



NVLAP LAB CODE 200707-0



FCC PART 15.239

MEASUREMENT AND TEST REPORT

For

Audex Telecom Industrial Co., Ltd.

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

Zhongshan, Guangdong, China

FCC ID: P68B00788

Report Type: Original Report	Product Type: FM Transmitter
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Report Number: RSZ08112502	
Report Date: 2008-12-22	
Reviewed By: EMC Manager	Green Xu <i>Green Xu</i>
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. 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.

* 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 Audex Telecom Industrial Co., Ltd.'s product, model: B-007 or the "EUT" as referred to in this report is a FM transmitter which measures approximately 5.0 cm L x 4.3 cm W x 2.8 cm H, rated input voltage: DC 1.5 battery.

** All measurement and test data in this report was gathered from production sample serial number: 0811069 (Assigned by BACL, Shenzhen). The EUT was received on 2008-11-25.*

Objective

This Type approval report is prepared on behalf of Audex Telecom Industrial Co., Ltd. in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.209, and 15.239 rules.

Related Submittal(s)/Grant(s)

No Related Submittals

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 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).



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

SYSTEM TEST CONFIGURATION

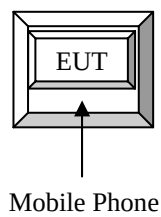
Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

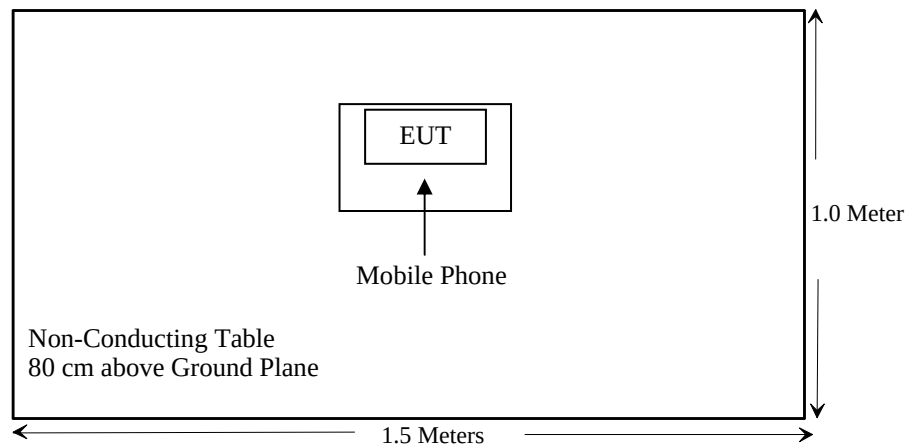
Equipment Modifications

No modification was made to the unit tested.

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Test Result
§15.203	Antenna Requirement	Compliant
§15.209 §15.239	Radiated Emissions	Compliant
§15.239 (a)	Band Edges	Compliant
§15.239 (a)	Emission Bandwidth	Compliant

§15.203 - ANTENNA REQUIREMENT

Standard Applicable

Standard Applicable

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 permanently attached antenna, the maximum antenna gain is -2 dBi, which, in accordance to the above section, is considered sufficient to comply with the provision of this section, please see EUT photo for details.

Test Result: Compliant

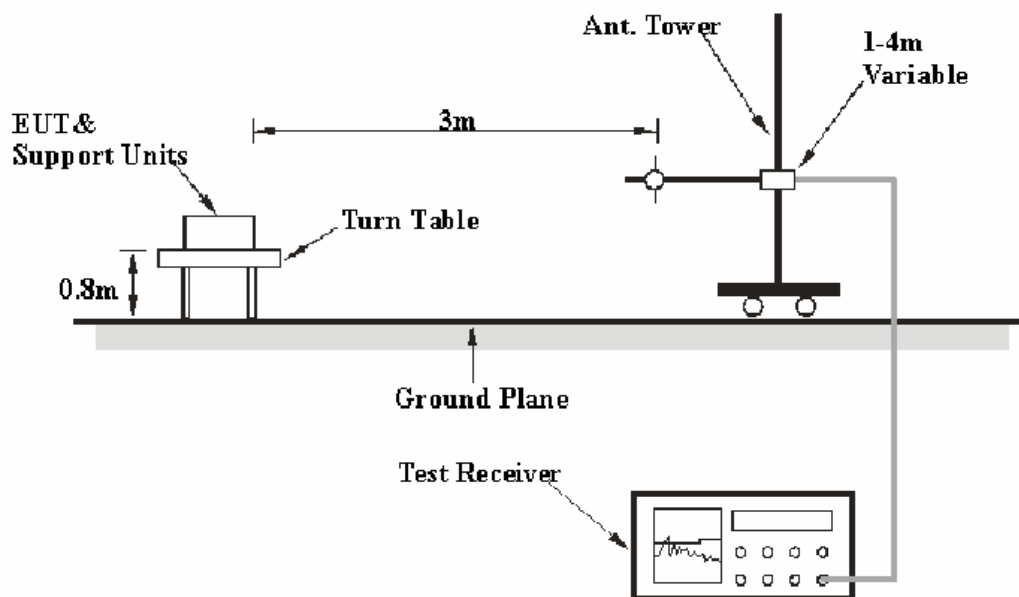
§15.209 and §15.239- RADIATED EMISSIONS

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.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 1000 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	2008-11-15	2009-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2008-11-07	2009-11-06
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2008-08-14	2009-08-14
HP	Amplifier	8449B	3008A00277	2008-09-29	2009-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2008-09-25	2009-09-25
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2008-05-09	2009-05-09

* **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 1GHz:

10.2 dB at **176.106250 MHz** in the **Vertical** polarization, Low Channel

8.0 dB at **894.270000 MHz** in the **Vertical** polarization, Middle Channel

7.2 dB at **897.180000 MHz** in the **Vertical** polarization, High Channel

Above 1GHz:

22.61 dB at **1380.00 MHz** in the **Horizontal** polarization, Low Channel for 88.1MHz

24.48 dB at **1026.00 MHz** in the **Horizontal** polarization, Middle Channel for 98.1MHz

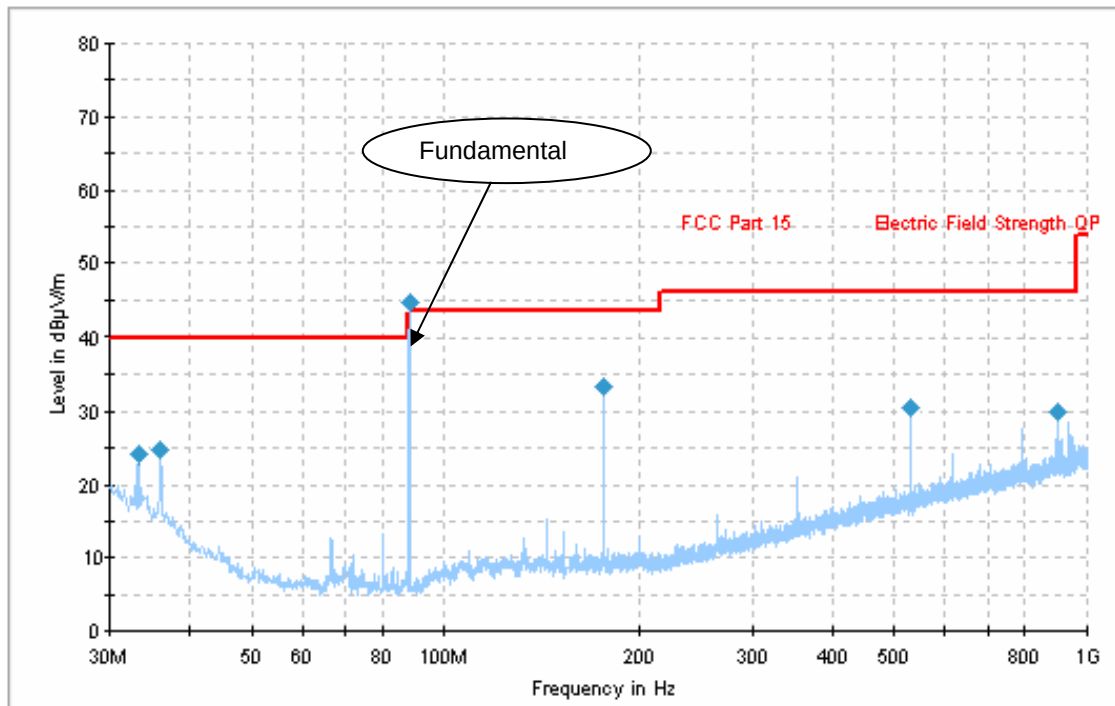
21.36 dB at **1540.00 MHz** in the **Vertical** polarization, High Channel for 107.9MHz

Test Data

Environmental Conditions

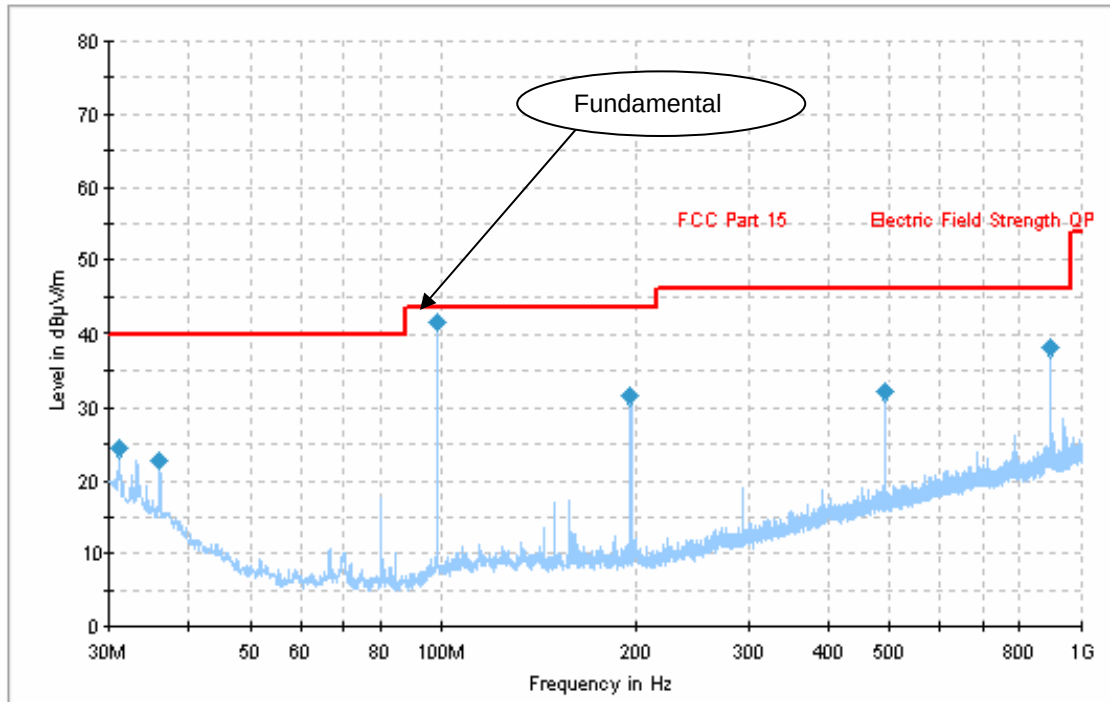
Temperature:	25 ° C
Relative Humidity:	56%
ATM Pressure:	100.2kPa

The testing was performed by Phoenix Liu on 2008-12-08.

Spurious Emission below 1 GHz:*Test Mode: Transmitting (88.1MHz)*

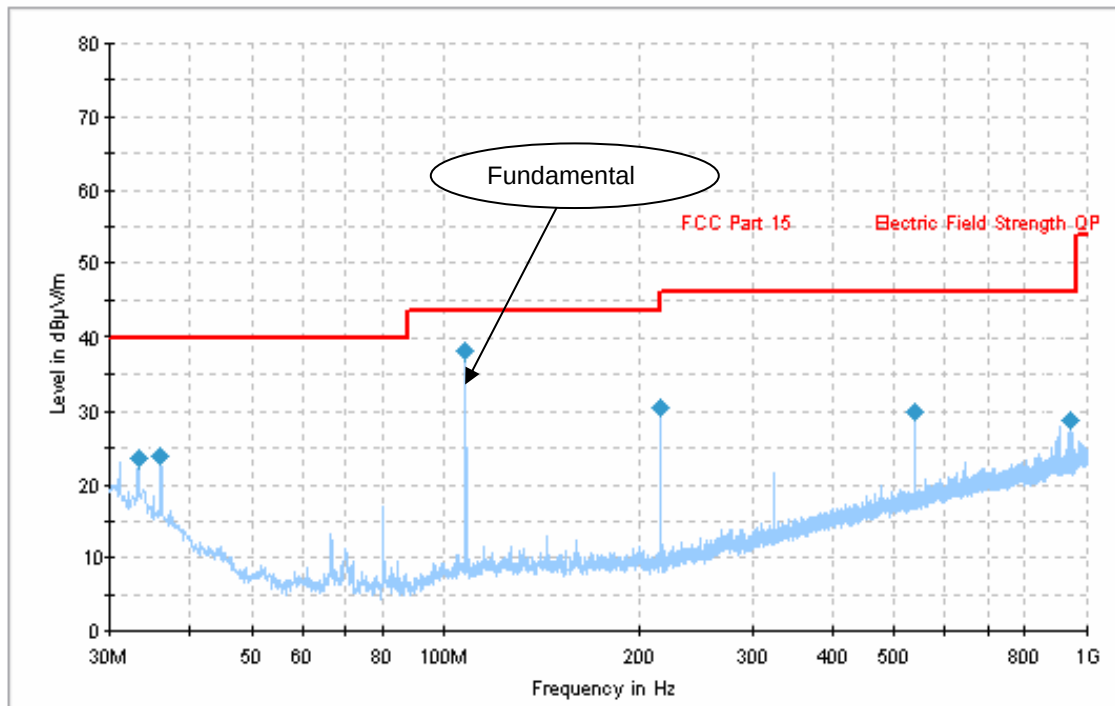
Frequency (MHz)	Corrected Amplitude (dBμV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
176.106250	33.3	201.0	V	115.0	-27.2	43.5	10.2
36.062500	24.9	99.0	H	91.0	-21.1	40.0	15.1
528.580000	30.5	99.0	H	3.0	-19.9	46.0	15.5
897.301250	30.0	99.0	H	35.0	-9.4	46.0	16.0
33.273750	23.8	299.0	H	244.0	-19.2	40.0	16.2

Test Mode: Transmitting (98.1MHz)



Frequency (MHz)	Corrected Amplitude (dBμV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
894.270000	38.0	99.0	V	0.0	-9.3	46.0	8.0
196.112500	31.4	99.0	V	0.0	-27.1	43.5	12.1
490.507500	32.0	100.0	H	0.0	-20.5	46.0	14.0
31.212500	24.1	299.0	H	0.0	-17.8	40.0	15.9
36.062500	22.7	199.0	H	0.0	-21.1	40.0	17.3

Test Mode: Transmitting (107.9MHz)



Frequency (MHz)	Corrected Amplitude (dBμV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
967.210000	28.8	401.0	V	0.0	-9.4	46.0	7.2
215.755000	30.4	100.0	V	0.0	-27.4	43.5	13.1
36.062500	23.9	401.0	H	0.0	-21.1	40.0	16.1
539.492500	29.8	99.0	H	0.0	-19.6	46.0	16.2
33.273750	23.3	299.0	H	0.0	-19.2	40.0	16.7

Field Strength of Fundamental:*Test Mode: Transmitting*

Frequency (MHz)	S.A. Reading (dBμV)	Detector PK/QP/AV	Direction Degree	Ant. Height (m)	Ant. Polar (H/V)	Ant. Loss (dB/m)	Cable Loss (dB)	Pre- Amp. Gain (dB)	Cord. Amp. (dBμV/m)	FCC Part15.239		
										Limit (dBμV/m)	Margin (dB)	Remarks
88.1	74.28	AV	120	1.00	V	5.70	0.57	36.65	43.90	48	4.10	Fund.
98.1	68.34	AV	90	1.20	V	8.40	0.61	36.75	40.60	48	7.40	Fund.
107.9	62.47	AV	45	1.00	V	10.90	0.68	36.65	37.40	48	10.60	Fund.
88.1	75.68	PK	120	1.20	V	5.70	0.57	36.65	45.30	68	22.70	Fund.
98.1	69.84	PK	90	1.20	V	8.40	0.61	36.75	42.10	68	25.90	Fund.
107.9	64.07	PK	45	1.20	V	10.90	0.68	36.65	39.00	68	29.00	Fund.

Spurious Emission above 1GHz:

Frequency (MHz)	S.A. Reading (dBμV)	Detector PK/QP/AV	Direction Degree	Ant. Height (m)	Ant. Polar (H/V)	Ant. Loss (dB/m)	Cable loss (dB)	Amplifier Gain (dB)	Cord. Amp. (dBμV/m)	FCC Part 15.239 & 15.209		
										Limit (dBμV/m)	Margin (dB)	Remarks
Frequency in Low Channel 88.1 MHz												
1380.00	33.92	AV	180.00	1.20	H	26.70	5.37	34.60	31.39	54.00	22.61	Spurious
1262.00	34.44	AV	180.00	1.20	V	24.80	5.11	34.80	29.55	54.00	24.45	Spurious
1058.00	34.99	AV	90.00	1.00	V	23.80	4.78	35.00	28.57	54.00	25.43	Spurious
1106.00	31.28	AV	90.00	1.00	H	25.10	4.78	35.00	26.16	54.00	27.84	Spurious
1380.00	48.21	PK	45.00	1.20	H	26.70	5.37	34.60	45.68	74.00	28.32	Spurious
1262.00	48.73	PK	45.00	1.20	V	24.80	5.11	34.80	43.84	74.00	30.16	Spurious
1058.00	49.28	PK	180.00	1.20	V	23.80	4.78	35.00	42.86	74.00	31.14	Spurious
1106.00	45.57	PK	180.00	1.20	H	25.10	4.78	35.00	40.45	74.00	33.55	Spurious
Frequency in Low Channel 98.1 MHz												
1026.00	34.64	AV	142.00	1.60	H	25.10	4.78	35.00	29.52	54.00	24.48	Spurious
1206.00	33.25	AV	135.00	1.30	H	25.90	5.11	34.80	29.46	54.00	24.54	Spurious
1164.00	34.23	AV	85.00	1.50	V	24.80	5.11	34.80	29.34	54.00	24.66	Spurious
1006.00	34.56	AV	243.00	1.40	V	23.80	4.78	35.00	28.14	54.00	25.86	Spurious
1026.00	48.93	PK	234.00	1.80	H	25.10	4.78	35.00	43.81	74.00	30.19	Spurious
1206.00	47.54	PK	156.00	1.40	H	25.90	5.11	34.80	43.75	74.00	30.25	Spurious
1164.00	48.52	PK	265.00	1.40	V	24.80	5.11	34.80	43.63	74.00	30.37	Spurious
1006.00	48.85	PK	153.00	1.50	V	23.80	4.78	35.00	42.43	74.00	31.57	Spurious
Frequency in Low Channel 107.9 MHz												
1540.00	33.62	AV	210.00	1.20	V	27.80	5.62	34.40	32.64	54.00	21.36	Spurious
1384.00	33.64	AV	156.00	1.20	H	26.70	5.37	34.60	31.11	54.00	22.89	Spurious
1026.00	34.27	AV	256.00	1.80	H	25.10	4.78	35.00	29.15	54.00	24.85	Spurious
1168.00	33.95	AV	142.00	1.50	V	24.80	5.11	34.80	29.06	54.00	24.94	Spurious
1540.00	47.91	PK	240.00	1.40	V	27.80	5.62	34.40	46.93	74.00	27.07	Spurious
1384.00	47.93	PK	128.00	1.50	H	26.70	5.37	34.60	45.40	74.00	28.60	Spurious
1026.00	48.56	PK	145.00	1.40	H	25.10	4.78	35.00	43.44	74.00	30.56	Spurious
1168.00	48.24	PK	142.00	1.40	V	24.80	5.11	34.80	43.35	74.00	30.65	Spurious

§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	2008-11-07	2009-11-06
HP	Amplifier	8447E	1937A01046	2008-11-15	2009-11-15
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2008-08-14	2009-08-14

*** 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.

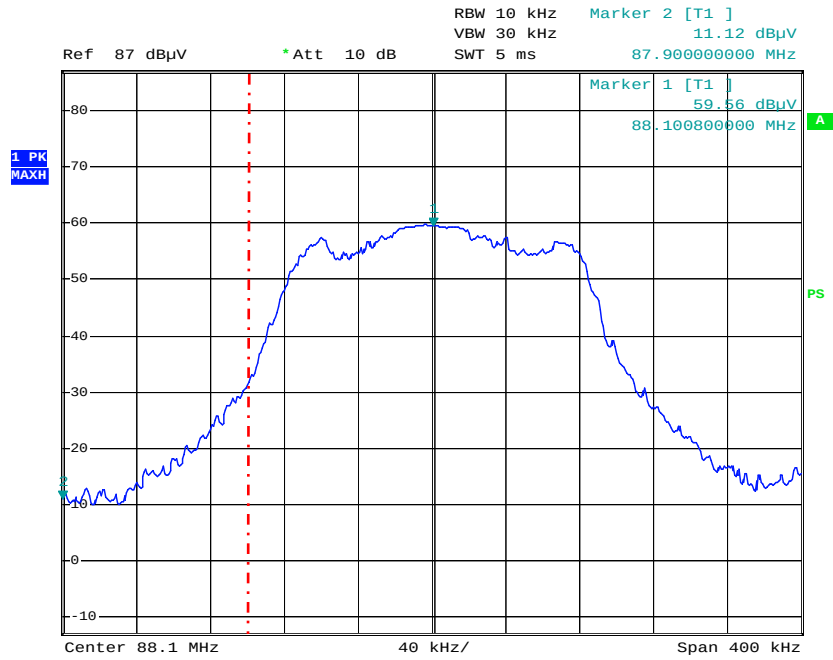
Test Data

Environmental Conditions

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

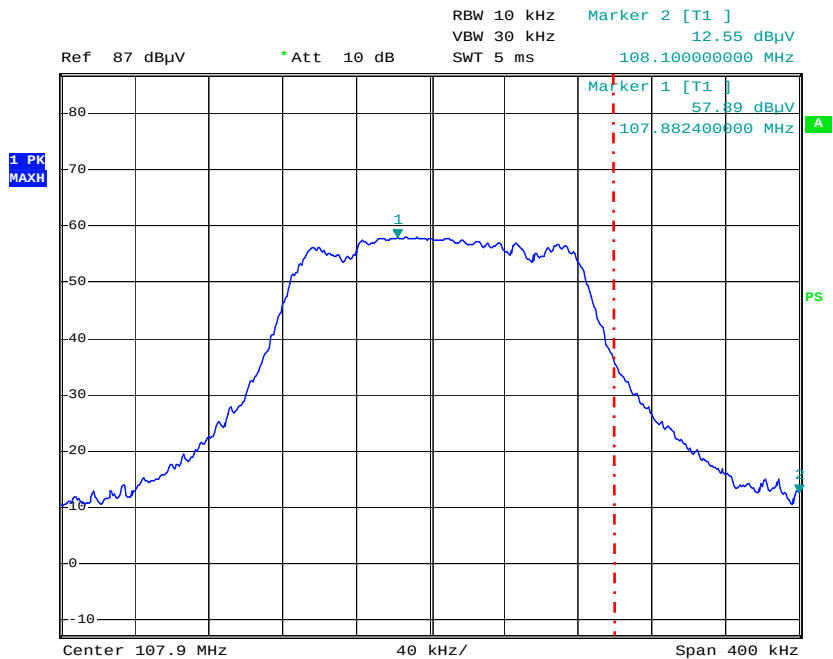
The testing was performed by Phoenix Liu on 2008-12-22.

Note: Device was verified the operation frequency range, it operates within 88 MHz to 108 MHz.



band left

Date: 22.DEC.2008 10:01:22



band right

Date: 22.DEC.2008 10:00:29

§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	2008-11-07	2009-11-06
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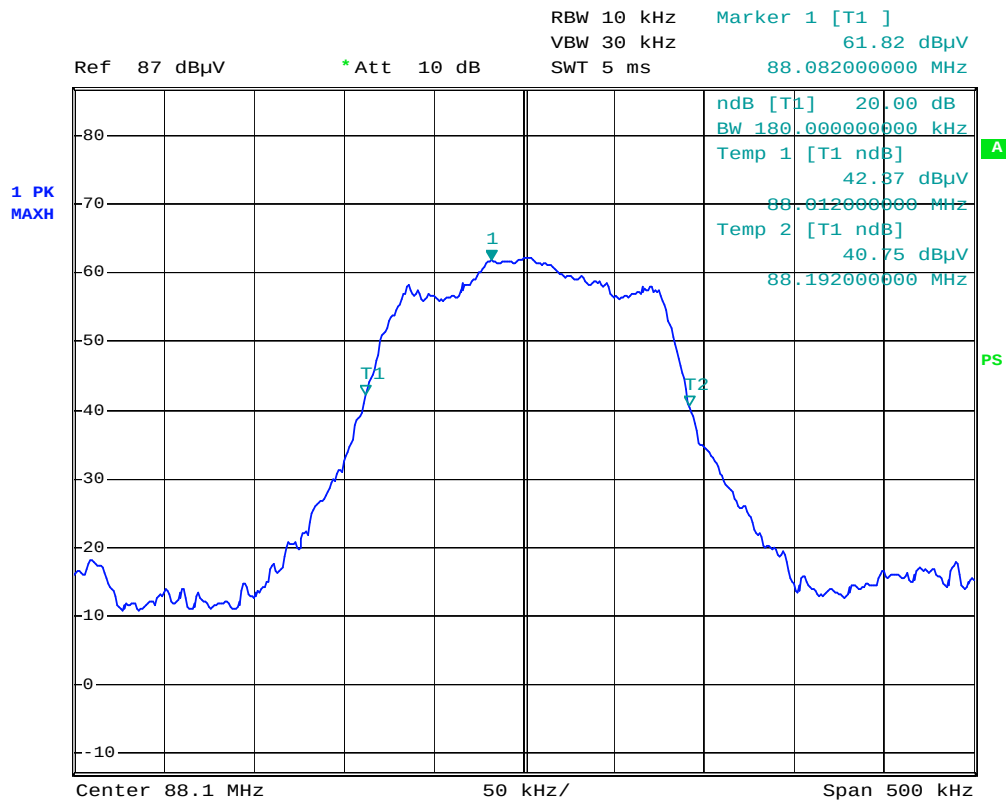
Environmental Conditions

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

The testing was performed by Phoenix Liu on 2008-12-22.

Test Mode: Transmitting

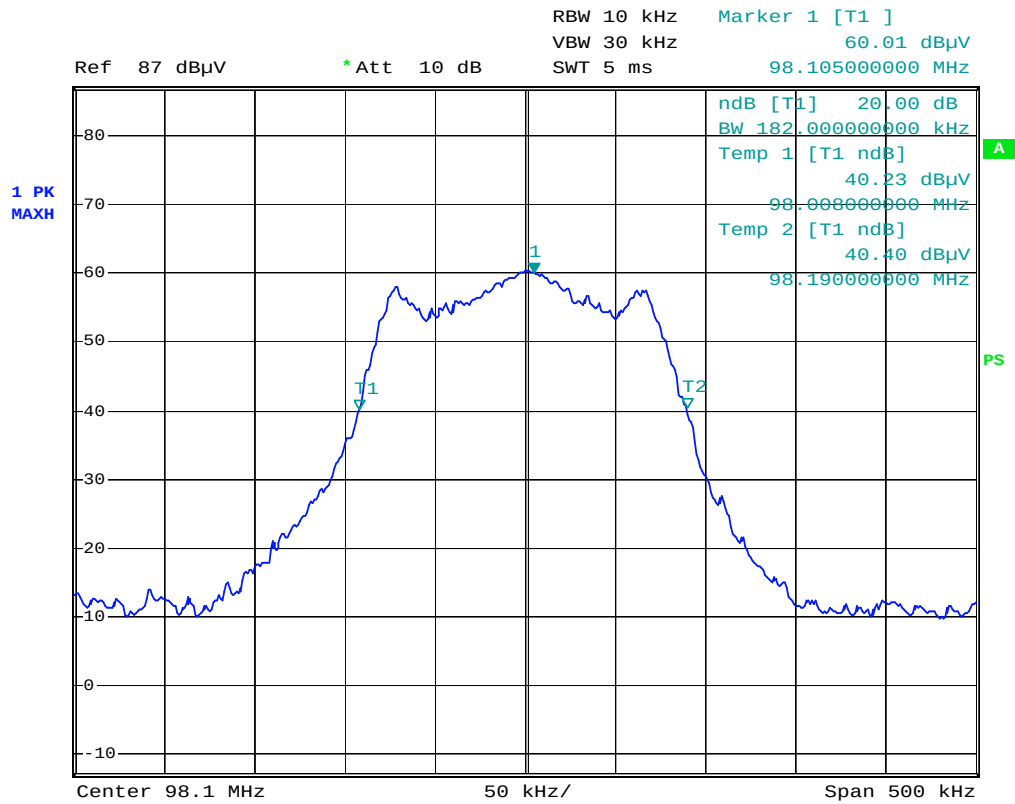
Low Channel



low channel

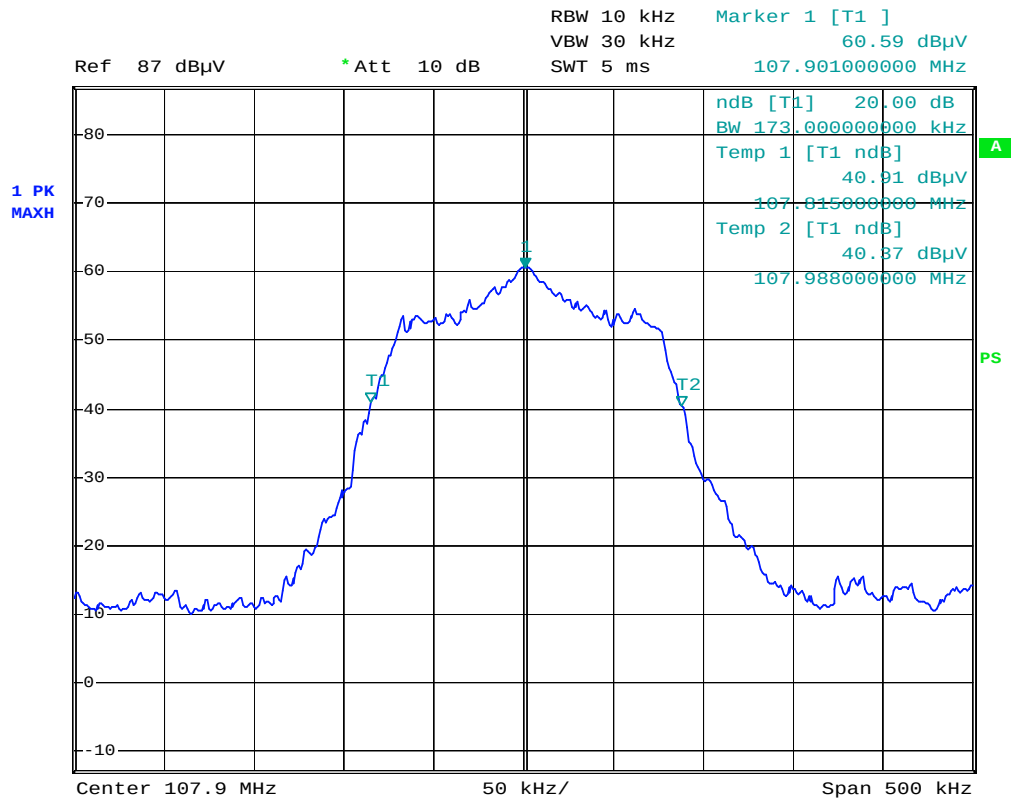
Date: 22.DEC.2008 09:36:41

Middle Channel



middle channel

Date: 22.DEC.2008 09:37:58

High Channel

high channel

Date: 22.DEC.2008 09:40:34

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