

FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.249

Report Reference No......: A1207086022-RR

FCC ID......: OYS-JR-01R

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Date of issue.....: Sep 07, 2012

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Testing Laboratory Name: Bontek Compliance Testing Laboratory Ltd

Address: 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

Applicant's name.....: Zealous Audio

Address: 10708 Lora Street, Temple City, Ca 91780

Test specification:

Standard: **FCC Part 15.249: Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHZ, and 24.0–24.25 GHz**

TRF Originator: Shenzhen CTL Electron Technology Co., Ltd.

Master TRF: Dated 2012-06

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Test item description: HeadPhone

Trade Mark: /

Manufacturer: **Zealous Audio**

Model/Type reference.....: JR-01

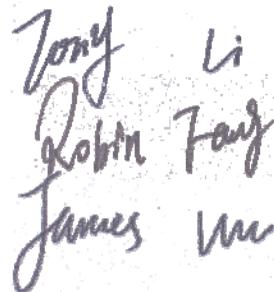
Listed Models: /

Ratings: DC 3.7 V

Operation Frequency: 2450MHz

Modulation: FHSS

Result.....: **Positive**



Handwritten signatures of Tony Li, Robin Fang, and James Wu, arranged vertically.

TEST REPORT

Test Report No. :	A1207086022-RR	Sep 07, 2012
		Date of issue

Equipment under Test : HeadPhone

Model /Type : JR-01

Listed Models : /

Applicant : **Zealous Audio**

Address : 10708 Lora Street, Temple City, Ca 91780

Manufacturer : **Zealous Audio**

Address : 10708 Lora Street, Temple City, Ca 91780

Test Result according to the standards on page 4:	Positive
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.249: Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHz, and 24.0–24.25 GHz.

ANSI C63.10-2009: American National Standard for Testing Unlicensed Wireless Devices

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	July 25, 2012
Testing commenced on	:	July 25, 2012
Testing concluded on	:	Sep 03, 2012

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage	:	<input type="radio"/> 120V / 60 Hz	<input type="radio"/> 115V / 60Hz
		<input type="radio"/> 12 V DC	<input type="radio"/> 24 V DC
		<input checked="" type="radio"/> Other (specified in blank below)	

DC 3.7V from Battery

2.3. Short description of the Equipment under Test (EUT)

2.45GHz Remote Transmitter.

For more details, refer to the user's manual of the EUT.

Serial number: Prototype

2.4. EUT operation mode

The EUT has been tested under typical operating condition.

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- - supplied by the manufacturer
- - supplied by the lab

<input type="radio"/>	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/
<input type="radio"/>	Notebook PC	Manufacturer :	DELL
		Model No. :	PP26L

2.6. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: OYS-JR-01** filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules.

2.7. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Bontek Compliance Testing Laboratory Ltd
1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) and CISPR Publication 22.

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

IC Registration No.: 7631A

The 3m alternate test site of Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on March, 2008.

FCC-Registration No.: 338263

Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 338263, March 24, 2008.

CNAS-Lab Code: L3923

Bontek Compliance Testing Laboratory Ltd has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: Mar 22, 2012. Valid time is until Mar 21, 2015.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	<u>15-35 ° C</u>
Humidity:	<u>30-60 %</u>
Atmospheric pressure:	<u>950-1050mbar</u>

3.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System

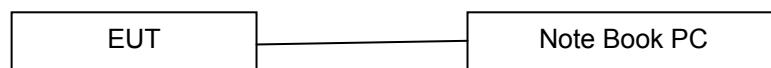


Table 2-1 Equipment Used in Tested System

No.	Product	Manufacturer	Model No.	FCC ID
1	Notebook PC	DELL	PP26L	-----

3.5. Test Description

FCC PART 15		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.249(a) & FCC Part 15.249(c),	Radiated Emissions	PASS
FCC Part 15.249(d)	Out of Band Emissions	PASS
FCC Part 15.215(C)	20 dB Bandwidth	PASS
FCC Part 15.203/15.249 (b)	Antenna Requirement	PASS

Remark: The measurement uncertainty is not included in the test result.

3.6. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics;Part 1" and TR-100028-02 "Electromagnetic compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof mobile radio equipment characteristics;Part 2 " and is documented in the Bontek Compliance Testing Laboratory Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Test Items	Measurement Uncertainty	Notes
Frequency stability	150 Hz	(1)
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-12.75 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-12.75 GHz	2.20 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.24 dB	(1)
Radiated Emissio 1~18GHz	5.16 dB	(1)
Radiated Emissio 18-40GHz	5.54 dB	(1)
Occupied Bandwidth	-----	(1)
Emission Mask	-----	(1)
Modulation Characteristic	-----	(1)
Transmitter Frequency Behavior	-----	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

3.7. Equipments Used during the Test

Radiated Emissions / Out of Band Emissions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ULTRA-BROADBAND ANTENNA	Rohde&Schwarz	HL562	100015	2012/4/23
2	EMI TEST RECEIVER	Rohde&Schwarz	ESI 26	100009	2012/4/23
3	RF TEST PANEL	Rohde&Schwarz	TS / RSP	335015/ 0017	2012/4/23
4	TURNTABLE	ETS	2088	2149	2012/4/23
5	ANTENNA MAST	ETS	2075	2346	2012/4/23
6	EMI TEST OFTWARE	Rohde&Schwarz	ESK1	N/A	2012/4/23
7	HORN ANTENNA	Rohde&Schwarz	HF906	100039	2012/4/23
8	Amplifier	Sonoma	310N	E009-13	2012/4/23
9	JS amplifier	Rohde&Schwarz	JS4-00101800-28-5A	F201504	2012/4/23
10	High pass filter	Compliance Direction systems	BSU-6	34202	2012/4/23
11	Horn Antenna	SCHWARZBECK	BBHA9170	25841	2012/4/23
12	Amplifier	Compliance Direction systems	PAP-1G-26	48	2012/4/23
13	Loop Antenna	Rohde&Schwarz	HFH2-Z2	100020	2012/4/23

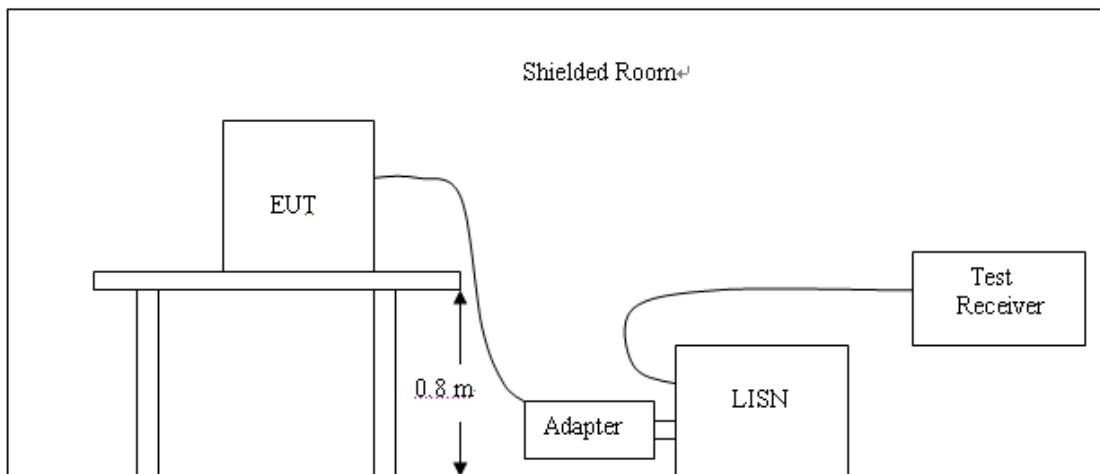
20 dB Bandwidth					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI TEST RECEIVER	Rohde&Schwarz	ESI 26	100009	2012/4/23
2	Power Meter	Anritsu	ML2487A	6K00001568	2012/4/23
3	Power Meter Sensor	Anritsu	ML2491A	0630989	2012/4/23
4	Spectrum Analyzer	Rohde&Schwarz	FSP	1164.4391.40	2012/4/23

AC Power Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Artificial Mains	Rohde&Schwarz	ESH2-Z5	100028	2012/4/23
2	EMI Test Receiver	Rohde&Schwarz	ESCS 30	100038	2012/4/23
3	Pulse Limiter	Rohde&Schwarz	ESHSZ2	100044	2012/4/23
4	EMI Test Software	Rohde&Schwarz	ES-K1 V1.71	N/A	2012/4/23

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission(Not applicable to this device)

TEST CONFIGURATION



TEST PROCEDURE

- 1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2009.
- 2 Support equipment, if needed, was placed as per ANSI C63.10-2009
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2009
- 4 The EUT received DC5V power from the adapter, the adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5 All support equipments received AC power from a second LISN, if any.
- 6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
- 8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

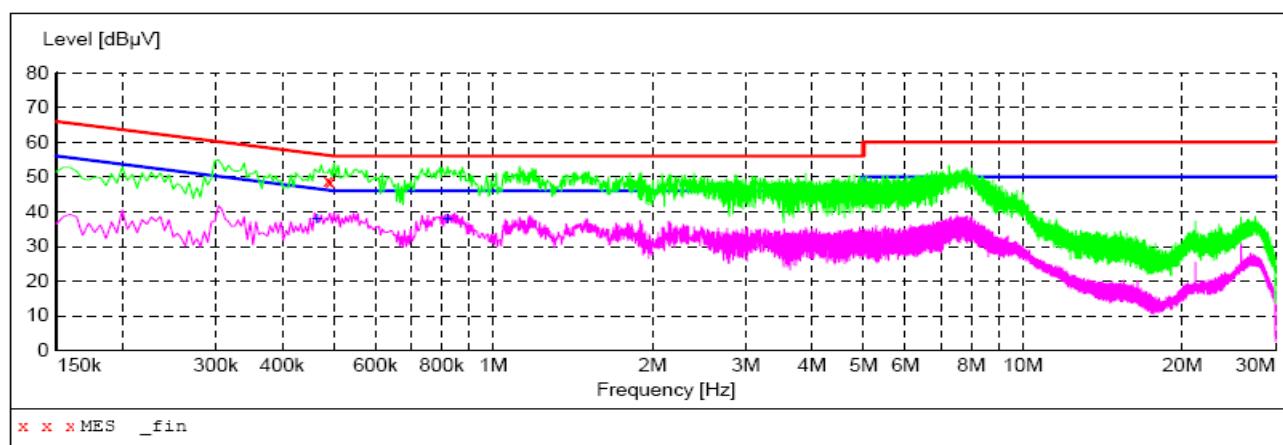
For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

Frequency (MHz)	Maximum RF Line Voltage (dB μ V)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

TEST RESULTS

SCAN TABLE: "Voltage (150K-30M) FIN"
 Short Description: 150K-30M Voltage



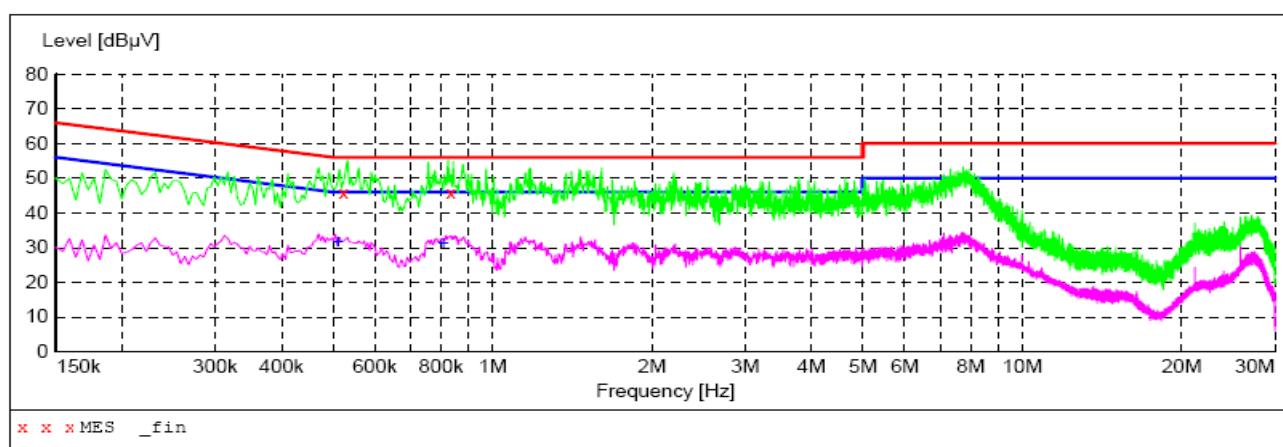
MEASUREMENT RESULT:

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.487500	49.00	10.3	56	7.2	QP	L1	GND
0.492000	48.70	10.3	56	7.4	QP	L1	GND

MEASUREMENT RESULT:

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.465000	38.00	10.3	47	8.6	AV	L1	GND
0.820500	38.10	10.2	46	7.9	AV	L1	GND

SCAN TABLE: "Voltage (150K-30M) FIN"
 Short Description: 150K-30M Voltage



MEASUREMENT RESULT:

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.523500	45.90	10.2	56	10.1	QP	N	GND
0.834000	45.90	10.2	56	10.1	QP	N	GND

MEASUREMENT RESULT:

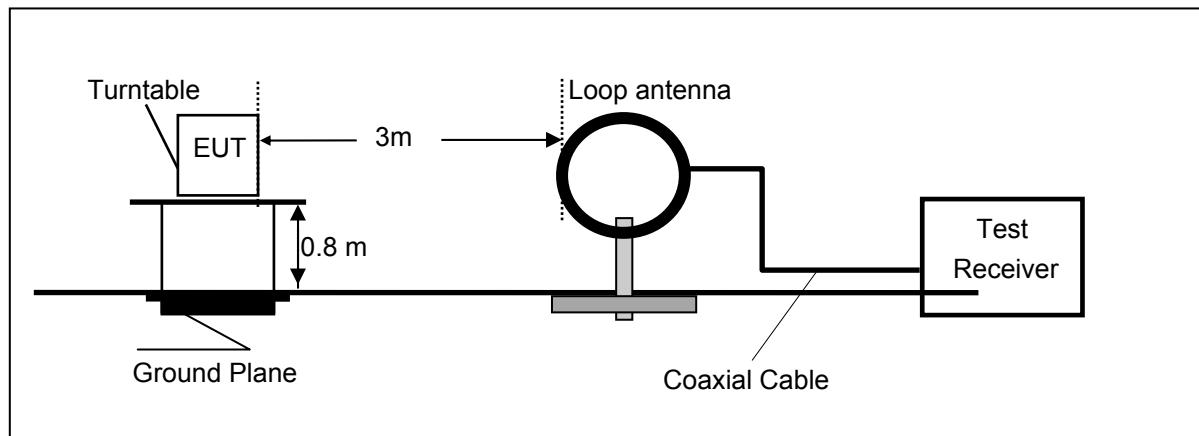
Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.510000	31.90	10.2	46	14.1	AV	N	GND
0.807000	31.20	10.2	46	14.8	AV	N	GND

4.2. Radiated Emission

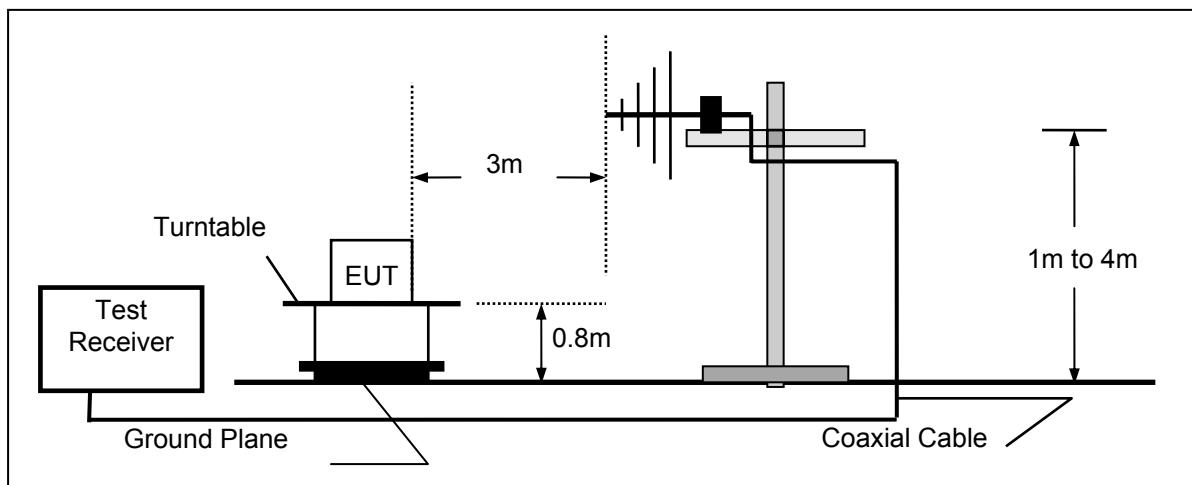
TEST CONFIGURATION

Radiated Emission Test Set-Up

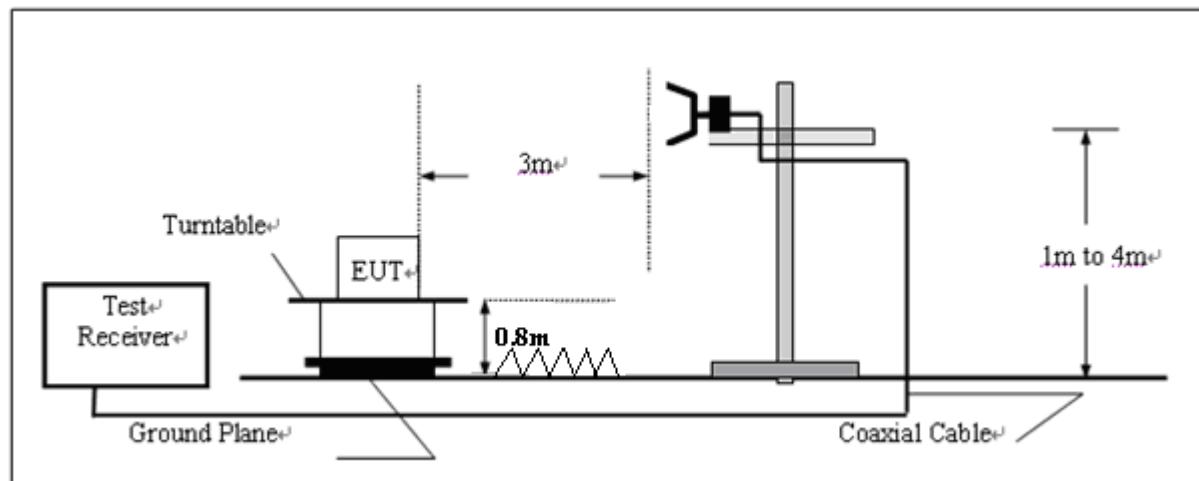
Frequency range 9KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

- 1 The EUT is placed on a turntable, which is 0.8m above ground plane.
- 2 The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 3 EUT is set 3m away from the receiving antenna, which is 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 to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 6 Repeat above procedures until the measurements for all frequencies are complete.
- 7 the fundamental frequency is 2.45GHz and the lowest crystal frequency is 45MHz, So the radiation emissions frequency range were tested from 30MHz to 25GHz.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

For example

Frequency (MHz)	FS (dB μ V/m)	RA (dB μ V/m)	AF (dB)	CL (dB)	AG (dB)	Transd (dB)
300.00	40	58.1	12.2	1.6	31.90	-18.1

$$Transd = AF + CL - AG$$

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.249(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of desired power.

Frequency (MHz)	Distance (Meters)	Radiated (dB μ V/m)	Radiated (μ V/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table. As per §15.249 (a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

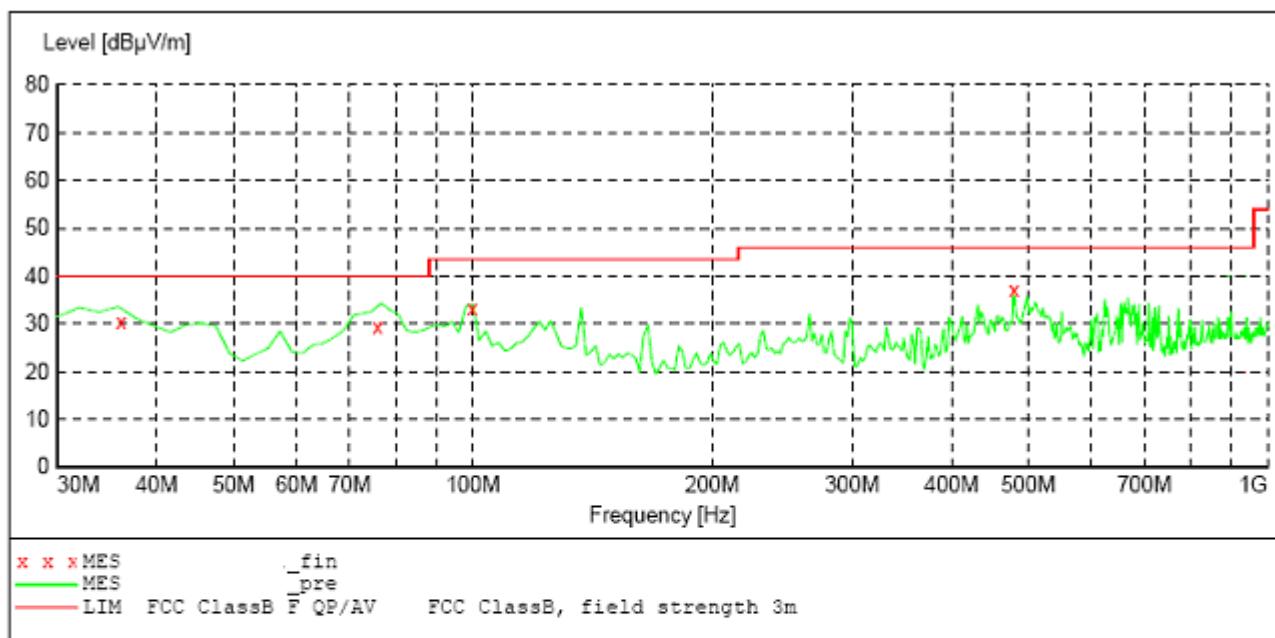
As per §15.249 (c), Field strength limits are specified at a distance of 3 meters.

TEST RESULTS

For 30MHz to 1000MHz

SCAN TABLE: "test Field(30M-1G)QP"

Short Description:			Field Strength(30M-1G)			
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	60.0 kHz	QuasiPeak	1.0 s	120 kHz	HL562



MEASUREMENT RESULT:

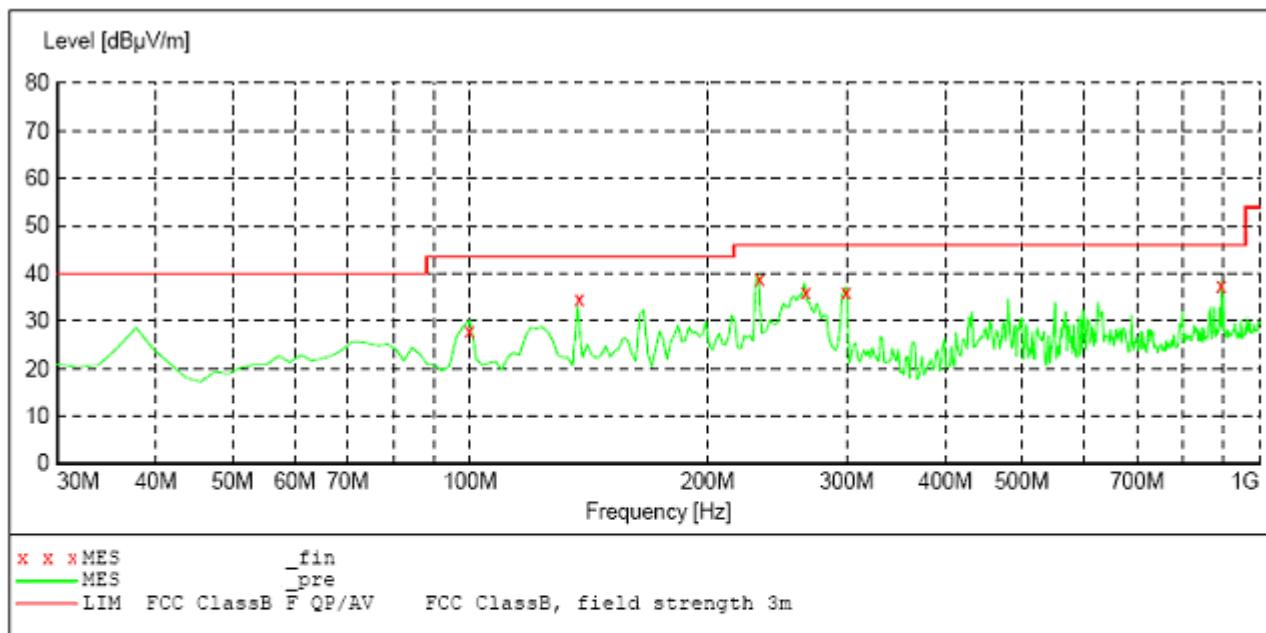
Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Det. QP	Height cm	Azimuth deg	Polarization
36.120000	30.30	-14.4	40.0	9.7	QP	100.0	168.00	VERTICAL
75.900000	29.40	-22.3	40.0	10.6	QP	100.0	256.00	VERTICAL
99.840000	33.30	-19.9	43.5	10.2	QP	100.0	191.00	VERTICAL
480.000000	37.00	-13.6	46.0	9.0	QP	100.0	260.00	VERTICAL

REMARKS :

1. *Undetectable
2. The IF bandwidth of EMI Test Receiver was 120KHz for measuring from 30 MHz to 1 GHz and 1 MHz for measuring above 1 GHz
3. The Transd=Cabel loss +Antenna factor -pre-amplifier factor
4. The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos. The worst case data is recorded in the report.

SCAN TABLE: "test Field(30M-1G)QP"

Short Description:			Field Strength(30M-1G)			
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	60.0 kHz	QuasiPeak	1.0 s	120 kHz	HL562

**MEASUREMENT RESULT:**

Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Det. QP	Height cm	Azimuth deg	Polarization
99.840000	28.00	-19.9	43.5	15.5	QP	350.0	240.00	HORIZONTAL
137.640000	34.50	-21.2	43.5	9.0	QP	150.0	140.00	HORIZONTAL
232.980000	38.70	-19.3	46.0	7.3	QP	100.0	243.00	HORIZONTAL
266.340000	36.00	-18.0	46.0	10.0	QP	249.0	181.00	HORIZONTAL
299.580000	36.00	-17.0	46.0	10.0	QP	100.0	44.00	HORIZONTAL
894.600000	37.60	-6.9	46.0	8.4	QP	100.0	147.00	HORIZONTAL

REMARKS :

1. *Undetectable
2. The IF bandwidth of EMI Test Receiver was 120KHz for measuring from 30 MHz to 1 GHz and 1 MHz for measuring above 1 GHz
3. The Transd=Cabel loss +Antenna factor -pre-amplifier factor
4. The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos. The worst case data is recorded in the report.

Above 1G**Radiated emission of fundamental emission**

Frequency (MHz)	Corrected Reading (dB μ V/m)@3m	FCC Limit (dB μ V/m) @3m	Margin (dB)	Detector	Polari- zation
2450	90.55	114.00	23.45	PK	Horizontal
2450	81.47	94.00	12.53	AV	Horizontal
2450	96.28	114.00	17.72	PK	Vertical
2450	87.01	94.00	6.99	AV	Vertical

Spurious radiated emission

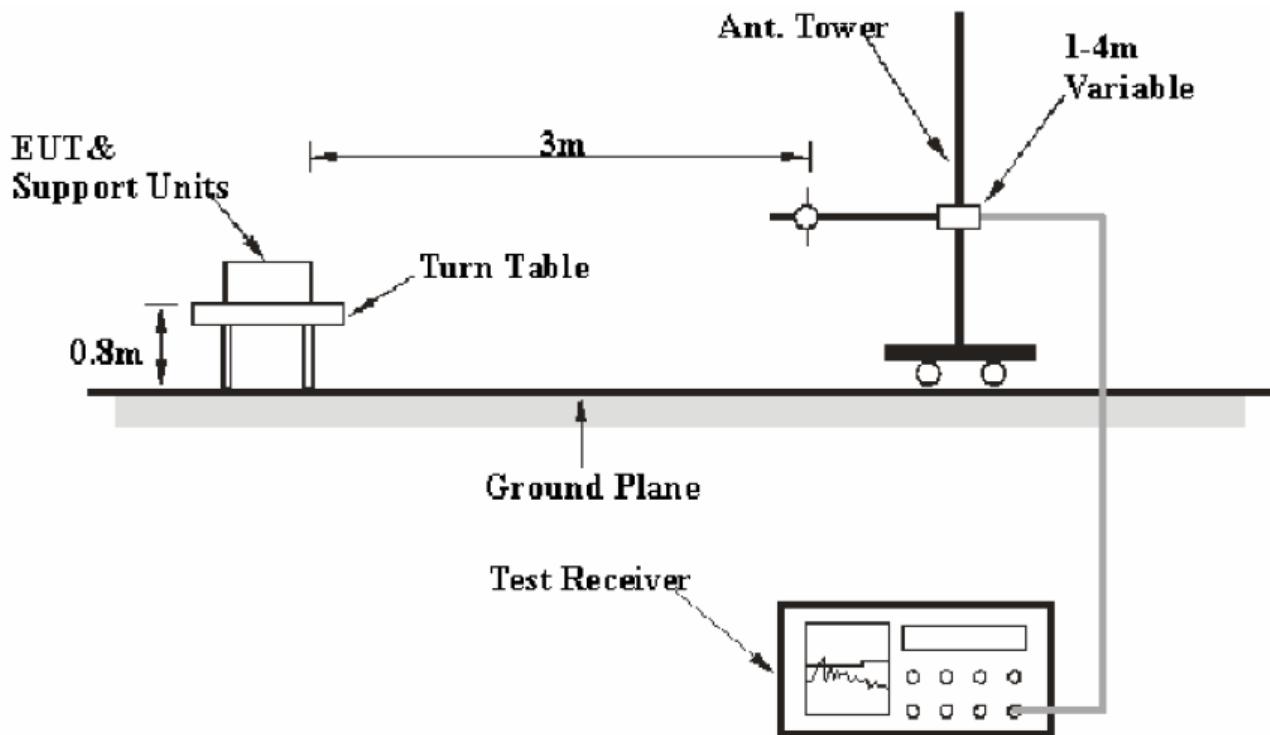
Frequency (MHz)	Corrected Reading (dB μ V/m)@3m	FCC Limit (dB μ V/m) @3m	Margin (dB)	Detector	Polari- zation
4900.00	59.26	74.00	14.74	PK	Horizontal
4900.00	50.14	54.00	3.86	AV	Horizontal
7350.00	56.82	74.00	17.18	PK	Horizontal
7350.00	47.91	54.00	6.09	AV	Horizontal
4900.00	61.17	74.00	12.83	PK	Vertical
4900.00	51.63	54.00	2.37	AV	Vertical
7350.00	58.00	74.00	16.00	PK	Vertical
7350.00	49.86	54.00	4.14	AV	Vertical

REMARKS:

1. The other emission levels were very low against the limit.
2. The limit value is defined as per 15.249
3. The worst test mode is BDR mode and the data is recorded. The average measurement was not performed when the peak measured data under the limit of average detection.

4.3. Out of band emissions

TEST CONFIGURATION



TEST PROCEDURE

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.4 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW to 1MHz and VBM to 3MHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength. The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW to 100 KHz and VBM to 300 KHz, to measure the conducted peak band edge.

LIMIT

FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

TEST RESULTS

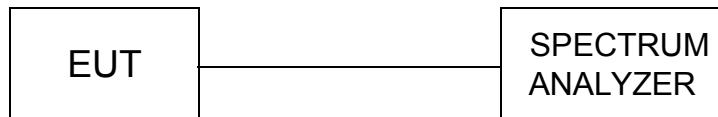
Frequency (MHz)	Corrected Reading (dB μ V/m)@3m	FCC Limit (dB μ V/m) @3m	Margin (dB)	Detector	Polarization
Out of left side band					
2390.00	45.55	74.00	28.45	PK	Horizontal
2390.00	39.89	54.00	14.11	AV	Horizontal
2390.00	46.28	74.00	27.72	PK	Vertical
2390.00	40.01	54.00	13.99	AV	Vertical
Out of right side band					
2483.50	49.20	74.00	24.80	PK	Horizontal
2483.50	40.71	54.00	13.29	AV	Horizontal
2483.50	52.39	74.00	21.61	PK	Vertical
2483.50	42.17	54.00	11.83	AV	Vertical

Note: 1. The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

2. The average measurement was not performed when the peak measured data under the limit of average detection.

4.4. 20dB Bandwidth Measurement

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW=30 KHz and VBW=100KHz.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

LIMIT

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

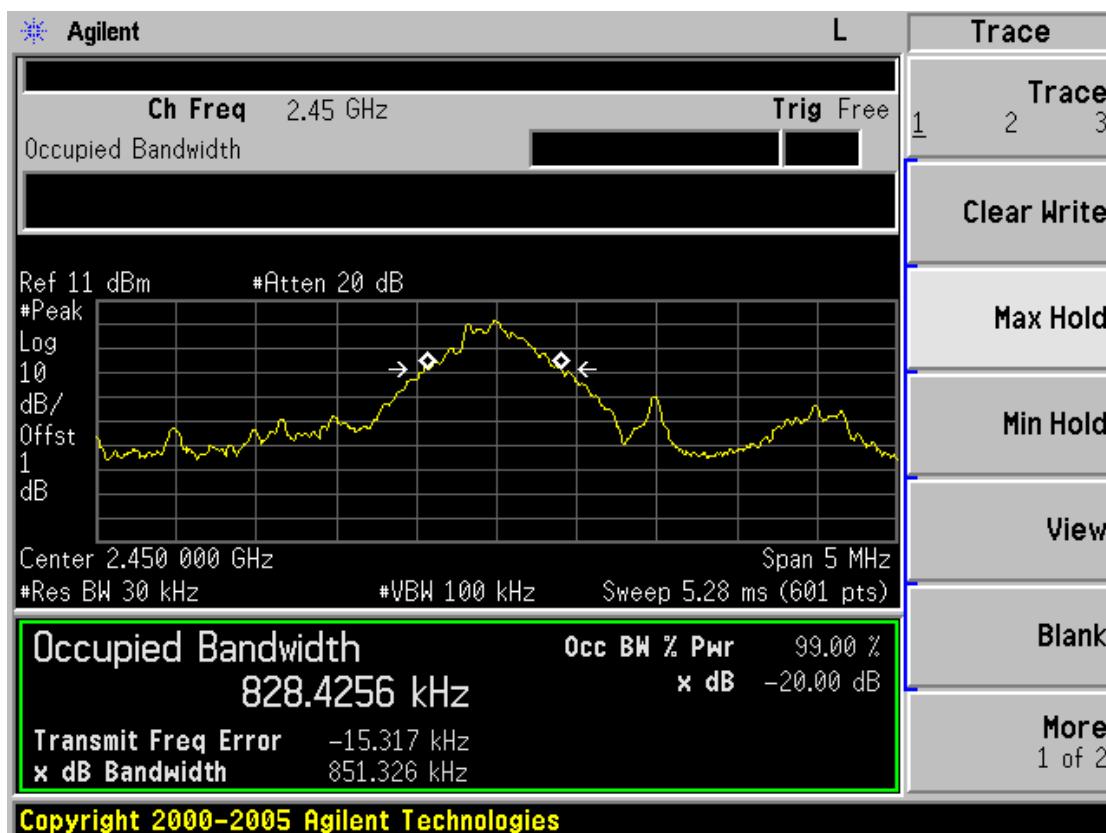
The 20dB bandwidth shall be no wider than 0.25% of the centre frequency for devices operating between 70-900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the centre frequency.

TEST RESULTS

20dB Bandwidth Measurement Result			
Operating Frequency	Test Data(MHz)	Limits(MHz)	Result
2.45GHz	0.828	12.25	PASS

Photos of 20dB Bandwidth Measurement(BDR Mode)

Low Channel



4.5. Antenna Requirement

According to FCC Part 15C § 15.203.

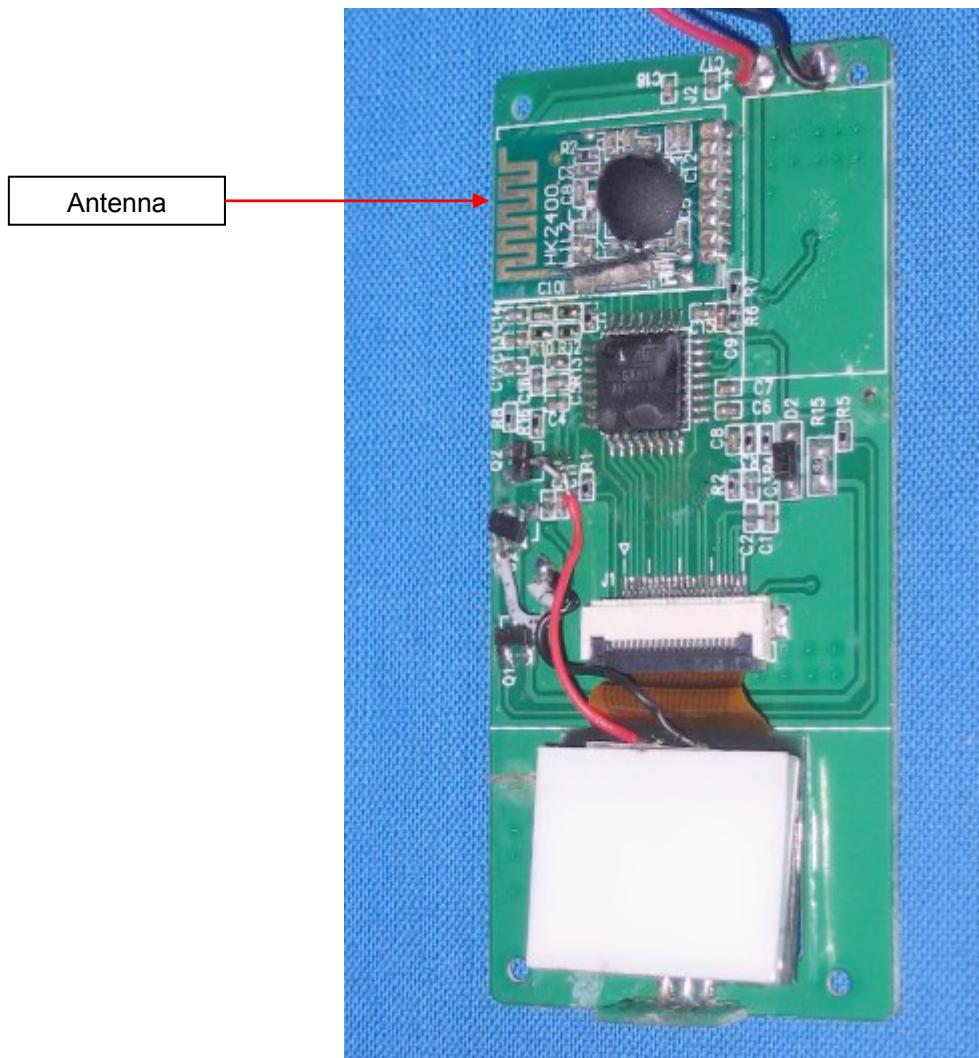
a), An intentional radiator shall be de-signed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

b), The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

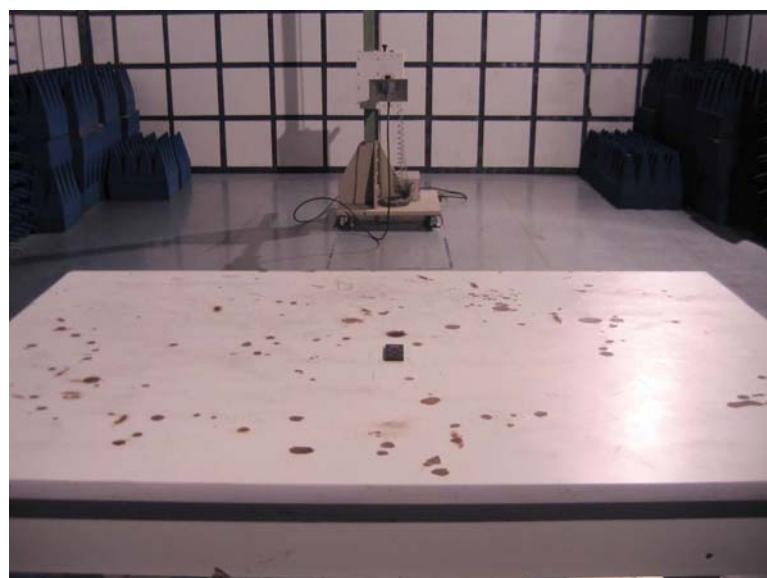
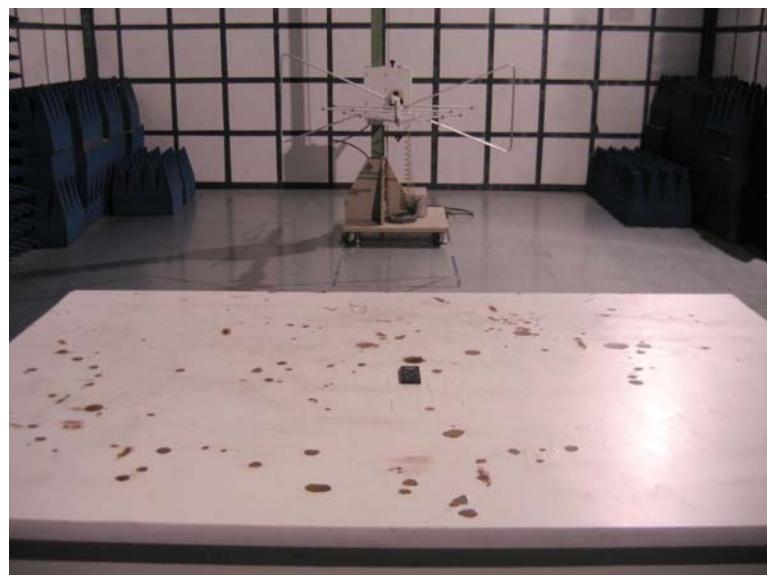
The EUT use of a Integral antenna, Please refer to the EUT Internal photos.

The EUT complied the antenna requirement.

Please refer to the EUT photos.

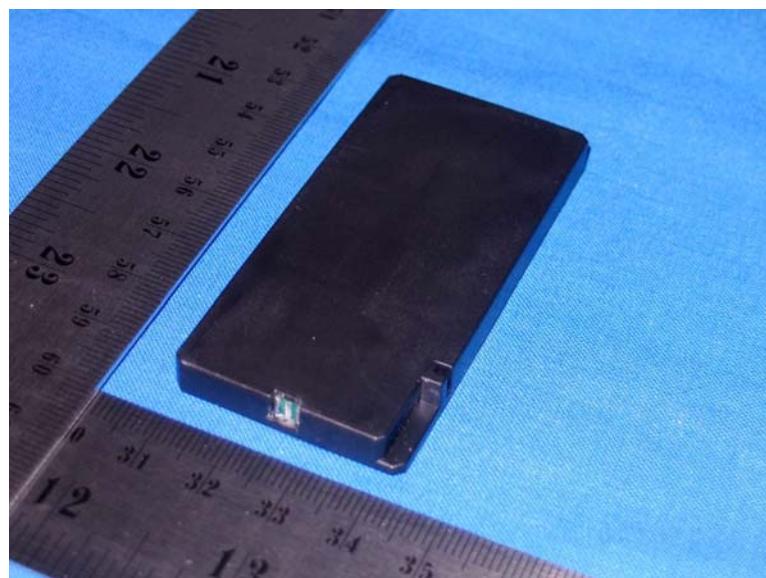


5. Test Setup Photos of the EUT

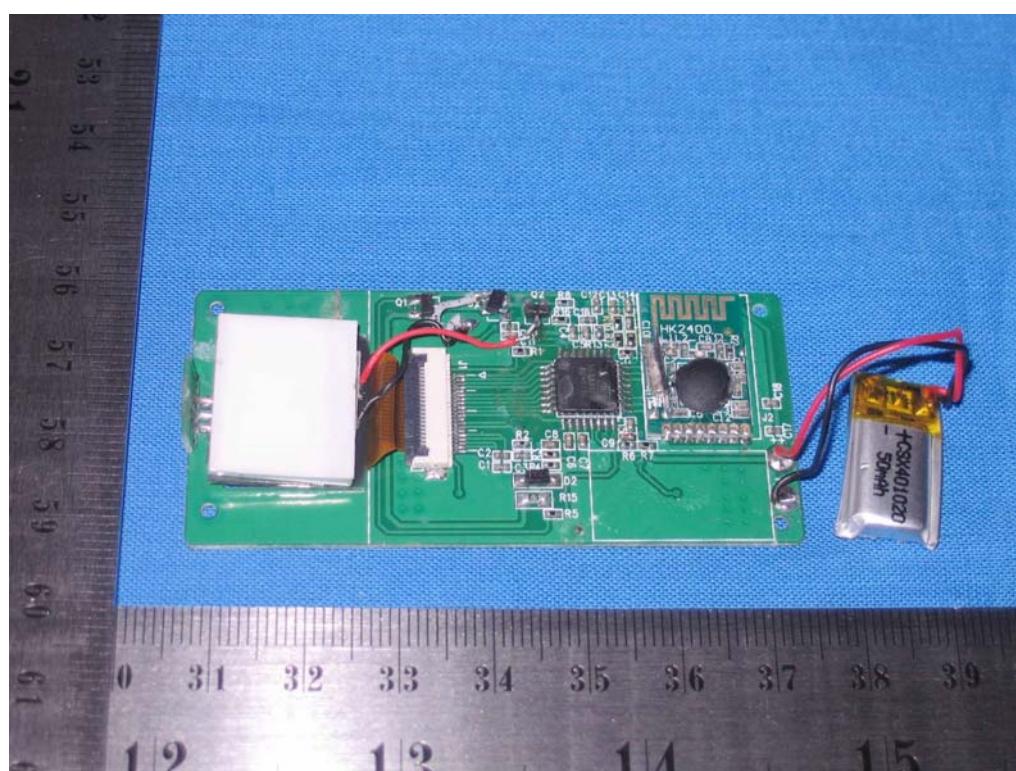
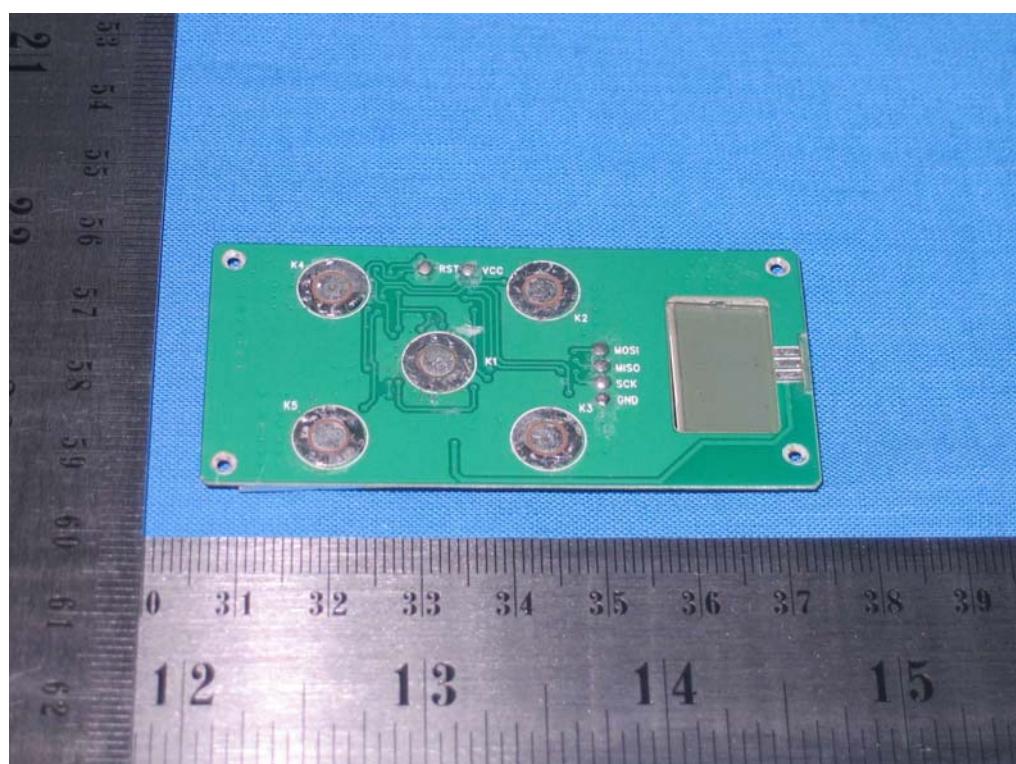


6. External and Internal Photos of the EUT

External Photos





Internal Photos

.....End of Report.....