

FCC PART 15.249
EMI MEASUREMENT AND TEST REPORT

For

Coby Communications Ltd.

Unit C-E, 8/F, PO Shau Centre, 115 How Ming Street, Kwun Tong
Kowloon, Hong Kong

FCC ID: S7ICS-P95

This Report Concerns: ☒ Original Report	Equipment Type: Transmitter, 2.4GHz Wireless Speaker
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Report No.: R0503243	
Report Date: 2005-04-12	
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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Coby Communications Ltd.*'s product, FCC ID: S7ICS-P95, or the "EUT" as referred to in this report is a transmitter of a 2.4GHz Wireless Speaker. The EUT operates between frequency 2455.7-2460.2 MHz (TX1), 2410.7-2415.2 MHz (TX2). The EUT measures approximately 110mmL x 110mmW x 75mmH.

** The test data gathered are from production sample, serial number: CS00032, 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 15.205, 15.207, 15.249, 15.203 and 15.209 rules.

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.

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.

Equipment Modifications

No modifications were made to the EUT.

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
Dell	Notebook	PP04S	W0142A00	IXmuB22111S

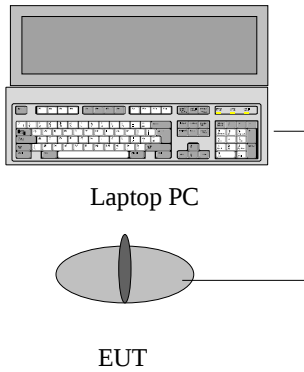
External I/O Cabling List and Details

Cable Description	Length (M)	Port/From	To
Shielded Audio Cable	1.8	Audio Port/EUT	Audio Port/Host

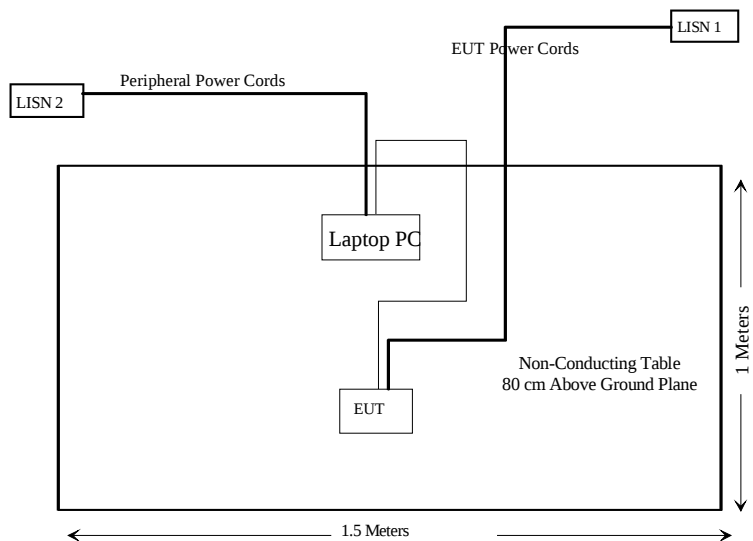
Power Supply Information

Manufacturer	Description	Model	Serial Number	FCC ID
Coby	Adaptor	U090030D	None	None

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 Bands of Operation	Compliant
§15.207 (a)	Conducted Emission	Compliant
§15.209 (a) §15.249 (a) (d)	Radiated Emission	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: Spectrum analyzer, 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 ± 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 as required.

The EUT was connected with 120Vac/60Hz power source.

Receiver Setup

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Rohde & Schwarz	Artificial-Mains Network	ESH2-Z5	871884/039	2004-08-15
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2004-09-11
Fluke	Calibrated Voltmeter	189	18485-38	2004-07-18

* **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 power cord of the host system was connected to the main outlet of the LISN-1.

Maximizing procedure were 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 an "QP". Average readings are distinguished with an "Ave".

Environmental Conditions

Temperature:	20 °C
Relative Humidity:	52%
ATM Pressure:	1020mbar

*Testing was performed by Jerry Wang on 2005-04-11.

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:

-36.4 dB at 0.81 MHz in the Neutral mode

Conducted Emissions Test Data

Frequency MHz	LINE CONDUCTED EMISSIONS			FCC CLASS B	
	Amplitude dBμV	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit dBμV	Margin dB
0.81	9.6	Ave	Neutral	46.0	-36.4
21.10	9.4	Ave	LINE	50.0	-40.6
0.81	11.3	QP	Neutral	56.0	-44.7
30.00	4.7	Ave	LINE	50.0	-45.3
0.23	17.0	QP	Neutral	62.4	-45.4
0.23	4.3	Ave	Neutral	52.4	-48.1
0.15	6.5	Ave	Neutral	56.0	-49.5
21.10	9.8	QP	LINE	60.0	-50.2
0.16	4.6	Ave	LINE	55.5	-50.9
0.15	12.4	QP	Neutral	66.0	-53.6
30.00	6.2	QP	LINE	60.0	-53.8
0.16	11.0	QP	LINE	65.5	-54.5

Plot of Conducted Emissions Test Data

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

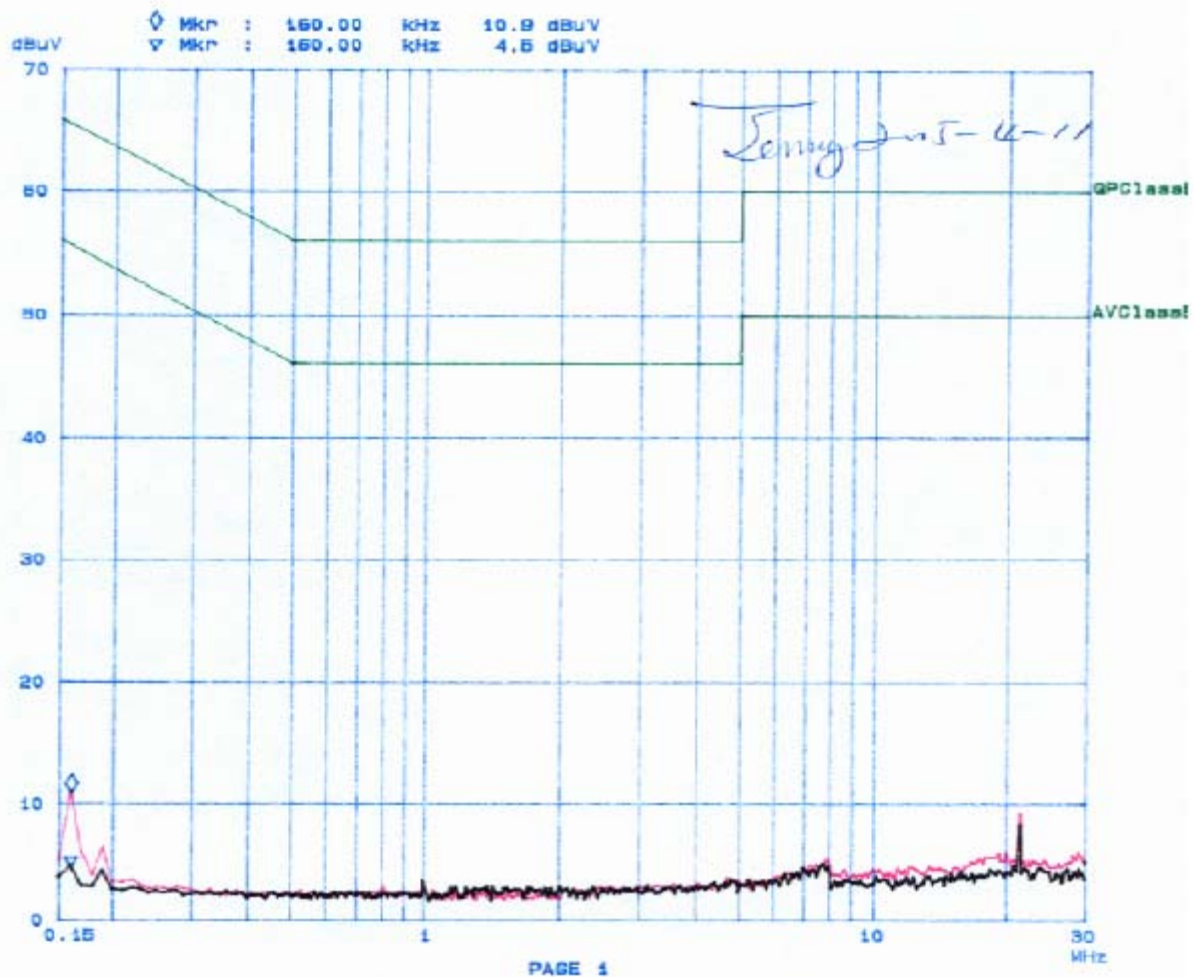
Bay Area Compliance Laboratory Corp
Class B

11. Apr 05 08:17

EUT: CS-P95
Manuf: Coby
Op Cond: Normal
Operator: Jenny
Comment: L

Scan Settings (3 Ranges)

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



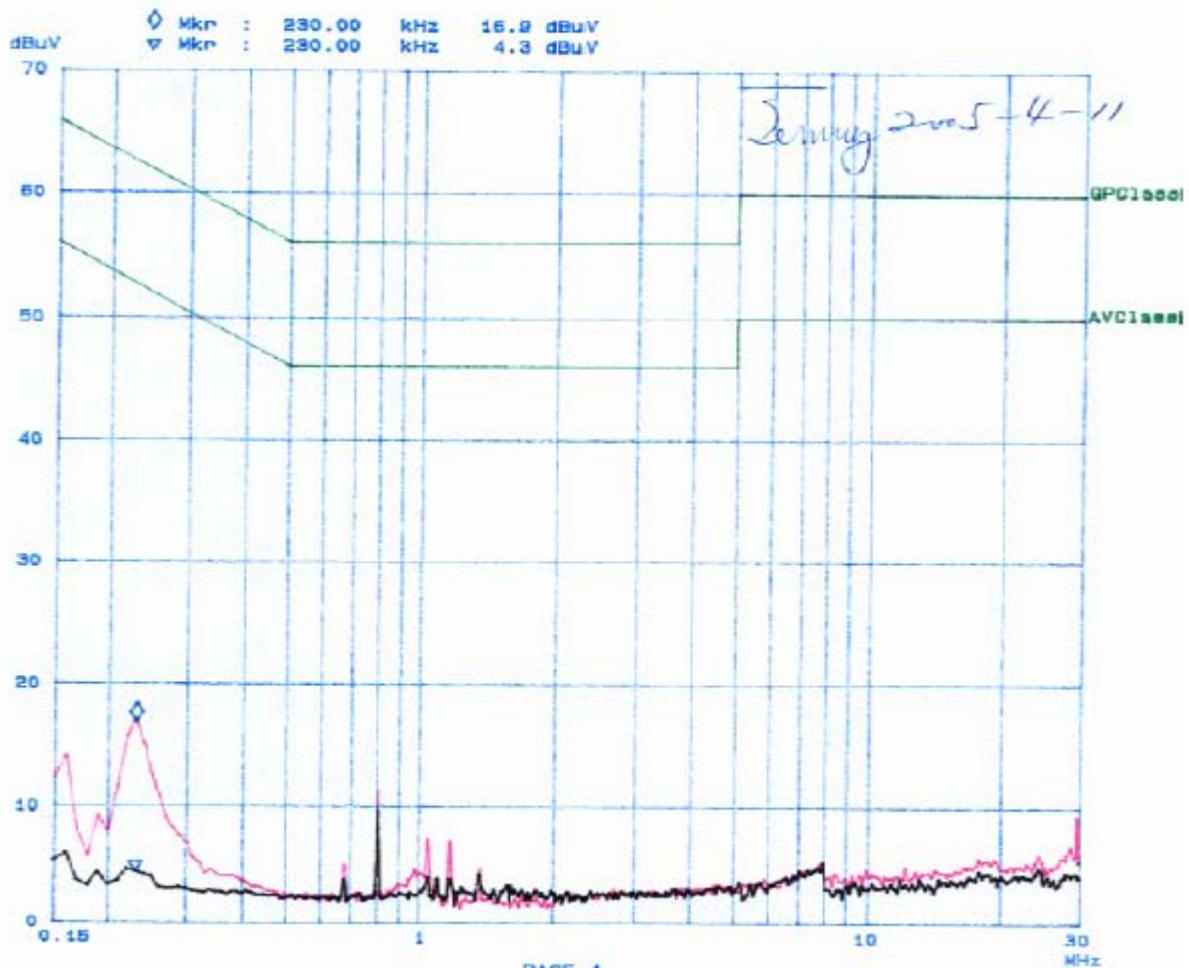
Bay Area Compliance Laboratory Corp
Class B

11. Apr 05 07:58

EUT: CS-P95
Manuf: Coby
Op Cond: Normal
Operator: Jerry
Comment: N

Scan Settings (3 Ranges)

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



§15.205 & §15.249 (a), (d) - 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 (millivolts/ meter)	Field strength of fundamental 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 ± 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.

The spacing between the peripherals was 10 centimeters.

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

The EUT was connected to the power adapter, which is connected with 120Vac/60Hz power source

Spectrum Analyzer Setup

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

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Amplifier (0.1-1300MHz)	8447D	2944A10187	2004-09-23
Agilent	Spectrum Analyzer	E4446A	US44300386	2004-11-10
A. H. Systems	Antenna, Horn, DRG	SAS-200/571	261	2004-08-02
HP	Amplifier, Pre, Microwave	8449B	3147A00400	2004-06-14
HP	Amplifier, Pre	8447D	2944A10187	8/25/2004
R&S	Receiver, EMI Test	ESCI 1166.5950K03	100044	9/29/2004
Sunol Sciences	30MHz – 2GHz Antenna	JB1	A013105-3	2/11/2005

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

Environmental Conditions

Temperature:	19°C
Relative Humidity:	56%
ATM Pressure:	1019mbar

*Testing was performed by Jerry Wang on 2005-03-28.

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:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

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:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Applicable Limit}$$

Summary of Test Results

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.207, and 15.249 and had the worst margin of:

Transmitter 1:

- 12.6dB at 2455.70 MHz in the Vertical polarization at Low Channel
- 8.9 dB at 4920.40MHz in the Horizontal polarization at High Channel

Transmitter 2:

- 14.50dB at 7232.10 MHz in the Horizontal polarization at Low Channel
- 10.00 dB at 4830.38MHz in the Horizontal polarization at High Channel
- 8.9 dB at 357.95 MHz in the Vertical polarization at Unintentional Emission

Radiated Emissions Test Result Data – Transmitter 1, 3Meter

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15 Subpart C	
Frequency MHz	Ampl. dBμV	Comments	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
1-25GHz, Low Channel											
2455.70	87.1	Fund/Ave	45	1.5	V	28.1	2.0	35.8	81.4	94	-12.6
7367.12	33.6	Ave	30	1.5	H	36.3	4.3	34.7	39.5	54	-14.5
2455.70	84.9	Fund/Ave	30	1.2	H	28.1	2.0	35.8	79.2	94	-14.8
7367.12	32.4	Ave	30	1.5	V	36.3	4.3	34.7	38.3	54	-15.7
4911.42	32.1	Ave	30	1.5	V	32.5	3.1	34.8	32.9	54	-21.1
4911.42	30.4	Ave	35	1.2	H	32.5	3.1	34.8	31.2	54	-22.8
7367.12	45.2	Peak	40	1.5	H	36.3	4.3	34.7	51.1	74	-22.9
7367.12	43.2	Peak	45	2.0	V	36.3	4.3	34.7	49.1	74	-24.9
4911.42	42.3	Peak	20	1.2	H	32.5	3.1	34.8	43.1	74	-30.9
4911.42	42.1	Peak	0	2.0	V	32.5	3.1	34.8	42.9	74	-31.1
2455.70	87.6	Fund/Peak	30	1.5	V	28.1	2.0	35.8	81.9	114	-32.1
2455.70	86.2	Fund/Peak	30	1.5	H	28.1	2.0	35.8	80.5	114	-33.5
1-25GHz, High Channel											
4920.40	44.3	Peak	180	1.5	H	32.5	3.1	34.8	45.1	54	-8.9
7380.60	33.9	Ave	180	1.2	V	36.3	4.3	34.7	39.8	54	-14.2
2460.20	82.1	Fund/Ave	180	1.5	H	28.1	2.0	35.8	76.4	94	-17.6
4920.40	35.2	Ave	180	1.5	H	32.5	3.1	34.8	36.0	54	-18.0
2460.20	80.3	Fund/Ave	180	1.5	V	28.1	2.0	35.8	74.6	94	-19.4
4920.40	30.5	Ave	120	1.2	V	32.5	3.1	34.8	31.3	54	-22.7
7380.60	43.2	Peak	120	1.5	H	36.3	4.3	34.7	49.1	74	-24.9
7380.60	42.3	Peak	180	1.2	V	36.3	4.3	34.7	48.2	74	-25.8
4920.40	40.3	Peak	90	1.2	V	32.5	3.1	34.8	41.1	74	-32.9
7380.60	33.1	Ave	180	1.5	H	36.3	4.3	34.7	39.0	74	-35.0
2460.20	83.2	Fund/Peak	180	1.5	H	28.1	2.0	35.8	77.5	114	-36.5
2460.20	81.7	Fund/Peak	180	1.5	V	28.1	2.0	35.8	76.0	114	-38.0

Radiated Emissions Test Result Data – Transmitter 2, 3Meter

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15 Subpart C	
Frequency MHz	Ampl. dBμV	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dB	Cable dB	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
1-25GHz, Low Channel											
7232.10	33.6	Ave	30	1.5	H	36.3	4.3	34.7	39.5	54	-14.5
7232.10	32.4	Ave	30	1.5	V	36.3	4.3	34.7	38.3	54	-15.7
2410.70	78.7	Fund/Ave	45	1.5	V	28.1	2.0	35.8	73.0	94	-21.0
4821.40	30.4	Ave	30	1.5	V	32.5	3.1	34.8	31.2	54	-22.8
4821.40	30.4	Ave	35	1.2	H	32.5	3.1	34.8	31.2	54	-22.8
7232.10	45.2	Peak	40	1.5	H	36.3	4.3	34.7	51.1	74	-22.9
7232.10	43.2	Peak	45	2.0	V	36.3	4.3	34.7	49.1	74	-24.9
2410.70	73.2	Fund/Ave	30	1.2	H	28.1	2.0	35.8	67.5	94	-26.5
4821.40	42.3	Peak	20	1.2	H	32.5	3.1	34.8	43.1	74	-30.9
4821.40	40.8	Peak	30	2.0	V	32.5	3.1	34.8	41.6	74	-32.4
2410.70	79.4	Fund/Peak	30	1.5	V	28.1	2.0	35.8	73.7	114	-40.3
2410.70	75.3	Fund/Peak	30	1.5	H	28.1	2.0	35.8	69.6	114	-44.4
1-25GHz, High Channel											
4830.38	43.2	Peak	180	1.5	H	32.5	3.1	34.8	44.0	54	-10.0
7245.58	34.2	Ave	180	1.2	V	36.3	4.3	34.7	40.1	54	-13.9
2415.20	79.6	Fund/Ave	180	1.5	H	28.1	2.0	35.8	73.9	94	-20.1
2415.20	79.3	Fund/Ave	180	1.5	V	28.1	2.0	35.8	73.6	94	-20.4
4830.38	32.3	Ave	180	1.5	H	32.5	3.1	34.8	33.1	54	-20.9
4830.38	31.8	Ave	120	1.2	V	32.5	3.1	34.8	32.6	54	-21.4
7245.58	43.6	Peak	180	1.2	V	36.3	4.3	34.7	49.5	74	-24.5
7245.58	42.9	Peak	120	1.5	H	36.3	4.3	34.7	48.8	74	-25.2
4830.38	42.3	Peak	90	1.2	V	32.5	3.1	34.8	43.1	74	-30.9
7245.58	32.6	Ave	180	1.5	H	36.3	4.3	34.7	38.5	74	-35.5
2415.20	80.9	Fund/Peak	180	1.5	V	28.1	2.0	35.8	75.2	114	-38.8
2415.20	80.8	Fund/Peak	180	1.5	H	28.1	2.0	35.8	75.1	114	-38.9

Radiated Emissions Test Result Data – Standby Mode, 3M

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15 Subpart C	
Frequency MHz	Ampl. dBμV	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dB	Cable dB	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
Unintentional Emission, 30MHz to 1000MHz											
357.95	47.3		180	1.2	V	15.5	2.3	28.1	37.1	46	-8.9
35.80	45.3		300	1.2	V	13.4	1.0	28.7	31.0	40	-9.0
35.80	45.2		180	1.2	V	13.4	1.0	28.7	30.9	40	-9.1
357.96	45.9		200	1.5	H	15.5	2.3	28.1	35.7	46	-10.3
125.00	46.2		180	3.0	H	11.9	1.6	28.5	31.1	43.5	-12.4
125.00	45.9		120	2.0	H	11.9	1.6	28.5	30.8	43.5	-12.7
71.60	43.2		180	1.5	V	9.2	1.2	28.8	24.8	40	-15.2
71.60	38.4		200	1.2	V	9.2	1.2	28.8	20.0	40	-20.0