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CE EMC TEST REPORT

REPORT NO. : CE110311E02

MODEL NO. : PHV1330, PHV1330-G

RECEIVED : Mar. 11, 2011

TESTED : Mar. 12 to 15, 2011

ISSUED DATE : Mar. 24, 2011

APPLICANT : Brinno Incorporated.

ADDRESS : 9F., No75, Zhouzi St., Taipei city 11493 Taiwan.

ISSUED BY: Bureau Veritas Consumer Products Services (H.K.)
Ltd., Taoyuan Branch Hsin Chu Laboratory

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	NA	Mar. 24, 2011



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1 CERTIFICATION

PRODUCT: PeepHole Viewer
BRAND NAME: brinno
MODEL NO.: PHV1330, PHV1330-G
TEST SAMPLE: ENGINEERING SAMPLE
APPLICANT: Brinno Incorporated.
TESTED: Mar. 12 to 15, 2011
STANDARDS: EN 55022:2006+A1:2007, Class B EN 55024:1998+A1:2001+
AS/NZS CISPR 22:2006, Class B A2:2003
EN 61000-3-2: 2006+A1: 2009+ IEC 61000-4-2:2008 ED.2.0
A2: 2009(Not Applicable) IEC 61000-4-3: 2006 + A1:
EN 61000-3-3:2008(Not Applicable) 2007 ED.3.0
IEC 61000-4-4: 2004+A1:
2010 ED 2.0(Not Applicable)
IEC 61000-4-5:2005 ED.2.0
(Not Applicable)
IEC 61000-4-6:2008 ED.3.0
(Not Applicable)
IEC 61000-4-8: 2009 ED.2.0
IEC 61000-4-11:2004 ED.2.0
(Not Applicable)

The above equipment (Model: PHV1330, PHV1330-G) have been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Midoli Peng, **DATE:** Mar. 24, 2011
(Midoli Peng, Specialist)

APPROVED BY : May Chen, **DATE:** Mar. 24, 2011
(May Chen, Deputy Manager)



2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

EMISSION			
Standard	Test Type	Result	Remarks
EN 55022:2006 +A1:2007, Class B	Conducted Test	NA	Not Applicable (Power supply is DC 3.3V from batteries)
	Telecom port conducted emission test	NA	Not Applicable
	Radiated Test	PASS	Meets Class B Limit Minimum passing margin is -4.26 dB at 671.97 MHz
EN 61000-3-2:2006 +A1: 2009+A2: 2009	Harmonic current emissions	NA	Not Applicable
EN 61000-3-3:2008	Voltage fluctuations & flicker	NA	Not Applicable

IMMUNITY (EN 55024:1998+A1:2001+A2:2003)			
Standard	Test Type	Result	Remarks
IEC 61000-4-2: 2008 ED.2.0	Electrostatic discharge immunity test	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-3: 2006 +A1:2007 ED.3.0	Radiated, radio-frequency, electromagnetic field immunity test	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-4: 2004 +A1: 2010 ED 2.0	Electrical fast transient / burst immunity test.	NA	Not Applicable
IEC 61000-4-5: 2005 ED.2.0	Surge immunity test	NA	Not Applicable
IEC 61000-4-6: 2008 ED.3.0	Immunity to conducted disturbances, induced by radio-frequency fields	NA	Not Applicable
IEC 61000-4-8: 2009 ED.2.0	Power frequency magnetic field immunity test.	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-11: 2004 ED.2.0	Voltage dips, short interruptions and voltage variations immunity tests	NA	Not Applicable



2.1 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	Value
Radiated emissions (30MHz ~ 1GHz)	3.21 dB
Radiated emissions (1GHz -18GHz)	2.19 dB



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	PeepHole Viewer
MODEL NO.	PHV1330, PHV1330-G
POWER SUPPLY	DC 3.3V from batteries
POWER CORD	NA
DATA CABLE SUPPLIED	NA
I/O PORT	NA
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT has two model names which are identical to each other in all aspects except for the following table:

Product	Model	Description
PeepHole Viewer	PHV1330	Without G-sensor
	PHV1330-G	With G-sensor

2. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3.2 GENERAL DESCRIPTION OF TEST MODE

The EUT was tested under the following test modes, and its data were recorded in this report:

Test Mode	Description
Mode 1	PHV1330
Mode 2	PHV1330-G



3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a kind of IT equipment and, according to the specifications of the manufacturers, must comply with the requirements of the following standards:

EN 55022:2006+A1:2007, Class B	EN 55024:1998+A1:2001+A2:2003
AS/NZS CISPR 22:2006, Class B	IEC 61000-4-2:2008 ED.2.0
EN 61000-3-2: 2006+A1: 2009+A2: 2009(Not Applicable)	IEC 61000-4-3: 2006+A1:2007 ED.3.0
EN 61000-3-3:2008(Not Applicable)	IEC 61000-4-4: 2004+A1: 2010 ED 2.0 (Not Applicable)
	IEC 61000-4-5:2005 ED.2.0 (Not Applicable)
	IEC 61000-4-6:2008 ED.3.0 (Not Applicable)
	IEC 61000-4-8: 2009 ED.2.0
	IEC 61000-4-11:2004 ED.2.0 (Not Applicable)

Notes: The above IEC basic standards are applied with latest version if customer has no special requirement.



3.4 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.

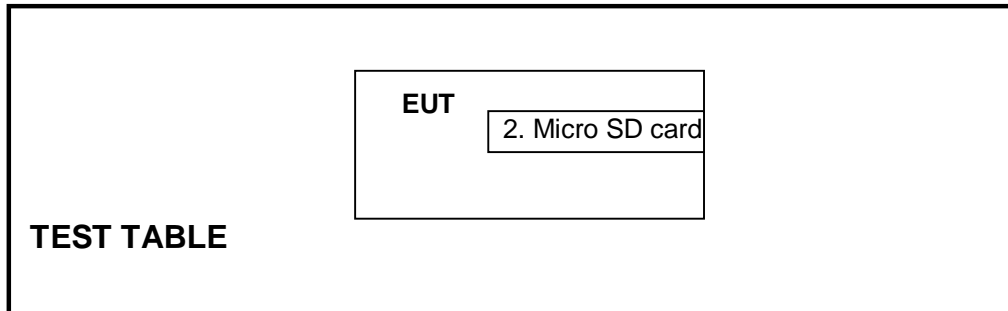
No.	Product	Brand	Model No.	Serial No.	FCC ID
1	G-Sensor	Kionix	KXTE9	NA	NA
2	Micro SD card	ADATA	NA	NA	NA

No.	Signal cable description
1	NA
2	NA

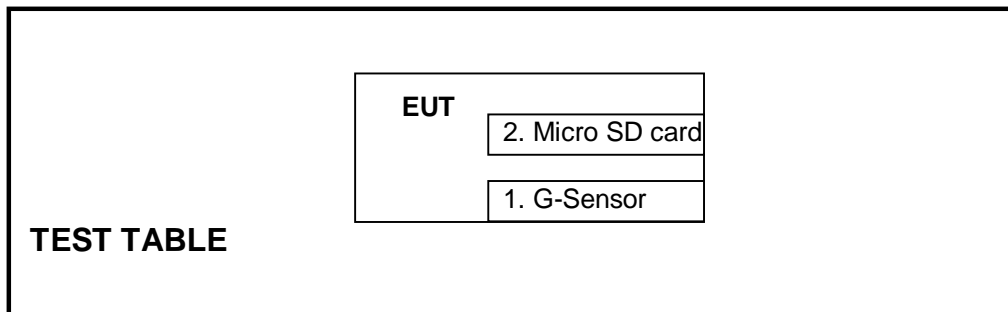
Note: 1. All power cords of the above support units are unshielded (1.8m).

3.5 CONFIGURATION OF SYSTEM UNDER TEST

Test mode 1



Test mode 2



4 EMISSION TEST

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

TEST STANDARD: EN 55022

FOR FREQUENCY BELOW 1000 MHz

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 - 230	40	30
230 - 1000	47	37

FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (GHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
1 to 3	76	56	70	50
3 to 6	80	60	74	54

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.

FREQUENCY RANGE OF RADIATED MEASUREMENT (FOR UNINTENTIONAL RADIATORS)

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement Range (MHz)
Below 108	1000
108 - 500	2000
500 - 1000	5000
Above 1000	Up to 5 times of the highest frequency or 6 GHz, whichever is less



4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4443A	MY48250349	July 29, 2010	July 28, 2011
	E4443A	MY49420002	Aug. 11, 2010	Aug. 10, 2011
Agilent Pre-Selector	N9039A	MY46520331	Aug. 11, 2010	Aug. 10, 2011
	N9039A	MY46520309	July 29, 2010	July 28, 2011
Agilent Signal Generator	N5181A	MY49060520	Aug. 12, 2010	Aug. 11, 2011
Mini-Circuits Pre-Amplifier	ZFL-1000VH2B	AMP-ZFL-01	Nov. 16, 2010	Nov. 15, 2011
	ZFL-1000VH2B	AMP-ZFL-02	Nov. 16, 2010	Nov. 15, 2011
Mini-Circuits Pre_Amplifier (1~18GHz)	ZVA-183-S+	AMP-ZVA-01	Nov. 16, 2010	Nov. 15, 2011
SPACEK LABS (18~40GHz)	SLKKa-48-6	9K16	Nov. 16, 2010	Nov. 15, 2011
SCHWARZBECK Trilog Broadband Antenna	VULB 9168	9168-359	April 30, 2010	April 29, 2011
	VULB 9168	9168-358	April 30, 2010	April 29, 2011
SCHWARZBECK Horn Antenna	BBHA 9170	9170-424	Oct. 08, 2010	Oct. 07, 2011
	BBHA 9120	9120D-783	Oct. 08, 2010	Oct. 07, 2011
RF CABLE	NA	RF104-110 RF104-206 RF104-209	Dec. 22, 2010	Dec. 21, 2011
RF Cable	8DFB	CHFCAB-001 CHFCAB-002 CHFCAB-003	Nov. 16, 2010	Nov. 15, 2011
Software	ADT_Radiated_V8.7.05	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in 10m Chamber No. F.

3. The FCC Site Registration No. is 928149.

4. The VCCI Site Registration No. is R-3252 & G-136.

5. The CANADA Site Registration No. is IC 7450H-1.



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4.1.3 TEST PROCEDURE

Below 1 GHz:

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meters chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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 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.

NOTE: 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for quasi-peak detection (QP) at frequency 30MHz to 1GHz.

Above 1 GHz:

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 10 meters chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna can be varied from one meter to four meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, detect 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 and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The spectrum analyzer 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:

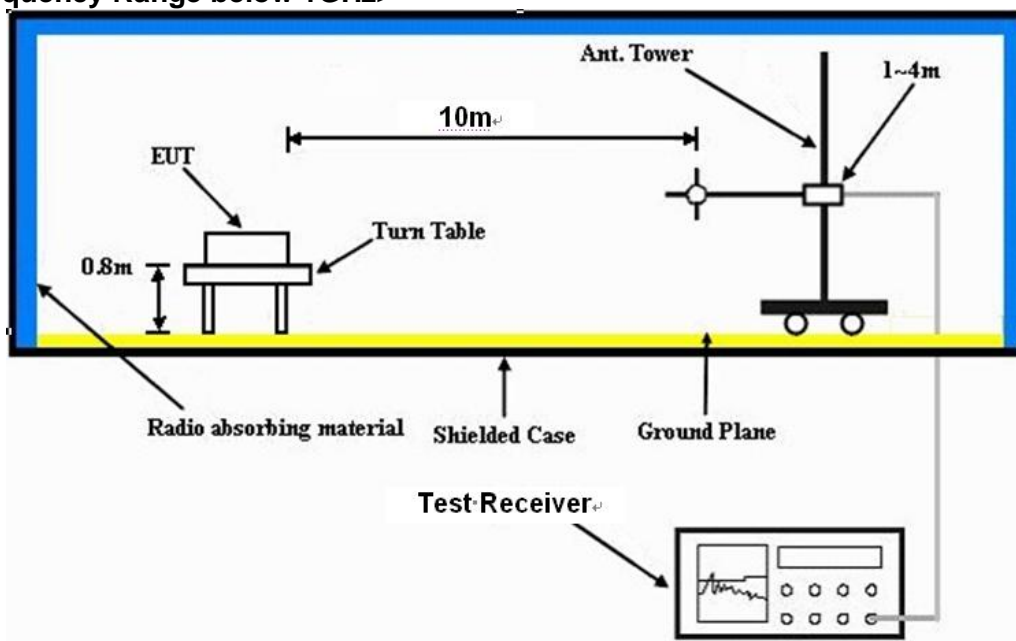
1. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.
2. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the interference-receiving antenna.

4.1.4 DEVIATION FROM TEST STANDARD

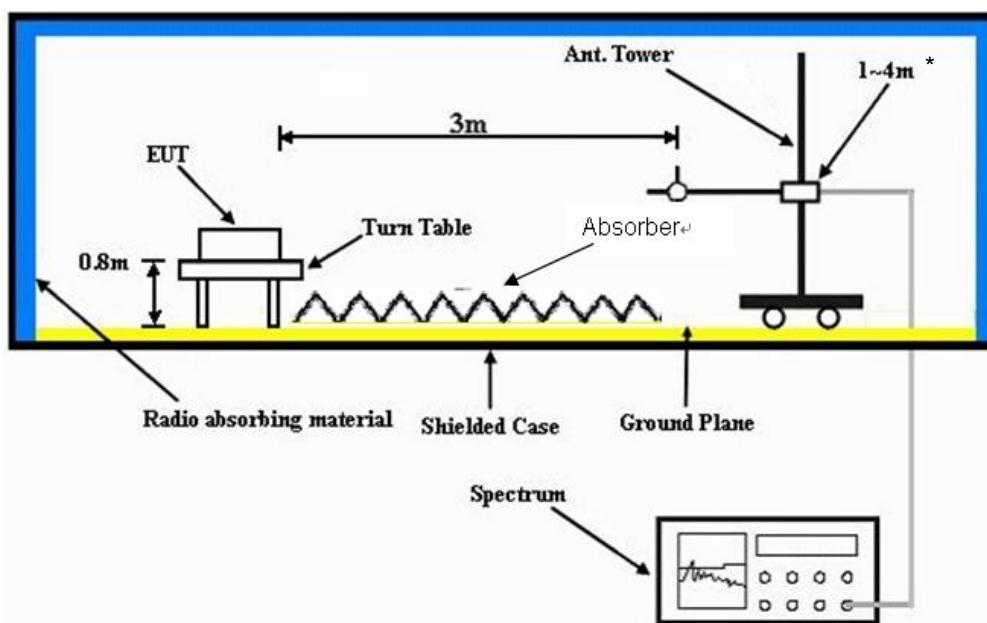
No deviation

4.1.5 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.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.



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4.1.6 EUT OPERATING CONDITIONS

1. Set the EUT for typical use.
2. Observed the monitor messages of EUT.



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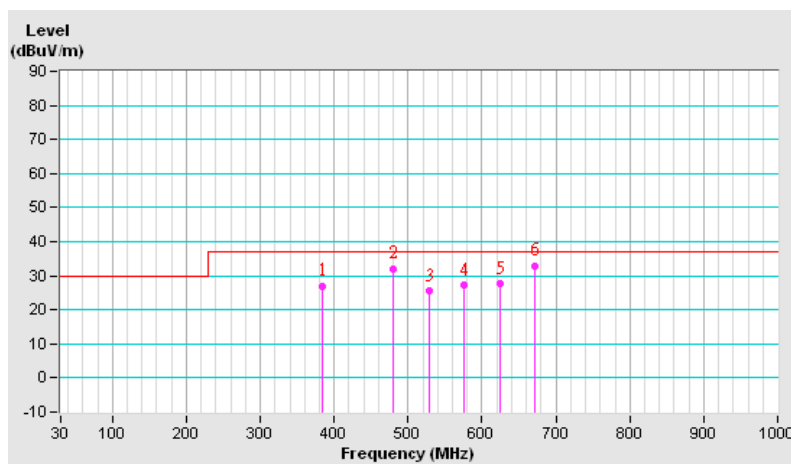
4.1.7 TEST RESULTS(MODE 1)

TEST MODE	Mode 1	INPUT POWER	DC 3.3V from batteries
FREQUENCY RANGE	30-1000 MHz	DETECTOR FUNCTION & BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 70 % RH, 1024 hPa	TESTED BY	Mike Hsieh

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	383.97	27.02 QP	37.00	-9.98	2.00 H	15	8.93	18.09
2	480.01	32.09 QP	37.00	-4.91	2.00 H	16	11.66	20.43
3	528.09	25.41 QP	37.00	-11.59	2.00 H	351	3.91	21.50
4	576.05	27.11 QP	37.00	-9.89	2.00 H	276	4.50	22.61
5	624.01	27.53 QP	37.00	-9.47	1.00 H	34	4.09	23.44
6	671.97	32.74 QP	37.00	-4.26	1.00 H	34	8.79	23.95

- 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.





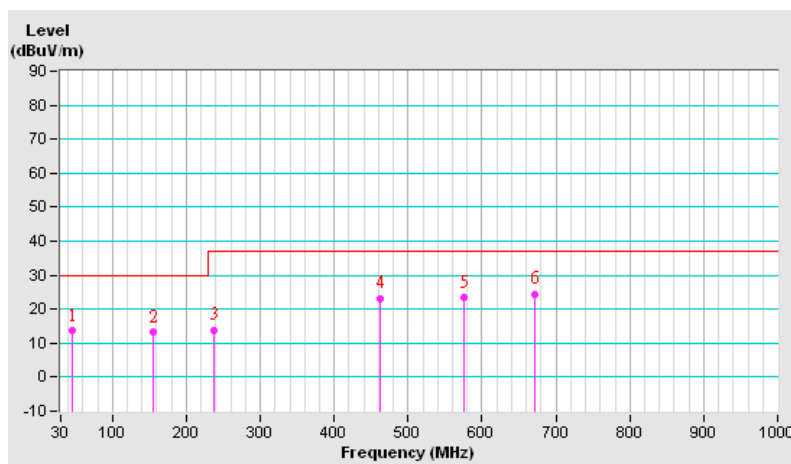
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TEST MODE	Mode 1	INPUT POWER	DC 3.3V from batteries
FREQUENCY RANGE	30-1000 MHz	DETECTOR FUNCTION & BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 70 % RH, 1024 hPa	TESTED BY	Mike Hsieh

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	46.22	13.58 QP	30.00	-16.42	3.00 V	341	-0.66	14.24
2	154.94	13.15 QP	30.00	-16.85	1.00 V	131	-1.78	14.93
3	236.53	13.93 QP	37.00	-23.07	3.00 V	297	0.61	13.32
4	462.01	22.93 QP	37.00	-14.07	4.00 V	204	2.52	20.41
5	576.17	23.28 QP	37.00	-13.72	3.00 V	218	0.11	23.17
6	671.97	24.27 QP	37.00	-12.73	1.00 V	4	-0.39	24.66

- 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.





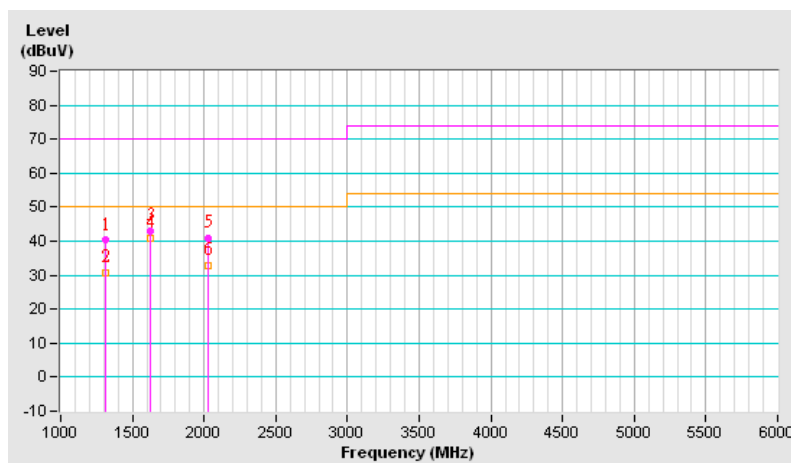
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TEST MODE	Mode 1	INPUT POWER	DC 3.3V from batteries
FREQUENCY RANGE	1000-2000 MHz	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) / Average (AV), 1MHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 70 % RH, 1024 hPa	TESTED BY	Mike Hsieh

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1313.60	40.26 PK	70.00	-29.74	1.00 H	227	12.14	28.12
2	1313.60	30.65 AV	50.00	-19.35	1.00 H	227	2.53	28.12
3	1625.00	42.84 PK	70.00	-27.16	1.00 H	351	13.79	29.05
4	1625.00	40.98 AV	50.00	-9.02	1.00 H	351	11.93	29.05
5	2030.00	40.74 PK	70.00	-29.26	1.00 H	198	10.55	30.19
6	2030.00	32.67 AV	50.00	-17.33	1.00 H	198	2.48	30.19

- 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.



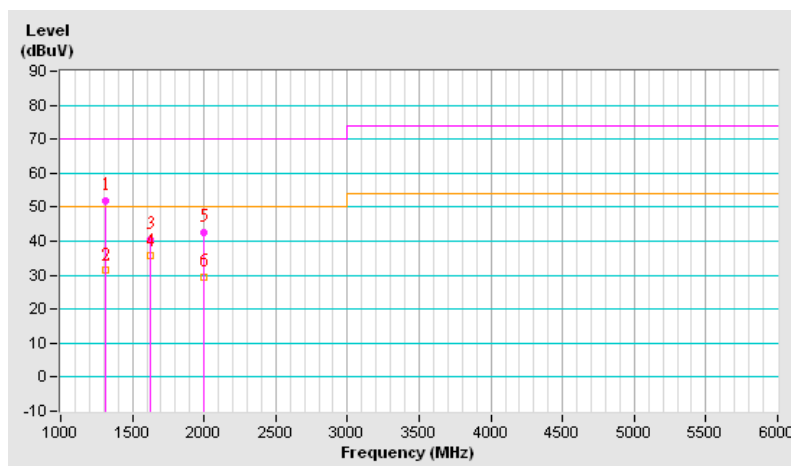


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TEST MODE	Mode 1	INPUT POWER	DC 3.3V from batteries
FREQUENCY RANGE	1000-2000 MHz	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) / Average (AV), 1MHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 70 % RH, 1024 hPa	TESTED BY	Mike Hsieh

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1313.60	51.95 PK	70.00	-18.05	1.00 V	309	23.83	28.12
2	1313.60	31.32 AV	50.00	-18.68	1.00 V	309	3.20	28.12
3	1625.00	40.48 PK	70.00	-29.52	1.00 V	45	11.43	29.05
4	1625.00	35.62 AV	50.00	-14.38	1.00 V	45	6.57	29.05
5	2000.00	42.69 PK	70.00	-27.31	1.00 V	67	12.62	30.07
6	2000.00	29.32 AV	50.00	-20.68	1.00 V	67	-0.75	30.07

- 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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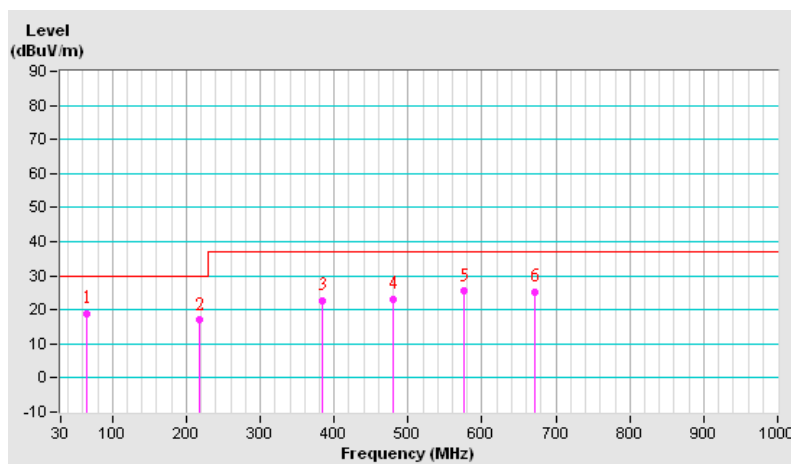
4.1.8 TEST RESULTS(MODE 2)

TEST MODE	Mode 2	INPUT POWER	DC 3.3V from batteries
FREQUENCY RANGE	30-1000 MHz	DETECTOR FUNCTION & BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 70 % RH, 1024 hPa	TESTED BY	Mike Hsieh

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	65.76	18.93 QP	30.00	-11.07	3.00 H	163	6.06	12.87
2	217.58	16.99 QP	30.00	-13.01	4.00 H	164	4.53	12.46
3	384.08	22.61 QP	37.00	-14.39	3.00 H	324	4.51	18.10
4	479.89	23.26 QP	37.00	-13.74	2.00 H	24	2.83	20.43
5	576.05	25.41 QP	37.00	-11.59	1.00 H	14	2.80	22.61
6	672.09	25.18 QP	37.00	-11.82	1.00 H	316	1.23	23.95

- 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.





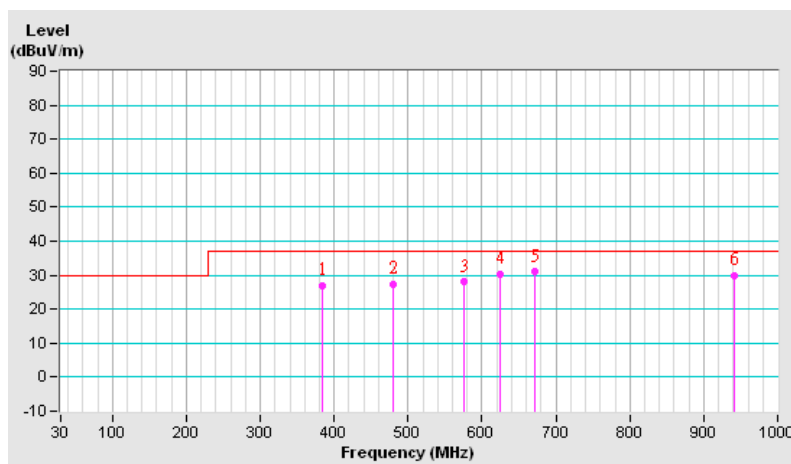
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TEST MODE	Mode 2	INPUT POWER	DC 3.3V from batteries
FREQUENCY RANGE	30-1000 MHz	DETECTOR FUNCTION & BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 70 % RH, 1024 hPa	TESTED BY	Mike Hsieh

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	384.08	27.06 QP	37.00	-9.94	1.00 V	190	8.65	18.41
2	480.01	27.30 QP	37.00	-9.70	3.00 V	195	6.45	20.85
3	575.93	27.96 QP	37.00	-9.04	3.00 V	159	4.79	23.17
4	623.89	30.41 QP	37.00	-6.59	3.00 V	112	6.34	24.07
5	671.97	30.89 QP	37.00	-6.11	3.00 V	161	6.23	24.66
6	940.91	29.96 QP	37.00	-7.04	2.00 V	104	1.38	28.58

- 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.





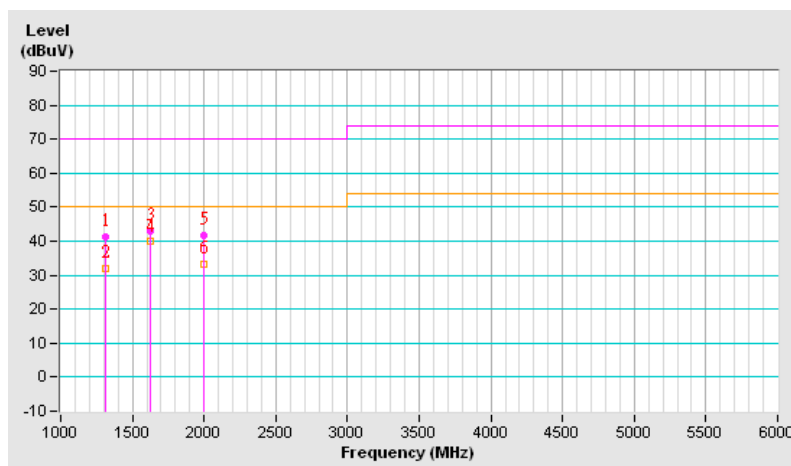
A D T

TEST MODE	Mode 2	INPUT POWER	DC 3.3V from batteries
FREQUENCY RANGE	1000-2000 MHz	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) / Average (AV), 1MHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 70 % RH, 1024 hPa	TESTED BY	Mike Hsieh

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1313.60	41.28 PK	70.00	-28.72	1.00 H	302	13.16	28.12
2	1313.60	31.87 AV	50.00	-18.13	1.00 H	302	3.75	28.12
3	1625.00	42.99 PK	70.00	-27.01	1.00 H	204	13.94	29.05
4	1625.00	39.87 AV	50.00	-10.13	1.00 H	204	10.82	29.05
5	2000.00	41.58 PK	70.00	-28.42	1.00 H	95	11.51	30.07
6	2000.00	33.23 AV	50.00	-16.77	1.00 H	95	3.16	30.07

- 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.



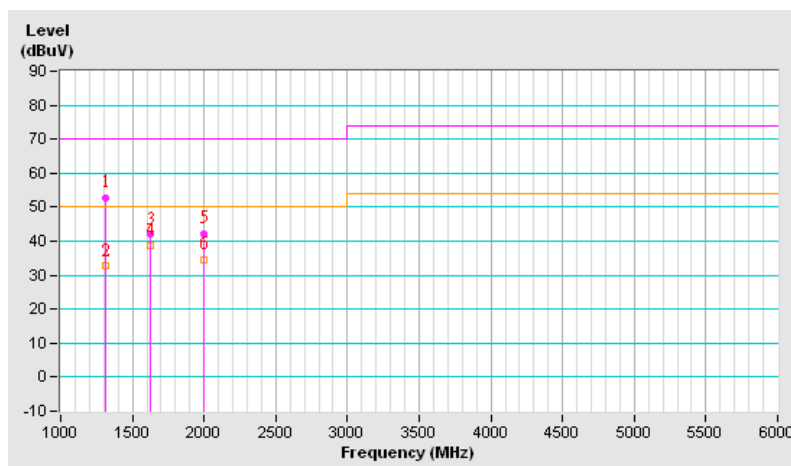


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TEST MODE	Mode 2	INPUT POWER	DC 3.3V from batteries
FREQUENCY RANGE	1000-2000 MHz	DETECTOR FUNCTION & BANDWIDTH	Peak (PK) / Average (AV), 1MHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 70 % RH, 1024 hPa	TESTED BY	Mike Hsieh

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1313.60	52.68 PK	70.00	-17.32	1.00 V	200	24.56	28.12
2	1313.60	32.66 AV	50.00	-17.34	1.00 V	200	4.54	28.12
3	1625.00	41.98 PK	70.00	-28.02	1.00 V	104	12.93	29.05
4	1625.00	38.61 AV	50.00	-11.39	1.00 V	104	9.56	29.05
5	2000.00	42.16 PK	70.00	-27.84	1.00 V	297	12.09	30.07
6	2000.00	34.62 AV	50.00	-15.38	1.00 V	297	4.55	30.07

- 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.



5 IMMUNITY TEST

5.1 GENERAL DESCRIPTION

Product Standard:	EN 55024:1998+A1:2001+A2:2003		
Basic Standard, Specification, and Performance Criteria:	IEC 61000-4-2	Electrostatic Discharge - ESD: 8kV air discharge, 4kV Contact discharge, Performance Criterion B	
	IEC 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test - RS: 80-1000 MHz, 3V/m, 80% AM (1kHz), Performance Criterion A	
	IEC 61000-4-4	Electrical Fast Transient/Burst - EFT, Power line: 1kV, Signal line: 0.5kV, Performance Criterion B	
	IEC 61000-4-5	Surge Immunity Test: 1.2/50 us Open Circuit Voltage, 8 /20 us Short Circuit Current, Power Line - 1 kV, line to earth - 2kV, Signal line: 1kV Performance Criterion B	
	IEC 61000-4-6	Conducted Radio Frequency Disturbances Test - CS: 0.15-80 MHz, 3V, 80% AM, 1kHz, Performance Criterion A	
	IEC 61000-4-8	Power Frequency Magnetic Field Test, 50 Hz, 1A/m, Performance Criterion A	
	IEC 61000-4-11	Voltage Dips: i) >95% reduction -0.5 period, Performance Criteria B ii) 30% reduction - 25 period, Performance Criterion C	
		Voltage Interruptions: i) >95% reduction - 250 period, Performance Criterion C	

5.2 GENERAL PERFORMANCE CRITERIA DESCRIPTION

According to Clause 7.1 of EN 55024 standard, the following describes the general performance criteria.

CRITERION A	The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
CRITERION B	After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomenon below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state if stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
CRITERION C	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

5.3 EUT OPERATING CONDITION

1. Set the EUT for typical use.
2. Observed the monitor messages of EUT.



5.4 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)

5.4.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Discharge Voltage:	Air Discharge – 2, 4, 8kV (Direct) Contact Discharge – 2, 4kV (Indirect)
Polarity:	Positive / Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point Contact Discharge: min. 200 times in total
Discharge Mode:	Single Discharge
Discharge Period:	1-second minimum

5.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
NoiseKen, ESD Simulator	ESS-100L(A)	0189C01491	Aug. 03, 2010	Aug. 02, 2011

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in ESD room A.

5.4.3 TEST PROCEDURE

The discharges shall be applied in two ways:

- a. Contact discharges to the conductive surfaces and coupling planes:
The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.
- b. Air discharges at slots and apertures and insulating surfaces:
On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.

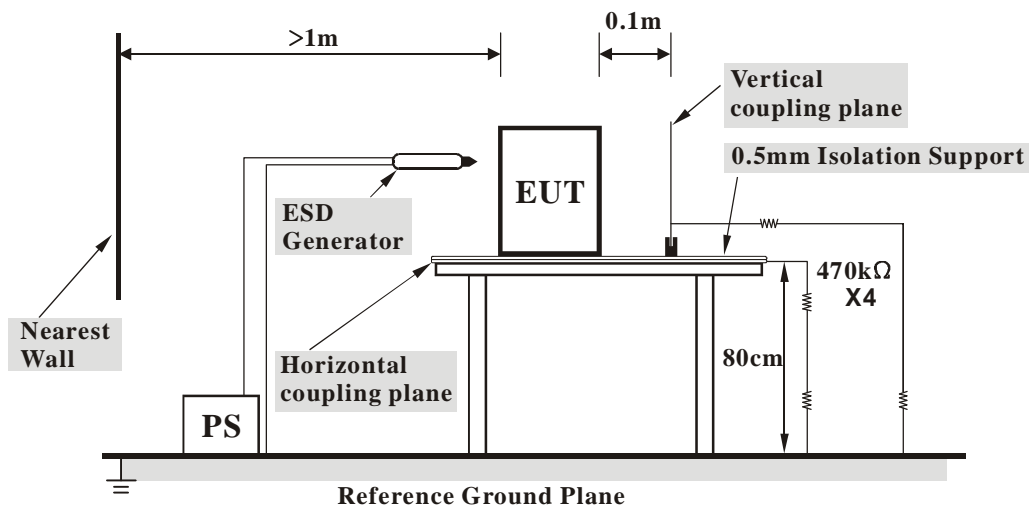
The basic test procedure was in accordance with IEC 61000-4-2:

- a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
- b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- c. The time interval between two successive single discharges was at least 1 second.
- d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.
- e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
- g. At least ten single discharges (in the most sensitive polarity) were applied to the **Horizontal Coupling Plane** at points on each side of the EUT. The ESD generator was positioned at a distance of 0.1 meters from the EUT with the discharge electrode touching the **HCP**.
- h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the **Vertical Coupling Plane** in sufficiently different positions that the four faces of the EUT were completely illuminated. The **VCP** (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.

5.4.4 DEVIATION FROM TEST STANDARD

No deviation

5.4.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the **Ground Reference Plane**. The **GRP** consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A **Horizontal Coupling Plane** (1.6m x 0.8m) was placed on the table and attached to the **GRP** by means of a cable with 940kΩ total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were placed on the **HCP** and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.



5.4.6 TEST RESULTS(MODE 1~2)

TEST MODE	Mode 1~2	INPUT POWER	DC 3.3V from batteries
ENVIRONMENTAL CONDITIONS	18 deg. C, 51% RH, 1024 hPa	TESTED BY	Jason Huang

TEST RESULTS OF DIRECT APPLICATION					
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge	Performance Criterion
2, 4, 8	+/-	1 ~ 7	NA	NOTE (1)	A

Note: No conductive surfaces found, therefore no contact discharge was executed.

Description of test point: Please refer to following page for representative mark only.

TEST RESULTS OF INDIRECT APPLICATION					
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling Plane	Vertical Coupling Plane	Performance Criterion
2, 4	+/-	1 ~ 4	NOTE (1)	NOTE (1)	A

Description of test point:

- 1. Front side 2. Right side 3. Left side 4. Rear side

NOTE: (1) There was no change compared with initial operation during the test.

DESCRIPTION OF TEST POINT





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5.5 RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST (RS)

5.5.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-3
Frequency Range:	80 MHz - 1000 MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Antenna Height:	1.5m
Dwell Time:	3 seconds

5.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
AR Power Amplifier	150W1000M3	311567	NA	NA
AR Power Amplifier	60S1G3M1	306171	NA	NA
AR LOG ANTENNA	AT5080ANT	309740	NA	NA
BOONTON RF Voltage Meter	4232A	93801	Dec. 17, 2010	Dec. 16, 2011
R&S Signal Generator	SMIQ03B	102114	Aug. 31, 2010	Aug. 30, 2011
Electric Field Probe	EMR-20	AB-0039	Sep. 23, 2010	Sep. 22, 2011
ADT RS Test Workbench(Software)	ADT_RS_V7.6.3	NA	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in Chamber Room No. B.

3. The transmit antenna was located at a distance of 2.0 meters from the EUT.



5.5.3 TEST PROCEDURE

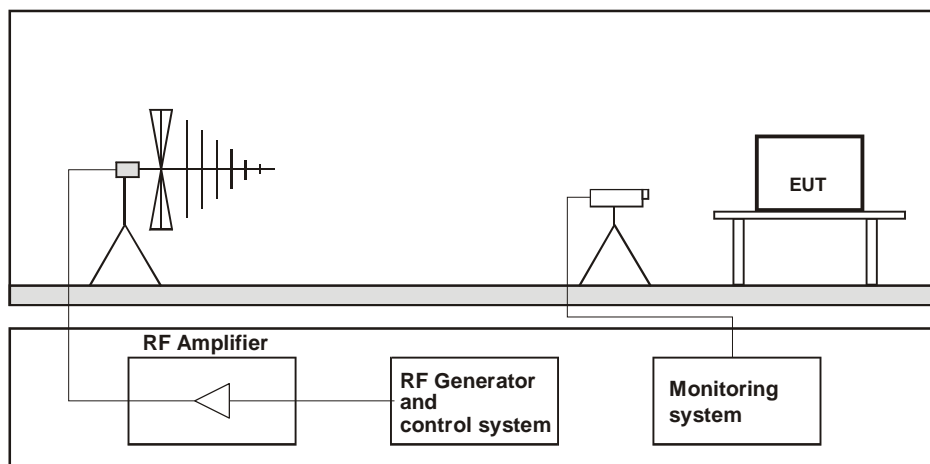
The test procedure was in accordance with IEC 61000-4-3

- a. The testing was performed in a fully-anechoic chamber.
- b. The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80% amplitude modulated with a 1kHz sine wave.
- c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond, but shall in no case be less than 0,5s.
- d. The field strength level was 3V/m.
- e. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

5.5.4 DEVIATION FROM TEST STANDARD

No deviation

5.5.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLETOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.



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5.5.6 TEST RESULTS(MODE 1~2)

TEST MODE	Mode 1~2	INPUT POWER	DC 3.3V from batteries
ENVIRONMENTAL CONDITIONS	20 deg. C, 55% RH, 1024 hPa	TESTED BY	Kyle Huang

Frequency (MHz)	Result	Polarity	Azimuth	Field Strength (V/m)	Observation	Performance Criterion
80 -1000	PASS	V&H	0	3	NOTE	A
80 -1000	PASS	V&H	90	3		
80 -1000	PASS	V&H	180	3		
80 -1000	PASS	V&H	270	3		

NOTE: There was no change compared with the initial operation during the test.



5.6 POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST

5.6.1 TEST SPECIFICATION

Basic Standard: IEC 61000-4-8
Frequency Range: 50Hz
Field Strength: 1 A/m
Observation Time: 1 minute
Inductance Coil: Helmholtz coil, diameter 1.5m

5.6.2 TEST INSTRUMENTS

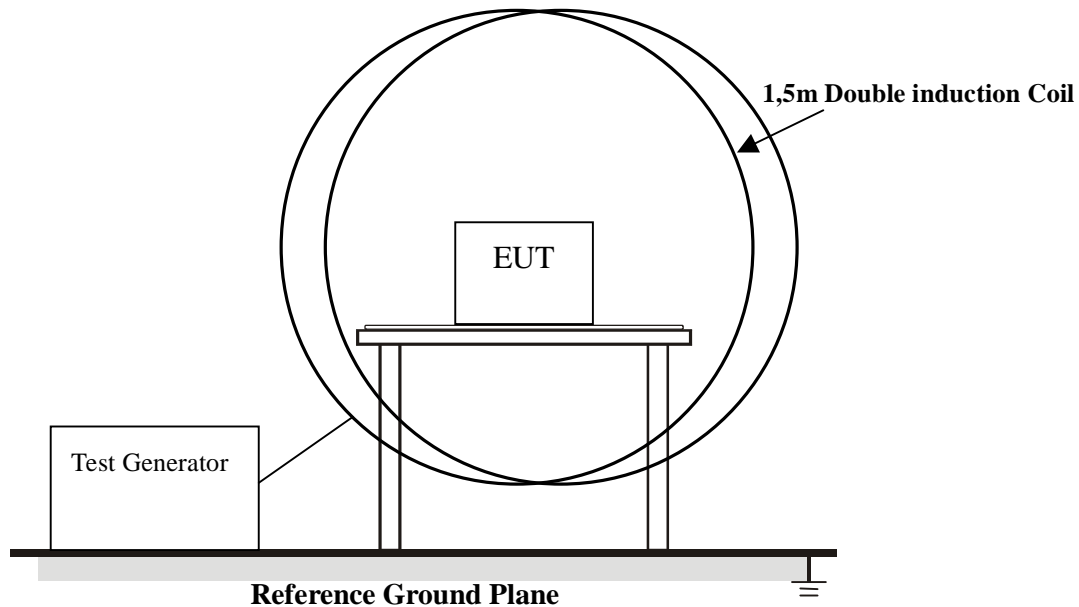
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
BELL, Triaxial Elf Magnetic Field Meter	4090	NA	Jan. 17, 2011	Jan. 16, 2012
MONTENA, Helmholt Coil	HC150-360	NA	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in EMS room.

5.6.3 TEST PROCEDURE

- a. The equipment is configured and connected to satisfy its functional requirements.
- b. The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.
- c. The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

5.6.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLETOP EQUIPMENT

The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (diameter 1.5m). The EUT placement shall then be rotated by 90 degrees in order to expose to the test field with different orientations.



5.6.5 TEST RESULTS(MODE 1~2)

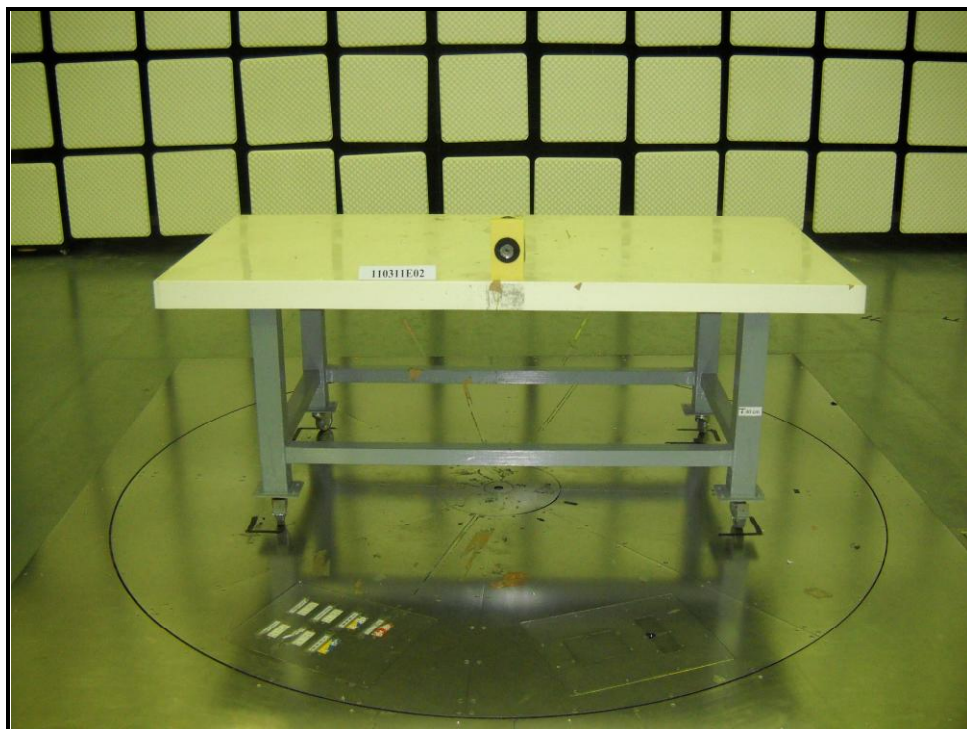
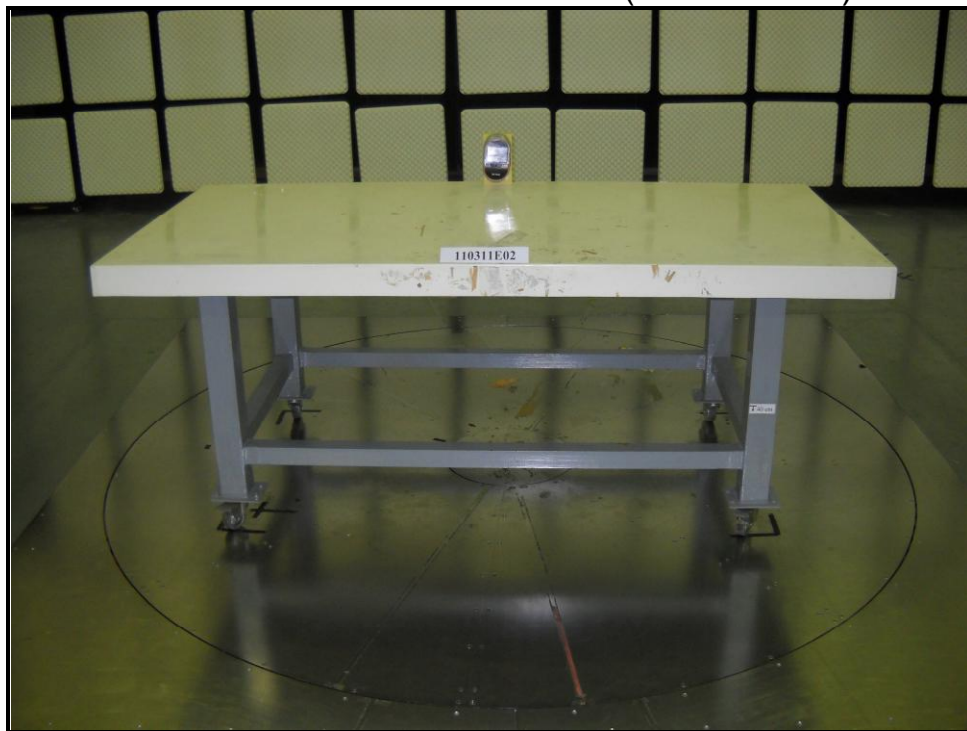
TEST MODE	Mode 1~2	INPUT POWER	DC 3.3V from batteries
ENVIRONMENTAL CONDITIONS	20 deg. C, 55 % RH, 1024 hPa	TESTED BY	Kyle Huang

DIRECTION	RESULTS	OBSERVATION	PERFORMANCE CRITERION
X	PASS	NOTE	A
Y	PASS	NOTE	A
Z	PASS	NOTE	A

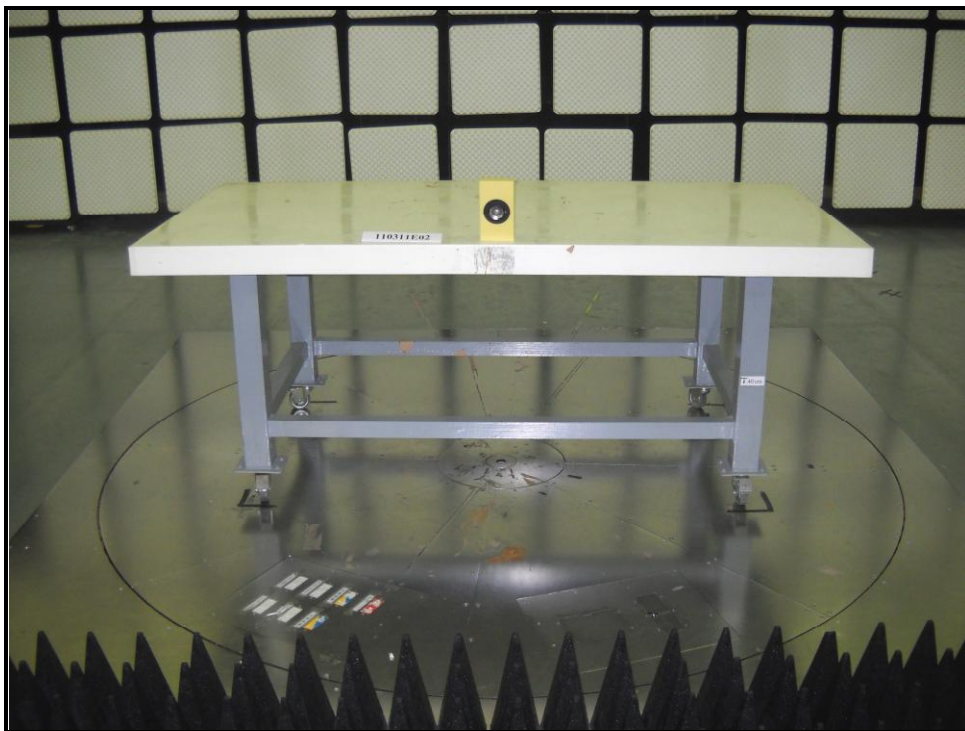
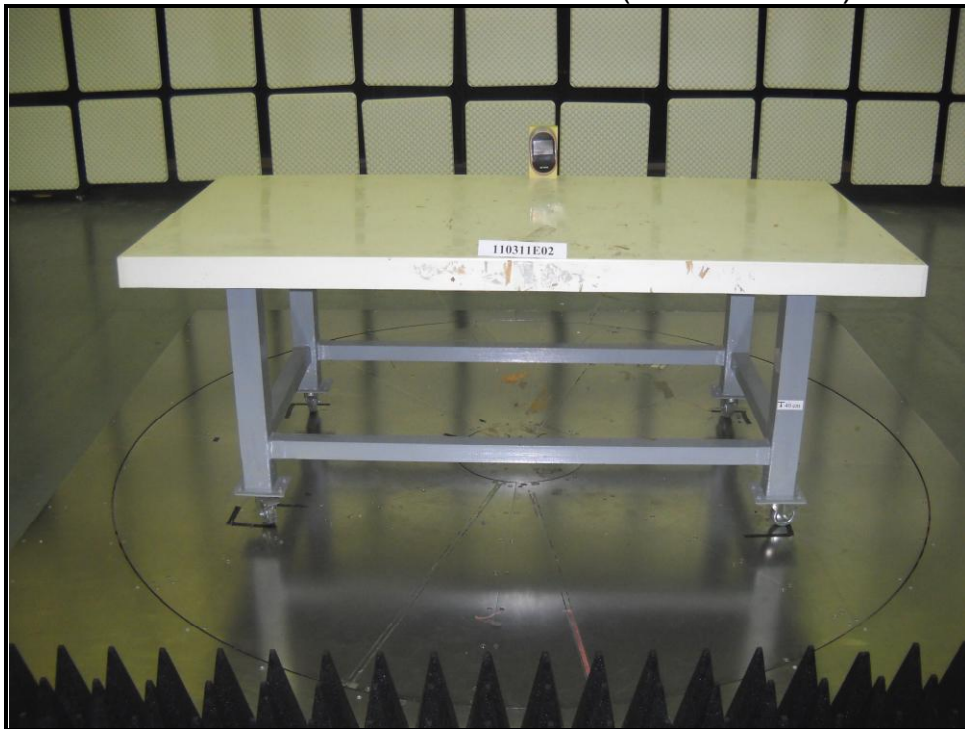
NOTE: There was no change compared with the initial operation during the test.

6 PHOTOGRAPHS OF THE TEST CONFIGURATION

RADIATED EMISSION TEST (Below 1GHz)



RADIATED EMISSION TEST (Above 1GHz)



ESD TEST



RS TEST



POWER-FREQUENCY MAGNETIC FIELDS TEST





7 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5.phtml.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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