

## FCC TEST REPORT

**Product** : mySwing  
**Trade mark** : N/A  
**Model/Type reference** : mySwing™ Basic Sensor  
**Serial number** : N/A  
**Ratings** : DC 3.7V  
**FCC ID** : Q2KMSWTX  
**Report number** : EESZE09070005-2  
**Date** : Sep. 19, 2012  
**Regulations** : See below

Test Standards	Results
<input checked="" type="checkbox"/> 47 CFR FCC Part 15 Subpart C 15.249:2011	PASS

Prepared for:  
**Noitom Limited**  
**Rm. 700, B&H Plaza, 1077 Nanhai Road, Shenzhen, China**

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Date:

Sep. 19, 2012  


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*N/A means not applicable.*

## 1. GENERAL INFORMATION

**Applicant:** Noitom Limited  
 Rm. 700, B&H Plaza, 1077 Nanhai Road, Shenzhen, China

**Manufacturer:** Noitom Limited  
 Rm. 700, B&H Plaza, 1077 Nanhai Road, Shenzhen, China

**Equipment authorization:** FCC Part 15 Certification

**FCC ID:** Q2KMSWTX

**Product:** mySwing

**Trade mark:** N/A

**Model/Type reference:** mySwing™ Basic Sensor

**Serial number:** N/A

**Report number:** EESZE09070005-2

**Sample Received Date:** Sep. 07, 2012

**Sample tested Date:** Sep. 07, 2012 to Sep. 19, 2012

The above equipment was tested by Centre Testing International for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, Subpart C and the measurement procedure according to ANSI C63.4:2003.

## 2. TEST SUMMARY

No.	Test Item	Rule	Test Result
1	Conducted Emission	15.207	PASS
2	Radiated Emission	15.209 15.249(a) (d)	PASS
3	20dB Bandwidth	15.215(c)	PASS
4	Out of Band Emission	15.249(d)	PASS

## 3. MEASUREMENT UNCERTAINTY

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement items	Uncertainty
Conducted Emission Test	3.2 dB
Radiated Emissions / Bandedge Emission	4.5 dB

## 4. PRODUCT INFORMATION

Items	Description
Rating	DC 3.7V
Intentional Transceiver	Intentional Transceiver
Frequency Channel	2406MHz, 2408MHz, 2410MHz, 2412MHz, 2414MHz, 2416MHz, 2418MHz, 2420MHz, 2422MHz, 2424MHz, 2426MHz, 2428MHz, 2430MHz, 2432MHz, 2434MHz, 2436MHz, 2438MHz, 2440MHz, 2442MHz, 2444MHz, 2446MHz, 2448MHz, 2450MHz, 2452MHz, 2454MHz, 2456MHz, 2458MHz, 2460MHz, 2462MHz, 2464MHz, 2466MHz, 2468MHz, 2470MHz, 2472MHz, 2474MHz, 2476MHz, 2478MHz, 2480MHz
Channel Number	38 (at intervals of 2MHz)
Antenna Type	PCB Antenna

## 5. SYSTEM TEST CONFIGURATION

### 5.1 Justification

For emissions testing, the equipment under test (Product) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions. It was powered by 3.7VDC. Only the worst case data were recorded in this test report.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

### 5.2 Product Exercising Software

The Product exercise program RF\_test\_tool, (provided by client) used during testing was designed to exercise the various system components in a manner similar to a typical use.

The parameters of test software setting:

During the test, Channel and power controlling software provided by the applicant was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the application and is going to be fixed on the firmware of the end product.

## 6. TEST EQUIPMENT LIST

Equipment	Manufacturer	Model Number	Serial Number	Due Date
3M Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	3510	07/09/2013
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	401	07/21/2013
Receiver	R&S	ESCI	100435	07/19/2013
Multi device Controller	ETS-LINGREN	2090	00057230	N/A
Horn Antenna	ETS-LINGREN	3117	00057407	07/07/2015
Spectrum Analyzer	Agilent	E4440A	MY46185649	03/07/2013
Microwave Preamplifier	CD	PAP-1G18G	2001	03/29/2013
Receiver	R&S	ESCI	100009	07/19/2013
LISN	R&S	ENV216	100098	07/19/2013
Double ridge horn antenna	A.H.SYSTEMS	SAS-574	6042	07/06/2015
Pre-amplifier	A.H.SYSTEMS	PAP-1840-60	6041	07/06/2015

## 7. SUPPORT EQUIPMENT LIST

No.	Device Type	Brand	Model	Series No.	Data Cable	Power Cord
1.	Notebook	Dell	V3400D-326	GYQTVP1	---	Unshielded

Remark: The notebook has got the FCC DOC certificate.

## 8. CONDUCTED EMISSION TEST

### 8.1. LIMITS

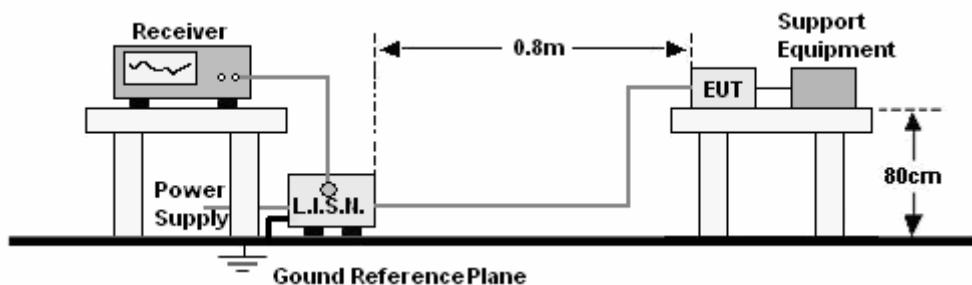
**Limits for Class B digital devices**

Frequency range (MHz)	Limits dB( $\mu$ V)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

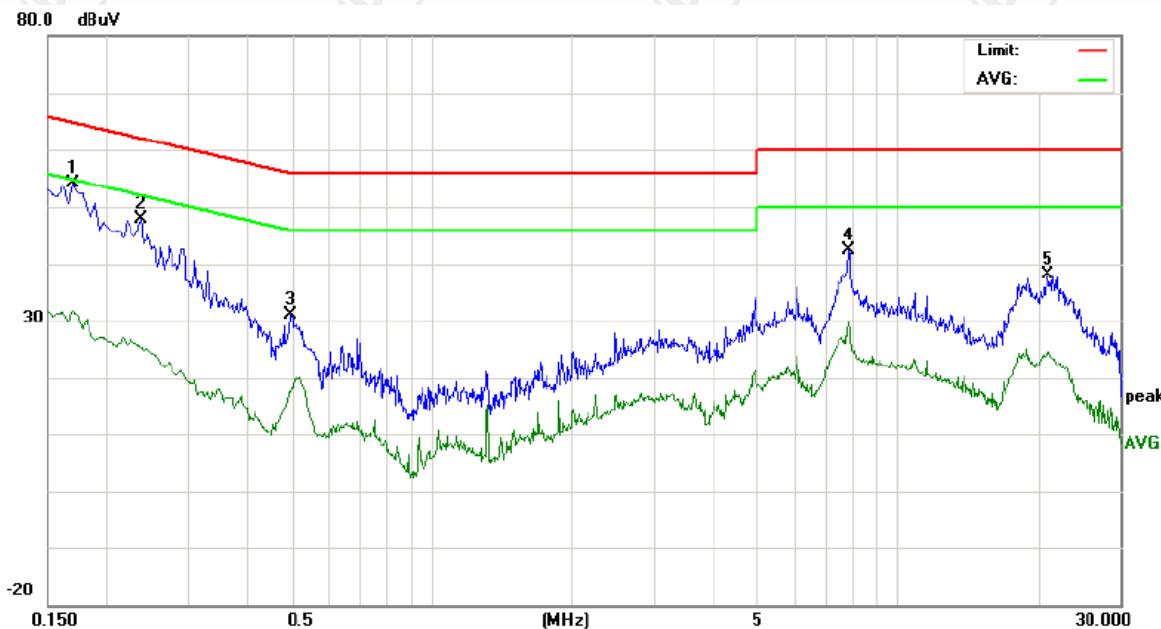
### 8.2. BLOCK DIAGRAM OF TEST SETUP



### 8.3. PROCEDURE OF CONDUCTED EMISSION TEST

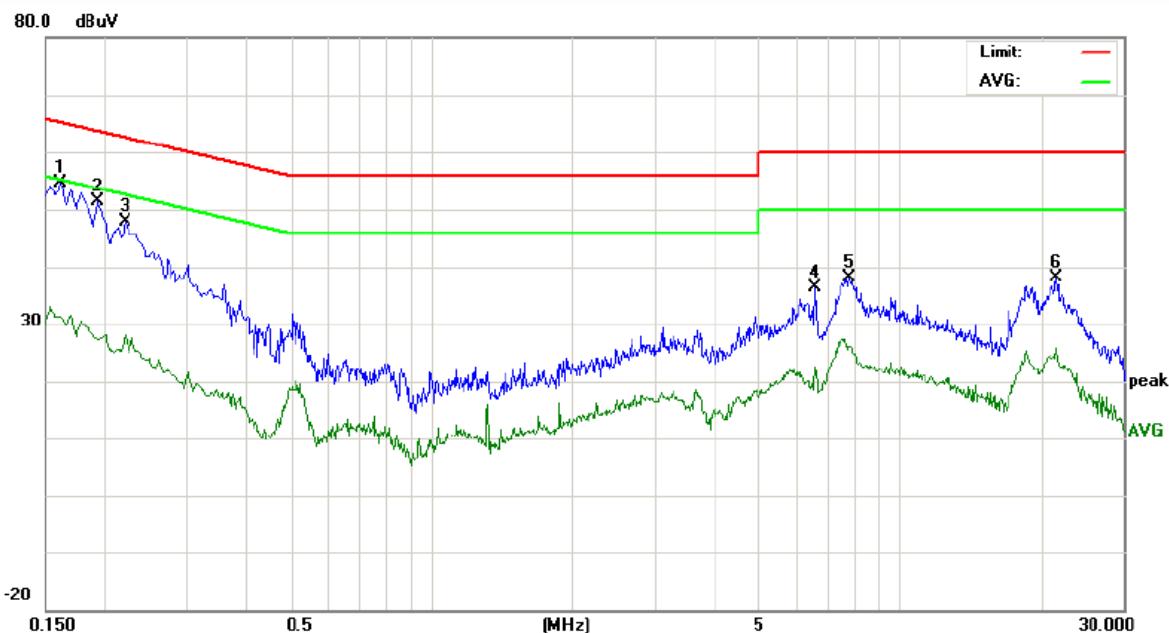
- The Product was placed on a nonconductive table above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N.).
- The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.
- For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

## 8.4. GRAPHS AND DATA



Site site #1 Phase: **L1** Temperature: 27  
 Limit: FCC Class B CE (QP) Power: AC 120V/60Hz Humidity: 55 %  
 EUT: mySwing  
 M/N: mySwingTM Basic Sensor  
 Mode: Charging and TX  
 Note:

No.	Reading_Level (dBuV)				Correct Factor	Measurement (dBuV)				Limit (dBuV)		Margin (dB)		
	Freq. MHz	Peak	QP	Avg		dB	peak	QP	Avg	QP	Avg	QP	Avg	P/F
1	0.1700	44.15		21.98	9.90		54.05		31.88	64.96	54.96	-10.91	-23.08	P
2	0.2380	38.05		15.59	9.90		47.95		25.49	62.16	52.16	-14.21	-26.67	P
3	0.4980	21.15		7.79	9.90		31.05		17.69	56.03	46.03	-24.98	-28.34	P
4	7.8660	32.34		19.71	10.10		42.44		29.81	60.00	50.00	-17.56	-20.19	P
5	21.0140	27.40		13.89	10.71		38.11		24.60	60.00	50.00	-21.89	-25.40	P



Site site #1  
 Phase: **N** Temperature: 27  
 Limit: FCC Class B CE (QP) Power: AC 120V/60Hz Humidity: 55 %  
 EUT: mySwing  
 M/N: mySwingTM Basic Sensor  
 Mode: Charging and TX  
 Note:

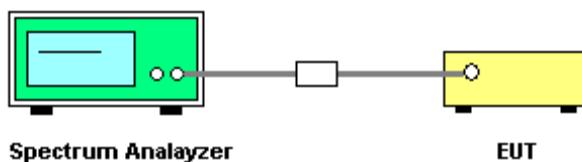
No.	Reading_Level (dBuV)			Correct Factor		Measurement (dBuV)			Limit (dBuV)			Margin (dB)		
	Freq. MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	0.1620	44.68		21.58	9.90	54.58		31.48	65.36	55.36	-10.78	-23.88	P	
2	0.1940	41.54		17.58	9.90	51.44		27.48	63.86	53.86	-12.42	-26.38	P	
3	0.2220	37.89		18.13	9.90	47.79		28.03	62.74	52.74	-14.95	-24.71	P	
4	6.6140	26.42		12.54	10.08	36.50		22.62	60.00	50.00	-23.50	-27.38	P	
5	7.8460	28.06		15.92	10.10	38.16		26.02	60.00	50.00	-21.84	-23.98	P	
6	21.6940	27.31		15.04	10.72	38.03		25.76	60.00	50.00	-21.97	-24.24	P	

## 9. 20DB BANDWIDTH MEASUREMENT

### 9.1. LIMITS

None

### 9.2. BLOCK DIAGRAM OF TEST SETUP

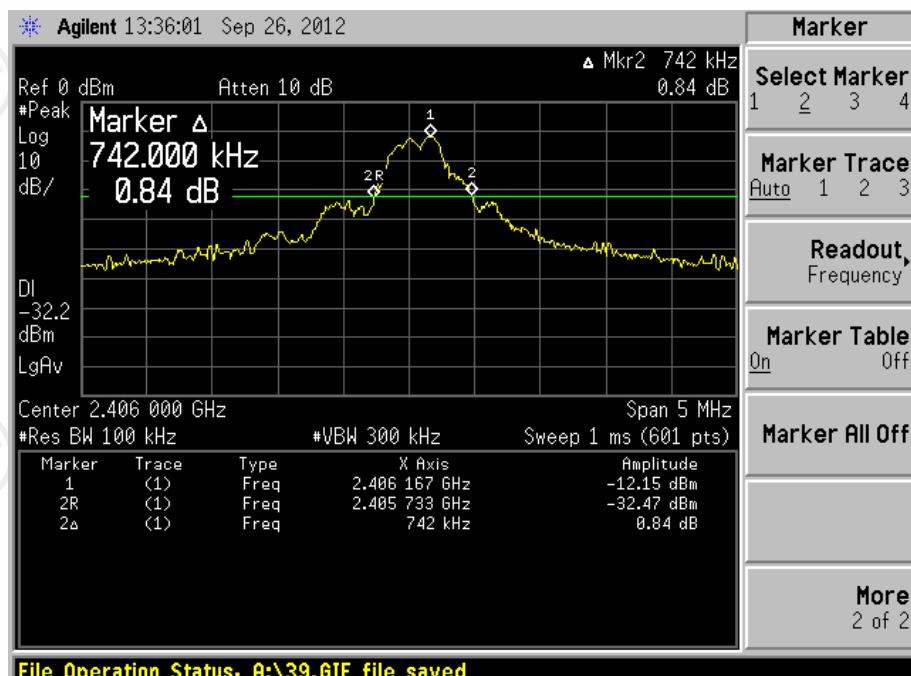


### 9.3. TEST PROCEDURE

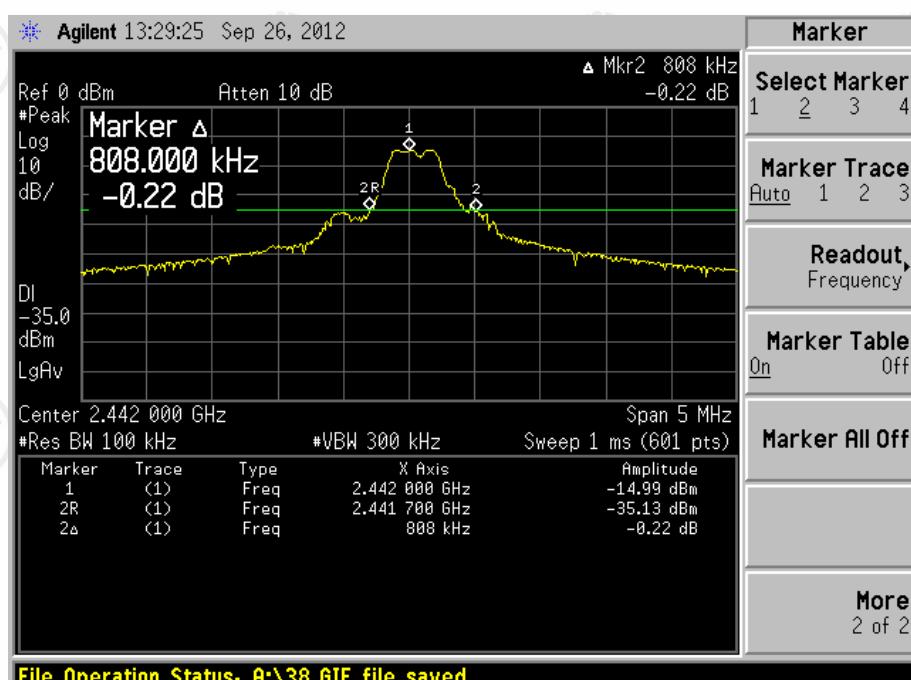
1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set spectrum analyzer's RBW and VBW to applicable value with Peak in Max Hold.
3. A PEAK output reading was taken, a DISPLAY line was drawn 20 dB lower than PEAK level.
4. The 20dB bandwidth was determined from where the channel output spectrum intersected the display line.

### 9.4. TEST RESULT

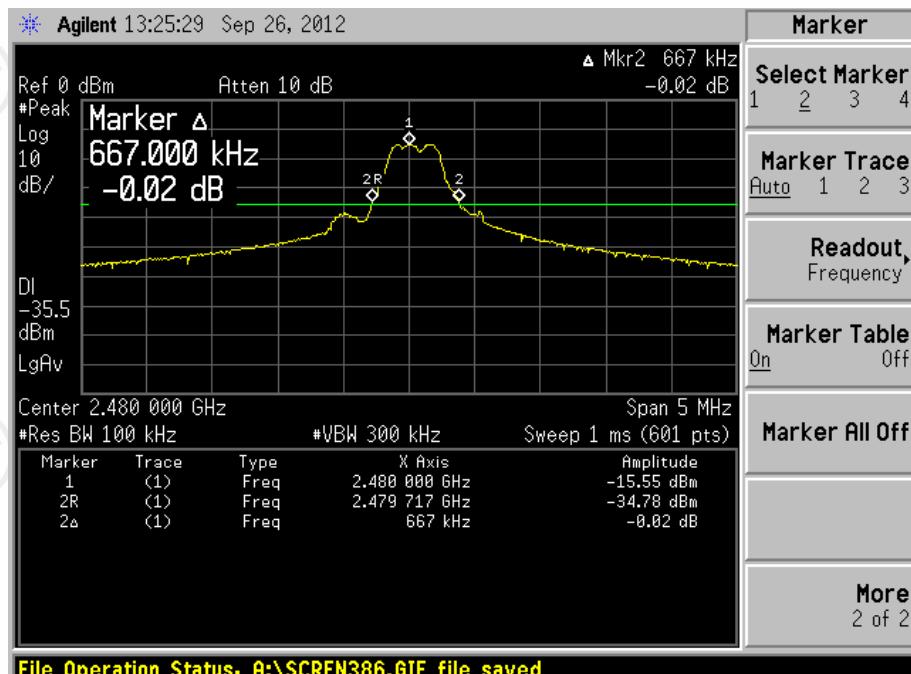
Frequency (MHz)	20 dB BW (MHz)	Result
2406	0.742	0.808MHz
2442	0.808	
2480	0.667	



2406 MHz



2442 MHz



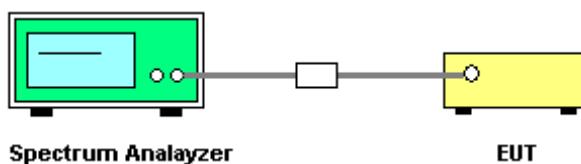
2480 MHz

## 10. OUT OF BAND EMISSION

### 10.1. LIMITS

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

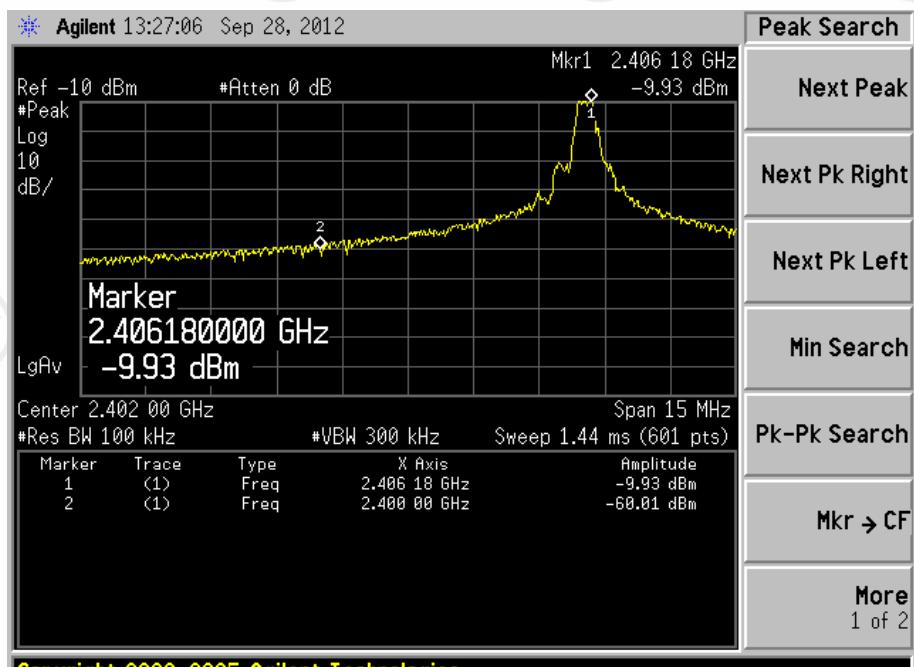
### 10.2. BLOCK DIAGRAM OF TEST SETUP



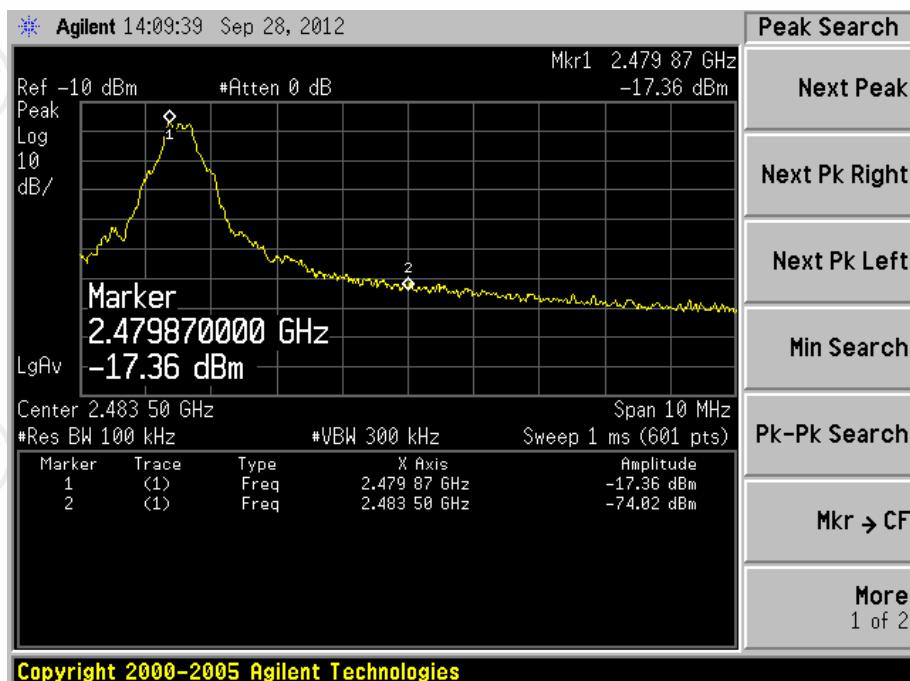
### 10.3. TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set spectrum analyzer's RBW and VBW to applicable value with Peak in Max Hold.
3. Record the emission drops at the band-edge relative to the highest fundamental emission level.
4. Use the marker-delta method to determine band-edge compliance as required.

### 10.4. TEST RESULT



2406MHz



2480MHz

## 11. RADIATED EMISSIONS MEASUREMENT

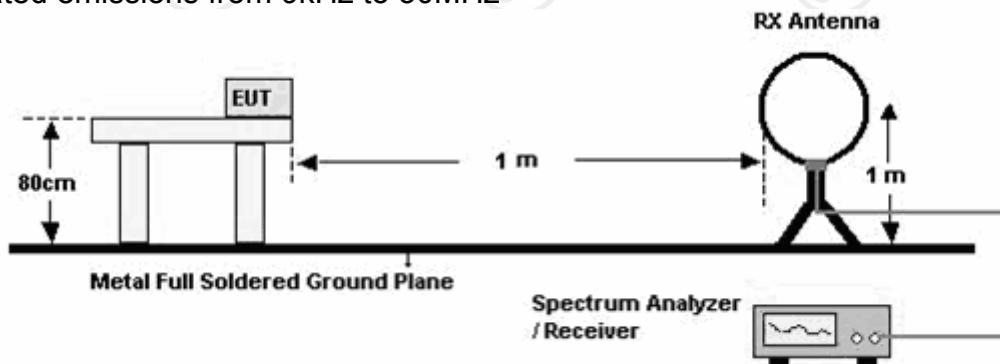
### 11.1. LIMITS

Fundamental Frequency (MHz)	Field strength of fundamental (dB $\mu$ V/m)		Field strength of harmonics (dB $\mu$ V/m)	
	PK	AV	PK	AV
2400-2483.5	114	94	74	54

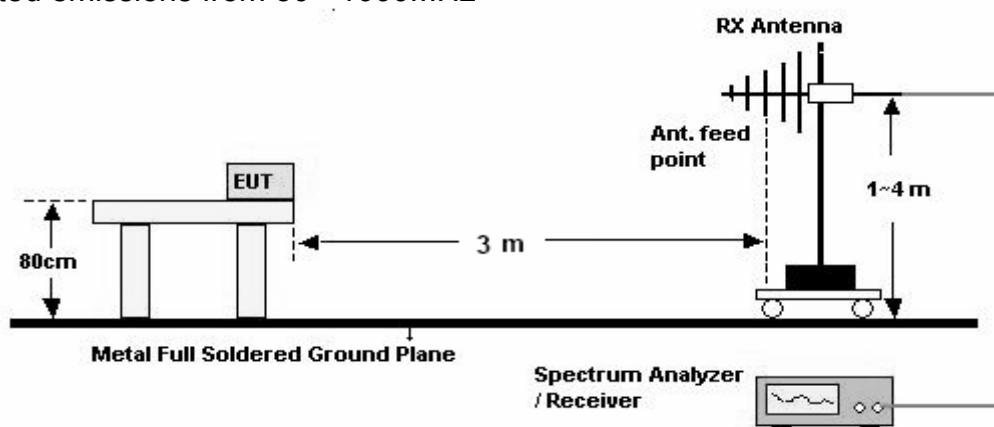
NOTE: For others frequency limits, refer to the § 15.209.

### 11.2. BLOCK DIAGRAM OF TEST SETUP

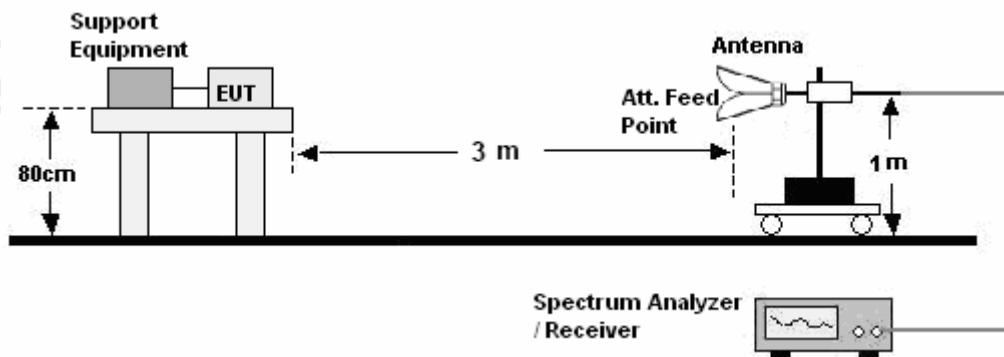
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30 - 1000MHz



For radiated emissions from 1GHz to 25GHz



### 11.3. TEST PROCEDURE

#### A. Above 30MHz

- The Product was placed on the top of a turntable 0.8 meters above the ground in the chamber, 3 meters away from the antenna (wideband antenna), which was mounted on the top of a variable-height antenna tower. The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.
- For each suspected emission, the Product was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test frequency analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

#### B. Below 30MHz

- The Product is placed on a turntable 0.8 meters above the ground in the chamber, 1 meter away from the antenna (loop antenna). The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.
- For each suspected emission, the Product was arranged to its worst case and then turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test frequency analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

### 11.4. TEST RESULT

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Final Emission ( dB $\mu$ V/m)	AC Limit (dB $\mu$ V/m)	Result (Pass / Fail)
159.333	H	QP	27.01	43.5	Pass
175.50	H	QP	29.80	43.5	Pass
2406.000	H	PK	83.77	94.0	Pass
4812.000	H	PK	38.59	54.0	Pass
175.500	V	QP	23.20	43.5	Pass
429.316	V	QP	27.46	46.0	Pass
2406.000	V	PK	88.56	94.0	Pass
4812.000	V	PK	45.62	54.0	Pass

### 2406MHz

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Final Emission ( dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Result (Pass / Fail)
191.667	H	QP	27.01	43.5	Pass
211.0667	H	QP	29.80	43.5	Pass
2442.000	H	PK	82.41	94.0	Pass
4884.000	H	PK	33.56	54.0	Pass
232.083	V	QP	23.72	46.0	Pass
566.733	V	QP	28.80	46.0	Pass
2442.000	V	PK	84.97	94.0	Pass
4884.000	V	PK	41.54	54.0	Pass

### 2442MHz

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Final Emission ( dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Result (Pass / Fail)
224..000	H	QP	30.76	46.0	Pass
427.700	H	QP	31.58	46.0	Pass
2480.000	H	PK	80.59	94.0	Pass
744.566	V	QP	34.11	46.0	Pass
864.200	V	QP	36.00	46.0	Pass
2480.000	V	PK	82.13	94.0	Pass
4960.000	V	PK	38.48	54.0	Pass

2480MHz

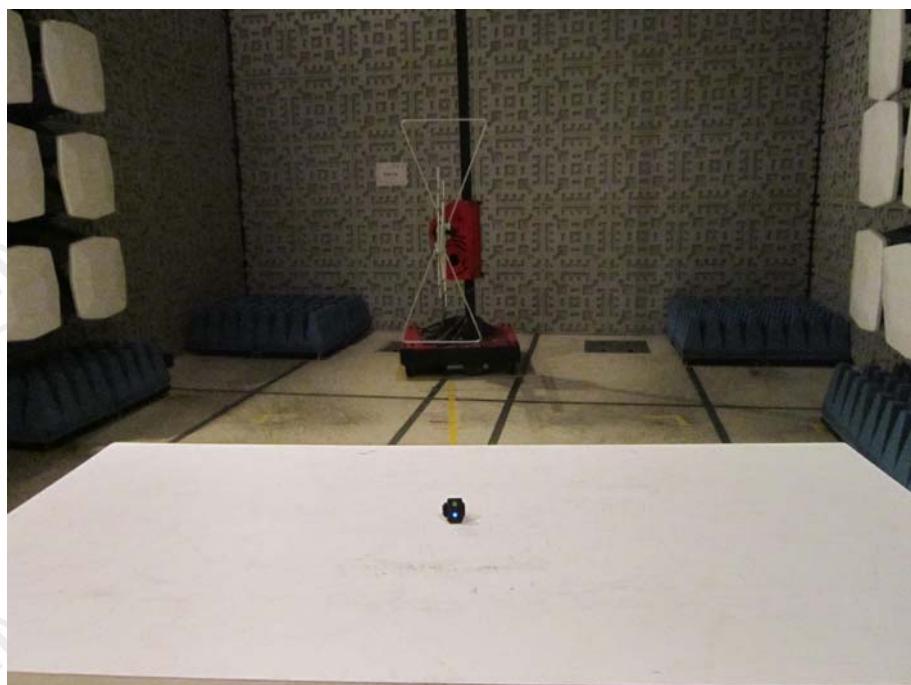
**Note 1:** The above tables show that the frequencies peak data are all below the average limit, so the average data of these frequencies are deemed to fulfill the average limits and not reported.

**Note 2:** The emissions below 30MHz are not reported for they are much lower than the limits.

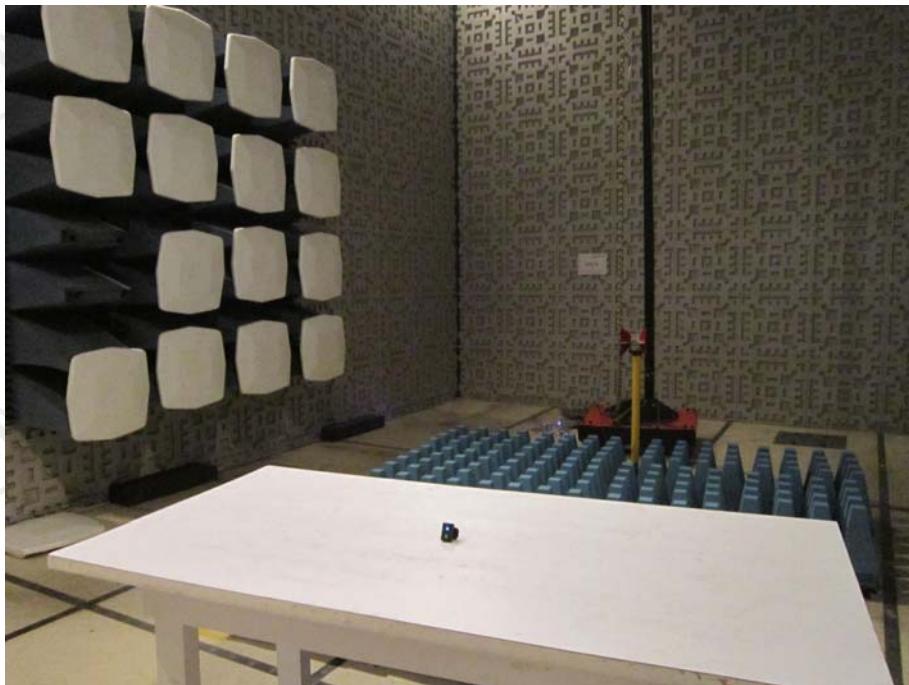
## APPENDIX 1 PHOTOGRAPHS OF TEST SETUP



**CONDUCTED EMISSION TEST SETUP (FOR CHARGING MODE)**



**TEST SETUP OF RADIATED EMISSION (30MHz-1GHz)**



**TEST SETUP OF RADIATED EMISSION (ABOVE 1GHZ)**

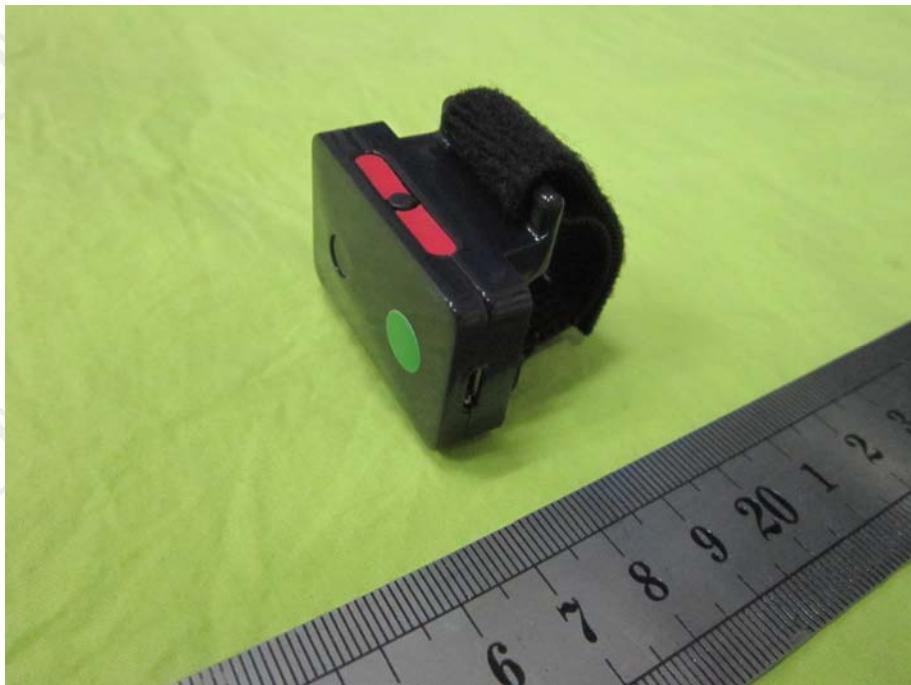
## APPENDIX 2 EXTERNAL PHOTOGRAPHS OF PRODUCT



View of Product-1



View of Product-2



View of Product-3



View of Product-4

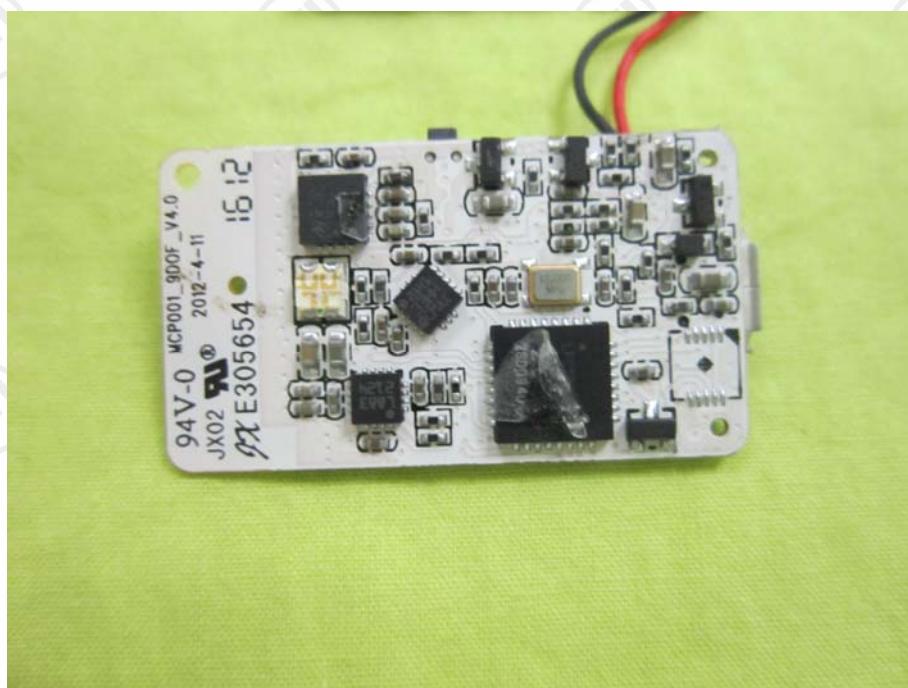
### APPENDIX 3 INTERNAL PHOTOGRAPHS OF PRODUCT



Internal View of EUT



Front View of PCB



Rear View of PCB

\*\*\* End of report \*\*\*

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