FCC PART 15.249

EMI MEASUREMENT AND TEST REPORT

For

Wireless eSystems, Inc.

65 Hill Ave.
Fort Walton Beach, Florida 32548

FCC ID: OYITOUCHREMOTE

This Report Concerns:	Equipment Type:
☒ Original Report	Touch Remote

Test Engineer:	James Ma
Report No.:	R0511141
Report Date:	2005-12-01
Reviewed By:	Snell Leong /
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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Wireless eSystems, Inc.* product, FCC ID: *OYITOUCHREMOTE*, or the "EUT" as referred to in this report is a Touch Remote, operating frequency 2432.8317 – 2435.4317 MHz. The EUT is measured approximately 127.0mmL x 101.6mmW x 25.4mmH.

** The test data gathered are from production sample, serial number: 001, provided by the manufacturer.*

Objective

This document is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 - 2003.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.207, 15.209, and 15.249.

Related Submittal(s)/Grant(s)

No Related Submittals

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4 - 2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp.

Test Facility

The Open Area Test site used by Bay Area Compliance Laboratory Corporation to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA with registration number: 90464.

Test site at Bay Area Compliance Laboratory Corporation has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to ANSI C63.4-2003.

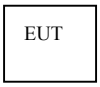
Schematics and Block Diagram

Please refer to Appendix A.

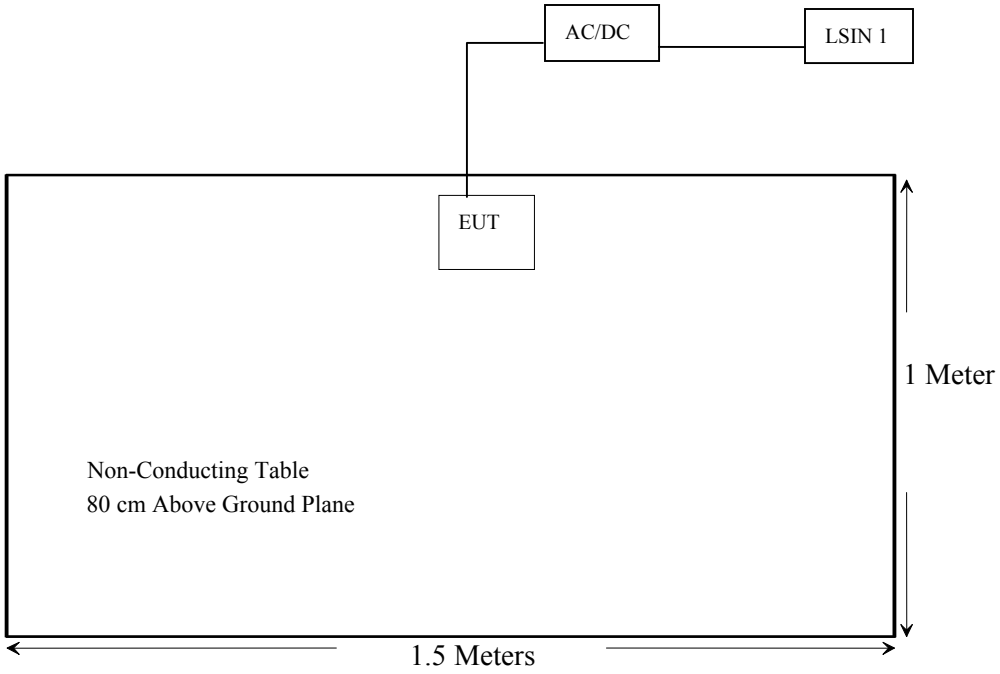
Equipment Modifications

No modifications were made to the EUT.

Test Setup Configuration



Test Setup Block Diagram



SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna Requirement	Compliant
§15.205	Restricted Band	Compliant
§15.207(a)	Conducted Emission	Compliant
§15.209 (a), §15.249 (a)	Radiated Emission	Compliant
15.249 (d)	Band Edge Testing	Compliant

§15.203 - ANTENNA REQUIREMENT

Standard Applicable

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna Connected Construction

The antenna connector is designed with permanent attachment and no consideration of replacement.

§ 15.207 (a) - CONDUCTED EMISSIONS TEST DATA

Measurement Uncertainty

All measurements involve certain levels of uncertainties. These uncertainties are attributed to: Receiver, Cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the estimated uncertainty of any conducted emission measurement at BACL is $\pm$2.4 dB.

EUT Setup

The measurement was performed in the shielded room, using the same setup per ANSI C63.4-2003 measurement procedure. The specification used was FCC 15 Subpart C limits.

External I/O cables were draped along the edge of the test table and bundle when necessary.

The EUT was connected to an adapter, which connected to 120Vac/60Hz power source.

Receiver Setup

The receiver was set to investigate the frequency 150 kHz to 30MHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Rohde & Schwarz	Receiver, EMI Test	ESCS30	100176	2005-09-15
Fluke	Calibrated Voltmeter	189	18485-38	2005-07-18
Rohde & Schwarz	LISN, Artificial Mains	ESH2-Z5	871884/039	2005-08-16

* **Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Test Procedure

During the conducted emission test, the adapter of EUT was connected to the main outlet of the LISN-1.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the peak detection mode, quasi-peak and average. Quasi-Peak readings are distinguished with a "QP". Average readings are distinguished with an "Ave".

Environmental Conditions

Temperature:	21 °C
Relative Humidity:	45%
ATM Pressure:	1080mbar

**Testing was performed by James Ma on 2005-11-23.*

Summary of Test Results

According to the recorded data in following table, the EUT complies with the FCC Conducted limit for a Class B device, with the *worst* margin reading of:

-17.8 dB at **0.395 MHz** in the **Neutral** mode

Conducted Emissions Test Data

LINE CONDUCTED EMISSIONS				FCC CLASS B	
Frequency MHz	Amplitude dBµV	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit dBµV	Margin dB
0.395	40.2	QP	Neutral	57.96	-17.8
0.575	37.9	QP	Neutral	56.00	-18.1
0.150	45.9	QP	Neutral	66.00	-20.1
0.540	35.0	QP	Line	56.00	-21.0
0.275	37.3	QP	Line	60.97	-23.7
0.150	42.1	QP	Line	66.00	-23.9
0.575	10.0	Ave	Neutral	46.00	-36.0
0.395	11.9	Ave	Neutral	47.96	-36.1
0.540	8.1	Ave	Line	46.00	-37.9
0.150	16.4	Ave	Neutral	56.00	-39.6
0.275	9.9	Ave	Line	50.97	-41.1
0.150	13.0	Ave	Line	56.00	-43.0

Plot of Conducted Emissions Test Data

Plot of Conducted Emissions test data was presented hereinafter as reference.

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23. Nov 05 14:17

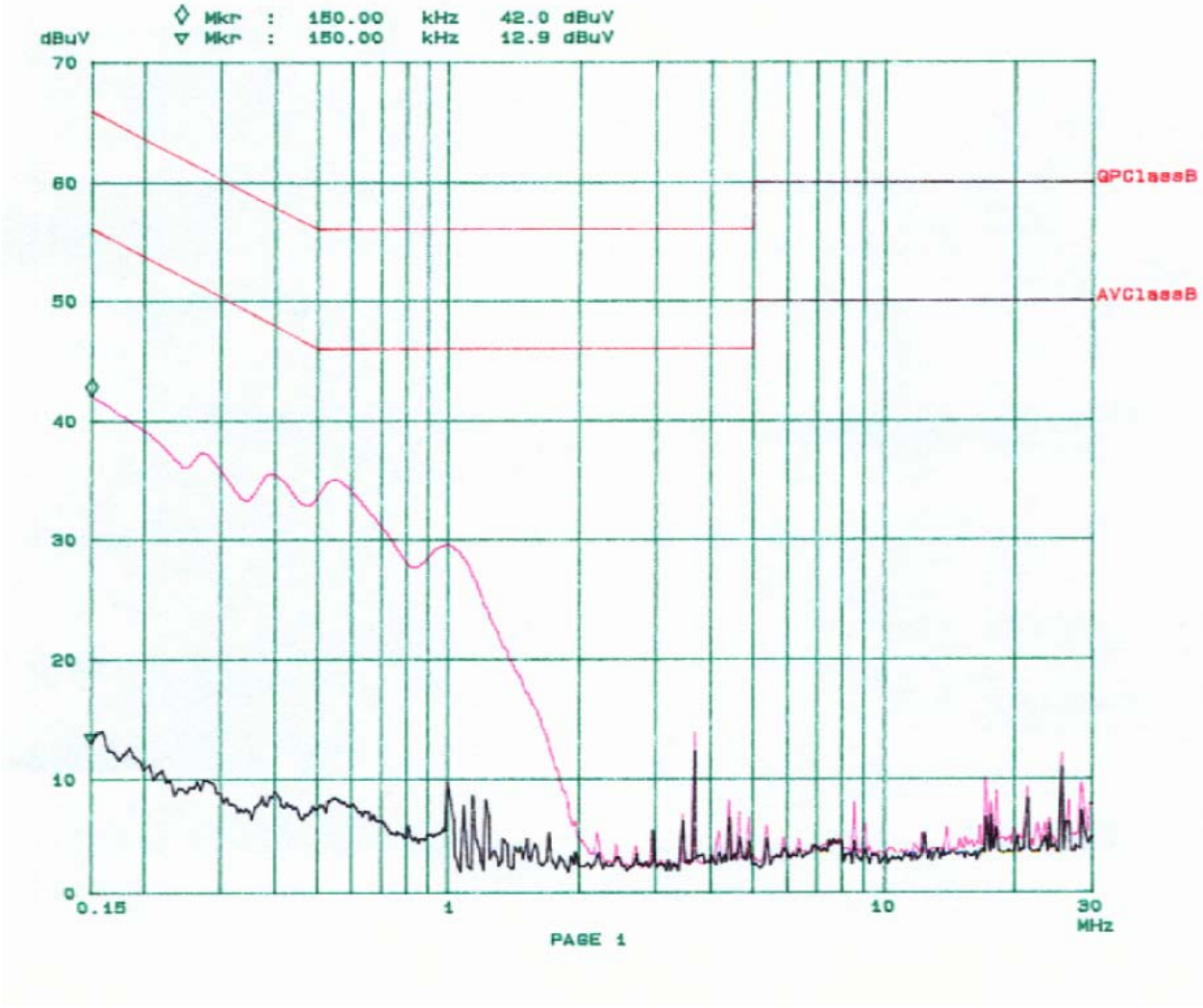
Class B

James

EUT: Touch Remote
Manuf: Wireless e Systems
Op Cond: Normal
Operator: James
Test Spec: Ch 6
Comment: L
120 AC

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	9k	QP+AV	20ms	15dBLN	OFF
1M	5M	10k	9k	QP+AV	1ms	15dBLN	OFF
5M	30M	100k	9k	QP+AV	1ms	15dBLN	OFF



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23. Nov 05 12:55

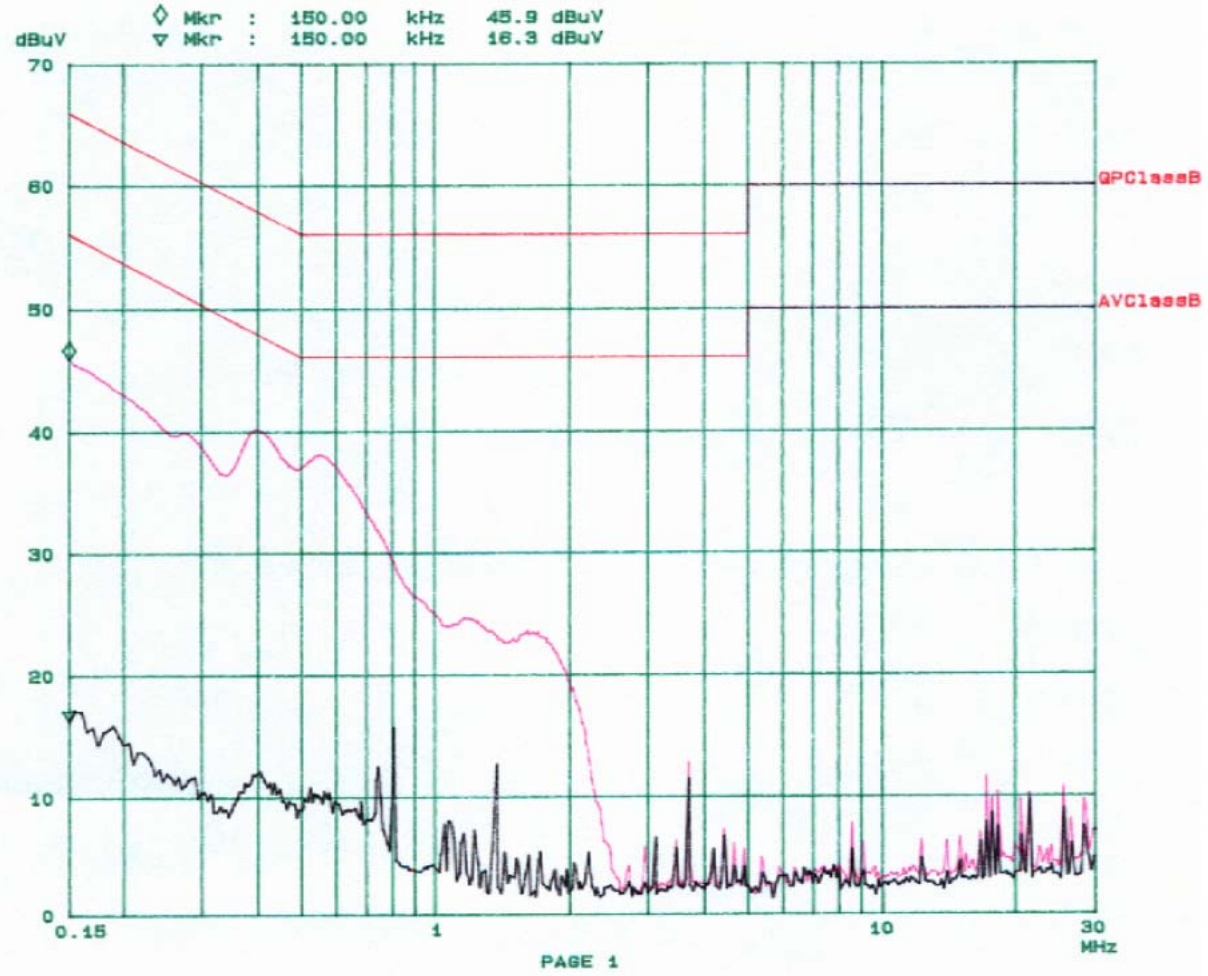
Class B

James

EUT: Touch Remote
Manuf: Wireless e Systems
Op Cond: Normal
Operator: James (ch6)
Comment: N
120 AC

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	9k	QP+AV	20ms	15dBLN	OFF
1M	5M	10k	9k	QP+AV	1ms	15dBLN	OFF
5M	30M	100k	9k	QP+AV	1ms	15dBLN	OFF



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§15.205, §15.209 (a), §15.249 (a) - RADIATED EMISSION DATA

Applicable Standard

According to §15.249 (a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

According to §15.249 (d), emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is $\pm$4.0 dB.

EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup in accordance with ANSI C63.4-2003. The specification used was the FCC 15 Subpart C limits.

External I/O cables were draped along the edge of the test table and bundle when necessary.

The EUT was connected to an adapter, which connected to 120Vac/60Hz power source.

Receiver Setup

According to FCC Rules, 47 CFR 15.33 (a) (1), the system was tested to 25GHz.

During the radiated emission test, the receiver was set with the following configurations:

Frequency Range	***RBW***	***Video B/W***
Below 30MHz	10kHz	10kHz
30 – 1000MHz	100kHz	100kHz
Above 1000MHz	1MHz	1MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Pre, Amplifer (1-26.5 GHz)	8449B	3147A00400	2005-10-05
A. H. Systems	Antenna, Horn, DRG	SAS-200/271	261	2005-04-20
Rohde & Schewarz	EMI Test Receiver	ESCI 1166.595 0K03	100044	2004-09-29

* **Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Environmental Conditions

Temperature:	21 °C
Relative Humidity:	45%
ATM Pressure:	1080mbar

**Testing was performed by James Ma on 2005-11-23.*

Test Procedure

For the radiated emissions test, the power cord of the EUT was connected to the AC floor outlet.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.

All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limits), and are distinguished with a "**Qp**" in the data table.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for applicable limits. The equation for margin calculation is as follows:

Margin = Corr. Ampl. - Applicable Limit

Summary of Test Results

According to the recorded data in following table, the EUT measured test data within the measurement uncertainty of ±4.0, and had the worst margin of:

-12.1 dB at **4865.66 MHz** in the **Vertical** polarization at **Low** Channel
-12.0 dB at **4868.06 MHz** in the **Horizontal** polarization at **Mid** Channel
-12.2 dB at **4870.86 MHz** in the **Vertical** polarization at **High** Channel

Radiated Emissions Test Result Data - 3Meter

Low Channel (0)

Frequency	Reading	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier	Correction Factor	15.249		Comments
MHz	dBuV/m	Degree	Meter	H / V	dB	dB	dB	dBuV/m	Limit (dBuV/m)	Margin dB	
4865.6634	41.1	200	1.0	v	32.5	3.1	34.8	41.9	54	-12.1	Ave
4865.6634	39.4	230	1.5	h	32.5	3.1	34.8	40.2	54	-13.8	Ave
2432.8317	98.0	20	1.0	v	28.7	2.0	35.8	92.8	114	-21.2	Fund/Peak
2400.0000	36.0	260	2.0	v	28.7	2.0	35.8	30.8	54	-23.2	Band Edge/ Ave
2400.0000	35.0	200	1.5	h	28.7	2.0	35.8	29.8	54	-24.2	Band Edge/ Ave
2432.8317	91.0	90	2.0	h	28.7	2.0	35.8	85.8	114	-28.2	Fund/Peak
4865.6634	44.0	200	1.0	v	32.5	3.1	34.8	44.8	74	-29.2	Peak
4865.6634	41.5	230	1.5	h	32.5	3.1	34.8	42.3	74	-31.7	Peak
2400.0000	40.0	260	2.0	v	28.7	2.0	35.8	34.8	74	-39.2	Band Edge/ Peak
2400.0000	38.0	200	1.5	h	28.7	2.0	35.8	32.8	74	-41.2	Band Edge/ Peak
2432.8317	57.9	20	1.0	v	28.7	2.0	35.8	52.7	94	-41.3	Fund/Ave
2432.8317	52.0	90	2.0	h	28.7	2.0	35.8	46.8	94	-47.2	Fund/Ave

Radiated Emissions Test Result Data - 3Meter

Mid Channel (6)

Frequency MHz	Reading dBuV/m	Direction Degree	Height Meter	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Factor dBuV/m	15.249 Limit (dBuV/m)	15.249 Margin dB	Comments
4868.0634	41.2	200	1.5	h	32.5	3.1	34.8	42.0	54	-12.0	Ave
4868.0634	40.2	200	1.5	v	32.5	3.1	34.8	41.0	54	-13.0	Ave
2434.0317	98.0	20	2.0	h	28.7	2.0	35.8	92.8	114	-21.2	Fund/Peak
2434.0317	97.7	0	2.5	v	28.7	2.0	35.8	92.5	114	-21.5	Fund/Peak
4868.0634	43.0	200	1.5	h	32.5	3.1	34.8	43.8	74	-30.2	Peak
4868.0634	42.5	200	1.5	v	32.5	3.1	34.8	43.3	74	-30.7	Peak
2434.0317	54.0	0	2.0	h	28.7	2.0	35.8	48.8	94	-45.2	Fund/Ave
2434.0317	51.7	10	2.5	v	28.7	2.0	35.8	46.5	94	-47.5	Fund/Ave

High Channel (13)

Frequency MHz	Reading dBuV/m	Direction Degree	Height Meter	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Factor dBuV/m	15.249 Limit (dBuV/m)	15.249 Margin dB	Comments
4870.8634	41.0	180	1.5	v	32.5	3.1	34.8	41.8	54	-12.2	Ave
4870.8634	40.8	90	2.5	h	32.5	3.1	34.8	41.6	54	-12.4	Ave
2483.5000	36.0	200	1.5	v	28.7	2.0	35.8	30.8	54	-23.2	Band Edge/ Ave
2435.4317	95.8	270	3.0	v	28.7	2.0	35.8	90.6	114	-23.4	Fund/Peak
2483.5000	35.0	200	1.5	h	28.7	2.0	35.8	29.8	54	-24.2	Band Edge/ Ave
2435.4317	94.2	250	2.5	h	28.7	2.0	35.8	89.0	114	-25.0	Fund/Peak
4870.8634	43.5	180	1.5	v	32.5	3.1	34.8	44.3	74	-29.7	Peak
4870.8634	43.0	90	2.5	h	32.5	3.1	34.8	43.8	74	-30.2	Peak
2483.5000	40.0	200	1.5	v	28.7	2.0	35.8	34.8	74	-39.2	Band Edge/ Peak
2483.5000	38.0	200	1.5	h	28.7	2.0	35.8	32.8	74	-41.2	Band Edge/ Peak
2435.4317	55.2	250	2.5	h	28.7	2.0	35.8	50.0	94	-44.0	Fund/Ave
2435.4317	51.5	270	3.0	v	28.7	2.0	35.8	46.3	94	-47.7	Fund/Ave