



World Standardization Certification & Testing CO., LTD
World Standardization Safety and EMC Testing Centre

FCC ID TEST REPORT

for

2.4G wireless optical mouse

MODEL: SH-003, SH-601~SH-699

FCC ID:XYL-SH003

Test Report Number: WSCT09100442E

Issued Date: January 4, 2010

Issued for

SUNICE INTERNATIONAL ELECTRONICS LIMITED

**5/F, No.27, Gongye Road, Gonghe Industry, Xixiang Town,
Bao'an District, Shenzhen, Guangdong, China**

Issued By:

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Revision History of Report

Rev.	Issue No.	Revisions	Effect Page	Revised By
00	WSCT09100442E	Initial Issue	ALL	Kallen Wang

TABLE OF CONTENTS

1	TEST CERTIFICATION.....	4
2	TEST RESULT SUMMARY	5
3	EUT DESCRIPTION.....	6
4	TEST METHODOLOGY	7
4.1.	DECISION OF FINAL TEST MODE.....	7
4.2.	EUT SYSTEM OPERATION	7
5	SETUP OF EQUIPMENT UNDER TEST.....	8
5.1.	DESCRIPTION OF SUPPORT UNITS	8
5.2.	CONFIGURATION OF SYSTEM UNDER TEST	8
6	FACILITIES AND ACCREDITATIONS	9
6.1.	FACILITIES	9
6.2.	ACCREDITATIONS	9
6.3.	MEASUREMENT UNCERTAINTY.....	9
7	Test Requirements	10
7.1.	CONDUCTED EMISSION MEASUREMENT.....	10
7.2.	RADIATION EMISSION TEST.....	13
7.3.	BAND EDGE TEST.....	19



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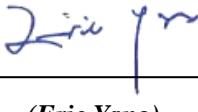
1 TEST CERTIFICATION

Product:	2.4G wireless optical mouse
Model:	SH-003, SH-601~SH-699
Applicant:	SUNICE INTERNATIONAL ELECTRONICS LIMITED 5/F, No.27, Gongye Road, Gonghe Industry, Xixiang Town, Bao'an District, Shenzhen, Guangdong, China
Manufacturer:	SUNICE INTERNATIONAL ELECTRONICS LIMITED 5/F, No.27, Gongye Road, Gonghe Industry, Xixiang Town, Bao'an District, Shenzhen, Guangdong, China
Trade Mark:	N/A
Tested:	October 17, 2009~ January 4, 2010
Test Voltage:	DC 3V
Applicable Standards:	FCC Part 15 Subpart C: 2007 ANSI C63.4:2003

Deviation from Applicable Standard

None

The above equipment has been tested by World Standardization Certification & Testing Co., Ltd., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By: 
(Eric Yang)

Date: 2010/01/04

Check By: 
(Kelly Wu)

Date: 2010/01/04

Approved By: 
(Kallen Wang)

Date: 2010/01/04



Report reference No.:WSCT09100442E

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Revised:None

2 TEST RESULT SUMMARY

Standard	Item	Result
FCC Part 15 Subpart C: Clause 15.249	Conducted emission Test	PASS
	Radiation Emission Test	PASS
	Band edge test	PASS

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

3 EUT DESCRIPTION

Product	2.4G wireless optical mouse
Trade Mark	N/A
Model	SH-003, SH-601~SH-699
Applicant	SUNICE INTERNATIONAL ELECTRONICS LIMITED
Housing material	Plastic/Metal
EUT Type	<input checked="" type="checkbox"/> Engineering Sample. <input type="checkbox"/> Product Sample, <input type="checkbox"/> Mass Product Sample.
Serial Number	N/A
Antenna Type	Integral Antenna
EUT Power Rating	DC 3V
Temperature Range(Operating)	+15 ~+ 35°C
Type of the Equipment	Combined Equipment
Operating Frequency	2402-2482MHz (17Channels)
Number of Channels	17Channels
Channel Separation	5MHz
Modulation type	GFSK
Dwell time	Each channel is less than 0.4s

Model Differences

No.	Model Number	Tested With
1	SH-003	<input checked="" type="checkbox"/>
2	SH-601~ SH-699	<input type="checkbox"/>

Note: All Models are the same except the Model name. So the test data of SH-003 can represent the remaining models.

Channel form:

Channel No.	Operation Frequency(MHz)	Channel No.	Operation frequency(MHz)
CH1	2402	CH10	2447
CH2	2407	CH11	2452
CH3	2412	CH12	2457
CH4	2417	CH13	2462
CH5	2422	CH14	2467
CH6	2427	CH15	2472
CH7	2432	CH16	2477
CH8	2437	CH17	2482
CH9	2442		

4 TEST METHODOLOGY

4.1. DECISION OF FINAL TEST MODE

The EUT was tested together with the below additional components, and configuration, which produced the worst emission levels, was selected and recorded in this report.

the following test mode was recorder in this report.

Test item	Test mode
Conducted emission Test	Tx mode
Radiation Emission Test	CH1, CH9,CH17
Band Edge Test	CH1, CH17

4.2. EUT SYSTEM OPERATION

1. Set up EUT with the support equipments.
2. Make sure the EUT work normally during the test.

Note: Test program is self-repeating throughout the test.

5 SETUP OF EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF SUPPORT UNITS

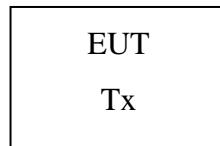
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Model No.	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1.	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note:

- 1) All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2) Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

5.2. CONFIGURATION OF SYSTEM UNDER TEST



(EUT:2.4G wireless optical mouse)

6 FACILITIES AND ACCREDITATIONS

6.1. FACILITIES

All measurement facilities used to collect the measurement data are located at 1-2/F, DaChong Science&Technology Building, No.28 of Tonggu Road, Nanshan District, Shenzhen, PRC

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

6.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	FCC (certificate registration number is 276008) TIMCO (certificate registration number is Q2001)
Japan	VCCI (certificate registration number is C-2912, R-2662)
Germany	TUV Rheinland
Canada	INDUSTRY CANADA (certificated registration number is 46405-7700)

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.wsct.org.cn>

6.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency		Uncertainty
Conducted emissions	9kHz~30MHz		+/- 3.59dB
Radiated emissions	Horizontal	30MHz ~ 200MHz	+/- 4.77dB
		200MHz ~1000MHz	+/- 4.93dB
	Vertical	30MHz ~ 200MHz	+/- 5.04dB
		200MHz ~1000MHz	+/- 4.93dB

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

7 Test Requirements

7.1. CONDUCTED EMISSION MEASUREMENT

7.1.1. LIMITS

FREQUENCY (MHz)	Class B (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

NOTE:

- (1) The lower limit shall apply at the transition frequencies.
- (2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
- (3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

7.1.2. TEST INSTRUMENTS

Conducted Emission Test Site G				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCI	100005	06/24/2010
LISN	AFJ	LS16	16010222119	09/29/2010
LISN(EUT)	Meestec	AN3016	04/10040	09/28/2010

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).
2. N.C.R = No Calibration Request.

7.1.3. TEST PROCEDURES

Procedure of Preliminary Test

The EUT and Support equipment, if needed, was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor standing equipment, it is placed on the ground plane, which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

All support equipment power received from a second LISN.

The EUT test program was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in Item 3.1 were scanned during the preliminary test.

After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.

The EUT configuration and cable configuration of the above highest emission levels were recorded for reference of the final test.

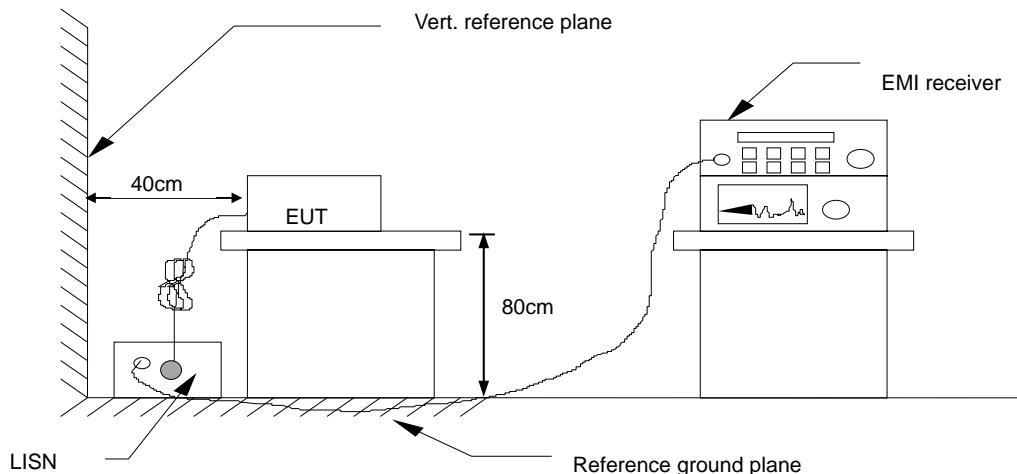
Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

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.

The test data of the worst-case condition(s) was recorded.

7.1.4. TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.1.5. Test Result

No applicable.

7.2. Radiation Emission Test

7.2.1. Limits

According to 15.249 the field strength of emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

Fundamental Frequency	Field Strength of Fundamental		Field Strength of Spurious	
	mV/meter	dBuV/meter	uV/meter	dBuV/meter
902-928MHz	50	94	500	54
2400-2483.5MHz	50	94	500	54
5725-5875MHz	50	94	500	54
24.0-24.25GHz	250	108	2500	68

The above field strength limits are specified at a distance of 3 meters. Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength uV/meter	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(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 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

Frequency Range of Radiated Measurement (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes(MHz)	Range(MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5 th harmonic of the highest frequency or 40GHz, whichever is lower

7.2.2. Test procedure

The EUT was placed on a turn table which was 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on a antenna tower. At the frequency band of 30MHz to 1GHz, The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 to 4 m for horizontal and vertical polarizations. The broadband antenna (calibrated by dipole antenna) was used as a receiving antenna. At the frequency band of 1GHz to 25GHz, The measuring antenna moved from 1 to 4 m for horizontal and vertical polarization. The horn antenna was used as a receiving antenna.

The resolution bandwidth and video bandwidth of the test receiver was 120 KHz and 300KHz for Quasi-peak detection at frequency below 1GHz.

The resolution bandwidth and video bandwidth of the test receiver was 1MHz and 3MHz for Peak detection at frequency above 1GHz.

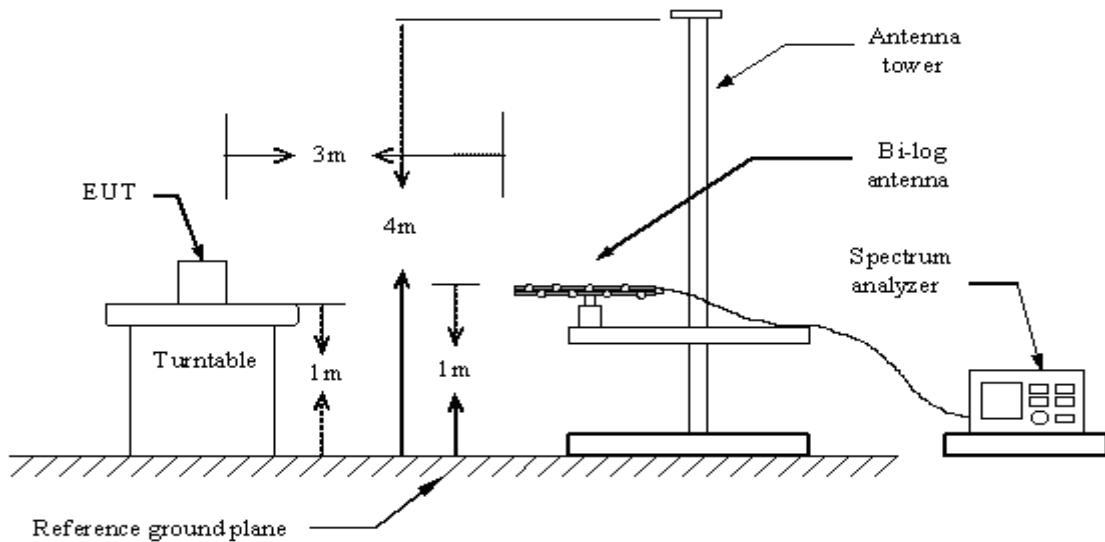
The resolution bandwidth of the test receiver was 1MHz and the video bandwidth are 10Hz for Average detection at frequency above 1GHz.

The EUT was tested in Chamber Site.

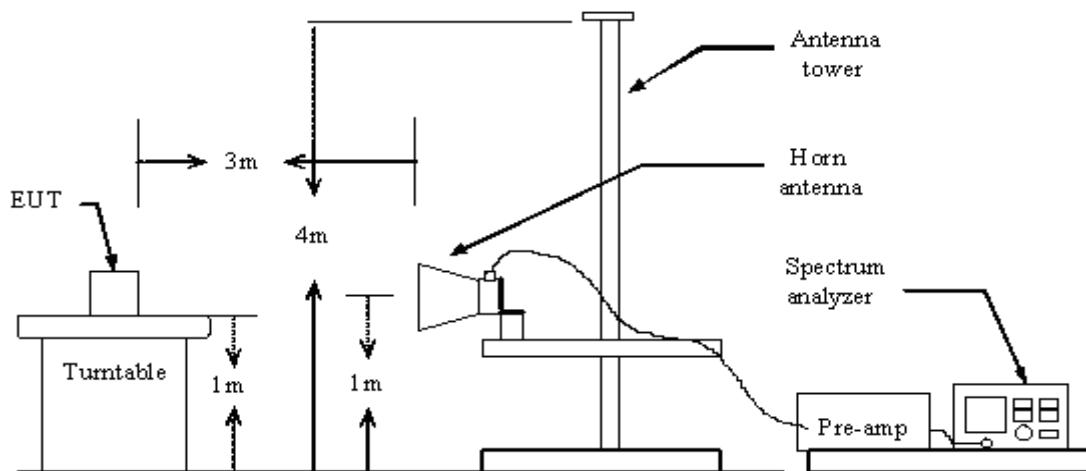
The test data of the worst case condition(s) was reported on the following pages.

7.2.3 Test setup diagram

Below 1GHz



Above 1GHz



7.2.4. Test Result

CH1 2402MHz test data

Frequency MHz	Emission Level dB μ V/m	Over Limits dB	Limits dB μ V/m	Detector	Polarity	Result
162.50	39.45	-4.05	43.50	QP	H	PASS
445.80	40.15	-5.85	46.00	QP	H	PASS
846.9	41.50	-4.50	46.00	QP	H	PASS
1685.0	55.17	-18.83	74.00	PK	H	PASS
1685.0	43.50	-10.50	54.00	AV	H	PASS
2400.0	52.60	-21.40	74.00	PK	H	PASS
2400.0	41.50	-12.50	54.00	AV	H	PASS
2402.0	98.50	-15.50	114.00	PK	H	PASS
2402.0	85.30	-8.7	94.00	AV	H	PASS
2450.4	56.30	-17.70	74.00	PK	H	PASS
2450.4	42.58	-11.42	54.00	AV	H	PASS
15438.0	63.70	-10.30	74.00	PK	H	PASS
15438.0	51.50	-2.50	54.00	AV	H	PASS
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46.50	36.80	-3.20	40.00	QP	V	PASS
445.80	41.54	-4.46	43.50	QP	V	PASS
846.9	40.60	-5.40	43.50	QP	V	PASS
1685.0	55.05	-18.95	74.00	PK	V	PASS
1685.0	42.13	-11.87	54.00	AV	V	PASS
2400.0	50.00	-24.00	74.00	PK	V	PASS
2400.0	38.60	-15.40	54.00	AV	V	PASS
2402.0	90.62	-23.38	114.00	PK	V	PASS
2402.0	78.60	-15.4	94.00	AV	V	PASS
2450.4	54.60	-19.40	74.00	PK	V	PASS
2450.4	40.15	-13.85	54.00	AV	V	PASS
15438.0	62.56	-11.44	74.00	PK	V	PASS
15438.0	50.00	-4.00	54.00	AV	V	PASS

Notes: 1. The readings were Quasi-Peak values below 1GHz.

The readings were Peak values + Average values above 1GHz

2. Emission Level = Antenna Factor + Cable Loss + Meter Reading

CH9 2442MHz test data

Frequency MHz	Emission Level dB μ V/m	Over Limits dB	Limits dB μ V/m	Detector	Polarity	Result
160.50	38.90	-4.60	43.50	QP	H	PASS
445.80	36.83	-9.17	46.00	QP	H	PASS
846.9	42.00	-4.00	46.00	QP	H	PASS
1685.0	51.60	-22.40	74.00	PK	H	PASS
1685.0	40.95	-13.05	54.00	AV	H	PASS
2442.0	86.33	-27.67	114.00	PK	H	PASS
2442.0	71.74	-25.26	94.00	AV	H	PASS
2450.4	51.45	-22.55	74.00	PK	H	PASS
2450.4	42.68	-11.32	54.00	AV	H	PASS
15438.0	62.03	-11.97	74.00	PK	H	PASS
15438.0	49.50	-4.50	54.00	AV	H	PASS
46.50	35.30	-4.70	40.00	QP	V	PASS
445.80	40.00	-6.00	43.50	QP	V	PASS
846.9	41.45	-4.55	43.50	QP	V	PASS
1685.0	53.60	-20.40	74.00	PK	V	PASS
1685.0	41.85	-12.15	54.00	AV	V	PASS
2442.0	87.02	-26.98	114.00	PK	V	PASS
2442.0	73.41	-20.59	94.00	AV	V	PASS
2450.4	53.50	-20.50	74.00	PK	V	PASS
2450.4	42.60	-11.40	54.00	AV	V	PASS
15438.0	64.40	-9.60	74.00	PK	V	PASS
15438.0	51.00	-3.00	54.00	AV	V	PASS

Notes: 1. The readings were Quasi-Peak values below 1GHz.

The readings were Peak values + Average values above 1GHz

2. Emission Level = Antenna Factor + Cable Loss + Meter Reading

CH17 2482MHz test data

Frequency MHz	Emission Level dB μ V/m	Over Limits dB	Limits dB μ V/m	Detector	Polarity	Result
160.50	37.50	-6.00	43.50	QP	H	PASS
445.80	34.50	-11.50	46.00	QP	H	PASS
846.9	42.60	-3.40	46.00	QP	H	PASS
1685.0	51.50	-22.50	74.00	PK	H	PASS
1685.0	40.50	-13.50	54.00	AV	H	PASS
2450.4	54.80	-19.20	74.00	PK	H	PASS
2450.4	42.25	-11.75	54.00	AV	H	PASS
2482.0	95.60	-18.4	114.00	PK	H	PASS
2482.0	80.65	-13.35	94.00	AV	H	PASS
2483.5	53.90	-20.1	74.00	PK	H	PASS
2483.5	40.50	-13.5	54.00	AV	H	PASS
15438.0	59.50	-14.5	74.00	PK	H	PASS
15438.0	48.60	-5.40	54.00	AV	H	PASS
<hr/>						
46.50	36.75	-3.25	40.00	QP	V	PASS
445.80	39.43	-6.57	46.00	QP	V	PASS
846.9	42.00	4.00	46.00	QP	V	PASS
1685.0	50.64	-23.36	74.00	PK	V	PASS
1685.0	40.13	-13.87	54.00	AV	V	PASS
2450.4	52.35	-21.65	74.00	PK	V	PASS
2450.4	40.10	-13.90	54.00	AV	V	PASS
2482.0	89.15	-24.85	114.00	PK	V	PASS
2482.0	75.46	-18.54	94.00	AV	V	PASS
2483.5	50.40	-23.60	74.00	PK	V	PASS
2483.5	38.65	-15.35	54.00	AV	V	PASS
15438.0	58.10	-15.9	74.00	PK	V	PASS
15438.0	48.60	-5.40	54.00	AV	V	PASS

Notes: 1. The readings were Quasi-Peak values below 1GHz.

The readings were Peak values + Average values above 1GHz

2. Emission Level = Antenna Factor + Cable Loss + Meter Reading

7.3. Band edge test

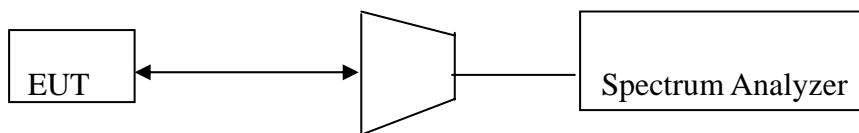
7.3.1. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in 100kHz bandwidth within the band that contains the highest level of the desired power.

7.3.2. Test procedure

1. The EUT was placed on a turntable which is 0.8m above ground plane.
2. Set EUT as continuous transmitting mode.
3. Set the EUT work on the CH1, CH17 individually.
4. Set SPA Frequency = Operation frequency, for PK: RBW =1MHz, VBW=1MHz
5. Set SPA trace max hold, then view.

7.3.3. Test setup diagram

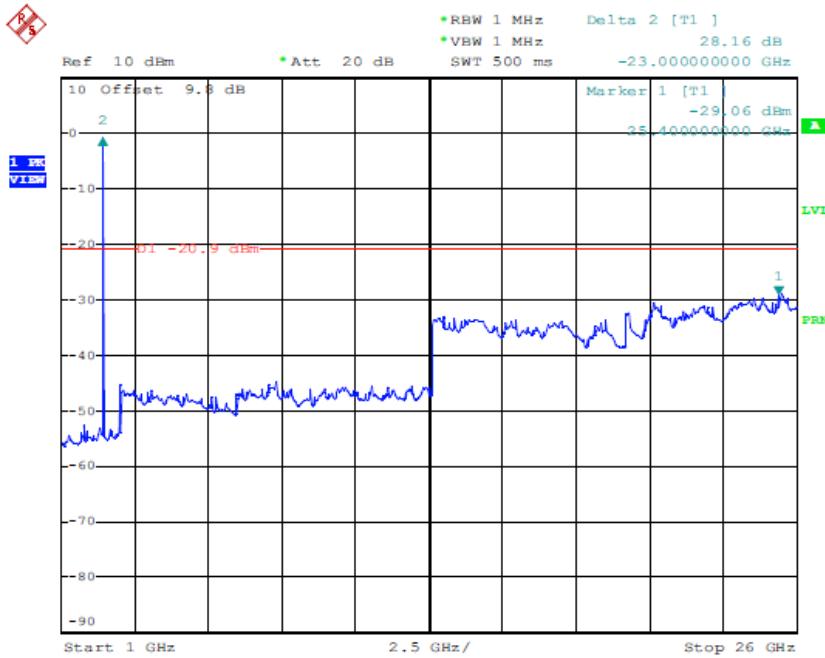


7.3.4. Test result

Pass.

For the band edge spurious emission, please see the test data of CH1 and CH17 of section 7.2.4, the band edge spurious emission meet the requirement of FCC Part 15.209 and FCC Part 15.205.

CH1 2402MHz



CH17 2482MHz

