



NVLAP LAB CODE 200707-0



FCC PART 15D

MEASUREMENT AND TEST REPORT

For

Shenzhen Guo Wei Electronics (H.K.) Co. Ltd.

Unit 20-21, 12/F, Goldfield Industrial Centre,
1 Sui Wo Road, Fo Tan, Shatin, Hong Kong

FCC ID: WSWDECT20-B96HS

Report Type: Original Report	Product Type: Digital Cordless Telephone (Handset)
Test Engineer: <u>Bruce Zhang</u>	<i>Bruce Zhang</i>
Report Number: <u>RSZA08112101</u>	
Report Date: <u>2008-12-04</u>	
Reviewed By: <u>Merry Zhao</u>	<i>Merry Zhao</i>
Prepared By: <u>EMC Engineer</u>	
Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008	

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Shenzhen). This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP*, NIST, or any agency of the Federal Government.

* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk “*”

TABLE OF CONTENTS

GENERAL INFORMATION.....	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	4
OBJECTIVE	4
RELATED SUBMITTAL(S)/GRANT(S).....	4
TEST METHODOLOGY	4
TEST FACILITY	4
SYSTEM TEST CONFIGURATION.....	6
DESCRIPTION OF TEST CONFIGURATION	6
EQUIPMENT MODIFICATIONS	6
LOCAL SUPPORT EQUIPMENT LIST AND DETAILS	6
CONFIGURATION OF TEST SETUP	7
BLOCK DIAGRAM OF TEST SETUP	7
SUMMARY OF TEST RESULTS.....	8
§15.319 (I) & §2.1093 - RF EXPOSURE.....	9
STANDARD APPLICABLE	9
RESULT: COMPLIANCE.	9
§15.317&§15.203 - ANTENNA REQUIREMENT.....	10
STANDARD APPLICABLE	10
ANTENNA CONNECTOR CONSTRUCTION	10
§15.319 (E) - ANTENNA GAIN.....	11
STANDARD APPLICABLE	11
§15.323 (A) - EMISSION BANDWIDTH.....	12
STANDARD APPLICABLE	12
TEST DATA	12
§15.319 (C) - PEAK TRANSMIT POWER.....	13
STANDARD APPLICABLE	13
TEST DATA	13
§15.319 (D) - POWER SPECTRAL DENSITY	14
STANDARD APPLICABLE	14
TEST DATA	14
§15.323 (D) - EMISSION INSIDE AND OUTSIDE THE SUB-BAND.....	15
STANDARD APPLICABLE	15
TEST EQUIPMENT LIST AND DETAILS.....	15
TEST DATA	15
§15.319 (G) - RADIATED EMISSIONS.....	23
MEASUREMENT UNCERTAINTY	23
EUT SETUP	23
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP	24
TEST EQUIPMENT LIST AND DETAILS.....	24

TEST PROCEDURE	24
CORRECTED AMPLITUDE & MARGIN CALCULATION	24
TEST RESULTS SUMMARY	25
TEST DATA	25
§15.323 (F) - FREQUENCY STABILITY	29
STANDARD APPLICABLE	29
TEST DATA	29
§15.323 (C) (E) & §15.319(F) – SPECIFIC REQUIREMENTS FOR UPCS DEVICE.....	30
TEST DATA	30

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Shenzhen Guo Wei Electronics (H.K.) Co. Ltd.*'s product, model number: *Oslo* or the "EUT" as referred to in this report is a handset of *Digital Cordless Telephone*, which measures approximately: 14.6 cm L x 5.5 cm W x 2.7 cm H, input voltage: DC 2.4V battery.

*Note: The original model "studio"(FCC ID: WSWDECT49B94TAMHS) and new model "Oslo", the RF module and hardware and software are same, and the PCB outline and Antenna are difference due to handset out look is difference.

** All measurement and test data in this report was gathered from production sample serial number: 0811057 (Assigned by BACL, Shenzhen). The EUT was received on 2008-11-21.*

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 C63.17 - 2006, and ANSI C64.3 2003.

The tests were performed in order to determine compliance with FCC Part 15, Subpart D, and section 15.203, 15.315, 15.317, 15.319 and 15.323 rules.

Related Submittal(s)/Grant(s)

None.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.17 - 2006, 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 Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 04, 2004. 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 has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



The current scope of accreditations can be found at
<http://ts.nist.gov/Standards/scopes/2007070.htm>

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

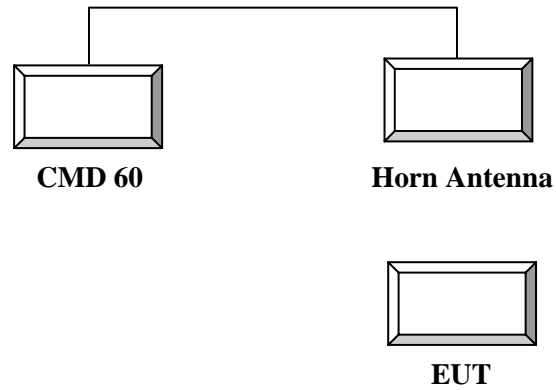
Equipment Modifications

No modification was made to the unit tested.

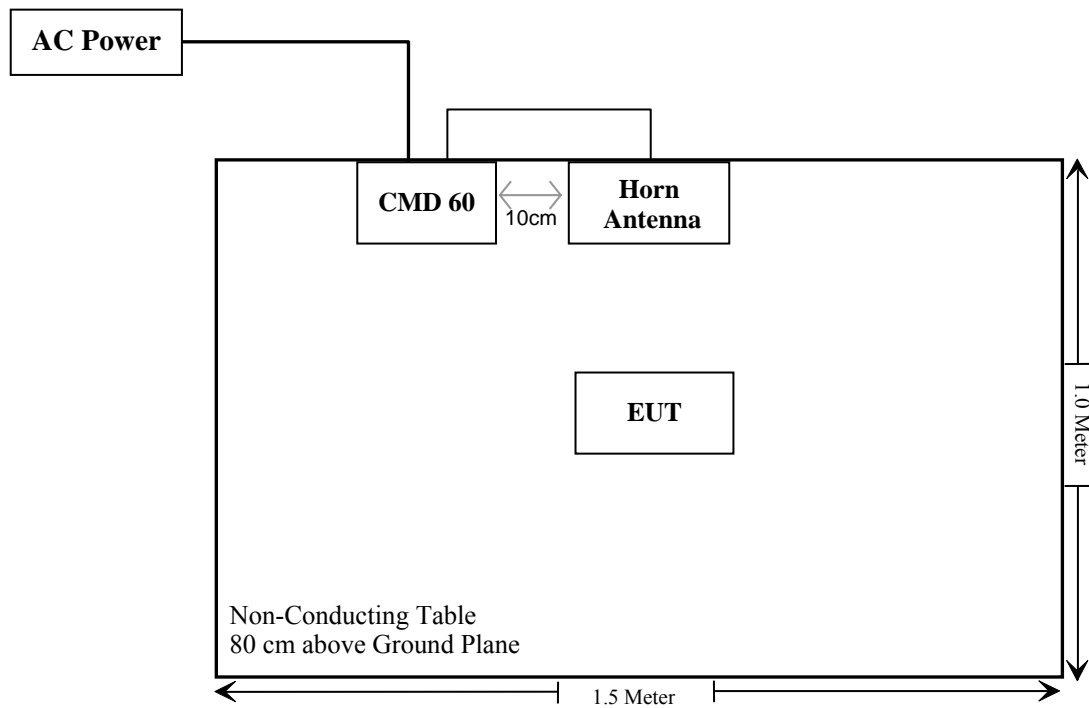
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
R & S	Digital Radio Communication Tester	CMD60	8299061026	DoC

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 15.319 (i); §2.1093	RF Radiation Exposure (SAR)	Compliant**
§ 15.317 § 15.203	Antenna Requirement	Compliant
§ 15.319 (e)	Antenna Gain	Compliant
§ 15.315 § 15.207	Conducted Emission	N/A
§ 15.323 (a)	Emission Bandwidth	Compliant*
§ 15.319 (c)	Peak Transmit Power	Compliant*
§ 15.319 (d)	Power Spectral Density	Compliant*
§ 15.323 (d)	Emission Inside and Outside the sub-band	Compliant*
§ 15.319 (g)	Radiated Emission	Compliant
§ 15.323 (f)	Frequency Stability Handset	Compliant*
§ 15.323 (c)(e) § 15.319 (f)	Specific Requirements for UPCS	Compliant*

Note:

* Original submission FCC ID: WSWDECT49B94TAMHS filed on 2008-12-04, Report Number: RSZ08101402.

** Please refer to SAR report (Report No.:R0811125-SAR).

§15. 319 (i) & §2.1093 - RF EXPOSURE

Standard Applicable

According to FCC Part 15.319 (i), Unlicensed PCS devices are subject to the radiofrequency radiation exposure requirements specified in §1.1307(b) and 2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a “general population/uncontrolled” environment. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

Result: Compliance.

Please refer to SAR test report No.R0811125-SAR.

§15.317&§15.203 - ANTENNA REQUIREMENT

Standard Applicable

According to CFR47 § 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

The EUT has an integral antenna on PCB. The maximum gain is 3 dBi. Please refer to the internal photos.

Result: Compliance.

Please refer to the EUT internal photos.

§15.319 (e) - ANTENNA GAIN

Standard Applicable

According to CFR 47 §15.319 (e):

The peak transmit power shall be reduced by the amount in decibels that the maximum directional gain of the antenna exceeds 3 dBi.

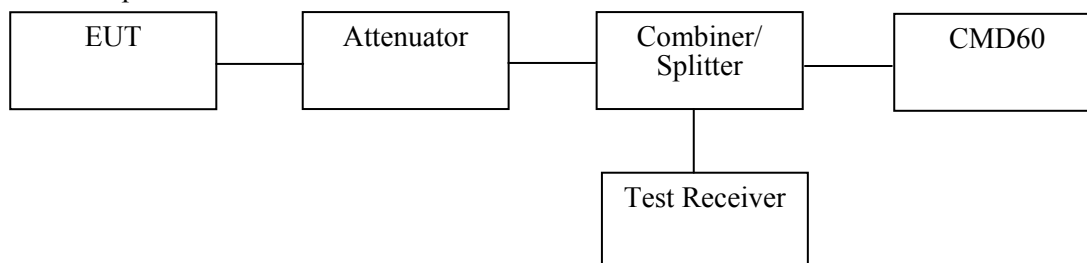
Result: The antenna gain is less than 3 dBi provided by manufacturer.

§15.323 (a) - EMISSION BANDWIDTH

Standard Applicable

The emission bandwidth is measured in accordance with ANSI C63.17 sub-clause 6.1.3 using the setup below

Test Setup 1:



The width, in Hz, of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that is 26 dB down relative to the maximum level of the modulated carrier. It is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1% of the emission band-width of the device under measurement. [Extraction from 47 CFR 15, subpart D, 15.303 (C)].

Test Data

Please refer to FCC ID: WSWDECT49B94TAMHS certified on December 04, 2008, Report No.: RSZ08101402.

§15.319 (c) - PEAK TRANSMIT POWER

Standard Applicable

The peak power output as measured over an interval of time equal to the transmission-burst duration of the device under all conditions of modulation. [47 CFR 15, subpart D, 15.303 (f)].

Part 15.323(a) & Part 15.319(c) Peak Transmit Power:

The limit for Peak Transmit Power (PTP) is calculated using the following formula:

$$PTP = 100 \mu W \times (EBW)^{1/2}$$

EBW is the transmit emission bandwidth in Hz determined in the other test item:

$$EBW = 1484000\text{Hz}$$

$$PTP = 100 \mu W \times (1484000)^{1/2}$$

$$PTP = 20.87\text{dBm}$$

The peak transmitter power is measured in accordance with ANSI C63.17-2006 Clause 6.1.2.

Test Data

Please refer to FCC ID: WSWDECT49B94TAMHS certified on December 04, 2008, Report No.: RSZ08101402.

§15.319 (d) - POWER SPECTRAL DENSITY

Standard Applicable

The average pulse energy in a 3 kHz bandwidth is divided by the pulse duration.

The power spectral density shall not exceed 3mW in any 3 kHz bandwidth as measured with a spectrum analyzer having a resolution bandwidth of 3 kHz.

The power spectral density is measured in accordance with ANSI C63.17.2006 Clause 6.1.5.

Test Data

Please refer to FCC ID: WSWDECT49B94TAMHS certified on December 04, 2008, Report No.: RSZ08101402.

§15.323 (d) - EMISSION INSIDE AND OUTSIDE THE SUB-BAND

Standard Applicable

Emissions inside the sub-band must comply with the following emission mask:

1. In the bands between 1B and 2B measured from the center of the emission bandwidth the total power emitted by the device shall be at least 30 dB below the transmit power permitted for that device;
2. in the bands between 2B and 3B measured from the center of the emission bandwidth the total power emitted by an intentional radiator shall be at least 50 dB below the transmit power permitted for that radiator;
3. in the bands between 3B and the sub-band edge the total power emitted by an intentional radiator in the measurement bandwidth shall be at least 60 dB below the transmit power permitted for that radiator.

Where B = emission bandwidth

Emission Outside the sub-band shall be attenuated below a reference power of 112 mw (20.5 dBm) as follows:

1. 30 dB between the sub-band and 1.25 MHz above or below the sub-band;
2. 50 dB between 1.25 and 2.5 MHz above or below the sub-band;
3. 60 dB at 2.5 MHz or greater above or below the sub-band.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	830245/006	2008-08-25	2009-08-25

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Test Data

Environmental Conditions

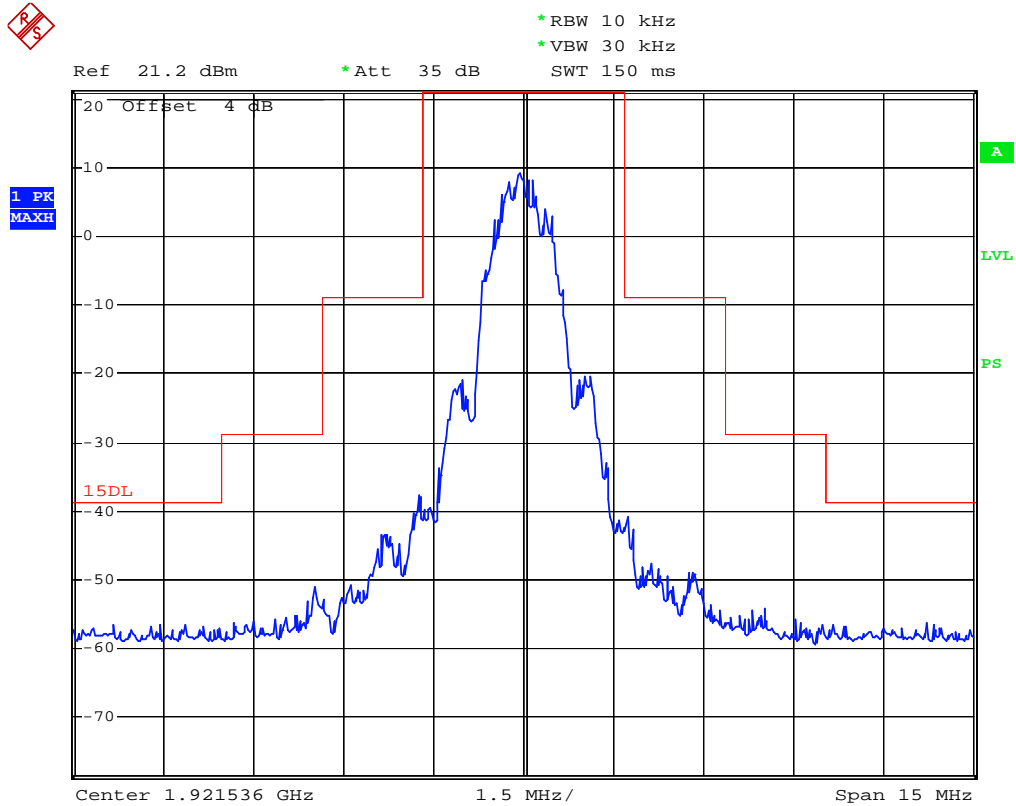
Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.8 kPa

The testing was performed by Bruce Zhang on 2008-11-20 to 2008-11-5

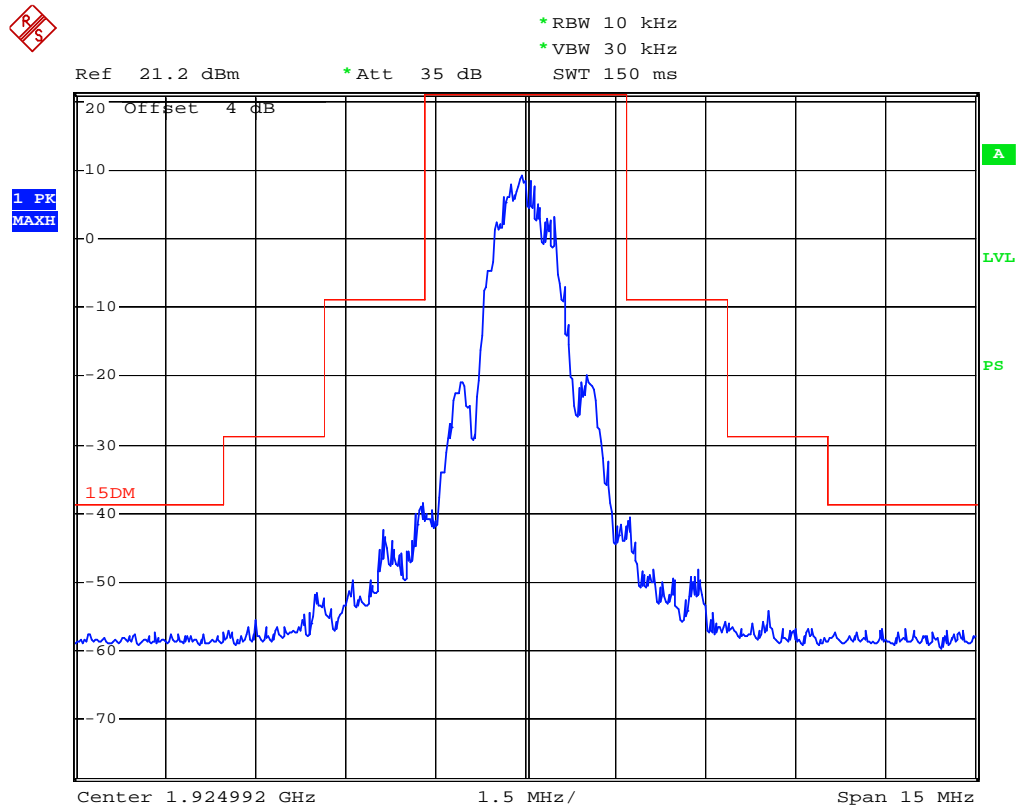
Test Mode: Transmitting

Test Result: Compliance.

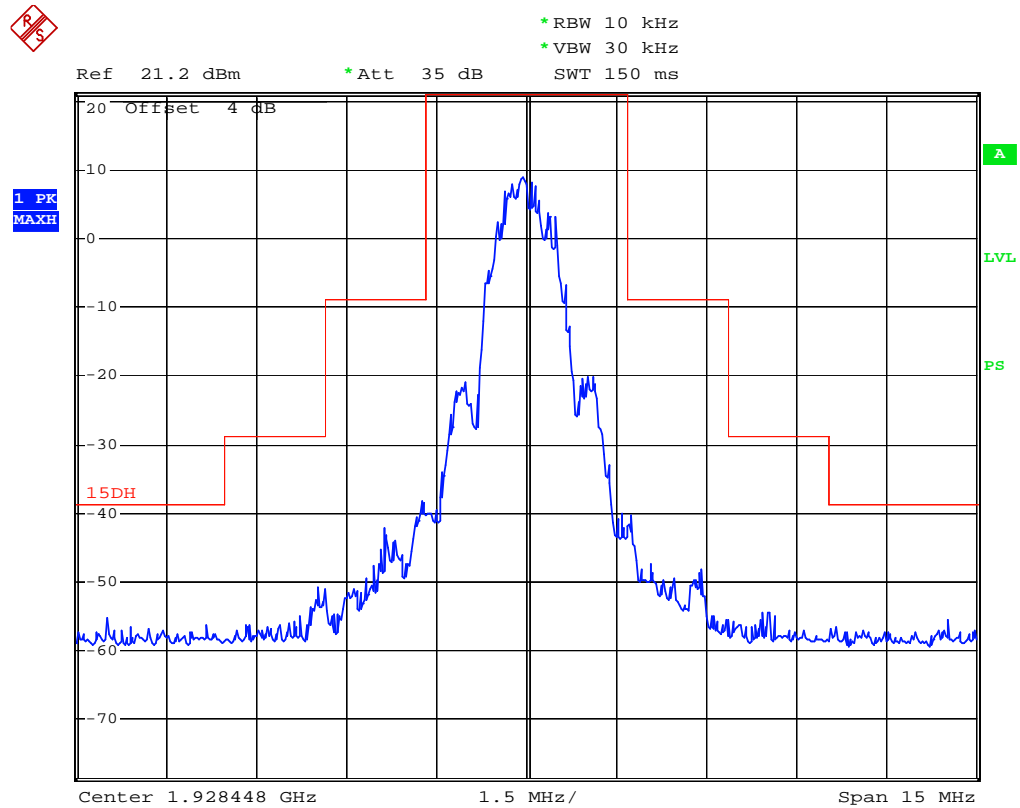
Please refer to following tables and plots

Low Channel (Unwanted Emission inside the Sub-band)

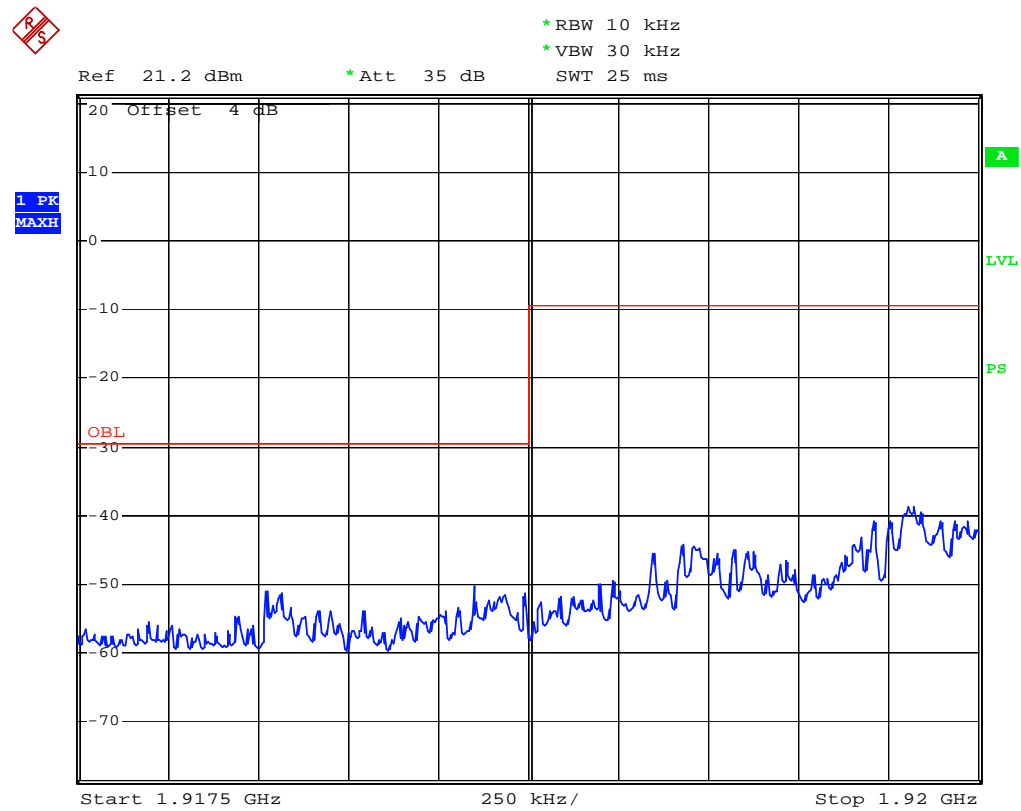
Date: 25.NOV.2008 15:18:32

Middle Channel (Unwanted Emission inside the Sub-band)

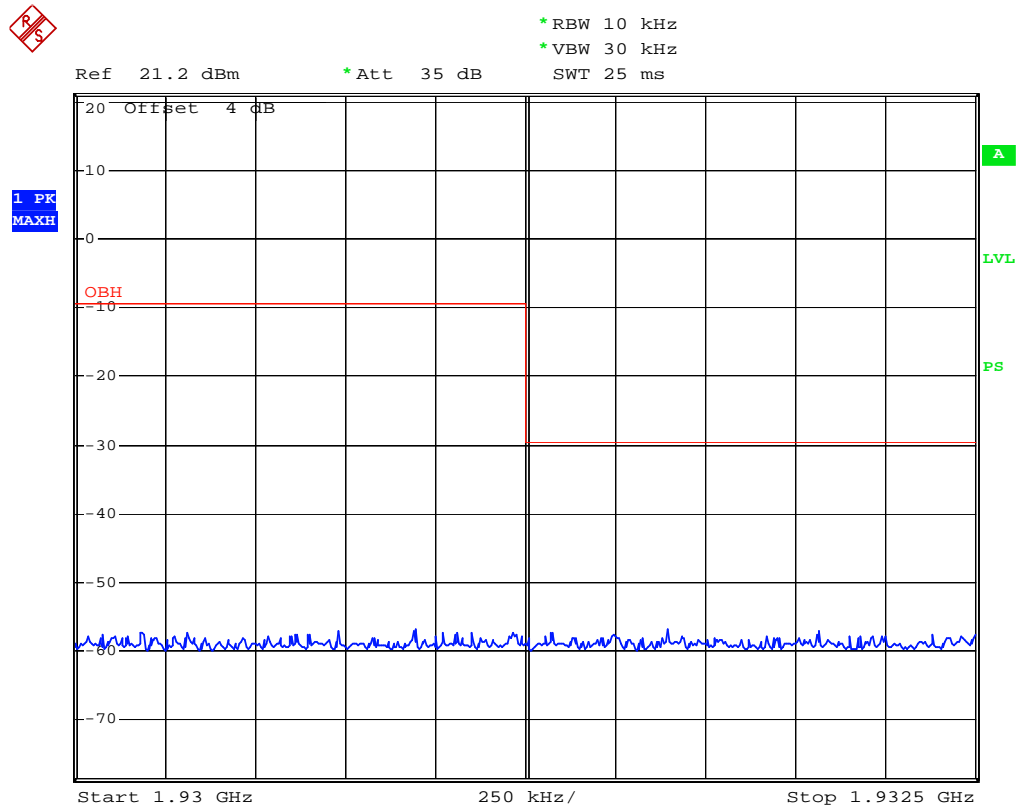
Date: 25.NOV.2008 15:20:12

High Channel (Unwanted Emission inside the Sub-band)

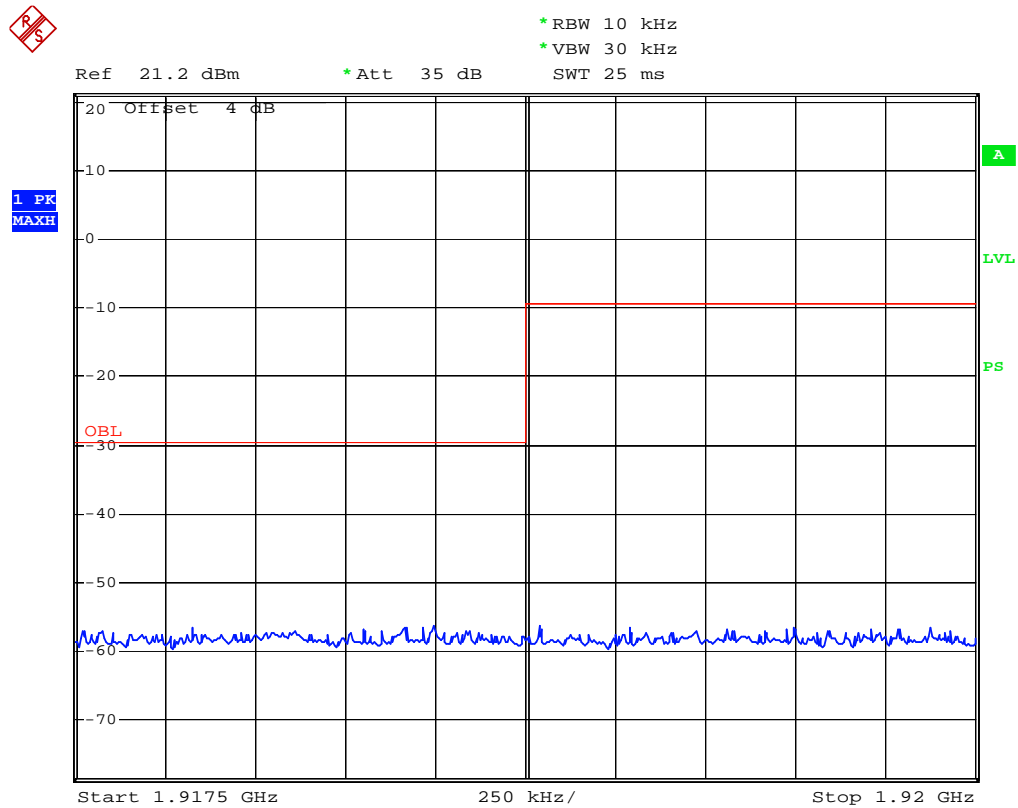
Date: 25.NOV.2008 15:22:00

Low Channels (Unwanted Emission outside the Sub-band)

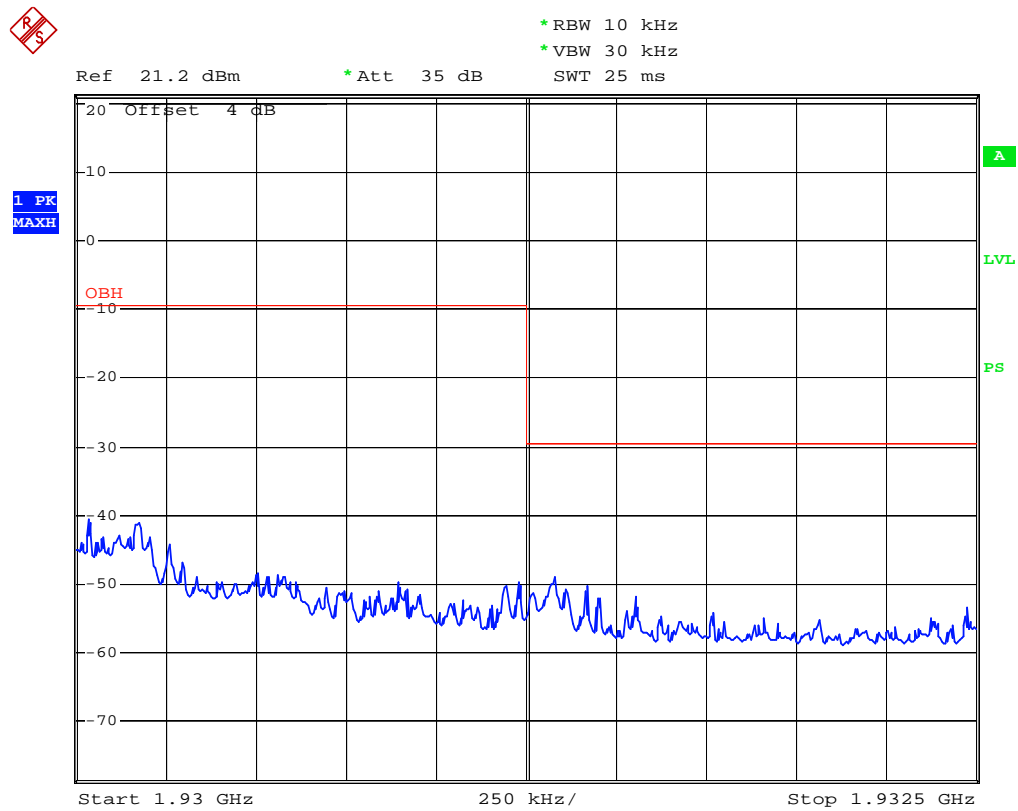
Date: 20.NOV.2008 10:29:14



Date: 20.NOV.2008 10:29:54

High Channels (Unwanted Emission outside the Sub-band)

Date: 20.NOV.2008 10:32:43



Date: 20.NOV.2008 10:30:58

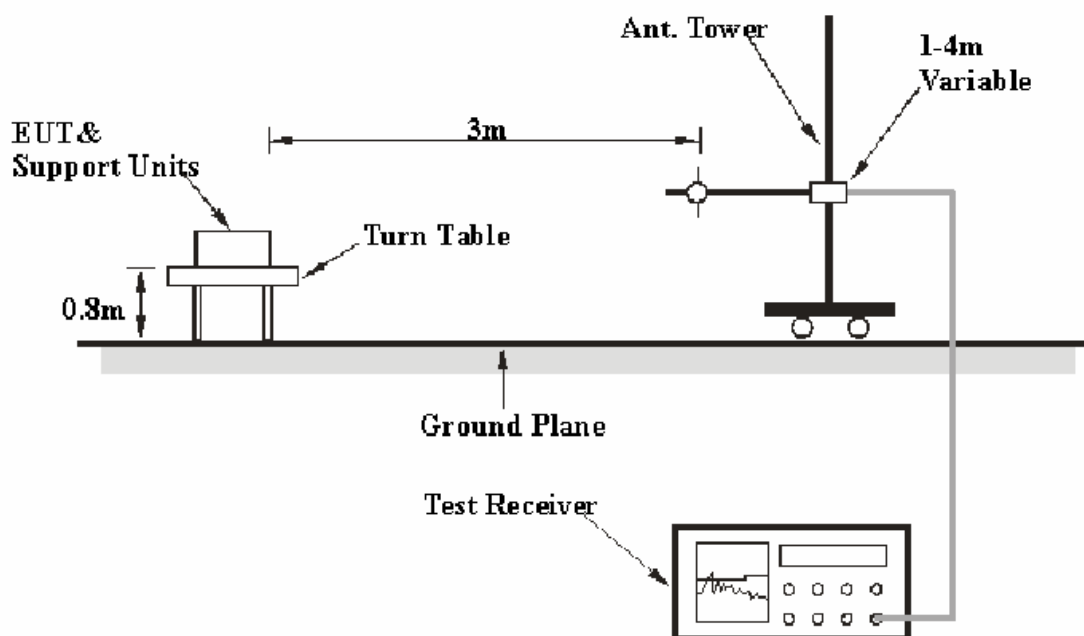
§15.319 (g) - RADIATED EMISSIONS

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 Bay Area Compliance Laboratories Corp. (Shenzhen) is ± 4.0 dB.

EUT Setup



The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.17 - 2006. The specification used was the FCC 15.209 and FCC 15.319(g) limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

<i>Frequency Range</i>	<i>RBW</i>	<i>Video B/W</i>
30MHz – 1000 MHz	100 kHz	300 kHz
Above 1 GHz	1 MHz	3 MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2008-11-15	2009-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-10-16	2009-10-16
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2008-03-11	2009-03-11
HP	Amplifier	8449B	3008A00277	2008-09-29	2009-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2008-09-25	2009-09-25
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2008-05-09	2009-05-09

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

For the radiated emissions test, the adapter was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30MHz-1GHz and peak and Average detection modes for frequencies above 1GHz.

Corrected Amplitude & Margin Calculation

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

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC 15.209 and 15.319 (g), with the worst margin reading of:

Transmitting mode (30 – 1000 MHz):

7.8 dB at **46.541675 MHz** in the **Vertical** polarization (**Low Channel**)
9.8 dB at **511.703425MHz** in the **Vertical** polarization (**High Channel**)

Transmitting mode (Above 1 GHz):

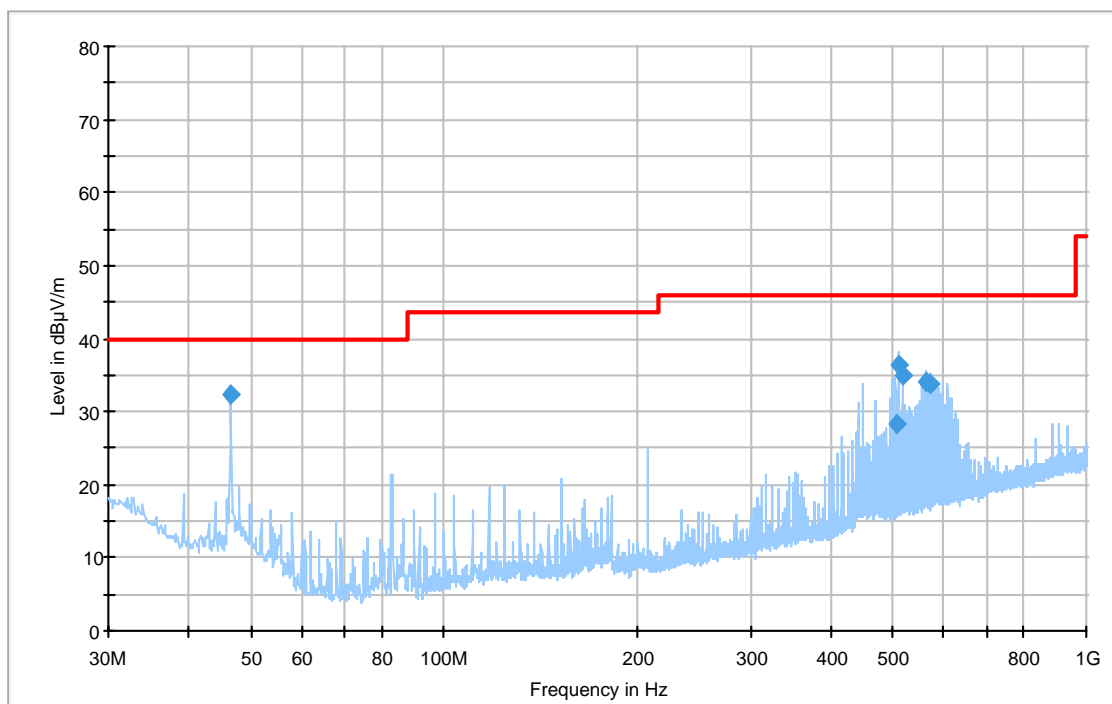
18.85 dB at **3843.072 MHz** in the **Vertical** polarization (**Low Channel**)
19.01 dB at **3856.896 MHz** in the **Vertical** polarization (**High Channel**)

Test Data

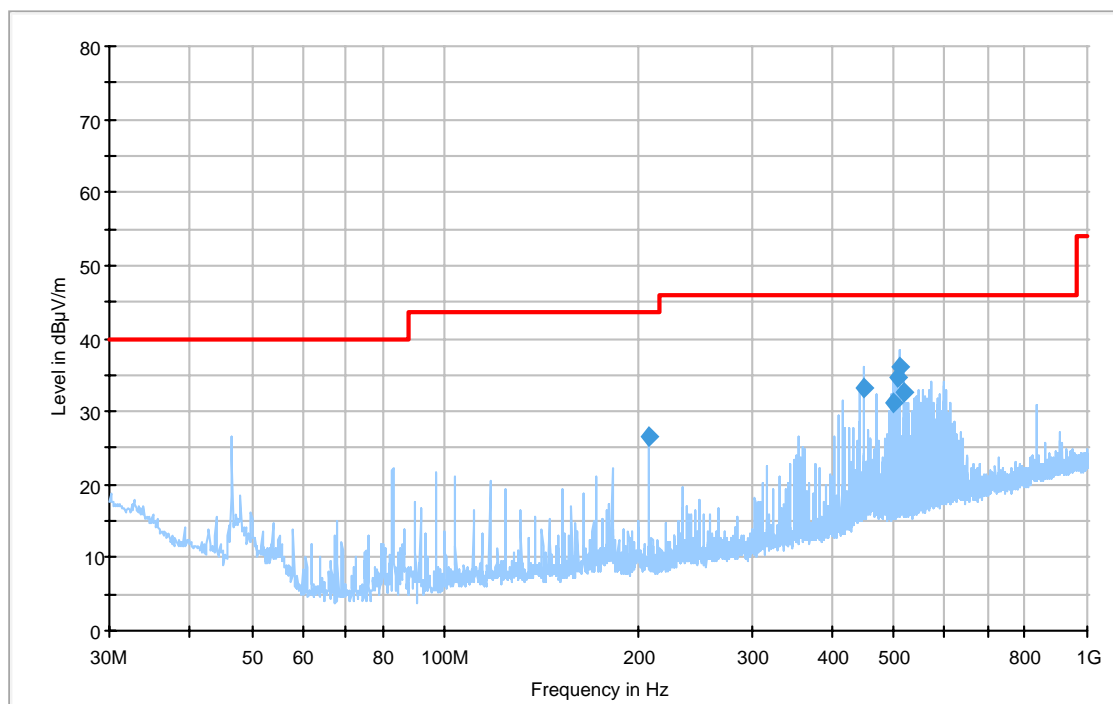
Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

The testing was performed by Bruce Zhang on 2008-11-25.

Test Mode: Transmitting Low Channel

Frequency (MHz)	Corrected Amp. (dBμV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
46.541675	32.2	105.0	V	285.0	-18.8	40.0	7.8
511.687450	36.4	105.0	V	3.0	-10.5	46.0	9.6
518.406400	34.8	104.0	V	268.0	-10.3	46.0	11.2
562.604300	34.1	103.0	V	355.0	-9.6	46.0	11.9
571.361075	33.8	104.0	V	9.0	-9.3	46.0	12.2
504.685000	28.3	105.0	V	350.0	-10.8	46.0	17.7

Test Mode: Transmitting High Channel

Frequency (MHz)	Corrected Amp. (dBμV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
511.703425	36.2	105.0	V	19.0	-10.5	46.0	9.8
504.631675	34.6	105.0	V	40.0	-10.8	46.0	11.4
450.204700	33.2	128.0	V	130.0	-11.3	46.0	12.8
518.688400	32.7	106.0	V	349.0	-10.3	46.0	13.3
497.673325	31.2	106.0	V	78.0	-10.8	46.0	14.8
207.873750	26.5	118.0	V	292.0	-3.9	43.5	17.0

Test Mode: Transmitting (Above 1GHz)

Freq. (MHz)	Meter Reading (dBμV)	Detector PK/QP/AV	Direction Degree	Antenna			Cable Loss (dB)	Pre- Amp. Gain (dB)	Cord. Amp. (dBuV/m)	FCC Part 15.319(g) / 209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBuV/m)	Margin (dB)	Remarks
Low Channel												
3843.072	52.43	PK	0	1.7	V	32.1	4.32	33.7	55.15	74	18.85	Harmonic
5764.608	45.32	PK	0	1.7	V	34.5	6.50	33.6	52.72	74	21.28	Harmonic
5764.608	44.67	PK	30	1.7	H	34.5	6.50	33.6	52.07	74	21.93	Harmonic
3843.072	48.74	PK	30	1.7	H	32.1	4.32	33.7	51.46	74	22.54	Harmonic
High Channel												
3856.896	52.27	PK	0	1.7	V	32.1	4.32	33.7	54.99	74	19.01	Harmonic
5785.344	45.69	PK	0	1.7	V	34.5	6.50	33.6	53.09	74	20.91	Harmonic
5785.344	44.88	PK	30	1.7	H	34.5	6.50	33.6	52.28	74	21.72	Harmonic
3856.896	48.17	PK	30	1.7	H	32.1	4.32	33.7	50.89	74	23.11	Harmonic

Field Strength of Fundamental Emission Average							
Freq. (MHz)	Peak Corrected Amplitude @3m (dBμV/m)	Ant. Polar (H/V)	Duty Cycle Factor (dB)	Corrected Amp. (dBμV/m)	FCC 15.319(g) / 209		Comment
					Limit (dBμV/m)	Margin	
Low Channel							
3843.072	55.15	V	-27.85	27.3	54	26.70	Harmonic
5764.608	52.72	V	-27.85	24.87	54	29.13	Harmonic
5764.608	52.07	H	-27.85	24.22	54	29.78	Harmonic
3843.072	51.46	H	-27.85	23.61	54	30.39	Harmonic
High Channel							
3843.072	54.99	V	-27.85	27.14	54	26.86	Harmonic
5764.608	53.09	V	-27.85	25.24	54	28.76	Harmonic
5764.608	52.28	H	-27.85	24.43	54	29.57	Harmonic
3843.072	50.89	H	-27.85	23.04	54	30.96	Harmonic

Note: Duty Cycle=Ton/Tp*100%

Ton=405μs=0.405ms

Tp=10ms

Duty Cycle=4.05%

Duty Cycle Factor = 20lg (Duty Cycle) = -27.85 dB

AV=PK+ Duty Cycle Factor

§15.323 (f) - FREQUENCY STABILITY

Standard Applicable

Per §15.323(f), the frequency stability of the carrier frequency of the intentional radiator shall be maintained within ± 10 ppm over 1 hour or the interval between channel access monitoring, whichever is shorter. The frequency stability shall be maintained over a temperature variation of -20° to $+50^{\circ}$ °C at normal supply voltage, and over a variation in the primary supply voltage of 85 percent to 115 percent of the rated supply voltage at a temperature of 20 °C. For equipment that is capable only of operating from a battery, the frequency stability tests shall be performed using a new battery without any further requirement to vary supply voltage

Test Data

Please refer to FCC ID: WSWDECT49B94TAMHS certified on December 04, 2008, Report No.: RSZ08101402.

§15.323 (c) (e) & §15.319(f) – SPECIFIC REQUIREMENTS FOR UPCS DEVICE

Test Data

Please refer to FCC ID: WSWDECT49B94TAMHS certified on December 04, 2008, Report No.: RSZ08101402.

******* END OF REPORT *******