FCC CFR 47 PART 15 SUBPART C

TEST REPORT

For

Action Star Enterprise Co., Ltd.

Cigarette Lighter FM Transmitter for iPod

Model: AT-111C; AT-111X

Trade Name: N/A

Issued to

Action Star Enterprise Co., Ltd.
10F, No. 159, Ta-Tung Rd., Sec. 2, Hsichih City,
Taipei Hsien, Taiwan, R.O.C. 221

Issued by

Compliance Certification Services Inc.
Hsintien Lab.
No. 165, Chunghsen Road, Hsintien City
Taipei Hsien, Taiwan
TEL: (02) 2217-0894
FAX: (02) 2217-1029

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1. TEST RESULT CERTIFICATION

Applicant:	Action Star Enterprise Co., Ltd. 10F, No. 159, Ta-Tung Rd., Sec. 2, Hsichih City, Taipei Hsien, Taiwan, R.O.C. 221
Equipment Under Test:	Cigarette Lighter FM Transmitter for iPod
Trade Name:	N/A
Model:	AT-111C; AT-111X
Model Difference	N/A
Report Number:	50707207-RP1
Date of Test:	July 14, 2005

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

The above equipment was tested by Compliance Certification Services Inc. 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 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits 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:*

David Wang
Manager of Hsintien Laboratory
Compliance Certification Services Inc.

Vince Chiang
Assistant Manager of Hsintien Laboratory
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	Cigarette Lighter FM Transmitter for iPod
Trade Name	N/A
Model	AT-111C; AT-111X
Power Supply	12VDC / 24VDC from DC power supply
Operate Frequency	88.1MHz to 107.9MHz with 200kHz step
Transmit Power	N/A
Modulation Technique	FM
Number of Channels	100 Channels
Operating Mode	Point-to-Point
Antenna Designation	Fixed Antenna, which is built in EUT

Note: *The product is a Transmitter. This submittal(s) (test report) is intended for FCC ID: RX4AT-111C filing to comply with Section 15.239 of the FCC Part 15 Subpart C Rules.*

MODEL DIFFERENCE

	Model Number	Difference	Test (check)
Original	AT-111C	The difference of models is marketing purposes only.	☒
Additional	AT-111X		☐

Note: *Client consigns only one model sample (Model Number is AT-111C) to test.*

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 Part 15 Subpart C.

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 calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

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 7.1 of ANSI C63.4-2003.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode.

Radiated Emissions

The EUT is a placed on as turntable, 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.

3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) 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

(b) 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 and tested in continuous transmitting mode.

1. The following test mode(s) were scanned during the preliminary test:

    1. **i-Pod mode**
    2. **Walkman Mode**

2. After the preliminary scan, the following test mode was found to produce the highest emission level.

    Mode 1

    Then, the EUT configuration and cable configuration of the above highest emission mode was recorded for all final test items. The Walkman played a music tape and set the volume to Max.

There are 100 channels on EUT, 88.1MHz to 107.9MHz with 200kHz spacing. We choose three channels, low (88.1MHz), middle (98.9MHz), high (107.9MHz), for test.

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. 81-1, Lane 210, Pa-de 2nd Road, Luchu Hsiang, Taoyuan Hsien, Taiwan

☒ No. 165, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) 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, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors 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 LISTINGS

The test facilities used to perform Electromagnetic compatibility tests are registered or accredited by the organizations listed in the following table which includes the recognized scope specifically.

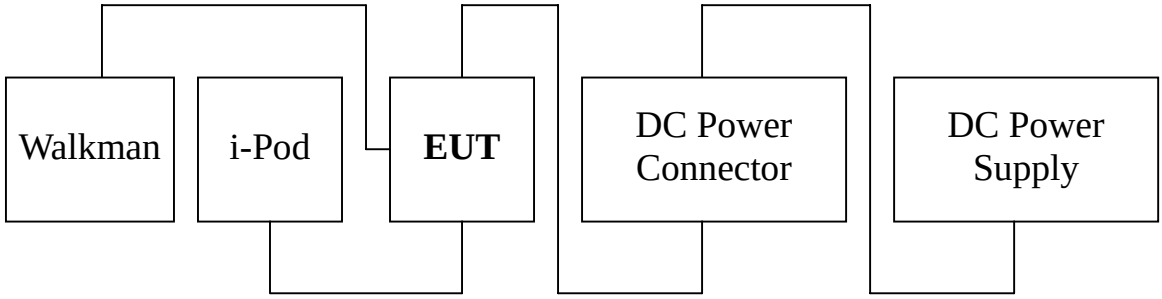
5.4 TABLE PF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	CFR 47, FCC Part 15/18 using ANSI 63.4; AS/NZS 3548; VCCI V3; CNS 13438; CNS 13439; CNS 13783; CNS 14115; CISPR 11/EN 55011; CISPR 14-1/EN 55014-1; CISPR 15/EN 55015; CISPR 22/EN 55022; EN 50081-1/EN 61000-6-3; EN 50082-1/EN 61000-6-4; IEC/EN 61000-4-2, IEC/EN 61000-4-3, IEC/EN 61000-4-4, IEC/EN 61000-4-5, IEC/EN 61000-4-6, IEC/EN 61000-4-8, IEC/EN 61000-4-11, IEC/EN 61000-3-2, IEC/EN 61000-3-3; CISPR 24/EN 55024; CISPR 14-2/EN 55014-2; EN 50081-2/EN 61000-6-1; EN 50082-2/EN 61000-6-2.	ACCREDITED 824.01
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	250366
Japan	VCCI	3/10 meter Open Area Test Sites and Line Conducted Test Room to perform conducted/radiated measurements	VCCI R-1434/1630~4 C-1511/1882
Norway	NEMKO	EN 50081-1/2, EN 50082-1/2, IEC 61000-6-1/2/3/4, EN 50091-2, EN 50130-4, EN 55011, EN 55013, EN 55014-1/2, EN 55015, EN 55022, EN 55024, EN 61000-3-2/3, EN 61326-1, IEC 61000-4-2/3/4/5/6/8/11, Cispr 16-1/2/3/4	ELA 103
Taiwan	CNLA	47 CFR FCC Part 15 Subpart B, EN 61000-3-2, EN 61000-3-3, CNS 13439, CNS 13783-1, CNS 13438, AS/NZS 3548, VCCI, CNS 13022-1/2/3, EN 55022, EN 55013, EN 55014-1, EN 61000-4-2/3/4/5/6/8/11, ENV 50204, ENV 50141, ENV 50142	CNLA 1108 ILAC MRA
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439	SL2-IN-E-0005 SL2-A1-E-0005 SL2-R1-E-0005 SL2-R2-E-0005
Canada	Industry Canada	RSS212, Issue 1	Canada IC 5742

Note: *No part of this report may be used to claim or imply product endorsement by CNLA, A2LA or other government agency.*

6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT



6.2 SUPPORT EQUIPMENT

No	Equipment	Model	Serial No.	FCC/BSMI ID	Trade Name	Data Cable	Power Cord
1	DC Power Supply	GPC-3030D	N/A	N/A	GW	Unshielded, 0.75m	Shielded, 1.8m
2	DC Power Connecter	N/A	N/A	N/A	N/A	Shielded, 0.45m	N/A
3	i-Pod	i-Pod	5U512E3RS41	N/A	Apple	Shielded, 0.2m	N/A
4	Walkman	RQ-L112T	N/A	DoC BSMI ID: 3913A162	Panasonic	Shielded, 0.55m	N/A

Notes:

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

7. FCC PART 15.239 REQUIREMENTS

7.1 26 dB BANDWIDTH

LIMIT

N/A

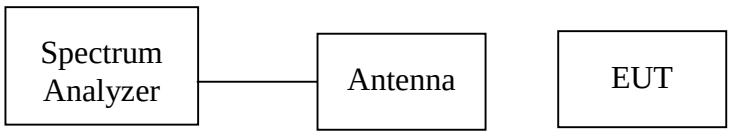
MEASUREMENT EQUIPMENT USED

Open Area Test Site: # I

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	CAL. DUE
SITE NSA	CCS	I Site	N/A	09/17/2005
MEASURE RECEIVER	SCHAFFNER	SCR3501	338	06/27/2006
SPECTRUM ANALYZER	ADVANTEST	R3132	120900008	No Calibration Required
ANTENNA	SCHAFFNER	CBL 6112B	2809	09/24/2005
AMPLIFIER	SCHAFFNER	CPA9231A	3626	10/08/2005
CABLE	BELDEN	9913	N-TYPE #I2	02/18/2006
ATTENUATOR	MCL	UNAT-6	AT06-3	10/08/2005
THERMO-HYGRO METER	TFA	N/A	NO.2	11/09/2005

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

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=10kHz, VBW = RBW, Span = 200kHz, Sweep = auto.
4. Mark the peak frequency and 26dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

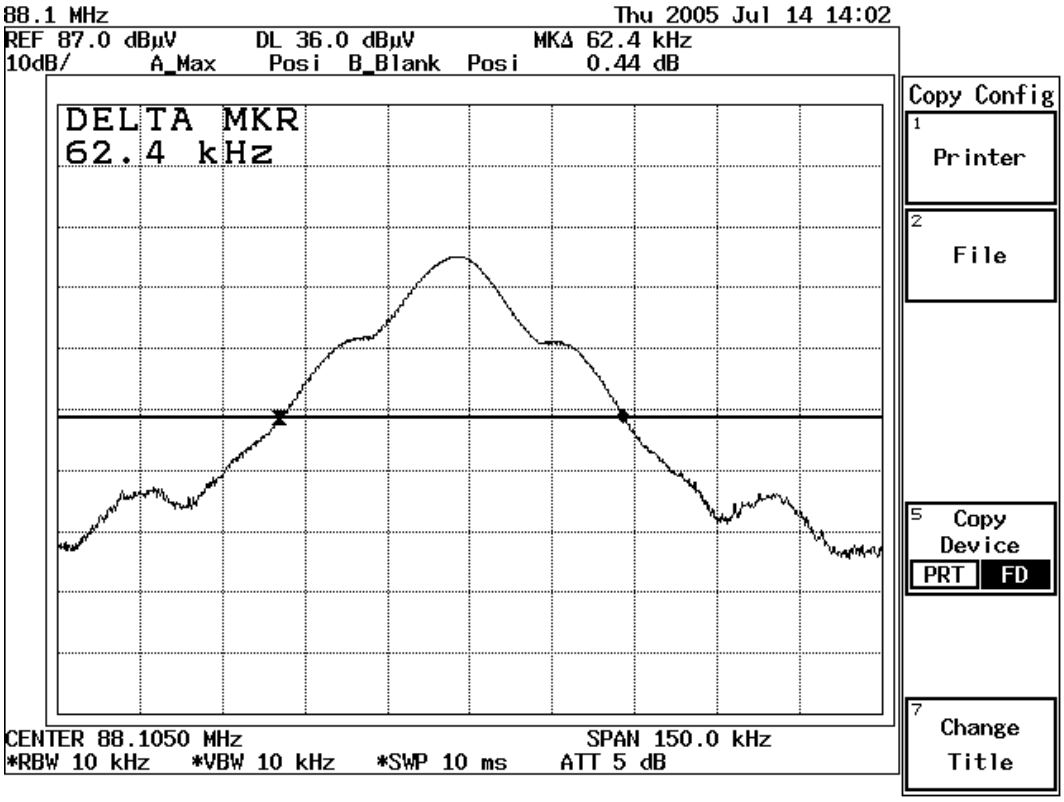
TEST RESULTS

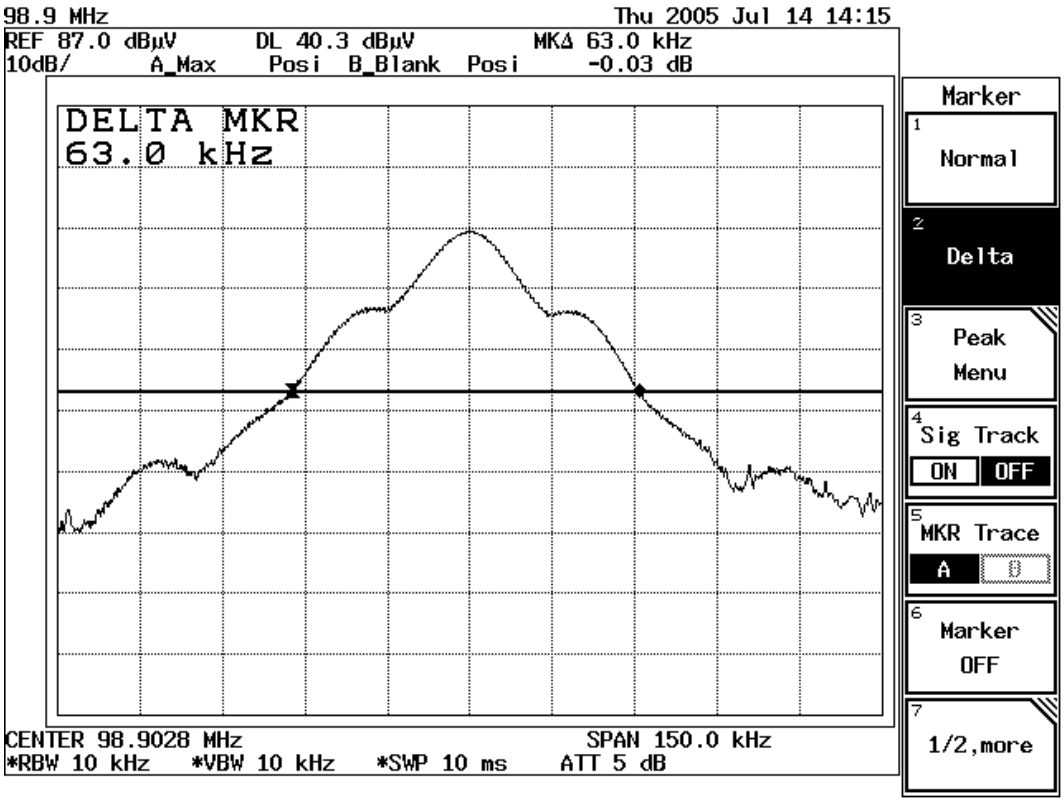
No non-compliance noted

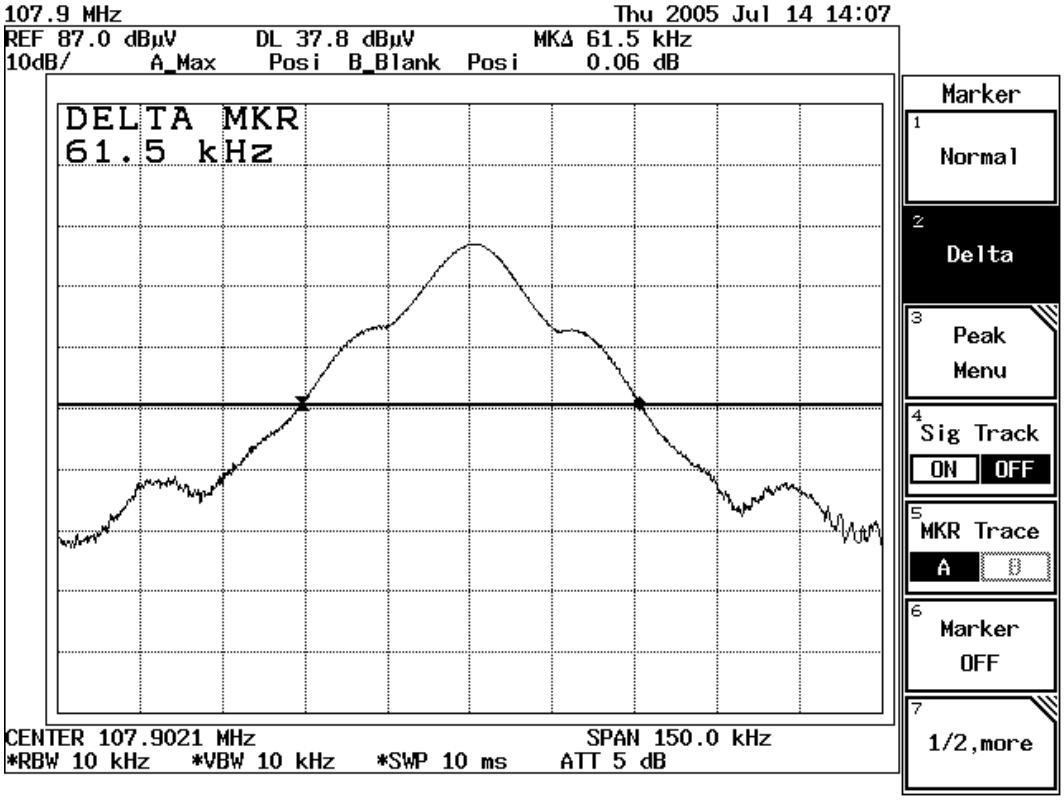
Test Data

Channel	Frequency (MHz)	Bandwidth (kHz)
1	88.1	62.4
2	98.9	63.0
3	107.9	61.5

Test Date Plot




98.9 MHz
Thu 2005 Jul 14 14:15
REF 87.0 dBµV
DL 40.3 dBµV
MKΔ 63.0 kHz
10dB/
A_Max
Posi
B_Blank
Posi
-0.03 dB
DELTA MKR
63.0 kHz
CENTER 98.9028 MHz
SPAN 150.0 kHz
*RBW 10 kHz
*VBW 10 kHz
*SWP 10 ms
ATT 5 dB
Marker
1 Normal
2 Delta
3 Peak Menu
4 Sig Track ON OFF
5 MKR Trace A 0
6 Marker OFF
7 1/2,more


107.9 MHz
Thu 2005 Jul 14 14:07
REF 87.0 dBµV
DL 37.8 dBµV
MKΔ 61.5 kHz
10dB/
A_Max
Posi
B_Blank
Posi
0.06 dB
DELTA MKR
61.5 kHz
CENTER 107.9021 MHz
SPAN 150.0 kHz
*RBW 10 kHz
*VBW 10 kHz
*SWP 10 ms
ATT 5 dB
Marker
1 Normal
2 Delta
3 Peak Menu
4 Sig Track ON OFF
5 MKR Trace A 0
6 Marker OFF
7 1/2,more

7.2 RADIATED EMISSIONS

LIMIT

1. The field strength of any emission within this band (section 15.239 frequency between 88MHz –108MHz) shall not exceed 250 micro volts /meter at 3 meters. (48dBμV/m at 3m) The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in section 15.35 for limiting peak emissions apply.

   The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in section 15.209(Intentional Radiators general limit), as below.

Frequency (MHz)	Field Strength (mV/m)	Measurement Distance (m)
1.705-30	30	30
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 15.231 and 15.241.*

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

Frequency (Hz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
1.705-30	30	69.54
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

MEASUREMENT EQUIPMENT USED

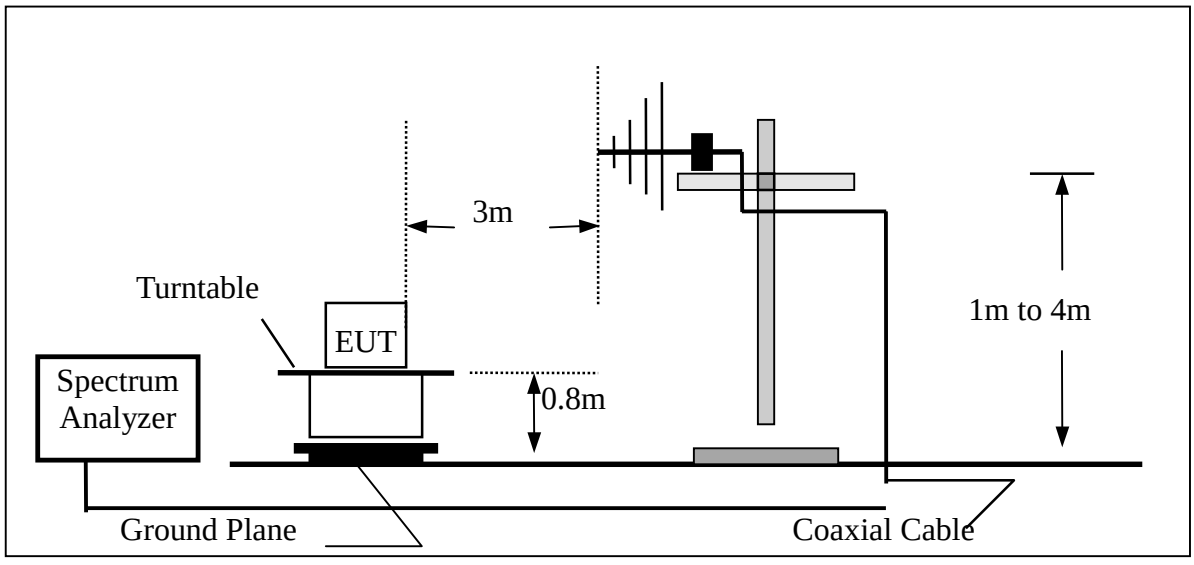
Open Area Test Site: # I

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	CAL. DUE
SITE NSA	CCS	I Site	N/A	09/17/2005
MEASURE RECEIVER	SCHAFFNER	SCR3501	338	06/27/2006
SPECTRUM ANALYZER	ADVANTEST	R3132	120900008	No Calibration Required
ANTENNA	SCHAFFNER	CBL 6112B	2809	09/24/2005
AMPLIFIER	SCHAFFNER	CPA9231A	3626	10/08/2005
CABLE	BELDEN	9913	N-TYPE #I2	02/18/2006
ATTENUATOR	MCL	UNAT-6	AT06-3	10/08/2005
THERMO-HYGRO METER	TFA	N/A	NO.2	11/09/2005

Note: *The measurement uncertainty is less than +/- 3.36dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CD*

Test Configuration

For Frequencies Below 1 GHz



TEST PROCEDURE

1. The EUT was placed on a turntable, which was 0.8m above ground plane.
2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
3. EUT was set at 3m away from the receiving antenna, which was varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was maximized by changing the polarization of receiving antenna, both horizontal and vertical.
6. Repeated above procedures until the measurements for all frequencies are completed.

TEST RESULTS

Test Data

We have tested three axes (X, Y, Z). The worst is Z-axis.

Frequencies for 88MHz - 108MHz:

Date: 2005-07-14 **Tested by:** Alex Pan

Temperature: 25°C **Humidity:** 51% RH

	Frequency (MHz)	Reading (dBuV)	Correction Factor (dBuV/m)	FS (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Mode (P/A)	Ant.Pol. H/V
X	88.104	37.90	-1.63	36.27	47.96	-11.69	P	V
	98.904	35.50	-1.80	33.70	47.96	-14.26	P	V
	107.902	39.10	-6.59	32.51	47.96	-15.45	P	V
Y	88.104	34.70	-1.63	33.07	47.96	-14.89	P	V
	98.904	41.40	-1.80	39.60	47.96	-8.36	P	V
	107.904	41.00	-6.59	34.41	47.96	-13.55	P	V
Z	88.104	45.20	-1.63	43.57	47.96	-4.39	P	V
	98.904	36.40	-1.80	34.60	47.96	-13.36	P	V
	107.902	42.60	-6.59	36.01	47.96	-11.95	P	V
X	88.104	46.60	-1.11	45.49	47.96	-2.47	P	H
	98.904	48.60	-7.13	41.47	47.96	-6.49	P	H
	107.904	52.70	-8.89	43.81	47.96	-4.15	P	H
Y	88.104	41.80	-1.11	40.69	47.96	-7.27	P	H
	98.904	46.00	-7.13	38.87	47.96	-9.09	P	H
	107.904	51.90	-8.89	43.01	47.96	-4.95	P	H
Z	88.104	47.70	-1.11	46.59	47.96	-1.37	P	H
	98.904	45.50	-7.13	38.37	47.96	-9.59	P	H
	107.904	52.60	-8.89	43.71	47.96	-4.25	P	H

Remark:

1. *Measuring frequencies from 88MHz to the 108MHz.*
2. *Datas 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.*
3. *The IF bandwidth of SPA between 88MHz to 108MHz was 10kHz.*
4. *Ant. Pol = Antenna Polarization / FS = Field strength.*

Frequencies for 30MHz-1GHz:

Date: 2005-07-14 **Tested by:** Alex Pan

Temperature: 25°C **Humidity:** 51% RH

Frequency (MHz)	Reading (dBuV)	Correction Factor (dBuV/m)	FS (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Mode (P/A)	Ant.Pol. H/V
44.5200	38.14	-11.43	26.71	40.00	-13.29	P	V
176.4700	36.78	-11.47	25.31	43.50	-18.19	P	V
297.7500	38.47	-6.42	32.05	46.00	-13.95	P	V
450.7400	39.46	-1.59	37.87	46.00	-8.13	P	V
636.2400	35.33	0.83	36.16	46.00	-9.84	P	V
838.1100	30.74	2.94	33.68	46.00	-12.32	P	V
45.3600	37.64	-11.84	25.80	40.00	-14.20	P	H
162.9900	38.67	-10.84	27.83	43.50	-15.67	P	H
230.4580	32.65	-9.11	23.54	46.00	-22.46	P	H
354.1200	35.61	-4.30	31.31	46.00	-14.69	P	H
567.4400	36.94	0.32	37.26	46.00	-8.74	P	H
768.1230	32.44	2.00	34.44	46.00	-11.56	P	H

Remark:

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/AV detector mode.*
3. *Datas 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.*
5. *Ant. Pol = Antenna Polarization / FS = Field strength.*

7.3 POWERLINE CONDUCTED EMISSIONS

Not applicable, as it's power was supplied from DC Power Supply.

APPENDIX 1 - PHOTOGRAPHS OF TEST SETUP

X axis

Y axis

Z axis