

Navdy

ADDENDUM TO TEST REPORT 98354-26

NVD01
Model: HUD

Tested To The Following Standard:

FCC Part 15 Subpart C Section(s)

15.247
(FHSS 2400-2483.5 MHz)

Report No.: 98354-26A

Date of issue: July 6, 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:

Navdy
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San Francisco, CA 94103

REPORT PREPARED BY:

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Mariposa, CA 95338

REPRESENTATIVE: Doug Simpson
Customer Reference Number: 1256

Project Number: 98354

DATE OF EQUIPMENT RECEIPT:

May 19, 2016

DATE(S) OF TESTING:

May 19-26, 2016

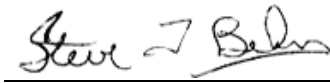
Revision History

Original: Testing of NVD01, Model: HUD, to FCC Part 15 Subpart C Section(s) 15.247, (FHSS 2400-2483.5 MHz).

Addendum A: To correct the table in section 15.247(a)(1) Carrier Separation.

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.
1120 Fulton Place
Fremont, CA 94539

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.02

Site Registration & Accreditation Information

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

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C - 15.247 (FHSS 2.4GHz)

Test Procedure	Description	Modifications	Results
15.247(a)(1)	Occupied Bandwidth	NA	Pass
15.247(a)(1)	Carrier Separation	NA	Pass
15.247(a)(1)(iii)	Number of Hopping Channels	NA	Pass
15.247(a)(1)(iii)	Average Time of Occupancy	NA	Pass
15.247(b)(1)	Output Power	NA	Pass
15.247(d)	RF Conducted Emissions & Band Edge	NA	NA1
15.247(d)	Radiated Emissions & Band Edge	NA	Pass
15.207	AC Conducted Emissions	NA	NA2

NA = Not Applicable

NA1 = Not applicable because the EUT has an integral antenna.

NA2 = Not applicable because the EUT is powered by battery.

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
NVD01	Navy	HUD	FPI619301231134A

Support Equipment:

Device	Manufacturer	Model #	S/N
AC/DC Adapter for Laptop	Asus	ADP-33AW	NA
Laptop	Asus	E200H	G2NLCX03681708B
Battery	DieHard	NA	NA

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	BLE 4.0
Operating Frequency Range:	2400MHz to 2483.5MHz
Number of Hopping Channels:	79
Modulation Type(s):	GFSK, $\pi/4$ -DQPSK and 8-DQPSK
Maximum Duty Cycle:	100%
Number of TX Chains:	79
Antenna Type(s) and Gain:	Integral/ -1dBi
Beamforming Type:	NA
Antenna Connection Type:	Integral
Nominal Input Voltage:	12VDC
Software used for Test:	Window Command Prompt

FCC Part 15 Subpart C

15.247(a) Transmitter Characteristics

Test Setup/Conditions			
Test Location:	Fremont Lab C3	Test Engineer:	Hieu Song Nguyenpham
Test Method:	ANSI C63.10 (2013)	Test Date(s):	5/20/2016
Configuration:	1		
Test Setup:	The EUT is placed on Styrofoam on a table. It is powered by a car battery at 12VDC which is under the table. The EUT is set continuously transmitting as intended.		

Environmental Conditions			
Temperature (°C)	22.7	Relative Humidity (%):	43

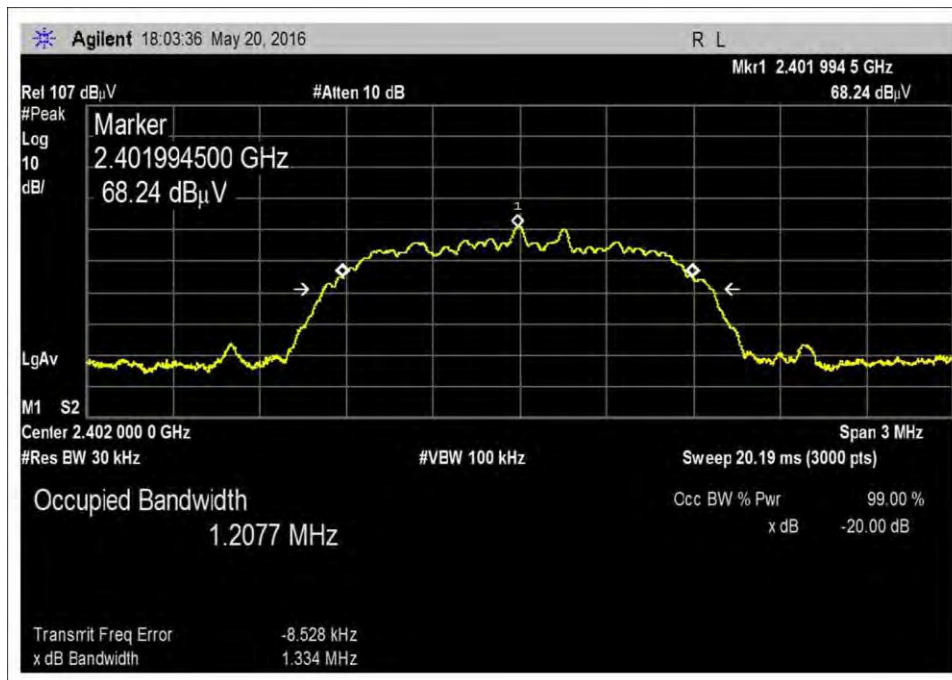
Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02157	Horn Antenna	EMCO	3115	12/2/2014	12/2/2016
P01210	Cable	Andrews	FSJ1P-50A-4A	1/15/2015	1/15/2017
03302	Cable	Astrolab	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
03471	Spectrum Analyzer	Agilent	E4440A	1/4/2016	1/4/2018

15.247(a)(1) 20 dB Bandwidth

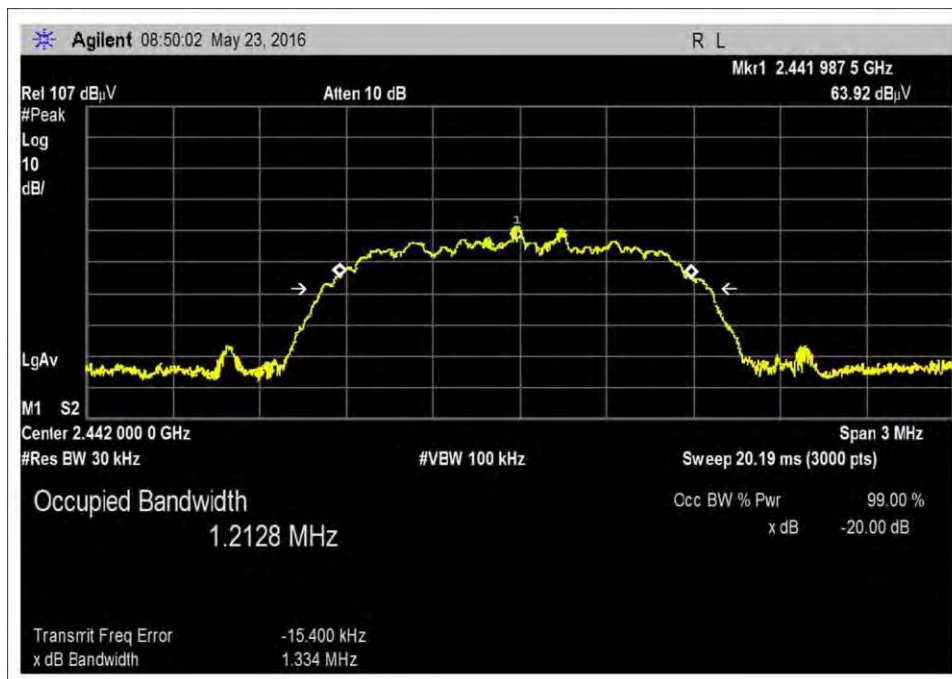
Test Data Summary					
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
2402	1	GFSK	1017	None	NA
2442	1	GFSK	1015		
2480	1	GFSK	1013		
2402	1	$\pi/4$ -DQPSK	1334		
2442	1	$\pi/4$ -DQPSK	1334		
2480	1	$\pi/4$ -DQPSK	1334		
2402	1	8-DQPSK	1306		
2442	1	8-DQPSK	1307		
2480	1	8-DQPSK	1308		

Plots

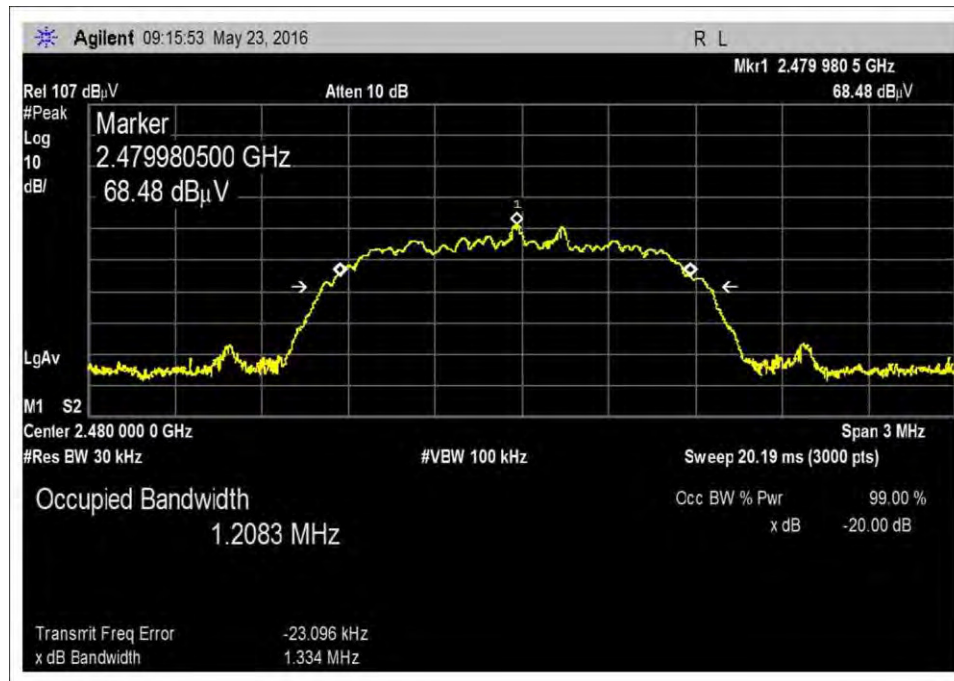
4-DQPSK



Low Channel

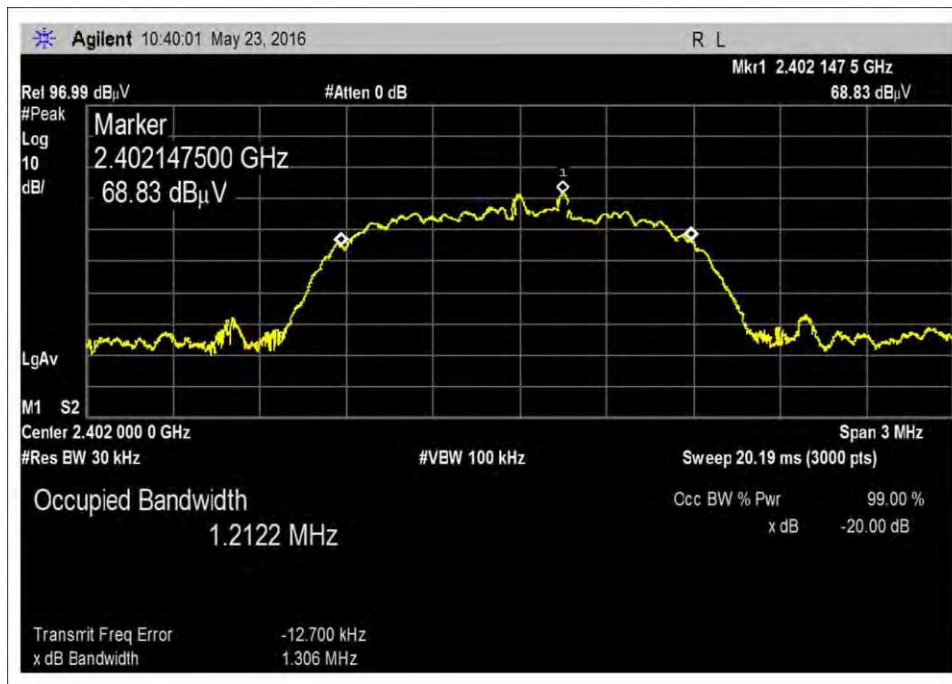


Middle Channel

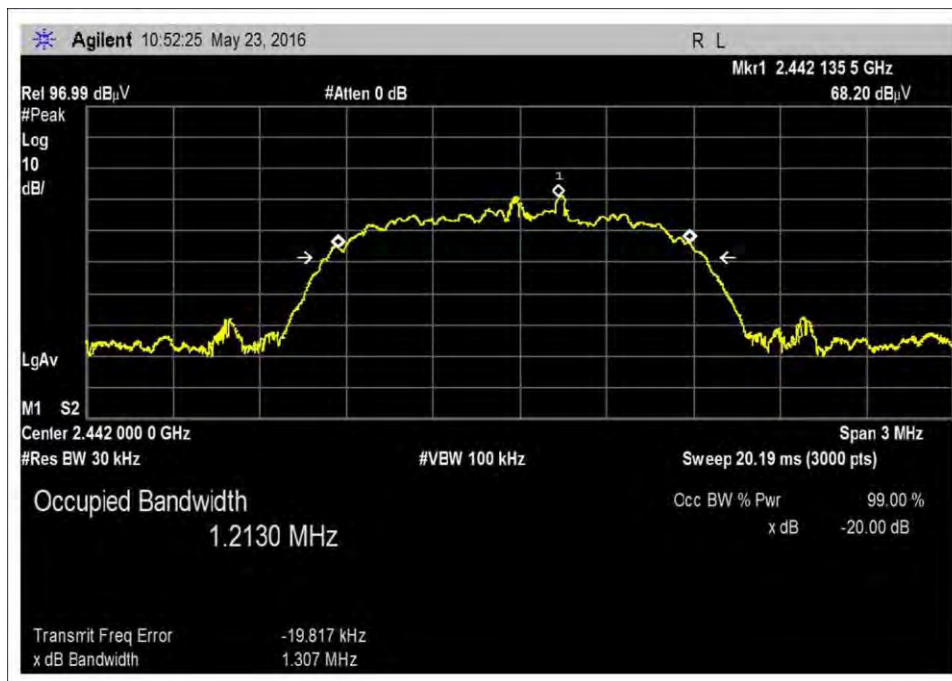


High Channel

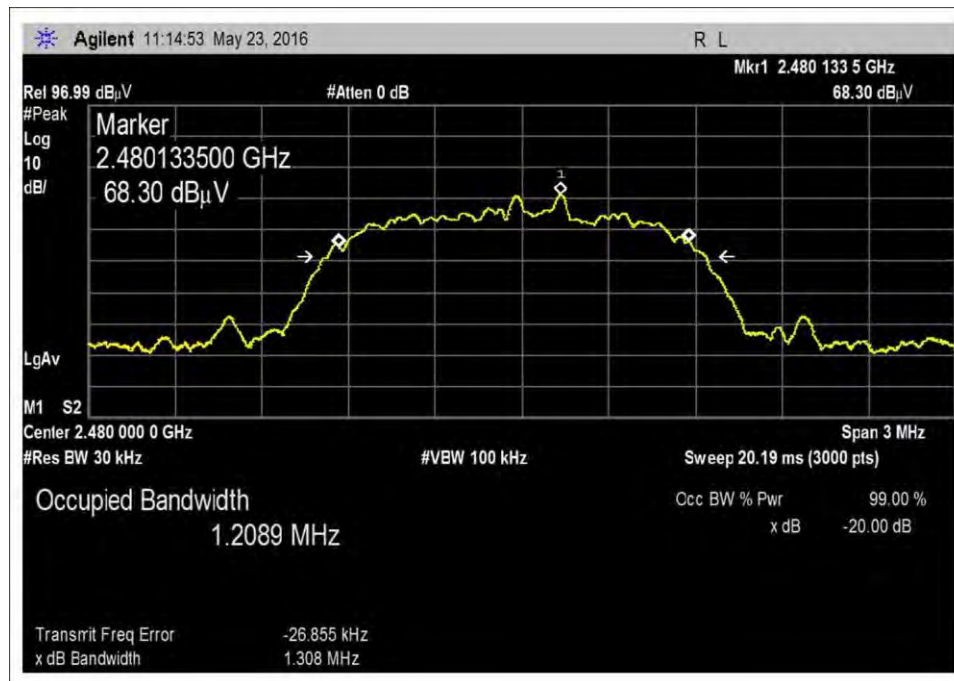
8-DQPSK



Low Channel

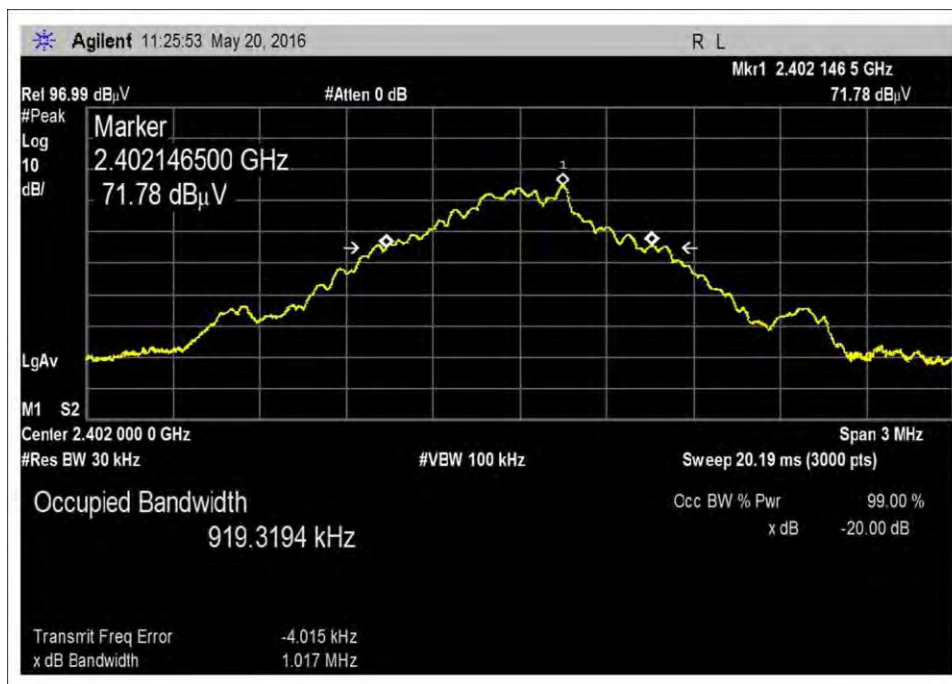


Middle Channel

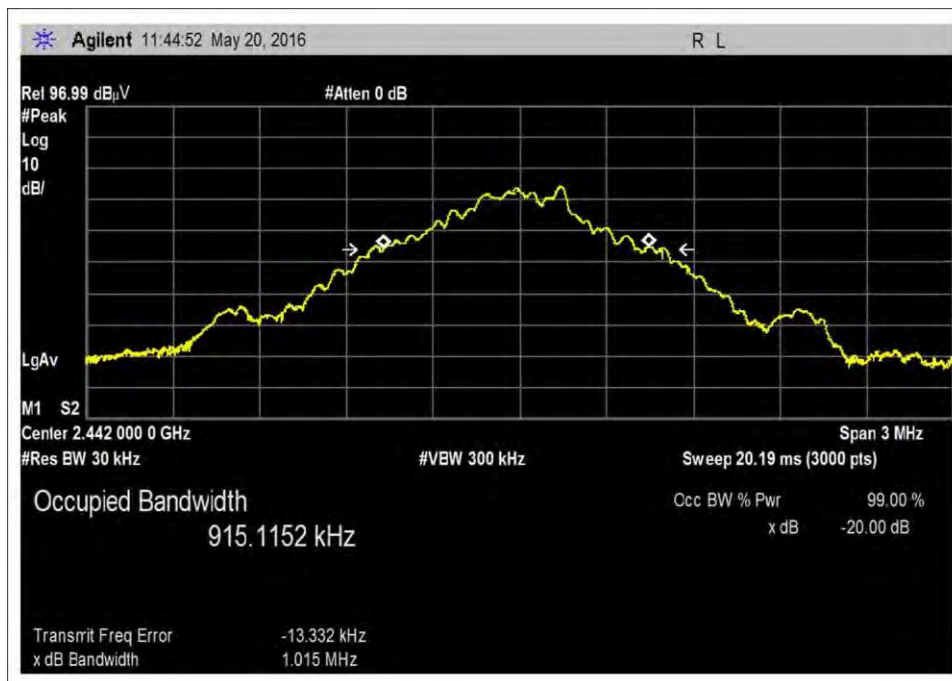


High Channel

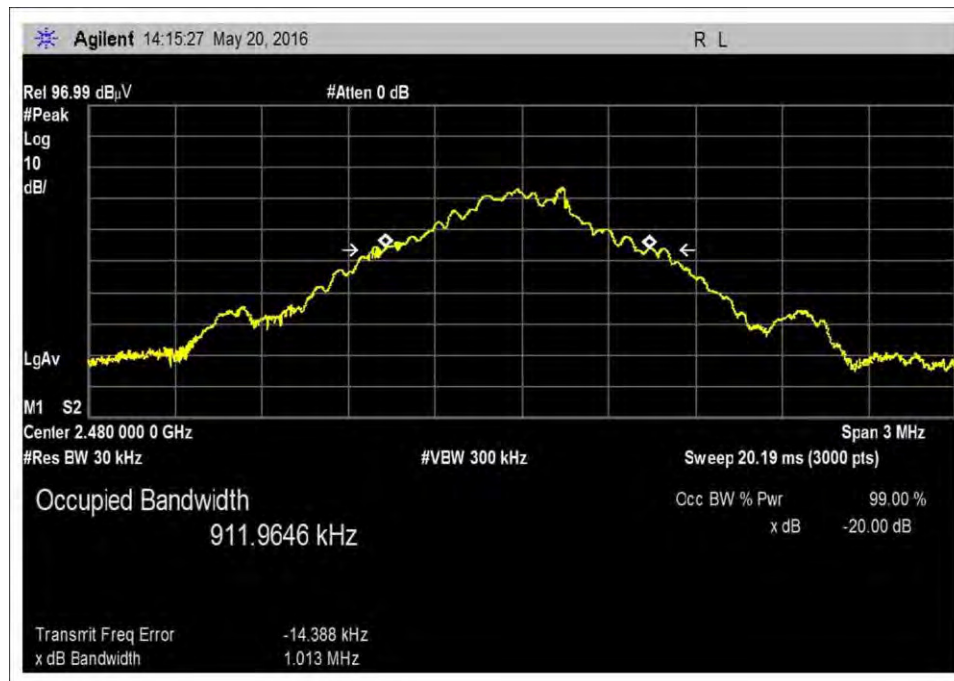
GFSK



Low Channel



Middle Channel



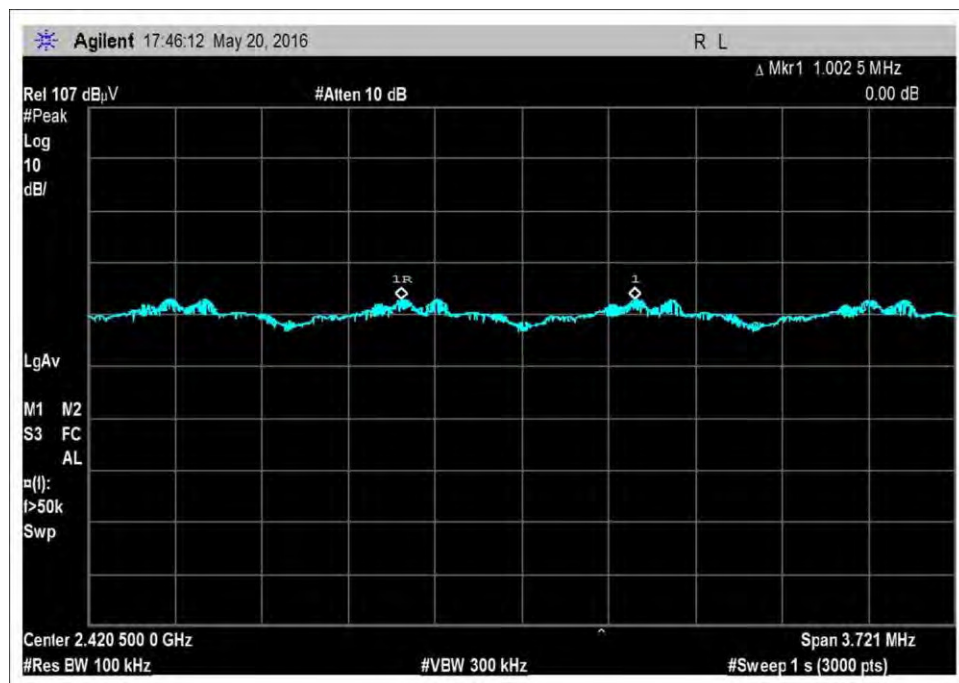
High Channel

15.247(a)(1) Carrier Separation

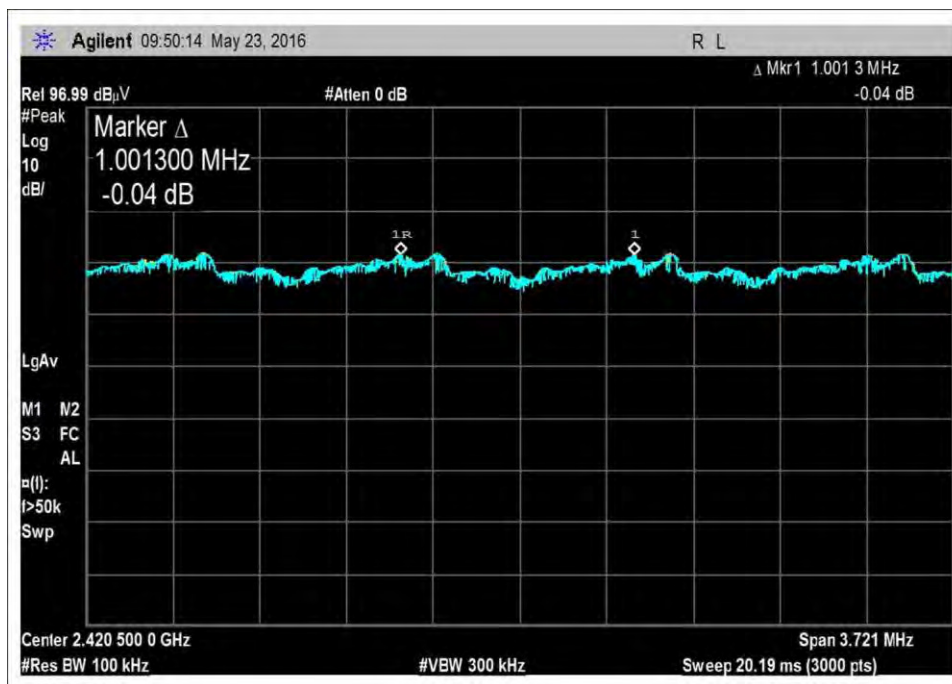
Test Data Summary					
Limit applied: Minimum 25kHz					
Antenna Port	Operational Mode	Modulation	Measured (kHz)	Limit (kHz)	Results
1	Normal	GFSK	1023	≥25	Pass
1	Normal	$\pi/4$ -DQPSK	1002.5	≥25	Pass
1	Normal	8-DQPSK	1001.3	≥25	Pass

Plots

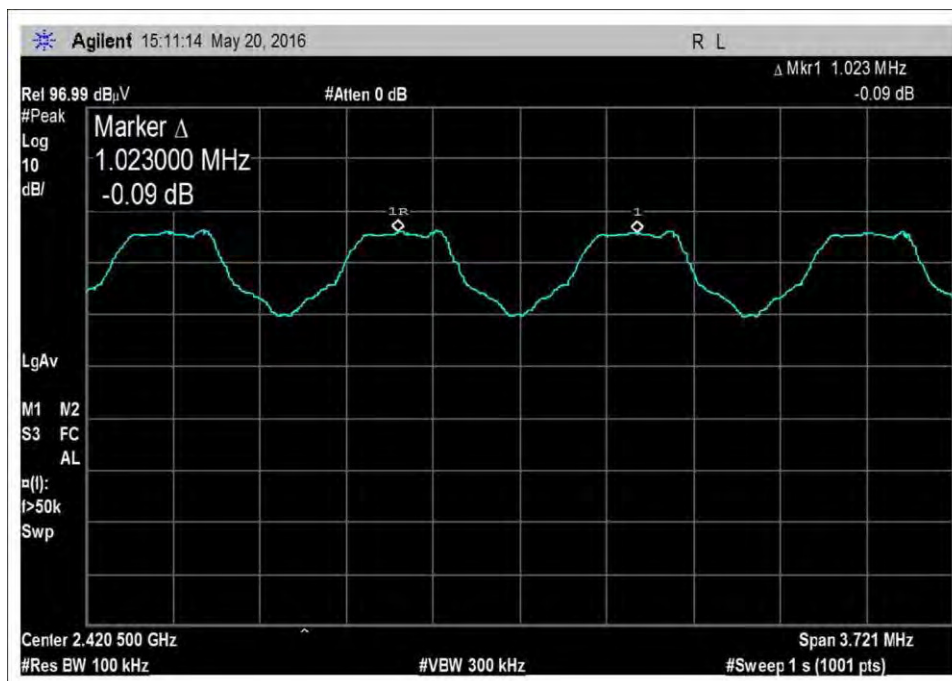
4-DQPSK



8-DQPSK



GFSK

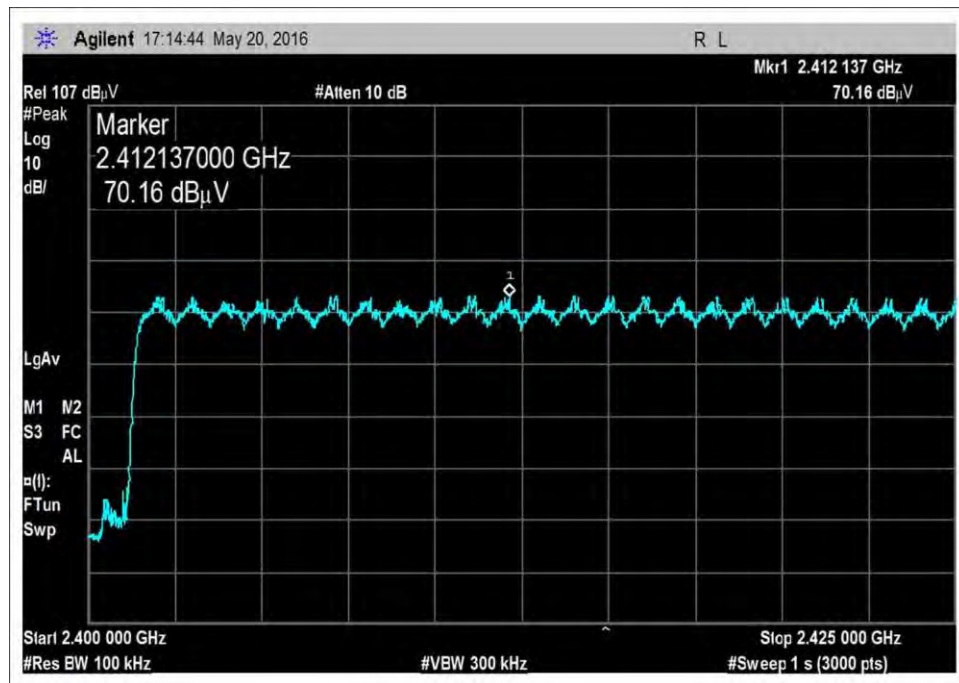


15.247(a)(1)(iii) Number of Hopping Channels

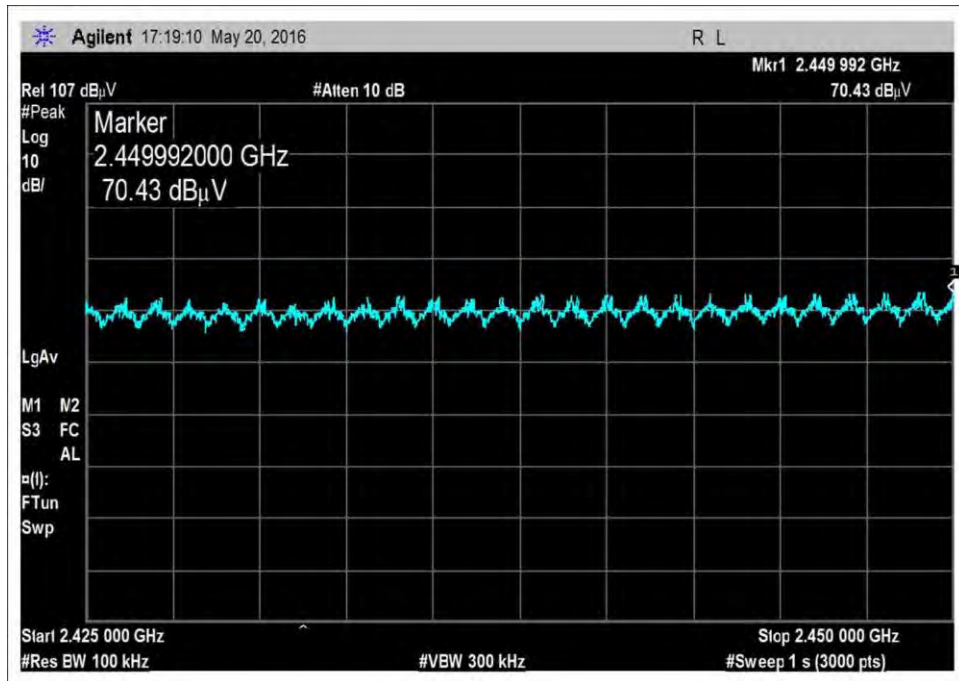
Test Data Summary					
Limit applied: 75; for equipment with power output >125 mW..					
Antenna Port	Operational Mode	Modulation	Measured (Channels)	Limit (Channels)	Results
1	Normal	GFSK	79	≥75	Pass
1	Normal	$\pi/4$ -DQPSK	79	≥75	Pass
1	Normal	8-DQPSK	79	≥75	Pass

Plots

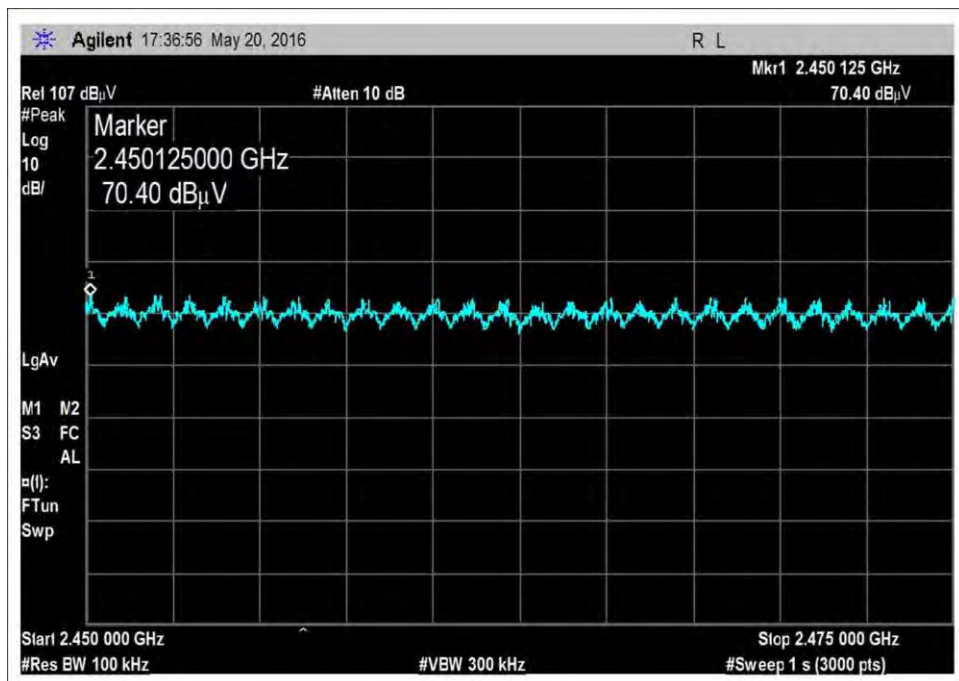
4-DQPSK



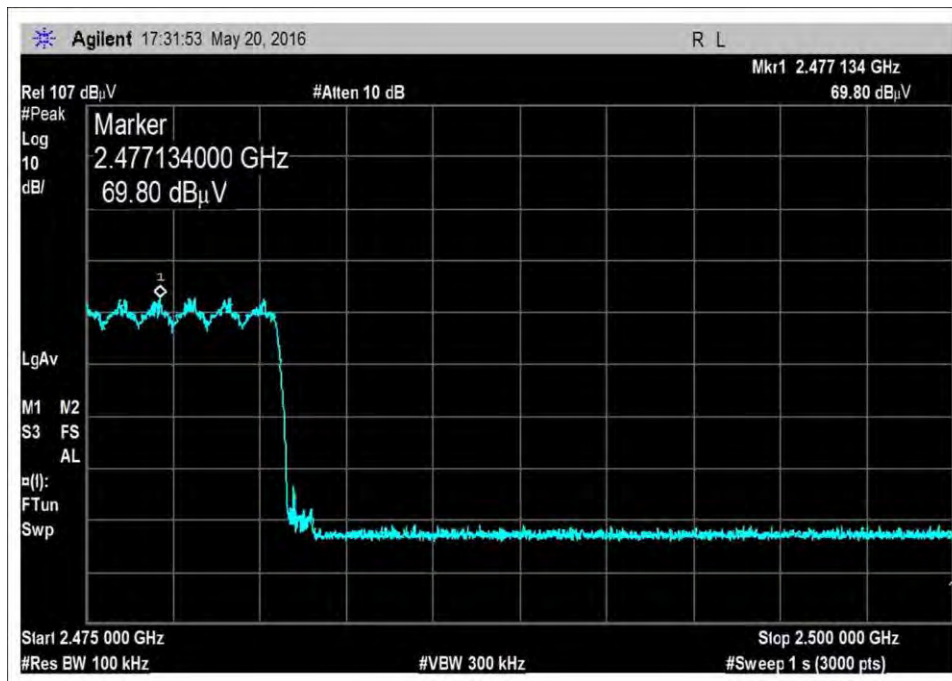
Number of Hopping, 1-24



Number of Hopping, 24 – 49

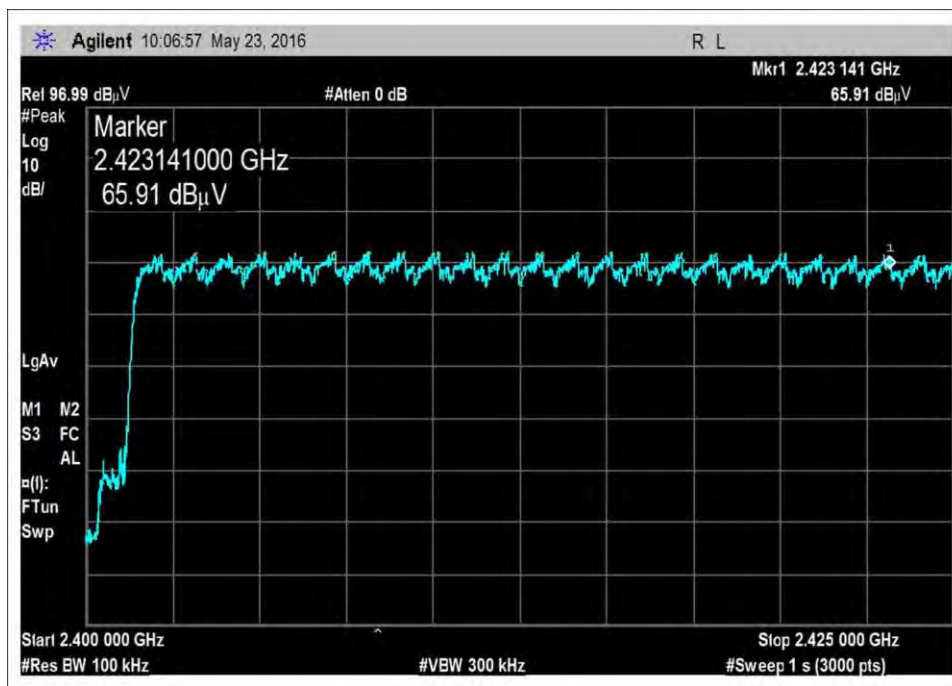


Number of Hopping, 49 – 74

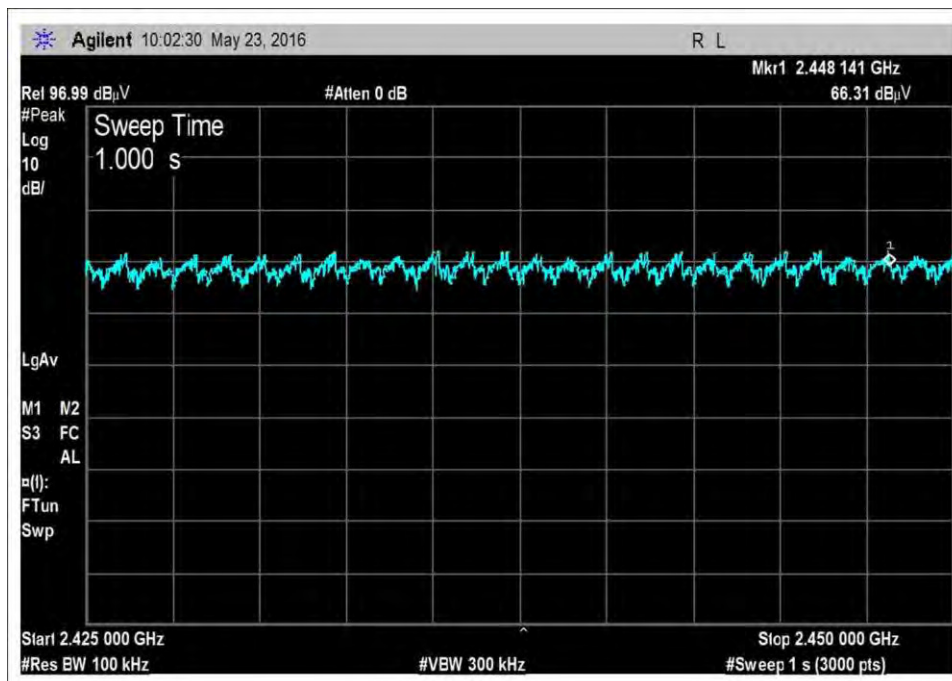


Number of Hopping, 74 - 79

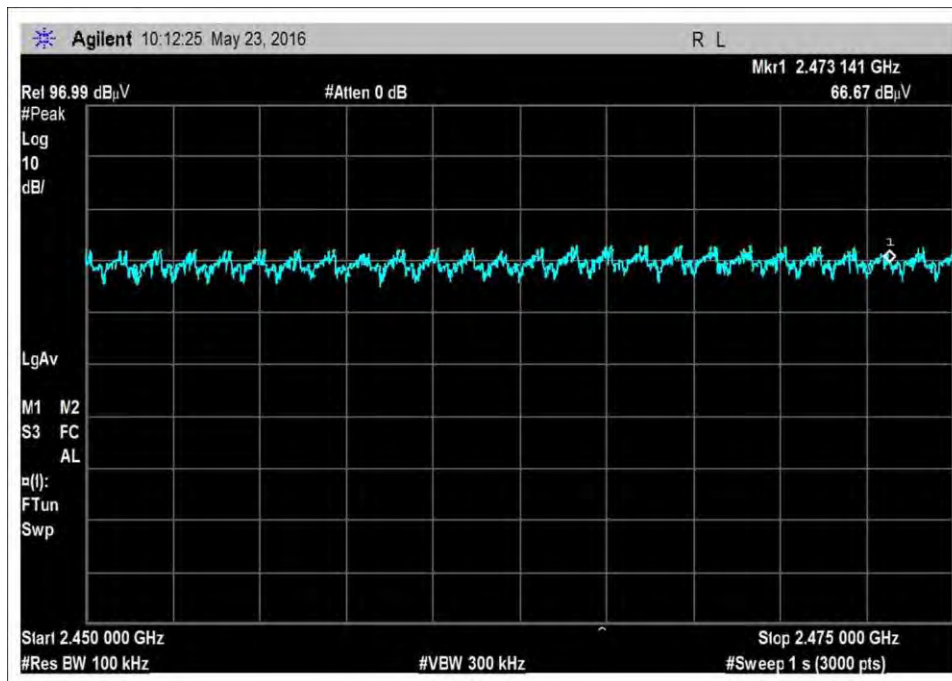
8-DQPSK



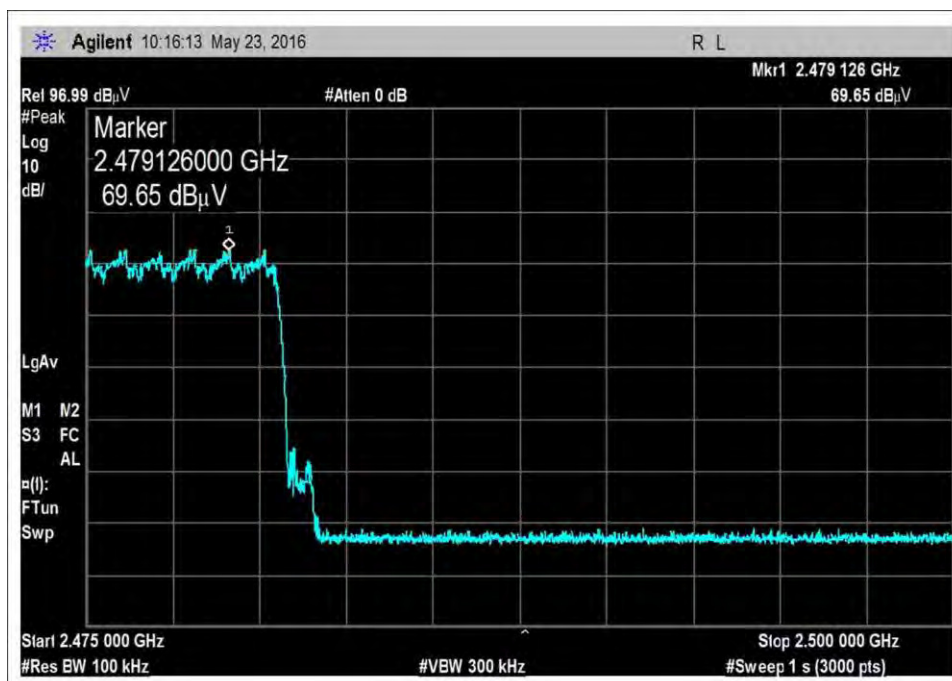
Number of Hopping, 1 – 24



Number of Hopping, 24 – 49

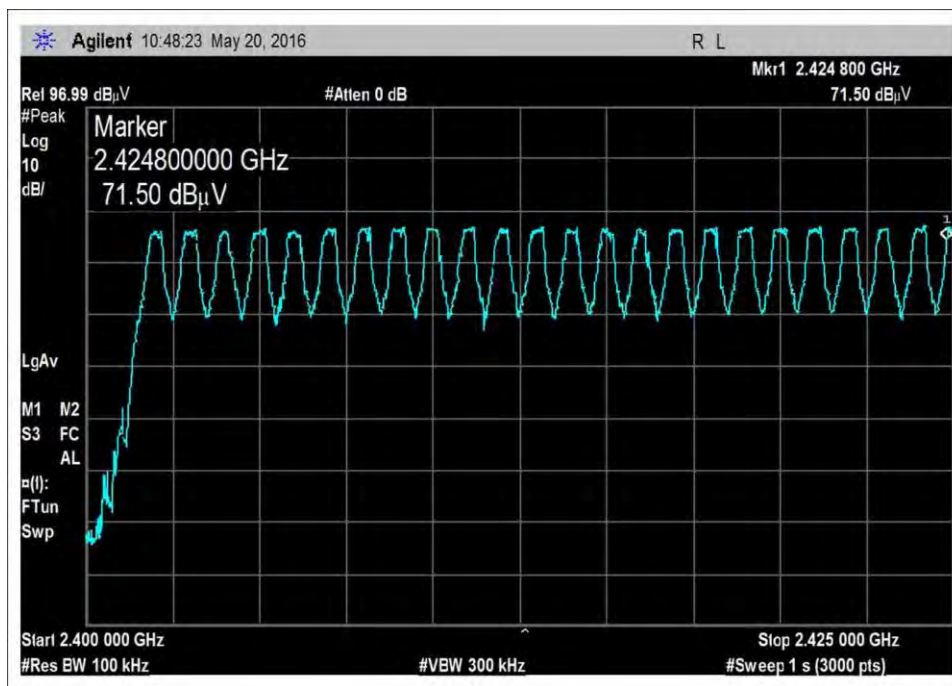


Number of Hopping, 49 – 74

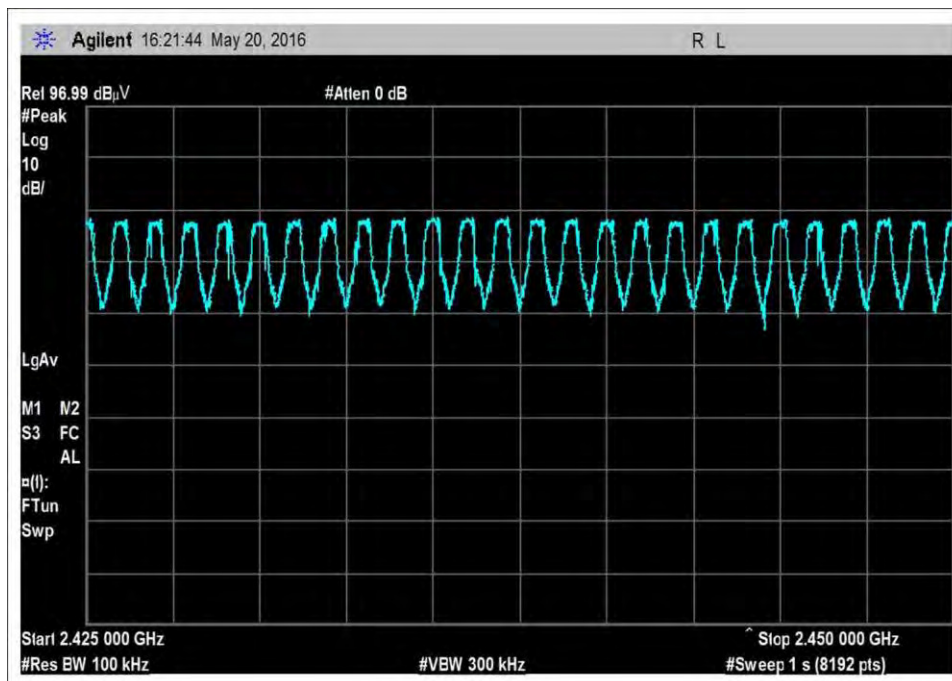


Number of Hopping, 74 – 79

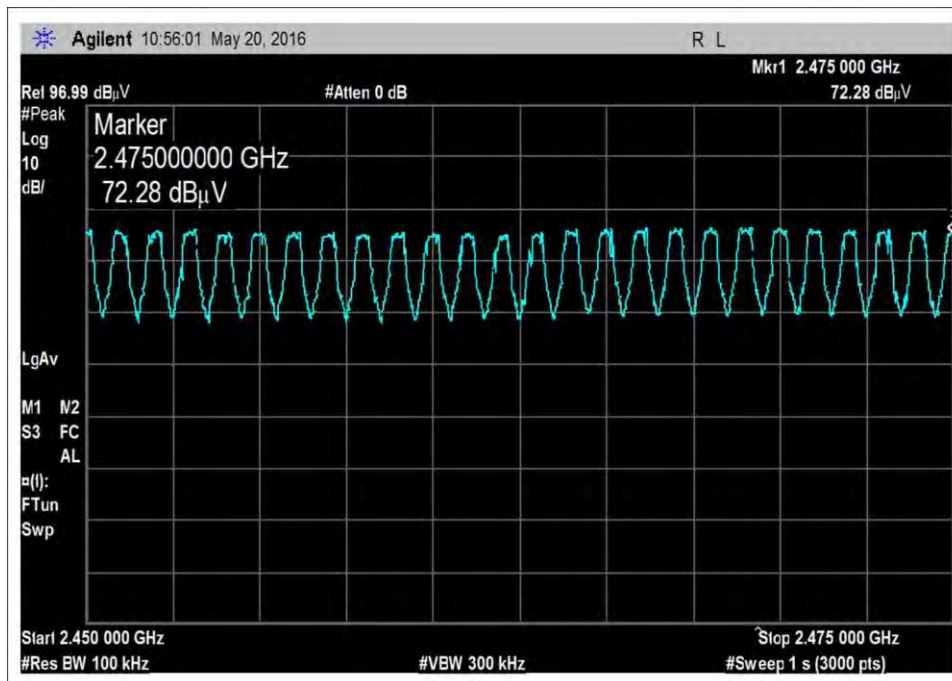
GFSK



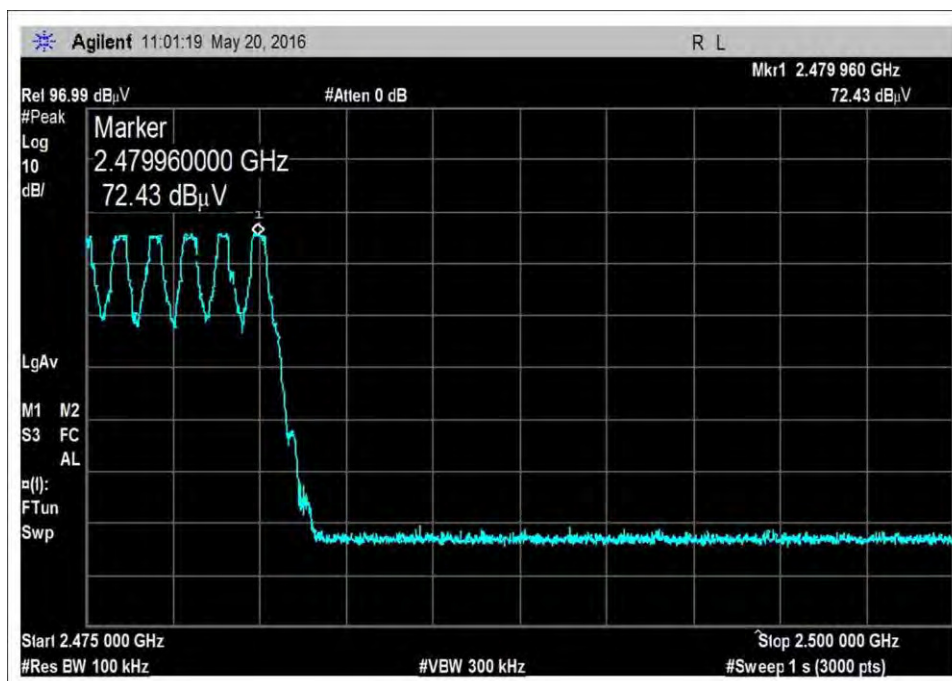
Number of Hopping, 1 – 24



Number of Hopping, 24 – 49



Number of Hopping, 49 – 74



Number of Hopping, 74 - 79

15.247(a)(1)(iii) Time of Occupancy

Test Data Summary					
Observation Period, P_{obs} is derived from the following: $P_{obs} = 0.4 \times \text{max number of hopping channels}$					
Antenna Port	Operational Mode	Modulation	Measured (ms)	Limit (ms/ P_{obs})	Results
1	Normal	$\pi/4$ -DQPSK	341.15	≤ 400	Pass
1	Normal	8-DQPSK	72.88	≤ 400	Pass
1	Normal	GFSK	344.58	≤ 400	Pass

Measured results are calculated as follows:

$$Dwell\ time = \left(\sum_{Bursts} RF\ Burst\ On\ Time + \sum_{Control} Control\ Signal\ On\ time \right) \Big|_{P_{obs}}$$

Actual Calculated Values: $\pi/4$ -DQPSK

Parameter	Value
Observation Period (P_{obs}):	31.6s
Number of RF Bursts / P_{obs} :	120
On time of RF Burst:	0.002841s
Number of Control or other signals / P_{obs} :	0
On time of Control or other Signals:	0
Total Measured On Time:	0.34115s

Actual Calculated Values: 8-DQPSK

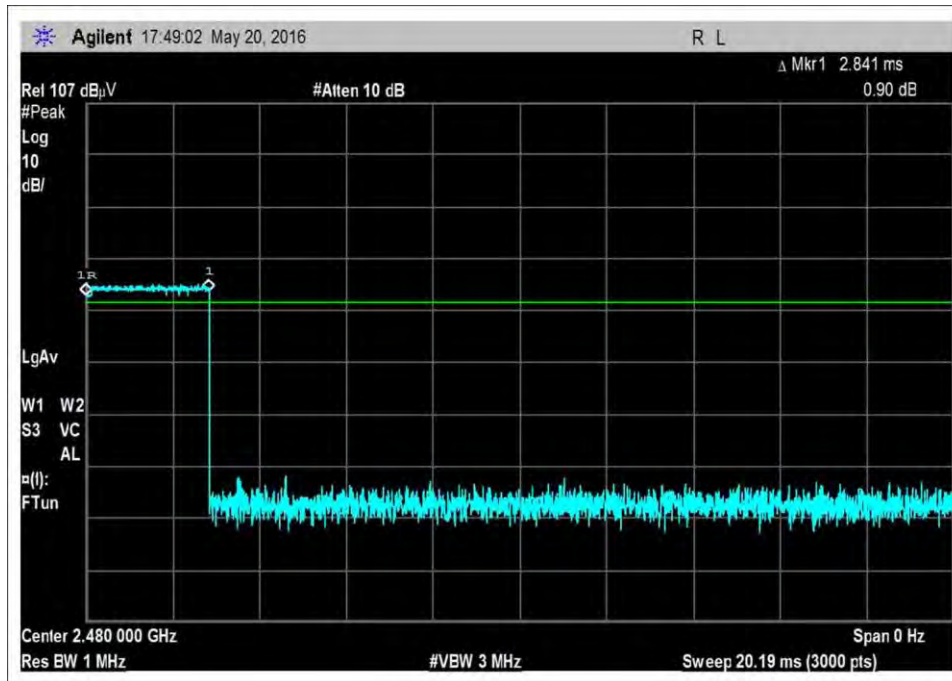
Parameter	Value
Observation Period (P_{obs}):	31.6s
Number of RF Bursts / P_{obs} :	25
On time of RF Burst:	0.002883s
Number of Control or other signals / P_{obs} :	0
On time of Control or other Signals:	0
Total Measured On Time:	0.07288s

Actual Calculated Values: GFSK

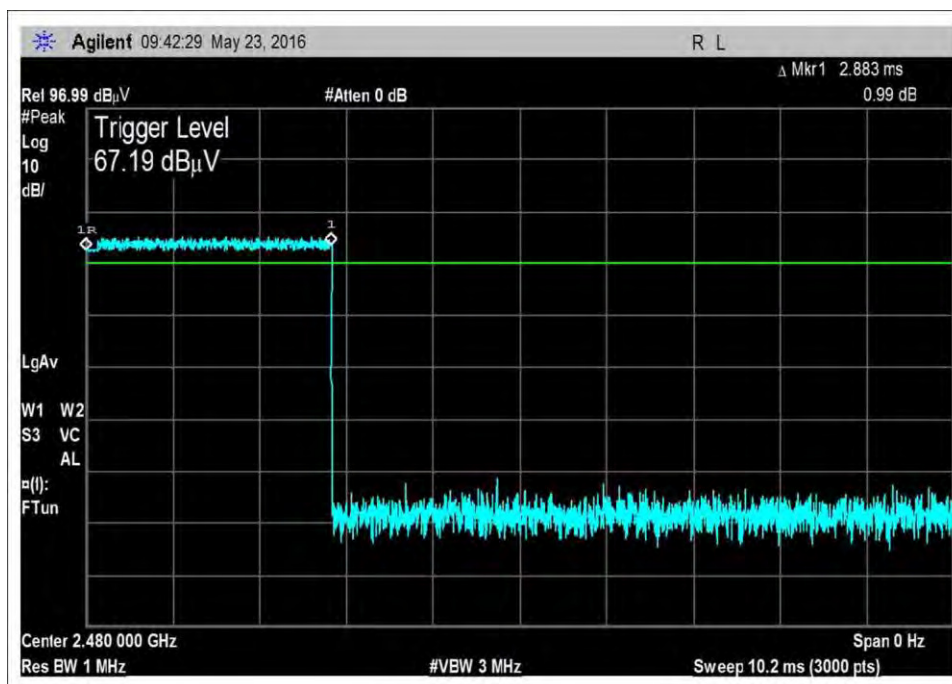
Parameter	Value
Observation Period (P_{obs}):	31.6s
Number of RF Bursts / P_{obs} :	120
On time of RF Burst:	0.0028696s
Number of Control or other signals / P_{obs} :	0
On time of Control or other Signals:	0
Total Measured On Time:	0.34458s

Plots

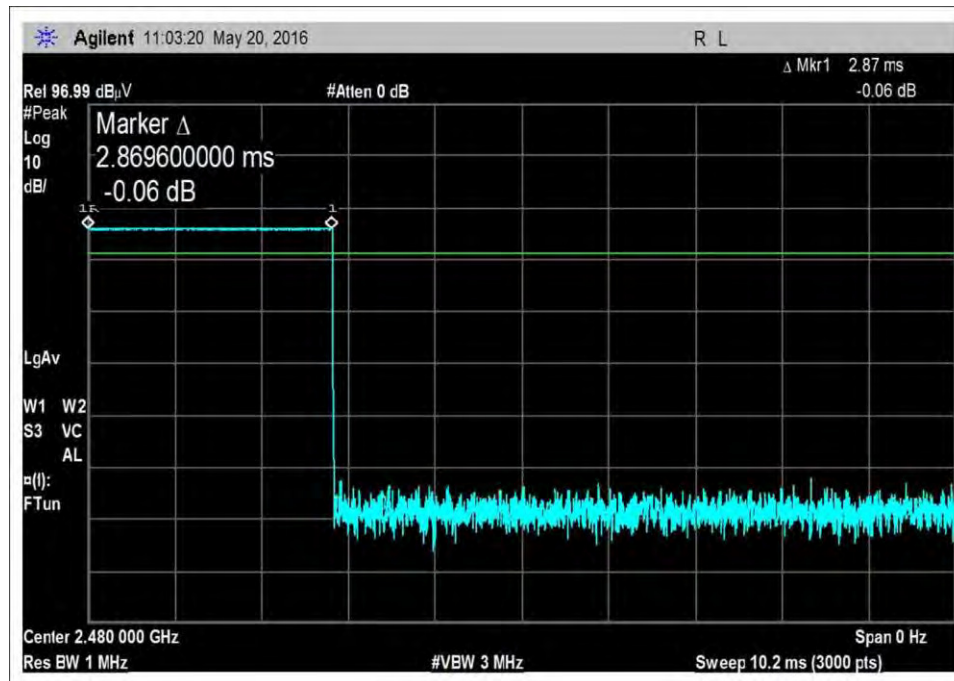
4-DQPSK



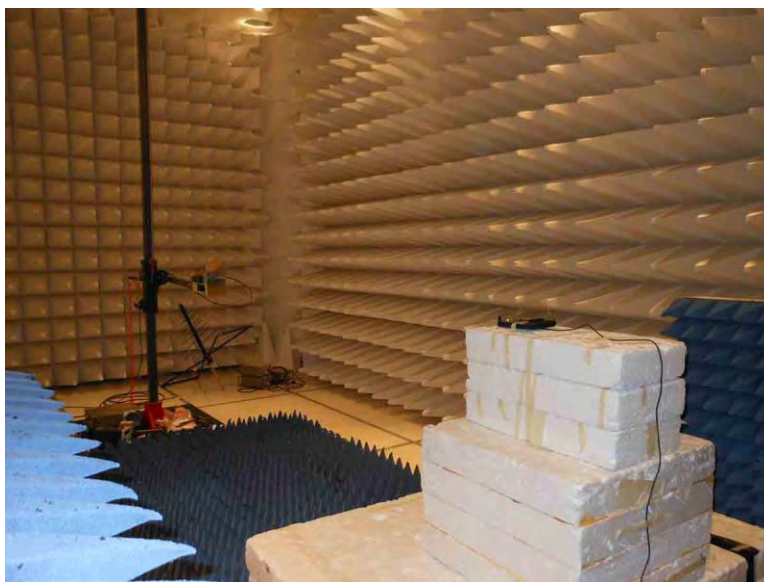
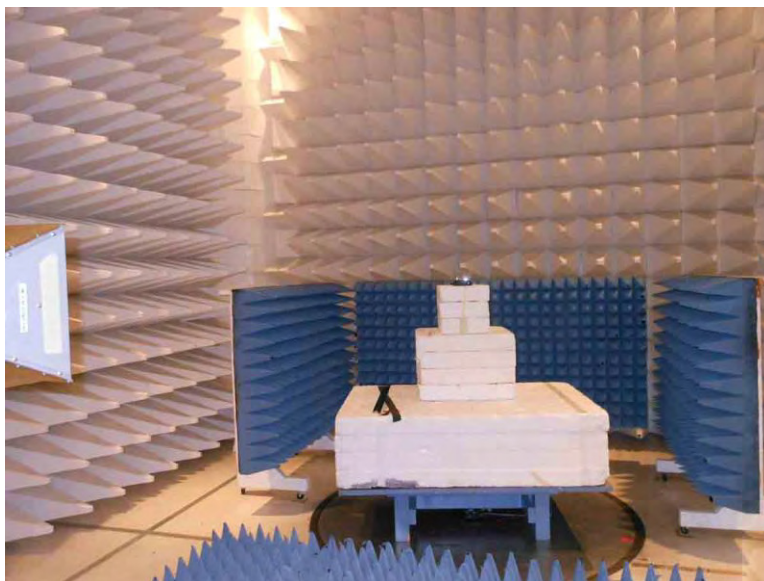
8-DQPSK



GFSK



Test Setup Photos



15.247(b)(1) Output Power

Test Data Summary - Voltage Variations

This equipment is battery powered. Power output tests were performed using a fresh battery.

Test Data Summary - Radiated Measurement - $\pi/4$ -DQPSK

Limit = $\begin{cases} 30\text{dBm Conducted}/36\text{dBm EIRP} & \geq 75 \text{ Channels} \\ 21\text{dBm Conducted}/27\text{dBm EIRP} & < 75 \text{ Channels (min 15)} \end{cases}$

Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Field Strength (dBuV/m @3m)	Calculated (dBm)	Limit (dBm)	Results
2402 Horizontal	$\pi/4$ -DQPSK	Integral/-1 dBi	105	10.771	≤ 30	Pass
2402 Vertical	$\pi/4$ -DQPSK	Integral/-1 dBi	98.8	4.571	≤ 30	Pass
2442 Horizontal	$\pi/4$ -DQPSK	Integral/-1 dBi	105.7	11.471	≤ 30	Pass
2442 Vertical	$\pi/4$ -DQPSK	Integral/-1 dBi	98.5	4.271	≤ 30	Pass
2480 Horizontal	$\pi/4$ -DQPSK	Integral/-1 dBi	105.6	11.371	≤ 30	Pass
2480 Vertical	$\pi/4$ -DQPSK	Integral/-1 dBi	99.6	5.371	≤ 30	Pass

Test Data Summary - Radiated Measurement - 8-DQPSK

Limit = $\begin{cases} 30\text{dBm Conducted}/36\text{dBm EIRP} & \geq 75 \text{ Channels} \\ 21\text{dBm Conducted}/27\text{dBm EIRP} & < 75 \text{ Channels (min 15)} \end{cases}$

Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Field Strength (dBuV/m @3m)	Calculated (dBm)	Limit (dBm)	Results
2402 Horizontal	8-DQPSK	Integral/-1 dBi	105.4	11.171	≤ 30	Pass
2402 Vertical	8-DQPSK	Integral/-1 dBi	98.9	4.671	≤ 30	Pass
2442 Horizontal	8-DQPSK	Integral/-1 dBi	105.1	10.871	≤ 30	Pass
2442 Vertical	8-DQPSK	Integral/-1 dBi	99.8	5.571	≤ 30	Pass
2480 Horizontal	8-DQPSK	Integral/-1 dBi	105.2	10.971	≤ 30	Pass
2480 Vertical	8-DQPSK	Integral/-1 dBi	98.9	4.671	≤ 30	Pass

Test Data Summary - Radiated Measurement GFSK						
$Limit = \begin{cases} 30dBm \text{ Conducted} / 36dBm \text{ EIRP} & \geq 75 \text{ Channels} \\ 21dBm \text{ Conducted} / 27dBm \text{ EIRP} & < 75 \text{ Channels (min 15)} \end{cases}$						
Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Field Strength (dBuV/m @3m)	Calculated (dBm)	Limit (dBm)	Results
2402 Horizontal	GFSK	Integral/-1 dBi	105.6	11.371	≤ 30	Pass
2402 Vertical	GFSK	Integral/-1 dBi	100.3	6.071	≤ 30	Pass
2442 Horizontal	GFSK	Integral/-1 dBi	105.1	10.871	≤ 30	Pass
2442 Vertical	GFSK	Integral/-1 dBi	100.1	5.871	≤ 30	Pass
2480 Horizontal	GFSK	Integral/-1 dBi	105.1	10.871	≤ 30	Pass
2480 Vertical	GFSK	Integral/-1 dBi	100.3	6.071	≤ 30	Pass

For fixed point-to-point antennas, the limit is calculated in accordance with 15.247(c)(1): $Limit = 30 - Roundup\left(\frac{G-6}{3}\right)$

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

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

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

Or equivalently, in logarithmic form:

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

Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(b) Power Output (2400-2483.5 MHz FHSS >75 Channels)**
 Work Order #: **98354** Date: 5/23/2016
 Test Type: **Radiated Scan** Time: 09:21:10
 Tested By: Hieu Song Nguyenpham Sequence#: 5
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

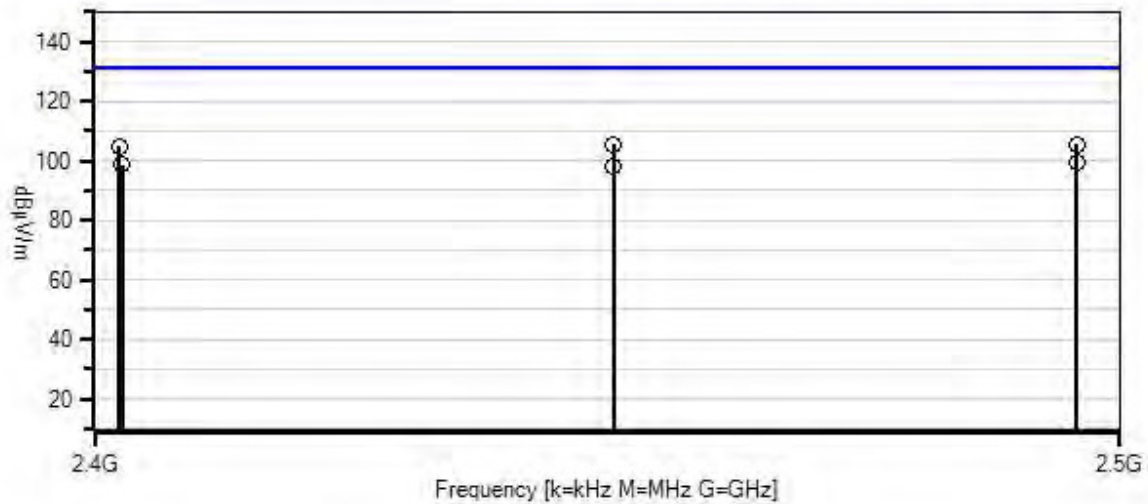
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth Classic ($\pi/4$-DQPSK) on TX Mode

Navdy W/O#: 98354 Sequence#: 5 Date: 5/23/2016
 15.247(b) Power Output (2400-2483.5 MHz FHSS >75 Channels) Test Distance: 3 Meters Vert



- Readings
- Peak Readings
- × QP Readings
- * Average Readings
- ▼ Ambient
- Software Version: 5.03.02
- 1 - 15.247(b) Power Output (2400-2483.5 MHz FHSS >75 Channels)

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	AN03302	Cable	32026-29094K- 29094K-72TC	1/29/2016	1/29/2018
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB		Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	2441.905M	73.1	+28.7	+1.3	+2.6		+0.0	105.7	131.2	-25.5	Horiz
2	2479.915M	72.9	+28.8	+1.3	+2.6		+0.0	105.6	131.2	-25.6	Horiz
3	2402.002M	72.5	+28.6	+1.3	+2.6		+0.0	105.0	131.2	-26.2	Horiz
4	2479.915M	66.9	+28.8	+1.3	+2.6		+0.0	99.6	131.2	-31.6	Vert
5	2402.252M	66.3	+28.6	+1.3	+2.6		+0.0	98.8	131.2	-32.4	Vert
6	2441.905M	65.9	+28.7	+1.3	+2.6		+0.0	98.5	131.2	-32.7	Vert

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(b) Power Output (2400-2483.5 MHz FHSS >75 Channels)**
 Work Order #: **98354** Date: 5/23/2016
 Test Type: **Radiated Scan** Time: 11:18:31
 Tested By: Hieu Song Nguyenpham Sequence#: 6
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

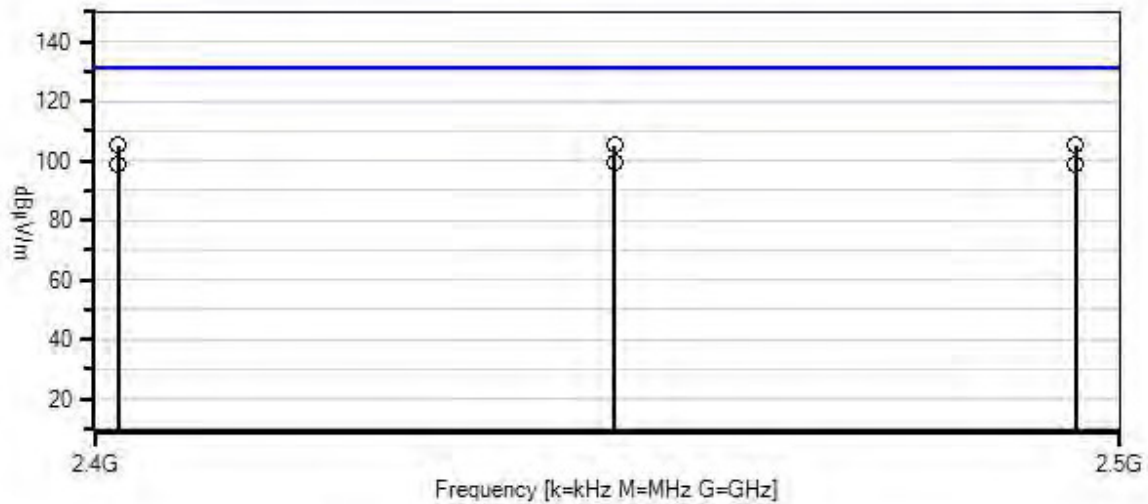
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth Classic (8-DQPSK) on TX Mode
--

Nvdv W/O#: 98354 Sequence#: 6 Date: 5/23/2016
 15.247(b) Power Output (2400-2483.5 MHz FHSS >75 Channels) Test Distance: 3 Meters Vert



- Readings
- Peak Readings
- × QP Readings
- * Average Readings
- ▼ Ambient
- Software Version: 5.03.02
- 1 - 15.247(b) Power Output (2400-2483.5 MHz FHSS >75 Channels)

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	AN03302	Cable	32026-29094K- 29094K-72TC	1/29/2016	1/29/2018
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB		Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	2401.882M	72.9	+28.6	+1.3	+2.6		+0.0	105.4	131.2	-25.8	Horiz
2	2479.845M	72.5	+28.8	+1.3	+2.6		+0.0	105.2	131.2	-26.0	Horiz
3	2441.965M	72.5	+28.7	+1.3	+2.6		+0.0	105.1	131.2	-26.1	Horiz
4	2441.965M	67.2	+28.7	+1.3	+2.6		+0.0	99.8	131.2	-31.4	Vert
5	2401.882M	66.4	+28.6	+1.3	+2.6		+0.0	98.9	131.2	-32.3	Vert
6	2479.845M	66.2	+28.8	+1.3	+2.6		+0.0	98.9	131.2	-32.3	Vert

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(b) Power Output (2400-2483.5 MHz FHSS >75 Channels)**
 Work Order #: **98354** Date: 5/20/2016
 Test Type: **Radiated Scan** Time: 14:47:34
 Tested By: Hieu Song Nguyenpham Sequence#: 4
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

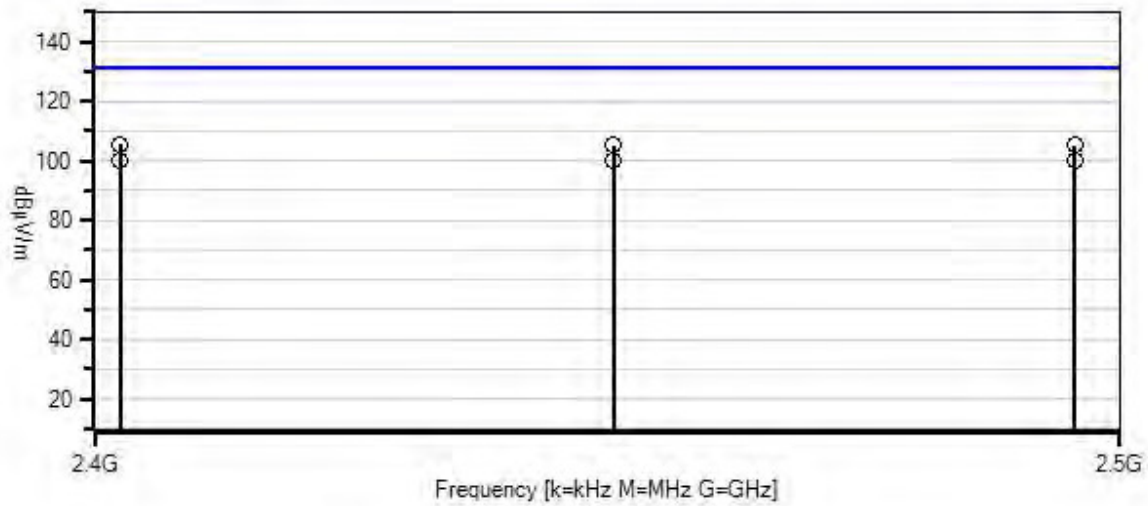
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth Classic (GFSK) on TX Mode

Navdy W/O#: 98354 Sequence#: 4 Date: 5/20/2016
 15.247(b) Power Output (2400-2483.5 MHz FHSS >75 Channels) Test Distance: 3 Meters Vert



- Readings
- Peak Readings
- × QP Readings
- * Average Readings
- ▼ Ambient
- Software Version: 5.03.02
- 1 - 15.247(b) Power Output (2400-2483.5 MHz FHSS >75 Channels)

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	AN03302	Cable	32026-29094K- 29094K-72TC	1/29/2016	1/29/2018
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

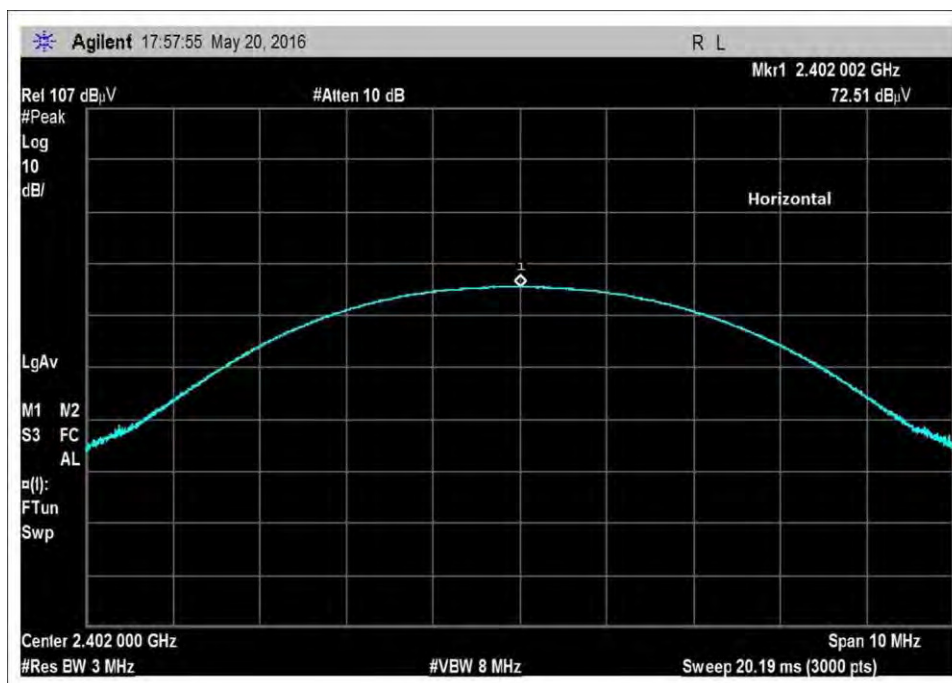
Reading listed by margin.

Test Distance: 3 Meters

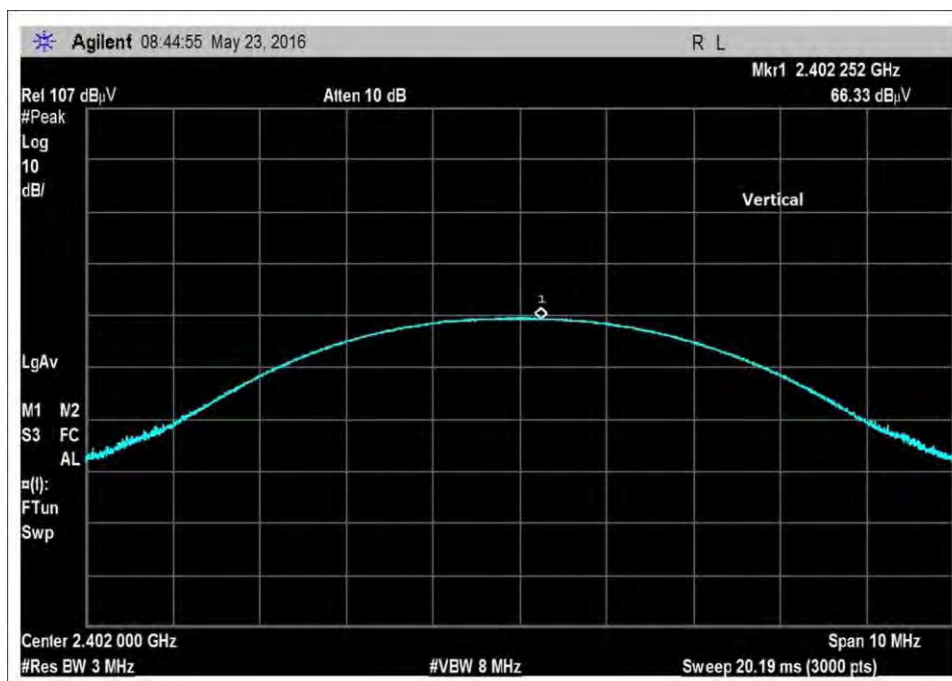
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB		Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	2402.105M	73.1	+28.6	+1.3	+2.6		+0.0	105.6	131.2	-25.6	Horiz
2	2441.928M	72.5	+28.7	+1.3	+2.6		+0.0	105.1	131.2	-26.1	Horiz
3	2479.728M	72.4	+28.8	+1.3	+2.6		+0.0	105.1	131.2	-26.1	Horiz
4	2402.105M	67.8	+28.6	+1.3	+2.6		+0.0	100.3	131.2	-30.9	Vert
5	2479.730M	67.6	+28.8	+1.3	+2.6		+0.0	100.3	131.2	-30.9	Vert
6	2441.928M	67.5	+28.7	+1.3	+2.6		+0.0	100.1	131.2	-31.1	Vert

Plots

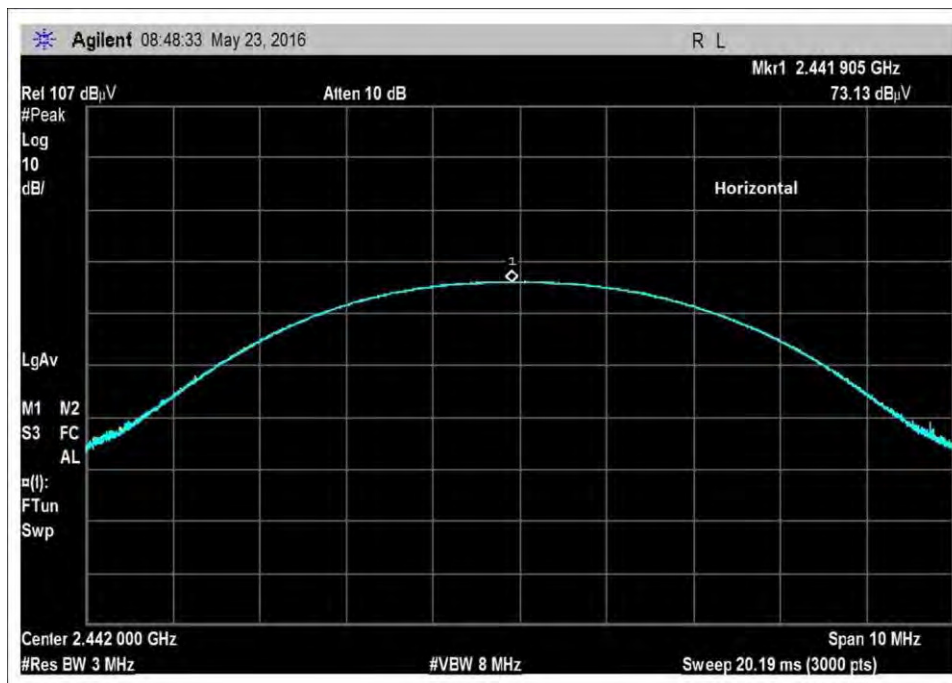
4-DQPSK



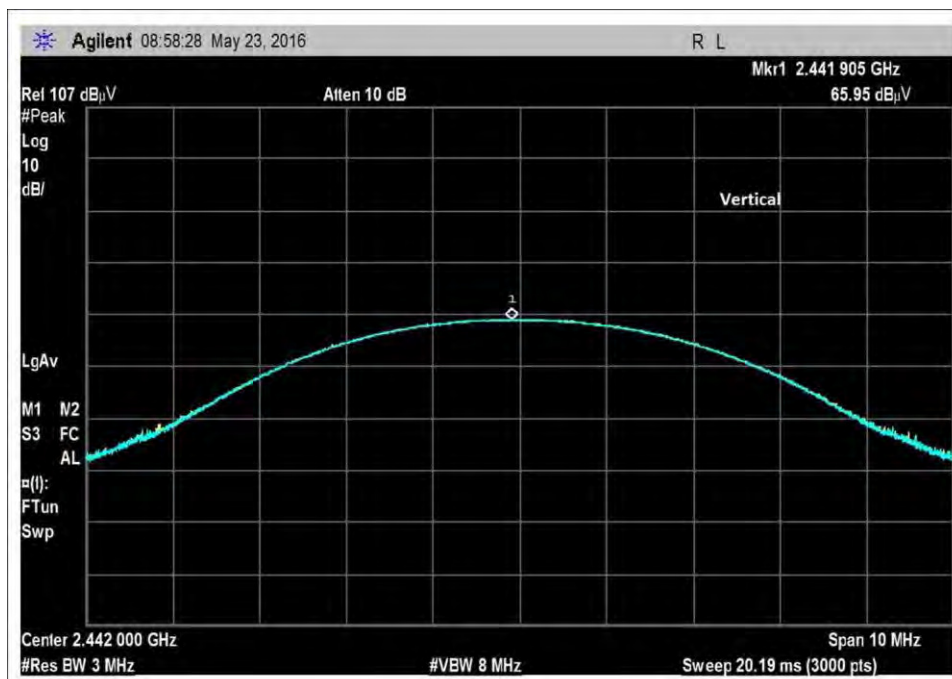
Low Channel, Horizontal



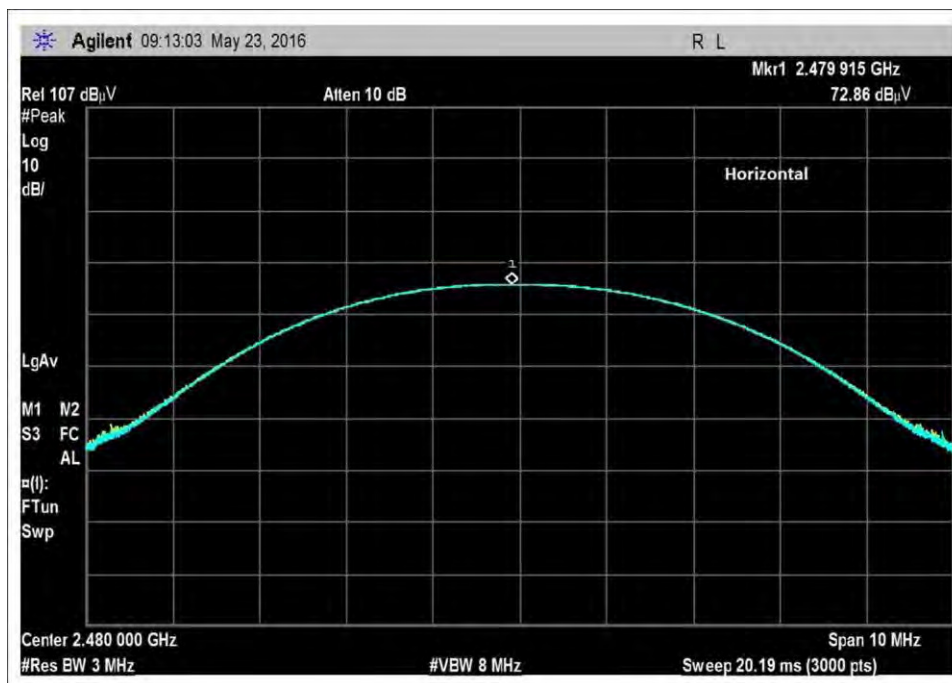
Low Channel, Vertical



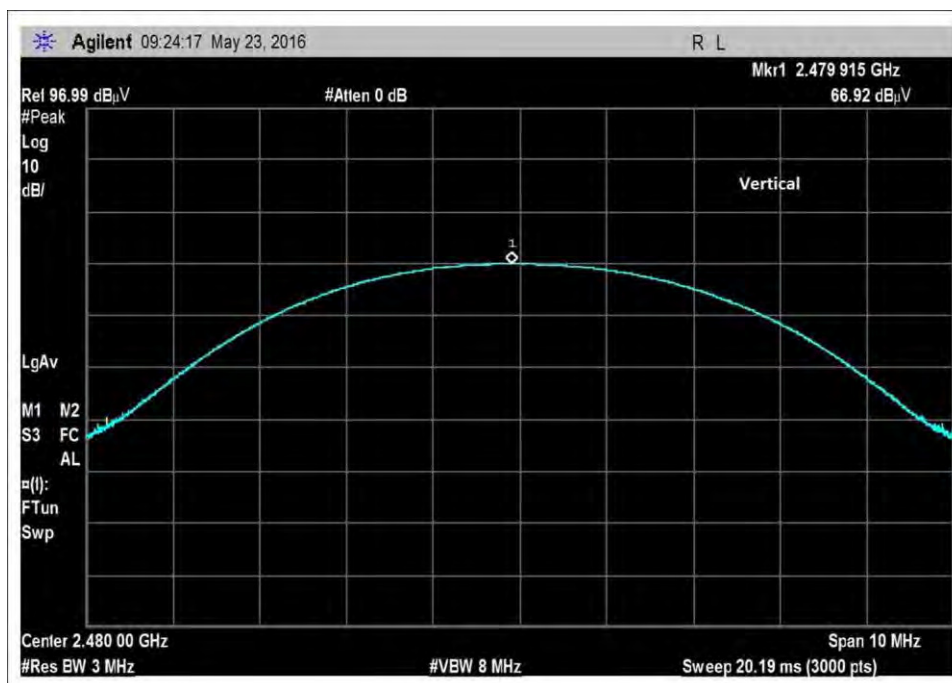
Middle Channel, Horizontal



Middle Channel, Vertical

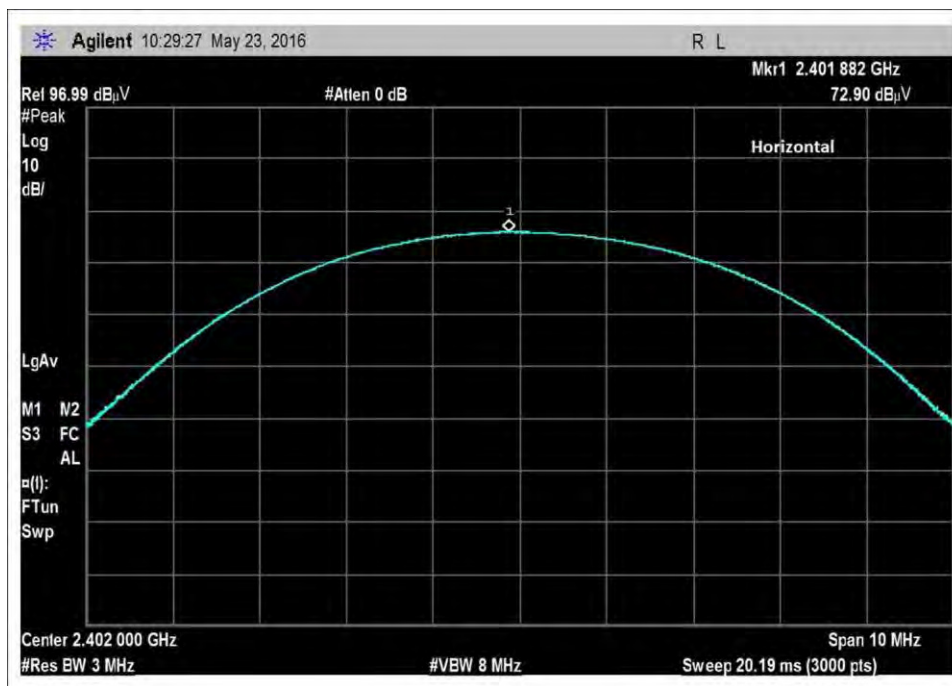


High Channel, Horizontal

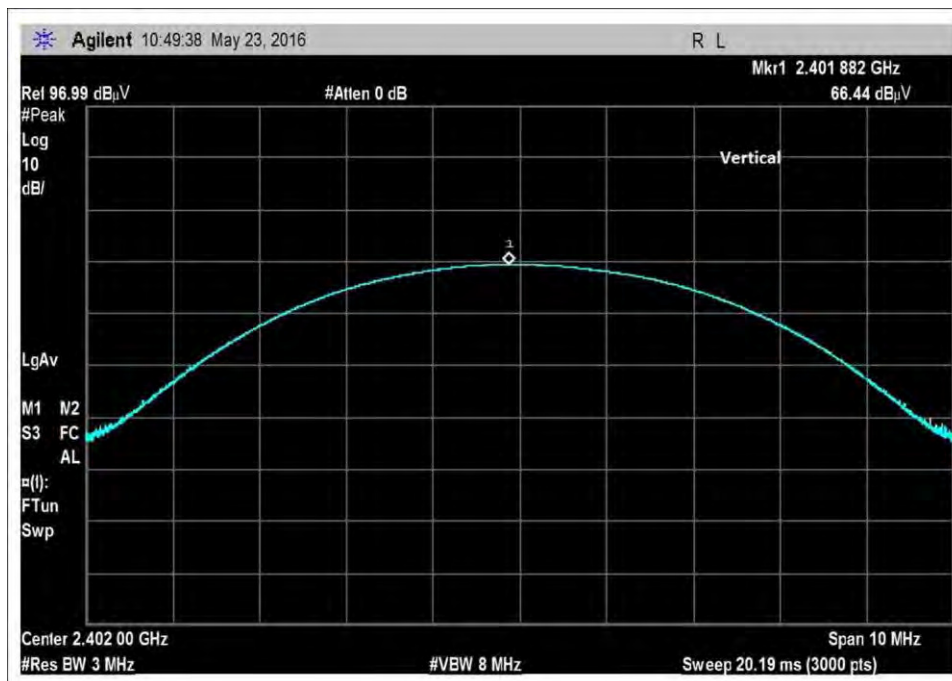


High Channel, Vertical

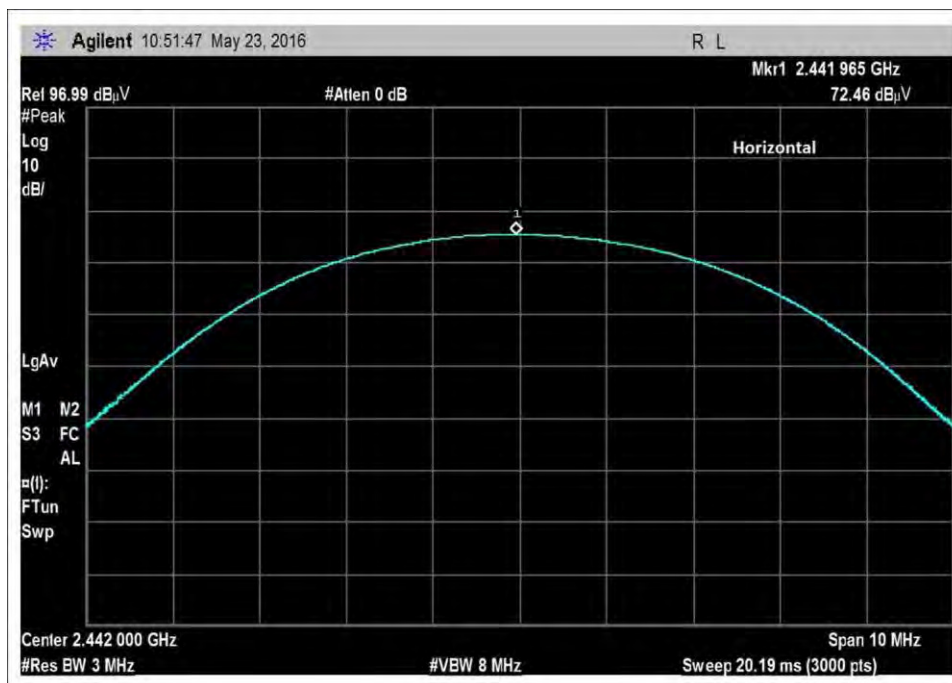
8-DQPSK



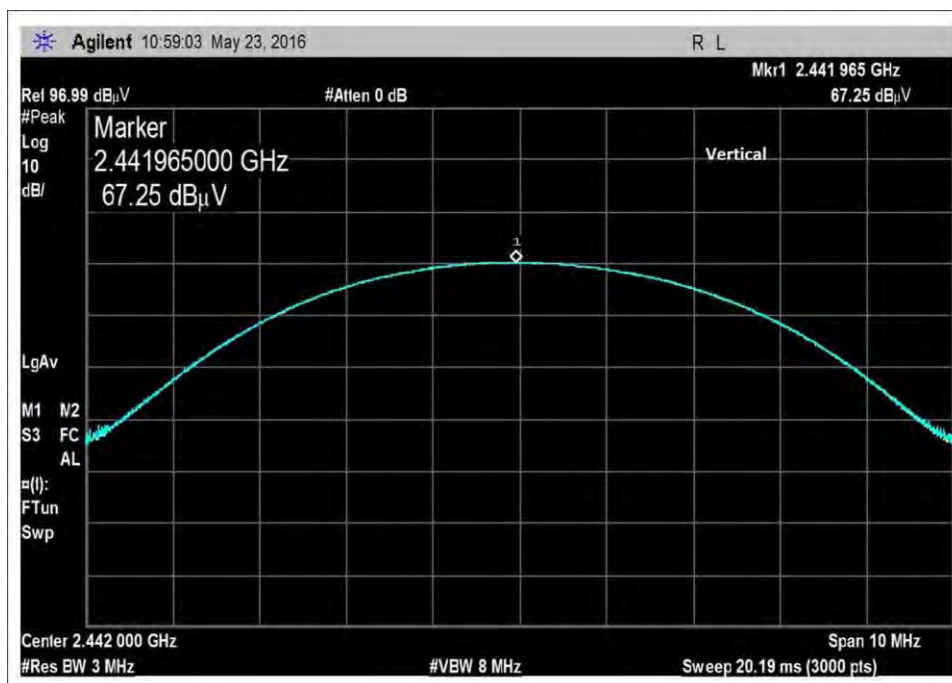
Low Channel, Horizontal



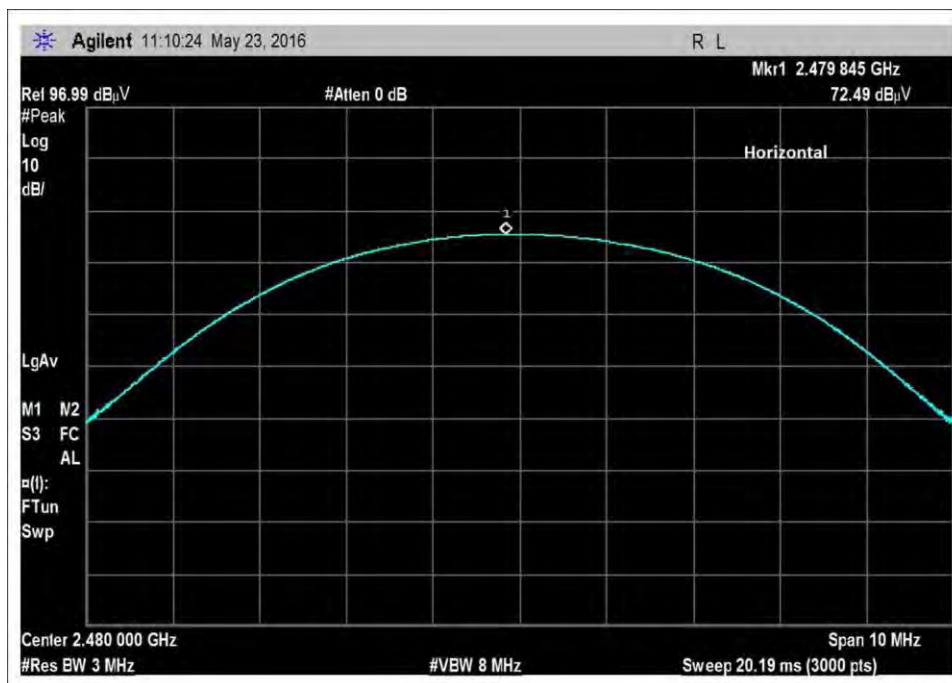
Low Channel, Vertical



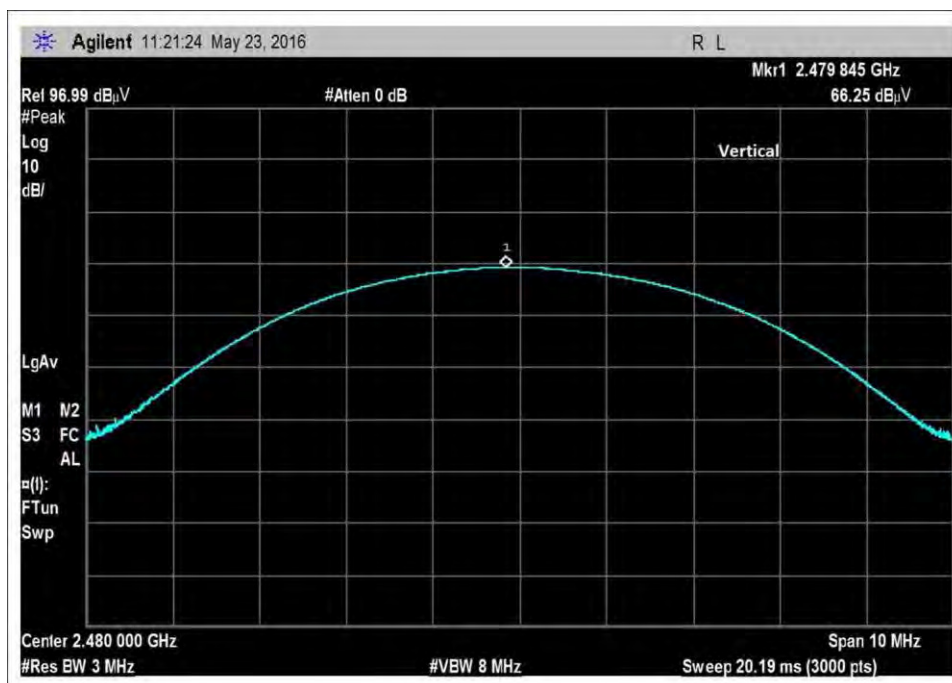
Middle Channel, Horizontal



Middle Channel, Vertical

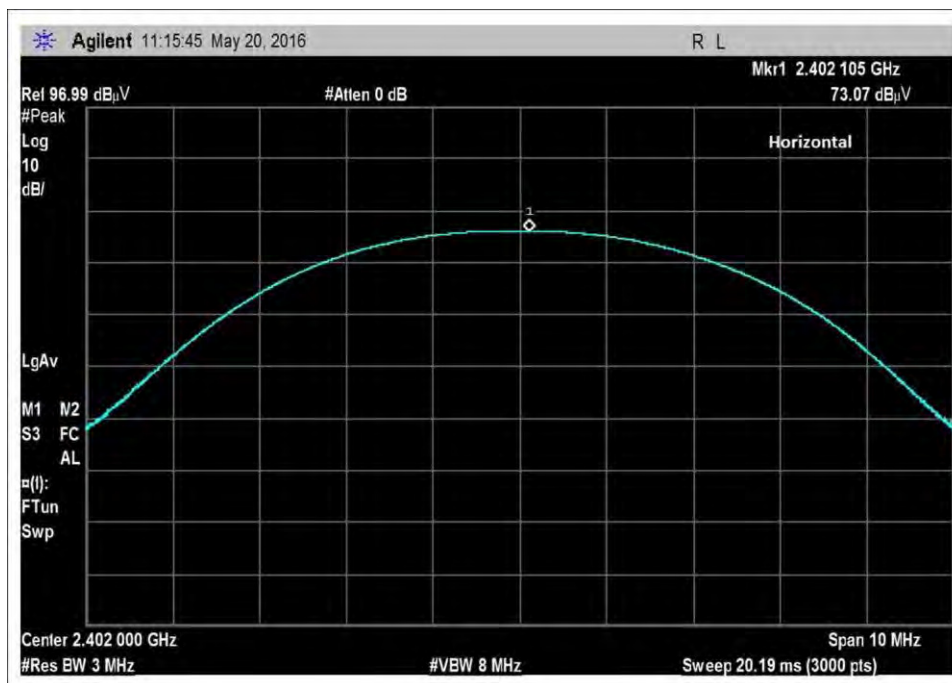


High Channel, Horizontal

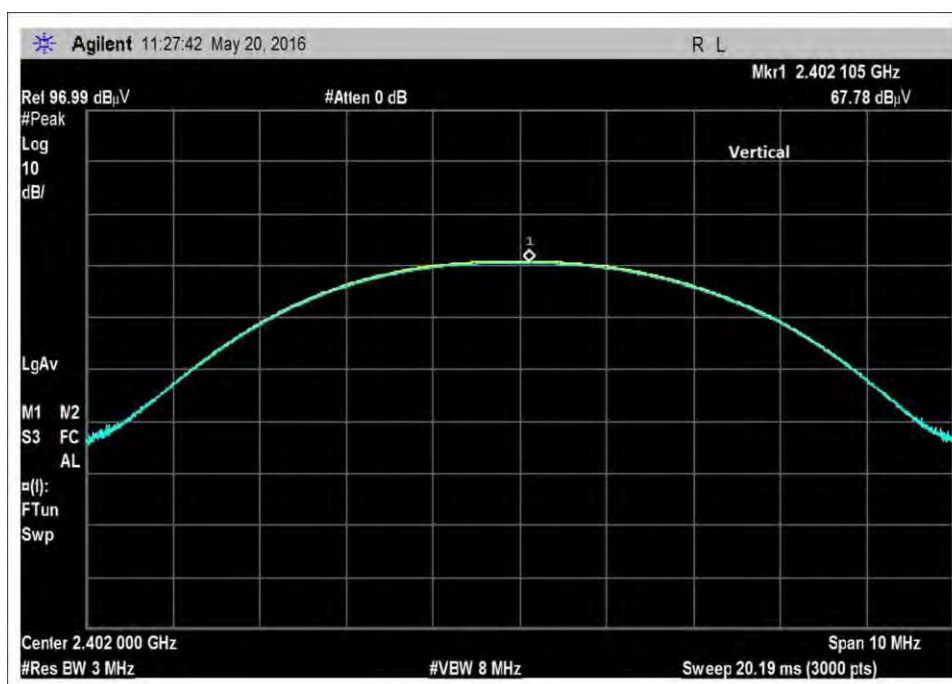


High Channel, Vertical

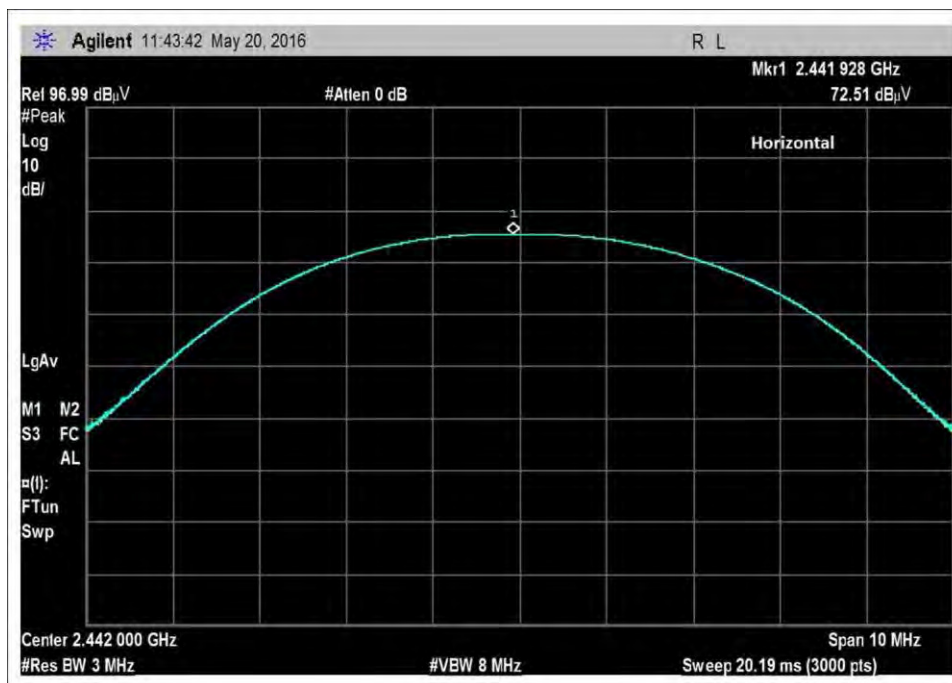
GFSK



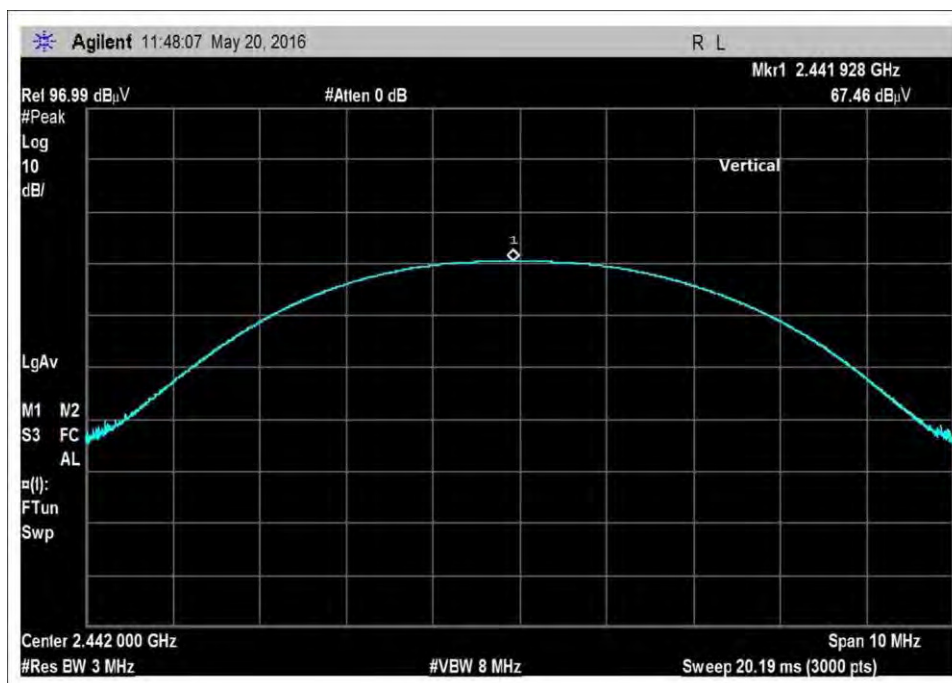
Low Channel, Horizontal



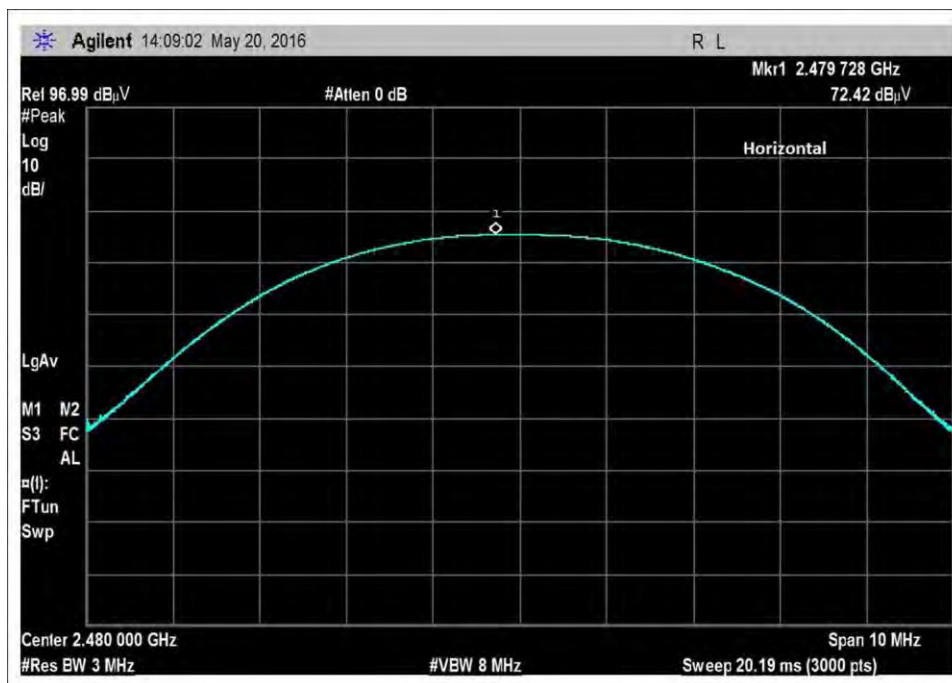
Low Channel, Vertical



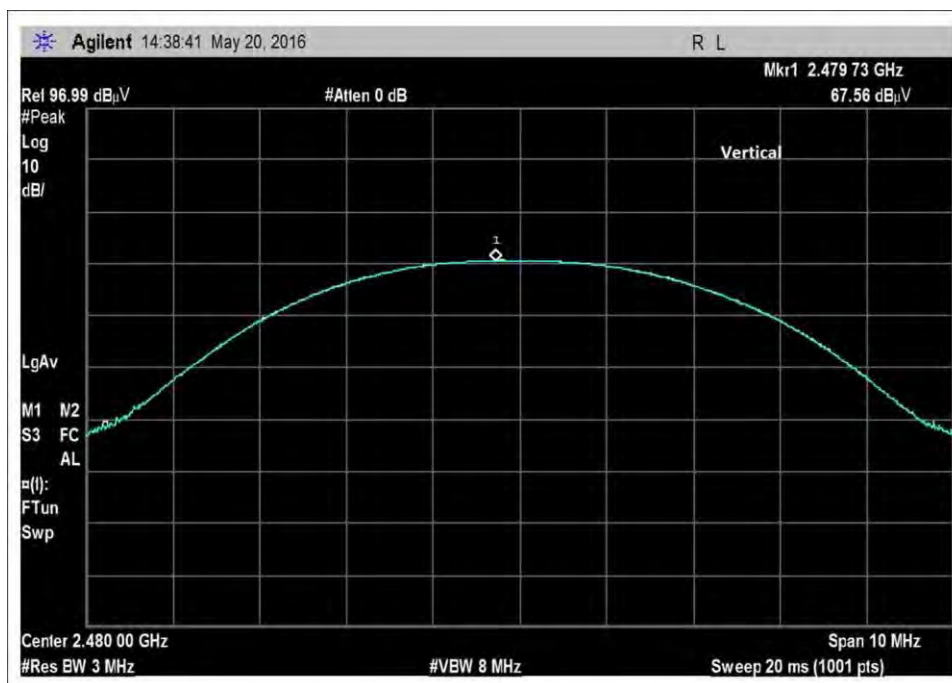
Middle Channel, Horizontal



Middle Channel, Vertical

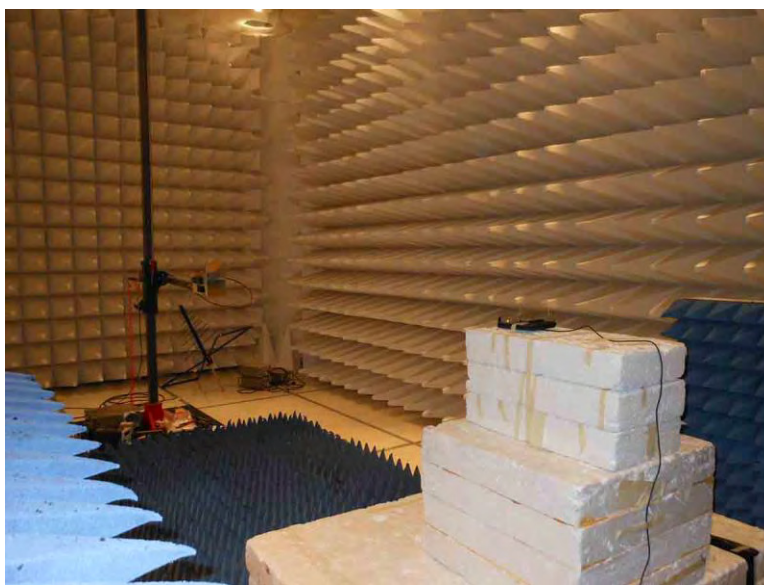
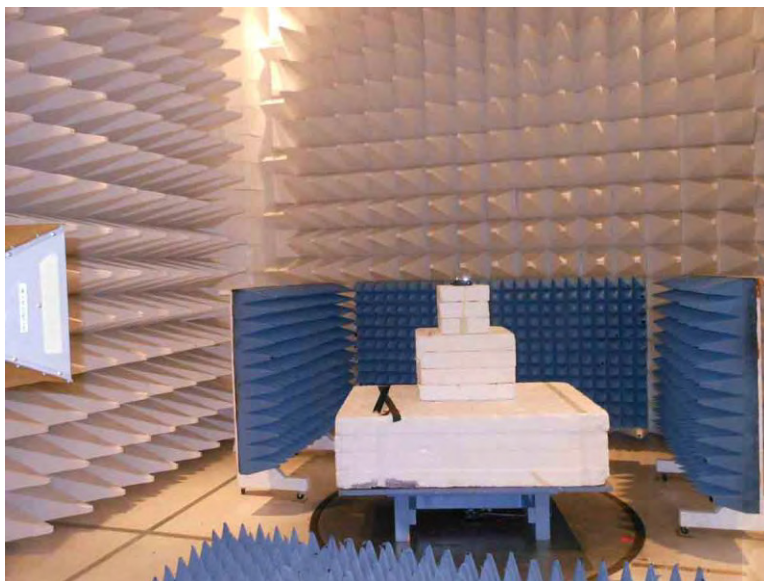


High Channel, Horizontal



High Channel, Vertical

Test Setup Photos



15.247(d) Radiated Emissions & Band Edge

Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98354** Date: 5/25/2016
 Test Type: **Radiated Scan** Time: 16:12:03
 Tested By: Hieu Song Nguyenpham Sequence#: 74
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
 Frequency Range: 9kHz to 1000MHz

 Temperature: 22.7°C
 Humidity: 43 %
 Atmospheric Pressure: 100.9kPa

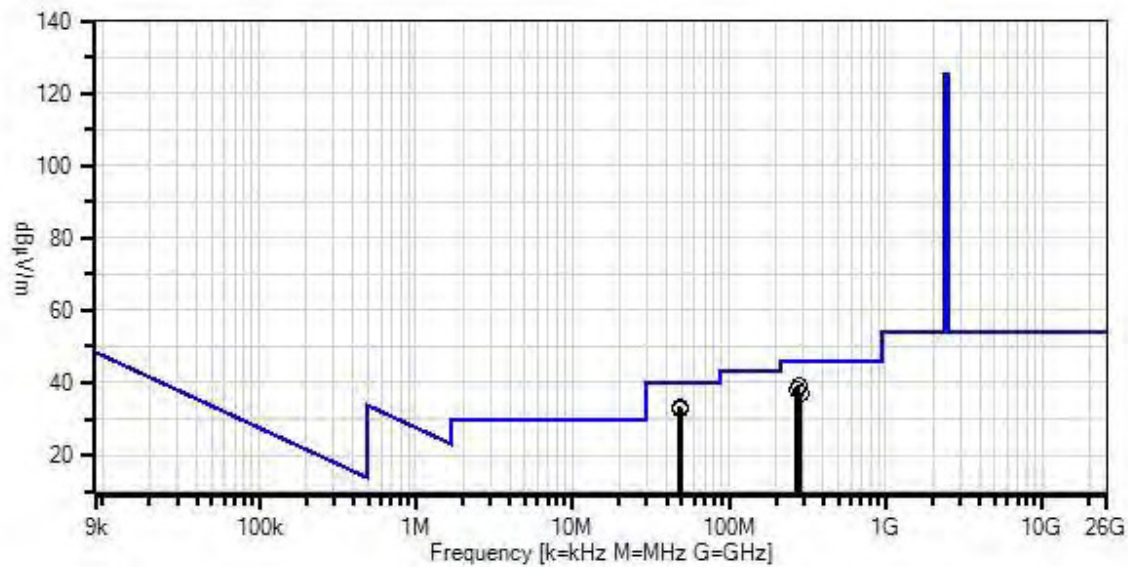
 High Clock: 2480MHz
 Application: Window Command Prompt
 Transmitting operating frequency= 2402, 2442 and 2480MHz
 Gain of the antenna: -1dBi
 Method: ANSI C63.10 2013

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

 The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended.

Bluetooth on Classic ($\pi/4$ -DQPSK) on TX Mode (Low Channel)

Navdy WD#: 98354 Sequence#: 74 Date: 5/25/2016
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters



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

○ Peak Readings
* Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00971A	Preamp	8447D	2/5/2016	2/5/2018
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017
T2	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T3	ANP06049	Attenuator	PE7002-6	5/9/2016	5/9/2018
T4	ANP00880	Cable	RG214U	5/10/2016	5/10/2018
T5	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T6	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	277.441M	44.9	-27.0 +0.3	+13.1 +0.6	+5.9	+1.6	+0.0	39.4	46.0	-6.6	Horiz
2	48.391M	44.6	-27.9 +0.1	+9.8 +0.2	+5.9	+0.6	+0.0	33.3	40.0	-6.7	Vert
3	49.485M	44.7	-27.9 +0.1	+9.3 +0.2	+5.9	+0.6	+0.0	32.9	40.0	-7.1	Vert
4	269.180M	43.9	-27.0 +0.3	+13.0 +0.6	+5.9	+1.6	+0.0	38.3	46.0	-7.7	Horiz
5	285.459M	42.2	-27.0 +0.3	+13.2 +0.7	+5.9	+1.7	+0.0	37.0	46.0	-9.0	Horiz

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98354** Date: 5/24/2016
 Test Type: **Radiated Scan** Time: 09:32:03
 Tested By: Hieu Song Nguyenpham Sequence#: 27
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

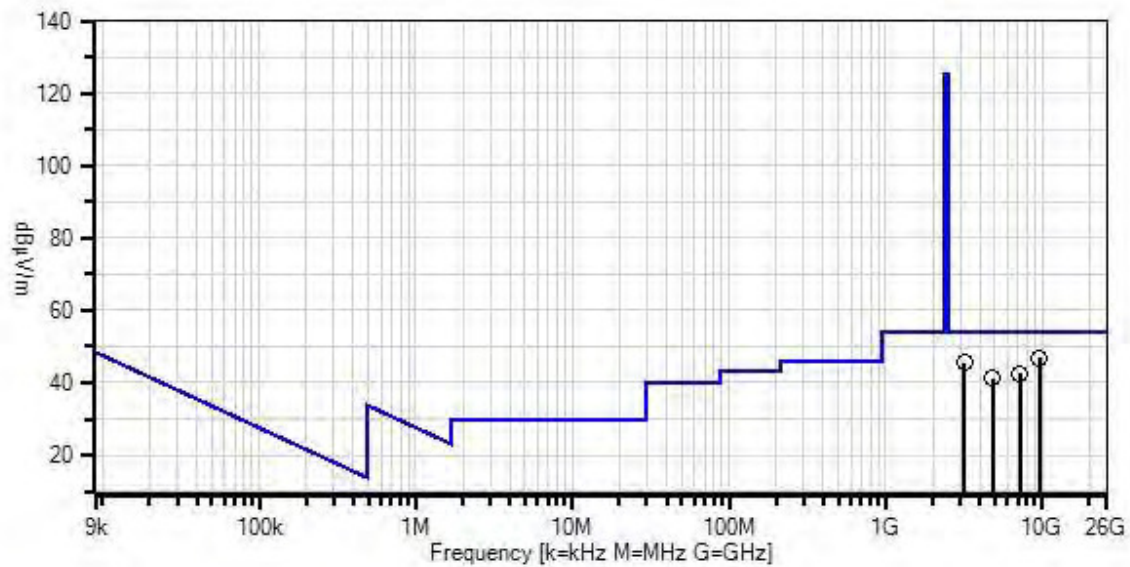
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission Frequency Range: 1000MHz to 25000MHz Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz 1000 MHz-25000MHz; RBW=1 MHz, VBW=1 MHz The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth Classic on $\pi/4$-DQPSK TX Mode (Low Channel)
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Navy WO#: 98354 Sequence#: 27 Date: 5/24/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



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

○ Peak Readings
 * Average Readings
 Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
T4	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP00929	Cable	various	1/25/2016	1/25/2018
	ANP06126	Cable	32022-29094K-29094K-168TC	3/18/2015	3/18/2017
T5	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	T5 dB	T6 dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	9608.440M	56.1	+38.6 +1.1	+2.6 +0.3	+5.4	-57.2	+0.0	46.9	54.0	-7.1	Horiz
2	3202.678M	67.5	+30.8 +0.6	+1.5 +0.6	+3.0	-58.6	+0.0	45.4	54.0	-8.6	Horiz
3	7206.600M	56.5	+35.9 +1.0	+2.2 +0.3	+5.0	-58.3	+0.0	42.6	54.0	-11.4	Horiz
4	4804.730M	59.1	+33.2 +0.8	+1.8 +0.3	+3.8	-57.8	+0.0	41.2	54.0	-12.8	Horiz

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98354** Date: 5/25/2016
 Test Type: **Radiated Scan** Time: 16:40:20
 Tested By: Hieu Song Nguyenpham Sequence#: 77
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission Frequency Range: 9kHz to 1000MHz Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz 1000 MHz-25000MHz; RBW=1 MHz, VBW=1 MHz The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth on Classic ($\pi/4$-DQPSK) on TX Mode (Middle Channel)

Navdy WD#: 98354 Sequence#: 77 Date: 5/25/2016
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters



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

○ Peak Readings
* Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00971A	Preamp	8447D	2/5/2016	2/5/2018
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017
T2	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T3	ANP06049	Attenuator	PE7002-6	5/9/2016	5/9/2018
T4	ANP00880	Cable	RG214U	5/10/2016	5/10/2018
T5	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T6	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	48.896M	45.8	-27.9 +0.1	+9.6 +0.2	+5.9	+0.6	+0.0	34.3	40.0	-5.7	Vert
2	49.569M	45.5	-27.9 +0.1	+9.3 +0.2	+5.9	+0.6	+0.0	33.7	40.0	-6.3	Vert
3	277.441M	43.9	-27.0 +0.3	+13.1 +0.6	+5.9	+1.6	+0.0	38.4	46.0	-7.6	Horiz
4	285.459M	43.6	-27.0 +0.3	+13.2 +0.7	+5.9	+1.7	+0.0	38.4	46.0	-7.6	Horiz
5	269.180M	42.7	-27.0 +0.3	+13.0 +0.6	+5.9	+1.6	+0.0	37.1	46.0	-8.9	Horiz

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98354** Date: 5/24/2016
 Test Type: **Radiated Scan** Time: 09:58:32
 Tested By: Hieu Song Nguyenpham Sequence#: 30
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

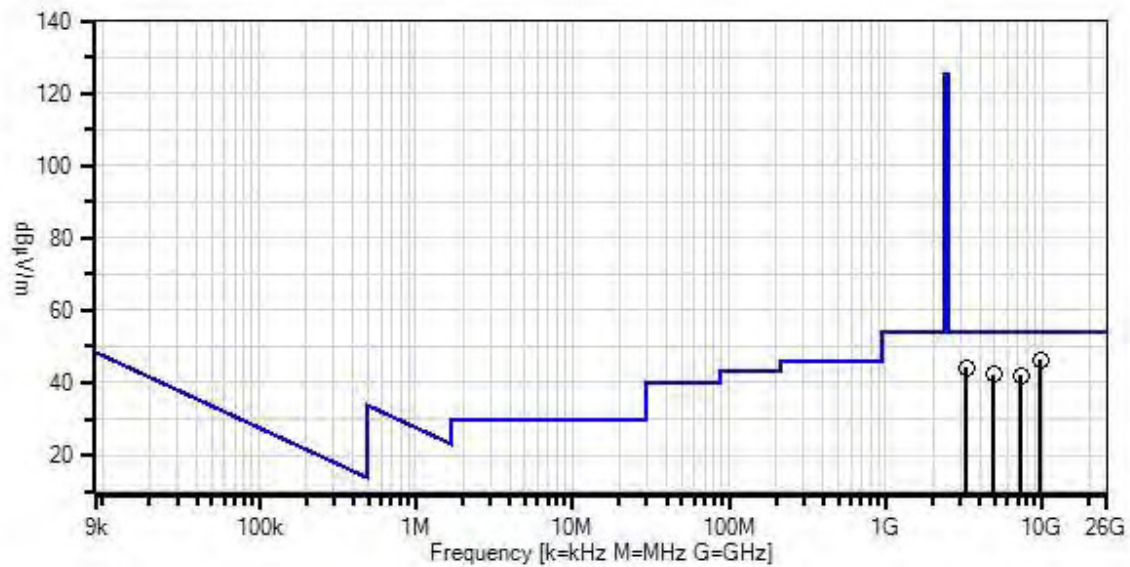
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission Frequency Range: 1000MHz to 25000MHz Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz 1000 MHz-25000MHz; RBW=1 MHz, VBW=1 MHz The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth Classic on $\pi/4$-DQPSK TX Mode (Middle Channel)

Navy WO#: 98354 Sequence#: 30 Date: 5/24/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



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

○ Peak Readings
 * Average Readings
 Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
T4	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP00929	Cable	various	1/25/2016	1/25/2018
	ANP06126	Cable	32022-29094K-29094K-168TC	3/18/2015	3/18/2017
T5	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	T5 dB	T6 dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	9764.160M	55.4	+39.0 +1.1	+2.6 +0.3	+5.6	-57.6	+0.0	46.4	54.0	-7.6	Horiz
2	3255.938M	66.3	+30.9 +0.6	+1.5 +0.6	+3.0	-58.6	+0.0	44.3	54.0	-9.7	Horiz
3	4886.500M	59.8	+33.4 +0.8	+1.8 +0.3	+3.8	-57.6	+0.0	42.3	54.0	-11.7	Horiz
4	7326.030M	55.4	+36.4 +1.0	+2.3 +0.3	+5.0	-58.3	+0.0	42.1	54.0	-11.9	Horiz

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98354** Date: 5/25/2016
 Test Type: **Radiated Scan** Time: 16:59:27
 Tested By: Hieu Song Nguyenpham Sequence#: 80
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission Frequency Range: 9kHz to 1000MHz Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz 1000 MHz-25000MHz; RBW=1 MHz, VBW=1 MHz The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth on Classic ($\pi/4$-DQPSK) on TX Mode (High Channel)

Navdy WD#: 98354 Sequence#: 80 Date: 5/25/2016
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters



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

○ Peak Readings
* Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00971A	Preamp	8447D	2/5/2016	2/5/2018
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017
T2	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T3	ANP06049	Attenuator	PE7002-6	5/9/2016	5/9/2018
T4	ANP00880	Cable	RG214U	5/10/2016	5/10/2018
T5	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T6	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	285.459M	44.7	-27.0 +0.3	+13.2 +0.7	+5.9	+1.7	+0.0	39.5	46.0	-6.5	Horiz
2	49.401M	44.7	-27.9 +0.1	+9.4 +0.2	+5.9	+0.6	+0.0	33.0	40.0	-7.0	Vert
3	48.012M	44.1	-27.9 +0.1	+10.0 +0.2	+5.9	+0.6	+0.0	33.0	40.0	-7.0	Vert
4	277.441M	43.2	-27.0 +0.3	+13.1 +0.6	+5.9	+1.6	+0.0	37.7	46.0	-8.3	Horiz
5	269.180M	42.3	-27.0 +0.3	+13.0 +0.6	+5.9	+1.6	+0.0	36.7	46.0	-9.3	Horiz

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98354** Date: 5/24/2016
 Test Type: **Radiated Scan** Time: 10:32:07
 Tested By: Hieu Song Nguyenpham Sequence#: 33
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

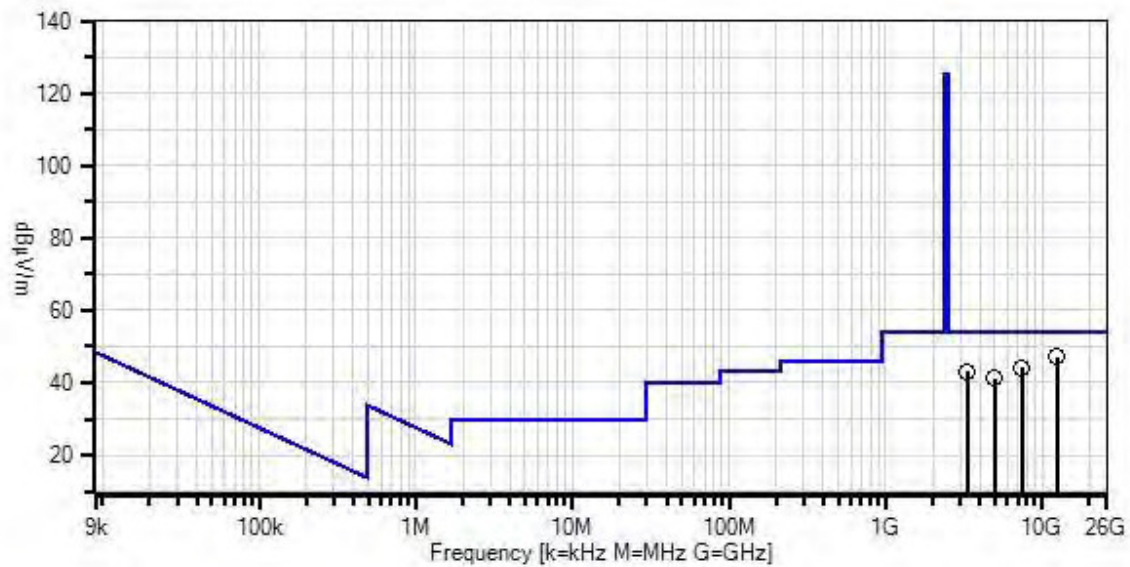
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission Frequency Range: 1000MHz to 25000MHz Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz 1000 MHz-25000MHz; RBW=1 MHz, VBW=1 MHz The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth Classic on $\pi/4$-DQPSK TX Mode (High Channel)

Navy WO#: 98354 Sequence#: 33 Date: 5/24/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



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

○ Peak Readings
 * Average Readings
 Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
T4	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP00929	Cable	various	1/25/2016	1/25/2018
	ANP06126	Cable	32022-29094K-29094K-168TC	3/18/2015	3/18/2017
T5	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	T5	T6			Table	dB μ V/m	dB μ V/m	dB	Ant
1	12402.750 M	53.6	+39.1 +1.3	+3.0 +0.4	+6.7	-56.9	+0.0	47.2	54.0	-6.8	Horiz
2	7443.520M	57.2	+36.6 +1.0	+2.3 +0.3	+5.1	-58.2	+0.0	44.3	54.0	-9.7	Horiz
3	3306.622M	65.0	+31.0 +0.6	+1.5 +0.6	+3.1	-58.6	+0.0	43.2	54.0	-10.8	Horiz
4	4956.420M	58.3	+33.5 +0.8	+1.8 +0.3	+3.8	-57.4	+0.0	41.1	54.0	-12.9	Horiz

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98354** Date: 5/26/2016
 Test Type: **Radiated Scan** Time: 09:03:26
 Tested By: Hieu Song Nguyenpham Sequence#: 83
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission Frequency Range: 9kHz to 1000MHz Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz 1000 MHz-25000MHz; RBW=1 MHz, VBW=1 MHz The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth on Classic (8-DQPSK) on TX Mode (Low Channel)

Navdy WD#: 98354 Sequence#: 83 Date: 5/26/2016
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters



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

○ Peak Readings
* Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00971A	Preamp	8447D	2/5/2016	2/5/2018
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017
T2	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T3	ANP06049	Attenuator	PE7002-6	5/9/2016	5/9/2018
T4	ANP00880	Cable	RG214U	5/10/2016	5/10/2018
T5	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T6	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	285.459M	44.7	-27.0 +0.3	+13.2 +0.7	+5.9	+1.7	+0.0	39.5	46.0	-6.5	Horiz
2	47.633M	44.4	-27.9 +0.1	+10.2 +0.2	+5.9	+0.6	+0.0	33.5	40.0	-6.5	Vert
3	48.012M	44.5	-27.9 +0.1	+10.0 +0.2	+5.9	+0.6	+0.0	33.4	40.0	-6.6	Vert
4	277.441M	43.2	-27.0 +0.3	+13.1 +0.6	+5.9	+1.6	+0.0	37.7	46.0	-8.3	Horiz
5	269.180M	42.3	-27.0 +0.3	+13.0 +0.6	+5.9	+1.6	+0.0	36.7	46.0	-9.3	Horiz

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98354** Date: 5/24/2016
 Test Type: **Radiated Scan** Time: 11:00:00
 Tested By: Hieu Song Nguyenpham Sequence#: 36
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

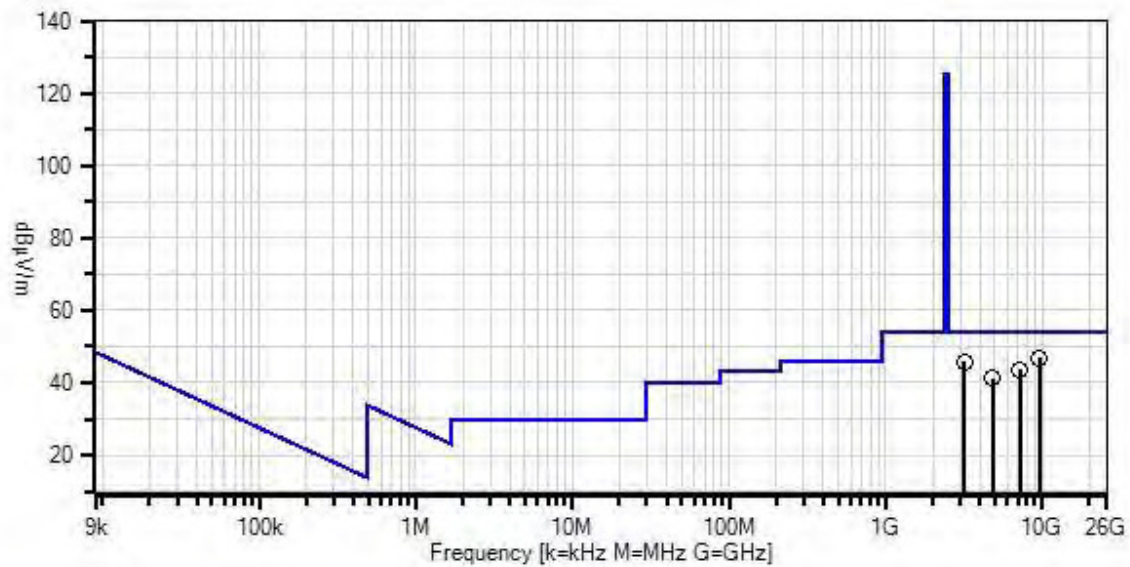
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission Frequency Range: 1000MHz to 25000MHz Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz 1000 MHz-25000MHz; RBW=1 MHz, VBW=1 MHz The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth Classic on 8-DQPSK TX Mode (Low Channel)

Navy WO#: 98354 Sequence#: 36 Date: 5/24/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



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

○ Peak Readings
 * Average Readings
 Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
T4	AN03114	Preamplifier	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP00929	Cable	various	1/25/2016	1/25/2018
	ANP06126	Cable	32022-29094K-29094K-168TC	3/18/2015	3/18/2017
T5	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	T5	T6			Table	dBμV/m	dBμV/m	dB	Ant
1	9611.170M	56.0	+38.6 +1.1	+2.6 +0.3	+5.4	-57.2	+0.0	46.8	54.0	-7.2	Horiz
2	3202.580M	67.9	+30.8 +0.6	+1.5 +0.6	+3.0	-58.6	+0.0	45.8	54.0	-8.2	Horiz
3	7205.730M	57.5	+35.9 +1.0	+2.2 +0.3	+5.0	-58.3	+0.0	43.6	54.0	-10.4	Horiz
4	4803.836M	59.1	+33.2 +0.8	+1.8 +0.3	+3.8	-57.8	+0.0	41.2	54.0	-12.8	Horiz

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98354** Date: 5/26/2016
 Test Type: **Radiated Scan** Time: 09:29:18
 Tested By: Hieu Song Nguyenpham Sequence#: 86
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission Frequency Range: 9kHz to 1000MHz Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz 1000 MHz-25000MHz; RBW=1 MHz, VBW=1 MHz The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth on Classic (8-DQPSK) on TX Mode (Middle Channel)
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Navdy WD#: 98354 Sequence#: 86 Date: 5/26/2016
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters



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

○ Peak Readings
* Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00971A	Preamp	8447D	2/5/2016	2/5/2018
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017
T2	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T3	ANP06049	Attenuator	PE7002-6	5/9/2016	5/9/2018
T4	ANP00880	Cable	RG214U	5/10/2016	5/10/2018
T5	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T6	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	48.012M	44.7	-27.9 +0.1	+10.0 +0.2	+5.9	+0.6	+0.0	33.6	40.0	-6.4	Vert
2	277.198M	44.7	-27.0 +0.3	+13.1 +0.6	+5.9	+1.6	+0.0	39.2	46.0	-6.8	Horiz
3	268.937M	43.8	-27.0 +0.3	+13.0 +0.6	+5.9	+1.6	+0.0	38.2	46.0	-7.8	Horiz
4	285.459M	42.2	-27.0 +0.3	+13.2 +0.7	+5.9	+1.7	+0.0	37.0	46.0	-9.0	Horiz
5	387.508M	37.7	-27.7 +0.4	+16.1 +0.8	+5.9	+2.0	+0.0	35.2	46.0	-10.8	Vert

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98354** Date: 5/24/2016
 Test Type: **Radiated Scan** Time: 11:35:16
 Tested By: Hieu Song Nguyenpham Sequence#: 39
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

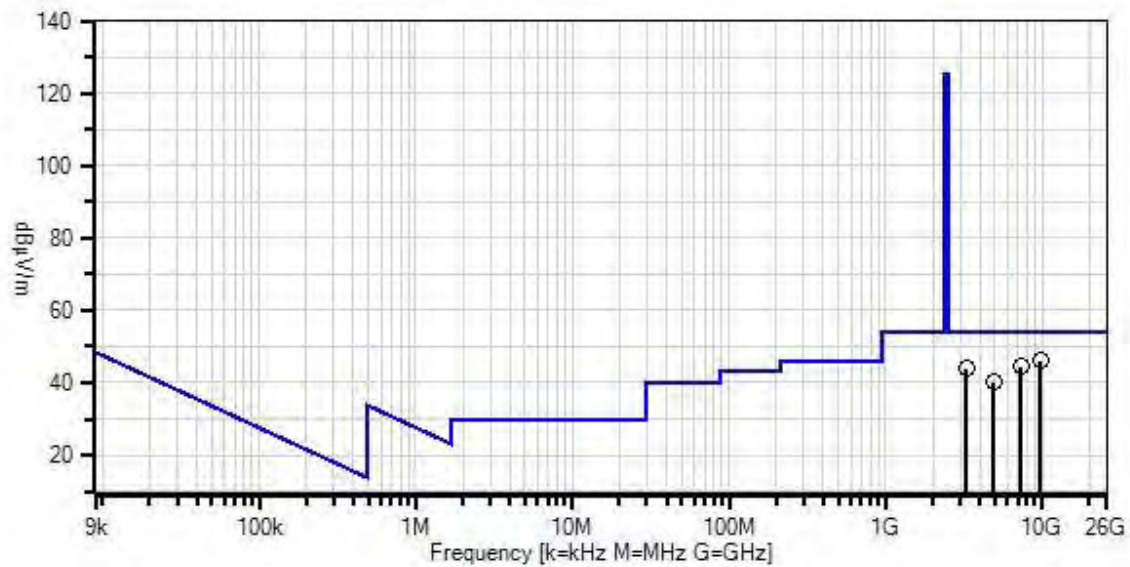
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission Frequency Range: 1000MHz to 25000MHz Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz 1000 MHz-25000MHz; RBW=1 MHz, VBW=1 MHz The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth Classic on 8-DQPSK TX Mode (Middle Channel)
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Navy WO#: 98354 Sequence#: 39 Date: 5/24/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



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

○ Peak Readings
 * Average Readings
 Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
T4	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP00929	Cable	various	1/25/2016	1/25/2018
	ANP06126	Cable	32022-29094K-29094K-168TC	3/18/2015	3/18/2017
T5	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	T5 dB	T6 dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	9768.680M	55.1	+39.0 +1.1	+2.6 +0.3	+5.6	-57.6	+0.0	46.1	54.0	-7.9	Horiz
2	7326.695M	57.8	+36.4 +1.0	+2.3 +0.3	+5.0	-58.3	+0.0	44.5	54.0	-9.5	Horiz
3	3255.960M	65.8	+30.9 +0.6	+1.5 +0.6	+3.0	-58.6	+0.0	43.8	54.0	-10.2	Horiz
4	4884.335M	57.5	+33.4 +0.8	+1.8 +0.3	+3.8	-57.6	+0.0	40.0	54.0	-14.0	Horiz

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98354** Date: 5/26/2016
 Test Type: **Radiated Scan** Time: 09:53:46
 Tested By: Hieu Song Nguyenpham Sequence#: 89
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission Frequency Range: 9kHz to 1000MHz Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz 1000 MHz-25000MHz; RBW=1 MHz, VBW=1 MHz The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth on Classic (8-DQPSK) on TX Mode (High Channel)
--

Navdy WD#: 98354 Sequence#: 89 Date: 5/26/2016
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters



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

○ Peak Readings
* Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00971A	Preamp	8447D	2/5/2016	2/5/2018
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017
T2	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T3	ANP06049	Attenuator	PE7002-6	5/9/2016	5/9/2018
T4	ANP00880	Cable	RG214U	5/10/2016	5/10/2018
T5	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T6	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	269.400M	45.0	-27.0 +0.3	+13.0 +0.6	+5.9	+1.6	+0.0	39.4	46.0	-6.6	Horiz
2	47.970M	44.2	-27.9 +0.1	+10.0 +0.2	+5.9	+0.6	+0.0	33.1	40.0	-6.9	Vert
3	49.485M	44.5	-27.9 +0.1	+9.3 +0.2	+5.9	+0.6	+0.0	32.7	40.0	-7.3	Vert
4	277.300M	43.7	-27.0 +0.3	+13.1 +0.6	+5.9	+1.6	+0.0	38.2	46.0	-7.8	Horiz
^	277.300M	47.2	-27.0 +0.3	+13.1 +0.6	+5.9	+1.6	+0.0	41.7	46.0	-4.3	Horiz
6	399.900M	38.8	-27.8 +0.4	+16.4 +0.8	+5.9	+2.0	+0.0	36.5	46.0	-9.5	Vert
7	263.200M	41.7	-27.0 +0.3	+12.9 +0.6	+5.9	+1.6	+0.0	36.0	46.0	-10.0	Horiz

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98354** Date: 5/24/2016
 Test Type: **Radiated Scan** Time: 12:00:17
 Tested By: Hieu Song Nguyenpham Sequence#: 42
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

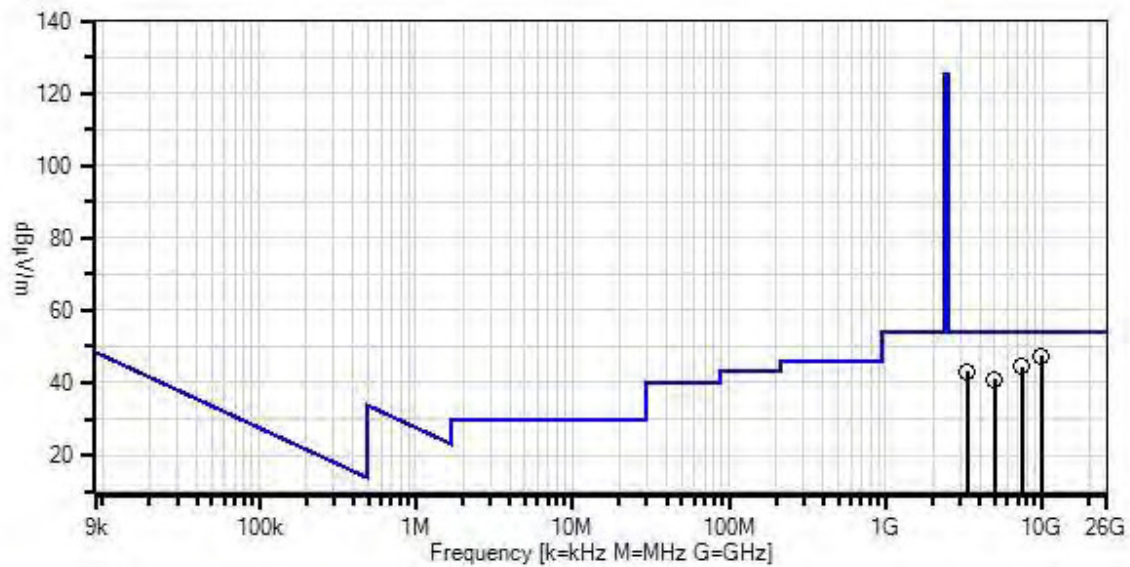
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission Frequency Range: 1000MHz to 25000MHz Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz 1000 MHz-25000MHz; RBW=1 MHz, VBW=1 MHz The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth Classic on 8-DQPSK TX Mode (High Channel)
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Navdy WD#: 98354 Sequence#: 42 Date: 5/24/2016
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



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

○ Peak Readings
* Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
T4	AN03114	Preamplifier	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP00929	Cable	various	1/25/2016	1/25/2018
	ANP06126	Cable	32022-29094K-29094K-168TC	3/18/2015	3/18/2017
T5	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	T5 dB	T6 dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	9919.932M	55.9	+39.5 +1.1	+2.6 +0.4	+5.7	-57.7	+0.0	47.5	54.0	-6.5	Horiz
2	7440.900M	57.4	+36.6 +1.0	+2.3 +0.3	+5.1	-58.2	+0.0	44.5	54.0	-9.5	Horiz
3	3306.642M	64.8	+31.0 +0.6	+1.5 +0.6	+3.1	-58.6	+0.0	43.0	54.0	-11.0	Horiz
4	4960.028M	58.0	+33.5 +0.8	+1.8 +0.3	+3.8	-57.3	+0.0	40.9	54.0	-13.1	Horiz

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98354** Date: 5/25/2016
 Test Type: **Radiated Scan** Time: 15:13:15
 Tested By: Hieu Song Nguyenpham Sequence#: 65
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

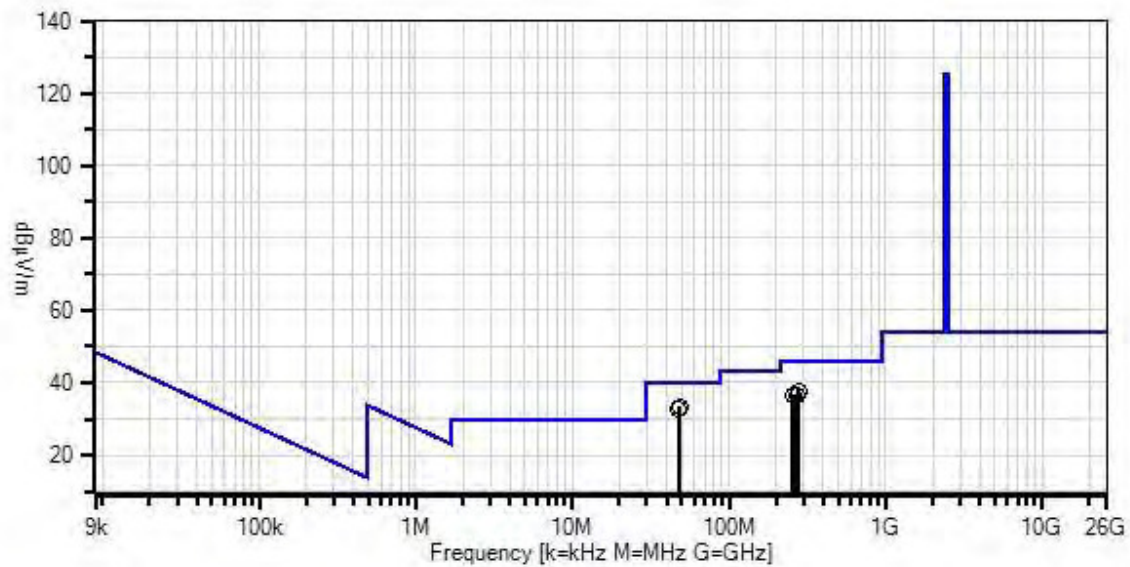
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission Frequency Range: 9kHz to 1000MHz Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz 1000 MHz-25000MHz; RBW=1 MHz, VBW=1 MHz The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth on Classic (GFSK) on TX Mode (Low Channel)
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Navdy WD#: 98354 Sequence#: 65 Date: 5/25/2016
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters



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

○ Peak Readings
* Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00971A	Preamp	8447D	2/5/2016	2/5/2018
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017
T2	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T3	ANP06049	Attenuator	PE7002-6	5/9/2016	5/9/2018
T4	ANP00880	Cable	RG214U	5/10/2016	5/10/2018
T5	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T6	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	48.643M	44.7	-27.9 +0.1	+9.7 +0.2	+5.9	+0.6	+0.0	33.3	40.0	-6.7	Vert
2	47.970M	43.7	-27.9 +0.1	+10.0 +0.2	+5.9	+0.6	+0.0	32.6	40.0	-7.4	Vert
3	279.385M	43.3	-27.0 +0.3	+13.1 +0.6	+5.9	+1.6	+0.0	37.8	46.0	-8.2	Horiz
4	269.180M	42.3	-27.0 +0.3	+13.0 +0.6	+5.9	+1.6	+0.0	36.7	46.0	-9.3	Horiz
5	256.788M	42.3	-27.0 +0.3	+12.9 +0.6	+5.9	+1.6	+0.0	36.6	46.0	-9.4	Horiz

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98354** Date: 5/23/2016
 Test Type: **Radiated Scan** Time: 15:29:47
 Tested By: Hieu Song Nguyenpham Sequence#: 18
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

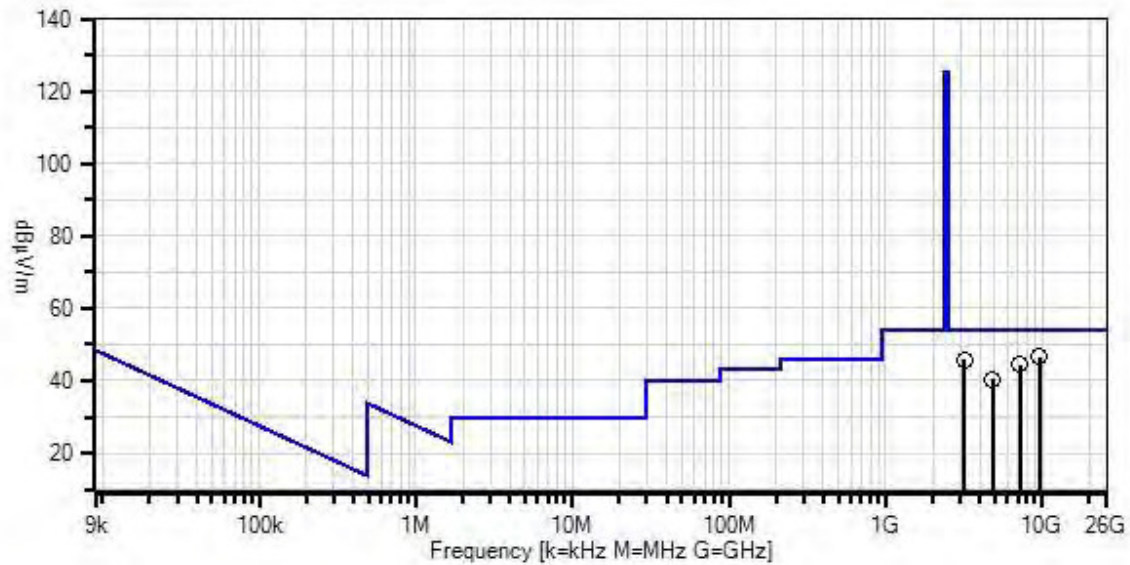
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission Frequency Range: 1000MHz to 25000MHz Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz 1000 MHz-25000MHz; RBW=1 MHz, VBW=1 MHz The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth Classic on GFSK TX Mode (Low Channel)

Navy WO#: 98354 Sequence#: 18 Date: 5/23/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



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

○ Peak Readings
 * Average Readings
 Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
T4	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP00929	Cable	various	1/25/2016	1/25/2018
	ANP06126	Cable	32022-29094K-29094K-168TC	3/18/2015	3/18/2017
T5	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	T5 dB	T6 dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	9610.320M	55.8	+38.6 +1.1	+2.6 +0.3	+5.4	-57.2	+0.0	46.6	54.0	-7.4	Horiz
2	3202.694M	67.9	+30.8 +0.6	+1.5 +0.6	+3.0	-58.6	+0.0	45.8	54.0	-8.2	Horiz
3	7206.440M	58.4	+35.9 +1.0	+2.2 +0.3	+5.0	-58.3	+0.0	44.5	54.0	-9.5	Horiz
4	4804.200M	58.4	+33.2 +0.8	+1.8 +0.3	+3.8	-57.8	+0.0	40.5	54.0	-13.5	Horiz

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98354** Date: 5/25/2016
 Test Type: **Radiated Scan** Time: 15:41:27
 Tested By: Hieu Song Nguyenpham Sequence#: 68
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

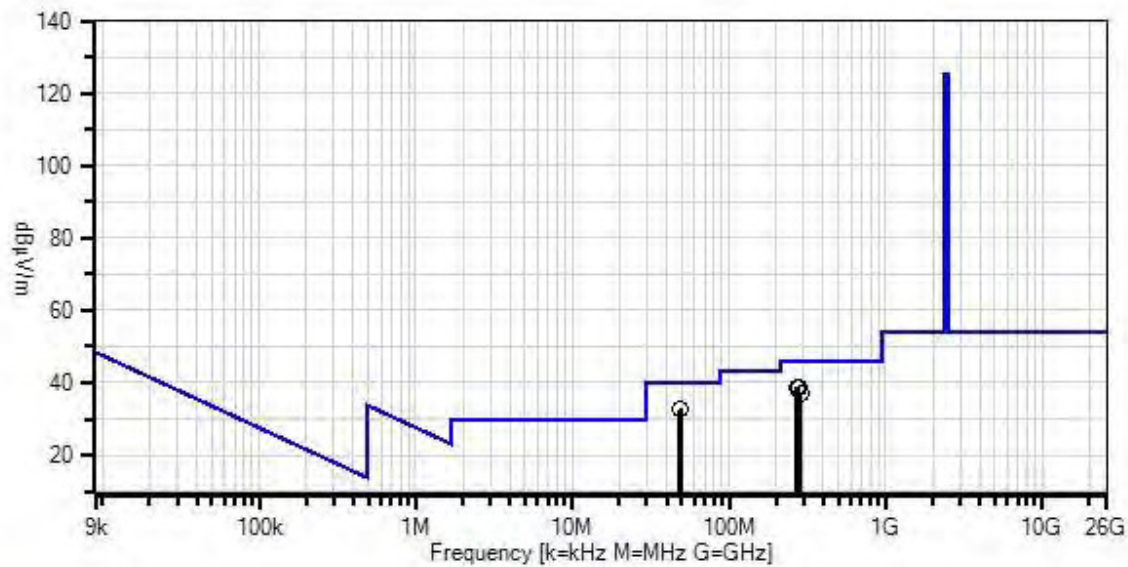
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission Frequency Range: 9kHz to 1000MHz Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz 1000 MHz-25000MHz; RBW=1 MHz, VBW=1 MHz The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth on Classic (GFSK) on TX Mode (Middle Channel)
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Navdy WD#: 98354 Sequence#: 68 Date: 5/25/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters



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

○ Peak Readings
 * Average Readings
 Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00971A	Preamp	8447D	2/5/2016	2/5/2018
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017
T2	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T3	ANP06049	Attenuator	PE7002-6	5/9/2016	5/9/2018
T4	ANP00880	Cable	RG214U	5/10/2016	5/10/2018
T5	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T6	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	49.485M	44.6	-27.9 +0.1	+9.3 +0.2	+5.9	+0.6	+0.0	32.8	40.0	-7.2	Vert
2	277.198M	44.2	-27.0 +0.3	+13.1 +0.6	+5.9	+1.6	+0.0	38.7	46.0	-7.3	Horiz
3	48.223M	43.8	-27.9 +0.1	+9.9 +0.2	+5.9	+0.6	+0.0	32.6	40.0	-7.4	Vert
4	269.180M	44.1	-27.0 +0.3	+13.0 +0.6	+5.9	+1.6	+0.0	38.5	46.0	-7.5	Horiz
5	285.216M	42.5	-27.0 +0.3	+13.2 +0.7	+5.9	+1.7	+0.0	37.3	46.0	-8.7	Horiz

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98354** Date: 5/23/2016
 Test Type: **Radiated Scan** Time: 15:59:33
 Tested By: Hieu Song Nguyenpham Sequence#: 21
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

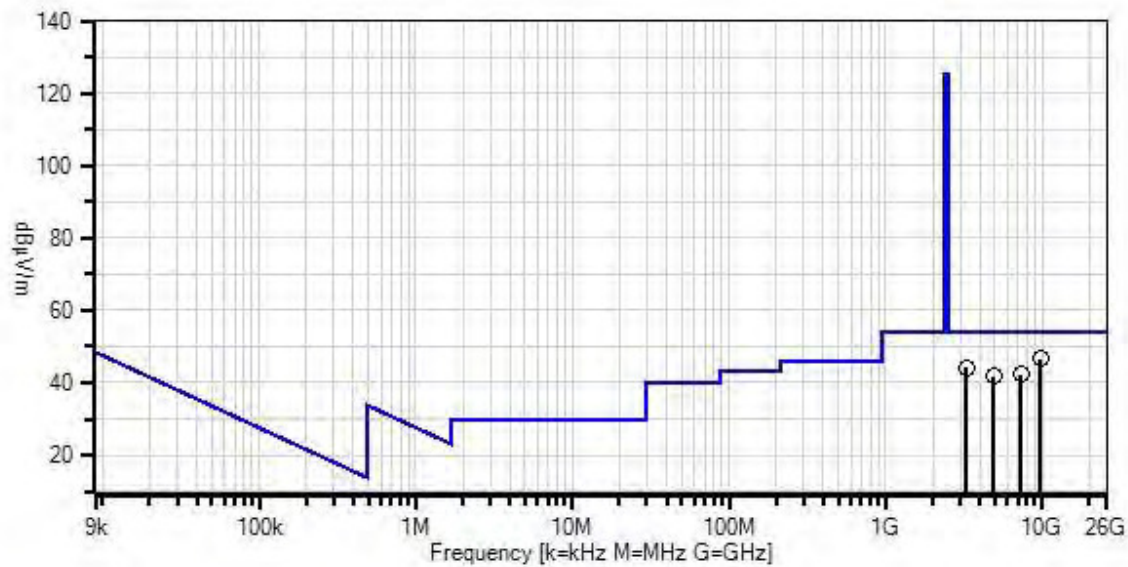
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission Frequency Range: 1000MHz to 25000MHz Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz 1000 MHz-25000MHz; RBW=1 MHz, VBW=1 MHz The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth Classic on GFSK TX Mode (Middle Channel)

Navy WO#: 98354 Sequence#: 21 Date: 5/23/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



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

○ Peak Readings
 * Average Readings
 Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
T4	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP00929	Cable	various	1/25/2016	1/25/2018
	ANP06126	Cable	32022-29094K-29094K-168TC	3/18/2015	3/18/2017
T5	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	T5 dB	T6 dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	9768.745M	55.6	+39.0 +1.1	+2.6 +0.3	+5.6	-57.6	+0.0	46.6	54.0	-7.4	Horiz
2	3255.990M	66.2	+30.9 +0.6	+1.5 +0.6	+3.0	-58.6	+0.0	44.2	54.0	-9.8	Horiz
3	7325.930M	55.5	+36.4 +1.0	+2.3 +0.3	+5.0	-58.3	+0.0	42.2	54.0	-11.8	Horiz
4	4883.975M	59.2	+33.4 +0.8	+1.8 +0.3	+3.8	-57.6	+0.0	41.7	54.0	-12.3	Horiz

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98354** Date: 5/25/2016
 Test Type: **Radiated Scan** Time: 15:57:20
 Tested By: Hieu Song Nguyenpham Sequence#: 71
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission Frequency Range: 9kHz to 1000MHz Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz 1000 MHz-25000MHz; RBW=1 MHz, VBW=1 MHz The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth on Classic (GFSK) on TX Mode (High Channel)
--

Navdy WD#: 98354 Sequence#: 71 Date: 5/25/2016
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters



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

○ Peak Readings
* Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00971A	Preamp	8447D	2/5/2016	2/5/2018
	AN00432	Loop Antenna	6502	5/8/2015	5/8/2017
T2	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
T3	ANP06049	Attenuator	PE7002-6	5/9/2016	5/9/2018
T4	ANP00880	Cable	RG214U	5/10/2016	5/10/2018
T5	ANP01187	Cable	CNT-195	12/30/2014	12/30/2016
T6	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	47.591M	43.2	-27.9 +0.1	+10.2 +0.2	+5.9	+0.6	+0.0	32.3	40.0	-7.7	Vert
2	269.180M	43.0	-27.0 +0.3	+13.0 +0.6	+5.9	+1.6	+0.0	37.4	46.0	-8.6	
3	277.198M	42.8	-27.0 +0.3	+13.1 +0.6	+5.9	+1.6	+0.0	37.3	46.0	-8.7	
4	285.459M	42.1	-27.0 +0.3	+13.2 +0.7	+5.9	+1.7	+0.0	36.9	46.0	-9.1	
5	46.918M	40.8	-27.9 +0.1	+10.5 +0.2	+5.9	+0.6	+0.0	30.2	40.0	-9.8	Vert

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98354** Date: 5/23/2016
 Test Type: **Radiated Scan** Time: 16:31:48
 Tested By: Hieu Song Nguyenpham Sequence#: 24
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

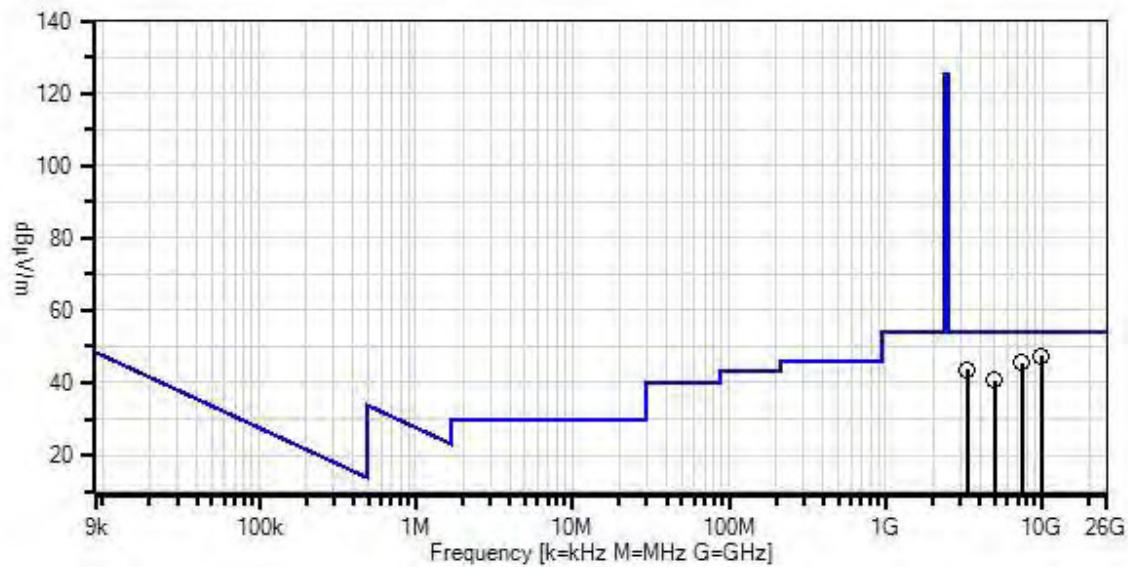
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission Frequency Range: 1000MHz to 25000MHz Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 2013 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz 1000 MHz-25000MHz; RBW=1 MHz, VBW=1 MHz The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth Classic on GFSK TX Mode (High Channel)

Navy WO#: 98354 Sequence#: 24 Date: 5/23/2016
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



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

○ Peak Readings
 * Average Readings
 Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
T2	AN03302	Cable	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
T3	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
T4	AN03114	Preamp	AMF-7D-00101800-30-10P	4/22/2015	4/22/2017
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017
	ANP00928	Cable	various	1/25/2016	1/25/2018
	ANP00929	Cable	various	1/25/2016	1/25/2018
	ANP06126	Cable	32022-29094K-29094K-168TC	3/18/2015	3/18/2017
T5	ANP06900	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
T6	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018
	AN02693	Active Horn Antenna-ANSI C63.5 3m	AMFW-5F-12001800-20-10P	5/6/2015	5/6/2017

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	T5 dB	T6 dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	9920.010M	55.8	+39.5 +1.1	+2.6 +0.4	+5.7	-57.7	+0.0	47.4	54.0	-6.6	Horiz
2	7439.870M	58.5	+36.6 +1.0	+2.3 +0.3	+5.1	-58.2	+0.0	45.6	54.0	-8.4	Horiz
3	3306.590M	65.4	+31.0 +0.6	+1.5 +0.6	+3.1	-58.6	+0.0	43.6	54.0	-10.4	Horiz
4	4959.680M	57.8	+33.5 +0.8	+1.8 +0.3	+3.8	-57.3	+0.0	40.7	54.0	-13.3	Horiz

Band Edge

Band Edge Summary – $\pi/4$ DQPSK

Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
2390.0	$\pi/4$ -DQPSK	Integral	43.6	<54	Pass
2483.5	$\pi/4$ -DQPSK	Integral	44.2	<54	Pass

Band Edge Summary – 8-DQPSK

Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
2390.0	8-DQPSK	Integral	44.1	<54	Pass
2483.5	8-DQPSK	Integral	44.9	<54	Pass

Band Edge Summary - GFSK

Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
2390.0	GFSK	Integral	43.9	<54	Pass
2483.5	GFSK	Integral	44.7	<54	Pass

Band Edge Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: Band Edge
 Work Order #: **98354** Date: 5/19/2016
 Test Type: **Radiated Scan** Time: 15:20:11
 Tested By: Hieu Song Nguyenpham Sequence#: 2
 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:

Temperature: 22.7°C Humidity: 43 % Atmospheric Pressure: 100.9kPa High Clock: 2480MHz Application: Window Command Prompt Transmitting operating frequency= 2402, 2442 and 2480MHz Gain of the antenna: -1dBi Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 13 The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended. Bluetooth Classic ($\pi/4$-DQPSK) on TX Mode

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02157	Horn Antenna- ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
	AN03302	Cable	32026-29094K- 29094K-72TC	1/29/2016	1/29/2018
	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: Band Edge
 Work Order #: **98354** Date: 5/19/2016
 Test Type: **Radiated Scan** Time: 15:20:11
 Tested By: Hieu Song Nguyenpham Sequence#: 2
 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:

Temperature: 22.7°C
Humidity: 43 %
Atmospheric Pressure: 100.9kPa
High Clock: 2480MHz
Application: Window Command Prompt
Transmitting operating frequency= 2402, 2442 and 2480MHz
Gain of the antenna: -1dBi
Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 13
The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended.
Bluetooth Classic (8-DQPSK) on TX Mode

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
	AN02157	Horn Antenna- ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
	AN03302	Cable	32026-29094K- 29094K-72TC	1/29/2016	1/29/2018
	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: **Navdy**
 Specification: Band Edge
 Work Order #: **98354** Date: 5/19/2016
 Test Type: **Radiated Scan** Time: 15:20:11
 Tested By: Hieu Song Nguyenpham Sequence#: 2
 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:

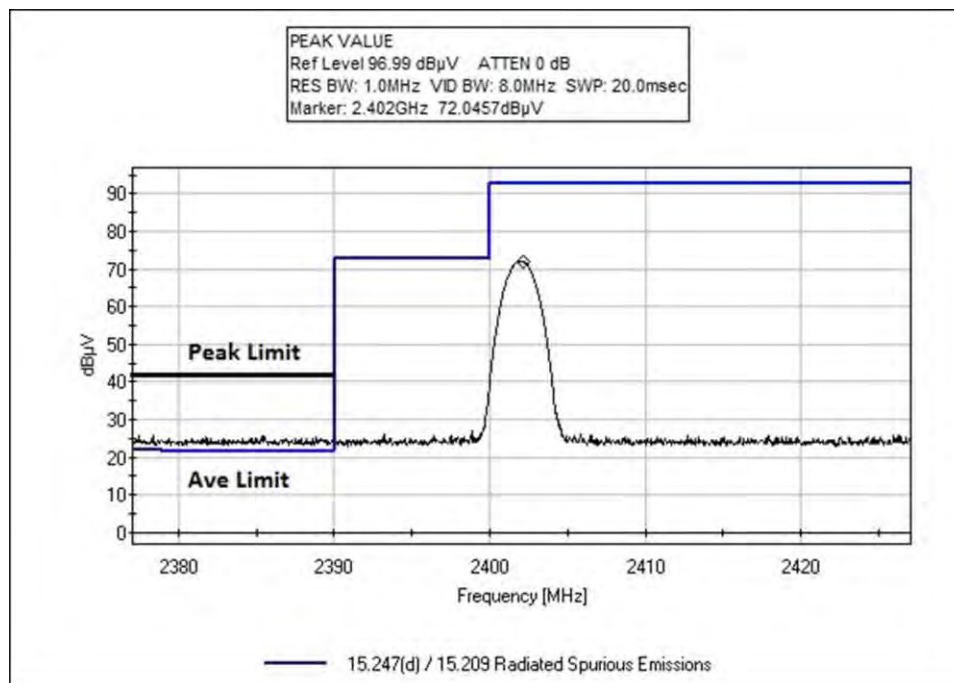
Temperature: 22.7°C
Humidity: 43 %
Atmospheric Pressure: 100.9kPa
High Clock: 2480MHz
Application: Window Command Prompt
Transmitting operating frequency= 2402, 2442 and 2480MHz
Gain of the antenna: -1dBi
Method: ANSI C63.10 (2013) and KDB 558074v03r05 section 13
The EUT is placed on a non-conducted table. It is powered up with a 12VDC battery It is set up continuously transmitting as intended.
Bluetooth Classic (GFSK) on TX Mode

Test Equipment:

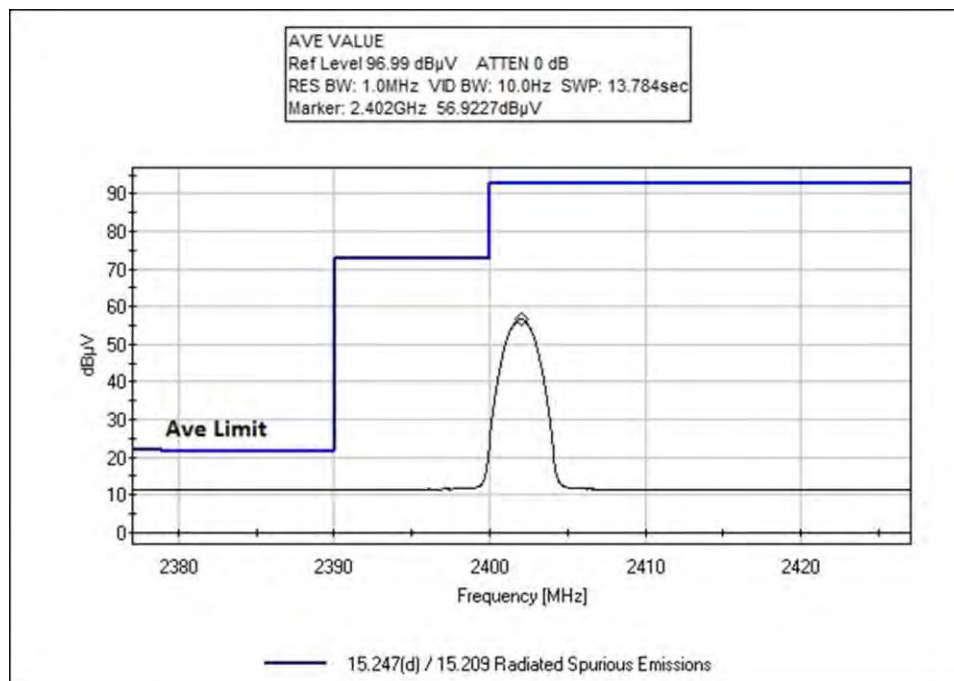
ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
	AN02157	Horn Antenna- ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
	AN03302	Cable	32026-29094K- 29094K-72TC	1/29/2016	1/29/2018
	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018

Band Edge Plots

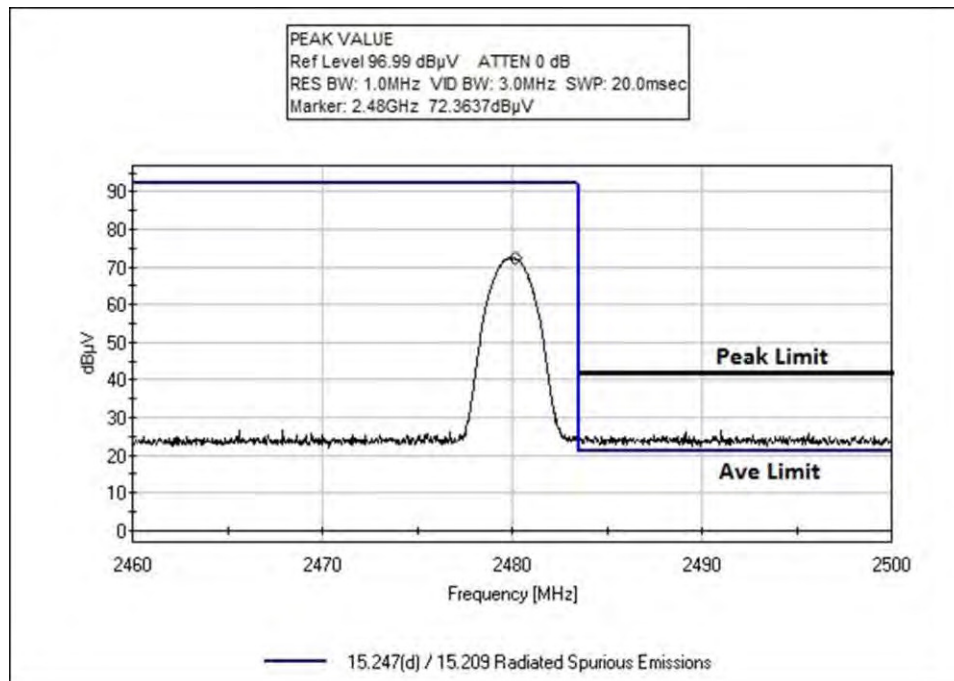
4-DQPSK



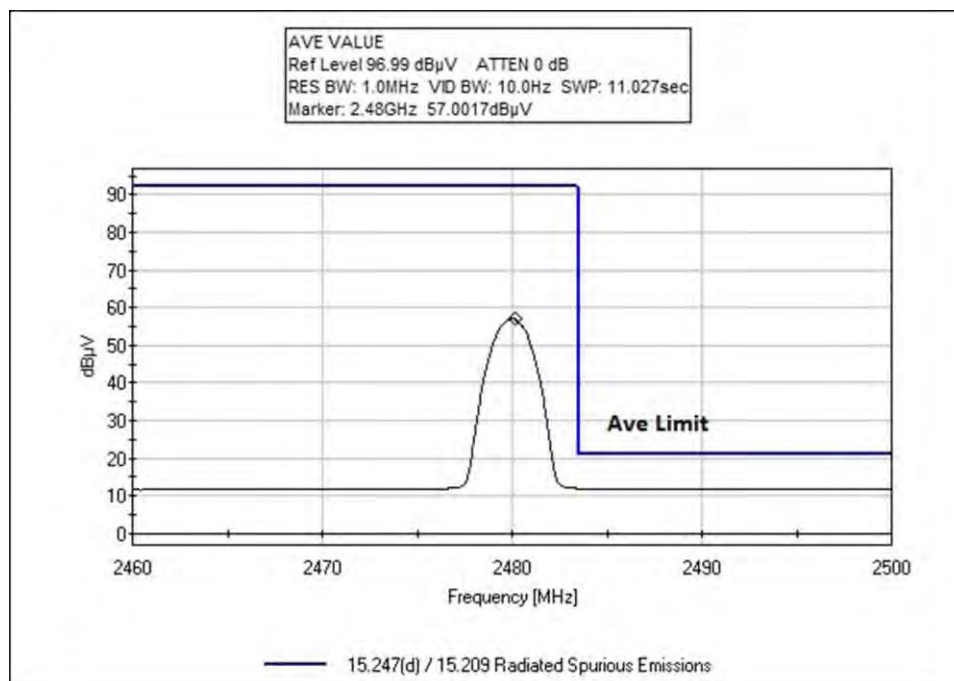
Low Channel



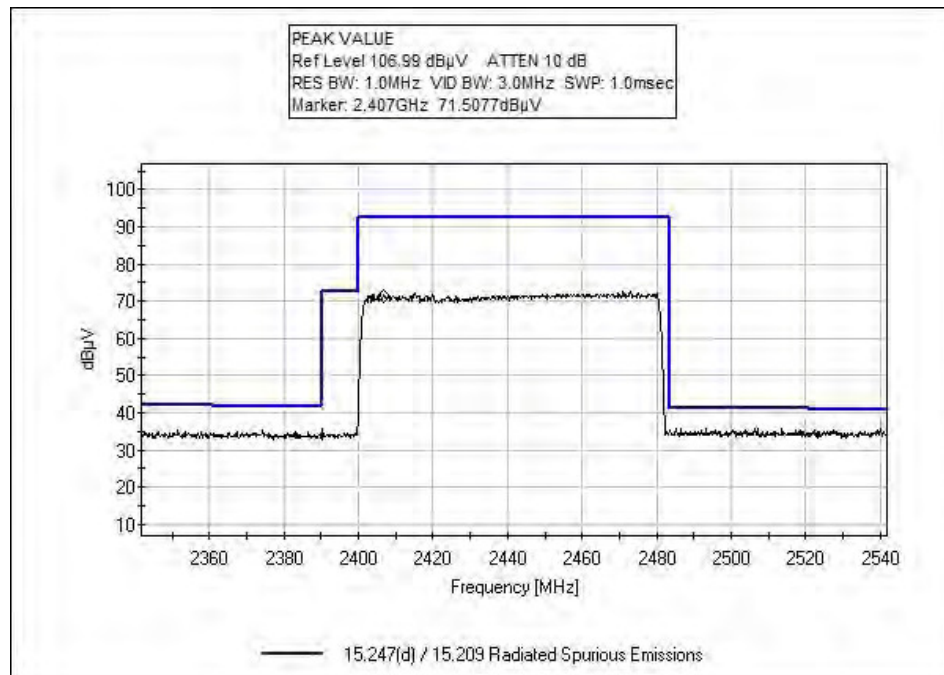
Low Channel



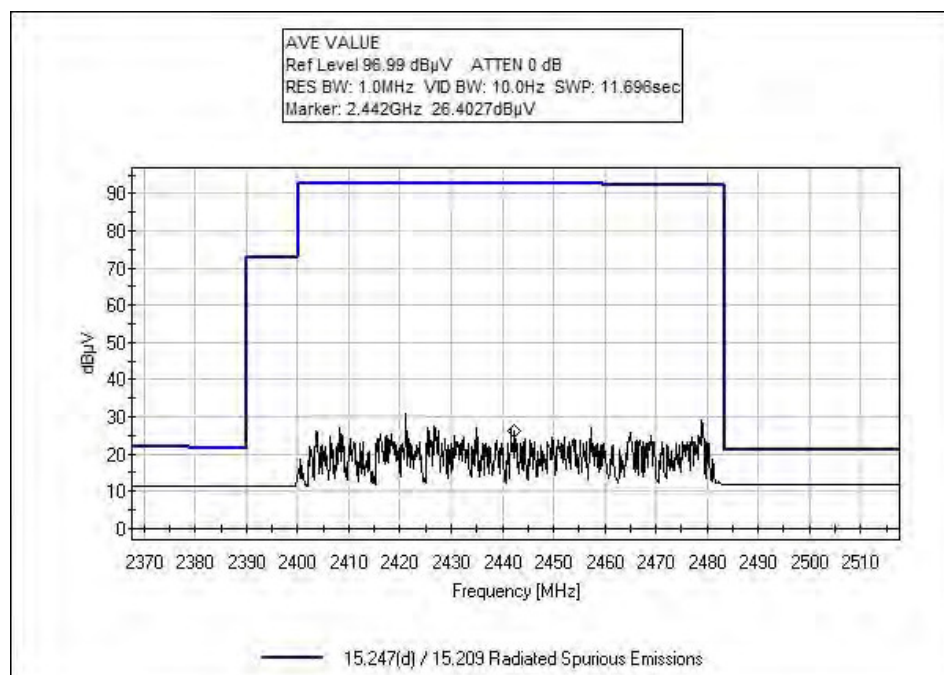
High Channel



High Channel

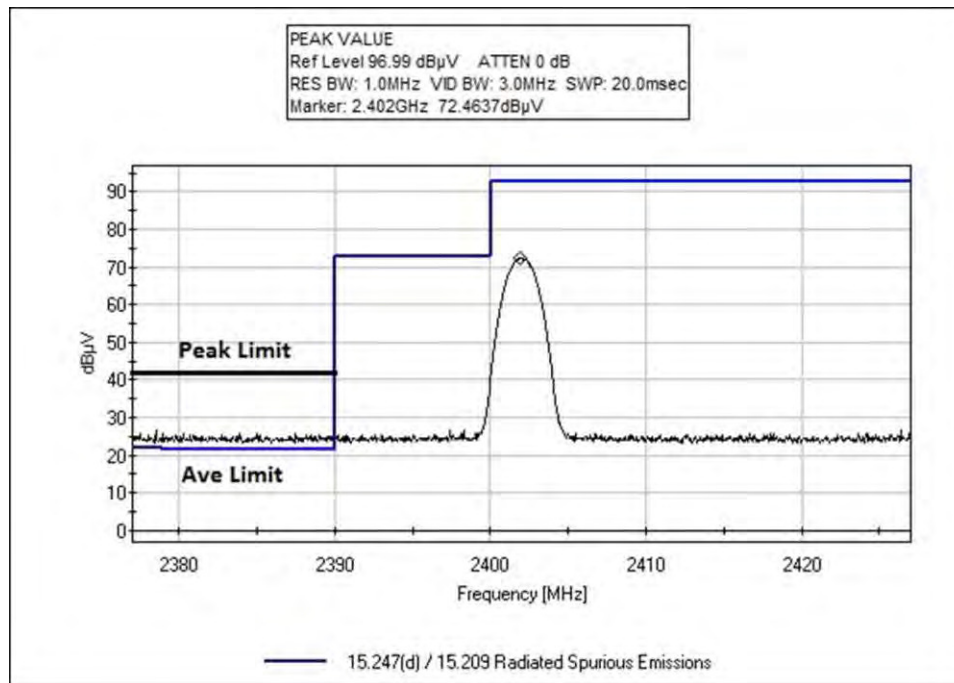


Hopping Mode

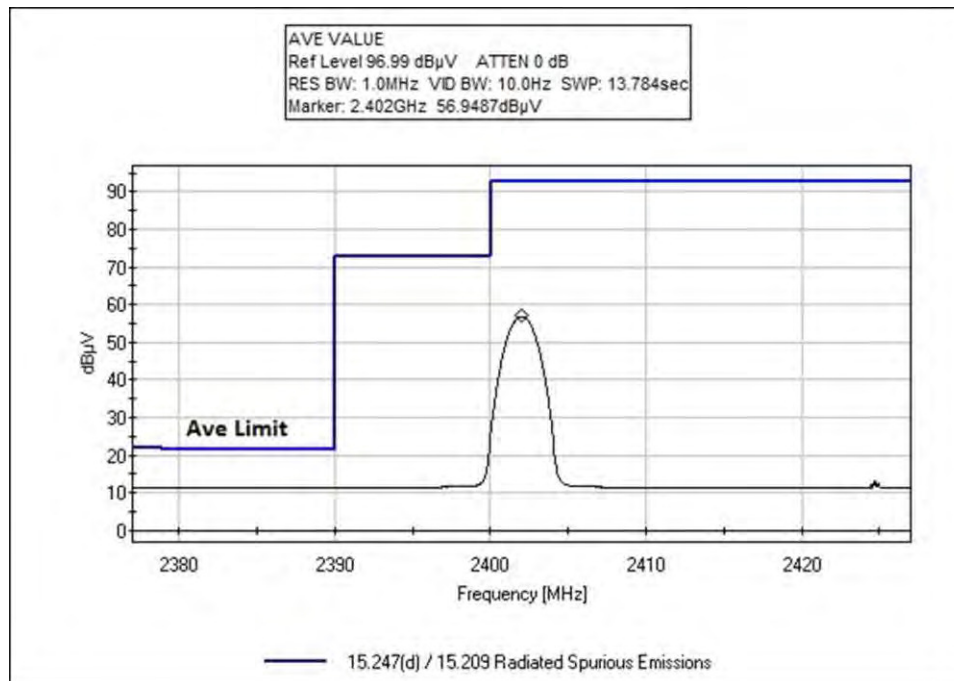


Hopping Mode

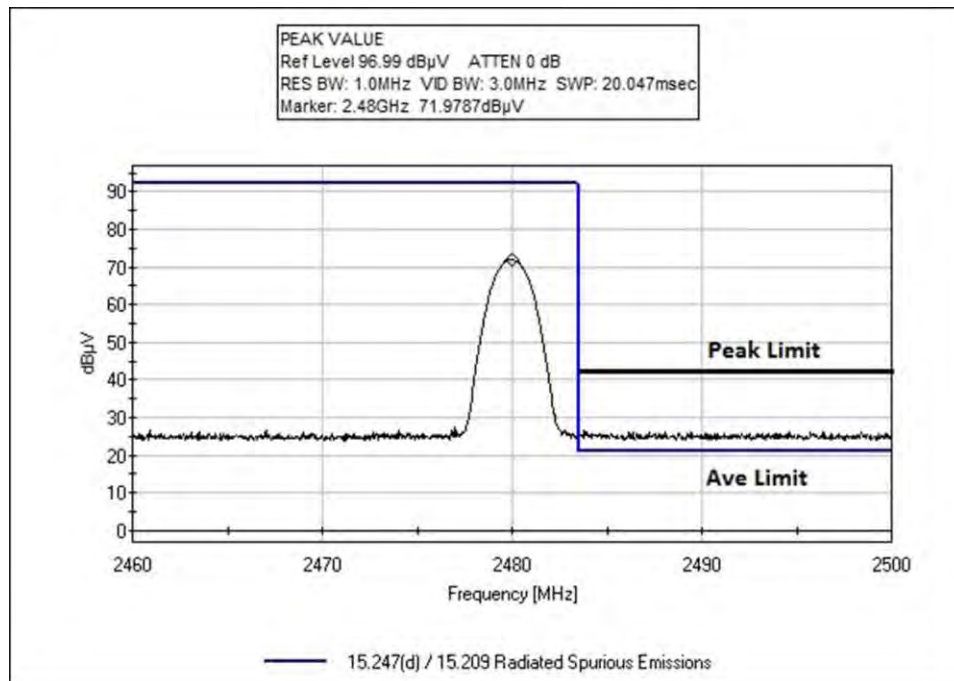
8-DQPSK



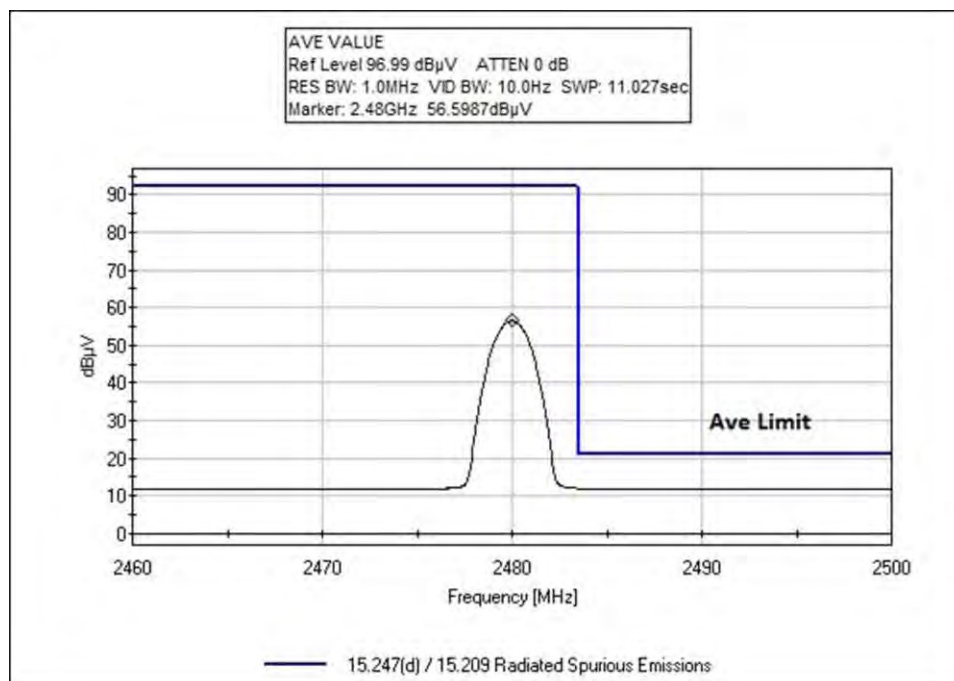
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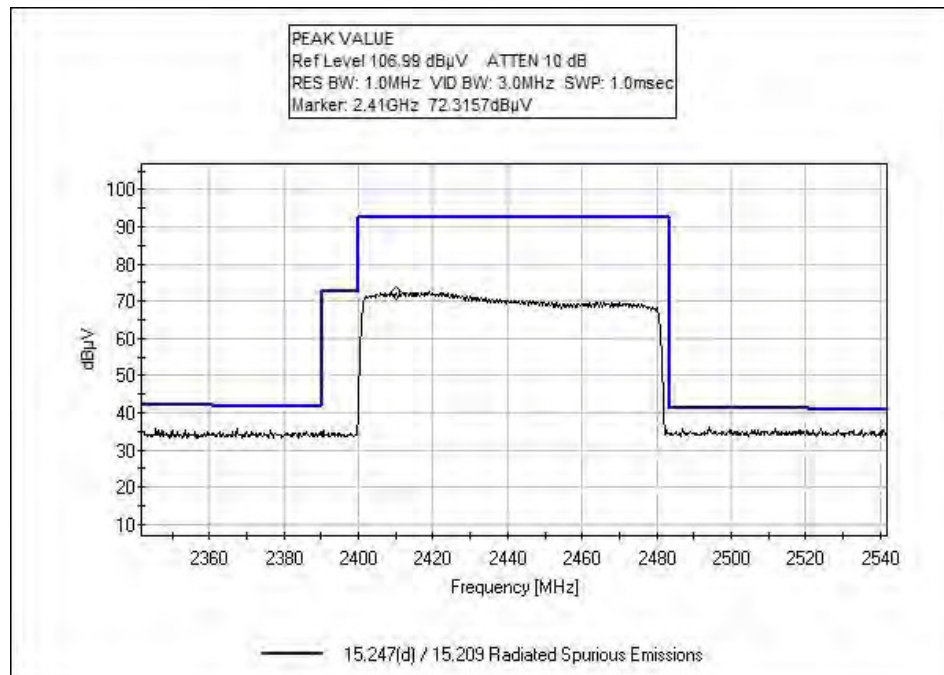
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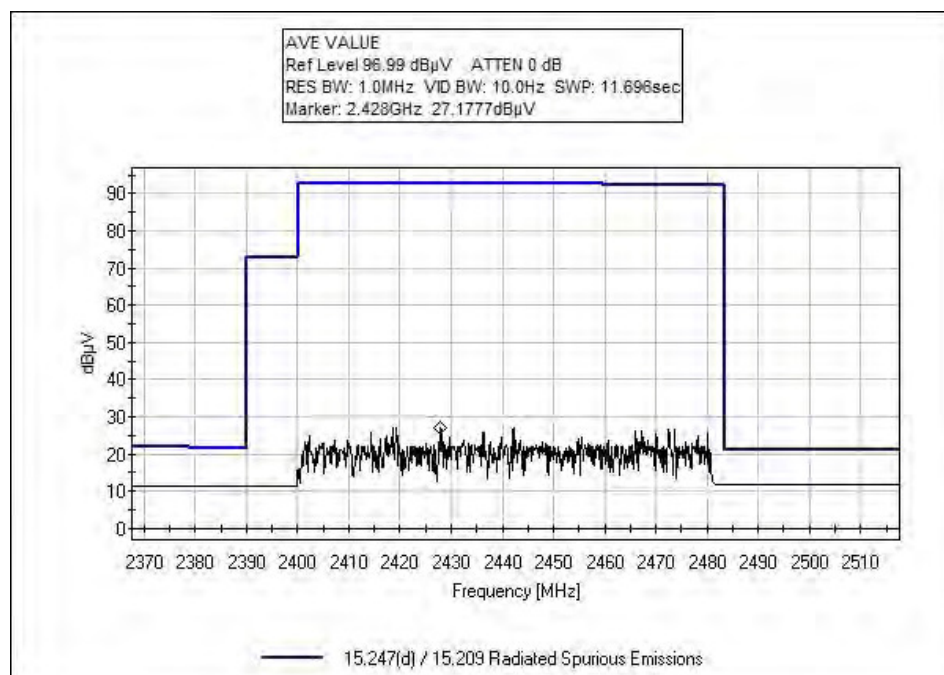
High Channel



High Channel

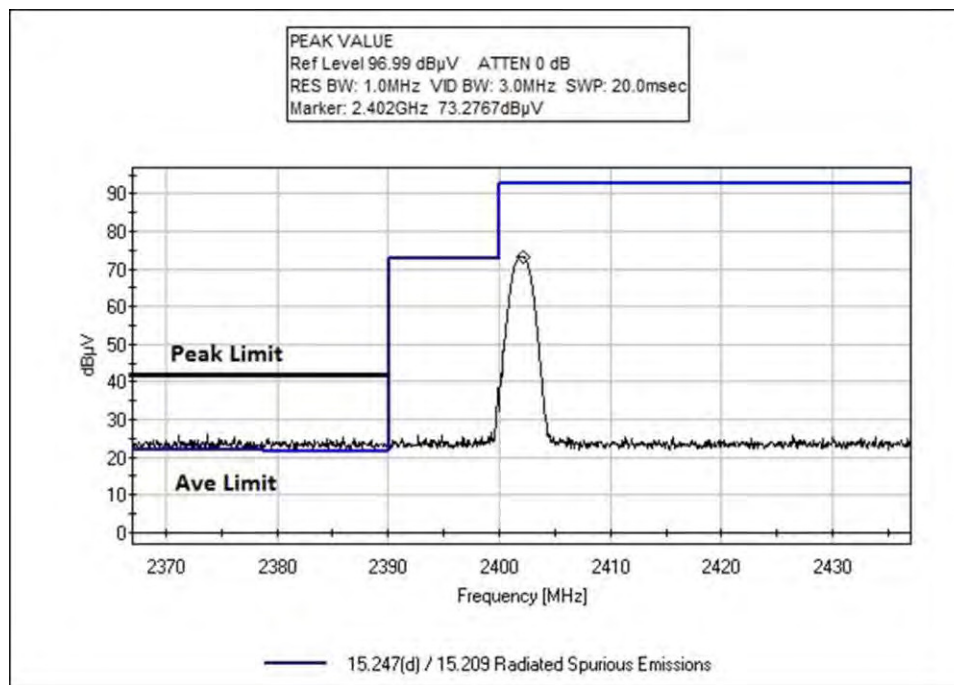


Hopping Mode

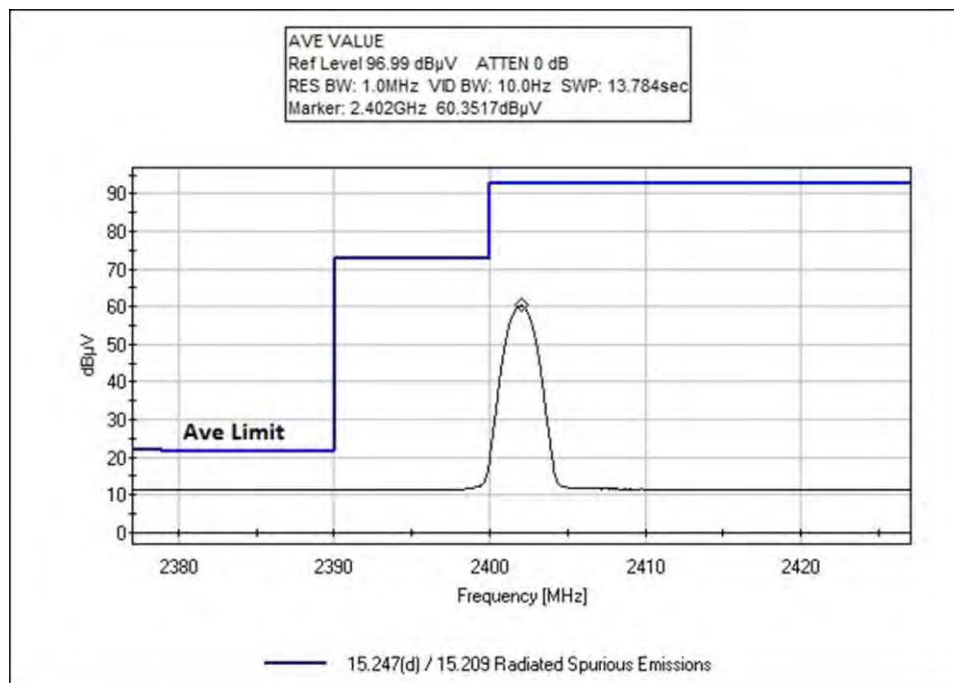


Hopping Mode

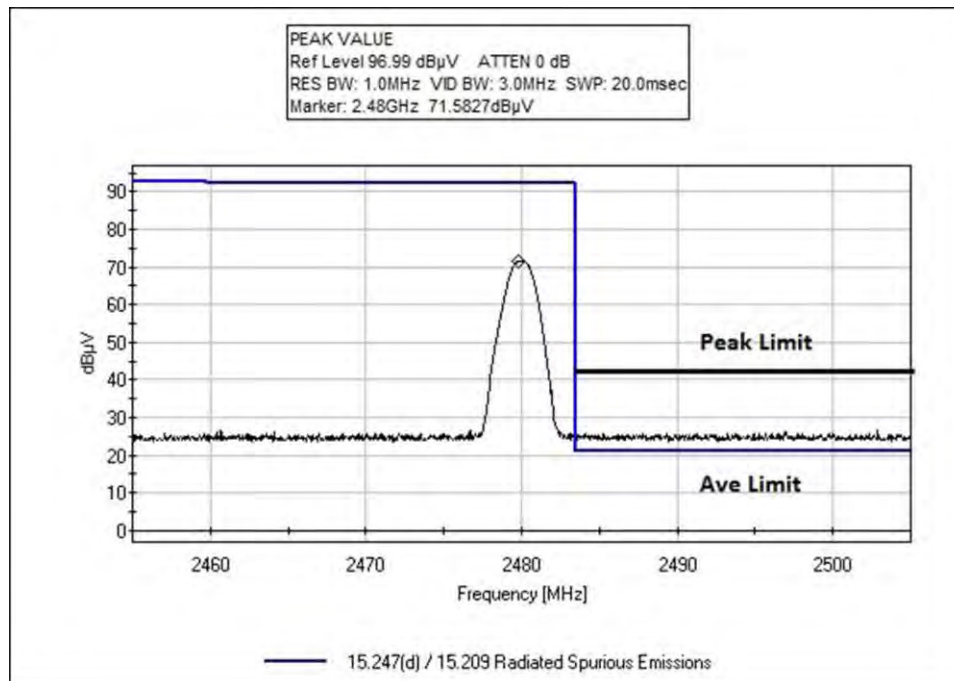
GFSK



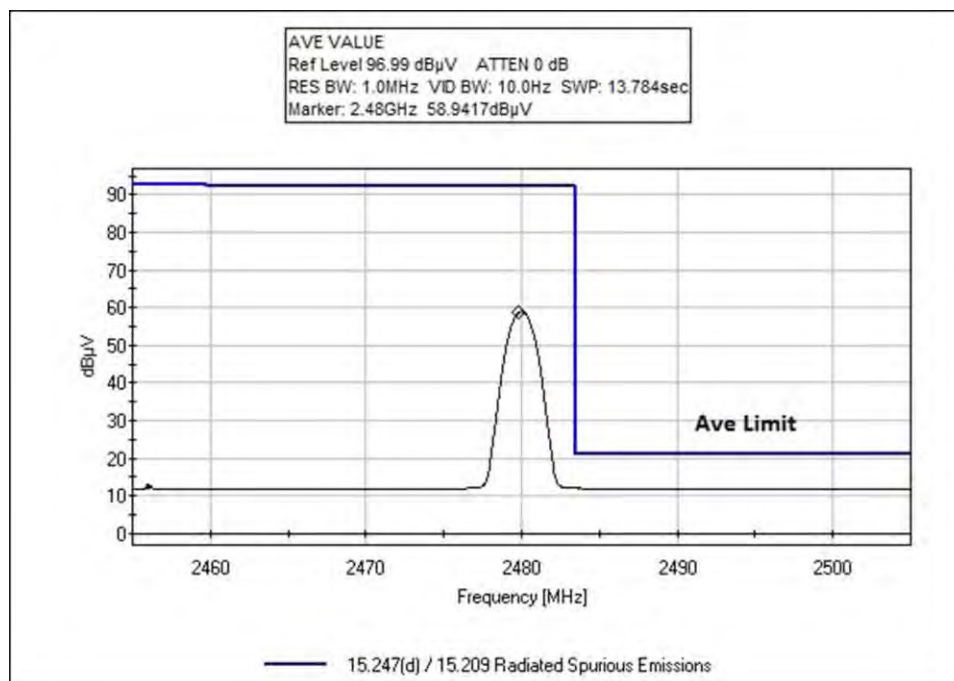
Low Channel



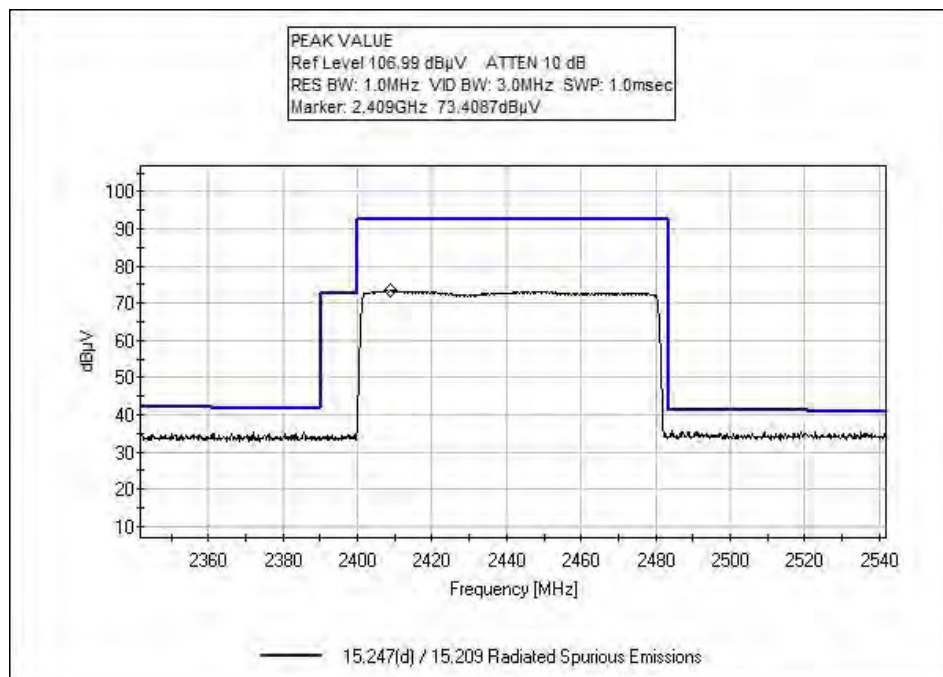
Low Channel



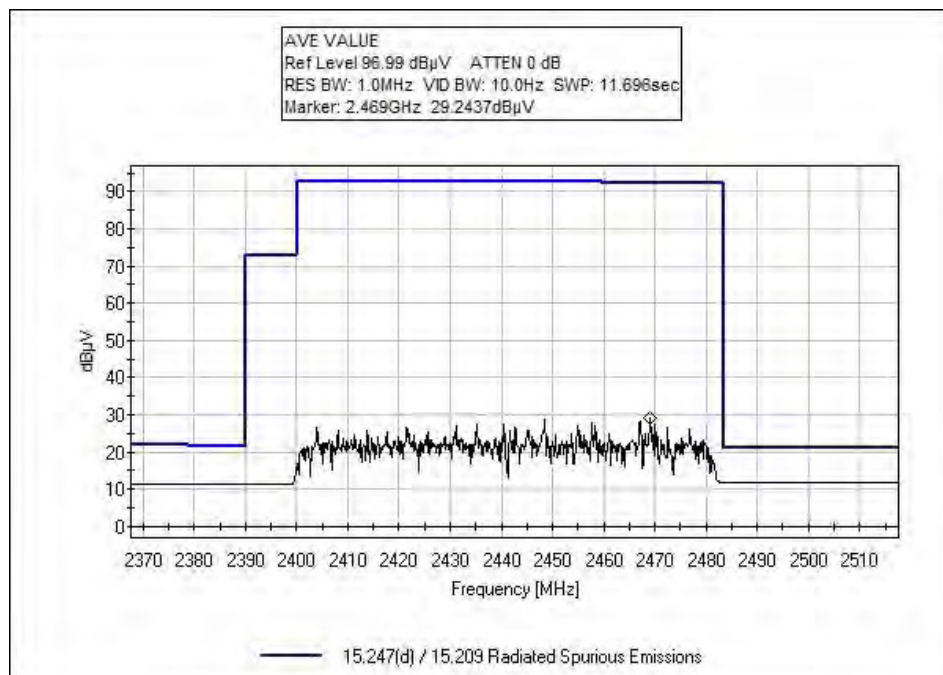
High Channel



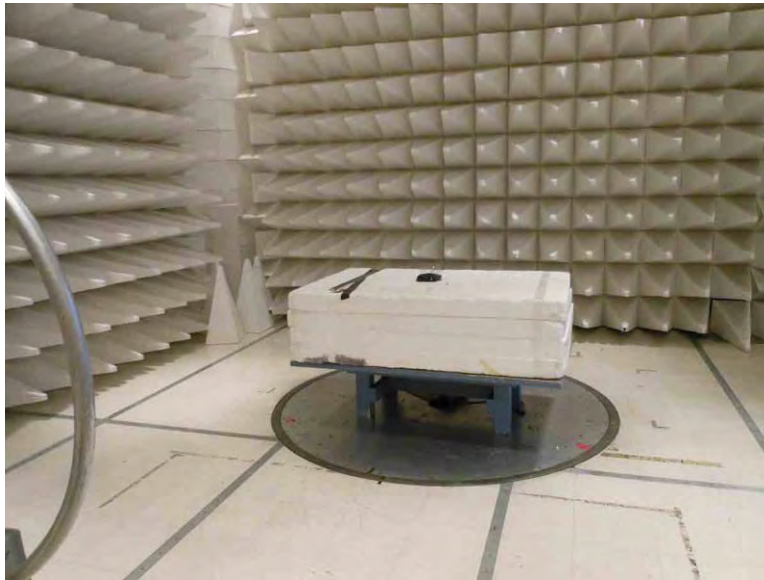
High Channel



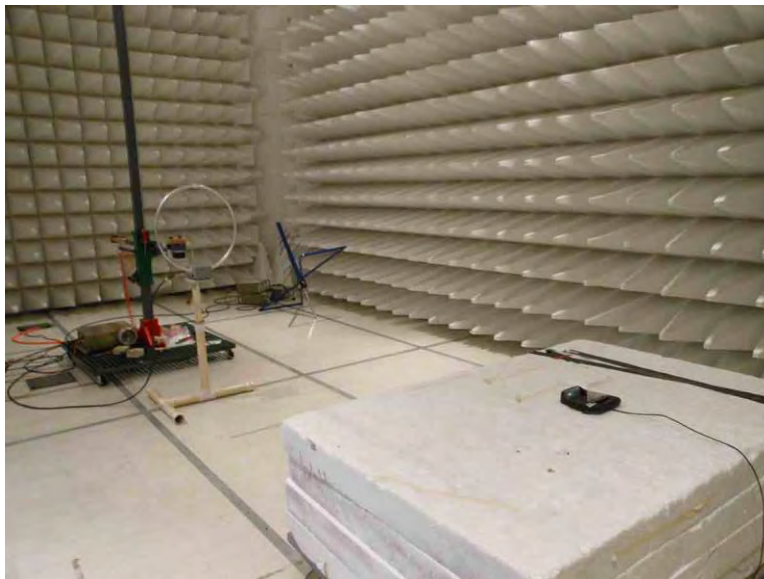
Hopping Mode



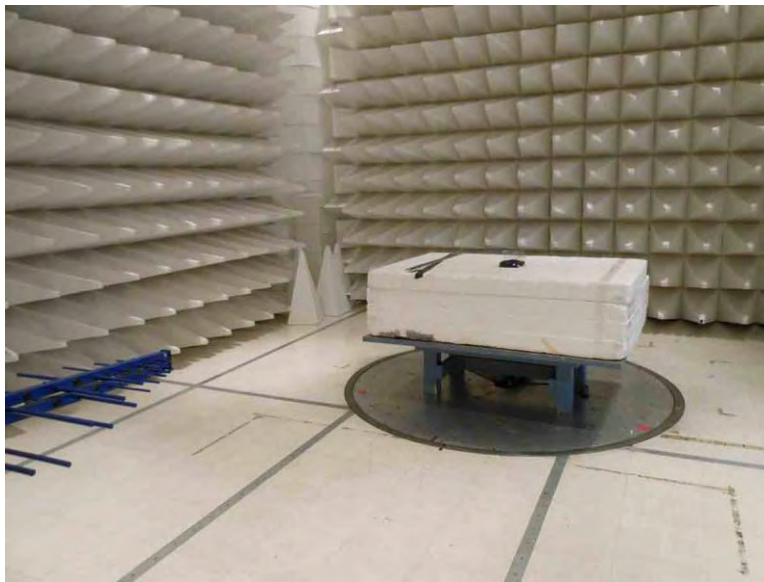
Test Setup Photos



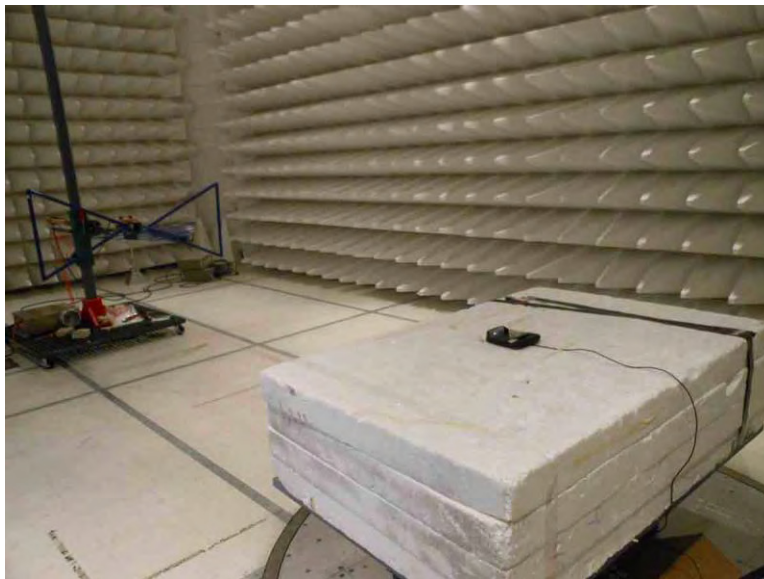
9kHz – 30MHz



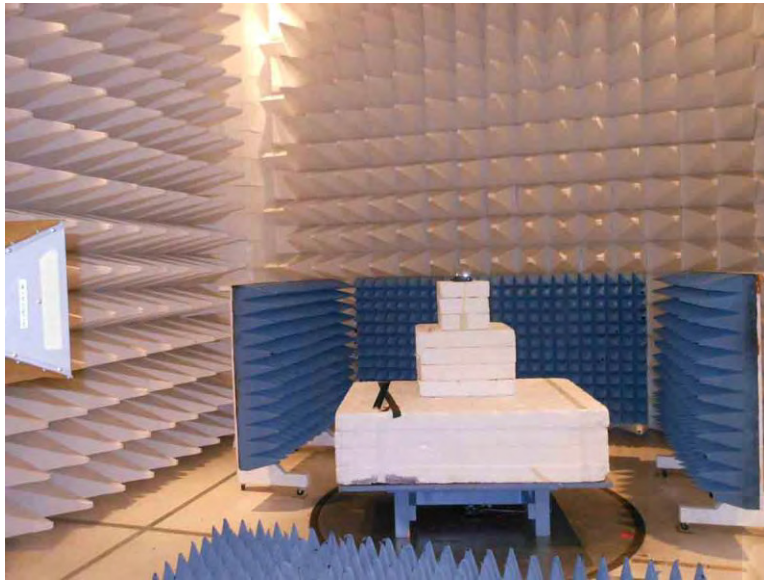
9kHz – 30MHz



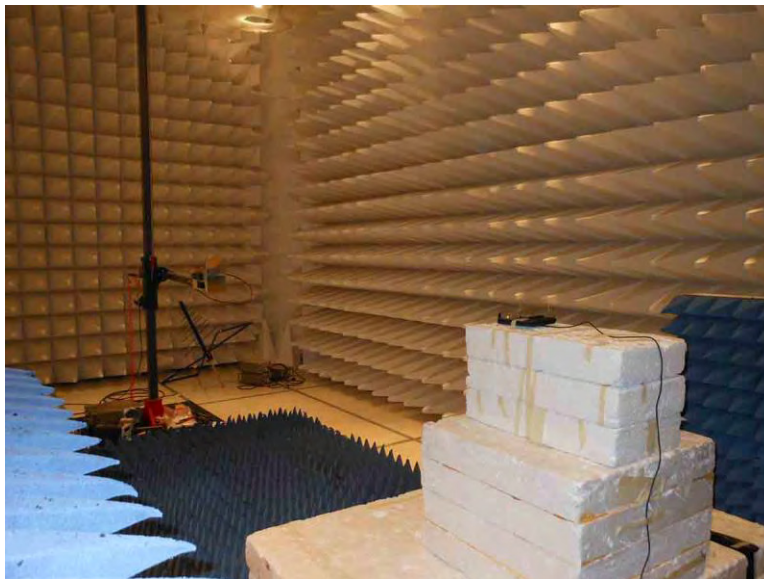
30MHz – 1GHz



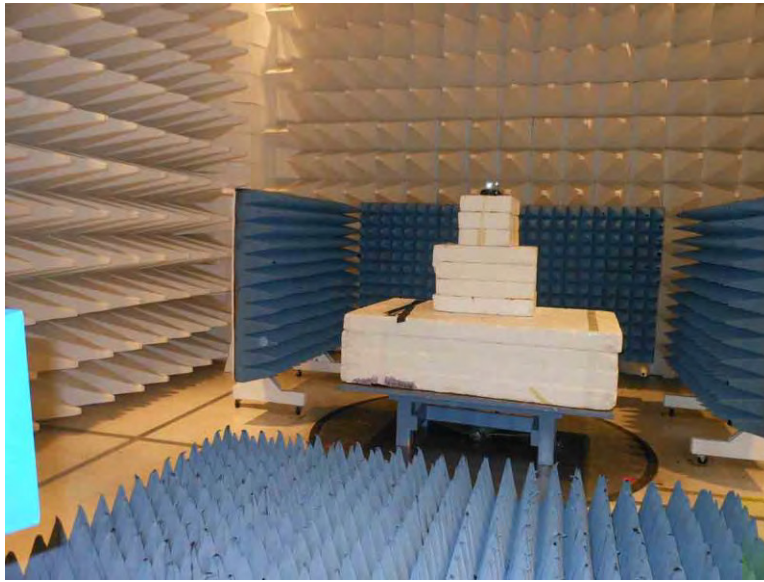
30MHz – 1GHz



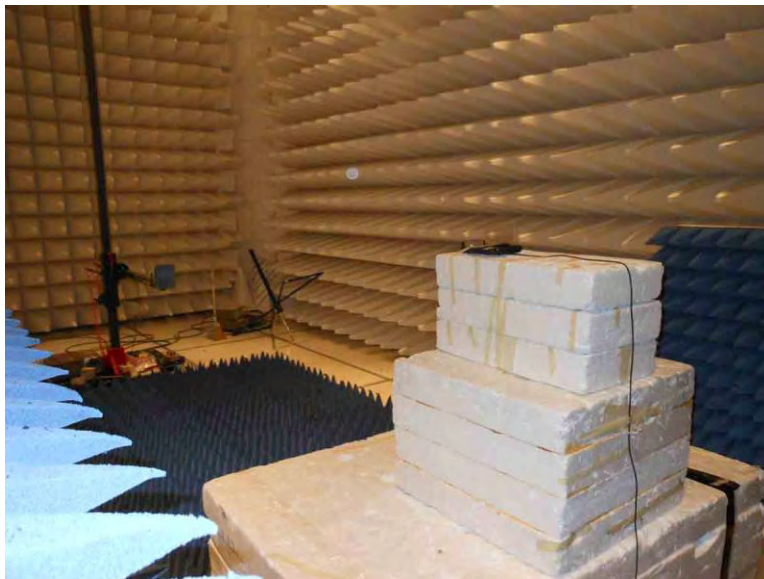
1 – 12GHz



1 – 12GHz



12 – 25GHz



12 – 25GHz

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 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. Individual measurements were compared with the displayed limit value in the margin column. The margin was calculated based on subtracting the limit value from the corrected measurement value; a positive margin represents a measurement exceeding the limit, while a negative margin represents a measurement less than the limit.

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

TEST INSTRUMENTATION AND ANALYZER SETTINGS

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

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

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or 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.