

BUREAU
VERITAS

Test Report No.: FC130808N038

Test Lab
Cert 2951.01

TEST REPORT



Applicant	SHUOYING DIGITAL SCIENCE&TECHNOLOGY(CHINA) Co., Ltd
Address	NO.187, 5th Binhai Road, Binhai Industrial Park, Economic and Technological Development Zone, Wenzhou, Zhejiang, China

Manufacturer or Supplier	SHUOYING DIGITAL SCIENCE&TECHNOLOGY(CHINA) Co., Ltd
Address	NO.187, 5th Binhai Road, Binhai Industrial Park, Economic and Technological Development Zone, Wenzhou, Zhejiang, China
Product	Action camera
Brand Name	N/A
Model	DV023
Additional Model & Model Difference	EVC355; SVC350 See item 2.1
Date of tests	Aug. 08, 2013 ~ Aug. 28, 2013

The submitted sample of the above equipment has been tested for according to the requirements of the following standards:

☒ FCC Part 15, Subpart B, Class B:2012

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Endy Li Project Engineer / EMC Department	Approved by Madison Luo Supervisor / EMC Department
	 Date: Aug. 28, 2013

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification



Table of Contents

RELEASE CONTROL RECORD	3
1 SUMMARY OF TEST RESULTS	4
1.1 MEASUREMENT UNCERTAINTY	4
2 GENERAL INFORMATION	5
2.1 GENERAL DESCRIPTION OF EUT	5
2.2 DESCRIPTION OF TEST MODES	6
2.3 DESCRIPTION OF SUPPORT UNITS	6
3 EMISSION TEST	7
3.1 CONDUCTED EMISSION MEASUREMENT	7
3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT	7
3.1.2 TEST INSTRUMENTS	7
3.1.3 TEST PROCEDURE	8
3.1.4 DEVIATION FROM TEST STANDARD	8
3.1.5 TEST SETUP	9
3.1.6 EUT OPERATING CONDITIONS	9
3.1.7 TEST RESULTS	10
3.2 RADIATED EMISSION MEASUREMENT	12
3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT	12
3.2.2 TEST INSTRUMENTS	13
3.2.3 TEST PROCEDURE	14
3.2.4 DEVIATION FROM TEST STANDARD	14
3.2.5 TEST SETUP	15
3.2.6 EUT OPERATING CONDITIONS	15
3.2.7 TEST RESULTS	16
4 PHOTOGRAPHS OF THE TEST CONFIGURATION	19
5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	19



Test Report No.: FC130808N038

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FC130808N038	Original release	Aug. 28, 2013



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD			
Standard Section	Test Item	Result	Remark
FCC Part 15, Subpart B, Class B	Conducted Emission Test	PASS	Meets Class B Limit Minimum passing margin is -11.12dB at 0.18075 MHz
	Radiated Emission Test (30MHz ~ 3GHz)	PASS	Meets Class B Limit Minimum passing margin is -3.59 dB at 624.04 MHz

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	+/-2.67 dB
Radiated emissions	30MHz ~ 1000MHz	+/-4.12 dB
	Above 1GHz	+/-4.30 dB



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Action camera
MODEL NO.	DV023
ADDITIONAL MODEL	EVC355; SVC350
POWER SUPPLY	DC 5V by USB host device input AC 120V/60Hz
DATA CABLE SUPPLIED	N/A
THE HIGHEST OPERATING FREQUENCY	Below 500MHz

NOTE:

1. Additional models EVC355, SVC350 are identical with the test model DV023 except the appearance color and model number for marketing purpose.
2. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
3. For the test results, the EUT had been tested with all conditions. But only the worst case was showed in test report.
4. The EUT is Action camera, the USB cable which the EUT used to connect the computer was shielded and with a core, like below. And it will be used by the applicant's declaration: "We declare that use the same cable with the testing report when delivery" .





2.2 DESCRIPTION OF TEST MODES

The EUT was tested under the following modes and the final worst mode were marked in boldface and recorded in this report.

◆ FOR Conducted Emission Test:

Test Mode
Data transmitting

◆ FOR Radiated Emission Test:

Test Mode
Data transmitting

2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

For all test

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook PC	Lenovo	E430	MP-0DN27	N/A
2	Printer	Lenovo	LJ2200L	LP02857415 48001408	N/A
3	Notebook PC	DELL	5P2PM2X	12400120329	N/A
4	Mouse	DELL	MOC5UO	H0K00K92	N/A

NO.	CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC Line: Unshielded, Detachable 1.5m, DC Line: Unshielded, Non-detachable 1.8m.
2	AC Line: Unshielded, Detachable 1.5m, USB Line: Unshielded, Detachable 1.5m.
3	AC Line: Unshielded, Detachable 1.0m, DC Line: Unshielded, Non-detachable 2.0m.
4	USB Line: Unshielded, Detachable 1.8m



3 EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

- NOTES:** (1) The lower limit shall apply at the transition frequencies.
(2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
(3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU 26	100005	May 14,13	May 13,14
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	May 14,13	May 13,14
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	May 14,13	May 13,14
Test software	ADT	ADT_Con _V7.3.7	N/A	N/A	N/A

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in Shielded Room 553.



3.1.3 TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.4:2009 (section 7).

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

NOTE:

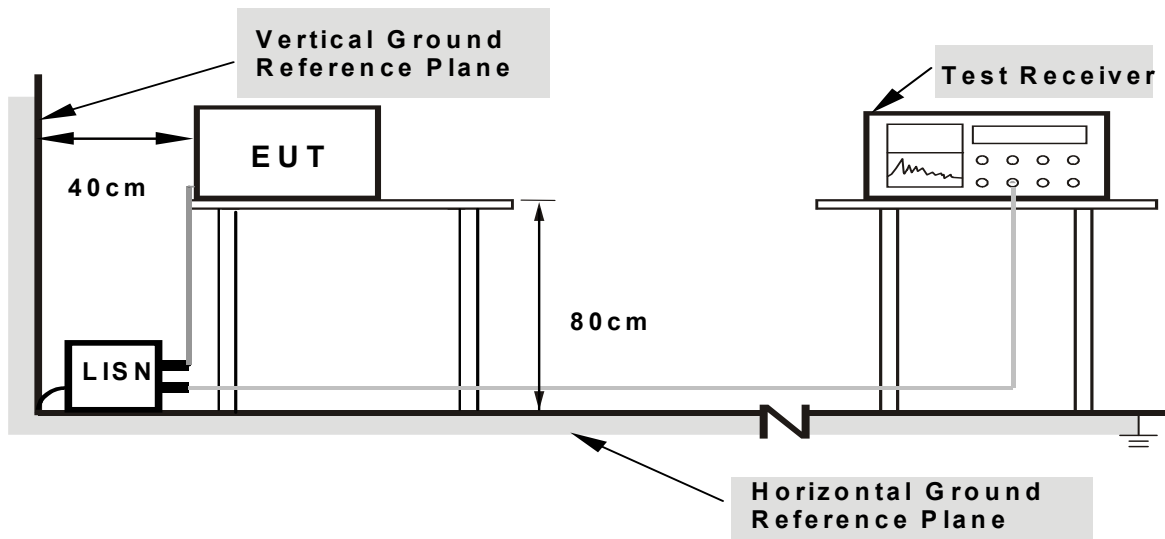
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

3.1.4 DEVIATION FROM TEST STANDARD

No deviation



3.1.5 TEST SETUP



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.

3.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power of all equipment. connect to notebook PC then running data transmitting software.
- b. EUT was operated according to the type described in manufacturer's specifications or the User's Manual.

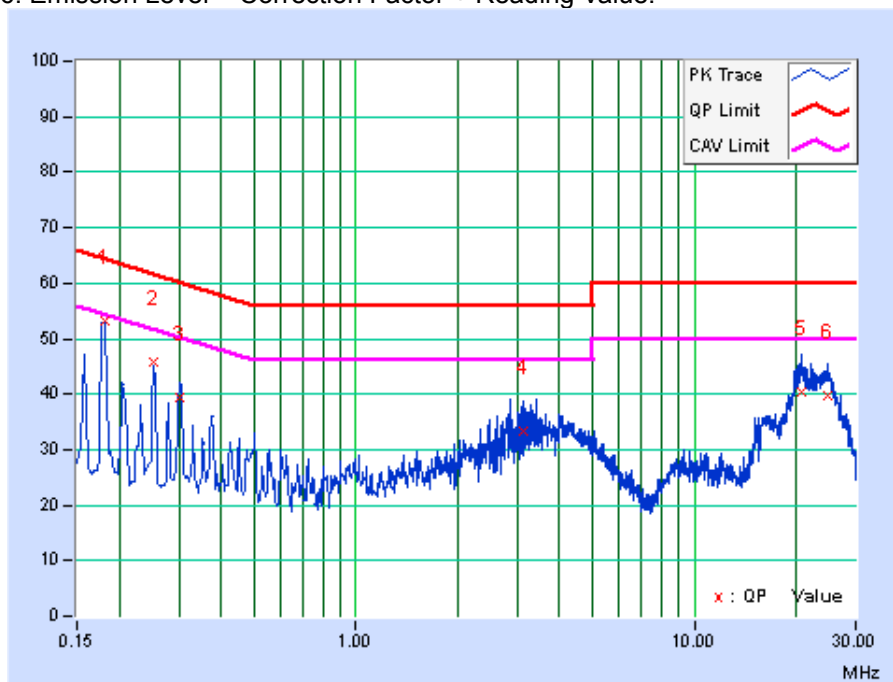


3.1.7 TEST RESULTS

TEST MODE	Data Transmitting	6DB BANDWIDTH	9 kHz
TEST VOLTAGE	DC 5V from PC input AC 120V/60Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 57% RH	TESTED BY	Bin

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18075	10.57	42.76	26.79	53.33	37.36	64.45	54.45	-11.12	-17.09
2	0.25166	10.41	35.23	17.21	45.64	27.62	61.70	51.70	-16.06	-24.08
3	0.30294	10.44	29.07	14.59	39.51	25.03	60.16	50.16	-20.65	-25.13
4	3.11769	9.83	23.48	16.35	33.31	26.18	56.00	46.00	-22.69	-19.82
5	20.84954	10.14	30.26	22.06	40.40	32.20	60.00	50.00	-19.60	-17.80
6	24.86511	10.38	29.41	21.88	39.79	32.26	60.00	50.00	-20.21	-17.74

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

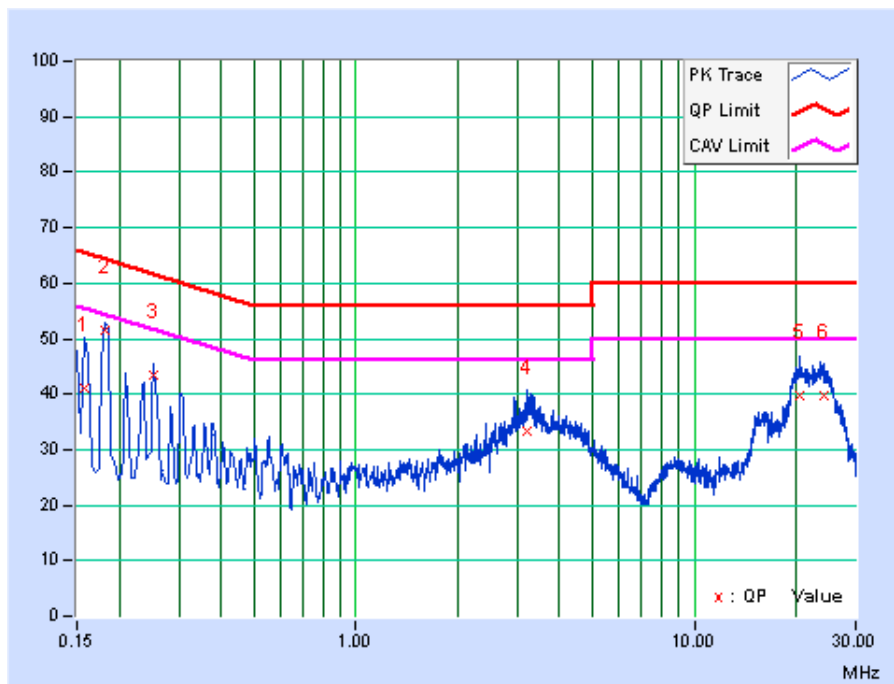




TEST MODE	Data Transmitting	6DB BANDWIDTH	9 kHz
TEST VOLTAGE	DC 5V from PC input AC 120V/60Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 57% RH	TESTED BY	Bin

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	10.51	30.54	11.23	41.05	21.74	65.58	55.58	-24.52	-33.83
2	0.18122	10.47	41.04	25.23	51.51	35.70	64.43	54.43	-12.92	-18.73
3	0.25166	10.36	33.18	16.58	43.54	26.94	61.70	51.70	-18.16	-24.76
4	3.20762	9.63	23.82	16.88	33.45	26.51	56.00	46.00	-22.55	-19.49
5	20.47024	10.20	29.63	21.83	39.83	32.03	60.00	50.00	-20.17	-17.97
6	24.07138	10.27	29.54	21.28	39.81	31.55	60.00	50.00	-20.19	-18.45

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.





3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.109)

FREQUENCY (MHz)	Class A (at 10m)		Class B (at 3m)	
	uV/m	dBuV/m	uV/m	dBuV/m
30 – 88	90	39.1	100	40.0
88 – 216	150	43.5	150	43.5
216 – 960	210	46.4	200	46.0
960 – 1000	300	49.5	500	54.0

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

LIMIT OF RADIATED EMISSION OF FCC PART 15, SUBPART B FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0

Note: (1) The lower limit shall apply at the transition frequencies.

(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).

(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.



3.2.2 TEST INSTRUMENTS

FOR FREQUENCY BELOW 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESVS10	841431/004	May 19,13	May 18,14
Bilog Antenna	Teseq	CBL 6111D	25758	Nov. 22,12	Nov. 21,13
EMI Test Receiver	Rohde&Schwarz	ESPI	100302	May 19,13	May 18,14
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Mar. 24,13	Mar. 23,14
Signal Amplifier	Agilent	8447D	2944A10488	N/A	N/A
Test software	ADT	ADT_Radiated_V7.5.4	N/A	N/A	N/A

NOTE: 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 2. The test was performed in Chamber 966.
 3. The FCC Site Registration No. is 494399

FOR FREQUENCY ABOVE 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	EMCO	3117	00062558	Oct.18,12	Oct.17,13
Spectrum Analyzer	Agilent	E4446A	MY46180622	April 24,13	April 23,14
Spectrum Analyzer (9KHz-25GHz)	Agilent	E7405A	MY45118807	May 14,13	May 13,14
Pre-Amplifier (100MHz-26.5GHz)	Agilent	8449B	3008A00409	May 14,13	May 13,14
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 04,12	Nov. 03,13
Test Software	ADT	ADT_Radiated_V7.6.15	N/A	N/A	N/A

NOTE: 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 2. The test was performed in 10m Chamber.
 3. The FCC Site Registration No. is 502831.



3.2.3 TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.4:2009 (section 12).

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters Semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters (below 1GHz) and 3 meters (above 1GHz) away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.
3. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.
4. $\text{Emission level(dBuV/m)} = \text{Raw Value(dBuV)} + \text{Correction Factor(dB/m)}$
5. $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)}$
6. $\text{Margin value} = \text{Emission level} - \text{Limit value}.$

3.2.4 DEVIATION FROM TEST STANDARD

No deviation

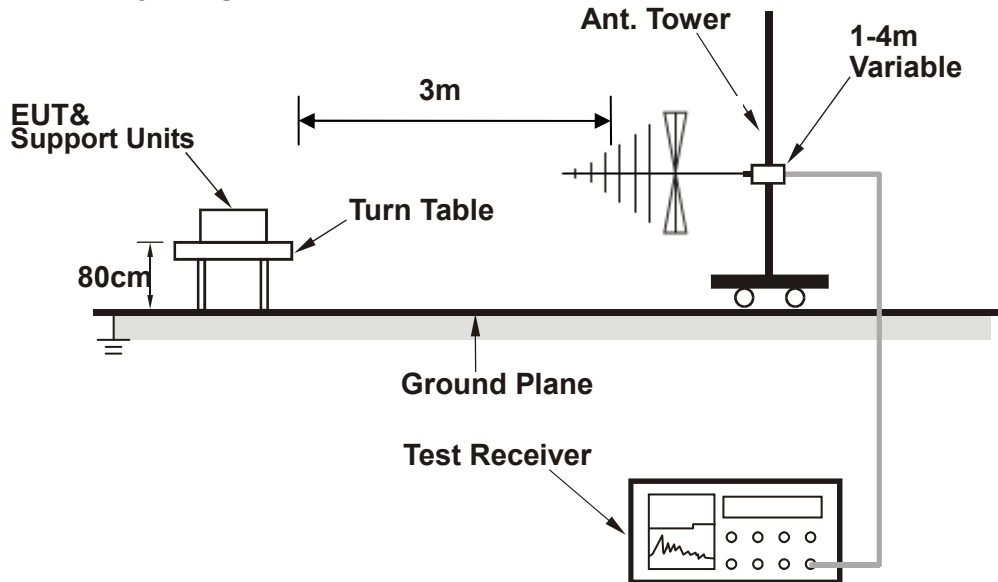


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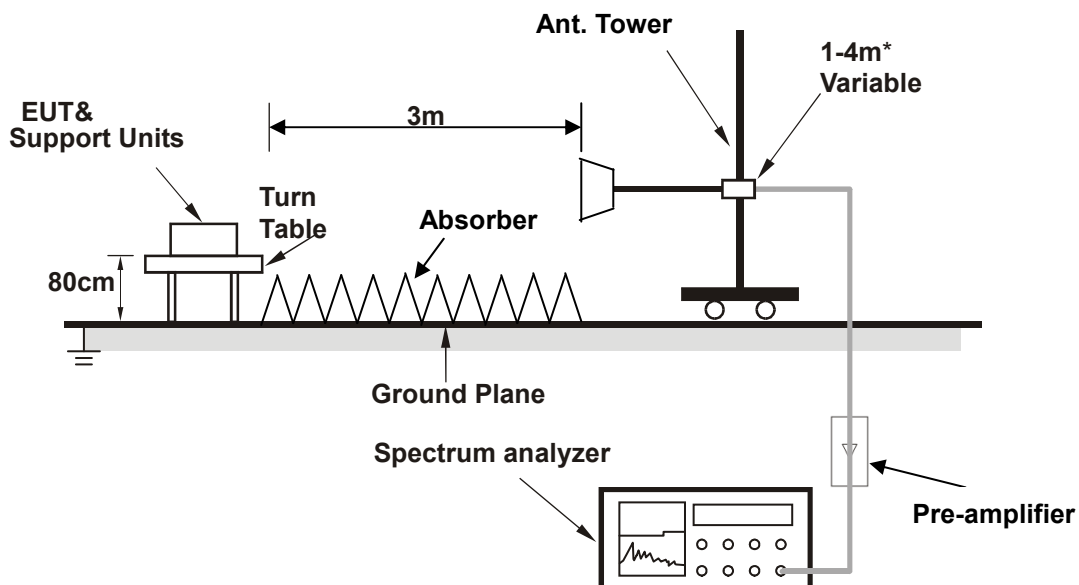
Test Report No.: FC130808N038

3.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



* : depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

3.2.6 EUT OPERATING CONDITIONS

Same as item 3.1.6.

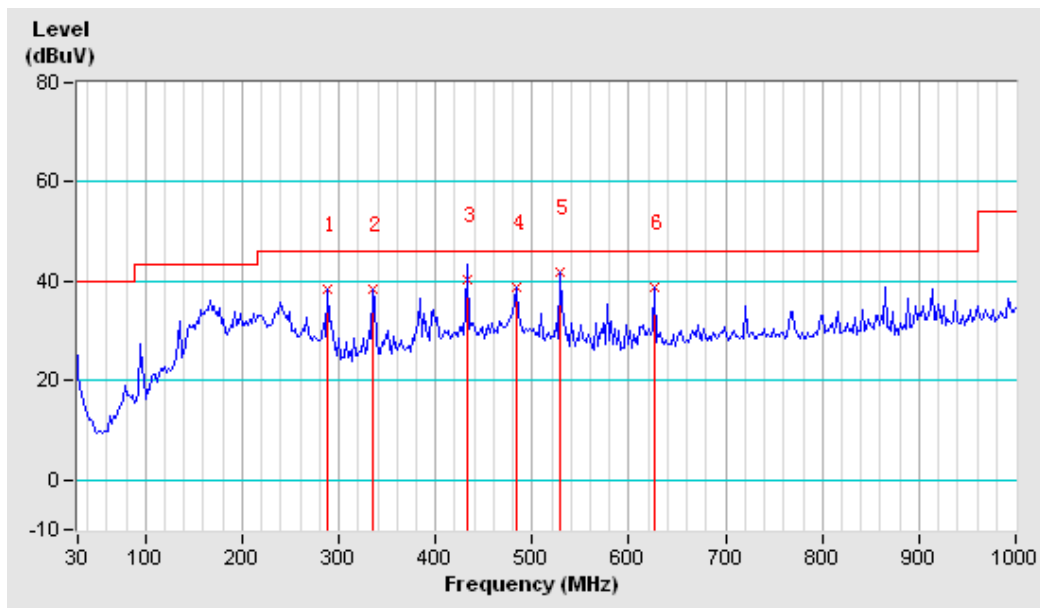


3.2.7 TEST RESULTS

TEST MODE	Data Transmitting	FREQUENCY RANGE	30-1000MHz
TEST VOLTAGE	DC 5V from PC input AC 120V/60Hz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	21deg. C, 53% RH	TESTED BY: Robert	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	288.25	15.64	22.92	38.56	46.00	-7.44	153	179
2	335.05	17.17	21.23	38.40	46.00	-7.60	124	222
3	432.06	20.32	20.10	40.42	46.00	-5.58	100	350
4	483.25	21.60	17.13	38.74	46.00	-7.26	214	88
5	528.10	22.65	19.21	41.86	46.00	-4.14	239	49
6	625.60	24.41	14.52	38.93	46.00	-7.07	185	130

REMARKS: The emission levels of other frequencies were very low against the limit.

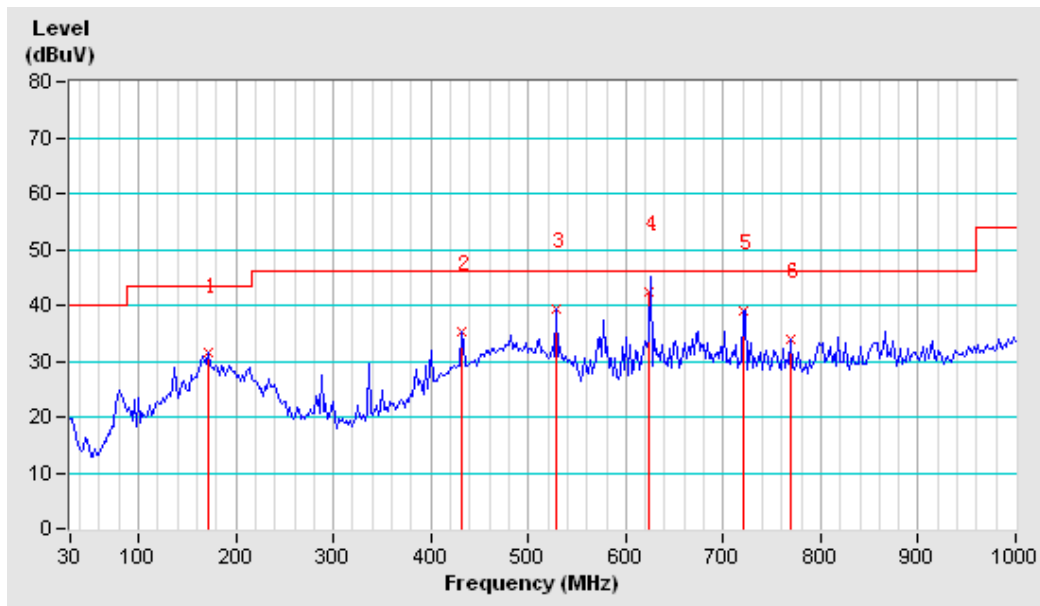




TEST MODE	Data Transmitting	FREQUENCY RANGE	30-1000MHz
TEST VOLTAGE	DC 5V from PC input AC 120V/60Hz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	21deg. C, 53% RH	TESTED BY: Robert	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	171.62	11.73	19.65	31.38	43.50	-12.12	224	137
2	431.58	20.32	14.94	35.27	46.00	-10.73	202	171
3	528.58	22.66	16.65	39.31	46.00	-6.69	160	232
4	624.04	24.41	18.00	42.41	46.00	-3.59	100	350
5	720.64	26.40	12.62	39.02	46.00	-6.98	116	300
6	769.14	27.10	6.87	33.97	46.00	-12.03	248	100

REMARKS: The emission levels of other frequencies were very low against the limit.





TEST MODE	Data Transmitting	FREQUENCY RANGE	1-6GHz
TEST VOLTAGE	DC 5V from PC input AC 120V/60Hz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1MHz
ENVIRONMENTAL CONDITIONS	25deg. C, 61% RH	TESTED BY: Endy Xie	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1592.00 PK	49.62	74.00	-24.38	100	160	51.75	-2.13
2	1592.00 AV	37.93	54.00	-16.07	100	160	40.06	-2.13
3	1808.00 PK	51.57	74.00	-22.43	100	300	51.42	0.15
4	1808.00 AV	41.59	54.00	-12.41	100	300	41.44	0.15
5	2650.00 PK	51.66	74.00	-22.34	100	244	48.14	3.52
6	2650.00 AV	39.67	54.00	-14.33	100	244	36.15	3.52

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1597.00 PK	48.64	74.00	-25.36	100	167	50.72	-2.08
2	1597.00 AV	37.36	54.00	-16.64	100	167	39.44	-2.08
3	1868.00 PK	50.47	74.00	-23.53	100	68	49.69	0.78
4	1868.00 AV	40.66	54.00	-13.34	100	68	39.88	0.78
5	2783.00 PK	51.88	74.00	-22.12	100	234	48.01	3.87
6	2783.00 AV	39.94	54.00	-14.06	100	234	36.07	3.87

- REMARKS:**
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.



Test Report No.: FC130808N038

4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to attached file (Test Setup Photo).

5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

Some modifications were made to the EUT by the lab during the test. And more details to see the modification letter.

---END---