

Partial FCC RF Test Report

APPLICANT : Getac Technology Corporation
EQUIPMENT : Notebook PC
BRAND NAME : Getac
MODEL NAME : S400
FCC ID : QLYS400
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Spread Spectrum (DSS)

This is a partial report which is only valid combined with the Integrated Bluetooth Module (Brand name: CastleNet / Model name: BTC04R, FCC ID: RK9-BTC04R) Report.

The product was received on Aug. 17, 2010 and completely tested on Sep. 08, 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
FR081715-02A	Rev. 01	Initial issue of report	Sep. 16, 2010

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(d)	A8.5	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
3.2	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 10.4 dB at 3.214 MHz
3.3	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.51 dB at 4804.00 MHz
3.4	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Getac Technology Corporation

5F., Building A, No. 209, Sec. 1, Nangang Rd., Nangang Dist., Taipei City 11568, Taiwan, R.O.C.

1.2 Manufacturer

GeTAC Technology(Kunshan)Co., LTD.

No. 269, 2nd Road, Export Processing Zone, Changjiang South Road, Kunshan, Jiangsu, P.R.C.

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Notebook PC
Brand Name	Getac
Model Name	S400
FCC ID	QLYS400
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	79
Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78
Channel Spacing	1 MHz
Maximum Output Power to Antenna	Bluetooth (1Mbps) : 3.55 dBm (0.002 W) Bluetooth EDR (2Mbps) : 0.86 dBm (0.001 W) Bluetooth EDR (3Mbps) : 1.98 dBm (0.002 W)
Antenna Type	PIFA Antenna with gain -3 dBi
Type of Antenna Connector	N/A
HW Version	R0B
SW Version	R005J
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : π /4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
EUT Stage	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

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	03CH05-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 §15.247
- FCC Public Notice DA 00-705
- 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.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	GPS Station	T&E	GS-50	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
3.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	LCD Monitor	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
5.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
6.	Earphone	Ergotech	ET-E200	FCC DoC	Unshielded, 1.8 m	N/A
7.	(USB) Mouse	LOGITECH	M-BZ96C	FCC DoC	Shielded, 1.7 m	N/A
8.	(PS2) Mouse	detroit	CM-201	FCC DoC	Shielded, 1.4 m	N/A
9.	Keyboard	Logitech	Y-S0002	FCC DoC	Shielded, 1.3 m	N/A
10.	(PS2) Keyboard	Acer	KB-2971	FCC DoC	Shielded, 1.3 m	N/A
11.	Printer	HP	Laser Jet 1300	FCC DoC	Unshielded, 1.8 m	Unshielded, 1.8 m
12.	Printer	EPSON	C61	FCC DoC	N/A	Unshielded, 1.8 m
13.	e-SATA HD	FREECOM	SSYBBA	FCC DoC	Unshielded, 1.8 m	N/A
14.	Modem	ACCEX	DM1414	IFAXDM1414	Shielded, 1.5 m	N/A
15.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	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	3.55 dBm	0.86 dBm	1.98 dBm
Ch39	2441MHz	2.86 dBm	0.40 dBm	1.33 dBm
Ch78	2480MHz	0.73 dBm	-1.55 dBm	-1.17 dBm

Remark:

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

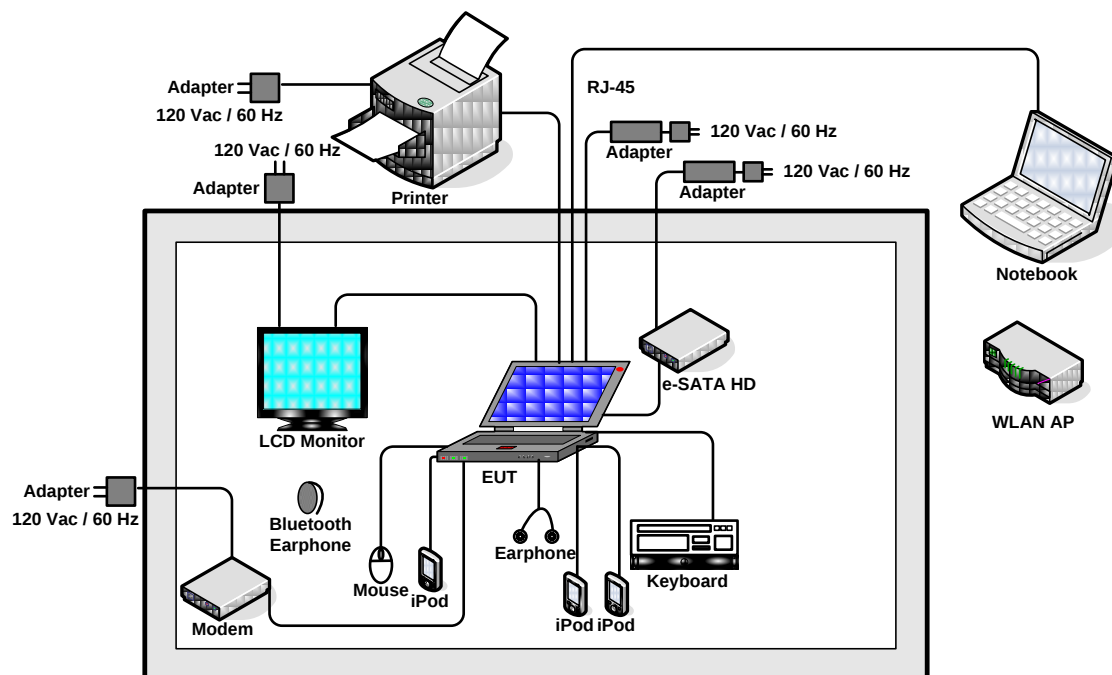
2.2 Test Mode

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).

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 π /4-DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Radiated TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	N/A	N/A
AC Conducted Emission	Mode 1 :WLAN Link + Bluetooth Link + TC + Adapter		
Remark:			
1. TC stands for Test Configuration, and consists of monitor, printer, HD, iPod, modem, mouse, earphone, keyboard, RJ-45 and GPS Rx.			
2. For radiated TCs, the data rate was set in 1Mbps due to the highest RF output power; only the data of these modes was reported.			
3. Only the radiated emission and conducted emission tests were performed in this report and the conducted test cases can be referred to the Bluetooth module (Brand name: CastleNet / Model name: BTC04R, FCC ID: RK9-BTC04R, ADT Report Number: RF970806A01) report.			

2.3 Connection Diagram of Test System



2.4 RF Utility

For Bluetooth function, programmed RF utility, "Blue test" was programmed in order to make the EUT continuous transmitting and receiving signals.

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.

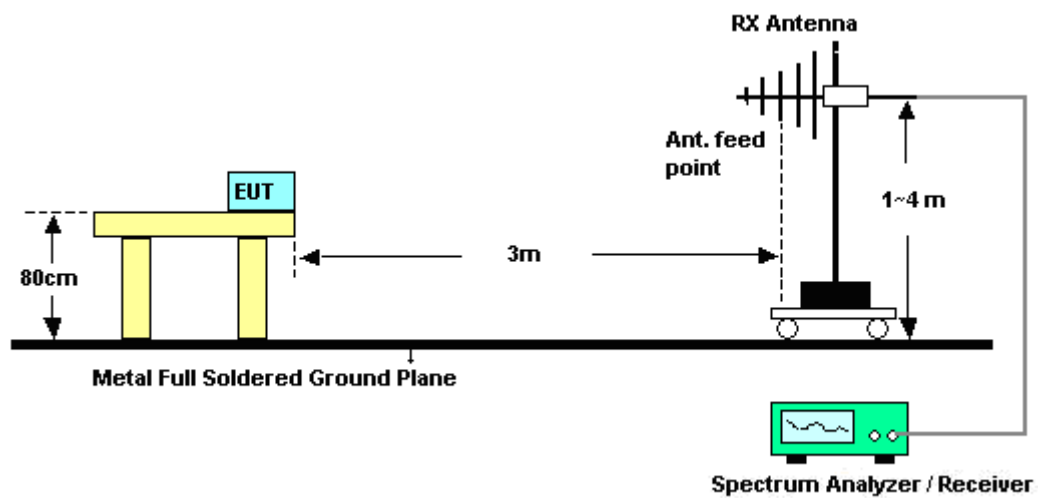
3.1.2 Measuring Instruments

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 :	26~27°C
Test Channel :	00	Relative Humidity :	43~44%
		Test Engineer :	Kay Wu

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
2389.99	47.39	-26.61	74	45.27	31.7	4.5	34.08	101	349	Peak
2389.99	36.14	-17.86	54	34.02	31.7	4.5	34.08	101	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
2369.66	46.53	-27.47	74	44.46	31.68	4.47	34.08	129	61	Peak
2369.66	34.24	-19.76	54	32.17	31.68	4.47	34.08	129	61	Average

Test Mode :	Mode 3	Temperature :	26~27°C
Test Channel :	78	Relative Humidity :	43~44%
		Test Engineer :	Kay Wu

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
2483.5	61.58	-12.42	74	59.29	31.78	4.59	34.08	104	311	Peak
2483.5	50.99	-3.01	54	48.7	31.78	4.59	34.08	104	311	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
2483.5	60.69	-13.31	74	58.4	31.78	4.59	34.08	100	74	Peak
2483.5	50.74	-3.26	54	48.45	31.78	4.59	34.08	100	74	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.

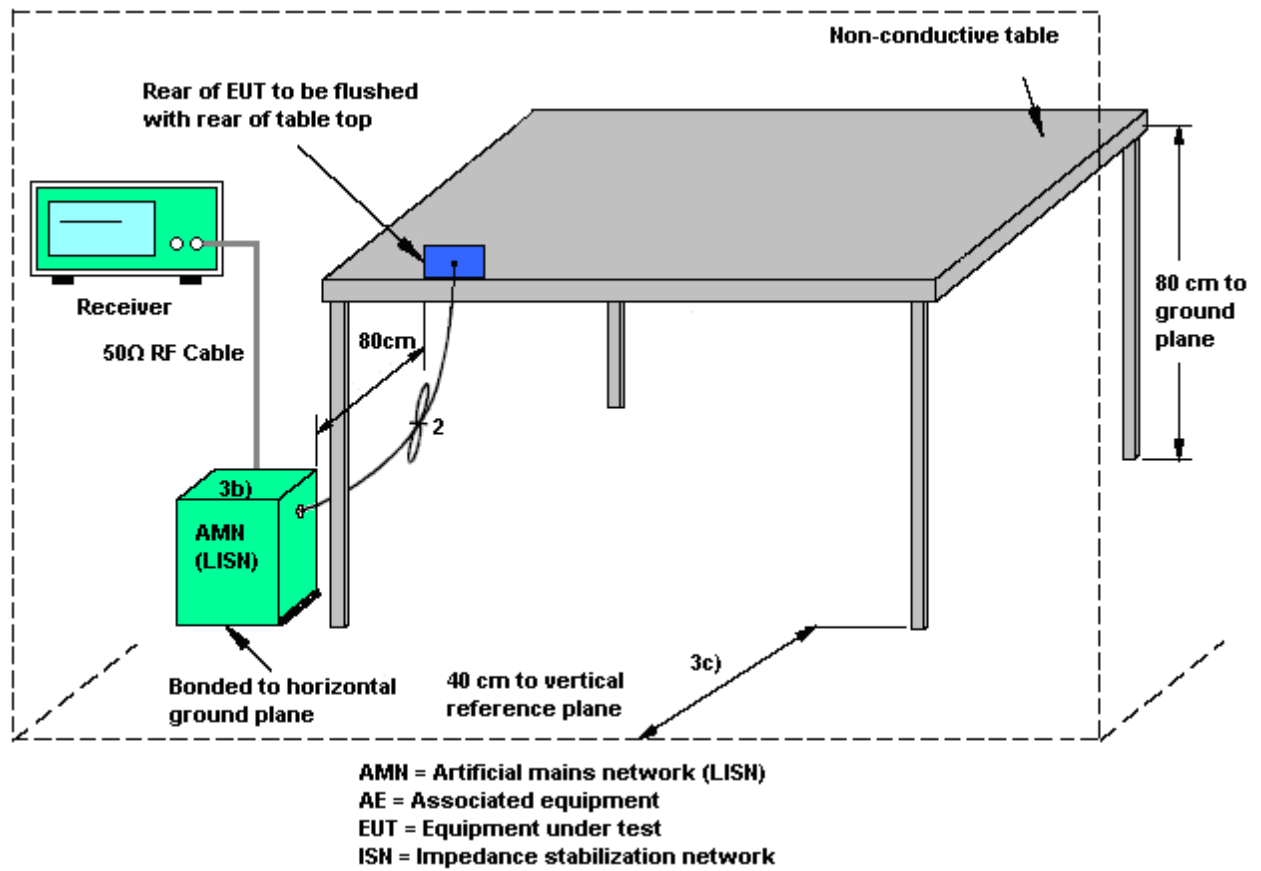
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

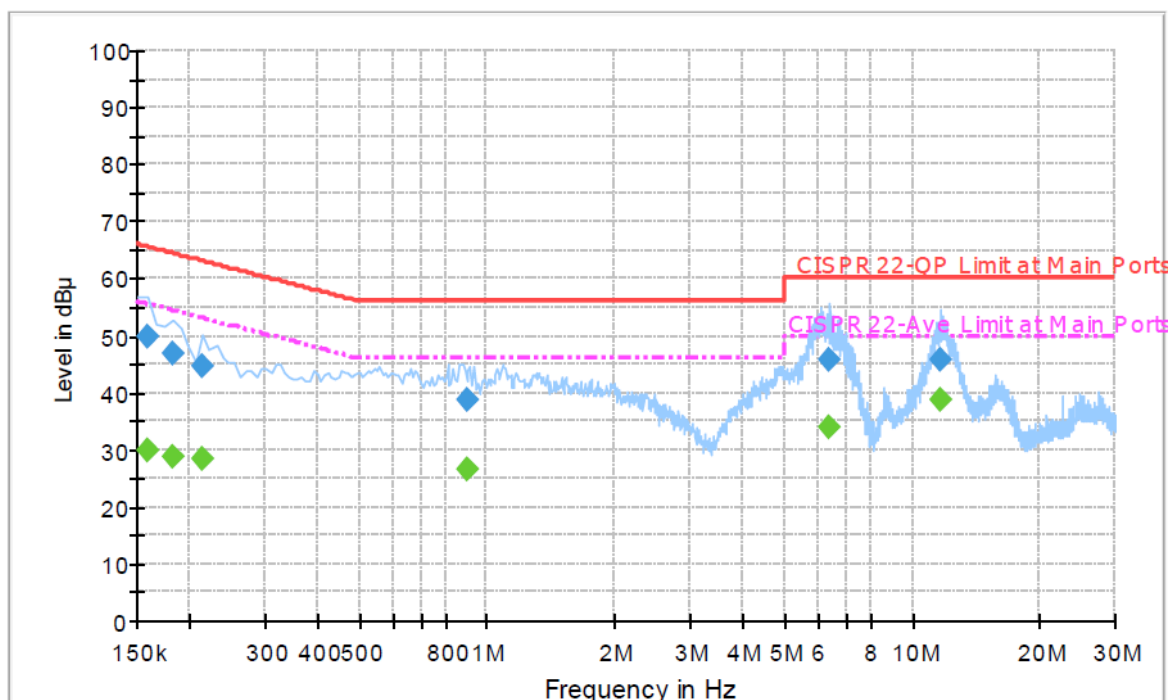
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
1. Connect EUT to the power mains through a line impedance stabilization network (LISN).
2. All 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

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	42~44%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Link + Bluetooth Link + TC + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



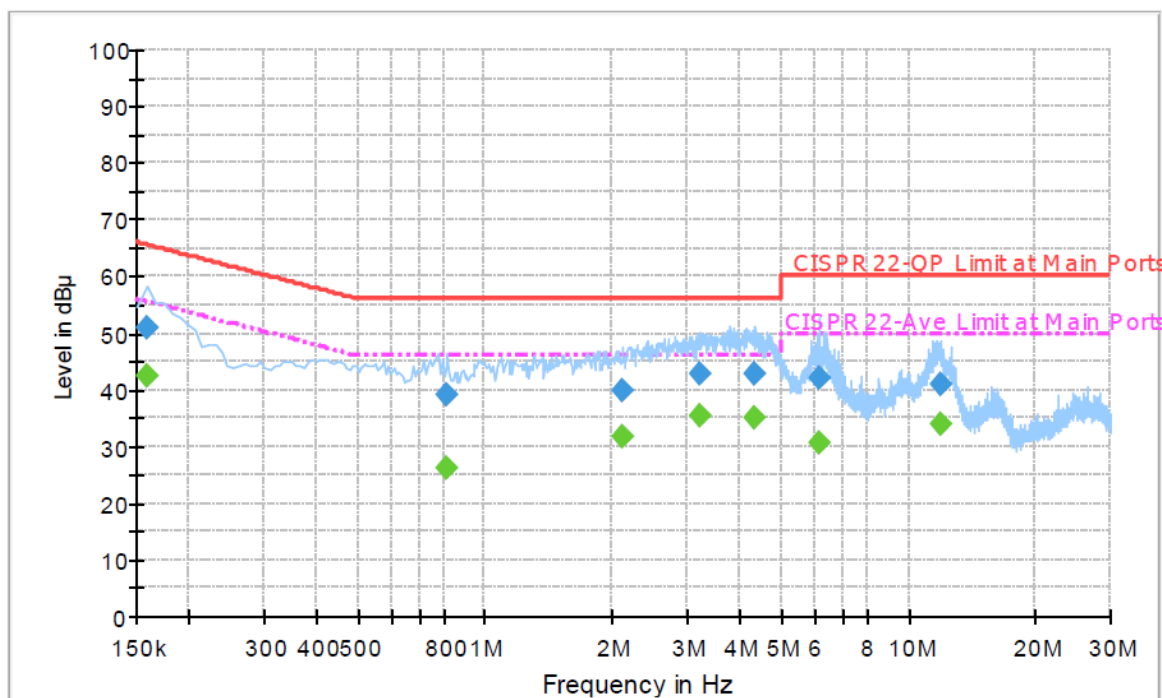
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.158000	49.9	Off	L1	19.3	15.7	65.6
0.182000	47.0	Off	L1	19.4	17.4	64.4
0.214000	44.7	Off	L1	19.3	18.3	63.0
0.902000	38.6	Off	L1	19.4	17.4	56.0
6.342000	45.6	Off	L1	19.5	14.4	60.0
11.654000	45.7	Off	L1	19.6	14.3	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.158000	29.8	Off	L1	19.3	25.8	55.6
0.182000	28.7	Off	L1	19.4	25.7	54.4
0.214000	28.3	Off	L1	19.3	24.7	53.0
0.902000	26.5	Off	L1	19.4	19.5	46.0
6.342000	34.1	Off	L1	19.5	15.9	50.0
11.654000	38.9	Off	L1	19.6	11.1	50.0

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	42~44%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Link + Bluetooth Link + TC + 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)
0.158000	51.1	Off	N	19.4	14.5	65.6
0.814000	39.2	Off	N	19.5	16.8	56.0
2.110000	39.9	Off	N	19.5	16.1	56.0
3.214000	43.0	Off	N	19.5	13.0	56.0
4.342000	42.8	Off	N	19.5	13.2	56.0
6.142000	41.9	Off	N	19.5	18.1	60.0
11.918000	40.9	Off	N	19.7	19.1	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.158000	42.6	Off	N	19.4	13.0	55.6
0.814000	26.1	Off	N	19.5	19.9	46.0
2.110000	31.7	Off	N	19.5	14.3	46.0
3.214000	35.6	Off	N	19.5	10.4	46.0
4.342000	34.9	Off	N	19.5	11.1	46.0
6.142000	30.7	Off	N	19.5	19.3	50.0
11.918000	33.9	Off	N	19.7	16.1	50.0

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

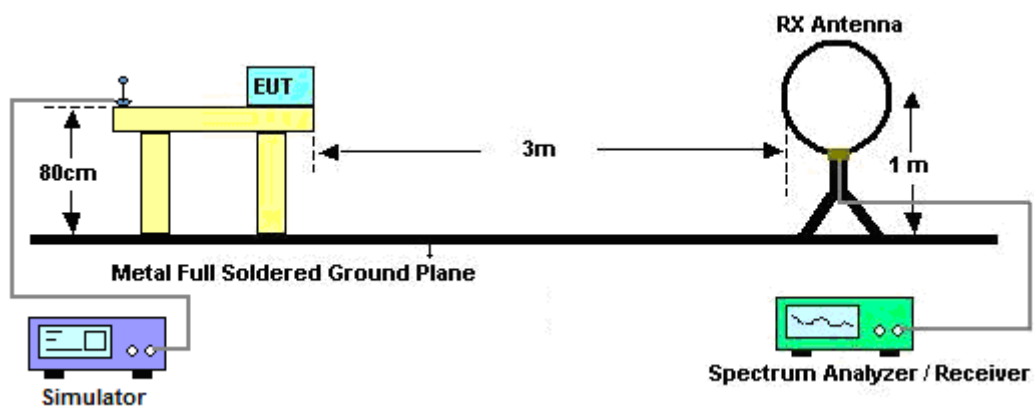
See list of measuring instruments of this test report.

3.3.3 Test Procedures

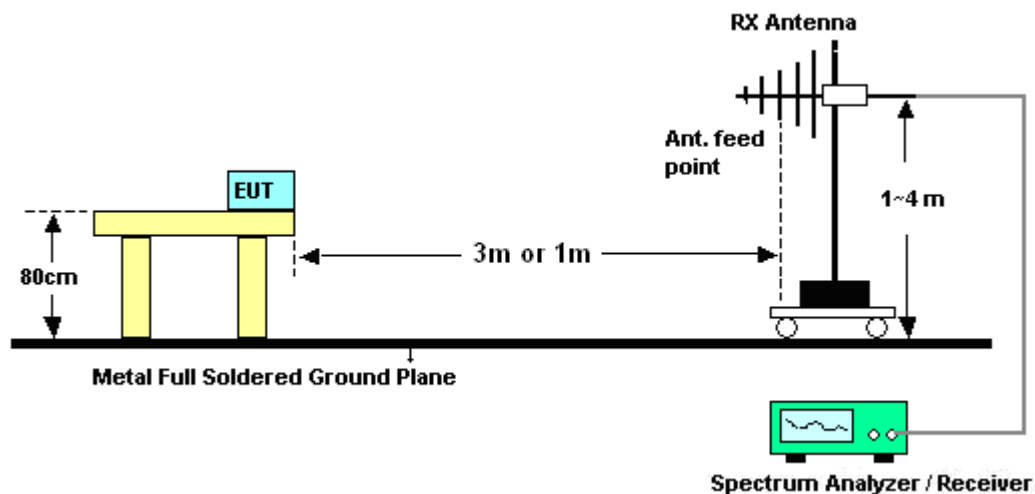
- The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector 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.

3.3.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



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

Test Engineer :	Kay Wu	Temperature :	26~27°C	
		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.

3.3.6 Test Result of Radiated Emission (30 MHz ~ 10th Harmonic)

Test Mode :	Mode 1	Temperature :	26~27°C
Test Channel :	00	Relative Humidity :	43~44%
Test Engineer :	Kay Wu	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
95.88	21.31	-22.19	43.5	41.39	10.52	0.95	31.55	-	-	Peak
175.53	30.53	-12.97	43.5	51.45	9.38	1.23	31.53	131	154	Peak
240.06	29.3	-16.7	46	47.79	11.68	1.34	31.51	-	-	Peak
364.4	29.48	-16.52	46	43.68	15.36	1.71	31.27	-	-	Peak
432.3	29.35	-16.65	46	41.56	17.08	1.87	31.16	-	-	Peak
531	25.37	-20.63	46	35.42	18.85	2.1	31	-	-	Peak
2389.99	36.14	-17.86	54	34.02	31.7	4.5	34.08	101	349	Average
2389.99	47.39	-26.61	74	45.27	31.7	4.5	34.08	101	349	Peak
2402	85.85	-	-	83.73	31.7	4.5	34.08	101	349	Average
2402	99.67	-	-	97.55	31.7	4.5	34.08	101	349	Peak
2492	32.93	-21.07	54	30.59	31.8	4.62	34.08	101	349	Average
2492	44.56	-29.44	74	42.22	31.8	4.62	34.08	101	349	Peak
4804	47.16	-6.84	54	63.42	33.76	6.42	56.44	100	253	Average
4804	54.14	-19.86	74	70.4	33.76	6.42	56.44	100	253	Peak



Test Mode :	Mode 1	Temperature :	26~27°C
Test Channel :	00	Relative Humidity :	43~44%
Test Engineer :	Kay Wu	Polarization :	Vertical
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
31.62	30	-10	40	43.66	17.3	0.58	31.54	100	226	Peak
59.97	29.66	-10.34	40	54.14	6.35	0.73	31.56	-	-	Peak
143.94	31.7	-11.8	43.5	51	11.07	1.14	31.51	-	-	Peak
365.1	28.73	-17.27	46	42.91	15.38	1.71	31.27	-	-	Peak
443.5	28.92	-17.08	46	41.15	17	1.92	31.15	-	-	Peak
531	27.2	-18.8	46	37.25	18.85	2.1	31	-	-	Peak
2369.66	34.24	-19.76	54	32.17	31.68	4.47	34.08	129	61	Average
2369.66	46.53	-27.47	74	44.46	31.68	4.47	34.08	129	61	Peak
2402	83.85	-	-	81.73	31.7	4.5	34.08	129	61	Average
2402	97.58	-	-	95.46	31.7	4.5	34.08	129	61	Peak
2490	32.92	-21.08	54	30.58	31.8	4.62	34.08	129	61	Average
2490	44.64	-29.36	74	42.3	31.8	4.62	34.08	129	61	Peak
4804	53.49	-0.51	54	69.75	33.76	6.42	56.44	100	92	Average
4804	62.86	-11.14	74	79.12	33.76	6.42	56.44	100	92	Peak

Test Mode :	Mode 2	Temperature :	26~27°C
Test Channel :	39	Relative Humidity :	43~44%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2441 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
95.88	23.59	-19.91	43.5	43.67	10.52	0.95	31.55	-	-	Peak
177.15	25.65	-17.85	43.5	46.7	9.24	1.23	31.52	-	-	Peak
240.06	32.37	-13.63	46	50.86	11.68	1.34	31.51	125	332	Peak
365.8	30.4	-15.6	46	44.55	15.41	1.71	31.27	-	-	Peak
430.9	28.5	-17.5	46	40.68	17.11	1.87	31.16	-	-	Peak
533.1	25.21	-20.79	46	35.2	18.9	2.1	30.99	-	-	Peak
2370	33.47	-20.53	54	31.4	31.68	4.47	34.08	103	350	Average
2370	44.99	-29.01	74	42.92	31.68	4.47	34.08	103	350	Peak
2441	85.46	-	-	83.23	31.75	4.56	34.08	103	350	Average
2441	99.2	-	-	96.97	31.75	4.56	34.08	103	350	Peak
2488	32.88	-21.12	54	30.57	31.8	4.59	34.08	103	350	Average
2488	45.15	-28.85	74	42.84	31.8	4.59	34.08	103	350	Peak
4882	45.87	-8.13	54	62.09	33.78	6.49	56.49	100	19	Average
4882	52.62	-21.38	74	68.84	33.78	6.49	56.49	100	19	Peak



Test Mode :	Mode 2	Temperature :	26~27°C
Test Channel :	39	Relative Humidity :	43~44%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2441 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
58.62	29.77	-10.23	40	53.9	6.69	0.73	31.55	103	56	Peak
95.88	31.96	-11.54	43.5	52.04	10.52	0.95	31.55	-	-	Peak
149.88	28.8	-14.7	43.5	48.66	10.5	1.14	31.5	-	-	Peak
365.1	29.26	-16.74	46	43.44	15.38	1.71	31.27	-	-	Peak
430.9	28.83	-17.17	46	41.01	17.11	1.87	31.16	-	-	Peak
531	29.18	-16.82	46	39.23	18.85	2.1	31	-	-	Peak
2328	33.16	-20.84	54	31.21	31.63	4.41	34.09	100	14	Average
2328	44.85	-29.15	74	42.9	31.63	4.41	34.09	100	14	Peak
2441	82.17	-	-	79.94	31.75	4.56	34.08	100	14	Average
2441	95.84	-	-	93.61	31.75	4.56	34.08	100	14	Peak
2484	32.8	-21.2	54	30.57	31.75	4.56	34.08	100	14	Average
2484	44.8	-29.2	74	42.51	31.78	4.59	34.08	100	14	Peak
4882	50.79	-3.21	54	67.01	33.78	6.49	56.49	100	92	Average
4882	58.31	-15.69	74	74.53	33.78	6.49	56.49	100	92	Peak



Test Mode :	Mode 3	Temperature :	26~27°C
Test Channel :	78	Relative Humidity :	43~44%
Test Engineer :	Kay Wu	Polarization :	Horizontal
Remark :	2480 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
95.88	24.13	-19.37	43.5	44.21	10.52	0.95	31.55	-	-	Peak
174.99	25.14	-18.36	43.5	46.06	9.38	1.23	31.53	-	-	Peak
233.31	32.66	-13.34	46	51.98	10.84	1.34	31.5	147	311	Peak
398	31.26	-14.74	46	44.22	16.41	1.82	31.19	-	-	Peak
533.1	24.76	-21.24	46	34.75	18.9	2.1	30.99	-	-	Peak
683.6	23.01	-22.99	46	31.55	19.85	2.35	30.74	-	-	Peak
2352	33.24	-20.76	54	31.23	31.66	4.44	34.09	104	311	Average
2352	45.16	-28.84	74	43.15	31.66	4.44	34.09	104	311	Peak
2480	84.1	-	-	81.81	31.78	4.59	34.08	104	311	Average
2480	97.31	-	-	95.02	31.78	4.59	34.08	104	311	Peak
2483.5	50.99	-3.01	54	48.7	31.78	4.59	34.08	104	311	Average
2483.5	61.58	-12.42	74	59.29	31.78	4.59	34.08	104	311	Peak
4960	48.37	-25.63	74	64.56	33.79	6.57	56.55	100	346	Peak



Test Mode :	Mode 3	Temperature :	26~27°C
Test Channel :	78	Relative Humidity :	43~44%
Test Engineer :	Kay Wu	Polarization :	Vertical
Remark :	2480 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
58.62	29.98	-10.02	40	54.11	6.69	0.73	31.55	100	43	Peak
143.94	32.57	-10.93	43.5	51.87	11.07	1.14	31.51	-	-	Peak
240.06	26.57	-19.43	46	45.06	11.68	1.34	31.51	-	-	Peak
366.5	30.65	-15.35	46	44.8	15.41	1.71	31.27	-	-	Peak
531	27.55	-18.45	46	37.6	18.85	2.1	31	-	-	Peak
746.6	26.65	-19.35	46	34.03	20.66	2.51	30.55	-	-	Peak
2352	33.02	-20.98	54	31.01	31.66	4.44	34.09	100	74	Average
2352	45.26	-28.74	74	43.25	31.66	4.44	34.09	100	74	Peak
2480	82.29	-	-	80	31.78	4.59	34.08	100	74	Average
2480	96.61	-	-	94.32	31.78	4.59	34.08	100	74	Peak
2483.5	50.74	-3.26	54	48.45	31.78	4.59	34.08	100	74	Average
2483.5	60.69	-13.31	74	58.4	31.78	4.59	34.08	100	74	Peak
4960	43.66	-10.34	54	59.85	33.79	6.57	56.55	100	103	Average
4960	53.19	-20.81	74	69.36	33.79	6.59	56.55	100	103	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	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)
GPS Station	T&E	GS-50	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
Spectrum Analyzer	R&S	FSP40	100057	9KHz-40GHz	Oct. 20, 2009	Oct. 19, 2010	Radiation (03CH05-HY)
Amplifier	COM-POWER	PA-103	161069	1KHz - 1GHz	Mar. 29, 2010	Mar. 28, 2011	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2009	Oct. 30, 2010	Radiation (03CH05-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 14, 2009	Oct. 13, 2010	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz- 26.5GHz	Nov. 11, 2009	Nov. 10, 2010	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)
Horn Antenna	Training Research	AH-0801	95119	8GHz~18GHz	Nov. 02, 2009	Nov. 01, 2010	Radiation (03CH05-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	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
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 EP081715-02 as below.