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FCC PART 15 SUBPART C TEST REPORT

FCC Part 15.247

Report Reference No.....:	**CTL1403250553-WB02**
Compiled by (position+printed name+signature)..:	File administrators Jacky Chen
Name of the organization performing the tests (position+printed name+signature)..:	Test Engineer Tracy Qi
Approved by (position+printed name+signature)..:	Manager Tracy Qi
Date of issue.....:	Apr. 15, 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.....:	**Bulltech Electronic Products S.L.**
Address.....:	Gran Via, 64, 2-I, 28013 Madrid, Spain.
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 ..... :	SMART PHONE
FCC ID……..:	2AAM3SYRENI50DCII
Trade Mark .....:	SZENIO
Model/Type reference.....:	Syreni 50DC II
GSM/WCDMA	
Transmit .....:	2G:GSM 850: 824~849MHz, PCS 1900: 1850~1910MHz 3G:WCDMA Band V: 824~849MHz
Receive .....:	2G:GSM 850: 869~894MHz, PCS 1900: 1930~1990MHz 3G:WCDMA Band V: 869~894MHz
Release Version .....:	2G:R99 3G:Rel-6
Type of modulation.....:	2G: GMSK for GSM/GPRS/EDGE 3G: QPSK
GPRS Type .....:	Class B

GPRS Class .....:	Class 12
GPS	
work frequency .....:	1575.42MHz
Type of modulation .....:	BPSK
Bluetooth	
Work frequency .....:	2402~2480MHz
Version.....:	V4.0
Type of modulation .....:	FHSS
Data Rate.....:	1Mbps(GFSK), 2Mbps(Pi/4 DQPSK), 3Mbps(8DPSK)
Wi-Fi	
Work frequency .....:	802.11b/g/n(40MHz): 2412~2462MHz
Type of modulation .....:	802.11b DSSS, 802.11g/n: OFDM
Data Rate.....:	802.11b: 1/2/5.5/11 Mbps 802.11g: 6/9/12/18/24/36/48/54 Mbps 802.11n: up to 135 Mbps
Antenna Gain .....:	-2.0 dBi for GSM850 and WCDMA Band V -1.0 dBi for PCS1900 0 dBi for Bluetooth and Wi-Fi
Antenna type .....:	Internal
IMEI 1 .....:	358392044937091
IMEI 2 .....:	358392044937109
Harware version .....:	8068-MB-V0.3
Software version.....:	8068-01C_K77W_OTD_A999W_BULLTECH_QHD_V008_ 20140117_1240
Result.....:	**Positive**

Shenzhen CTL Testing Technology Co., Ltd.

TEST REPORT

Test Report No. :	CTL1403250553-WB02	Apr. 15, 2014 Date of issue

Equipment under Test	:	SMART PHONE
Model /Type	:	Syreni 50DC II
Applicant	:	**Bulltech Electronic Products S.L.**
Address	:	Gran Via, 64, 2-I, 28013 Madrid, Spain.
Manufacturer	:	**Shenzhen ODX Telecom Equipment Co., Ltd.**
Address	:	2nd Floor of Building B, HongLianYing Technology Park, No.286 of SiLi Road, DaBuXiang Community, Longhua New District, Shenzhen, 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.

Shenzhen CTL Testing Technology Co.,Ltd.

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

KDB Publication No. KDB 558074 D01 v03r01 Guidance on Measurements for Digital Transmission Systems

ANSI C63.4-2003

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2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Mar. 25, 2014
Testing commenced on	:	Mar. 25, 2014
Testing concluded on	:	Apr. 15, 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)		

DC 3.7V from battery

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

A SMART PHONE with WCDMA/GSM, Bluetooth, GPS and wifi 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

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 ID
1	Notebook PC	DELL	PP18L	------	E2KWM3945ABG

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

This submittal(s) (test report) is intended for **FCC ID: 2AAM3SYRENI50DCII** 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
Radio	FCC Part 15 Subpart C (Section15.247)	CTL1403250553-WB02
RF Exposure	FCC Per 47 CFR 2.1091(b)	CTL1403250553-WB02

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

Frequency Band(MHz)	2400-2483.5	5150-5350	5470-5725	5725-5850
Bluetooth 4.0	√	—	—	—

3. The EUT provides one completed transmitter and receiver.

Modulation Mode	TX Function
GFSK	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 Mode:

Test Mode(TM)	Description	Remark
TM1	Transmitting	2402MHz
TM2	Transmitting	2440MHz
TM3	Transmitting	2480MHz

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: 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.

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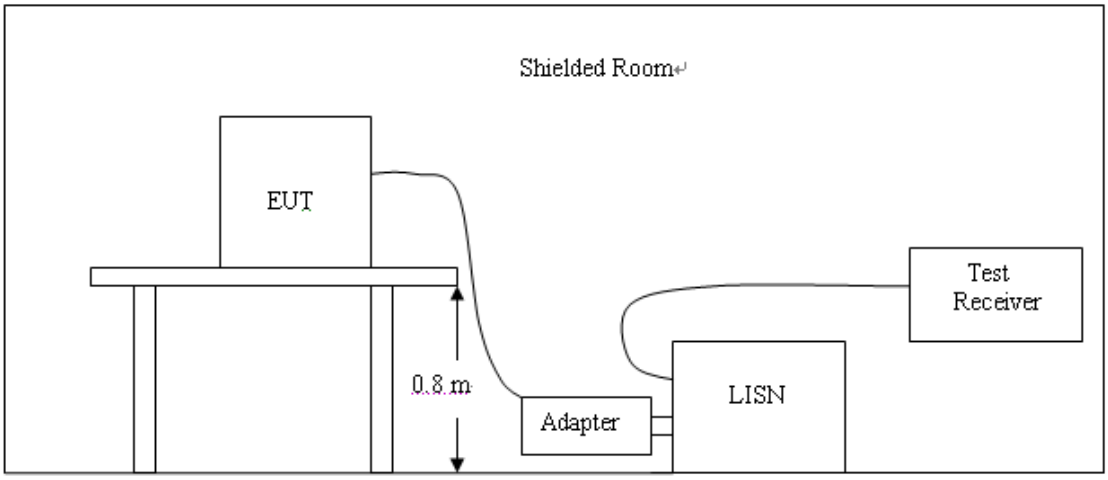
3.6. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2013/07/12	2014/07/11
EMI Test Receiver	R&S	ESCI	103710	2013/07/10	2014/07/09
Spectrum Analyzer	Agilent	E4407B	MY45108355	2013/07/06	2014/07/05
Controller	EM Electronics	Controller EM 1000	N/A	2013/07/06	2014/07/05
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2013/07/12	2014/07/11
Horn Antenna	SCHWARZBECK	BBHA9170	1562	2013/07/12	2014/07/11
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2013/07/12	2014/07/11
LISN	R&S	ENV216	101316	2013/07/10	2014/07/09
LISN	SCHWARZBECK	NSLK8127	8127687	2013/07/10	2014/07/09
Microwave Preamplifier	HP	8349B	3155A00882	2013/07/10	2014/07/09
Amplifier	HP	8447D	3113A07663	2013/07/10	2014/07/09
Transient Limiter	Com-Power	LIT-153	532226	2013/07/10	2014/07/09
Radio Communication Tester	R&S	CMU200	3655A03522	2013/07/06	2014/07/05
Temperature/Humidity Meter	zhicheng	ZC1-2	22522	2013/07/10	2014/07/09
SIGNAL GENERATOR	HP	8647A	3200A00852	2013/07/10	2014/07/09
Wideband Peak Power Meter	Anritsu	ML2495A	220.23.35	2013/07/06	2014/07/05
Climate Chamber	ESPEC	EL-10KA	A20120523	2013/07/06	2014/07/05
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	/	2013/07/06	2014/07/05
High-Pass Filter	K&L	41H10-1375/U12750-O/O	/	2013/07/06	2014/07/05

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

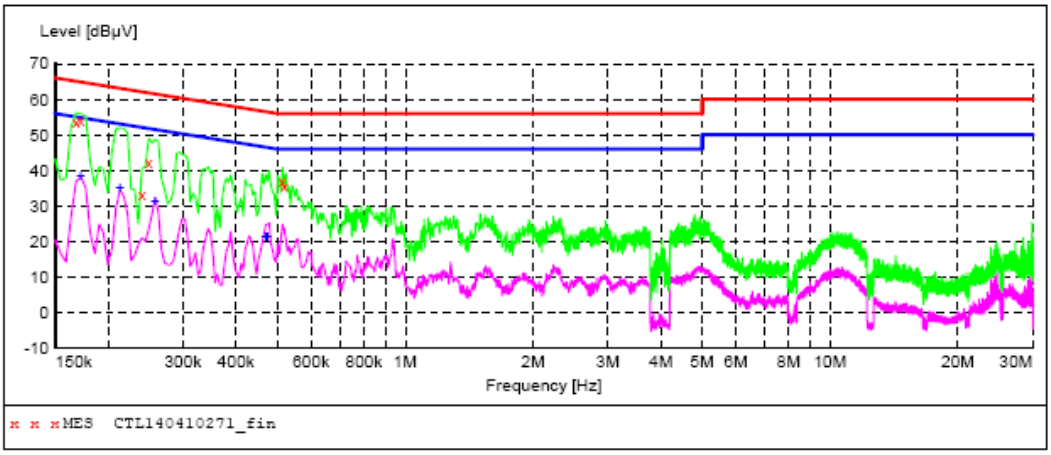
For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

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: "CTL140410271_fin"

4/10/2014 8:56AM

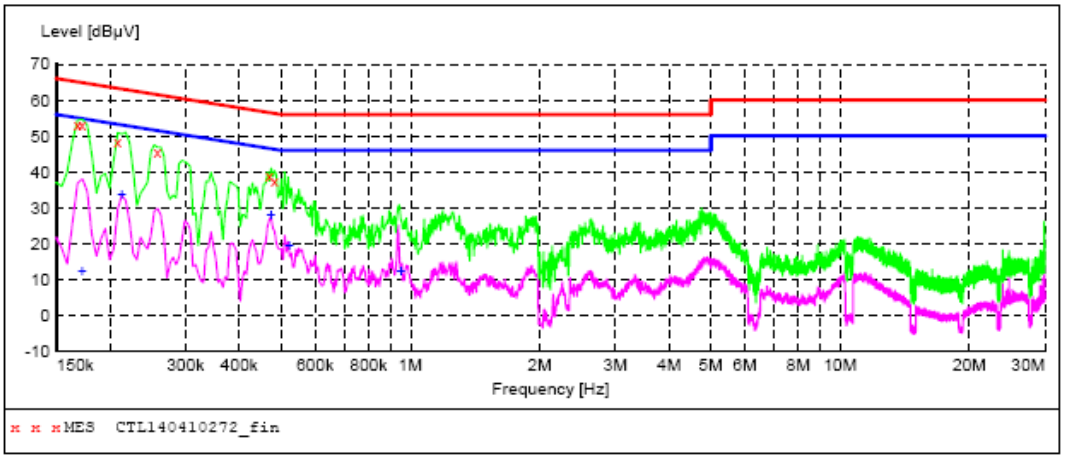
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.168000	53.70	10.2	65	11.4	QP	N	GND
0.172500	53.90	10.2	65	10.9	QP	N	GND
0.240000	33.30	10.2	62	28.8	QP	N	GND
0.249000	42.40	10.2	62	19.4	QP	N	GND
0.514500	36.90	10.2	56	19.1	QP	N	GND
0.519000	35.60	10.2	56	20.4	QP	N	GND

MEASUREMENT RESULT: "CTL140410271_fin2"

4/10/2014 8:56AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.172500	38.30	10.2	55	16.5	AV	N	GND
0.213000	35.20	10.2	53	17.9	AV	N	GND
0.258000	31.10	10.2	52	20.4	AV	N	GND
0.469500	21.20	10.2	47	25.3	AV	N	GND
0.474000	21.30	10.2	46	25.1	AV	N	GND

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



MEASUREMENT RESULT: "CTL140410272_fin"

4/10/2014 9:02AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.168000	53.00	10.2	65	12.1	QP	L1	GND
0.172500	53.00	10.2	65	11.8	QP	L1	GND
0.208500	48.40	10.2	63	14.9	QP	L1	GND
0.258000	45.70	10.2	62	15.8	QP	L1	GND
0.469500	38.70	10.2	57	17.8	QP	L1	GND
0.483000	37.30	10.2	56	19.0	QP	L1	GND

MEASUREMENT RESULT: "CTL140410272_fin2"

4/10/2014 9:02AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.172500	12.40	10.2	55	42.4	AV	L1	GND
0.213000	33.70	10.2	53	19.4	AV	L1	GND
0.474000	27.90	10.2	46	18.5	AV	L1	GND
0.523500	19.50	10.2	46	26.5	AV	L1	GND
0.951000	12.30	10.3	46	33.7	AV	L1	GND

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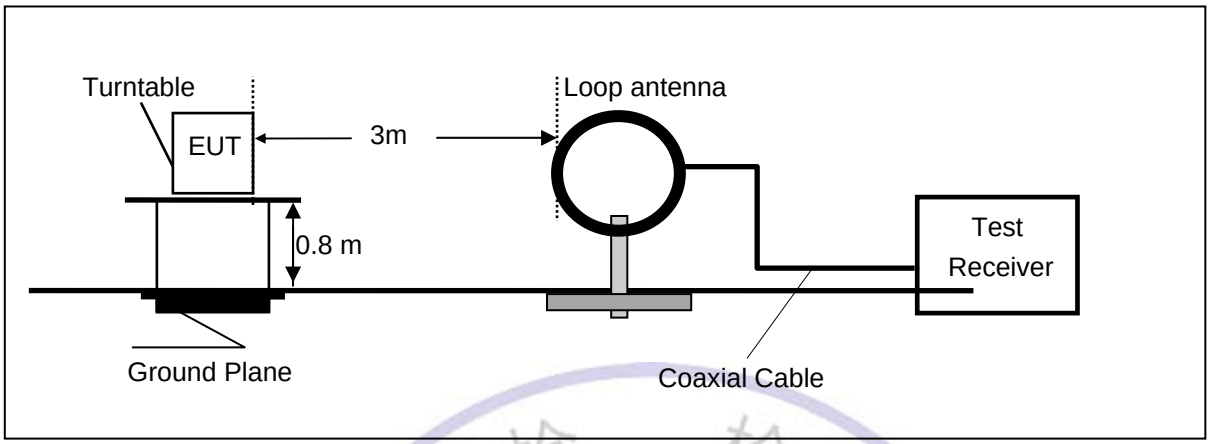
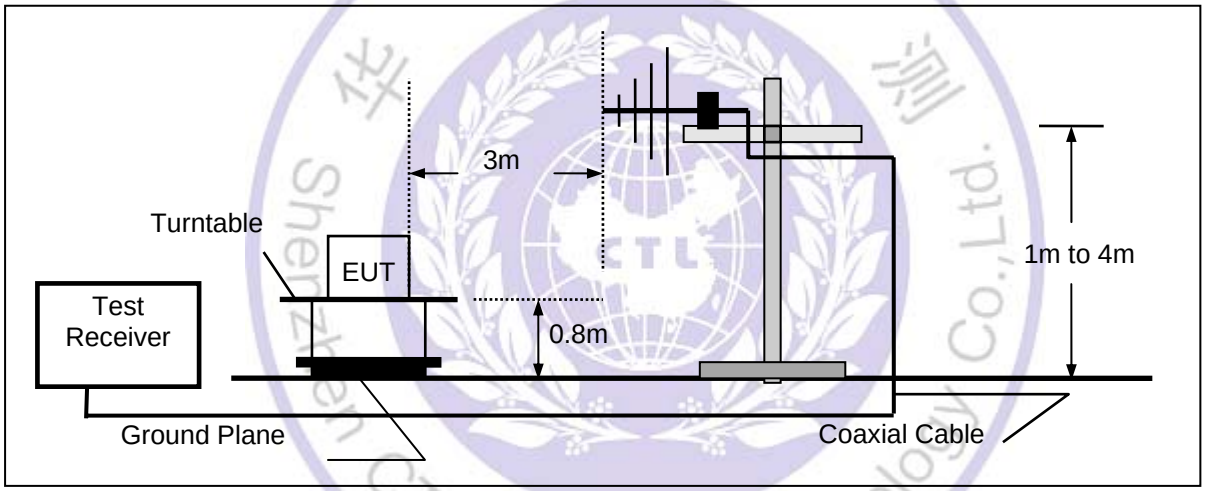
4.2. Radiated Emission

TEST CONFIGURATION

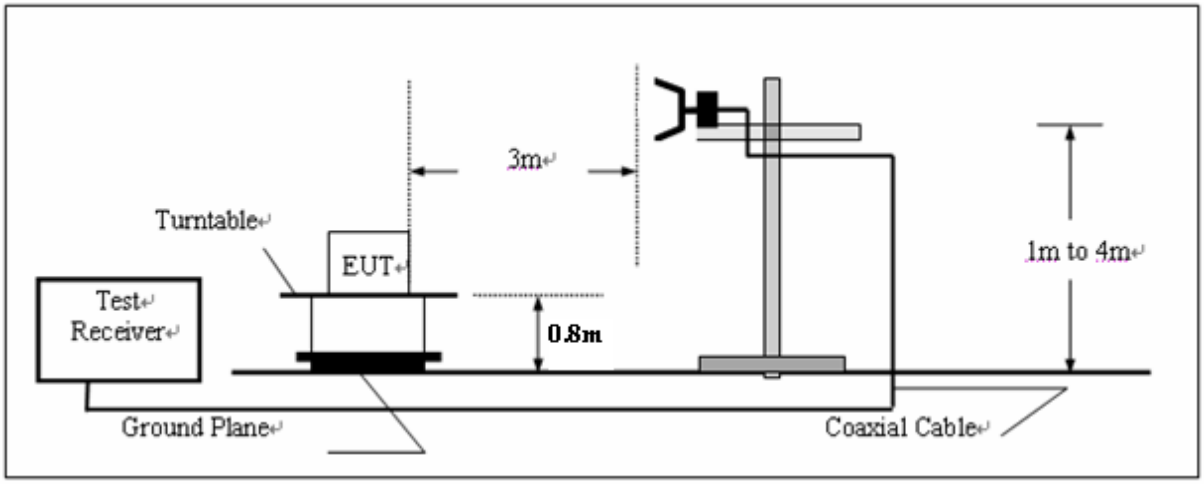
Radiated Emission Test Set-Up
Frequency range 9KHz – 30MHz



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℃ to 360℃ 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 (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

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 (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

TEST RESULTS

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
0	H	2401.9	56.5	35.7	92.2	Fundamental	/	PK
	V	354.0	6.6	16.4	23.0	46	-23.0	QP
	V	539.3	4.4	20.9	25.3	46	-20.7	QP
	H	3122.5	43.5	-1.7	41.8	54(Note)	-12.2	PK
	V	4804.0	41.9	2.3	44.2	54(Note)	-9.8	PK
	V	7213.5	55.2	8.8	64.0	72.2	-8.2	PK
	V	7209.1	47.1	8.7	55.8	62.2	-6.4	AV
	H	24000.0	59.1	-8.9	50.2	54(Note)	-3.8	PK
19	H	2440.1	59.3	36.1	95.4	Fundamental	/	PK
	V	365.1	1.8	16.7	18.5	46	-27.5	QP
	V	539.3	4.7	21.0	25.7	46	-20.3	QP
	H	3122.5	44.1	-1.7	42.4	54(Note)	-11.6	PK
	H	4880.0	41.8	2.5	44.3	54(Note)	-9.7	PK
	V	7321.0	54.1	8.7	62.8	74	-11.2	PK
	V	7321.0	44.2	8.7	52.9	54	-1.1	AV
	H	24000.0	58.9	-8.9	50.0	54(Note)	-4.0	PK
39	H	2480.0	62.6	37.1	99.7	Fundamental	/	PK
	V	439.8	3.0	18.5	21.5	46	-24.5	QP
	V	539.3	3.8	20.9	24.7	46	-21.3	QP
	H	3122.5	43.5	-1.7	41.8	54(Note)	-12.2	PK
	H	4944.0	44.8	2.9	47.7	54(Note)	-6.3	PK
	V	7434.5	52.1	8.7	60.8	74	-13.2	PK
	V	7437.0	44.3	8.6	52.9	54	-1.1	AV
	H	24000.0	59.1	-8.9	50.2	54(Note)	-3.8	PK

Note

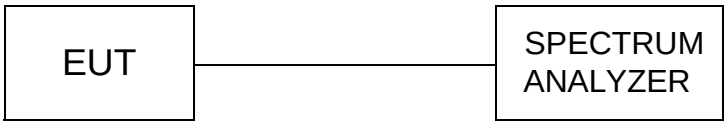
1: The test trace is same as the ambient noise and the test results which are attenuated more than 20 dB below the permissible value limit (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

2: This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

3: According to FCC Part15.247(d). Radiated emission which don't fall in the restricted bands, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

4.3. Maximum Peak Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to C63.10 -2009 and KDB 558074 D01 v03r01,The EUT was directly connected to the power meter / spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

Use the wideband power meter to test peak power and record the result.

LIMIT

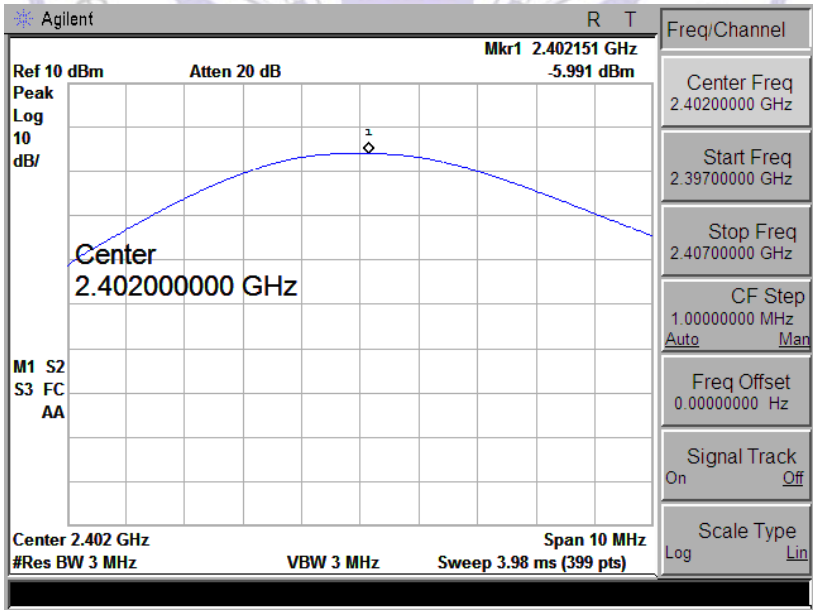
The Maximum Peak Output Power Measurement limit is 30dBm.

TEST RESULTS

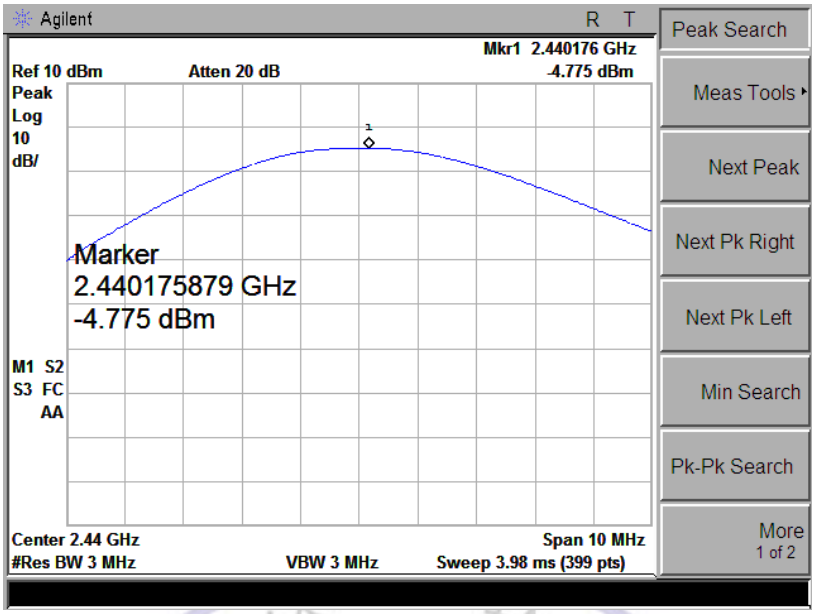
Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass / Fail
2402	-5.991	30	PASS
2440	-4.775	30	PASS
2480	-5.144	30	PASS

Note: The test results including the cable lose.

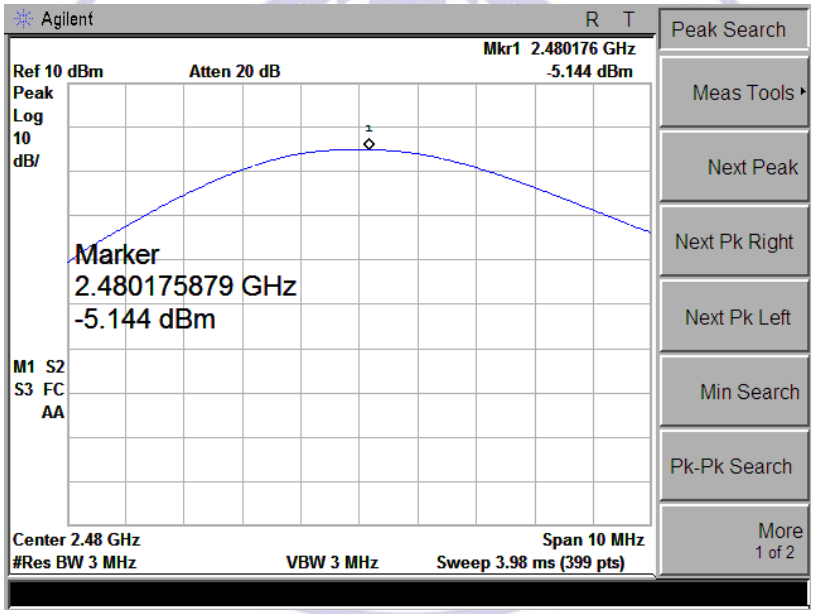
Low channel



Middle channel

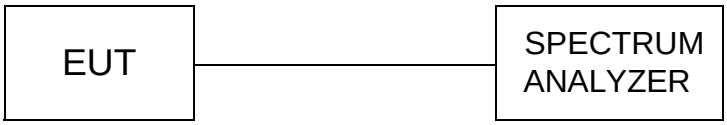


High channel



4.4. 6dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

1. The testing follows FCC KDB Publication No. 558074 D01 v03r01 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.
4. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

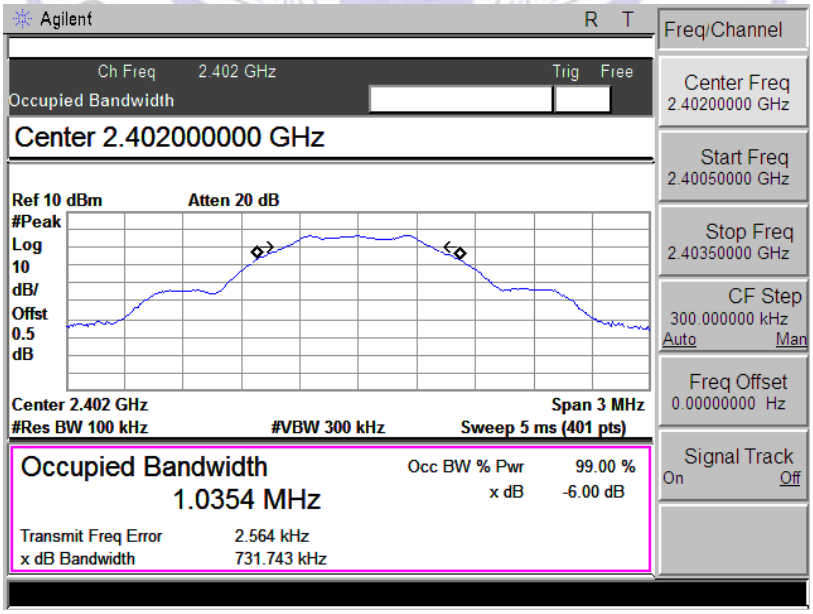
LIMIT

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

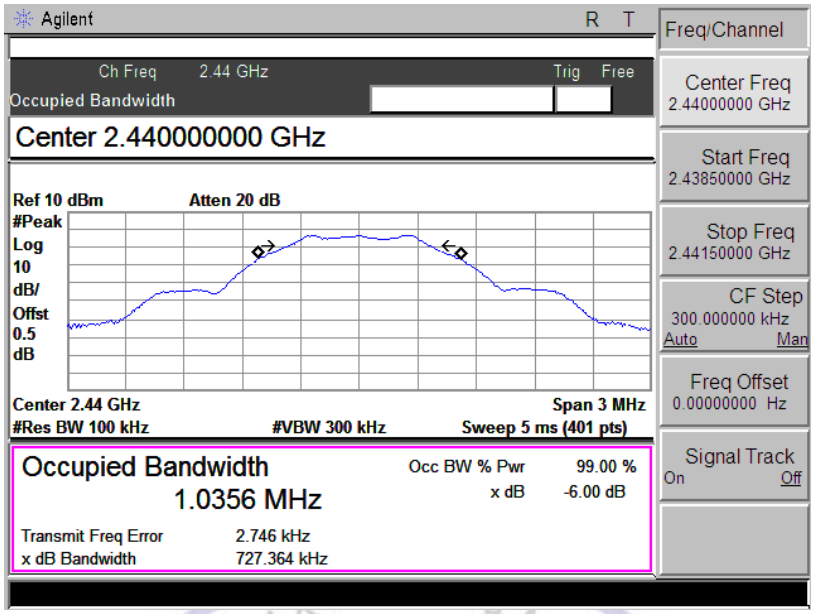
TEST RESULTS

CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (KHz)	LIMIT (KHz)	PASS/FAIL
2402	731.743	500	PASS
2440	727.364	500	PASS
2480	736.614	500	PASS

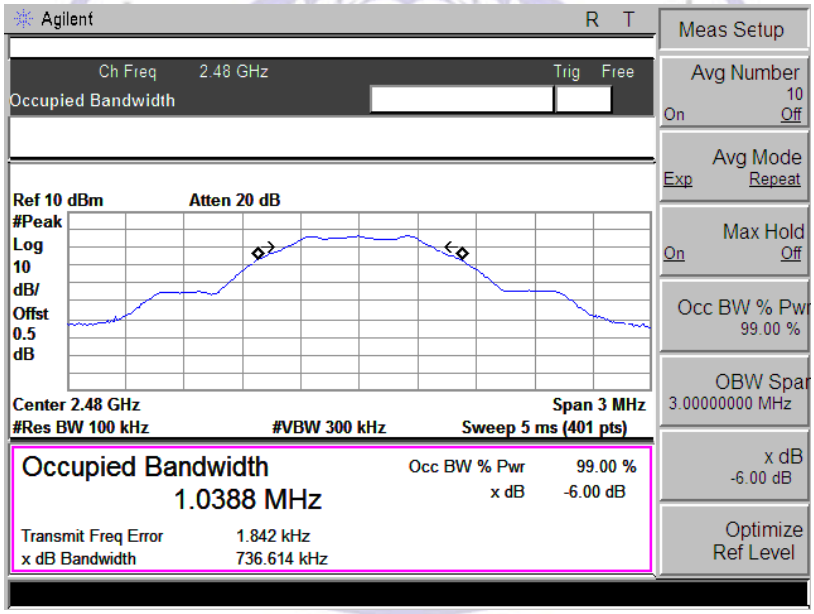
Low Channel



Middle Channel

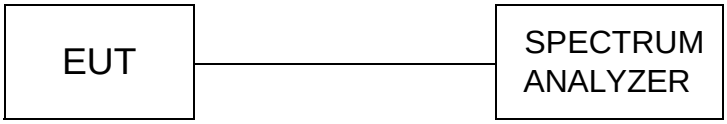


High Channel



4.5. Band Edge

TEST CONFIGURATION



TEST PROCEDURE

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10 and FCC KDB Publication No. 558074 D01 v03r01 (Measurement Guidelines of DTS) 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=100kHz and VBM= 300KHz 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 and VBW to 100 kHz, to measure the conducted peak band edge.

Connect the spectrum analyzer to the EUT using an appropriate RF cable connected to the EUT output. Configure the spectrum analyzer settings as described below (be sure to enter all losses between the unlicensed wireless device output and the spectrum analyzer).

- Span: Set Span for minimum 50 MHz - Reference Level: 110 dBμV (corrected for gains and losses of test antenna factor, preamp gain and cable loss) - Attenuation: 10 dB

- Sweep Time: Coupled - Resolution Bandwidth: Up to and including 1 GHz = ≥ 100 kHz

- Resolution Bandwidth: Above 1 GHz = 1 MHz - Video Bandwidth: Below 1 GHz = 300 kHz

- Video Bandwidth: Up to and including 1 GHz =≥ 3 MHz for peak and10 Hz for average

- Detector: Peak

Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel.

LIMIT

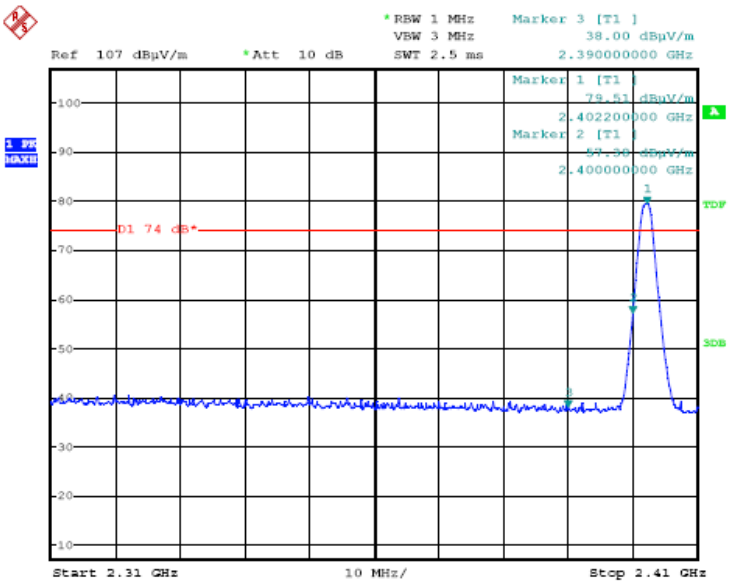
1. Below -20dB of the highest emission level in operating band.

2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209(see Section 15.205(c)).

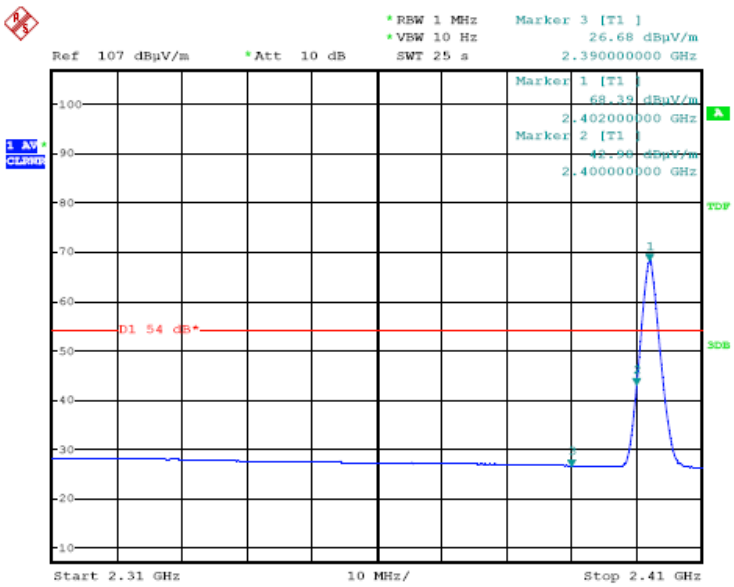
Frequency (MHz)	Limit Average (dBuv/m)	Limit Peak (dBuv/m)
Below 2390 or Above 2483.5	54	74

TEST RESULTS

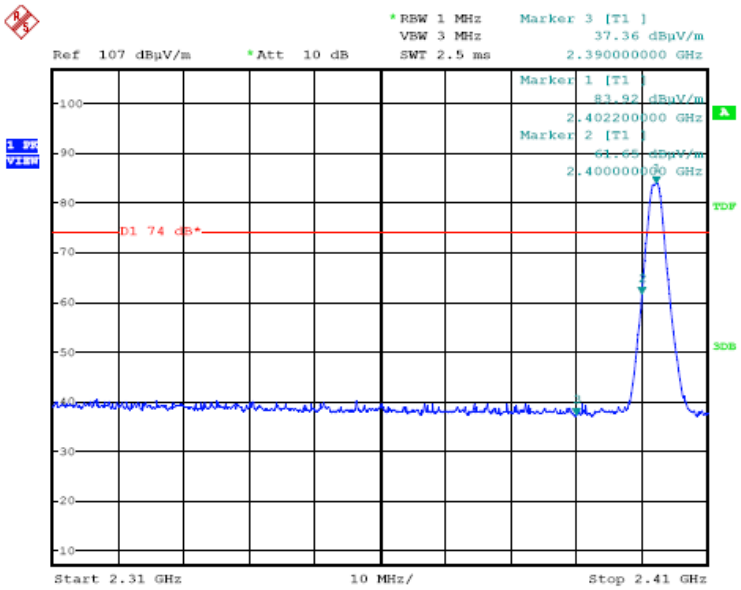
Engineer: Happy	
Site: AC5	Time: 2014/04/14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_ DRH-118 (1-18GHz)	Polarity: Horizontal
EUT: SMART PHONE	Power: By Battery
Note: Transmit at channel 2402MHz	



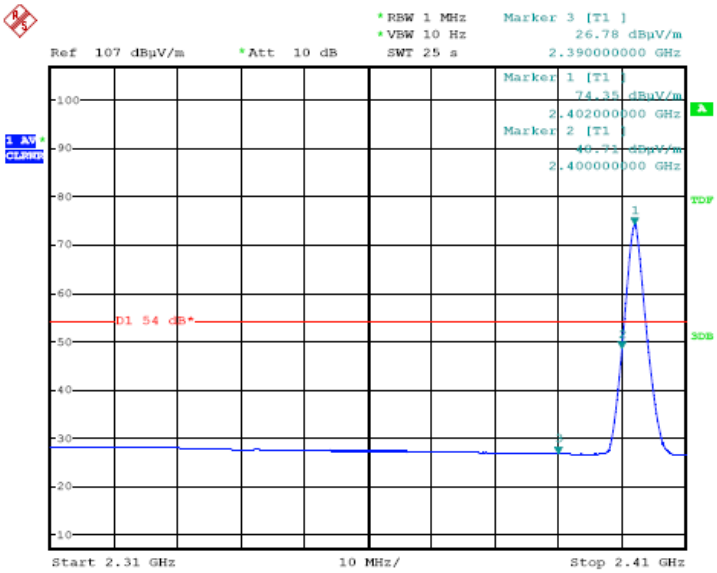
Engineer: Happy	
Site: AC5	Time: 2014/04/14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_ DRH-118 (1-18GHz)	Polarity: Horizontal
EUT: SMART PHONE	Power: By Battery
Note: Transmit at channel 2402MHz	



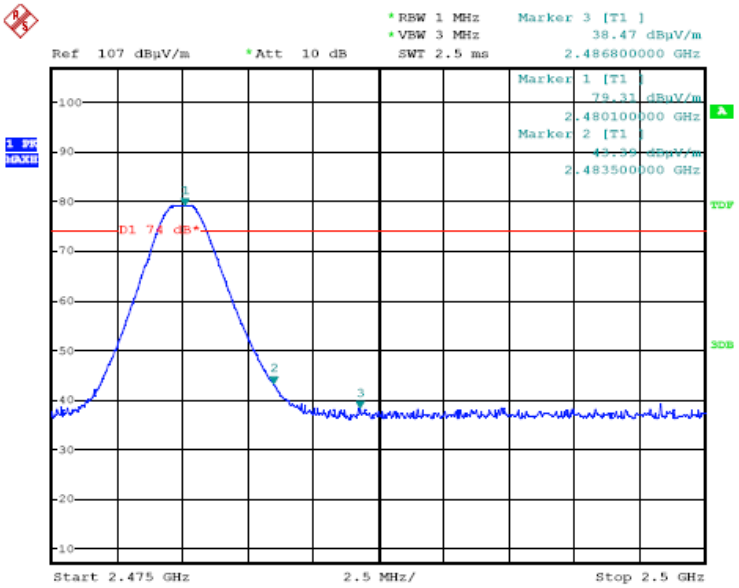
Engineer: Happy	
Site: AC5	Time: 2014/04/14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_ DRH-118 (1-18GHz)	Polarity: Vertical
EUT: SMART PHONE	Power: By Battery
Note: Transmit at channel 2402MHz	



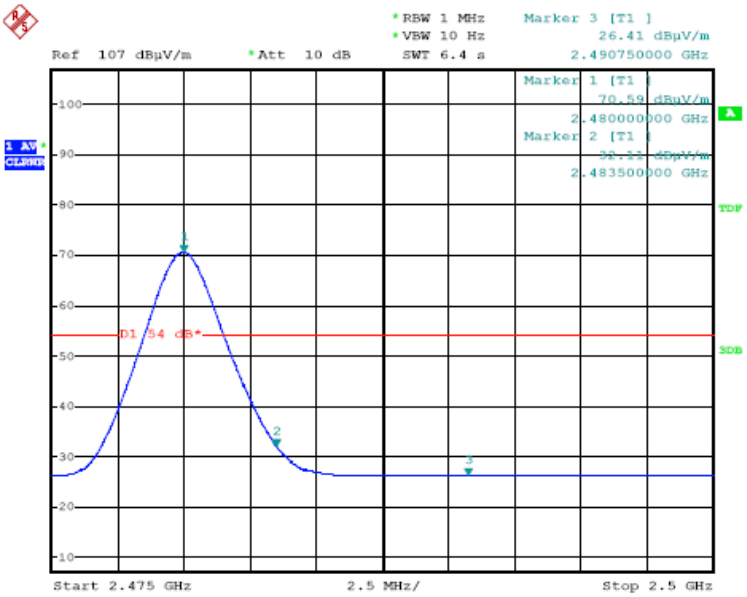
Engineer: Happy	
Site: AC5	Time: 2014/04/14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_988(1-18GHz)	Polarity: Vertical
EUT: SMART PHONE	Power: By Battery
Note: Transmit at channel 2402MHz	



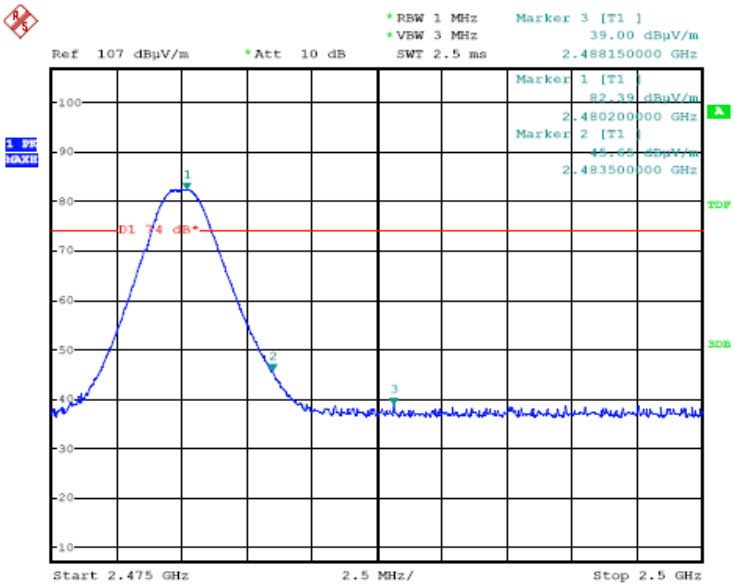
Engineer: Happy	
Site: AC5	Time: 2014/04/14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_ DRH-118 (1-18GHz)	Polarity: Horizontal
EUT: SMART PHONE	Power: By Battery
Note: Transmit at channel 2480MHz	



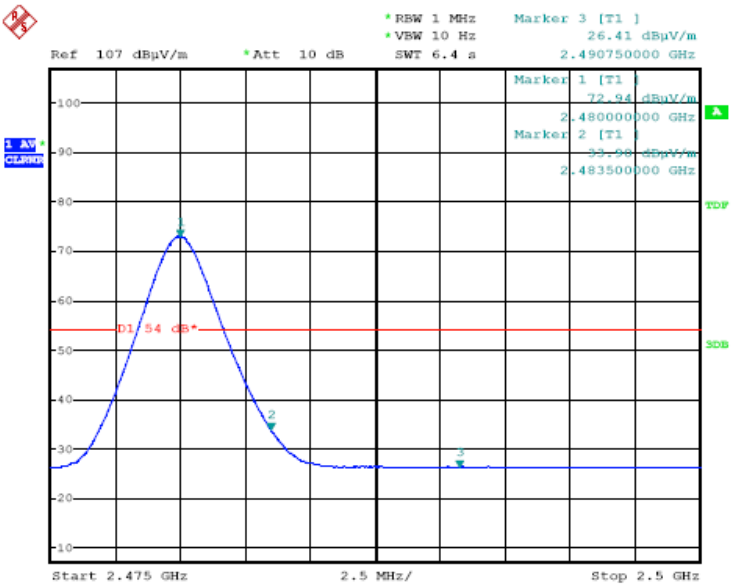
Engineer: Happy	
Site: AC5	Time: 2014/04/14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_ DRH-118 (1-18GHz)	Polarity: Horizontal
EUT: SMART PHONE	Power: By Battery
Note: Transmit at channel 2480MHz	



Engineer: Happy	
Site: AC5	Time: 2014/04/14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_ DRH-118 (1-18GHz)	Polarity: Vertical
EUT: SMART PHONE	Power: By Battery
Note: Transmit at channel 2480MHz	

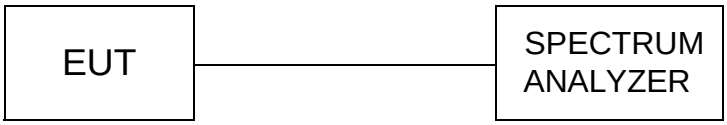


Engineer: Happy	
Site: AC5	Time: 2014/04/14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_ DRH-118 (1-18GHz)	Polarity: Vertical
EUT: SMART PHONE	Power: By Battery
Note: Transmit at channel 2480MHz	



4.6. Power Spectral Density Measurement

TEST CONFIGURATION



TEST PROCEDURE

The EUT was tested according to KDB 558074 D01 v03r01 for compliance to FCC 47CFR 15.247 requirements.

Set RBW= 3 kHz, VBW⩾10KHz, SPAN to 1.5 times greater than the EBW,.

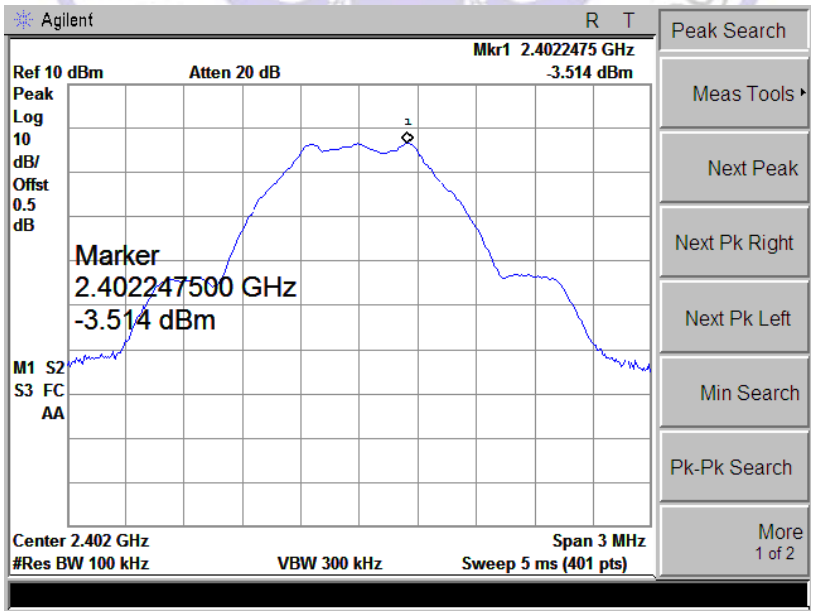
LIMIT

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

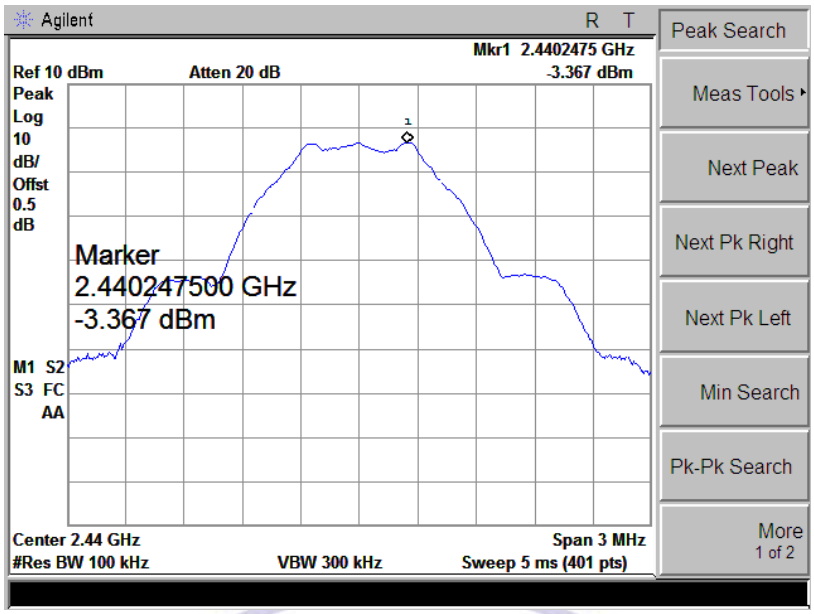
TEST RESULTS

Modulation Mode	Channel	Channel Frequency (MHz)	PSD (dBm/3KHz)	Maximum limit (dBm/3KHz)	PASS / FAIL
GFSK	1	2402	-3.514	8	PASS
	19	2440	-3.367	8	PASS
	39	2480	-3.777	8	PASS

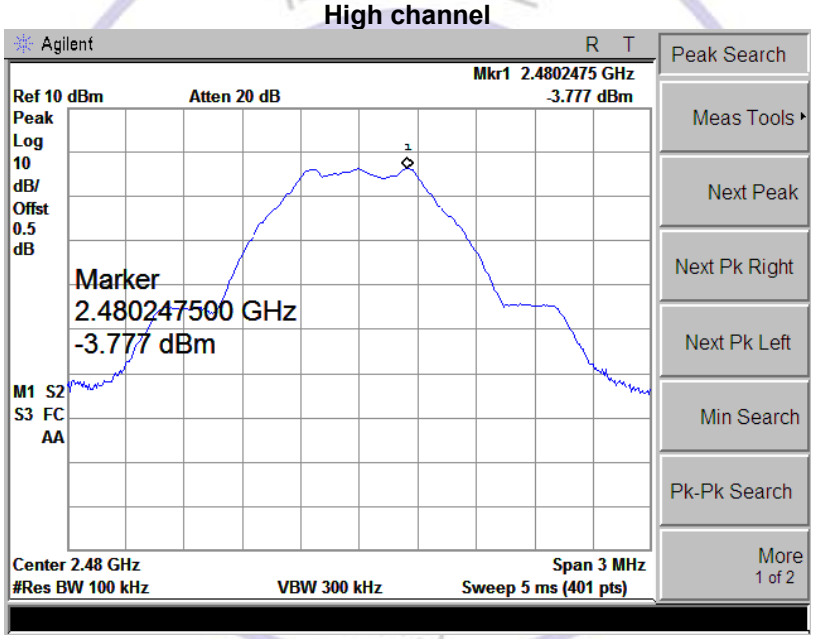
Low channel



Middle channel

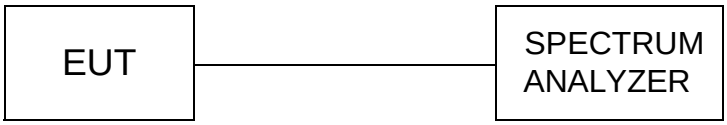


High channel



4.7. Spurious RF Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

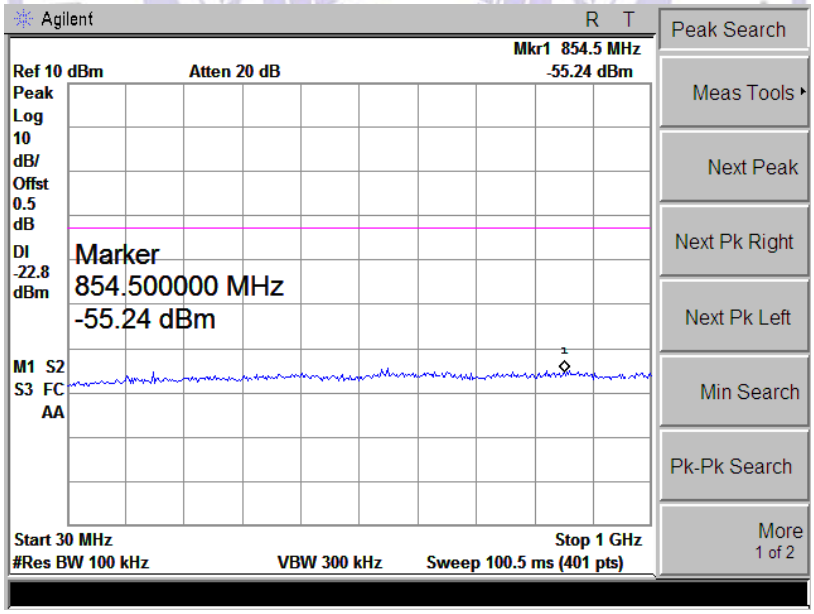
The EUT was tested according to KDB 558074 D01 v03r01 for compliance to FCC 47CFR 15.247 requirements.
The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2009 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBM= 300KHz to measure the peak field strength , and measure frequeny range from 30MHz to 26.5GHz.

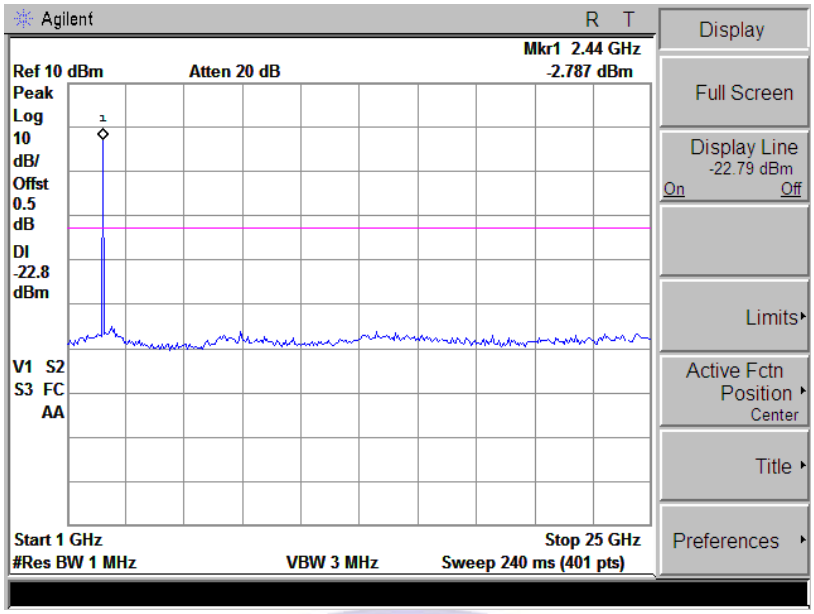
LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

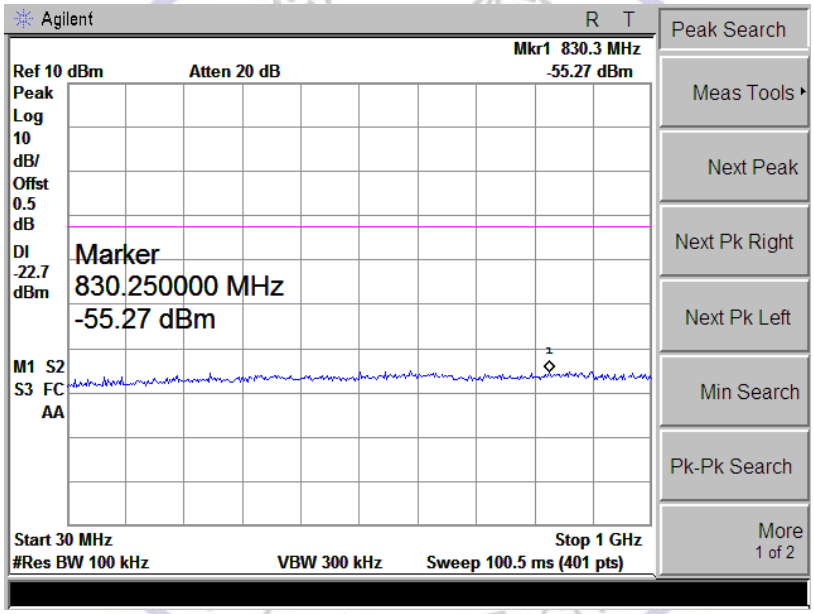
TEST RESULTS

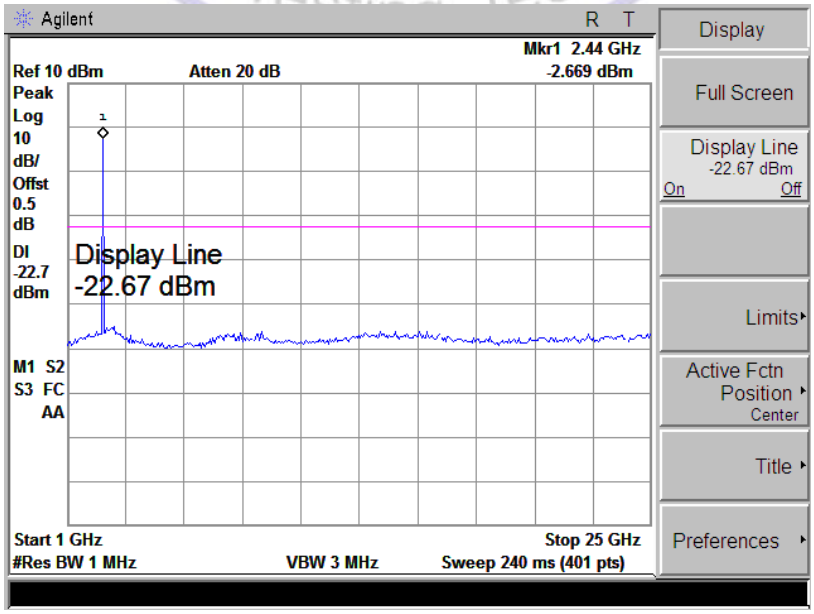
Low channel



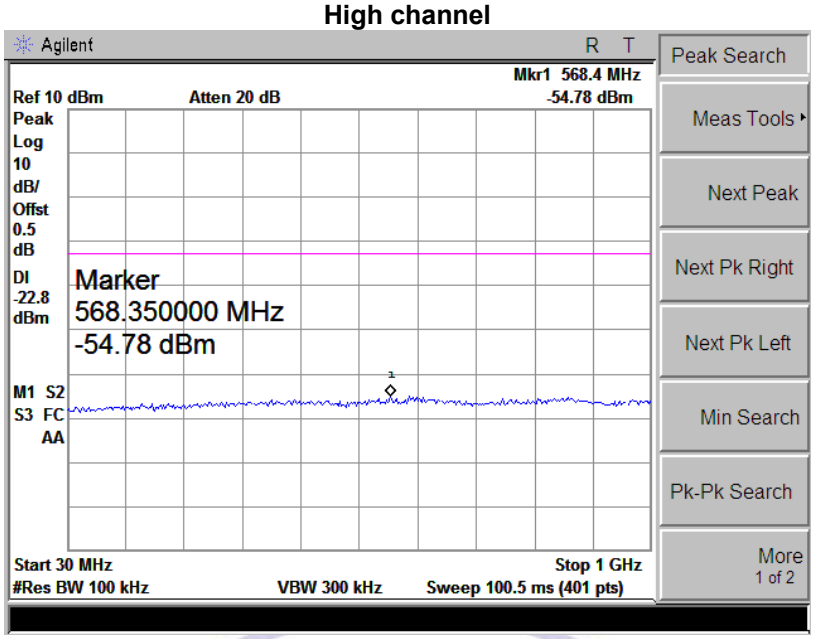


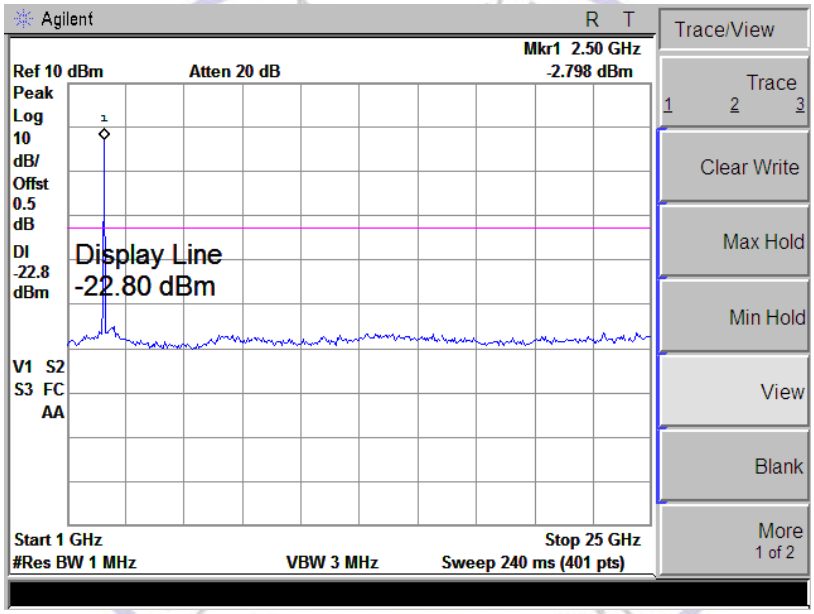
Middle channel





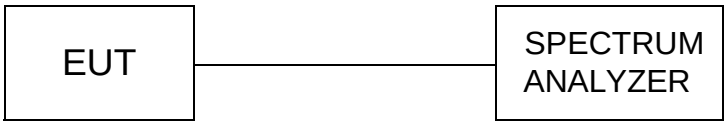
High channel





4.8. Operation Frequency Range of 20dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

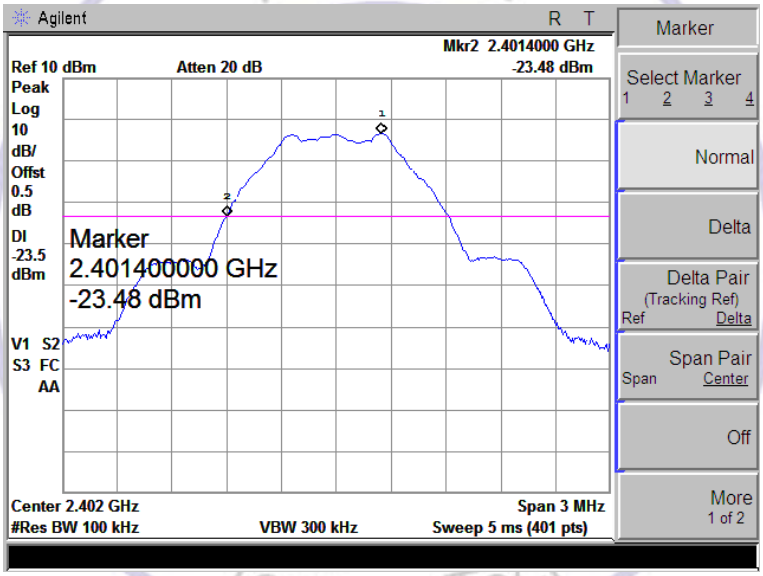
The EUT was tested according to KDB 558074 D01 v03r01 for compliance to FCC 47CFR 15.247 requirements.
Set RBW = 100 kHz, Span greater than RBW.

LIMIT

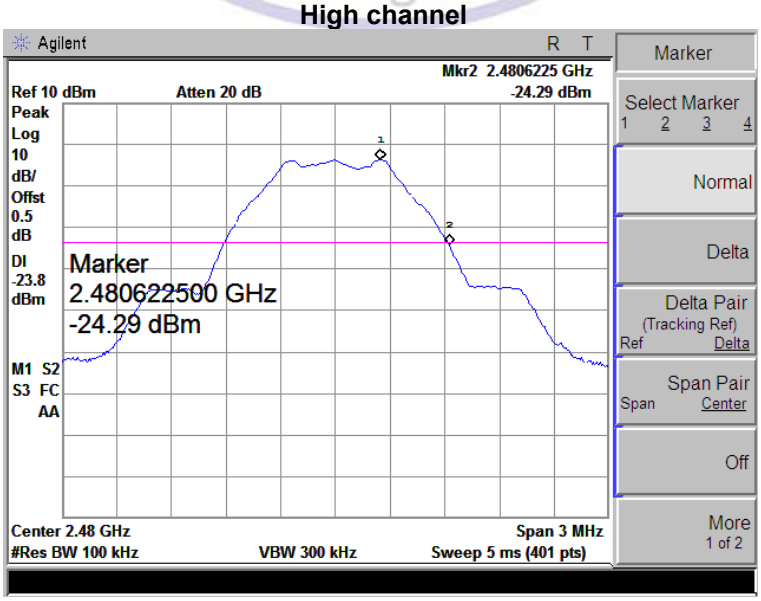
20 dB bandwidth of the emission is contained within the operation frequency band.

TEST RESULTS

Low channel



High channel



4.9. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

The antenna used in this product is a internal Antenna, The directional gains of antenna used for transmitting is 0dBi.

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4.10. RF Exposure

STANDARD APPLICABLE

According to § 1.1307 (b)(1), system operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a portable device. Per KDB 447498 D01 v05, the device used distance is 5mm from body.

LIMIT

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm2)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

MEASUREMENT RESULTS

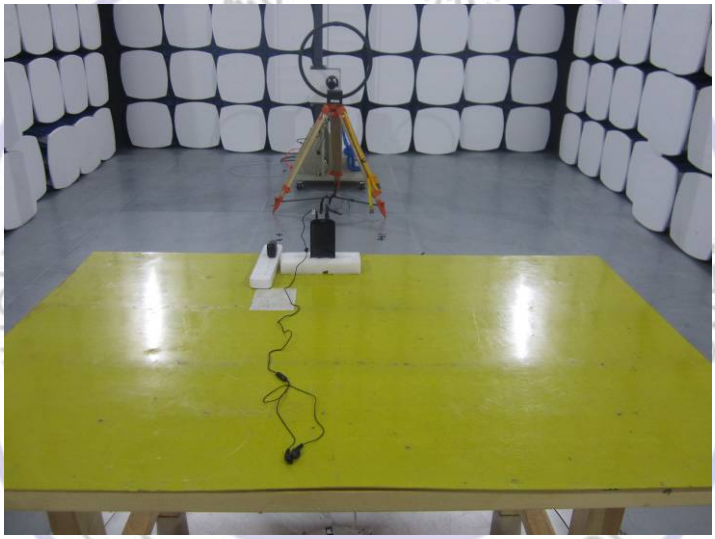
Per KDB 447498 D01 V05

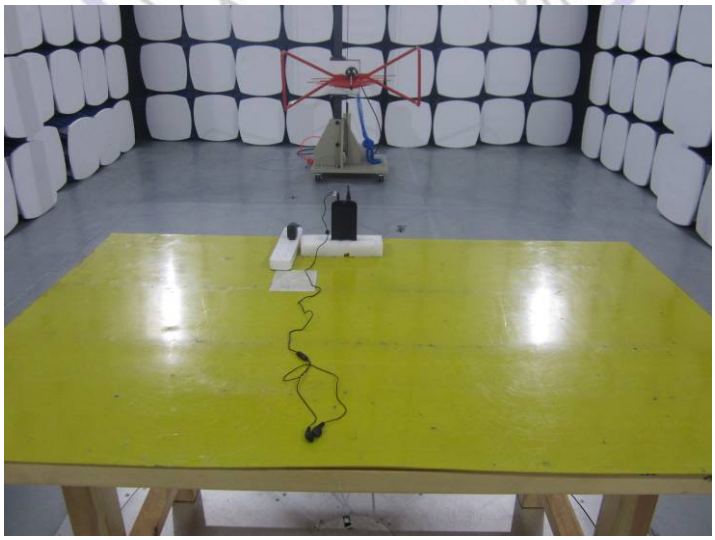
This is a Bluetooth function and the Max peak output power is -4.775 dBm (0.33 mW) lower than low threshold 10 mW in general population category.

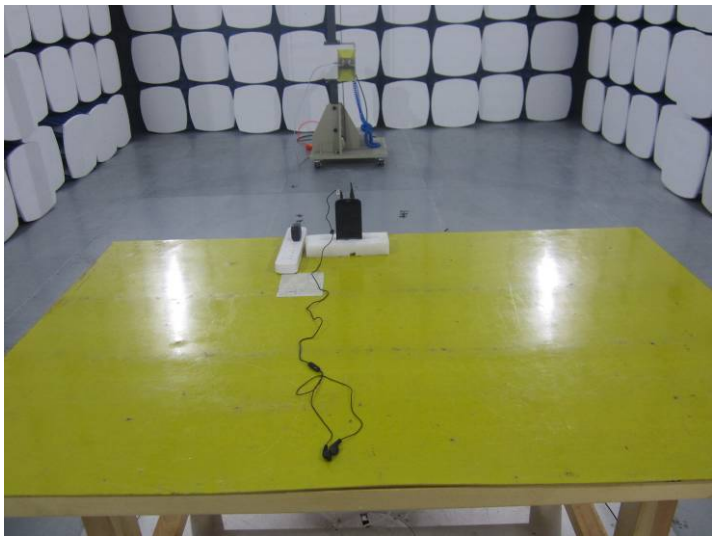
The SAR measurement is not necessary.

Shenzhen CTL Testing Technology Co., Ltd

5. Test Setup Photos of the EUT







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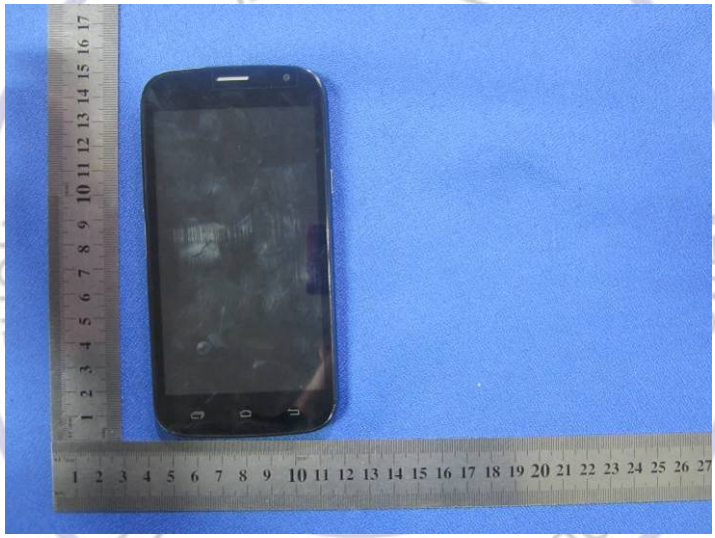
Shenzhen CTL Testing Technology Co.,Ltd.

6. External and Internal Photos of the EUT

External Photos of EUT



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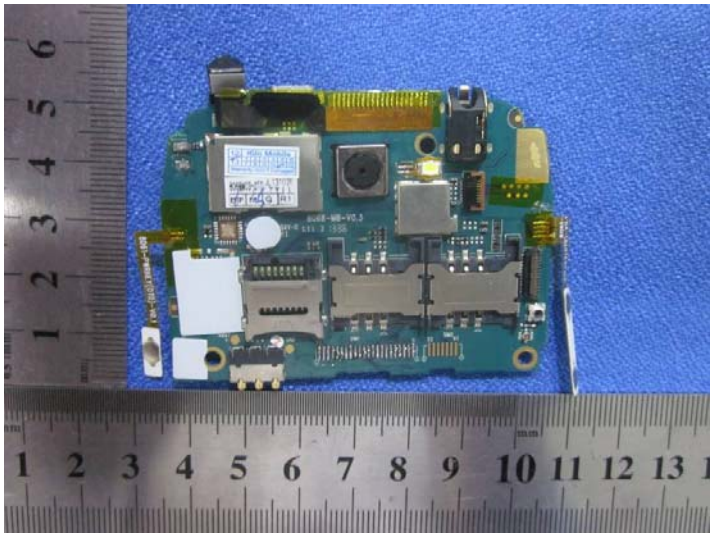
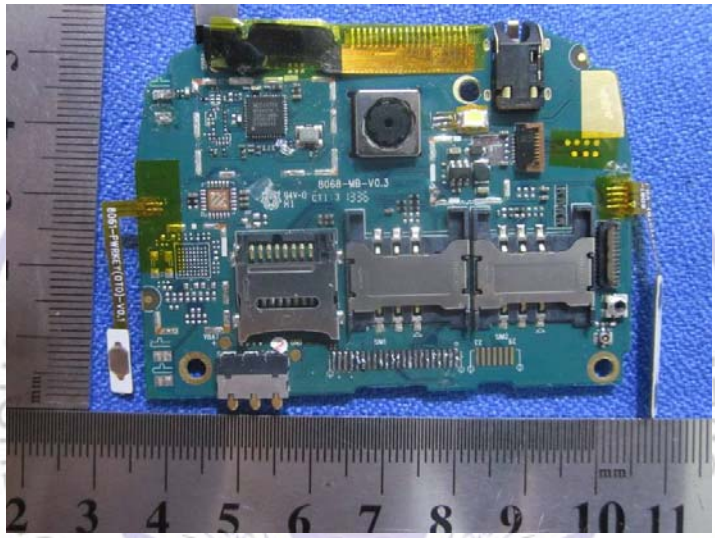
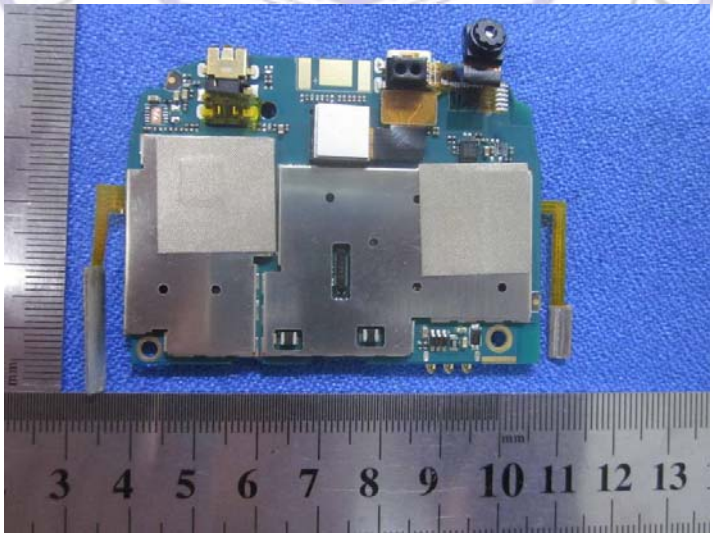
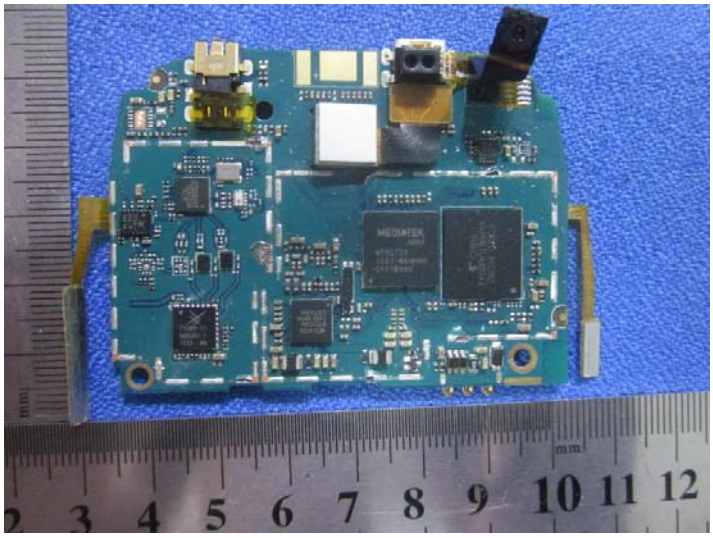
CTL

Internal Photos of EUT





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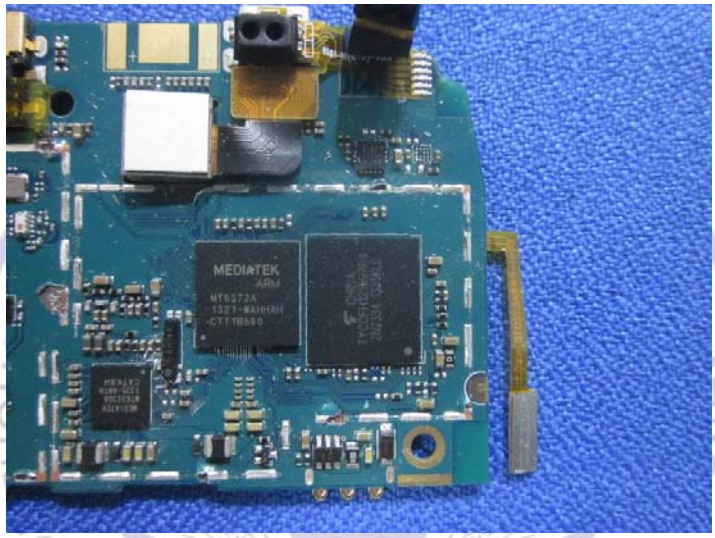
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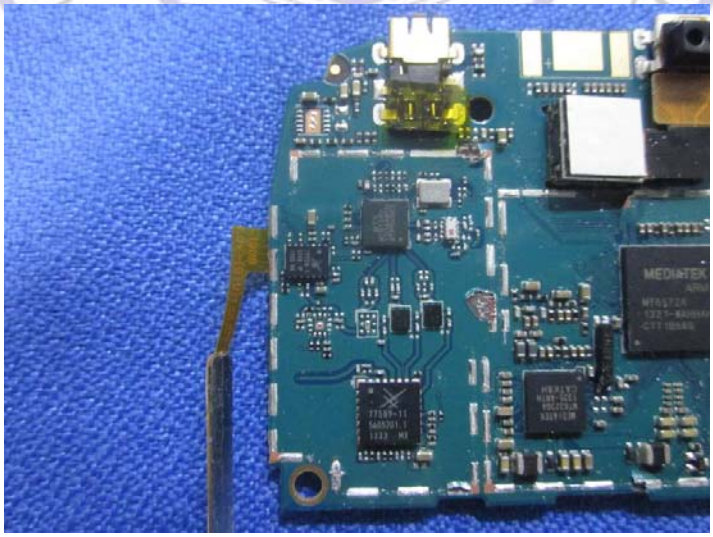
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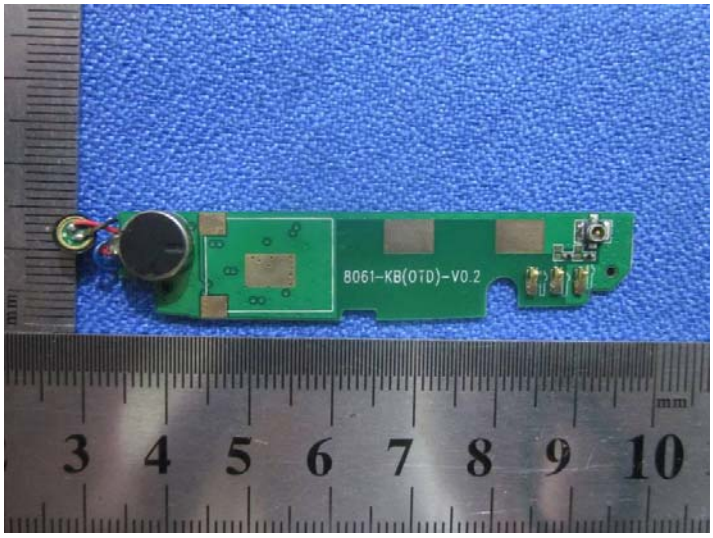

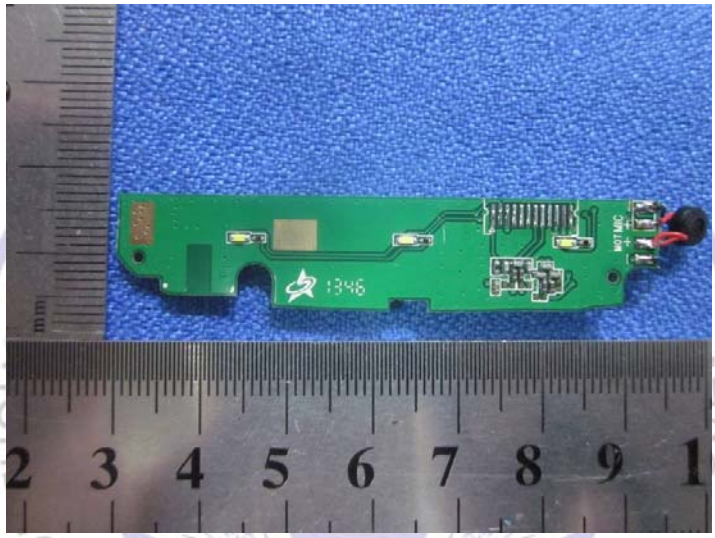

.....End of Report.....

CTL Testing Technology