

# Radio Frequency – Electromagnetic Energy (RF-EME) Compliance Report



Prepared for:  
Sprint Nextel  
c/o Black & Veatch Corporation  
2999 Oak Rd. Suite 910  
Walnut Creek, CA 94597

Site No. FS04XC191  
San Jose Water District  
1220 Pecten Court  
Milpitas, California 95035  
Santa Clara County  
37.413294; -122.881928 NAD83  
monopole

EBI Project No. 62112344  
December 19, 2011

**RECEIVED**

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**CITY OF MILPITAS  
PLANNING DIVISION**

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RF-EME Compliance Report  
EBI Project No. 62112344

Site No. FS04XC191  
1220 Pecten Court, Milpitas, California

## EXECUTIVE SUMMARY

### Purpose of Report

EnviroBusiness Inc. (dba EBI Consulting) has been contracted by Sprint Nextel to conduct radio frequency electromagnetic (RF-EME) modeling for Sprint Site FS04XC191 located at 1220 Pecten Court in Milpitas, California to determine RF-EME exposure levels from existing and proposed Sprint wireless communications equipment at this site. As described in greater detail in Section 11.0 of this report, the Federal Communications Commission (FCC) has developed Maximum Permissible Exposure (MPE) Limits for general public exposures and occupational exposures. This report summarizes the results of RF-EME modeling in relation to relevant FCC RF-EME compliance standards for limiting human exposure to RF-EME fields.

this report contains a detailed summary of the RF EME analysis for the site.

This document addresses the compliance of Sprint's proposed transmitting facilities independently and in relation to all collocated facilities at the site.

## **1.0 LOCATION OF ALL EXISTING ANTENNAS AND FACILITIES AND EXISTING RF LEVELS**

This project involves the removal of three (3) existing antennas replaced with six (6) proposed Sprint wireless telecommunication antennas on a monopole located at 1220 Pecten Court in Milpitas, California. There are three Sectors (A, B, and C) proposed to be replaced at the site, with two (2) antennas that may be re-installed per sector.

Based on drawings and aerial photography review an unknown carrier also has wireless antennas on the monopole. These antennas were included in the modeling analysis.

## **2.0 LOCATION OF ALL APPROVED (BUT NOT INSTALLED) ANTENNAS AND FACILITIES AND EXPECTED RF LEVELS FROM THE APPROVED FACILITIES**

There are no antennas or facilities that are approved and not installed based on information provided to EBI and Sprint at the time of this report.

## **3.0 NUMBER AND TYPES OF WTS WITHIN 100 FEET OF THE PROPOSED SITE AND ESTIMATES OF CUMULATIVE EMR EMISSIONS AT THE PROPOSED SITE**

With the exception of the antennas mentioned in Section 1.0, there are no other Wireless Telecommunication Service (WTS) sites observed within 100 feet of the proposed site.

## **4.0 LOCATION AND NUMBER OF THE SPRINT ANTENNAS AND BACK-UP FACILITIES PER BUILDING AND NUMBER AND LOCATION OF OTHER TELECOMMUNICATION FACILITIES ON THE PROPERTY**

Sprint proposes the removal of three (3) existing replaced with six (6) proposed Sprint wireless telecommunication antennas on a monopole located at 1220 Pecten Court in Milpitas, California. There are three Sectors (A, B, and C) proposed to be replaced at the site, with two (2) antennas that may be re-installed per sector. In each sector, there is proposed to be one antenna transmitting in the 800 MHz and the 1900 MHz frequency ranges and one antenna transmitting in the 1600 MHz frequency range. The Sector A antennas will be oriented 0° from true north. The Sector B antennas will be oriented 120° from true north. The Sector C antennas will be oriented 265° from true north. The bottoms of the antennas will be 37 feet above ground level.

Based on drawings and aerial photography review an unknown carrier also has wireless antennas on the monopole. These antennas were included in the modeling analysis.

## **5.0 POWER RATING FOR ALL EXISTING AND PROPOSED BACKUP EQUIPMENT SUBJECT TO THE APPLICATION**

The operating power for modeling purposes was assumed to be 20 Watts per transmitter for the 800 MHz antenna and there will be one (1) transmitter operating at this frequency. The operating power for the purpose of modeling was assumed to be 20 Watts per transmitter and one (1) transmitter operating in the 1600 MHz frequency range. Additionally, for modeling purposes it was assumed to be 20 Watts per transmitter and six (6) transmitters operating at the 1900 MHz.

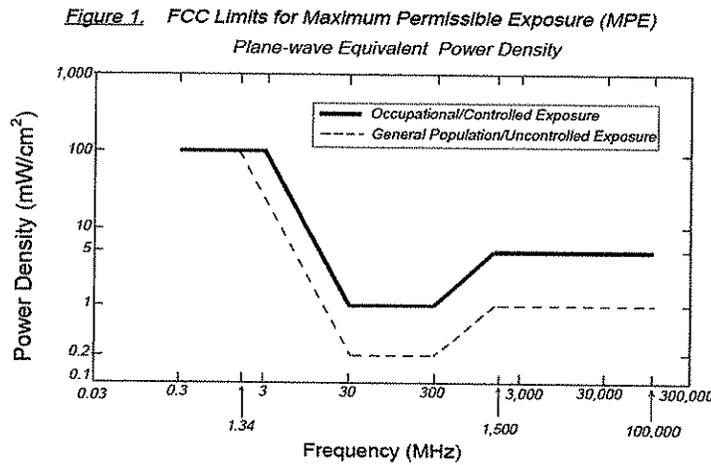
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time [E] <sup>2</sup> , [H] <sup>2</sup> , or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f <sup>2</sup> )*	6
30-300	61.4	0.163	1.0	6
300-1,500	--	--	f/300	6
1,500-100,000	--	--	5	6

**(B) Limits for General Public/Uncontrolled Exposure**

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time [E] <sup>2</sup> , [H] <sup>2</sup> , or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	30
30-300	27.5	0.073	0.2	30
300-1,500	--	--	f/1,500	30
1,500-100,000	--	--	1.0	30

f = Frequency in (MHz)

\* Plane-wave equivalent power density



Based on the above, the most restrictive thresholds for exposures of unlimited duration to RF energy for several personal wireless services are summarized below:

Personal Wireless Service	Approximate Frequency	Occupational MPE	Public MPE
Personal Communication (PCS)	1,950 MHz	5.00 mW/cm <sup>2</sup>	1.00 mW/cm <sup>2</sup>
Cellular Telephone	870 MHz	2.90 mW/cm <sup>2</sup>	0.58 mW/cm <sup>2</sup>
Specialized Mobile Radio	855 MHz	2.85 mW/cm <sup>2</sup>	0.57 mW/cm <sup>2</sup>
Most Restrictive Freq. Range	30-300 MHz	1.00 mW/cm <sup>2</sup>	0.20 mW/cm <sup>2</sup>

MPE limits are designed to provide a substantial margin of safety. These limits apply for continuous exposures and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health.

**6.0 TOTAL NUMBER OF WATTS PER INSTALLATION AND THE TOTAL NUMBER OF WATTS FOR ALL INSTALLATIONS ON THE BUILDING**

The effective radiated power (ERP) for the 800 MHz transmitter combined on site is 662 Watts. The ERP for the 1600 MHz transmitters combined on site is 895 Watts. The ERP for the 1900 MHz transmitters combined on site is 6,929 Watts. The ERPs for other carriers on site was not provided.

**7.0 PREFERRED METHOD OF ATTACHMENT OF PROPOSED ANTENNA WITH PLOT OR ROOF PLAN INCLUDING: DIRECTIONALITY OF ANTENNAS, HEIGHT OF ANTENNAS ABOVE NEAREST WALKING SURFACE, DISCUSS NEARBY INHABITED BUILDINGS**

Based on the information provided to EBI, the information indicates that the proposed antennas are to be rack-mounted to the monopole, operating in the directions, frequencies, and heights mentioned in section 4.0 above. The area north of the monopole is shown as Montague Expressway. The area south of the monopole is shown as a large vacant lot. The area east of the Subject Property is shown as an on-ramp followed by Interstate 680. The area west of the monopole is a parking lot followed by commercial buildings approximately 110 feet west of the monopole.

**8.0 ESTIMATED AMBIENT RADIO FREQUENCY FIELDS FOR THE PROPOSED SITE**

Based on worst-case predictive modeling, there are no predicted areas on any accessible ground-level walking/working surface related to the proposed Sprint antennas that exceed the FCC's occupational or general public exposure limits at this site. At the nearest walking/working surfaces to the proposed Sprint antennas, the maximum power density is 5.60 percent of the FCC's general public limit (1.12 percent of the FCC's occupational limit). The composite exposure level from all other carriers existing on this site combined with Sprint's proposed antennas is 6.30 percent of the FCC's general public limit (1.26 percent of the FCC's occupational limit) at the nearest walking/working surface to each antenna. The inputs used in the modeling are summarized in the RoofView® export file presented in Appendix B.

There are no modeled areas on the ground that exceed the FCC's limits for general public or occupational exposure in front of the other carrier antennas.

**9.0 SIGNAGE AT THE FACILITY IDENTIFYING ALL WTS EQUIPMENT AND SAFETY PRECAUTIONS FOR PEOPLE NEARING THE EQUIPMENT AS MAY BE REQUIRED BY THE APPLICABLE FCC ADOPTED STANDARDS (DISCUSS SIGNAGE FOR THOSE WHO SPEAK LANGUAGES OTHER THAN ENGLISH)**

Signs are the primary means for control of access to areas where RF exposure levels may potentially exceed the MPE. It is recommended that additional signage be installed for the new antennas making people aware of the antennas locations. Also workers elevated above the roof or ground level should be made aware of the antennas locations. There are no fields in front of the proposed antennas and therefore barriers are not recommended.

Additionally, there are areas where workers elevated above the ground may be exposed to power densities greater than the general population and occupational limits. Workers and the general public should be informed about the presence and locations of antennas and their associated fields.

Additionally, access to this site is accomplished via a locked access gate as such, the general public is not able to access the rooftop.

**10.0 STATEMENT ON WHO PRODUCED THIS REPORT AND QUALIFICATIONS**

Please see the certifications attached in Appendix A below.

**11.0 FEDERAL COMMUNICATIONS COMMISSION (FCC) REQUIREMENTS**

The FCC has established Maximum Permissible Exposure (MPE) limits for human exposure to Radiofrequency Electromagnetic (RF-EME) energy fields, based on exposure limits recommended by the National Council on Radiation Protection and Measurements (NCRP) and, over a wide range of frequencies, the exposure limits developed by the Institute of Electrical and Electronics Engineers, Inc. (IEEE) and adopted by the American National Standards Institute (ANSI) to replace the 1982 ANSI guidelines. Limits for localized absorption are based on recommendations of both ANSI/IEEE and NCRP.

The FCC guidelines incorporate two separate tiers of exposure limits that are based upon occupational/controlled exposure limits (for workers) and general public/uncontrolled exposure limits for members of the general public.

**Occupational/controlled exposure limits** apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general public/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

**General public/uncontrolled exposure limits** apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment-related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Table I and Figure I (below), which are included within the FCC's OET Bulletin 65, summarize the MPE limits for RF emissions. These limits are designed to provide a substantial margin of safety. They vary by frequency to take into account the different types of equipment that may be in operation at a particular facility and are "time-averaged" limits to reflect different durations resulting from controlled and uncontrolled exposures.

The FCC's MPEs are measured in terms of power (mW) over a unit surface area (cm<sup>2</sup>). Known as the power density, the FCC has established an occupational MPE of 5 milliwatts per square centimeter (mW/cm<sup>2</sup>) and an uncontrolled MPE of 1 mW/cm<sup>2</sup> for equipment operating in the 1600 MHz and 1900 MHz frequency ranges. For the Sprint equipment operating at 800 MHz, the FCC's occupational MPE is 2.66 mW/cm<sup>2</sup> and an uncontrolled MPE of 0.53 mW/cm<sup>2</sup>. These limits are considered protective of these populations.

<b>Table I: Limits for Maximum Permissible Exposure (MPE)</b>
<b>(A) Limits for Occupational/Controlled Exposure</b>

Personal Communication (PCS) facilities used by Sprint in this area operate within a frequency range of 800-1900 MHz. Facilities typically consist of: 1) electronic transceivers (the radios or cabinets) connected to wired telephone lines; and 2) antennas that send the wireless signals created by the transceivers to be received by individual subscriber units (PCS telephones). Transceivers are typically connected to antennas by coaxial cables.

Because of the short wavelength of PCS services, the antennas require line-of-site paths for good propagation, and are typically installed above ground level. Antennas are constructed to concentrate energy towards the horizon, with as little energy as possible scattered towards the ground or the sky. This design, combined with the low power of PCS facilities, generally results in no possibility for exposure to approach Maximum Permissible Exposure (MPE) levels, with the exception of areas directly in front of the antennas.

### **Statement of Compliance**

A site is considered out of compliance with FCC regulations if there are areas that exceed the FCC exposure limits and there are no RF hazard mitigation measures in place. Any carrier which has an installation that contributes more than 5% of the applicable MPE must participate in mitigating these RF hazards.

### **12.0 LIMITATIONS**

This report was prepared for the use of Sprint Nextel. It was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same locale under like circumstances. The conclusions provided by EBI are based solely on the information provided by the client. The observations in this report are valid on the date of the investigation. Any additional information that becomes available concerning the site should be provided to EBI so that our conclusions may be revised and modified, if necessary. This report has been prepared in accordance with Standard Conditions for Engagement and authorized proposal, both of which are integral parts of this report. No other warranty, expressed or implied, is made

### **13.0 SUMMARY AND CONCLUSIONS**

EBI has prepared this Radiofrequency Emissions Compliance Report for the proposed Sprint telecommunications equipment at the site located at 1220 Pecten Court in Milpitas, California.

EBI has conducted theoretical modeling to estimate the worst-case power density from Sprint antennas and the other carriers' existing antennas to document potential MPE levels at this location and ensure that site control measures are adequate to meet FCC and OSHA requirements. As presented in the preceding sections, based on worst-case predictive modeling, there are no modeled exposures on any accessible ground-level walking/working surface related to proposed equipment in the area that exceed the FCC's occupational and general public exposure limits at this site. As such, the proposed Sprint project is in compliance with FCC rules and regulations.

Signage is recommended at the site as presented in Section 9.0. Posting of the signage brings the site into compliance with FCC rules and regulations.

RF-EME Compliance Report  
EBI Project No. 62112344

Site No. FS04XC191  
1220 Pecten Court, Milpitas, California

## **Appendix A**

### **Certifications**

RF-EME Compliance Report  
EBI Project No. 62112344

Site No. FS04XC191  
End of Pecten Court, Milpitas, California

Reviewed and Approved by:



A handwritten signature in black ink, appearing to read "H. Stockinger", written over the right side of the professional seal.

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Herbert J. Stockinger, PE  
Senior Engineer

Note that EBI's scope of work is limited to an evaluation of the Radio Frequency – Electromagnetic Energy (RF-EME) field generated by the antennas and broadcast equipment noted in this report. The engineering and design of the building and related structures, as well as the impact of the antennas and broadcast equipment on the structural integrity of the building, are specifically excluded from EBI's scope of work.

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EBI Consulting

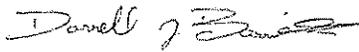
RF-EME Compliance Report  
EBI Project No. 62112344

Site No. FS04XC191  
1220 Pecten Court, Milpitas, California

## Preparer Certification

I, Darrell Barrick, state that:

- I am an employee of EnviroBusiness Inc. (d/b/a EBI Consulting), which provides RF-EME safety and compliance services to the wireless communications industry.
- I have successfully completed RF-EME safety training, and I am aware of the potential hazards from RF-EME and would be classified "occupational" under the FCC regulations.
- I am familiar with the FCC rules and regulations as well as OSHA regulations both in general and as they apply to RF-EME exposure.
- I have reviewed the data provided by the client and incorporated it into this Site Compliance Report such that the information contained in this report is true and accurate to the best of my knowledge.



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RF-EME Compliance Report  
EBI Project No. 62112344

Site No. FS04XC191  
1220 Pecten Court, Milpitas, California

**Appendix B**  
**Roofview® Export File**

Map, Settings, Antenna, and Symbol Data Table .. Exported from workbook -> Roof View RF Template\_Sprint Cor  
 Done on 12/19/2011 at 12:12:49 PM.  
 Use this format to prepare other data sets for the RoofView workbook file.  
 You may use as many rows in this TOP header as you wish.  
 The critical point are the cells in COLUMN ONE that read 'Start...' (eg. StartMapDefinition)  
 If used, these (4) headers are required to be spelled exactly, as one word (eg. StartMapDefinition)  
 The very next row will be considered the start of that data block.  
 The first row of the data block can be a header (as shown below), but this is optional.  
 When building a text file for import, Add the Map info first, then the Antenna data, followed by the symbol data.  
 All rows above the first marker line 'Start...' will be ignored, no matter how many there are.  
 This area is for you use for documentation.  
 End of help comments.

You can place as much text here as you wish as long as you don't place it below  
 the Start Map Definition row below the blue line.  
 You may insert more rows using the Insert menu.  
 Should you need additional lines to document your project, simply insert additional rows  
 by highlighting the row number adjacent to the blue line below and then clicking on the Insert menu  
 and selecting rows.

StartMapDefinition		Roof Max X	Roof Max Y	Map Max X	Map Max Y	Offset	X Offset	Number of envelope	List Of Areas												
StartMapDefinition		170	160	180	170	10	10	1	SUS41:5FK	SUS41:5FK	SUS41:5FK	SUS41:5FK	SUS41:5FK	SUS41:5FK	SUS41:5FK	SUS41:5FK	SUS41:5FK	SUS41:5FK	SUS41:5FK	SUS41:5FK	SUS41:5FK
Standard	Method	Uptime	Scale	Factor	Low Thr	Low Color	Mid Thr	Mid Color	Hi Thr	Hi Color	Over Color	Ap Ht	Mult	Ap Ht Method							
4	2	3	1	100	1	500	4	S000	2	3	1.5	1									
StartAntennaData		It is advisable to provide an ID (ant 1) for all antennas																			
ID	Name	Freq (MHz)	Trans Power	Trans Count	Coax Len	Coax Type	Other Loss	Input Power	Calc Power	Mfg	Model	X (ft)	Y (ft)	Z (ft)	Type	Aper (ft)	dBd Gain	BWdth Pt Dir	Uptime Profile	ON flag	
SPT A1	Sprint	800	20	1	3	1/2 LDF	0.5		17.53194	KMW	ET-X-TS-90-14-90-17-IR	16	22	37	6	11.9	90,0	90,0	90,0	ON*	
SPT A1	Sprint	1900	20	2	3	1/2 LDF	0.5		35.06388	KMW	ET-X-TS-90-14-90-17-IR	16	22	37	6	14.9	90,0	90,0	90,0	ON*	
SPT A1	Sprint	1900	20	4	3	1/2 LDF	0.5		70.12776	KMW	ET-X-TS-90-14-90-17-IR	16	22	37	6	14.6	90,0	90,0	90,0	ON*	
SPT A2	Sprint	1600	20	1	3	1/2 LDF	0.5		17.53194	KMW	H2-X-LU-90-16-IR	20	21	37	6	13.9	90,0	90,0	90,0	ON*	
SPT B1	Sprint	800	20	1	3	1/2 LDF	0.5		17.53194	KMW	ET-X-TS-90-14-90-17-IR	20	18	37	6	11.9	90,120	90,120	90,120	ON*	
SPT B1	Sprint	1900	20	2	3	1/2 LDF	0.5		35.06388	KMW	ET-X-TS-90-14-90-17-IR	20	18	37	6	14.9	90,120	90,120	90,120	ON*	
SPT B1	Sprint	1900	20	4	3	1/2 LDF	0.5		70.12776	KMW	ET-X-TS-90-14-90-17-IR	20	18	37	6	14.6	90,120	90,120	90,120	ON*	
SPT B2	Sprint	1600	20	1	3	1/2 LDF	0.5		17.53194	KMW	H2-X-LU-90-16-IR	17	15	37	6	13.9	90,120	90,120	90,120	ON*	
SPT C1	Sprint	800	20	1	3	1/2 LDF	0.5		17.53194	KMW	ET-X-TS-72-16-65-19-IR	14	16	37	6	14.9	72,240	72,240	72,240	ON*	
SPT C1	Sprint	1900	20	2	3	1/2 LDF	0.5		35.06388	KMW	ET-X-TS-72-16-65-19-IR	14	16	37	6	16.9	65,240	65,240	65,240	ON*	
SPT C1	Sprint	1900	20	4	3	1/2 LDF	0.5		70.12776	KMW	ET-X-TS-72-16-65-19-IR	14	16	37	6	16.9	65,240	65,240	65,240	ON*	
SPT C2	Sprint	1600	20	1	3	1/2 LDF	0.5		17.53194	KMW	H2-X-LU-65-17-IR	13	20	37	6	15.4	65,240	65,240	65,240	ON*	
UNK1 A	Unknown	850	100	1					50.11872	Unknown	Unknown	17	20	46.5	3.5	12	63,0	63,0	63,0	ON*	
UNK1 B	Unknown	850	100	1					50.11872	Unknown	Unknown	17	17	46.5	3.5	12	63,0	63,0	63,0	ON*	
UNK1 C	Unknown	850	100	1					50.11872	Unknown	Unknown	15	18	46.5	3.5	12	63,0	63,0	63,0	ON*	
StartSymbolData																					
Sym	Map Mark	Roof X	Roof Y	Map Label	Description ( notes for this table only )																
Sym		5	35	AC Unit	Sample symbols																
Sym		14	5	Roof Access																	
Sym		45	5	AC Unit																	
Sym		45	20	Ladder																	