TEST REPORT

Report Number: 102241369MPK-012
Project Number: G102241369
March 21, 2016

Testing performed on the
WiFi/BT Module Card
Model: 576253
FCC ID: 2AHLA-576253
IC: 4811A-576253

To

FCC Part 15 Subpart C (15.247)
Industry Canada RSS-247 Issue 1

For

Bosch Automotive Service Solutions LLC

Test Performed by:	Test Authorized by:
Intertek	Bosch Automotive Service Solutions LLC
1365 Adams Court	655 Eisenhower Dr.
Menlo Park, CA 94025 USA	Owatonna, MN 55060 USA

Prepared by: _____ **Date:** March 21, 2016
Anderson Soungpanya

Reviewed by: _____ **Date:** March 21, 2016
Krishna K Vemuri

Report No. 102241369MPK-012

Equipment Under Test:	WiFi/BT Module Card
Trade Name:	WiFi/BT Module Card
Model Number:	576253
Serial Number:	MPK1511100953-001
Applicant:	Bosch Automotive Service Solutions LLC
Contact:	Eric Vande Zande
Address:	Bosch Automotive Service Solutions LLC 655 Eisenhower Dr. Owatonna, MN 55060
Country	USA
Tel. Number:	(507) 455-4437
Email:	eric.vandezande@us.bosch.com
Applicable Regulation:	FCC Part 15 Subpart C (15.247) Industry Canada RSS-247 Issue 1 FCC Part 15, Subpart B Industry Canada ICES-003
Date of Test:	January 15 – March 02, 2016

We attest to the accuracy of this report:

Anderson Soungpanya	Krishna K Vemuri
Project Engineer	EMC Engineering Team Lead

TABLE OF CONTENTS

1.0 Introduction

The Equipment Under Test (EUT) is the WiFi/BT Module Card, model number 576253, consisting one FHSS radio. This test report covers only the FHSS radio.

This report is designed to show compliance of the 2.4 GHz transceiver with the requirements of FCC Part 15 Subpart C (15.247) and RSS-247.

1.1 Summary of Tests

TEST	REFERENCE FCC Part 15 Subpart C (15.247)	REFERENCE RSS-247	RESULTS
RF Output Power	15.247(b)	5.4.2	Complies
20-dB Bandwidth	15.247(a)(1)	5.1.1	Complies
Channel Separation	15.247(a)(1)	5.1.2	Complies
Number of Hopping Channels	15.247(a)(1)	5.14	Complies
Average Channel Occupancy Time	15.247(a)(1)	5.14	Complies
Out-of-Band Antenna Conducted Emission	15.247(d)	5.5	Complies
Transmitter Radiated Emissions	15.247(d), 15.209, 15.205	RSS-GEN	Complies
RF Exposure	15.247(i)	RSS-102	Complies
AC Conducted Emission	15.207	RSS-GEN	Complies
Antenna Requirement	15.203	RSS-GEN	Complies. The EUT utilizes internal antenna.

2.0 General Description

2.1 Product Description

The Mid Range Scan Tool (MRST) is to be used in an automotive service shop environment in global markets. The MRST is usable as a standalone instrument by connecting to the vehicle diagnostic connector. Vehicle diagnostic connectivity is also added for certain Multi-Media equipped vehicles via USB, Bluetooth, and audio cable.

Overview of the EUT

Applicant	Bosch Automotive Service Solutions LLC
Manufacturer name & address	Bosch Automotive Service Solutions LLC 655 Eisenhower Dr. Owatonna, MN 55060 USA
Trade Name	Bosch Automotive Service Solutions LLC
Model Number	576253
FCC Identifier	2AHLA-576253
IC Identifier	4811A-576253
Type of Transmission	Frequency Hopping Spread Spectrum
Rated RF Output	3.79 dBm, 2.393mW
Frequency Range	2402 – 2480 MHz
Number of Channel(s)	79, (Channels 0-78)
Modulation Type	GFSK, π/4-DQPSK, 8DPSK
Duty Cycle	2.5 %
Data Rate	Up to 3Mbps
Antenna(s) type & Gain	YAGEO - ANTX150P111B24553; Internal Antenna, 3.2 dBi peak gain Taoglas Antenna Solution - FXP.840.07.0055B; Internal Antenna, 2.0 dBi peak gain

EUT receive date: October 19, 2015
EUT receive condition: The pre-production version of the EUT was received in good condition with no apparent damage. As declared by the Applicant, it is identical to the production units.
Test start date: January 15, 2016
Test completion date: March 02, 2016
The test results in this report pertain only to the item tested.

2.2 Related Submittal(s) Grants

None.

2.3 Test Methodology

Antenna conducted measurements were performed according to the procedure DA 00-705 Released March 30, 2000 “Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.”

Both AC mains line-conducted and radiated emissions measurements were performed according to the procedures in ANSI C63.4. Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Data Sheet"** of this Application.

All other measurements were made in accordance with the procedures in part 2 of CFR 47.

Following is the channel test plan:

Channels in 2.4 GHz band			
Test Channel		Frequency, MHz	Tested
Low	0	2402	√
Middle	39	2440	√
High	78	2480	√

2.4 Test Facility

The test site used to collect the radiated data is site 1 (10-m semi-anechoic chamber). This test facility and site measurement data have been fully placed on file with the FCC, IC and A2LA accredited.

2.5 Measurement Uncertainty

Compliance with the limits was based on the results of the measurements and doesn’t take into account the measurement uncertainty.

Estimated Measurement Uncertainty

Measurement	Expanded Uncertainty (k=2)		
	0.15 MHz – 1 GHz	1 GHz – 6 GHz	> 6 GHz
RF Power and Power Density – antenna conducted	1.1 dB	1.5 dB	–
Unwanted emissions - antenna conducted	1.2 dB	1.7 dB	2.0 dB
Bandwidth – antenna conducted	50 Hz	100 Hz	–
Radiated emissions	4.2 dB	5.4 dB	
AC mains conducted emissions	2.4 dB	-	-

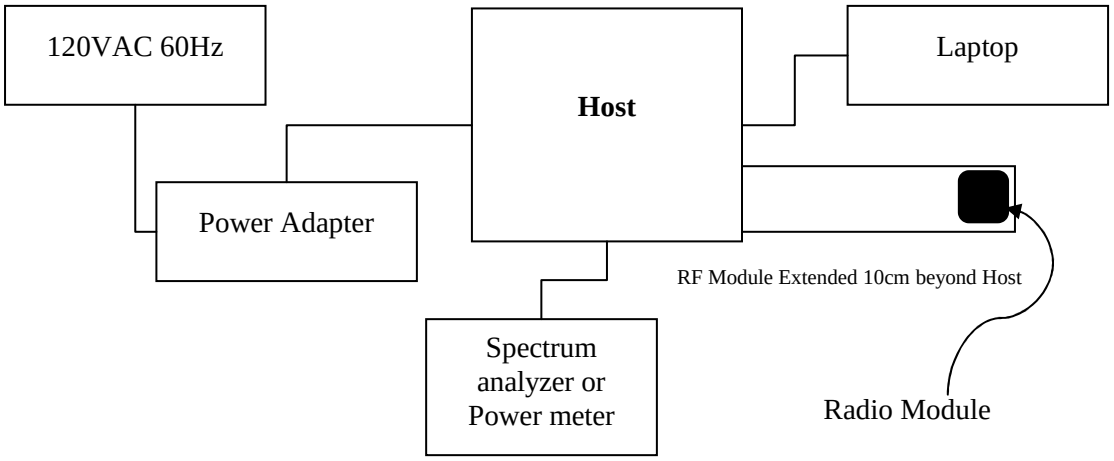
3.0 System Test Configuration

3.1 Support Equipment

Description	Manufacturer	Model No./ Part No.
Power Adapter	I.T.E Power Supply	PW172KB1500B02
Laptop	Acer	Aspire E1-571-6811

3.2 Block Diagram of Test Setup

Antenna was removed and co-axial connector with a cable was installed for Conducted Measurements. 50Ohm Load was used for Radiated Measurements.



S = Shielded **U** = Unshielded	**F** = With Ferrite **m** = Length in Meters

3.3 Justification

For radiated emission measurements the EUT is placed on a non-conductive table. The EUT is attached to peripherals and they are connected and operational (as typical as possible). The EUT is wired to transmit full power. During testing, all cables are manipulated to produce worst-case emissions.

3.4 Mode of Operation During Test

During transmitter testing, the transmitter was setup to transmit continuously at maximum RF power on the low channel, middle channel, high channel and with hopping channels enabled.

3.5 Modifications Required for Compliance

Intertek installed no modifications during compliance testing in order to bring the product into compliance.

3.6 Additions, Deviations and Exclusions from Standards

No additions, deviations or exclusions from the standard were made.

4.0 Transmitter Emissions Measurement Results

4.1 20dB Bandwidth, and 99% Occupied Bandwidth
FCC Rule 15.247(a)(1)

4.1.1 Procedure

The Procedure described in the FCC Publication DA 00-705 Released March 30, 2000 "Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems" was used to determine the 20dB bandwidth.

- Span = Approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
- RBW = 1% of the 20 dB bandwidth
- VBW = 3 x RBW
- Sweep = Auto
- Detector function = Peak
- Trace = Max hold

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the markerdelta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

For 99% power bandwidth measurement, the bandwidth was determined by using the built-in 99% occupied bandwidth function of the spectrum analyzer.

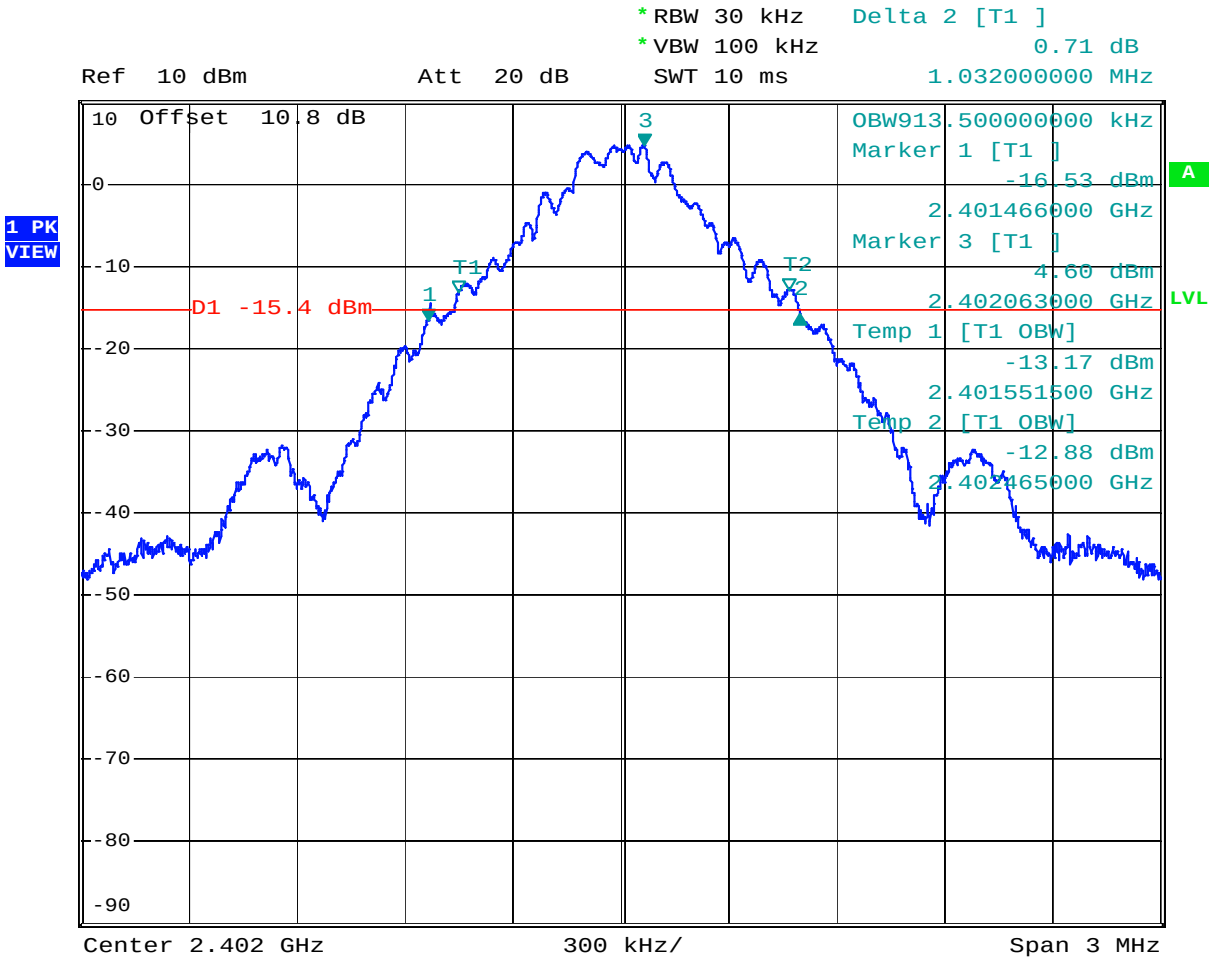
The antenna port of the EUT was connected to the input of a spectrum analyzer (SA). For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A Peak output reading was taken, a Display line was drawn for 20dB lower than Peak level. The 20dB bandwidth was determined from where the channel output spectrum intersected the display line.

Tested By:	Anderson Soungpanya
Test Date:	January 15, 2016

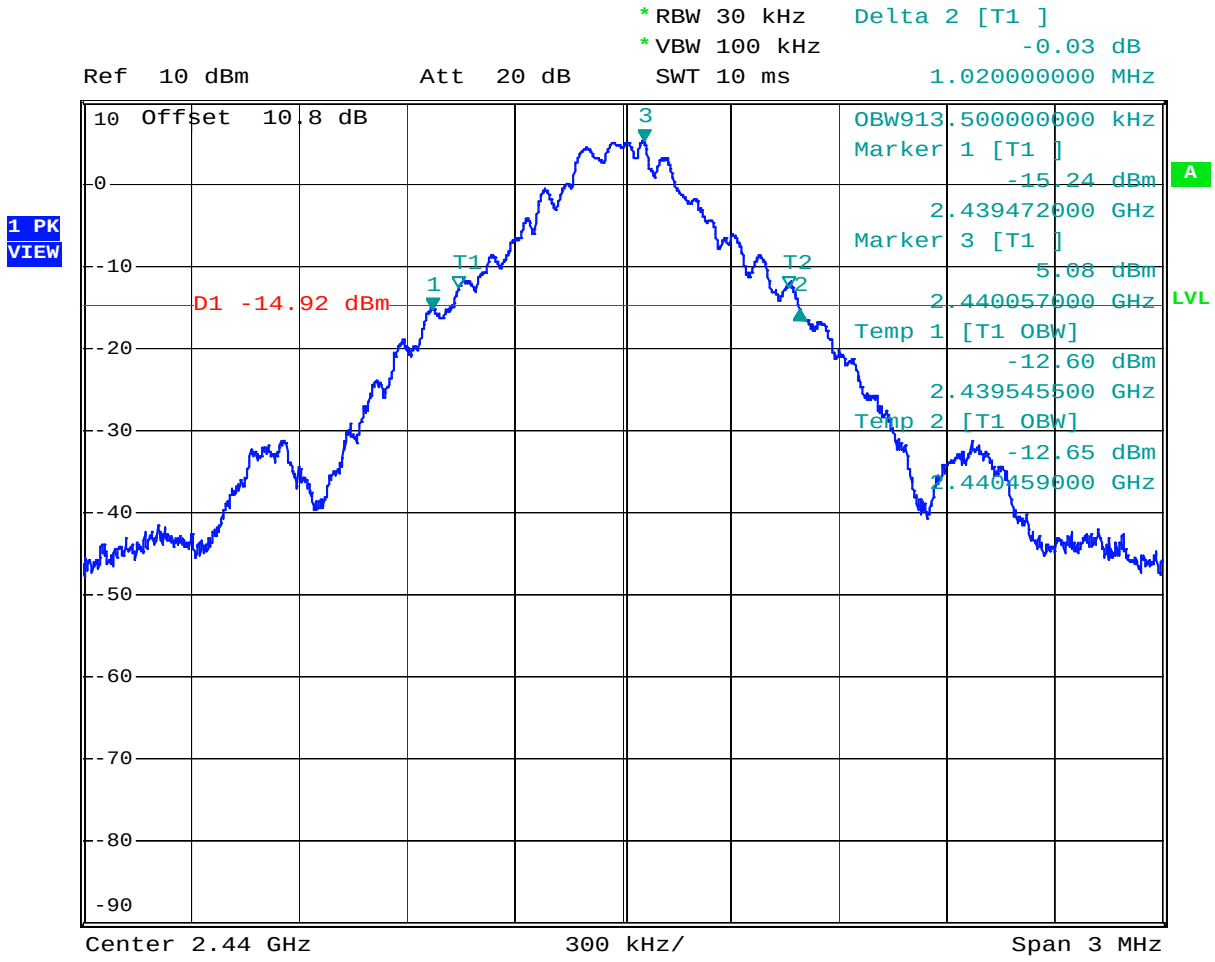
4.1.2 Test Result

Modulation Type	Channel	Frequency MHz	20 dB FCC Bandwidth, MHz	99% Bandwidth, MHz	Plot #
GFSK	0	2402	1.032	0.914	1.1
	39	2440	1.020	0.914	1.2
	78	2480	1.038	0.918	1.3
π/4-DQPSK	0	2402	1.392	1.265	1.4
	39	2440	1.398	1.251	1.5
	78	2480	1.398	1.244	1.6
8DPSK	0	2402	1.398	1.257	1.7
	39	2440	1.412	1.248	1.8
	78	2480	1.392	1.242	1.9

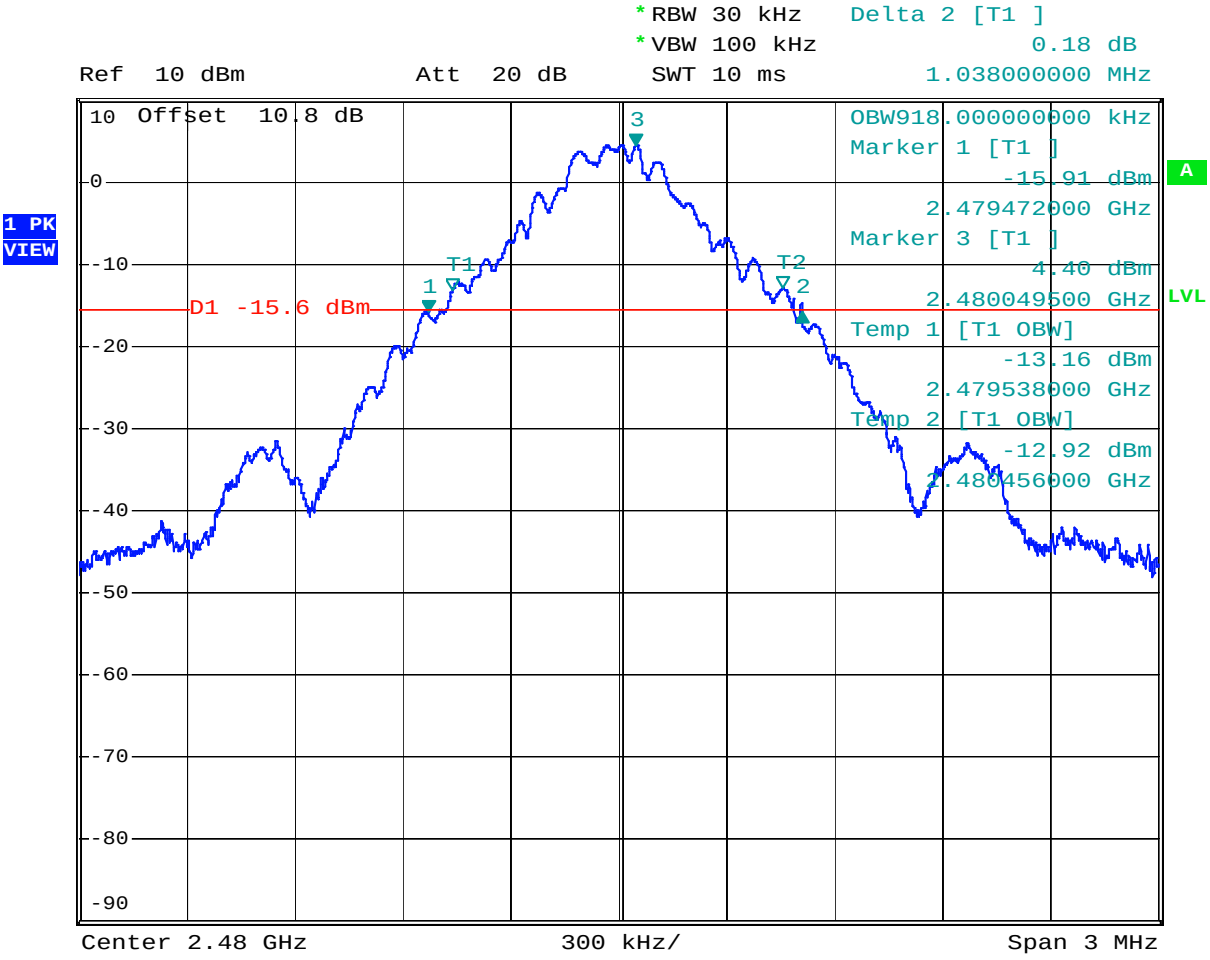
Plot 1. 1 – 20dB Bandwidth Low Channel GFSK



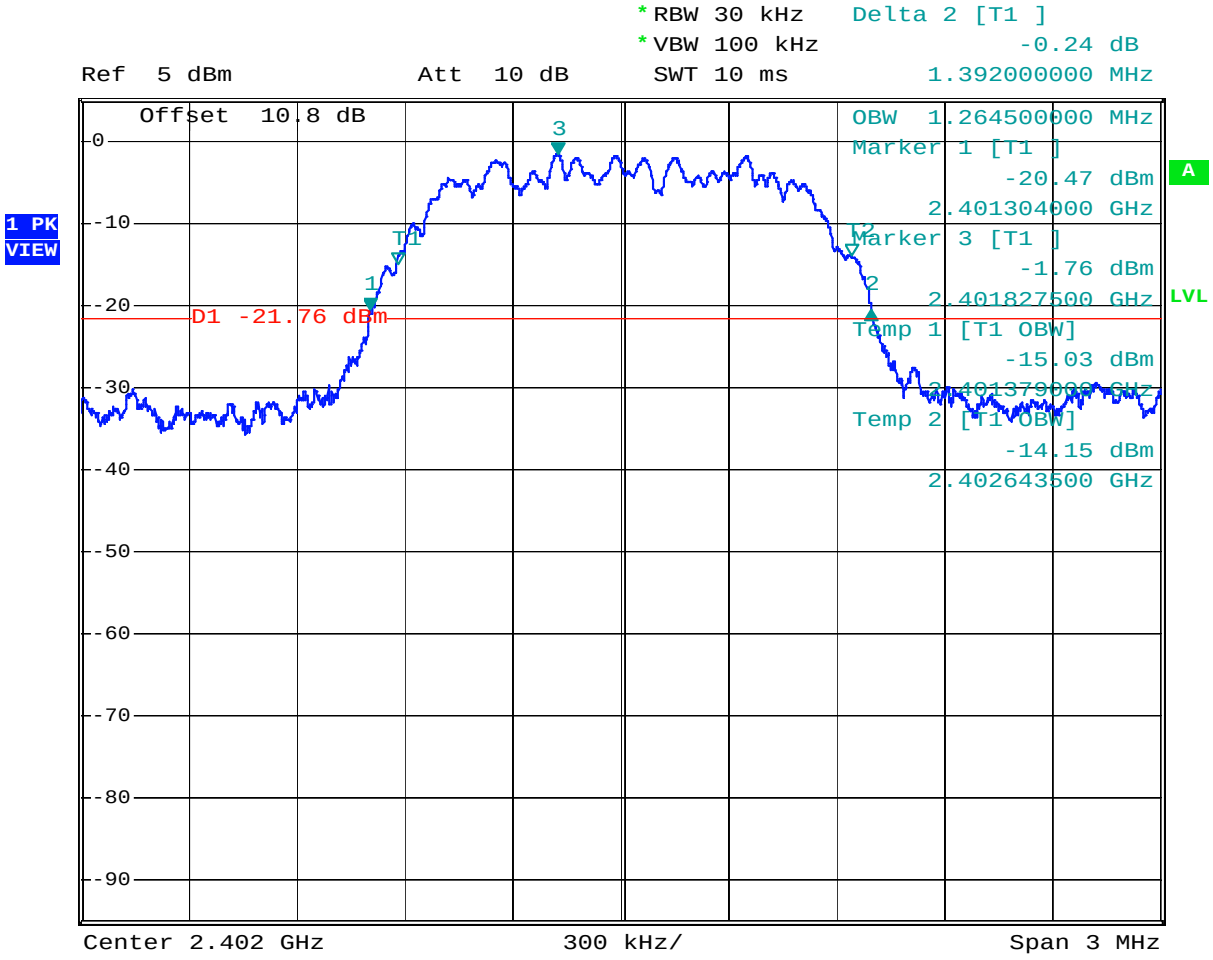
Plot 1. 2 – 20dB Bandwidth Middle Channel GFSK



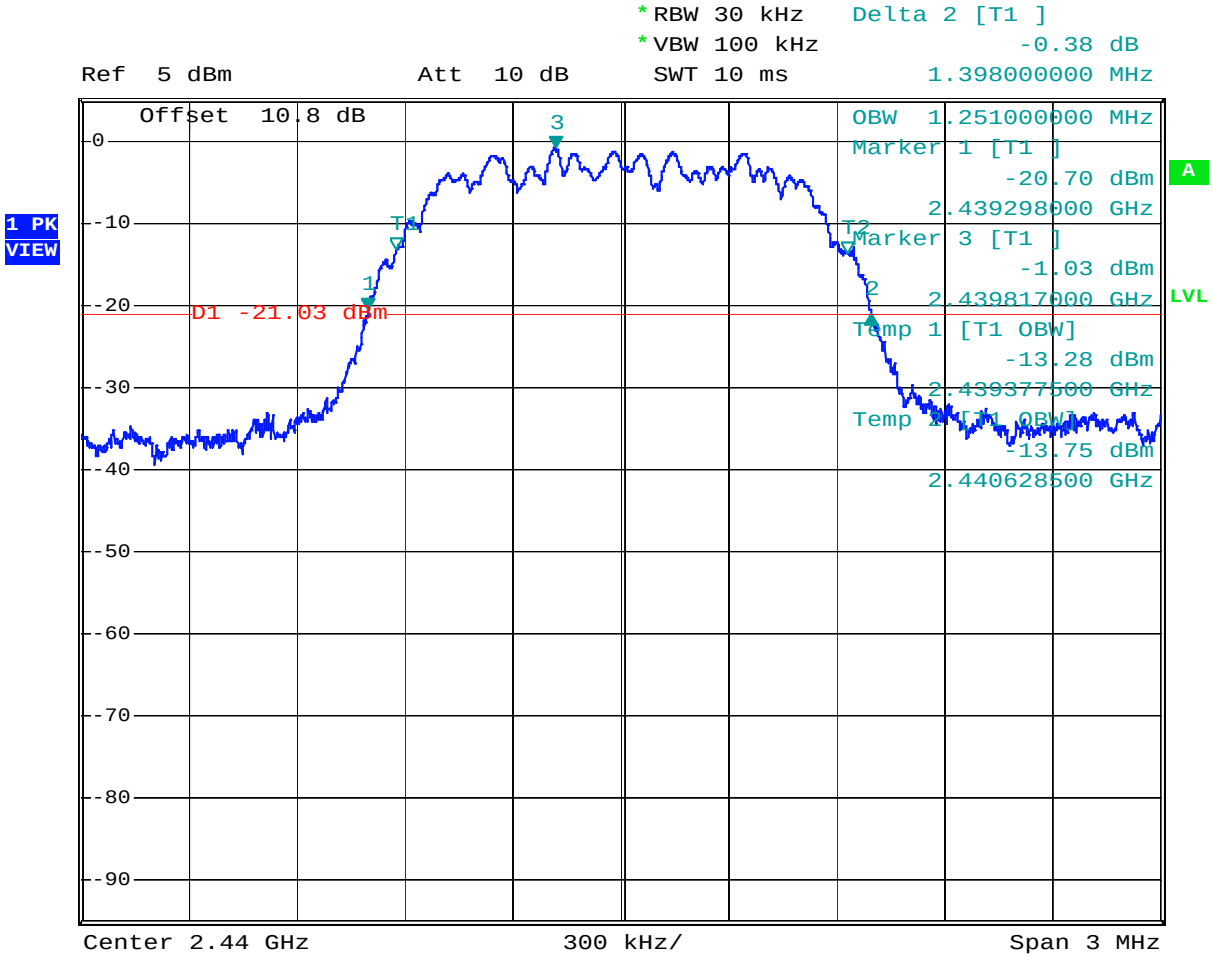
Plot 1. 3 – 20dB Bandwidth High Channel GFSK



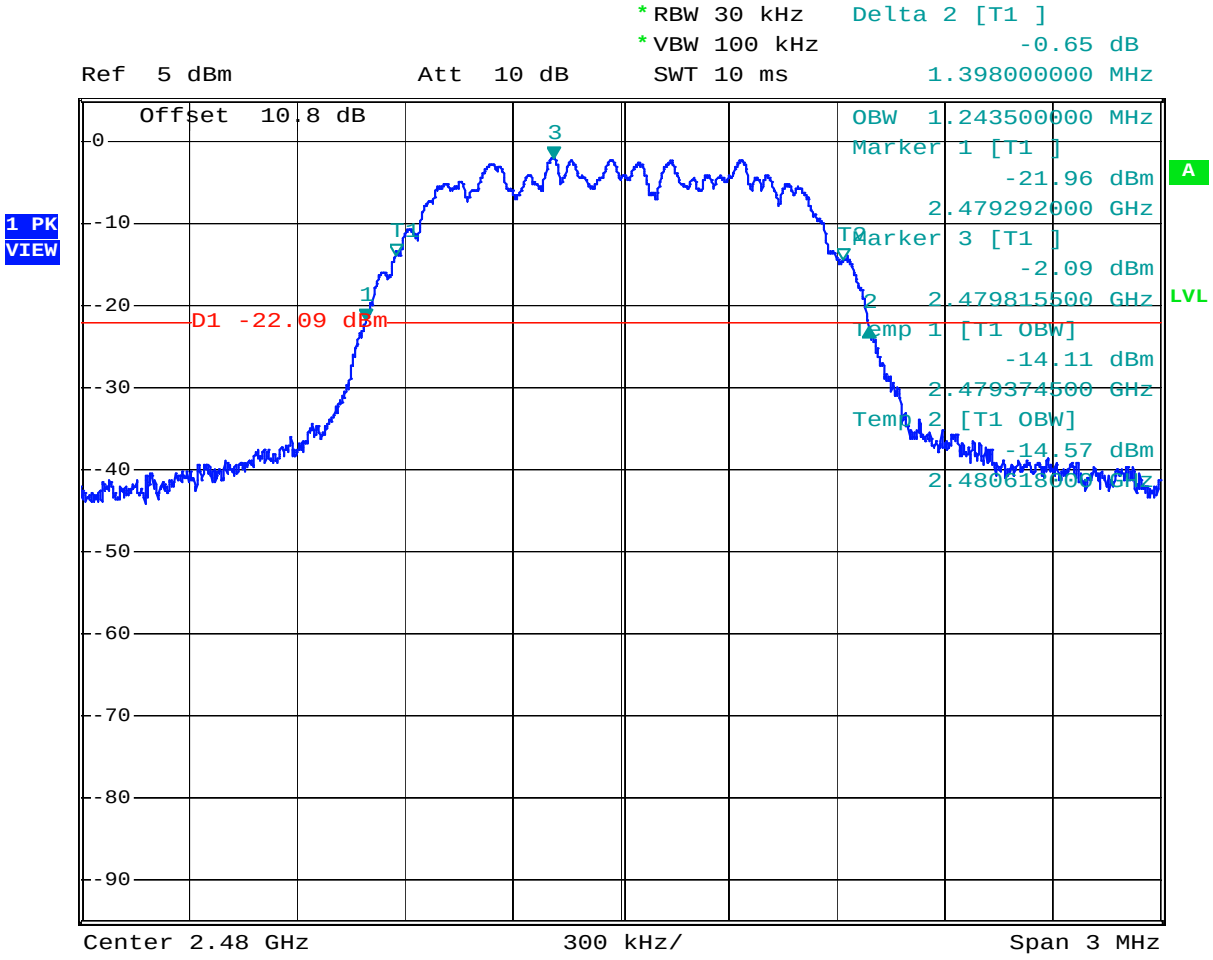
Plot 1. 4 – 20dB Bandwidth Low Channel π/4-DQPSK



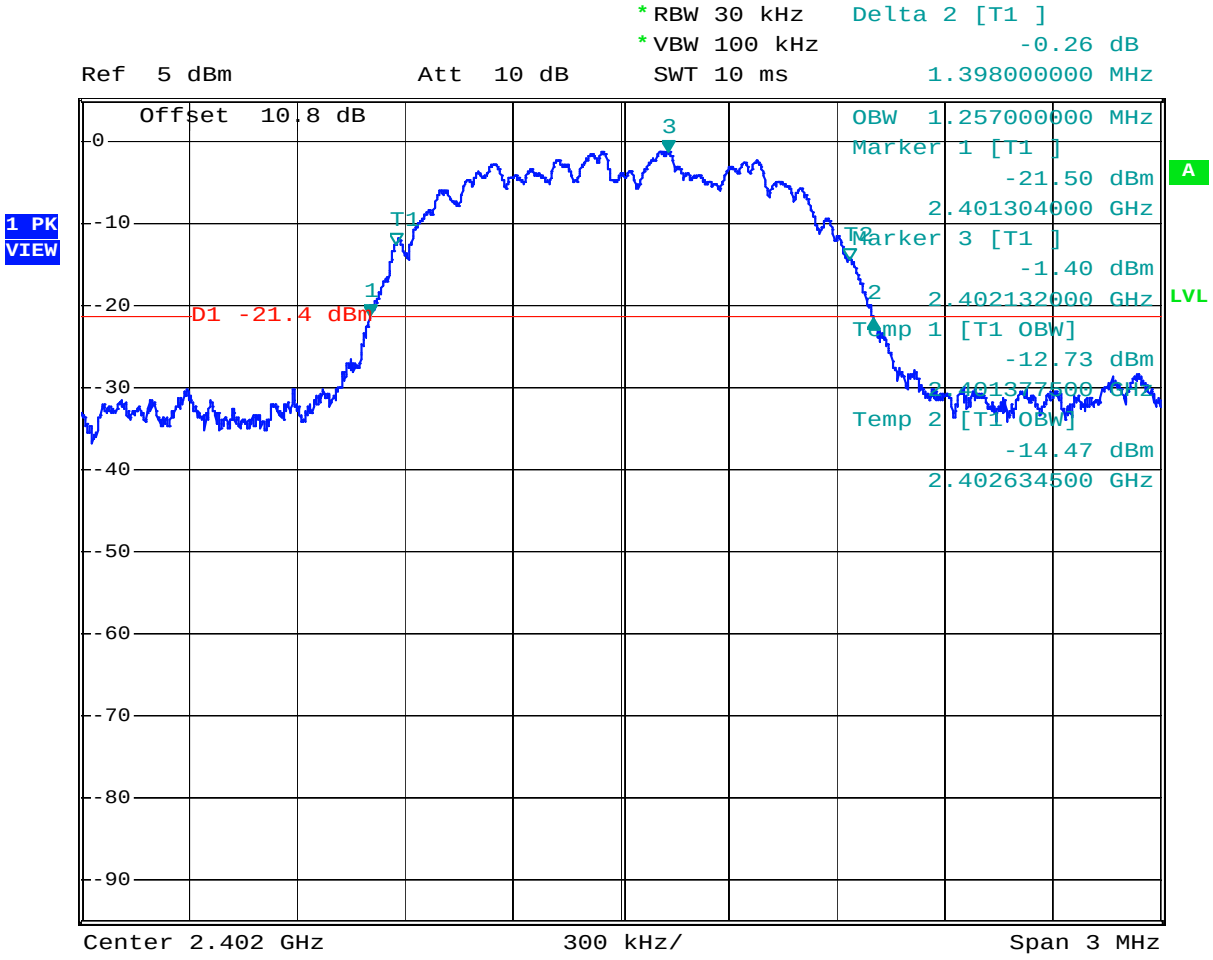
Plot 1. 5 – 20dB Bandwidth Middle Channel π/4-DQPSK



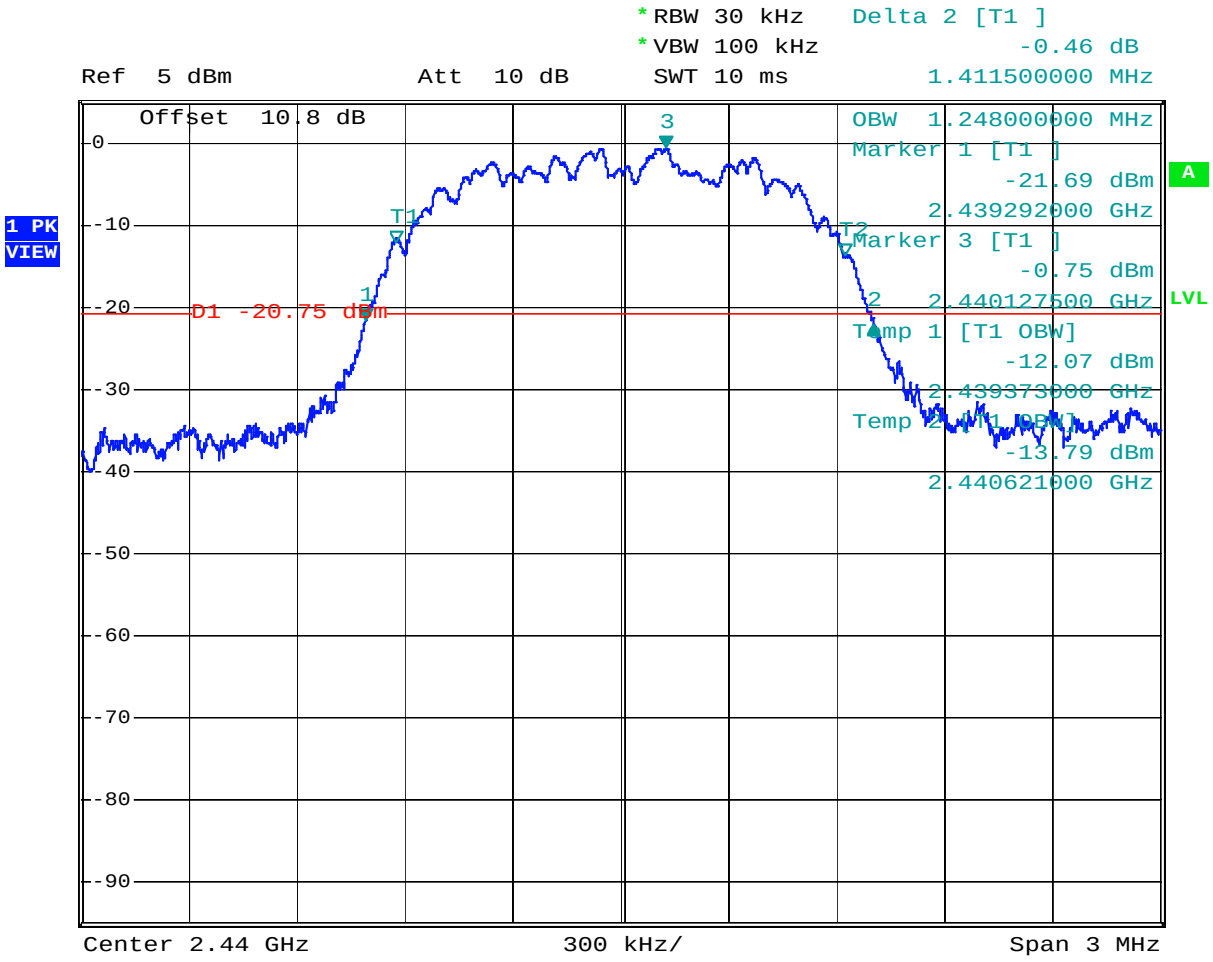
Plot 1. 6 – 20dB Bandwidth High Channel π/4-DQPSK



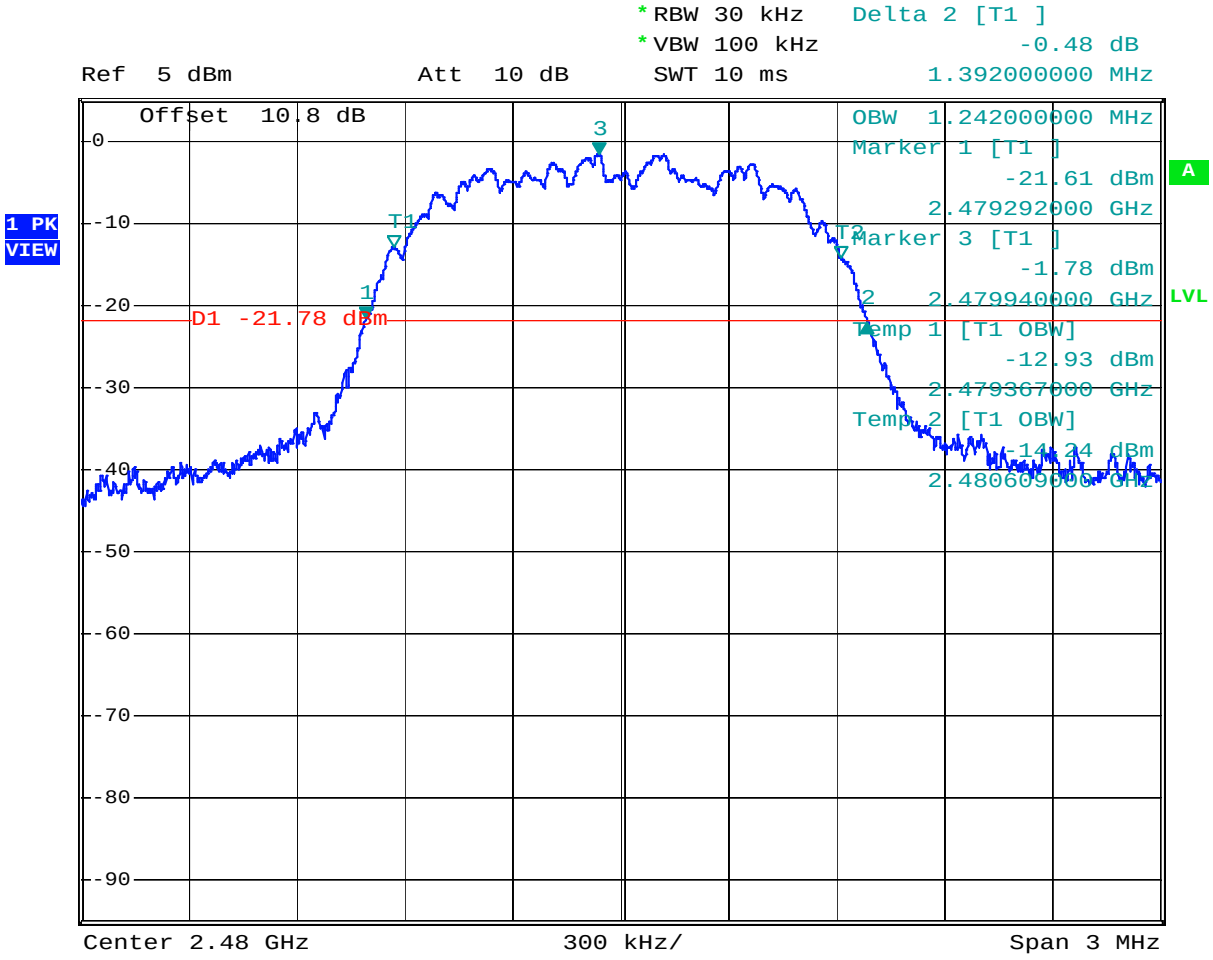
Plot 1. 7 – 20dB Bandwidth Low Channel 8DPSK



Plot 1. 8 – 20dB Bandwidth Middle Channel 8DPSK



Plot 1. 9 – 20dB Bandwidth High Channel 8DPSK



4.2 Conducted Output Power at Antenna Terminals
FCC Rule 15.247(b)(1)

4.2.1 Requirement

For systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, the maximum peak output power is 1 watt (30 dBm), for all other systems 0.125 W (21 dBm).

4.2.2 Procedure

The Procedure described in the FCC Publication DA 00-705 Released March 30, 2000 "Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems" was used to determine the RF Output Power.

- Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
- RBW > the 20 dB bandwidth of the emission being measured
- VBW = 3 x RBW
- Sweep = auto
- Detector function = peak
- Trace = max hold

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power (see the NOTE above regarding external attenuation and cable loss). The limit is specified in one of the subparagraphs of this Section. Submit this plot.

The antenna port of the EUT was connected to the input of a spectrum analyzer. Power was read directly from the spectrum analyzer and cable loss correction was added to the reading to obtain the power at the antenna terminals.

Tested By:	Anderson Soungpanya
Test Date:	March 02, 2016

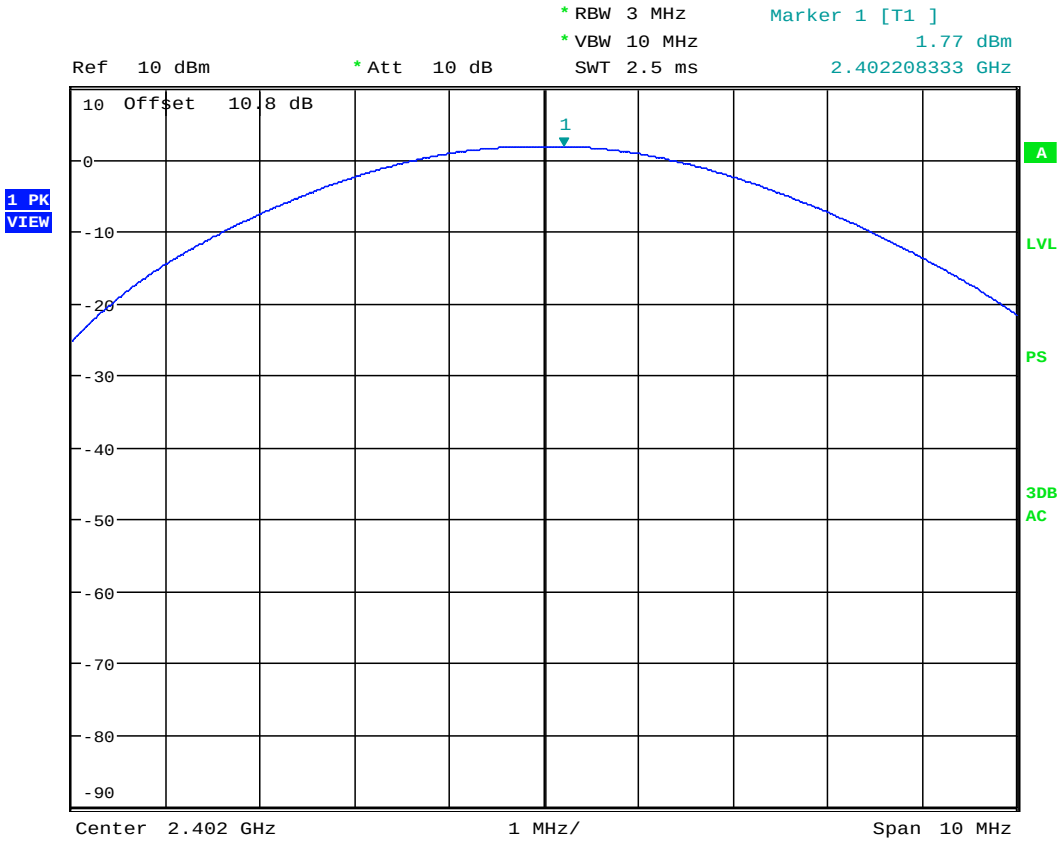
4.3.3 Test Result

Refer to the following plots for the test result:

Modulation Type	Channel	Frequency MHz	Conducted Peak Power dBm	Conducted Peak Power mW	Plot #
GFSK	0	2402	1.77	1.50	2.1
	39	2440	3.79	2.39	2.2
	78	2480	3.14	2.06	2.3
π/4-DQPSK	0	2402	1.06	1.28	2.4
	39	2440	3.27	2.12	2.5
	78	2480	2.60	1.82	2.6
8DPSK	0	2402	1.63	1.46	2.7
	39	2440	3.75	2.37	2.7
	78	2480	3.08	2.03	2.9

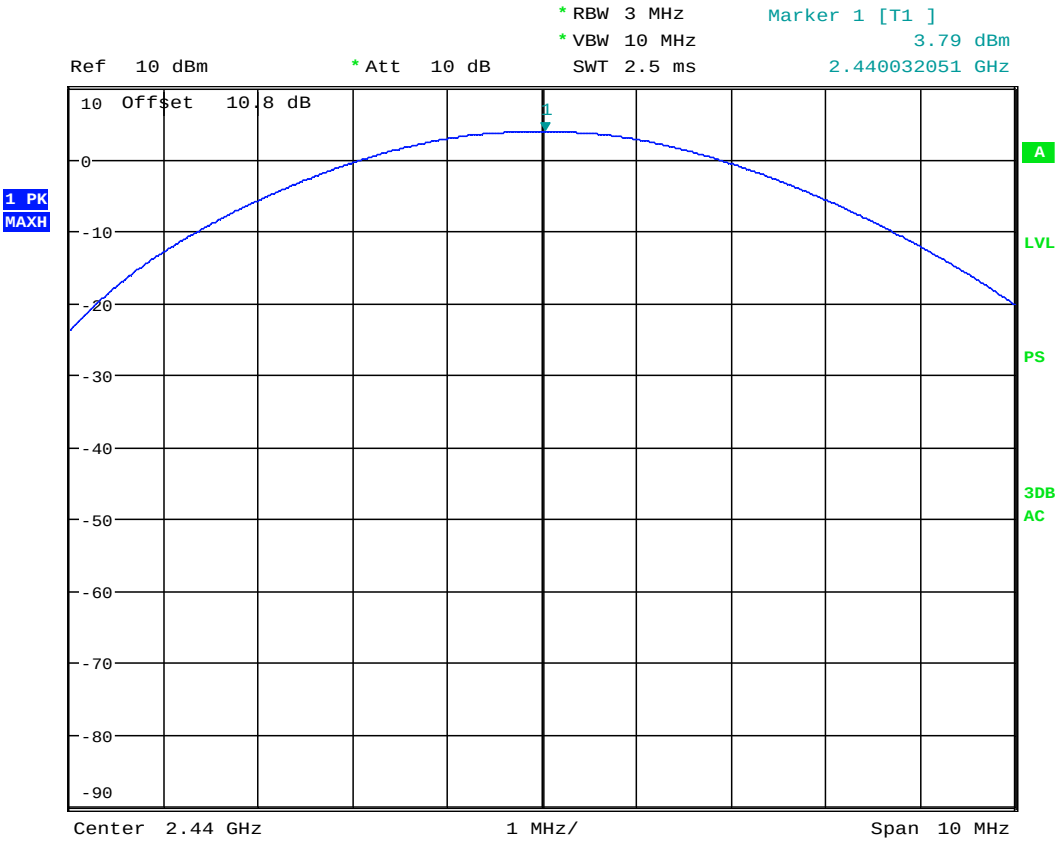
Results	Complies

Plot 2. 2 – Output Power Low Channel GFSK



Date: 2.MAR.2016 23:51:08

Plot 2. 2 – Output Power Middle Channel GFSK



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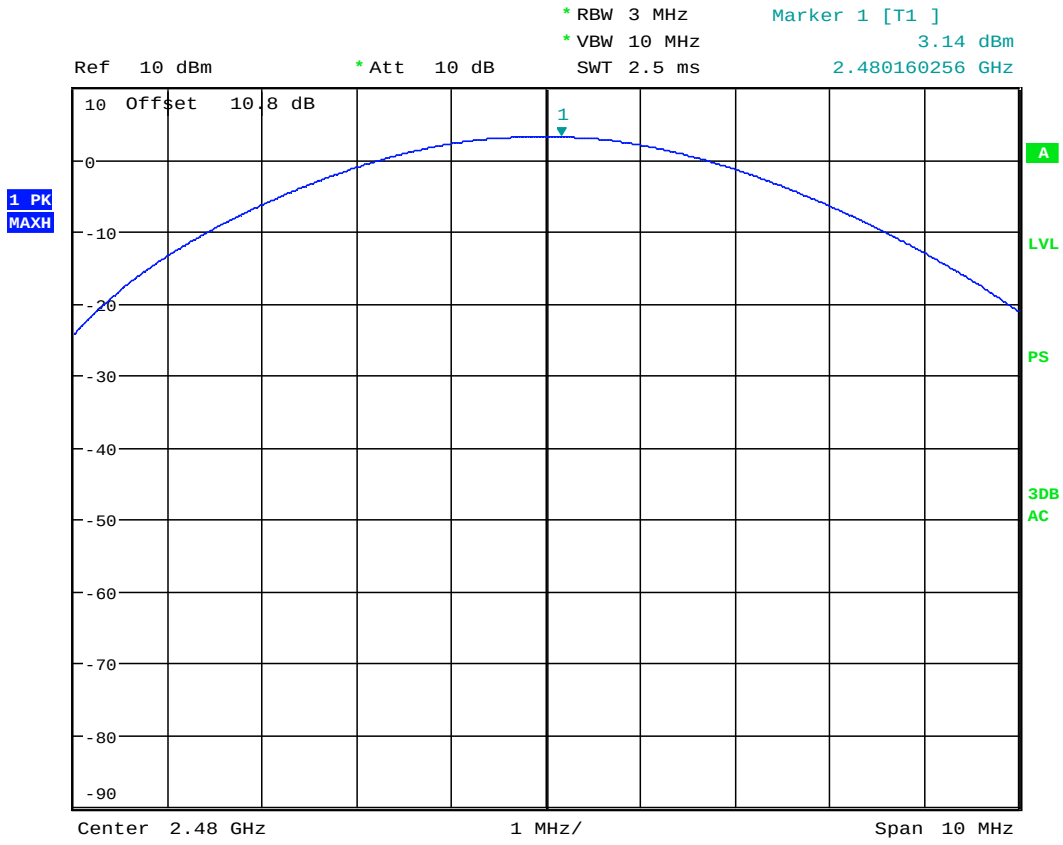
Plot 2. 3 – Output Power High Channel GFSK



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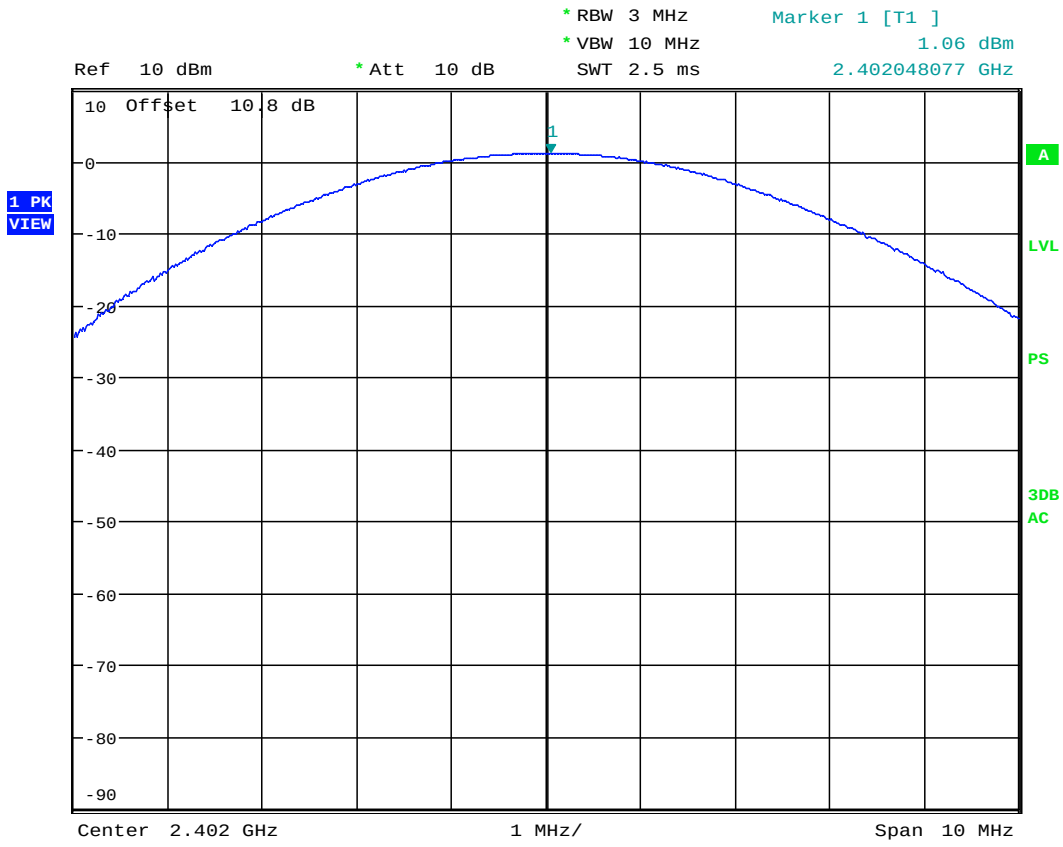
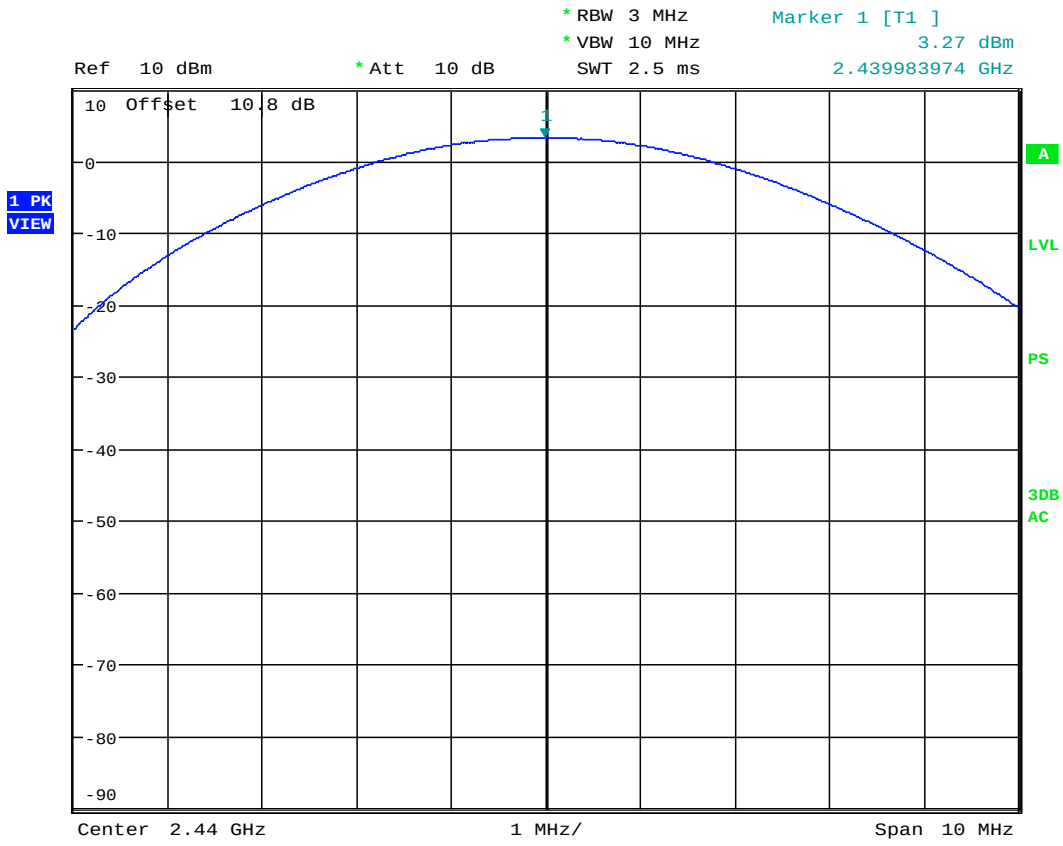
Plot 2. 4 – Output Power Low Channel π/4-DQPSK

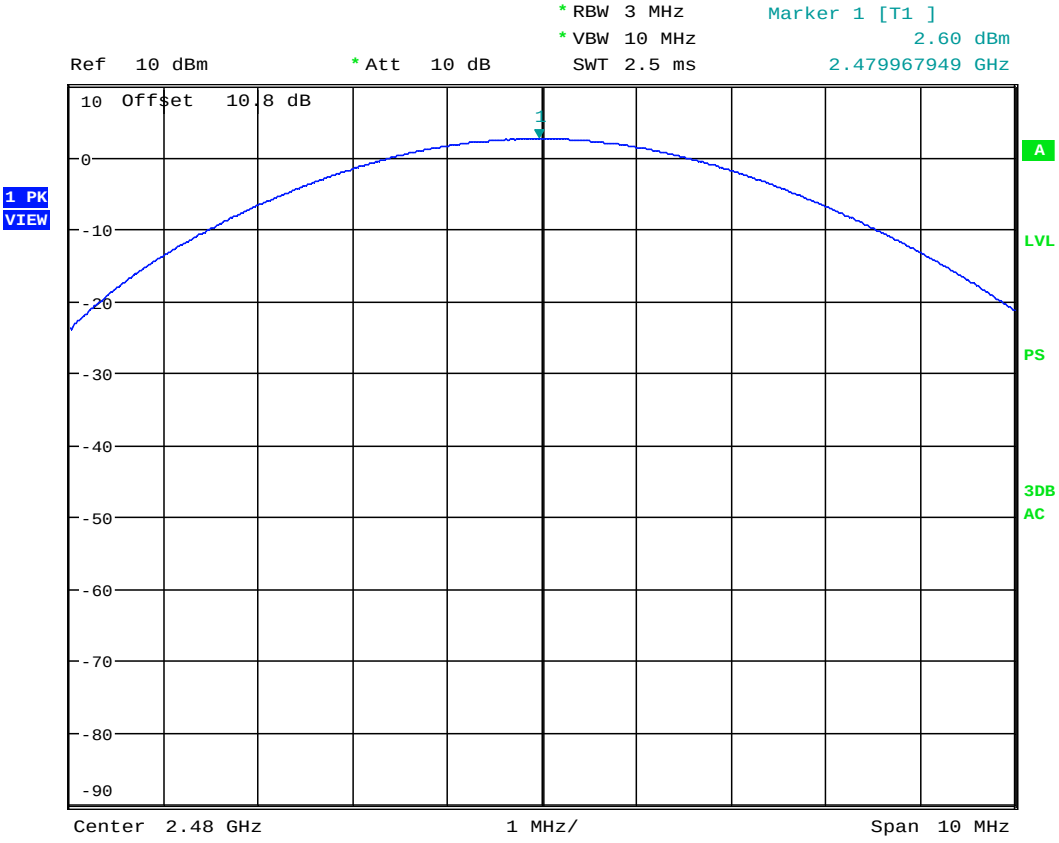


Date: 2.MAR.2016 23:47:57

Plot 2. 5 – Output Power Middle Channel π/4-DQPSK



Plot 2. 6 – Output Power High Channel π/4-DQPSK



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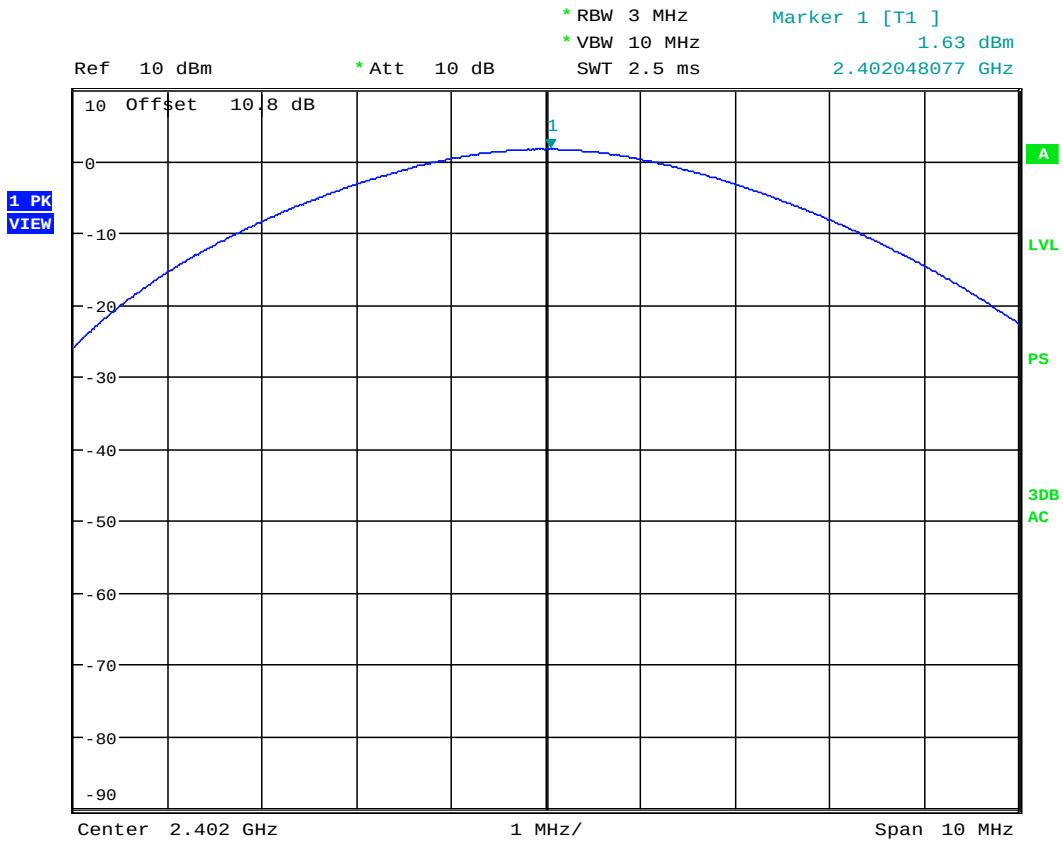
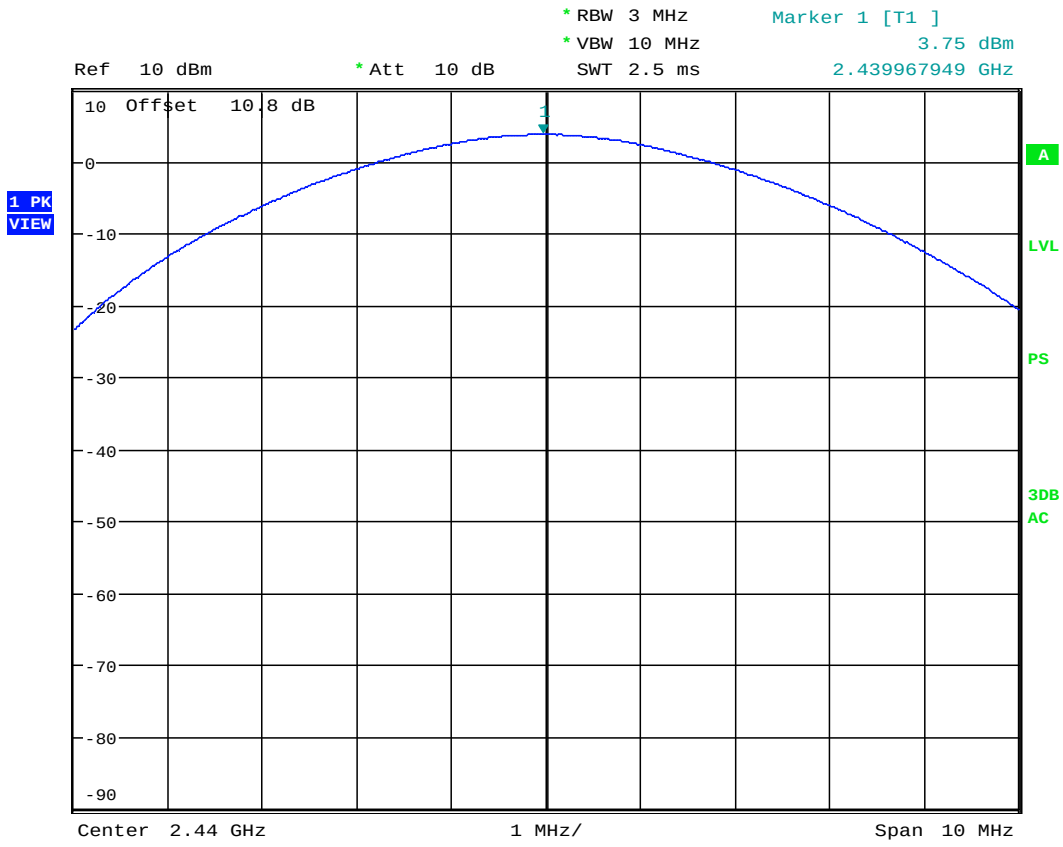
Plot 2. 7 – Output Power Low Channel 8DPSK

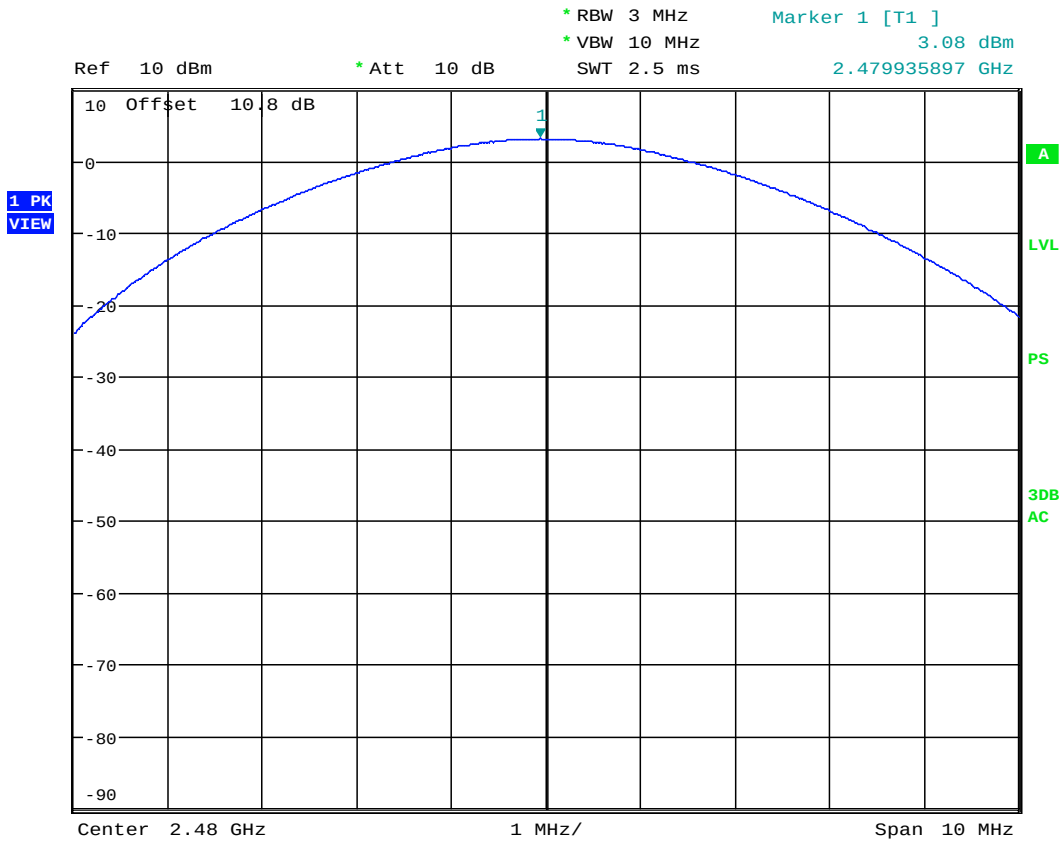


Plot 2. 8 – Output Power Middle Channel 8DPSK



Date: 2.MAR.2016 23:49:26

Plot 2. 9 – Output Power High Channel 8DPSK



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4.3 Carrier Frequency Separation
FCC 15.247 (a)(1)

4.3.1 Requirement

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

4.3.2 Procedure

The Procedure described in the FCC Publication DA 00-705 Released March 30, 2000 "Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems" was used to determine the Carrier Frequency Separation.

- The EUT must have its hopping function enabled
- Span = wide enough to capture the peaks of two adjacent channels
- Resolution (or IF) Bandwidth (RBW) = 1% of the span
- Video (or Average) Bandwidth (VBW) = 3 x RBW
- Sweep = auto
- Detector function = peak
- Trace = max hold

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section. Submit this plot.

Tested By:	Anderson Soungpanya
Test Date:	February 01, 2016

4.3.3 Test Result

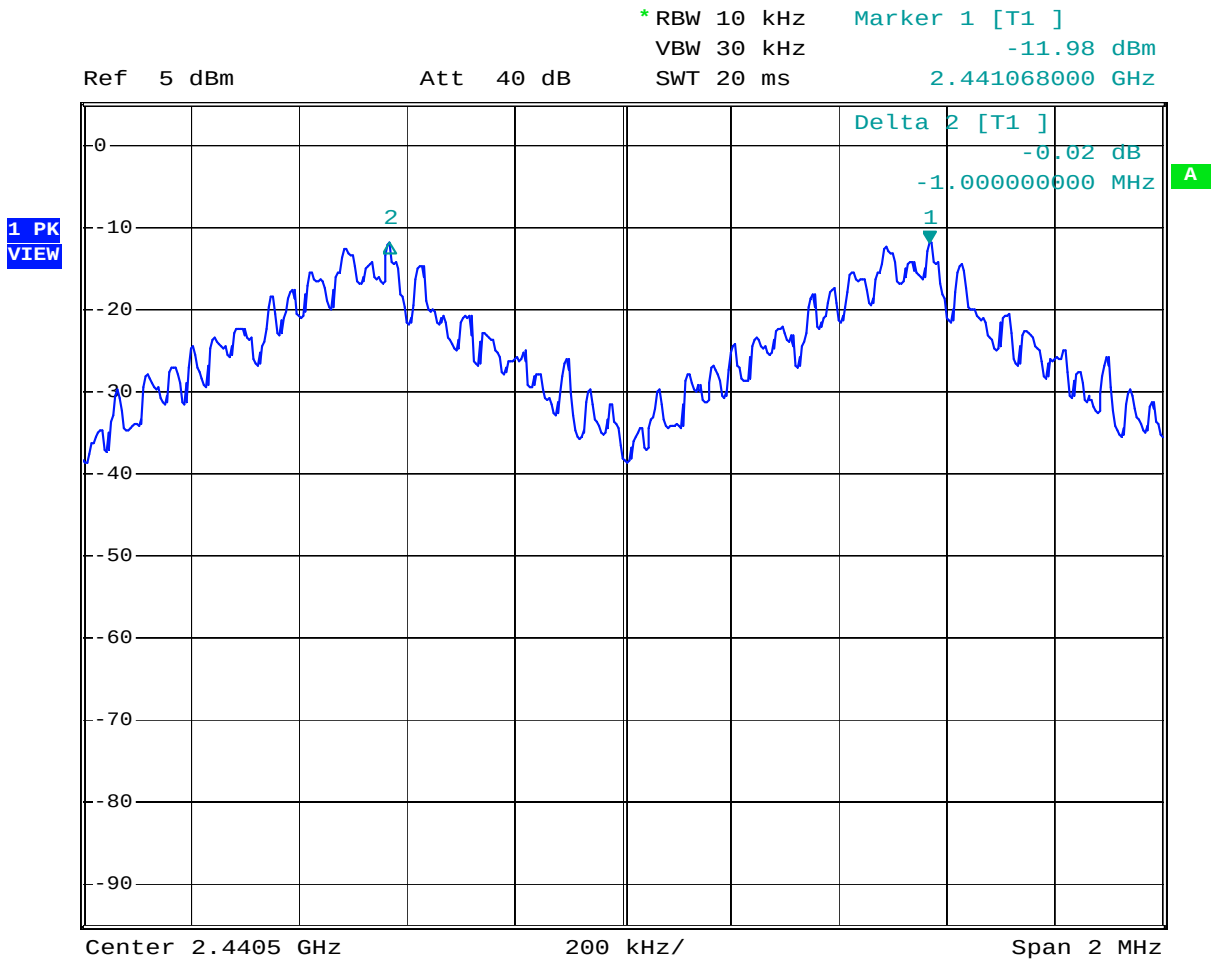
The worst case 20dB Bandwidth is 1.412 MHz, therefor this bandwidth was used to calculate the minimum limit for Carrier Frequency Separation below.

(2/3) * 1.412 MHz = 0.941 MHz (minimum requirement)

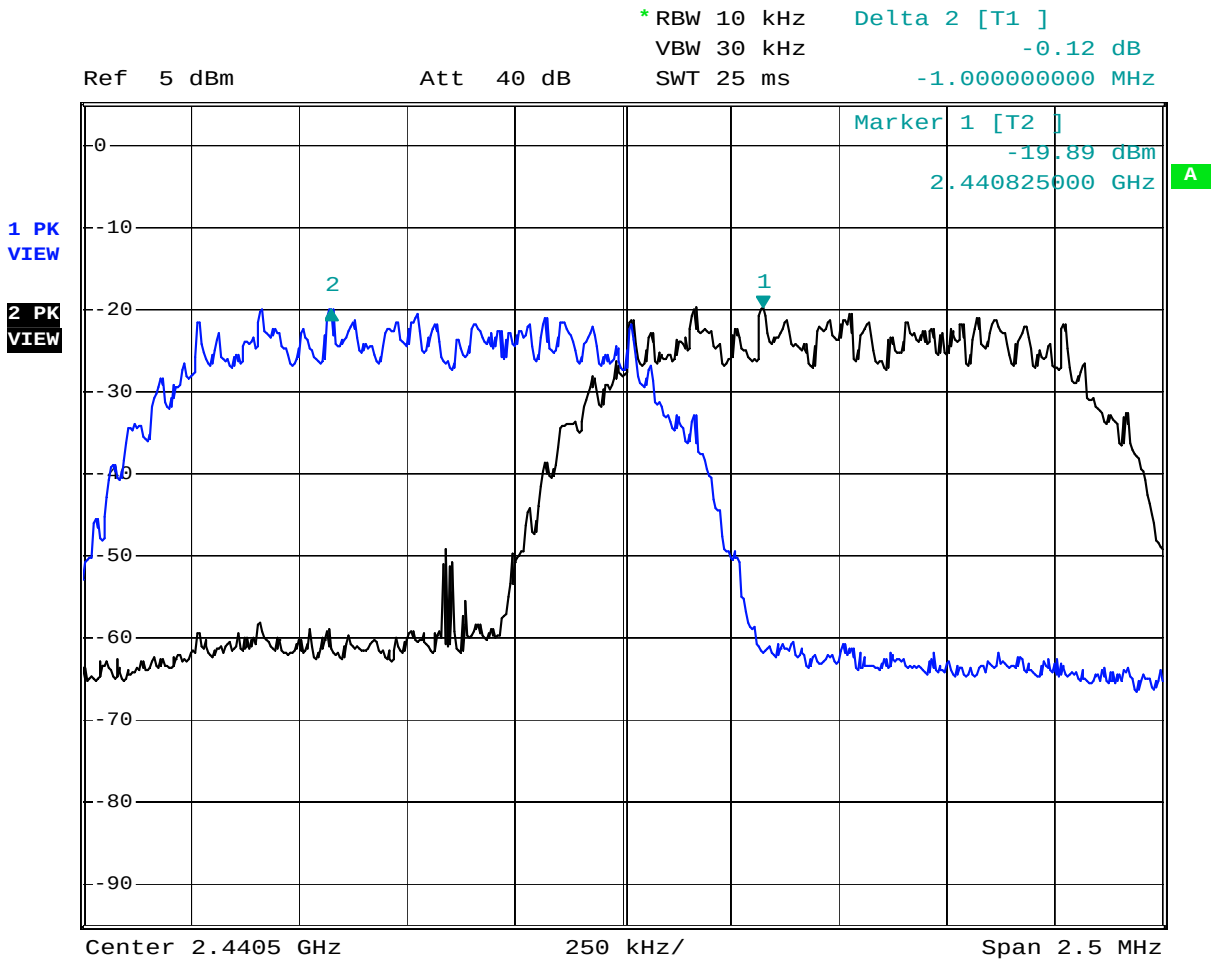
The Carrier Frequency Separation is **1.00 MHz**, therefore meets the minimum requirement. Please refer to spectrum analyzer plot 3.1 below for the test result.

Results	**Complies**

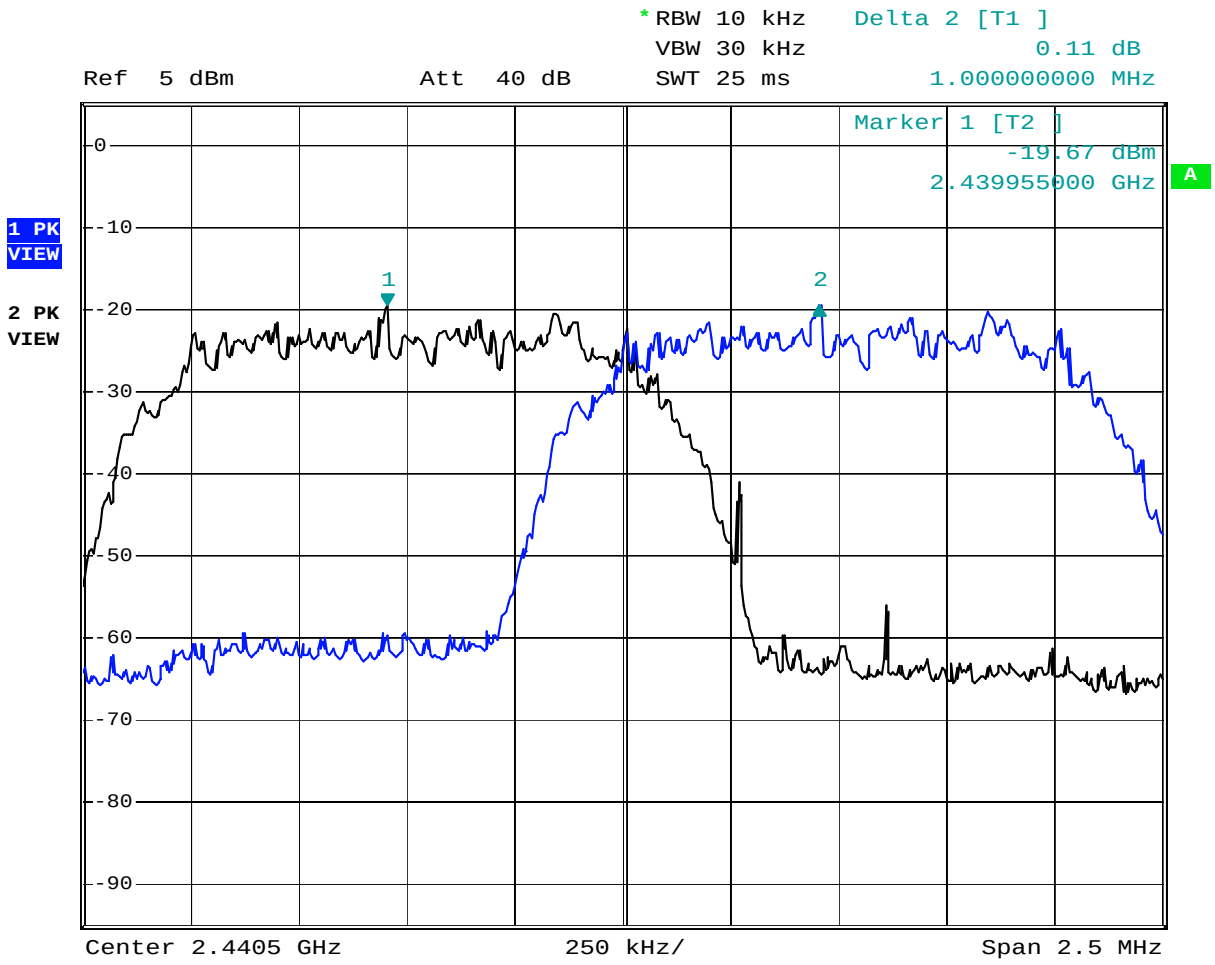
Plot 3.3– Channel Separation GFSK



Plot 3.2– Channel Separation π/4-DQPSK



Plot 3.2– Channel Separation DPQSK



Date: 1.FEB.2016 11:32:16

4.4 Number of Channels
FCC 15.247 (a)(1)(iii)

4.4.1 Requirement

Systems operating in the 2400-2483.5 MHz band shall use at least 15 hopping channels.

4.4.2 Procedure

The Procedure described in the FCC Publication DA 00-705 Released March 30, 2000 "Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems" was used to determine the Number of Channels.

- The EUT must have its hopping function enabled.
- Span = the frequency band of operation
- RBW = 1% of the span
- VBW = 3 x RBW
- Sweep = auto
- Detector function = peak
- Trace = max hold

Allow the trace to stabilize. It may prove necessary to break the span up to sections, in order to clearly show all of the hopping frequencies.

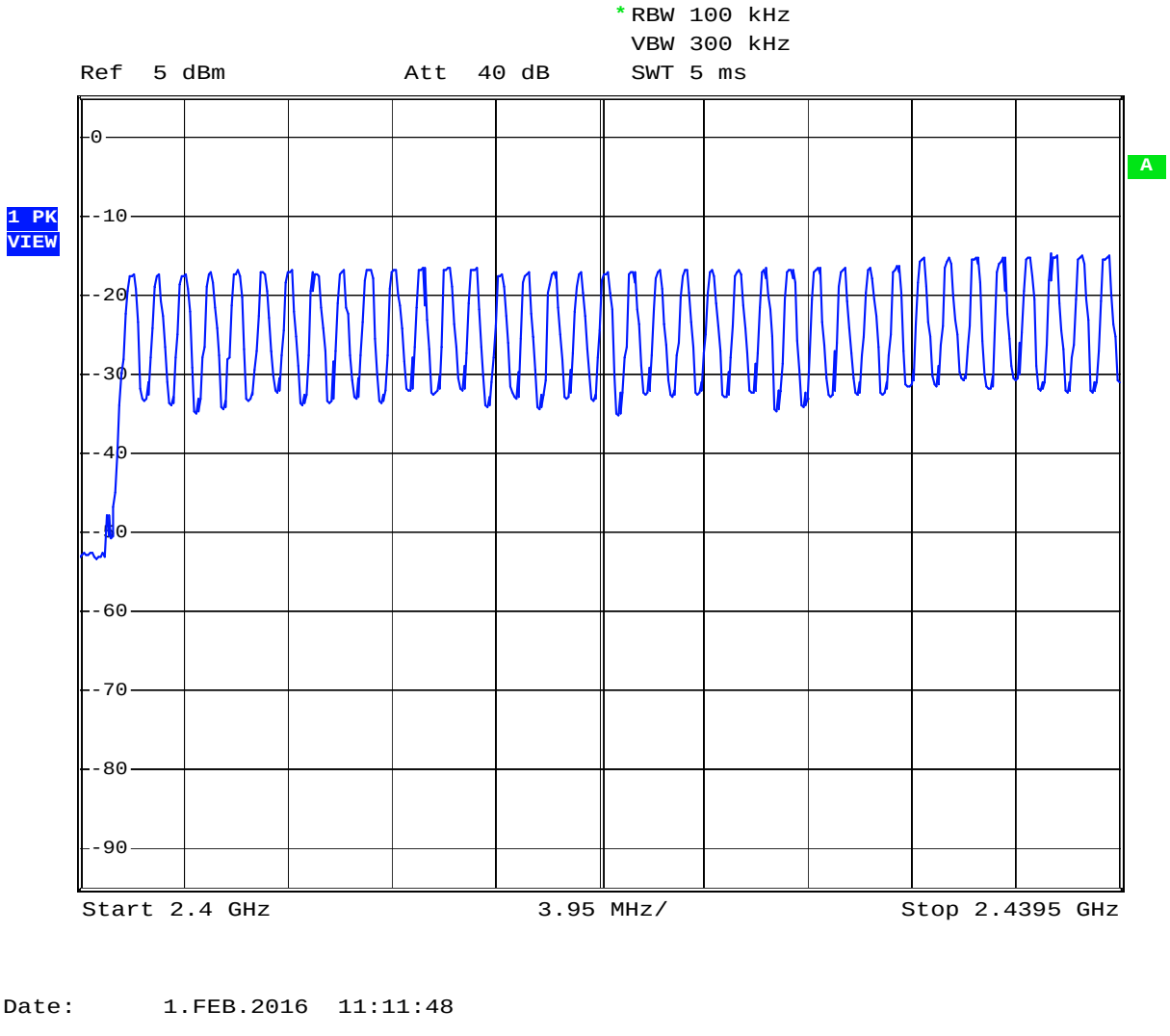
With the analyzer set to MAX HOLD, readings were taken once channels were filled in. The traces were broken down into 2 spans from 2400 to 2483.5MHz. The channel peaks were recorded and compared to the minimum number of channels required in the regulation.

Tested By:	Anderson Soungpanya
Test Date:	February 01, 2016

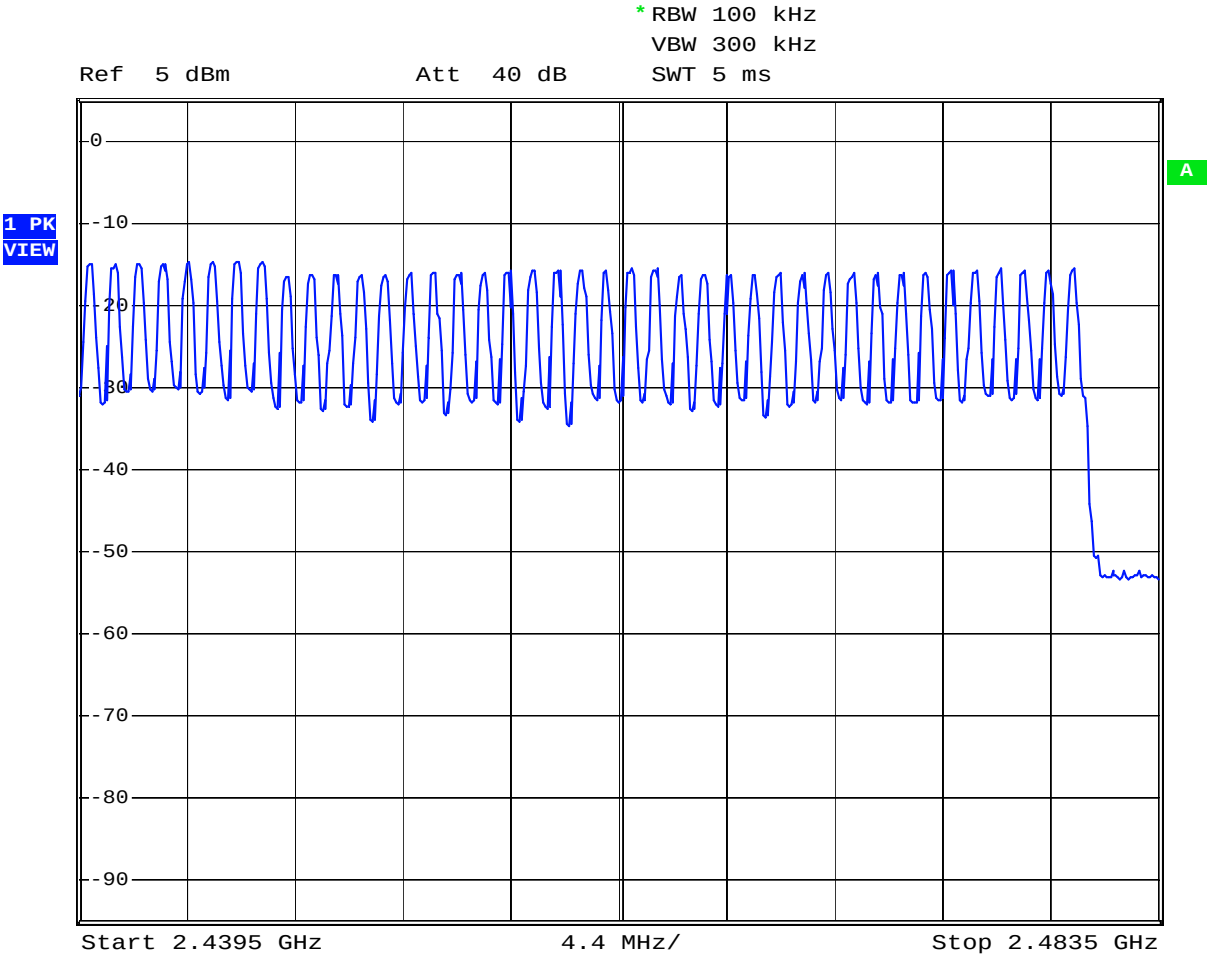
4.4.3 Test Result

Results	79 Channels -Complies

Plot 4.1 - Number of hopping channels (2400 to 2442.5 MHz)



Plot 4.2 - Number of hopping channels (GFSK - 2442.5 to 2483.5 MHz)



4.5 Average Channel Occupancy Time
FCC 15.247(a)(1)

4.5.1 Requirement

For systems operating in the 2400-2483.5 MHz band, the average time of occupancy on any channel shall not be greater than 0.4 second within a period of 0.4 second multiplied by the number of hopping channels employed.

4.5.2 Procedure

The Procedure described in the FCC Publication DA 00-705 Released March 30, 2000 “Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems” was used to determine the Average Channel Occupancy Time.

- The EUT must have its hopping function enabled.
- Span = zero span, centered on a hopping channel
- RBW = 1 MHz
- VBW = 3 x RBW
- Sweep = as necessary to capture the entire dwell time per hopping channel
- Detector function = peak
- Trace = max hold

If possible, use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. An oscilloscope may be used instead of a spectrum analyzer.

The spectrum analyzer center frequency was set to one of the known hopping channels, the SPAN was set to ZERO SPANS, and the TRIGGER was set to VIDEO. The time duration of the transmission so captured was measured with the MARKER DELTA function.

Since the radio is employed 78 hopping channels, the Occupancy Time was calculated for the period of 0.4 * 79 = 31.6 sec.

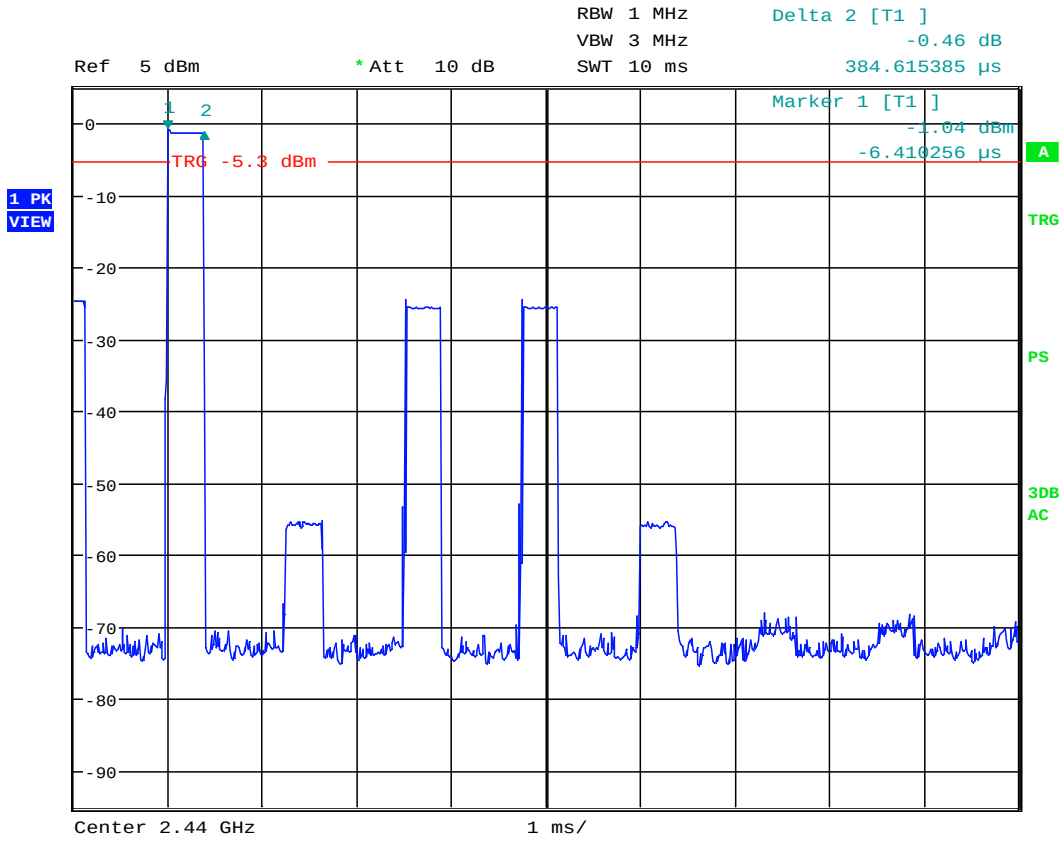
Tested By:	Anderson Soungpanya
Test Date:	March 02, 2016

4.5.3 Test Results

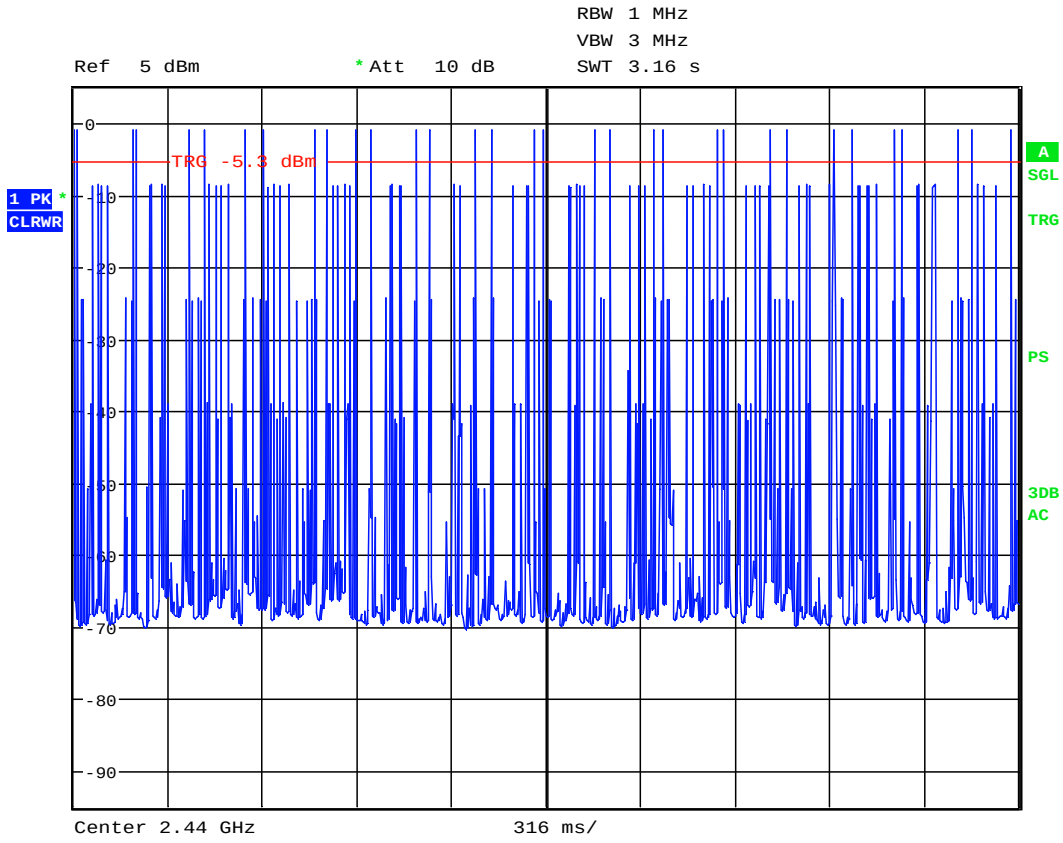
Results	Complies

GFSK, DH1

No. of Burst in 3.16s (31.6s Period)	Burst On Time (ms)	Dwell Time (ms)	Dwell Time limit (ms)
32*10	0.385	123.2	400



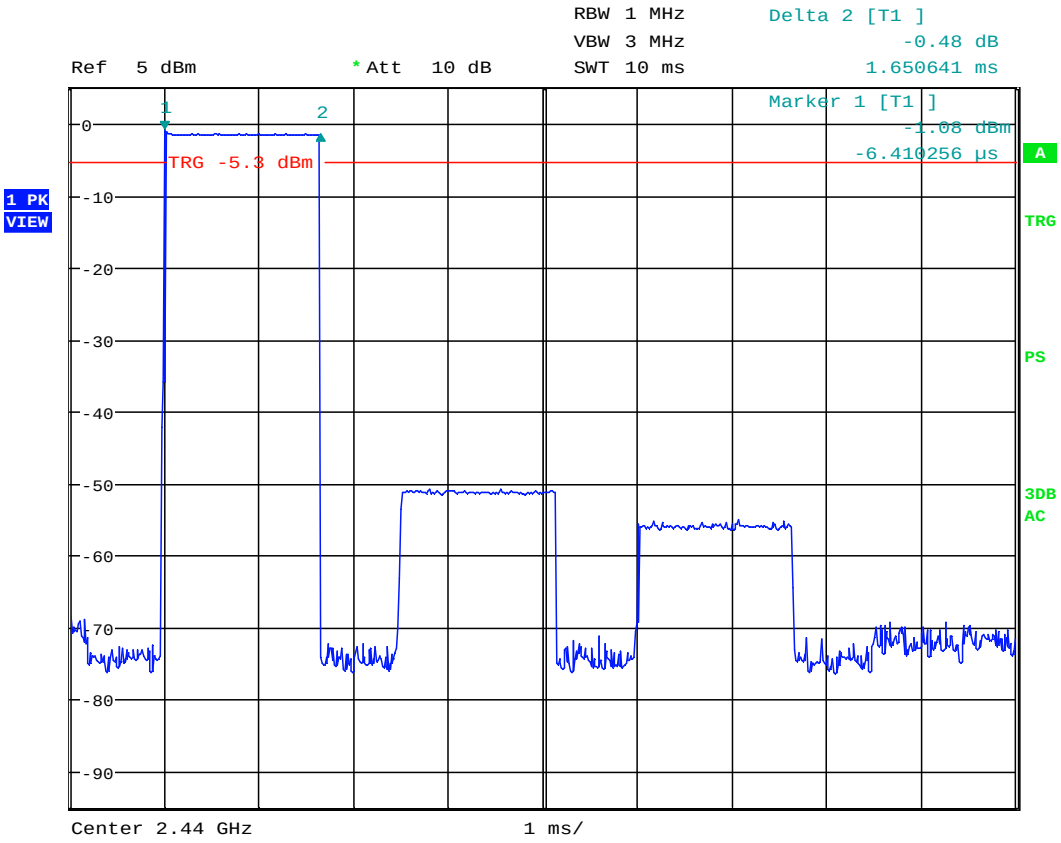
Date: 2.MAR.2016 23:08:48



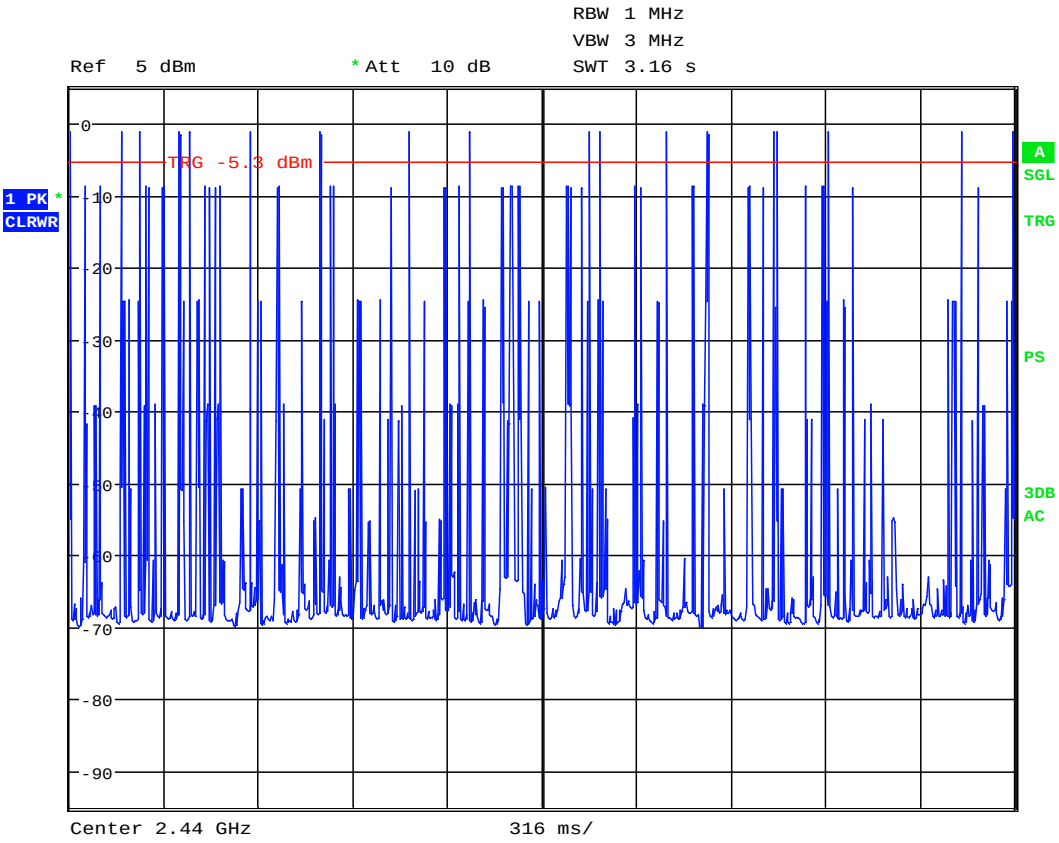
Date: 2.MAR.2016 23:09:43

GFSK, DH3

No. of Burst in 3.16s (31.6s Period)	Burst On Time (ms)	Dwell Time (ms)	Dwell Time limit (ms)
18*10	1.65	297.0	400



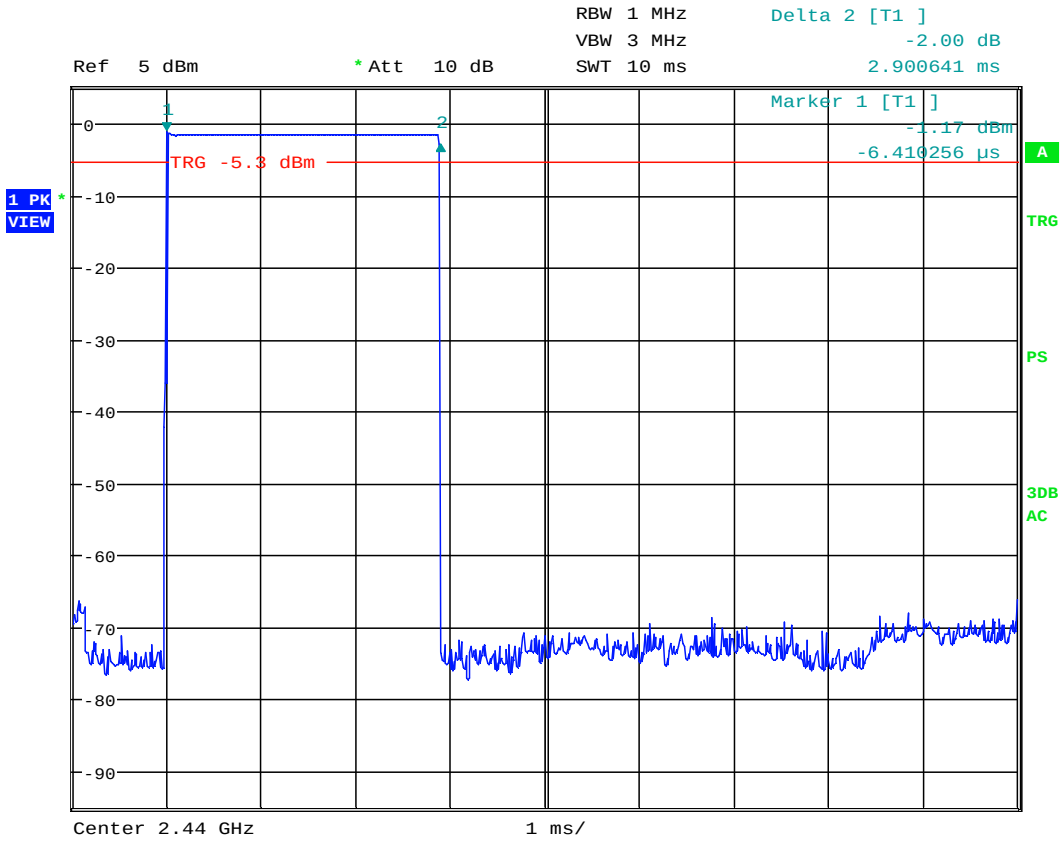
Date: 2.MAR.2016 23:11:03



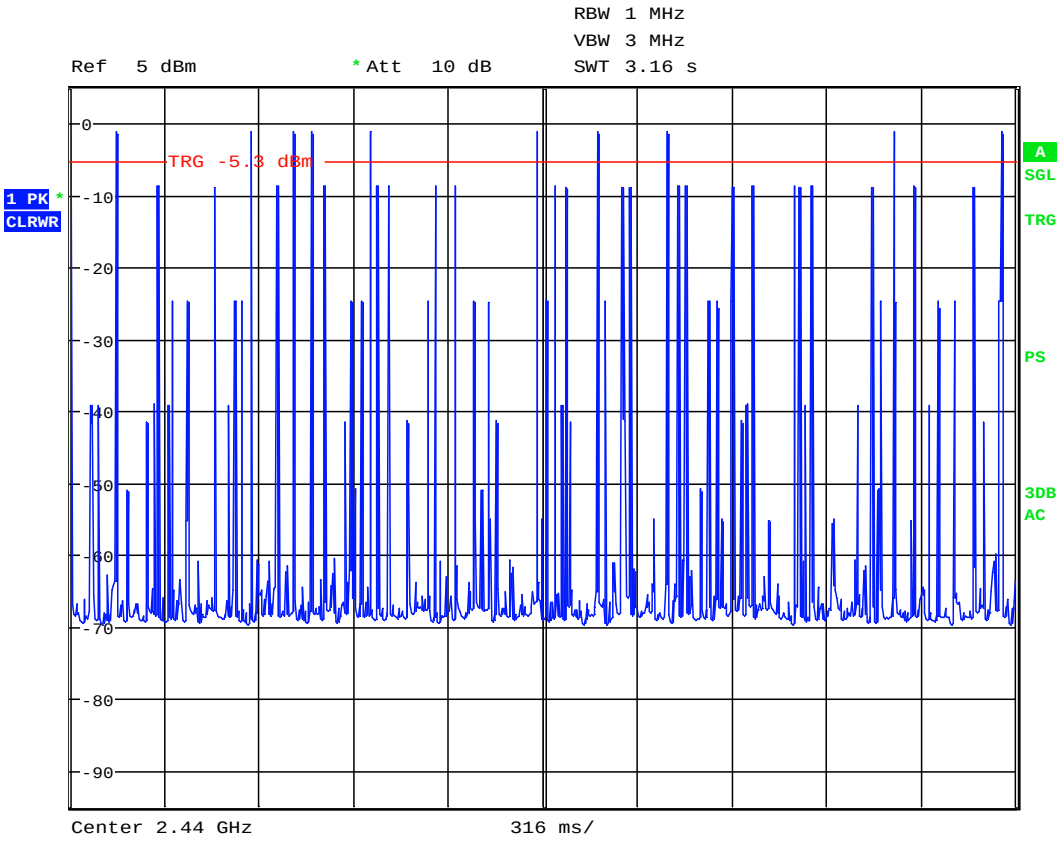
Date: 2.MAR.2016 23:12:10

GFSK, DH5

No. of Burst in 3.16s (31.6s Period)	Burst On Time (ms)	Dwell Time (ms)	Dwell Time limit (ms)
12*10	2.90	348.0	400



Date: 2.MAR.2016 23:15:26

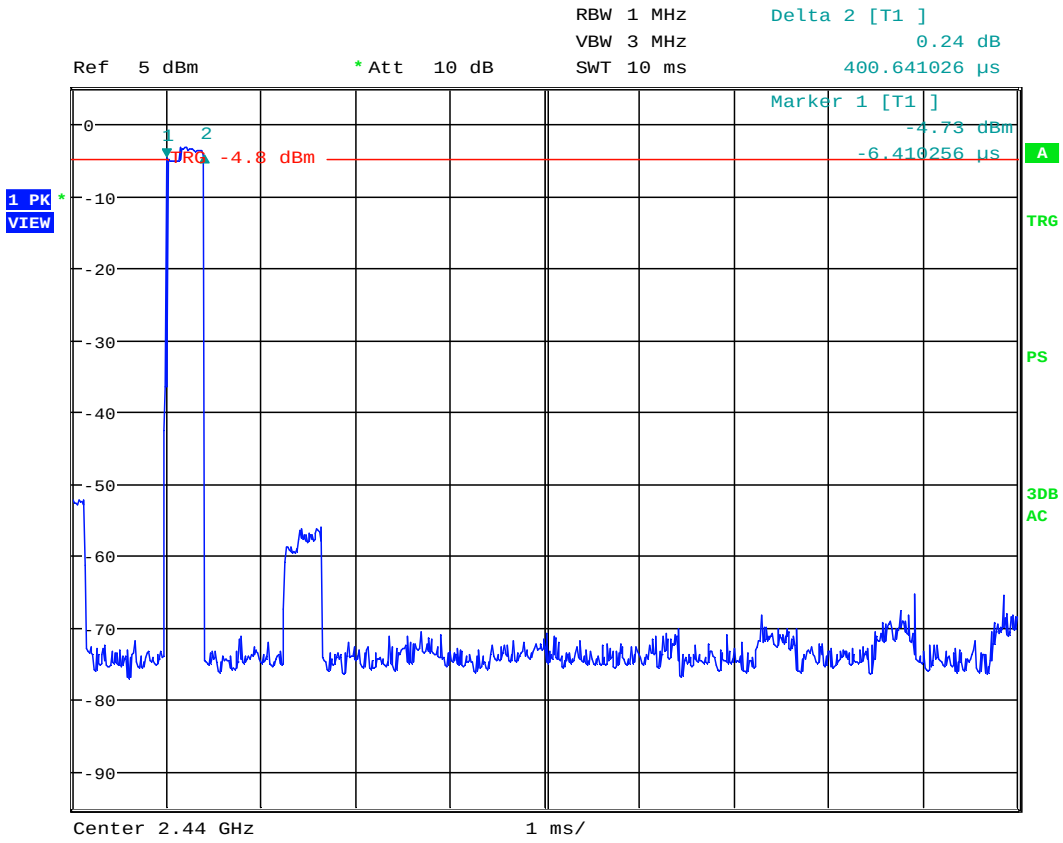


Date: 2.MAR.2016 23:16:19

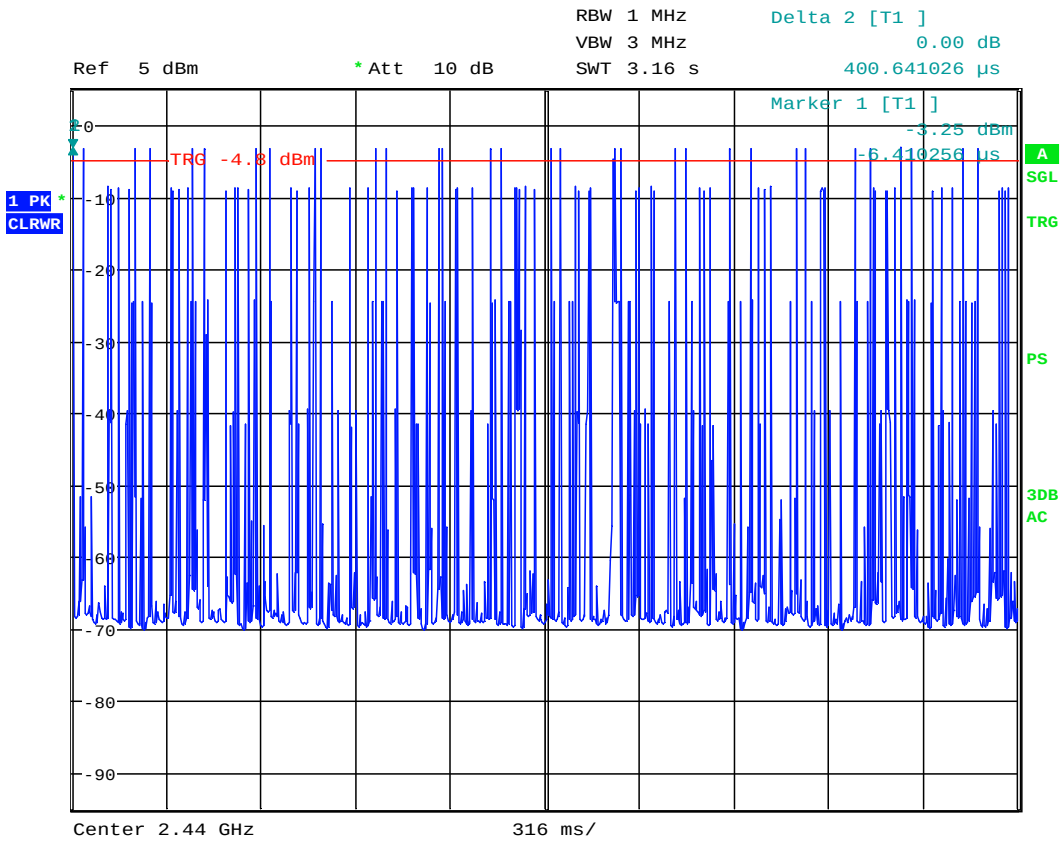
4.5.3 Test Results (Continued)

π/4-DQPSK, DH1

No. of Burst in 3.16s (31.6s Period)	Burst On Time (ms)	Dwell Time (ms)	Dwell Time limit (ms)
32*10	0.401	128.3	400



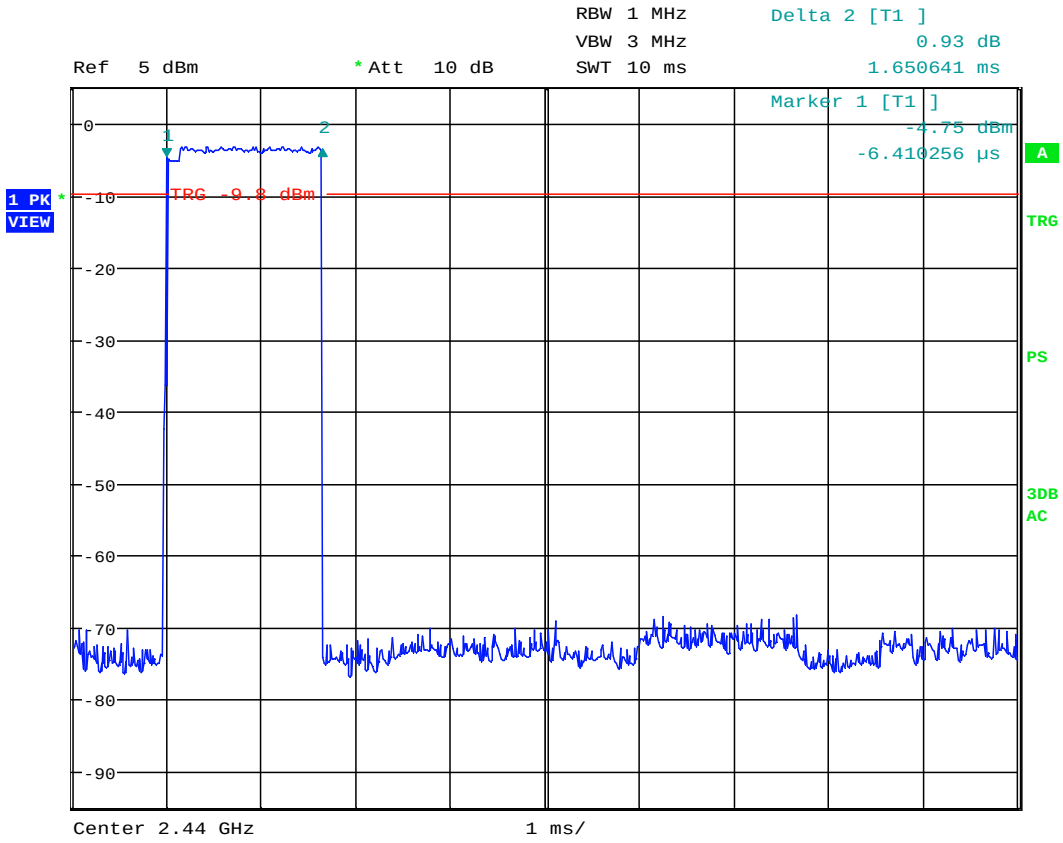
Date: 2.MAR.2016 22:59:54



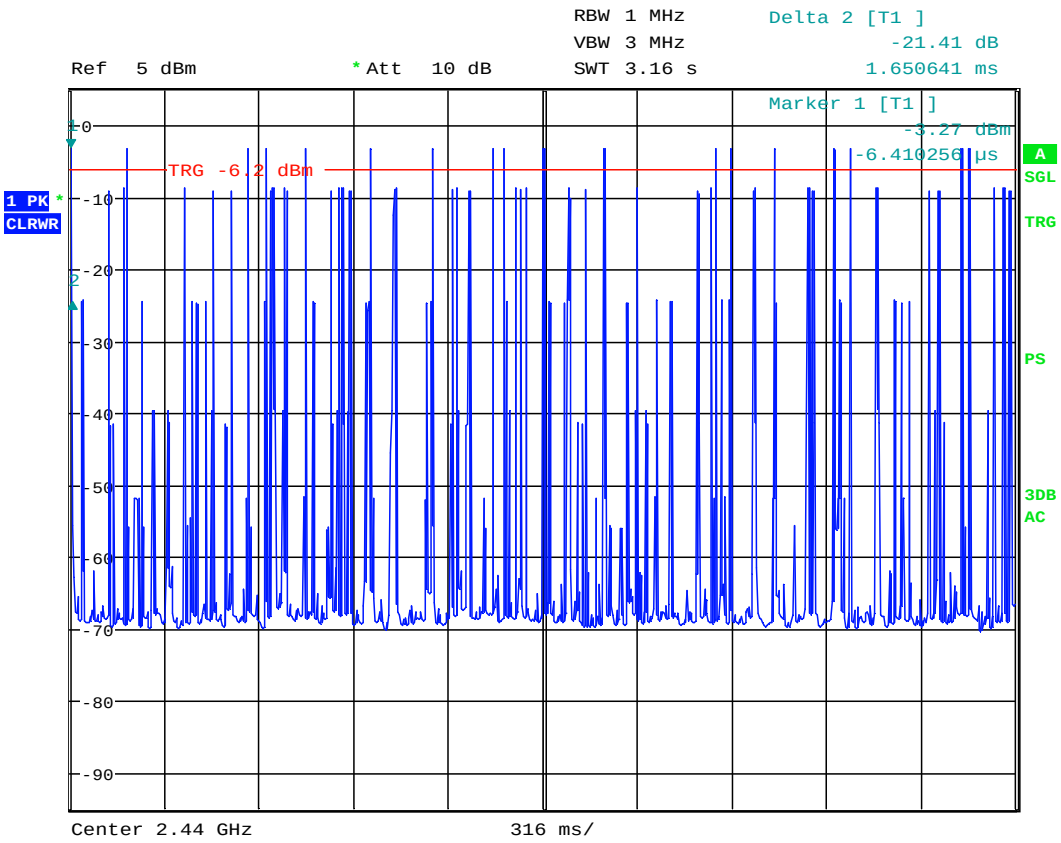
Date: 2.MAR.2016 23:01:05

π/4-DQPSK, DH3

No. of Burst in 3.16s (31.6s Period)	Burst On Time (ms)	Dwell Time (ms)	Dwell Time limit (ms)
18*10	1.65	297.0	400



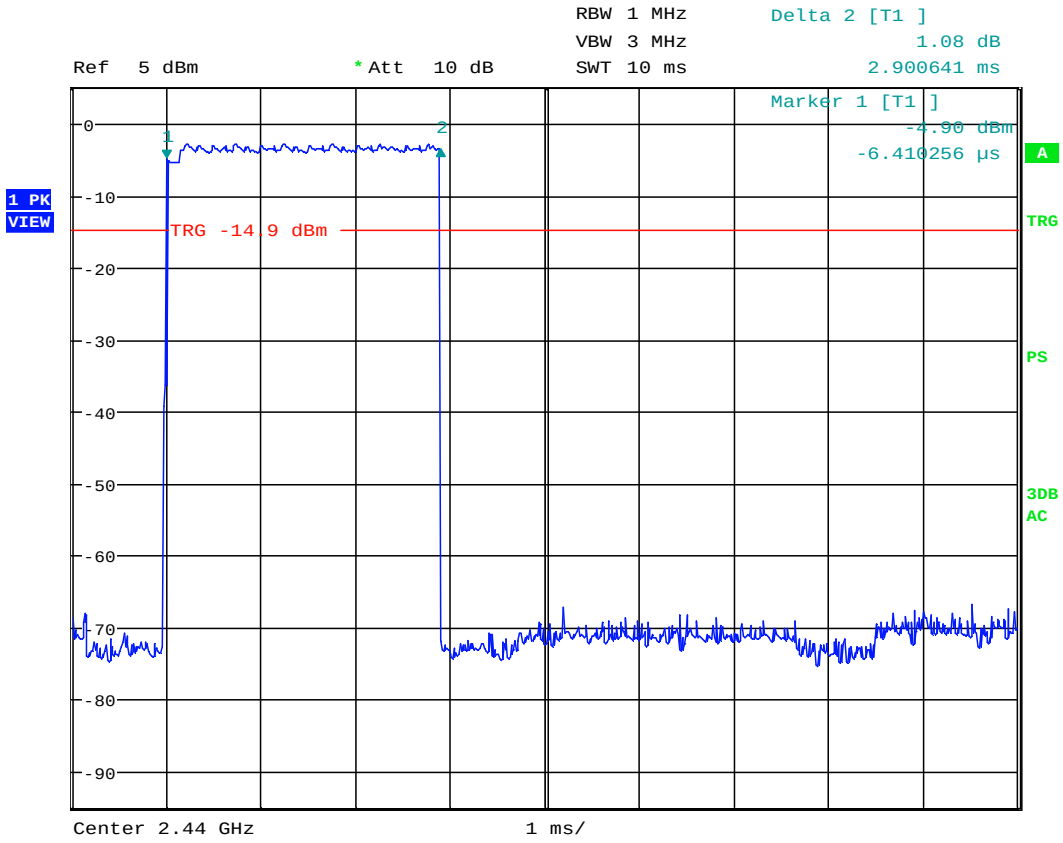
Date: 2.MAR.2016 23:02:42



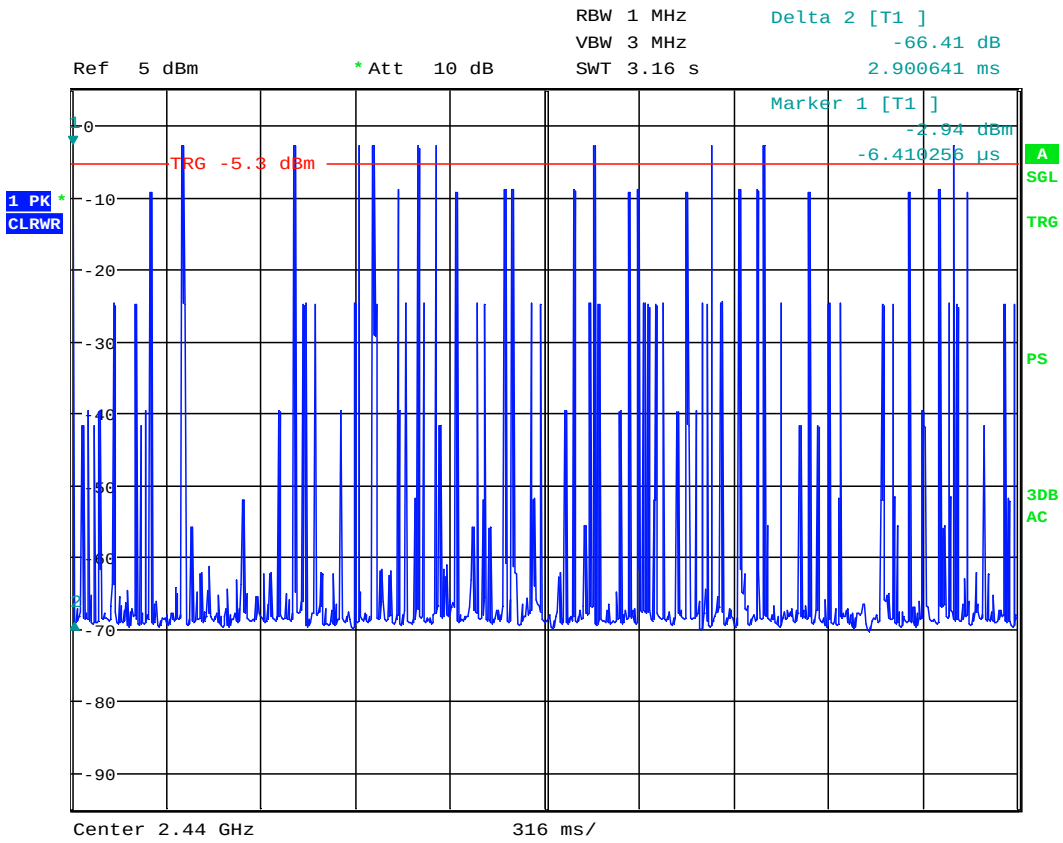
Date: 2.MAR.2016 23:03:31

π/4-DQPSK, DH5

No. of Burst in 3.16s (31.6s Period)	Burst On Time (ms)	Dwell Time (ms)	Dwell Time limit (ms)
11*10	2.90	319.0	400



Date: 2.MAR.2016 23:05:28

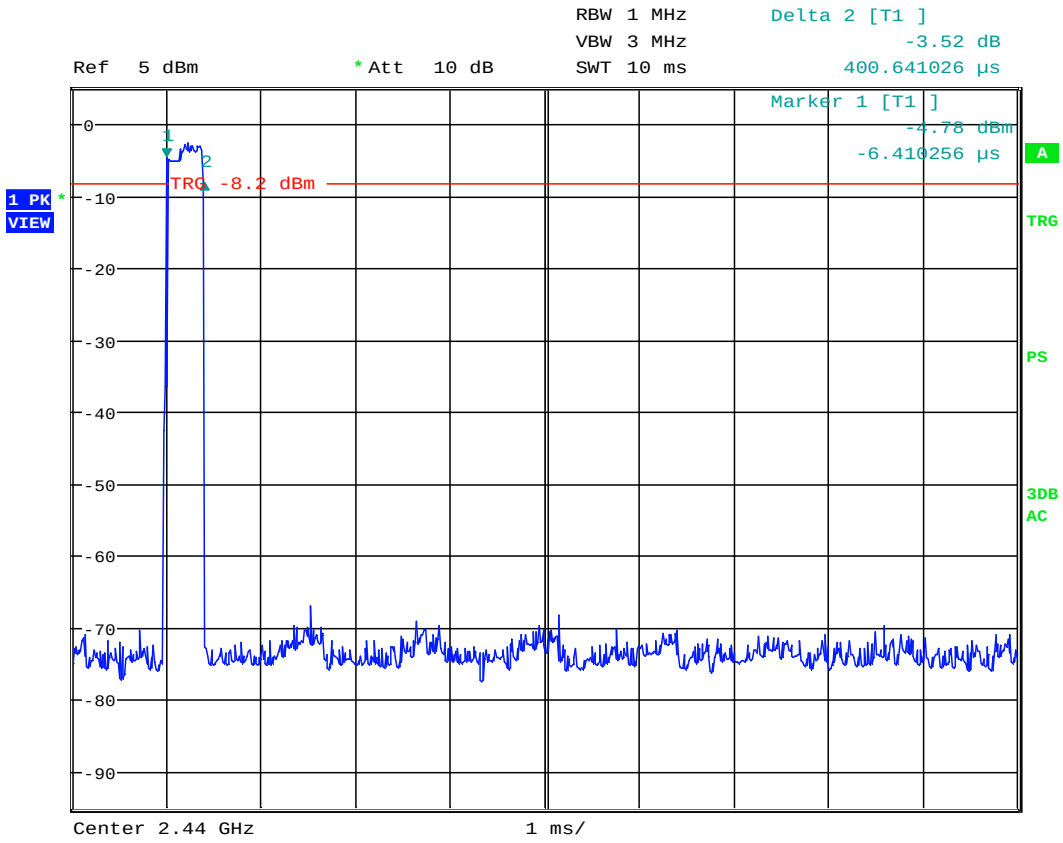


Date: 2.MAR.2016 23:06:13

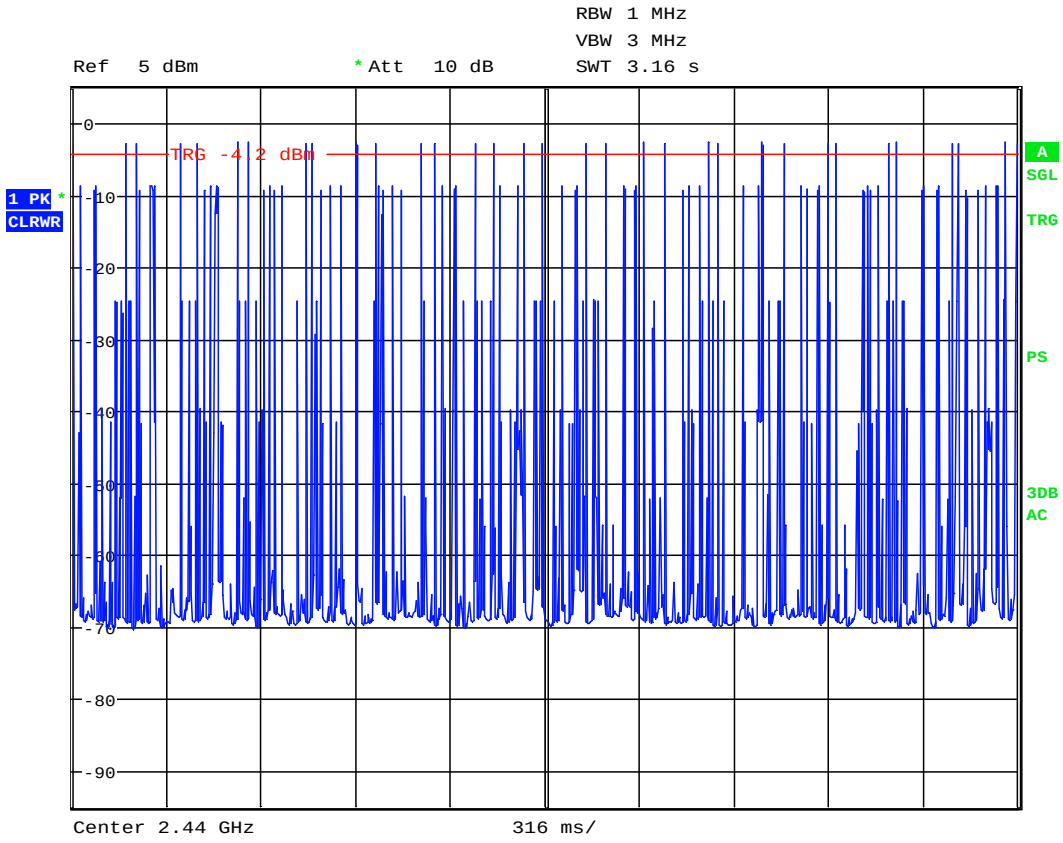
4.5.3 Test Results (Continued)

8DPSK, DH1

No. of Burst in 3.16s (31.6s Period)	Burst On Time (ms)	Dwell Time (ms)	Dwell Time limit (ms)
31*10	0.401	124.3	400



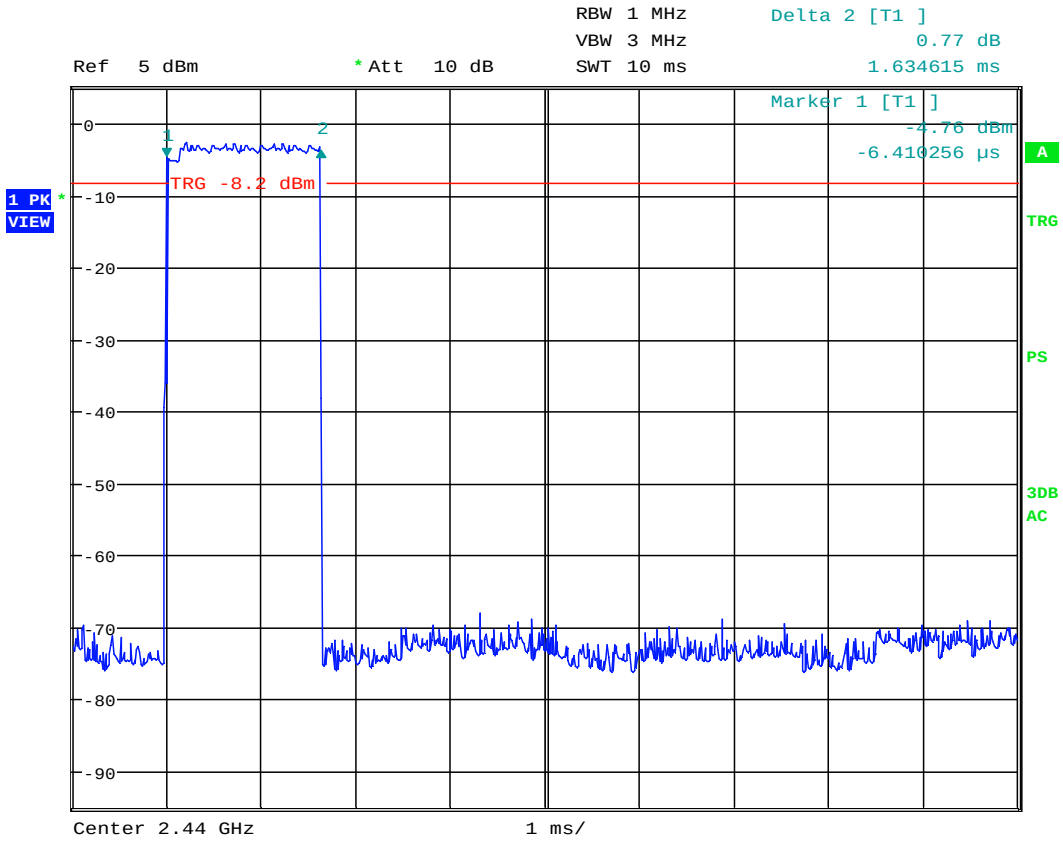
Date: 2.MAR.2016 22:43:16



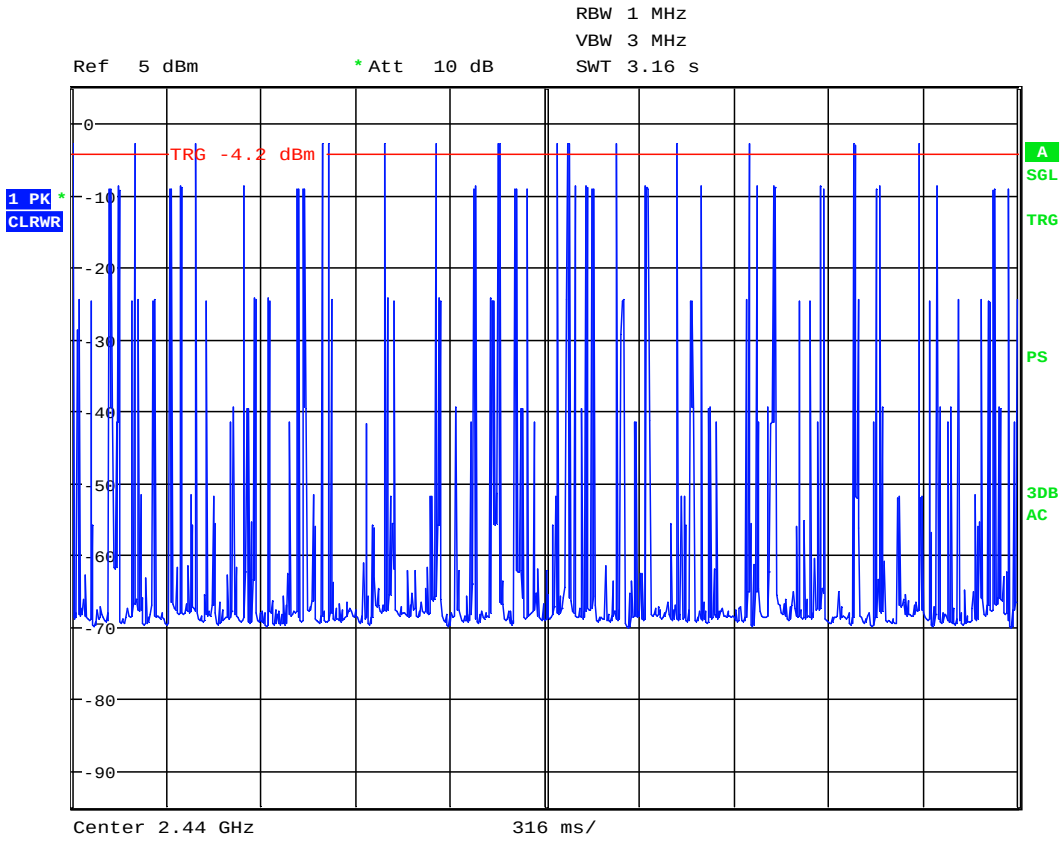
Date: 2.MAR.2016 22:50:11

8DPSK, DH3

No. of Burst in 3.16s (31.6s Period)	Burst On Time (ms)	Dwell Time (ms)	Dwell Time limit (ms)
15*10	1.63	244.5	400



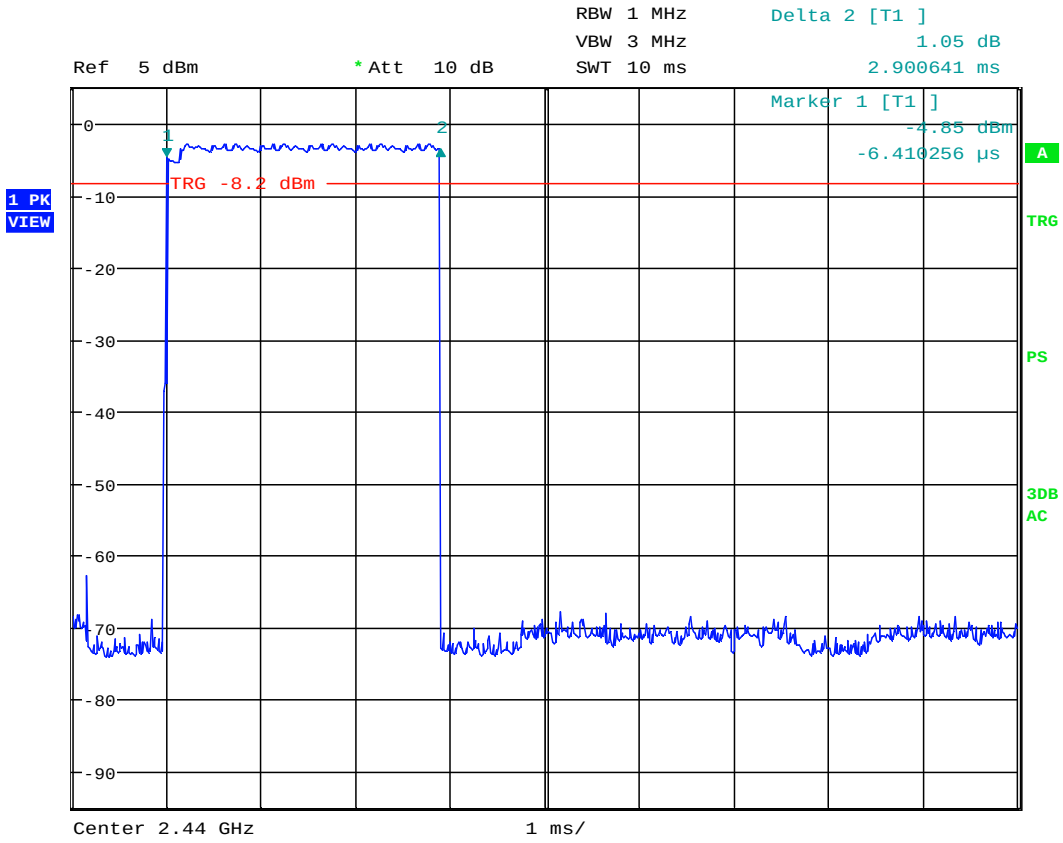
Date: 2.MAR.2016 22:44:10



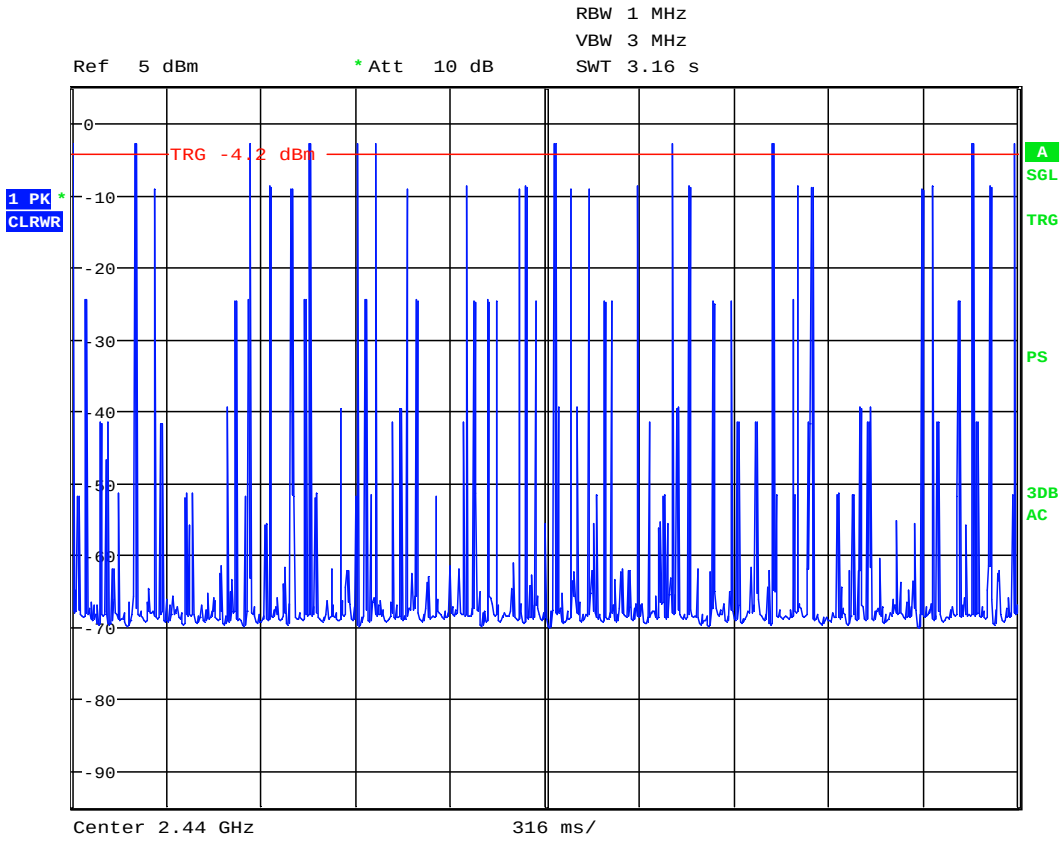
Date: 2.MAR.2016 22:45:38

8DPSK, DH3

No. of Burst in 3.16s (31.6s Period)	Burst On Time (ms)	Dwell Time (ms)	Dwell Time limit (ms)
11*10	2.90	319.0	400



Date: 2.MAR.2016 22:22:39



Date: 2.MAR.2016 22:52:18

4.6 Out-of-Band Conducted Emissions
FCC 15.247(d)

4.6.1 Requirement

In any 100 kHz bandwidths outside the EUT pass-band, the RF power shall be at least 20dB (peak) or 30 dB (average) below that of the maximum in-band 100 kHz emissions.

4.6.2 Procedure

The Procedure described in the FCC Publication DA 00-705 Released March 30, 2000 “Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems” was used to determine the Out-of-Band Conducted Emissions.

- Span = wide enough to capture the peak level of the in-band emission and all spurious
- emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the
- 10th harmonic. Typically, several plots are required to cover this entire span.
- RBW = 100 kHz
- VBW = 3 x RBW
- Sweep = auto
- Detector function = peak
- Trace = max hold

Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this Section.

A spectrum analyzer was connected to the antenna port of the transmitter. Analyzer Resolution Bandwidth was set to 100 kHz. For each channel investigated, the in-band and out-of-band emission measurements were performed. The out-of-band emissions were measured from 30 MHz to 26 GHz.

Tested By:	Anderson Soungpanya
Test Date:	February 1-2, 2016

4.6.3 Test Result

Refer to the following plots and out-of-band conducted spurious emissions at the Band-Edge, Table 4.1 & 4.2 for the test results:

Table 4.1

Radio	Channel	Frequency MHz	Description	Plot #
GFSK	0	2402	Scan 30 MHz – 26 GHz	4.1
	39	2440	Scan 30 MHz – 26 GHz	4.2
	78	2480	Scan 30 MHz – 26 GHz	4.3
π/4-DQPSK	0	2402	Scan 30 MHz – 26 GHz	4.4
	39	2440	Scan 30 MHz – 26 GHz	4.5
	78	2480	Scan 30 MHz – 26 GHz	4.6
8DPSK	0	2402	Scan 30 MHz – 26 GHz	4.7
	39	2440	Scan 30 MHz – 26 GHz	4.8
	78	2480	Scan 30 MHz – 26 GHz	4.9

Out-of-Band Conducted Spurious Emissions at the Band-Edge:

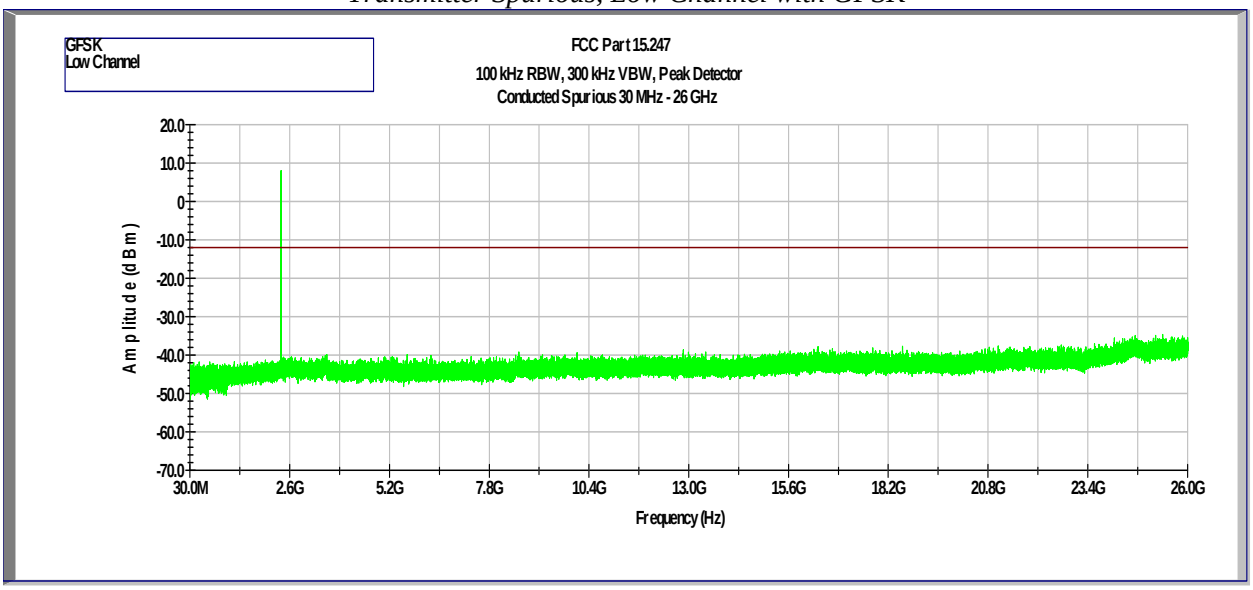
Table 4.2

Radio	Channel	Frequency MHz	Out-band emissions margin to In-band emissions	Plot #
GFSK	0	2402	Complies	4.10
	Hopping	Low Band Edge	Complies	4.11
	78	2480	Complies	4.12
	Hopping	High Band Edge	Complies	4.13
π/4-DQPSK	0	2402	Complies	4.14
	Hopping	Low Band Edge	Complies	4.15
	78	2480	Complies	4.16
	Hopping	High Band Edge	Complies	4.17
8DPSK	0	2402	Complies	4.18
	Hopping	Low Band Edge	Complies	4.19
	78	2480	Complies	4.20
	Hopping	High Band Edge	Complies	4.21

Results	**Complies**

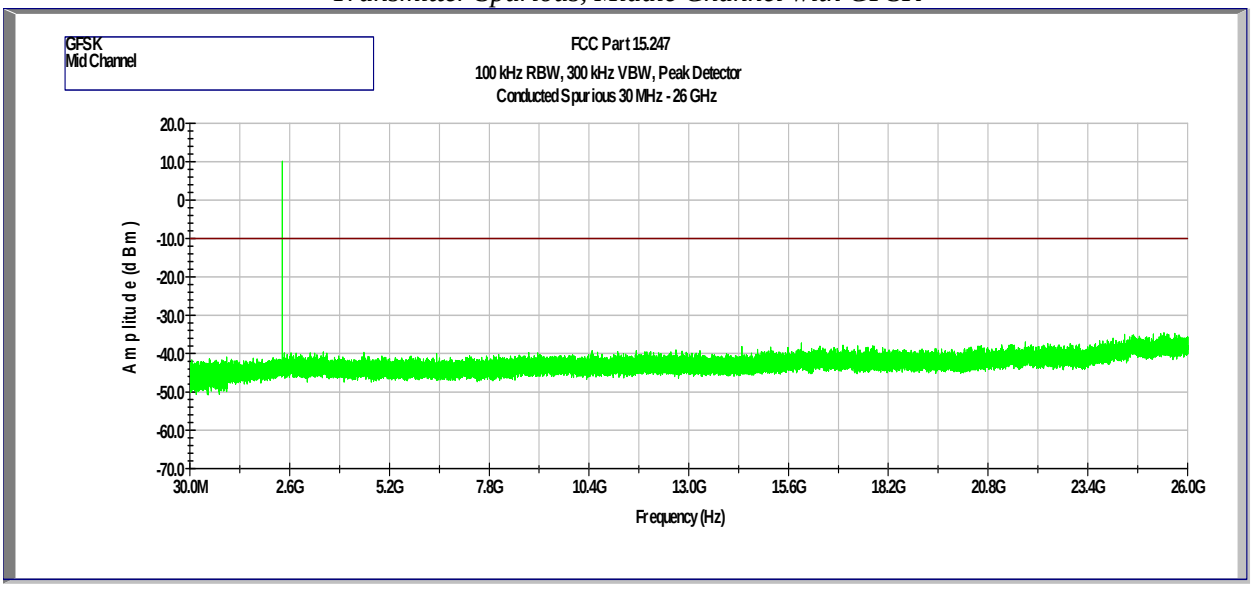
Plot 4.1

Transmitter Spurious, Low Channel with GFSK



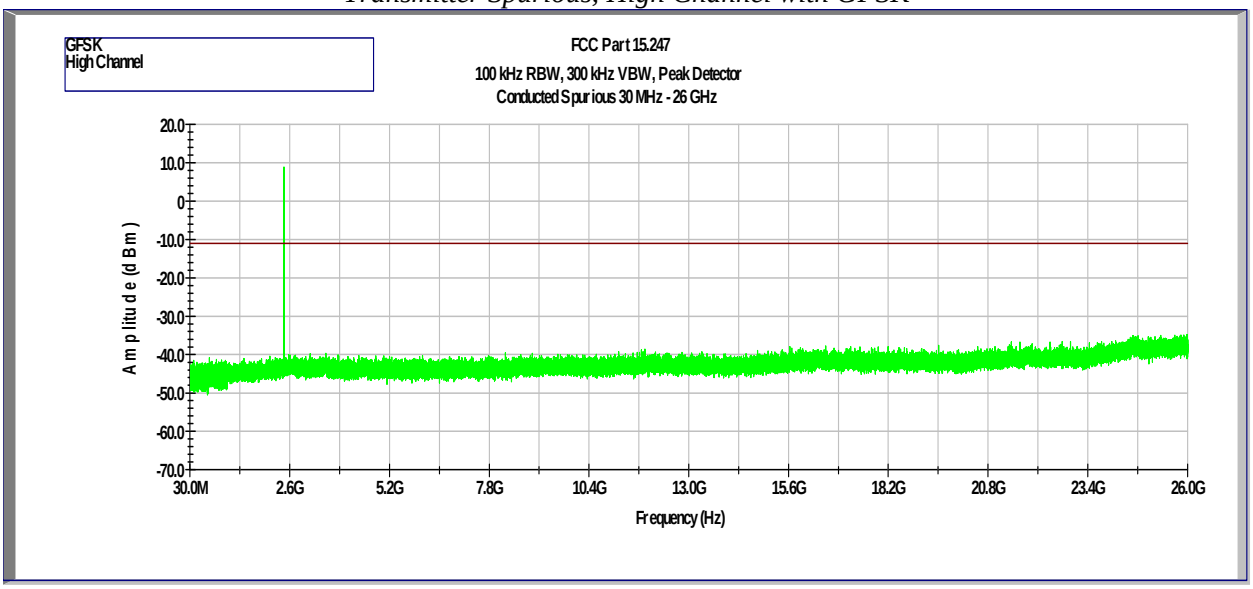
Plot 4.2

Transmitter Spurious, Middle Channel with GFSK



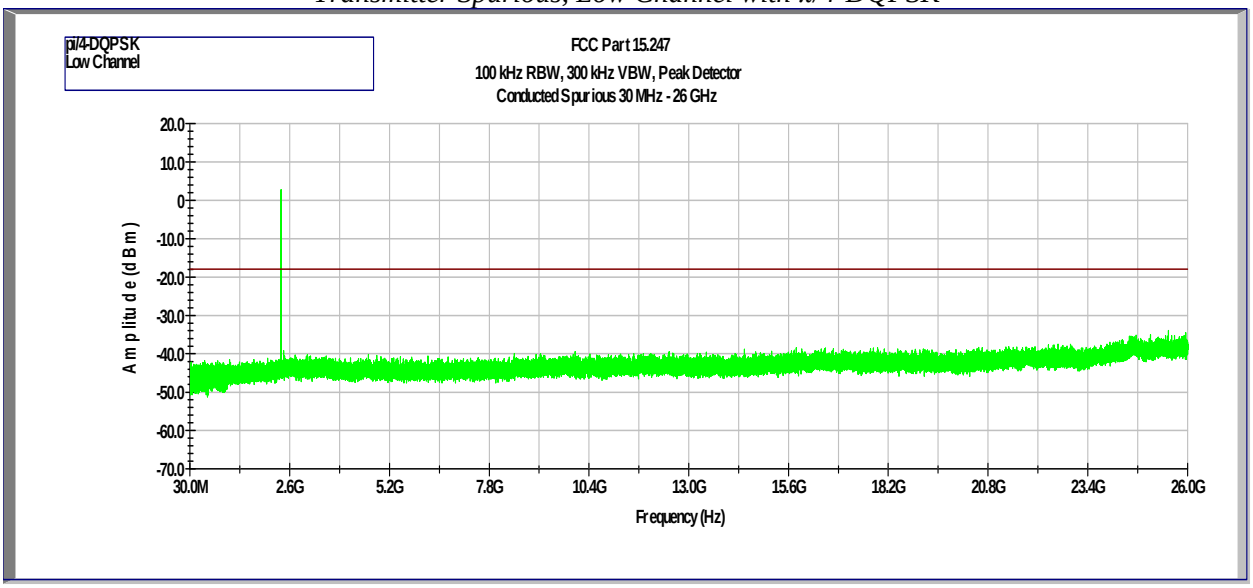
Plot 4.3

Transmitter Spurious, High Channel with GFSK



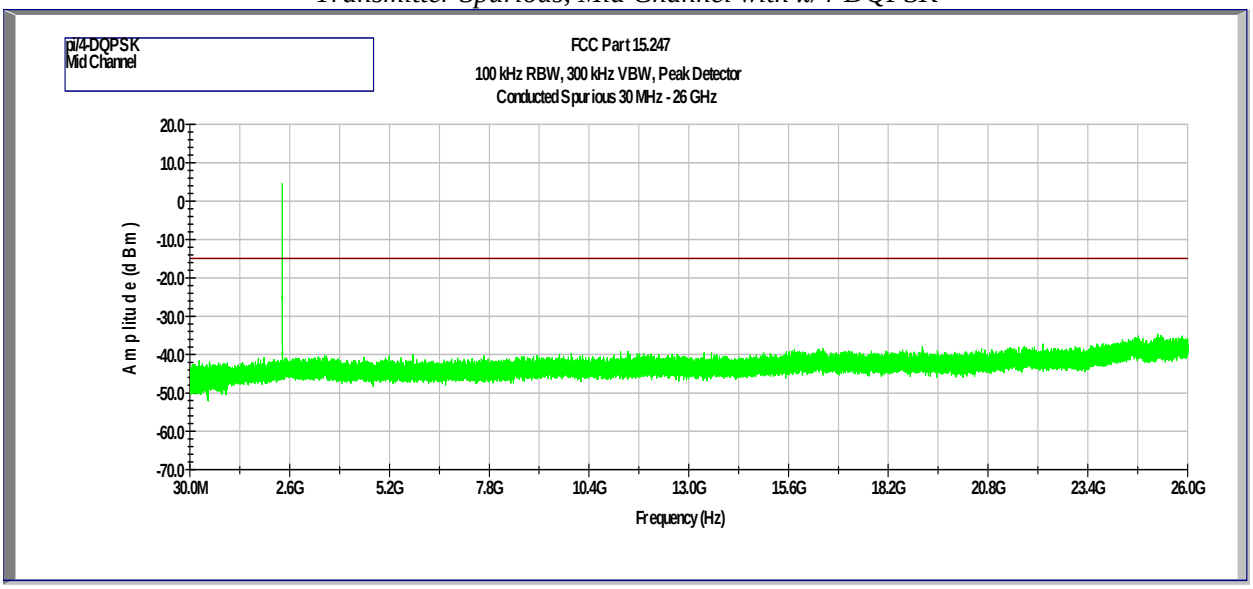
Plot 4.4

Transmitter Spurious, Low Channel with π/4-DQPSK



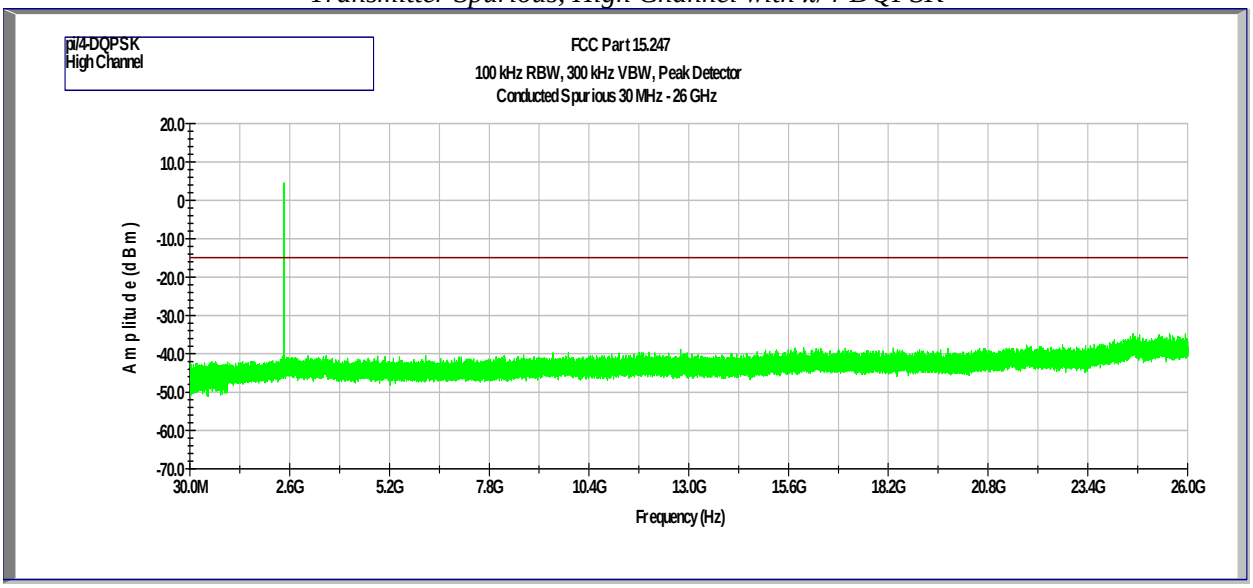
Plot 4.5

Transmitter Spurious, Mid Channel with π/4-DQPSK



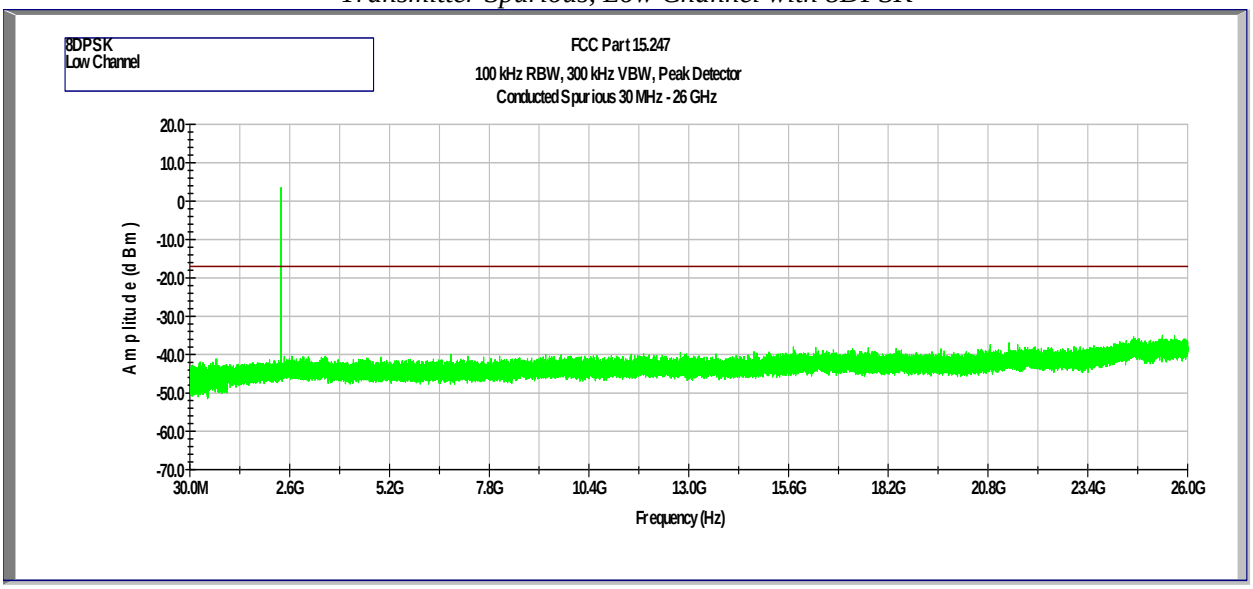
Plot 4.6

Transmitter Spurious, High Channel with π/4-DQPSK



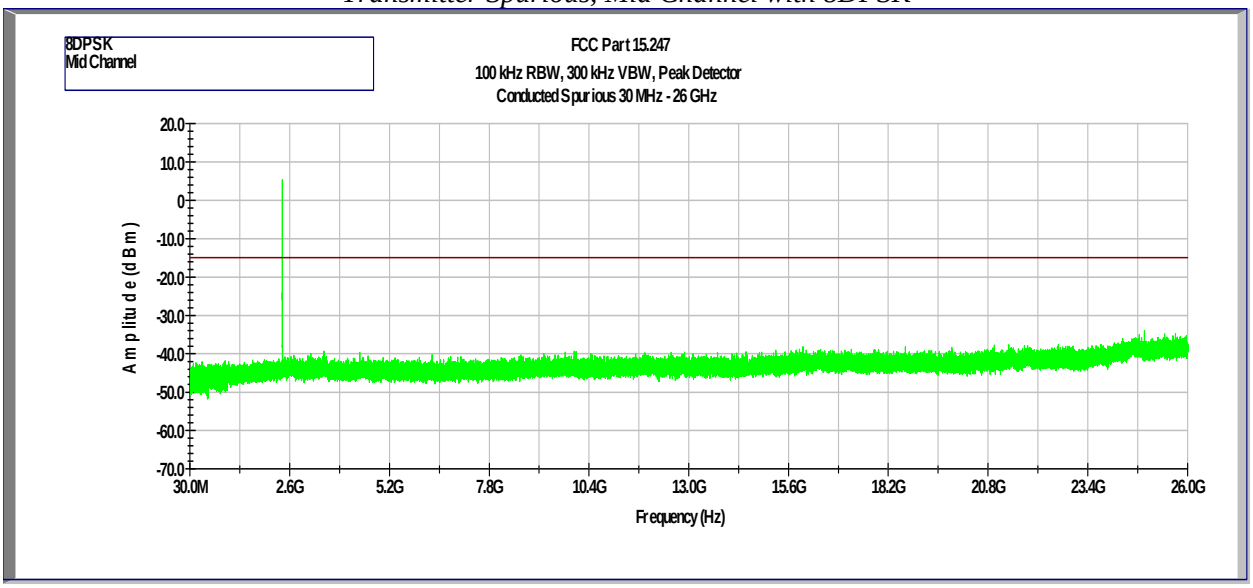
Plot 4.7

Transmitter Spurious, Low Channel with 8DPSK



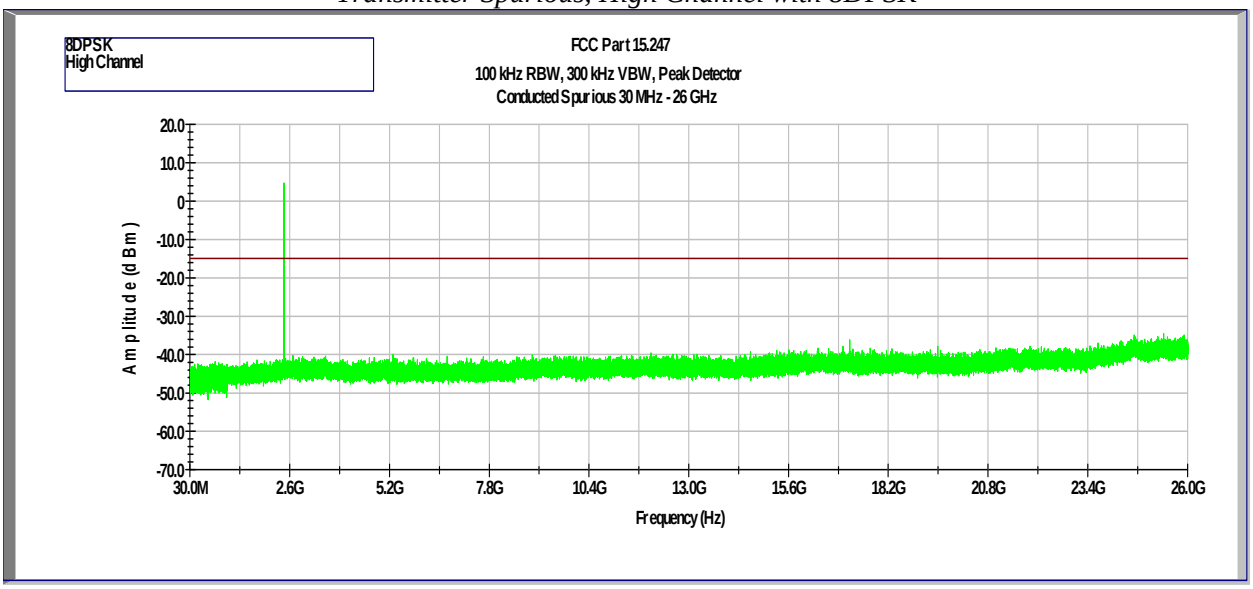
Plot 4.8

Transmitter Spurious, Mid Channel with 8DPSK

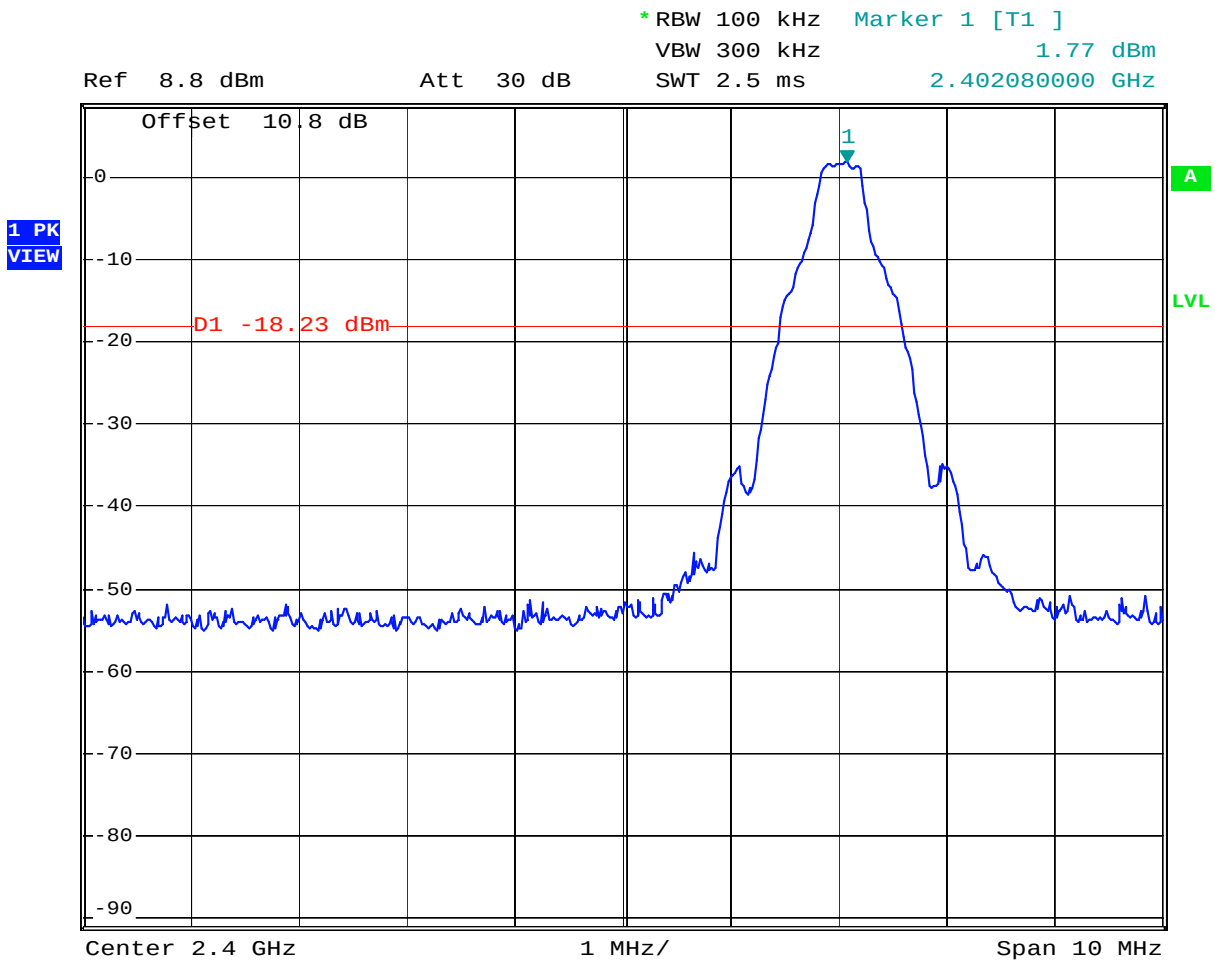


Plot 4.9

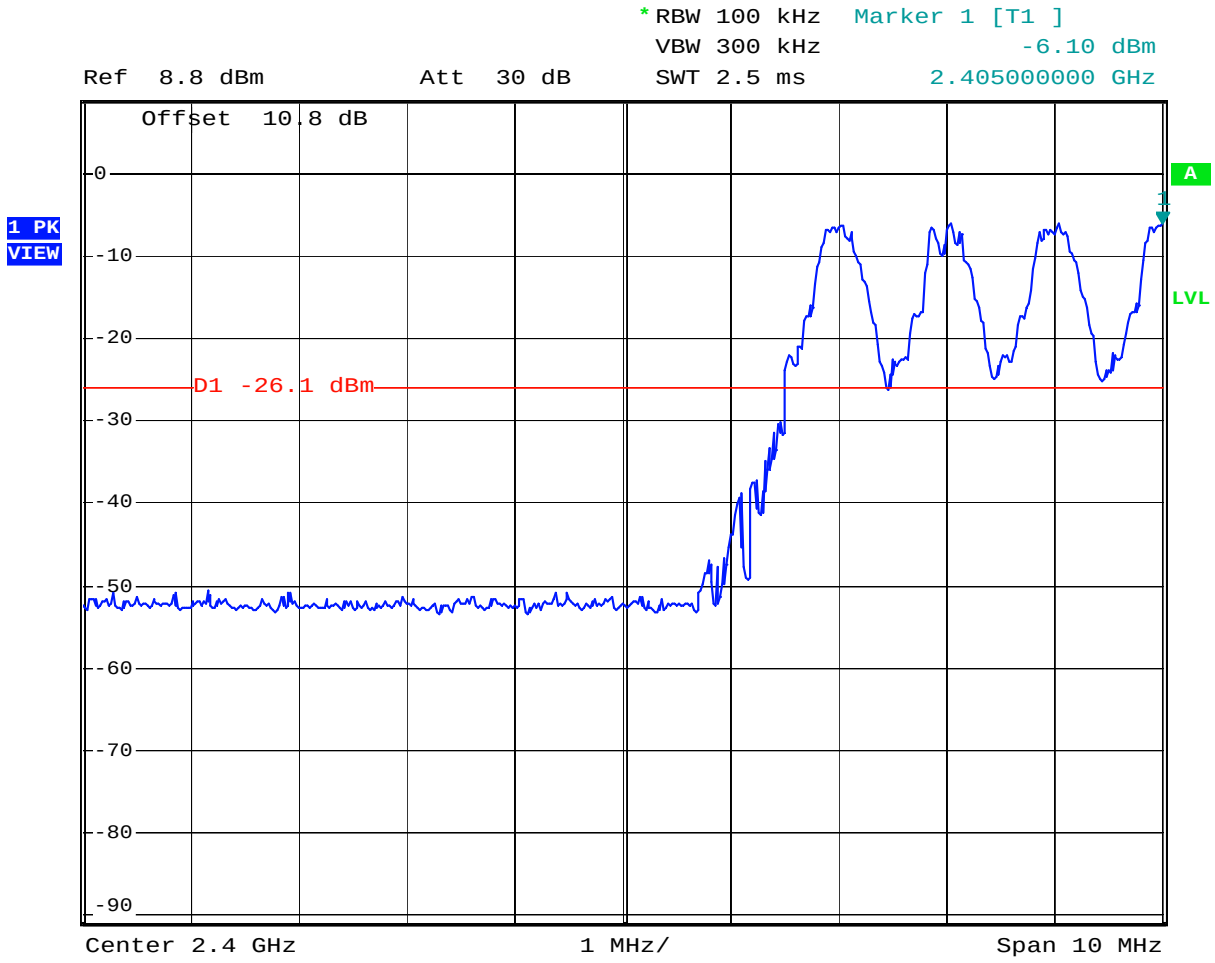
Transmitter Spurious, High Channel with 8DPSK



Plot 4.10
Conducted Band Edge, Low Channel with GFSK



Plot 4.11
Conducted Band Edge, with GFSK (Hopping)



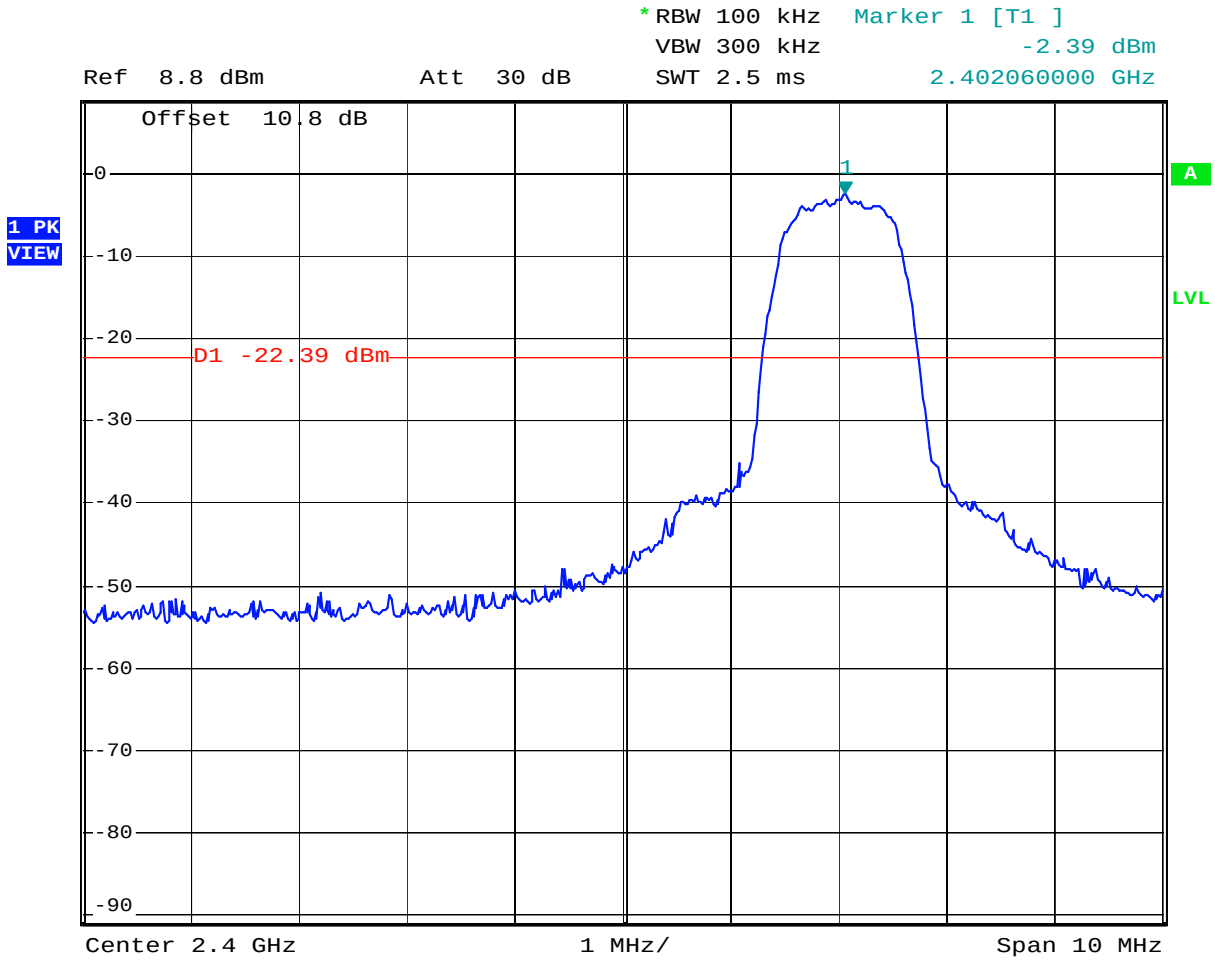
Date: 1.FEB.2016 12:20:00

Plot 4.12
Conducted Band Edge, High Channel with GFSK

Date: 1.FEB.2016 12:04:42

Plot 4.13
Conducted Band Edge, with GFSK (Hopping)

Plot 4.14
Conducted Band Edge, Low Channel with π/4-DQPSK



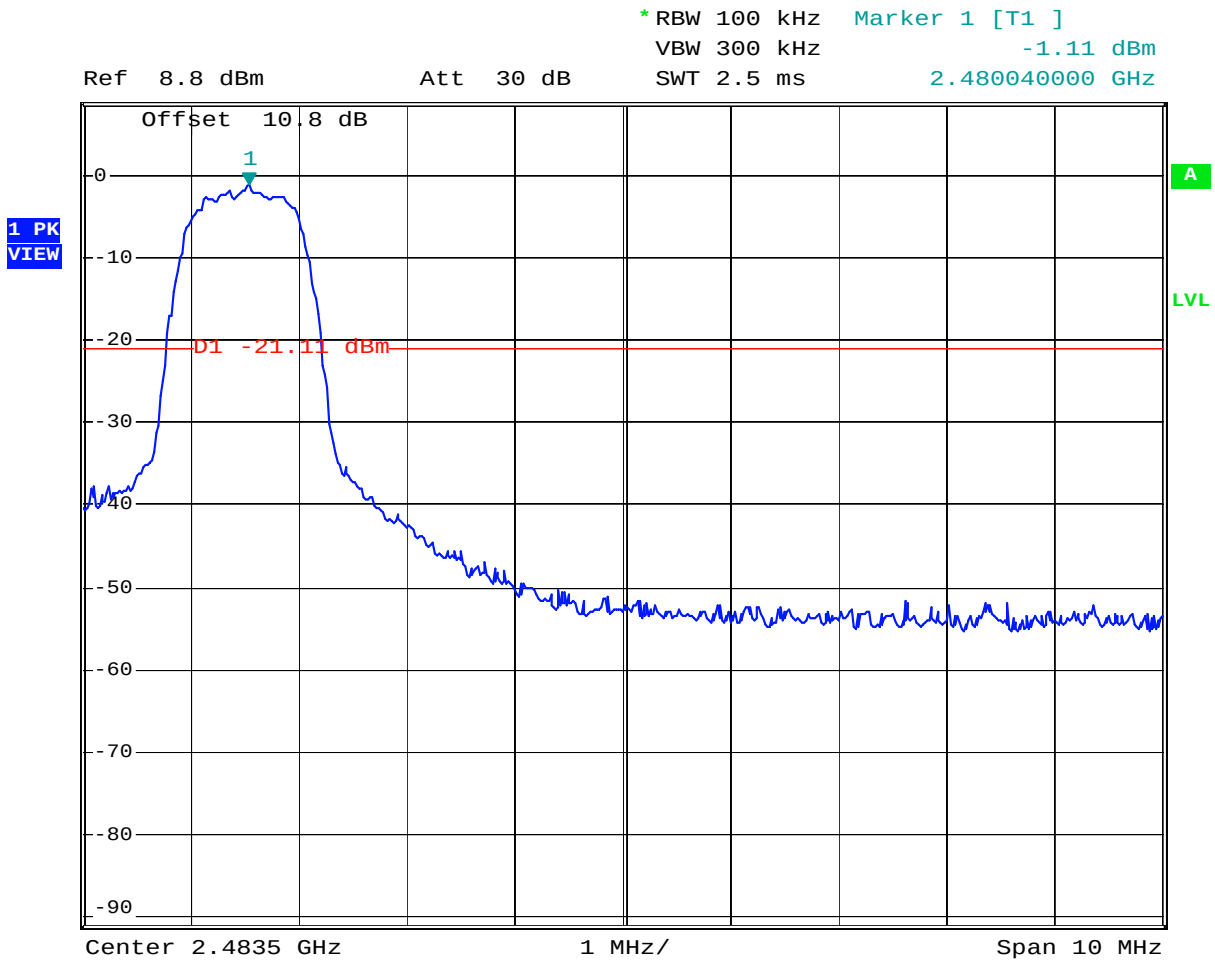
Date: 1.FEB.2016 12:13:20

Plot 4.15

Conducted Band Edge, with π/4-DQPSK (Hopping)

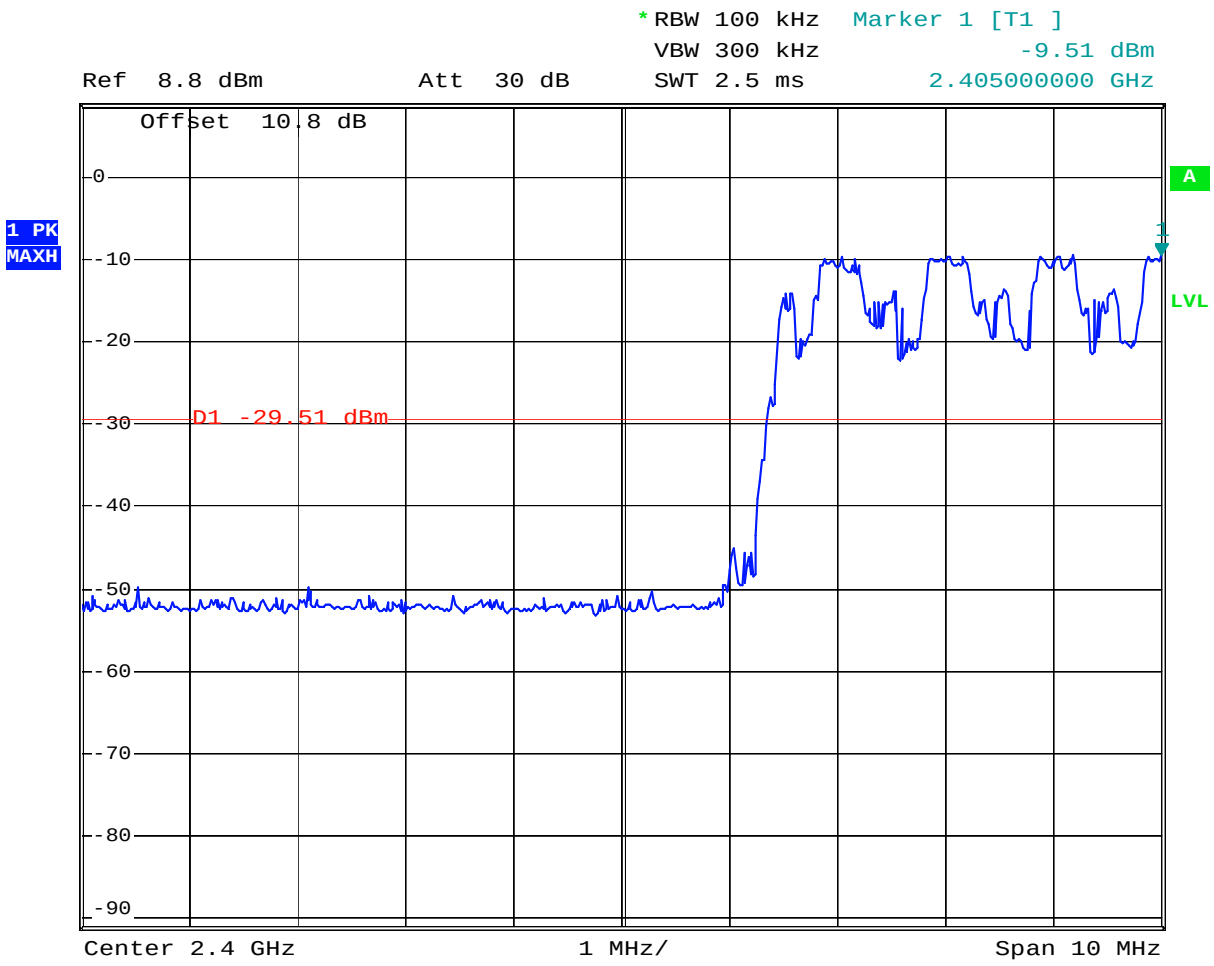
Date: 1.FEB.2016 12:32:29

Plot 4.16
Conducted Band Edge, High Channel with π/4-DQPSK



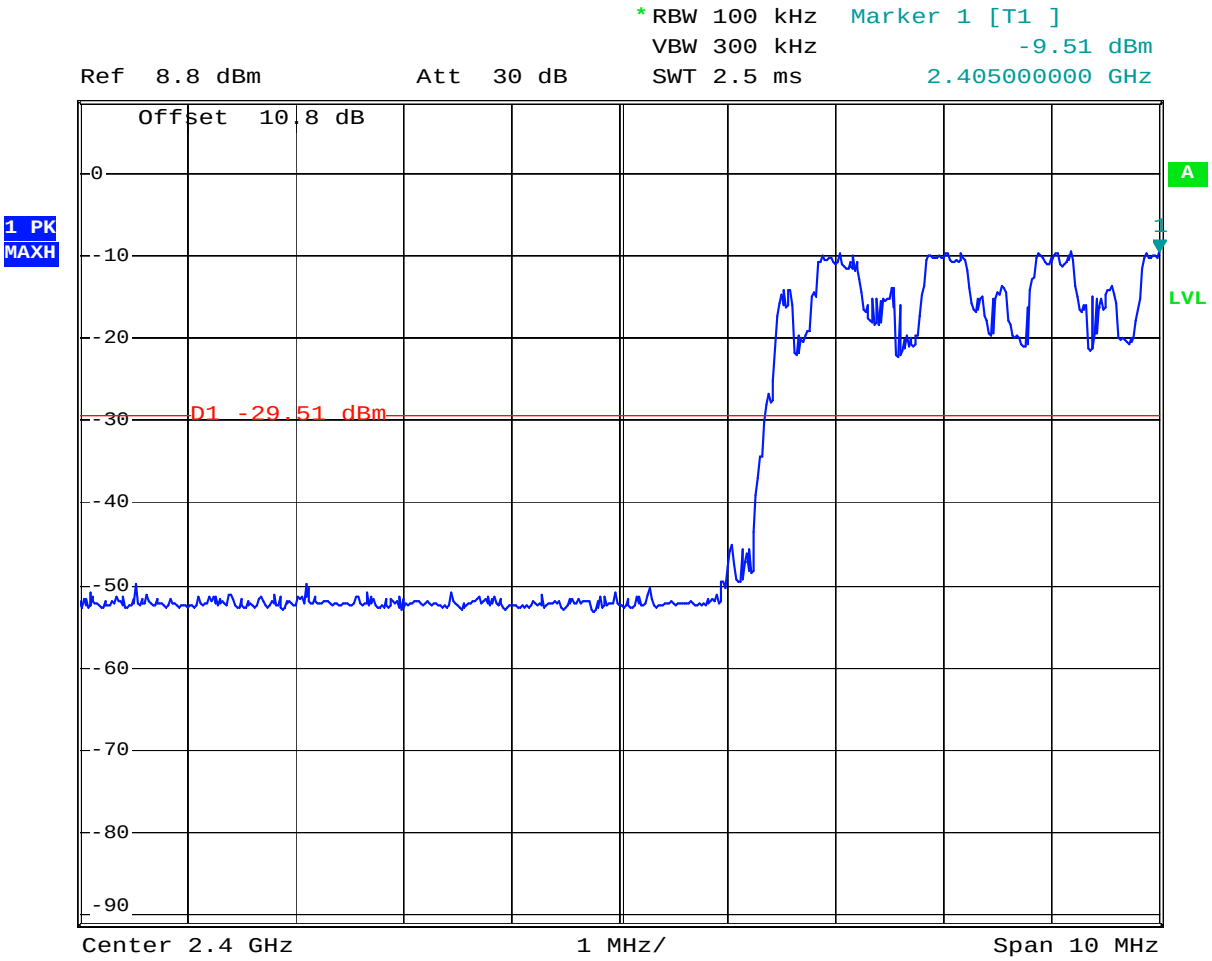
Plot 4.17
Conducted Band Edge, with π/4-DQPSK (Hopping)

Plot 4.18
Conducted Band Edge, Low Channel with 8DPSK

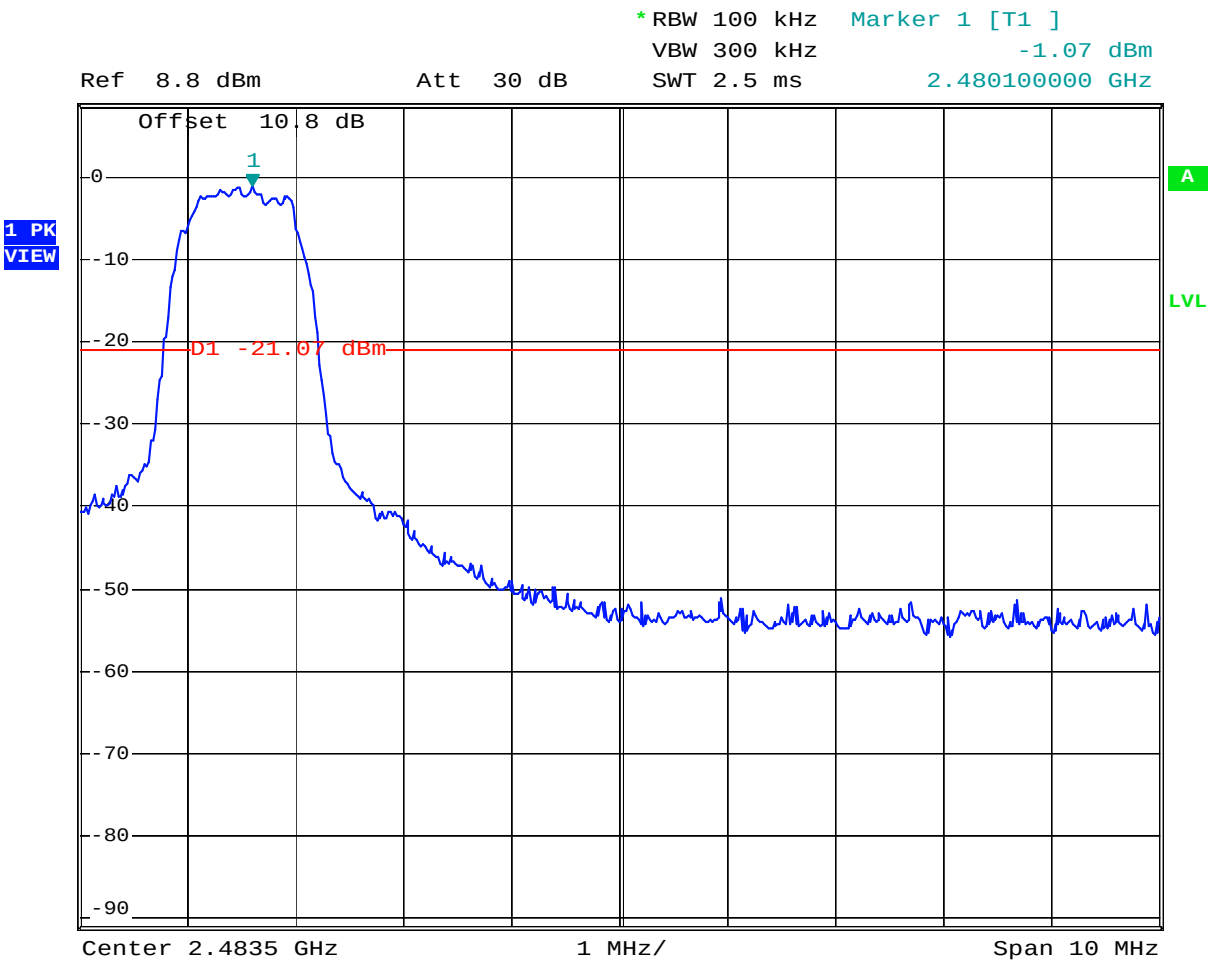


Plot 4.19

Conducted Band Edge, with 8DPSK (Hopping)



Plot 4.20
Conducted Band Edge, High Channel with 8DPSK



Date: 1.FEB.2016 12:06:48

Plot 4.21

Conducted Band Edge, with 8DPSK (Hopping)

Date: 1.FEB.2016 13:04:27

4.7 Transmitter Radiated Emissions
FCC Rule 15.247(d), 15.209, 15.205

4.7.1 Requirement

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

For out of band radiated emissions (except for frequencies in restricted bands), in any 100 kHz bandwidths outside the EUT pass-band, the RF power shall be at least 20dB (peak) or 30 dB (average) below that of the maximum in-band 100 kHz emissions.

4.7.2 Procedure

Radiated emission measurements were performed from 30 MHz to 26,000 MHz. Spectrum Analyzer Resolution Bandwidth is 100 kHz or greater for frequencies 30 MHz to 1000 MHz, 1 MHz for frequencies above 1000 MHz.

The EUT is placed on a plastic turntable that is 80 cm in height. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). During testing, all cables were manipulated to produce worst-case emissions. The signal is maximized through rotation. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at 3 meters

Measurements made from 1 GHz to 18GHz had a 2.4-2.5GHz notch filter in place. A preamp was used from 30MHz to 26GHz.

All measurements were made with a Peak Detector and compared to QP limits for 30MHz – 1GHz and Average or Peak limits for 1GHz – 26GHz where applicable.

Data is included of the worst-case configuration (the configuration which resulted in the highest emission levels).

EUT was tested with YAGEO - ANTX150P111B24553; Internal Antenna, 3.2 dBi peak gain

4.7.3 Field Strength Calculation

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF – AG; if measurement is performed at a distance other than specified in the rule, a Distance Correction Factor (DCF) shall be added.

Where FS = Field Strength in dB(μV/m)
RA = Receiver Amplitude (including preamplifier) in dB(μV); AF = Antenna Factor in dB(1/m)
CF = Cable Attenuation Factor in dB; AG = Amplifier Gain in dB

Assume a receiver reading of 52.0 dB(μV) is obtained. The antennas factor of 7.4 dB(1/m) and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving field strength of 32 dB(μV/m). This value in dB(μV/m) was converted to its corresponding level in μV/m.
RA = 52.0 dB(μV)
AF = 7.4 dB(1/m)
CF = 1.6 dB
AG = 29.0 dB
FS = 52.0+7.4+1.6-29.0 = 32 dB(μV/m).
Level in μV/m = Common Antilogarithm [(32 dBμV/m)/20] = 39.8 μV/m.

4.7.4 Test Results

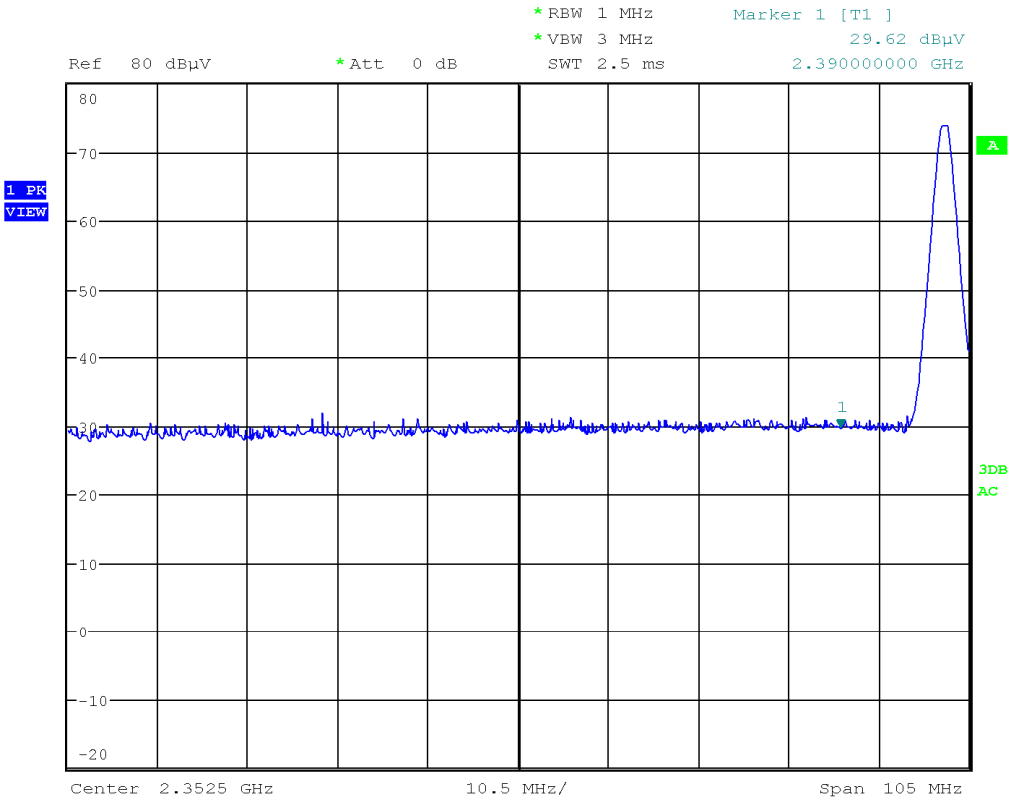
The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Radiated emission measurements were performed up to 26GHz. No other emissions were detected above the noise floor which is at least 10 dB below the limit.

Tested By:	Anderson Soungpanya
Test Date:	January 18 – February 05, 2016

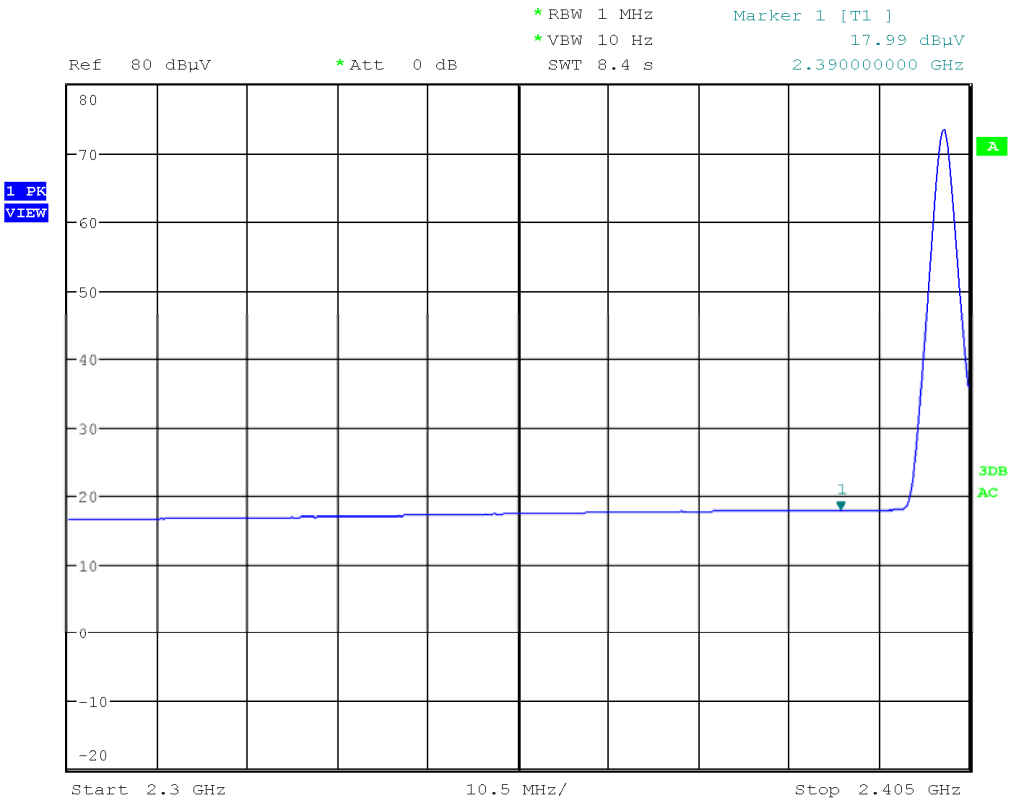
4.7.4 Test Results: 15.209/15.205 Restricted Band Emissions with Internal Antenna

GSFK Modulation for Out-of-Band Spurious Emissions at the Band Edge



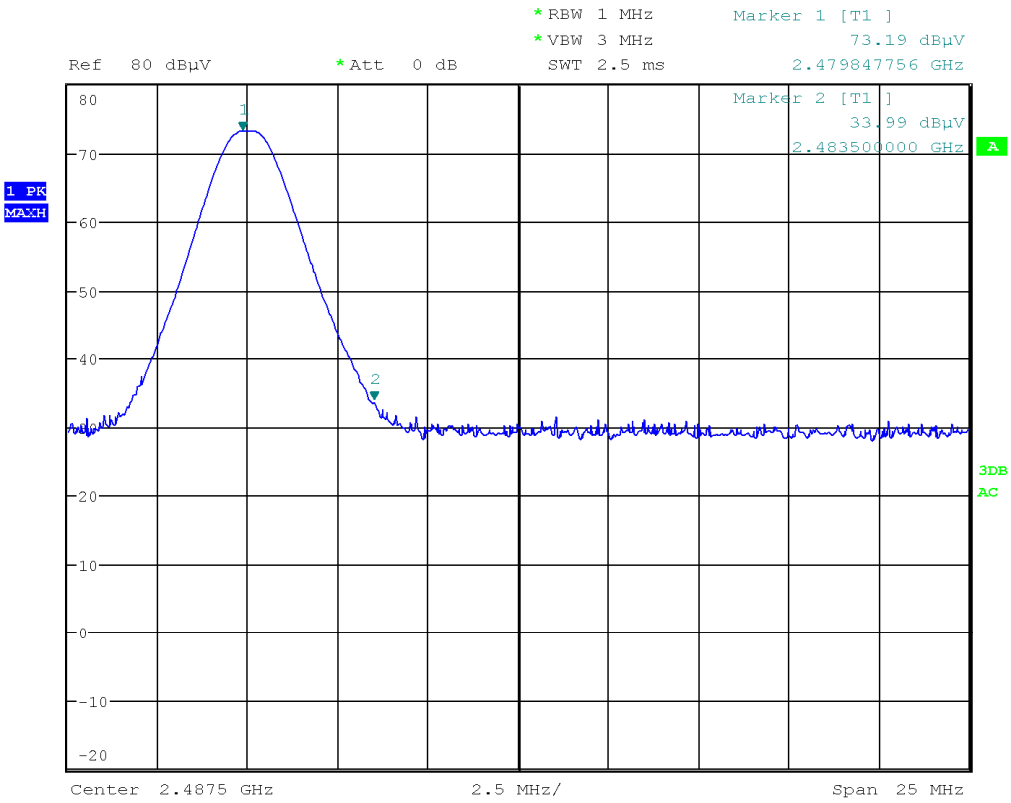
Date: 18.JAN.2016 07:55:08

Modulation Type	Detector	EUT Channel	Frequency	Raw Amplitude at 3m	Corr. Factor	FS at 3m	Peak Limit	Margin	Results
			MHz	dB(uV)	dB	dB(uV/m)	dB(uV/m)	dB	
GFSK	Peak	0	2402	29.6	29.8	59.4	74	-14.6	Pass



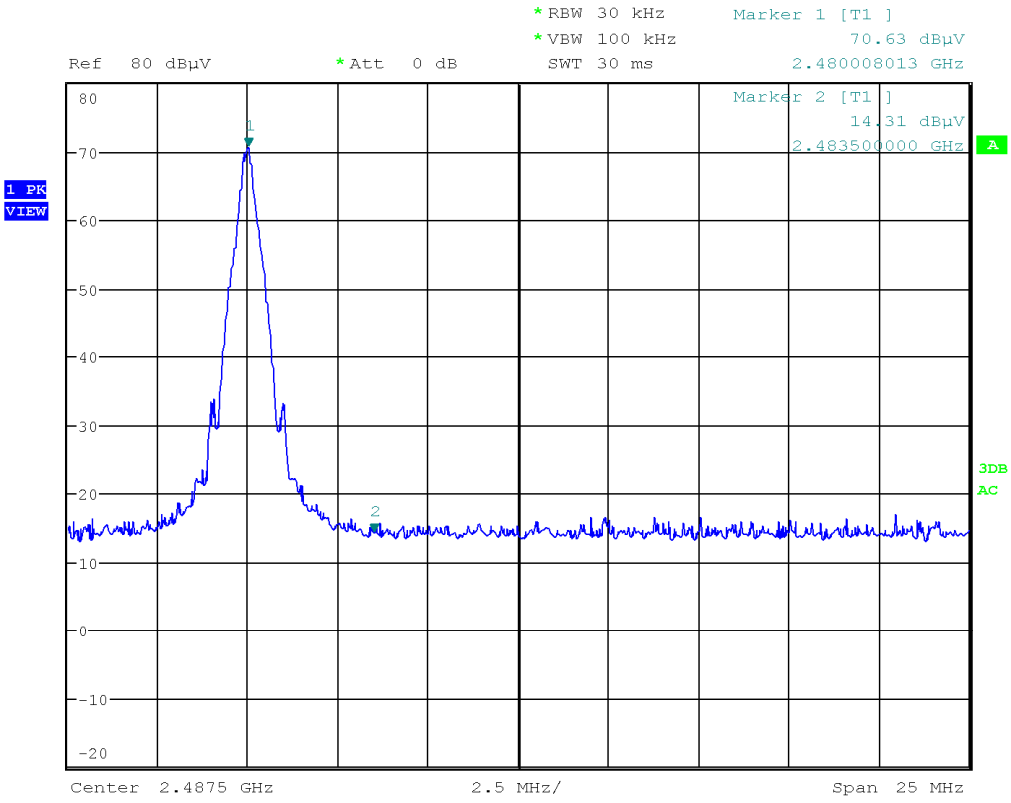
Date: 18.JAN.2016 07:53:26

Modulation Type	Detector	EUT Channel	Frequency	Raw Amplitude at 3m	Corr. Factor	FS at 3m	Peak Limit	Margin	Results
			MHz	dB(uV)	dB	dB(uV/m)	dB(uV/m)	dB	
GFSK	Avg	0	2402	18.0	29.8	47.8	54	-6.2	Pass



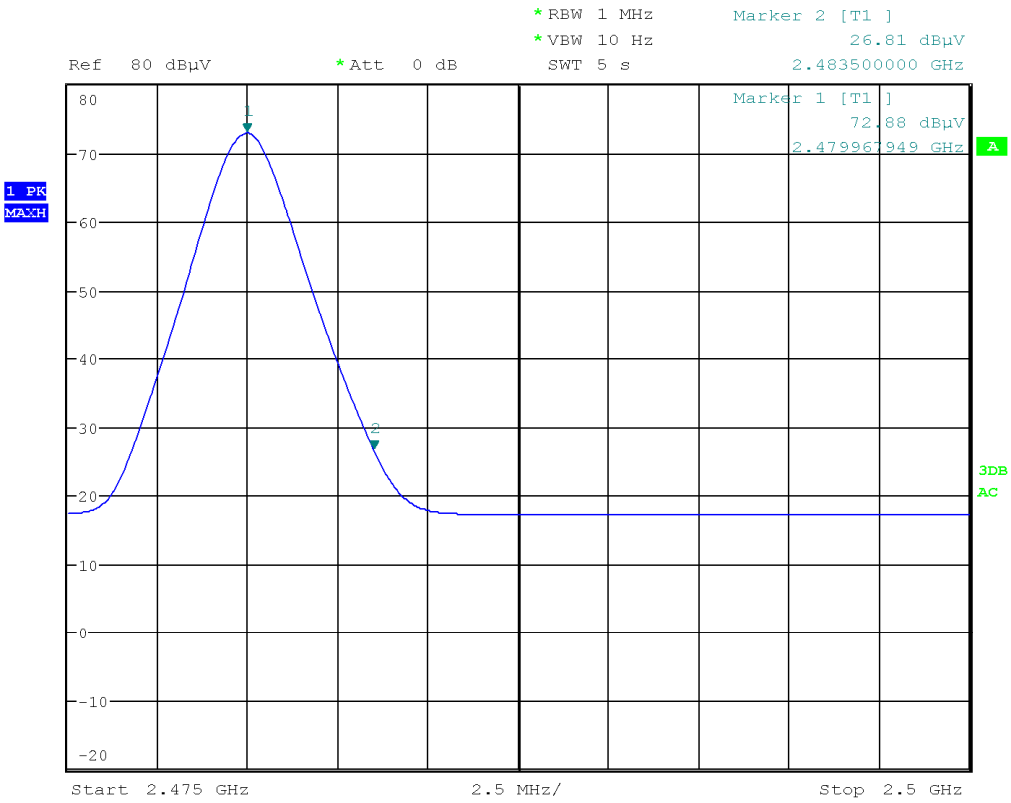
Date: 18.JAN.2016 07:17:57

Modulation Type	Detector	EUT Channel	Frequency	Raw Amplitude at 3m	Corr. Factor	FS at 3m	Peak Limit	Margin	Results
			MHz	dB(uV)	dB	dB(uV/m)	dB(uV/m)	dB	
GFSK	Peak	78	2480	34	29.8	63.8	74	-10.2	Pass



Date: 18.JAN.2016 07:20:06

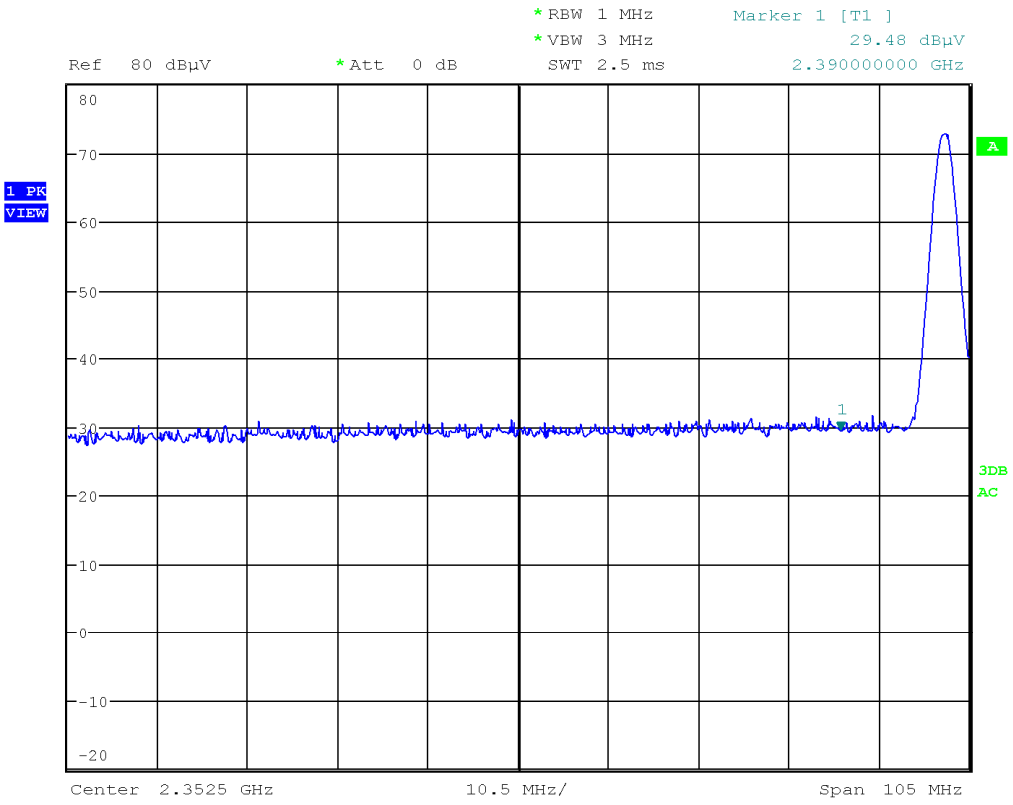
Modulation Type	Detector	EUT Channel	Frequency	Peak to Band Edge Delta
			MHz	dB
GFSK	Peak	78	2480	56.3



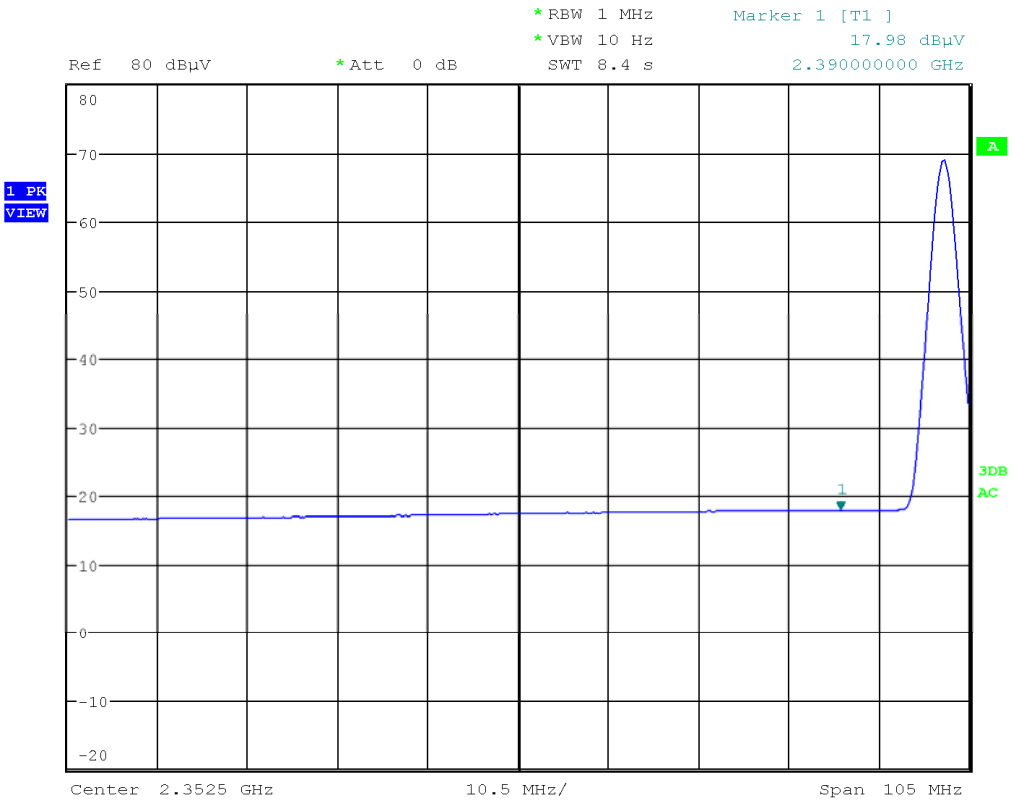
Date: 18.JAN.2016 07:16:59

Frequency	Raw FS Amplitude at 3m	Corr. Factor	FS at 3m	Peak to Band Edge Delta	Corrected Band edge FS at 3m	Av Limit	Margin	Results
MHz	dB(uV)	dB	dB(uV/m)	dB	dB(uV/m)	dB(uV/m)	dB	
2480	72.9	29.8	102.7	56.3	46.4	54	-7.6	Pass

π/4-DQPSK Modulation for Out-of-Band Spurious Emissions at the Band Edge

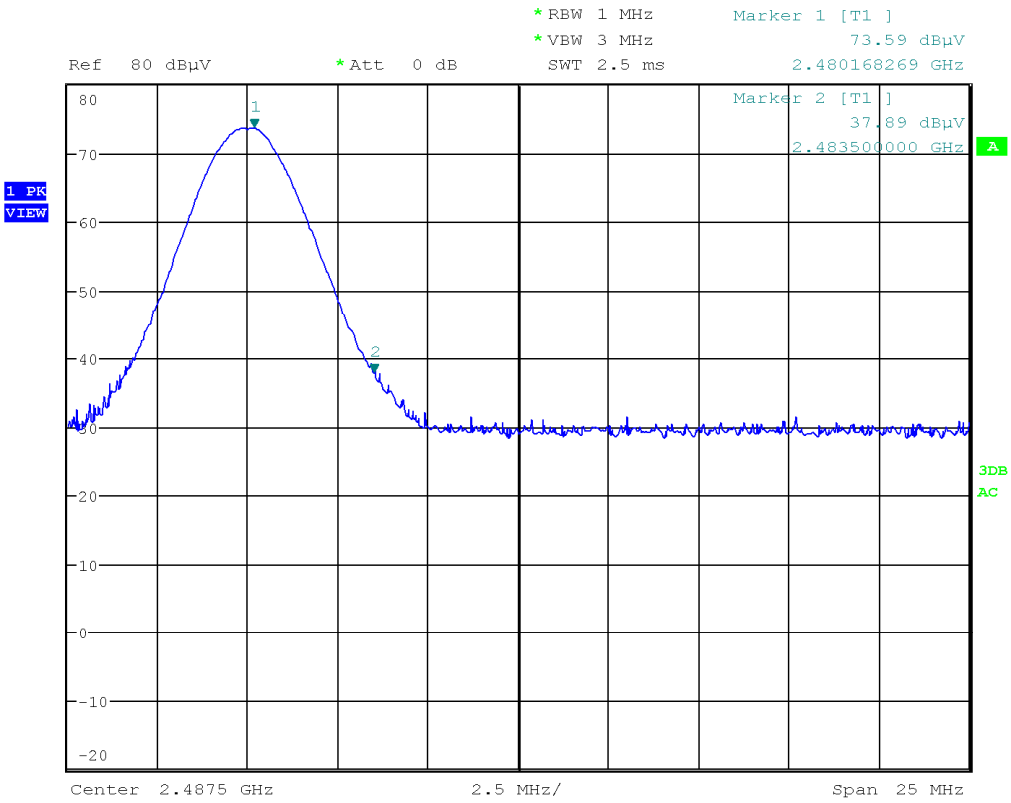


Modulation Type	Detector	EUT Channel	Frequency	Raw Amplitude at 3m	Corr. Factor	FS at 3m	Peak Limit	Margin	Results
			MHz	dB(uV)	dB	dB(uV/m)	dB(uV/m)	dB	
π/4-DQPSK	Peak	0	2402	29.5	29.8	59.3	74	-14.7	Pass



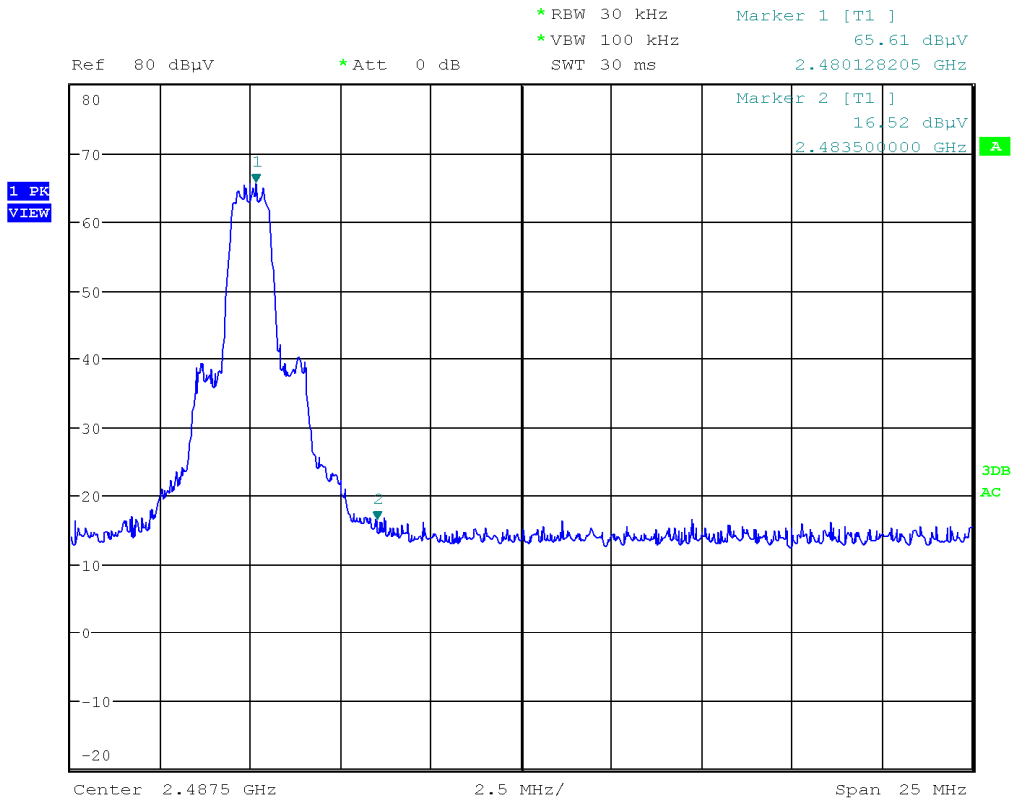
Date: 18.JAN.2016 08:01:01

Modulation Type	Detector	EUT Channel	Frequency	Raw Amplitude at 3m	Corr. Factor	FS at 3m	Peak Limit	Margin	Results
			MHz	dB(uV)	dB	dB(uV/m)	dB(uV/m)	dB	
π/4-DQPSK	Avg	0	2402	18.0	29.8	47.8	54	-6.2	Pass

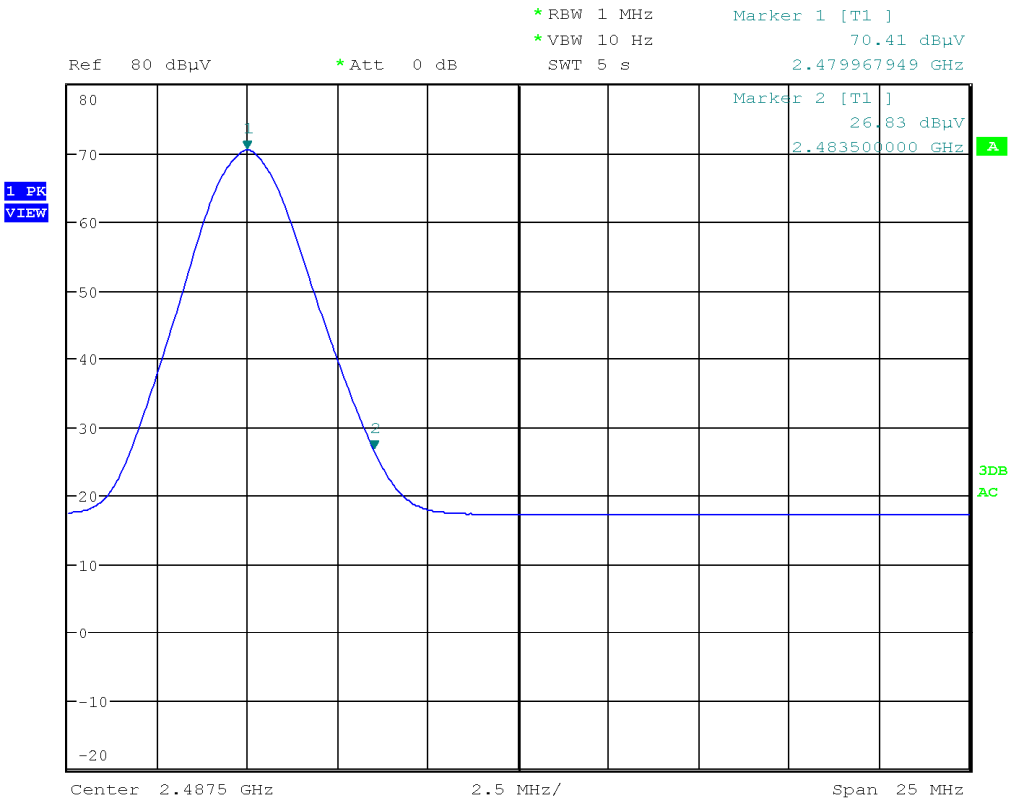


Date: 18.JAN.2016 07:29:26

Modulation Type	Detector	EUT Channel	Frequency	Raw Amplitude at 3m	Corr. Factor	FS at 3m	Peak Limit	Margin	Results
			MHz	dB(uV)	dB	dB(uV/m)	dB(uV/m)	dB	
π/4-DQPSK	Peak	78	2480	37.9	29.8	67.7	74	-6.3	Pass



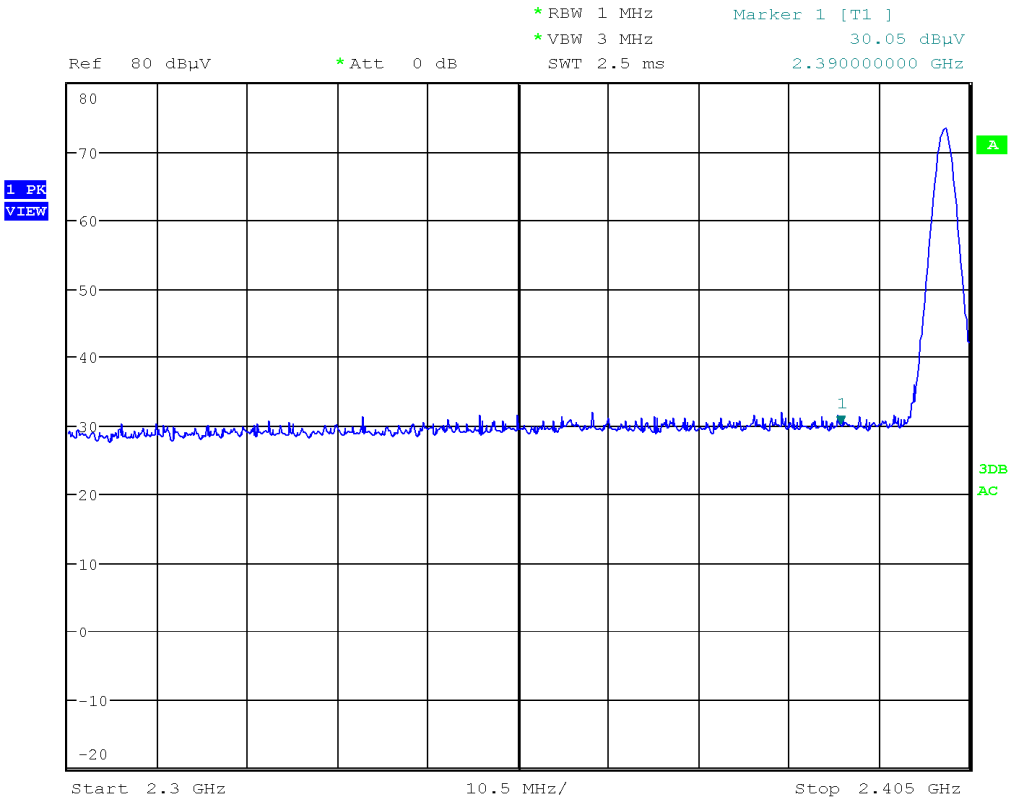
Modulation Type	Detector	EUT Channel	Frequency	Peak to Band Edge Delta
			MHz	dB
π/4-DQPSK	Peak	78	2480	49.1



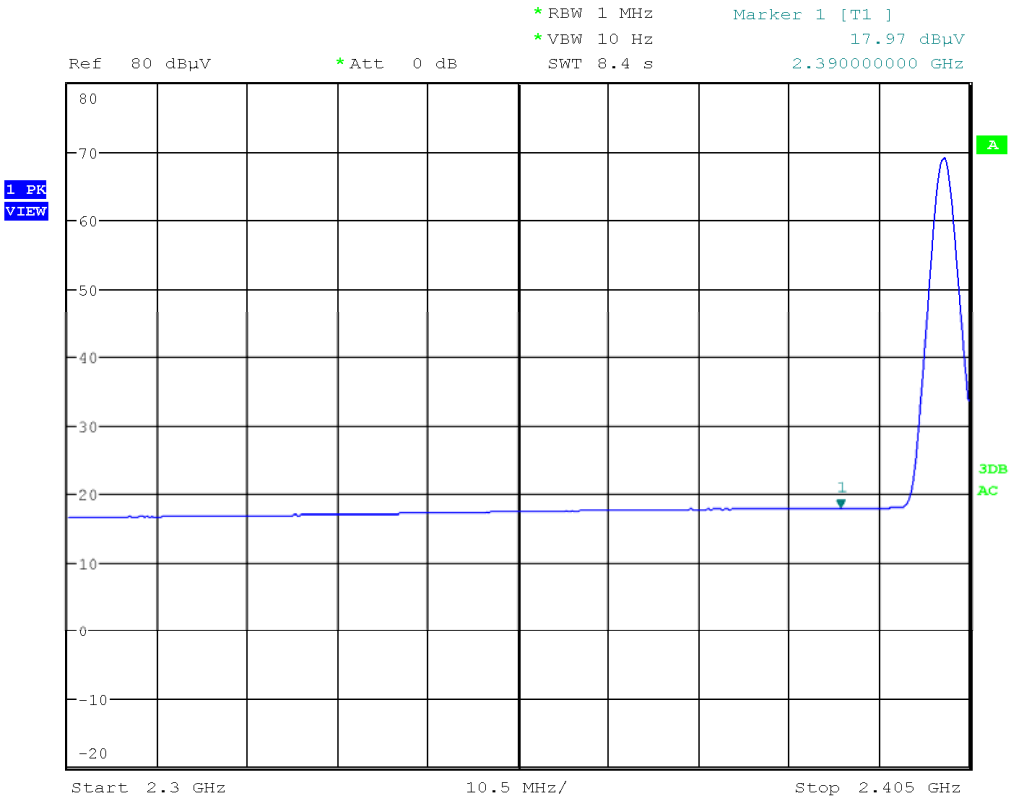
Date: 18.JAN.2016 07:28:24

Frequency	Raw FS Amplitude at 3m	Corr. Factor	FS at 3m	Peak to Band Edge Delta	Corrected Band edge FS at 3m	Av Limit	Margin	Results
MHz	dB(uV)	dB	dB(uV/m)	dB	dB(uV/m)	dB(uV/m)	dB	
2480	70.4	29.8	100.2	49.1	51.1	54	-2.9	Pass

8DPSK Modulation for Out-of-Band Spurious Emissions at the Band Edge

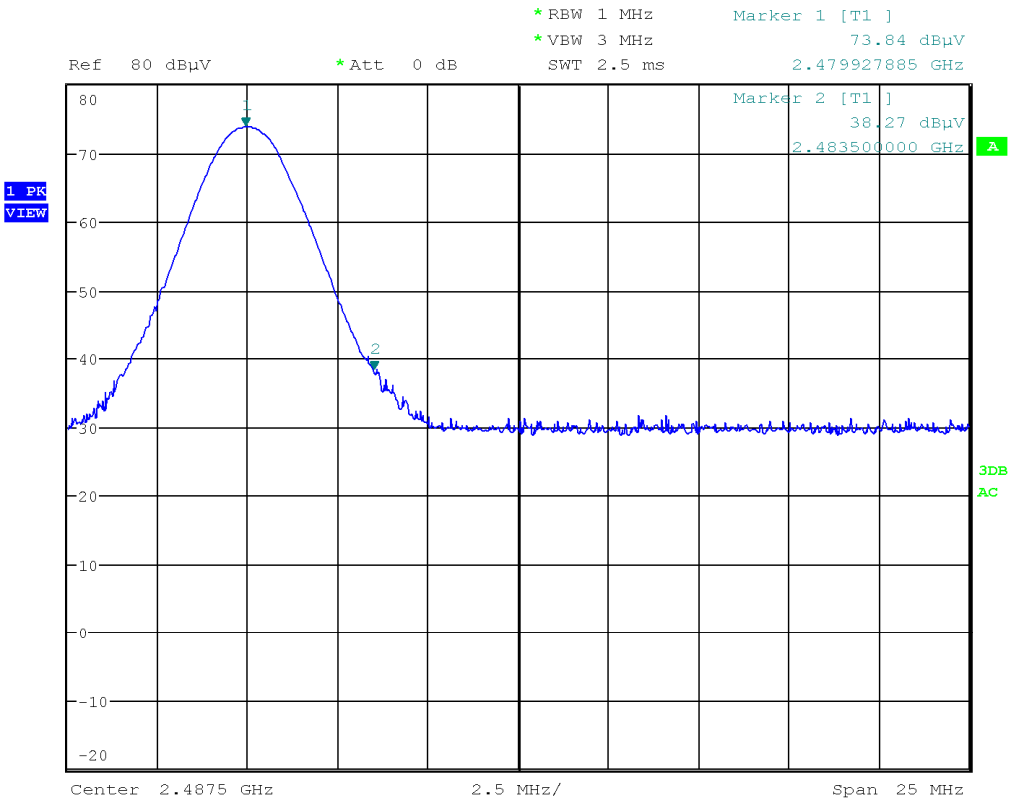


Modulation Type	Detector	EUT Channel	Frequency	Raw Amplitude at 3m	Corr. Factor	FS at 3m	Peak Limit	Margin	Results
			MHz	dB(uV)	dB	dB(uV/m)	dB(uV/m)	dB	
8DPSK	Peak	0	2402	30.1	29.8	59.9	74	-14.1	Pass



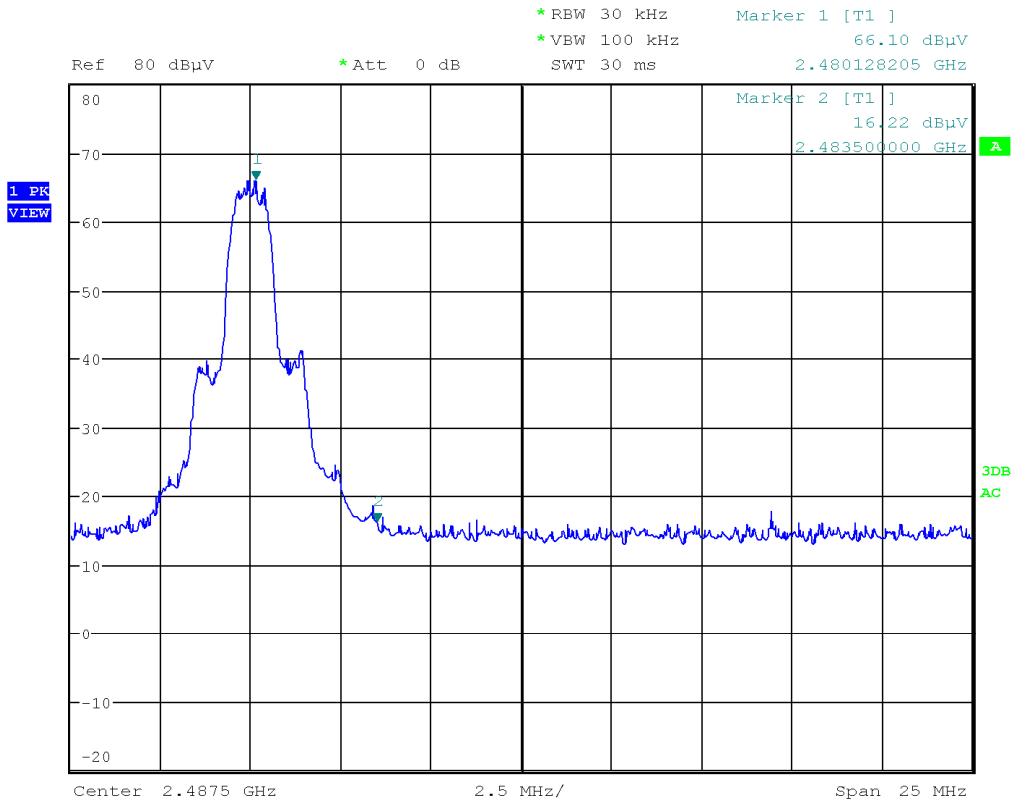
Date: 18.JAN.2016 08:06:23

Modulation Type	Detector	EUT Channel	Frequency	Raw Amplitude at 3m	Corr. Factor	FS at 3m	Peak Limit	Margin	Results
			MHz	dB(uV)	dB	dB(uV/m)	dB(uV/m)	dB	
8DPSK	Avg	0	2402	18.0	29.8	47.8	54	dB	Pass

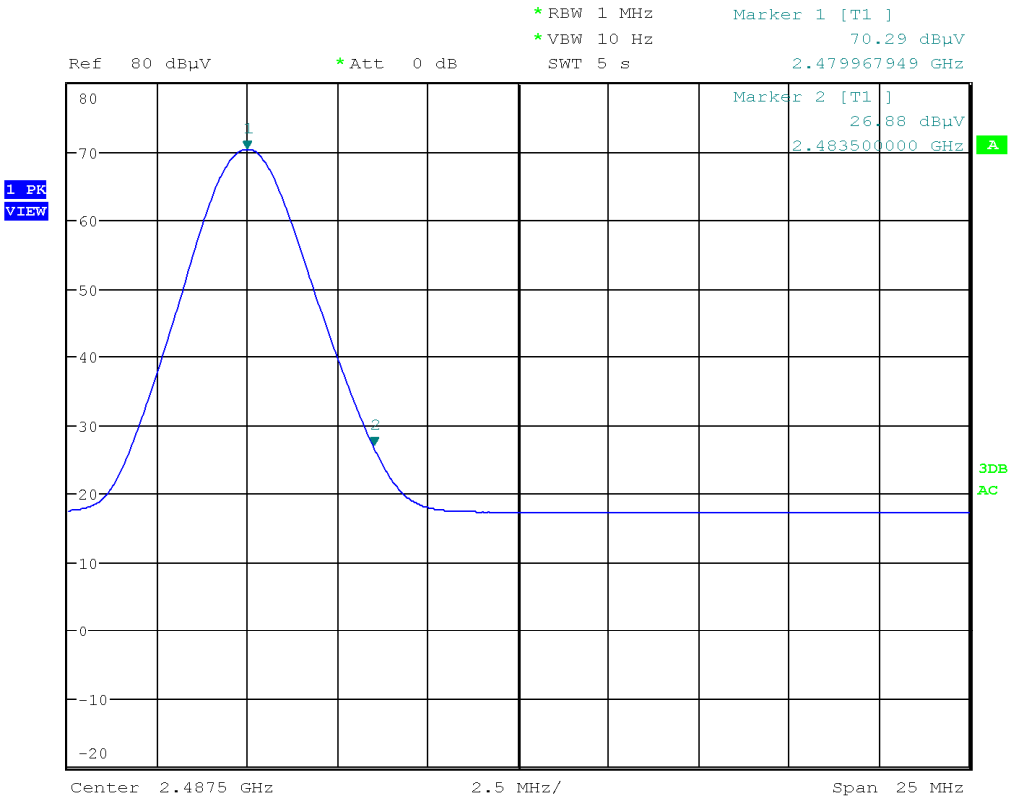


Date: 18.JAN.2016 07:39:33

Modulation Type	Detector	EUT Channel	Frequency	Raw Amplitude at 3m	Corr. Factor	FS at 3m	Peak Limit	Margin	Results
			MHz	dB(uV)	dB	dB(uV/m)	dB(uV/m)	dB	
8DPSK	Peak	78	2480	38.3	29.8	68.1	74	-5.9	Pass



Modulation Type	Detector	EUT Channel	Frequency	Peak to Band Edge Delta
			MHz	dB
8DPSK	Peak	78	2480	49.9



Frequency	Raw FS Amplitude at 3m	Corr. Factor	FS at 3m	Peak to Band Edge Delta	Corrected Band edge FS at 3m	Av Limit	Margin	Results
MHz	dB(uV)	dB	dB(uV/m)	dB	dB(uV/m)	dB(uV/m)	dB	
2480	70.3	29.8	100.1	49.9	50.2	54	-3.8	Pass

Out-of-Band Radiated Spurious Emissions GFSK

Test Results: 15.209 Radiated Spurious Emissions Low Channel, Tx at 2402MHz

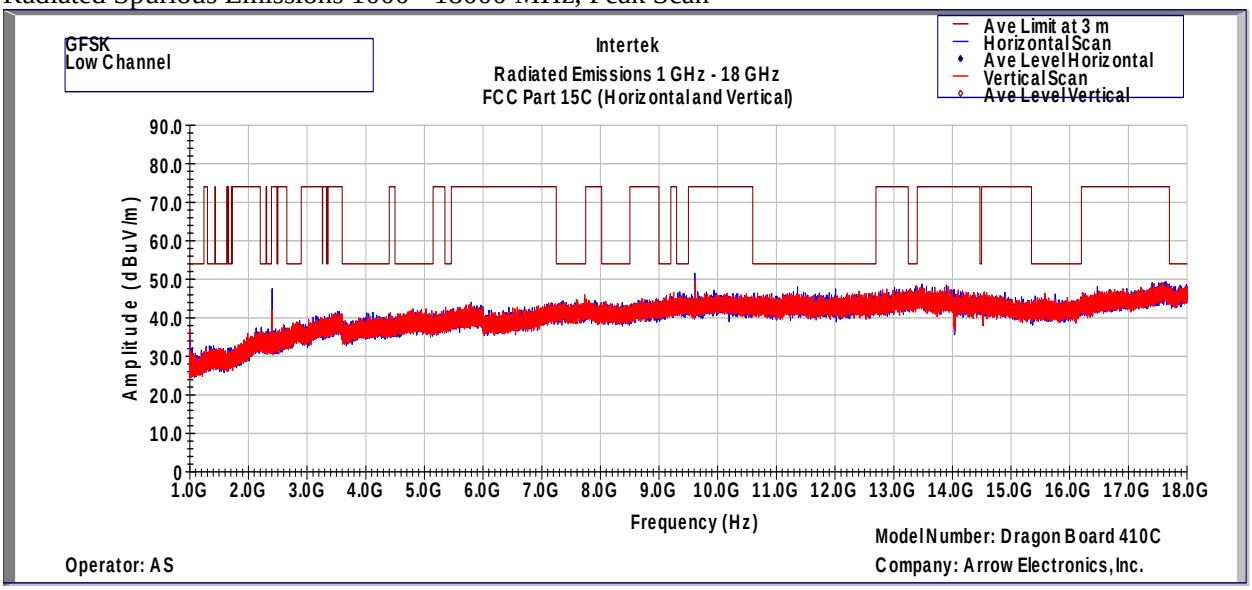
Radiated Spurious Emissions 30 MHz - 1000 MHz (Horizontal)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
148.502	39.5	43.5	-4.0	51.6	1.3	32.0	10.5	8.1
240.037	39.7	46.0	-6.3	47.2	1.9	32.0	10.5	12.0
247.506	41.8	46.0	-4.2	49.5	1.9	32.0	10.5	11.9
264.029	37.8	46.0	-8.2	44.4	2.0	32.0	10.5	12.8
395.981	39.5	46.0	-6.5	42.7	2.6	32.0	10.5	15.7
445.483	40.7	46.0	-5.3	42.7	2.7	32.0	10.5	16.8
527.998	43.3	46.0	-2.7	44.0	3.0	32.1	10.5	18.0
539.994	38.7	46.0	-7.3	39.5	3.0	32.1	10.5	17.9
552.022	40.4	46.0	-5.6	41.3	3.0	32.1	10.5	17.8
600.004	38.3	46.0	-7.7	38.7	3.1	32.2	10.5	18.3
606.018	38.4	46.0	-7.6	38.6	3.1	32.2	10.5	18.4
624.028	38.4	46.0	-7.6	38.0	3.2	32.2	10.5	18.9
643.525	39.7	46.0	-6.3	38.9	3.3	32.2	10.5	19.3
644.01	38.7	46.0	-7.3	37.8	3.3	32.2	10.5	19.3
646.5	36.8	46.0	-9.2	36.0	3.3	32.3	10.5	19.3
648.019	37.5	46.0	-8.5	36.7	3.3	32.3	10.5	19.3
660.015	43.7	46.0	-2.3	42.7	3.4	32.3	10.5	19.3
672.011	37.9	46.0	-8.1	37.0	3.4	32.3	10.5	19.2
677.152	38.1	46.0	-7.9	37.3	3.5	32.3	10.5	19.1
711.134	41.5	46.0	-4.5	39.6	3.6	32.3	10.5	20.1
719.993	36.7	46.0	-9.3	34.6	3.6	32.3	10.5	20.2
731.019	39.7	46.0	-6.3	37.6	3.7	32.2	10.5	20.2
742.497	38.8	46.0	-7.2	36.7	3.7	32.2	10.5	20.1
743.985	37.2	46.0	-8.8	35.2	3.7	32.2	10.5	20.1
769.011	40.8	46.0	-5.2	38.4	3.8	32.2	10.5	20.3
775.865	38.9	46.0	-7.1	36.4	3.8	32.2	10.5	20.4
779.972	36.7	46.0	-9.3	34.1	3.8	32.1	10.5	20.5
789.963	37.8	46.0	-8.2	34.8	3.8	32.1	10.5	20.9
801.797	39.9	46.0	-6.1	36.6	3.8	32.1	10.5	21.1
865.267	37.2	46.0	-8.8	33.2	3.9	31.8	10.5	21.4
899.993	37.2	46.0	-8.8	32.4	4.0	31.6	10.5	21.9

Radiated Spurious Emissions 30 MHz - 1000 MHz (Vertical)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
184.165	39.4	43.5	-4.1	50.2	1.5	32.0	10.5	9.3
216.014	39.0	46.0	-7.0	48.2	1.7	32.0	10.5	10.6
225.714	40.3	46.0	-5.7	48.6	1.8	32.0	10.5	11.4
240.005	42.0	46.0	-4.0	49.6	1.9	32.0	10.5	12.0
247.506	41.6	46.0	-4.4	49.3	1.9	32.0	10.5	11.9
264.029	37.3	46.0	-8.7	43.9	2.0	32.0	10.5	12.8
282.717	37.2	46.0	-8.8	43.8	2.2	32.0	10.5	12.7
285.272	36.7	46.0	-9.3	43.2	2.2	32.0	10.5	12.8
286.597	36.1	46.0	-9.9	42.5	2.2	32.0	10.5	12.8
287.794	36.4	46.0	-9.6	42.8	2.2	32.0	10.5	12.9
290.348	37.6	46.0	-8.4	43.9	2.2	32.0	10.5	12.9
292.935	36.2	46.0	-9.8	42.4	2.2	32.0	10.5	13.0
294.228	36.5	46.0	-9.5	42.7	2.3	32.0	10.5	13.1
301.115	37.0	46.0	-9.0	42.8	2.3	32.0	10.5	13.4
303.184	35.9	46.0	-10.1	41.7	2.3	32.0	10.5	13.4
323.263	36.0	46.0	-10.0	41.2	2.4	32.0	10.5	13.9
445.516	36.7	46.0	-9.3	38.7	2.7	32.0	10.5	16.8
451.433	39.5	46.0	-6.5	41.3	2.7	32.0	10.5	17.0
475.004	36.8	46.0	-9.2	38.6	2.8	32.1	10.5	17.0
539.994	38.8	46.0	-7.2	39.6	3.0	32.1	10.5	17.9
552.022	39.1	46.0	-6.9	40.0	3.0	32.1	10.5	17.8
601.944	36.3	46.0	-9.7	36.6	3.1	32.2	10.5	18.3
660.015	38.7	46.0	-7.3	37.8	3.4	32.3	10.5	19.3
752.391	36.3	46.0	-9.7	34.4	3.7	32.2	10.5	19.9
769.011	36.1	46.0	-9.9	33.7	3.8	32.2	10.5	20.3
789.995	38.4	46.0	-7.6	35.4	3.8	32.1	10.5	20.9
801.829	36.9	46.0	-9.1	33.6	3.8	32.1	10.5	21.1
827.631	36.5	46.0	-9.5	32.9	3.9	32	10.5	21.2
902.903	38.7	46.0	-7.3	33.7	4.0	31.6	10.5	22
985.741	38.8	54.4	-16.0	31.5	4.1	30.9	10.5	22.8

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan



Note: Radiated emission measurements were performed up to 25GHz. No Emissions were identified when scanned from 18-25 GHz

Note: FS@3m = RA + AF + δ + CF - Preamp, (Peak)
Corrected Peak Scans are under the Average Limit of 54.

Test Results: 15.209 Radiated Spurious Emissions Mid Channel, Tx at 2440MHz

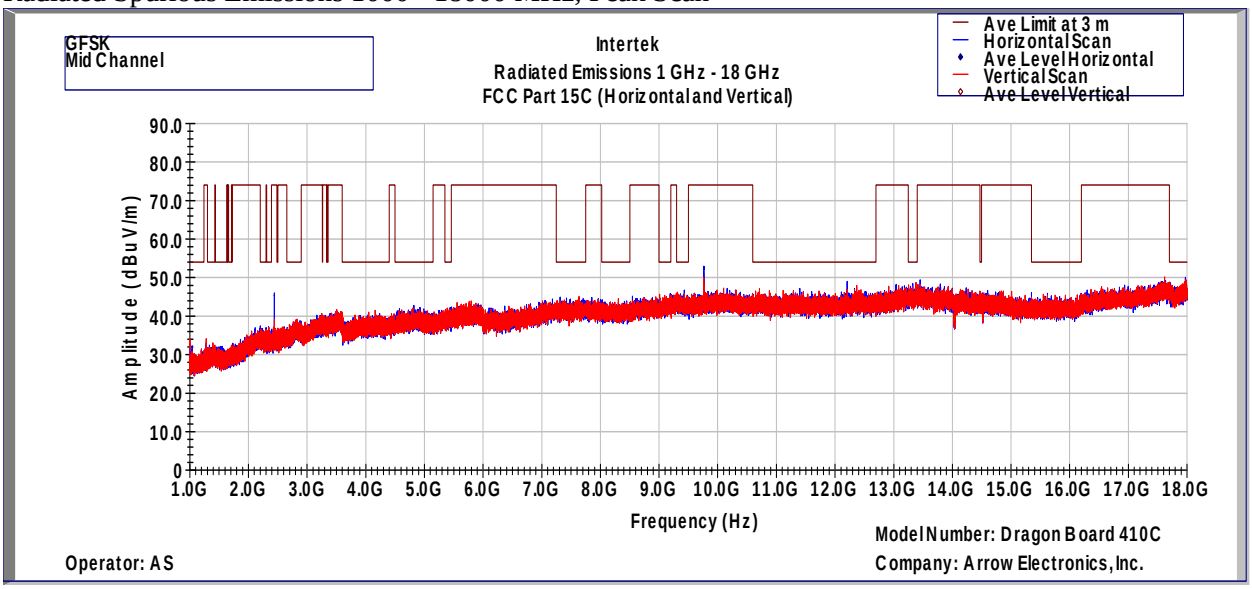
Radiated Spurious Emissions 30 MHz - 1000 MHz (Horizontal)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
148.502	39.9	43.5	-3.6	52.0	1.3	32.0	10.5	8.1
240.005	39.3	46.0	-6.7	46.9	1.9	32.0	10.5	12.0
247.506	42.0	46.0	-4.0	49.7	1.9	32.0	10.5	11.9
395.981	39.6	46.0	-6.4	42.9	2.6	32.0	10.5	15.7
445.483	40.6	46.0	-5.4	42.6	2.7	32.0	10.5	16.8
527.998	42.5	46.0	-3.5	43.1	3.0	32.1	10.5	18.0
539.994	37.7	46.0	-8.3	38.5	3.0	32.1	10.5	17.9
551.989	40.6	46.0	-5.4	41.4	3.0	32.1	10.5	17.8
600.004	38.1	46.0	-7.9	38.5	3.1	32.2	10.5	18.3
606.018	38.4	46.0	-7.6	38.6	3.1	32.2	10.5	18.4
624.028	37.1	46.0	-8.9	36.8	3.2	32.2	10.5	18.9
643.493	40.2	46.0	-5.8	39.3	3.3	32.2	10.5	19.3
644.01	39.2	46.0	-6.8	38.4	3.3	32.2	10.5	19.3
646.532	38.4	46.0	-7.6	37.6	3.3	32.3	10.5	19.3
648.019	37.1	46.0	-8.9	36.3	3.3	32.3	10.5	19.3
660.015	43.5	46.0	-2.5	42.5	3.4	32.3	10.5	19.3
672.011	38.2	46.0	-7.8	37.3	3.4	32.3	10.5	19.2
677.152	42.9	46.0	-3.1	42.1	3.5	32.3	10.5	19.1
711.166	39.9	46.0	-6.1	38.0	3.6	32.3	10.5	20.1
731.019	40.0	46.0	-6.0	37.8	3.7	32.2	10.5	20.2
742.497	38.7	46.0	-7.3	36.6	3.7	32.2	10.5	20.1
744.017	36.7	46.0	-9.3	34.7	3.7	32.2	10.5	20.1
768.978	41.5	46.0	-4.5	39.1	3.8	32.2	10.5	20.3
775.833	38.9	46.0	-7.1	36.4	3.8	32.2	10.5	20.4
789.995	37.6	46.0	-8.4	34.6	3.8	32.1	10.5	20.9
801.829	40.1	46.0	-5.9	36.8	3.8	32.1	10.5	21.1
865.235	37.9	46.0	-8.1	33.8	3.9	31.8	10.5	21.4
905.134	38.1	46.0	-7.9	33.1	4.0	31.6	10.5	22.1
958.549	39.1	46.0	-6.9	33.3	4.1	31.1	10.5	22.4
960.004	38.9	54.0	-15.1	33.1	4.1	31.1	10.5	22.4
1000	41.8	54.0	-12.2	35.1	4.2	30.8	10.5	22.8

Radiated Spurious Emissions 30 MHz - 1000 MHz (Vertical)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
148.502	40.7	43.5	-2.8	52.8	1.3	32.0	10.5	8.1
184.198	39.2	43.5	-4.3	50.0	1.5	32.0	10.5	9.3
193.995	36.6	43.5	-6.9	47.1	1.5	32.0	10.5	9.5
216.014	39.5	46.0	-6.5	48.7	1.7	32.0	10.5	10.6
225.746	39.8	46.0	-6.2	48.1	1.8	32.0	10.5	11.4
240.005	41.4	46.0	-4.6	49.0	1.9	32.0	10.5	12.0
247.539	41.3	46.0	-4.7	49.0	1.9	32.0	10.5	11.9
264.029	37.9	46.0	-8.1	44.5	2.0	32.0	10.5	12.8
276.380	36.6	46.0	-9.4	43.2	2.1	32.0	10.5	12.8
284.108	36.7	46.0	-9.3	43.3	2.2	32.0	10.5	12.8
285.304	36.8	46.0	-9.2	43.2	2.2	32.0	10.5	12.8
286.565	37.0	46.0	-9.0	43.5	2.2	32.0	10.5	12.8
291.771	37.4	46.0	-8.6	43.7	2.2	32.0	10.5	13.0
294.325	38.1	46.0	-7.9	44.2	2.3	32.0	10.5	13.1
299.304	37.6	46.0	-8.4	43.4	2.3	32.0	10.5	13.3
300.921	39.9	46.0	-6.1	45.7	2.3	32.0	10.5	13.4
304.478	37.2	46.0	-8.8	42.9	2.3	32.0	10.5	13.4
413.797	36.7	46.0	-9.3	39.3	2.6	32.0	10.5	16.4
451.433	41.1	46.0	-4.9	42.9	2.7	32.0	10.5	17.0
474.971	37.2	46.0	-8.8	39.0	2.8	32.1	10.5	17.0
499.997	41.6	46.0	-4.4	43.0	2.9	32.1	10.5	17.3
527.998	41.9	46.0	-4.1	42.5	3.0	32.1	10.5	18.0
539.994	39.5	46.0	-6.5	40.3	3.0	32.1	10.5	17.9
551.989	39.4	46.0	-6.6	40.3	3.0	32.1	10.5	17.8
601.912	38.4	46.0	-7.6	38.7	3.1	32.2	10.5	18.3
660.015	37.4	46.0	-8.6	36.4	3.4	32.3	10.5	19.3
790.027	38.4	46.0	-7.6	35.4	3.8	32.1	10.5	20.9
801.829	36.9	46.0	-9.1	33.6	3.8	32.1	10.5	21.1
827.631	37.2	46.0	-8.8	33.6	3.9	32.0	10.5	21.2
865.235	37.1	46.0	-8.9	33.1	3.9	31.8	10.5	21.4

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan



Note: Radiated emission measurements were performed up to 25GHz. No Emissions were identified when scanned from 18-25 GHz

Note: FS@3m = RA + AF + δ + CF - Preamp, (Peak)
Corrected Peak Scans are under the Average Limit of 54.

Test Results: 15.209 Radiated Spurious Emissions High Channel, Tx at 2480MHz

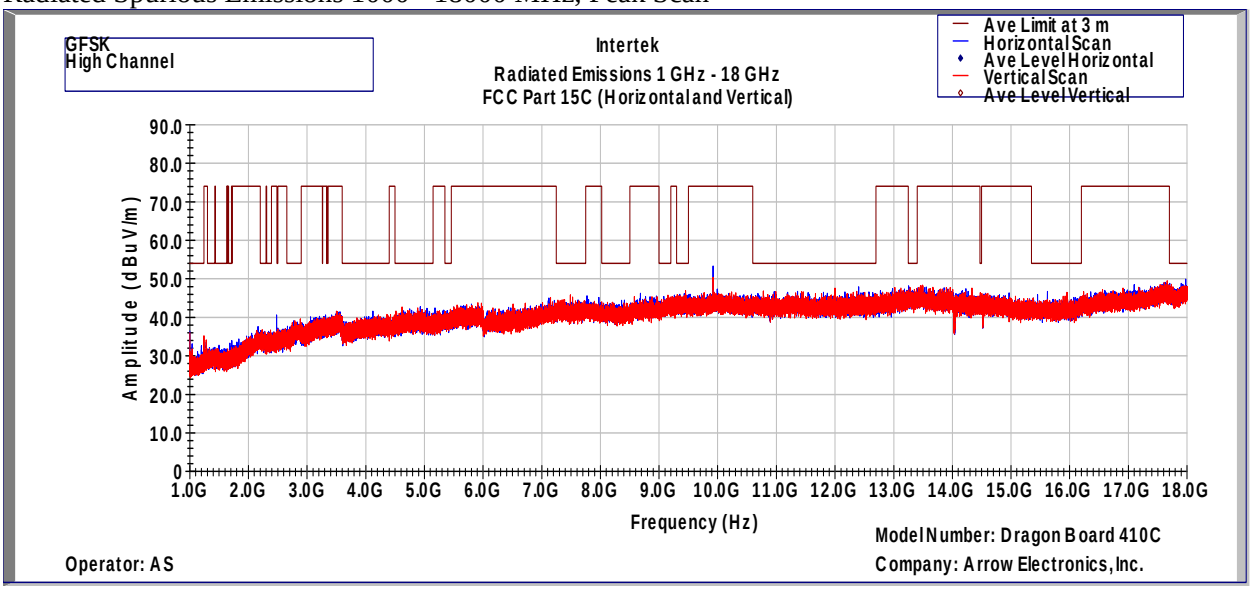
Radiated Spurious Emissions 30 MHz - 1000 MHz (Horizontal)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
148.502	40.0	43.5	-3.5	52.1	1.3	32.0	10.5	8.1
240.005	39.3	46.0	-6.7	46.9	1.9	32.0	10.5	12.0
247.506	42.5	46.0	-3.5	50.2	1.9	32.0	10.5	11.9
395.981	39.0	46.0	-7.0	42.2	2.6	32.0	10.5	15.7
445.483	40.5	46.0	-5.5	42.5	2.7	32.0	10.5	16.8
527.998	43.1	46.0	-2.9	43.8	3.0	32.1	10.5	18.0
539.994	39.3	46.0	-6.7	40.1	3.0	32.1	10.5	17.9
551.989	40.1	46.0	-5.9	41.0	3.0	32.1	10.5	17.8
600.004	37.4	46.0	-8.6	37.7	3.1	32.2	10.5	18.3
606.018	38.8	46.0	-7.2	39.0	3.1	32.2	10.5	18.4
623.996	37.4	46.0	-8.6	37.0	3.2	32.2	10.5	18.9
643.493	40.3	46.0	-5.7	39.4	3.3	32.2	10.5	19.3
644.042	39.2	46.0	-6.8	38.4	3.3	32.2	10.5	19.3
646.564	38.4	46.0	-7.6	37.5	3.3	32.3	10.5	19.3
648.019	37.4	46.0	-8.6	36.6	3.3	32.3	10.5	19.3
660.015	43.6	46.0	-2.4	42.7	3.4	32.3	10.5	19.3
672.011	39.0	46.0	-7.0	38.1	3.4	32.3	10.5	19.2
677.152	41.8	46.0	-4.2	41.1	3.5	32.3	10.5	19.1
711.199	40.1	46.0	-5.9	38.2	3.6	32.3	10.5	20.1
730.987	38.8	46.0	-7.2	36.7	3.7	32.2	10.5	20.2
742.497	39.3	46.0	-6.7	37.2	3.7	32.2	10.5	20.1
769.011	41.6	46.0	-4.4	39.2	3.8	32.2	10.5	20.3
775.833	37.7	46.0	-8.3	35.2	3.8	32.2	10.5	20.4
780.004	37.4	46.0	-8.6	34.8	3.8	32.1	10.5	20.5
792.000	37.5	46.0	-8.5	34.4	3.8	32.1	10.5	20.9
801.829	39.8	46.0	-6.2	36.4	3.8	32.1	10.5	21.1
859.091	37.0	46.0	-9.0	33.2	3.9	31.8	10.5	21.2
865.235	38.5	46.0	-7.5	34.5	3.9	31.8	10.5	21.4
902.903	38.3	46.0	-7.7	33.4	4.0	31.6	10.5	22.0
960.004	39.1	54.0	-14.9	33.3	4.1	31.1	10.5	22.4
963.366	38.5	54.0	-15.5	32.6	4.1	31.1	10.5	22.4

Radiated Spurious Emissions 30 MHz - 1000 MHz (Vertical)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
148.502	41.0	43.5	-2.5	53.1	1.3	32.0	10.5	8.1
182.969	39.6	43.5	-3.9	50.4	1.5	32.0	10.5	9.2
193.962	37.6	43.5	-5.9	48.1	1.5	32.0	10.5	9.5
205.893	36.3	43.5	-7.2	46.3	1.6	32.0	10.5	9.9
213.686	36.9	43.5	-6.6	46.3	1.7	32.0	10.5	10.4
216.014	39.5	46.0	-6.5	48.7	1.7	32.0	10.5	10.6
225.714	41.4	46.0	-4.6	49.8	1.8	32.0	10.5	11.4
240.005	41.7	46.0	-4.3	49.3	1.9	32.0	10.5	12.0
247.506	41.2	46.0	-4.8	48.9	1.9	32.0	10.5	11.9
264.029	38.3	46.0	-7.7	44.9	2.0	32.0	10.5	12.8
289.119	37.0	46.0	-9.0	43.4	2.2	32.0	10.5	12.9
291.674	36.3	46.0	-9.7	42.5	2.2	32.0	10.5	13.0
294.260	36.3	46.0	-9.7	42.4	2.3	32.0	10.5	13.1
296.815	36.4	46.0	-9.6	42.4	2.3	32.0	10.5	13.2
300.953	37.6	46.0	-8.4	43.4	2.3	32.0	10.5	13.4
445.516	36.5	46.0	-9.5	38.5	2.7	32.0	10.5	16.8
451.400	40.6	46.0	-5.4	42.5	2.7	32.0	10.5	17.0
475.004	37.0	46.0	-9.0	38.7	2.8	32.1	10.5	17.0
499.997	41.6	46.0	-4.4	43.0	2.9	32.1	10.5	17.3
527.998	42.2	46.0	-3.8	42.8	3.0	32.1	10.5	18.0
539.994	38.2	46.0	-7.8	39.1	3.0	32.1	10.5	17.9
551.989	39.8	46.0	-6.2	40.7	3.0	32.1	10.5	17.8
601.912	38.9	46.0	-7.1	39.2	3.1	32.2	10.5	18.3
660.015	37.8	46.0	-8.2	36.8	3.4	32.3	10.5	19.3
752.391	39.2	46.0	-6.8	37.3	3.7	32.2	10.5	19.9
790.027	37.6	46.0	-8.4	34.6	3.8	32.1	10.5	20.9
801.829	37.3	46.0	-8.7	33.9	3.8	32.1	10.5	21.1
827.631	37.6	46.0	-8.4	34.0	3.9	32.0	10.5	21.2
865.267	37.9	46.0	-8.1	33.8	3.9	31.8	10.5	21.4
902.871	38.8	46.0	-7.2	33.9	4.0	31.6	10.5	22.0
909.531	37.8	46.0	-8.2	32.5	4.0	31.5	10.5	22.3
913.250	37.2	46.0	-8.8	31.9	4.0	31.5	10.5	22.3
973.713	38.2	54.0	-15.8	31.9	4.1	31.0	10.5	22.6

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan



Note: Radiated emission measurements were performed up to 25GHz. No Emissions were identified when scanned from 18-25 GHz

Note: FS@3m = RA + AF + δ + CF - Preamp, (Peak)
Corrected Peak Scans are under the Average Limit of 54.

Results	**Complies**

Out-of-Band Radiated Spurious Emissions π/4-DQPSK

Test Results: 15.209 Radiated Spurious Emissions Low Channel, Tx at 2402MHz

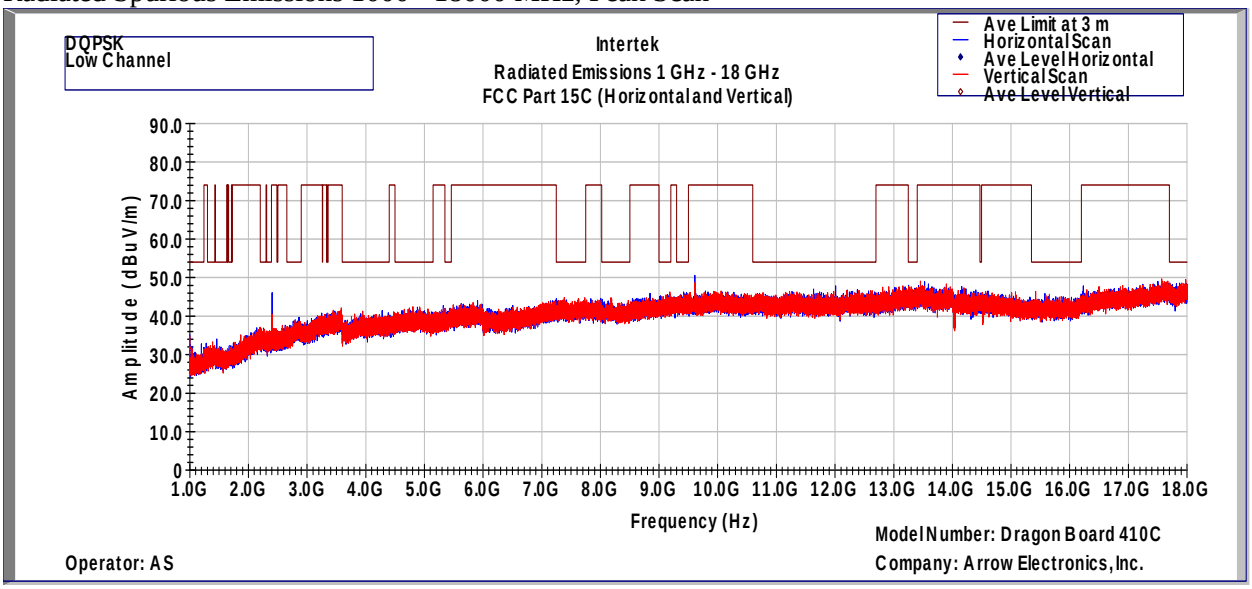
Radiated Spurious Emissions 30 MHz - 1000 MHz (Horizontal)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
148.502	40.1	43.5	-3.4	52.2	1.3	32.0	10.5	8.1
240.005	39.7	46.0	-6.3	47.3	1.9	32.0	10.5	12.0
247.506	42.0	46.0	-4.0	49.7	1.9	32.0	10.5	11.9
395.981	39.7	46.0	-6.3	42.9	2.6	32.0	10.5	15.7
445.483	40.2	46.0	-5.8	42.2	2.7	32.0	10.5	16.8
539.994	38.8	46.0	-7.2	39.6	3.0	32.1	10.5	17.9
552.022	40.2	46.0	-5.8	41.1	3.0	32.1	10.5	17.8
600.037	38.7	46.0	-7.3	39.0	3.1	32.2	10.5	18.3
606.051	40.6	46.0	-5.4	40.8	3.1	32.2	10.5	18.4
624.028	37.7	46.0	-8.3	37.4	3.2	32.2	10.5	18.9
643.493	40.2	46.0	-5.8	39.4	3.3	32.2	10.5	19.3
644.010	39.3	46.0	-6.7	38.4	3.3	32.2	10.5	19.3
646.564	38.5	46.0	-7.5	37.7	3.3	32.3	10.5	19.3
648.019	37.2	46.0	-8.8	36.4	3.3	32.3	10.5	19.3
672.011	38.1	46.0	-7.9	37.3	3.4	32.3	10.5	19.2
677.152	41.8	46.0	-4.2	41.0	3.5	32.3	10.5	19.1
711.231	39.8	46.0	-6.2	37.9	3.6	32.3	10.5	20.1
719.993	37.2	46.0	-8.8	35.1	3.6	32.3	10.5	20.2
730.987	39.8	46.0	-6.2	37.6	3.7	32.2	10.5	20.2
742.497	39.3	46.0	-6.7	37.2	3.7	32.2	10.5	20.1
744.017	38.6	46.0	-7.4	36.6	3.7	32.2	10.5	20.1
769.011	41.1	46.0	-4.9	38.7	3.8	32.2	10.5	20.3
775.801	39.8	46.0	-6.2	37.3	3.8	32.2	10.5	20.4
780.004	37.4	46.0	-8.6	34.7	3.8	32.1	10.5	20.5
790.027	37.9	46.0	-8.1	34.9	3.8	32.1	10.5	20.9
801.829	40.2	46.0	-5.8	36.9	3.8	32.1	10.5	21.1
859.124	37.2	46.0	-8.8	33.4	3.9	31.8	10.5	21.2
899.993	37.8	46.0	-8.2	33.1	4.0	31.6	10.5	21.9
960.004	39.3	54.0	-14.7	33.5	4.1	31.1	10.5	22.4

Radiated Spurious Emissions 30 MHz - 1000 MHz (Vertical)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
148.502	40.2	43.5	-3.3	52.3	1.3	32.0	10.5	8.1
182.775	39.4	43.5	-4.1	50.2	1.5	32.0	10.5	9.2
193.962	37.2	43.5	-6.3	47.7	1.5	32.0	10.5	9.5
216.014	40.5	46.0	-5.5	49.7	1.7	32.0	10.5	10.6
238.000	36.9	46.0	-9.1	44.5	1.9	32.0	10.5	12.0
247.506	41.6	46.0	-4.4	49.3	1.9	32.0	10.5	11.9
263.350	36.5	46.0	-9.5	43.2	2.0	32.0	10.5	12.8
263.996	37.9	46.0	-8.1	44.5	2.0	32.0	10.5	12.8
282.911	36.5	46.0	-9.5	43.1	2.2	32.0	10.5	12.7
287.923	36.6	46.0	-9.4	43.0	2.2	32.0	10.5	12.9
289.249	38.9	46.0	-7.1	45.3	2.2	32.0	10.5	12.9
294.325	37.8	46.0	-8.2	43.9	2.3	32.0	10.5	13.1
300.953	38.4	46.0	-7.6	44.2	2.3	32.0	10.5	13.4
323.296	36.9	46.0	-9.1	42.0	2.4	32.0	10.5	13.9
376.161	37.4	46.0	-8.6	41.0	2.5	32.0	10.5	15.3
413.797	39.3	46.0	-6.7	41.9	2.6	32.0	10.5	16.4
499.997	42.0	46.0	-4.0	43.3	2.9	32.1	10.5	17.3
527.998	41.4	46.0	-4.6	42.1	3.0	32.1	10.5	18.0
539.994	38.7	46.0	-7.3	39.5	3.0	32.1	10.5	17.9
551.989	39.0	46.0	-7.0	39.9	3.0	32.1	10.5	17.8
575.011	36.5	46.0	-9.5	36.5	3.0	32.2	10.5	18.6
601.912	38.8	46.0	-7.2	39.1	3.1	32.2	10.5	18.3
660.015	37.7	46.0	-8.3	36.7	3.4	32.3	10.5	19.3
714.755	39.1	46.0	-6.9	37.1	3.6	32.3	10.5	20.1
790.027	39.0	46.0	-7.0	36.0	3.8	32.1	10.5	20.9
801.829	37.1	46.0	-8.9	33.7	3.8	32.1	10.5	21.1
827.631	39.8	46.0	-6.2	36.3	3.9	32.0	10.5	21.2
865.267	36.5	46.0	-9.5	32.5	3.9	31.8	10.5	21.4
902.903	39.9	46.0	-6.1	35.0	4.0	31.6	10.5	22.0

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan



Note: Radiated emission measurements were performed up to 25GHz. No Emissions were identified when scanned from 18-25 GHz

Note: FS@3m = RA + AF + δ + CF - Preamp, (Peak)
Corrected Peak Scans are under the Average Limit of 54.

Test Results: 15.209 Radiated Spurious Emissions Mid Channel, Tx at 2440MHz

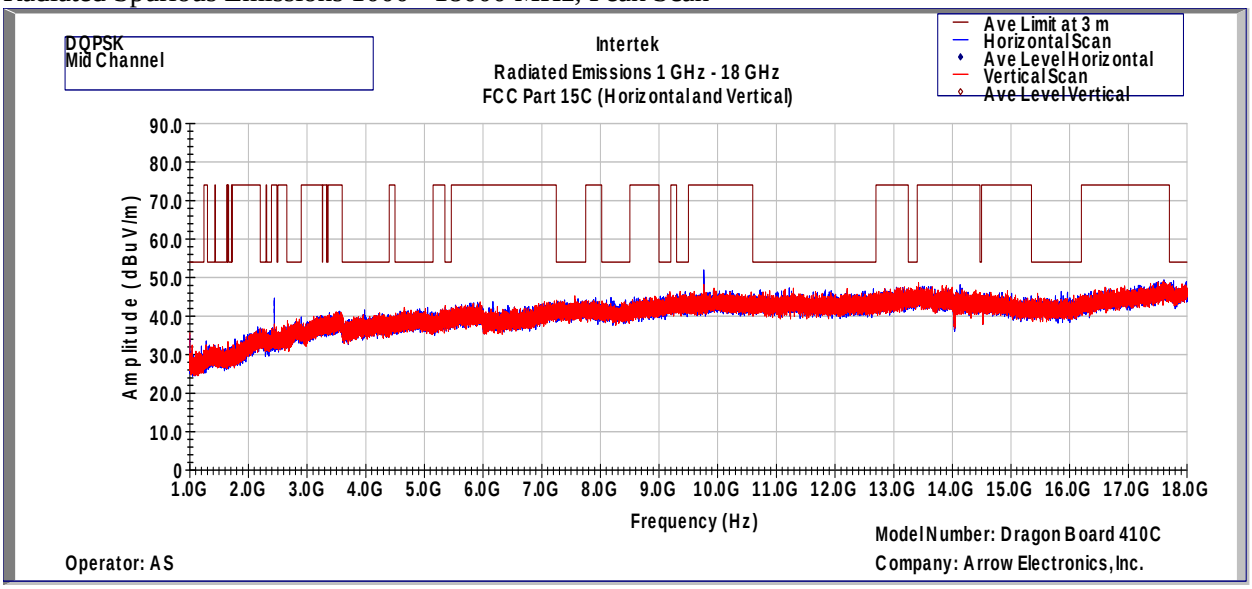
Radiated Spurious Emissions 30 MHz - 1000 MHz (Horizontal)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
148.502	40.1	43.5	-3.4	52.2	1.3	32.0	10.5	8.1
216.014	37.3	46.0	-8.7	46.5	1.7	32.0	10.5	10.6
240.005	40.1	46.0	-5.9	47.7	1.9	32.0	10.5	12.0
263.996	38.3	46.0	-7.7	44.9	2.0	32.0	10.5	12.8
396.013	39.0	46.0	-7.0	42.2	2.6	32.0	10.5	15.7
445.483	40.6	46.0	-5.4	42.6	2.7	32.0	10.5	16.8
539.994	38.9	46.0	-7.1	39.7	3.0	32.1	10.5	17.9
552.022	39.5	46.0	-6.5	40.4	3.0	32.1	10.5	17.8
600.037	37.6	46.0	-8.4	37.9	3.1	32.2	10.5	18.3
605.986	37.9	46.0	-8.1	38.1	3.1	32.2	10.5	18.4
624.028	37.5	46.0	-8.5	37.2	3.2	32.2	10.5	18.9
643.493	39.1	46.0	-6.9	38.3	3.3	32.2	10.5	19.3
644.010	39.0	46.0	-7.0	38.2	3.3	32.2	10.5	19.3
646.532	38.3	46.0	-7.7	37.4	3.3	32.3	10.5	19.3
648.019	36.8	46.0	-9.2	35.9	3.3	32.3	10.5	19.3
672.011	38.5	46.0	-7.5	37.7	3.4	32.3	10.5	19.2
677.152	40.4	46.0	-5.6	39.6	3.5	32.3	10.5	19.1
711.134	40.0	46.0	-6.0	38.1	3.6	32.3	10.5	20.1
730.987	39.8	46.0	-6.2	37.7	3.7	32.2	10.5	20.2
742.497	38.4	46.0	-7.6	36.3	3.7	32.2	10.5	20.1
768.978	40.4	46.0	-5.6	38.1	3.8	32.2	10.5	20.3
775.833	39.2	46.0	-6.8	36.7	3.8	32.2	10.5	20.4
779.972	36.9	46.0	-9.1	34.2	3.8	32.1	10.5	20.5
789.995	37.7	46.0	-8.3	34.7	3.8	32.1	10.5	20.9
801.829	41.1	46.0	-4.9	37.8	3.8	32.1	10.5	21.1
865.235	38.9	46.0	-7.1	34.9	3.9	31.8	10.5	21.4
902.871	37.8	46.0	-8.2	32.9	4.0	31.6	10.5	22.0
960.004	38.9	54.0	-15.1	33.1	4.1	31.1	10.5	22.4
984.027	38.4	54.0	-15.6	31.9	4.1	30.9	10.5	22.8

Radiated Spurious Emissions 30 MHz - 1000 MHz (Vertical)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
184.198	39.9	43.5	-3.6	50.7	1.5	32.0	10.5	9.3
193.962	37.3	43.5	-6.2	47.8	1.5	32.0	10.5	9.5
216.014	39.8	46.0	-6.2	49.1	1.7	32.0	10.5	10.6
240.037	41.9	46.0	-4.1	49.5	1.9	32.0	10.5	12.0
263.382	36.7	46.0	-9.3	43.3	2.0	32.0	10.5	12.8
264.029	38.3	46.0	-7.7	44.9	2.0	32.0	10.5	12.8
285.304	37.3	46.0	-8.7	43.8	2.2	32.0	10.5	12.8
287.891	37.2	46.0	-8.8	43.6	2.2	32.0	10.5	12.9
289.119	37.0	46.0	-9.0	43.4	2.2	32.0	10.5	12.9
293.129	37.6	46.0	-8.4	43.8	2.2	32.0	10.5	13.0
295.554	36.9	46.0	-9.1	42.9	2.3	32.0	10.5	13.1
298.140	36.6	46.0	-9.4	42.5	2.3	32.0	10.5	13.3
301.050	38.0	46.0	-8.0	43.9	2.3	32.0	10.5	13.4
376.161	36.9	46.0	-9.1	40.6	2.5	32.0	10.5	15.3
445.483	36.7	46.0	-9.3	38.7	2.7	32.0	10.5	16.8
475.004	36.7	46.0	-9.3	38.4	2.8	32.1	10.5	17.0
499.997	41.6	46.0	-4.4	43.0	2.9	32.1	10.5	17.3
527.998	41.6	46.0	-4.4	42.3	3.0	32.1	10.5	18.0
539.994	38.5	46.0	-7.5	39.3	3.0	32.1	10.5	17.9
552.022	39.5	46.0	-6.5	40.3	3.0	32.1	10.5	17.8
575.011	36.7	46.0	-9.3	36.8	3.0	32.2	10.5	18.6
601.944	39.0	46.0	-7.0	39.3	3.1	32.2	10.5	18.3
660.015	37.6	46.0	-8.4	36.6	3.4	32.3	10.5	19.3
789.995	38.2	46.0	-7.8	35.2	3.8	32.1	10.5	20.9
827.631	41.9	46.0	-4.1	38.4	3.9	32.0	10.5	21.2
865.235	36.5	46.0	-9.5	32.5	3.9	31.8	10.5	21.4
902.903	39.1	46.0	-6.9	34.2	4.0	31.6	10.5	22.0
996.023	40.3	54.0	-13.7	33.6	4.2	30.8	10.5	22.8

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan



Note: Radiated emission measurements were performed up to 25GHz. No Emissions were identified when scanned from 18-25 GHz

Note: FS@3m = RA + AF + δ + CF - Preamp, (Peak)
Corrected Peak Scans are under the Average Limit of 54.

Test Results: 15.209 Radiated Spurious Emissions High Channel, Tx at 2480MHz

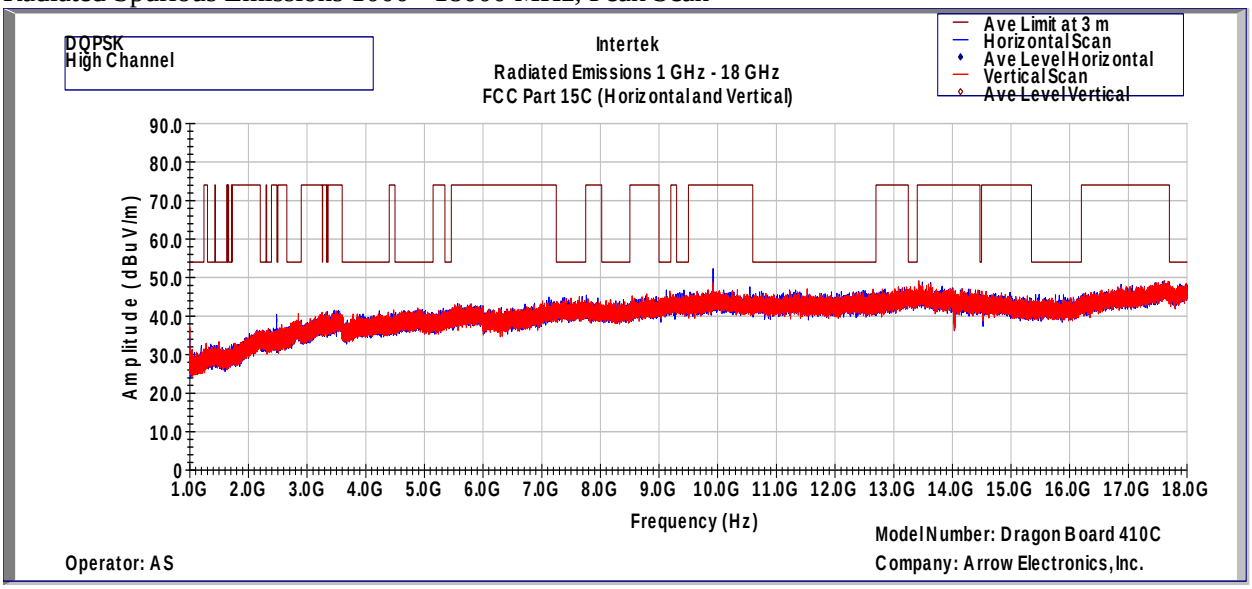
Radiated Spurious Emissions 30 MHz - 1000 MHz (Horizontal)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
148.502	39.8	43.5	-3.7	51.9	1.3	32.0	10.5	8.1
240.005	40.1	46.0	-5.9	47.7	1.9	32.0	10.5	12.0
263.996	38.0	46.0	-8.0	44.7	2.0	32.0	10.5	12.8
396.013	39.7	46.0	-6.3	42.9	2.6	32.0	10.5	15.7
445.516	40.2	46.0	-5.8	42.3	2.7	32.0	10.5	16.8
539.994	38.2	46.0	-7.8	39.0	3.0	32.1	10.5	17.9
552.022	40.1	46.0	-5.9	41.0	3.0	32.1	10.5	17.8
600.037	37.7	46.0	-8.3	38.1	3.1	32.2	10.5	18.3
606.018	39.0	46.0	-7.0	39.2	3.1	32.2	10.5	18.4
624.028	38.3	46.0	-7.7	38.0	3.2	32.2	10.5	18.9
643.493	40.8	46.0	-5.2	40.0	3.3	32.2	10.5	19.3
644.010	38.7	46.0	-7.3	37.8	3.3	32.2	10.5	19.3
646.500	37.2	46.0	-8.8	36.4	3.3	32.3	10.5	19.3
672.011	37.9	46.0	-8.1	37.1	3.4	32.3	10.5	19.2
677.152	40.5	46.0	-5.5	39.8	3.5	32.3	10.5	19.1
711.199	39.2	46.0	-6.8	37.3	3.6	32.3	10.5	20.1
731.019	38.9	46.0	-7.1	36.7	3.7	32.2	10.5	20.2
742.497	39.0	46.0	-7.0	36.8	3.7	32.2	10.5	20.1
743.985	38.6	46.0	-7.4	36.6	3.7	32.2	10.5	20.1
768.978	41.6	46.0	-4.4	39.2	3.8	32.2	10.5	20.3
775.833	38.7	46.0	-7.3	36.2	3.8	32.2	10.5	20.4
780.004	37.4	46.0	-8.6	34.8	3.8	32.1	10.5	20.5
789.995	37.6	46.0	-8.4	34.6	3.8	32.1	10.5	20.9
801.829	40.8	46.0	-5.2	37.5	3.8	32.1	10.5	21.1
827.631	41.3	46.0	-4.7	37.7	3.9	32.0	10.5	21.2
859.124	36.9	46.0	-9.1	33.1	3.9	31.8	10.5	21.2
865.267	38.5	46.0	-7.5	34.4	3.9	31.8	10.5	21.4
900.058	37.8	46.0	-8.2	33.1	4.0	31.6	10.5	21.9
960.004	40.2	54.0	-13.8	34.4	4.1	31.1	10.5	22.4

Radiated Spurious Emissions 30 MHz - 1000 MHz (Vertical)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
183.163	39.6	43.5	-3.9	50.4	1.5	32.0	10.5	9.2
189.306	37.5	43.5	-6.0	48.1	1.5	32.0	10.5	9.4
193.962	36.7	43.5	-6.8	47.2	1.5	32.0	10.5	9.5
216.014	39.4	46.0	-6.6	48.6	1.7	32.0	10.5	10.6
225.714	41.9	46.0	-4.1	50.2	1.8	32.0	10.5	11.4
239.100	36.7	46.0	-9.3	44.3	1.9	32.0	10.5	12.0
240.005	41.3	46.0	-4.7	48.9	1.9	32.0	10.5	12.0
247.506	41.5	46.0	-4.5	49.2	1.9	32.0	10.5	11.9
263.382	36.6	46.0	-9.4	43.2	2.0	32.0	10.5	12.8
263.996	37.3	46.0	-8.7	44.0	2.0	32.0	10.5	12.8
282.782	37.7	46.0	-8.3	44.3	2.2	32.0	10.5	12.7
289.184	36.7	46.0	-9.3	43.1	2.2	32.0	10.5	12.9
292.999	36.3	46.0	-9.7	42.5	2.2	32.0	10.5	13.0
301.050	37.8	46.0	-8.2	43.6	2.3	32.0	10.5	13.4
338.589	36.2	46.0	-9.8	40.9	2.4	32.0	10.5	14.4
376.193	36.7	46.0	-9.3	40.3	2.5	32.0	10.5	15.3
445.516	36.5	46.0	-9.5	38.5	2.7	32.0	10.5	16.8
451.465	41.2	46.0	-4.8	43.0	2.7	32.0	10.5	17.0
474.971	37.2	46.0	-8.8	39.0	2.8	32.1	10.5	17.0
499.997	41.7	46.0	-4.3	43.0	2.9	32.1	10.5	17.3
539.994	40.2	46.0	-5.8	41.0	3.0	32.1	10.5	17.9
551.989	38.9	46.0	-7.1	39.8	3.0	32.1	10.5	17.8
601.912	38.7	46.0	-7.3	39.0	3.1	32.2	10.5	18.3
660.015	37.1	46.0	-8.9	36.2	3.4	32.3	10.5	19.3
752.359	37.1	46.0	-8.9	35.2	3.7	32.2	10.5	19.9
789.995	38.1	46.0	-7.9	35.1	3.8	32.1	10.5	20.9
801.829	36.6	46.0	-9.4	33.2	3.8	32.1	10.5	21.1
827.663	36.4	46.0	-9.6	32.9	3.9	32.0	10.5	21.2
865.267	36.9	46.0	-9.1	32.9	3.9	31.8	10.5	21.4
902.903	40.4	46.0	-5.6	35.5	4.0	31.6	10.5	22.0

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan



Note: Radiated emission measurements were performed up to 25GHz. No Emissions were identified when scanned from 18-25 GHz

Note: FS@3m = RA + AF + δ + CF - Preamp, (Peak)
Corrected Peak Scans are under the Average Limit of 54.

Results	**Complies**

Out-of-Band Radiated Spurious Emissions 8DPSK

Test Results: 15.209 Radiated Spurious Emissions Low Channel, Tx at 2402MHz

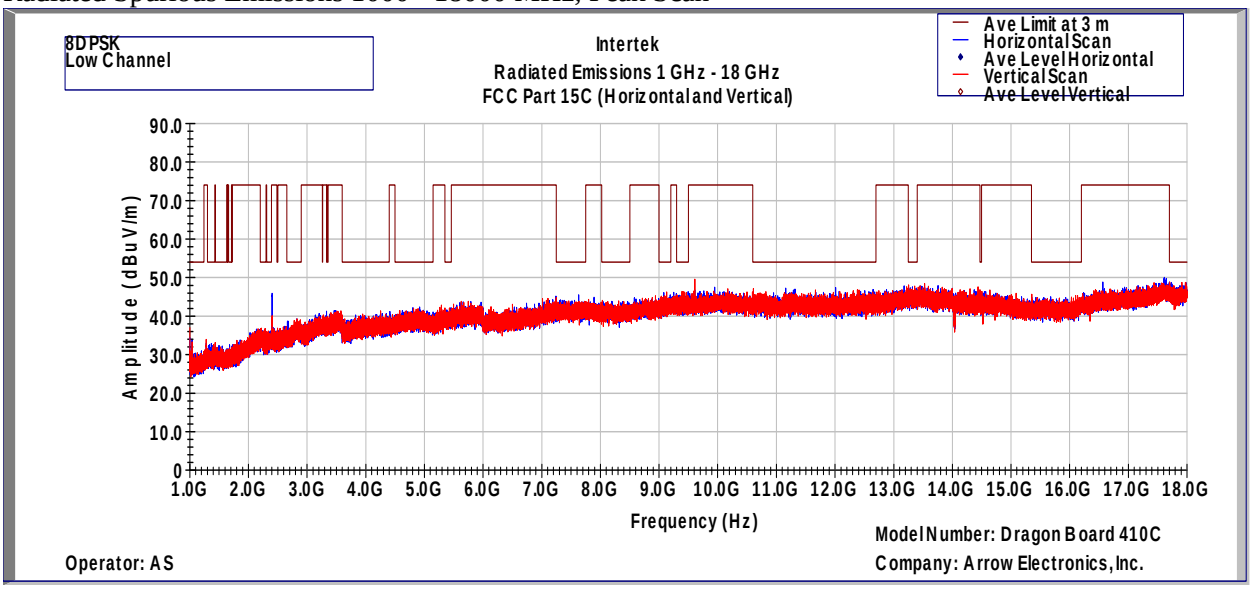
Radiated Spurious Emissions 30 MHz - 1000 MHz (Horizontal)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
216.014	37.4	46.0	-8.6	46.7	1.7	32.0	10.5	10.6
240.005	39.5	46.0	-6.5	47.1	1.9	32.0	10.5	12.0
264.029	38.2	46.0	-7.8	44.8	2.0	32.0	10.5	12.8
395.981	40.3	46.0	-5.7	43.5	2.6	32.0	10.5	15.7
445.516	40.6	46.0	-5.4	42.6	2.7	32.0	10.5	16.8
539.994	37.9	46.0	-8.1	38.7	3.0	32.1	10.5	17.9
552.022	40.1	46.0	-5.9	41.0	3.0	32.1	10.5	17.8
600.004	37.4	46.0	-8.6	37.7	3.1	32.2	10.5	18.3
605.986	38.5	46.0	-7.5	38.7	3.1	32.2	10.5	18.4
624.028	37.6	46.0	-8.4	37.2	3.2	32.2	10.5	18.9
643.525	39.7	46.0	-6.3	38.8	3.3	32.2	10.5	19.3
644.010	38.9	46.0	-7.1	38.0	3.3	32.2	10.5	19.3
646.532	38.1	46.0	-7.9	37.3	3.3	32.3	10.5	19.3
672.011	37.9	46.0	-8.1	37.1	3.4	32.3	10.5	19.2
677.152	41.2	46.0	-4.8	40.4	3.5	32.3	10.5	19.1
711.134	39.7	46.0	-6.3	37.8	3.6	32.3	10.5	20.1
730.987	39.9	46.0	-6.1	37.7	3.7	32.2	10.5	20.2
742.497	39.1	46.0	-6.9	37.0	3.7	32.2	10.5	20.1
752.391	37.7	46.0	-8.3	35.8	3.7	32.2	10.5	19.9
768.978	41.4	46.0	-4.6	39.0	3.8	32.2	10.5	20.3
775.865	38.9	46.0	-7.1	36.4	3.8	32.2	10.5	20.4
780.004	37.6	46.0	-8.4	35.0	3.8	32.1	10.5	20.5
789.995	38.3	46.0	-7.7	35.3	3.8	32.1	10.5	20.9
801.829	41.0	46.0	-5.0	37.7	3.8	32.1	10.5	21.1
827.599	37.9	46.0	-8.1	34.4	3.9	32.0	10.5	21.2
865.267	38.9	46.0	-7.1	34.9	3.9	31.8	10.5	21.4
902.903	38.7	46.0	-7.3	33.8	4.0	31.6	10.5	22.0
960.004	39.4	54.0	-14.6	33.6	4.1	31.1	10.5	22.4

Radiated Spurious Emissions 30 MHz - 1000 MHz (Vertical)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
182.937	39.8	43.5	-3.7	50.6	1.5	32.0	10.5	9.2
193.962	37.7	43.5	-5.8	48.2	1.5	32.0	10.5	9.5
209.806	36.5	43.5	-7.0	46.2	1.7	32.0	10.5	10.2
216.014	39.7	46.0	-6.3	48.9	1.7	32.0	10.5	10.6
247.506	40.8	46.0	-5.2	48.5	1.9	32.0	10.5	11.9
263.382	36.4	46.0	-9.6	43.0	2.0	32.0	10.5	12.8
264.029	38.3	46.0	-7.7	44.9	2.0	32.0	10.5	12.8
285.272	37.0	46.0	-9.0	43.4	2.2	32.0	10.5	12.8
286.533	36.9	46.0	-9.1	43.4	2.2	32.0	10.5	12.8
289.184	36.4	46.0	-9.6	42.8	2.2	32.0	10.5	12.9
290.445	38.9	46.0	-7.1	45.2	2.2	32.0	10.5	12.9
293.064	37.6	46.0	-8.4	43.8	2.2	32.0	10.5	13.0
300.889	36.8	46.0	-9.2	42.6	2.3	32.0	10.5	13.4
303.055	36.6	46.0	-9.4	42.4	2.3	32.0	10.5	13.4
445.516	37.4	46.0	-8.6	39.4	2.7	32.0	10.5	16.8
475.004	36.4	46.0	-9.6	38.2	2.8	32.1	10.5	17.0
539.994	39.4	46.0	-6.6	40.2	3.0	32.1	10.5	17.9
552.022	39.6	46.0	-6.4	40.5	3.0	32.1	10.5	17.8
574.978	36.6	46.0	-9.4	36.6	3.0	32.2	10.5	18.6
601.912	38.6	46.0	-7.4	38.9	3.1	32.2	10.5	18.3
660.015	37.9	46.0	-8.1	36.9	3.4	32.3	10.5	19.3
752.391	39.0	46.0	-7.0	37.1	3.7	32.2	10.5	19.9
790.027	38.8	46.0	-7.2	35.8	3.8	32.1	10.5	20.9
801.829	36.6	46.0	-9.4	33.3	3.8	32.1	10.5	21.1
827.631	36.7	46.0	-9.3	33.1	3.9	32.0	10.5	21.2
902.903	40.1	46.0	-5.9	35.1	4.0	31.6	10.5	22.0
997.025	38.6	54.0	-15.4	31.9	4.2	30.8	10.5	22.8

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan



Note: Radiated emission measurements were performed up to 25GHz. No Emissions were identified when scanned from 18-25 GHz

Note: FS@3m = RA + AF + δ + CF - Preamp, (Peak)
Corrected Peak Scans are under the Average Limit of 54.

Test Results: 15.209 Radiated Spurious Emissions Mid Channel, Tx at 2440MHz

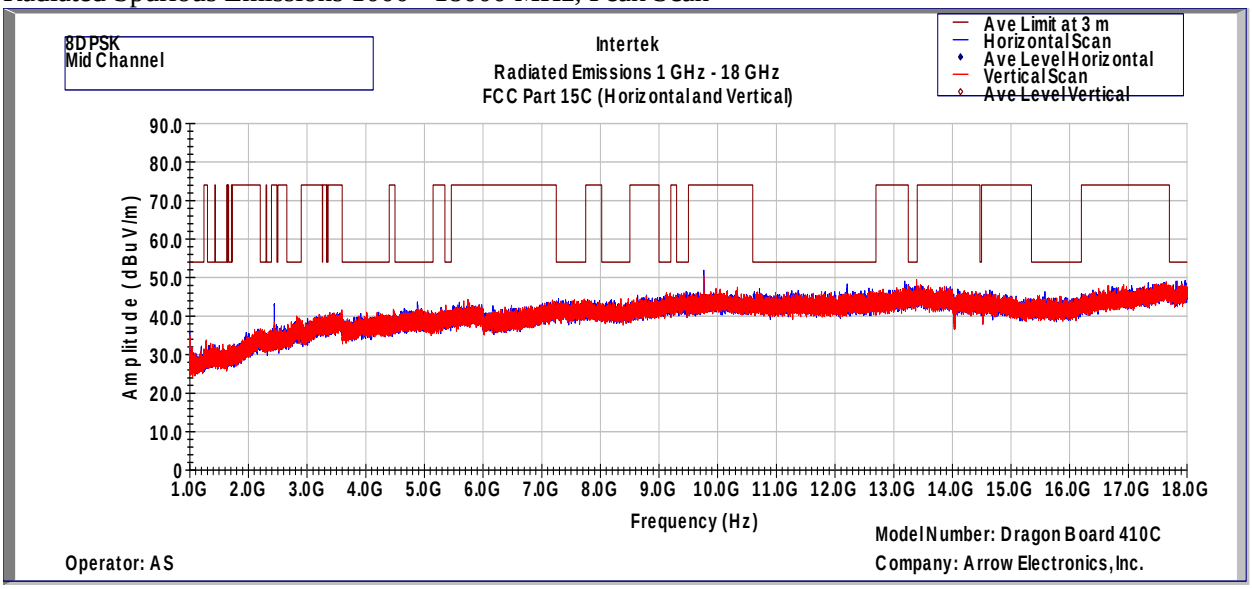
Radiated Spurious Emissions 30 MHz - 1000 MHz (Horizontal)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
148.502	39.8	43.5	-3.7	51.9	1.3	32.0	10.5	8.1
240.005	39.0	46.0	-7.0	46.6	1.9	32.0	10.5	12.0
247.506	42.0	46.0	-4.0	49.7	1.9	32.0	10.5	11.9
263.996	38.8	46.0	-7.2	45.4	2.0	32.0	10.5	12.8
395.981	40.2	46.0	-5.8	43.4	2.6	32.0	10.5	15.7
445.483	39.9	46.0	-6.1	42.0	2.7	32.0	10.5	16.8
539.994	38.4	46.0	-7.6	39.2	3.0	32.1	10.5	17.9
551.989	40.5	46.0	-5.5	41.4	3.0	32.1	10.5	17.8
600.004	37.7	46.0	-8.3	38.1	3.1	32.2	10.5	18.3
606.018	38.3	46.0	-7.7	38.5	3.1	32.2	10.5	18.4
643.525	40.9	46.0	-5.1	40.0	3.3	32.2	10.5	19.3
644.010	39.6	46.0	-6.4	38.7	3.3	32.2	10.5	19.3
646.564	39.6	46.0	-6.4	38.7	3.3	32.3	10.5	19.3
648.019	38.1	46.0	-7.9	37.2	3.3	32.3	10.5	19.3
672.011	38.4	46.0	-7.6	37.6	3.4	32.3	10.5	19.2
677.152	40.7	46.0	-5.3	39.9	3.5	32.3	10.5	19.1
711.134	40.4	46.0	-5.6	38.5	3.6	32.3	10.5	20.1
719.993	37.8	46.0	-8.2	35.7	3.6	32.3	10.5	20.2
730.987	39.4	46.0	-6.6	37.3	3.7	32.2	10.5	20.2
742.465	39.4	46.0	-6.6	37.3	3.7	32.2	10.5	20.1
743.985	37.6	46.0	-8.4	35.6	3.7	32.2	10.5	20.1
769.011	41.4	46.0	-4.6	39.0	3.8	32.2	10.5	20.3
775.833	40.3	46.0	-5.7	37.8	3.8	32.2	10.5	20.4
801.829	40.8	46.0	-5.2	37.5	3.8	32.1	10.5	21.1
865.267	39.5	46.0	-6.5	35.4	3.9	31.8	10.5	21.4
899.993	37.8	46.0	-8.2	33.0	4.0	31.6	10.5	21.9
905.134	38.0	46.0	-8.0	33.0	4.0	31.6	10.5	22.1
940.959	37.7	46.0	-8.3	31.9	4.0	31.3	10.5	22.5
960.036	39.2	54.0	-14.8	33.4	4.1	31.1	10.5	22.4
981.020	38.5	54.0	-15.5	32.0	4.1	31.0	10.5	22.8

Radiated Spurious Emissions 30 MHz - 1000 MHz (Vertical)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
73.100	36.3	40.0	-3.7	50.0	0.9	32.1	10.5	6.9
182.549	38.9	43.5	-4.6	49.7	1.5	32.0	10.5	9.2
193.962	36.4	43.5	-7.1	46.9	1.5	32.0	10.5	9.5
216.014	39.3	46.0	-6.7	48.6	1.7	32.0	10.5	10.6
225.714	38.4	46.0	-7.6	46.7	1.8	32.0	10.5	11.4
240.037	42.0	46.0	-4.0	49.5	1.9	32.0	10.5	12.0
247.506	41.1	46.0	-4.9	48.8	1.9	32.0	10.5	11.9
263.382	37.7	46.0	-8.3	44.4	2.0	32.0	10.5	12.8
264.029	38.5	46.0	-7.5	45.1	2.0	32.0	10.5	12.8
277.609	36.3	46.0	-9.7	42.9	2.1	32.0	10.5	12.7
286.533	36.6	46.0	-9.4	43.1	2.2	32.0	10.5	12.8
289.152	36.2	46.0	-9.8	42.6	2.2	32.0	10.5	12.9
290.380	37.2	46.0	-8.8	43.5	2.2	32.0	10.5	12.9
292.935	39.1	46.0	-6.9	45.3	2.2	32.0	10.5	13.0
294.228	37.7	46.0	-8.3	43.8	2.3	32.0	10.5	13.1
300.630	36.9	46.0	-9.1	42.7	2.3	32.0	10.5	13.4
445.483	36.6	46.0	-9.4	38.6	2.7	32.0	10.5	16.8
475.004	36.3	46.0	-9.7	38.0	2.8	32.1	10.5	17.0
499.997	41.9	46.0	-4.1	43.3	2.9	32.1	10.5	17.3
527.998	42.0	46.0	-4.0	42.7	3.0	32.1	10.5	18.0
539.994	38.9	46.0	-7.1	39.7	3.0	32.1	10.5	17.9
552.022	39.5	46.0	-6.5	40.4	3.0	32.1	10.5	17.8
601.912	36.5	46.0	-9.5	36.8	3.1	32.2	10.5	18.3
660.015	37.4	46.0	-8.6	36.5	3.4	32.3	10.5	19.3
790.027	37.4	46.0	-8.6	34.3	3.8	32.1	10.5	20.9
801.829	36.7	46.0	-9.3	33.3	3.8	32.1	10.5	21.1
811.206	36.3	46.0	-9.7	32.8	3.8	32.1	10.5	21.2
827.631	40.2	46.0	-5.8	36.6	3.9	32.0	10.5	21.2
902.903	38.8	46.0	-7.2	33.9	4.0	31.6	10.5	22.0
913.347	37.8	46.0	-8.2	32.5	4.0	31.5	10.5	22.3

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan



Note: Radiated emission measurements were performed up to 25GHz. No Emissions were identified when scanned from 18-25 GHz

Note: FS@3m = RA + AF + δ + CF - Preamp, (Peak)
Corrected Peak Scans are under the Average Limit of 54.

Test Results: 15.209 Radiated Spurious Emissions High Channel, Tx at 2480MHz

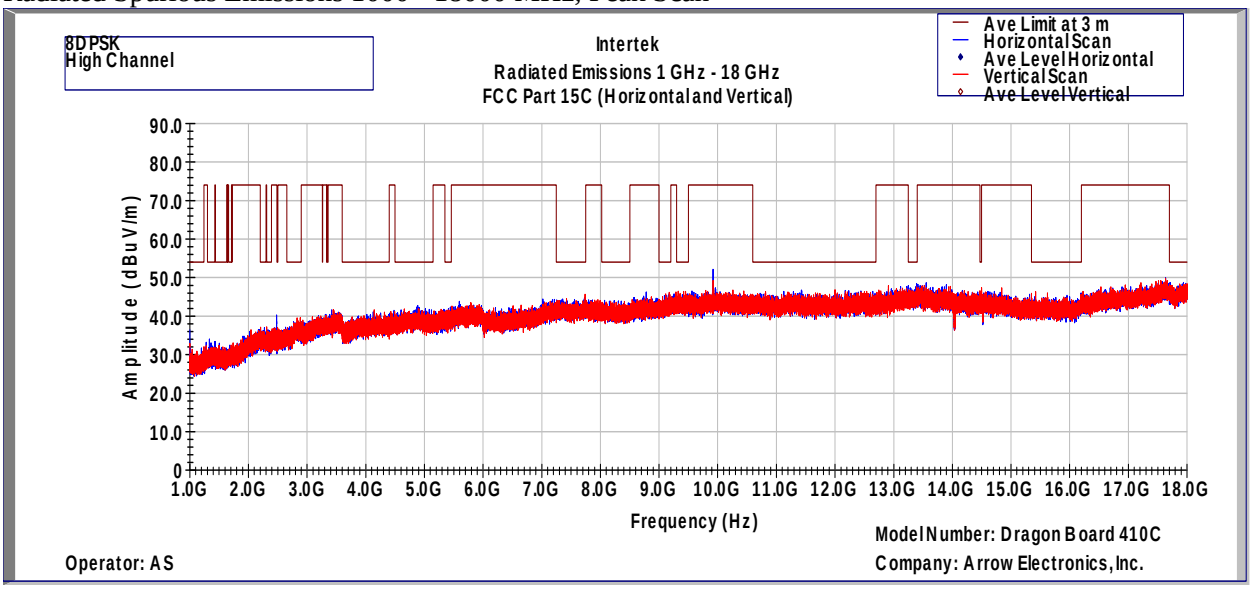
Radiated Spurious Emissions 30 MHz - 1000 MHz (Horizontal)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
148.502	40.0	43.5	-3.5	52.1	1.3	32.0	10.5	8.1
240.005	40.1	46.0	-5.9	47.7	1.9	32.0	10.5	12.0
264.029	37.9	46.0	-8.1	44.5	2.0	32.0	10.5	12.8
395.981	40.2	46.0	-5.8	43.4	2.6	32.0	10.5	15.7
445.516	41.5	46.0	-4.5	43.5	2.7	32.0	10.5	16.8
539.961	39.0	46.0	-7.0	39.8	3.0	32.1	10.5	17.9
551.989	40.2	46.0	-5.8	41.1	3.0	32.1	10.5	17.8
600.004	37.2	46.0	-8.8	37.5	3.1	32.2	10.5	18.3
606.018	38.4	46.0	-7.6	38.6	3.1	32.2	10.5	18.4
624.028	37.9	46.0	-8.1	37.5	3.2	32.2	10.5	18.9
643.525	40.4	46.0	-5.6	39.6	3.3	32.2	10.5	19.3
644.010	39.2	46.0	-6.8	38.3	3.3	32.2	10.5	19.3
646.564	37.0	46.0	-9.0	36.1	3.3	32.3	10.5	19.3
648.052	37.3	46.0	-8.7	36.4	3.3	32.3	10.5	19.3
672.011	39.9	46.0	-6.1	39.1	3.4	32.3	10.5	19.2
677.184	40.3	46.0	-5.7	39.5	3.5	32.3	10.5	19.1
711.134	41.5	46.0	-4.5	39.6	3.6	32.3	10.5	20.1
730.987	39.3	46.0	-6.7	37.2	3.7	32.2	10.5	20.2
742.497	41.1	46.0	-4.9	39.0	3.7	32.2	10.5	20.1
743.985	39.2	46.0	-6.8	37.2	3.7	32.2	10.5	20.1
769.011	41.0	46.0	-5.0	38.6	3.8	32.2	10.5	20.3
775.865	39.6	46.0	-6.4	37.1	3.8	32.2	10.5	20.4
790.027	37.6	46.0	-8.4	34.6	3.8	32.1	10.5	20.9
801.829	40.3	46.0	-5.7	37.0	3.8	32.1	10.5	21.1
902.838	38.3	46.0	-7.7	33.4	4.0	31.6	10.5	22.0
905.134	38.2	46.0	-7.8	33.2	4.0	31.6	10.5	22.1
911.989	37.1	46.0	-8.9	31.8	4.0	31.5	10.5	22.3
932.876	38.1	46.0	-7.9	32.3	4.0	31.4	10.5	22.6
960.036	39.4	54.0	-14.6	33.6	4.1	31.1	10.5	22.4

Radiated Spurious Emissions 30 MHz - 1000 MHz (Vertical)

Frequency	Peak FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
186.784	39.8	43.5	-3.7	50.4	1.5	32.0	10.5	9.4
193.962	37.7	43.5	-5.8	48.2	1.5	32.0	10.5	9.5
216.014	40.0	46.0	-6.0	49.3	1.7	32.0	10.5	10.6
225.746	39.0	46.0	-7.0	47.4	1.8	32.0	10.5	11.4
230.273	36.6	46.0	-9.4	44.5	1.8	32.0	10.5	11.8
240.005	42.0	46.0	-4.0	49.5	1.9	32.0	10.5	12.0
247.506	41.3	46.0	-4.7	49.0	1.9	32.0	10.5	11.9
263.996	38.6	46.0	-7.4	45.3	2.0	32.0	10.5	12.8
285.336	36.7	46.0	-9.3	43.1	2.2	32.0	10.5	12.8
287.858	36.5	46.0	-9.5	42.9	2.2	32.0	10.5	12.9
289.119	36.6	46.0	-9.4	43.0	2.2	32.0	10.5	12.9
290.477	36.7	46.0	-9.3	43.0	2.2	32.0	10.5	12.9
291.674	37.4	46.0	-8.6	43.7	2.2	32.0	10.5	13.0
292.999	36.6	46.0	-9.4	42.8	2.2	32.0	10.5	13.0
295.489	37.4	46.0	-8.6	43.4	2.3	32.0	10.5	13.1
298.076	37.1	46.0	-8.9	43.0	2.3	32.0	10.5	13.3
445.516	37.3	46.0	-8.7	39.3	2.7	32.0	10.5	16.8
451.400	40.8	46.0	-5.2	42.6	2.7	32.0	10.5	17.0
499.997	42.0	46.0	-4.0	43.4	2.9	32.1	10.5	17.3
527.998	41.4	46.0	-4.6	42.1	3.0	32.1	10.5	18.0
539.994	39.5	46.0	-6.5	40.3	3.0	32.1	10.5	17.9
551.989	39.4	46.0	-6.6	40.3	3.0	32.1	10.5	17.8
601.912	36.9	46.0	-9.1	37.2	3.1	32.2	10.5	18.3
660.015	38.3	46.0	-7.7	37.3	3.4	32.3	10.5	19.3
677.152	42.4	46.0	-3.6	41.6	3.5	32.3	10.5	19.1
769.011	37.2	46.0	-8.8	34.9	3.8	32.2	10.5	20.3
790.027	38.6	46.0	-7.4	35.6	3.8	32.1	10.5	20.9
801.829	36.2	46.0	-9.8	32.9	3.8	32.1	10.5	21.1
827.631	36.4	46.0	-9.6	32.8	3.9	32.0	10.5	21.2
865.267	37.4	46.0	-8.6	33.4	3.9	31.8	10.5	21.4
902.903	39.3	46.0	-6.7	34.4	4.0	31.6	10.5	22.0
999.968	38.4	54.0	-15.6	31.7	4.2	30.8	10.5	22.8

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan



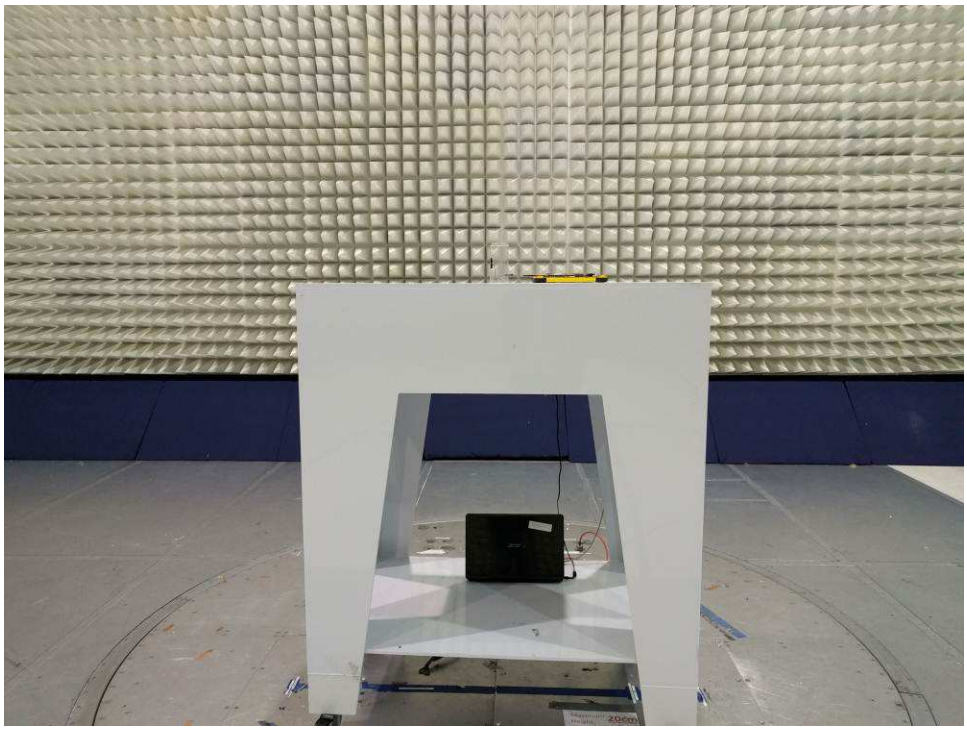
Note: Radiated emission measurements were performed up to 25GHz. No Emissions were identified when scanned from 18-25 GHz

Note: FS@3m = RA + AF + δ + CF - Preamp, (Peak)
Corrected Peak Scans are under the Average Limit of 54.

Results	**Complies**

4.7.5 Test Setup Photographs

The following photographs show the testing configurations used.



5.0 List of Test Equipment

Measurement equipment used for emission compliance testing utilized the equipment on the following list:

Equipment	Manufacturer	Model/Type	Asset #	Cal Int	Cal Due
Spectrum Analyzer	Rohde and Schwarz	FSU	ITS00913	12	01/05/17
EMI Receiver	Rohde and Schwarz	ESU	ITS 00961	12	06/02/16
Spectrum Analyzer	Rohde and Schwarz	FSP	ITS 01200	12	02/26/17
Pre-Amplifier	Sonoma Instrument	310N	ITS 00942	12	01/07/17
Pre-Amplifier (1-18GHz)	Miteq	AMF-4D-001180-24-10P	ITS 00526	12	10/06/16
Pre-Amplifier (18-40GHz)	Miteq	JSD44-18004000-305P	ITS 00921	12	06/18/16
BI-Log Antenna	Antenna Research	LPB-2513	ITS 00355	12	08/11/16
Pyramidal Horn Antenna	EMCO	3160-09	ITS 00571	#	#
Horn Antenna	EMCO	3115	ITS 01595	12	02/08/17

No Calibration required

6.0 Document History

Revision/ Job Number	Writer Initials	Reviewers Initials	Date	Change
1.0 / G102241369	AS	KK	March 21, 2016	Original document