



FCC Test Report

APPLICANT : PAX Technology Limited
EQUIPMENT : Wireless POS Terminal
BRAND NAME : PAX
MODEL NAME : D200
MARKETING NAME : D200
FCC ID : V5PD200W
STANDARD : FCC 47 CFR FCC Part 15 Subpart B
CLASSIFICATION : Certification

The product was received on Sep. 16, 2013 and testing was completed on Oct. 15, 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 C63.4-2009 and shown to be compliant 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: Louis Wu / Manager

Approved 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.



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REVISION HISTORY



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 3.24 dB at 0.410 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 1.46 dB at 527.610 MHz for Quasi-Peak



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	Wireless POS Terminal
Brand Name	PAX
Model Name	D200
Marketing Name	D200
FCC ID	V5PD200W
EUT supports Radios application	WLAN 2.4GHz 802.11bgn HT20/ Bluetooth v2.1 + EDR / RFID
HW Version	D200-XXX-XXX
SW Version	V1.XX
EUT Stage	Production Unit

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	802.11b/g/n: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz RFID : 13.56 MHz
Rx Frequency	802.11b/g/n: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz RFID : 13.56 MHz
Antenna Type	WLAN : FPC Antenna Bluetooth : Ceramic SMD Antenna RFID : PCB Antenna
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) Bluetooth v2.1 BR (1Mbps) : GFSK Bluetooth v2.1 EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth v2.1 EDR (3Mbps) : 8-DPSK RFID: ASK

1.5. Modification of EUT

No modifications are made to the EUT during all test items.



1.6. 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 Registration No.
	CO01-SZ	03CH01-SZ	831040

1.7. 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 C63.4-2009

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 C63.4-2009 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<1G	EMI RE≥1G
1.	Charging Mode (EUT with adapter)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Note 1
2.	Data application transferred mode (EUT with notebook)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Abbreviations:

- EMI AC: AC conducted emissions
- EMI RE \geq 1G: EUT radiated emissions \geq 1GHz
- EMI RE < 1G: EUT radiated emissions < 1GHz

Note 1: Testing for this mode is not required or not the worst case.

Remark: For signal above 1GHz, the worst case was test item 2.

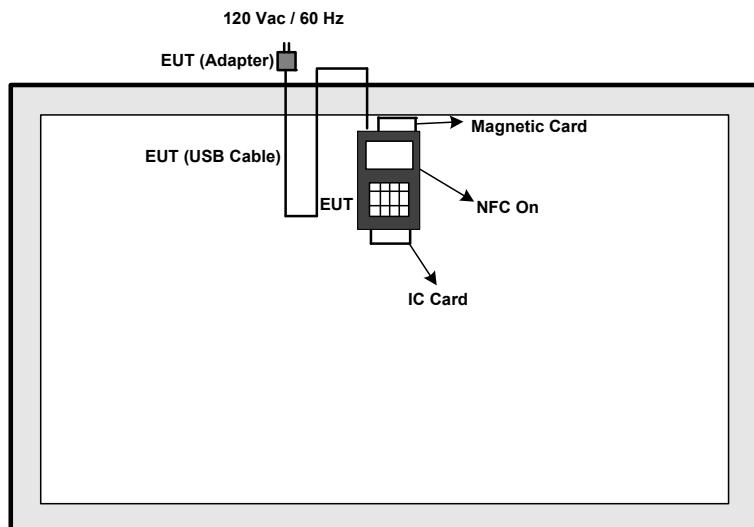


Test Items	EUT Configure Mode	Function Type
AC Conducted Emission	1/2	Mode 1: RFID On + USB Cable (Charging from Adapter) <Fig.1> Mode 2: IC Card + USB Cable (Charging from Adapter) <Fig.1> Mode 3: Magnetic Card + USB Cable (Charging from Adapter) <Fig.1> Mode 4: WLAN Link + USB Cable (Charging from Adapter) <Fig.2> Mode 5: Bluetooth Link + USB Cable (Charging from Adapter) <Fig.3> Mode 6: USB Cable (Data Link with Notebook) <Fig.4>
Radiated Emissions < 1GHz	1/2	Mode 1: RFID On + USB Cable (Charging from Adapter) <Fig.1> Mode 2: IC Card + USB Cable (Charging from Adapter) <Fig.1> Mode 3: Magnetic Card + USB Cable (Charging from Adapter) <Fig.1> Mode 4: WLAN Link + USB Cable (Charging from Adapter) <Fig.2> Mode 5: Bluetooth Link + USB Cable (Charging from Adapter) <Fig.3> Mode 6: USB Cable (Data Link with Notebook) <Fig.4>
Radiated Emissions \geq 1GHz	2	Mode 1: USB Cable (Data Link with Notebook) <Fig.4>

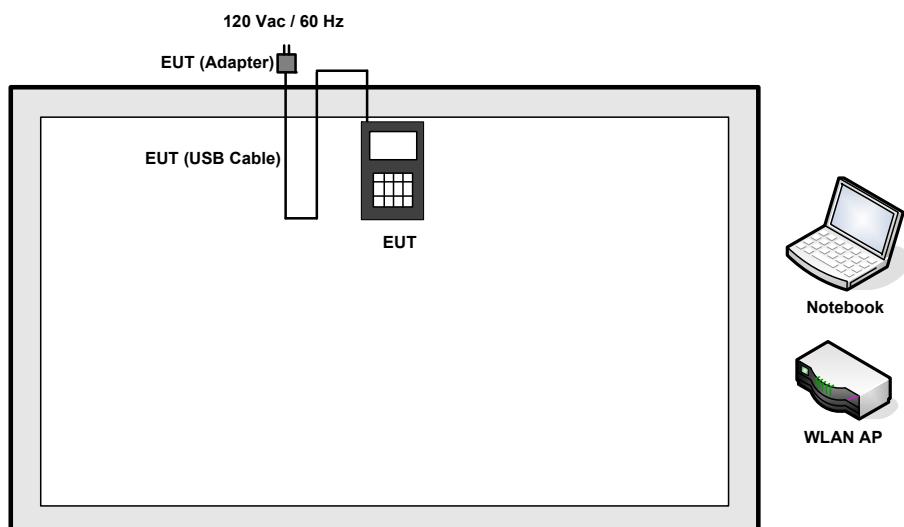
Remark:

1. The worst case of AC is mode 3, and the USB Link Mode of AC is mode 6; the test data of these modes are reported.
2. The worst case of RE < 1G is mode 6; only the test data of this mode is reported.
3. Link with Notebook means data application transferred mode between EUT and Notebook.

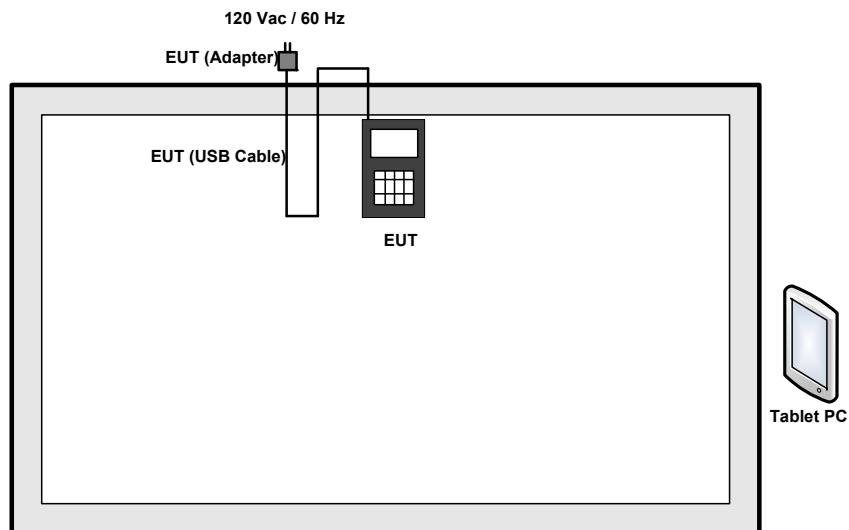
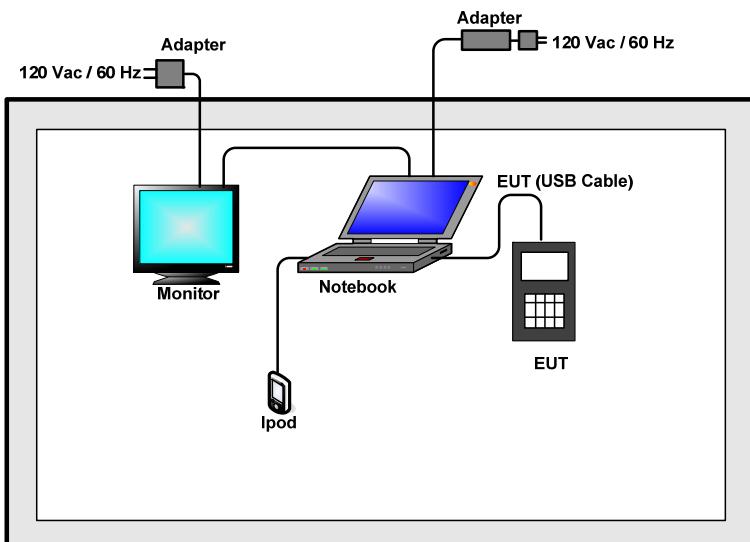
2.2. Connection Diagram of Test System



<Fig.1>



<Fig.2>

**<Fig.3>****<Fig.4>**



2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	D-Link	DIR-615	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-805	N/A	N/A	Unshielded, 1.8 m
3.	Notebook	DELL	P08S	FCC DoC	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Notebook	Lenovo	G480	PRC4	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
5.	Monitor	DELL	1707FPt	FCC DoC	Shielded, 1.2m	Unshielded, 1.8 m
6.	Monitor	DELL	IN1940MWB	FCC DoC	Shielded, 1.2m	Unshielded, 1.8 m
7.	IPod	Apple	MC525 ZP/A	FCC DoC	Shielded, 1.0m	N/A
8.	Tablet PC	Lenovo	IdeaTab A2107A-H	N/A	N/A	N/A

2.4. EUT Operation Test Setup

The EUT was attached to the Tablet PC or WLAN AP, and the following programs installed in the EUT were programmed during the test.

1. Execute the program, "SSCOM32" under WIN7 installed in notebook for files transfer with EUT via USB cable.
2. EUT executed IC Card function.
3. EUT executed Magnetic Card function.
4. Turn on RFID 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.

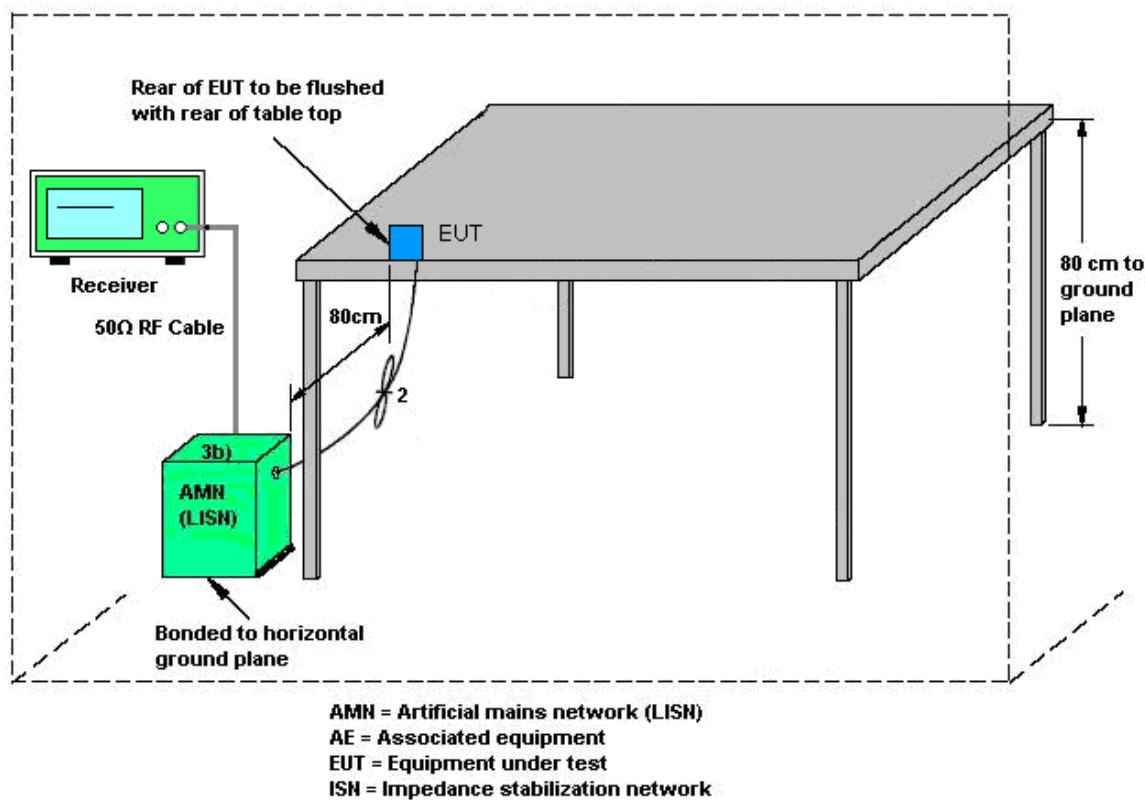
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

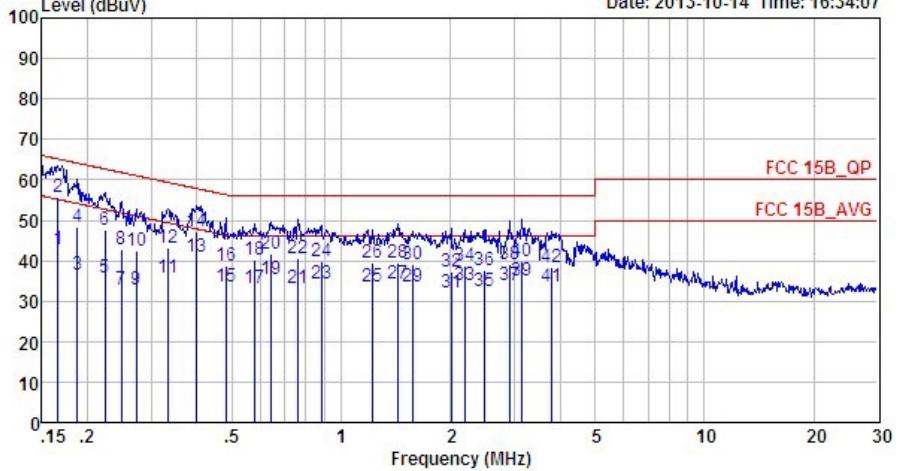
3.1.3 Test Procedure

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.

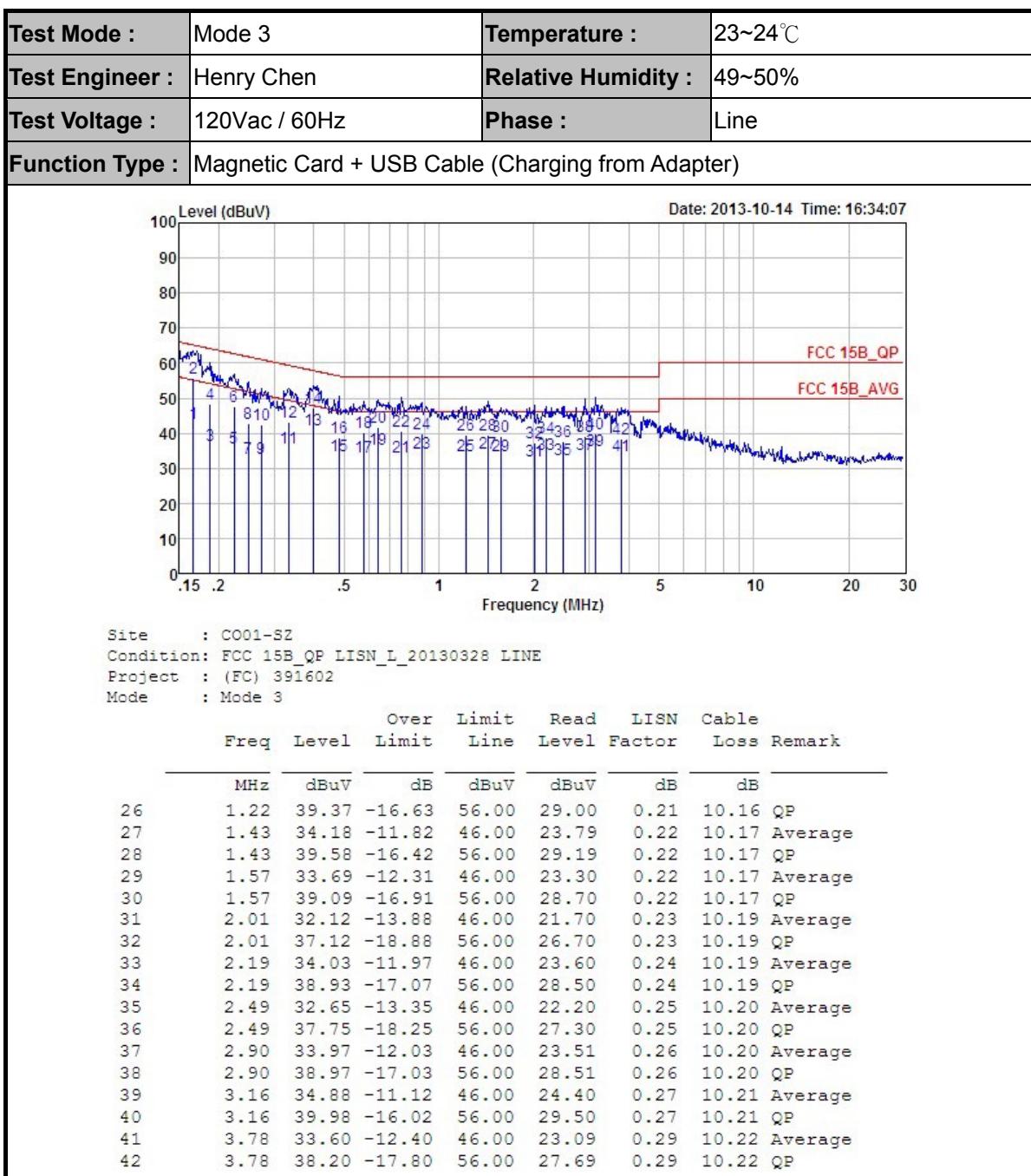
3.1.4 Test Setup

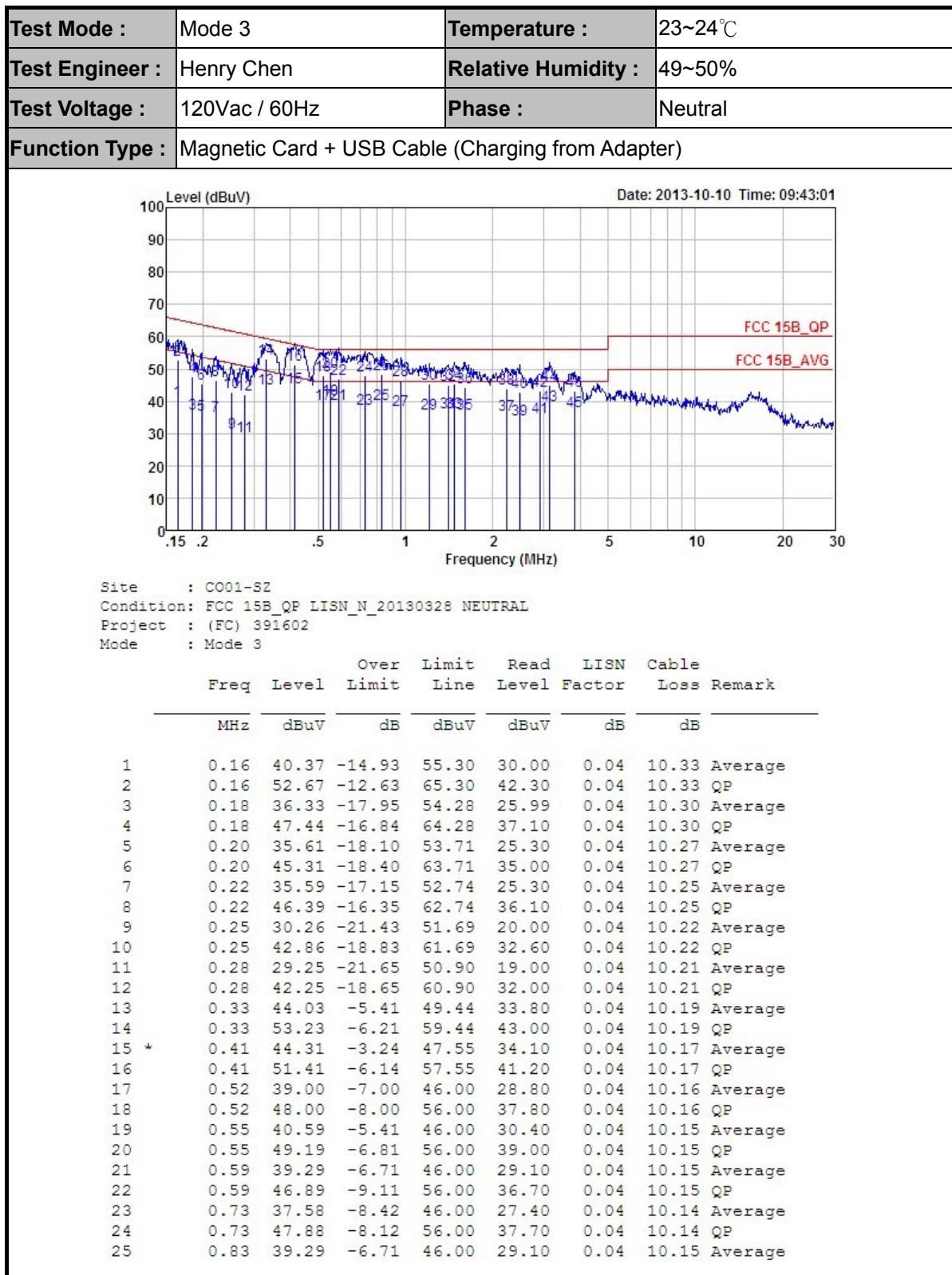


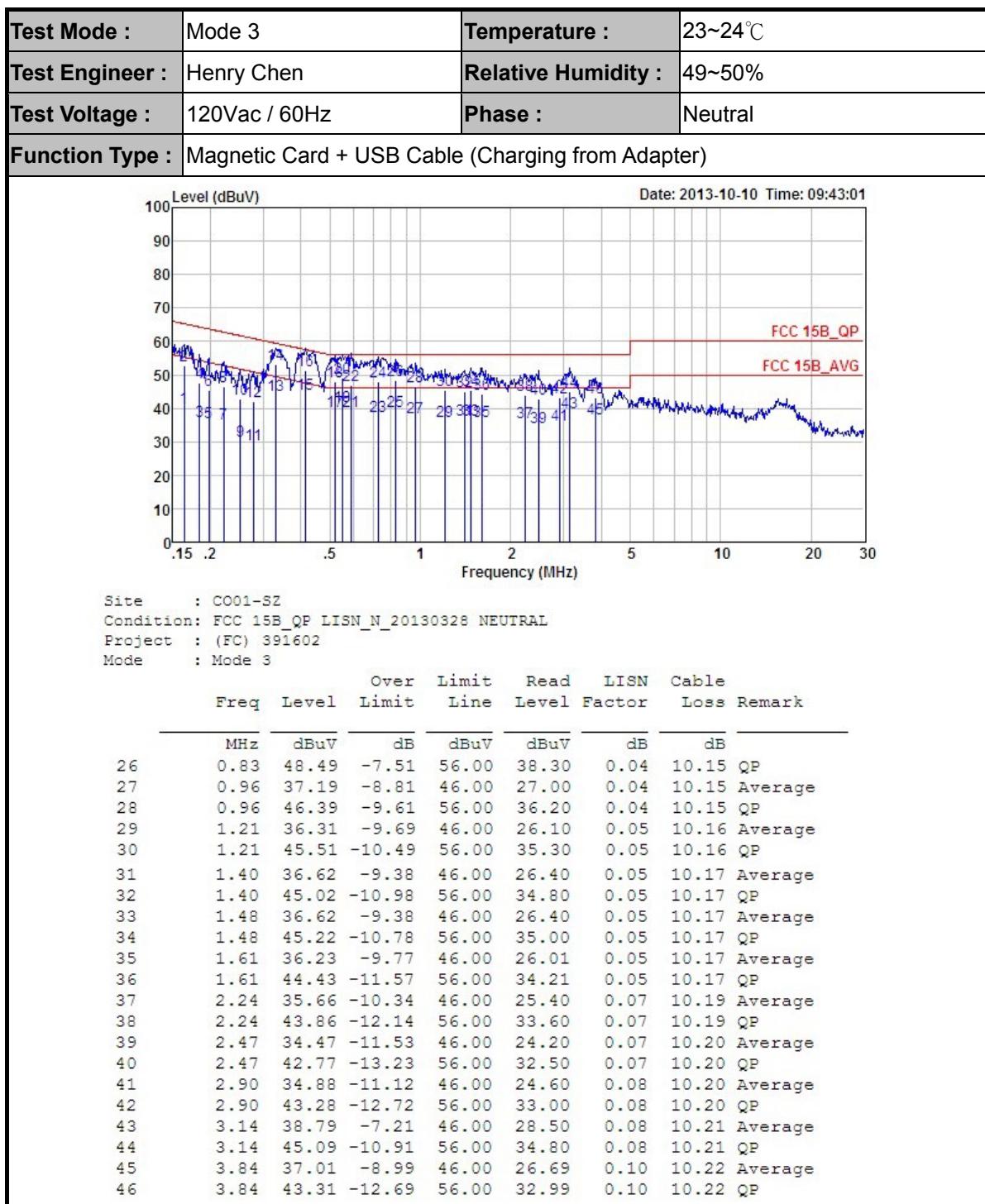
3.1.5 Test Result of AC Conducted Emission

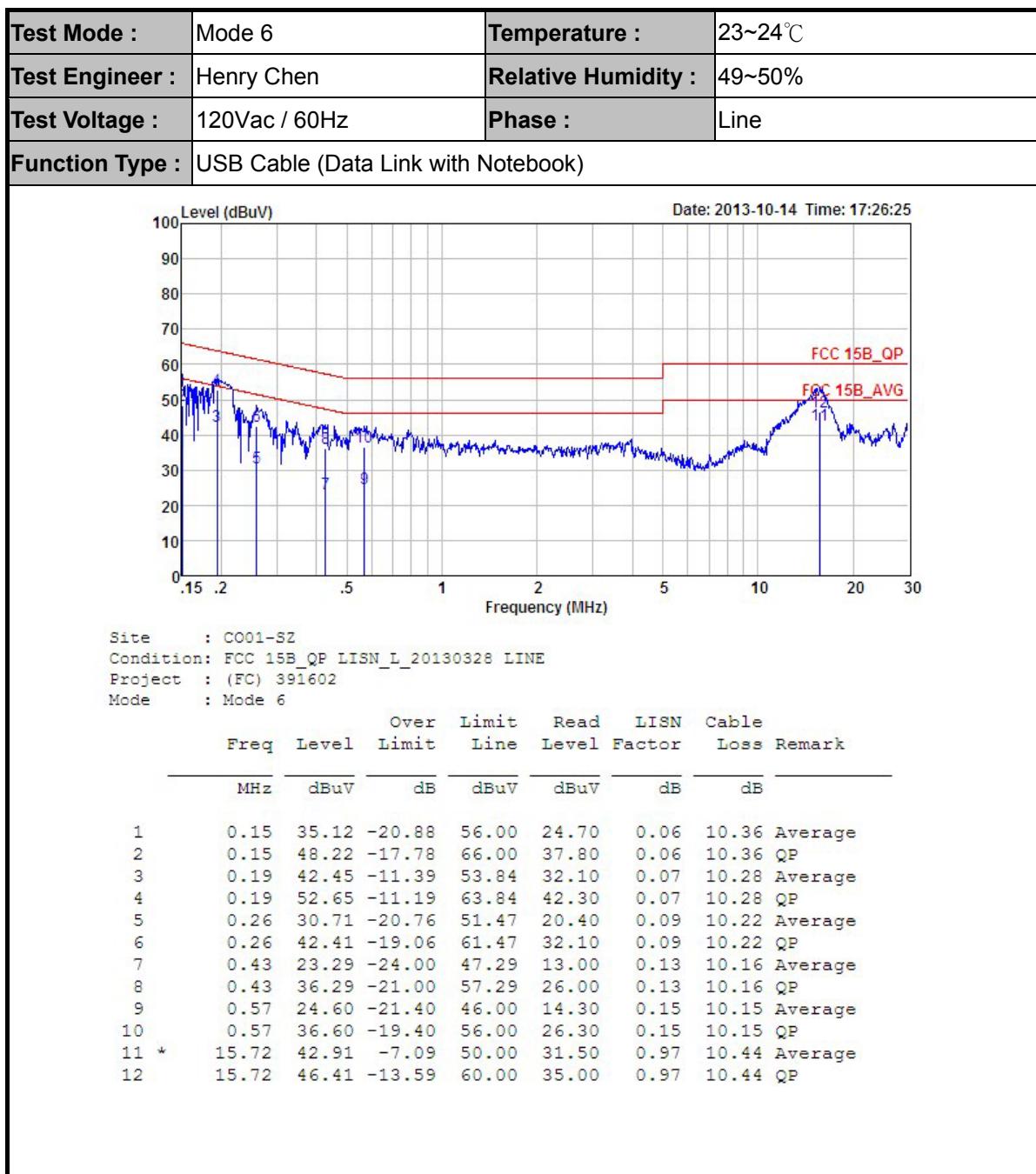
Test Mode :	Mode 3	Temperature :	23~24°C																			
Test Engineer :	Henry Chen	Relative Humidity :	49~50%																			
Test Voltage :	120Vac / 60Hz	Phase :	Line																			
Function Type :	Magnetic Card + USB Cable (Charging from Adapter)																					
 Date: 2013-10-14 Time: 16:34:07																						
Site : CO01-S2 Condition: FCC 15B_QP LISN_L_20130328 LINE Project : (FC) 391602 Mode : Mode 3																						
<table border="1"> <thead> <tr> <th rowspan="2">Freq</th> <th rowspan="2">Level</th> <th>Over</th> <th>Limit</th> <th>Read</th> <th>LISN</th> <th>Cable</th> </tr> <tr> <th>Line</th> <th>Level</th> <th>Factor</th> <th>Loss</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>MHz</td> <td>dBuV</td> <td>dB</td> <td>dBuV</td> <td>dBuV</td> <td>dB</td> <td>dB</td> </tr> </tbody> </table>				Freq	Level	Over	Limit	Read	LISN	Cable	Line	Level	Factor	Loss	Remark	MHz	dBuV	dB	dBuV	dBuV	dB	dB
Freq	Level	Over	Limit			Read	LISN	Cable														
		Line	Level	Factor	Loss	Remark																
MHz	dBuV	dB	dBuV	dBuV	dB	dB																
1	0.17	42.69	-12.47	55.16	32.30	0.06	10.33 Average															
2	0.17	55.89	-9.27	65.16	45.50	0.06	10.33 QP															
3	0.19	36.46	-17.69	54.15	26.10	0.07	10.29 Average															
4	0.19	48.16	-15.99	64.15	37.80	0.07	10.29 QP															
5	0.22	35.72	-16.98	52.70	25.39	0.08	10.25 Average															
6	0.22	47.42	-15.28	62.70	37.09	0.08	10.25 QP															
7	0.25	32.71	-19.11	51.82	22.40	0.09	10.22 Average															
8	0.25	42.81	-19.01	61.82	32.50	0.09	10.22 QP															
9	0.27	33.00	-18.03	51.03	22.70	0.09	10.21 Average															
10	0.27	42.50	-18.53	61.03	32.20	0.09	10.21 QP															
11	0.33	35.80	-13.60	49.40	25.50	0.11	10.19 Average															
12	0.33	43.10	-16.30	59.40	32.80	0.11	10.19 QP															
13 *	0.40	40.79	-7.07	47.86	30.50	0.12	10.17 Average															
14	0.40	47.29	-10.57	57.86	37.00	0.12	10.17 QP															
15	0.48	33.50	-12.82	46.32	23.20	0.14	10.16 Average															
16	0.48	38.90	-17.42	56.32	28.60	0.14	10.16 QP															
17	0.58	33.30	-12.70	46.00	23.00	0.15	10.15 Average															
18	0.58	40.30	-15.70	56.00	30.00	0.15	10.15 QP															
19	0.64	35.40	-10.60	46.00	25.10	0.15	10.15 Average															
20	0.64	41.70	-14.30	56.00	31.40	0.15	10.15 QP															
21	0.76	33.11	-12.89	46.00	22.80	0.17	10.14 Average															
22	0.76	40.71	-15.29	56.00	30.40	0.17	10.14 QP															
23	0.88	34.43	-11.57	46.00	24.10	0.19	10.14 Average															
24	0.88	40.03	-15.97	56.00	29.70	0.19	10.14 QP															
25	1.22	33.67	-12.33	46.00	23.30	0.21	10.16 Average															

 | | |



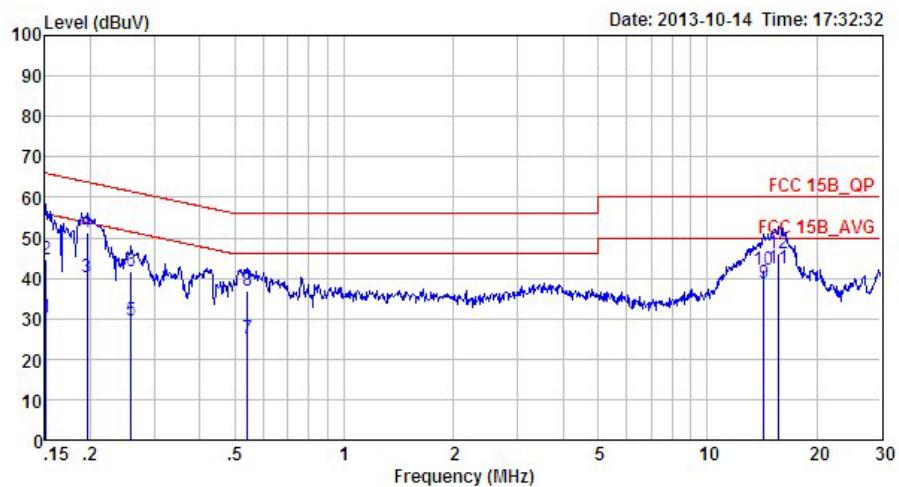








Test Mode :	Mode 6	Temperature :	23~24°C
Test Engineer :	Henry Chen	Relative Humidity :	49~50%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	USB Cable (Data Link with Notebook)		



Site : CO01-S2

Condition: FCC 15B_QP LISN_N_20130328 NEUTRAL

Project : (FC) 391602

Mode : Mode 6

Freq	Level	Over	Limit	Read	LISN	Cable	Remark
		Freq	Level	Limit	Line	Level	
1	0.15	30.10	-25.86	55.96	19.70	0.04	10.36 Average
2	0.15	44.70	-21.26	65.96	34.30	0.04	10.36 QP
3	0.20	40.32	-13.48	53.80	30.00	0.04	10.28 Average
4	0.20	51.32	-12.48	63.80	41.00	0.04	10.28 QP
5	0.26	29.46	-22.01	51.47	19.20	0.04	10.22 Average
6	0.26	41.76	-19.71	61.47	31.50	0.04	10.22 QP
7	0.54	24.99	-21.01	46.00	14.80	0.04	10.15 Average
8	0.54	36.79	-19.21	56.00	26.60	0.04	10.15 QP
9	14.29	38.61	-11.39	50.00	27.71	0.49	10.41 Average
10	14.29	41.91	-18.09	60.00	31.01	0.49	10.41 QP
11 *	15.72	42.40	-7.60	50.00	31.40	0.56	10.44 Average
12	15.72	46.30	-13.70	60.00	35.30	0.56	10.44 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

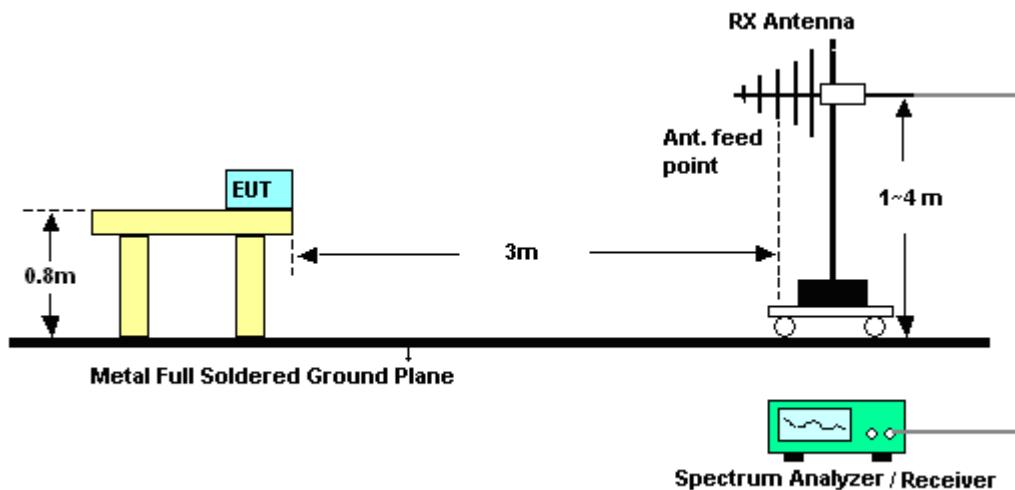
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

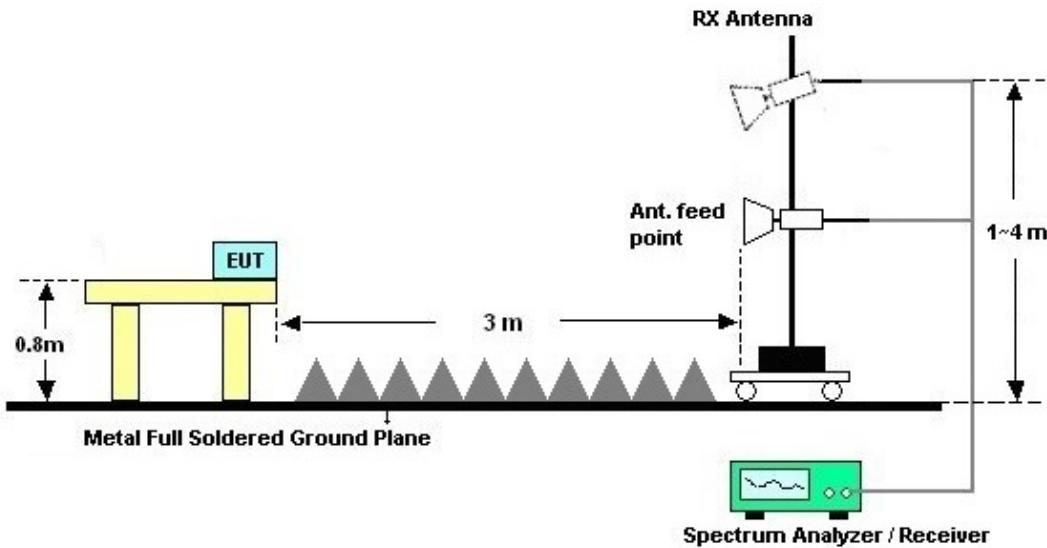
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna 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 (dB μ V/m) = 20 log Emission level (μ V/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

3.2.4. Test Setup of Radiated Emission

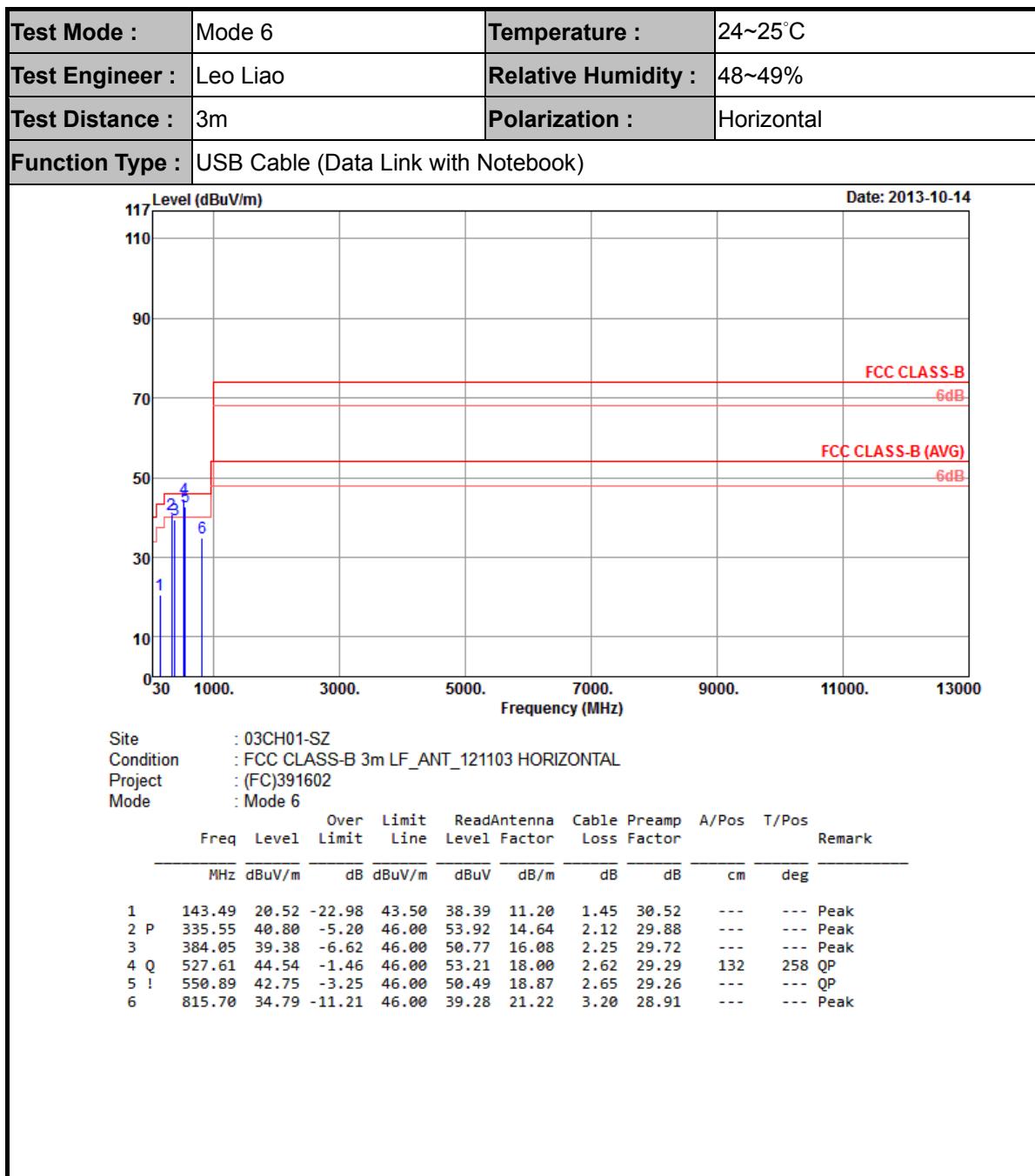
For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

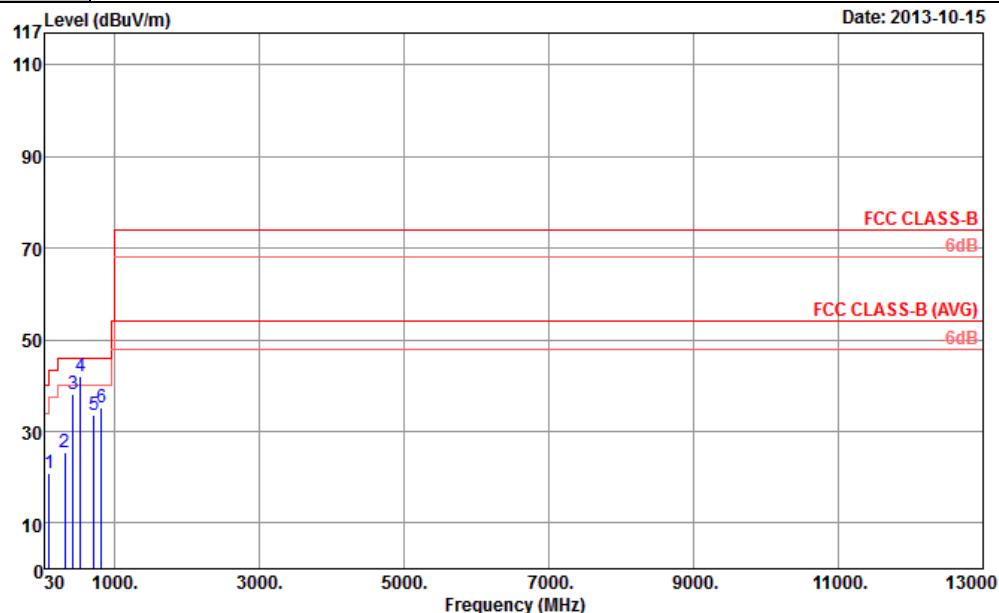


3.2.5. Test Result of Radiated Emission





Test Mode :	Mode 6	Temperature :	24~25°C
Test Engineer :	Leo Liao	Relative Humidity :	48~49%
Test Distance :	3m	Polarization :	Vertical
Function Type :	USB Cable (Data Link with Notebook)		



Site : 03CH01-SZ
Condition : FCC CLASS-B 3m LF_ANT_121103 VERTICAL
Project : (FC)391602
Mode : Mode 6

Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	A/Pos	T/Pos	Remark
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	98.87	20.78	-22.72	43.50	39.27	10.93	1.25	30.67	---	--- Peak
2	312.27	25.45	-20.55	46.00	40.04	13.32	2.05	29.96	---	--- Peak
3	431.58	38.06	-7.94	46.00	48.51	16.74	2.37	29.56	---	--- Peak
4 P	527.61	42.11	-3.89	46.00	50.78	18.00	2.62	29.29	100	158 Peak
5	719.67	33.56	-12.44	46.00	39.61	20.00	2.99	29.04	---	--- Peak
6	815.70	35.23	-10.77	46.00	39.72	21.22	3.20	28.91	---	--- Peak



4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
ESClO TEST Receiver	R&S	1142.8007.03	100724	9kHz~3GHz	Mar. 28, 2013	Oct. 10, 2013~Oct. 14, 2013	Mar. 27, 2014	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Mar. 28, 2013	Oct. 10, 2013~Oct. 14, 2013	Mar. 27, 2014	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Mar. 28, 2013	Oct. 10, 2013~Oct. 14, 2013	Mar. 27, 2014	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	N/A	Nov. 20, 2012	Oct. 10, 2013~Oct. 14, 2013	Nov. 19, 2013	Conduction (CO01-SZ)
Spectrum Analyzer	Agilent Technologies	N9038A	MY52260185	20Hz~26.5GHz	Apr. 04, 2013	Oct. 14, 2013~Oct. 15, 2013	Apr. 03, 2014	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	00119436	1GHz~18GHz	Oct. 12, 2013	Oct. 14, 2013~Oct. 15, 2013	Oct. 11, 2014	Radiation (03CH01-SZ)
Bilog Antenna	SCHAFFNER	CBL6112B	2614	30MHz~2GHz	Nov. 03, 2012	Oct. 14, 2013~Oct. 15, 2013	Nov. 02, 2013	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz ~3000MHz GAIN 30db	Mar. 28, 2013	Oct. 14, 2013~Oct. 15, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	Mar. 28, 2013	Oct. 14, 2013~Oct. 15, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
Turn Table	EM Electronic	EM 1000	N/A	0 ~ 360 degree	N/A	Oct. 14, 2013~Oct. 15, 2013	N/A	Radiation (03CH01-SZ)
Antenna Mast	EM electronic	EM 1000	N/A	1 m~4 m	N/A	Oct. 14, 2013~Oct. 15, 2013	N/A	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 = 2Uc(y))	2.26
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.90
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