



SINTEK LABORATORY CO., LTD.
TEL: +86-755-27604866 FAX: +86-755-27608359

FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

MINWA(CHINA) ELECTRONICS CO., LTD.

Digital FM Transmitter

Model: 97651

Trade Name: 

Report No. : ST0907013F

Prepared for

**MINWA(CHINA) ELECTRONICS CO., LTD.
Minwa (Shenzhen) Industrial Park, Fu Shing Au Village, Ping Hu Town,
Long Gang District, Shenzhen, 518111, China.**

Prepared by

**SINTEK LABORATORY CO., LTD.
No. 7, Xinshidai Industrial, Guantian Village,
Shiyan Town, Bao`an District, Shenzhen,Guangdong, P.R.C.**

TEL: 86-755-27604866
FAX: 86-755-27608359

Note: This report shall not be reproduced except in full, without the written approval of Sintek Laboratory Co.,Ltd. This document may be altered or revised by Sintek Laboratory Co.,Ltd. personnel only, and shall be noted in the revision section of the document.



TABLE OF CONTENTS


1. TEST RESULT CERTIFICATION.....	3
2. EUT DESCRIPTION	4
3. TEST METHODOLOGY	5
3.1 EUT CONFIGURATION	5
3.2 EUT EXERCISE.....	5
3.3 GENERAL TEST PROCEDURES.....	5
3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS.....	6
3.5 DESCRIPTION OF TEST MODES	6
4. INSTRUMENT CALIBRATION.....	7
5. FACILITIES AND ACCREDITATIONS	8
5.1 FACILITIES8	
5.2 EQUIPMENT.....	8
5.3 LABORATORY ACCREDITATIONS AND LISTING.....	8
6. SETUP OF EQUIPMENT UNDER TEST	9
6.1 SETUP CONFIGURATION OF EUT.....	9
6.2 SUPPORT EQUIPMENT	9
7. FCC PART 15.239 REQUIREMENTS.....	10
7.1 BANDWIDTH OF EMISSION.....	10
7.2 POWERLINE CONDUCTED EMISSIONS.....	20



1. TEST RESULT CERTIFICATION

Applicant: MINWA (CHINA) ELECTRONICS CO., LTD.
 Minwa (Shenzhen) Industrial Park, Fu Shing Au Village, Ping Hu Town,
 Long Gang District, Shenzhen, 518111, China.

Equipment Under Test: Digital FM Transmitter

Trade Name: 

Model: 97651

Date of Test: August1 ~ 5, 2006

Report No. : ST0907013F

FCC ID : UM7-FM808B

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC Part 15 Subpart C	No non-compliance noted

Summary of Measurement	Test Requirement	Standard Paragraph	Result
Antenna Requirement	FCC PART15	15.203	Compliance
Conducted Emission	FCC PART15	15.207	Not applicable
Radiation Emission	FCC PART15	15.209&15.239	Compliance
Bandwidth Requirement	FCC PART15	15.239	Compliance
Band edge Requirement	FCC PART15	15.239	Compliance

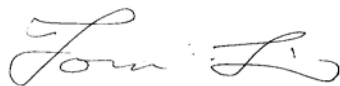
We hereby certify that:

The above equipment was tested by SINTEK laboratory co., ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.239.

The test results of this report relate only to the tested sample identified in this report.


Approved by:

Reviewed by:






2. EUT DESCRIPTION

Product	Digital FM Transmitter
Trade Name	
Model Number	97651
Model Discrepancy	N/A
Power Supply	DC 12V by Battery
Frequency Range	88.1~107.9 MHz
Number of Channels	199 Channels
Antenna Requirement	<p>Requirement(s): 47 CFR § 15.203 An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. Antenna requirement must meet at least one of the following:</p> <ul style="list-style-type: none">a) Antenna must be permanently attached to the device.b) Antenna must use a unique type of connector to attach to the device.c) Device must be professionally installed. Installer shall be responsible for ensuring that the correct antenna is employed with the device. <p>The EUT'S antenna is fixed on the main PCB / Gain: 1.21dBi</p>

Note: This submittal(s) (test report) is intended for FCC ID: UM7-FM808B filing to comply with Section 15.239 of the FCC Part 15, Subpart C Rules.



3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, and 15.239.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.239 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4: 2001, Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max emission, the relative positions of this hand-held transmitter (EUT) were rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4: 2001.

3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	²
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

3.5 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.



4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.



5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at No. 7, Xinshidai industrial, Guantian Village, Shiyan Town, Baoan District Shenzhen, China.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.3 LABORATORY ACCREDITATIONS AND LISTING

Site on file with the FCC: The certificate registration number is 963441 for 3&10M OATS

Site listed with the VCCI: The certificate registration number is R-2023 and C-2178 for 3&10M OATS



6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
	MP3	ipod	A1137	YM541C7ASZB	N/A	N/A	N/A

Notes:

All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

7. FCC PART 15.239 REQUIREMENTS

7.1 BANDWIDTH OF EMISSION

APPLICABLE STANDARD

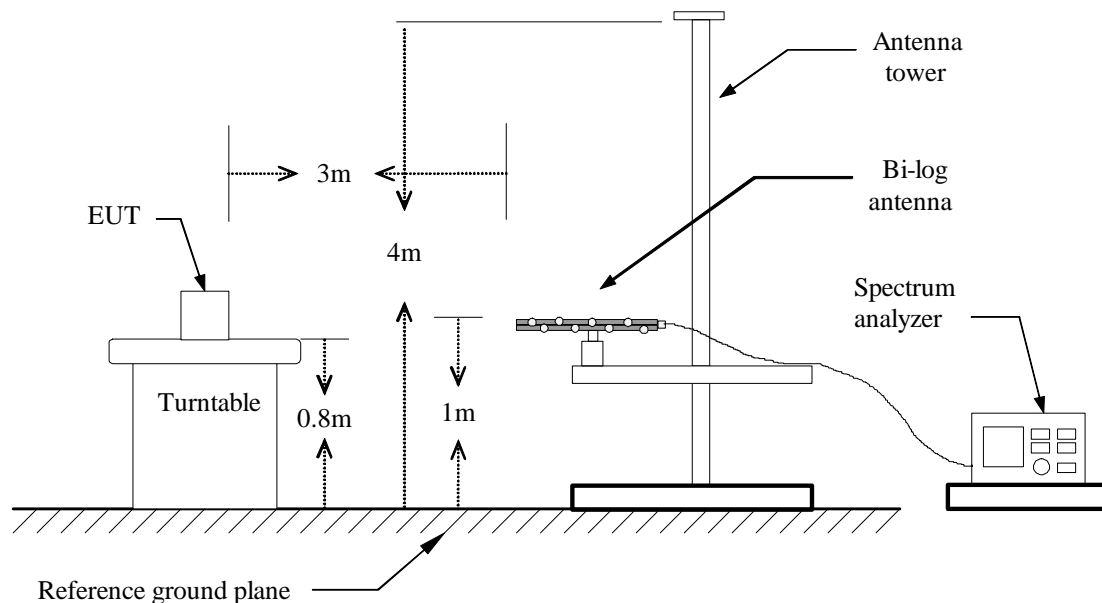
Per FCC rule &15.239a, Emissions from the intentional radiator shall be confined within a band 200KHz wide centered on the operating frequency. The 200KHz band shall lie wholly within the frequency range of 88-108MHz

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	ADVANTEST	R3132	140301570	06/12/2010
Turn Table	SINTEK	N/A	N/A	N.C.R
Antenna Tower	SINTEK	N/A	N/A	N.C.R
Controller	SINTEK	N/A	N/A	N.C.R
Bi-log Antenna	SCHAFFNER	CBL6111C	2775	06/12/2010
Pre-Amplifier	COM-POWER	PA-103	161062	06/12/2010

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration



TEST PROCEDURE

Place the EUT on the table and set it in the transmitting mode.

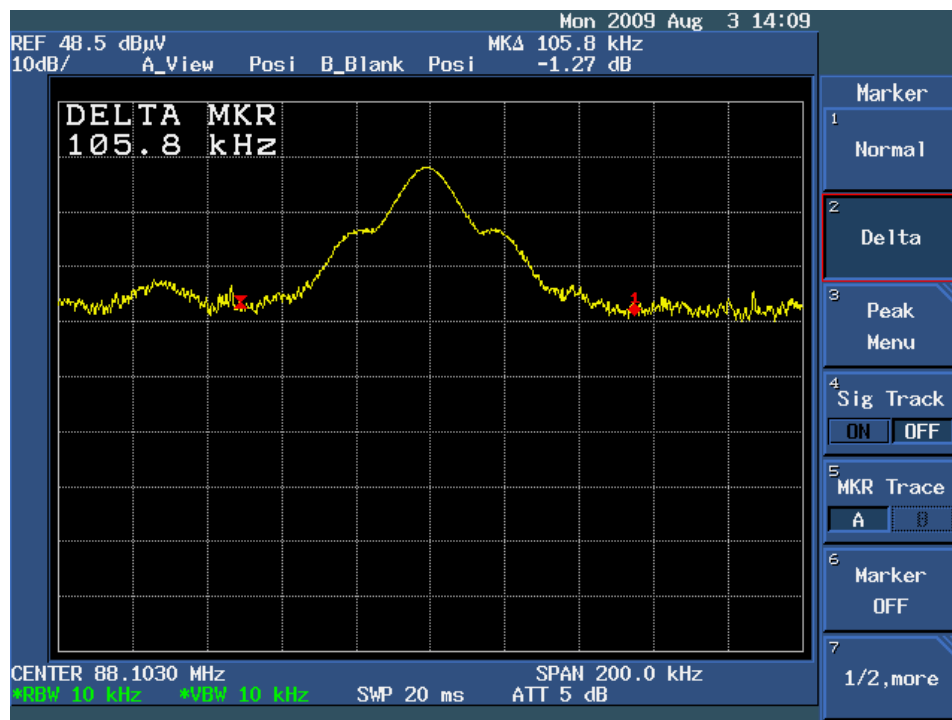
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

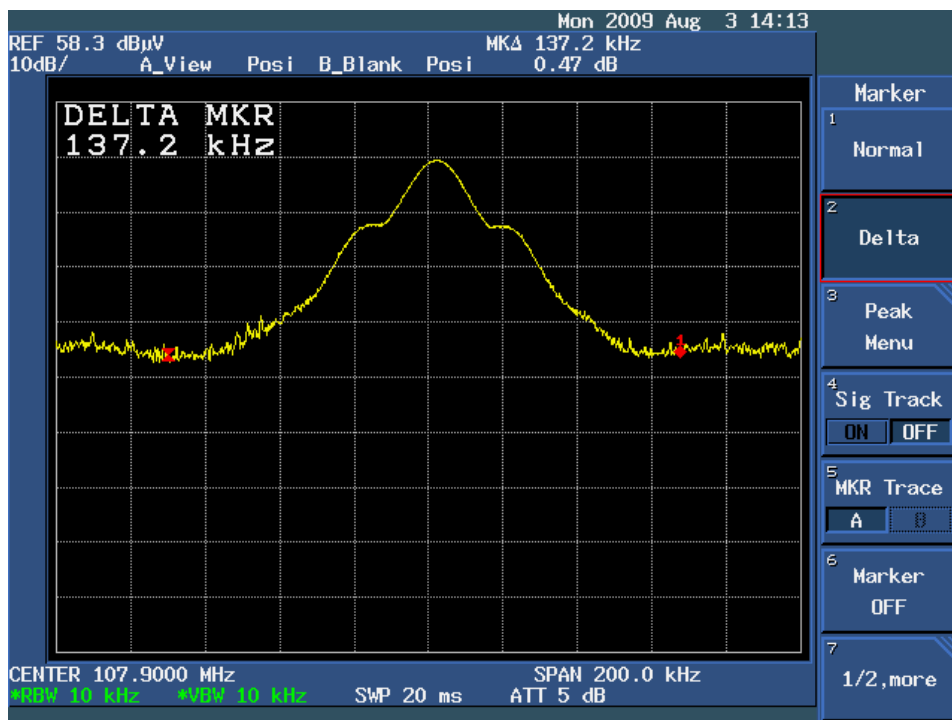
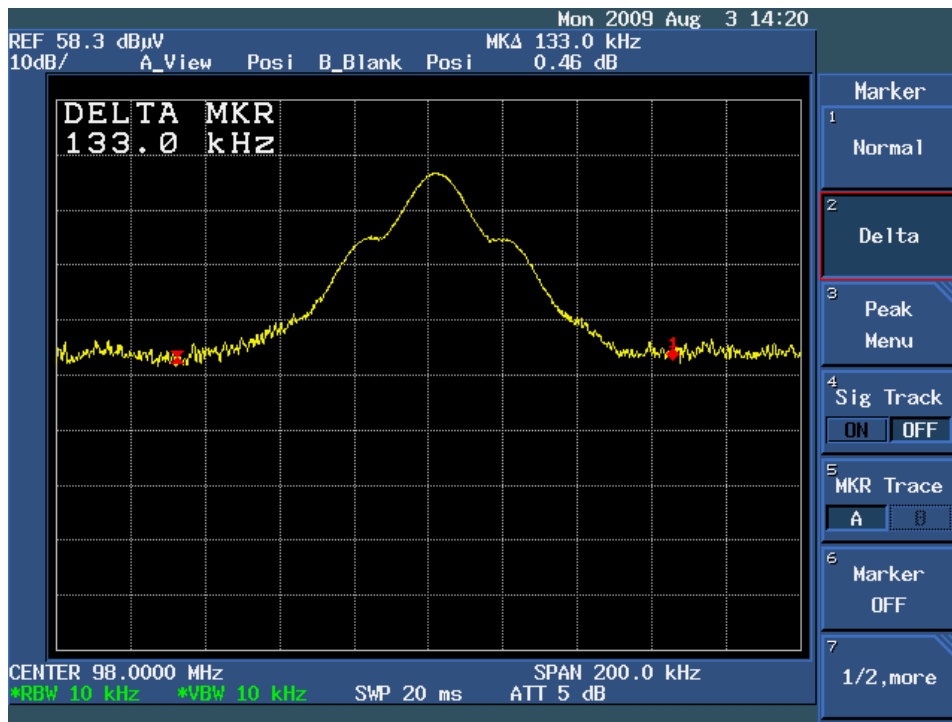
Set the spectrum analyzer as RBW = 10kHz, VBW = RBW, Span = 200KHz, Sweep = auto.

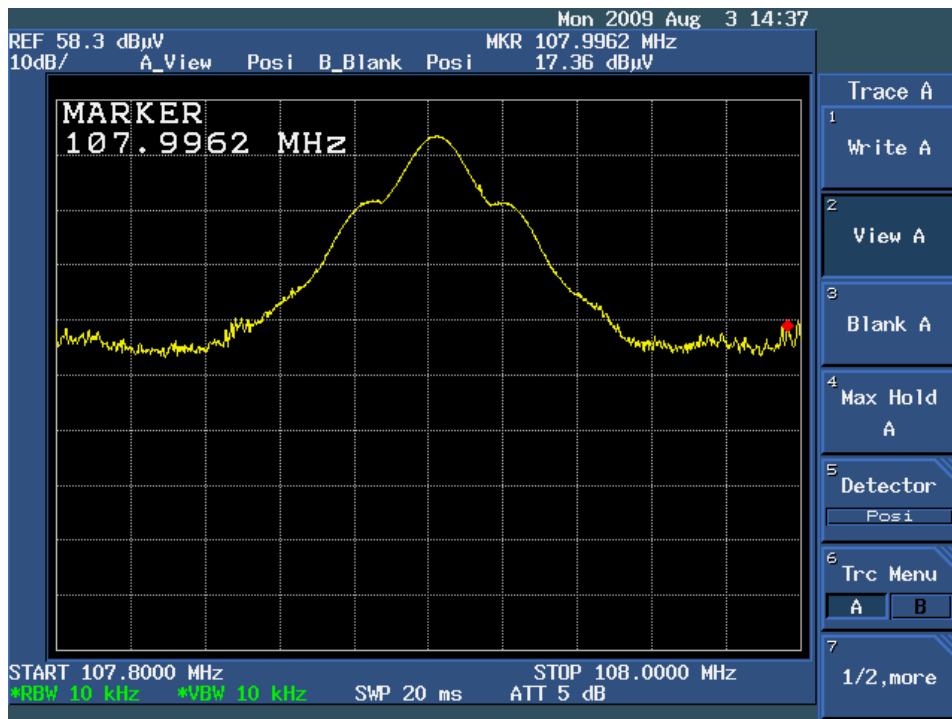
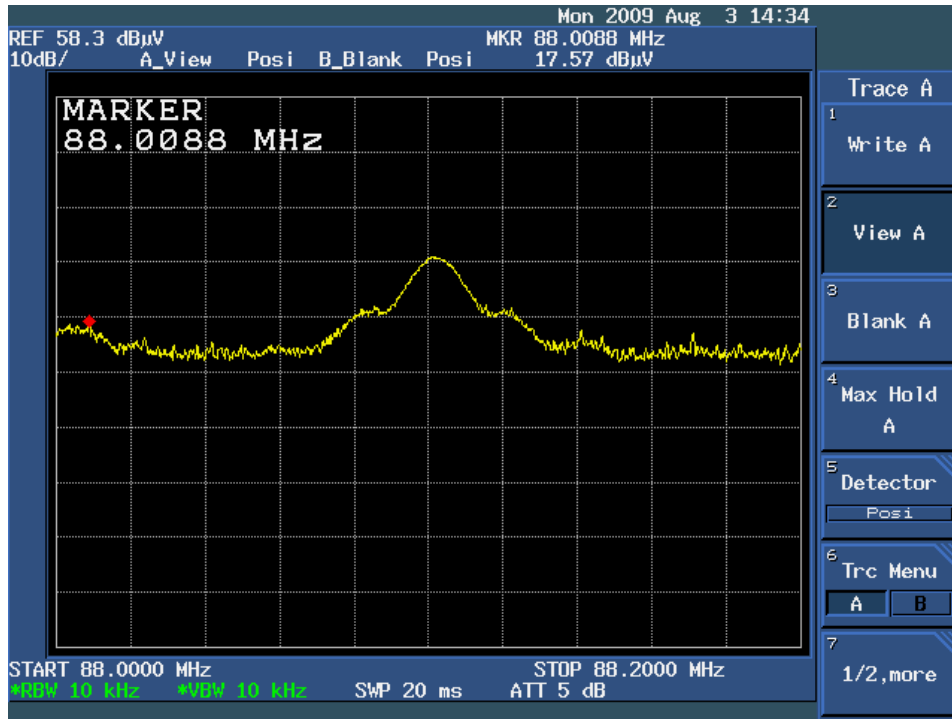
TEST RESULTS

No non-compliance noted

Test Plot







7.2 Radiated Emissions

LIMIT

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

FCC PART 15 subpart C section 15.209 :

Frequency (MHz)	Field Strength (mV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

Note: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.239.

In the above emission table, the tighter limit applies at the band edges.

Frequency (MHz)	Field Strength ($\mu\text{V}/\text{m}$ at 3-meter)	Field Strength ($\text{dB}\mu\text{V}/\text{m}$ at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

FCC PART 15 subpart C section 15.239:

In the above emission table, the tighter limit applies at the band edges.

Frequency (MHz)	Field Strength($\text{dB}\mu\text{V}/\text{m}$)		Measurement Distance (m)
	PK	AVG	
88-108	67.96	47.96	3

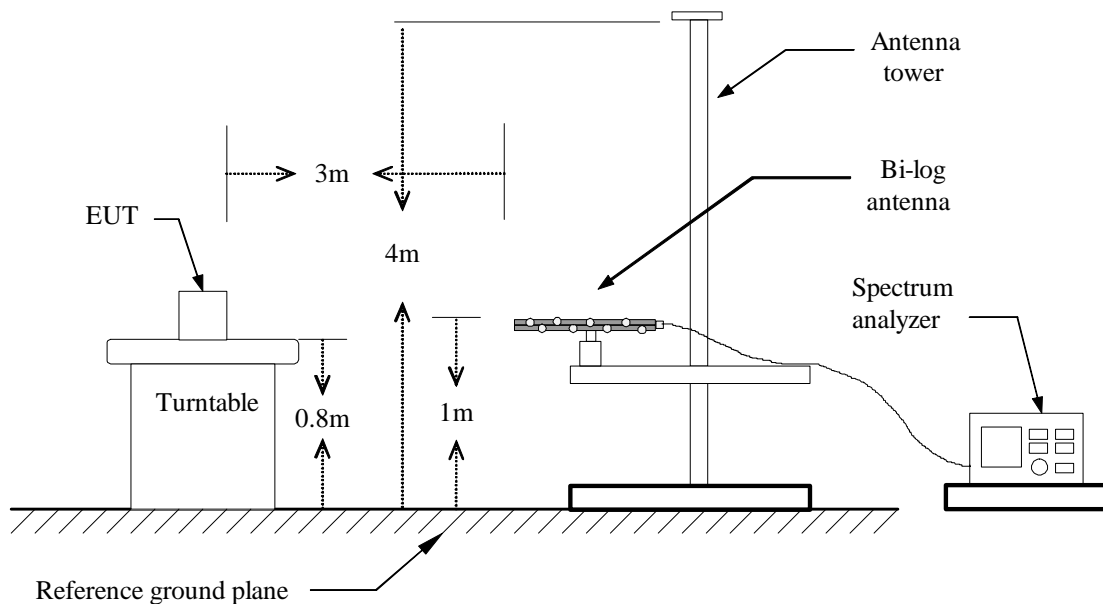
MEASUREMENT EQUIPMENT USED

Open Area Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	ADVANTEST	R3271A	85060231	06/12/2010
Spectrum Analyzer	ADVANTEST	R3132	140301570	06/12/2010
EMI Test Receiver	SCHAFFNER	SCR3501	464	06/12/2010
Pre-Amplifier	COM-POWER	PA-103	161062	06/12/2010
Bi-log Antenna	SCHAFFNER	CBL6111C	2775	06/12/2010
Turn Table	SINTEK	N/A	N/A	N.C.R
Antenna Tower	SINTEK	N/A	N/A	N.C.R
Controller	SINTEK	N/A	N/A	N.C.R
RF Switch	ANRITSU	MP59B	M53867	N.C.R
Horn antenna	EMCO	3115	9602-4659	06/12/2010
Pre-Amplifier	HP	8449B	3008B00965	06/12/2010

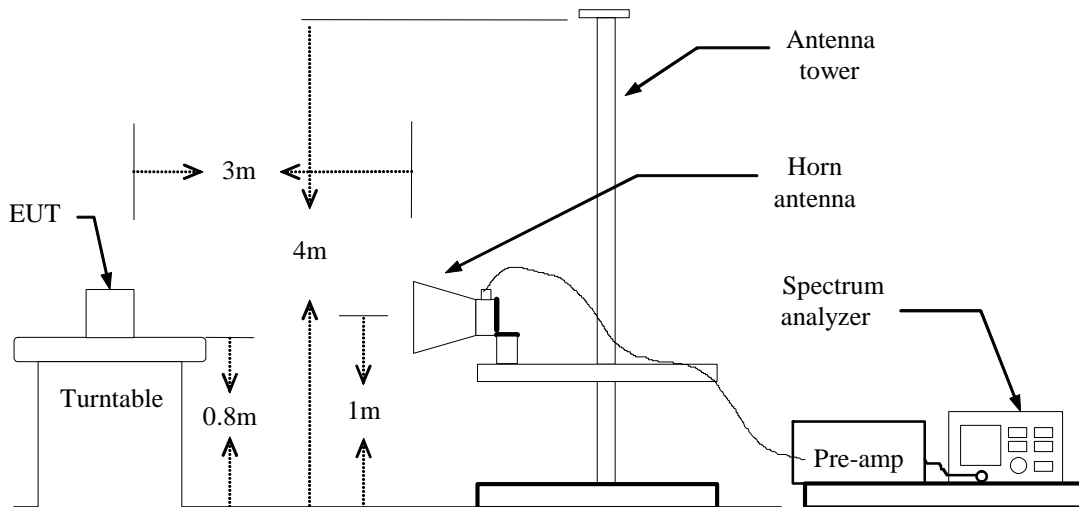
Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration

Below 1 GHz



Above 1 GHz



TEST PROCEDURE

The EUT is placed on a turntable, which is 0.8m above ground plane.

The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.

Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

Repeat above procedures until the measurements for all frequencies are complete.



TEST RESULTS

Below 1 GHz

Operation Mode: 88.1MHz

Test Date: Aug 4, 2009

Temperature: 20°C

Tested by: ray

Humidity: 70 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP/AV)	Reading (dBUV)	Factor (dB)	Actual FS (dBUV/m)	Limit 3m (dBUV/m) PK/QP/AV	Safe Margin (dB)
88.10	V	Peak/AV	25.23	16.90	42.13/42.13	67.96/--/47.96	-25.83/-5.83
176.24	V	Peak	16.25	11.28	27.53	--/43.50/--	-15.97
265.68	V	Peak	14.16	14.05	28.21	--/46.00/--	-17.79
382.05	V	Peak	15.48	18.00	33.48	--/46.00/--	-12.52
560.56	V	Peak	9.33	23.69	33.02	--/46.00/--	-12.98
737.04	V	Peak	12.62	29.54	42.16	--/46.00/--	-3.84
88.10	H	Peak/AV	24.32	15.21	39.53/39.53	67.96/--/47.96	-28.43/-8.43
176.24	H	Peak	18.96	16.35	35.31	--/43.50/--	-8.19
265.68	H	Peak	17.13	16.58	33.71	--/46.00/--	-12.29
382.05	H	Peak	16.74	21.09	37.83	--/46.00/--	-8.17
560.56	H	Peak	13.55	24.09	37.64	--/46.00/--	-8.36
737.04	H	Peak	10.04	28.55	38.59	--/46.00/--	-7.41

Notes:

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.



Operation Mode: 98MHz

Test Date: Aug 4, 2009

Temperature: 20°C

Tested by: ray

Humidity: 70 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP/AV)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m) PK/QP/AV	Safe Margin (dB)
98.01	V	Peak/AV	30.40/27.95	16.89	47.29/44.84	67.96/--/47.96	-20.67/-3.12
196.2	V	Peak	11.09	17.16	28.25	--/43.50/--	-15.25
294.8	V	Peak	13.57	14.77	28.34	--/46.00/--	-17.66
393.1	V	Peak	10.59	15.47	26.06	--/46.00/--	-19.94
490.17	V	Peak	5.57	22.79	28.36	--/46.00/--	-17.64
N/A	V	Peak	N/A	N/A	N/A	N/A	N/A
98.01	H	Peak/AV	27.33/25.75	16.39	43.72/42.14	67.96/--/47.96	-24.24/-5.82
196.2	H	Peak	18.63	15.26	33.89	--/43.50/--	-9.61
294.03	H	Peak	10.59	14.18	24.77	--/46.00/--	-21.23
393.1	H	Peak	16.61	16.09	32.70	--/46.00/--	-13.30
490.07	H	Peak	12.09	20.38	29.47	--/46.00/--	-16.53
686.11	H	Peak	5.70	23.69	29.39	--/46.00/--	-16.61

Notes:

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.



Operation Mode: 107.9MHz

Test Date: Aug 4, 2009

Temperature: 20°C

Tested by: ray

Humidity: 70 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP/AV)	Reading (dBUV)	Factor (dB)	Actual FS (dBUV/m)	Limit 3m (dBUV/m) PK/QP/AV	Safe Margin (dB)
107.90	V	Peak/AV	27.47/23.38	17.74	45.21/41.12	67.96/--/47.96	-22.75/-6.84
216.1	V	Peak	10.10	18.14	28.24	--/46.00/--	-17.76
324.03	V	Peak	13.21	16.24	29.45	--/46.00/--	-16.55
540.04	V	Peak	7.52	19.31	26.83	--/46.00/--	-19.17
757.01	V	Peak	2.07	23.18	25.25	--/46.00/--	-20.75
N/A	V	Peak	N/A	N/A	N/A	N/A	N/A
107.90	H	Peak/AV	27.14/25.25	17.59	44.73/42.84	67.96/--/47.96	-23.23/-5.12
216.1	H	Peak	15.21	18.69	33.90	--/46.00/--	-12.10
324.03	H	Peak	11.37	15.34	26.71	--/46.00/--	-19.29
540.04	H	Peak	9.38	17.69	27.07	--/46.00/--	-18.93
757.01	H	Peak	10.52	23.91	34.43	--/46.00/--	-11.57
865.01	H	Peak	7.14	24.10	31.24	--/46.00/--	-14.76

Notes:

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.

7.2 POWERLINE CONDUCTED EMISSIONS

LIMIT

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	SCHAFFNER	SCR3501	464	06/12/2010
Spectrum Analyzer	ADVANTEST	R3132	140301570	06/12/2010
LISN	COM-POWER	LI115	2027	06/12/2010
LISN	COM-POWER	LI115	2029	06/12/2010

Remark: Each piece of equipment is scheduled for calibration once a year.



Test Configuration

The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4: 2001

The EUT is set to transmit in a continuous mode.

TEST PROCEDURE

The EUT was placed on a table, which is 0.8m above ground plane.

Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

Repeat above procedures until all frequency measured were complete.



SINTEK LABORATORY CO., LTD.
TEL: +86-755-27604866 FAX: +86-755-27608359

TEST RESULTS

N/A: DC 12V by battery

APPENDIX 1 PHOTOGRPHS OF TEST SETUP

Radiated Emission Set up Photos

