FCC Test Report

Report No.:	RF141225E12-1
FCC ID:	Q87-WRT1900ACV2
Test Model:	WRT1900AC V2
Received Date:	Dec. 25, 2014
Test Date:	Jan. 06 to Mar. 02, 2015
Issued Date:	Mar. 13, 2015
Applicant:	Linksys LLC
Address:	121 Theory Drive Irvine California 92617 United States
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.
Test Location (1):	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.
Test Location (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
RF141225E12-1	Original release.	Mar. 13, 2015

1 Certificate of Conformity

Product:	802.11ac Router
Brand:	Linksys
Test Model:	WRT1900AC V2
Sample Status:	ENGINEERING SAMPLE
Applicant:	Linksys LLC
Test Date:	Jan. 06 to Mar. 02, 2015
Standards:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10:2009

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 : Phoenix Huang , **Date:** Mar. 13, 2015

Phoenix Huang / Specialist

Approved by : , **Date:** Mar. 13, 2015

May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (SECTION 15.407 Under New Rule)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -2.79dB at 0.15000MHz.
15.407(b) (1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5150.00MHz & 5436.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is R-SMA not a standard connector.

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	150kHz ~ 30MHz	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.37 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.72 dB
	6GHz ~ 18GHz	4.00 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	802.11ac Router
Brand	Linksys
Test Model	WRT1900AC V2
Status of EUT	ENGINEERING SAMPLE
Driver version	2.0.5.165474
Power Supply Rating	DC 12V from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT20 and VHT40 mode of 2.4GHz Band.
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 1733.33Mbps
Operating Frequency	**For 15.407** **5GHz:** 5.18 ~ 5.24GHz
	For 15.247 **2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.745 ~ 5.825GHz
Number of Channel	**For 15.407** 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)
	For 15.247 (2.4GHz) 11 for 802.11b, 802.11g, 802.11n (HT20), VHT20 7 for 802.11n (HT40), VHT40 **For 15.247 (5GHz)** 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	**For 15.407** 802.11a: 701.93mW 802.11ac (VHT20): 701.067mW 802.11ac (VHT40): 674.561mW 802.11ac (VHT80): 131.005mW **For 15.247(2.4GHz)** 802.11b: 981.935mW 802.11g: 619.213mW 802.11n (HT20): 600.722mW 802.11n (HT40): 187.699mW **For 15.247(5GHz)** 802.11a: 622.189mW 802.11ac (VHT20): 609.698mW 802.11ac (VHT40): 553.141mW 802.11ac (VHT80): 525.495mW
Antenna Type	Please see NOTE
Antenna Connector	Please see NOTE
Accessory Device	Adapter x1
Data Cable Supplied	NA

Note:

1. 2.4GHz and 5GHz technology can transmit at same time.
2. The EUT must be supplied with a power adapter and following four different models could be chosen as following table:

No	Brand	Model No.	Spec.
1	CWT	2AAF036F US	Input: 100-240V, 1.2A, 50/60Hz Output: 12V, 3A DC output cable: 1.8m, unshielded
2	CWT	2ABN036F US	Input: 100-240V, 1.0A, 50/60Hz Output: 12V, 3A DC output cable: 1.8m, unshielded
3	LEI	MU42-1120300-A1	Input: 100-240V, 1.5A, 50/60Hz Output: 12V, 3A DC output cable: 1.8m, unshielded
4	LEI	MU42-3120300-A1	Input: 100-240V, 1.1A, 50/60Hz Output: 12V, 3A DC output cable: 1.8m, unshielded
Note: For radiated emissions test, the EUT was pre-tested with above adapters, the worst case was found in adapter 3. Therefore only the test data of the adapter was recorded in this report.			

3. The antennas provided to the EUT, please refer to the following table:

Transmitter Circuit	Brand	Gain (dBi)	Cable Loss (dB)	Net Gain (dBi)	Frequency Range (GHz to GHz)	Antenna Type	Connecter Type
Chain (0)	LINKSYS	2.5	1	1.5	2.4 ~ 2.4835	DIPOLE	R-SMA
		2.6	1.6	1	5.15 ~ 5.25		
		3.8	1.9	1.9	5.725 ~ 5.85		
Chain (1)	LINKSYS	2.5	1	1.5	2.4 ~ 2.4835	DIPOLE	R-SMA
		2.6	1.5	1.1	5.15 ~ 5.25		
		3.8	2.1	1.7	5.725 ~ 5.85		
Chain (2)	LINKSYS	2.5	1	1.5	2.4 ~ 2.4835	DIPOLE	R-SMA
		2.6	1.5	1.1	5.15 ~ 5.25		
		3.8	2.1	1.7	5.725 ~ 5.85		
Chain (3)	LINKSYS	2.5	0.5	2	2.4 ~ 2.4835	DIPOLE	R-SMA
		2.6	0.9	1.7	5.15 ~ 5.25		
		3.8	1.6	2.2	5.725 ~ 5.85		

4. The EUT has two different Transformer types could be chosen and please refer the below table:

Type 1 (Vendor: MINGTEK)		
Vendor P/N	**Vendor**	**Location**
HN1878CG	MINGTEK	T1
HN3678CG	MINGTEK	T2, T3
Type 2 (Vendor: BOTHHAND)		
Vendor P/N	**Vendor P/N**	**Vendor P/N**
LG1P109N LF	BOTHHAND	T1
LG2P109N LF	BOTHHAND	T2, T3
From the above types, the worst radiated emission was found in **Type 1** (Vendor: MINGTEK). Therefore only the test data of the type were recorded in this report.		

5. The EUT incorporates a MIMO function with beamforming.

For 2.4GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11b	1 ~ 11Mbps	4TX*	4RX
802.11g	6 ~ 54Mbps	4TX	4RX
802.11n (HT20) & 802.11n (HT40)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
VHT20	MCS0~8 Nss=1	4TX	4RX
	MCS0~8 Nss=2	4TX	4RX
VHT40	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
For 5GHz Band			
802.11a	6 ~ 54Mbps	4TX	4RX
802.11n (HT20) & 802.11n (HT40)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11ac (VHT20)	MCS0~8 Nss=1	4TX	4RX
	MCS0~8 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~8 Nss=4	4TX	4RX
802.11ac (VHT40) & 802.11ac (VHT80)	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~9 Nss=4	4TX	4RX

Note: 1. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

2. * From the above modulation modes, the 802.11b without beamforming.

6. 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 Test Modes

FOR 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

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

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
1	√	√	√	√	Adapter 3 + Type 1
2	-	-	√	-	Adapter 3 + Type 2
3	-	-	√	-	Adapter 1 + Type 1
4	-	-	√	-	Adapter 1 + Type 2
5	-	-	√	-	Adapter 2 + Type 1
6	-	-	√	-	Adapter 2 + Type 2
7	-	-	√	-	Adapter 4 + Type 1
8	-	-	√	-	Adapter 4 + Type 2

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

PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **Y-plane** (for below 1GHz) **and X-plane** (for above 1GHz).

NOTE: "-"means no effect.

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.

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3

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.

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5180-5240	36 to 48	40	OFDM	BPSK	6

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.

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5180-5240	36 to 48	40	OFDM	BPSK	6

Antenna Port Conducted Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ 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.

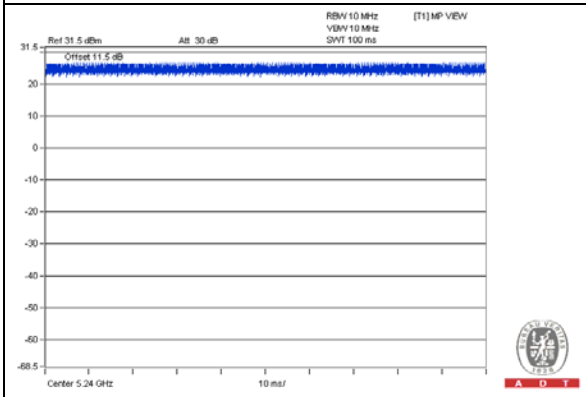
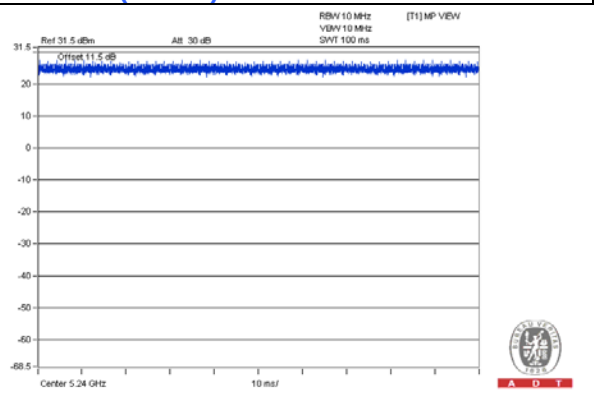
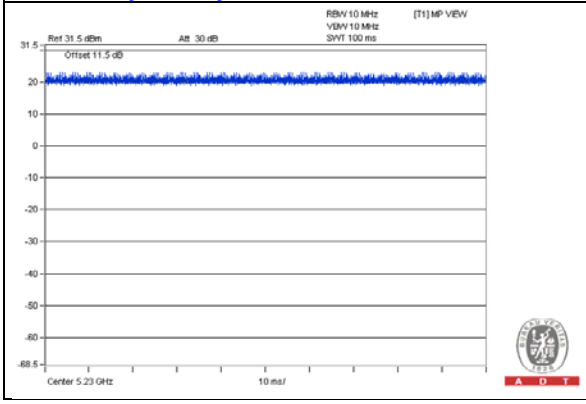
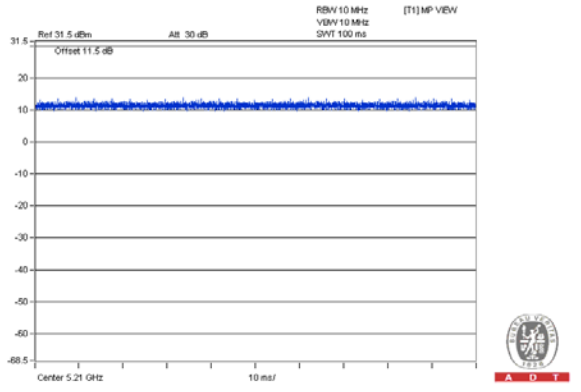
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	23deg. C, 67%RH	120Vac, 60Hz	Tim Ho
	23deg. C, 67%RH	120Vac, 60Hz	Robert Cheng
RE<1G	22deg. C, 69%RH	120Vac, 60Hz	Tim Ho
PLC	25deg. C, 60%RH	120Vac, 60Hz	Barry Lee
	20deg. C, 71%RH	120Vac, 60Hz	Wythe Lin
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is 100 %, duty factor is not required.

802.11a	802.11ac (VHT20)
	
802.11ac (VHT40)	**802.11ac (VHT80)**
	

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.

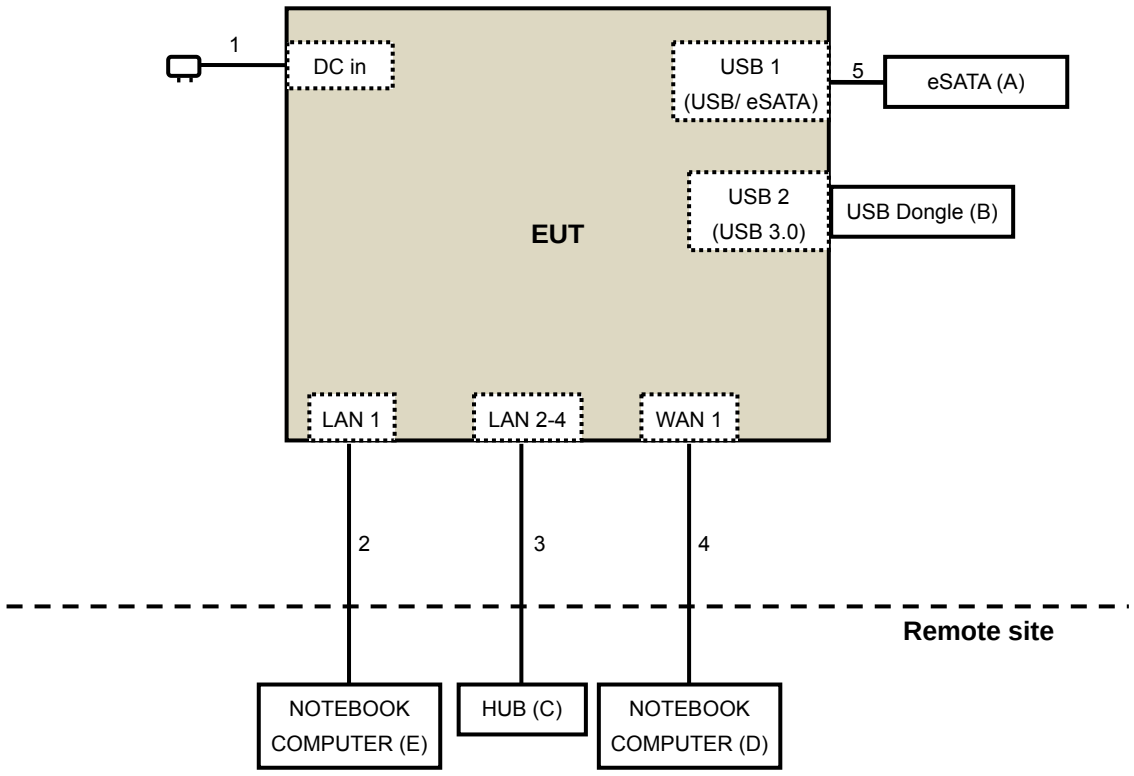
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	eSATA	NA	HTS541680J9SA00	SGCZ35SE	NA	Supplied by Client
B.	USB Dongle	Transcend	TS16GJF750K	NA	NA	Provided by Lab
C.	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab
D.	NOTEBOOK COMPUTER	DELL	PP32LA	GSLB32S	FCC DoC	Provided by Lab
E.	NOTEBOOK COMPUTER	DELL	D531	CN-0XM006-48643-86L-4472	QDS-BRCM1019	Provided by Lab

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC power	1	1.8	No	0	Supplied by Client
2.	RJ-45	1	10	No	0	Provided by Lab
3.	RJ-45	3	10	No	0	Provided by Lab
4.	RJ-45	1	10	No	0	Provided by Lab
5.	eSATA	1	0.6	Yes	0	Supplied by Client

3.4.1 Configuration of System under Test



3.5 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 E (15.407)
789033 D02 General UNII Test Procedures New Rules v01
662911 D01 Multiple Transmitter Output v02r01
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.

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 (dBμV/m)	AV:54 (dBμV/m)
APPLICABLE TO	**EIRP LIMIT**	**EQUIVALENT FIELD STRENGTH AT 3m**
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBμV/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(dBμV/m) [*1] PK:78.2 (dBμV/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:

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

4.1.2 Test Instruments

Below 1GHz

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	July 21, 2014	July 20, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-03	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 06, 2015	Feb. 05, 2016
RF Cable	NA	CHGCAB_001	Oct. 04, 2014	Oct. 03, 2015
Horn_Antenna AISI	AIH.8018	0000320091110	Aug. 27, 2014	Aug. 26, 2015
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	131205 131214 SNMY23684/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCI	EMC184045	980143	Jan. 16, 2015	Jan. 15, 2016
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Antenna Tower & Turn Table CT	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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3 The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5 The VCCI Site Registration No. is G-137.
6 The CANADA Site Registration No. is IC 7450H-2.
7 Tested Date: Feb. 26, 2015

Above 1GHz

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY50010156	Aug. 11, 2014	Aug. 10, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-04	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 27, 2014	Feb. 26, 2015
RF Cable	NA	CHHCAB_001	Oct. 05, 2014	Oct. 04, 2015
Horn_Antenna AISI	AIH.8018	0000220091110	Aug. 26, 2014	Aug. 25, 2015
Pre-Amplifier Agilent	8449B	300801923	Oct. 28, 2014	Oct. 27, 2015
RF Cable	NA	131206 131215 SNMY23685/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCI	EMC184045	980143	Jan. 15, 2015	Jan. 14, 2016
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Software	ADT_Radiated_V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015
Power meter Anritsu	ML2495A	1014008	Apr. 30, 2014	Apr. 29, 2015
Power sensor Anritsu	MA2411B	0917122	Apr. 30, 2014	Apr. 29, 2015
Temperature & Humidity Chamber GIANTFORCE	GTH-150-40-SP-AR	MAA0812-008	Jan. 12, 2015	Jan. 11, 2016

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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3 The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5 The CANADA Site Registration No. is IC 7450H-3.
6 Tested Date: Jan. 21 to 22, 2015

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:

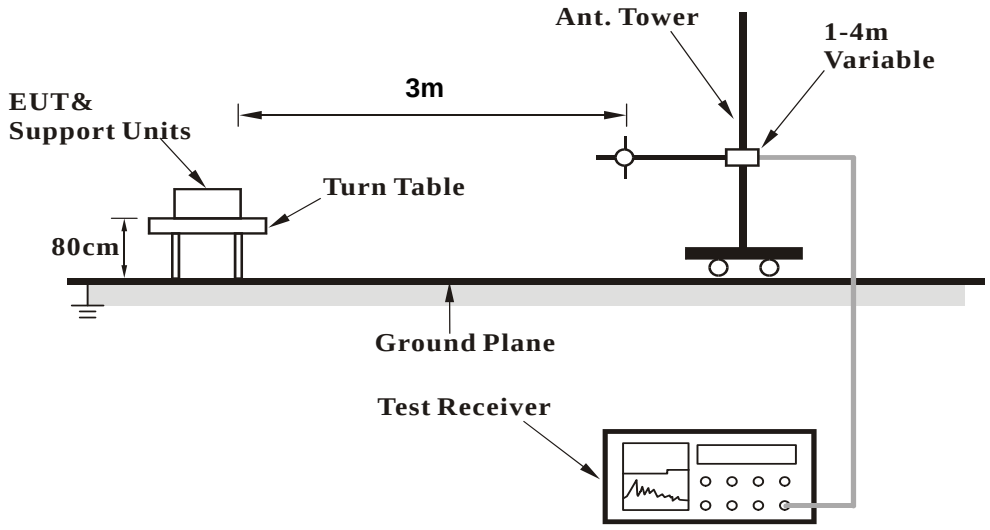
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

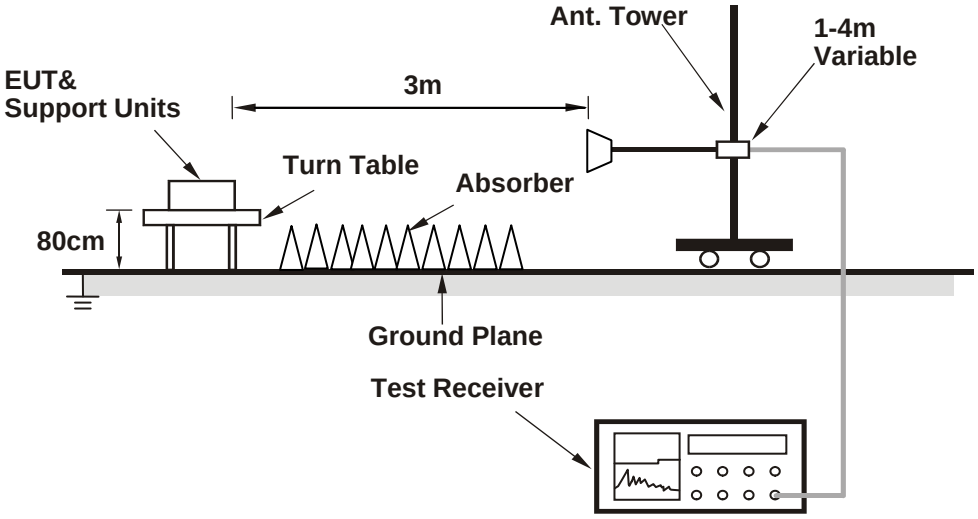
No deviation.

4.1.5 Test Setup

<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

1. Connect the EUT with the support units D-E (Notebook Computer) which is placed in remote site.
2. The communication partner run test program “DutApiMimoApApp.exe” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data

802.11a

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	5150.00	52.4 PK	74.0	-21.6	1.31 H	80	48.12	4.28
2	5150.00	40.9 AV	54.0	-13.1	1.31 H	80	36.62	4.28
3	*5180.00	106.2 PK			1.35 H	74	101.81	4.39
4	*5180.00	96.5 AV			1.35 H	74	92.11	4.39
5	5417.00	48.7 PK	74.0	-25.3	1.20 H	33	44.06	4.64
6	5417.00	40.2 AV	54.0	-13.8	1.20 H	33	35.56	4.64
7	#10360.00	55.4 PK	74.0	-18.6	1.12 H	321	45.34	10.06
8	#10360.00	42.8 AV	54.0	-11.2	1.12 H	321	32.74	10.06
9	15540.00	59.8 PK	74.0	-14.2	1.02 H	352	44.96	14.84
10	15540.00	46.3 AV	54.0	-7.7	1.02 H	352	31.46	14.84
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	5150.00	66.9 PK	74.0	-7.1	1.04 V	26	62.62	4.28
2	5150.00	53.1 AV	54.0	-0.9	1.04 V	26	48.82	4.28
3	*5180.00	118.2 PK			1.05 V	329	113.81	4.39
4	*5180.00	109.2 AV			1.05 V	329	104.81	4.39
5	5417.00	63.1 PK	74.0	-10.9	1.26 V	21	58.46	4.64
6	5417.00	52.5 AV	54.0	-1.5	1.26 V	21	47.86	4.64
7	#10360.00	55.9 PK	74.0	-18.1	1.31 V	197	45.84	10.06
8	#10360.00	43.8 AV	54.0	-10.2	1.31 V	197	33.74	10.06
9	15540.00	60.4 PK	74.0	-13.6	1.03 V	123	45.56	14.84
10	15540.00	47.6 AV	54.0	-6.4	1.03 V	123	32.76	14.84

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

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	5150.00	48.4 PK	74.0	-25.6	1.25 H	28	44.12	4.28
2	5150.00	35.4 AV	54.0	-18.6	1.25 H	28	31.12	4.28
3	*5200.00	109.2 PK			1.30 H	59	104.76	4.44
4	*5200.00	98.7 AV			1.30 H	59	94.26	4.44
5	5357.00	48.4 PK	74.0	-25.6	1.26 H	36	43.86	4.54
6	5357.00	39.8 AV	54.0	-14.2	1.26 H	36	35.26	4.54
7	5436.00	50.3 PK	74.0	-23.7	1.24 H	29	45.66	4.64
8	5436.00	41.4 AV	54.0	-12.6	1.24 H	29	36.76	4.64
9	#10400.00	53.6 PK	74.0	-20.4	1.36 H	13	43.53	10.07
10	#10400.00	40.2 AV	54.0	-13.8	1.36 H	13	30.13	10.07
11	15600.00	49.9 PK	74.0	-24.1	1.32 H	320	34.84	15.06
12	15600.00	41.2 AV	54.0	-12.8	1.32 H	320	26.14	15.06
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	5150.00	62.1 PK	74.0	-11.9	1.03 V	25	57.82	4.28
2	5150.00	47.0 AV	54.0	-7.0	1.03 V	25	42.72	4.28
3	*5200.00	121.1 PK			1.04 V	16	116.66	4.44
4	*5200.00	111.3 AV			1.04 V	16	106.86	4.44
5	5357.00	62.8 PK	74.0	-11.2	1.26 V	260	58.26	4.54
6	5357.00	52.0 AV	54.0	-2.0	1.26 V	260	47.46	4.54
7	5436.00	64.5 PK	74.0	-9.5	1.25 V	261	59.86	4.64
8	**5436.00**	**53.9 AV**	**54.0**	**-0.1**	**1.25 V**	**261**	**49.26**	**4.64**
9	#10400.00	64.2 PK	74.0	-9.8	1.32 V	195	54.13	10.07
10	#10400.00	50.3 AV	54.0	-3.7	1.32 V	195	40.23	10.07
11	15600.00	59.9 PK	74.0	-14.1	1.00 V	245	44.84	15.06
12	15600.00	49.2 AV	54.0	-4.8	1.00 V	245	34.14	15.06

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	4997.00	48.2 PK	74.0	-25.8	1.21 H	30	44.33	3.87
2	4997.00	39.7 AV	54.0	-14.3	1.21 H	30	35.83	3.87
3	*5240.00	112.0 PK			1.37 H	61	107.59	4.41
4	*5240.00	102.1 AV			1.37 H	61	97.69	4.41
5	5397.00	48.3 PK	74.0	-25.7	1.17 H	20	43.64	4.66
6	5397.00	35.6 AV	54.0	-18.4	1.17 H	20	30.94	4.66
7	#5477.00	50.8 PK	68.2	-17.4	1.22 H	41	46.20	4.60
8	#10480.00	54.2 PK	68.2	-14.0	1.20 H	312	43.94	10.26
9	15720.00	49.8 PK	74.0	-24.2	1.30 H	12	35.13	14.67
10	15720.00	42.1 AV	54.0	-11.9	1.30 H	12	27.43	14.67
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	4997.00	59.2 PK	74.0	-14.8	1.08 V	346	55.33	3.87
2	4997.00	49.3 AV	54.0	-4.7	1.08 V	346	45.43	3.87
3	*5240.00	124.2 PK			1.03 V	12	119.79	4.41
4	*5240.00	114.8 AV			1.03 V	12	110.39	4.41
5	5397.00	65.0 PK	74.0	-9.0	1.12 V	328	60.34	4.66
6	5397.00	53.6 AV	54.0	-0.4	1.12 V	328	48.94	4.66
7	#5477.00	65.7 PK	68.2	-2.5	1.00 V	329	61.10	4.60
8	#10480.00	64.2 PK	68.2	-4.0	1.35 V	188	53.94	10.26
9	15720.00	58.8 PK	74.0	-15.2	1.00 V	241	44.13	14.67
10	15720.00	49.1 AV	54.0	-4.9	1.00 V	241	34.43	14.67

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT20)

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	5150.00	52.6 PK	74.0	-21.4	1.19 H	46	48.32	4.28
2	5150.00	41.0 AV	54.0	-13.0	1.19 H	46	36.72	4.28
3	*5180.00	105.0 PK			1.12 H	330	100.61	4.39
4	*5180.00	95.2 AV			1.12 H	330	90.81	4.39
5	5417.00	49.0 PK	74.0	-25.0	1.23 H	17	44.36	4.64
6	5417.00	40.4 AV	54.0	-13.6	1.23 H	17	35.76	4.64
7	#10360.00	55.4 PK	74.0	-18.6	1.14 H	333	45.34	10.06
8	#10360.00	42.5 AV	54.0	-11.5	1.14 H	333	32.44	10.06
9	15540.00	59.6 PK	74.0	-14.4	1.06 H	352	44.76	14.84
10	15540.00	46.1 AV	54.0	-7.9	1.06 H	352	31.26	14.84
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	5150.00	66.5 PK	74.0	-7.5	1.07 V	18	62.22	4.28
2	5150.00	53.2 AV	54.0	-0.8	1.07 V	18	48.92	4.28
3	*5180.00	117.6 PK			1.00 V	327	113.21	4.39
4	*5180.00	108.8 AV			1.00 V	327	104.41	4.39
5	5417.00	62.8 PK	74.0	-11.2	1.24 V	3	58.16	4.64
6	5417.00	52.5 AV	54.0	-1.5	1.24 V	3	47.86	4.64
7	#10360.00	55.8 PK	74.0	-18.2	1.29 V	187	45.74	10.06
8	#10360.00	43.6 AV	54.0	-10.4	1.29 V	187	33.54	10.06
9	15540.00	60.1 PK	74.0	-13.9	1.20 V	133	45.26	14.84
10	15540.00	47.1 AV	54.0	-6.9	1.20 V	133	32.26	14.84

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

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	5150.00	50.0 PK	74.0	-24.0	1.21 H	42	45.72	4.28
2	5150.00	40.9 AV	54.0	-13.1	1.21 H	42	36.62	4.28
3	*5200.00	108.3 PK			1.13 H	331	103.86	4.44
4	*5200.00	97.8 AV			1.13 H	331	93.36	4.44
5	5357.00	48.5 PK	74.0	-25.5	1.15 H	38	43.96	4.54
6	5357.00	39.8 AV	54.0	-14.2	1.15 H	38	35.26	4.54
7	5436.00	47.9 PK	74.0	-26.1	1.26 H	32	43.26	4.64
8	5436.00	39.6 AV	54.0	-14.4	1.26 H	32	34.96	4.64
9	#10400.00	53.8 PK	74.0	-20.2	1.19 H	315	43.73	10.07
10	#10400.00	41.2 AV	54.0	-12.8	1.19 H	315	31.13	10.07
11	15600.00	49.5 PK	74.0	-24.5	1.32 H	19	34.44	15.06
12	15600.00	43.2 AV	54.0	-10.8	1.32 H	19	28.14	15.06
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	5150.00	62.1 PK	74.0	-11.9	1.22 V	12	57.82	4.28
2	5150.00	46.7 AV	54.0	-7.3	1.22 V	12	42.42	4.28
3	*5200.00	121.3 PK			1.08 V	27	116.86	4.44
4	*5200.00	111.7 AV			1.08 V	27	107.26	4.44
5	5357.00	62.8 PK	74.0	-11.2	1.20 V	271	58.26	4.54
6	5357.00	52.3 AV	54.0	-1.7	1.20 V	271	47.76	4.54
7	5436.00	64.2 PK	74.0	-9.8	1.24 V	247	59.56	4.64
8	5436.00	53.7 AV	54.0	-0.3	1.24 V	247	49.06	4.64
9	#10400.00	63.6 PK	74.0	-10.4	1.26 V	205	53.53	10.07
10	#10400.00	49.9 AV	54.0	-4.1	1.26 V	205	39.83	10.07
11	15600.00	60.4 PK	74.0	-13.6	1.03 V	230	45.34	15.06
12	15600.00	48.7 AV	54.0	-5.3	1.03 V	230	33.64	15.06

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	4997.00	48.7 PK	74.0	-25.3	1.00 H	0	44.83	3.87
2	4997.00	40.0 AV	54.0	-14.0	1.00 H	0	36.13	3.87
3	*5240.00	112.5 PK			1.10 H	324	108.09	4.41
4	*5240.00	101.7 AV			1.10 H	324	97.29	4.41
5	5397.00	48.7 PK	74.0	-25.3	1.23 H	27	44.04	4.66
6	5397.00	35.7 AV	54.0	-18.3	1.23 H	27	31.04	4.66
7	#5477.00	51.2 PK	68.2	-17.0	1.23 H	46	46.60	4.60
8	#10480.00	54.6 PK	68.2	-13.6	1.14 H	305	44.34	10.26
9	15720.00	49.7 PK	74.0	-24.3	1.30 H	10	35.03	14.67
10	15720.00	42.5 AV	54.0	-11.5	1.30 H	10	27.83	14.67
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	4997.00	58.8 PK	74.0	-15.2	1.14 V	354	54.93	3.87
2	4997.00	49.2 AV	54.0	-4.8	1.14 V	354	45.33	3.87
3	*5240.00	124.7 PK			1.02 V	12	120.29	4.41
4	*5240.00	115.0 AV			1.02 V	12	110.59	4.41
5	5397.00	64.7 PK	74.0	-9.3	1.14 V	341	60.04	4.66
6	5397.00	53.4 AV	54.0	-0.6	1.14 V	341	48.74	4.66
7	#5477.00	66.1 PK	68.2	-2.1	1.35 V	315	61.50	4.60
8	#10480.00	64.5 PK	68.2	-3.7	1.38 V	174	54.24	10.26
9	15720.00	58.6 PK	74.0	-15.4	1.01 V	233	43.93	14.67
10	15720.00	47.9 AV	54.0	-6.1	1.01 V	233	33.23	14.67

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT40)

CHANNEL	TX Channel 38	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	5150.00	55.2 PK	74.0	-18.8	1.28 H	37	50.92	4.28
2	5150.00	42.7 AV	54.0	-11.3	1.28 H	37	38.42	4.28
3	*5190.00	102.6 PK			1.09 H	331	98.19	4.41
4	*5190.00	92.4 AV			1.09 H	331	87.99	4.41
5	#10380.00	53.9 PK	74.0	-20.1	1.18 H	319	43.83	10.07
6	#10380.00	40.2 AV	54.0	-13.8	1.18 H	319	30.13	10.07
7	15570.00	49.4 PK	74.0	-24.6	1.29 H	213	34.45	14.95
8	15570.00	41.2 AV	54.0	-12.8	1.29 H	213	26.25	14.95
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	5150.00	67.9 PK	74.0	-6.1	1.07 V	330	63.62	4.28
2	5150.00	53.2 AV	54.0	-0.8	1.07 V	330	48.92	4.28
3	*5190.00	112.1 PK			1.05 V	331	107.69	4.41
4	*5190.00	103.7 AV			1.05 V	331	99.29	4.41
5	#10380.00	56.6 PK	74.0	-17.4	1.25 V	195	46.53	10.07
6	#10380.00	43.2 AV	54.0	-10.8	1.25 V	195	33.13	10.07
7	15570.00	60.8 PK	74.0	-13.2	1.20 V	321	45.85	14.95
8	15570.00	47.9 AV	54.0	-6.1	1.20 V	321	32.95	14.95

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	5150.00	55.6 PK	74.0	-18.4	1.24 H	39	51.32	4.28
2	5150.00	42.1 AV	54.0	-11.9	1.24 H	39	37.82	4.28
3	*5230.00	110.7 PK			1.08 H	337	106.28	4.42
4	*5230.00	110.1 AV			1.08 H	337	105.68	4.42
5	5454.00	49.6 PK	74.0	-24.4	1.34 H	217	44.98	4.62
6	5454.00	41.2 AV	54.0	-12.8	1.34 H	217	36.58	4.62
7	#10460.00	54.3 PK	74.0	-19.7	1.17 H	326	44.09	10.21
8	#10460.00	41.5 AV	54.0	-12.5	1.17 H	326	31.29	10.21
9	15690.00	50.2 PK	74.0	-23.8	1.31 H	14	35.52	14.68
10	15690.00	42.2 AV	54.0	-11.8	1.31 H	14	27.52	14.68
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	5150.00	67.9 PK	74.0	-6.1	1.05 V	341	63.62	4.28
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.05 V**	**341**	**49.62**	**4.28**
3	*5230.00	120.1 PK			1.04 V	331	115.68	4.42
4	*5230.00	111.1 AV			1.04 V	331	106.68	4.42
5	5454.00	62.1 PK	74.0	-11.9	1.04 V	93	57.48	4.62
6	5454.00	51.0 AV	54.0	-3.0	1.04 V	93	46.38	4.62
7	#10460.00	58.6 PK	74.0	-15.4	1.06 V	200	48.39	10.21
8	#10460.00	47.2 AV	54.0	-6.8	1.06 V	200	36.99	10.21
9	15690.00	61.2 PK	74.0	-12.8	1.23 V	325	46.52	14.68
10	15690.00	48.2 AV	54.0	-5.8	1.23 V	325	33.52	14.68

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT80)

CHANNEL	TX Channel 42	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	5150.00	54.7 PK	74.0	-19.3	1.27 H	217	50.42	4.28
2	5150.00	44.2 AV	54.0	-9.8	1.27 H	217	39.92	4.28
3	*5210.00	99.3 PK			1.09 H	331	94.87	4.43
4	*5210.00	89.3 AV			1.09 H	331	84.87	4.43
5	5350.00	43.7 PK	74.0	-30.3	1.29 H	43	39.19	4.51
6	5350.00	33.6 AV	54.0	-20.4	1.29 H	43	29.09	4.51
7	#10420.00	54.3 PK	74.0	-19.7	1.19 H	328	44.19	10.11
8	#10420.00	41.4 AV	54.0	-12.6	1.19 H	328	31.29	10.11
9	15630.00	49.8 PK	74.0	-24.2	1.32 H	27	34.86	14.94
10	15630.00	40.2 AV	54.0	-13.8	1.32 H	27	25.26	14.94
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	5150.00	65.8 PK	74.0	-8.2	1.07 V	333	61.52	4.28
2	5150.00	53.4 AV	54.0	-0.6	1.07 V	333	49.12	4.28
3	*5210.00	109.9 PK			1.04 V	331	105.47	4.43
4	*5210.00	101.5 AV			1.04 V	331	97.07	4.43
5	5350.00	55.2 PK	74.0	-18.8	1.07 V	333	50.69	4.51
6	5350.00	42.5 AV	54.0	-11.5	1.07 V	333	37.99	4.51
7	#10420.00	54.7 PK	74.0	-19.3	1.00 V	20	44.59	10.11
8	#10420.00	42.3 AV	54.0	-11.7	1.00 V	20	32.19	10.11
9	15630.00	60.6 PK	74.0	-13.4	1.02 V	321	45.66	14.94
10	15630.00	47.9 AV	54.0	-6.1	1.02 V	321	32.96	14.94

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz Data:

802.11a

CHANNEL	TX Channel 40	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	Below 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	105.50	38.6 QP	43.5	-4.9	1.00 H	354	55.18	-16.57
2	467.87	42.7 QP	46.0	-3.4	2.00 H	225	49.99	-7.34
3	519.45	42.2 QP	46.0	-3.8	1.00 H	350	48.50	-6.32
4	604.06	44.2 QP	46.0	-1.8	1.50 H	337	48.22	-4.06
5	608.92	42.8 QP	46.0	-3.2	1.00 H	343	46.69	-3.85
6	807.74	44.9 QP	46.0	-1.1	2.00 H	158	45.37	-0.51
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	57.58	38.9 QP	40.0	-1.2	2.00 V	304	52.29	-13.44
2	75.07	37.8 QP	40.0	-2.3	1.00 V	190	54.12	-16.37
3	468.61	42.9 QP	46.0	-3.1	1.50 V	133	50.25	-7.33
4	577.49	40.9 QP	46.0	-5.1	2.00 V	346	45.93	-5.00
5	622.31	42.4 QP	46.0	-3.7	1.50 V	360	46.05	-3.70
6	653.89	43.4 QP	46.0	-2.6	1.00 V	317	46.76	-3.34

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

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.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	ENV216	100071	Nov. 10, 2014	Nov. 09, 2015
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 10 , 2014	Mar. 09, 2015
50 ohms Terminator	N/A	EMC-03	Sep. 22, 2014	Sep. 21, 2015
50 ohms Terminator	N/A	EMC-02	Sep. 30, 2014	Sep. 29, 2015
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 Shielded Room No. C.
3 The VCCI Con C Registration No. is C-3611.
4 Tested Date: Jan. 06 to Mar. 02, 2015

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/ 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.

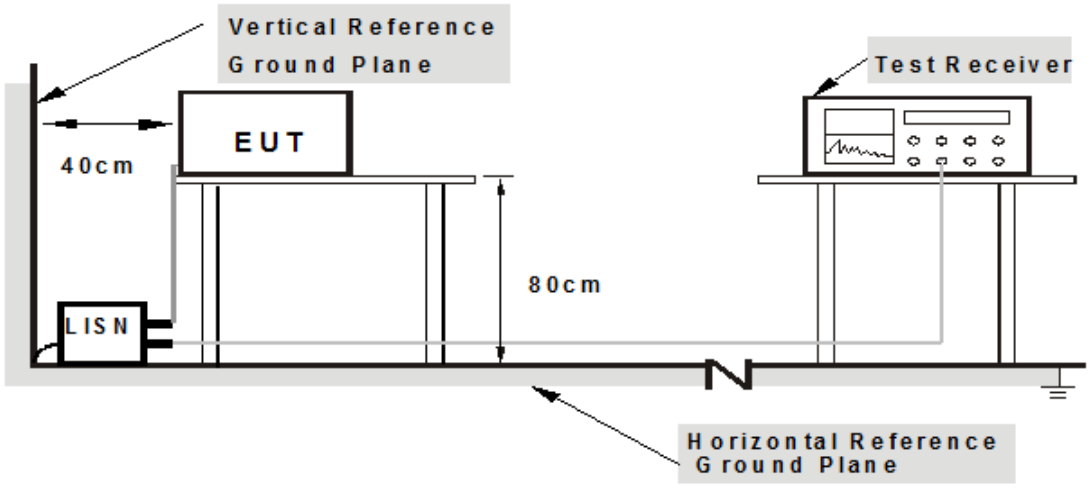
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

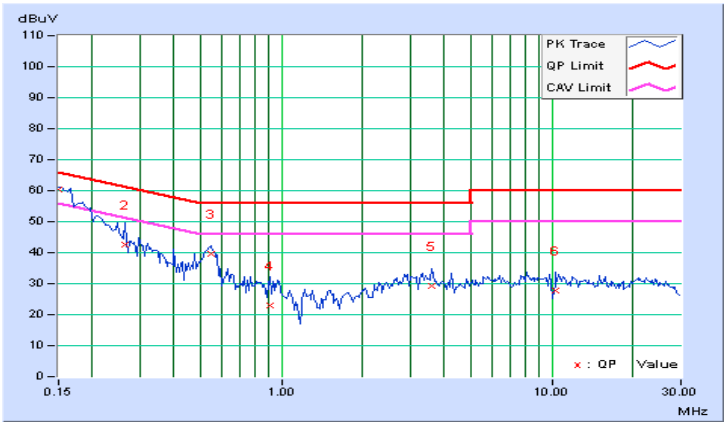
4.2.7 Test Results (Mode 1)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.07	60.14	46.24	60.21	46.31	66.00	56.00	-5.79	-9.69
2	0.26328	0.08	42.40	26.38	42.48	26.46	61.33	51.33	-18.85	-24.87
3	0.54844	0.10	39.52	31.56	39.62	31.66	56.00	46.00	-16.38	-14.34
4	0.90391	0.12	22.86	13.56	22.98	13.68	56.00	46.00	-33.02	-32.32
5	3.58203	0.24	29.02	23.76	29.26	24.00	56.00	46.00	-26.74	-22.00
6	10.37109	0.46	27.30	21.32	27.76	21.78	60.00	50.00	-32.24	-28.22

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.

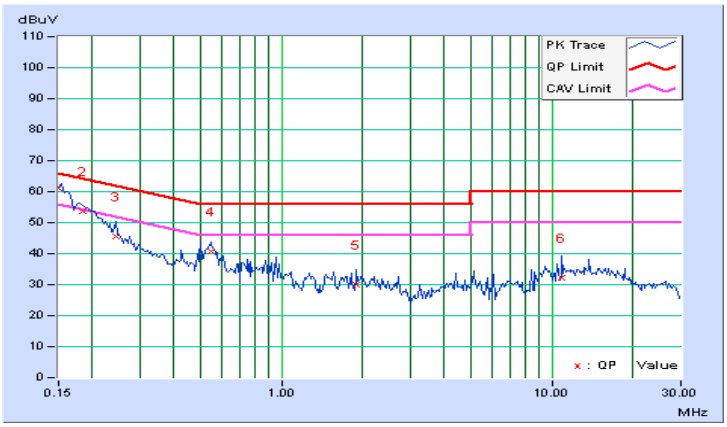


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.07	60.86	46.48	60.93	46.55	66.00	56.00	-5.07	-9.45
2	0.18516	0.06	53.82	41.12	53.88	41.18	64.25	54.25	-10.37	-13.07
3	0.24375	0.07	45.36	31.78	45.43	31.85	61.97	51.97	-16.54	-20.12
4	0.54844	0.10	40.70	33.14	40.80	33.24	56.00	46.00	-15.20	-12.76
5	1.89453	0.17	29.74	23.78	29.91	23.95	56.00	46.00	-26.09	-22.05
6	10.87500	0.49	31.76	25.54	32.25	26.03	60.00	50.00	-27.75	-23.97

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.



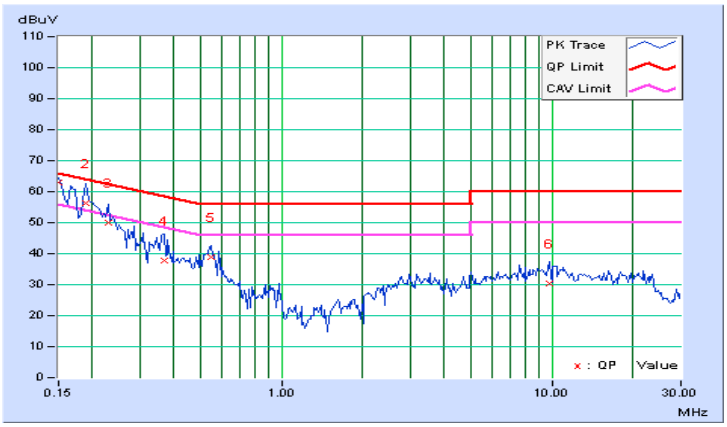
4.2.8 Test Results (Mode 2)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.07	63.04	42.96	63.11	43.03	66.00	56.00	-2.89	-12.97
2	0.18906	0.07	56.34	40.70	56.41	40.77	64.08	54.08	-7.67	-13.31
3	0.22812	0.07	49.85	34.79	49.92	34.86	62.52	52.52	-12.60	-17.66
4	0.36875	0.09	37.75	23.28	37.84	23.37	58.53	48.53	-20.69	-25.16
5	0.54844	0.10	38.90	31.47	39.00	31.57	56.00	46.00	-17.00	-14.43
6	9.75000	0.44	29.82	24.54	30.26	24.98	60.00	50.00	-29.74	-25.02

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.

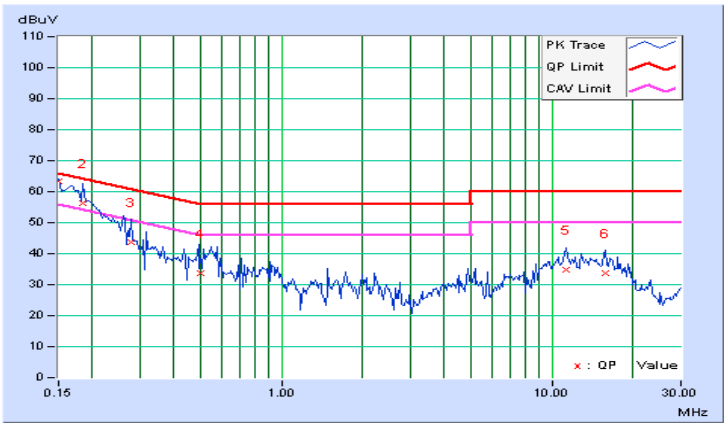


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15000**	**0.07**	**63.14**	**43.53**	**63.21**	**43.60**	**66.00**	**56.00**	**-2.79**	**-12.40**
2	0.18516	0.06	56.32	35.05	56.38	35.11	64.25	54.25	-7.87	-19.14
3	0.27891	0.07	43.67	31.20	43.74	31.27	60.85	50.85	-17.11	-19.58
4	0.50000	0.10	33.72	25.00	33.82	25.10	56.00	46.00	-22.18	-20.90
5	11.28516	0.50	34.15	29.12	34.65	29.62	60.00	50.00	-25.35	-20.38
6	15.73438	0.63	33.23	28.01	33.86	28.64	60.00	50.00	-26.14	-21.36

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.



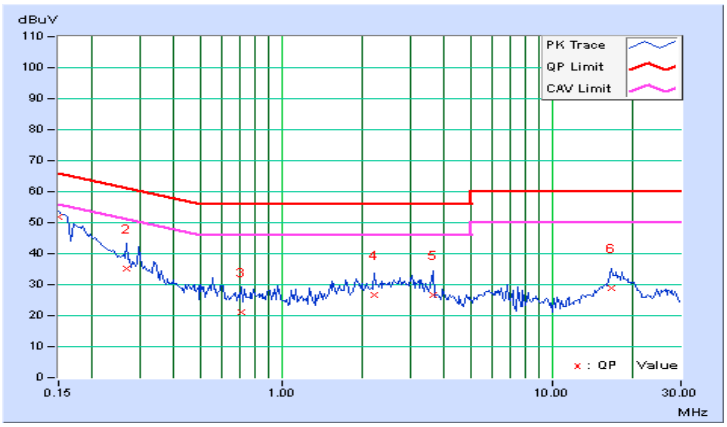
4.2.9 Test Results (Mode 3)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.07	51.94	38.90	52.01	38.97	66.00	56.00	-13.99	-17.03
2	0.26719	0.08	35.28	24.08	35.36	24.16	61.20	51.20	-25.85	-27.05
3	0.71250	0.11	20.82	15.84	20.93	15.95	56.00	46.00	-35.07	-30.05
4	2.20703	0.19	26.44	21.50	26.63	21.69	56.00	46.00	-29.37	-24.31
5	3.63281	0.24	26.28	19.22	26.52	19.46	56.00	46.00	-29.48	-26.54
6	16.58984	0.62	28.26	22.34	28.88	22.96	60.00	50.00	-31.12	-27.04

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.

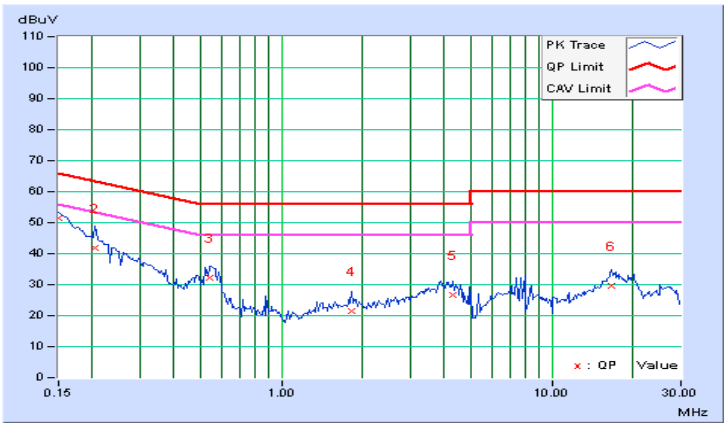


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.07	51.42	38.42	51.49	38.49	66.00	56.00	-14.51	-17.51
2	0.20469	0.06	41.92	29.22	41.98	29.28	63.42	53.42	-21.44	-24.14
3	0.54453	0.10	32.26	27.10	32.36	27.20	56.00	46.00	-23.64	-18.80
4	1.82422	0.17	21.24	15.46	21.41	15.63	56.00	46.00	-34.59	-30.37
5	4.32031	0.27	26.22	19.06	26.49	19.33	56.00	46.00	-29.51	-26.67
6	16.53125	0.65	28.98	22.96	29.63	23.61	60.00	50.00	-30.37	-26.39

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.



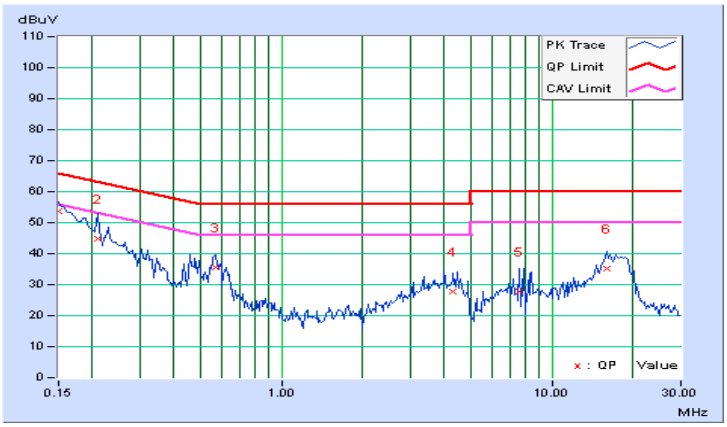
4.2.10 Test Results (Mode 4)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.07	53.48	39.11	53.55	39.18	66.00	56.00	-12.45	-16.82
2	0.20859	0.07	44.72	31.22	44.79	31.29	63.26	53.26	-18.47	-21.97
3	0.56797	0.10	35.64	31.12	35.74	31.22	56.00	46.00	-20.26	-14.78
4	4.27734	0.26	27.69	20.92	27.95	21.18	56.00	46.00	-28.05	-24.82
5	7.57031	0.37	27.54	16.42	27.91	16.79	60.00	50.00	-32.09	-33.21
6	16.05078	0.61	34.74	28.18	35.35	28.79	60.00	50.00	-24.65	-21.21

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.

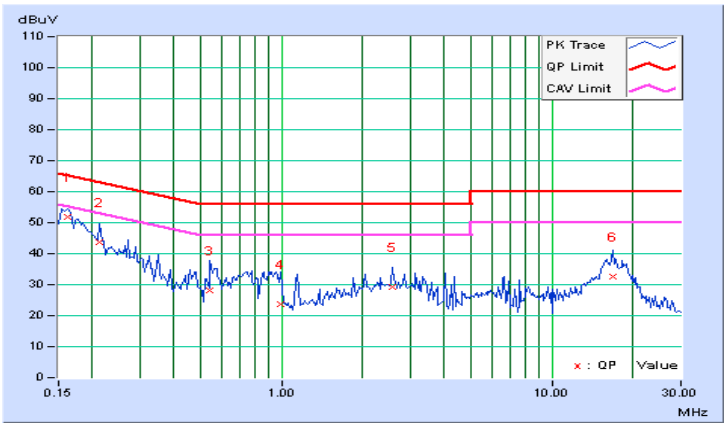


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	0.06	51.92	38.54	51.98	38.60	65.38	55.38	-13.39	-16.77
2	0.21250	0.06	43.50	31.18	43.56	31.24	63.11	53.11	-19.55	-21.87
3	0.54453	0.10	28.16	17.84	28.26	17.94	56.00	46.00	-27.74	-28.06
4	0.99766	0.13	23.72	17.23	23.85	17.36	56.00	46.00	-32.15	-28.64
5	2.57031	0.20	29.15	23.85	29.35	24.05	56.00	46.00	-26.65	-21.95
6	16.90234	0.66	31.86	25.48	32.52	26.14	60.00	50.00	-27.48	-23.86

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.



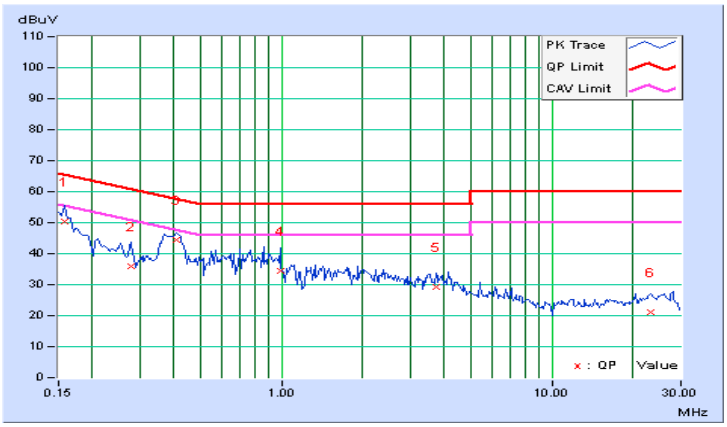
4.2.11 Test Results (Mode 5)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.07	50.20	35.42	50.27	35.49	65.58	55.58	-15.31	-20.09
2	0.27891	0.08	35.80	23.58	35.88	23.66	60.85	50.85	-24.97	-27.19
3	0.40781	0.09	44.32	35.18	44.41	35.27	57.69	47.69	-13.28	-12.42
4	0.99375	0.13	34.34	24.88	34.47	25.01	56.00	46.00	-21.53	-20.99
5	3.72266	0.24	28.86	22.20	29.10	22.44	56.00	46.00	-26.90	-23.56
6	23.21094	0.76	20.48	14.38	21.24	15.14	60.00	50.00	-38.76	-34.86

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.

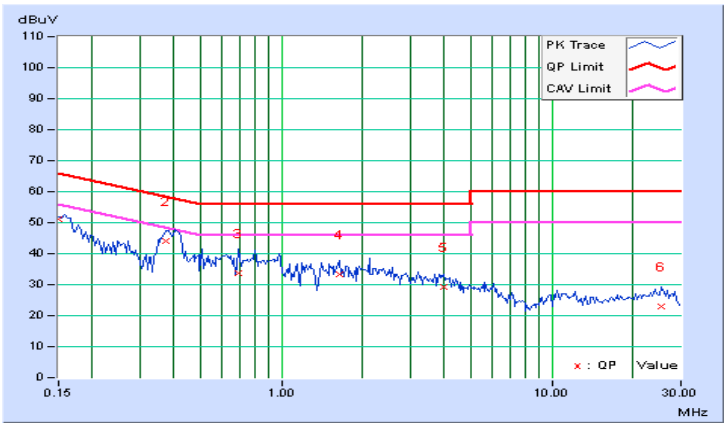


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.07	51.08	36.76	51.15	36.83	66.00	56.00	-14.85	-19.17
2	0.37266	0.09	43.92	33.80	44.01	33.89	58.44	48.44	-14.44	-14.56
3	0.68906	0.11	33.62	22.32	33.73	22.43	56.00	46.00	-22.27	-23.57
4	1.64063	0.16	33.24	26.06	33.40	26.22	56.00	46.00	-22.60	-19.78
5	3.99219	0.26	28.94	22.20	29.20	22.46	56.00	46.00	-26.80	-23.54
6	25.48828	0.86	22.26	16.40	23.12	17.26	60.00	50.00	-36.88	-32.74

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.



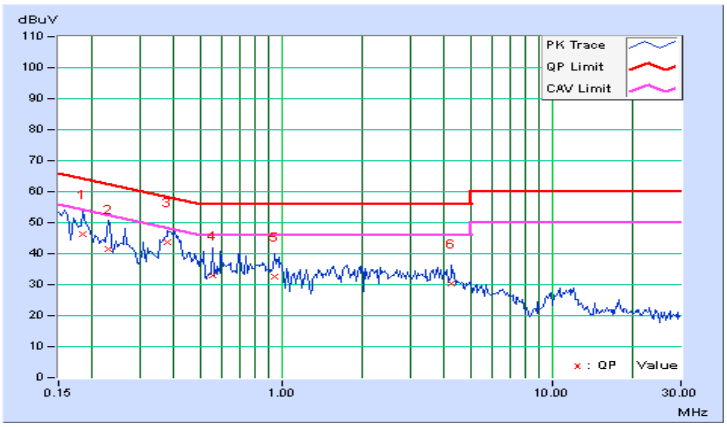
4.2.12 Test Results (Mode 6)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18516	0.07	46.16	32.46	46.23	32.53	64.25	54.25	-18.02	-21.72
2	0.22812	0.07	41.37	28.05	41.44	28.12	62.52	52.52	-21.08	-24.40
3	0.38047	0.09	43.56	33.74	43.65	33.83	58.27	48.27	-14.62	-14.44
4	0.55625	0.10	32.77	18.61	32.87	18.71	56.00	46.00	-23.13	-27.29
5	0.94297	0.13	32.50	24.78	32.63	24.91	56.00	46.00	-23.37	-21.09
6	4.26953	0.26	30.15	22.85	30.41	23.11	56.00	46.00	-25.59	-22.89

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.

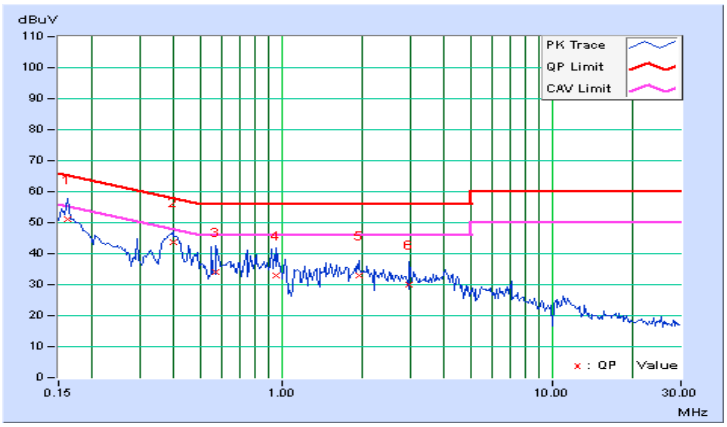


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	0.06	51.06	35.19	51.12	35.25	65.38	55.38	-14.25	-20.12
2	0.39609	0.09	43.56	36.55	43.65	36.64	57.93	47.93	-14.29	-11.30
3	0.57188	0.10	34.10	22.47	34.20	22.57	56.00	46.00	-21.80	-23.43
4	0.95859	0.13	32.85	26.38	32.98	26.51	56.00	46.00	-23.02	-19.49
5	1.92969	0.18	32.64	25.40	32.82	25.58	56.00	46.00	-23.18	-20.42
6	2.96094	0.22	29.66	22.81	29.88	23.03	56.00	46.00	-26.12	-22.97

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.



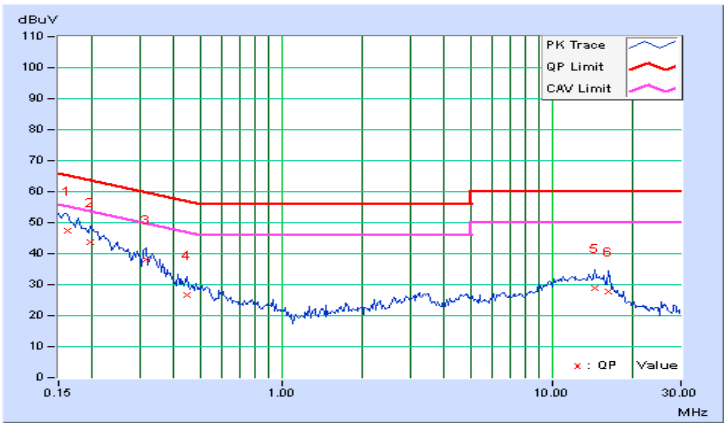
4.2.13 Test Results (Mode 7)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	0.07	47.16	36.70	47.23	36.77	65.38	55.38	-18.15	-18.61
2	0.19687	0.07	43.50	32.42	43.57	32.49	63.74	53.74	-20.17	-21.25
3	0.31797	0.08	37.96	31.66	38.04	31.74	59.76	49.76	-21.72	-18.02
4	0.44688	0.09	26.72	17.84	26.81	17.93	56.93	46.93	-30.12	-29.00
5	14.42969	0.57	28.42	23.78	28.99	24.35	60.00	50.00	-31.01	-25.65
6	16.20703	0.61	27.14	21.32	27.75	21.93	60.00	50.00	-32.25	-28.07

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.

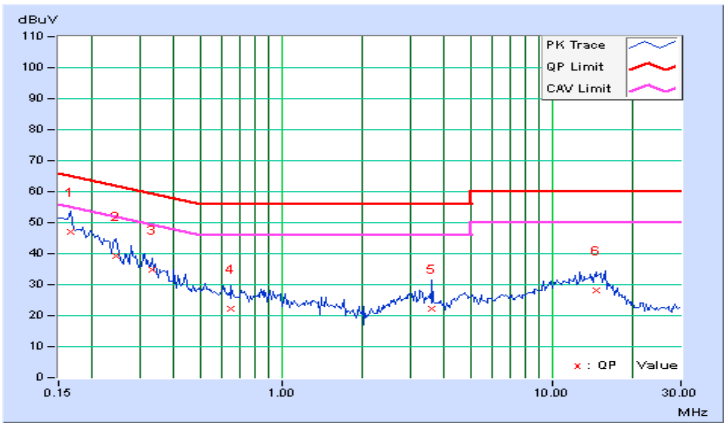


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	0.06	46.80	33.32	46.86	33.38	65.18	55.18	-18.31	-21.79
2	0.24375	0.07	39.18	29.92	39.25	29.99	61.97	51.97	-22.72	-21.98
3	0.33359	0.08	34.70	28.90	34.78	28.98	59.36	49.36	-24.58	-20.38
4	0.65391	0.11	22.20	13.78	22.31	13.89	56.00	46.00	-33.69	-32.11
5	3.61328	0.24	22.12	13.28	22.36	13.52	56.00	46.00	-33.64	-32.48
6	14.60547	0.60	27.50	22.96	28.10	23.56	60.00	50.00	-31.90	-26.44

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.



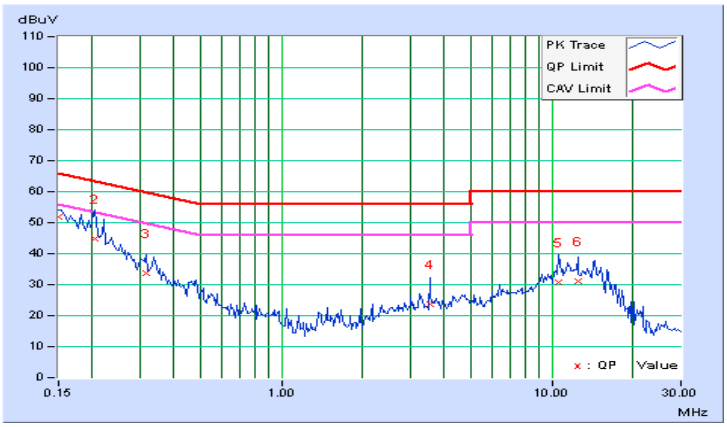
4.2.14 Test Results (Mode 8)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.07	51.86	39.81	51.93	39.88	66.00	56.00	-14.07	-16.12
2	0.20469	0.07	44.76	29.03	44.83	29.10	63.42	53.42	-18.59	-24.32
3	0.31797	0.08	33.69	23.33	33.77	23.41	59.76	49.76	-25.99	-26.35
4	3.55469	0.23	23.36	13.93	23.59	14.16	56.00	46.00	-32.41	-31.84
5	10.59375	0.47	30.39	25.24	30.86	25.71	60.00	50.00	-29.14	-24.29
6	12.48438	0.52	30.46	25.27	30.98	25.79	60.00	50.00	-29.02	-24.21

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.

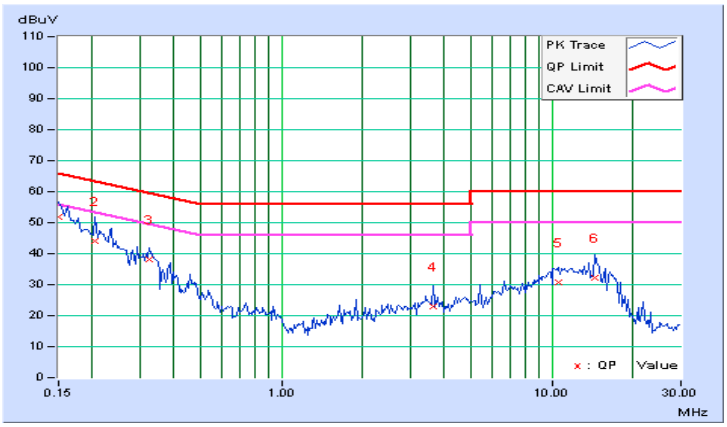


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.07	51.71	39.79	51.78	39.86	66.00	56.00	-14.22	-16.14
2	0.20469	0.06	44.03	31.10	44.09	31.16	63.42	53.42	-19.33	-22.26
3	0.32578	0.08	37.89	33.89	37.97	33.97	59.56	49.56	-21.59	-15.59
4	3.62109	0.24	22.60	13.95	22.84	14.19	56.00	46.00	-33.16	-31.81
5	10.58594	0.48	30.09	25.70	30.57	26.18	60.00	50.00	-29.43	-23.82
6	14.41016	0.59	31.68	25.75	32.27	26.34	60.00	50.00	-27.73	-23.66

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.



4.3 Transmit Power Measurment

4.3.1 Limits of Transmit Power Measurement

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p ≦ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
	√	Indoor Access Point	1 Watt (30 dBm)
		Mobile and Portable client device	250mW (24 dBm)
U-NII-2A			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3			1 Watt (30 dBm)

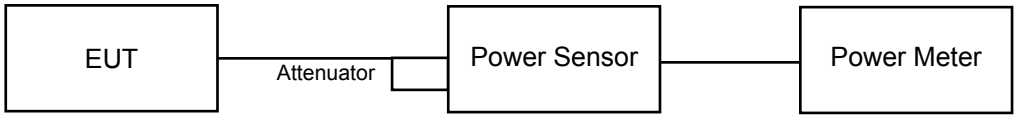
*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedures

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 Test Results

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	18.07	18.37	18.52	18.69	277.91	24.44	28.75	Pass
40	5200	22.15	22.37	22.52	22.71	701.93	28.46	28.75	Pass
48	5240	22.06	22.35	22.43	22.61	689.86	28.39	28.75	Pass

NOTE: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2$ / 4] = 7.25dBi > 6dBi , so the power limit shall be reduced to 30-(7.25-6) = 28.75dBm.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	18.02	18.39	18.56	18.76	279.352	24.46	28.75	Pass
40	5200	22.12	22.31	22.16	22.48	674.594	28.29	28.75	Pass
48	5240	22.24	22.46	22.43	22.61	701.067	28.46	28.75	Pass

NOTE: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2$ / 4] = 7.25dBi > 6dBi , so the power limit shall be reduced to 30-(7.25-6) = 28.75dBm.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	16.02	16.11	16.42	16.56	169.969	22.30	28.75	Pass
46	5230	22.16	22.11	22.37	22.43	674.561	28.29	28.75	Pass

NOTE: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2$ / 4] = 7.25dBi > 6dBi , so the power limit shall be reduced to 30-(7.25-6) = 28.75dBm.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	14.65	15.03	15.45	15.43	131.005	21.17	28.75	Pass

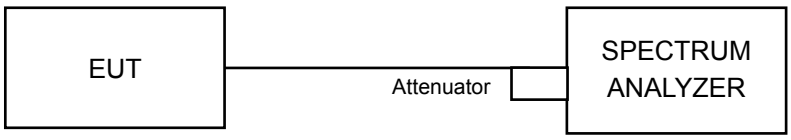
NOTE: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2$ / 4] = 7.25dBi > 6dBi , so the power limit shall be reduced to 30-(7.25-6) = 28.75dBm.

4.4 Peak Power Spectral Density Measurement

4.4.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
	√	Indoor Access Point	
		Mobile and Portable client device	11dBm/ MHz
U-NII-2A			11dBm/ MHz
U-NII-2C			11dBm/ MHz
U-NII-3			30dBm/ MHz

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

Using method SA-1
a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
b. Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
c. Sweep time = auto, trigger set to “free run”.
d. Trace average at least 100 traces in power averaging mode.
e. Record the max value

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm)				Total Power Density (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
36	5180	3.75	4.77	4.16	4.82	10.42	15.75	Pass
40	5200	7.76	8.24	8.54	8.85	14.39	15.75	Pass
48	5240	7.69	6.91	8.62	9.15	14.20	15.75	Pass

NOTE: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2$ / 4] = 7.25dBi > 6dBi , so the power density limit shall be reduced to 17-(7.25-6) = 15.75dBm.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm)				Total Power Density (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
36	5180	4.67	4.20	4.11	4.66	10.44	15.75	Pass
40	5200	7.84	7.84	8.07	8.36	14.05	15.75	Pass
48	5240	7.37	5.75	8.27	8.27	13.55	15.75	Pass

NOTE: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2$ / 4] = 7.25dBi > 6dBi , so the power density limit shall be reduced to 17-(7.25-6) = 15.75dBm.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD (dBm)				Total Power Density (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
38	5190	-0.38	-1.35	-0.68	-0.26	5.37	15.75	Pass
46	5230	4.50	4.69	4.98	4.95	10.81	15.75	Pass

NOTE: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2$ / 4] = 7.25dBi > 6dBi , so the power density limit shall be reduced to 17-(7.25-6) = 15.75dBm.

802.11ac (VHT80):

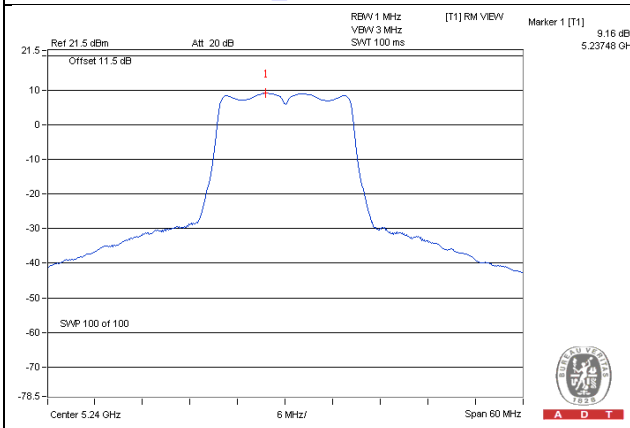
Chan.	Chan. Freq. (MHz)	PSD (dBm)				Total Power Density (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
42	5210	-5.20	-5.60	-5.39	-5.04	0.72	15.75	Pass

NOTE: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

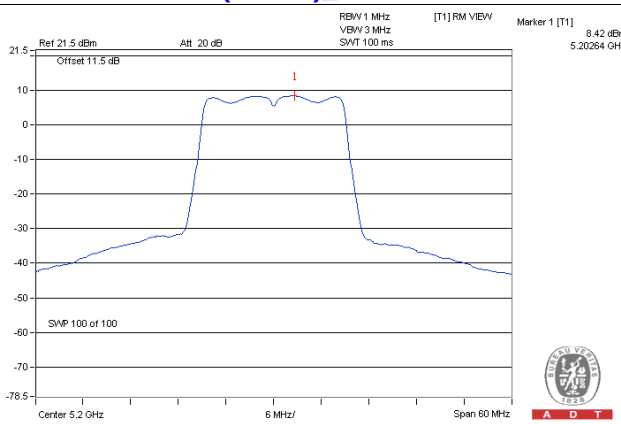
2. Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$ + $10^{G4/20}$)^2 / 4] = 7.25dBi > 6dBi , so the power density limit shall be reduced to 17-(7.25-6) = 15.75dBm.

Spectrum Plot of Worst Value

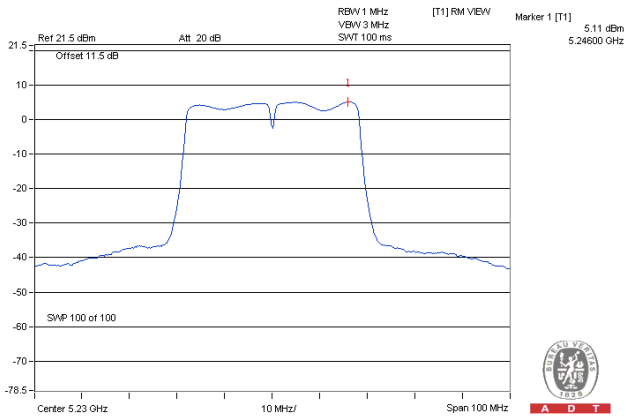
802.11a_Chain 3 / CH48



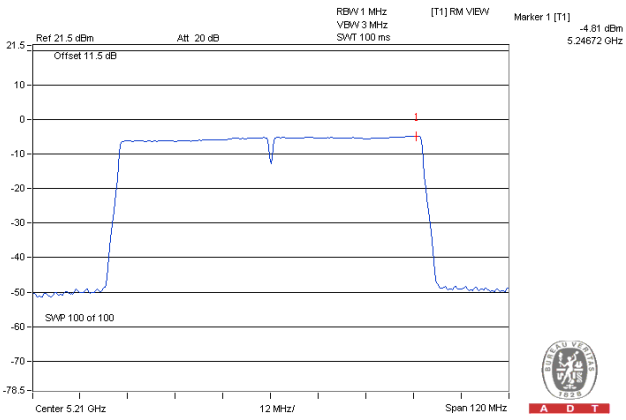
802.11ac (VHT20)_Chain 3 / CH40



802.11ac (VHT40)_Chain 2 / CH46



802.11ac (VHT80)_Chain 3 / CH42

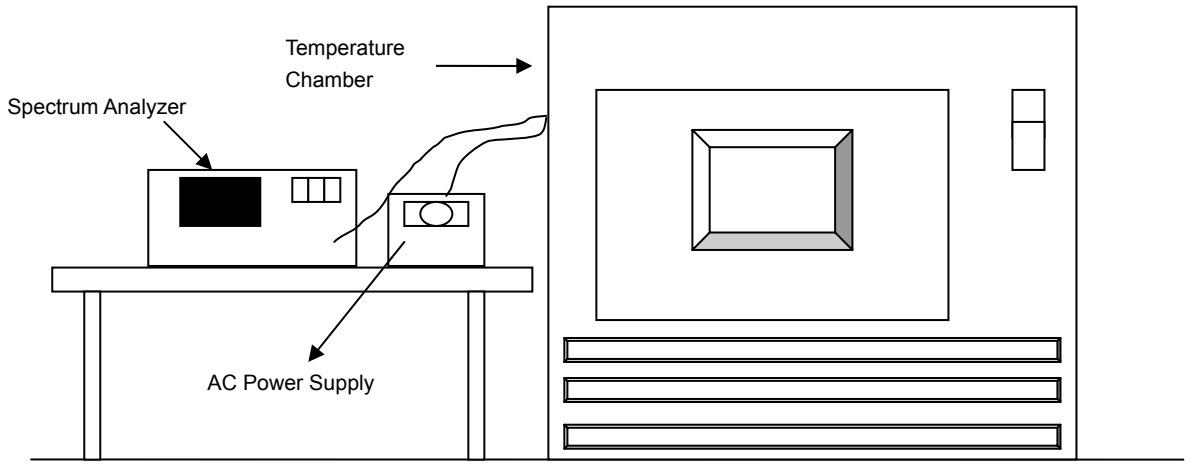


4.5 Frequency Stability Measurement

4.5.1 Limits of Frequency Stability Measurement

The frequency of the carrier signal shall be maintained within band of operation

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
b. Turn the EUT on and couple its output to a spectrum analyzer.
c. Turn the EUT off and set the chamber to the highest temperature specified.
d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

Set the EUT transmit at un-modulation mode to test frequency stability.

4.5.7 Test Results

Frequemcy Stability Versus Temp.									
Operating Frequency: 5240MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	120	5239.9874	-0.00024	5239.9844	-0.00030	5239.988	-0.00023	5239.9863	-0.00026
40	120	5239.986	-0.00027	5239.9874	-0.00024	5239.9828	-0.00033	5239.9872	-0.00024
30	120	5239.9725	-0.00052	5239.9722	-0.00053	5239.9752	-0.00047	5239.9766	-0.00045
20	120	5240.0035	0.00007	5240.0032	0.00006	5239.9992	-0.00002	5240.0017	0.00003
10	120	5239.9809	-0.00036	5239.984	-0.00031	5239.9827	-0.00033	5239.982	-0.00034
0	120	5239.9966	-0.00006	5239.9969	-0.00006	5239.9977	-0.00004	5239.9953	-0.00009
-10	120	5239.9771	-0.00044	5239.9791	-0.00040	5239.9773	-0.00043	5239.9813	-0.00036
-20	120	5240.0159	0.00030	5240.0169	0.00032	5240.0178	0.00034	5240.0162	0.00031
-30	120	5239.9801	-0.00038	5239.9772	-0.00044	5239.9782	-0.00042	5239.9762	-0.00045

Frequemcy Stability Versus Temp.									
Operating Frequency: 5240MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5240.0037	0.00007	5240.0035	0.00007	5239.9991	-0.00002	5240.0013	0.00002
	120	5240.0035	0.00007	5240.0032	0.00006	5239.9992	-0.00002	5240.0017	0.00003
	102	5240.0035	0.00007	5240.003	0.00006	5239.9992	-0.00002	5240.0022	0.00004

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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