

FCC Test Report

(Co-Located)

Report No.: RF150212E01-2

FCC ID: Q87-RE6700

Test Model: RE6700

Received Date: Feb. 12, 2015

Test Date: Mar. 16 ~ Mar. 30, 2015

Issued Date: Mar. 31, 2015

Applicant: Linksys LLC

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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A D T

Release Control Record

Issue No.	Description	Date Issued
RF150212E01-2	Original release	Mar. 31, 2015

1 Certificate of Conformity

Product: Wireless Extender

Brand: Linksys

Test Model: RE6700

Sample Status: Engineering sample

Applicant: Linksys LLC

Test Date: Mar. 16 ~ Mar. 30, 2015

Standards: FCC Part 15, Subpart C (Section 15.247)
FCC Part 15, Subpart E (Section 15.407)

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 : Celine Chou , **Date:** Mar. 31, 2015
Celine Chou / Specialist

Approved by : Ken Liu , **Date:** Mar. 31, 2015
Ken Liu / Senior Manager

2 Summary of Test Results

Applied Standard:		47 CFR FCC PART 15, Subpart C (SECTION 15.247) 47 CFR FCC PART 15, Subpart E (SECTION 15.407)	
FCC Clause	Test Item	Result	Remarks
15.207 15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -4.05dB at 0.47813MHz.
15.247(d) 15.407(b)(1/2/3) (b)(6)	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 751.23MHz.

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	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Wireless Extender
Brand	Linksys
Test Model	RE6700
Status of EUT	Engineering sample
Driver Version	1.0.00.012
Power Supply Rating	Refer to note
Modulation Type	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	2412 ~ 2462MHz, 5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	2412 ~ 2462MHz: 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40) 5180 ~ 5240MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)
Output Power	2412 ~ 2462MHz: 751.073mW 5180 ~ 5240MHz: 493.610mW 5745 ~ 5825MHz: 427.269mW
Antenna Type	2.4GHz: Dipole antenna with 3.97dBi gain 5GHz: Dipole antenna with 5.97dBi gain
Antenna Connector	i-pex(MHF)
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. According to the applicant's requirement, two test samples were tested for conducted emission only.
2. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

Modulation Mode	TX Function	Beamforming mode
802.11b	2TX	Not Support
802.11g	2TX	Not Support
802.11n (HT20)	2TX	Not Support
802.11n (HT40)	2TX	Not Support
802.11a	2TX	Not Support
802.11n (HT20)	2TX	Support
802.11n (HT40)	2TX	Support
802.11ac (VHT20)	2TX	Support
802.11ac (VHT40)	2TX	Support
802.11ac (VHT80)	2TX	Support

* For 2.4GHz Band and 802.11a, the EUT doesn't support Beamforming mode.

* The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11ac mode for VHT20 / VHT40, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

* For 802.11n and 802.11ac, after pre-tested two modes (with beamforming mode and without beamforming mode) found with beamforming mode was the worst, therefore chosen for final test and presented in the test report.

3. The EUT internal following power supply.

Brand	HON-KWANG
Model	HK-XX18-A12
Input Power	100-240Vac, 47-63Hz, 0.8A
Output Power	12Vdc, 1.5A

3.2 Description of Test Modes

For 2412 ~ 2462MHz

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

Channel	Frequency	Channel	Frequency
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

7 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

For 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (HT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

For 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20):

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

2 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE≥1G	RE<1G	PLC	
A	√	√	-	Sample 1
B	-	-	√	Sample 2
C	-	-	√	Sample 3

Where **RE≥1G**: Radiated Emission above 1GHz & Bandedge Measurement
RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

Note: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

Radiated Emission Test (Above 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. RANGE (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
A	802.11n (HT20) + 802.11n (HT20)	2412 ~ 2462	1 to 11	11 + 165	BPSK
		5180 ~ 5240	36 to 48		BPSK
		5745 ~ 5825	149 to 165		BPSK

Radiated Emission Test (Below 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. RANGE (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
A	802.11n (HT20) + 802.11n (HT20)	2412 ~ 2462	1 to 11	11 + 165	BPSK
		5180 ~ 5240	36 to 48		BPSK
		5745 ~ 5825	149 to 165		BPSK

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. RANGE (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
B, C	802.11n (HT20) + 802.11n (HT20)	2412 ~ 2462	1 to 11	11 + 165	BPSK
		5180 ~ 5240	36 to 48		BPSK
		5745 ~ 5825	149 to 165		BPSK

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	20deg. C, 67%RH	120Vac, 60Hz	Jones Chang
RE<1G	20deg. C, 67%RH	120Vac, 60Hz	Jones Chang
PLC	25deg. C, 70%RH	120Vac, 60Hz	Barry Lee

3.3 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 radiated emission

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Light Bulb	Yeh Chiang	250W	NA	NA	-
B.	Notebook	DELL	E5410	6RP2YM1	FCC DoC Approved	-
C.	Earphone	PHILIPS	SBC HL150	NA	NA	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item B acted as communication partners to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	AC	1	1.8	No	0	-
2.	RJ 45	1	10	No	0	-
3.	Audio	1	1.8	No	0	-

For conducted emission

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Light Bulb	You Sheng	250W	NA	NA	-
B.	Notebook	DELL	PP27L	7YLB32S	FCC DoC Approved	-
C.	AP Router	D-Link	DIR-810L	QBXP1D4002851	FCC DoC Approved	-
D.	Notebook	DELL	E5420	CHHYLQ1	FCC DoC Approved	-
E.	Notebook	DELL	PP32LA	HSLB32S	FCC DoC Approved	-
F.	Earphone	Hawk	HKC920	H001	FCC DoC Approved	-

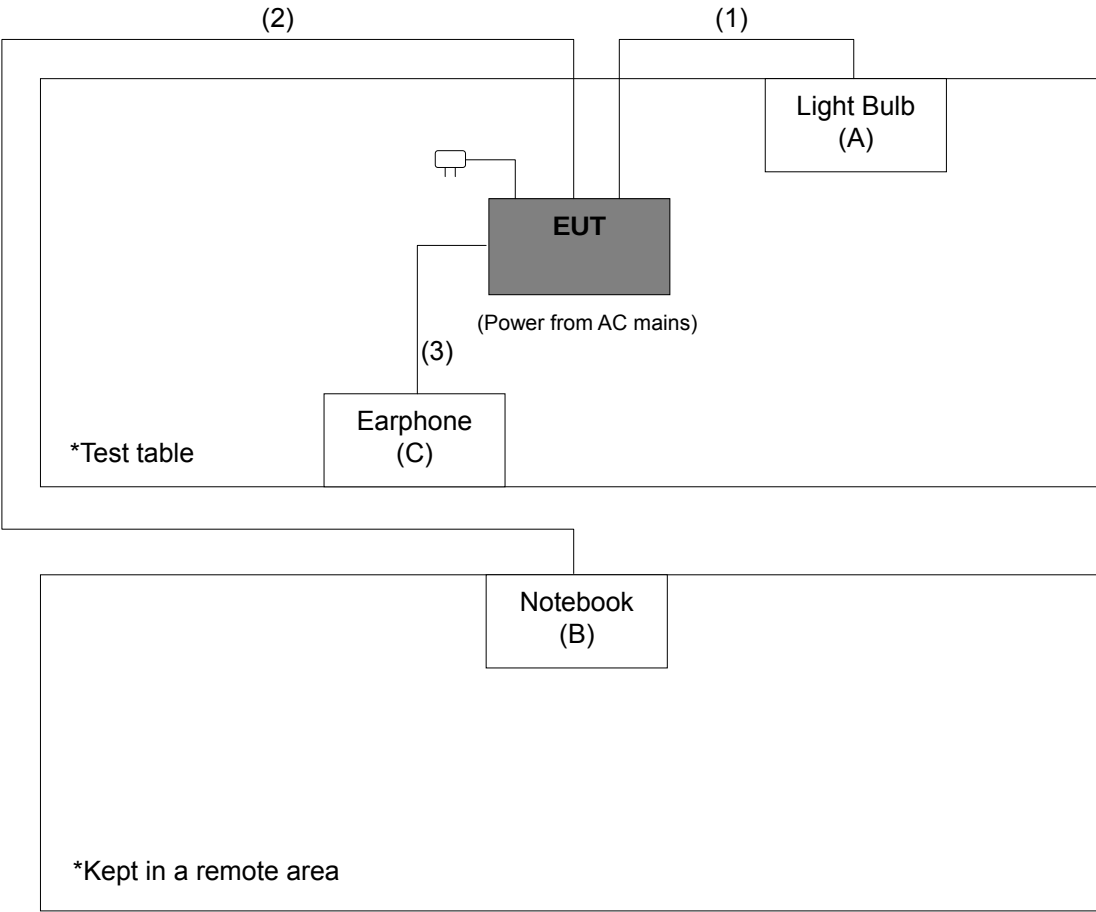
Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item B-E acted as communication partners to transfer data.

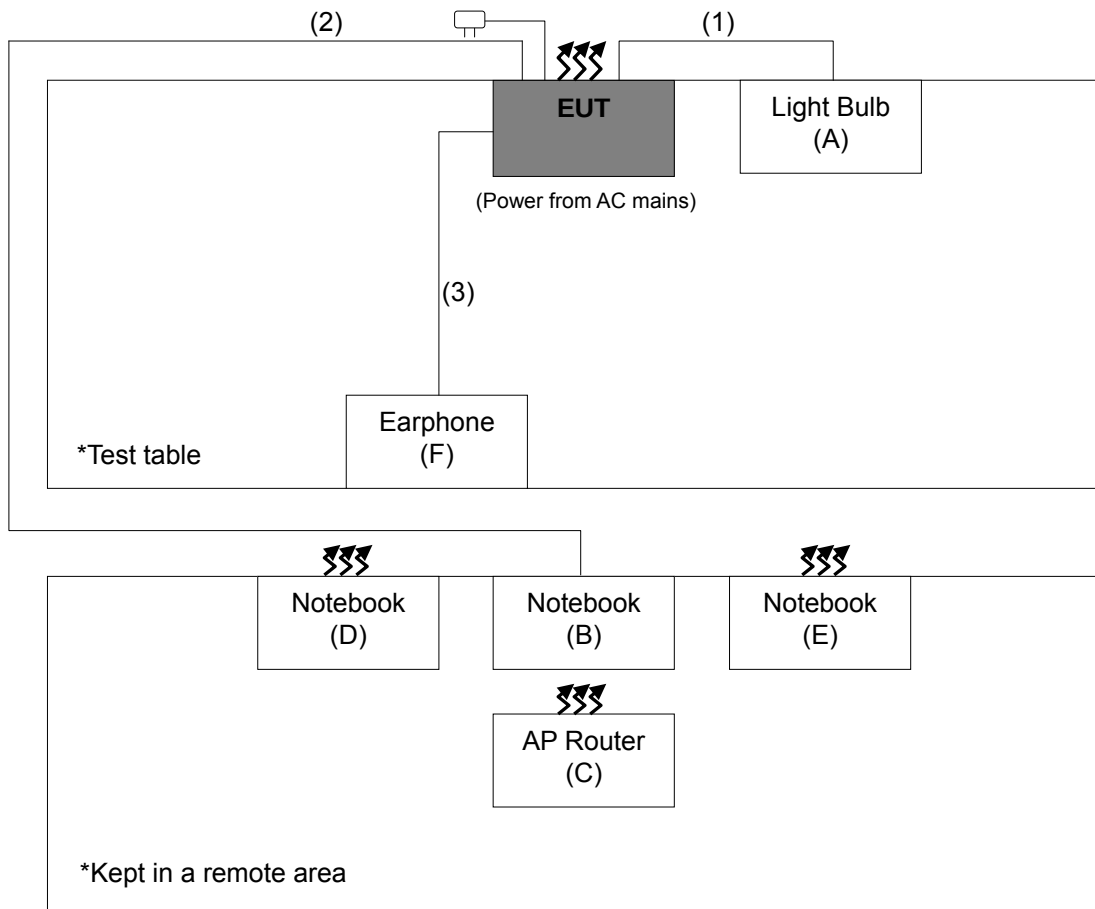
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	AC	1	0.7	No	0	-
2.	RJ45	1	10	No	0	-
3.	Audio	1	1.5	No	0	-

3.3.1 Configuration of System under Test

For radiated emission



For conducted emission



3.4 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 (Section 15.247)

FCC Part 15, Subpart E (Section 15.407)

ANSI C63.10-2009

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 and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

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 1000MHz, 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 20dB under any condition of modulation.

LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedures New Rules v01	FIELD STRENGTH AT 3m	
	PK:74 (dBuV/m)	AV:54 (dBuV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBuV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK:-27 (dBm/MHz) ^{*1} PK:-17 (dBm/MHz) ^{*2}	PK: 68.2(dBuV/m) ^{*1} PK:78.2 (dBuV/m) ^{*2}

NOTE: ^{*1} beyond 10MHz of the band edge ^{*2} within 10 MHz of band edge

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000 \sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 06, 2014	Oct. 05, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSU 43	100115	Dec. 18, 2014	Dec. 17, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Feb. 06, 2015	Feb. 05, 2016
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Feb. 05, 2015	Feb. 04, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 09, 2015	Feb. 08, 2016
Preamplifier Agilent	8449B	3008A01961	Oct. 18, 2014	Oct. 17, 2015
Preamplifier Agilent	8447D	2944A10738	Oct. 18, 2014	Oct. 17, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 09, 2014	Aug. 08, 2015
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table BV ADT	TT100.	TT93021704	NA	NA
Turn Table Controller BV ADT	SC100.	SC93021704	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 4.
 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The FCC Site Registration No. is 460141.
 5. The IC Site Registration No. is IC7450F-4.

4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. 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 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. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

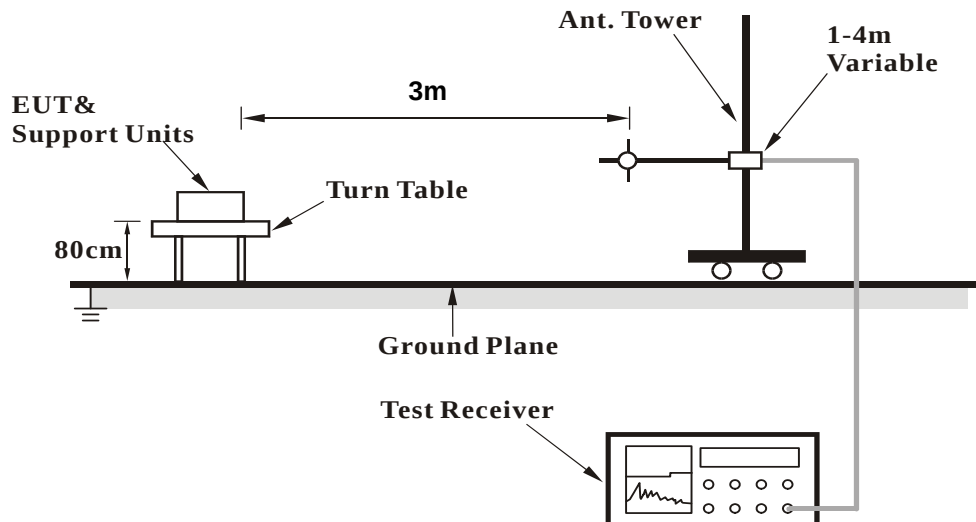
1. For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the ground at 3 meter chamber room for test.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($10 \log(1/\text{duty cycle})$).
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
6. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

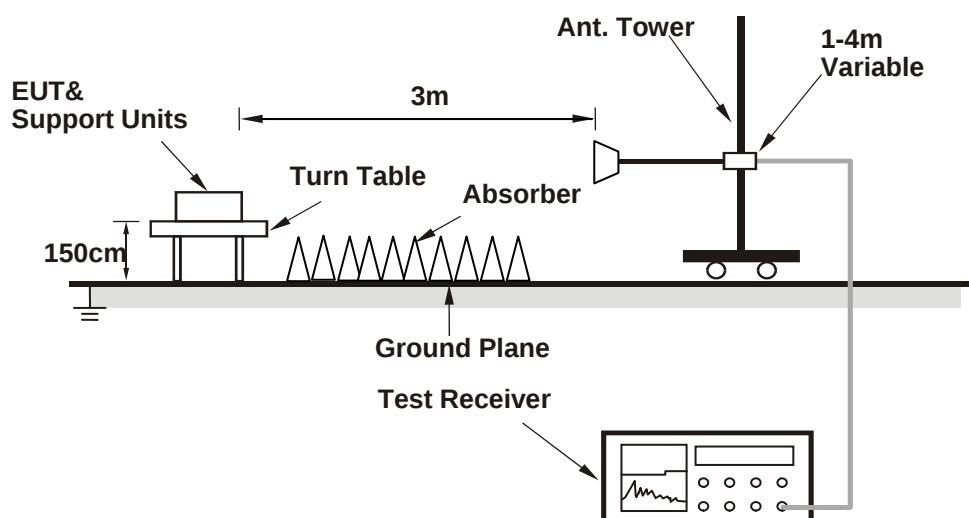
No deviation.

4.1.5 Test Set Up

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Conditions

- Placed the EUT on the testing table.
- Prepared a notebook to act as communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The communication partner sent data to EUT by command "PING".
- The necessary accessories enable the system in full functions.

4.1.7 Test Results

Above 1GHz data:

802.11n (HT20) + 802.11n (HT20)

CHANNEL	TX Channel 11 + 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	*2462.00	103.0 PK			2.03 H	198	70.40	32.60
2	*2462.00	93.1 AV			2.03 H	198	60.50	32.60
3	2483.50	63.6 PK	74.0	-10.4	1.01 H	220	30.90	32.70
4	2483.50	47.6 AV	54.0	-6.4	1.01 H	220	14.90	32.70
5	4824.00	48.5 PK	74.0	-25.5	1.26 H	64	42.60	5.90
6	4824.00	35.3 AV	54.0	-18.7	1.26 H	64	29.40	5.90
7	*5825.00	106.6 PK			1.06 H	163	66.10	40.50
8	*5825.00	95.5 AV			1.06 H	163	55.00	40.50
9	#5850.00	56.9 PK	78.2	-21.3	1.00 H	150	50.00	6.90
10	#5853.00	63.7 PK	78.2	-14.5	1.00 H	150	56.70	7.00
11	#5861.00	59.6 PK	74.0	-14.4	1.10 H	160	52.60	7.00
12	#5861.00	48.6 AV	54.0	-5.4	1.10 H	160	41.60	7.00
13	11650.00	59.9 PK	74.0	-14.1	1.00 H	96	41.00	18.90
14	11650.00	47.6 AV	54.0	-6.4	1.00 H	96	28.70	18.90
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	*2462.00	111.3 PK			2.10 V	258	78.70	32.60
2	*2462.00	101.6 AV			2.10 V	258	69.00	32.60
3	2483.50	69.7 PK	74.0	-4.3	2.01 V	288	37.00	32.70
4	2483.50	52.8 AV	54.0	-1.2	2.01 V	288	20.10	32.70
5	4924.00	49.5 PK	74.0	-24.5	1.13 V	70	43.50	6.00
6	4924.00	37.5 AV	54.0	-16.5	1.13 V	70	31.50	6.00
7	*5825.00	117.1 PK			1.73 V	299	76.60	40.50
8	*5825.00	105.7 AV			1.73 V	299	65.20	40.50
9	#5850.00	63.9 PK	78.2	-14.3	1.82 V	280	57.00	6.90
10	#5853.00	72.6 PK	78.2	-5.6	1.82 V	280	65.60	7.00
11	#5861.00	69.0 PK	74.0	-5.0	1.82 V	256	62.00	7.00
12	#5861.00	51.0 AV	54.0	-3.0	1.82 V	256	44.00	7.00
13	11650.00	60.3 PK	74.0	-13.7	1.20 V	57	41.40	18.90
14	11650.00	47.1 AV	54.0	-6.9	1.20 V	57	28.20	18.90

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. " * ": Fundamental frequency.

Below 1GHz data:

802.11n (HT20) + 802.11n (HT20)

CHANNEL	TX Channel 11 + 165	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	57.12	33.0 QP	40.0	-7.0	1.99 H	16	47.60	-14.60
2	375.98	37.9 QP	46.0	-8.1	1.00 H	129	48.90	-11.00
3	624.85	34.6 QP	46.0	-11.4	1.00 H	211	40.20	-5.60
4	750.01	44.9 QP	46.0	-1.1	1.00 H	234	48.10	-3.20
5	875.67	37.7 QP	46.0	-8.3	1.49 H	146	38.80	-1.10
6	1000.10	42.5 QP	54.0	-11.5	1.99 H	153	41.70	0.80
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	29.90	32.6 QP	40.0	-7.4	1.00 V	13	48.30	-15.70
2	375.98	31.9 QP	46.0	-14.1	1.00 V	40	42.90	-11.00
3	624.85	35.7 QP	46.0	-10.3	1.00 V	109	41.30	-5.60
4	751.23	45.0 QP	46.0	-1.0	1.49 V	14	48.20	-3.20
5	875.67	38.9 QP	46.0	-7.1	1.00 V	79	40.00	-1.10
6	1000.10	48.9 QP	54.0	-5.1	1.00 V	246	48.10	0.80

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

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 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCS 30	100287	Apr. 09, 2014	Apr. 08, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-523	Sep. 29, 2014	Sep. 28, 2015
RF Cable (JYEBAO)	5D-FB	COACAB-001	May 26, 2014	May 25, 2015
50 ohms Terminator	50	3	Oct. 17, 2014	Oct. 16, 2015
50 ohms Terminator	N/A	EMC-04	Oct. 21, 2014	Oct. 20, 2015
Software ADT	BV ADT_Cond_V7.3.7.3	NA	NA	NA
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	ENV216	100072	June 10, 2014	June 09, 2015

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 Hsin Chu Shielded Room No. A. (NVLAP LAB CODE: 200838-0)

3. The VCCI Site Registration No. is C-817.

4.2.3 Test Procedures

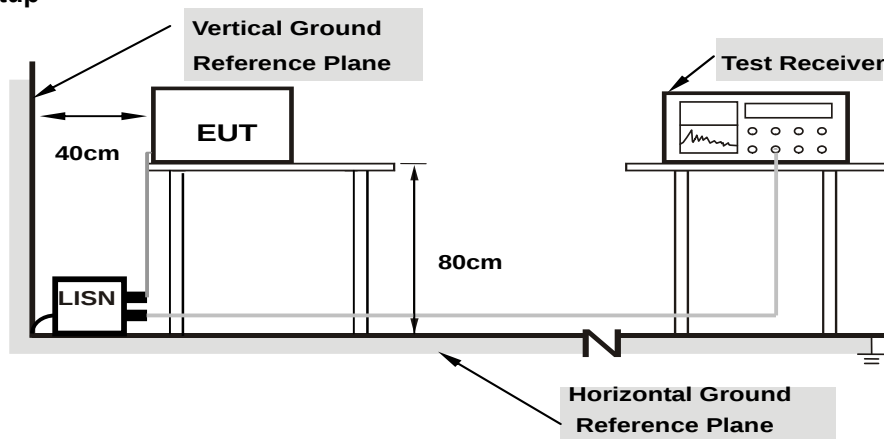
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

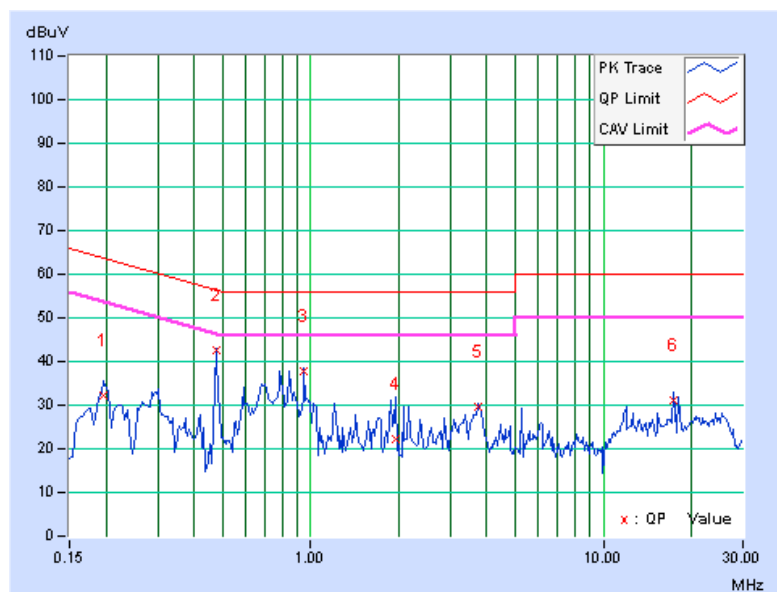
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test mode	B		

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	0.19687	0.07	32.26	26.50	32.33	26.57	63.74	53.74	-31.41	-27.17
2	0.47422	0.09	42.64	41.44	42.73	41.53	56.44	46.44	-13.71	-4.91
3	0.95078	0.11	37.76	36.90	37.87	37.01	56.00	46.00	-18.13	-8.99
4	1.95703	0.16	22.12	11.58	22.28	11.74	56.00	46.00	-33.72	-34.26
5	3.75000	0.23	29.44	22.44	29.67	22.67	56.00	46.00	-26.33	-23.33
6	17.42188	0.61	30.48	27.98	31.09	28.59	60.00	50.00	-28.91	-21.41

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.

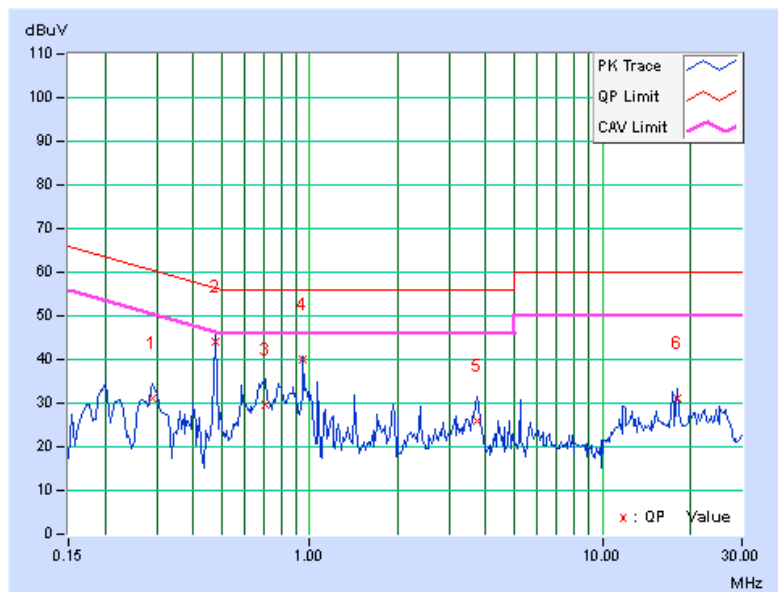


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test mode	B		

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	0.29063	0.07	31.20	23.22	31.27	23.29	60.51	50.51	-29.23	-27.21
2	0.47813	0.08	43.88	42.24	43.96	42.32	56.37	46.37	-12.41	-4.05
3	0.70859	0.09	29.70	20.12	29.79	20.21	56.00	46.00	-26.21	-25.79
4	0.95078	0.09	40.04	38.98	40.13	39.07	56.00	46.00	-15.87	-6.93
5	3.74219	0.20	25.58	20.72	25.78	20.92	56.00	46.00	-30.22	-25.08
6	18.09375	0.61	30.62	27.78	31.23	28.39	60.00	50.00	-28.77	-21.61

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.

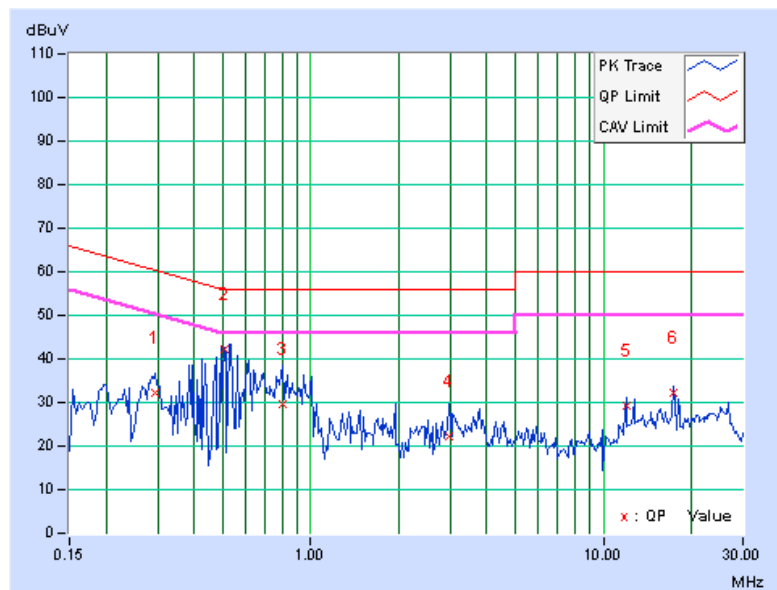


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test mode	C		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.29453	0.08	32.28	24.20	32.36	24.28	60.40	50.40	-28.04	-26.12
2	0.50625	0.09	42.18	41.28	42.27	41.37	56.00	46.00	-13.73	-4.63
3	0.80625	0.10	29.42	20.00	29.52	20.10	56.00	46.00	-26.48	-25.90
4	2.98438	0.20	22.00	14.04	22.20	14.24	56.00	46.00	-33.80	-31.76
5	11.94531	0.48	28.78	24.38	29.26	24.86	60.00	50.00	-30.74	-25.14
6	17.41406	0.61	31.56	28.74	32.17	29.35	60.00	50.00	-27.83	-20.65

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.

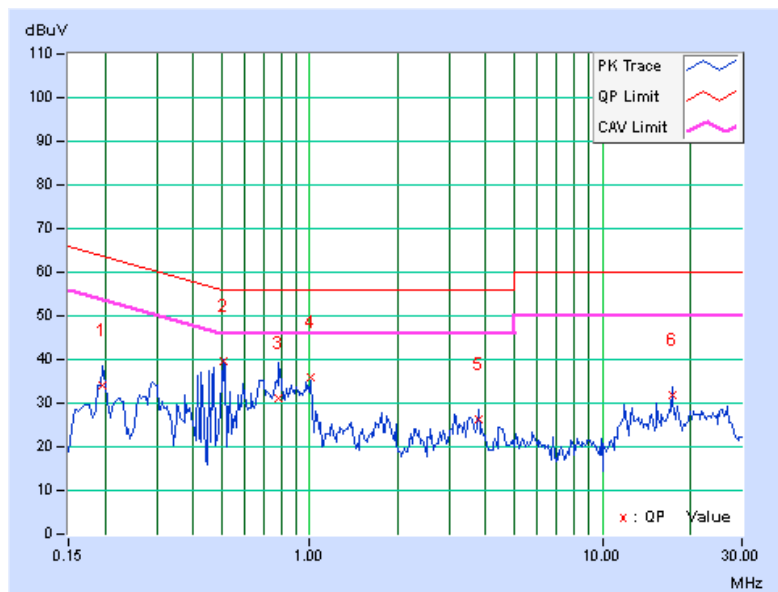


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test mode	C		

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	0.19687	0.07	33.98	27.56	34.05	27.63	63.74	53.74	-29.69	-26.11
2	0.50547	0.08	39.44	38.62	39.52	38.70	56.00	46.00	-16.48	-7.30
3	0.78672	0.09	31.14	21.34	31.23	21.43	56.00	46.00	-24.77	-24.57
4	1.00781	0.09	35.72	33.34	35.81	33.43	56.00	46.00	-20.19	-12.57
5	3.76172	0.20	26.18	21.04	26.38	21.24	56.00	46.00	-29.62	-24.76
6	17.41797	0.59	31.16	28.38	31.75	28.97	60.00	50.00	-28.25	-21.03

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:

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Web Site: www.bureauveritas-adt.com

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

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