



TEST REPORT

Report Number: 100455091ATL-002

September 29, 2011

Product Name: Sirius XM Lynx Portable Radio

Product Model Number: SXi1

Standard: FCC Part 15, Subpart C, Intentional Radiators (15.239)

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:

Richard Bianco
EMC Team Leader

Report reviewed by:

Jeremy O. Pickens
Senior Staff Engineer

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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 requirements of the standard(s) indicated. 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 -		PASS
6.0	Occupied Bandwidth (FCC 15C - 15.239 (a))		PASS
7.0	§ 15.239(b) / (c) Field strength requirements (FCC 15C - 15.239 (b)) FEA Adapter – 88.1MHz		PASS
7.0	§ 15.239(b) / (c) Field strength requirements (FCC 15C - 15.239 (b)) FEA Adapter – 96.9MHz		PASS
7.0	§ 15.239(b) / (c) Field strength requirements (FCC 15C - 15.239 (b)) FEA Adapter – 107.9MHz		PASS
8.0	Test Equipment List		
9.0	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:	July 11, 2011
EUT receive condition:	Good

Description of EUT provided by Client:

Sirius XM Lynx Hardware Features

- Revolutionary SiriusXM *PowerConnect*™ 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™ 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 12Vdc battery supplied to the dock. The satellite signal was amplified and retransmitted into the emissions chamber to the radio under test. The radio then transmitted the music on the FM channel being investigated. The channels tested were 88.1, 96.9, and 107.9MHz.

Mode of Operation	Frequency Range (MHz)	Number of Channels	Channel Separation (kHz)
FM	88.1-107.9	100	200

Applicant Information:

XM Radio Inc.
1500 Eckington Pl, 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:

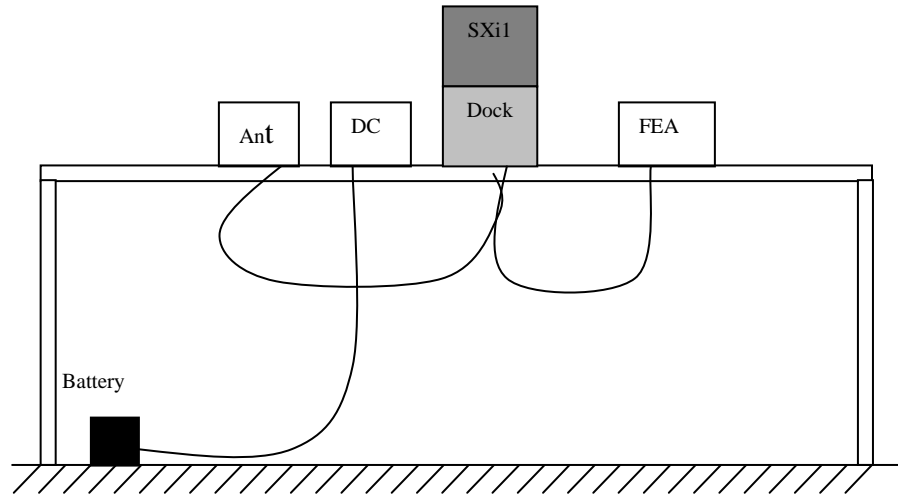
Record the details of EUT cabling, document the support equipment, and show the interconnections in a block diagram.

Support Equipment - Cardock Configurations			
Description	Manufacturer	Model Number	Serial Number
Indoor/Outdoor Antenna	Sirius XM	620	Not Labeled
CarDock	Sirius XM	V-Dock Sample	Not Labeled
FEA Adapter	Sirius XM	Not Labeled	Not Labeled
Power Connect Adapter	Sirius XM	SXDPIP1	U434B27001B1J01
DC Battery	Werker	WKA12-80C/FR	Not Labeled

Support Equipment - Cardock Configuration			
Description	Manufacturer	Model Number	Serial Number
Laptop	Dell	Latitude D610	CN-0D4571-48643-62H
Power supply	Dell	PA-1650-05D2	CN-0F7970-71615-55M

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

Configuration Diagram –Radiated Emissions (FEA Adapter)



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)	Applicant	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
	Manufacturer	Company Name:	Same
		Address:	Same
		Phone:	Same
2.1033(b)(2)	Equipment	FCC ID:	RS2SXI1
		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	

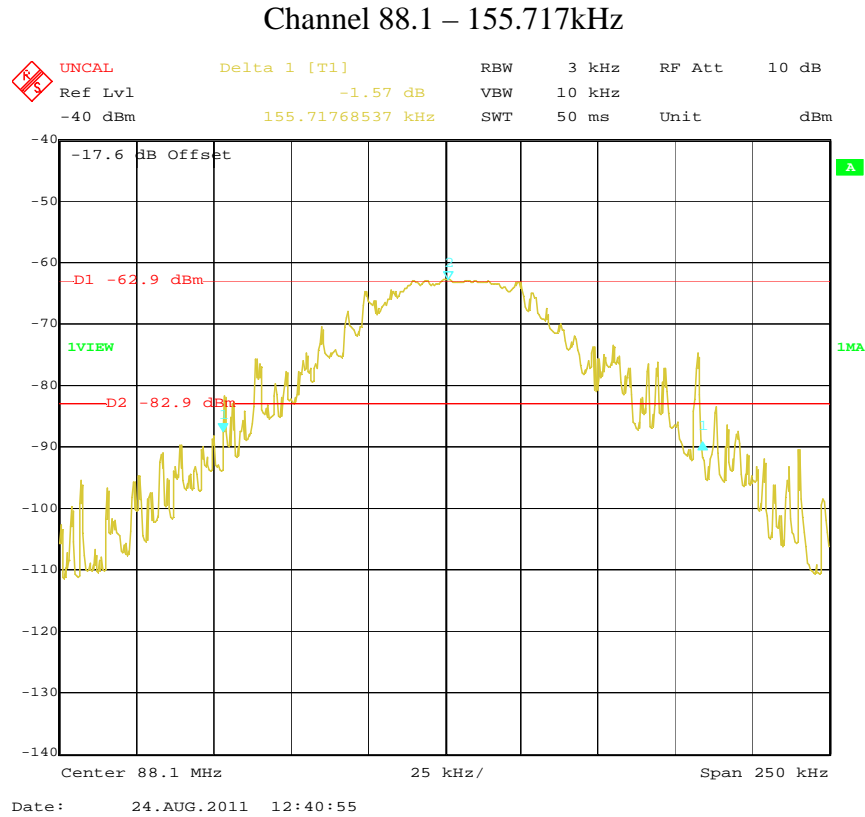
6.0 Occupied Bandwidth (FCC 15C - 15.239 (a))

Method:

Test Requirement: Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108 MHz.

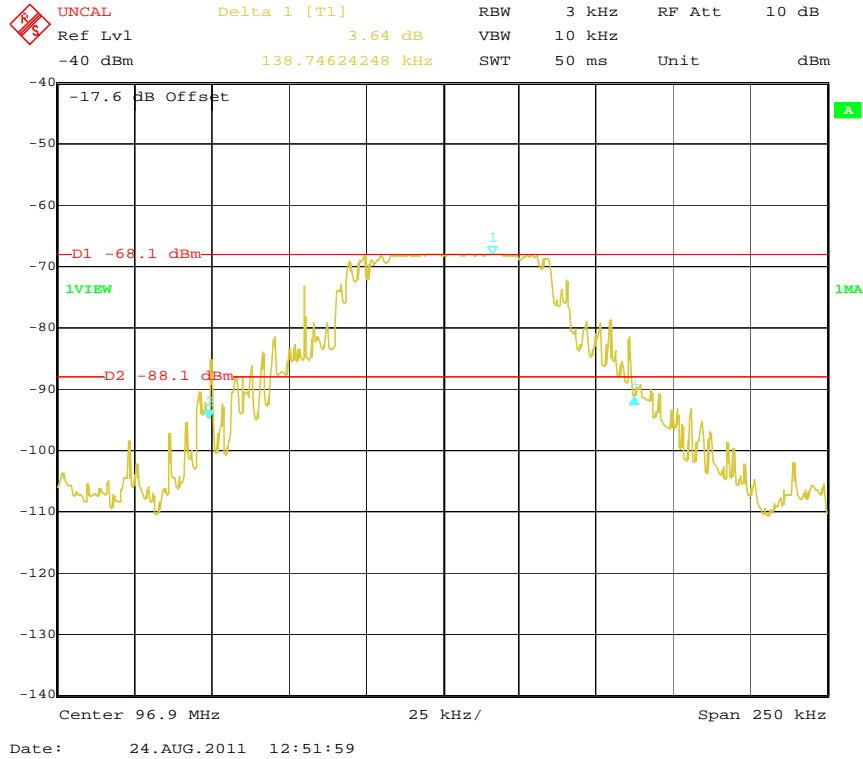
Test Procedure: ANSI C63.4: 2003, Section 13.1.7 and Annex H.6

Results: The sample tested was found to Comply



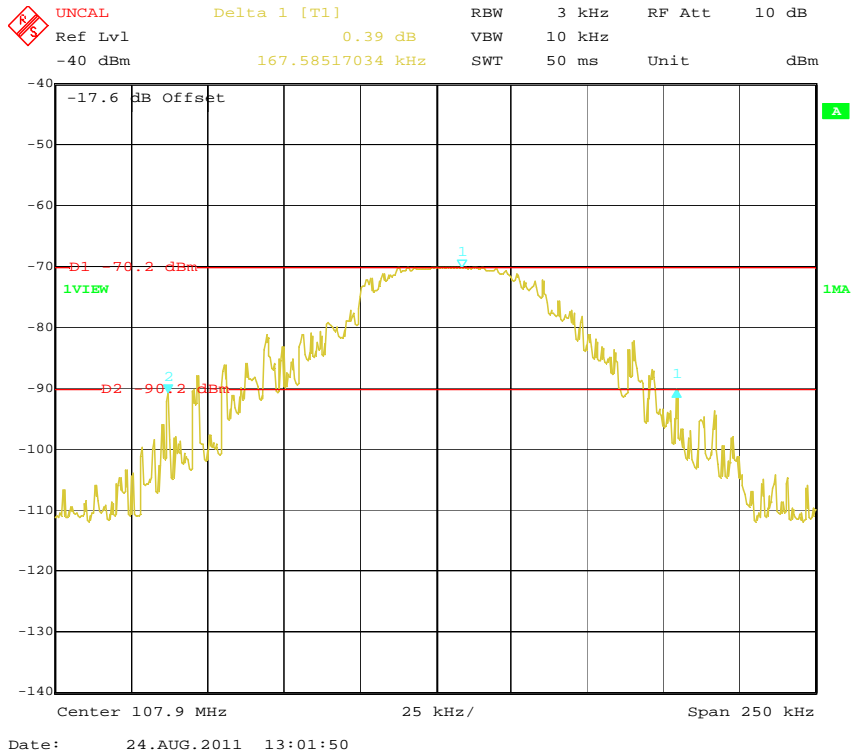
Lower Channel – 88.1MHz

Channel 96.9 – 138.746kHz



Middle Channel – 96.9MHz

Channel 107.9 – 167.58kHz



Upper Channel – 107.9MHz

7.0 § 15.239(b) / (c) Field strength requirements (FCC 15C - 15.239 (b)) (FEA Adapter)

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

Specific Setup Details

- Receiver configured to receive live Sirius Satellite Programming
- Receiver configured for the Max audio output level

7.0 Field strength requirements (FEA Adapter) @ 88.1MHz

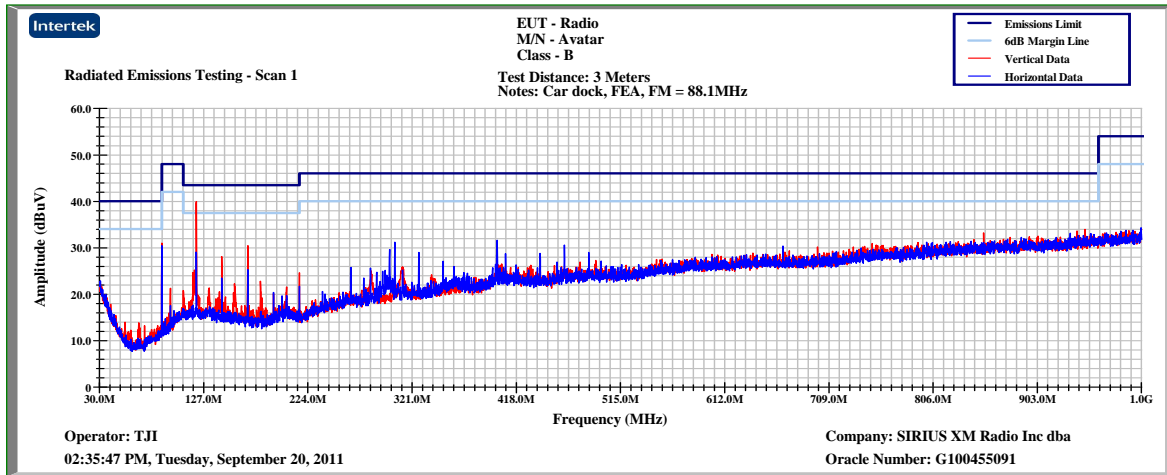
Results: The sample tested was found to Comply.

Specific Setup Details

- The SiriusXM SXi1 is positioned in a vertical position with at the back edge of the wooden testing table.
- SiriusXM SXi1 is powered by its 5V PowerConnect adapter via a 12V DC battery placed on the testing table and an 'iFMCLA' power adapter.
- The SiriusXM satellite antenna is connected to the SiriusXM SXi1's 'Antenna' port.
- The 'Audio' port of the SiriusXM SXi1's dock is terminated with its 'Aux-In' audio cable.
- The FM Modulator menu should be used to enable the FM signal from the SiriusXM SXi1.
- The SiriusXM SXi1 is configured to receive live SiriusXM programming service.
- The SiriusXM SXi1 is configured for Max audio output level.

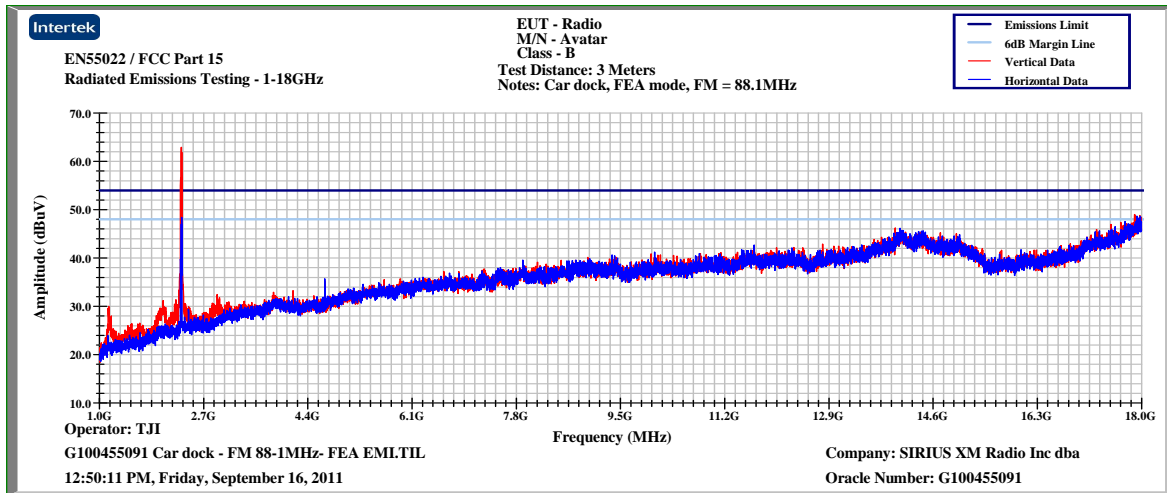
7.0 Field strength requirements (FEA Adapter) @ 88.1MHz

Peak Plot – 30MHz-1000MHz



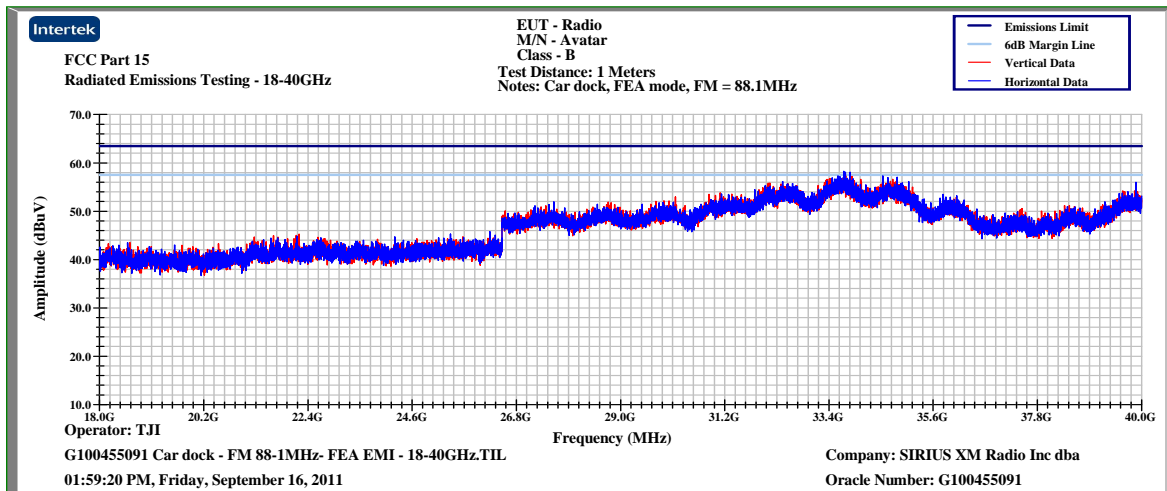
Note: The 120MHz signal is produced by the digital circuitry, the signal remains at the same level when the TX is turned off.

Peak Plot – 1000MHz-18000MHz



Note: Peaks above the limit between 2.2 and 2.5GHz are signals transmitted into the chamber with the satellite signal and are not related to the DUT.

Peak Plot – 18000MHz-40000MHz



7.0 Field strength requirements (FEA Adapter) @ 88.1MHz

Tabular Data

Frequency Range (MHz): 30-40000

Test Distance (m): 3

Input power: 12VDC battery

Limit: 15_239-3m

Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Net dB(uV/m)	3m Limit dB(uV/m)	Margin dB	Detectors / Bandwidths Det/RBW/VBW
FM = 88.1MHz									
v	88.100	49.5	8.9	1.9	28.4	31.9	48.0	-16.1	QP/120k/300k
v	120.005	52.3	12.7	2.2	28.3	38.9	43.5	-4.6	QP/120k/300k
v	143.999	41.9	11.7	2.4	28.5	27.5	43.5	-16.0	QP/120k/300k
v	168.000	45.9	10.3	2.6	28.3	30.5	43.5	-13.0	QP/120k/300k
v	311.550	33.4	14.3	3.7	28.0	23.4	46.0	-22.6	QP/120k/300k
h	400.063	42.1	16.1	4.2	28.0	34.4	46.0	-11.6	QP/120k/300k
Calculations		G=C+D+E-F			I=G-H				

7.0 Field strength requirements (FEA Adapter) @ 96.9MHz

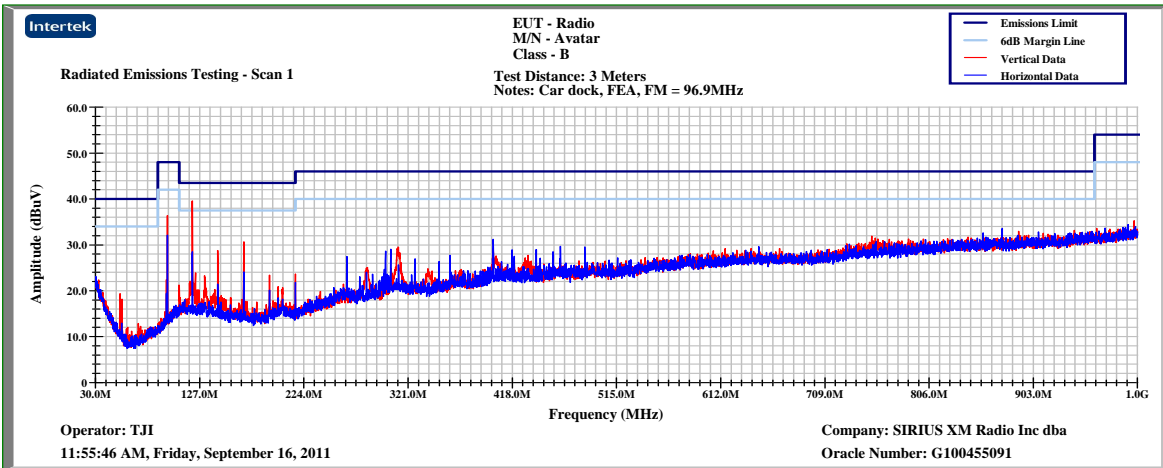
Results: The sample tested was found to Comply.

Specific Setup Details

- The SiriusXM SXi1 is positioned in a vertical position with at the back edge of the wooden testing table.
- SiriusXM SXi1 is powered by its 5V PowerConnect adapter via a 12V DC battery placed on the testing table and an 'iFMCLA' power adapter.
- The SiriusXM satellite antenna is connected to the SiriusXM SXi1's 'Antenna' port.
- The 'Audio' port of the SiriusXM SXi1's dock is terminated with its 'Aux-In' audio cable.
- The FM Modulator menu should be used to enable the FM signal from the SiriusXM SXi1.
- The SiriusXM SXi1 is configured to receive live SiriusXM programming service.
- The SiriusXM SXi1 is configured for Max audio output level.

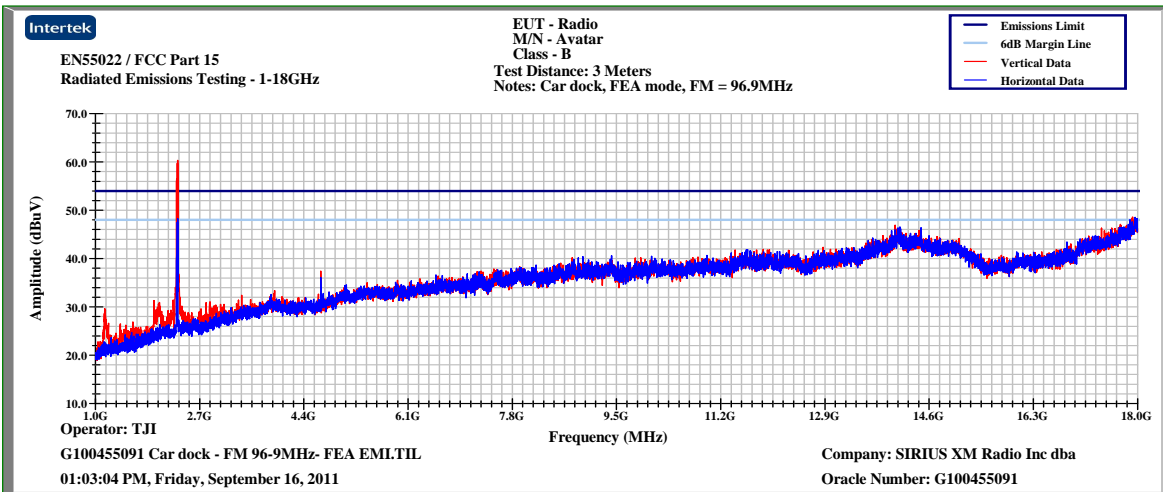
7.0 Field strength requirements (FEA Adapter) @ 96.9MHz

Peak Plot – 30MHz-1000MHz



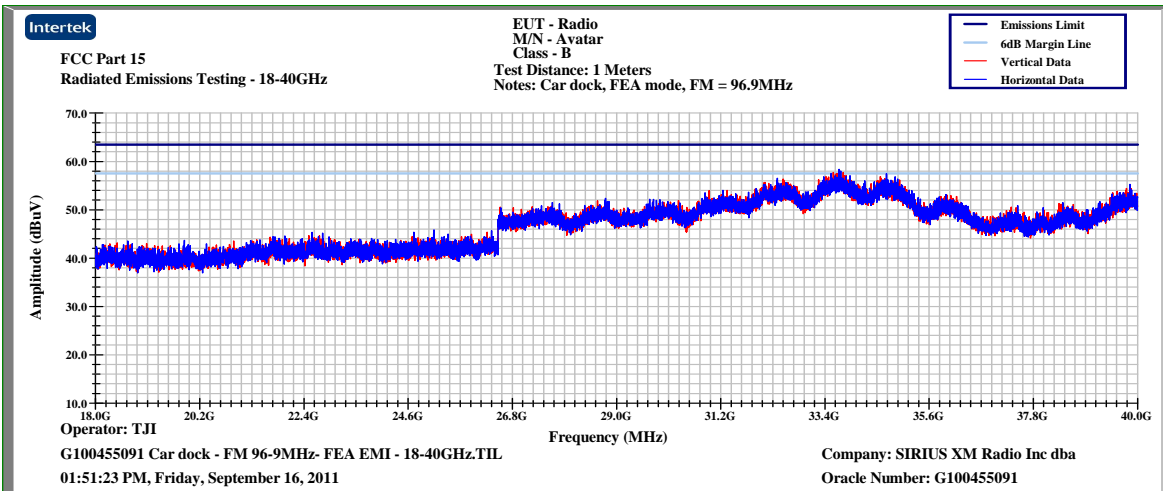
Note: The 120MHz signal is produced by the digital circuitry, the signal remains at the same level when the TX is turned off.

Peak Plot – 1000MHz-18000MHz



Note: Peaks above the limit between 2.2 and 2.5GHz are signals transmitted into the chamber with the satellite signal and are not related to the DUT.

Peak Plot – 18000MHz-40000MHz



7.0 Field strength requirements (FEA Adapter) @ 96.9MHz

Tabular Data

Frequency Range (MHz): 30-40000

Test Distance (m): 3

Input power: 12VDC battery

Limit: 15_239-3m

Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Net dB(uV/m)	3m Limit dB(uV/m)	Margin dB	Detectors / Bandwidths Det/RBW/VBW
FM = 96.9MHz									
v	96.903	52.1	10.5	2.0	28.4	36.2	48.0	-11.8	QP/120k/300k
v	120.005	52.1	12.7	2.2	28.3	38.7	43.5	-4.8	QP/120k/300k
v	144.005	42.2	11.7	2.4	28.5	27.8	43.5	-15.7	QP/120k/300k
v	168.003	46.1	10.3	2.6	28.3	30.7	43.5	-12.8	QP/120k/300k
v	311.550	33.4	14.3	3.7	28.0	23.4	46.0	-22.6	QP/120k/300k
h	399.838	38.1	16.1	4.2	28.0	30.4	46.0	-15.6	QP/120k/300k
Calculations		G=C+D+E-F			I=G-H				

7.0 Field strength requirements (FEA Adapter) @ 107.9MHz

Method:

Testing was performed using the emissions test methods described in the previous section

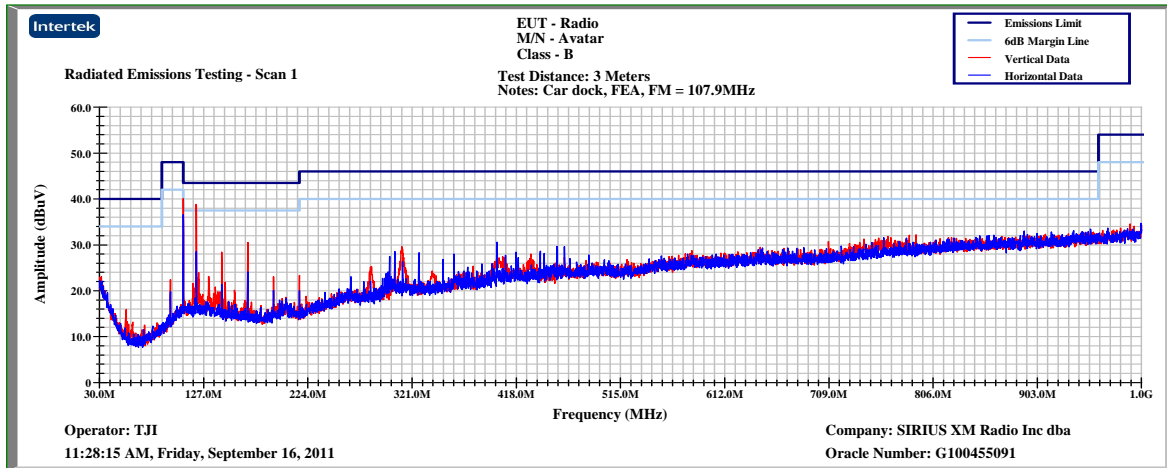
Results: The sample tested was found to Comply.

Specific Setup Details

- The SiriusXM SXi1 is positioned in a vertical position with at the back edge of the wooden testing table.
- SiriusXM SXi1 is powered by its 5V PowerConnect adapter via a 12V DC battery placed on the testing table and an 'iFMCLA' power adapter.
- The SiriusXM satellite antenna is connected to the SiriusXM SXi1's 'Antenna' port.
- The 'Audio' port of the SiriusXM SXi1's dock is terminated with its 'Aux-In' audio cable.
- The FM Modulator menu should be used to enable the FM signal from the SiriusXM SXi1.
- The SiriusXM SXi1 is configured to receive live SiriusXM programming service.
- The SiriusXM SXi1 is configured for Max audio output level.

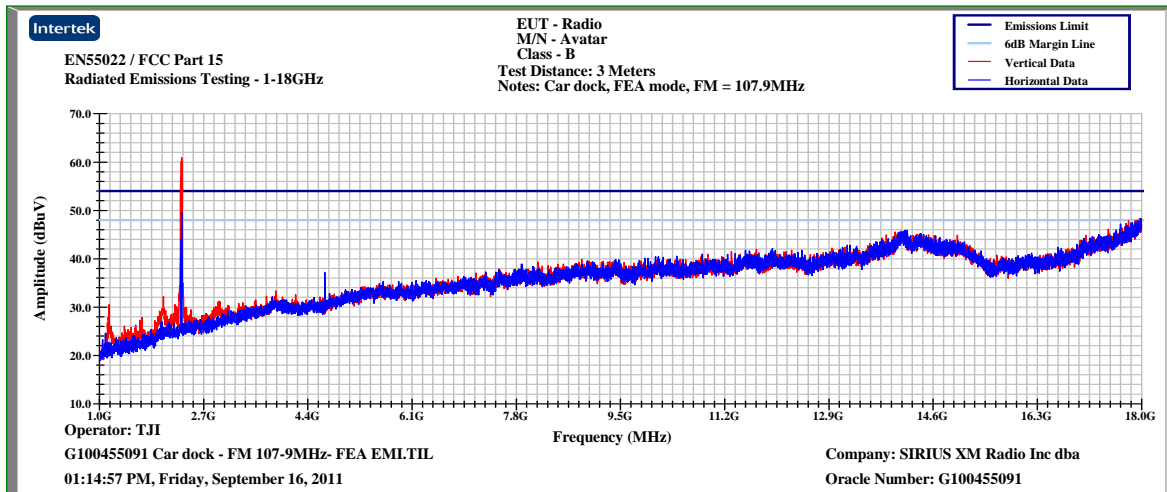
7.0 Field strength requirements (FEA Adapter) @ 107.9MHz

Peak Plot – 30MHz-1000MHz



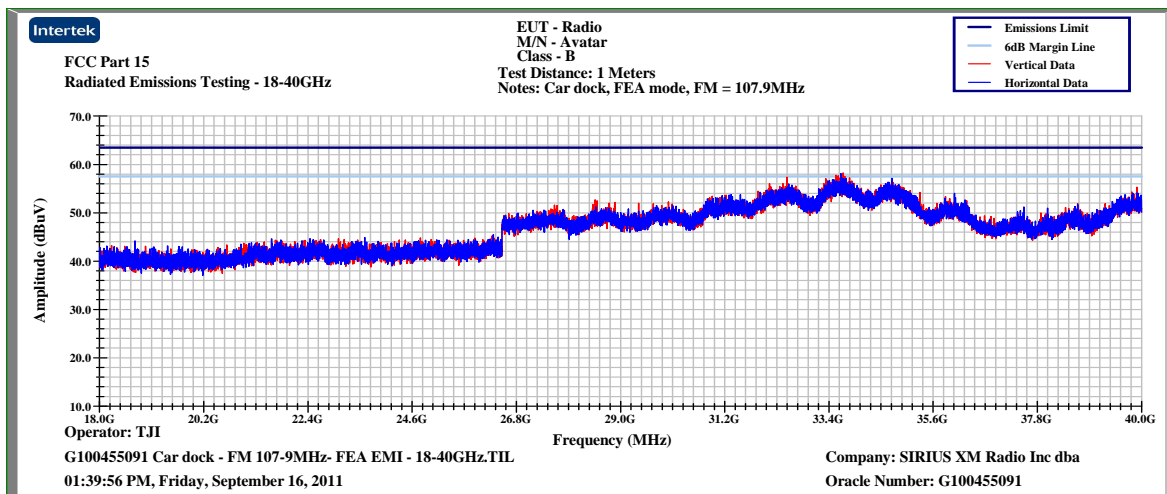
Note: The 120MHz signal is produced by the digital circuitry, the signal remains at the same level when the TX is turned off.

Peak Plot – 1000MHz-18000MHz



Note: Peaks above the limit between 2.2 and 2.5GHz are signals transmitted into the chamber with the satellite signal and are not related to the DUT.

Peak Plot – 18000MHz-40000MHz



7.0 Field strength requirements (FEA Adapter) @ 107.9MHz

Tabular Data

Frequency Range (MHz): 30-40000

Test Distance (m): 3

Input power: 12VDC battery

Limit: 15_239-3m

Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Net dB(uV/m)	3m Limit dB(uV/m)	Margin dB	Detectors / Bandwidths Det/RBW/VBW
FM = 107.9MHz									
v	107.903	49.9	12.3	2.1	28.2	36.0	48.0	-12.0	QP/120k/300k
v	120.001	45.7	12.7	2.2	28.3	32.3	43.5	-11.2	QP/120k/300k
v	143.995	42.6	11.7	2.4	28.5	28.2	43.5	-15.3	QP/120k/300k
v	167.998	42.5	10.3	2.6	28.3	27.1	43.5	-16.4	QP/120k/300k
v	311.600	33.6	14.3	3.7	28.0	23.6	46.0	-22.4	QP/120k/300k
v	400.050	33.4	16.7	4.2	28.0	26.3	46.0	-19.7	QP/120k/300k
Calculations		G=C+D+E-F			I=G-H				

8.0 Test Equipment List

Description	Manufacturer	Model	Serial Number	Cal Due
Bilog Antenna	Chase	CBL6112A	2622	10/13/2011
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	08/19/2012
Cable E401	Megaphase	TR40	E401	07/07/2012
Cable E402	Megaphase	TR40	E402	07/07/2012
Cable E403	Megaphase	TR40	E403	07/07/2012
Cable TT4	Andrews	TT4	TT4	05/24/2012
EMI Receiver	Hewlett Packard	8546A	213109	10/26/2011
EMI Receiver RF Preselector	Hewlett Packard	85460A	213108	10/26/2011
Horn Antenna (1-18GHz)	EMCO	3115	9208-3919	05/07/2012
Horn Antenna (18-40GHz)	EMCO	3116	9310-2222	07/07/2012
LISN	Fischer	FCC-LISN-50-50-M	2019	11/12/2011
Preamplifier, 10 MHz to 2000 MHz	Mini-Circuits	ZKL-2	D052005	08/16/2012
Preamplifier (1-18GHz)	Miteq	AMF-4D-001180-24-10P	1020106	10/04/2011
Preamplifier (18-40GHz)	Miteq	JS4	965178	07/06/2012
Preamplifier (18-40GHz)	Miteq	JS4	818197	07/06/2012
Spectrum Analyzer	Rohde & Schwartz	FSEK30	100253	10/22/2011

9.0 Revision History

Revision Level	Date	Report Number	Notes
Original issue	September 19, 2011	100455091ATL-002	--
1	September 21, 2011	100455091ATL-002	Changes Sirius to SiriusXM in configuration description. Added equipment list information.
2	September 26, 2011	100455091ATL-002	Removed FM direct 15.209 from the 15.239 test report
3	September 29, 2011	100455091ATL-002	Pages 11,14,17 – statement about 120MHz signal