

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART B & C REQUIREMENT**

OF

Microwave Sensor

MODEL No.: SST-MS2

FCC ID: O3E-SST-MS2

REPORT NO: KAN111121083E

ISSUE DATE: May 15, 2012

Prepared for
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VERIFICATION OF COMPLIANCE

Applicant:	NINGBO HI-TECH ZONE SENSITI SCIENCE & TECHNOLOGY CO., LTD Building No.1 Lingyun Industry Park, No.1177 Lingyun Road, Ningbo, Zhejiang, China
Product Description:	Microwave Sensor
Model Number:	SST-MS2
File Number:	KAN111121083E
Date of Test:	May 3, 2012 to May 14, 2012

We hereby certify that:

The above equipment was tested by NINGBO EMTEK CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2009) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.249.

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

Approved By



**Andy.wang/Manager
NINGBO EMTEK CO., LTD.**

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1. GENERAL INFORMATION

1.1.Product Description

The EUT is a short range, lower power, Details of technical specification, refers to the description in follows:

- a. Operation Frequency: 5793.910MHz
- b. Number of Channel: 1
- c. Antenna Designation: Internal
- d. Rated RF Output Power: Less than 10mW.
- e. Power Supply: AC 120V, 60Hz

1.2.Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: O3E-SST-MS2 filing to comply with Section 15.249 of the FCC Part 15 Subpart C Rules.

1.3.Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 -2009. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4.Special Accessories

Not available for this EUT intended for grant.

1.5.Equipment Modifications

Not available for this EUT intended for grant.

1.6. Test Facility

Site Description	
EMC Lab.	: Accredited by FCC, June 14, 2011 The Certificate Registration Number is 463622. Accredited by Industry Canada, May 2, 2011 The Certificate Registration Number is 46405-9469..
Name of Firm	: NINGBO EMTEK CO., LTD.
Site Location	: 1F Building 4, 1177#, Lingyun Road, Ningbo National Hi-Tech Zone, Ningbo, Zhejiang, China

30MHz~26GHz Radiated emission item Subcontracted in Shenzhen Emtek:

EMC Lab.	The Certificate Registration Number is 406365.
Name of Firm	: SHENZHEN EMTEK CO., LTD.
Site Location	: Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China

26GHz~40GHz Radiated emission item Subcontracted in QuieTek:

EMC Lab.	The Certificate Registration Number is 800392.
Name of Firm	: QuieTek Technology (Suzhou) Co., Ltd.
Site Location	: No.99, Hongye Road, Suzhou Industrial Park, Suzhou, Jiangsu, China

1.7. Measurement Uncertainty

Conducted Emission Uncertainty : 2.8dB

Radiated Emission Uncertainty : 3.7dB (30M~26GHz Polarize: H)
(3m Chamber) 3.6dB (30M~26GHz Polarize: V)

Radiated Emission Uncertainty : 26GHz~40GHz : 2.8 dB (tested in QuieTek)

2. SYSTEM TEST CONFIGURATION

2.1.EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2.EUT Exercise

The EUT (Microwave Sensor) has been tested under Normal Operating and standby condition. No software used to control the EUT for staying in continuous transmitting and receiving mode for testing.

2.3.Requirement for Compliance

2.3.1.Conducted Emissions

According to §15.207, For intentional radiator device 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 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	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 0.50MHz.

2.3.2. Radiated Emissions

(a) FCC Part 15, Subpart C Section 15.209 limit of radiated emission for frequency below 1000GHz. The emissions from an intentional radiator shall not exceed the field strength level specified in the following table:

Frequency (MHz)	Field strength $\mu\text{V/m}$	Distance(m)	Field strength at 3m $\text{dB}\mu\text{V/m}$
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

Remark:

1. Emission level in $\text{dB}\mu\text{V/m} = 20 \log (\mu\text{V/m})$
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

(b) FCC Part 15, Section 15.35(b) limit of radiated emission for frequency above 1000MHz

Frequency(MHz)	$\text{dB}\mu\text{V/m(at 3m)}$	
	PEAK	AVERAGE
Above 1000	74.0	54.0

(c) FCC Part 15, Subpart C Section 15.249(a). The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Frequency(MHz)	Filed Strength of Fundamental(at 3m)		Filed Strength of Harmonics (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
902-928	114	94	74.0	54.0
2400-2483.5	114	94	74.0	54.0
5725-5875	114	94	74.0	54.0
24000-24250	128	108	88.0	68.0

(d) Band edge

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

Frequency Range(MHz)	Limit($\text{dB}\mu\text{V/m}$)	
	Peak	AV
902-928	74	54
2400-2483.5		
5725-5850		
24000-24250		

2.3.3. Antenna Requirement

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

2.4.Configuration of Tested System



2.5.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.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
1.	Microwave Sensor	SENSITI	SST-MS2	O3E-SST-MS2	N/A	EUT
Note: Unless otherwise denoted as EUT in 『Remark』 column , device(s) used in tested system is a support equipment.						

3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§ 15.207	Conducted Emission	Compliant
§ 15.249(a), § 15.249(d) § 15.249(e), § 15.209	Radiated Emission	Compliant
§15.249	Band Edge	Compliant
§ 15.203	Antenna Requirement	Compliant

4. DESCRIPTION OF TEST MODES

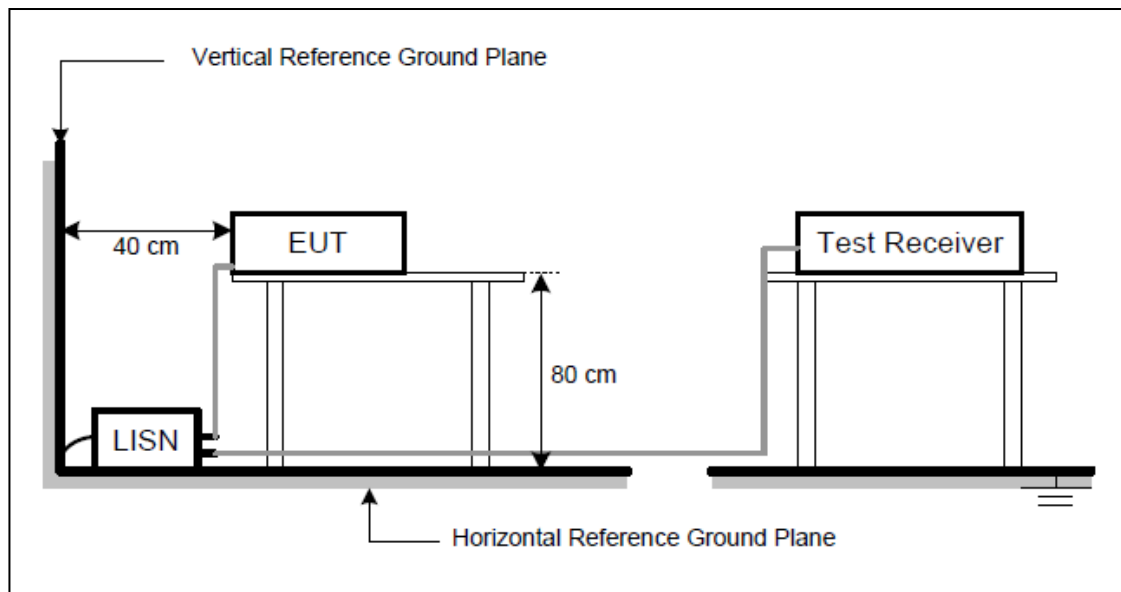
Test Mode	Frequency(MHz)
TX	5793.910

5. CONDUCTED EMISSIONS TEST

5.1.Measurement Procedure:

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

5.2.Test SET-UP



5.3.Measurement Equipment Used:

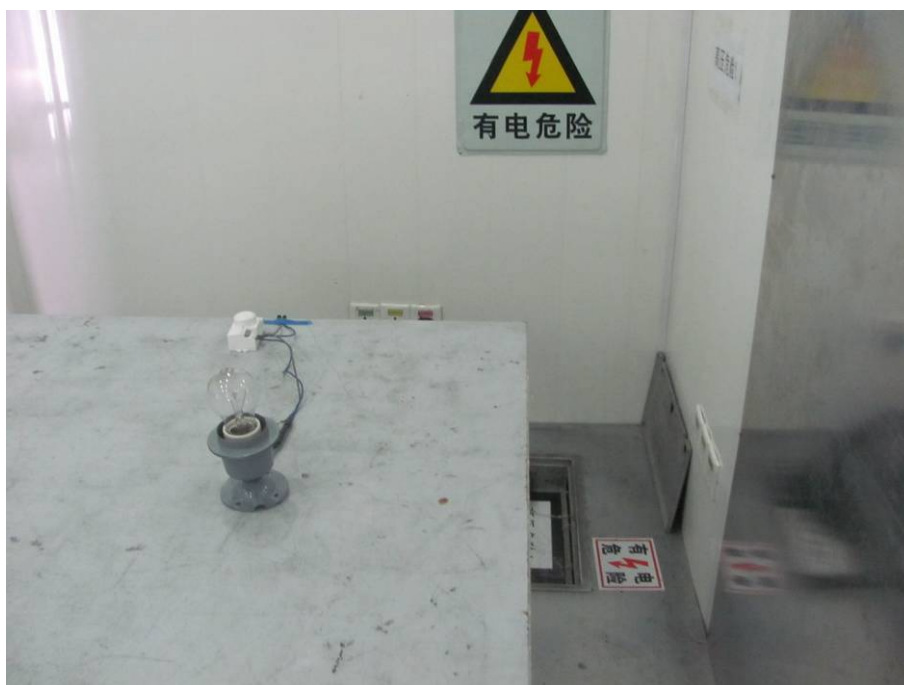
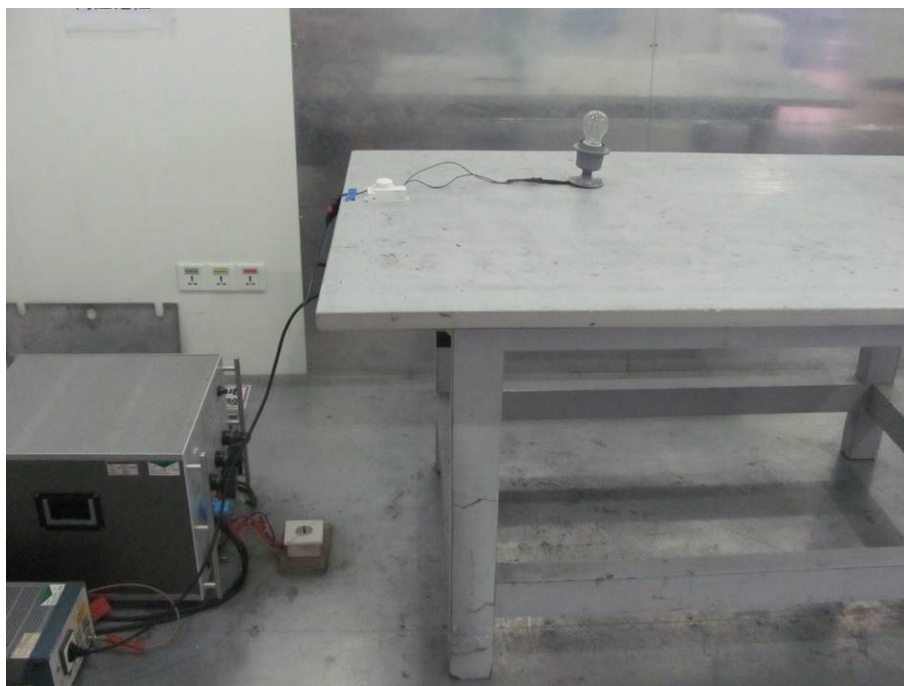
Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/29/2011	05/28/2012
L.I.S.N	Rohde & Schwarz	ESH2-Z5	834549/005	05/29/2011	05/28/2012
L.I.S.N	Rohde & Schwarz	ESH2-Z5	834549/005	05/29/2011	05/28/2012
50ΩCoaxial Switch	Anritsu	MP59B	M20531	05/29/2011	05/28/2012

5.4.Measurement Result:

Date of Test:	May 11, 2012	Temperature:	20°C
Frequency Detector:	0.15~30MHz	Humidity:	55%
Test Result:	PASS	Test Mode:	TX

Test Line	Frequency MHz	Emission Level QP dB(μV)	Emission Level AV dB(μV)	Limits QP dB(μV)	Limits AV dB(μV)	Margin QP dB(μV)	Margin AV dB(μV)
Neutral	0.154	28.00	9.80	65.78	55.78	-37.78	-45.98
	0.166	26.70	9.40	65.16	55.16	-38.46	-45.76
	0.186	24.70	9.20	64.21	54.21	-39.51	-45.01
	16.390	22.60	14.10	60.00	50.00	-37.40	-35.90
	18.330	23.10	13.00	60.00	50.00	-36.90	-37.00
	26.458	36.70	25.10	60.00	50.00	-23.30	-24.90
Line	0.162	27.70	9.60	65.36	55.36	-37.66	-45.76
	0.178	25.60	9.50	64.58	54.58	-38.98	-45.08
	0.230	21.60	8.00	62.45	52.45	-40.85	-44.45
	0.250	19.90	7.90	61.76	51.76	-41.86	-43.86
	25.474	36.00	24.00	60.00	50.00	-24.00	-26.00
	26.690	37.70	26.00	60.00	50.00	-22.30	-24.00

5.5. Conducted Measurement Photos:



6. RADIATED EMISSION TEST

6.1.Measurement Procedure

- a. All measurements were made at 3 meters.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

6.2.Measurement Equipment Used:

(1) Measurement equipment used below 26GHz:

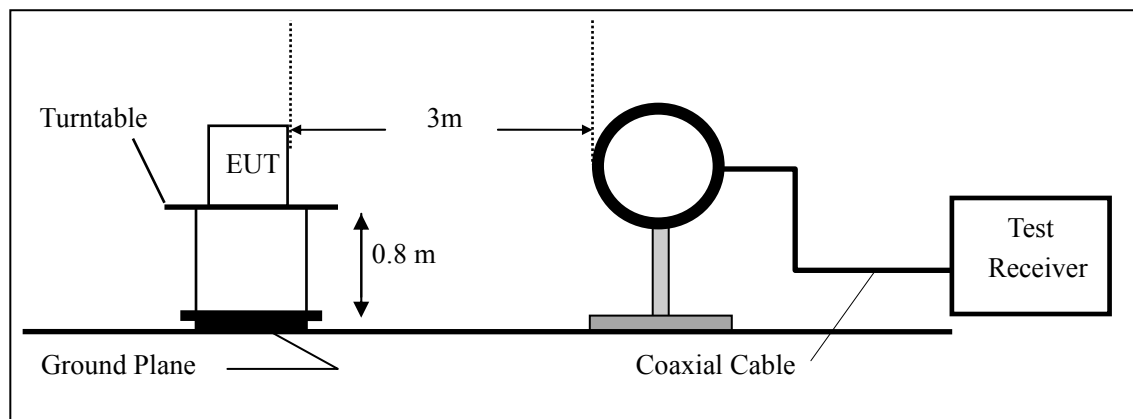
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	ESU	1302.6005.26	05/29/2011	05/28/2012
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	05/29/2011	05/28/2012
Pre-Amplifier	HP	8447D	2944A07999	05/29/2011	05/28/2012
Bilog Antenna	Schwarzbeck	VULB9163	142	05/29/2011	05/28/2012
Loop Antenna	ARA	PLA-1030/B	1029	05/29/2011	05/28/2012
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	05/29/2011	05/28/2012
Horn Antenna	Schwarzbeck	BBHA 9120	D143	05/29/2011	05/28/2012

(2) Measurement equipment used 26GHz~40GHz (QuieTek):

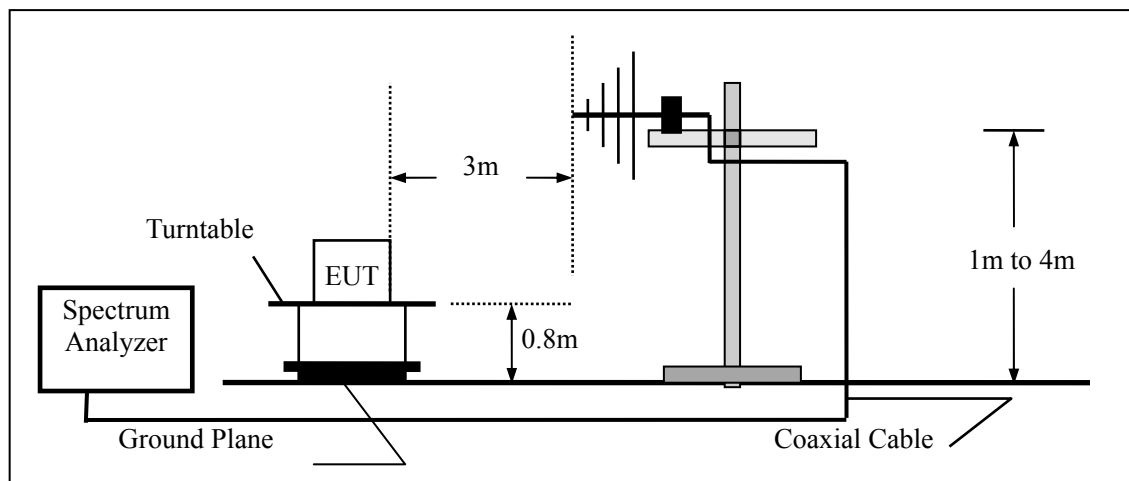
Instrument	Manufacturer	Type No.	Serial No.	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY45300103	2012/05/01	2013/04/30
PSG Analog S.G.	Agilent	E8257D	MY44321116	2012/04/24	2013/04/23
Preamplifier	QuieTek	AP-025C	CHM-0503006	2012/05/06	2013/05/05
Preamplifier	QuieTek	AP-180C	CHM-0602013	2012/05/06	2013/05/05
Bilog Type Antenna	Schaffner	CBL6112D	22254	2011/10/19	2012/10/18
Half Wave Tuned Dipole Antenna	Com-power	AD-100	40137	2011/11/25	2013/11/24
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2011/06/12	2012/06/11
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	737	2011/11/25	2013/11/24
Temperature/ Humidity Meter	zhicheng	ZC1-2	AC6-TH	2012/01/15	2013/01/14

6.3.Test SET-UP

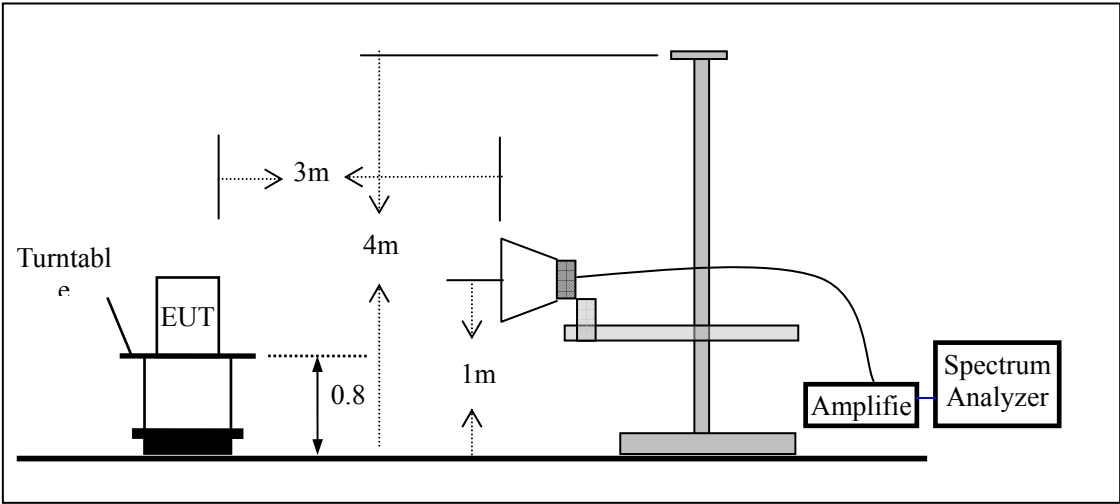
(a) Radiated Emission Test Set-Up, Frequency Below 30MHz



(b) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(c) Radiated Emission Test Set-Up, Frequency Above 1000MHz



6.4.Radiated Measurement Result

Operation Mode:	TX	Test Date :	May 11, 2012
Frequency Range:	30~1000MHz	Temperature :	22 °C
Test Result:	PASS	Humidity :	58 %
Measured Distance:	3m	Test By:	King

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
32.0667	V	23.60	40.00	-16.40	PK
33.3278	V	23.50	40.00	-16.50	PK
45.2166	V	21.60	40.00	-18.40	PK
49.1865	V	21.20	40.00	-18.80	PK
50.2324	V	20.90	40.00	-19.10	PK
58.4074	V	19.10	40.00	-20.90	PK
919.2865	V	31.7	46.00	-14.30	PK
36.8953	H	17.70	40.00	-22.30	PK
44.5868	H	17.50	40.00	-22.50	PK
51.4807	H	17.00	40.00	-23.00	PK
57.5940	H	17.30	40.00	-22.70	PK
94.7600	H	16.50	43.50	-27.00	PK
909.6666	H	31.80	46.00	-14.20	PK

- Note:** (1) All Readings are Peak Value.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

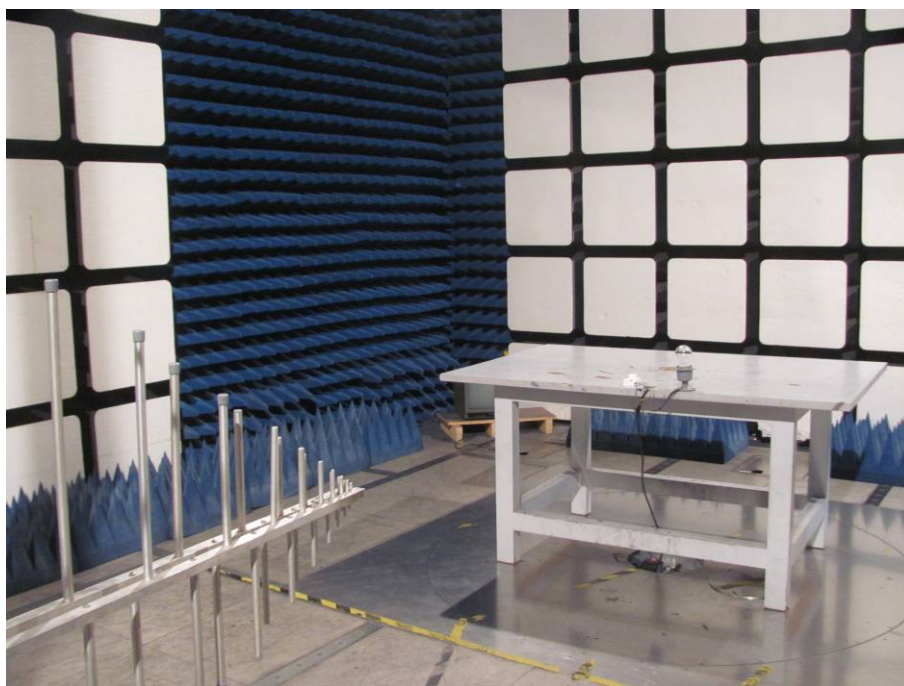
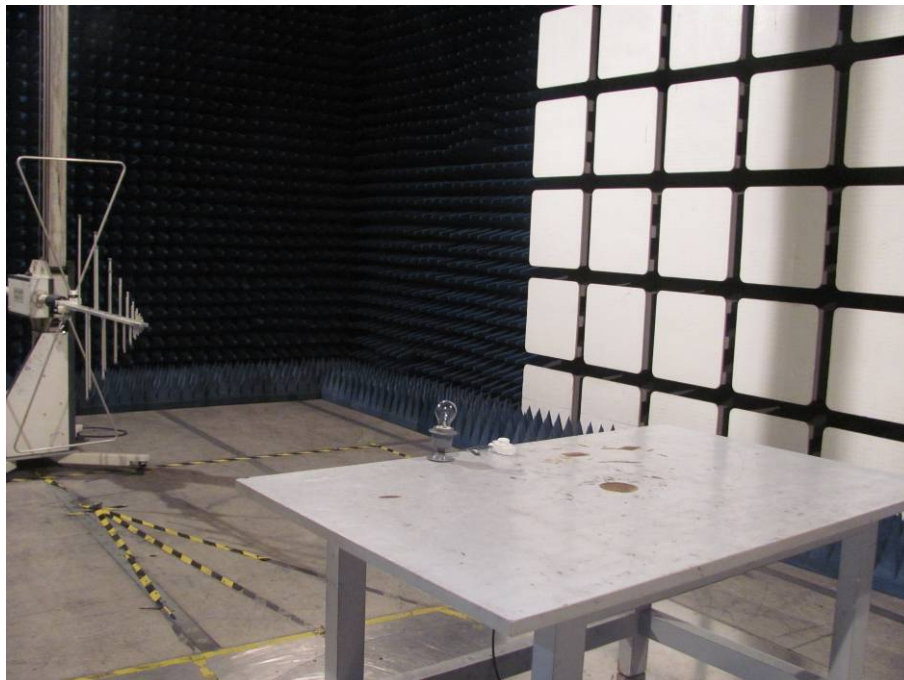
Operation Mode:	TX	Test Date :	May 11, 2012
Frequency Range:	1-40GHz	Temperature :	22 °C
Test Result:	PASS	Humidity :	58 %
Measured Distance:	3m	Test By:	King

Freq. (MHz)	Ant.Pol	Emission Level (dBuV)		Limit 3m (dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
5793.910	V	98.7	88.8	114.0	94.0	-15.3	-5.2
11587.820	V	57.4	46.6	74.0	54.0	-16.6	-7.4
17381.730	V	60.6	47.2	74.0	54.0	-13.4	-6.8
--	V	--	--	--	--	--	--
--	V	--	--	--	--	--	--
5793.910	H	93.7	86.1	114.0	94.0	-20.3	-7.9
11587.820	H	56.0	43.6	74.0	54.0	-18.0	-10.4
17381.730	H	56.6	45.5	74.0	54.0	-17.4	-8.5
--	H	--	--	--	--	--	--
--	H	--	--	--	--	--	--

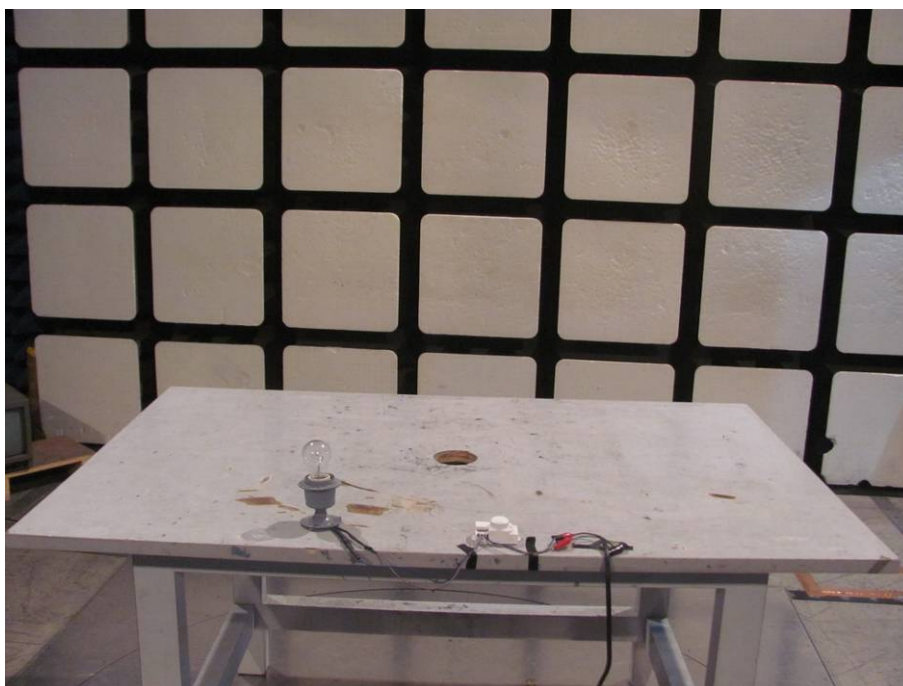
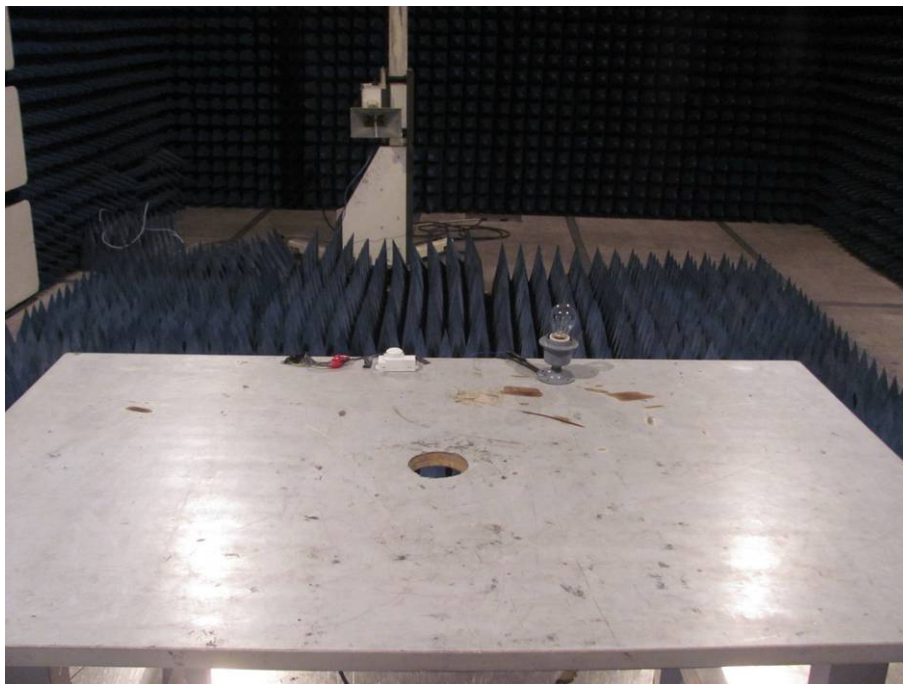
- Note:** (1) All Readings are Peak Value and AV.
 (2) Emission Level= Reading Level+Probe Factor +Cable Loss
 (3) The average measurement was not performed when the peak measured data under the limit of average detection.
 (4) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured

6.5.Radiated Measurement Photos:

30M~1000MHz:



Above 1000MHz:



7. BAND EDGES MEASUREMENT

7.1. Standard Applicable

According to 15.249(d), out band emission except for harmonics shall be comply with §15.209 or at least attenuated by 50 dB below the level of the fundamental.

7.2. Measurement Procedure

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = AUTO.

7.3. Measurement Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	ESU	1302.6005.26	05/29/2011	05/29/2812
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	05/29/2011	05/29/2812
Pre-Amplifier	HP	8447D	2944A07999	05/29/2011	05/29/2812
Bilog Antenna	Schwarzbeck	VULB9163	142	05/29/2011	05/29/2812
Loop Antenna	ARA	PLA-1030/B	1029	05/29/2011	05/29/2812
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	05/29/2011	05/29/2812
Horn Antenna	Schwarzbeck	BBHA 9120	D143	05/29/2011	05/29/2812

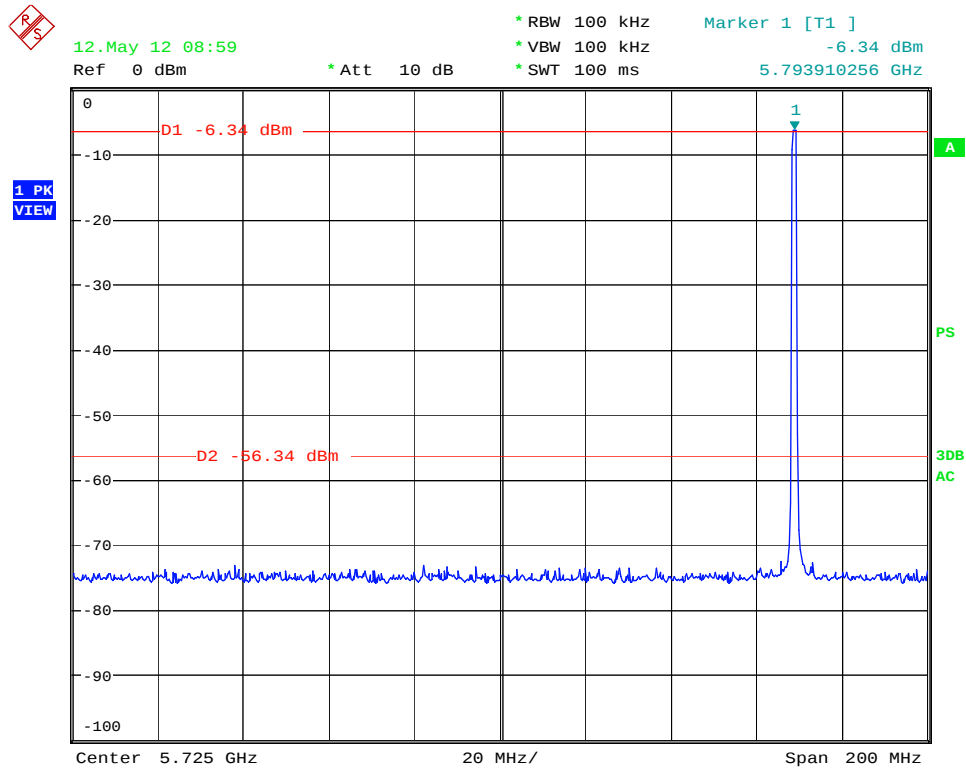
7.4. Test Setup

Same as 6.3 Radiated Emission Measurement.

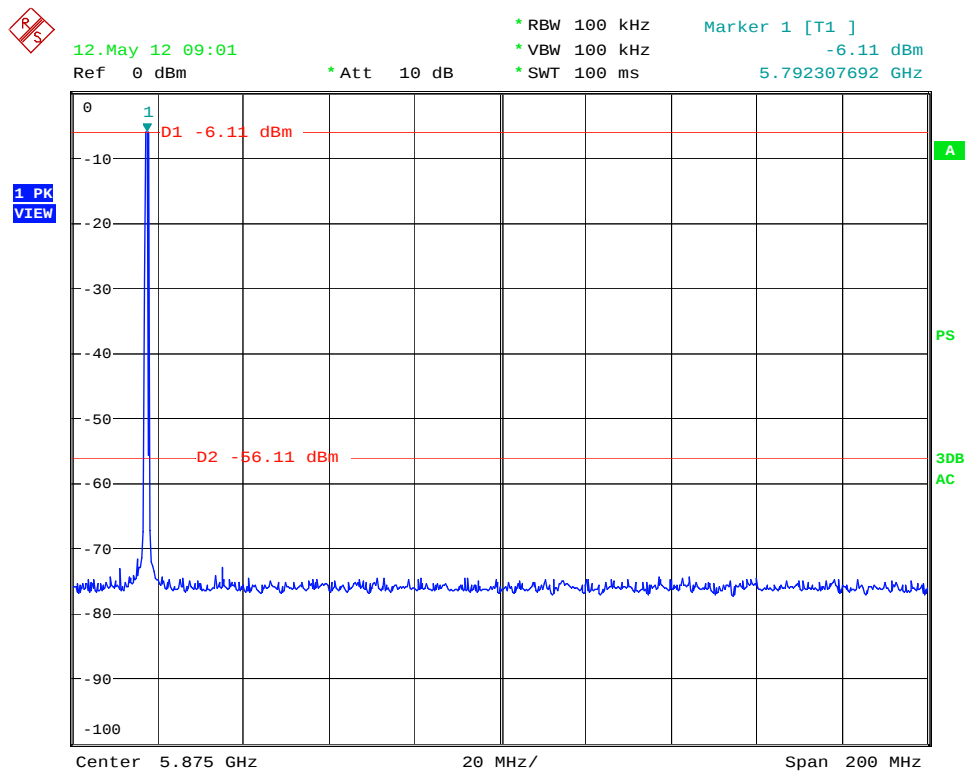
7.5. Test Results

Pass

The test plots as following:



Date: 12.MAY.2012 08:59:40



Date: 12.MAY.2012 09:01:52

8. ANTENNA APPLICATION

8.1. Standard Applicable

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

8.2. Antenna Construction

The EUT'S antenna (Internal antenna) is permanently integrated on the main EUT, no consideration of replacement.