SIRIUS SATELLITE RADIO

REMOTE RADIATOR VEHICLE TESTING
UNIVERSITY OF MICHIGAN
Model SP-3

October 19, 2006

DISCUSSION OF TESTING AND RESULTS

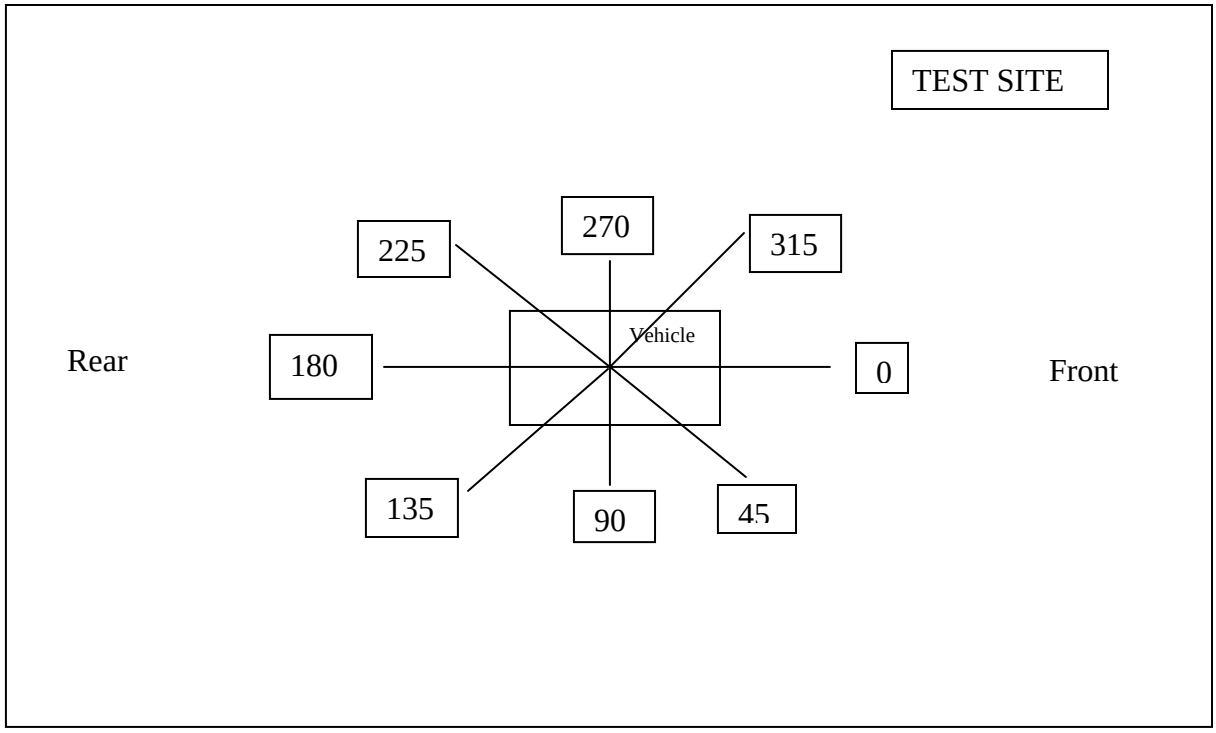
Satellite radio products function to receive satellite radio channels, decode the modulation on the satellite signal and modulate the recovered base band signal onto a carrier in the FM radio band for reception by the FM radio in the vehicle. The remote radiator concept provides for better coupling to the car radio of the modulated FM signal from the satellite receiver.

These tests were implemented to gather data on a remote radiator configuration with Sirius Satellite radio products. The data was taken on 8 radials with 3 different vehicles at a distance of 3 meters from the closest point of the vehicle.

In situ testing was performed for three vehicles based on the following vehicle sizes; small, medium, and large. The selected vehicles were: Chrysler 300, Nissan Quest, and a Honda Accord. The above vehicles have window mount antennas and the remote antenna was located adjacent to the window antenna in each case. Three frequencies in the FM band were measured; one near the low end (88 MHz), middle, (98 MHz) and high end (108 MHz) of the band in both horizontal and vertical polarizations.

The results show that the remote radiator produces levels are about 15 dB or more below the FCC Section 15.239 limits when measured 3 meters from the perimeter of the vehicle. In the tables that follow, Kg is the correction factor for preamp gain and cable loss and Ka is the antenna factor for the measurement antenna.

Below is a diagram of the radial arrangement for measurements as laid out on the test site showing their position relative to the vehicle position. Measurement were made using an antenna and mast moved to each marked location. Antenna height was varied from 1 to 4 meters at each location.



Chrysler 300 w/ Rear Glass Antenna

Radial Angle	88 MHz (dBuV)		98 MHz (dBuV)		108 MHz (dBuV)	
	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
0	40.1	36.9	33.5	28.3	32.0	26.2
45	33.8	34.1	32.1	32.7	29.6	30.7
90	41.3	40.8	29.7	31.4	28.5	32.8
135	44.1	42.7	28.9	30.9	28.4	32.6
180	35.3	33.9	28.6	30.0	30.7	27.0
225	28.3	30.1	31.7	31.1	31.9	30.0
270	37.4	44.2	37.5	32.5	29.0	34.4
315	34.7	35.1	30.1	32.8	32.9	31.1
Max dBuV	44.1	44.2	37.5	32.8	32.9	34.4
Max dBuV/m	31.1	31.2	25.4	20.7	22	23.5
Limit Margin	-16.9	-16.8	-22.6	-27.3	-26	-24.5

44.2	Max Reading (dBuV)
31.2	Max Output (dBuV/m)
-16.8	Min Margin (dB)

Range and BICON calibration (05Oct06)			
	Kg	Ka	Corr
88	20.8	7.8	-13
98	20.4	8.3	-12.1
108	19.9	9	-10.9

Nissan Quest w/ Side Glass Diversity

Radial Angle	88 MHz (dBuV)		98 MHz (dBuV)		108 MHz (dBuV)	
	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
0	35.5	29.7	34.2	26.6	29.6	20.1
45	32.8	31.0	31.4	26.4	32.9	34.9
90	32.4	33.8	38.1	35.2	27.7	26.4
135	42.2	34.1	42.4	40.0	24.3	27.6
180	42.8	33.8	37.0	36.3	23.6	27.5
225	45.5	38.6	30.8	31.1	25.3	25.2
270	36.3	38.3	28.5	35.5	33.0	28.6
315						
Max dBuV	45.5	38.6	42.4	40	33	34.9
Max dBuV/m	32.5	25.6	30.3	27.9	22.1	24
Limit Margin	-15.5	-22.4	-17.7	-20.1	-25.9	-24

45.5	**Max Reading (dBuV)**
32.5	**Max Output (dBuV/m)**
-15.5	**Min Margin (dB)**

Range and BICON calibration (05Oct06)			
	Kg	**Ka**	**Corr**
88	20.8	7.8	-13
98	20.4	8.3	-12.1
108	19.9	9	-10.9

Honda Accord with Rear Glass Antenna

Radial Angle	88 MHz (dBuV)		98 MHz (dBuV)		108 MHz (dBuV)	
	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
0	42.4	32.2	40.2	28.5	37.8	29.2
45	39.4	31.9	39.6	31.1	32.0	29.9
90	38.9	39.9	26.5	39.3	34.7	41.3
135	32.0	31.5	33.3	26.5	36.2	32.1
180	46.0	32.9	36.5	26.1	38.7	28.6
225	42.1	34.5	31.8	29.9	37.0	31.4
270	38.2	42.6	31.3	37.7	33.4	37.9
315	41.1	40.9	34.8	34.6	29.3	26.8
Max dBuV	46	42.6	40.2	39.3	38.7	41.3
Max dBuV/m	33	29.6	28.1	27.2	27.8	30.4
Limit Margin	-15	-18.4	-19.9	-20.8	-20.2	-17.6

46	**Max Reading (dBuV)**
33	**Max Output (dBuV/m)**
-15	**Min Margin (dB)**

Range and BICON calibration (05Oct06)			
	Kg	**Ka**	**Corr**
88	20.8	7.8	-13
98	20.4	8.3	-12.1
108	19.9	9	-10.9

TEST SITE PHOTOS