



FCC REPORT

Applicant: UMEOX MOBILE LIMITED

Address of Applicant: 3409 Times Square Excellence, FuTian Shenzhen, 518000 China

Equipment Under Test (EUT)

Name: Mobile phone

Model No.: QPAD2

Trademark: UMEOX

FCC ID: WNKUMEOX-QPAD2

Standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247:2009

Date of Receipt: 30 Sep. 2010

Date of Test: 30 Sep.-13 Oct. 2010

Date of Issue: 15 Oct. 2010

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of GTS International Electrical Approvals or testing done by GTS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by GTS International Electrical Approvals in writing.

This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only."

2 Contents

	Page
1 COVER PAGE.....	1
2 CONTENTS.....	2
3 TEST SUMMARY.....	3
4 GENERAL INFORMATION.....	4
4.1 CLIENT INFORMATION	4
4.2 GENERAL DESCRIPTION OF E.U.T.....	4
4.3 E.U.T OPERATION MODE	6
4.4 TEST FACILITY.....	6
4.5 TEST LOCATION.....	6
4.6 OTHER INFORMATION REQUESTED BY THE CUSTOMER	6
4.7 TEST INSTRUMENTS LIST.....	7
5 TEST RESULTS AND MEASUREMENT DATA.....	8
5.1 ANTENNA REQUIREMENT:.....	8
5.2 CONDUCTED PEAK OUTPUT POWER.....	9
5.3 20DB OCCUPY BANDWIDTH	12
5.4 CARRIER FREQUENCIES SEPARATION	15
5.5 HOPPING CHANNEL NUMBER.....	18
5.6 DWELL TIME.....	20
5.7 BAND EDGE	23
5.8 PSEUDORANDOM FREQUENCY HOPPING SEQUENCE	25
5.9 RADIATED EMISSION	26
5.9.1 Radiated emission below 1GHz.....	28
5.9.2 Transmitter emission above 1GHz.....	29
5.10 CONDUCTED EMISSION	31
5.11 RF EXPOSURE COMPLIANCE REQUIREMENT	34
5.11.1 Standard requirement.....	34
5.11.2 EUT RF Exposure.....	34
6 PHOTOGRAPHS-TEST SETUP PHOTO	35
7 PHOTOGRAPHS - EUT CONSTRUCTIONAL DETAILS	37

3 Test Summary

Test Item	Section in CFR 47	Result
Antenna Requirement	15.203/15.247 (c)	Passed
Conducted Peak Output Power	15.247 (b)(1)	Passed
20dB Occupied Bandwidth	15.247 (a)(1)	Passed
Carrier Frequencies Separation	15.247 (a)(1)	Passed
Hopping Channel Number	15.247 (a)(1)	Passed
Dwell Time	15.247 (a)(1)	Passed
Pseudorandom Frequency Hopping Sequence	15.247(b)(4)&TCB Exclusion List	Passed
Radiated Emission	15.205/15.209	Passed
RF Exposure Compliance Requirement	15.247(b)(4)& TCB Exclusion List (7 July 2002)	Passed

Remark:

Passed: The EUT complies with the essential requirements in the standard.

Failed: The EUT does not comply with the essential requirements in the standard.

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

4 General Information

4.1 Client Information

Applicant:	UMEOX MOBILE LIMITED
Address of Applicant:	3409 Times Square Excellence, FuTian Shenzhen, 518000 China
Manufacturer:	UMEOX MOBILE LIMITED
Address of Manufacturer:	3409 Times Square Excellence, FuTian Shenzhen, 518000 China

4.2 General Description of E.U.T.

Product Name:	Mobile phone
Model No.:	QPAD2
Operation Frequency:	2402MHz~2480MHz
Channel numbers:	79
Channel separation:	1MHz
Modulation type:	GFSK
Antenna Type:	Integral
Antenna gain:	2dBi
Power supply:	DC 3.7V Li-ion rechargeable Battery

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	21	2422MHz	41	2442MHz	61	2462MHz
2	2403MHz	22	2423MHz	42	2443MHz	62	2463MHz
3	2404MHz	23	2424MHz	43	2444MHz	63	2464MHz
4	2405MHz	24	2425MHz	44	2445MHz	64	2465MHz
5	2406MHz	25	2426MHz	45	2446MHz	65	2466MHz
6	2407MHz	26	2427MHz	46	2447MHz	66	2467MHz
7	2408MHz	27	2428MHz	47	2448MHz	67	2468MHz
8	2409MHz	28	2429MHz	48	2449MHz	68	2469MHz
9	2410MHz	29	2430MHz	49	2450MHz	69	2470MHz
10	2411MHz	30	2431MHz	50	2451MHz	70	2471MHz
11	2412MHz	31	2432MHz	51	2452MHz	71	2472MHz
12	2413MHz	32	2433MHz	52	2453MHz	72	2473MHz
13	2414MHz	33	2434MHz	53	2454MHz	73	2474MHz
14	2415MHz	34	2435MHz	54	2455MHz	74	2475MHz
15	2416MHz	35	2436MHz	55	2456MHz	75	2476MHz
16	2417MHz	36	2437MHz	56	2457MHz	76	2477MHz
17	2418MHz	37	2438MHz	57	2458MHz	77	2478MHz
18	2419MHz	38	2439MHz	58	2459MHz	78	2479MHz
19	2420MHz	39	2440MHz	59	2460MHz	79	2480MHz
20	2421MHz	40	2441MHz	60	2461MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2441MHz
The Highest channel	2480MHz

4.3 E.U.T Operation mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	52 % RH
Atmospheric Pressure:	1012 mbar
Test mode:	
Bluetooth mode	Keep the EUT in Bluetooth communicating mode.

4.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC —Registration No.: 600491**

Global United Technology Service Co., Ltd., Shenzhen 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 out files. Registration 600491, July 20, 2010.

4.5 Test Location

All tests were performed at:

Global United Technology Service Co., Ltd.

Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

Tel: 0755-27798480

Fax: 0755-27798960

4.6 Other Information Requested by the Customer

None.

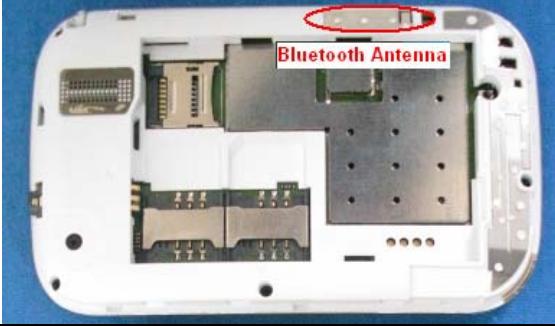
4.7 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	3m Semi-Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS201	Mar. 30 2010	Mar. 30 2011
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS202	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Sep. 10 2010	Sep. 10 2011
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS204	Sep. 10 2010	Sep. 10 2011
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS205	June 30 2010	June 30 2011
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Coaxial Cable	GTS	N/A	GTS400	Apr. 01 2010	Apr. 01 2011
8	Coaxial Cable	GTS	N/A	GTS401	Apr. 01 2010	Apr. 01 2011
9	Coaxial cable	GTS	N/A	GTS402	Apr. 01 2010	Apr. 01 2011
10	Coaxial Cable	GTS	N/A	GTS407	Apr. 01 2010	Apr. 01 2011
11	Coaxial Cable	GTS	N/A	GTS408	Apr. 01 2010	Apr. 01 2011
12	Amplifier(10KHz-5GHz)	Sonomma Instrument	305-1052	GTS210	Apr. 01 2010	Apr. 01 2011
13	Amplifier(2GHz-20GHz)	HP	8349B	GTS231	Apr. 01 2010	Apr. 01 2011
14	Universal radio communication tester	Rohde & Schwarz	CMU200	GTS235	May 11 2010	May 11 2011
15	Signal Generator	Rohde & Schwarz	SML03	GTS236	May 11 2010	May 11 2011
16	Temp. Humidity/Barometer	Oregon Scientific	BA-888	GTS248	May 11 2010	May 11 2011
17	D.C. Power Supply	Insteek	PS-3030	GTS232	NA	NA
18	Splitter	Agilent	11636B	GTS237	May 11 2010	May 11 2011

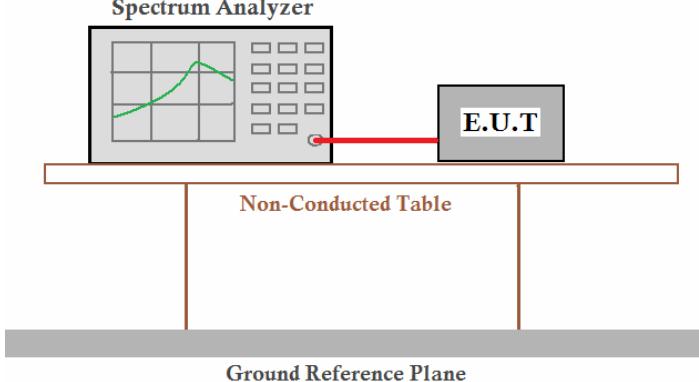
Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS206	Apr. 10 2010	Apr. 10 2011
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS208	Sep. 14 2010	Sep. 14 2011
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS209	Sep. 14 2010	Sep. 14 2011
4	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS207	Apr. 14 2010	Apr. 14 2011
5	Coaxial Cable	GTS	N/A	GTS406	Apr. 01 2010	Apr. 01 2011
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

5 Test results and Measurement Data

5.1 Antenna requirement:

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
15.203 requirement:	<i>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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</i>
15.247(c) (1)(i) requirement:	(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.
E.U.T Antenna:	The antenna is unique, the typical gain of the antenna is 2dBi.
	

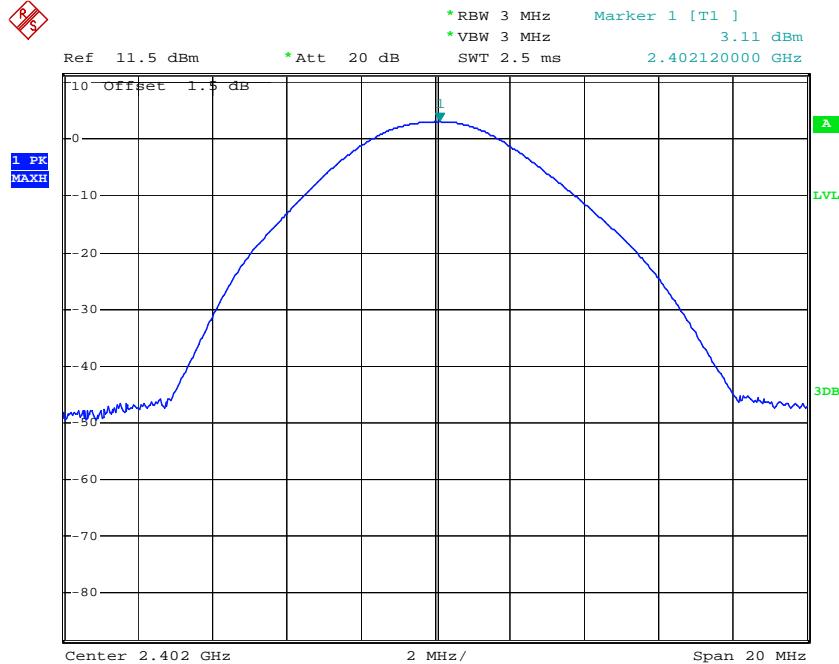
5.2 Conducted Peak Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.4:2003 and KDB DA00-705
Receiver setup:	RBW=1MHz, VBW=1MHz, Detector=Peak
Limit:	21dBm
Test setup:	<p style="text-align: center;"> Spectrum Analyzer  Non-Conducted Table Ground Reference Plane </p>
	<p><i>Remark:</i> <i>Offset the High-Frequency cable loss 2.5dB in the spectrum analyzer.</i></p>
Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 4.3 for details
Test results:	Passed

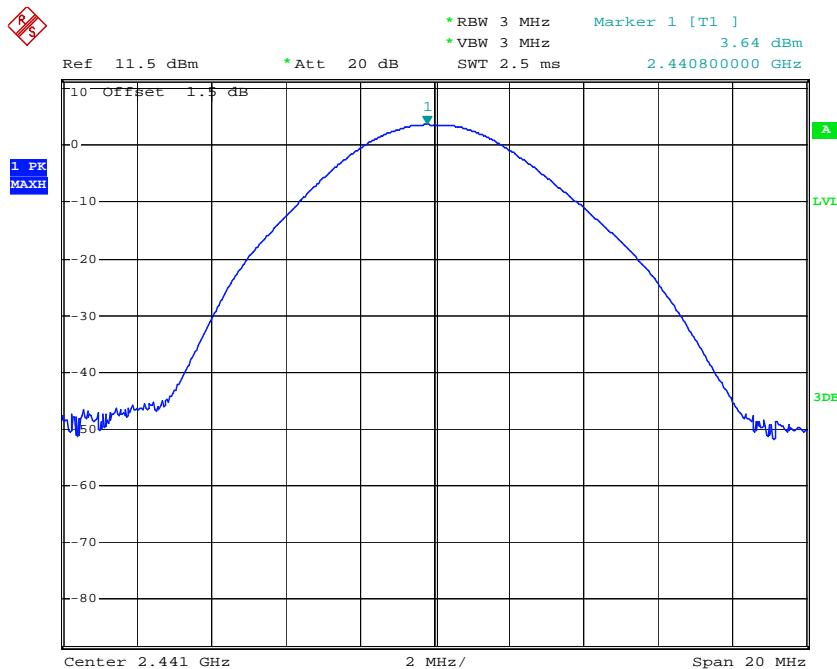
Measurement Data

Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	3.11	21.00	Pass
Middle	3.64	21.00	Pass
Highest	2.11	21.00	Pass

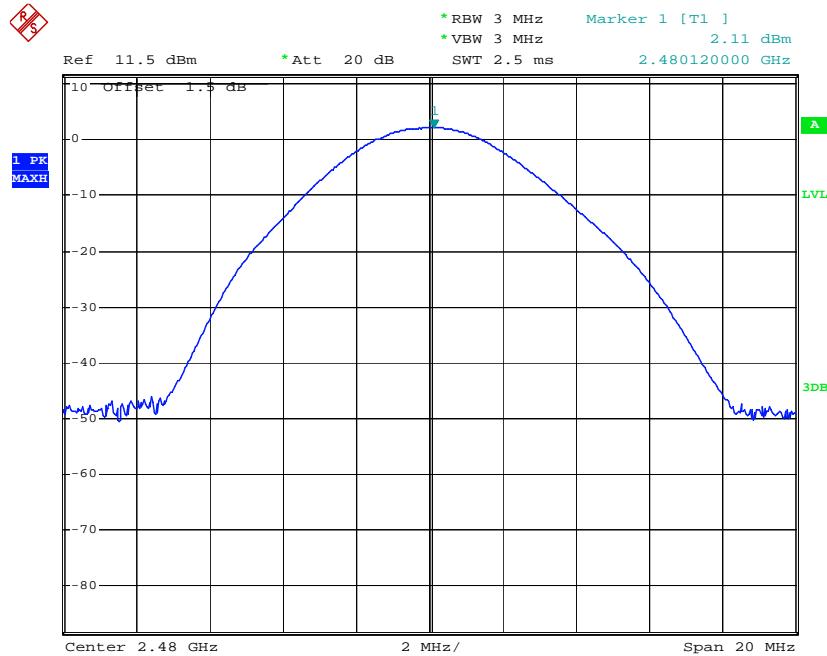
Test channel:	Lowest
---------------	--------



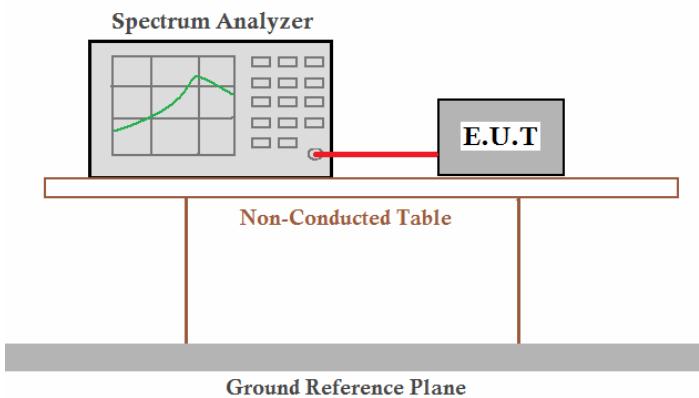
Test channel:	Middle
---------------	--------



Test channel:	Highest
---------------	---------



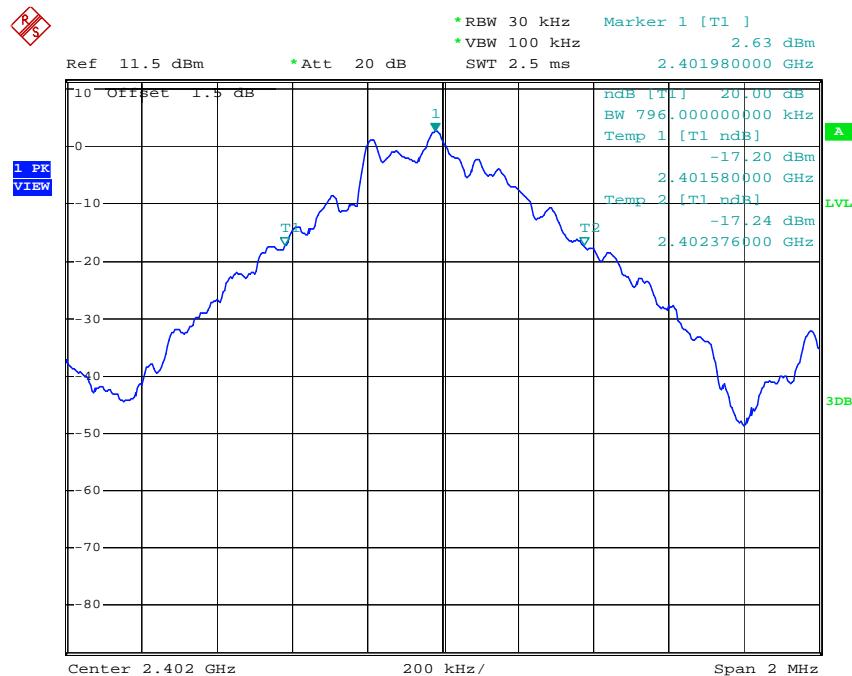
5.3 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.4:2003 and KDB DA00-705
Receiver setup:	RBW=30KHz, VBW=100KHz,detector=Peak
Limit:	NA
Test setup:	<p style="text-align: center;">  Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane </p> <p><i>Remark:</i> Offset the High-Frequency cable loss 0.5dB in the spectrum analyzer.</p>
Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 4.3 for details
Test results:	Passed

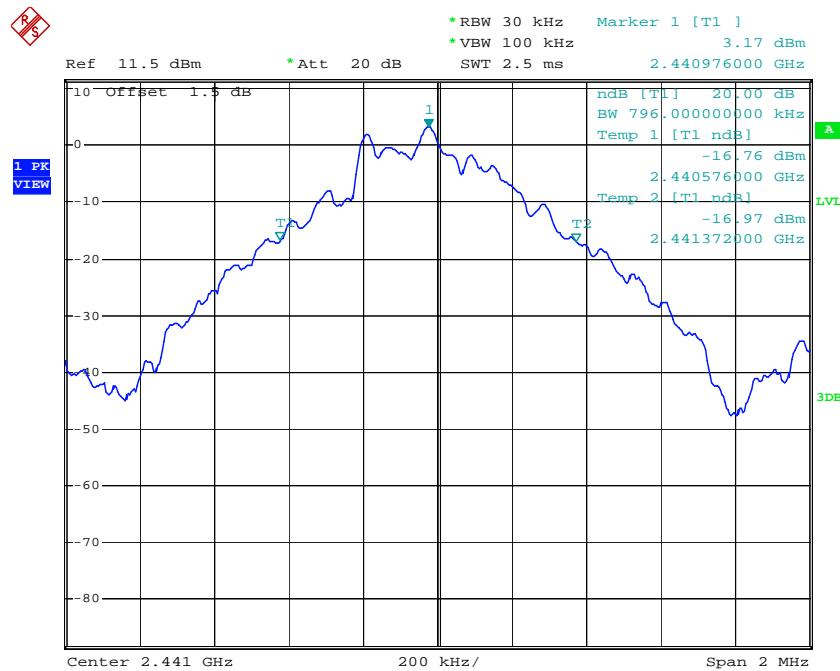
Measurement Data			
Test channel	Lowest	Middle	Highest
20dB Occupy Bandwidth (KHz)	796	796	792

Test plot as follows:

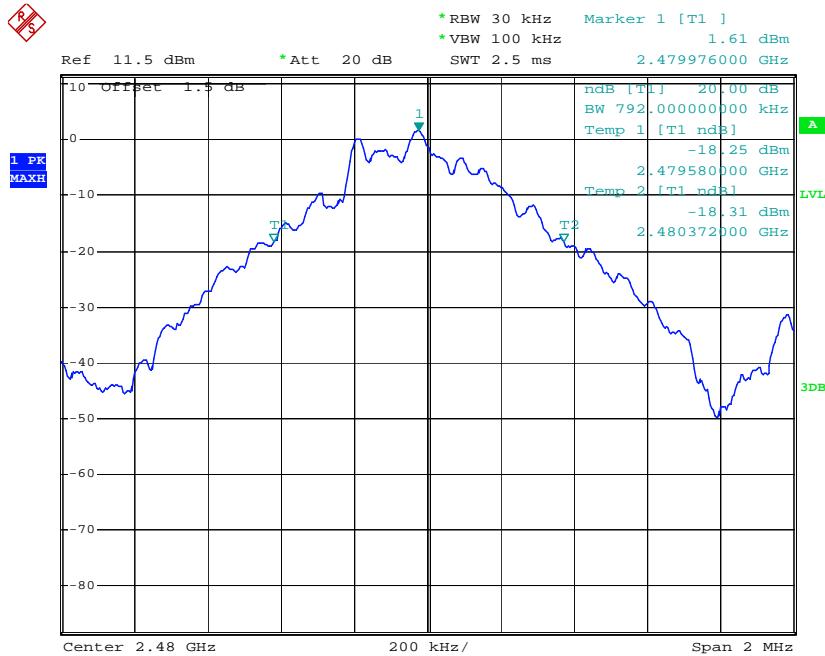
Test channel:	Lowest
---------------	--------



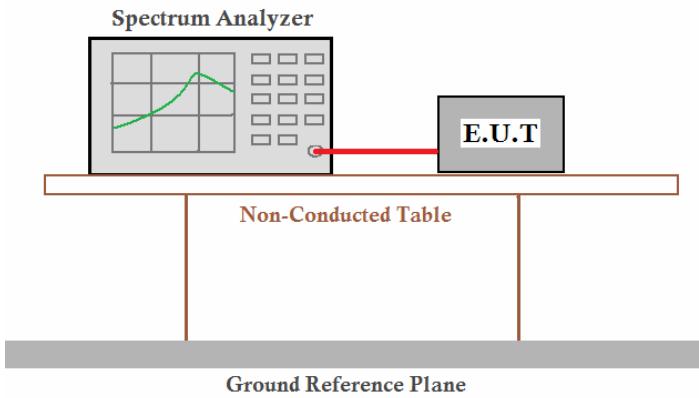
Test channel:	Middle
---------------	--------



Test channel:	Highest
---------------	---------



5.4 Carrier Frequencies Separation

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.4:2003 and KDB DA00-705
Receiver setup:	RBW=30KHz, VBW=100KHz, detector=Peak
Limit:	0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater)
Test setup:	<p style="text-align: center;">  Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane </p> <p><i>Remark:</i> Offset the High-Frequency cable loss 0.5dB in the spectrum analyzer.</p>
Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 4.3 for details
Test results:	Passed

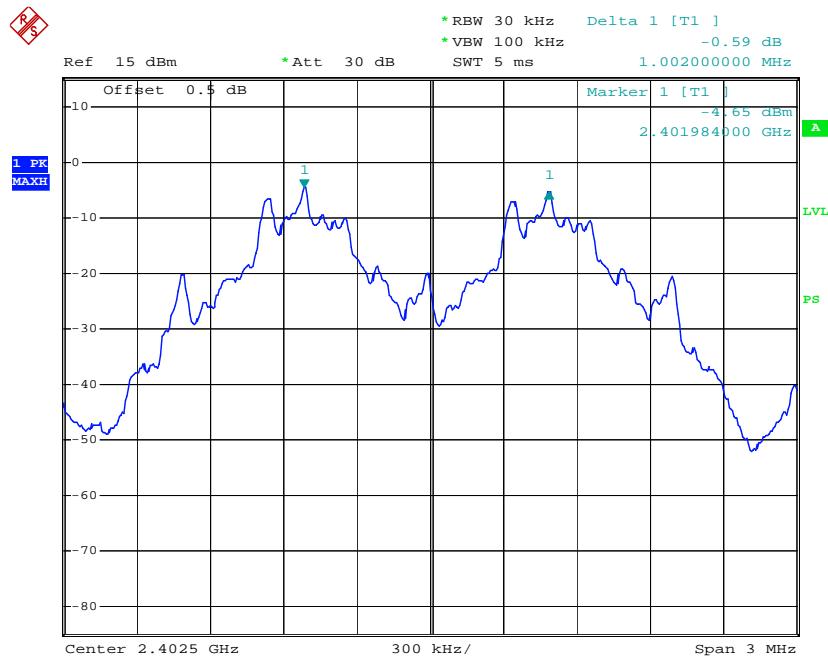
Measurement Data			
Test channel	Carrier Frequencies Separation (KHz)	Limit (KHz)	Result
Lowest	1002	530.7	Pass
Middle	1002	530.7	Pass
Highest	1002	530.7	Pass

Note: According to section 5.4,

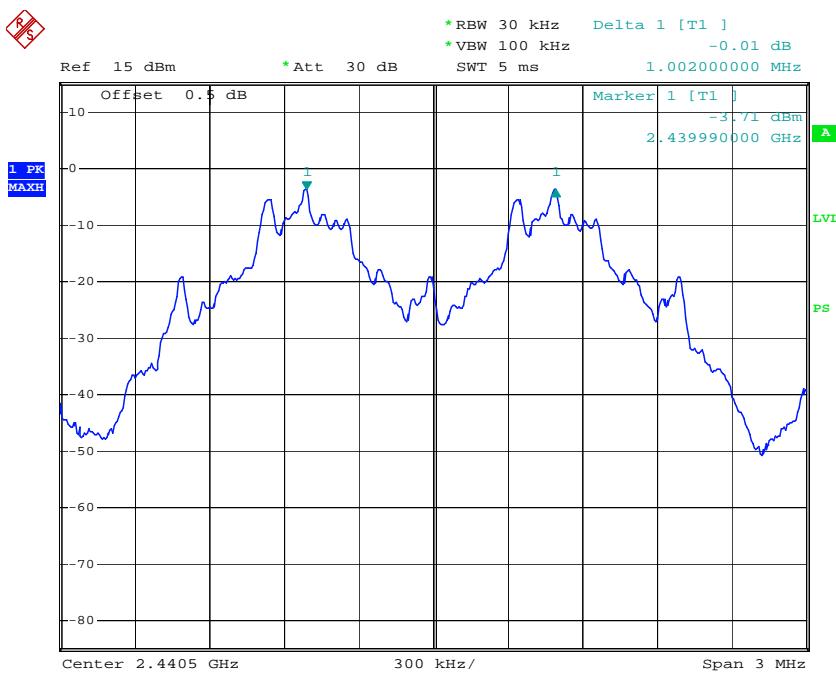
Mode	20dB bandwidth (KHz) (worse case)	Limit (KHz) (Carrier Frequencies Separation)
GFSK	796	530.7

Test plot as follows:

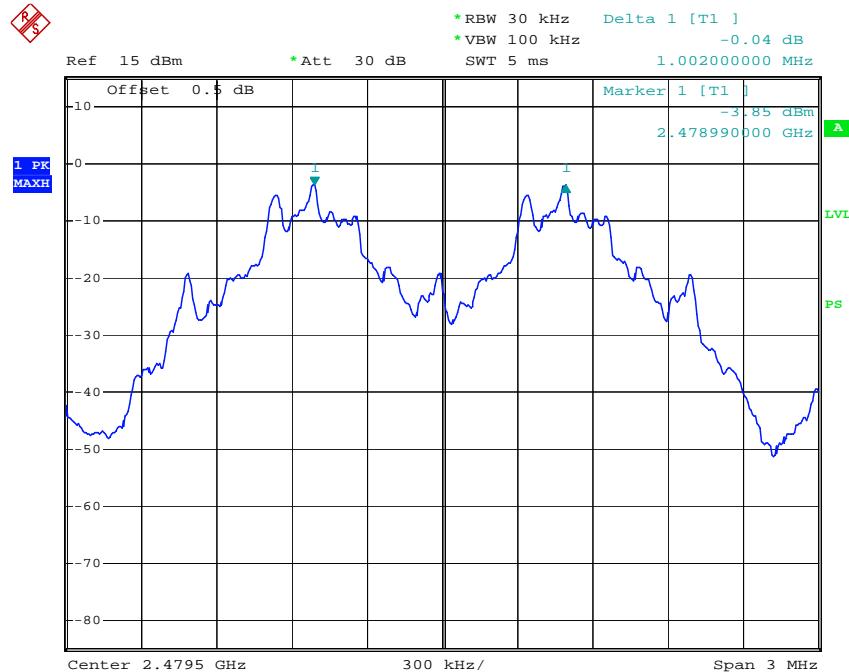
Test channel:	Lowest
---------------	--------



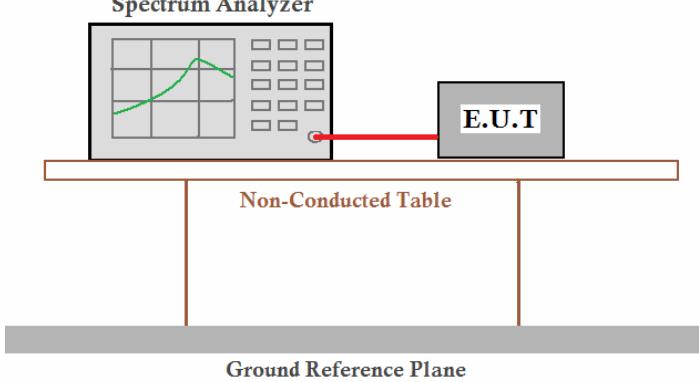
Test channel:	Middle
---------------	--------



Test channel:	Highest
---------------	---------

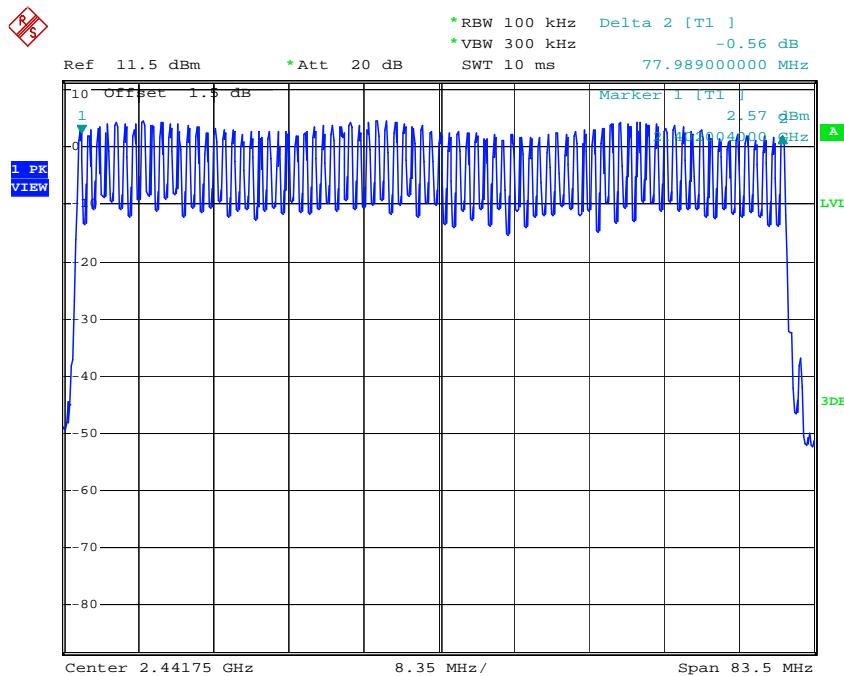


5.5 Hopping Channel Number

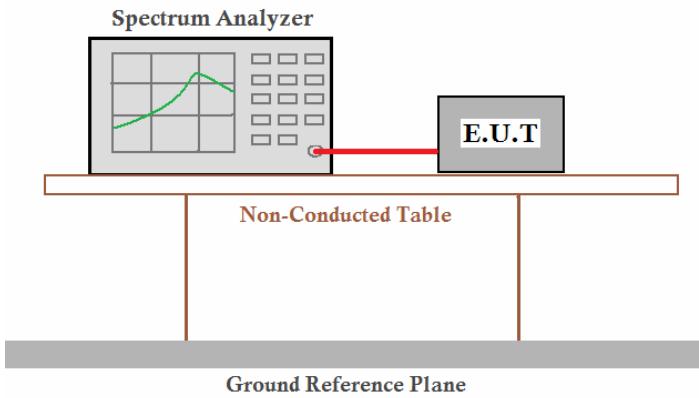
Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.4:2003 and KDB DA00-705
Receiver setup:	RBW=30KHz, VBW=100KHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak
Limit:	15channels
Test setup:	<p style="text-align: center;"> Spectrum Analyzer  Non-Conducted Table Ground Reference Plane </p> <p><i>Remark:</i> Offset the High-Frequency cable loss 0.5dB in the spectrum analyzer.</p>
Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 4.3 for details
Test results:	Passed

Measurement Data	
Hopping channel numbers	79 channel

Test plot as follows



5.6 Dwell Time

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.4:2003 and KDB DA00-705
Receiver setup:	RBW=1MHz, VBW=1MHz, Span=0Hz, Detector=Peak
Limit:	0.4 Second
Test setup:	
Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 4.3 for details
Test results:	Passed

Measurement Data

Mode	Packet	Pulse wide (msec)	Dwell time (sec)	Limit (sec)	Result
GFSK	DH1	0.525	0.168	0.4	Pass
	DH3	1.780	0.285	0.4	Pass
	DH5	3.040	0.324	0.4	Pass

Dwell time

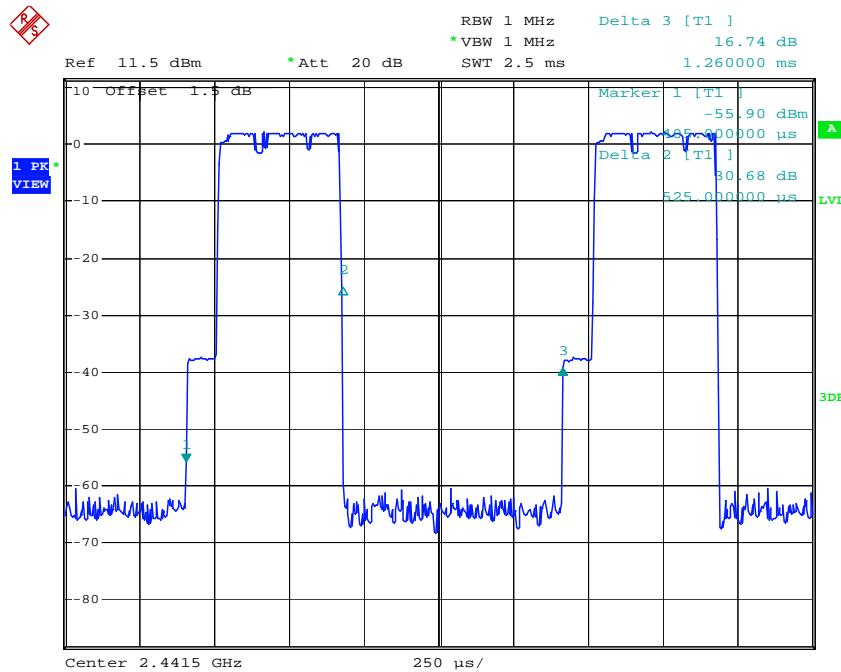
DH1: Dwell time = Pulse time*(1600/2/79)*31.6S;

DH3: Dwell time = Pulse time*(1600/4/79)*31.6S;

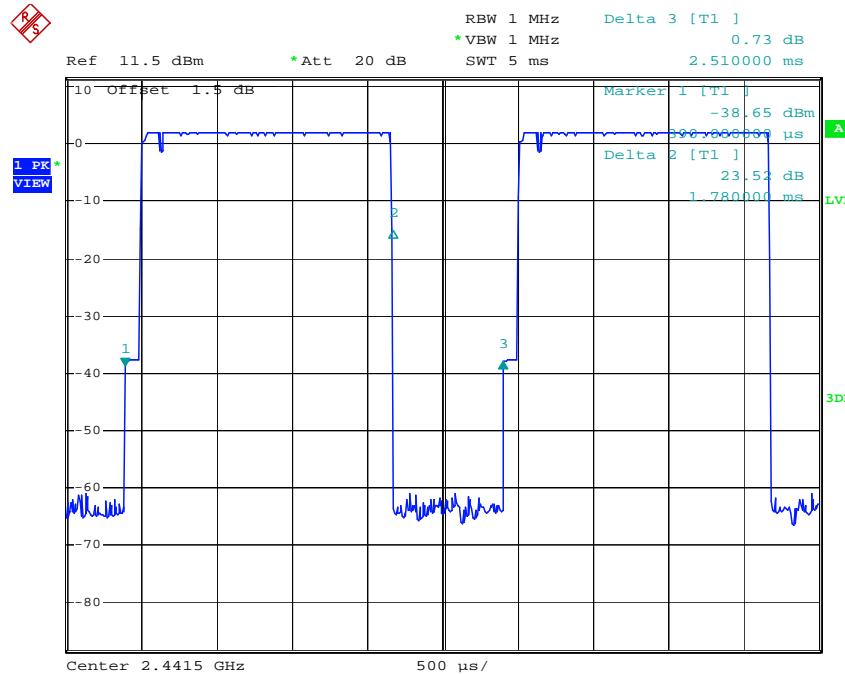
DH5: Dwell time = Pulse time*(1600/6/79)*31.6S;

Test plot as follows

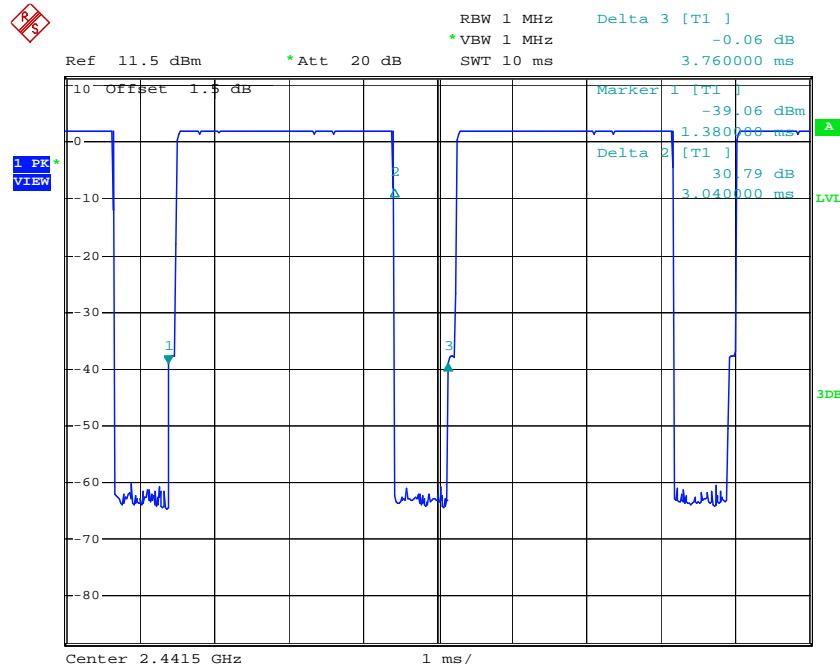
Test mode:	GFSK	Test Packet:	DH1
------------	------	--------------	-----



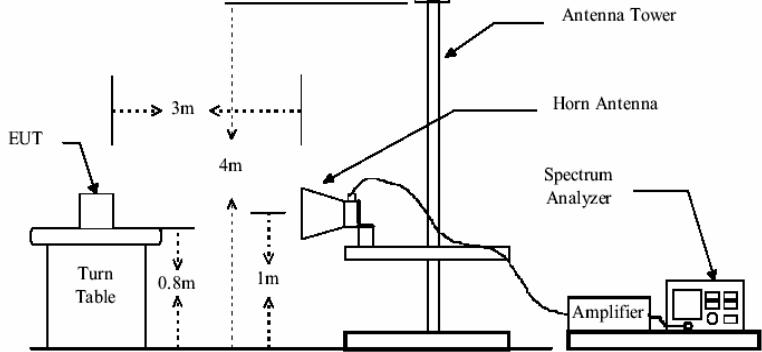
Test mode:	GFSK	Test Packet:	DH3
------------	------	--------------	-----



Test mode:	GFSK	Test Packet:	DH5
------------	------	--------------	-----



5.7 Band Edge

Test Requirement:	FCC Part15 C Section 15.209 and 15.205																			
Test Method:	ANSI C63.4: 2003																			
Test Frequency Range:	2400MHz to 2483.5MHz																			
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)																			
Receiver setup:	<table border="1"> <thead> <tr> <th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr> </thead> <tbody> <tr> <td>Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr> <tr> <td></td><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr> </tbody> </table>					Frequency	Detector	RBW	VBW	Remark	Above 1GHz	Peak	1MHz	3MHz	Peak Value		Peak	1MHz	10Hz	Average Value
Frequency	Detector	RBW	VBW	Remark																
Above 1GHz	Peak	1MHz	3MHz	Peak Value																
	Peak	1MHz	10Hz	Average Value																
Limit:	<table border="1"> <tr> <td>Above 1GHz</td><td>54.0</td><td>Average Value</td></tr> <tr> <td></td><td>74.0</td><td>Peak Value</td></tr> </table>					Above 1GHz	54.0	Average Value		74.0	Peak Value									
Above 1GHz	54.0	Average Value																		
	74.0	Peak Value																		
Test Procedure:	<ol style="list-style-type: none"> The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report. 																			
Test setup:																				

Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 4.3 for details
Test results:	Passed

Test mode:	Transmitting	Test channel:	Lowest	Remark:	Peak
------------	--------------	---------------	--------	---------	------

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2390	6.28	32.24	39.03	58.76	58.25	74	-15.75	Vertical
2400	6.34	32.25	38.87	60.22	59.94	74	-14.06	Vertical
2390	6.28	32.24	39.03	55.29	54.78	74	-19.22	Horizontal
2400	6.34	32.25	38.87	56.37	56.09	74	-17.91	Horizontal

Test mode:	Transmitting	Test channel:	Lowest	Remark:	Average
------------	--------------	---------------	--------	---------	---------

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2390	6.28	32.24	39.03	48.36	47.85	54	-6.15	Vertical
2400	6.34	32.25	38.87	49.01	48.73	54	-5.27	Vertical
2390	6.28	32.24	39.03	44.98	44.47	54	-9.53	Horizontal
2400	6.34	32.25	38.87	46.72	46.44	54	-7.56	Horizontal

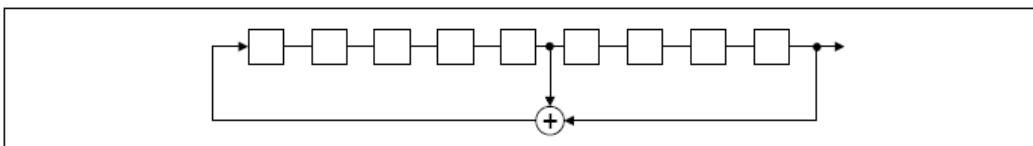
Test mode:	Transmitting	Test channel:	Highest	Remark:	Peak
------------	--------------	---------------	---------	---------	------

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2483.5	6.22	32.29	39.53	57.3	56.28	74	-17.72	Vertical
2500	5.76	32.30	39.15	56.82	55.73	74	-18.27	Vertical
2483.5	6.22	32.29	39.53	55.82	54.8	74	-19.20	Horizontal
2500	5.76	32.30	39.15	55.1	54.01	74	-19.99	Horizontal

Test mode:	Transmitting	Test channel:	Highest	Remark:	Average
------------	--------------	---------------	---------	---------	---------

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2483.5	6.22	32.29	39.53	47.35	46.33	54	-7.67	Vertical
2500	5.76	32.30	39.15	48.27	47.18	54	-6.82	Vertical
2483.5	6.22	32.29	39.53	46.17	45.15	54	-8.85	Horizontal
2500	5.76	32.30	39.15	45.01	43.92	54	-10.08	Horizontal

5.8 Pseudorandom Frequency Hopping Sequence

Test Requirement:	FCC Part15 C Section 15.247 (a)(1) requirement:																						
	<p>Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.</p> <p>Alternatively. Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.</p>																						
EUT Pseudorandom Frequency Hopping Sequence																							
<p>The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONES; i.e. the shift register is initialized with nine ones.</p> <ul style="list-style-type: none"> • Number of shift register stages: 9 • Length of pseudo-random sequence: $2^9 - 1 = 511$ bits • Longest sequence of zeros: 8 (non-inverted signal)  <p>Linear Feedback Shift Register for Generation of the PRBS sequence</p> <p>An example of Pseudorandom Frequency Hopping Sequence as follow:</p> <table border="1"> <tr> <td>0</td><td>2</td><td>4</td><td>6</td><td>62</td><td>64</td><td>78</td><td>1</td><td>73</td><td>75</td><td>77</td> </tr> <tr> <td> </td><td> </td> </tr> </table> <p>Each frequency used equally on the average by each transmitter. The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.</p>		0	2	4	6	62	64	78	1	73	75	77											
0	2	4	6	62	64	78	1	73	75	77													

5.9 Radiated Emission

Test Requirement:	FCC Part15 C Section 15.209 and 15.205																									
Test Method:	ANSI C63.4: 2003																									
Test Frequency Range:	30MHz to 25GHz																									
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)																									
Receiver setup:	<table border="1"> <thead> <tr> <th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr> </thead> <tbody> <tr> <td>30MHz-1GHz</td><td>Quasi-peak</td><td>100KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr> <tr> <td>Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr> <tr> <td></td><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr> </tbody> </table>					Frequency	Detector	RBW	VBW	Remark	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value	Above 1GHz	Peak	1MHz	3MHz	Peak Value		Peak	1MHz	10Hz	Average Value	
Frequency	Detector	RBW	VBW	Remark																						
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value																						
Above 1GHz	Peak	1MHz	3MHz	Peak Value																						
	Peak	1MHz	10Hz	Average Value																						
Limit:	<table border="1"> <thead> <tr> <th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr> </thead> <tbody> <tr> <td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr> <tr> <td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr> <tr> <td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr> <tr> <td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr> <tr> <td>Above 1GHz</td><td>54.0</td><td>Average Value</td></tr> <tr> <td></td><td>74.0</td><td>Peak Value</td></tr> </tbody> </table>					Frequency	Limit (dBuV/m @3m)	Remark	30MHz-88MHz	40.0	Quasi-peak Value	88MHz-216MHz	43.5	Quasi-peak Value	216MHz-960MHz	46.0	Quasi-peak Value	960MHz-1GHz	54.0	Quasi-peak Value	Above 1GHz	54.0	Average Value		74.0	Peak Value
Frequency	Limit (dBuV/m @3m)	Remark																								
30MHz-88MHz	40.0	Quasi-peak Value																								
88MHz-216MHz	43.5	Quasi-peak Value																								
216MHz-960MHz	46.0	Quasi-peak Value																								
960MHz-1GHz	54.0	Quasi-peak Value																								
Above 1GHz	54.0	Average Value																								
	74.0	Peak Value																								
Test Procedure:	<ol style="list-style-type: none"> The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report. 																									

Test setup:	<p>Below 1GHz</p> <p>Antenna Tower</p> <p>EUT</p> <p>Turn Table</p> <p>Ground Plane</p> <p>Search Antenna</p> <p>RF Test Receiver</p> <p>Above 1GHz</p> <p>Antenna Tower</p> <p>EUT</p> <p>Turn Table</p> <p>Ground Plane</p> <p>Horn Antenna</p> <p>Spectrum Analyzer</p> <p>Amplifier</p>
Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 4.3 for details
Test results:	Passed

Note:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

5.9.1 Radiated emission below 1GHz

Test channel:	Lowest
---------------	--------

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
77.840	0.69	12.61	25.71	51.18	38.77	40.0	-1.23	Vertical
57.792	0.96	12.14	25.68	48.57	35.99	40.0	-4.01	Vertical
146.921	1.50	10.06	25.64	55.54	41.46	43.5	-2.04	Vertical
172.793	1.64	13.36	25.63	51.85	41.22	43.5	-2.28	Vertical
309.831	2.09	16.66	25.59	49.32	42.48	46.0	-3.52	Vertical
334.195	16.45	16.86	25.58	48.68	42.09	46.0	-3.91	Vertical
56.989	0.69	10.55	25.71	50.77	36.30	40.0	-3.70	Horizontal
126.446	1.35	11.41	25.65	51.46	38.57	43.5	-4.93	Horizontal
148.921	1.50	10.20	25.64	56.07	42.13	43.5	-1.37	Horizontal
172.793	1.64	10.58	25.63	56.54	43.13	43.5	-0.37	Horizontal
194.773	1.74	11.28	25.62	52.64	40.04	43.5	-3.46	Horizontal
559.73	2.58	21.34	25.54	41.52	39.90	46.0	-6.10	Horizontal

Test channel:	Middle
---------------	--------

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
77.840	0.69	12.61	25.71	51.90	39.49	40.0	-0.51	Vertical
57.462	0.96	12.14	25.68	48.51	35.93	40.0	-4.07	Vertical
125.404	1.34	10.80	25.65	50.49	36.98	43.5	-6.52	Vertical
150.921	1.50	10.06	25.64	54.98	40.90	43.5	-2.60	Vertical
170.793	1.64	13.36	25.63	52.37	41.74	43.5	-1.76	Vertical
307.831	2.09	16.66	25.59	50.44	43.60	46.0	-2.40	Vertical
56.792	0.69	10.55	25.71	44.39	29.92	40.0	-10.08	Horizontal
79.800	0.96	7.43	25.68	49.44	32.15	40.0	-7.85	Horizontal
147.921	1.50	10.20	25.64	53.44	39.50	43.5	-4.00	Horizontal
170.793	1.64	10.58	25.63	55.32	41.91	43.5	-1.59	Horizontal
193.773	1.74	11.28	25.62	53.77	41.17	43.5	-2.33	Horizontal
475.499	2.37	20.83	25.55	42.66	40.31	46.0	-5.69	Horizontal

Test channel:	Highest
---------------	---------

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
77.792	0.69	12.61	25.71	51.54	39.13	40.0	-0.87	Vertical
57.456	0.96	12.14	25.68	51.93	39.35	40.0	-0.65	Vertical
122.404	1.34	10.80	25.65	54.55	41.04	43.5	-2.46	Vertical
153.200	1.53	10.56	25.64	56.46	42.91	43.5	-0.59	Vertical
170.793	1.64	13.36	25.63	53.10	42.47	43.5	-1.03	Vertical
357.929	2.18	16.98	25.57	50.09	43.68	46.0	-2.32	Vertical
122.404	1.34	11.71	25.65	52.48	39.88	43.5	-3.62	Horizontal
147.921	1.50	10.20	25.64	54.11	40.17	43.5	-3.33	Horizontal
170.793	1.64	10.58	25.63	55.25	41.84	43.5	-1.66	Horizontal
193.773	1.74	11.28	25.62	55.27	42.67	43.5	-0.83	Horizontal
214.514	1.84	11.69	25.61	54.06	41.98	43.5	-1.52	Horizontal
490.745	2.39	20.85	25.55	46.86	44.55	46.0	-1.45	Horizontal

5.9.2 Transmitter emission above 1GHz

Test channel:	Lowest	Remark:	Peak
---------------	--------	---------	------

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2327.75	6.02	29.76	39.75	43.76	39.79	74.00	-34.21	Vertical
2398.25	6.34	30.03	38.87	43.57	41.07	74.00	-32.93	Vertical
2400.00	6.34	30.03	38.87	43.59	41.09	74.00	-32.91	Vertical
4804.00	9.36	34.25	41.53	45.37	47.45	74.00	-26.55	Vertical
7206.00	13.38	37.23	40.98	46.49	56.12	74.00	-17.88	Vertical
2327.75	6.02	29.76	39.75	43.62	39.65	74.00	-34.35	Horizontal
2398.25	6.34	30.03	38.87	44.00	41.50	74.00	-32.50	Horizontal
2400.00	6.34	30.03	38.87	43.81	41.31	74.00	-32.69	Horizontal
4804.00	9.36	34.25	41.53	44.22	46.30	74.00	-27.70	Horizontal
7206.00	13.38	37.23	40.98	45.61	55.24	74.00	-18.76	Horizontal

Test channel:	Lowest	Remark:	Average
---------------	--------	---------	---------

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2327.75	6.02	29.76	39.75	31.03	27.06	54.00	-26.94	Vertical
2398.25	6.34	30.03	38.87	31.15	28.65	54.00	-25.35	Vertical
2400.00	6.34	30.03	38.87	31.18	28.68	54.00	-25.32	Vertical
4804.00	9.36	34.25	41.53	31.04	33.12	54.00	-20.88	Vertical
7206.00	13.38	37.23	40.98	31.30	40.93	54.00	-13.07	Vertical
2327.75	6.02	29.76	39.75	31.21	27.24	54.00	-26.76	Horizontal
2398.25	6.34	30.03	38.87	31.08	28.58	54.00	-25.42	Horizontal
2400.00	6.34	30.03	38.87	31.12	28.62	54.00	-25.38	Horizontal
4804.00	9.36	34.25	41.53	31.02	33.10	54.00	-20.90	Horizontal
7206.00	13.38	37.23	40.98	31.37	41.00	54.00	-13.00	Horizontal

Test channel:	Middle	Remark:	Peak
---------------	--------	---------	------

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2400.00	6.34	30.03	38.87	43.78	41.28	74.00	-32.72	Vertical
2483.50	6.22	30.32	39.53	43.95	40.96	74.00	-33.04	Vertical
4882.00	10.57	34.35	40.33	46.04	50.63	74.00	-23.37	Vertical
7323.00	12.91	37.31	40.40	45.35	55.17	74.00	-18.83	Vertical
9764.00	13.89	38.03	37.94	40.47	54.45	74.00	-19.55	Vertical
2400.00	6.34	30.03	38.87	43.59	41.09	74.00	-32.91	Horizontal
2483.50	6.22	30.32	39.53	48.20	45.21	74.00	-28.79	Horizontal
4882.00	10.57	34.35	40.33	50.12	54.71	74.00	-19.29	Horizontal
7323.00	12.91	37.31	40.40	46.11	55.93	74.00	-18.07	Horizontal
9764.00	13.89	38.03	37.94	40.46	54.44	74.00	-19.56	Horizontal

Test channel:	Middle	Remark:	Average
---------------	--------	---------	---------

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2400.00	6.34	30.03	38.87	31.00	28.50	54.00	-25.50	Vertical
2483.50	6.22	30.32	39.53	30.85	27.86	54.00	-26.14	Vertical
4882.00	10.57	34.35	40.33	31.41	36.00	54.00	-18.00	Vertical
7323.00	12.91	37.31	40.40	31.59	41.41	54.00	-12.59	Vertical
9764.00	13.89	38.03	37.94	28.20	42.18	54.00	-11.82	Vertical
2400.00	6.34	30.03	38.87	31.01	28.51	54.00	-25.49	Horizontal
2483.50	6.22	30.32	39.53	30.83	27.84	54.00	-26.16	Horizontal
4882.00	10.57	34.35	40.33	31.36	35.95	54.00	-18.05	Horizontal
7323.00	12.91	37.31	40.40	31.57	41.39	54.00	-12.61	Horizontal
9764.00	13.89	38.03	37.94	28.20	42.18	54.00	-11.82	Horizontal

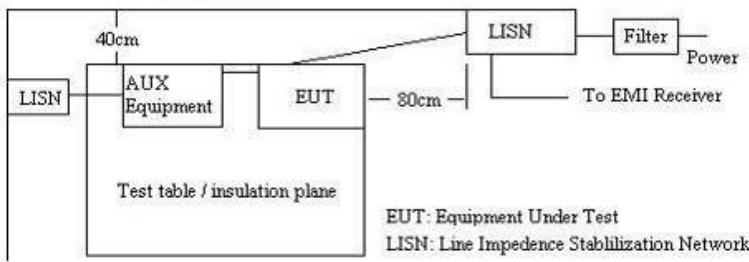
Test channel:	Highest	Remark:	Peak
---------------	---------	---------	------

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2483.50	6.22	30.32	39.53	53.71	50.72	74.00	-23.28	Vertical
2500.00	5.76	30.37	39.15	43.72	40.70	74.00	-33.30	Vertical
4960.00	10.43	34.45	41.03	44.73	48.58	74.00	-25.42	Vertical
7440.00	12.72	37.37	40.01	45.29	55.37	74.00	-18.63	Vertical
9920.00	14.24	38.08	37.78	40.44	54.98	74.00	-19.02	Vertical
2483.50	6.22	30.32	39.53	43.98	40.99	74.00	-33.01	Horizontal
2500.00	5.76	30.37	39.15	44.04	41.02	74.00	-32.98	Horizontal
4960.00	10.43	34.45	41.03	44.48	48.33	74.00	-25.67	Horizontal
7440.00	12.72	37.37	40.01	44.67	54.75	74.00	-19.25	Horizontal
9920.00	14.24	38.08	37.78	40.91	55.45	74.00	-18.55	Horizontal

Test channel:	Highest	Remark:	Average
---------------	---------	---------	---------

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2483.50	6.22	30.32	39.53	30.52	27.53	54.00	-26.47	Vertical
2500.00	5.76	30.37	39.15	30.54	27.52	54.00	-26.48	Vertical
4960.00	10.43	34.45	41.03	32.01	35.86	54.00	-18.14	Vertical
7440.00	12.72	37.37	40.01	31.46	41.54	54.00	-12.46	Vertical
9920.00	14.24	38.08	37.78	27.19	41.73	54.00	-12.27	Vertical
2483.50	6.22	30.32	39.53	30.58	27.59	54.00	-26.41	Horizontal
2500.00	5.76	30.37	39.15	30.60	27.58	54.00	-26.42	Horizontal
4960.00	10.43	34.45	41.03	31.99	35.84	54.00	-18.16	Horizontal
7440.00	12.72	37.37	40.01	31.47	41.55	54.00	-12.45	Horizontal
9920.00	14.24	38.08	37.78	27.18	41.72	54.00	-12.28	Horizontal

5.10 Conducted Emission

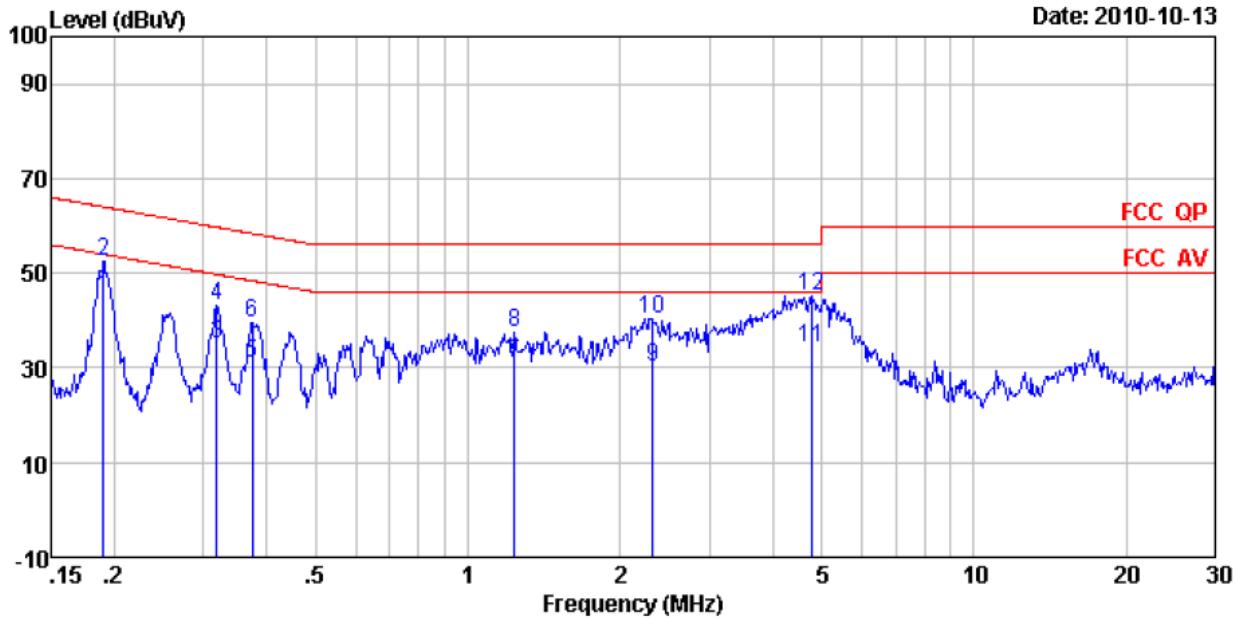
Test Requirement:	FCC Part15 C Section 15.207																
Test Method:	ANSI C63.4: 2003																
Test Frequency Range:	150kHz to30MHz																
Limit:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency</th> <th colspan="2">Limits dB(uV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15MHz-0.50MHz</td><td>66-56</td><td>56-46</td> </tr> <tr> <td>0.50MHz-5MHz</td><td>56</td><td>46</td> </tr> <tr> <td>5MHz-30MHz</td><td>60</td><td>50</td> </tr> </tbody> </table>			Frequency	Limits dB(uV)		Quasi-peak	Average	0.15MHz-0.50MHz	66-56	56-46	0.50MHz-5MHz	56	46	5MHz-30MHz	60	50
Frequency	Limits dB(uV)																
	Quasi-peak	Average															
0.15MHz-0.50MHz	66-56	56-46															
0.50MHz-5MHz	56	46															
5MHz-30MHz	60	50															
Test Procedure:	<ul style="list-style-type: none"> a. The EUT was placed on a table which is 0.8m above ground plane. b. Maximum procedure was performed on the six highest emissions to ensure EUT compliance. c. Repeat above procedures until all frequency measured were complete. 																
Test setup:	<p style="text-align: center;">Reference Plane</p>  <p style="text-align: center;">Test table / insulation plane</p> <p>EUT: Equipment Under Test LISN: Line Impedance Stabilization Network</p>																
Test Instruments:	Refer to section 4.7 for details																
Test mode:	Refer to section 4.3 for details																
Test results:	Passed																

Measurement Result:
Test mode: Bluetooth transmitting
Line:

Data: 16

File: E:\GTS project\U\conducted.EM6 (16)

Date: 2010-10-13



Condition : FCC QP LISN LINE

Job No. : 236TX

EUT : Mobile phone

Test Mode : Bluetooth mode

Test Engineer: Taik

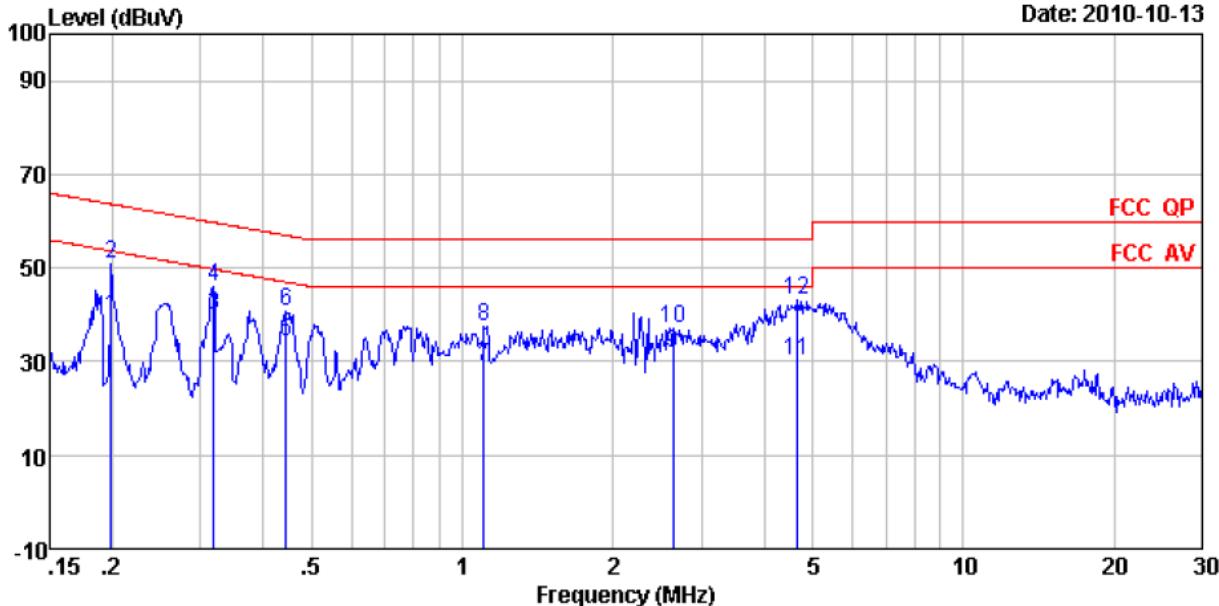
	Read Freq	LISN Level	Cable Factor	Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.190	41.20	3.66	0.01	44.87	54.02	-9.15	Average
2	0.190	48.87	3.66	0.01	52.54	64.02	-11.48	QP
3	0.318	31.40	3.60	0.01	35.01	49.75	-14.74	Average
4	0.318	39.40	3.60	0.01	43.01	59.75	-16.74	QP
5	0.375	27.40	3.59	0.01	31.00	48.39	-17.39	Average
6	0.375	36.04	3.59	0.01	39.64	58.39	-18.75	QP
7	1.236	27.60	3.45	0.01	31.06	46.00	-14.94	Average
8	1.236	33.93	3.45	0.01	37.39	56.00	-18.61	QP
9	2.321	26.51	3.38	0.14	30.03	46.00	-15.97	Average
10	2.321	36.80	3.38	0.14	40.32	56.00	-15.68	QP
11	4.797	30.60	3.30	0.31	34.21	46.00	-11.79	Average
12	4.797	41.76	3.30	0.31	45.37	56.00	-10.63	QP

Neutral:

Data: 15

File: E:\GTS project\U\conducted.EM6 (16)

Date: 2010-10-13



Condition : FCC QP LISN NEUTRAL

Job No. : 236TX

EUT : Mobile phone

Test Mode : Bluetooth mode

Test Engineer: Taik

	Read Freq	LISN Level	Cable Factor	Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV		dB	dBuV	dBuV		
1	0.199	35.90	3.66	0.01	39.57	53.67	-14.10	Average
2	0.199	47.29	3.66	0.01	50.96	63.67	-12.71	QP
3	0.318	36.40	3.60	0.01	40.01	49.75	-9.74	Average
4	0.318	42.27	3.60	0.01	45.88	59.75	-13.87	QP
5	0.444	30.80	3.57	0.01	34.38	46.98	-12.60	Average
6	0.444	37.30	3.57	0.01	40.88	56.98	-16.10	QP
7	1.106	25.60	3.47	0.01	29.08	46.00	-16.92	Average
8	1.106	33.97	3.47	0.01	37.45	56.00	-18.55	QP
9	2.636	28.10	3.37	0.17	31.64	46.00	-14.36	Average
10	2.636	33.57	3.37	0.17	37.11	56.00	-18.89	QP
11	4.647	26.40	3.31	0.30	30.01	46.00	-15.99	Average
12	4.647	39.46	3.31	0.30	43.07	56.00	-12.93	QP

5.11 RF Exposure Compliance Requirement

5.11.1 Standard requirement

15.247(b)(4) requirement:

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section. if transmitting antennas of directional gain greater than 6 dBi are used. the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1). (b)(2). and (b)(3) of this section. as appropriate. by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.11.2 EUT RF Exposure

The Max Conducted Peak Output Power is 3.64dBm(2.31mW) in middle channel (2.441GHz);
The best case gain of the antenna is 2dBi.

2dBi logarithmic terms convert to numeric result is nearly 1.58
According to formula. Calculate the EIRP test result:

$$\text{EIRP} = P \times G = 2.31 \times 1.58 = 3.65 \text{mW} \quad ①$$

SAR requirement:

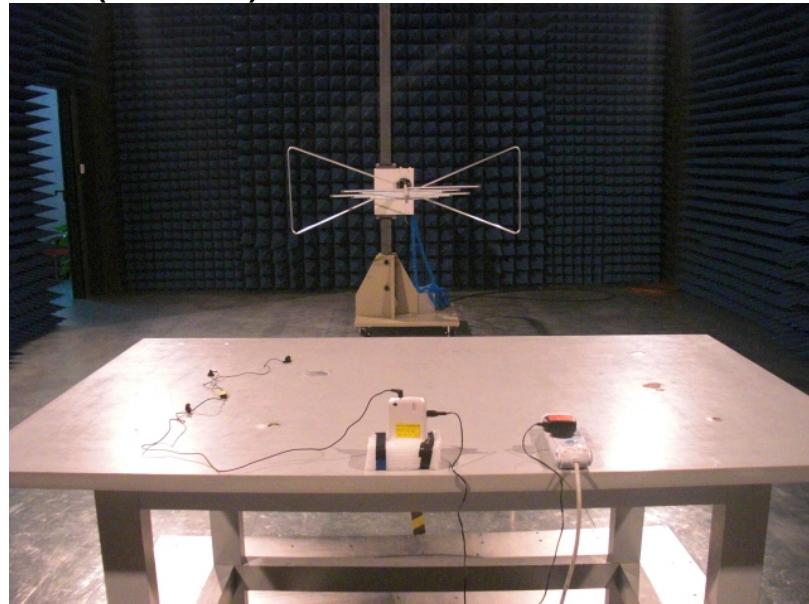
$$S = 60/f(\text{GHz}) = 60/2.441 = 24.58 \text{mW} \quad ②;$$

$$① < ②.$$

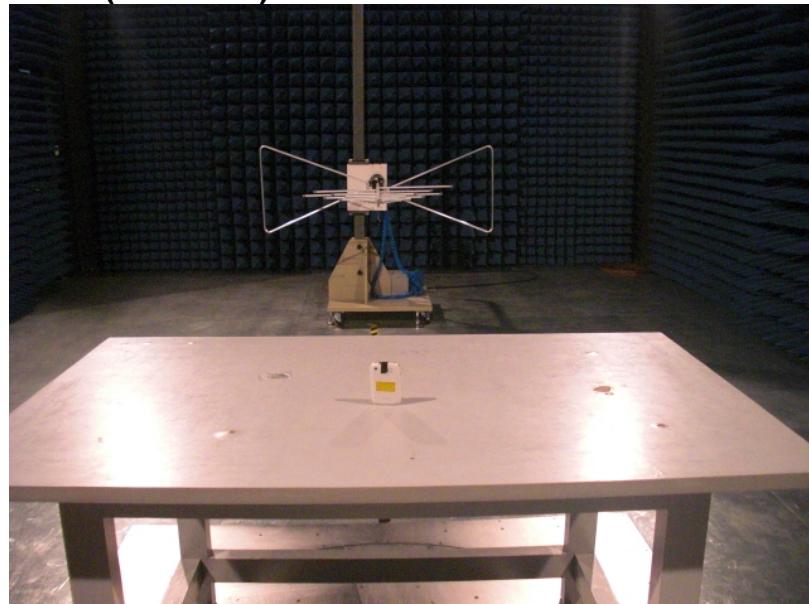
So the SAR report is not required.

6 Photographs-test setup photo

Radiated Emission(below 1G)



Radiated Emission (above 1G)

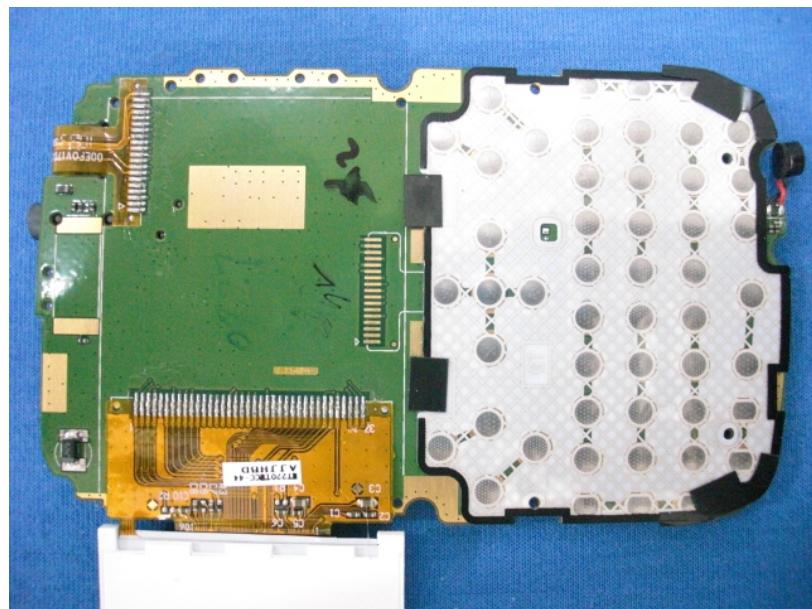


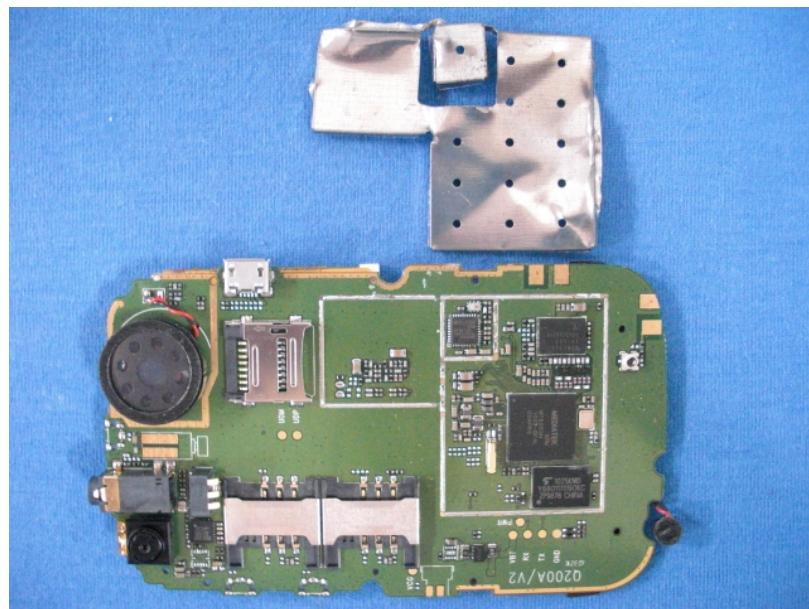
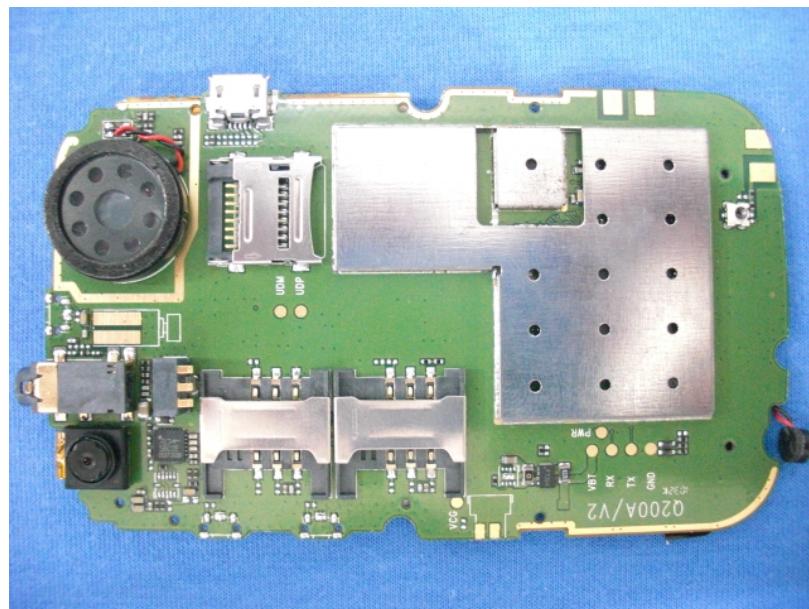
Conducted Emission

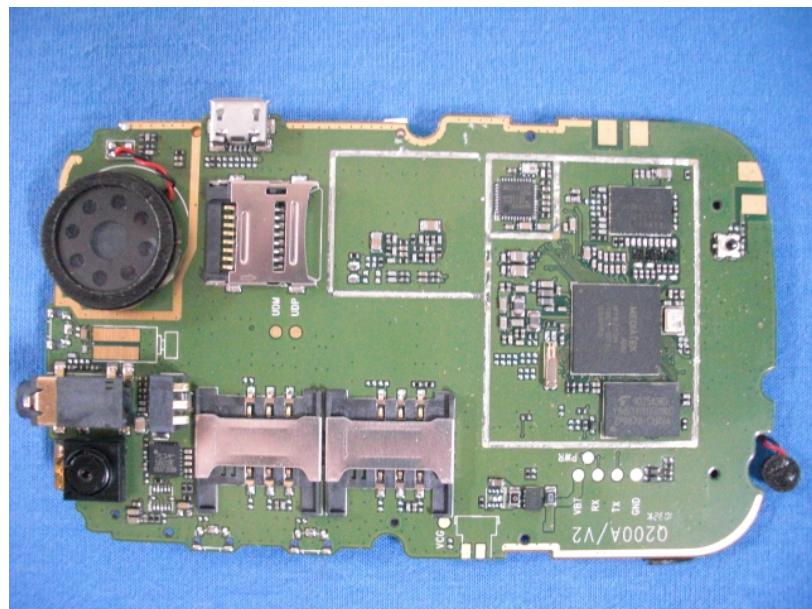
7 Photographs - EUT Constructional Details

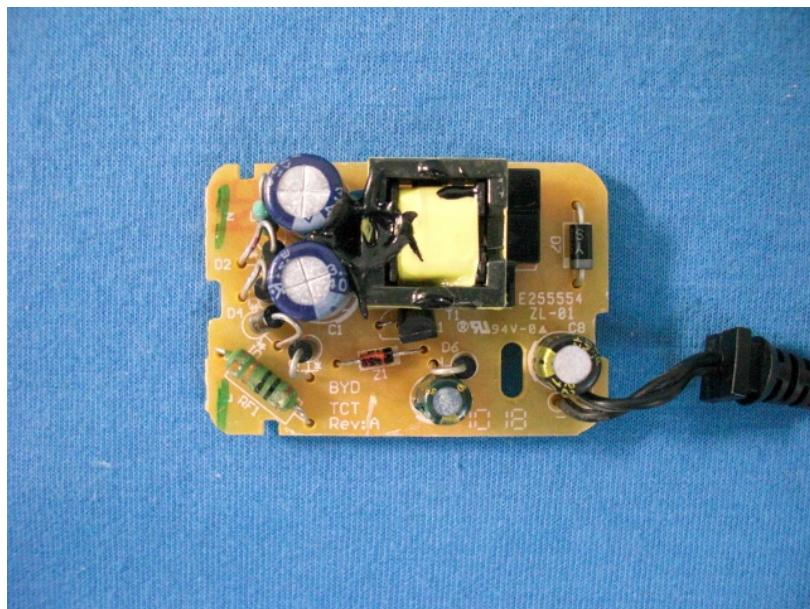


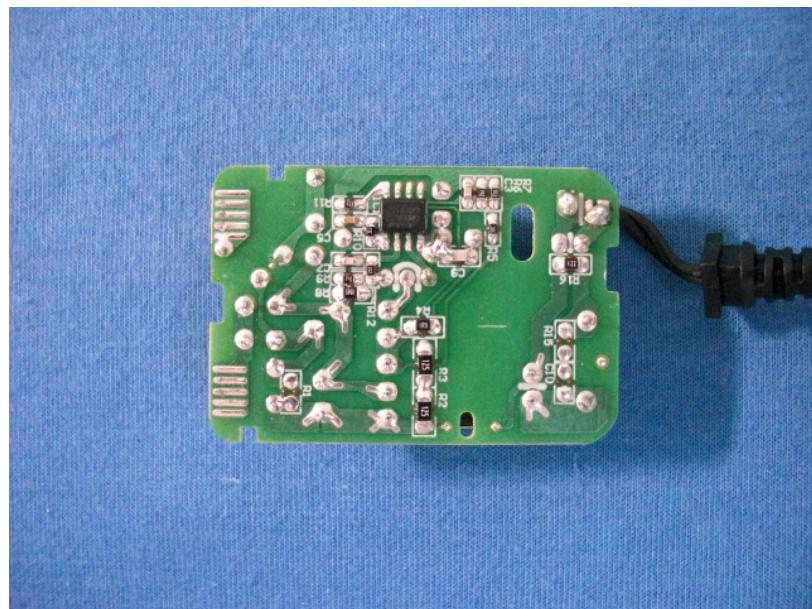












-----end-----