

FCC Test Report

APPLICANT : PAX Technology Limited
EQUIPMENT : PINPAD
BRAND NAME : PAX
MODEL NAME : S300
MARKETING NAME : S300
FCC ID : V5PS300RF
STANDARD : FCC 47 CFR FCC Part 15 Subpart B
CLASSIFICATION : Certification

The product was received on Mar. 18, 2013 and completely tested on Apr. 25, 2013. We, SPORTON INTERNATIONAL (SHENZHEN) 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 (SHENZHEN) INC., the test report shall not be reproduced except in full.

Reviewed by:



Jones Tsai / Manager



SPORTON INTERNATIONAL (SHENZHEN) INC.

No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C.

TABLE OF CONTENTS

REVISION HISTORY.....	3
SUMMARY OF TEST RESULT	4
1. GENERAL DESCRIPTION	5
1.1. Applicant.....	5
1.2. Manufacturer	5
1.3. Feature of Equipment Under Test.....	5
1.4. Product Specification of Equipment Under Test	5
1.5. Test Site	6
1.6. Applied Standards	6
2. TEST CONFIGURATION OF EQUIPMENT UNDER TEST	7
2.1. Test Mode	7
2.2. Connection Diagram of Test System	9
2.3. Support Unit used in test configuration and system.....	13
2.4. Test Software	13
3. TEST RESULT.....	14
3.1. Test of AC Conducted Emission Measurement	14
3.2. Test of Radiated Emission Measurement	20
4. LIST OF MEASURING EQUIPMENT	24
5. UNCERTAINTY OF EVALUATION	25
APPENDIX A. PHOTOGRAPHS OF EUT	
APPENDIX B. SETUP PHOTOGRAPHS	

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC331814	Rev. 01	Initial issue of report	May 14, 2013

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.107	AC Conducted Emission	< 15.107 limits	PASS	Under limit 0.32 dB at 7.940 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 4.50 dB at 93.050 MHz

1. General Description

1.1. Applicant

PAX Technology Limited

Room 2416, 24/F., Sun Hung Kai Centre, 30 Harbour Road, Wanchai, Hong Kong

1.2. Manufacturer

PAX Computer Technology (Shenzhen) Co., Ltd.

4/F, No.3 Building, Software Park, Second Central Science-Tech Road, High-Tech industrial Park, Shenzhen, Guangdong, P.R.C.

1.3. Feature of Equipment Under Test

Product Feature	
Equipment	PINPAD
Brand Name	PAX
Model Name	S300
Marketing Name	S300
FCC ID	V5PS300RF
EUT supports Radios application	NFC
HW Version	S300-XXX-XX3-XXXX
SW Version	Prolin2.3
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4. Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx Frequency	NFC : 13.56 MHz
Rx Frequency Range	NFC : 13.56 MHz
Antenna Type	NFC : PCB Antenna
Type of Modulation	NFC: ASK

1.5. Test Site

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.		
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL: +86-755- 3320-2398		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	CO01-SZ	03CH01-SZ	831040/4086F-1

1.6. Applied Standards

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

- FCC 47 CFR FCC Part 15 Subpart B
- ANSI C63.4-2003

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

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 (30MHz to the 5th 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.

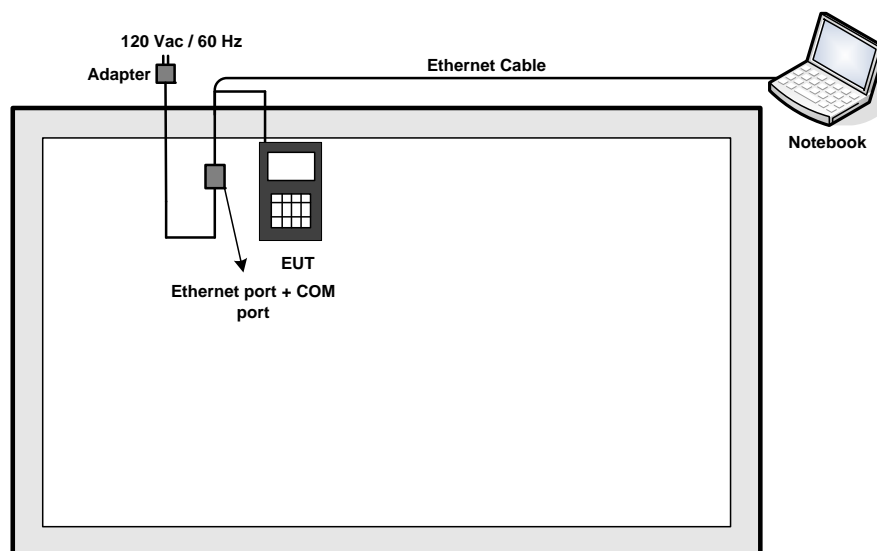
Item	EUT Configuration	Test Condition	
		EMI AC	EMI RE
1.	Operating Mode (EUT with adapter)	☒	☒
2.	Charging Mode (EUT with PC)	☒	☒

Abbreviations:

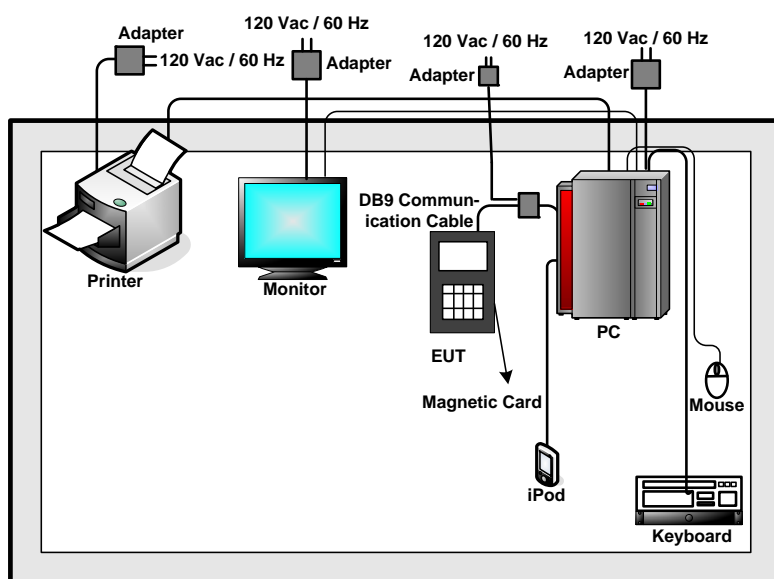
- EMI AC: AC conducted emissions
- EMI RE: EUT radiated emissions

Test Items	EUT Configure Mode	Function Type
AC Conducted Emission	1/2	Mode 1: LAN Link + Ethernet port + COM port Cable + Adapter<Fig.1> Mode 2: Magnetic Card + DB9 Communication Cable + Adapter<Fig.2> Mode 3: COM port + PS2 Cable + DB9 Communication Cable + PC<Fig.3> Mode 4: USB Link + USB host + Adapter<Fig.4> Mode 5: IC Card + Ethernet port + COM port Cable + Adapter<Fig.5> Mode 6: RF Card + Ethernet port + COM port Cable + Adapter<Fig.6>
Radiated Emissions	1/2	Mode 1: LAN Link + Ethernet port + COM port Cable + Adapter<Fig.1> Mode 2: Magnetic Card + DB9 Communication Cable + Adapter<Fig.2> Mode 3: COM port + PS2 Cable + DB9 Communication Cable + PC<Fig.3> Mode 4: USB Link + USB host + Adapter<Fig.4> Mode 5: IC Card + DB9 Communication Cable + Adapter<Fig.7> Mode 6: RF Card + DB9 Communication Cable + Adapter<Fig.8>
Remark: <ol style="list-style-type: none"> The worst case of AC Conducted Emission is mode 1; only the test data of this mode was reported. The worst case of Radiated Emissions is mode 6; only the test data of this mode was reported. 		

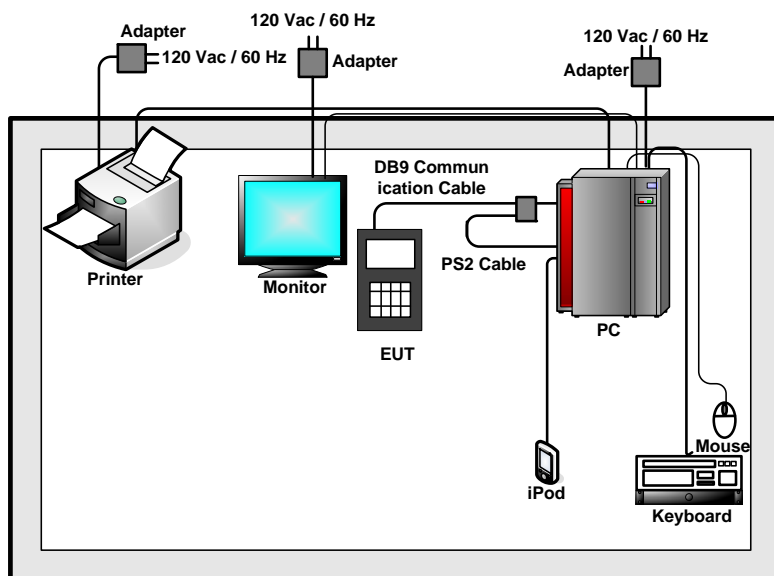
2.2. Connection Diagram of Test System



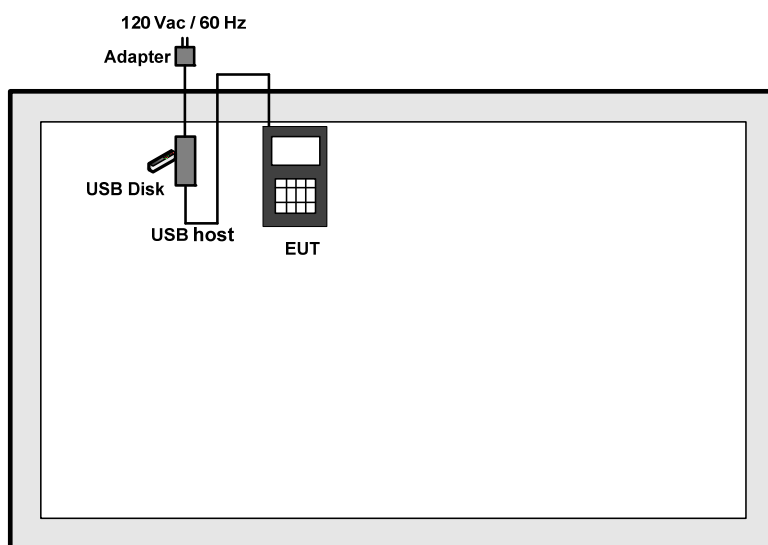
<Fig.1>



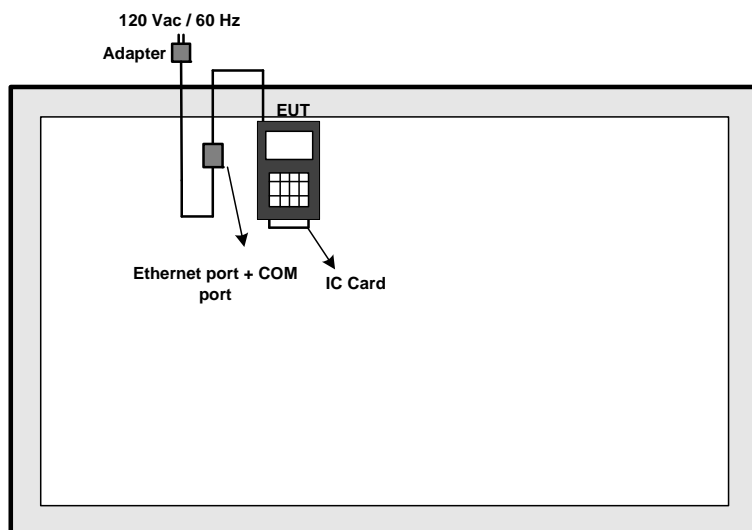
<Fig.2>



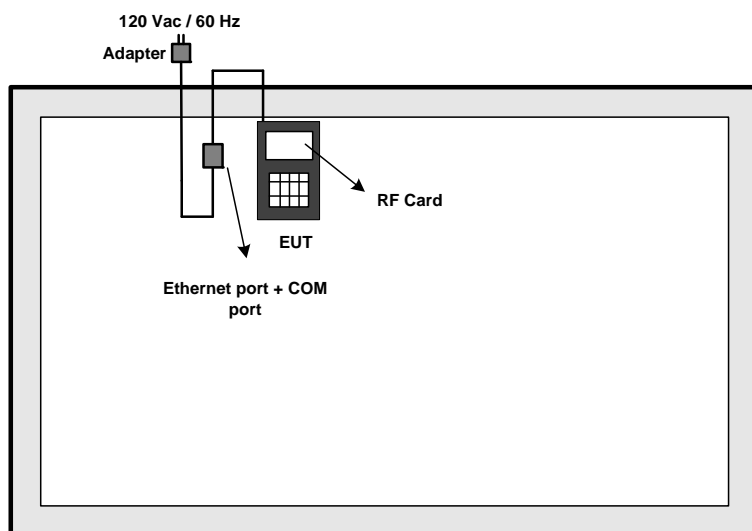
<Fig.3>



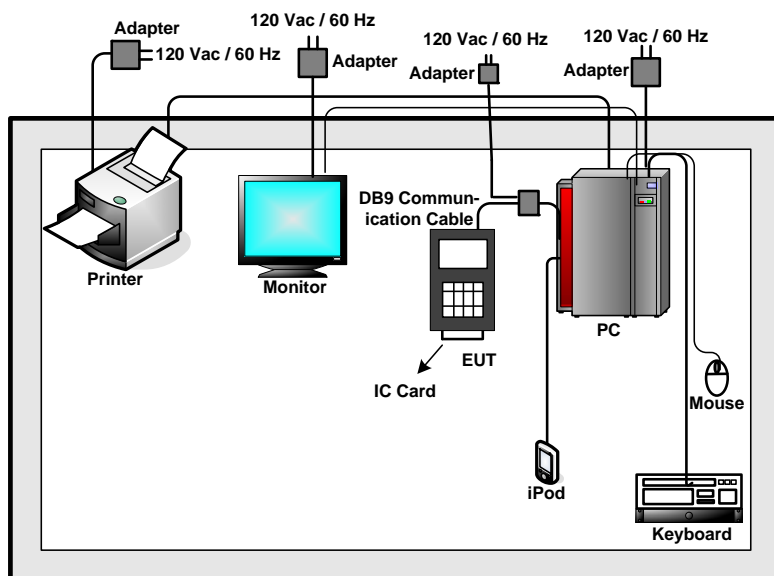
<Fig.4>



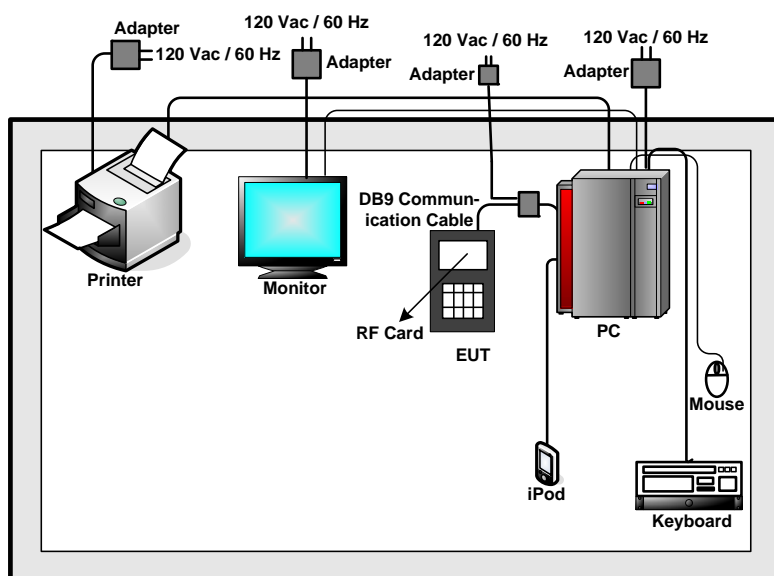
<Fig.5>



<Fig.6>



<Fig.7>



<Fig.8>

2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	DELL	VOSTRO1440	FCC DoC	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
2.	PC	DELL	OPTIPLEX 390	FCC DoC	N/A	Unshielded, 1.8 m
3.	Monitor	DELL	IN1940MWB	FCC DoC	Shielded, 1.2 m	Unshielded, 1.8 m
4.	(USB) Mouse	DELL	MS111-L	FCC DoC	Shielded, 1.5 m	N/A
5.	(USB) Keyboard	DELL	KB212-B	FCC DoC	Shielded, 1.5 m	N/A
6.	iPod	Apple	MC525 ZP/A	FCC DoC	Unshielded, 1.0 m	N/A
7.	Printer	SAMSUNG	ML-1610	FCC DoC	Shielded, 1.8 m	Unshielded, 1.8 m
8.	USB disk	Yuzhan	N/A	N/A	N/A	N/A
9	Adapter	HuntKey	HKA00505010-2P	N/A	N/A	N/A
10	Ethernet port + COM port Cable	N/A	N/A	N/A	N/A	N/A
11	USB host	N/A	N/A	N/A	N/A	N/A

2.4. Test Software

1. EUT executed IC Card function.
2. EUT executed Magnetic Card function.
3. EUT executed RF Card function.
4. EUT connect to PC via COM port cables for data transfer.
5. EUT executed USB Link function.
6. EUT executed LAN Link function.

3. Test Result

3.1. Test of AC Conducted Emission Measurement

3.1.1 Limits 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.

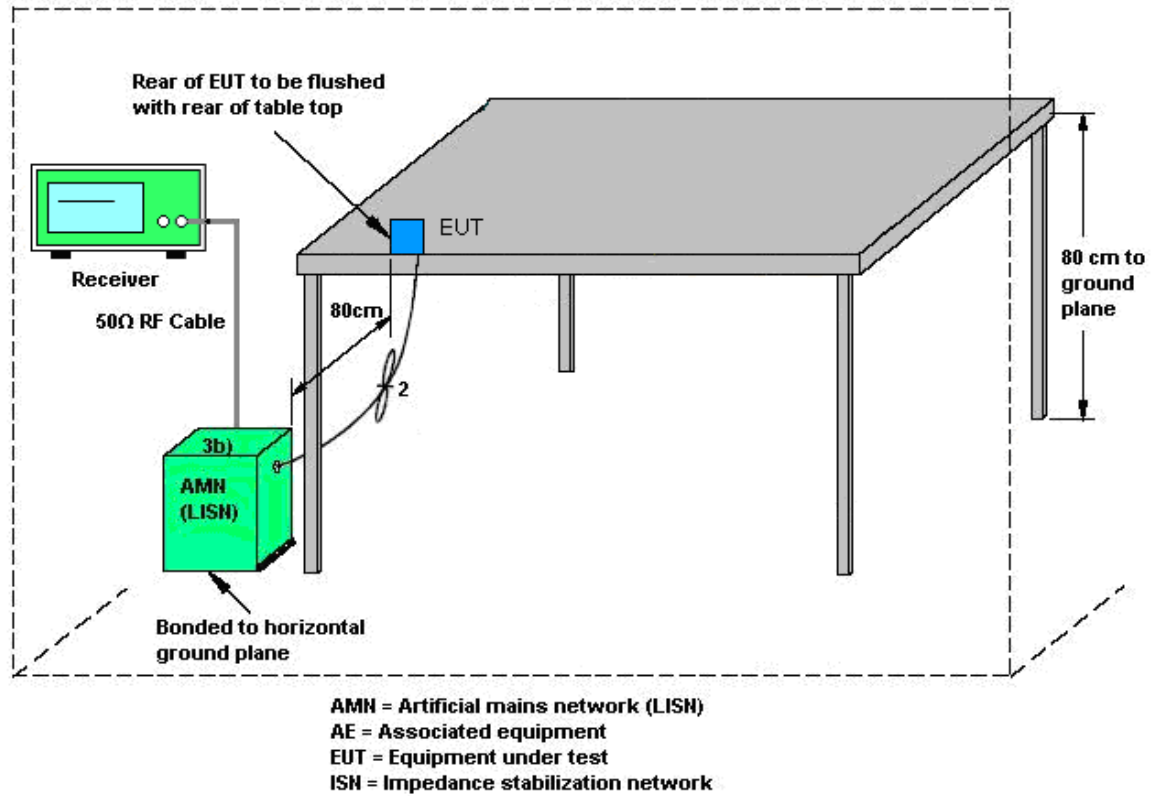
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

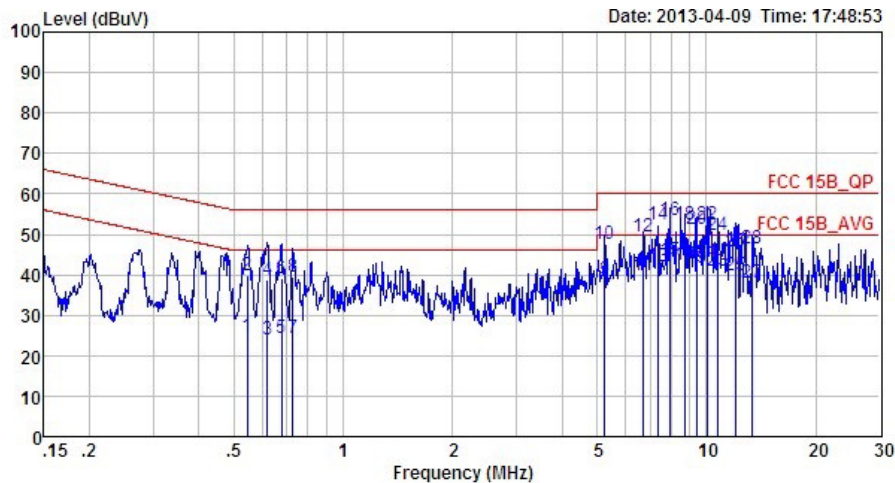
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.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

3.1.4 Test Setup



3.1.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	23~24℃
Test Engineer :	Leo Liao	Relative Humidity :	48~49%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	LAN Link + Ethernet port + COM port Cable + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

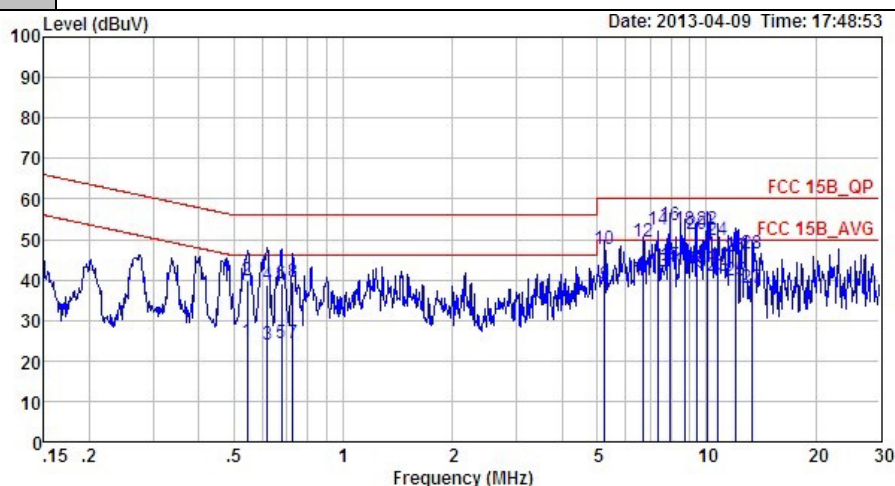


Site : C001-S2
Condition: FCC 15B_QP LISN_L_2000601 LINE

Mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.54	24.61	-21.39	46.00	14.50	0.02	10.09	Average
2	0.54	39.71	-16.29	56.00	29.60	0.02	10.09	QP
3	0.62	23.92	-22.08	46.00	13.80	0.02	10.10	Average
4	0.62	38.82	-17.18	56.00	28.70	0.02	10.10	QP
5	0.68	24.32	-21.68	46.00	14.20	0.02	10.10	Average
6	0.68	39.22	-16.78	56.00	29.10	0.02	10.10	QP
7	0.73	24.43	-21.57	46.00	14.31	0.02	10.10	Average
8	0.73	39.53	-16.47	56.00	29.41	0.02	10.10	QP
9	5.25	38.86	-11.14	50.00	28.61	0.07	10.18	Average
10	5.25	47.76	-12.24	60.00	37.51	0.07	10.18	QP
11	6.70	40.00	-10.00	50.00	29.70	0.10	10.20	Average
12	6.70	49.50	-10.50	60.00	39.20	0.10	10.20	QP
13	7.33	42.12	-7.88	50.00	31.80	0.11	10.21	Average
14	7.33	52.42	-7.58	60.00	42.10	0.11	10.21	QP
15 *	7.94	43.55	-6.45	50.00	33.20	0.12	10.23	Average
16	7.94	53.35	-6.65	60.00	43.00	0.12	10.23	QP
17	8.73	42.41	-7.59	50.00	32.00	0.16	10.25	Average
18	8.73	52.41	-7.59	60.00	42.00	0.16	10.25	QP
19	9.40	41.67	-8.33	50.00	31.20	0.20	10.27	Average
20	9.40	51.17	-8.83	60.00	40.70	0.20	10.27	QP

Test Mode :	Mode 1	Temperature :	23~24°C
Test Engineer :	Leo Liao	Relative Humidity :	48~49%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	LAN Link + Ethernet port + COM port Cable + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

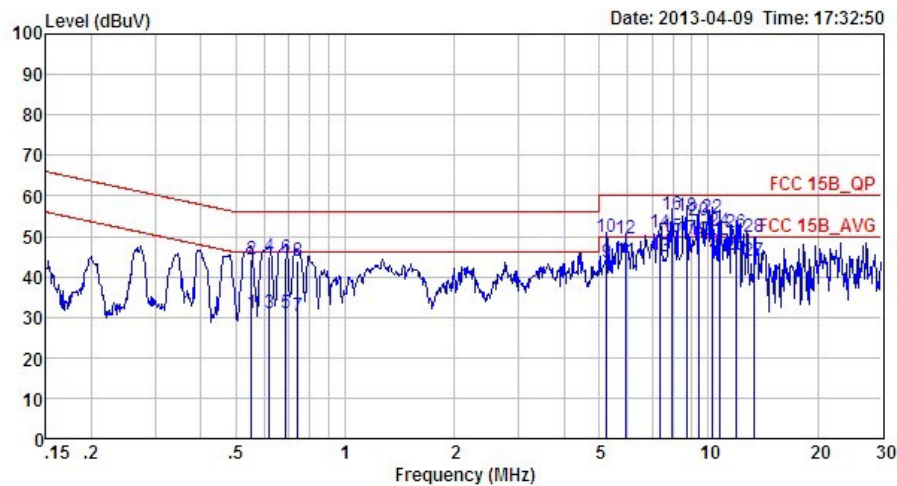


Site : CO01-S2
Condition: FCC 15B_QP LISN_L_2000601 LINE

Mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
21	10.07	43.25	-6.75	50.00	32.70	0.26	10.29	Average
22	10.07	52.55	-7.45	60.00	42.00	0.26	10.29	QP
23	10.73	41.06	-8.94	50.00	30.50	0.26	10.30	Average
24	10.73	49.66	-10.34	60.00	39.10	0.26	10.30	QP
25	12.00	39.90	-10.10	50.00	29.31	0.25	10.34	Average
26	12.00	45.90	-14.10	60.00	35.31	0.25	10.34	QP
27	13.41	38.04	-11.96	50.00	27.40	0.25	10.39	Average
28	13.41	46.44	-13.56	60.00	35.80	0.25	10.39	QP

Test Mode :	Mode 1	Temperature :	23~24°C
Test Engineer :	Leo Liao	Relative Humidity :	48~49%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	LAN Link + Ethernet port + COM port Cable + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

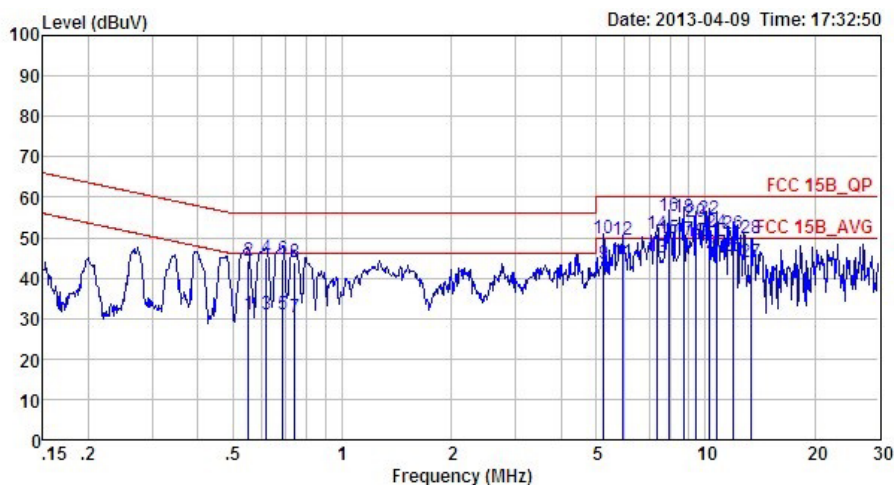


Site : CO01-SZ
Condition: FCC 15B_QP LISN_N_2000601 NEUTRAL

Mode : Mode 1

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.55	31.10	-14.90	46.00	20.99	0.02	10.09	Average
2	0.55	44.40	-11.60	56.00	34.29	0.02	10.09	QP
3	0.62	30.81	-15.19	46.00	20.69	0.02	10.10	Average
4	0.62	45.11	-10.89	56.00	34.99	0.02	10.10	QP
5	0.69	30.82	-15.18	46.00	20.70	0.02	10.10	Average
6	0.69	44.72	-11.28	56.00	34.60	0.02	10.10	QP
7	0.74	30.32	-15.68	46.00	20.20	0.02	10.10	Average
8	0.74	43.92	-12.08	56.00	33.80	0.02	10.10	QP
9	5.25	43.67	-6.33	50.00	33.40	0.09	10.18	Average
10	5.25	49.77	-10.23	60.00	39.50	0.09	10.18	QP
11	5.93	44.10	-5.90	50.00	33.80	0.10	10.20	Average
12	5.93	49.60	-10.40	60.00	39.30	0.10	10.20	QP
13	7.33	44.95	-5.05	50.00	34.60	0.14	10.21	Average
14	7.33	50.85	-9.15	60.00	40.50	0.14	10.21	QP
15 *	7.94	49.68	-0.32	50.00	39.29	0.16	10.23	Average
16	7.94	55.28	-4.72	60.00	44.89	0.16	10.23	QP
17	8.73	49.55	-0.45	50.00	39.10	0.20	10.25	Average
18	8.73	55.05	-4.95	60.00	44.60	0.20	10.25	QP
19	9.40	49.11	-0.89	50.00	38.60	0.24	10.27	Average
20	9.40	54.01	-5.99	60.00	43.50	0.24	10.27	QP

Test Mode :	Mode 1	Temperature :	23~24°C
Test Engineer :	Leo Liao	Relative Humidity :	48~49%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	LAN Link + Ethernet port + COM port Cable + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15B_QP LISN_N_2000601 NEUTRAL

Mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
21	10.29	49.19	-0.81	50.00	38.60	0.30	10.29	Average
22	10.29	54.79	-5.21	60.00	44.20	0.30	10.29	QP
23	10.79	46.21	-3.79	50.00	35.61	0.30	10.30	Average
24	10.79	51.31	-8.69	60.00	40.71	0.30	10.30	QP
25	11.93	45.26	-4.74	50.00	34.60	0.32	10.34	Average
26	11.93	51.06	-8.94	60.00	40.40	0.32	10.34	QP
27	13.41	43.82	-6.18	50.00	33.10	0.33	10.39	Average
28	13.41	49.92	-10.08	60.00	39.20	0.33	10.39	QP

3.2. Test of Radiated Emission Measurement

3.2.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.2.2. Measuring Instruments

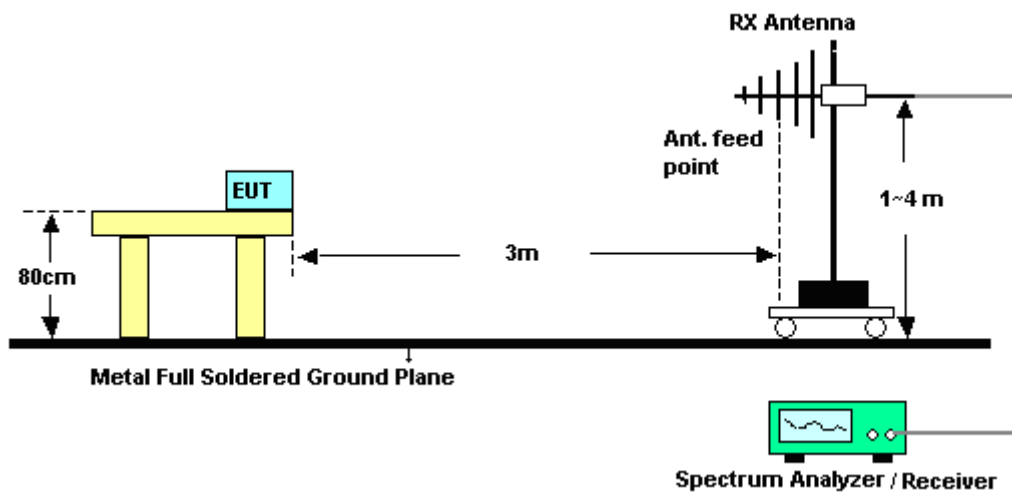
See list of measuring instruments of this test report.

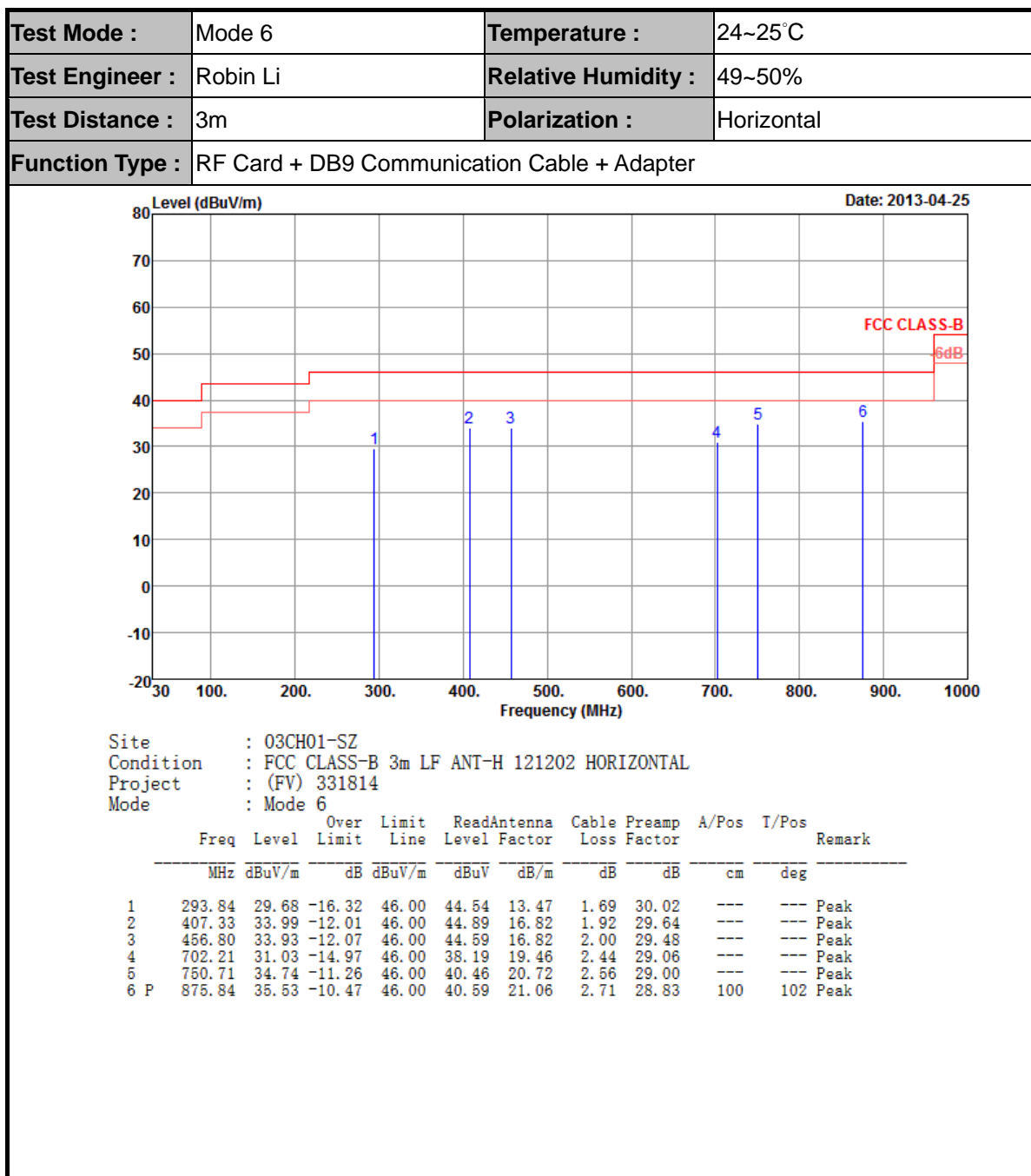
3.2.3. Test Procedures

1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dBuV/m) = 20 log Emission level (uV/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor= Level

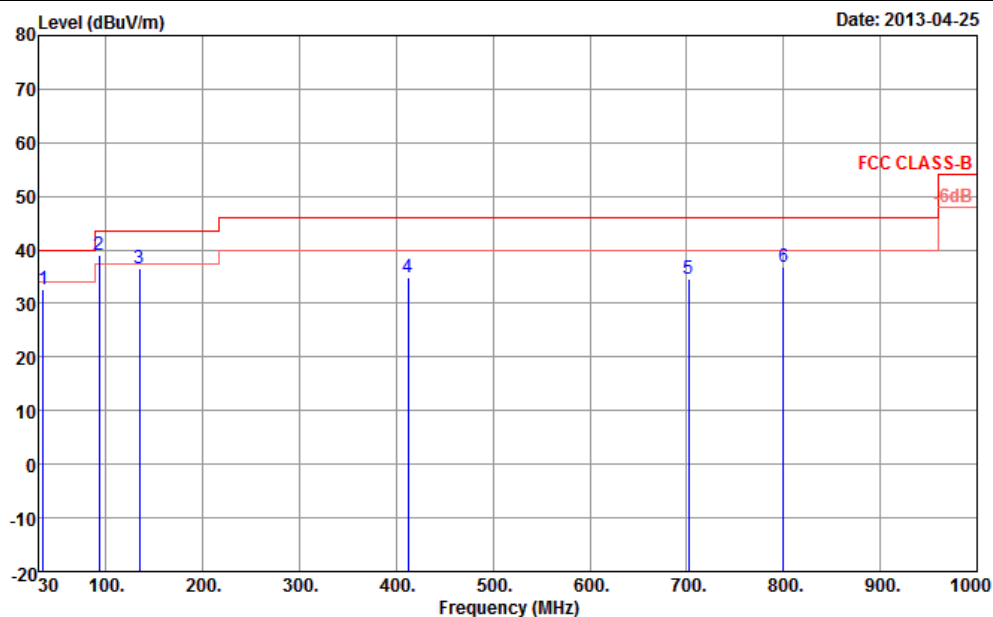
3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



3.2.5. Test Result of Radiated Emission


Test Mode :	Mode 6	Temperature :	24~25°C
Test Engineer :	Robin Li	Relative Humidity :	49~50%
Test Distance :	3m	Polarization :	Vertical
Function Type :	RF Card + DB9 Communication Cable + Adapter		



Site : 03CH01-SZ
 Condition : FCC CLASS-B 3m LF ANT-V 121202 VERTICAL
 Project : (FV) 331814
 Mode : Mode 6

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	cm	deg	
1	34.85	32.52	-7.48	40.00	49.17	13.00	0.91	30.56	---	Peak
2 P	93.05	39.00	-4.50	43.50	58.31	10.20	1.14	30.65	100	255 Peak
3	134.76	36.48	-7.02	43.50	53.69	12.10	1.24	30.55	---	Peak
4	412.18	34.93	-11.07	46.00	45.77	16.86	1.93	29.63	---	Peak
5	702.21	34.49	-11.51	46.00	41.65	19.46	2.44	29.06	---	Peak
6	800.18	36.84	-9.16	46.00	42.65	20.50	2.62	28.93	---	Peak

4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC LISN	ETS-LINDGR EN	3816/2SH	00103912	0.1MHz~108MHz	Feb. 28, 2013	Apr. 09, 2013	Feb. 27, 2014	Conduction (CO01-SZ)
AC LISN	ETS-LINDGR EN	3816/2SH	00103892	0.1MHz~108MHz	Feb. 28, 2013	Apr. 09, 2013	Feb. 27, 2014	Conduction (CO01-SZ)
ESCIO TEST Receiver	R&S	1142.8007. 03	100724	9K-3GHz	Mar. 08, 2013	Apr. 09, 2013	Mar. 07, 2014	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	61602000089 1N/A	N/A	Oct. 12, 2012	Apr. 09, 2013	Oct. 11, 2013	Conduction (CO01-SZ)
ESCI TEST Receiver	R&S	ESCI	100724	9K-3GHz	Mar. 28, 2013	Apr. 25, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
Bilog Antenna	SCHAFFNER	CBL6112B	2614	30MHz~2GHz	Nov. 03, 2012	Apr. 25, 2013	Nov. 02, 2013	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9K-3000MHz GAIN 30db	Mar. 28, 2013	Apr. 25, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)

5. Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 KHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.26
--	------

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

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

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

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 EP331814 as below.