

APPENDIX 3.5-A: PRE-CONSTRUCTION ELECTROMAGNETIC MEASUREMENT SURVEY ALONG THE SAN FRANCISCO TO SAN JOSE PROJECT SECTION

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Introduction

This appendix documents measurement results from a pre-construction electromagnetic survey of locations along the San Francisco San Jose Project Section (Project Section, or project). The purpose of the survey was to: (1) provide a baseline characterization of the existing electromagnetic environment, (2) allow comparisons with the expected electromagnetic footprint from the planned California High-Speed Rail (HSR) System, and (3) provide guidance for electromagnetic compatibility requirements by defining the typical electromagnetic environment that the HSR system must operate in without interference.

Analysts reviewed land uses, existing facilities, and infrastructure along the alignment and evaluated a list of approximately 70 candidate sites. This review concentrated on identifying potentially electromagnetic interference (EMI)–sensitive facilities as well as existing electromagnetic field (EMF) sources such as power generation, power distribution, and communications facilities. The selection criteria, taken from Technical Memorandum (TM) 3.4.11, *Measurement Procedure for Assessment of CHSTP Alignment EMI Footprint* (Authority 2010), favored providing a balanced coverage of:

- The geographic extent of the segment
- High-emission sites
- Low-emission sites
- Sites with high-sensitivity receptors

A final group consisting of 14 sites was selected based upon the above considerations and to provide representative coverage of land uses. At each of these sites, analysts conducted two types of measurements—one measuring radiated electric fields and the second measuring background direct current (DC) and power frequency magnetic fields. To characterize the radio frequency (RF) environment, analysts measured radiated electric fields from 10 kilohertz (kHz) to 6 gigahertz (GHz) using an RF spectrum analyzer and calibrated antennas. Expected sources of RF signals include:

- Cell towers (cellular telephone)
- Broadcast towers (radio and television broadcasts)
- Airport radars and aircraft communications equipment
- General high-frequency and very-high-frequency fixed and mobile communications systems (e.g., police, fire, emergency medical technician, utilities, and government)
- Local wireless (wireless fidelity [WiFi] and Worldwide Interoperability for Microwave Access)

Analysts also measured background DC and power frequency magnetic fields along the alignment, and recorded these magnetic fields using a three-axis fluxgate sensor with a waveform recording data acquisition system. Expected sources of DC and low-frequency magnetic fields include:

- The geomagnetic field
- High-voltage transmission lines
- Electric distribution lines
- Traction power distribution facilities
- Geomagnetic perturbations due to passing vehicles and trains

The facilities most sensitive to shifts in the DC (geomagnetic perturbations) and alternating current (AC) magnetic fields are:

- High technology semiconductor (e.g., electron microscopes [transmission electron microscopes/scanning electron microscopes], electron-beam lithography, ion-writing systems, focused ion-beam systems)
- High technology biology (e.g., nuclear magnetic resonance, magnetic resonance imaging [MRI], and electron microscopes)
- Medical imaging (e.g., computed tomography [CT] scanners, MRI systems)

- University research (instrumentation for chemistry, physics, electrical engineering, and similar systems to those mentioned for high technology and medical facilities).

Test Procedures and Equipment

Analysts characterized the RF environment along the Project Section by measuring the prevailing electric field strength at each of 14 test sites, over the frequency range from 10 kHz to 6 GHz. The RF and magnetic field measurements were performed between July 18, 2016 and July 22, 2016. Measurements were made using a vertical monopole antenna (AH Systems SAS-550-1) for the frequency range from 10 kHz to 30 megahertz (MHz), and a broadband biological antenna (AH Systems SAS-521-7) for the frequency range from 25 MHz to 6 GHz, connected to an Anritsu MS2721B Spectrum Analyzer. Measurements were made in eight contiguous frequency bands and recorded per Section 6.4 of TM 3.4.11. Where practical, the RF antennas were located approximately 50 feet from the project alternatives.

Electric field measurement files from the spectrum analyzer include both min-hold and max-hold levels as a function of frequency across each of the measurement bands, and a complete file set will be preserved for each measurement location. Reported results include the low-frequency measurements with the omni-directional vertical monopole, plus measurements with the biological antenna in both horizontal and vertical positions, first facing the proposed alignment, and then in the direction that exhibited the maximum signal strength in each measurement band.

The magnetic field measurements characterized the prevailing background magnetic field levels as well as the temporal variations caused by the passing of trains on the existing right-of-way. Measurements were made at two positions at each site, separated by approximately 30 feet. The magnetic field measurements were performed using a pair of three-axis 5-gauss Bartington fluxgate sensors (bandwidth DC to 3 kHz), connected to National Instruments data acquisition system. Magnetic field waveforms were recorded so that DC and full frequency information is available over the entire sensor bandwidth.

Overview of the Measurement Results

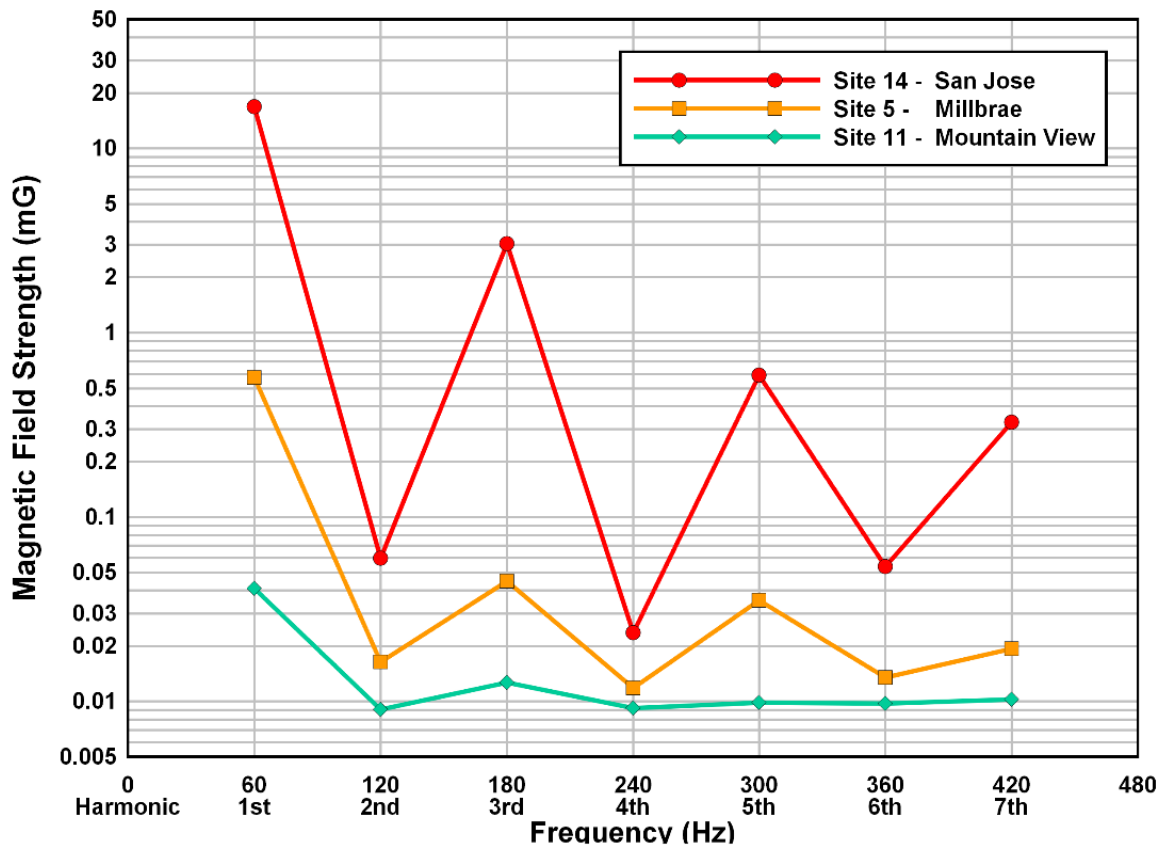
Magnetic Fields

The measured DC magnetic field strengths ranged from 310 to 500 milligauss (mG) across the 14 sites. At individual sites, the differences in field strength between the two sensors ranged from 0.4 to 79 mG. Site 10 (Urban Lane/Wells Avenue, Palo Alto) was the exception, showing a difference of 170 mG due to a steel fence very close to one of the magnetometers. For sites where the magnetometers were located close to the existing Caltrain tracks, fluctuations in DC level were distinctly noticeable during train passbys. At Site 9 (Fair Oaks Lane/Dinkelspiel Station Lane, Atherton) the magnetometers were approximately 16 feet from the nearest track centerline, and the DC levels changed roughly 50 mG during passbys. These fluctuations diminished rapidly with distance—at Site 3 (Bayshore Boulevard/Van Waters Road, Brisbane), fluctuations were on the order of 5 mG at 50 feet from the nearest track centerline, while fluctuations of just 2 mG were observed at Site 2 (Bayshore Boulevard/Valley Drive, Brisbane) at 65 feet from the nearest track centerline.

AC magnetic field strengths at the 14 sites varied over a range of more than two orders of magnitude, from 0.04 mG to 21 mG. The levels depend almost entirely on a site's proximity to power lines (medium-voltage distribution and high-voltage transmission lines) and other electrical system infrastructure. Such a range in observed magnetic field strengths is expected, due to the rapid decrease in magnetic field strength as you move away from these sources.

Figure 1 provides an illustration of the measured AC magnetic field strengths for three sites: a primarily residential area (Site 11, Franklin Street/Evelyn Avenue, Mountain View), a mixed residential and commercial area (Site 5, Monterey Street/Madrone Street, Millbrae), and an industrial area in close proximity to high-voltage transmission lines (Site 14, Montgomery/Otterson Street, San Jose). These sites cover the full range of observed magnetic field strengths, with Site 11 the lowest, Site 14 the highest, and Site 5 representing the median

level. Levels are plotted for the 60-hertz (Hz) fundamental and the second through seventh harmonics. The large range of observed levels, which vary by nearly a factor of 400, is typical.



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Figure 1 Maximum Magnetic Field Strengths for Three Representative Sites

Electric Fields

Because of the very broad range of frequencies of interest, the electric field measurements at each site were divided into eight overlapping frequency bands to provide adequate frequency resolution in each band. Table 1 summarizes the maximum magnitude of the measured electric field values, by frequency band for each survey site.

The resource study area (RSA) is highly developed and includes a large number of RF sources. Over 40 television and radio (AM and FM broadcast) transmitters were identified within 2 miles of the project alignment. In addition, there are hundreds of cellular communications towers and point-to-point microwave links operating in the region, as well as a significant number of intermittent fixed and mobile RF sources. This activity results in remarkably uniform and relatively high background levels within the RSA over much of the RF spectrum.

Table 1 Maximum Measured Radio Frequency Field Strengths by Frequency Band

Measurement Site	Band 0 10–50 kHz	Band 1 50–550 KHz	Band 2 .50–3.0 MHz	Band 3 2.5–7.5 MHz	Band 4 5.0–30 MHz	Band 5 25–200 MHz	Band 6 0.20–2.2 GHz	Band 7 2.0–6.0 GHz
San Francisco to South San Francisco Subsection								

Measurement Site	Band 0 10–50 kHz	Band 1 50–550 KHz	Band 2 .50–3.0 MHz	Band 3 2.5–7.5 MHz	Band 4 5.0–30 MHz	Band 5 25–200 MHz	Band 6 0.20–2.2 GHz	Band 7 2.0–6.0 GHz
1 – San Francisco	140.3	123.9	140.7	112.8	93.7	115.8	123.1	111.0
2 – Brisbane	137.0	126.2	137.3	113.1	100.1	123.7	104.5	95.4
3 – Brisbane	143.6	126.0	139.2	119.7	96.0	107.6	111.4	105.6
4 – South San Francisco	140.4	129.2	142.6	122.8	93.5	99.3	105.5	105.3
San Bruno to San Mateo Subsection								
5 – San Bruno	134.1	122.8	139.2	111.0	101.8	111.4	119.8	100.7
6 – Burlingame	137.2	142.7	142.7	114.6	88.3	112.7	108.1	109.3
San Mateo to Palo Alto Subsection								
7 – San Carlos	134.0	126.6	145.3	129.4	98.9	93.2	97.1	91.3
8 – Redwood City	133.2	126.5	144.8	127.0	94.9	101.0	130.4	116.7
9 – Atherton	131.9	128.8	143.7	120.3	91.5	88.6	127.2	100.1
10 – Palo Alto	140.2	128.7	143.1	117.7	91.3	96.0	105.1	97.2
Mountain View to Santa Clara Subsection								
11 – Mountain View	142.6	127.3	144.7	122.6	90.5	120.0	103.5	85.5
12 – Sunnyvale	141.2	125.1	144.8	121.3	92.0	101.0	98.3	87.0
San Jose Diridon Station Approach Subsection								
13 – San Jose	135.1	128.4	143.5	128.4	101.7	119.0	122.9	114.4
14 – San Jose	146.7	124.4	145.0	122.5	97.1	110.6	118.7	112.3

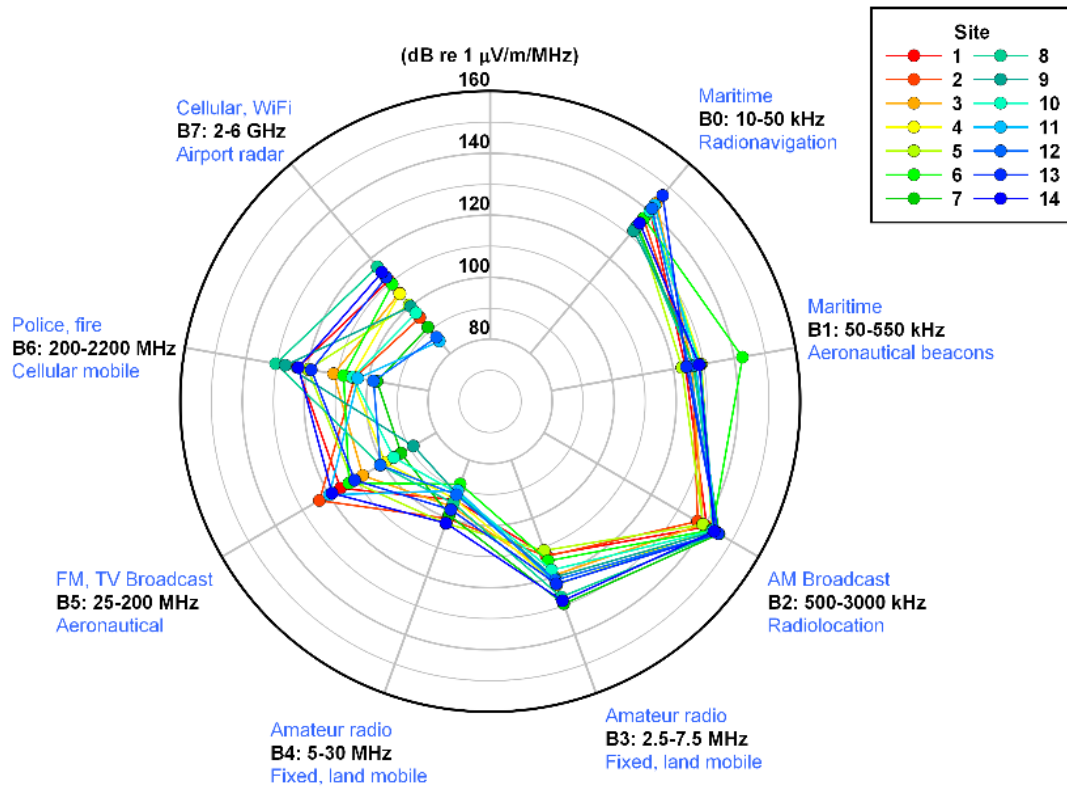
GHz = gigahertz

kHz = kilohertz

MHz = megahertz

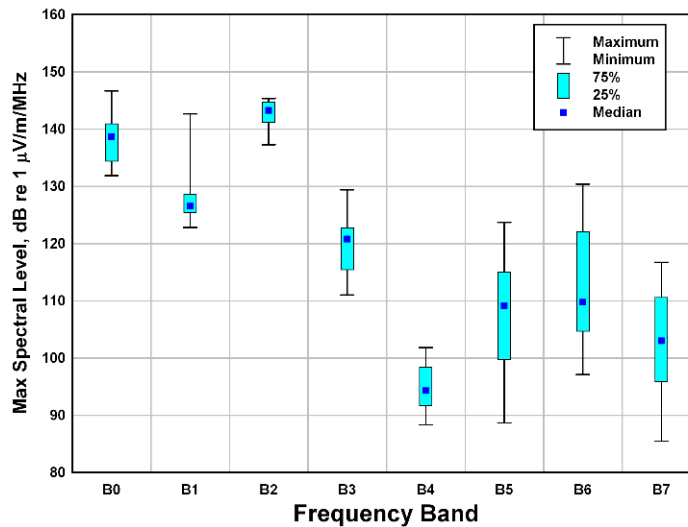
Field strength values are in decibels, referenced to 1 microvolt meter/MHz

Figure 2 graphically illustrates the maximum measured electric field strengths by frequency band for the 14 measurement sites, as well as the typical spectrum uses in each frequency band. Because of the well-developed nature of the region, the band-by-band measured field strengths were relatively consistent, with only a few sites falling more than 10 decibels from the mean in any given frequency band. Figure 3 illustrates the variance in RF field strengths across the 14 sites, by frequency band, and Figure 4 illustrates the maximum measured electric field strengths.



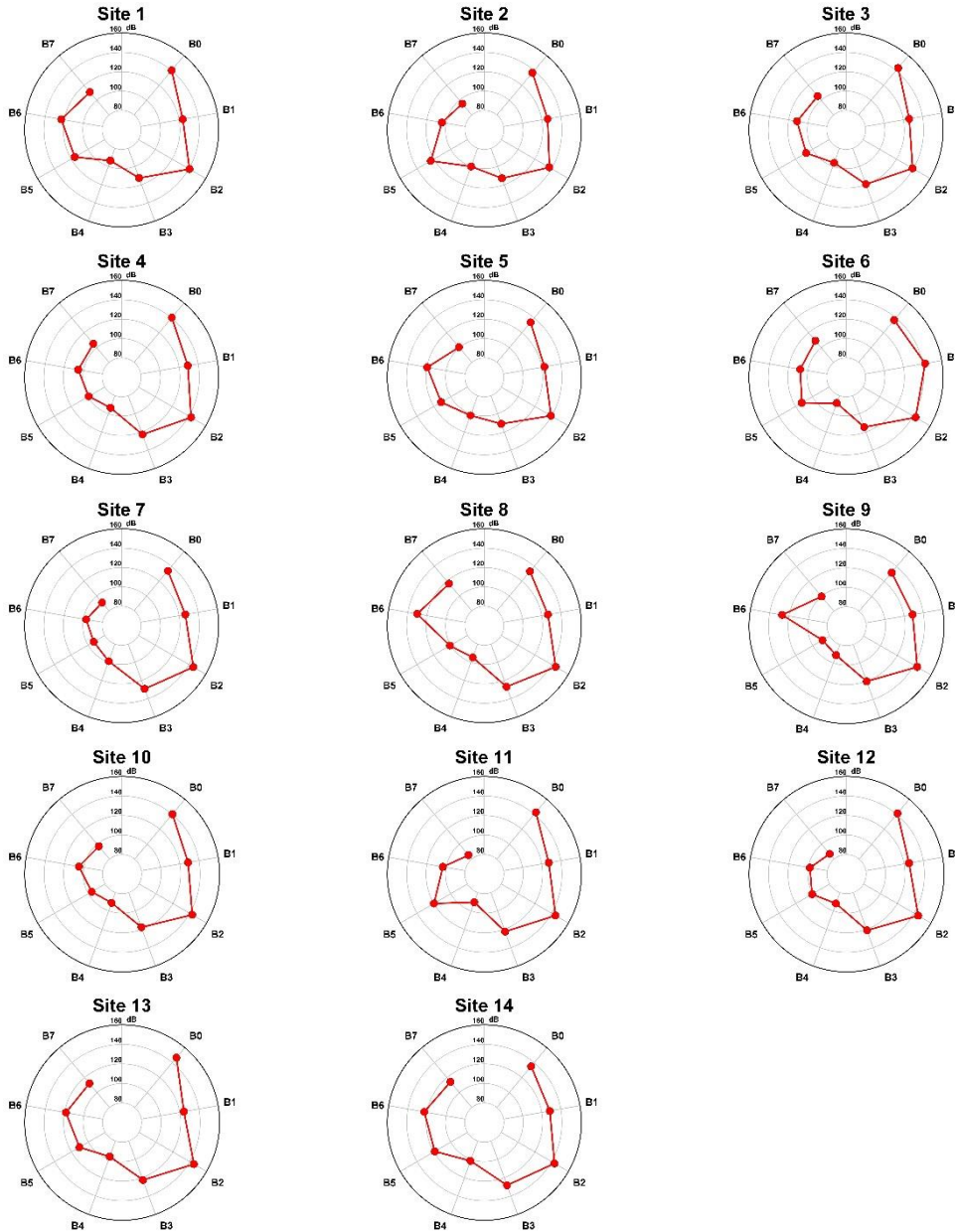
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Figure 2 Maximum Electric Field Strengths by Frequency Band



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Figure 3 Variation in Measured Maximum Electric Field Strengths



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Figure 4 Maximum Measured Electric Field Strengths

Individual Site Observations

The following provides a brief summary of the EMF measurements conducted at each site. Complete measurement results are plotted and tabulated in Site Photographs and Measurement Data.

Site 1 (C Street/Owens Street, San Francisco)

This measurement site is in a heavily developed area adjacent to the existing Caltrain right-of-way, Interstate (I-) 280, and the University of California San Francisco Mission Bay Medical Center in the Mission Bay neighborhood of San Francisco. Overall magnitudes of DC magnetic fields at this site are influenced by nearby steel objects. The small DC field variations observed

were produced by passing vehicles on the closest side street that parallels I-280 and the alignment. Step (or fixed, as opposed to transient) changes in the DC magnetic field were recorded when parked vehicles come or go. No significant AC sources are nearby.

Visual identification of nearby RF emitters was hindered by the number and size of the adjacent buildings. However, maximum RF field strengths in the most active bands were controlled by AM broadcast stations (measurement band B2), FM broadcast stations (band B5), and cellular communications services (bands B6 and B7).

Site 2 (Bayshore Boulevard/Valley Drive, Brisbane)

Site 2 is in Brisbane at a relatively undeveloped site in the parking area behind the Brisbane Fire Station located at the intersection of Bayshore Boulevard and Valley Drive, near the Tunnel Avenue overpass. No significant AC or DC sources are nearby. Relatively low DC and AC magnetic fields were recorded at this site.

Site 3 (Bayshore Boulevard/Van Waters Road, Brisbane)

This measurement site is in Brisbane, in a relatively low-density industrial area off Bayshore Boulevard near the Brisbane Lagoon and the existing Caltrain tracks. This site was considered during site selection as a likely “quiet” site in terms of EMI. Brief spikes in DC magnetic field observed at this location are due to Caltrain passbys. No significant AC sources are nearby this measurement site.

Site 4 (Gateway Boulevard/Oyster Point Boulevard, South San Francisco)

Site 4 is in South San Francisco in a medium-density commercial/light-industrial area, within the parking lot at the Gateway Research Park, which includes operators of magnetically sensitive equipment. Analysts observed variations in DC data at this site due to passing vehicles moving in and out of the parking lot. Transmission lines are located south of the site, but these AC sources are far enough away that measured AC field strengths were quite low.

Site 5 (Monterey Street/Madrone Street, San Bruno)

This measurement site is in residential neighborhood near the San Francisco International Airport (SFO), adjacent to the Bay Area Rapid Transit (BART) system. Very large swings in DC fields were produced by the flow of traction currents from BART operations. The BART tracks pass this location in a tunnel heading toward the Millbrae Station, and there is a traction power substation located approximately 0.35 mile south of the measurement site. Local AC fields are mainly associated with high-voltage and medium-voltage overhead distribution lines along Madrone Avenue.

Site 6 (Trousdale Drive/California Drive, Burlingame)

Site 6 is in Burlingame, across from Burlingame Police Station and medical offices that operate MRI and CT imaging systems along Trousdale Drive. Changes in DC fields were due to Caltrain passbys and passing vehicles in the parking lot and along California Drive. AC fields were generated by an overhead distribution line running along California Drive.

Site 7 (Old County Road/Inverness Drive, San Carlos)

This measurement site is on a residential street in San Carlos, adjacent to the existing Caltrain tracks. Surrounding land uses are largely residential and light commercial in nature. The variation in DC fields at this location was caused by vehicle traffic on Old County Road. AC fields were generated by an overhead distribution line.

Site 8 (Arguello Street/Brewster Avenue, Redwood City)

This measurement site is in Redwood City in an office/commercial area, along Arguello Street, which runs parallel and adjacent to the existing Caltrain tracks. Across the street from the measurement site is a medical facility that focuses on radiology. Small, transient DC field variations were recorded at this location due to traffic, as well as with step changes due arrival of parked cars. AC fields were generated by overhead distribution lines.

Site 9 (Fair Oaks Lane/Dinkelspiel Station Lane, Atherton)

Site 9 is adjacent to the Atherton Caltrain Station southbound platform, on the west side of the Caltrain corridor. The Atherton Police Department is located nearby, but otherwise there are few RF emitters in the vicinity of this measurement site. Very strong DC field spikes were observed at this location due to passing Caltrain trains while AC fields, aside from transients caused by the passing trains, are less than 0.5 mG.

Site 10 (Urban Lane/Wells Avenue, Palo Alto)

Site 10 is behind the Palo Alto Medical Center adjacent to the existing Caltrain tracks. The DC magnetic field magnitude at the first sensor was reduced greatly by a nearby steel fence. DC field variations were produced by passing Caltrain trains. AC fields of approximately 1 mG were associated with an overhead distribution line.

Site 11 (Franklin Street/Evelyn Avenue, Mountain View)

This measurement site is in Mountain View, near a facility that houses both the Mountain View Fire Department and Police Station. The site is within a largely residential area, and is approximately 1,000 feet west of the Mountain View Caltrain Station. A few small DC field variations were recorded due to local vehicle traffic on Evelyn Avenue. AC fields were extremely low (less than 0.1 mG) because there are no nearby local AC sources.

Site 12 (Kifer Road/San Lucar Court, Sunnyvale)

Site 12 is in Sunnyvale, adjacent to an analytical instrumentation company in a light industrial area. DC variations were recorded associated with vehicle traffic accessing parking lots. AC fields were generated by overhead distribution lines at the back of the parking lot, adjacent to the Caltrain tracks.

Site 13 (Newhall Street/Newhall Drive, San Jose)

This measurement site was south of the Avaya Stadium in San Jose and approximately 0.25 mile east of the San Jose International Airport. The surrounding areas is mixed commercial and residential, and a small electrical substation is located immediately southeast of the measurement site. DC magnetic fields were quiet at this location. AC magnetic fields were due to overhead distribution lines. Magnetic fields show some variation due to varying load currents on the power lines, including a step change near the middle.

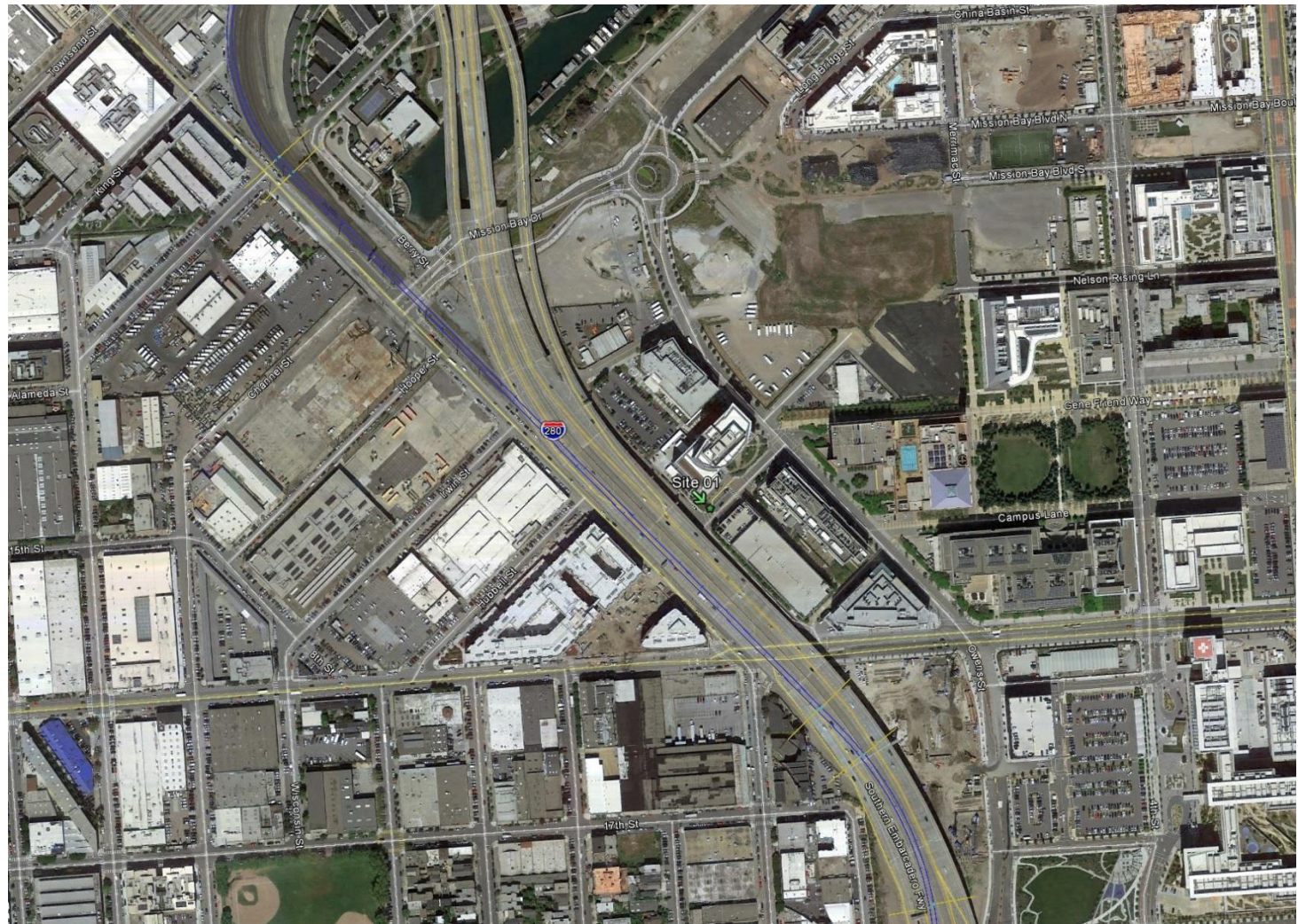
Site 14 (Montgomery Street/Otterson Street, San Jose)

This location was South of Diridon Station adjacent to the Pacific Gas and Electric Company (PG&E) Distribution Substation Surrounding land uses are industrial and high-density residential, with numerous high-voltage and medium-voltage electrical distribution lines nearby. DC magnetic fields were relatively constant with very small variations. The first sensor had a total magnitude comparable to expected ambient, but the second was lower, indicating influence from nearby steel objects. Multiple trains moved along the alignment, but on the opposite side of the substation, they were sufficiently distant for the DC fluctuations to be quite small. AC magnetic fields in the 10–20 mG range are produced by the substation bus conductors and the power lines connected to the substation.

Site Photographs and Measurement Data

This section provides photographs and measurement results from each site. For each site, the following information is provided:

- Aerial location map identifying the measurement site
- Photographs of measurement site and views
- Measured DC and AC magnetic field strengths
- Measured environmental RF levels for Bands 0–4, Band 5, Band 6, and Band 7



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Figure 5a Location 1: C Street/Owens Street, San Francisco

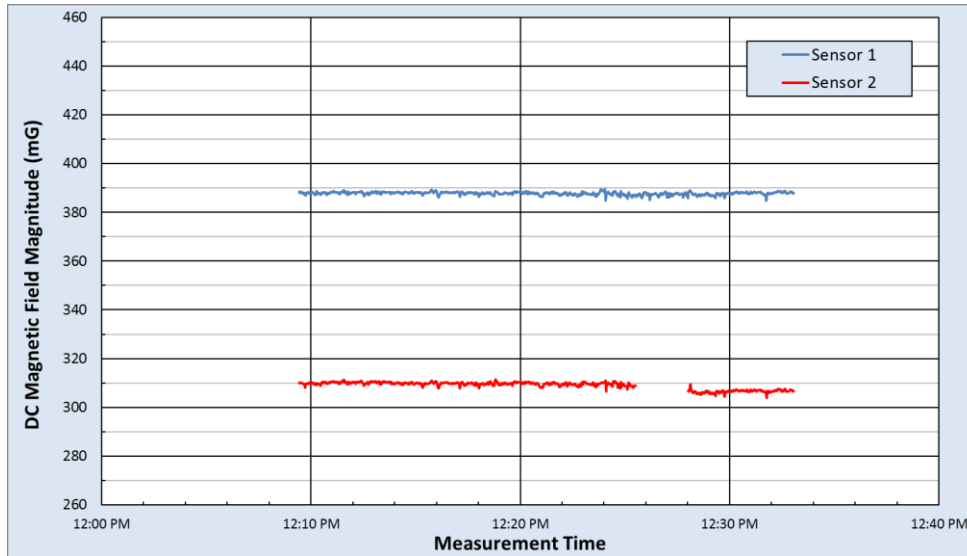
Urban setting near the existing rail alignment, nearby RF emitters obscured (Lat 37.767722°, Lon -122.395489°)



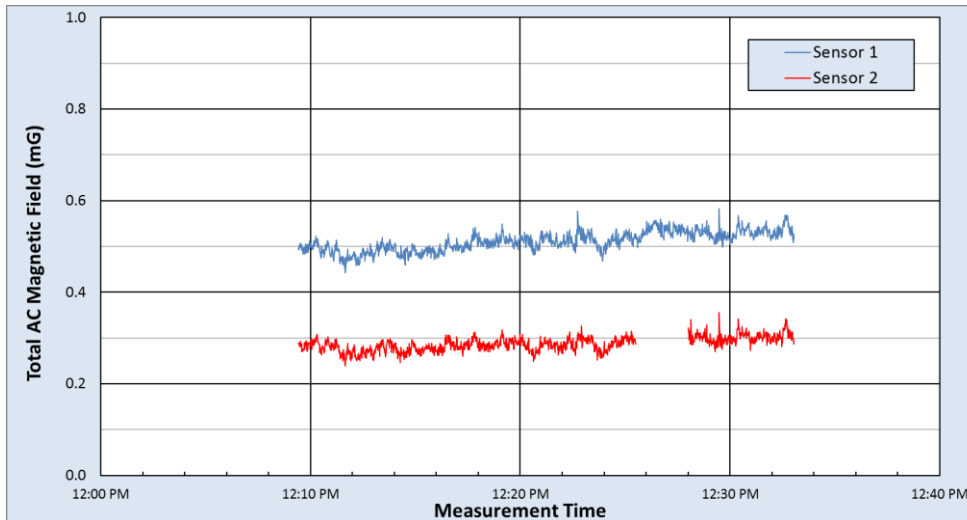
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Figure 5b Location 1: Measurement Location and Site Views

Photos depicting the site from the perspective of the RF measurement location. In the center is a satellite view, indicating the alignment (green line) and measurement points (red = RF, magenta = magnetometers). The satellite view is rotated so that the image at 0° faces the alignment.



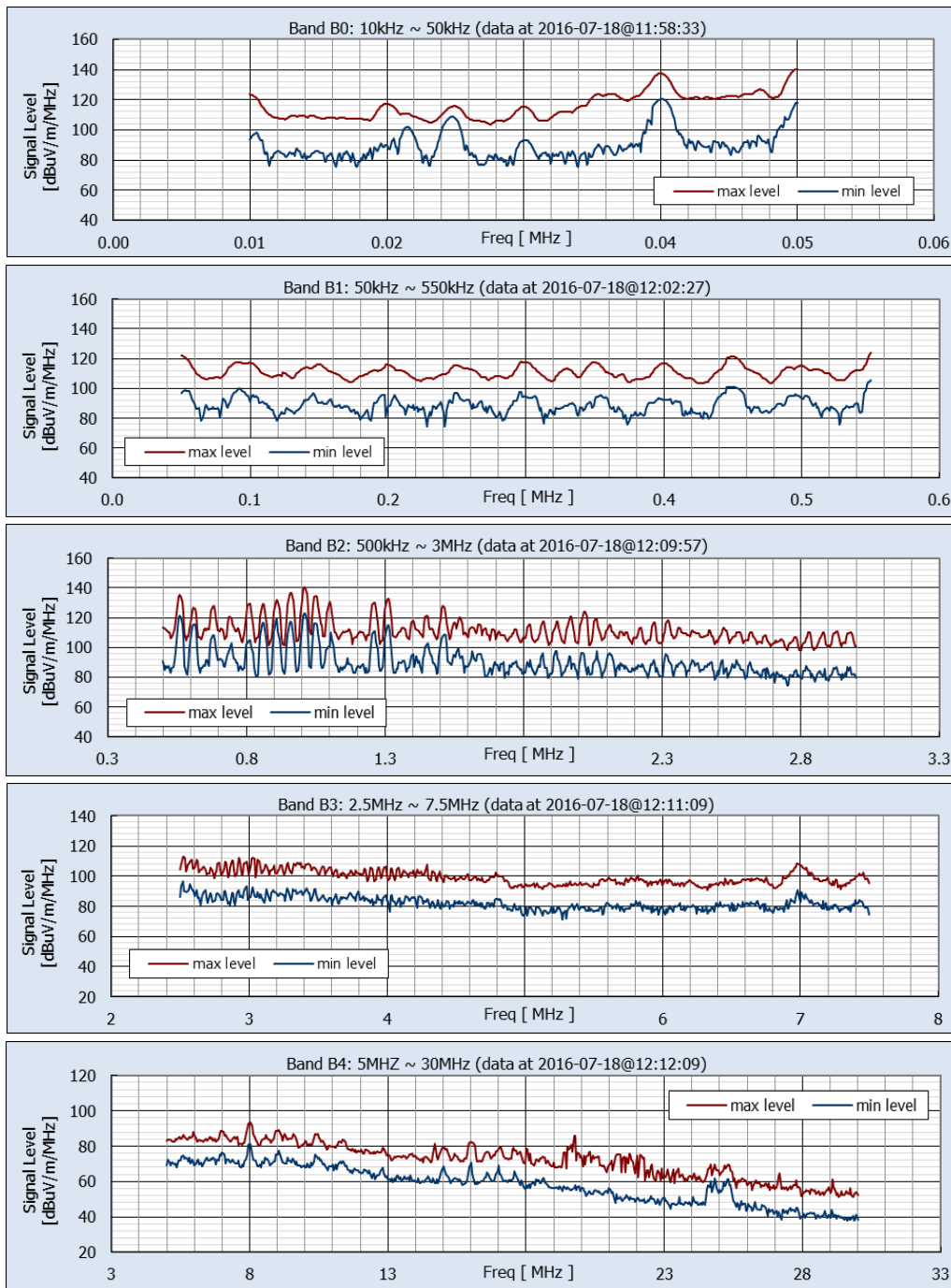
DC Magnetic Field Measurement Statistics						
	B Horizontal (mG)		B Vertical (mG)		B Total (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	271.2	172.5	283.3	267.9	389.5	311.4
Median	266.6	166.9	281.7	261.1	387.9	309.6
Min	264.0	151.5	278.1	257.7	384.8	303.9
Range	7.1	20.9	5.2	10.2	4.7	7.5
Std Dev	0.5	3.9	0.7	1.0	0.6	1.5



rms AC Magnetic Field Measurement Statistics																
	Fund 60Hz (mG)		2nd (mG)		3rd (mG)		4th (mG)		5th (mG)		6th (mG)		7th (mG)		Total AC (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	0.576	0.345	0.109	0.069	0.074	0.075	0.046	0.046	0.085	0.084	0.040	0.034	0.054	0.057	0.583	0.356
Median	0.502	0.272	0.017	0.016	0.050	0.048	0.014	0.014	0.063	0.060	0.015	0.015	0.033	0.034	0.511	0.287
Min	0.434	0.225	0.004	0.005	0.030	0.028	0.003	0.004	0.043	0.036	0.004	0.004	0.012	0.011	0.443	0.239
Range	0.141	0.120	0.105	0.065	0.044	0.047	0.043	0.042	0.041	0.048	0.036	0.030	0.042	0.046	0.140	0.117
Std Dev	0.022	0.016	0.006	0.005	0.006	0.006	0.004	0.004	0.007	0.007	0.004	0.004	0.006	0.006	0.022	0.015

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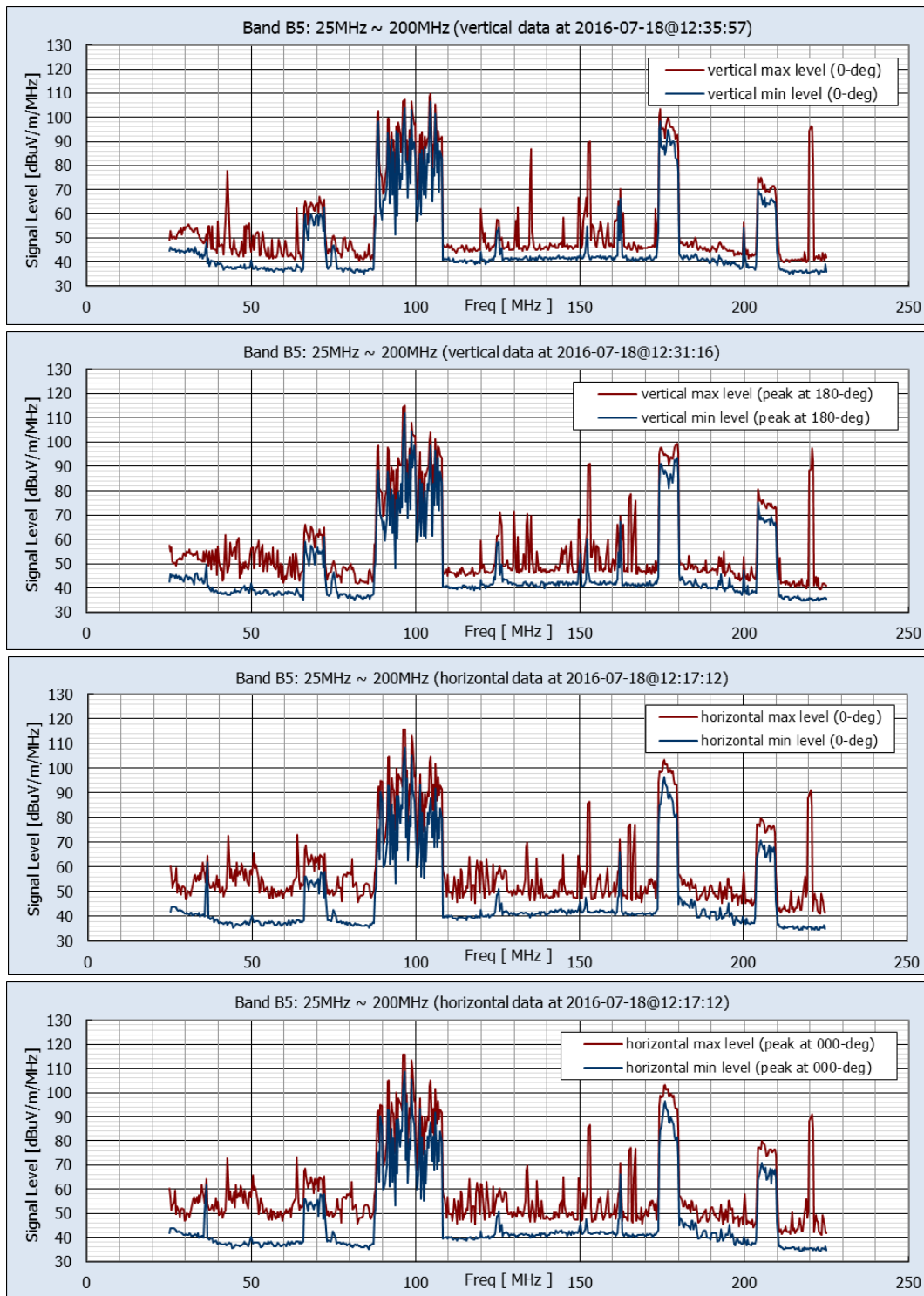
Figure 5c Location 1: Measured Direct Current and Alternating Current Magnetic Field Strengths



Maximum Levels					
Band number	Freq. Range (MHz)	Pk Min-Hold dB uV/m/MHz	@ Freq. (MHz)	Pk Max-Hold dB uV/m/MHz	@ Freq. (MHz)
B0	0.01 ~ 0.05	120.5	0.0401	140.3	0.0500
B1	0.05 ~ 0.55	105.2	0.5500	123.9	0.5500
B2	0.50 ~ 3.00	122.9	1.0091	140.7	1.0091
B3	2.5 ~ 7.5	96.3	2.5182	112.8	2.5273
B4	5 ~ 30	81.1	8.0000	93.7	8.0000

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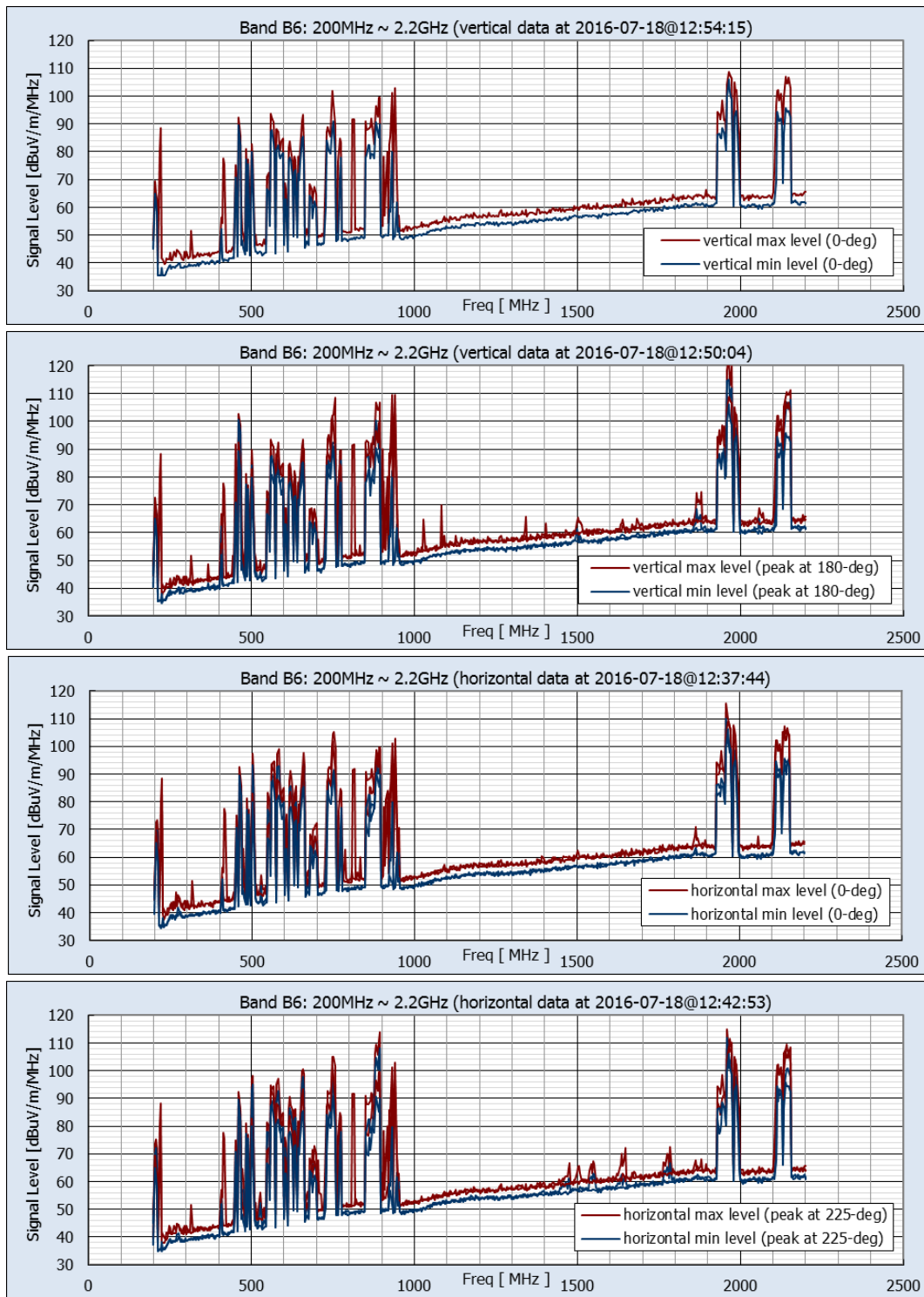
Figure 5d Location 1: Measured Environmental Radio Frequency Levels Non-Directional Data from Vertically Oriented Monopole Antenna, Bands 0–4



Maximum Levels									
Band number	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B5	25 ~ 200	111.9	96.636	114.8	96.636	108.5	96.636	115.8	96.273

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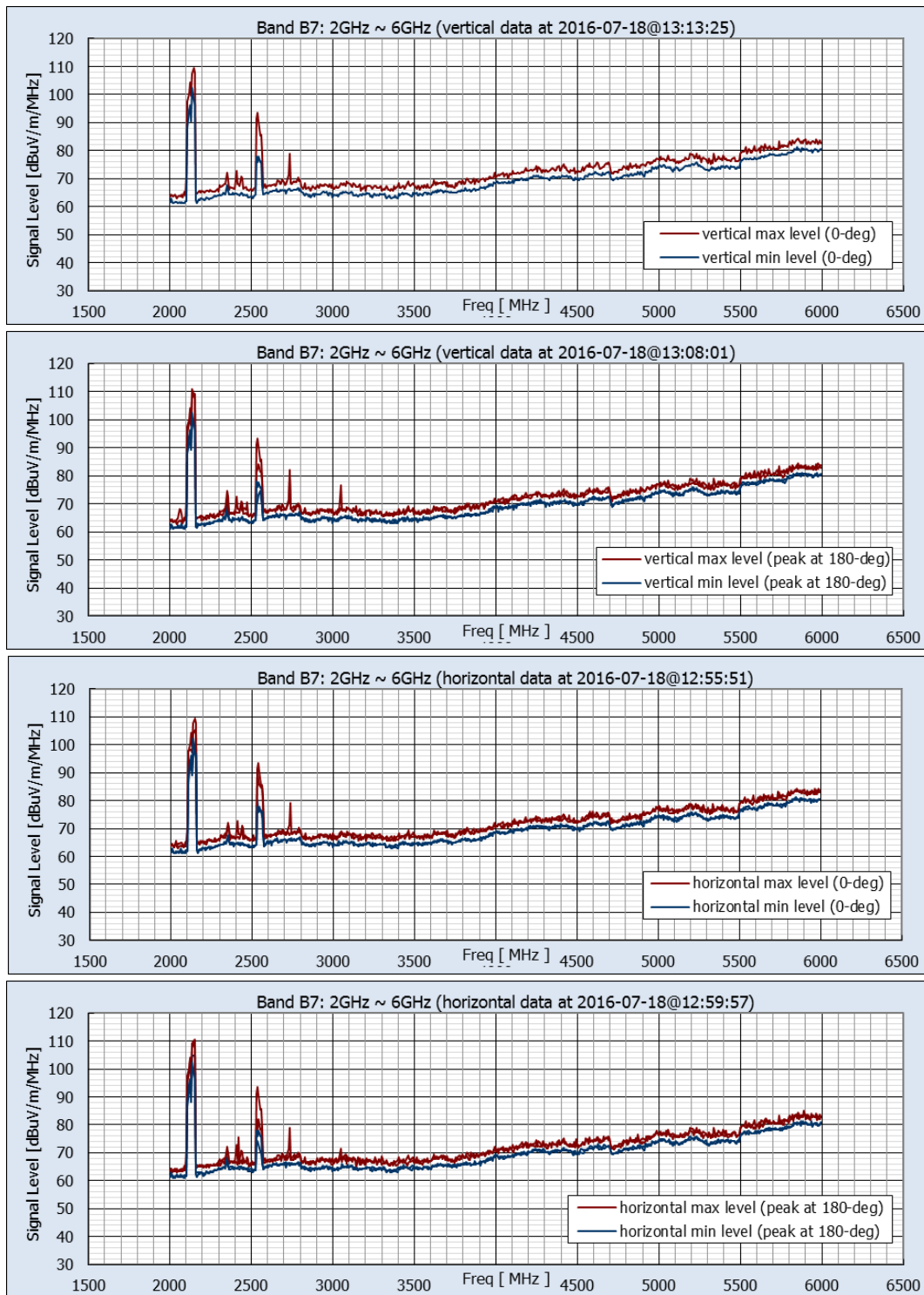
Figure 5e Location 1: Measured Environmental Radio Frequency Levels Band 5 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B6	200 ~ 2200	115.1	1963.636	123.1	1963.636	112.0	1960.000	115.5	1960.000

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Figure 5f Location 1: Measured Environmental Radio Frequency Levels Band 6 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B7	2000~6000	102.3	2138.182	111.0	2138.182	104.9	2145.455	110.6	2152.727

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Figure 5g Location 1: Measured Environmental Radio Frequency Levels Band 7 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



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Figure 6a Location 2: Bayshore Boulevard/Valley Drive, Brisbane

Adjacent to Brisbane Fire/Police Stations and existing rail (Lat 37.687718°, Lon -122.399457°)



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Figure 6b Location 2: Measurement Location and Site Views

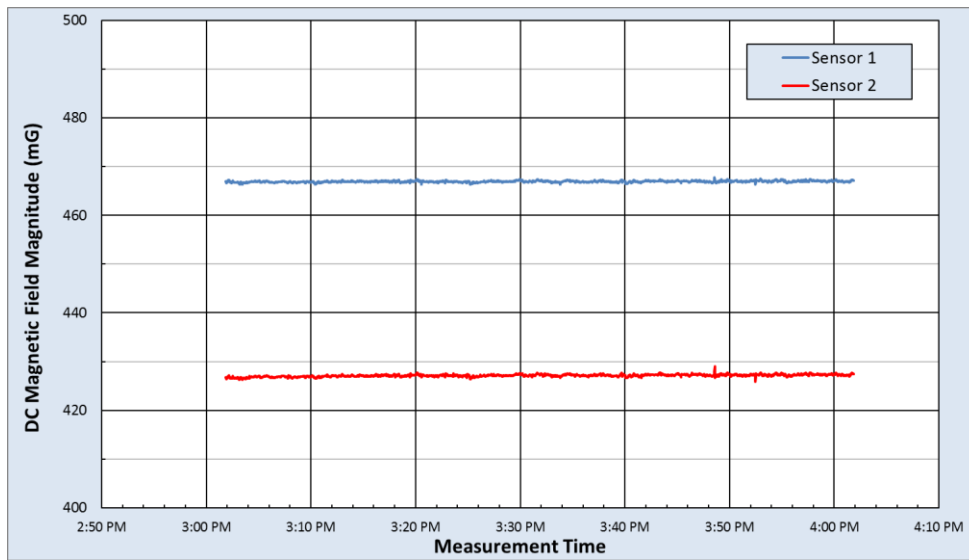
Photos depicting the site from the perspective of the RF measurement location. In the center is a satellite view, indicating the alignment (green line) and measurement points (red = RF, magenta = magnetometers). The satellite view is rotated so that the image at 0° faces the alignment.



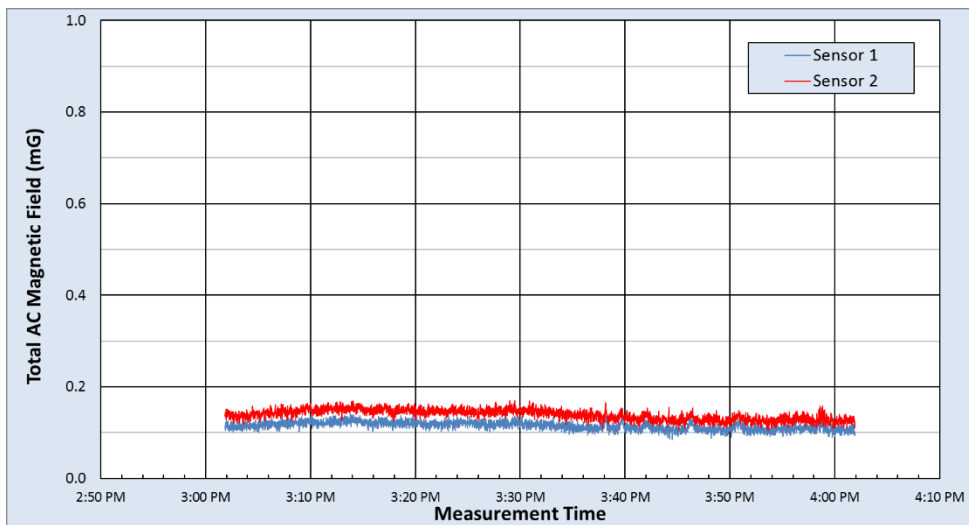
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Figure 6c Location 2: Local EMF Sources

Adjacent to the Brisbane Fire, Police station. Nearby emitters include fixed communications, high-voltage transmission lines. Photos depicting visible close-proximity emitters. Other emissions sources may exist but are not visible from the site.



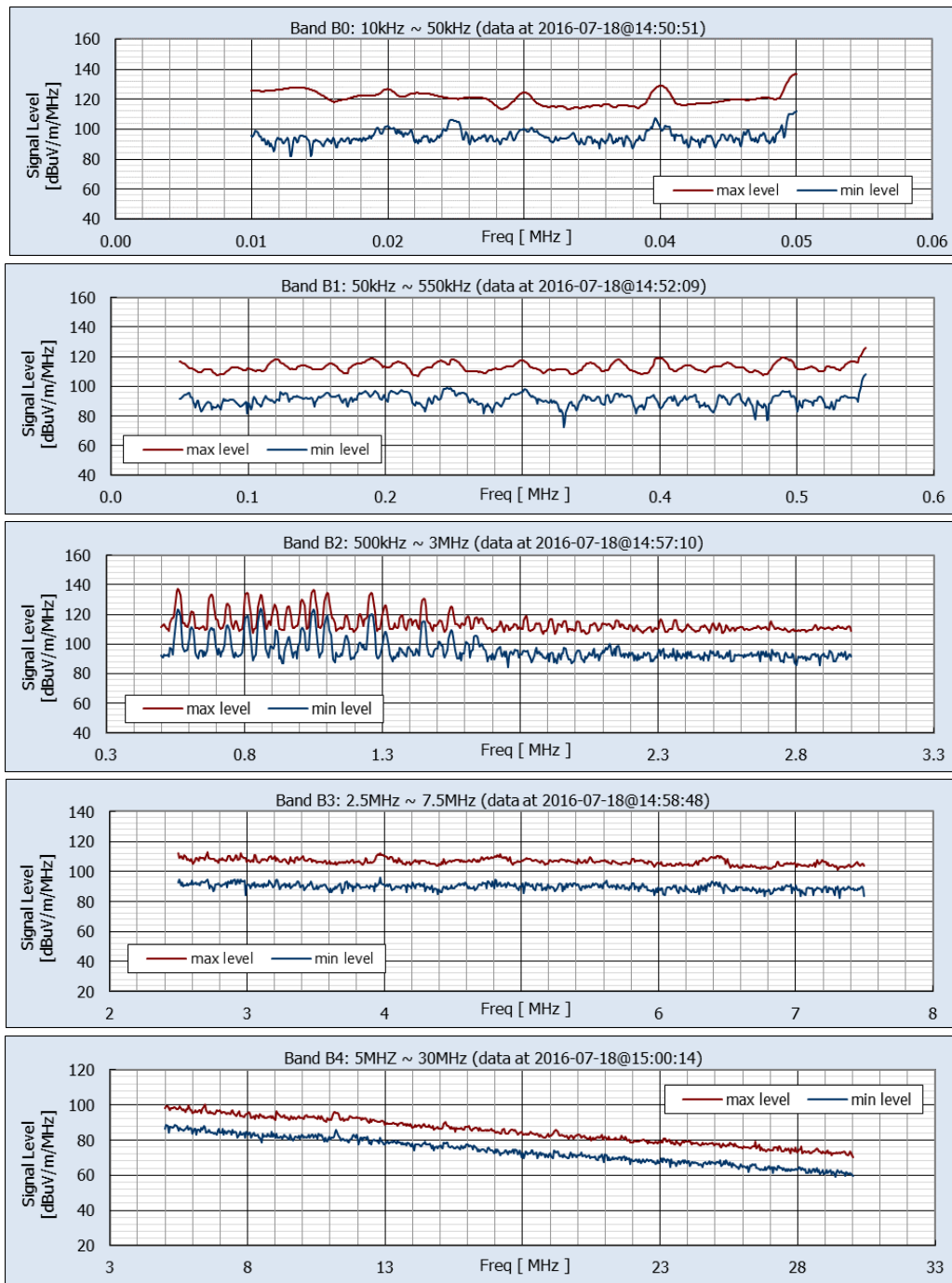
DC Magnetic Field Measurement Statistics						
	B Horizontal (mG)		B Vertical (mG)		B Total (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	224.5	239.3	416.0	357.4	467.8	429.0
Median	222.7	237.7	410.4	354.9	466.9	427.1
Min	211.6	235.8	409.0	353.5	466.3	425.9
Range	12.9	3.5	7.1	3.8	1.6	3.1
Std Dev	0.4	0.3	0.3	0.4	0.2	0.2



rms AC Magnetic Field Measurement Statistics																
	Fund 60Hz (mG)		2nd (mG)		3rd (mG)		4th (mG)		5th (mG)		6th (mG)		7th (mG)		Total AC (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	0.114	0.140	0.114	0.130	0.070	0.069	0.079	0.069	0.072	0.079	0.080	0.072	0.077	0.078	0.145	0.170
Median	0.084	0.105	0.067	0.083	0.016	0.017	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.115	0.140
Min	0.055	0.062	0.044	0.062	0.003	0.003	0.004	0.003	0.004	0.004	0.003	0.003	0.003	0.003	0.085	0.104
Range	0.059	0.078	0.071	0.068	0.067	0.067	0.075	0.065	0.068	0.074	0.078	0.069	0.074	0.074	0.059	0.066
Std Dev	0.011	0.015	0.006	0.007	0.007	0.007	0.006	0.006	0.007	0.007	0.006	0.006	0.006	0.006	0.009	0.012

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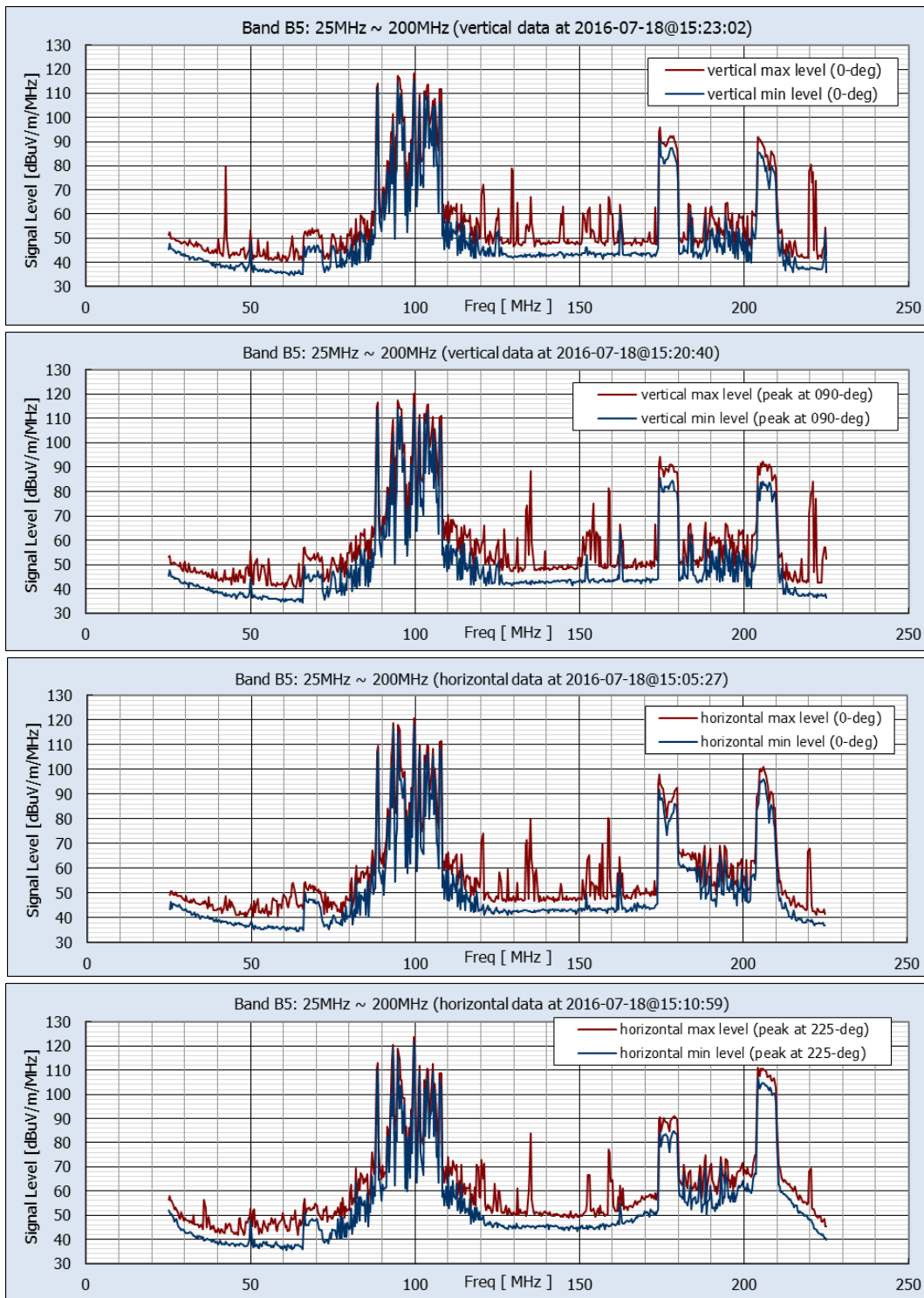
Figure 6d Location 2: Alternating Current and Direct Current Magnetic Field Measurement Results



Maximum Levels					
Band number	Freq. Range (MHz)	Pk Min-Hold dB uV/m/MHz	@ Freq. (MHz)	Pk Max-Hold dB uV/m/MHz	@ Freq. (MHz)
B0	0.01 ~ 0.05	112.2	0.0500	137.0	0.0500
B1	0.05 ~ 0.55	108.4	0.5500	126.2	0.5500
B2	0.50 ~ 3.00	123.7	0.8591	137.3	0.5591
B3	2.5 ~ 7.5	95.9	3.9727	113.1	2.7091
B4	5 ~ 30	88.6	5.0455	100.1	6.4545

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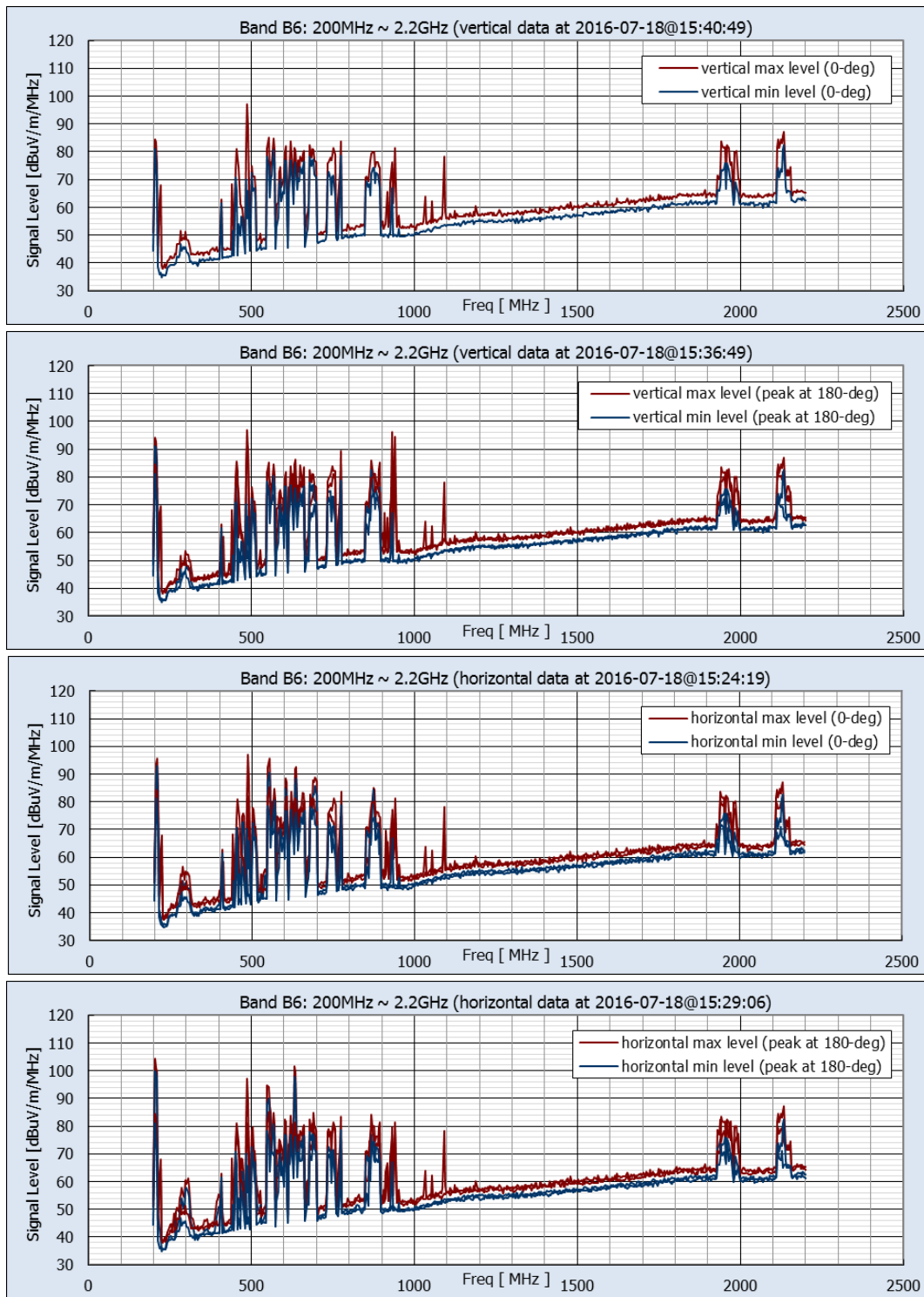
Figure 6e Location 2: Measured Environmental Radio Frequency Levels Non-Directional Data from Vertically Oriented Monopole Antenna, Bands 0–4



Maximum Levels									
Band number	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B5	25 ~ 200	115.5	99.545	120.2	99.545	121.6	99.545	123.7	99.545

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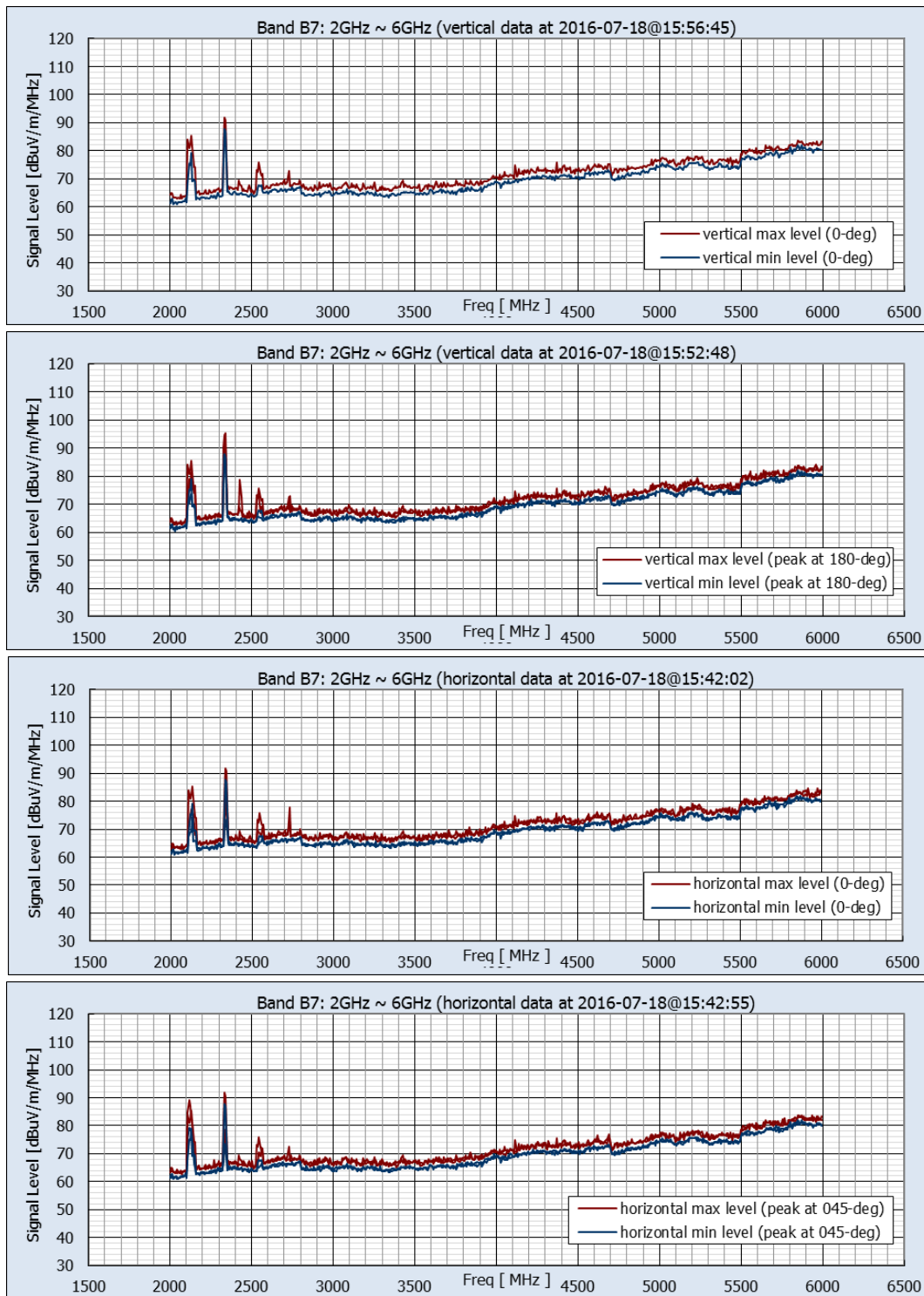
Figure 6f Location 2: Measured Environmental Radio Frequency Levels Band 5 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B6	200 ~ 2200	90.9	203.636	97.0	487.273	99.8	203.636	104.5	203.636

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Figure 6g Location 2: Measured Environmental Radio Frequency Levels Band 6 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B7	2000~6000	89.3	2341.818	95.4	2341.818	79.4	2116.364	89.3	2116.364

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Figure 6h Location 2: Measured Environmental Radio Frequency Levels Band 7 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



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Figure 7a Location 3: Bayshore Boulevard/Van Waters Road, Brisbane
Open site with relatively few local emitters (Lat 37.681158°, Lon -122.393923°)



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Figure 7b Location 3: Measurement Location and Site Views

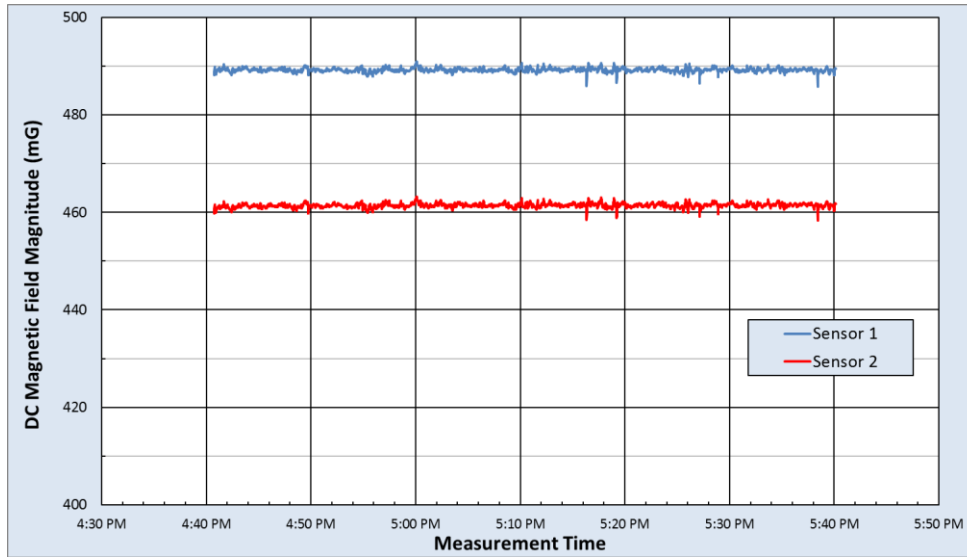
Photos depicting the site from the perspective of the RF measurement location. In the center is a satellite view, indicating the alignment (green line) and measurement points (red = RF, magenta = magnetometers). The satellite view is rotated so that the image at 0° faces the alignment.



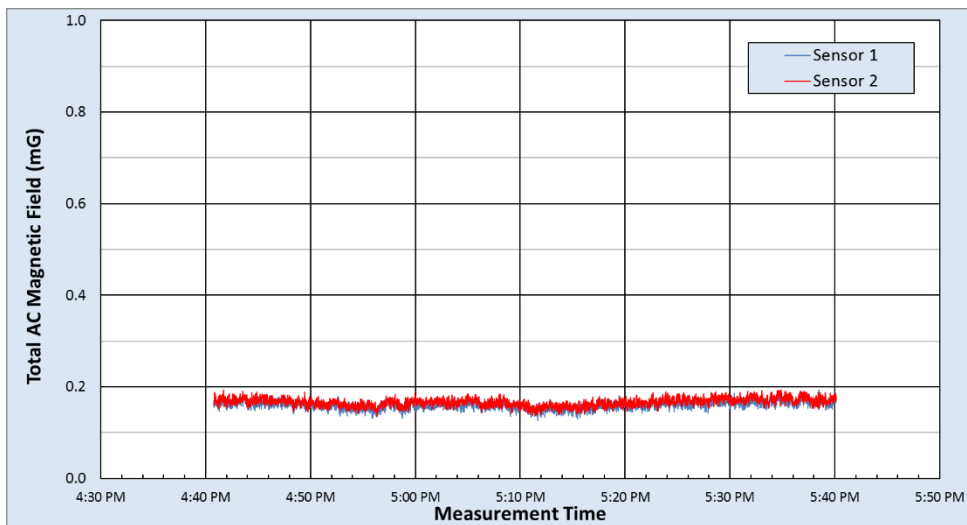
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Figure 7c Location 3: Local EMF Sources

Photo depicting visible close-proximity emitters, including railway communications and an adjacent distribution line. Other emissions sources may exist but are not visible from the site.



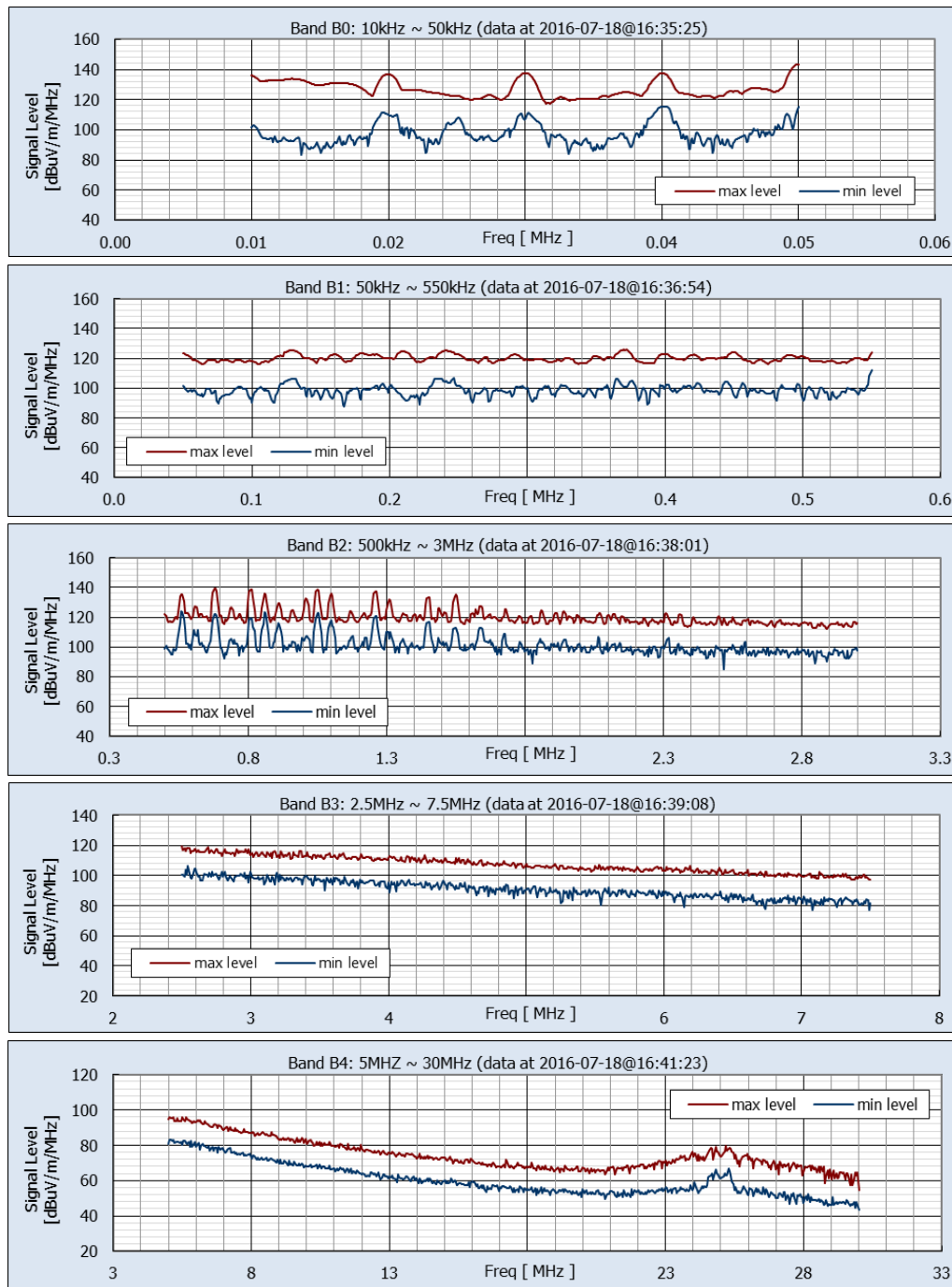
DC Magnetic Field Measurement Statistics						
	B Horizontal (mG)		B Vertical (mG)		B Total (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	252.1	249.9	422.9	391.9	490.9	463.2
Median	250.5	248.1	420.2	389.0	489.2	461.4
Min	248.8	246.9	417.1	385.6	485.8	458.3
Range	3.4	3.0	5.8	6.3	5.1	4.9
Std Dev	0.3	0.3	0.6	0.7	0.4	0.4



rms AC Magnetic Field Measurement Statistics																
	Fund 60Hz (mG)		2nd (mG)		3rd (mG)		4th (mG)		5th (mG)		6th (mG)		7th (mG)		Total AC (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	0.171	0.170	0.096	0.099	0.035	0.038	0.032	0.032	0.035	0.040	0.034	0.039	0.036	0.036	0.193	0.193
Median	0.136	0.141	0.077	0.079	0.017	0.018	0.015	0.015	0.017	0.018	0.015	0.015	0.015	0.016	0.160	0.166
Min	0.101	0.106	0.057	0.055	0.002	0.004	0.002	0.004	0.003	0.004	0.002	0.004	0.003	0.003	0.127	0.135
Range	0.070	0.063	0.039	0.044	0.033	0.034	0.029	0.029	0.031	0.036	0.032	0.035	0.032	0.033	0.066	0.058
Std Dev	0.010	0.010	0.006	0.006	0.005	0.005	0.004	0.005	0.005	0.005	0.004	0.005	0.005	0.005	0.009	0.009

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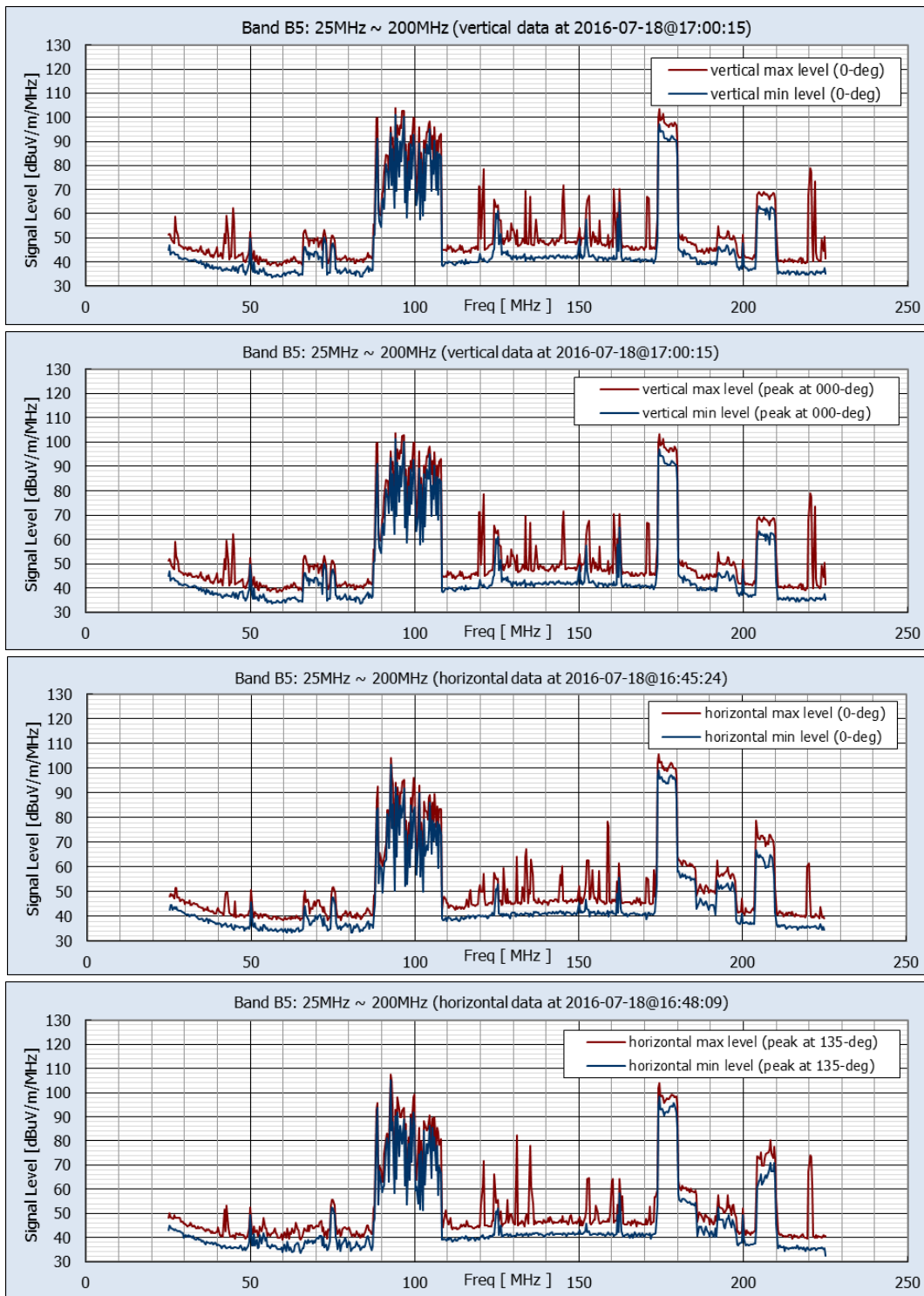
Figure 7d Location 3: Alternating Current and Direct Current Magnetic Field Measurement Results



Maximum Levels					
Band number	Freq. Range (MHz)	Pk Min-Hold dB uV/m/MHz	@ Freq. (MHz)	Pk Max-Hold dB uV/m/MHz	@ Freq. (MHz)
B0	0.01 ~ 0.05	115.4	0.0500	143.6	0.0500
B1	0.05 ~ 0.55	112.2	0.5500	126.0	0.3718
B2	0.50 ~ 3.00	124.0	0.5591	139.2	0.6818
B3	2.5 ~ 7.5	106.2	2.5455	119.7	2.5000
B4	5 ~ 30	83.1	5.1818	96.0	5.5000

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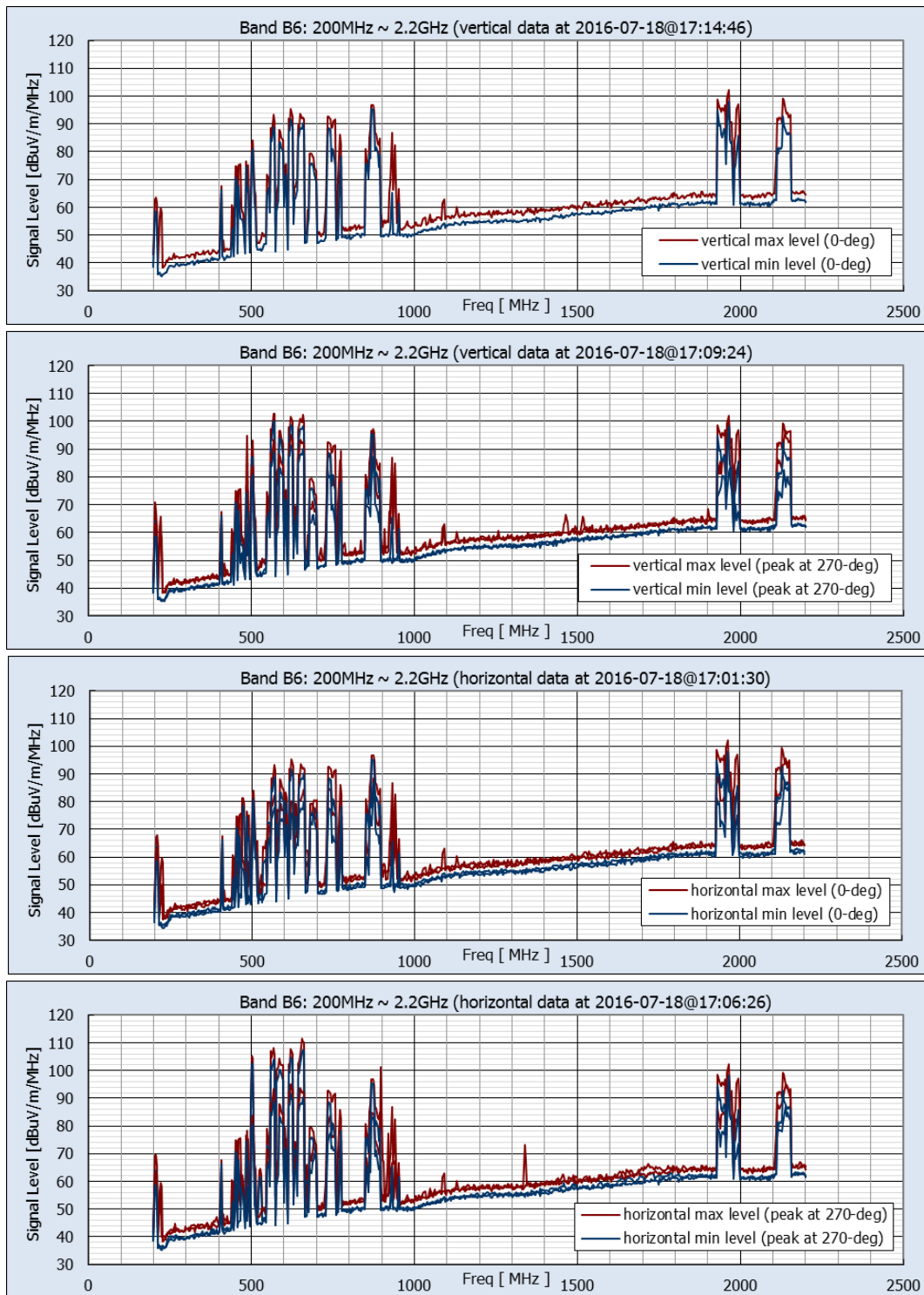
Figure 7e Location 3: Measured Environmental Radio Frequency Levels Non-Directional Data from Vertically Oriented Monopole Antenna, Bands 0–4



Maximum Levels									
Band number	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B5	25 ~ 200	101.1	94.091	103.6	94.091	105.3	92.636	107.6	92.636

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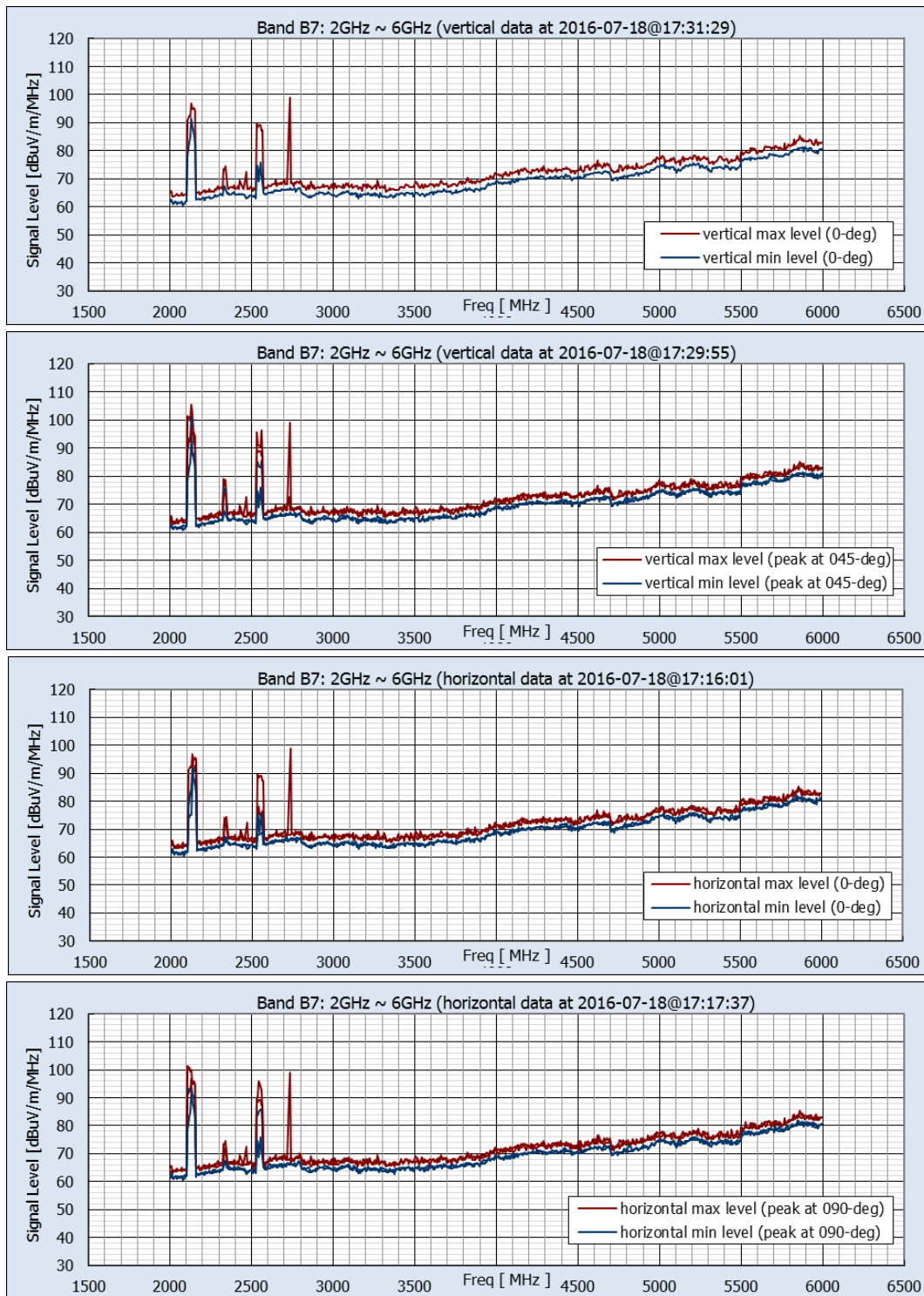
Figure 7f Location 3: Measured Environmental Radio Frequency Levels Band 5 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B6	200 ~ 2200	99.9	570.909	102.8	567.273	107.4	658.182	111.4	654.545

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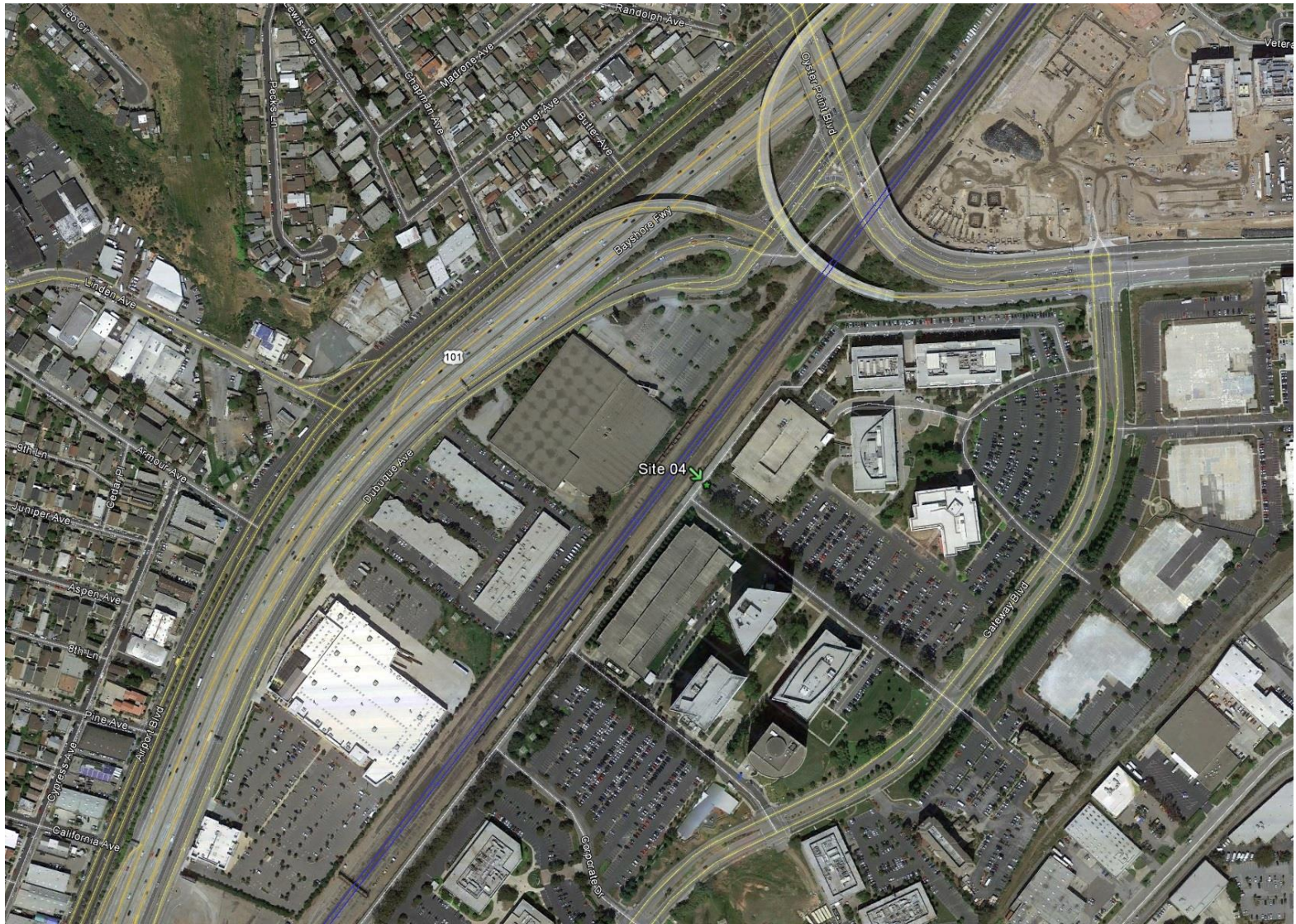
Figure 7g Location 3: Measured Environmental Radio Frequency Levels Band 6 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B7	2000~6000	101.1	2130.909	105.6	2130.909	94.4	2130.909	101.3	2109.091

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Figure 7h Location 3: Measured Environmental Radio Frequency Levels Band 7 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



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Figure 8a Location 4: Gateway Boulevard/Oyster Point Boulevard, South San Francisco
Commercial Research Park, with local high-voltage transmission lines, (Lat 37.660396°, Lon -122.400218°)



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Figure 8b Location 4: Measurement Location and Site Views

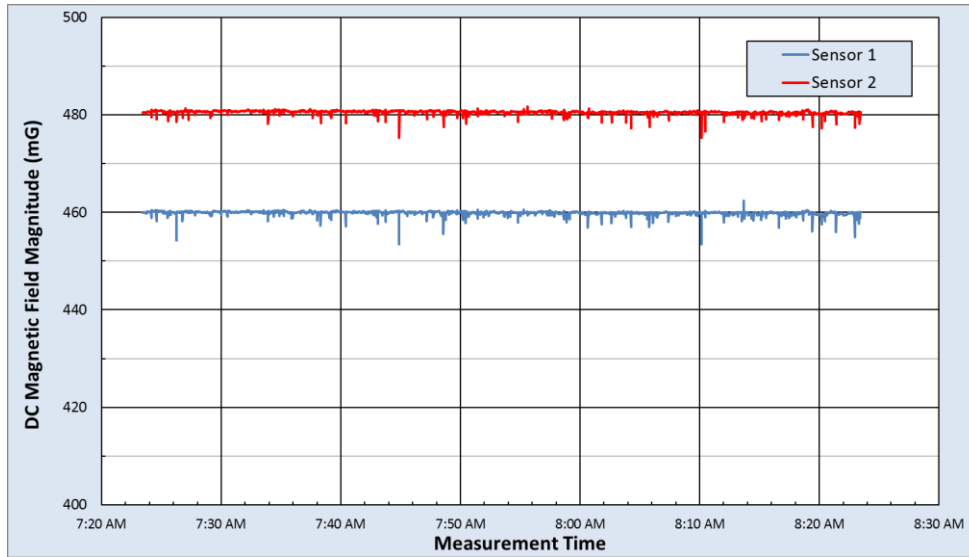
Photos depicting the site from the perspective of the RF measurement location. In the center is a satellite view, indicating the alignment (green line) and measurement points (red = RF, magenta = magnetometers). The satellite view is rotated so that the image at 0° faces the alignment.



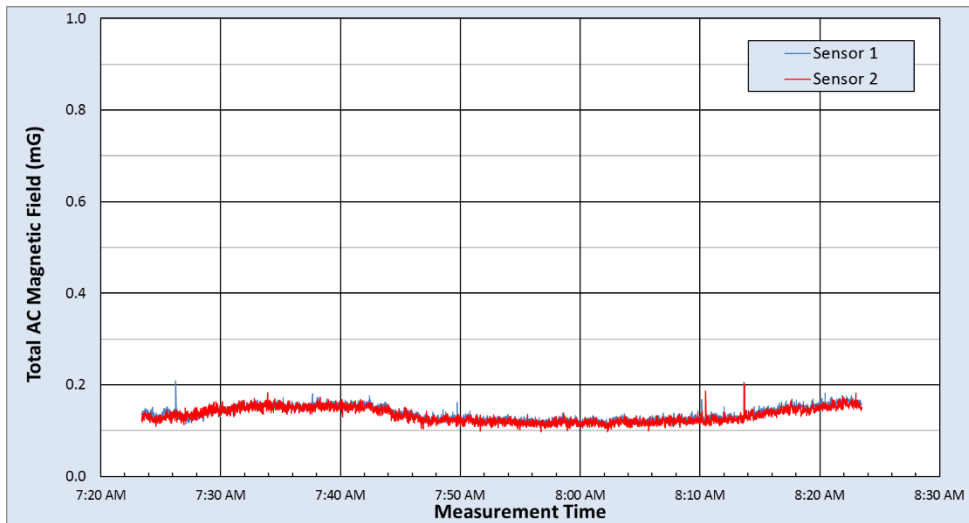
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Figure 8c Location 4: Local EMF Sources

Photo depicting visible close-proximity emitters, including adjacent high-voltage transmission lines. Other emissions sources may exist but are not visible from the site.



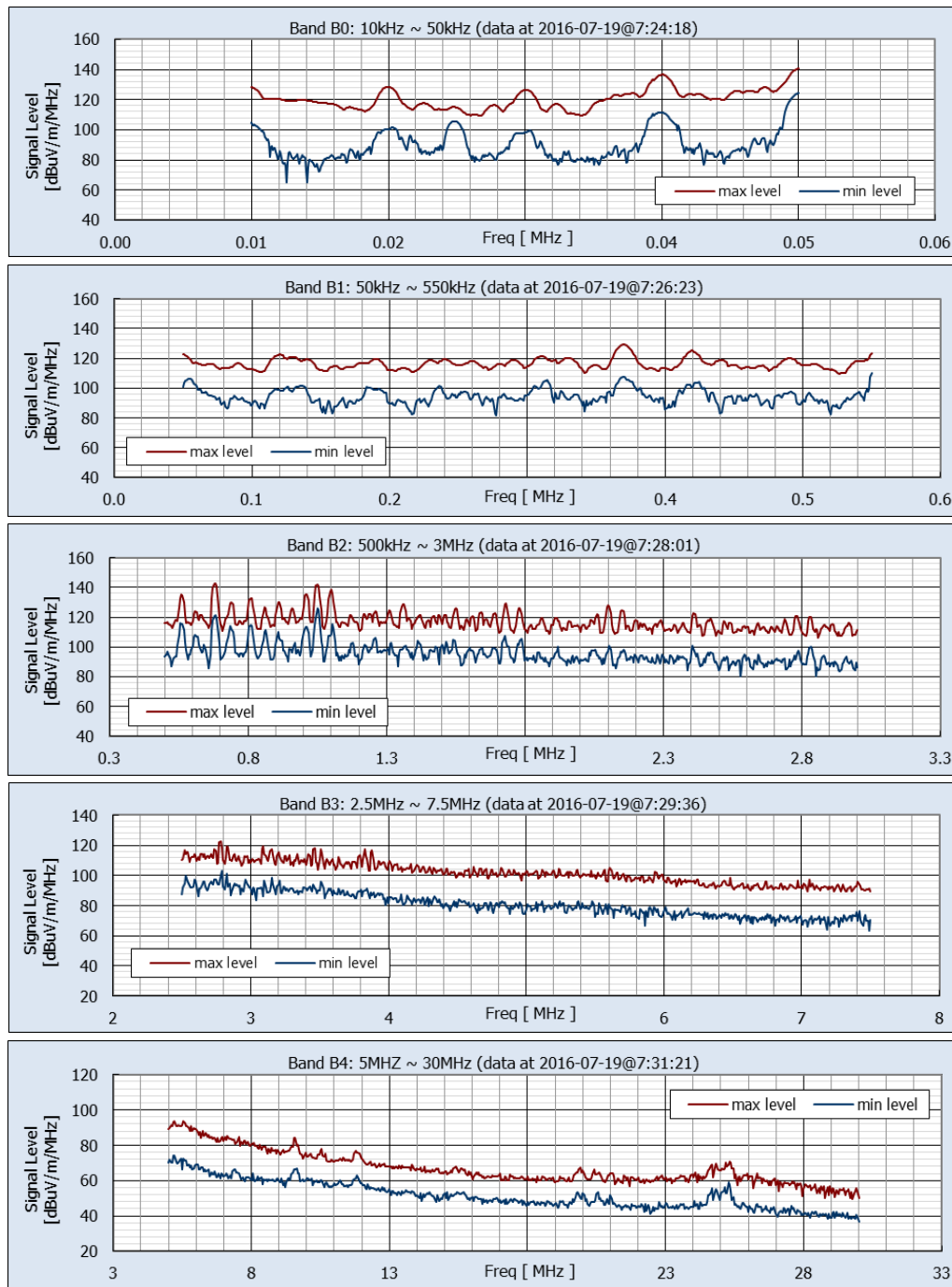
DC Magnetic Field Measurement Statistics						
	B Horizontal (mG)		B Vertical (mG)		B Total (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	248.8	276.9	391.7	395.6	462.4	481.7
Median	242.1	273.8	391.1	394.9	459.9	480.6
Min	235.6	268.6	385.3	390.8	453.5	475.3
Range	13.2	8.3	6.4	4.8	8.9	6.4
Std Dev	0.3	0.3	0.4	0.4	0.4	0.3



rms AC Magnetic Field Measurement Statistics																
	Fund 60Hz (mG)		2nd (mG)		3rd (mG)		4th (mG)		5th (mG)		6th (mG)		7th (mG)		Total AC (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	0.162	0.157	0.121	0.099	0.051	0.049	0.041	0.071	0.048	0.049	0.034	0.036	0.032	0.036	0.209	0.201
Median	0.097	0.091	0.081	0.077	0.026	0.025	0.012	0.024	0.026	0.025	0.011	0.013	0.012	0.013	0.134	0.130
Min	0.057	0.053	0.064	0.057	0.012	0.010	0.003	0.006	0.010	0.010	0.002	0.002	0.002	0.003	0.106	0.097
Range	0.104	0.104	0.058	0.042	0.040	0.040	0.038	0.065	0.038	0.039	0.032	0.033	0.030	0.033	0.103	0.104
Std Dev	0.020	0.020	0.004	0.006	0.004	0.005	0.004	0.010	0.005	0.005	0.004	0.004	0.004	0.004	0.015	0.016

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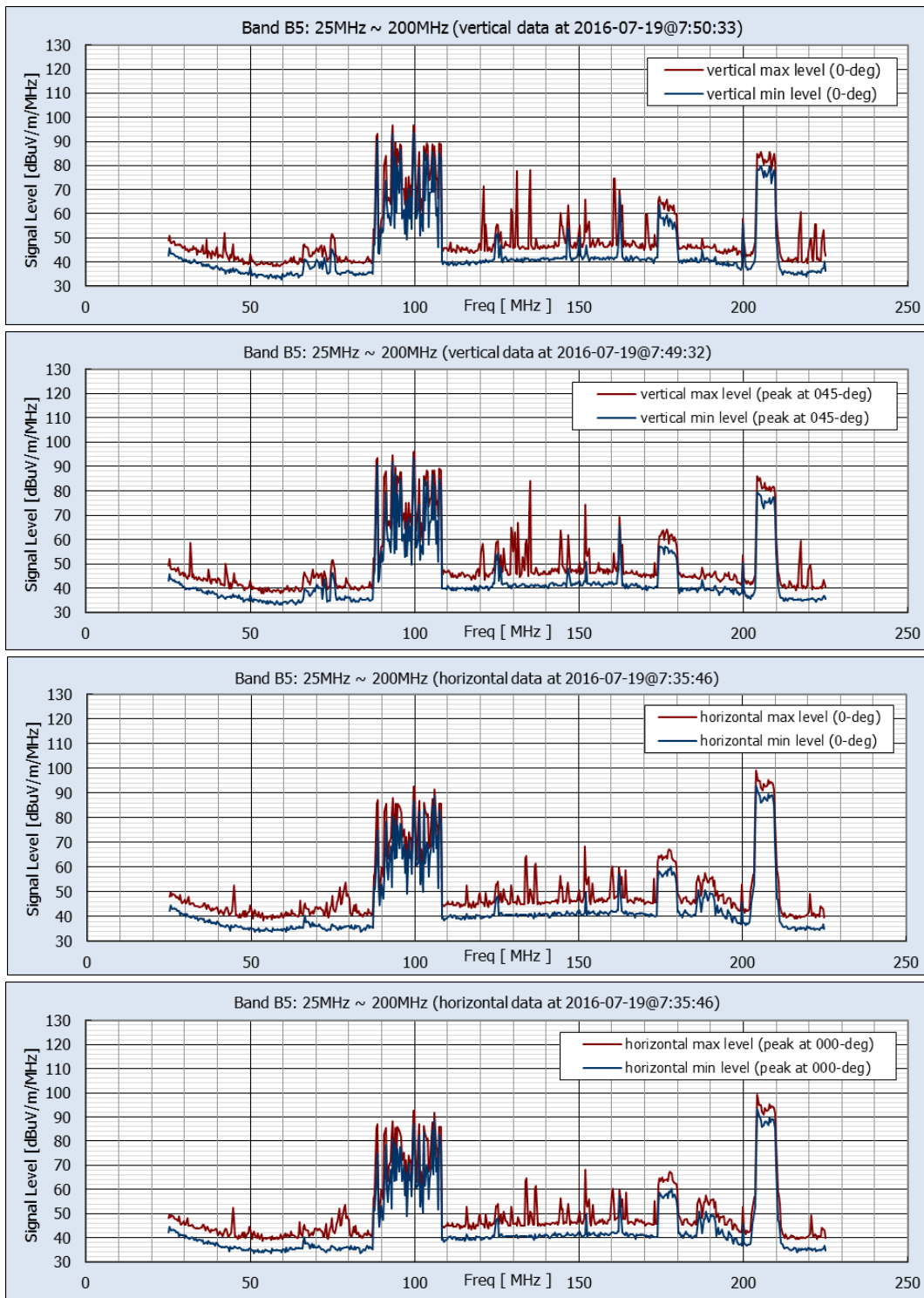
Figure 8d Location 4: Alternating Current and Direct Current Magnetic Field Measurement Results



Maximum Levels					
Band number	Freq. Range (MHz)	Pk Min-Hold dB uV/m/MHz	@ Freq. (MHz)	Pk Max-Hold dB uV/m/MHz	@ Freq. (MHz)
B0	0.01 ~ 0.05	124.2	0.0500	140.4	0.0500
B1	0.05 ~ 0.55	110.4	0.5500	129.2	0.3700
B2	0.50 ~ 3.00	125.8	1.0500	142.6	0.6818
B3	2.5 ~ 7.5	103.3	2.7909	122.8	2.7818
B4	5 ~ 30	74.1	5.1818	93.5	5.5455

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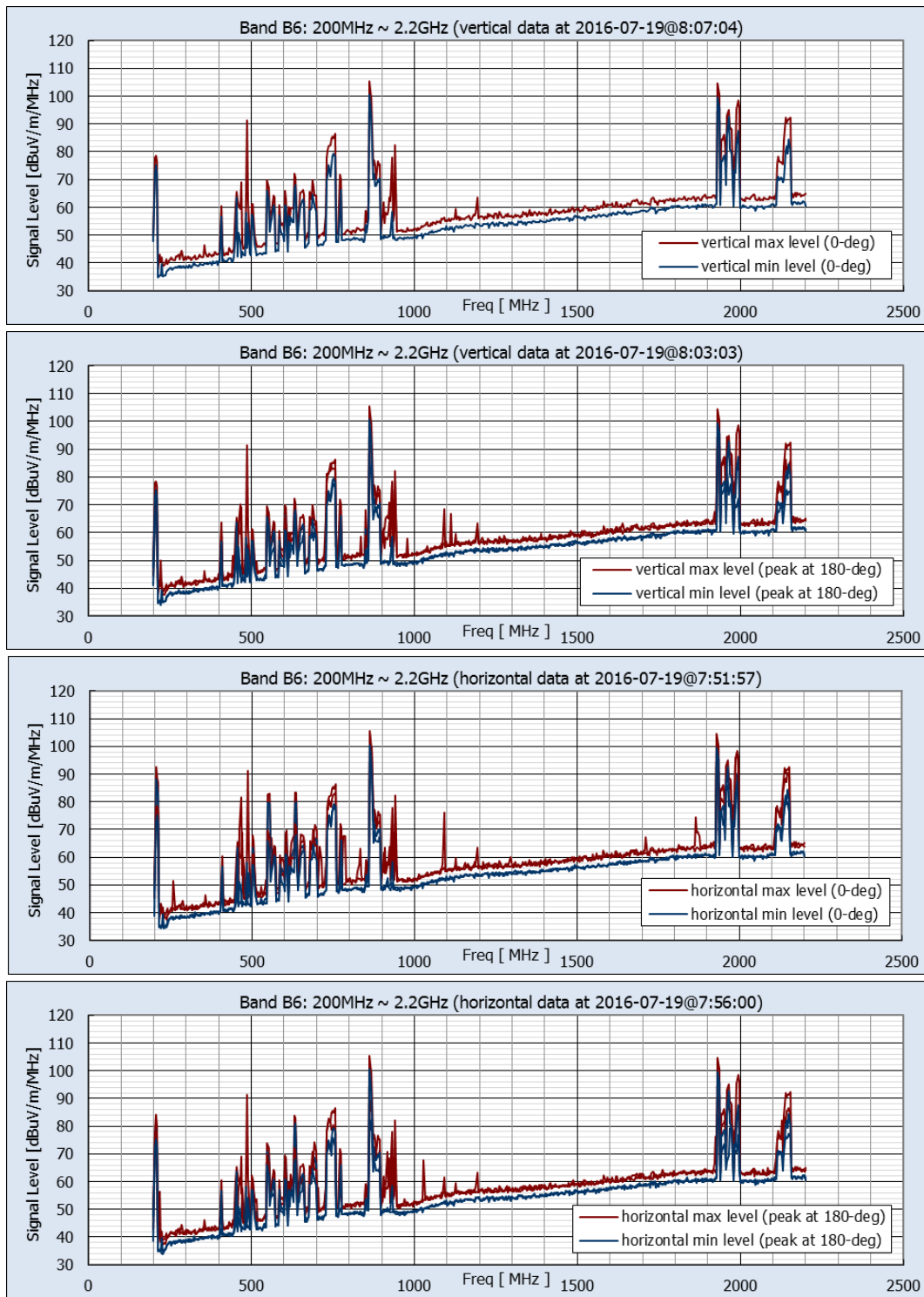
Figure 8e Location 4: Measured Environmental Radio Frequency Levels Non-Directional Data from Vertically Oriented Monopole Antenna, Bands 0–4



Maximum Levels									
Band number	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B5	25 ~ 200	93.8	99.545	96.9	99.545	93.2	204.273	99.3	204.273

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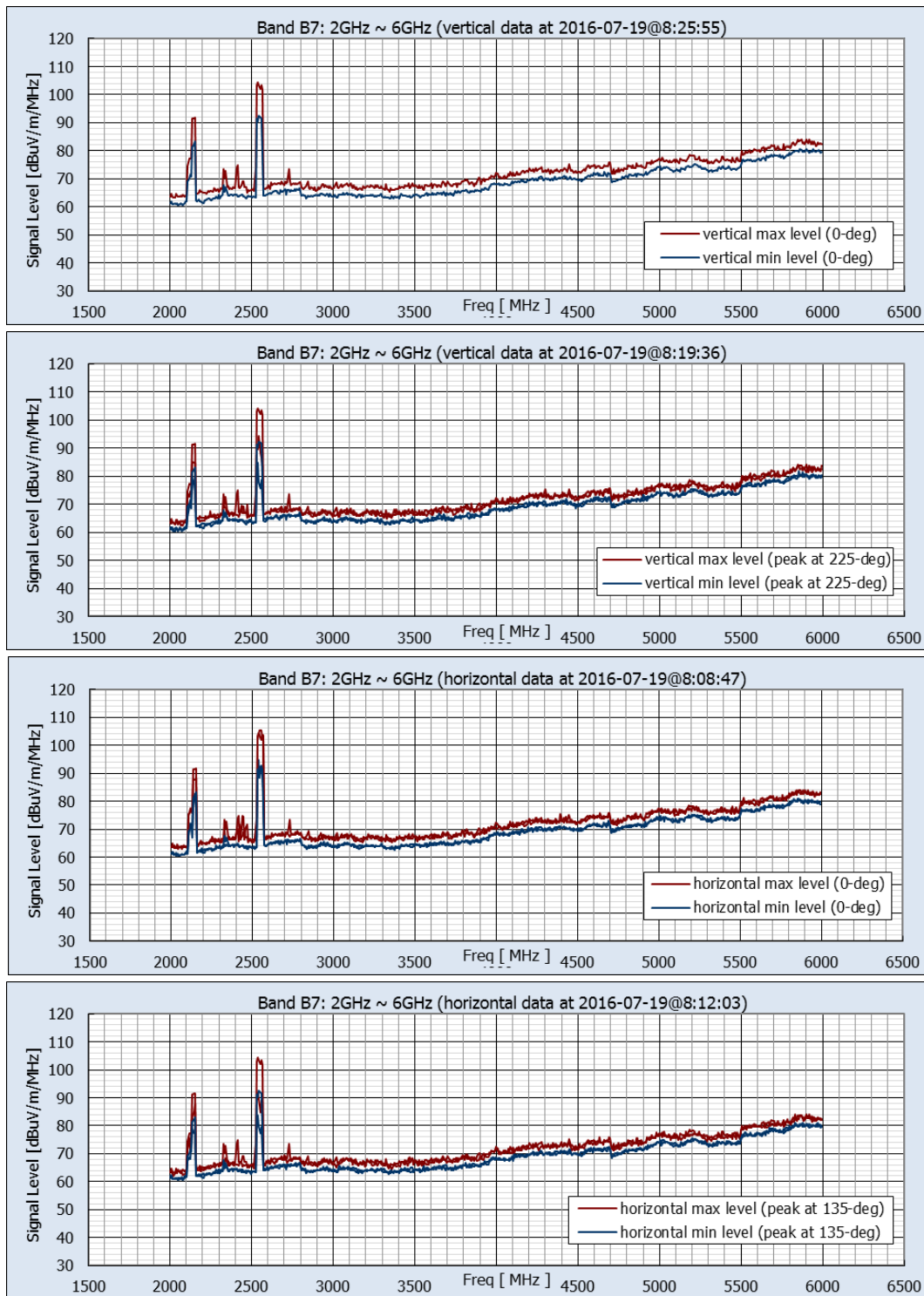
Figure 8f Location 4: Measured Environmental Radio Frequency Levels Band 5 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B6	200 ~ 2200	100.6	861.818	105.5	861.818	97.3	1930.909	104.5	861.818

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Figure 8g Location 4: Measured Environmental Radio Frequency Levels Band 6 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B7	2000~6000	92.4	2545.455	104.3	2538.182	94.6	2538.182	105.3	2545.455

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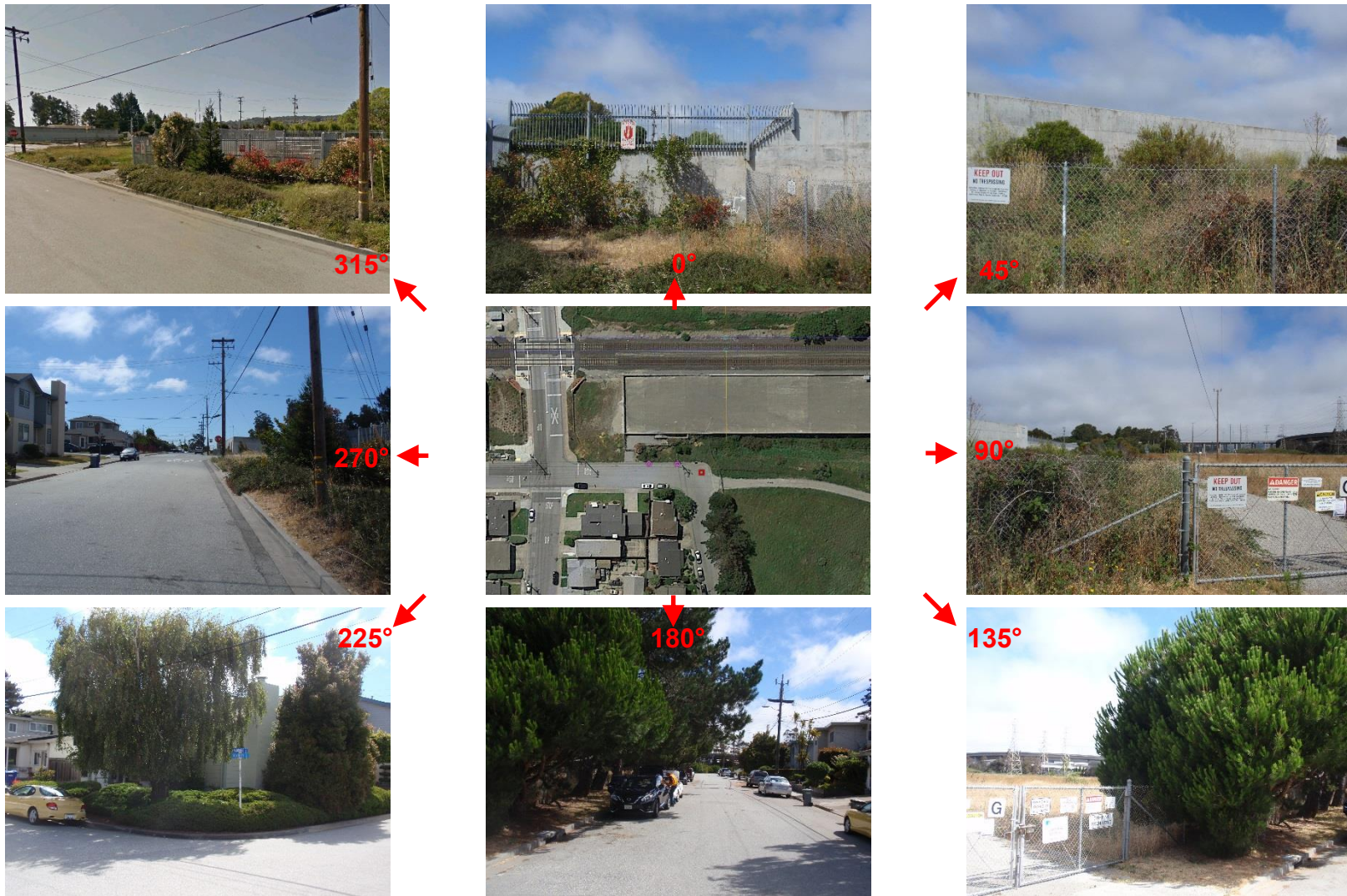
Figure 8h Location 4: Measured Environmental Radio Frequency Levels Band 7 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



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Figure 9a Location 5: Monterey Street/Madrone Street, San Bruno

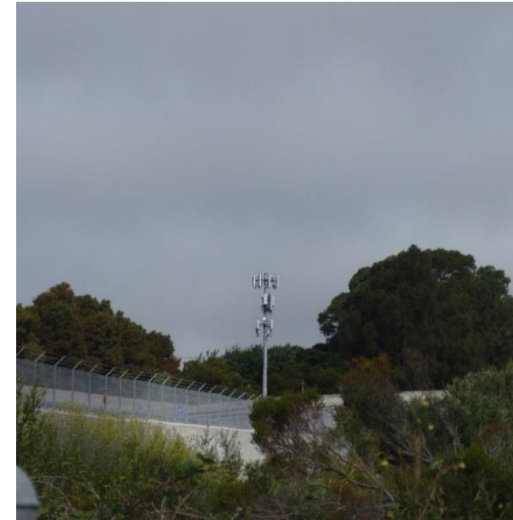
Residential area adjacent to San Francisco International Airport, numerous local RF emitters (Lat 37.610129°, Lon -122.396565°)



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Figure 9b Location 5: Measurement Location and Site Views

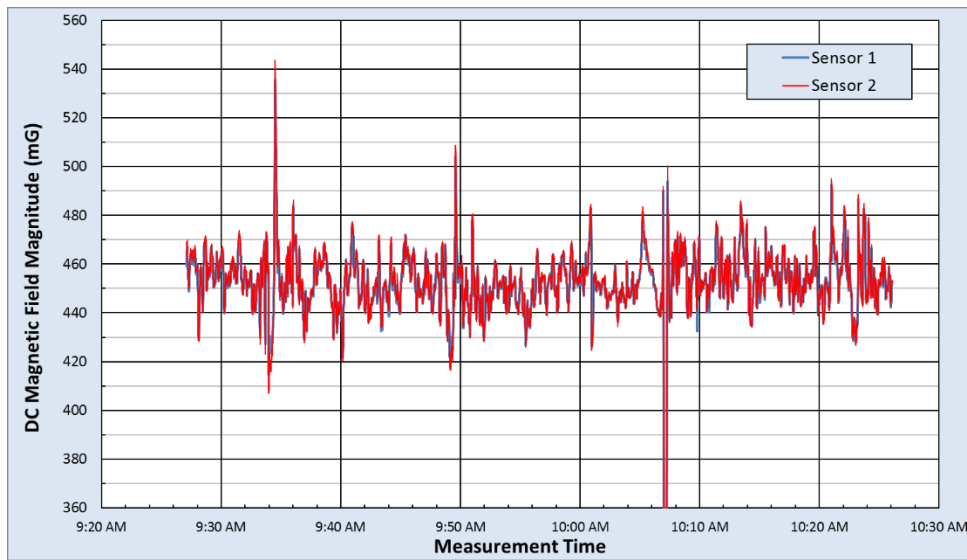
Photos depicting the site from the perspective of the RF measurement location. In the center is a satellite view, indicating the alignment (green line) and measurement points (red = RF, magenta = magnetometers). The satellite view is rotated so that the image at 0° faces the alignment.



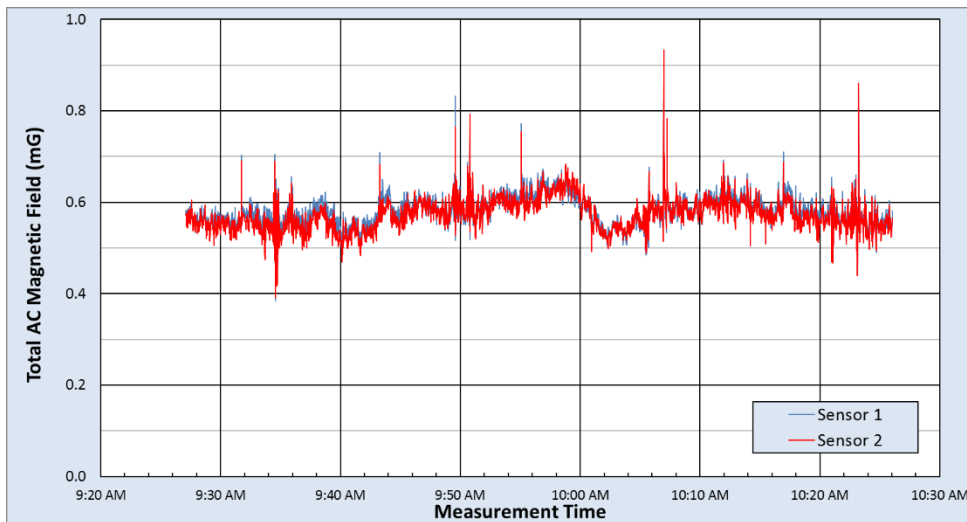
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Figure 9c Location 5: Local EMF Sources

Photos depicting visible close-proximity emitters, including distribution lines, high-voltage transmission lines, and a cell tower. Other emissions sources may exist but are not visible from the site.



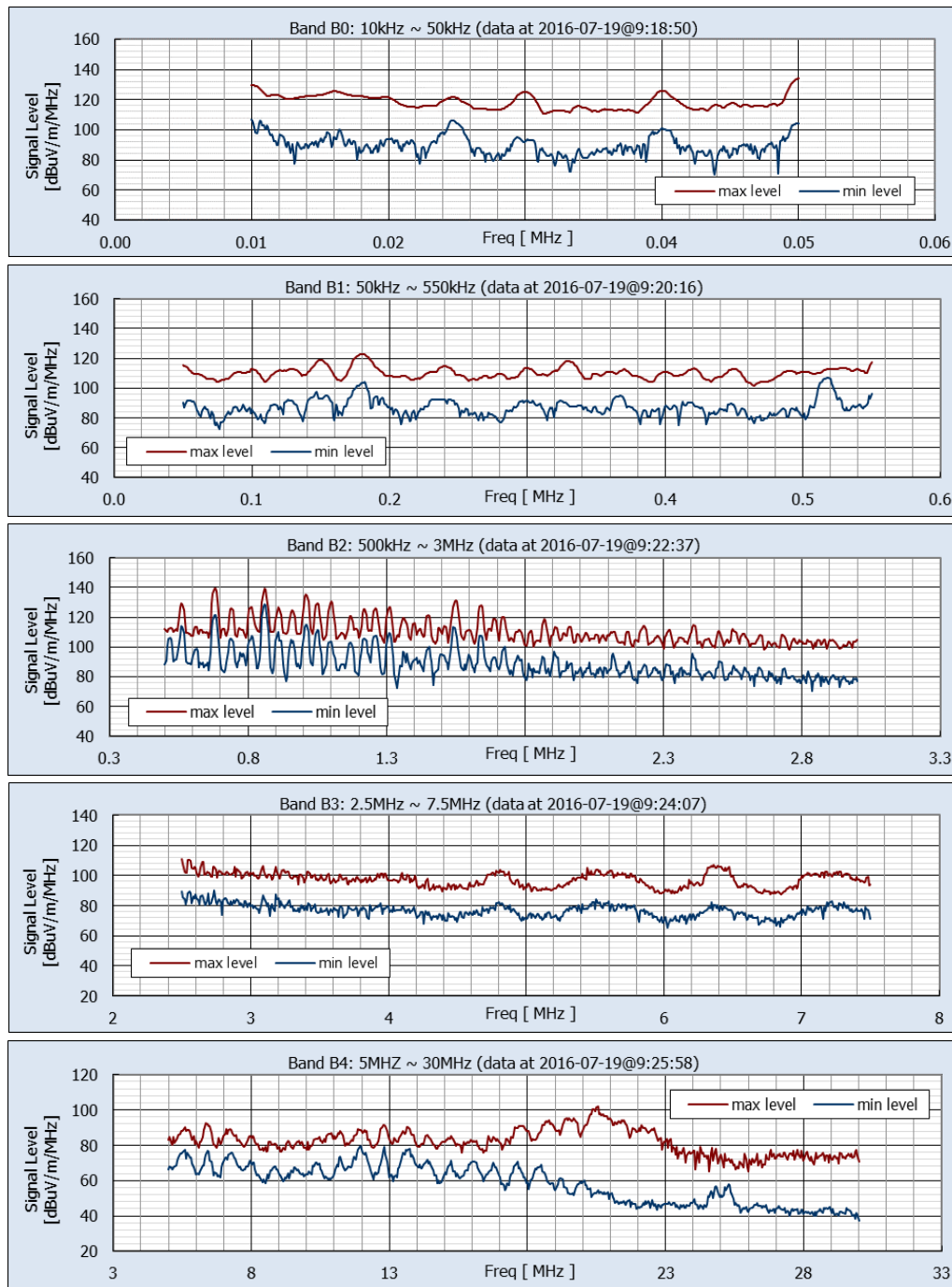
DC Magnetic Field Measurement Statistics						
	B Horizontal (mG)		B Vertical (mG)		B Total (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	267.2	275.2	464.1	468.9	535.5	543.7
Median	214.2	209.3	398.6	401.4	452.7	453.1
Min	171.0	158.7	250.2	246.0	303.0	292.7
Range	96.2	116.5	213.9	222.9	232.4	251.0
Std Dev	4.8	6.5	13.6	14.1	13.8	14.8



rms AC Magnetic Field Measurement Statistics																
	Fund 60Hz (mG)		2nd (mG)		3rd (mG)		4th (mG)		5th (mG)		6th (mG)		7th (mG)		Total AC (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	0.875	0.902	0.262	0.217	0.203	0.179	0.157	0.146	0.171	0.128	0.123	0.119	0.114	0.126	0.906	0.933
Median	0.574	0.567	0.016	0.016	0.052	0.038	0.011	0.012	0.039	0.032	0.013	0.014	0.022	0.016	0.578	0.571
Min	0.285	0.285	0.004	0.003	0.024	0.020	0.002	0.003	0.018	0.012	0.003	0.003	0.007	0.003	0.384	0.392
Range	0.590	0.617	0.258	0.214	0.179	0.159	0.155	0.143	0.154	0.116	0.119	0.116	0.107	0.123	0.522	0.542
Std Dev	0.034	0.035	0.013	0.012	0.009	0.008	0.007	0.007	0.007	0.007	0.006	0.006	0.006	0.006	0.034	0.035

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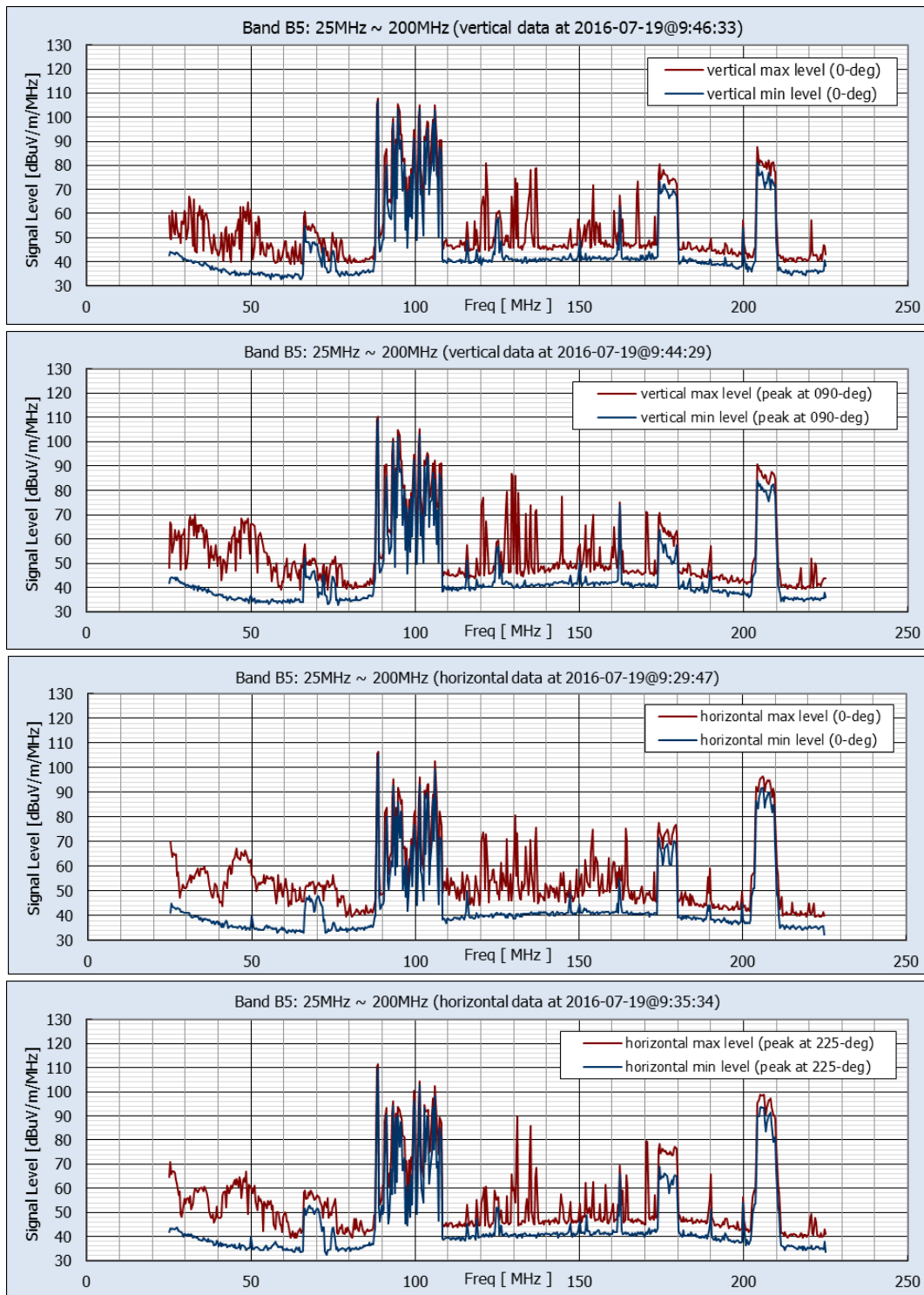
Figure 9d Location 5: Alternating Current and Direct Current Magnetic Field Measurement Results



Maximum Levels					
Band number	Freq. Range (MHz)	Pk Min-Hold dB uV/m/MHz	@ Freq. (MHz)	Pk Max-Hold dB uV/m/MHz	@ Freq. (MHz)
B0	0.01 ~ 0.05	106.9	0.0100	134.1	0.0500
B1	0.05 ~ 0.55	106.8	0.5182	122.8	0.1800
B2	0.50 ~ 3.00	128.7	0.8591	139.2	0.6818
B3	2.5 ~ 7.5	90.3	2.7364	111.0	2.5000
B4	5 ~ 30	79.4	11.9545	101.8	20.5455

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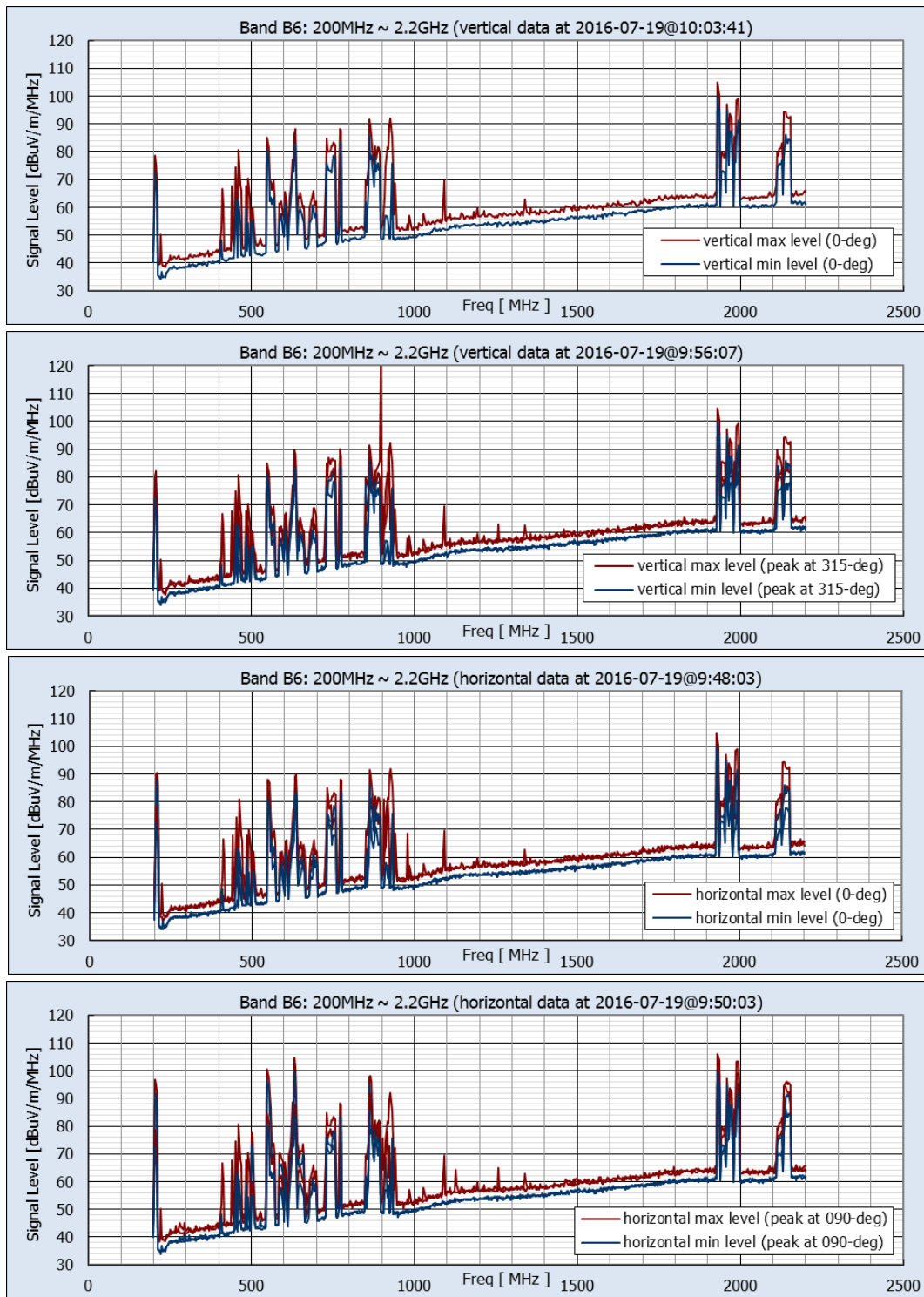
Figure 9e Location 5: Measured Environmental Radio Frequency Levels Non-Directional Data from Vertically Oriented Monopole Antenna, Bands 0–4



Maximum Levels									
Band number	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B5	25 ~ 200	109.2	88.636	110.3	88.636	109.9	88.636	111.4	88.636

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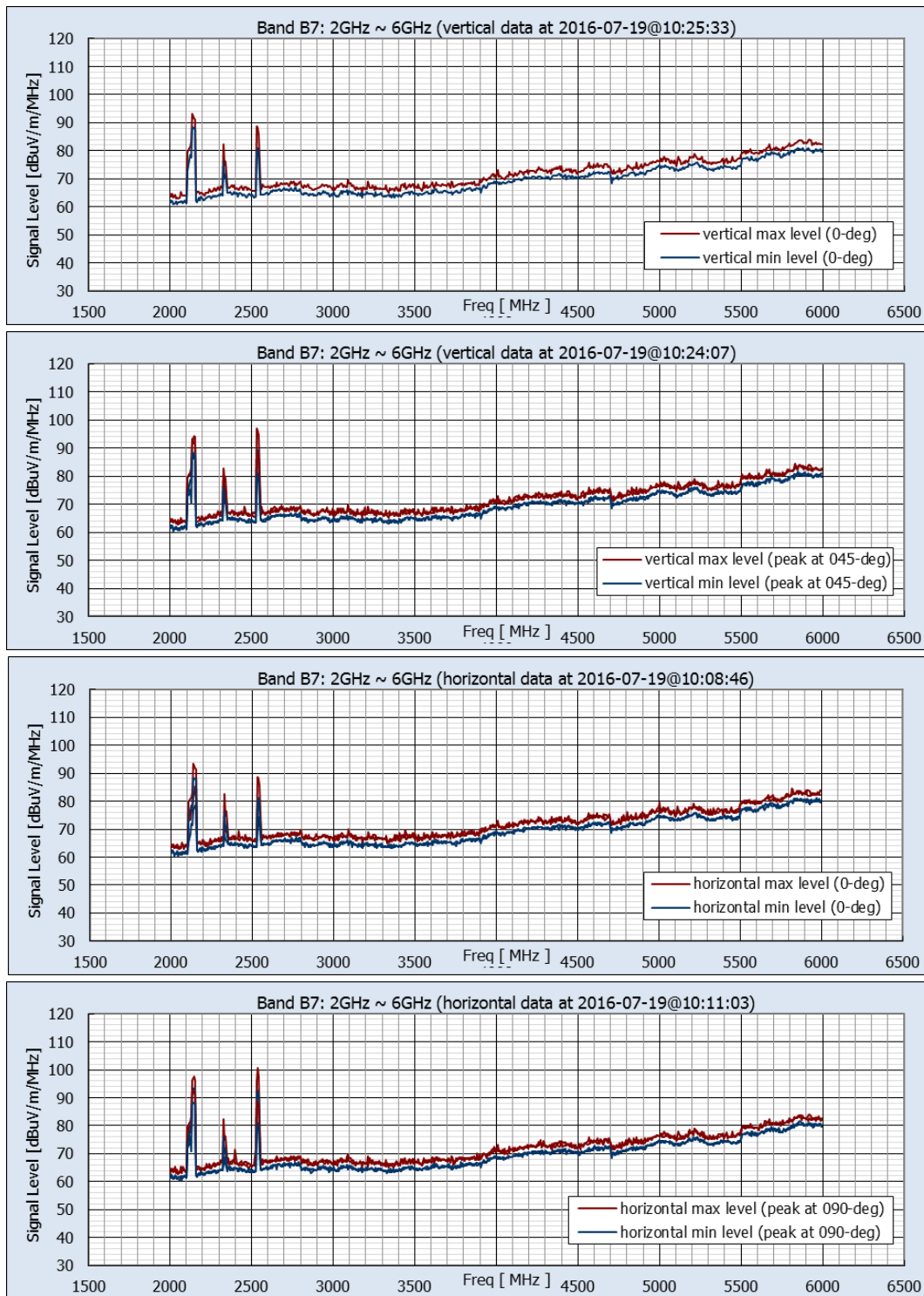
Figure 9f Location 5: Measured Environmental Radio Frequency Levels Band 5 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B6	200 ~ 2200	99.7	1930.909	119.8	898.182	101.3	1930.909	106.2	1930.909

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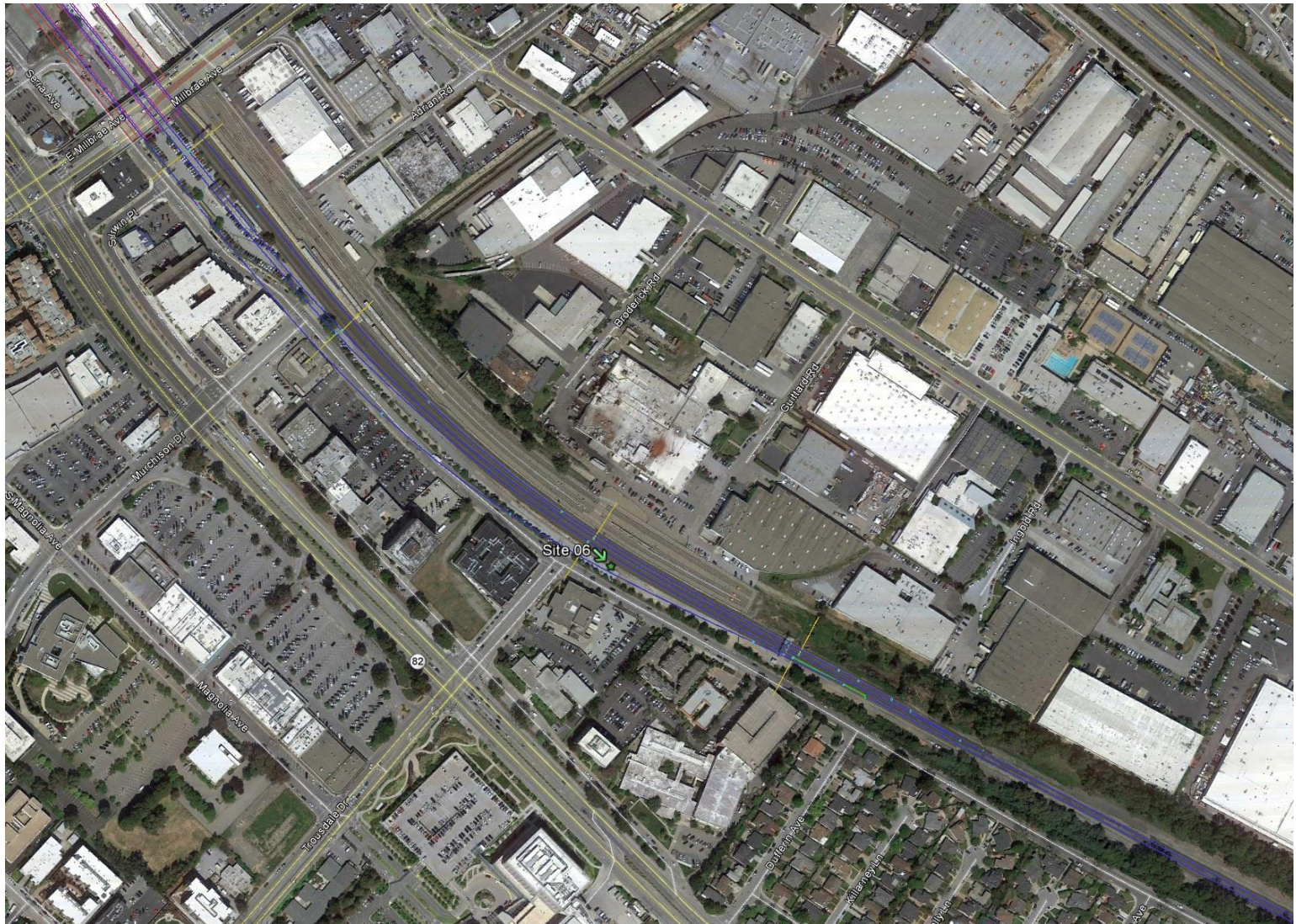
Figure 9g Location 5: Measured Environmental Radio Frequency Levels Band 6 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B7	2000~6000	89.4	2530.909	97.0	2530.909	93.5	2138.182	100.7	2538.182

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Figure 9h Location 5: Measured Environmental Radio Frequency Levels Band 7 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



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Figure 10a Location 6: Trossell Drive/California Drive, Burlingame

Urban setting adjacent to Burlingame Police Department, Medical Facilities (Lat 37.595437°, Lon -122.381704°)



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Figure 10b Location 6: Measurement Location and Site Views

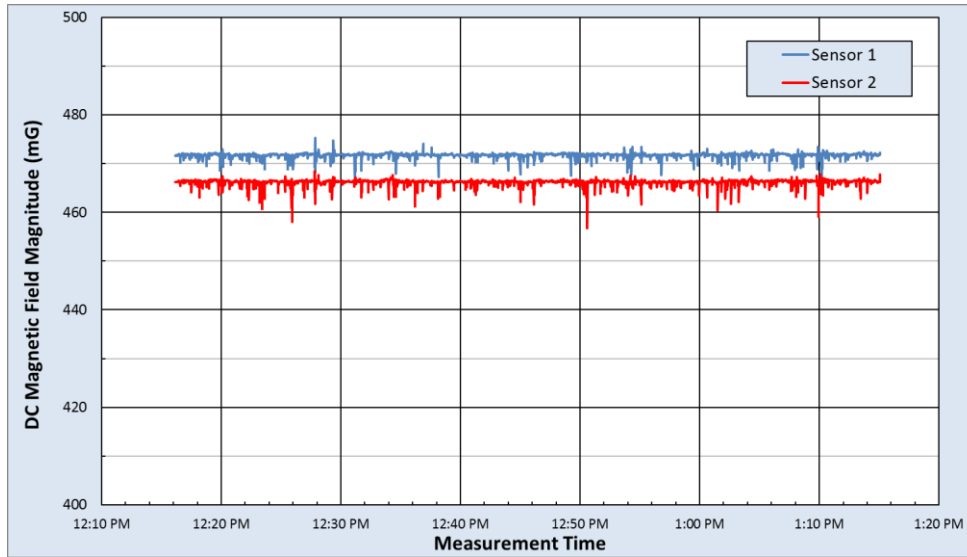
Photos depicting the site from the perspective of the RF measurement location. In the center is a satellite view, indicating the alignment (green line) and measurement points (red = RF, magenta = magnetometers). The satellite view is rotated so that the image at 0° faces the alignment.



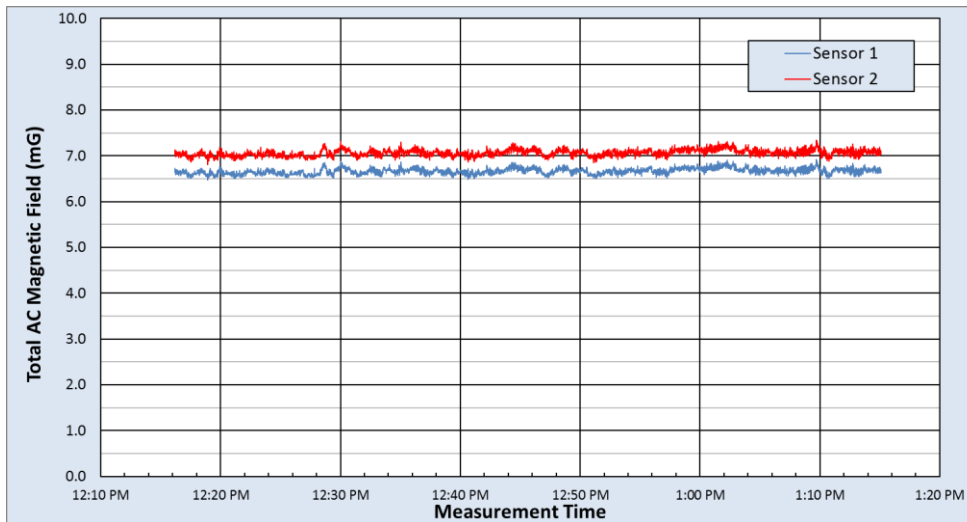
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Figure 10c Location 6: Local EMF Sources

Photos depicting visible close-proximity emitters, including distribution lines and communication lines. Other emissions sources may exist but are not visible from the site.



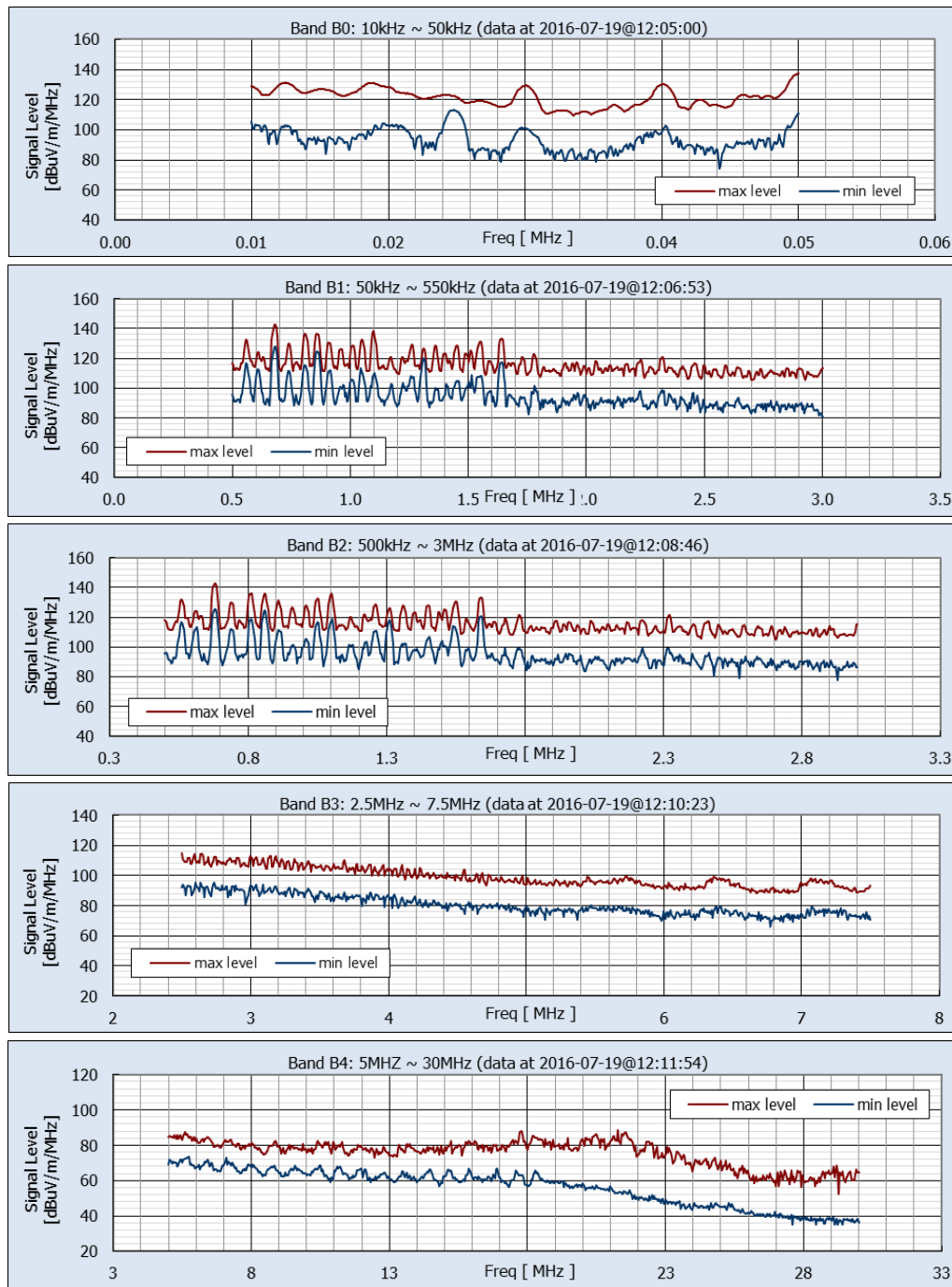
DC Magnetic Field Measurement Statistics						
	B Horizontal (mG)		B Vertical (mG)		B Total (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	252.5	271.0	414.9	395.0	475.2	468.4
Median	225.5	249.8	414.4	393.8	471.8	466.3
Min	219.3	241.9	400.8	382.0	466.7	456.7
Range	33.2	29.1	14.1	12.9	8.5	11.7
Std Dev	1.0	0.8	0.6	0.7	0.5	0.6



rms AC Magnetic Field Measurement Statistics																
	Fund 60Hz (mG)		2nd (mG)		3rd (mG)		4th (mG)		5th (mG)		6th (mG)		7th (mG)		Total AC (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	6.902	7.325	0.160	0.172	0.147	0.147	0.078	0.119	0.489	0.515	0.058	0.070	0.131	0.136	6.920	7.344
Median	6.651	7.049	0.075	0.080	0.088	0.093	0.025	0.027	0.419	0.444	0.015	0.014	0.093	0.101	6.666	7.065
Min	6.452	6.797	0.037	0.043	0.041	0.053	0.012	0.011	0.376	0.400	0.003	0.002	0.060	0.068	6.468	6.814
Range	0.450	0.527	0.123	0.130	0.106	0.094	0.066	0.108	0.113	0.115	0.054	0.068	0.072	0.068	0.452	0.530
Std Dev	0.066	0.073	0.007	0.007	0.007	0.008	0.005	0.005	0.013	0.014	0.004	0.004	0.010	0.011	0.066	0.073

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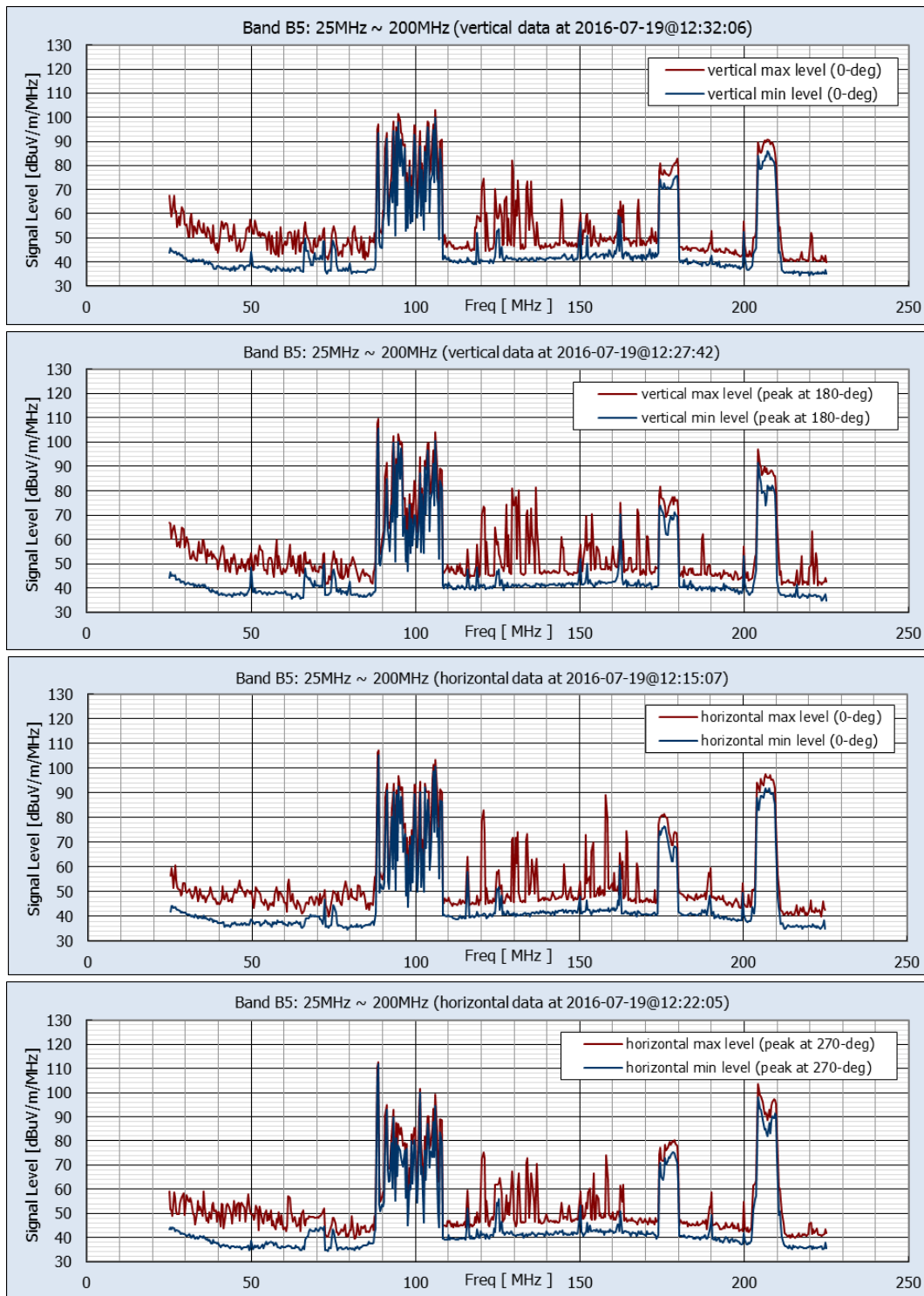
Figure 10d Location 6: Alternating Current and Direct Current Magnetic Field Measurement Results



Maximum Levels					
Band number	Freq. Range (MHz)	Pk Min-Hold dB uV/m/MHz	@ Freq. (MHz)	Pk Max-Hold dB uV/m/MHz	@ Freq. (MHz)
B0	0.01 ~ 0.05	113.0	0.0248	137.2	0.0500
B1	0.05 ~ 0.55	127.7	0.6818	142.7	0.6818
B2	0.50 ~ 3.00	125.5	0.6818	142.7	0.6818
B3	2.5 ~ 7.5	95.3	2.7364	114.6	2.5000
B4	5 ~ 30	73.7	5.7273	88.3	21.2727

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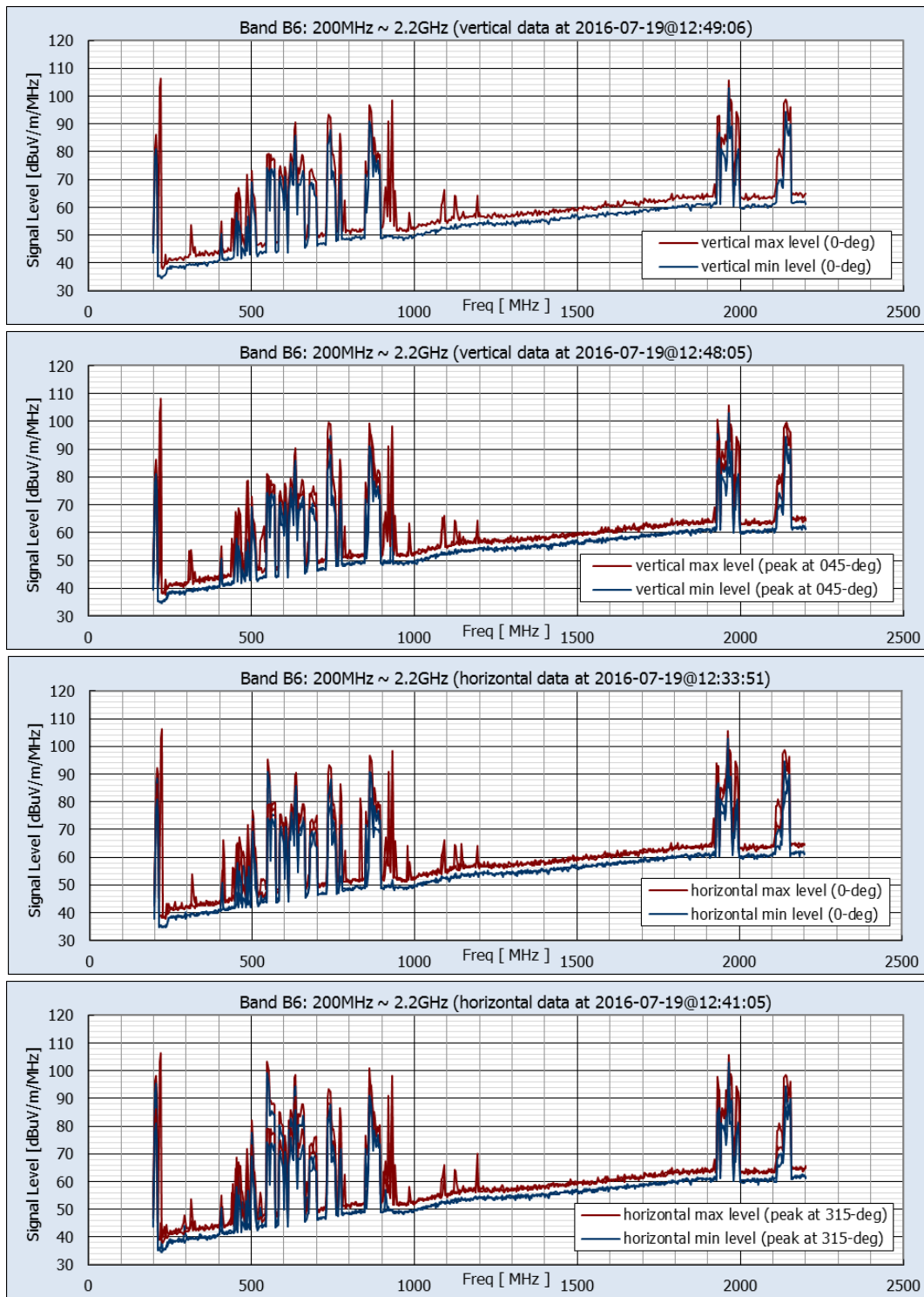
Figure 10e Location 6: Measured Environmental Radio Frequency Levels Non-Directional Data from Vertically Oriented Monopole Antenna, Bands 0–4



Maximum Levels									
Band number	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B5	25 ~ 200	105.6	88.636	109.6	88.636	111.8	88.636	112.7	88.636

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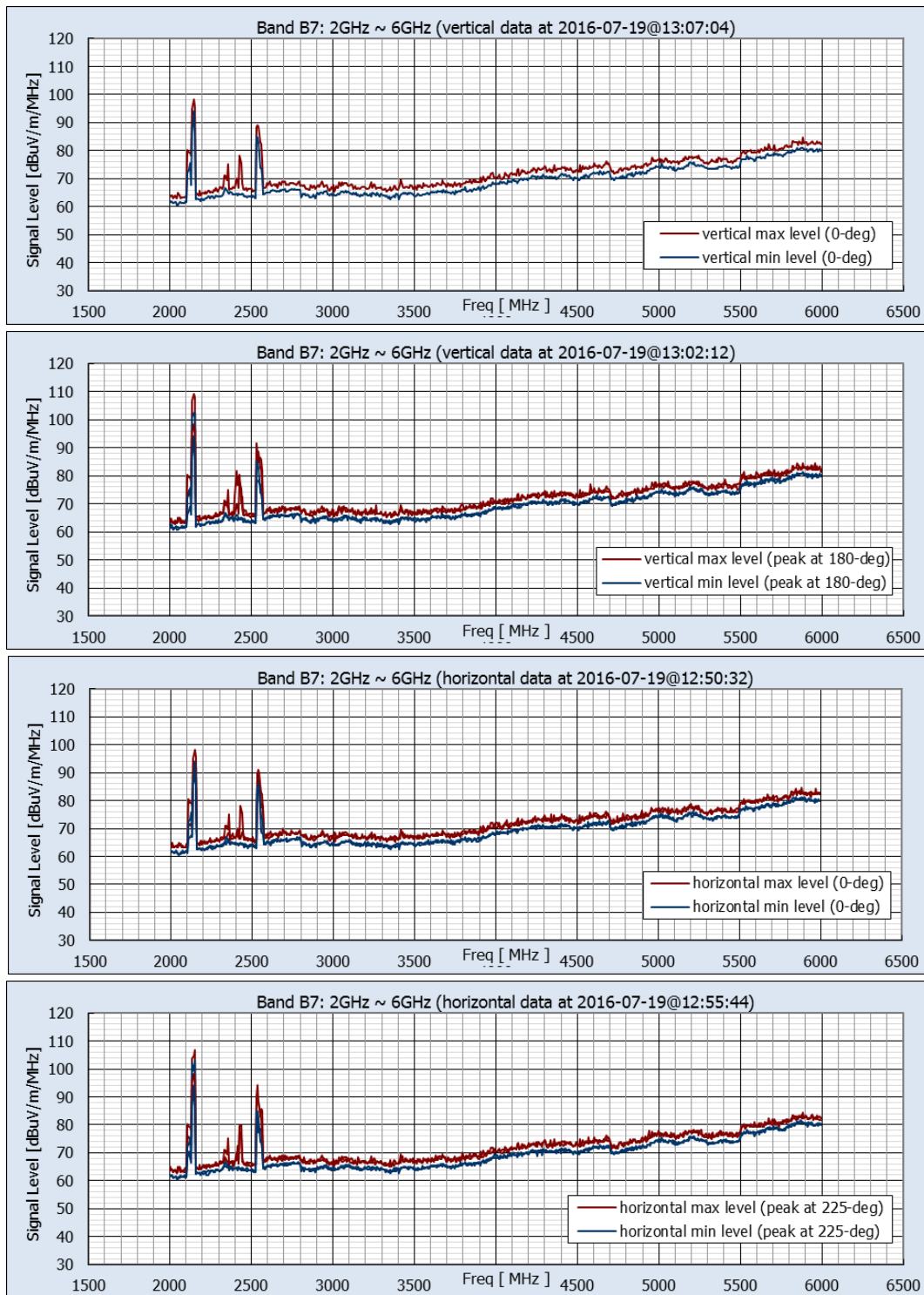
Figure 10f Location 6: Measured Environmental Radio Frequency Levels Band 5 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B6	200 ~ 2200	103.0	1963.636	108.1	221.818	99.3	549.091	103.4	549.091

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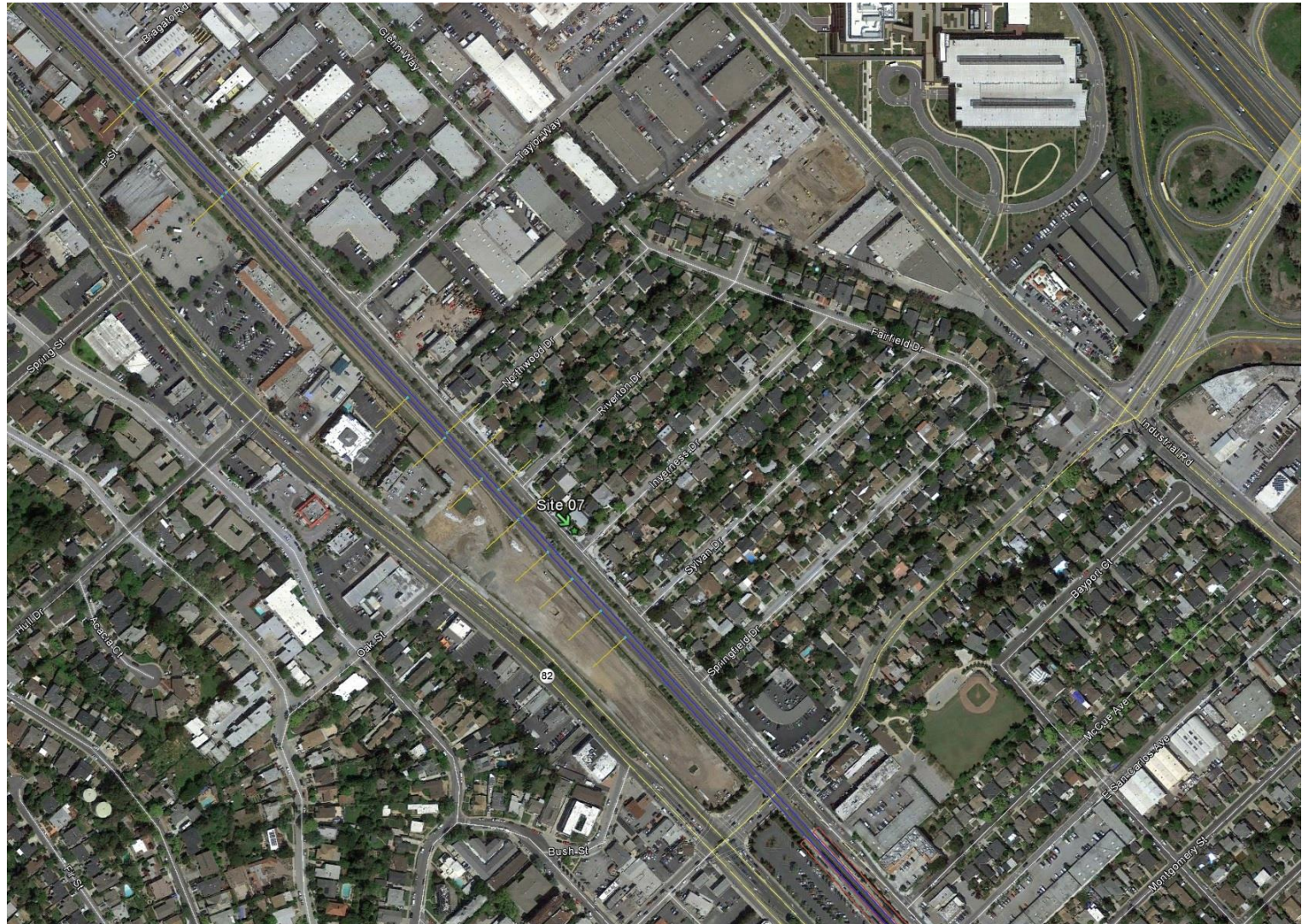
Figure 10g Location 6: Measured Environmental Radio Frequency Levels Band 6 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B7	2000~6000	102.5	2145.455	109.3	2145.455	103.0	2152.727	106.8	2152.727

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Figure 10h Location 6: Measured Environmental Radio Frequency Levels Band 7 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



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Figure 11a Location 7: Old County Road/Inverness Drive, San Carlos

Mostly residential just setting east of the Caltrain alignment (Lat 37.510969°, Lon -122.263314°)



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Figure 11b Location 7: Measurement Location and Site Views

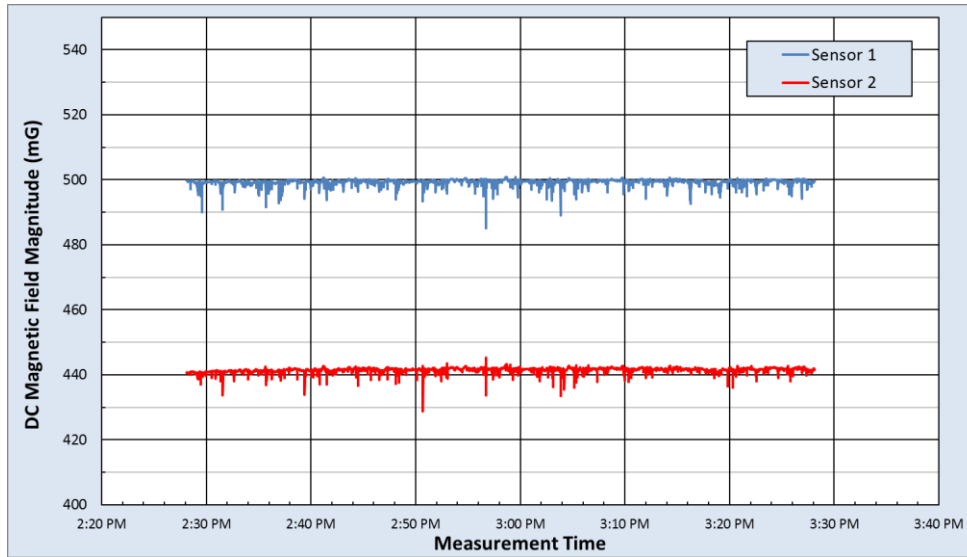
Photos depicting the site from the perspective of the RF measurement location. In the center is a satellite view, indicating the alignment (green line) and measurement points (red = RF, magenta = magnetometers). The satellite view is rotated so that the image at 0° faces the alignment.



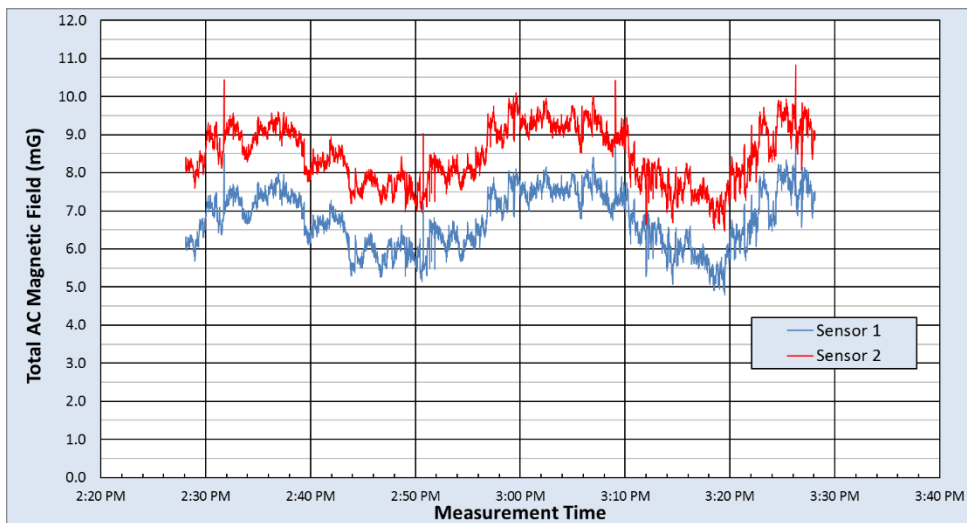
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Figure 11c Location 7: Local EMF Sources

Photos depicting visible close-proximity emitters, including distribution lines perpendicular to the alignment and relatively distance cellular communications. Other emissions sources may exist but are not visible from the site.



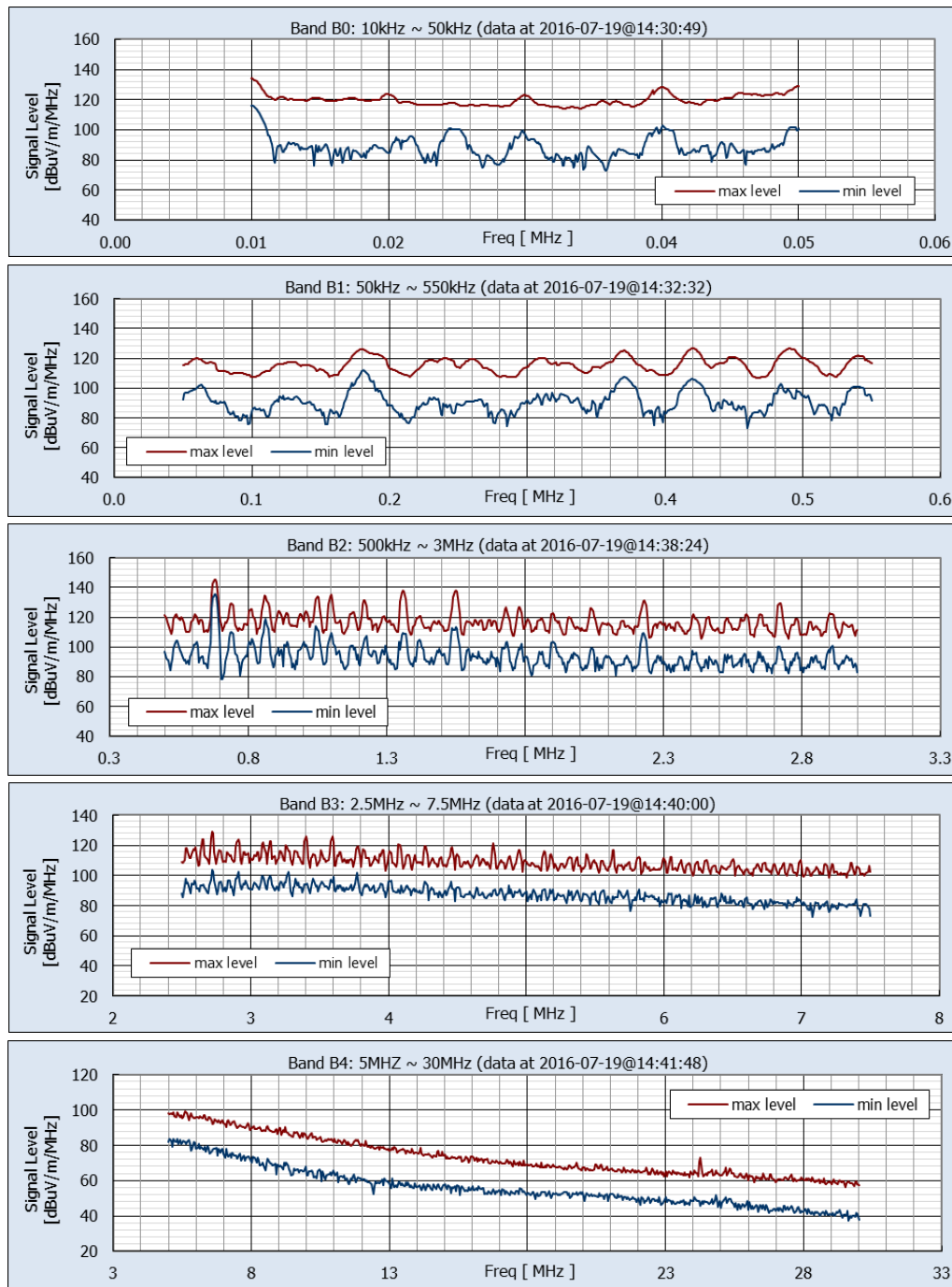
DC Magnetic Field Measurement Statistics						
	B Horizontal (mG)		B Vertical (mG)		B Total (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	189.8	232.4	468.3	387.3	500.9	445.3
Median	176.2	213.7	467.5	386.5	499.5	441.6
Min	167.8	204.2	453.9	373.7	485.2	428.8
Range	22.1	28.2	14.4	13.6	15.6	16.4
Std Dev	0.9	0.8	0.9	0.8	0.9	0.8



rms AC Magnetic Field Measurement Statistics																
	Fund 60Hz (mG)		2nd (mG)		3rd (mG)		4th (mG)		5th (mG)		6th (mG)		7th (mG)		Total AC (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	8.861	10.703	0.187	0.154	1.684	1.801	0.128	0.093	0.259	0.260	0.076	0.072	0.150	0.164	8.991	10.823
Median	6.560	8.273	0.077	0.077	1.556	1.659	0.058	0.051	0.192	0.204	0.023	0.023	0.115	0.129	6.742	8.442
Min	4.561	6.251	0.019	0.024	1.364	1.435	0.033	0.030	0.149	0.156	0.006	0.006	0.085	0.093	4.811	6.464
Range	4.299	4.452	0.168	0.130	0.320	0.366	0.095	0.064	0.110	0.104	0.070	0.066	0.065	0.071	4.180	4.359
Std Dev	0.762	0.760	0.021	0.020	0.071	0.074	0.007	0.007	0.013	0.014	0.006	0.006	0.009	0.010	0.753	0.754

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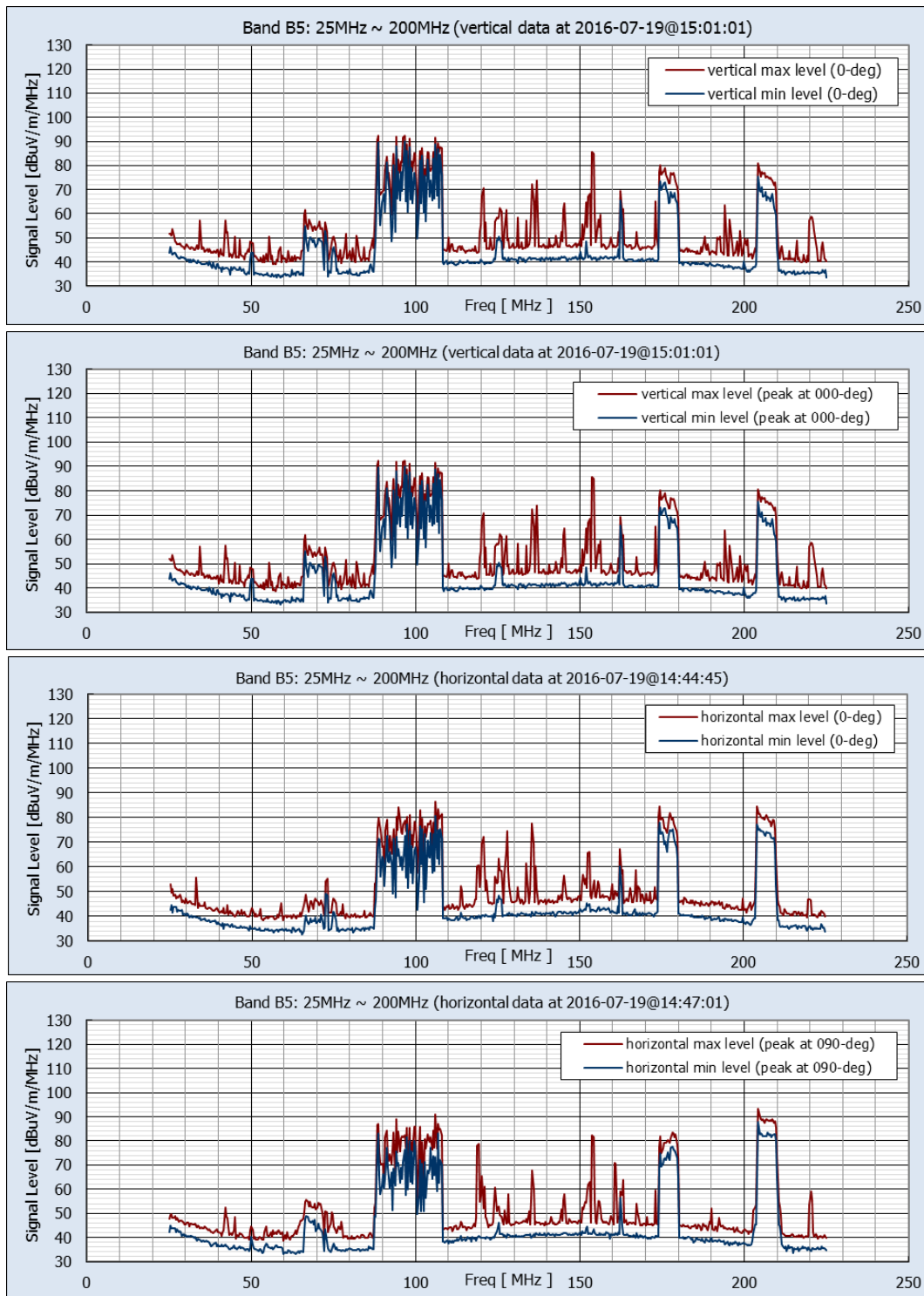
Figure 11d Location 7: Alternating Current and Direct Current Magnetic Field Measurement Results



Maximum Levels					
Band number	Freq. Range (MHz)	Pk Min-Hold dB uV/m/MHz	@ Freq. (MHz)	Pk Max-Hold dB uV/m/MHz	@ Freq. (MHz)
B0	0.01 ~ 0.05	116.1	0.0101	134.0	0.0100
B1	0.05 ~ 0.55	111.9	0.1809	126.6	0.4209
B2	0.50 ~ 3.00	135.1	0.6818	145.3	0.6818
B3	2.5 ~ 7.5	103.8	2.7182	129.4	2.7182
B4	5 ~ 30	83.6	5.3182	98.9	5.5909

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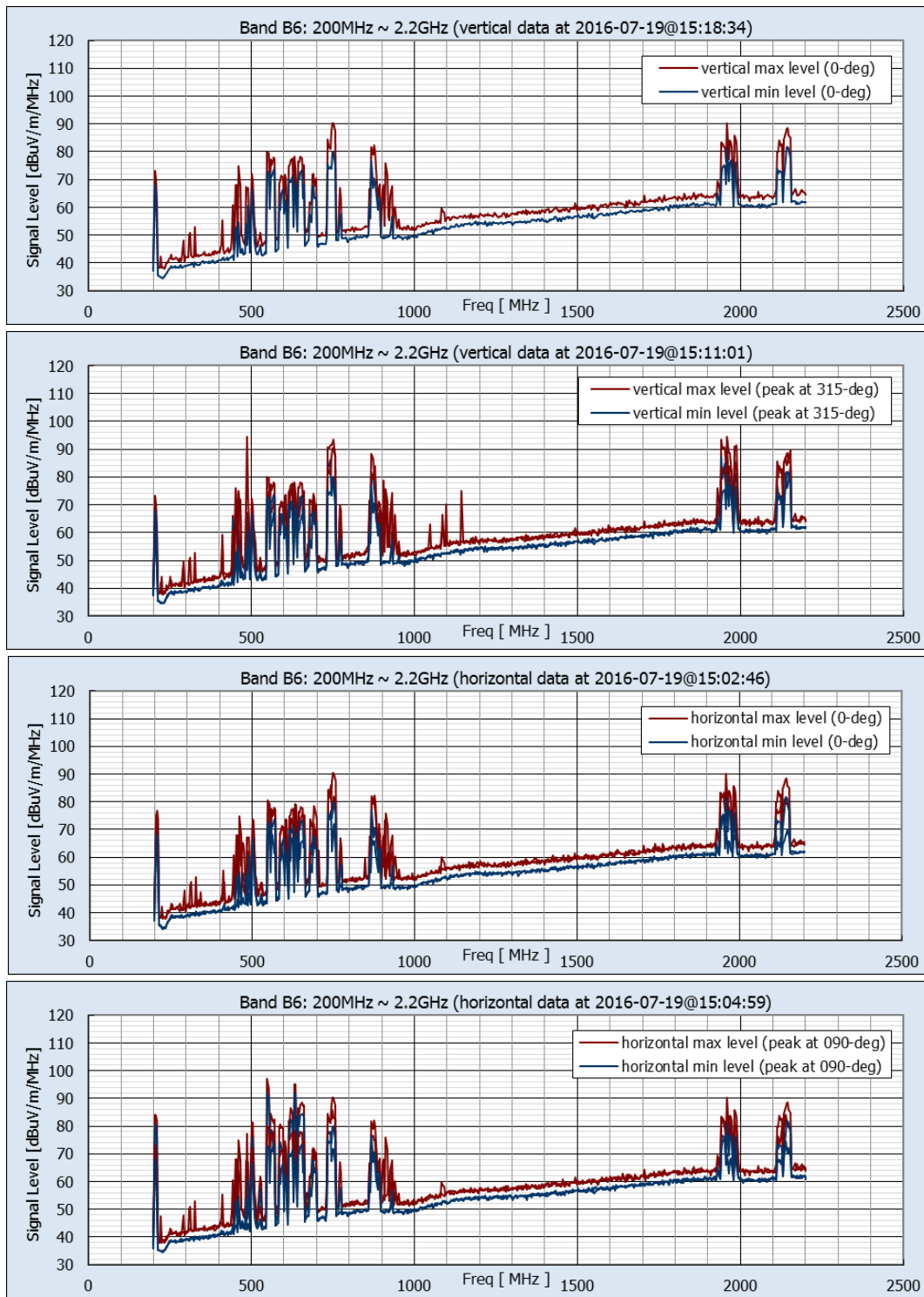
Figure 11e Location 7: Measured Environmental Radio Frequency Levels Non-Directional Data from Vertically Oriented Monopole Antenna, Bands 0–4



Maximum Levels									
Band number	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B5	25 ~ 200	89.8	96.636	92.3	88.636	87.7	204.273	93.2	204.273

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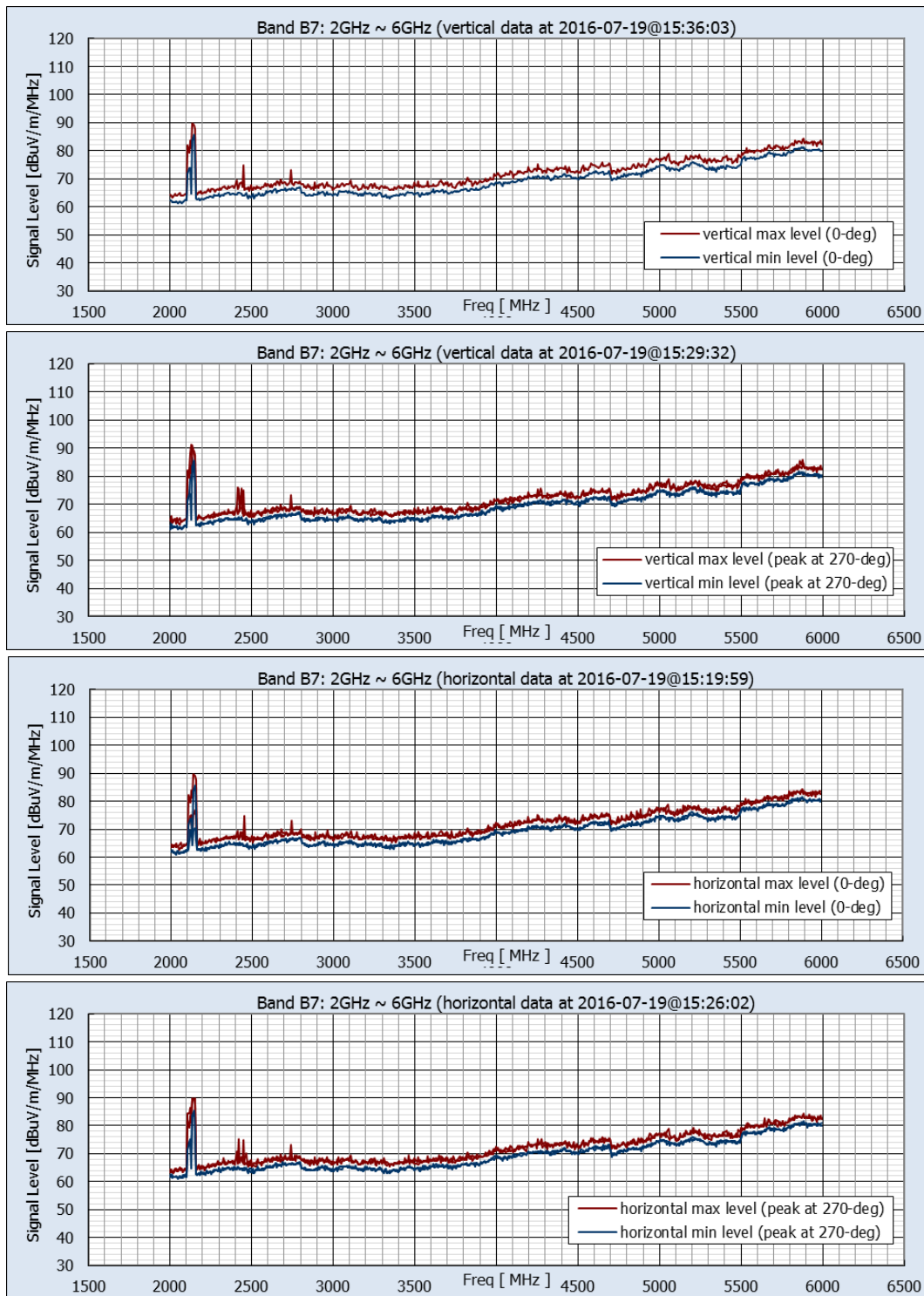
Figure 11f Location 7: Measured Environmental Radio Frequency Levels Band 5 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B6	200 ~ 2200	87.7	1960.000	94.6	487.273	92.1	549.091	97.1	549.091

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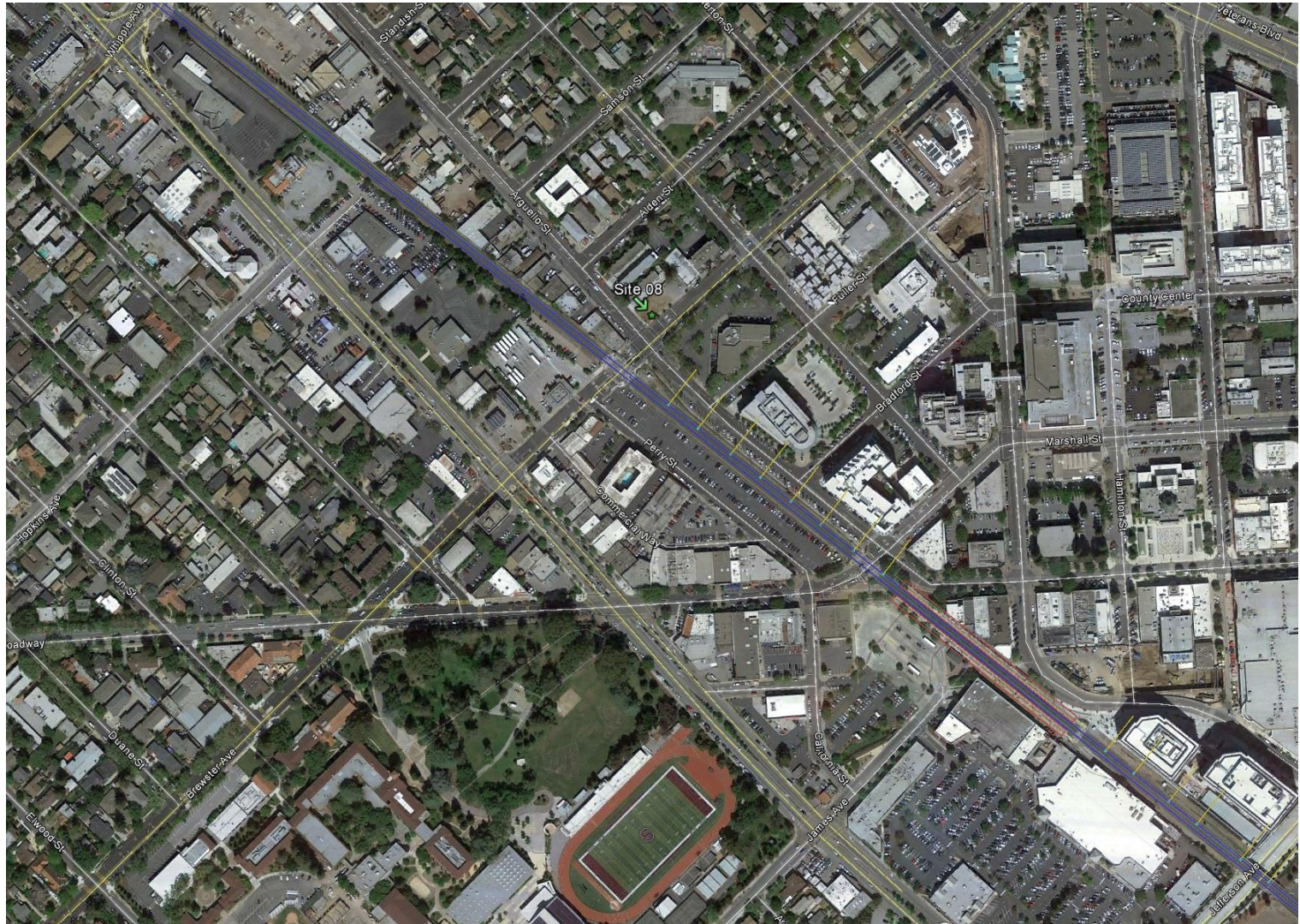
Figure 11g Location 7: Measured Environmental Radio Frequency Levels Band 6 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B7	2000~6000	86.4	2138.182	91.3	2130.909	83.7	2145.455	89.7	2152.727

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Figure 11h Location 7: Measured Environmental Radio Frequency Levels Band 7 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



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Figure 12a Location 8: Arguello Street/Brewster Avenue, Redwood City

Urban setting adjacent to medical center and near the existing rail alignment (Lat 37.488378°, Lon -122.234697°)



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Figure 12b Location 8: Measurement Location and Site Views

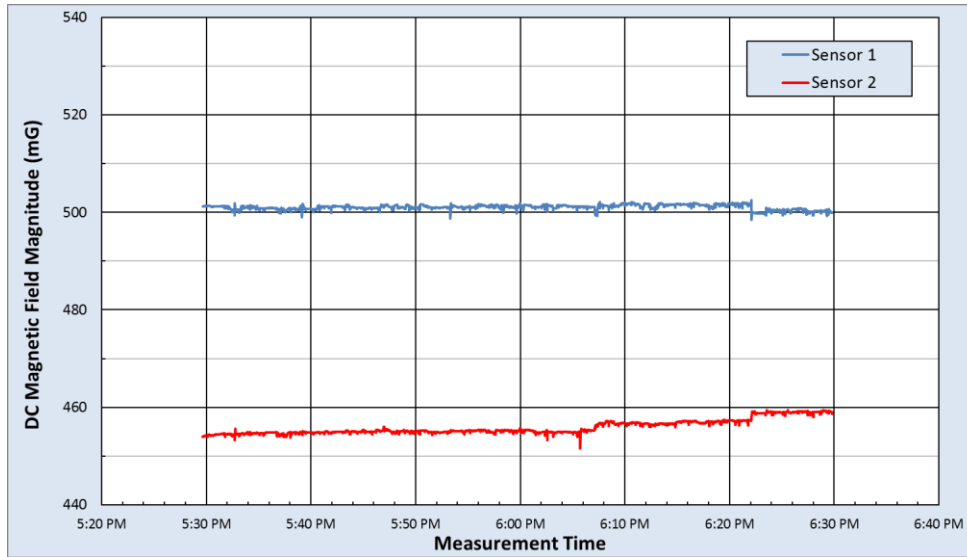
Photos depicting the site from the perspective of the RF measurement location. In the center is a satellite view, indicating the alignment (green line) and measurement points (red = RF, magenta = magnetometers). The satellite view is rotated so that the image at 0° faces the alignment.



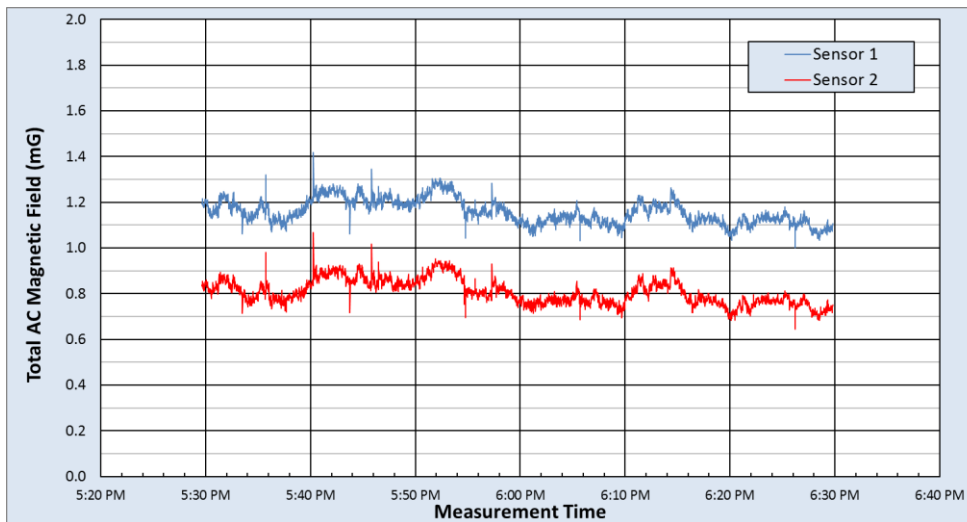
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Figure 12c Location 8: Local EMF Sources

Photos depicting visible close-proximity emitters, including cell towers and distribution lines parallel and perpendicular to the alignment. Other emissions sources may exist but are not visible from the site.



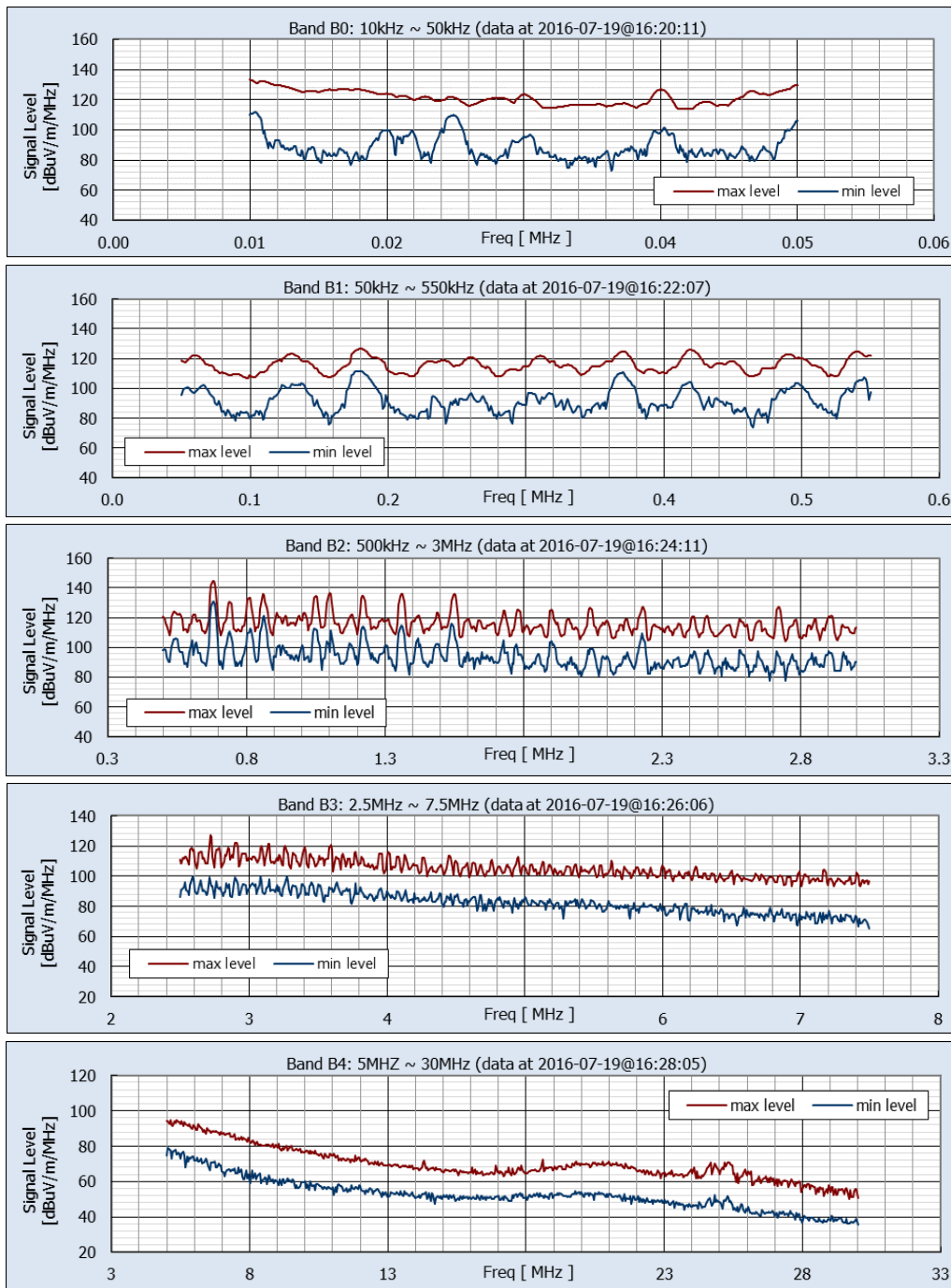
DC Magnetic Field Measurement Statistics						
	B Horizontal (mG)		B Vertical (mG)		B Total (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	263.9	263.5	429.8	383.7	502.6	459.4
Median	259.3	254.3	428.7	377.4	501.1	455.2
Min	255.8	247.2	426.7	374.1	498.4	451.6
Range	8.1	16.3	3.2	9.6	4.1	7.8
Std Dev	0.6	2.7	0.5	1.1	0.5	1.5



rms AC Magnetic Field Measurement Statistics																
	Fund 60Hz (mG)		2nd (mG)		3rd (mG)		4th (mG)		5th (mG)		6th (mG)		7th (mG)		Total AC (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	1.413	1.064	0.033	0.093	0.110	0.105	0.023	0.053	0.037	0.042	0.024	0.036	0.063	0.054	1.417	1.068
Median	1.145	0.791	0.018	0.018	0.092	0.084	0.010	0.011	0.021	0.015	0.011	0.011	0.041	0.027	1.150	0.797
Min	0.997	0.642	0.006	0.004	0.069	0.063	0.002	0.002	0.005	0.004	0.002	0.002	0.023	0.009	1.003	0.648
Range	0.416	0.422	0.027	0.089	0.042	0.042	0.021	0.051	0.033	0.038	0.022	0.034	0.040	0.045	0.413	0.420
Std Dev	0.054	0.056	0.004	0.005	0.006	0.005	0.003	0.004	0.005	0.004	0.003	0.003	0.006	0.005	0.054	0.055

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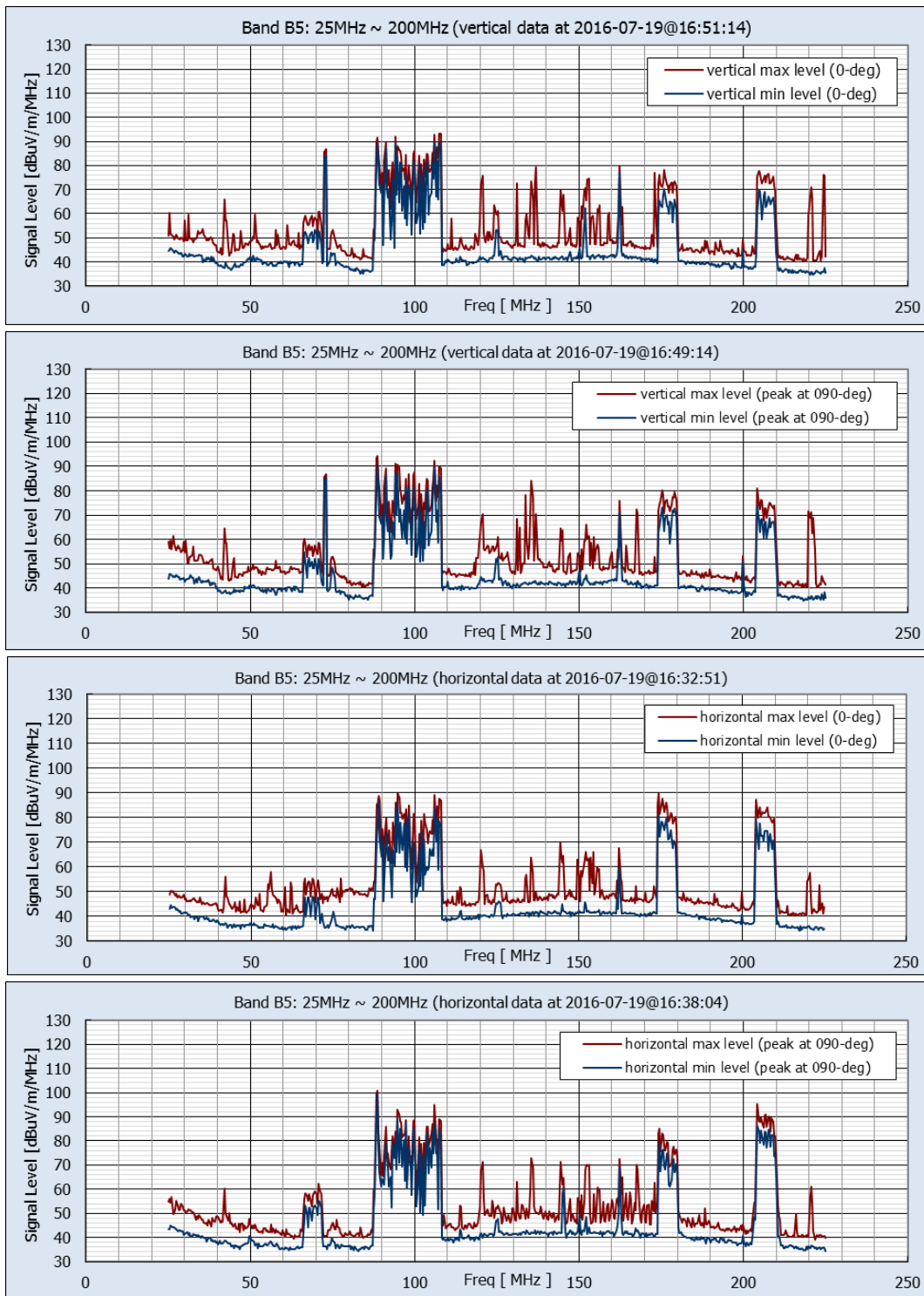
Figure 12d Location 8: Alternating Current and Direct Current Magnetic Field Measurement Results



Maximum Levels					
Band number	Freq. Range (MHz)	Pk Min-Hold dB uV/m/MHz	@ Freq. (MHz)	Pk Max-Hold dB uV/m/MHz	@ Freq. (MHz)
B0	0.01 ~ 0.05	111.8	0.0104	133.2	0.0100
B1	0.05 ~ 0.55	111.6	0.1791	126.5	0.1800
B2	0.50 ~ 3.00	130.5	0.6818	144.8	0.6818
B3	2.5 ~ 7.5	99.9	3.0818	127.0	2.7182
B4	5 ~ 30	79.2	5.0455	94.9	5.1364

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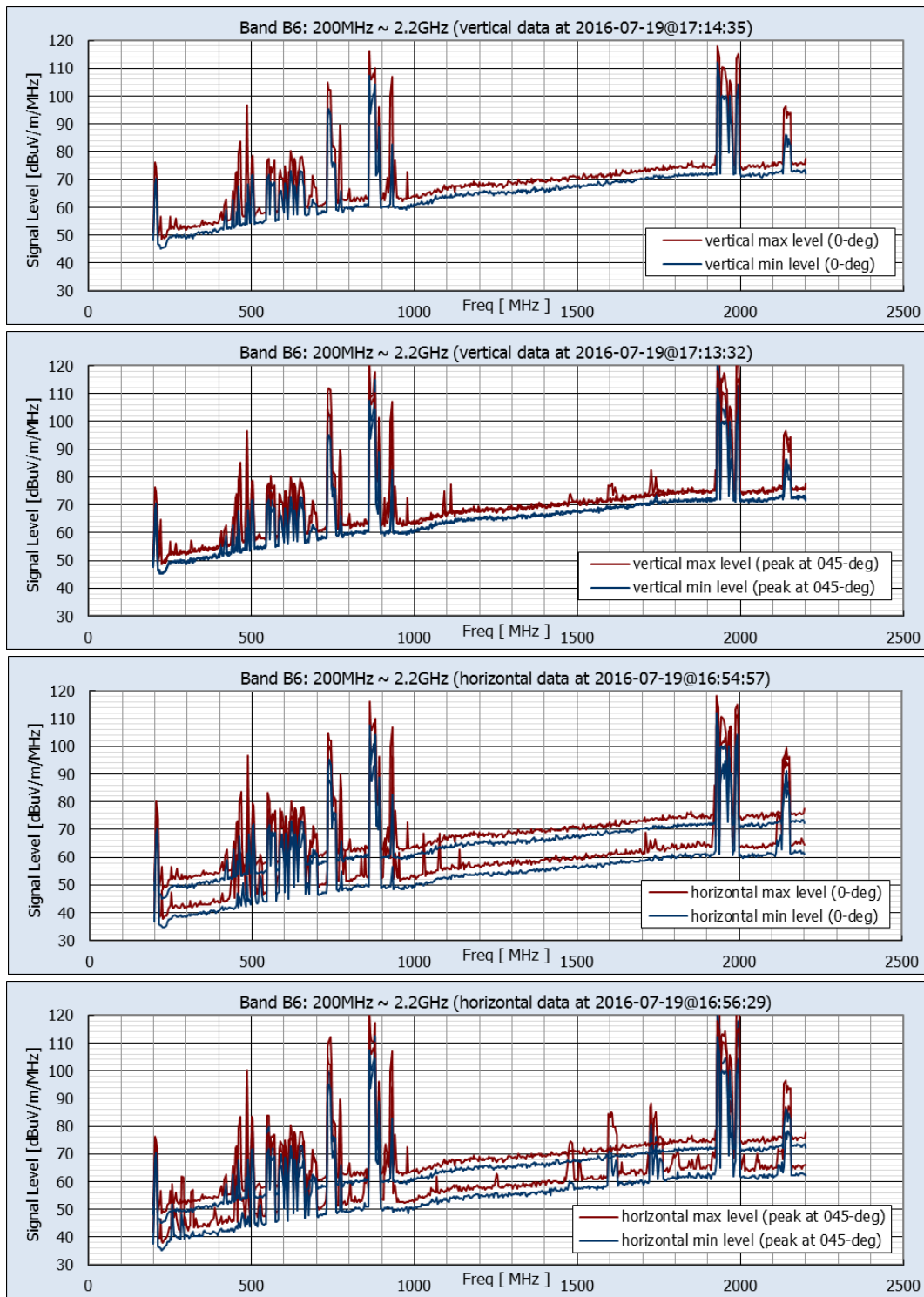
Figure 12e Location 8: Measured Environmental Radio Frequency Levels Non-Directional Data from Vertically Oriented Monopole Antenna, Bands 0–4



Maximum Levels									
Band number	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B5	25 ~ 200	90.3	88.636	94.1	88.636	99.5	88.636	101.0	88.636

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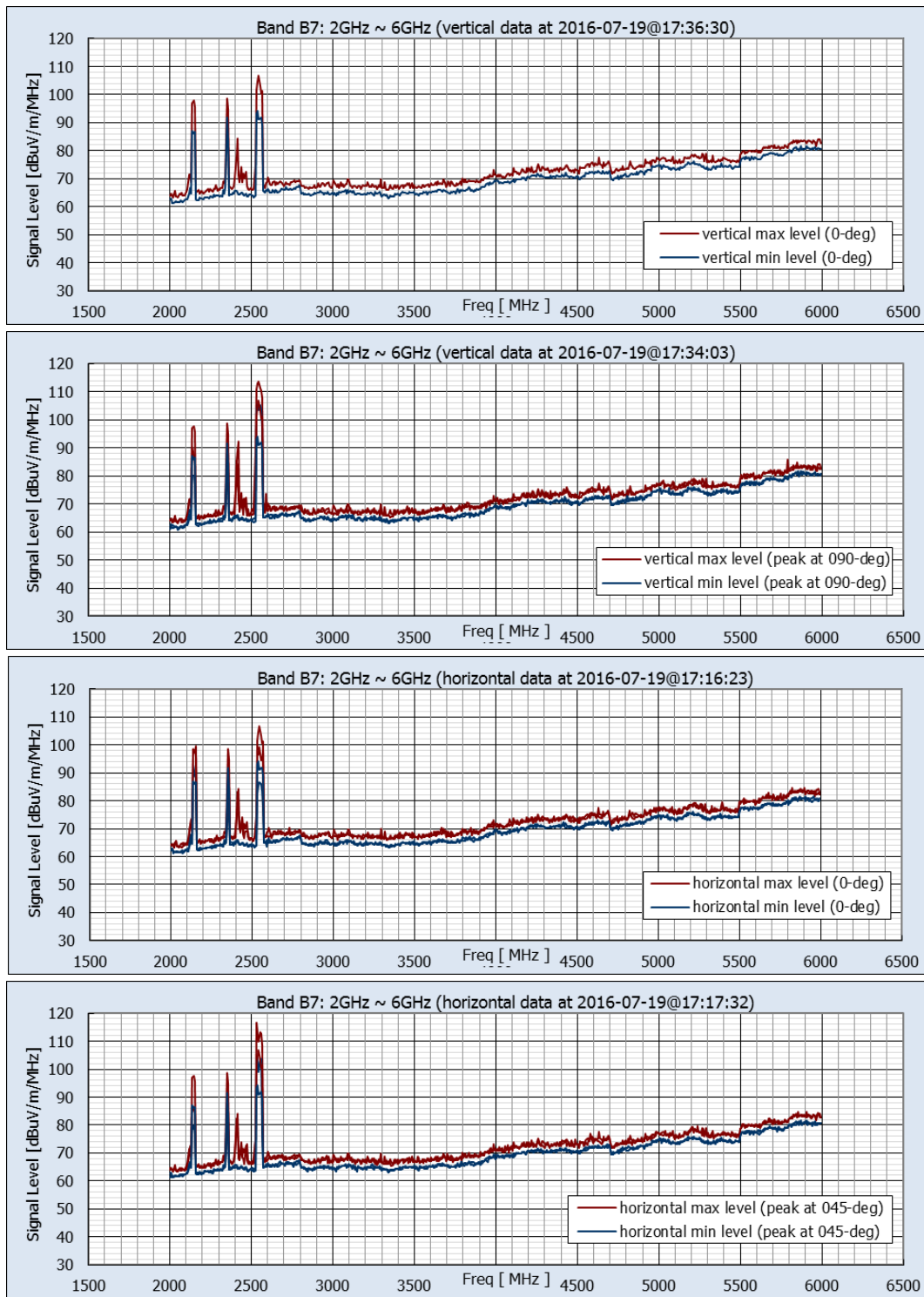
Figure 12f Location 8: Measured Environmental Radio Frequency Levels Band 5 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B6	200 ~ 2200	120.9	1930.909	126.9	1934.545	120.4	1930.909	130.4	1930.909

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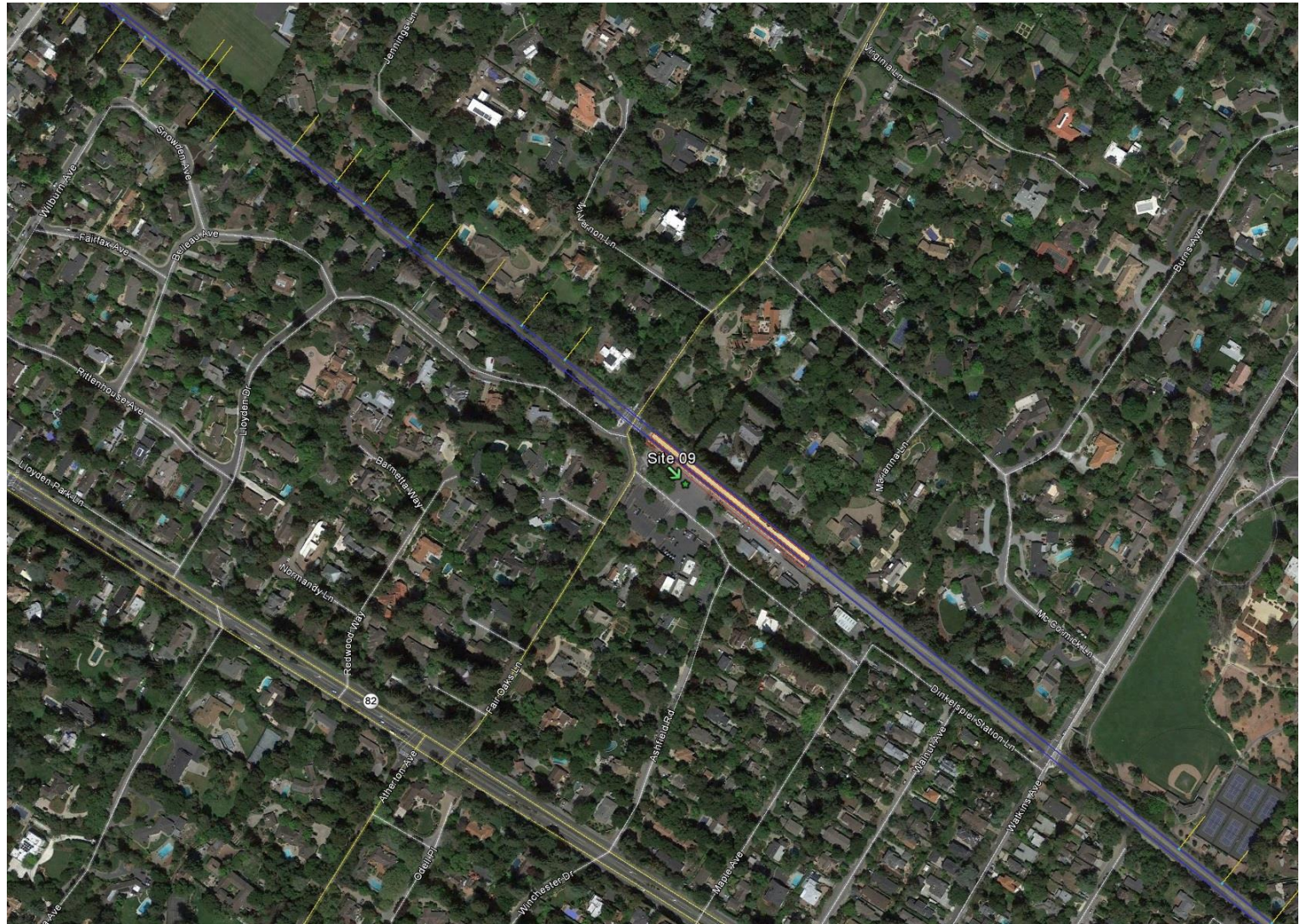
Figure 12g Location 8: Measured Environmental Radio Frequency Levels Band 6 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B7	2000~6000	105.2	2552.727	113.7	2545.455	104.0	2538.182	116.7	2530.909

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Figure 12h Location 8: Measured Environmental Radio Frequency Levels Band 7 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



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Figure 13a Location 9: Fair Oaks Lane/Dinkelspiel Station Lane, Atherton

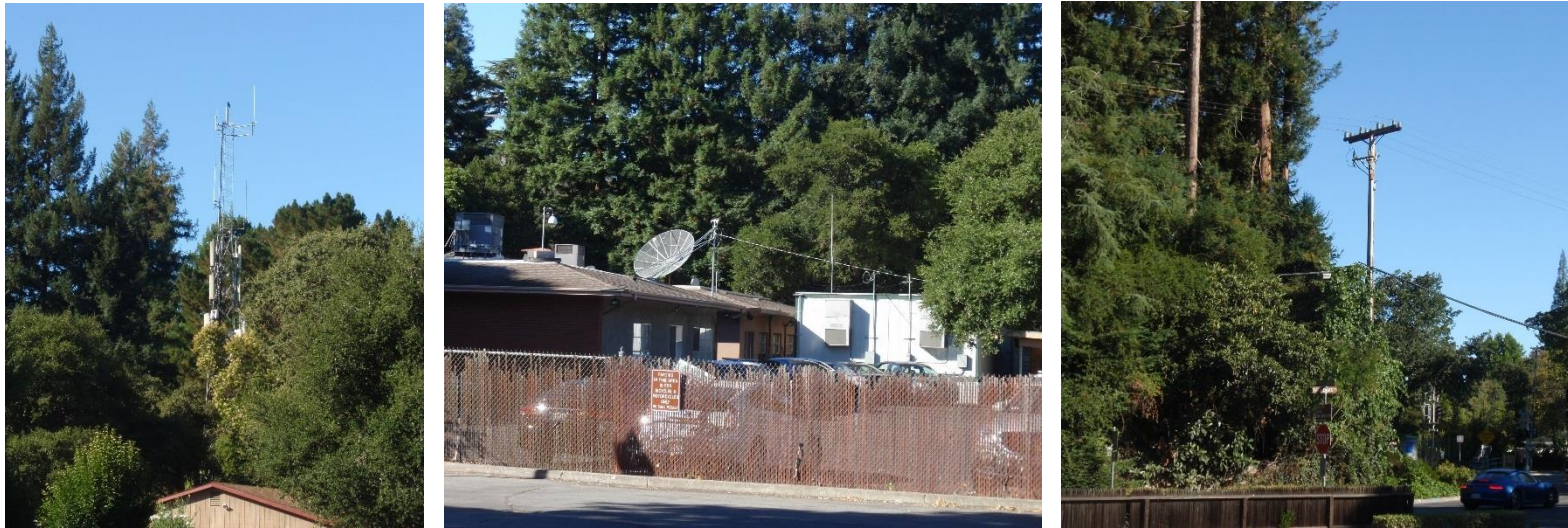
Suburban setting adjacent to the Atherton Police Department, Caltrain station (Lat 37.464290°, Lon -122.197755°)



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Figure 13b Location 9: Measurement Location and Site Views

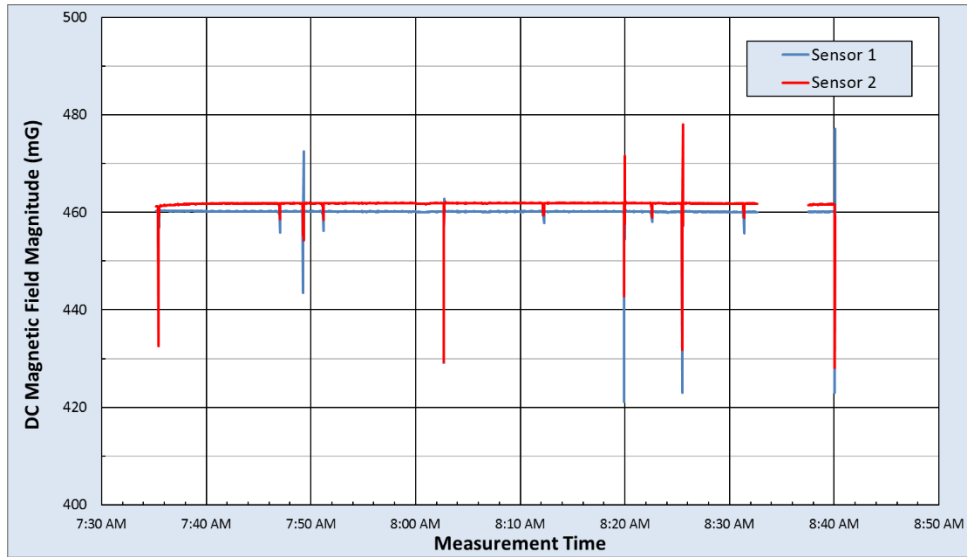
Photos depicting the site from the perspective of the RF measurement location. In the center is a satellite view, indicating the alignment (green line) and measurement points (red = RF, magenta = magnetometers). The satellite view is rotated so that the image at 0° faces the alignment.



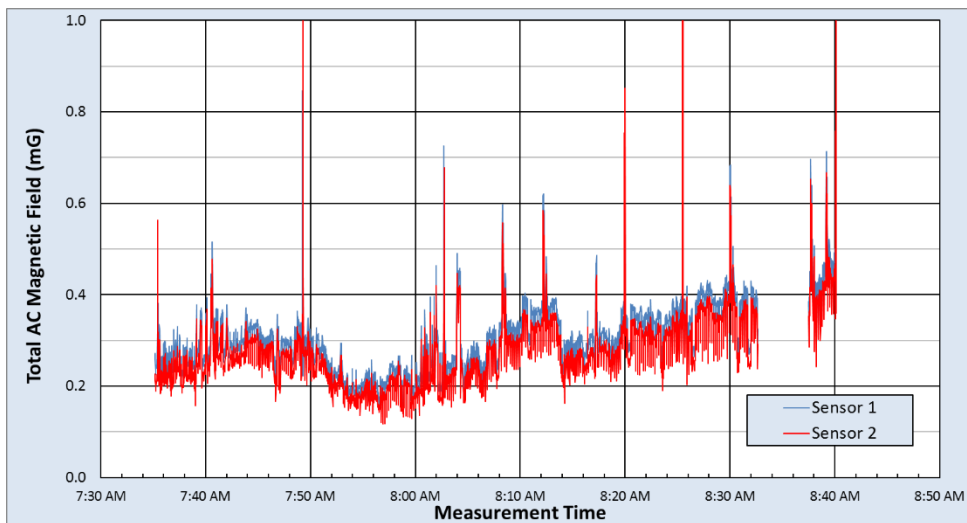
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Figure 13c Location 9: Local EMF Sources

Photos depicting visible close-proximity emitters including police communications, and distribution lines perpendicular to the alignment. Other emissions sources may exist but are not visible from the site.



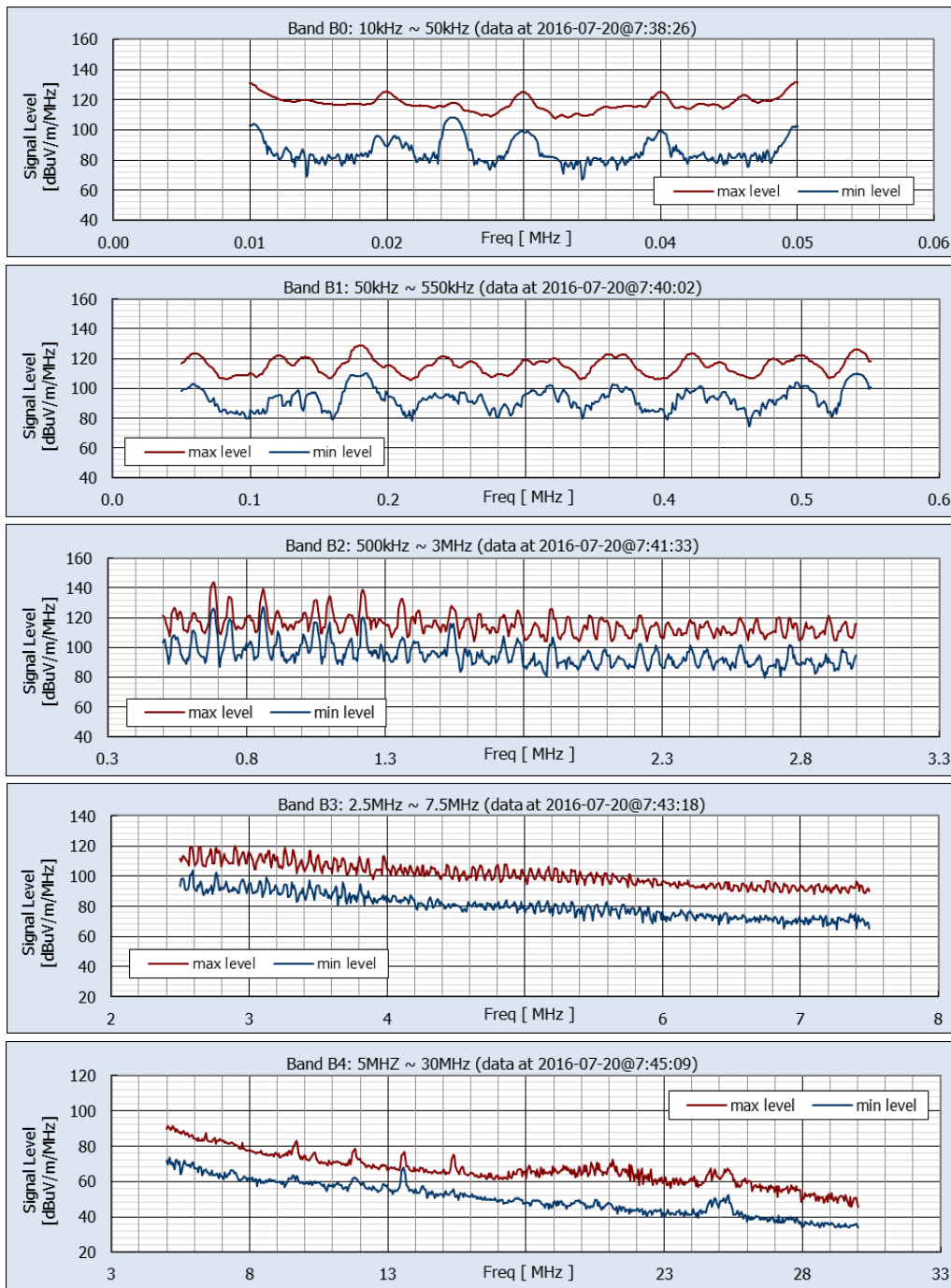
DC Magnetic Field Measurement Statistics						
	B Horizontal (mG)		B Vertical (mG)		B Total (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	249.0	268.7	407.1	397.2	477.2	478.0
Median	215.6	239.0	406.5	395.2	460.2	461.8
Min	200.3	218.8	366.6	354.4	421.3	428.1
Range	48.7	49.9	40.5	42.8	55.9	49.9
Std Dev	0.9	0.8	1.4	1.4	1.3	1.2



rms AC Magnetic Field Measurement Statistics																
	Fund 60Hz (mG)		2nd (mG)		3rd (mG)		4th (mG)		5th (mG)		6th (mG)		7th (mG)		Total AC (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	0.983	1.276	0.486	0.800	0.369	0.551	0.259	0.416	0.212	0.347	0.182	0.297	0.165	0.271	1.229	1.740
Median	0.279	0.251	0.009	0.011	0.103	0.090	0.009	0.014	0.020	0.020	0.009	0.011	0.015	0.014	0.297	0.267
Min	0.095	0.078	0.002	0.001	0.058	0.044	0.002	0.002	0.006	0.005	0.002	0.002	0.003	0.002	0.145	0.118
Range	0.888	1.199	0.484	0.799	0.311	0.507	0.257	0.414	0.206	0.342	0.180	0.295	0.162	0.270	1.084	1.622
Std Dev	0.081	0.081	0.015	0.021	0.017	0.018	0.008	0.012	0.007	0.010	0.006	0.008	0.006	0.008	0.080	0.083

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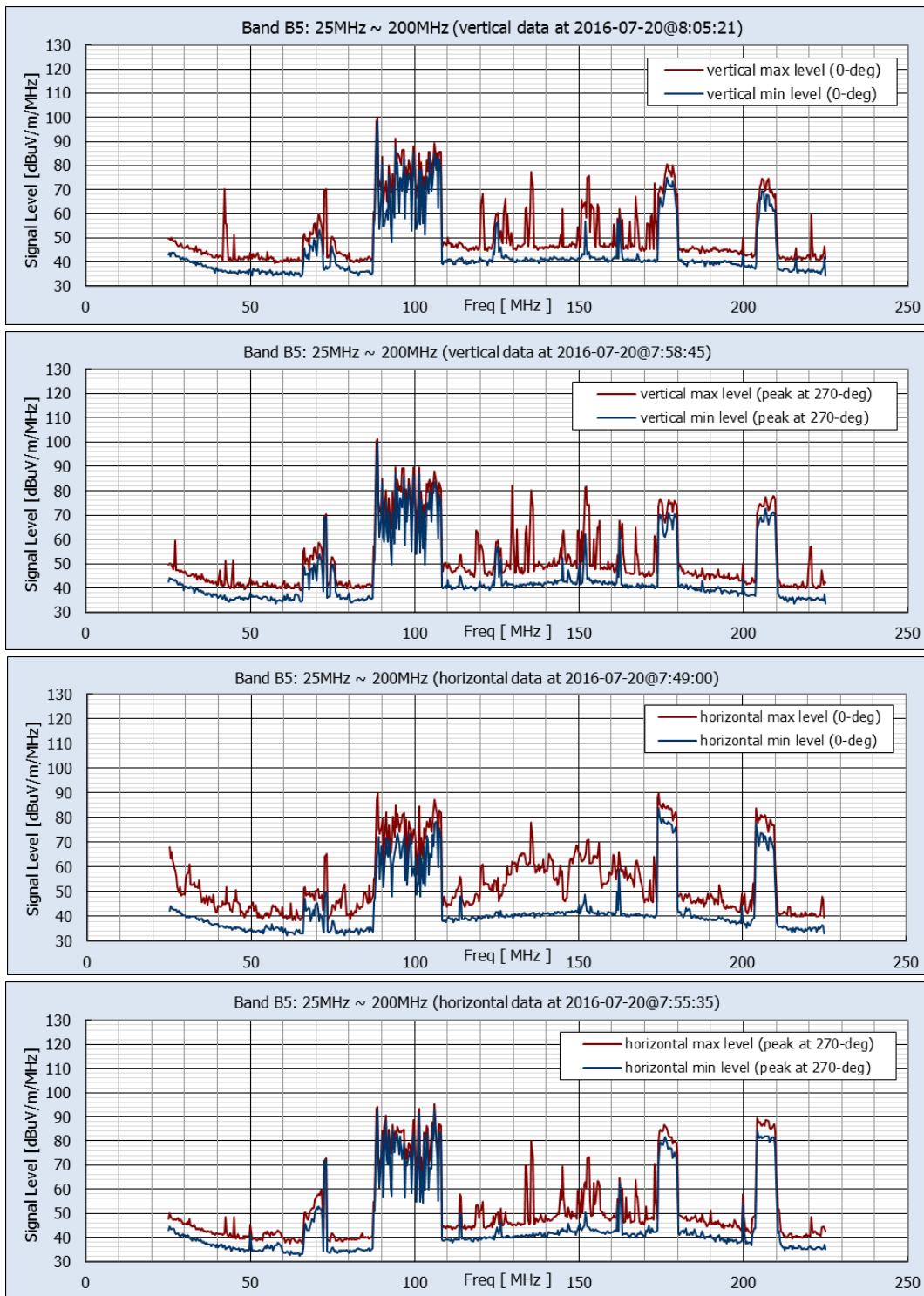
Figure 13d Location 9: Alternating Current and Direct Current Magnetic Field Measurement Results



Maximum Levels					
Band number	Freq. Range (MHz)	Pk Min-Hold dB uV/m/MHz	@ Freq. (MHz)	Pk Max-Hold dB uV/m/MHz	@ Freq. (MHz)
B0	0.01 ~ 0.05	108.4	0.0248	131.9	0.0500
B1	0.05 ~ 0.55	110.1	0.1836	128.8	0.1800
B2	0.50 ~ 3.00	127.2	0.8591	143.7	0.6818
B3	2.5 ~ 7.5	103.5	2.5909	120.3	2.9000
B4	5 ~ 30	73.7	5.0909	91.5	5.2273

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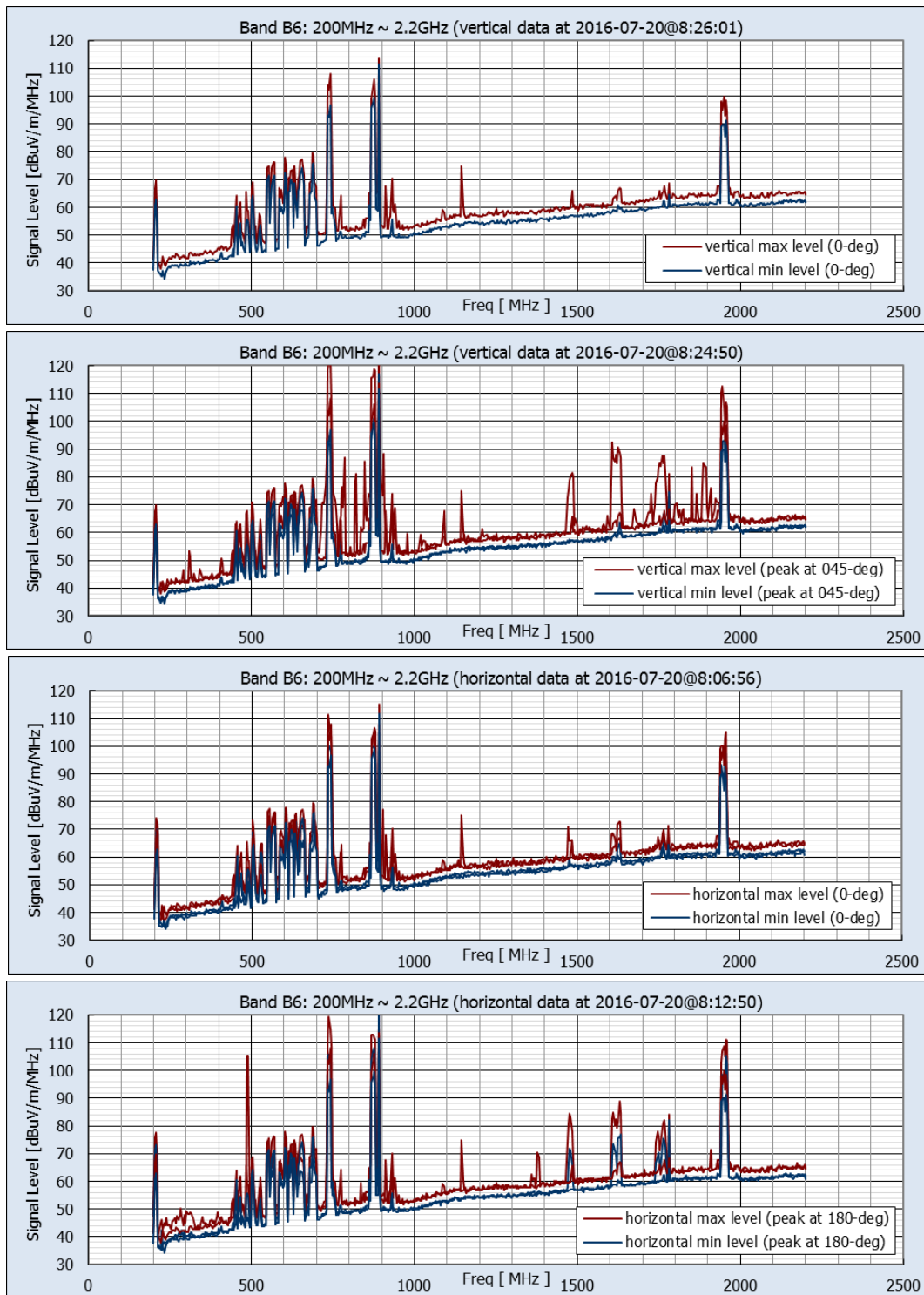
Figure 13e Location 9: Measured Environmental Radio Frequency Levels Non-Directional Data from Vertically Oriented Monopole Antenna, Bands 0–4



Maximum Levels									
Band number	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B5	25 ~ 200	99.9	88.636	101.2	88.636	93.1	88.636	95.3	106.091

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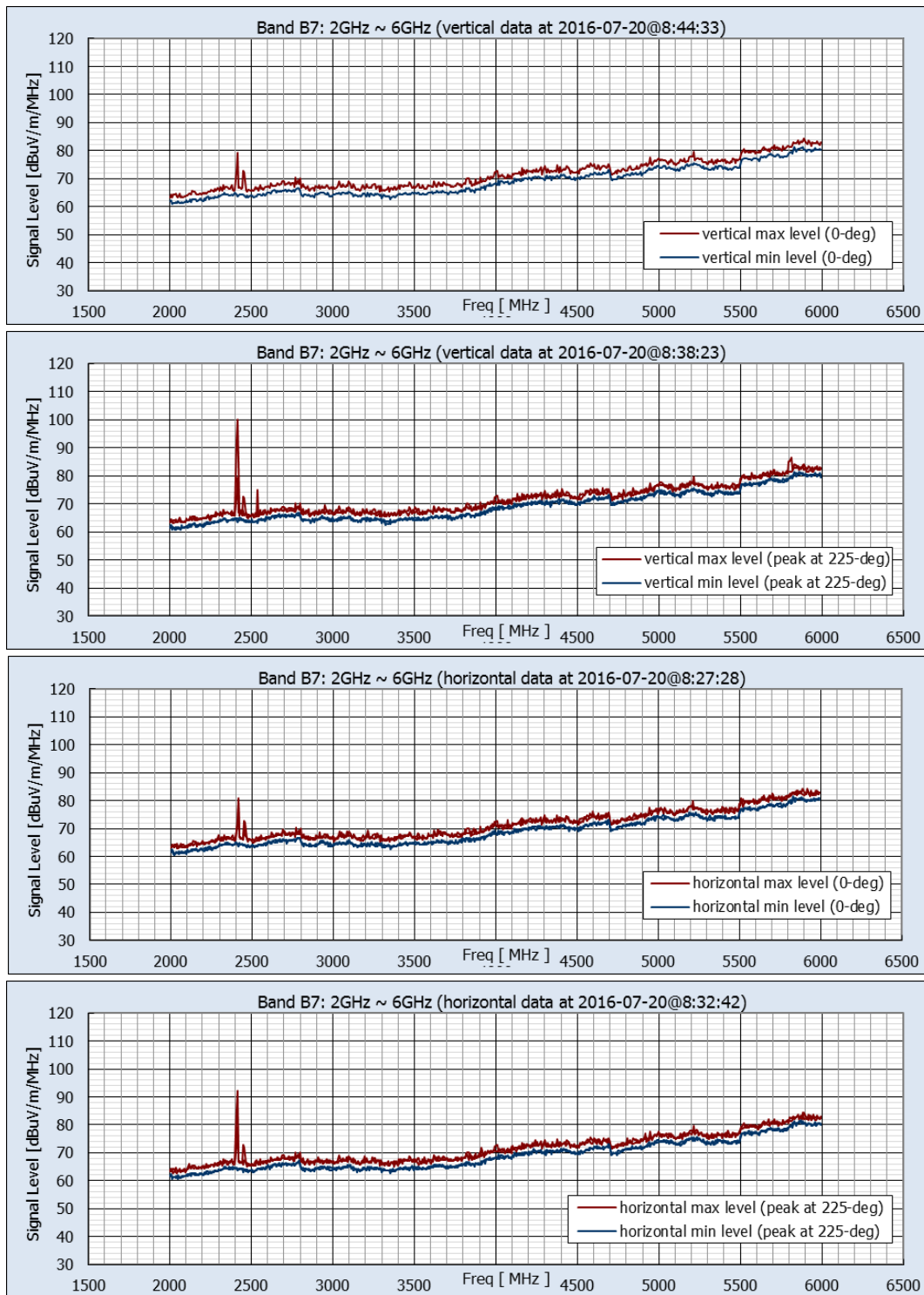
Figure 13f Location 9: Measured Environmental Radio Frequency Levels Band 5 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B6	200 ~ 2200	117.1	890.909	127.2	890.909	120.3	890.909	122.8	890.909

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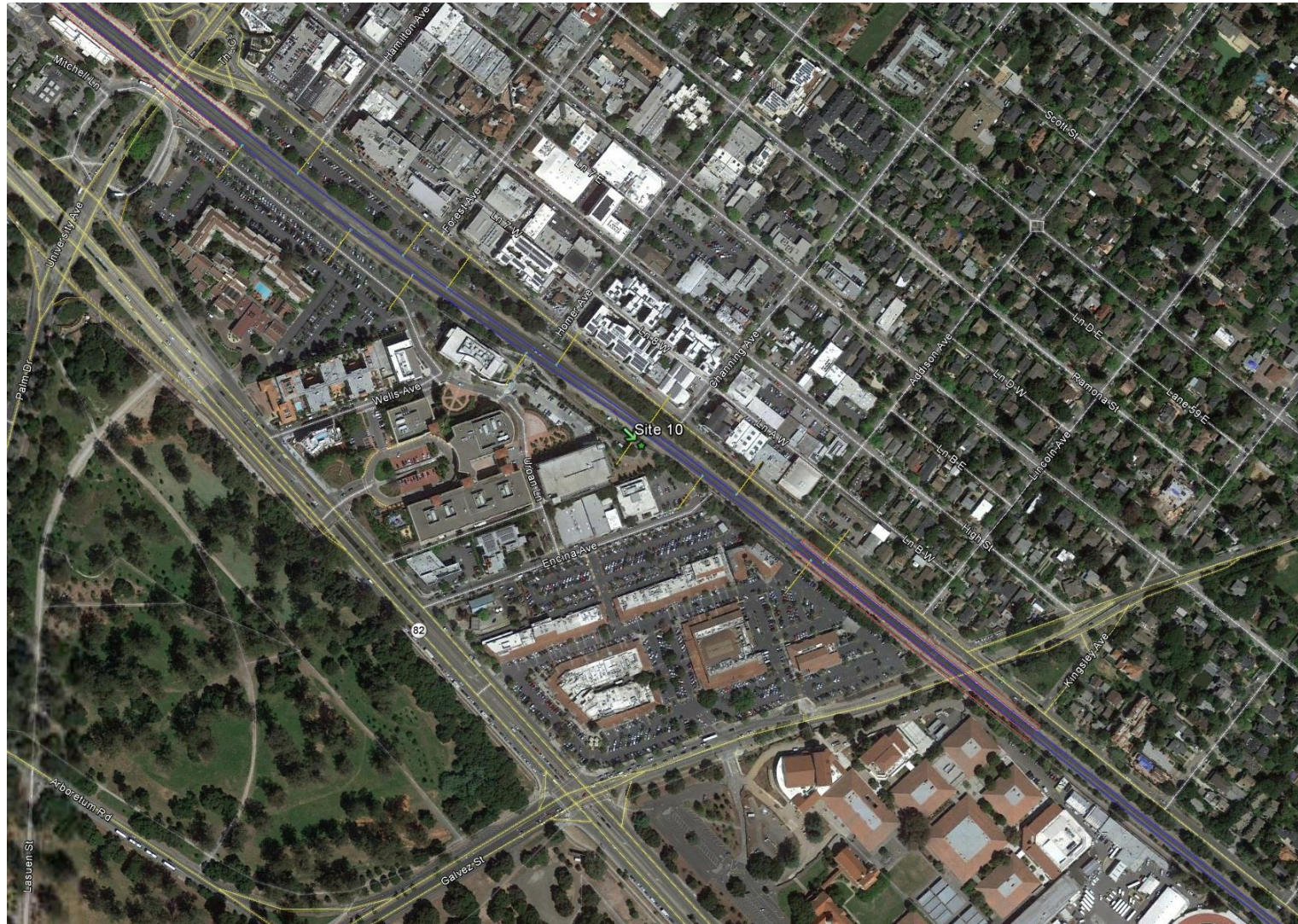
Figure 13g Location 9: Measured Environmental Radio Frequency Levels Band 6 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B7	2000~6000	66.4	2669.091	100.1	2414.545	66.4	2690.909	92.1	2414.545

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Figure 13h Location 9: Measured Environmental Radio Frequency Levels Band 7 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



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Figure 14a Location 10: Urban Lane/Wells Avenue, Palo Alto

Urban setting near the Palo Alto Medical Center (Lat 37.440126°, Lon -122.159531°)



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Figure 14b Location 10: Measurement Location and Site Views

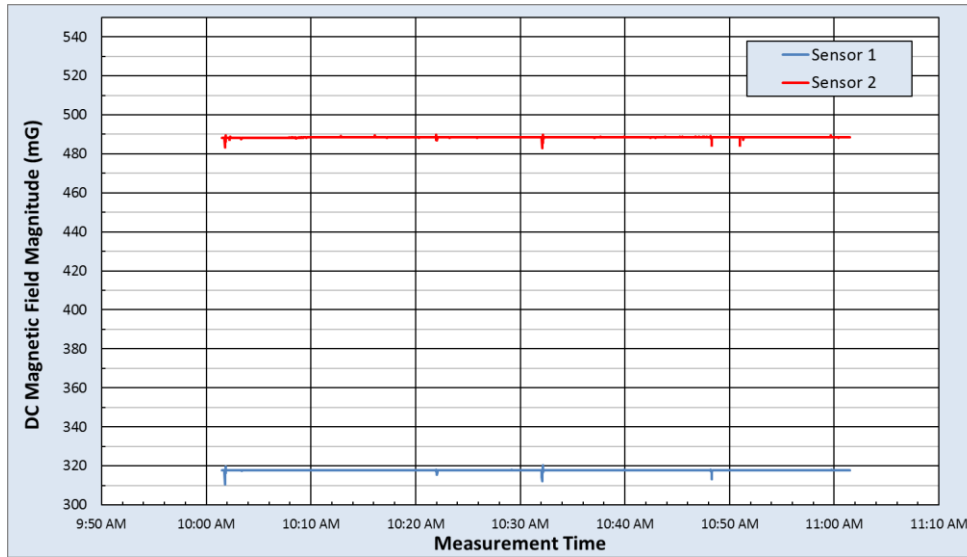
Photos depicting the site from the perspective of the RF measurement location. In the center is a satellite view, indicating the alignment (green line) and measurement points (red = RF, magenta = magnetometers). The satellite view is rotated so that the image at 0° faces the alignment.



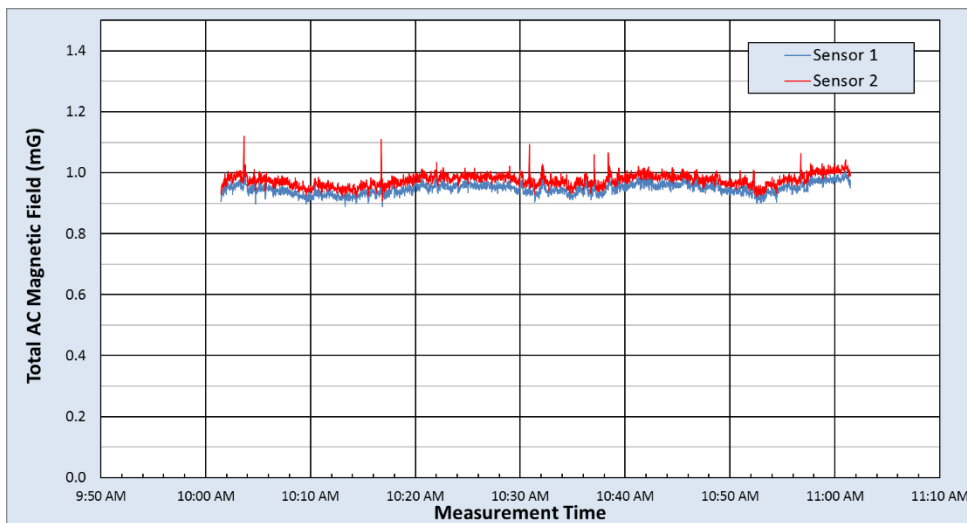
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Figure 14c Location 10: Local EMF Sources

Immediately adjacent to the Palo Alto Medical Center. Nearby emitters railway communications and distribution lines parallel to the alignment. Photos depicting visible close-proximity emitters. Other emissions sources may exist but are not visible from the site.



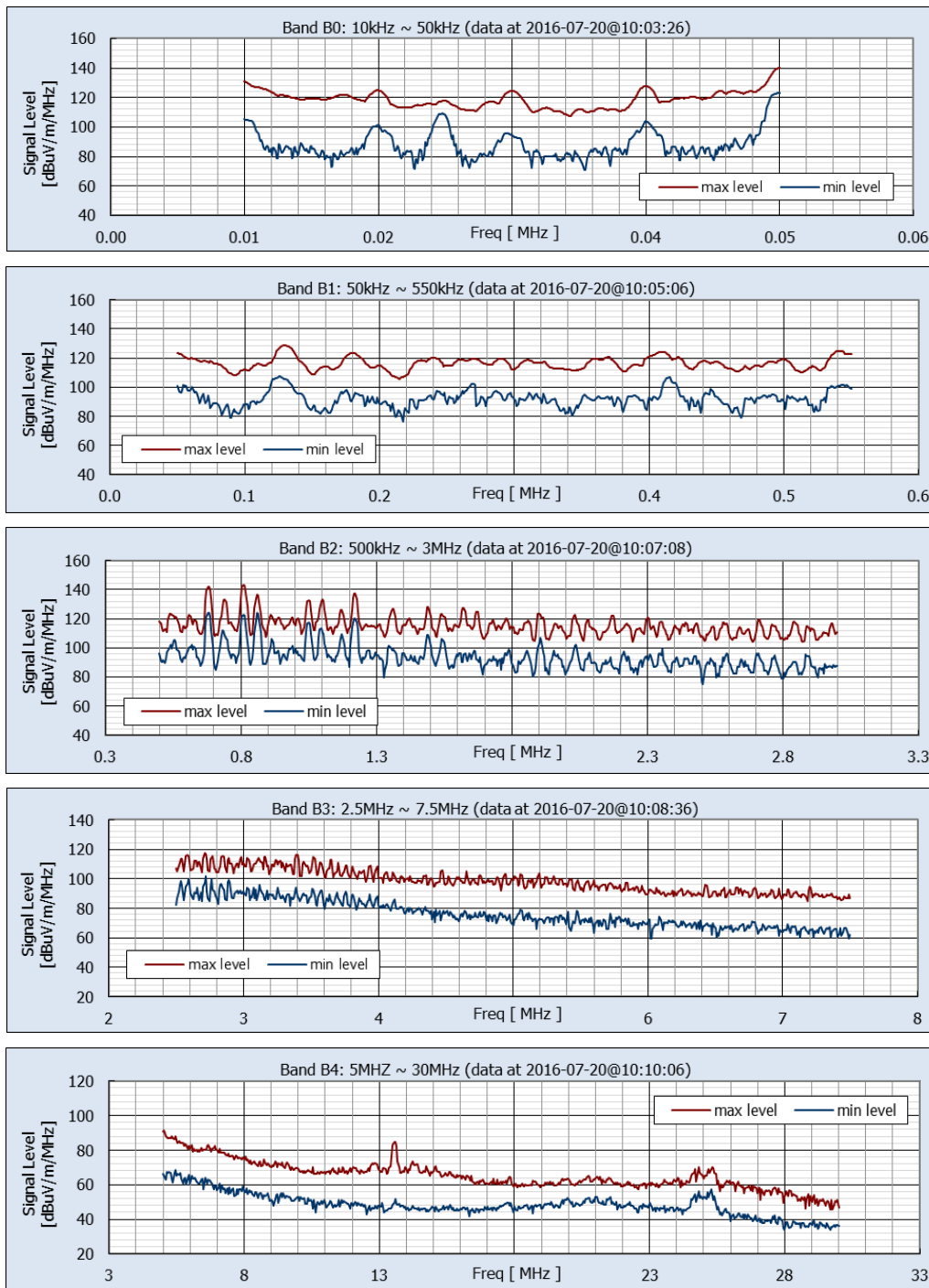
DC Magnetic Field Measurement Statistics						
	B Horizontal (mG)		B Vertical (mG)		B Total (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	209.3	349.9	243.3	343.8	320.2	489.8
Median	204.7	347.4	243.0	343.4	317.8	488.5
Min	200.6	343.2	235.6	334.8	310.4	483.0
Range	8.6	6.7	7.7	9.0	9.8	6.7
Std Dev	0.2	0.3	0.3	0.3	0.2	0.2



rms AC Magnetic Field Measurement Statistics																
	Fund 60Hz (mG)		2nd (mG)		3rd (mG)		4th (mG)		5th (mG)		6th (mG)		7th (mG)		Total AC (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	1.038	1.093	0.061	0.036	0.263	0.249	0.026	0.024	0.093	0.084	0.023	0.026	0.074	0.071	1.068	1.119
Median	0.915	0.946	0.015	0.014	0.227	0.220	0.011	0.011	0.074	0.068	0.011	0.011	0.056	0.053	0.947	0.976
Min	0.854	0.878	0.004	0.004	0.209	0.199	0.002	0.002	0.054	0.053	0.003	0.002	0.041	0.036	0.888	0.909
Range	0.184	0.216	0.057	0.032	0.053	0.051	0.024	0.022	0.039	0.031	0.020	0.024	0.034	0.035	0.180	0.210
Std Dev	0.019	0.020	0.004	0.004	0.005	0.005	0.003	0.003	0.004	0.004	0.003	0.003	0.005	0.005	0.018	0.020

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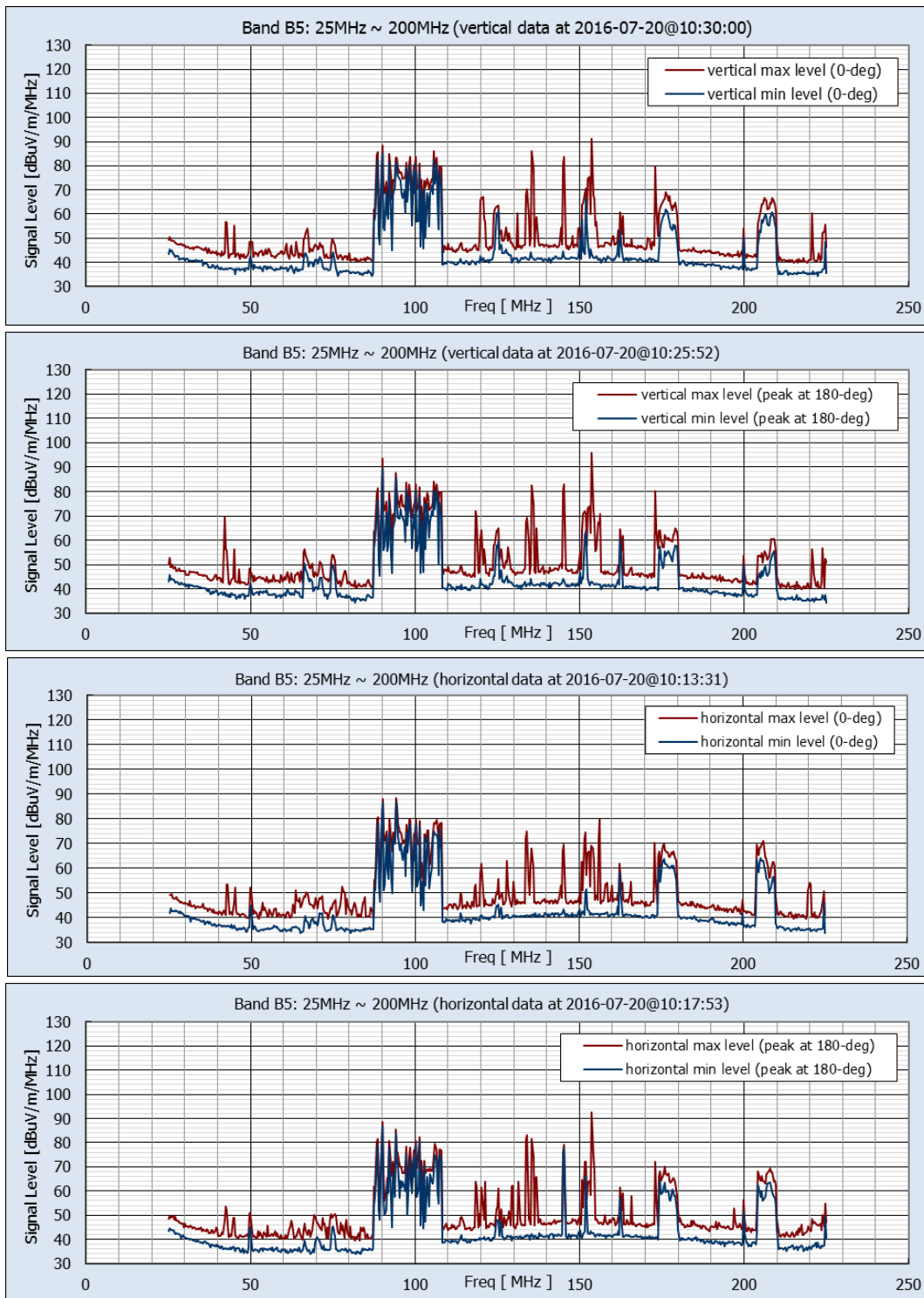
Figure 14d Location 10: Alternating Current and Direct Current Magnetic Field Measurement Results



Maximum Levels					
Band number	Freq. Range (MHz)	Pk Min-Hold dB uV/m/MHz	@ Freq. (MHz)	Pk Max-Hold dB uV/m/MHz	@ Freq. (MHz)
B0	0.01 ~ 0.05	123.0	0.0499	140.2	0.0500
B1	0.05 ~ 0.55	107.6	0.1264	128.7	0.1300
B2	0.50 ~ 3.00	124.3	0.8591	143.1	0.8091
B3	2.5 ~ 7.5	101.7	2.7182	117.7	2.7091
B4	5 ~ 30	68.7	5.4545	91.3	5.0455

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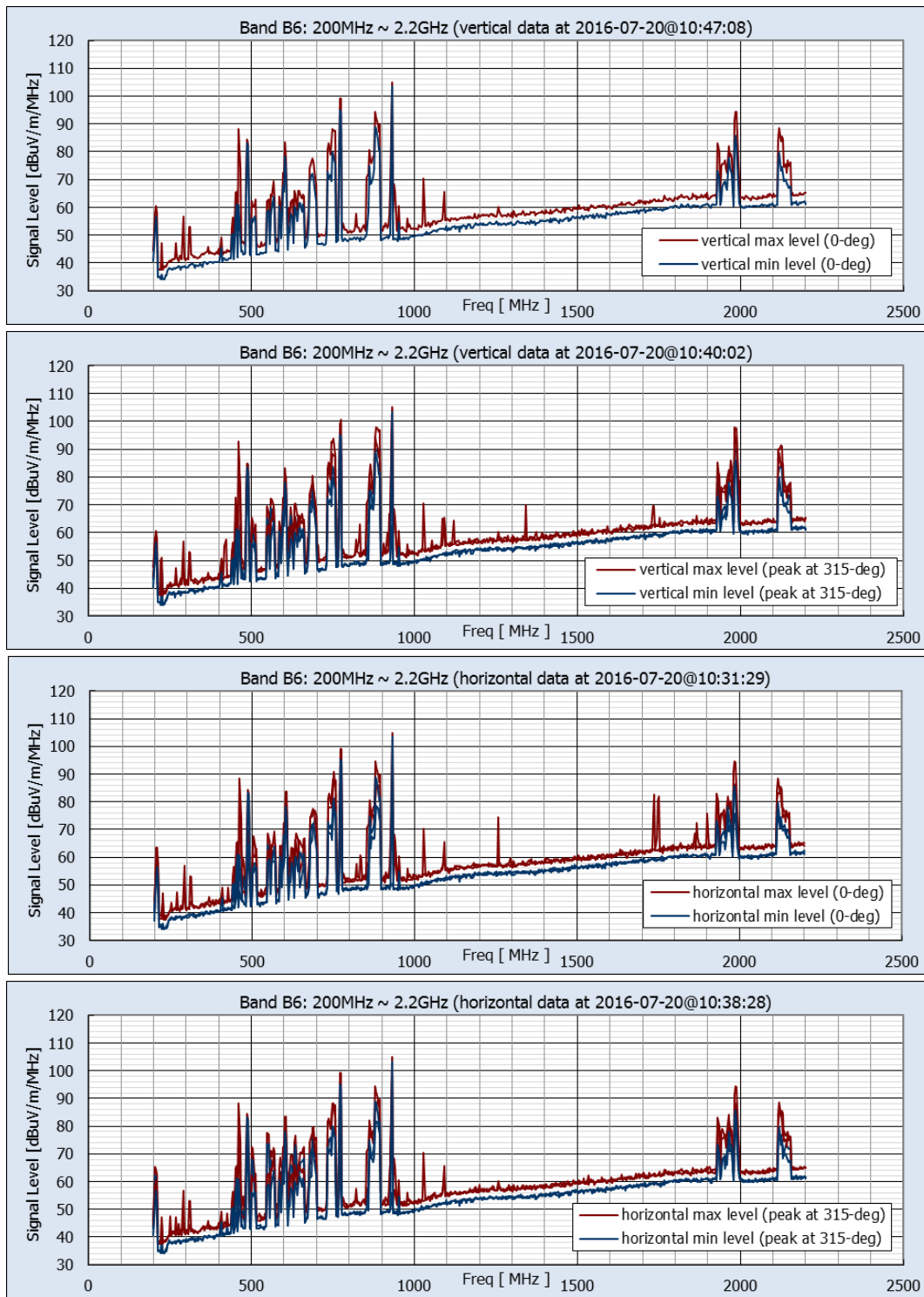
Figure 14e Location 10: Measured Environmental Radio Frequency Levels Non-Directional Data from Vertically Oriented Monopole Antenna, Bands 0–4



Maximum Levels									
Band number	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B5	25 ~ 200	89.6	90.091	96.0	153.727	86.9	94.091	92.4	153.727

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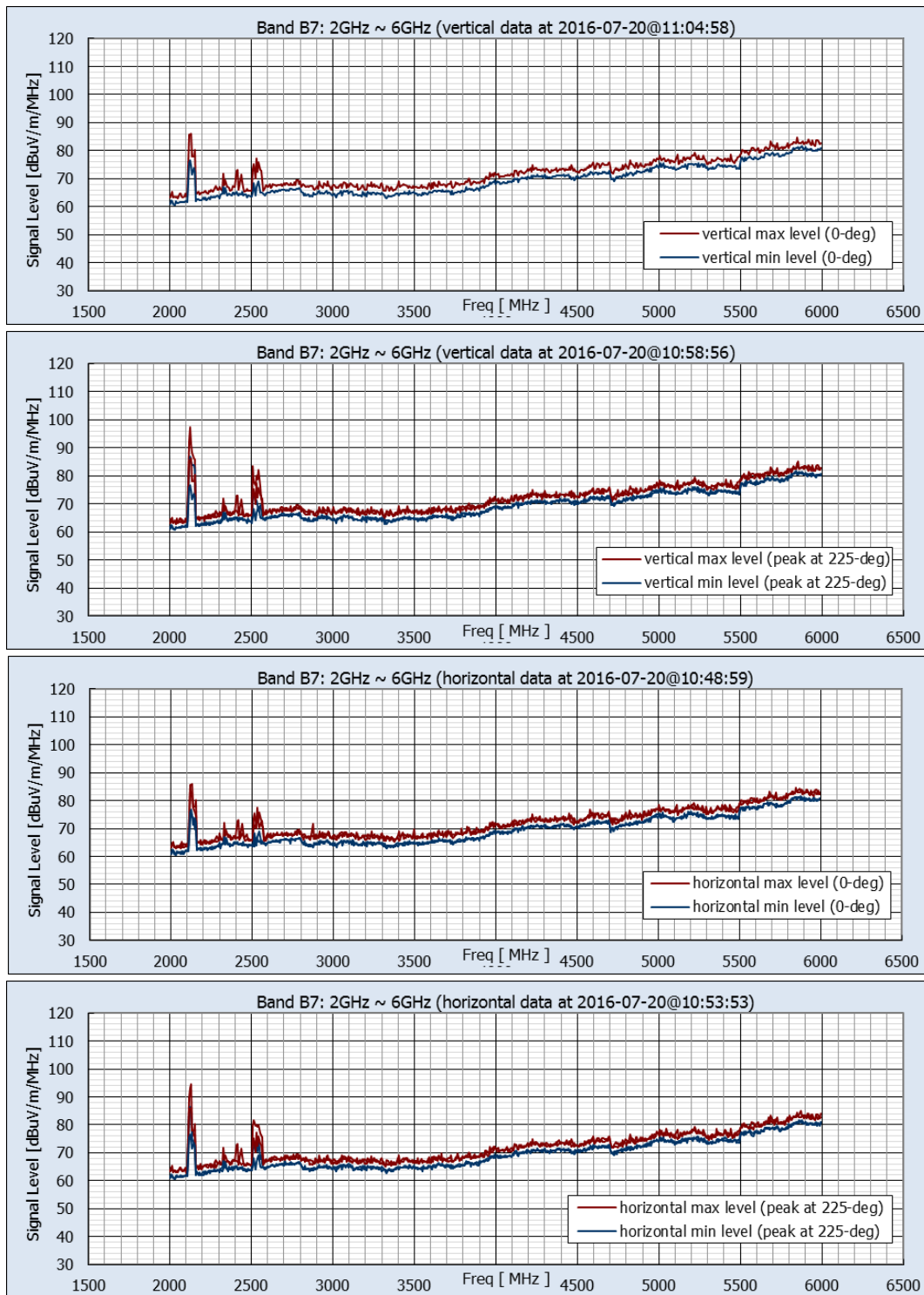
Figure 14f Location 10: Measured Environmental Radio Frequency Levels Band 5 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B6	200 ~ 2200	103.4	930.909	105.1	930.909	83.1	770.909	97.7	930.909

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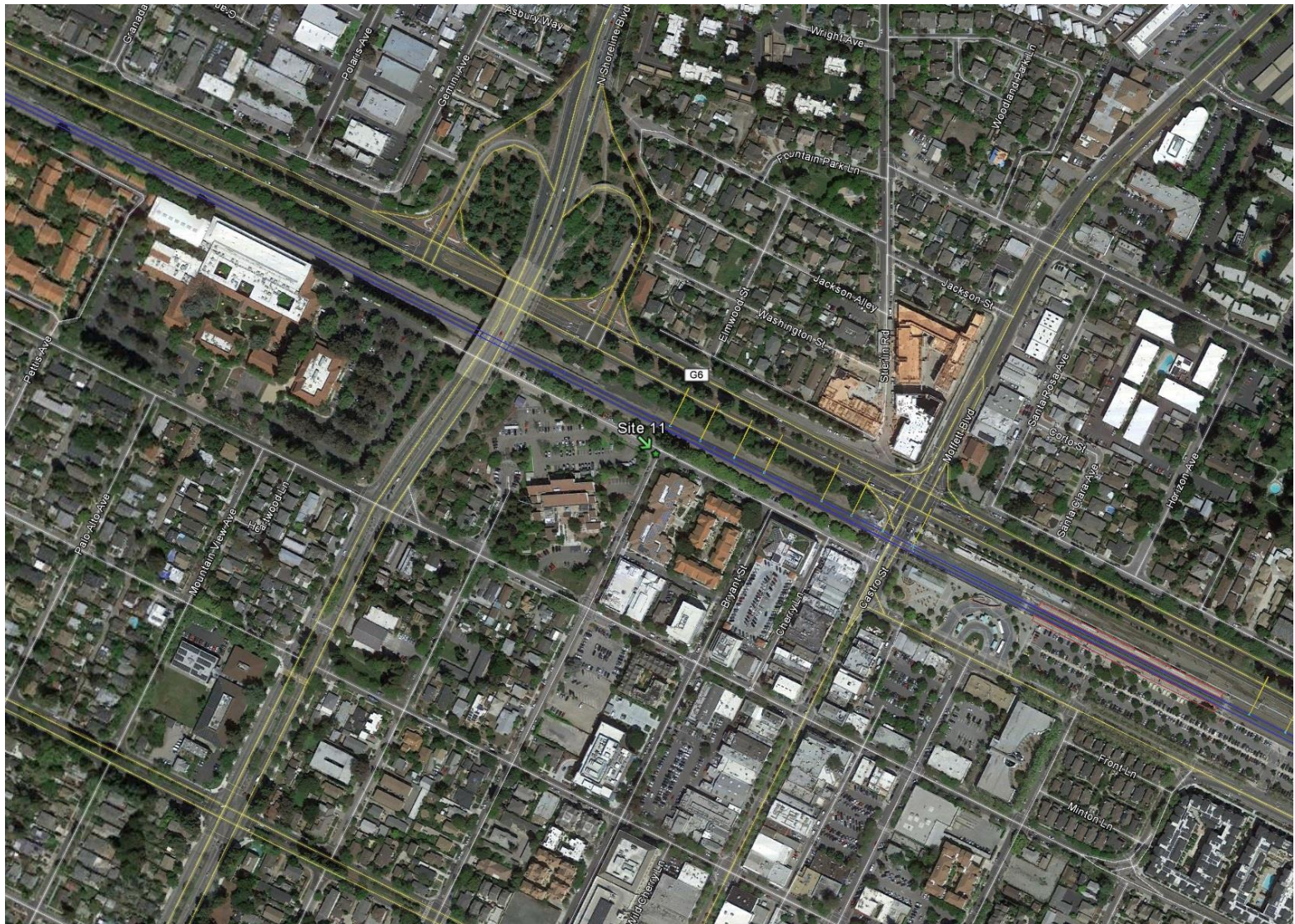
Figure 14g Location 10: Measured Environmental Radio Frequency Levels Band 6 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B7	2000~6000	86.8	2123.636	97.2	2123.636	86.6	2123.636	94.5	2130.909

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Figure 14h Location 10: Measured Environmental Radio Frequency Levels Band 7 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



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Figure 15a Location 11: Franklin Street/Evelyn Avenue, Mountain View

Commercial/residential area near the Mountain View Police department, Caltrain Station (Lat 37.395923°, Lon -122.080568°)



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Figure 15b Location 11: Measurement Location and Site Views

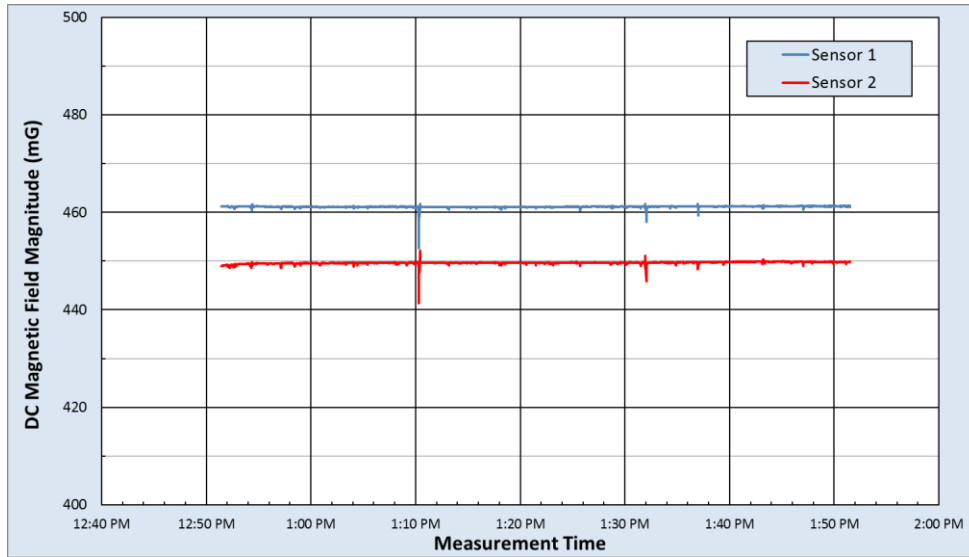
Photos depicting the site from the perspective of the RF measurement location. In the center is a satellite view, indicating the alignment (green line) and measurement points (red = RF, magenta = magnetometers). The satellite view is rotated so that the image at 0° faces the alignment.



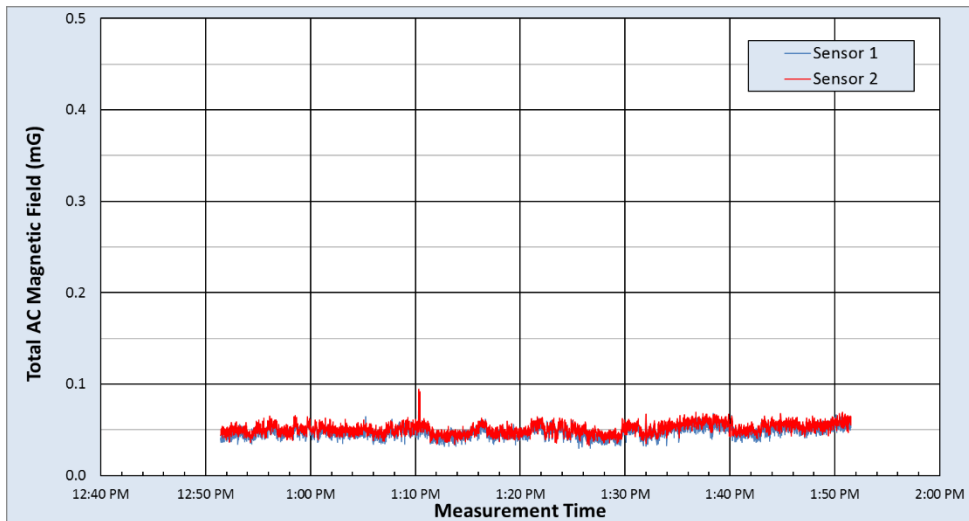
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Figure 15c Location 11: Local EMF Sources

Photo depicting visible close-proximity emitters, including police communications. Other emissions sources may exist but are not visible from the site.



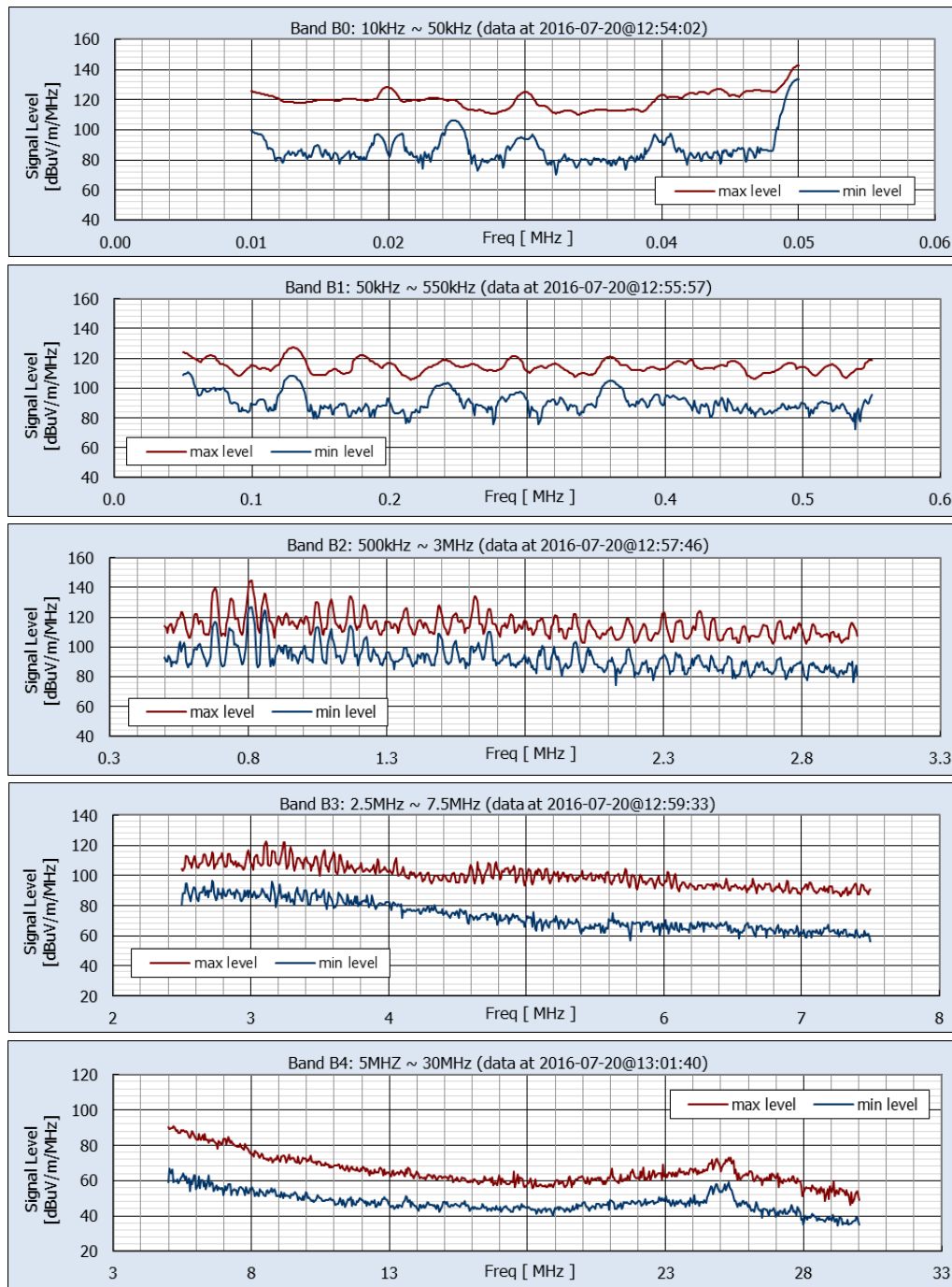
DC Magnetic Field Measurement Statistics						
	B Horizontal (mG)		B Vertical (mG)		B Total (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	272.4	254.9	374.6	374.4	461.7	452.1
Median	269.1	249.4	374.5	374.2	461.1	449.6
Min	267.1	247.1	364.7	365.1	452.7	441.5
Range	5.2	7.8	10.0	9.3	9.0	10.6
Std Dev	0.2	0.3	0.2	0.4	0.2	0.3



rms AC Magnetic Field Measurement Statistics																
	Fund 60Hz (mG)		2nd (mG)		3rd (mG)		4th (mG)		5th (mG)		6th (mG)		7th (mG)		Total AC (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	0.071	0.085	0.028	0.028	0.028	0.027	0.022	0.029	0.021	0.021	0.023	0.021	0.024	0.027	0.085	0.094
Median	0.039	0.043	0.009	0.009	0.012	0.013	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.011	0.047	0.051
Min	0.019	0.019	0.002	0.002	0.003	0.003	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.003	0.030	0.033
Range	0.052	0.066	0.026	0.026	0.025	0.024	0.020	0.027	0.020	0.019	0.021	0.019	0.022	0.025	0.055	0.061
Std Dev	0.007	0.007	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.006	0.006

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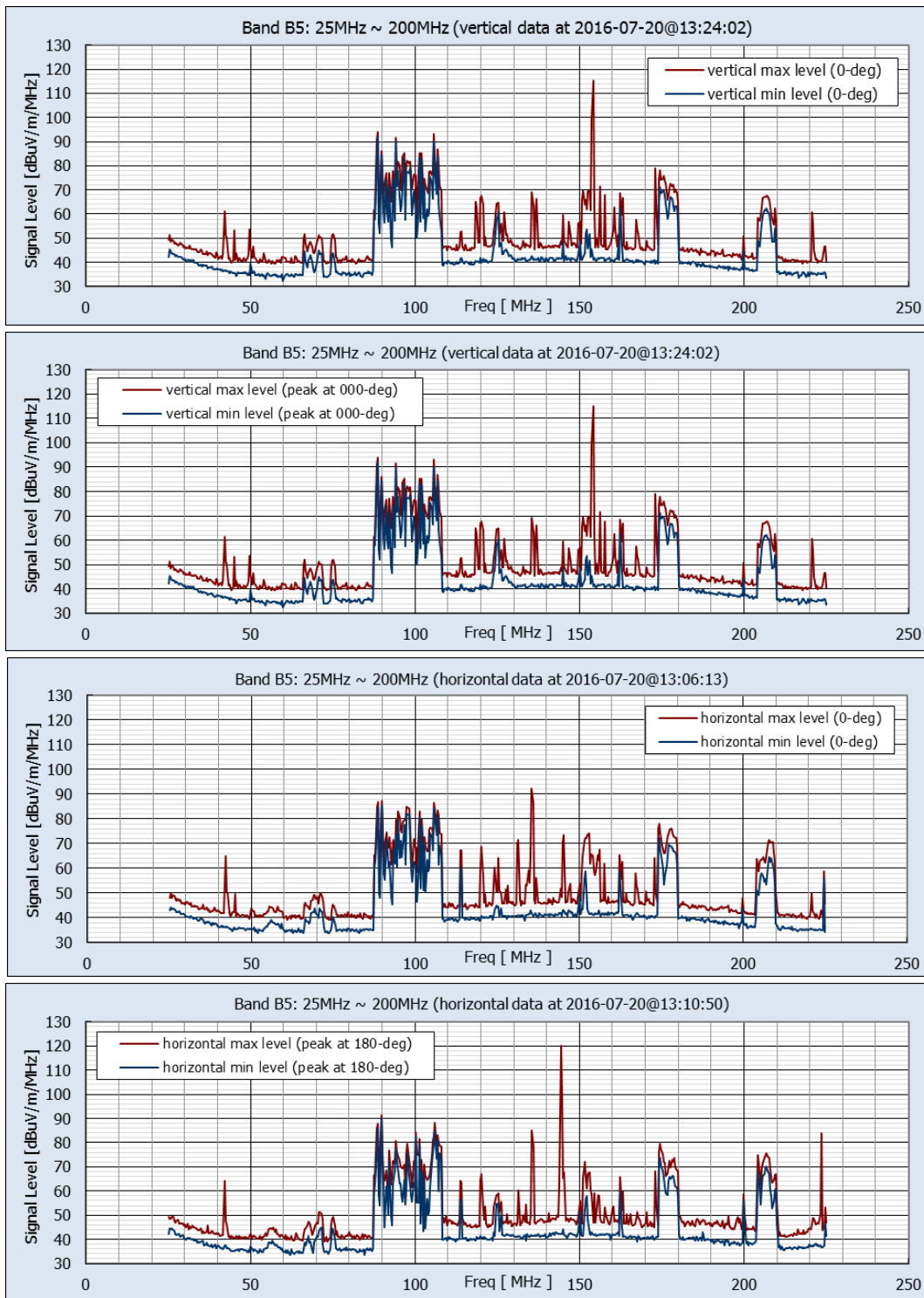
Figure 15d Location 11: Alternating Current and Direct Current Magnetic Field Measurement Results



Maximum Levels					
Band number	Freq. Range (MHz)	Pk Min-Hold dB uV/m/MHz	@ Freq. (MHz)	Pk Max-Hold dB uV/m/MHz	@ Freq. (MHz)
B0	0.01 ~ 0.05	133.7	0.0500	142.6	0.0500
B1	0.05 ~ 0.55	110.5	0.0536	127.3	0.1300
B2	0.50 ~ 3.00	126.8	0.8091	144.7	0.8091
B3	2.5 ~ 7.5	96.3	2.7182	122.6	3.1091
B4	5 ~ 30	66.9	5.0455	90.5	5.1818

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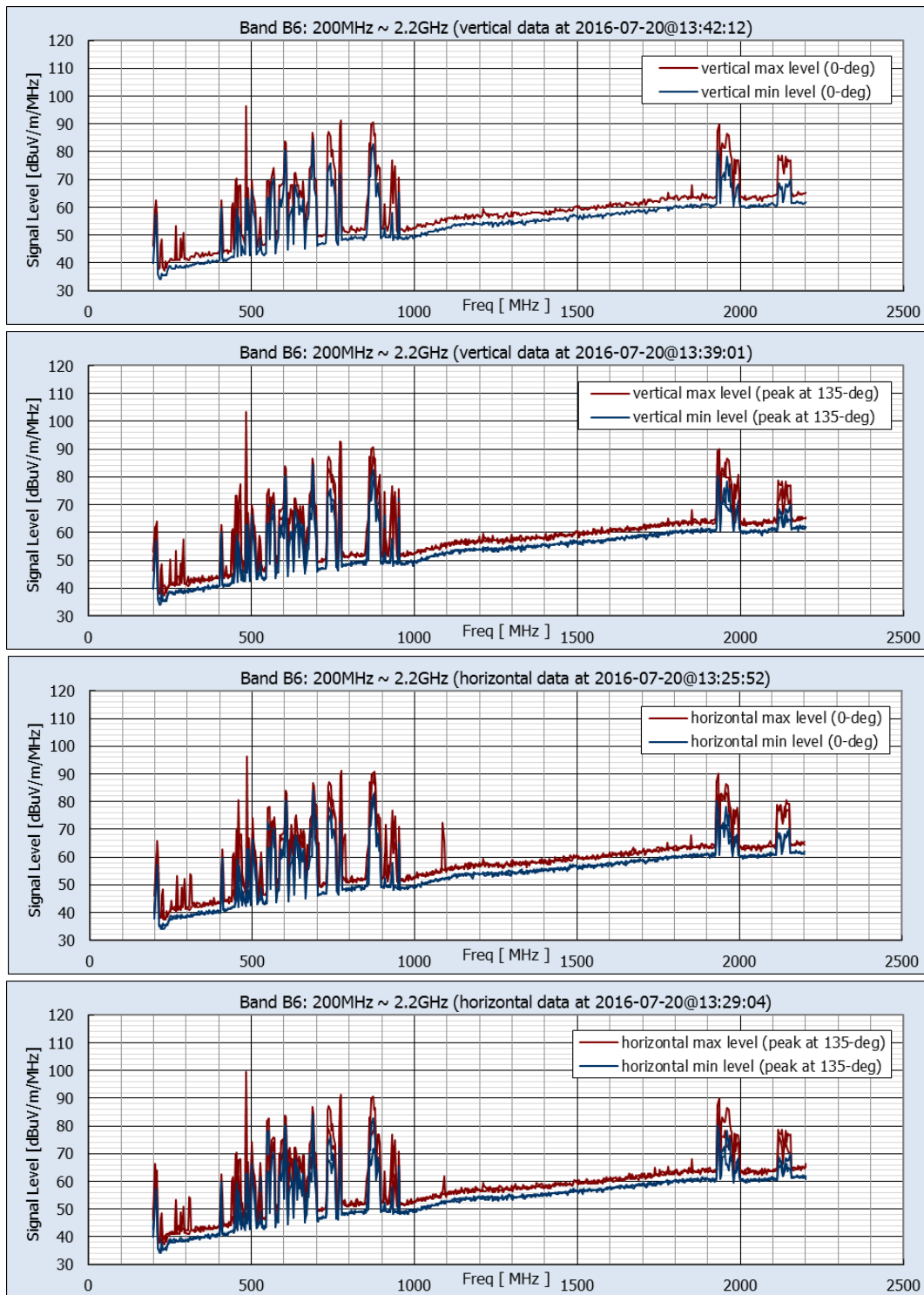
Figure 15e Location 11: Measured Environmental Radio Frequency Levels Non-Directional Data from Vertically Oriented Monopole Antenna, Bands 0–4



Maximum Levels									
Band number	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B5	25 ~ 200	91.8	88.636	115.1	154.091	89.7	89.727	120.0	144.273

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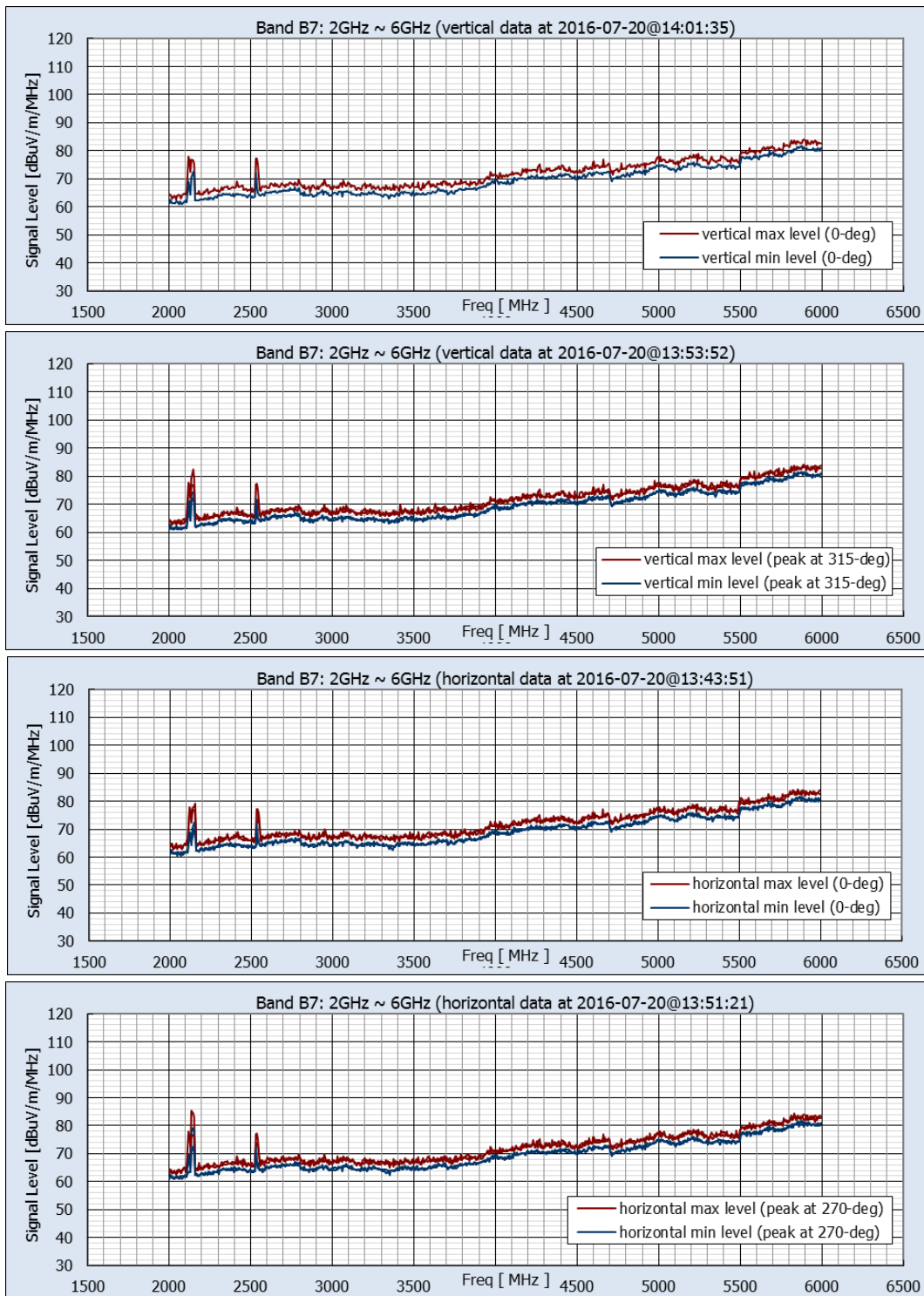
Figure 15f Location 11: Measured Environmental Radio Frequency Levels Band 5 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B6	200 ~ 2200	90.2	770.909	103.5	483.636	83.2	876.364	99.6	483.636

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Figure 15g Location 11: Measured Environmental Radio Frequency Levels Band 6 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B7	2000~6000	74.1	2145.455	82.6	2145.455	79.2	2145.455	85.5	2138.182

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Figure 15h Location 11: Measured Environmental Radio Frequency Levels Band 7 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



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Figure 16a Location 12: Kifer Road/San Lucar Court, Sunnyvale

Industrial/commercial setting near the existing rail alignment (Lat 37.373863°, Lon -122.012087°)



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Figure 16b Location 12: Measurement Location and Site Views

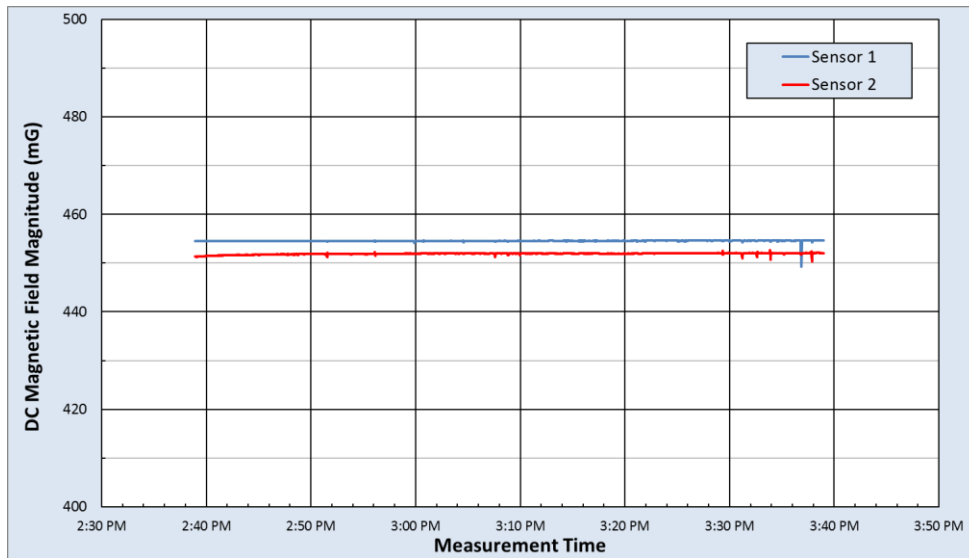
Photos depicting the site from the perspective of the RF measurement location. In the center is a satellite view, indicating the alignment (green line) and measurement points (red = RF, magenta = magnetometers). The satellite view is rotated so that the image at 0° faces the alignment.



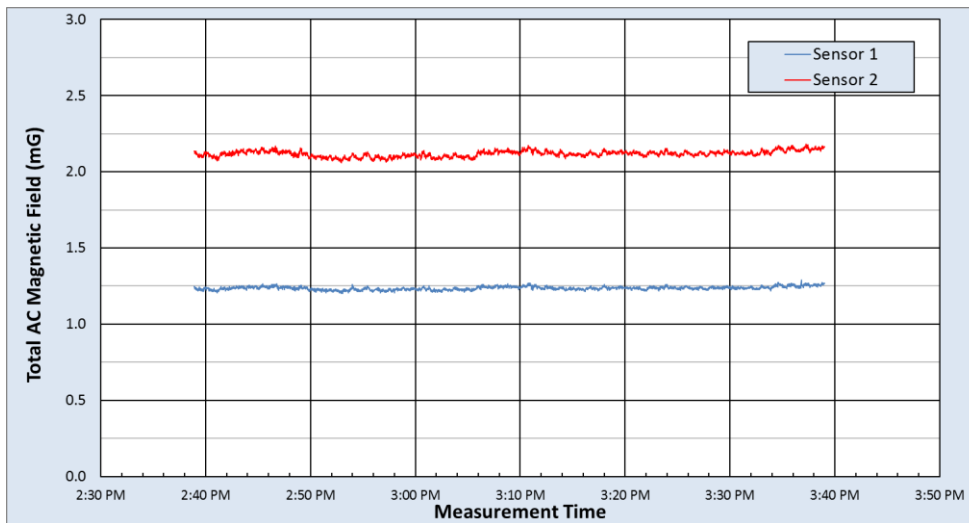
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Figure 16c Location 12: Local EMF Sources

Photos depicting visible close-proximity emitters, including distribution lines perpendicular to the alignment. Other emissions sources may exist but are not visible from the site.



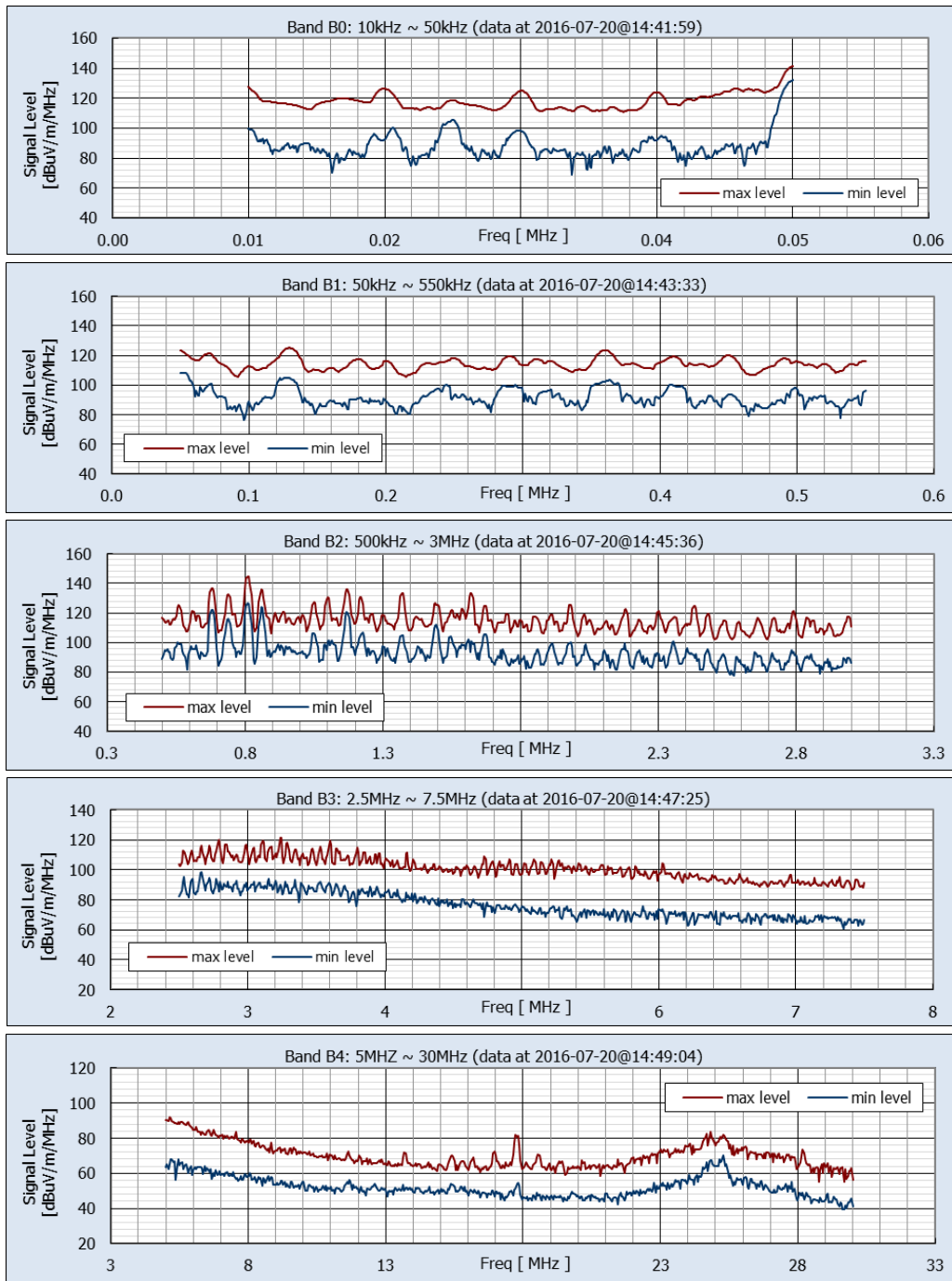
DC Magnetic Field Measurement Statistics						
	B Horizontal (mG)		B Vertical (mG)		B Total (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	233.2	218.8	390.8	397.2	454.7	452.6
Median	232.4	216.7	390.6	396.6	454.5	452.0
Min	230.5	214.8	384.7	395.2	449.3	450.4
Range	2.8	4.0	6.1	2.0	5.4	2.3
Std Dev	0.1	0.2	0.1	0.2	0.1	0.2



rms AC Magnetic Field Measurement Statistics																
	Fund 60Hz (mG)		2nd (mG)		3rd (mG)		4th (mG)		5th (mG)		6th (mG)		7th (mG)		Total AC (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	1.282	2.174	0.023	0.026	0.028	0.040	0.020	0.020	0.139	0.198	0.077	0.070	0.133	0.158	1.288	2.181
Median	1.231	2.111	0.010	0.010	0.015	0.025	0.009	0.010	0.091	0.154	0.010	0.010	0.063	0.096	1.236	2.119
Min	1.195	2.052	0.003	0.002	0.004	0.012	0.002	0.002	0.073	0.137	0.002	0.002	0.046	0.069	1.200	2.060
Range	0.087	0.122	0.020	0.025	0.024	0.029	0.018	0.019	0.066	0.061	0.075	0.068	0.087	0.089	0.088	0.121
Std Dev	0.012	0.020	0.003	0.003	0.003	0.004	0.003	0.003	0.005	0.005	0.007	0.007	0.006	0.007	0.011	0.020

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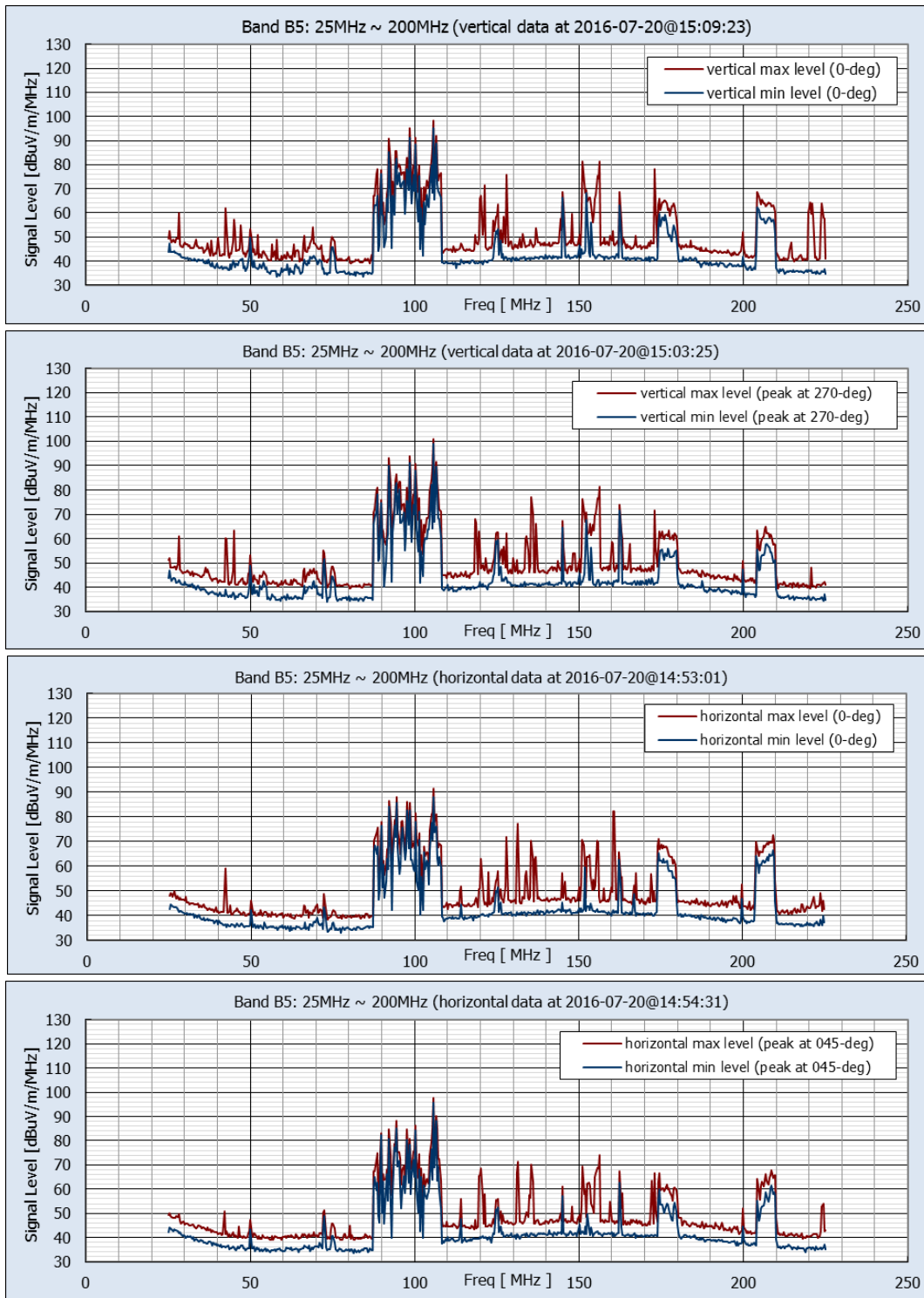
Figure 16d Location 12: Alternating Current and Direct Current Magnetic Field Measurement Results



Maximum Levels					
Band number	Freq. Range (MHz)	Pk Min-Hold dB uV/m/MHz	@ Freq. (MHz)	Pk Max-Hold dB uV/m/MHz	@ Freq. (MHz)
B0	0.01 ~ 0.05	132.0	0.0500	141.2	0.0500
B1	0.05 ~ 0.55	108.4	0.0509	125.1	0.1300
B2	0.50 ~ 3.00	126.4	0.8091	144.8	0.8091
B3	2.5 ~ 7.5	98.8	2.6636	121.3	3.2364
B4	5 ~ 30	70.5	25.2727	92.0	5.1364

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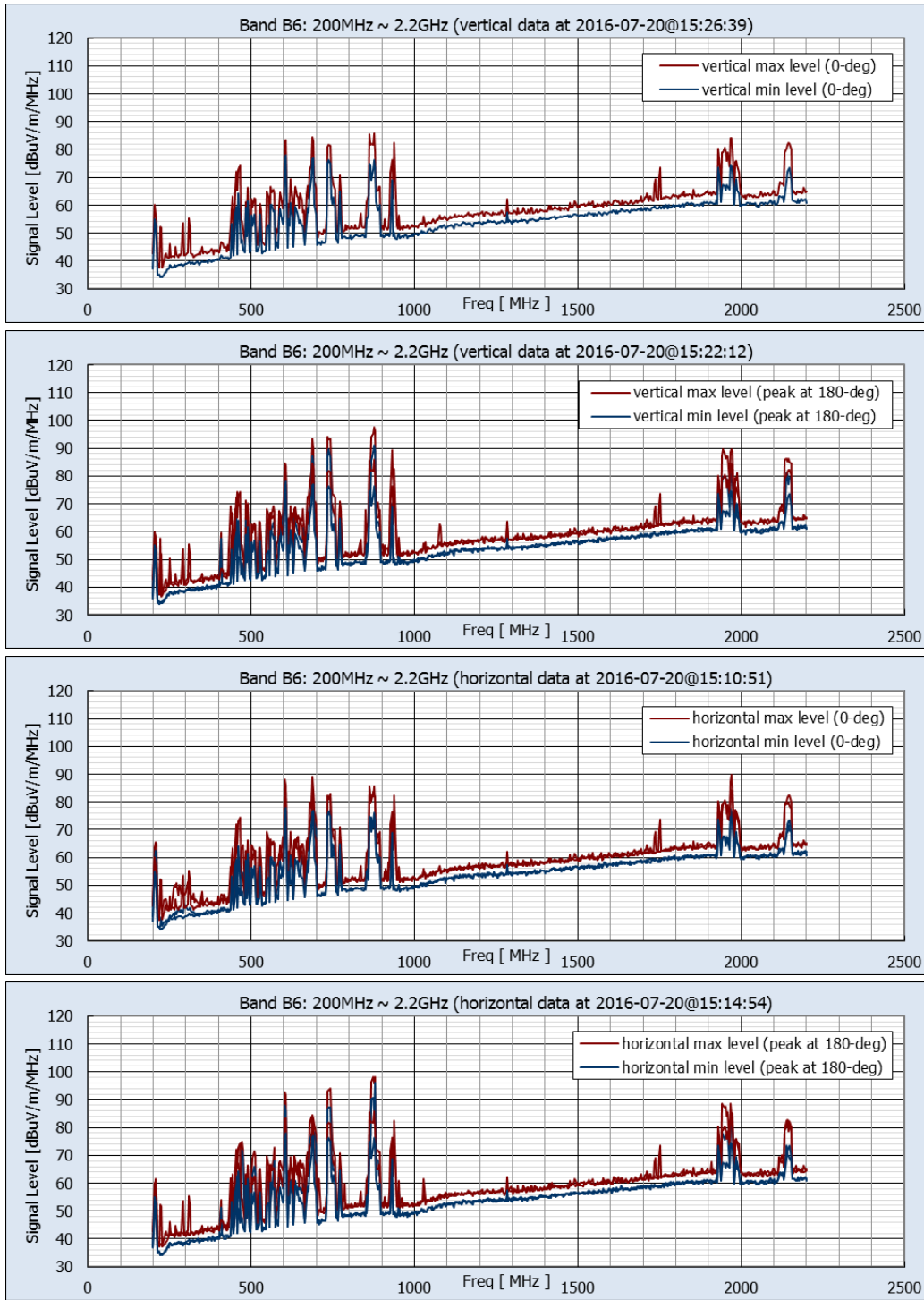
Figure 16e Location 12: Measured Environmental Radio Frequency Levels Non-Directional Data from Vertically Oriented Monopole Antenna, Bands 0–4



Maximum Levels									
Band number	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B5	25 ~ 200	98.9	105.727	101.0	105.727	95.7	105.727	97.7	105.727

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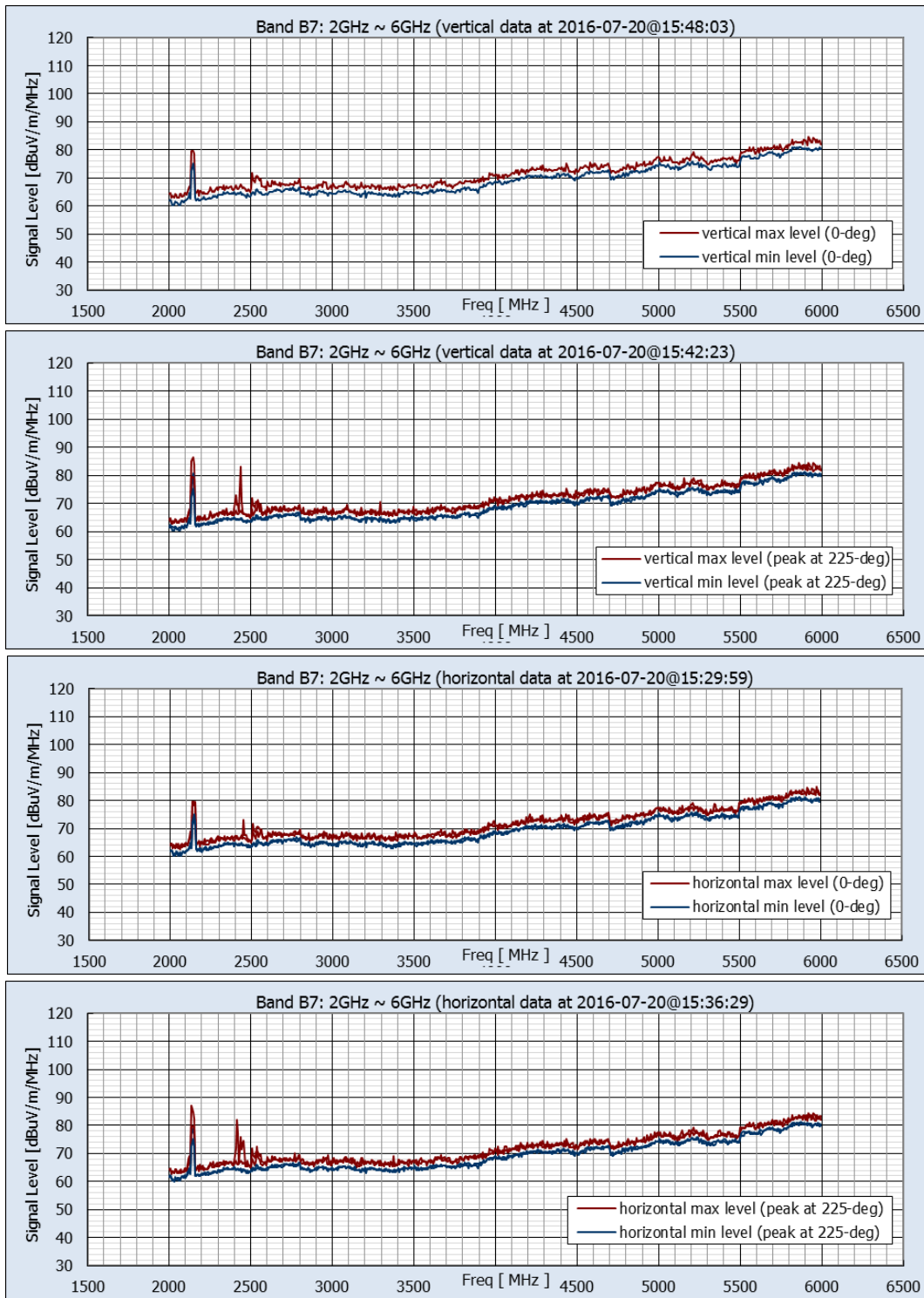
Figure 16f Location 12: Measured Environmental Radio Frequency Levels Band 5 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B6	200 ~ 2200	91.1	876.364	97.7	876.364	96.2	880.000	98.3	872.727

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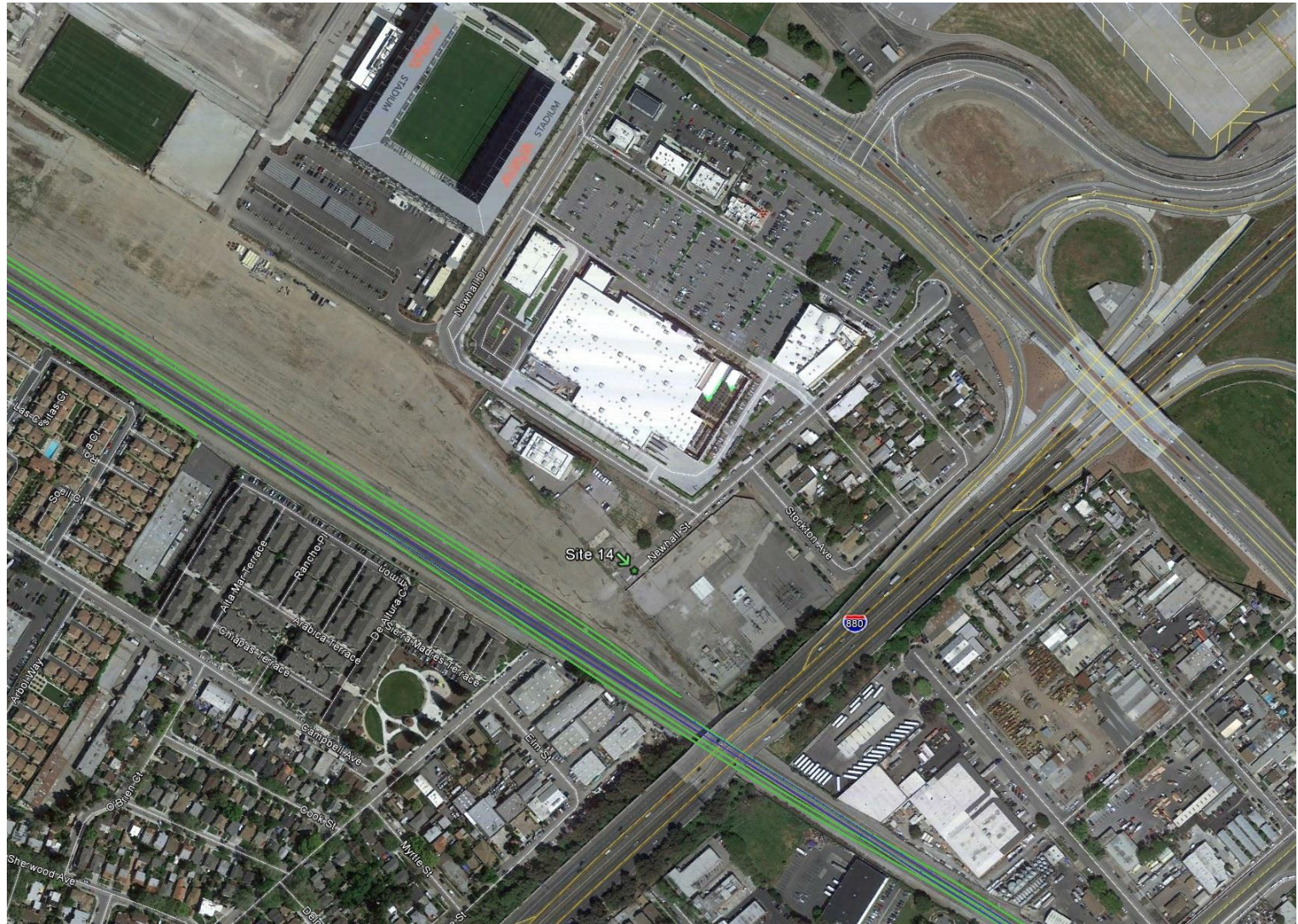
Figure 16g Location 12: Measured Environmental Radio Frequency Levels Band 6 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B7	2000~6000	80.9	2145.455	86.6	2145.455	78.8	2145.455	87.0	2138.182

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Figure 16h Location 12: Measured Environmental Radio Frequency Levels Band 7 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



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Figure 17a Location 13: Newhall Street/Newhall Drive, San Jose

Industrial/commercial area near the existing rail alignment, Avaya Stadium, and San Jose International Airport (Lat 37.347447°, -121.923012°)



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Figure 17b Location 13: Measurement Location and Site Views

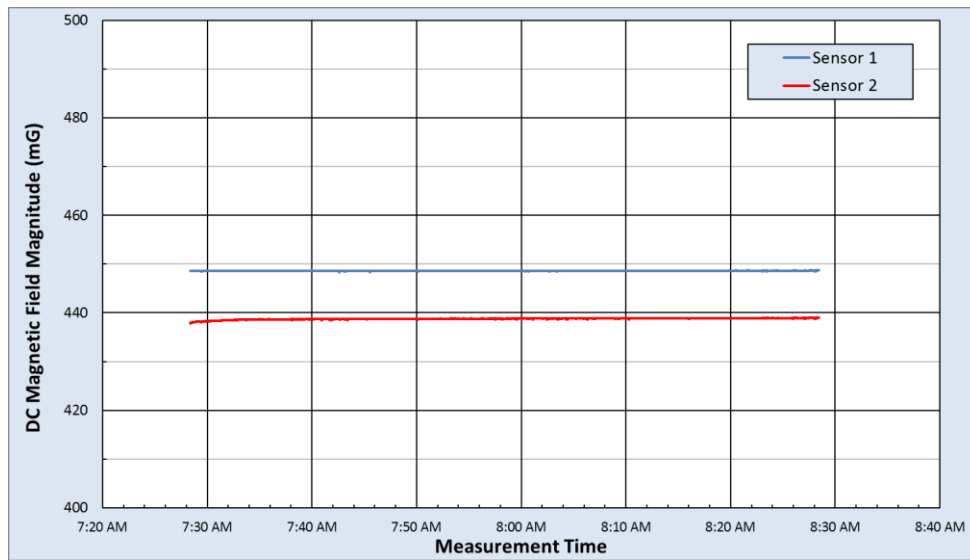
Photos depicting the site from the perspective of the RF measurement location. In the center is a satellite view, indicating the alignment (green line) and measurement points (red = RF, magenta = magnetometers). The satellite view is rotated so that the image at 0° faces the alignment.



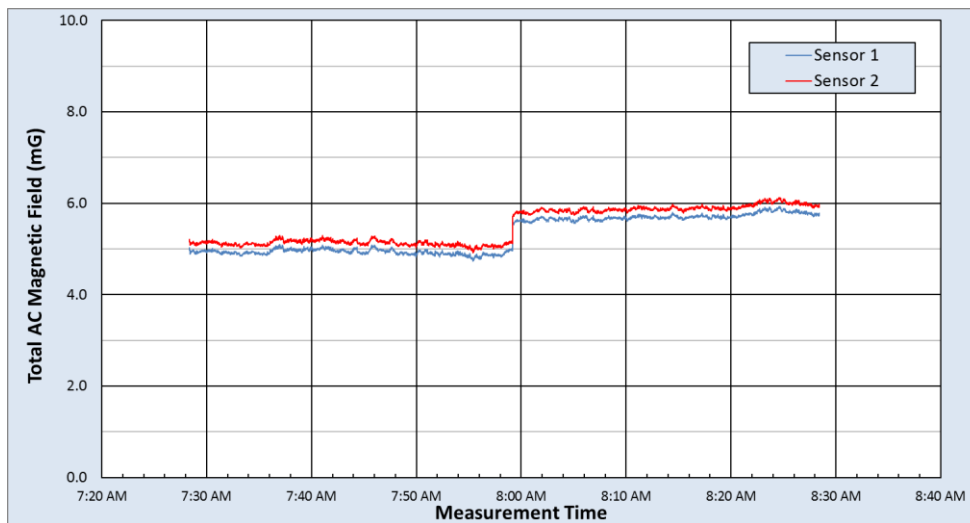
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Figure 17c Location 13: Local EMF Sources

Photos depicting visible close-proximity emitters, which include cell towers, distribution lines parallel and perpendicular to the alignment, and a small electrical substation. Other emissions sources may exist but are not visible from the site.



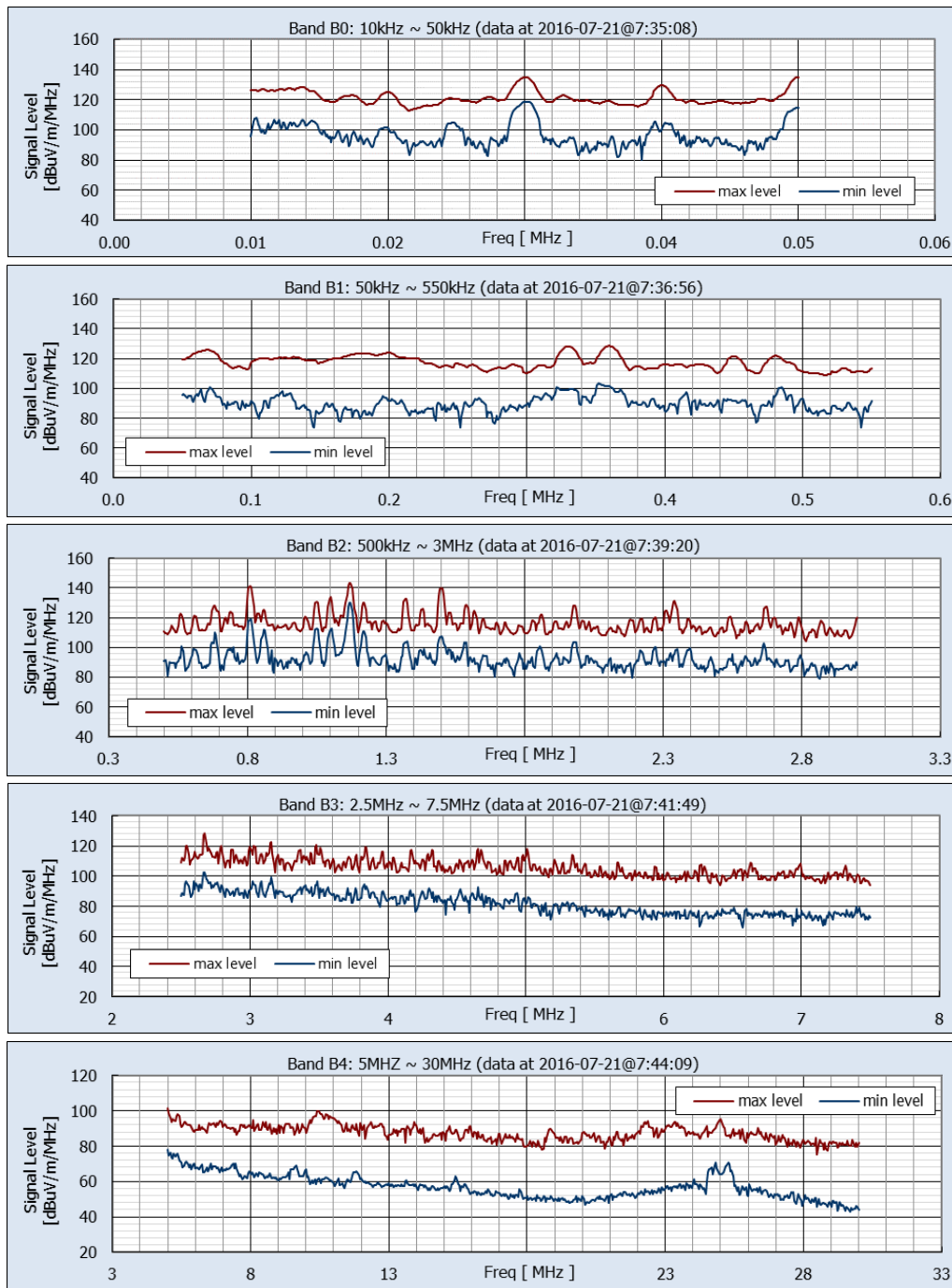
DC Magnetic Field Measurement Statistics						
	B Horizontal (mG)		B Vertical (mG)		B Total (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	242.1	249.6	378.0	361.2	448.7	439.0
Median	241.8	249.4	377.9	361.0	448.6	438.8
Min	241.7	249.2	377.6	360.0	448.5	437.9
Range	0.4	0.5	0.4	1.3	0.2	1.1
Std Dev	0.1	0.1	0.0	0.2	0.0	0.2



rms AC Magnetic Field Measurement Statistics																
	Fund 60Hz (mG)		2nd (mG)		3rd (mG)		4th (mG)		5th (mG)		6th (mG)		7th (mG)		Total AC (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	5.910	6.109	0.023	0.034	0.110	0.116	0.019	0.058	0.494	0.543	0.021	0.027	0.098	0.099	5.925	6.127
Median	5.018	5.214	0.011	0.013	0.090	0.094	0.009	0.011	0.439	0.481	0.009	0.011	0.028	0.032	5.041	5.241
Min	4.709	4.891	0.002	0.003	0.068	0.071	0.002	0.003	0.364	0.388	0.002	0.002	0.008	0.008	4.733	4.920
Range	1.201	1.218	0.021	0.030	0.042	0.045	0.018	0.056	0.130	0.155	0.019	0.025	0.090	0.092	1.192	1.207
Std Dev	0.396	0.394	0.003	0.004	0.008	0.006	0.003	0.006	0.023	0.028	0.003	0.003	0.022	0.022	0.393	0.390

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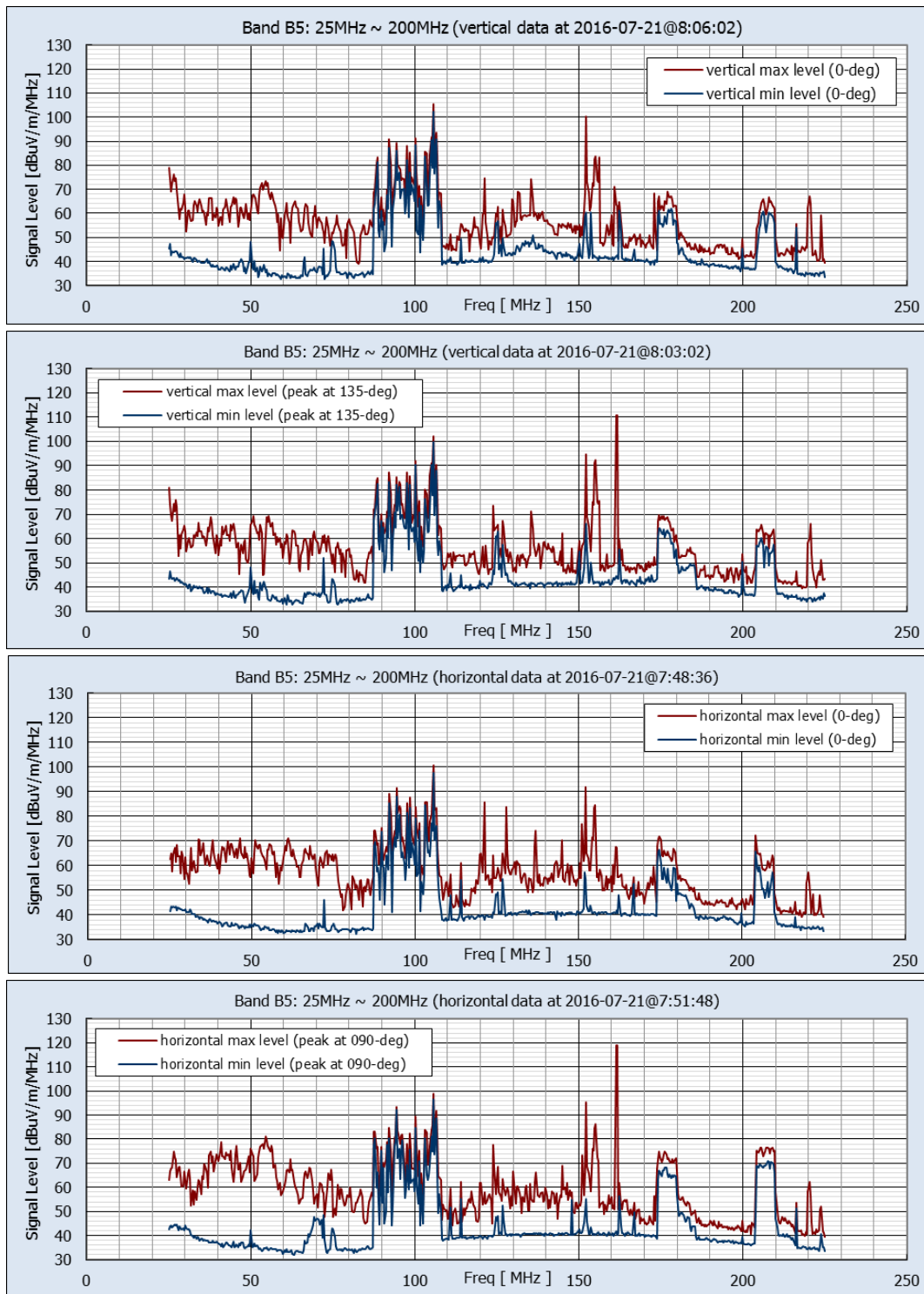
Figure 17d Location 13: Alternating Current and Direct Current Magnetic Field Measurement Results



Maximum Levels					
Band number	Freq. Range (MHz)	Pk Min-Hold dB uV/m/MHz	@ Freq. (MHz)	Pk Max-Hold dB uV/m/MHz	@ Freq. (MHz)
B0	0.01 ~ 0.05	118.8	0.0301	135.1	0.0500
B1	0.05 ~ 0.55	103.8	0.3518	128.4	0.3600
B2	0.50 ~ 3.00	130.1	1.1682	143.5	1.1682
B3	2.5 ~ 7.5	102.3	2.6636	128.4	2.6727
B4	5 ~ 30	77.8	5.0000	101.7	5.0000

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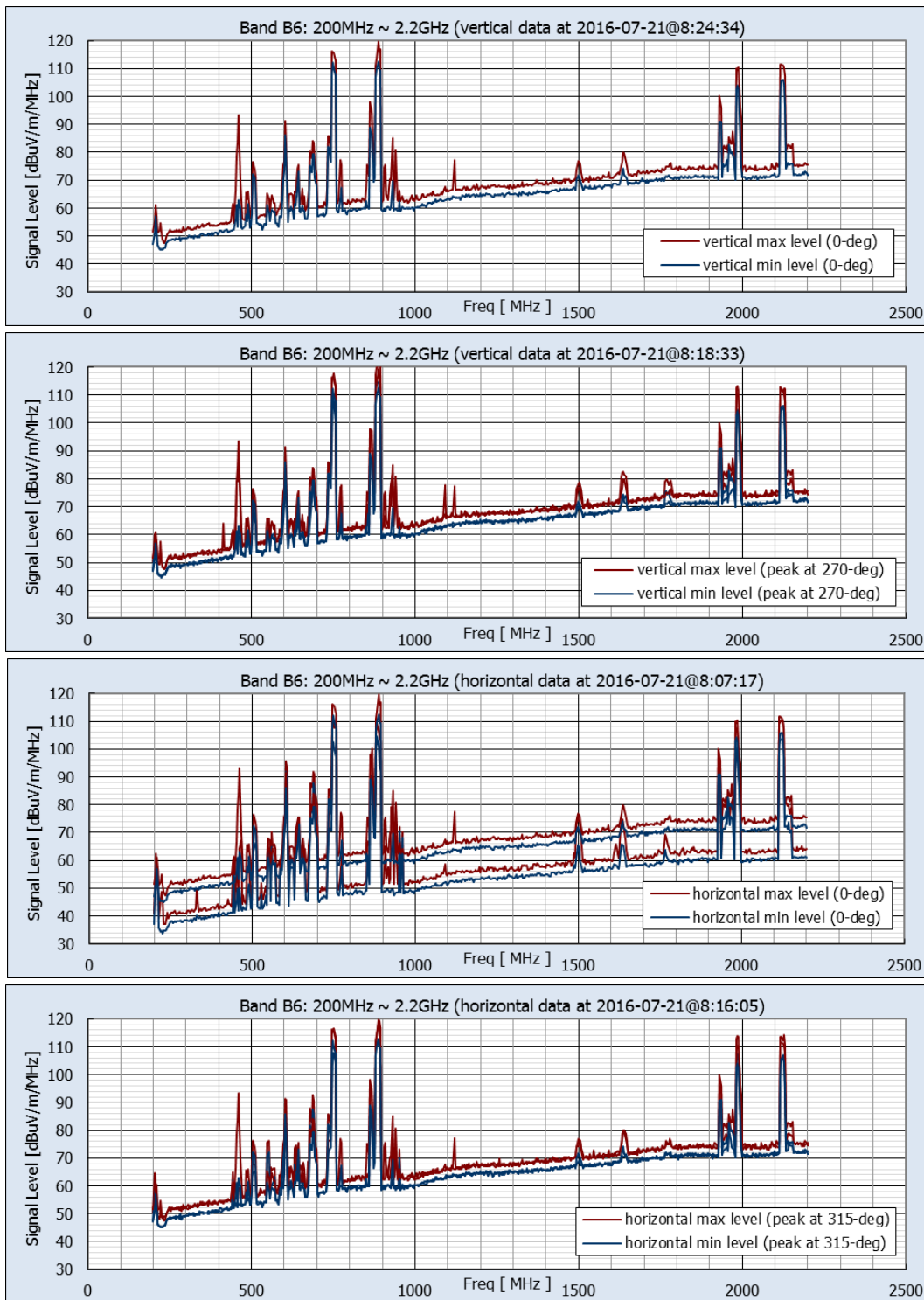
Figure 17e Location 13: Measured Environmental Radio Frequency Levels Non-Directional Data from Vertically Oriented Monopole Antenna, Bands 0–4



Maximum Levels									
Band number	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B5	25 ~ 200	102.1	105.727	110.6	161.727	97.7	105.727	119.0	161.727

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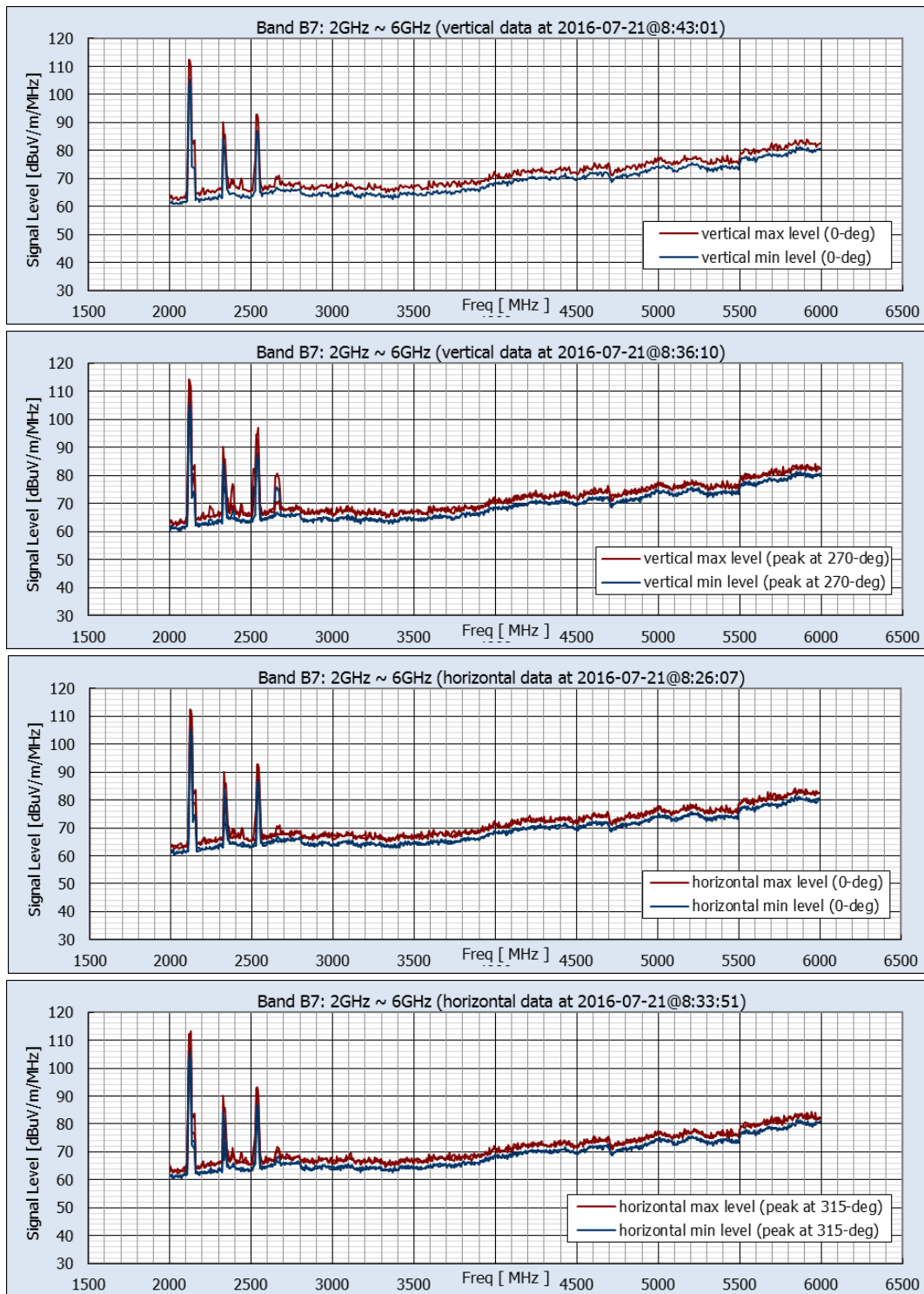
Figure 17f Location 13: Measured Environmental Radio Frequency Levels Band 5 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B6	200 ~ 2200	114.6	887.273	122.9	890.909	113.0	887.273	119.3	890.909

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Figure 17g Location 13: Measured Environmental Radio Frequency Levels Band 6 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B7	2000~6000	107.6	2116.364	114.4	2116.364	107.2	2123.636	113.3	2130.909

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Figure 17h Location 13: Measured Environmental Radio Frequency Levels Band 7 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



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Figure 18a Location 14: Montgomery Street/Otterson Street, San Jose

Industrial/commercial setting between Diridon Station and the PG&E substation (Lat 37.328142°, Lon -121.902140°)



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Figure 18b Location 14: Measurement Location and Site Views

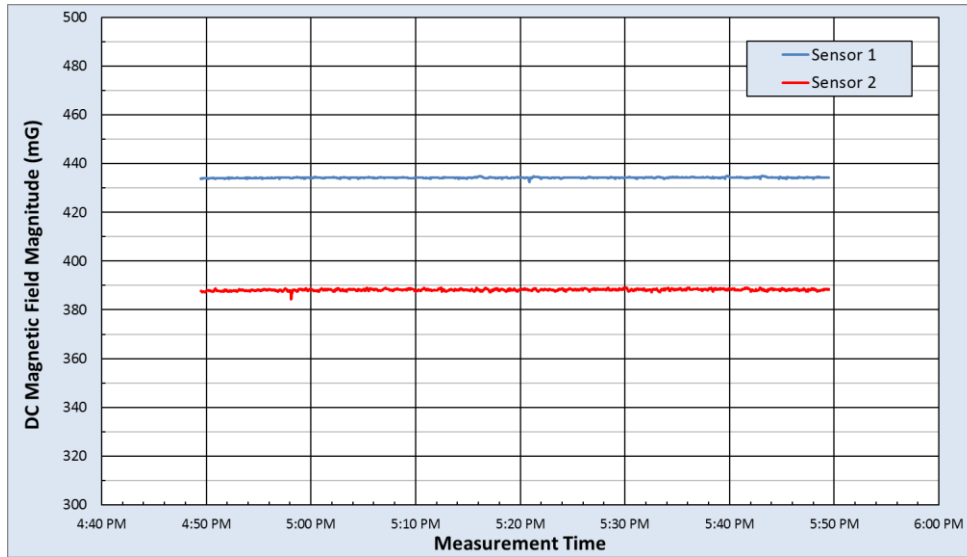
Photos depicting the site from the perspective of the RF measurement location. In the center is a satellite view, indicating the alignment (green line) and measurement points (red = RF, magenta = magnetometers). The satellite view is rotated so that the image at 0° faces the alignment.



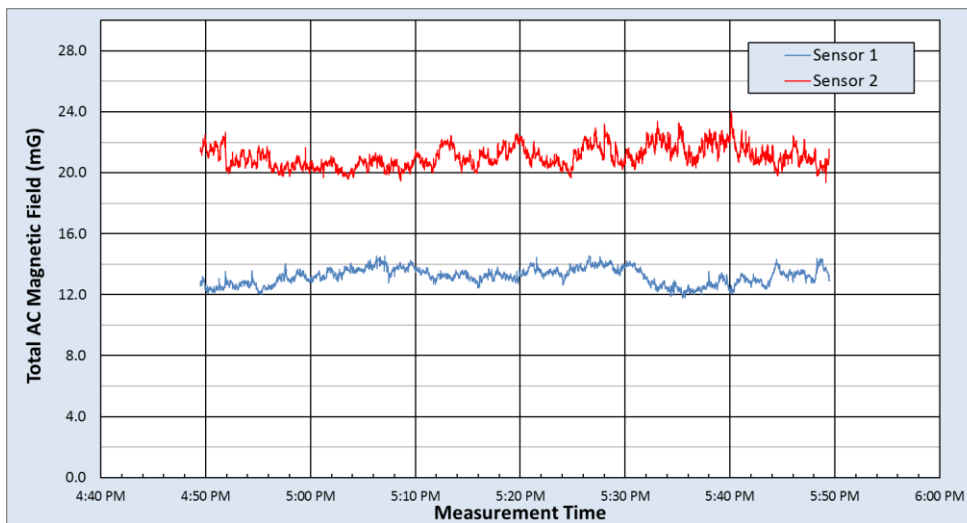
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Figure 18c Location 14: Local EMF Sources

Photos depicting visible close-proximity emitters, which include high-voltage transmission lines and substation equipment, distribution lines, and cellular communications. Other emissions sources may exist but are not visible from the site.



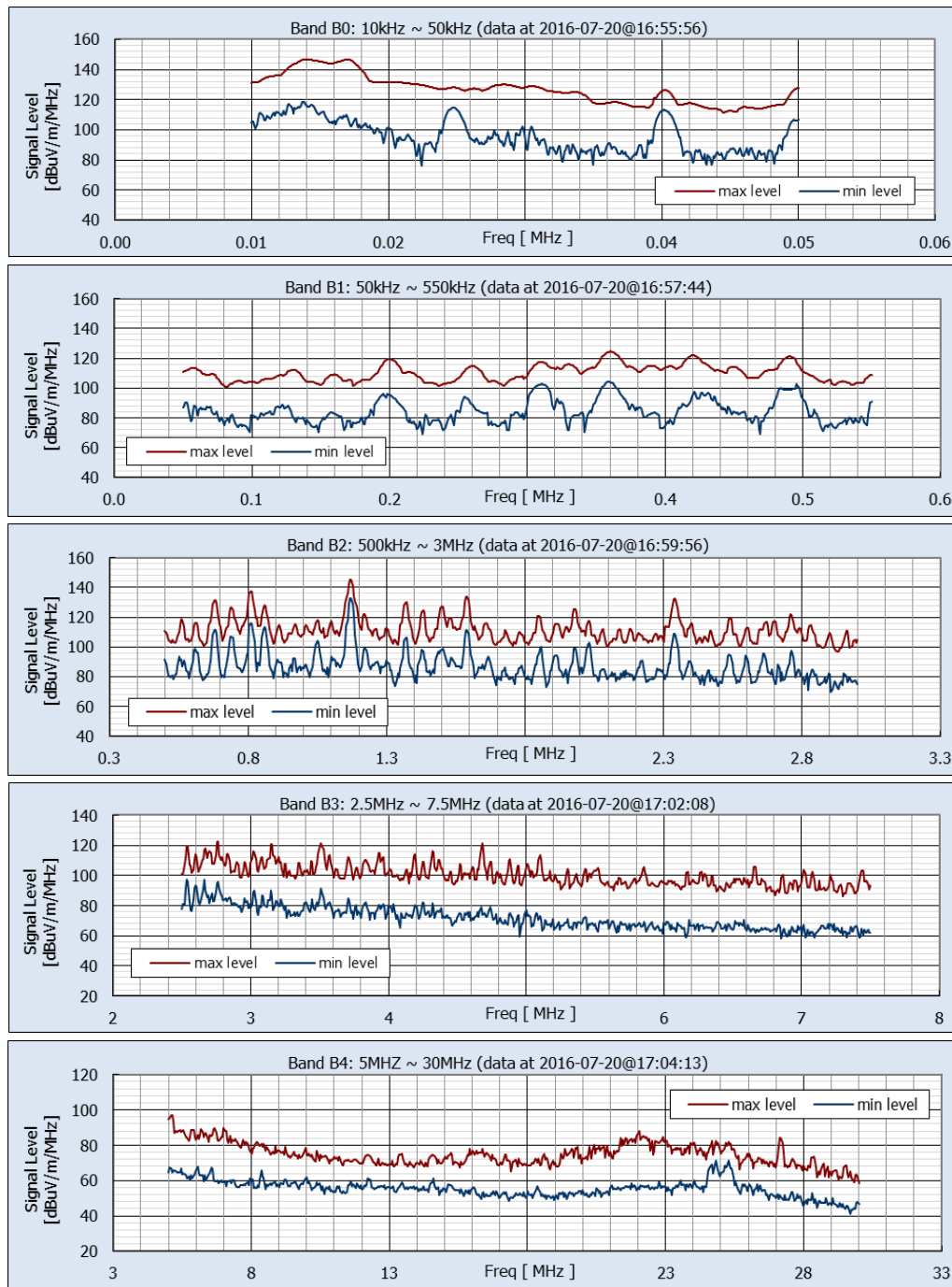
DC Magnetic Field Measurement Statistics						
	B Horizontal (mG)		B Vertical (mG)		B Total (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	289.7	222.9	325.5	319.5	434.9	389.1
Median	288.9	222.2	324.1	318.4	434.2	388.2
Min	288.2	221.0	322.3	314.1	432.5	384.4
Range	1.5	1.9	3.2	5.5	2.4	4.7
Std Dev	0.2	0.4	0.3	0.5	0.2	0.4



rms AC Magnetic Field Measurement Statistics																
	Fund 60Hz (mG)		2nd (mG)		3rd (mG)		4th (mG)		5th (mG)		6th (mG)		7th (mG)		Total AC (mG)	
	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2	Sensor 1	Sensor 2
Max	14.402	23.718	0.107	0.229	2.078	4.397	0.073	0.092	0.699	0.727	0.076	0.244	0.314	0.488	14.556	24.043
Median	13.072	20.533	0.037	0.083	2.004	4.079	0.015	0.033	0.629	0.550	0.018	0.090	0.275	0.380	13.241	20.946
Min	11.594	18.948	0.007	0.010	1.937	3.729	0.003	0.006	0.576	0.381	0.005	0.019	0.231	0.303	11.791	19.387
Range	2.808	4.770	0.100	0.219	0.141	0.668	0.070	0.087	0.122	0.347	0.071	0.225	0.082	0.185	2.765	4.656
Std Dev	0.552	0.719	0.013	0.038	0.023	0.086	0.006	0.014	0.017	0.058	0.006	0.030	0.010	0.024	0.543	0.706

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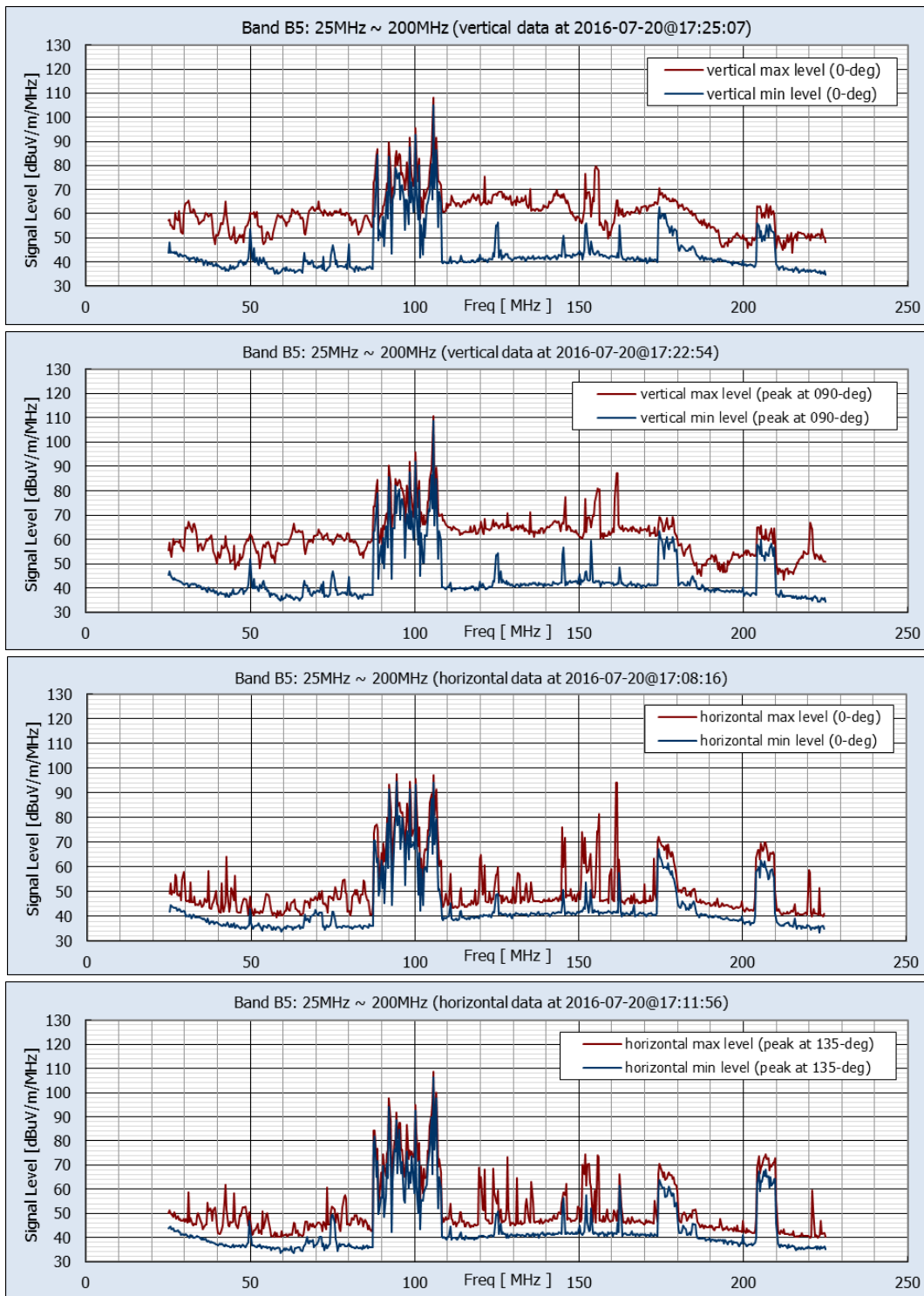
Figure 18d Location 14: Alternating Current and Direct Current Magnetic Field Measurement Results



Maximum Levels					
Band number	Freq. Range (MHz)	Pk Min-Hold dB uV/m/MHz	@ Freq. (MHz)	Pk Max-Hold dB uV/m/MHz	@ Freq. (MHz)
B0	0.01 ~ 0.05	118.7	0.0138	146.7	0.0170
B1	0.05 ~ 0.55	104.0	0.3591	124.4	0.3600
B2	0.50 ~ 3.00	132.7	1.1727	145.0	1.1682
B3	2.5 ~ 7.5	97.5	2.5364	122.5	2.7636
B4	5 ~ 30	71.2	25.2727	97.1	5.0909

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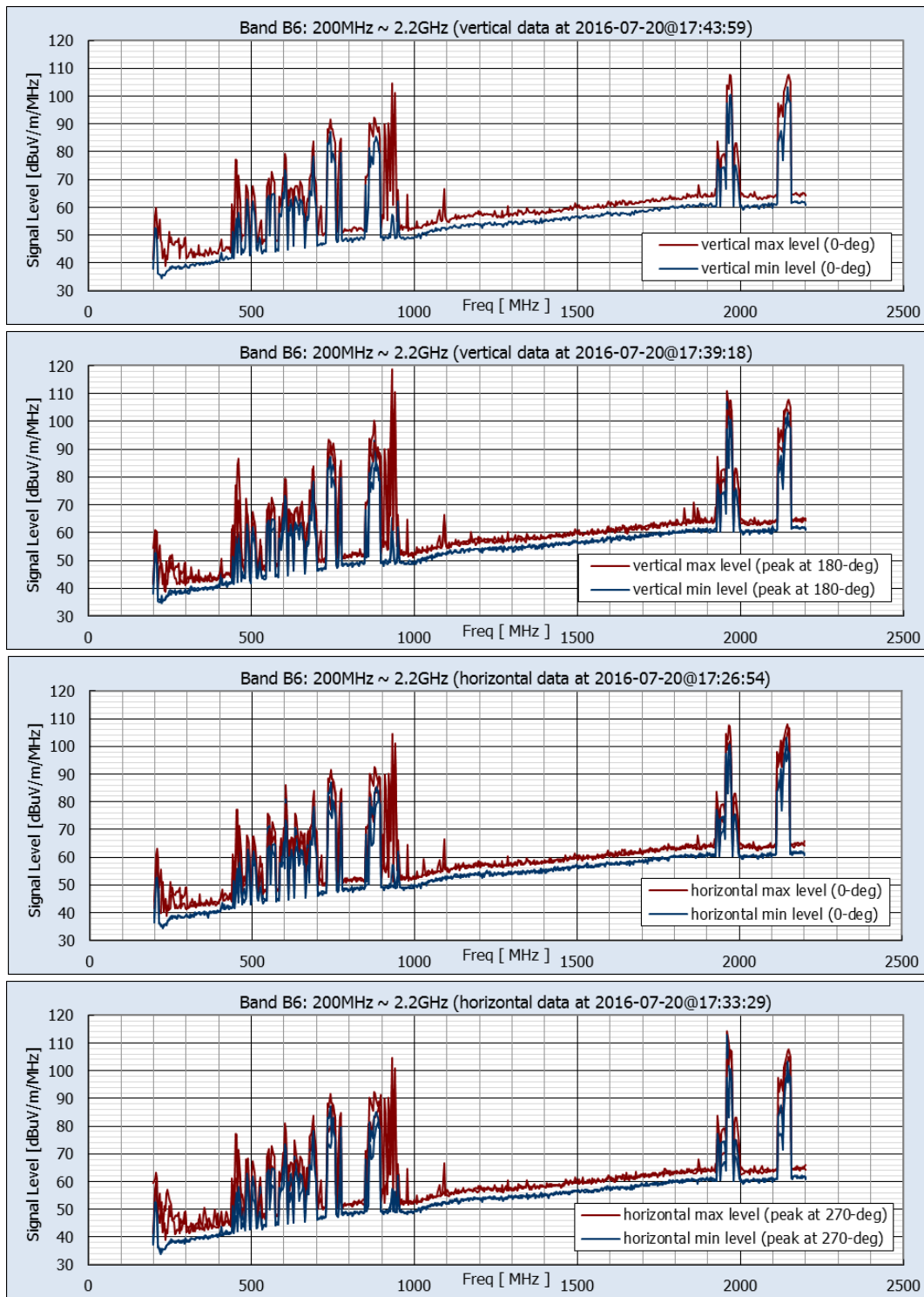
Figure 18e Location 14: Measured Environmental Radio Frequency Levels Non-Directional Data from Vertically Oriented Monopole Antenna, Bands 0–4



Maximum Levels									
Band number	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B5	25 ~ 200	108.5	105.727	110.6	105.727	106.3	105.727	108.6	105.727

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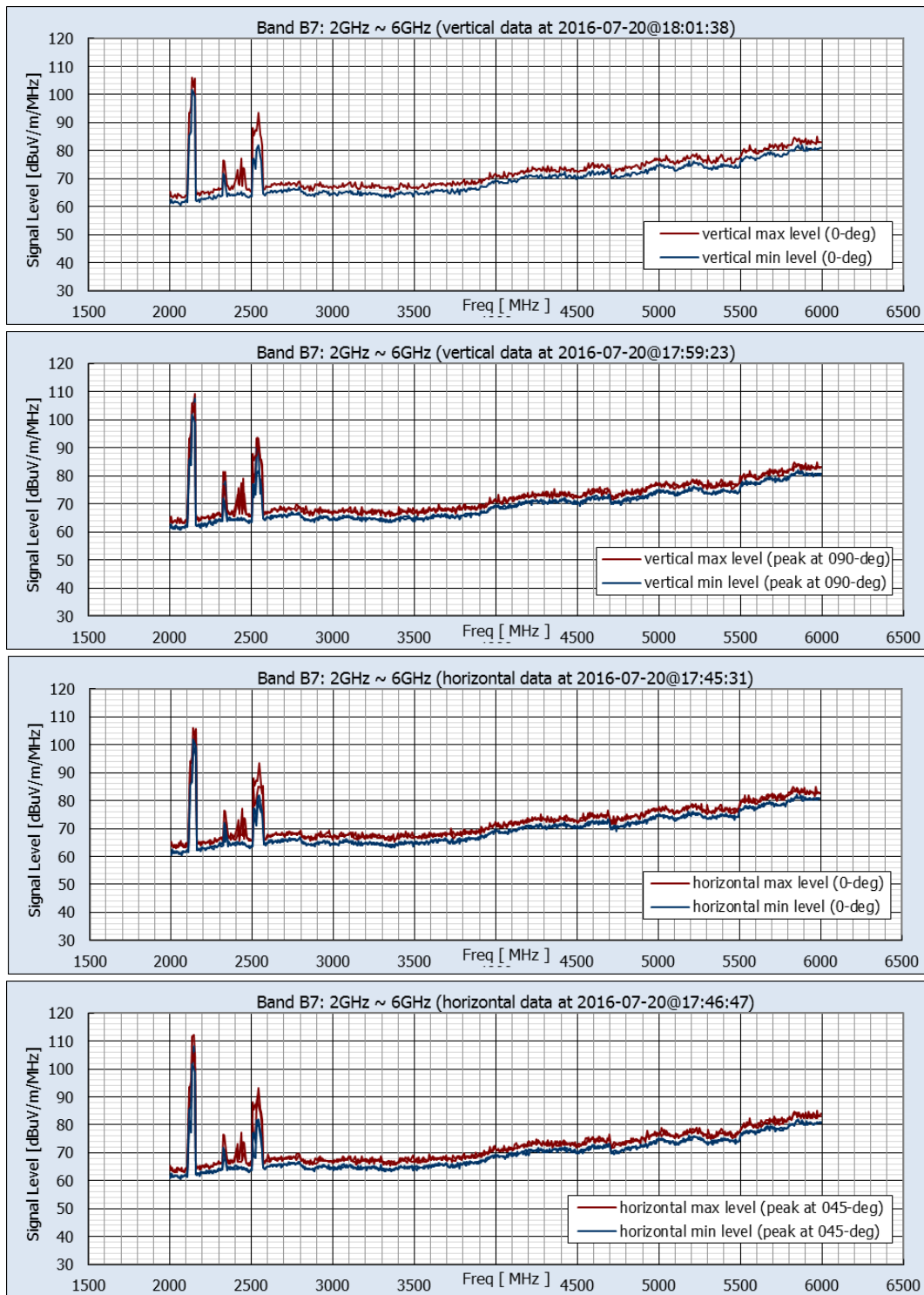
Figure 18f Location 14: Measured Environmental Radio Frequency Levels Band 5 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B6	200 ~ 2200	107.1	1960.000	118.7	930.909	112.7	1960.000	114.2	1960.000

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Figure 18g Location 14: Measured Environmental Radio Frequency Levels Band 6 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation



Maximum Levels									
Band	Freq. Range (MHz)	Vertical				Horizontal			
		Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Min-Hold (dBuV/m/MHz)	@ Freq. (MHz)	Pk Max-Hold (dBuV/m/MHz)	@ Freq. (MHz)
B7	2000~6000	107.4	2152.727	109.2	2152.727	108.3	2145.455	112.3	2145.455

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Figure 18h Location 14: Measured Environmental Radio Frequency Levels Band 7 Vertical and Horizontal Components, Facing Alignment (0-deg) and at Peak Orientation

REFERENCES

California High-Speed Rail Authority (Authority). 2010. *Measurement Procedure for Assessment of CHSRP Alignment EMI Footprint*. TM 3.4.11. Prepared by Parsons Brinckerhoff. March 2010.