

FCC Test Report

Report No.: RF160824C03

FCC ID: 2AF5PMG7550

Test Model: MG7550

Series Model: MG7550XY (where X can be A, B, C, D or blank, and Y can be A, B, C, D or blank.)

Received Date: Aug. 24, 2016

Test Date: Aug. 26 ~ Sep. 17, 2016

Issued Date: Sep. 29, 2016

Applicant: MTRLC LLC

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

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Test Location: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)



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Release Control Record

Issue No.	Description	Date Issued
RF160824C03	Original release	Sep. 29, 2016

1 Certificate of Conformity

Product: 16x4 DOCSIS 3.0 Cable Modem plus AC1900 Router

Brand: Motorola

Test Model: MG7550

Series Model: MG7550XY (where X can be A, B, C, D or blank, and Y can be A, B, C, D or blank.)

Sample Status: Engineering Sample

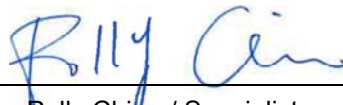
Applicant: MTRLC LLC

Test Date: Aug. 26 ~ Sep. 17, 2016

Standards: 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 :



Date: Sep. 29, 2016

Polly Chien / Specialist

Approved by :



Date: Sep. 29, 2016

Ken Liu / Senior 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 -15.25dB at 19.21094MHz.
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 -0.6dB at 11400.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
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 RSMA 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	Expanded Uncertainty (k=2) (\pm)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.63 dB
	200MHz ~ 1000MHz	3.64 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	16x4 DOCSIS 3.0 Cable Modem plus AC1900 Router
Brand	Motorola
Test Model	MG7550
Series Model	MG7550XY (where X can be A, B, C, D or blank, and Y can be A, B, C, D or blank.)
Model Difference	The optional suffixes X and Y are to be used for identical hardware models that differ for marketing/sales purposes only.
Status of EUT	Engineering Sample
Power Supply Rating	12Vdc (adapter)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	OFDM
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 600Mbps 802.11ac: up to 1300Mbps
Operating Frequency	5260 ~ 5320MHz, 5500 ~ 5700MHz
Number of Channel	5260 ~ 5320MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5500 ~ 5700MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 11, 802.11n (HT40), 802.11ac (VHT40): 5, 802.11ac (VHT80): 2
Output Power	5260 ~ 5320MHz: 161.850mW 5500 ~ 5700MHz: 165.363mW
Antenna Type	Wire antenna with 2.8dBi gain
Antenna Connector	RSMA
Accessory Device	NA
Data Cable Supplied	1.48m non-shielded RJ45 cable w/o core

Note:

1. This report is prepared for FCC class II permissive change. This report is adding 5.26GHz to 5.32GHz and 5.50GHz to 5.70GHz by software.
2. The EUT incorporates a MIMO function. Physically, the EUT provides 3 completed transmitters and 3 receivers.

Modulation Mode	TX Function
802.11a	3TX
802.11n (HT20)	3TX
802.11n (HT40)	3TX
802.11ac (VHT20)	3TX
802.11ac (VHT40)	3TX
802.11ac (VHT80)	3TX

* 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)

3. The EUT uses following adapter.

Adapter	
Brand	Gongjin
Model	S36B52-120A250-04
Input Power	100-240Vac, 50/60Hz Max, 1.0A
Output Power	12Vdc, 2.5A
Power Line	1.5m cable without core attached on adapter

3.2 Description of Test Modes

For 5260 ~ 5320MHz

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

Channel	Frequency	Channel	Frequency
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

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

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290 MHz

For 5500 ~ 5700MHz

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

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz		

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

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz		

2 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530 MHz	122	5610 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where **RE≥1G**: Radiated Emission above 1GHz & Bandedge Measurement
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 3 axis. The worst case was found when positioned on **Z-plane**.

Radiated Emission Test (Above 1GHz):

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6.0
-	802.11ac (VHT20)		52 to 64	52, 60, 64	OFDM	BPSK	7.2
-	802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	15.0
-	802.11ac (VHT80)		58	58	OFDM	BPSK	97.5
-	802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	BPSK	6.0
-	802.11ac (VHT20)		100 to 140	100, 116, 140	OFDM	BPSK	7.2
-	802.11ac (VHT40)		102 to 134	102, 110, 134	OFDM	BPSK	15.0
-	802.11ac (VHT80)		106	106, 122	OFDM	BPSK	97.5

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)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5260-5320	52 to 64	52	OFDM	BPSK	6.0
-	802.11a	5500-5700	100 to 140		OFDM	BPSK	6.0

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)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5260-5320	52 to 64	52	OFDM	BPSK	6.0
-	802.11a	5500-5700	100 to 140		OFDM	BPSK	6.0

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.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6.0
-	802.11ac (VHT20)		52 to 64	52, 60, 64	OFDM	BPSK	7.2
-	802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	15.0
-	802.11ac (VHT80)		58	58	OFDM	BPSK	97.5
-	802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	BPSK	6.0
-	802.11ac (VHT20)		100 to 140	100, 116, 140	OFDM	BPSK	7.2
-	802.11ac (VHT40)		102 to 134	102, 110, 134	OFDM	BPSK	15.0
-	802.11ac (VHT80)		106	106, 122	OFDM	BPSK	97.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE _≥ 1G	20deg. C, 69%RH	120Vac, 60Hz	Tank Wu
RE _{<} 1G	20deg. C, 69%RH	120Vac, 60Hz	Bond Tseng
PLC	20deg. C, 69%RH	120Vac, 60Hz	Bayu Chen
APCM	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is > 98%, duty factor is not required.

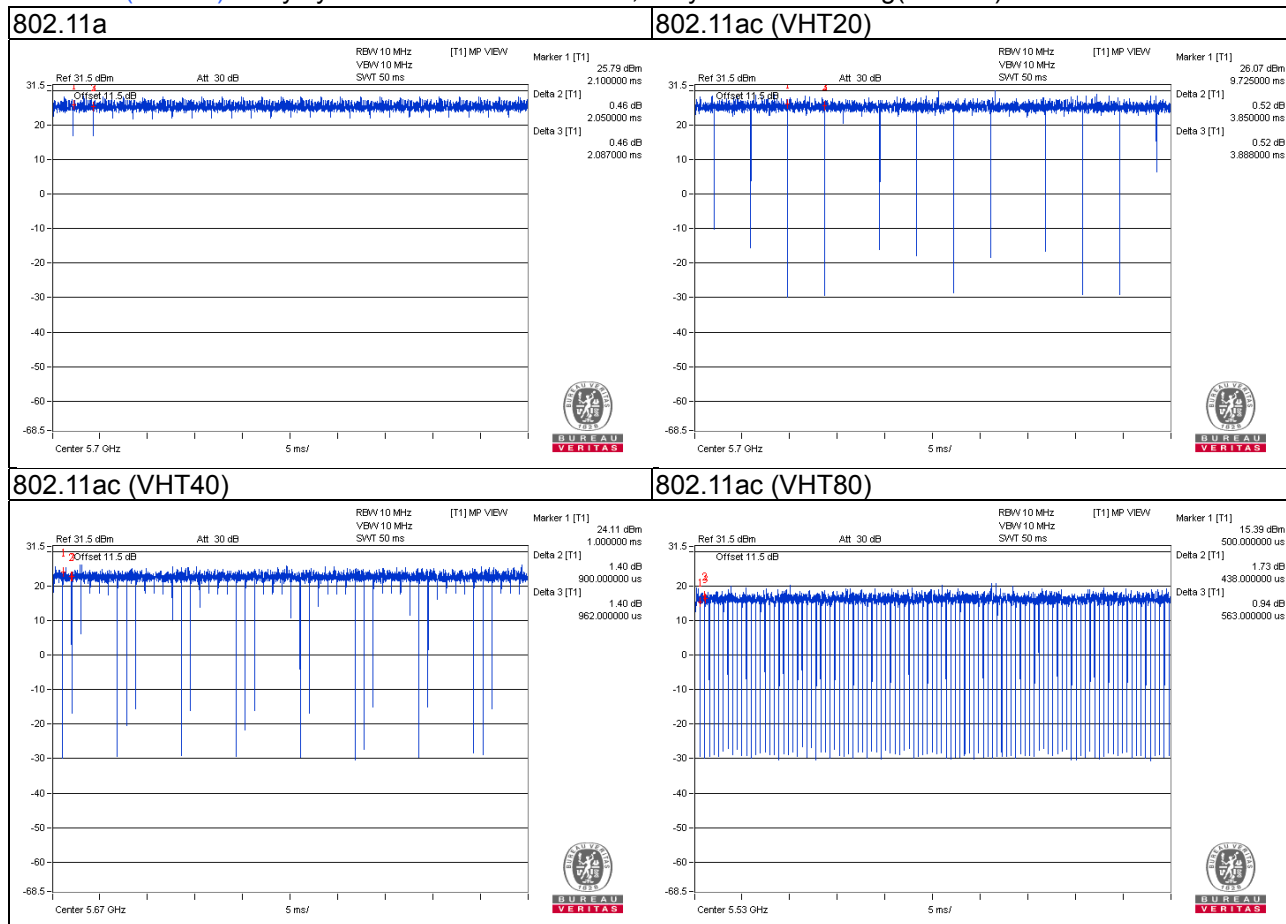
Duty cycle of test signal is < 98 %, duty factor is required.

802.11a: Duty cycle = $2.05/2.08 = 0.986$

802.11ac (VHT20): Duty cycle = $3.850/3.880 = 0.992$

802.11ac (VHT40): Duty cycle = $0.900/0.962 = 0.936$, Duty factor = $10 * \log(1/0.936) = 0.29$

802.11ac (VHT80): Duty cycle = $0.438/0.563 = 0.778$, Duty factor = $10 * \log(1/0.778) = 1.09$



3.4 Description of Support Units

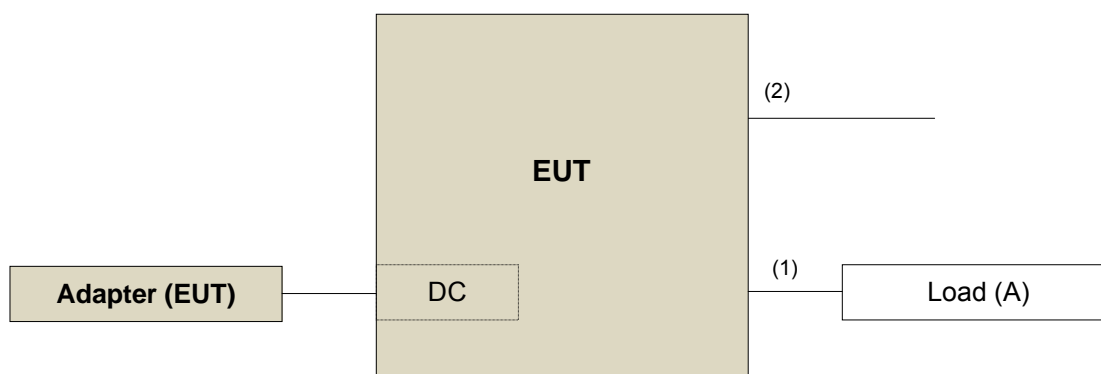
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Load	NA	NA	NA	NA	-

Note: 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.	Cat.5e cable	3	1.8	N	0	-
2.	Coaxial cable	1	1.8	-	0	-

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)

KDB 789033 D02 General UNII Test Procedures New Rules v01r03

KDB 662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2013

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

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

4 Test Types and Results

4.1 Radiated Emission 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 Procedure New Rules v01r03			Field Strength at 3m	
			PK:74 (dBµV/m)	AV:54 (dBµV/m)
Frequency Band	Applicable To		EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)		PK:-27 (dBm/MHz)	PK:68.2(dBµV/m)
5250~5350 MHz	15.407(b)(2)			
5470~5725 MHz	15.407(b)(3)			
5725~5850 MHz	<input checked="" type="checkbox"/>	15.407(b)(4)(i)	PK:-27 (dBm/MHz) ^{*1} PK:10 (dBm/MHz) ^{*2} PK:15.6 (dBm/MHz) ^{*3} PK:27 (dBm/MHz) ^{*4}	PK: 68.2(dBµV/m) ^{*1} PK:105.2 (dBµV/m) ^{*2} PK: 110.8(dBµV/m) ^{*3} PK:122.2 (dBµV/m) ^{*4}
	<input type="checkbox"/>	15.407(b)(4)(ii)	Emission limits in section 15.247(d)	
^{*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.	

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

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Dec. 23, 2015	Dec. 22, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Apr. 19, 2016	Apr. 18, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-148	Jan. 18, 2016	Jan. 17, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Jan. 08, 2016	Jan. 07, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Jan. 18, 2016	Jan. 17, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
Preamplifier Agilent	8449B	3008A01911	Aug. 09, 2016	Aug. 08, 2017
Preamplifier Agilent	8447D	2944A10638	Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-02(30 9222 +248780)	Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-03(27 4092)	Aug. 09, 2016	Aug. 08, 2017
RF signal cable Woken	8D-FB	Cable-CH9-01	Aug. 09, 2016	Aug. 08, 2017
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2015	Oct. 17, 2016
High Speed Peak Power Meter	ML2495A	0824011	Jul. 09, 2015	Jul. 08, 2016
Power Sensor	MA2411B	0738171	Aug. 11, 2016	Aug. 10, 2017

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 9.
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 215374.
5. The IC Site Registration No. is IC 7450F-9.

4.1.3 Test Procedures

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:

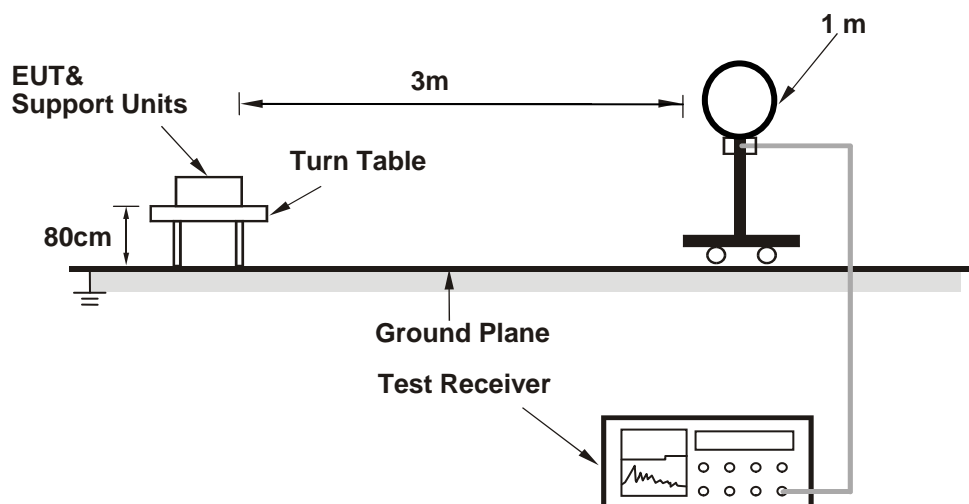
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) 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

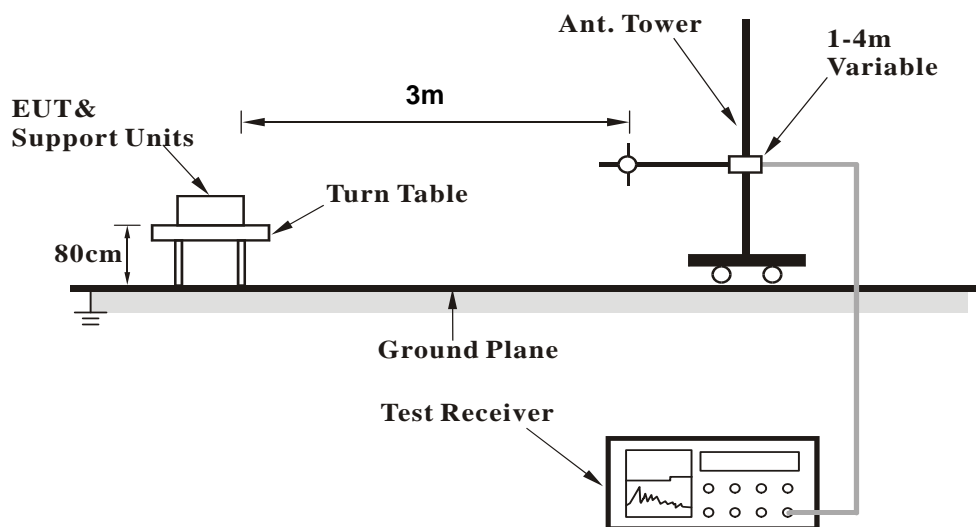
No deviation.

4.1.5 Test Setup

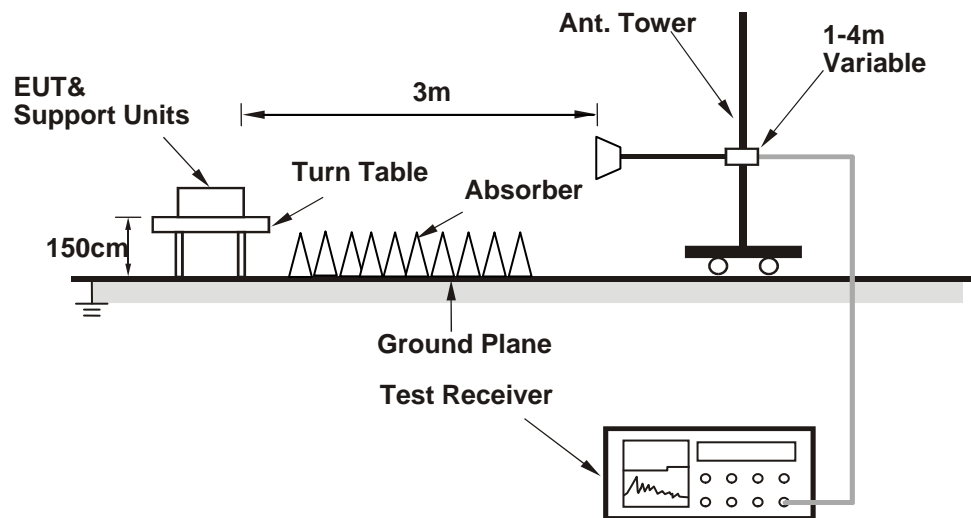
For Radiated emission below 30MHz



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 Conditions

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

4.1.7 Test Results

Above 1GHz Data

802.11a

CHANNEL	TX Channel 52	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	#3506.66	48.1 PK	74.0	-25.9	1.99 H	299	47.90	0.20
2	#3506.66	38.1 AV	54.0	-15.9	1.99 H	299	37.90	0.20
3	5150.00	59.9 PK	74.0	-14.1	1.80 H	11	55.30	4.60
4	5150.00	47.8 AV	54.0	-6.2	1.80 H	11	43.20	4.60
5	*5260.00	114.3 PK			1.62 H	11	71.40	42.90
6	*5260.00	104.2 AV			1.62 H	11	61.30	42.90
7	5382.00	60.5 PK	74.0	-13.5	1.79 H	202	55.70	4.80
8	5382.00	48.2 AV	54.0	-5.8	1.79 H	202	43.40	4.80
9	#10520.00	65.3 PK	74.0	-8.7	1.58 H	232	49.30	16.00
10	#10520.00	52.1 AV	54.0	-1.9	1.58 H	232	36.10	16.00
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	#3506.66	47.0 PK	74.0	-27.0	2.08 V	244	46.80	0.20
2	#3506.66	36.9 AV	54.0	-17.1	2.08 V	244	36.70	0.20
3	5150.00	60.4 PK	74.0	-13.6	1.53 V	356	55.80	4.60
4	5150.00	49.0 AV	54.0	-5.0	1.53 V	356	44.40	4.60
5	*5260.00	113.7 PK			2.37 V	14	70.80	42.90
6	*5260.00	104.1 AV			2.37 V	14	61.20	42.90
7	5382.00	61.0 PK	74.0	-13.0	1.58 V	18	56.20	4.80
8	5382.00	49.0 AV	54.0	-5.0	1.58 V	18	44.20	4.80
9	#10520.00	61.3 PK	74.0	-12.7	1.95 V	310	45.30	16.00
10	#10520.00	48.4 AV	54.0	-5.6	1.95 V	310	32.40	16.00

Remark:

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 60	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	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	#3533.00	47.5 PK	74.0	-26.5	1.86 H	296	47.20	0.30
2	#3533.00	38.2 AV	54.0	-15.8	1.86 H	296	37.90	0.30
3	*5300.00	109.5 PK			1.44 H	3	66.60	42.90
4	*5300.00	99.8 AV			1.44 H	3	56.90	42.90
5	5378.00	64.3 PK	74.0	-9.7	1.59 H	2	59.50	4.80
6	5378.00	52.9 AV	54.0	-1.1	1.59 H	2	48.10	4.80
7	10600.00	64.2 PK	74.0	-9.8	2.56 H	228	47.90	16.30
8	10600.00	51.0 AV	54.0	-3.0	2.56 H	228	34.70	16.30
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	#3533.00	46.9 PK	74.0	-27.1	2.07 V	246	46.60	0.30
2	#3533.00	35.9 AV	54.0	-18.1	2.07 V	246	35.60	0.30
3	*5300.00	108.1 PK			1.68 V	310	65.20	42.90
4	*5300.00	98.7 AV			1.68 V	310	55.80	42.90
5	5378.00	62.8 PK	74.0	-11.2	1.68 V	17	58.00	4.80
6	5378.00	52.3 AV	54.0	-1.7	1.68 V	17	47.50	4.80
7	10600.00	60.9 PK	74.0	-13.1	1.94 V	295	44.60	16.30
8	10600.00	46.7 AV	54.0	-7.3	1.94 V	295	30.40	16.30

Remark:

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 64	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	#3546.00	46.5 PK	74.0	-27.5	2.01 H	299	46.20	0.30
2	#3546.00	36.8 AV	54.0	-17.2	2.01 H	299	36.50	0.30
3	*5320.00	111.3 PK			2.05 H	6	68.40	42.90
4	*5320.00	101.2 AV			2.05 H	6	58.30	42.90
5	5400.00	66.3 PK	74.0	-7.7	1.52 H	199	61.50	4.80
6	5400.00	53.0 AV	54.0	-1.0	1.52 H	199	48.20	4.80
7	10640.00	62.0 PK	74.0	-12.0	1.70 H	309	45.60	16.40
8	10640.00	48.3 AV	54.0	-5.7	1.70 H	309	31.90	16.40
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	#3546.00	45.9 PK	74.0	-28.1	2.11 V	251	45.60	0.30
2	#3546.00	35.3 AV	54.0	-18.7	2.11 V	251	35.00	0.30
3	*5320.00	110.8 PK			1.86 V	16	67.90	42.90
4	*5320.00	101.3 AV			1.86 V	16	58.40	42.90
5	5400.00	63.8 PK	74.0	-10.2	1.91 V	311	59.00	4.80
6	5400.00	52.8 AV	54.0	-1.2	1.91 V	311	48.00	4.80
7	10640.00	61.2 PK	74.0	-12.8	1.91 V	299	44.80	16.40
8	10640.00	46.9 AV	54.0	-7.1	1.91 V	299	30.50	16.40

Remark:

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 100	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	3666.00	46.6 PK	74.0	-27.4	1.63 H	277	45.90	0.70
2	3666.00	37.9 AV	54.0	-16.1	1.63 H	277	37.20	0.70
3	5415.00	64.7 PK	74.0	-9.3	1.71 H	207	59.90	4.80
4	5415.00	52.9 AV	54.0	-1.1	1.71 H	207	48.10	4.80
5	#5470.00	60.4 PK	74.0	-13.6	1.88 H	203	55.50	4.90
6	#5470.00	47.1 AV	54.0	-6.9	1.88 H	203	42.20	4.90
7	*5500.00	110.1 PK			1.79 H	193	66.90	43.20
8	*5500.00	99.5 AV			1.79 H	193	56.30	43.20
9	11000.00	63.1 PK	74.0	-10.9	1.61 H	222	45.80	17.30
10	11000.00	48.9 AV	54.0	-5.1	1.61 H	222	31.60	17.30
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	3666.00	46.5 PK	74.0	-27.5	2.11 V	245	45.80	0.70
2	3666.00	36.8 AV	54.0	-17.2	2.11 V	245	36.10	0.70
3	5415.00	63.2 PK	74.0	-10.8	1.60 V	311	58.40	4.80
4	5415.00	52.5 AV	54.0	-1.5	1.60 V	311	47.70	4.80
5	#5470.00	59.9 PK	74.0	-14.1	1.71 V	296	55.00	4.90
6	#5470.00	46.6 AV	54.0	-7.4	1.71 V	296	41.70	4.90
7	*5500.00	108.0 PK			1.66 V	310	64.80	43.20
8	*5500.00	98.8 AV			1.66 V	310	55.60	43.20
9	11000.00	62.2 PK	74.0	-11.8	1.88 V	296	44.90	17.30
10	11000.00	48.1 AV	54.0	-5.9	1.88 V	296	30.80	17.30

Remark:

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 116	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	3720.00	47.6 PK	74.0	-26.4	1.54 H	278	46.60	1.00
2	3720.00	39.1 AV	54.0	-14.9	1.54 H	278	38.10	1.00
3	5460.00	60.9 PK	74.0	-13.1	1.89 H	203	56.10	4.80
4	5460.00	49.7 AV	54.0	-4.3	1.89 H	203	44.90	4.80
5	#5470.00	62.5 PK	74.0	-11.5	1.62 H	204	57.60	4.90
6	#5470.00	51.1 AV	54.0	-2.9	1.62 H	204	46.20	4.90
7	*5580.00	115.1 PK			1.60 H	196	71.70	43.40
8	*5580.00	104.4 AV			1.60 H	196	61.00	43.40
9	11160.00	64.2 PK	74.0	-9.8	2.28 H	229	47.60	16.60
10	11160.00	51.1 AV	54.0	-2.9	2.28 H	229	34.50	16.60
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	3720.00	47.2 PK	74.0	-26.8	2.09 V	256	46.20	1.00
2	3720.00	38.0 AV	54.0	-16.0	2.09 V	256	37.00	1.00
3	5460.00	60.3 PK	74.0	-13.7	1.96 V	311	55.50	4.80
4	5460.00	47.9 AV	54.0	-6.1	1.96 V	311	43.10	4.80
5	#5470.00	60.4 PK	74.0	-13.6	1.72 V	287	55.50	4.90
6	#5470.00	47.6 AV	54.0	-6.4	1.72 V	287	42.70	4.90
7	*5580.00	114.0 PK			1.49 V	308	70.60	43.40
8	*5580.00	104.3 AV			1.49 V	308	60.90	43.40
9	11160.00	62.5 PK	74.0	-11.5	1.80 V	229	45.90	16.60
10	11160.00	49.2 AV	54.0	-4.8	1.80 V	229	32.60	16.60

Remark:

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 140	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	3800.00	49.0 PK	74.0	-25.0	1.55 H	281	47.90	1.10
2	3800.00	39.0 AV	54.0	-15.0	1.55 H	281	37.90	1.10
3	*5700.00	112.3 PK			2.14 H	190	68.80	43.50
4	*5700.00	101.9 AV			2.14 H	190	58.40	43.50
5	#5725.00	66.6 PK	68.2	-1.6	2.04 H	188	61.50	5.10
6	11400.00	64.4 PK	74.0	-9.6	2.29 H	231	47.90	16.50
7	11400.00	51.6 AV	54.0	-2.4	2.29 H	231	35.10	16.50
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	3800.00	47.9 PK	74.0	-26.1	2.11 V	261	46.80	1.10
2	3800.00	38.3 AV	54.0	-15.7	2.11 V	261	37.20	1.10
3	*5700.00	112.0 PK			1.60 V	306	68.50	43.50
4	*5700.00	102.3 AV			1.60 V	306	58.80	43.50
5	#5725.00	66.2 PK	68.2	-2.0	1.70 V	301	61.10	5.10
6	11400.00	62.6 PK	74.0	-11.4	1.89 V	230	46.10	16.50
7	11400.00	49.2 AV	54.0	-4.8	1.89 V	230	32.70	16.50

Remark:

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 52	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	#3506.66	47.9 PK	74.0	-26.1	1.83 H	295	47.70	0.20
2	#3506.66	38.5 AV	54.0	-15.5	1.83 H	295	38.30	0.20
3	5150.00	59.5 PK	74.0	-14.5	1.66 H	10	54.90	4.60
4	5150.00	48.2 AV	54.0	-5.8	1.66 H	10	43.60	4.60
5	*5260.00	114.4 PK			1.73 H	192	71.50	42.90
6	*5260.00	104.5 AV			1.73 H	192	61.60	42.90
7	5380.00	60.7 PK	74.0	-13.3	1.77 H	2	55.90	4.80
8	5380.00	47.9 AV	54.0	-6.1	1.77 H	2	43.10	4.80
9	#10520.00	65.2 PK	74.0	-8.8	1.66 H	266	49.20	16.00
10	#10520.00	51.7 AV	54.0	-2.3	1.66 H	266	35.70	16.00
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	#3506.66	48.1 PK	74.0	-25.9	1.96 V	241	47.90	0.20
2	#3506.66	38.2 AV	54.0	-15.8	1.96 V	241	38.00	0.20
3	5150.00	60.8 PK	74.0	-13.2	1.54 V	272	56.20	4.60
4	5150.00	47.6 AV	54.0	-6.4	1.54 V	272	43.00	4.60
5	*5260.00	113.0 PK			1.70 V	293	70.10	42.90
6	*5260.00	103.7 AV			1.70 V	293	60.80	42.90
7	5350.00	61.2 PK	74.0	-12.8	1.61 V	22	56.50	4.70
8	5350.00	49.0 AV	54.0	-5.0	1.61 V	22	44.30	4.70
9	#10520.00	61.8 PK	74.0	-12.2	2.18 V	308	45.80	16.00
10	#10520.00	48.1 AV	54.0	-5.9	2.18 V	308	32.10	16.00

Remark:

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 60	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	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	#3533.00	47.4 PK	74.0	-26.6	1.72 H	277	47.10	0.30
2	#3533.00	38.5 AV	54.0	-15.5	1.72 H	277	38.20	0.30
3	*5300.00	111.1 PK			2.06 H	339	68.20	42.90
4	*5300.00	100.3 AV			2.06 H	339	57.40	42.90
5	5378.00	64.5 PK	74.0	-9.5	1.68 H	197	59.70	4.80
6	5378.00	53.0 AV	54.0	-1.0	1.68 H	197	48.20	4.80
7	10600.00	63.8 PK	74.0	-10.2	2.18 H	223	47.50	16.30
8	10600.00	51.1 AV	54.0	-2.9	2.18 H	223	34.80	16.30
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	#3533.00	47.0 PK	74.0	-27.0	1.99 V	248	46.70	0.30
2	#3533.00	36.4 AV	54.0	-17.6	1.99 V	248	36.10	0.30
3	*5300.00	107.8 PK			1.62 V	285	64.90	42.90
4	*5300.00	98.4 AV			1.62 V	285	55.50	42.90
5	5378.00	63.7 PK	74.0	-10.3	1.66 V	320	58.90	4.80
6	5378.00	52.9 AV	54.0	-1.1	1.66 V	320	48.10	4.80
7	10600.00	61.4 PK	74.0	-12.6	1.93 V	281	45.10	16.30
8	10600.00	47.4 AV	54.0	-6.6	1.93 V	281	31.10	16.30

Remark:

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 64	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	#3546.00	47.1 PK	74.0	-26.9	1.99 H	301	46.80	0.30
2	#3546.00	37.1 AV	54.0	-16.9	1.99 H	301	36.80	0.30
3	*5320.00	114.7 PK			2.46 H	358	71.80	42.90
4	*5320.00	104.3 AV			2.46 H	358	61.40	42.90
5	5400.00	65.5 PK	74.0	-8.5	1.66 H	206	60.70	4.80
6	5400.00	53.0 AV	54.0	-1.0	1.66 H	206	48.20	4.80
7	10640.00	62.3 PK	74.0	-11.7	1.77 H	311	45.90	16.40
8	10640.00	49.2 AV	54.0	-4.8	1.77 H	311	32.80	16.40
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	#3546.00	46.2 PK	74.0	-27.8	2.09 V	261	45.90	0.30
2	#3546.00	36.1 AV	54.0	-17.9	2.09 V	261	35.80	0.30
3	*5320.00	111.3 PK			1.62 V	303	68.40	42.90
4	*5320.00	101.7 AV			1.62 V	303	58.80	42.90
5	5400.00	64.2 PK	74.0	-9.8	1.74 V	21	59.40	4.80
6	5400.00	52.8 AV	54.0	-1.2	1.74 V	21	48.00	4.80
7	10640.00	61.4 PK	74.0	-12.6	1.90 V	308	45.00	16.40
8	10640.00	47.2 AV	54.0	-6.8	1.90 V	308	30.80	16.40

Remark:

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 100	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	3666.66	46.2 PK	74.0	-27.8	1.88 H	301	45.50	0.70
2	3666.66	36.2 AV	54.0	-17.8	1.88 H	301	35.50	0.70
3	5420.00	63.9 PK	74.0	-10.1	1.90 H	203	59.10	4.80
4	5420.00	53.0 AV	54.0	-1.0	1.90 H	203	48.20	4.80
5	#5470.00	60.3 PK	74.0	-13.7	1.70 H	199	55.40	4.90
6	#5470.00	47.3 AV	54.0	-6.7	1.70 H	199	42.40	4.90
7	*5500.00	110.6 PK			1.76 H	199	67.40	43.20
8	*5500.00	99.8 AV			1.76 H	199	56.60	43.20
9	11000.00	62.9 PK	74.0	-11.1	1.99 H	237	45.60	17.30
10	11000.00	50.1 AV	54.0	-3.9	1.99 H	237	32.80	17.30
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	3666.66	45.8 PK	74.0	-28.2	1.81 V	255	45.10	0.70
2	3666.66	35.6 AV	54.0	-18.4	1.81 V	255	34.90	0.70
3	5420.00	63.2 PK	74.0	-10.8	1.60 V	302	58.40	4.80
4	5420.00	52.1 AV	54.0	-1.9	1.60 V	302	47.30	4.80
5	#5470.00	60.3 PK	74.0	-13.7	1.68 V	251	55.40	4.90
6	#5470.00	46.7 AV	54.0	-7.3	1.68 V	251	41.80	4.90
7	*5500.00	108.4 PK			1.70 V	311	65.20	43.20
8	*5500.00	99.1 AV			1.70 V	311	55.90	43.20
9	11000.00	62.5 PK	74.0	-11.5	1.93 V	248	45.20	17.30
10	11000.00	49.4 AV	54.0	-4.6	1.93 V	248	32.10	17.30

Remark:

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 116	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	5460.00	61.1 PK	74.0	-12.9	2.24 H	201	56.30	4.80
2	5460.00	49.5 AV	54.0	-4.5	2.24 H	201	44.70	4.80
3	#5470.00	61.5 PK	74.0	-12.5	2.77 H	102	56.60	4.90
4	#5470.00	48.6 AV	54.0	-5.4	2.77 H	102	43.70	4.90
5	*5580.00	116.1 PK			1.53 H	197	72.70	43.40
6	*5580.00	104.8 AV			1.53 H	197	61.40	43.40
7	11160.00	63.6 PK	74.0	-10.4	1.53 H	222	47.00	16.60
8	11160.00	52.4 AV	54.0	-1.6	1.53 H	222	35.80	16.60
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	5460.00	59.5 PK	74.0	-14.5	1.76 V	18	54.70	4.80
2	5460.00	49.3 AV	54.0	-4.7	1.76 V	18	44.50	4.80
3	#5470.00	60.3 PK	74.0	-13.7	1.88 V	342	55.40	4.90
4	#5470.00	47.2 AV	54.0	-6.8	1.88 V	342	42.30	4.90
5	*5580.00	111.5 PK			1.42 V	312	68.10	43.40
6	*5580.00	102.8 AV			1.42 V	312	59.40	43.40
7	11600.00	62.7 PK	74.0	-11.3	1.88 V	187	46.60	16.10
8	11600.00	49.3 AV	54.0	-4.7	1.88 V	187	33.20	16.10

Remark:

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 140	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	*5700.00	111.5 PK			1.95 H	196	68.00	43.50
2	*5700.00	100.3 AV			1.95 H	196	56.80	43.50
3	#5780.00	66.7 PK	68.2	-1.5	2.05 H	189	61.50	5.20
4	11400.00	68.1 PK	74.0	-5.9	1.44 H	226	51.60	16.50
5	11400.00	53.4 AV	54.0	-0.6	1.44 H	226	36.90	16.50
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	*5700.00	109.0 PK			1.59 V	309	65.50	43.50
2	*5700.00	99.6 AV			1.59 V	309	56.10	43.50
3	#5780.00	64.4 PK	68.2	-3.8	1.61 V	275	59.20	5.20
4	11400.00	64.8 PK	74.0	-9.2	1.32 V	198	48.30	16.50
5	11400.00	51.4 AV	54.0	-2.6	1.32 V	198	34.90	16.50

Remark:

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 54	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	#3513.33	47.3 PK	74.0	-26.7	2.06 H	315	47.10	0.20
2	#3513.33	37.1 AV	54.0	-16.9	2.06 H	315	36.90	0.20
3	*5270.00	108.2 PK			1.96 H	200	65.30	42.90
4	*5270.00	97.7 AV			1.96 H	200	54.80	42.90
5	5350.00	65.5 PK	74.0	-8.5	2.16 H	206	60.80	4.70
6	5350.00	52.9 AV	54.0	-1.1	2.16 H	206	48.20	4.70
7	#10540.00	62.6 PK	74.0	-11.4	2.19 H	233	46.40	16.20
8	#10540.00	49.9 AV	54.0	-4.1	2.19 H	233	33.70	16.20
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	#3513.33	47.8 PK	74.0	-26.2	1.89 V	257	47.60	0.20
2	#3513.33	37.0 AV	54.0	-17.0	1.89 V	257	36.80	0.20
3	*5270.00	107.4 PK			1.59 V	278	64.50	42.90
4	*5270.00	97.0 AV			1.59 V	278	54.10	42.90
5	5350.00	63.7 PK	74.0	-10.3	1.52 V	5	59.00	4.70
6	5350.00	52.5 AV	54.0	-1.5	1.52 V	5	47.80	4.70
7	#10540.00	61.6 PK	74.0	-12.4	1.94 V	253	45.40	16.20
8	#10540.00	48.3 AV	54.0	-5.7	1.94 V	253	32.10	16.20

Remark:

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 62	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	#3540.00	47.3 PK	74.0	-26.7	2.02 H	294	47.10	0.20
2	#3540.00	36.8 AV	54.0	-17.2	2.02 H	294	36.60	0.20
3	*5310.00	110.1 PK			2.09 H	345	67.20	42.90
4	*5310.00	99.4 AV			2.09 H	345	56.50	42.90
5	5350.00	70.8 PK	74.0	-3.2	1.91 H	351	66.10	4.70
6	5350.00	50.5 AV	54.0	-3.5	1.91 H	351	45.80	4.70
7	5400.00	69.1 PK	74.0	-4.9	2.03 H	204	64.30	4.80
8	5400.00	52.9 AV	54.0	-1.1	2.03 H	204	48.10	4.80
9	10620.00	62.0 PK	74.0	-12.0	2.08 H	234	45.50	16.50
10	10620.00	48.8 AV	54.0	-5.2	2.08 H	234	32.30	16.50
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	#3540.00	46.7 PK	74.0	-27.3	1.89 V	261	46.50	0.20
2	#3540.00	35.6 AV	54.0	-18.4	1.89 V	261	35.40	0.20
3	*5310.00	106.4 PK			1.61 V	354	63.50	42.90
4	*5310.00	97.0 AV			1.61 V	354	54.10	42.90
5	5350.00	67.8 PK	74.0	-6.2	1.80 V	313	63.10	4.70
6	5350.00	48.6 AV	54.0	-5.4	1.80 V	313	43.90	4.70
7	5400.00	61.9 PK	74.0	-12.1	1.77 V	314	57.10	4.80
8	5400.00	51.3 AV	54.0	-2.7	1.77 V	314	46.50	4.80
9	10620.00	61.5 PK	74.0	-12.5	1.89 V	244	45.00	16.50
10	10620.00	48.3 AV	54.0	-5.7	1.89 V	244	31.80	16.50

Remark:

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 102	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	3673.33	47.6 PK	74.0	-26.4	1.50 H	285	46.80	0.80
2	3673.33	38.5 AV	54.0	-15.5	1.50 H	285	37.70	0.80
3	5430.00	65.1 PK	74.0	-8.9	1.75 H	209	60.30	4.80
4	5430.00	53.0 AV	54.0	-1.0	1.75 H	209	48.20	4.80
5	#5470.00	63.2 PK	74.0	-10.8	1.96 H	198	58.30	4.90
6	#5470.00	47.9 AV	54.0	-6.1	1.96 H	198	43.00	4.90
7	*5510.00	109.6 PK			2.12 H	346	66.40	43.20
8	*5510.00	98.4 AV			2.12 H	346	55.20	43.20
9	11020.00	62.8 PK	74.0	-11.2	1.71 H	231	45.60	17.20
10	11020.00	49.3 AV	54.0	-4.7	1.71 H	231	32.10	17.20
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	3673.33	47.8 PK	74.0	-26.2	2.28 V	275	47.00	0.80
2	3673.33	38.7 AV	54.0	-15.3	2.28 V	275	37.90	0.80
3	5430.00	61.9 PK	74.0	-12.1	1.77 V	18	57.10	4.80
4	5430.00	50.3 AV	54.0	-3.7	1.77 V	18	45.50	4.80
5	#5470.00	63.6 PK	74.0	-10.4	2.11 V	18	58.70	4.90
6	#5470.00	47.6 AV	54.0	-6.4	2.11 V	18	42.70	4.90
7	*5510.00	107.2 PK			1.72 V	318	64.00	43.20
8	*5510.00	97.3 AV			1.72 V	318	54.10	43.20
9	11020.00	62.3 PK	74.0	-11.7	1.82 V	241	45.10	17.20
10	11020.00	48.7 AV	54.0	-5.3	1.82 V	241	31.50	17.20

Remark:

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 110	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	5457.00	65.8 PK	74.0	-8.2	1.93 H	208	61.00	4.80
2	5457.00	53.0 AV	54.0	-1.0	1.93 H	208	48.20	4.80
3	#5467.00	67.1 PK	68.2	-1.1	1.57 H	212	62.20	4.90
4	*5550.00	109.3 PK			1.42 H	206	66.00	43.30
5	*5550.00	98.6 AV			1.42 H	206	55.30	43.30
6	11100.00	62.1 PK	74.0	-11.9	1.25 H	134	45.70	16.40
7	11100.00	48.8 AV	54.0	-5.2	1.25 H	134	32.40	16.40
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	5457.00	64.0 PK	74.0	-10.0	1.49 V	298	59.20	4.80
2	5457.00	52.0 AV	54.0	-2.0	1.49 V	298	47.20	4.80
3	#5467.00	65.1 PK	68.2	-3.1	1.64 V	322	60.20	4.90
4	*5550.00	107.7 PK			1.54 V	320	64.40	43.30
5	*5550.00	98.0 AV			1.54 V	320	54.70	43.30
6	11100.00	61.7 PK	74.0	-12.3	1.79 V	83	45.30	16.40
7	11100.00	48.6 AV	54.0	-5.4	1.79 V	83	32.20	16.40

Remark:

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 134	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	*5670.00	111.9 PK			1.41 H	204	68.40	43.50
2	*5670.00	100.2 AV			1.41 H	204	56.70	43.50
3	#5752.00	66.5 PK	68.2	-1.7	1.50 H	202	61.30	5.20
4	11340.00	62.9 PK	74.0	-11.1	1.36 H	148	45.80	17.10
5	11340.00	49.4 AV	54.0	-4.6	1.36 H	148	32.30	17.10
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	*5670.00	111.0 PK			1.53 V	312	67.50	43.50
2	*5670.00	98.8 AV			1.53 V	312	55.30	43.50
3	#5752.00	65.2 PK	68.2	-3.0	1.63 V	293	60.00	5.20
4	11340.00	62.5 PK	74.0	-11.5	1.82 V	91	45.40	17.10
5	11340.00	49.1 AV	54.0	-4.9	1.82 V	91	32.00	17.10

Remark:

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 58	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	#3526.66	47.4 PK	74.0	-26.6	2.17 H	299	47.10	0.30
2	#3526.66	37.4 AV	54.0	-16.6	2.17 H	299	37.10	0.30
3	5150.00	60.3 PK	74.0	-13.7	1.88 H	215	55.70	4.60
4	5150.00	47.4 AV	54.0	-6.6	1.88 H	215	42.80	4.60
5	*5290.00	105.3 PK			2.10 H	213	62.40	42.90
6	*5290.00	95.2 AV			2.10 H	213	52.30	42.90
7	5350.00	67.8 PK	74.0	-6.2	2.05 H	210	63.10	4.70
8	5350.00	52.7 AV	54.0	-1.3	2.05 H	210	48.00	4.70
9	#10580.00	62.5 PK	74.0	-11.5	1.89 H	302	46.20	16.30
10	#10580.00	49.2 AV	54.0	-4.8	1.89 H	302	32.90	16.30
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	#3526.66	46.4 PK	74.0	-27.6	2.11 V	269	46.10	0.30
2	#3526.66	36.4 AV	54.0	-17.6	2.11 V	269	36.10	0.30
3	5150.00	60.1 PK	74.0	-13.9	1.58 V	279	55.50	4.60
4	5150.00	47.0 AV	54.0	-7.0	1.58 V	279	42.40	4.60
5	*5290.00	104.7 PK			1.63 V	302	61.80	42.90
6	*5290.00	94.7 AV			1.63 V	302	51.80	42.90
7	5350.00	68.2 PK	74.0	-5.8	1.89 V	16	63.50	4.70
8	5350.00	51.9 AV	54.0	-2.1	1.89 V	16	47.20	4.70
9	#10580.00	61.5 PK	74.0	-12.5	1.81 V	299	45.20	16.30
10	#10580.00	47.3 AV	54.0	-6.7	1.81 V	299	31.00	16.30

Remark:

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 106	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	3686.66	48.6 PK	74.0	-25.4	2.18 H	287	47.80	0.80
2	3686.66	38.3 AV	54.0	-15.7	2.18 H	287	37.50	0.80
3	5460.00	65.2 PK	74.0	-8.8	2.19 H	212	60.40	4.80
4	5460.00	52.9 AV	54.0	-1.1	2.19 H	212	48.10	4.80
5	#5470.00	69.4 PK	74.0	-4.6	1.69 H	203	64.50	4.90
6	#5470.00	52.9 AV	54.0	-1.1	1.69 H	203	48.00	4.90
7	*5530.00	107.4 PK			1.68 H	199	64.20	43.20
8	*5530.00	96.6 AV			1.68 H	199	53.40	43.20
9	11060.00	63.3 PK	74.0	-10.7	1.91 H	307	46.50	16.80
10	11060.00	49.6 AV	54.0	-4.4	1.91 H	307	32.80	16.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	3686.66	46.6 PK	74.0	-27.4	1.99 V	271	45.80	0.80
2	3686.66	36.5 AV	54.0	-17.5	1.99 V	271	35.70	0.80
3	5460.00	64.1 PK	74.0	-9.9	1.77 V	317	59.30	4.80
4	5460.00	50.8 AV	54.0	-3.2	1.77 V	317	46.00	4.80
5	#5470.00	67.4 PK	74.0	-6.6	1.65 V	318	62.50	4.90
6	#5470.00	50.6 AV	54.0	-3.4	1.65 V	318	45.70	4.90
7	*5530.00	104.1 PK			1.71 V	318	60.90	43.20
8	*5530.00	94.4 AV			1.71 V	318	51.20	43.20
9	11060.00	62.1 PK	74.0	-11.9	4.00 V	289	45.30	16.80
10	11060.00	48.3 AV	54.0	-5.7	4.00 V	289	31.50	16.80

Remark:

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 122	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	*5610.00	108.0 PK			1.57 H	197	64.20	43.80
2	*5610.00	98.4 AV			1.57 H	197	54.60	43.80
3	#5726.00	59.6 PK	74.0	-14.4	1.74 H	200	53.90	5.70
4	#5726.00	49.4 AV	54.0	-4.6	1.74 H	200	43.70	5.70
5	11220.00	64.5 PK	74.0	-9.5	1.86 H	315	47.30	17.20
6	11220.00	50.5 AV	54.0	-3.5	1.86 H	315	33.30	17.20
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	*5610.00	105.8 PK			1.65 V	325	62.00	43.80
2	*5610.00	96.3 AV			1.65 V	325	52.50	43.80
3	#5726.00	59.4 PK	74.0	-14.6	1.89 V	288	53.70	5.70
4	#5726.00	49.2 AV	54.0	-4.8	1.89 V	288	43.50	5.70
5	11220.00	63.7 PK	74.0	-10.3	3.86 V	300	46.50	17.20
6	11220.00	49.9 AV	54.0	-4.1	3.86 V	300	32.70	17.20

Remark:

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: 802.11a

CHANNEL	TX Channel 52	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	125.06	32.2 QP	43.5	-11.3	1.99 H	92	47.80	-15.60
2	179.38	34.2 QP	43.5	-9.3	1.99 H	119	48.50	-14.30
3	249.22	33.2 QP	46.0	-12.8	1.00 H	120	46.60	-13.40
4	301.60	33.0 QP	46.0	-13.0	1.00 H	95	44.20	-11.20
5	499.48	36.2 QP	46.0	-9.8	1.00 H	128	42.70	-6.50
6	625.58	40.8 QP	46.0	-5.2	1.00 H	287	43.90	-3.10
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	30.00	36.4 QP	40.0	-3.6	1.00 V	209	52.00	-15.60
2	49.40	36.0 QP	40.0	-4.0	1.00 V	13	49.60	-13.60
3	185.20	31.5 QP	43.5	-12.0	1.00 V	323	46.50	-15.00
4	249.22	35.3 QP	46.0	-10.7	1.00 V	300	48.70	-13.40
5	375.32	32.3 QP	46.0	-13.7	1.00 V	111	41.60	-9.30
6	499.48	38.5 QP	46.0	-7.5	1.00 V	172	45.00	-6.50

Remark:

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.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Dec. 23, 2015	Dec. 22, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Dec. 26, 2015	Dec. 25, 2016
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 11, 2016	Jan. 10, 2017
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 26, 2016	Jul. 25, 2017
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 2.
3. The VCCI Site Registration No. is C-2047.

4.2.3 Test Procedures

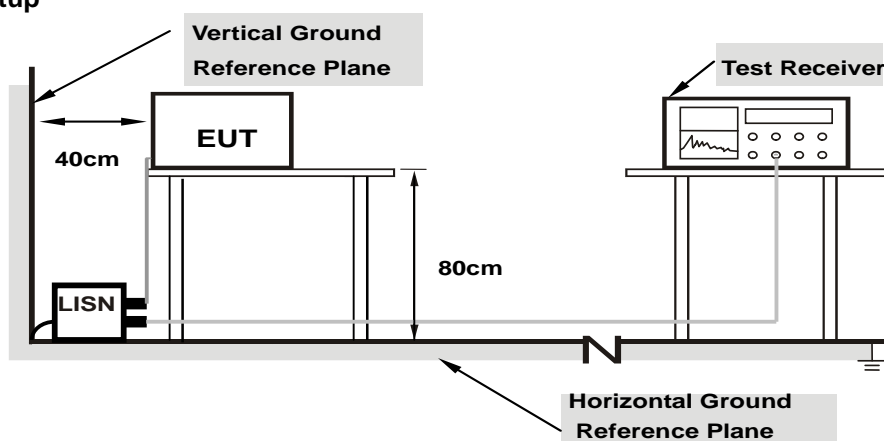
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

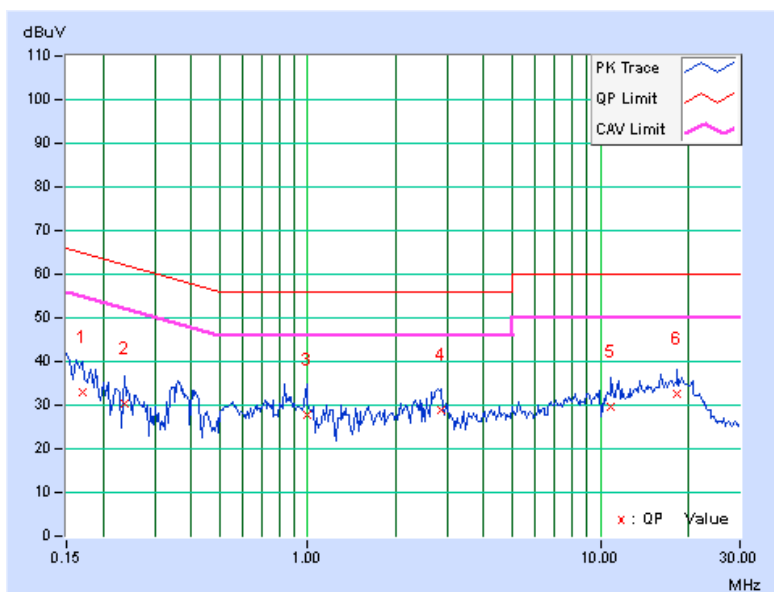
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	10.19	22.70	3.94	32.89	14.13	64.98	54.98	-32.09	-40.85
2	0.23594	10.22	20.16	2.64	30.38	12.86	62.24	52.24	-31.86	-39.38
3	0.98984	10.31	17.42	9.19	27.73	19.50	56.00	46.00	-28.27	-26.50
4	2.87109	10.39	18.39	8.65	28.78	19.04	56.00	46.00	-27.22	-26.96
5	10.82813	10.54	19.08	12.71	29.62	23.25	60.00	50.00	-30.38	-26.75
6	18.39063	10.65	21.87	16.66	32.52	27.31	60.00	50.00	-27.48	-22.69

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.

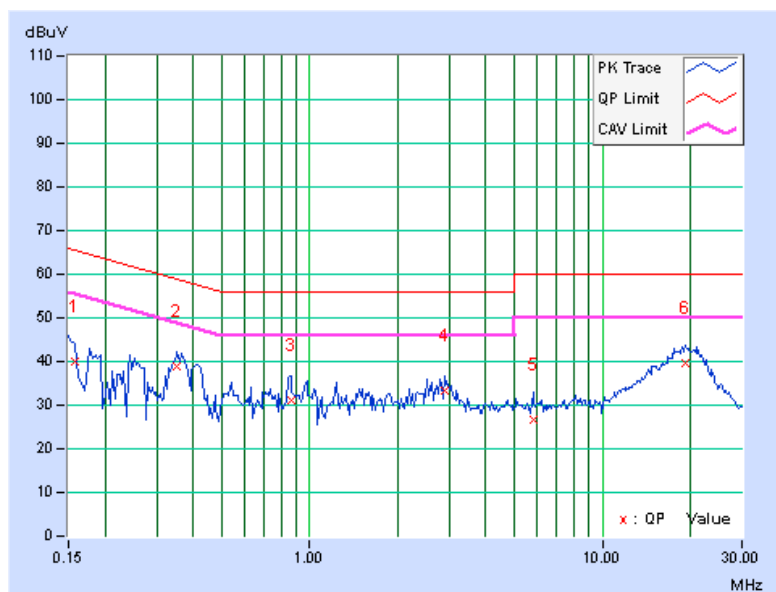


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	10.19	29.65	16.26	39.84	26.45	65.58	55.58	-25.74	-29.13
2	0.35313	10.28	28.49	12.87	38.77	23.15	58.89	48.89	-20.12	-25.74
3	0.86094	10.29	20.64	10.78	30.93	21.07	56.00	46.00	-25.07	-24.93
4	2.87891	10.47	23.02	13.86	33.49	24.33	56.00	46.00	-22.51	-21.67
5	5.80469	10.57	16.06	10.07	26.63	20.64	60.00	50.00	-33.37	-29.36
6	19.21094	10.86	28.84	23.89	39.70	34.75	60.00	50.00	-20.30	-15.25

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 Measurement

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 \leq 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	$\sqrt{\quad}$		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C	$\sqrt{\quad}$		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 $N_{ANT} \leq 4$;

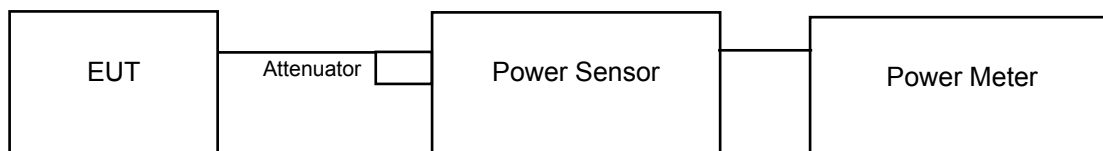
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

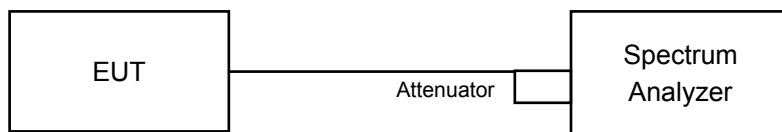
For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

4.3.2 Test Setup

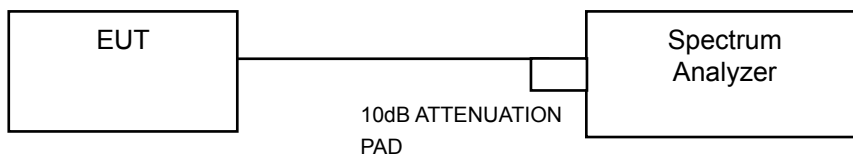
For 802.11a, 802.11ac (VHT20), 802.11ac (VHT40)



For 802.11ac (VHT80)



For 26dB and Occupied Bandwidth



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For Average Power Measurement

For 802.11a, 802.11ac (VHT20), 802.11ac (VHT40)

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.

For 802.11ac (VHT80)

- a. Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
- b. Set sweep trigger to "free run".
- c. Set RBW = 1 MHz.
- d. Set VBW \geq 3 MHz
- e. Number of points in sweep \geq 2 Span / RBW.
- f. Sweep time \leq (number of points in sweep) * T
- g. Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
- h. Detector = RMS.
- i. Trace mode = max hold.
- j. Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.
- k. Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

For 26dB Bandwidth

- a. Set RBW = approximately 1% of the emission bandwidth.
- b. Set the VBW > RBW.
- c. Detector = Peak.
- d. Trace mode = max hold.
- e. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

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 Result

Power Output:

802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
52	5260	14.87	14.47	15.23	92.023	19.64	24.00	Pass
60	5300	13.93	12.77	13.42	65.619	18.17	24.00	Pass
64	5320	15.60	14.56	15.08	97.095	19.87	24.00	Pass
100	5500	14.29	14.81	15.46	92.278	19.65	24.00	Pass
116	5580	15.16	15.45	15.34	102.083	20.09	24.00	Pass
140	5700	15.35	15.40	15.86	107.499	20.31	24.00	Pass

Note:

Chain 0

1. $11\text{dBm} + 10\log (20.55) = 24.13 > 24\text{dBm}$
2. $11\text{dBm} + 10\log (20.43) = 24.10 > 24\text{dBm}$
3. $11\text{dBm} + 10\log (20.53) = 24.12 > 24\text{dBm}$
4. $11\text{dBm} + 10\log (20.58) = 24.13 > 24\text{dBm}$
5. $11\text{dBm} + 10\log (20.62) = 24.14 > 24\text{dBm}$
6. $11\text{dBm} + 10\log (20.45) = 24.11 > 24\text{dBm}$

Chain 1

1. $11\text{dBm} + 10\log (20.46) = 24.11 > 24\text{dBm}$
2. $11\text{dBm} + 10\log (20.43) = 24.10 > 24\text{dBm}$
3. $11\text{dBm} + 10\log (20.32) = 24.08 > 24\text{dBm}$
4. $11\text{dBm} + 10\log (20.39) = 24.09 > 24\text{dBm}$
5. $11\text{dBm} + 10\log (20.36) = 24.09 > 24\text{dBm}$
6. $11\text{dBm} + 10\log (20.37) = 24.09 > 24\text{dBm}$

Chain 2

1. $11\text{dBm} + 10\log (20.55) = 24.13 > 24\text{dBm}$
2. $11\text{dBm} + 10\log (20.63) = 24.14 > 24\text{dBm}$
3. $11\text{dBm} + 10\log (20.57) = 24.13 > 24\text{dBm}$
4. $11\text{dBm} + 10\log (20.57) = 24.13 > 24\text{dBm}$
5. $11\text{dBm} + 10\log (20.44) = 24.10 > 24\text{dBm}$
6. $11\text{dBm} + 10\log (20.52) = 24.12 > 24\text{dBm}$

802.11ac (VHT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
52	5260	15.31	14.83	15.58	100.513	20.02	24.00	Pass
60	5300	13.54	12.58	13.17	61.456	17.89	24.00	Pass
64	5320	16.21	15.14	16.08	114.993	20.61	24.00	Pass
100	5500	15.37	15.27	15.49	103.486	20.15	24.00	Pass
116	5580	15.34	15.56	15.69	107.241	20.30	24.00	Pass
140	5700	15.49	15.34	15.58	105.739	20.24	24.00	Pass

Note:

Chain 0

1. $11\text{dBm} + 10\log (20.60) = 24.14 > 24\text{dBm}$
2. $11\text{dBm} + 10\log (20.69) = 24.16 > 24\text{dBm}$
3. $11\text{dBm} + 10\log (20.63) = 24.14 > 24\text{dBm}$
4. $11\text{dBm} + 10\log (20.57) = 24.13 > 24\text{dBm}$
5. $11\text{dBm} + 10\log (20.66) = 24.15 > 24\text{dBm}$
6. $11\text{dBm} + 10\log (20.61) = 24.14 > 24\text{dBm}$

Chain 1

1. $11\text{dBm} + 10\log (20.49) = 24.12 > 24\text{dBm}$
2. $11\text{dBm} + 10\log (20.62) = 24.14 > 24\text{dBm}$
3. $11\text{dBm} + 10\log (20.54) = 24.13 > 24\text{dBm}$
4. $11\text{dBm} + 10\log (20.54) = 24.13 > 24\text{dBm}$
5. $11\text{dBm} + 10\log (20.57) = 24.13 > 24\text{dBm}$
6. $11\text{dBm} + 10\log (20.49) = 24.12 > 24\text{dBm}$

Chain 2

1. $11\text{dBm} + 10\log (20.91) = 24.20 > 24\text{dBm}$
2. $11\text{dBm} + 10\log (20.92) = 24.21 > 24\text{dBm}$
3. $11\text{dBm} + 10\log (20.50) = 24.12 > 24\text{dBm}$
4. $11\text{dBm} + 10\log (20.83) = 24.19 > 24\text{dBm}$
5. $11\text{dBm} + 10\log (20.86) = 24.19 > 24\text{dBm}$
6. $11\text{dBm} + 10\log (20.86) = 24.19 > 24\text{dBm}$

802.11ac (VHT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
54	5270	17.40	16.85	17.67	161.850	22.09	24.00	Pass
62	5310	17.09	16.05	16.80	139.303	21.44	24.00	Pass
102	5510	16.66	16.74	16.02	133.545	21.26	24.00	Pass
110	5550	16.14	16.08	15.57	117.724	20.71	24.00	Pass
134	5670	17.31	17.04	17.85	165.363	22.18	24.00	Pass

Note:

Chain 0

1. $11\text{dBm} + 10\log (41.28) = 27.16 > 24\text{dBm}$
2. $11\text{dBm} + 10\log (41.33) = 27.16 > 24\text{dBm}$
3. $11\text{dBm} + 10\log (41.04) = 27.13 > 24\text{dBm}$
4. $11\text{dBm} + 10\log (41.14) = 27.14 > 24\text{dBm}$
5. $11\text{dBm} + 10\log (41.20) = 27.15 > 24\text{dBm}$

Chain 1

1. $11\text{dBm} + 10\log (41.03) = 27.13 > 24\text{dBm}$
2. $11\text{dBm} + 10\log (41.44) = 27.17 > 24\text{dBm}$
3. $11\text{dBm} + 10\log (41.36) = 27.17 > 24\text{dBm}$
4. $11\text{dBm} + 10\log (41.21) = 27.15 > 24\text{dBm}$
5. $11\text{dBm} + 10\log (41.23) = 27.15 > 24\text{dBm}$

Chain 2

1. $11\text{dBm} + 10\log (41.68) = 27.20 > 24\text{dBm}$
2. $11\text{dBm} + 10\log (41.69) = 27.20 > 24\text{dBm}$
3. $11\text{dBm} + 10\log (41.59) = 27.19 > 24\text{dBm}$
4. $11\text{dBm} + 10\log (41.52) = 27.18 > 24\text{dBm}$
5. $11\text{dBm} + 10\log (41.56) = 27.19 > 24\text{dBm}$

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
58	5290	15.52	15.04	15.19	100.597	20.03	24.00	Pass
106	5530	16.20	16.31	16.53	129.421	21.12	24.00	Pass
122	5610	16.01	16.03	16.03	120.076	20.79	24.00	Pass

Note:

Chain 0

1. $11\text{dBm} + 10\log (82.71) = 30.18 > 24\text{dBm}$
2. $11\text{dBm} + 10\log (82.31) = 30.15 > 24\text{dBm}$
3. $11\text{dBm} + 10\log (82.21) = 30.15 > 24\text{dBm}$

Chain 1

1. $11\text{dBm} + 10\log (82.63) = 30.17 > 24\text{dBm}$
2. $11\text{dBm} + 10\log (82.54) = 30.17 > 24\text{dBm}$
3. $11\text{dBm} + 10\log (82.68) = 30.17 > 24\text{dBm}$

Chain 2

1. $11\text{dBm} + 10\log (82.75) = 30.18 > 24\text{dBm}$
2. $11\text{dBm} + 10\log (83.24) = 30.20 > 24\text{dBm}$
3. $11\text{dBm} + 10\log (83.22) = 30.20 > 24\text{dBm}$

26dB Bandwidth:

802.11a

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
52	5260	20.55	20.46	20.55
60	5300	20.43	20.43	20.63
64	5320	20.53	20.32	20.57
100	5500	20.58	20.39	20.57
116	5580	20.62	20.36	20.44
140	5700	20.45	20.37	20.52

802.11ac (VHT20)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
52	5260	20.60	20.49	20.91
60	5300	20.69	20.62	20.92
64	5320	20.63	20.54	20.50
100	5500	20.57	20.54	20.83
116	5580	20.66	20.57	20.86
140	5700	20.61	20.49	20.86

802.11ac (VHT40)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
54	5270	41.28	41.03	41.68
62	5310	41.33	41.44	41.69
102	5510	41.04	41.36	41.59
110	5550	41.14	41.21	41.52
134	5670	41.20	41.23	41.56

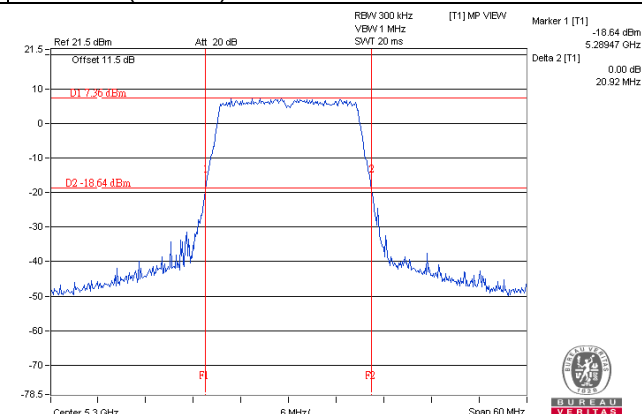
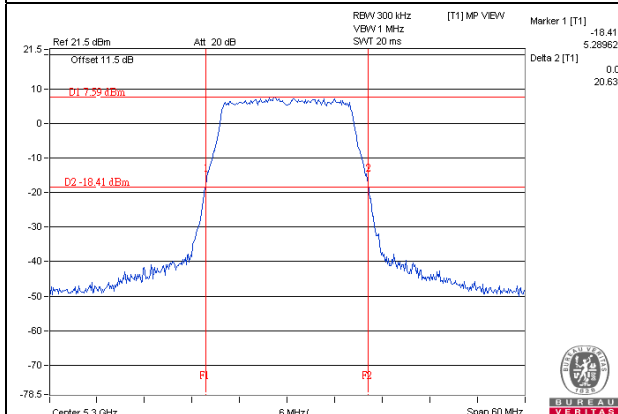
802.11ac (VHT80)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
58	5290	82.71	82.63	82.75
106	5530	82.31	82.54	83.24
122	5610	82.21	82.68	83.22

Spectrum Plot of Worst Value

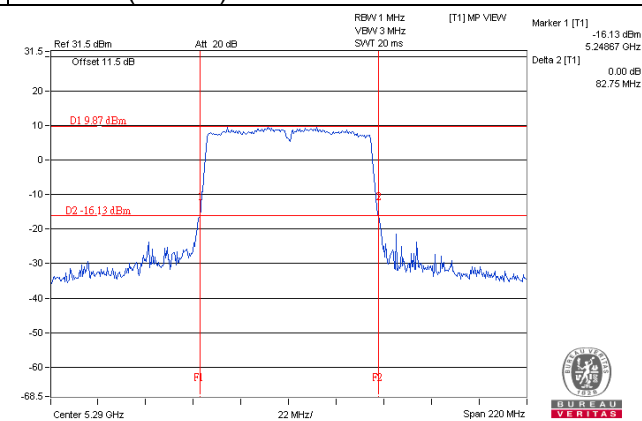
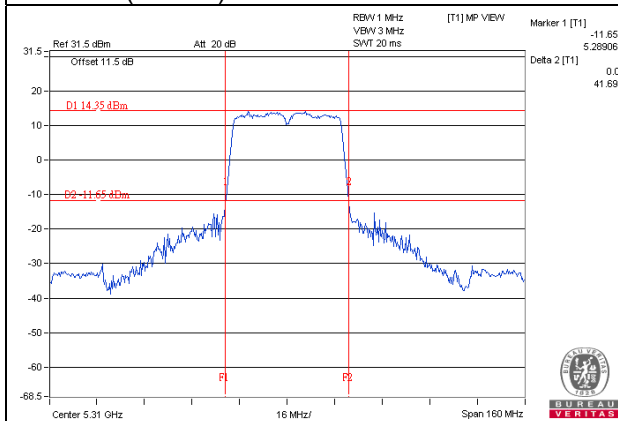
802.11a

802.11ac (VHT20)



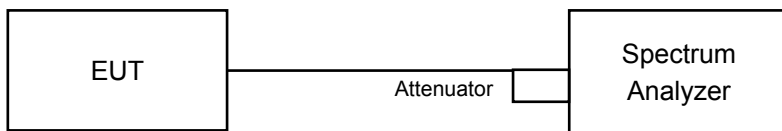
802.11ac (VHT40)

802.11ac (VHT80)



4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to sample. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

4.4.4 Test Result

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
52	5260	16.92	16.80	16.92
60	5300	16.68	16.80	16.92
64	5320	16.68	17.04	17.04
100	5500	16.80	16.80	16.92
116	5580	16.80	16.80	16.92
140	5700	16.80	16.80	16.80

802.11ac (VHT20)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
52	5260	17.76	17.88	17.88
60	5300	17.88	17.88	18.00
64	5320	17.76	17.88	17.88
100	5500	17.88	17.76	17.88
116	5580	17.88	17.88	18.00
140	5700	17.76	17.76	17.88

802.11ac (VHT40)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
54	5270	36.60	36.72	36.72
62	5310	36.60	36.72	36.60
102	5510	36.72	36.72	36.72
110	5550	36.60	36.72	36.60
134	5670	36.72	36.72	36.60

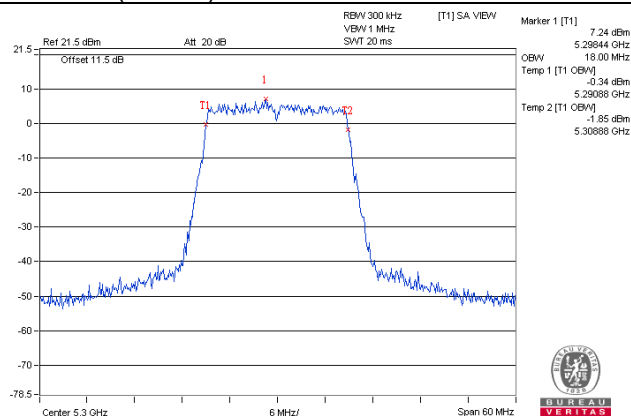
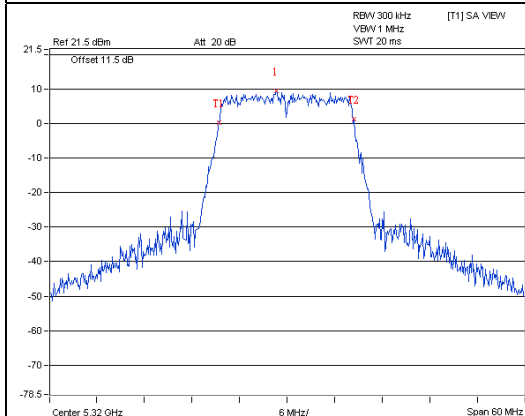
802.11ac (VHT80)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
58	5290	75.84	75.84	75.84
106	5530	75.84	76.08	75.84
122	5610	75.84	75.84	75.60

Spectrum Plot of Worst Value

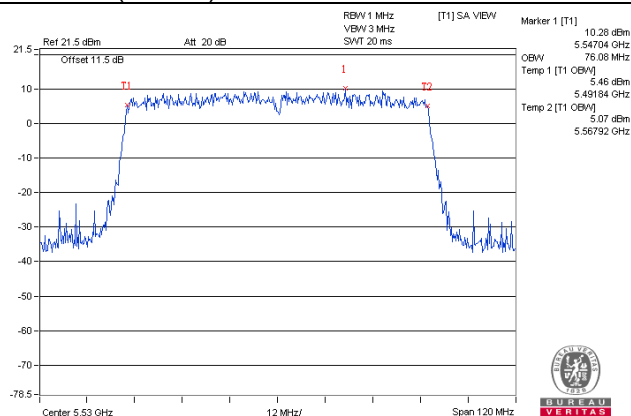
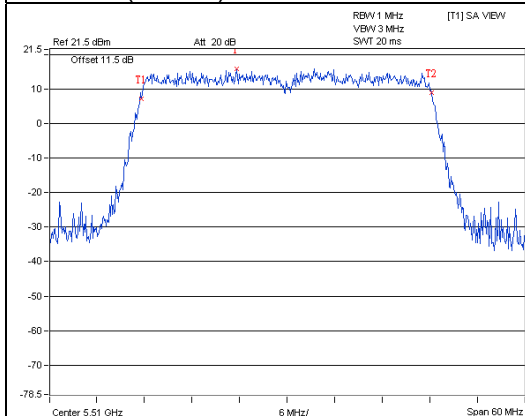
802.11a

802.11ac (VHT20)



802.11ac (VHT40)

802.11ac (VHT80)



EUT MAXIMUM CONDUCTED POWER

802.11a

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	97.095	19.87
5470~5725	107.499	20.31

802.11ac (VHT20)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	114.993	20.61
5470~5725	107.241	20.30

802.11ac (VHT40)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	161.850	22.09
5470~5725	165.363	22.18

802.11ac (VHT80)

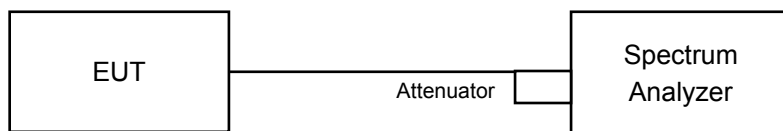
Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	100.597	20.03
5470~5725	129.421	21.12

4.5 Peak Power Spectral Density Measurement

4.5.1 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/ 500kHz

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

Using method SA-1, Duty cycle >98%:

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

Using method SA-2, Duty cycle <98%

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
- Sweep time = auto, trigger set to “free run”.
- Trace average at least 100 traces in power averaging mode.
- Record the max value and add 10 log (1/duty cycle)

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

Same as Item 4.3.6.

4.5.7 Test Results

802.11a

Chan.	Freq. (MHz)	PSD (dBm/3kHz)			Total PSD (dBm/3kHz)	Max. Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
52	5260	3.91	3.85	4.33	8.81	9.43	Pass
60	5300	3.14	1.84	2.66	7.35	9.43	Pass
64	5320	5.04	3.68	4.46	9.20	9.43	Pass
100	5500	4.07	3.81	4.84	9.03	9.43	Pass
116	5580	4.59	4.62	4.65	9.39	9.43	Pass
140	5700	4.62	4.56	4.66	9.38	9.43	Pass

Note:

1. Method 1 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 = $2.8\text{dBi} + 10\log(3) = 7.57\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $11 - (7.57 - 6) = 9.43\text{dBm}$.

802.11ac (VHT20)

Chan.	Freq. (MHz)	PSD (dBm/3kHz)			Total PSD (dBm/3kHz)	Max. Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
52	5260	4.24	3.71	4.85	9.06	9.43	Pass
60	5300	2.70	1.69	2.20	6.99	9.43	Pass
64	5320	5.33	3.96	-0.73	8.29	9.43	Pass
100	5500	4.38	4.39	4.38	9.15	9.43	Pass
116	5580	4.35	4.21	4.60	9.16	9.43	Pass
140	5700	4.35	4.36	4.60	9.21	9.43	Pass

Note:

1. Method 1 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 = $2.8\text{dBi} + 10\log(3) = 7.57\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $11 - (7.57 - 6) = 9.43\text{dBm}$.

802.11ac (VHT40)

Chan.	Freq. (MHz)	PSD (dBm/10kHz)			Total PSD w/o duty factor (dBm/10kHz)	Duty factor	Total PSD with duty factor (dBm/10kHz)	Max. Limit (dBm/ 3kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2					
54	5270	3.60	3.19	3.80	8.31	0.29	8.60	9.43	Pass
62	5310	3.47	2.28	3.27	7.81	0.29	8.10	9.43	Pass
102	5510	3.45	3.47	4.21	8.49	0.29	8.78	9.43	Pass
110	5550	3.43	3.13	4.10	8.34	0.29	8.63	9.43	Pass
134	5670	3.99	4.28	4.46	9.02	0.29	9.31	9.43	Pass

Note:

1. Method 1 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 = $2.8\text{dBi} + 10\log(3) = 7.57\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $11-(7.57-6) = 9.43\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD (dBm/10kHz)			Total PSD w/o duty factor (dBm/10kHz)	Duty factor	Total PSD with duty factor (dBm/10kHz)	Max. Limit (dBm/ 3kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2					
58	5290	-1.12	-2.03	-1.72	3.16	1.09	4.25	9.43	Pass
106	5530	-0.53	-0.69	-0.40	4.23	1.09	5.32	9.43	Pass
122	5610	-0.55	-0.91	-0.47	4.13	1.09	5.22	9.43	Pass

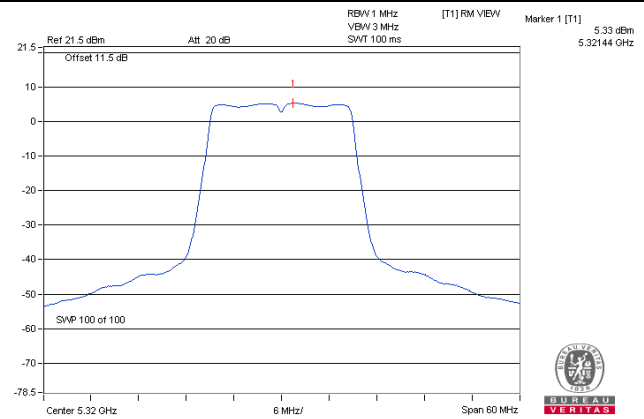
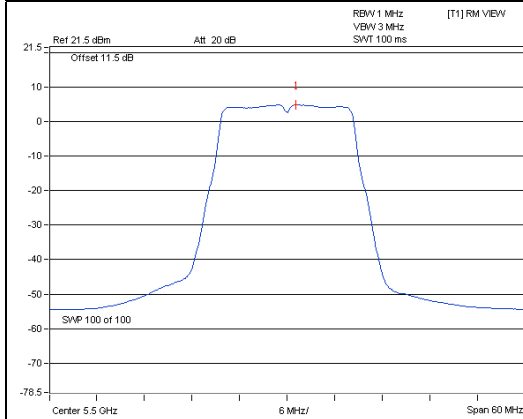
Note:

1. Method 1 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 = $2.8\text{dBi} + 10\log(3) = 7.57\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $11-(7.57-6) = 9.43\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

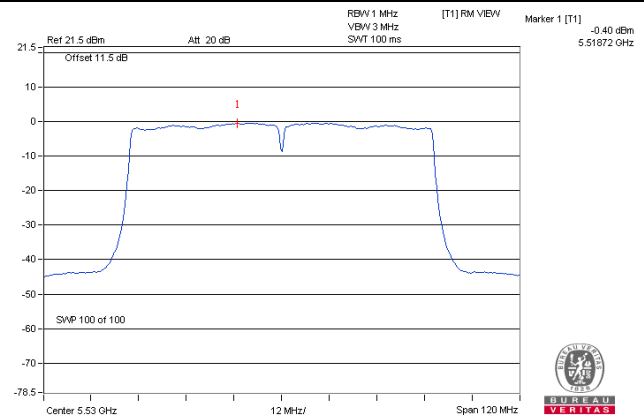
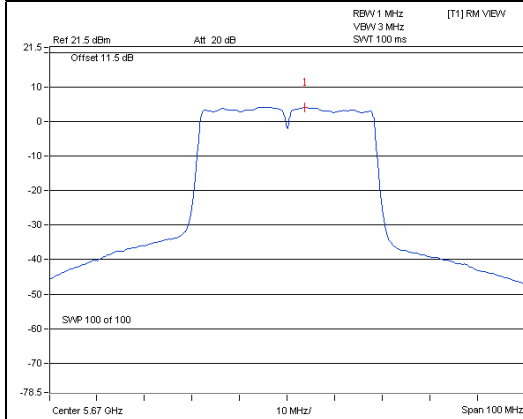
802.11a / Chain 2 / CH 100

802.11ac (VHT20) / Chain 0 / CH 64



802.11ac (VHT40) / Chain 2 / CH 134

802.11ac (VHT80) / Chain 2 / CH 106

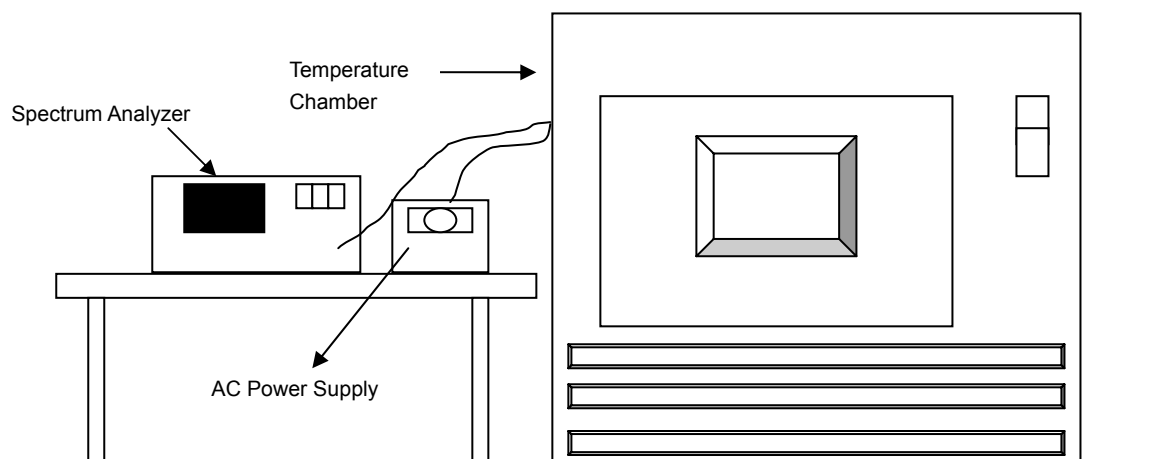


4.6 Frequency Stability

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- 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.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- 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.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5260MHz									
Temp. (°C)	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	5259.9950	-0.00010	5259.9961	-0.00007	5259.9976	-0.00005	5259.9981	-0.00004
40	120	5260.0081	0.00015	5260.0116	0.00022	5260.0071	0.00013	5260.008	0.00015
30	120	5259.9768	-0.00044	5259.9798	-0.00038	5259.9804	-0.00037	5259.9769	-0.00044
20	120	5259.9987	-0.00002	5259.996	-0.00008	5259.9975	-0.00005	5259.999	-0.00002
10	120	5259.9847	-0.00029	5259.9845	-0.00029	5259.9874	-0.00024	5259.9857	-0.00027
0	120	5260.0019	0.00004	5259.9992	-0.00002	5259.9993	-0.00001	5260.0014	0.00003
-10	120	5259.9932	-0.00013	5259.9933	-0.00013	5259.9892	-0.00021	5259.9934	-0.00013
-20	120	5260.0062	0.00012	5260.0061	0.00012	5260.0035	0.00007	5260.0068	0.00013
-30	120	5259.9802	-0.00038	5259.981	-0.00036	5259.9809	-0.00036	5259.9834	-0.00032

Frequency Stability Versus Voltage									
Operating Frequency: 5260MHz									
Temp. (°C)	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	5259.9982	-0.00003	5259.9956	-0.00008	5259.9974	-0.00005	5259.9992	-0.00002
	120	5259.9987	-0.00002	5259.996	-0.00008	5259.9975	-0.00005	5259.999	-0.00002
	102	5259.9979	-0.00004	5259.9952	-0.00009	5259.9971	-0.00006	5259.9996	-0.00001

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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