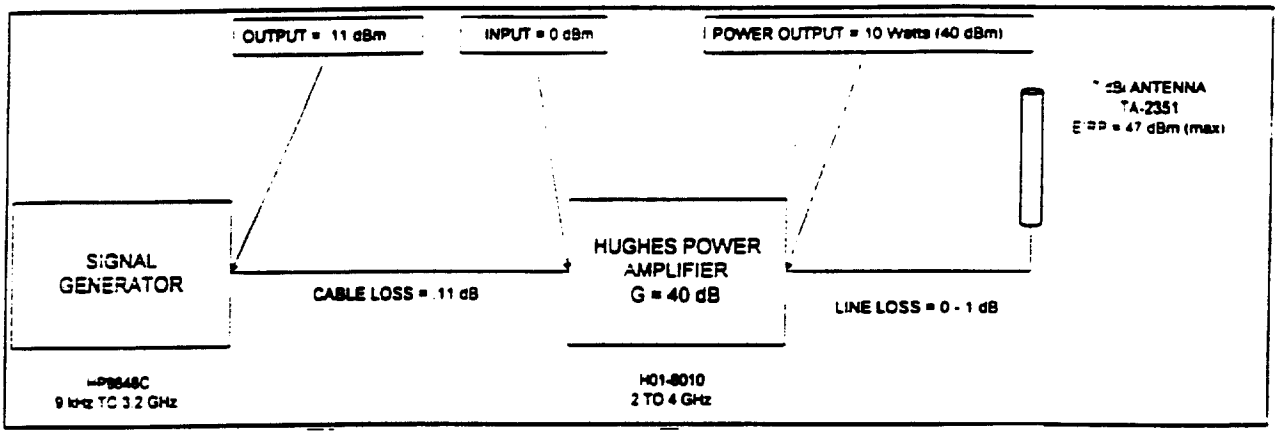
XM Satellite Radio Inc.
Form 442
Exhibit 1
Response to Question 4

Transmitter Characteristics of Portable Sites

Component/Parameter	Value	Notes
Transmit Frequency	2332.5-2345 MHz	• Adjustable center frequency within range
EIRP Maximum Nominal	 50 W 40W	• Measured at antenna boresight • Referenced to isotropic antenna
Signal & Modulation	CW	• Continuous wave transmission


OUTPUT = 11 dBm
INPUT = 0 dBm
POWER OUTPUT = 10 Watts (40 dBm)
ANTENNA
TA-2351
47 dBm (max)
SIGNAL GENERATOR
CABLE LOSS = .11 dB
HUGHES POWER AMPLIFIER
G = 40 dB
LINE LOSS = 0 - 1 dB
9 kHz TO 3.2 GHz
H01-8010
2 TO 4 GHz

XM Satellite Radio Inc. seeks a national experimental authorization to conduct tests of its terrestrial repeater network using portable transmitters in the regions listed below. XM Radio will conduct the tests on a region-by-region basis. Once testing is completed in one region, XM Radio will move the portable transmitters to the next region for testing.

The portable transmitter locations will be distributed throughout the metropolitan areas listed below. The antennas for the transmitters will be located on controlled access roof tops of buildings while the electronic equipment may be placed on the roof tops or in top-floor equipment rooms. When necessary, the antennas may be located on cranes. The antennas will be mounted less than four meters above the building height and will in no event extend more than six meters above the building height.

The portable transmitters will use Continuous Wave transmissions and will mainly be used to characterize the propagation channel.

1. Los Angeles & Riverside-San Bernadino, CA
2. Las Vegas, NV
3. Washington, DC & Baltimore, MD
4. Pittsburgh, PA
5. Boston, MA & Providence, RI & Worcester, MA (including Manchester and Nashua)
6. San Diego, CA
7. San Francisco, San Jose, Sacramento, Fresno, Stockton, Modesto, Monterey, CA
8. New York, NY & Philadelphia, PA & Hartford, CT & Springfield, MA & Wilmington, DE
9. Philadelphia, PA
10. Chicago, IL & Milwaukee-Racine, WI
11. Atlanta, GA
12. Dallas-Ft. Worth, TX
13. Houston-Galveston, TX (including Baytown)
14. Austin, TX
15. San Antonio, TX
16. Miami, Ft. Lauderdale, Hollywood, West Palm Beach-Boca Raton, FL
17. Orlando, Tampa-St. Petersburg-Clearwater, Lakeland-Winterhaven, FL
18. Tampa-St. Petersburg-Clearwater, FL
19. Richmond, VA
20. Detroit-Flint-Ann Arbor, MI
21. Phoenix, AZ
22. Seattle-Tacoma, WA
23. Portland- Eugene, OR
24. St. Louis, MO

25. Denver-Boulder, CO
26. Minneapolis-St. Paul, MN
27. Cleveland-Akron, OH
28. Cincinnati-Dayton, OH
29. Columbus, OH
30. Norfolk-Virginia Beach-Newport News, VA
31. Kansas City, KS-MO
32. Nashville, TN
33. Indianapolis, IN
34. Salt Lake City-Ogden-Provo, UT
35. Charlotte-Gastonia-Rock Hill, NC-SC
36. New Orleans, LA
37. Memphis, TN
38. Louisville-Lexington, KY
39. Jacksonville, FL
40. Oklahoma City, OK
41. Rochester, NY
42. Buffalo-Niagra Falls, NY
43. Raleigh-Durham, NC
44. Greensboro-Winston-Salem-High Point, NC
45. Tucson, AZ
46. Albany-Schenectady-Troy, NY
47. Birmingham, AL
48. Greenville-Spartanburg, SC
49. Albuquerque, NM
50. Omaha-Council Bluffs, NE-IA
51. El Paso, TX
52. Tulsa, OK
53. Grand Rapids, MI
54. McAllen, Brownsville, Harlingen, TX
55. Knoxville, TN
56. Syracuse, NY
57. Allentown-Bethlehem, PA
58. Wilmington, DE
59. Harrisburg-Lebanon-Carlisle, PA
60. Toledo, OH
61. Ft. Meyers-Naples-Marco Island, FL

XM Satellite Radio Inc.
Form 442
Exhibit 3
Response to Question 10

NARRATIVE STATEMENT

XM Satellite Radio Inc. intends to utilize a System Validation Single Frequency Network (SV-SFN) of portable locations to optimize a terrestrial repeater system that will be used to augment the satellite Digital Audio Radio Service (DARS) system. Satellite signals at S-Band do not fully provide coverage to urban areas due to the severe blockage from buildings. Consequently, a terrestrial network will retransmit the satellite service signal to provide coverage in those urban areas where the satellite signal is blocked. To optimize the network planning, XM Satellite Radio plans to conduct a series of tests beginning in August 1999 using a limited number of transmitters.

Testing of the SV-SFN transmitter system will be for the purpose of channel characterization, including signal power and multi-path characteristics, to assist in establishing and validating propagation and channel models for a single frequency network. Consequently, on any given field testing day, one transmitter may be operating or several of the transmitters may be emitting RF energy simultaneously. These measurements will help verify techniques and equipment.

The portable transmitters will each be controlled and monitored locally. Figure A-1 illustrates the test architectures for the portable transmitters.

Testing is planned during the period of August 1999 through August 2001. XM Satellite Radio will conduct tests during normal working hours. Non-working hour testing is not planned. The transmitters will only emit RF energy when tests are being conducted--the transmitters will be turned off at all other times.

XM Satellite Radio Inc.
Form 442
Exhibit 4
Response to Question 13

Portable Transmitter Equipment

Component/Parameter	Value	Notes
Signal Generator		HP Signal Generator 8648C or equivalent
Power Amplifier	10 Watts	Hughes H01-8010 or equivalent
Antenna	7 dBi Omni	TA-2351 or equivalent

XM Satellite Radio Inc.
Form 442
Exhibit 5
Response to Question 18

AUTHORIZATIONS REVOKED

Space Technologies Investments, Inc. ("SpaceTech"), formerly called McCaw Space Technologies, Inc., is a minority shareholder of American Mobile Satellite Corporation ("AMSC"). AMSC is the eighty percent (80%) owner of XM Satellite Radio Holdings, Inc., which wholly owns XM Satellite Radio Inc. ("XM Radio"). SpaceTech held a conditional authorization to construct, launch, and operate a private satellite system providing international communications services between the Indian and Pacific Ocean regions, and had filed a request with the FCC for a one-year extension of time for demonstrating permanent financial qualifications for its conditionally authorized system. On January 26, 1993, the FCC denied this extension request and declared this conditional authorization of SpaceTech null and void. *See* Memorandum Opinion & Order, FCC File No CSS-86003-LA, DA-93-108 (Comm. Carr. Bur., released Feb. 5, 1993).

The denial of SpaceTech's extension request did not involve actual or alleged misconduct. In addition, as a minority shareholder of AMSC, SpaceTech will have no control over AMSC or XM Radio, nor any of their operations. Further, the Commission has granted other applications of XM Radio and AMSC and found XM Radio, AMSC, and its subsidiaries qualified to be Commission licensees notwithstanding the denial of SpaceTech's extension request.

Radio Frequency Exposure Compliance

Because the transmitter antennas will be located on controlled access building roof tops, the exposure to humans will be limited. The transmitters can be turned off when roof top activities close to the antennas are required by maintenance or other workers. In addition, the antennas will be situated such that the distance to near-by buildings will be greater than that indicated by the calculations listed below. Consequently, the FCC radio-frequency field exposure limits will not be exceeded.

For the purposes of predicting RF field strength and power density levels, the following equations from the OET Bulletin 65[1] are used:

$$S = \frac{EIRP}{4\Pi R^2}$$

where: S= Power Density (mW/ sq cm)
EIRP = Transmit Power (mW) x Antenna Gain (relative it isotropic radiator)
R = distance to the center of radiation of the antenna (m)

As a worst case prediction, 100% reflection of the incoming radiation is assumed. This is representative of a roof top environment. This results in a four fold increase in power density giving:

$$S = \frac{EIRP}{\Pi R^2}$$

Based on the FCC limits outlined in OET Bulletin 65 for maximum permissible exposure (MPE) for a frequency of 2340 MHz, the maximum allowable power density is calculated to be:

General Population Exposure =	1.0 mW/ sq cm
Occupational Exposure =	5.0 mW/ sq cm

1/ *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*, FCC OET Bulletin 65, Ed. 97-01, August 1997.

Using these limits, the minimum separation distance required to receive this power density is calculated as a function of the antenna discrimination (see TIL-TEK TA-2350 antenna data sheet) and shown in Table 1.

Table 1. RF Exposure Limit Ranges

Angle Below Main Beam (Deg)	Antenna Gain (dBi)	Occupational (m)	General Pop (m)
0	10	2.52	5.64
5	6	1.59	3.56
10	-6	0.40	0.89
15	-2	0.63	1.42
20	-6	0.40	0.89
25	-3	0.56	1.26
30	-8	0.32	0.71
35	-5	0.45	1.00
40	-9	0.28	0.63
45	-5	0.45	1.00
50	-14	0.16	0.36
55	-8	0.32	0.71
60	-9	0.28	0.63
65	-18	0.10	0.22
70	-9	0.28	0.63
75	-8	0.32	0.71
80	-9	0.28	0.63
85	-10	0.25	0.56
90	-13	0.18	0.40

This is a worse case RF Exposure calculation. The field strengths for the portable transmitters will be lower in all cases.

Emission Isolation to Existing Systems

XM Satellite Radio recognizes that the experimental transmitters are not allowed to cause harmful interference to nearby stations including systems operating in adjacent bands. In addition, XM Satellite Radio understands that space communications (Deep Space Network (DSN) in the 2290-2300 MHz band) and Radioastronomy (ARECIBO.2370-2380 MHz) as well as aeronautical telemetry systems (>2360 MHz) operate in nearby bands. As noted in the Wireless Communications Service (WCS) FCC reports, some existing multipoint distribution service and the instructional television fixed service (MDS/ITFS) systems have a poor front-end design with limited frequency selectivity and are thus susceptible to out-of-band operations in the 2.3 GHz band. XM Satellite Radio analysis, however, indicates that there is a very low probability for causing interference to existing systems both at the frequency of operation and in adjacent bands.

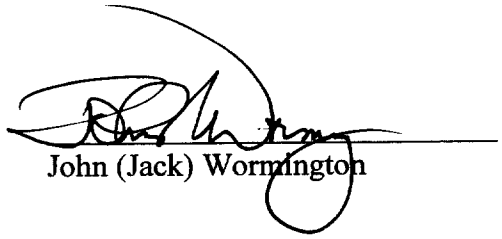
Because the experimental transmitters will be located on roof tops, they may be situated near base stations for systems, such as MDS/ITFS. Preliminary measurements of the high power amplifier indicate that harmonics will be - 55 dBc and spurious emissions less than - 60dBc. This combined with other reductions to out-of band emissions (e.g., filtering at input to HPA, coupling loss to antenna) will dramatically reduce any emission outside the 2320 - 2345 MHz band. In addition, XM Satellite Radio will situate the antennas on the roof-tops to ensure that no existing basestation receives excessive RF energy.

Finally, XM Radio's proposed operation of these transmitters will avoid any interference to the sensitive systems operated by the DSN or ARECIBO. Also, the transmitter 1.2 kW maximum EIRP is also below the maximum authorized (2 kW) for WCS systems operating in adjacent bands, so MDS/ITFS systems will be protected from interference.

Technical Certification

I, John (Jack) Wormington, Senior Vice President, Engineering and Operations of XM Satellite Radio Inc. ("XM Radio"), hereby certify the following under penalty of perjury:

I have reviewed the foregoing "Application for New or Modified Radio Station Authorization Under Part 5 of FCC Rules - Experimental Radio Service (Other than Broadcast)." The information contained in this application is true and correct to the best of my belief.



John (Jack) Wormington

Dated: July 14, 1999