

FCC PART 15.247
MEASUREMENT AND TEST REPORT

For
Sunitec Enterprise Co., Ltd.

10F.-1, No.200, JingpingRd., Jhonghe City, aipei County

FCC ID: RA8-BC006

Report Type: Original Report	Product Type: Bluetooth Multipoint Speakerphone
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* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "*" ...

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Sunitec Enterprise Co., Ltd.*'s product, model number: *BC932* or the "EUT" as referred to in this report is a *Bluetooth Multipoint Speakerphone*, which measures approximately: 12.85 cm L x 6.05 cm W x 2.1 cm H, input voltage: 3.7V battery.

** All measurement and test data in this report was gathered from production sample serial number: 0808041 (Assigned by BACL, Shenzhen). The EUT was received on 2008-08-20.*

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, 15.207, 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).

Equipment Modifications

No modification was made to the unit tested.

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
Great Quality	Laptop	RX-7336	Q733E	DoC

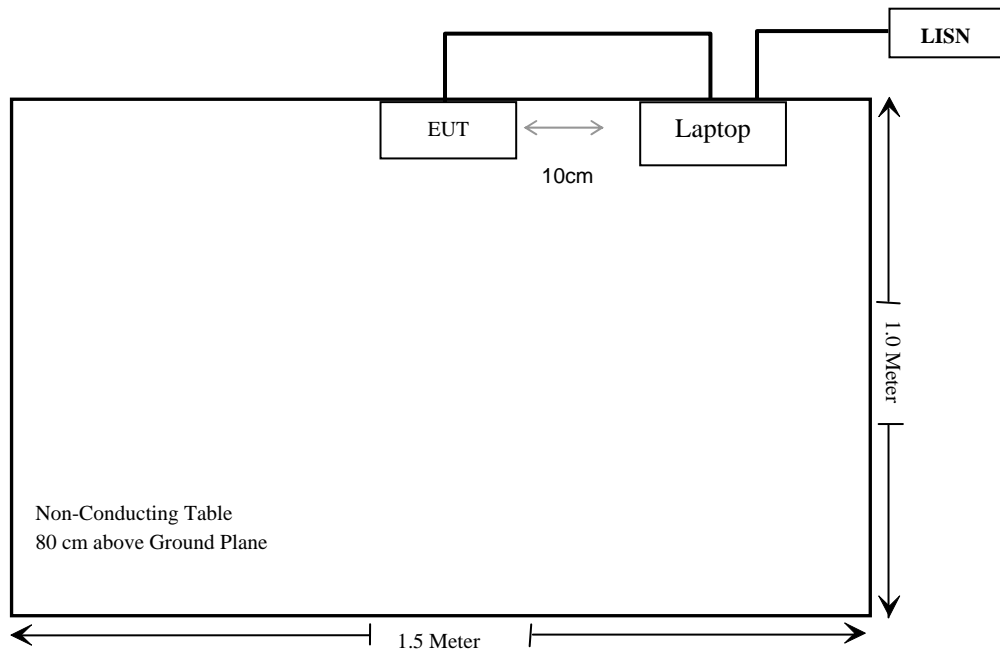
External I/O Cable

Cable Description	Length (m)	From Port	To
Unshielded Detachable USB Cable	0.5	EUT	Laptop

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b)(1)	Maximum Permissible exposure (MPE)	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	Conducted Emissions	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	Compliant

* Within measurement uncertainty.

CFR47 §15.247 (i), §1.1307 (b)(1) - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Standard Applicable

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.

According to §1.1310 and §2.1091 RF exposure is calculated.

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

$$S = \frac{PG}{4\pi R^2}$$

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

P = output power to antenna

G = Antenna Gain

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

BDR Mode :

P: 3.13 (dBm)

P: 2.056 (mW)

G: 0dBi

G: 1 (in numeric)

Prediction distance: >20 (cm)

Predication frequency: 2441 (MHz)

The worst case is power density at predication frequency at 20 cm: 0.000409 (mW/cm²)

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

0.000409 (mW/cm²) < 1 (mW/cm²)

Result: Pass

EDR Mode:

P: 3.76(dBm)

P: 2.377 (mW)

G: 0dBi

G: 1 (in numeric)

Prediction distance: >20 (cm)

Predication frequency: 2441 (MHz)

The worst case is power density at predication frequency at 20 cm: 0.000473(mW/cm²)MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

$$0.000473 \text{ (mW/cm}^2\text{)} < 1 \text{ (mW/cm}^2\text{)}$$

Result: Pass

CFR47 §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 a printed antenna on PCB. The maximum gain is 0 dBi; please refer to the internal photos.

Result: Compliant.

CFR47 §15.207 (a) - CONDUCTED EMISSIONS

Applicable Standard

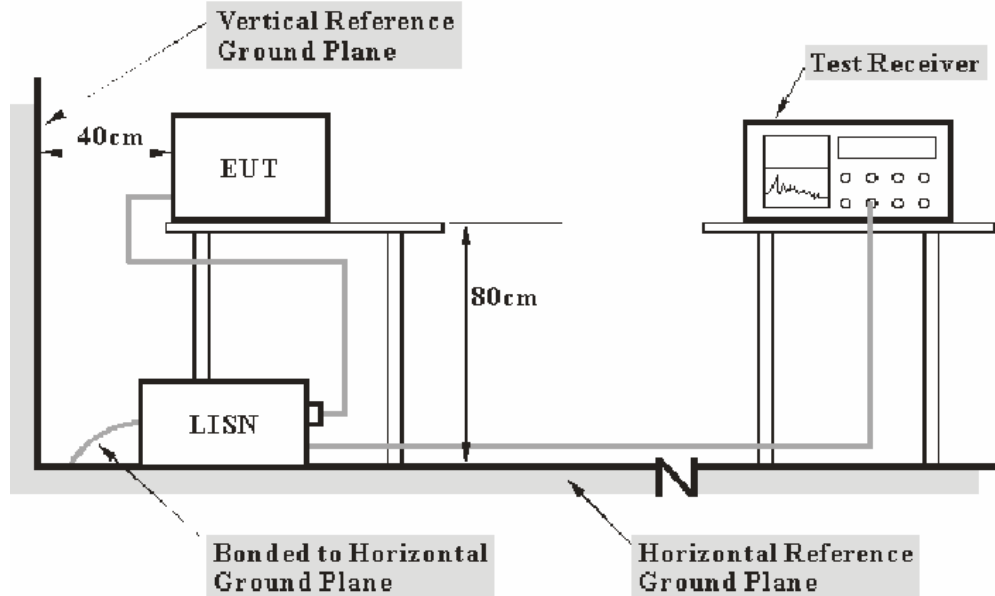
CFR47 §15.207

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 Laboratory 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 15.207 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 adapter 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	12208	N/A	N/A
Rohde & Schwarz	EMI Test Receiver	ESCS30	DE25330	2008-03-25	2009-03-25
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2008-03-25	2009-03-25

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

* **Statement of Traceability:** Bay Area Compliance Laboratory 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 adapter was connected to the outlet of 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 15.207, with the worst margin reading of:

4.9 dB at 0.5500 MHz in the **Neutral** conductor mode

Test Data**Environmental Conditions**

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

* The testing was performed by Phoenix Liu on 2008-09-24.

Test Mode: PC Charging

Line Conducted Emissions				FCC Part 15.207	
Frequency (MHz)	Amplitude (dB μ V)	Detector (QP/AV)	Conductor (Line/Neutral)	Limit (dB μ V)	Margin (dB)
0.5500	51.10	QP	Neutral	56.00	4.90
0.5600	49.90	QP	Line	56.00	6.10
0.4400	50.40	QP	Line	57.06	6.66
26.8250	52.90	QP	Neutral	60.00	7.10
26.8000	52.50	QP	Line	60.00	7.50
28.6300	52.40	QP	Line	60.00	7.60
0.9450	48.30	QP	Neutral	56.00	7.70
0.1950	51.90	QP	Neutral	63.82	11.92
0.2400	49.50	QP	Neutral	62.10	12.60
0.2400	39.20	AV	Neutral	52.10	12.90
0.1550	52.80	QP	Neutral	65.73	12.93
0.3350	46.40	QP	Line	59.33	12.93
0.5500	32.30	AV	Neutral	46.00	13.70
0.9450	31.40	AV	Neutral	46.00	14.60
0.5600	30.90	AV	Line	46.00	15.10
0.1750	48.10	QP	Line	64.72	16.62
0.3350	32.30	AV	Line	49.33	17.03
0.1750	36.50	AV	Line	54.72	18.22
0.4400	28.20	AV	Line	47.06	18.86
27.1200	27.00	AV	Neutral	50.00	23.00
28.6300	25.20	AV	Line	50.00	24.80
0.1550	30.90	AV	Neutral	55.73	24.83
26.7450	24.70	AV	Line	50.00	25.30
0.1950	26.40	AV	Neutral	53.82	27.42

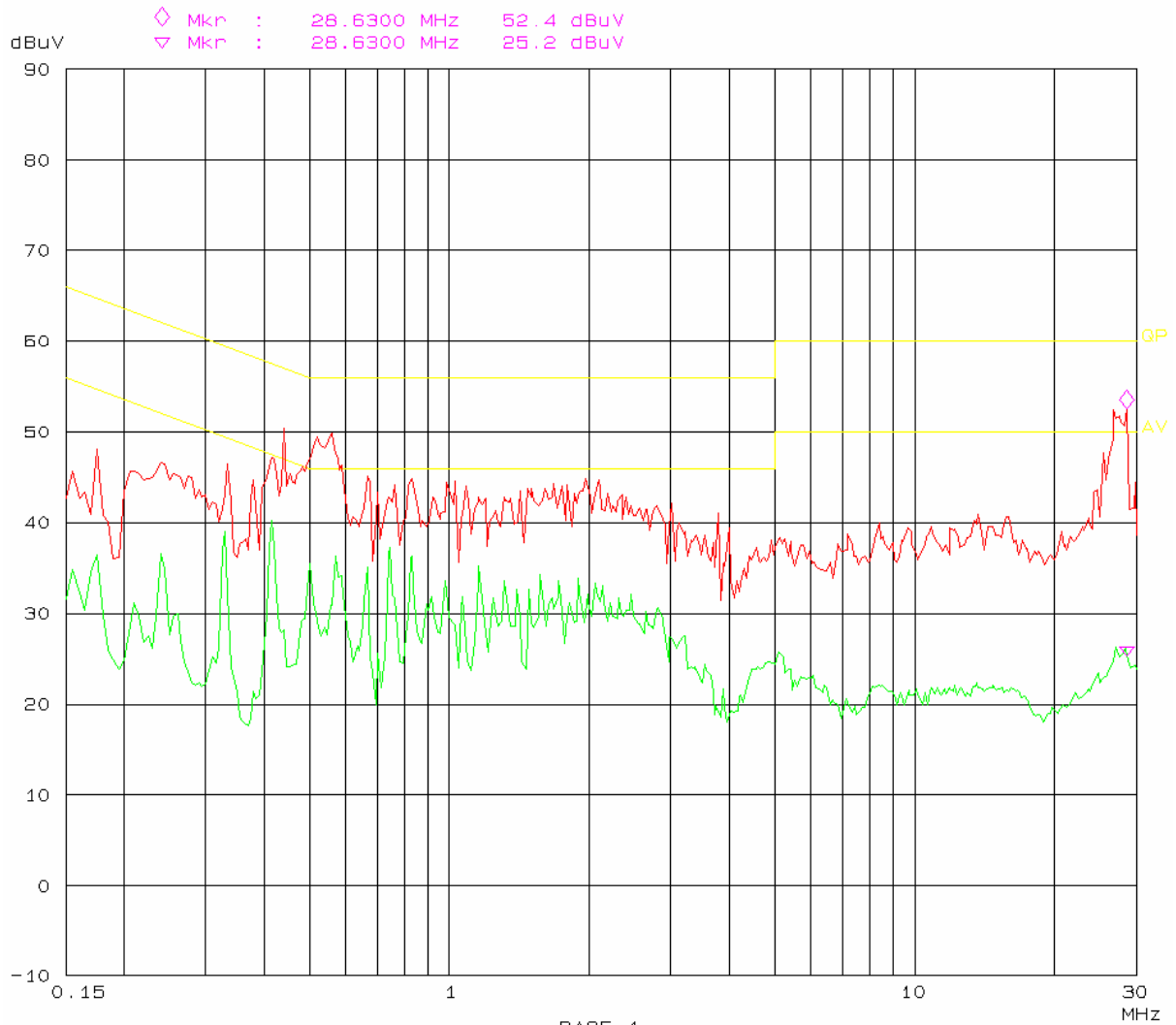
Plot(s) of Test Data

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

Conducted emission FCC Part 15

26. Sep 08 14:48

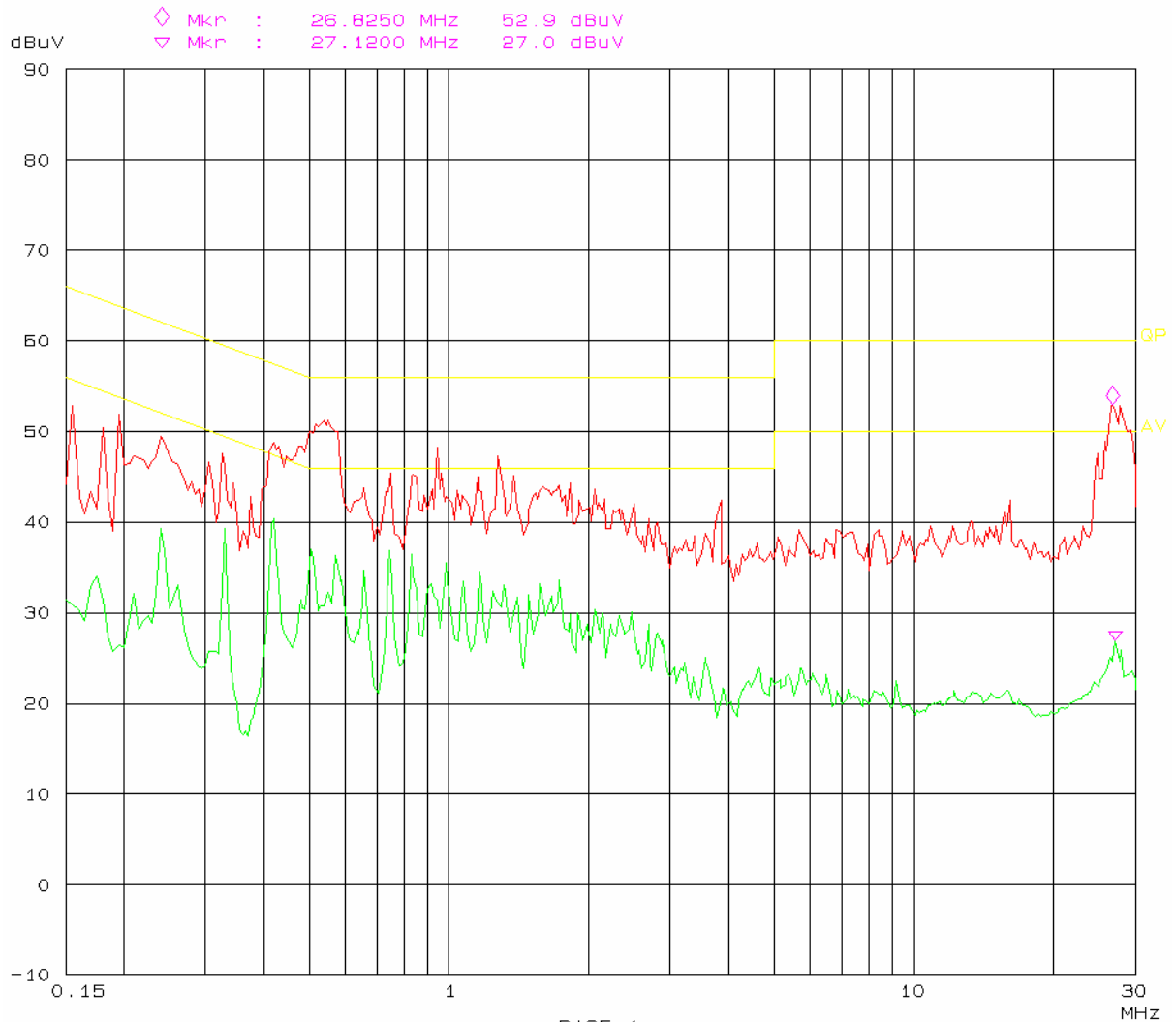
EUT: Bluetooth Multipoint Speakerphone M/N:BC932
Manuf: Sunitec
Op Cond: charging
Operator: Phoenix
Test Spec: AC 120V/60Hz L
Comment: Temp: 25 Hum: 56%



Conducted emission FCC Part 15

26. Sep 08 15:04

EUT: Bluetooth Multipoint Speakerphone M/N:BC932
Manuf: Sunitec
Op Cond: charging
Operator: Phoenix
Test Spec: AC 120V/60Hz N
Comment: Temp: 25 Hum: 56%



CFR47 §15.205, §15.109, §15.209, §15.247 - RADIATED EMISSIONS

Applicable Standard

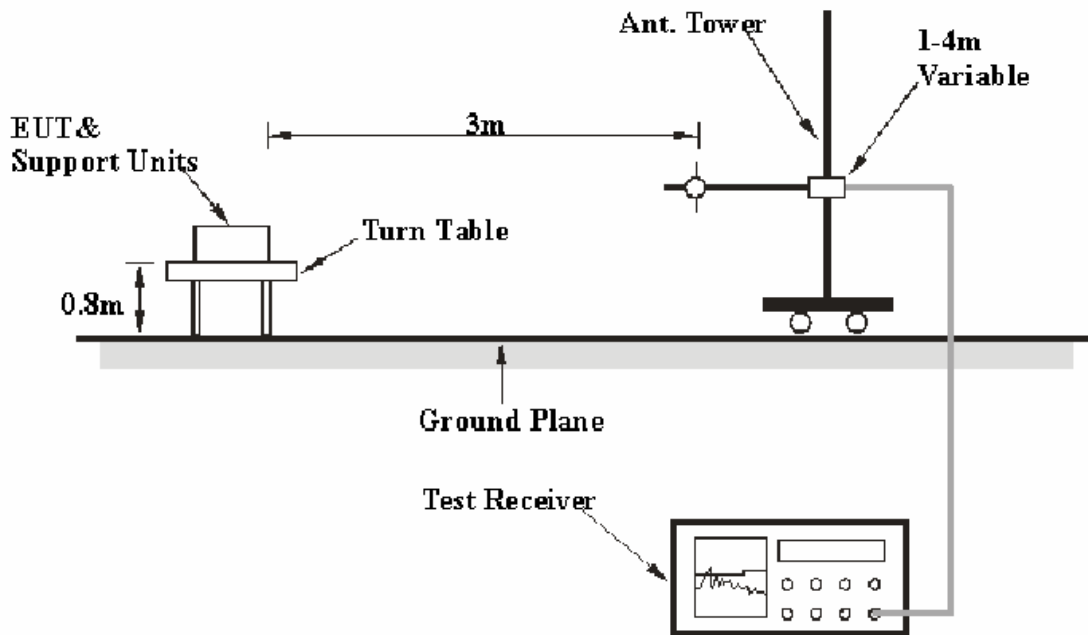
CFR47 §15.205; §15.209; §15.247 (d).

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 15.209 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 adapter 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	2007-10-16	2008-10-16
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2008-04-12	2009-04-12
HP	Amplifier	8449B	3008A00277	2007-09-29	2008-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2008-09-25	2009-09-25
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2008-05-09	2009-05-09

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

Test Procedure

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

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

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

Corrected Amplitude & Margin Calculation

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

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

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

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

Test Results Summary

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

USB Charging mode:

1.1 dB at 58.999375 MHz in the Vertical polarization

Car charger charging mode:

14.8 dB at 897.028050 MHz in the Horizontal polarization

Transmitting BDR mode (Below 1GHz):

4.9 dB at 666.646100 MHz in the Horizontal polarization

Transmitting BDR mode (Above 1 GHz):

17.54 dB at 4804 MHz in the Vertical polarization (Low Channel)
18.63 dB at 1594 MHz in the Vertical polarization (Middle Channel)
17.20 dB at 4960 MHz in the Horizontal polarization (High Channel)

Transmitting EDR mode (Below 1GHz):

3.1 dB at 247.620625 MHz in the Vertical polarization

Transmitting EDR mode (Above 1 GHz):

16.67 dB at 4804 MHz in the Vertical polarization (Low Channel)
17.76 dB at 1594 MHz in the Vertical polarization (Middle Channel)
16.33 dB at 4960 MHz in the Horizontal polarization (High Channel)

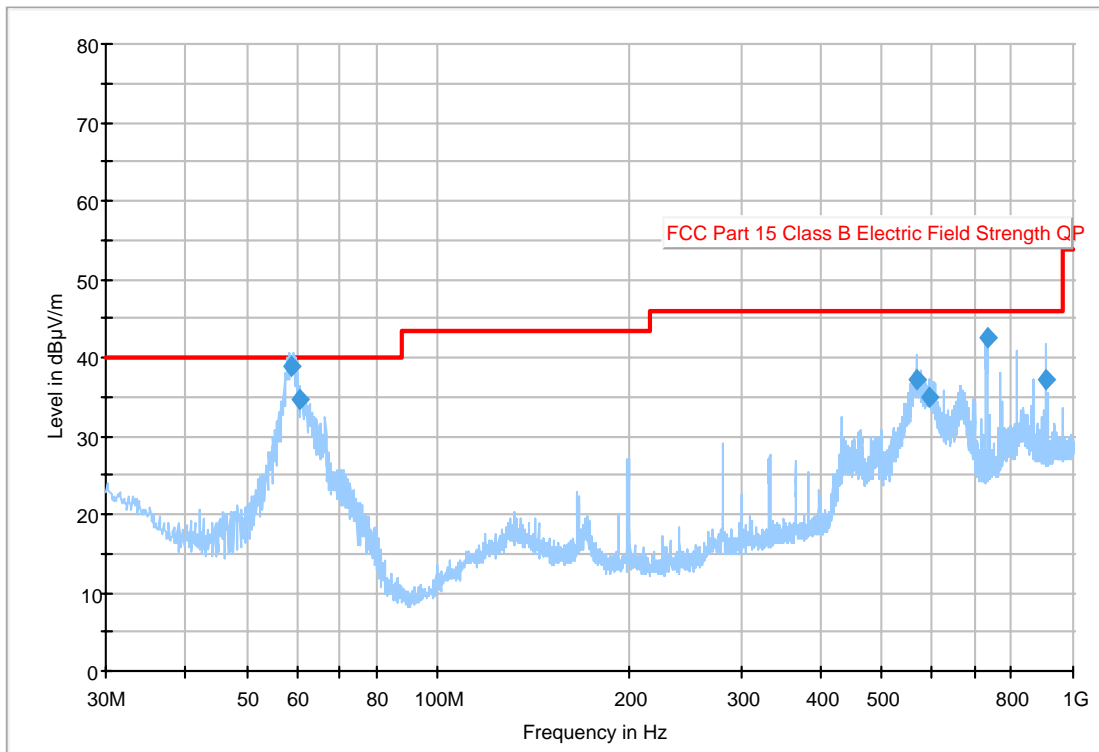
Test Data

Environmental Conditions

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

** The testing was performed by Phoenix Liu on 2008-09-22*

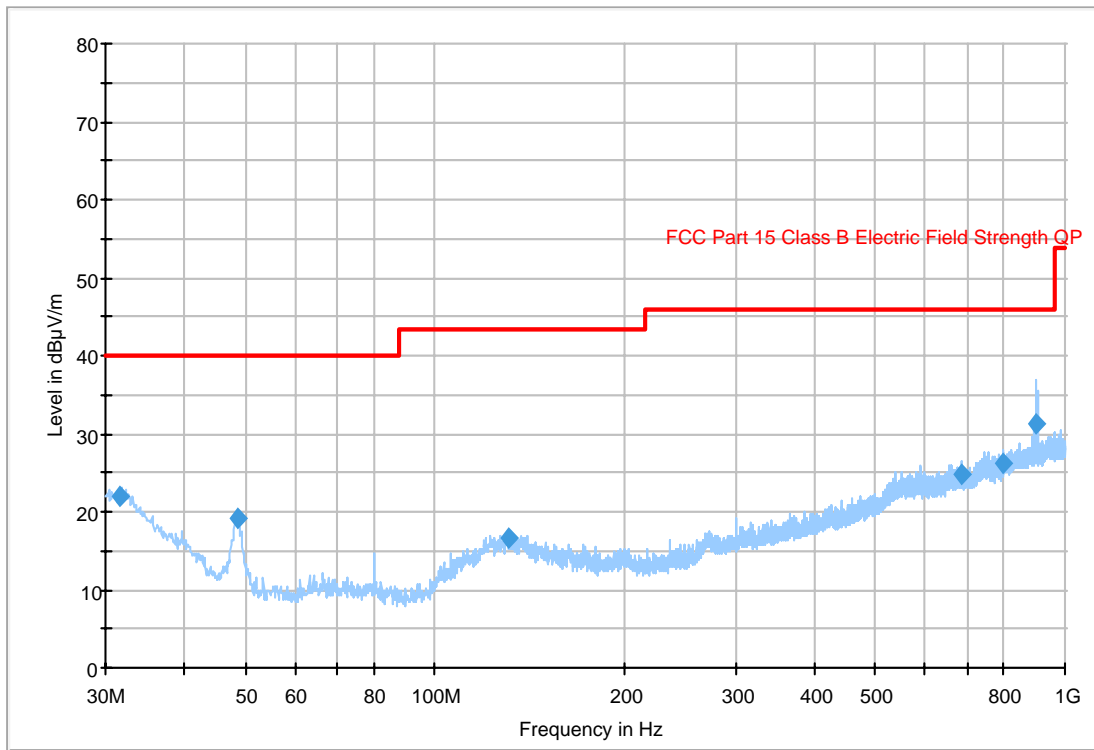
Test Mode: USB Charging



Frequency (MHz)	Corrected Amp. (dBµV/m)	Antenna Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
58.999375	38.9	109.0	V	22.0	-17.3	40.0	1.1*
732.954550	42.4	107.0	V	274.0	-1.2	46.0	3.6*
60.563550	34.6	129.0	V	164.0	-17.2	40.0	5.4
569.047975	37.3	188.0	H	265.0	-3.8	46.0	8.7
905.886800	37.1	251.0	V	343.0	1.2	46.0	8.9
593.439250	34.8	119.0	V	166.0	-3.5	46.0	11.2

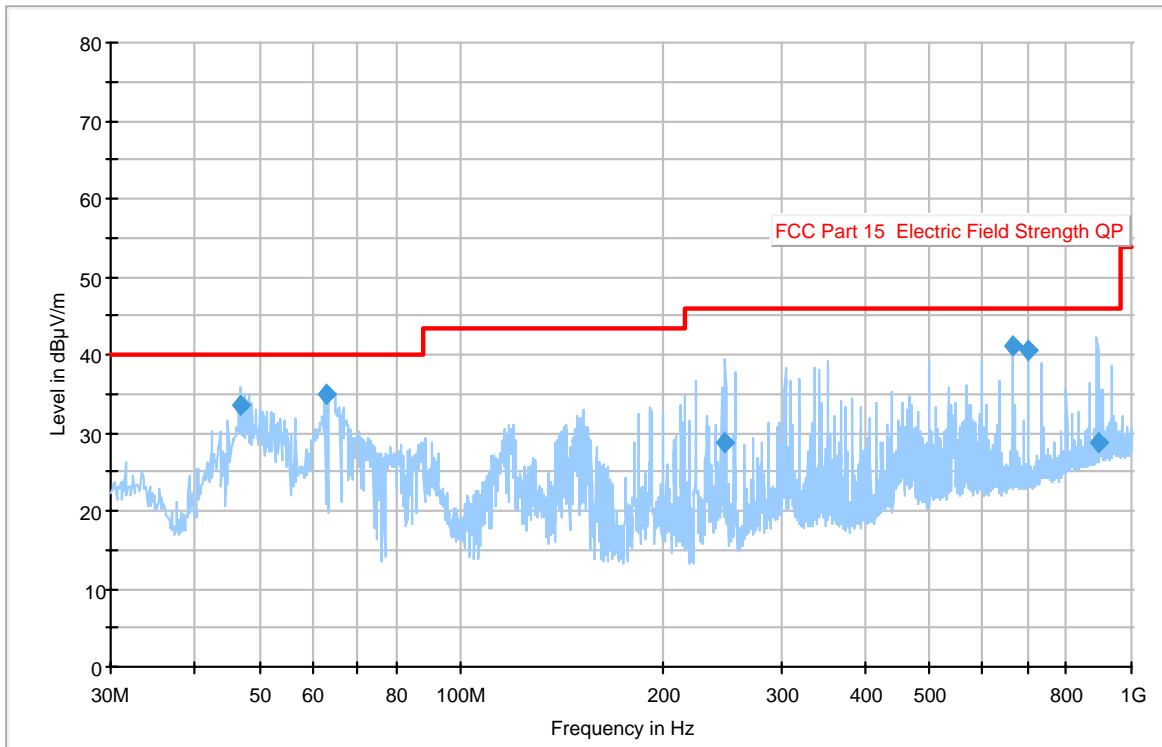
* Within measurement uncertainty.

Test Mode: Charging with Car Charger



Frequency (MHz)	Corrected Amp. (dBµV/m)	Antenna Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
897.028050	31.2	231.0	H	118.0	1.2	46.0	14.8
31.545675	22.1	358.0	V	343.0	-5.1	40.0	17.9
796.135875	26.3	198.0	H	171.0	-0.4	46.0	19.7
48.551230	19.1	175.0	V	256.0	0.8	40.0	20.9
682.864950	24.7	254.0	H	355.0	-2.2	46.0	21.3
131.365000	16.7	260.0	H	118.0	1.1	43.5	26.8

Test Mode: Transmitting (BDR) (Below 1GHz)



Frequency (MHz)	Corrected Amp. (dBµV/m)	Antenna Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
666.646100	41.1	103.0	H	206.0	-2.3	46.0	4.9
700.047825	40.6	103.0	H	197.0	-2.0	46.0	5.4
46.931000	33.6	136.0	V	122.0	-15.7	40.0	11.4
62.819625	34.9	103.0	V	50.0	-17.0	40.0	14.2
247.620625	28.8	125.0	V	100.0	-17.0	40.0	15.4
889.677475	28.6	131.0	V	128.0	1.0	46.0	22.4

Test Mode: Transmitting (BDR) (Above 1GHz)

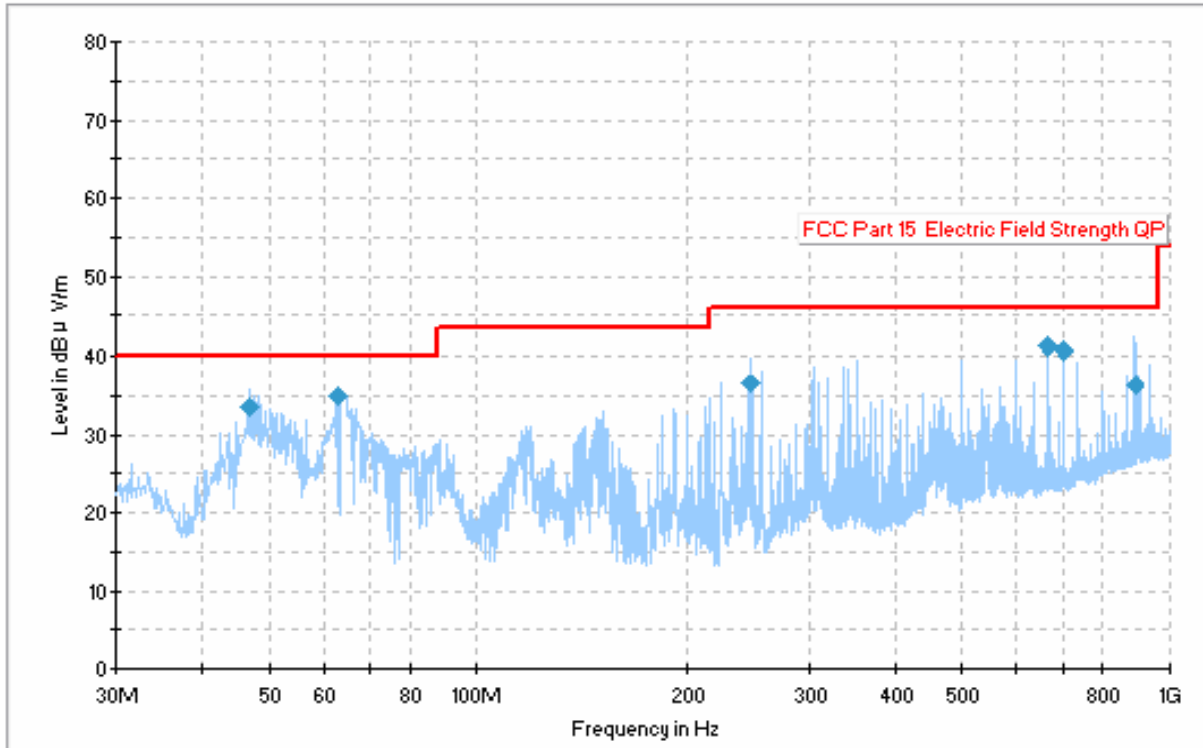
Freq. (MHz)	S.A. Reading (dBμV)	Detector PK/QP/AV	Direction Degree	Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Corr. Amp. (dBuV/m)	FCC Part 15.247/209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBuV/m)	Margin (dB)	Remarks
Low Channel (2402 MHz)												
4804	33.42	AV	90	1	V	31.8	4.64	33.4	36.46	54	17.54	Harmonic
4804	32.76	AV	90	1	H	31.8	4.64	33.4	35.80	54	18.20	Harmonic
1064	40.17	AV	180	1.2	H	24.4	3.18	35	32.75	54	21.25	Spurious
4804	48.56	PK	180	1.2	H	31.8	4.64	33.4	51.60	74	22.40	Harmonic
1064	32.98	AV	180	1.2	V	24.4	3.18	35	25.56	54	28.44	Spurious
4804	42.18	PK	180	1.2	V	31.8	4.64	33.4	45.22	74	28.78	Harmonic
1064	51.40	PK	45	1.2	V	24.4	3.18	35	43.98	74	30.02	Spurious
1064	51.30	PK	45	1.2	H	24.4	3.18	35	43.88	74	30.12	Spurious
Middle Channel (2441 MHz)												
1594	41.30	AV	85	1.5	V	26.3	2.77	35	35.37	54	18.63	Spurious
4882	31.61	AV	243	1.4	V	31.8	4.64	33.4	34.65	54	19.35	Harmonic
1594	40.20	AV	135	1.3	H	26.3	2.77	35	34.27	54	19.73	Spurious
4882	30.53	AV	142	1.6	H	31.8	4.64	33.4	33.57	54	20.43	Harmonic
4882	45.30	PK	153	1.5	V	31.8	4.64	33.4	48.34	74	25.66	Harmonic
4882	44.40	PK	234	1.8	H	31.8	4.64	33.4	47.44	74	26.56	Harmonic
1594	52.45	PK	265	1.4	V	26.3	2.77	35	46.52	74	27.48	Spurious
1594	50.21	PK	156	1.4	H	26.3	2.77	35	44.28	74	29.72	Spurious
High Channel (2480 MHz)												
4960	33.85	AV	256	1.8	H	31.8	4.55	33.4	36.80	54	17.20	Harmonic
4960	33.79	AV	142	1.5	V	31.8	4.55	33.4	36.74	54	17.26	Harmonic
4960	48.08	PK	145	1.4	H	31.8	4.55	33.4	51.03	74	22.97	Harmonic
4960	47.46	PK	142	1.4	V	31.8	4.55	33.4	50.41	74	23.59	Harmonic
1064	37.04	AV	156	1.2	H	24.4	3.18	35	29.62	54	24.38	Spurious
1064	35.40	AV	210	1.2	V	24.4	3.18	35	27.98	54	26.02	Spurious
1064	50.94	PK	128	1.5	H	24.4	3.18	35	43.52	74	30.48	Spurious
1064	48.90	PK	240	1.4	V	24.4	3.18	35	41.48	74	32.52	Spurious

Spurious emission in restricted band (BDR):

Freq. (MHz)	S.A. Reading (dBμV)	Detector PK/QP/AV	Direction Degree	Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Corr. Amp. (dBuV/m)	FCC Part 15.247/209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBuV/m)	Margin (dB)	Remarks
2384.985	38.44	AV	210	1.3	V	27.5	3.90	33.90	35.94	54	18.06	Spurious
2492.860	31.69	AV	120	1.1	H	27.5	3.90	33.90	29.19	54	24.81	Spurious
2492.860	31.25	AV	210	1.3	V	27.5	3.90	33.90	28.75	54	25.25	Spurious
2384.985	31.03	AV	120	1.1	H	27.5	3.90	33.90	28.53	54	25.47	Spurious
2492.860	49.67	PK	75	1.3	V	27.5	3.90	33.90	47.17	74	26.83	Spurious
2384.985	49.57	PK	75	1.3	V	27.5	3.90	33.90	47.07	74	26.93	Spurious
2384.985	46.83	PK	210	1.3	H	27.5	3.90	33.90	44.33	74	29.67	Spurious
2492.860	40.45	PK	210	1.3	H	27.5	3.90	33.90	37.95	74	36.05	Spurious

Note: The above are the highest points in restricted band.

Test Mode: Transmitting (EDR) (Below 1GHz)



Frequency (MHz)	Corrected Amp. (dBµV/m)	Antenna Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
247.620625	36.9	125.0	V	100.0	-17.0	40.0	3.1*
666.646100	41.1	103.0	H	206.0	-2.3	46.0	4.9
62.819625	34.9	103.0	V	50.0	-17.0	40.0	5.1
700.047825	40.6	103.0	H	197.0	-2.0	46.0	5.4
46.931000	33.6	136.0	V	122.0	-15.7	40.0	6.4
889.677475	32.4	131.0	V	128.0	1.0	46.0	13.6

* Within measurement uncertainty.

Test Mode: Transmitting (EDR) (Above 1GHz)

Freq. (MHz)	S.A. Reading (dBμV)	Detector PK/QP/AV	Direction Degree	Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Corr. Amp. (dBuV/m)	FCC Part 15.247/209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBuV/m)	Margin (dB)	Remarks
Low Channel (2402 MHz)												
4804	34.29	AV	110	1.1	V	31.8	4.64	33.4	37.33	54	16.67	Harmonic
4804	33.63	AV	110	1.1	H	31.8	4.64	33.4	36.67	54	17.33	Harmonic
1064	41.04	AV	200	1.3	H	24.4	3.18	35	33.62	54	20.38	Spurious
4804	49.43	PK	200	1.3	H	31.8	4.64	33.4	52.47	74	21.53	Harmonic
1064	33.85	AV	200	1.3	V	24.4	3.18	35	26.43	54	27.57	Spurious
4804	43.05	PK	200	1.3	V	31.8	4.64	33.4	46.09	74	27.91	Harmonic
1064	52.27	PK	65	1.3	V	24.4	3.18	35	44.85	74	29.15	Spurious
1064	52.17	PK	65	1.3	H	24.4	3.18	35	44.75	74	29.25	Spurious
Middle Channel (2441 MHz)												
1594	42.17	AV	105	1.6	V	26.3	2.77	35	36.24	54	17.76	Spurious
4882	32.48	AV	263	1.5	V	31.8	4.64	33.4	35.52	54	18.48	Harmonic
1594	41.07	AV	155	1.4	H	26.3	2.77	35	35.14	54	18.86	Spurious
4882	31.4	AV	162	1.7	H	31.8	4.64	33.4	34.44	54	19.56	Harmonic
4882	46.17	PK	173	1.6	V	31.8	4.64	33.4	49.21	74	24.79	Harmonic
4882	45.27	PK	254	1.9	H	31.8	4.64	33.4	48.31	74	25.69	Harmonic
1594	53.32	PK	285	1.5	V	26.3	2.77	35	47.39	74	26.61	Spurious
1594	51.08	PK	176	1.5	H	26.3	2.77	35	45.15	74	28.85	Spurious
High Channel (2480 MHz)												
4960	34.72	AV	276	1.9	H	31.8	4.55	33.4	37.67	54	16.33	Harmonic
4960	34.66	AV	162	1.6	V	31.8	4.55	33.4	37.61	54	16.39	Harmonic
4960	48.95	PK	165	1.5	H	31.8	4.55	33.4	51.9	74	22.1	Harmonic
4960	48.33	PK	162	1.5	V	31.8	4.55	33.4	51.28	74	22.72	Harmonic
1064	37.91	AV	176	1.3	H	24.4	3.18	35	30.49	54	23.51	Spurious
1064	36.27	AV	230	1.3	V	24.4	3.18	35	28.85	54	25.15	Spurious
1064	51.81	PK	148	1.6	H	24.4	3.18	35	44.39	74	29.61	Spurious
1064	49.77	PK	260	1.5	V	24.4	3.18	35	42.35	74	31.65	Spurious

Spurious emission in restricted band (EDR):

Freq. (MHz)	S.A. Reading (dBμV)	Detector PK/QP/AV	Direction Degree	Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Corr. Amp. (dBuV/m)	FCC Part 15.247/209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBuV/m)	Margin (dB)	Remarks
2384.602	40.17	AV	210	1.3	V	27.5	3.90	33.90	37.67	54	16.33	Spurious
2492.988	33.42	AV	120	1.1	H	27.5	3.90	33.90	30.92	54	23.08	Spurious
2492.988	32.98	AV	210	1.3	V	27.5	3.90	33.90	30.48	54	23.52	Spurious
2384.602	32.76	AV	120	1.1	H	27.5	3.90	33.90	30.26	54	23.74	Spurious
2492.988	51.4	PK	75	1.3	V	27.5	3.90	33.90	48.9	74	25.1	Spurious
2384.602	51.3	PK	75	1.3	V	27.5	3.90	33.90	48.8	74	25.2	Spurious
2384.602	48.56	PK	210	1.3	H	27.5	3.90	33.90	46.06	74	27.94	Spurious
2492.988	42.18	PK	210	1.3	H	27.5	3.90	33.90	39.68	74	34.32	Spurious

Note: The above are the highest points in restricted band.

CFR47 §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	100035	2007-10-16	2008-10-16

* **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:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

* The testing was performed by Phoenix Liu on 2008-09-04 to 2008-09-19.

Test Result: Compliant.

Please refer to following tables and plots

Test Mode: Transmitting (BDR)

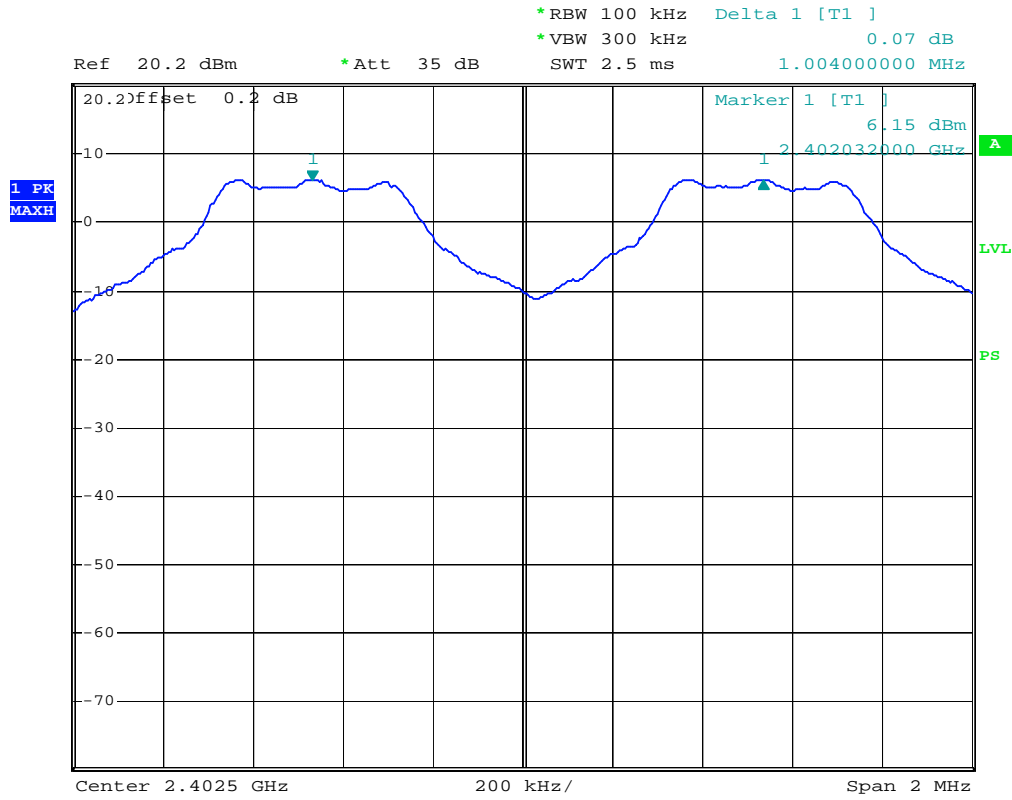
Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low Channel	2402	1.004	0.531	Pass
Adjacent Channel	2403			
Mid Channel	2441	1.004	0.533	Pass
Adjacent Channel	2442			
High Channel	2480	1.004	0.533	Pass
Adjacent Channel	2479			

Test Mode: Transmitting (EDR)

Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low Channel	2402	1.008	0.779	Pass
Adjacent Channel	2403			
Mid Channel	2441	1.008	0.784	Pass
Adjacent Channel	2442			
High Channel	2480	1.008	0.784	Pass
Adjacent Channel	2479			

Test Mode: Transmitting (BDR)

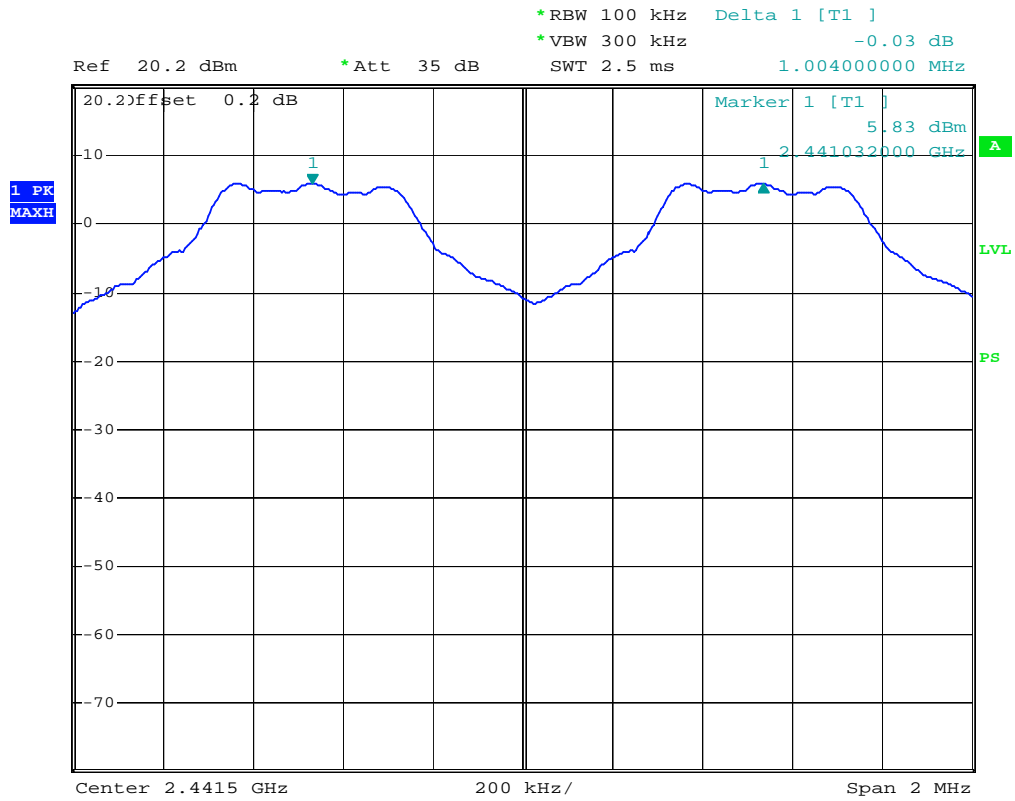
Low Channel



channel separation low

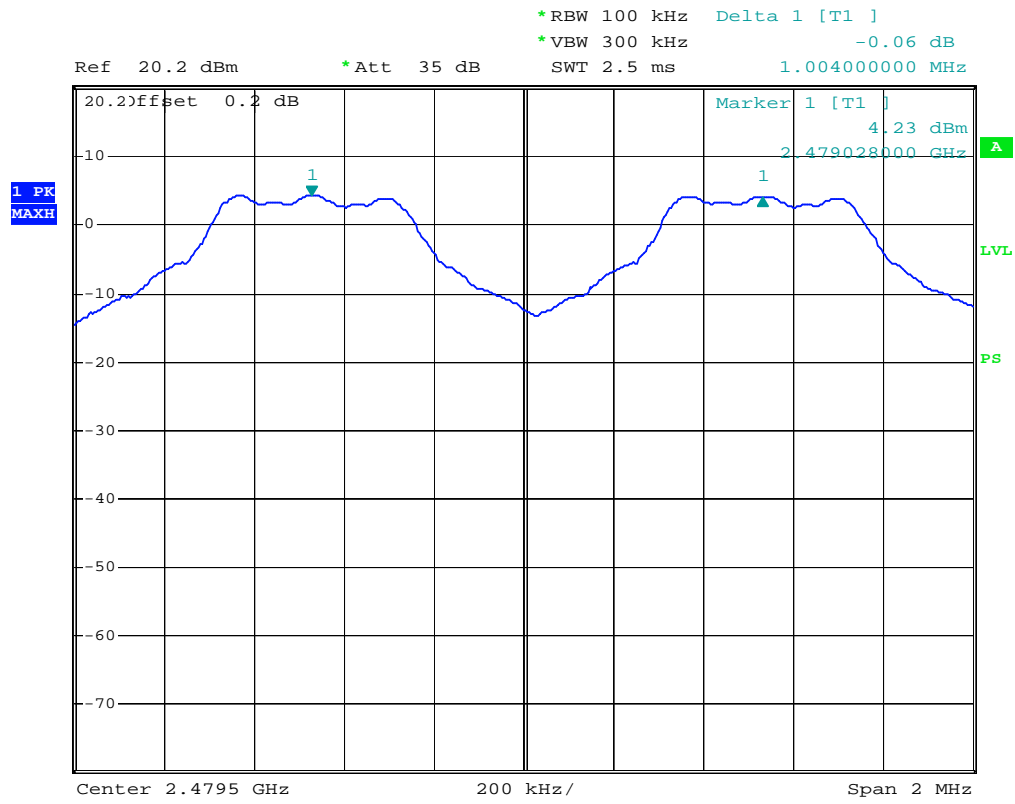
Date: 4.SEP.2008 11:51:55

Middle Channel



channel separation middle
Date: 4.SEP.2008 11:53:12

High Channel

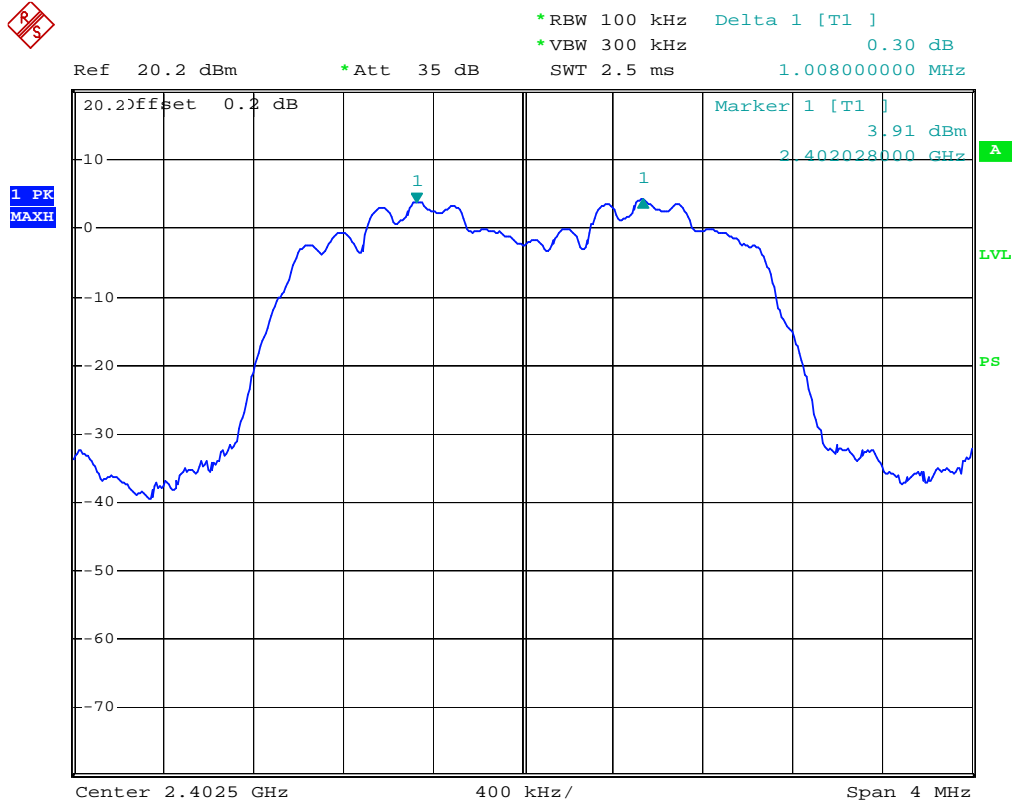


channel separation high

Date: 4.SEP.2008 11:54:12

Test Mode: Transmitting (EDR)

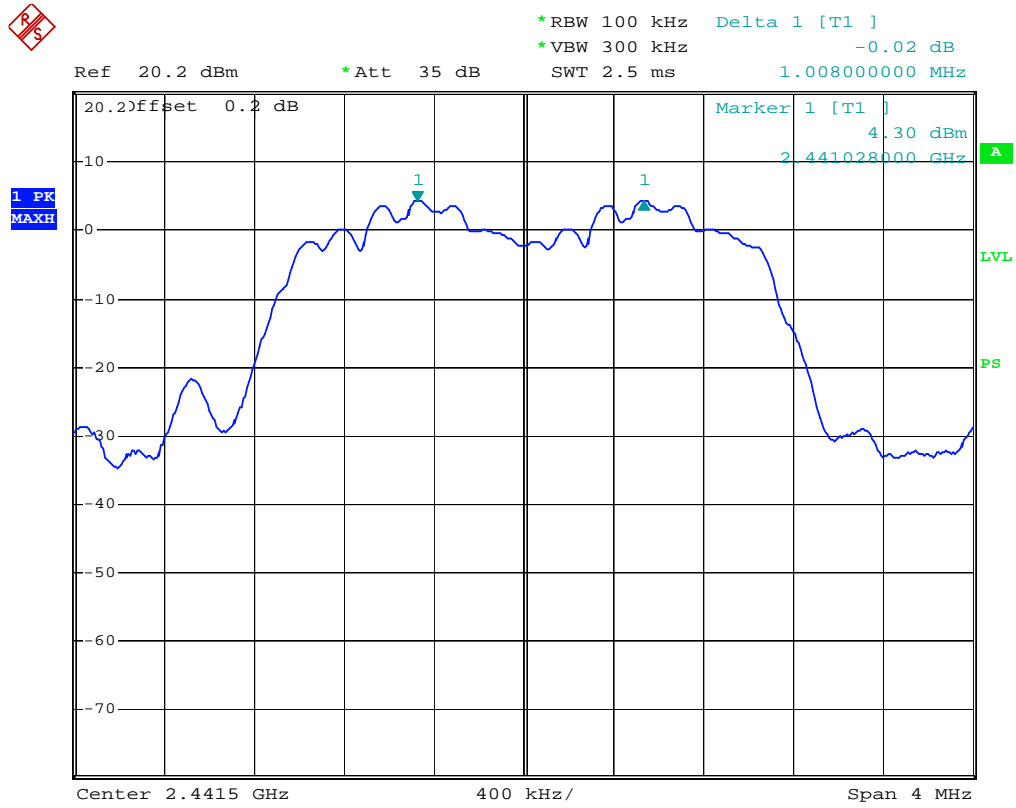
Low Channel



channel separation low channel

Date: 19.SEP.2008 13:02:47

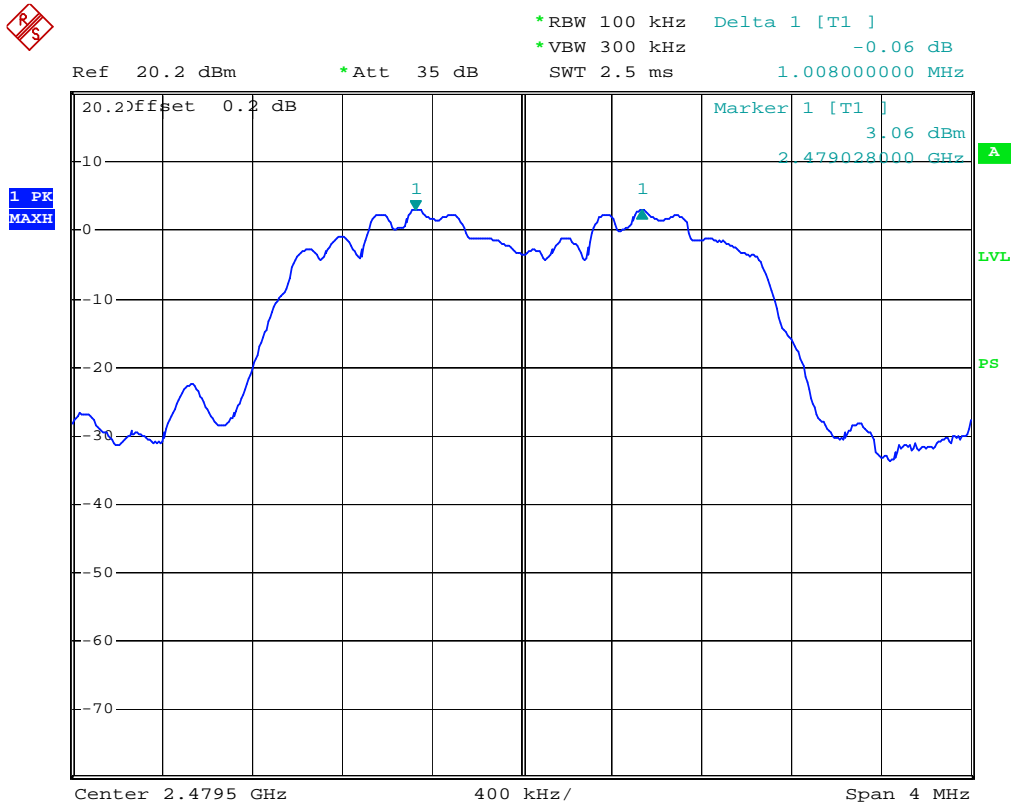
Middle Channel



channel separation middle channel

Date: 19.SEP.2008 13:01:13

High Channel



channel separation high channel

Date: 19.SEP.2008 12:48:29

CFR47 §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	2007-10-16	2008-10-16

* **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:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

* The testing was performed by Phoenix Liu on 2008-09-04 to 2008-09-19.

Test Result: Compliant.

Please refer to following tables and plots

Test Mode: Transmitting (BDR)

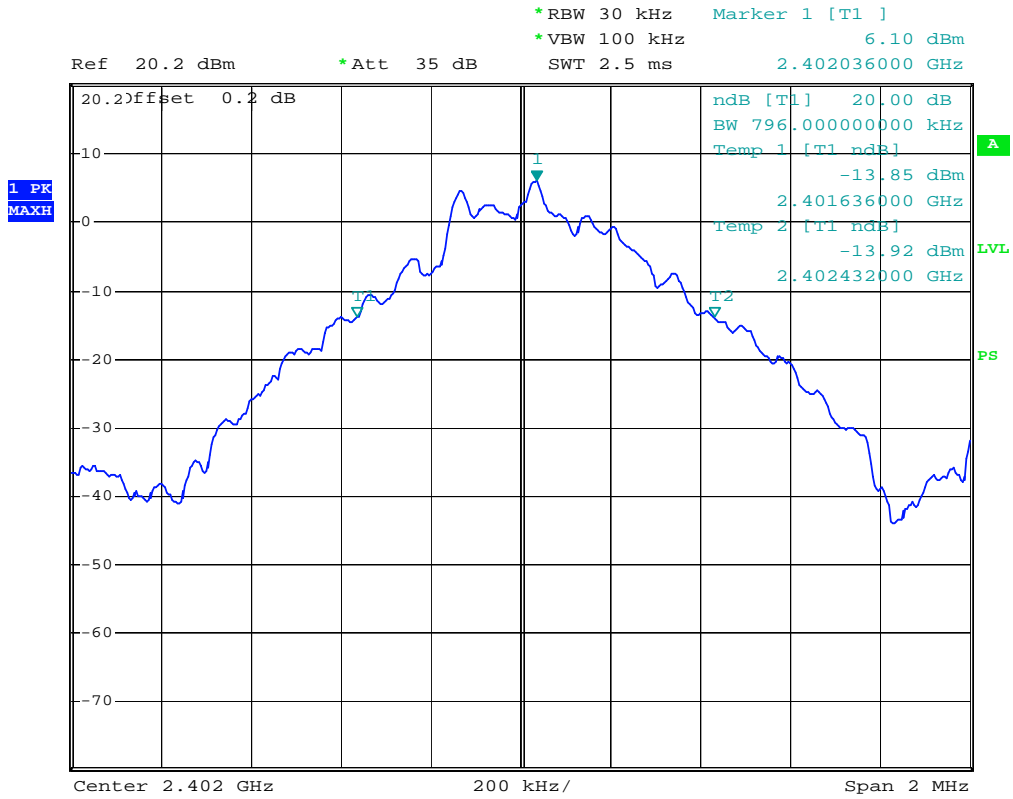
Channel	Channel Frequency (MHz)	20dB Bandwidth (MHz)
Low	2402	796
Middle	2441	800
High	2480	800

Test Mode: Transmitting (EDR)

Channel	Channel Frequency (MHz)	20dB Bandwidth (MHz)
Low	2402	1.168
Middle	2441	1.176
High	2480	1.176

Test Mode: Transmitting (BDR)

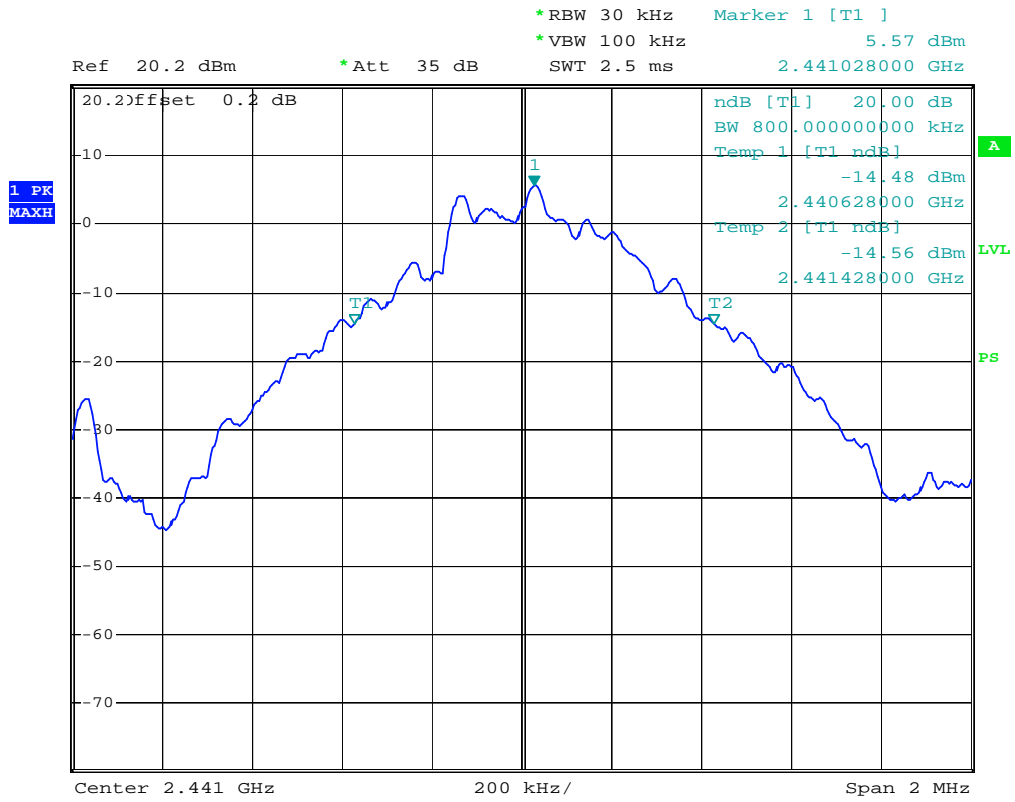
Low Channel



20dB bandwidth low

Date: 4.SEP.2008 11:44:41

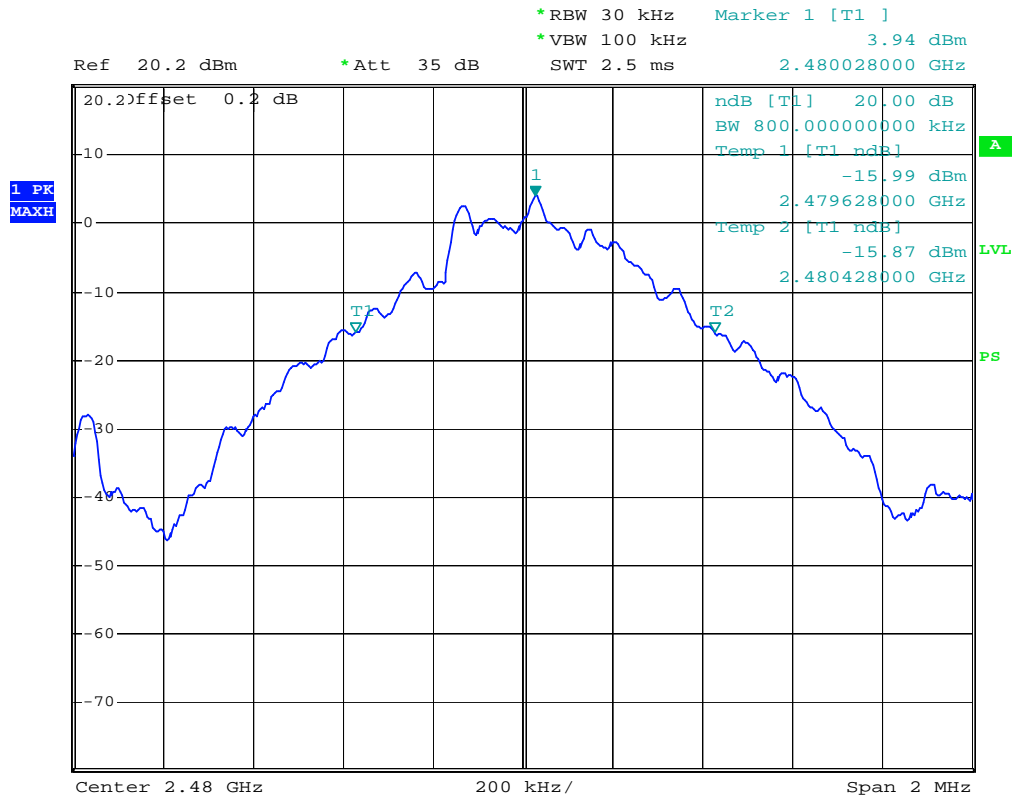
Middle Channel



20dB bandwidth middle

Date: 4.SEP.2008 11:45:20

High Channel

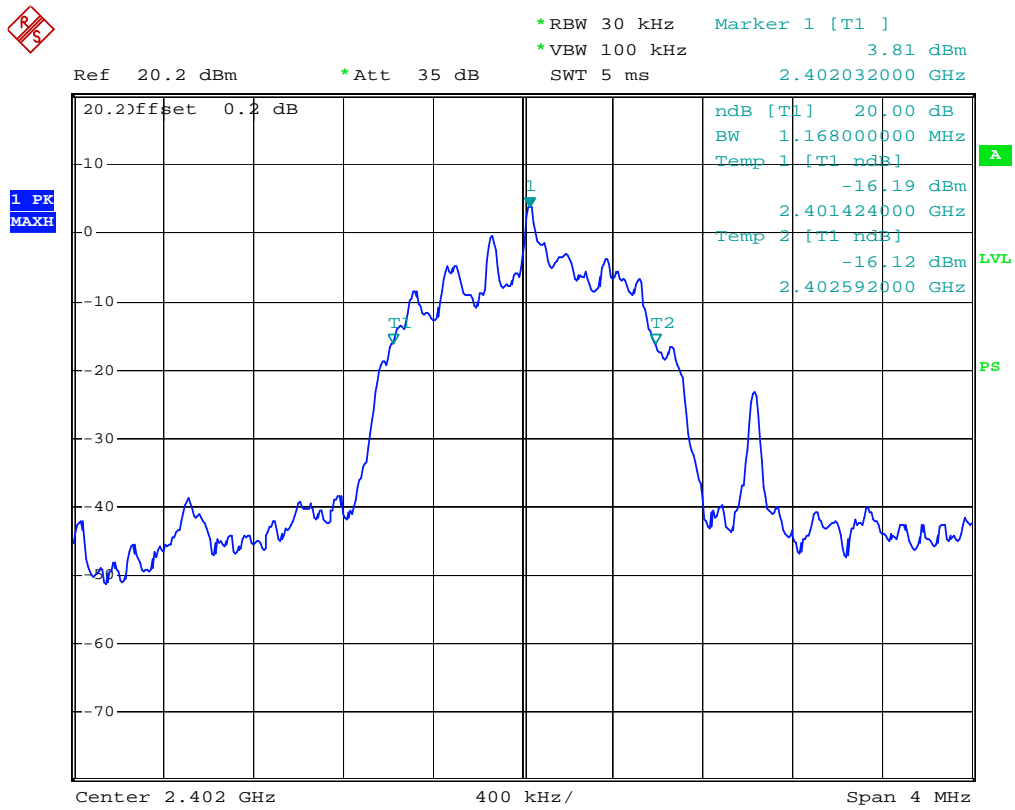


20dB bandwidth high

Date: 4.SEP.2008 11:46:01

Test Mode: Transmitting (EDR)

Low Channel



20dB bandwidth low channel
 Date: 19.SEP.2008 12:43:23

Middle Channel



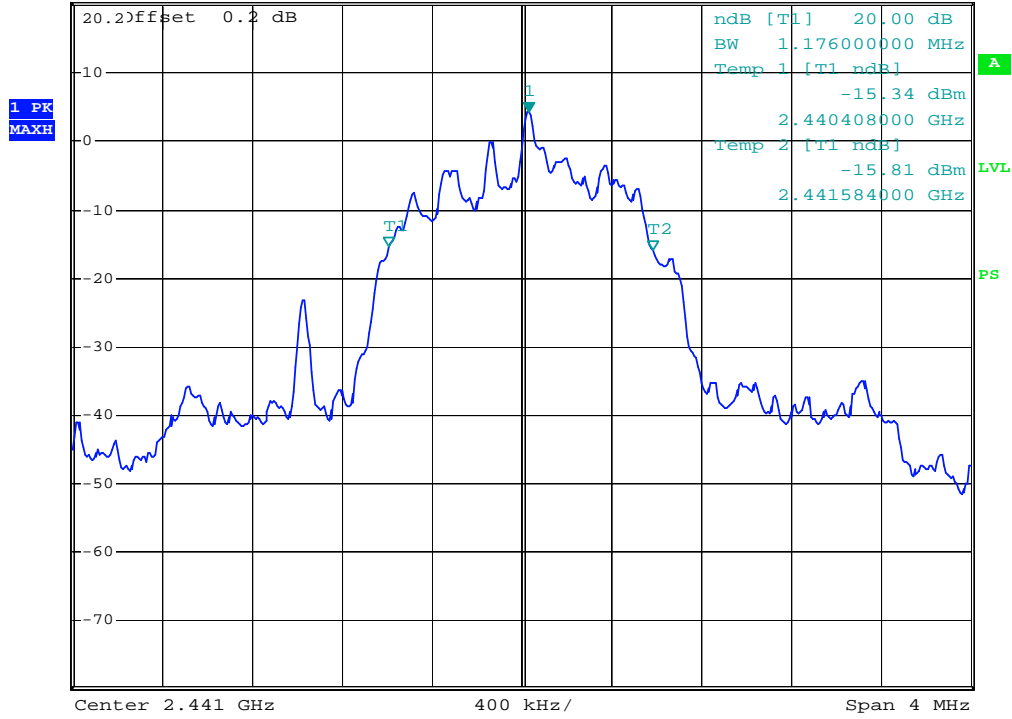
*RBW 30 kHz Marker 1 [T1]
*VBW 100 kHz 4.27 dBm
SWT 5 ms 2.441032000 GHz

Ref 20.2 dBm

*Att 35 dB

SWT 5 ms

2.441032000 GHz



20dB bandwidth middle channel

Date: 19.SEP.2008 12:42:33

High Channel

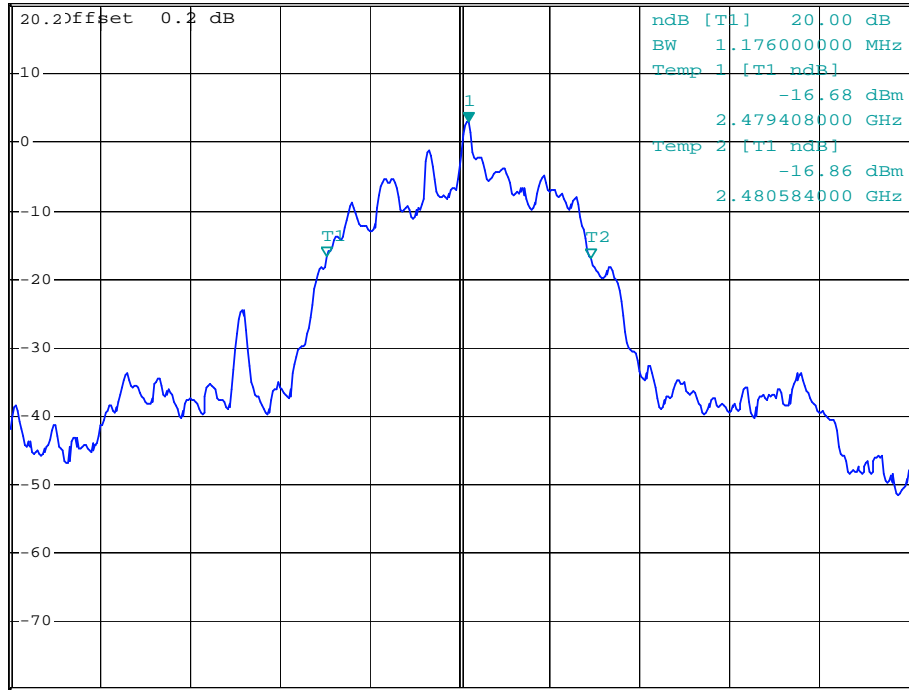


*RBW 30 kHz Marker 1 [T1]
*VBW 100 kHz 3.00 dBm
SWT 5 ms 2.480040000 GHz

Ref 20.2 dBm

*Att 35 dB

1 PR
MAXH



Center 2.48 GHz 400 kHz/ Span 4 MHz

20dB bandwidth high channel

Date: 19.SEP.2008 12:41:35

CFR47 §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	2007-10-16	2008-10-16

* **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:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

The testing was performed by Phoenix Liu on 2008-09-04.

Test Result: Compliant.

Please refer to following tables and plots

Test Mode: Transmitting (BDR)

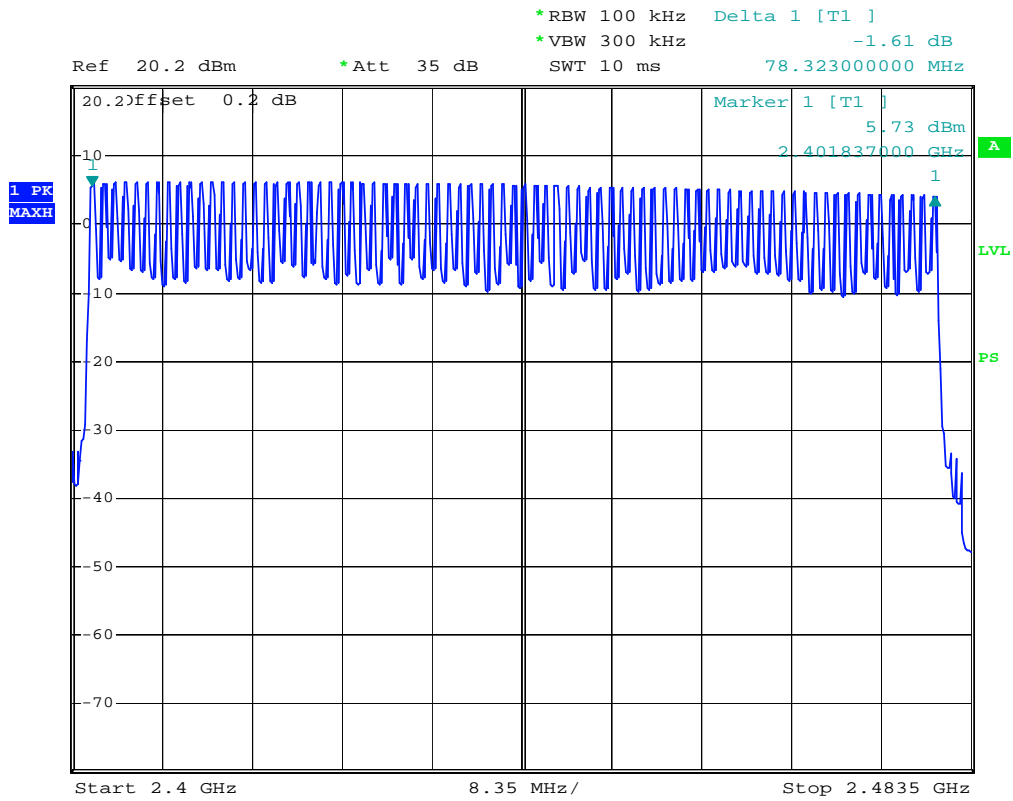
Frequency Range (MHz)	Number of Hopping Channel	Limit
2402-2480	79	>15

Test Mode: Transmitting (EDR)

Frequency Range (MHz)	Number of Hopping Channel	Limit
2402-2480	79	>15

Test Mode: Transmitting (BDR)

Number of Hopping Channels

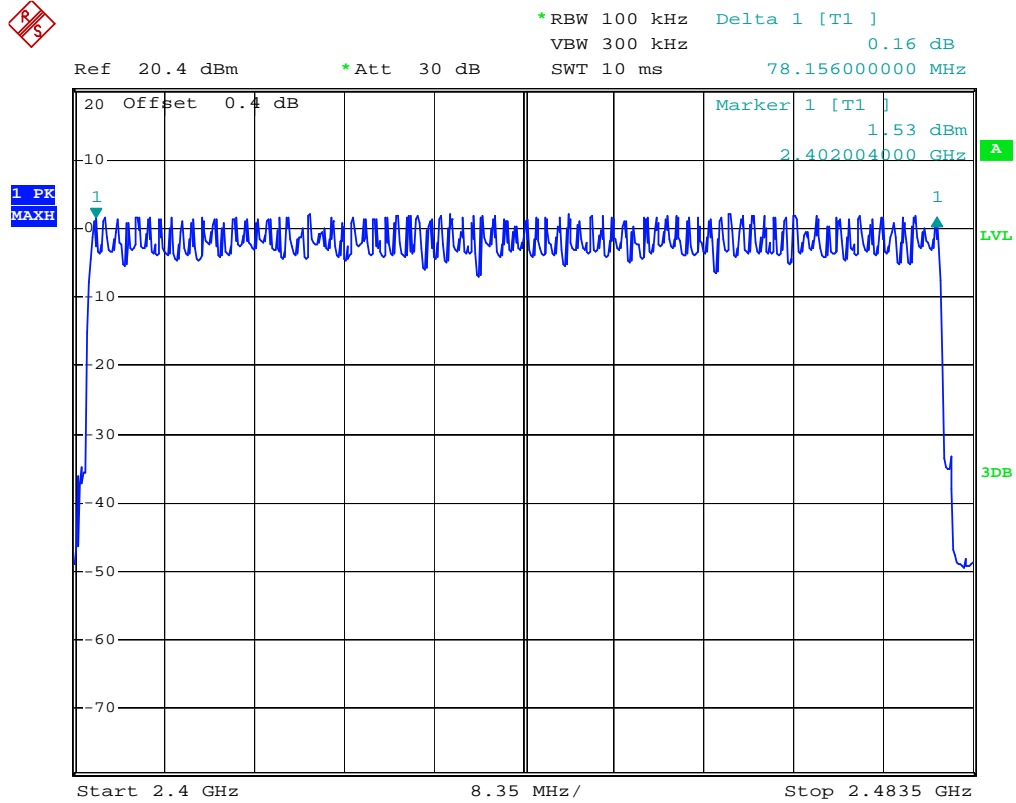


hopping channels

Date: 4.SEP.2008 11:43:32

Test Mode: Transmitting (EDR)

Number of Hopping Channels



hopping channels EDR

Date: 11.AUG.2008 11:44:22

CFR47 §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	2007-10-16	2008-10-16

* **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:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

* The testing was performed by Phoenix Liu on 2008-09-04 to 2008-09-19.

Test Result: Compliant.

Please refer to following tables and plots

Test Mode: Transmitting (BDR)

DH 1

Channel	Pulse width (ms)	Dwell time (s)	Limit (s)	Result
Low	0.540	0.1728	0.4	Pass
Middle	0.540	0.1728	0.4	Pass
High	0.540	0.1728	0.4	Pass

NOTE: Dwell time=Pulse width (ms) \times (1600 \div 2 \div 79) \times 31.6 Second

DH 3

Channel	Pulse width (ms)	Dwell time (s)	Limit (s)	Result
Low	1.810	0.2896	0.4	Pass
Middle	1.810	0.2896	0.4	Pass
High	1.810	0.2896	0.4	Pass

NOTE: Dwell time=Pulse width (ms) \times (1600 \div 4 \div 79) \times 31.6 Second

DH 5

Channel	Pulse width (ms)	Dwell time (s)	Limit (s)	Result
Low	3.080	0.3285	0.4	Pass
Middle	3.080	0.3285	0.4	Pass
High	3.100	0.3307	0.4	Pass

NOTE: Dwell time=Pulse width (ms) \times (1600 \div 6 \div 79) \times 31.6 Second

Test Mode: Transmitting (EDR)

DH 1

Channel	Pulse width (ms)	Dwell time (s)	Limit (s)	Result
Low	0.445	0.1424	0.4	Pass
Middle	0.445	0.1424	0.4	Pass
High	0.445	0.1424	0.4	Pass

NOTE: Dwell time=Pulse width (ms) \times (1600 \div 2 \div 79) \times 31.6 Second

DH 3

Channel	Pulse width (ms)	Dwell time (s)	Limit (s)	Result
Low	0.820	0.118	0.4	Pass
Middle	0.820	0.122	0.4	Pass
High	0.820	0.123	0.4	Pass

NOTE: Dwell time=Pulse width (ms) \times (1600 \div 4 \div 79) \times 31.6 Second

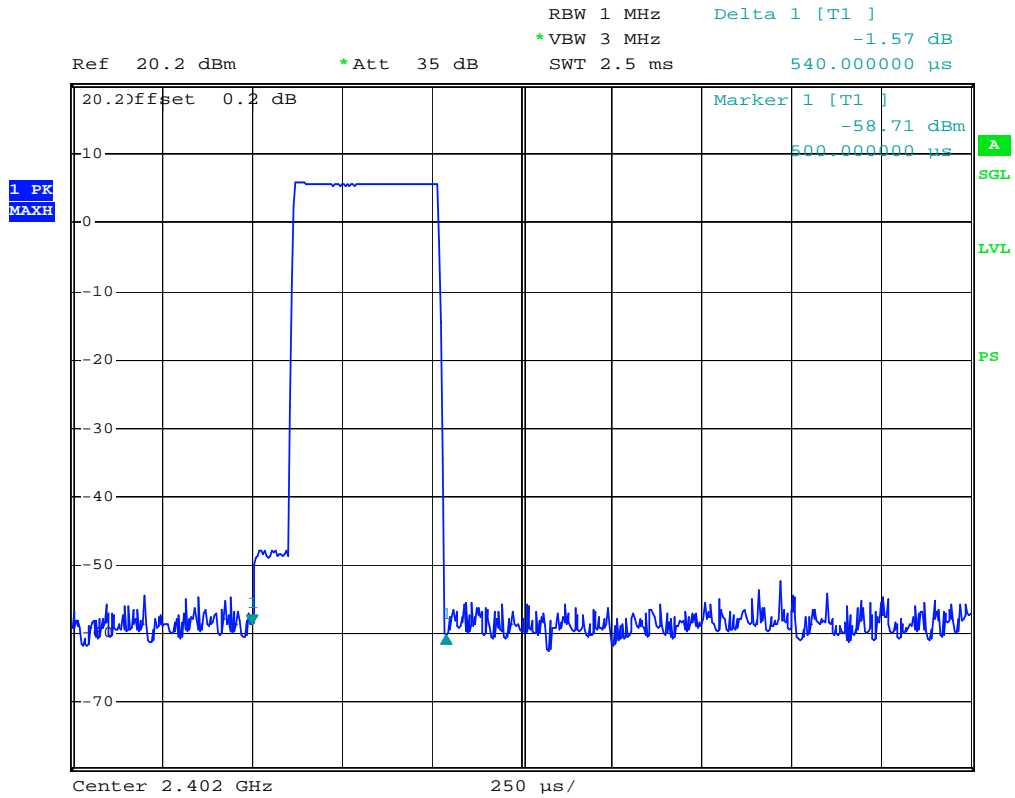
DH 5

Channel	Pulse width (ms)	Dwell time (s)	Limit (s)	Result
Low	1.240	0.1323	0.4	Pass
Middle	1.240	0.1323	0.4	Pass
High	1.240	0.1323	0.4	Pass

NOTE: Dwell time=Pulse width (ms) \times (1600 \div 6 \div 79) \times 31.6 Second

Test Mode: Transmitting (BDR)

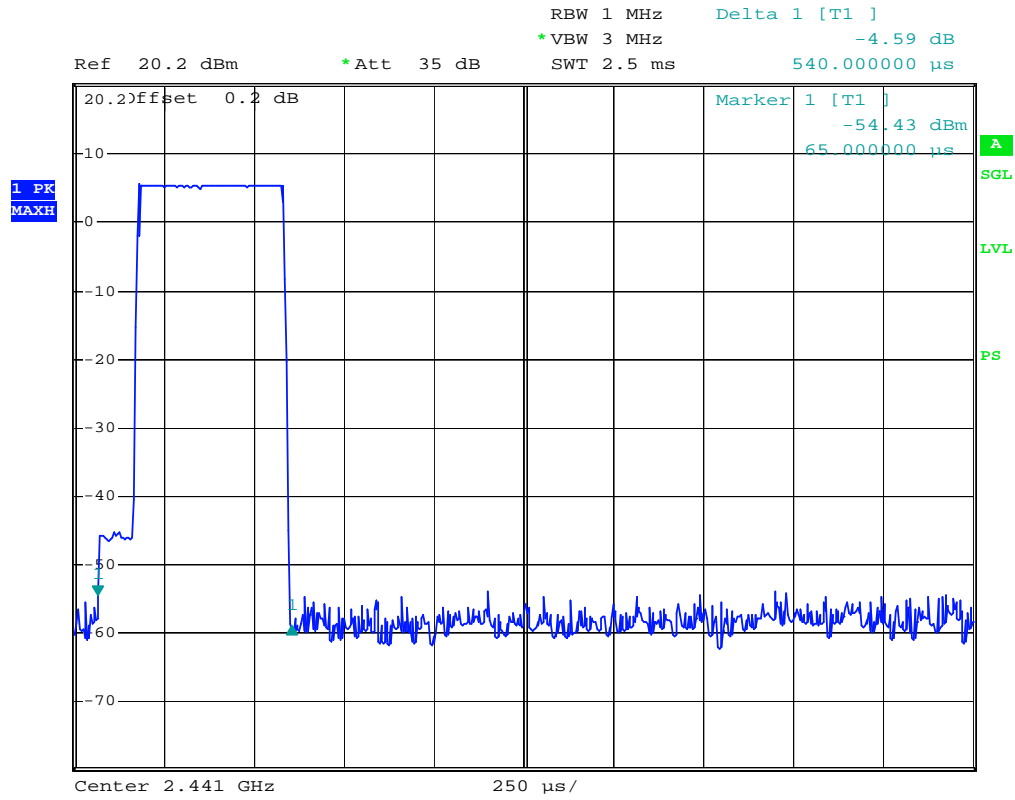
Low Channel for DH1



dwll time low channel DH1

Date: 4.SEP.2008 12:02:51

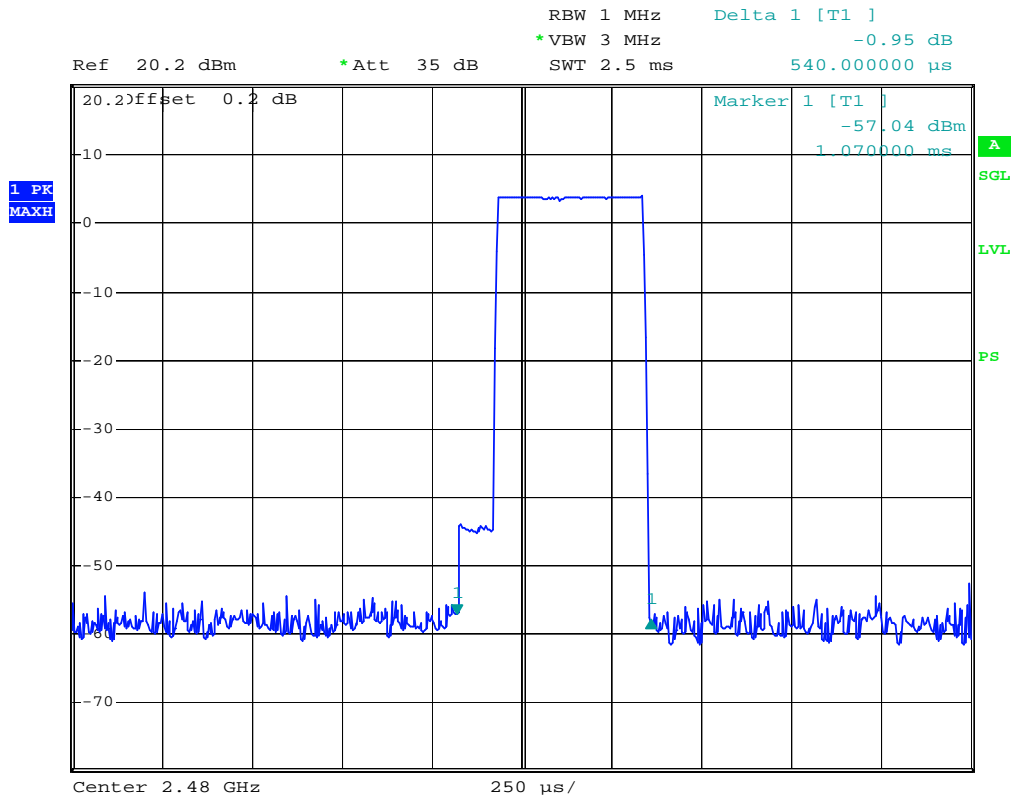
Middle Channel for DH1



dwll time middle channel DH1

Date: 4.SEP.2008 12:04:07

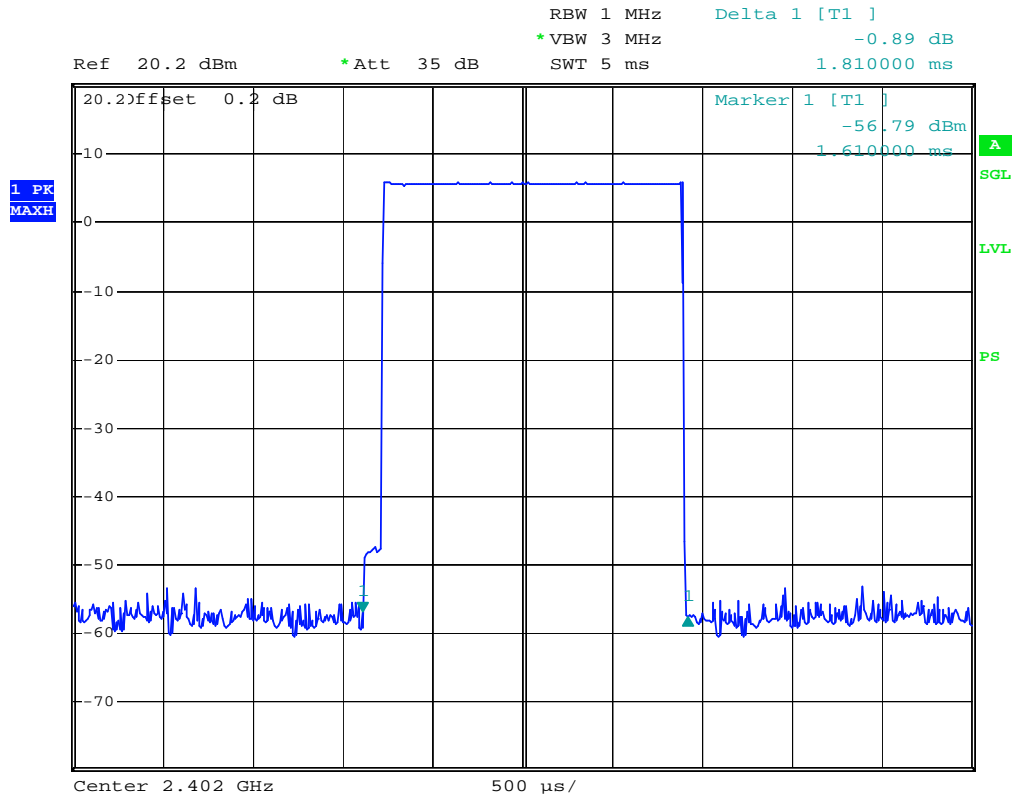
High Channel for DH1



dwll time high channel DH1

Date: 4.SEP.2008 12:05:02

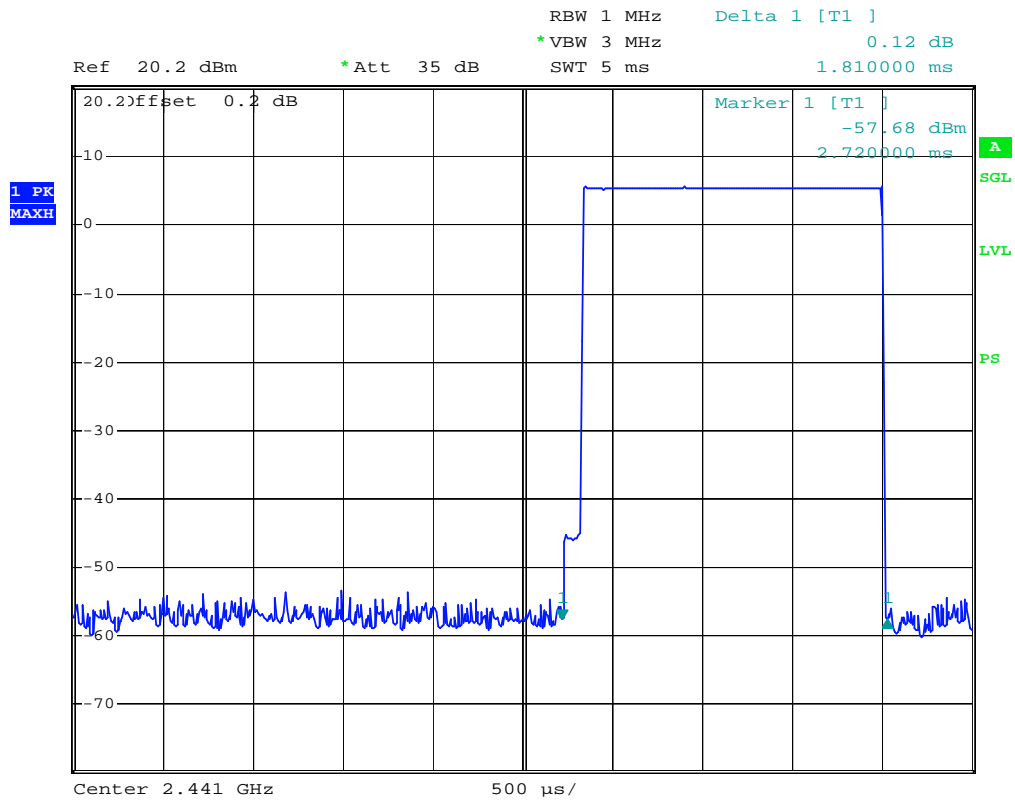
Low Channel for DH3



dwll time low channel DH3

Date: 4.SEP.2008 13:11:53

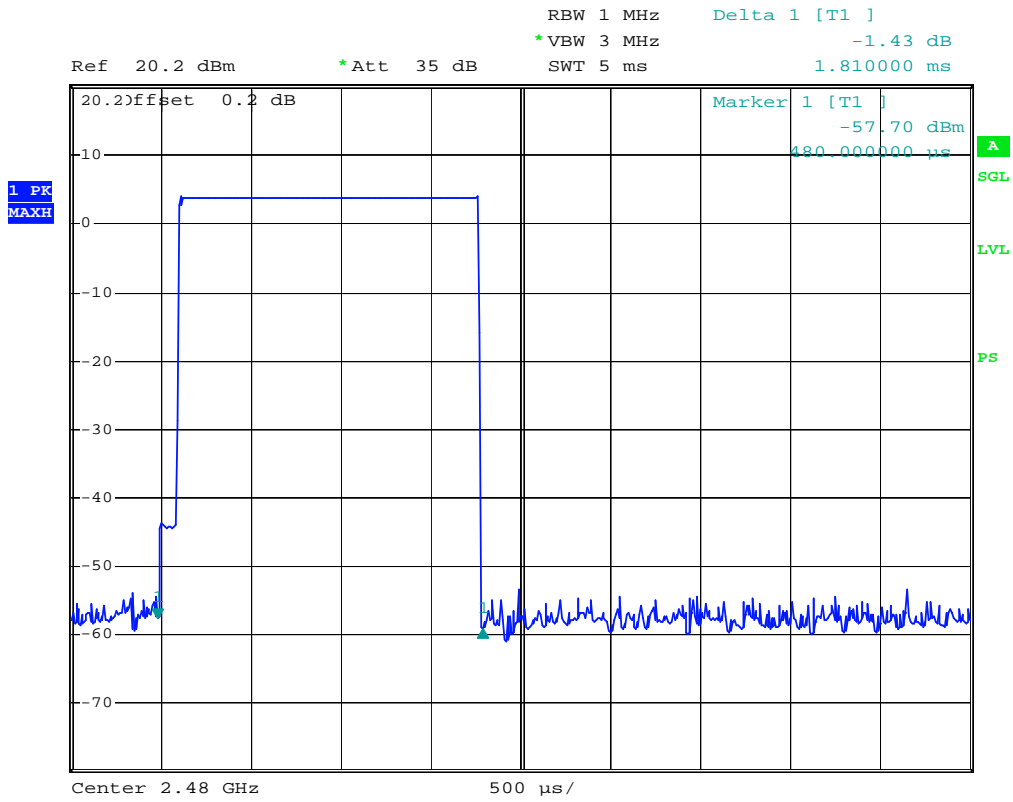
Middle Channel for DH3



dwll time middle channel DH3

Date: 4.SEP.2008 13:13:42

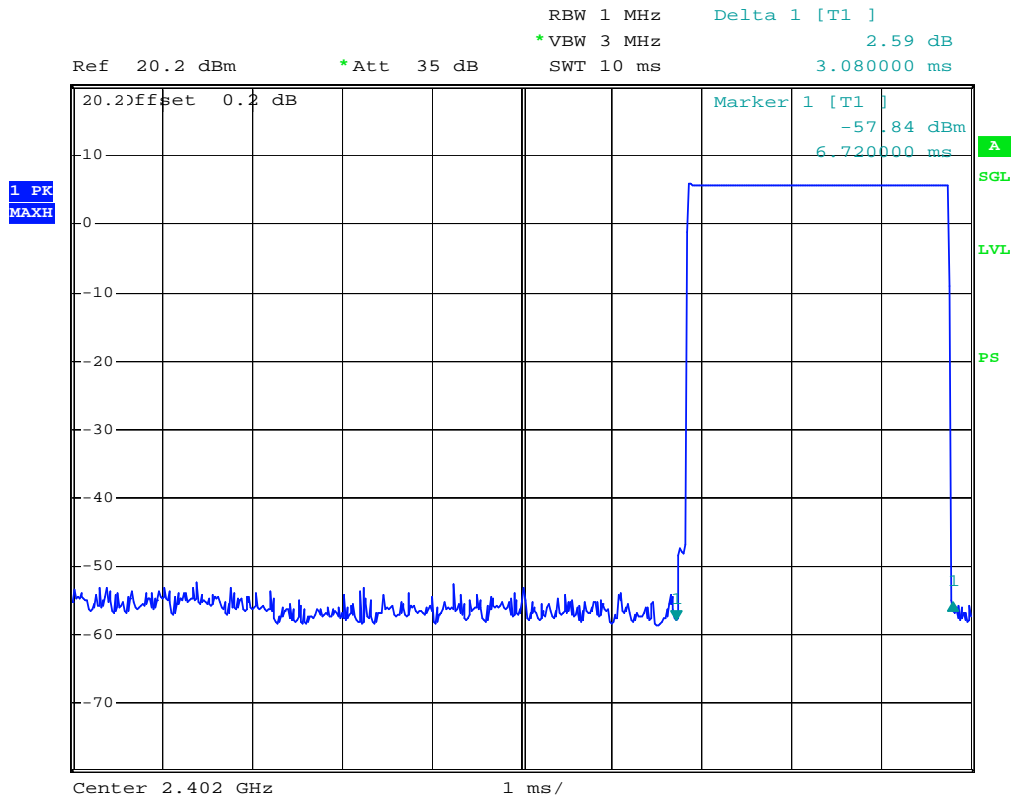
High Channel for DH3



dwll time high channel DH3

Date: 4.SEP.2008 13:15:33

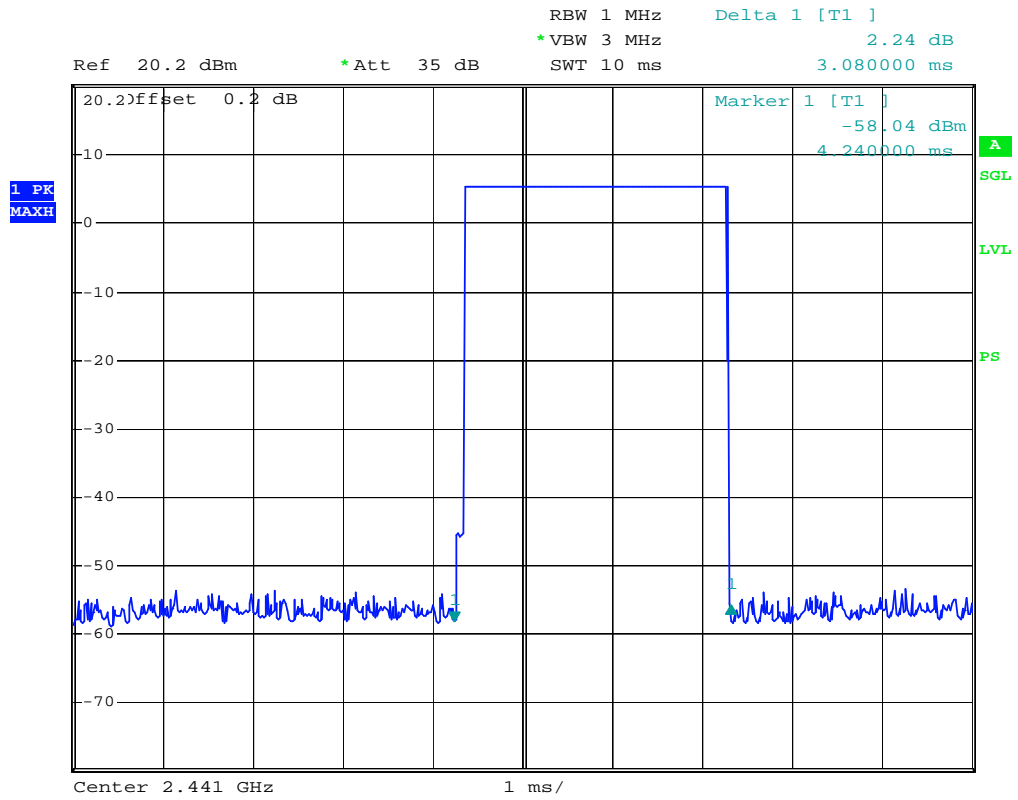
Low Channel for DH5



dwll time low channel DH5

Date: 4.SEP.2008 13:21:02

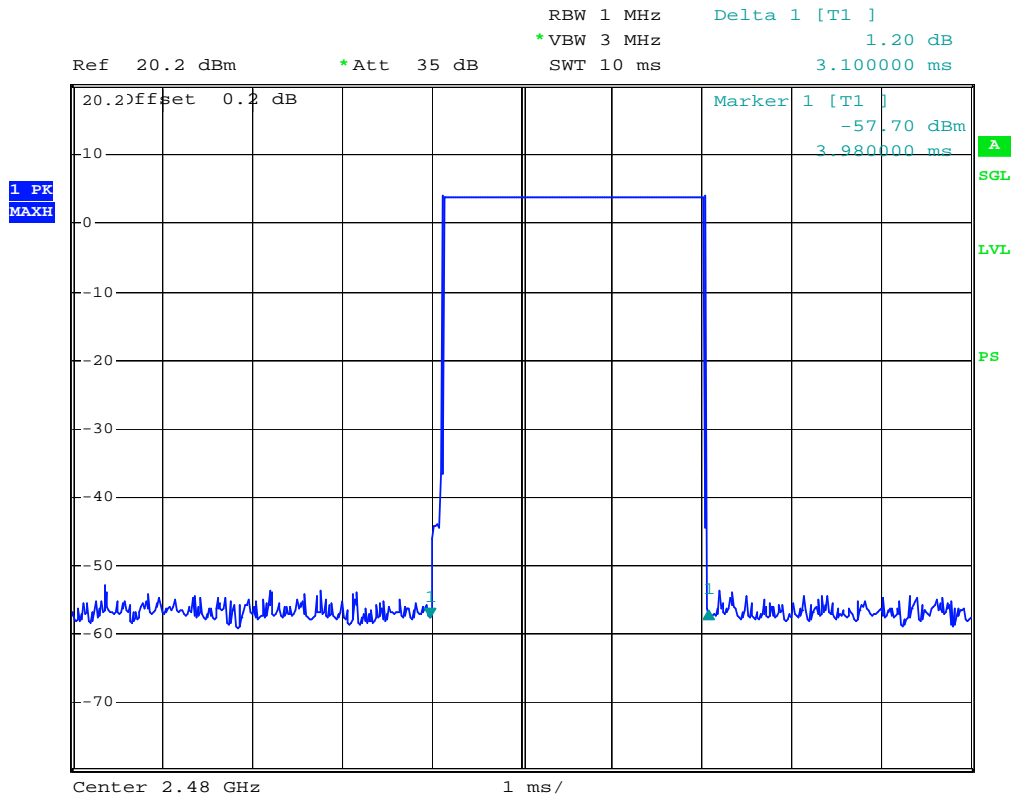
Middle Channel for DH5



dwll time middle channel DH5

Date: 4.SEP.2008 13:19:28

High Channel for DH5

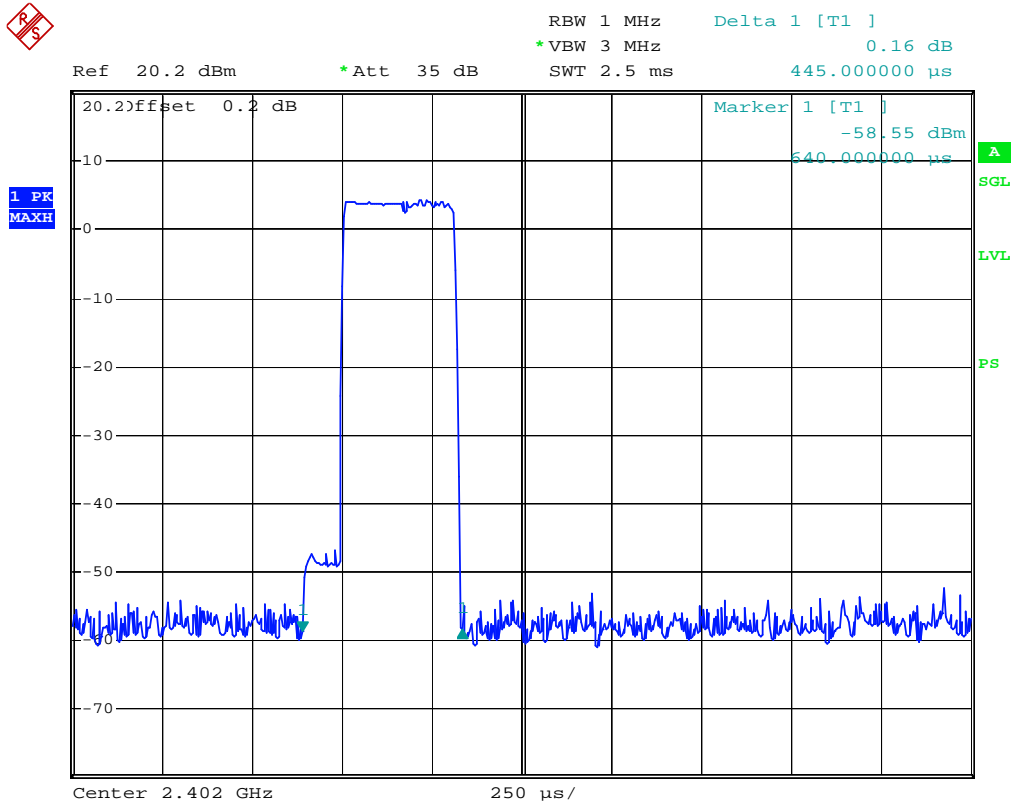


dwll time high channel DH5

Date: 4.SEP.2008 13:17:13

Test Mode: Transmitting (EDR)

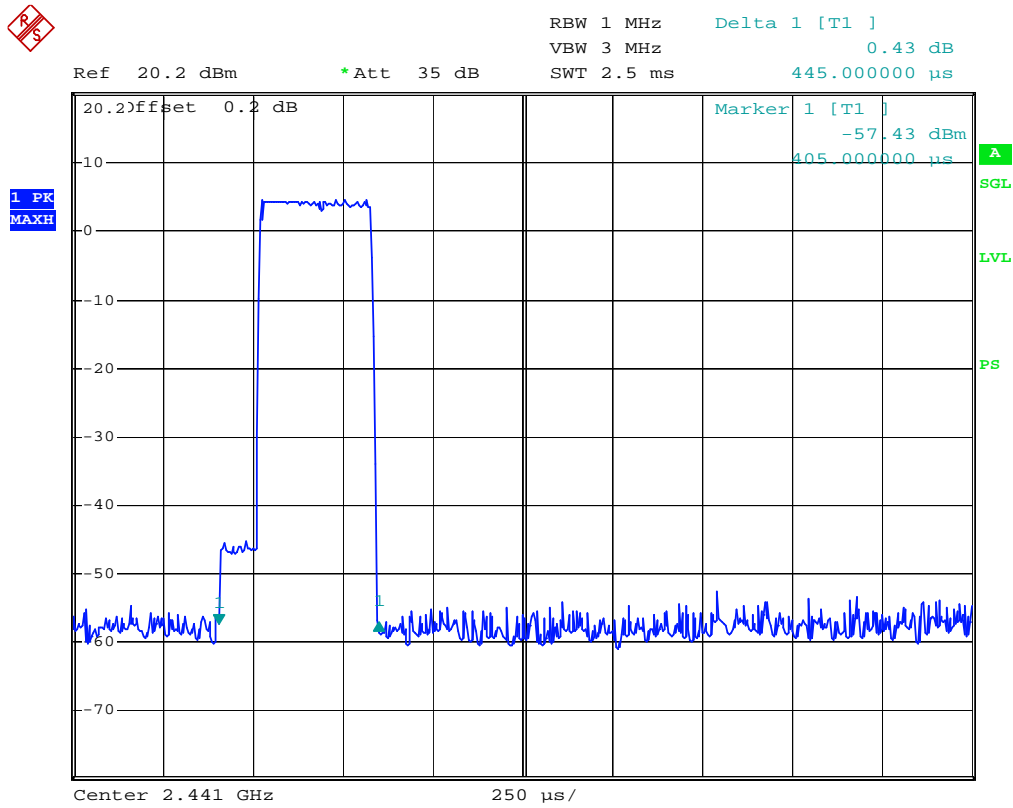
Low Channel for DH1



dwll time low channel DH1 EDR

Date: 19.SEP.2008 13:43:56

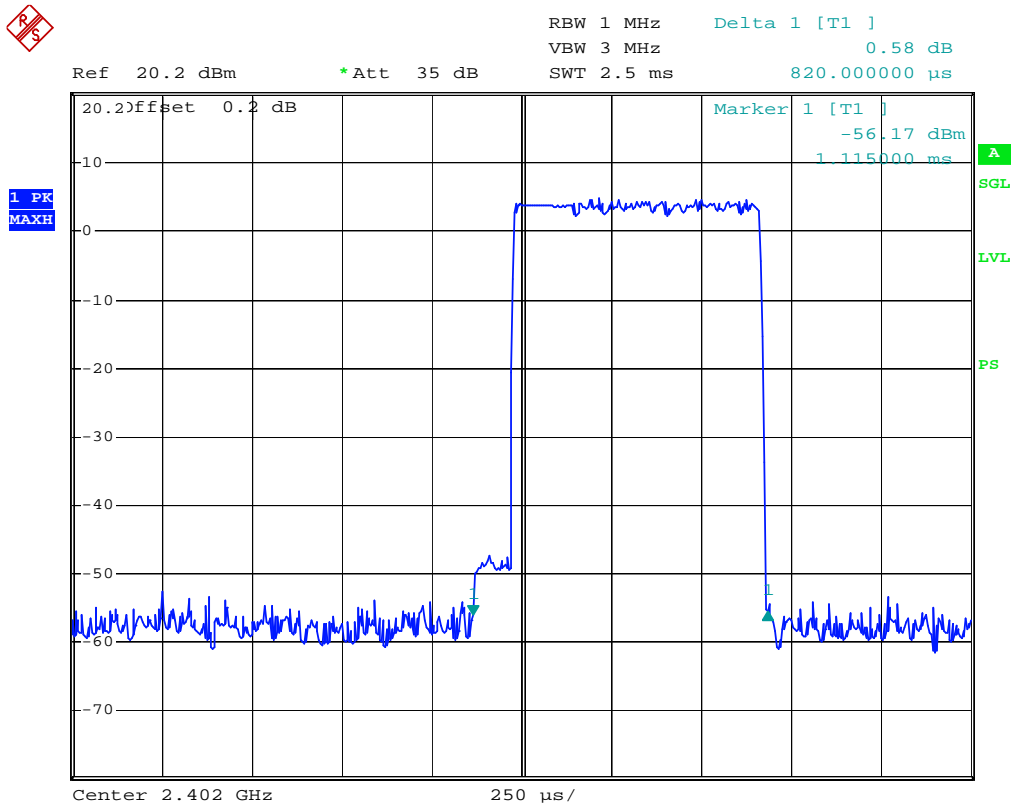
Middle Channel for DH1



dwll time middle channel DH1 EDR

Date: 19.SEP.2008 13:46:21

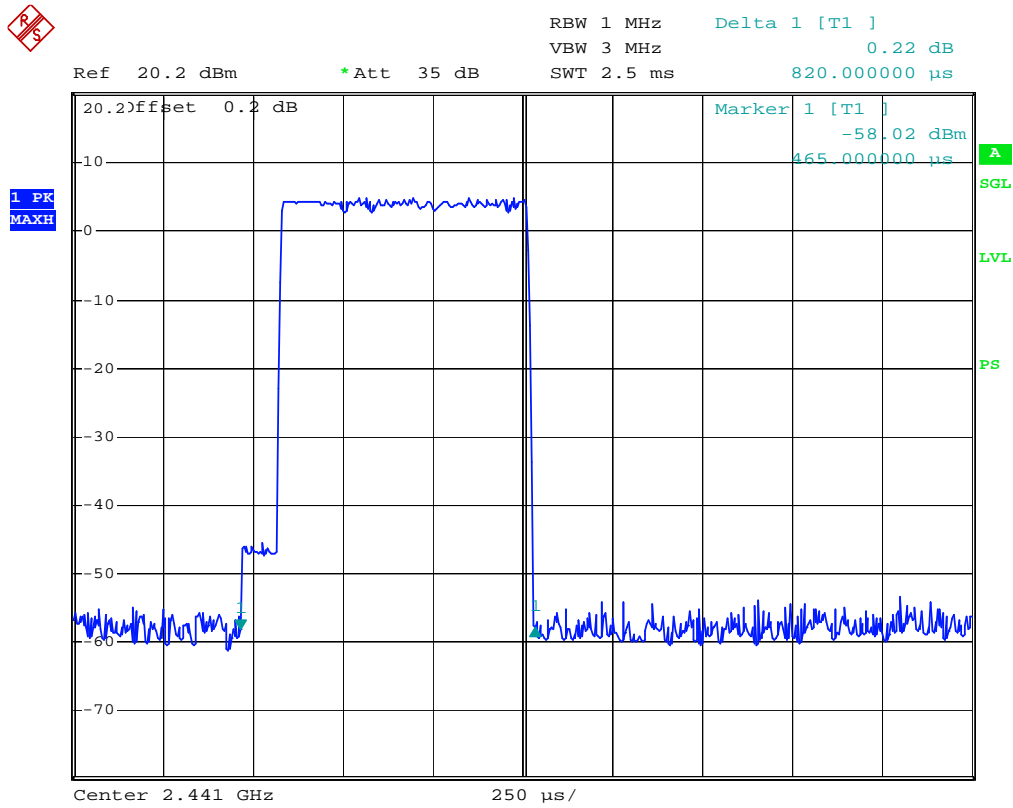
Low Channel for DH3



dwll time low channel DH3 EDR

Date: 19.SEP.2008 13:51:33

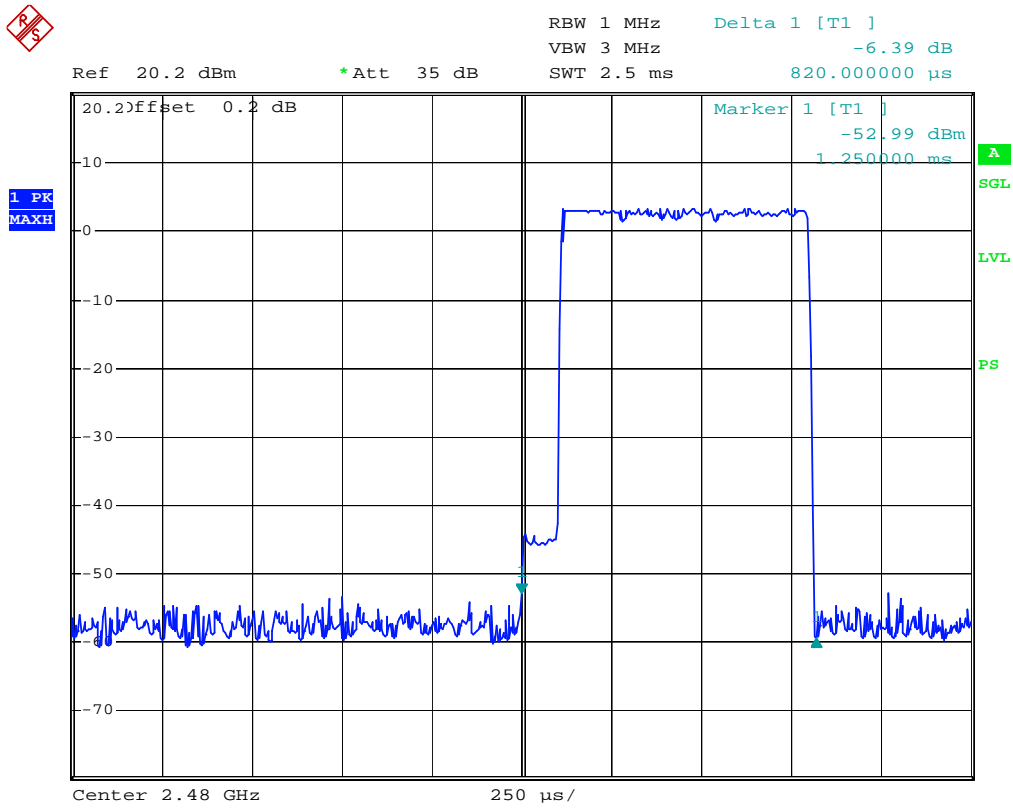
Middle Channel for DH3



dwll time middle channel DH3 EDR

Date: 19.SEP.2008 13:50:47

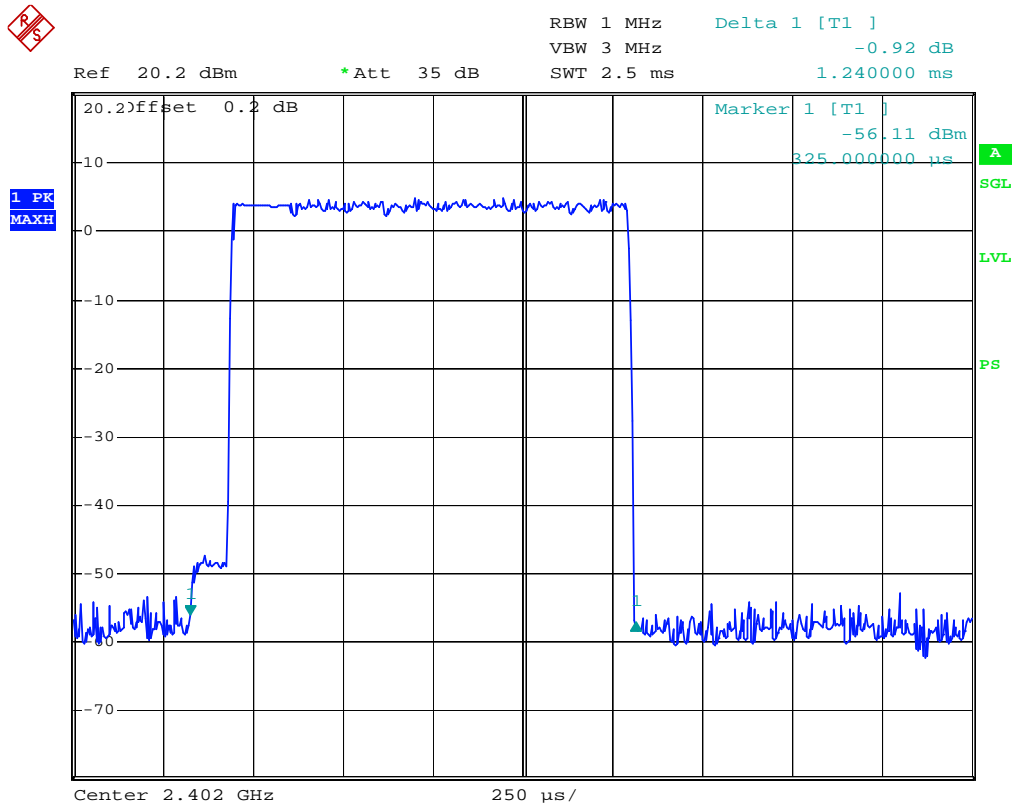
High Channel for DH3



dwll time high channel DH3 EDR

Date: 19.SEP.2008 13:49:35

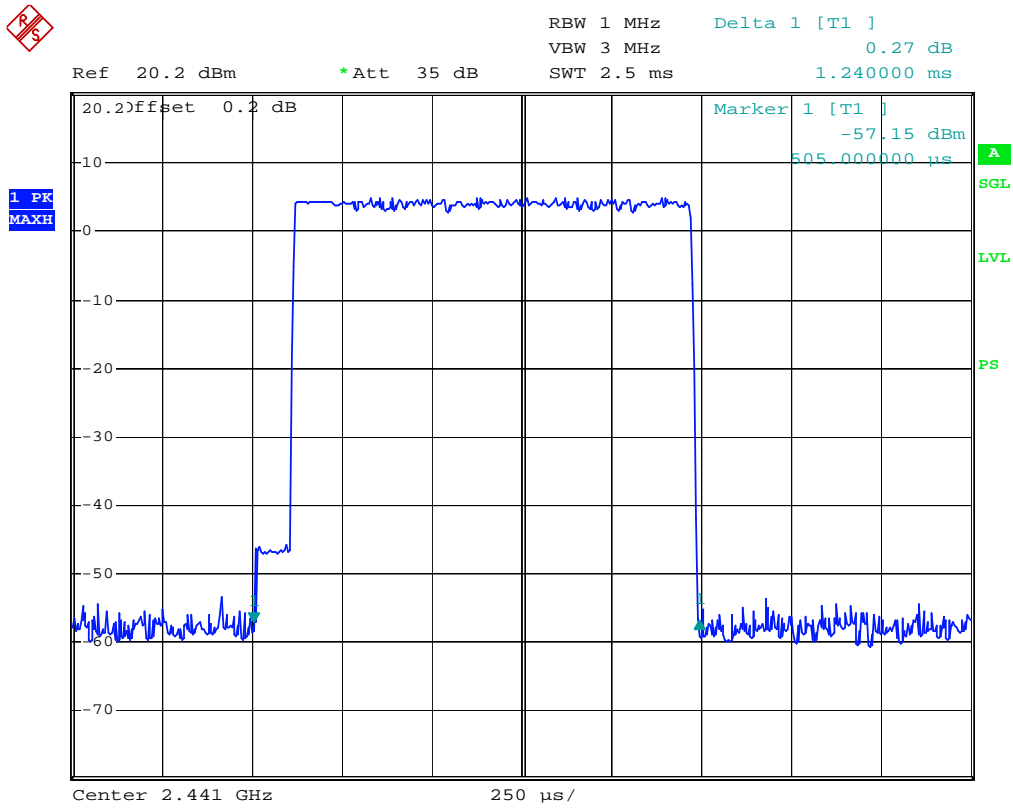
Low Channel for DH5



dwll time low channel DH5 EDR

Date: 19.SEP.2008 13:53:49

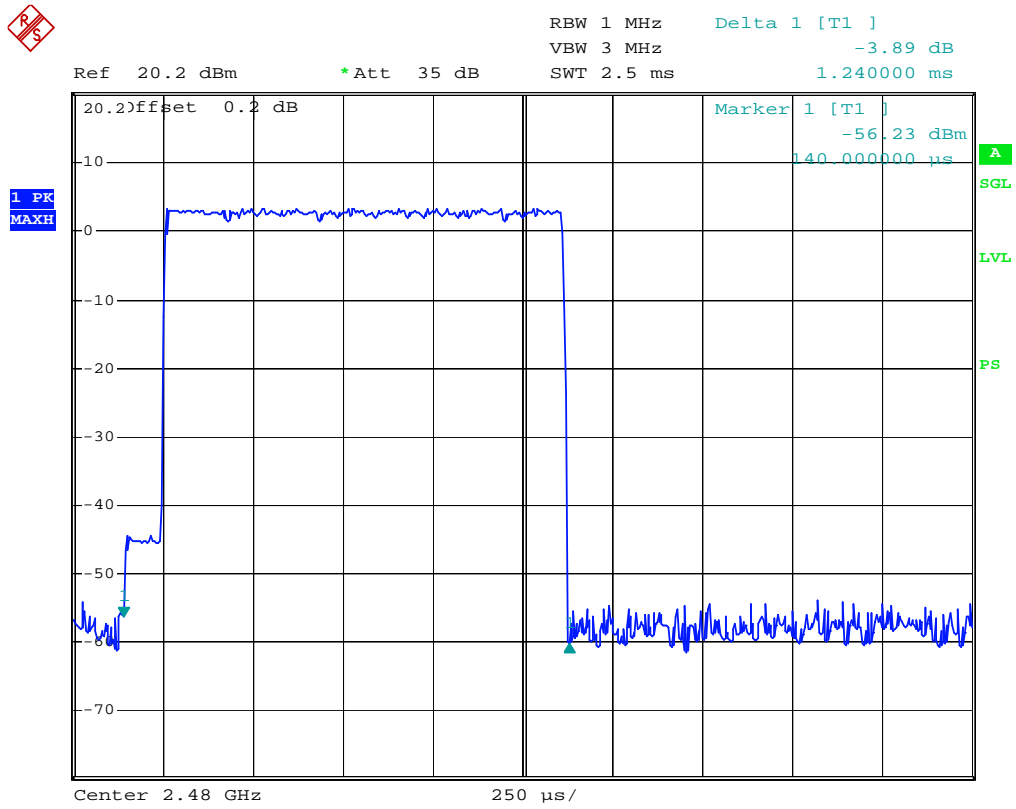
Middle Channel for DH5



dwll time middle channel DH5 EDR

Date: 19.SEP.2008 13:55:55

High Channel for DH5



dwell time high channel DH5 EDR

Date: 19.SEP.2008 13:56:40

CFR47 §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.

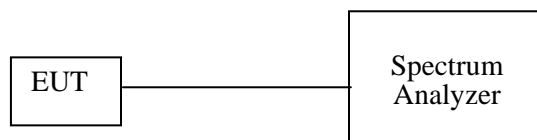
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-10-16	2008-10-16

* **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:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

* The testing was performed by Phoenix Liu on 2008-09-26.

Test Result: Compliant.

Please refer to following tables and plots

Test Mode: Transmitting (BDR)

Channel	Channel Frequency (MHz)	Reading Power (dBm)	Power Output (mw)	Limit (mw)
Low	2402	2.91	1.954	125
Mid	2441	3.13	2.056	125
High	2480	3.02	2.004	125

Note: Typical Antenna Gain =0dBi

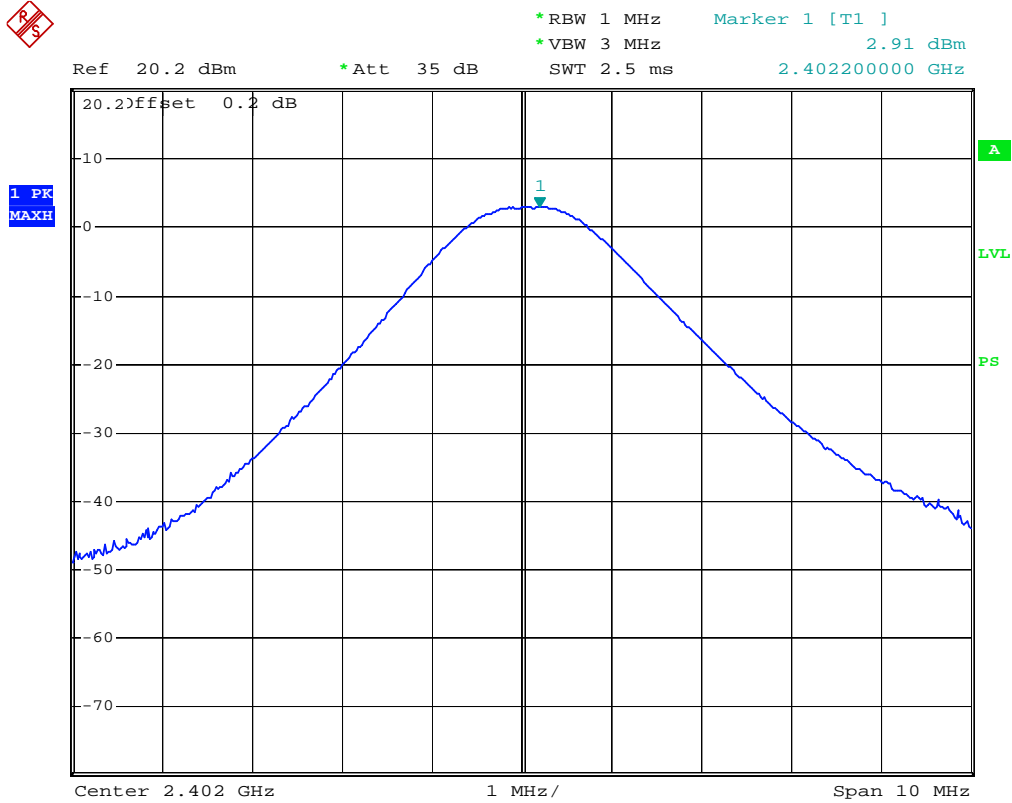
Test Mode: Transmitting (EDR)

Channel	Channel Frequency (MHz)	Reading Power (dBm)	Power Output (mw)	Limit (mw)
Low	2402	3.53	2.254	125
Mid	2441	3.76	2.377	125
High	2480	3.56	2.270	125

Note: Typical Antenna Gain =0dBi

Test Mode: Transmitting (BDR)

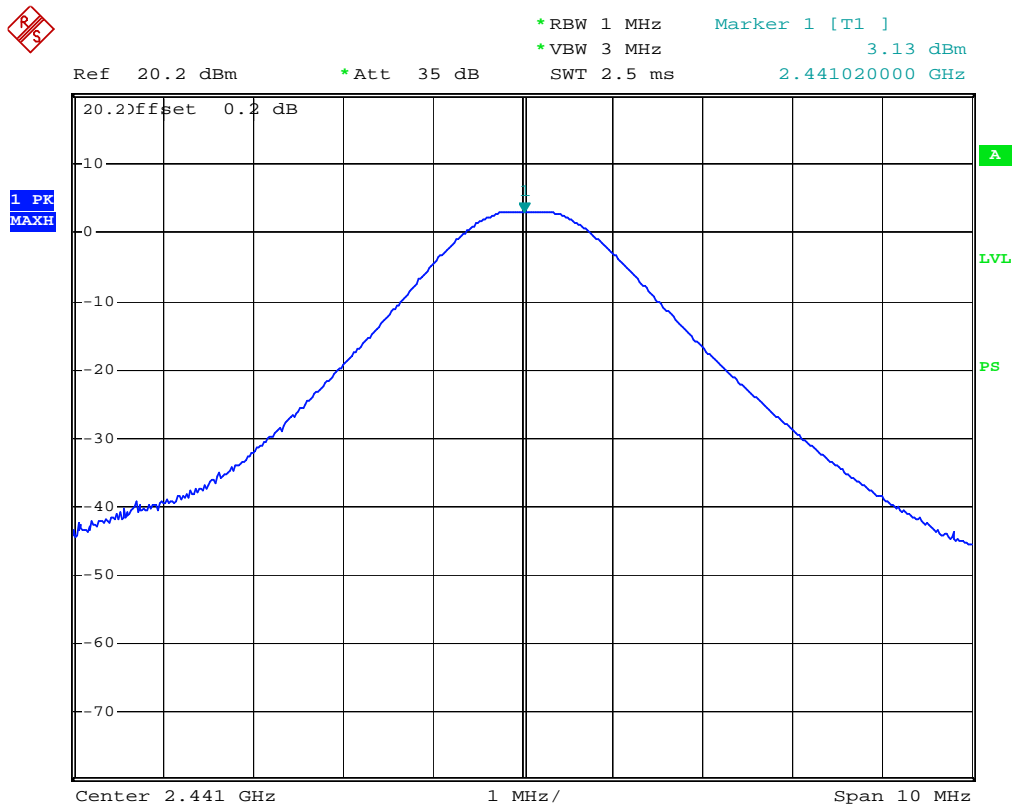
Low Channel



peak of output power low channel

Date: 26.SEP.2008 14:39:43

Middle Channel



peak of output power middle channel

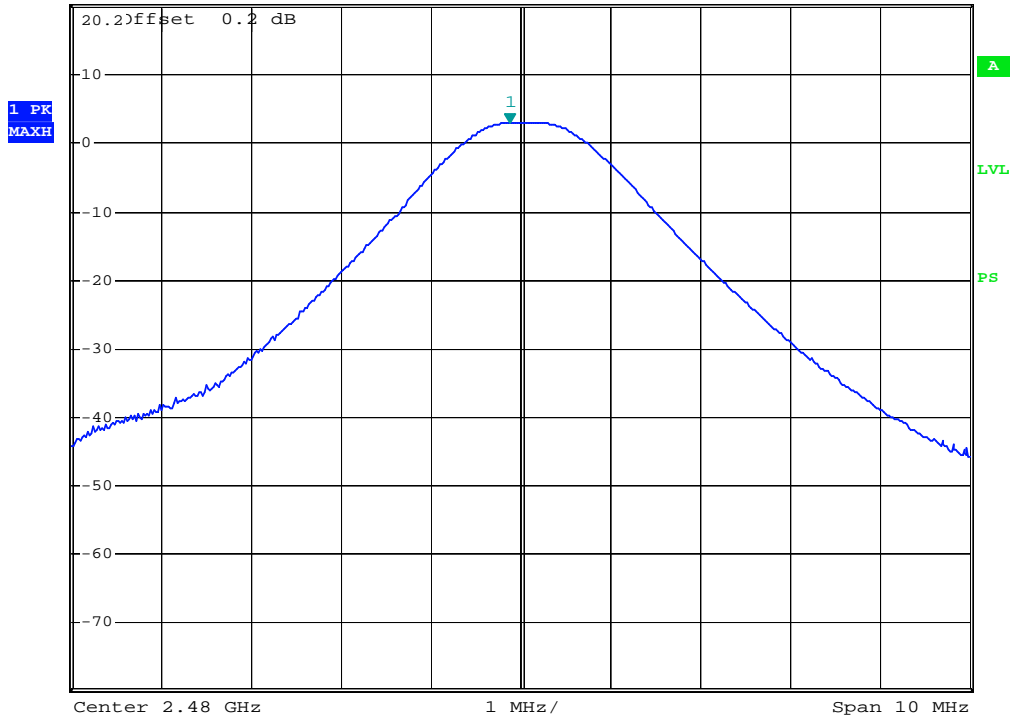
Date: 26.SEP.2008 14:37:06

High Channel



*RBW 1 MHz Marker 1 [T1]
*VBW 3 MHz 3.02 dBm
SWT 2.5 ms 2.479880000 GHz

Ref 20.2 dBm *Att 35 dB

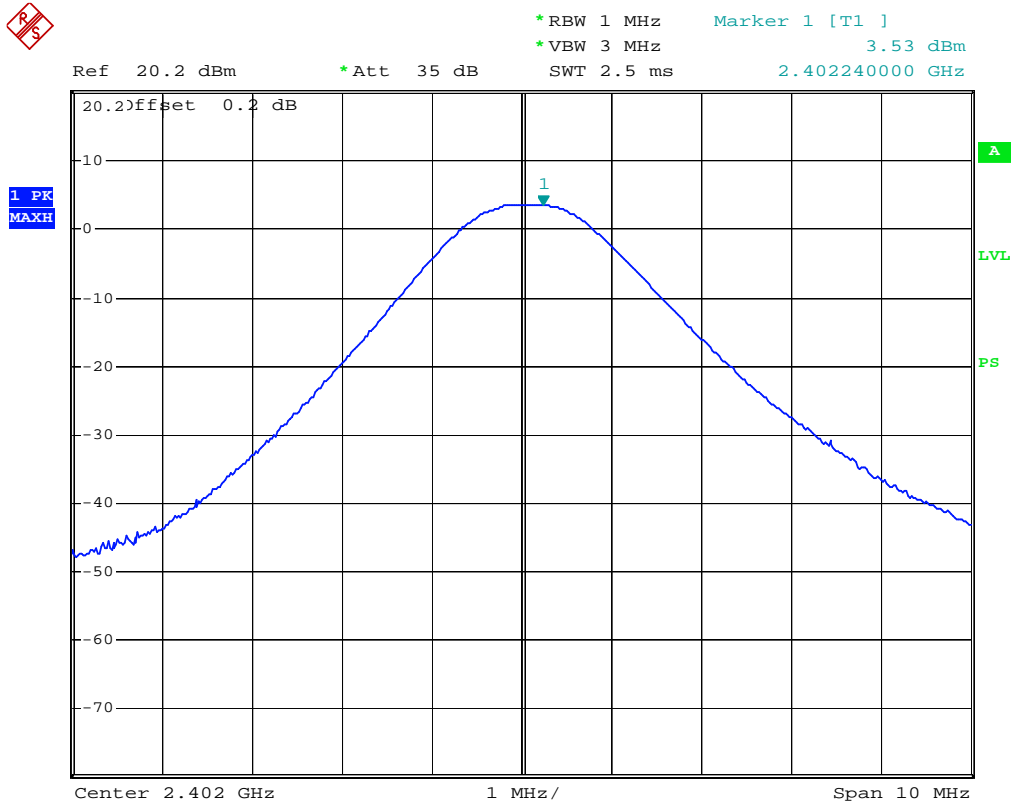


peak of output power high channel

Date: 26.SEP.2008 14:37:49

Test Mode: Transmitting (EDR)

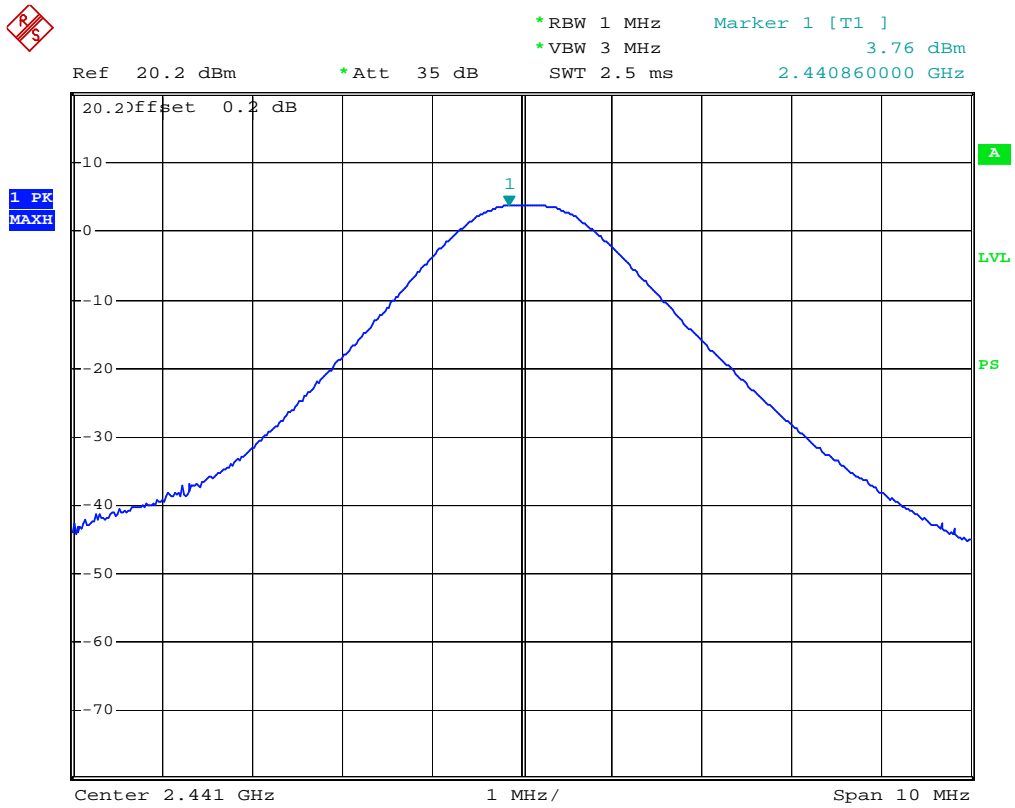
Low Channel



peak of output power low channel

Date: 26.SEP.2008 14:39:16

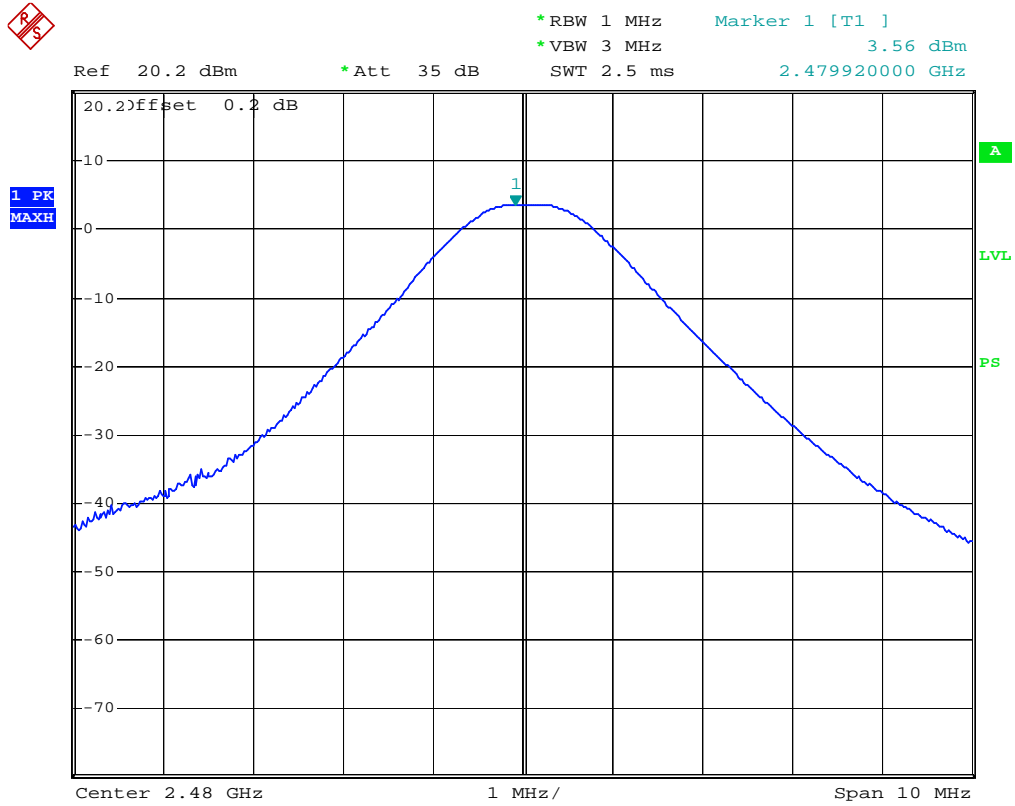
Middle Channel



peak of output power middle channel

Date: 26.SEP.2008 14:36:36

High Channel



peak of output power high channel

Date: 26.SEP.2008 14:38:32

CFR47 §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	2007-10-16	2008-10-16

* **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. For conducted measurements the transmitter shall be connected to the measuring equipment.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz 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:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

**The testing was performed by Phoenix Liu on 2008-09-26.*

Test Result: Compliant

Please refer to the following table and plots.

Test Mode: Transmitting (BDR)

Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)
2399.900	57.85	20
2483.600	57.50	20

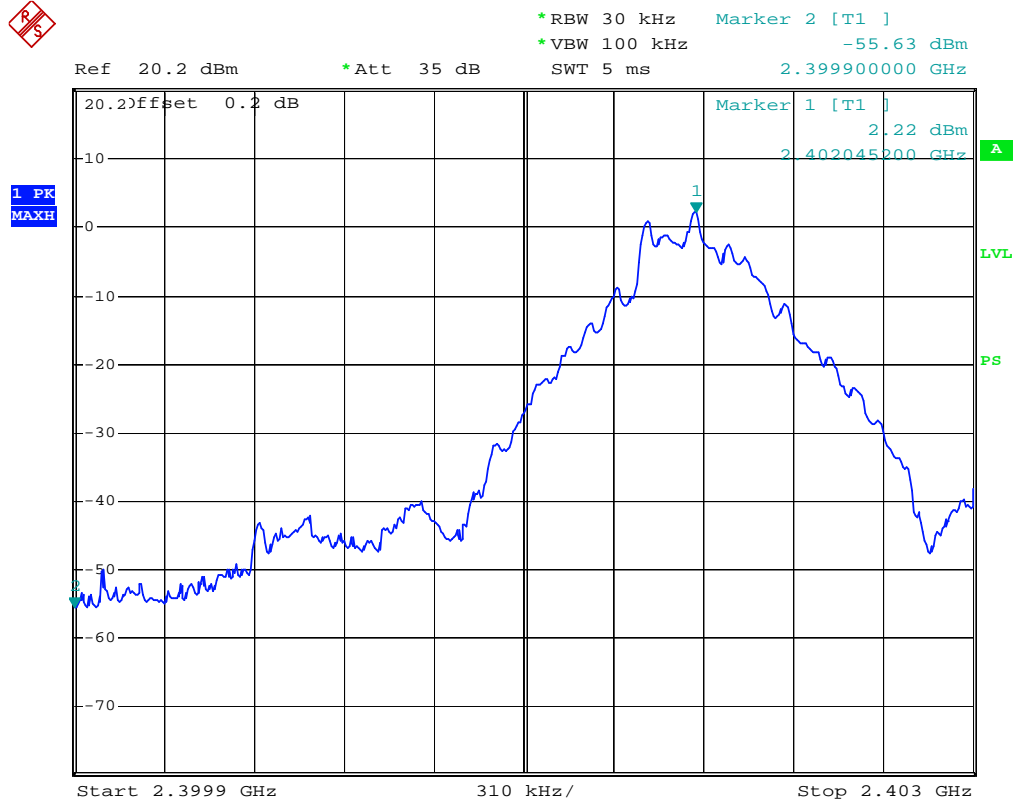
Test Mode: Transmitting (EDR)

Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)
2399.900	56.15	20
2483.600	58.03	20

Note: The point fall into the stricted band was tested in FCC 15.209, please refer to the restrict band testing.

Test Mode: Transmitting (BDR)

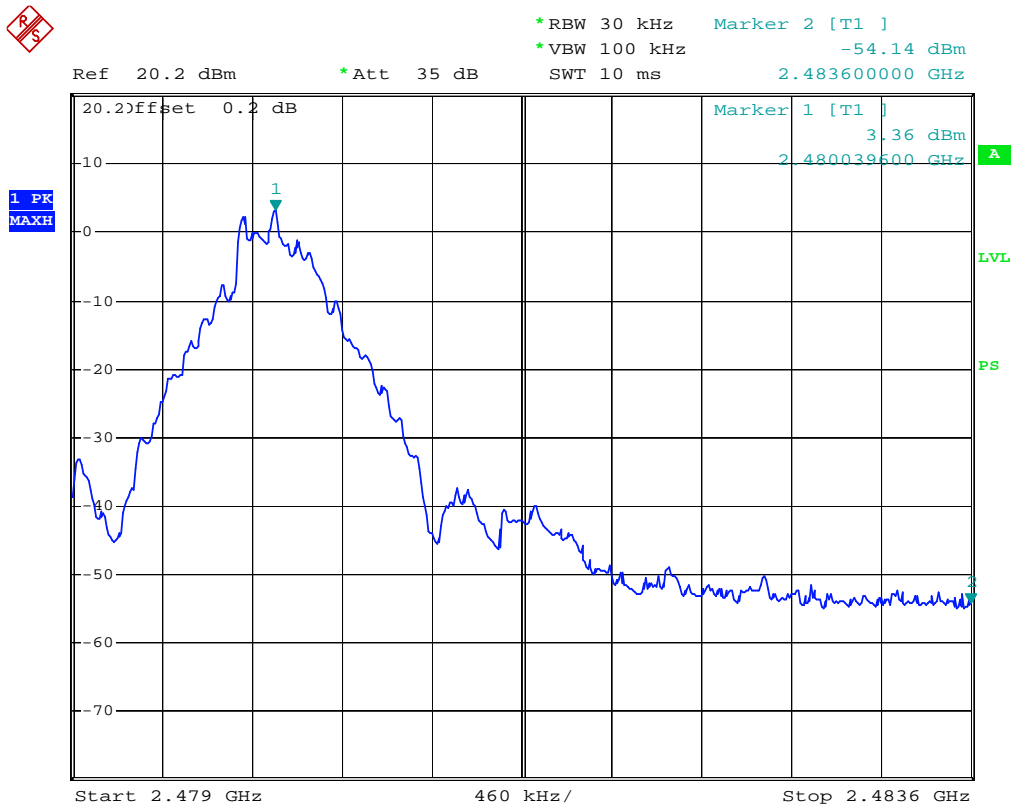
Band Edge Left Side



out of bandedge left

Date: 26.SEP.2008 14:09:31

Band Edge Right Side

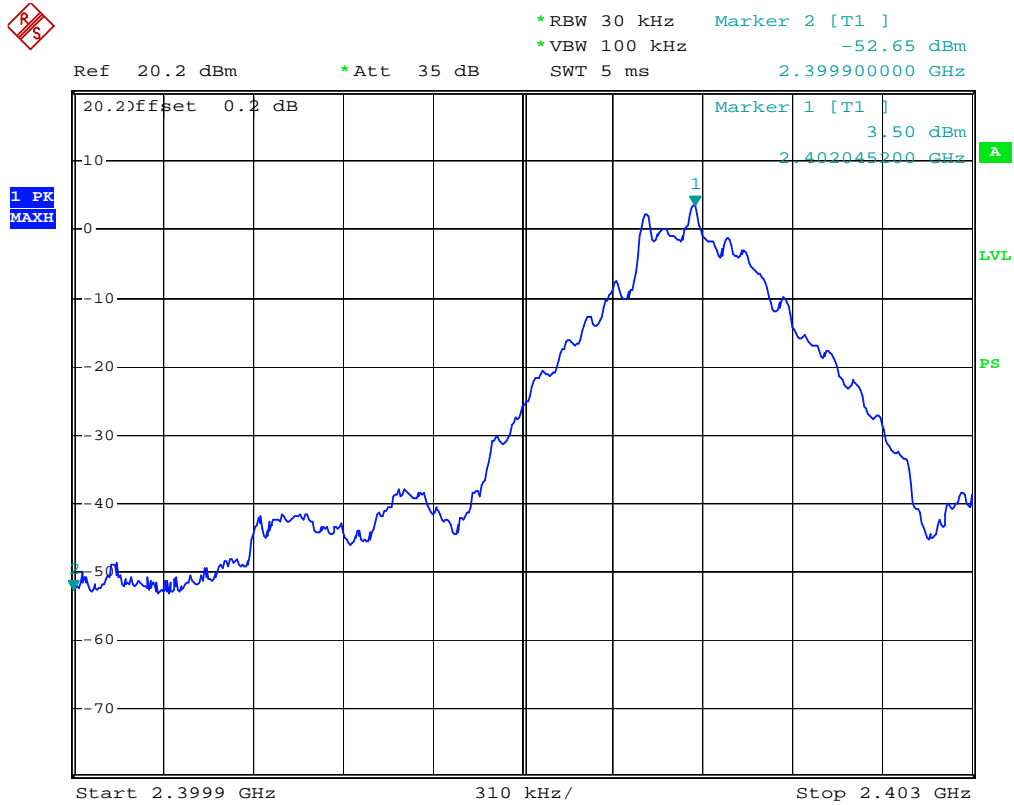


out of bandedge right

Date: 26.SEP.2008 14:21:57

Test Mode: Transmitting (EDR)

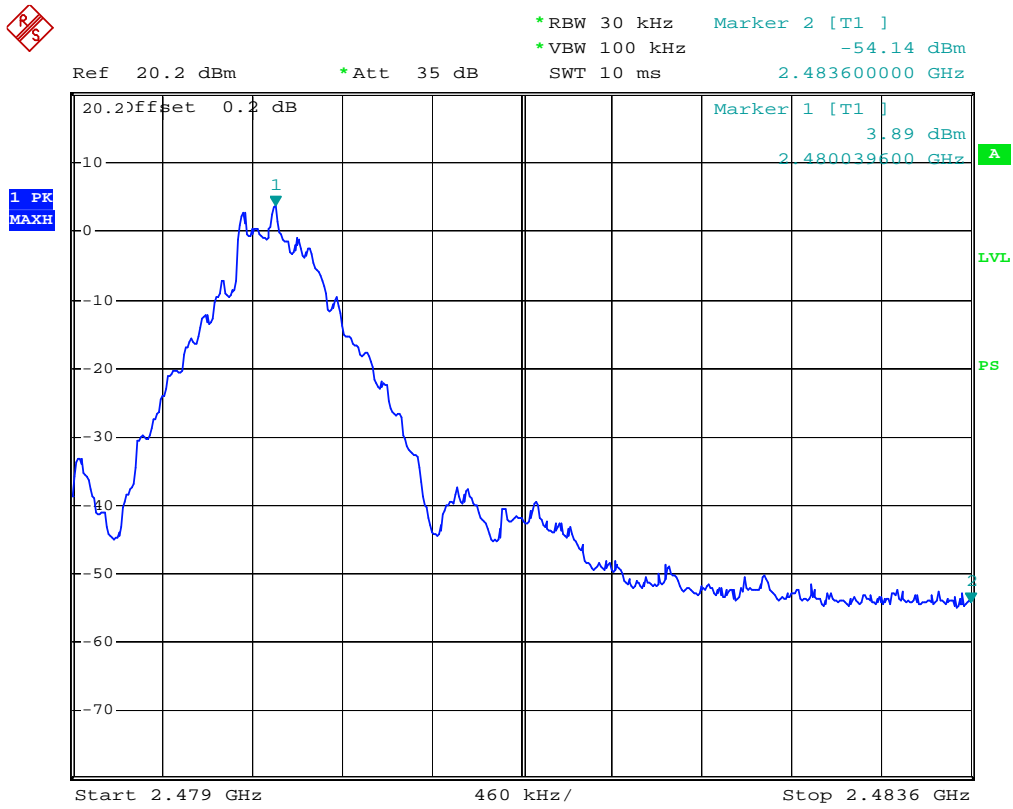
Band Edge Left Side



out of bandedge left

Date: 26.SEP.2008 14:08:57

Band Edge Right Side



out of bandedge right

Date: 26.SEP.2008 14:22:28

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