TEST REPORT

Date: 2011-10-24
Report No.: 68.870.11.005.01F

Applicant:	MAXWISE Production Enterprise Ltd. Room 1501, 15/F., AT Tower, 180 Electric Road, North Point, Hong Kong

Description of Samples:

Model name:	PS3 BLUETOOTH CONTROLLER
Brand name:	---
Model no.:	5K02047MW, P-0105760, 155273, 233467
FCCID:	Q2VBTCT5K02047

Date Samples Received: 2011-10-08

Date Tested: 2011-10-08 to 2011-10-20

Investigation Requested: FCC Part 15 Subpart C, Section 15.247

Conclusions: The submitted product <u>COMPLIED</u> with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Remarks: ----

Checked by: Approved by:-

John Zhi	Nicolas Cheng
Project Engineer	Project Manager
Wireless & Telecom department	Wireless & Telecom department

Report No.: 68.870.11.005.01F

CONTENT:

5.0   List of Measurement Equipments

Appendix A

Photos of Test Setup

Appendix B

External EUT Photos

Appendix C

Internal EUT Photos

1.0   General Details

1.1   Test Laboratory

SEM.Test Compliance Services Co., Ltd.
EMC Laboratory registered by FCC with
FCC Registration Number: 994117

Test By： *Susan Su*

Susan Su

1.2   Applicant Details
Applicant

MAXWISE Production Enterprise Ltd.

Kong Room 1501, 15/F., AT Tower, 180 Electric
Road, North Point, Hong Kong

Manufacturer

MAXWISE Production Enterprise Ltd.

No.1 Henghai Road, South District, Zhongshan,
Guangdong,China

1.3 Equipment Under Test [EUT]

Description of EUT

Product Description:	PS3 BLUETOOTH CONTROLLER
Model No.:	5K02047MW， P-0105760, 155273, 233467
Brand Name:	Nil
FCCID:	Q2VBTCT5K02047
Rating:	DC 3.6V, LTT-AAA700mAh 3.6V NI-MH
	USB 5V for Charging
Antenna Type:	Integral
Operated Frequency:	2402 -2480 MHz
No. of Channel:	79
Accessories and Auxiliary Equipments:	PC (Manufacture: Lenovo)

General Operation of EUT

The Equipment Under Test (EUT) is a transmitter of PS3 bluetooth controller operated at 2.4GHz; it takes digital signal to the PC. This EUT is designed for portable used, as it is powered by Li-ion chargeable battery only, and the USB jack at the side panel of EUT is for charging input, it cannot share data information with computer.

As per Client Declaration, the circuit design, PCB Layout, shielding and interface of 5K02047MW with other models of P-0105760, 155273, 233467 are the same, they only differ in cosmetic only. So we use 5K02047MW as a representative model to perform all testing.

FHSS Operation Principle:

This module is controlled by microchip to generate Pseudorandom Frequency Hopping Sequence, this module support 79 hopping channels. Refer to section 4.5 of this report to have more detail of Pseudorandom Hopping Algorithm.

1.4 Related Submittal(s) Grants

This is a signal application subjected to Certificate Authorization.

2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2009 and ANSI C63.4: 2003 for FCC Verification

2.2 Test Standards and Results Summary Tables

Test Condition	Test Requirement	Test Result	
		Pass	N/A
Number of Frequency Hopping	Section 15.247 (a1)	☒	☐
20dB Bandwidth Measurement	Section 15.247 (a1)	☒	☐
Hopping Channel Carrier Frequency Separation	Section 15.247 (a1)	☒	☐
Average Time of Occupancy	Section 15.247 (a1)	☒	☐
Pseudorandom Hopping Algorithm	Section 15.247 (a1)	☒	☐
Band Edge Measurement	Section 15.247	☒	☐
Maximum Output Power	Section 15.247 (b1)	☒	☐
Out of Band Emission	Section 15.247 (d)	☒	☐
Radiated Emission in Restricted Band	Section 15.247 (d)	☒	☐
Conducted Emission on AC Mains	Section 15.207	☒	☐
RF Exposure	Section 15.247 (i)	☒ See note 1	☐
Antenna Requirement	Section 15.203	☒ See note 2	☐

Note 1 : Since this EUT is not a portable product it is deemed to fulfill this requirement without conducting SAR measurement.

Note 2 : The EUT uses a permanently attached antenna, which in accordance to Section 15.203, is considered sufficient to comply with the provisions of this section.

Remark: N/A - Not Applicable

3.0 Test Methodology

3.1 Radiated Emission

The sample was placed 0.8m above the ground plane on a standard emission test site *. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

*On a standard emission test site with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 994117.

3.2 Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

$$FS = R + \text{System Factor}$$
$$\text{System Factor} = AF + CF + FA - PA$$

Where FS = Net Field Strength in dBuV/m at 3 meters.
     R = Reading of Spectrum Analyzer / Test Receiver in dBuV.
    AF = Antenna Factor in dB.
    CF = Cable Attenuation Factor in dB.
    FA = Filter Attenuation Factor in dB.
    PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

3.3 Conducted Emissions

The test was performed in accordance with ANSI C63.4: 2003, with the following: initial measurements were performed in peak and average detection modes on the live line of personal computer, any emissions recorded within 30dB of the relevant limit lines were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

4.0   Test Results

4.1   Number of Hopping Frequency

Test Requirement: FCC part 15 section 15.247 (a1)(iii)
Test Date: 2011-10-09
Mode of Operation: Transmitting mode.
Detector Function: Max Hold

Result: PASS

Measured Result :
Number of Channels = 79

Channel Frequency in sequence:

Ch1=2402 Ch2=2403 Ch3=2404 Ch4=2405 Ch5=2406 Ch6=2407 Ch7=2408 Ch8=2409 Ch9=2410 Ch10=2411
Ch11=2412 Ch12=2413 Ch13=2414 Ch14=2415 Ch15=2416 Ch16=2417 Ch17=2418 Ch18=2419 Ch19=2420
Ch20=2421 Ch21=2422 Ch22=2423 Ch23=2424 Ch24=2425 Ch25=2426 Ch26=2427 Ch27=2428 Ch28=2429
Ch29=2430 Ch30=2431 Ch31=2432 Ch32=2433 Ch33=2434 Ch34=2435 Ch35=2436 Ch36=2437 Ch37=2438
Ch38=2439 Ch39=2440 Ch40=2441 Ch41=2442 Ch42=2443 Ch43=2444 Ch44=2445 Ch45=2446 Ch46=2447
Ch47=2448 Ch48=2449 Ch49=2450 Ch50=2451 Ch51=2452 Ch52=2453 Ch53=2454 Ch54=2455 Ch55=2456
Ch56=2457 Ch57=2458 Ch58=2459 Ch59=2460 Ch60=2461 Ch61=2462 Ch62=2463 Ch63=2464 Ch64=2465
Ch65=2466 Ch66=2467 Ch67=2468 Ch68=2469 Ch69=2470 Ch70=2471 Ch71=2472 Ch72=2473 Ch73=2474
Ch74=2475 Ch75=2476 Ch76=2477 Ch77=2478 Ch78=2479 Ch79=2480

Limit for Number of Hopping Channel [Section 15.247 (a1)(iii)]

At least 15 non-overlapping channels for 2400-2483.5MHz.

Figure 1 – Result data graph shows the number of operation channels:
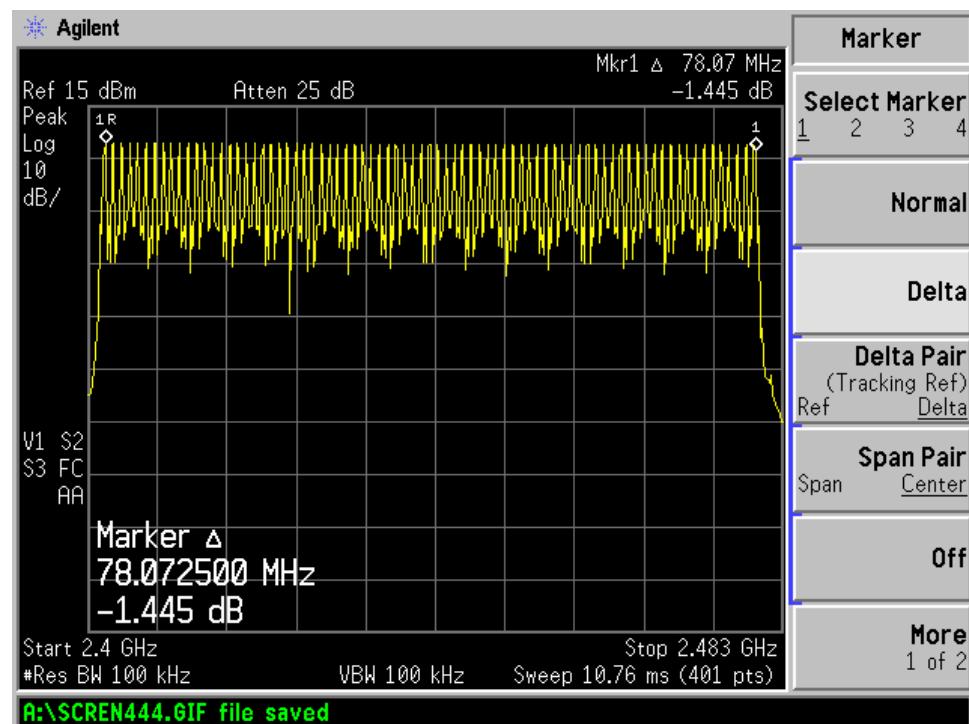
4.2 20dB Bandwidth Measurement

Test Requirement:	FCC part 15 section 15.247 (a1)
Test Date:	2011-10-09
Mode of Operation:	Transmitting mode.
Detector Function:	Max Hold

Test Setup:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

Channel	Measured frequency (MHz)	20dB Bandwidth (MHz)
Lowest : 1	2402	1.133
Middle: 9	2441	1.133
Highest : 16	2480	1.133

This result is used for checking the hopping channel carrier frequencies separation.

Figure 2 – Result data graph shows 20 dB bandwidth, CF = 2.402GHz, BW = 1.133MHz
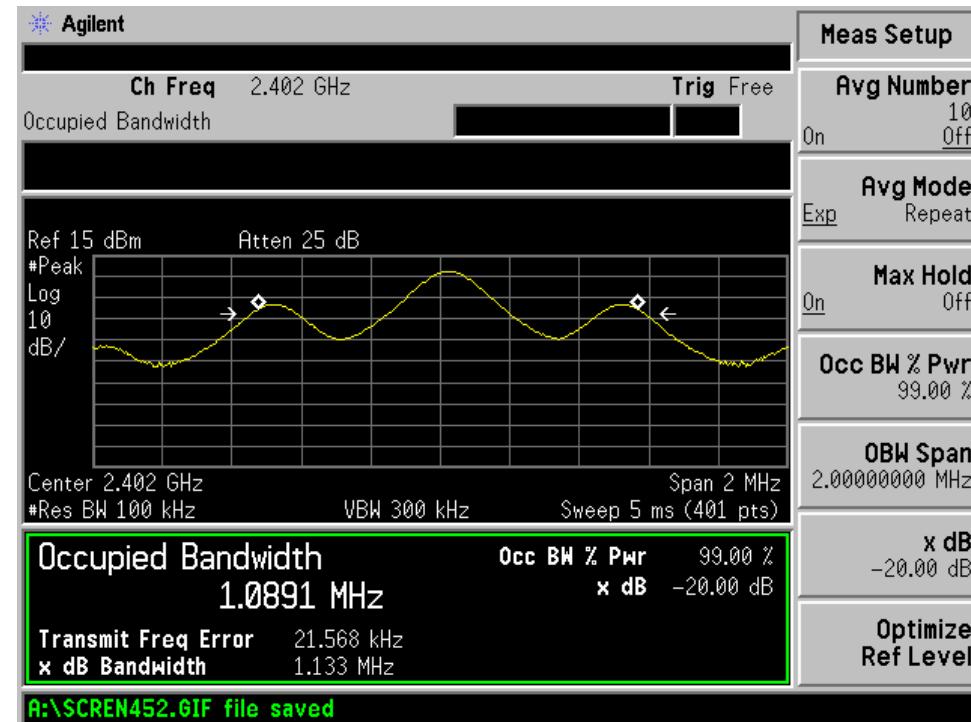
Figure 3 – Result data graph shows 20 dB bandwidth, CF = 2.441GHz, BW = 1.133MHz
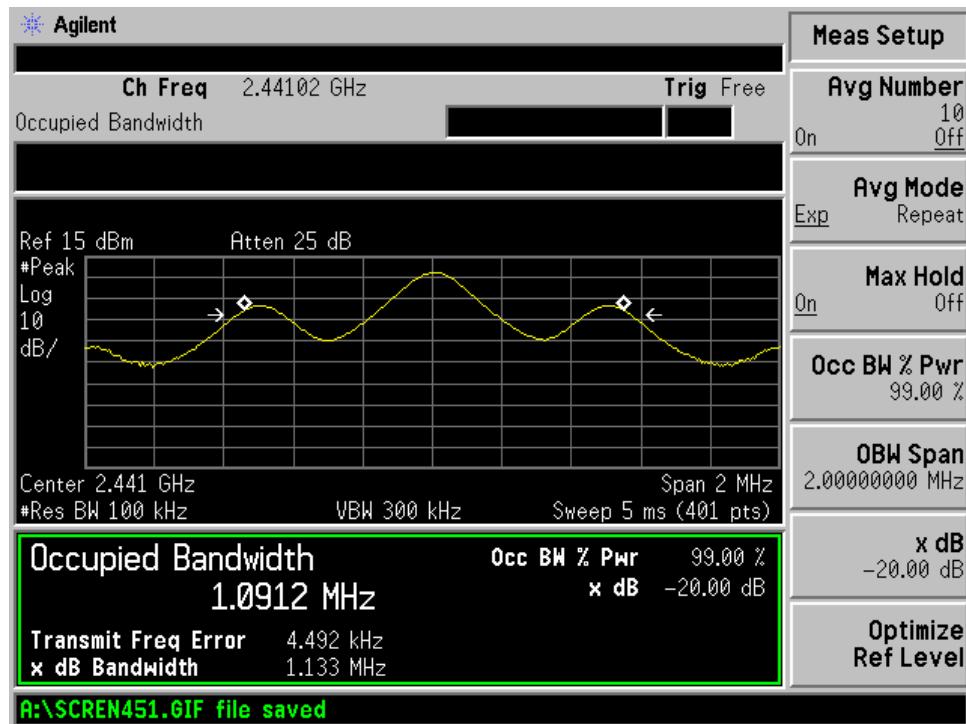

Figure 4 – Result data graph shows 20 dB bandwidth, CF = 2.48GHz, BW = 1.133MHz

TÜV SÜD China.
6th Floor, H Hall, Century Craftwork Culture Square,
No. 4001, Fuqiang Road, Futian District, Shenzhen, China.
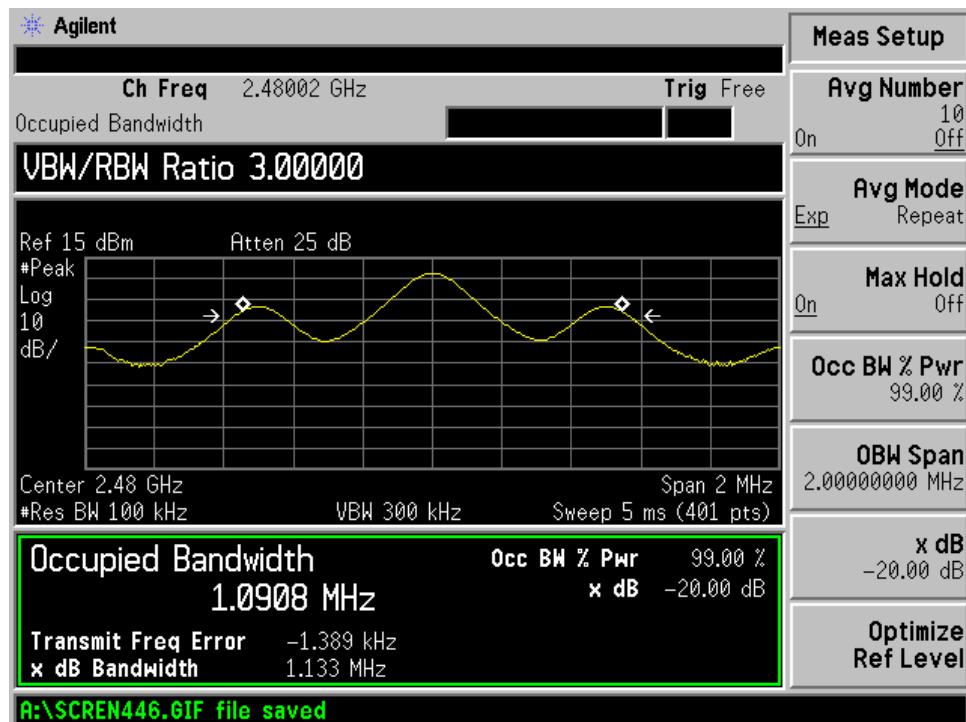
4.3 Hopping Channel Carrier Frequency Separation

Test Requirement: FCC part 15 section 15.247 (a1)
Test Date: 2011-10-09
Mode of Operation: Transmitting mode.
Detector Function: Max Hold

Result: PASS

Measured Result :

Refer to the delta marker, the frequency separation between two adjacent channels is 1.005MHz, therefore requirement of channel separated by a two-thirds of the 20dB bandwidth of the hopping channel is applied.

According to the test result shown in section 4.2, the maximum 20dB bandwidth is 1.133MHz, so the hopping channel separation of this EUT is found to comply with the requirement.

Limits for Hopping Channel Separation [Section 15.247 (a1)]:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25KHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25KHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

Figure 5 – Result data graph shows the channel separation:
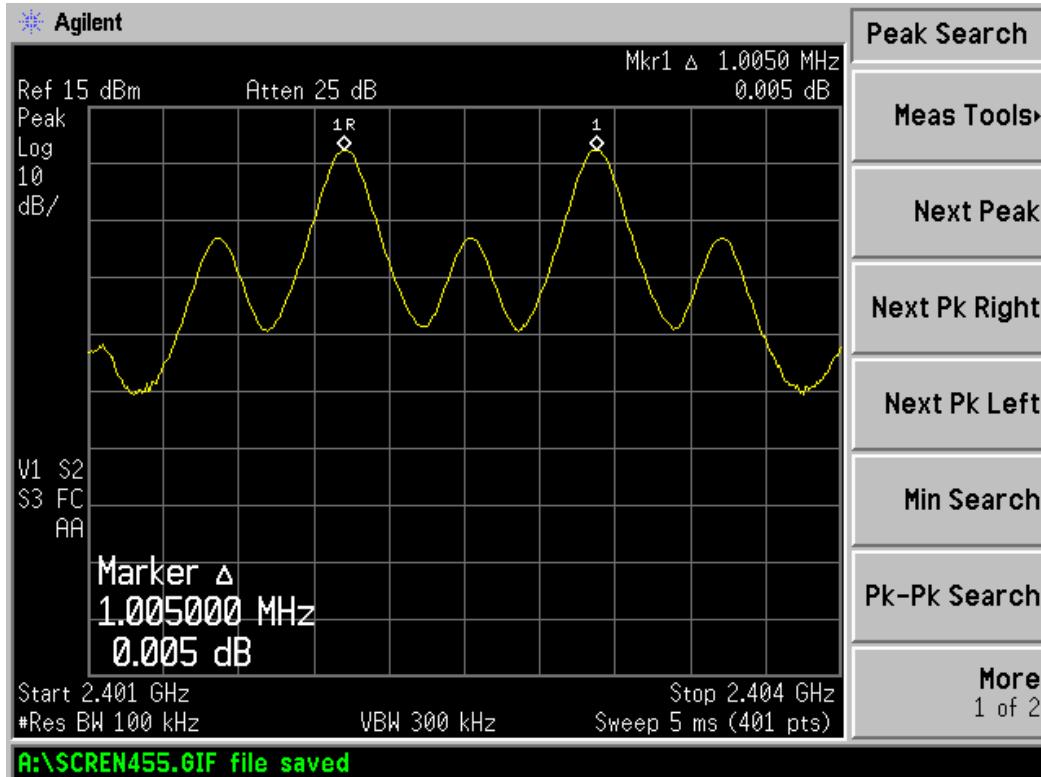
4.4 Average Time of Channel Occupancy

Test Requirement: FCC part 15 section 15.247 (a1)(iii)
Test Date: 2011-10-09
Mode of Operation: Transmitting mode.
Detector Function: Zero span, Sweep time 6.4s

Result : PASS

Measured Result :
Observing time for total 79 hopping channels is 79 x 0.4s = 31.6s
Dwell time = time slot length * hop rate / number of hopping channels *31.6s
The hop rate=1600
Figure 6 show the number of the time slot pulse length

Therefore, the average channel occupancy times (ms)
= 0.44*1600/79*31.6
So, total transmitting time is 281.6ms (<0.4s)

Limits for Average Time of Occupancy [Section 15.247 (a1)(iii)]:

The average time of occupancy on any channel shall not be greater than 0.4 second within a period of 0.4 seconds multiplied by the number of hopping channels employed.

Figure 6 – Result data graph shows time slot pulse length = 0.44ms。

TÜV SÜD China.
6th Floor, H Hall, Century Craftwork Culture Square,
No. 4001, Fuqiang Road, Futian District, Shenzhen, China.
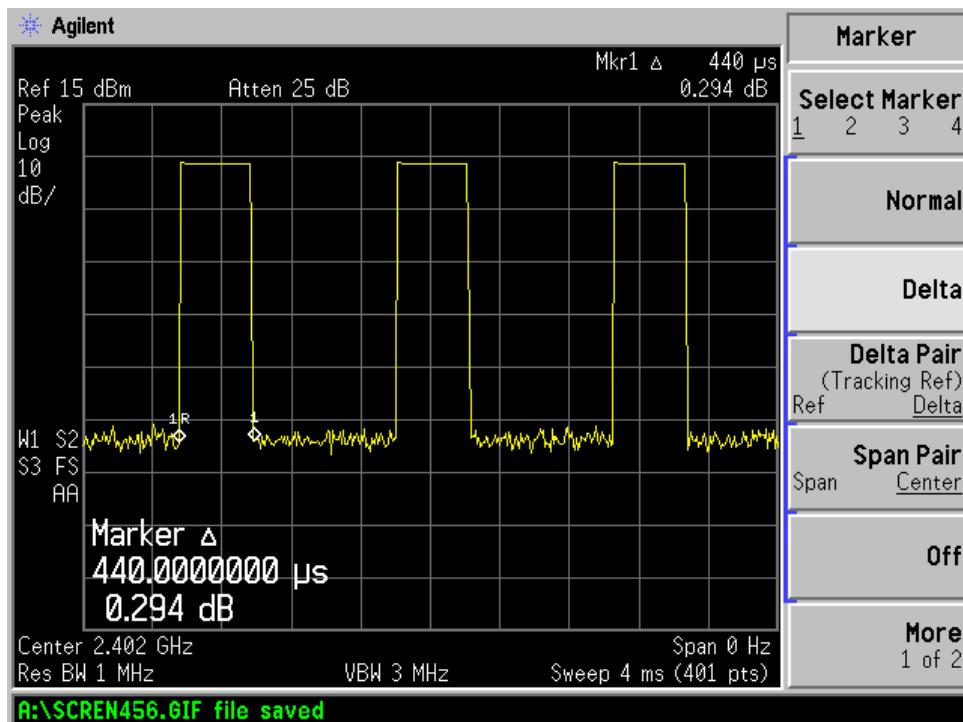
4.5 Pseudorandom Hopping Algorithm

Pseudorandom Frequency Hopping

The embedded FHSS engine uses 79 hopping frequencies. Each channel frequency is selected from a pseudorandom ordered list of hopping frequencies, from 2402MHz to 2480MHz with separating in 1MHz apart from each of the channels. A single data frame is transmitted on each frequency location before skipping to the next hopping frequency in the list.

The system will generate a pseudorandom ordered list base on:

- public address which is unique
- authentication 128 bit key
- encryption 8 - 128 bits key
- a random number which is different for each new transaction.

Frequency use is equally used on average.

System Receiver Input Bandwidth

The receiver bandwidth is equal to the receiver bandwidth in the 79 hopping channel mode, which is 1MHz. The receiver bandwidth was verified during RF hopping to the relative channel.

Requirement for Pseudorandom Hopping Algorithm [Section 15.247 (a1)]:

The channel frequencies shall be selected from a pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on average by the transmitter.

TÜV SÜD China.
6th Floor, H Hall, Century Craftwork Culture Square,
No. 4001, Fuqiang Road, Futian District, Shenzhen, China.

4.6   Band Edge Measurement

Test Requirement: FCC part 15 section 15.247
Test Date: 2011-10-09
Mode of Operation: Transmitting mode.
Detector Function: Max Hold

Result: PASS

Measured Result :

Refer to the figure 9 and 10, it shows the frequency of lower band edge and upper band edge is 2.402GHz and 2.480GHz separately.

Limits of Band Edge for Carrier Frequencies Operated within the Bands [Section 15.247]:

The carrier frequencies should operate within 2400-2483.5MHz.

Figure 7 – Result data graph shows the frequency of lowest channel.
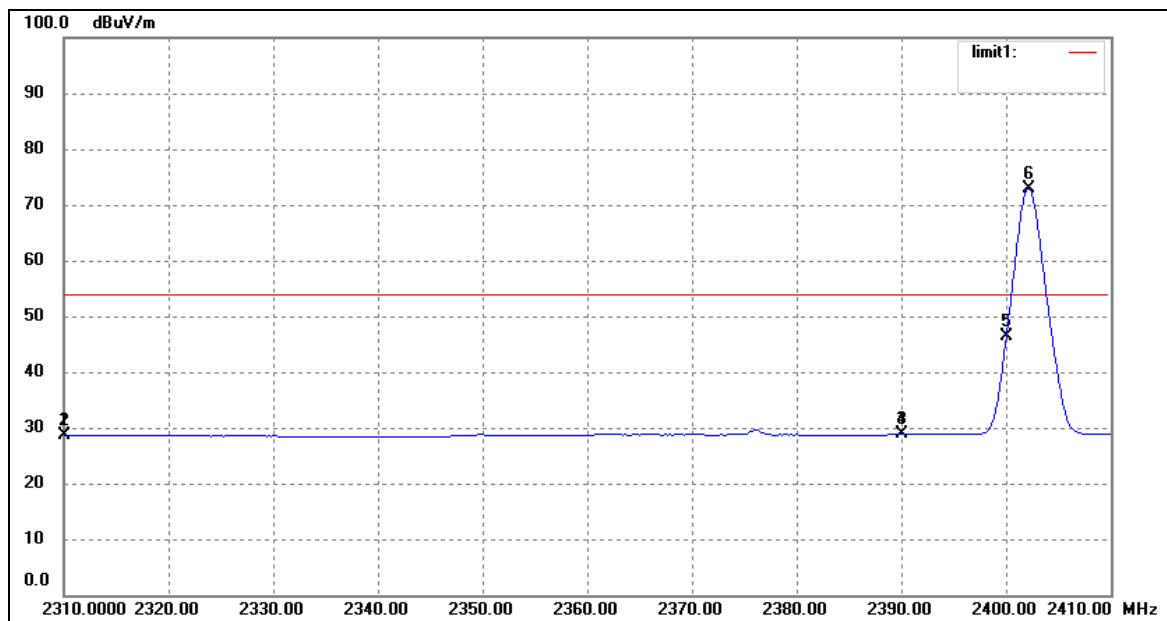
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	36.07	-7.51	28.56	54.00	-25.44	AV
2	2310.000	50.33	-7.51	42.82	74.00	-31.18	PK
3	2390.000	36.21	-7.34	28.87	54.00	-25.13	AV
4	2390.000	50.93	-7.34	43.59	74.00	-30.41	PK
5	2400.000	53.64	-7.31	46.33	54.00	-7.67	PK
6	2402.200	80.08	-7.31	72.77	---	---	PK

Figure 8 – Result data graph shows the frequency of highest channel.

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.500	45.21	-7.13	38.08	54.00	-15.92	AV
2	2483.500	52.80	-7.13	45.67	74.00	-28.33	PK
3	2500.000	35.74	-7.08	28.66	54.00	-25.34	AV
4	2500.000	49.21	-7.08	42.13	74.00	-31.87	PK

4.7   Maximum Output Power

Test Requirement:	FCC part 15 section 15.247 (a1)
Test Method:	ANSI C63.4:2003
Test Date:	2011-10-09
Mode of Operation:	Transmitting mode.
Detector Function:	Peak
Measurement BW:	RBW 5MHz ; VBW 10MHz

Test Setup:

TÜV SÜD China.
6th Floor, H Hall, Century Craftwork Culture Square,
No. 4001, Fuqiang Road, Futian District, Shenzhen, China.
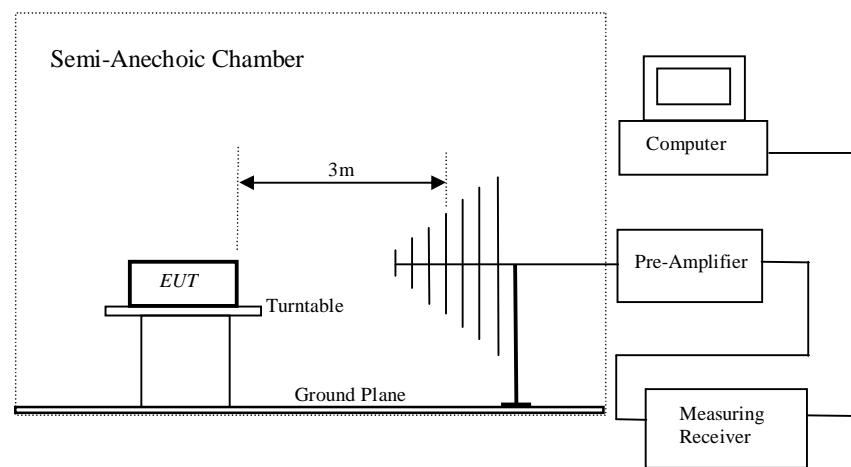
Result : PASS

Frequency	Output Power		Max. Output Power
(MHz)	(dBuV/m)	(V/m)	(mW)
Lowest Channel : 2402	74.2	0.0051	0.0079
Middle Channel : 2441	72.1	0.0040	0.0049
Highest Channel : 2480	81.2	0.0115	0.0395
Limit	117.2	0.723	125.0

Calculate the transmitter's peak power using the following equation:

$$E = \frac{\sqrt{30PG}}{d}$$

Where: E is the measured maximum fundamental field strength in V/m, utilizing a RBW $\geq$ the 20 dB bandwidth of the emission, VBW > RBW, peak detector function. Follow the procedures in C63.4-2003 with respect to maximizing the emission.

G is the numeric gain of the transmitting antenna with reference to an isotropic radiator.
G =0dBi.

d is the distance in meters from which the field strength was measured.

P is the power in watts for which you are solving:

$$P = \frac{(E*d)2}{30G}$$

Limits for Maximum Output Power [Section 15.247 (a1)(iii)]:

For frequency hopping systems employing at least 75 hopping channels: 1 Watt
For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 Watts

4.8   Out of Band Emissions and Emissions in Restricted Bands

Test Requirement:	FCC part 15 section 15.247 (d)
Test Method:	ANSI C63.4:2003
Test Date:	2011-10-09
Mode of Operation:	Transmitting mode.
Detector Function:	Peak
Measurement BW:	RBW 100KHz ; VBW 300KHz below 1GHz
	RBW 1MHz ; VBW 3MHz Above 1GHz

Test Setup:

TÜV SÜD China.
6th Floor, H Hall, Century Craftwork Culture Square,
No. 4001, Fuqiang Road, Futian District, Shenzhen, China.
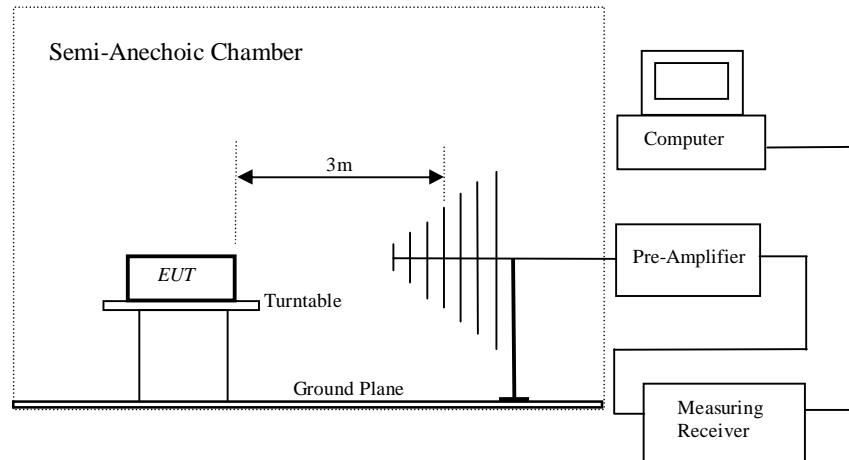
Result : PASS

Out of Frequency Band Emissions:

For out of band emissions that are close to or exceed 20dB attenuation requirement, and emission falls into restricted band, radiated emission was performed in order to show compliance with the general radiated emission requirement.

Result Summary:

Refer to Figure 10 to 11 for the emission data graph, result shows that the significant emissions detected are with more than 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

Limits for Out of Frequency Band Emission [Section 15.247 (d)]:

In any 100kHz 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 100kHz bandwidth within the band that contains the highest level of the desired power. Attenuation below the general limits specified in Section 15.209(a) is not required.

Limit for Radiated Emission Falling in Restricted Bands [Section 15.209]:

Frequency (MHz)	Field Strength [μV/m]	Field Strength [dBμV/m]
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

Radiated emissions, which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209.

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

	Emissions Frequency	E-Field Polarity	Reading	System Factor	Field strength at 3m	Limit	Delta to Limit
	MHz		dBuV/m	dB	dBuV/m	dBuV/m	dBuV/m
				Lowest Channel			
PK	*2259.28	V	53.88	-7.63	46.25	74.00	-27.75
AV		V	47.67	-7.63	40.04	54.00	-13.96
PK	*7521.33	V	49.36	-1.73	47.63	74.00	-26.37
AV		V	43.15	-1.73	41.42	54.00	-12.58
PK	9934.89	V	48.66	1.58	50.24	74.00	-23.76
AV		V	42.45	1.58	44.03	54.00	-9.97
PK	*1195.91	H	54.03	-11.70	42.33	74.00	-31.67
AV		H	47.82	-11.70	36.12	54.00	-17.88
PK	*2248.08	H	54.65	-7.65	47.00	74.00	-27.00
AV		H	48.44	-7.65	40.79	54.00	-13.21
PK	9984.39	H	48.41	1.67	50.08	74.00	-23.92
AV		H	42.2	1.67	43.87	54.00	-10.13
				Middle Channel			
PK	*2327.67	V	58.21	-7.48	50.73	74.00	-23.27
AV		V	52.00	-7.48	44.52	54.00	-9.48
PK	2434.14	V	56.96	-7.24	49.72	74.00	-24.28
AV		V	50.75	-7.24	43.51	54.00	-10.49
PK	9984.39	V	48.34	1.67	50.01	74.00	-23.99
AV		V	42.13	1.67	43.80	54.00	-10.20
PK	*1195.97	H	52.15	-11.70	40.45	74.00	-33.55
AV		H	45.94	-11.70	34.24	54.00	-19.76
PK	*2327.67	H	58.22	-7.48	50.74	74.00	-23.26
AV		H	52.01	-7.48	44.53	54.00	-9.47
PK	10034.14	H	49.02	1.74	50.76	74.00	-23.24
AV		H	42.81	1.74	44.55	54.00	-9.45
				Highest Channel			
PK	*1195.91	V	52.12	-11.70	40.42	74.00	-33.58
AV		V	45.91	-11.70	34.21	54.00	-19.79
PK	*4945.00	V	51.38	-11.25	40.13	74.00	-33.87
AV		V	45.17	-11.25	33.92	54.00	-20.08
PK	3586.73	V	49.53	-5.81	43.72	74.00	-30.28
AV		V	43.32	-5.81	37.51	54.00	-16.49
PK	9984.39	V	48.60	1.67	50.27	74.00	-23.73
AV		V	42.39	1.67	44.06	54.00	-9.94
PK	*1195.91	H	53.23	-11.70	41.53	74.00	-32.47
AV		H	47.02	-11.70	35.32	54.00	-18.68
PK	*4621.42	H	49.60	-4.80	44.80	74.00	-29.20
AV		H	43.39	-4.80	38.59	54.00	-15.41
PK	*5391.19	H	50.21	-4.13	46.08	74.00	-27.92
AV		H	44.00	-4.13	39.87	54.00	-14.13
PK	6775.94	H	49.41	-2.29	47.12	74.00	-26.88
AV		H	43.20	-2.29	40.91	54.00	-13.09
PK	9934.89	H	49.07	1.58	50.65	74.00	-23.35
AV		H	42.86	1.58	44.44	54.00	-9.56

TÜV SÜD China.
6th Floor, H Hall, Century Craftwork Culture Square,
No. 4001, Fuqiang Road, Futian District, Shenzhen, China.

For charging and transmitting by PC below 1GHz emissions

Channel	Value	Emissions	E-Field	Reading	System	Field	Limit	Delta to
						Strength		
		Frequency	Polarity		Factor	at 3m		Limit
		MHz		dBµV/m	dB	dBµV/m	dBµV/m	dBµV/m
ALL	QP	36.0007	V	23.96	7.05	31.01	40.00	-8.99
ALL	QP	46.6664	V	25.26	8.14	33.40	40.00	-6.60
ALL	QP	98.8326	V	14.91	8.34	23.25	43.50	-20.25
ALL	QP	*168.4138	V	19.72	4.84	24.56	43.50	-18.94
ALL	QP	578.6699	V	19.40	16.18	35.58	46.00	-10.42
ALL	QP	925.7563	V	17.52	21.38	38.90	46.00	-7.10
ALL	QP	31.7313	H	19.25	6.77	26.02	40.00	-13.98
ALL	QP	51.4807	H	15.63	7.91	23.54	40.00	-16.46
ALL	QP	96.0986	H	17.24	8.14	25.38	43.50	-18.12
ALL	QP	*168.4138	H	24.86	4.84	29.70	43.50	-13.80
ALL	QP	482.2156	H	22.46	12.67	35.13	46.00	-10.87
ALL	QP	766.0571	H	20.48	18.51	38.99	46.00	-7.01

Refer to Figure 9 to 11 shows the worst case channel's emission data graph from 30MHz-26GHz.

Result Summary:

1) Communication mode: All other emissions are more than 20dB below FCC part 15.209 limit.

2) No further spurious emissions found between 30 MHz and lowest internal used/generated frequency and from   30MHz to 1GHz.

Remarks:

1. " * " Radiated emissions which fall in the restricted bands as defined in Section 15.205(a).

2. Emission level with more than 20dB below the FCC required limit is not mentioned in table.

3. Delta to Limit = Field strength (dBµV/m) – Limit (dBµV/m).

4. Average factor= 20 log(duty cycle)=20 log(0.44/0.9)=-6.21

5. Calculated measurement uncertainty: 9kHz -30MHz: 1.8dB.
                                       30MHz -1GHz: 5.2dB.
                                       1GHz -18GHz: 5.1dB.

Below 1GHz emission data

Figure 9 – Radiated emission data graph (30MHz-1GHz)

Horizontal

Vertical

TÜV SÜD China.
6th Floor, H Hall, Century Craftwork Culture Square,
No. 4001, Fuqiang Road, Futian District, Shenzhen, China.
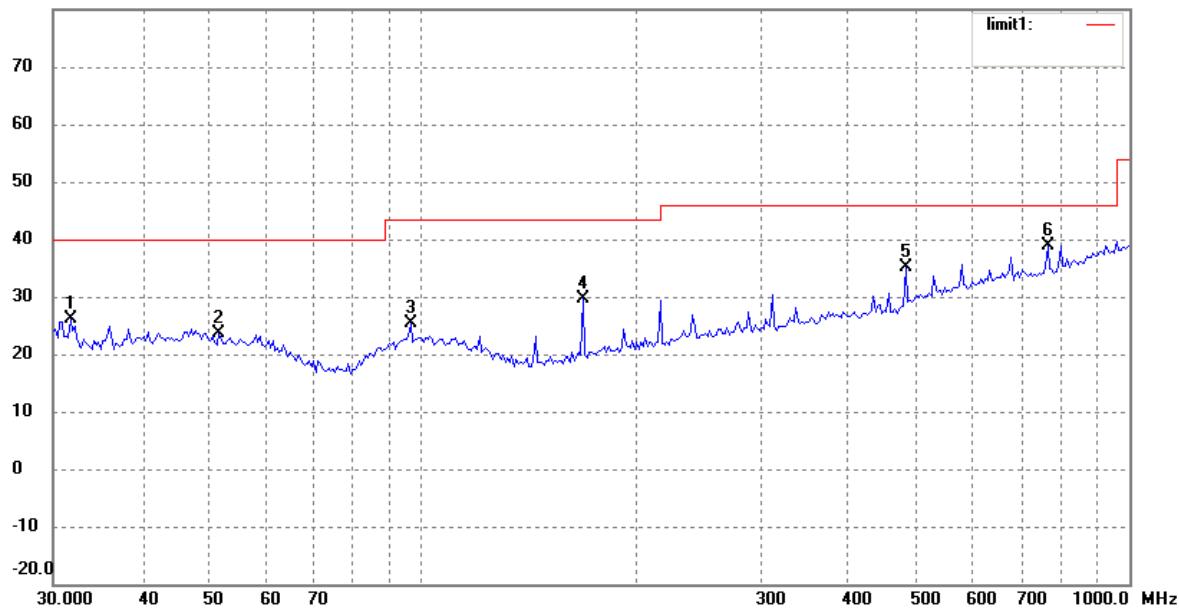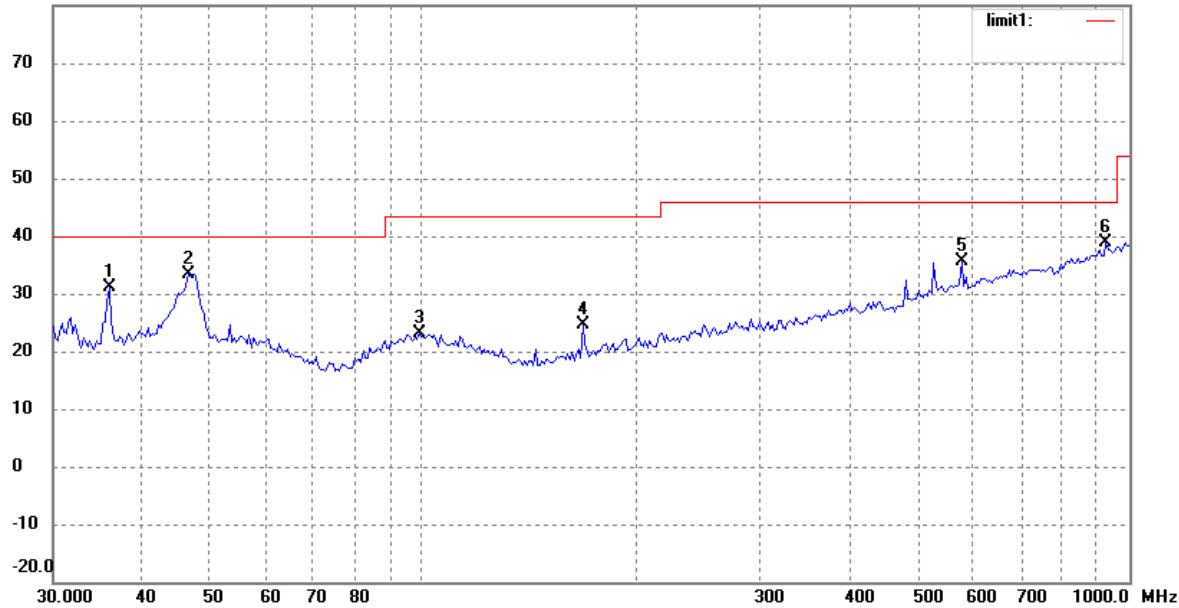
Figure 10 – Radiated emission data graph (Vertical polarization, 1GHz-26GHz)

Lowest Channel

Middle Channel

TÜV SÜD China.
6th Floor, H Hall, Century Craftwork Culture Square,
No. 4001, Fuqiang Road, Futian District, Shenzhen, China.
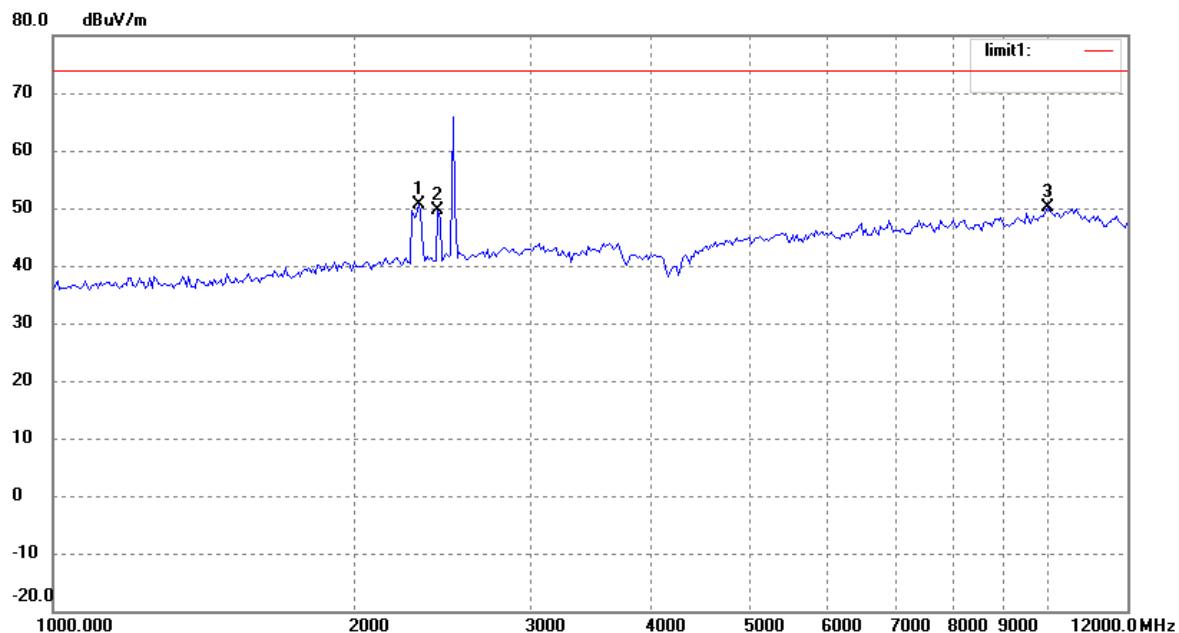
Highest Channel

Remark: Only background noise was measured from 12GHz-26GHz.

**Figure 11 – Radiated emission data graph (Horizontal polarization, 30MHz-1GHz)**

Lowest Channel

TÜV SÜD China.
6th Floor, H Hall, Century Craftwork Culture Square,
No. 4001, Fuqiang Road, Futian District, Shenzhen, China.
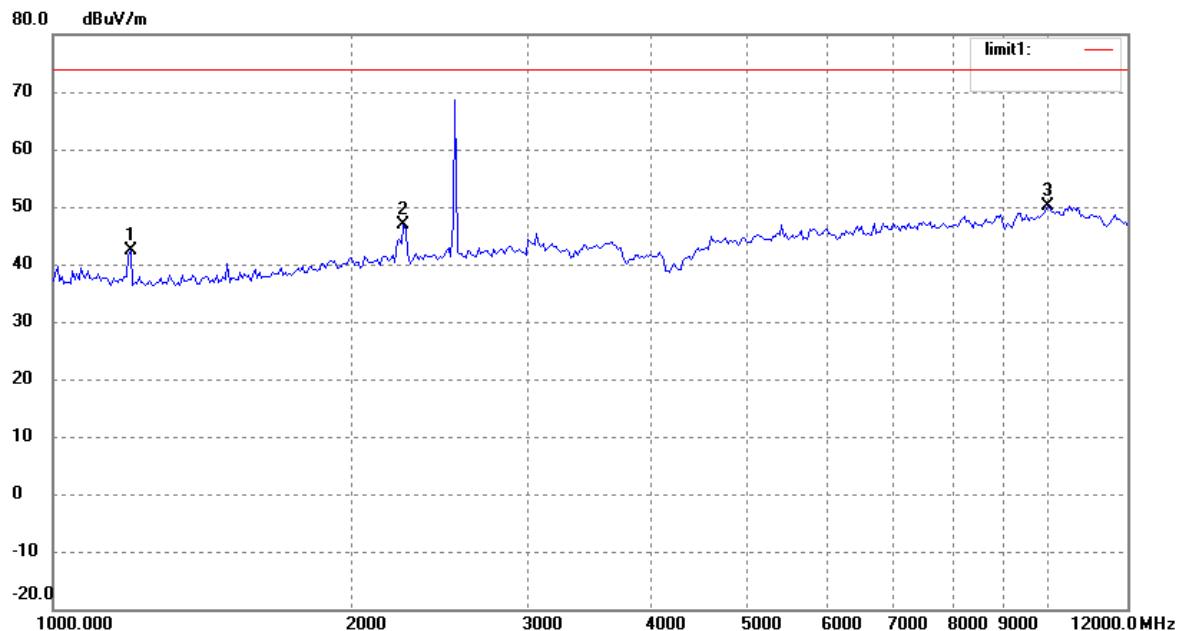
Middle Channel
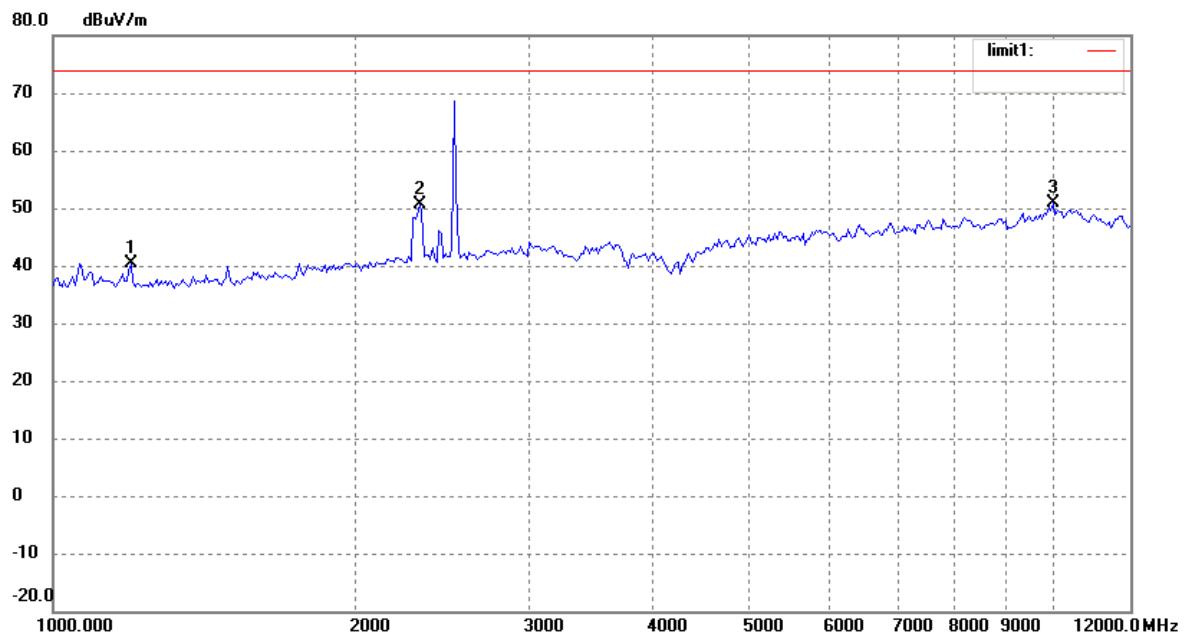
Highest Channel
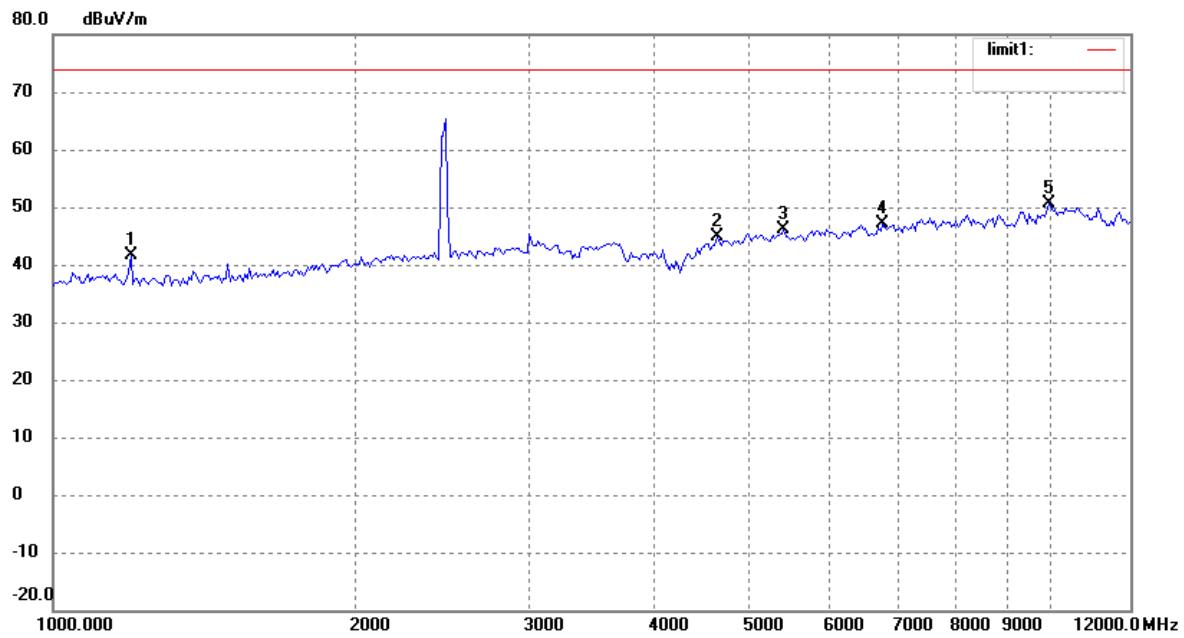
Remark: Only background noise was measured from 12GHz-26GHz.

4.9   Conducted Emissions (0.15MHz to 30MHz)

|	
Test Requirement:	FCC part 15 Section 15.207 Class B
Test Method:	ANSI C63.4:2003
Test Date:	2011-10-09
Mode of Operation:	-Transmitting mode
Detector Function:	CISPR Quasi Peak
Measurement BW:	9 kHz
Worst Case Channel:	1

Results: PASS

Test Setup
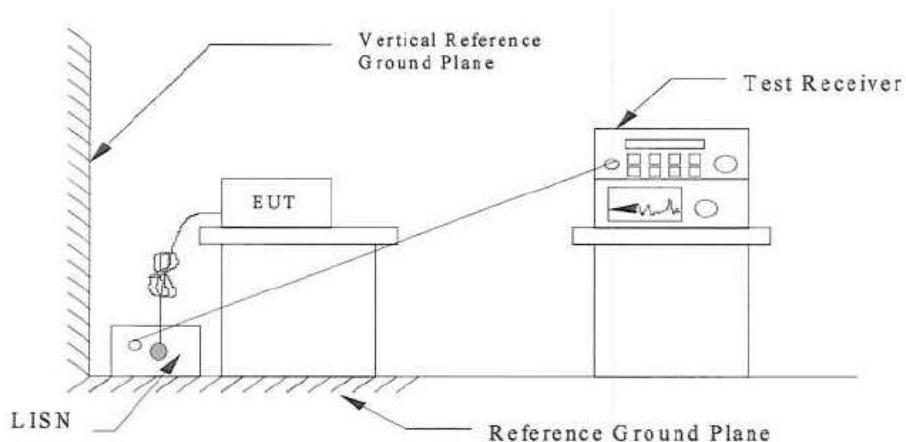
- Refer Figure 12 for the result data graph.

Figure 12– Result data graph shows the conducted emission (Live and Neutral).

For Charging and Communicating by PC /Line Port
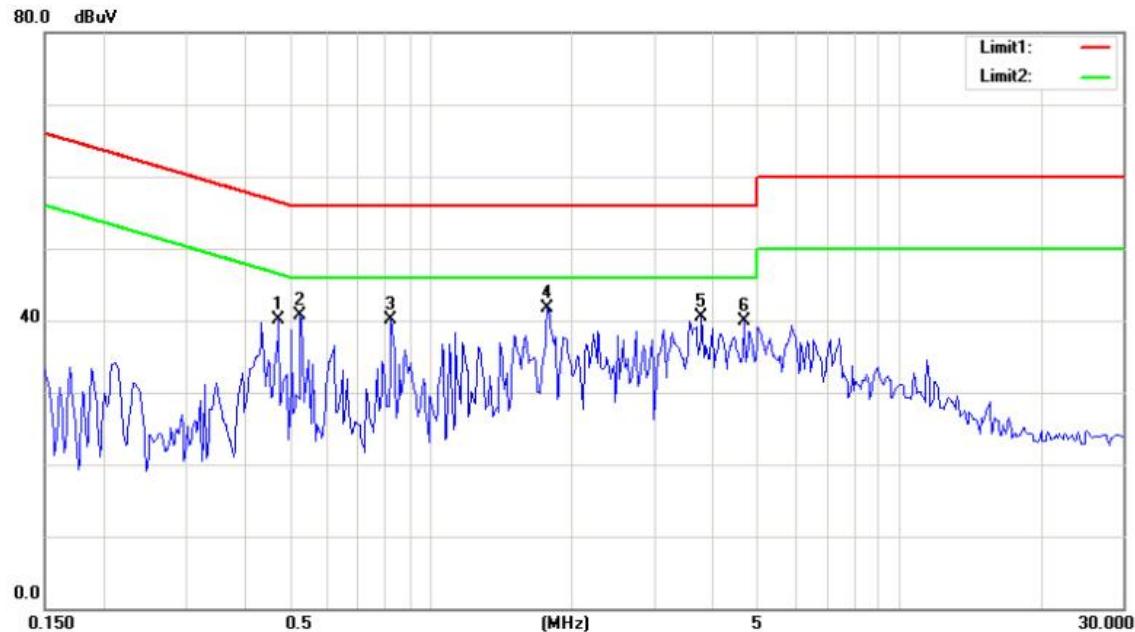
For Charging and Communicating by PC /Neutral Port
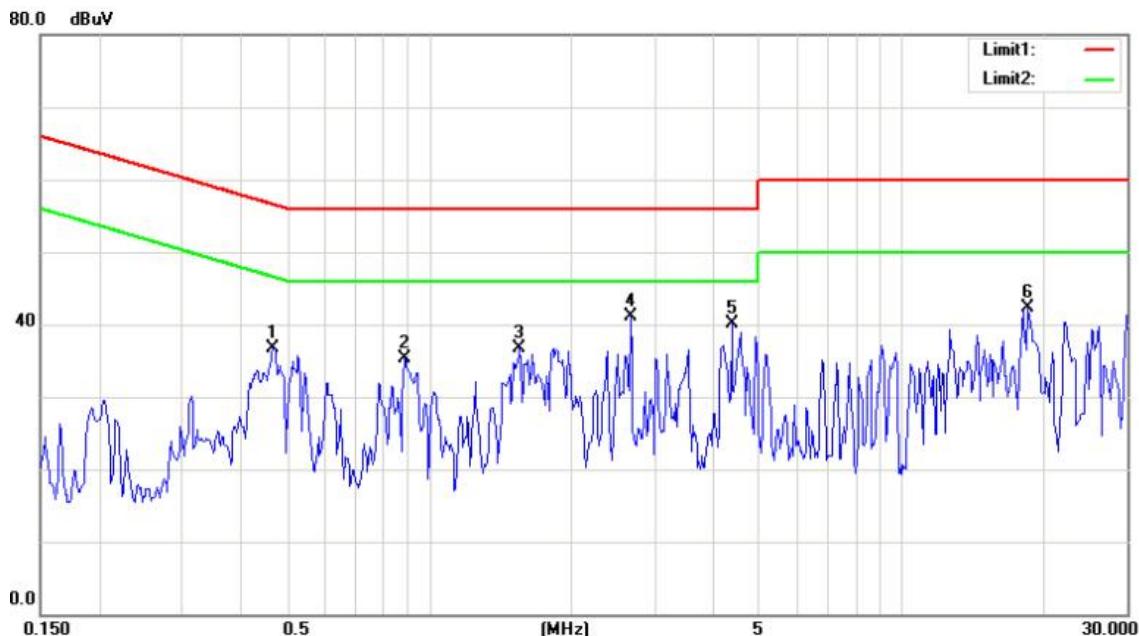
Conducted Emissions					
Frequency (MHz)	Detector (QP/AV)	Phase	Result (dBμV)	Limit (dBμV)	Margin
0.4663	QP	L	36.75	56.58	-19.83
0.8881	QP	L	35.27	56.00	-20.73
1.5562	QP	L	36.79	56.00	-19.21
2.6695	QP	L	41.08	56.00	-14.92
4.3631	QP	L	40.18	56.00	-15.82
18.5155	QP	L	42.28	60.00	-17.72
0.4742	QP	N	40.06	56.44	-16.38
0.529	QP	N	40.76	56.00	-15.24
0.8217	QP	N	40.06	56.00	-15.94
1.779	QP	N	41.78	56.00	-14.22
3.789	QP	N	40.45	56.00	-15.55

Limits for Conducted Emission [Section 15.207]:

Frequency Range [MHz]	Quasi-Peak Limit [dBμV]	Average Limit [dBμV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Remarks:
Calculated measurement uncertainty: ±2.8dB

Report No.: 68.870.11.005.01F

5.0   List of Measurement Equipment

Radiated Emission and Out of Band Emissions

Description	Manufacturer	Model no.	Serial no.	Last cal	CAL due
Spectrum Analyzer	Agilent	E4402B	US41192821	2011-08-12	2012-08-11
Moisture Test Chamber	GONGWEN	GDS-150	SEMT-0013	2011-07-16	2012-07-15
DC Power Supply	LW	APR-3003	N/A	2011-07-16	2012-07-15
Spectrum Analyzer	Agilent	E4402B	US41192821	2011-08-12	2012-08-11
Moisture Test Chamber	GONGWEN	GDS-150	SEMT-0013	2011-07-16	2012-07-15
Spectrum Analyzer	R&S	FSP	836079/035	2010-12-20	2011-12-19
Positioning Controller	C&C	CC-C-1F	N/A	2010-12-20	2011-12-19
RF Switch	EM	EMSW18	SW060023	2010-12-20	2011-12-19
Pre-amplifier	Agilent	8447F	3113A06717	2010-12-20	2011-12-19
Pre-amplifier	Compliance Direction	PAP-0118	24002	2010-12-20	2011-12-19
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2011-01-09	2012-01-08
Horn Antenna	ETS	3117	00086197	2011-01-09	2012-01-08
Anechoic chamber	Albatross Projects	MCDC	----	2010-03-20	2012-03-19

Conducted Emission

Description	Manufacturer	Model no.	Serial no.	Last cal	CAL due
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2010-12-20	2011-12-19
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2010-12-20	2011-12-19
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2010-12-20	2011-12-19
AMN	EMCO	3825/2	11967C	2010-12-20	2011-12-19
Current Probe	FCC	F-33-4	091684	2010-12-20	2011-12-19

Remarks:
CM   Corrective Maintenance
N/A   Not Applicable or Not Available

TÜV SÜD China.
6th Floor, H Hall, Century Craftwork Culture Square,
No. 4001, Fuqiang Road, Futian District, Shenzhen, China.

APPENDIX A – Photos of Test Setup

Conducted Emission (150kHz to 30MHz)

Radiated Emission (Below 1GHz)

APPENDIX A – Photos of Test Setup

Radiated Emission (Above 1GHz)

TÜV SÜD China.
6th Floor, H Hall, Century Craftwork Culture Square,
No. 4001, Fuqiang Road, Futian District, Shenzhen, China.

APPENDIX B – External of EUT

APPENDIX B – External of EUT