

FCC Test Report (WLAN)

Report No.: RF141008E03E

FCC ID: PPD-QCNFA435

Test Model: QCNFA435

Received Date: Apr. 29, 2015

Test Date: May 05 to 06, 2015

Issued Date: May 12, 2015

Applicant: Qualcomm Atheros, Inc.

Address: 1700 Technology Drive, San Jose, CA 95110

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

Issue No.	Description	Date Issued
RF141008E03E	Original release.	May 12, 2015



A D T

1 Certificate of Conformity

Product: Single Stream 802.11a/b/g/n/ac + BT 4.1 M.2 Type Card

Brand: Qualcomm Atheros

Test Model: QCNFA435

Sample Status: R&D SAMPLE

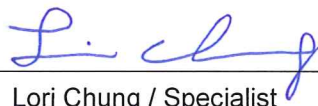
Applicant: Qualcomm Atheros, Inc.

Test Date: May 05 to 06, 2015

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
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 :


Lori Chung / Specialist

Date:

May 12, 2015

Approved by :


May Chen / Manager

Date:

May 12, 2015

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -7.69dB at 0.18906MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -3.0dB at 899.284MHz.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is IPEX not a standard connector.

- NOTE:** 1. For WLAN: The EUT was operating in 2.4 ~ 2.4835GHz, 5.15~5.35GHz, 5.47~5.725GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 2.4 ~ 2.4835GHz and 5.725~5.850GHz. For the 5.15~5.35GHz, 5.47~5.725GHz RF parameters was recorded in another test report.
2. This report is prepared for FCC Class II change. (Only conducted emission / radiated emissions / conducted power were presented in this test report).

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	5.43 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 (WLAN)

Product	Single Stream 802.11a/b/g/n/ac + BT 4.1 M.2 Type Card
Brand	Qualcomm Atheros
Test Model	QCNFA435
Status of EUT	R&D SAMPLE
Power Supply Rating	3.3Vdc form host equipment
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n : up to 150Mbps 802.11ac: up to 433.3Mbps
Operating Frequency	For 15.407 5.18 ~ 5.24GHz, 5.26 ~ 5.32GHz, 5.50 ~ 5.72GHz
	For 15.247 2.412 ~ 2.462GHz, 5.745 ~ 5.825GHz
Number of Channel	For 15.407 20 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 10 for 802.11n (HT40), 802.11ac (VHT40) 5 for 802.11ac (VHT80)
	For 15.247 (2.4GHz) 11 for 802.11b/g, 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: 54.325 mW For 15.247 (2.4GHz) VHT20: 271.644mW For 15.247 (5GHz) 802.11a: 101.391mW
Antenna Type	See item 3.2
Antenna Connector	See item 3.2
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. This report is prepared for FCC Class II change. The difference compared with the Report No.: RF141008E03 R1 design is as the following:
 - ◆ Shielding change. Shielding shape and z-height change.
2. According to above conditions, only conducted emission / radiated emissions / conducted power need to be performed. And all data was verified to meet the requirements.
3. There are Bluetooth technology and WLAN technology used for the EUT.
4. The EUT incorporates a 1T1R function.

2.4GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	1TX	1RX
802.11g	6 ~ 54Mbps	1TX	1RX
802.11n (HT20)	MCS 0~7	1TX	1RX
802.11n (HT40)	MCS 0~7	1TX	1RX
VHT20	MCS 0~8, Nss=1	1TX	1RX
VHT40	MCS 0~9, Nss=1	1TX	1RX
5GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11a	6 ~ 54Mbps	1TX	1RX
802.11n (HT20)	MCS 0~7	1TX	1RX
802.11n (HT40)	MCS 0~7	1TX	1RX
802.11ac (VHT20)	MCS 0~8, Nss=1	1TX	1RX
802.11ac (VHT40)	MCS 0~9, Nss=1	1TX	1RX
802.11ac (VHT80)	MCS 0~9, Nss=1	1TX	1RX

5. The EUT was pre-tested under the following modes:

Test Mode	Data rate
Mode A	400ns GI
Mode B	800ns GI

From the above modes, the worst case was found in **Mode B**. Therefore only the test data of the mode was recorded in this report.

6. WLAN/BT coexistence mode:

- ◆ 1x1 WLAN + BT:
 - 5GHz 802.11a/an (or 11ac) transmit concurrent with BT.
 - 2.4GHz: timely shared coexistence.

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

3.2 Description of Antenna

The antenna gain was declared by client; please refer to the following table:

Ant. No.	Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	2.4GHz Cable Loss (dBi)	5GHz Cable Loss (dBi)	Connector Type	Cable Length (mm)
1	Main	WNC	81-EBJ15.005	PIFA	3.00	Band 1&2: 2.56	1.15	Band 1&2: 1.70	IPEX	300
						Band 3: 4.76		Band 3: 1.74		
						Band 4: 4.76		Band 4: 1.79		
	Aux	WNC	81-EBJ15.005	PIFA	3.62	Band 1&2: 3.08	1.15	Band 1&2: 1.70	IPEX	300
						Band 3: 3.31		Band 3: 1.74		
						Band 4: 2.42		Band 4: 1.79		
2	Main	WNC	81.ED415.001	PIFA	0.22	Band 1&2: 5.56	0.96	Band 1&2: 1.29	IPEX	300
						Band 3: 5.03		Band 3: 1.36		
						Band 4: 3.14		Band 4: 1.38		
	Aux	WNC	81.ED415.001	PIFA	1.48	Band 1&2: 5.17	0.96	Band 1&2: 1.29	IPEX	300
						Band 3: 5.34		Band 3: 1.36		
						Band 4: 2.93		Band 4: 1.38		

- Note: 1. Above antenna gains of antenna are Total (H+V).
2. All of antenna can be application for WLAN and Bluetooth.
3. For 2.4GHz: From the above antennas, Ant. No. 1 (Aux) was selected as representative antennas for the test.
4. For 5GHz band 1 & 2: From the above antennas, Ant. No. 2 (Main) was selected as representative antennas for the test.
5. For 5GHz band 3: From the above antennas, Ant. No. 2 (Aux) was selected as representative antennas for the test.
6. For 5GHz band 4: From the above antennas, Ant. No. 1 (Main) was selected as representative antennas for the test.

3.3 Description of Test Modes

For 2.4GHz:

11 channels are provided for 802.11b, 802.11g, 802.11n (HT20) and VHT20:

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

7 channels are provided for 802.11n (HT40) and VHT40:

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

For 5GHz (5745 ~ 5825MHz):

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.3.1 Test Mode Applicability and Tested Channel Detail

For 2.4GHz:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	UE \geq 1G	UE<1G	PLC	APCM	
-	√	√	√	√	-

Where **UE \geq 1G:** Unwanted Emission above 1GHz

UE < 1G: Unwanted Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

Unwanted 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
VHT20	1 to 11	1, 6, 11	OFDM	6.5

Unwanted 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
VHT20	1 to 11	6	OFDM	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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
VHT20	1 to 13	6	OFDM	6

Antenna Port Conducted Measurement:

- ☒ 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
VHT20	1 to 11	1, 6, 11	OFDM	6.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
UE \geq 1G	23deg. C, 66%RH	120Vac, 60Hz	Andy Ho
UE<1G	20deg. C, 68%RH	120Vac, 60Hz	Gary Cheng
PLC	25deg. C, 70%RH	120Vac, 60Hz	Mike Hsieh
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

For 5GHz:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	UE \geq 1G	UE<1G	PLC	APCM	
-	√	√	√	√	-

Where **UE \geq 1G:** Unwanted Emission above 1GHz

UE < 1G: Unwanted Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

Unwanted 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
802.11a	149 to 165	149, 157, 165	OFDM	6

Unwanted 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
802.11a	149 to 165	157	OFDM	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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
802.11a	149 to 165	157	OFDM	6

Antenna Port Conducted Measurement:

- ☒ 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
802.11a	149 to 165	149, 157, 165	OFDM	6

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
UE\geq1G	23deg. C, 66%RH	120Vac, 60Hz	Robert Cheng
UE<1G	20deg. C, 68%RH	120Vac, 60Hz	Robert Cheng
PLC	25deg. C, 70%RH	120Vac, 60Hz	Mike Hsieh
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

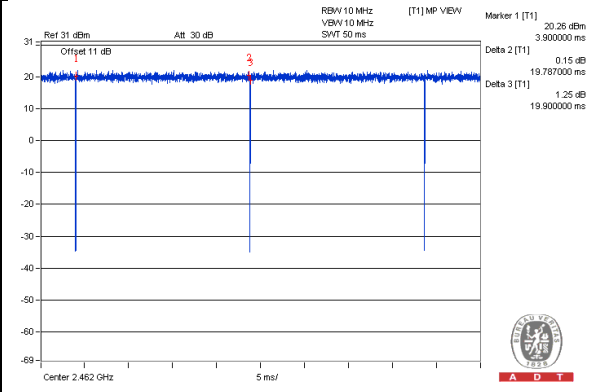
3.4 Duty Cycle of Test Signal

2.4GHz Band:

Duty cycle of test signal is $\geq 98\%$, duty factor is not required.

VHT20: Duty cycle = 19.787 ms/19.9 ms = 0.994

VHT20

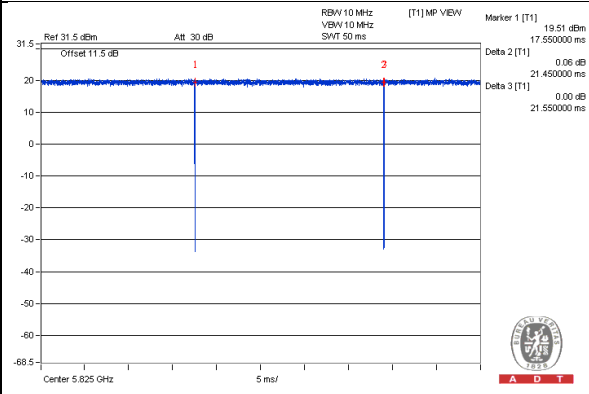


5GHz Band:

Duty cycle of test signal is $\geq 98\%$, duty factor is not required.

802.11a: Duty cycle = 21.45 ms/21.55 ms = 0.995

802.11a



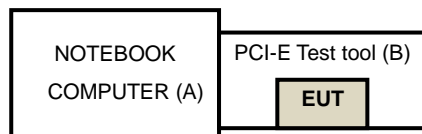
3.5 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	NOTEBOOK COMPUTER	Lenovo	769	NA	QDS-BRCM1020	Supplied by Client
B	PCI-E Test tool	Qualcomm Atheros	4883428	6108H1D0423	NA	Supplied by Client

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

3.5.1 Configuration of System under Test



3.6 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)
558074 D01 DTS Meas Guidance v03r02
ANSI C63.10-2009

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

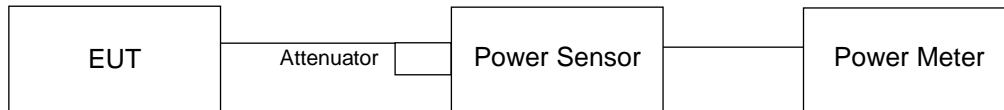
4 Test Types and Results (For 2.4GHz Band)

4.1 Conducted Output Power Measurement

4.1.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

4.1.2 Test Setup



4.1.3 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter Anritsu	ML2495A	0824006	May 22, 2014	May 21, 2015
Power Sensor Anritsu	MA2411B	0738172	May 22, 2014	May 21, 2015

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- Tested date : May 06, 2015

4.1.4 Test Procedures

The peak / average power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak / average power sensor. Record the power level.

4.1.5 Deviation from Test Standard

No deviation.

4.1.6 EUT Operating Conditions

The software (QCA Radio Control Toolkit V3.0.33.0) provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.1.7 Test Results

For Peak Power

VHT20

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	169.044	22.28	30	Pass
6	2437	271.644	24.34	30	Pass
11	2462	138.038	21.40	30	Pass

For Average Power

VHT20

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	39.994	16.02
6	2437	103.276	20.14
11	2462	38.194	15.82

4.2 Unwanted Emission Measurement (Radiated)

4.2.1 Limits of Unwanted Emission Measurement

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

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

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

4.2.2 Test Instruments

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-1000VH2 B	AMP-ZFL-04	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 06, 2015	Feb. 05, 2016
RF Cable	NA	CHHCAB_001	Oct. 05, 2014	Oct. 04, 2015
Horn_Antenna AISI	AIH.8018	0000220091110	Feb. 06, 2015	Feb. 05, 2016
Pre-Amplifier Agilent	8449B	300801923	Oct. 28, 2014	Oct. 27, 2015
RF Cable	NA	131206 131213 131215 SNMY23685/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Dec. 12, 2014	Dec. 11, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Feb. 05, 2015	Feb. 04, 2016
RF Cable	NA	329751/4 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

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: May 06, 2015

4.2.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 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:

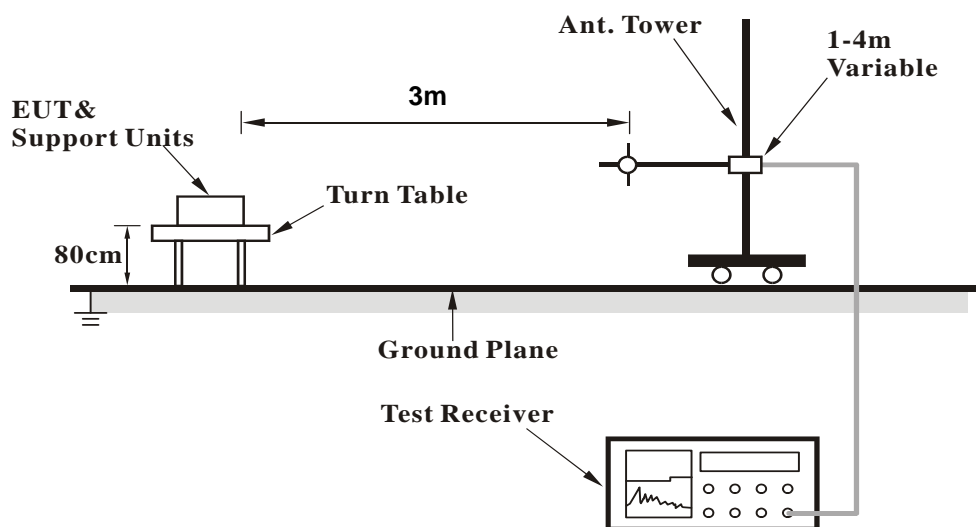
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.2.4 Deviation from Test Standard

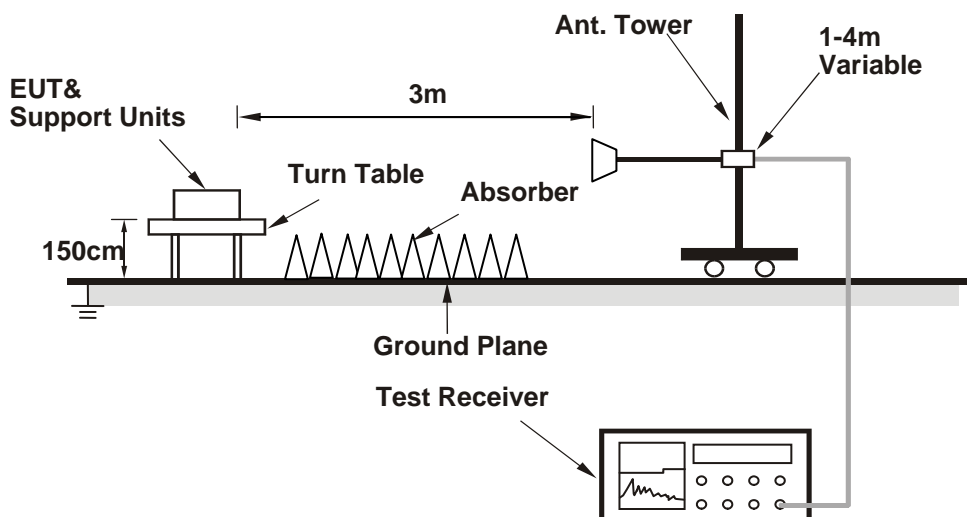
Testing for radiated emissions above 1GHz was performed with the EUT elevated at 1.5m instead of 0.8m. 1.5m is the required height in ANSI C63.10:2013 as referenced by RSS GEN issue 4. This test height has been permitted by FCC as discussed in FCC-TCB conference call in December 2014.

4.2.5 Test Setup

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.2.6 EUT Operating Conditions

1. Connect the EUT with the support unit A (Notebook Computer) which is placed on a testing table.
2. The communication partner run test program "QCA Radio Control Toolkit V3.0.33.0" to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.2.7 Test Results

Above 1GHz Data

VHT20

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.1 PK	74.0	-11.9	1.39 H	224	67.97	-5.87
2	2390.00	49.1 AV	54.0	-4.9	1.39 H	224	54.97	-5.87
3	*2412.00	110.2 PK			1.39 H	224	116.00	-5.80
4	*2412.00	98.5 AV			1.39 H	224	104.30	-5.80
5	4824.00	51.1 PK	74.0	-22.9	1.83 H	18	47.68	3.42
6	4824.00	40.0 AV	54.0	-14.0	1.83 H	18	36.58	3.42
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	60.4 PK	74.0	-13.6	1.00 V	180	93.92	-33.52
2	2390.00	48.3 AV	54.0	-5.7	1.00 V	180	81.82	-33.52
3	*2412.00	110.5 PK			1.00 V	180	143.98	-33.48
4	*2412.00	98.1 AV			1.00 V	180	131.58	-33.48
5	4824.00	51.9 PK	74.0	-22.1	1.11 V	321	83.09	-31.19
6	4824.00	40.1 AV	54.0	-13.9	1.11 V	321	71.29	-31.19

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.4 PK	74.0	-15.6	1.54 H	208	64.27	-5.87
2	2390.00	45.4 AV	54.0	-8.6	1.54 H	208	51.27	-5.87
3	*2437.00	114.5 PK			1.38 H	221	120.20	-5.70
4	*2437.00	103.2 AV			1.38 H	221	108.90	-5.70
5	2483.50	57.0 PK	74.0	-17.0	1.50 H	222	62.49	-5.49
6	2483.50	44.1 AV	54.0	-9.9	1.50 H	222	49.59	-5.49
7	4874.00	51.1 PK	74.0	-22.9	1.81 H	24	47.70	3.40
8	4874.00	40.1 AV	54.0	-13.9	1.81 H	24	36.70	3.40
9	7311.00	52.6 PK	74.0	-21.4	1.10 H	163	44.84	7.76
10	7311.00	45.9 AV	54.0	-8.1	1.10 H	163	38.14	7.76

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	54.6 PK	74.0	-19.4	1.04 V	305	88.12	-33.52
2	2390.00	41.4 AV	54.0	-12.6	1.04 V	305	74.92	-33.52
3	*2437.00	113.8 PK			1.05 V	182	147.21	-33.41
4	*2437.00	102.7 AV			1.05 V	182	136.11	-33.41
5	2483.50	53.8 PK	74.0	-20.2	1.00 V	294	87.07	-33.27
6	2483.50	40.6 AV	54.0	-13.4	1.00 V	294	73.87	-33.27
7	4874.00	51.8 PK	74.0	-22.2	1.13 V	306	82.95	-31.15
8	4874.00	40.2 AV	54.0	-13.8	1.13 V	306	71.35	-31.15
9	7311.00	59.7 PK	74.0	-14.3	1.09 V	360	89.75	-30.05
10	7311.00	48.1 AV	54.0	-5.9	1.09 V	360	78.15	-30.05

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.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	110.4 PK			1.43 H	209	115.99	-5.59
2	*2462.00	98.5 AV			1.43 H	209	104.09	-5.59
3	2483.50	61.2 PK	74.0	-12.8	1.03 H	248	66.69	-5.49
4	2483.50	47.9 AV	54.0	-6.1	1.03 H	248	53.39	-5.49
5	4924.00	45.5 PK	74.0	-28.5	1.11 H	350	42.11	3.39
6	4924.00	34.3 AV	54.0	-19.7	1.11 H	350	30.91	3.39
7	7386.00	55.0 PK	74.0	-19.0	1.00 H	312	46.95	8.05
8	7386.00	40.7 AV	54.0	-13.3	1.00 H	312	32.65	8.05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	110.8 PK			1.00 V	193	144.14	-33.34
2	*2462.00	98.2 AV			1.00 V	193	131.54	-33.34
3	2483.50	60.4 PK	74.0	-13.6	1.09 V	292	93.67	-33.27
4	2483.50	48.2 AV	54.0	-5.8	1.09 V	292	81.47	-33.27
5	4924.00	50.7 PK	74.0	-23.3	1.09 V	308	81.80	-31.10
6	4924.00	39.7 AV	54.0	-14.3	1.09 V	308	70.80	-31.10
7	7386.00	59.5 PK	74.0	-14.5	1.10 V	360	89.45	-29.95
8	7386.00	47.8 AV	54.0	-6.2	1.10 V	360	77.75	-29.95

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.

Below 1GHz Data:

VHT20

CHANNEL	TX Channel 6	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	215.90	40.0 QP	43.5	-3.5	1.00 H	71	56.11	-16.09
2	230.79	40.1 QP	46.0	-5.9	1.00 H	274	55.29	-15.18
3	298.79	42.8 QP	46.0	-3.2	1.00 H	186	54.75	-11.95
4	322.73	42.8 QP	46.0	-3.2	1.00 H	89	53.76	-11.00
5	699.35	40.2 QP	46.0	-5.8	2.00 H	303	43.59	-3.37
6	899.28	43.0 QP	46.0	-3.0	1.50 H	294	42.80	0.17
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	215.90	38.4 QP	43.5	-5.1	2.00 V	320	54.48	-16.09
2	286.95	36.5 QP	46.0	-9.5	1.50 V	360	48.89	-12.40
3	298.79	36.9 QP	46.0	-9.1	2.00 V	295	48.87	-11.95
4	322.75	42.9 QP	46.0	-3.1	1.50 V	333	53.89	-11.00
5	359.90	36.6 QP	46.0	-9.4	1.00 V	202	47.04	-10.44
6	431.87	37.2 QP	46.0	-8.9	1.00 V	213	45.55	-8.40

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

4.3 Conducted Emission Measurement

4.3.1 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.

4.3.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	847124/029	Oct. 22, 2014	Oct. 21, 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)	5D-FB	COCCAB-001	Mar. 09, 2015	Mar. 08, 2016
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: May 05, 2015

4.3.3 Test Procedures

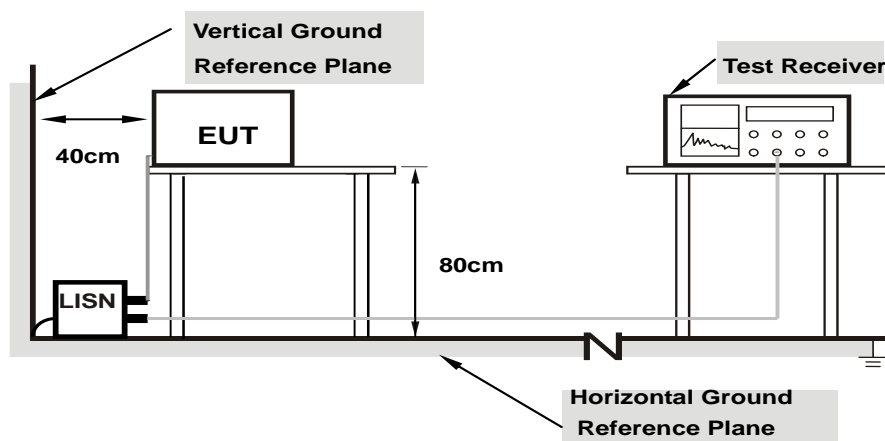
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.3.4 Deviation from Test Standard

No deviation.

4.3.5 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).

4.3.6 EUT Operating Conditions

Same as 4.2.6.

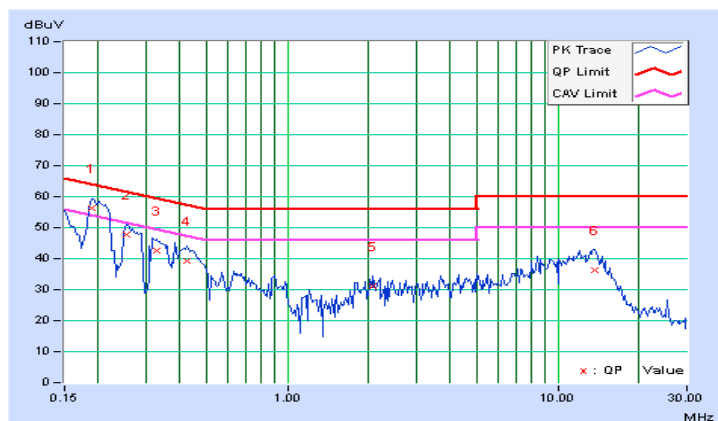
4.3.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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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	0.18906	0.09	56.30	39.22	56.39	39.31	64.08	54.08	-7.69	-14.77
2	0.25547	0.09	47.82	33.12	47.91	33.21	61.58	51.58	-13.66	-18.36
3	0.32969	0.10	42.38	28.52	42.48	28.62	59.46	49.46	-16.98	-20.84
4	0.42734	0.10	39.19	22.30	39.29	22.40	57.30	47.30	-18.01	-24.90
5	2.06641	0.17	30.90	19.38	31.07	19.55	56.00	46.00	-24.93	-26.45
6	13.69141	0.54	35.68	27.16	36.22	27.70	60.00	50.00	-23.78	-22.30

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

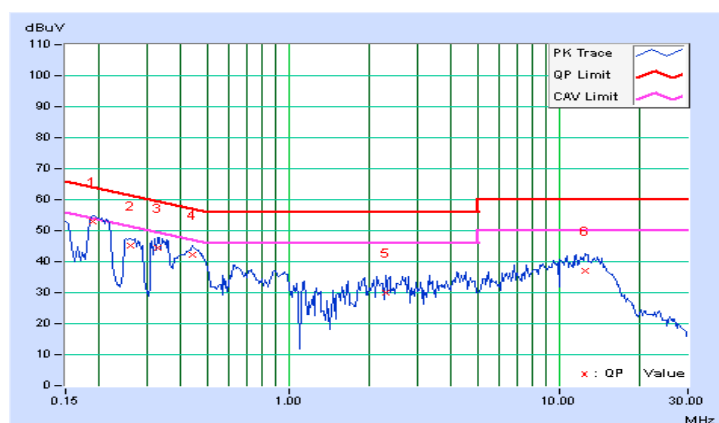


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBUV)		Emission Level (dBUV)		Limit (dBUV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18906	0.08	52.74	36.81	52.82	36.89	64.08	54.08	-11.26	-17.19
2	0.25938	0.09	44.98	32.68	45.07	32.77	61.45	51.45	-16.39	-18.69
3	0.32969	0.09	44.28	31.74	44.37	31.83	59.46	49.46	-15.09	-17.63
4	0.44297	0.10	41.97	28.74	42.07	28.84	57.01	47.01	-14.93	-18.16
5	2.28906	0.18	29.86	20.33	30.04	20.51	56.00	46.00	-25.96	-25.49
6	12.49609	0.53	36.47	28.51	37.00	29.04	60.00	50.00	-23.00	-20.96

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



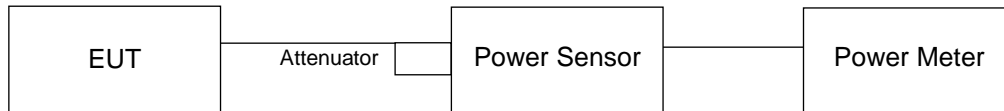
5 Test Types and Results (For 5GHz Band)

5.1 Conducted Output Power Measurement

5.1.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 5725 –5850 MHz bands: 1 Watt (30dBm)

5.1.2 Test Setup



5.1.3 Test Instruments

Same as Item 4.1.3

5.1.4 Test Procedures

Same as Item 4.1.4

5.1.5 Deviation from Test Standard

No deviation.

5.1.6 EUT Operating Conditions

Same as Item 4.1.6

5.1.7 Test Results

For Peak Power

802.11a

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
149	5745	94.406	19.75	30	Pass
157	5785	101.391	20.06	30	Pass
165	5825	96.161	19.83	30	Pass

For Average Power

802.11a

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
149	5745	49.317	16.93
157	5785	55.463	17.44
165	5825	50.003	16.99

5.2 Unwanted Emission Measurement (Radiated)

5.2.1 Limits of Unwanted Emission Measurement

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

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

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

5.2.2 Test Instruments

Same as item 4.2.2

5.2.3 Test Procedures

Same as item 4.2.3

5.2.4 Deviation from Test Standard

Testing for radiated emissions above 1GHz was performed with the EUT elevated at 1.5m instead of 0.8m. 1.5m is the required height in ANSI C63.10:2013 as referenced by RSS GEN issue 4. This test height has been permitted by FCC as discussed in FCC-TCB conference call in December 2014.

5.2.5 Test Setup

Same as item 4.2.5

5.2.6 EUT Operating Conditions

Same as item 4.2.6

5.2.7 Test Results

Above 1GHz Data

802.11a

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5745.00	110.9 PK			1.09 H	183	106.41	4.49
2	*5745.00	102.3 AV			1.09 H	183	97.81	4.49
3	11490.00	60.4 PK	74.0	-13.6	1.23 H	62	50.36	10.04
4	11490.00	47.7 AV	54.0	-6.3	1.23 H	62	37.66	10.04
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	*5745.00	112.7 PK			1.02 V	121	143.41	-30.71
2	*5745.00	103.2 AV			1.02 V	121	133.91	-30.71
3	11490.00	60.2 PK	74.0	-13.8	1.27 V	39	88.26	-28.06
4	11490.00	48.5 AV	54.0	-5.5	1.27 V	39	76.56	-28.06

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.

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	110.8 PK			1.21 H	185	106.30	4.50
2	*5785.00	102.4 AV			1.21 H	185	97.90	4.50
3	11570.00	60.6 PK	74.0	-13.4	1.24 H	93	50.52	10.08
4	11570.00	48.3 AV	54.0	-5.7	1.24 H	93	38.22	10.08

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	*5785.00	113.3 PK			1.05 V	123	144.03	-30.73
2	*5785.00	103.5 AV			1.05 V	123	134.23	-30.73
3	11570.00	60.8 PK	74.0	-13.2	1.23 V	65	88.85	-28.05
4	11570.00	49.1 AV	54.0	-4.9	1.23 V	65	77.15	-28.05

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.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	110.6 PK			1.13 H	186	106.07	4.53
2	*5825.00	102.1 AV			1.13 H	186	97.57	4.53
3	11650.00	60.1 PK	74.0	-13.9	1.22 H	76	50.13	9.97
4	11650.00	47.8 AV	54.0	-6.2	1.22 H	76	37.83	9.97

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	*5825.00	113.6 PK			1.02 V	121	144.33	-30.73
2	*5825.00	103.7 AV			1.02 V	121	134.43	-30.73
3	11650.00	59.3 PK	74.0	-14.7	1.30 V	41	87.49	-28.19
4	11650.00	48.1 AV	54.0	-5.9	1.30 V	41	76.29	-28.19

REMARKS:

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

Below 1GHz Data

802.11a

CHANNEL	TX Channel 157	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	215.90	40.3 QP	43.5	-3.2	1.00 H	170	56.41	-16.09
2	230.78	40.4 QP	46.0	-5.6	1.00 H	244	55.57	-15.19
3	298.82	42.8 QP	46.0	-3.2	1.00 H	156	54.75	-11.95
4	322.71	42.7 QP	46.0	-3.3	1.10 H	102	53.68	-11.00
5	699.34	40.2 QP	46.0	-5.8	1.70 H	270	43.57	-3.37
6	899.30	42.8 QP	46.0	-3.2	1.50 H	204	42.59	0.17
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	215.82	38.4 QP	43.5	-5.1	1.70 V	300	54.47	-16.09
2	286.90	36.4 QP	46.0	-9.6	1.10 V	150	48.80	-12.40
3	298.70	36.8 QP	46.0	-9.2	1.20 V	288	48.77	-11.95
4	322.82	42.8 QP	46.0	-3.2	1.00 V	313	53.78	-11.00
5	359.90	36.8 QP	46.0	-9.2	1.00 V	162	47.22	-10.44
6	431.78	36.9 QP	46.0	-9.1	1.10 V	200	45.29	-8.40

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

5.3 Conducted Emission Measurement

5.3.1 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.

5.3.2 Test Instruments

Same as item 4.3.2

5.3.3 Test Procedures

Same as item 4.3.3

5.3.4 Deviation from Test Standard

No deviation.

5.3.5 Test Setup

Same as item 4.3.5

5.3.6 EUT Operating Conditions

Same as 4.2.6.

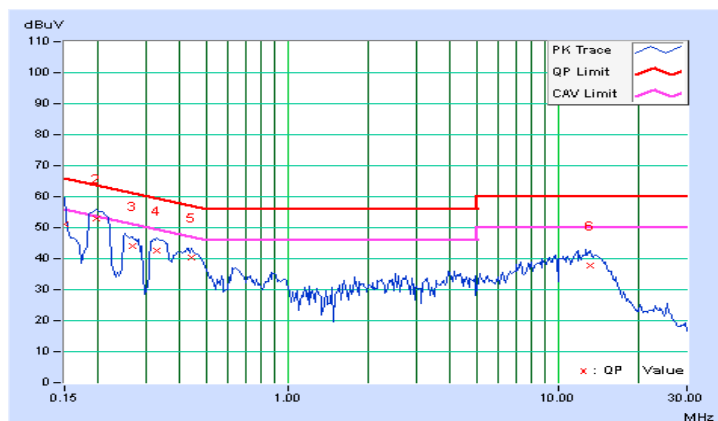
5.3.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.08	51.16	29.88	51.24	29.96	66.00	56.00	-14.76	-26.04
2	0.19687	0.09	52.76	39.41	52.85	39.50	63.74	53.74	-10.89	-14.24
3	0.26719	0.09	43.94	31.73	44.03	31.82	61.20	51.20	-17.17	-19.38
4	0.32969	0.10	42.54	30.70	42.64	30.80	59.46	49.46	-16.82	-18.66
5	0.44297	0.10	40.26	26.93	40.36	27.03	57.01	47.01	-16.64	-19.97
6	13.10547	0.53	37.08	27.84	37.61	28.37	60.00	50.00	-22.39	-21.63

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

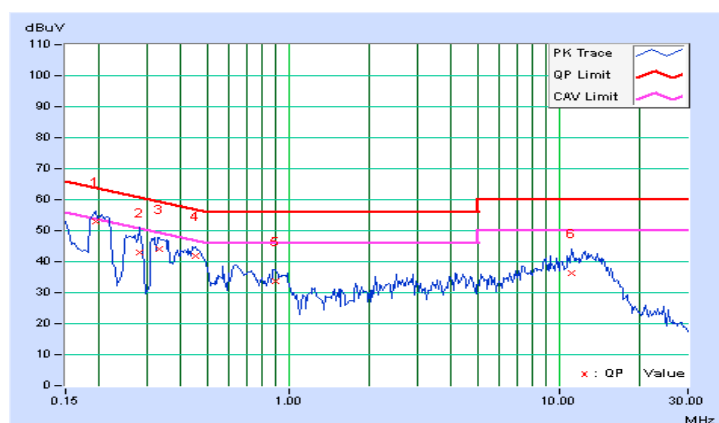


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19297	0.08	52.70	39.12	52.78	39.20	63.91	53.91	-11.13	-14.71
2	0.28281	0.09	43.03	28.11	43.12	28.20	60.73	50.73	-17.61	-22.53
3	0.33359	0.09	43.87	32.13	43.96	32.22	59.36	49.36	-15.40	-17.14
4	0.45078	0.10	41.59	28.50	41.69	28.60	56.86	46.86	-15.17	-18.26
5	0.89219	0.12	33.56	19.12	33.68	19.24	56.00	46.00	-22.32	-26.76
6	11.20313	0.49	35.86	27.44	36.35	27.93	60.00	50.00	-23.65	-22.07

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



6 Pictures of Test Arrangements

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

7 Appendix A – 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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