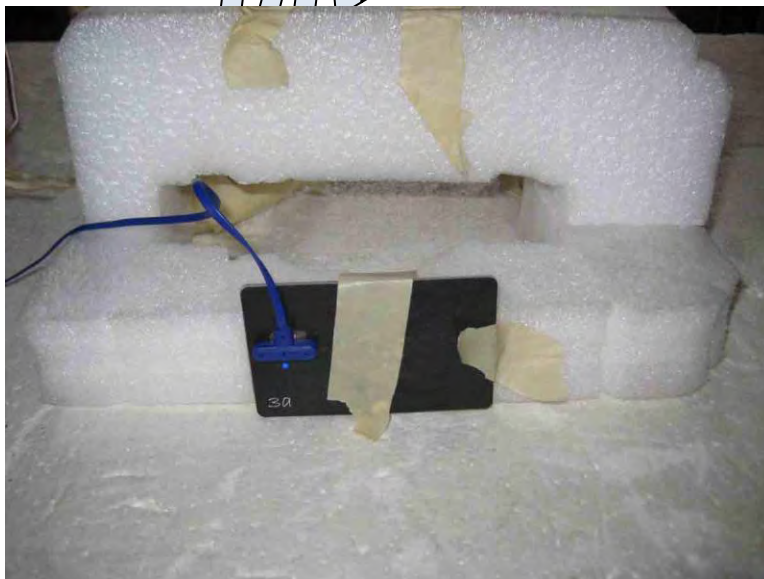
BLE, GFSK, 2402MHz



BLE, GFSK, 2480MHz



Test Setup Photo(s)



Y Axis



Z Axis

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Test Setup, View #1



Test Setup, View #2



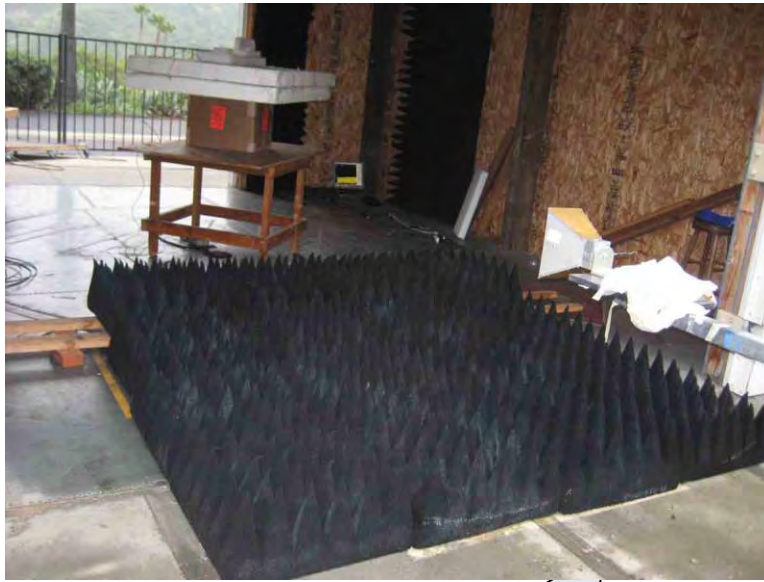


Test Setup, View #3



Test Setup, View #4





Test Setup, View #5

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## 15.249(a) Field Strength of Fundamental

### Test Setup/Conditions/ Data

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Pl • Brea, CA 92823 • 7149936112  
 Customer: **BluStor PMC**  
 Specification: **15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter)**  
 Work Order #: **98130** Date: 4/7/2016  
 Test Type: **Maximized Emissions** Time: 14:12:09  
 Tested By: Don Nguyen Sequence#: 0  
 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:

The EUT is placed on Styrofoam platform at 1.5m height. The EUT is set to transmit continuously at 99% duty cycle. USB charge is connected to the EUT during test. The manufacturer declares that the EUT will not be marketed with the USB charger.

Operating frequency: 2402-2480MHz

Bluetooth V4 modulation: GFSK, 8DPSK, and pi/4-DQPSK

BLE modulation: GFSK

Tested frequency: 2402MHz, 2441MHz, 2480MHz

RBW=VBW=1MHz;

Temperature, 17°C

Relative Humidity, 45%

Test Method: ANSI C63.10 (2013)

Site D

Note: The EUT is tested in three orthogonal axes.

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00787	Preamp	83017A	6/10/2015	6/10/2017
T2	AN01646	Horn Antenna	3115	3/4/2016	3/4/2018
T3	ANP04382	Cable	LDF-50	7/30/2014	7/30/2016
T4	ANP06360	Cable	L1-PNMNM-48	7/29/2014	7/29/2016
T5	AN02869	Spectrum Analyzer	E4440A	7/17/2015	7/17/2016
T6	AN02946	Cable	32022-2-2909K-36TC	11/2/2015	11/2/2017

**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	2480.000M	75.7	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	71.9	94.0 Bluetooth V4, 8DPSK, Y axis	-22.1	Vert
2	2441.000M	76.0	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	71.9	94.0 Bluetooth V4, GFSK, Y axis	-22.1	Horiz
3	2480.000M	75.5	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	71.7	94.0 Bluetooth V4, 8DPSK, Z axis	-22.3	Horiz
4	2441.000M	75.7	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	71.6	94.0 Bluetooth V4, GFSK, X axis	-22.4	Horiz
5	2441.000M	75.1	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	71.0	94.0 Bluetooth V4, GFSK, Z axis	-23.0	Horiz
6	2480.130M	74.8	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	71.0	94.0 Bluetooth V4, pi/4- DQPSK, Z axis	-23.0	Horiz
7	2441.000M	75.1	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	71.0	94.0 Bluetooth V4, 8DPSK, Y axis	-23.0	Vert
8	2480.000M	74.7	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	70.9	94.0 Bluetooth V4, 8DPSK, X axis	-23.1	Horiz
9	2480.000M	74.4	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	70.6	94.0 Bluetooth V4, GFSK, X axis	-23.4	Horiz
10	2441.000M	74.4	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	70.3	94.0 Bluetooth V4, GFSK, X axis	-23.7	Vert
11	2441.000M	74.3	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	70.2	94.0 Bluetooth V4, GFSK, Z axis	-23.8	Vert
12	2480.000M	73.6	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	69.8	94.0 Bluetooth V4, 8DPSK, Y axis	-24.2	Horiz

13	2441.130M	73.8	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	69.7	94.0	-24.3	Vert
									Bluetooth V4, pi/4-DQPSK, Y axis		
14	2480.000M	73.5	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	69.7	94.0	-24.3	Vert
									Bluetooth V4, 8DPSK, X axis		
15	2480.130M	73.4	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	69.6	94.0	-24.4	Vert
									Bluetooth V4, pi/4-DQPSK, Z axis		
16	2441.130M	73.5	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	69.4	94.0	-24.6	Horiz
									Bluetooth V4, pi/4-DQPSK, Z axis		
17	2480.130M	73.1	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	69.3	94.0	-24.7	Horiz
									Bluetooth V4, pi/4-DQPSK, X axis		
18	2441.130M	73.3	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	69.2	94.0	-24.8	Horiz
									Bluetooth V4, pi/4-DQPSK, Y axis		
19	2480.130M	72.9	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	69.1	94.0	-24.9	Vert
									Bluetooth V4, pi/4-DQPSK, Y axis		
20	2402.130M	73.3	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	69.1	94.0	-24.9	Horiz
									Bluetooth V4, pi/4-DQPSK, Z axis		
21	2441.000M	73.1	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	69.0	94.0	-25.0	Vert
									Bluetooth V4, GFSK, Y axis		
22	2480.130M	72.5	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	68.7	94.0	-25.3	Horiz
									Bluetooth V4, pi/4-DQPSK, Y axis		
23	2441.000M	72.8	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	68.7	94.0	-25.3	Horiz
									Bluetooth V4, 8DPSK, Z axis		
24	2480.000M	72.3	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	68.5	94.0	-25.5	Horiz
									BLE, GFSK, Z axis		
25	2441.000M	72.5	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	68.4	94.0	-25.6	Vert
									Bluetooth V4, 8DPSK, Z axis		
26	2441.130M	72.4	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	68.3	94.0	-25.7	Vert
									Bluetooth V4, pi/4-DQPSK, Z axis		
27	2441.000M	72.1	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	68.0	94.0	-26.0	Horiz
									Bluetooth V4, 8DPSK, Y axis		
28	2480.000M	71.8	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	68.0	94.0	-26.0	Vert
									Bluetooth V4, 8DPSK, Z axis		
29	2441.130M	72.0	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	67.9	94.0	-26.1	Vert
									Bluetooth V4, pi/4-DQPSK, X axis		
30	2480.000M	71.7	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	67.9	94.0	-26.1	Vert
									BLE, GFSK, Y axis		

31	2480.000M	71.7	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	67.9	94.0	-26.1	Vert
									Bluetooth V4, GFSK, X axis		
32	2441.000M	71.8	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	67.7	94.0	-26.3	Horiz
									Bluetooth V4, 8DPSK, X axis		
33	2441.130M	71.8	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	67.7	94.0	-26.3	Horiz
									Bluetooth V4, pi/4- DQPSK, X axis		
34	2402.000M	71.8	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	67.6	94.0	-26.4	Vert
									Bluetooth V4, 8DPSK, Y axis		
35	2441.030M	71.7	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	67.6	94.0	-26.4	Horiz
									BLE, GFSK, Z axis		
36	2402.100M	71.8	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	67.6	94.0	-26.4	Horiz
									Bluetooth V4, pi/4- DQPSK, Y axis		
37	2402.130M	71.7	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	67.5	94.0	-26.5	Vert
									Bluetooth V4, pi/4- DQPSK, Z axis		
38	2441.030M	71.5	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	67.4	94.0	-26.6	Vert
									BLE, GFSK, Z axis		
39	2402.000M	71.5	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	67.3	94.0	-26.7	Horiz
									Bluetooth V4, 8DPSK, X axis		
40	2480.000M	71.1	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	67.3	94.0	-26.7	Vert
									Bluetooth V4, GFSK, Y axis		
41	2480.000M	70.8	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	67.0	94.0	-27.0	Horiz
									BLE, GFSK, Y axis		
42	2480.000M	70.7	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	66.9	94.0	-27.1	Horiz
									BLE, GFSK, X axis		
43	2480.000M	70.3	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	66.5	94.0	-27.5	Vert
									Bluetooth V4, GFSK, Z axis		
44	2402.100M	70.5	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	66.3	94.0	-27.7	Horiz
									Bluetooth V4, pi/4- DQPSK, X axis		
45	2402.030M	70.5	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	66.3	94.0	-27.7	Horiz
									BLE, GFSK, Z axis		
46	2402.130M	70.4	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	66.2	94.0	-27.8	Vert
									Bluetooth V4, pi/4- DQPSK, Y axis		
47	2480.000M	70.0	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	66.2	94.0	-27.8	Horiz
									Bluetooth V4, GFSK, Z axis		
48	2402.030M	70.3	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	66.1	94.0	-27.9	Vert
									BLE, GFSK, Y axis		
49	2441.030M	70.2	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	66.1	94.0	-27.9	Vert
									BLE, GFSK, Y axis		

50	2480.000M	69.8	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	66.0	94.0	-28.0	Horiz
									Bluetooth V4, GFSK, Y axis		
51	2441.030M	69.9	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	65.8	94.0	-28.2	Horiz
									BLE, GFSK, Y axis		
52	2402.000M	69.9	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	65.7	94.0	-28.3	Horiz
									Bluetooth V4, 8DPSK, Z axis		
53	2402.000M	69.8	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	65.6	94.0	-28.4	Vert
									Bluetooth V4, GFSK, Y axis		
54	2402.000M	69.7	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	65.5	94.0	-28.5	Horiz
									Bluetooth V4, GFSK, X axis		
55	2441.000M	69.2	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	65.1	94.0	-28.9	Vert
									Bluetooth V4, 8DPSK, X axis		
56	2402.000M	69.1	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	64.9	94.0	-29.1	Horiz
									Bluetooth V4, 8DPSK, Y axis		
57	2402.000M	69.0	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	64.8	94.0	-29.2	Horiz
									Bluetooth V4, GFSK, Z axis		
58	2402.030M	69.0	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	64.8	94.0	-29.2	Vert
									BLE, GFSK, Z axis		
59	2402.000M	68.8	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	64.6	94.0	-29.4	Horiz
									Bluetooth V4, GFSK, Y axis		
60	2441.030M	68.2	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	64.1	94.0	-29.9	Horiz
									BLE, GFSK, X axis		
61	2480.000M	67.8	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	64.0	94.0	-30.0	Vert
									BLE, GFSK, Z axis		
62	2402.000M	68.2	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	64.0	94.0	-30.0	Vert
									Bluetooth V4, 8DPSK, X axis		
63	2480.130M	67.6	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	63.8	94.0	-30.2	Vert
									Bluetooth V4, pi/4- DQPSK, X axis		
64	2402.030M	67.9	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	63.7	94.0	-30.3	Horiz
									BLE, GFSK, Y axis		
65	2402.030M	67.8	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	63.6	94.0	-30.4	Horiz
									BLE, GFSK, X axis		
66	2402.000M	67.5	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	63.3	94.0	-30.7	Vert
									Bluetooth V4, GFSK, Z axis		
67	2480.000M	65.8	-39.7 +0.0	+25.2 +0.8	+6.5	+3.4	+0.0	62.0	94.0	-32.0	Vert
									BLE, GFSK, X axis		
68	2402.000M	66.1	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	61.9	94.0	-32.1	Vert
									Bluetooth V4, 8DPSK, Z axis		

69	2402.000M	65.1	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	60.9	94.0	-33.1	Vert
									Bluetooth V4, GFSK, X axis		
70	2402.000M	65.1	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	60.9	94.0	-33.1	Vert
									Bluetooth V4, pi/4- DQPSK, X axis		
71	2441.130M	62.4	-39.7 +0.0	+25.1 +0.7	+6.5	+3.3	+0.0	58.3	94.0	-35.7	Vert
									BLE, GFSK, X axis		
72	2402.030M	60.2	-39.6 +0.0	+25.0 +0.7	+6.5	+3.2	+0.0	56.0	94.0	-38.0	Vert
									BLE, GFSK, X axis		

Test Data Summary - Voltage Variations					
Frequency (MHz)	Modulation / Ant Port	V <sub>Minimum</sub> (dBuV/m)	V <sub>Nominal</sub> (dBuV/m)	V <sub>Maximum</sub> (dBuV/m)	Max Deviation from V <sub>Nominal</sub> (dB)
NA	NA	NA	NA	NA	NA

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

NA: This equipment is battery powered and manufacturer declares the equipment cannot operate while charging. The EUT was fully charged while testing.

#### **Parameter Definitions:**

Measurements performed at input voltage

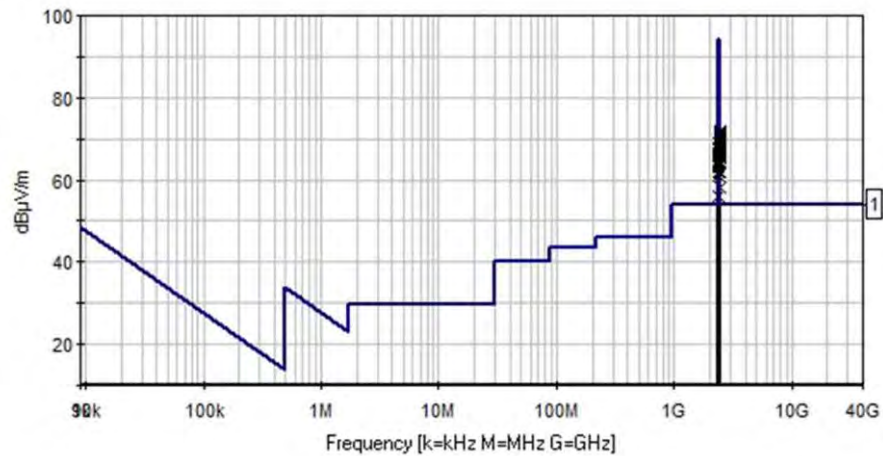
Parameter	Value
V <sub>Nominal</sub> :	3.7VDC
V <sub>Minimum</sub> :	NA
V <sub>Maximum</sub> :	NA

Test Data Summary – Radiated Field Strength Measurement					
Frequency (MHz)	Modulation	Ant. Type	Measured (dBuV/m @ 3m)	Limit (dBuV/m @ 3m)	Results
2480	Bluetooth V4, 8DPSK	Chip antenna	71.9	≤94	Pass
2441	Bluetooth V4, GFSK	Chip antenna	71.9	≤94	Pass
2480	Bluetooth V4, pi/4-DQPSK	Chip antenna	71.0	≤94	Pass
2480	BLE, GFSK	Chip antenna	68.5	≤94	Pass



## Plot Data

BluStor PMC WO#: 98130 Sequence#: 0 Date: 4/7/2016  
 15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter) Test Distance: 3 Meters Vert

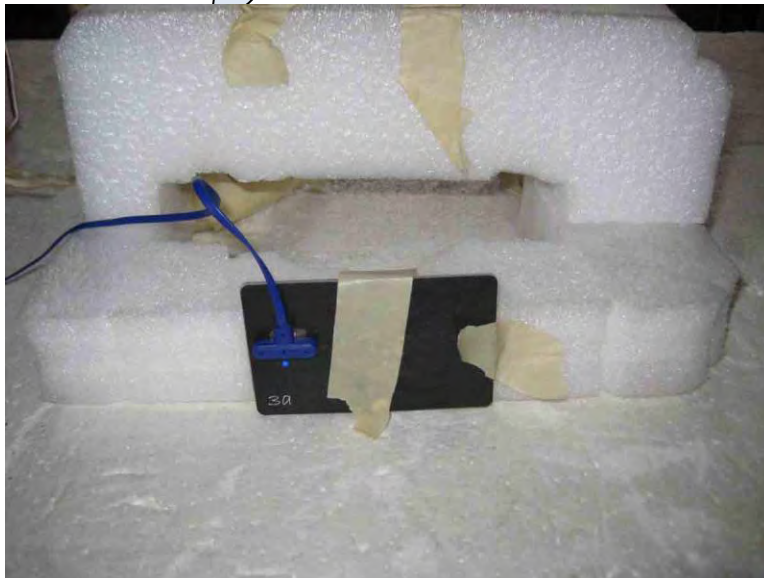


— Readings  
 1 - 15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter)  
 × Peak Readings  
 Software Version: 5.03.02

Test Setup Photo(s)



X Axis



Y Axis



Z Axis

**DRAFT**



Test Setup, View #1



Test Setup, View #2

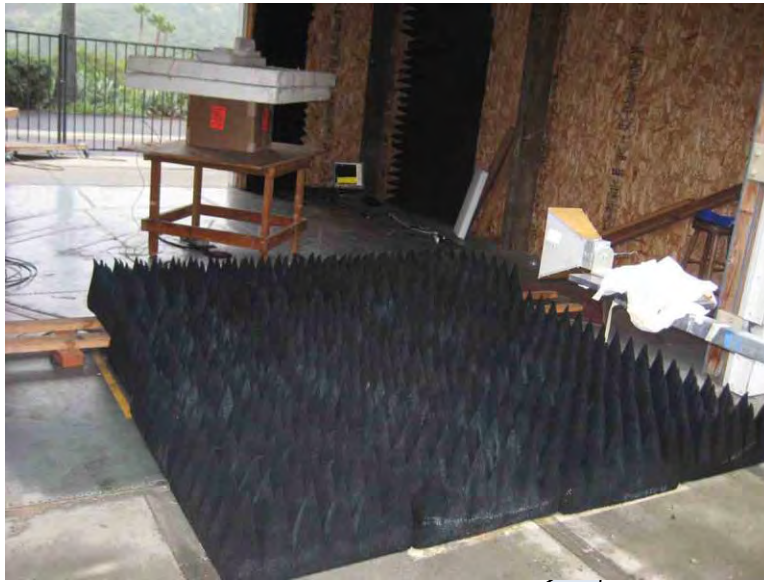




Test Setup, View #3



Test Setup, View #4



Test Setup, View #5

*DRAFT*

## 15.249(a) Radiated Emissions

### Test Setup/Conditions / Data

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Pl • Brea, CA 92823 • 7149936112  
 Customer: **BluStor PMC**  
 Specification: **15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter)**  
 Work Order #: **98130** Date: 4/8/2016  
 Test Type: **Maximized Emissions** Time: 11:52:52  
 Tested By: Don Nguyen Sequence#: 1  
 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:

The EUT is placed on Styrofoam platform at 1.5m height (above 1GHz) and 0.8m height (below 1GHz). The EUT is set to transmit continuously at 99% duty cycle. USB charger is connected to the EUT during test. The manufacturer declares that the EUT will not be marketed with the USB charger.

Operating frequency: 2402-2480MHz

Tested frequencies: 2402MHz, 2441MHz, 2480MHz

Bluetooth V4 modulation: GFSK, 8DPSK, and pi/4-DQPSK

BLE modulation: GFSK

Frequency range of measurement = 9k-25000MHz

0.009MHz to 0.15MHz RBW=VBW=0.2kHz.

0.15MHz to 30MHz RBW=VBW=9kHz.

30MHz to 1000MHz RBW=VBW=120kHz.

1000MHz to 25000MHz RBW=VBW=1MHz.

Temperature, 17°C

Relative Humidity, 45%

Test Method: ANSI C63.10 (2013)

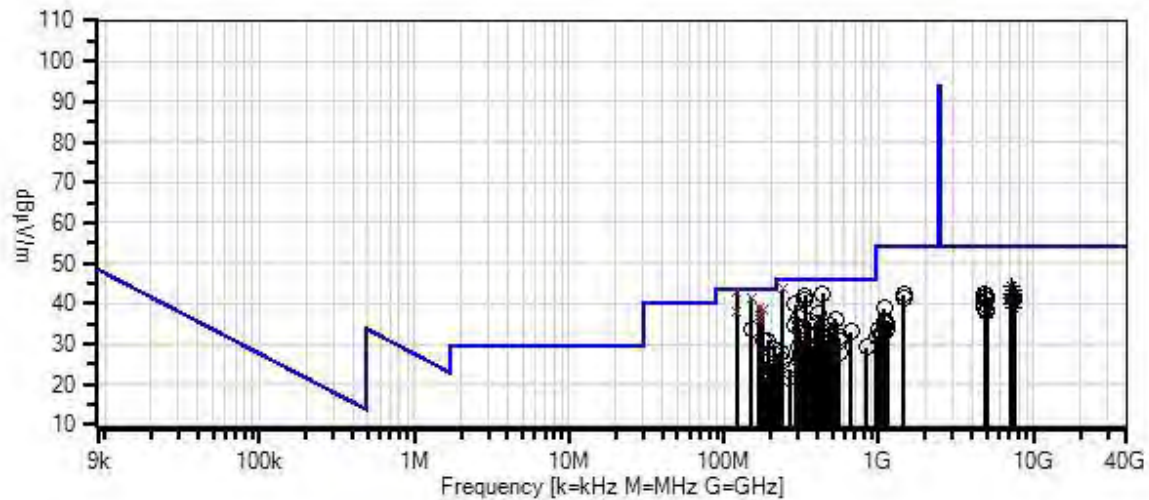
Site D

Note: The EUT is tested in three orthogonal axes. Data represents worst case emissions. Tested modes: BLE (GFSK) and Bluetooth V4 (8DPSK)

The EUT will not transmit when charging with normal firmware in normal operation mode.



BluStor PMC WD#: 98130 Sequence#: 1 Date: 4/8/2016  
15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter) Test Distance: 3 Meters Vert



— Readings  
 $\circ$  Peak Readings  
 $\times$  QP Readings  
 $*$  Average Readings  
 $\blacktriangledown$  Ambient  
 Software Version: 5.03.02  
 1 - 15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter)

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN00314	Loop Antenna	6502	7/2/2014	7/2/2016
	AN01413	Horn Antenna	84125-80008	11/25/2014	11/25/2016
T1	AN00787	Preamp	83017A	6/10/2015	6/10/2017
T2	AN01646	Horn Antenna	3115	3/4/2016	3/4/2018
T3	ANP06360	Cable	L1-PNMNM-48	7/29/2014	7/29/2016
T4	AN02946	Cable	32022-2-2909K-36TC	11/2/2015	11/2/2017
T5	AN03385	High Pass Filter	11SH10-3000/T10000-O/O	6/15/2015	6/15/2017
T6	AN02869	Spectrum Analyzer	E4440A	7/17/2015	7/17/2016
T7	AN00010	Preamp	8447D	3/14/2016	3/14/2018
T8	ANP04382	Cable	LDF-50	7/30/2014	7/30/2016
T9	AN01992	Biconilog Antenna	CBL6111C	12/4/2014	12/4/2016
T10	ANP05555	Cable	RG223/U	5/7/2014	5/7/2016
T11	ANP05569	Cable	RG-214/U	5/7/2014	5/7/2016

**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	T5	T6	T7	T8	Table	dBμV/m	dBμV/m	dB	Ant
1	120.003M	56.0	+0.0	+0.0	+0.0	+0.0	+0.0	42.9	43.5	-0.6	Vert
	QP		+0.0	+0.0	-27.0	+1.2			BLE, low CH, USB cable unplugged		
			+11.5	+0.1	+1.1						
^	120.003M	56.6	+0.0	+0.0	+0.0	+0.0	+0.0	43.5	43.5	+0.0	Vert
			+0.0	+0.0	-27.0	+1.2			BLE, low CH, USB cable unplugged		
			+11.5	+0.1	+1.1						
3	150.004M	54.2	+0.0	+0.0	+0.0	+0.0	+0.0	41.4	43.5	-2.1	Horiz
	QP		+0.0	+0.0	-26.9	+1.4			8DPSK, low CH		
			+11.2	+0.2	+1.3						
^	150.004M	54.4	+0.0	+0.0	+0.0	+0.0	+0.0	41.6	43.5	-1.9	Horiz
			+0.0	+0.0	-26.9	+1.4			8DPSK, low CH		
			+11.2	+0.2	+1.3						
^	150.000M	48.8	+0.0	+0.0	+0.0	+0.0	+0.0	36.0	43.5	-7.5	Horiz
			+0.0	+0.0	-26.9	+1.4			BLE, low CH		
			+11.2	+0.2	+1.3						
6	240.000M	54.7	+0.0	+0.0	+0.0	+0.0	+0.0	43.7	46.0	-2.3	Horiz
	QP		+0.0	+0.0	-26.6	+1.8			8DPSK, low CH		
			+12.0	+0.2	+1.6						
^	240.000M	55.0	+0.0	+0.0	+0.0	+0.0	+0.0	44.0	46.0	-2.0	Horiz
			+0.0	+0.0	-26.6	+1.8			8DPSK, low CH		
			+12.0	+0.2	+1.6						
^	240.000M	52.9	+0.0	+0.0	+0.0	+0.0	+0.0	41.9	46.0	-4.1	Horiz
			+0.0	+0.0	-26.6	+1.8			BLE, low CH		
			+12.0	+0.2	+1.6						
9	432.000M	48.3	+0.0	+0.0	+0.0	+0.0	+0.0	42.5	46.0	-3.5	Vert
			+0.0	+0.0	-27.6	+2.3			BLE, low CH		
			+16.9	+0.4	+2.2						

10	336.000M	50.1	+0.0 +0.0 +14.5	+0.0 +0.0 +0.3	+0.0 -26.8 +1.9	+0.0 +2.0	+0.0	42.0	46.0 BLE, low CH	-4.0	Vert
11	167.995M QP	53.0	+0.0 +0.0 +10.1	+0.0 +0.0 +0.2	+0.0 -26.9 +1.3	+0.0 +1.5	+0.0	39.2	43.5 BLE, low CH	-4.3	Vert
12	180.005M QP	53.4	+0.0 +0.0 +9.1	+0.0 +0.0 +0.2	+0.0 -26.9 +1.3	+0.0 +1.5	+0.0	38.6	43.5 8DPSK, low CH	-4.9	Horiz
^	180.005M	53.6	+0.0 +0.0 +9.1	+0.0 +0.0 +0.2	+0.0 -26.9 +1.3	+0.0 +1.5	+0.0	38.8	43.5 8DPSK, low CH	-4.7	Horiz
^	180.000M	48.7	+0.0 +0.0 +9.1	+0.0 +0.0 +0.2	+0.0 -26.9 +1.3	+0.0 +1.5	+0.0	33.9	43.5 BLE, low CH	-9.6	Horiz
15	336.000M	49.1	+0.0 +0.0 +14.5	+0.0 +0.0 +0.3	+0.0 -26.8 +1.9	+0.0 +2.0	+0.0	41.0	46.0 BLE, low CH	-5.0	Horiz
16	120.009M QP	51.2	+0.0 +0.0 +11.5	+0.0 +0.0 +0.1	+0.0 -27.0 +1.1	+0.0 +1.2	+0.0	38.1	43.5 8DPSK, low CH	-5.4	Horiz
^	120.009M	51.8	+0.0 +0.0 +11.5	+0.0 +0.0 +0.1	+0.0 -27.0 +1.1	+0.0 +1.2	+0.0	38.7	43.5 8DPSK, low CH	-4.8	Horiz
^	120.000M	49.4	+0.0 +0.0 +11.5	+0.0 +0.0 +0.1	+0.0 -27.0 +1.1	+0.0 +1.2	+0.0	36.3	43.5 BLE, low CH	-7.2	Horiz
19	288.000M	49.2	+0.0 +0.0 +13.2	+0.0 +0.0 +0.3	+0.0 -26.6 +1.8	+0.0 +1.9	+0.0	39.8	46.0 BLE, low CH	-6.2	Horiz
20	168.000M QP	50.8	+0.0 +0.0 +10.1	+0.0 +0.0 +0.2	+0.0 -26.9 +1.3	+0.0 +1.5	+0.0	37.0	43.5 8DPSK, low CH	-6.5	Horiz
^	168.000M	51.4	+0.0 +0.0 +10.1	+0.0 +0.0 +0.2	+0.0 -26.9 +1.3	+0.0 +1.5	+0.0	37.6	43.5 8DPSK, low CH	-5.9	Horiz
^	168.000M	34.6	+0.0 +0.0 +10.1	+0.0 +0.0 +0.2	+0.0 -26.9 +1.3	+0.0 +1.5	+0.0	20.8	43.5 BLE, low CH, USB cable unplugged	-22.7	Horiz
23	167.999M QP	49.8	+0.0 +0.0 +10.1	+0.0 +0.0 +0.2	+0.0 -26.9 +1.3	+0.0 +1.5	+0.0	36.0	43.5 8DPSK, low CH	-7.5	Vert
^	167.995M	54.0	+0.0 +0.0 +10.1	+0.0 +0.0 +0.2	+0.0 -26.9 +1.3	+0.0 +1.5	+0.0	40.2	43.5 BLE, low CH	-3.3	Vert
^	167.999M	51.1	+0.0 +0.0 +10.1	+0.0 +0.0 +0.2	+0.0 -26.9 +1.3	+0.0 +1.5	+0.0	37.3	43.5 8DPSK, low CH	-6.2	Vert
26	408.000M	43.7	+0.0 +0.0 +16.5	+0.0 +0.0 +0.3	+0.0 -27.5 +2.1	+0.0 +2.2	+0.0	37.3	46.0 8DPSK, low CH, USB cable unplugged	-8.7	Horiz

27	300.010M	46.0	+0.0 +0.0 +13.3	+0.0 +0.0 +0.3	+0.0 -26.6 +1.8	+0.0 +1.9	+0.0	36.7	46.0 8DPSK, low CH, USB cable unplugged	-9.3	Vert
28	7206.100M Ave	33.4	-40.2 +0.2 +0.0	+32.5 +0.0 +0.0	+5.9 +0.0 +0.0	+1.4 +11.2	+0.0	44.4	54.0 8DPSK, low CH	-9.6	Horiz
^	7206.100M	41.0	-40.2 +0.2 +0.0	+32.5 +0.0 +0.0	+5.9 +0.0 +0.0	+1.4 +11.2	+0.0	52.0	54.0 8DPSK, low CH	-2.0	Horiz
30	149.995M	46.4	+0.0 +0.0 +11.2	+0.0 +0.0 +0.2	+0.0 -26.9 +1.3	+0.0 +1.4	+0.0	33.6	43.5 BLE, low CH	-9.9	Vert
31	525.005M	40.0	+0.0 +0.0 +18.5	+0.0 +0.0 +0.4	+0.0 -28.1 +2.5	+0.0 +2.6	+0.0	35.9	46.0 8DPSK, low CH, USB cable unplugged	-10.1	Vert
32	360.000M	43.0	+0.0 +0.0 +15.2	+0.0 +0.0 +0.3	+0.0 -27.0 +1.9	+0.0 +2.1	+0.0	35.5	46.0 8DPSK, low CH, USB cable unplugged	-10.5	Horiz
33	7440.100M Ave	31.4	-40.4 +0.3 +0.0	+33.1 +0.0 +0.0	+6.0 +0.0 +0.0	+1.4 +11.6	+0.0	43.4	54.0 8DPSK, hi CH	-10.6	Horiz
^	7440.100M	38.9	-40.4 +0.3 +0.0	+33.1 +0.0 +0.0	+6.0 +0.0 +0.0	+1.4 +11.6	+0.0	50.9	54.0 8DPSK, hi CH	-3.1	Horiz
35	390.650M	41.7	+0.0 +0.0 +16.1	+0.0 +0.0 +0.3	+0.0 -27.3 +2.1	+0.0 +2.2	+0.0	35.1	46.0 BLE, low CH	-10.9	Horiz
36	288.000M	44.2	+0.0 +0.0 +13.2	+0.0 +0.0 +0.3	+0.0 -26.6 +1.8	+0.0 +1.9	+0.0	34.8	46.0 BLE, low CH	-11.2	Vert
37	480.010M	39.5	+0.0 +0.0 +17.7	+0.0 +0.0 +0.4	+0.0 -27.9 +2.4	+0.0 +2.5	+0.0	34.6	46.0 8DPSK, low CH, USB cable unplugged	-11.4	Horiz
38	7205.383M Ave	31.5	-40.2 +0.2 +0.0	+32.5 +0.0 +0.0	+5.9 +0.0 +0.0	+1.4 +11.2	+0.0	42.5	54.0 BLE, low CH	-11.5	Horiz
^	7205.383M	40.3	-40.2 +0.2 +0.0	+32.5 +0.0 +0.0	+5.9 +0.0 +0.0	+1.4 +11.2	+0.0	51.3	54.0 BLE, low CH	-2.7	Horiz
40	7439.317M Ave	30.4	-40.4 +0.3 +0.0	+33.1 +0.0 +0.0	+6.0 +0.0 +0.0	+1.4 +11.6	+0.0	42.4	54.0 BLE, hi CH	-11.6	Horiz
^	7439.317M	38.8	-40.4 +0.3 +0.0	+33.1 +0.0 +0.0	+6.0 +0.0 +0.0	+1.4 +11.6	+0.0	50.8	54.0 BLE, hi CH	-3.2	Horiz
42	4804.100M	37.7	-40.5 +0.1 +0.0	+30.0 +0.0 +0.0	+4.7 +0.0 +0.0	+1.2 +9.2	+0.0	42.4	54.0 8DPSK, low CH	-11.6	Horiz

43	1440.100M	51.4	-39.8 +0.0 +0.0	+23.3 +0.0 +0.0	+2.4 +0.0 +0.0	+0.6 +4.4	+0.0	42.3	54.0 8DPSK, hi CH	-11.7	Horiz
44	7323.000M Ave	30.9	-40.3 +0.3 +0.0	+32.8 +0.0 +0.0	+5.9 +0.0 +0.0	+1.4 +11.3	+0.0	42.3	54.0 8DPSK, mid CH	-11.7	Vert
^	7323.000M	39.6	-40.3 +0.3 +0.0	+32.8 +0.0 +0.0	+5.9 +0.0 +0.0	+1.4 +11.3	+0.0	51.0	54.0 8DPSK, mid CH	-3.0	Vert
46	4882.000M	36.7	-40.2 +0.1 +0.0	+30.0 +0.0 +0.0	+4.8 +0.0 +0.0	+1.2 +9.3	+0.0	41.9	54.0 8DPSK, mid CH	-12.1	Horiz
47	7323.033M Ave	30.4	-40.3 +0.3 +0.0	+32.8 +0.0 +0.0	+5.9 +0.0 +0.0	+1.4 +11.3	+0.0	41.8	54.0 8DPSK, mid CH	-12.2	Horiz
^	7323.033M	38.7	-40.3 +0.3 +0.0	+32.8 +0.0 +0.0	+5.9 +0.0 +0.0	+1.4 +11.3	+0.0	50.1	54.0 8DPSK, mid CH	-3.9	Horiz
49	312.009M	42.6	+0.0 +0.0 +13.7	+0.0 +0.0 +0.3	+0.0 -26.7 +1.8	+0.0 +2.0	+0.0	33.7	46.0 8DPSK, low CH, USB cable unplugged	-12.3	Horiz
50	7322.375M Ave	30.2	-40.3 +0.3 +0.0	+32.8 +0.0 +0.0	+5.9 +0.0 +0.0	+1.4 +11.3	+0.0	41.6	54.0 BLE, mid CH	-12.4	Horiz
^	7322.375M	38.5	-40.3 +0.3 +0.0	+32.8 +0.0 +0.0	+5.9 +0.0 +0.0	+1.4 +11.3	+0.0	49.9	54.0 BLE, mid CH	-4.1	Horiz
52	4804.100M	36.9	-40.5 +0.1 +0.0	+30.0 +0.0 +0.0	+4.7 +0.0 +0.0	+1.2 +9.2	+0.0	41.6	54.0 8DPSK, low CH	-12.4	Vert
53	7206.100M Ave	30.5	-40.2 +0.2 +0.0	+32.5 +0.0 +0.0	+5.9 +0.0 +0.0	+1.4 +11.2	+0.0	41.5	54.0 8DPSK, low CH	-12.5	Vert
^	7206.100M	38.0	-40.2 +0.2 +0.0	+32.5 +0.0 +0.0	+5.9 +0.0 +0.0	+1.4 +11.2	+0.0	49.0	54.0 8DPSK, low CH	-5.0	Vert
55	480.000M	38.3	+0.0 +0.0 +17.7	+0.0 +0.0 +0.4	+0.0 -27.9 +2.4	+0.0 +2.5	+0.0	33.4	46.0 BLE, low CH, USB cable unplugged	-12.6	Vert
56	192.004M	45.4	+0.0 +0.0 +9.1	+0.0 +0.0 +0.2	+0.0 -26.8 +1.4	+0.0 +1.6	+0.0	30.9	43.5 8DPSK, low CH	-12.6	Vert
57	180.004M	45.7	+0.0 +0.0 +9.1	+0.0 +0.0 +0.2	+0.0 -26.9 +1.3	+0.0 +1.5	+0.0	30.9	43.5 8DPSK, low CH	-12.6	Vert
58	191.995M	45.4	+0.0 +0.0 +9.1	+0.0 +0.0 +0.2	+0.0 -26.8 +1.4	+0.0 +1.6	+0.0	30.9	43.5 BLE, low CH	-12.6	Vert
59	1440.000M	50.4	-39.8 +0.0 +0.0	+23.3 +0.0 +0.0	+2.4 +0.0 +0.0	+0.6 +4.4	+0.0	41.3	54.0 8DPSK, hi CH	-12.7	Vert

60	4882.000M	35.9	-40.2 +0.1 +0.0	+30.0 +0.0 +0.0	+4.8 +0.0 +0.0	+1.2 +9.3 +0.0	+0.0	41.1	54.0 8DPSK, mid CH	-12.9	Vert
61	660.005M	34.9	+0.0 +0.0 +20.1	+0.0 +0.0 +0.4	+0.0 -28.1 +2.8	+0.0 +2.9 +0.0	+0.0	33.0	46.0 8DPSK, low CH, USB cable unplugged	-13.0	Vert
62	4960.100M	35.6	-40.1 +0.1 +0.0	+30.0 +0.0 +0.0	+4.8 +0.0 +0.0	+1.2 +9.4 +0.0	+0.0	41.0	54.0 8DPSK, hi CH	-13.0	Vert
63	390.625M	39.5	+0.0 +0.0 +16.1	+0.0 +0.0 +0.3	+0.0 -27.3 +2.1	+0.0 +2.2 +0.0	+0.0	32.9	46.0 8DPSK, low CH	-13.1	Horiz
64	4960.000M	35.4	-40.1 +0.1 +0.0	+30.0 +0.0 +0.0	+4.8 +0.0 +0.0	+1.2 +9.4 +0.0	+0.0	40.8	54.0 8DPSK, hi CH	-13.2	Horiz
65	7322.400M Ave	29.4	-40.3 +0.3 +0.0	+32.8 +0.0 +0.0	+5.9 +0.0 +0.0	+1.4 +11.3 +0.0	+0.0	40.8	54.0 BLE, mid CH	-13.2	Vert
^	7322.400M	38.1	-40.3 +0.3 +0.0	+32.8 +0.0 +0.0	+5.9 +0.0 +0.0	+1.4 +11.3 +0.0	+0.0	49.5	54.0 BLE, mid CH	-4.5	Vert
67	7439.400M Ave	28.3	-40.4 +0.3 +0.0	+33.1 +0.0 +0.0	+6.0 +0.0 +0.0	+1.4 +11.6 +0.0	+0.0	40.3	54.0 BLE, hi CH	-13.7	Vert
^	7439.400M	37.3	-40.4 +0.3 +0.0	+33.1 +0.0 +0.0	+6.0 +0.0 +0.0	+1.4 +11.6 +0.0	+0.0	49.3	54.0 BLE, hi CH	-4.7	Vert
69	480.005M	37.1	+0.0 +0.0 +17.7	+0.0 +0.0 +0.4	+0.0 -27.9 +2.4	+0.0 +2.5 +0.0	+0.0	32.2	46.0 8DPSK, low CH, USB cable unplugged	-13.8	Vert
70	7205.322M Ave	29.0	-40.2 +0.2 +0.0	+32.5 +0.0 +0.0	+5.9 +0.0 +0.0	+1.4 +11.2 +0.0	+0.0	40.0	54.0 BLE, low CH	-14.0	Vert
^	7205.322M	38.1	-40.2 +0.2 +0.0	+32.5 +0.0 +0.0	+5.9 +0.0 +0.0	+1.4 +11.2 +0.0	+0.0	49.1	54.0 BLE, low CH	-4.9	Vert
72	480.005M	36.7	+0.0 +0.0 +17.7	+0.0 +0.0 +0.4	+0.0 -27.9 +2.4	+0.0 +2.5 +0.0	+0.0	31.8	46.0 BLE, low CH, USB cable unplugged	-14.2	Horiz
73	552.000M	35.3	+0.0 +0.0 +19.0	+0.0 +0.0 +0.4	+0.0 -28.1 +2.5	+0.0 +2.6 +0.0	+0.0	31.7	46.0 BLE, low CH, USB cable unplugged	-14.3	Vert
74	4803.867M	35.0	-40.5 +0.1 +0.0	+30.0 +0.0 +0.0	+4.7 +0.0 +0.0	+1.2 +9.2 +0.0	+0.0	39.7	54.0 BLE, low CH	-14.3	Horiz
75	210.004M	42.6	+0.0 +0.0 +9.9	+0.0 +0.0 +0.2	+0.0 -26.7 +1.4	+0.0 +1.6 +0.0	+0.0	29.0	43.5 8DPSK, low CH	-14.5	Vert

76	7440.100M Ave	27.2	-40.4 +0.3 +0.0	+33.1 +0.0 +0.0	+6.0 +0.0 +0.0	+1.4 +11.6 +0.0	+0.0	39.2	54.0 8DPSK, hi CH	-14.8	Vert
^	7440.100M	35.8	-40.4 +0.3 +0.0	+33.1 +0.0 +0.0	+6.0 +0.0 +0.0	+1.4 +11.6 +0.0	+0.0	47.8	54.0 8DPSK, hi CH	-6.2	Vert
78	4803.872M	34.3	-40.5 +0.1 +0.0	+30.0 +0.0 +0.0	+4.7 +0.0 +0.0	+1.2 +9.2 +0.0	+0.0	39.0	54.0 BLE, low CH	-15.0	Vert
79	504.000M	35.5	+0.0 +0.0 +18.1	+0.0 +0.0 +0.4	+0.0 -28.0 +2.4	+0.0 +2.5 +0.0	+0.0	30.9	46.0 8DPSK, low CH, USB cable unplugged	-15.1	Horiz
80	552.000M	34.5	+0.0 +0.0 +19.0	+0.0 +0.0 +0.4	+0.0 -28.1 +2.5	+0.0 +2.6 +0.0	+0.0	30.9	46.0 8DPSK, low CH, USB cable unplugged	-15.1	Horiz
81	1079.850M	51.3	-41.1 +0.0 +0.0	+22.2 +0.0 +0.0	+2.1 +0.0 +0.0	+0.5 +3.8 +0.0	+0.0	38.8	54.0 8DPSK, hi CH	-15.2	Horiz
82	330.020M	39.0	+0.0 +0.0 +14.3	+0.0 +0.0 +0.3	+0.0 -26.8 +1.9	+0.0 +2.0 +0.0	+0.0	30.7	46.0 8DPSK, low CH, USB cable unplugged	-15.3	Vert
83	4882.030M	33.4	-40.2 +0.1 +0.0	+30.0 +0.0 +0.0	+4.8 +0.0 +0.0	+1.2 +9.3 +0.0	+0.0	38.6	54.0 BLE, mid CH	-15.4	Horiz
84	4960.000M	33.0	-40.1 +0.1 +0.0	+30.0 +0.0 +0.0	+4.8 +0.0 +0.0	+1.2 +9.4 +0.0	+0.0	38.4	54.0 BLE, hi CH	-15.6	Vert
85	4882.000M	33.0	-40.2 +0.1 +0.0	+30.0 +0.0 +0.0	+4.8 +0.0 +0.0	+1.2 +9.3 +0.0	+0.0	38.2	54.0 BLE, mid CH	-15.8	Vert
86	456.010M	35.3	+0.0 +0.0 +17.3	+0.0 +0.0 +0.4	+0.0 -27.7 +2.3	+0.0 +2.4 +0.0	+0.0	30.0	46.0 8DPSK, low CH, USB cable unplugged	-16.0	Horiz
87	4959.917M	32.5	-40.1 +0.1 +0.0	+30.0 +0.0 +0.0	+4.8 +0.0 +0.0	+1.2 +9.4 +0.0	+0.0	37.9	54.0 BLE, hi CH	-16.1	Horiz
88	360.000M	36.9	+0.0 +0.0 +15.2	+0.0 +0.0 +0.3	+0.0 -27.0 +1.9	+0.0 +2.1 +0.0	+0.0	29.4	46.0 BLE, low CH, USB cable unplugged	-16.6	Horiz
89	840.010M	27.7	+0.0 +0.0 +22.2	+0.0 +0.0 +0.5	+0.0 -27.7 +3.2	+0.0 +3.3 +0.0	+0.0	29.2	46.0 8DPSK, low CH, USB cable unplugged	-16.8	Vert
90	300.000M	38.5	+0.0 +0.0 +13.3	+0.0 +0.0 +0.3	+0.0 -26.6 +1.8	+0.0 +1.9 +0.0	+0.0	29.2	46.0 8DPSK, low CH	-16.8	Horiz



91	330.000M	37.2	+0.0 +0.0 +14.3	+0.0 +0.0 +0.3	+0.0 -26.8 +1.9	+0.0 +2.0	+0.0	28.9	46.0 8DPSK, low CH	-17.1	Horiz
92	552.000M	31.4	+0.0 +0.0 +19.0	+0.0 +0.0 +0.4	+0.0 -28.1 +2.5	+0.0 +2.6	+0.0	27.8	46.0 BLE, low CH, USB cable unplugged	-18.2	Horiz
93	1080.000M	48.3	-41.1 +0.0 +0.0	+22.2 +0.0 +0.0	+2.1 +0.0 +0.0	+0.5 +3.8	+0.0	35.8	54.0 8DPSK, hi CH	-18.2	Vert
94	192.010M	39.8	+0.0 +0.0 +9.1	+0.0 +0.0 +0.2	+0.0 -26.8 +1.4	+0.0 +1.6	+0.0	25.3	43.5 8DPSK, low CH	-18.2	Horiz
95	233.375M	39.4	+0.0 +0.0 +11.6	+0.0 +0.0 +0.2	+0.0 -26.7 +1.5	+0.0 +1.7	+0.0	27.7	46.0 BLE, low CH	-18.3	Horiz
96	216.014M	40.5	+0.0 +0.0 +10.3	+0.0 +0.0 +0.2	+0.0 -26.7 +1.5	+0.0 +1.7	+0.0	27.5	46.0 8DPSK, low CH, USB cable unplugged	-18.5	Horiz
97	450.005M	32.9	+0.0 +0.0 +17.2	+0.0 +0.0 +0.4	+0.0 -27.7 +2.3	+0.0 +2.4	+0.0	27.5	46.0 8DPSK, low CH, USB cable unplugged	-18.5	Vert
98	1128.000M	47.2	-40.8 +0.0 +0.0	+22.4 +0.0 +0.0	+2.1 +0.0 +0.0	+0.5 +3.9	+0.0	35.3	54.0 8DPSK, hi CH	-18.7	Vert
99	1104.350M	47.3	-40.9 +0.0 +0.0	+22.3 +0.0 +0.0	+2.1 +0.0 +0.0	+0.5 +3.8	+0.0	35.1	54.0 8DPSK, hi CH	-18.9	Horiz
100	504.000M	31.6	+0.0 +0.0 +18.1	+0.0 +0.0 +0.4	+0.0 -28.0 +2.4	+0.0 +2.5	+0.0	27.0	46.0 BLE, low CH, USB cable unplugged	-19.0	Vert
101	360.005M	34.3	+0.0 +0.0 +15.2	+0.0 +0.0 +0.3	+0.0 -27.0 +1.9	+0.0 +2.1	+0.0	26.8	46.0 8DPSK, low CH, USB cable unplugged	-19.2	Vert
102	312.000M	35.6	+0.0 +0.0 +13.7	+0.0 +0.0 +0.3	+0.0 -26.7 +1.8	+0.0 +2.0	+0.0	26.7	46.0 BLE, low CH, USB cable unplugged	-19.3	Vert
103	204.420M	38.0	+0.0 +0.0 +9.5	+0.0 +0.0 +0.2	+0.0 -26.7 +1.4	+0.0 +1.6	+0.0	24.0	43.5 BLE, low CH	-19.5	Horiz
104	390.005M	33.2	+0.0 +0.0 +16.0	+0.0 +0.0 +0.3	+0.0 -27.3 +2.1	+0.0 +2.2	+0.0	26.5	46.0 8DPSK, low CH, USB cable unplugged	-19.5	Vert
105	312.000M	35.2	+0.0 +0.0 +13.7	+0.0 +0.0 +0.3	+0.0 -26.7 +1.8	+0.0 +2.0	+0.0	26.3	46.0 BLE, low CH, USB cable unplugged	-19.7	Horiz
106	408.000M	32.6	+0.0 +0.0 +16.5	+0.0 +0.0 +0.3	+0.0 -27.5 +2.1	+0.0 +2.2	+0.0	26.2	46.0 BLE, low CH, USB cable unplugged	-19.8	Horiz

107	375.005M	33.2	+0.0 +0.0 +15.6	+0.0 +0.0 +0.3	+0.0 -27.2 +2.0	+0.0 +2.2	+0.0	26.1	46.0 8DPSK, low CH, USB cable unplugged	-19.9	Vert
108	360.000M	33.3	+0.0 +0.0 +15.2	+0.0 +0.0 +0.3	+0.0 -27.0 +1.9	+0.0 +2.1	+0.0	25.8	46.0 BLE, low CH, USB cable unplugged	-20.2	Vert
109	240.010M	36.8	+0.0 +0.0 +12.0	+0.0 +0.0 +0.2	+0.0 -26.6 +1.6	+0.0 +1.8	+0.0	25.8	46.0 8DPSK, low CH, USB cable unplugged	-20.2	Vert
110	196.945M	37.6	+0.0 +0.0 +9.1	+0.0 +0.0 +0.2	+0.0 -26.7 +1.4	+0.0 +1.6	+0.0	23.2	43.5 BLE, low CH	-20.3	Vert
111	1008.100M	47.0	-41.5 +0.0 +0.0	+21.9 +0.0 +0.0	+2.0 +0.0 +0.0	+0.5 +3.6	+0.0	33.5	54.0 8DPSK, hi CH	-20.5	Horiz
112	1128.350M	45.4	-40.8 +0.0 +0.0	+22.4 +0.0 +0.0	+2.1 +0.0 +0.0	+0.5 +3.9	+0.0	33.5	54.0 8DPSK, hi CH	-20.5	Horiz
113	456.000M	30.8	+0.0 +0.0 +17.3	+0.0 +0.0 +0.4	+0.0 -27.7 +2.3	+0.0 +2.4	+0.0	25.5	46.0 BLE, low CH, USB cable unplugged	-20.5	Vert
114	408.000M	31.7	+0.0 +0.0 +16.5	+0.0 +0.0 +0.3	+0.0 -27.5 +2.3	+0.0 +2.2	+0.0	25.3	46.0 BLE, low CH, USB cable unplugged	-20.7	Vert
115	216.000M	35.7	+0.0 +0.0 +10.3	+0.0 +0.0 +0.2	+0.0 -26.7 +1.5	+0.0 +1.7	+0.0	22.7	43.5 BLE, low CH, USB cable unplugged	-20.8	Vert
116	204.414M	36.4	+0.0 +0.0 +9.5	+0.0 +0.0 +0.2	+0.0 -26.7 +1.4	+0.0 +1.6	+0.0	22.4	43.5 8DPSK, low CH	-21.1	Vert
117	456.000M	30.1	+0.0 +0.0 +17.3	+0.0 +0.0 +0.4	+0.0 -27.7 +2.3	+0.0 +2.4	+0.0	24.8	46.0 BLE, low CH, USB cable unplugged	-21.2	Horiz
118	185.380M	36.7	+0.0 +0.0 +9.1	+0.0 +0.0 +0.2	+0.0 -26.8 +1.3	+0.0 +1.5	+0.0	22.0	43.5 8DPSK, low CH	-21.5	Horiz
119	216.010M	37.5	+0.0 +0.0 +10.3	+0.0 +0.0 +0.2	+0.0 -26.7 +1.5	+0.0 +1.7	+0.0	24.5	46.0 BLE, low CH, USB cable unplugged	-21.5	Horiz
120	1056.000M	45.3	-41.2 +0.0 +0.0	+22.1 +0.0 +0.0	+2.1 +0.0 +0.0	+0.5 +3.7	+0.0	32.5	54.0 8DPSK, hi CH	-21.5	Vert
121	432.000M	30.2	+0.0 +0.0 +16.9	+0.0 +0.0 +0.4	+0.0 -27.6 +2.2	+0.0 +2.3	+0.0	24.4	46.0 8DPSK, low CH, USB cable unplugged	-21.6	Horiz
122	1056.100M	45.0	-41.2 +0.0 +0.0	+22.1 +0.0 +0.0	+2.1 +0.0 +0.0	+0.5 +3.7	+0.0	32.2	54.0 8DPSK, hi CH	-21.8	Horiz

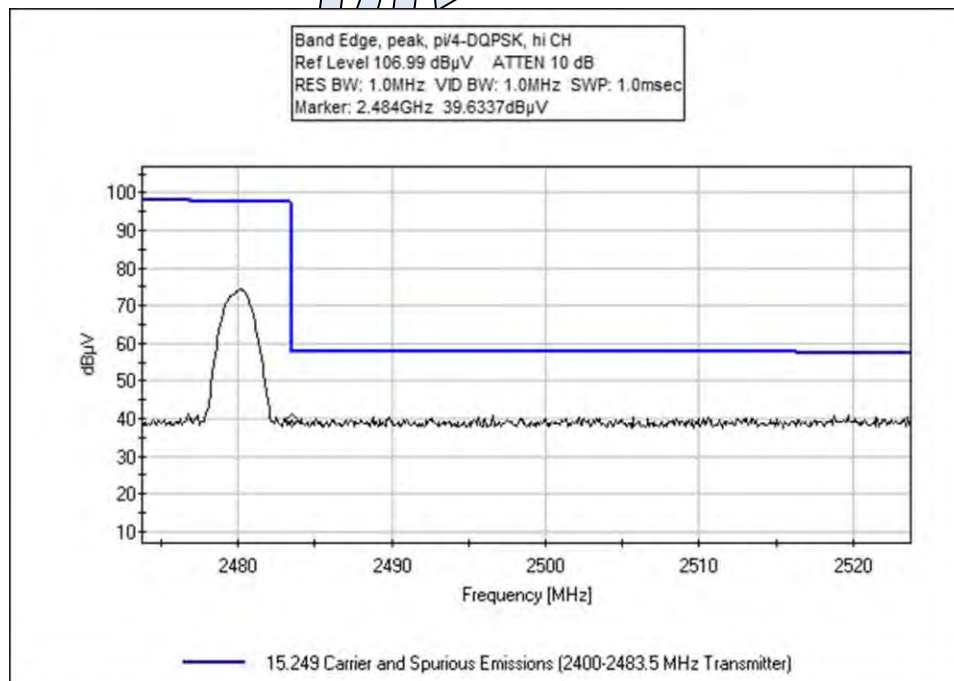
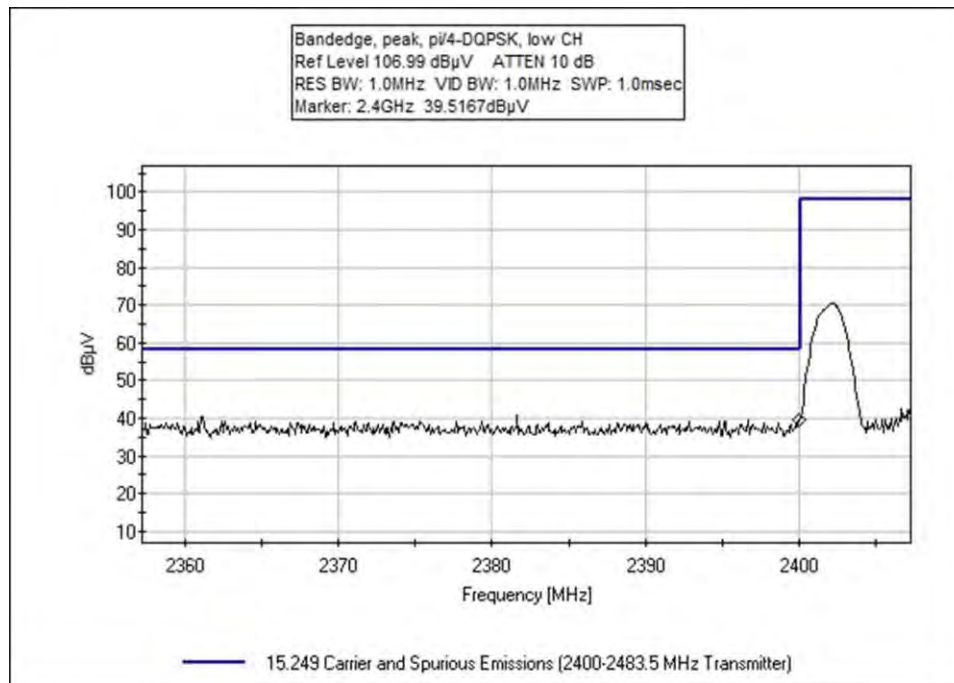
123	1031.850M	45.2	-41.4 +0.0 +0.0	+22.0 +0.0 +0.0	+2.0 +0.0 +0.0	+0.5 +3.7 +0.0	+0.0	32.0	54.0 8DPSK, hi CH	-22.0	Horiz
124	210.005M	34.9	+0.0 +0.0 +9.9	+0.0 +0.0 +0.2	+0.0 -26.7 +1.4	+0.0 +1.6 +0.0	+0.0	21.3	43.5 8DPSK, low CH	-22.2	Horiz
125	264.000M	33.7	+0.0 +0.0 +12.9	+0.0 +0.0 +0.2	+0.0 -26.6 +1.7	+0.0 +1.8 +0.0	+0.0	23.7	46.0 BLE, low CH, USB cable unplugged	-22.3	Vert
126	960.005M	28.2	+0.0 +0.0 +23.2	+0.0 +0.0 +0.6	+0.0 -27.5 +3.5	+0.0 +3.5 +0.0	+0.0	31.5	54.0 8DPSK, low CH, USB cable unplugged	-22.5	Vert
127	420.005M	29.4	+0.0 +0.0 +16.7	+0.0 +0.0 +0.3	+0.0 -27.5 +2.2	+0.0 +2.3 +0.0	+0.0	23.4	46.0 8DPSK, low CH, USB cable unplugged	-22.6	Vert
128	504.000M	27.9	+0.0 +0.0 +18.1	+0.0 +0.0 +0.4	+0.0 -28.0 +2.4	+0.0 +2.5 +0.0	+0.0	23.3	46.0 BLE, low CH, USB cable unplugged	-22.7	Horiz
129	435.005M	29.1	+0.0 +0.0 +16.9	+0.0 +0.0 +0.4	+0.0 -27.6 +2.2	+0.0 +2.3 +0.0	+0.0	23.3	46.0 8DPSK, low CH, USB cable unplugged	-22.7	Vert
130	375.000M	29.9	+0.0 +0.0 +15.6	+0.0 +0.0 +0.3	+0.0 -27.2 +2.0	+0.0 +2.2 +0.0	+0.0	22.8	46.0 8DPSK, low CH	-23.2	Horiz
131	192.834M	33.8	+0.0 +0.0 +9.1	+0.0 +0.0 +0.2	+0.0 -26.8 +1.4	+0.0 +1.6 +0.0	+0.0	19.3	43.5 8DPSK, low CH	-24.2	Vert
132	263.990M	31.8	+0.0 +0.0 +12.9	+0.0 +0.0 +0.2	+0.0 -26.6 +1.7	+0.0 +1.8 +0.0	+0.0	21.8	46.0 BLE, low CH, USB cable unplugged	-24.2	Horiz
133	185.379M	33.9	+0.0 +0.0 +9.1	+0.0 +0.0 +0.2	+0.0 -26.8 +1.3	+0.0 +1.5 +0.0	+0.0	19.2	43.5 8DPSK, low CH	-24.3	Vert
134	384.000M	25.4	+0.0 +0.0 +15.9	+0.0 +0.0 +0.3	+0.0 -27.2 +2.0	+0.0 +2.2 +0.0	+0.0	18.6	46.0 BLE, low CH, USB cable unplugged	-27.4	Horiz

## Band Edge

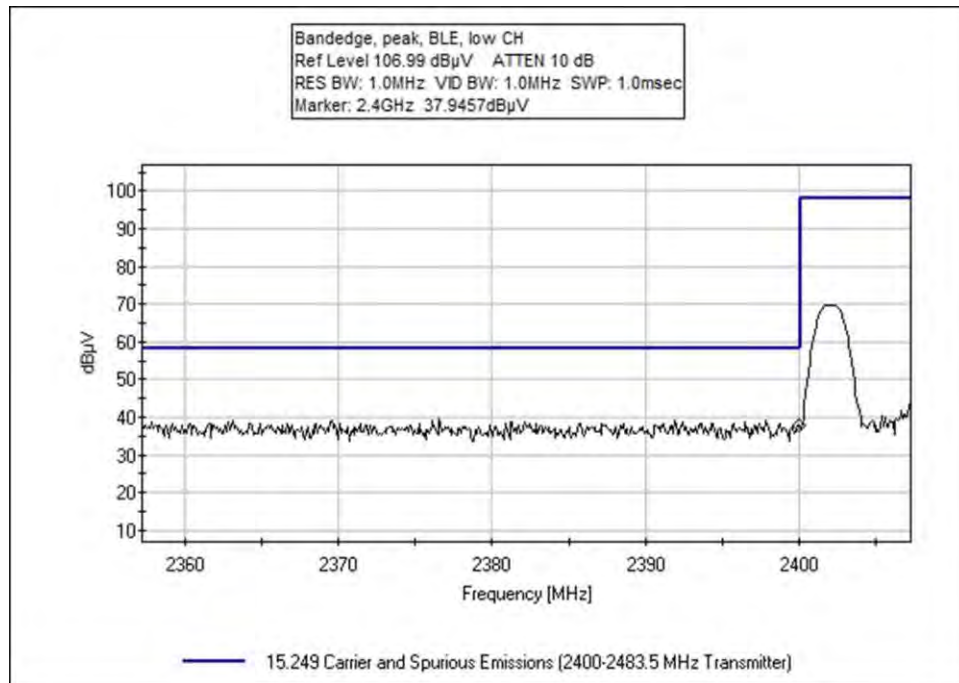
Band Edge Summary					
Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
2400	Bluetooth V4, pi/4-DQPSK	Chip antenna	39.5167	<54	Pass
2483.5	Bluetooth V4, pi/4-DQPSK	Chip antenna	39.6337	<54	Pass
2400	Bluetooth V4, GFSK	Chip antenna	37.4517	<54	Pass
2483.5	Bluetooth V4, GFSK	Chip antenna	38.8097	<54	Pass
2400	Bluetooth V4, 8DPSK	Chip antenna	37.6367	<54	Pass
2483.5	Bluetooth V4, 8DPSK	Chip antenna	39.3187	<54	Pass
2400	BLE, GFSK	Chip antenna	37.9457	<54	Pass
2483.5	BLE, GFSK	Chip antenna	39.5437	<54	Pass

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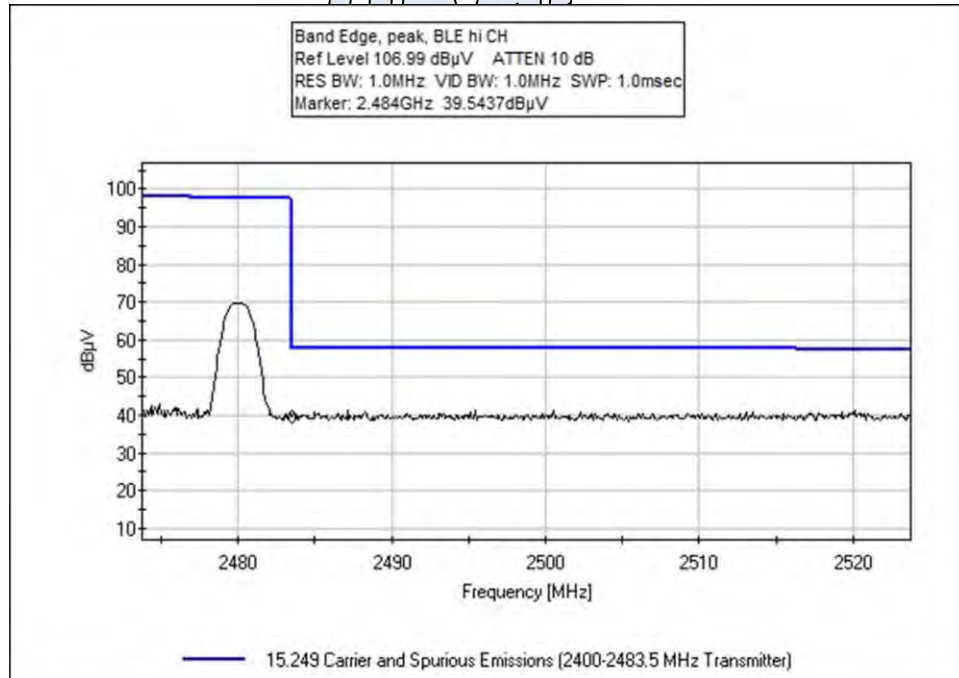
## Band Edge Plots

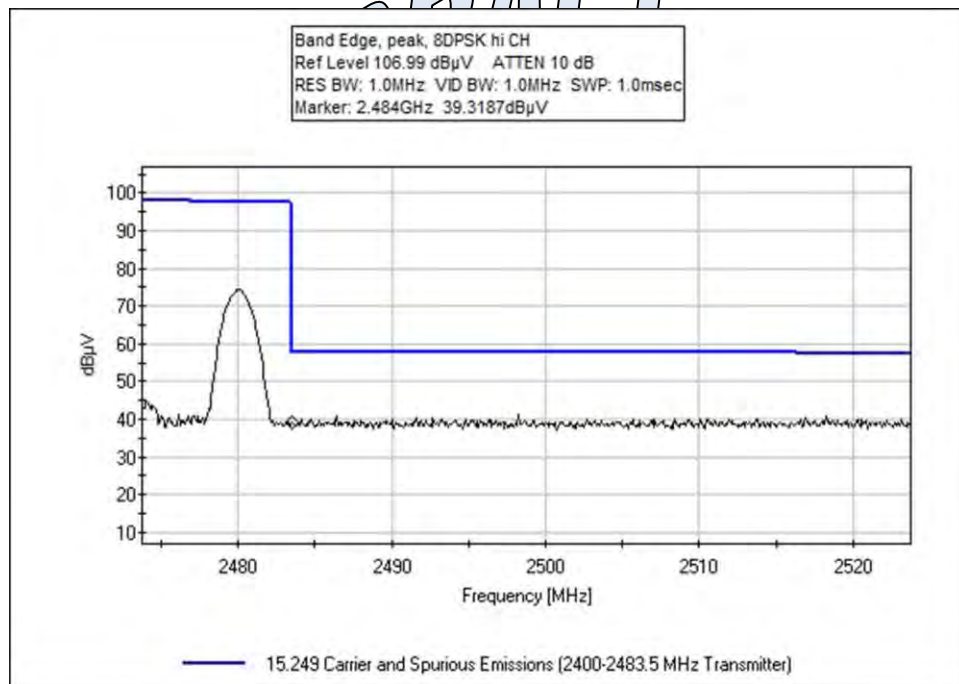
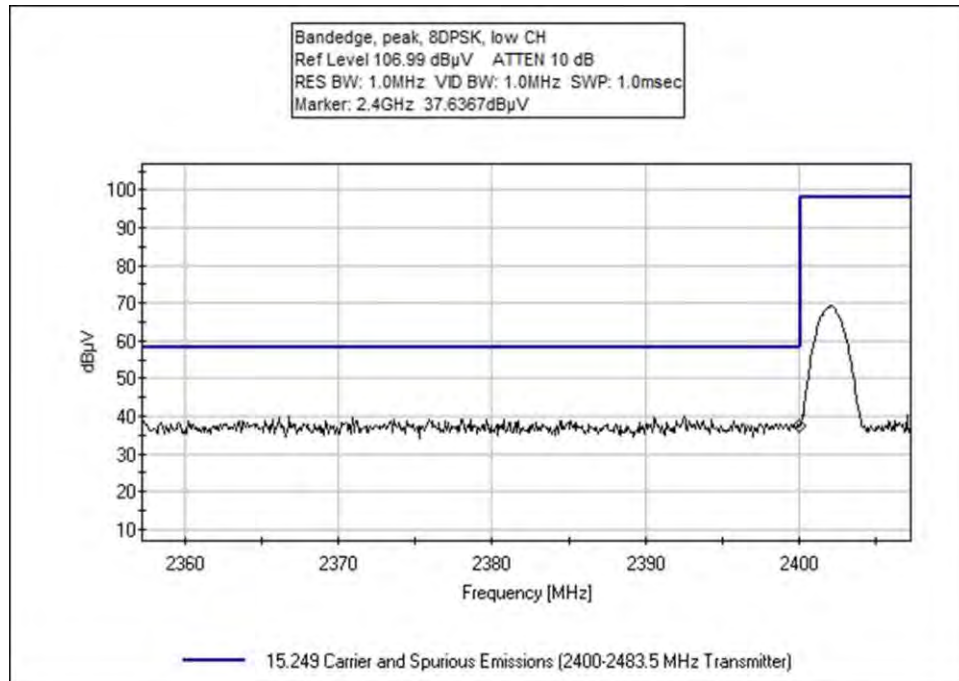


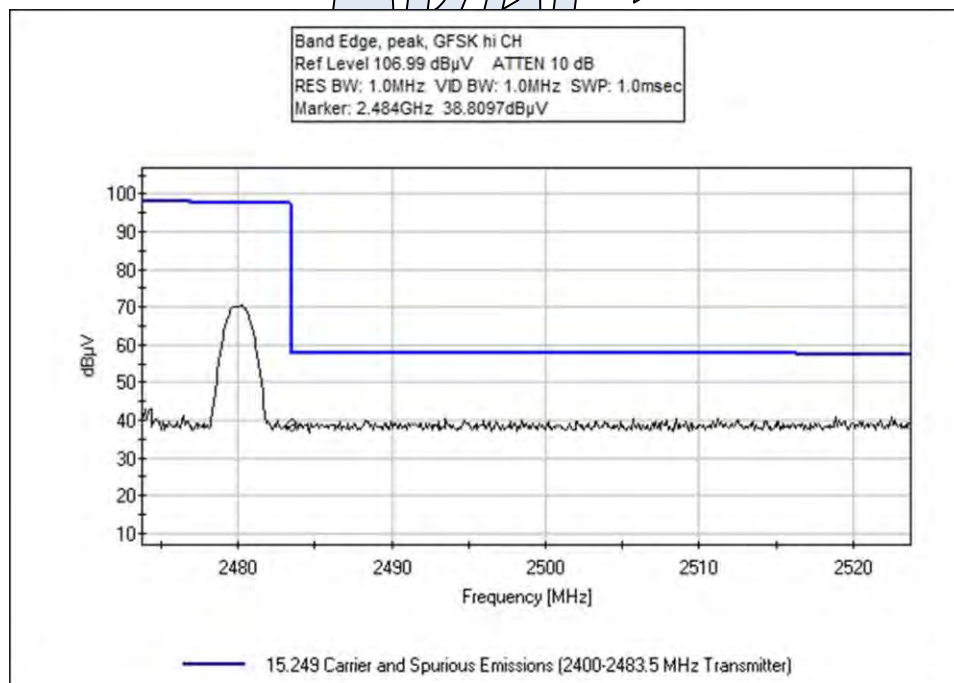
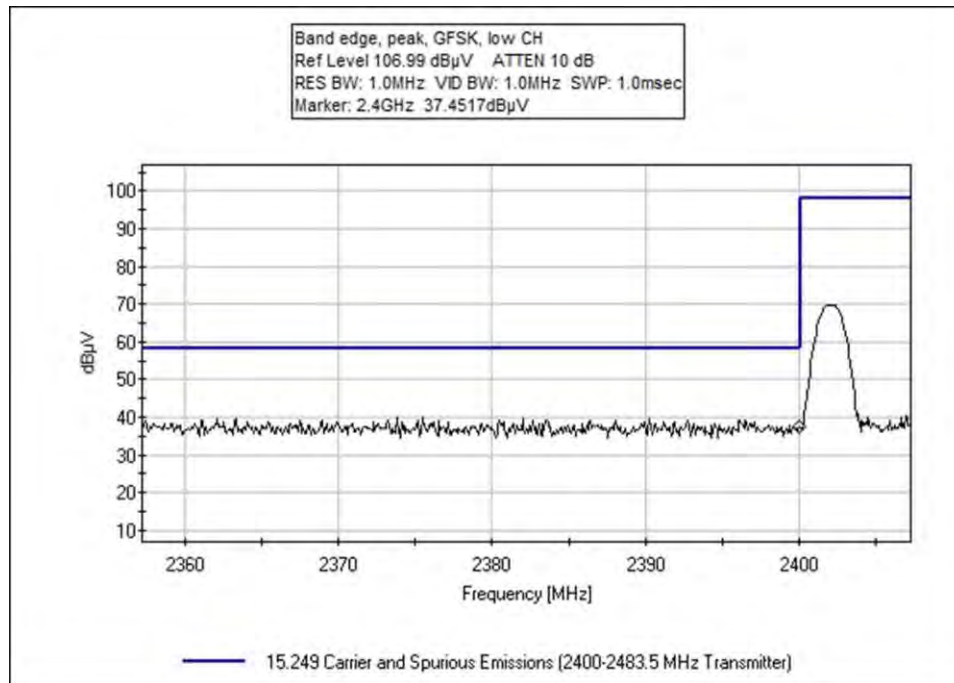




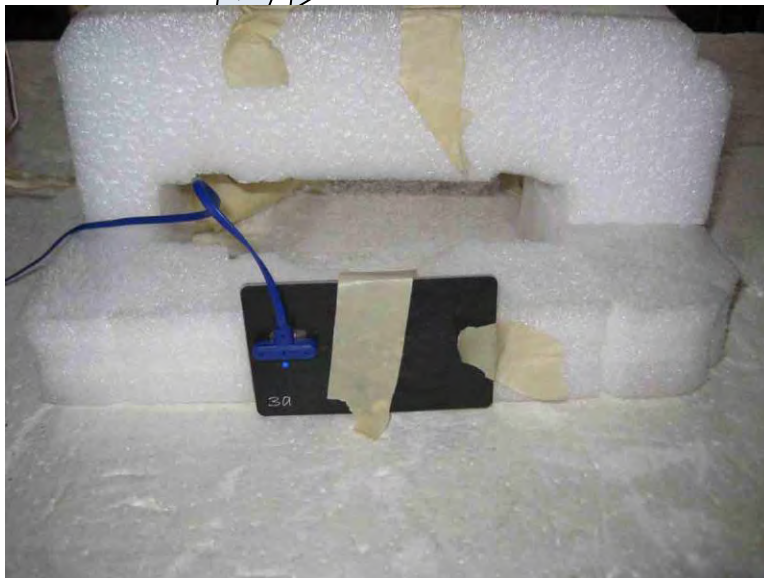
DATA







Test Setup Photo(s)



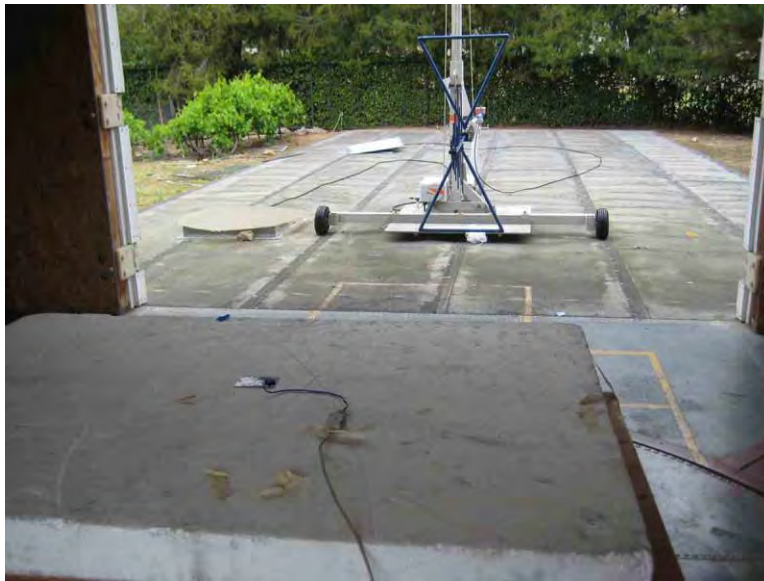
Y Axis



Z Axis

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Test Setup, View #1



Test Setup, View #2



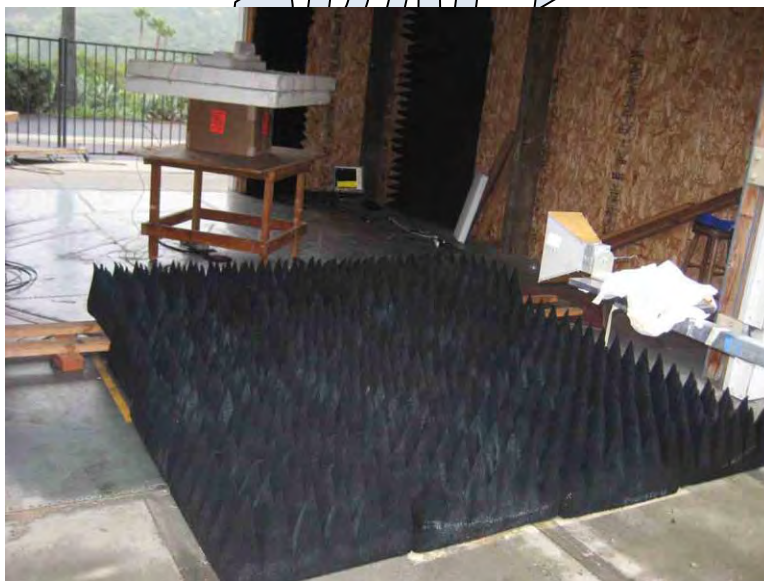
Test Setup, View #3



Test Setup, View #4



Test Setup, View #5



Test Setup, View #6



## 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  $\text{dB}\mu\text{V}/\text{m}$ , the spectrum analyzer reading in  $\text{dB}\mu\text{V}$  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	( $\text{dB}\mu\text{V}$ )
+	Antenna Factor	( $\text{dB}/\text{m}$ )
+	Cable Loss	( $\text{dB}$ )
-	Distance Correction	( $\text{dB}$ )
-	Preamplifier Gain	( $\text{dB}$ )
=	Corrected Reading	( $\text{dB}\mu\text{V}/\text{m}$ )

### 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.