


FCC PART 15.249
EMI MEASUREMENT AND TEST REPORT

For
Cheung Hung Electronics Ltd.

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FCC ID: TWXCHA808B

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Product Name: 2.4GHz Cordless Phone – Base
Test Engineer: James Ma 	
Report No.: R0601252(B)	
Report Date: 2006-02-08	
Reviewed By: Daniel Deng/ 	
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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Cheung Hung Electronics Ltd.*'s product, FCC ID: *TWXCHA808B*, or the "EUT" as referred to in this report is a Cordless Phone, base portion. The base operates at frequency 924.045-926.218 MHz and measures approximately 165.1mmL x 78.7mmW x 88.9mmH.

** The test data gathered are from production sample, serial number: 20060120001, provided by the manufacturer.*

EUT Photo



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 and 15.205, 15.207, 15.249 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 Test site used by Bay Area Compliance Laboratory Corporation to collect radiated and conducted emission measurement data is located at 230 Commercial Street, Sunnyvale, California 94085, 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 registration number: 90464 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

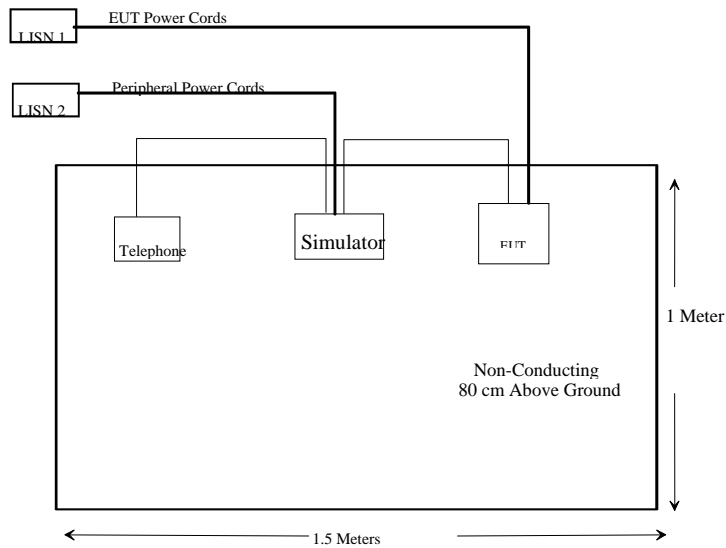
Manufacturer	Description	Model	Serial Number
Southern Telecom	Telephone	None	None
Teltone Corp	Phone Simulator	TLS-3B-01	80071

Power Supply

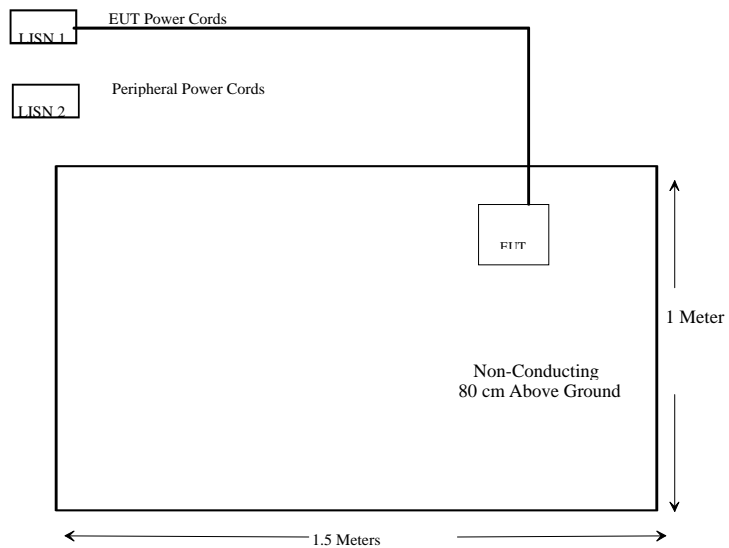
Manufacturer	Description	Model	Serial Number
Cheung Hung Electronics	AC Adaptor	N/A	N/A

Test Setup Block Diagram

Conducted Emission



Radiated Emission



SUMMARY OF TEST RESULTS

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

**Within the measurement uncertainty*

§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.

Antenna gain is 0 dBi, single port wire antenna.

§ 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 ± 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.

Environmental Conditions

Temperature:	17°C
Relative Humidity:	45%
ATM Pressure:	1009mbar

**Testing was performed by James Ma on 2006-02-06.*

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Rohde & Schwarz	LISN	ESH2-Z5	871884/039	2005-11-14
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2005-09-15

*** 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 provided 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".

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:

-22.3 dB at 25.900 MHz in the Line 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
25.900	37.7	QP	Line	60.00	-22.3
0.905	27.6	QP	Neutral	56.00	-28.4
0.900	27.2	QP	Line	56.00	-28.8
27.500	21.0	Ave	Line	50.00	-29.0
27.500	29.5	QP	Line	60.00	-30.5
16.000	11.1	Ave	Neutral	50.00	-38.9
25.900	9.9	Ave	Line	50.00	-40.1
0.900	4.9	Ave	Line	46.00	-41.1
0.905	4.8	Ave	Neutral	46.00	-41.2
16.000	14.3	QP	Neutral	60.00	-45.7
17.200	3.5	Ave	Neutral	50.00	-46.5
17.200	11.9	QP	Neutral	60.00	-48.1

Plot of Conducted Emissions Test Data

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

Bay Area Compliance Laboratory Corp
Class B

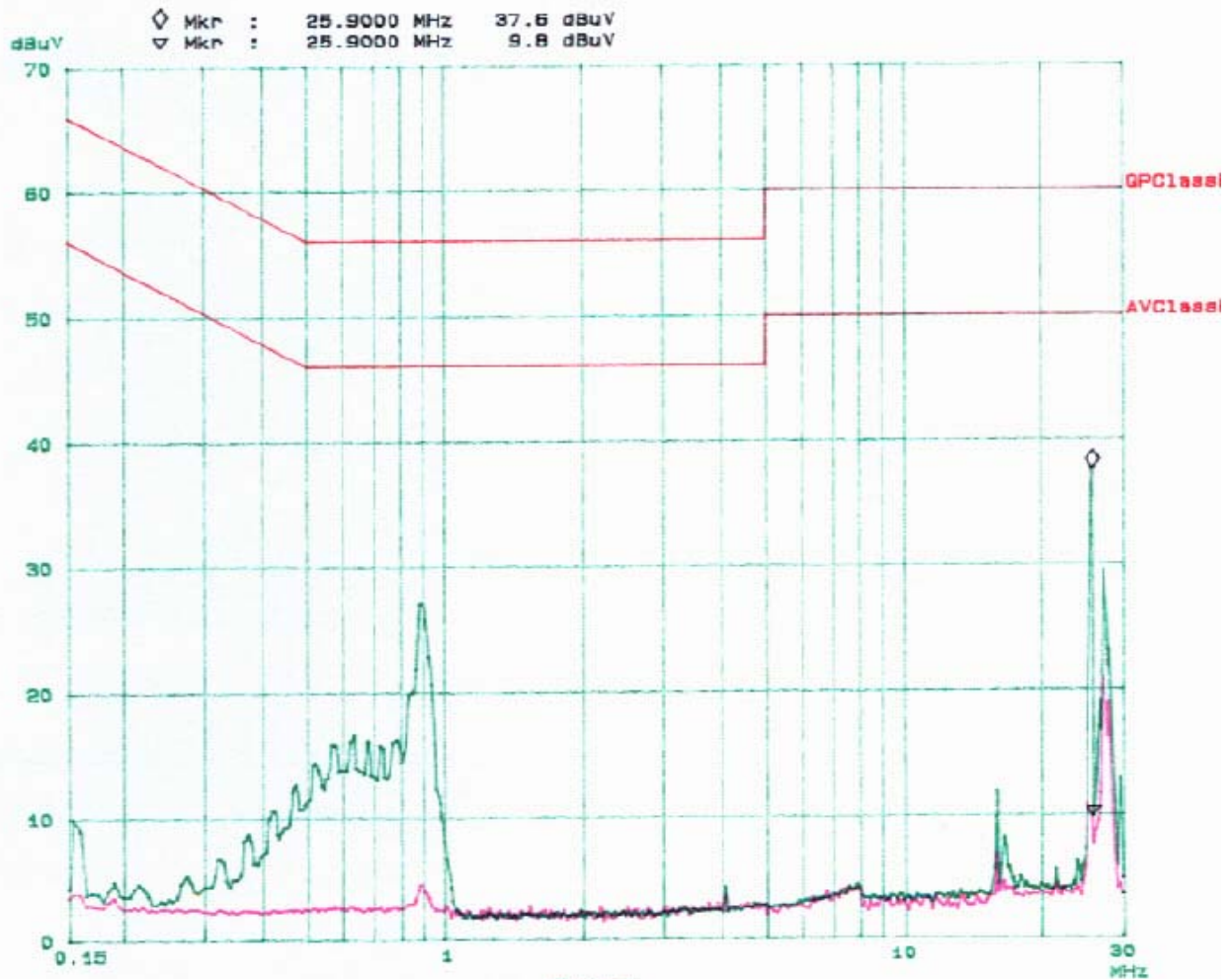
06. Feb 06 14:14

James M

EUT: 2.4 GHz Cordless Phone
Manuf: Cheung Hung Electr.
Op Cond: Normal
Operator: James
Comment: L
File name: NVIDIA.RES

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	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



Bay Area Compliance Laboratory Corp
Class B

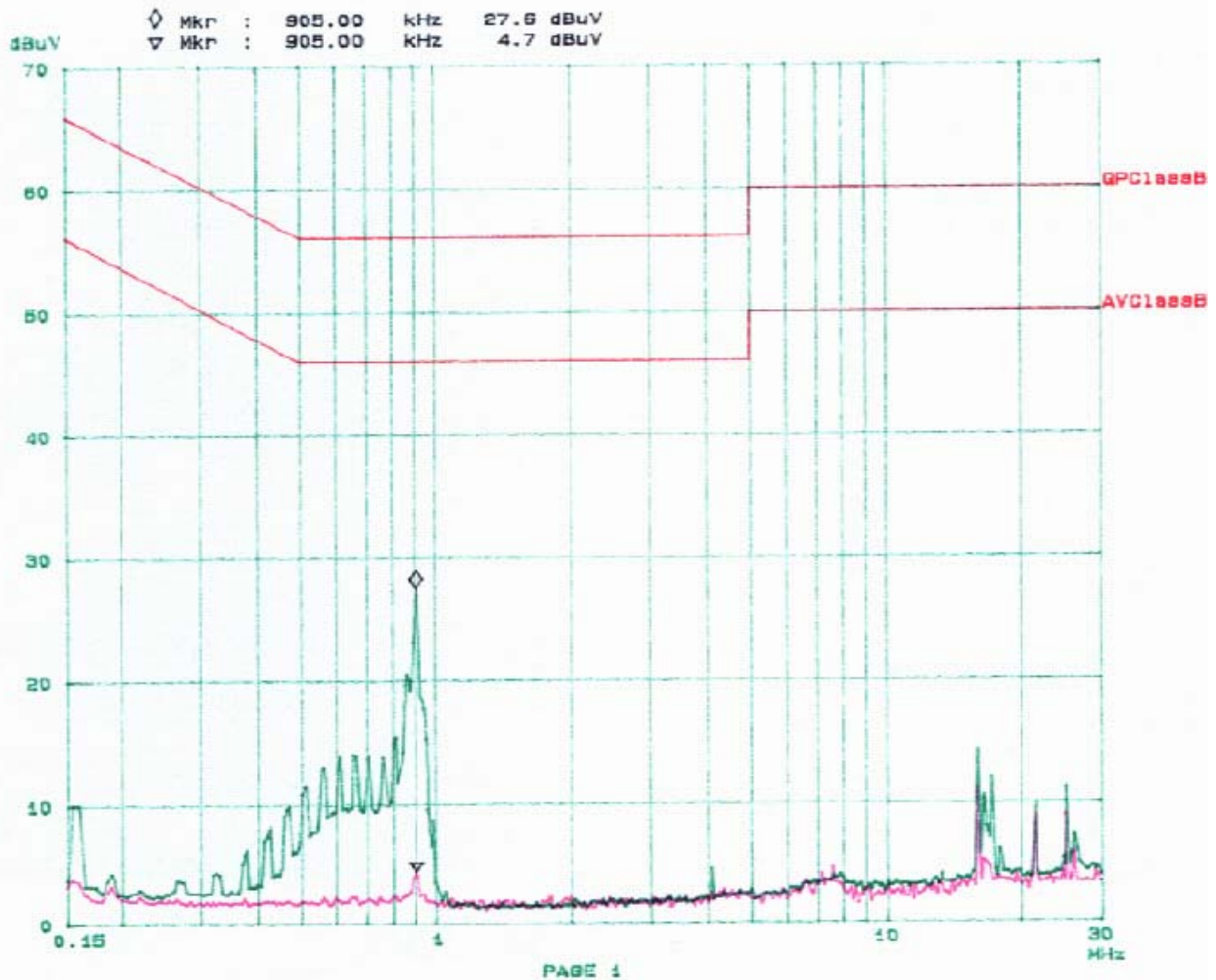
08. Feb 08 12:59

EUT: 2.4 GHz Cordless Phone
Manuf: Cheung Hung Electr.
Op Cond: Normal
Operator: James
Comment: N
120VAC
File name: NVIDIA.RES

James

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	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, §15.209 (a), §15.249 (a), §15.249 (d) - RADIATED EMISSION DATA AND BAND-EDGE TESTING

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 (microvolts/ meter)	harmonics
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.

Requirements: FCC 15.249 (c), the emission power at the START and STOP frequencies shall be at least 50 dB below the level of the fundamental or to the general radiated emission limits in FCC 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

Environmental Conditions

Temperature:	17°C
Relative Humidity:	45%
ATM Pressure:	1009mbar

*Testing was performed by James Ma on 2006-02-03.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Sonoma Instrument	Amplifier, Pre (10 KHz ~2.5 GHz)	317	260407	03/20/2006
Agilent	Amplifier, Pre, Microwave	8449B	3008A01978	8/10/2005
Agilent	Analyzer, Spectrum	8564A	3943A01781	12/08/2005
ETS- Lindgren	30Mhz ~ 3 GHz Antenna	JB3	A020106-2/S006628	02/14/2006
A. H. Systems	Antenna, Horn, DRG	SAS-200/571	261	04/20/2005

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

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 measured test data within the measurement uncertainty of ± 4.0 , and had the worst margin of:

-1.18* dB at 1386.000 MHz in the Horizontal polarization at Low Channel
-0.6* dB at 1852.437 MHz in the Horizontal polarization at High Channel
-15.2 dB at 644.80 MHz in the Horizontal polarization at Unintentional Emission
 (*Within the measurement uncertainty)

Radiated Emissions Test Result Data - Base, 3Meter

Low Channel

Frequency	Reading	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier	Correction Factor	FCC	FCC	Comments
MHz	dBuV	Degree	Meter	H / V	dB	dB	dB	dBuV/m	Limit dBuV/m	Margin dB	
1386.0000	61.8	45	1.5	H	24.80	1.62	35.4	52.82	54	-1.18*	Ave
1848.0903	60.0	60	1.5	H	26.10	1.67	35.4	52.37	54	-1.63*	Ave
1848.0903	59.4	60	1.5	V	26.10	1.67	35.4	51.77	54	-2.23*	Ave
1386.0000	60.2	45	1.5	V	24.80	1.62	35.4	51.22	54	-2.78*	Ave
1594.5000	59.6	45	1.5	V	25.00	1.69	35.4	50.89	54	-3.11*	Ave
1594.5000	58.4	45	1.5	H	25.00	1.69	35.4	49.69	54	-4.31	Ave
924.0451	92.0	140	1.8	H	22.10	1.80	27.3	88.60	94	-5.40	Fund/QP
924.0451	91.0	84	1.8	V	22.10	1.80	27.3	87.60	94	-6.40	Fund/QP
1848.0903	68.7	60	1.0	H	26.10	1.67	35.4	61.07	74	-12.93	Peak
1386.0000	70.0	45	1.0	H	24.80	1.62	35.4	61.02	74	-12.98	Peak
1848.0903	66.2	60	2.0	V	26.10	1.67	35.4	58.57	74	-15.43	Peak
1386.0000	65.5	45	2.0	V	24.80	1.62	35.4	56.52	74	-17.48	Peak
902.0000	29.0	140	1.8	H	22.60	2.45	27.4	26.65	46	-19.35	Band Edge/QP
902.0000	28.7	84	2.0	V	22.60	2.45	27.4	26.35	46	-19.65	Band Edge/QP
1594.5000	63.0	45	2.0	V	25.00	1.69	35.4	54.29	74	-19.71	Peak
1594.5000	60.5	45	1.0	H	25.00	1.69	35.4	51.79	74	-22.21	Peak

High Channel

Frequency	Reading	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier	Correction Factor	FCC	FCC	Comments
MHz	dBuV/m	Degree	Meter	H / V	dB	dB	dB	dBuV/m	Limit dBuV/m	Margin dB	
1852.437	61.4	60	1.5	H	26.10	1.67	35.8	53.4	54	-0.6*	Ave
1852.437	61.2	60	2.0	V	26.10	1.67	35.8	53.2	54	-0.8*	Ave
1390.000	61.8	60	1.5	H	24.80	1.62	35.4	52.8	54	-1.2*	Ave
1598.000	60.6	60	2.0	V	25.00	1.69	35.6	51.7	54	-2.3*	Ave
1598.000	60.0	60	1.5	H	25.00	1.69	35.6	51.1	54	-2.9*	Ave
1390.000	58.9	60	2.0	V	24.80	1.62	35.4	49.9	54	-4.1	Ave
926.219	90.0	65	2.0	V	22.10	1.80	27.3	86.6	94	-7.4	Fund/QP
926.219	89.4	180	3.0	H	22.10	1.80	27.3	86.0	94	-8.0	Fund/QP
1852.437	70.7	60	2.0	V	26.10	1.67	35.8	62.7	74	-11.3	Peak
1852.437	70.4	60	1.5	H	26.10	1.67	35.8	62.4	74	-11.6	Peak
1598.000	68.3	60	2.0	V	25.00	1.69	35.6	59.4	74	-14.6	Peak
1390.000	68.0	60	1.5	H	24.80	1.62	35.4	59.0	74	-15.0	Peak
1598.000	63.0	60	1.5	H	25.00	1.69	35.6	54.1	74	-19.9	Peak
1390.000	61.0	60	2.0	V	24.80	1.62	35.4	52.0	74	-22.0	Peak
928.000	20.0	270	2.0	V	22.10	1.80	27.3	16.6	46	-29.4	Band Edge/QP
928.000	19.0	180	3.0	H	22.10	1.80	27.3	15.6	46	-30.4	Band Edge/QP

Unintentional Emission

Frequency	Reading	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier	Correction Factor	FCC	FCC
MHz	dBuV/m	Degree	Meter	H/V	dB	dB	dB	dBuV/m	Limit dBuV/m	Margin dB
644.80	37.9	280	3.0	H	19.8	1.5	28.4	30.8	46	-15.2
644.80	36.5	260	1.0	V	19.8	1.5	28.4	29.4	46	-16.6
517.20	37.1	180	2.5	H	18.1	1.3	28.5	28.0	46	-18.0
471.30	37.2	330	1.0	V	17.7	1.3	28.6	27.6	46	-18.4
400.22	36.6	270	2.0	V	15.4	1.8	28.1	25.7	46	-20.3
400.22	35.2	180	1.5	H	15.4	1.8	28.1	24.3	46	-21.7

*Within the measurement uncertainty