

FCC RF Test Report

APPLICANT : Bryton Incorporation
EQUIPMENT : GPS enabled cycling computer
BRAND NAME : bryton
MODEL NAME : Rider 30
FCC ID : YDM-RIDER30
STANDARD : FCC Part 15 Subpart C §15.249
CLASSIFICATION : Part15 Low Power Communication Device Transmitter

The product was received on Sep. 13, 2010 and completely tested on Oct. 07, 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:



Anderson Chiu / Deputy Manager



SPORTON INTERNATIONAL INC.

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



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR091316	Rev. 01	Initial issue of report	Oct. 11, 2010

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 0.62 dB at 2401 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 30
FCC ID	YDM-RIDER30
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	78
Carrier Frequency of Each Channel	$2400+n*1$ MHz; $n=1\sim78$
Channel Spacing	1 MHz
Antenna Type	Fixed Internal 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

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	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

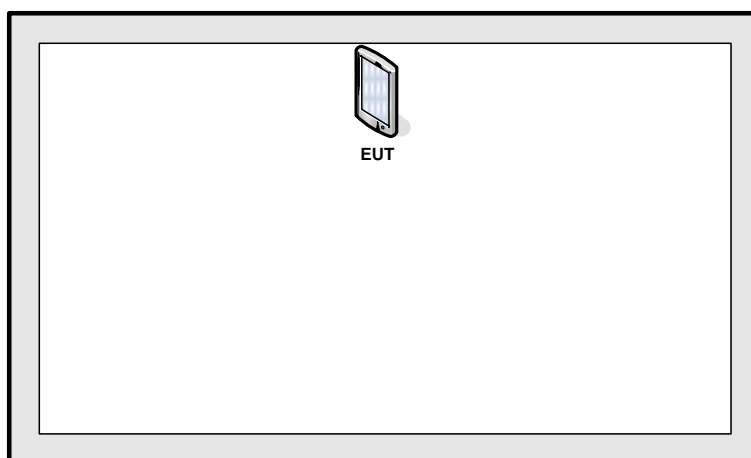
The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction (150 kHz to 30 MHz), radiation (9 kHz to the 10th harmonic of the highest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

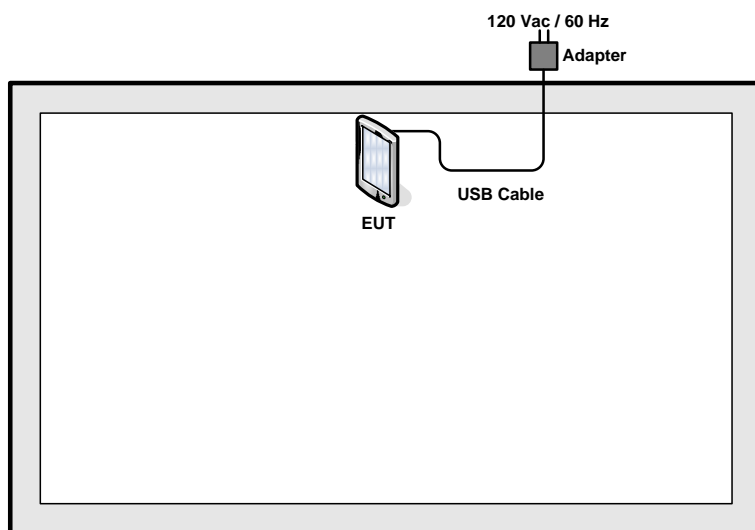
Test Item	Test Cases
Radiated TCs	Mode 1: Tx CH01_2401 MHz Mode 2: Tx CH39_2439 MHz Mode 3: Tx CH78_2478 MHz Mode 4: EUT + USB Cable (Charging from Adapter)
AC Conducted Emission	Mode 1 :EUT + USB Cable (Charging from Adapter)

2.2 Connection Diagram of Test System

<EUT Tx Mode>



<EUT with USB Cable (Charging from Adapter) Mode>



2.3 RF Utility

The RF utility 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
¹ 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	(²)
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.

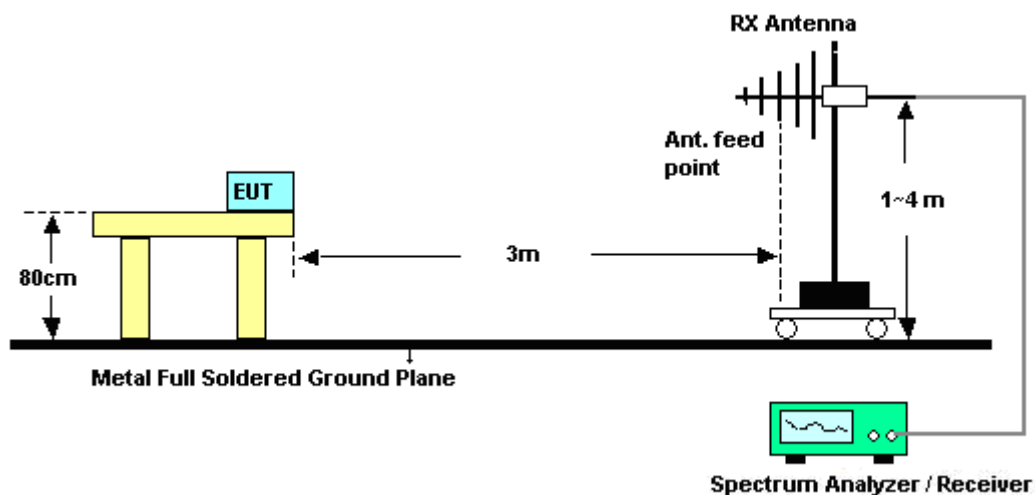
3.1.2 Measuring Instruments

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 :	24~25°C
Test Channel :	01	Relative Humidity :	43~44%
		Test Engineer :	David Yang

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
2388.09	47.77	-26.23	74	43.09	32.18	6.03	33.53	111	349	Peak
2388.09	36.41	-17.59	54	31.73	32.18	6.03	33.53	111	349	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
2387.33	47.92	-26.08	74	43.24	32.18	6.03	33.53	143	55	Peak
2387.33	35	-19	54	30.32	32.18	6.03	33.53	143	55	Average

Test Mode :	Mode 3	Temperature :	24~25°C
Test Channel :	78	Relative Humidity :	43~44%
		Test Engineer :	David Yang

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
2485.37	48.35	-25.65	74	43.45	32.28	6.18	33.56	115	344	Peak
2485.37	35.26	-18.74	54	30.36	32.28	6.18	33.56	115	344	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
2485.37	46.86	-27.14	74	41.96	32.28	6.18	33.56	199	33	Peak
2485.37	34.03	-19.97	54	29.13	32.28	6.18	33.56	199	33	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.

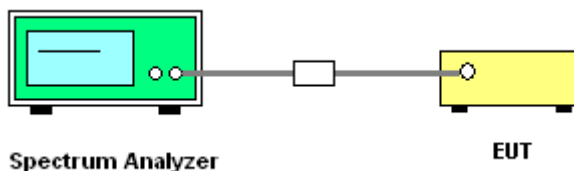
3.2.2 Measuring Instruments

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

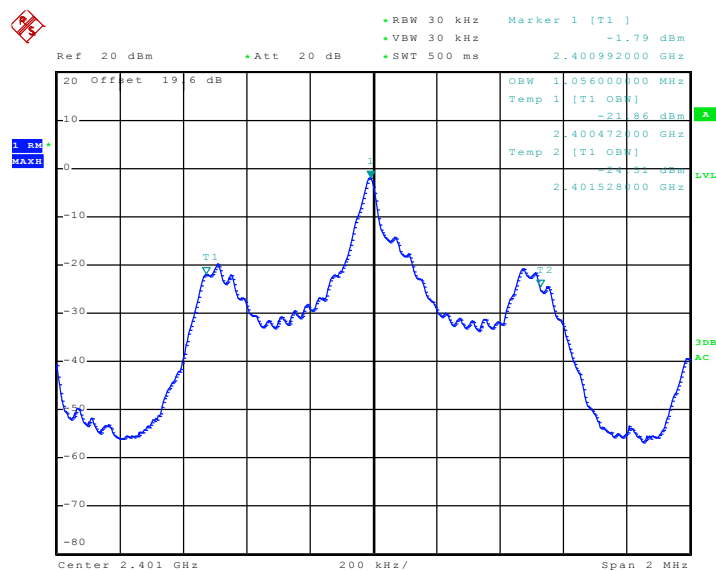


3.2.5 Test Result of Emission Bandwidth

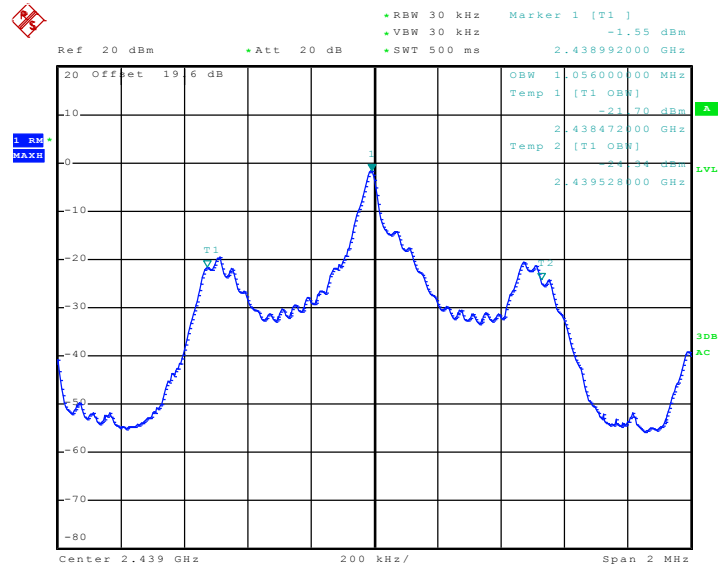
Test Mode :	Mode 1, 2, 3	Temperature :	24~26°C
Test Engineer :	Alan Liu	Relative Humidity :	51~54%

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
01	2401	1.056
39	2439	1.056
78	2478	1.052

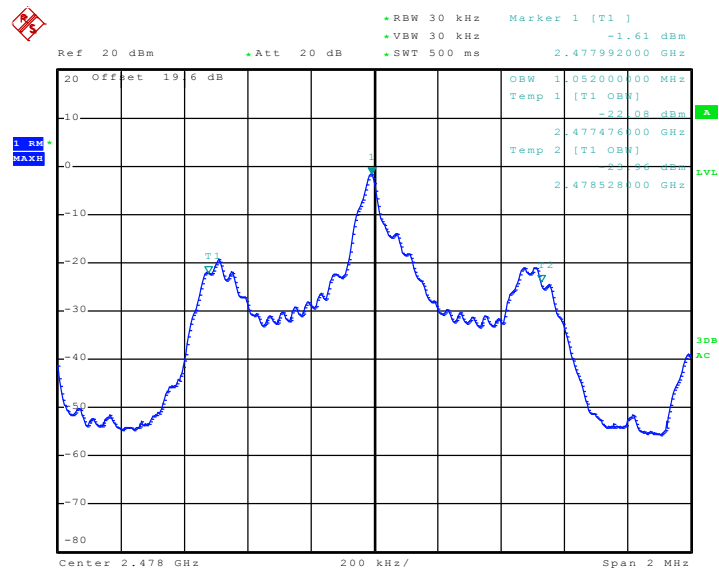
Occupied Bandwidth Plot on Channel 01



Date: 5.OCT.2010 09:24:11

Occupied Bandwidth Plot on Channel 39


Date: 5.OCT.2010 09:22:01

Occupied Bandwidth Plot on Channel 78


Date: 5.OCT.2010 09:23:18

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.

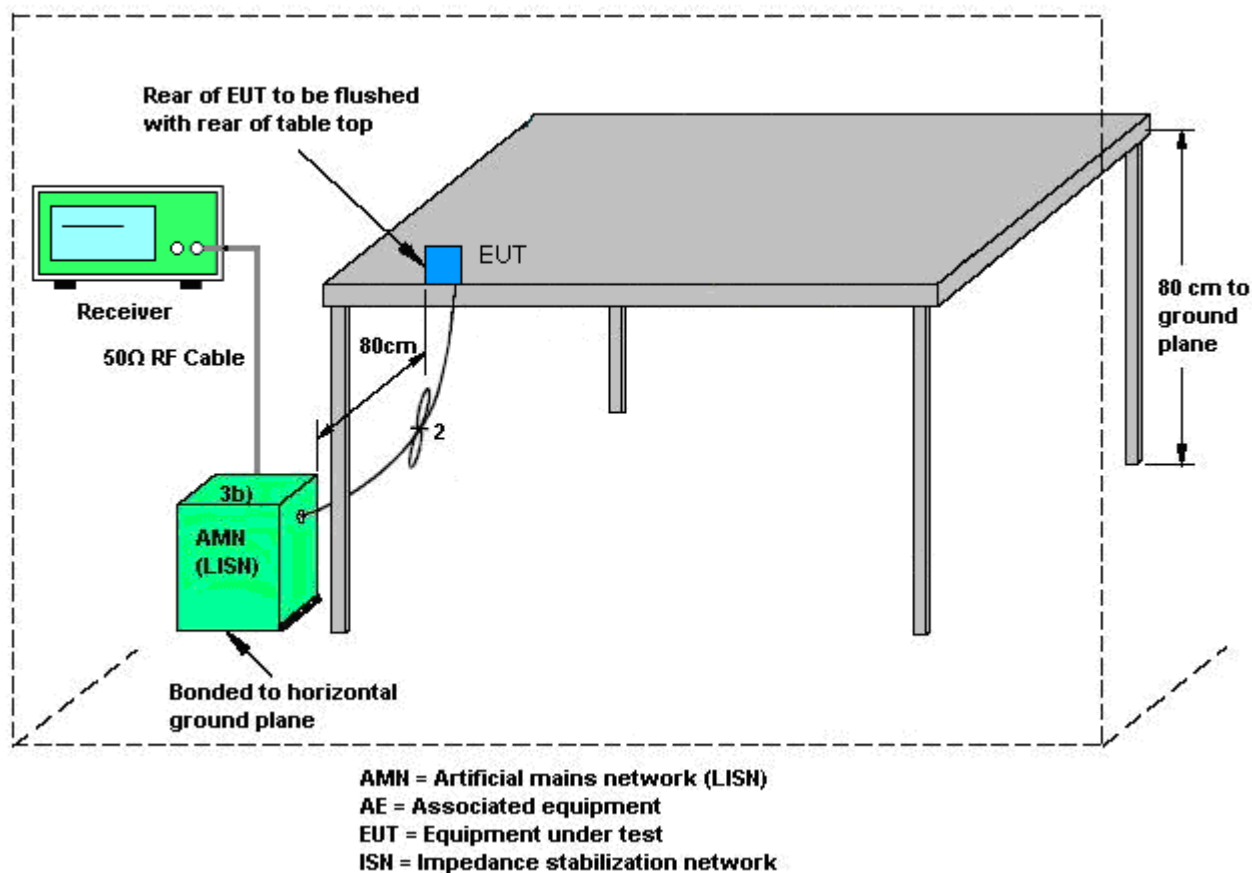
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

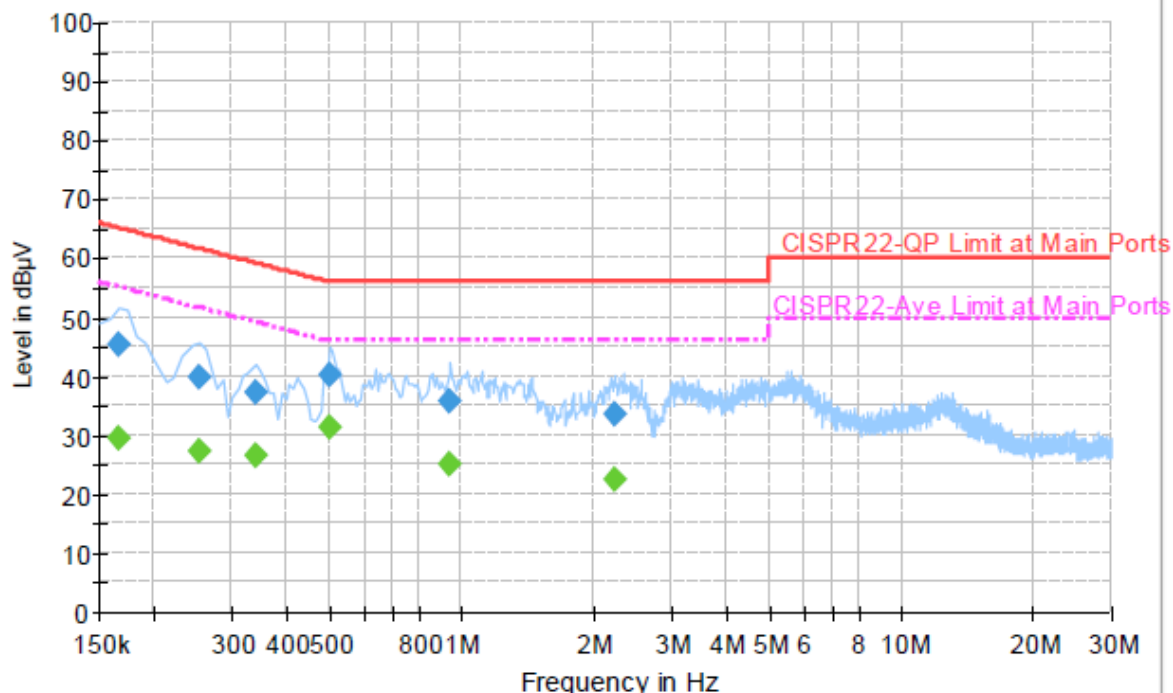
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All 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 :	44~46%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	EUT + USB Cable (Charging from Adapter)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



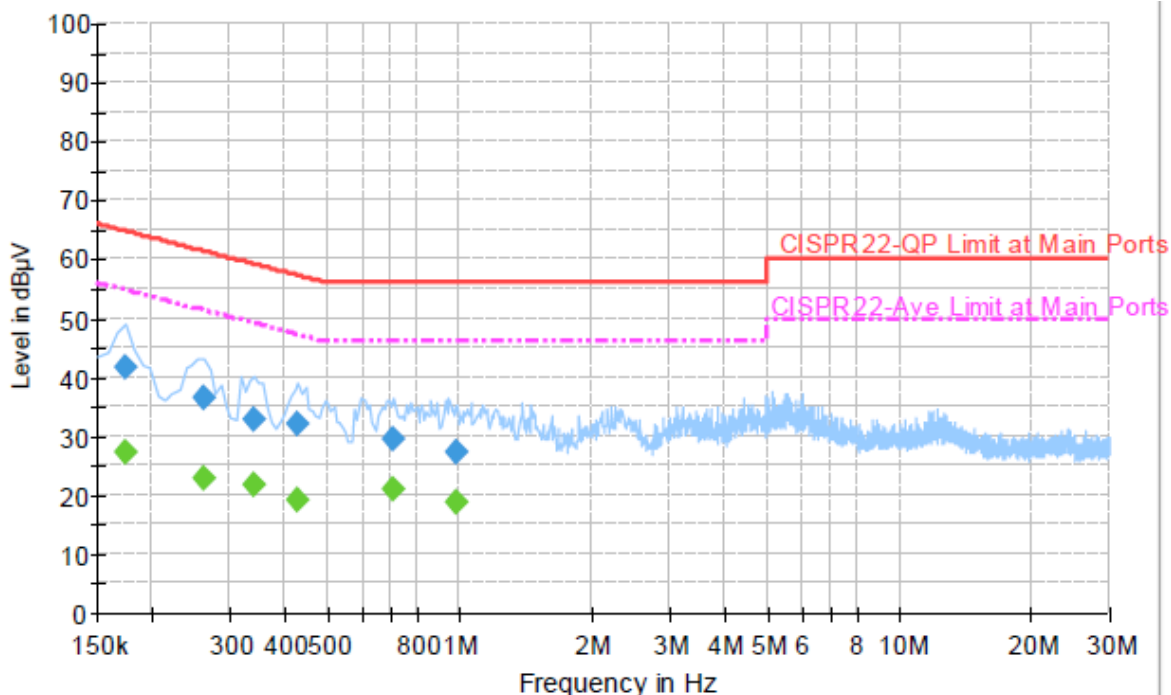
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	45.3	Off	L1	19.3	19.9	65.2
0.254000	40.0	Off	L1	19.3	21.6	61.6
0.342000	37.4	Off	L1	19.3	21.8	59.2
0.502000	40.4	Off	L1	19.3	15.6	56.0
0.942000	35.8	Off	L1	19.4	20.2	56.0
2.222000	33.4	Off	L1	19.5	22.6	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	29.4	Off	L1	19.3	25.8	55.2
0.254000	27.2	Off	L1	19.3	24.4	51.6
0.342000	26.6	Off	L1	19.3	22.6	49.2
0.502000	31.3	Off	L1	19.3	14.7	46.0
0.942000	25.1	Off	L1	19.4	20.9	46.0
2.222000	22.4	Off	L1	19.5	23.6	46.0

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Jiang	Relative Humidity :	44~46%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	EUT + USB Cable (Charging from 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	N	19.3	23.0	64.8
0.262000	36.4	Off	N	19.4	25.0	61.4
0.342000	32.9	Off	N	19.3	26.3	59.2
0.430000	32.2	Off	N	19.4	25.1	57.3
0.710000	29.7	Off	N	19.5	26.3	56.0
0.982000	27.3	Off	N	19.5	28.7	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.174000	27.5	Off	N	19.3	27.3	54.8
0.262000	23.0	Off	N	19.4	28.4	51.4
0.342000	21.7	Off	N	19.3	27.5	49.2
0.430000	19.1	Off	N	19.4	28.2	47.3
0.710000	21.1	Off	N	19.5	24.9	46.0
0.982000	19.0	Off	N	19.5	27.0	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

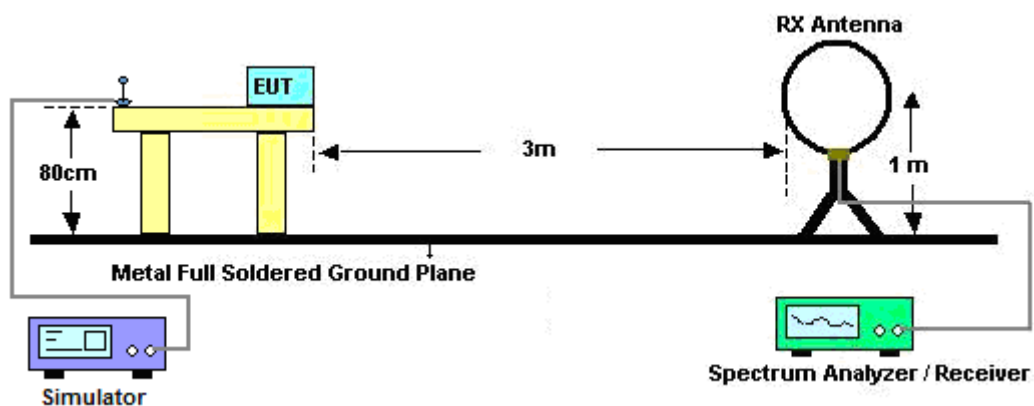
See list of measuring instruments of this test report.

3.4.3 Test Procedures

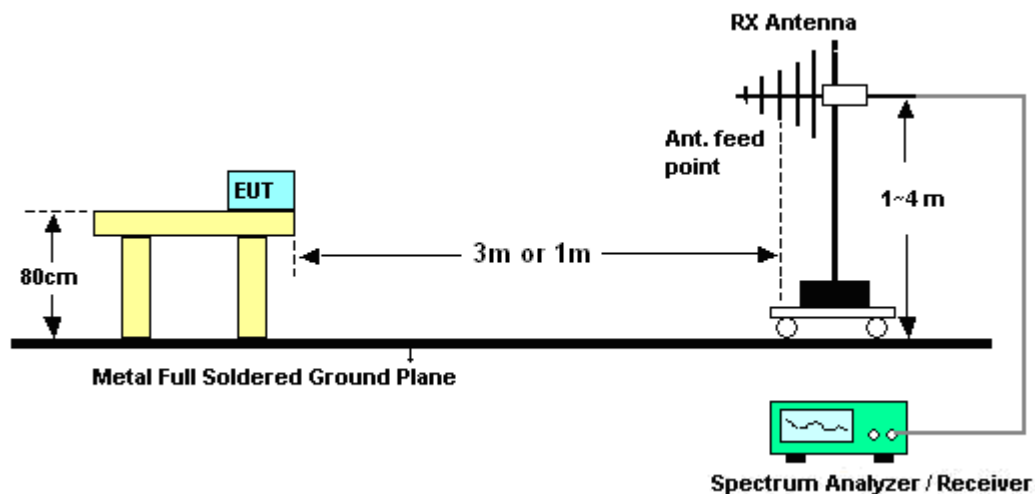
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold.
 - Above 18 GHz shall be extrapolated to the specified distance 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)
- 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 :	David Yang	Temperature :	24~25℃	
		Relative Humidity :	43~44%	

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 ~ 10th Harmonic)

Test Mode :	Mode 1: Tx CH01_2401 MHz	Temperature :	24~25°C
Test Engineer :	David Yang	Relative Humidity :	43~44%
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
34.05	20.44	-19.56	40	34.05	17.29	0.57	31.47	124	350	Peak
107.49	15.11	-28.39	43.5	34.56	11.06	1.04	31.55	-	-	Peak
228.18	12.13	-33.87	46	32.02	10.08	1.47	31.44	-	-	Peak
461	17.78	-28.22	46	29.18	17.36	2.32	31.08	-	-	Peak
649.3	21.3	-24.7	46	28.89	20.44	2.84	30.87	-	-	Peak
749.4	23.35	-22.65	46	29.47	21.52	3.06	30.7	-	-	Peak
2388.09	47.77	-26.23	74	43.09	32.18	6.03	33.53	111	349	Peak
2388.09	36.41	-17.59	54	31.73	32.18	6.03	33.53	111	349	Average
2401	94.68	-19.32	114	90	32.18	6.03	33.53	111	349	Peak
2401	93.38	-0.62	94	88.7	32.18	6.03	33.53	111	349	Average
2494	33.56	-20.44	54	28.65	32.3	6.18	33.57	111	349	Average
2494	45.9	-28.1	74	40.99	32.3	6.18	33.57	111	349	Peak
8181	55.01	-18.99	74	42.71	35.53	10.88	34.11	106	341	Peak
8181	40.27	-13.73	54	27.97	35.53	10.88	34.11	106	341	Average
9604	39.86	-34.14	74	72.6	-10.38	12.01	34.37	100	0	Peak



Test Mode :	Mode 1: Tx CH01_2401 MHz	Temperature :	24~25°C
Test Engineer :	David Yang	Relative Humidity :	43~44%
Polarization :	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
30.81	20.79	-19.21	40	32.76	18.95	0.54	31.46	100	54	Peak
88.05	12.55	-30.95	43.5	34.53	8.62	0.93	31.53	-	-	Peak
256.26	13.71	-32.29	46	30.71	12.85	1.57	31.42	-	-	Peak
424.6	17.3	-28.7	46	29.58	16.63	2.23	31.14	-	-	Peak
645.8	21.83	-24.17	46	29.45	20.42	2.83	30.87	-	-	Peak
965.7	25.9	-28.1	54	28.81	24.18	3.48	30.57	-	-	Peak
2387.33	47.92	-26.08	74	43.24	32.18	6.03	33.53	143	55	Peak
2387.33	35	-19	54	30.32	32.18	6.03	33.53	143	55	Average
2401	92.55	-21.45	114	87.87	32.18	6.03	33.53	143	55	Peak
2401	92.27	-1.73	94	87.59	32.18	6.03	33.53	143	55	Average
2484	33.64	-20.36	54	28.74	32.28	6.18	33.56	143	55	Average
2484	45.54	-28.46	74	40.64	32.28	6.18	33.56	143	55	Peak
8349	55.46	-18.54	74	43.04	35.57	10.95	34.1	100	92	Peak
8349	40.69	-13.31	54	28.27	35.57	10.95	34.1	100	92	Average
9604	39.4	-34.6	74	72.14	-10.38	12.01	34.37	100	0	Peak



Test Mode :	Mode 2: Tx CH39_2439 MHz	Temperature :	24~25°C
Test Engineer :	David Yang	Relative Humidity :	43~44%
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
30.54	20.72	-19.28	40	32.69	18.95	0.54	31.46	128	348	Peak
107.49	13.9	-29.6	43.5	33.35	11.06	1.04	31.55	-	-	Peak
260.58	13.52	-32.48	46	30.42	12.92	1.6	31.42	-	-	Peak
427.4	17.66	-28.34	46	29.87	16.69	2.24	31.14	-	-	Peak
673.8	22.16	-23.84	46	29.48	20.64	2.89	30.85	-	-	Peak
872.6	24.88	-21.12	46	29.38	22.92	3.3	30.72	-	-	Peak
2390	46.57	-27.43	74	41.89	32.18	6.03	33.53	165	332	Peak
2390	34.24	-19.76	54	29.56	32.18	6.03	33.53	165	332	Average
2439	94.61	-19.39	114	89.81	32.24	6.11	33.55	165	332	Peak
2439	93	-1	94	88.2	32.24	6.11	33.55	165	332	Average
2486	46.37	-27.63	74	41.47	32.28	6.18	33.56	165	332	Peak
2486	33.69	-20.31	54	28.79	32.28	6.18	33.56	165	332	Average
8274	55.87	-18.13	74	43.49	35.56	10.92	34.1	113	232	Peak
8274	40.05	-13.95	54	27.67	35.56	10.92	34.1	113	232	Average
9756	38.81	-35.19	74	71.3	-10.1	11.93	34.32	100	0	Peak



Test Mode :	Mode 2: Tx CH39_2439 MHz	Temperature :	24~25°C
Test Engineer :	David Yang	Relative Humidity :	43~44%
Polarization :	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
31.89	20.4	-19.6	40	32.91	18.4	0.55	31.46	102	79	Peak
88.05	13.33	-30.17	43.5	35.31	8.62	0.93	31.53	-	-	Peak
256.26	18.93	-27.07	46	35.93	12.85	1.57	31.42	-	-	Peak
355.3	17.9	-28.1	46	32.23	14.93	2.02	31.28	-	-	Peak
564.6	20.7	-25.3	46	29.68	19.39	2.59	30.96	-	-	Peak
808.9	23.52	-22.48	46	28.75	22.3	3.16	30.69	-	-	Peak
2332	46.73	-27.27	74	42.2	32.09	5.95	33.51	170	24	Peak
2332	33.48	-20.52	54	28.95	32.09	5.95	33.51	170	24	Average
2439	90.09	-23.91	114	85.29	32.24	6.11	33.55	170	24	Peak
2439	89.9	-4.1	94	85.1	32.24	6.11	33.55	170	24	Average
2486	45.54	-28.46	74	40.64	32.28	6.18	33.56	170	24	Peak
2486	33.7	-20.3	54	28.8	32.28	6.18	33.56	170	24	Average
8322	55.54	-18.46	74	43.13	35.57	10.94	34.1	100	195	Peak
8322	40.5	-13.5	54	28.09	35.57	10.94	34.1	100	195	Average
9756	37.36	-36.64	74	69.85	-10.1	11.93	34.32	100	0	Peak



Test Mode :	Mode 3: Tx CH78_2478 MHz	Temperature :	24~25°C
Test Engineer :	David Yang	Relative Humidity :	43~44%
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	20.63	-19.37	40	32.05	19.51	0.53	31.46	131	355	Peak
107.49	14.07	-29.43	43.5	33.52	11.06	1.04	31.55	-	-	Peak
138.81	15.33	-28.17	43.5	33.97	11.71	1.2	31.55	-	-	Peak
428.1	17.47	-28.53	46	29.68	16.69	2.24	31.14	-	-	Peak
646.5	22.01	-23.99	46	29.62	20.43	2.83	30.87	-	-	Peak
785.8	23.94	-22.06	46	29.49	22.02	3.12	30.69	-	-	Peak
2364	47.41	-26.59	74	42.81	32.13	5.99	33.52	115	344	Peak
2364	33.89	-20.11	54	29.29	32.13	5.99	33.52	115	344	Average
2478	94.22	-19.78	114	89.32	32.28	6.18	33.56	115	344	Peak
2478	92.97	-1.03	94	88.07	32.28	6.18	33.56	115	344	Average
2485.37	48.35	-25.65	74	43.45	32.28	6.18	33.56	115	344	Peak
2485.37	35.26	-18.74	54	30.36	32.28	6.18	33.56	115	344	Average
8250	54.57	-19.43	74	42.22	35.55	10.91	34.11	110	302	Peak
8250	39.83	-14.17	54	27.48	35.55	10.91	34.11	110	302	Average
9912	36.18	-37.82	74	68.39	-9.78	11.85	34.28	100	0	Peak



Test Mode :	Mode 3: Tx CH78_2478 MHz	Temperature :	24~25°C
Test Engineer :	David Yang	Relative Humidity :	43~44%
Polarization :	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
31.89	20.52	-19.48	40	33.03	18.4	0.55	31.46	105	88	Peak
118.29	12.75	-30.75	43.5	31.17	12.05	1.09	31.56	-	-	Peak
248.7	12.39	-33.61	46	29.73	12.54	1.53	31.41	-	-	Peak
447	18.05	-27.95	46	29.78	17.09	2.29	31.11	-	-	Peak
626.9	23.48	-22.52	46	31.33	20.27	2.77	30.89	-	-	Peak
803.3	24.25	-21.75	46	29.53	22.25	3.15	30.68	-	-	Peak
2340	33.73	-20.27	54	29.19	32.11	5.95	33.52	199	33	Average
2340	46.39	-27.61	74	41.85	32.11	5.95	33.52	199	33	Peak
2478	91.12	-2.88	94	86.22	32.28	6.18	33.56	199	33	Average
2478	91.35	-22.65	114	86.45	32.28	6.18	33.56	199	33	Peak
2485.37	46.86	-27.14	74	41.96	32.28	6.18	33.56	199	33	Peak
2485.37	34.03	-19.97	54	29.13	32.28	6.18	33.56	199	33	Average
8322	55.37	-18.63	74	42.96	35.57	10.94	34.1	100	188	Peak
8322	40.53	-13.47	54	28.12	35.57	10.94	34.1	100	188	Average
9912	35.81	-38.19	74	68.02	-9.78	11.85	34.28	100	0	Peak



Test Mode :	Mode 4: EUT + USB Cable (Charging from Adapter)	Temperature :	24~25°C
Test Engineer :	David Yang	Relative Humidity :	43~44%
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
31.89	21.06	-18.94	40	33.57	18.4	0.55	31.46	131	346	Peak
128.01	19.76	-23.74	43.5	38.4	11.79	1.14	31.57	-	-	Peak
216.3	18.37	-27.63	46	39.35	9.08	1.4	31.46	-	-	Peak
400.1	17.88	-28.12	46	30.79	16.13	2.14	31.18	-	-	Peak
609.4	21.56	-24.44	46	29.61	20.14	2.72	30.91	-	-	Peak
805.4	24.39	-21.61	46	29.65	22.27	3.15	30.68	-	-	Peak

Test Mode :	Mode 4: EUT + USB Cable (Charging from Adapter)	Temperature :	24~25°C
Test Engineer :	David Yang	Relative Humidity :	43~44%
Polarization :	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
51.33	23.59	-16.41	40	46.65	7.77	0.71	31.54	112	139	Peak
119.37	23.15	-20.35	43.5	41.47	12.14	1.1	31.56	-	-	Peak
166.89	21.64	-21.86	43.5	42.04	9.89	1.23	31.52	-	-	Peak
380.5	19.87	-26.13	46	33.41	15.6	2.1	31.24	-	-	Peak
615	21.31	-24.69	46	29.31	20.18	2.73	30.91	-	-	Peak
850.2	24.18	-21.82	46	28.94	22.7	3.27	30.73	-	-	Peak



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 Fixed Internal 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	ESU	100211	9KHz – 2.75GHz	May 28, 2010	May 27, 2011	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. 19, 2010	Aug. 18, 2011	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.32 dB.GAIN	Mar. 27, 2010	Mar. 26, 2011	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	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
Combined Standard Uncertainty $U_c(y)$	1.13		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.26		

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
Combined Standard Uncertainty $U_c(y)$	1.27		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.54		

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
Combined Standard Uncertainty $U_c(y)$	2.36				
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.72				



Appendix A. Photographs of EUT

Please refer to Sporton report number EP091316 as below.