

FCC PART 15.247

EMI MEASUREMENT AND TEST REPORT

For

Audex Telecom Industrial Co., Ltd.

4/F., Chuangye Center, Kangle Rd., Zhongshan Torch Hi-Tech Industrial Zone, Zhongshan China

FCC ID: P68SPB28022F88

August 30, 2006

This Report Concerns: ☒ Original Report	Equipment Type: LCD Speakerphone
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Report No.: RSZ06062802	
Test Date: July 3-August 30, 2006	
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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The Audex Telecom Industrial Co., Ltd.'s product, model number: SPB-2802 or the "EUT" as referred to in this report is a *LCD Speakerphone*, which measures approximately: 11.0 cm L x 7.5 cm W x 2.7 cm H, rated input voltage: Battery 3.6V.

AC Adapter:
Model: DG050050D
Input: 120V AC 60Hz
Output: 5V DC 500mA

** The test data gathered are from production sample, serial number: 0606057. Provided by the manufacturer, we receive the EUT on 2006-6-28.*

Objective

This Type approval report is prepared on behalf of Audex Telecom Industrial Co., Ltd. in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

No related submittal(s).

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 emissions measurement was performed and Bay Area Compliance Lab 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 Lab 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 518038, P.R.China.

Test site at Bay Area Compliance Lab 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 and Industrial Canada registration test site No.: 5500A. 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 Lab 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/ts/htdocs/210/214/scopes/2007070.htm>

Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
DELL	Motherboard	OWC297	CN-OWC297-70821-564-00NI	DoC
DELL	Power	NPS-250KB D	CN-0H2678-17972-56E-80BM	DoC
Seagate	Hard Disk	ST340014A	5JXK3GXE	DoC
DELL	3.5' Floppy	N/A	CN-0N8893-69802-54Q-02P0	DoC
Lite -ON	CD-Rom	LTN-489S	N/A	DoC
Intel	Ethernet	PRO 10/100 VE	N/A	DoC

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
DELL	PC	DELL 170L	CN-0TC670-70821-560-F4Q6	DoC
DELL	Keyboard	SK-8110	CN07N244-71616-56A-1B1E	DoC
DELL	Mouse	M071KC	520027907	DoC
DELL	LCD Monitor	1505FP	Y4287-7168-571-GBSH	DoC
ProMOS	Memory	V826632K24SATG-C0	0525-K1933700	DoC
Intel	CPU	Celeron D-2533	N/A	DoC

External I/O Cable

Cable Description	Length (M)	From/Port	To
Shielded Detachable Keyboard Cable	1.50	Keyboard Port / Host	Keyboard
Shielded Detachable Mouse Cable	1.50	PS/2 Port / Host	Mouse
Shielded Detachable VGA Cable	1.50	VGA Port / Host	Monitor
Shielded Detachable Adapter Cable	0.10	USB Cable	Adapter
Shielded Detachable USB Cable	1.15	EUT	Adapter

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

Bay Area Compliance Lab Corp. (ShenZhen) has not done any modification on the EUT.

EUT Exercise Software

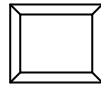
The exercise software is available.

Special Accessories

The special Accessories were provided by Bay Area Compliance Lab Corp. (ShenZhen).

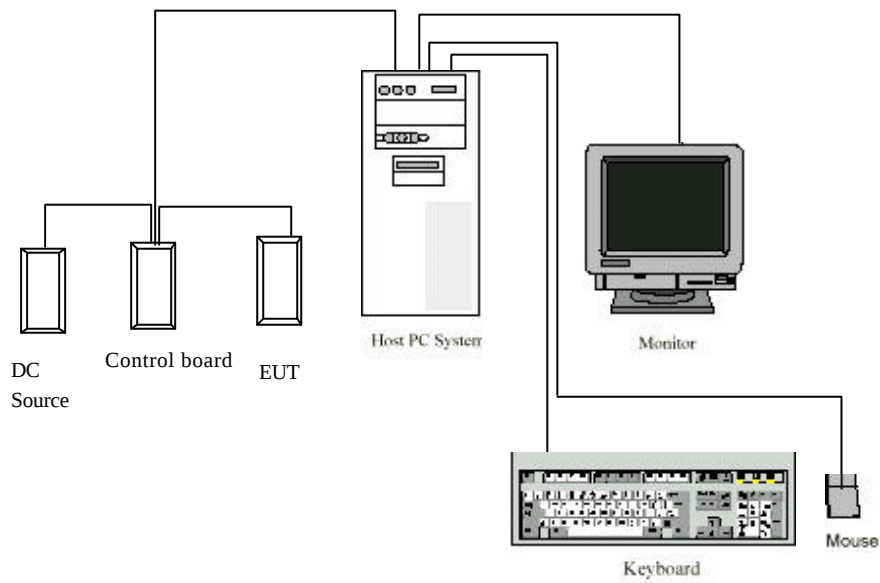
Configuration of Test Setup

Conducted Emission:



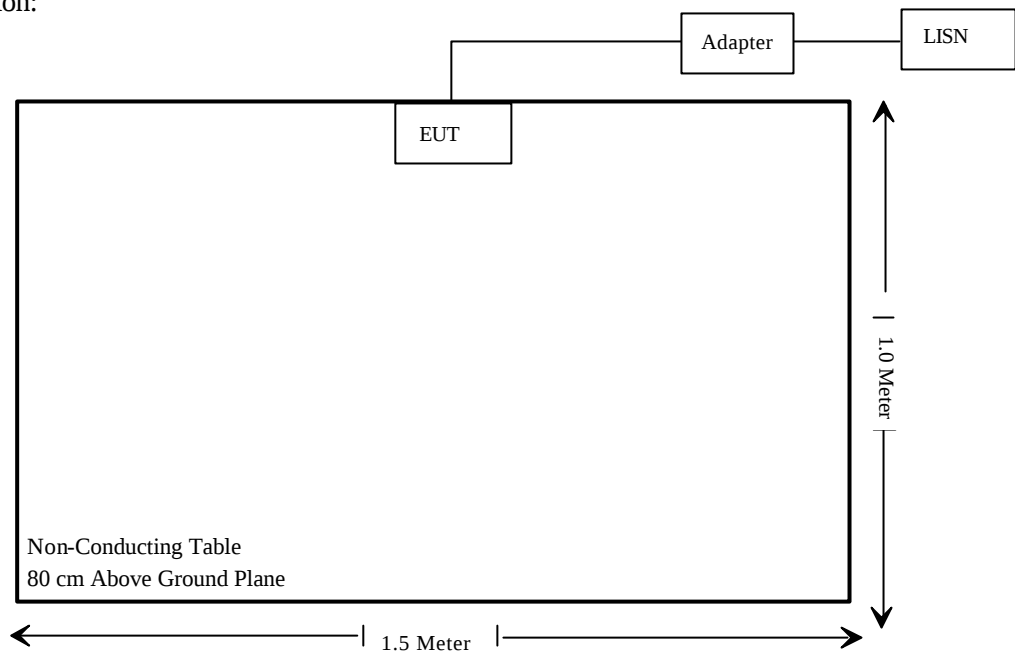
EUT

Radiated Emission:

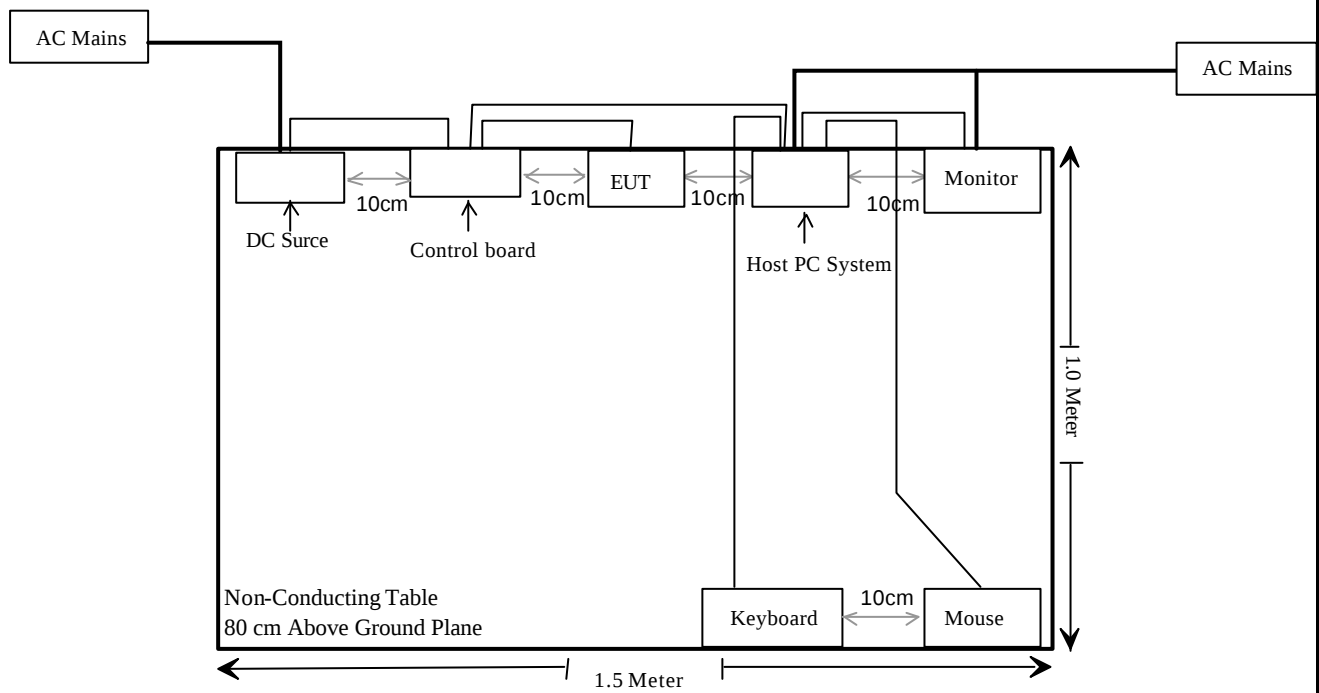


Block Diagram of Test Setup

Conducted Emission:



Radiated Emission:



SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§ 15.207 (a)	Conducted Emission	Compliant
§ 15.247 (b)	RF Exposure	Compliant
§ 15.203	Antenna Requirement	Compliant
§ 15.205	Restricted Band	Compliant
§ 15.205, §15.209, §15.247(d)	Radiated Emission	Compliant*
§15.247 (a)(1)	20 dB Bandwidth	Compliant
§ 15.247(a)(1)	Channel Separation Test	Compliant
§ 15.247(a)(1)(iii)	Time of occupancy (Dwell Time)	Compliant
§ 15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliant
§ 15.247(b)(1)	Peak Output Power Measurement	Compliant
§ 15.247(d)	Band edges testing	Compliant

* Within measurement uncertainty.

§15.247(b) - RF EXPOSURE

Limit

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Since the output power of this device was so low (0.0000845 Watts), it met the RF Exposure Requirement.

§15.203 - ANTENNA REQUIREMENT

Standard Applicable

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.

And according to § 15.247 (b) (4), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connected Construction

The EUT was a permanently attached antenna which, in accordance to the above sections, is considered sufficient to comply with the provisions of these sections. Please see EUT photo for details.

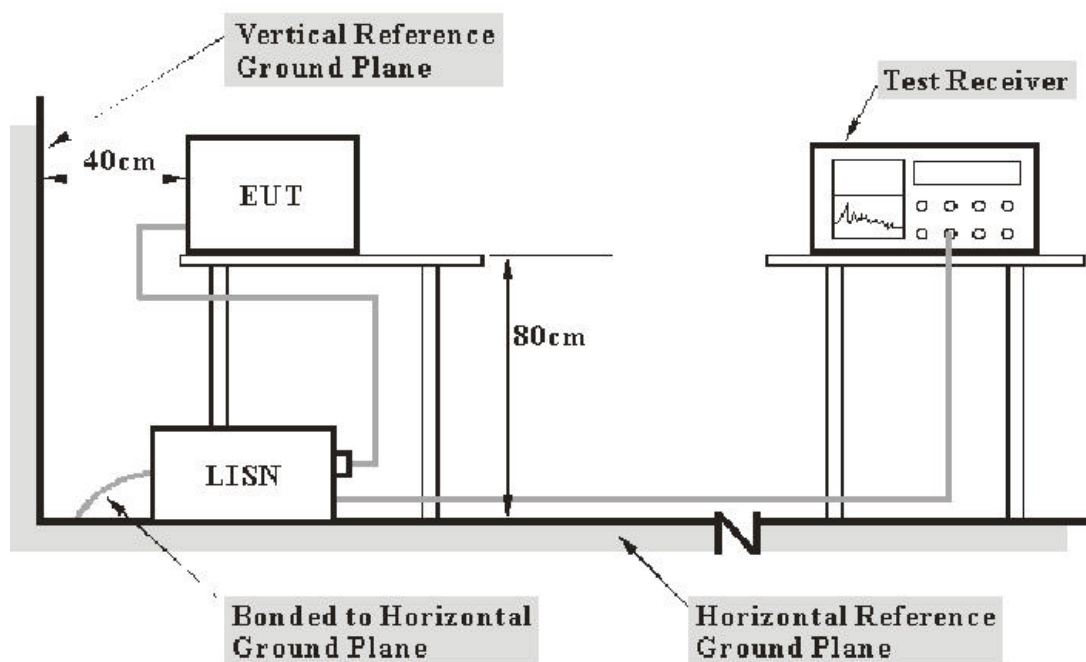
§15.107 (a) - CONDUCTED EMISSION

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 Lab Corp. (ShenZhen) is ± 2.4 dB.

EUT Setup



- Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15 Class B 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 EUT was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

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

<i>Frequency Range</i>	<i>IF B/W</i>
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Com-Power	L.I.S.N.	LI-200	12005	N/A	N/A
Com-Power	L.I.S.N.	LI-200	12008	N/A	N/A
Rohde & Schwarz	EMI Test Receiver	ESCS30	DE25330 or 830245/006	2006-1-26	2007-1-26
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2006-3-1	2007-3-1

* Com-Power's LISN were used as the supporting equipment.

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

Test Procedure

During the conducted emission test, the EUT was connected to the LISN.

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

All data was recorded in the Quasi-peak and average detection mode.

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15 Class B, with the worst margin reading of:

-23.80 dB at 0.240 MHz in the Neutral conductor mode.

Test Data**Environmental Conditions**

Temperature:	25 ° C
Relative Humidity:	54%
ATM Pressure:	1000mbar

The testing was performed by Deny Xiong on 2006-7-3.

Test Mode: Charging

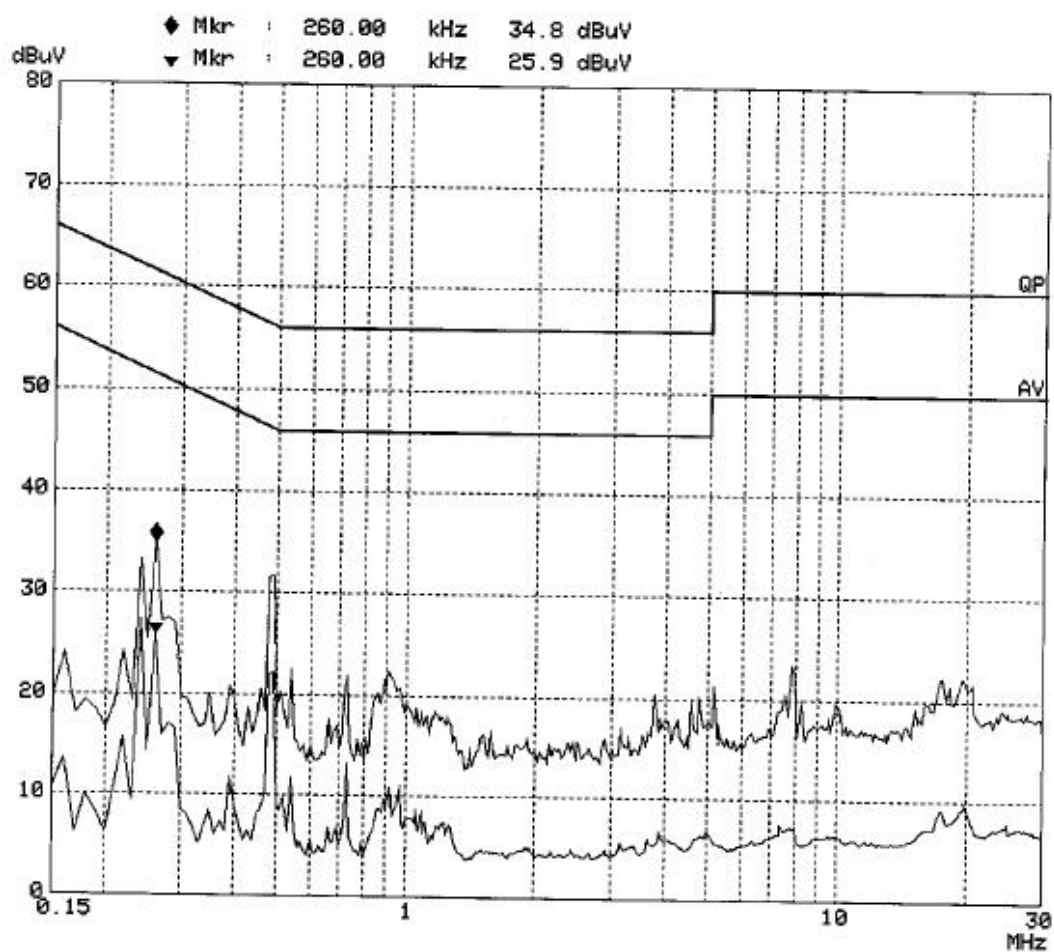
LINE CONDUCTED EMISSIONS				FCC PART 15 CLASS B	
Frequency MHz	Amplitude dBμV	Detector QP/AV	Phase Live/Neutral	Limit dBμV	Margin dB
0.240	28.30	AV	Neutral	52.10	-23.80
0.490	22.20	AV	Live	46.17	-23.97
0.490	31.70	QP	Live	56.17	-24.47
0.260	36.60	QP	Neutral	61.43	-24.83
0.260	26.10	AV	Neutral	51.43	-25.33
0.260	26.00	AV	Live	51.43	-25.43
0.260	34.90	QP	Live	61.43	-26.53
0.240	34.20	QP	Neutral	62.10	-27.90
0.480	28.20	QP	Neutral	56.34	-28.14
0.480	16.90	AV	Neutral	46.34	-29.44
0.910	22.40	QP	Live	56.00	-33.60
0.950	21.70	QP	Neutral	56.00	-34.30
0.910	10.80	AV	Live	46.00	-35.20
19.780	23.40	QP	Neutral	60.00	-36.60
7.810	23.40	QP	Live	60.00	-36.60
0.950	8.70	AV	Neutral	46.00	-37.30
0.160	17.90	AV	Neutral	55.46	-37.56
6.180	21.50	QP	Live	60.00	-38.50
19.780	9.80	AV	Neutral	50.00	-40.20
0.160	24.80	QP	Neutral	65.46	-40.66
0.160	24.20	QP	Live	65.46	-41.26
0.160	13.70	AV	Live	55.46	-41.76
7.810	7.30	AV	Live	50.00	-42.70
6.180	5.60	AV	Live	50.00	-44.40

Plot(s) of Test Data

Plot(s) of Test Data is presented hereinafter as reference.

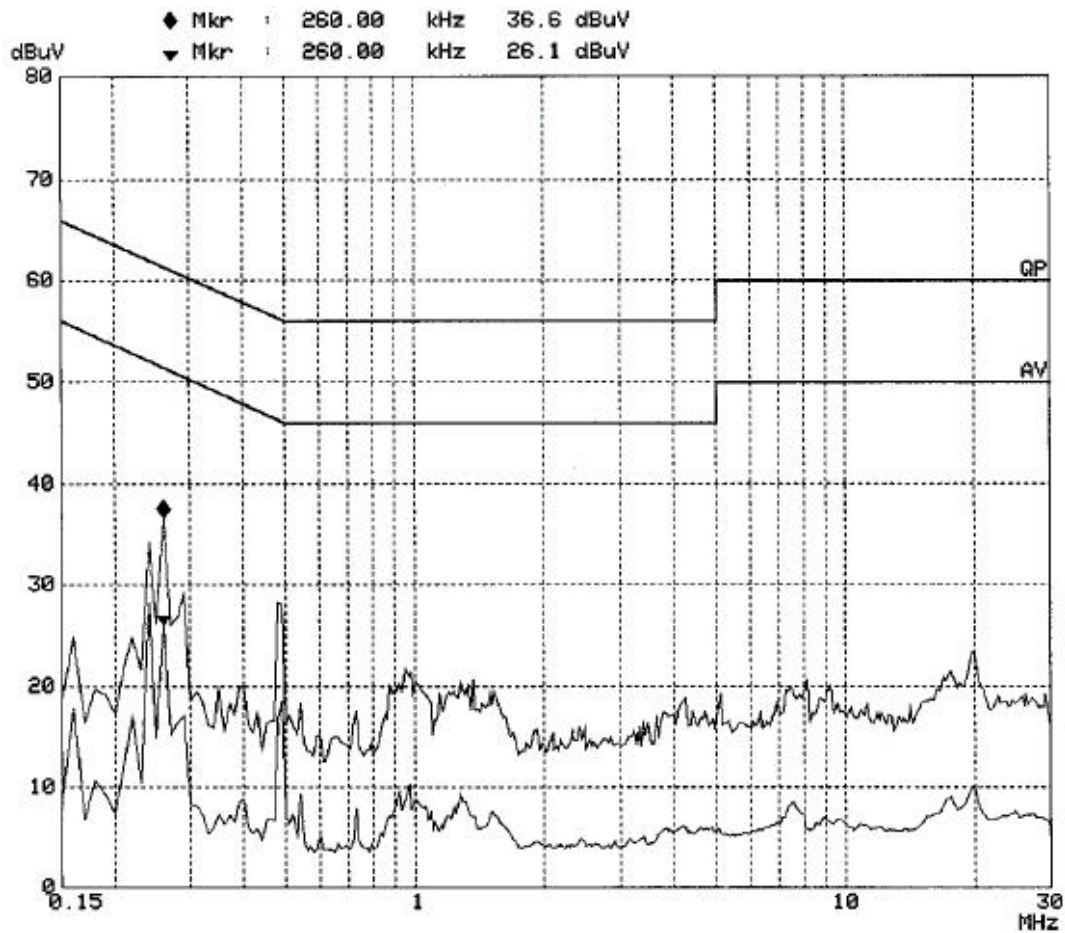
Conducted emission FCC Part 15

EUT: LCD Speaker phone M/N: SPB-2802
Manuf: Audex
Op Cond: charging
Operator: Louise
Test Spec: AC 120V/60Hz L
Comment: Temp.:27 Humi.: 56%
Date: 03. Jul 06 13:29



Conducted emission FCC Part 15

EUT: LCD Speaker phone M/N: SPB-2802
Manuf: Audex
Op Cond: charging
Operator: Louise
Test Spec: AC 120V/60Hz N
Comment: Temp.: 27 Humi.: 56%
Date: 03. Jul 06 13:09



§15.205, §15.209, §15.247 - RADIATED EMISSION

Applicable Standard

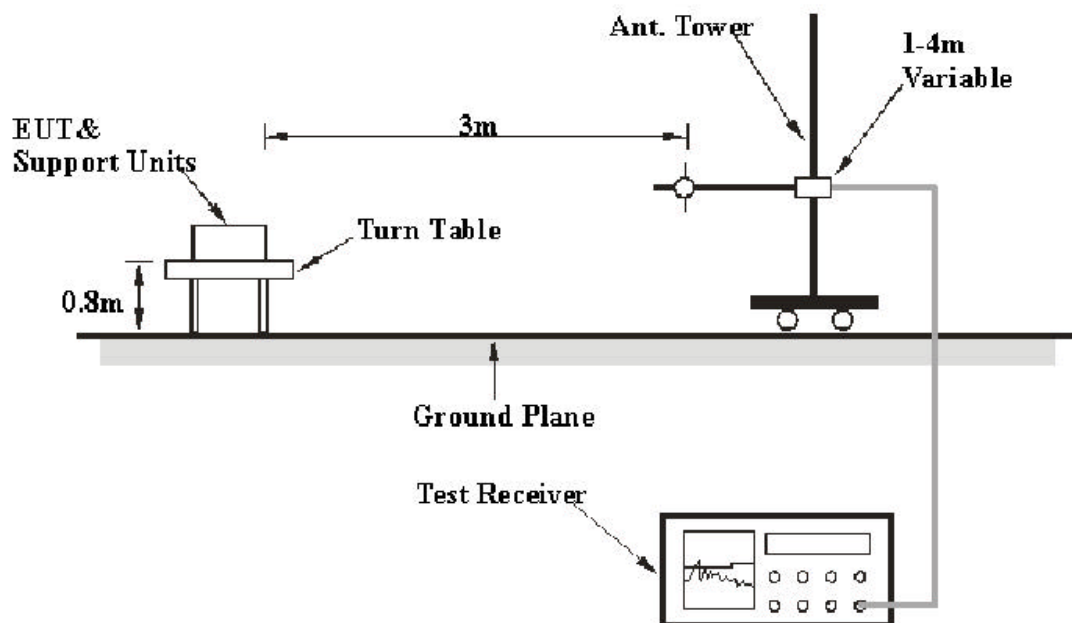
According to FCC §15.247 (d)

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 Lab Corp. (ShenZhen) is ± 4.0 dB.

EUT Setup



The radiated emission tests were performed in the 3-meter Chamber, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209 and FCC 15.247 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.

The EUT was connected to a 120 VAC/60 Hz power source.

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
1000 MHz – 25 GHz	1 MHz	3 MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
A.H. System	Horn Antenna	SAS-200/571	135	2006-4-28	2007-4-28
HP	Amplifier	HP8447D	2944A09795	2005-8-17	2006-8-17
HP	Preamplifier	8449B	3008A00277	2005-8-17	2006-8-17
Agilent	Spectrum Analyzer	8564E	3943A01781	2005-12-8	2006-12-8
Rohde&Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2006-4-28	2007-4-28

*** Statement of Traceability:** Bay Area Compliance Lab 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 EUT and all support equipment power cords were connected to the AC floor outlet.

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

All data was recorded in the Quasi-peak, PK&AV detection mode.

Corrected Amplitude & Margin Calculation

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

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

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of $\pm 7\text{dB}$ means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

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

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209, and 15.247, with the worst margin reading of:

- 0.89 dB at 4804 MHz in the **Horizontal** polarization 1GHz--25GHz: Low Channel, *Transmitting mode*
- 1.55 dB at 4882 MHz in the **Vertical** polarization 1GHz--25GHz: Middle Channel, *Transmitting mode*
- 0.52 dB at 4960 MHz in the **Vertical** polarization 1GHz--25GHz: High Channel, *Transmitting mode*
- 1.65 dB at 32.17 MHz in the **Vertical** polarization, 30 MHz-1000MHz, *Transmitting mode*
- 13.3 dB at 49.288225 MHz in the **Vertical** polarization, 30 MHz-1000MHz, *Charging mode*

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1009mbar

The testing was performed by Deny Xiong on 2006-7-18.

Test Mode: Transmitting: 1GHz--25GHz (Low Channel)

Frequency	Meter Reading	Detector	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier Gain	FCC Part 15.247			
									Corr. Ampl.	Limit	Margin	
MHz	dBuV/m	PK/QP/AV	Degree	Meter	H / V	dB	dB	dB	dBuV/m	dBuV/m	dB	
Low Channel (1GHz---25GHz)												
2402	99.3	PK	147	1.4	V	27.4	3.61	35.0	95.31			Fundamental
2402	98.84	A V	147	1.4	V	27.4	3.61	35.0	94.85			Fundamental
2402	99.5	PK	247	1.0	H	27.4	3.61	35.0	95.51			Fundamental
2402	99.17	A V	247	1.0	H	27.4	3.61	35.0	95.18			Fundamental
4804	49.67	A V	348	1.91	H	31.3	4.64	32.5	53.11	54	-0.89*	Harmonic
4804	49.33	A V	253	1.7	V	31.3	4.64	32.5	52.77	54	-1.23*	Harmonic
9608	36.4	A V	186	1.2	V	37.6	5.35	34.1	45.25	54	-8.75	Harmonic
7206	37.6	A V	322	1.01	H	35.4	4.51	33.7	43.81	54	-10.19	Harmonic
9608	34.5	A V	316	1.31	H	37.6	5.35	34.1	43.35	54	-10.65	Harmonic
7206	36.5	A V	88	1.01	V	35.4	4.51	33.7	42.71	54	-11.29	Harmonic
9608	48.33	PK	316	1.31	H	37.6	5.35	34.1	57.18	74	-16.82	Harmonic
9608	47.67	PK	186	1.2	V	37.6	5.35	34.1	56.52	74	-17.48	Harmonic
4804	53.0	PK	348	1.91	H	31.3	4.64	32.5	56.44	74	-17.56	Harmonic
4804	52.67	PK	253	1.7	V	31.3	4.64	32.5	56.11	74	-17.89	Harmonic
7206	48.5	PK	322	1.01	H	35.4	4.51	33.7	54.71	74	-19.29	Harmonic
7206	47.17	PK	88	1.01	V	35.4	4.51	33.7	53.38	74	-20.62	Harmonic

Test Mode: Transmitting: 1GHz---25GHz (Middle Channel)

Frequency	Meter Reading	Detector	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier Gain	Corr. Ampl.	FCC Part 15.247		
MHz	dBuV/m	PK/QP/AV	Degree	Meter	H / V	dB	dB	dB	dBuV/m	Limit dBuV/m	Margin dB	
Middle Channel (1GHz---25GHz)												
2441	100.5	PK	87	1.38	V	27.4	3.61	34.1	97.41			Fundamental
2441	100.17	AV	87	1.38	V	27.4	3.61	34.1	97.08			Fundamental
2441	100.0	PK	344	1.4	H	27.4	3.61	34.1	96.91			Fundamental
2441	99.67	AV	344	1.4	H	27.4	3.61	34.1	96.58			Fundamental
4882	50.0	AV	226	1.73	V	31.3	4.55	33.4	52.45	54	-1.55*	Harmonic
4882	47.67	AV	158	1.95	H	31.3	4.55	33.4	50.12	54	-3.88*	Harmonic
9764	34.8	AV	170	1.2	V	38.2	5.50	34.1	44.4	54	-9.60	Harmonic
9764	34.67	AV	72	1.6	H	38.2	5.50	34.1	44.27	54	-9.73	Harmonic
7323	36.5	AV	74	1.51	H	35.3	4.62	33.7	42.72	54	-11.28	Harmonic
7323	36.4	AV	241	1.53	V	35.3	4.62	33.7	42.62	54	-11.38	Harmonic
9764	48.17	PK	170	1.2	V	38.2	5.50	34.1	57.77	74	-16.23	Harmonic
9764	48.1	PK	72	1.6	H	38.2	5.50	34.1	57.7	74	-16.30	Harmonic
4882	53.5	PK	226	1.73	V	31.3	4.55	33.4	55.95	74	-18.05	Harmonic
7323	49.0	PK	74	1.51	H	35.3	4.62	33.7	55.22	74	-18.78	Harmonic
7323	48.67	PK	241	1.53	V	35.3	4.62	33.7	54.89	74	-19.11	Harmonic
4882	52.33	PK	158	1.95	H	31.3	4.55	33.4	54.78	74	-19.22	Harmonic

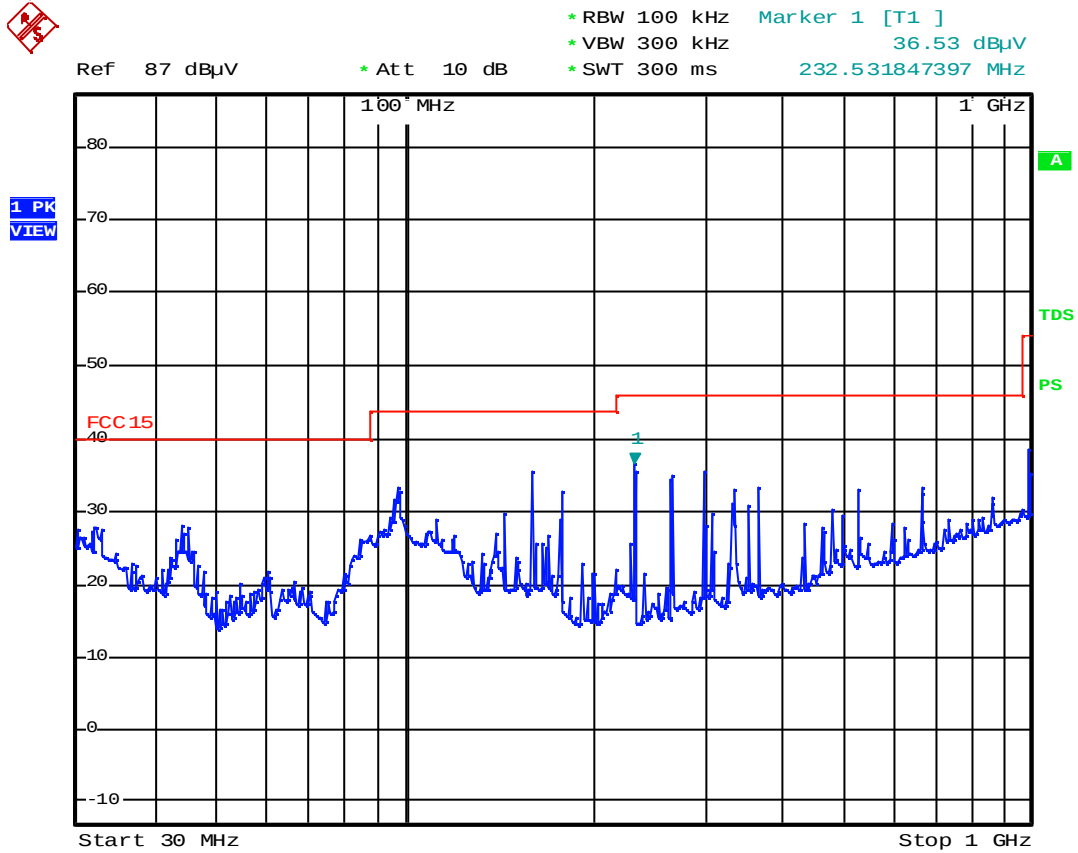
Test Mode: Transmitting: 1GHz---25GHz (High Channel)

Frequency	Meter Reading	Detector	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier Gain	Corr. Ampl.	FCC Part 15.247		
MHz	dBuV/m	PK/QP/AV	Degree	Meter	H / V	dB	dB	dB	dBuV/m	Limit dBuV/m	Margin dB	
High Channel (1GHz---25GHz)												
2480	100.0	PK	83	1.37	V	28.0	3.8	33.4	98.4			Fundamental
2480	99.67	AV	83	1.37	V	28.0	3.8	33.4	98.07			Fundamental
2480	99.33	PK	60	1.5	H	28.0	3.8	33.4	97.73			Fundamental
2480	98.33	AV	60	1.5	H	28.0	3.8	33.4	96.73			Fundamental
4960	50.33	AV	0	1.72	V	32.0	4.55	33.4	53.48	54	-0.52*	Harmonic
4960	48.83	AV	352	1.48	H	32.0	4.55	33.4	51.98	54	-2.02*	Harmonic
9920	36.33	AV	270	1.2	V	38.0	5.23	34.1	45.46	54	-8.54	Harmonic
9920	35.33	AV	60	1.2	H	38.0	5.23	34.1	44.46	54	-9.54	Harmonic
7440	36.6	AV	90	1.0	H	35.0	4.75	34.3	42.05	54	-11.95	Harmonic
7440	36.5	AV	180	1.1	V	35.0	4.75	34.3	41.95	54	-12.05	Harmonic
9920	48.83	PK	270	1.2	V	38.0	5.23	34.1	57.96	74	-16.04	Harmonic
9920	47.83	PK	60	1.2	H	38.0	5.23	34.1	56.96	74	-17.04	Harmonic
4960	53.5	PK	0	1.72	V	32.0	4.55	33.4	56.65	74	-17.35	Harmonic
4960	52.67	PK	352	1.48	H	32.0	4.55	33.4	55.82	74	-18.18	Harmonic
7440	49.33	PK	360	2.0	H	35.0	4.75	34.3	54.78	74	-19.22	Harmonic
7440	48.5	PK	180	1.1	V	35.0	4.75	34.3	53.95	74	-20.05	Harmonic

Test Mode: Transmitting: 30 MHz-1000MHz

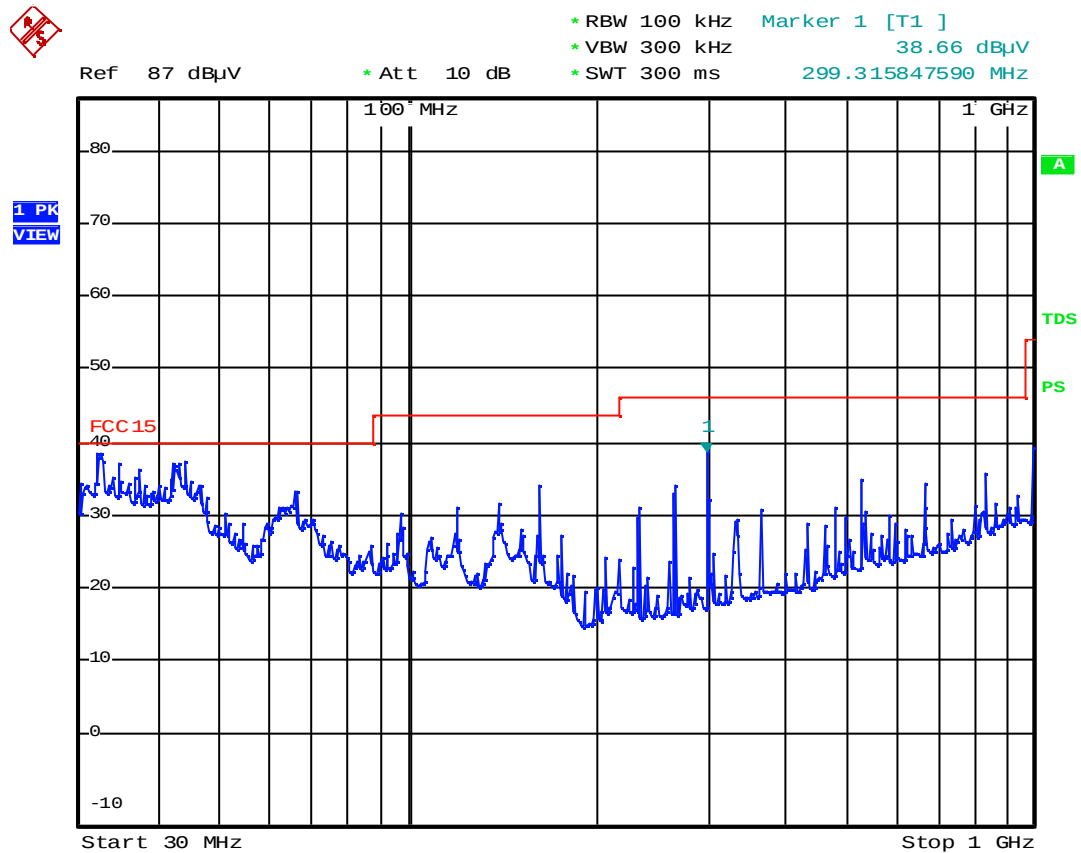
Frequency MHz	Meter Reading dBuV/m	Detector PK/QP/AV	Direction Degree	Height Meter	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier Gain dB	Corr. Ampl. dBuV/m	FCC Part 15.209	
										Limit dBuV/m	Margin dB
32.17	40.90	QP	289	1.0	V	24.10	0.37	27.02	38.35	40.00	-1.65*
44.12	49.84	QP	289	1.0	V	14.30	0.23	27.01	37.36	40.00	-2.64*
66.26	50.56	QP	60	1.0	V	8.50	0.79	26.91	32.94	40.00	-7.06
299.31	48.73	QP	180	1.2	V	13.80	2.61	26.48	38.66	46.00	-7.34
160.34	47.77	QP	60	1.2	H	12.70	1.92	26.90	35.49	43.50	-8.01
232.53	49.10	QP	35	3.8	H	11.70	2.17	26.44	36.53	46.00	-9.47
162.61	46.10	QP	45	1.2	V	12.70	1.92	26.90	33.82	43.50	-9.68
97.45	50.77	QP	45	1.0	H	8.20	0.80	26.75	33.02	43.50	-10.48
299.31	45.56	QP	45	1.2	H	13.80	2.61	26.48	35.49	46.00	-10.51
528.24	41.17	QP	45	1.0	V	18.30	3.03	27.50	35.00	46.00	-11.00
267.54	46.44	QP	35	3.8	H	12.30	2.39	26.23	34.90	46.00	-11.10
986.07	37.72	QP	90	1.2	H	23.50	3.76	26.64	38.34	54.00	-15.66

* Within measurement uncertainty.



Audex LCD Speakerphone M/N:SPB-2802 Radiation emission Horiz
ontal

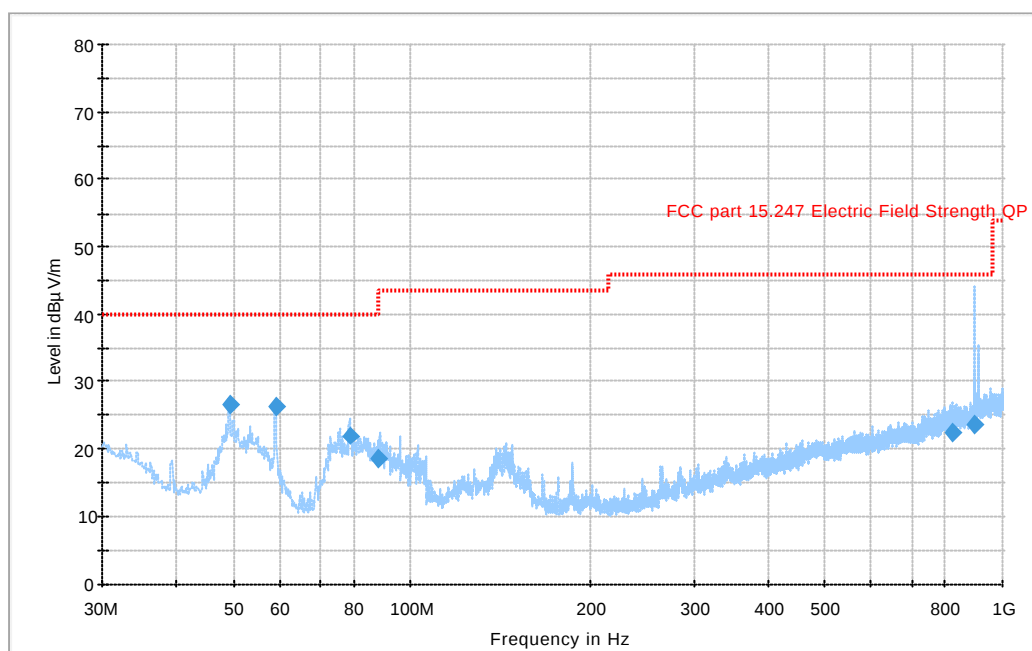
Date: 18.JUL.2006 08:48:36



Audex LCD Speakerphone M/N:SPB-2802 Radiation emission

Date: 18.JUL.2006 08:38:31

Test Mode: Charging



QP Measurement

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity
49.288225	26.7	3000.000	120.000	145.0	V
59.112600	26.3	3000.000	120.000	115.0	V
78.781125	22.0	3000.000	120.000	118.0	V
87.766425	18.6	3000.000	120.000	111.0	V
821.643750	22.5	3000.000	120.000	141.0	H
890.465775	23.8	3000.000	120.000	315.0	H

(continuation of the "Final Measurement Detector 1" table from column 6 ...)

Frequency (MHz)	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
49.288225	248.0	-18.0	13.3	40.0
59.112600	247.0	-18.8	13.7	40.0
78.781125	331.0	-18.3	18.0	40.0
87.766425	334.0	-18.7	21.4	40.0
821.643750	317.0	-1.4	23.5	46.0
890.465775	154.0	-0.2	22.2	46.0

§15.247(a) (1)-CHANNEL SEPARATION TEST**Applicable Standard**

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2005-8-17	2006-8-17

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

Test Procedure

1. Set the EUT in transmitting mode, spectrum Bandwidth was set at 100 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another truce
3. Measure the channel separation.

Limit

FCC Part 15, Subpart C Section 15.247(a)(1). Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB Bandwidth of the hopping channel, whichever is greater.

FREQUENCY RANGE (MHz)	Limit (kHz)
902-928	>25kHz or the 20dB bandwidth
2400-2483.5	>25kHz or two-thirds of the 20dB bandwidth
5725-5850	>25kHz or the 20dB bandwidth

Test Data**Environmental Conditions**

Temperature:	27 °C
Relative Humidity:	50 %
ATM Pressure:	1009 mbar

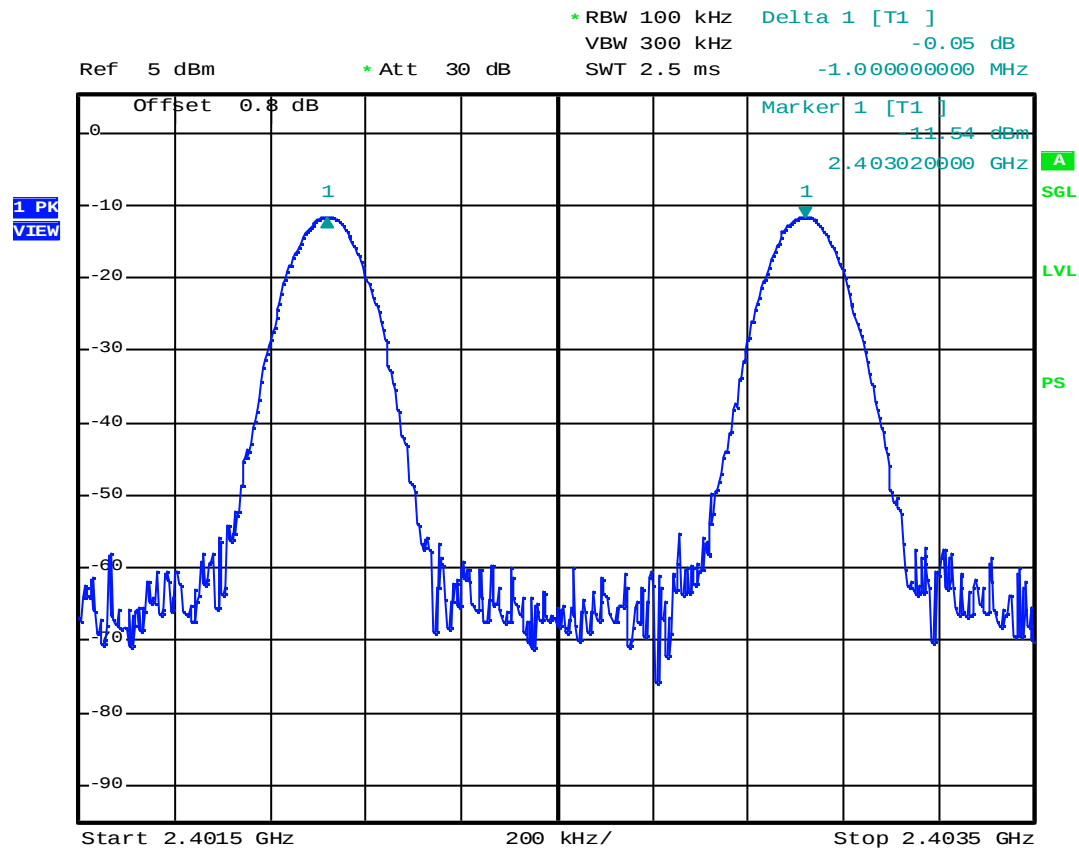
The testing was performed by Deny Xiong on 2006-8-16.

Test Result: Pass

Test mode: Transmitting

Channel	Channel Frequency (MHz)	Channel Separation (KHz)	Limit (kHz)	Result
Low Channel	2402	1000	180.0	Pass
Adjacency Channel	2403			
Mid Channel	2441	1000	180.0	Pass
Adjacency Channel	2442			
High Channel	2480	1000	180.0	Pass
Adjacency Channel	2479			

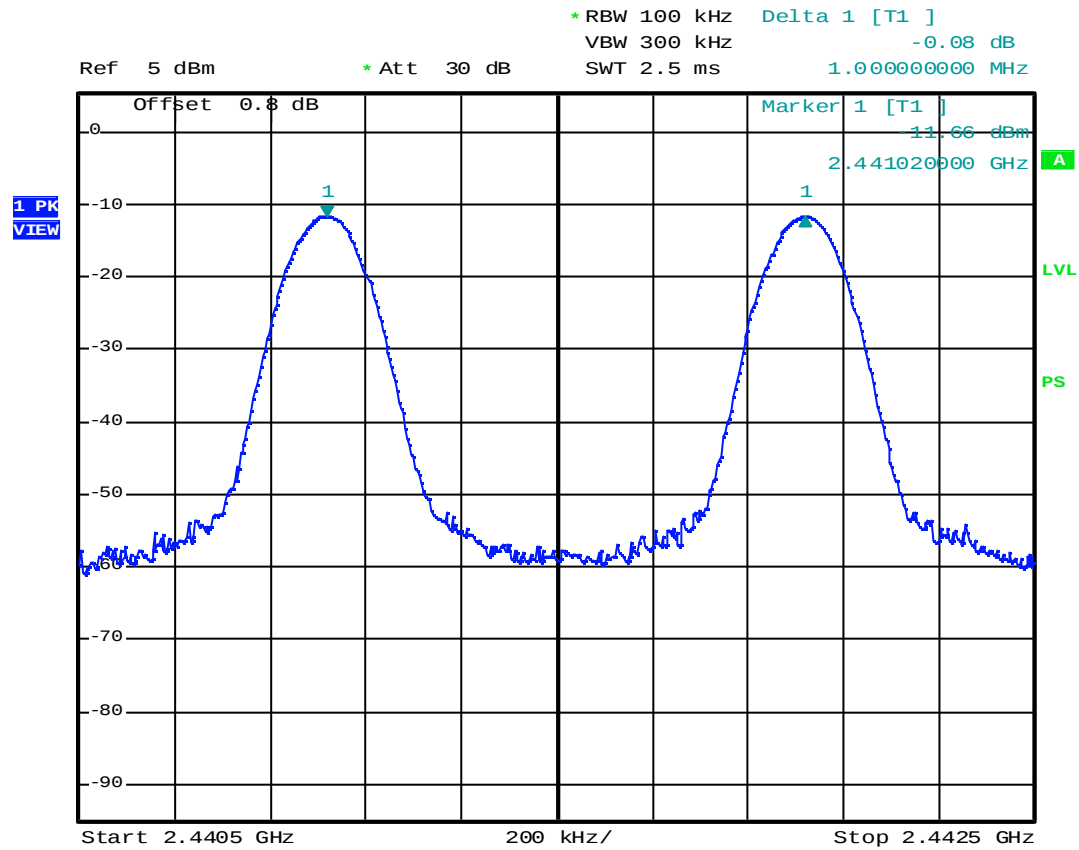
Low channel



M/N:SPB-2802 Channel separation low channel

Date: 16.AUG.2006 10:36:26

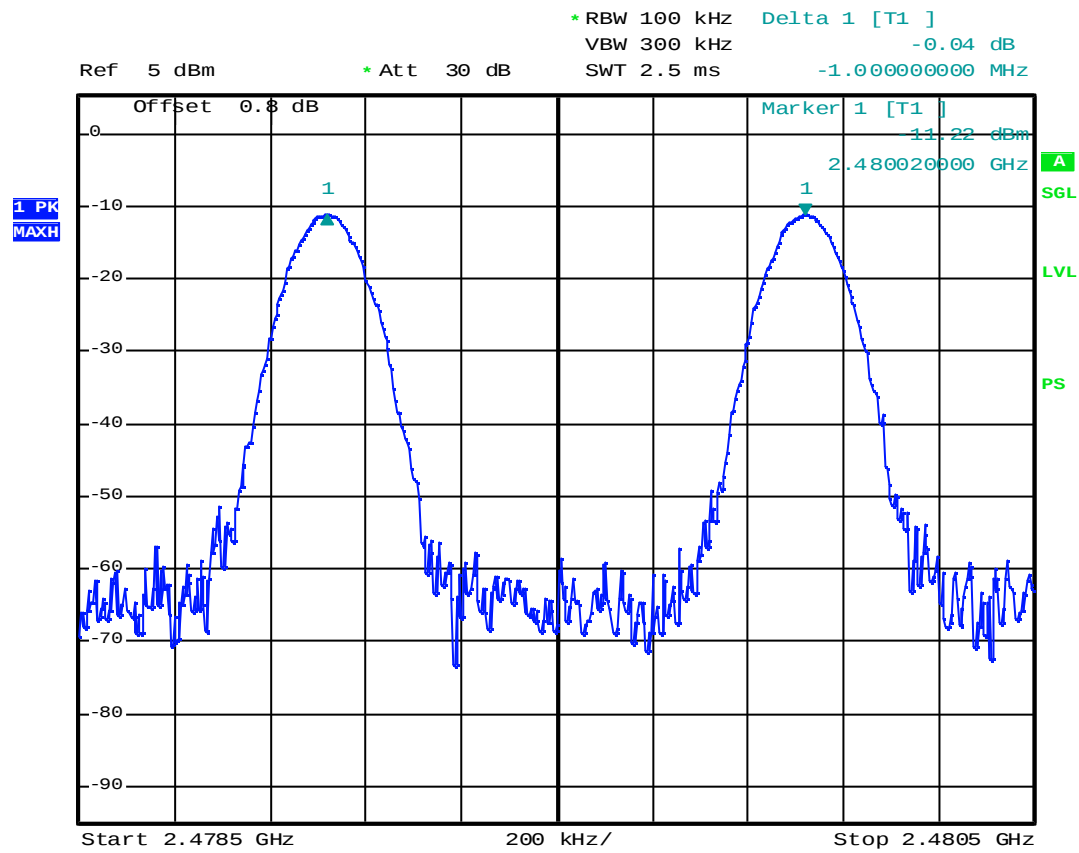
Middle channel



M/N:SPB-2802 Channel separation middle channel

Date: 16.AUG.2006 10:53:35

High channel



M/N:SPB-2802 Channel separation high channel

Date: 16.AUG.2006 10:48:58

§15.247(a) (1) –20dB BANDWIDTH TESTING

Applicable Standard

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB Bandwidth of the hopping channel, whichever is greater.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17

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

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	53%
ATM Pressure:	1009mbar

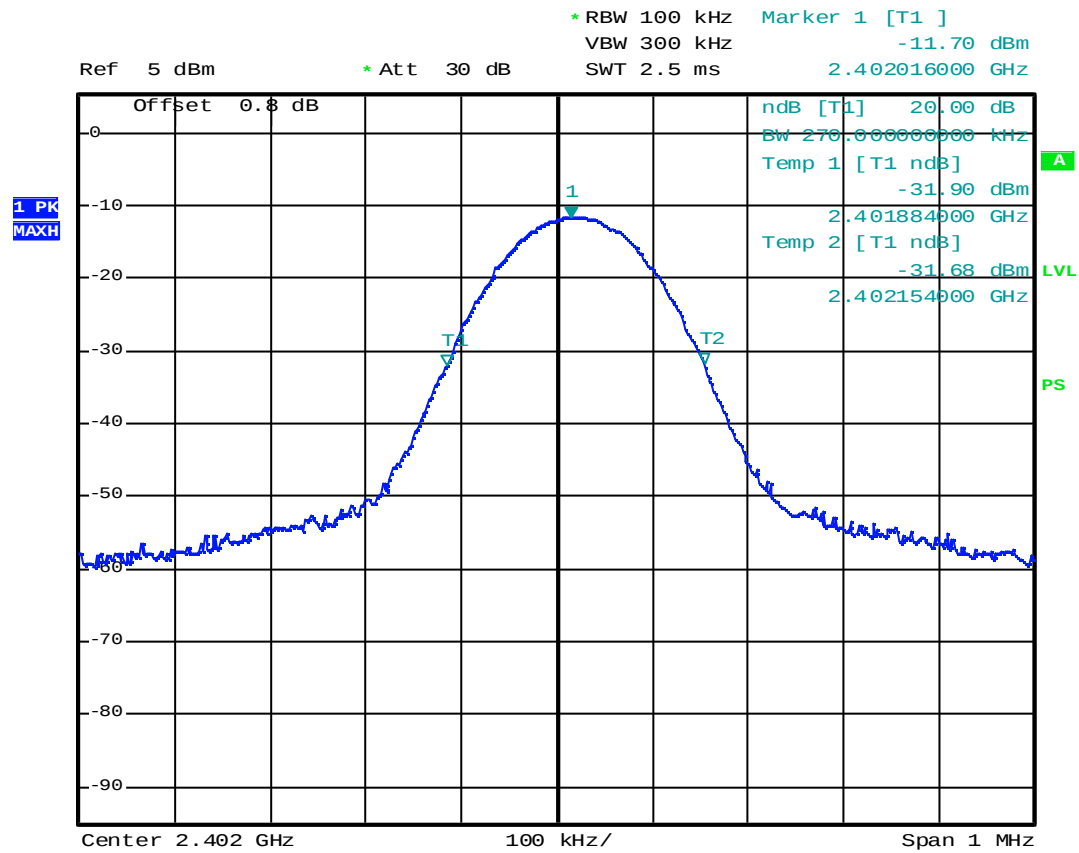
The testing was performed by Deny Xiong on 2006-8-16.

Test Mode: Transmitting

Channel	Channel Frequency (MHz)	20dB Bandwidth (kHz)	Result
Low Channel	2402	270	Pass
Mid Channel	2441	270	Pass
High Channel	2480	270	Pass

Test Result: Pass

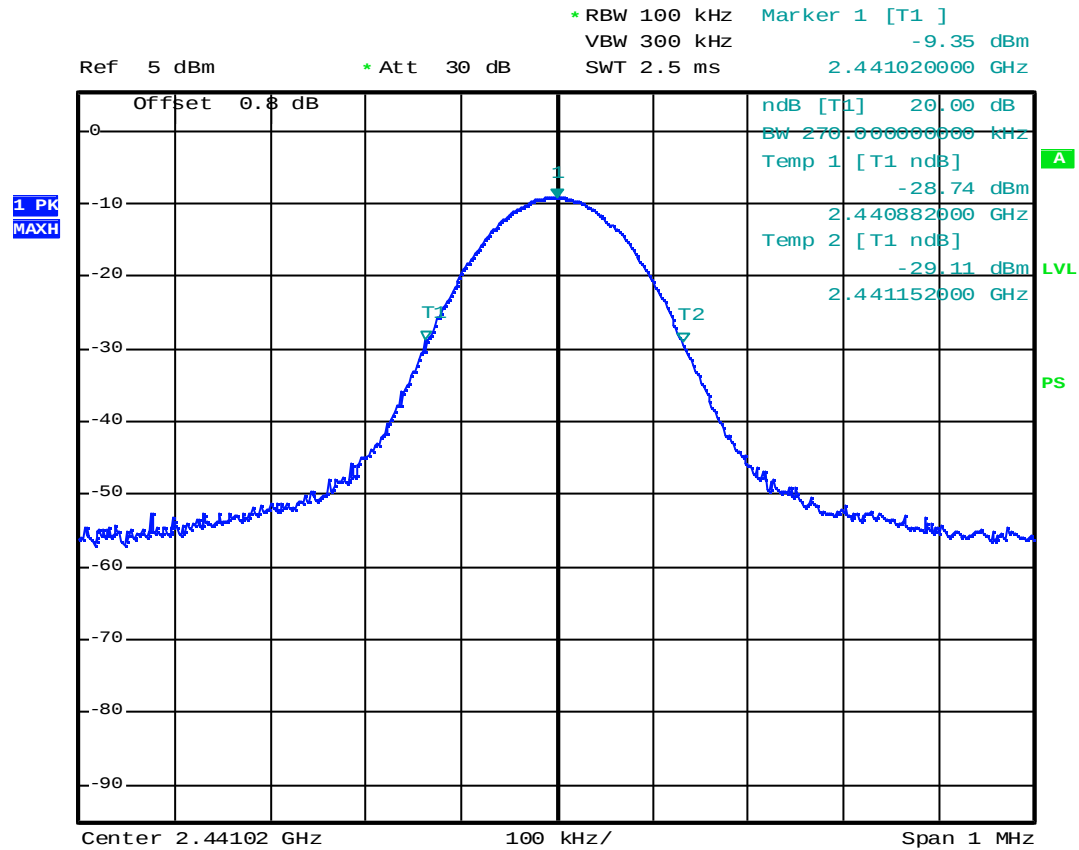
Low channel



M/N:SPB-2802 20dB Bandwidth Low channel

Date: 16.AUG.2006 09:31:19

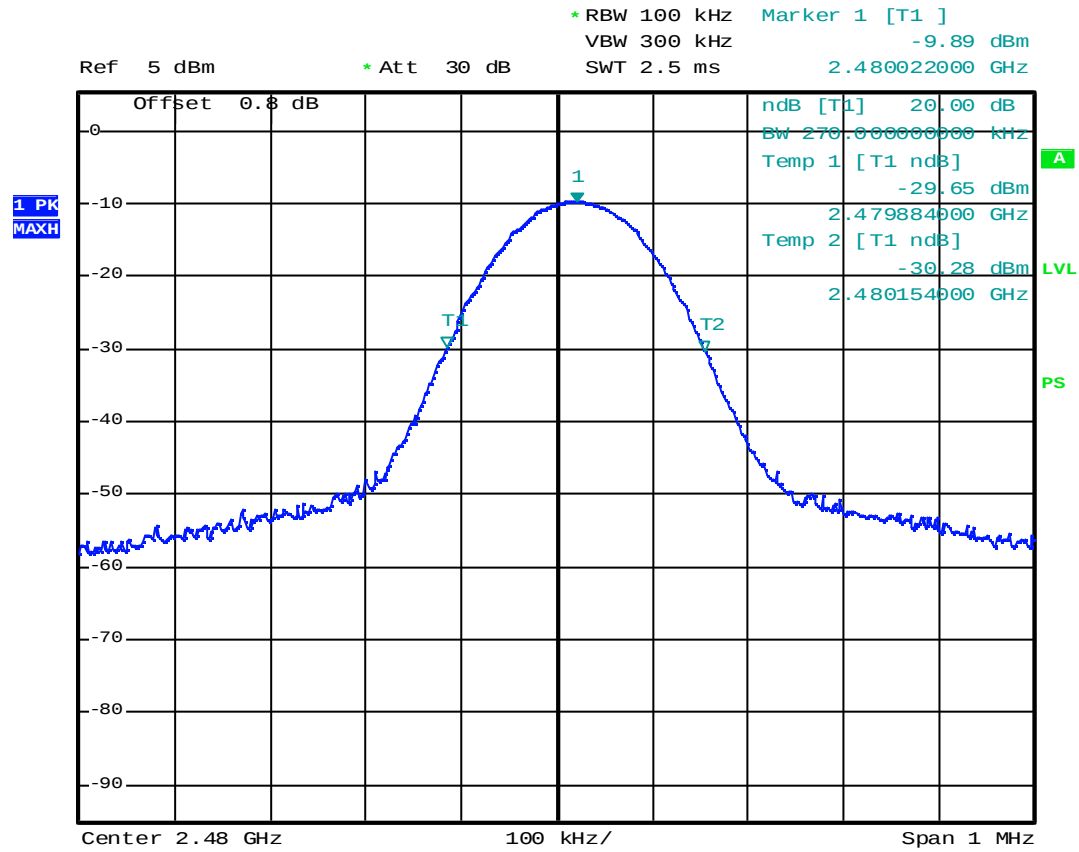
Middle channel



M/N:SPB-2802 20dB Bandwidth Middle channel

Date: 16.AUG.2006 09:34:48

High channel



M/N:SPB-2802 20dB Bandwidth High channel

Date: 16.AUG.2006 09:36:19

§15.247(a) (1) (iii)-QUANTITY OF HOPPING CHANNEL TEST

Applicable Standard

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2005-9-15	2006-9-15

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

Test Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in transmitting mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

Limit

FCC Part 15, Subpart C Section 15.247

FREQUENCY RANGE (MHz)	Limit (Quantity of Hopping Channel)			
	20 dB bandwidth <250 kHz	20 dB bandwidth >250 kHz	20 dB bandwidth <1 MHz	20 dB bandwidth >1 MHz
902-928	50	25	N/A	N/A
2400-2483.5	N/A	N/A	≥ 15	≥ 15
5725-5850	N/A	N/A	N/A	N/A

Test Data

Environmental Conditions

Temperature:	27 °C
Relative Humidity:	50 %
ATM Pressure:	1009 mbar

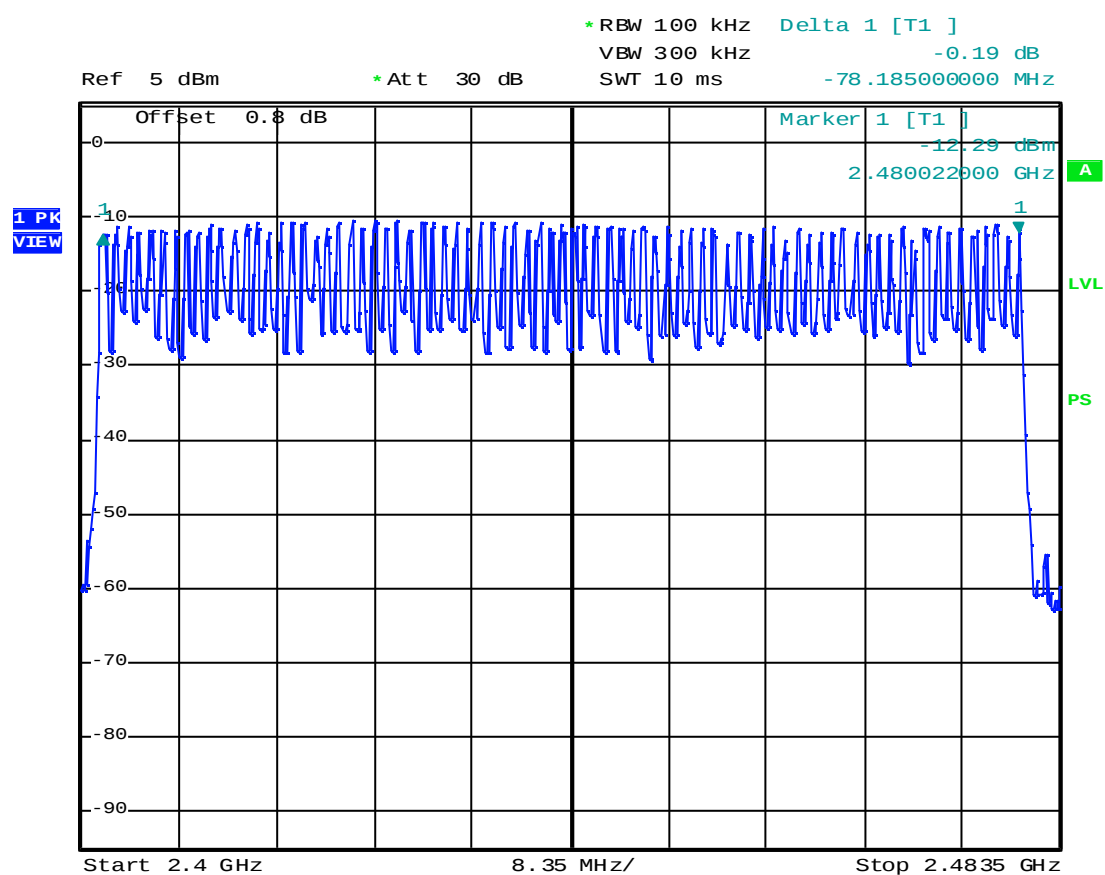
The testing was performed by Deny Xiong on 2006-8-16.

Test mode: Transmitting

The frequency hopping systems operating in 2.400~2.4835 GHz band employ 79 nonoverlapping channels.

Hopping Channel Frequency Range (MHz)	Quantity of Hopping Channel Read Value (Channel)	Limit (CH)
2402-2480	79.00	15

Test Result: Pass



M/N:SPB-2802 Quantity of channel

Date: 16.AUG.2006 09:41:40

§15.247(a) (1) (iii) -TIME OF OCCUPANCY (DWELL TIME)**Applicable Standard**

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17

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

Test Procedure

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 X channel no.(s), The quantity of Pulse was got from single sweep. In addition, the time of single Pulse was tested.

Limit

FCC Part 15, Subpart C Section 15.247.

FREQUENCY RANGE (MHz)	LIMIT (ms)		
	20dB bandwidth <250kHz (50 Channel)	20dB bandwidth >250kHz (50 Channel)	20dB bandwidth <1 MHz (79 Channel)
902-928	N/A	N/A	N/A
2400-2483.5	N/A	N/A	31.6s
5725-5850	N/A	N/A	N/A

Test Data**Environmental Conditions**

Temperature:	27 °C
Relative Humidity:	50 %
ATM Pressure:	1009 mbar

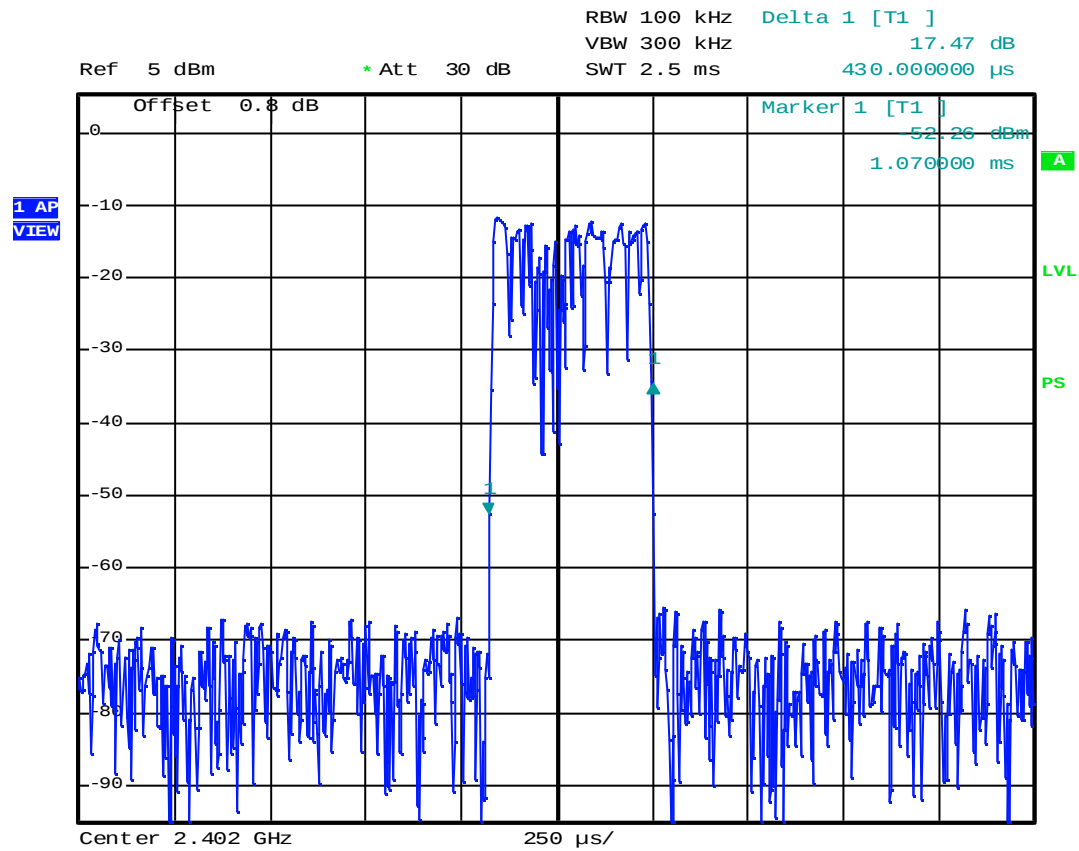
The testing was performed by Deny Xiong on 2006-8-16.

Test mode: Transmitting

Channel	Pulse wide (msec)	Number of hopping Pulses in 0.4*channel number	Dwell time (sec)	Limit (sec)	Result
Low Channel	0.43	0.43×320	0.1376	0.4	Pass
Mid Channel	0.43	0.43×320	0.1376	0.4	Pass
High Channel	0.43	0.43×320	0.1376	0.4	Pass

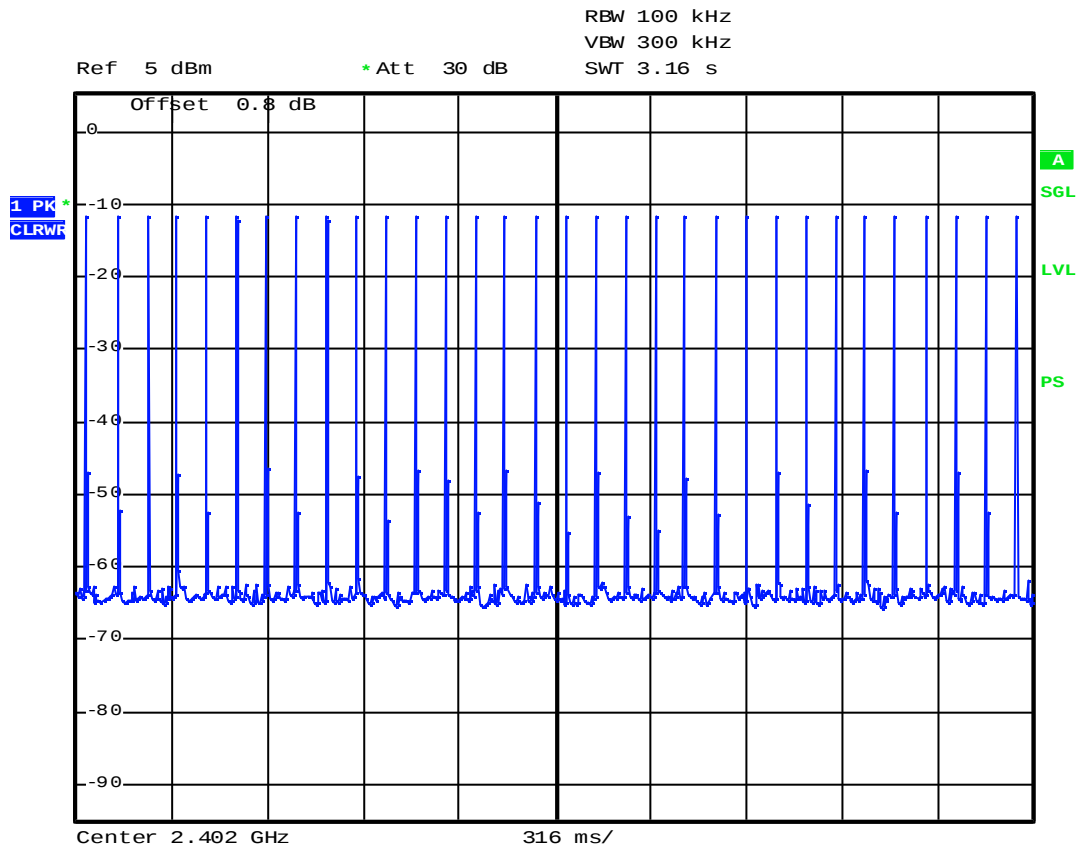
Test Result: Pass

Low channel



M/N:SPB-2802 Pulse of Low channel

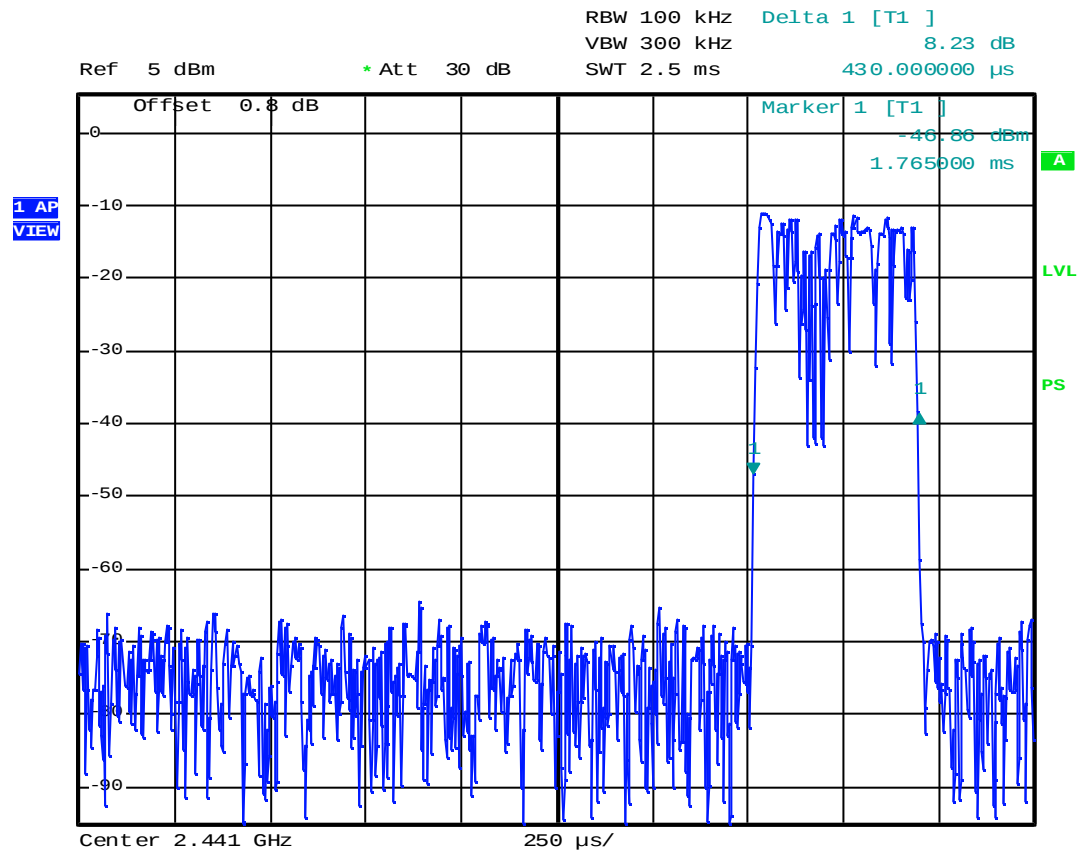
Date: 16.AUG.2006 09:57:00



M/N:SPB-2802 No of pluse Low channel

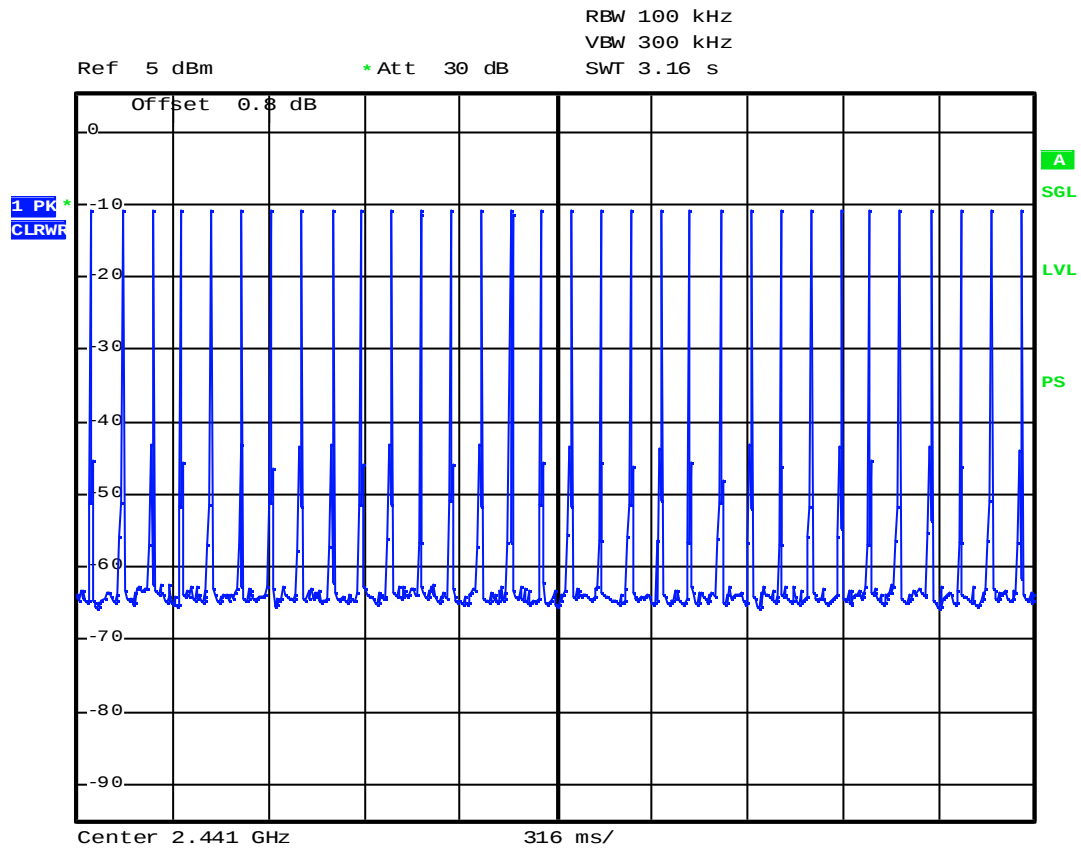
Date: 16.AUG.2006 10:19:56

Middle channel



M/N:SPB-2802 Pulse of Middle channel

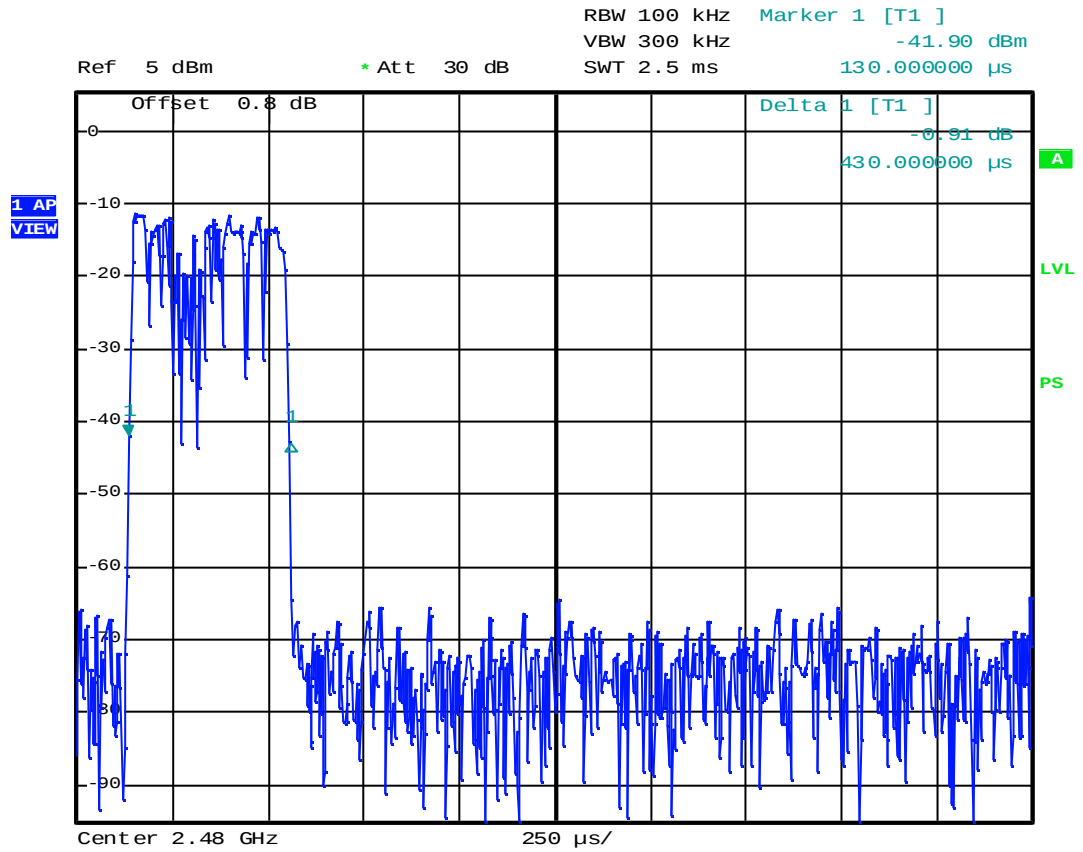
Date: 16.AUG.2006 09:54:17



M/N:SPB-2802 No of pluse middle channel

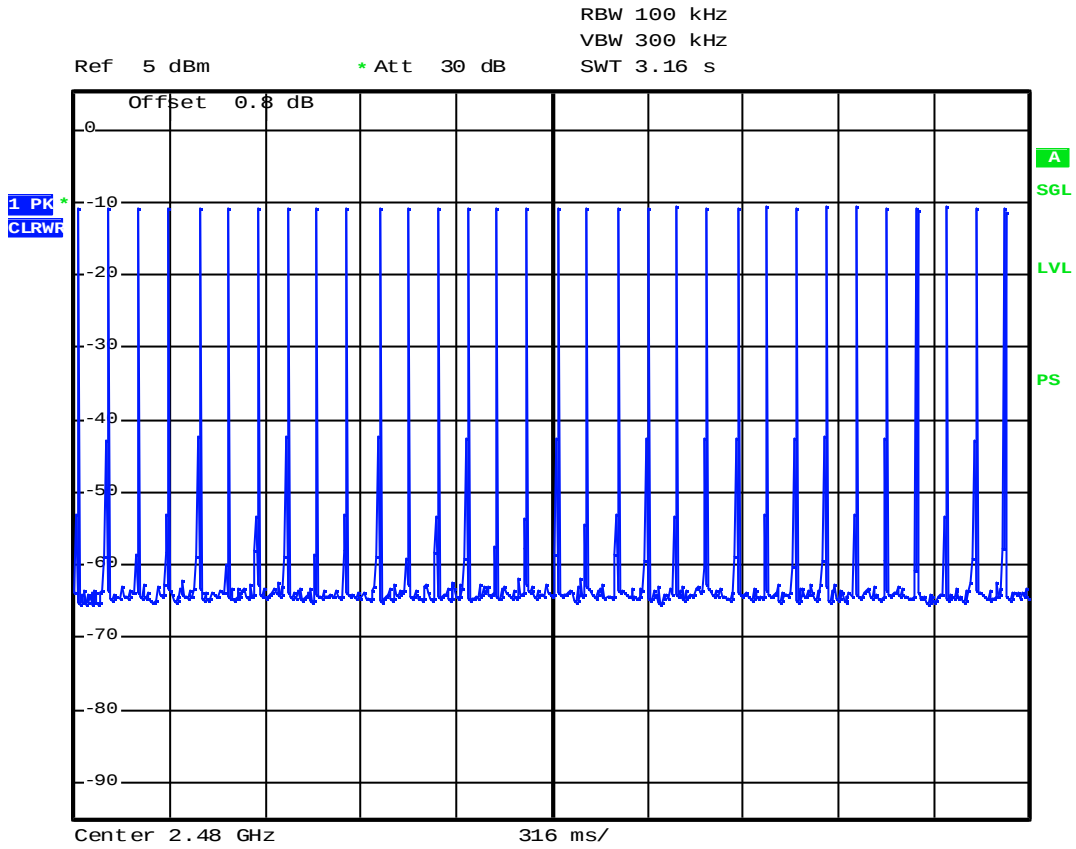
Date: 16.AUG.2006 10:21:21

High channel



M/N:SPB-2802 Pulse of high channel

Date: 16.AUG.2006 10:05:44



M/N:SPB-2802 No of pluse high channel

Date: 16.AUG.2006 10:22:03

§15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

According to § 15.247(b) (1), for frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

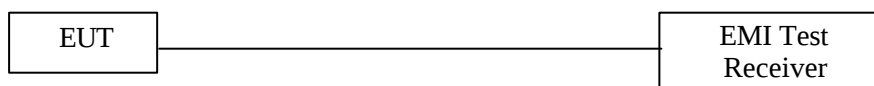
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17

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

Test Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to a EMI Test Receiver.
3. Add a correction factor to the display.



Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	53%
ATM Pressure:	1009mbar

The testing was performed by Deny Xiong on 2006-8-30.

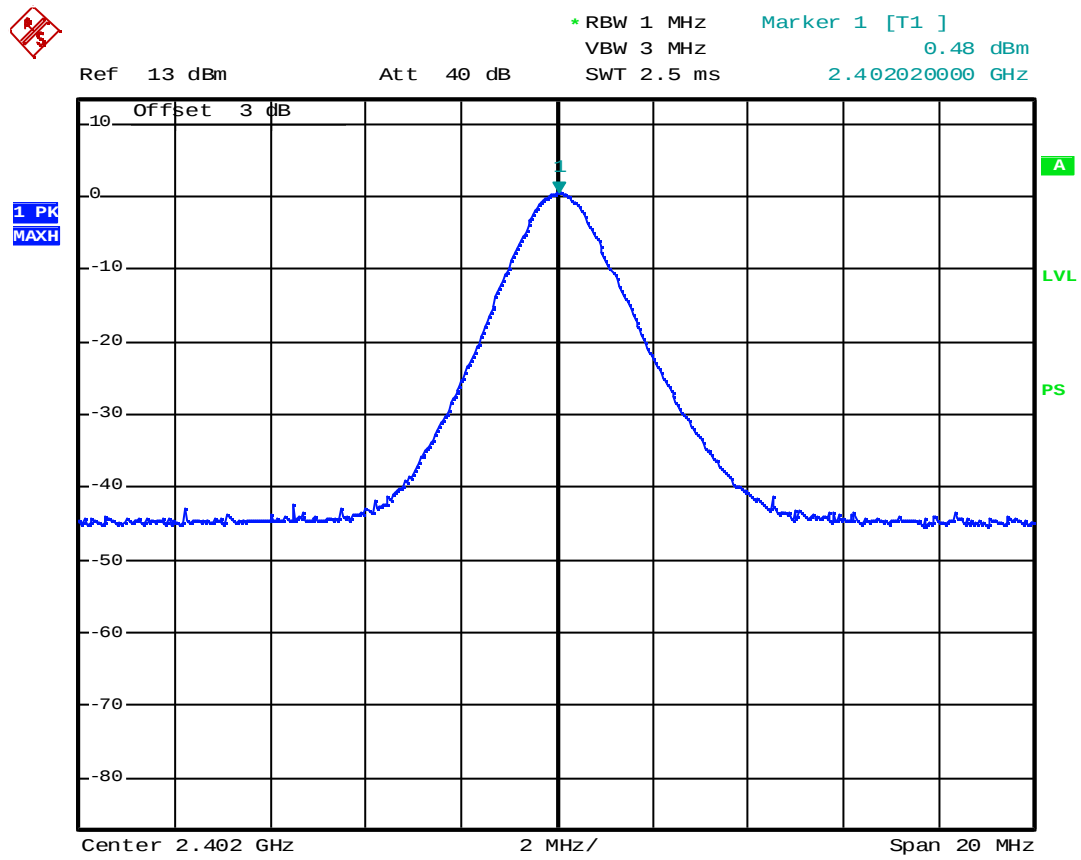
Test mode: Transmitting

Please refer to the following plots.

Channel	Channel Frequency (MHz)	Power Output		Limit (mW)
		(dBm)	(mW)	
Low Channel	2402	0.48	1.117	1000
Mid Channel	2441	1.08	1.282	1000
High Channel	2480	2.25	1.679	1000

Test Result: Pass

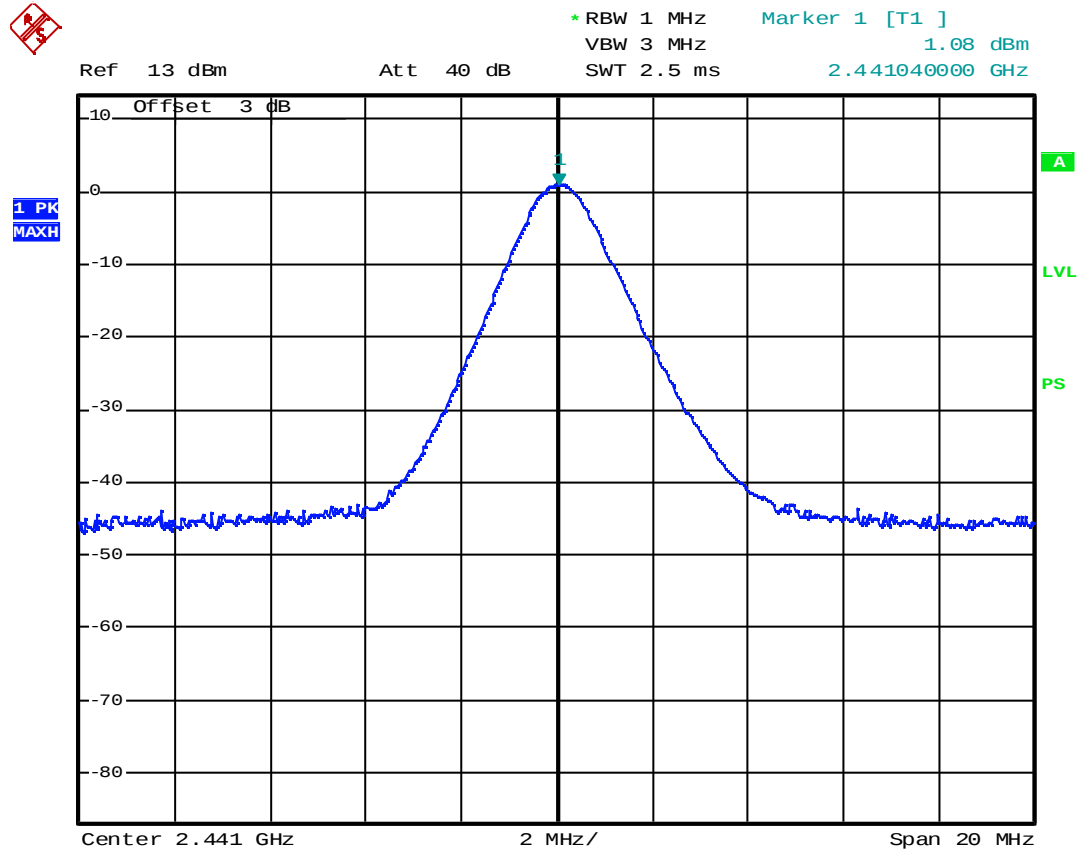
Low channel



M/N:SPB-2802 RF OUT OF Power Low channel

Date: 30.AUG.2006 15:42:54

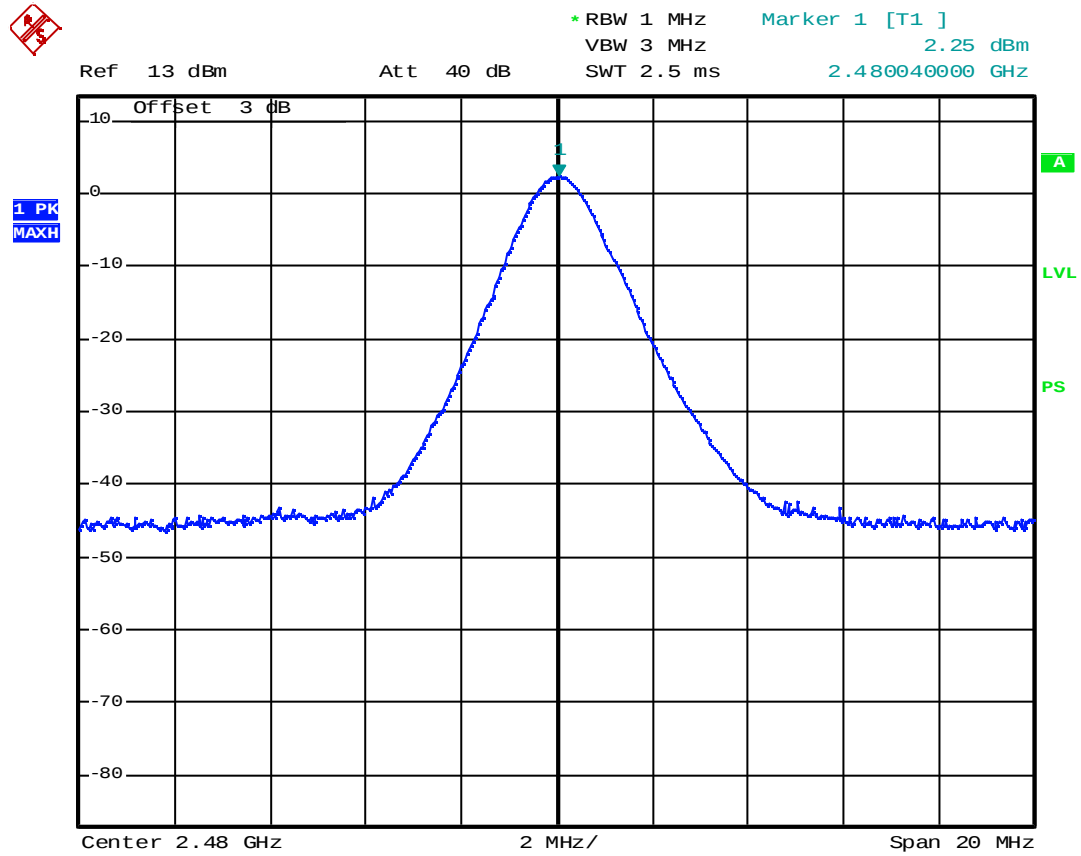
Middle channel



M/N:SPB-2802 RF OUT OF Power Middle channel

Date: 30.AUG.2006 15:50:04

High channel



M/N:SPB-2802 RF OUT OF Power High channel

Date: 30.AUG.2006 15:49:18

§15.247(d) - BAND EDGES TESTING

Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Spectrum Analyzer	8564E	3943A01781	2005-12-8	2006-12-8

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

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Data**Environmental Conditions**

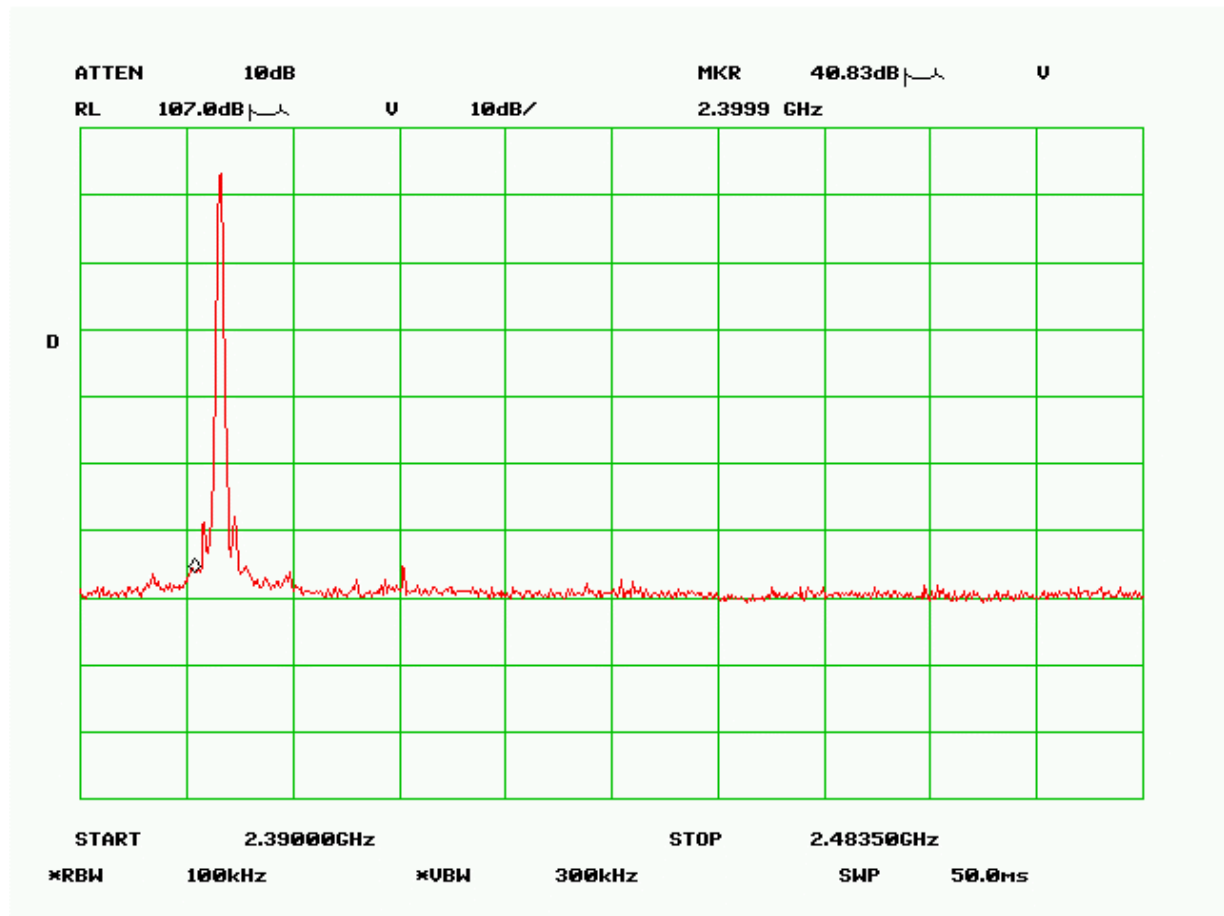
Temperature:	18 °C
Relative Humidity:	53 %
ATM Pressure:	1009mbar

The testing was performed by Deny Xiong on 2006-8-16.

Test Mode: Base (Transmitting)

Test Result: Pass (Please refer to the plots)

Low channel



High channel

