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## FCC PART 15 SUBPART B TEST REPORT

### FCC Part 15B

Report Reference No.....: **CTL1502060364-F**

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Tracy Qi

Date of issue.....: Apr. 06, 2015

Test Laboratory Name.....: **Shenzhen CTL Testing Technology Co., Ltd.**

Address.....: Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055

Applicant's name.....: **HYIN TECHNOLOGY CO.,LTD**

Address.....: 709, Building 212, Tairan Industrial Part, Che Gong Miao, Futian District, Shenzhen, Guangdong, China

#### Test specification:

Standard .....: FCC Part 15B: Unintentional Radiators

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


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

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Test item description .....: **Industrial Rugged Handheld Computer**

FCC ID.....: **2AEG8-HY3800W**

Trade Mark .....: 

Model/Type reference.....: HY3800W

Work frequency .....: RFID 902.75-927.25MHz/WiFi 2412-2462MHz

Type of modulation .....: DSSS(CCK,DQPSK,DBPSK),OFDM(64QAM,16QAM,QPSK, BPSK), RFID(FHSS)

Antenna Gain .....: 6.0dBi (RFID)/1.0dBi (WiFi)

Antenna type .....: Loop/Internal

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

**TEST REPORT**

<b>Test Report No. :</b> CTL1502060364-F	Apr. 06, 2015
	Date of issue

Equipment under Test : Industrial Rugged Handheld Computer

Model /Type : HY3800W

**Applicant** : **HYIN TECHNOLOGY CO.,LTD**

Address : 709, Building 212, Tairan Industrial Part, Che Gong Miao, Futian District, Shenzhen, Guangdong, China

**Manufacturer** : **HYIN TECHNOLOGY CO.,LTD**

Address : 709, Building 212, Tairan Industrial Part, Che Gong Miao, Futian District, Shenzhen, Guangdong, China

**Test Result** according to the standards on page 5:

**Positive**

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: 2009](#)



## 2. SUMMARY

### 2.1. General Remarks

Date of receipt of test sample	:	Mar. 07, 2015
Testing commenced on	:	Mar. 07, 2015
Testing concluded on	:	Apr. 06, 2015

### 2.2. Equipment Under Test

#### Power supply system utilised

Power supply voltage	:	<input checked="" 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 7.4V from battery

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

The device is an Industrial Rugged Handheld Computer.

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

Serial number: Prototype

### 2.4. EUT operation mode

Test Mode(TM)	Description	Remark
TM1	USB copy to PC	Keep Data Exchanging
TM2	Charging	charging from AC adapter
TM3	RFID	RFID function on
TM4	WIFI	WIFI function on

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.

All above test modes were checked, only the worst case test data were reported.

EUT configuration

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

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

- AC adapter

Manufacturer : HYIN TECHNOLOGY CO.,LTD

Model No. : JT-H9001000

- Notebook PC

Manufacturer : DELL

Model No. : PP18L

## 2.5. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: 2AEG8-HY3800W filing to comply with of the FCC Part 15B Rules.

## 2.6. Modifications

No modifications were implemented to meet testing criteria.





### **3. TEST ENVIRONMENT**

#### **3.1. Address of the test laboratory**

Shenzhen CTL Testing Technology Co., Ltd.

Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055

The sites are constructed in conformance with the requirements of ANSI C6230, 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.: 9618B**

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

##### **FCC-Registration No.: 970318**

Shenzhen CTL Testing Technology Co., 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 970318, December 19, 2013.

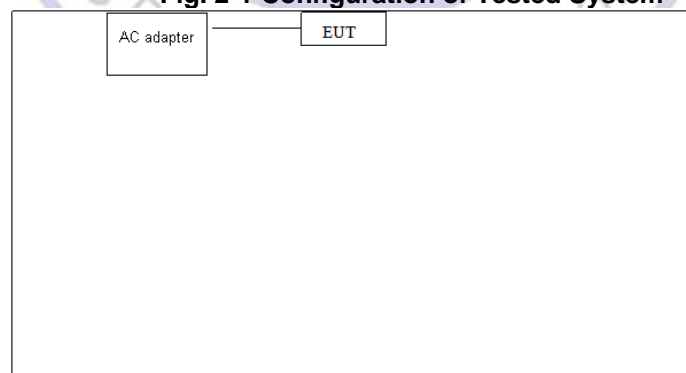
#### **3.3. Environmental conditions**

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**



#### **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 Shenzhen CTL Testing Technology Co., 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 CTL 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

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2014/07/12	2015/07/11
EMI Test Receiver	R&S	ESCI	103710	2014/07/10	2015/07/09
Spectrum Analyzer	Agilent	E4407B	MY45108355	2014/07/06	2015/07/05
Controller	EM Electronics	Controller EM 1000	N/A	2014/07/06	2015/07/05
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2014/07/12	2015/07/11
Horn Antenna	SCHWARZBECK	BBHA9170	1562	2014/07/12	2015/07/11
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2014/07/12	2015/07/11
LISN	R&S	ENV216	101316	2014/07/10	2015/07/09
LISN	SCHWARZBECK	NSLK8127	8127687	2014/07/10	2015/07/09
Microwave Preamplifier	HP	8349B	3155A00882	2014/07/10	2015/07/09
Amplifier	HP	8447D	3113A07663	2014/07/10	2015/07/09
Power Sensor	Rohde&Schwarz	OSP-120 (including B157)	115683	2014/07/02	2015/07/01
Transient Limiter	Com-Power	LIT-153	532226	2014/07/10	2015/07/09
Radio Communication Tester	R&S	CMU200	3655A03522	2014/07/06	2015/07/05
Temperature/Humidity Meter	zhicheng	ZC1-2	22522	2014/07/10	2015/07/09
SIGNAL GENERATOR	HP	8647A	3200A00852	2014/07/10	2015/07/09
Wideband Peak Power Meter	Anritsu	ML2495A	220.23.35	2014/07/06	2015/07/05
Power Sensor	Anritsu	MA2411B	0738552	2014/07/06	2015/07/05
Climate Chamber	ESPEC	EL-10KA	A20120523	2014/07/06	2015/07/05
High-Pass Filter	K&L	9SH10-2700/X12750 -O/O	/	2014/07/06	2015/07/05
High-Pass Filter	K&L	41H10-1375/U12750 -O/O	/	2014/07/06	2015/07/05
RF Cable	HUBER+SUHNER	RG214	/	2014/07/09	2015/07/08



### 3.7. Summary of Test Result

No deviations from the test standards

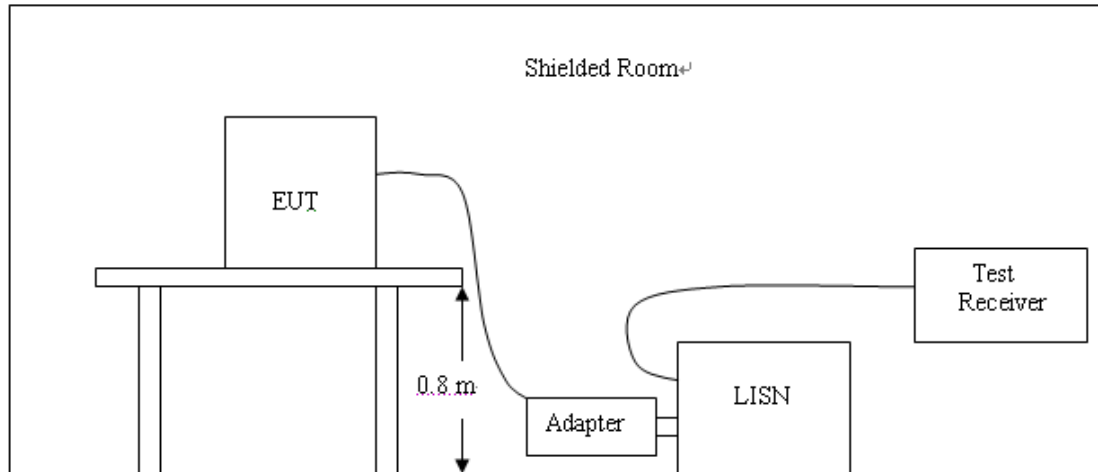
Test Item	Test Requirement	Standard Paragraph	Result
Radiated Emission	FCC PART 15	Section 15.109	PASS
Conducted Emission	FCC PART 15	Section 15.107	PASS



## 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 (dBµV)			
	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

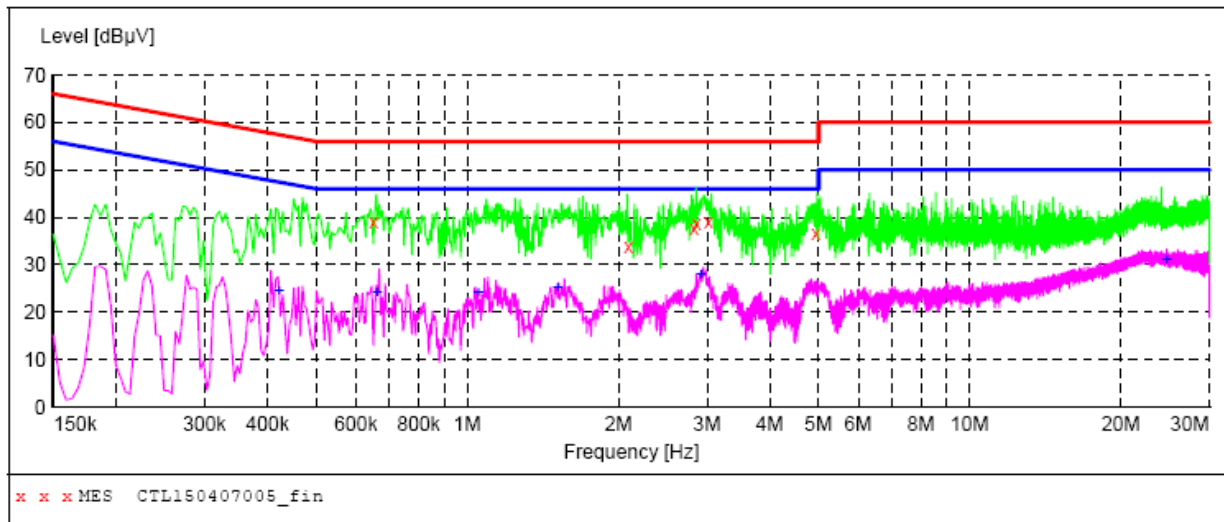
For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

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: "CTL150407005\_fin"**

4/7/2015 9:29AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.650000	38.90	10.2	56	17.1	QP	N	GND
2.090000	33.70	10.4	56	22.3	QP	N	GND
2.828000	37.80	10.4	56	18.2	QP	N	GND
2.858000	38.80	10.4	56	17.2	QP	N	GND
3.020000	39.00	10.4	56	17.0	QP	N	GND
4.940000	36.60	10.4	56	19.4	QP	N	GND

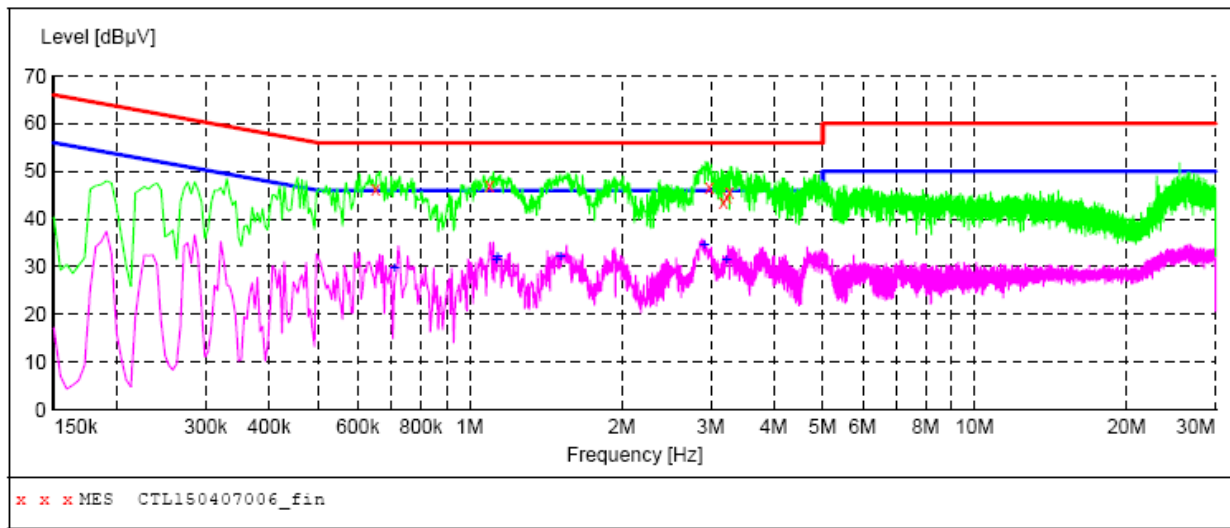
**MEASUREMENT RESULT: "CTL150407005\_fin2"**

4/7/2015 9:29AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.422000	24.50	10.2	47	22.9	AV	N	GND
0.662000	24.00	10.2	46	22.0	AV	N	GND
1.052000	24.20	10.3	46	21.8	AV	N	GND
1.514000	25.30	10.3	46	20.7	AV	N	GND
2.924000	27.90	10.4	46	18.1	AV	N	GND
24.656000	31.10	11.1	50	18.9	AV	N	GND

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

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "CTL150407006\_fin"**

4/7/2015 9:33AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.650000	46.30	10.2	56	9.7	QP	L1	GND
1.094000	46.90	10.3	56	9.1	QP	L1	GND
2.978000	46.60	10.4	56	9.4	QP	L1	GND
3.176000	43.60	10.4	56	12.4	QP	L1	GND
3.230000	44.60	10.4	56	11.4	QP	L1	GND
3.266000	45.50	10.4	56	10.5	QP	L1	GND

**MEASUREMENT RESULT: "CTL150407006\_fin2"**

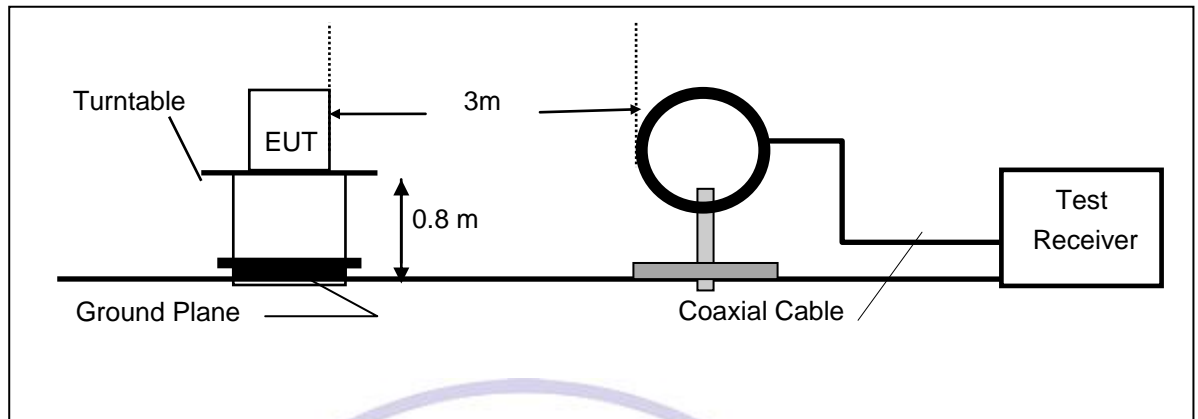
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Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.710000	29.80	10.2	46	16.2	AV	L1	GND
1.130000	31.30	10.3	46	14.7	AV	L1	GND
1.136000	32.10	10.3	46	13.9	AV	L1	GND
1.514000	32.00	10.3	46	14.0	AV	L1	GND
2.918000	34.50	10.4	46	11.5	AV	L1	GND
3.230000	31.40	10.4	46	14.6	AV	L1	GND

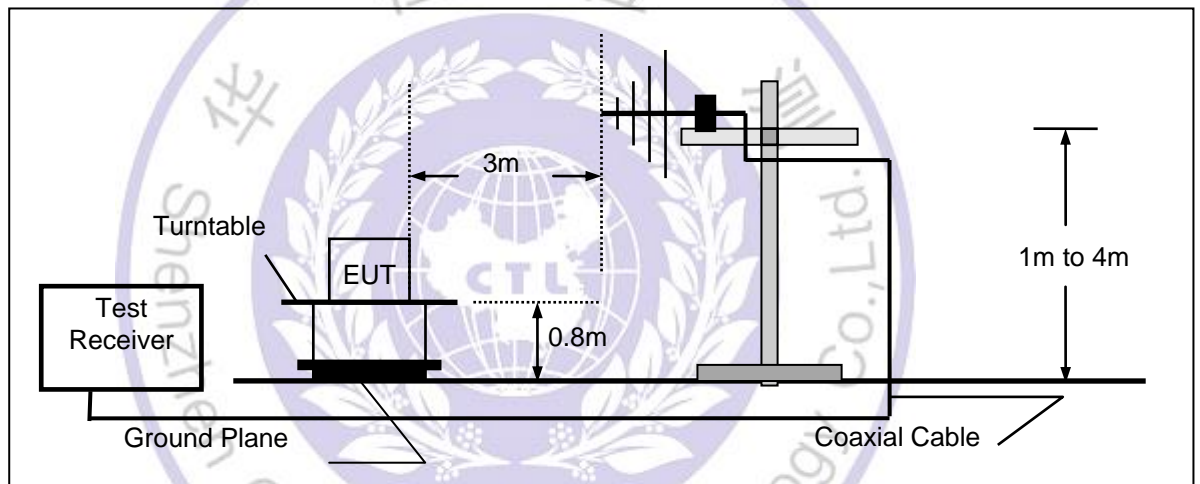
## 4.2. Radiated Emissions Test

### TEST CONFIGURATION

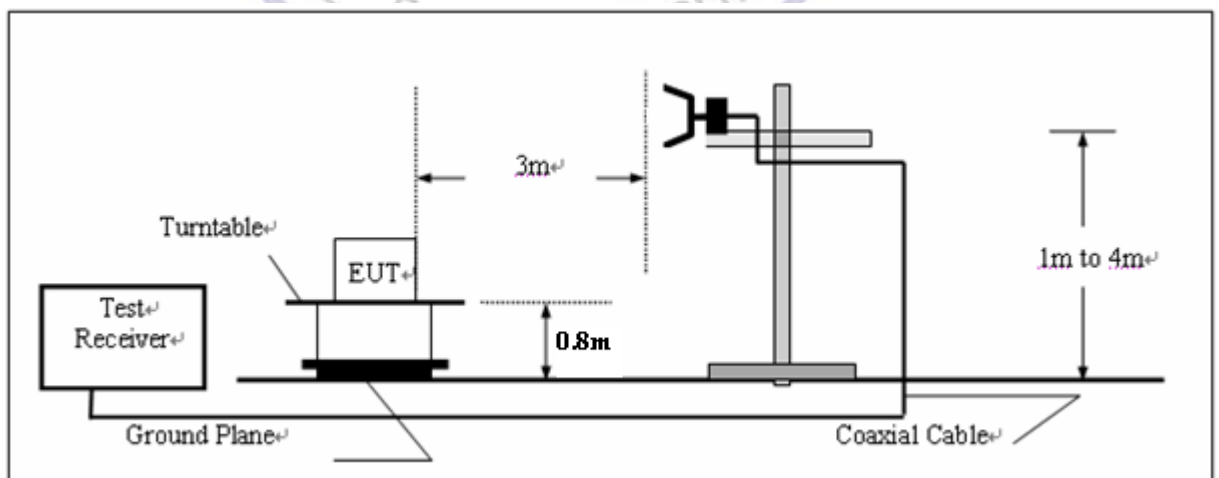
#### (A) Radiated Emission Test Set-Up, Frequency Below 30MHz



#### (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:

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

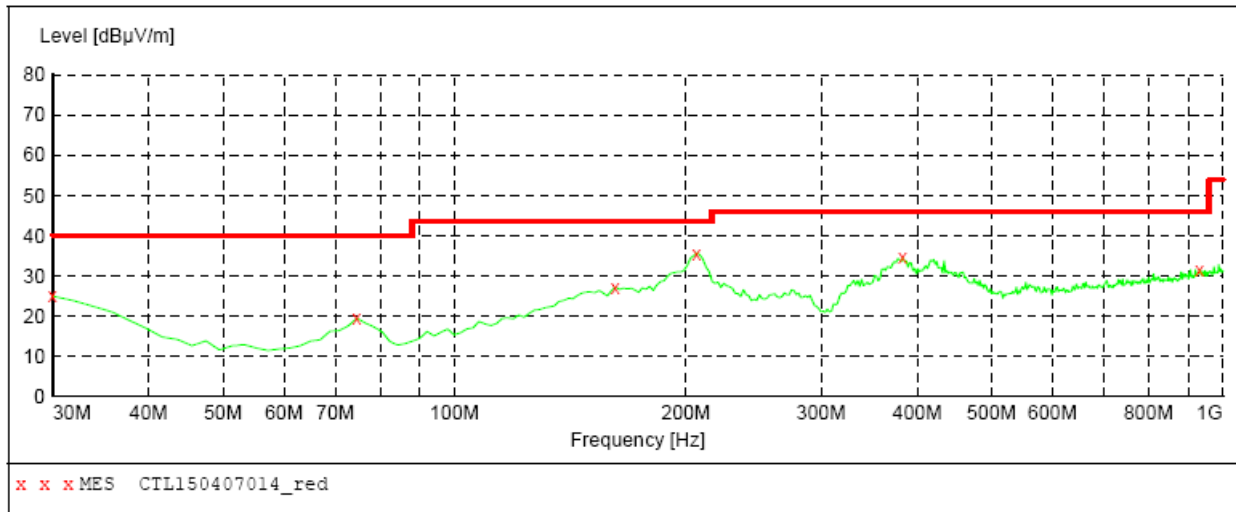
Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

**TEST PROCEDURE**

1. The testing follows the guidelines in ANSI C63.4-2009.
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 degree 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.

**TEST RESULTS*****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	300.0 ms	120 kHz	JB1

***MEASUREMENT RESULT: "CTL150407014\_red"***

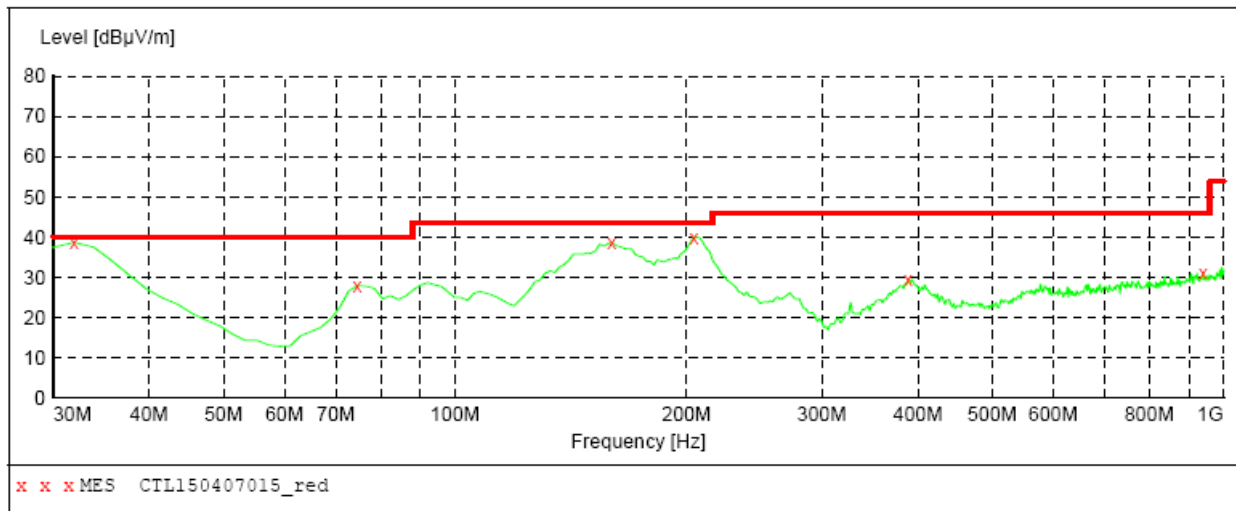
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Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	24.90	21.1	40.0	15.1	---	0.0	0.00	HORIZONTAL
74.620000	19.40	8.5	40.0	20.6	---	0.0	0.00	HORIZONTAL
161.920000	27.10	13.9	43.5	16.4	---	0.0	0.00	HORIZONTAL
206.540000	35.60	14.3	43.5	7.9	---	0.0	0.00	HORIZONTAL
383.080000	34.50	17.8	46.0	11.5	---	0.0	0.00	HORIZONTAL
932.100000	31.50	26.4	46.0	14.5	---	0.0	0.00	HORIZONTAL



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

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency				
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1

***MEASUREMENT RESULT: "CTL150407015\_red"***

4/7/2015 10:14AM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
31.940000	38.70	19.6	40.0	1.3	---	0.0	0.00	VERTICAL
74.620000	27.90	8.5	40.0	12.1	---	0.0	0.00	VERTICAL
159.980000	38.60	13.9	43.5	4.9	---	0.0	0.00	VERTICAL
204.600000	40.00	14.4	43.5	3.5	---	0.0	0.00	VERTICAL
388.900000	29.40	17.9	46.0	16.6	---	0.0	0.00	VERTICAL
939.860000	31.00	26.5	46.0	15.0	---	0.0	0.00	VERTICAL

**Remark:**

- (1) Measuring frequencies from 9 KHz to the 6 GHz, Loop Antenna used for below 30MHz measurement. Radiated emission test from 9KHz to 30MHz, above 1GHz were verified, and no any emission was found except system noise floor, then the test results from 9KHz to 30MHz, and above 1GHz are not reported.
- (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.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 100KHz. Below 30MHz was 10KHz. Above 1GHz was 1MHz.

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