



NVLAP LAB CODE 200707-0



FCC PART 15.239

MEASUREMENT AND TEST REPORT

For

Shenzhen ZuanBao Technology Co., Ltd.

5/F, 20 Building, Longjun Industrial Region, Heping West Road,
Longhua, Baoan District, Shenzhen, Guangdong, China

FCC ID: YNH-ZB-118

Report Type: Original Report	Product Type: FM Transmitter
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Report Number: <u>RSZ10072604</u>	
Report Date: <u>2010-09-03</u>	
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* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "*" (Rev.2)

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Shenzhen ZuanBao Technology Co., Ltd.*'s product, *FCC ID: YNH-ZB-118* model: *ZB-118* or the "EUT" as referred to in this report is a *FM Transmitter* which measures approximately 11.0 cm (L) x 5.2 cm (W) x 4.0 cm (H), rated input voltage: DC 12 V battery.

Technical Specification

FM Transmitter		
1	Operating Frequency Band	88.1~107.9 MHz
2	Channel Step	200 kHz
3	Output power	48dBμV@3m
4	Antenna	sheet metal
5	Antenna Gain	0 dBi

** All measurement and test data in this report was gathered from production sample serial number: 1007110 (Assigned by BACL, Shenzhen). The EUT was received on 2010-07-26.*

Objective

This report is prepared on behalf of *Shenzhen ZuanBao Technology Co., Ltd.* in accordance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.207, 15.209, and 15.239 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 radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

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

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 21, 2007. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

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



NVLAP LAB CODE 200707-0

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

SYSTEM TEST CONFIGURATION

Justification

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.

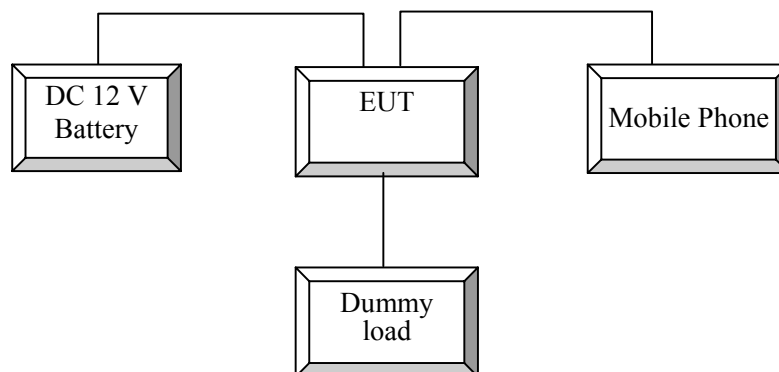
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
NOKIA	Mobile Phone	E63	N/A	DoC
BACL	Dummy load	5Ω	N/A	N/A

External I/O Cable

Cable Description	Length (m)	From Port	To
Unshielded Undetachable Audio Cable	1.8	EUT	Mobile Phone

Configuration of Test Setup



DC 12V Battery

10 cm

EUT

10 cm

10 cm

Mobile Phone

Dummy load

Non-conduction table
80 cm above Ground Plane

1.5 Meter

1.0 Meter

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Test Result
§15.203	Antenna Requirement	Compliance
§15.207	Conducted Emissions	N/A
§15.205, §15.209, §15.239	Radiated Emissions	Compliance
§15.239 (a)	Band Edges	Compliance
§15.239 (a)	Emission Bandwidth	Compliance

N/A: The EUT is powered by battery.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

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.

Antenna Connector Construction

The EUT has sheet metal antenna, connect to the car charger when operating. Its gain is 0 dBi in a typical fashion which, in accordance to the above section, is considered sufficient to comply with the provision of this section, please see EUT photo for details.

Result: Compliance.

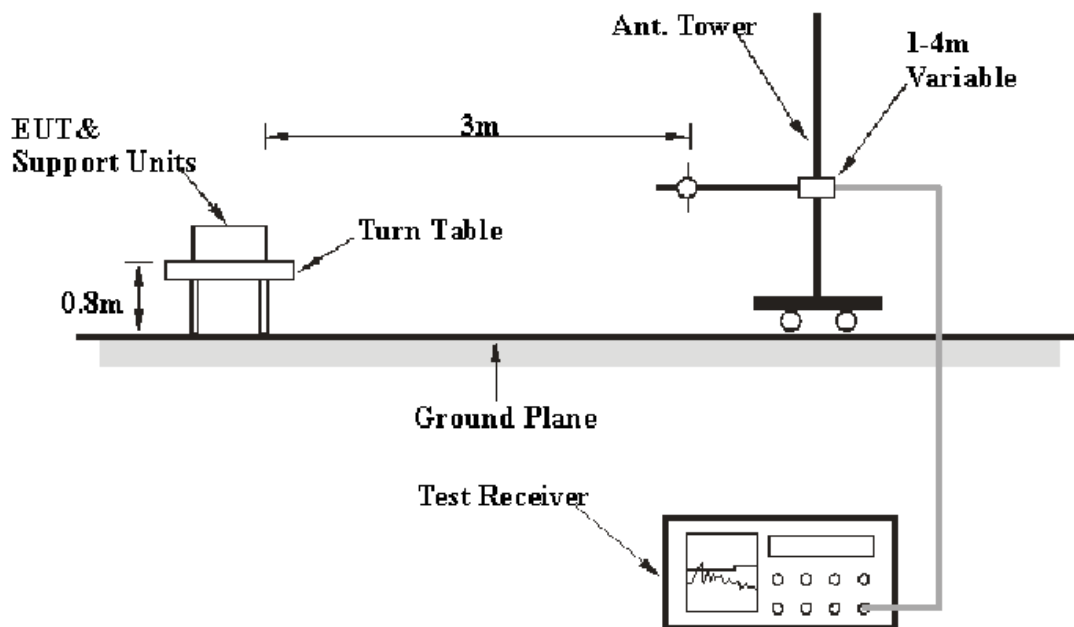
FCC §15.205, §15.209 & §15.239- RADIATED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is ± 4.0 dB.

EUT Setup



The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4 - 2003. The specification used was the FCC Part 15.209 and FCC Part 15.239.

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

EMI Test Receiver Setup

The system was investigated from 30 MHz to 2000 MHz.

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

<i>Frequency Range</i>	<i>RBW</i>	<i>VBW</i>
30 – 1000 MHz	100 kHz	300 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2010-08-02	2011-08-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2009-11-24	2010-11-23
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2010-05-05	2011-05-04
HP	Amplifier	8449B	3008A00277	2009-09-12	2010-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2010-05-05	2011-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2010-07-08	2011-07-07

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

Test Procedure

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

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 5.8 dB means the emission is 5.8 dB below the limit. The equation for margin calculation is as follows:

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

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209 and 15.239, with the worst margin reading of:

Below 1 GHz (DC 12V):

10.9 dB at **76.692000 MHz** in the **Vertical** polarization for 88.1 MHz.
10.7 dB at **31.212500 MHz** in the **Horizontal** polarization for 98.1 MHz.
3.9 dB at **539.500000 MHz** in the **Horizontal** polarization for 107.9 MHz.

Above 1 GHz:

12.69 dB at **1945.9 MHz** in the **Horizontal** polarization, High Channel for 107.9MHz

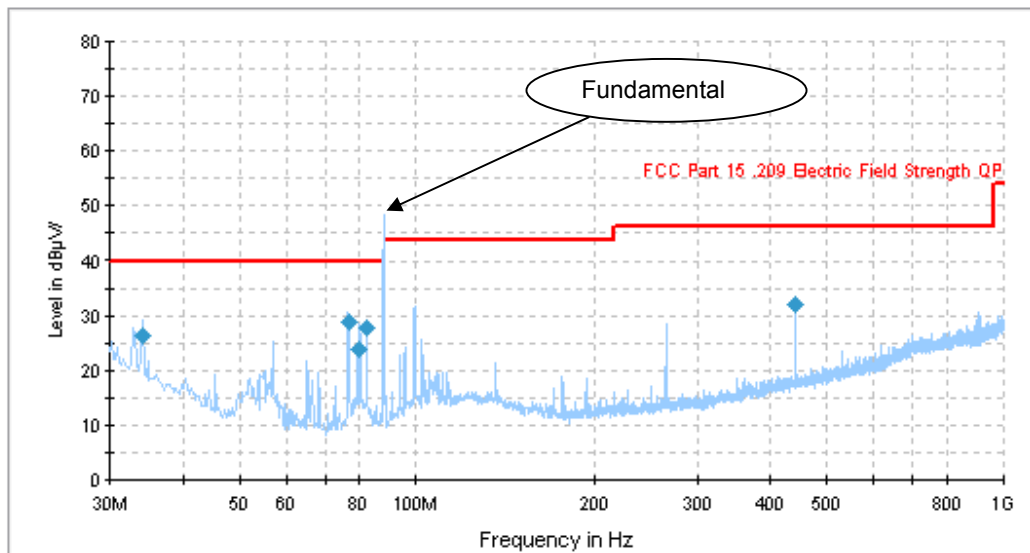
Test Data**Environmental Conditions**

Temperature:	25 ° C
Relative Humidity:	56%
ATM Pressure:	100.2 kPa

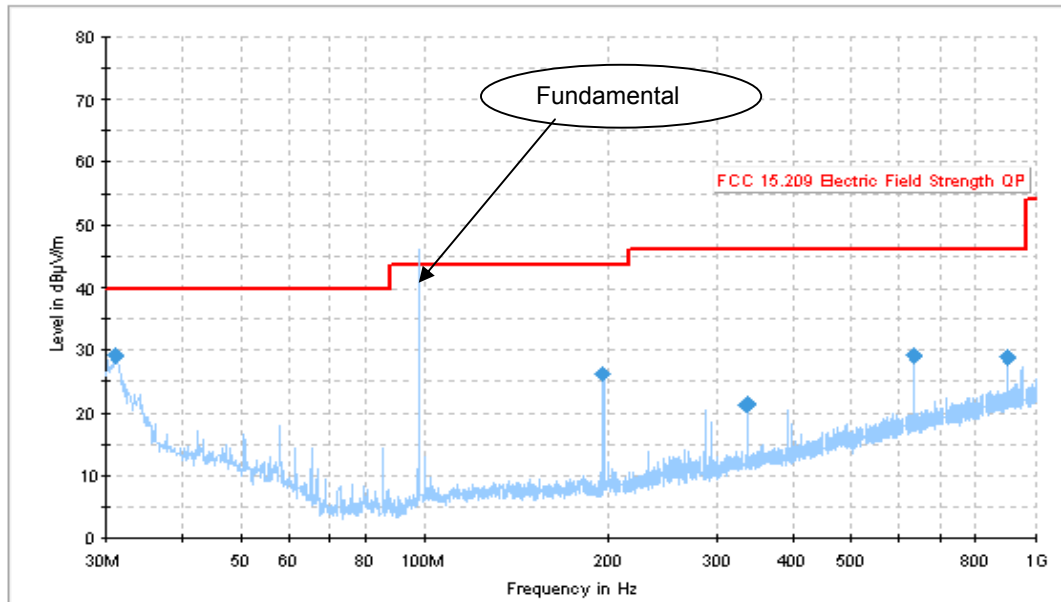
The testing was performed by Kvass Yang on 2010-08-24.

Below 1 GHz:**Low Channel (f = 88.1 MHz)**

Auto Test(FCC 15)



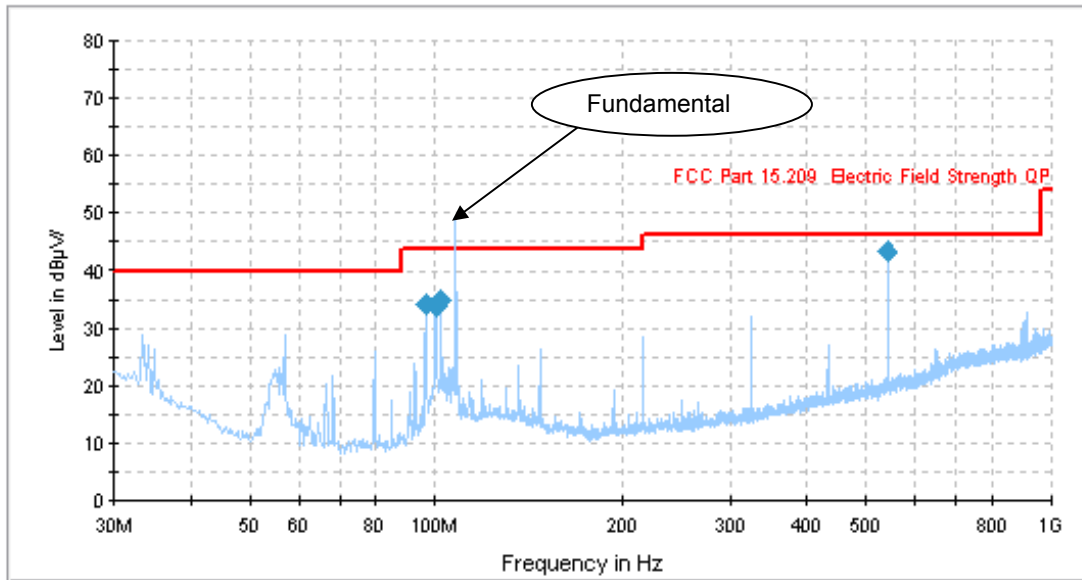
Frequency (MHz)	Corrected Amplitude (dBμV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
76.692000	29.1	207.0	V	45.0	-9.2	40.0	10.9
82.427250	27.8	307.0	V	43.0	-10.0	40.0	12.2
34.216000	26.3	295.0	H	209.0	-8.3	40.0	13.7
441.280000	32.3	203.0	H	166.0	-15.2	46.0	13.7
79.852750	23.8	305.0	V	43.0	-9.2	40.0	16.2

Middle Channel (f = 98.1 MHz)

Frequency (MHz)	Corrected Amplitude (dBμV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
31.212500	29.3	115.0	H	77.0	-9.2	40.0	10.7
631.848575	29.3	111.0	H	268.0	-7.7	46.0	16.7
901.936175	28.8	243.0	H	194.0	-3.8	46.0	17.2
196.112500	26.2	109.0	H	99.0	-10.3	43.5	17.3
336.035000	21.3	115.0	H	246.0	-4.5	46.0	24.7

High Channel (f = 107.9 MHz)

Auto Test(FCC 15)



Frequency (MHz)	Corrected Amplitude (dBμV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
539.500000	42.1	401.0	H	106.0	-15.8	46.0	3.9*
102.205000	34.9	401.0	H	106.0	-11.8	43.5	8.6
96.501750	34.2	401.0	H	129.0	-10.6	43.5	9.3
100.302500	34.0	401.0	H	112.0	-11.6	43.5	9.5

Note: The data which below the limit 20 dB was not recorded.

* Within measurement uncertainty.

Field Strength of Fundamental:

Frequency (MHz)	Meter Reading (dBμV)	Detector (PK/Ave.)	Table Direction Degree	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	FCC Part 15.239	
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)
88.1	67.36	Ave.	360	1.1	V	5.5	0.44	25.9	47.4	48	0.60
98.1	65.63	Ave.	197	1.2	V	6.6	0.47	25.8	46.9	48	1.10
107.9	60.48	Ave.	263	1.2	V	10.9	0.52	25.7	46.2	48	1.80
88.1	70.16	PK	105	1.2	V	5.5	0.44	25.9	50.2	68	17.8
98.1	68.43	PK	0	1.3	V	6.6	0.47	25.8	49.7	68	18.3
107.9	62.68	PK	36	1.4	V	10.9	0.52	25.7	48.4	68	19.6

Note: Measured at 3 meter

Above 1 GHz:**Spurious Emission:**

Frequency (MHz)	Meter Reading (dBμV)	Detector (PK/Ave.)	Table Direction Degree	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	FCC Part15.239/15.209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	Remarks
High Channel 107.9 MHz												
1945.9	36.98	Ave.	0	1.5	H	28.20	2.88	26.75	41.31	54	12.69	Spurious
1965.1	35.24	Ave.	0	1.1	V	27.80	2.97	26.83	39.18	54	14.82	Spurious
1945.9	42.19	PK	360	1.6	H	28.20	2.88	26.75	46.52	74	27.48	Spurious
1965.1	40.94	PK	0	1.2	V	27.80	2.97	26.83	44.88	74	29.12	Spurious

Note: The 10th harmonic of low and middle channel are less than 1 GHz, so no test data recorded.

FCC §15.239(a) – BAND EDGES

Standard applicable

Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88–108 MHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2009-11-24	2010-11-23
HP	Amplifier	8447E	1937A01046	2010-08-02	2011-08-01
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2010-05-05	2011-05-04

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

Test Procedure

With the EUT's antenna attached, the EUT's radiated emission power was received by the test antenna which was connected to the spectrum analyzer with the START and STOP frequencies set to the EUT's operation band.

Test Data

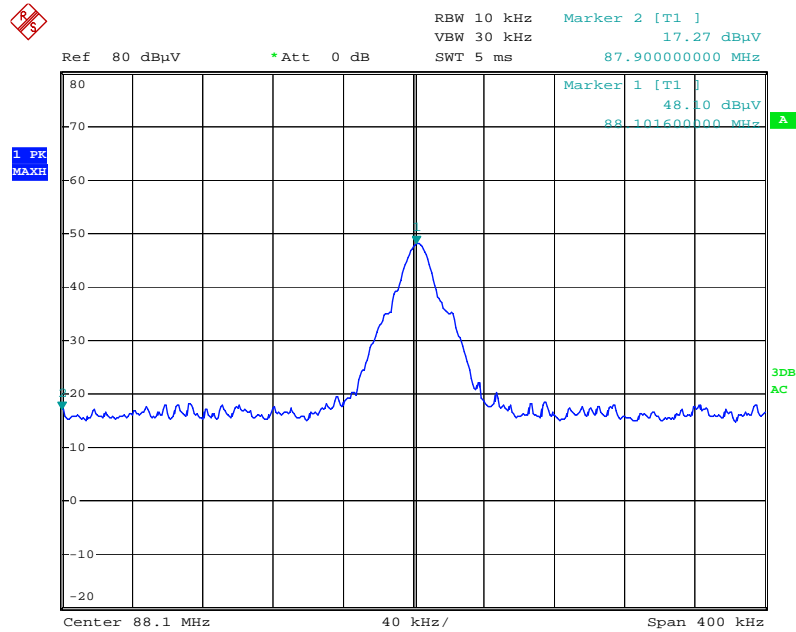
Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56%
ATM Pressure:	100.2 kPa

The testing was performed by Kvass Yang on 2010-08-08.

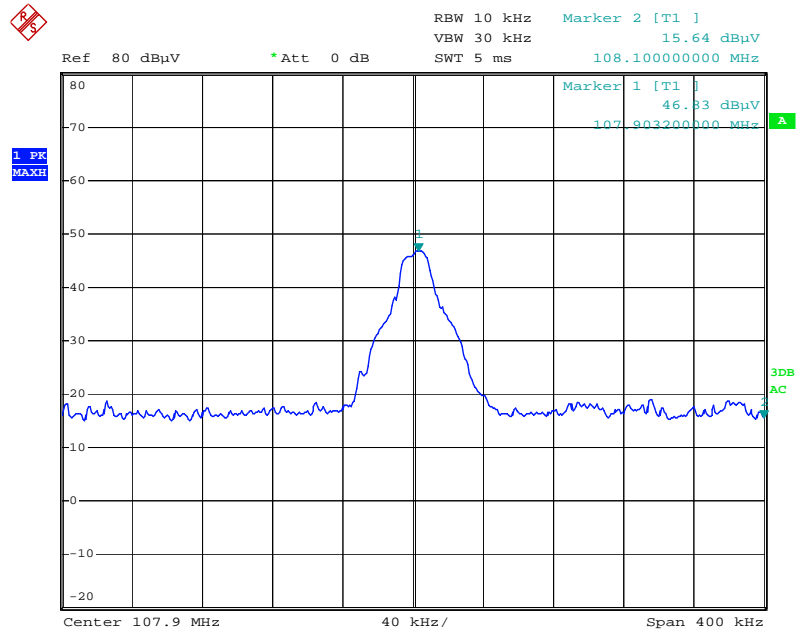
Note: The EUT has been verified the operation range. It turns in 88 MHz to 108 MHz range.

Lowest Channel



Date: 8.AUG.2010 18:23:22

Highest Channel



Date: 8.AUG.2010 18:26:06

FCC §15.239(A) – EMISSION BANDWIDTH

Standard applicable

Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88–108 MHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2009-11-24	2010-11-23
HP	Amplifier	8447E	1937A01046	2010-08-02	2011-08-01
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2010-05-05	2011-05-04

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Test Procedure

With the EUT's antenna attached, the EUT's radiated emission power was received by the test antenna which was connected to the spectrum analyzer with the START and STOP frequencies set to the EUT's operation band.

Test Data

Environmental Conditions

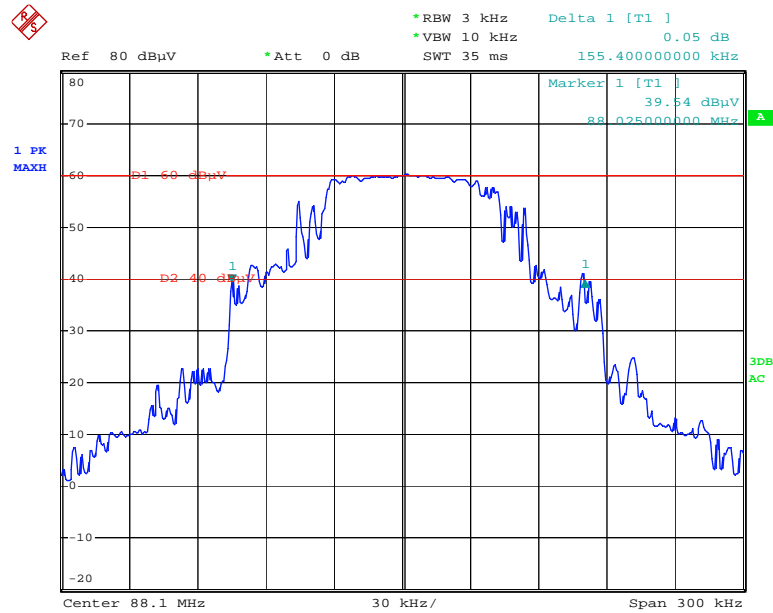
Temperature:	25 ° C
Relative Humidity:	56%
ATM Pressure:	100.2 kPa

The testing was performed by Kvass Yang on 2010-09-02 to 2010-09-03.

Please refer to the following table and plots.

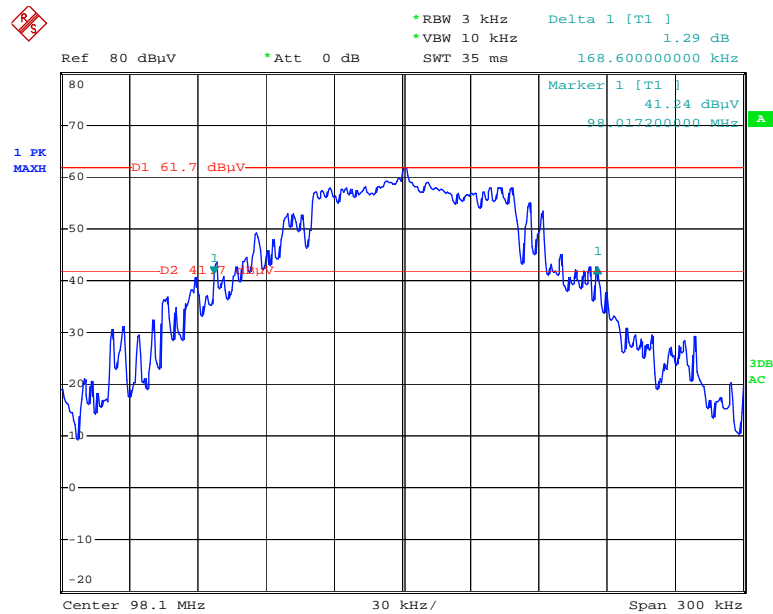
Channel	Frequency (MHz)	20 dB Emission Bandwidth (kHz)	Limit (kHz)
Low	88.1	155.4	200
Middle	98.1	168.6	200
High	107.9	158.4	200

Low Channel

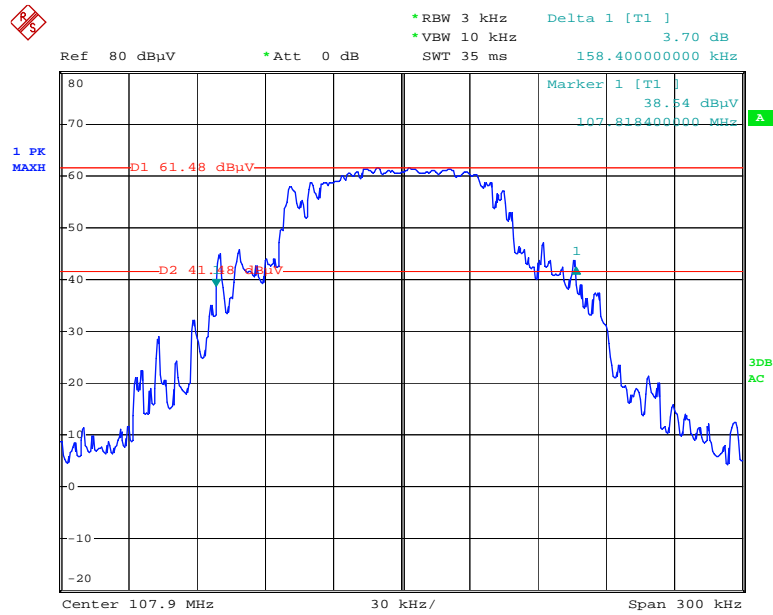


Date: 3.SEP.2010 11:04:10

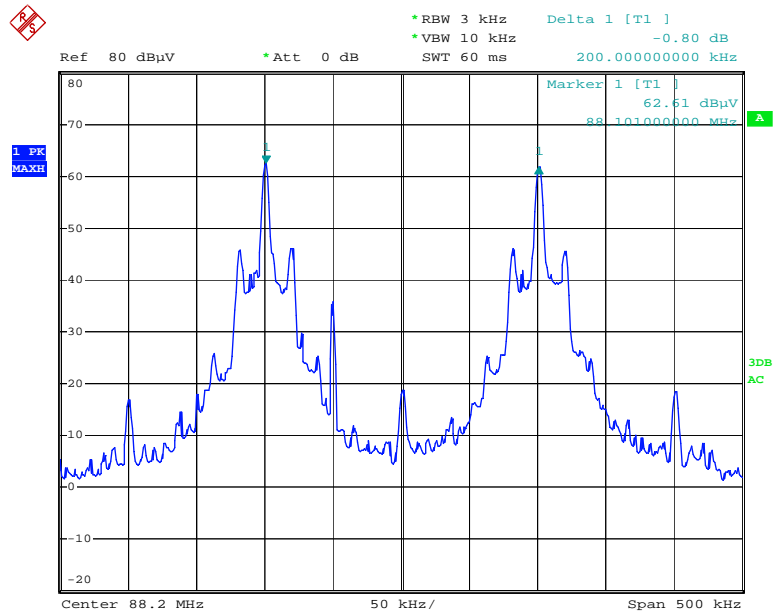
Middle Channel



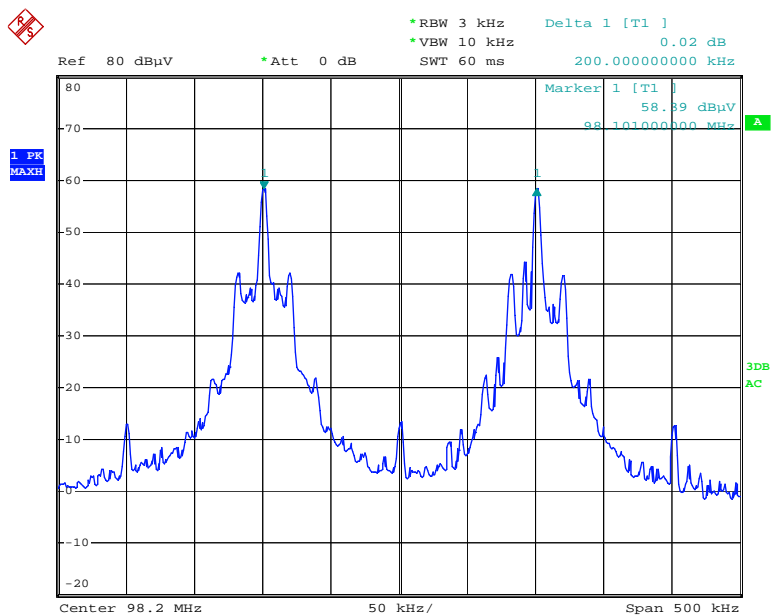
Date: 3.SEP.2010 11:10:12

High Channel

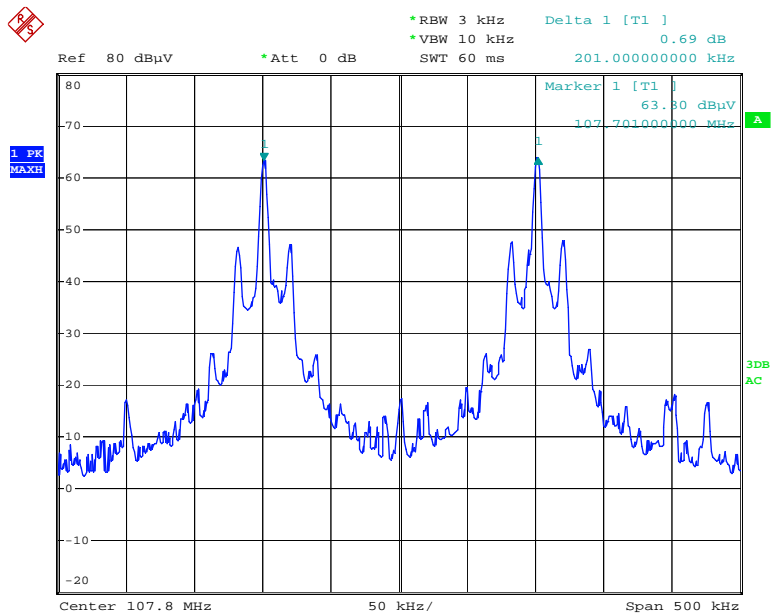
Date: 3.SEP.2010 11:06:22

Channel Spacing:**Low Channel**

Date: 2.SEP.2010 15:57:56

Middle Channel

Date: 2.SEP.2010 15:56:33

High Channel

Date: 2.SEP.2010 15:57:27

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