



BUREAU
VERITAS Test Report No.: FC130828N039



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	DV108
Additional Model & Model Difference	EVC255; See item 2.1
Date of tests	Aug. 28, 2013 ~ Sep. 17, 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: Sep. 23, 2013

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FC130828N039	Original release	Sep. 23, 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 -7.89dB at 0.53318 MHz
	Radiated Emission Test (30MHz ~ 3GHz)	PASS	Meets Class B Limit Minimum passing margin is -3.83 dB at 280.26 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



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2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Action camera
MODEL NO.	DV108
ADDITIONAL MODEL	EVC255
POWER SUPPLY	DC 5V by USB host device input AC 120V/60Hz
DATA CABLE SUPPLIED	AV out line: Shielded, detachable, 1.0m, with a core.
THE HIGHEST OPERATING FREQUENCY	Below 500MHz

NOTE:

1. Additional models EVC255 is identical with the test model DV108 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" .





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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	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	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 14,2013	May 13,2014
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	May 14,2013	May 13,2014
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	May 14,2013	May 13,2014
Test software	ADT	ADT_Cond 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, GRRG/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:

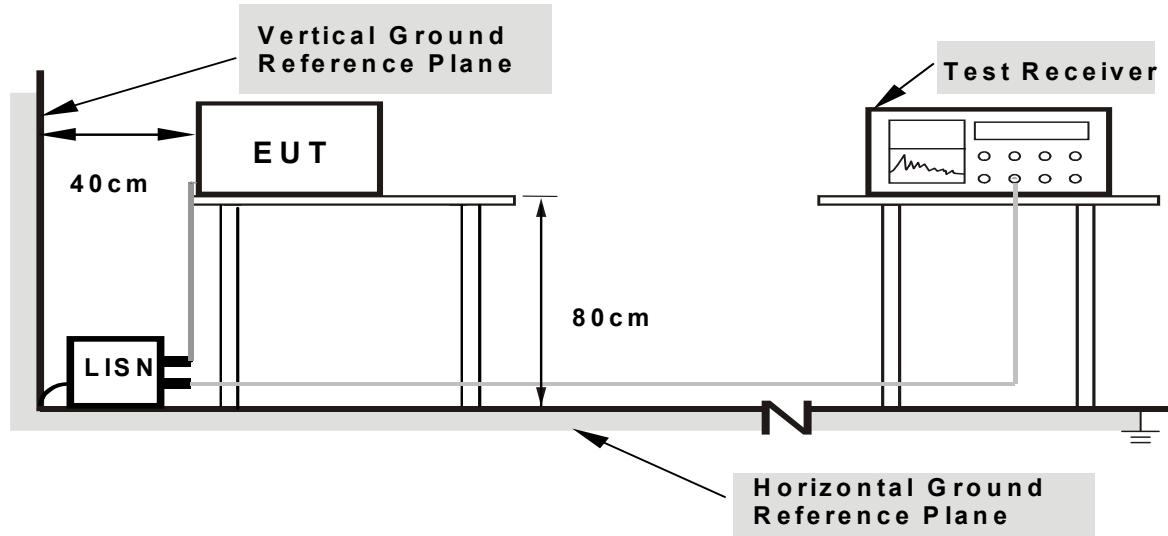
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission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



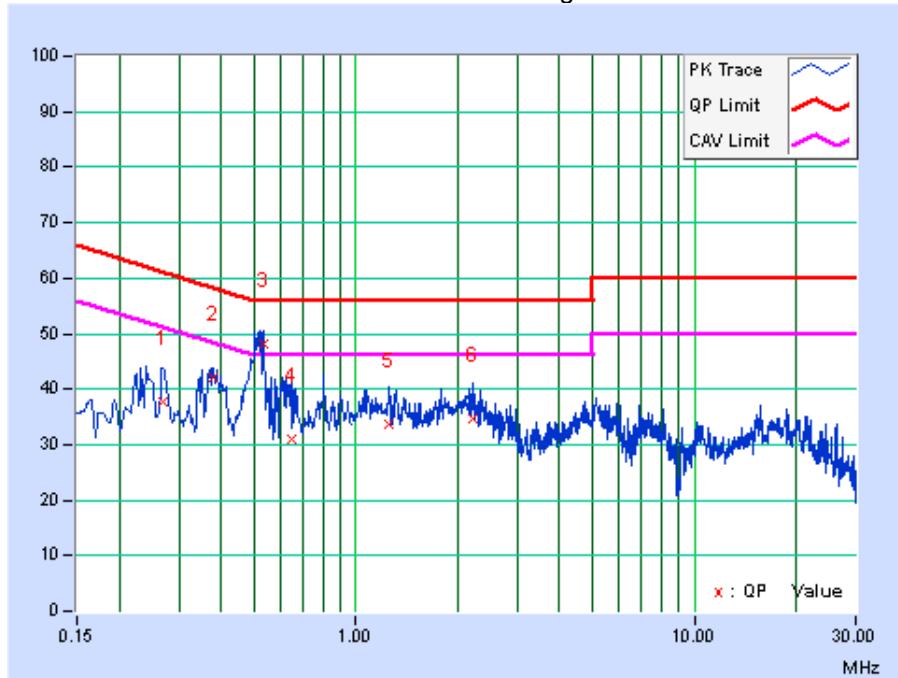
3.1.7 TEST RESULTS

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, 60% 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	0.26765	10.42	27.29	17.35	37.71	27.77	61.19	51.19	-23.48	-23.42
2	0.37699	10.37	31.56	22.20	41.93	32.57	58.35	48.35	-16.42	-15.78
3	0.53318	10.30	37.81	21.44	48.11	31.74	56.00	46.00	-7.89	-14.26
4	0.64266	10.19	20.88	14.70	31.07	24.89	56.00	46.00	-24.93	-21.11
5	1.25262	9.89	23.76	17.38	33.65	27.27	56.00	46.00	-22.35	-18.73
6	2.22230	9.83	24.94	21.22	34.77	31.05	56.00	46.00	-21.23	-14.95

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.





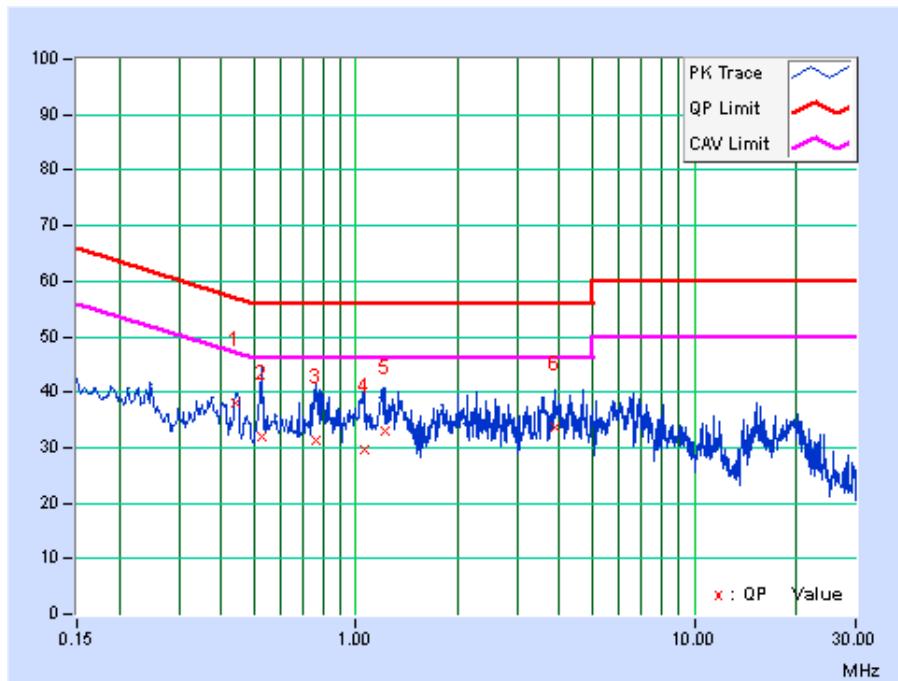
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TEST MODE	Data Transmitting	6DB BANDWIDTH	9 kHz
TEST VOLTAGE	DC 5V from PC input AC 120V/60Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 60% RH	TESTED BY	Bin

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	0.44156	10.45	27.50	25.70	37.95	36.15	57.03	47.03	-19.08	-10.88
2	0.52927	10.46	21.44	16.49	31.90	26.95	56.00	46.00	-24.10	-19.05
3	0.75984	9.99	21.46	14.45	31.45	24.44	56.00	46.00	-24.55	-21.56
4	1.05712	9.80	19.86	13.77	29.66	23.57	56.00	46.00	-26.34	-22.43
5	1.21743	9.77	23.09	16.71	32.86	26.48	56.00	46.00	-23.14	-19.52
6	3.86059	9.63	23.89	16.52	33.52	26.15	56.00	46.00	-22.48	-19.85

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 19,2013	May 18,2014
Bilog Antenna	Teseq	CBL 6111D	36043	Jul. 27,2013	Jul. 26,2014
EMI Test Receiver	Rohde&Schwarz	ESPI	100302	May 19,2013	May 18,2014
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Mar. 24,2013	Mar. 23,2014
Signal Amplifier	Agilent	8447D	2944A10488	N/A	N/A
Test software	ADT	ADT_Radiate_d_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, GRRG/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.18,2012	Oct.17,2013
Spectrum Analyzer	Agilent	E4446A	MY46180622	April 24,2013	April 23,2014
Spectrum Analyzer (9KHz-25GHz)	Agilent	E7405A	MY45118807	May 14,2013	May 13,2014
Pre-Amplifier (100MHz-26.5GHz)	Agilent	8449B	3008A00409	May 14,2013	May 13,2014
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 04,2012	Nov. 03,2013
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, GRRG/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. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
5. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
6. Margin value = Emission level – Limit value.

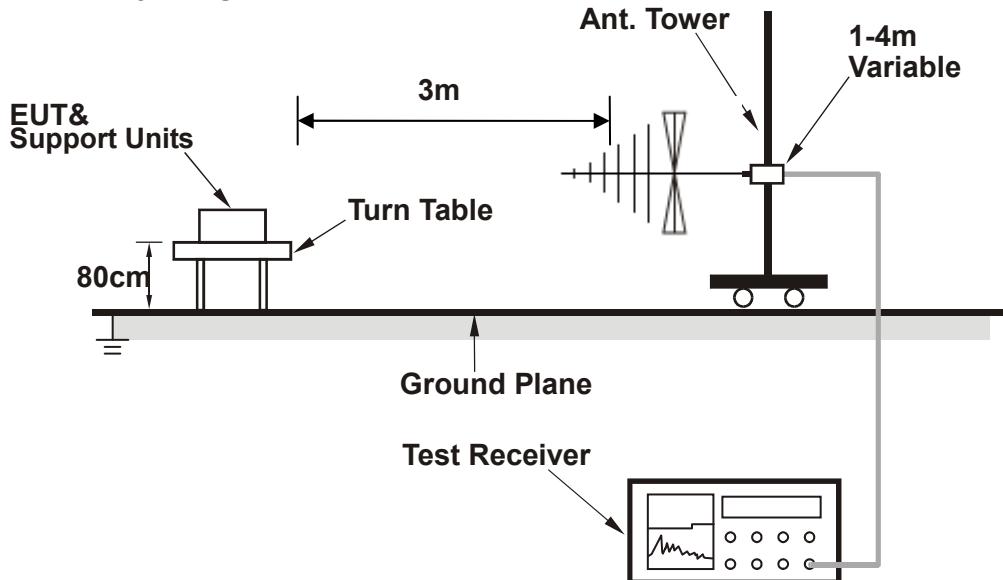
3.2.4 DEVIATION FROM TEST STANDARD

No deviation

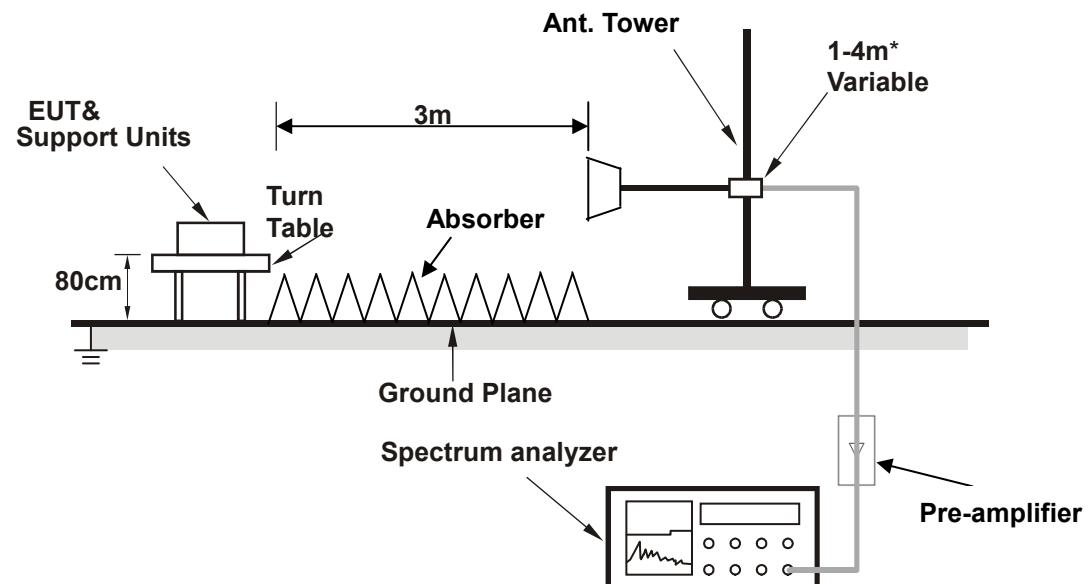


3.2.5 TEST SETUP

<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.

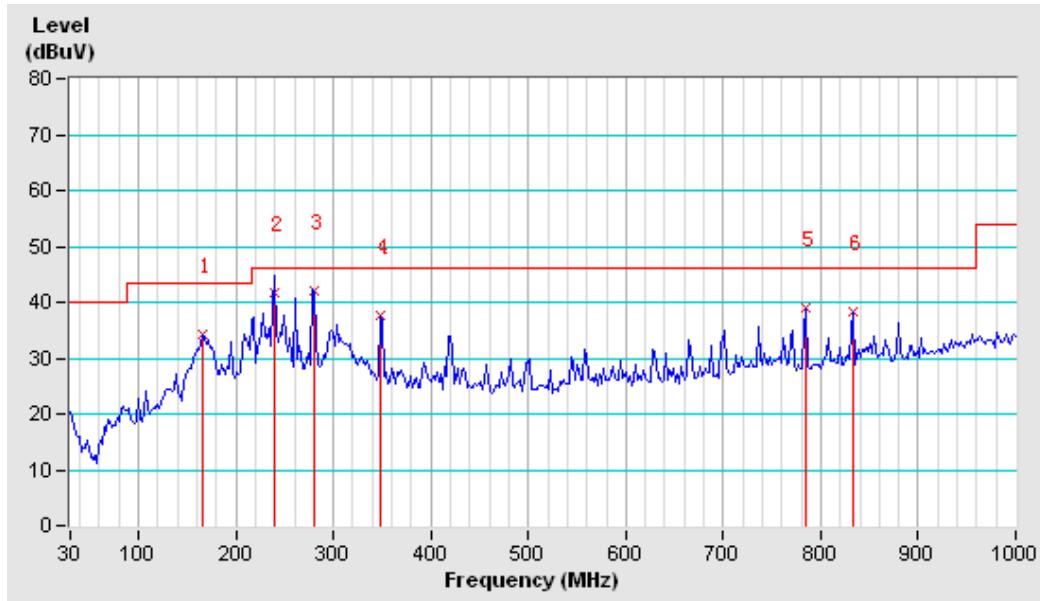


3.2.7 TEST RESULTS

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	23deg. 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	165.80	12.16	21.99	34.16	43.50	-9.34	100	0
2	240.00	12.95	28.90	41.85	46.00	-4.15	110	0
3	280.26	15.36	26.81	42.17	46.00	-3.83	167	112
4	348.16	17.44	20.21	37.66	46.00	-8.34	149	77
5	784.66	27.27	11.82	39.09	46.00	-6.91	112	20
6	833.16	27.71	10.70	38.41	46.00	-7.59	127	45

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



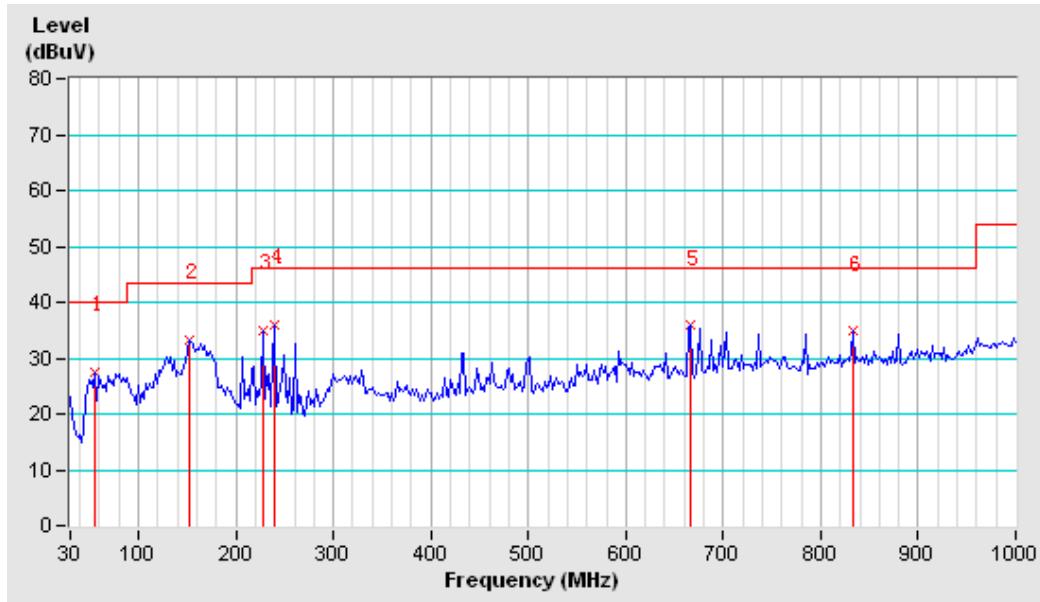


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TEST MODE	Data Transmitting	FREQUENCY RANGE	30-1000MHz
TEST VOLTAGE	DC 5V from PC input AC 120V/60Hz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	23deg. C, 53% RH	TESTED BY: Robert	

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	55.22	7.50	20.13	27.62	40.00	-12.38	100	0
2	152.22	12.55	20.71	33.27	43.50	-10.23	100	272
3	227.88	11.85	23.20	35.06	46.00	-10.94	100	236
4	239.52	12.90	23.01	35.90	46.00	-10.10	100	0
5	666.32	25.18	10.61	35.79	46.00	-10.21	100	172
6	833.16	27.71	7.11	34.82	46.00	-11.18	100	337

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





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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	1483.00 PK	49.97	74.00	-24.03	100	151	53.11	-3.14
2	1483.00 AV	43.97	54.00	-10.03	100	151	47.11	-3.14
3	2075.00 PK	50.65	74.00	-23.35	100	316	48.33	2.32
4	2075.00 AV	45.26	54.00	-8.74	100	225	42.94	2.32
5	3000.00 PK	54.02	74.00	-19.98	100	246	49.60	4.42
6	3000.00 AV	44.58	54.00	-9.42	100	246	40.16	4.42

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	1483.00 PK	48.45	74.00	-25.55	100	331	51.59	-3.14
2	1483.00 AV	42.60	54.00	-11.40	100	331	45.74	-3.14
3	2076.00 AV	45.35	54.00	-8.65	100	241	43.03	2.32
4	2077.00 PK	50.47	74.00	-23.53	100	242	48.15	2.32
5	3000.00 PK	46.82	74.00	-27.18	100	360	42.40	4.42
6	3000.00 AV	42.65	54.00	-11.35	100	360	38.23	4.42

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



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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---