Lab Code: 200707-0

FCC PART 15.239

EMI MEASUREMENT AND TEST REPORT

For

TELEWAY INDUSTRIAL LTD

5/F, BLOCK 40, MAJIALONG INDUSTRIAL AREA, NANSHAN DISTRICT, SHENZHEN, 518052, GUANGDONG PROVINCE, PRC

FCC ID: TM4TMP3FT2

This Report Concerns:	Equipment Type:
☒ Original Report	FM TRANSMITTER

Test Engineer:	Charmi Peng
Report No.:	RSZ06111401
Test Date:	2006-12-16 to 2006-12-23
Report Date:	2006-12-19
Reviewed By:	EMC Manager: Boni Baniqued
Prepared By:	Bay Area Compliance Laboratory Corp. (ShenZhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China. Tel: + 86-755-33320018 Fax: +86-755-33320008

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *TELEWAY INDUSTRIAL LTD*'s product, model: *TMP3FT2* or the "EUT" as referred to in this report is a *FM TRANSMITTER* which measures approximately 7.5 cm L x 4.5 cm W x 2.0 cm H, rated input voltage: DC 3 V battery.

** The test data gathered are from an engineering sample, serial number: 0611021 provided by the manufacturer, we receive the EUT on 2006-11-14.*

Objective

This Type approval report is prepared on behalf of *TELEWAY INDUSTRIAL LTD* in accordance with FCC Part 15, Subpart C, and section 15.209, 15.35, 15.205, 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 Laboratory 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 Laboratory 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 518038, P.R. of China.

Test site at Bay Area Compliance Laboratory 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 Laboratory Corp. (ShenZhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0). The current scope of accreditations can be found at http://ts.nist.gov/ts/htdocs/210/214/scopes/2007070.htm

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
TMS	Digital MP3 Player	/	/	DoC

External I/O Cable

Cable Description	Length (M)	From/Port	To
Undetectable Audio Input Cable	0.17	EUT	MP3

SYSTEM TEST CONFIGURATION

Justification

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

EUT Exercise Software

N/A.

Special Accessories

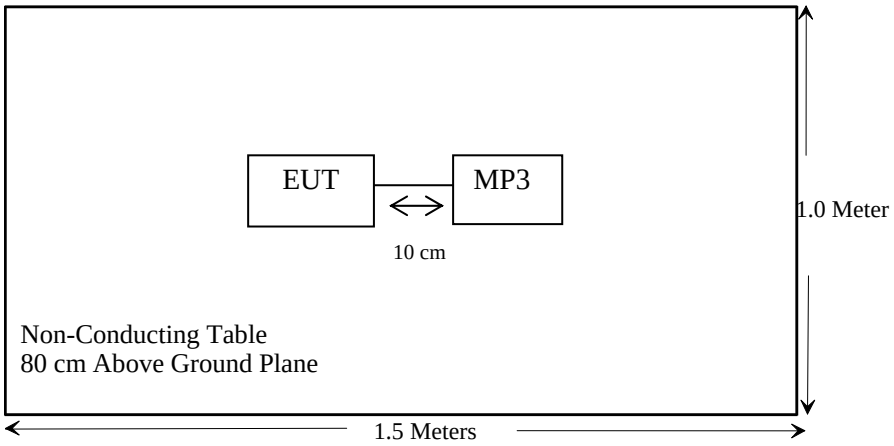
The special accessories were provided by Bay Area Compliance Laboratory Corp. (ShenZhen).

Equipment Modifications

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

Configuration of Test Setup

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna Requirement	Compliant
§15.209 §15.239	Radiated Emission	Compliant*
§15.239 (a)	Band Edges	Compliant
§15.239 (a)	Emission Bandwidth	Compliant

* Within measurement uncertainty.

§15.203 - ANTENNA REQUIREMENT

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, 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: Compliant

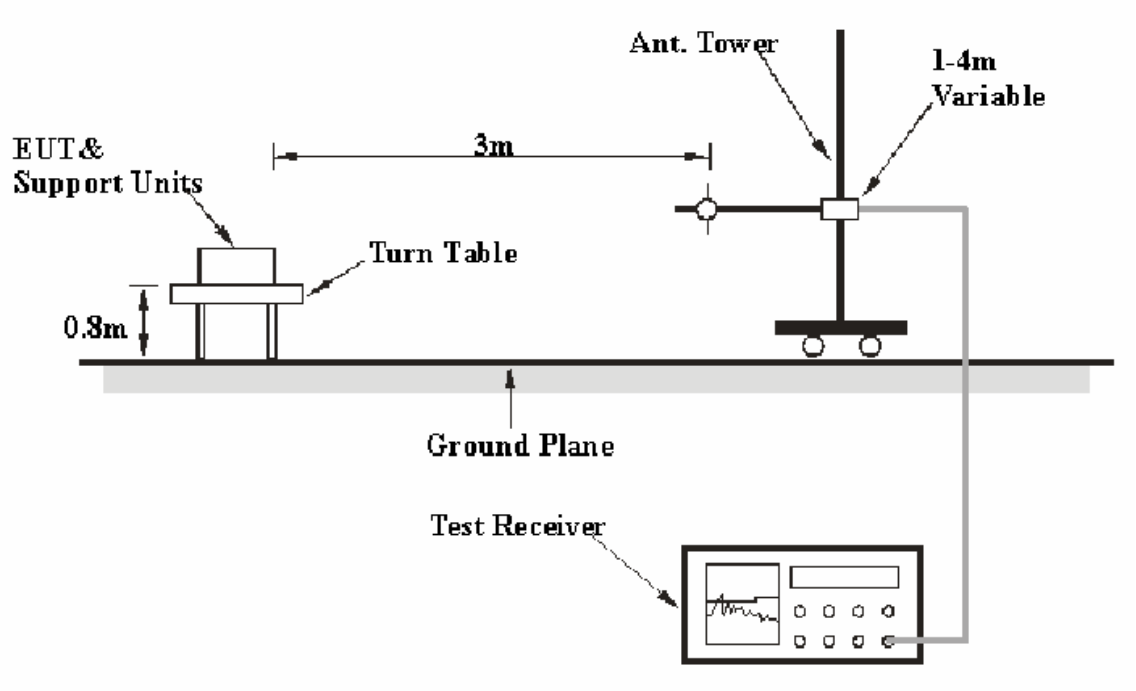
§15.209 and §15.239- RADIATED EMISSION

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, 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 Laboratory 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:

Frequency Range	***RBW***	***VBW***
30 – 1000 MHz	100 kHz	300 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Spectrum Analyzer	8564E	3943A01781	2006-11-22	2007-11-22
HP	Amplifier	8449B	3008A00277	2006-09-29	2007-09-29
SUNOL SCIENCES	Horn Antenna	DRH-118	A052604	2006-07-20	2007-07-20
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2006-09-29	2007-09-29
HP	Amplifier	8447E	1937A01046	2006-08-17	2007-08-17
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2006-08-14	2007-08-14

*** Statement of Traceability:** Bay Area Compliance Laboratory 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:

Corr. Ampl. = Meter Reading + Antenna Loss + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 5.8dB means the emission is 5.8dB below the limit. The equation for margin calculation is as follows:

Margin = Limit - Corr. Ampl.

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:

0.9 dB at **88.3 MHz** in the **Vertical** polarization

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	53%
ATM Pressure:	1002mbar

The testing was performed by Charmi Peng on 2006-12-16.

Test Mode: Transmitting Middle channel

Frequency MHz	Meter Reading dBuV	Detector PK/QP/AV	Direction Degree	Height Meter	Polar H / V	Antenna Factor dB/m	Cable loss dB	Amplifier Gain dB	Corr. Ampl. dBuV/m	FCC PART 15.239 & 15.209		
										Limit dBuV/m	Margin dB	Remarks
88.30	66.0	AV	45	1.0	V	6.1	1.8	26.8	47.1	48.00	0.9*	Fundamental
88.30	62.8	AV	289	1.0	H	6.1	1.8	26.8	43.9	48.00	4.1	Fundamental
264.90	45.2	QP	60	1.0	H	11.3	2.1	26.0	32.6	46.00	13.4	Harmonic
176.60	40.5	QP	289	1.0	H	10.2	2.1	26.6	26.2	43.50	17.3	Harmonic
88.30	66.4	PK	45	1.0	V	6.1	1.8	26.8	47.5	68.00	20.5	Fundamental
88.30	63.2	PK	289	1.0	H	6.1	1.8	26.8	44.3	68.00	23.7	Fundamental
353.20	29.0	QP	45	1.2	H	13.4	3.2	25.8	19.8	46.00	26.2	Harmonic
353.20	26.2	QP	35	3.8	V	13.4	3.2	25.8	17.0	46.00	29.0	Harmonic
264.90	29.5	QP	60	1.2	V	11.3	2.1	26.0	16.9	46.00	29.1	Harmonic
176.60	26.9	QP	45	1.0	V	10.2	2.1	26.6	12.6	43.50	30.9	Harmonic

* Within measurement uncertainty.

§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	2006-09-29	2007-09-29
HP	Amplifier	8447E	1937A01046	2006-08-17	2007-08-17
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2006-08-14	2007-08-14

*** Statement of Traceability:** Bay Area Compliance Laboratory 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

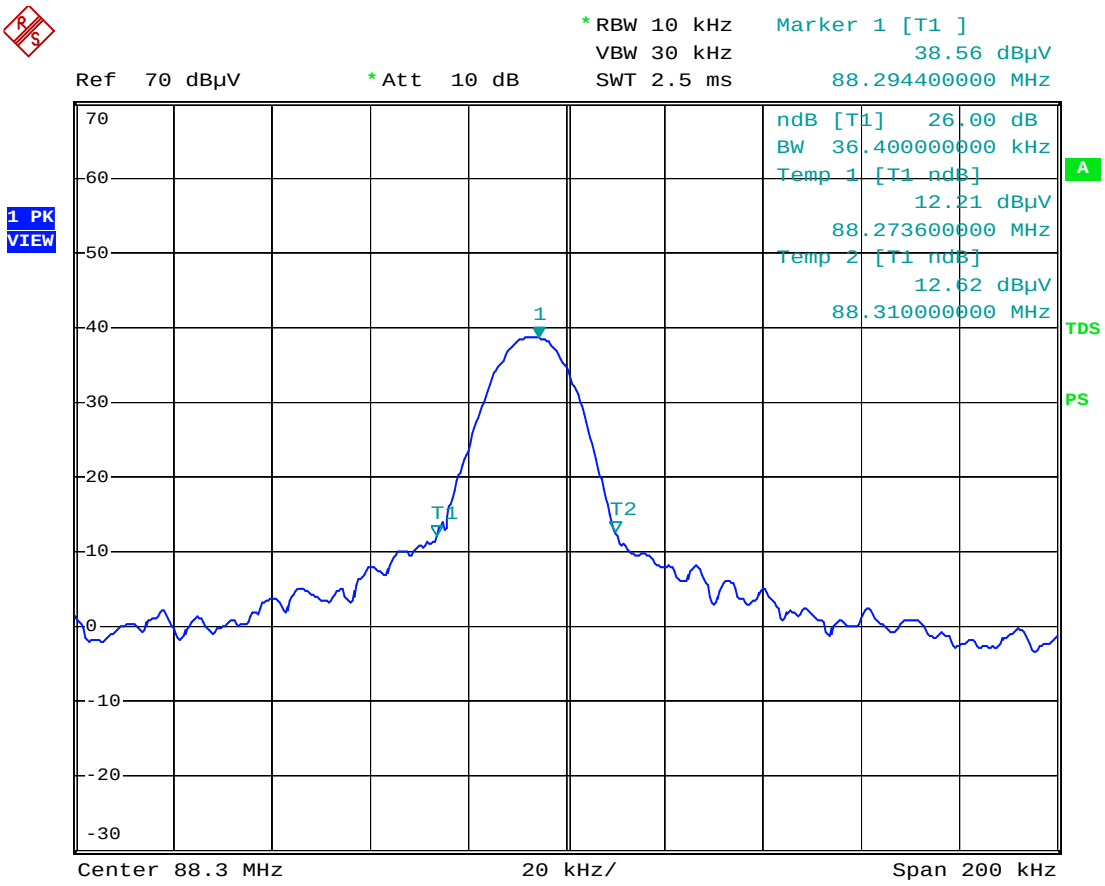
Temperature:	27 ° C
Relative Humidity:	56%
ATM Pressure:	1002mbar

The testing was performed by Charmi Peng on 2006-12-18.

Test Mode: Transmitting (MP3 Player)

Transmitting channel	Transmitting frequency (MHz)	Emission bandwidth (kHz)	Limit (kHz)	Result
Mid channel	88.3	36.4	200	Pass

Note: The band width was tested with the maximum audio input.



emission bandwidth

Date: 18.DEC.2006 12:53:32

§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	2006-9-29	2007-9-29
HP	Amplifier	8447E	1937A01046	2006-8-17	2007-8-17
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2006-8-14	2007-8-14

*** Statement of Traceability:** Bay Area Compliance Laboratory 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

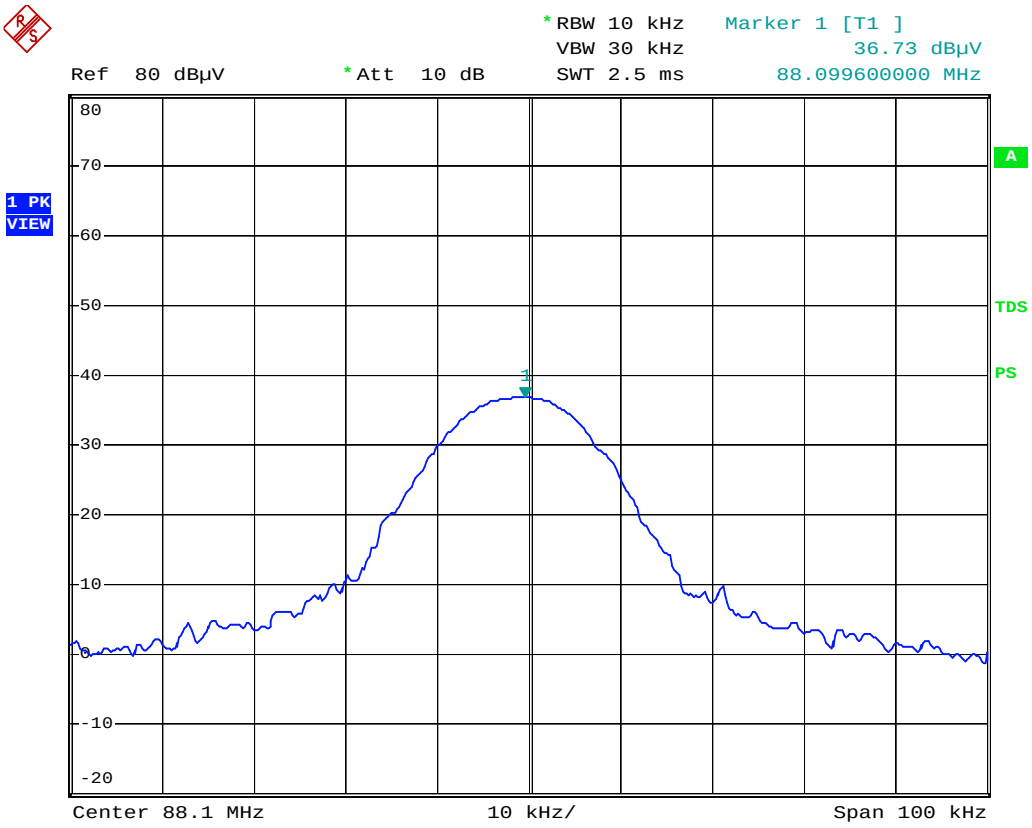
Temperature:	27 ° C
Relative Humidity:	56%
ATM Pressure:	1002mbar

The testing was performed by Charmi Peng on 2006-12-23.

Test Mode: Transmitting

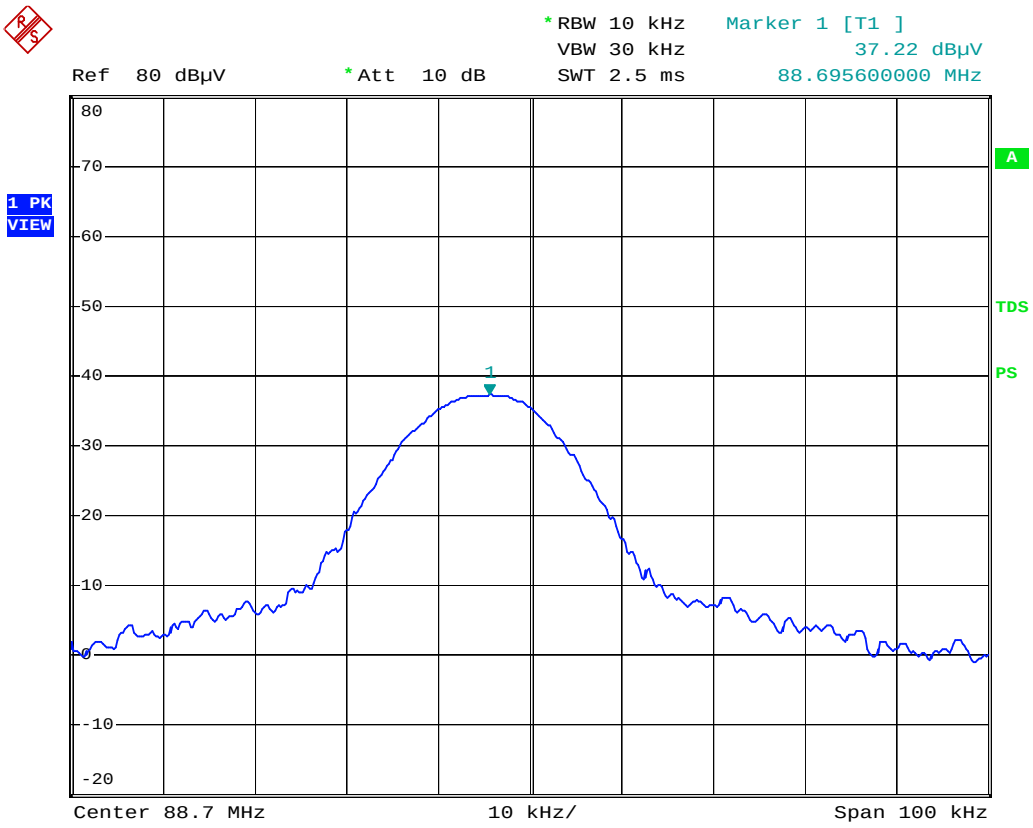
Result: The turning control was manually adjusted to verify the maximum turning range. Please refer to the plots attached

Maximum tuning range of the transmitter:



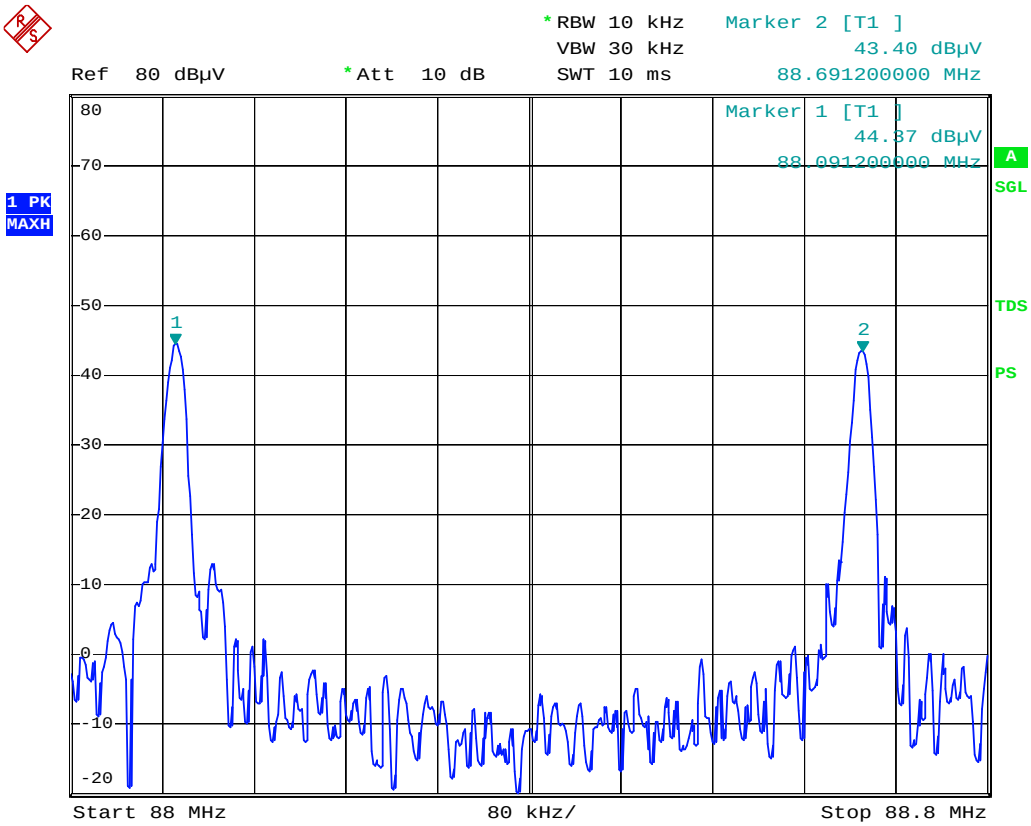
Teleway frequency range low channel

Date: 23.DEC.2006 10:23:12



Teleway frequency range high channel

Date: 23.DEC.2006 10:21:59



Teleway frequency range low-high channel

Date: 23.DEC.2006 10:27:52

§15.239(c) – OUT OF BAND EMISSION

Test Standard

The field strength of any emissions radiated on any frequency outside of the specified 200 kHz band shall not exceed the general radiated emission limits in §15.209.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2006-08-17	2007-08-17
HP	Amplifier	HP8447E	1937A01046	2006-08-17	2007-08-17
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2006-08-14	2007-08-14

*** Statement of Traceability:** Bay Area Compliance Lab 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:	27 ° C
Relative Humidity:	56%
ATM Pressure:	1002mbar

The testing was performed by Charmi Peng on 2006-12-18.

Transmitting channel	Transmitting frequency (MHz)	Out of band frequency (MHz)	Level (dBuV/m)	Limit (dBuv/m)	Result
Low channel	88.1	88.2	6.12	43.5	Pass
		80.0	6.36	40.0	Pass
High channel	88.7	88.8	6.53	43.5	Pass
		88.6	7.09	43.5	Pass