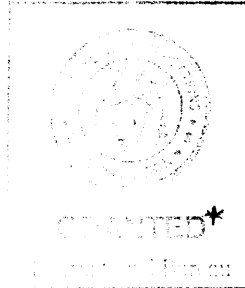


SAT-STA-20081205-00222  
Sirius XM Radio Inc.

IB2008002829



\* subject to conditions

File # SAT- STA- 20081205- 00222

Call Sign \_\_\_\_\_ Grant Date 03/17/09  
(or other identifier)

Term Dates period of  
From 03/17/09 To: 180 days

Approved by OMB  
3060-0678

Date & Time Filed: Dec 5 2008 1:25:36:116PM  
File Number: SAT-STA-20081205-00222  
Callsign:

Approved: Stephen J. Duall  
Stephen J. Duall  
Chief, Policy Branch

FEDERAL COMMUNICATIONS COMMISSION  
APPLICATION FOR SPACE STATION SPECIAL TEMPORARY AUTHORITY

FOR OFFICIAL USE ONLY

APPLICANT INFORMATION

Enter a description of this application to identify it on the main menu:

Request for Special Temporary Authority to Operate Very Low Power Repeaters and Signal Boosters at Indefinite Locations

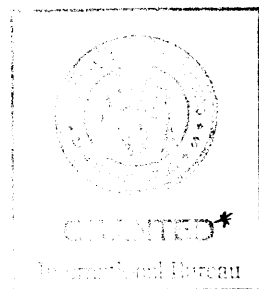
I. Applicant

<b>Name:</b>	Sirius XM Radio Inc.	<b>Phone Number:</b>	212-584-5100
<b>DBA Name:</b>		<b>Fax Number:</b>	212-584-5353
<b>Street:</b>	1221 Avenue of the Americas 36th Floor	<b>E-Mail:</b>	
<b>City:</b>	New York	<b>State:</b>	NY
<b>Country:</b>	USA	<b>Zipcode:</b>	10020 -
<b>Attention:</b>	Patrick L. Donnelly		

**Application of Sirius XM Radio Inc. for Special Temporary Authority  
IBFS File No. SAT-STA-20081205-00222**

Sirius XM Radio Inc. (Sirius XM) is granted special temporary authority (STA) for a period of 180 days to operate indoor terrestrial repeaters with an effectively isotropically radiated power (EIRP) (average) of (1) up to 10 watts and (2) up to 0.0001 watts at trade shows and other indoor locations, such as automobile industry promotional events, press and marketing events, and investor relations events. This authorization is subject to the Commission's rules, the operational and technical parameters specified in Sirius XM's application, and the following conditions:

1. Any actions taken as a result of this STA are solely at the applicant's own risk. This STA shall not prejudice the outcome of the final rules adopted by the Commission in IB Docket No. 95-91;
2. Operation of the terrestrial repeaters is authorized pursuant to this STA on a non-interference basis with respect to all permanently authorized radiocommunication facilities;
3. The terrestrial repeaters are restricted to the simultaneous retransmission of the complete programming, and only that programming, transmitted by the satellite directly to SDARS receivers;
4. Where applicable, coordination of the operations of the terrestrial repeaters shall be completed with all affected Administrations prior to operation, in accordance with all applicable international agreements including those with Canada and Mexico;
5. The terrestrial repeaters shall comply with Part 1 of the Commission's rules, Subpart I – Procedures Implementing the National Environmental Policy Act of 1969, including the guidelines for human exposure to radio frequency electromagnetic fields as defined in Sections 1.1307(b) and 1.1310 of the Commission's rules, 47 C.F.R. §§ 1.1307(b) and 1.1310;
6. The out-of-band emissions of the terrestrial repeaters shall be limited to 75+10log(EIRP) dB less than the transmitter EIRP;
7. Sirius XM will maintain full ownership and operational control of the terrestrial repeaters;
8. Sirius XM will immediately shut down the terrestrial repeaters upon a complaint of interference, upon direction from the Commission, or upon finding that the repeaters have not been properly installed;
9. Sirius XM is granted 30 days from the date of the release of this authorization to decline the authorization as conditioned. Failure to respond within that period will constitute formal acceptance of the authorization as conditioned.
10. This action is taken on delegated authority pursuant to 47 C.F.R. § 0.261 and is effective upon release. Petitions for reconsideration under 47 C.F.R. § 1.106 or applications for review under 47 C.F.R. § 1.115 may be filed within 30 days of the date of the Public Notice announcing this action.



\* subject to conditions

File # SAT-STA-20081205-00222

Call Sign \_\_\_\_\_ Grant Date 03/17/09  
(or other identifier)

Term Dates period of  
From 03/17/09 To: 180 days

Approved: Stephen J. Duall

Stephen J. Duall  
Chief, Policy Branch

2. Contact	
<b>Name:</b> James S. Blitz	<b>Phone Number:</b> 202-380-4000
<b>Company:</b> Sirius XM Radio Inc.	<b>Fax Number:</b> 202-380-4981
<b>Street:</b> 1500 Eckington Place NE	<b>E-Mail:</b> james.blitz@xmradio.com
<b>City:</b> Washington	<b>State:</b> DC
<b>Country:</b> USA	<b>Zipcode:</b> 20002 -
<b>Attention:</b>	<b>Relationship:</b> Same
(If your application is related to an application filed with the Commission, enter either the file number or the IB Submission ID of the related application. Please enter only one.)	
3. Reference File Number or Submission ID	
4a. Is a fee submitted with this application?	
<input checked="" type="radio"/> If Yes, complete and attach FCC Form 159. If No, indicate reason for fee exemption (see 47 C.F.R. Section 1.1114). <input type="radio"/> Governmental Entity <input type="radio"/> Noncommercial educational licensee <input type="radio"/> Other (please explain):	
4b. Fee Classification    CXW - Space Station (Non-Geostationary)	
5. Type Request	
<input type="radio"/> Change Station Location <input type="radio"/> Extend Expiration Date <input checked="" type="radio"/> Other	
6. Temporary Orbit Location	7. Requested Extended Expiration Date

8. Description (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

Sirius XM Radio Inc. (Sirius) requests Special Temporary Authority to operate very low power terrestrial repeaters (less than 10 watts EIRP) and signal boosters (less than 0.0001 watts EIRP) at indefinite locations for one hundred eighty days pursuant to the technical parameters listed in Exhibit A.

9. By checking Yes, the undersigned certifies that neither applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. See 47 CFR 1.2002(b) for the meaning of "party to the application" for these purposes.  Yes  No

10. Name of Person Signing  
James S. Blitz

11. Title of Person Signing  
Vice President, Regulatory Counsel

12. Please supply any need attachments.

Attachment 1: STA Request

Attachment 2:

Attachment 3:

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND / OR IMPRISONMENT  
(U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION AUTHORIZATION  
(U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).

**FCC NOTICE REQUIRED BY THE PAPERWORK REDUCTION ACT**

The public reporting for this collection of information is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the required data, and completing and reviewing the collection of information. If you have any comments on this burden estimate, or how we can improve the collection and reduce the burden it causes you, please write to the Federal Communications Commission, AMD-PERM, Paperwork Reduction Project (3060-0678), Washington, DC 20554. We will also accept your comments regarding the Paperwork Reduction Act aspects of this collection via the Internet if you send them to [jboley@fcc.gov](mailto:jboley@fcc.gov). PLEASE DO NOT SEND COMPLETED FORMS TO THIS ADDRESS.

Remember – You are not required to respond to a collection of information sponsored by the Federal government, and the government may not conduct or sponsor this collection, unless it displays a currently valid OMB control number or if we fail to provide you with this notice. This collection has been assigned an OMB control number of 3060-0678.

**THE FOREGOING NOTICE IS REQUIRED BY THE PAPERWORK REDUCTION ACT OF 1995, PUBLIC LAW 104-13, OCTOBER 1, 1995, 44 U.S.C. SECTION 3507.**

# SIRIUS XM

RADIO INC.

1500 Eckington Place, N.E.  
Washington, D.C. 20002  
Tel: 202-380-4000  
Fax: 202-380-4500  
www.sirius.com www.xmradio.com

December 5, 2008

**Via IBFS**  
Ms. Marlene H. Dortch  
Secretary  
Federal Communications Commission  
445 12th Street, S.W.  
Washington, D.C. 20554

**Re: Sirius XM Radio Inc.  
Request for 180-Day Special Temporary Authority to Operate  
Very Low Power Repeaters and Signal Boosters at Indefinite Locations**

Dear Ms. Dortch:

Pursuant to Section 25.120(b)(2) of the Commission's rules, 47 C.F.R. § 25.120(b)(2), Sirius XM Radio Inc. ("Sirius XM"), a satellite radio licensee in the Satellite Digital Audio Radio Service, hereby requests 180-Day Special Temporary Authority ("STA") to operate in its licensed frequency band (i) very low power terrestrial repeaters with an Effective Isotropically Radiated Power ("EIRP") of up to 10 watts and (ii) signal boosters with an EIRP of up to 0.0001 watts that have previously been approved for use in retail stores and other indoor locations. This application seeks authority to operate these very low power repeaters and signal boosters in connection with both the Sirius frequency band (2320-2332.5 MHz) and the XM Radio Inc. ("XM") frequency band (2332.5-2345 MHz).<sup>1</sup> Sirius XM expects to operate these very low power repeaters and signal boosters at events in various venues, at locations and on dates that cannot yet be identified, for a period of 180 days after grant of this request.<sup>2</sup>

<sup>1</sup> Pursuant to the merger to which the Commission consented in *Applications of XM Satellite Radio Holdings Inc. and Sirius Satellite Radio Inc. for Consent to Transfer Control of Licenses*, Memorandum Opinion and Order and Report and Order, 23 FCC Rcd 12348 (2008), Sirius XM is the parent company of XM Radio Inc. Satellite CD Radio Inc., the corporate entity holding Sirius's satellite authorizations, is also a subsidiary of Sirius XM.

<sup>2</sup> The first event at which Sirius XM desires to use the facilities requested herein is the Utah International Auto Expo in Sandy, Utah, for which the equipment needs to be installed and

The International Bureau previously granted a 180-day STA request filed by Sirius Satellite Radio Inc.<sup>3</sup> (“Sirius”) to operate very low power repeaters and signal boosters at various temporary automobile industry promotional events, press and marketing events, investor relations events, and trade shows at specified locations and dates.<sup>4</sup> The only difference between that application and the instant request is that no specific locations are identified herein. The Bureau has previously given XM authority to operate very low power repeaters and signal boosters at similar events and shows at indefinite locations and dates.<sup>5</sup>

The Wireless Communications Services Coalition (“WCS Coalition”) has stated that it has no objection to the operation of repeaters and boosters at trade shows provided that operations are temporary in nature, operations are at low power levels, the satellite radio licensee commits to operate the repeaters and boosters on a non-interference basis, and the satellite radio licensee acknowledges that construction of these facilities is at its own risk.<sup>6</sup> As discussed herein, Sirius XM satisfies all of these conditions.

The Commission has recognized that satellite radio operators require terrestrial repeaters to provide high-quality service nationwide.<sup>7</sup> Consistent with this policy, in September 2001, the Bureau granted Sirius XM temporary authority to operate a nationwide network of terrestrial repeaters.<sup>8</sup>

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operating by January 13, 2009. In the event that the Commission cannot grant the instant STA by January 13, 2009, Sirius XM may need to file a similar application for a 30-day STA prior to that date.

<sup>3</sup> Sirius is the predecessor to Sirius XM, prior to the merger with XM.

<sup>4</sup> See Sirius Satellite Radio Inc., File No. SAT-STA-20080530-00117 (granted August 13, 2008).

<sup>5</sup> See SAT-STA-20070222-00036 (granted May 17, 2007)(the “XM 2007 Trade Show STA”).

<sup>6</sup> See Letter from Paul Sinderbrand, Counsel for the WCS Coalition, to John Giusti, Acting Chief, International Bureau, FCC, File No. SAT-STA-20061211-00147; SAT-STA-20061211-00148 (December 14, 2006).

<sup>7</sup> See *Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band, Report and Order, Memorandum Opinion and Order, and Further Notice of Proposed Rulemaking*, 12 FCC Rcd 5754, 5770 ¶ 37 (1997).

<sup>8</sup> See Sirius Satellite Radio, Inc., Application for Special Temporary Authority to Operate Satellite Digital Audio Radio Service Complimentary Terrestrial Repeaters, Order and Authorization, 16 FCC Rcd. 16773, ¶ 18 (2001) (“Sirius STA Order”); XM Radio, Inc., Application for Special Temporary Authority to Operate Satellite Digital Audio Radio Service Complimentary Terrestrial Repeaters, Order and Authorization, 16 FCC Rcd. 16781, ¶ 18 (2001) (“XM STA Order”).

The Bureau has subsequently granted Sirius XM additional STAs to operate terrestrial repeaters, pending issuance of final rules governing the deployment and use of repeaters.<sup>9</sup>

*Request for STA.* Sirius XM will use the very low power repeaters and signal boosters for which it seeks authority to operate herein to demonstrate equipment and service at temporary events in various venues across the United States, such as automobile industry promotional events, press and marketing events, investor relations events, and trade shows. In many cases, Sirius XM expects that it will not know the locations and dates of the events covered by this STA with sufficient lead time to prepare individual STA requests and obtain authorization without expedited processing by the Commission. The objective of this request is to simplify the administrative process for supporting these events for the Commission and Sirius XM. Accordingly, Sirius XM herein requests STA to operate the very low power repeaters and signal boosters at indefinite locations. The operation of very low power repeaters and signal boosters at each event will not exceed a period of 10 consecutive days (including operation prior to the official start of each event for set-up and testing activities) except for automotive industry trade shows where the repeaters could be in operation up to 20 consecutive days. Sirius XM expects to operate very low power repeaters and signal boosters pursuant to this STA at no more than 10 events in any consecutive 30 day period.

Due to blockage from walls, ceilings, and other structures, it is often difficult to provide quality reception of SDARS satellite and even terrestrial signals at certain venues, which may not have line-of-sight views to receive Sirius XM's signal. The difficulties with providing coverage at certain venues require radios to be displayed with hard wire connections, which limits the locations within a venue at which Sirius XM can set up its displays, thereby creating difficulties for event organizers as well as for Sirius XM. Because some venues consist of a large, often multi-level space, Sirius XM anticipates using one or more (but no more than six) very low power repeaters at each event. Depending on the venue, Sirius XM may also use one or more (but no more than three) strategically placed signal boosters. The optimal number of very low power repeaters and signal boosters will be chosen to ensure full coverage of each event. Accordingly, grant of this STA to use these very low power repeaters and signal boosters for the limited periods requested herein will serve the public interest.

<sup>9</sup> See, e.g., *Sirius Satellite Radio Inc., Request to Modify Special Temporary Authority to Operate Additional Satellite Digital Audio Radio Service Terrestrial Repeaters, Order and Authorization*, 19 FCC Rcd. 18140 (2004) (granting Sirius an STA in File No. SAT-STA-20031106-00370, effective Sept. 15, 2004). Since that time, the Commission has extended the STA several times, pending the issuance of final rules governing the use of satellite DARS terrestrial repeaters. In September 2004, the Commission granted Sirius a new STA to operate for 180 days or until the Commission issues final rules governing the use of satellite DARS terrestrial repeaters. See *Sirius Satellite Radio Inc., Request to Modify Special Temporary Authority to Operate Satellite DARS Terrestrial Repeaters, Order and Authorization*, 19 FCC Rcd 18149 (2004). Sirius timely filed an application for renewal of this STA on March 1, 2005. See File No. SAT-STA-20050301-00053. To date, the Commission has not acted on this application.



*Technical Information for Very Low Power Repeaters.* Enclosed as Exhibit A is the following technical information pertaining to the very low power repeaters: (1) antenna type; (2) antenna beamwidth; (3) total EIRP; (4) approximate maximum height AGL; and (5) antenna specification sheets.

*Technical Information for Signal Boosters.* Enclosed as Exhibit B are the technical parameters for the signal boosters, which are identical to the parameters previously approved by the Bureau for use in retail stores and other indoor locations.<sup>10</sup> Specifically, Sirius XM has included the following information for these signal boosters: (1) antenna type; (2) antenna beamwidth; (3) total EIRP; and (4) approximate maximum height AGL.

*Technical Information on EME compliance.* Enclosed is Exhibit C showing compliance with Part 1 of the Commission's rules. Subpart I - Procedures Implementing the National Environmental Policy Act of 1969, including the guidelines for human exposure to radio frequency electromagnetic fields in Sections 1.1307(b) and 1.1310 of the Commission's Rules. This analysis uses worst case configuration parameters for Very Low Power Repeaters and Signal Boosters and is valid for all deployments under this STA.

*Location Information.* Given that the locations and dates of the events at which Sirius XM will operate very low power repeaters and signal boosters pursuant to this STA are often not known until shortly before the event takes places, it is impractical for Sirius XM to provide precise location information in this application. Accordingly, to the extent necessary, Sirius XM herein requests waiver under Section 1.3 of the Rules, 47 C.F.R. § 1.3, of the requirement that it provide "full particulars of the proposed operation" with this application for STA.<sup>11</sup> Moreover, given that the locations and dates of the events will not be known until shortly before an event takes places, it would be impractical and wasteful of the Commission's resources for Sirius XM to seek authority every time it proposed to operate very low power repeaters and signal boosters at a new venue. Sirius XM notes that the Bureau did not require locations and dates of operation for the 5000 in-store signal boosters that XM and Sirius were authorized to operate in June 2005,<sup>12</sup> the 5000

<sup>10</sup> See XM Radio Inc., Request for Special Temporary Authority, File No. SAT-STA-20030409-00076 (granted June 23, 2003) ("*XM Signal Booster STA*"). Exhibit C of that application provided an interference analysis for the signal boosters that are the subject of this application. Sirius XM incorporates this interference analysis by reference. On June 5, 2003, XM further supplemented the application with a sample link budget for the signal boosters. See Letter from Lon C. Levin, XM, to Marlene H. Dortch, Secretary, FCC, File No. SAT-STA-20030409-00076 (filed June 5, 2003). The link budget is also incorporated by reference herein. See also XM Radio Inc., File No. SAT-STA-20050712-00145 (granted January 18, 2007) ("*Indoor Booster STA*").

<sup>11</sup> 47 C.F.R. § 25.120(a).

additional such in-store boosters the two companies were authorized to operate in January 2007,<sup>13</sup> or the 5000 indoor boosters that XM was authorized to operate in January 2007.<sup>14</sup>

*Interference Considerations.* The very low power repeaters and signal boosters have a very low probability of interference to other radio services. Because Sirius XM has exclusive use of its licensed frequency band,<sup>15</sup> there is no potential for in-band interference. In addition, the very low power repeaters will operate at a maximum EIRP of 10 watts within the center 4 to 5 MHz of each of Sirius XM's individually licensed 12.5 MHz frequency bands, well below the threshold EIRP of 2000 watts identified by the adjacent WCS licensees as a potential interference concern.<sup>16</sup> The adjacent-band WCS licensees are permitted to operate base stations at a power level of 2000 watts EIRP and therefore must be able to withstand potential interference from such operations. With respect to the signal boosters, Sirius XM has previously demonstrated that these signal boosters will not cause adjacent band interference to WCS operations.<sup>17</sup> There has also been no documented interference since Sirius XM began using these same signal boosters and very low power repeaters to support similar events and venues. Accordingly, Sirius XM does not anticipate that these very low power repeaters and signal boosters will cause interference to any WCS receivers.

This facility for which authority is requested herein will operate at a power level well under 2.0 kilowatts, which is below the threshold identified by the WCS Coalition as a potential interference concern.<sup>18</sup> Accordingly, Sirius XM does not anticipate that operation of the new

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<sup>12</sup> See XM Radio Inc., File No. SAT-STA-20030409-00076 (granted June 26, 2003); Sirius Satellite Radio Inc., File No. SAT-STA-20030411-00075 (granted June 26, 2003).

<sup>13</sup> See XM Radio Inc., File No. SAT-STA-20050601-00113 (granted January 18, 2007); Sirius Satellite Radio Inc., File No. SAT-STA-20050601-00114 (granted January 18, 2007).

<sup>14</sup> See Indoor Booster STA.

<sup>15</sup> 47 C.F.R. § 25.202(a)(6) (the 2320-2345 MHz band is allocated exclusively for SDARS).

<sup>16</sup> See *supra* note 3; see also XM Radio, Inc., *Application for Special Temporary Authority to Operate Satellite Digital Audio Radio Service Complimentary Terrestrial Repeaters, Order and Authorization*, DA 01-2172, at ¶ 12 (rel. September 17, 2001) (“XM Radio STA Order”) (“The comments from WCS licensees express concern about blanketing interference from DARS repeaters that operate with an Equivalent Isotropically Radiated Power (EIRP) above 2 kW”).

<sup>17</sup> XM Signal Booster STA at Exhibit C.

<sup>18</sup> Sirius STA Order ¶ 12 (“The comments from WCS licensees express concern about blanketing interference from DARS repeaters that operate with an Equivalent Isotropically Radiated Power (EIRP) above 2 kW.”). The WCS Coalition has said that it will defer from objecting to STA requests that propose operations of no more than 2,000 watts EIRP, even if they do not specify peak or average EIRP, provided that grant of the STA (i) is conditioned on operation on a non-interference basis; and (ii) is subject to the condition that the issue of peak versus average EIRP will be addressed in the pending DARS rulemaking (IB Docket No. 95-91). See Letter from

repeater will cause any interference to WCS operators or any other entity. To the extent Sirius' original 2001 STA requires it to coordinate with affected Wireless Communications Services ("WCS") licensees prior to operating any repeater,<sup>19</sup> the Bureau also stated that it expected "WCS licensees to provide a schedule or as much advance notice as possible of when their stations are to be placed in operation." *Id.* To date, Sirius XM has not received information from any WCS licensee regarding their plans for WCS deployment. However, in the event that prohibited interference does occur, Sirius will cease operation of this facility until any such interference can be eliminated. Sirius XM's Repeater Control Center (202-529-7012) is available on a continuous basis to receive such reports of any suspected interference and take immediate corrective action.

*Ownership and Control of Very Low Power Repeaters and Signal Boosters.* Sirius XM will own each very low power repeater and signal booster operated at a given venue and will retain full operational control of each very low power repeater and signal booster. Sirius XM will also be responsible for installation of each very low power repeater and signal booster.

*Public Interest Considerations.* Prompt grant of this STA will promote the continued success of satellite radio and thereby serve the public interest. The demand for SDARS radios by the public has continued to increase over time. Accordingly, Sirius XM participates in events at various venues where it provides demonstrations of its equipment and service, such as automobile industry promotional events, press and marketing events, investor relations events, and trade shows. Grant of this STA will serve the public interest because the very low power repeaters and signal boosters will allow for adequate reception of Sirius XM's satellite radio service at venues where satellite radio signals may be attenuated due to blockage from walls, ceilings, or other structures. Without these very low power repeaters and signal boosters to overcome signal blockage within the venues, however, Sirius XM cannot undertake real-time demonstrations of its equipment and service, especially demonstrations of the full mobility of SDARS service. These very low power repeaters and signal boosters will provide clear signal reception within these venues for these demonstrations.

The need to provide high-quality satellite radio service for our business partners, equipment suppliers, potential customers, and others at these venues provides the extraordinary circumstances justifying this STA request.<sup>20</sup> As the Bureau recognized when it granted the original Sirius STA in 2001, this terrestrial repeater network enables Sirius XM to provide "high quality radio signals to listeners in areas that have limited radio service." continuous radio coverage for individuals on

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Paul J. Sinderbrand, Counsel to the WCS Coalition, to Ms. Helen Domenici, FCC. File No. SAT-STA-20061207-00145 (filed March 19, 2007). Sirius XM agrees to these conditions.

<sup>19</sup> One of the conditions imposed in the original STA grants was the requirement that Sirius and XM each pre-coordinate with WCS licensees any repeater affecting an operational WCS base station. *See Sirius Radio STA Order*, ¶ 14; *XM STA Order*, ¶ 14.

<sup>20</sup> *See* 47 U.S.C. § 309(f); 47 C.F.R. § 25.120(b)(1).

long-distance trips, and “[d]iverse program formats, including educational, ethnic and religious programming.”<sup>21</sup>

*Certifications.* *Sirius XM* acknowledges that the conditions imposed in the *Sirius Radio STA Order* granting Sirius’s request for STA to operate terrestrial repeaters will continue to apply to any repeaters authorized as a result of this application. Specifically, Sirius certifies the following:

- (1) Sirius XM will operate the very low power repeaters and signal boosters at its own risk, and such operation shall not prejudice the outcome of the final rules adopted by the Commission in GEN Docket 95-91;
- (2) Sirius XM will operate the very low power repeaters and signal boosters on a non-interference basis with respect to all permanently authorized radiocommunication facilities;
- (3) The very low power repeaters and signal boosters will be restricted to the simultaneous retransmission of the complete programming, and only that programming, transmitted by the satellite directly to SDARS receivers;
- (4) Where applicable, coordination of the very low power repeaters and signal boosters will be completed with all affected Administrations prior to operation, in accordance with all applicable international agreements including those with Canada and Mexico;
- (5) The very low power repeaters and signal boosters will comply with Part 17 of the Commission’s rules – Construction, Marking, and Lighting of Antenna Structures;
- (6) The very low power repeaters and signal boosters will comply with Part 1 of the Commission’s rules, Subpart I - Procedures Implementing the National Environmental Policy Act of 1969, including the guidelines for human exposure to radio frequency electromagnetic fields as defined in Sections 1.1307(b) and 1.1310 of the Commission’s rules;
- (7) The out-of-band emissions of the very low power repeaters and signal boosters will be limited to 75+10log (FIRP) dB less than the transmitter FIRP;
- (8) Sirius XM will operate the very low power repeaters and signal boosters according to the technical parameters provided in this application;
- (9) Sirius XM will maintain full ownership and operational control of each very low power repeater and signal booster; and

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<sup>21</sup> *Sirius STA Order*, 16 FCC Rcd at 16773 (¶ 9).

Ms. Marlene H. Dortch  
December 5, 2008  
Page 8

(10) Sirius XM will immediately shut down any very low power repeater and any signal booster upon a complaint of interference, upon direction from the Commission, or upon finding that a very low power repeater or signal booster has not been properly installed.

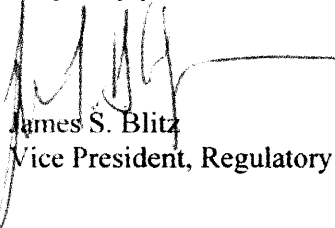
Granting this request will not alter Sirius XM's obligation to protect authorized radiocommunications facilities from interference, nor will it prejudice the outcome of the Commission's ongoing rulemaking pertaining to the deployment and operation of terrestrial repeaters.

Sirius XM hereby certifies that no party to this application is subject to a denial of Federal benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. § 853(a).

In connection with this application, Sirius XM is submitting payment to the Federal Communications Commission in the amount of Two Thousand Seven Hundred Twenty-Five Dollars (\$2725.00) -- the filing fee applicable to requests for STAs for non-geostationary ("NGSO") satellites.<sup>22</sup>

Please direct any questions regarding this matter to the undersigned.

Very truly yours,



James S. Blitz  
Vice President, Regulatory Counsel

cc: Stephen Duall, FCC

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<sup>22</sup> See International and Satellite Services Fee Filing Guide (October 2006).

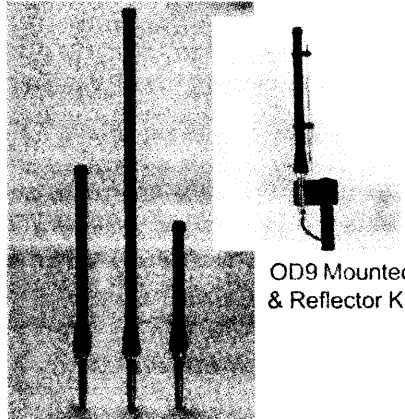
## Exhibit A

### Technical Parameters for Trade Show Repeaters

Below is the following technical information for the trade show repeaters:

- (1) antenna type;
- (2) antenna beamwidth;
- (3) total EIRP; and
- (4) approximate height Above Ground Level (AGL)
- (5) antenna specification sheets

Antenna Type	Antenna Beamwidth	EIRP Total in Watts	Height AGL
Omni -- Mobile Mark OD9-2400	360 degrees	10	< 50 feet
Omni -- YDI Model # A2408	360 degrees	10	< 50 feet
Multi-Patch Panel -- PCTel Model WISP24018PTNF	18 degrees	10	< 50 feet
Omni Antenna and External Amplifier (CPI Model # 01027997-00)	360 degrees	10	< 50 feet



OD9, OD12, OD6 Shown

## OD Series Omni Antenna

For WLAN, Video and Data Systems

- 3 dBi, 6 dBi, 9 dBi & 12 dBi antennas provide uniform omni coverage
- Unique design allows economical build out
- Mounting kit includes all hardware needed
- Reflector option provides directional beamshaping & increased performance

The OD Series Antennas are optimized for use in a wide variety of wireless systems. Typical uses include WLAN access points or bridge (802.11b/g), and surveillance transmitters.

These antennas consist of a collinear array with elements stacked vertically. Unique phasing cancels out-of-phase current distribution, improving system performance. This design maintains an omni pattern in the horizontal plane. The OD Series are free space antennas; no ground plane is required.

An option for the OD series is a reflector kit that beam shapes the omni pattern into a directional cardioid shape. This can result in improved directional gain, and isolation for reduced interference.

The low profile black radome (1" diameter) makes the antennas durable and rugged. They can withstand the harshest environments of snow, wind, rain and ice. The feed assembly is made of precision machined aluminum components and is irradiated for weather protection. The antennas comes with all the hardware needed to install it to a mast. The OD antennas normally terminate with a

female N connector. Optional models include pigtail cable with connector. For ISM, Part 15 compliant connectors are available (reverse polarized), please consult factory.

### Model Numbers

Model	Freq.(MHz)	Gain	Applications
OD3-2400	2400-2485	3 dBi	WLAN, ISM, Video
OD6-2400	2400-2485	6 dBi	WLAN, ISM, Video
OD9-2400	2400-2485	9 dBi	WLAN, ISM, Video
OD12-2400	2400-2485	12 dBi	WLAN, ISM, Video

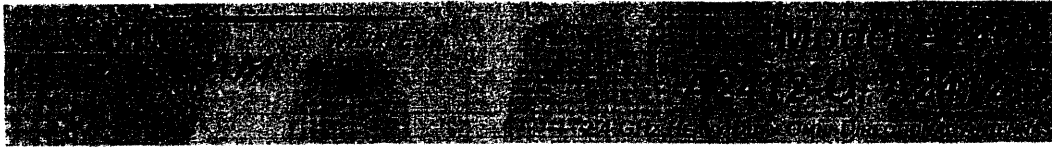
For pigtail cable options and special frequencies, please consult factory for latest model numbers and configurations.

### Options

Options	Model
Add-on kit for 6 dBi models	ODR6-Kit
Add-on kit for 9 dBi models	ODR9-Kit
Add-on kit for 12 dBi models	ODR12-Kit
Rev TNC with 1 ft Cable option	add -PTA to OD model
Rev BNC with 4 ft Cable option	add -PT2 to OD model

### Specifications

<b>Frequency &amp; Gain:</b>	See above	<b>Length/Weight:</b>	
<b>Bandwidth @2:1 VSWR:</b>	See above	3 dBi Models	16 inches, 1.5 lbs
<b>Nominal Impedance:</b>	50 ohms	6 dBi Models	19 inches, 1.5 lbs
<b>Max. Power (continuous):</b>	100 watts	9 dBi Models	27 inches, 2.0 lbs
<b>Vertical Beamwidth (-3 dB point):</b>		12 dBi Model	41 inches, 2.5 lbs
3 dBi Model	55 degrees	<b>OD Series Interface:</b>	N female connector
6 dBi Model	25 degrees	<b>Mounting Kit:</b>	Mast mount kit included
9 dBi Model	14 degrees	<b>Mounting Dimensions:</b>	Use mast up to 2" OD
12 dBi Model	7 degrees	<b>Material:</b>	Polycarbonate with aluminum body, fiberglass radome on OD12 with aluminum body
<b>Wind Loading (flat plate equiv.):</b>	30-40 sq. inches	<b>Options:</b>	Reflector Option Kit
<b>Rated Wind Velocity:</b>	100+ mph		Pigtail Cable Option
<b>Lightning Protection:</b>	External suggested		Part 15 Reverse Connectors
<b>Antenna Diameter:</b>	1", main mast		



**Model A2408**

- 8 dBi gain
- Wide beamwidth (25°)
- Low profile

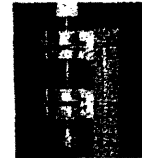


**Model A2412-O**

- 12 dBi gain
- No downtilt
- 5° beamwidth

**Model A2412-D**

- 12 dBi gain
- 3° downtilt
- 5° beamwidth



**Mounting Details  
for Model A2412**

Model	A2408 (omni)	A2412-O (omni)	A2412-D (omni)
TBW Part Number	203-900009-001	203-900004-001	203-900003-001
<b>Electrical</b>			
Frequency Range:	2.400 to 2.500 GHz	2.400 to 2.485 GHz	2.400 to 2.485 GHz
Forward Gain:	8 dBi	12 dBi	12 dBi
VSWR:	< 2:1	< 2:1	< 2:1
Polarization:	Vertical	Vertical	Vertical
Beamwidth:	25 degrees	5 degrees	5 degrees with 3 degrees downtilt
<b>Mechanical</b>			
Termination:	N-type Female	N-type Female	N-type Female
Mounting:	U-Bolt bracket mount for 1-2.5 in O.D.	U-Bolt bracket mount for 1-2.5 in O.D.	U-Bolt bracket mount for 1-2.5 in O.D.
Dimensions (Diameter x Length):	1 in / 16 in	1 in / 5 ft, 5 in	1 in / 5 ft, 5 in
Weight:	2 lbs	3 lbs 8 oz	3 lbs 8 oz
Flat Panel Equivalent Area:	0.11 sq ft	0.45 sq ft	0.45 sq ft
Wind Survival:	125 mph	125 mph	125 mph
Radome:	Heavy-duty white UV inhibited fiberglass radome seal with internal copper elements		

Specifications subject to change without notice

Apr 2005-01

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# WISPerformance Series Directional Panel Antennas

**MAXRAD**

## Directional Panels

The WISP directional panel antennas are designed to provide maximum gain at 2.4 GHz frequencies. With a VSWR of less than 1.6:1, all models provide efficient and stable performance across the band. These robust antennas are designed for outdoor applications.

### General Specifications: Directional panel antennas

Radome Material:  
UV stable plastic

Polarization:  
Linear, Vertical/Horizontal

Nominal Impedance:  
50 Ohms

VSWR:  
<1.6:1

Maximum Power Input:  
20 Watts

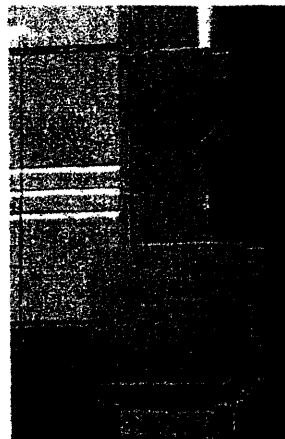
Cable:  
12' RG58/U with attached female N connector

Mounting Method:  
Mast mount included

Temperature Range:  
-40° C to +70° C

### Features and Benefits:

- Patented printed circuit board design. Best performance-to-price ratio.
- Attractive, low profile UV stable housing. Blends well with indoor and outdoor environments where aesthetic considerations are important.
- Corner exit RG-58/U pigtail design. Permits the panel to be mounted in vertical or horizontal polarity.
- Adjustable mounting brackets for outdoor mounting. Provide maximum flexibility for outdoor installations.



Directional Panels

### Electrical Specifications

Model #	Frequency Range	Gain	Front-to-Back- Ratio	3 dB Horizontal Beamwidth	3 dB Vertical Beamwidth	VSWR	Maximum Power Input
WISP24009PTNF	2.3-2.5 GHz	9.0 dBi	> 15 dB	60°	60°	< 1.6:1	20 Watts
WISP24013PTNF	2.3-2.5 GHz	13.0 dBi	> 18 dB	35°	35°	< 1.6:1	20 Watts
WISP24018PTNF	2.3-2.5 GHz	18.0 dBi	> 25 dB	18°	19°	< 1.6:1	20 Watts

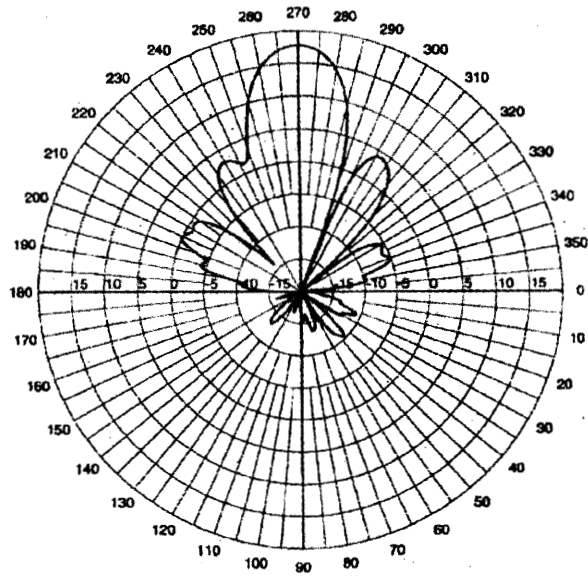
### Mechanical Specifications

Model #	Frontal Wind Loading @100 mph	Dimensions	Weight	Included Mount	Cable
WISP24009PTNF	9.3 lbs.	5.1" x 4.7" x 1.5"	0.5 lbs.	Indoor/outdoor articulating mount	12' RG58/U
WISP24013PTNF	27.9 lbs.	8.8" x 8.1" x 1.6"	1.2 lbs.	Heavy duty outdoor adjustable mount	12' RG58/U
WISP24018PTNF	85 lbs.	15.1" x 13.9" x 1.9"	3.9 lbs.	Heavy duty outdoor adjustable mount	12' RG58/U

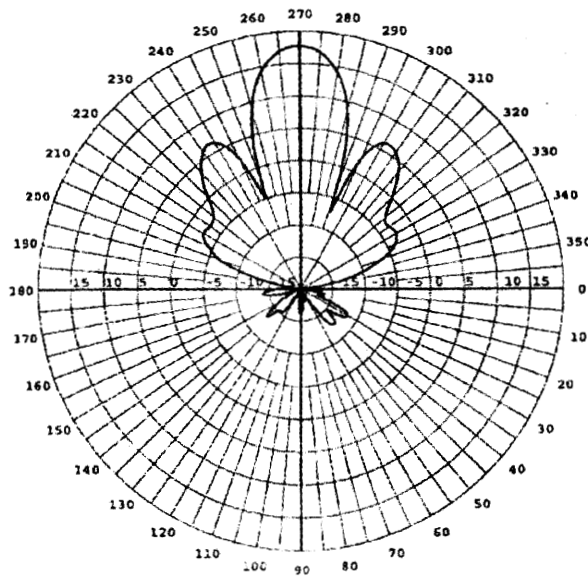
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**WISP24018PTNF Elevation Cut**



**WISP24018PTNF Azimuth Cut**

## Exhibit B

### Technical Parameters for Signal Boosters

Below is the following information for the signal boosters.

- (1) antenna type;
- (2) antenna beamwidth;
- (3) total EIRP; and
- (4) approximate height Above Ground Level (AGL)

Antenna Type	Antenna Beamwidth	EIRP Total in Watts	Height AGL
Antenna Specialists XMSSR923WR	75 degrees	.0001	< 50 feet
Integrated patch	160 degrees	.0001	< 50 feet

The transmitted carriers have a center frequency and frequency stability identical to the received SDARS satellite or terrestrial carriers. Frequency accuracy is controlled by the satellite or terrestrial repeater and not by the signal booster.

## Exhibit C

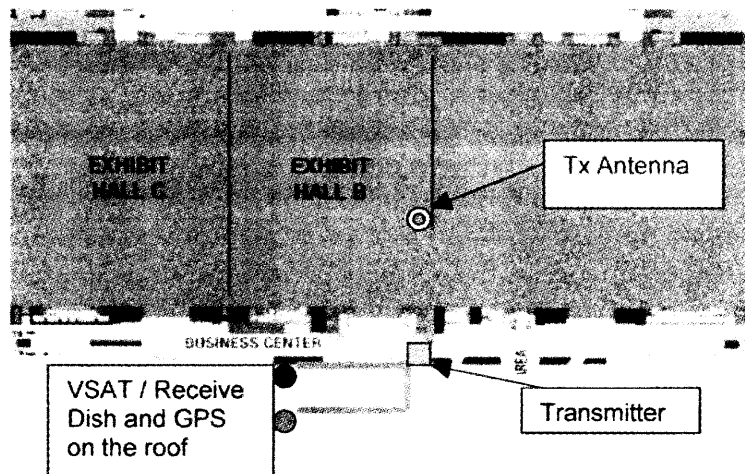
### RF Exposure Compliance

This technical addendum supports the request for 180-Day Special Temporary Authority to Operate Very Low Power Repeaters and Signal Boosters at Indefinite Locations.

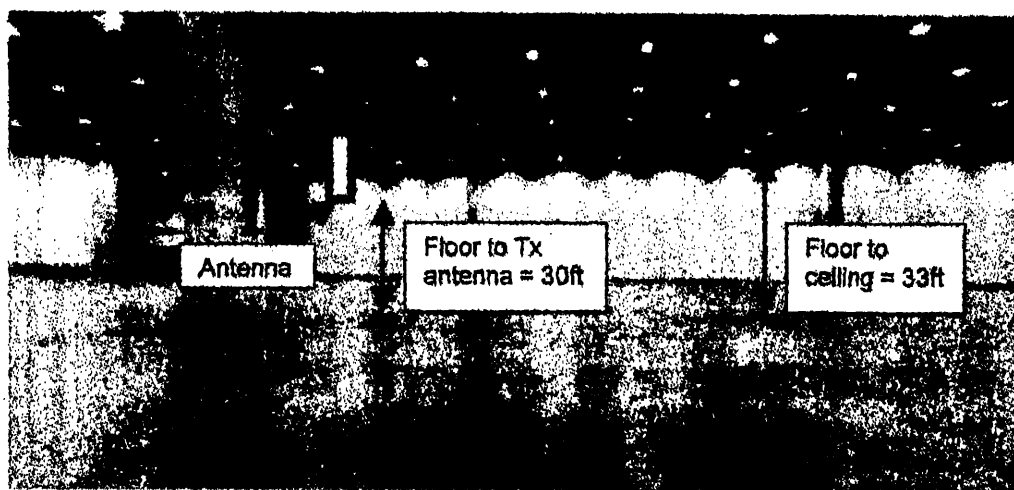
#### 1. RF Exposure Analysis for Low-Power Transmitter

The typical transmitter set up for a trade venue is illustrated in the figures below:

**Figure 1: Diagram of Exhibit hall**



**Figure 2: Main Exhibit hall**



To establish the RF exposure environment for this request, the following process has been used to demonstrate that there will be no general population exposure over the allowed limit:

1. The location of the antenna and the transmission parameters have been established. The antenna is placed 30 feet above the show floor as seen in Figure 2. The output power of the transmitter will be set to a maximum of 8 watt (average), 35.7 watt (peak). Together with the assumed length and type of cable feeding the antenna (which is omni directional) and the type and gain of the antenna used, this leads to an effective isotropically radiated power (EIRP) of 9.5 watts (average) and 42.5 watts (peak). This calculation is summarized in Table 1. At the Sirius Satellite Radio frequency band (2320-2332.5 MHz) and the XM Radio frequency band (2332.5-2345 MHz), the FCC has established a limit of 1 mW/square centimeter for general population exposure (OET 65).
2. Using the calculation methods described in OET 65 and the EIRP's derived as described in above, a calculation is made of the power density at various distances from the antenna for both the average and peak powers involved. The distance of 23 feet was chosen as the minimum distance criteria for exposure by taking the height of the antenna (30 feet) and subtracting a 7 foot allowance for the height of any individuals who may be present on the show floor. This distance represents the closest point that a member of the general population could approach this repeater antenna. Table 2 summarizes the results of the normal calculation (using the formula  $\text{Power Density} = \text{EIRP} / (4 * \pi * R^2)$  from OET 65) and also a more conservative formula which takes into account reflection (the formula  $\text{PD} = 2.56 * \text{EIRP} / (4 * \pi * R^2)$ ) also from OET 65. In order to provide a comprehensive view, values are included separately for the regular case (average and peak power based) and for the reflective case (peak power based).

### **Summary**

Using a very conservative approach, the calculated RF exposure levels from the proposed installation are well within the stated limits defined in OET 65. Several worst case assumptions were made as follows:

1. No allowance was made for the significant reduction in power density that will occur due to the attenuation of the antenna pattern at the location immediately under the antenna, the location to which the minimum distance of 23 feet applies.
2. No allowance was made in the case of peak level calculations for the fact that these levels occur a very small fraction of the overall time of transmission.
3. There is no access to the ceiling area where the antenna is mounted except with a construction lift.
4. The highest level of exposure, involving the potential for additive reflection and peak level EIRP, was used as the exposure criteria.

**Table 1: Transmit chain loss budget**

	Average (watts)	Average (dBW)	Peak (watts)	Peak (dBW)
Transmitter output power	8.0	9.0	35.7	15.5
Cable Loss (db)		8.25		8.25
Antenna gain dBi (max)		9.0		9.0
EIRP (max)	9.5	9.8	42.5	16.3

The effective isotropic radiated power (EIRP) is calculated by taking the transmitter output power, subtracting the cable loss, and adding the antenna gain.

The peak power is determined by applying the peak to average factor of the OFDM waveform to the average power of the transmitter. This peak level occurs less than 1/1000<sup>th</sup> of the time for the Sirius waveform for this transmitter type.

**Table 2: Calculations for power density**

- Power Density =  $EIRP / (4\pi R^2)$  (Equation 4 page 19 of OET 65)
- Power Density adjusted for reflection =  $2.56 * \text{Power Density}$  (Equation 7, page 21 of OET 65)

As can be seen from this table, even under very conservative transmission assumptions, the general population exposure limits are not exceeded at the worst case location.

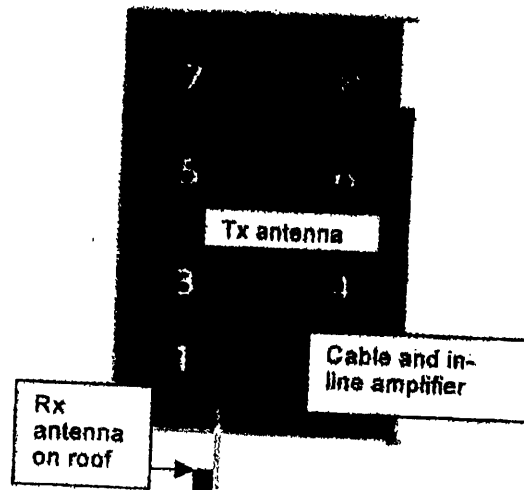
Radial Distance from Antenna (Feet)	Power Density (Average) mW/square cm	Power density (Peak) mW/square cm	Peak power density with 2.56 multiplier (Max reflection)	Worst Case Safety Margin over exposure standard (times)
23	0.00159	0.00710	0.01817	56.02729
28	0.00107	0.00479	0.01226	81.56273
33	0.00077	0.00345	0.00883	113.27923
38	0.00058	0.00260	0.00666	150.20881
43	0.00045	0.00203	0.00520	192.33545
48	0.00036	0.00163	0.00417	239.66515
53	0.00030	0.00134	0.00342	292.19593
58	0.00025	0.00112	0.00286	349.92777

Radial Distance from Antenna (Feet)	Power Density (Average) mW/square cm	Power density (Peak) mW/square cm	Peak power density with 2.56 multiplier (Max reflection)	Worst Case Safety Margin over exposure standard (times)
63	0.00021	0.00095	0.00242	412.86068
68	0.00018	0.00081	0.00208	480.99485
73	0.00016	0.00070	0.00180	554.32969
78	0.00014	0.00062	0.00158	632.86580
83	0.00012	0.00055	0.00140	716.60297
88	0.00011	0.00048	0.00124	805.54121
93	0.00010	0.00043	0.00111	899.68052
98	0.00009	0.00039	0.00100	999.02090
103	0.00008	0.00035	0.00091	1103.56234
108	0.00007	0.00032	0.00082	1213.30485
113	0.00007	0.00029	0.00075	1328.24842
118	0.00006	0.00027	0.00069	1448.39306
123	0.00006	0.00025	0.00064	1573.73877
128	0.00005	0.00023	0.00059	1704.28554
133	0.00005	0.00021	0.00054	1840.03339
138	0.00004	0.00020	0.00050	1980.98229
143	0.00004	0.00018	0.00047	2127.13227
148	0.00004	0.00017	0.00044	2278.48331
153	0.00004	0.00016	0.00041	2436.03542
158	0.00003	0.00015	0.00039	2596.78859
163	0.00003	0.00014	0.00036	2763.74284

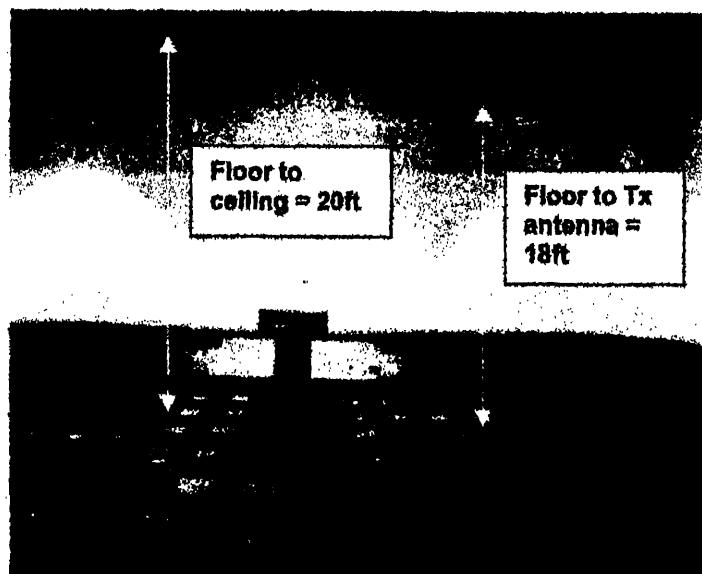
## 2. RF Exposure Analysis for Signal Booster

The typical set up of the signal booster is illustrated in the figures below:

Figure 3: Diagram of meeting rooms



**Figure 4: Meeting room**



To establish the RF exposure environment for the signal boosters, the following process has been used to confirm that there is no general population exposure over the allowed limit:

1. The transmit antenna is placed 18 feet above the meeting floor as seen in Figure 4. A 0.0001 Watt EIRP signal booster identical to boosters that have previously been approved for retail stores is used. At the Sirius Satellite Radio frequency band (2320-2332.5 MHz) and the XM Radio frequency band (2332.5-2345 MHz), the FCC has established a limit of 1 mW/square centimeter for general population exposure (OET 65).
2. Using the calculation methods described in OET 65 and the EIRP's described above, a calculation is made of the power density at various distances from the transmit antenna. The distance of 11 feet was chosen as the minimum distance criteria for exposure by taking the height of the antenna (18 feet) and subtracting a 7 foot allowance for the height of any individuals who may be present on the show floor. This distance represents the closest point that a member of the general population could approach this transmit antenna. Table 4 summarizes the results of the normal calculation (using the formula  $\text{Power Density} = \text{EIRP} / (4 * \pi * R^2)$  from OET 65) and also a more conservative formula which takes into account reflection (the formula  $\text{PD} = 2.56 * \text{EIRP} / (4 * \pi * R^2)$ ) also from OET 65. In order to provide a comprehensive view, values are included separately for the regular case and for the reflective case.

### Summary

Using a very conservative approach, the calculated RF exposure levels from the proposed installation are well within the stated limits defined in OET 65. Several worst case assumptions were made as follows:

1. No allowance was made for the significant reduction in power density that will occur due to the attenuation beyond the 3 dB antenna beamwidth.



2. The highest level of exposure, involving the potential for additive reflection was used as the exposure criteria.

**Table 3: Signal Booster specifications**

Antenna Type	Antenna Beamwidth	Total EIRP in Watts
Antenna Specialsts XMSSR923WR	75 degrees	0.0001

**Table 4: Calculations for power density**

- Power Density =  $EIRP / (4\pi R^2)$  (Equation 4 page 19 of OET 65)
- Power Density adjusted for reflection =  $2.56 * \text{Power Density}$  (Equation 7, page 21 of OET 65)

As can be seen from this table, even under very conservative transmission assumptions, the general population exposure limits are not exceeded at the worst case location.

Radial Distance from Antenna (Feet)	Power Density mW/square cm	Power Density with 2.56 multiplier (Max reflection)	Worst Case Safety Margin over exposure standard (times)
11	0.00000073	0.0000019	5345618
12	0.00000061	0.0000016	6361725
13	0.00000052	0.0000013	7468191
14	0.00000045	0.0000012	8659015
15	0.00000039	0.0000010	9940196
16	0.00000035	0.0000009	11309734
17	0.00000031	0.0000008	12767629
18	0.00000027	0.0000007	14313882
19	0.00000024	0.0000006	15948491
20	0.00000022	0.0000006	17671459
21	0.00000020	0.0000005	19482783
22	0.00000018	0.0000005	21382465
23	0.00000017	0.0000004	23370504
24	0.00000015	0.0000004	25446900
25	0.00000014	0.0000004	27611654
26	0.00000013	0.0000003	29864765
27	0.00000012	0.0000003	32206233
28	0.00000011	0.0000003	34636059
29	0.00000011	0.0000003	37154242
30	0.00000010	0.0000003	39760782
31	0.00000009	0.0000002	42455679
32	0.00000009	0.0000002	45238934
33	0.00000008	0.0000002	48110546
34	0.00000008	0.0000002	51070516
35	0.00000007	0.0000002	54118842