



# Variant FCC RF Test Report

**APPLICANT** : Acer Incorporated  
**EQUIPMENT** : Tablet Computer  
**BRAND NAME** : Acer  
**MODEL NAME** : A501  
**FCC ID** : HLZTMDMA501A  
**STANDARD** : FCC Part 15 Subpart C §15.247  
**CLASSIFICATION** : Digital Spread Spectrum (DSS)

This is a variant report which is only valid together with the original test report. The product was received on Jun. 09, 2011 and completely tested on Jun. 15, 2011. 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:

Jones Tsai / 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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## REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR132604-04A	Rev. 01	<p>This is a variant report. The original report which can be referred to Sporton Report No. FR132604A as appendix C.</p> <p>Detail changes list as below :</p> <ol style="list-style-type: none"><li>1. Antenna change of WWAN Aux. (antenna gain is lower than original antenna type is same as the original case.)</li><li>2. eMMC add Scandisk 64G and Samsung 64G</li><li>3. LPDDR2 add Hynix 8Gb</li><li>4. Camera add Liteon / 11P2BA501</li><li>5. Battery add SANYO BAT1010</li><li>6. Touch +LCD add AUO+Cando B101EW05 V1</li><li>7. USB cable added ICT(DC081001A00) and MEC(DC081001A00)</li></ol> <p>For the changes, the test case was verified.</p>	Jul. 01, 2011



## SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(d)	A8.5	Frequency Band Edges	≤ 20dBc	Pass	-
3.2	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 11.8 dB at 0.17 MHz
3.3	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 11.12 dB at 31.08 MHz
3.4	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-



## 1 General Description

### 1.1 Applicant

**Acer Incorporated**

8F., No. 88, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 22181, Taiwan (R.O.C)

### 1.2 Manufacturer

**1. Compal Electronics, Inc.**

No. 581, Ruiguang Rd., Neihu District, Taipei City 11492, Taiwan

**2. Compal Electronics Technology (Kunshan) Co., Ltd.**

No. 25, Third Avenue, A Zone, Kunshan Comprehensive Free Trade Zone, Kunshan, Jiangsu, China

**3. Compal Information (Kunshan) Co., Ltd.**

No. 15, Third Avenue, A Zone, Kunshan Comprehensive Free Trade Zone, Kunshan, Jiangsu, China

**4. Compal Information Technology (Kunshan) Co., Ltd.**

No. 58, First Avenue, A Zone, Kunshan Comprehensive Free Trade Zone, Kunshan, Jiangsu, China

**5. Compalead Eletrônica Do Brasil Indústria E Comércio Ltda**

Rua Kanebo 175, Galpões C1, C2, C3, C4, C5 C6 E C12, Bairro Distrito Industrial Jundiaí Business Park, Cep 13213-090, Jundiaí - São Paulo, Brasil

**6. Compal (Vietnam) Co., Ltd.**

Ba Thien Industrial Zone, Ba Hien Commune, Binh Xuyen County, Vinh Phuc Province, Vietnam



### 1.3 Feature of Equipment Under Test

Product Feature & Specification	
<b>Equipment</b>	Tablet Computer
<b>Brand Name</b>	Acer
<b>Model Name</b>	A501
<b>Integrated Module</b>	Brand Name : Ericsson Model Name : F5521gw
<b>Sample 1</b>	EUT with LCM Main, eMMC 1, Carema Main and LP DDR2 1
<b>Sample 2</b>	EUT with LCM 2nd, eMMC 2, Carema 2nd and LP DDR2 2
<b>Sample 3</b>	EUT with LCM 2nd, eMMC 3, Carema 2nd and LP DDR2 2
<b>FCC ID</b>	HLZTMDMA501A
<b>Tx/Rx Frequency Range</b>	2400 MHz ~ 2483.5 MHz
<b>Number of Channels</b>	79
<b>Carrier Frequency of Each Channel</b>	2402+n*1 MHz; n=0~78
<b>Channel Spacing</b>	1 MHz
<b>Maximum Output Power to Antenna</b>	Bluetooth (1Mbps) : 2.61 dBm Bluetooth EDR (2Mbps) : 5.16 dBm Bluetooth EDR (3Mbps) : 2.94 dBm
<b>Antenna Type</b>	PIFA Antenna with gain 1.75 dBi
<b>HW Version</b>	LA-6872P Rev. 2
<b>Type of Modulation</b>	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : π /4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
<b>EUT Stage</b>	Identical Prototype

**Remark:**

1. For other wireless features of this EUT, test report will be issued separately.
2. This test report recorded only product characteristics and test results of Digital Spread Spectrum (DSS).
3. 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	03CH05-HY	722060/4086B-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 §15.247
- FCC Public Notice DA 00-705
- ANSI C63.4-2003
- IC RSS-210 Issue 8

**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.



## 1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Base Station	Anritsu	MT8852B	N/A	N/A	Unshielded, 1.8 m
2.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
3.	GPS Station	T&E	GS-50	N/A	N/A	Unshielded, 1.8 m
4.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
5.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
6.	LCD Monitor	Dell	U2410	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
7.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
8.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
9.	iPod Earphone	Apple	N/A	N/A	shielded, 1.0 m	N/A
10.	Controller	Acer	IR28012AC3	FCC DoC	N/A	N/A



## 2 Test Configuration of Equipment Under Test

### 2.1 RF Output Power

Preliminary tests were performed in different data rate and recorded the RF output power in the following table:

Channel	Frequency	Bluetooth RF Output Power		
		Data Rate / Modulation		
		GFSK	$\pi/4$ -DQPSK	8-DPSK
		1Mbps	2Mbps	3Mbps
Ch00	2402MHz	1.40 dBm	3.94 dBm	1.87 dBm
Ch39	2441MHz	2.11 dBm	4.71 dBm	2.54 dBm
Ch78	2480MHz	2.61 dBm	5.16 dBm	2.94 dBm

**Remark:**

1. The data rate was set in 2Mbps for all the test items due to the highest RF output power.
2. The EUT is programmed to transmit signals continuously for all testing.



## 2.2 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).

Pre-scanned tests were conducted to determine the final configuration from all possible combinations.

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

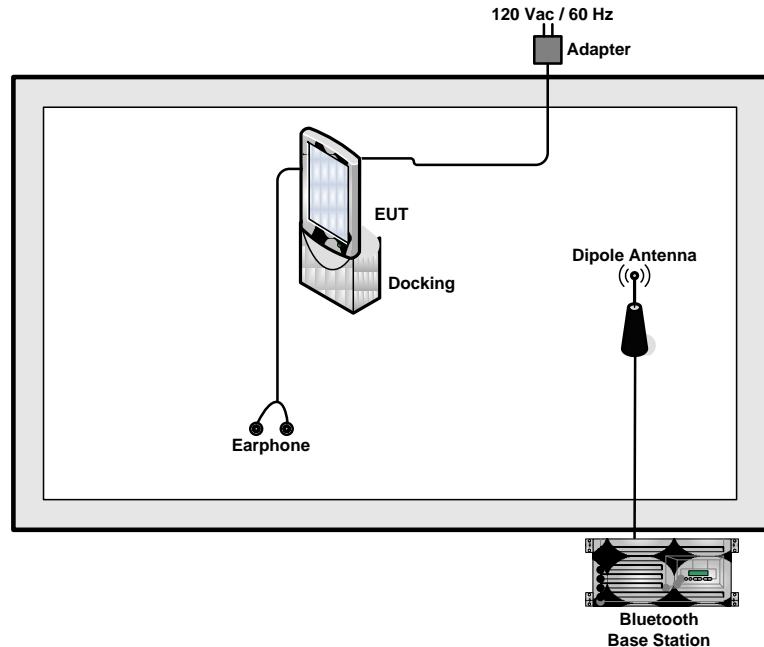
Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps $\pi/4$ -DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Radiated TCs	N/A	Mode 1: CH00_2402 MHz + Docking for Sample 2	N/A
AC Conducted Emission	Mode 1 :WCDMA Band I Link + WLAN Link + Bluetooth Link + GPS Rx + Adapter + TC 2 + USB Cable 2 (Link with Notebook) for Sample 2 Mode 2 :WCDMA Band I Link + WLAN Link + Bluetooth Link + GPS Rx + Adapter + TC 2 + USB Cable 3 (Link with Notebook) for Sample 3		

**Remark:**

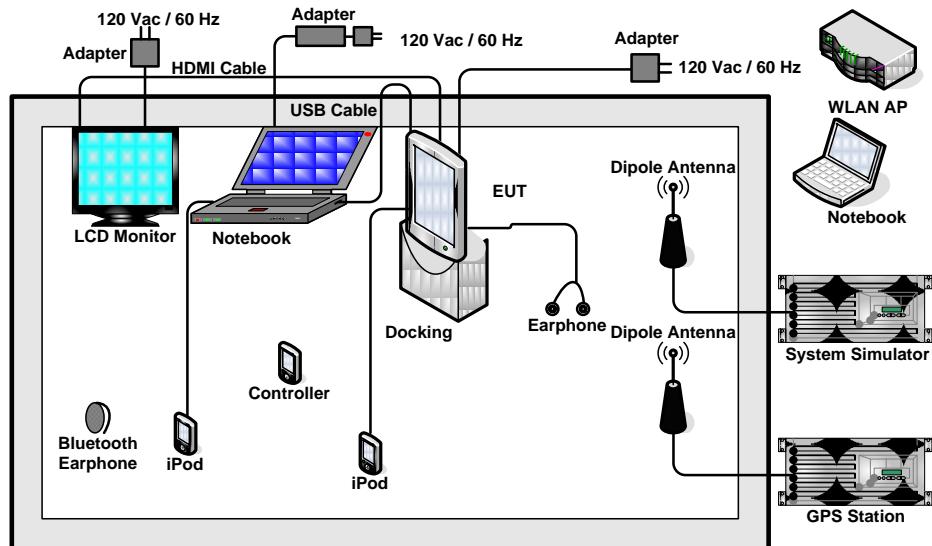
1. TC 2 stands for Test Configuration, and consists of iPod, HDMI cable, docking, monitor, and earphone.
2. For radiated TCs, the data rate was set in 2Mbps due to the highest RF output power; only the data of these modes was reported.
3. For conducted emission, the worst case is mode 2; only the test data of this mode was reported.

## 2.3 Connection Diagram of Test System

### <EUT with Docking in Bluetooth Tx Mode>



### <EUT with USB Cable (Link with Notebook) Mode>



## 2.4 RF Utility

For Bluetooth function, the RF utility, "ADB command" was installed in EUT which was programmed in order to make the EUT into the engineering modes to contact with Bluetooth base station for transmitting and receiving signals continuously.



### **3 Test Result**

#### **3.1 Band Edges Measurement**

##### **3.1.1 Limit of Band Edges**

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

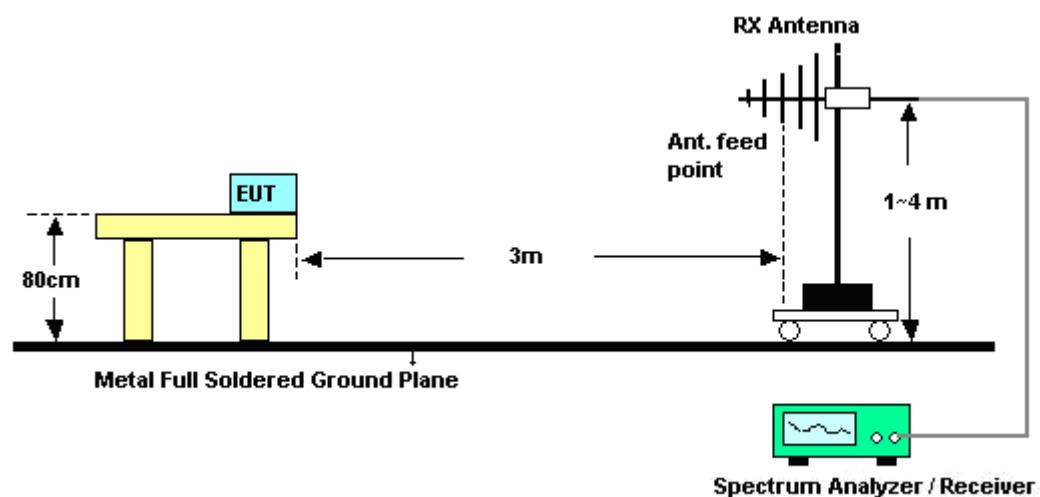
##### **3.1.2 Measuring Instruments**

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 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, Video bandwidth (VBW)  $\geq$  RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 300k Hz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. 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).
4. In case the emission is fail due to the used RBW / VBW is too wide, marker-delta method of FCC Public Notice DA 00-705 will be followed.

### 3.1.4 Test Setup





## 3.1.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1			Temperature :		24~26°C		
Test Channel :	00			Relative Humidity :		47~49%		
					Test Engineer :		Elvis Chen	

## 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
2387.71	46.43	-27.57	74	44.26	31.68	4.57	34.08	124	192	Peak
2387.71	32.61	-21.39	54	30.41	31.7	4.58	34.08	124	192	Average

## ANTENNA POLARITY : VERTICAL

Frequency ( mz )	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
2355.03	45.55	-28.45	74	43.48	31.63	4.53	34.09	100	52	Peak
2355.03	32.58	-21.42	54	30.46	31.66	4.55	34.09	100	52	Average



## 3.2 AC Conducted Emission Measurement

### 3.2.1 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.

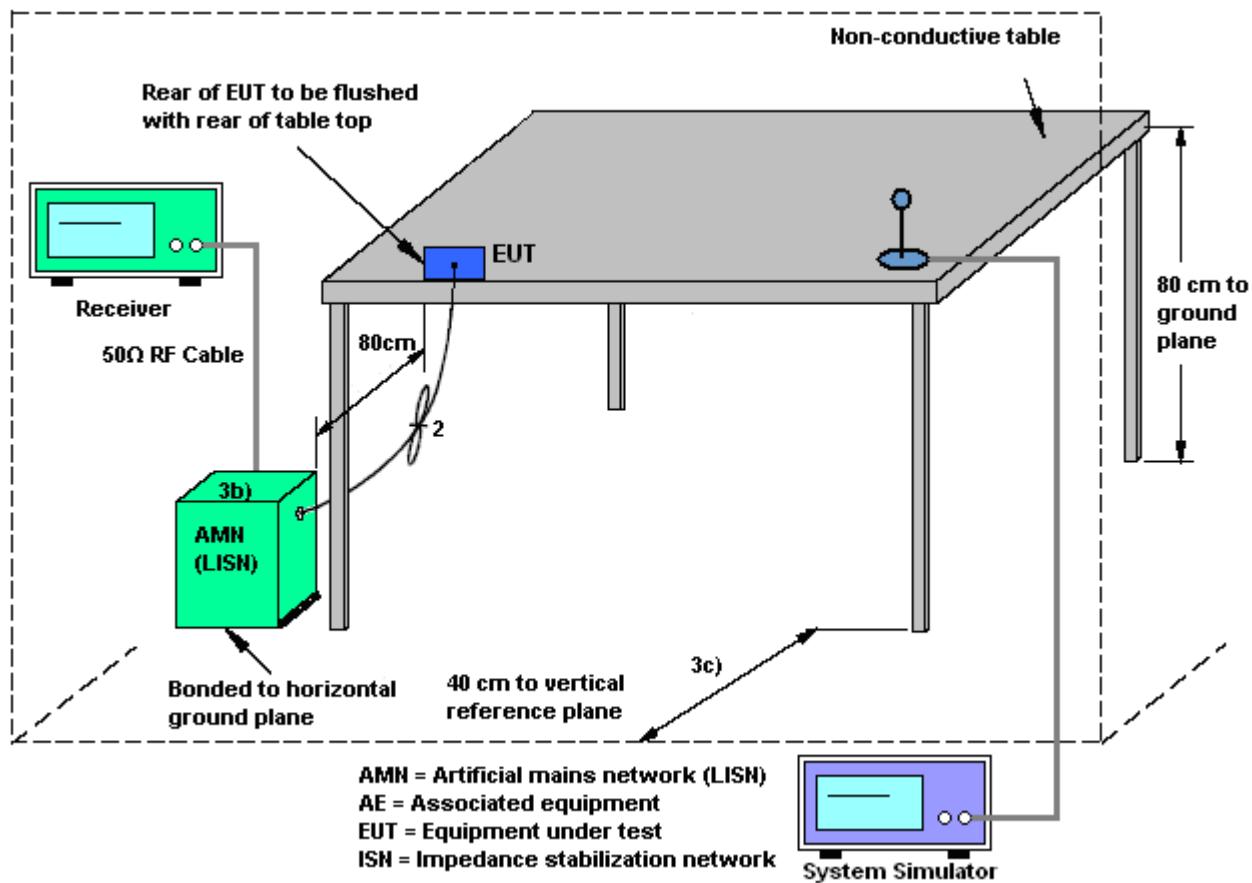
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

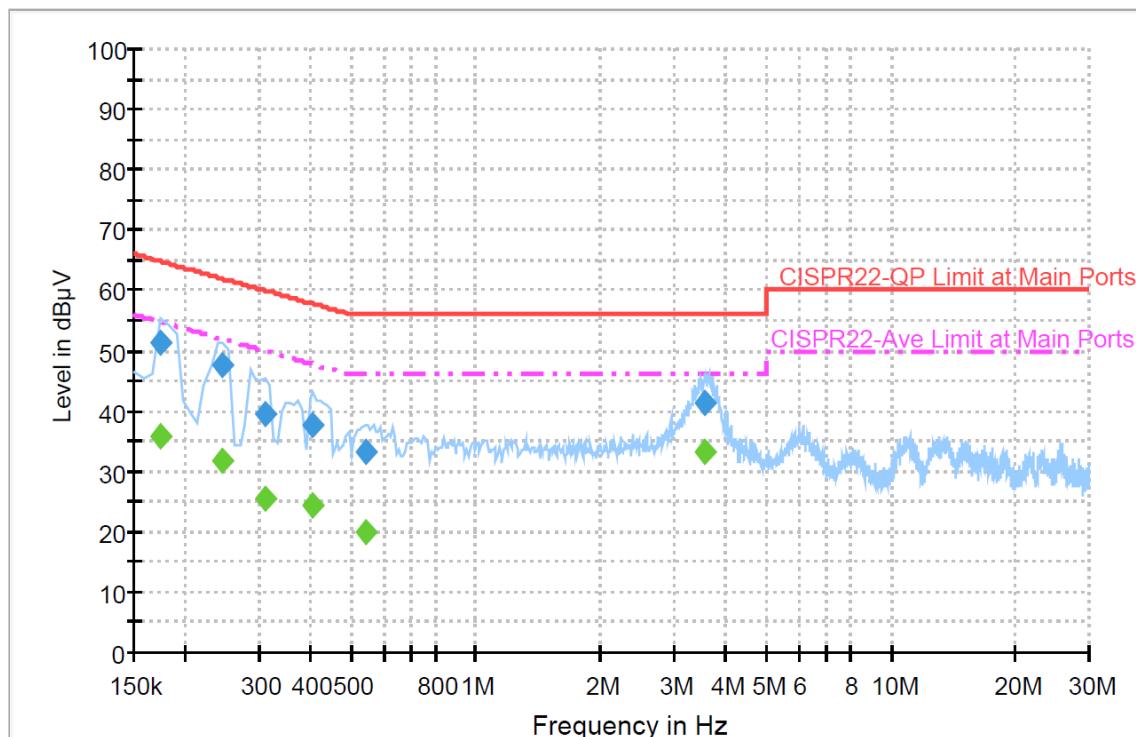
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
1. Connect EUT to the power mains through a line impedance stabilization network (LISN).
2. All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

### 3.2.4 Test Setup



### 3.2.5 Test Result of AC Conducted Emission

<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	21~23°C
<b>Test Engineer :</b>	Novic Chiang	<b>Relative Humidity :</b>	41~43%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Line
<b>Function Type :</b>	WCDMA Band I Link + WLAN Link + Bluetooth Link + GPS Rx + Adapter + TC 2 + USB Cable 3 (Link with Notebook) for Sample 3		
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		



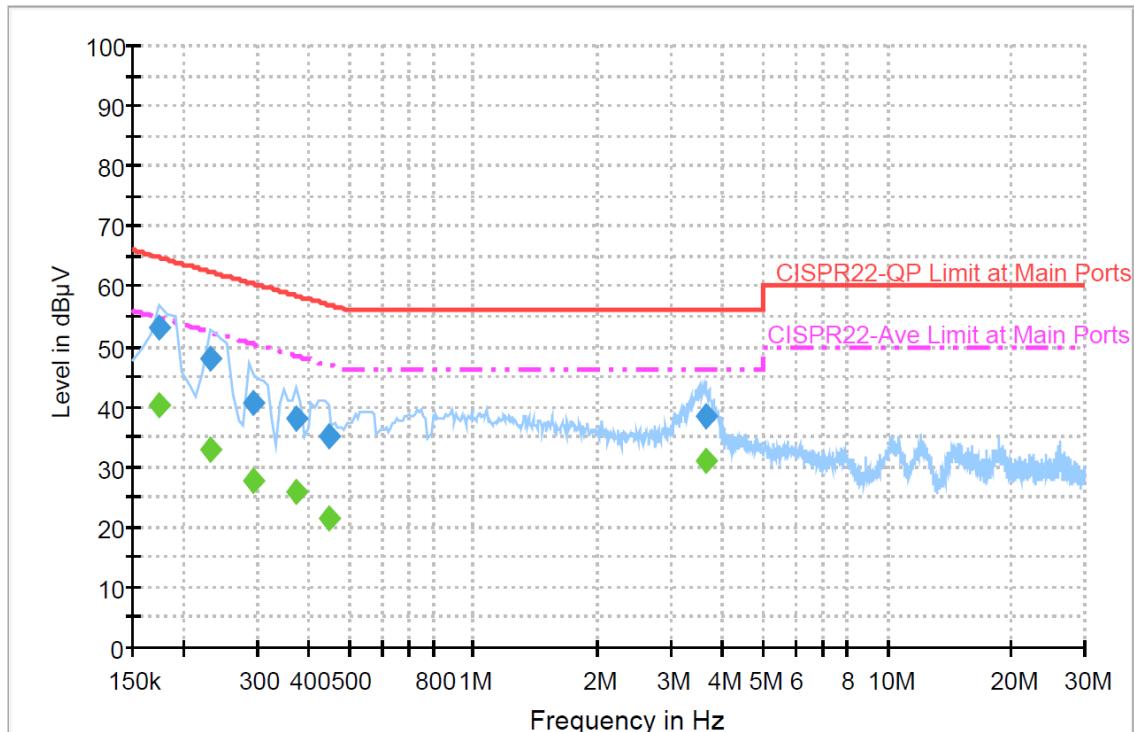
#### Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.174000	51.2	Off	L1	19.3	13.6	64.8
0.246000	47.5	Off	L1	19.4	14.4	61.9
0.310000	39.5	Off	L1	19.3	20.5	60.0
0.406000	37.6	Off	L1	19.4	20.1	57.7
0.542000	33.4	Off	L1	19.3	22.6	56.0
3.574000	41.4	Off	L1	19.5	14.6	56.0

#### Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.174000	35.8	Off	L1	19.3	19.0	54.8
0.246000	31.7	Off	L1	19.4	20.2	51.9
0.310000	25.5	Off	L1	19.3	24.5	50.0
0.406000	24.3	Off	L1	19.4	23.4	47.7
0.542000	20.0	Off	L1	19.3	26.0	46.0
3.574000	33.2	Off	L1	19.5	12.8	46.0

<b>Test Mode :</b>	Mode 2	<b>Temperature :</b>	21~23°C
<b>Test Engineer :</b>	Novic Chiang	<b>Relative Humidity :</b>	41~43%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Neutral
<b>Function Type :</b>	WCDMA Band I Link + WLAN Link + Bluetooth Link + GPS Rx + Adapter + TC 2 + USB Cable 3 (Link with Notebook) for Sample 3		
<b>Remark :</b>	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	53.0	Off	N	19.3	11.8	64.8
0.230000	48.1	Off	N	19.4	14.3	62.4
0.294000	40.6	Off	N	19.3	19.8	60.4
0.374000	38.1	Off	N	19.4	20.3	58.4
0.446000	35.1	Off	N	19.3	21.8	56.9
3.654000	38.5	Off	N	19.5	17.5	56.0

**Final Result 2**

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.174000	40.3	Off	N	19.3	14.5	54.8
0.230000	32.9	Off	N	19.4	19.5	52.4
0.294000	27.8	Off	N	19.3	22.6	50.4
0.374000	25.8	Off	N	19.4	22.6	48.4
0.446000	21.5	Off	N	19.3	25.4	46.9
3.654000	30.9	Off	N	19.5	15.1	46.0



### 3.3 Radiated Emission Measurement

#### 3.3.1 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

#### 3.3.2 Measuring Instruments

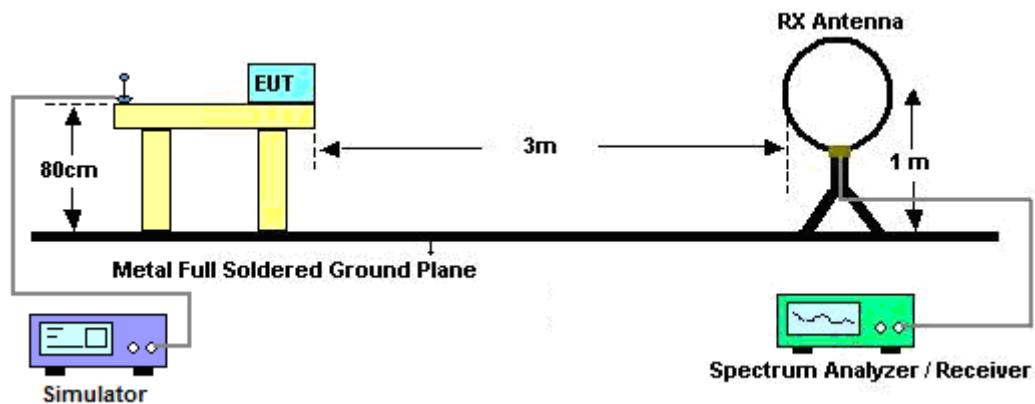
See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

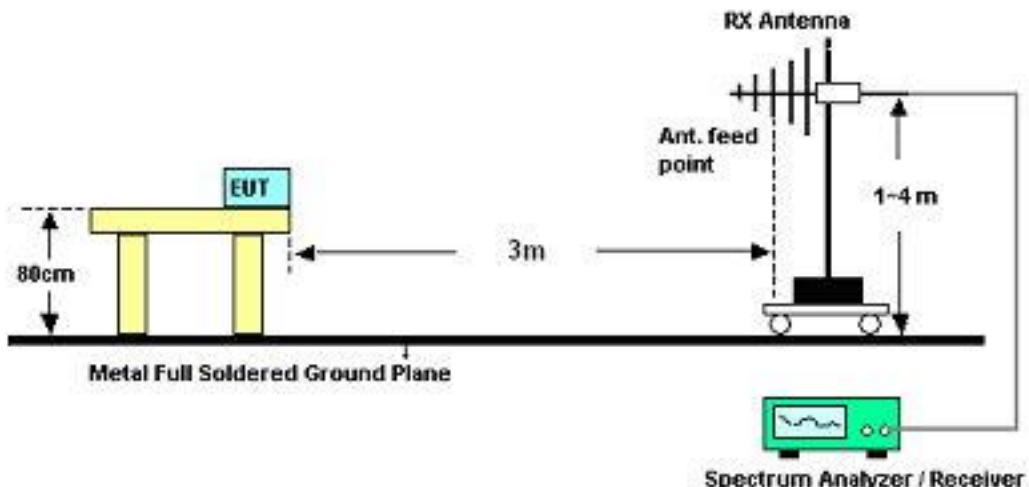
1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:
  - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = 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)
3. 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.
4. Measured average value for the peak value is greater than 54 dB<sub>UV</sub>/m

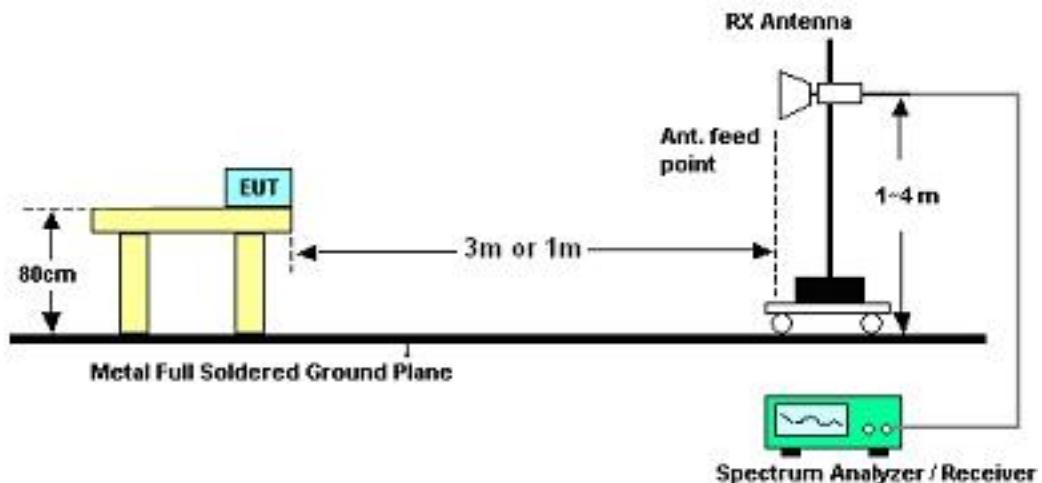
### 3.3.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



**For radiated emissions above 1GHz****3.3.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)**

<b>Test Engineer :</b>	Elvis Chen	<b>Temperature :</b>	24~26°C	
		<b>Relative Humidity :</b>	47~49%	
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.

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

Test Mode :	Mode 1		Temperature :		24~26°C				
Test Channel :	00		Relative Humidity :		47~49%				
Test Engineer :	Elvis Chen		Polarization :		Horizontal				
Remark :	2402 MHz is Fundamental Signals which can be ignored.								

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
31.08	27.41	-12.59	40	40.47	17.78	0.71	31.55	100	58	Peak
183.36	26.06	-17.44	43.5	47.67	8.48	1.41	31.5	-	-	Peak
248.97	28.48	-17.52	46	46.75	11.6	1.66	31.53	-	-	Peak
393.8	23.46	-22.54	46	38.05	14.61	2	31.2	-	-	Peak
853	23.74	-22.26	46	29.89	21.42	2.93	30.5	-	-	Peak
953.1	25.44	-20.56	46	29.74	23.01	3.07	30.38	-	-	Peak
2387.71	32.61	-21.39	54	30.41	31.7	4.58	34.08	124	192	Average
2387.71	46.43	-27.57	74	44.26	31.68	4.57	34.08	124	192	Peak
2402	80.2	-	-	78	31.7	4.58	34.08	124	192	Average
2402	97.21	-	-	95.01	31.7	4.58	34.08	124	192	Peak
2486	31.49	-22.51	54	29.15	31.78	4.64	34.08	124	192	Average
2486	44.18	-29.82	74	41.84	31.78	4.64	34.08	124	192	Peak
4806	44	-30	74	60.17	33.76	6.51	56.44	100	0	Peak



<b>Test Mode :</b>	Mode 1	<b>Temperature :</b>	24~26°C
<b>Test Channel :</b>	00	<b>Relative Humidity :</b>	47~49%
<b>Test Engineer :</b>	Elvis Chen	<b>Polarization :</b>	Vertical
<b>Remark :</b>	2402 MHz is Fundamental Signals which can be ignored.		

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
31.08	28.88	-11.12	40	41.94	17.78	0.71	31.55	100	43	Peak
54.3	25.68	-14.32	40	49.61	6.77	0.83	31.53	-	-	Peak
114.24	24.44	-19.06	43.5	44.34	10.45	1.17	31.52	-	-	Peak
617.1	20.79	-25.21	46	30.36	18.79	2.48	30.84	-	-	Peak
801.2	23.54	-22.46	46	30.22	21.03	2.83	30.54	-	-	Peak
923.7	24.9	-21.1	46	29.99	22.32	3.03	30.44	-	-	Peak
2355.03	32.58	-21.42	54	30.46	31.66	4.55	34.09	100	52	Average
2355.03	45.55	-28.45	74	43.48	31.63	4.53	34.09	100	52	Peak
2402	78.28	-	-	76.08	31.7	4.58	34.08	100	52	Average
2402	94.78	-	-	92.58	31.7	4.58	34.08	100	52	Peak
2484	31.9	-22.1	54	29.56	31.78	4.64	34.08	100	52	Average
2484	43.95	-30.05	74	41.61	31.78	4.64	34.08	100	52	Peak
4806	46.12	-27.88	74	62.29	33.76	6.51	56.44	100	0	Peak



## **3.4 Antenna Requirements**

### **3.4.1 Standard Applicable**

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. 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.

### **3.4.2 Antenna Connected Construction**

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

### **3.4.3 Antenna Gain**

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



## 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. 16, 2010	Aug. 15, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz – 30MHz	Dec. 03, 2010	Dec. 02, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz – 30MHz	Dec. 01, 2010	Nov. 30, 2011	Conduction (CO05-HY)
AC Power Source	APC	APC-1000 W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
System Simulator	R&S	CMU200	114256	N/A	Feb. 15, 2011	Feb. 14, 2012	Conduction (CO05-HY)
GPS Station	T&E	GS-50	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
Spectrum Analyzer	R&S	FSP30	101352	9KHz-40GHz	Nov. 03, 2010	Nov. 02, 2011	Radiation (03CH05-HY)
Amplifier	COM-POWER	PA-103	161075	1KHz - 1GHz	Mar. 29, 2011	Mar. 28, 2012	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2725	30MHz ~ 1GHz	Nov. 06, 2010	Nov. 05, 2011	Radiation (03CH05-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA917025 1	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz- 26.5GHz	Apr. 14, 2011	Apr. 13, 2012	Radiation (03CH05-HY)
Turn Table	HD	Deis HD 2000	420/611	0 - 360 degree	N/A	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	MA 240	240/666	1 m - 4 m	N/A	N/A	Radiation (03CH05-HY)
Horn Antenna	ESCO	3117	00066584	1GHz ~ 18GHz	Aug. 05, 2010	Aug. 04, 2011	Radiation (03CH05-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH05-HY)
Bluetooth Base Station	Anritsu	MT8852B	6K00005722	N/A	N/A	N/A	Radiation (03CH05-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 = $20\log(1-\Gamma 1^*\Gamma 2)$	+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 EP132604-04 as below.



## **Appendix C. Original Report**

Please refer to Sporton report number FR132604A as below.