NVLAP LAB CODE 200707-0

FCC PART 15D

MEASUREMENT AND TEST REPORT

For

Shandong Bittel Electronics Co., Ltd.

No. 1 Rizhao N Rd, Rizhao, Shandong, P. R. of China

FCC ID: WI6HWDCDZJ

Report Type:	Product Type:
Additional Report	Cordless Phone (Handset)

Test Engineer:	Bruce Zhang
Report Number:	RSZA08122903
Report Date:	2009-04-29
Reviewed By:	Merry Zhao EMC Engineer
Prepared By:	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

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Shandong Bittel Electronics Co., Ltd.'s* product, model number: *HWDCD9888(38)TSD-NS, HWDCD9888(38)TSD-TN, HWDCD9888(38)TSD, HWDCD9888(38)TS-N, HWDCD9888(38)TS, HWDCD9888(38)TSD-ZJ, HWDCD9888(38)TSD-T-ZJ, HWDCD9888(38)TS-ZJ (Handset) Note: For all the models, (N=P, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10)* or the "EUT" as referred to in this report is a *Cordless phone*, which measures approximately: 22.8 cm L x 5.8 cm W x 6.5 cm H, input voltage: 3.6V battery (Ni-MH AAA 800mAH 3.6V).

*Note: The series products, model *HWDCD9888(38)TSD-NS, HWDCD9888(38)TSD-TN, HWDCD9888(38)TSD, HWDCD9888(38)TS-N, HWDCD9888(38)TS, HWDCD9888(38)TSD-ZJ, HWDCD9888(38)TSD-T-ZJ, HWDCD9888(38)TS-ZJ (Handset) Note: For all the models, (N=P, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10),* we select *HWDCD9888(38)TSD* to test, which was explained in the attached Declaration Letter.

** All measurement and test data in this report was gathered from production sample serial number: 0812081 (Assigned by BACL, Shenzhen). The EUT was received on 2008-12-29.*

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)

The original application submission FCC ID was WI6HWDZJ, which was granted on 2008-10-07.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.17 - 1998, 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 21, 2007. 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).

NVLAP 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).

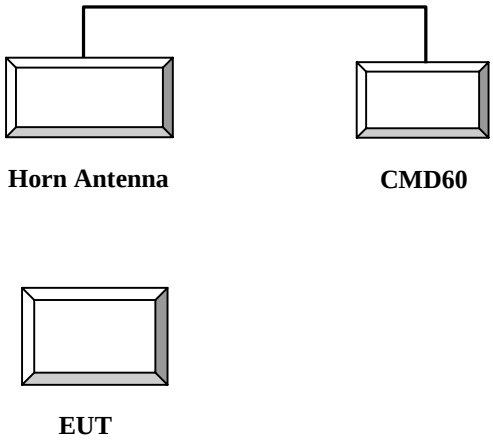
Equipment Modifications

No modification was made to the unit tested.

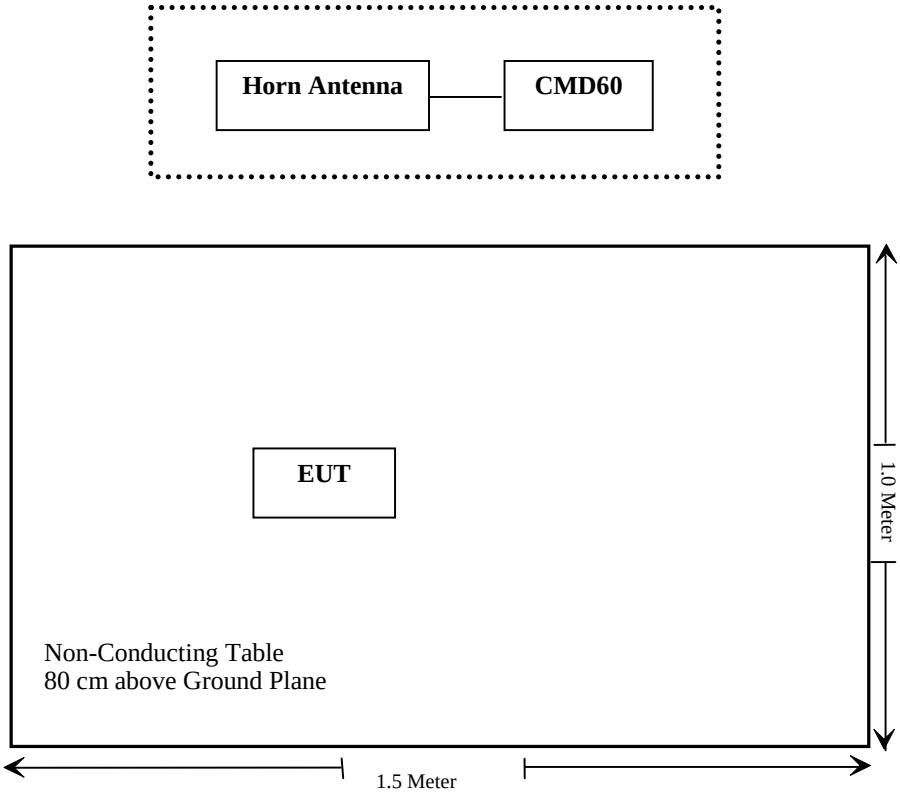
Local Support Equipment List and Details

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
§ 15.315 § 15.207	Conducted Emission	Compliant ***
§ 15.319 (g)	Radiated Emission	Compliant
§ 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**
§ 15.323 (f)	Frequency Stability	Compliant**
§ 15.323 (c)(e) § 15.319 (f)	Verification of Access Protocols	Compliant**

Note: * Please refer to SAR report R0901073-SAR.
** Original submission FCC ID: WI6HWDZJ filed 2008-10-07, Report No.: RSZ08070807.
*** Battery operation, charged from the Base, conducted emission has been checked in base submittal.

§15. 319 (i) & §2.1093 - RF EXPOSURE

Standard Applicable

According to FCC Part15.319 (i), Unlicensed PCS devices are subject to the radiofrequency radiation exposure requirements specified in §§1.1307(b), 2.1091 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:

Please refer to SAR report R0901073-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.

§15.315&§15.207 - CONDUCTED 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, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratories Corp. (ShenZhen) is $\pm$2.4 dB.

Test Data

Please refer to FCC ID: WI6HWDZJ certified on October 07, 2008, report No.: RSZ08070807.

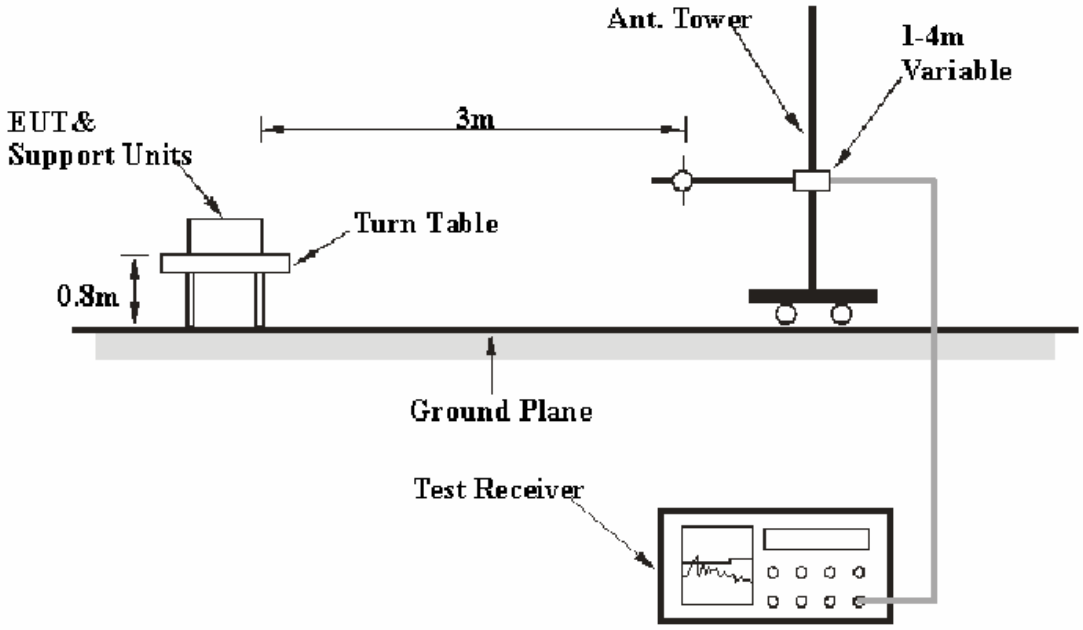
§15.319 (g) - RADIATED EMISSIONS

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:

Frequency Range	***RBW***	***Video B/W***
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	2008-11-07	2009-11-06
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2009-03-11	2010-03-11
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	2008-08-28	2009-08-27

*** 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:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss- 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:

Margin = Limit - Corrected Amplitude

Test Results Summary

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

Below 1 GHz:

8.6 dB at **511.487275 MHz** in the **Vertical** polarization

Above 1 GHz:

10.38 dB at **7686.144 MHz** in the **Horizontal** polarization **(Low Channel)**

9.44 dB at **7713.192 MHz** in the **Horizontal** polarization **(High Channel)**

Test Data

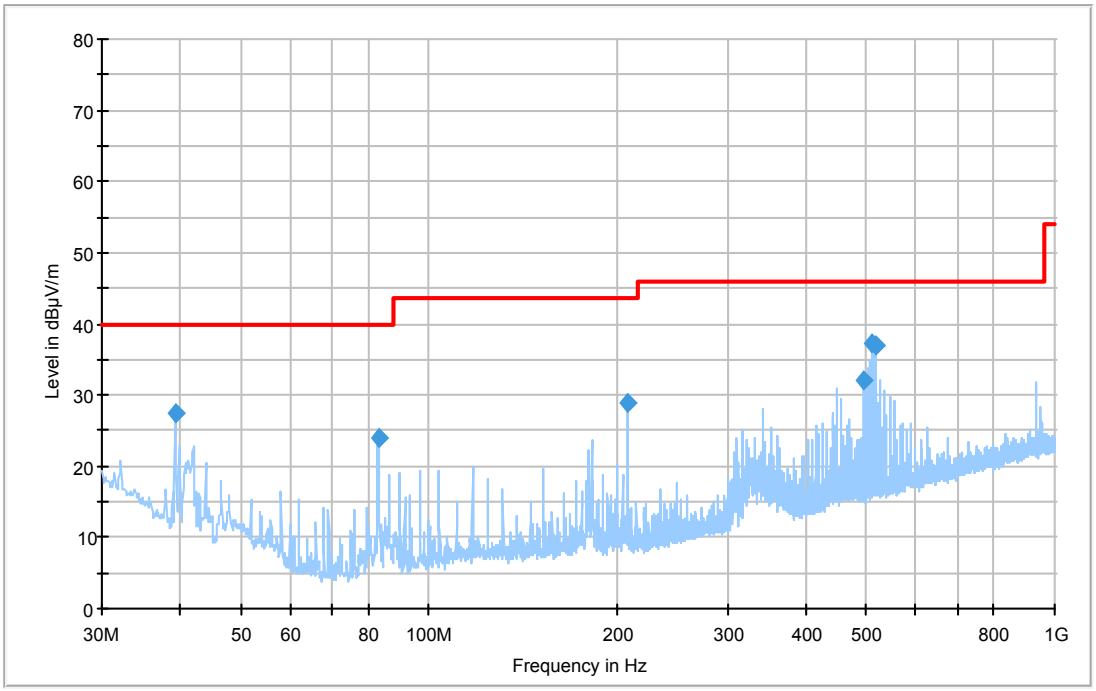
Environmental Conditions

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

The testing was performed by Bruce Zhang on 2009-03-25.

Below 1 GHz:

Test Mode: Transmitting



Frequency (MHz)	Corrected Amp. (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
511.487275	37.4	105.0	V	113.0	-10.6	46.0	8.6
518.416000	36.9	104.0	V	118.0	-10.3	46.0	9.1
39.376600	27.6	126.0	V	269.0	-15.0	40.0	12.4
494.023750	32.0	104.0	V	116.0	-10.4	46.0	14.0
207.873750	28.9	117.0	V	42.0	-10.7	43.5	14.6
82.986500	24.1	227.0	H	34.0	-3.9	40.0	15.9

Above 1 GHz:

Test Mode: Transmitting

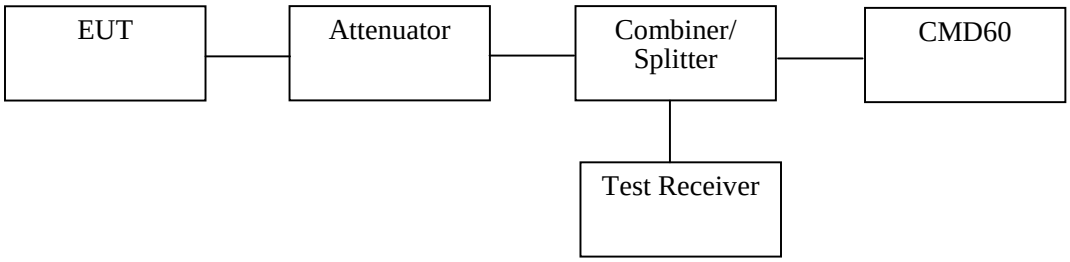
Freq. (MHz)	S.A. Reading (dBuV)	Detector PK/QP/AV	Direction Degree	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBuV/m)	FCC Part 15.319/209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBuV/m)	Margin (dB)	Remarks
Low Channel												
7686.144	52.96	PK	48	1.0	H	36.3	7.96	33.6	63.62	74	10.38	Harmonic
7686.144	29.60	AV	0	1.0	V	37.0	7.96	33.6	40.96	54	13.04	Harmonic
7686.144	29.62	AV	48	1.0	H	36.3	7.96	33.6	40.28	54	13.72	Harmonic
7686.144	48.66	PK	0	1.0	V	37.0	7.96	33.6	60.02	74	13.98	Harmonic
5764.608	52.33	PK	206	1.0	V	34.5	6.50	33.6	59.73	74	14.27	Harmonic
5764.608	50.80	PK	136	1.0	H	34.5	6.50	33.6	58.2	74	15.80	Harmonic
5764.608	30.70	AV	206	1.0	V	34.5	6.50	33.6	38.1	54	15.90	Harmonic
5764.608	30.55	AV	136	1.0	H	34.5	6.50	33.6	37.95	54	16.05	Harmonic
3843.072	51.37	PK	180	1.0	H	32.1	4.32	33.7	54.09	74	19.91	Harmonic
3843.072	31.20	AV	180	1.0	H	32.1	4.32	33.7	33.92	54	20.08	Harmonic
3843.072	31.13	AV	200	1.0	V	32.1	4.32	33.7	33.85	54	20.15	Harmonic
3843.072	50.72	PK	200	1.0	V	32.1	4.32	33.7	53.44	74	20.56	Harmonic
High Channel												
7713.192	52.56	PK	56	1.8	H	37.1	8.5	33.6	64.56	74	9.44	Harmonic
7713.192	30.05	AV	344	1.1	V	37.3	8.5	33.6	42.25	54	11.75	Harmonic
7713.192	29.70	AV	56	1.8	H	37.1	8.5	33.6	41.7	54	12.30	Harmonic
7713.192	48.43	PK	344	1.1	V	37.3	8.5	33.6	60.63	74	13.37	Harmonic
5785.344	51.89	PK	140	1.0	H	34.5	6.50	33.6	59.29	74	14.71	Harmonic
5785.344	50.81	PK	54	1.0	V	34.5	6.50	33.6	58.21	74	15.79	Harmonic
5785.344	30.56	AV	140	1.0	H	34.5	6.50	33.6	37.96	54	16.04	Harmonic
5785.344	30.51	AV	54	1.0	V	34.5	6.50	33.6	37.91	54	16.09	Harmonic
3856.896	52.83	PK	176	1.0	V	32.1	4.32	33.7	55.55	74	18.45	Harmonic
3856.896	31.15	AV	176	1.0	V	32.1	4.32	33.7	33.87	54	20.13	Harmonic
3856.896	30.91	AV	350	1.0	H	32.1	4.32	33.7	33.63	54	20.37	Harmonic
3856.896	49.58	PK	350	1.0	H	32.1	4.32	33.7	52.3	74	21.70	Harmonic

§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 VFR 15, subpart D, 15.303 (C)].

Test Data

Please refer to FCC ID: WI6HWDZJ certified on October 07, 2008, report No.: RSZ08070807.

§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 μ W x $(EBW)^{1/2}$
EBW is the transmit emission bandwidth in Hz determined in the other test item:
EBW = 1330000Hz
PTP = 100 μ W x $(1330000)^{1/2}$
PTP = 20.62dBm

Test Data

Please refer to FCC ID: WI6HWDZJ certified on October 07, 2008, report No.: RSZ08070807.

§15.319 (d) - POWER SPECTRAL DENSITY

Standard Applicable

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

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

Test Data

Please refer to FCC ID: WI6HWDZJ certified on October 07, 2008, report No.: RSZ08070807.

§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 Data

Please refer to FCC ID: WI6HWDZJ certified on October 07, 2008, report No.: RSZ08070807.

§15.323 (f) - FREQUENCY STABILITY

Standard Applicable

This procedure should be carried out for each of the following test cases:

Temperature	Supply Voltage
20℃	85-115% or new batteries
-20℃[a]	Normal
+50℃	Normal

[a] Use the lowest temperature at which the EUT is specified to operate if it is above -20 ℃.

Using the mean carrier frequency at 20℃ and at nominal supply voltage as the reference, the mean carrier frequency shall be maintained within ±10 ppm at the two extreme temperatures (or as declared by the manufacturer) and at normal temperature (typically 20℃) at the two extreme supply voltages.

Test Data

Please refer to FCC ID: WI6HWDZJ certified on October 07, 2008, report No.: RSZ08070807.

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

Test Data

Please refer to FCC ID: WI6HWDZJ certified on October 07, 2008, report No.: RSZ08070807.

APPENDIX A - DECLARATION LETTER

Bittel

Shandong Bittel Electronics Co., Ltd.
No.1 N. Rizhao Rd., Rizhao, Shandong, P. R. China
Tel：0633-2212149 Fax：0633-2212149

Date: 2009-4-17

Declaration letter

For: Our Product ： Cordless phone ： Model name：HWDCD9888(38)TSD
We are going to change the following information：

	Original	New
Appearance	External photos are submitted as attachments	
model	HWD9888(48)TSD	HWDCD9888(38)TSD
FCC ID	WI6HWDZJ	WI6HWDCDZJ

This Change of identification request applies for a new FCC ID WI6HWDCDZJ as established in Part 15 for a currently approved device，The original grant to Shandong Bittel Electronics Co., Ltd.will remain in effect.

Handset：

RF module is the same. The Antenna/PCB layout are different due to handset outlook is different. Detailed changes as following:

1. We have made various changes to the Layout of the main board ,such as Antenna port and antenna length changed, and we declare that Antenna changed because chassis is different and the original antenna affects audio-frequency and the power of the antenna port is identical as before, as to the direction of the antenna was changed because sup-plat may damage capacitor in actual production;
2. Tantalum capacitor location changed;
3. we add the connection port to the new main board. because It's inconvenient to install receiver in actual production, and connect receiver with the front-end circuit board.
4. As to the right side of new motherboard, Various Layouts have been changed, the added weld spot in the front-end is used to connect receiver with the front-end of the circuit board, which is convenient for assembling.

Sincerely Yours,

Signature: Jiangwen Tian

Typed or Printed Name: Jiangwen Tian
Title: Engineer
Company Name: Shandong Bittel Electronics Co.，LTD

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