FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

DONGGUAN CHIA MAW ELECTRONIC TECH. CO.,LTD.
WIRELESS AUDIO TRANSMITTER

Model: JK-RF4020, CM-RF4020

Trade Name: Jackenzie

Prepared for

DONGGUAN CHIA MAW ELECTRONIC TECH. CO.,LTD.
HUANG CHAO LANG, 2nd INDUSTRIAL DISTRICT, DA LANG TOWN
DONGGUAN, GUANGDONG, CHINA

Prepared by

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1. TEST RESULT CERTIFICATION

Applicant: DONGGUAN CHIA MAW electronics tech. Co., ltd.
HUANG CAO LANG,2nd industry district, DA LANG town, DONGGUAN, GUANGDONG china

Equipment Under Test: wireless audio transmitter

Trade Name: jackenzie

Model: JK-RF4020, CM-RF4020

Date of Test: JANUARY 16, 2006

Report No. : ST0511024

FCC ID : TXIRF4020

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

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: 2001 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.247.

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

Approved by: *Reviewed by:*

2. EUT DESCRIPTION

Product	Wireless audio transmitter
Trade Name	jackenzie
Model Number	JK-RF4020, CM-RF4020
Model Discrepancy	N/A
Power Supply	DC 5V
Frequency Range	2400 ~ 2483.5 MHz
Number of Channels	1 Channels
Antenna Specification	N/A
Temperature Range	0 ~ + 60°C

Note: *This submittal(s) (test report) is intended for FCC ID: TXIRF4020 filing to comply with Section 15.247 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 15.247.

3.1EUT 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.

3.2EUT 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 15.247 under the FCC Rules Part 15 Subpart C.

3.3GENERAL 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.

3.4FCC 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.

3.5DESCRIPTION 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. ANTENNA REQUIREMENTS

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the applicant can be used with the device. The use of a permanently attached antennas or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with this requirement.

The antennas are permanently attached antenna.
There are no provisions for connection to an external antenna.

7. SETUP OF EQUIPMENT UNDER TEST

7.1SETUP CONFIGURATION OF EUT

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

7.2SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	Data Cable	Power Cord
1	DVD PLAY	norcent	DP315	N/A	1.0m/unshield	1.5m/unshield

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.

8. FCC PART 15.247 REQUIREMENTS

8.16dB BANDWIDTH

LIMIT

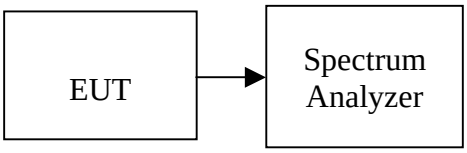
For the direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	ADVANTEST	R3132	140301570	06/12/2005

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 = 100kHz, VBW = RBW, Span = 20MHz, Sweep = auto.

Mark the peak frequency and –6dB (upper and lower) frequency.

Repeat until all the rest channels are investigated.

TEST RESULTS

No non-compliance noted

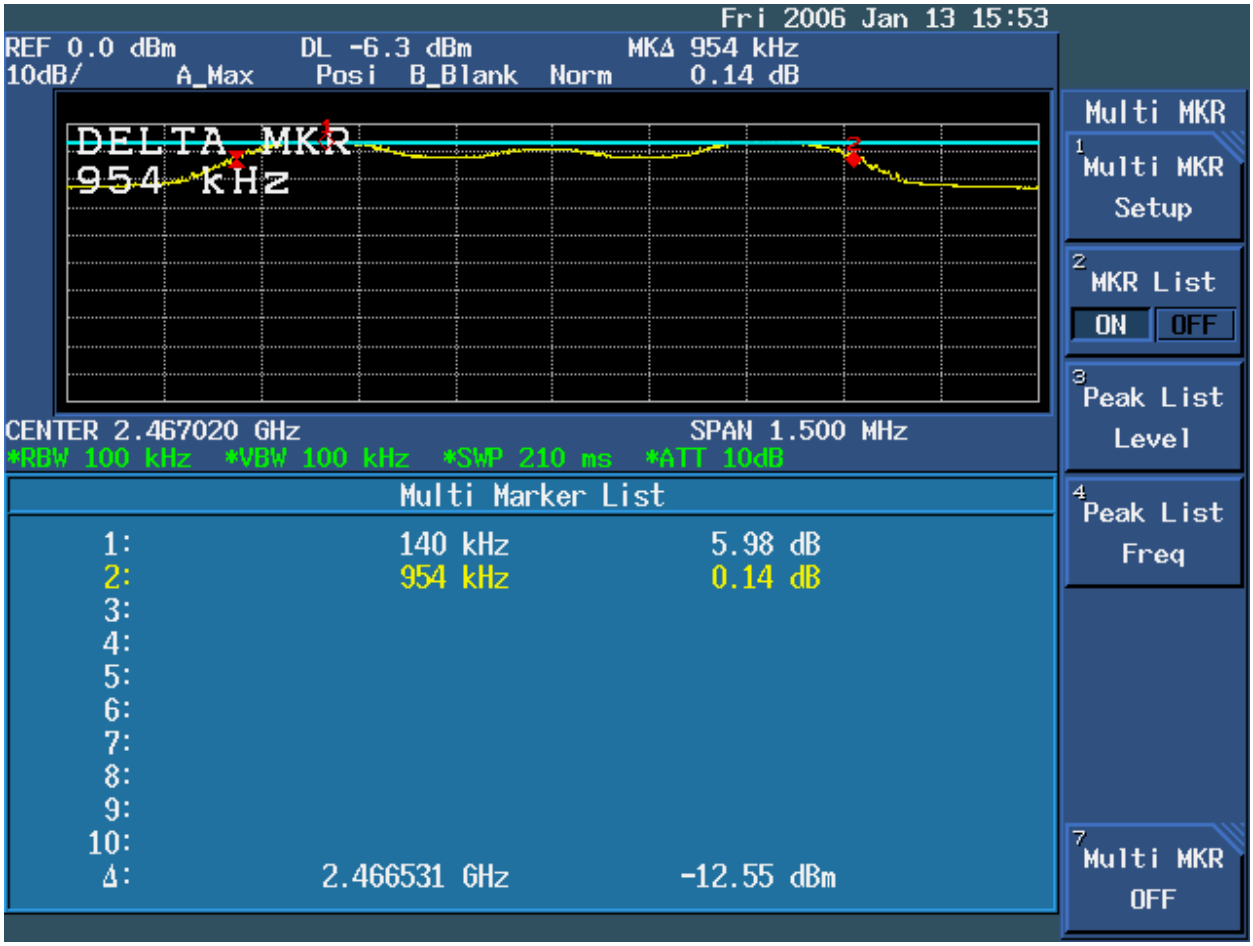
Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
	2466.60	954	>500	PASS

Test Plot

6dB Bandwidth



8.2PEAK POWER

LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

For systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 watt.

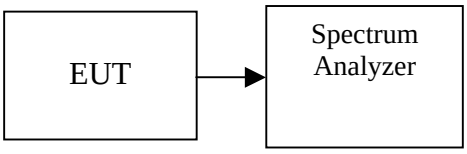
Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	ADVANTEST	R3132	140301570	06/12/2005

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

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the Spectrum analyzer. The Spectrum analyzer is set to the peak power detection.

TEST RESULTS

No non-compliance noted

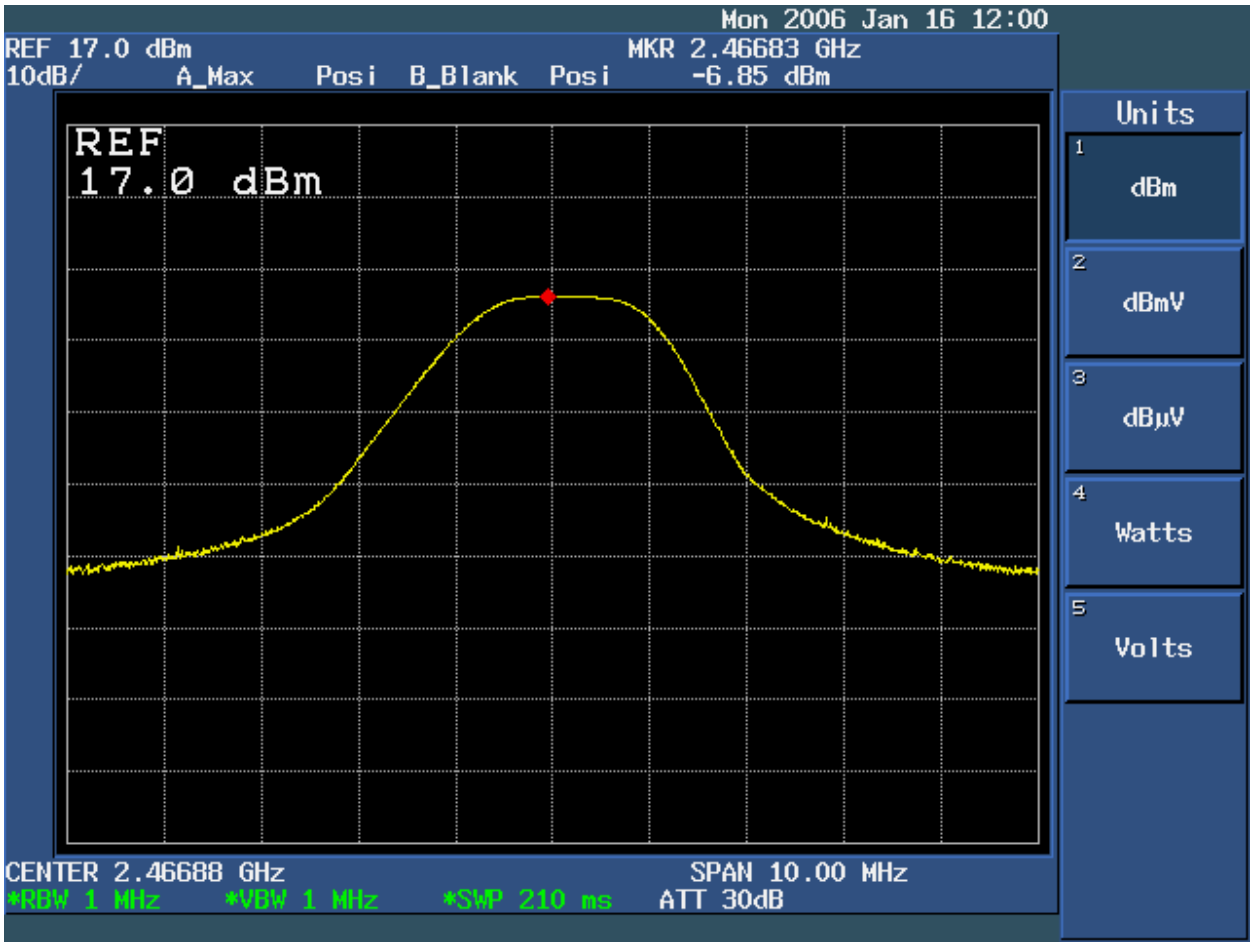
Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Output Power (dBm)	Factor (dB)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
	2466.60	-6.85	1.50	-5.35	0.000292	1	PASS

Test Plot

Peak power



8.3BAND EDGES MEASUREMENT

LIMIT

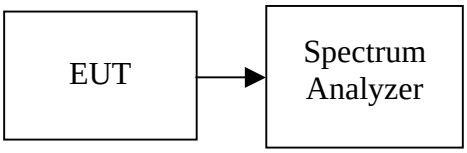
According to §15.247(c), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in15.209(a).

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	ADVANTEST	R3132	140301570	06/12/2005

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.

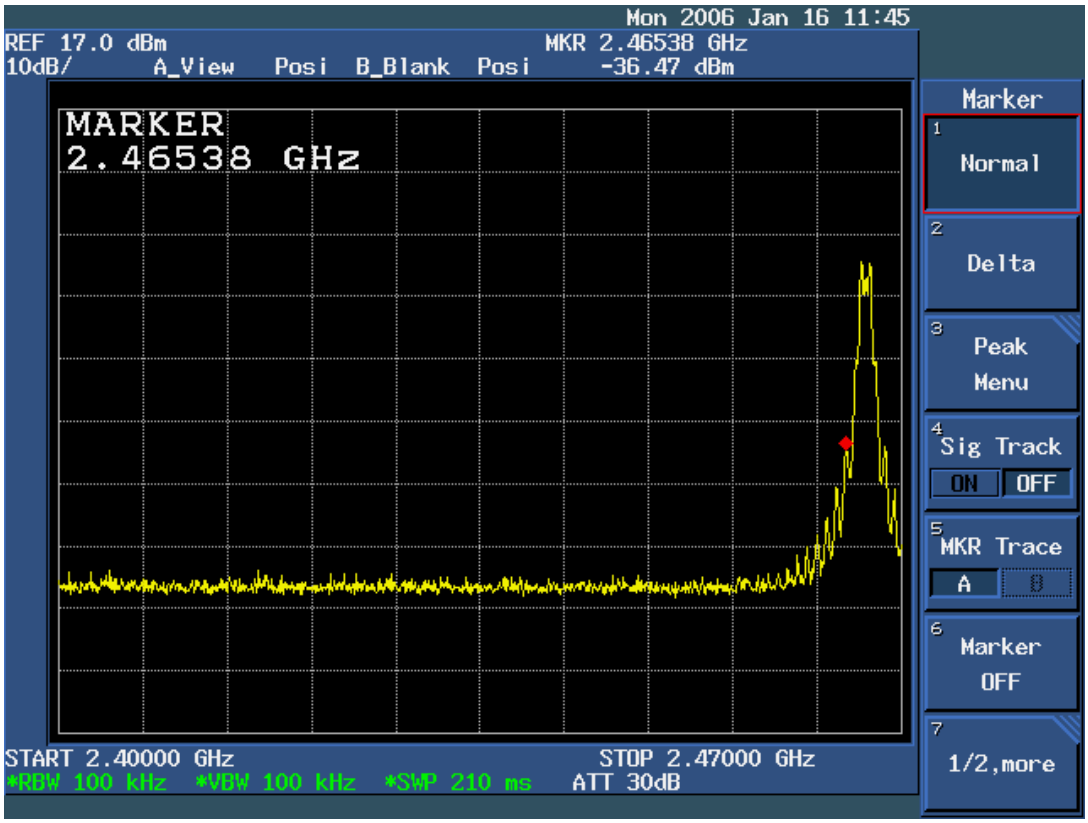
Set the spectrum analyzer as RBW = 100kHz, VBW = RBW, Sweep = auto.

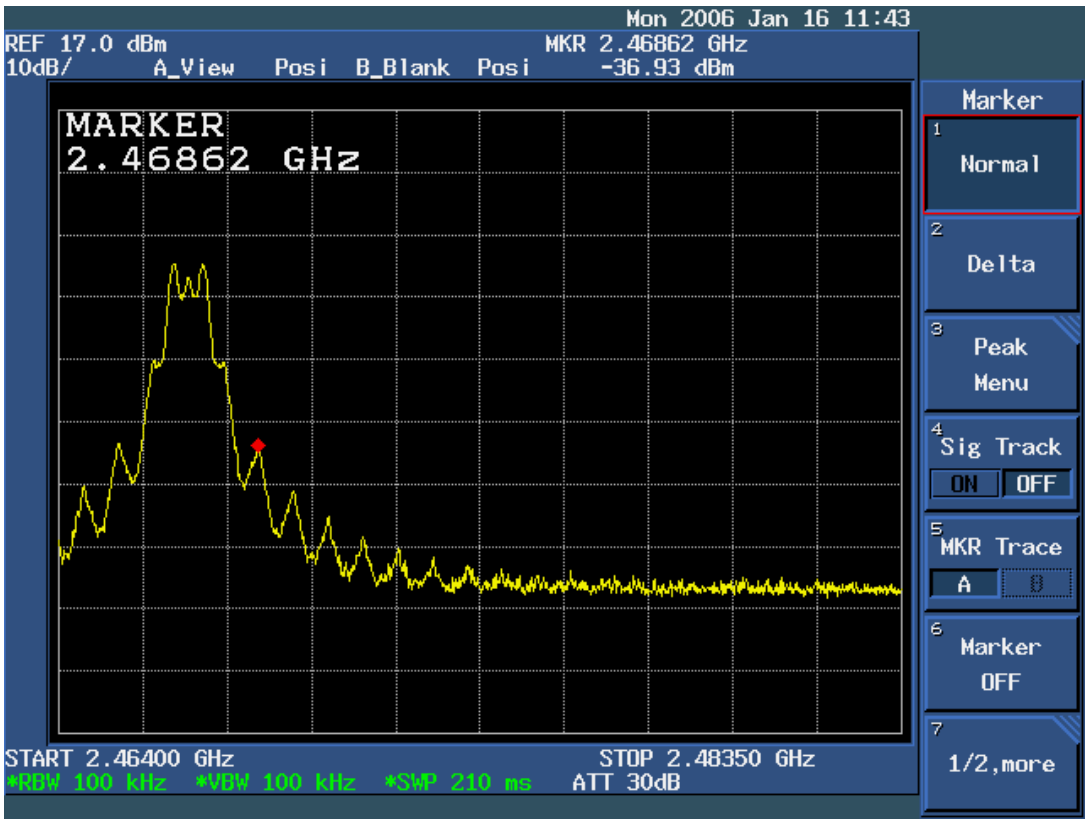
Repeat until all the rest channels are investigated.

TEST RESULTS

Refer to attach spectrum analyzer data chart.

Band Edges


Mon 2006 Jan 16 11:45
REF 17.0 dBm
10dB/
A_View
Posi
B_Blank
Posi
MKR 2.46538 GHz
-36.47 dBm
MARKER
2.46538 GHz
Marker
1 Normal
2 Delta
3 Peak Menu
4 Sig Track ON OFF
5 MKR Trace A B
6 Marker OFF
7 1/2,more
START 2.40000 GHz
*RBW 100 kHz
*VBW 100 kHz
*SWP 210 ms
STOP 2.47000 GHz
ATT 30dB


Mon 2006 Jan 16 11:43
REF 17.0 dBm
10dB/
A_View
Posi
B_Blank
Posi
MKR 2.46862 GHz
-36.93 dBm
MARKER
2.46862 GHz
Marker
1 Normal
2 Delta
3 Peak Menu
4 Sig Track ON OFF
5 MKR Trace A B
6 Marker OFF
7 1/2,more
START 2.46400 GHz
*RBW 100 kHz
*VBW 100 kHz
*SWP 210 ms
STOP 2.48350 GHz
ATT 30dB

8.4PEAK POWER SPECTRAL DENSITY

LIMIT

For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

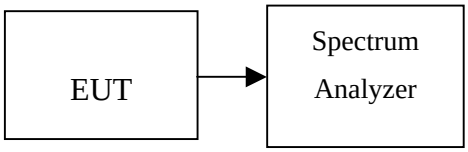
The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	ADVANTEST	R3132	140301570	06/12/2005

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 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 = 3kHz, VBW = 3kHz, Span = 500kHz,

Record the max. reading.

Repeat the above procedure until the measurements for all frequencies are completed.

TEST RESULTS

No non-compliance noted

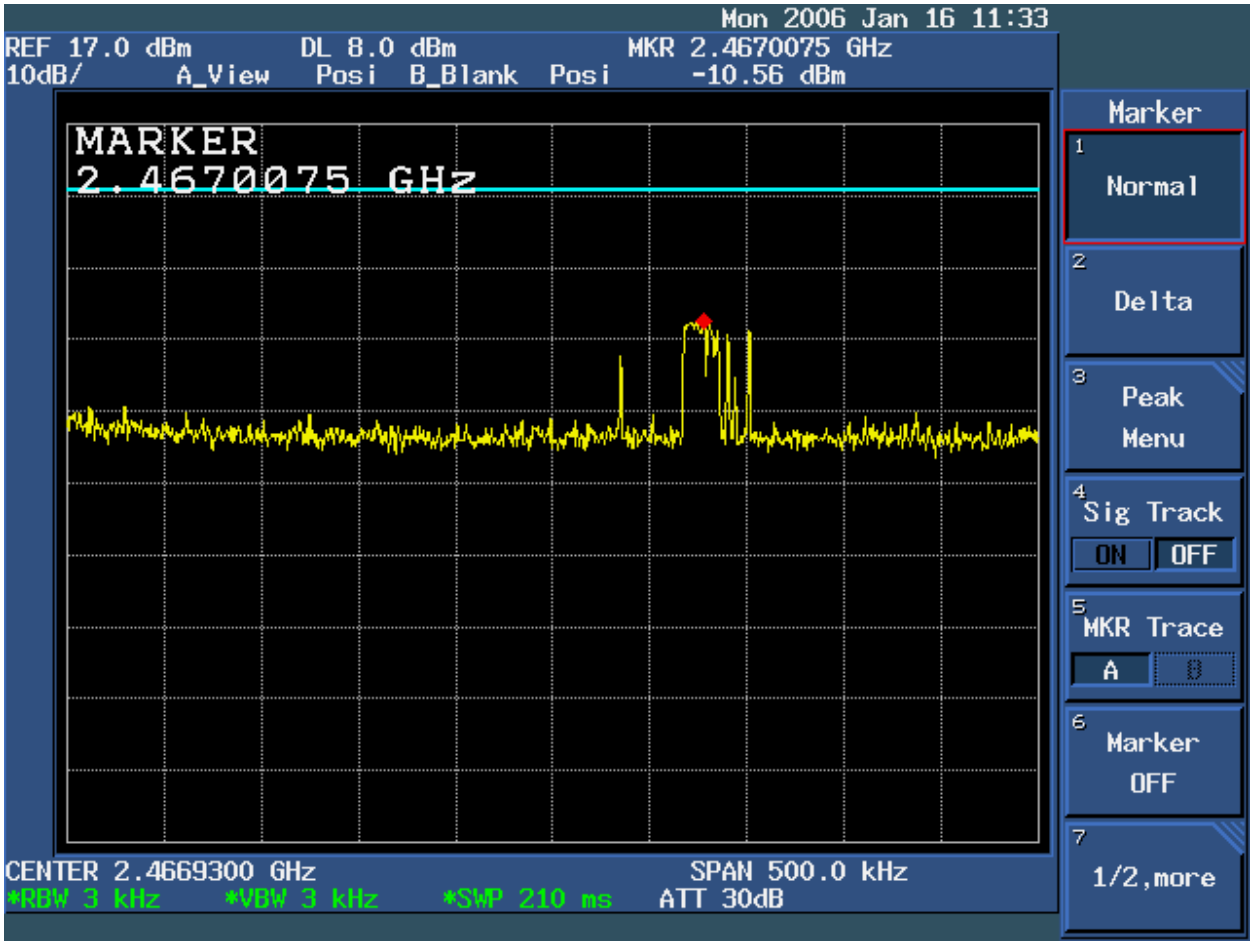
Test Data

Test mode:

Channel	Frequency	Reading (dBm)	Factor (dB)	PPSD (dBm)	Limit (dBm)	Result
	2467	-10.56	1.50	-9.06	8.00	PASS

Test Plot

PPSD



8.5 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:

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 15.231 and 15.241.*

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)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

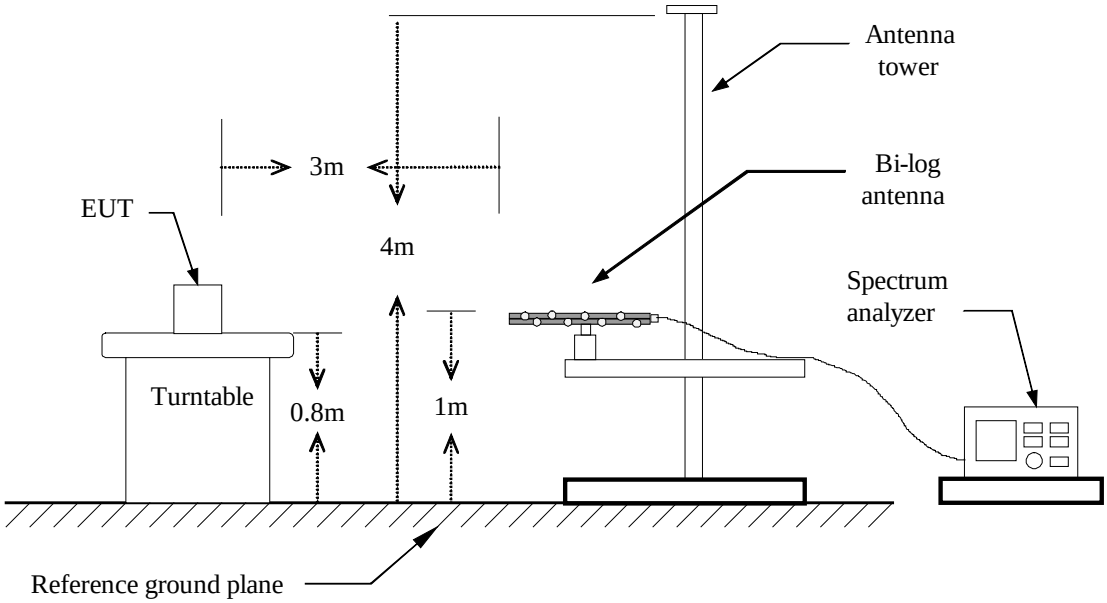
MEASUREMENT EQUIPMENT USED

Open Area Test Site				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	ADVANTEST	R3271A	85060231	06/12/2005
Spectrum Analyzer	ADVANTEST	R3132	140301570	06/12/2005
EMI Test Receiver	SCHAFFNER	SCR3501	464	06/12/2005
Pre-Amplifier	COM-POWER	PA-103	161062	06/12/2005
Bilog Antenna	SCHAFFNER	CBL6111C	2775	06/12/2005
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	06/12/2005
Pre-Amplifier	HP	8449B	3008B00965	06/12/2005

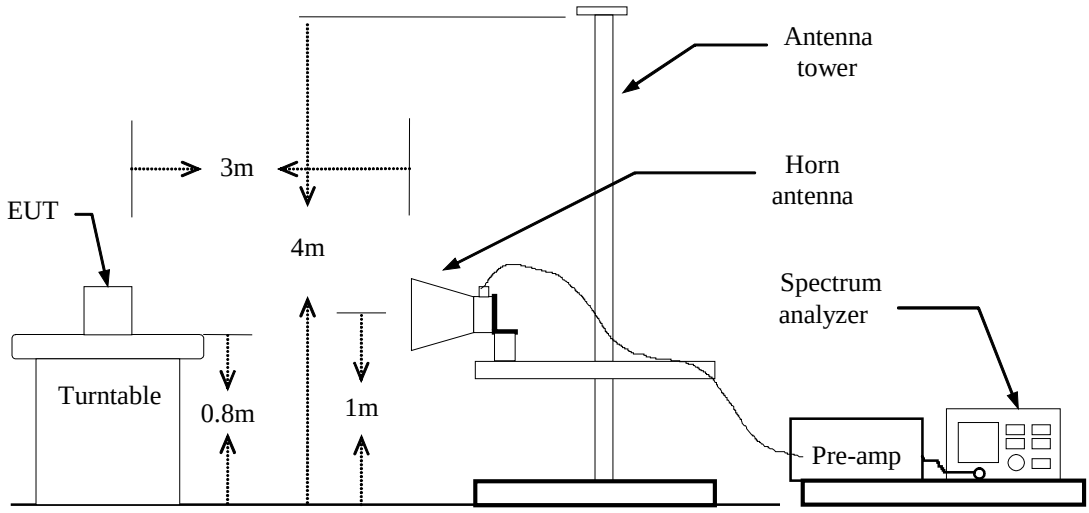
Remark: *Each piece of equipment is scheduled for calibration once a year.*

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: Normal

Test Date: JAN 16, 2006

Temperature: 20°C

Tested by: Ray

Humidity: 70 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
154.16	V	Peak	20.18	15.52	35.70	43.50	-7.8
192.96	V	Peak	19.50	16.98	36.48	43.50	-7.02
206.54	V	Peak	22.45	16.00	38.45	43.5	-5.05
219.15	V	Peak	21.66	16.47	38.13	46.00	-7.87
244.37	V	Peak	21.29	15.41	36.07	46.00	-9.3
296.75	V	Peak	20.82	14.43	35.25	46.00	-10.75
206.54	H	Peak	25.46	10.76	36.22	43.50	-7.28
270.56	H	Peak	21.49	14.49	35.98	46.00	-10.02
283.17	H	Peak	20.09	16.13	36.22	46.00	-9.78
296.75	H	Peak	19.47	17.08	36.55	46.00	-9.45
614.91	H	Peak	18.26	23.23	41.49	46.00	-4.51
629.46	H	Peak	19.29	23.46	42.75	46.00	-3.25

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.

Above 1 GHz

Operation Mode: Normal **Test Date:** JAN 16, 2006

Temperature: 20°C **Tested by:** Ray

Humidity: 70 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1350.00	V	50.62	---	-9.28	41.32	---	74.00	54.00	-12.68	Peak
3802.00	V	41.00	---	1.86	42.86	---	74.00	54.00	-11.14	Peak
4932.67	V	41.17	---	3.28	44.45	---	74.00	54.00	-9.55	Peak
9864.33	V	35.26	---	7.83	43.09	---	74.00	54.00	-10.91	Peak
N/A										
N/A										
4932.67	H	39.5	---	2.75	42.25	---	74.00	54.00	-11.75	Peak
9864.33	H	38.23	---	3.86	42.09	---	74.00	54.00	-11.91	Peak
N/A										
N/A										
N/A										
N/A										

Notes:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
3. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.*
4. *Spectrum setting:*
   a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
   b. AV Setting 1GH z- 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.

8.6POWERLINE 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 (dBμV)	
	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	06/12/2005
Spectrum Analyzer	ADVANTEST	R3132	140301570	06/12/2005
LISN	COM-POWER	LI115	2027	06/12/2005
LISN	COM-POWER	LI115	2029	06/12/2005

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.

TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Test Data

Operation Mode:	Normal	**Test Date:**	JAN 16, 2006
Temperature:	18°C	**Tested by:**	Ray
Humidity:	68% RH		

Freq. (MHz)	Q.P. Raw (dBuV)	AVG Raw (dBuV)	Q.P. Limit (dBuV)	AVG Limit (dBuV)	Q.P. Margin (dB)	AVG Margin (dB)	Note
0.150	57.87	39.34	66.00	56	-8.13	-16.66	L1
0.359	52.75	34.25	60.03	50.03	-7.28	-15.78	L1
0.583	41.02	---	56.00	46	-14.98	---	L1
2.551	35.62	---	56.00	---	-20.38	---	L1
4.243	35.21	---	56.00	---	-20.79	---	L1
15.263	41.59	---	60.00	---	-18.41	---	L1
0.159	58.04	40.36	65.74	55.74	-7.69	-15.37	L2
0.191	54.23	37.43	64.84	54.84	-10.61	-17.41	L2
0.379	53.48	35.12	59.45	49.45	-5.97	-14.33	L2
0.555	49.62	30.66	56.00	46.00	-6.38	-15.34	L2
0.681	49.25	29.12	56.00	46.00	-6.75	16.88	L2
15.439	40.66	---	60.00	---	-19.34	---	L2

Note:

Measuring frequencies from 0.15 MHz to 30MHz.

The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.

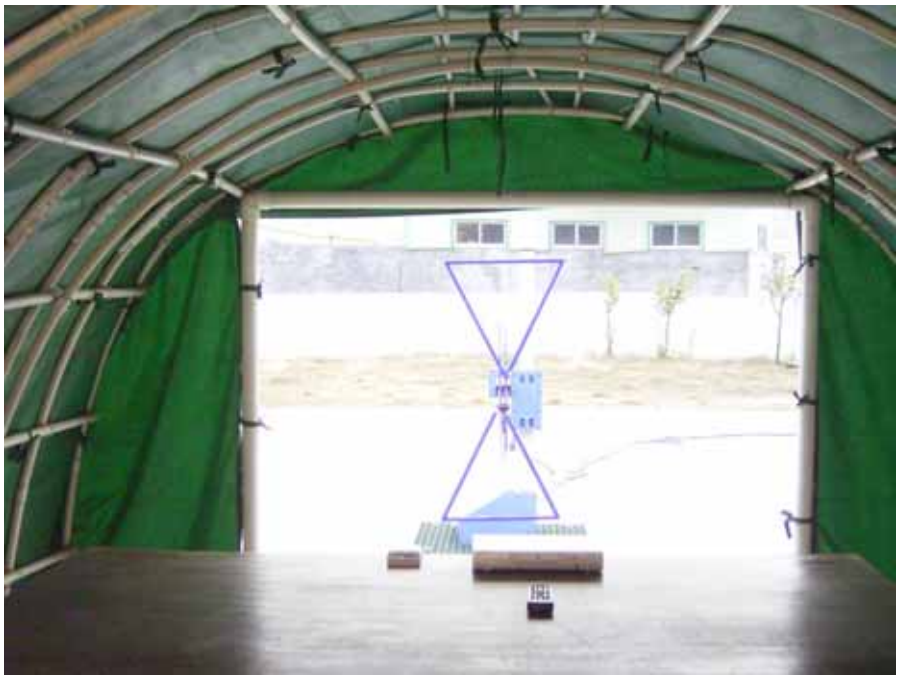
"---" denotes the emission level was or more than 2dB below the Average limit

The IF bandwidth of SPA between 0.15MHz to 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9kHz;

L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

APPENDIX 1
PHOTOGRPHS OF TEST SETUP

Radiated Emission Set up Photos



Conducted Emission Set Up Photos