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FCC PART 15 SUBPART C TEST REPORT

Report Reference No......: **CTL1409092257-WF**

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Tracy Qi

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(position+printed name+signature)...: Manager Tracy Qi

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Date of issue.....: Nov. 06, 2014

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.....: **Bullitt Group**

Address.....: No. 4, The Aquarium, King Street, Reading, RG1 2AN United Kingdom

Test specification:

Standard: FCC Part 15C

ANSI C63.4-2009

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

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Test item description: Cat® wireless charging Pad

FCC ID.....: ZL5WCS50

Trade Mark: Cat

Model/Type reference.....: CUWC-BLYE-S50

Transmit Frequency.....: 112KHz~205KHz

Antenna type: Loop antenna

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

TEST REPORT

Test Report No. :	CTL1409092257-WF	Nov. 06, 2014
		Date of issue

Equipment under Test : Cat® wireless charging Pad

Type / Model(s) : CUWC-BLYE-S50

Applicant : **Bullitt Group**

Address : No. 4, The Aquarium, King Street, Reading, RG1 2AN United Kingdom

Manufacturer : **SHENZHEN AIGUOSI ELECTRONIC TECHNOLOGY CO.LTD**

Address : 5F, BUILD D, DIINGFENG TECHNOLOGY PARK, SHIYAN SHUITIAN,
GREATWALL ROAD, BAOAN, SHENZHEN, CHINA

Test Result according to the
standards on page 4:

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.

Contents

1.	<u>TEST STANDARDS</u>	<u>4</u>
2.	<u>SUMMARY</u>	<u>5</u>
2.1.	General Remarks	5
2.2.	Equipment Under Test	5
2.3.	Short description of the Equipment under Test (EUT)	5
2.4.	EUT operation mode	5
2.5.	EUT configuration	5
2.6.	Related Submittal(s) / Grant (s)	5
2.7.	Modifications	5
2.8.	Summary of Test Results	6
3.	<u>TEST ENVIRONMENT</u>	<u>7</u>
3.1.	Address of the test laboratory	7
3.2.	Test Facility	7
3.3.	Environmental conditions	7
3.4.	Statement of the measurement uncertainty	7
3.5.	Equipments Used during the Test	8
4.	<u>TEST CONDITIONS AND RESULTS</u>	<u>9</u>
4.1.	AC Power Conducted Emission	9
4.2.	Radiated Emission	12
4.3.	20dB Bandwidth	17
5.	<u>TEST SETUP PHOTOS OF THE EUT</u>	<u>19</u>
6.	<u>EXTERNAL AND INTERNAL PHOTOS OF THE EUT</u>	<u>20</u>

1. TEST STANDARDS

The tests were performed according to following standards:

[FCC Rules Part 15.207,15.209, 15.215\(c\)](#)

[ANSI C63.4-2009](#)

All measurements contained in this report were conducted with ANSI C63.4-2009, 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	:	Oct. 22, 2014
Testing commenced on	:	Oct. 22, 2014
Testing concluded on	:	Nov. 06, 2014

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)

A Cat® wireless charging Pad work frequency range 112KHz~205KHz.
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 mode for testing.

2.5. EUT configuration

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

- ☐ - supplied by the manufacturer
- ☒ - supplied by the lab

☒ Mobile Phone	Manufacturer :	SAMSUNG
	Model No. :	I9300
☐ AC adapter	Manufacturer :	Kuantech (Baihai) Co., Ltd
	Model No. :	KSAS0121900050HU

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

This submittal(s) (test report) is intended for **FCC ID: ZL5WCS50** filing to comply with FCC Part 15, Subpart C Rules.

2.7. Modifications

No modifications were implemented to meet testing criteria.

2.8. Summary of Test Results

The EUT is a Cat® wireless charging Pad, The functions of the EUT listed as below:

	Test Standards	Test Result
Electric Field Radiated Emissions	FCC Part 15 Subpart C (Section15.209)	PASS
20dB Bandwidth	FCC Part 15 Subpart C (Section15.215(c))	PASS
Conducted Emissions	FCC Part 15 Subpart C (Section15.207)	PASS

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



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, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

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.

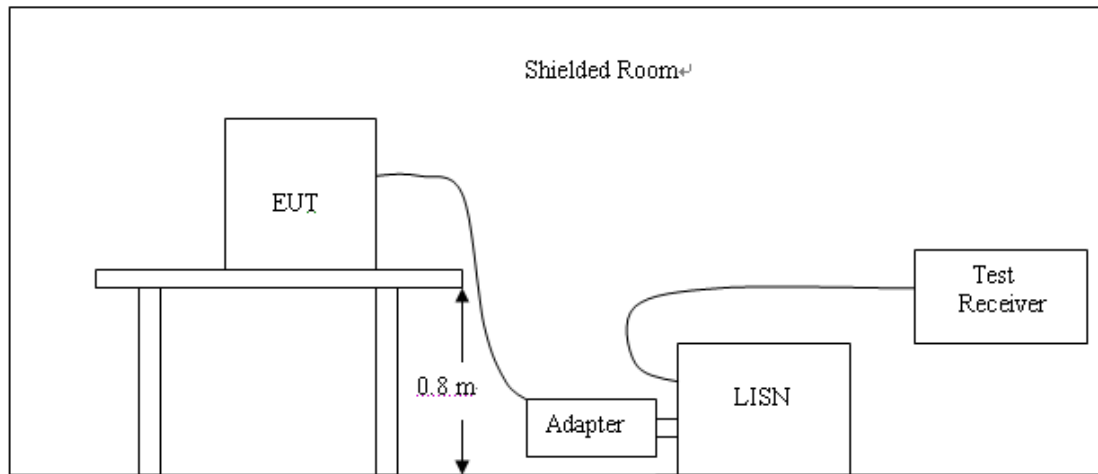
3.5. Equipments Used during the Test

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
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
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

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 C63.10-2009.
- 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.
Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

AC Power Conducted Emission Limit

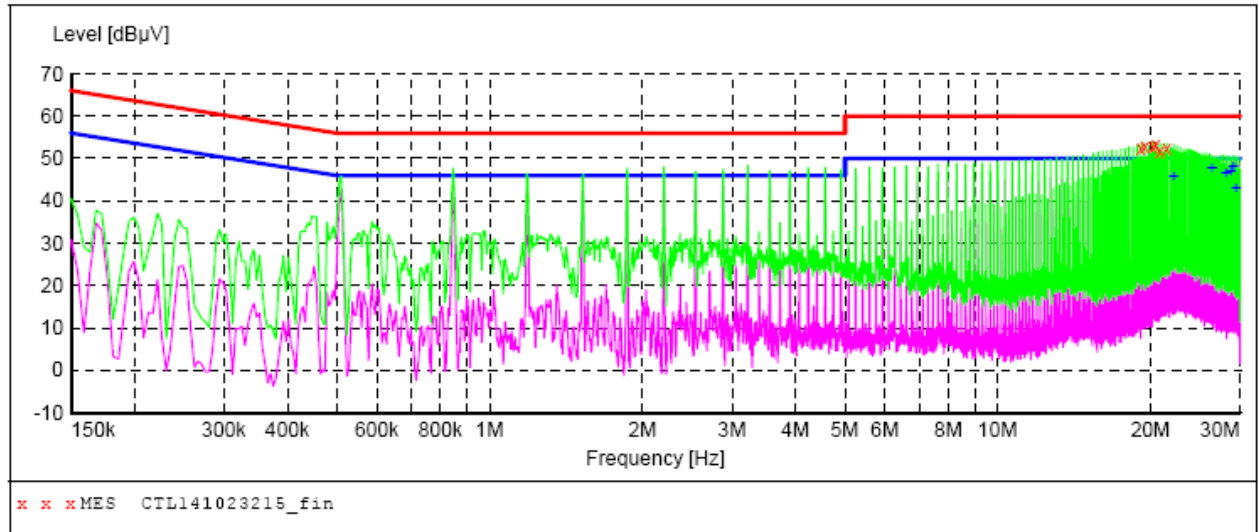
For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

Frequency (MHz)	Maximum RF Line Voltage (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

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

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "CTL141023215_fin"**

10/23/2014 5:24PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
19.136000	52.30	10.9	60	7.7	QP	L1	GND
19.478000	52.80	10.9	60	7.2	QP	L1	GND
20.156000	52.80	11.0	60	7.2	QP	L1	GND
20.492000	53.00	11.0	60	7.0	QP	L1	GND
20.828000	51.50	11.0	60	8.5	QP	L1	GND
21.512000	52.40	11.0	60	7.6	QP	L1	GND

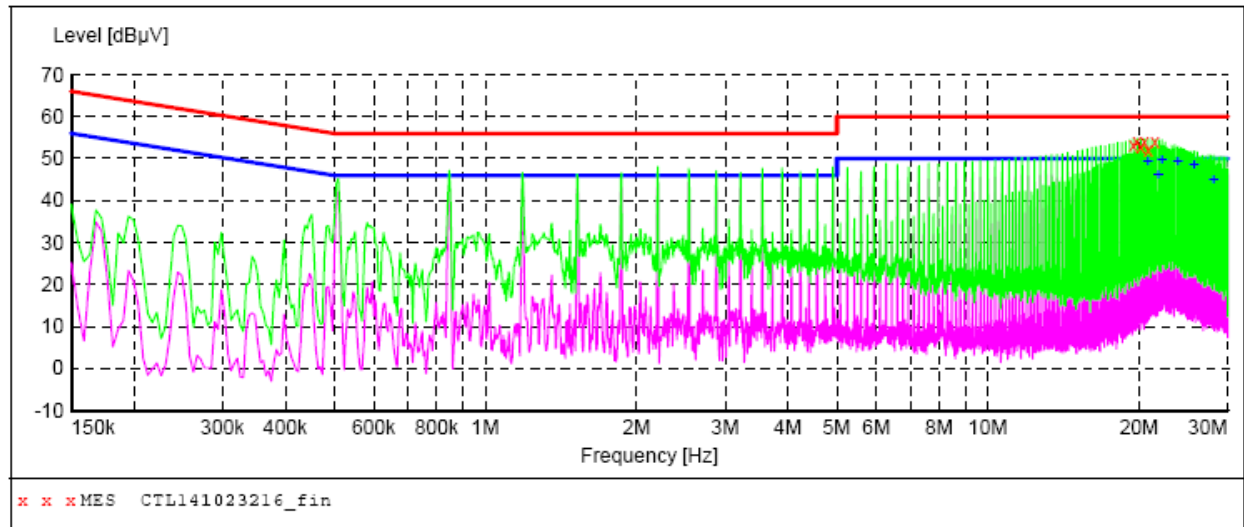
MEASUREMENT RESULT: "CTL141023215_fin2"

10/23/2014 5:24PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
22.184000	45.80	11.0	50	4.2	AV	L1	GND
26.420000	47.80	11.2	50	2.2	AV	L1	GND
28.118000	46.50	11.2	50	3.5	AV	L1	GND
28.790000	46.90	11.2	50	3.1	AV	L1	GND
29.132000	47.90	11.2	50	2.1	AV	L1	GND
29.474000	42.90	11.3	50	7.1	AV	L1	GND

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

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "CTL141023216_fin"**

10/23/2014 5:27PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
19.472000	53.10	10.9	60	6.9	QP	N	GND
19.808000	54.00	10.9	60	6.0	QP	N	GND
20.150000	52.90	11.0	60	7.1	QP	N	GND
20.486000	53.90	11.0	60	6.1	QP	N	GND
20.828000	52.20	11.0	60	7.8	QP	N	GND
21.500000	53.90	11.0	60	6.1	QP	N	GND

MEASUREMENT RESULT: "CTL141023216_fin2"

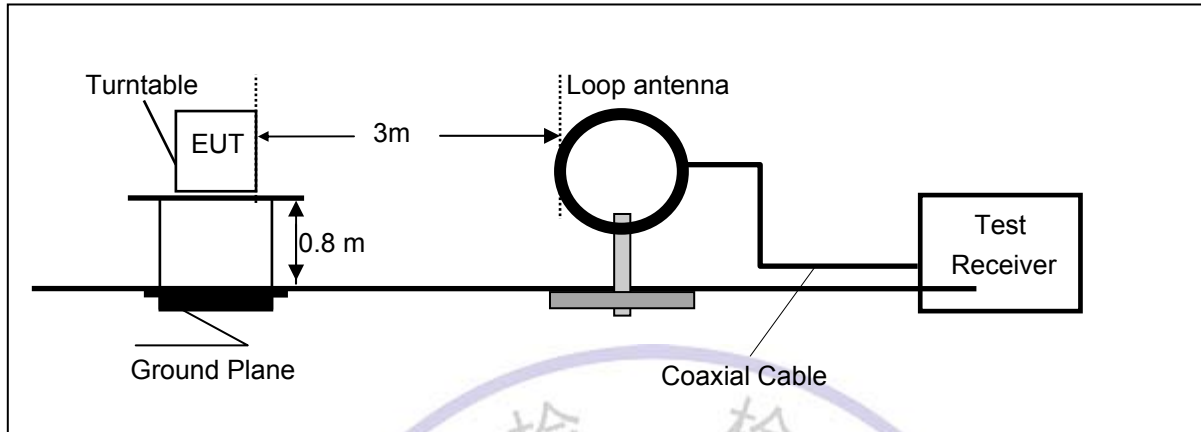
10/23/2014 5:27PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
20.822000	49.30	11.0	50	0.7	AV	N	GND
21.842000	46.20	11.0	50	3.8	AV	N	GND
22.178000	49.50	11.0	50	0.5	AV	N	GND
23.870000	49.10	11.1	50	0.9	AV	N	GND
25.730000	48.30	11.1	50	1.7	AV	N	GND
28.106000	44.80	11.2	50	5.2	AV	N	GND

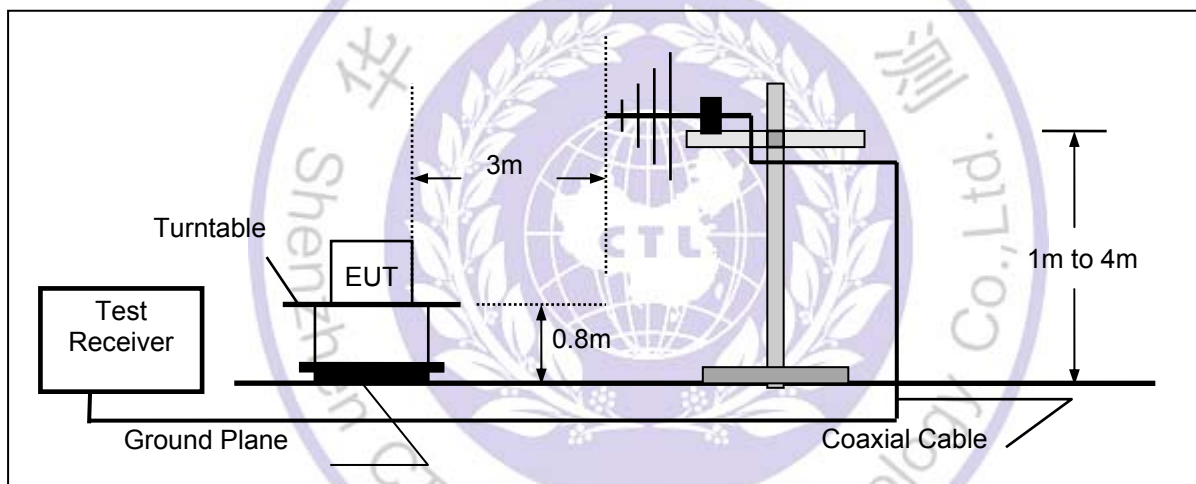
4.2. Radiated Emission

TEST CONFIGURATION

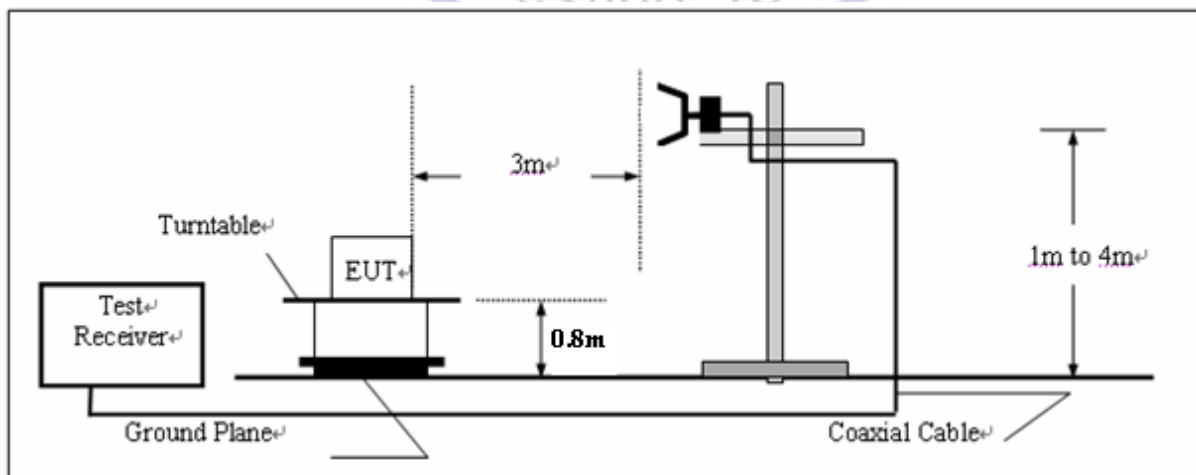
Radiated Emission Test Set-Up
Frequency range 9KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

- 1 The EUT 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°C to 360°C 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.

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 (dBμV/m)	RA (dBμV/m)	AF (dB)	CL (dB)	AG (dB)	Transd (dB)
300.00	40	58.1	12.2	1.6	31.90	-18.1

$$\text{Transd} = \text{AF} + \text{CL} - \text{AG}$$

RADIATION 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:

9k~30MHz:

Frequency Range (MHz)	E-field Strength Limit @ 30m (mV/m)	E-field Strength Limit @ 3m (dBμV/m)
0.009-0.490	2400/F(kHz)	129-94
0.490-1.705	24000/F(kHz)	74-63
1.705-30	30	70

Note: Where the limits have been defined at one distance, and a signal level measured at another, the limits have been extrapolated using the following formula:

$$\text{Extrapolation(dB)} = 40\log_{10}(\text{Measurement Distance/Specification Distance})$$

Note:

- (1) The tighter limit shall apply at the edge between two frequency bands.
- (2) dBuV/m = 20*log(uV/m)

30M~1GHz:

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/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

Note:

(1) The tighter limit shall apply at the edge between two frequency bands.

(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

TEST RESULTS**WORST-CASE RADIATED EMISSION BELOW 30 MHz**

Frequency (KHz)	Meter Reading (dBμV)	Polar	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Levels (dBμV/m)	Limits at 3m (dBμV/m)	Detector Mode PK /AV
123.78(F)	49.02	Loop	23.62	0.01	72.65	105.75	PK
16.29	31.69	Loop	22.84	-0.25	54.28	123.36	PK
27.02	34.22	Loop	19.53	-0.24	53.51	118.98	PK
105.19	27.96	Loop	22.67	0.01	50.64	107.20	PK
110.00	26.74	Loop	23.50	0.01	50.25	106.78	PK
2540.12	25.74	Loop	25.19	0.04	50.97	70.00	PK

Remark: 1. 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.

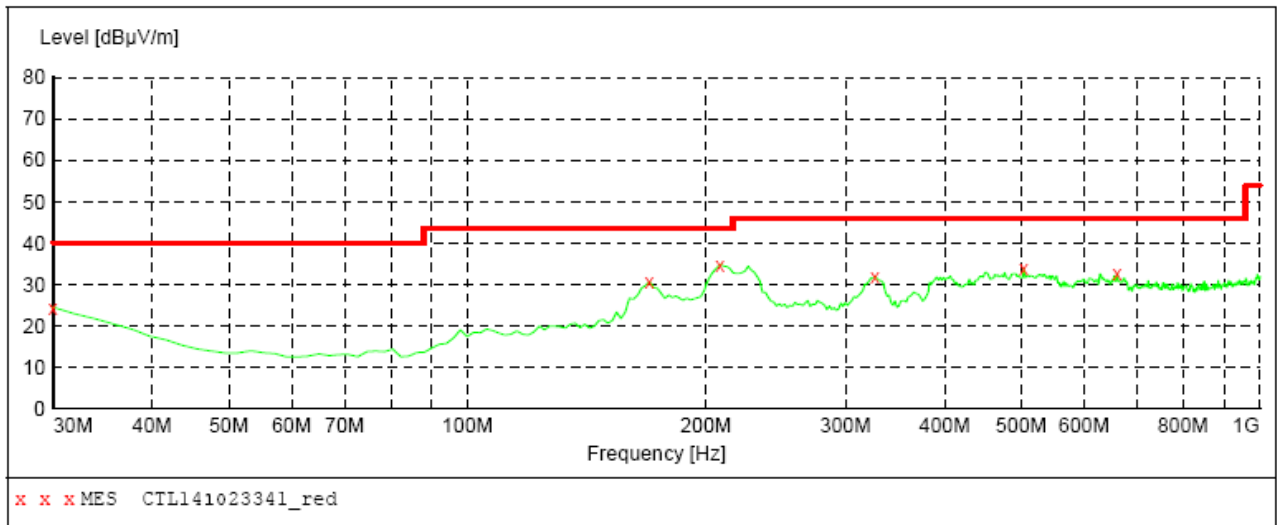
2. The test limit distance is 3m limit.

3. PK means Peak Value, QP means Quasi Peak Value, AV means Average Value.

4. F means Fundamental Frequency.

Radiated Emission Test Data 30-1000MHz:***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: "CTL141023341_red"***

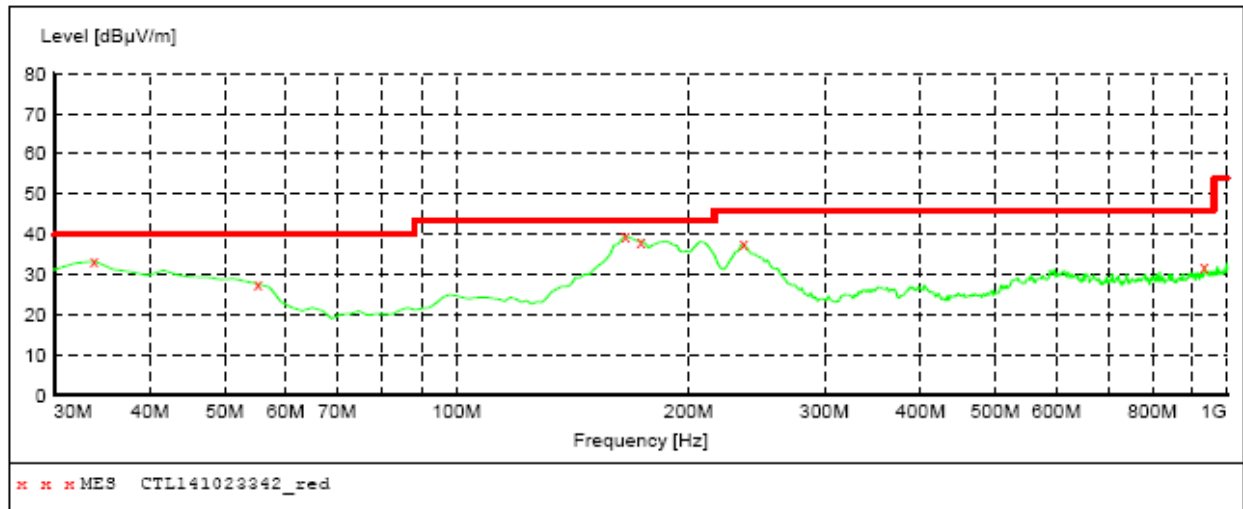
10/23/2014 5:07PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	24.40	21.1	40.0	15.6	---	0.0	0.00	HORIZONTAL
169.680000	30.70	13.6	43.5	12.8	---	0.0	0.00	HORIZONTAL
208.480000	34.80	14.3	43.5	8.7	---	0.0	0.00	HORIZONTAL
326.820000	32.00	16.2	46.0	14.0	---	0.0	0.00	HORIZONTAL
503.360000	33.90	20.4	46.0	12.1	---	0.0	0.00	HORIZONTAL
660.500000	32.60	22.9	46.0	13.4	---	0.0	0.00	HORIZONTAL



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: "CTL141023342_red"***

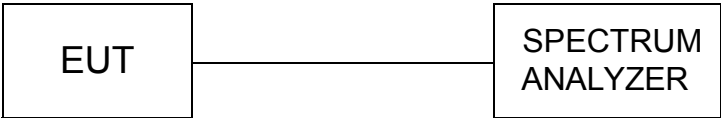
10/23/2014 5:09PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
33.880000	33.30	18.1	40.0	6.7	---	0.0	0.00	VERTICAL
55.220000	27.70	8.3	40.0	12.3	---	0.0	0.00	VERTICAL
165.800000	39.50	13.8	43.5	4.0	---	0.0	0.00	VERTICAL
173.560000	38.40	13.3	43.5	5.1	---	0.0	0.00	VERTICAL
235.640000	37.50	14.1	46.0	8.5	---	0.0	0.00	VERTICAL
934.040000	32.00	26.4	46.0	14.0	---	0.0	0.00	VERTICAL



4.3. 20dB Bandwidth

TEST CONFIGURATION



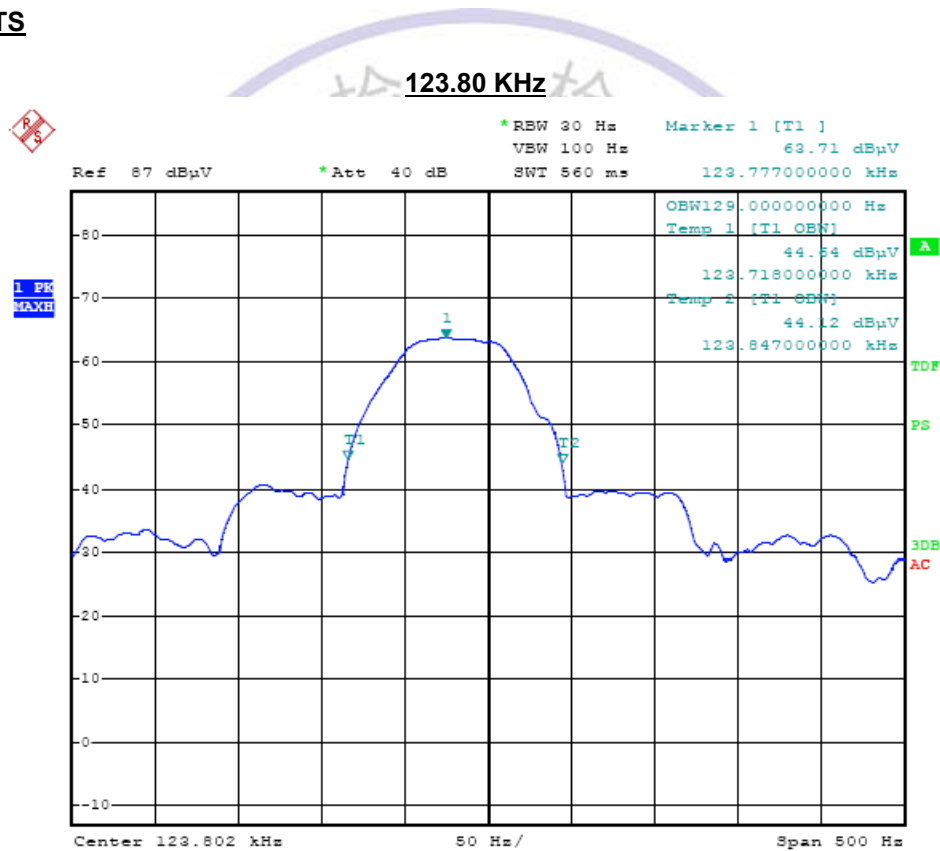
TEST PROCEDURE

The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30Hz RBW and 100Hz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

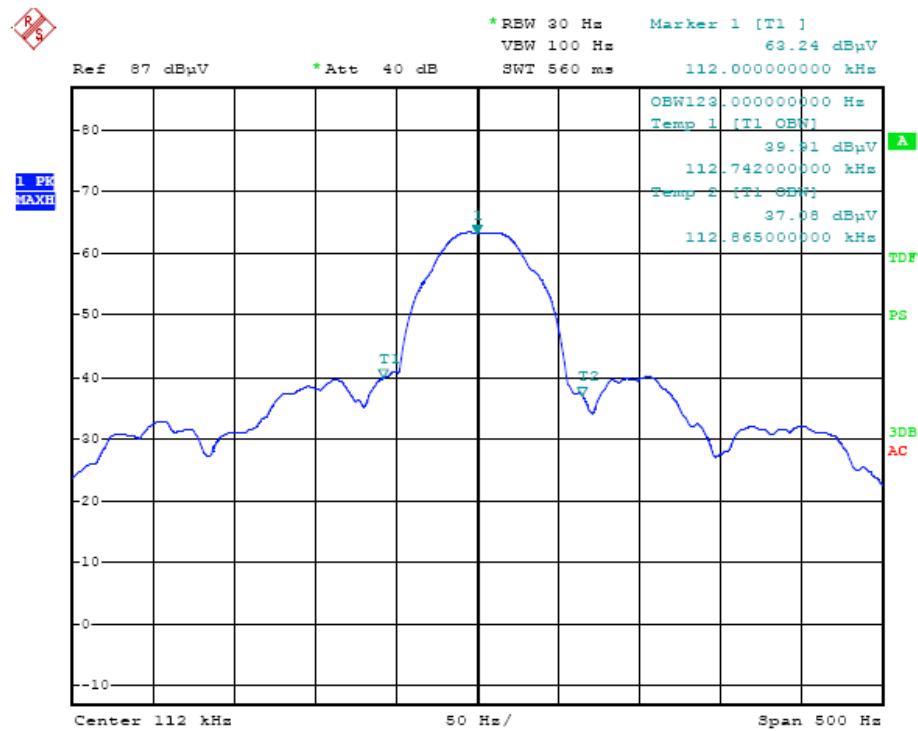
LIMIT

The 20dB bandwidth shall be less than 80% of the permitted frequency band.

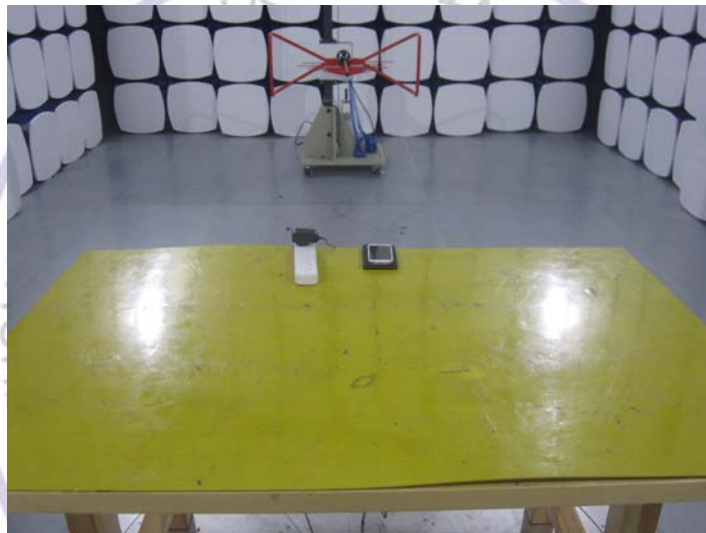
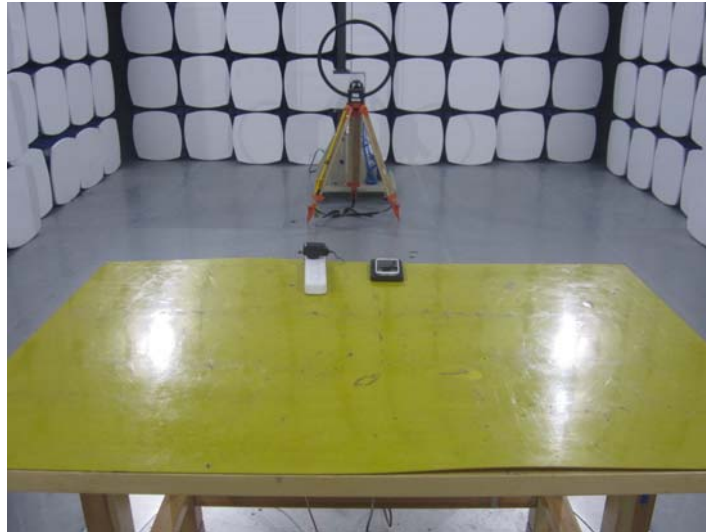
TEST RESULTS



112.00 KHz



5. Test Setup Photos of the EUT



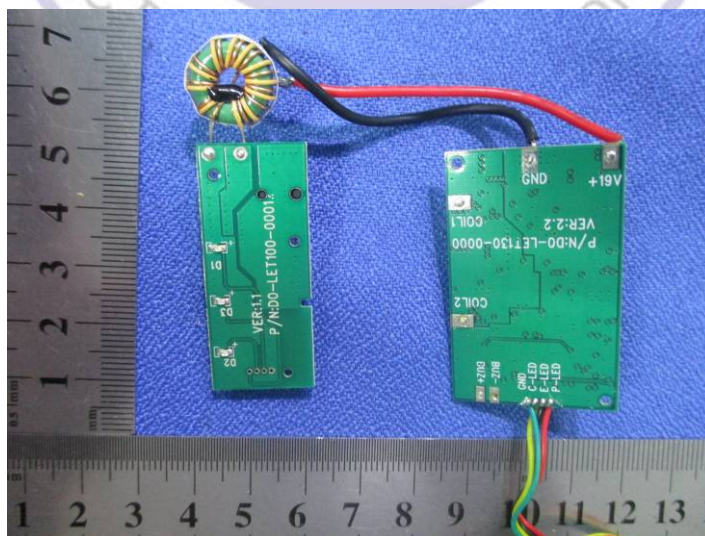
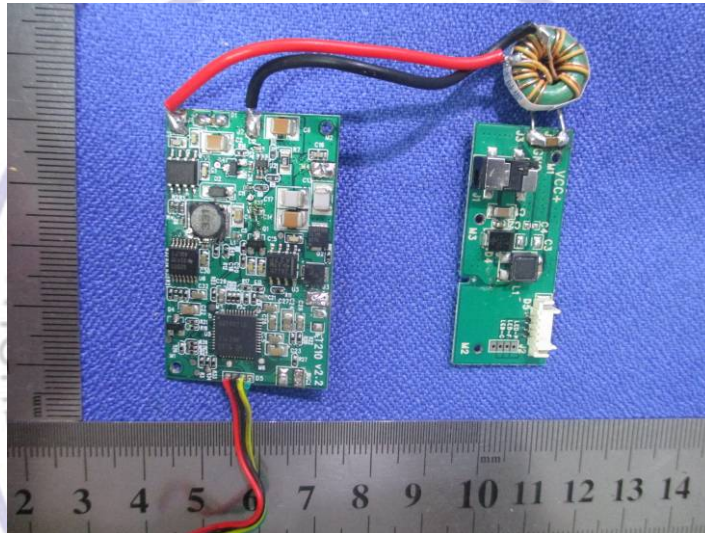
6. External and Internal Photos of the EUT

External Photos







Internal Photos

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