

# FCC RF Test Report

**APPLICANT** : Bryton Incorporation  
**EQUIPMENT** : GPS enabled cycling computer  
**BRAND NAME** : bryton  
**MODEL NAME** : Rider 50  
**FCC ID** : YDM-RIDER50  
**STANDARD** : FCC Part 15 Subpart C §15.249  
**CLASSIFICATION** : Part15 Low Power Communication Device Transmitter

The product was received on Apr. 15, 2010 and completely tested on May 05, 2010. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:



Roy Wu / Manager



## **SPORTON INTERNATIONAL INC.**

**No. 52, Hwa Ya 1<sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.**



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### SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.205 15.249	A8.5 A2.9	Frequency Band Edges	15.205(a) 15.249(d)	Pass	-
3.2	15.215	A8.5	Emission Bandwidth	15.215(c)	Pass	-
3.3	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 14.7 dB at 0.502 MHz
3.4	15.249	A2.9	Transmitter Radiated Emission	15.209(a) & 15.249(a)	Pass	Under limit 1.42 dB at 2478 MHz
3.5	15.203	A8.4	Antenna Requirement	N/A	Pass	-



# 1 General Description

## 1.1 Applicant

**Bryton Incorporation**

6F., No. 100, Zhouzi St., Neihu Dist., Taipei City 11493, Taiwan (R.O.C.)

## 1.2 Manufacturer

**A-MAX Technology Industrial Park**

No. 8, Industrial Park, Gonghe Village, Shajing Town, Bao'an District, ShenZhen, China

## 1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	GPS enabled cycling computer
Brand Name	bryton
Model Name	Rider 50
FCC ID	YDM-RIDER50
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	78
Carrier Frequency of Each Channel	2400+n*1 MHz; n=1~78
Channel Spacing	1 MHz
Antenna Type	Chip Antenna with gain -2 dBi
HW Version	R03
SW Version	R10
EUT Stage	Production Unit

**Remark:**

1. This test report recorded only product characteristics and test results of Part15 Low Power Communication Device Transmitter.
2. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 1.4 Testing Site

<b>Test Site</b>	SPORTON INTERNATIONAL INC.		
<b>Test Site Location</b>	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		<b>FCC/IC Registration No.</b>
	CO05-HY	03CH07-HY	TW1022/4086B-1

## 1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.249
- ♦ ANSI C63.4-2003
- ♦ IC RSS-210 Issue 7

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.

## 2 Test Configuration of Equipment Under Test

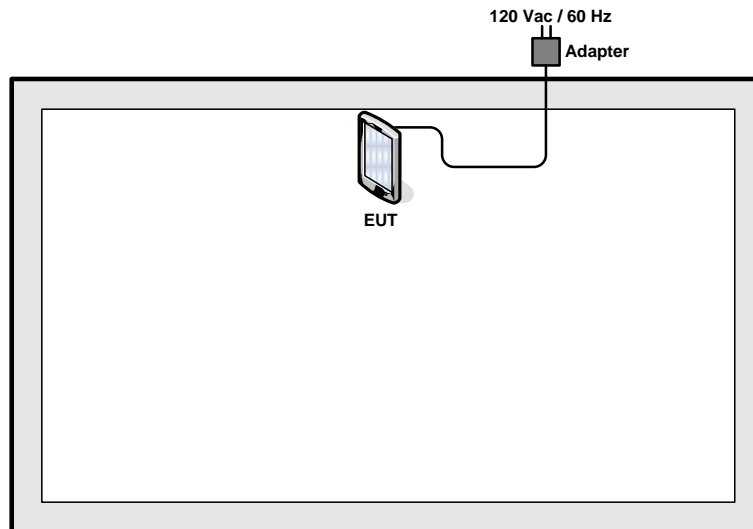
### 2.1 Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction (150 kHz to 30 MHz), radiation (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

The following tables are showing the test modes as the worst cases and recorded in this report.

Test Item	Test Cases
Radiated TCs	Mode 1: CH01_2401 MHz Mode 2: CH39_2439 MHz Mode 3: CH78_2478 MHz
AC Conducted Emission	Mode 1 :Tx CH39 (2439 MHz) + Adapter

### 2.2 Connection Diagram of Test System



### 2.3 RF Utility

The RF utility, "ANTRFTest" was installed in EUT which was programmed in order to make the EUT transmitting and receiving signals continuously.

### 3 Test Result

#### 3.1 Band Edges Measurement

##### 3.1.1 Limit

###### 1. Restricted bands of operation

Except as shown in paragraph (d) of this section (Part 15.205), 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	2690 - 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			

2. Emissions 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.

##### 3.1.2 Measuring Instruments

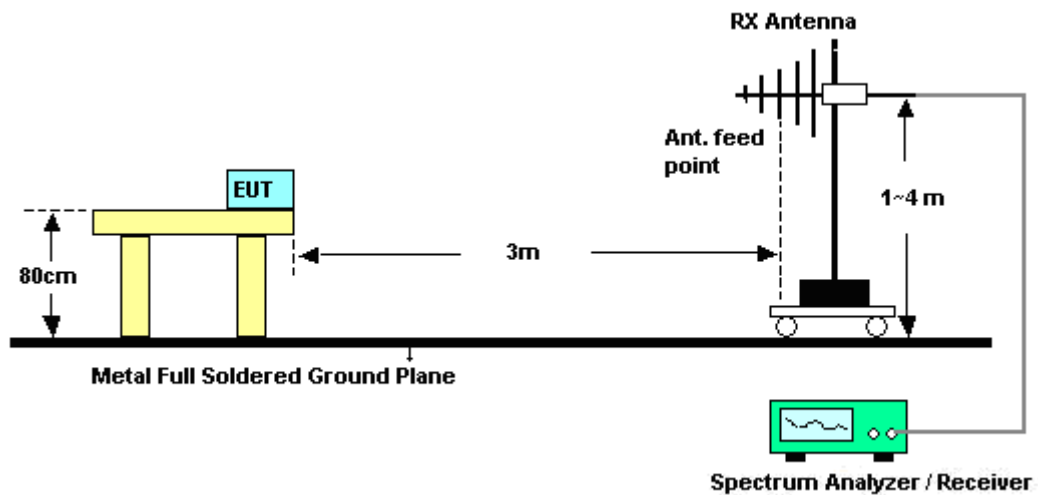
See list of measuring instruments of this test report.



### 3.1.3 Test Procedures

1. The testing follows the guidelines in ANSI C63.4-2003 Measurement Guidelines.
2. Radiated emission test: Applies to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 1MHz, Sweep: Auto for Peak; set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto for Average. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation. See FCC Section 15.35(b) and (c).

### 3.1.4 Test Setup





3.1.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	24~26°C
Test Channel :	01	Relative Humidity :	49~53%
		Test Engineer :	Cona Huang

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2355.41	44.86	-29.14	74	41.43	32.08	5.49	34.14	137	360	Peak
2355.41	33.02	-20.98	54	29.59	32.08	5.49	34.14	137	360	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2315.7	45.97	-28.03	74	42.57	32	5.53	34.13	100	110	Peak
2315.7	33	-21	54	29.6	32	5.53	34.13	100	110	Average

Test Mode :	Mode 3	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	49~53%
		Test Engineer :	Cona Huang

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2486.7	45.09	-28.91	74	41.63	32.27	5.38	34.19	116	354	Peak
2486.7	35.37	-18.63	54	31.91	32.27	5.38	34.19	116	354	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2493.73	44.54	-29.46	74	41.07	32.3	5.37	34.2	119	238	Peak
2493.73	32.73	-21.27	54	29.26	32.3	5.37	34.2	119	238	Average

## 3.2 Emission Bandwidth Measurement

### 3.2.1 Limit

Intentional radiators operation under the alternative provisions to the general emission limits, as contained in section 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

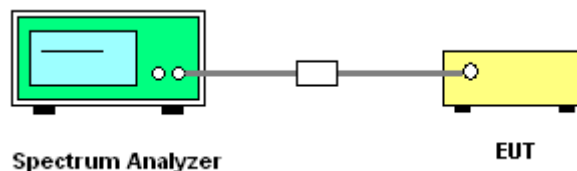
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
2. The EUT should be transmitting at its maximum data rate as the worst cases.
3. Use the following spectrum analyzer settings:  
Span = 2 MHz; RBW = 30 kHz; VBW  $\geq$  RBW; Sweep = 500 ms; Detector function = RM;  
Trace = max hold.
4. The marker-delta reading at this point is the occupied bandwidth of the emission.

### 3.2.4 Test Setup



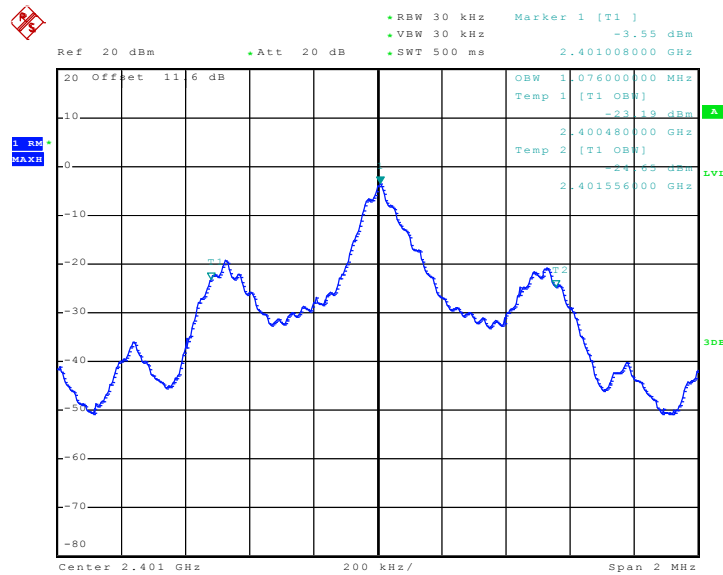


3.2.5 Test Result of Emission Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	24°C
Test Engineer :	Andy Yeh	Relative Humidity :	48%

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
01	2401	1.076
39	2439	1.084
78	2478	1.088

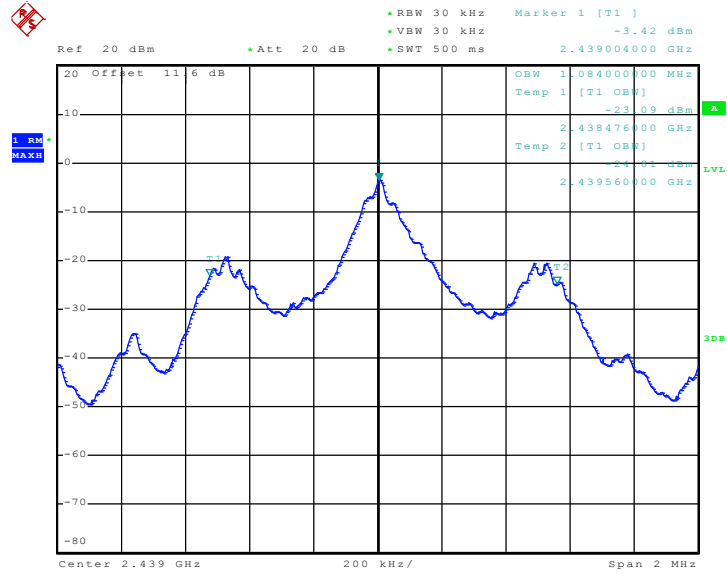
Occupied Bandwidth Plot on Channel 01



Date: 5.MAY.2010 18:07:59

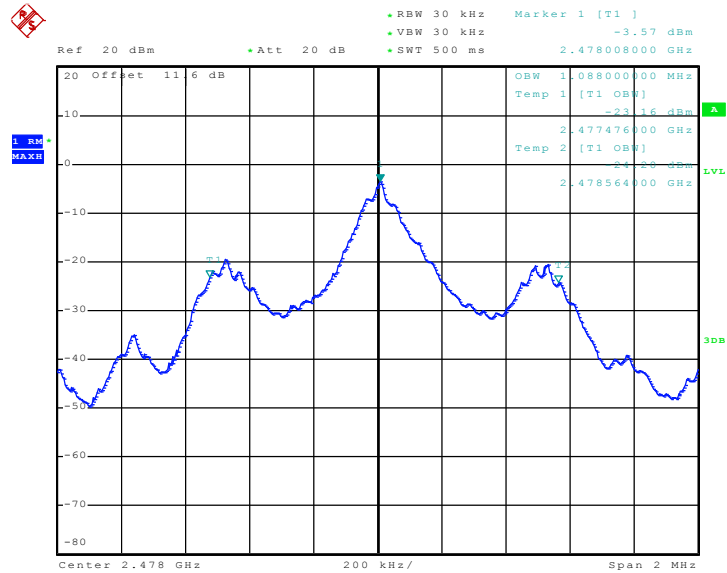


### Occupied Bandwidth Plot on Channel 39



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### Occupied Bandwidth Plot on Channel 78



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### 3.3 AC Conducted Emission Measurement

#### 3.3.1 Limit of AC Conducted Emission

For equipment 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.

Frequency of emission (MHz)	Conducted limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

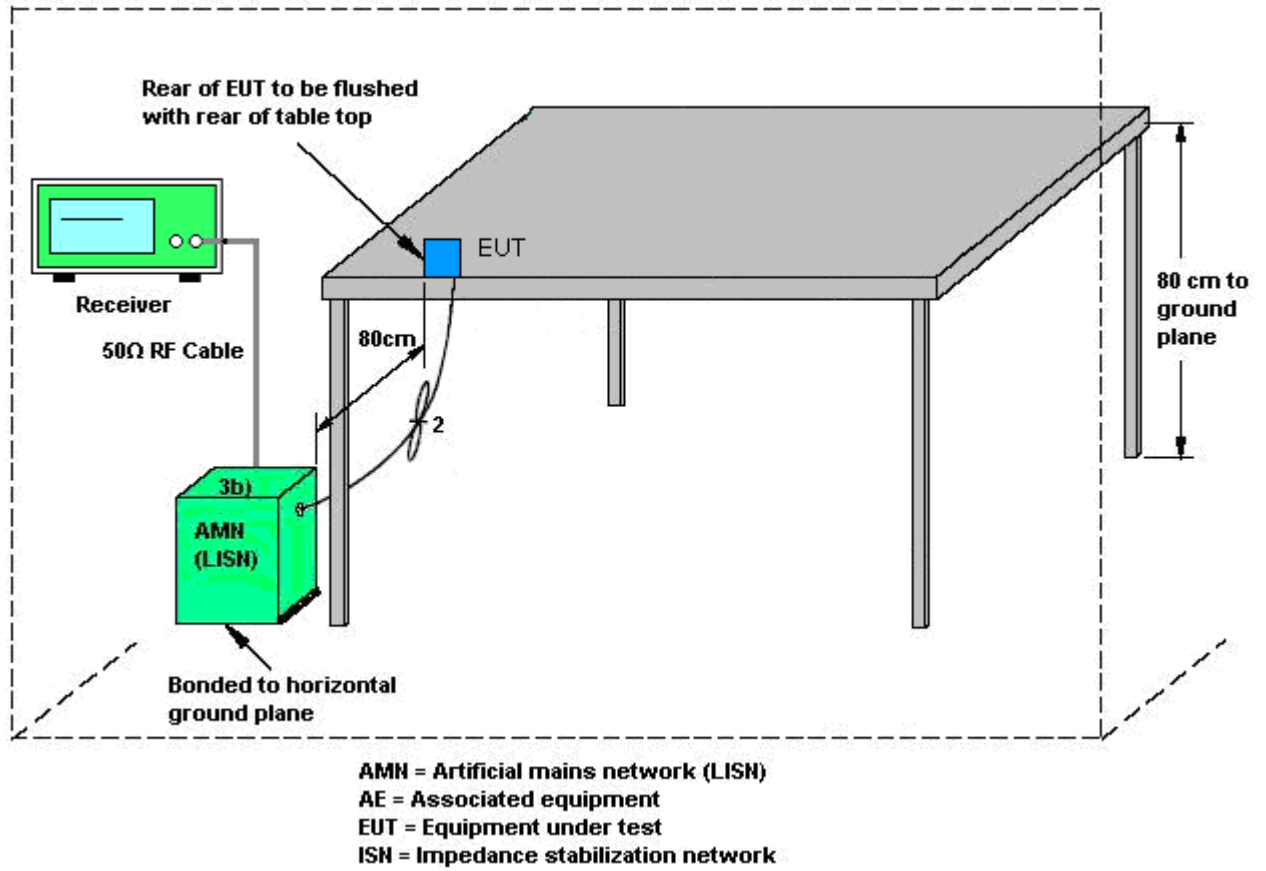
#### 3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

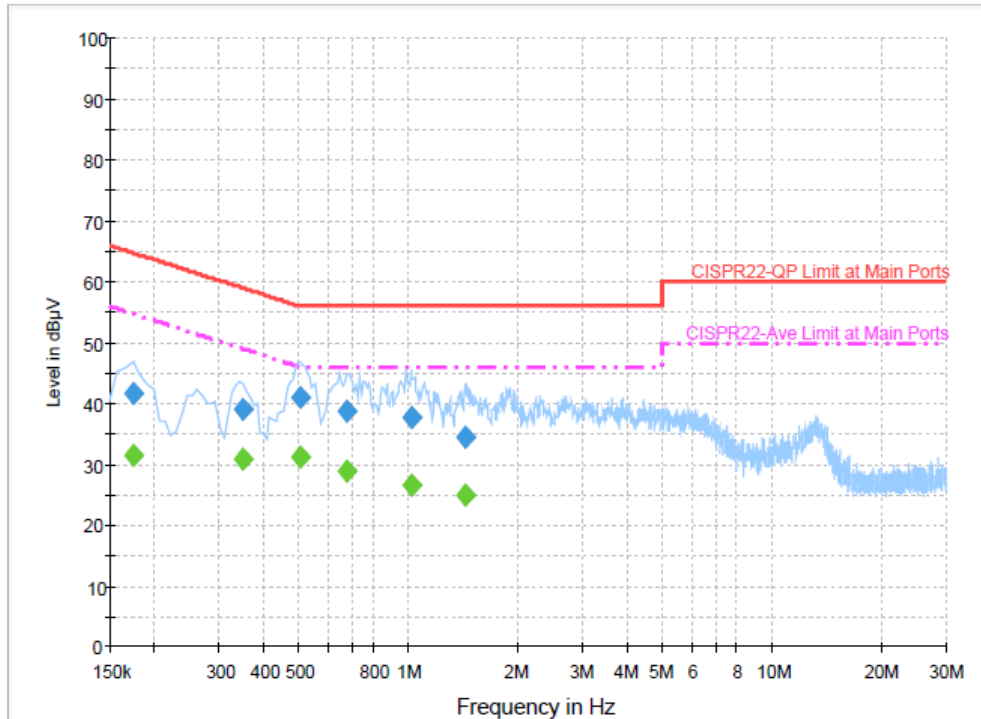
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

### 3.3.4 Test Setup



### 3.3.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Jiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Tx CH39 (2439 MHz) + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



#### Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.174000	41.8	Off	L1	19.5	23.0	64.8
0.350000	39.0	Off	L1	19.5	20.0	59.0
0.502000	41.0	Off	L1	19.4	15.0	56.0
0.678000	38.8	Off	L1	19.5	17.2	56.0
1.014000	37.6	Off	L1	19.4	18.4	56.0
1.430000	34.3	Off	L1	19.5	21.7	56.0

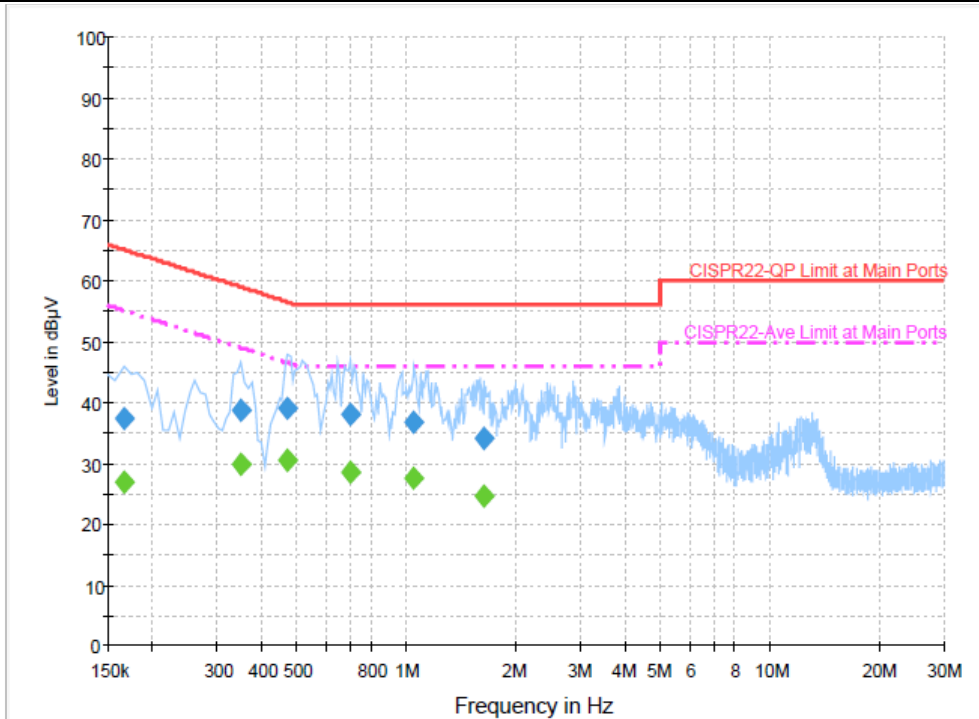
#### Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.174000	31.4	Off	L1	19.5	23.4	54.8
0.350000	30.7	Off	L1	19.5	18.3	49.0
0.502000	31.3	Off	L1	19.4	14.7	46.0
0.678000	29.0	Off	L1	19.5	17.0	46.0
1.014000	26.7	Off	L1	19.4	19.3	46.0
1.430000	25.1	Off	L1	19.5	20.9	46.0





Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Jiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Tx CH39 (2439 MHz) + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



**Final Result 1**

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.166000	37.3	Off	N	19.5	27.9	65.2
0.350000	38.8	Off	N	19.4	20.2	59.0
0.470000	38.9	Off	N	19.4	17.6	56.5
0.702000	38.2	Off	N	19.5	17.8	56.0
1.046000	36.8	Off	N	19.4	19.2	56.0
1.630000	34.2	Off	N	19.5	21.8	56.0

**Final Result 2**

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.166000	27.0	Off	N	19.5	28.2	55.2
0.350000	29.7	Off	N	19.4	19.3	49.0
0.470000	30.6	Off	N	19.4	15.9	46.5
0.702000	28.6	Off	N	19.5	17.4	46.0
1.046000	27.5	Off	N	19.4	18.5	46.0
1.630000	24.6	Off	N	19.5	21.4	46.0

### 3.4 Radiated Emission Measurement

#### 3.4.1 Limit of Radiated Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/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

#### 3.4.2 Measuring Instruments

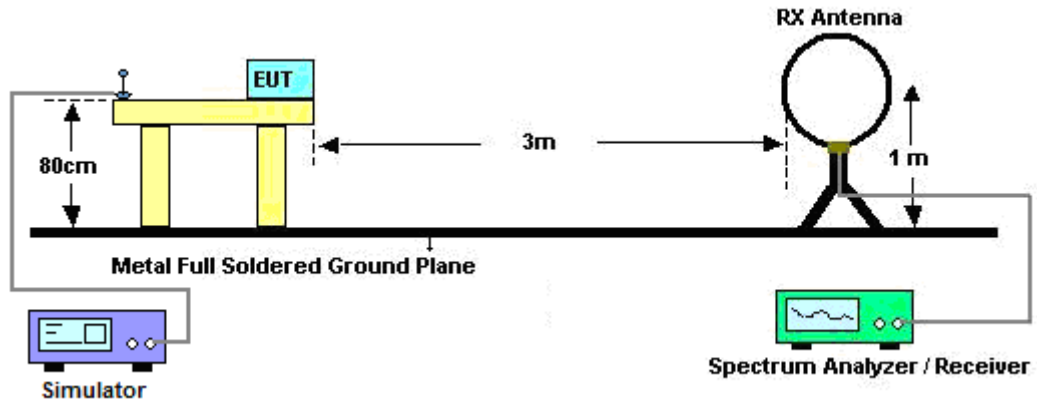
See list of measuring instruments of this test report.

#### 3.4.3 Test Procedures

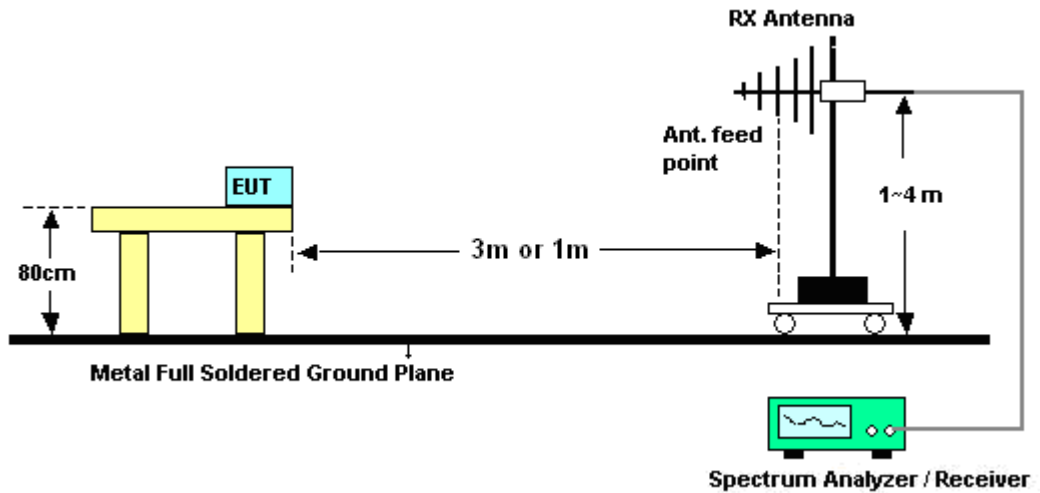
1. Use the following spectrum analyzer settings:
  - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold.
  - (2) Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.  
 Distance extrapolation factor =  $20 \log(\text{specific distance [3m]} / \text{test distance [1m]})$  (dB)
2. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.

### 3.4.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz





3.4.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

Test Engineer :	Cona Huang	Temperature :	24~26°C	
		Relative Humidity :	49~53%	
Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

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

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

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



3.4.6 Test Result of Radiated Emission (30 MHz ~ 10<sup>th</sup> Harmonic)

Test Mode :	Mode 1	Temperature :	24~26°C
Test Channel :	01	Relative Humidity :	49~53%
Test Engineer :	Cona Huang	Polarization :	Horizontal

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	24.43	-15.57	40	35.85	19.51	0.53	31.46	-	-	Peak
217.65	33.26	-12.74	46	54.22	9.1	1.4	31.46	100	154	Peak
223.86	31.54	-14.46	46	51.93	9.62	1.44	31.45	-	-	Peak
310.5	31.45	-14.55	46	47.24	13.74	1.79	31.32	-	-	Peak
363	31.61	-14.39	46	45.68	15.13	2.07	31.27	-	-	Peak
416.2	33.14	-12.86	46	45.65	16.45	2.2	31.16	-	-	Peak
2355.41	33.02	-20.98	54	29.59	32.08	5.49	34.14	137	360	Average
2355.41	44.86	-29.14	74	41.43	32.08	5.49	34.14	137	360	Peak
2401	91.29	-22.71	114	87.86	32.13	5.46	34.16	137	360	Peak
2401	90.98	-3.02	94	87.55	32.13	5.46	34.16	137	360	Average
2492	32.39	-21.61	54	28.92	32.3	5.37	34.2	137	360	Average
2492	43.7	-30.3	74	40.23	32.3	5.37	34.2	137	360	Peak
8385	55.03	-18.97	74	44.03	36	10.1	35.1	100	154	Peak
8385	39.77	-14.23	54	28.77	36	10.1	35.1	100	154	Average



<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	24~26°C
<b>Test Channel :</b>	01	<b>Relative Humidity :</b>	49~53%
<b>Test Engineer :</b>	Cona Huang	<b>Polarization :</b>	Vertical

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	26.01	-13.99	40	37.43	19.51	0.53	31.46	-	-	Peak
83.46	26.8	-13.2	40	49.48	7.96	0.9	31.54	-	-	Peak
217.65	30.97	-15.03	46	51.93	9.1	1.4	31.46	-	-	Peak
310.5	25.53	-20.47	46	41.32	13.74	1.79	31.32	-	-	Peak
467.3	28.76	-17.24	46	39.99	17.5	2.34	31.07	-	-	Peak
623.4	33.9	-12.1	46	41.79	20.25	2.76	30.9	100	263	Peak
2315.7	33	-21	54	29.6	32	5.53	34.13	100	110	Average
2315.7	45.97	-28.03	74	42.57	32	5.53	34.13	100	110	Peak
2401	82.38	-31.62	114	78.95	32.13	5.46	34.16	100	110	Peak
2401	82.02	-11.98	94	78.59	32.13	5.46	34.16	100	110	Average
2484	32.37	-21.63	54	28.91	32.27	5.38	34.19	100	110	Average
2484	43.38	-30.62	74	39.92	32.27	5.38	34.19	100	110	Peak
8394	55.01	-18.99	74	44	36	10.11	35.1	100	215	Peak
8394	39.7	-14.3	54	28.69	36	10.11	35.1	100	215	Average



<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	24~26°C
<b>Test Channel :</b>	39	<b>Relative Humidity :</b>	49~53%
<b>Test Engineer :</b>	Cona Huang	<b>Polarization :</b>	Horizontal

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	24.22	-15.78	40	35.64	19.51	0.53	31.46	-	-	Peak
217.65	32.64	-13.36	46	53.6	9.1	1.4	31.46	-	-	Peak
223.86	32.1	-13.9	46	52.49	9.62	1.44	31.45	-	-	Peak
310.5	31.45	-14.55	46	47.24	13.74	1.79	31.32	-	-	Peak
363	32.05	-13.95	46	46.12	15.13	2.07	31.27	-	-	Peak
416.2	33.46	-12.54	46	45.97	16.45	2.2	31.16	126	222	Peak
2358	45.25	-28.75	74	41.82	32.08	5.49	34.14	167	360	Peak
2358	33.09	-20.91	54	29.66	32.08	5.49	34.14	167	360	Average
2439	92.2	-21.8	114	88.74	32.22	5.41	34.17	167	360	Peak
2439	91.95	-2.05	94	88.49	32.22	5.41	34.17	167	360	Average
2492	32.4	-21.6	54	28.93	32.3	5.37	34.2	167	360	Average
2492	43.38	-30.62	74	39.91	32.3	5.37	34.2	167	360	Peak
8262	54.09	-19.91	74	43.17	36	10.02	35.1	100	169	Peak
8262	40.03	-13.97	54	29.11	36	10.02	35.1	100	169	Average



<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	24~26°C
<b>Test Channel :</b>	39	<b>Relative Humidity :</b>	49~53%
<b>Test Engineer :</b>	Cona Huang	<b>Polarization :</b>	Vertical

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	26.97	-13.03	40	38.39	19.51	0.53	31.46	-	-	Peak
84.54	27.06	-12.94	40	49.61	8.09	0.9	31.54	-	-	Peak
217.65	31.12	-14.88	46	52.08	9.1	1.4	31.46	-	-	Peak
310.5	25.68	-20.32	46	41.47	13.74	1.79	31.32	-	-	Peak
467.3	29.22	-16.78	46	40.45	17.5	2.34	31.07	-	-	Peak
623.4	34	-12	46	41.89	20.25	2.76	30.9	100	347	Peak
2334	45.08	-28.92	74	41.68	32.02	5.51	34.13	137	231	Peak
2334	33.02	-20.98	54	29.62	32.02	5.51	34.13	137	231	Average
2439	82.78	-31.22	114	79.32	32.22	5.41	34.17	137	231	Peak
2439	82.5	-11.5	94	79.04	32.22	5.41	34.17	137	231	Average
2486	32.38	-21.62	54	28.92	32.27	5.38	34.19	137	231	Average
2486	44.37	-29.63	74	40.91	32.27	5.38	34.19	137	231	Peak
8277	54.27	-19.73	74	43.34	36	10.03	35.1	100	147	Peak
8277	40.16	-13.84	54	29.23	36	10.03	35.1	100	147	Average





<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	24~26°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	49~53%
<b>Test Engineer :</b>	Cona Huang	<b>Polarization :</b>	Horizontal

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
30	24.57	-15.43	40	35.99	19.51	0.53	31.46	-	-	Peak
217.65	32.77	-13.23	46	53.73	9.1	1.4	31.46	-	-	Peak
223.86	32.31	-13.69	46	52.7	9.62	1.44	31.45	-	-	Peak
310.5	31.98	-14.02	46	47.77	13.74	1.79	31.32	-	-	Peak
363	32	-14	46	46.07	15.13	2.07	31.27	-	-	Peak
416.2	33.27	-12.73	46	45.78	16.45	2.2	31.16	100	181	Peak
2316	44.52	-29.48	74	41.12	32	5.53	34.13	116	354	Peak
2316	33.04	-20.96	54	29.64	32	5.53	34.13	116	354	Average
2478	92.9	-21.1	114	89.44	32.27	5.38	34.19	116	354	Peak
2478	92.58	-1.42	94	89.12	32.27	5.38	34.19	116	354	Average
2486.7	45.09	-28.91	74	41.63	32.27	5.38	34.19	116	354	Peak
2486.7	35.37	-18.63	54	31.91	32.27	5.38	34.19	116	354	Average
8313	54.53	-19.47	74	43.58	36	10.05	35.1	111	158	Peak
8313	40.26	-13.74	54	29.31	36	10.05	35.1	111	158	Average



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	24~26°C
<b>Test Channel :</b>	78	<b>Relative Humidity :</b>	49~53%
<b>Test Engineer :</b>	Cona Huang	<b>Polarization :</b>	Vertical

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
37.02	26.11	-13.89	40	41.34	15.66	0.6	31.49	-	-	Peak
84.54	27.33	-12.67	40	49.88	8.09	0.9	31.54	-	-	Peak
217.65	31.16	-14.84	46	52.12	9.1	1.4	31.46	-	-	Peak
310.5	25.49	-20.51	46	41.28	13.74	1.79	31.32	-	-	Peak
467.3	29.24	-16.76	46	40.47	17.5	2.34	31.07	-	-	Peak
623.4	34.17	-11.83	46	42.06	20.25	2.76	30.9	135	259	Peak
2340	45.79	-28.21	74	42.38	32.05	5.5	34.14	119	238	Peak
2340	33.07	-20.93	54	29.66	32.05	5.5	34.14	119	238	Average
2478	84.71	-29.29	114	81.25	32.27	5.38	34.19	119	238	Peak
2478	84.15	-9.85	94	80.69	32.27	5.38	34.19	119	238	Average
2493.73	32.73	-21.27	54	29.26	32.3	5.37	34.2	119	238	Average
2493.73	44.54	-29.46	74	41.07	32.3	5.37	34.2	119	238	Peak
8433	54.34	-19.66	74	43.31	36	10.13	35.1	100	266	Peak
8433	40.43	-13.57	54	29.4	36	10.13	35.1	100	266	Average



## **3.5 Antenna Requirements**

### **3.5.1 Standard Applicable**

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

### **3.5.2 Antenna Connected Construction**

The antennas type used in this product is Chip Antenna without connector and it is considered to meet antenna requirement.



### 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 05, 2009	Aug. 04, 2010	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9kHz~30MHz	Nov. 30, 2009	Nov. 29, 2010	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9kHz~30MHz	Nov. 23, 2009	Nov. 22, 2010	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2009	Oct. 30, 2010	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP	101067	9KHz ~ 30GHz	Dec. 04, 2009	Dec. 03, 2010	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 20, 2009	Aug. 19, 2010	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 14, 2009	Oct. 13, 2010	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec.09,2009	Dec. 08, 2010	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32dB.GAIN	Mar. 27, 2010	Mar. 26, 2011	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 KHz~30 MHz	May 22, 2008	May 21, 2010	Radiation (03CH07-HY)

## 5 Uncertainty of Evaluation

### Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Contribution	Uncertainty of $X_i$		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.10	Normal (k=2)	0.05
Cable Loss	0.10	Normal (k=2)	0.05
AMN Insertion Loss	2.50	Rectangular	0.63
Receiver Specification	1.50	Rectangular	0.43
Site Imperfection	1.39	Rectangular	0.80
Mismatch	+0.34 / -0.35	U-Shape	0.24
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>1.13</b>		
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>2.26</b>		

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Contribution	Uncertainty of $X_i$		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>1.27</b>		
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>2.54</b>		



**Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)**

Contribution	Uncertainty of $X_i$		$u(X_i)$	$C_i$	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	±0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	±1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	±0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site Imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\text{Log}(1-\Gamma_1*\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
<b>Combined Standard Uncertainty <math>U_c(y)</math></b>	<b>2.36</b>				
<b>Measuring Uncertainty for a Level of Confidence of 95% (<math>U = 2U_c(y)</math>)</b>	<b>4.72</b>				



## **Appendix A. Photographs of EUT**

Please refer to Sporton report number EP041501 as below.