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FCC PART 15 SUBPART C TEST REPORT

FCC Part 15.247

Report Reference No.: **CTL1509012520-WF02**

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Date of issue.....: Sept. 08, 2015

Test Firm.....: **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: **SHENZHEN ZOWEE TECHNOLOGY CO.,LTD**

Address.....: Science&Technology Industrial Park of Privately Owned Enterprises,
Pingshan, Xili, Nanshan District, Shenzhen, China

Test specification:

Standard: FCC Part 15.247: Operation within the bands 902–928 MHz, 2400–
2483.5 MHz, and 5725–5850 MHz.

Master TRF: Dated 2011-01

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Test item description: 7 inch MID

FCC ID.....: 2AAP6M7065

Trade Mark: NuVision

Model/Type reference.....: TM700A520L, TW748G, TM700A510L, TM700A530L,
TM700A540L, TM700A550L

Work frequency: 2402~2480MHz

Version.....: V4.0

Type of modulation: GFSK

Antenna Gain: 0 dBi

Antenna type: Internal

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

TEST REPORT

Test Report No. :	CTL1509012520-WF02	Sept. 08, 2015 Date of issue
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Equipment under Test : 7 inch MID

Model /Type : TM700A520L

Listed Models : TW748G, TM700A510L, TM700A530L, TM700A540L, TM700A550L

Difference Description : Only the color and model's name is different

Applicant : SHENZHEN ZOWEE TECHNOLOGY CO.,LTD

Address : Science&Technology Industrial Park of Privately Owned Enterprises, Pingshan, Xili, Nanshan District, Shenzhen, China

Manufacturer : SHENZHEN ZOWEE TECHNOLOGY CO.,LTD

Address : Science&Technology Industrial Park of Privately Owned Enterprises, Pingshan, Xili, Nanshan District, Shenzhen, China

Test Result according to the standards on page 5:	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 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices

ANSI C63.4-2014: American National Standard for Methods of Measurement of Radio- Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.



2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Sept. 01, 2015
Testing commenced on	:	Sept. 01, 2015
Testing concluded on	:	Sept. 08, 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 3.7V from Internal battery

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

7 inch MID with WIFI and Bluetooth function.

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. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing. There are 40 channels of EUT, and the test carried out at the lowest channel, middle channel and highest channel .

Frequency Range:	2400-2483.5MHz
Channel number:	40 channels
Modulation type:	GFSK
Antenna:	internal

Test Channel	Test Frequency
Low Channel	2402 MHz
Middle Channel	2440 MHz
High Channel	2480 MHz

2.5. EUT configuration

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

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

●	Notebook PC	Manufacturer :	DELL
		Model No. :	PP18L
		FCC approved:	FCC DoC
●	AC adapter	Manufacturer :	SHENZHEN JUKE ELECTRONICS CO.,LTD
		Model No. :	JK050200-S04USA

2.6. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



Table 2-1 Equipment Used in Tested System

No.	Product	Manufacturer	Model No.	Serial No.	FCC approved
1	Notebook PC	DELL	PP18L	27548966 7000262	FCC DoC

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

This submittal(s) (test report) is intended for FCC ID: 2AAP6M7065 filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.8. Modifications

No modifications were implemented to meet testing criteria.

2.9. NOTE

1. The EUT have Bluetooth 4.0 functions, The functions of the EUT listed as below:

	Test Standards	Reference Report
BT 3.0	FCC Part 15 Subpart C (Section15.247)	CTL1509012520-WF01
BT 4.0	FCC Part 15 Subpart C (Section15.247)	CTL1509012520-WF02
WIFI	FCC Part 15 Subpart C (Section15.247)	CTL1509012520-WF03

2. The frequency bands used in this EUT are listed as follows:

Frequency Band(MHz)	2400-2483.5	5150-5350	5470-5725	5725-5850
BT 3.0	✓	—	—	—
BT 4.0	✓	—	—	—
WIFI	✓	—	—	—

3. The EUT provides one completed transmitter and receiver.

Modulation Mode	TX Function
BT 3.0	1TX
BT 4.0	1TX
WIFI	1TX

2.10. Channel list

Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	20	2442
01	2404	21	2444
02	2406	22	2446
03	2408	23	2448
04	2410	24	2450
05	2412	25	2452
06	2414	26	2454
07	2416	27	2456
08	2418	28	2458
09	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

2.11. Mode of Operation

1. The EUT has been tested under normal operating condition.
2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low (2402MHz), mid (2440MHz) and high (2480MHz) with highest data rate are chosen for full testing.

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 C63.7, ANSI C63.10 (2013) 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:	15-35 °C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. 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	Above 1GHz	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.

3.5. Test Description

FCC PART 15		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.247(a)(2)	6dB Bandwidth	PASS*
FCC Part 15.247(d)	Spurious RF Conducted Emission	PASS*
FCC Part 15.247(b)	Maximum Peak Output Power	PASS*
FCC Part 15.247(e)	Power Spectral Density	PASS*
FCC Part 15.109/ 15.205/ 15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge Compliance of RF Emission	PASS*
FCC Part 15.203/15.247 (b)	Antenna Requirement	PASS*
FCC Per 47 CFR 2.1091(b)	MPE Evaluation	PASS*

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

This report is on the basis of the original FCC ID: 2AAP6M7065 report, the rear camera of the EUT was removed, except that, all others are the same, and this change are not influence all the RF circuit. Only conducted emission and radiated emission below 1GHz are re-tested.

*. The result, please reference to the original report.



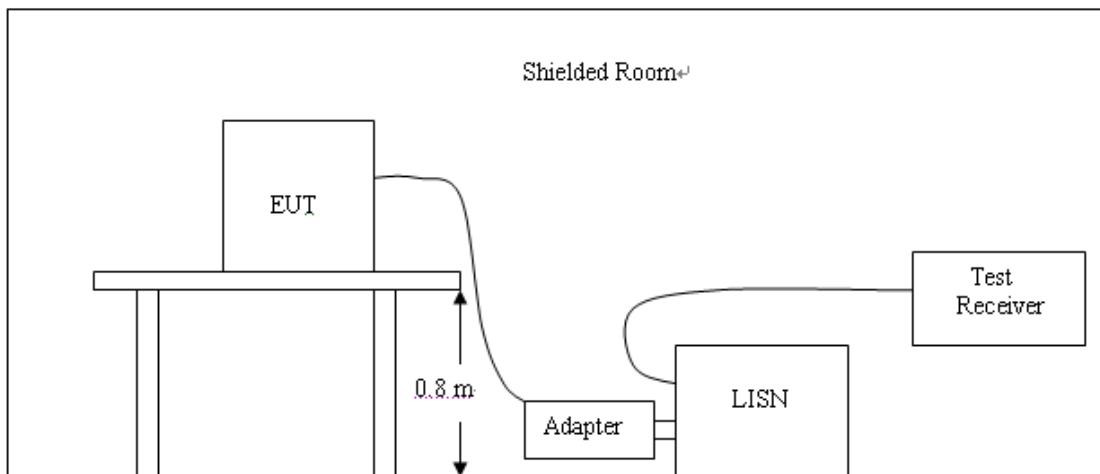
3.6. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
ULTRA-ROADBAND ANTENNA	Sunol Sciences Corp.	JB1	A061713	2015/06/02	2016/06/01
EMI Test Receiver	R&S	ESCI	103710	2015/06/02	2016/06/01
Spectrum Analyzer	Agilent	E4407B	MY41440676	2015/05/21	2016/05/20
Controller	EM Electronics	Controller EM 1000	N/A	2015/05/21	2016/05/20
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2015/05/19	2016/05/18
Active Loop Antenna	Daze	ZN30900A	N/A	2015/05/19	2016/05/18
LISN	R&S	ENV216	3560.6550.12	2015/06/02	2016/06/01
LISN	R&S	ESH2-Z5	860014/010	2015/06/02	2016/06/01
ISN	FCC	F-071115-1057-1-09	11229	2015/05/19	2016/05/18
Amplifier	Agilent	8349B	3008A02306	2015/05/19	2016/05/18
Amplifier	Agilent	8447D	2944A10176	2015/05/19	2016/05/18
Transient Limiter	SCHWARZCECK	VTSD 9561F	9666	2015/06/02	2016/06/01
Radio Communication Tester	R&S	CMU200	115419	2015/05/22	2016/05/21
Temperature/Humidity Meter	Gangxing	CTH-608	02	2015/05/20	2016/05/19
SIGNAL GENERATOR	Agilent	E4421B	US40051744	2015/05/20	2016/05/19
Wideband Peak Power Meter	Anritsu	ML2495A	220.23.35	2015/05/20	2016/05/19
Climate Chamber	ESPEC	EL-10KA	A20120523	2015/05/20	2016/05/19
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2015/05/20	2016/05/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	N/A	2015/05/20	2016/05/19
RF Cable	HUBER+SUHNER	RG214	N/A	2015/05/20	2016/05/19

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

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 C63.10-2013.
- 2 Support equipment, if needed, was placed as per ANSI C63.10-2013
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
- 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.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

AC Power Conducted Emission Limit

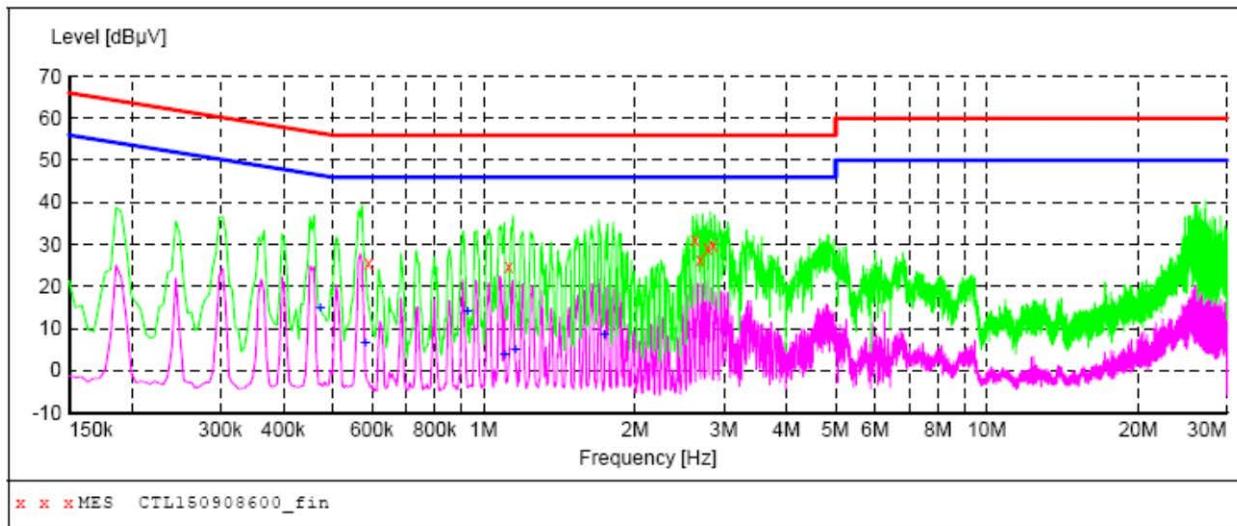
For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

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

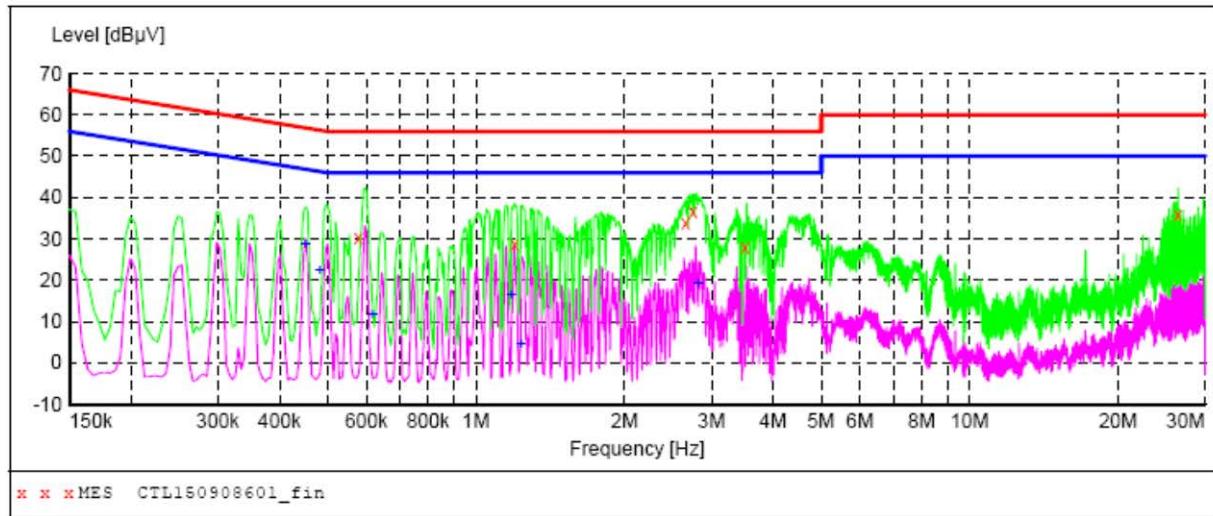
**MEASUREMENT RESULT: "CTL150908600_fin"**

9/8/2015 10:18AM	Frequency	Level	Transd	Limit	Margin	Detector	Line	PE
	MHz	dB μ V	dB	dB μ V	dB			
	0.591001	25.30	10.2	56	30.7	QP	N	GND
	1.122001	24.70	10.3	56	31.3	QP	N	GND
	2.634001	31.20	10.4	56	24.8	QP	N	GND
	2.692501	26.10	10.4	56	29.9	QP	N	GND
	2.787001	28.90	10.4	56	27.1	QP	N	GND
	2.859001	29.80	10.4	56	26.2	QP	N	GND

MEASUREMENT RESULT: "CTL150908600_fin2"

9/8/2015 10:18AM	Frequency	Level	Transd	Limit	Margin	Detector	Line	PE
	MHz	dB μ V	dB	dB μ V	dB			
	0.474001	15.00	10.2	46	31.4	AV	N	GND
	0.582001	6.30	10.2	46	39.7	AV	N	GND
	0.928501	14.10	10.3	46	31.9	AV	N	GND
	1.104001	3.70	10.3	46	42.3	AV	N	GND
	1.158001	5.00	10.3	46	41.0	AV	N	GND
	1.738501	8.50	10.3	46	37.5	AV	N	GND

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



MEASUREMENT RESULT: "CTL150908601_fin"

9/8/2015 10:21AM	Frequency	Level	Transd	Limit	Margin	Detector	Line	PE
	MHz	dB μ V	dB	dB μ V	dB			
	0.577501	30.20	10.2	56	25.8	QP	L1	GND
	1.198501	28.60	10.3	56	27.4	QP	L1	GND
	2.656501	33.90	10.4	56	22.1	QP	L1	GND
	2.751001	36.70	10.4	56	19.3	QP	L1	GND
	3.502501	27.90	10.4	56	28.1	QP	L1	GND
	26.407501	35.60	11.2	60	24.4	QP	L1	GND

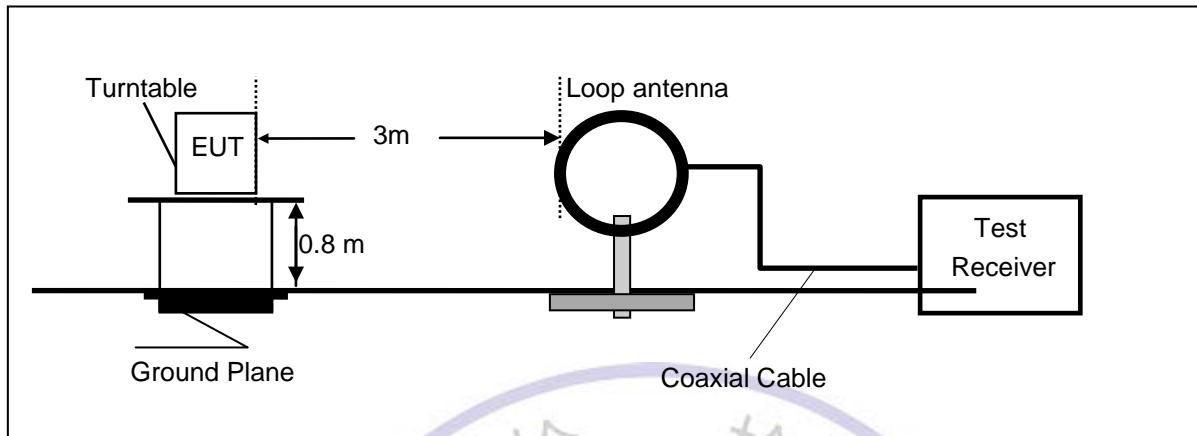
MEASUREMENT RESULT: "CTL150908601_fin2"

9/8/2015 10:21AM	Frequency	Level	Transd	Limit	Margin	Detector	Line	PE
	MHz	dB μ V	dB	dB μ V	dB			
	0.451501	28.60	10.2	47	18.2	AV	L1	GND
	0.483001	22.20	10.2	46	24.1	AV	L1	GND
	0.618001	11.80	10.2	46	34.2	AV	L1	GND
	1.180501	16.40	10.3	46	29.6	AV	L1	GND
	1.234501	4.50	10.3	46	41.5	AV	L1	GND
	2.818501	19.10	10.4	46	26.9	AV	L1	GND

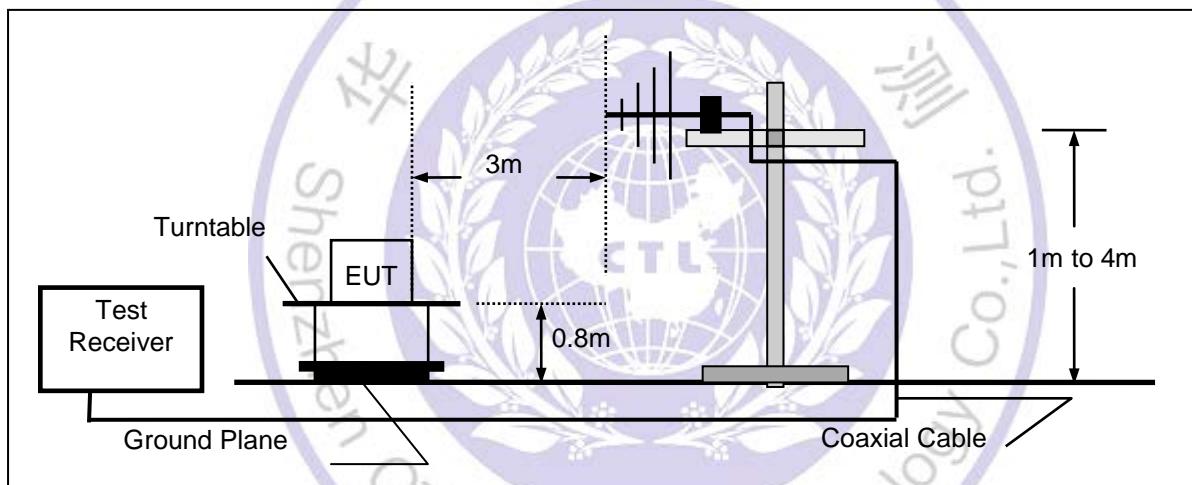
4.2. Radiated Emission

TEST CONFIGURATION

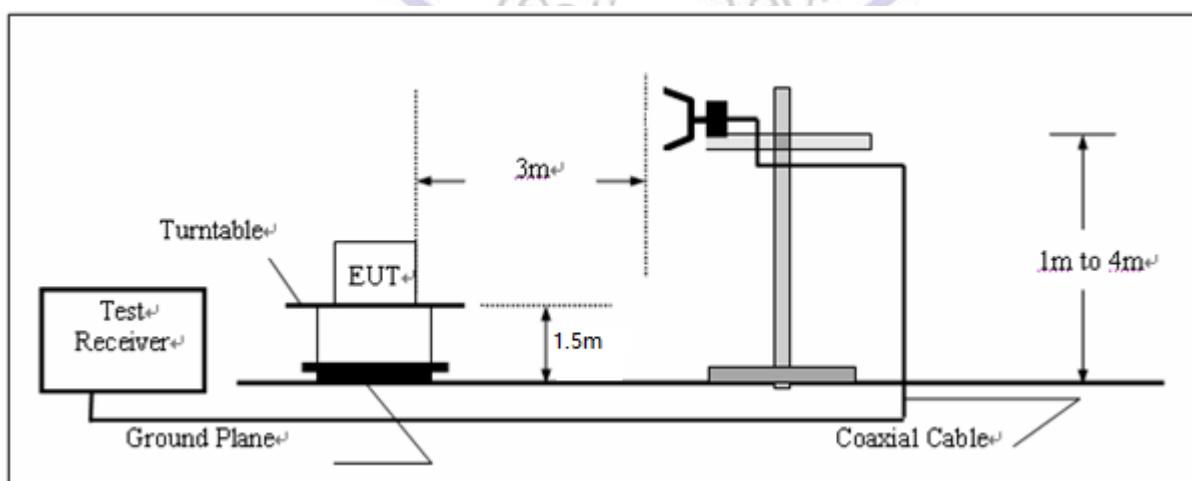
Radiated Emission Test Set-Up
Frequency range 9KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

- 1 The EUT was placed on a turn table which is 0.8m above ground plane.
- 2 Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0 $^{\circ}$ to 360 $^{\circ}$ to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. the fundamental frequency is 2400-2483.5MHz, So the radiation emissions frequency range were tested from 9KHz 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 § 15.247(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

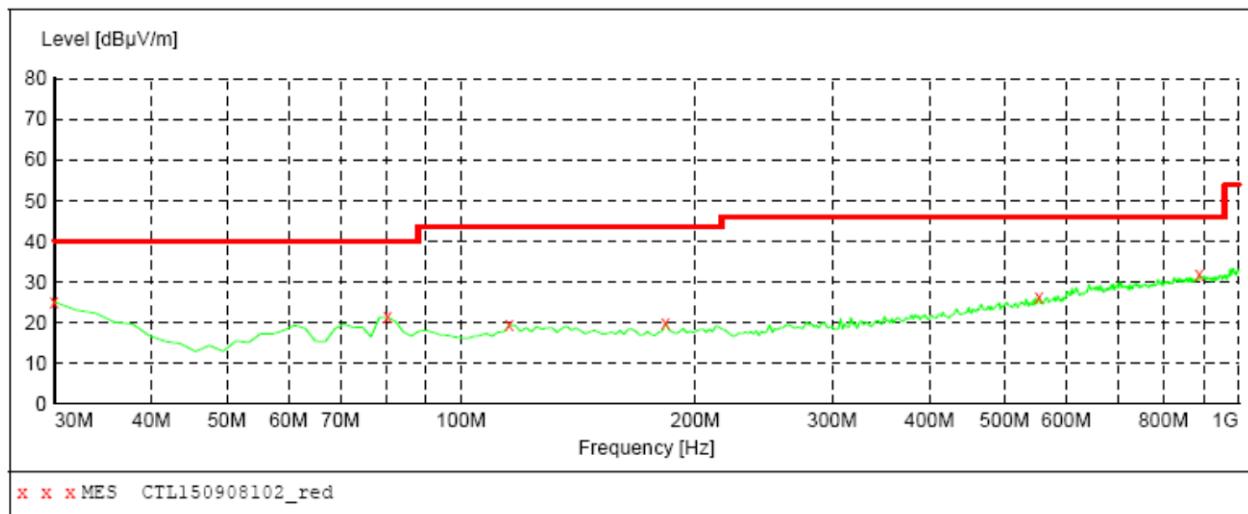
TEST RESULTS

Below 1GHz:

The radiated measurement are performed the each test mode and channel (low/mid/high), the datum recorded below is the worst case for all the test mode and channel.

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

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



MEASUREMENT RESULT: "CTL150908102_red"

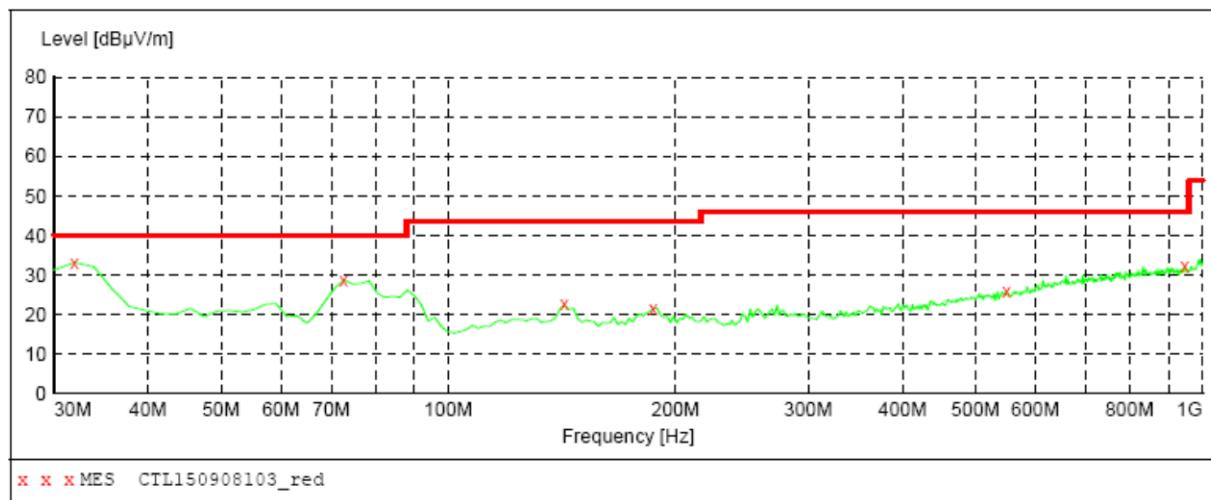
9/8/2015 9:44AM

Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	25.00	20.8	40.0	15.0	---	0.0	0.00	HORIZONTAL
80.440000	21.30	8.5	40.0	18.7	---	0.0	0.00	HORIZONTAL
115.360000	19.30	14.3	43.5	24.2	---	0.0	0.00	HORIZONTAL
183.260000	19.80	13.1	43.5	23.7	---	0.0	0.00	HORIZONTAL
553.800000	26.20	21.0	46.0	19.8	---	0.0	0.00	HORIZONTAL
889.420000	31.80	25.8	46.0	14.2	---	0.0	0.00	HORIZONTAL

Testing Technology

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

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

***MEASUREMENT RESULT: "CTL150908103_red"***

9/8/2015 9:46AM

Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Det. ---	Height cm	Azimuth deg	Polarization
31.940000	33.10	19.2	40.0	6.9	---	0.0	0.00	VERTICAL
72.680000	28.70	8.3	40.0	11.3	---	0.0	0.00	VERTICAL
142.520000	22.50	14.2	43.5	21.0	---	0.0	0.00	VERTICAL
187.140000	21.60	13.1	43.5	21.9	---	0.0	0.00	VERTICAL
549.920000	25.90	21.0	46.0	20.1	---	0.0	0.00	VERTICAL
947.620000	32.30	26.5	46.0	13.7	---	0.0	0.00	VERTICAL

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