



FCC PART 15 SUBPART B TEST REPORT

FCC Part 15B

Report Reference No.....: **CTL120509408-WD**

Compiled by

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Date of issue.....: July 09, 2012

Representative Laboratory Name : **Shenzhen CTL Electromagnetic Technology Co., Ltd.**

Address.....: Zone B, 4/F, Block 20, Guangqian Industrial Park, Longzhu Road, Nanshan, Shenzhen 518055 China.

Test Firm.....: **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.....: **Winstars Technology Limited**

Address.....: Block 4, Taisong Industrial Park, Dalang Street, Longhua Town, Bao'an District, Shenzhen, China

Test specification:

Standard: FCC Part 15B: Unintentional Radiators

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

Master TRF.....: Dated 2011-01

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Test item description : WIFI Repeater

Trade Mark: /

Model/Type reference.....: WS-WN518N2

I/O Type of EUT.....: RJ45 port

I/O Q'TY.....: 1

Antenna Type.....: Interior

FCC ID.....: **NZ3WS-WN518N2**

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

TEST REPORT

Test Report No. : CTL120509408-WD	July 09, 2012
	Date of issue

Equipment under Test : WIFI Repeater

Model /Type : WS-WN518N2

Listed Models : /

Applicant : Winstars Technology Limited

Address : Block 4, Taisong Industrial Park, Dalang Street, Longhua Town, Bao'an District, Shenzhen, China

Manufacturer : Winstars Technology Limited

Address : Block 4, Taisong Industrial Park, Dalang Street, Longhua Town, Bao'an District, Shenzhen, China

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 Part 15B](#): Unintentional Radiators

[ANCI C63.4: 2003](#)



2. SUMMARY

2.1. General Remarks

Date of receipt of test sample : June 20, 2012

Testing commenced on : June 20, 2012

Testing concluded on : June 30, 2012

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage : 120V / 60 Hz 115V / 60Hz
 12 V DC 24 V DC
 Other (specified in blank below)

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

The device is a WIFI Repeater.

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

Serial number: Prototype

2.4. EUT operation mode

Test Mode:

1. The EUT has been tested under normal operating condition.
2. No test program used to control the EUT within testing.
3. EUT Function and Test Mode.

The field strength of radiation emission was measured in the following position: EUT stand-up position (Y axis), lie-down position (X, Z axis).

The following data show only with the worst case setup.

The worst case of Y axis was reported.

Based on client request, all normal using modes of the normal function were tested but only the worst test data of the worst mode is reported by this report.

2.5. EUT configuration

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

- supplied by the manufacturer
- supplied by the lab

Mouse

Manufacturer : DELL

Model No. : MOC5UO

Notebook PC

Manufacturer : SONY Coporation

Model No. : PCG-41216W

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

This submittal(s) (test report) is intended for FCC ID: **NZ3WS-WN518N2** filing to comply with of the FCC Part 15B 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, 2011.

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.

3.3. Environmental conditions

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

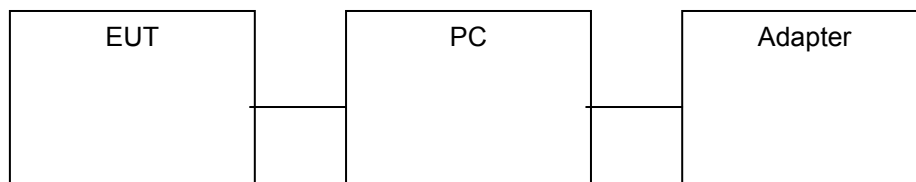
Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 950-1050mbar

3.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



3.5. 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 CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ 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.

Hereafter the best measurement capability for Bontek laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	1~12.75GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6. Equipments Used during the Test

Item	Test Equipment	Manufacturer	Model No.	Last Cal.	Due. Date
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	2012/04/14	2013/04/13
2	Radio Communication Tester	ROHDE & SCHWARZ	CMU200	2012/04/14	2013/04/13
3	Dual Directional Coupler	Agilent	778D	2012/04/14	2013/04/13
4	10dB attenuator	SCHWARZBECK	MTAIMP-136	2012/04/14	2013/04/13
5	Tunable Bandreject filter	K&L	3TNF-800	2012/04/14	2013/04/13
6	Tunable Bandreject filter	K&L	5TNF-1700	2012/04/14	2013/04/13
7	High-Pass Filter	K&L	9SH10-2700/X12750-O/O	2012/04/14	2013/04/13
8	High-Pass Filter	K&L	41H10-1375/U12750-O/O	2012/04/14	2013/04/13
9	Coaxial Cable	Huber+Suhner	AC4-RF-H	2012/04/14	2013/04/13
10	AC Power Supply	IDRC	CF-500TP	2012/04/14	2013/04/13
11	DC Power Supply	IDRC	CD-035-020PR	2012/04/14	2013/04/13
12	RF Current Probe	FCC	F-33-4	2012/04/14	2013/04/13
13	Temperature /Humidity Meter	zhicheng	ZC1-2	2012/04/14	2013/04/13
14	MICROWAVE AMPLIFIER	HP	8349B	2012/04/14	2013/04/13
15	Amplifier	HP	8447D	2012/04/14	2013/04/13
16	SIGNAL GENERATOR	HP	8647A	2012/04/14	2013/04/13
17	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	2012/04/14	2013/04/13
18	Horn Antenna	Schwarzbeck	BBHA9120A	2012/04/14	2013/04/13
19	EMI Test Receiver	R&S	ESPI	2012/04/14	2013/04/13
20	Loop Antenna	ZHINAN	ZN30900A	2012/04/14	2013/04/13
21	Horn Antenna	Schwarzbeck	BBHA9120D	2012/04/14	2013/04/13
22	Horn Antenna	Schwarzbeck	BBHA9170	2012/04/14	2013/04/13

3.7. Summary of Test Result

No deviations from the test standards

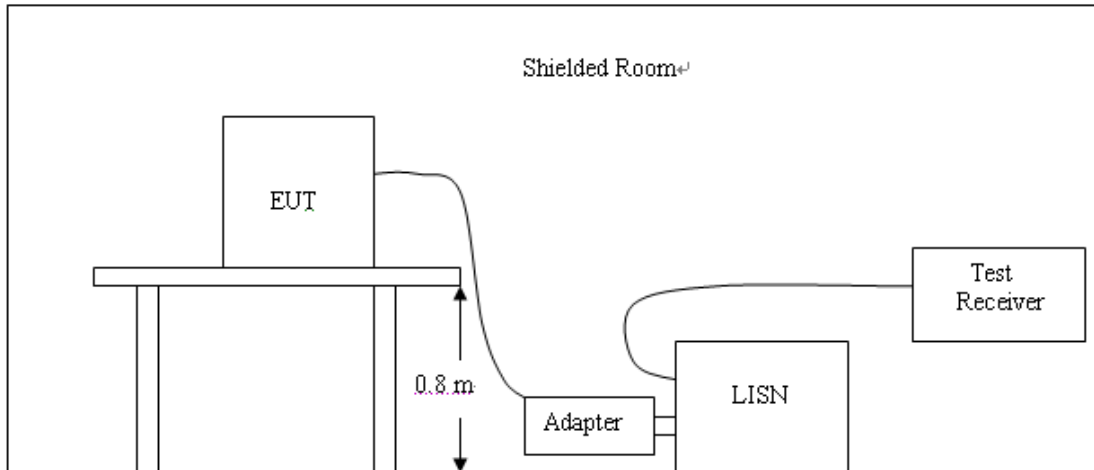
Test Item	Test Requirement	Standard Paragrph	Result
Radiated Emission	FCC PART 15	Section 15.109	PASS
Conducted Emission	FCC PART 15	Section 15.107	PASS



4. TEST CONDITIONS AND RESULTS

4.1. Conducted Emissions Test

TEST CONFIGURATION



TEST PROCEDURE

For unintentional device, according to § 15.107(a) Line 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

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

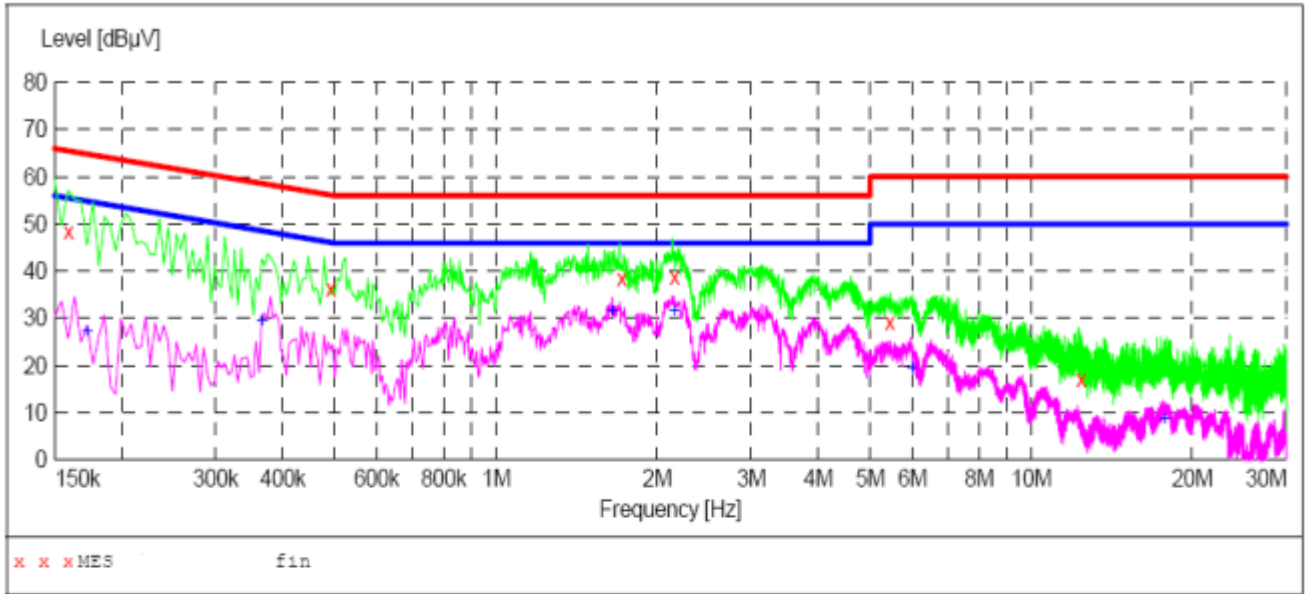
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

The RBW/VBW for 150KHz to 30MHz: 9KHz

TEST RESULTS

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



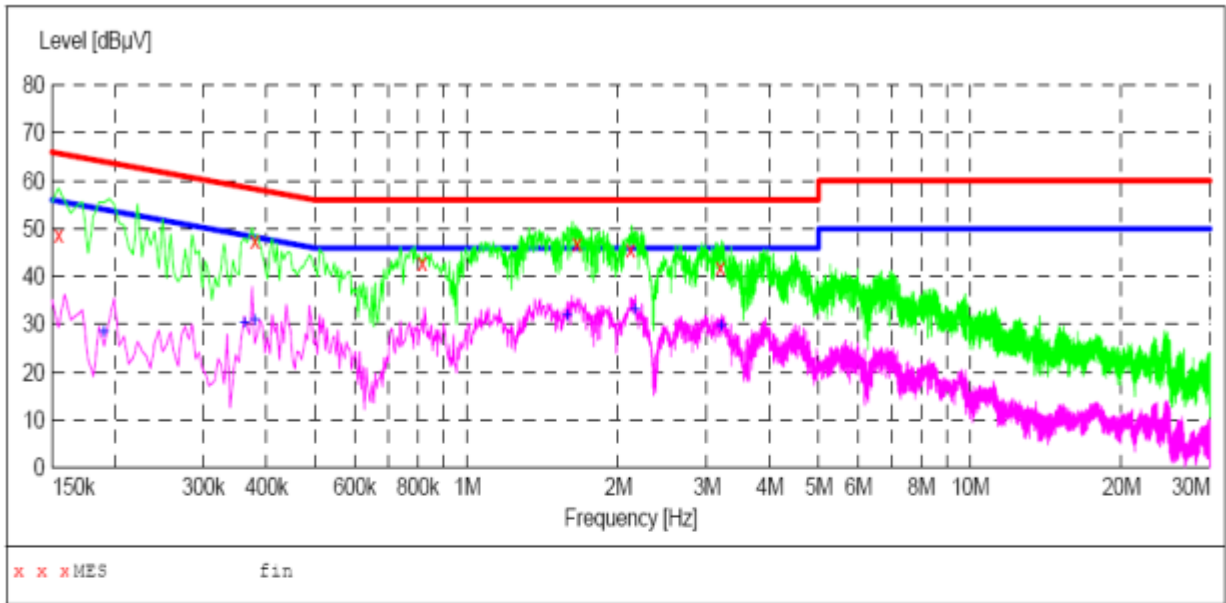
MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.159000	48.50	10.1	66	17.0	QP	N	GND
0.492000	36.30	10.1	56	19.8	QP	N	GND
1.720500	38.40	10.2	56	17.6	QP	N	GND
2.157000	38.90	10.2	56	17.1	QP	N	GND
5.451000	29.20	10.2	60	30.8	QP	N	GND
12.412500	17.10	10.4	60	42.9	QP	N	GND

MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.172500	27.30	10.1	55	27.5	AV	N	GND
0.366000	29.40	10.1	49	19.2	AV	N	GND
1.653000	31.60	10.2	46	14.4	AV	N	GND
2.157000	31.50	10.2	46	14.5	AV	N	GND
6.000000	19.50	10.2	50	30.5	AV	N	GND
17.745000	8.90	10.4	50	41.1	AV	N	GND

SCAN TABLE: "Voltage (9K-30M)FIN"
 Short Description: 150K-30M Voltage



MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.154500	48.80	10.1	66	17.0	QP	L1	GND
0.379500	47.60	10.1	58	10.7	QP	L1	GND
0.816000	42.90	10.1	56	13.1	QP	L1	GND
1.657500	46.90	10.2	56	9.1	QP	L1	GND
2.116500	45.50	10.2	56	10.5	QP	L1	GND
3.196500	42.00	10.2	56	14.0	QP	L1	GND

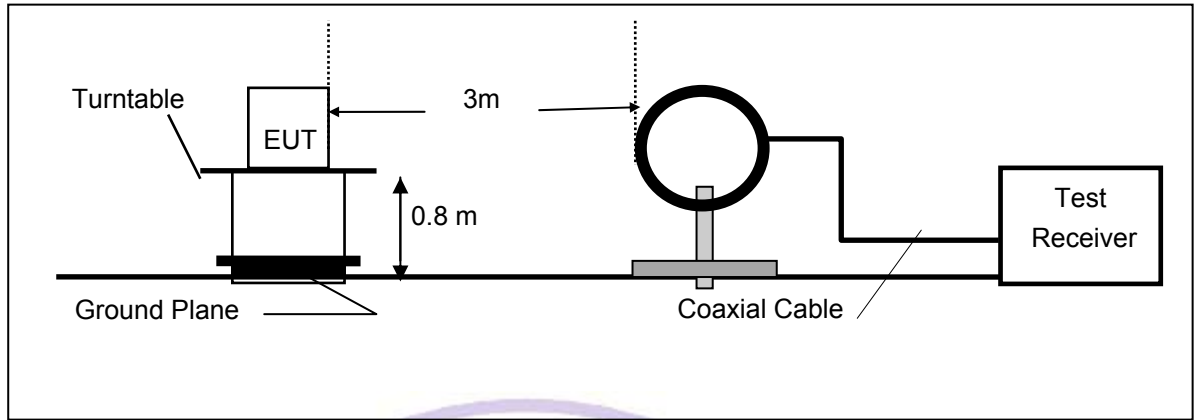
MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.190500	28.50	10.1	54	25.5	AV	L1	GND
0.361500	30.60	10.1	49	18.1	AV	L1	GND
0.379500	30.90	10.1	48	17.4	AV	L1	GND
1.585500	32.10	10.2	46	13.9	AV	L1	GND
2.161500	33.10	10.2	46	12.9	AV	L1	GND
3.214500	29.80	10.2	46	16.2	AV	L1	GND

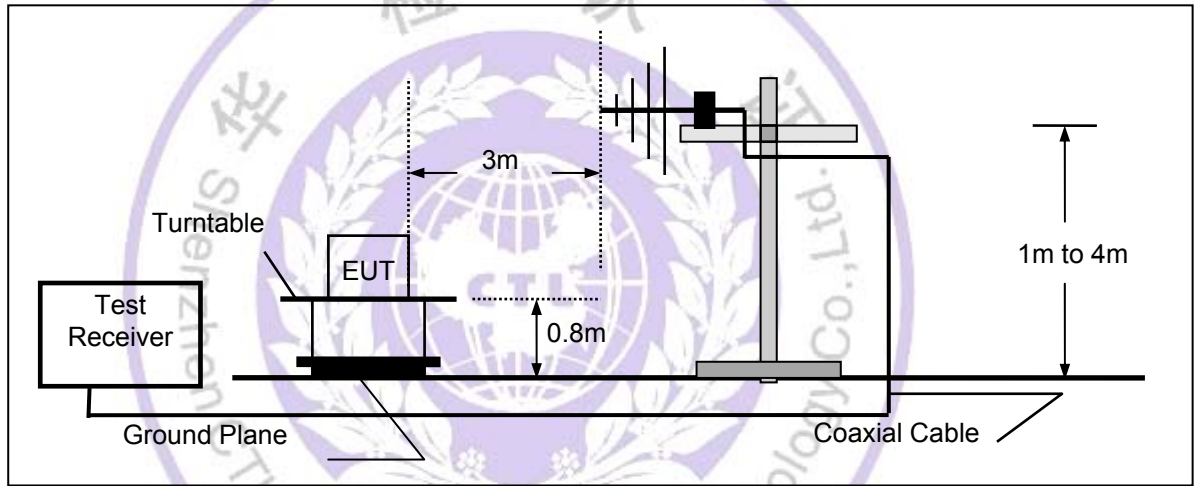
4.2. Radiated Emissions Test

TEST CONFIGURATION

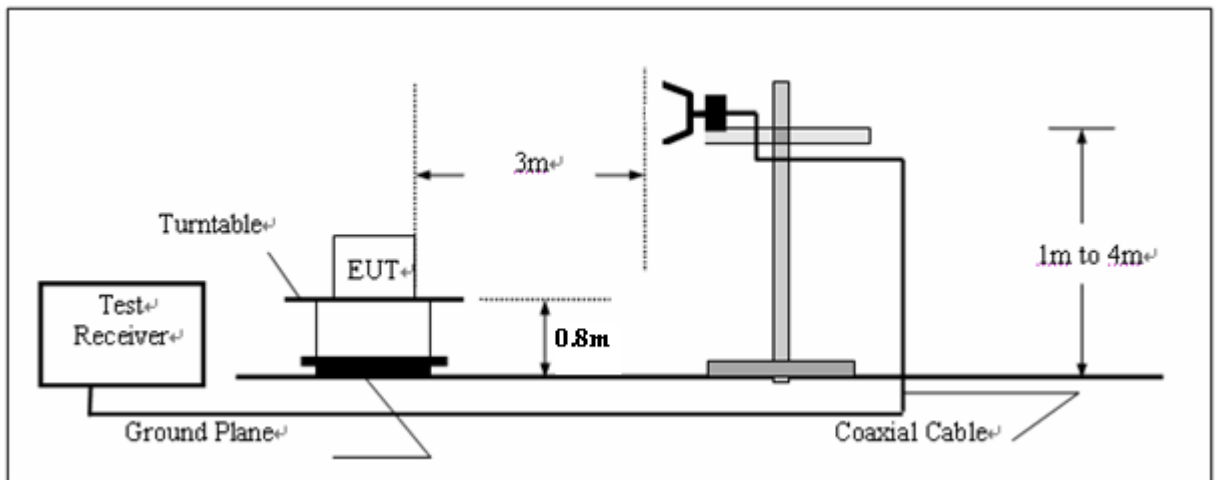
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



LIMIT

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

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	

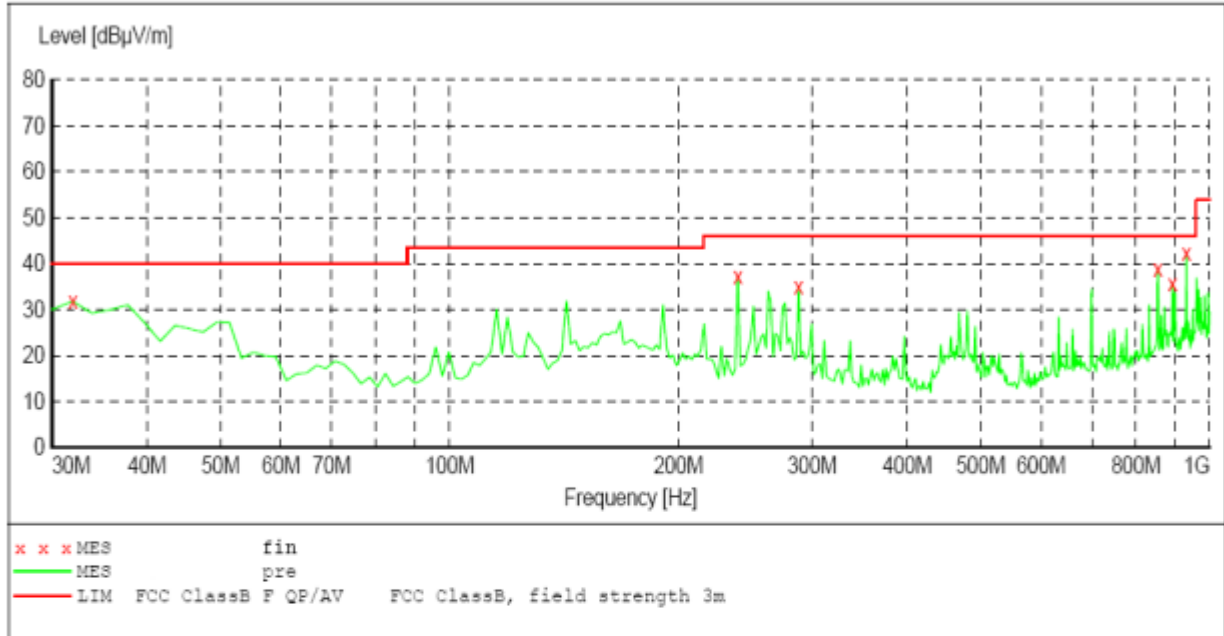
TEST PROCEDURE

1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed on a turn table which is 0.8m above ground plane.
3. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Repeat above procedures until all frequency measurements have been completed.
6. The test frequency range from 9KHz to 25GHz per FCC PART 15.33(a).

TEST RESULTS

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	120 kHz	HL562 201106

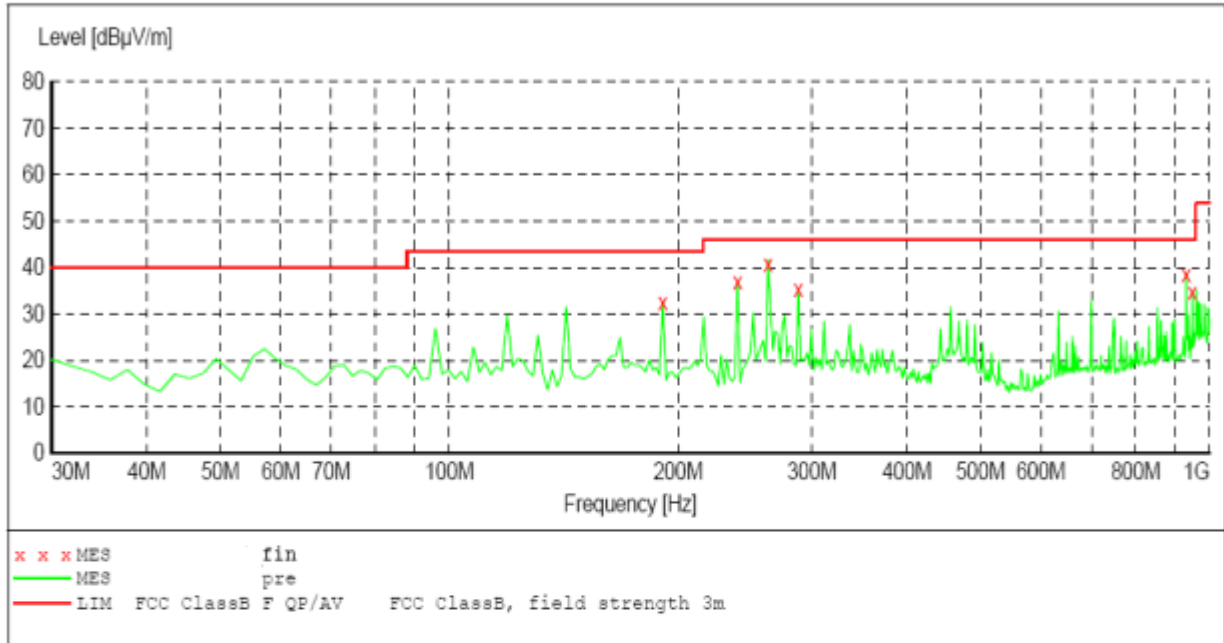


MEASUREMENT RESULT:

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
31.940000	31.90	-12.3	40.0	8.1	QP	100.0	86.00	VERTICAL
239.520000	37.20	-18.9	46.0	8.8	QP	100.0	211.00	VERTICAL
288.020000	34.90	-17.7	46.0	11.1	QP	100.0	211.00	VERTICAL
854.500000	38.90	-7.5	46.0	7.1	QP	100.0	197.00	VERTICAL
893.300000	35.80	-6.8	46.0	10.2	QP	100.0	205.00	VERTICAL
932.100000	42.40	-7.2	46.0	3.6	QP	100.0	187.00	VERTICAL

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
30.0 MHz	1.0 GHz	MaxPeak	Coupled	120 kHz	HL562 201106



MEASUREMENT RESULT:

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
191.020000	32.50	-22.2	43.5	11.0	QP	100.0	49.00	HORIZONTAL
239.520000	37.00	-18.9	46.0	9.0	QP	100.0	0.00	HORIZONTAL
262.800000	40.70	-18.1	46.0	5.3	QP	100.0	346.00	HORIZONTAL
288.020000	35.40	-17.7	46.0	10.6	QP	100.0	275.00	HORIZONTAL
932.100000	38.60	-7.2	46.0	7.4	QP	100.0	65.00	HORIZONTAL
949.560000	34.60	-7.4	46.0	11.4	QP	100.0	39.00	HORIZONTAL

Remark:

- (1) Measuring frequencies from 9 KHz to the 1GHz, Loop Antenna used below 30MHz. See Section 3.6 table item 20. Radiated emission test from 9KHz to 30MHz was verified, and no any emission was found except system noise floor.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) 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. The test results from 9KHz to 25MHz are not reported because the emisssons levels that are 20dB below the official limit.
- (5) The IF bandwidth of EMI Test Receiver between 25MHz to 1GHz was 100KHz. Below 30MHz was 10KHz.



5. Test Setup Photos of the EUT



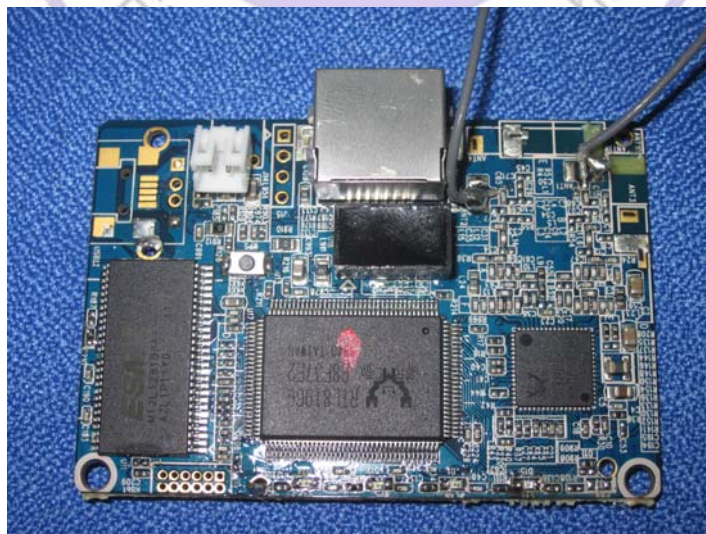
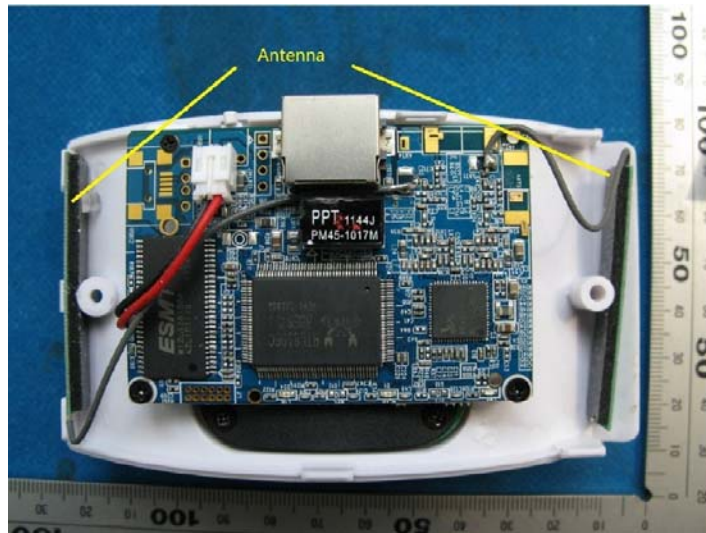
6. External and Internal Photos of the EUT

External Photos





Internal Photos



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