

RF EXPOSURE EVALUATION
Maximum Permissible Exposure (MPE)

Applicant Name:
 Sirius XM Satellite Radio Inc.
 1500 Eckington Place, NE
 Washington, DC 20002
 United States

Date of Testing:
 5/3 - 6/14/2023
Test Site/Location:
 Element Lab. Columbia, MD, USA
Test Report Serial No.:
 1M2305010066-03-R2.RS2

FCC ID:	RS2SXVRBT2
IC:	5750A-SXVRBT2C
APPLICANT:	Sirius XM Satellite Radio Inc.

EUT Type: Satellite Radio with FM Transmitter and Bluetooth
Model: SXVRBT1
HVIN: SXVRBT1C
FCC Classification: Low Power Communication Device Transmitter (DXX),
 Part 15 Spread Spectrum Transmitter (DSS)
FCC Rule Part: FCC Part 1 (§1.1310), Part 2 (§2.1091)
ISED Specification(s): RSS-102 issue 5
Test Procedure(s): KDB 447498 D01

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in FCC KDB 447498 D01. Test results reported herein relate only to the item(s) tested.


This revised Test Report (S/N: 1M2305010066-03-R2.RS2) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.




RJ Ortanez
Executive Vice President



FCC ID: RS2SXVRBT2 IC: 5750A-SXVRBT2C	 MAXIMUM PERMISSIBLE EXPOSURE REPORT	Approved by: Technical Manager
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1.0 RF EXPOSURE EVALUATION – MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 Introduction

This document is prepared to show compliance with the RF Exposure requirements as required in §1.1310 of the FCC Rules and Regulations and RSS-102 of Industry Canada. The limit for Maximum Permissible Exposure (MPE), specified in FCC §1.1310, is listed in Table 1-1 and Rss-102, is listed in Table 1-2. According to FCC §1.1310 and RSS-102: the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b).

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (Minutes)
(A) Limits For Occupational / Control Exposures (f = frequency)				
30-300	61.4	0.163	1.0	6
300-1500	...	...	f/300	6
1500-100,000	...	...	5.0	6
(B) Limits For General Population / Uncontrolled Exposure (f = frequency)				
30-300	27.5	0.073	0.2	30
300-1500	...	...	f/1500	30
1500-100,000	...	...	1.0	30


Table 1-1. Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ¹²	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	87/ f ^{0.5}	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ f ^{0.25}	0.1540/ f ^{0.25}	8.944/ f ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 f ^{0.3417}	0.008335 f _{0.3417}	0.02619 f ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ f ^{1.2}
150000-300000	0.158 f ^{0.5}	4.12 x 10 ⁻⁴ f _{0.5}	6.67 x 10 ⁻⁵ f	616000/ f ^{1.2}
<p>Note: f is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).</p>				

Table 1-2. ISED Limits for Devices Used by the General Public (Uncontrolled Environment) EUT Description

1.2 EUT Description

The **Sirius XM Satellite Radio Inc. FCC ID: RS2SXVRBT2** is a Satellite Radio with FM Transmitter and Bluetooth.

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1.3 Test Procedure

The procedure used to determine the RF power density was based upon measurements using a calibrated probe. The probe was set at a distance of 20cm from multiple sides of the EUT to determine the E-Field and H-Field measurements for FCC and for ISED compliance. The exposure was averaged over a time period not to exceed 6 minutes to determine the compliance.

Test Setup

The EUT and measurement equipment were set up per Figure 1-1 below and test setup photos provided.

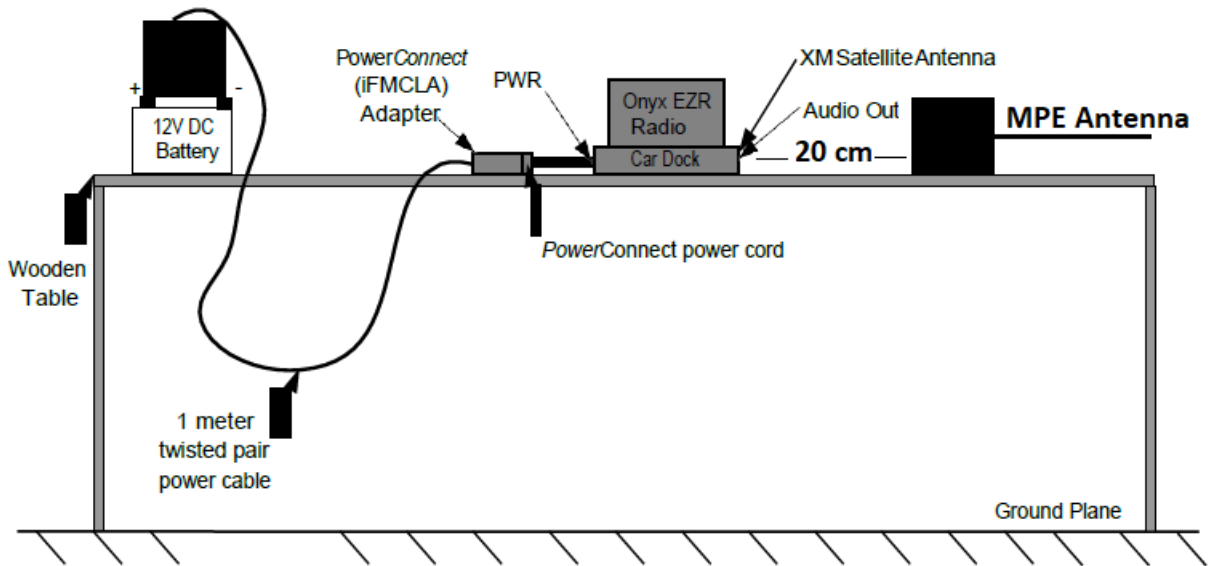


Figure 1-1. MPE Test Setup

Friis Transmission Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4\pi r^2)$

Where,

P_d = Power Density (mW/cm²)

π = 3.1416

P_{out} = output power to antenna (mW)


r = distance between observation point and center of the radiator (cm)

G = gain of antenna in linear scale

Calculated MPE

The power density limit for General Population/Uncontrolled Exposure at each frequency is determined based on the information in Table 1-1.

There is no co-location between the electric fields of any two transmitters therefore following power densities are calculated for each individual transmitter by frequency at 20cm spacing:

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1.4 Measurement Data

Frequency	2441 MHz		
Limit	1.000 mW/cm ²		
Distance (cm), R =	20 cm		
Power (dBm), P =	13.82 dBm	24.10 mW	
TX Ant Gain (dBi), G =	2.66 dBi		
Power Density (S) =	0.009 mW/cm ²	(at 20cm)	
Minimum Distance =	1.9 cm		

Table 1-3. Calculated MPE Data for 2.4GHz Band

Probe location to DUT	E-Field Measurements (V/m)	Distant from Probe (cm)	FCC Limit (V/m)	ISED Limit (V/m)
Front	0.57	20	27.5	22.06
Left side	0.56	20	27.5	22.06
Right side	0.57	20	27.5	22.06
Back	0.54	20	27.5	22.06


Probe location to DUT	H-Field Measurements (A/m)	Distant from Probe (cm)	FCC Limit (V/m)	ISED Limit (V/m)
Front	0.0194	20	0.073	0.05852
Left side	0.0191	20	0.073	0.05852
Right side	0.0181	20	0.073	0.05852
Back	0.0183	20	0.073	0.05852

Table 1-4. MPE Data for 96.9MHz Band

1.5 Summary of Results


Frequency Band [MHz]	Maximum Antenna Gain [dBi]	MPE @ 20cm (mW/cm ²)	Test Result
2402 - 2480	2.66	0.009	PASS
88.1 – 107.9	N/A	0.0001	PASS

Table 1-5. Maximum Permissible Exposure Summary Table

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2.0 CONCLUSION

The device meets the mobile RF exposure limit at a 20cm separation distance as specified in §2.1091 of the FCC Rules and Regulations and Health Canada Safety Code 6. An appropriate RF exposure compliance statement will be placed in the user's manual.

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