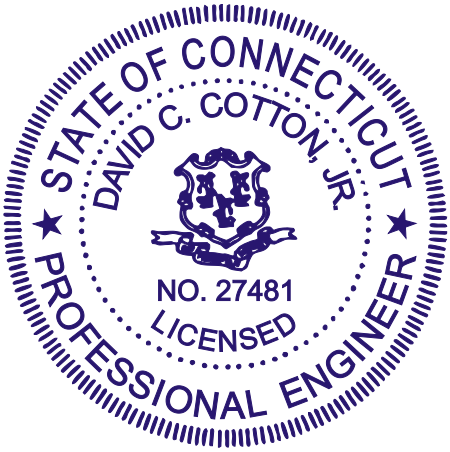
RF EMISSIONS COMPLIANCE REPORT
Crown Castle on behalf of Sirius XM Radio Inc.

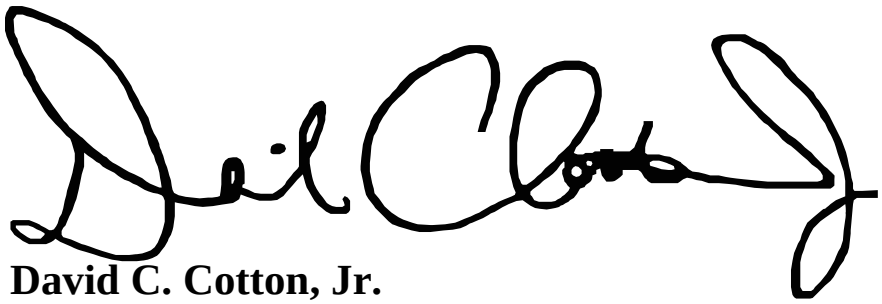
Application #: 213469

Site: NHV 104 943122
BU: 806359
423 Oronoque Road
Milford, CT
3/15/2014

Report Status:

Sirius XM Radio Inc. Is Compliant





David C. Cotton, Jr.
Licensed Professional Engineer (Electrical)
State of Connecticut, PEN.0027481
Date: 2014-March-16

Prepared By:

Sitesafe, Inc.

200 North Glebe Road, Suite 1000 Arlington, VA 22203 Voice 703-276-1100
Fax 703-276-1169

Engineering Statement in Re:
Electromagnetic Energy Analysis
Sirus XM Radio Inc.
Milford, CT

My signature on the cover of this document indicates:

That I am registered as a Professional Engineer in the jurisdiction indicated; and

That I have extensive professional experience in the wireless communications engineering industry; and

That I am an employee of Sitesafe, Inc. in Arlington, Virginia; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission ("the FCC" and "the FCC Rules") both in general and specifically as they apply to the FCC's Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; and

That the technical information serving as the basis for this report was supplied by Sirus XM Radio Inc. (See attached Site Summary and Carrier documents), and that Sirus XM Radio Inc.'s installations involve communications equipment, antennas and associated technical equipment at a location referred to as the "NHV 104 943122" ("the site"); and

That Sirus XM Radio Inc. proposes to operate at the site with transmit antennas listed in the carrier summary and with a maximum effective radiated power as specified by Sirus XM Radio Inc. and shown on the worksheet, and that worst-case 100% duty cycle have been assumed; and

That in addition to the emitters specified in the worksheet, there are additional collocated point-to-point microwave facilities on this structure and, the antennas used are highly directional oriented at angles at or just below the horizontal and, that the energy present at ground level is typically so low as to be considered insignificant and have not been included in this analysis; and

That this analysis has been performed with the assumption that the ground immediately surrounding the tower is primarily flat or falling; and

That at this time, the FCC requires that certain licensees address specific levels of radio-frequency energy to which workers or members of the public might possibly be exposed (at §1.1307(b) of the FCC Rules); and

That such consideration of possible exposure of humans to radio-frequency radiation must utilize the standards set by the FCC, which is the Federal Agency having jurisdiction over communications facilities; and

That the FCC rules define two tiers of permissible exposure guidelines: 1) "uncontrolled environments," defined as situations in which persons may not be aware of (the "general public"), or may not be able to control their exposure to a transmission facility; and (2) "controlled environments," which defines situations in which persons are aware of their potential for exposure (industry personnel); and

That this statement specifically addresses the uncontrolled environment (which is more conservative than the controlled environment) and the limit set forth in the FCC rules for

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licensees of Sirus XM Radio Inc.'s operating frequency as shown on the attached antenna worksheet; and

That when applying the uncontrolled environment standards, the predicted Maximum Power Density at two meters above ground level from the proposed Sirus XM Radio Inc. operation is no more than 1.399% of the maximum in any accessible area on the ground and

That it is understood per FCC Guidelines and OET65 Appendix A, that regardless of the existent radio-frequency environment, only those licenses whose contributions exceed five percent of the exposure limit pertinent to their operation(s) bear any responsibility for bringing any non-compliant area(s) into compliance; and

That when applying the uncontrolled environment standards, the cumulative predicted energy density from the proposed operation is no more than 2.697% of the maximum in any accessible area up to two meters above the ground per OET-65; and

That the calculations provided in this report are based on data provided by the client and antenna pattern data supplied by the antenna manufacturer, in accordance with FCC guidelines listed in OET-65. Horizontal and vertical antenna patterns are combined for modeling purposes to accurately reflect the energy two meters above ground level where on-axis energy refers to maximum energy two meters above the ground along the azimuth of the antenna and where area energy refers to the maximum energy anywhere two meters above the ground regardless of the antenna azimuth, accounting for cumulative energy from multiple antennas for the carrier and frequency range indicated; and

That the Occupational Safety and Health Administration has policies in place which address worker safety in and around communications sites, thus individual companies will be responsible for their employees' training regarding Radio Frequency Safety.

In summary, it is stated here that the proposed operation at the site would not result in exposure of the Public to excessive levels of radio-frequency energy as defined in the FCC Rules and Regulations, specifically 47 CFR 1.1307 and that Sirus XM Radio Inc.'s proposed operation is completely compliant.

Finally, it is stated that access to the tower should be restricted to communication industry professionals, and approved contractor personnel trained in radio-frequency safety; and that the instant analysis addresses exposure levels at two meters above ground level and does not address exposure levels on the tower, or in the immediate proximity of the antennas.

Sirus XM Radio Inc.
NHV 104 943122
Site Summary

Carrier	Area Maximum Percentage MPE
MetroPCS	0.218 %
Sirius XM Radio Inc.	1.399 %
Sirius XM Radio Inc.	0 %
T-Mobile	0.162 %
Verizon Wireless	0.125 %
Verizon Wireless	0.313 %
Verizon Wireless	0.169 %
Verizon Wireless	0.311 %

Composite Site MPE: 2.697 %

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MetroPCS
NHV 104 943122
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	2.17882	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.21788	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXV18-206517LS	73	0	1691	1.133491	0.113349	1.777201	0.17772
RFS	APXV18-206517LS	73	120	1691	1.133491	0.113349	1.777201	0.17772
RFS	APXV18-206517LS	73	240	1691	1.133491	0.113349	1.777201	0.17772

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Sirus XM Radio Inc.
NHV 104 943122
Carrier Summary

Frequency:	2320	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	13.99059	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	1.39906	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
TIL-TEK	TA-2335-DAB-L-95-T0	90	0	7331	10.505189	1.050519	13.990591	1.399059

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Sirus XM Radio Inc. (RX ONLY)
NHV 104 943122
Carrier Summary

Frequency:	7000	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	0	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Generic	Dish	45	216	0	0	0	0	0
TIL-TEK	TA-2324	50	198	0	0	0	0	0

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T-Mobile
NHV 104 943122
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	1.61824	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.16182	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APX16DW-16DWV	83	90	1691	1.133491	0.113349	1.499465	0.149947
RFS	APX16DW-16DWV	83	210	1691	1.133491	0.113349	1.499465	0.149947
RFS	APX16DW-16DWV	83	330	1691	1.133491	0.113349	1.499465	0.149947

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Verizon Wireless
NHV 104 943122
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	1.24622	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.12462	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Antel	BXA-171063-8CF-2ET	101	20	1236	1.012759	0.101276	1.227978	0.122798
Antel	BXA-171063-8CF-2ET	101	140	1236	1.012759	0.101276	1.227978	0.122798
Antel	BXA-171063-8CF-2ET	101	260	1236	1.012759	0.101276	1.227978	0.122798

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Verizon Wireless
NHV 104 943122
Carrier Summary

Frequency:	751	MHz
Maximum Permissible Exposure (MPE):	500.67	µW/cm^2
Maximum power density at ground level:	1.56796	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.31317	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
SWEDCOM	SWCP 2X5515	101	260	1897	1.520252	0.303646	1.566884	0.312959
SWEDCOM	SWCP 2X5515	101	20	1897	1.520252	0.303646	1.566884	0.312959
SWEDCOM	SWCP 2X5515	101	140	1897	1.520252	0.303646	1.566884	0.312959

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Verizon Wireless
NHV 104 943122
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	1.68827	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.16883	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Antel	BXA-171063-8CF-0ET	105	20	2033	0.987568	0.098757	1.39261	0.139261
Antel	BXA-171063-8CF-0ET	105	140	2033	1.516372	0.151637	1.613006	0.161301
Antel	BXA-171063-8CF-0ET	105	260	1854	0.980958	0.098096	1.398125	0.139813

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Verizon Wireless
NHV 104 943122
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	µW/cm^2
Maximum power density at ground level:	1.76505	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.31148	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	DB846F65ZAXY	105	20	1127	0.767284	0.135403	0.873202	0.154094
ANDREW	DB846F65ZAXY	105	140	1127	0.767284	0.135403	0.873202	0.154094
ANDREW	DB846F65ZAXY	105	140	1127	0.833176	0.147031	0.873202	0.154094
ANDREW	DB846F65ZAXY	105	20	1127	0.767284	0.135403	0.873202	0.154094
ANDREW	DB846F65ZAXY	105	260	1127	0.833177	0.147031	0.873202	0.154094
ANDREW	DB846F65ZAXY	105	260	1127	0.767284	0.135403	0.873202	0.154094

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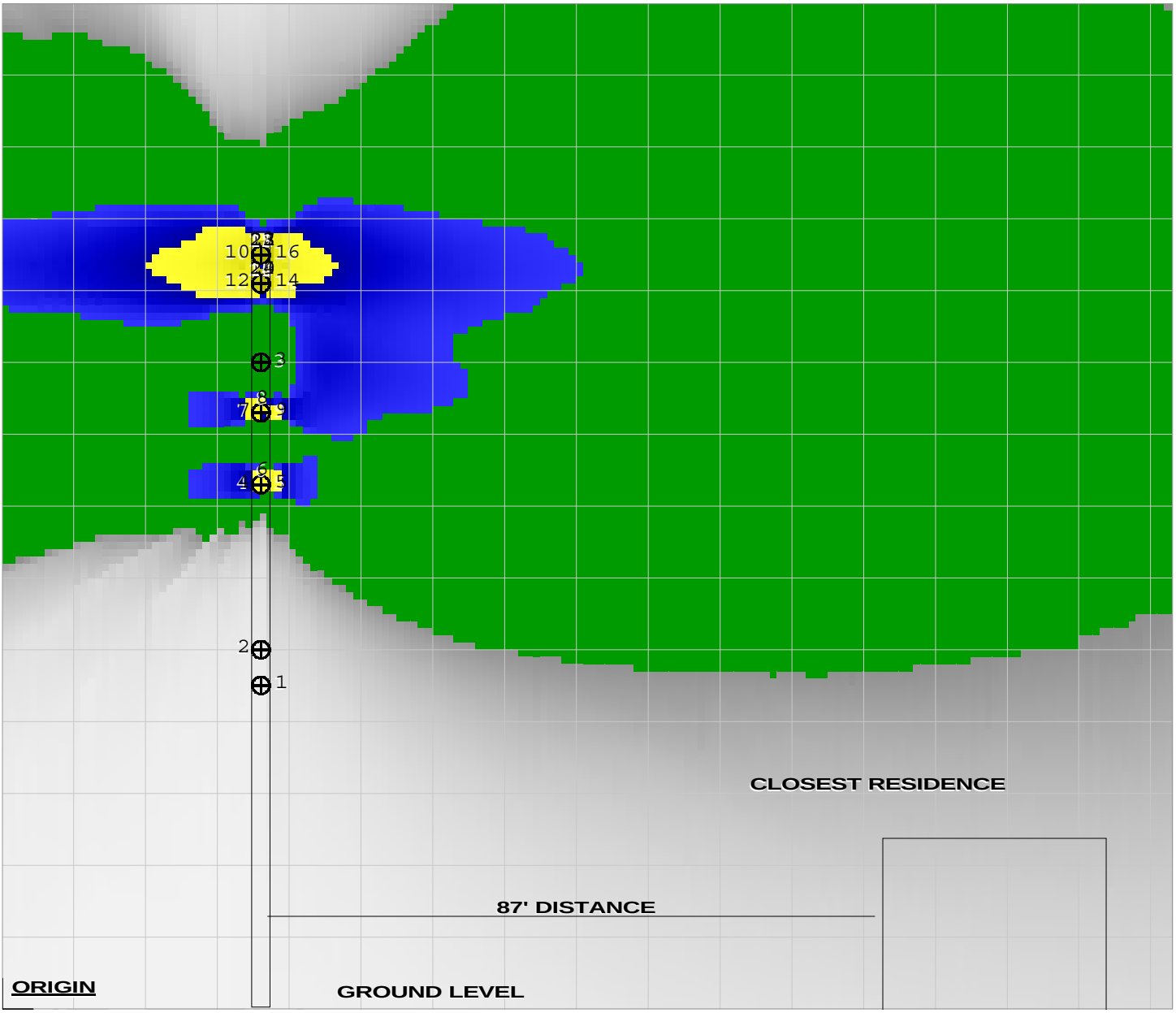
RF Emissions Diagram for: NHV 104 943122
Side Elevation



% of FCC Public Exposure Limit
Individual Points

- 5000 <= X
- 500 <= X < 5000
- 100 <= X < 500
- 5 <= X < 100
- X <= 5

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www.sitesafe.com
Sitesafe ID# 123717
Site Name: NHV 104 943122

Sitesafe Inc. assumes no responsibility for modeling results not verified by Sitesafe personnel.
Contact Sitesafe Inc. for modeling assistance (703) 276-1100.
SitesafeTC Version 2.81.00
2/15/2014

Feet
10 0 10 20
Grid Size is 10.0