**XM Satellite Radio Inc Additional Information**
**Applicable to FM band modulators/transmitters**
**Operating under Part 15.239 of the FCC Rules**

**FCC ID RS2XDPENT1**
**August 10, 2009**

**Paragraph numbers below refer to 'Procedures for a Telecommunications Certification Body', section 2 (f) of KDB file 388624 D01 Permit But Ask v02**

i. Describe the operation of the device.

The Sirius XM Radio (onyX) device is a 2.3 GHz SDARS radio designed for use in an automobile or home. The radio includes a built-in FM modulator which permits playing the audio through a conventional FM receiver when used with the radio's associated car-docking cradle. The radio was also designed for use with a special car cradle, i.e. the Gen2 car cradle that implements injecting an FM signal through the vehicle's CLA socket via an "iFMCLA" power CLA cord that plugs into its power port. This power CLA cable also provides power (5V) to the satellite radio. An optional home-docking accessory permits connection of the audio output to a conventional home stereo system, and disables the FM modulator.

An FM Coupler (product name: 'SureConnect') is designed to deliver the FM modulated signal from the XM Radio receiver to the vehicle's FM radio by means of capacitive coupling. The SureConnect, fed from the car-docking cradle (model 136-7368A), clips to the vehicle's aerial antenna. The FM power level is such that radiation from the shielded cable is minimal and within FCC limits, yet the power available for coupling is sufficient to provide good FM performance. In addition to the SureConnect, a similar product called the FM Extender Antenna (FEA) could also be utilized in the same manner when used with the same car-docking cradle (model 136-7368A).

When using the Gen2 car cradle along with the "iFMCLA" power cord, FM couplers are not needed to deliver the FM modulated signal to the vehicle's FM radio; the satellite radio's down converted 200 KHz bandwidth FM signal is injected into the vehicle's CLA socket via the "iFMCLA" power cord and then to the vehicle's FM radio's wiring harness, which in-turn acts as an antenna.

The onyX product has a built-in FM modulator chip i.e. Si4712 from Silicon Laboratories. The FM signal is coupled onto the center conductor of the RF coaxial cable used with the Sirius XM antenna module. If the user utilizes the FM modulator in the product, they would have a choice of using the XM SureConnect FM coupler; the FM Extender Antenna (FEA); the FM Direct Adapter; or the "iFMCLA" power cord accessories. There is no internal FM transmitting antenna. The Si4712 is capable of scanning the entire FM band and recommending FM frequencies to the end user to use for transmission, this mode of operation is labeled Frequency Finder in the Vehicle Mode menu option. The Frequency Finder mode of operation can be initiated in 3 ways: 1)

When Vehicle Mode is initially turned ON; 2) Selecting Frequency Finder option in Vehicle Mode menu; 3) Holding down the Jump button for 2 seconds (after Vehicle Mode is turned ON). The Frequency Finder feature scans the entire FM band from 88.1 MHz to 107.9 MHz, performs an algorithm on the data and recommends up to 4 FM frequencies to the end user to set the FM modulator transmit frequency. The FM modulator transmit frequency can also be set manually using View All Frequencies option, available as the last selection after a Frequency Finder operation is performed. The FM modulator is turned ON/OFF via the menu option Vehicle Mode.

ii. Provide information on the device and its antenna.
The device is a 2.3 GHz SDARS radio with an included receive-only S-Band antenna. The FM Modulator/Transmitter portion of this device couples the FM signal to the vehicle's FM radio antenna using the SureConnect FM coupler or FEA device. It could also function without the SureConnect FM coupler or FEA device interacting with the vehicle's whip antenna by deploying the Gen2 car cradle in conjunction with the "iFMCLA" power cord accessory.

iii. How is it installed?
The radio is typically mounted in its cradle on the vehicle's dashboard with installation hardware provided along with the unit. The cradle is connected to a receive satellite antenna, and powered by a CLA or "iFMCLA" power cord. The SureConnect and FM Direct adapter accessories hook up to the vehicle's FM whip antenna, and the CLA power cord plug directly into the CLA socket of the vehicle. To clearly instruct users on proper installation practices, detailed installation instructions are included in all accessory packages.

iv. Describe the test procedure used. (OAT's, In situ, etc.)
For all test configurations, an A2LA accredited laboratory using their OAT's testing facility was used for making measurements. In-situ measurements were taken from three representative vehicles i.e. small, medium & SUV by an A2LA accredited test lab.

v. If tested in a car, describe how was it configured and tested.
See diagram 5 from the test report below. The antenna mast was moved along a line at a 3-meter distance from the vehicle while the antenna mast was adjusted between 1 and 4 meters in order to find the maximum emissions. The above procedure was repeated with the vehicle in 4 positions; 0, 90, 180, and 270 degrees. Both Horizontal and Vertical emissions were tested. The above tests were repeated with each of three vehicles: a Range Rover (full size SUV); Subaru Outback; and a Nissan Sentra.

vi. At the present time, FM transmitters (subject to 15.239) tested in vehicles must also be tested on a test table. Provide both sets of data. All data must be compliant.

Table 4-1.1 below, from the test report, shows the maximum emissions as measured by the lab's OAT's site.

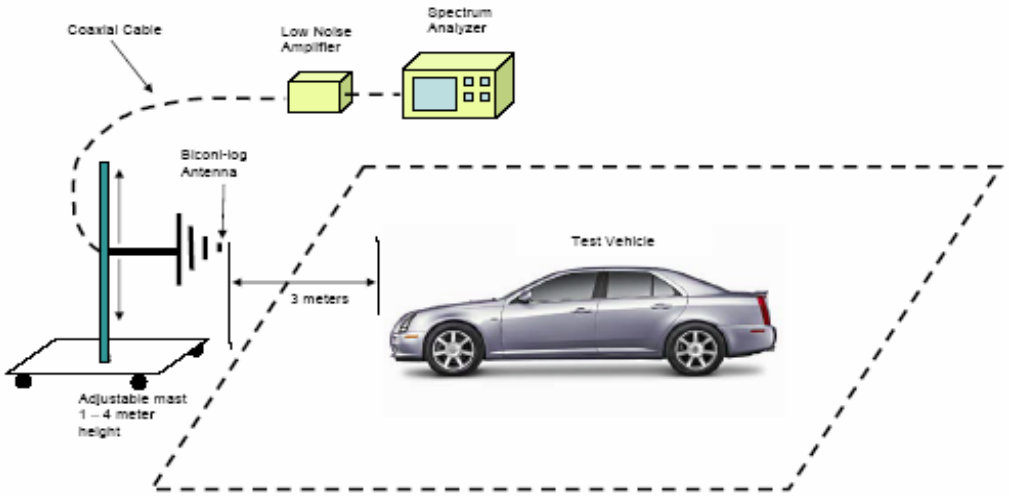
Table 4.1-1: In-Band Radiated Emissions

| Temperature: 85°F Humidity: 55% | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Emission Frequency (MHz) | Test Detector | Antenna Polarity (H/V) | Turntable Azimuth (deg) | Antenna Height (m) | Analyzer Reading (dBuV) | Site Correction Factor (dB/m) | Emission Level (dBuV/m) | FCC Limit (dBuV/m) | FCC Margin (dB) | IC Limit (dBuV/m) | IC Margin (dB) |
| 89.100 | Qp | V | 260 | 1.0 | 63.4 | -22.9 | 40.5 | 48.0 | -7.5 | 60.0 | -19.5 |
| 97.700 | Qp | V | 225 | 1.0 | 64.7 | -20.8 | 43.9 | 48.0 | -4.1 | 60.0 | -16.1 |
| 106.300 | Qp | V | 220 | 1.0 | 60.4 | -19.6 | 40.8 | 48.0 | -7.2 | 60.0 | -19.2 |

**In-Band Radiated Measurements – Test Configuration #1**

Tables 4.2.1 thru 4.2.3 below, from the test report, show the emissions measured for the in-situ portion of the tests. The low, mid and high frequency measurements were taken at 89.1, 97.7 and 106.3 MHz respectively; in lieu of the usual 88.1, 97.1 and 107.7 MHz to avoid interference from FM broadcast stations that were detected in the area of the test range.

**Diagram 5: In-Vehicle Measurement Method**



4.2.1 Radiated Measurement Data for Nissan Sentra (15.239(b) / 15.209)

| Emission Frequency (MHz) | Test Detector | Antenna Polarity (H/V) | Turntable Azimuth (deg) | Antenna Height (m) | Analyzer Reading (dBuV) | Site Correction Factor (dB/m) | Emission Level (dBuV/m) | FCC Limit (dBuV/m) | FCC Margin (dB) | IC Limit (dBuV/m) | IC Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 89.100 | Qp | H | 0 | 1.5 | 54.8 | -22.9 | 31.9 | 48.0 | -16.1 | 60.0 | -28.1 |
| 89.100 | Qp | H | 180 | 2.0 | 51.8 | -22.9 | 28.9 | 48.0 | -19.1 | 60.0 | -31.1 |
| 89.100 | Qp | H | 90 | 4.0 | 64.4 | -22.9 | 41.5 | 48.0 | -6.5 | 60.0 | -18.5 |
| 89.100 | Qp | H | 270 | 2.5 | 63.7 | -22.9 | 40.8 | 48.0 | -7.2 | 60.0 | -19.2 |
| 89.100 | Qp | V | 0 | 1.5 | 61.8 | -22.9 | 38.9 | 48.0 | -9.1 | 60.0 | -21.1 |
| 89.100 | Qp | V | 180 | 1.2 | 59.3 | -22.9 | 36.4 | 48.0 | -11.6 | 60.0 | -23.6 |
| 89.100 | Qp | V | 90 | 2.5 | 59.8 | -22.9 | 36.9 | 48.0 | -11.1 | 60.0 | -23.1 |
| 89.100 | Qp | V | 270 | 1.5 | 58.7 | -22.9 | 35.8 | 48.0 | -12.2 | 60.0 | -24.2 |
| 97.700 | Qp | H | 0 | 3.0 | 52.8 | -20.8 | 32.0 | 48.0 | -16.0 | 60.0 | -28.0 |
| 97.700 | Qp | H | 180 | 3.0 | 54.0 | -20.8 | 33.2 | 48.0 | -14.8 | 60.0 | -26.8 |
| 97.700 | Qp | H | 90 | 3.5 | 62.7 | -20.8 | 41.9 | 48.0 | -6.1 | 60.0 | -18.1 |
| 97.700 | Qp | H | 270 | 4.0 | 62.5 | -20.8 | 41.7 | 48.0 | -6.3 | 60.0 | -18.3 |
| 97.700 | Qp | V | 0 | 2.0 | 58.0 | -20.8 | 37.2 | 48.0 | -10.8 | 60.0 | -22.8 |
| 97.700 | Qp | V | 180 | 1.0 | 60.9 | -20.8 | 40.1 | 48.0 | -7.9 | 60.0 | -19.9 |
| 97.700 | Qp | V | 90 | 1.5 | 58.3 | -20.8 | 37.5 | 48.0 | -10.5 | 60.0 | -22.5 |
| 97.700 | Qp | V | 270 | 1.8 | 57.7 | -20.8 | 36.9 | 48.0 | -11.1 | 60.0 | -23.1 |
| 106.300 | Qp | H | 0 | 4.0 | 50.8 | -19.6 | 31.2 | 48.0 | -16.8 | 60.0 | -28.8 |
| 106.300 | Qp | H | 180 | 3.0 | 52.2 | -19.6 | 32.6 | 48.0 | -15.4 | 60.0 | -27.4 |
| 106.300 | Qp | H | 90 | 3.0 | 56.7 | -19.6 | 37.1 | 48.0 | -10.9 | 60.0 | -22.9 |
| 106.300 | Qp | H | 270 | 3.0 | 62.9 | -19.6 | 43.3 | 48.0 | -4.7 | 60.0 | -16.7 |
| 106.300 | Qp | V | 0 | 1.0 | 61.3 | -19.6 | 41.7 | 48.0 | -6.3 | 60.0 | -18.3 |
| 106.300 | Qp | V | 180 | 1.5 | 61.5 | -19.6 | 41.9 | 48.0 | -6.1 | 60.0 | -18.1 |
| 106.300 | Qp | V | 90 | 1.5 | 62.1 | -19.6 | 42.5 | 48.0 | -5.5 | 60.0 | -17.5 |
| 106.300 | Qp | V | 270 | 2.0 | 57.4 | -19.6 | 37.8 | 48.0 | -10.2 | 60.0 | -22.2 |

**In-Band Radiated Measurements (Nissan Sentra) – Test Configuration #2**

4.2.2 Radiated Measurement Data for Subaru Outback (15.239(b) / 15.209)

| Emission Frequency (MHz) | Test Detector | Antenna Polarity (H/V) | Turntable Azimuth (deg) | Antenna Height (m) | Analyzer Reading (dBuV) | Site Correction Factor (dB/m) | Emission Level (dBuV/m) | FCC Limit (dBuV/m) | FCC Margin (dB) | IC Limit (dBuV/m) | IC Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 89.1 | Qp | H | 0.0 | 2.5 | 53.3 | -22.9 | 30.4 | 48.0 | -17.6 | 60.0 | -29.6 |
| 89.1 | Qp | V | 0.0 | 1.5 | 53.0 | -22.9 | 30.1 | 48.0 | -17.9 | 60.0 | -29.9 |
| 89.1 | Qp | H | 90.0 | 3.0 | 53.5 | -22.9 | 30.6 | 48.0 | -17.4 | 60.0 | -29.4 |
| 89.1 | Qp | V | 90.0 | 2.0 | 45.0 | -22.9 | 22.1 | 48.0 | -25.9 | 60.0 | -37.9 |
| 89.1 | Qp | H | 180.0 | 2.4 | 51.3 | -22.9 | 28.4 | 48.0 | -19.6 | 60.0 | -31.6 |
| 89.1 | Qp | V | 180.0 | 3.5 | 51.6 | -22.9 | 28.7 | 48.0 | -19.3 | 60.0 | -31.3 |
| 89.1 | Qp | H | 270.0 | 2.0 | 52.1 | -22.9 | 29.2 | 48.0 | -18.8 | 60.0 | -30.8 |
| 89.1 | Qp | V | 270.0 | 1.0 | 50.9 | -22.9 | 28.0 | 48.0 | -20.0 | 60.0 | -32.0 |
| 97.7 | Qp | H | 0.0 | 3.5 | 44.7 | -20.8 | 23.9 | 48.0 | -24.1 | 60.0 | -36.1 |
| 97.7 | Qp | V | 0.0 | 3.0 | 53.9 | -20.8 | 33.1 | 48.0 | -14.9 | 60.0 | -26.9 |
| 97.7 | Qp | H | 90.0 | 3.5 | 53.6 | -20.8 | 32.8 | 48.0 | -15.2 | 60.0 | -27.2 |
| 97.7 | Qp | V | 90.0 | 3.5 | 50.4 | -20.8 | 29.6 | 48.0 | -18.4 | 60.0 | -30.4 |
| 97.7 | Qp | H | 180.0 | 2.2 | 42.9 | -20.8 | 22.1 | 48.0 | -25.9 | 60.0 | -37.9 |
| 97.7 | Qp | V | 180.0 | 3.0 | 54.5 | -20.8 | 33.7 | 48.0 | -14.3 | 60.0 | -26.3 |
| 97.7 | Qp | H | 270.0 | 4.0 | 53.0 | -20.8 | 32.2 | 48.0 | -15.8 | 60.0 | -27.8 |
| 97.7 | Qp | V | 270.0 | 1.0 | 52.0 | -20.8 | 31.2 | 48.0 | -16.8 | 60.0 | -28.8 |
| 106.3 | Qp | H | 0.0 | 4.0 | 48.6 | -19.6 | 29.0 | 48.0 | -19.0 | 60.0 | -31.0 |
| 106.3 | Qp | V | 0.0 | 2.5 | 49.9 | -19.6 | 30.3 | 48.0 | -17.7 | 60.0 | -29.7 |
| 106.3 | Qp | H | 90.0 | 4.0 | 44.3 | -19.6 | 24.7 | 48.0 | -23.3 | 60.0 | -35.3 |
| 106.3 | Qp | V | 90.0 | 1.0 | 50.2 | -19.6 | 30.6 | 48.0 | -17.4 | 60.0 | -29.4 |
| 106.3 | Qp | H | 180.0 | 3.0 | 49.1 | -19.6 | 29.5 | 48.0 | -18.5 | 60.0 | -30.5 |
| 106.3 | Qp | V | 180.0 | 2.5 | 52.6 | -19.6 | 33.0 | 48.0 | -15.0 | 60.0 | -27.0 |
| 106.3 | Qp | H | 270.0 | 4.0 | 47.7 | -19.6 | 28.1 | 48.0 | -19.9 | 60.0 | -31.9 |
| 106.3 | Qp | V | 270.0 | 2.5 | 48.2 | -19.6 | 28.6 | 48.0 | -19.4 | 60.0 | -31.4 |

**In-Band Radiated Measurements (Subaru Outback) – Test Configuration #2**

4.2.3 Radiated Measurement Data for Range Rover SUV (15.239(b) / 15.209)

| Emission Frequency (MHz) | Test Detector | Antenna Polarity (H/V) | Turntable Azimuth (deg) | Antenna Height (m) | Analyzer Reading (dBuV) | Site Correction Factor (dB/m) | Emission Level (dBuV/m) | FCC Limit (dBuV/m) | FCC Margin (dB) | IC Limit (dBuV/m) | IC Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 89.100 | Qp | H | 0 | 2.5 | 47.4 | -22.9 | 24.5 | 48.0 | -23.5 | 60.0 | -35.5 |
| 89.100 | Qp | H | 270 | 3.0 | 48.7 | -22.9 | 25.8 | 48.0 | -22.2 | 60.0 | -34.2 |
| 89.100 | Qp | H | 90 | 3.2 | 46.9 | -22.9 | 24.0 | 48.0 | -24.0 | 60.0 | -36.0 |
| 89.100 | Qp | H | 180 | 3.5 | 47.1 | -22.9 | 24.2 | 48.0 | -23.8 | 60.0 | -35.8 |
| 89.100 | Qp | V | 0 | 2.5 | 51.6 | -22.9 | 28.7 | 48.0 | -19.3 | 60.0 | -31.3 |
| 89.100 | Qp | V | 270 | 1.5 | 51.5 | -22.9 | 28.6 | 48.0 | -19.4 | 60.0 | -31.4 |
| 89.100 | Qp | V | 90 | 1.5 | 47.5 | -22.9 | 24.6 | 48.0 | -23.4 | 60.0 | -35.4 |
| 89.100 | Qp | V | 180 | 1.0 | 45.2 | -22.9 | 22.3 | 48.0 | -25.7 | 60.0 | -37.7 |
| 97.700 | Qp | H | 0 | 3.0 | 47.6 | -20.8 | 26.8 | 48.0 | -21.2 | 60.0 | -33.2 |
| 97.700 | Qp | H | 90 | 3.0 | 47.2 | -20.8 | 26.4 | 48.0 | -21.6 | 60.0 | -33.6 |
| 97.700 | Qp | H | 180 | 3.0 | 47.9 | -20.8 | 27.1 | 48.0 | -20.9 | 60.0 | -32.9 |
| 97.700 | Qp | H | 270 | 1.6 | 48.6 | -20.8 | 27.8 | 48.0 | -20.2 | 60.0 | -32.2 |
| 97.700 | Qp | V | 0 | 1.5 | 49.4 | -20.8 | 28.6 | 48.0 | -19.4 | 60.0 | -31.4 |
| 97.700 | Qp | V | 270 | 1.5 | 51.3 | -20.8 | 30.5 | 48.0 | -17.5 | 60.0 | -29.5 |
| 97.700 | Qp | V | 90 | 1.5 | 51.3 | -20.8 | 30.5 | 48.0 | -17.5 | 60.0 | -29.5 |
| 97.700 | Qp | V | 180 | 1.5 | 46.1 | -20.8 | 25.3 | 48.0 | -22.7 | 60.0 | -34.7 |
| 106.300 | Qp | H | 0 | 2.8 | 48.0 | -19.6 | 28.4 | 48.0 | -19.6 | 60.0 | -31.6 |
| 106.300 | Qp | H | 270 | 3.0 | 51.3 | -19.6 | 31.7 | 48.0 | -16.3 | 60.0 | -28.3 |
| 106.300 | Qp | H | 90 | 2.5 | 46.6 | -19.6 | 27.0 | 48.0 | -21.0 | 60.0 | -33.0 |
| 106.300 | Qp | H | 180 | 4.0 | 44.1 | -19.6 | 24.5 | 48.0 | -23.5 | 60.0 | -35.5 |
| 106.300 | Qp | V | 0 | 2.0 | 47.6 | -19.6 | 28.0 | 48.0 | -20.0 | 60.0 | -32.0 |
| 106.300 | Qp | V | 270 | 1.2 | 50.6 | -19.6 | 31.0 | 48.0 | -17.0 | 60.0 | -29.0 |
| 106.300 | Qp | V | 90 | 2.0 | 52.4 | -19.6 | 32.8 | 48.0 | -15.2 | 60.0 | -27.2 |
| 106.300 | Qp | V | 180 | 1.5 | 45.5 | -19.6 | 25.9 | 48.0 | -22.1 | 60.0 | -34.1 |

**In-Band Radiated Measurements (Range Rover) – Test Configuration #2**

vii. Was the tuning range properly verified? The test lab should indicate in the report that the tuning controls were manually adjusted to verify maximum tuning range.
As reported in the onyX Test Reports, the tuning range was verified by the lab to be within the range of 88.1 MHz to 107.9 MHz per FCC requirements.

viii. Was the bandwidth properly tested with maximum audio input?
The XM radio includes a user-settable audio output adjustment which controls the audio line out level to the audio output jack. During occupied bandwidth tests the level was set to maximum.

ix. Use a typical audio file from a typical device. e.g. do not use a 1 kHz signal from a signal generator.
The occupied bandwidth was measured while receiving XM's broadcast signal. In addition, several channels were sampled to obtain maximum deviation.

x. Provide the test report showing compliance with the rules.
The test report showing compliance with the FCC rules has been provided to the TCB.