Exhibit A. Experiment Objectives and Operations

XM Satellite Radio intends to utilize a System Validation Single Frequency Network (SV-SFN) of four fixed locations to test the deployment of its terrestrial repeater system. The terrestrial network will retransmit the satellite service signal to provide coverage in those urban areas where the satellite signal is blocked. XM Satellite Radio plans to conduct a series of tests beginning in February 2000 to optimize the network planning using two types of repeaters.

The 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 validation 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 repeaters could be transmitting simultaneously. These measurements will help verify techniques and equipment. The test team will have access to all the transmitter locations so they can monitor and control the equipment.

Testing is planned to start in February 2000 and will continue through December 2000. Testing will be conducted during normal working hours. The repeaters will only transmit when a test is actually being conducted and will be turned off at all other times.

Exhibit B. Transmitter Locations

The SV-SFN will consist of four fixed transmitters located around Fort Lauderdale, Florida. The specific geographic and site parameters of the transmitters are listed in Table B-1 and shown in Figures B-1 to B-4. The technical characteristics for the repeaters are provided in Exhibit C. The antennas for the standard transmitters will be located on controlled access rooftops or in top floor equipment rooms. The antennas will not extend more than 6 meters above the building height. The antennas will be mounted less than 4 meters above the building height.

The high-power antenna will be located on a tower that is shared among a number of different transmitting systems. The site is owned by the Dade county school board and the tower is owned by WLRN. There is controlled access to the area around the tower so that a person from the general pubic could not casually walk into the area.

Table B-1. Fixed Transmitter Site Parameters

Transmitter	Latitude (North)	Longitude (West)	Building Height Above Ground (Note 1)	Ground Elevation	Transmitter Type
SV-SFN Tx 1	26° 12' 19"	80° 08' 20"	48 m	4.0 m	Standard
SV-SFN Tx 2	26° 07' 17"	80° 08' 23"	122 m	3.1 m	Standard
SV-SFN Tx 3	26° 13' 50"	80° 05' 27"	92 m	2.0 m	Standard
SV-SFN Tx 4	25° 58' 58"	80° 11' 46"	153 m	3.1 m	High-power

Note 1: The standard antennas will be mounted less than 4 meters above the building height; they will not extend more than 6 meters.

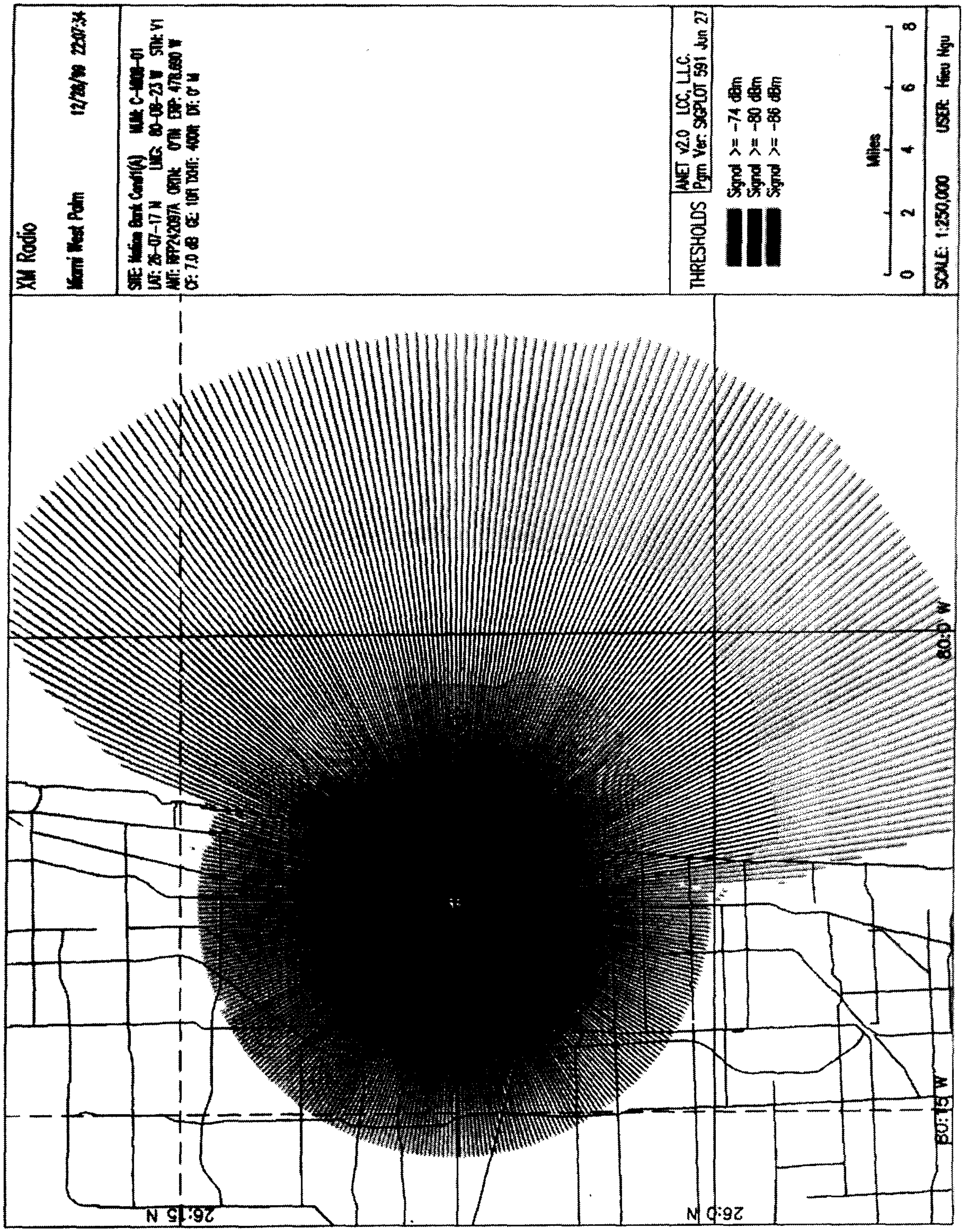

Figure B-1 Nation Bank Location

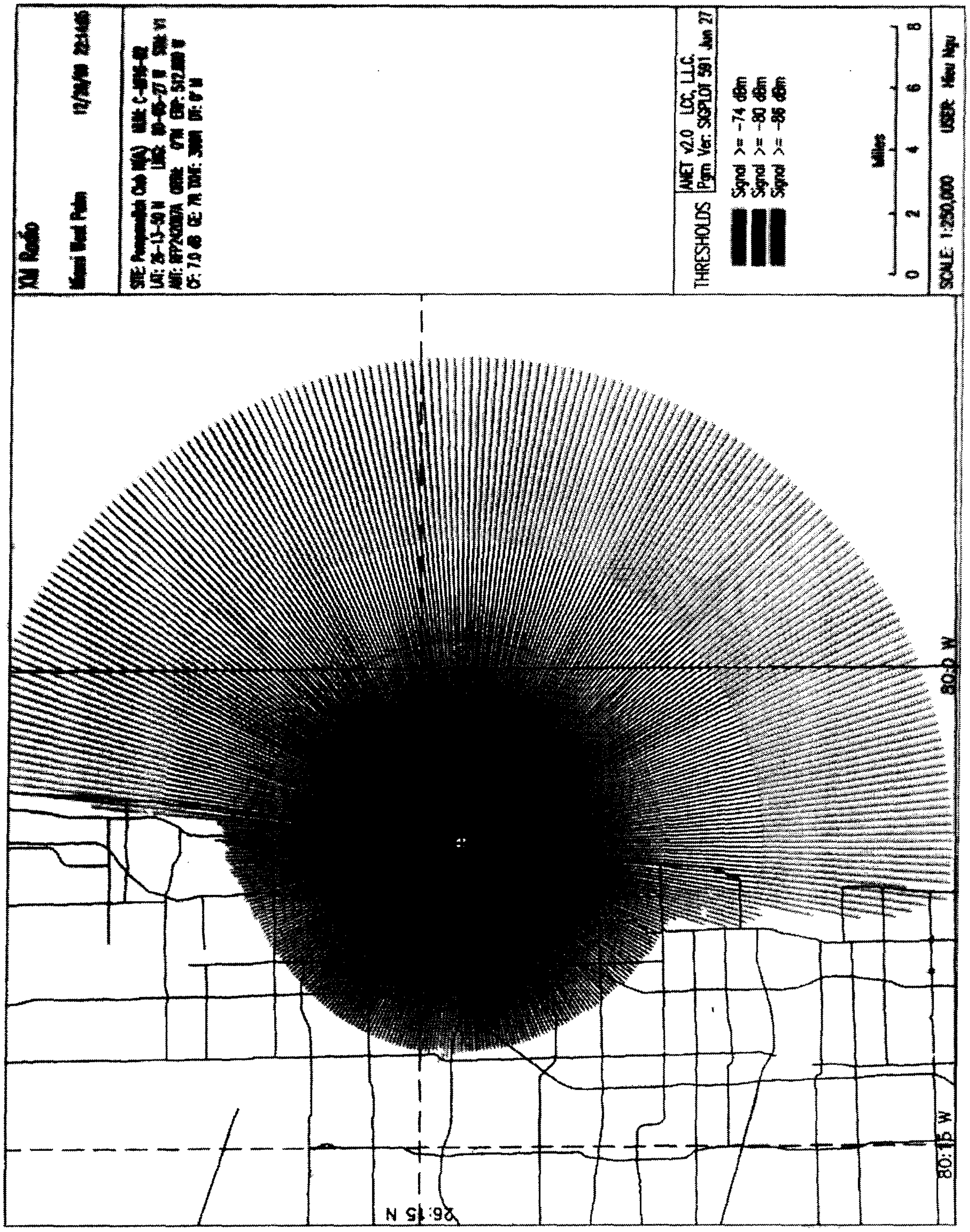

Figure B-2 Pompano Beach Location

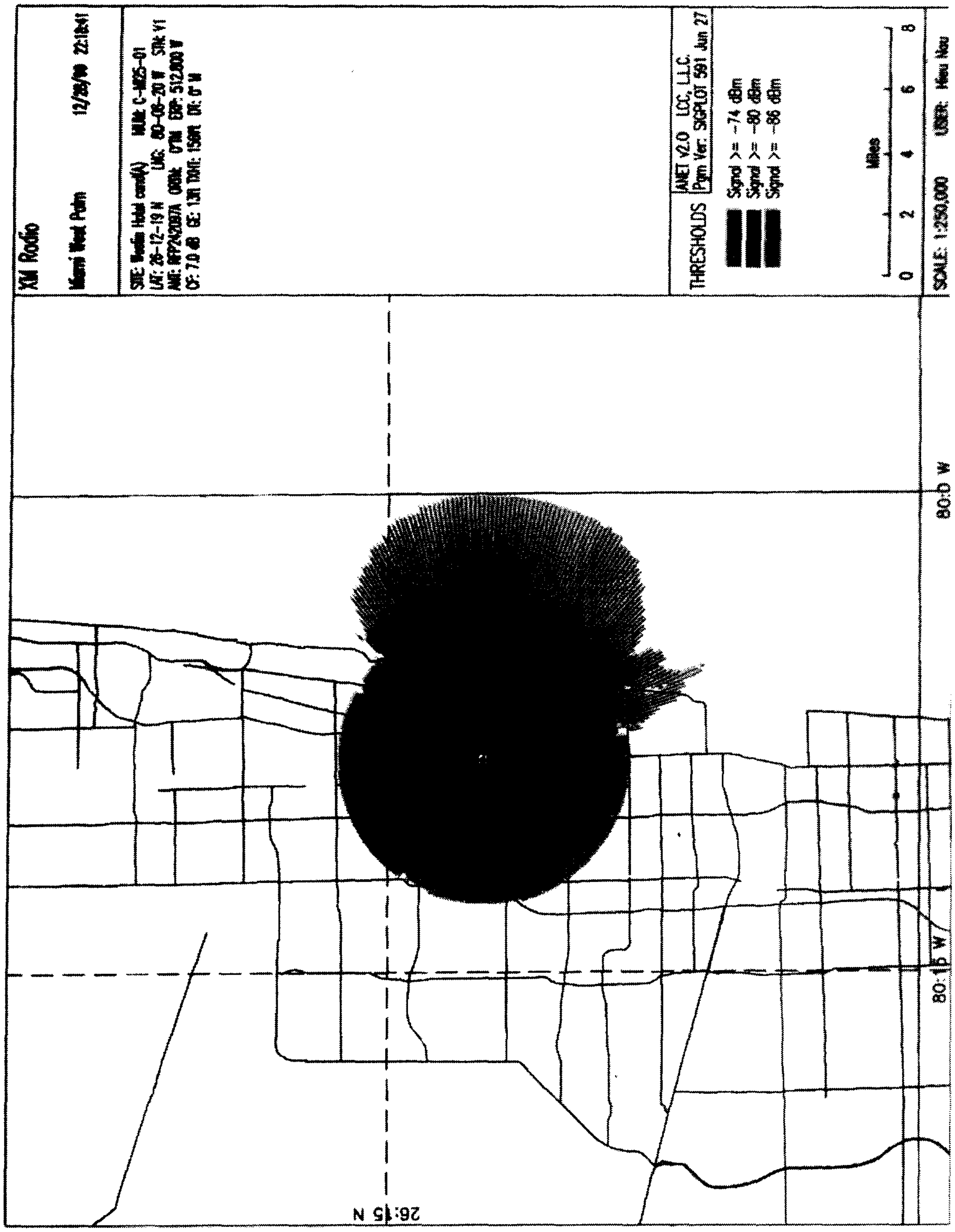

Figure B-3 Nation Bank Location

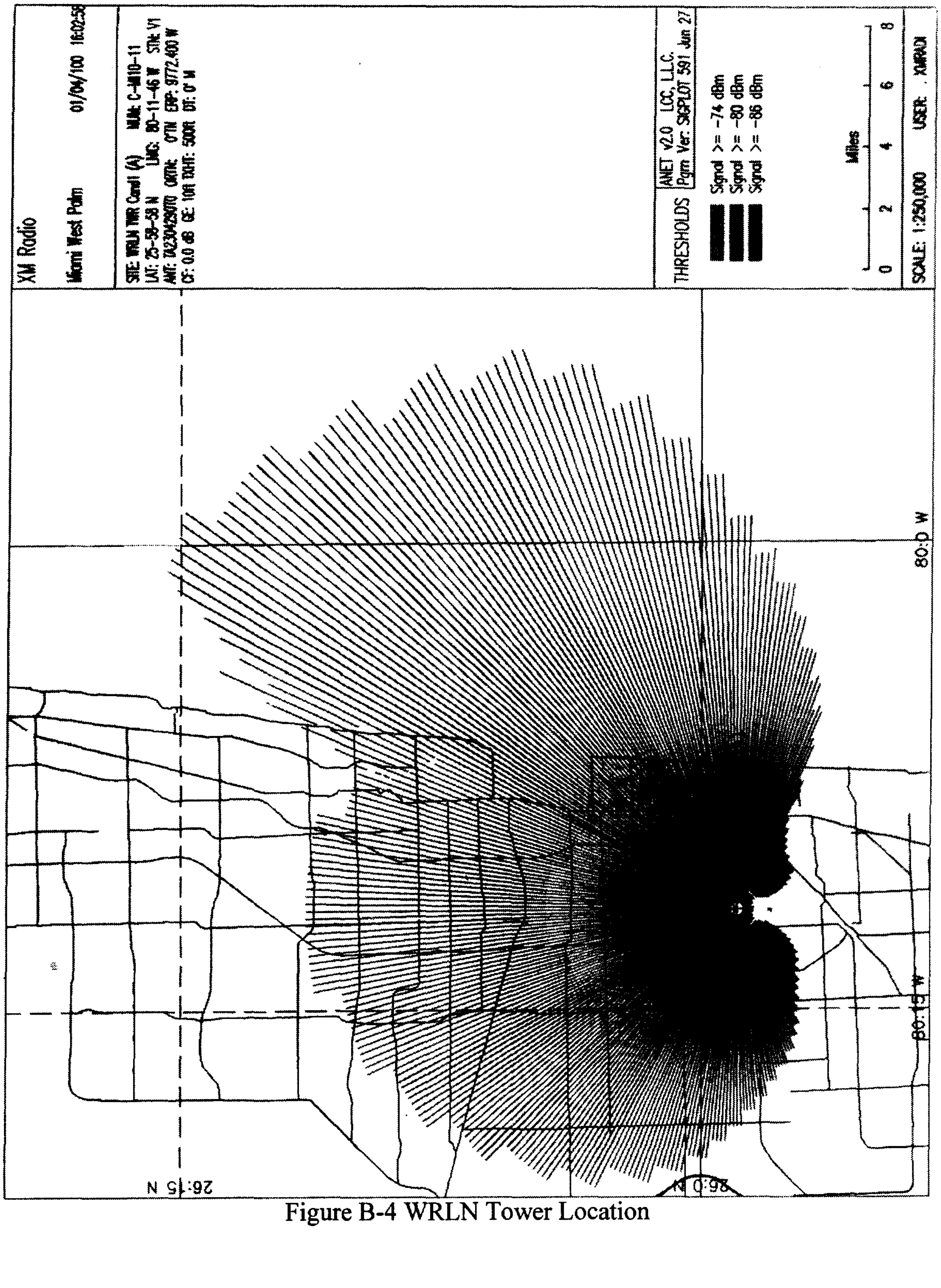

Figure B-4 WRLN Tower Location

Exhibit C. Transmitter Technical Parameters

There will be two types of transmitters used in the SV-SFN. Three of the transmitters will be identical. These are called the standard transmitters. One transmitter will have approximately 10 dB higher EIRP and will be called the high-power transmitter. Table C-1 summarizes the technical parameters of the fixed transmitters. Tables C-2 and C-3 provide technical information about the transmitter equipment.

Table C-1 Transmitter Characteristics

Component/Parameter	Value	Notes
Transmit Frequency	2332.5-2345 MHz	Adjustable center frequency within range
EIRP of Standard Transmitter Maximum Nominal	 1.2 kW 800 W	Measured at antenna boresight Referenced to isotropic antenna Power will be adjustable (nominal EIRP = 800 W ± 200 W
EIRP of High-power Transmitter Maximum Nominal	 50 kW	Measured at antenna boresight Referenced to isotropic antenna Power will be adjustable
CW Tone Emission Designator	 NON	This signal will be used for propagation measurements

Table C-2 Transmitter Equipment for Standard Repeater

Component/Parameter	Value	Notes
RF S-Band HPA Rated Output Power Spectral shoulder regrowth Back-off	 100 W 30 dBc > 6 dB	Manufacturer: Unique Systems Measured from 1 dB compression point
Antenna Model number Gain at Boresight Polarization Electronic Downtilt	 TA-2350 10 dBi Vertical 0°	Manufacturer: TIL-TEK

Table C-3 Transmitter Equipment for High-power Transmitter

Component/Parameter	Value	Notes
RF S-Band HPA Rated Output Power Spectral shoulder regrowth Back-off	 1400 W 24 dBc > 6 dB	Manufacturer: Unique Systems Measured from 1 dB compression point
Antenna Model number Gain at Boresight Polarization Electronic Downtilt	 TA-2304-2 15.5 dBi Vertical 0°	Manufacturer: TIL-TEK For 90° Sector Coverage

Exhibit D. Radio Frequency Exposure Compliance

The standard transmitter antennas will be located on controlled access building rooftops, so the exposure to humans will be limited. The standard transmitters can be turned off whenever there are activities close to the antenna by maintenance or other workers. In addition, the antennas will be situated such that the distance to near-by buildings will be greater that that indicated by the calculations listed below. Consequentially, the FCC radio-frequency field exposure limits will not be exceeded.

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

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 the power density using the equation:

$$S = \text{EIRP} / \pi R^2$$

Where: S = Power Density (mW/sq cm)
EIRP = Transmit Power (mW) x Antenna Gain
R = distance to the center of radiation of the antenna (cm)

Using this equation, the minimum separation distance required to receive this power density is calculated as a function of the antenna discrimination for the standard transmitter is shown in Table D-1.

Table D-1. RF Exposure Limit Ranges for Standard Transmitter

Angle Below Main Beam (deg)	Antenna Gain (dBi)	Occupational (m)	General Population (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	-5	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

The high-power antenna will be located on a tower that is shared among a number of different transmitting systems. The site is owned by the Dade county school board and the tower is owned by WLRN. The area beneath the tower has controlled access so that a person from the general pubic could not casually walk into an area. The nearest building that could be within the coverage of the antenna's 90° sector is approximately 1000 meters away, which is outside the RF exposure range limit for the high-power transmitter computed in Table D-2. The RF exposure range limit as a function of the antenna discrimination is listed in Table D-2.

Table D-2. RF Exposure Limit Ranges for High-power Transmitter

Angle Below Main Beam (deg)	Antenna Gain (dBi)	Occupational (m)	General Population (m)
0	15	16.79	37.54
5	9	8.45	18.90
10	1	3.23	7.22
15	-5	1.64	3.66
20	-2	2.36	5.28
25	-11	0.81	1.80
30	-4	1.91	4.26
35	-15	0.51	1.14
40	-4	1.94	4.34
45	-10	0.94	2.09
50	-11	0.85	1.89
55	-9	1.09	2.45
60	-14	0.59	1.33
65	-17	0.43	0.95
70	-18	0.37	0.82
75	-23	0.21	0.46
80	-27	0.14	0.31
85	-24	0,18	0.41
90	-23	0.21	0.46

Exhibit E. 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 in the 2290-2300 MHz band) and Radioastronomy (at Arecibo in the 2370-2380 MHz band) as well as aeronautical telemetry systems (>2360 MHz) operate in nearby bands. As noted in the Wireless Communication Service Report and Order (FCC 97-112), some existing multipoint distribution systems and instructional television fixed service systems have a poor front-end design with limited frequency selectivity and are susceptible to out-of-band emissions.

Preliminary measurements of the high power amplifiers to be used in the proposed transmitters indicate that the harmonics will be –55 dBc and spurious emissions less than –60 dBc. This combined with filtering at the input to the HPA and antenna losses will dramatically reduce any emission outside the 2332.5-2345.0 MHz band.