



588 West Jindu Road, Songjiang District, Shanghai, China

Telephone: +86 (0) 21 6191 5666  
Fax: +86 (0) 21 6191 5655  
ee.shanghai@sgs.com

Report No.: SHEM120300025513  
Page: 1 of 17

## **TEST REPORT**

**Application No. :** SHEM120300025513  
**Applicant:** ICP Electronics Inc.  
**Manufacturer:** Armorlink SH Corp.  
**FCC ID:** RFH210UPC-V312  
**Fundamental Frequency :** 125KHz  
**Equipment Under Test (EUT):**  
**Product Name:** PANEL PC  
**Brand Name:**   
**Model No.:** UPC-V312-D525  
**Standards:** FCC PART 15 SUBPART C, Section 15.209  
**Date of Receipt:** Mar. 12, 2012  
**Date of Test:** May 13, 2012 to August 13, 2012  
**Date of Issue:** August.15, 2012  
**Test Result :** **PASS \***

\* In the configuration tested, the EUT complied with the standards specified above.



Jim Xu  
E&E Section Head  
SGS-CSTC(Shanghai) Co., Ltd.



Neil Zhang  
E&E Project Engineer  
SGS-CSTC(Shanghai) Co., Ltd.

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## 2 Test Summary

TEST ITEM	FCC REFERANCE	RESULT
Field Strength of Fundamental and Radiated Emission	15.209	Pass
Power Line Conducted Emission	15.207	Pass
Antenna Requirement	15.203	Compliance

Noted: “-” means not require in the rules.



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<b>4 General Information</b>		
<b>4.1 Client Information</b>		
Applicant :	ICP Electronics Inc.	
Applicant Address:	3F., No.22, Zhongxing Rd., Xizhi Dist., New Taipei City 221, Taiwan, R.O.C	
Manufacturer:	Armorlink SH Corp.	
Manufacturer Address:	515.Shenfu Rd,Xinzhuang Industrial Development Zone,Minhang District,Shanghai,P.R.China	
<b>4.2 Details of E.U.T.</b>		
Product Name	PANEL PC	
Brand Name	<b>ieI</b>	
Model No.	UPC-V312-D525	
Antenna Type	Loop Antenna	
Rated Input:	Power 1: 10.5Vdc-36Vdc, 2.5A-8.57A (Power form DC Jack via AC/DC Adapter) Power 2: 9Vdc-36Vdc, 2.5A-10A (Power form terminal block)	
Adapter:	Manufacturer:	FSP Group Inc.
	Model No.:	FSP065-RAB
	Rated Input:	AC 100V-240V 50-60Hz 1.5A
	Rated Output:	DC 19V 3.42A
Frequency	125KHz	
Modulation Type:	ASK(100% ASK , OOK)	
<b>4.3 Description of Support Units</b>		
<b>Name</b>	<b>Model No.</b>	<b>Remark</b>
N/A	N/A	N/A

**4.4 Test Location**

Tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

No.588 West Jindu Road, Songjiang District, Shanghai, China. 201612.

Tel: +86 21 6191 5666 Fax: +86 21 6191 5655

No tests were sub-contracted.

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#### **4.5 Other Information Requested by the Customer**

None.

#### **4.6 Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2014-07-26.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2015-02-22.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A. Expiry Date: 2014-09-20.



#### 4.7 Test Instruments

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
1	EMI test receiver	Rohde & Schwarz	ESU40	100109	2012-6-4	2013-6-3
2	Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-679	2012-6-4	2013-6-3
3	Horn Antenna	Rohde & Schwarz	HF906	100284	2012-3-12	2013-3-10
4	ANTENNA	SCHWARZBECK	VULB9168	9168-313	2012-6-4	2013-6-3
5	Ultra broadband antenna	Rohde & Schwarz	HL562	100227	2011-10-8	2012-10-7
6	Atmosphere pressure meter	Shanghai ZhongXuan Electronic Co;Ltd	BY-2009P	--	2011-10-14	2012-10-15
7	CLAMP METER	FLUKE	316	86080010	2012-4-22	2013-4-20
8	Thermo-Hygrometer	ZHICHEN	ZC1-2	01050033	2012-10-14	2013-10-15
9	High-low temperature cabinet	Shanghai YuanZhen	GW2050	--	2011-09-05	2012-09-03
11	Tunable Notch Filter	Wainwright instruments GmbH	WRCT1800.0/2000.0-0.2/40-5SSK	11	2012-6-16	2013-6-15
12	Tunable Notch Filter	Wainwright instruments GmbH	WRCT800.0/80.0-0.2/40-5SSK	9	2012-5-7	2013-5-6
13	High pass Filter	FSCW	HP 12/2800-5AA2	19A45-02	2012-5-5	2013-5-4
14	Low noise amplifier	TESEQ	LNA6900	70133	2012-6-4	2013-6-3
15	EMI test receiver	Rohde & Schwarz	ESCS30	100086	2012-4-8	2013-4-7

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16	Line impedance stabilization network	SCHWARZBECK	NSLK8127	8127-490	2012-05-07	2013-05-06
17	Loop Antenna	Schaffner	HLA6120	1193	2012-05-06	2013-05-05

**Permitted frequency range**

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
18	Spectrum Analyzer	Rohde & Schwarz	FSP-30	2705121009	2012-04-13	2013-04-12
19	Temperature and Humidity Test Chamber	Shanghai YuanZhen	GW2050	--	2011-09-05	2012-09-03

**4.8 E.U.T. Operation**

Input voltage: 120V/60Hz supply for the adapter and 9V~36V DC supply for the terminal block.

Operating Environment:

Temperature: 25.0 °C

Humidity: 45 % RH

Atmospheric Pressure: 1010 mbar

EUT Operation:

The EUT and the Support equipment are configured to create an operating communication link under RFID status.



## **4.9 Test Procedure & Measurement Data**

### **4.9.1 Field Strength of Fundamental and Radiated Spurious Emission**

<b>Test Requirement:</b>	FCC §15.209
<b>Test date:</b>	August. 13, 2012
<b>Standard Applicable</b>	ANSI C63.10:2009

#### **Test Procedures:**

1. Test Procedures for emission from 9 kHz to 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.

c. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.

d. The test-receiver system was set to Peak and Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

2. Test Procedures for emission from 30 MHz to 1000 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower.

During performing radiated emission above 1 GHz, the EUT was set 1 meter away from the interference-receiving antenna.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.

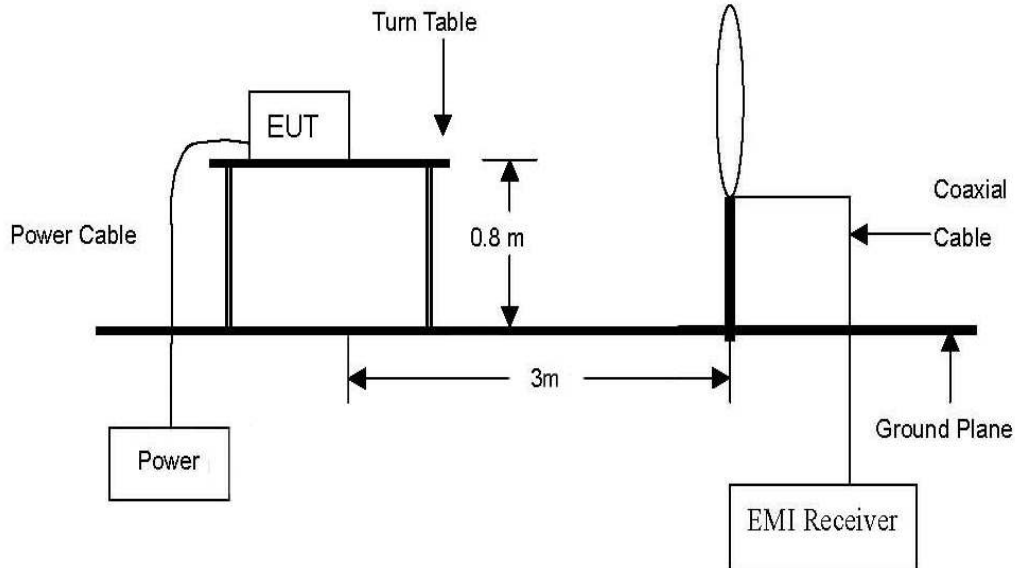
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

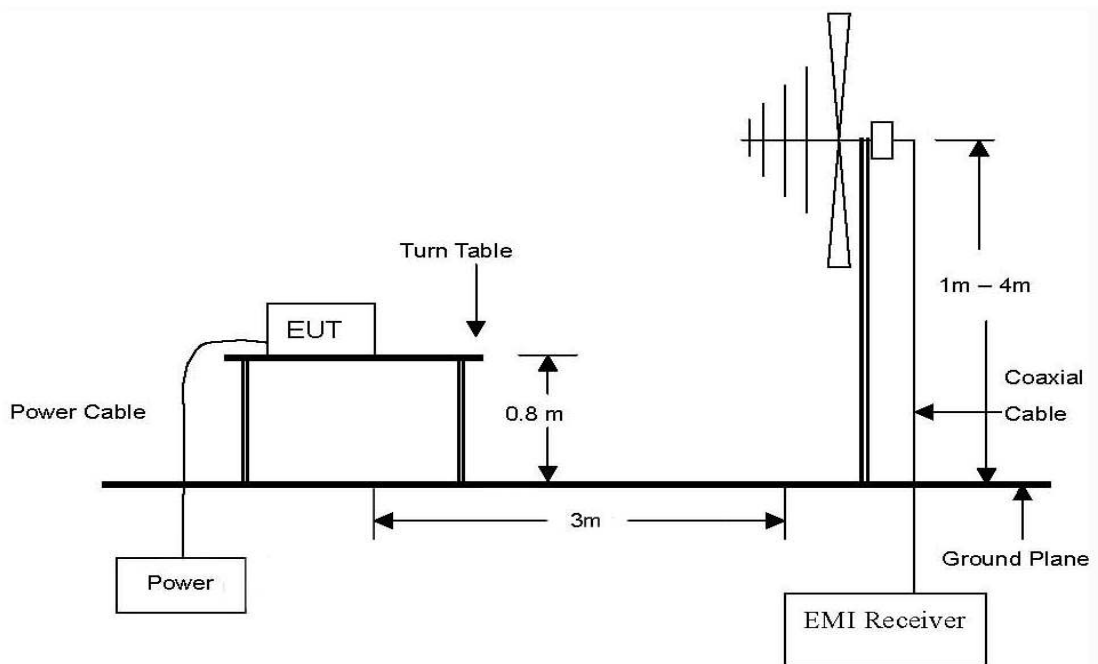
#### **EUT Setup:**



The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30MHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.





**Measurement Result**

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Radiated Emissions			Ant	Correction Factors	Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	Ant.(dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
0.125	30.55	QP	H	23.72	54.27	105.67	-51.40
0.125	29.99	QP	V	23.72	53.71	105.67	-51.96

**Remark:**

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. Margin value = Emission level – Limit value.

The measured field strength was extrapolated to distance 300 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

$$\begin{aligned}
 &24000/125\text{kHz} = 192 \text{ uV/m} \quad 300\text{m} \\
 &= 25.67 \text{ dBuV/m} \quad 300\text{m} \\
 &= 25.67 + 20\log(300/3)^2 \quad 3\text{m} \\
 &= 105.67 \text{ dBuV/m}
 \end{aligned}$$



9kHz~30MHz Spurious Emissions

Radiated Emissions			Ant	Correction Factors	Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	Ant.(dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
0.17	18.48	QP	H	24.08	42.56	103.1	-60.54
0.38	16.59	QP	H	24.12	40.71	96.1	-55.39
0.63	18.28	QP	H	24.17	42.45	71.7	-29.25
0.88	15.86	QP	H	24.30	40.16	68.80	-28.64
6.73	16.62	QP	H	25.06	41.68	69.50	-27.82

Radiated Emissions			Ant	Correction Factors	Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	Ant.(dB/m)	Emission Level (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
0.17	20.10	QP	V	24.08	44.18	103.1	-58.92
0.38	17.23	QP	V	24.12	41.35	96.1	-54.75
0.63	17.04	QP	V	24.17	41.21	71.7	-30.49
0.88	15.55	QP	V	24.30	39.85	68.80	-28.95
6.73	15.14	QP	V	25.06	40.20	69.50	-29.30

**Remark:**

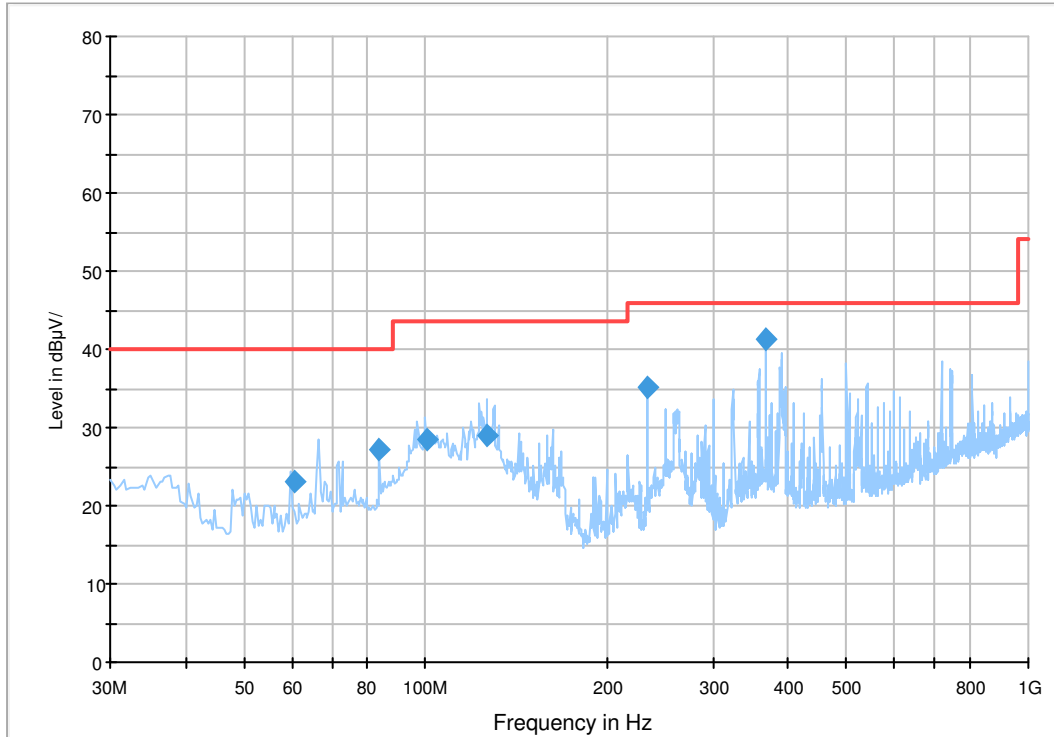
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. Above limits have been translated by the formula

The EUT is a fixed device, so one axes (X lie down) were observed while the test receiver worked as “max hold” continuously and the highest reading among the whole test procedure was recorded. Pretest at 120V/60Hz supply for the AC/DC adapter and 9~36V DC supply for the terminal block,worst case was found at the 120/60Hz supply..



**30MHz~1GHz**

CISPR22 RE 30M-1GHz



**Antenna Horizontal**

Frequency (MHz)	QuasiPeak (dB µ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)
233.312000	35.2	1000.000	120.000	132.0	H	321.0	10.9	10.80
100.544615	28.5	1000.000	120.000	175.0	H	276.0	10.2	15.00
83.935163	27.3	1000.000	120.000	175.0	H	56.0	9.6	12.70
60.485000	23.0	1000.000	120.000	143.0	H	75.0	12.9	17.00
126.398880	29.0	1000.000	120.000	220.0	H	66.0	-12.1	14.50
366.680320	41.3	1000.000	120.000	100.0	H	342.0	-8.2	4.70

(continuation of the "Final Result 1" table from column 9 ...)

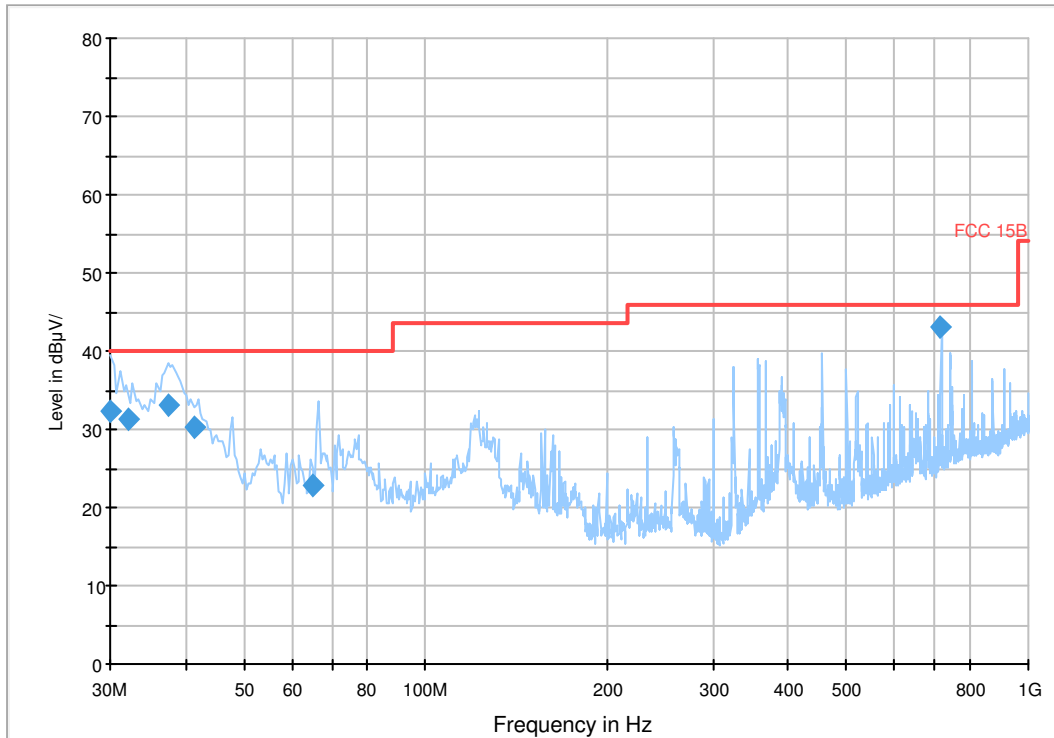
Frequency (MHz)	Limit (dB µ)	Comment
233.312000	46.00	
100.544615	43.50	
83.935163	40.00	
60.485000	40.00	
126.398880	43.50	
366.680320	46.00	

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**Antenna Vertical**

CISPR22 RE 30M-1GHz



Frequency (MHz)	QuasiPeak (dB µ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)
32.034576	31.4	1000.000	120.000	100.0	H	15.0	-11.5	8.60
30.066515	32.4	1000.000	120.000	100.0	H	62.0	-12.2	7.60
41.458649	30.2	1000.000	120.000	100.0	H	19.0	-11.0	9.80
37.490080	33.2	1000.000	120.000	100.0	H	119.0	-11.3	6.80
64.801600	22.9	1000.000	120.000	112.0	H	7.0	-12.4	17.10
716.555520	43.1	1000.000	120.000	100.0	H	168.0	0.0	2.90

(continuation of the "Final Result 1" table from column 9 ...)

Frequency (MHz)	Limit (dB µ)	Comment
32.034576	40.00	
30.066515	40.00	
41.458649	40.00	
37.490080	40.00	
64.801600	40.00	
716.555520	46.00	

Remark: Pretest at 120V/60Hz supply for the AC/DC adapter and 9~36V DC supply for the terminal block, worst case was found at the 120/60Hz supply.



## 4.9.2 Conducted Emission Test

**Test Requirement:** FCC Part15 15.207

**Test date:** May. 18, 2012

**Standard Applicable** According to section 15.207,frequency 150KHz to 30MHz shall not exceed the limit table as blew.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 <sup>*</sup>	56 to 46 <sup>*</sup>
0.5-5	56	46
5-30	60	50

### EUT Setup

1.The conducted emission tests were performed in the test site,using the setup in accordance with the ANSI C63.10-2009.

2.EUT is connect with AC Power adaptor was plug-in LISN.The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.

3.The LISN was connected with 120V AC/60Hz power source.

### Measurement Result

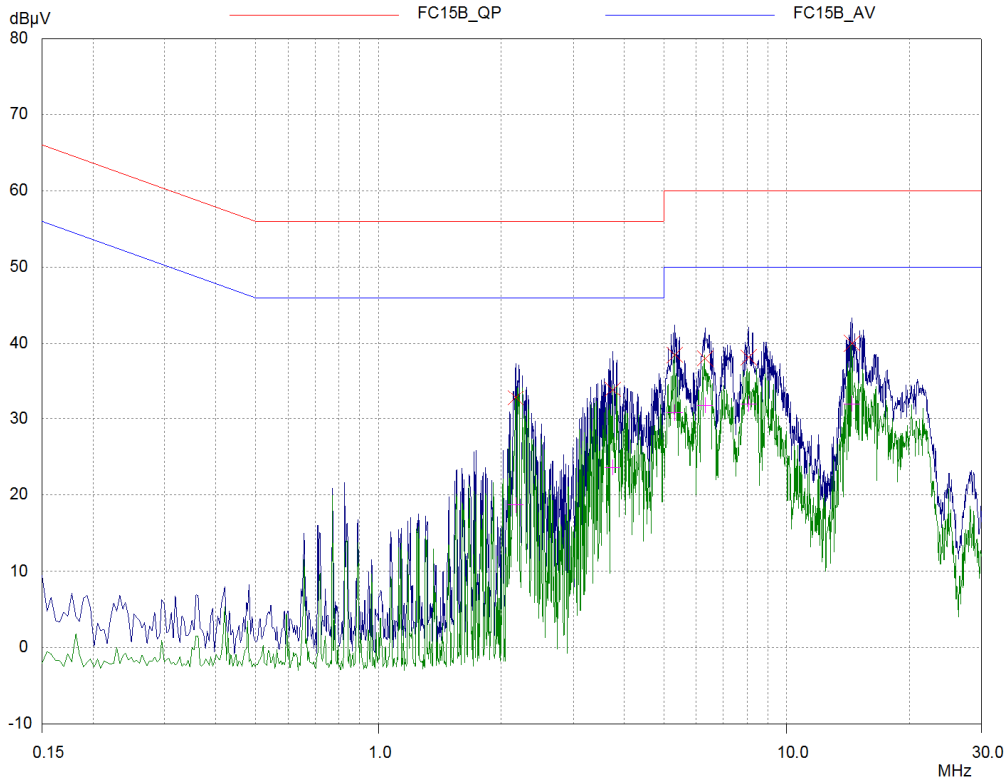
Operation mode:RFID working mode

Note:All test modes have been tested.



**SGS-CSTC Standards  
Technical Services  
(Shanghai) Co., Ltd.**

**L line:**



**Final Measurement Results**

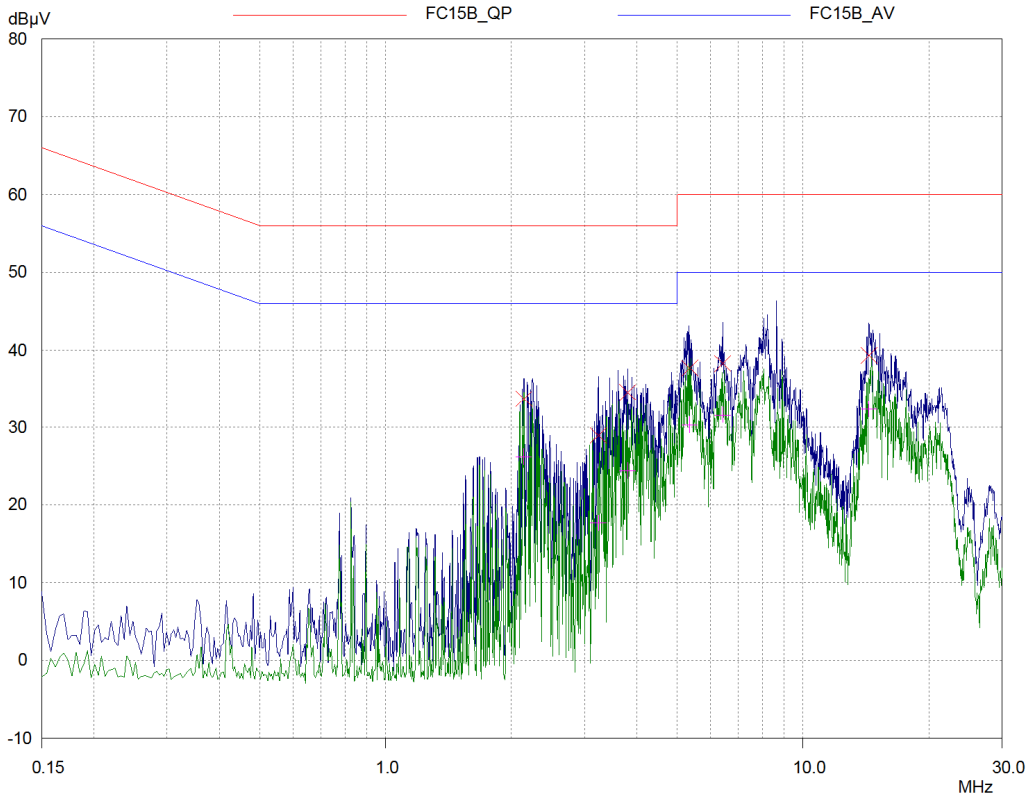
Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
2.18582	32.80	56.00	23.20
3.74765	33.93	56.00	22.07
5.31796	38.51	60.00	21.49
6.30625	38.01	60.00	21.99
8.06795	38.20	60.00	21.80
14.45078	39.88	60.00	20.11

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB
2.18582	18.71	46.00	27.29
3.74765	23.60	46.00	22.40
5.31796	30.76	50.00	19.24
6.30625	31.74	50.00	18.26
8.06795	31.91	50.00	18.09
14.45078	31.97	50.00	18.03

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**N Line:**



**Final Measurement Results**

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
2.14218	33.88	56.00	22.32
3.22812	28.53	56.00	27.07
3.78843	34.56	56.00	21.41
5.34531	37.71	60.00	22.29
6.41171	38.31	60.00	21.69
14.38437	39.33	60.00	20.67

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB
2.14218	26.20	46.00	19.80
3.22812	17.68	46.00	28.32
3.78843	24.38	46.00	21.61
5.34531	30.30	50.00	19.70
6.41171	31.58	50.00	18.42
14.38437	32.31	50.00	17.69

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#### **4.9.3 Antenna Requirement**

**Test Requirement:** FCC Part15 15.203

##### **5.3.7.1 Standard Requirement**

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

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 provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

##### **5.3.7.2 Antenna Connected Construction**

The antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

##### **5.3.7.3 Result**

The EUT antenna is integral Antenna. It comply with the standard requirement.

**End of Report**