



## TEST REPORT

Report Number: 100712625ATL-002

April 27, 2012

**Product Name: Sirius XM Lynx Portable Radio**

**Product Model Number: SXi1**

Standard: FCC Part 15, Subpart C, Intentional Radiators (15.247)

Tested by:  
Intertek Testing Services NA Inc.  
1950 Evergreen Blvd., Suite 100  
Duluth, GA 30096

Client:  
SIRIUS XM Radio Inc  
1500 Eckington PL NE  
Washington, DC 20002  
Contact: Beejay Jolayemi  
Phone: 202.680.4288  
Fax: 202.380.4091

Report prepared by:

Troy Ihle  
Project Engineer

Report reviewed by:

Jeremy O. Pickens  
Senior Staff Engineer - EMC

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## 1.0 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 3.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested complies with the testing indicated below. The results obtained in this test report pertain only to the item(s) tested. Refer to the Test Summary for the specific details.

## 2.0 Test Summary

Section	Test Full Name	Test Date	Result
3.0	Description of Equipment Under Test		
4.0	System setup including cable interconnection details, support equipment and simplified block diagram.		
5.0	Transmitter Information for equipment operating under Parts 11, 15 and 18 of the rules (Transmitter Info -		
6.0	§ 15.247(b)(3) Conducted Power	4/26/2012	PASS
7.0	§ 15.247(d) Conducted Spurious Emissions	4/26/2012	PASS
8.0	§ 15.247(d) Radiated Spurious Emissions	4/23-25/2012	PASS
9.0	Test Equipment List		
10.0	Revision History		

### 3.0 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Satellite Radio	SIRIUS XM Satellite Radio	SXi1	NA

EUT receive date:	April 20, 2012
EUT receive condition:	Good

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Satellite Radio	SIRIUS XM Satellite Radio	SXi1	<b>Lynx A</b> , Radio ID: LC9N040Q, Rev 05C(HW), FROY 60 (SW)
Satellite Radio	SIRIUS XM Satellite Radio	SXi1	<b>Lynx B</b> , Radio ID: J78P04HU, Rev 07(HW), FROY 80 (SW)
Satellite Radio	SIRIUS XM Satellite Radio	SXi1	<b>Lynx B1</b> , Radio ID: J78P04CP, Rev 07(HW), FROY 80 (SW)

EUT receive date:	April 20, 2012
EUT receive condition:	Good

Description of EUT provided by Client:

Sirius XM Lynx Hardware Features

- Revolutionary SiriusXM *PowerConnect*<sup>™</sup> FM Transmitter works through your vehicle's radio\* with easy Do-It-Yourself Installation. The color-coded Vehicle Dock makes it simple to connect.
- Customize your display by choosing the backlight color theme that matches your mood or vehicle dash lights.
- Personalize your radio by choosing the trim ring that reflects your taste or complements your vehicle interior.
- View artist name, song title, and channel information on the large color display.
- Browse programs, artists, and songs playing on other channels without having to change the channel.
- One-Touch Jump<sup>™</sup> to traffic and weather of the 20 most congested cities, or to the previous channel to which you were listening.
- Save and enjoy fast access to your favorite channels.
- Lock and unlock channels with easy-to-use parental controls.
- Complete *PowerConnect* Vehicle Kit included.
- Universal docking capability - add accessories for your home, office, additional vehicles or even outdoors.
- Connectivity could be achieved via Satellite, WiFi, Bluetooth & USB.

Description of EUT exercising:

The EUT was powered with a fully charged 3.7Vdc Li-ion battery. The EUT was in a continuous transmit mode during testing.

<b>Mode of Operation</b>	<b>Frequency Range (MHz)</b>	<b>Number of Channels</b>	<b>Channel Separation (kHz)</b>
Bluetooth	2400-2483.5	NA	NA

Applicant Information:

XM Radio Inc.  
1500 Eckington PI, NE  
Washington, DC 20002

Manufacturer Information:

WNC (Kunshan) Corp.  
NO. 88 Central Avenue, Area B, Kunshan Export Processing Zone  
Kunshan City, Jiangsu, China

#### 4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

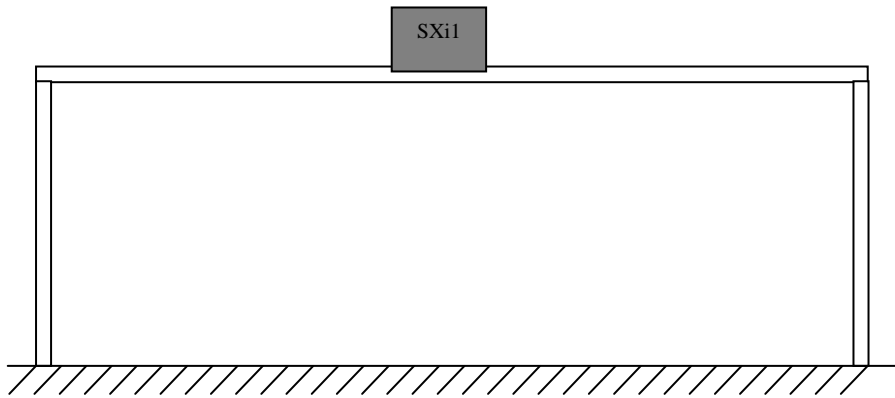
**Method:**

Record the details of EUTcabling, document the support equipment, and show the interconnections in a block diagram.

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
No support equipment required			

**4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)**

**Configuration Diagram – Test Setup**



**5.0 Transmitter Information for equipment operating under Parts 11, 15 and 18 of the rules (Transmitter Info - Unlicensed)**

FCC Rule Part			
2.1033(b)(1)	<b>Applicant</b>	Company Name:	Sirius XM Satellite Radio, Inc.
		Address:	3161 S.W. 10th Street, Deerfield Beach, FL 33442
		Phone:	202-680-4288
		Contact Name:	Beejay Jolayemi
	<b>Manufacturer</b>	Company Name:	Same
		Address:	Same
		Phone:	Same
2.1033(b)(2)	<b>Equipment</b>	FCC ID:	RS2SX11
		EUT Model Number:	SXi1
		EUT Serial Number:	NA
2.1033(b)(3)	User Manual	Attach as separate exhibit.	
2.1033(b)(4)	Brief description of circuit functions	Attach as separate exhibit.	
2.1033(b)(5)	Block diagram showing frequency of oscillators	Attach as separate exhibit.	
2.1033(b)(6)	Test report	Incorporated with this document	
2.1033(b)(7)	Internal and external photographs	Attach as separate exhibit.	
2.1033(b)(8)	Peripheral Equipment	Can be used?	N/A
		Comercially available?	N/A
2.1033(b)(9)	Transition rules apply?	No	
2.1033(b)(10)	Scanning receiver?	No	
2.1033(b)(11)	Transmitter in 59-64 GHz band?	No	
2.1033(b)(12)	Software defined radio?	No	

## 6.0 15.247(b)(3) Conducted Peak Power

### Method:

The maximum peak conducted output power of the intentional radiator shall not exceed the following: For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

FCC's KDB Publication 558074, "Measurement of Digital Transmission Systems Operating under Section 15.247" March 23, 2005

Power Output Option #1 was used for testing

As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level.

If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Equipment setup for radiated disturbance tests shall follow the guidelines of ANSI C63.4.

### TEST SITE

The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10 meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3 meter diameter turntable.

A2LA: 1455.01

IC: 2077-1

VCCI Registration Number: R-2570

### MEASUREMENT UNCERTAINTY

Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes. The values given are the measurement uncertainty values with an expanded uncertainty of  $k=2$ .

30 MHz to 1000 MHz at 3 meters: +/- 3.9 dB

30 MHz to 1000 MHz at 10 meters: +/- 3.6 dB

1 GHz to 18 GHz at 3 meters: +/- 4.2 dB



**6.0 15.247(b)(3) Conducted Peak Power**

**Tabular Data:**

**Original test sample**

Channel	Power dBm	Limit (dBm)	Margin	Results
Blue tooth 8DPSK – Low Channel (2402)	4.58	30	25.42	Pass
Blue tooth 8DPSK – Mid Channel (2441)	4.63	30	25.37	Pass
Blue tooth 8DPSK – High Channel (2480)	4.5	30	25.5	Pass

**Lynx B1**

Channel	Power dBm	Limit (dBm)	Margin	Results
Blue tooth 8DPSK – Low Channel (2402)	1.13	30	28.87	Pass
Blue tooth 8DPSK – Mid Channel (2441)	1.98	30	28.02	Pass
Blue tooth 8DPSK – High Channel (2480)	2.89	30	27.11	Pass

## 7.0 15.247(d) Conducted Spurious Emissions

### Method:

Equipment setup for conducted disturbance tests shall follow the guidelines of ANSI C63.4.  
FCC's KDB Publication 558074, "Measurement of Digital Transmission Systems Operating under Section 15.247" March 23, 2005

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB.

### TEST SITE

The test site for conducted emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. The VCCI Registration Number for this site is C-2818.

### MEASUREMENT UNCERTAINTY

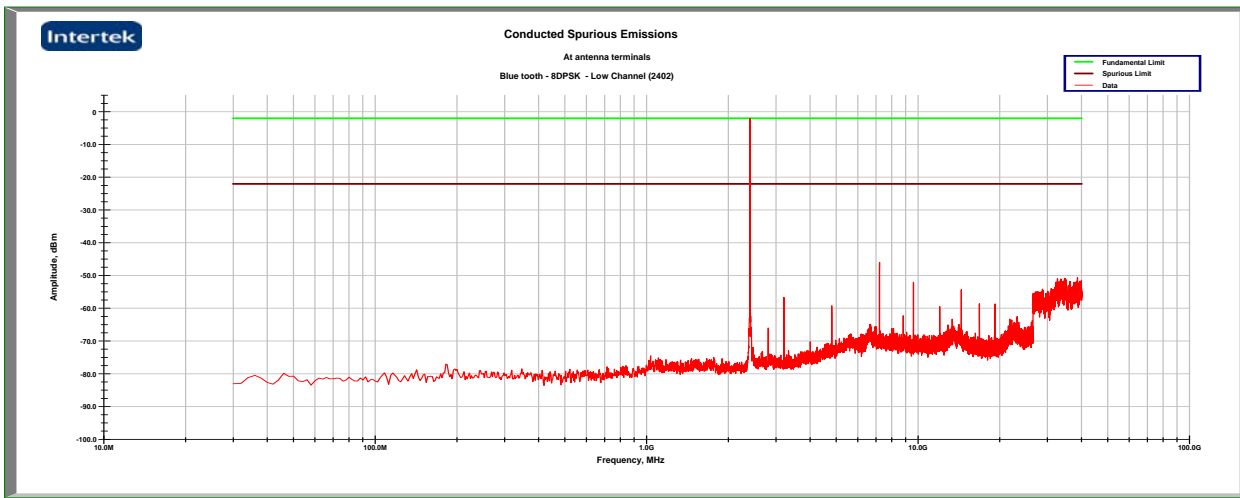
Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes. The values given are the measurement uncertainty values with an expanded uncertainty of  $k=2$ .

150 kHz to 30 MHz: +/- 2.8 dB

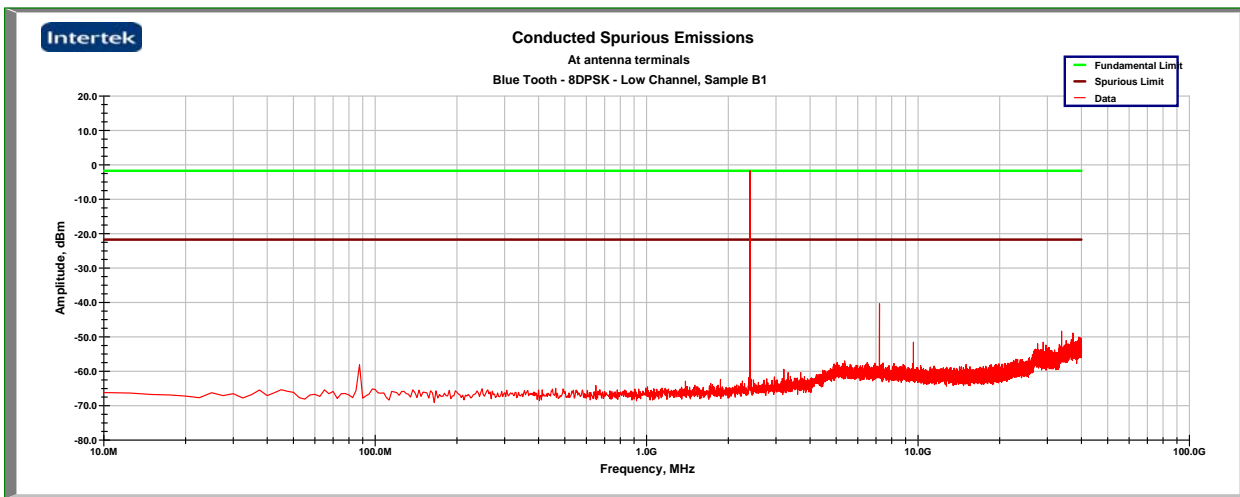
**Results: The sample tested was found to Comply.**

### 7.0 15.247(d) Conducted Spurious Emissions

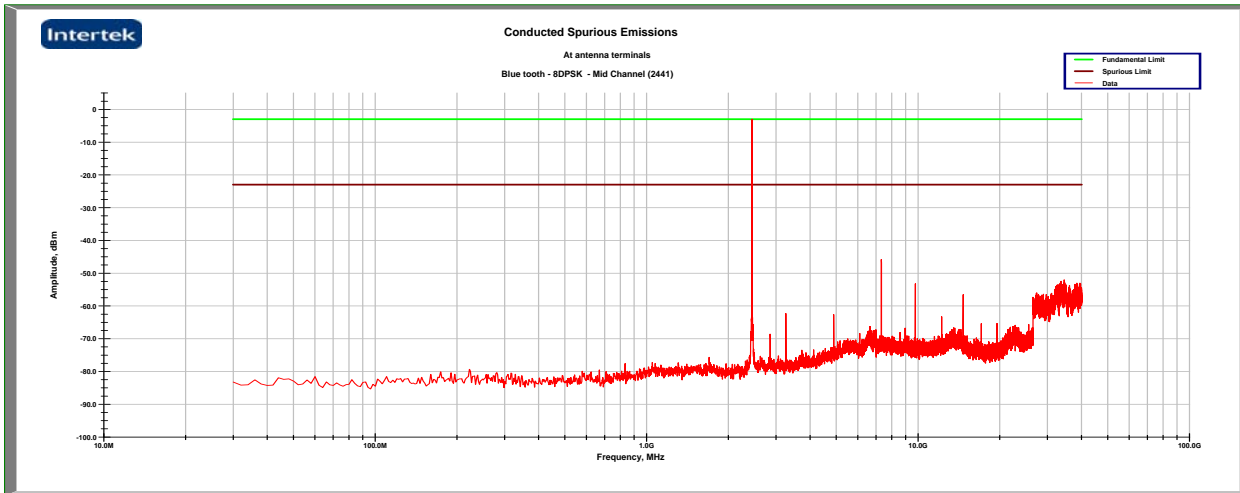
Original test sample - Low Channel – 8DPSK



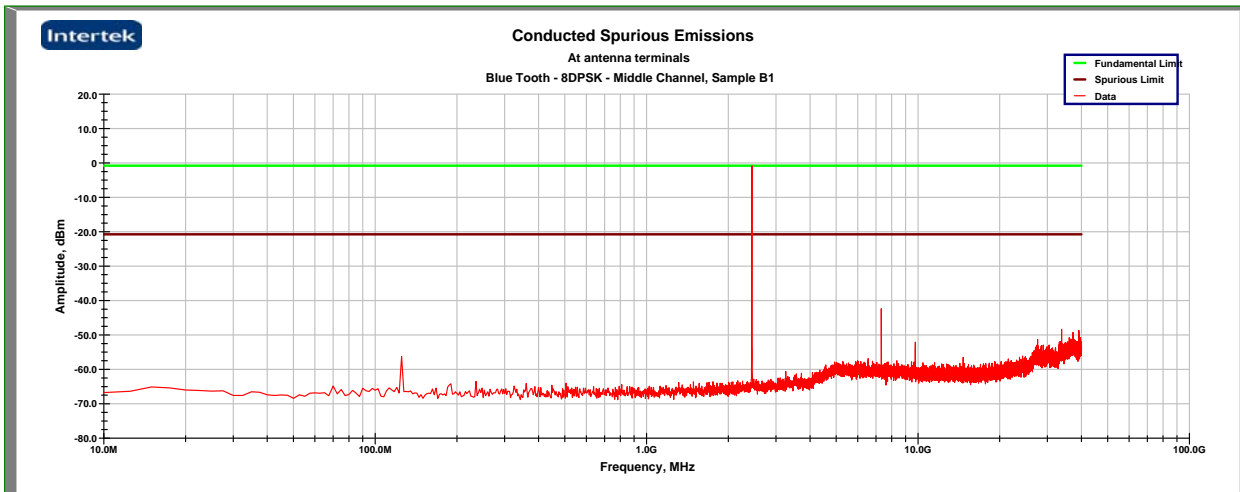
Lynx B1- Low Channel – 8DPSK



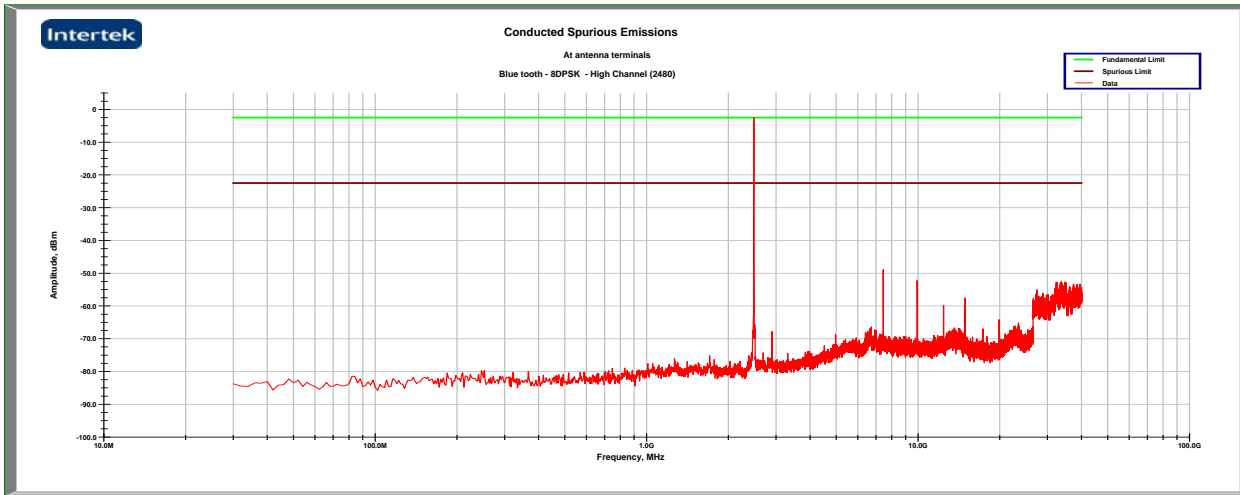
Original test sample - Middle Channel – 8DPSK



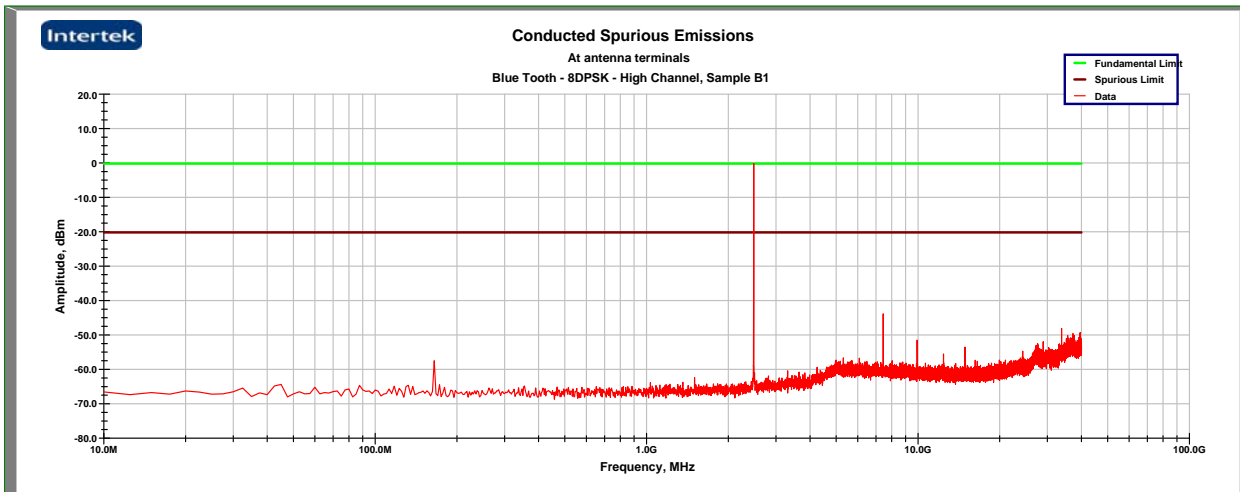
Lynx B1- Middle Channel – 8DPSK



Original test sample - High Channel – 8DPSK



Lynx B1- High Channel – 8DPSK



## 8.0 15.247(d) Radiated Spurious Emissions

### Method:

Measurements in the frequency range of 30 MHz to 40000 MHz shall be performed with a quasi-peak detector instrument that meets the requirements of Section One of CISPR 16. Above 1000 MHz, a peak detector shall be used. Peak values converted to average by applying the duty cycle correction factor, when applicable. When an average detector is used, it shall meet the requirements of Section One of CISPR 16. The measuring antenna shall correlate to a balanced dipole.

### Bandwidths:

30 MHz to 1000 MHz: 120 kHz RBW and 1 MHz VBW

Above 1000 MHz: 1 MHz RBW and 3 MHz VBW

Measurements of the radiated field are made with the antenna located at a distance of 3 or 10 meters from the EUT. The limit applied to the measurement shall be appropriate for the test distance. The test distance shall be indicated in the results section.

The EUT shall be arranged and connected with cables terminated in accordance with the product specification.

Exploratory tests should be carried out while varying the cable positions to determine the maximum or near-maximum emission level. During manipulation, cables shall not be placed under or on top of the system test components unless such placement is required by the inherent equipment design.

The antenna shall be adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.

The antenna-to-EUT azimuth shall be varied during the measurement to find the maximum field-strength readings.

The antenna-to-EUT polarization (horizontal and vertical) shall be varied during the measurements to find the maximum field-strength readings.

If the EUT is intended for tabletop use, it shall be placed on a table whose top is 0.8m above the ground plane. The table shall be constructed of non-conductive materials. Its dimensions are at least 1m by 1.5m, but may be extended for larger EUT.

If EUT is floor standing, the EUT was placed on a horizontal metal ground plane and isolated from the ground plane by up to 12 mm of insulating material.

Equipment setup for radiated disturbance tests shall follow the guidelines of ANSI C63.4.

### TEST SITE

The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10 meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3 meter diameter turntable.

A2LA: 1455.01

IC: 2077-1

VCCI Registration Number: R-2570

### MEASUREMENT UNCERTAINTY

Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes. The values given are the measurement uncertainty values with an expanded uncertainty of  $k=2$ .

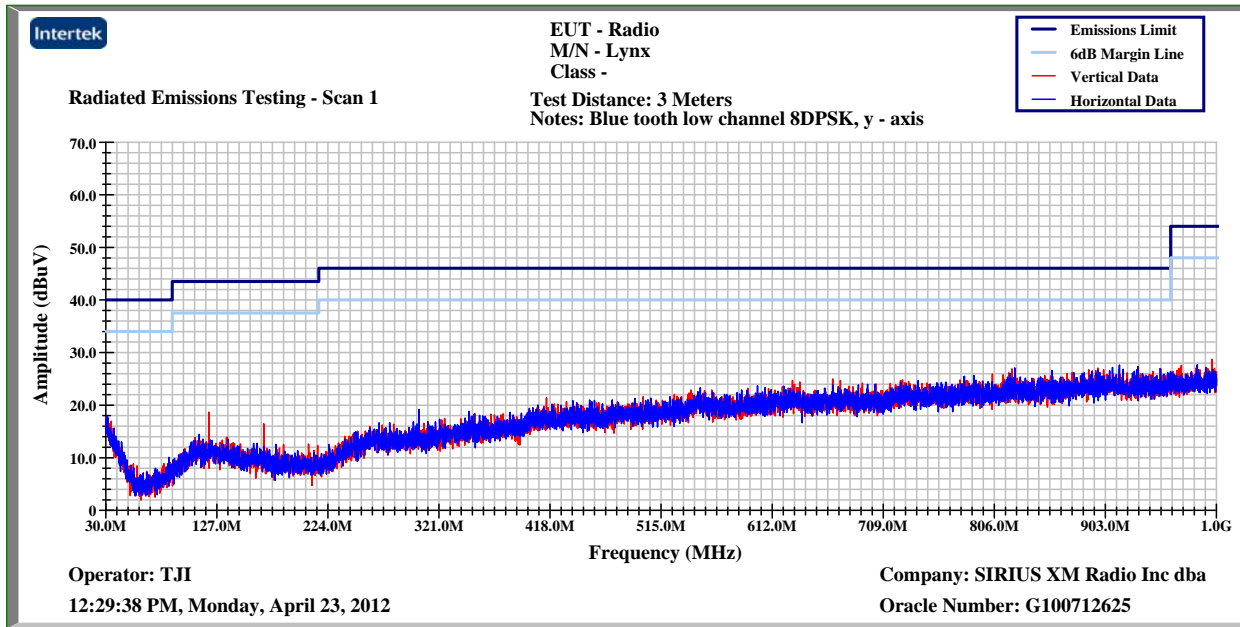
30 MHz to 1000 MHz at 3 meters: +/- 3.9 dB

30 MHz to 1000 MHz at 10 meters: +/- 3.6 dB

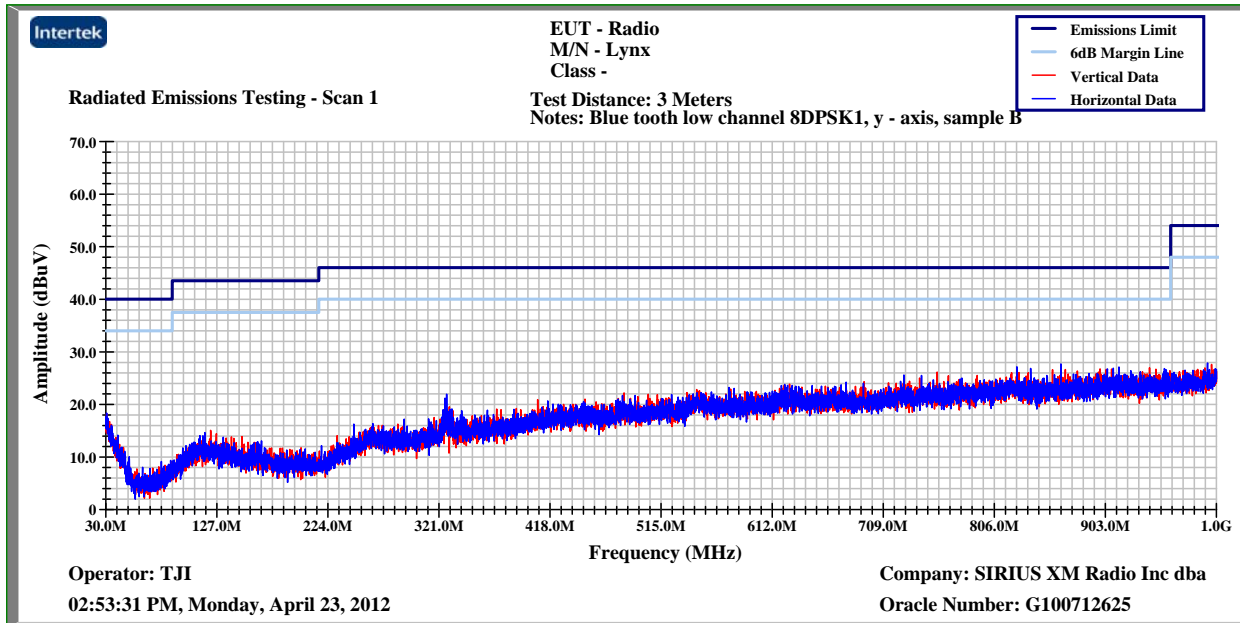
1 GHz to 18 GHz at 3 meters: +/- 4.2 dB

### 8.0 15.247(d) Radiated Spurious Emissions

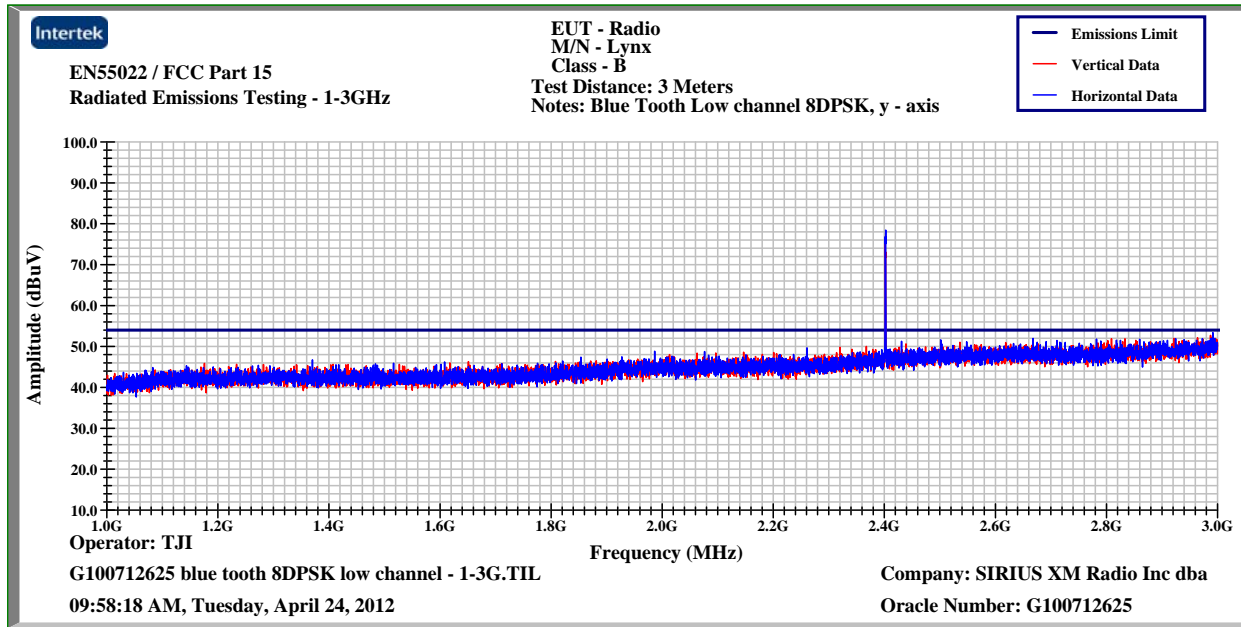
Lynx B1- Peak Plot – 30MHz-1000MHz – 8DPSK – Low Channel



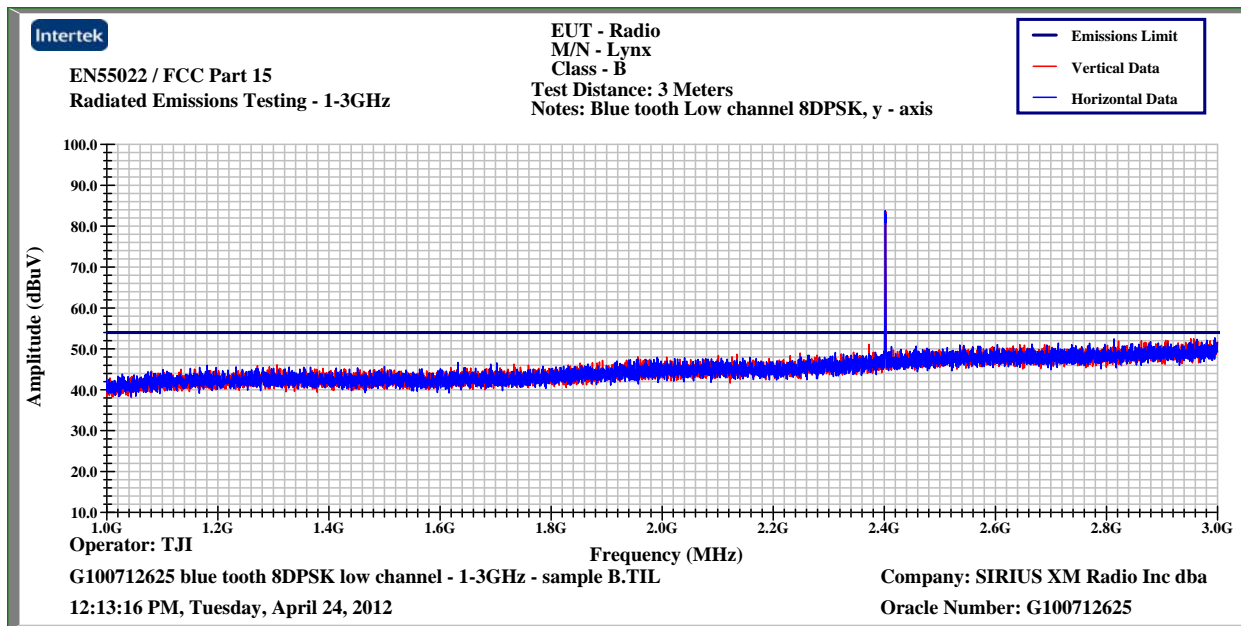
Lynx B2- Peak Plot – 30MHz-1000MHz – 8DPSK – Low Channel



Lynx B1- Peak Plot – 1000MHz-3000MHz – 8DPSK – Low Channel

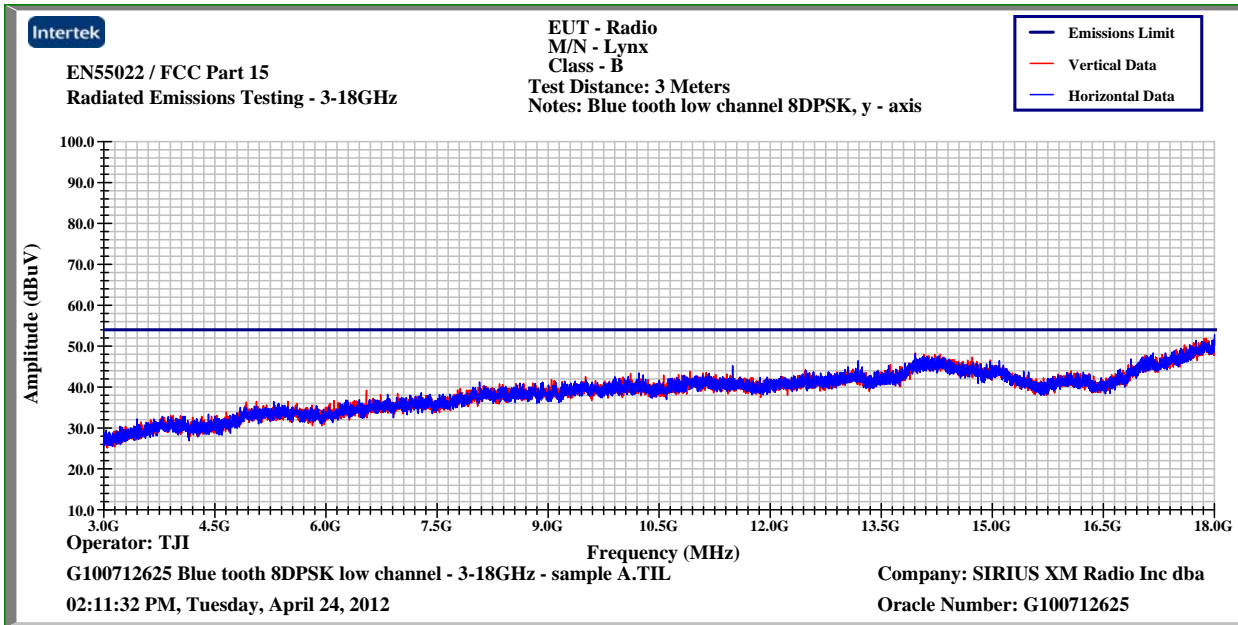


Lynx B2- Peak Plot – 1000MHz-3000MHz – 8DPSK – Low Channel

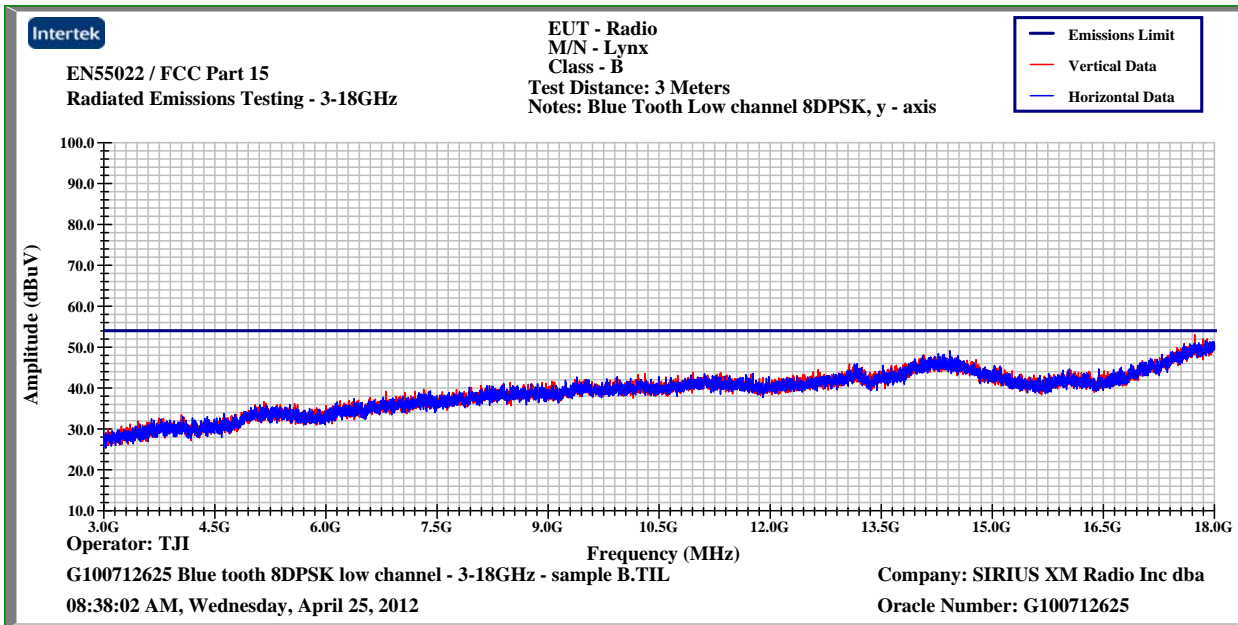




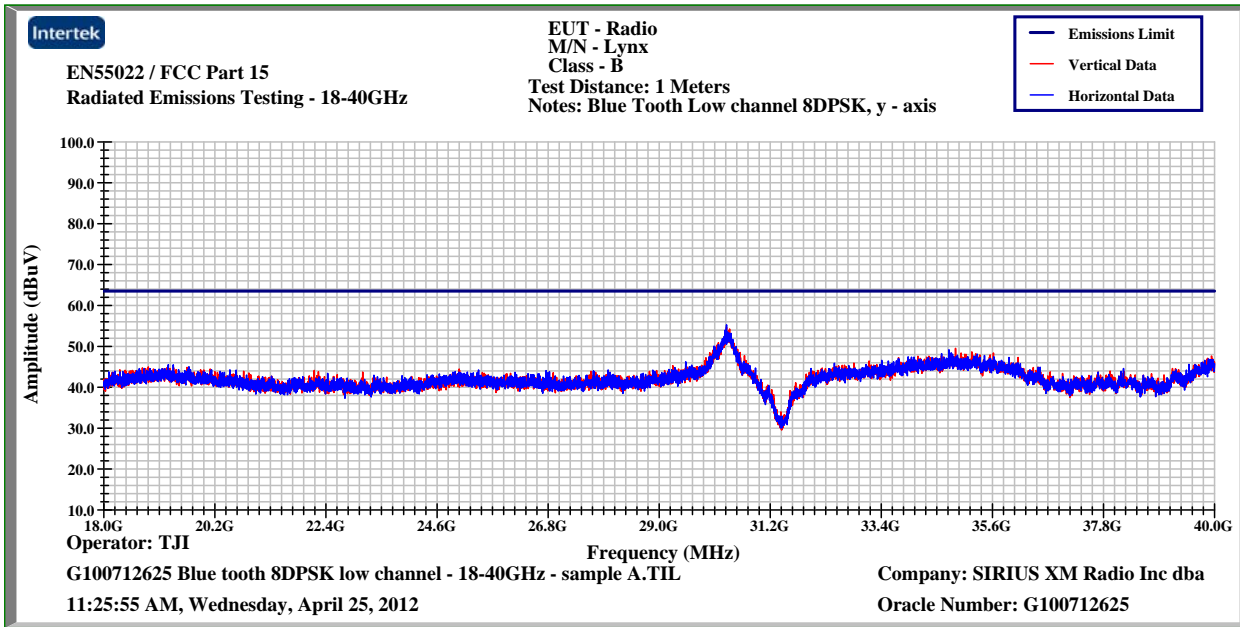
Lynx B1- Peak Plot – 3000MHz-18000MHz – 8DPSK – Low Channel



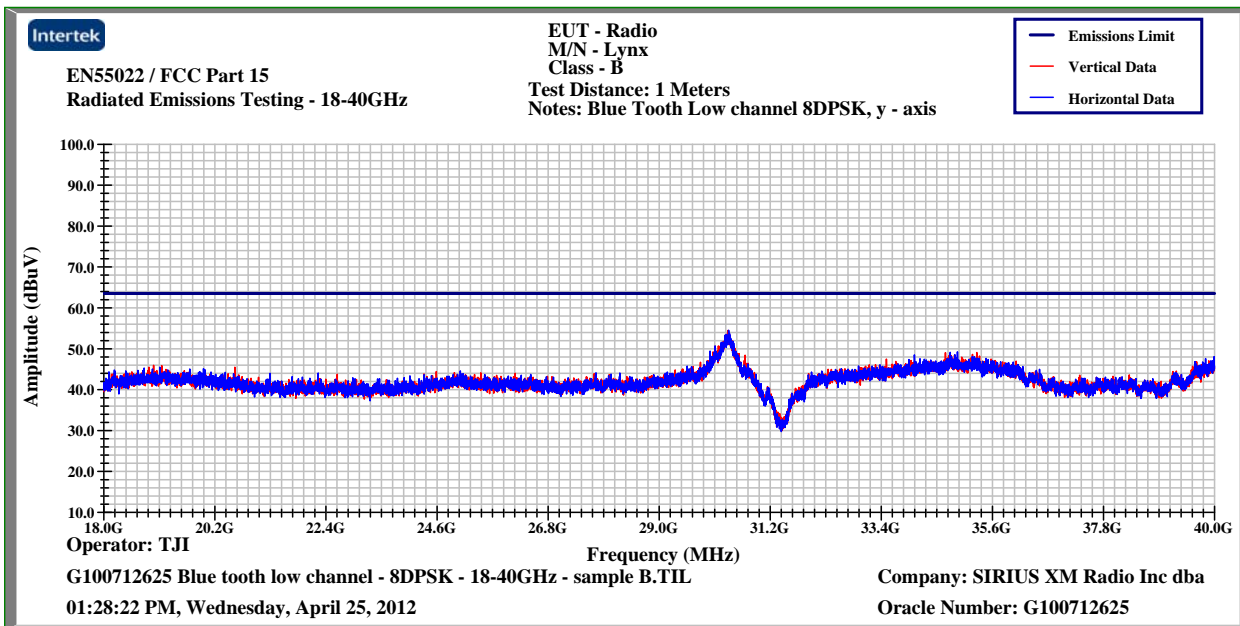
Lynx B2- Peak Plot – 3000MHz-18000MHz – 8DPSK – Low Channel



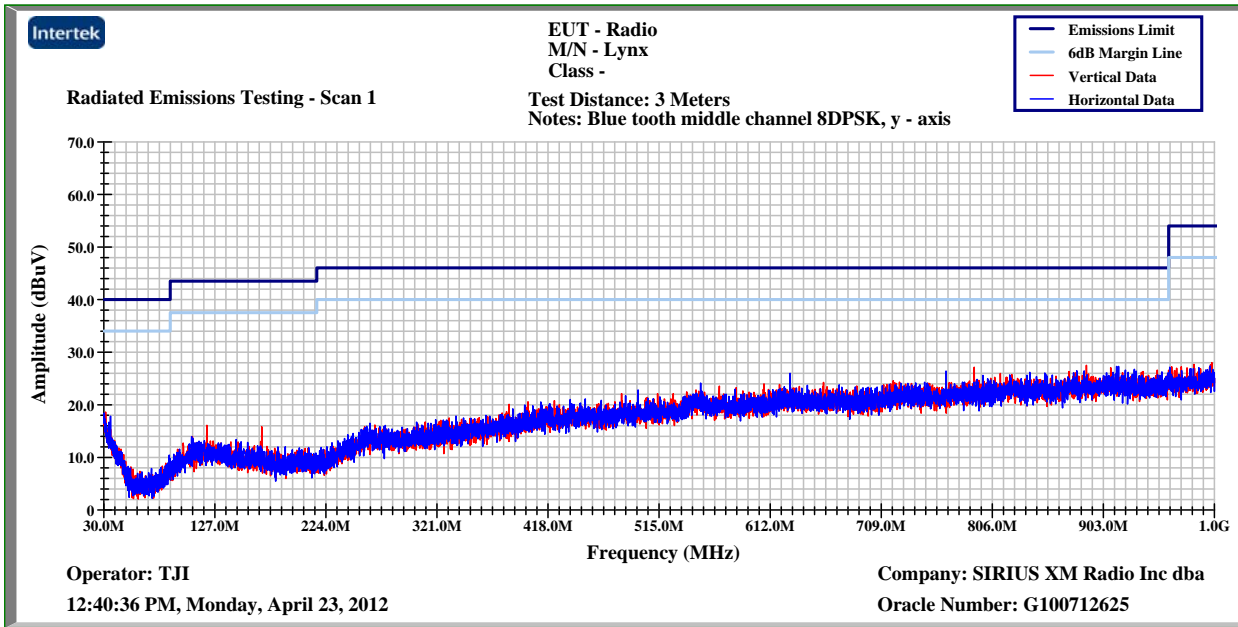
Lynx B1- Peak Plot – 18000MHz-40000MHz – 8DPSK – Low Channel



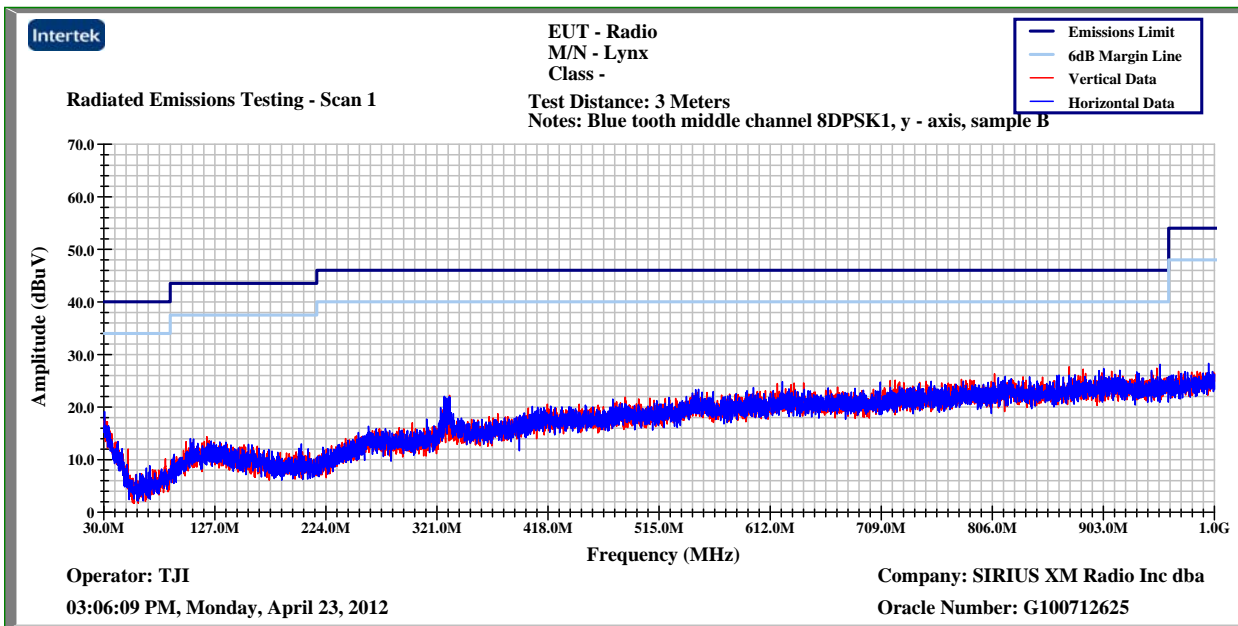
Lynx B2- Peak Plot – 18000MHz-40000MHz – 8DPSK – Low Channel



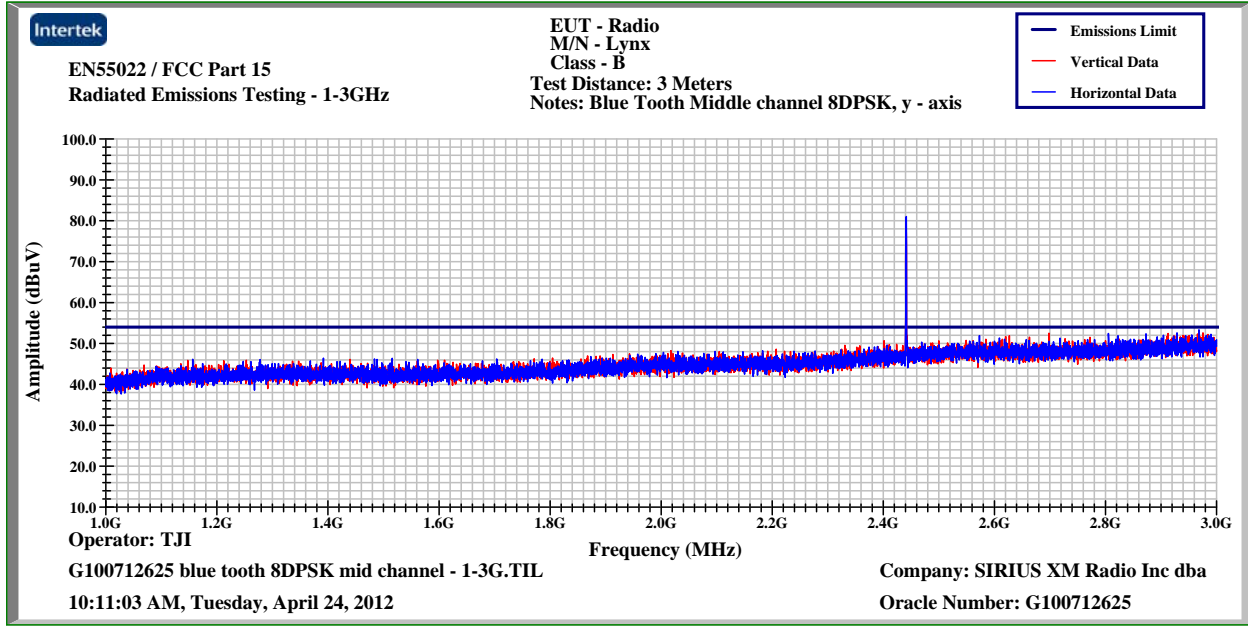
Lynx B1- Peak Plot – 30MHz-1000MHz – 8DPSK – Middle Channel



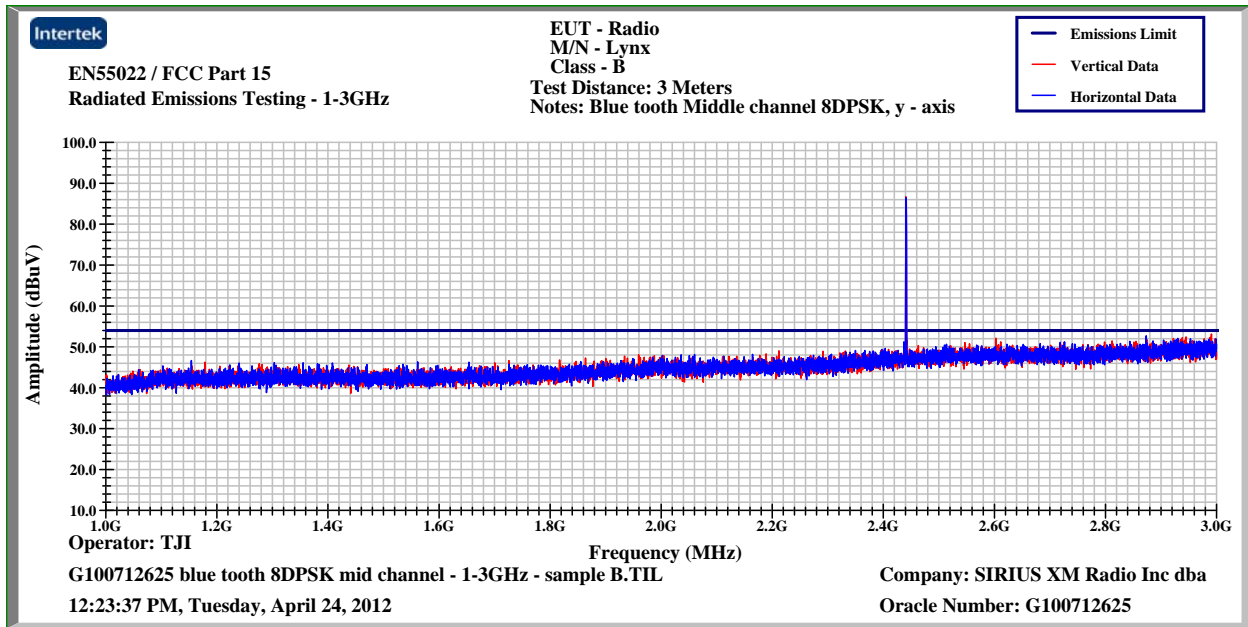
Lynx B2- Peak Plot – 30MHz-1000MHz – 8DPSK – Middle Channel



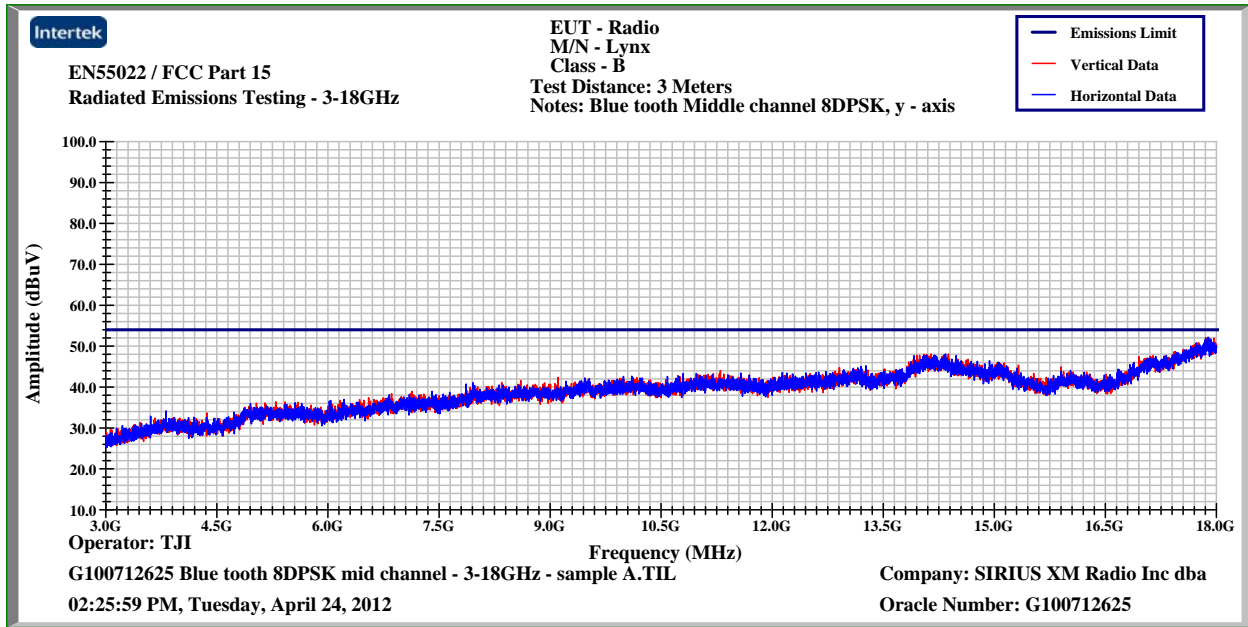
Lynx B1- Peak Plot – 1000MHz-3000MHz – 8DPSK – Middle Channel



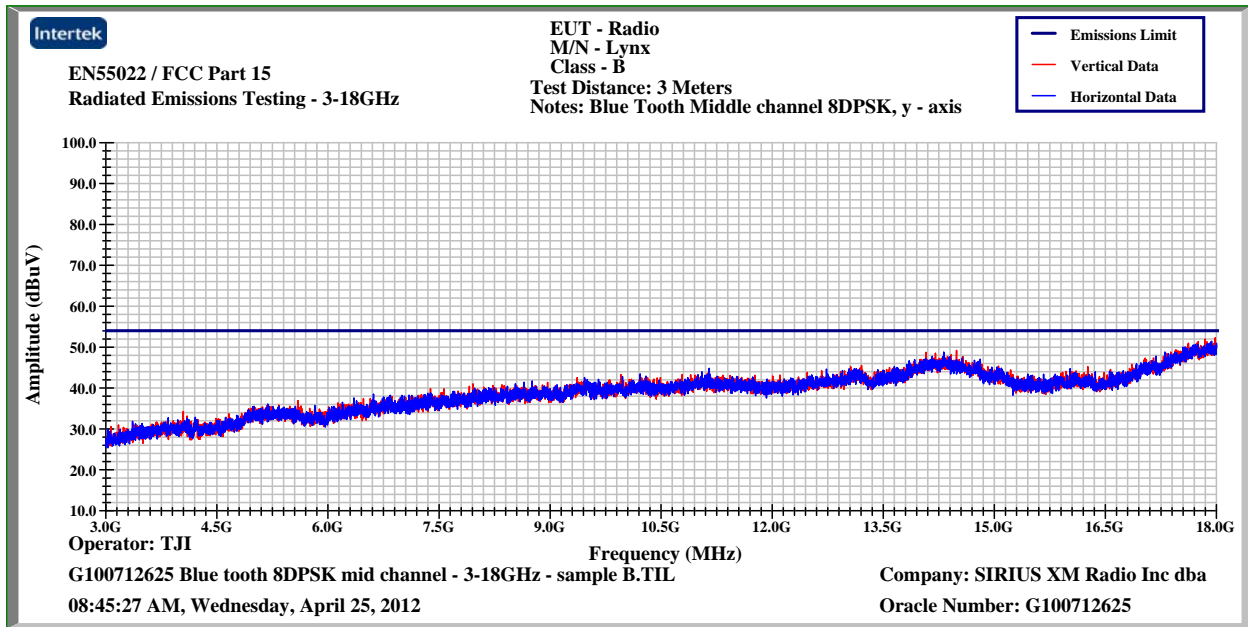
Lynx B2- Peak Plot – 1000MHz-3000MHz – 8DPSK – Middle Channel



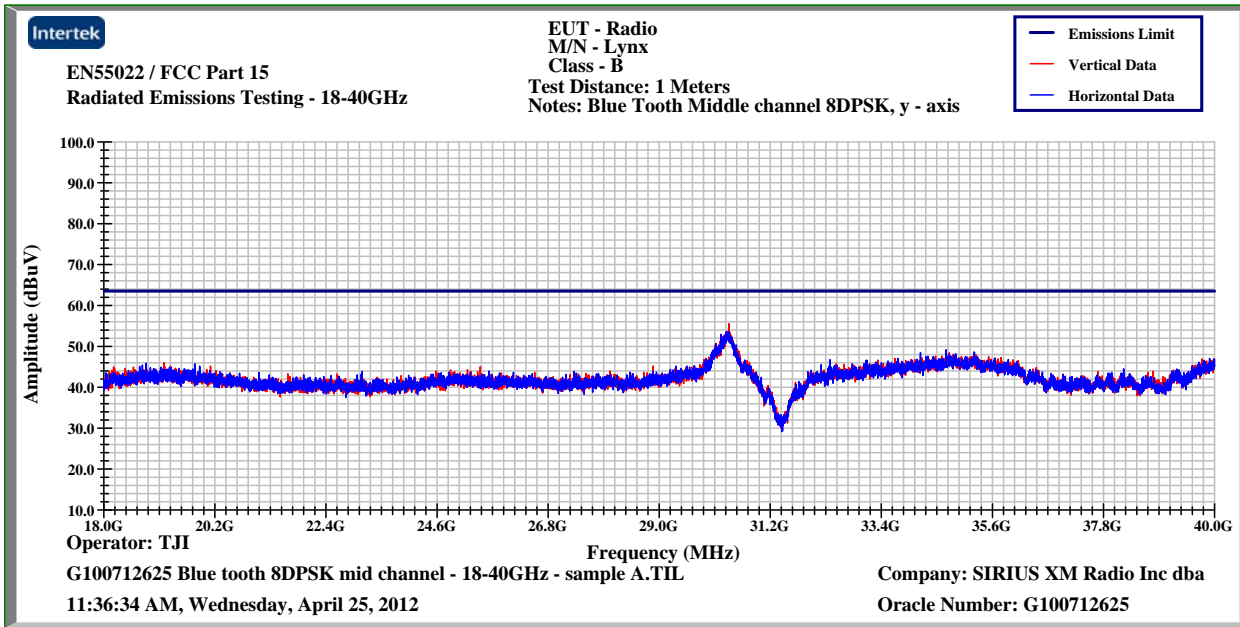
Lynx B1- Peak Plot – 3000MHz-18000MHz – 8DPSK – Middle Channel



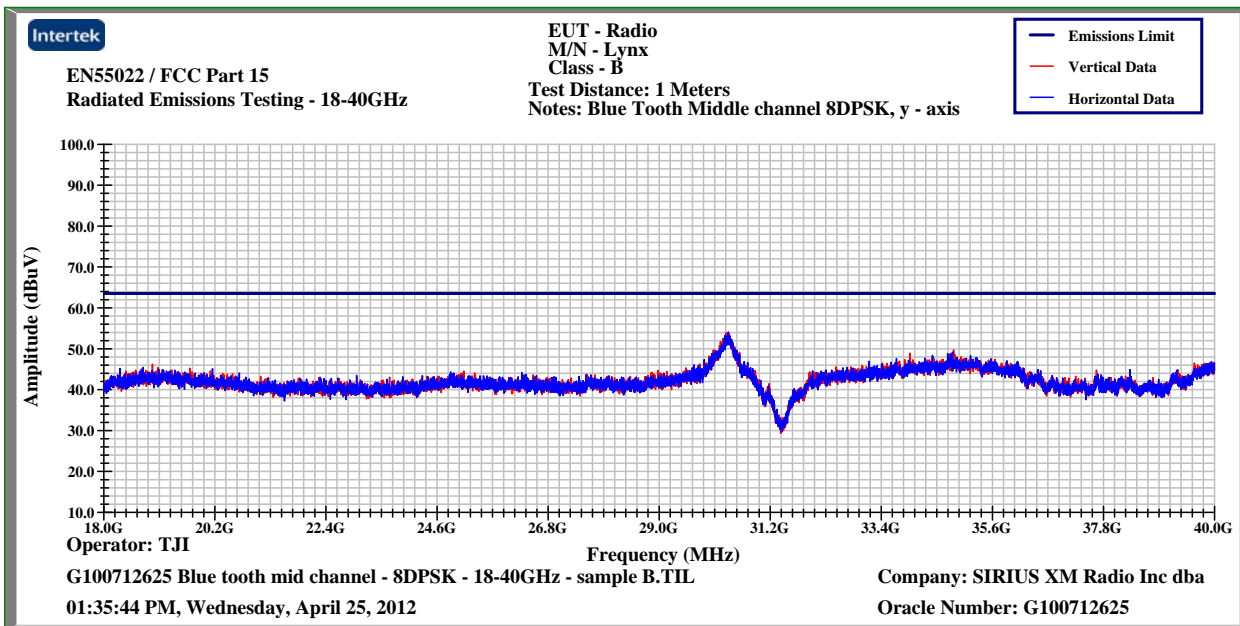
Lynx B2- Peak Plot – 3000MHz-18000MHz – 8DPSK – Middle Channel



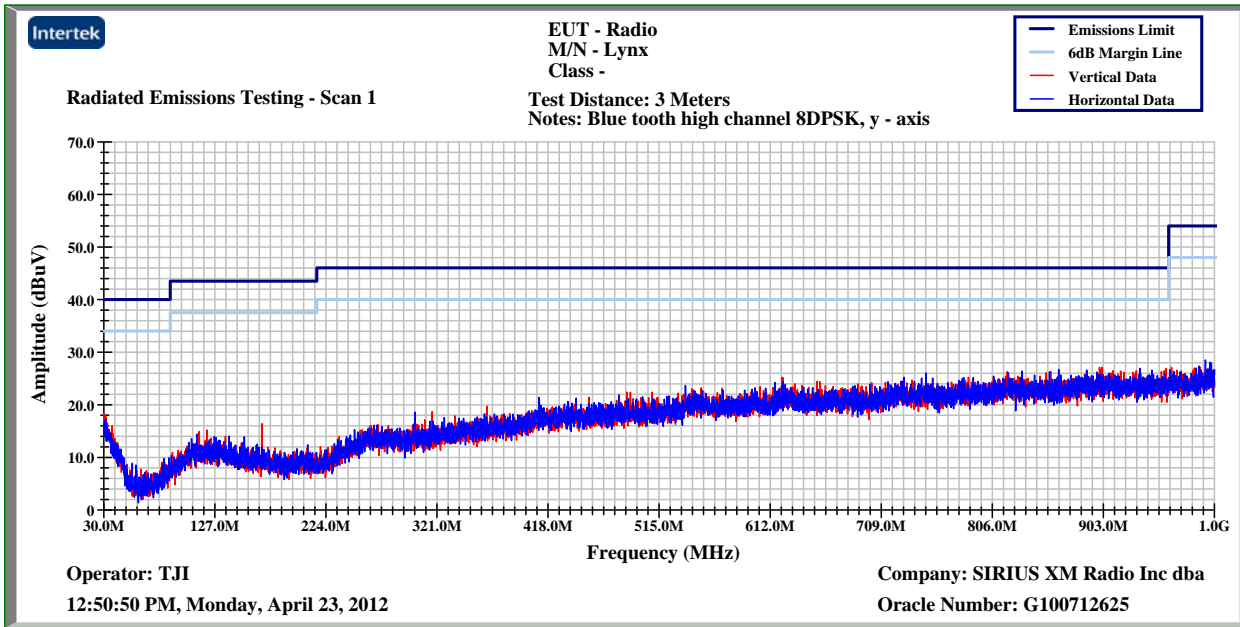
Lynx B1- Peak Plot – 18000MHz-40000MHz – 8DPSK – Middle Channel



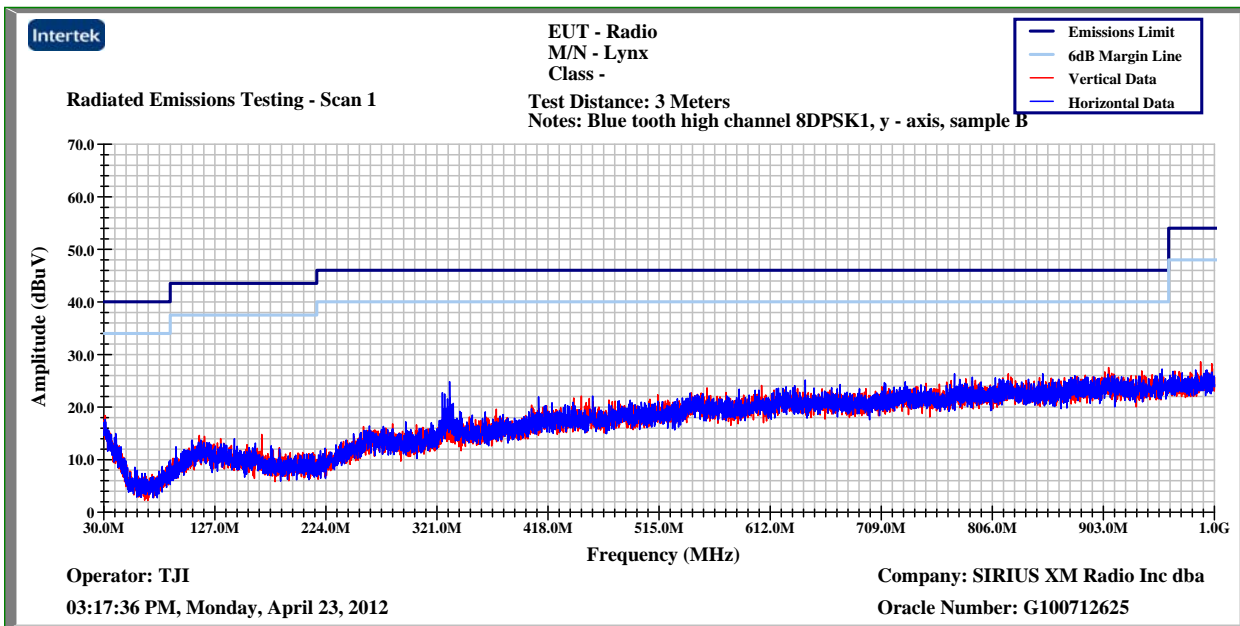
Lynx B2- Peak Plot – 18000MHz-40000MHz – 8DPSK – Middle Channel



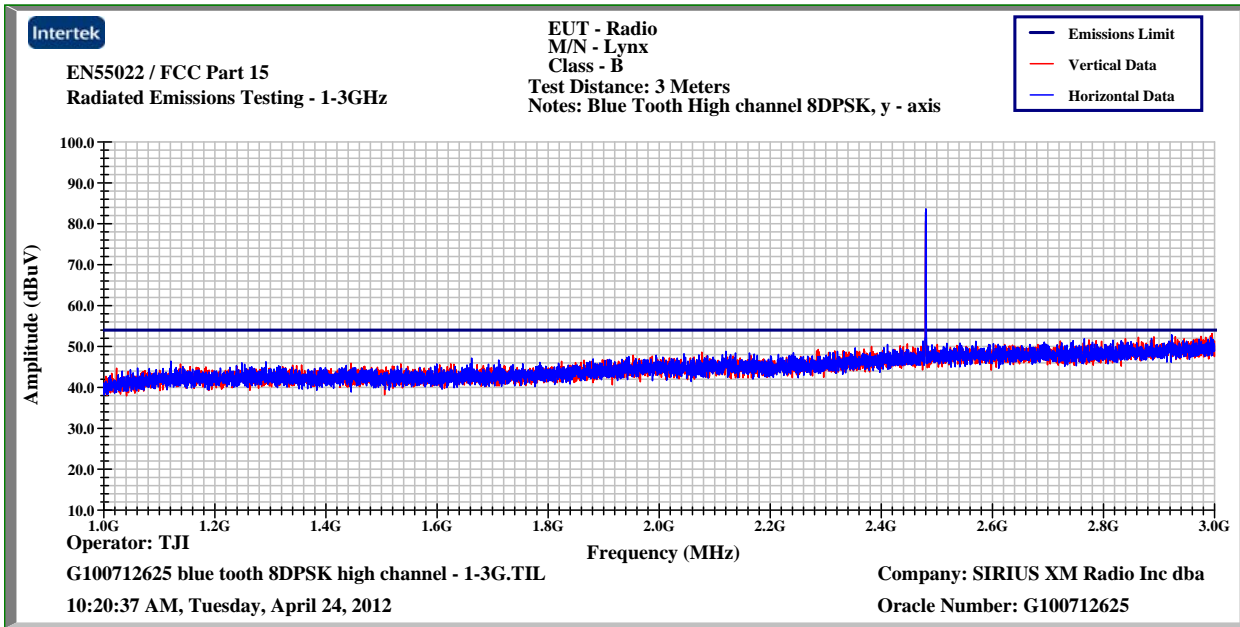
Lynx B1- Peak Plot – 30MHz-1000MHz – 8DPSK – High Channel



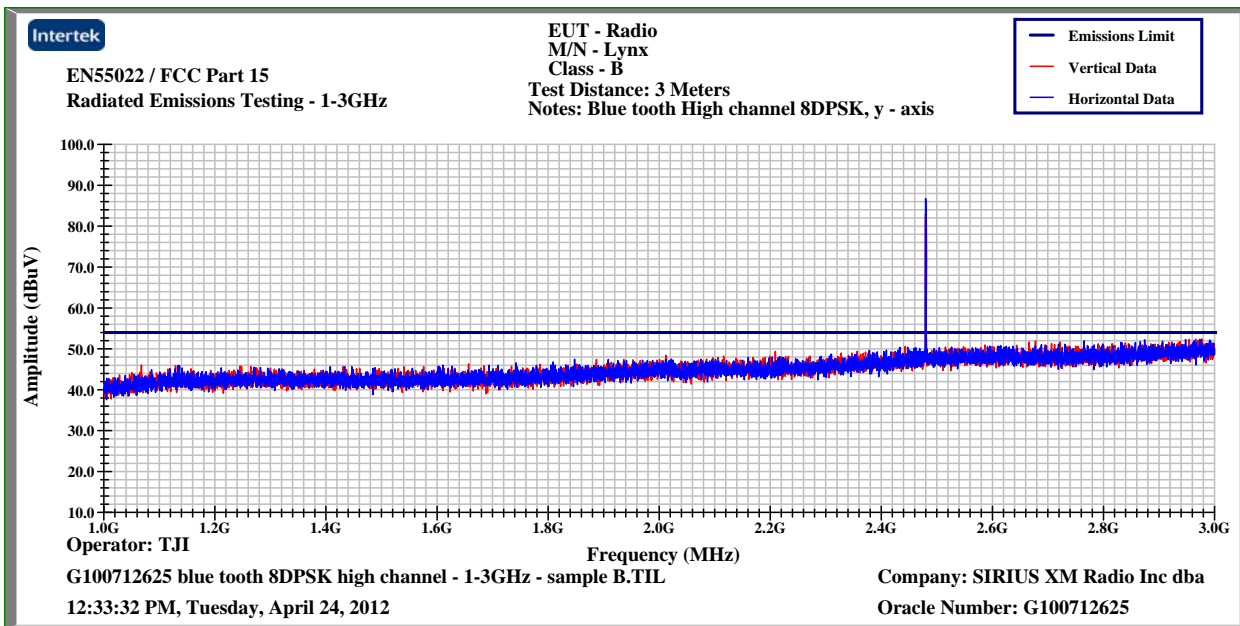
Lynx B2- Peak Plot – 30MHz-1000MHz – 8DPSK – High Channel



Lynx B1- Peak Plot – 1000MHz-3000MHz – 8DPSK – High Channel

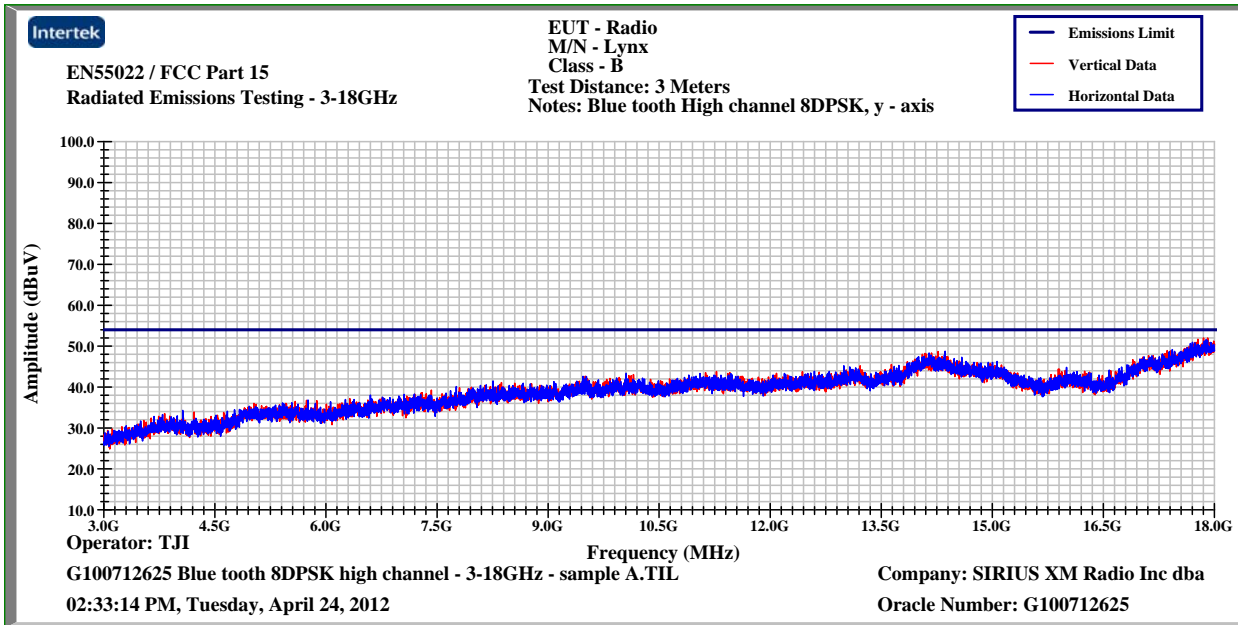


Lynx B2- Peak Plot – 1000MHz-3000MHz – 8DPSK – High Channel

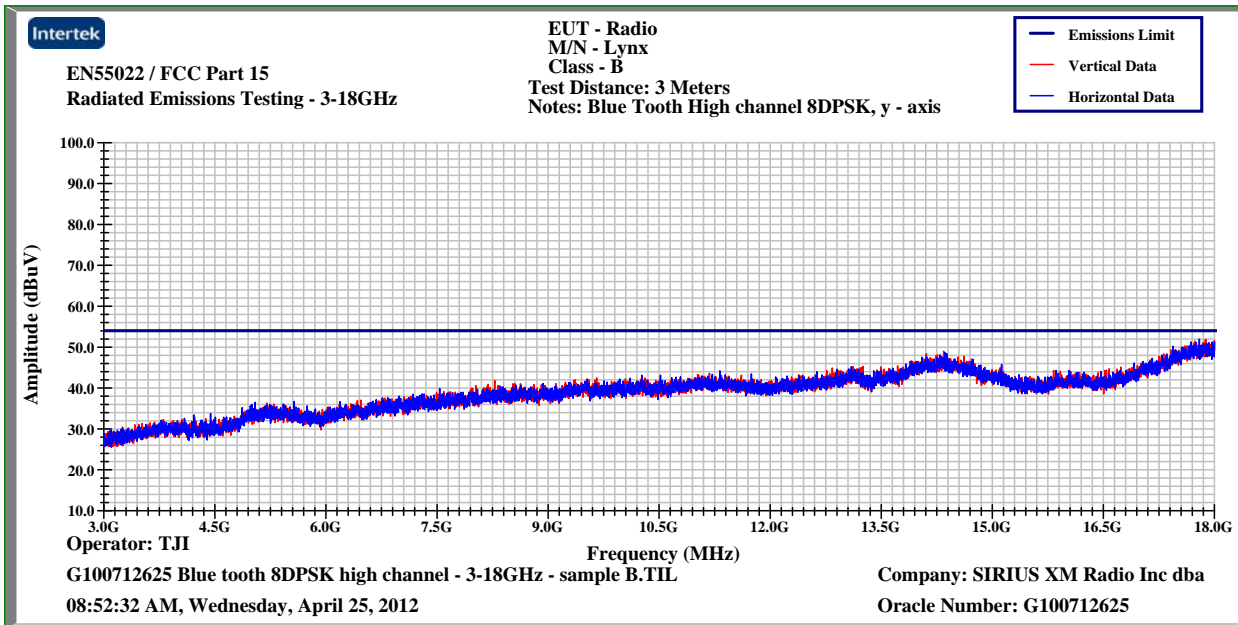




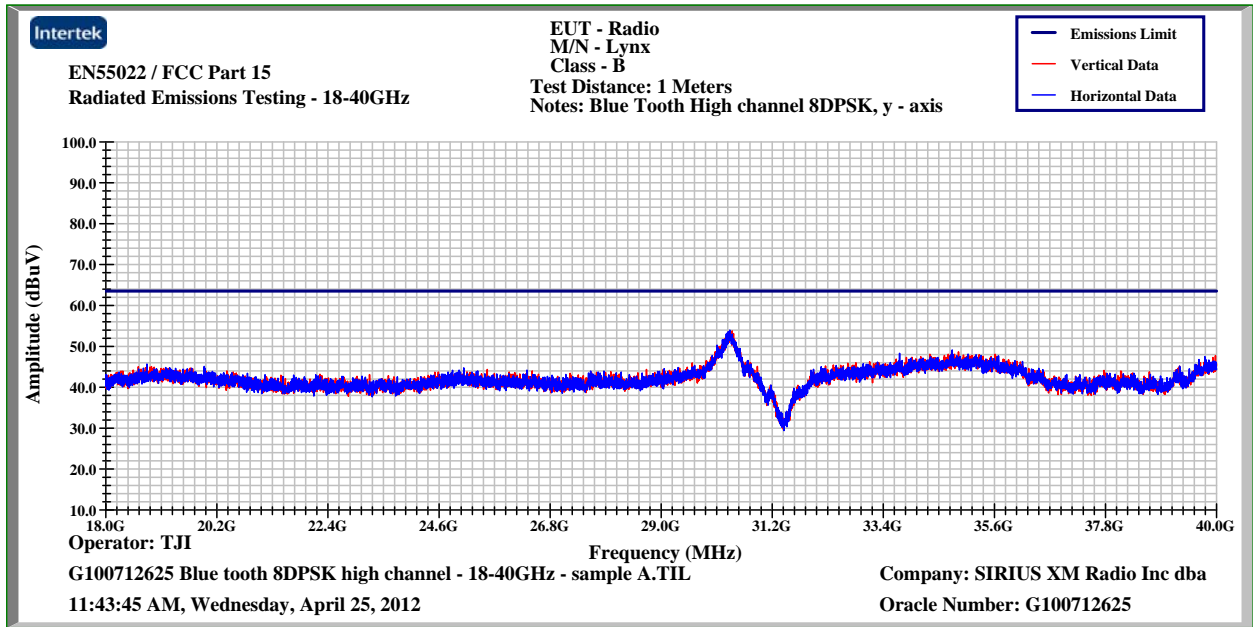
Lynx B1- Peak Plot – 3000MHz-18000MHz – 8DPSK – High Channel



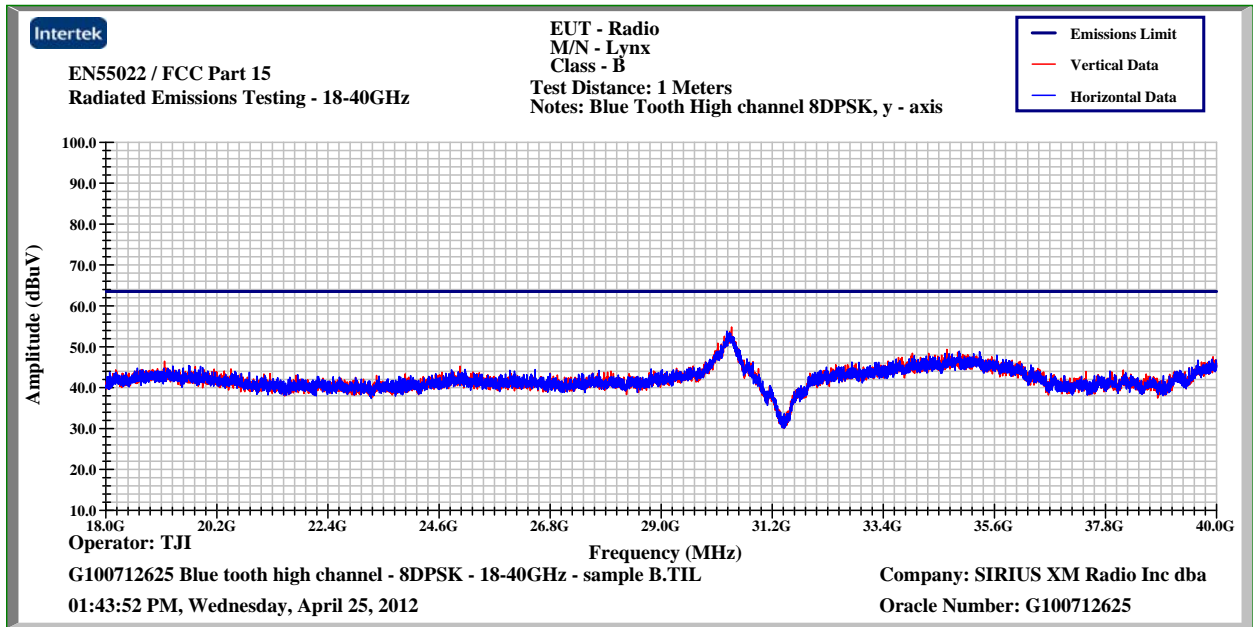
Lynx B2- Peak Plot – 3000MHz-18000MHz – 8DPSK – High Channel



Lynx B1- Peak Plot – 18000MHz-40000MHz – 8DPSK – High Channel



Lynx B2- Peak Plot – 18000MHz-40000MHz – 8DPSK – High Channel



## 9.0 Test Equipment List

Description	Manufacturer	Model	Serial Number	Cal Due
Bilog Antenna	Chase	CBL6112B	2622	10/25/2012
Cable E205	Megaphase	TM18 NKNK 118	9053201 003	05/12/2012
Cable E206	Megaphase	TM18 NKNK 118	9053201 004	05/12/2012
Cable MP3	Megaphase	G919-NKNK-394	MP3	05/12/2012
Cable ST-3	Storm Products Co.	PR90-195-7MTR	09-07-601	09/07/2012
Cable E401	Megaphase	TM40 K1K1 9	E401	07/07/2012
Cable E402	Megaphase	TM40 K1K1 9	E402	07/07/2012
Cable E405	Megaphase	TM40 K1K1 9	E405	07/07/2012
Horn Antenna (1-18GHz)	EMCO	3115	9208-3919	05/07/2012
Horn Antenna (18-40GHz)	EMCO	3116	9310-2222	07/07/2012
Preamplifier, 10 MHz to 2000 MHz	Mini-Circuits	ZKL-2	D052005	08/16/2012
Preamplifier (1-18GHz)	Miteq	AMF-4D-001180-24-10P	1020106	10/06/2012
Preamplifier (18-40GHz)	Miteq	JS4	965178	07/06/2012
Preamplifier (18-40GHz)	Miteq	JS4	818197	07/06/2012
Spectrum Analyzer	Rohde & Schwartz	FSU	100005	12/07/2012

**10.0 Revision History**

<b>Revision Level</b>	<b>Date</b>	<b>Report Number</b>	<b>Notes</b>
Original issue	April 27, 2012	100712625ATL-002	--