TEST REPORT

Date: 2016-06-26
Report No.: 60.880.14.017.04J

Applicant:	I.R.I.S.s.a I.R.I.S. s.a rue du bosquet 10 1348 Louvain-La-Neuve Belgium .
Description of Samples:	Model name: Mouse scanner (USB Dongle) Brand name: IRIS Model no.: IRIScan™ Mouse Wifi
Date Samples Received:	2015-01-06
Date Tested:	2015-01-06 to 2015-01-28
Investigation Requested:	MIC Notice No.88 Annex 43 Certificate regulation Article 2, paragraph 1, item 19
Conclusions:	The submitted product COMPLIED with the procedures given in ARIB STD-T66 Version 3.7. 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:

Simon wang
Project Engineer

John Zhi
Section Manager

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Photos of Test Setup

Appendix B
External EUT Photos

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Internal EUT Photos

1.0 General Details

1.1 Test Laboratory

STC (Dongguan) Company Ltd.
68 Fumin Nan Rd, Dalang, Dongguan, Guangdong, PRC.
EMC Laboratory registered by CNAS with
CNAS Registration Number: L3428

Tested by:

John Zhi

1.2 Applicant Details

Applicant

I.R.I.S.s.a
I.R.I.S. s.a rue du bosquet 10 1348 Louvain-La-Neuve Belgium

Manufacturer

Systech Electronic Ltd.
Unit 802, 8/F, Sunbeam Centre, 27 Shing Yip Street, Kwun Tong, Kowloon, Hong Kong.

1.3 Equipment Under Test [EUT]

Description of EUT

Product Description:	Mouse scanner (Mouse)
Model No.:	IRIScan™ Mouse Wifi
Brand Name:	IRIS
Rating:	DC 5.0V by USB Port
Antenna Type:	PCB Antenna
Antenna Gain:	0dBi
Operated Frequency:	2402 – 2479 MHz
Channel Separation:	1 MHz
No. of Operated Channel:	78 Channels 2402; 2403; 2404; 2405; 2406; 2407; 2408; 2409; 2410; 2411; 2412; 2413; 2414; 2415; 2416; 2417; 2418; 2419; 2420; 2421; 2422; 2423; 2424; 2425; 2426; 2427; 2428; 2429; 2430; 2431; 2432; 2433; 2434; 2435; 2436; 2437; 2438; 2439; 2440; 2441; 2442; 2443; 2444; 2445; 2446; 2447; 2448; 2449; 2450; 2451; 2452; 2453; 2454; 2455; 2456; 2457; 2458; 2459; 2460; 2461; 2462; 2463; 2464; 2465; 2466; 2467; 2468; 2469; 2470; 2471; 2472; 2473; 2474; 2475; 2476; 2477; 2478; 2479
Modulation:	DSSS
Accessories and Auxiliary Equipments:	ThinkPad Notebook
Hardware Version:	V1.0
Software Version:	V1.0

General Operation of EUT

The Equipment Under Test (EUT) is a USB Dongle of the Mouse scanner which operated at 2.4GHz.

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 ARIB STD-T66 and Separated Table No. 43 – Certificate regulation article 2, paragraph 1, item 19 Test method of Radio Equipment for the frequency band of 2400-2483.5MHz.

2.2 Test Standards and Results Summary Tables

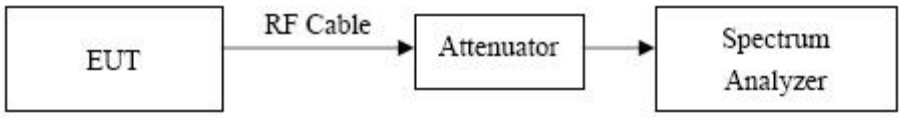
Test Condition	Test Requirement	Test Result	
		Pass	N/A
RF Output Power	Item 19 of Article 2 Paragraph 1	☒	☐
Frequency Tolerance	Item 19 of Article 2 Paragraph 1	☒	☐
Occupied Bandwidth	Item 19 of Article 2 Paragraph 1	☒	☐
Spreading Bandwidth	Item 19 of Article 2 Paragraph 1	☒	☐
Transmitter Spurious Emissions	Item 19 of Article 2 Paragraph 1	☒	☐
Receiver Spurious Emissions	Item 19 of Article 2 Paragraph 1	☒	☐

Remark: N/A - Not Applicable

Note 1: Customer Declaration

3.0 Test Methodology

All measurements contained in this report were conducted with test method for radio equipment specified in No.43 – Certificate regulation article 2, paragraph 1, item 19. And measuring method for electric field intensity of radio station with remarkably weak radio wave transmitted.



The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted with Channel 1, accordingly in reference to the Operating Instructions.

- During the EUT is designed to operate by direct plug in USB port only. Therefore the test is conducted with the rated voltage.

4.0 Test Results

4.1 RF OUTPUT POWER

Test Requirement:	Item 19 of Article 2 Paragraph 1
Test Date:	2015-01-06
Mode of Operation:	Transmitting mode.
Measurement:	RBW = 1MHz, VBW = 1MHz, center of frequency = frequency of Peak Power, Sweep = Auto, Span = 0Hz
Detector Function:	Max Hold

Result: PASS

Environmental Conditions:

Temperature:	24 °C
Relative Humidity:0	54%
ATM Pressure:	1011 mbar

Measured Result :

Test Mode: Normal Voltage

RF Output Power:

Test mode	Frequency (MHz)	Measure Value (dBm/MHz)	Limit (dBm/MHz)	Antenna Gain (dBi)	EIRP (dBm/MHz)	EIRP Limit (dBm/MHz)
DSSS	2402	-5.35	10	0	-5.35	12.14
DSSS	2440	-3.89	10	0	-3.89	12.14
DSSS	2479	-3.91	10	0	-3.91	12.14

Note: EIRP = conducted power density + maximum antenna gain.

RF Output Power Tolerance

Test mode	Frequency (MHz)	Output Power (mW/MHz)	Rated Output Power (mW/MHz)	Tolerance (%)	Limit (%)
DSSS	2402	0.29	0.5	-42.00%	+20% to -80%
DSSS	2440	0.41	0.5	-18.00%	+20% to -80%
DSSS	2479	0.41	0.5	-18.00%	+20% to -80%

Note: Tolerance = (Output Power – Rated Output Power) / Rated Output Power * 100%

Limit for RF Output Power

According to Item 19 and Item 19-2 of Article 2 Paragraph 1, the maximum permit antenna power is 10mW/MHz, the maximum EIRP is 12.14dBm/MHz and the maximum permit tolerance is +20% to -80%.

4.2 FREQUENCY TOLERANCE

Test Requirement:	Item 19 and Item 19-2 of Article 2 Paragraph 1
Test Date:	2015-01-19
Mode of Operation:	Transmitting mode.
Measurement:	RBW, VBW=10KHz, Span = 200KHz, Sweep Time=Auto
Detector Function:	Max Hold

Environmental Conditions:

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

Result: PASS

Measured Result :

Test Mode: Normal Voltage

Tested Mode	Tx Frequency (MHz)	Reading Value (MHz)	Tolerance (ppm)	Limit (ppm)
DSSS	2402	2401.9997	0.125	50
DSSS	2440	2439.9965	1.434	50
DSSS	2479	2479.0089	3.590	50

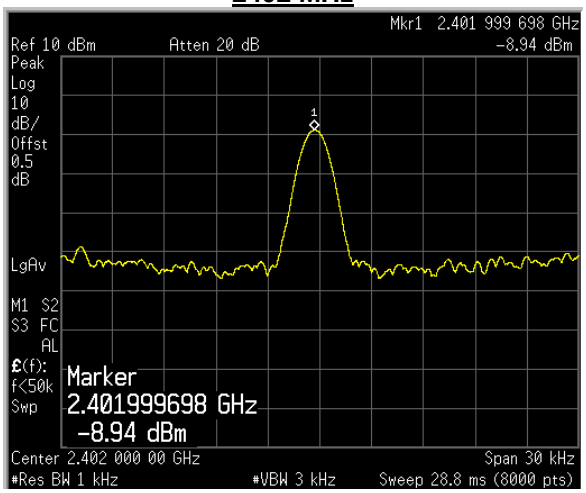
Please refer to the test plot in following pages

Limit for Frequency Tolerance

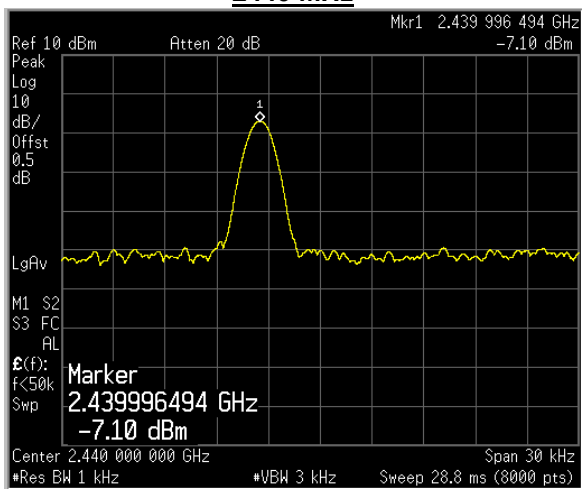
According to Item 19 and Item 19-2 of Article 2 Paragraph 1, the maximum permit tolerance of frequency is 50ppm.

Test Mode: DSSS
Normal Voltage

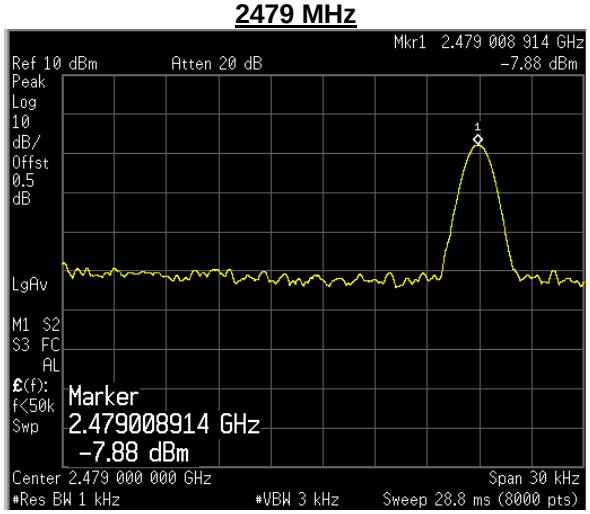
2402 MHz



2440 MHz



2479 MHz



4.3 OCCUPIED BANDWIDTH

Test Requirement: Item 19 and Item 19-2 of Article 2 Paragraph 1.
Test Date: 2015-01-19
Mode of Operation: Transmitting mode.
Detector Function: Max Hold

Environmental Conditions:

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

Result: PASS
Measured Result :
Occupied Bandwidth (99% Emission bandwidth)

Test Mode: Normal Voltage

Test mode	Reading Value(MHz)	Limit (MHz)
	Lower Channel	
DSSS	2.0261	< 26

Test mode	Reading Value(MHz)	Limit (MHz)
	Middle Channel	
DSSS	2.0023	< 26

Test mode	Reading Value(MHz)	Limit (MHz)
	Higher Channel	
DSSS	1.9836	< 26

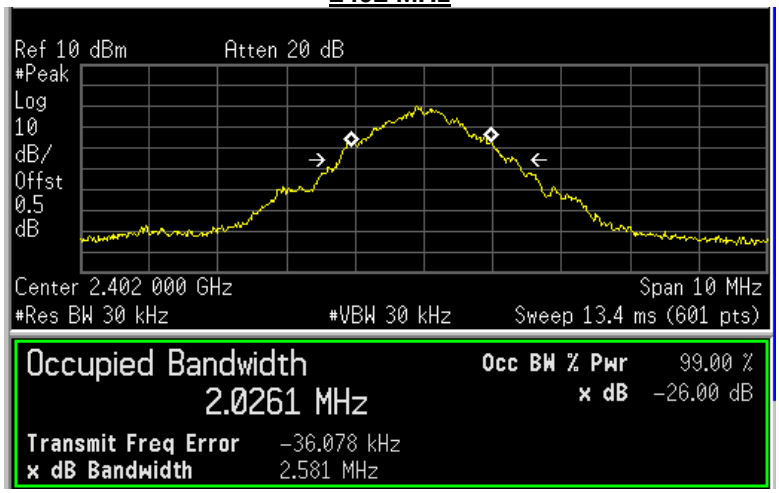
Please refer to the test plots in following pages

Limits for Occupied Bandwidth:

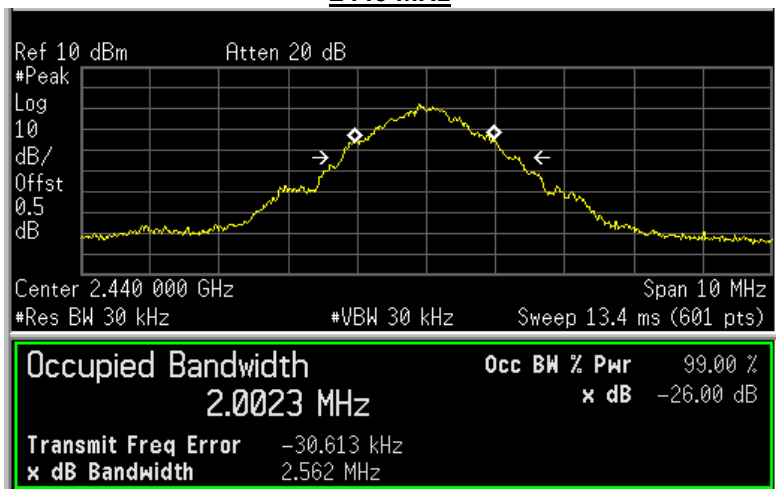
According to Item 19 and Item 19-2 of Article 2 Paragraph 1. The occupied bandwidth shall not exceed 83.5MHz and the operating frequency range lies within the band 2400MHz to 2483.5MHz.

Test Mode: DSSS
Normal Voltage

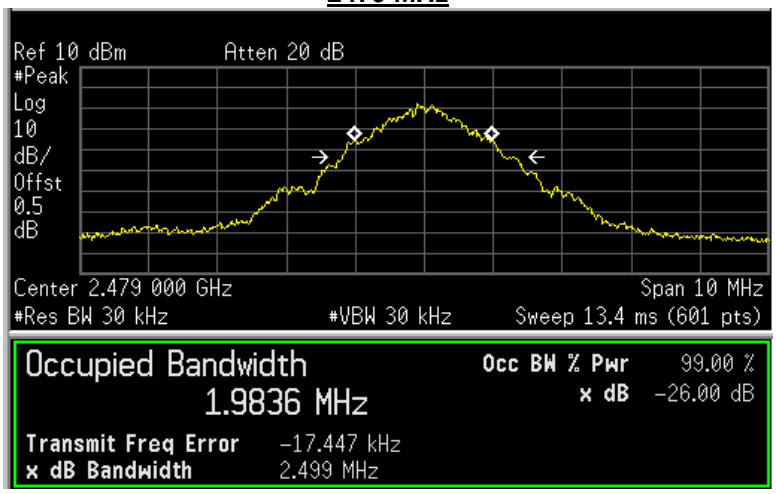
2402 MHz



2440 MHz



2479 MHz



4.4 SPREADING BANDWIDTH

Test Requirement: Item 19 and Item 19-2 of Article 2 Paragraph 1.
Test Date: 2015-01-19
Mode of Operation: Transmitting mode.
Detector Function: Max Hold

Environmental Conditions:

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

Result: PASS

Measured Result :

Diffusion Bandwidth (90% Emission bandwidth)

Test Mode: Normal Voltage

Test mode	Reading Value(MHz)	Limit (kHz)
	Lower Channel	
DSSS	1.1193	> 500

Test mode	Reading Value(MHz)	Limit (kHz)
	Middle Channel	
DSSS	1.1149	> 500

Test mode	Reading Value(MHz)	Limit (kHz)
	Higher Channel	
DSSS	1.0560	> 500

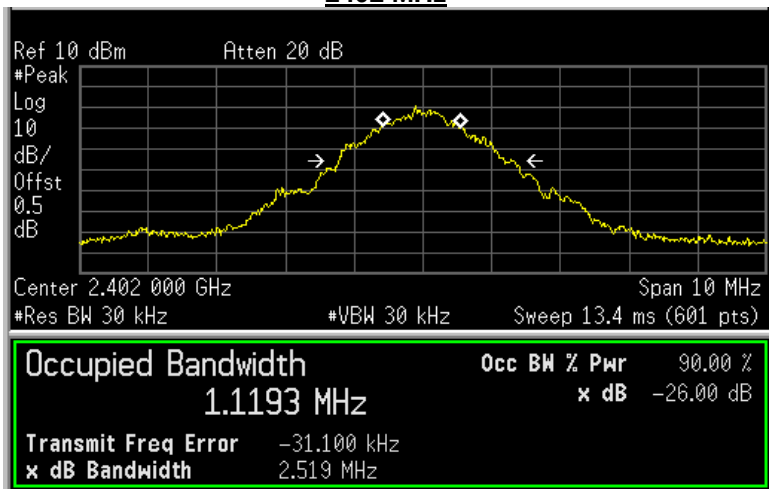
Please refer to the test plots in following pages

Limits for Occupied Bandwidth:

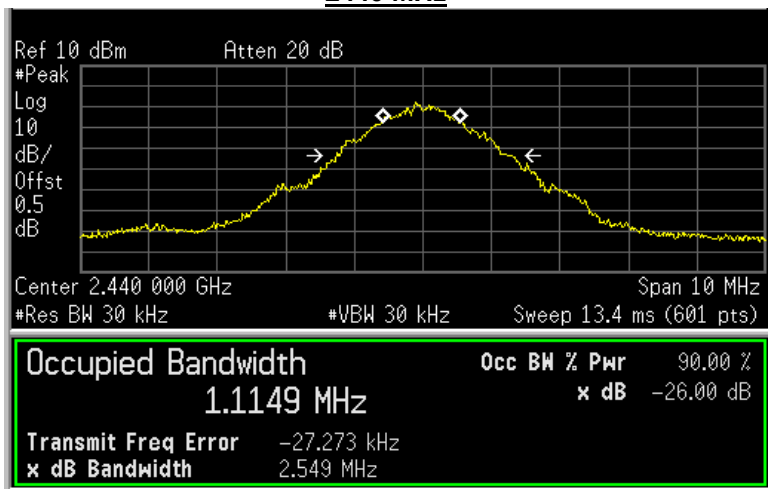
According to Item 19 and Item 19-2 of Article 2 Paragraph 1. The spreading bandwidth no less than 500kHz, and the operating frequency range lies within the band 2400MHz to 2483.5 MHz.

Test Mode: DSSS
Normal Voltage

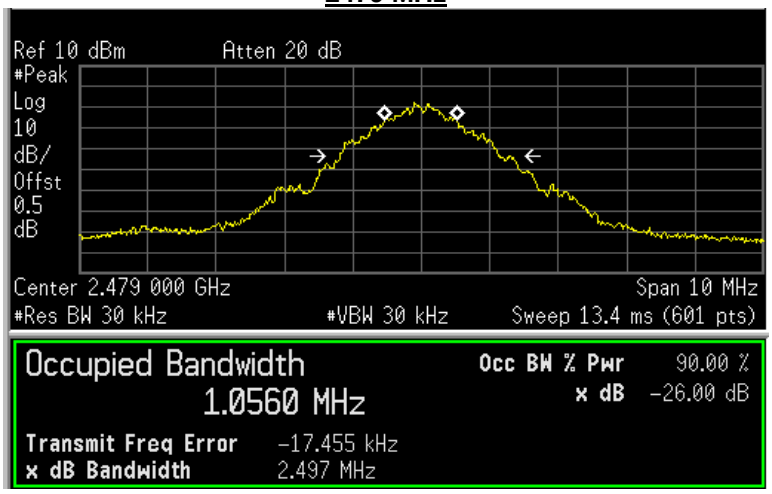
2402 MHz



2440 MHz



2479 MHz



4.5 RADIO INTERFERENCE PREVENTION CAPABILITY MEASUREMENT

Test Requirement: Item 19 and Item 19-2 of Article 2 Paragraph 1.
Test Date: 2015-01-19
Mode of Operation: Normal Transmitting mode.
Detector Function: MAC Scan

Environmental Conditions:

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

Result: PASS

Measured Result :

Test Mode: Normal Voltage

Test Condition	Operating Frequency		
	2402 MHz	2440 MHz	2479 MHz
DSSS	48	48	48

Limits for Radio Interference Prevention Capability

Item	Limits
Identification code	≥ 48

4.6 TRANSMITTER SPURIOUS EMISSIONS

Test Requirement: Item 19 and Item 19-2 of Article 2 Paragraph 1.
Test Date: 2015-01-20
Mode of Operation: Transmitting mode.
Detector Function: Positive peak

Environmental Conditions:

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

Result: PASS

Measured Result :

Test Mode: Normal Voltage

DSSS – 2402 MHz

Frequency Range (MHz)	Maximum Spurious Emission Value (dBm)	Limit (dBm)
10-1000	-74.631	-36
1000-2387	-57.280	-26
2387-2400	-26.053	-16
2483.5-2496.5	-69.023	-16
2496.5-13000	-58.741	-26

DSSS – 2440 MHz

Frequency Range (MHz)	Maximum Spurious Emission Value (dBm)	Limit (dBm)
10-1000	-75.633	-36
1000-2387	-61.587	-26
2387-2400	-65.931	-16
2483.5-2496.5	-67.515	-16
2496.5-13000	-55.774	-26

DSSS – 2479 MHz

Frequency Range (MHz)	Maximum Spurious Emission Value (dBm)	Limit (dBm)
10-1000	-71.055	-36
1000-2387	-62.245	-26
2387-2400	-66.590	-16
2483.5-2496.5	-60.486	-16
2496.5-13000	-54.921	-26

Please refer to the test plots in following pages

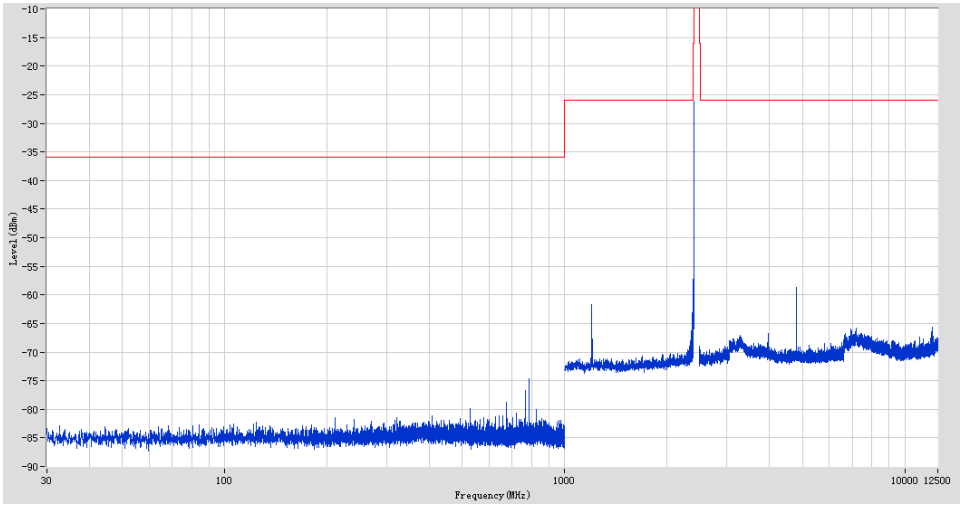
Limits for Transmitter Spurious Emissions:

According to Item 19 of Article 2 Paragraph 1. The transmitter spurious emissions shall not exceeded the following limit:

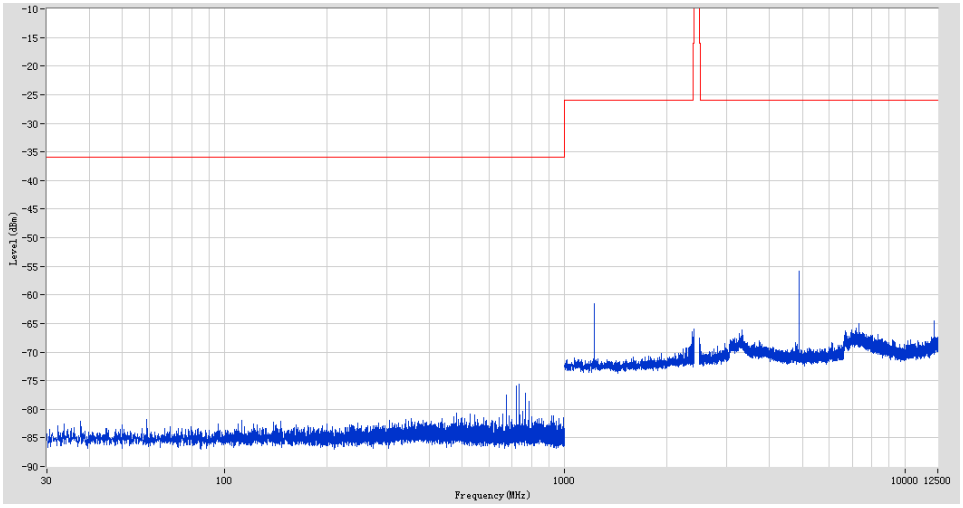
(1) Below 2387MHz : 2.5μW/MHz (-26dBm)
(2) 2387 to 2400MHz : 25μW/MHz (-16dBm)
(3) 2483.5 through 2496.5MHz : 25μW/MHz (-16dBm)
(4) Over 2496.5MHz : 2.5μW/MHz (-26dBm)

Mode : DSSS

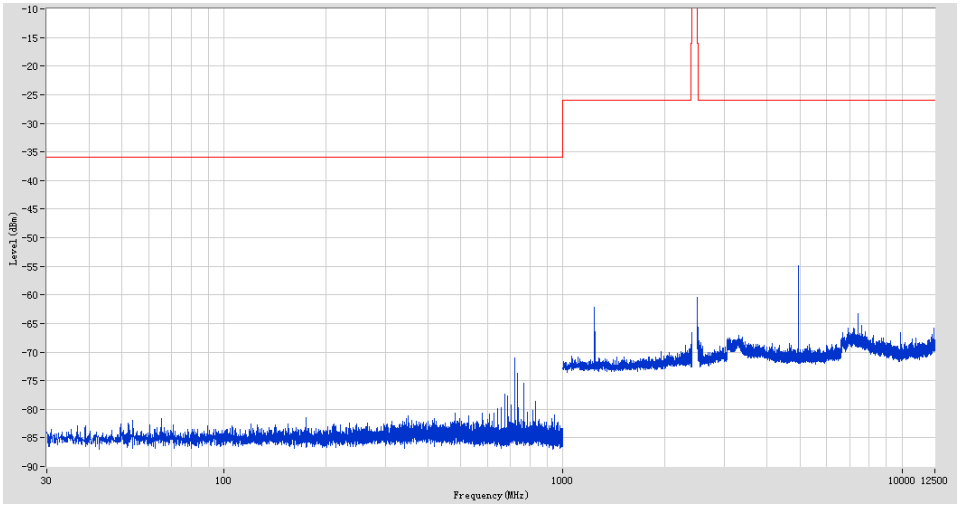
2402 MHz



2440 MHz



2479 MHz



4.6 RECEIVER SPURIOUS EMISSIONS

Test Requirement: Item 19 and Item 19-2 of Article 2 Paragraph 1.
Test Date: 2015-01-19
Mode of Operation: Receiving mode
Detector Function: Peak Hold

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

Result : PASS

Measure Result:

Test Mode: Normal Voltage

DSSS – 2402 MHz

Frequency Range (MHz)	Maximum Spurious Emission Value (dBm)	Limit (dBm)
30-1000	-77.611	-54
1000-12750	-55.650	-47

DSSS – 2440 MHz

Frequency Range (MHz)	Maximum Spurious Emission Value (dBm)	Limit (dBm)
30-1000	-77.262	-54
1000-12750	-55.099	-47

DSSS – 2479 MHz

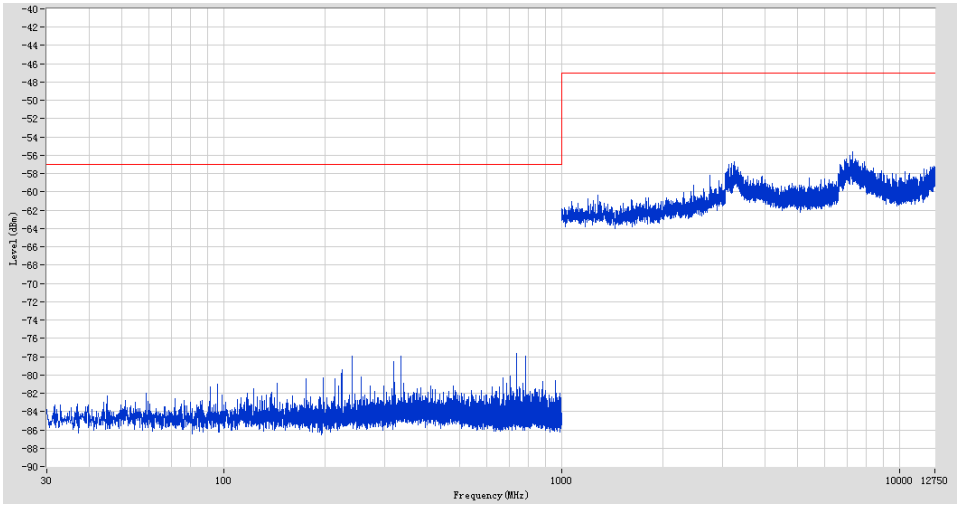
Frequency Range (MHz)	Maximum Spurious Emission Value (dBm)	Limit (dBm)
30-1000	-77.670	-54
1000-12750	-55.641	-47

Please refer to the test plots in following pages

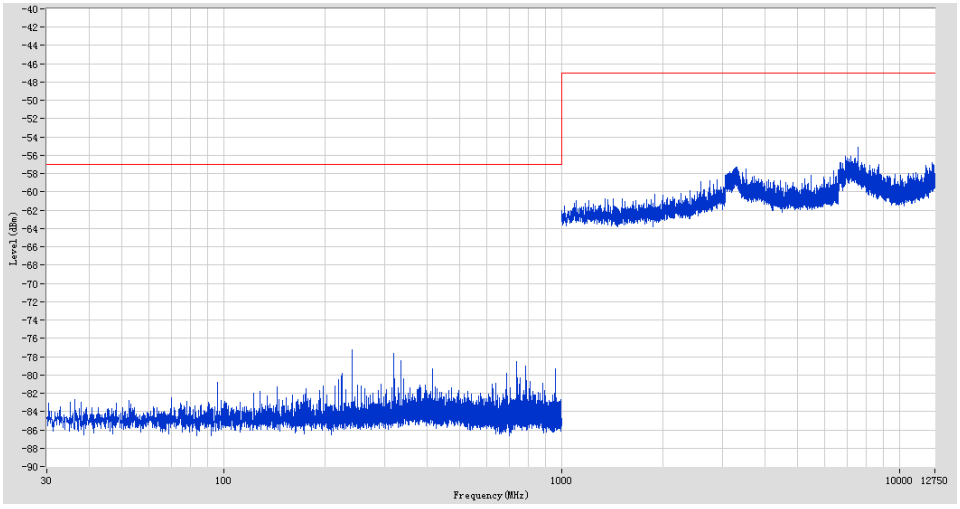
Limits for Receiver Spurious Emissions:
According to Item 19 and Item 19-2 of Article 2 Paragraph 1. The receiver spurious emissions shall not exceeded the following limit:
(1) Below 1GHz : 4nW (-54dBm)
(2) 1GHz or higher : 20nW (-47dBm)

Mode : DSSS

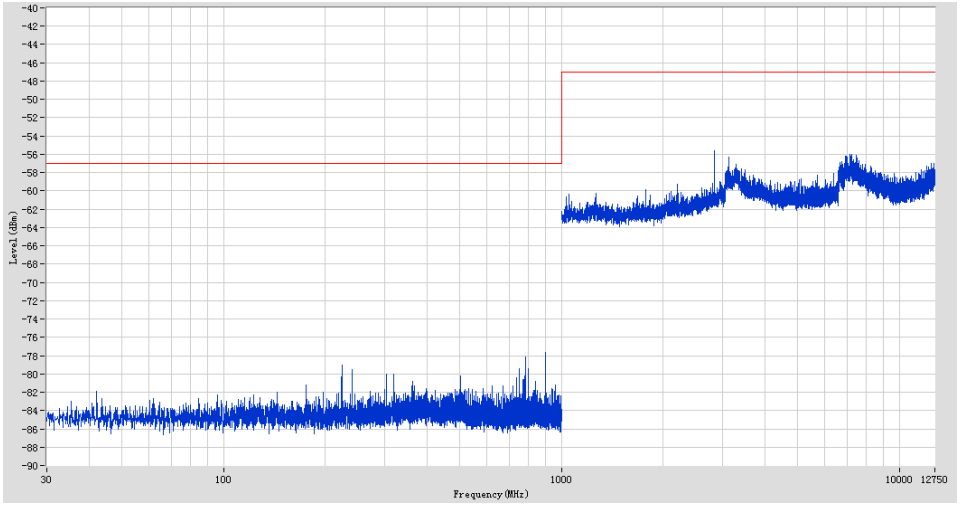
2402 MHz



2440 MHz



2479 MHz



5.0 List of Measurement Equipment

Ref No.	Kind of Equipment	Manufacturer	Type	S/N	Cal Date	Due Date
01	Spectrum Analyzer	Agilent	E4440A	US41421290	2014-02-17	2015-02-17
02	EMI Test Receiver	R&S	ESIB26	100388	2014-11-16	2015-11-28
03	DC Power	Longwei	L-31	N/A	2014-02-17	2015-02-17

Subclause	Test Items	Test Equipment Items No.
TRANSMITTER PARAMETER		
4.1	RF Output Power	01, 03
4.2	Frequency Tolerance	01, 03
4.3	Occupied Bandwidth	01, 03
4.4	Holding Time of Hopping Frequency	01
4.6	Transmitter Spurious Emissions	01, 02, 03
RECEIVER PARAMETER		
4.7	Receiver Spurious Emissions	01, 02, 03

Remarks:

CM Corrective Maintenance
N/A Not Applicable or Not Available

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District, 518052 Shenzhen, CHINA