FCC Test Report
(Co-Located)

Report No.:	RF171005D11-2
FCC ID:	PY317300391
Test Model:	R6350
Received Date:	Oct. 5, 2017
Test Date:	Dec. 11 ~ 27, 2017
Issued Date:	Dec. 27, 2017
Applicant:	NETGEAR INC.
Address:	350 East Plumeria Drive, San Jose, CA 95134, USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)
FCC Registration / Designation Number:	198487 / TW2021

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RF171005D11-2	Original release.	Dec. 27, 2017

1 Certificate of Conformity

Product:	AC1750 Smart WiFi Router
Brand:	NETGEAR
Test Model:	R6350
Sample Status:	Engineering sample
Applicant:	NETGEAR INC.
Test Date:	Dec. 11 ~ 27, 2017
Standard:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10: 2013

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

Prepared by : Annie Chang , **Date:** Dec. 27, 2017

Annie Chang / Senior Specialist

Approved by : Rex. Lai , **Date:** Dec. 27, 2017

Rex Lai / Associate Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -15.88dB at 0.16562MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.30dB at 2390.00MHz.

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	2.77 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	2.38 dB
	30MHz ~ 1000MHz	5.54 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	4.77 dB
	6GHz ~ 18GHz	5.48 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AC1750 Smart WiFi Router	
Brand	NETGEAR	
Test Model	R6350	
Status of EUT	Engineering sample	
Power Supply Rating	12Vdc from adapter (refer to note as below)	
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only.	
Modulation Technology	DSSS,OFDM	
Transfer Rate	2.4GHz	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
	5.0GHz	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 600Mbps 802.11ac: up to 1733Mbps
Operating Frequency	2412 ~ 2462MHz, 5180 ~ 5240MHz, 5745 ~ 5825MHz	
Number of Channel	2.4GHz	11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
	5.0GHz	**5180 ~ 5240MHz** 4 for 802.11a, 802.11n (20MHz), 802.11ac (20MHz) 2 for 802.11n (40MHz), 802.11ac (40MHz) 1 for 802.11ac (80MHz) **5745 ~ 5825MHz** 5 for 802.11a, 802.11n (20MHz), 802.11ac (20MHz) 2 for 802.11n (40MHz), 802.11ac (40MHz) 1 for 802.11ac (80MHz)
Output Power	2.4GHz	592.681mW
	5.0GHz	**5180 ~ 5240MHz:** 723.658mW **5745 ~ 5825MHz:** 829.502mW
Antenna Type	Refer to note as below	
Antenna Connector	Refer to note as below	
Accessory Device	N/A	
Data Cable Supplied	N/A	

Note:

1. The EUT provides 4 completed transmitters and 4 receivers.

Modulation Mode	TX Function		
	2.4GHz	5.0GHz (Non-Beamforming)	5.0GHz (Beamforming)
802.11a	-	4TX	-
802.11b	2TX	-	-
802.11g	2TX	-	-
802.11n (20MHz)	2TX	4TX	-
802.11n (40MHz)	2TX	4TX	-
802.11ac (20MHz)	-	4TX	4TX
802.11ac (40MHz)	-	4TX	4TX
802.11ac (80MHz)	-	4TX	4TX

2. The EUT uses following adapter.

Adapter	1	2
Brand	LEI	CWT
Model	ML18-F120150-A1	2ABB018F 1 NJ
P/N	332-10858-01	332-10927-01
AC Input Power	100-120V~ 50/60Hz 0.5A	100-120V~ 50/60Hz 0.6A
DC Output Power	12V, 1.5A	12V, 1.5A
Plug Type	US Plug	US Plug
Cable	Non-shielded DC cable (1.8m)	Non-shielded DC cable (1.8m)

After pre-tested, the **adapter 1** was the worst case for final test.

3. The 5GHz antennas provided to the EUT, please refer to the following table:

Frequency Band (MHz)	Chain No.	Antenna Type	Directional Gain (dBi)	Connectot Type
5180-5240	Chain 0	PIFA	6.92	N/A
	Chain 1	Dipole		I- PEX
	Chain 2	Dipole		I-PEX
	Chain 3	Dipole		I-PEX
5745-5825	Chain 0	PIFA	7.28	N/A
	Chain 1	Dipole		I- PEX
	Chain 2	Dipole		I-PEX
	Chain 3	Dipole		I-PEX

The directional gain info are from operation description of antenna specifications exhibit, which calculate by each degrees (15 degrees/step) to find worst case antenna configuration and define directional gain.

The directional antenna gain information is declared by manufacturer and more detailed features description please refer to operation description of antenna specifications exhibit.

4. The 2.4GHz antennas provided to the EUT, please refer to the following table:

Chain No.	Antenna Type	Antenna Gain (dBi)	Connectot Type
Chain 0	Dipole	2.61	I-PEX
Chain 1	Dipole	3.15	I-PEX

The directional gain table:

Frequency (MHz)	Max. Gain (dBi)
2412 ~ 2462	5.89

Note:

(i) If transmit signals are *correlated*, then

Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$ dBi [Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

5. 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 2412 ~ 2462MHz

11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

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

7 channels are provided for 802.11n (40MHz):

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

FOR 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (20MHz), 802.11ac (20MHz):

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

2 channels are provided for 802.11n (40MHz), 802.11ac (40MHz):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (80MHz):

Channel	Frequency
42	5210MHz

FOR 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (20MHz), 802.11ac (20MHz):

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

2 channels are provided for 802.11n (40MHz), 802.11ac (40MHz):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (80MHz):

Channel	Frequency
155	5775MHz

3.3 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE≥1G	RE<1G	PLC	
-	√	√	√	-

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission

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. BAND (MHz)	TESTED CHANNEL	MODULATION TECHNOLOGY
-	802.11b + 802.11a	2412 ~ 2462	6	DSSS
		5180 ~ 5240	40	OFDM
-	802.11b + 802.11ac (40MHz)	2412 ~ 2462	6	DSSS
		5745 ~ 5825	159	OFDM

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. BAND (MHz)	TESTED CHANNEL	MODULATION TECHNOLOGY
-	802.11b + 802.11a	2412 ~ 2462	6	DSSS
		5180 ~ 5240	40	OFDM
-	802.11b + 802.11ac (40MHz)	2412 ~ 2462	6	DSSS
		5745 ~ 5825	159	OFDM

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. BAND (MHz)	TESTED CHANNEL	MODULATION TECHNOLOGY
-	802.11b + 802.11a	2412 ~ 2462	6	DSSS
		5180 ~ 5240	40	OFDM
-	802.11b + 802.11ac (40MHz)	2412 ~ 2462	6	DSSS
		5745 ~ 5825	159	OFDM

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	28deg. C, 70%RH	120Vac, 60Hz	James Wei
RE<1G	20deg. C, 72%RH	120Vac, 60Hz	James Wei
PLC	22deg. C, 70%RH	120Vac, 60Hz	Ian Chang

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.	NOTEBOOK COMPUTER	DELL	PP27L	8SNZ12S	FCC DoC Approved	Provided by Lab

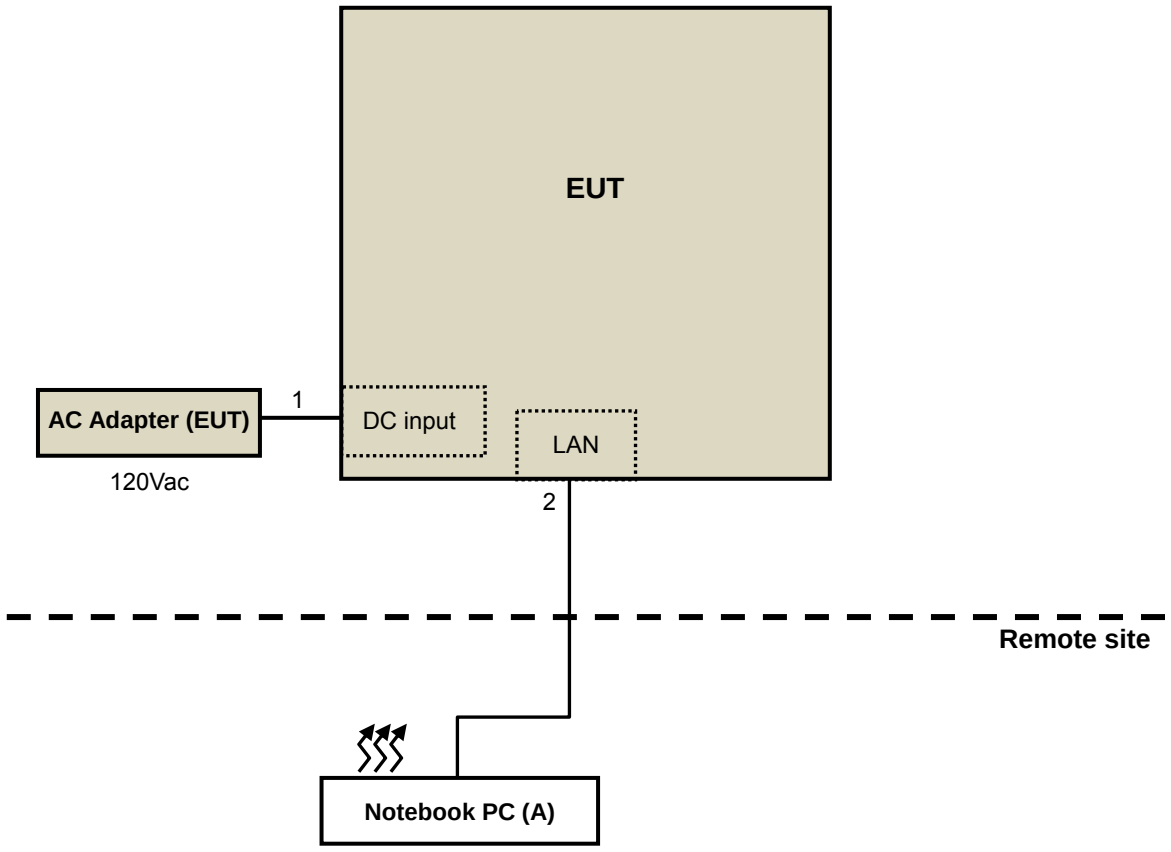
Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC cable	1	1.8	N	0	Supplied by client
2.	LAN cable	1	10	N	0	Provided by Lab

Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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)
KDB 789033 D02 General UNII Test Procedure New Rules v02r01
KDB 662911 D01 Multiple Transmitter Output v02r01
FCC Part 15, Subpart C (15.247)
KDB 558074 D01 DTS Meas Guidance v04
ANSI C63.10-2013

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

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

<table>
<tr><td colspan="3">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="3" rowspan="2">789033 D02 General UNII Test Procedure New Rules v02r01</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK:74 (dBµV/m)</td><td>AV:54 (dBµV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK:-27 (dBm/MHz)</td><td rowspan="3">PK:68.2(dBµV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK:-27 (dBm/MHz) *1
PK:10 (dBm/MHz) *2
PK:15.6 (dBm/MHz) *3
PK:27 (dBm/MHz) *4</td><td>PK: 68.2(dBµV/m) *1
PK:105.2 (dBµV/m) *2
PK: 110.8(dBµV/m) *3
PK:122.2 (dBµV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="5">*1 beyond 75 MHz or more above of the band edge.
*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.
*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</td></tr>
</table>

Note:

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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 21, 2017	Feb. 20, 2018
HP Preamplifier	8449B	3008A01201	Feb. 22, 2017	Feb. 21, 2018
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Feb. 21, 2017	Feb. 20, 2018
Agilent TEST RECEIVER	N9038A	MY51210129	Feb. 8, 2017	Feb. 7, 2018
Schwarzbeck Antenna	VULB 9168	139	Nov. 29, 2017	Nov. 28, 2018
Schwarzbeck Antenna	VHBA 9123	480	May 19, 2017	May 18, 2019
Schwarzbeck Horn Antenna	BBHA-9170	212	Dec. 30, 2016	Dec. 29, 2017
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Dec. 12, 2016	Dec. 11, 2017
			Dec. 12, 2017	Dec. 11, 2018
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V7.6.15.9.5	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF104	CABLE-CH6	Aug. 14, 2017	Aug. 13, 2018
SUHNER RF cable With 3dB PAD	SF102	Cable-CH8-3.6m	Aug. 14, 2017	Aug. 13, 2018
KEYSIGHT MIMO Powermeasurement Test set	U2021XA	U2021XA-001	May 31,2017	May 30,2018
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Jul. 26, 2017	Jul. 25, 2018
Loop Antenna EMCI	LPA600	270	Aug. 11, 2017	Aug. 10, 2019
EMCO Horn Antenna	3115	00028257	Nov. 30, 2017	Nov. 29, 2018
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 29, 2017	Sep. 28, 2018
Anritsu Power Sensor	MA2411B	0738404	Apr. 24, 2017	Apr. 23, 2018
Anritsu Power Meter	ML2495A	0842014	Apr. 24, 2017	Apr. 23, 2018

NOTE: 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.
4. The Industry Canada Reference No. IC 7450E-6.

4.1.3 Test Procedure

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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. Both X and Y axes of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case 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.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) 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:

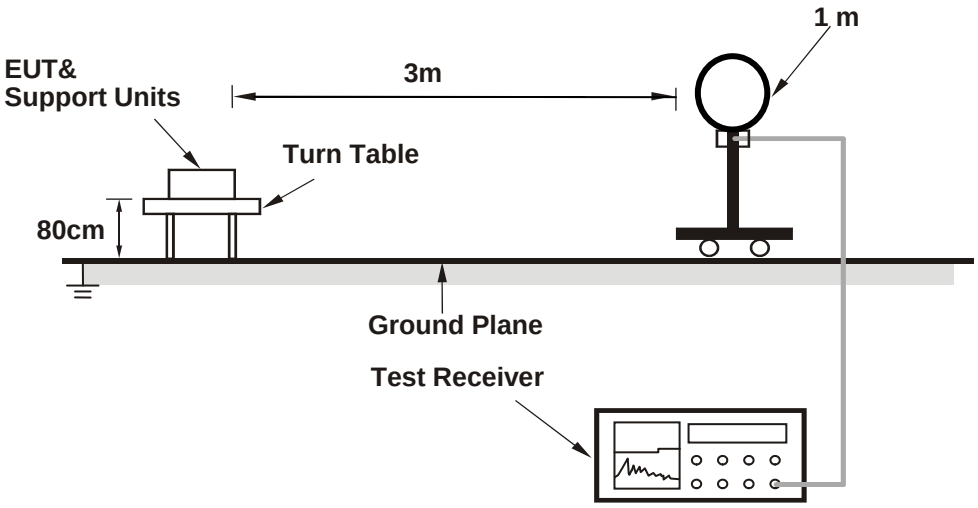
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

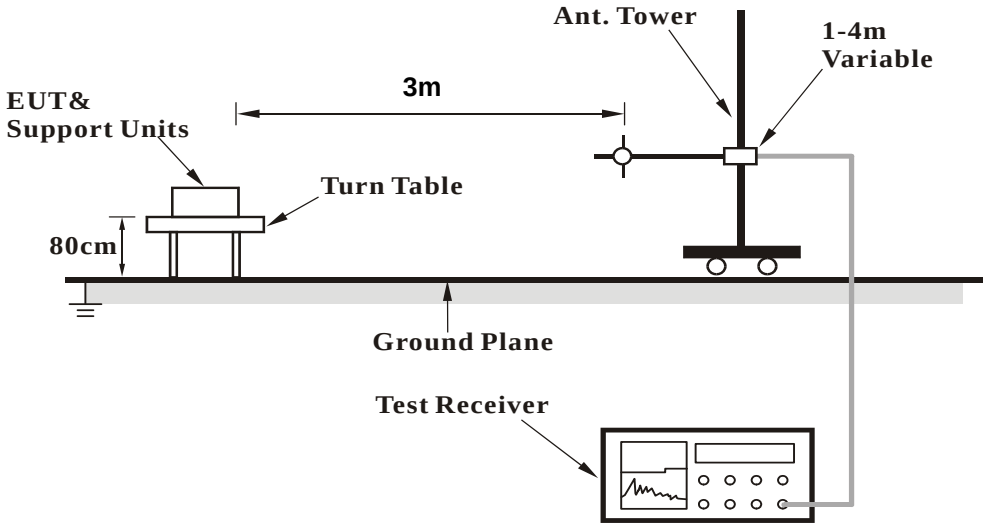
No deviation.

4.1.5 Test Setup

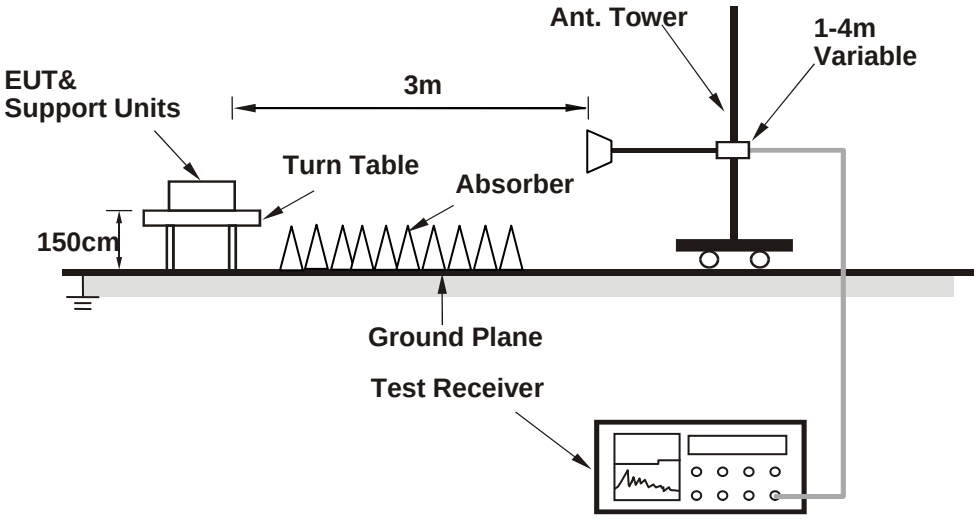
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

a. Connected the EUT with AC adapter placed on testing table.
b. Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

ABOVE 1GHz DATA

802.11b + 802.11a

CHANNEL	TX Channel 6 + 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	2390.00	53.58 PK	74.00	-20.42	1.21 H	5	55.89	-2.31
2	2390.00	41.70 AV	54.00	-12.30	1.21 H	5	44.01	-2.31
3	*2437.00	104.83 PK			1.21 H	5	106.84	-2.01
4	*2437.00	101.22 AV			1.21 H	5	103.23	-2.01
5	4874.00	43.68 PK	74.00	-30.32	2.89 H	321	39.43	4.25
6	4874.00	30.54 AV	54.00	-23.46	2.89 H	321	26.29	4.25
7	*5200.00	113.79 PK			1.25 H	271	108.82	4.97
8	*5200.00	105.13 AV			1.25 H	271	100.16	4.97
9	10400.00	58.99 PK	74.00	-15.01	2.96 H	310	43.41	15.58
10	10400.00	46.33 AV	54.00	-7.67	2.96 H	310	30.75	15.58
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	2390.00	59.93 PK	74.00	-14.07	1.18 V	354	62.24	-2.31
2	**2390.00**	**53.70 AV**	**54.00**	**-0.30**	**1.18 V**	**354**	**56.01**	**-2.31**
3	*2437.00	114.63 PK			1.18 V	354	116.64	-2.01
4	*2437.00	110.75 AV			1.18 V	354	112.76	-2.01
5	4874.00	45.08 PK	74.00	-28.92	1.22 V	128	40.83	4.25
6	4874.00	32.91 AV	54.00	-21.09	1.22 V	128	28.66	4.25
7	*5200.00	118.74 PK			1.55 V	286	113.77	4.97
8	*5200.00	109.50 AV			1.55 V	286	104.53	4.97
9	10400.00	60.80 PK	74.00	-13.20	1.15 V	218	45.22	15.58
10	10400.00	47.52 AV	54.00	-6.48	1.15 V	218	31.94	15.58

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – 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.

802.11b + 802.11ac (40MHz)

CHANNEL	TX Channel 6 + 159	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	2390.00	53.58 PK	74.00	-20.42	1.21 H	5	55.89	-2.31
2	2390.00	41.70 AV	54.00	-12.30	1.21 H	5	44.01	-2.31
3	*2437.00	104.83 PK			1.21 H	5	106.84	-2.01
4	*2437.00	101.22 AV			1.21 H	5	103.23	-2.01
5	4874.00	43.68 PK	74.00	-30.32	2.89 H	321	39.43	4.25
6	4874.00	30.54 AV	54.00	-23.46	2.89 H	321	26.29	4.25
7	5652.28	53.97 PK	68.20	-14.23	1.51 H	288	47.36	6.61
8	*5795.00	107.57 PK			1.51 H	288	100.84	6.73
9	*5795.00	95.34 AV			1.51 H	288	88.61	6.73
10	5927.52	49.62 PK	68.20	-18.58	1.51 H	288	42.60	7.02
11	11590.00	61.68 PK	74.00	-12.32	2.66 H	162	44.93	16.75
12	11590.00	48.83 AV	54.00	-5.17	2.66 H	162	32.08	16.75
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	2390.00	59.93 PK	74.00	-14.07	1.18 V	354	62.24	-2.31
2	**2390.00**	**53.70 AV**	**54.00**	**-0.30**	**1.18 V**	**354**	**56.01**	**-2.31**
3	*2437.00	114.63 PK			1.18 V	354	116.64	-2.01
4	*2437.00	110.75 AV			1.18 V	354	112.76	-2.01
5	4874.00	45.08 PK	74.00	-28.92	1.22 V	128	40.83	4.25
6	4874.00	32.91 AV	54.00	-21.09	1.22 V	128	28.66	4.25
7	5647.36	58.62 PK	68.20	-9.58	1.96 V	24	52.01	6.61
8	*5795.00	115.76 PK			1.96 V	24	109.03	6.73
9	*5795.00	101.46 AV			1.96 V	24	94.73	6.73
10	5968.69	56.47 PK	68.20	-11.73	1.96 V	24	49.27	7.20
11	11590.00	63.13 PK	74.00	-10.87	1.27 V	188	46.38	16.75
12	11590.00	50.26 AV	54.00	-3.74	1.27 V	188	33.51	16.75

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 WORST-CASE DATA

802.11b + 802.11a

CHANNEL	TX Channel 6 + 40	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 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	135.05	18.12 QP	43.50	-25.38	1.01 H	130	27.99	-9.87
2	326.97	30.80 QP	46.00	-15.20	1.99 H	87	37.23	-6.43
3	530.52	27.14 QP	46.00	-18.86	2.03 H	329	29.38	-2.24
4	649.05	33.58 QP	46.00	-12.42	1.42 H	233	33.29	0.29
5	773.36	31.65 QP	46.00	-14.35	1.55 H	227	28.32	3.33
6	913.91	35.24 QP	46.00	-10.76	1.06 H	360	29.83	5.41
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	135.88	17.47 QP	43.50	-26.03	1.01 V	320	27.24	-9.77
2	314.40	20.64 QP	46.00	-25.36	1.33 V	92	27.43	-6.79
3	489.78	24.19 QP	46.00	-21.81	1.59 V	106	27.13	-2.94
4	568.25	25.74 QP	46.00	-20.26	1.00 V	287	27.11	-1.37
5	733.06	31.60 QP	46.00	-14.40	2.83 V	152	29.57	2.03
6	928.41	32.59 QP	46.00	-13.41	1.07 V	111	27.00	5.59

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

802.11b + 802.11ac (40MHz)

CHANNEL	TX Channel 6 + 159	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

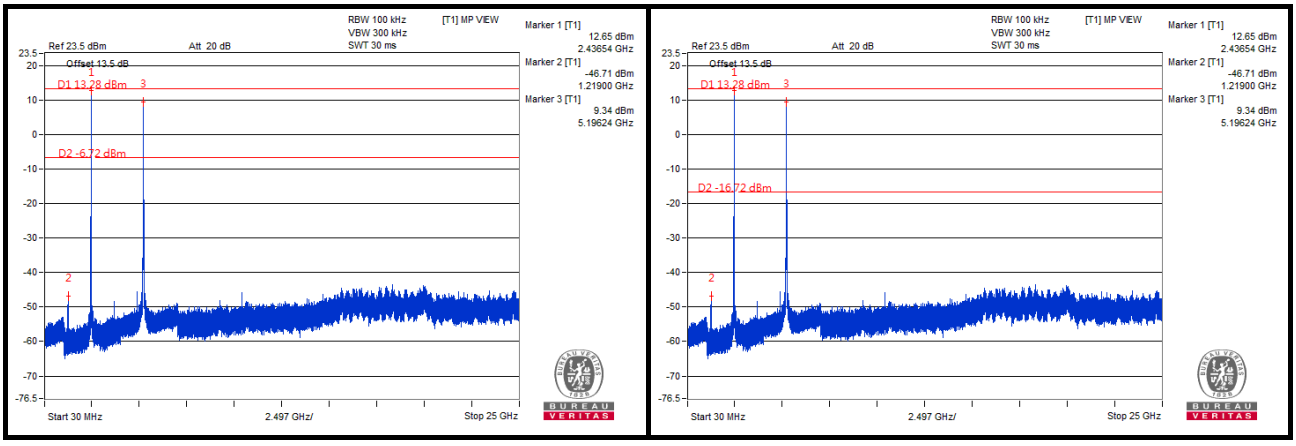
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	140.63	18.00 QP	43.50	-25.50	1.00 H	67	27.45	-9.45
2	290.40	22.53 QP	46.00	-23.47	1.92 H	214	30.10	-7.57
3	448.17	26.42 QP	46.00	-19.58	1.48 H	140	30.25	-3.83
4	573.64	27.66 QP	46.00	-18.34	1.43 H	86	28.87	-1.21
5	739.60	32.19 QP	46.00	-13.81	1.05 H	228	30.18	2.01
6	898.05	32.39 QP	46.00	-13.61	2.07 H	154	27.49	4.90
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	77.19	29.59 QP	40.00	-10.41	1.77 V	199	42.40	-12.81
2	153.04	25.92 QP	43.50	-17.58	1.82 V	108	34.78	-8.86
3	300.39	24.16 QP	46.00	-21.84	1.43 V	117	31.43	-7.27
4	569.22	26.63 QP	46.00	-19.37	1.67 V	158	27.98	-1.35
5	749.21	30.97 QP	46.00	-15.03	1.93 V	172	29.42	1.55
6	855.76	32.72 QP	46.00	-13.28	2.24 V	7	28.44	4.28

REMARKS:

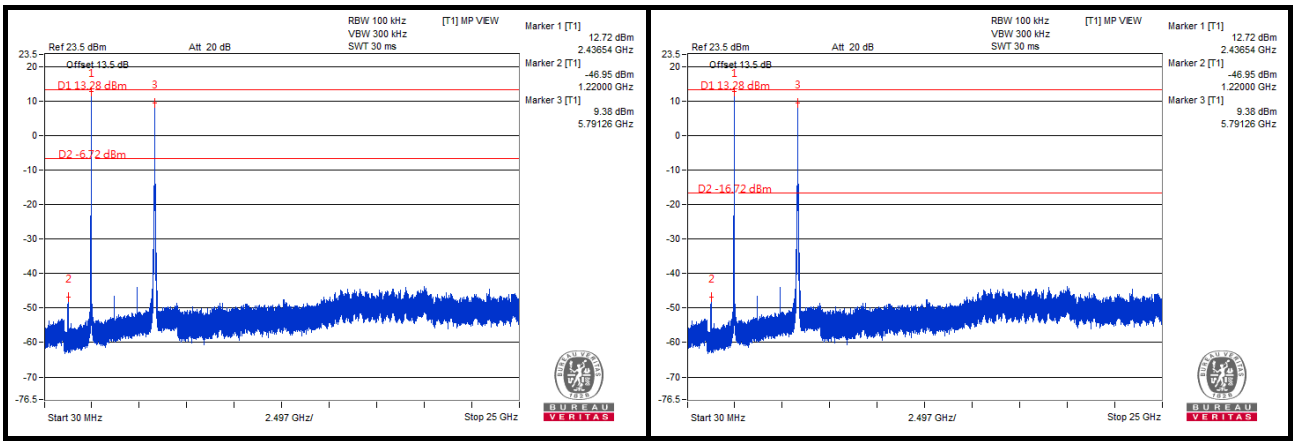
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.1.8 Test Results of Maximum Unwanted Emission Levels

802.11b_CH6 + 802.11a_CH40



802.11b_CH6 + 802.11ac (40MHz)_CH159



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.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	100276	Apr. 10, 2017	Apr. 09, 2018
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ENV216	101197	May 22, 2017	May 21, 2018
LISN With Adapter (for EUT)	AD10	C10Ada-002	May 22, 2017	May 21, 2018
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100218	Nov. 23, 2017	Nov. 22, 2018
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 9, 2017	May 8, 2018
Software	Cond_V7.3.7.4	NA	NA	NA
RF cable (JYEBAO) With 10dB PAD	5D-FB	Cable-C10.01	Feb. 14, 2017	Feb. 13, 2018
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-011484	May 18, 2017	May 17, 2018
ROHDE & SCHWARZ Artificial Mains Network (For TV EUT)	ESH3-Z5	100220	Nov. 14, 2017	Nov. 13, 2018
LISN With Adapter (for TV EUT)	100220	N/A	Nov. 14, 2017	Nov. 13, 2018

Notes: 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. 10.
3. The VCCI Site Registration No. C-1852.

4.2.3 Test Procedure

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.

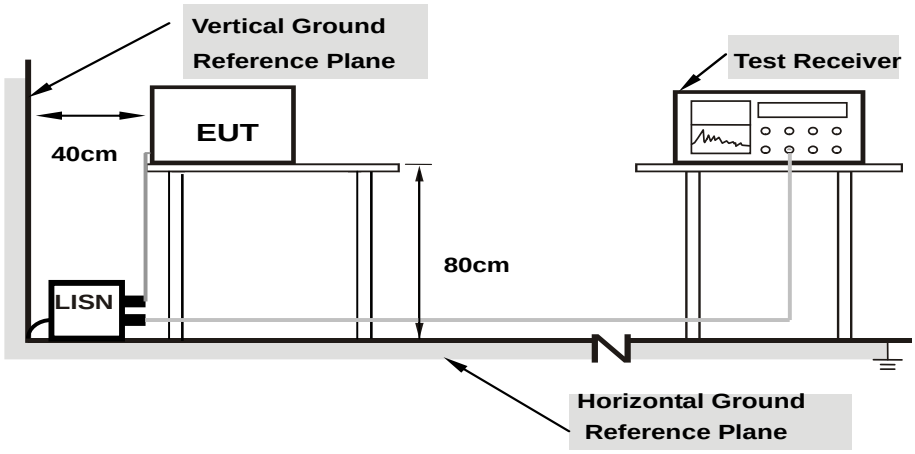
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

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 Condition

Same as item 4.1.6.

4.2.7 Test Results

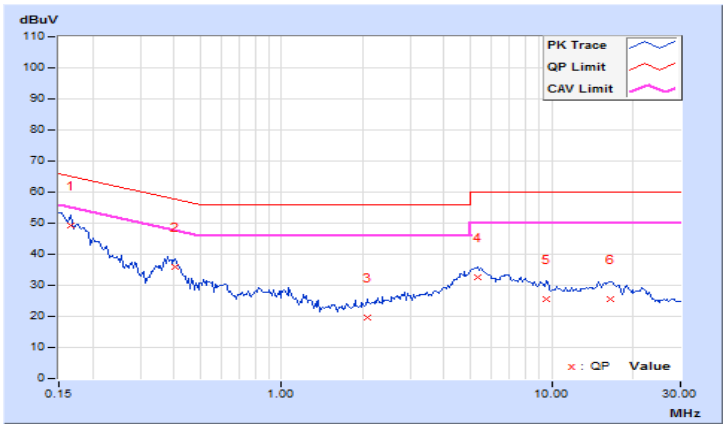
802.11b + 802.11a

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

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.16562**	**9.65**	**39.65**	**23.19**	**49.30**	**32.84**	**65.18**	**55.18**	**-15.88**	**-22.34**
2	0.40391	9.69	26.20	19.34	35.89	29.03	57.77	47.77	-21.88	-18.74
3	2.07031	9.90	9.84	4.04	19.74	13.94	56.00	46.00	-36.26	-32.06
4	5.32422	10.08	22.43	17.04	32.51	27.12	60.00	50.00	-27.49	-22.88
5	9.57031	10.17	15.37	10.16	25.54	20.33	60.00	50.00	-34.46	-29.67
6	16.45703	10.30	15.37	10.40	25.67	20.70	60.00	50.00	-34.33	-29.30

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

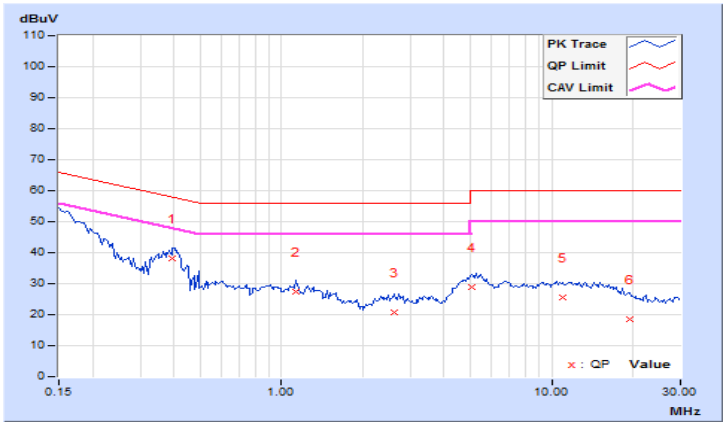


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.39609	9.73	28.33	21.76	38.06	31.49	57.93	47.93	-19.87	-16.44
2	1.12891	9.81	17.46	13.19	27.27	23.00	56.00	46.00	-28.73	-23.00
3	2.60156	9.97	10.62	4.32	20.59	14.29	56.00	46.00	-35.41	-31.71
4	5.03516	10.18	18.77	12.89	28.95	23.07	60.00	50.00	-31.05	-26.93
5	11.05078	10.28	15.19	10.68	25.47	20.96	60.00	50.00	-34.53	-29.04
6	19.42969	10.41	8.26	3.16	18.67	13.57	60.00	50.00	-41.33	-36.43

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



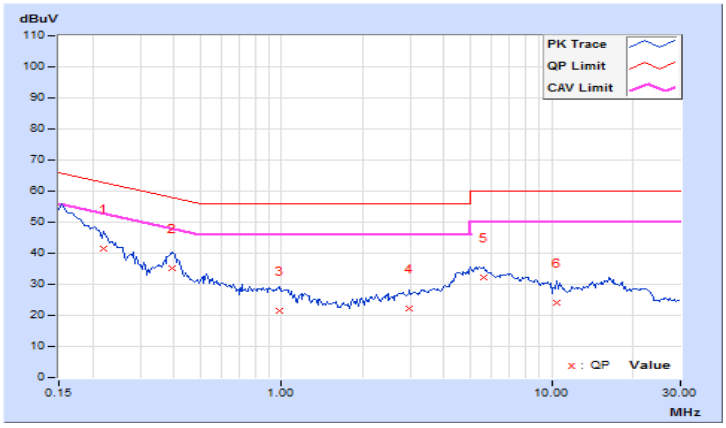
802.11b + 802.11ac (40MHz)

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

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22031	9.65	31.87	16.54	41.52	26.19	62.81	52.81	-21.29	-26.62
2	0.39219	9.69	25.57	18.51	35.26	28.20	58.02	48.02	-22.76	-19.82
3	0.97813	9.79	11.80	6.51	21.59	16.30	56.00	46.00	-34.41	-29.70
4	2.96875	9.97	12.08	5.44	22.05	15.41	56.00	46.00	-33.95	-30.59
5	5.59375	10.08	22.08	16.79	32.16	26.87	60.00	50.00	-27.84	-23.13
6	10.40625	10.19	13.83	8.77	24.02	18.96	60.00	50.00	-35.98	-31.04

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

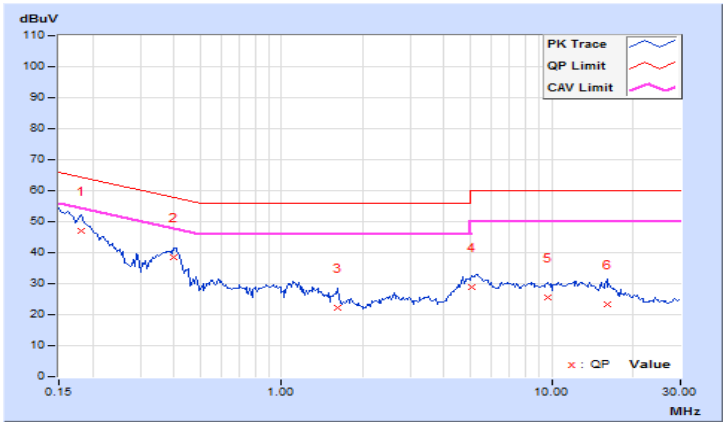


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18125	9.69	37.22	22.81	46.91	32.50	64.43	54.43	-17.52	-21.93
2	0.40000	9.73	28.91	22.01	38.64	31.74	57.85	47.85	-19.21	-16.11
3	1.62109	9.86	12.51	6.78	22.37	16.64	56.00	46.00	-33.63	-29.36
4	5.06250	10.18	18.86	12.82	29.04	23.00	60.00	50.00	-30.96	-27.00
5	9.67188	10.25	15.45	10.50	25.70	20.75	60.00	50.00	-34.30	-29.25
6	16.03906	10.36	13.04	8.41	23.40	18.77	60.00	50.00	-36.60	-31.23

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

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