



NVLAP LAB CODE 200707-0



FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

SUNITEC ENTERPRISE CO., LTD

NO.2, Qilin Road 2, Run Tang Ind, Dan-Keng Village, Fu Ming Community, Guan-lan Town,
BaoAn District, ShenZhen, GuangDong, China.

FCC ID: RA8-BC331

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: Bluetooth Speakerphone
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Report No.: RSZ07120301	
Test Date: 2007-12-10 to 2007-12-18	
Report Date: 2007-12-18	
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Note: This test report is for the customer shown above and their specific product only. 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.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *SUNITEC ENTERPRISE CO., LTD*'s product, model number: *BC331(4PR910)* or the "EUT" as referred to in this report is a *Bluetooth Speakerphone*, which measures approximately 11.6 cm L x 4.7 cm W x 1.0 cm H, rated input voltage: DC 3.7V Battery.

The series products, model: BC331,BC351,BC371,4PR910,BCXXX, we select 4PR910 to test.

** All measurement and test data in this report was gathered from production sample serial number: 0711044 (Assigned by BACL, Shenzhen). The EUT was received on 2007-12-03.*

Objective

This Type approval report is prepared on behalf of *SUNITEC ENTERPRISE 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 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).



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).

EUT Exercise Software

N/A.

Special Accessories

N/A.

Equipment Modifications

No modifications were made to the EUT.

Host System Configuration List and Details

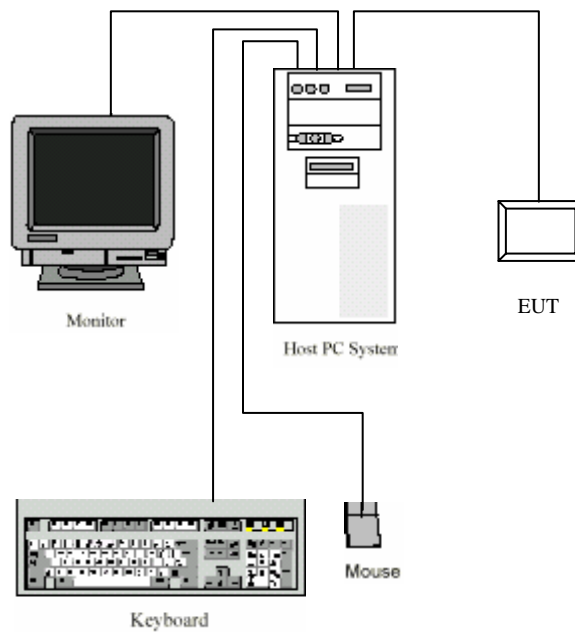
Manufacturer	Description	Model	Serial Number	FCC ID
DELL	PC	DELL 170L	CN-0TC670-70821-560-F4Q6	DoC
DELL	Keyboard	SK-8110	CN07N244-71616-56A-1B1E	DoC
DELL	Mouse	M071KC	520027907	DoC
DELL	LCD Monitor	1505FP	Y4287-7168-571-GBSH	DoC
ProMOS	Memory	V826632K24SATG-C0	0525-K1933700	DoC
Intel	CPU	Celeron D-2533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

Local Support Equipment List and Details

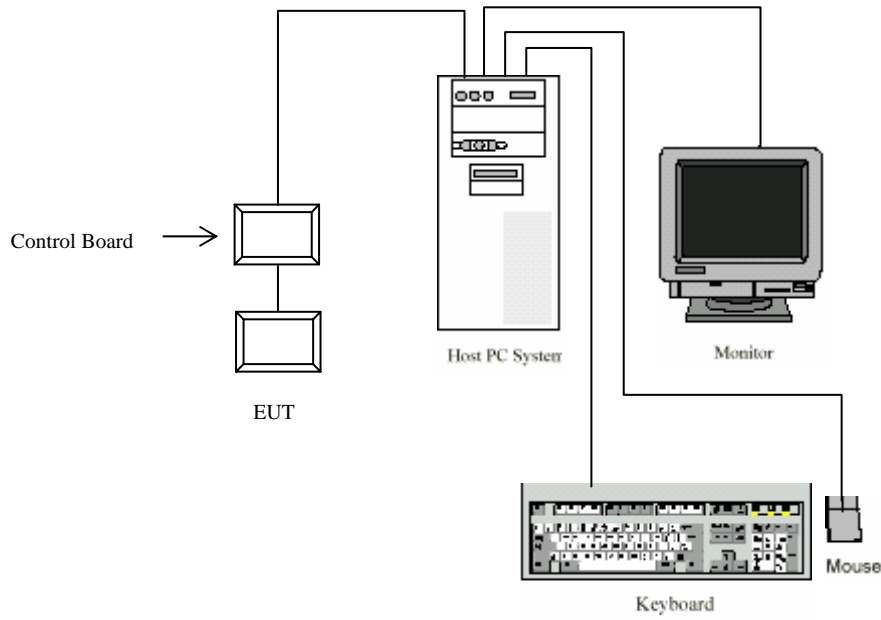
Manufacturer	Description	Model	Serial Number	FCC ID
DELL	Motherboard	OWC297	CN-OWC297-70821-564-00NI	DoC
DELL	Power	NPS-250KB D	CN-0H2678-17972-56E-80BM	DoC
Seagate	Hard Disk	ST340014A	5JXK3GXE	DoC
DELL	3.5' Floppy	N/A	CN-0N8893-69802-54Q-02P0	DoC
Lite-ON	CD-Rom	LTN-489S	N/A	DoC
Intel	Ethernet	PRO 10/100 VE	N/A	DoC
CS	Smart Card	ACOS2	N/A	DoC

External I/O Cable

Cable Description	Length (M)	From Port	To
Shielded Detachable K/B Cable	1.5	K/B Port /Host	K/B
Shielded Detachable Mouse Cable	1.5	Mouse Port /Host	Mouse
Shielded Detachable Cable	1.4	Adapter	EUT

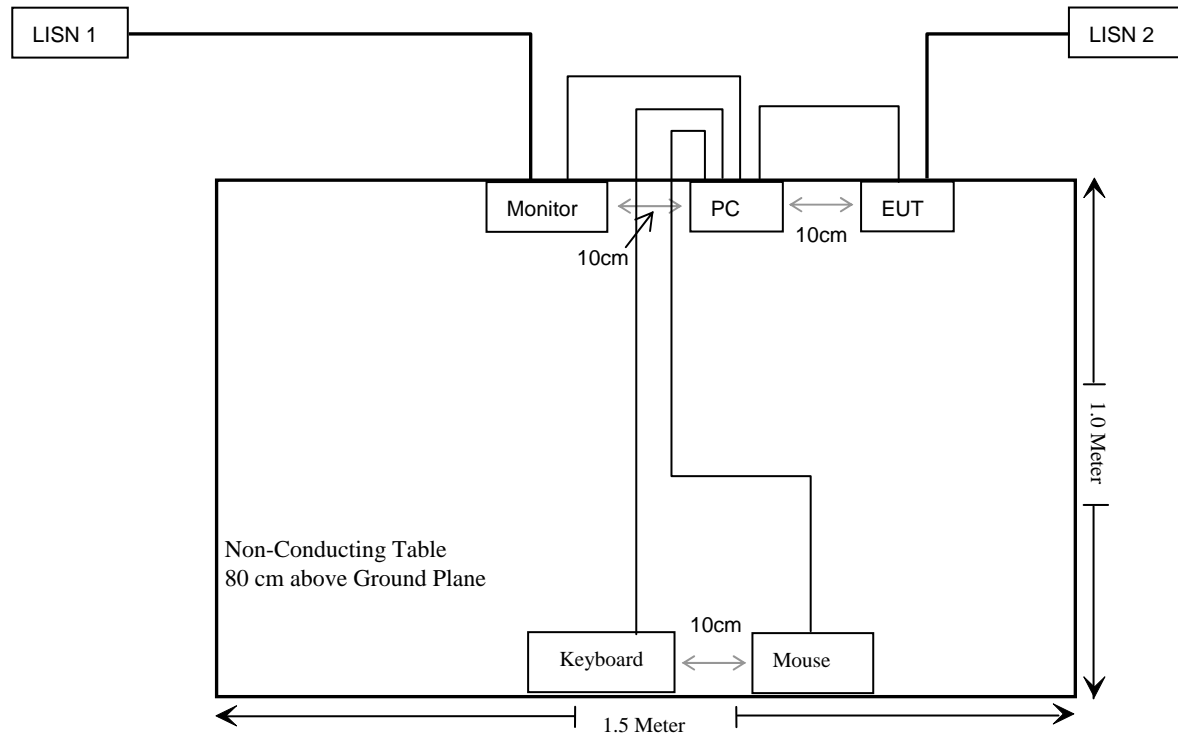
Configuration of Test Setup**Charging mode**

Transmitting mode

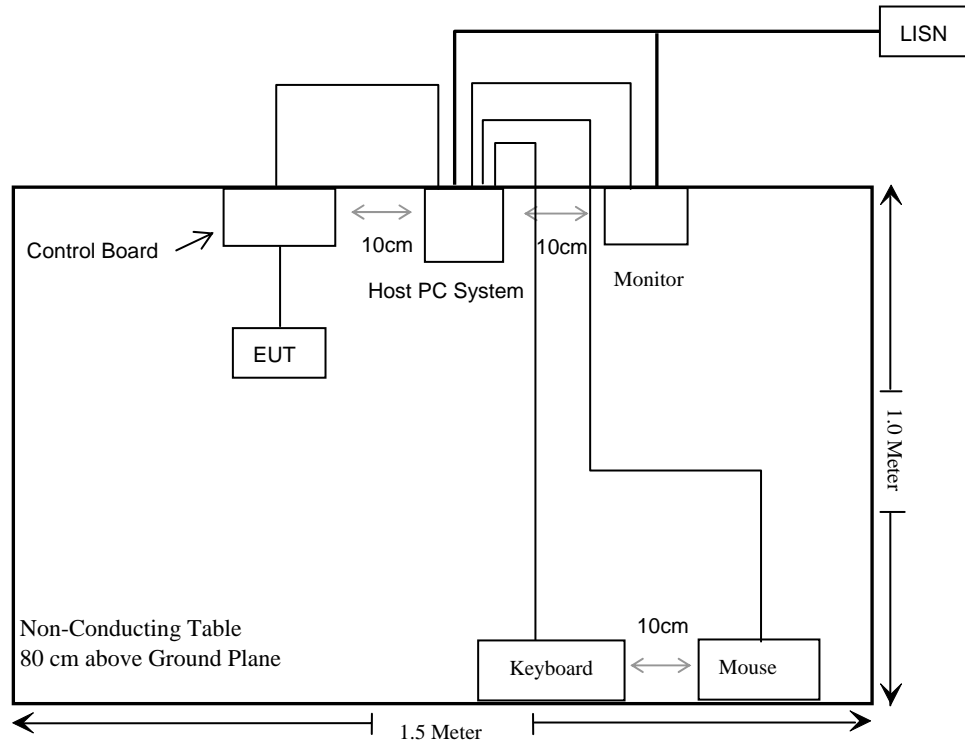


Block Diagram of Test Setup

Charging mode



Transmitting mode



SUMMARY OF TEST RESULTS

Fcc Rules	Description of Test	Result
§15.247 (i) & §2.1091	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.107	Conducted Emissions	Compliant
§15.109, §15.205, §15.209, §15.247(d)	Radiated Emission	Compliant
§15.247(a)(1)	Channel Separation Test	Compliant
§15.247(a)(1)	20dB Bandwidth Testing	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

§15.247 (i) and §2.1091 - 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.

Radio frequency radiation exposure was calculated based on § 1.1310 limits.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

Test Data

Predication of MPE limit at a given distance

$$S = PG/4\pi R^2$$

S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW) .

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally **numeric** gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Maximum peak output power at antenna input terminal: 1.57 (dBm)

Maximum peak output power at antenna input terminal: 1.435 (mW)

Prediction distance: >20 (cm)

Predication frequency: 2402 (MHz)

Antenna Gain (typical): 0 (dBi)

Antenna Gain (typical): 1 numeric

The worst case is power density at predication frequency at 20 cm : (mW/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

$$0.0002856 \text{ (mW/cm}^2\text{)} < 1 \text{ (mW/cm}^2\text{)}$$

Result: Pass

§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.

Antenna Connector Construction

The EUT has a Intergral antennawhich built on the board, the gain is less than 0dBi,in accordance to the above sections, is considered sufficient to comply with the provisions of these sections. Please see EUT photo for details.

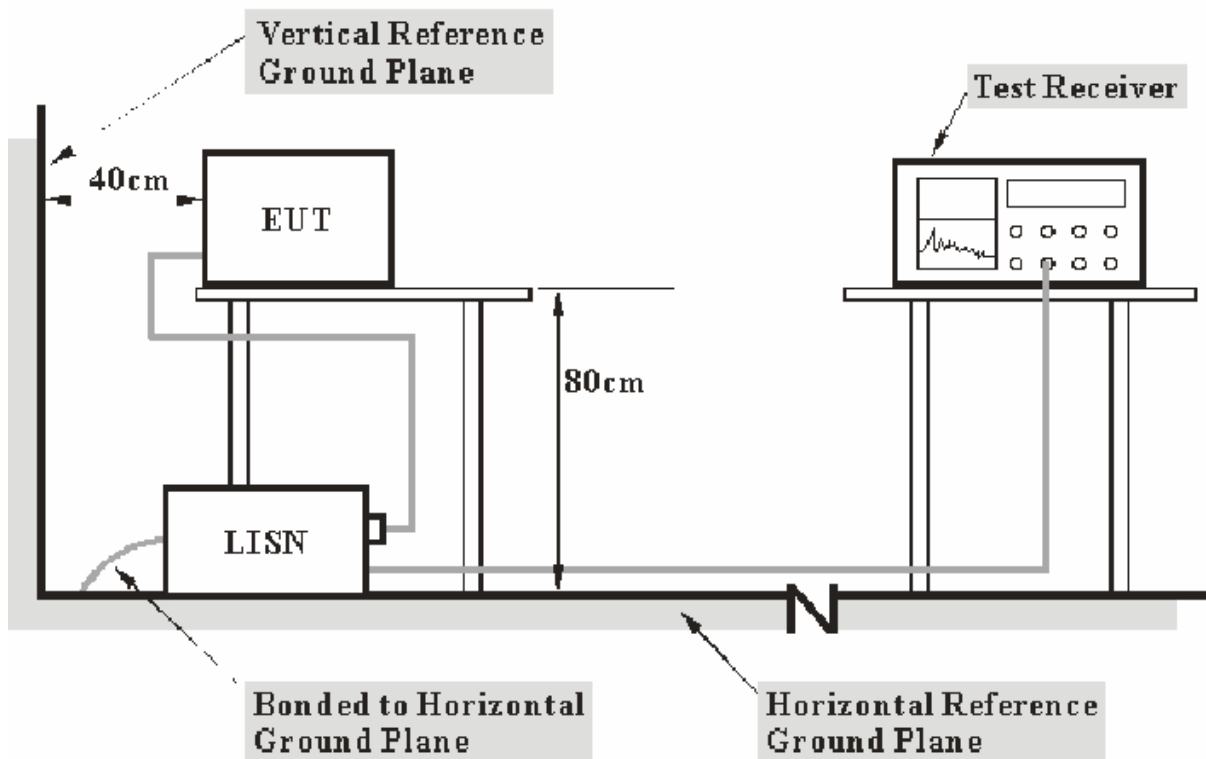
§15.107 (a) - CONDUCTED EMISSIONS

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 ± 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 spacing between the peripherals was 10 cm.

The host PC 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	ESCI	100035	2007-09-29	2008-09-29
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2007-03-26	2008-03-26

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

* **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

During the conducted emission test, the host PC was connected to the outlet of the first LISN, and all other support equipment were connected to the outlet of the second 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 15.207, with the worst margin reading of:

11.60 dB at 20.410 MHz in the Hot conductor mode

Test Data**Environmental Conditions**

Temperature:	25 ° C
Relative Humidity:	56%
ATM Pressure:	100.1 kPa

The testing was performed by Andy Yan on 2007-12-18.

Test Mode: Charging

Line Conducted Emissions				FCC PART 15 Class B	
Frequency (MHz)	Amplitude (dB μ V)	Detector QP/AV	Hot/Neutral	Limit (dB μ V)	Margin (dB)
20.410	48.40	QP	Hot	60.00	11.60
21.025	48.00	QP	Neutral	60.00	12.00
3.595	42.80	QP	Neutral	56.00	13.20
23.075	45.80	QP	Hot	60.00	14.20
21.505	35.20	AV	Neutral	50.00	14.80
1.025	30.20	AV	Hot	46.00	15.80
3.565	39.30	QP	Hot	56.00	16.70
0.180	36.80	AV	Hot	54.49	17.69
3.645	26.60	AV	Neutral	46.00	19.40
15.380	40.40	QP	Neutral	60.00	19.60
0.300	30.00	AV	Hot	50.24	20.24
20.445	29.50	AV	Hot	50.00	20.50
0.180	33.30	AV	Neutral	54.49	21.19
1.025	34.70	QP	Hot	56.00	21.30
1.250	22.90	AV	Neutral	46.00	23.10
0.180	39.00	QP	Hot	64.49	25.49
1.250	29.80	QP	Neutral	56.00	26.20
3.620	19.60	AV	Hot	46.00	26.40
0.300	32.70	QP	Hot	60.24	27.54
0.295	22.80	AV	Neutral	50.38	27.58
0.180	36.60	QP	Neutral	64.49	27.89
0.295	29.40	QP	Neutral	60.38	30.98
15.555	18.80	AV	Neutral	50.00	31.20
23.130	16.80	AV	Hot	50.00	33.20

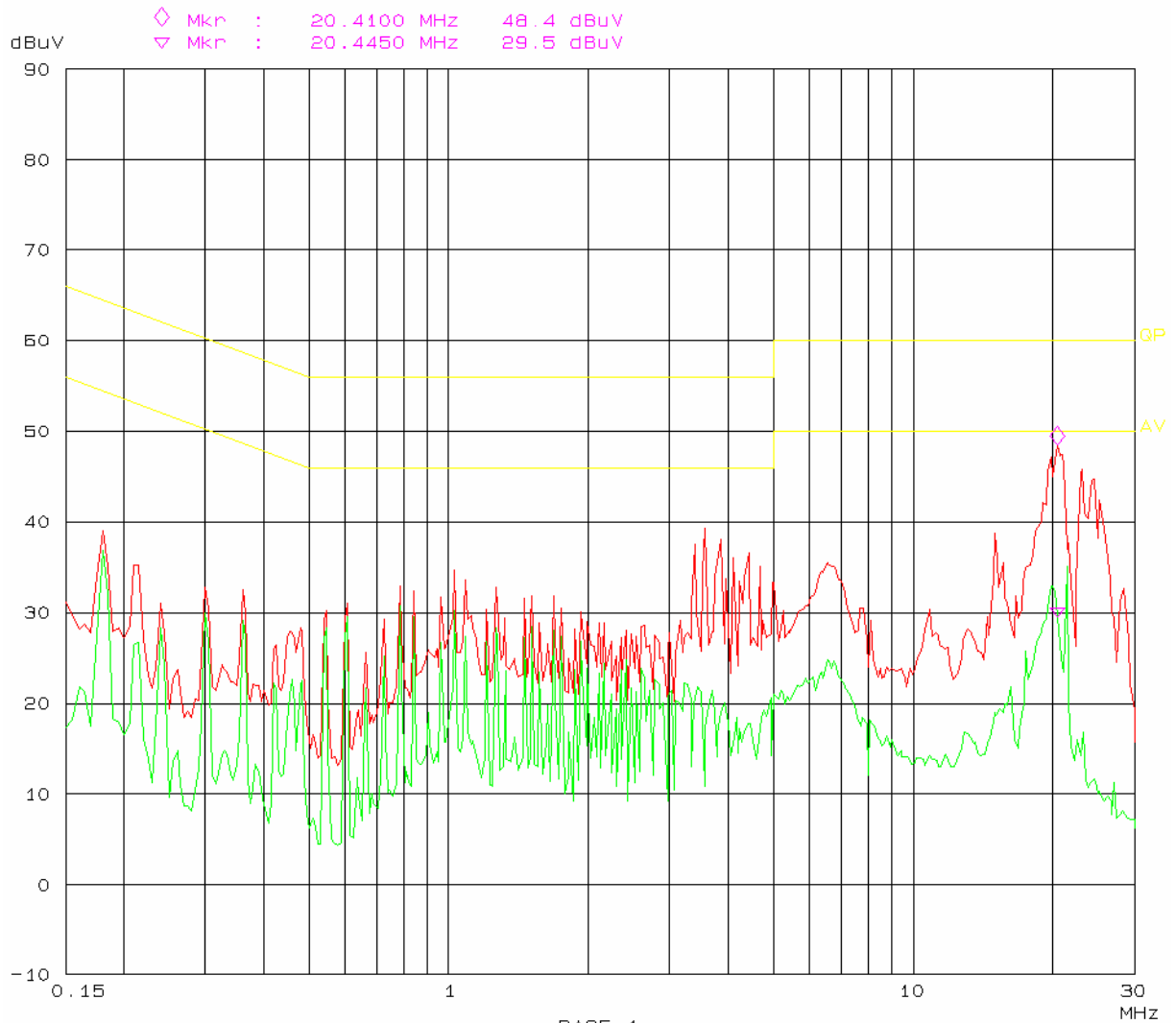
Plot(s) of Test Data

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

Conducted emission test
FCC part15 B

18. Dec 07 09:58

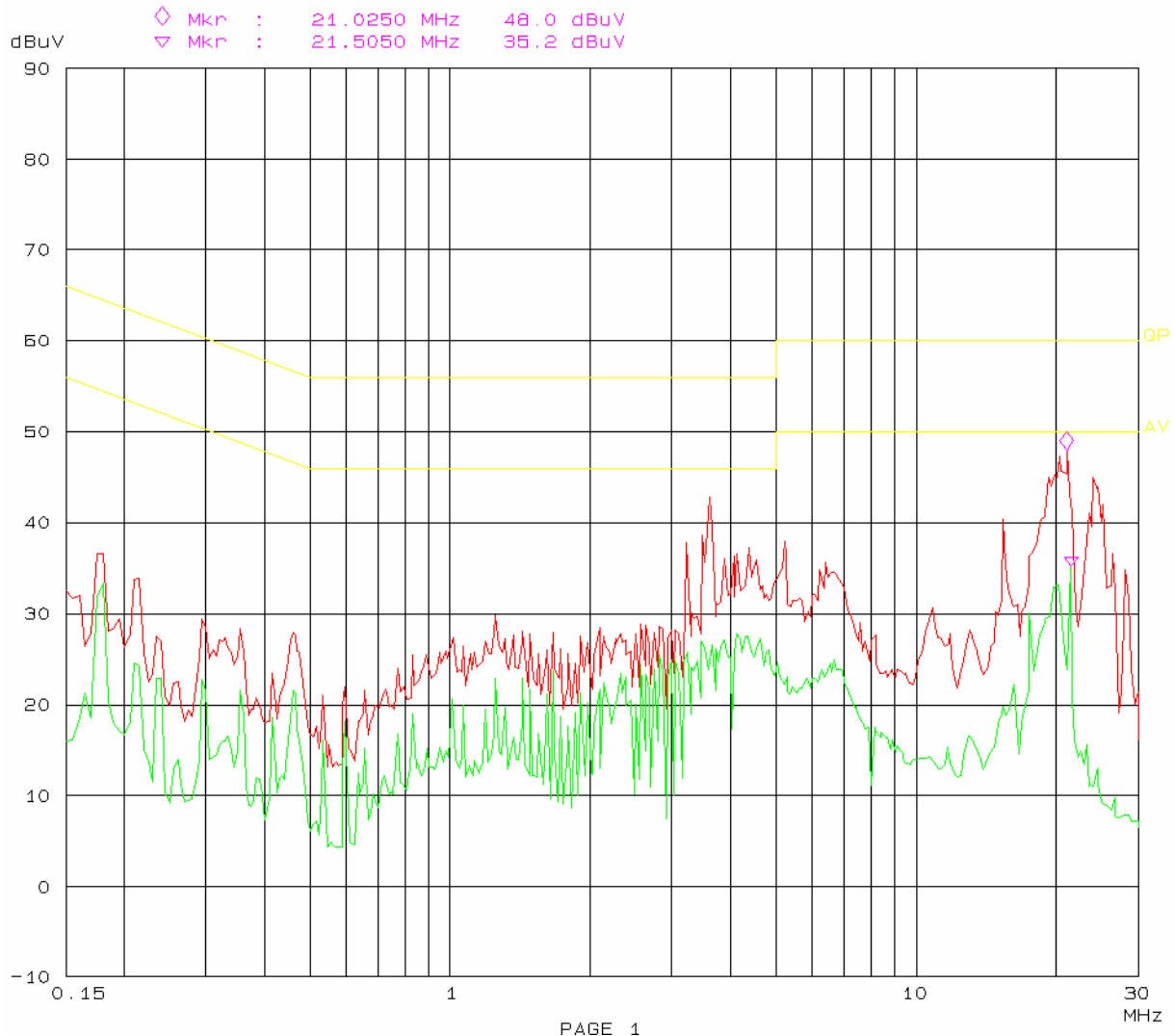
EUT: Bluetooth speakerphone
Manuf: SUNITEC M/N: BC331 (4PR910)
Op Cond: Charging H
Operator: Andy
Test Spec: AC 120V/60Hz L
Comment: Temp: 25 Humi 56%



Conducted emission test
FCC part15 B

18. Dec 07 09:39

EUT: Bluetooth speakerphone
Manuf: SUNITEC M/N: BC331 (4PR910)
Op Cond: Charging
Operator: Andy
Test Spec: AC 120V/60Hz N
Comment: Temp: 25 Humi 56%



§15.109, §15.205, §15.209, §15.247 - RADIATED EMISSIONS

Applicable Standard

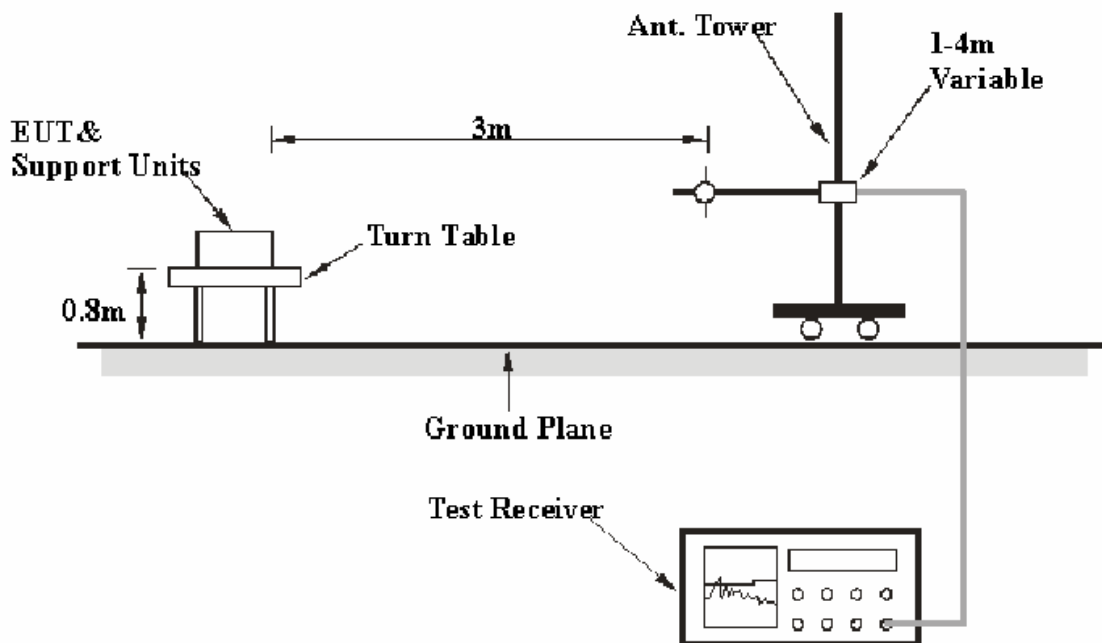
According to FCC §15.247 (d)

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 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 C63.4-2003. The specification used was the FCC 15.109, 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 host PC 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
HP	Amplifier	HP8447D	2944A09795	2007-11-15	2008-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-09-29	2008-09-29
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2007-08-14	2008-08-14
HP	Amplifier	8449B	3008A00277	2007-09-29	2008-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2007-09-25	2008-09-25
Agilent	Spectrum Analyzer	8564E	3943A01781	2007-11-22	2008-11-22

* **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 host PC was connected to the outlet of the first LISN, and all other support equipment power cords were connected to the outlet of the second LISN.

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

All data was recorded in the 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 Meter Reading. The basic equation is as follows:

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

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 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 Title 47, Part 15, Subpart C, section 15.109, 15.205, 15.209, and 15.247, with the worst margin reading of:

Charging mode: 4.6 dB at 63.191875 MHz in the Vertical polarization
Transmitting mode: 12.26 dB at 4804 MHz in the Horizontal polarization, for above 1 GHz (Low Channel)
Transmitting mode: 10.51 dB at 4882 MHz in the Vertical polarization, for above 1 GHz (Middle Channel)
Transmitting mode: 10.58 dB at 4960 MHz in the Vertical polarization, for above 1 GHz (High Channel)
Transmitting mode: 11.3 dB at 233.15 MHz in the Vertical polarization, up to 1 GHz

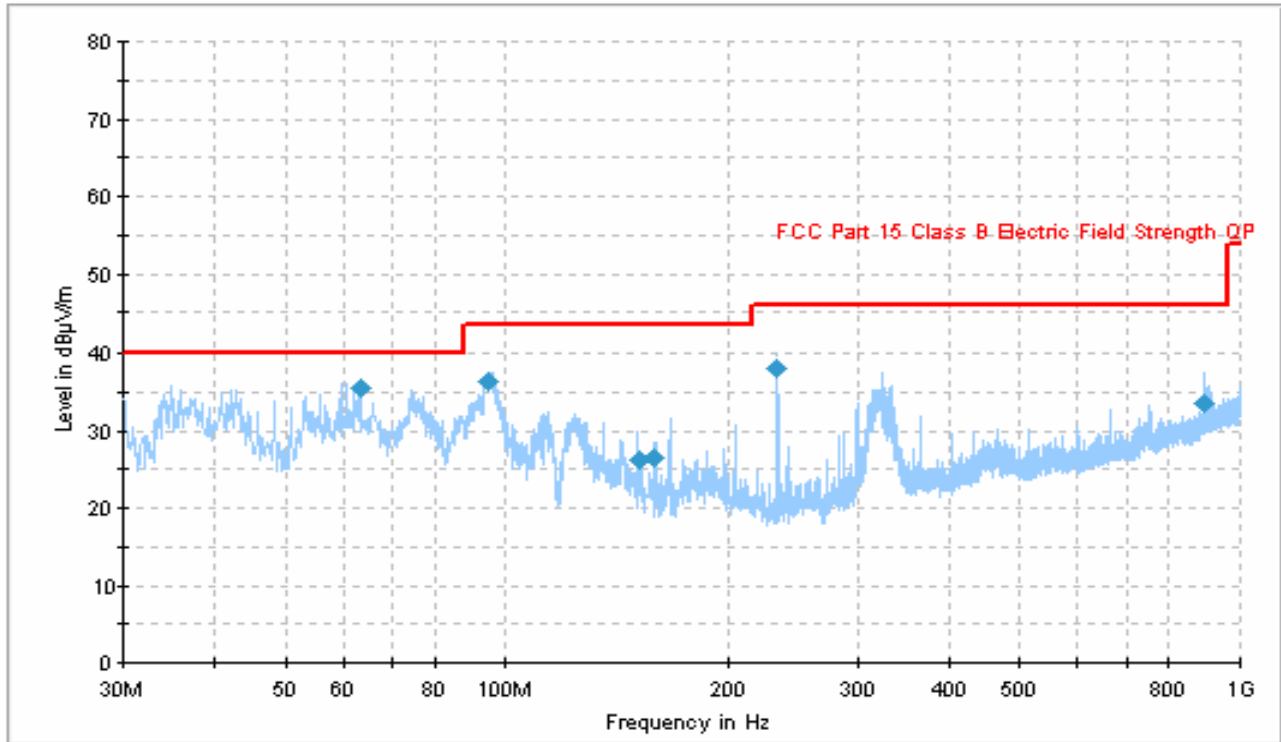
Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	52%
ATM Pressure:	100.9 kPa

The testing was performed by Andy Yan on 2007-11-19.

Test Mode: Charging



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
63.191875	35.4	143.0	V	280.0	-18.6	40.0	4.6
94.838875	36.3	103.0	V	97.0	-18.6	43.5	7.2
233.136188	38.3	103.0	V	100.0	-13.5	46.0	7.7
893.200062	33.4	103.0	V	207.0	-0.4	46.0	12.6
158.763875	26.5	301.0	H	0.0	-13.5	43.5	17.0
151.233625	26.2	288.0	H	0.0	-13.4	43.5	17.3

Test Mode: Transmitting**(Above 1G)**

Freq. (MHz)	Meter Reading (dBuV)	Detector PK/QP/AV	Direction Degree	Ant. Height (m)	Ant. Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Corrected Amp. (dBuV/m)	FCC Part 15.247/15.209		
										Limit (dBuV/m)	Margin (dB)	Remarks
Low Channel												
2402	95.19	PK	90	1.0	H	30.1	3.61	34.0	94.9			Fund.
2402	54.45	AV	45	1.0	H	30.1	3.61	34.0	54.16			Fund.
2402	96.53	PK	90	1.0	V	30.2	3.61	34.0	96.34			Fund.
2402	55.30	AV	45	1.0	V	30.2	3.61	34.0	55.11			Fund.
4804	34.50	AV	90	1.0	H	36.0	4.64	33.4	41.74	54	12.26	Harmonic
4804	35.67	AV	90	1.0	V	34.7	4.64	33.4	41.61	54	12.39	Harmonic
4804	51.78	PK	180	1.2	V	34.7	4.64	33.4	57.72	74	16.28	Harmonic
4804	46.81	PK	180	1.2	H	36.0	4.64	33.4	54.05	74	19.95	Harmonic
1601	38.35	AV	180	1.2	V	27.1	2.77	36.0	32.22	54	21.78	Spurious
1281	35.43	AV	180	1.2	H	26.0	2.60	36.0	28.03	54	25.97	Spurious
1281	52.55	PK	45	1.2	H	26.0	2.60	36.0	45.15	74	28.85	Spurious
1601	48.64	PK	45	1.2	V	27.1	2.77	36.0	42.51	74	31.49	Spurious
Middle Channel												
2441	94.05	PK	60	1.4	H	30.2	3.61	34.0	93.86			Fund.
2441	53.08	AV	152	1.3	H	30.2	3.61	34.0	52.89			Fund.
2441	95.52	PK	128	1.5	V	30.6	3.61	34.0	95.73			Fund.
2441	55.45	AV	156	1.2	V	30.6	3.61	34.0	55.66			Fund.
4882	37.25	AV	243	1.4	V	35.0	4.64	33.4	43.49	54	10.51	Harmonic
4882	33.59	AV	142	1.6	H	36.0	4.64	33.4	40.83	54	13.17	Harmonic
4882	53.40	PK	153	1.5	V	35.0	4.64	33.4	59.64	74	14.36	Harmonic
4882	48.10	PK	234	1.8	H	36.0	4.64	33.4	55.34	74	18.66	Harmonic
1627	37.84	AV	85	1.5	V	27.2	2.77	35.0	32.81	54	21.19	Spurious
1627	36.20	AV	135	1.3	H	27.2	2.77	35.0	31.17	54	22.83	Spurious
1627	50.91	PK	265	1.4	V	27.2	2.77	35.0	45.88	74	28.12	Spurious
1627	48.86	PK	156	1.4	H	27.2	2.77	35.0	43.83	74	30.17	Spurious
High Channel												
2480	94.12	PK	89	1.5	H	30.6	3.61	34	94.33			Fund.
2480	55.47	AV	65	1.5	H	30.6	3.61	34	55.68			Fund.
2480	94.34	PK	65	1.4	V	30.6	3.61	34	94.55			Fund.
2480	55.92	AV	65	1.6	V	30.6	3.61	34	56.13			Fund.
4960	33.44	AV	256	1.8	H	36.6	4.55	33.4	41.19	54	12.81	Harmonic
1654	36.23	AV	156	1.2	H	27.8	2.77	35.0	31.8	54	22.2	Spurious
4960	36.87	AV	142	1.5	V	35.4	4.55	33.4	43.42	54	10.58	Harmonic
1654	35.46	AV	324	1.2	V	27.6	2.77	35.0	30.83	54	23.17	Spurious
4960	46.98	PK	145	1.4	H	36.6	4.55	33.4	54.73	74	19.27	Harmonic
1654	49.12	PK	128	1.5	H	27.8	2.77	35.0	44.69	74	29.31	Spurious
4960	52.14	PK	142	1.4	V	35.4	4.55	33.4	58.69	74	15.31	Harmonic
1654	50.54	PK	324	1.3	V	27.6	2.77	35.0	45.91	74	28.09	Spurious

Test Mode: Transmitting

Freq. (MHz)	Meter Reading (dBuV)	Detector PK/QP/AV	Direction Degree	Ant. Height (m)	Ant. Polar H / V	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Corrected Amp. (dBuV/m)	FCC Part 15.247/15.209		
										Limit (dBuV/m)	Margin (dB)	Remarks
Frequency (up to 1G)												
233.15	34.7	QP	66.0	244.0	V		-12.0		11.3	46.0	11.3	Spurious
464.75	32.3	QP	0.0	222.0	V		-6.3		13.7	46.0	13.7	Spurious
47.98	25.5	QP	101.0	401.0	H		-16.9		14.5	40.0	14.5	Spurious
298.69	30.6	QP	124.0	208.0	V		-9.4		15.4	46.0	15.4	Spurious
531.35	29.4	QP	353.0	187.0	V		-5.6		16.7	46.0	16.7	Spurious
32.66	22.3	QP	93.0	235.0	H		-6.6		17.7	40.0	17.7	Spurious

Spurious Emission in Restricted Band: (RBW=1MHz, VBW=3MHz)

Freq. (MHz)	Reading (dBuV/m)	Detector PK/QP/AV	Direction Degree	Ant. Height (m)	Ant. Polar H / V	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Corrected Amp. (dBuV/m)	FCC 15.209	
										Limit (dBuV/m)	Margin (dB)
Out of left side band (2310 MHz-2390 MHz)											
2380.00	48.75	PK	180	1.2	H	30.6	3.61	35	47.96	74	26.04
2367.21	47.23	PK	45	1.2	H	30.6	3.61	35	46.44	74	27.56
2334.35	46.58	PK	90	1.1	H	30.6	3.61	35	45.79	74	28.21
2377.28	49.17	PK	180	1.2	V	30.6	3.61	35	48.38	74	25.62
Out of right side band (2483.5 MHz-2500 MHz)											
2483.65	47.98	PK	234	1.8	V	30.6	3.61	35	47.19	74	26.81
2489.32	47.12	PK	156	1.4	V	30.6	3.61	35	46.33	74	27.67
2494.61	48.21	PK	153	1.5	H	30.6	3.61	35	47.42	74	26.58
2490.52	47.25	PK	243	1.4	H	30.6	3.61	35	46.46	74	27.54

Note: Above PEAK measured spurious emission values are complied with the average limit (54 dBuV/m), thus average measurement has been omitted.

§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 20 dB 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 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-09-29	2008-09-29

* **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

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.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

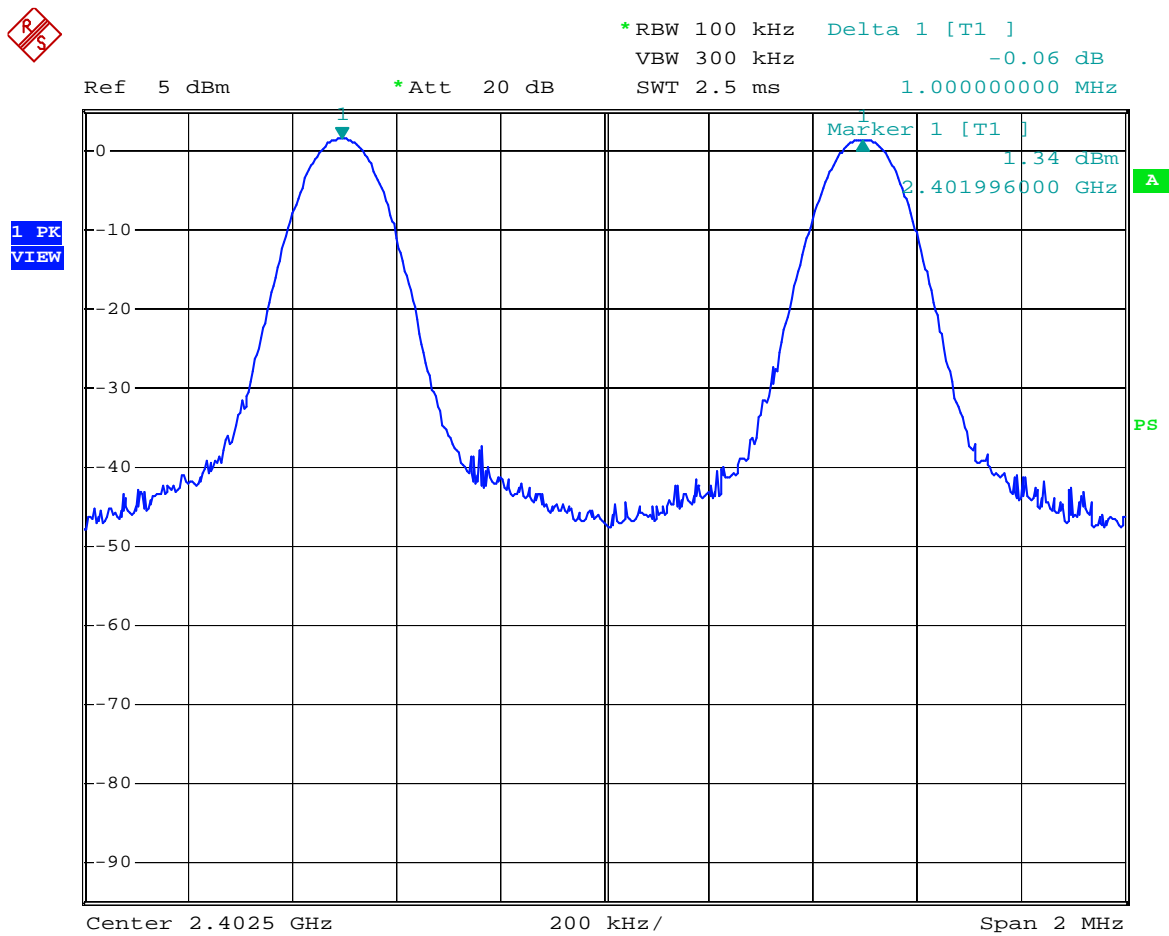
The testing was performed by Andy Yan on 2007-12-10.

Test Result: Pass.

Please refer to following table and plots.

Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (kHz)
Low Channel	2402	1000	186.7
Adjacent Channel	2403		
Middle Channel	2441	1004	186.7
Adjacent Channel	2442		
High Channel	2480	1004	181.3
Adjacent Channel	2479		

Low Channel



channel separation low channel

Date: 10.DEC.2007 05:42:35

Middle Channel

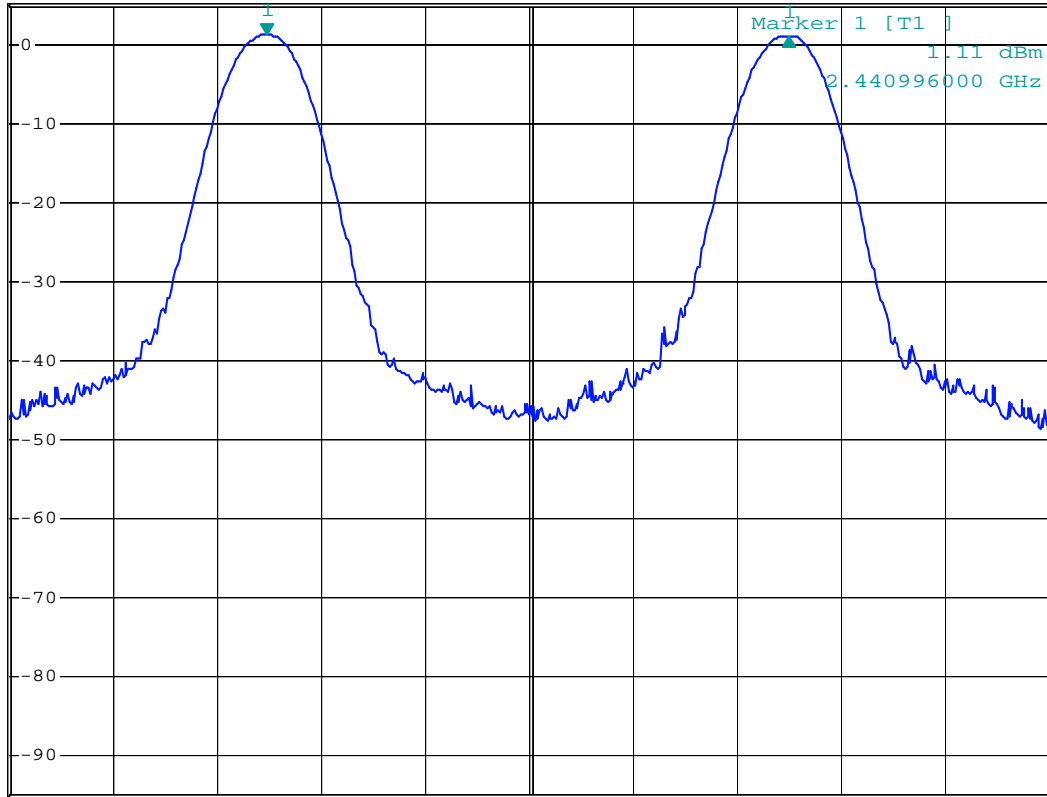


*RBW 100 kHz Delta 1 [T1]
VBW 300 kHz -0.08 dB
SWT 2.5 ms 1.00400000 MHz

Ref 5 dBm

*Att 20 dB

1 PK
VIEW



A

PS

Center 2.4415 GHz

200 kHz/

Span 2 MHz

channel separation middle channel

Date: 10.DEC.2007 05:41:14

High Channel

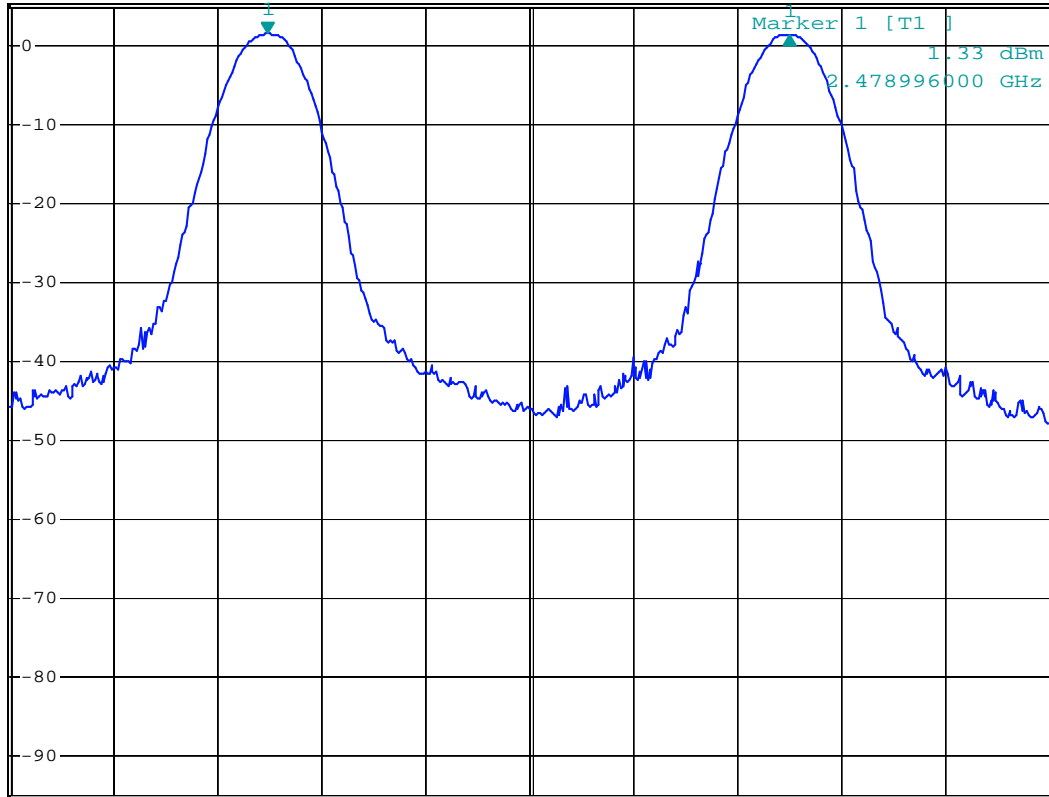


*RBW 100 kHz Delta 1 [T1]
VBW 300 kHz -0.08 dB
SWT 2.5 ms 1.004000000 MHz

Ref 5 dBm

*Att 20 dB

1 PK
VIEW



Center 2.4795 GHz

200 kHz/

Span 2 MHz

channel separation high channel

Date: 10.DEC.2007 05:40:15

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

Applicable Standard

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 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125mW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-09-29	2008-09-29

* **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

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:	100.9 kPa

The testing was performed by Andy Yan on 2007-12-10.

Test Mode: Transmitting

Channel	Channel Frequency (MHz)	20dB Bandwidth (kHz)
Low Channel	2402	280
Mid Channel	2441	280
High Channel	2480	272

Test Result: Please refer to following plots

Low Channel

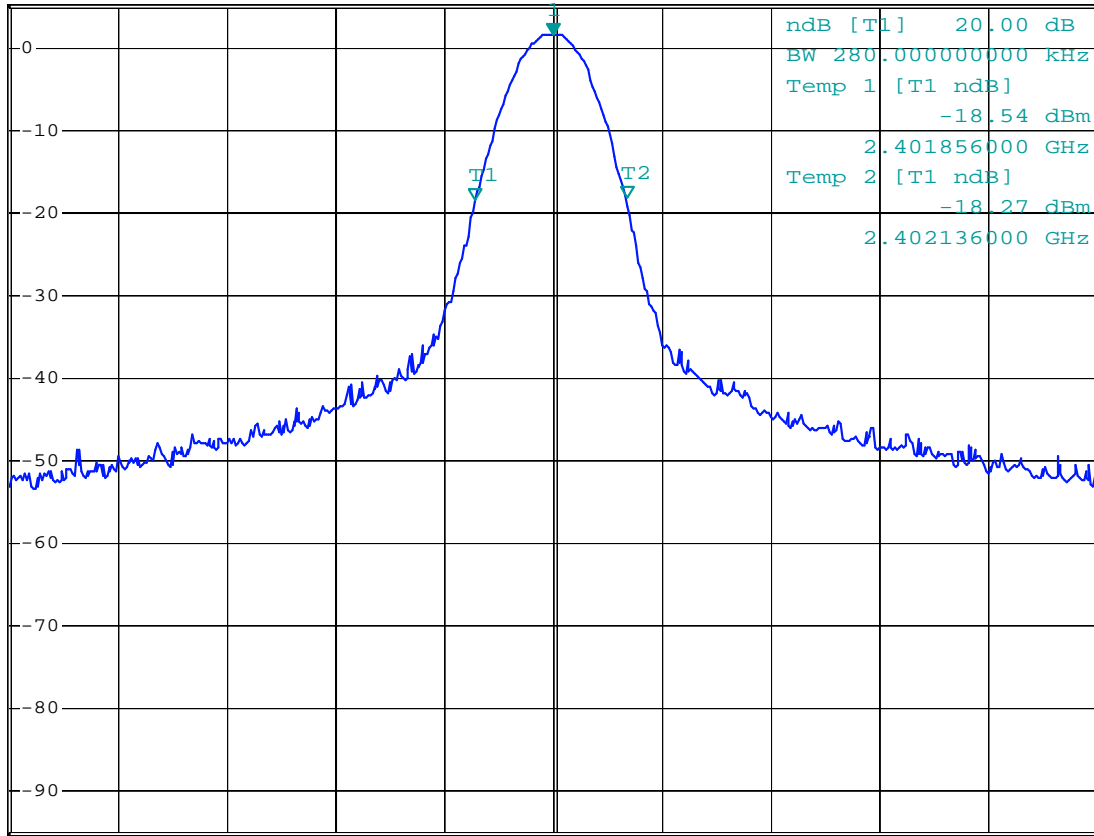


*RBW 100 kHz Marker 1 [T1]
VBW 300 kHz 1.47 dBm
SWT 2.5 ms 2.40200000 GHz

Ref 5 dBm

*Att 20 dB

1 PK
VIEW



A

PS

Center 2.402 GHz

200 kHz/

Span 2 MHz

20 dB Bandwidth low channel

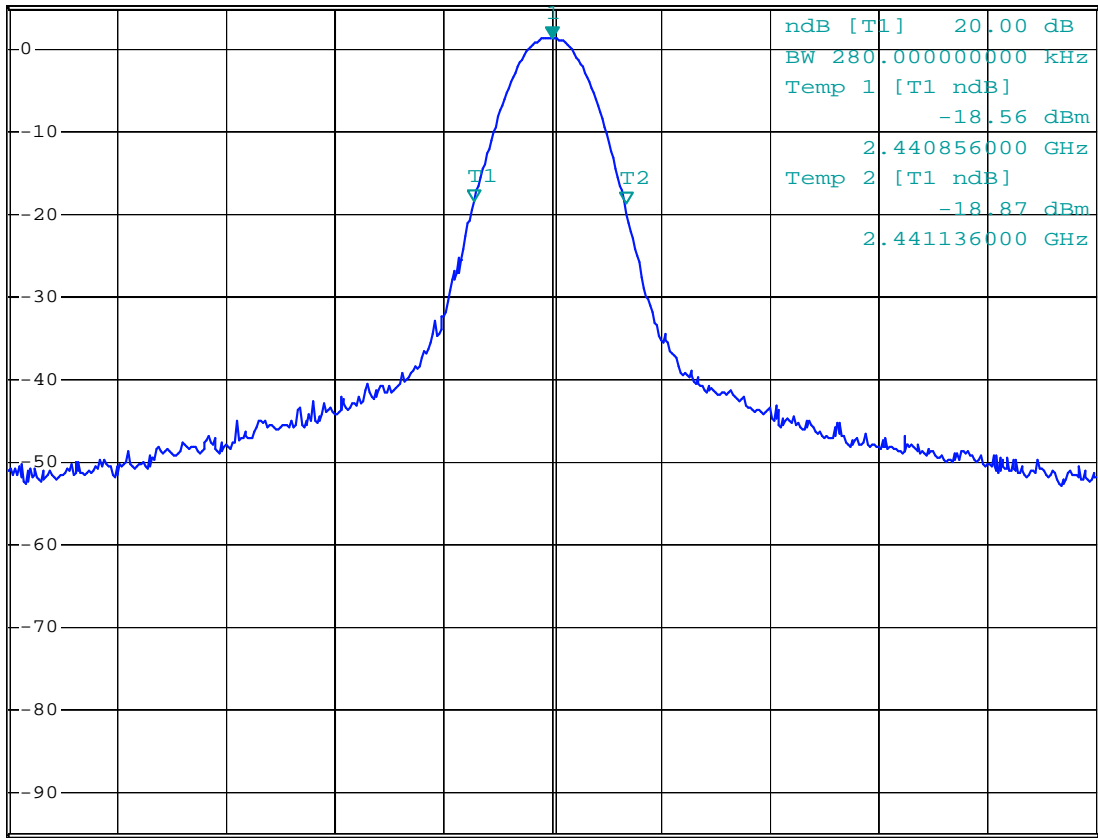
Date: 10.DEC.2007 05:20:48

Middle Channel



*RBW 100 kHz Marker 1 [T1]
 VBW 300 kHz 1.18 dBm
 Ref 5 dBm *Att 20 dB SWT 2.5 ms 2.441000000 GHz

1 PK
 MAXH



A

PS

Center 2.441 GHz 200 kHz/ Span 2 MHz

20 dB Bandwidth middle channel

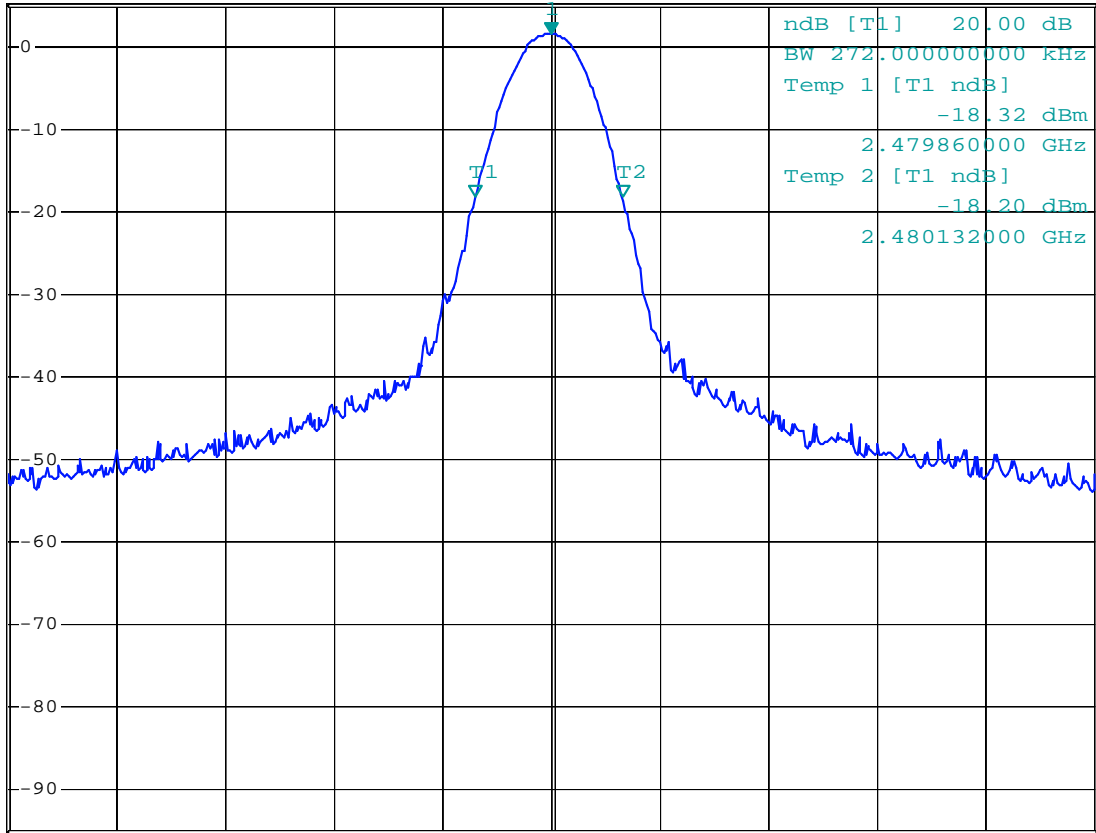
Date: 10.DEC.2007 05:22:11

High Channel



*RBW 100 kHz Marker 1 [T1]
 VBW 300 kHz 1.40 dBm
 Ref 5 dBm *Att 20 dB SWT 2.5 ms 2.480000000 GHz

1 PK
 VIEW



Center 2.48 GHz 200 kHz / Span 2 MHz

20 dB Bandwidth high channel

Date: 10.DEC.2007 05:22:57

§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	2007-09-29	2008-09-29

* **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

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.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Andy Yan on 2007-12-10.

Test mode: Transmitting

Test Result: Pass

Please refer to following plot.

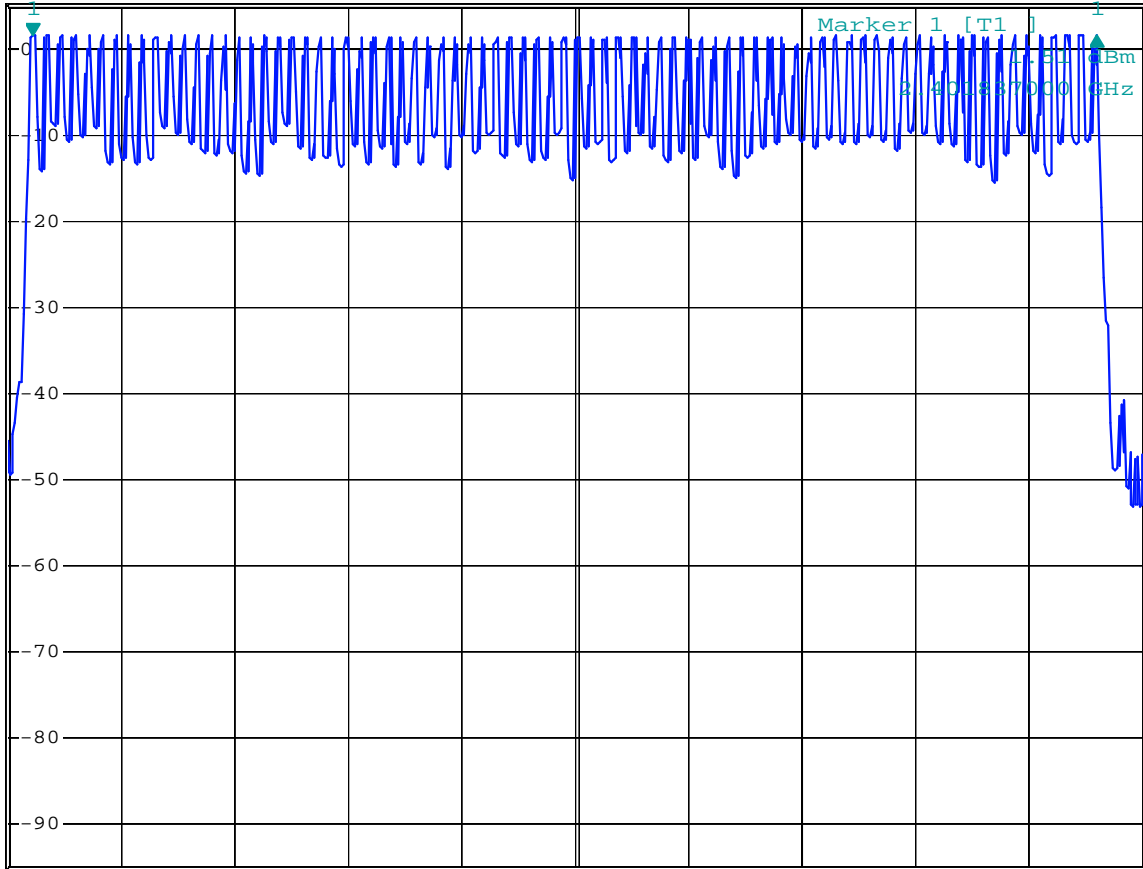


*RBW 100 kHz Delta 1 [T1]
VBW 300 kHz -0.10 dB
SWT 10 ms 78.32300000 MHz

Ref 5 dBm

*Att 20 dB

1 PK
MAXH



Start 2.4 GHz

8.35 MHz/

Stop 2.4835 GHz

number of hopping channels

Date: 10.DEC.2007 05:31:04

§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	2007-09-29	2008-09-29

* **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

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 get from single sweep. In addition, the time of single pulses was tested.

Dwell Time= time slot length * hope rate/ number of hopping channels * 31.6s
Hop rate=1600/s

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Andy Yan on 2007-12-10.

Test mode: Transmitting

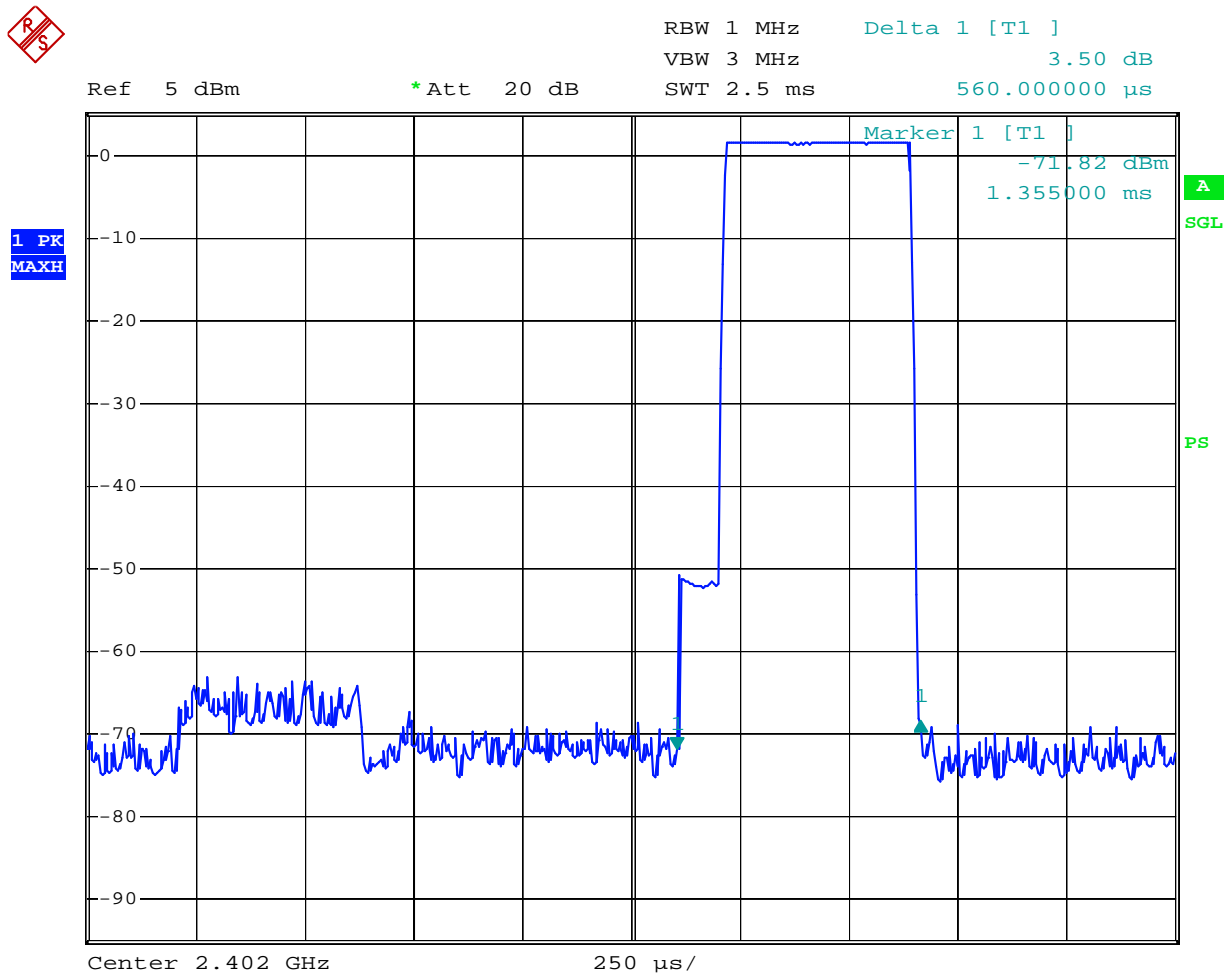
Test Result: Pass.

Please refer to following table and plots.

Channel	Pulse width (msec)	Dwell time (sec)	Limit (sec)	Result
Low Channel	0.560	0.1792	0.4	Pass
Mid Channel	0.560	0.1792	0.4	Pass
High Channel	0.560	0.1792	0.4	Pass

NOTE: Dwell time= Pulse time*(1600/2/79)*31.6S

Low Channel



dwell time low channel

Date: 10.DEC.2007 05:33:08

Middle Channel

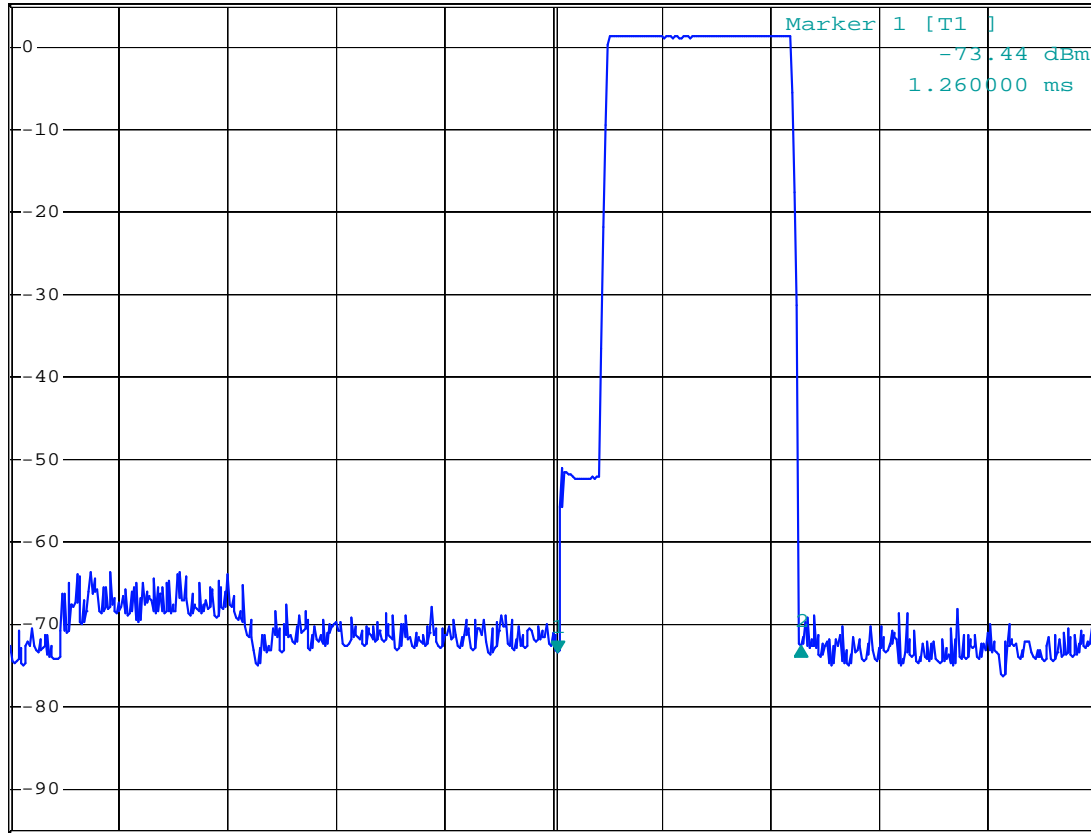


RBW 1 MHz Delta 2 [T1]
VBW 3 MHz 0.76 dB
SWT 2.5 ms 560.00000 μ s

Ref 5 dBm

*Att 20 dB

1 PK
MAXH



Center 2.441 GHz 250 μ s/

dwll time middle channel

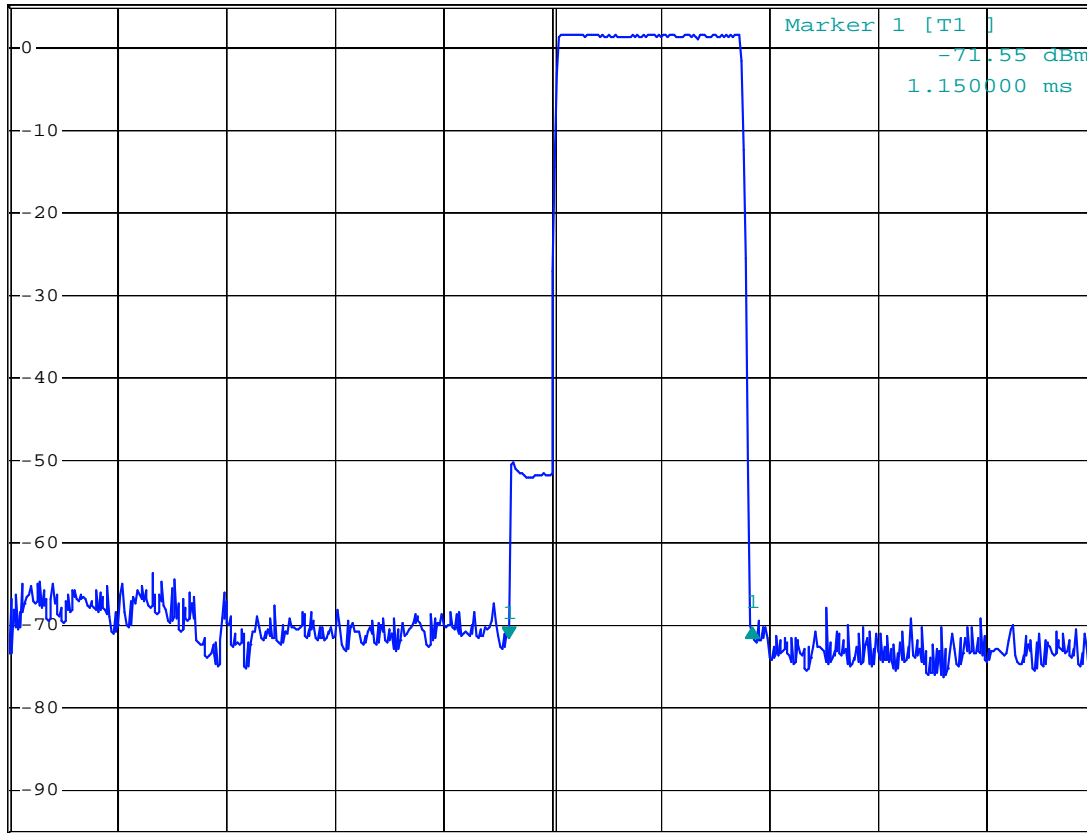
Date: 10.DEC.2007 05:35:19

High Channel



Ref 5 dBm *Att 20 dB RBW 1 MHz Delta 1 [T1] VBW 3 MHz 1.35 dB SWT 2.5 ms 560.000000 μ s

1 PK
MAXH



Center 2.48 GHz 250 μ s/

dwll time high channel

Date: 10.DEC.2007 05:37:40

§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.

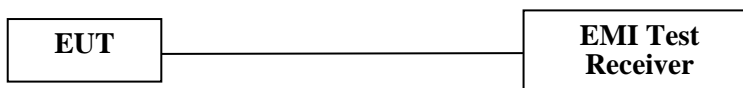
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-09-29	2008-09-29

* **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

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 an EMI Test Receiver.
3. Add a correction factor to the display.



Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56%
ATM Pressure:	100.0 kPa

The testing was performed by Andy Yan on 2007-12-10.

Test Result: Pass

Please refer to the following table and plots.

Channel	Channel Frequency (MHz)	Power Output		Limit (w)
		(dBm)	(mw)	
Low Channel	2402	1.57	1.435	1
Mid Channel	2441	1.27	1.340	1
High Channel	2480	1.54	1.426	1

Low Channel

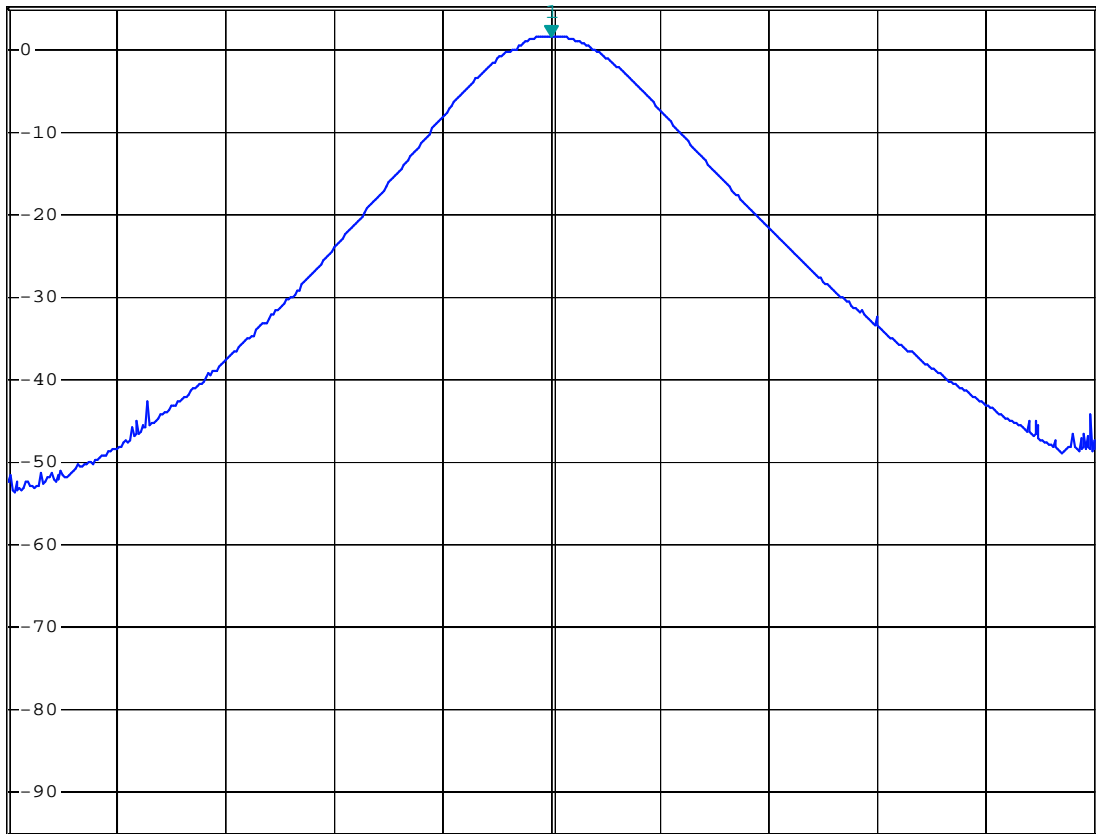


*RBW 1 MHz Marker 1 [T1]
 VBW 3 MHz 1.57 dBm
 SWT 2.5 ms 2.40200000 GHz

Ref 5 dBm

*Att 20 dB

1 PK
 MAXH



Center 2.402 GHz

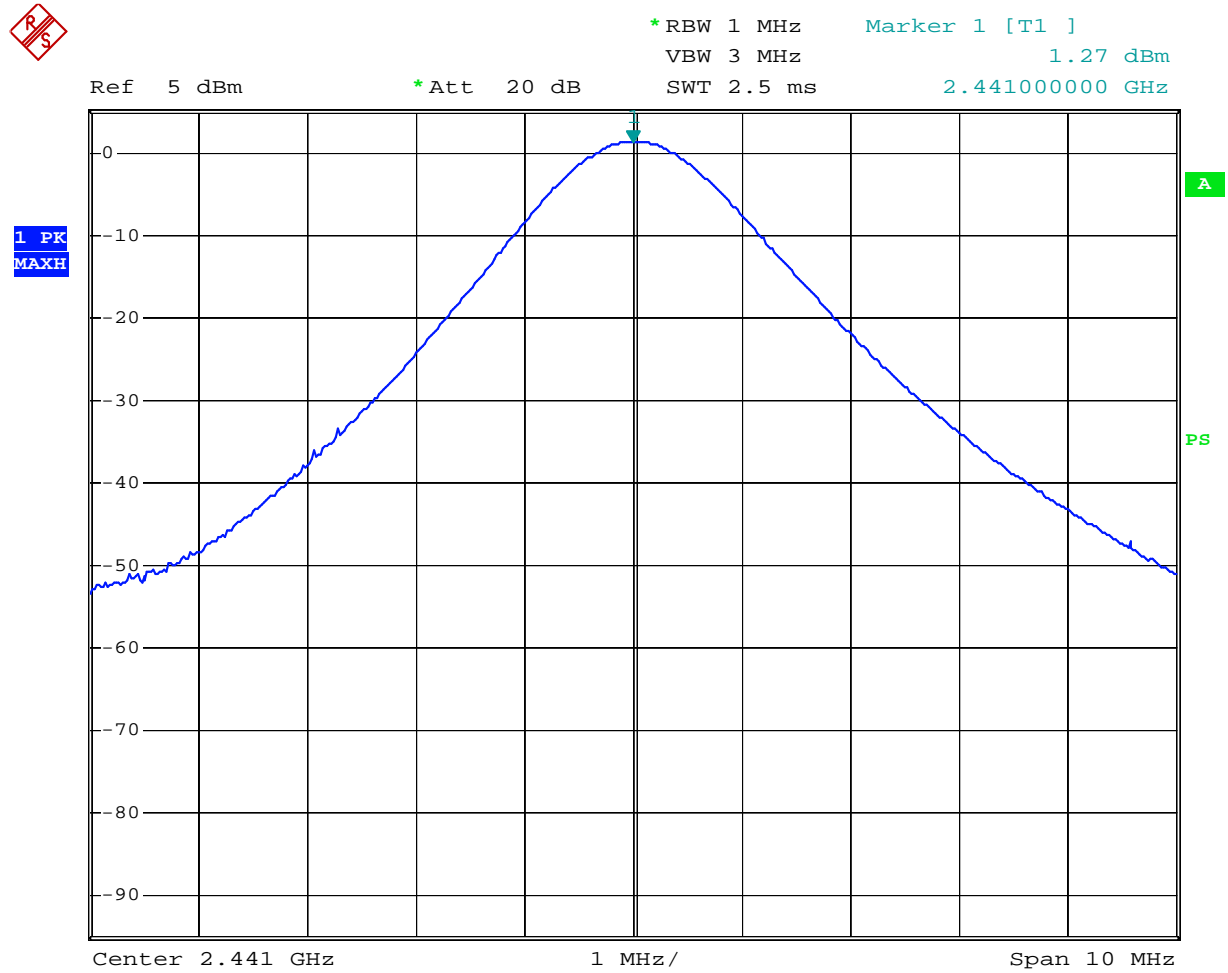
1 MHz/

Span 10 MHz

output power low channel

Date: 10.DEC.2007 05:25:18

Middle Channel



output power middle channel
 Date: 10.DEC.2007 05:24:43

High Channel

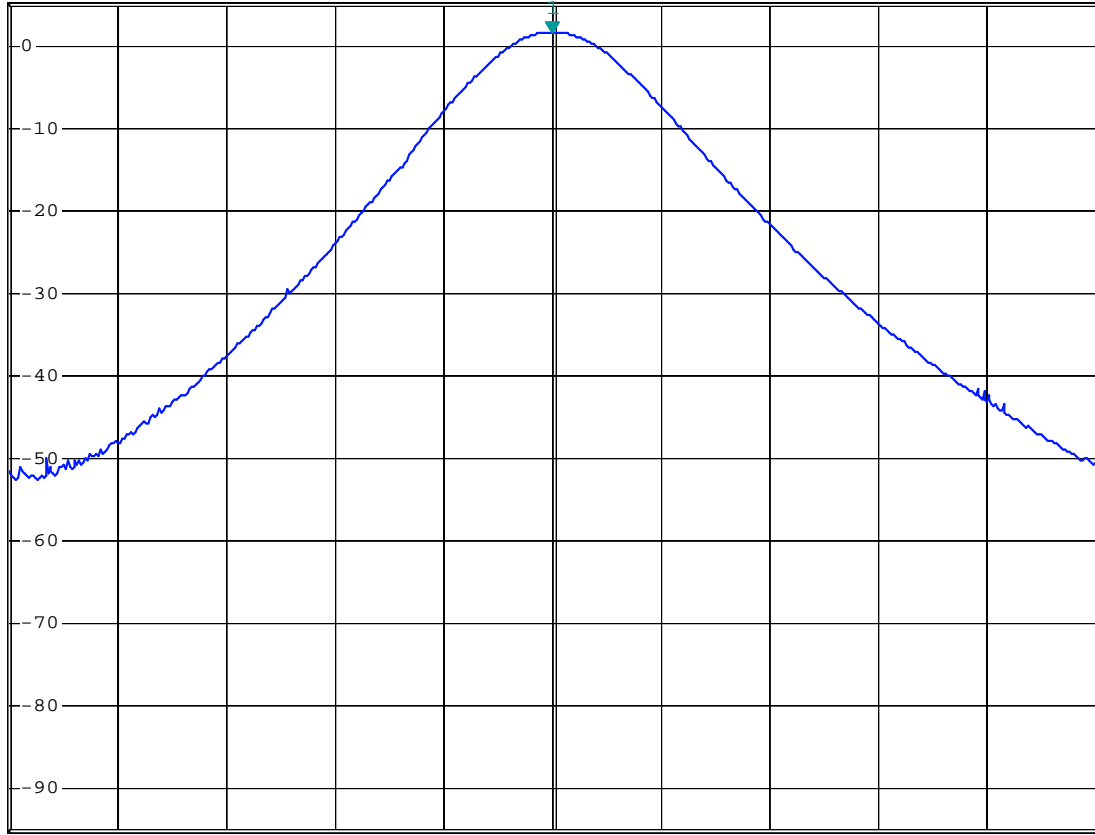


*RBW 1 MHz Marker 1 [T1]
VBW 3 MHz 1.54 dBm
SWT 2.5 ms 2.48000000 GHz

Ref 5 dBm

*Att 20 dB

1 PK
MAXH



A

PS

Center 2.48 GHz

1 MHz/

Span 10 MHz

output power high channel

Date: 10.DEC.2007 05:24:03

§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
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-09-29	2008-09-29

* **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

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. Put it on the Rotated table and turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel 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, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz.
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:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

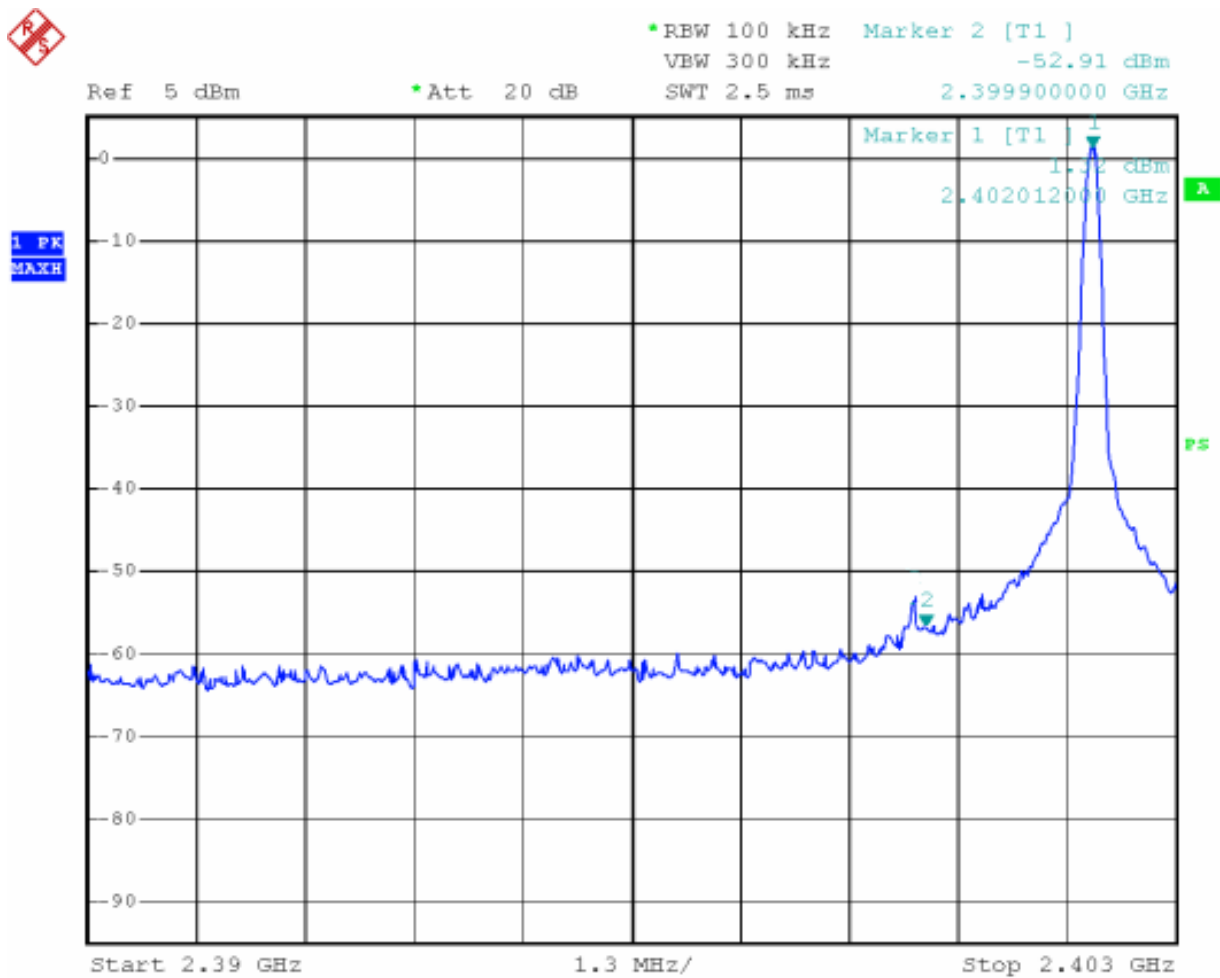
The testing was performed by Andy Yan on 2007-12-10.

Test Result: Pass

Please refer to the following table and plots

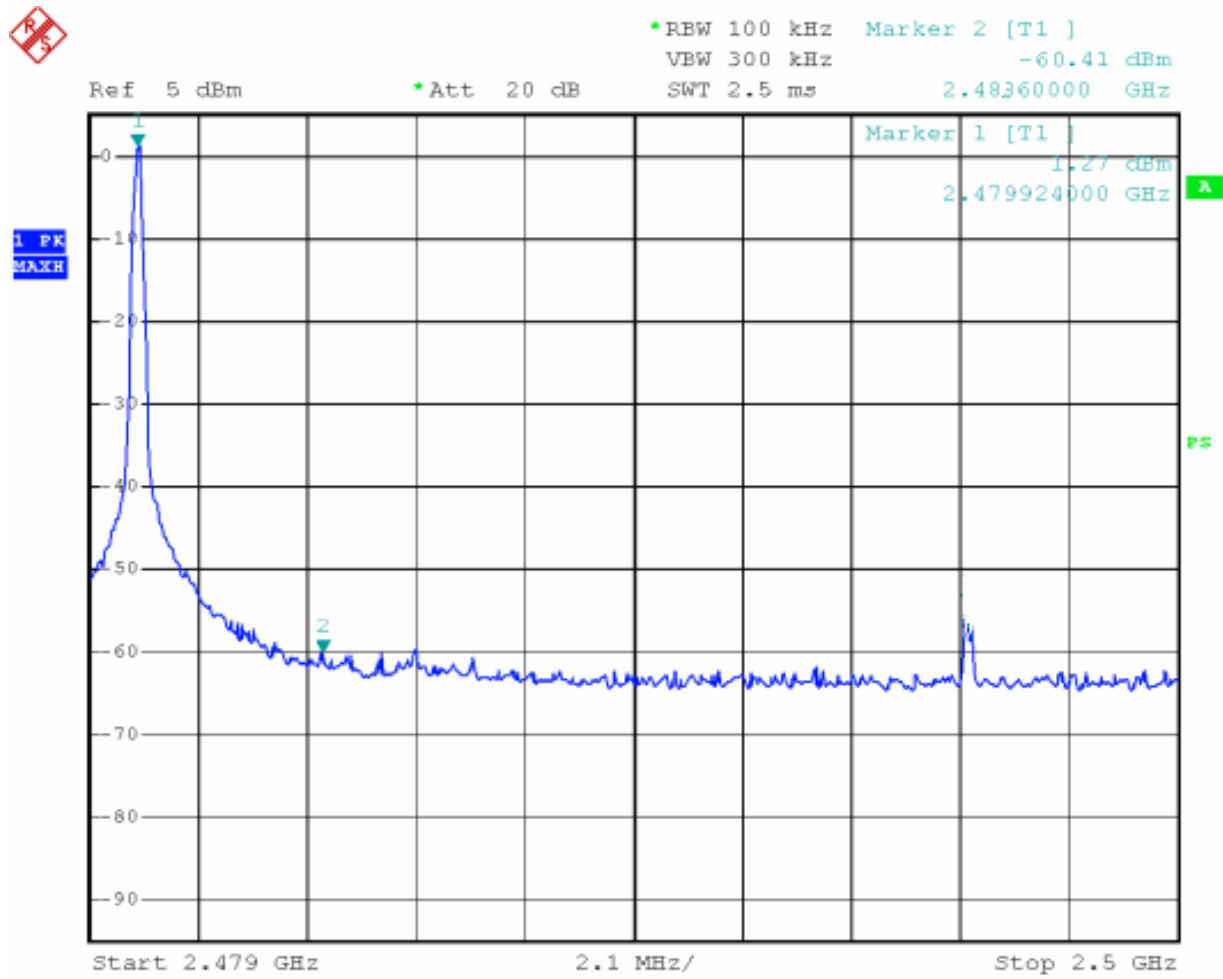
Frequency (MHz)	Attenuation (dBc)	Limit (dBc)
2399.9	54.23	20
2483.6	61.68	20

Note: Attenuation = Highest Peak – Emission Level



out of bandedge left

Date: 10.DEC.2007 05:49:14



out of bandedge right

Date: 10.DEC.2007 05:47:53

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