



# FCC 47 CFR PART 15 SUBPART C

## TEST REPORT

*For*

**Applicant :** GTSYS LIMITED

**Address :** 23/F, Heng Shan Centre, 145 Queen's Road East, Wan Chai, Hong Kong

**Product Name :** INTEGRATED RFID READER

**Model Name :** IR-U-POE/12

**Brand Name :** GTSYS "R.I.A."

**FCC ID :** A2BIRUPOE-12-30DB

**Report No. :** STS140523F2

**Date of Issue :** June. 24, 2014

**Issued by :** Shenzhen Super Test Service Technology Co., Ltd.

**Address :** No.5, Langshan 2nd Rd., North Hi-Tech Industrial Park, Nanshan Shenzhen, China

**Tel :** 86-755-2795 8522

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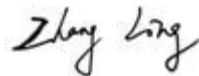
## 1. VERIFICATION OF CONFORMITY

**Equipment Under Test:** INTEGRATED RFID READER  
**Brand Name:** GTSYS "R.I.A."  
**Model Number:** IR-U-POE/12  
**Series Model Name:** N/A  
**Difference description:** N/A  
**FCC ID:** A2BIRUPOE-12-30DB  
**Applicant:** GTSYS LIMITED  
23/F, Heng Shan Centre, 145 Queen's Road East, Wan Chai, Hong Kong  
CWLinux Limited  
**Manufacturer:** Unit 138, 13/F Weswick Cermercial Bld. 147-151 Queen's Road East , Wan Chai, Hong Kong  
**Technical Standards:** 47 CFR Part 15 Subpart C  
**File Number:** STS140523F2  
**Date of test:** June 09, 2014 ~ June 24, 2014  
**Deviation:** None  
**Condition of Test Sample:** Normal  
**Test Result:** PASS

The above equipment was tested by STS for compliance with the requirements set forth in FCC rules and the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Tested by (+ signature):



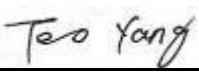
Zhang Ling

Review by (+ signature):



July Wen

Approved by (+ signature):



Terry Yang

## 2. GENERAL INFORMATION

### 2.1 Product Information

<b>EUT Description</b>	
Description:	INTEGRATED RFID READER
Brand Name:	GTSYS "R.I.A."
Model Name:	IR-U-POE/12
Series Number:	N/A
Model Difference description:	N/A
Power Supply:	802.3at POE Injector
Frequency Range:	902.75MHz-927.25MHz(Low:902.75MHz, Middle:914.75MHz, High:927.25MHz)
Number of Channels:	50
Modulation Technique:	DSB-ASK
Antenna Type:	Internal
Antenna Gain:	12 dBi
Temperature Range:	-20°C ~ +55°C

**NOTE:**

1. For a more detailed features description about the EUT, please refer to User's Manual.

## 2.2 Objective

The objective of the report is to perform tests according to 47 CFR Part 15 Subpart C for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15(10-1-05 Edition)	Radio Frequency Devices

## 2.3 Test Standards and Results

Test items and the results are as bellow:

No.	Section	Description	Result	Date of Test
1	15.247(a)	Number of Hopping Frequency	PASS	2014-06-13
2	15.247(a)	20dB Bandwidth	PASS	2014-06-13
3	15.247(b)	Peak Output Power	PASS	2014-06-13
4	15.247(a)	Carrier Frequency Separation	PASS	2014-06-13
5	15.247(a)	Time of Occupancy (Dwell time)	PASS	2014-06-13
6	15.247(d)	Conducted Spurious Emission	PASS	2014-06-13
7	15.247(d)	Band Edge	PASS	2014-06-15
8	15.207	Conducted Emission	PASS	2014-06-15
9	15.247(d) 15.205 15.209	Radiated Emission	PASS	2014-06-15

*Note:* 1. The test result judgment is decided by the limit of measurement standard  
 2. The information of measurement uncertainty is available upon the customer's request.

## Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15-35°C
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

### 3. TEST FACILITY

#### 3.1 TEST FACILITY

Test Site: BZT Testing Technology Co.,Ltd.  
Location: 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China.  
Description: The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003.  
FCC Registration No.: 701733

#### 3.2 GENERAL TEST PROCEDURES

##### **EUT Function and Test Mode**

The EUT has been tested under normal operating (TX) and standby (RX) condition.

The field strength of radiation emission was measured in the following position: EUT stand-up position (Y axis), lie-down position (X, Z axis).

The following data show only with the worst case setup.

The worst case of Y axis was reported.

Based on client request, all normal using modes of the normal function were tested but only the worst test data of the worst mode is recorded by this report.

### Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4:2009, Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

### Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4:2003.

### **3.3 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS**

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

#### 4. TEST EQUIPMENT LIST

**Instrumentation:** The following list contains equipment used at MOST for testing. The equipment conforms to the CISPR 16-1/ANSI C63.2 Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10 kHz to 1.0 GHz or above.

No.	Equipment	Manufacturer	Model No.	S/N	Calculator due date
1	Test Receiver	Rohde & Schwarz	ESCI	100492	2015/03/14
2	Spectrum Analyzer	Agilent	E7405A	US44210471	2015/03/14
3	L.I.S.N.	Rohde & Schwarz	ENV216	100093	2015/03/14
4	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2015/03/14
5	Terminator	Hubersuhner	50Ω	No.1	2015/03/14
6	RF Cable	SchwarzBeck	N/A	No.1	2015/03/14
7	Test Receiver	Rohde & Schwarz	ESPI	101202	2015/03/14
8	Bilog Antenna	Sunol	JB3	A121206	2015/03/14
9	Horn Antenna	TRC	N/A	N/A	2015/03/14
10	Cable	Resenberger	N/A	NO.1	2015/03/14
11	Cable	SchwarzBeck	N/A	NO.2	2015/03/14
12	Cable	SchwarzBeck	N/A	NO.3	2015/03/14
13	DC Power Filter	DuoJi	DL2×30B	N/A	2015/03/14
14	Single Phase Power Line Filter	DuoJi	FNF 202B30	N/A	2015/03/14
15	3 Phase Power Line Filter	DuoJi	FNF 402B30	N/A	2015/03/14
16	Test Receiver	Rohde & Schwarz	ESCI	100492	2015/03/14
17	Absorbing Clamp	Luthi	MDS21	3635	2015/03/14
18	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2015/03/14
19	AC Power Source	Kikusui	AC40MA	LM003232	2015/03/14
20	Test Analyzer	Kikusui	KHA1000	LM003720	2015/03/14
21	Line Impedance Network	Kikusui	LIN40MA-PCR-L	LM002352	2015/03/14
22	ESD Tester	Kikusui	KES4021	LM003537	2015/03/14
23	EMCPRO System	EM Test	UCS-500-M4	V0648102026	2015/03/14
24	Signal Generator	IFR	2032	203002/100	2015/03/14
25	Amplifier	A&R	150W1000	301584	2015/03/14
26	CDN	FCC	FCC-801-M2-25	47	2015/03/14
27	CDN	FCC	FCC-801-M3-25	107	2015/03/14
28	EM Injection Clamp	FCC	F-203I-23mm	403	2015/03/14
29	RF Cable	MIYAZAKI	N/A	No.1/No.2	2015/03/14
30	Universal Radio Communication Tester	ROHDE&SCHWARZ	CMU200	0304789	2015/03/14
31	Telecommunication Antenna	European Antennas	PSA 75301R/170	0304213	2015/03/14

**NOTE:** Equipments listed above have been calibrated and are in the period of validation.

## 5. 47 CFR Part 15 C 15.247 Requirements

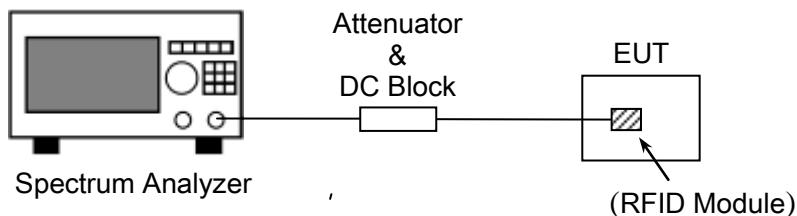
### 5.1 Number of Hopping Frequency

#### Definition

According to FCC section 15.247(a)(1)(i), For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

#### Test Description

The EUT is DC 48V power by ISO802.3AT Type2 PoE Injector, is coupled to the Spectrum Analyzer (SA) through the Attenuator/DC Block. The path loss as the factor is calibrated to correct the reading. During the measurement, the EUT is activated and is set to operate at maximum power. The RF load attached to the EUT antenna terminal is 50Ohm.



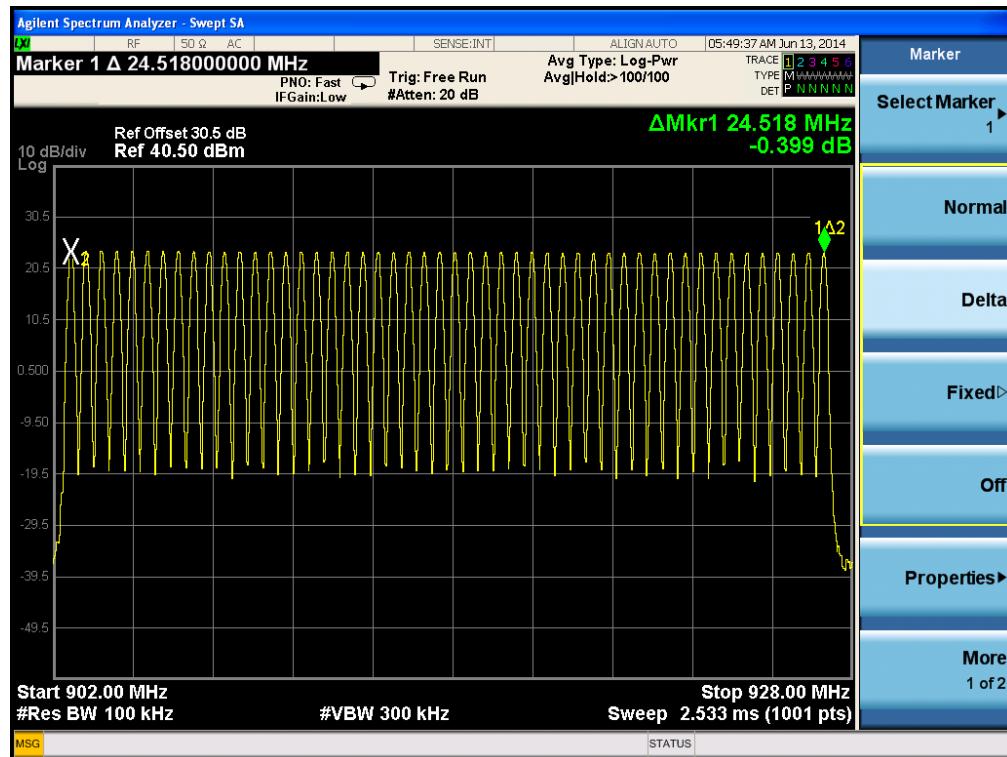
#### Test Result

The Module operates at hopping-on test mode; the frequencies number employed is counted to verify the Module's using the number of hopping frequency.

#### A. Test Verdict

Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Refer to Plot	Verdict
902 - 928	50	25	Plot A	PASS

## B. Test Plots



(Plot A: 902MHz to 928MHz)

## 5.2 20dB Bandwidth

### Definition

According to FCC section 15.247(a)(1)(i), For frequency hopping systems operating in the 902–928 MHz band: The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

### Test Description

See section 5.1.2 of this report.

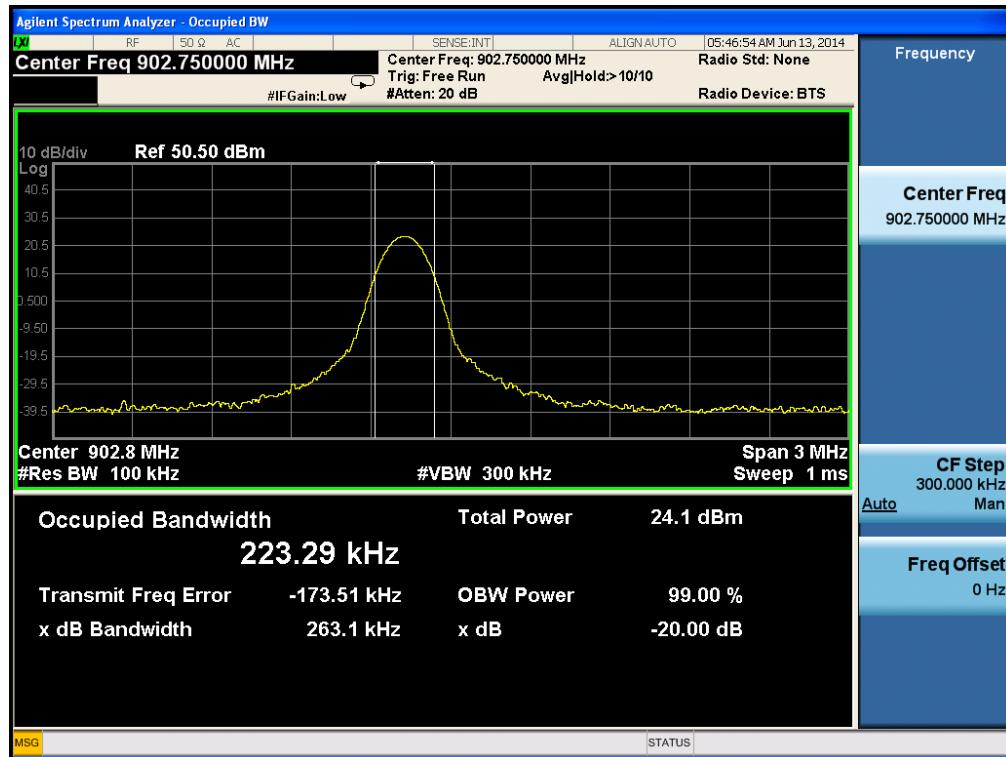
### Test Result

The lowest, middle and highest channels are selected to perform testing to record the 20 dB bandwidth of the Module.

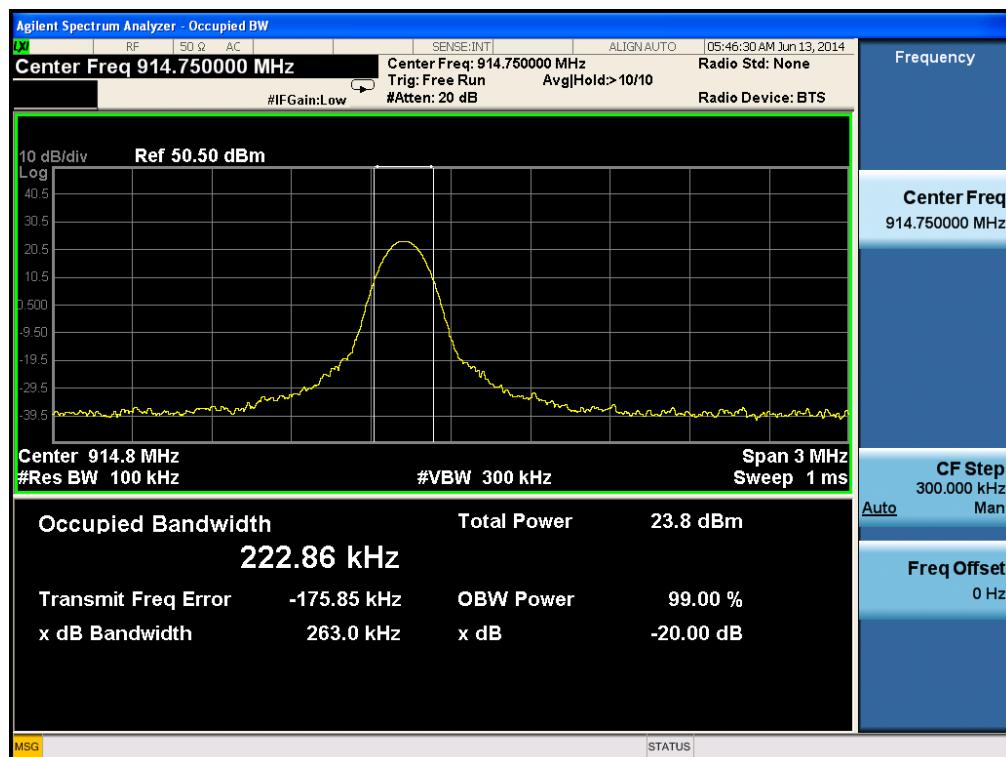
#### A. Test Verdict:

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	Limit (kHz)	Refer to Plot
Low	902.75	263.1	<500kHz	Plot A
Middle	914.75	263.0		Plot B
High	927.25	267.2		Plot C

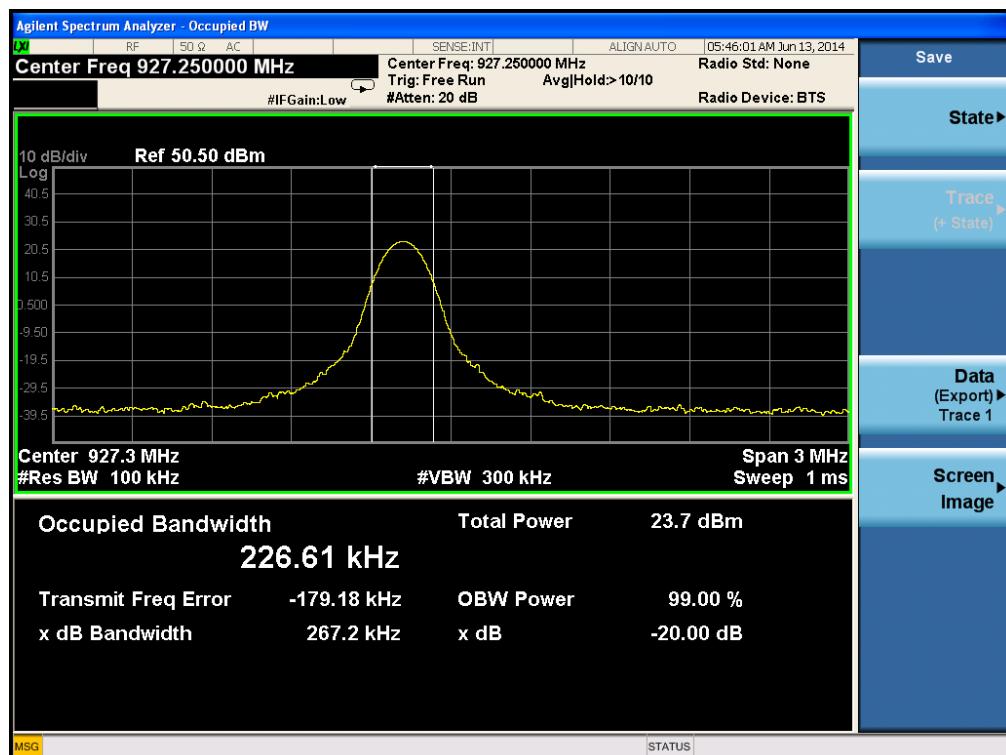
#### B. Test Plot:



(Plot A: CH Low)



(Plot B: CH Mid)



(Plot C: CH High)

### 5.3 Peak Output Power

#### Definition

According to FCC section 15.247(b)(2), for frequency hopping systems operating in the 902–928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section. 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.

#### Test Description

See section 5.1.2 of this report.

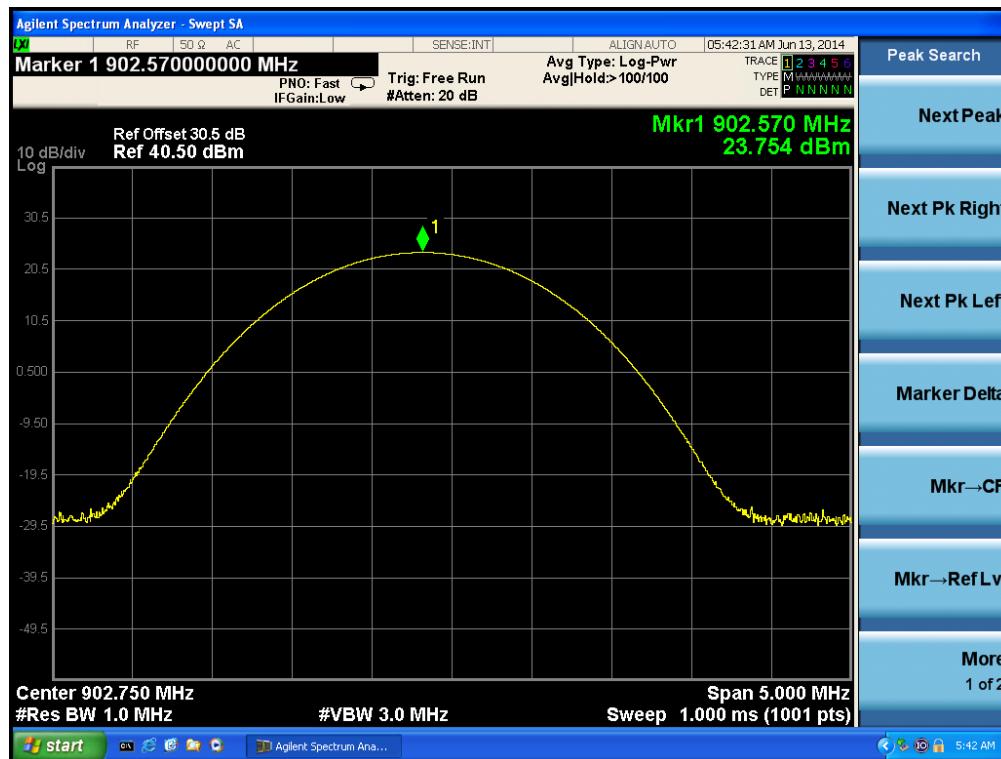
#### Test Result

The EUT operates at maximum output power mode. The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module. This power complies with the FCC requirement.

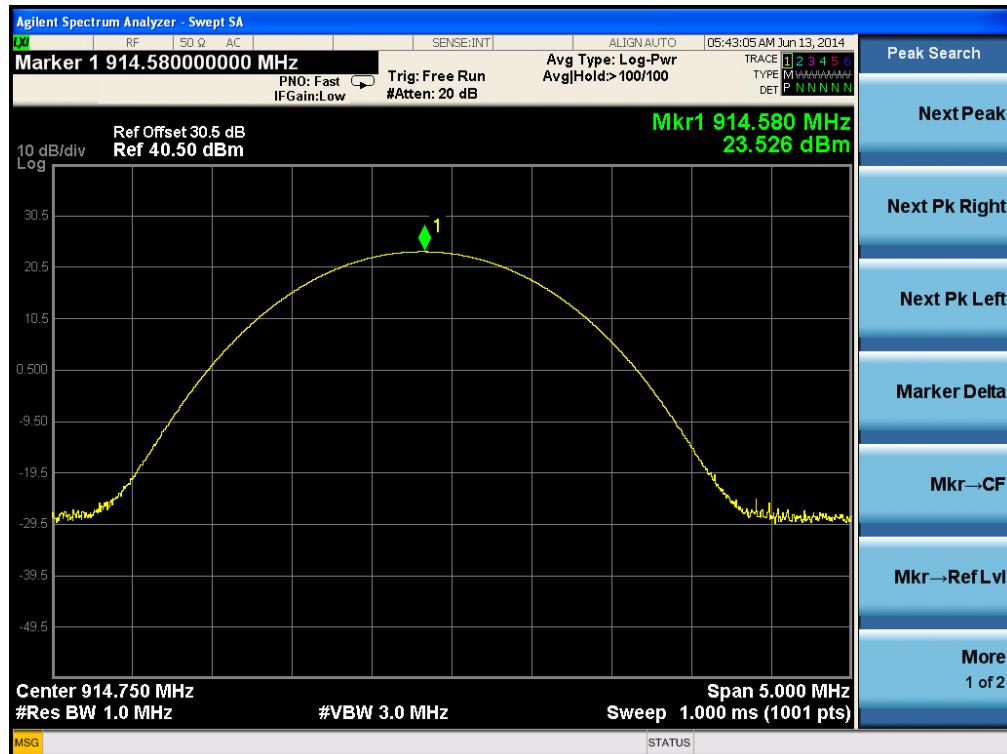
##### A. Test Verdict:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
Low	902.75	23.754	0.24	24	1	PASS
Middle	914.75	23.526	0.22			PASS
High	927.25	23.378	0.22			PASS

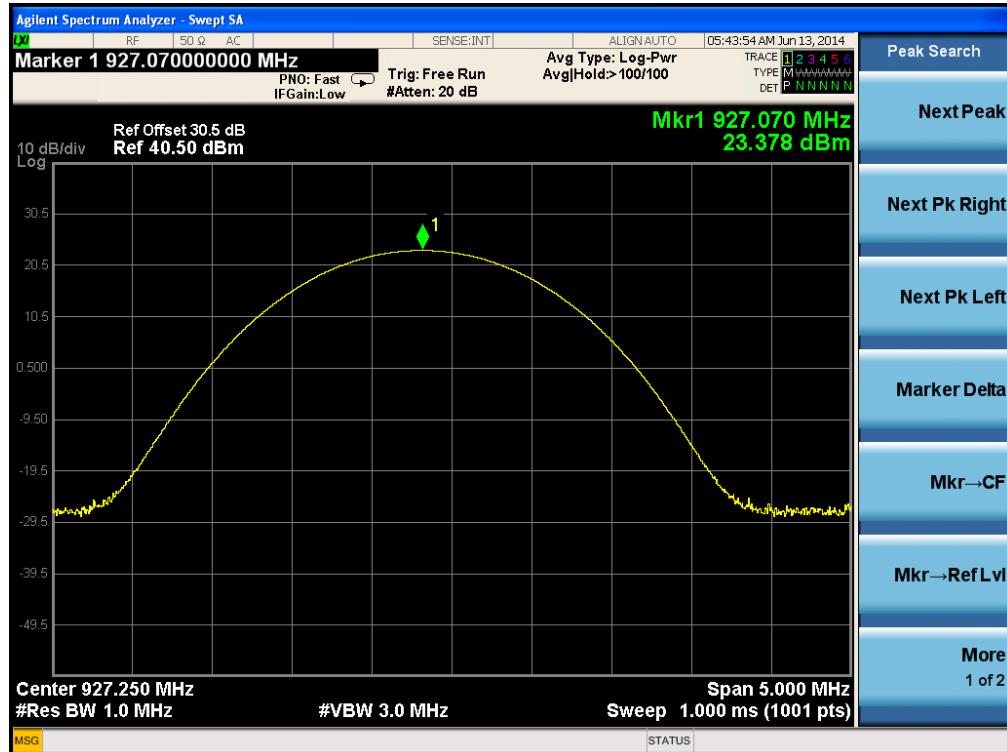
##### B. Test Plot:



(CH Low)



(CH Mid)



(CH High)

## 5.4 Carried Frequency Separation

### Definition

According to FCC section 15.247(a)(1)(i), For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

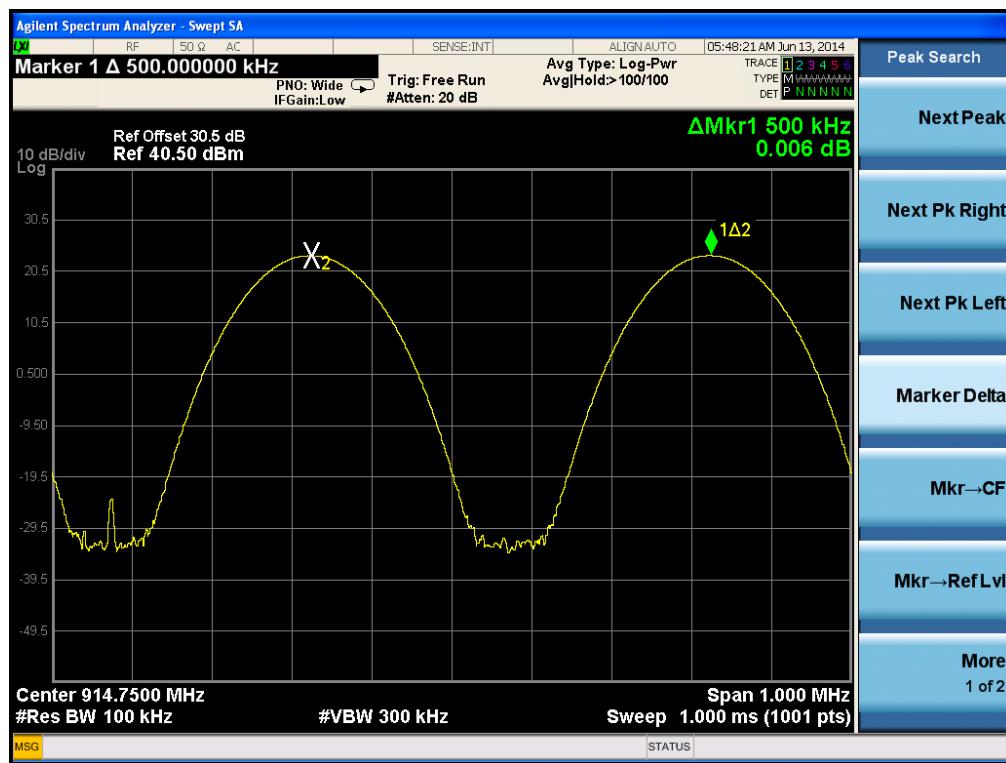
### Test Description

See section 5.1.2 of this report.

### Test Result

The EUT operates at hopping-on test mode.

The Module does have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel (420kHz, refer to section 5.1.3), whichever is greater. This Carried Frequency Separation complies with the FCC requirement.



## 5.5 Time of Occupancy (Dwell time)

### Definition

According to FCC section 15.247(a)(1)(i), For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

### Test Description

See section 5.1.2 of this report.

### Test Result

#### A. Test Verdict

Channel	Frequency (MHz)	Pulse Time		Calculated Dwell Time (ms)	Limit (ms)	Verdict
		ms	Refer to Plot			
Low	902.75	340.0	Plot A	295.70	400	PASS
Middle	914.75	350.0	Plot B	296.58		PASS
High	927.25	325	Plot C	303.80		PASS

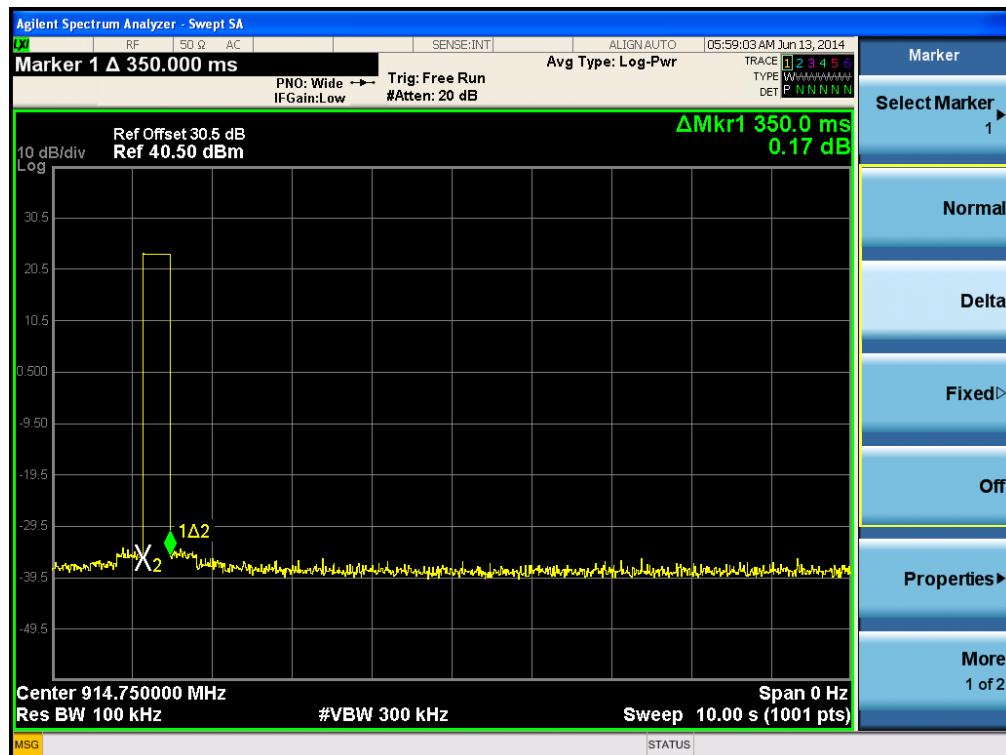
Time of occupancy calculation:  
 The minimum measured repetition of the channel occupancy (repetition) = 1  
 Single occupancy duration (single duration) = 0.325 sec  
 Time of occupancy = (single duration) x (repetition) = 0.325 x 1 = 0.325 sec

## B. Test Plots

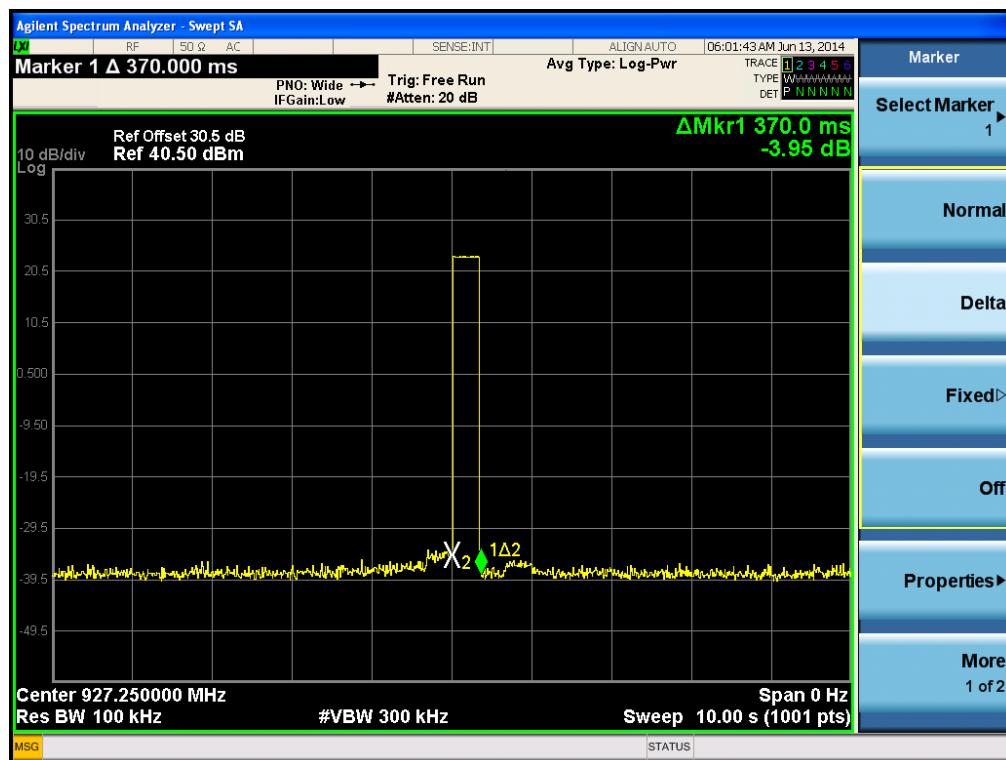
Note: the following plots record the Pulse Time of the Module carrier.



(Plot A: CH Low)



(Plot B: CH Mid)



(Plot C: CH High)

## 5.6 Conducted Spurious Emission

### Definition

According to FCC section 15.247(d), 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 Description

See section 5.1.2 of this report.

### Test Result

The EUT operates at hopping-off test mode. The measurement frequency range is from 9 KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions.

#### Test Plot:



(CH Low, 9kHz to 10GHz)



(CH Mid, 9kHz to 10GHz)



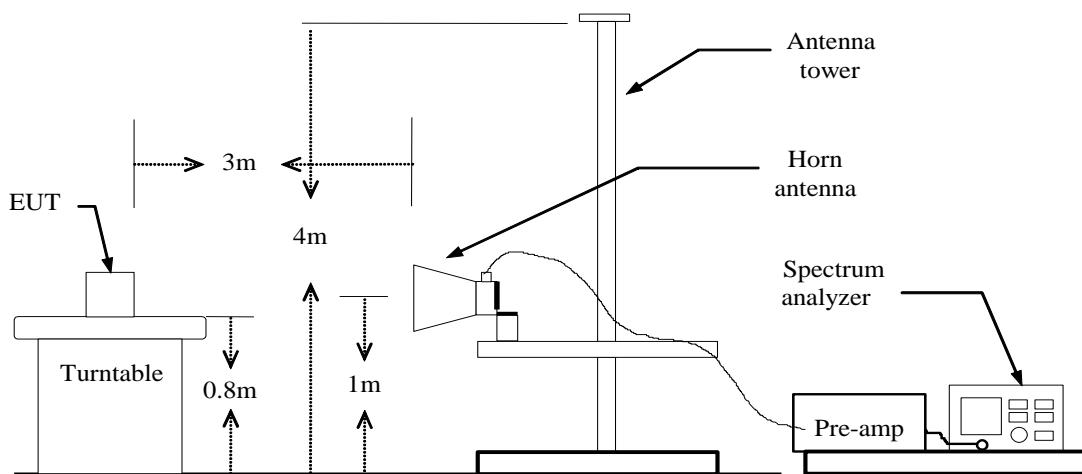
(CH High, 9kHz to 10GHz)

## 5.7 Band Edge

### Definition

According to FCC section 15.247(d), 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.

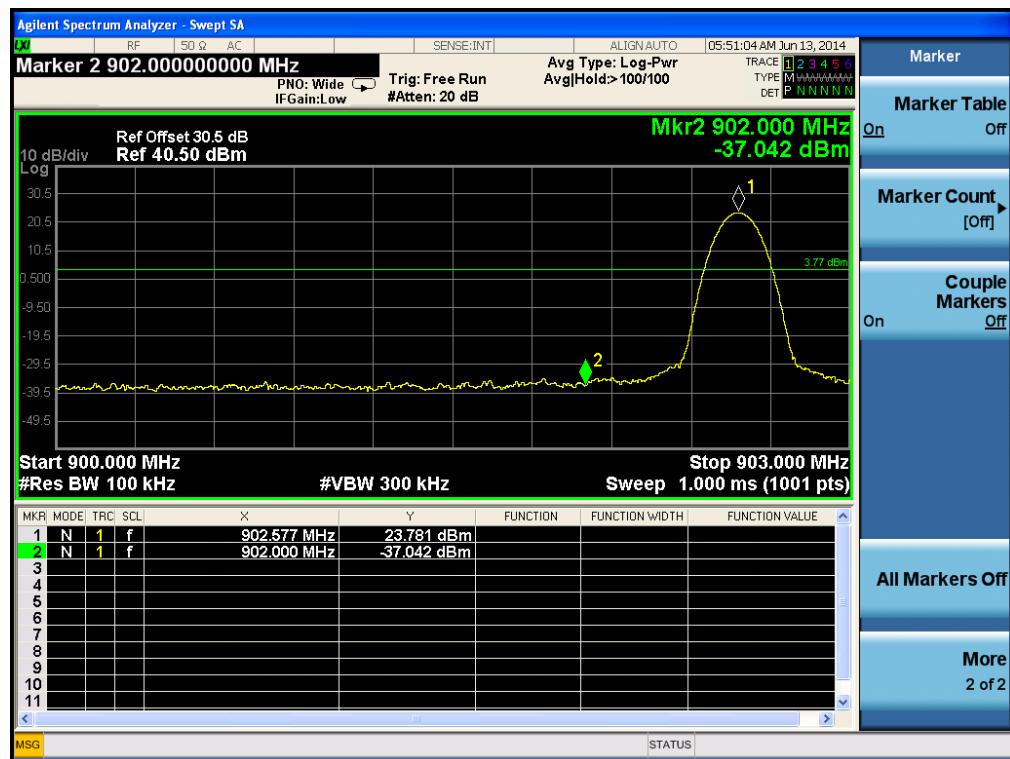
### Test Description



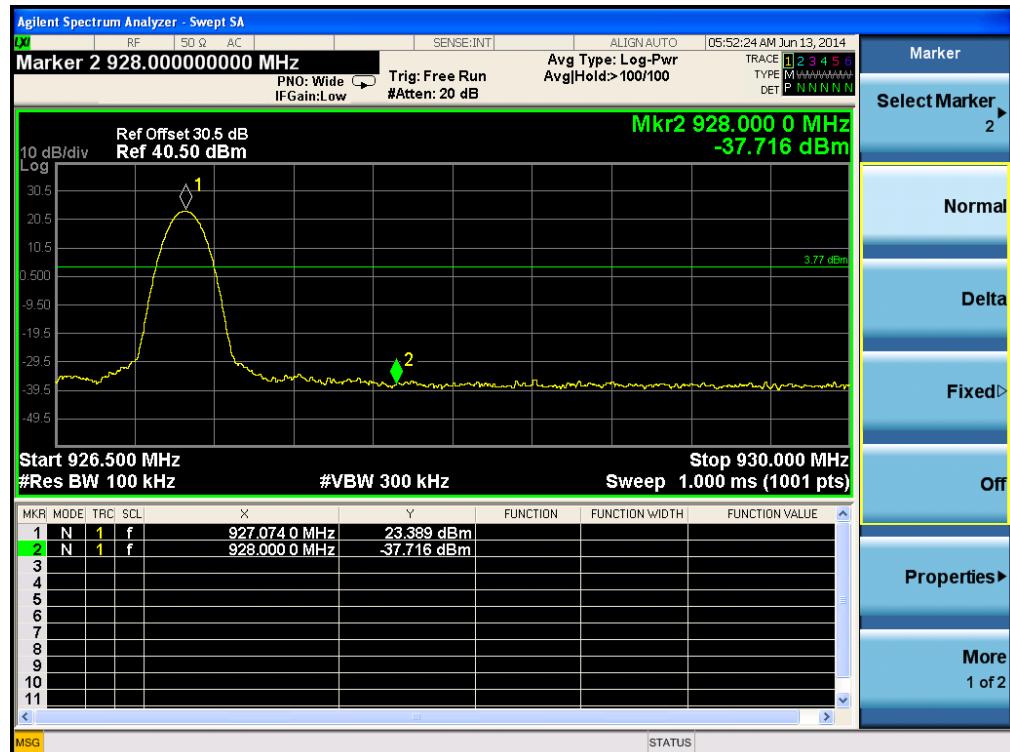
### Test Result

**The EUT operates at continuous transmit test mode. The lowest and highest channels are tested to verify the band edge emissions.**

## Test Plot:



(CH Low)



(CH High)

## 5.8 Conducted Emission

## Definition

According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN).

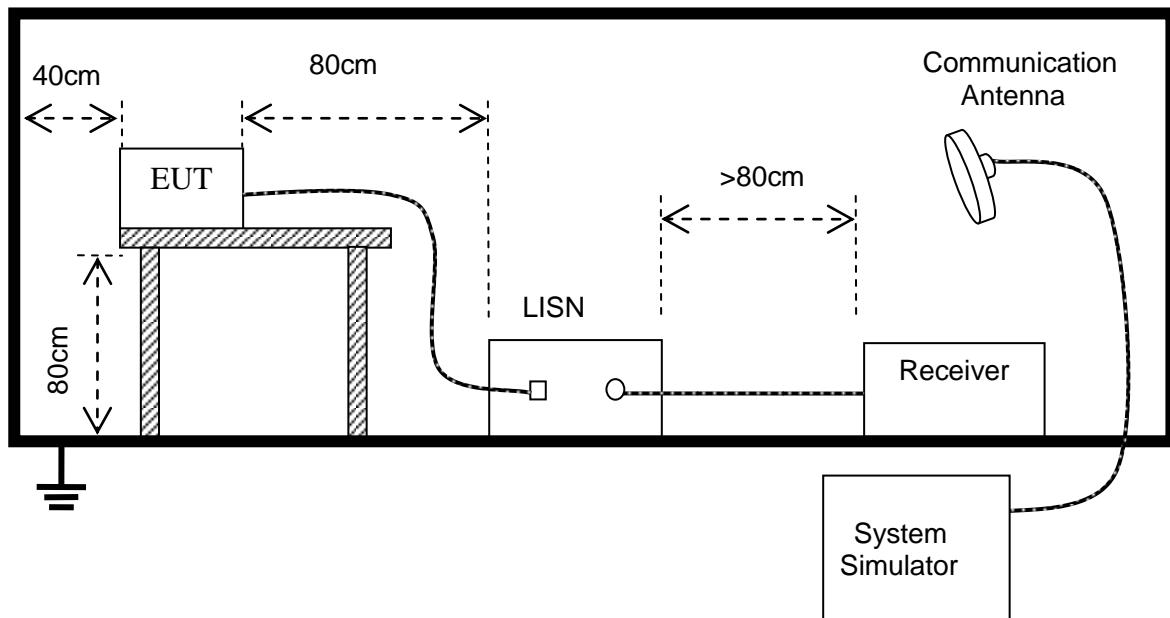
Frequency	Maximum RF Line Voltage	
	Q.P.( dBuV)	Average( dBuV)
150kHz-500kHz	66-56	56-46
500kHz-5MHz	56	46
5MHz-30MHz	60	50

**Note:**

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

## Test Description

The EUT is DC 48V power by ISO802.3AT Type2 PoE Injector. The path loss as the factor is calibrated to correct the reading. During the measurement, the EUT is activated and is set to operate at maximum power.



## Test Result

A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less  $-2\text{dB}$  to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

Freq. (MHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	State
P/F				
--	--	--	--	PASS
--	--	--	--	PASS

**Note:**

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log \left( \frac{\text{specific distance}}{\text{test distance}} \right) \text{dB}$ ;

Limit line = specific limits(dBuv) + distance extrapolation factor.

## 5.9 Radiated Emission

### Definition

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

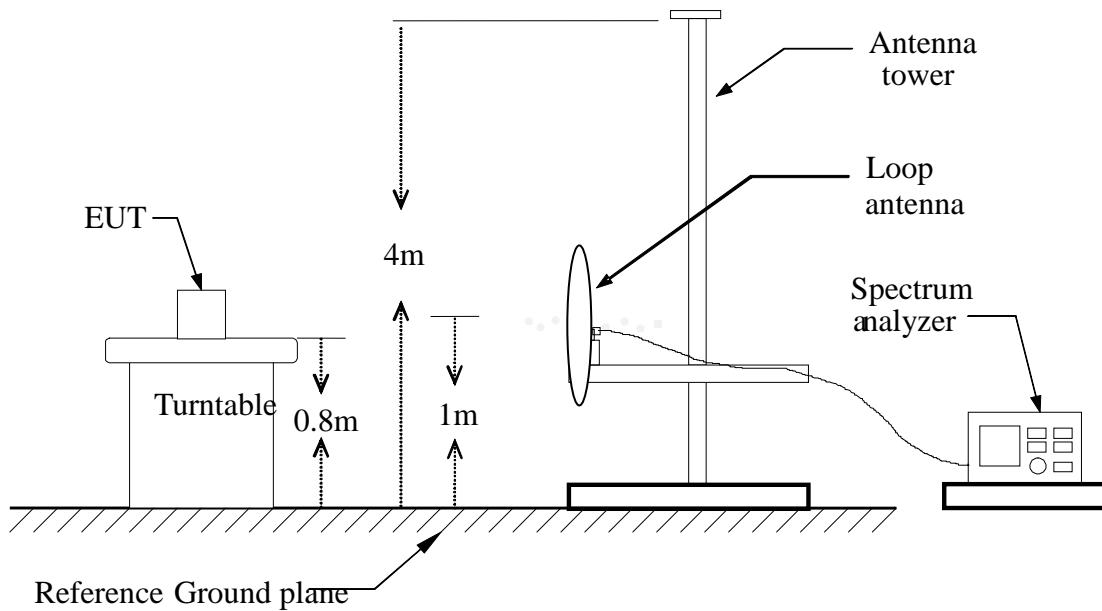
According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ( $\mu$ V/m)	Measurement Distance (m)
0.009 - 0.490	$2400/F(\text{kHz})$	300
0.490 - 1.705	$24000/F(\text{kHz})$	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

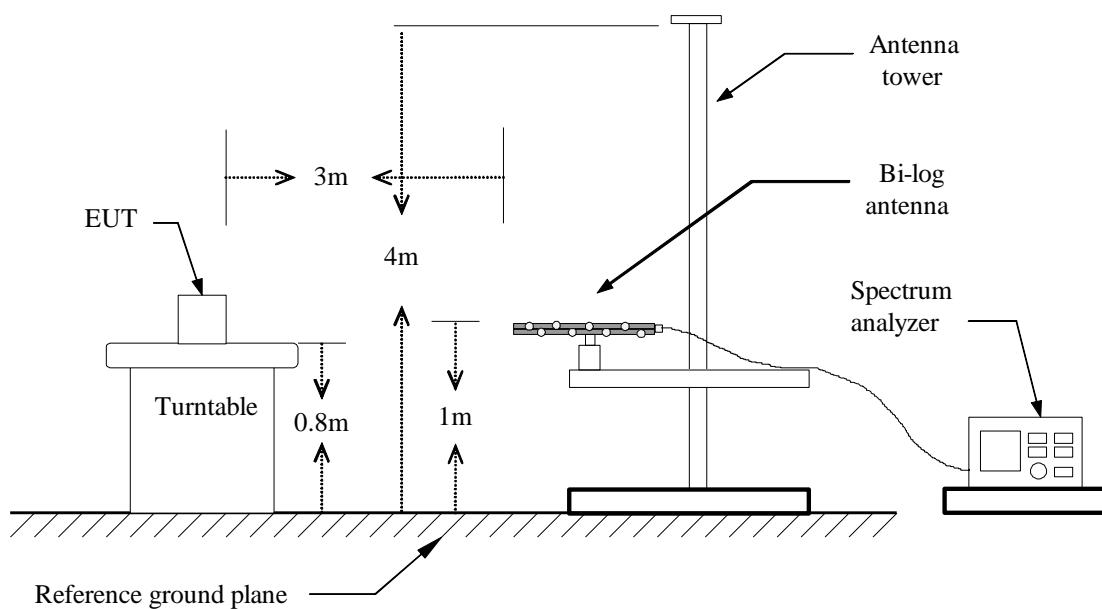
As shown in FCC section 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

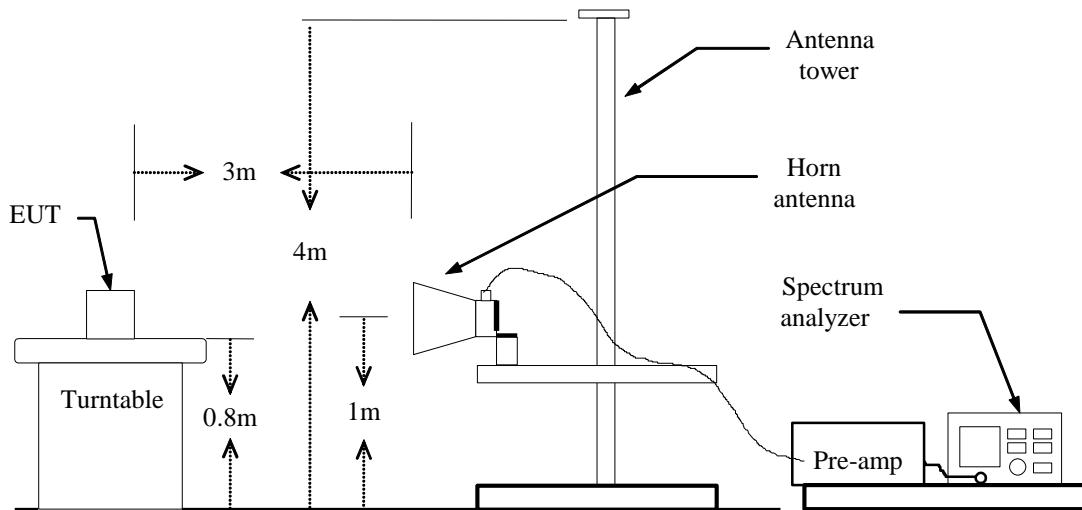
## Test Description

### A. Test Setup:



### Blow 1GHz:



**Above 1GHz:****B. Test procedures**

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

7. Repeat above procedures until the measurements for all frequencies are complete.

## Test Result

### Form 9KHz to 30MHz:

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	AV Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
2402.00	H	92.05	66.29	9.08	101.13	75.37	114.00	94.00	-18.63
<hr/>									
1612.50	H	54.66	30.74	5.84	60.50	36.58	74.00	54.00	-17.42
4815.00	H	55.96	26.86	16.63	72.59	43.49	74.00	54.00	-10.51
N/A									>20
<hr/>									
2402.00	V	93.26	72.36	9.08	102.34	77.18	114.00	94.00	-16.82
<hr/>									
1612.50	V	55.03	23.57	5.84	60.87	29.41	74.00	54.00	-24.59
4815.00	V	55.03	25.69	16.63	71.66	42.32	74.00	54.00	-11.68
N/A									>20

### -No detected in below 30MHz.

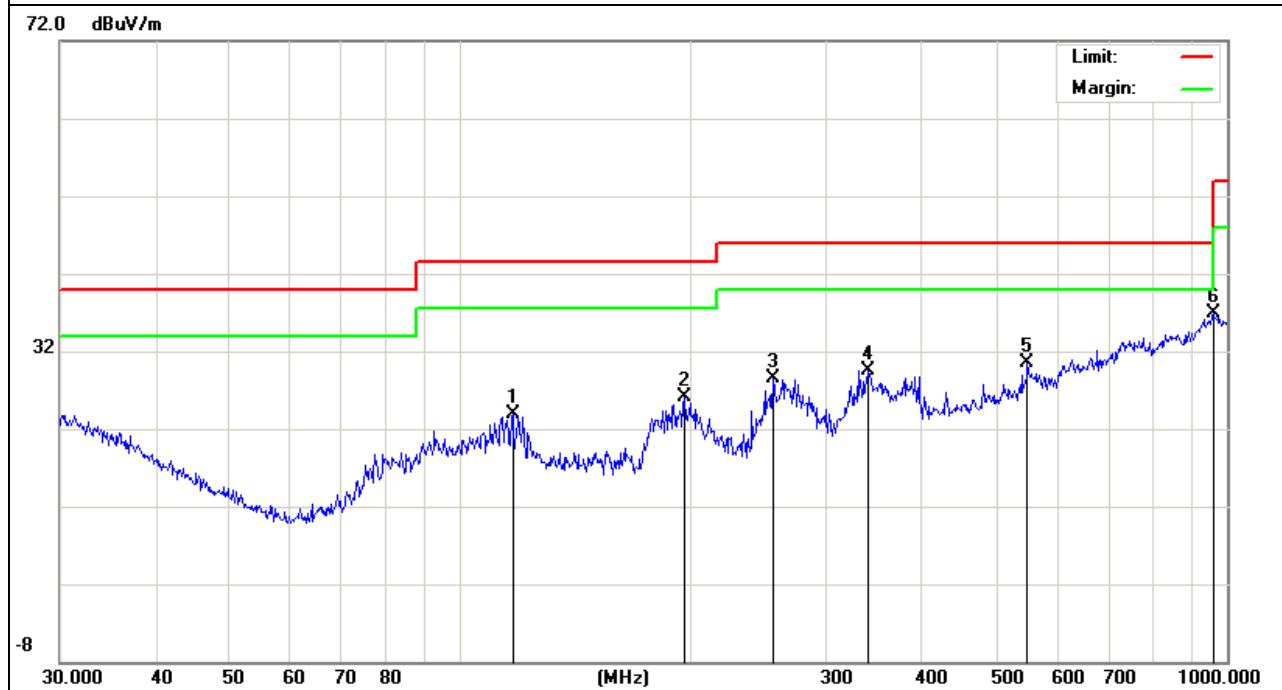
The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

**Below 1 GHz**

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
116.9495	11.94	12.01	23.95	43.5	-19.55	Peak
195.822	17.23	8.97	26.2	43.5	-17.3	Peak
255.6229	14.19	14.35	28.54	46	-17.46	Peak
340.7817	13.34	16.16	29.5	46	-16.5	Peak
549.0193	6.94	23.59	30.53	46	-15.47	Peak

**Remark:**

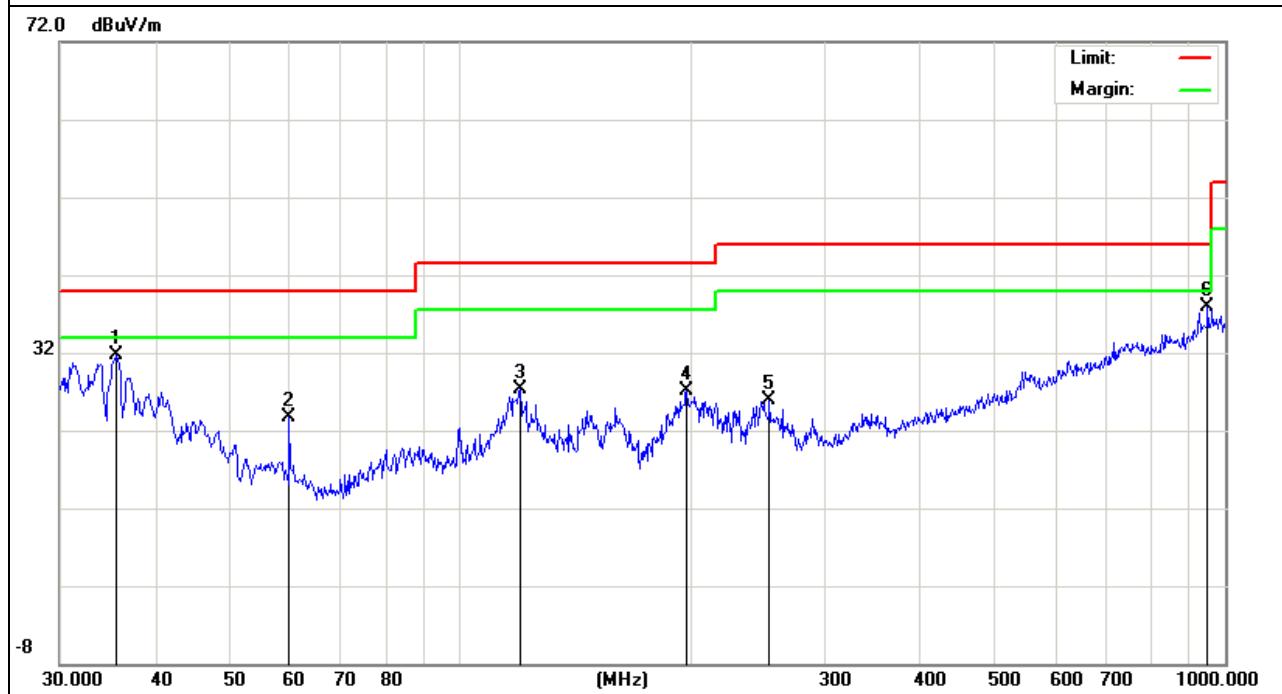
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
35.624	16.13	15.56	31.69	40	-8.31	
59.8588	18.32	5.32	23.64	40	-16.36	Peak
119.8555	15.21	12.09	27.3	43.5	-16.2	Peak
197.8926	18.03	8.99	27.02	43.5	-16.48	Peak
253.8367	11.87	14.09	25.96	46	-20.04	Peak
35.624	16.13	15.56	31.69	40	-8.31	Peak

## Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



**Above 1 GHz**

**Operation Mode:** CH Low  
**Temperature:** 20°C  
**Humidity:** 58 % RH

**Test Date:** 2014-06-15  
**Tested by:** Habby Guo  
**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading	AV Readin g	Ant. / CL CF	Actual Fs		Peak	AV	Peak	AV
							Limit	Limit	Margin	Margin
					Peak (dBuV/m)	AV (dBuV/m)				
1805.30	H	59.53	40.61	7.11	66.64	47.72	74	54	-7.36	-6.28
2708.05	H	46.93	38.55	9.65	56.58	48.2	74	54	-17.42	-5.8
N/A	H									
1805.30	V	57.29	40.39	7.11	64.4	47.5	74	54	-9.6	-6.5
2708.05	V	53.07	37.62	9.65	62.72	47.27	74	54	-11.28	-6.73
N/A	V									

**Notes:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
  - a. Peak Setting 1GHz - 10GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
  - b. AV Setting 1GHz - 10GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.
5. No additional spurious emissions found between lowest internal generated and 30 MHz

**Operation Mode:** CH Mid      **Test Date:** 2014-06-15  
**Temperature:** 20°C      **Tested by:** Habby Guo  
**Humidity:** 70 % RH      **Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading	AV Readin g	Ant. / CL CF	Actual Fs		Peak	AV	Peak	AV
							Limit	Limit	Margin	Margin
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)		
1829.35	H	53.27	35.62	7.25	60.52	42.87	74	54	-13.48	-11.13
2744.18	H	52.86	35.72	9.24	62.1	44.96	74	54	-11.9	-9.04
N/A	H									
1829.35	V	57.79	40.72	7.25	65.04	47.97	74	54	-8.96	-6.03
2744.18	V	56.44	39.96	9.24	65.68	49.2	74	54	-8.32	-4.8
N/A	V									

**Notes:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
  - a. Peak Setting 1GHz - 10GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
  - b. AV Setting 1GHz - 10GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.
5. *No additional spurious emissions found between lowest internal generated and 30 MHz*

**Operation Mode:** CH High**Test Date:** 2014-06-15**Temperature:** 20°C**Tested by:** Habby Guo**Humidity:** 70 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading	AV Readin g	Ant. / CL CF	Actual Fs		Peak	AV	Peak	AV
							Limit	Limit	Margin	Margin
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	(dB)	(dB)
1854.32	H	61.72	44.02	6.79	68.51	50.81	74	54	-5.49	-3.19
2781.58	H	44.75	40.8	9.38	54.13	50.18	74	54	-19.87	-3.82
N/A	H									
1854.32	V	61.52	42.37	6.79	68.31	49.16	74	54	-5.69	-4.84
2781.58	V	51.51	37.83	9.38	60.89	47.21	74	54	-13.11	-6.79
N/A	V									

**Notes:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
  - a. Peak Setting 1GHz - 10GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
  - b. AV Setting 1GHz - 10GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.
5. *No additional spurious emissions found between lowest internal generated and 30 MHz*

**APPENDIX 1**  
**PHOTOGRAPHS OF TEST SETUP**

CE TEST SETUP



RE TEST SETUP

30MHz-1000MHz (The worst case)



1000MHz-10000MHz (The worst case)



-----END OF REPORT-----