FCC Test Report

Report No.:	RF160511C17-5
FCC ID:	MSQP027
Test Model:	P027
Received Date:	May 11, 2016
Test Date:	May 19, 2016 ~ May 24, 2016
Issued Date:	Jun. 13, 2016
Applicant:	ASUSTek COMPUTER INC.
Address:	4F, No. 150, LI-TE Rd., PEITOU, TAIPEI 112, TAIWAN
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)
Test Location:	No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
RF160511C17-5	Original Release	Jun. 13, 2016

1 Certificate of Conformity

Product:	ASUS Tablet
Brand:	ASUS
Test Model:	P027
Sample Status:	Identical Prototype
Applicant:	ASUSTek COMPUTER INC.
Test Date:	May 19, 2016 ~ May 24, 2016
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.209) ANSI C63.10:2013

The above equipment has 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 : _____ , **Date:** Jun. 13, 2016

Ivonne Wu / Supervisor

Approved by : _____ , **Date:** Jun. 13, 2016

Stanley Wu / Assistant Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.225, 15.215)			
FCC Clause	**Test Item**	**Result**	**Remarks**
15.207	Conducted emission test	Pass	Meet the requirement of limit. Minimum passing margin is -19.81 dB at 0.38600 MHz.
15.209	Radiated emission test	Pass	Meet the requirement of limit. Minimum passing margin is -7.77 dB at 30.97 MHz.

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:

Measurement	Frequency	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~1000 MHz	2.95 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	ASUS Tablet
Brand	ASUS
Test Model	P027
Status of EUT	Identical Prototype
Power Supply Rating	5.0 Vdc (adapter or host equipment) 3.8 Vdc (Li-ion battery)
Operating Frequency	214 kHz
Accessory Device	Refer to Note
Data Cable Supplied	Refer to Note

Note:

1. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter 1 (Variable Plug)	ASUS	AD2037M20	I/P: 100-240Vac, 0.3A O/P: 5.0Vdc, 2A
Adapter 2 (US Plug)	ASUS	AD2037320	I/P: 100-240Vac, 0.3A O/P: 5.0Vdc, 2A
Adapter 3 (US Plug)	ASUS	W12-010N3A	I/P: 100-240Vac, 0.3A O/P: 5.0Vdc, 2A
Battery	SIMPLO TECHNOLOGY CO LTD	C12P1601	3.8Vdc, 22Wh or 5900mAh or 5790mAh
USB Cable 1	ASAP	LA05US014-1N	0.9m shielded cable without core
USB Cable 2	FOXCONN	CUDU01B-AJ004-DF	0.9m shielded cable without core
USB Cable 3	ASAP	LA05US025-AN	0.9m shielded cable without core
USB Cable 4	FOXCONN	CUDU01B-AJ009-DF	0.9m shielded cable without core
USB Cable 5	HONGLIN	130-27217	0.9m shielded cable without core
Touch pen	ASUS	PAD-22 Z STYLUS	214 kHz
LCD Panel	TIANMA	TM097QDSP01-00	9.7”
Front Camera	CHICONY	CBFE55720003870LH	5M
Rear Camera	CHICONY	CJAF83020003871LH	8M
CPU	MTK	C.S MT8176V	825 Pin, 2.1GHz / 1MB
LPDDR 1	Hynix	H9CCNNNBJTMLAR-NUM	4G
LPDDR 2	MICRON	MT52L512M32D2PF-107WT:B	4G
eMMC 1	Samsung	KLMDG8JENB-B041	128GB
eMMC 2	Sandisk	SDINADF4-128G-L	128GB
eMMC 3	Toshiba	THGBMHG9C4LBAIR	64G
eMMC 4	Hynix	H26M78208CMR	64G
Main Board	ASUS	Z500M	--
BT/WLAN Module	MTK	MT6630QP	--

* LPDDR2 and eMMC 1 were chosen as a representative for final test.

2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 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.

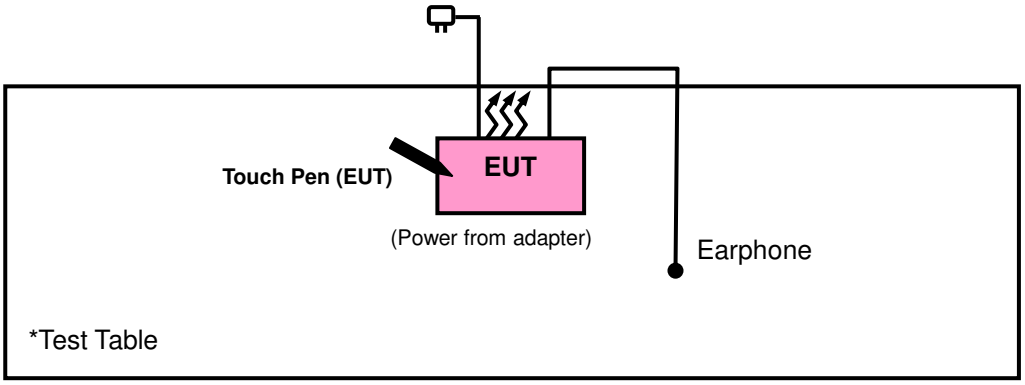
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Earphone	N/A	N/A	N/A	N/A

No.	Signal Cable Description Of The Above Support Units
1.	N/A

Note:

1. All power cords of the above support units are non-shielded (1.8m).

3.2.1 Configuration of System under Test



3.3 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.209)
ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

4 Test Types and Results

4.1 Radiated Emission Measurement

4.1.1 Limits of Radiated Emission Measurement

The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

Frequencies (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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manaufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Jan. 21, 2016	Jan. 20, 2017
Spectrum Analyzer Agilent	N9010A	MY52220314	Sep. 03, 2015	Sep. 02, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2015	Dec. 16, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Jan. 04, 2016	Jan. 03, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Jan. 08, 2016	Jan. 07, 2017
Loop Antenna	EM-6879	269	Jul. 31, 2015	Jul. 30, 2016
Bluetooth Tester	CBT	100980	Apr. 27, 2015	Apr. 26, 2017
Agilent Communications Tester-Wireless	8960 Series 10	MY53201073	Jul. 03, 2015	Jul. 02, 2017
Preamplifier EMCI	EMC 012645	980115	Dec. 21, 2015	Dec. 20, 2016
Preamplifier EMCI	EMC 184045	980116	Dec. 21, 2015	Dec. 20, 2016
Preamplifier EMCI	EMC 330H	980112	Dec. 28, 2015	Dec. 27, 2016
Power Meter Anritsu	ML2495A	1232002	Sep. 21, 2015	Sep. 20, 2016
Power Sensor Anritsu	MA2411B	1207325	Sep. 21, 2015	Sep. 20, 2016
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 12, 2015	Oct. 11, 2016
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 12, 2015	Oct. 11, 2016
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 12, 2015	Oct. 11, 2016
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	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 HwaYa Chamber 10.
3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The FCC Site Registration No. is 690701.
5. The IC Site Registration No. is IC7450F-10.

4.1.3 Test Procedures

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. 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. Height of receiving 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

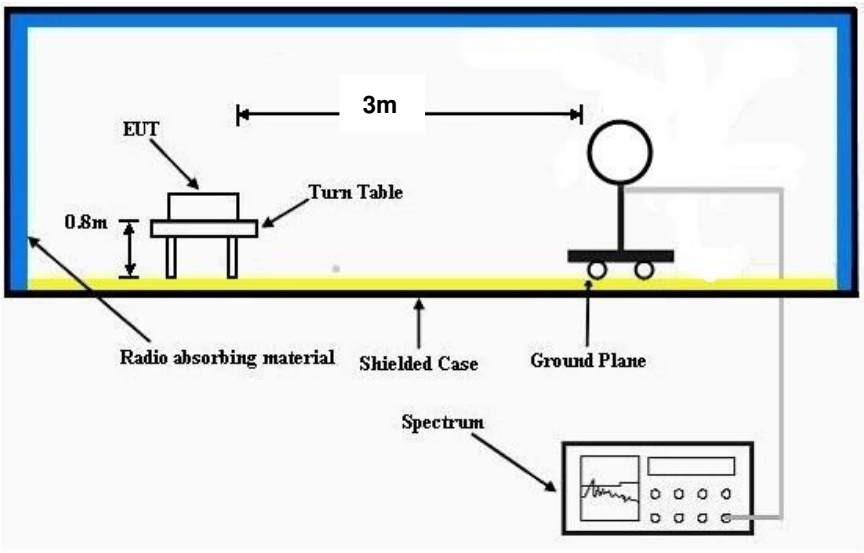
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98 %) or 10 Hz (Duty cycle > 98 %) for Average detection (AV) at frequency above 1 GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

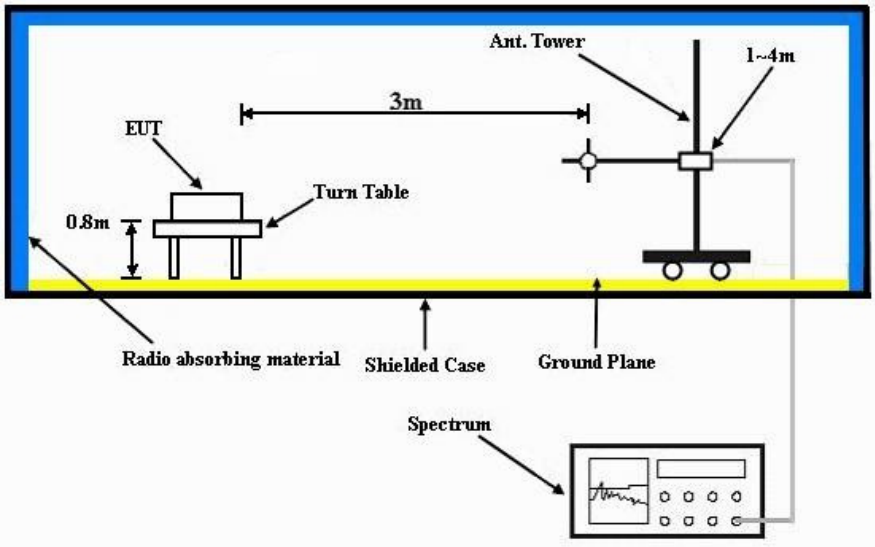
No deviation.

4.1.5 Test Set Up

Frequency range 9k~30MHz:



Frequency range 30~1000MHz:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

a. Placed the EUT on the testing table.
b. Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

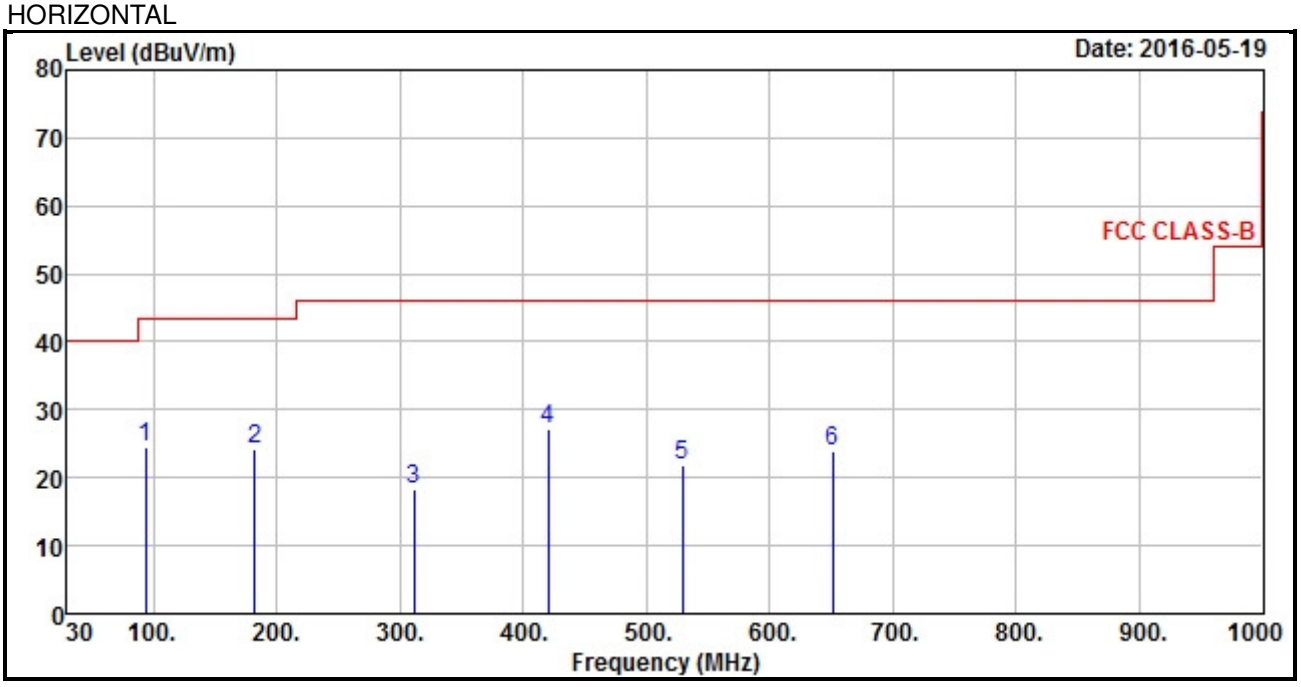
EUT Test Condition		Measurement Detail	
Input Power	120 Vac, 60 Hz	**Frequency Range**	0.009 ~ 30MHz
Environmental Conditions	25 deg. C, 65 % RH	**Detector Function**	Quasi-Peak
Tested By	Toby Tian		

Antennal Polarity & Test Distance: Open at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
0.214	54.16	43.52	101	-46.84	51.49	0.02	40.87	100	360	Average
0.428	49.81	44.36	94.98	-45.17	46.09	0.05	40.69	100	360	Average
0.642	47.28	44.45	71.45	-24.17	43.42	0.09	40.68	100	360	QP
0.856	33.57	32.44	68.95	-35.38	41.74	0.11	40.72	100	360	QP
1.07	37.41	37.05	67.02	-29.61	40.98	0.13	40.75	100	360	QP
1.284	41.28	41.54	65.43	-24.15	40.36	0.14	40.76	100	360	QP
Antennal Polarity & Test Distance: Close at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
0.214	53.57	42.93	101	-47.43	51.49	0.02	40.87	100	0	Average
0.428	49.41	43.96	94.98	-45.57	46.09	0.05	40.69	100	0	Average
0.642	46.65	43.82	71.45	-24.8	43.42	0.09	40.68	100	0	QP
0.856	33.56	32.43	68.95	-35.39	41.74	0.11	40.72	100	0	QP
1.07	36.45	36.09	67.02	-30.57	40.98	0.13	40.75	100	0	QP
1.284	39.53	39.79	65.43	-25.9	40.36	0.14	40.76	100	0	QP

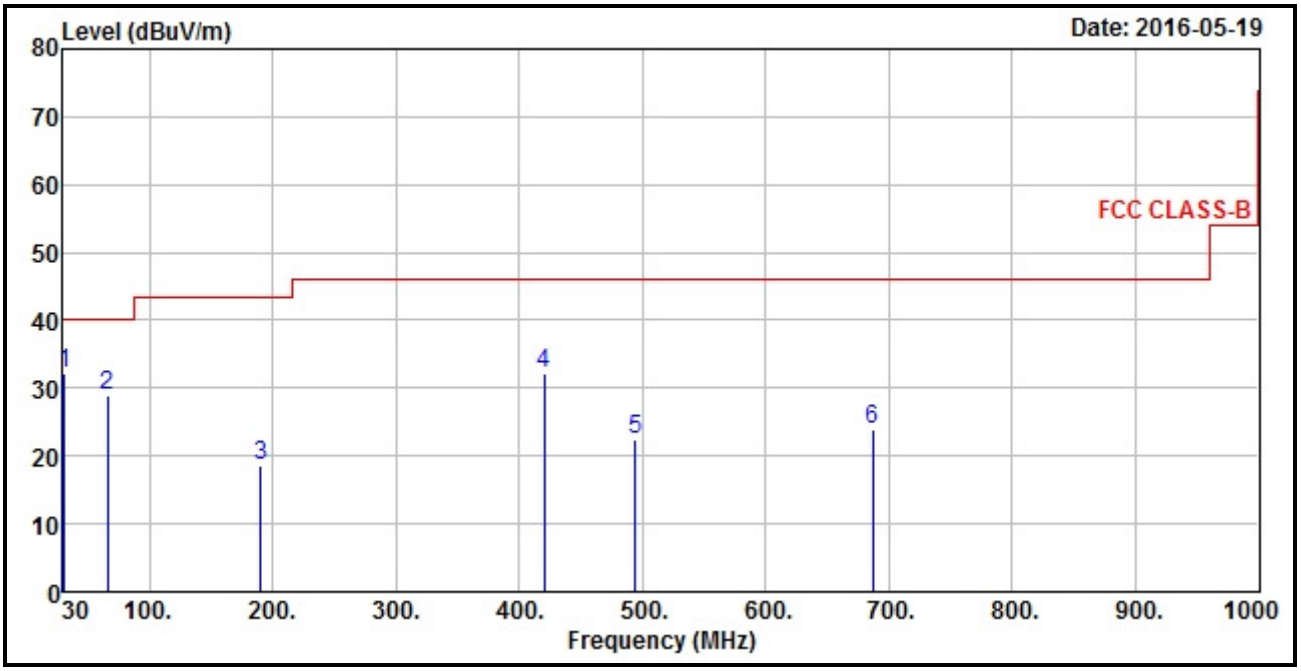
REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. Above limits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

EUT Test Condition		Measurement Detail	
Input Power	120 Vac, 60 Hz	**Frequency Range**	Below 1000 MHz
Environmental Conditions	25 deg. C, 65 % RH	**Detector Function**	Quasi-Peak
Tested By	Toby Tian		

HORIZONTAL



VERTICAL



Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emissino Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
94.02	24.51	46.86	43.5	-18.99	8.6	1.01	31.96	114	329	Peak
182.29	24.24	44.23	43.5	-19.26	10.6	1.22	31.81	117	209	Peak
311.3	18.37	35.42	46	-27.63	13.22	1.67	31.94	136	107	Peak
419.94	27.1	41.48	46	-18.9	15.73	1.94	32.05	107	248	Peak
529.55	21.77	33.33	46	-24.23	17.99	2.14	31.69	101	335	Peak
650.8	23.77	33.2	46	-22.23	20.22	2.36	32.01	109	326	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emissino Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
30.97	32.23	50.62	40	-7.77	12.14	0.59	31.12	136	141	Peak
65.89	28.92	48.47	40	-11.08	11.24	0.85	31.64	122	339	Peak
190.05	18.61	38.97	43.5	-24.89	10.05	1.26	31.67	135	319	Peak
419.94	32.13	46.51	46	-13.87	15.73	1.94	32.05	103	303	Peak
494.63	22.55	34.96	46	-23.45	17.21	2.08	31.7	104	66	Peak
686.69	23.87	32.62	46	-22.13	20.66	2.43	31.84	100	245	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

   Margin value = Emission level – Limit value.

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note:

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.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 16, 2015	Nov. 15, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2015	Dec. 25, 2016
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2016	Feb. 25, 2017
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 24, 2015	Jul. 23, 2016
Software ADT	BV ADT_Cond_ V7.3.7.3	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 HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

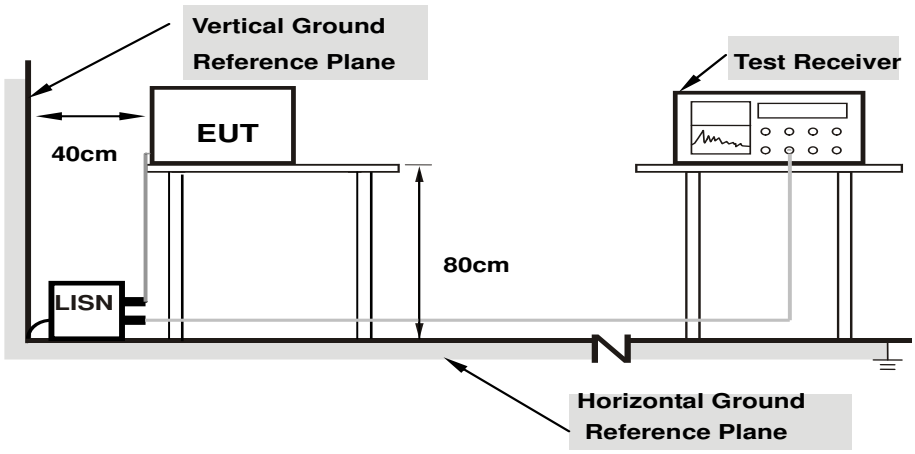
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling 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 – 20 dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz - 30 MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Conditions

a. Placed the EUT on the testing table.
b. Set the EUT under transmission condition continuously at specific channel frequency.

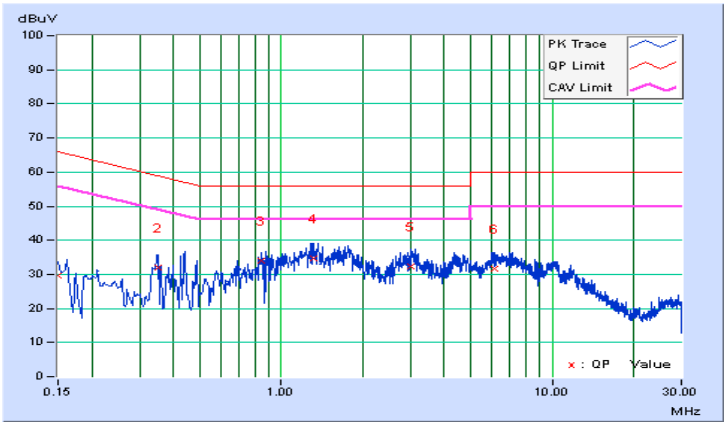
4.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
Tested by	Toby Tian	Test Date	2016/5/19

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.01	19.48	11.31	29.49	21.32	66.00	56.00	-36.51	-34.68
2	0.34943	10.10	21.97	11.33	32.07	21.43	58.98	48.98	-26.91	-27.55
3	0.84200	10.18	23.66	12.61	33.84	22.79	56.00	46.00	-22.16	-23.21
4	1.31000	10.22	24.57	7.84	34.79	18.06	56.00	46.00	-21.21	-27.94
5	2.99000	10.34	21.91	11.01	32.25	21.35	56.00	46.00	-23.75	-24.65
6	6.12479	10.52	21.11	11.75	31.63	22.27	60.00	50.00	-28.37	-27.73

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

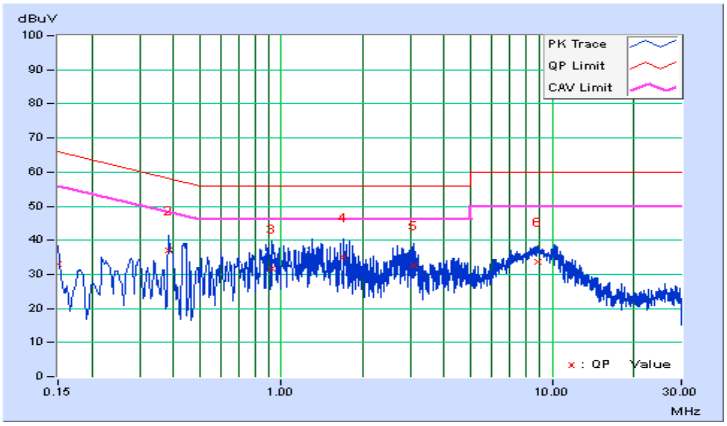


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
Tested by	Toby Tian	Test Date	2016/5/19

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.03	23.10	13.95	33.13	23.98	66.00	56.00	-32.87	-32.02
2	0.38600	10.12	26.93	18.22	37.05	28.34	58.15	48.15	-21.10	-19.81
3	0.92600	10.20	21.57	12.63	31.77	22.83	56.00	46.00	-24.23	-23.17
4	1.70600	10.26	24.62	12.38	34.88	22.64	56.00	46.00	-21.12	-23.36
5	3.08200	10.36	22.31	8.27	32.67	18.63	56.00	46.00	-23.33	-27.37
6	8.83400	10.73	22.86	15.82	33.59	26.55	60.00	50.00	-26.41	-23.45

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – 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.

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

Linko EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety
Tel: 886-3-3183232
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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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