

FCC Test Report (DFS Band)

Report No.: RF170601E12B-1

FCC ID: 2AKCZ-0C2

Test Model: APL43-0C2

Received Date: June 01, 2017

Test Date: June 15 to Aug. 01, 2017

Issued Date: Nov. 30, 2017

Applicant: SonicWall Inc.

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

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Release Control Record

Issue No.	Description	Date Issued
RF170601E12B-1	Original release.	Nov. 30, 2017

1 Certificate of Conformity

Product: Wireless Access Point

Brand: SONICWALL

Test Model: APL43-0C2

Sample Status: ENGINEERING SAMPLE

Applicant: SonicWall Inc.

Test Date: June 15 to Aug. 01, 2017

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10: 2013

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

Prepared by :

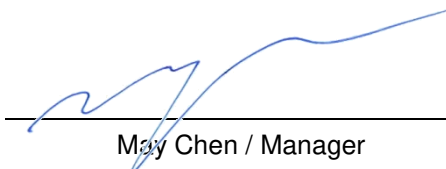


Date:

Nov. 30, 2017

Claire Kuan / Specialist

Approved by :



Date:

Nov. 30, 2017

May Chen / 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 -7.73dB at 0.35313MHz.
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 -1.1dB at 5458.60MHz.
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) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.32 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.14 dB
	6GHz ~ 18GHz	5.04 dB
	18GHz ~ 40GHz	5.25 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (DFS Band)

Product	Wireless Access Point
Brand	SONICWALL
Test Model	APL43-0C2
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	48-55Vdc (POE)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54/ 48/ 36/ 24/ 18/ 12/ 9/ 6Mbps 802.11n: up to 600Mbps 802.11ac: up to 1733Mbps
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	Radio 2: 5.26GHz ~ 5.32GHz: CDD Mode: 71.48mW Beamforming Mode: 35.738mW 5.50GHz ~ 5.70GHz: CDD Mode: 140.987mW Beamforming Mode: 35.489mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
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.: RF170601E12-1 as the following information:
◆ Add DFS band <5.26~ 5.32GHz, 5.50 ~ 5.70GHz >.
2. According to above condition, all test items need to be performed. And all data were verified to meet the requirements.
3. The EUT incorporates a MIMO function.

Band	Modulation Mode	TX Function	Beamforming	Radio
5GHz	802.11a	4TX	Not Support	Radio 2
	802.11n (HT20)	4TX	Support	
	802.11n (HT40)	4TX	Support	
	802.11ac (VHT20)	4TX	Support	
	802.11ac (VHT40)	4TX	Support	
	802.11ac (VHT80)	4TX	Support	

4. The EUT uses following antennas.

External antenna									Internal antenna	
Type	Dipole								PIFA	
Connector	RSMA								IPEX	
Radio	1				2				3	4
Frequency	2.4GHz				5GHz				2.4GHz	BT-LE
Antenna	1	2	3	4	5	6	7	8	9	10
Gain (dBi)	5.08	5.08	5.08	5.08	8.41	8.41	8.41	8.41	2.91	3.13

5. Radio 1 & Radio 2 & Radio 3 & BLE technologies can transmit at same time.

6. Spurious emission of the simultaneous operation (2.4GHz, 5GHz and BT LE) has been evaluated and no non-compliance was found.

7. The power settings are list as below.

Modulation Mode	Frequency (MHz)	Power Setting	
		CDD Mode	Beamforming mode
802.11a	5260	7	-
	5300	6.5	-
	5320	6.5	-
	5500	5	-
	5580	5.5	-
	5700	6.5	-
802.11ac (VHT20)	5260	7	7
	5300	7	7
	5320	7	7
	5500	5.5	5.5
	5580	5.5	5.5
	5700	6.5	6.5
802.11ac (VHT40)	5270	10.5	7.5
	5310	10	7
	5510	8.5	5.5
	5550	9	6
	5670	9.5	6.5
802.11ac (VHT80)	5290	8	7
	5530	6.5	5.5
	5610	12	6

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

3.2 Description of Test Modes

FOR 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 $\geq$ 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE $\geq$ 1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

NOTE:

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

Radiated Emission Test (Above 1GHz):

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

CDD 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
802.11ac (VHT20)		52 to 64	52, 60, 64	OFDM	BPSK	6.5
802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	13.5
802.11ac (VHT80)		58	58	OFDM	BPSK	29.3
802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	BPSK	6
802.11ac (VHT20)		100 to 140	100, 116, 140	OFDM	BPSK	6.5
802.11ac (VHT40)		102 to 134	102, 110, 134	OFDM	BPSK	13.5
802.11ac (VHT80)		106 to 122	106, 122	OFDM	BPSK	29.3

Radiated Emission Test (Below 1GHz):

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT40)	5260-5320 5500-5700	54 to 62 102 to 134	134	OFDM	BPSK	13.5

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.

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT40)	5260-5320 5500-5700	54 to 62 102 to 134	134	OFDM	BPSK	13.5

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.

CDD 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
802.11ac (VHT20)		52 to 64	52, 60, 64	OFDM	BPSK	6.5
802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	13.5
802.11ac (VHT80)		58	58	OFDM	BPSK	29.3
802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	BPSK	6
802.11ac (VHT20)		100 to 140	100, 116, 140	OFDM	BPSK	6.5
802.11ac (VHT40)		102 to 134	102, 110, 134	OFDM	BPSK	13.5
802.11ac (VHT80)		106 to 122	106, 122	OFDM	BPSK	29.3
Beamforming Mode (Output power only)						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6.5
802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	13.5
802.11ac (VHT80)		58	58	OFDM	BPSK	29.3
802.11ac (VHT20)	5500-5700	100 to 140	100, 116, 140	OFDM	BPSK	6.5
802.11ac (VHT40)		102 to 134	102, 110, 134	OFDM	BPSK	13.5
802.11ac (VHT80)		106 to 122	106, 122	OFDM	BPSK	29.3

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE _≥ 1G	25deg. C, 70%RH	120Vac, 60Hz	Andy Ho
RE _{<} 1G	22deg. C, 67%RH	120Vac, 60Hz	Weiwei Lo
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng

3.3 Duty Cycle of Test Signal

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

If duty cycle of test signal is $< 98\%$, duty factor is required

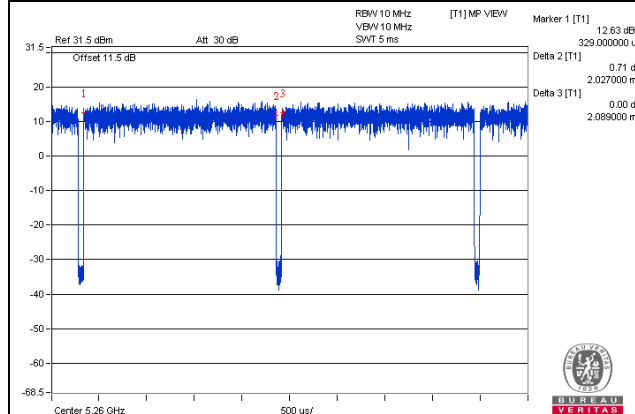
802.11a: Duty cycle = $2.027/2.089 = 0.97$, Duty factor = $10 * \log(1/0.97) = 0.13$

802.11ac (VHT20): Duty cycle = $4.97/5.033 = 0.987$

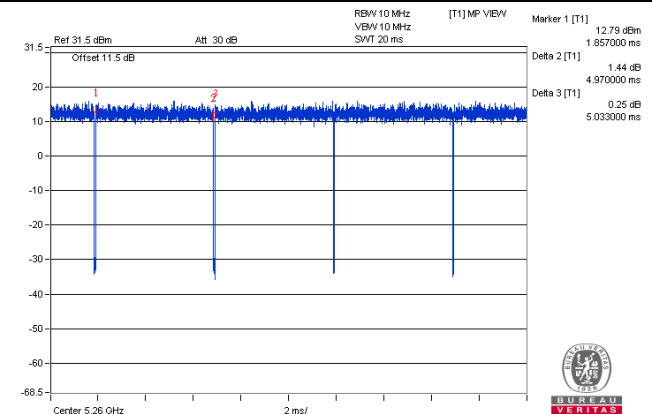
802.11ac (VHT40): Duty cycle = $2.415/2.485 = 0.972$, Duty factor = $10 * \log(1/0.972) = 0.12$

802.11ac (VHT80): Duty cycle = $1.135/1.205 = 0.942$, Duty factor = $10 * \log(1/0.942) = 0.26$

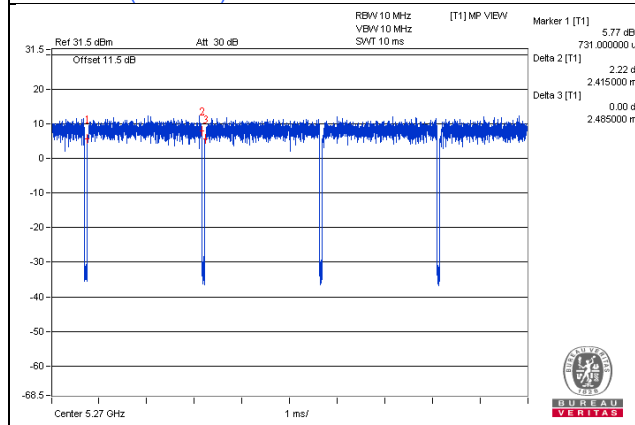
802.11a



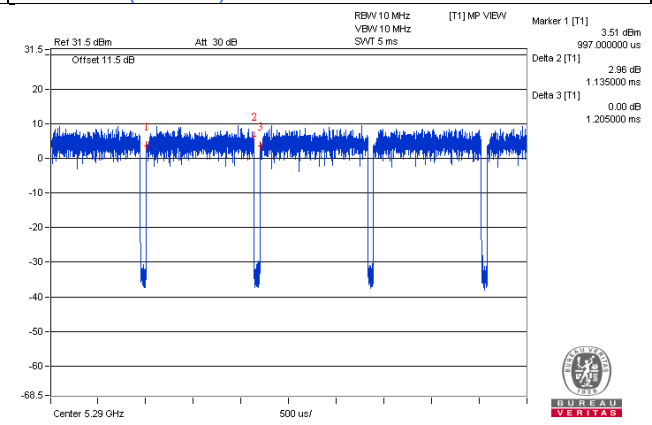
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	PoE Adapter	Microsemi	PD-9501-10G	NA	NA	Supplied by client
B.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
C.	Laptop	DELL	E5430	GM1SKV1	FCC DoC	Provided by Lab
D.	USB Disk 3.0	Transcend	16GB	NA	NA	Provided by Lab

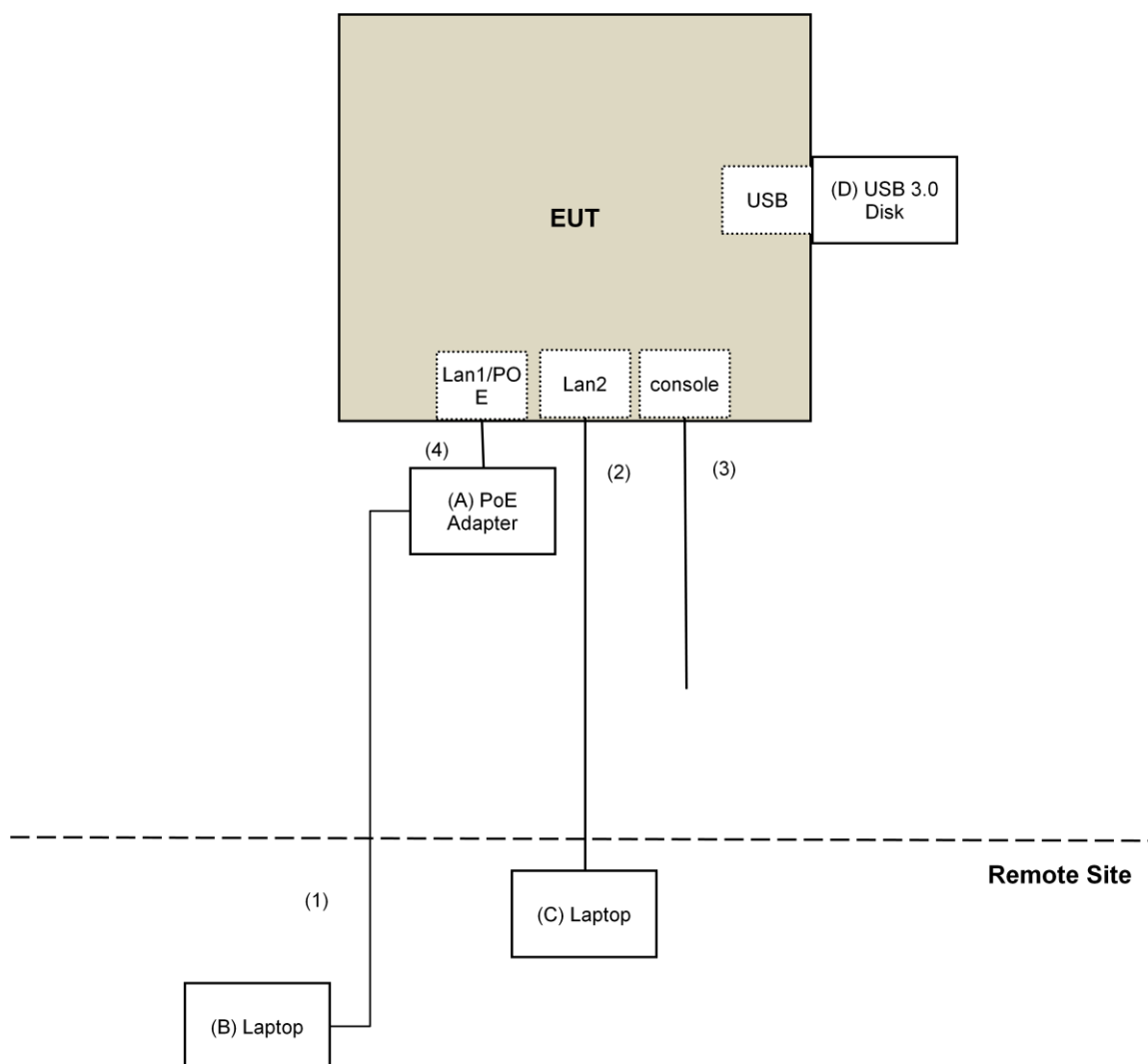
Note:

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

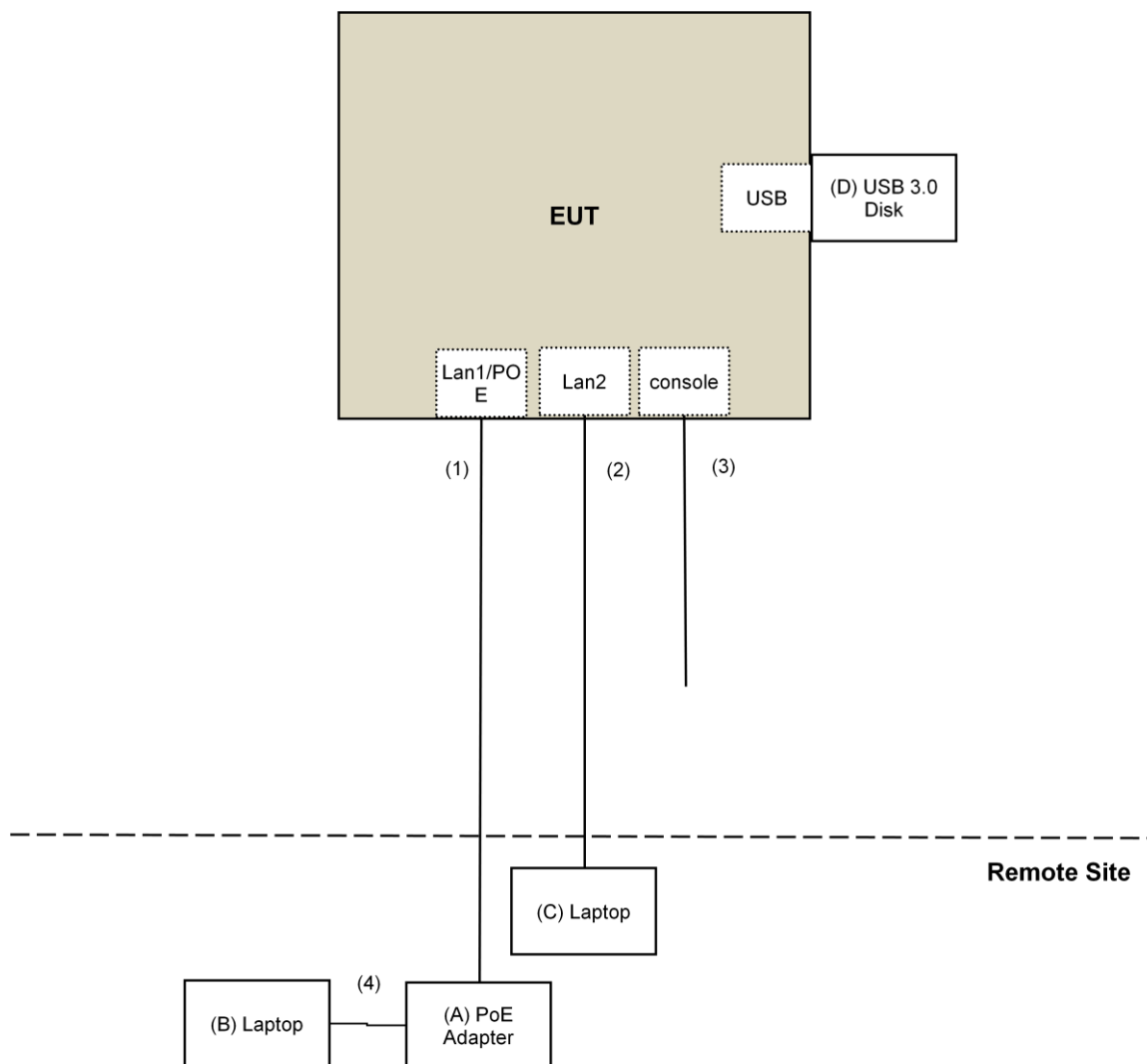
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	Console Cable	1	1.6	No	0	Provided by Lab
4.	RJ-45 Cable	1	3	No	0	Provided by Lab

3.4.1 Configuration of System under Test

For conducted emission test:



For other test items:



3.5 General Description of Applied Standard

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

FCC Part 15, Subpart E (15.407)

KDB 789033 D02 General UNII Test Procedure New Rules v01r04

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 is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It 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:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 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 v01r04			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	☒	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}
	☐	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.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	Aug. 18, 2016	Aug. 17, 2017
Pre-Amplifier ^(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna ^(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 17, 2017	Jan. 16, 2018
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 06, 2017	May 05, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Dec. 29, 2016	Dec. 28, 2017
RF Cable	8D	966-3-1 966-3-2 966-3-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Oct. 05, 2016	Oct. 04, 2017
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Dec. 28, 2016	Dec. 27, 2017
Pre-Amplifier EMCI	EMC12630SE	980384	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160922 150317 150322	Feb. 02, 2017 Mar. 29, 2017 Mar. 29, 2017	Feb. 01, 2018 Mar. 28, 2018 Mar. 28, 2018
Spectrum Analyzer Keysight	N9030A	MY54490570	July 08, 2017	July 07, 2018
Pre-Amplifier EMCI	EMC184045SE	980386	Feb. 02, 2017	Feb. 01, 2018
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 15, 2016	Dec. 14, 2017
RF Cable	SUCOFLEX 102	36432/2 36433/2	Jan. 15, 2017	Jan. 14, 2018
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Spectrum Analyzer Agilent	E4446A	MY48250253	Dec. 21, 2016	Dec. 20, 2017
Power meter Anritsu	ML2495A	1014008	May 11, 2017	May 10, 2018
Power sensor Anritsu	MA2411B	0917122	May 11, 2017	May 10, 2018
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 11, 2017	Jan. 10, 2018
Digital Multimeter FLUKE	87III	73680266	Nov. 10, 2016	Nov. 09, 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 966 Chamber No. 3.
3. The CANADA Site Registration No. is 20331-1
4. The FCC Designation Number is TW2022.
5. Tested Date: July 28 to Aug. 01, 2017

4.1.3 Test Procedure

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Both X and Y axes of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

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

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

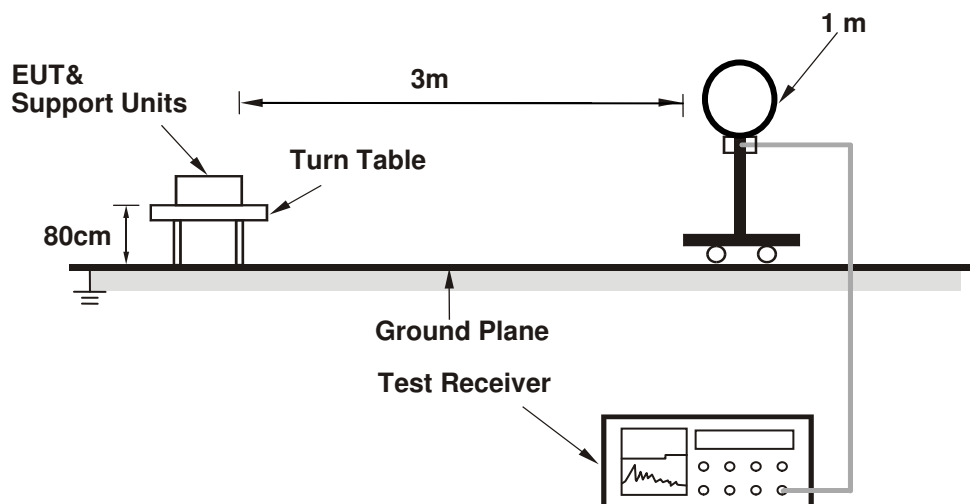
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

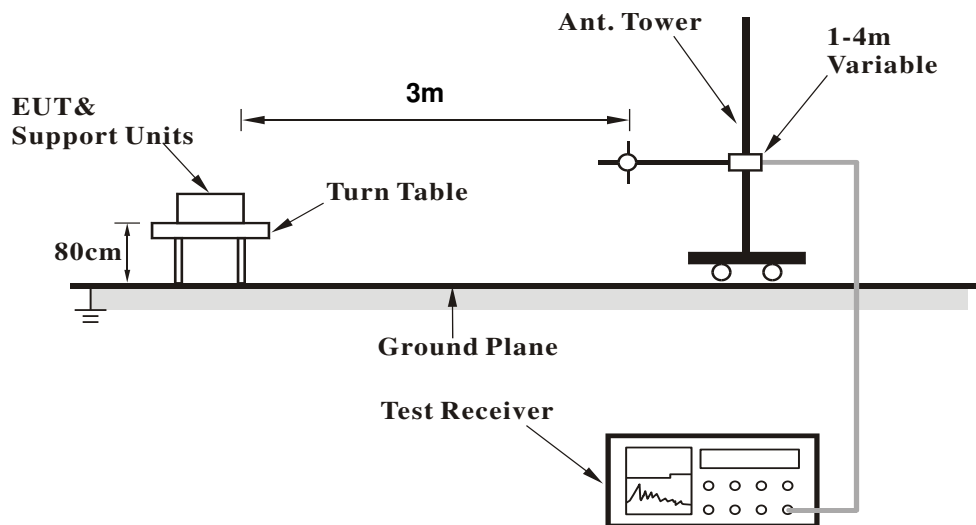
No deviation.

4.1.5 Test Setup

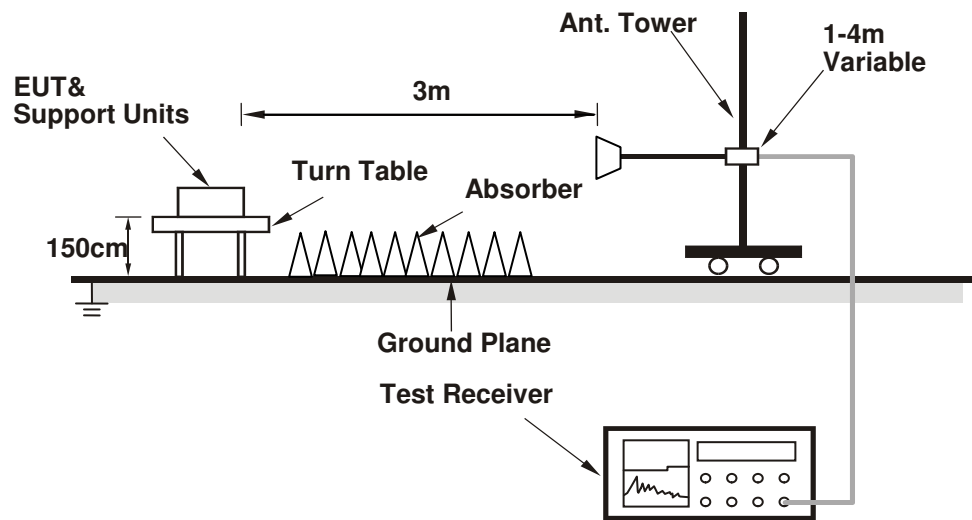
For Radiated emission below 30MHz



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 Condition

- Connected the EUT with the Laptop which is placed on remote site.
- Contorlling software (QRCT Ver3.0.187.0) has been activated to set the EUT on specific status.

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	5150.00	46.3 PK	74.0	-27.7	1.04 H	359	42.6	3.7
2	5150.00	36.2 AV	54.0	-17.8	1.04 H	359	32.5	3.7
3	*5260.00	98.4 PK			1.04 H	359	94.4	4.0
4	*5260.00	88.4 AV			1.04 H	359	84.4	4.0
5	#10520.00	53.2 PK	74.0	-20.8	1.39 H	327	40.0	13.2
6	#10520.00	36.4 AV	54.0	-17.6	1.39 H	327	23.2	13.2
7	15780.00	45.8 PK	74.0	-28.2	1.49 H	331	32.2	13.6
8	15780.00	34.0 AV	54.0	-20.0	1.49 H	331	20.4	13.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	49.6 PK	74.0	-24.4	1.50 V	360	45.9	3.7
2	5150.00	39.5 AV	54.0	-14.5	1.50 V	360	35.8	3.7
3	*5260.00	112.5 PK			1.50 V	360	108.5	4.0
4	*5260.00	102.7 AV			1.50 V	360	98.7	4.0
5	#10520.00	55.1 PK	74.0	-18.9	1.50 V	144	41.9	13.2
6	#10520.00	39.8 AV	54.0	-14.2	1.50 V	144	26.6	13.2
7	15780.00	46.7 PK	74.0	-27.3	2.70 V	145	33.1	13.6
8	15780.00	36.4 AV	54.0	-17.6	2.70 V	145	22.8	13.6

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 60	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	5150.00	46.2 PK	74.0	-27.8	1.03 H	360	42.5	3.7
2	5150.00	35.8 AV	54.0	-18.2	1.03 H	360	32.1	3.7
3	*5300.00	97.5 PK			1.03 H	360	93.4	4.1
4	*5300.00	87.9 AV			1.03 H	360	83.8	4.1
5	5350.00	46.7 PK	74.0	-27.3	1.03 H	360	42.6	4.1
6	5350.00	36.4 AV	54.0	-17.6	1.03 H	360	32.3	4.1
7	10600.00	52.9 PK	74.0	-21.1	1.41 H	311	39.4	13.5
8	10600.00	36.3 AV	54.0	-17.7	1.41 H	311	22.8	13.5
9	15900.00	45.7 PK	74.0	-28.3	1.55 H	318	32.8	12.9
10	15900.00	34.1 AV	54.0	-19.9	1.55 H	318	21.2	12.9

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	48.3 PK	74.0	-25.7	1.50 V	360	44.6	3.7
2	5150.00	37.9 AV	54.0	-16.1	1.50 V	360	34.2	3.7
3	*5300.00	111.6 PK			1.50 V	360	107.5	4.1
4	*5300.00	102.5 AV			1.50 V	360	98.4	4.1
5	5350.00	53.1 PK	74.0	-20.9	1.50 V	360	49.0	4.1
6	5350.00	42.8 AV	54.0	-11.2	1.50 V	360	38.7	4.1
7	10600.00	55.9 PK	74.0	-18.1	1.50 V	47	42.4	13.5
8	10600.00	40.2 AV	54.0	-13.8	1.50 V	47	26.7	13.5
9	15900.00	46.7 PK	74.0	-27.3	2.72 V	160	33.8	12.9
10	15900.00	36.4 AV	54.0	-17.6	2.72 V	160	23.5	12.9

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 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	*5320.00	97.9 PK			1.03 H	354	93.8	4.1
2	*5320.00	88.0 AV			1.03 H	354	83.9	4.1
3	5350.00	50.2 PK	74.0	-23.8	1.03 H	354	46.1	4.1
4	5350.00	35.9 AV	54.0	-18.1	1.03 H	354	31.8	4.1
5	10640.00	53.0 PK	74.0	-21.0	1.34 H	312	39.5	13.5
6	10640.00	36.2 AV	54.0	-17.8	1.34 H	312	22.7	13.5
7	15960.00	45.3 PK	74.0	-28.7	1.54 H	337	32.4	12.9
8	15960.00	33.7 AV	54.0	-20.3	1.54 H	337	20.8	12.9
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	*5320.00	112.0 PK			1.50 V	194	107.9	4.1
2	*5320.00	102.6 AV			1.50 V	194	98.5	4.1
3	5350.00	56.6 PK	74.0	-17.4	1.50 V	194	52.5	4.1
4	5350.00	42.3 AV	54.0	-11.7	1.50 V	194	38.2	4.1
5	10640.00	55.7 PK	74.0	-18.3	1.53 V	39	42.2	13.5
6	10640.00	39.8 AV	54.0	-14.2	1.53 V	39	26.3	13.5
7	15960.00	46.9 PK	74.0	-27.1	2.68 V	176	34.0	12.9
8	15960.00	36.9 AV	54.0	-17.1	2.68 V	176	24.0	12.9

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 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	5460.00	53.0 PK	74.0	-21.0	1.08 H	349	48.8	4.2
2	5460.00	35.8 AV	54.0	-18.2	1.08 H	349	31.6	4.2
3	#5461.00	54.5 PK	74.0	-19.5	1.08 H	349	50.3	4.2
4	#5461.00	36.5 AV	54.0	-17.5	1.08 H	349	32.3	4.2
5	*5500.00	99.2 PK			1.08 H	349	95.0	4.2
6	*5500.00	88.4 AV			1.08 H	349	84.2	4.2
7	11000.00	53.0 PK	74.0	-21.0	1.36 H	329	38.9	14.1
8	11000.00	36.0 AV	54.0	-18.0	1.36 H	329	21.9	14.1
9	#16500.00	46.0 PK	74.0	-28.0	1.44 H	344	31.5	14.5
10	#16500.00	34.2 AV	54.0	-19.8	1.44 H	344	19.7	14.5

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	55.3 PK	74.0	-18.7	2.00 V	360	51.1	4.2
2	5460.00	40.2 AV	54.0	-13.8	2.00 V	360	36.0	4.2
3	#5461.00	56.8 PK	74.0	-17.2	2.00 V	360	52.6	4.2
4	#5461.00	40.6 AV	54.0	-13.4	2.00 V	360	36.4	4.2
5	*5500.00	113.3 PK			2.00 V	360	109.1	4.2
6	*5500.00	103.1 AV			2.00 V	360	98.9	4.2
7	11000.00	55.5 PK	74.0	-18.5	1.51 V	30	41.4	14.1
8	11000.00	39.4 AV	54.0	-14.6	1.51 V	30	25.3	14.1
9	#16500.00	47.3 PK	74.0	-26.7	2.63 V	187	32.8	14.5
10	#16500.00	37.2 AV	54.0	-16.8	2.63 V	187	22.7	14.5

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 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	5457.00	52.1 PK	74.0	-21.9	1.02 H	342	47.9	4.2
2	5457.00	37.9 AV	54.0	-16.1	1.02 H	342	33.7	4.2
3	*5580.00	98.2 PK			1.02 H	342	94.0	4.2
4	*5580.00	88.8 AV			1.02 H	342	84.6	4.2
5	#5725.00	49.5 PK	74.0	-24.5	1.02 H	342	45.1	4.4
6	#5725.00	35.8 AV	54.0	-18.2	1.02 H	342	31.4	4.4
7	11160.00	53.2 PK	74.0	-20.8	1.36 H	338	39.5	13.7
8	11160.00	36.7 AV	54.0	-17.3	1.36 H	338	23.0	13.7
9	#16740.00	45.4 PK	74.0	-28.6	1.52 H	335	29.7	15.7
10	#16740.00	33.7 AV	54.0	-20.3	1.52 H	335	18.0	15.7

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	54.5 PK	74.0	-19.5	1.50 V	44	50.3	4.2
2	5457.00	40.3 AV	54.0	-13.7	1.50 V	44	36.1	4.2
3	*5580.00	112.3 PK			1.50 V	44	108.1	4.2
4	*5580.00	103.2 AV			1.50 V	44	99.0	4.2
5	#5725.00	49.9 PK	74.0	-24.1	1.50 V	44	45.5	4.4
6	#5725.00	38.1 AV	54.0	-15.9	1.50 V	44	33.7	4.4
7	11160.00	47.6 PK	74.0	-26.4	1.50 V	143	33.9	13.7
8	11160.00	36.8 AV	54.0	-17.2	1.50 V	143	23.1	13.7
9	#16740.00	47.7 PK	74.0	-26.3	2.60 V	177	32.0	15.7
10	#16740.00	37.4 AV	54.0	-16.6	2.60 V	177	21.7	15.7

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 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	99.1 PK			1.01 H	335	94.6	4.5
2	*5700.00	88.9 AV			1.01 H	335	84.4	4.5
3	#5725.00	52.2 PK	74.0	-21.8	1.01 H	335	47.8	4.4
4	#5725.00	39.8 AV	54.0	-14.2	1.01 H	335	35.4	4.4
5	11400.00	53.4 PK	74.0	-20.6	1.38 H	330	39.8	13.6
6	11400.00	36.6 AV	54.0	-17.4	1.38 H	330	23.0	13.6
7	#17100.00	45.6 PK	74.0	-28.4	1.48 H	317	28.2	17.4
8	#17100.00	33.6 AV	54.0	-20.4	1.48 H	317	16.2	17.4

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	113.2 PK			1.87 V	11	108.7	4.5
2	*5700.00	103.5 AV			1.87 V	11	99.0	4.5
3	#5725.00	56.8 PK	74.0	-17.2	1.87 V	11	52.4	4.4
4	#5725.00	44.4 AV	54.0	-9.6	1.87 V	11	40.0	4.4
5	11400.00	47.5 PK	74.0	-26.5	1.56 V	155	33.9	13.6
6	11400.00	36.7 AV	54.0	-17.3	1.56 V	155	23.1	13.6
7	#17100.00	47.5 PK	74.0	-26.5	2.59 V	174	30.1	17.4
8	#17100.00	37.0 AV	54.0	-17.0	2.59 V	174	19.6	17.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT20)

CHANNEL	TX Channel 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	5150.00	47.4 PK	74.0	-26.6	1.04 H	354	43.7	3.7
2	5150.00	36.0 AV	54.0	-18.0	1.04 H	354	32.3	3.7
3	*5260.00	97.2 PK			1.04 H	354	93.2	4.0
4	*5260.00	85.7 AV			1.04 H	354	81.7	4.0
5	#10520.00	53.9 PK	74.0	-20.1	1.42 H	311	40.7	13.2
6	#10520.00	36.8 AV	54.0	-17.2	1.42 H	311	23.6	13.2
7	15780.00	46.0 PK	74.0	-28.0	1.54 H	346	32.4	13.6
8	15780.00	34.2 AV	54.0	-19.8	1.54 H	346	20.6	13.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	48.8 PK	74.0	-25.2	1.50 V	360	45.1	3.7
2	5150.00	37.4 AV	54.0	-16.6	1.50 V	360	33.7	3.7
3	*5260.00	111.3 PK			1.50 V	360	107.3	4.0
4	*5260.00	100.4 AV			1.50 V	360	96.4	4.0
5	#10520.00	52.2 PK	74.0	-21.8	1.50 V	140	39.0	13.2
6	#10520.00	39.1 AV	54.0	-14.9	1.50 V	140	25.9	13.2
7	15780.00	47.3 PK	74.0	-26.7	2.65 V	188	33.7	13.6
8	15780.00	37.1 AV	54.0	-16.9	2.65 V	188	23.5	13.6

REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " * ": Fundamental frequency.
- " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 60	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	*5300.00	97.0 PK			1.04 H	354	92.9	4.1
2	*5300.00	85.6 AV			1.04 H	354	81.5	4.1
3	5350.00	49.2 PK	74.0	-24.8	1.04 H	354	45.1	4.1
4	5350.00	35.9 AV	54.0	-18.1	1.04 H	354	31.8	4.1
5	10600.00	53.6 PK	74.0	-20.4	1.40 H	311	40.1	13.5
6	10600.00	36.4 AV	54.0	-17.6	1.40 H	311	22.9	13.5
7	15900.00	46.0 PK	74.0	-28.0	1.57 H	348	33.1	12.9
8	15900.00	34.0 AV	54.0	-20.0	1.57 H	348	21.1	12.9

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	*5300.00	111.1 PK			1.50 V	148	107.0	4.1
2	*5300.00	100.3 AV			1.50 V	148	96.2	4.1
3	5350.00	52.5 PK	74.0	-21.5	1.50 V	148	48.4	4.1
4	5350.00	39.2 AV	54.0	-14.8	1.50 V	148	35.1	4.1
5	10600.00	55.2 PK	74.0	-18.8	1.50 V	358	41.7	13.5
6	10600.00	40.8 AV	54.0	-13.2	1.50 V	358	27.3	13.5
7	15900.00	47.0 PK	74.0	-27.0	2.64 V	192	34.1	12.9
8	15900.00	36.9 AV	54.0	-17.1	2.64 V	192	24.0	12.9

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 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	*5320.00	97.6 PK			1.03 H	356	93.5	4.1
2	*5320.00	86.8 AV			1.03 H	356	82.7	4.1
3	5350.00	48.9 PK	74.0	-25.1	1.03 H	356	44.8	4.1
4	5350.00	37.1 AV	54.0	-16.9	1.03 H	356	33.0	4.1
5	10640.00	53.6 PK	74.0	-20.4	1.36 H	305	40.1	13.5
6	10640.00	36.3 AV	54.0	-17.7	1.36 H	305	22.8	13.5
7	15960.00	46.5 PK	74.0	-27.5	1.63 H	333	33.6	12.9
8	15960.00	34.4 AV	54.0	-19.6	1.63 H	333	21.5	12.9

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	*5320.00	111.7 PK			1.50 V	131	107.6	4.1
2	*5320.00	101.2 AV			1.50 V	131	97.1	4.1
3	5350.00	55.3 PK	74.0	-18.7	1.50 V	131	51.2	4.1
4	5350.00	43.5 AV	54.0	-10.5	1.50 V	131	39.4	4.1
5	10640.00	55.7 PK	74.0	-18.3	1.47 V	349	42.2	13.5
6	10640.00	41.2 AV	54.0	-12.8	1.47 V	349	27.7	13.5
7	15960.00	46.4 PK	74.0	-27.6	2.67 V	202	33.5	12.9
8	15960.00	36.6 AV	54.0	-17.4	2.67 V	202	23.7	12.9

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 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	5452.70	48.6 PK	74.0	-25.4	1.03 H	349	44.4	4.2
2	5452.70	35.9 AV	54.0	-18.1	1.03 H	349	31.7	4.2
3	#5470.00	50.9 PK	74.0	-23.1	1.03 H	349	46.7	4.2
4	#5470.00	38.2 AV	54.0	-15.8	1.03 H	349	34.0	4.2
5	*5500.00	97.6 PK			1.03 H	349	93.4	4.2
6	*5500.00	86.7 AV			1.03 H	349	82.5	4.2
7	11000.00	53.3 PK	74.0	-20.7	1.34 H	303	39.2	14.1
8	11000.00	35.9 AV	54.0	-18.1	1.34 H	303	21.8	14.1
9	#16500.00	46.3 PK	74.0	-27.7	1.67 H	322	31.8	14.5
10	#16500.00	34.2 AV	54.0	-19.8	1.67 H	322	19.7	14.5

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	5452.70	49.0 PK	74.0	-25.0	1.50 V	167	44.8	4.2
2	5452.70	37.3 AV	54.0	-16.7	1.50 V	167	33.1	4.2
3	#5470.00	57.3 PK	74.0	-16.7	1.50 V	167	53.1	4.2
4	#5470.00	44.6 AV	54.0	-9.4	1.50 V	167	40.4	4.2
5	*5500.00	111.7 PK			1.50 V	167	107.5	4.2
6	*5500.00	101.3 AV			1.50 V	167	97.1	4.2
7	11000.00	55.4 PK	74.0	-18.6	1.50 V	360	41.3	14.1
8	11000.00	41.1 AV	54.0	-12.9	1.50 V	360	27.0	14.1
9	#16500.00	46.7 PK	74.0	-27.3	2.62 V	210	32.2	14.5
10	#16500.00	36.9 AV	54.0	-17.1	2.62 V	210	22.4	14.5

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 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	#5470.00	48.3 PK	74.0	-25.7	1.03 H	341	44.1	4.2
2	#5470.00	36.2 AV	54.0	-17.8	1.03 H	341	32.0	4.2
3	*5580.00	97.9 PK			1.03 H	341	93.7	4.2
4	*5580.00	86.8 AV			1.03 H	341	82.6	4.2
5	#5725.00	49.0 PK	74.0	-25.0	1.03 H	341	44.6	4.4
6	#5725.00	35.6 AV	54.0	-18.4	1.03 H	341	31.2	4.4
7	11160.00	53.0 PK	74.0	-21.0	1.32 H	303	39.3	13.7
8	11160.00	35.9 AV	54.0	-18.1	1.32 H	303	22.2	13.7
9	#16740.00	46.3 PK	74.0	-27.7	1.71 H	321	30.6	15.7
10	#16740.00	34.3 AV	54.0	-19.7	1.71 H	321	18.6	15.7

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	#5470.00	49.5 PK	74.0	-24.5	1.50 V	188	45.3	4.2
2	#5470.00	37.4 AV	54.0	-16.6	1.50 V	188	33.2	4.2
3	*5580.00	112.0 PK			1.50 V	188	107.8	4.2
4	*5580.00	101.3 AV			1.50 V	188	97.1	4.2
5	#5725.00	50.1 PK	74.0	-23.9	1.50 V	188	45.7	4.4
6	#5725.00	36.7 AV	54.0	-17.3	1.50 V	188	32.3	4.4
7	11160.00	55.0 PK	74.0	-19.0	1.53 V	360	41.3	13.7
8	11160.00	40.8 AV	54.0	-13.2	1.53 V	360	27.1	13.7
9	#16740.00	46.7 PK	74.0	-27.3	2.60 V	207	31.0	15.7
10	#16740.00	37.0 AV	54.0	-17.0	2.60 V	207	21.3	15.7

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 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	98.5 PK			1.01 H	327	94.0	4.5
2	*5700.00	87.8 AV			1.01 H	327	83.3	4.5
3	#5729.00	51.0 PK	74.0	-23.0	1.01 H	327	46.6	4.4
4	#5729.00	36.5 AV	54.0	-17.5	1.01 H	327	32.1	4.4
5	11400.00	52.8 PK	74.0	-21.2	1.29 H	295	39.2	13.6
6	11400.00	35.9 AV	54.0	-18.1	1.29 H	295	22.3	13.6
7	#17100.00	45.9 PK	74.0	-28.1	1.76 H	328	28.5	17.4
8	#17100.00	34.2 AV	54.0	-19.8	1.76 H	328	16.8	17.4
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	112.7 PK			1.79 V	335	108.2	4.5
2	*5700.00	101.6 AV			1.79 V	335	97.1	4.5
3	#5729.00	57.0 PK	74.0	-17.0	1.79 V	335	52.6	4.4
4	#5729.00	42.5 AV	54.0	-11.5	1.79 V	335	38.1	4.4
5	11400.00	54.9 PK	74.0	-19.1	1.55 V	354	41.3	13.6
6	11400.00	40.4 AV	54.0	-13.6	1.55 V	354	26.8	13.6
7	#17100.00	46.6 PK	74.0	-27.4	2.59 V	194	29.2	17.4
8	#17100.00	36.7 AV	54.0	-17.3	2.59 V	194	19.3	17.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT40)

CHANNEL	TX Channel 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	5146.60	49.2 PK	74.0	-24.8	1.16 H	360	45.6	3.6
2	5146.60	35.8 AV	54.0	-18.2	1.16 H	360	32.2	3.6
3	*5270.00	98.2 PK			1.16 H	360	94.2	4.0
4	*5270.00	88.6 AV			1.16 H	360	84.6	4.0
5	5350.00	50.1 PK	74.0	-23.9	1.16 H	360	46.0	4.1
6	5350.00	37.9 AV	54.0	-16.1	1.16 H	360	33.8	4.1
7	#10540.00	51.2 PK	74.0	-22.8	1.30 H	297	37.9	13.3
8	#10540.00	38.1 AV	54.0	-15.9	1.30 H	297	24.8	13.3
9	15810.00	45.5 PK	74.0	-28.5	1.57 H	358	32.1	13.4
10	15810.00	33.4 AV	54.0	-20.6	1.57 H	358	20.0	13.4
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	5146.60	50.2 PK	74.0	-23.8	1.50 V	360	46.6	3.6
2	5146.60	36.7 AV	54.0	-17.3	1.50 V	360	33.1	3.6
3	*5270.00	112.3 PK			1.50 V	360	108.3	4.0
4	*5270.00	102.8 AV			1.50 V	360	98.8	4.0
5	5350.00	56.5 PK	74.0	-17.5	1.50 V	360	52.4	4.1
6	5350.00	44.3 AV	54.0	-9.7	1.50 V	360	40.2	4.1
7	#10540.00	52.0 PK	74.0	-22.0	1.42 V	346	38.7	13.3
8	#10540.00	40.1 AV	54.0	-13.9	1.42 V	346	26.8	13.3
9	15810.00	45.5 PK	74.0	-28.5	2.73 V	135	32.1	13.4
10	15810.00	35.5 AV	54.0	-18.5	2.73 V	135	22.1	13.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 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	*5310.00	98.9 PK			1.21 H	349	94.8	4.1
2	*5310.00	88.5 AV			1.21 H	349	84.4	4.1
3	5350.00	55.3 PK	74.0	-18.7	1.21 H	349	51.2	4.1
4	5350.00	43.7 AV	54.0	-10.3	1.21 H	349	39.6	4.1
5	10620.00	50.8 PK	74.0	-23.2	1.26 H	307	37.3	13.5
6	10620.00	37.8 AV	54.0	-16.2	1.26 H	307	24.3	13.5
7	15930.00	45.6 PK	74.0	-28.4	1.53 H	360	32.8	12.8
8	15930.00	33.5 AV	54.0	-20.5	1.53 H	360	20.7	12.8

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	*5310.00	112.9 PK			1.50 V	360	108.8	4.1
2	*5310.00	102.6 AV			1.50 V	360	98.5	4.1
3	5350.00	61.7 PK	74.0	-12.3	1.50 V	360	57.6	4.1
4	5350.00	50.1 AV	54.0	-3.9	1.50 V	360	46.0	4.1
5	10620.00	52.6 PK	74.0	-21.4	1.45 V	353	39.1	13.5
6	10620.00	40.6 AV	54.0	-13.4	1.45 V	353	27.1	13.5
7	15930.00	45.4 PK	74.0	-28.6	2.72 V	126	32.6	12.8
8	15930.00	35.2 AV	54.0	-18.8	2.72 V	126	22.4	12.8

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 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	5460.00	47.9 PK	74.0	-26.1	1.21 H	353	43.7	4.2
2	5460.00	37.0 AV	54.0	-17.0	1.21 H	353	32.8	4.2
3	#5462.70	54.0 PK	74.0	-20.0	1.21 H	353	49.8	4.2
4	#5462.70	39.8 AV	54.0	-14.2	1.21 H	353	35.6	4.2
5	*5510.00	95.2 PK			1.21 H	353	91.0	4.2
6	*5510.00	85.3 AV			1.21 H	353	81.1	4.2
7	11020.00	51.0 PK	74.0	-23.0	1.21 H	323	37.0	14.0
8	11020.00	38.1 AV	54.0	-15.9	1.21 H	323	24.1	14.0
9	#16530.00	46.0 PK	74.0	-28.0	1.48 H	360	31.1	14.9
10	#16530.00	33.9 AV	54.0	-20.1	1.48 H	360	19.0	14.9

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	54.3 PK	74.0	-19.7	1.50 V	167	50.1	4.2
2	5460.00	43.4 AV	54.0	-10.6	1.50 V	167	39.2	4.2
3	#5462.70	60.4 PK	74.0	-13.6	1.50 V	167	56.2	4.2
4	#5462.70	46.2 AV	54.0	-7.8	1.50 V	167	42.0	4.2
5	*5510.00	109.3 PK			1.50 V	167	105.1	4.2
6	*5510.00	99.9 AV			1.50 V	167	95.7	4.2
7	11020.00	52.4 PK	74.0	-21.6	1.39 V	348	38.4	14.0
8	11020.00	40.7 AV	54.0	-13.3	1.39 V	348	26.7	14.0
9	#16530.00	45.5 PK	74.0	-28.5	2.77 V	113	30.6	14.9
10	#16530.00	35.1 AV	54.0	-18.9	2.77 V	113	20.2	14.9

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 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	5460.00	50.0 PK	74.0	-24.0	1.16 H	346	45.8	4.2
2	5460.00	37.2 AV	54.0	-16.8	1.16 H	346	33.0	4.2
3	#5462.00	52.3 PK	74.0	-21.7	1.16 H	346	48.1	4.2
4	#5462.00	38.3 AV	54.0	-15.7	1.16 H	346	34.1	4.2
5	*5550.00	99.0 PK			1.16 H	346	94.8	4.2
6	*5550.00	88.5 AV			1.16 H	346	84.3	4.2
7	11100.00	51.4 PK	74.0	-22.6	1.16 H	332	37.6	13.8
8	11100.00	38.5 AV	54.0	-15.5	1.16 H	332	24.7	13.8
9	#16650.00	45.9 PK	74.0	-28.1	1.47 H	360	30.3	15.6
10	#16650.00	34.0 AV	54.0	-20.0	1.47 H	360	18.4	15.6

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	56.4 PK	74.0	-17.6	1.50 V	167	52.2	4.2
2	5460.00	44.6 AV	54.0	-9.4	1.50 V	167	40.4	4.2
3	#5462.00	58.7 PK	74.0	-15.3	1.50 V	167	54.5	4.2
4	#5462.00	44.7 AV	54.0	-9.3	1.50 V	167	40.5	4.2
5	*5550.00	113.1 PK			1.50 V	167	108.9	4.2
6	*5550.00	102.8 AV			1.50 V	167	98.6	4.2
7	11100.00	52.1 PK	74.0	-21.9	1.44 V	360	38.3	13.8
8	11100.00	40.3 AV	54.0	-13.7	1.44 V	360	26.5	13.8
9	#16650.00	46.0 PK	74.0	-28.0	2.72 V	100	30.4	15.6
10	#16650.00	35.6 AV	54.0	-18.4	2.72 V	100	20.0	15.6

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 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	97.6 PK			1.22 H	341	93.3	4.3
2	*5670.00	88.4 AV			1.22 H	341	84.1	4.3
3	#5727.90	54.0 PK	74.0	-20.0	1.22 H	341	49.6	4.4
4	#5727.90	39.9 AV	54.0	-14.1	1.22 H	341	35.5	4.4
5	11340.00	50.9 PK	74.0	-23.1	1.18 H	330	37.3	13.6
6	11340.00	38.0 AV	54.0	-16.0	1.18 H	330	24.4	13.6
7	#17010.00	46.2 PK	74.0	-27.8	1.44 H	360	29.1	17.1
8	#17010.00	33.8 AV	54.0	-20.2	1.44 H	360	16.7	17.1

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	111.7 PK			1.50 V	339	107.4	4.3
2	*5670.00	103.0 AV			1.50 V	339	98.7	4.3
3	#5727.90	60.4 PK	74.0	-13.6	1.50 V	339	56.0	4.4
4	#5727.90	46.3 AV	54.0	-7.7	1.50 V	339	41.9	4.4
5	11340.00	52.5 PK	74.0	-21.5	1.45 V	360	38.9	13.6
6	11340.00	40.5 AV	54.0	-13.5	1.45 V	360	26.9	13.6
7	#17010.00	46.0 PK	74.0	-28.0	2.72 V	110	28.9	17.1
8	#17010.00	35.5 AV	54.0	-18.5	2.72 V	110	18.4	17.1

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT80)

CHANNEL	TX Channel 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	5150.00	46.2 PK	74.0	-27.8	1.59 H	215	42.5	3.7
2	5150.00	36.9 AV	54.0	-17.1	1.59 H	215	33.2	3.7
3	*5290.00	92.9 PK			1.59 H	215	88.8	4.1
4	*5290.00	83.5 AV			1.59 H	215	79.4	4.1
5	5368.90	55.6 PK	74.0	-18.4	1.59 H	215	51.5	4.1
6	5368.90	46.3 AV	54.0	-7.7	1.59 H	215	42.2	4.1
7	#10580.00	47.4 PK	74.0	-26.6	1.32 H	295	34.0	13.4
8	#10580.00	36.1 AV	54.0	-17.9	1.32 H	295	22.7	13.4
9	15870.00	44.4 PK	74.0	-29.6	1.52 H	337	31.4	13.0
10	15870.00	32.8 AV	54.0	-21.2	1.52 H	337	19.8	13.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	49.6 PK	74.0	-24.4	1.50 V	195	45.9	3.7
2	5150.00	40.3 AV	54.0	-13.7	1.50 V	195	36.6	3.7
3	*5290.00	107.0 PK			1.50 V	195	102.9	4.1
4	*5290.00	97.9 AV			1.50 V	195	93.8	4.1
5	5368.90	62.0 PK	74.0	-12.0	1.50 V	195	57.9	4.1
6	5368.90	52.7 AV	54.0	-1.3	1.50 V	195	48.6	4.1
7	#10580.00	48.4 PK	74.0	-25.6	1.43 V	360	35.0	13.4
8	#10580.00	37.3 AV	54.0	-16.7	1.43 V	360	23.9	13.4
9	15870.00	46.0 PK	74.0	-28.0	2.70 V	157	33.0	13.0
10	15870.00	36.0 AV	54.0	-18.0	2.70 V	157	23.0	13.0

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 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	5458.60	61.4 PK	74.0	-12.6	1.61 H	223	57.2	4.2
2	5458.60	49.5 AV	54.0	-4.5	1.61 H	223	45.3	4.2
3	#5462.00	59.4 PK	74.0	-14.6	1.61 H	223	55.2	4.2
4	#5462.00	47.1 AV	54.0	-6.9	1.61 H	223	42.9	4.2
5	*5530.00	92.4 PK			1.61 H	223	88.2	4.2
6	*5530.00	83.0 AV			1.61 H	223	78.8	4.2
7	#5725.00	49.1 PK	74.0	-24.9	1.61 H	223	44.7	4.4
8	#5725.00	38.0 AV	54.0	-16.0	1.61 H	223	33.6	4.4
9	11060.00	47.2 PK	74.0	-26.8	1.23 H	281	33.3	13.9
10	11060.00	36.1 AV	54.0	-17.9	1.23 H	281	22.2	13.9
11	#16590.00	45.8 PK	74.0	-28.2	1.55 H	357	30.2	15.6
12	#16590.00	33.7 AV	54.0	-20.3	1.55 H	357	18.1	15.6

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	5458.60	64.8 PK	74.0	-9.2	1.50 V	170	60.6	4.2
2	5458.60	52.9 AV	54.0	-1.1	1.50 V	170	48.7	4.2
3	#5462.00	64.0 PK	74.0	-10.0	1.50 V	170	59.8	4.2
4	#5462.00	51.7 AV	54.0	-2.3	1.50 V	170	47.5	4.2
5	*5530.00	106.5 PK			1.50 V	170	102.3	4.2
6	*5530.00	97.6 AV			1.50 V	170	93.4	4.2
7	#5725.00	50.4 PK	74.0	-23.6	1.50 V	170	46.0	4.4
8	#5725.00	39.3 AV	54.0	-14.7	1.50 V	170	34.9	4.4
9	11060.00	48.3 PK	74.0	-25.7	1.45 V	351	34.4	13.9
10	11060.00	37.3 AV	54.0	-16.7	1.45 V	351	23.4	13.9
11	#16590.00	45.3 PK	74.0	-28.7	2.68 V	172	29.7	15.6
12	#16590.00	35.4 AV	54.0	-18.6	2.68 V	172	19.8	15.6

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 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	5460.00	56.7 PK	74.0	-17.3	1.63 H	235	52.5	4.2
2	5460.00	43.4 AV	54.0	-10.6	1.63 H	235	39.2	4.2
3	#5470.00	56.5 PK	74.0	-17.5	1.63 H	235	52.3	4.2
4	#5470.00	43.2 AV	54.0	-10.8	1.63 H	235	39.0	4.2
5	*5610.00	98.8 PK			1.63 H	235	94.4	4.4
6	*5610.00	89.2 AV			1.63 H	235	84.8	4.4
7	#5740.00	52.8 PK	74.0	-21.2	1.63 H	235	48.4	4.4
8	#5740.00	42.8 AV	54.0	-11.2	1.63 H	235	38.4	4.4
9	11220.00	52.2 PK	74.0	-21.8	1.20 H	296	38.5	13.7
10	11220.00	41.1 AV	54.0	-12.9	1.20 H	296	27.4	13.7
11	#16830.00	46.7 PK	74.0	-27.3	1.56 H	360	30.8	15.9
12	#16830.00	34.2 AV	54.0	-19.8	1.56 H	360	18.3	15.9

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	63.1 PK	74.0	-10.9	1.50 V	170	58.9	4.2
2	5460.00	49.8 AV	54.0	-4.2	1.50 V	170	45.6	4.2
3	#5470.00	62.9 PK	74.0	-11.1	1.50 V	170	58.7	4.2
4	#5470.00	49.6 AV	54.0	-4.4	1.50 V	170	45.4	4.2
5	*5610.00	112.9 PK			1.50 V	170	108.5	4.4
6	*5610.00	103.8 AV			1.50 V	170	99.4	4.4
7	#5740.00	59.2 PK	74.0	-14.8	1.50 V	170	54.8	4.4
8	#5740.00	49.2 AV	54.0	-4.8	1.50 V	170	44.8	4.4
9	11220.00	54.3 PK	74.0	-19.7	1.48 V	355	40.6	13.7
10	11220.00	44.2 AV	54.0	-9.8	1.48 V	355	30.5	13.7
11	#16830.00	46.4 PK	74.0	-27.6	2.63 V	174	30.5	15.9
12	#16830.00	36.1 AV	54.0	-17.9	2.63 V	174	20.2	15.9

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz Data:

802.11ac (VHT40)

CHANNEL	TX Channel 134	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	89.98	36.6 QP	43.5	-6.9	3.80 H	96	50.5	-13.9
2	109.33	36.4 QP	43.5	-7.1	3.30 H	308	47.5	-11.1
3	270.20	29.6 QP	46.0	-16.4	1.40 H	131	38.3	-8.7
4	320.40	29.2 QP	46.0	-16.8	1.40 H	59	35.9	-6.7
5	730.03	35.0 QP	46.0	-11.0	1.90 H	357	34.2	0.8
6	809.99	36.2 QP	46.0	-9.8	2.30 H	320	34.2	2.0
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	72.58	32.3 QP	40.0	-7.7	3.50 V	356	43.3	-11.0
2	102.15	32.4 QP	43.5	-11.1	3.25 V	338	44.5	-12.1
3	145.58	31.6 QP	43.5	-11.9	1.60 V	337	39.8	-8.2
4	335.02	31.2 QP	46.0	-14.8	2.60 V	90	37.7	-6.5
5	523.01	31.1 QP	46.0	-14.9	1.53 V	349	33.6	-2.5
6	624.00	33.2 QP	46.0	-12.8	2.30 V	360	33.8	-0.6

REMARKS:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 24, 2016	Oct. 23, 2017
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 26, 2016	Oct. 25, 2017
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 03, 2017	June 02, 2018
50 ohms Terminator	N/A	EMC-02	Sep. 29, 2016	Sep. 28, 2017
RF Cable	5D-FB	COCCAB-001	Sep. 30, 2016	Sep. 29, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-004	June 20, 2016	June 19, 2017
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. 1.
3. Tested Date: June 15, 2017

4.2.3 Test Procedure

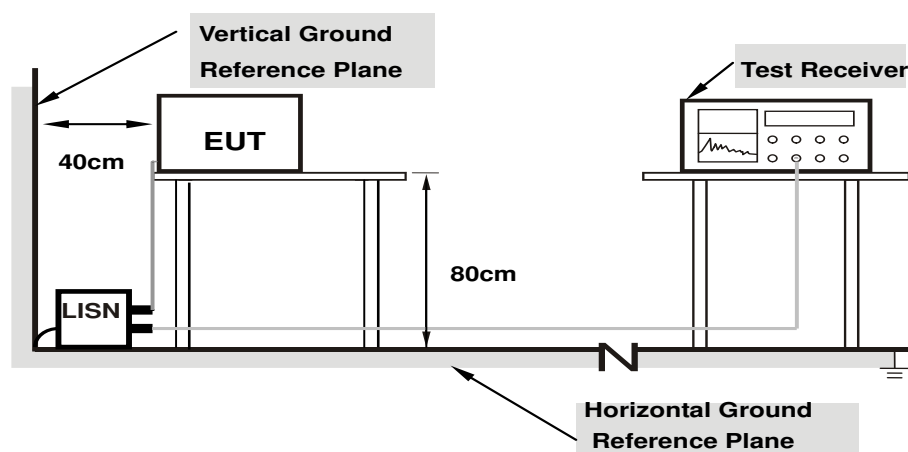
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

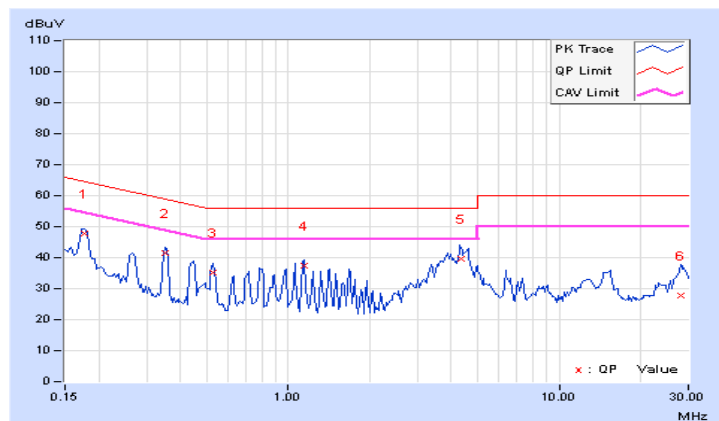
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17734	10.19	37.64	33.30	47.83	43.49	64.61	54.61	-16.78	-11.12
2	0.35313	10.21	31.39	30.95	41.60	41.16	58.89	48.89	-17.29	-7.73
3	0.53038	10.23	24.80	23.44	35.03	33.67	56.00	46.00	-20.97	-12.33
4	1.15234	10.26	27.20	19.16	37.46	29.42	56.00	46.00	-18.54	-16.58
5	4.32953	10.26	29.20	24.83	39.46	35.09	56.00	46.00	-16.54	-10.91
6	27.97656	11.45	16.33	11.22	27.78	22.67	60.00	50.00	-32.22	-27.33

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.

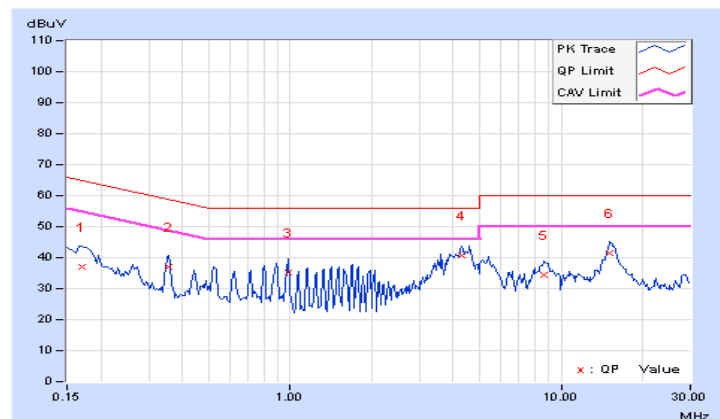


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	10.17	26.70	14.70	36.87	24.87	64.98	54.98	-28.11	-30.11
2	0.35703	10.20	26.82	25.89	37.02	36.09	58.80	48.80	-21.78	-12.71
3	0.98203	10.23	25.06	16.29	35.29	26.52	56.00	46.00	-20.71	-19.48
4	4.29688	10.18	30.48	25.76	40.66	35.94	56.00	46.00	-15.34	-10.06
5	8.67969	10.42	24.05	10.03	34.47	20.45	60.00	50.00	-25.53	-29.55
6	15.17188	10.89	30.52	20.56	41.41	31.45	60.00	50.00	-18.59	-18.55

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 Wireless 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 Wireless Access Point	1 Watt (30 dBm)
		Indoor Wireless Access Point	1 Watt (30 dBm)
		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 $N_{ANT} \leq 4$;

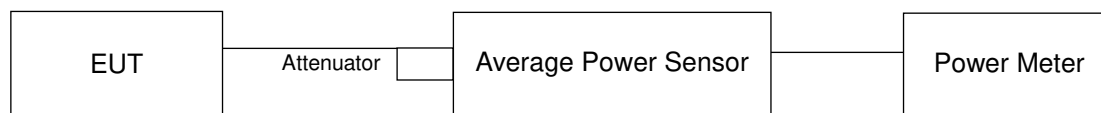
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

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

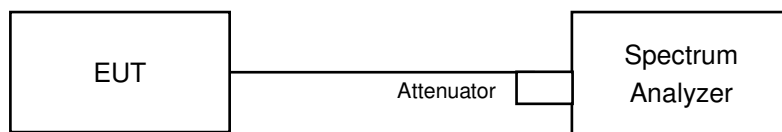
For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

4.3.2 Test Setup

FOR POWER OUTPUT MEASUREMENT



FOR 26dB 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

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 26dB OCCUPIED BANDWIDTH

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. 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 Condition

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

CDD Mode

802.11a

Power Output:

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
52	5260	8.85	8.20	9.86	10.38	34.878	15.43	21.56	Pass
60	5300	8.87	8.23	9.34	10.73	34.782	15.41	21.56	Pass
64	5320	8.79	8.41	9.06	10.90	34.859	15.42	21.58	Pass
100	5500	8.30	8.91	9.84	9.77	33.663	15.27	21.59	Pass
116	5580	9.50	8.42	9.38	10.12	34.813	15.42	21.57	Pass
140	5700	8.93	9.21	9.78	10.10	35.892	15.55	21.59	Pass

Note: Directional gain = 8.41dBi > 6dBi , so the power limit shall be reduced to “Determined Conducted Limit-(8.41-6)”.

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	19.82	20.57	19.85	19.95
60	5300	19.97	20.13	20.13	19.86
64	5320	19.95	19.94	19.93	20.30
100	5500	19.98	20.05	19.98	20.09
116	5580	20.11	20.29	20.09	19.87
140	5700	20.16	20.02	20.01	19.96

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	19.82	23.97 < 24
60	5300	19.86	23.97 < 24
64	5320	19.93	23.99 < 24
100	5500	19.98	24 = 24
116	5580	19.87	23.98 < 24
140	5700	19.96	24 = 24

802.11ac (VHT20)

Power Output:

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
52	5260	8.55	7.89	9.50	10.12	32.506	15.12	21.59	Pass
60	5300	8.91	8.36	9.50	10.86	35.738	15.53	21.59	Pass
64	5320	8.81	8.33	8.96	11.11	35.193	15.46	21.59	Pass
100	5500	8.76	9.07	9.80	10.15	35.489	15.50	21.59	Pass
116	5580	9.20	8.22	9.20	9.92	33.09	15.20	21.59	Pass
140	5700	8.74	8.82	9.50	9.84	33.654	15.27	21.59	Pass

Note: Directional gain = 8.41dBi > 6dBi, so the power limit shall be reduced to "Determined Conducted Limit-(8.41-6)".

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	20.82	20.66	20.80	20.74
60	5300	20.82	20.76	20.97	20.80
64	5320	20.91	20.79	20.77	20.76
100	5500	20.67	20.90	21.00	20.87
116	5580	20.71	21.15	21.07	20.81
140	5700	20.80	21.00	20.73	20.95

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	20.66	24.15 < 24
60	5300	20.76	24.17 < 24
64	5320	20.76	24.17 < 24
100	5500	20.67	24.15 < 24
116	5580	20.71	24.16 < 24
140	5700	20.73	24.16 < 24

802.11ac (VHT40)

Power Output:

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
54	5270	11.98	11.29	12.84	13.62	71.48	18.54	21.59	Pass
62	5310	11.71	11.25	12.30	14.04	70.493	18.48	21.59	Pass
102	5510	11.57	12.21	12.51	13.18	69.61	18.43	21.59	Pass
110	5550	12.22	12.69	12.24	12.80	71.054	18.52	21.59	Pass
134	5670	12.12	12.04	12.59	13.16	71.145	18.52	21.59	Pass

Note: Directional gain = 8.41dBi > 6dBi , so the power limit shall be reduced to "Determined Conducted Limit-(8.41-6)".

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
54	5270	40.94	40.97	40.86	40.83
62	5310	40.94	40.98	40.78	40.84
102	5510	41.00	41.04	40.95	40.81
110	5550	40.95	40.76	40.82	41.06
134	5670	40.93	41.44	41.01	40.91

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
54	5270	40.83	27.1 < 24
62	5310	40.78	27.1 < 24
102	5510	40.81	27.1 < 24
110	5550	40.76	27.1 < 24
134	5670	40.91	27.11 < 24

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
58	5290	9.87	9.46	10.74	11.86	45.74	16.60	21.59	Pass
106	5530	10.03	9.92	10.71	11.32	45.214	16.55	21.59	Pass
122	5610	15.77	14.80	15.04	16.14	140.987	21.49	21.59	Pass

Note: Directional gain = 8.41dBi > 6dBi , so the power limit shall be reduced to “Determined Conducted Limit-(8.41-6)”.

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
58	5290	84.68	84.84	84.34	85.38
106	5530	85.42	85.21	85.59	85.17
122	5610	85.55	84.38	85.16	85.22

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	84.34	30.26 < 24
106	5530	85.17	30.3 < 24
122	5610	84.38	30.26 < 24

Beamforming Mode

802.11ac (VHT20)

Power Output:

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
52	5260	8.55	7.89	9.50	10.12	32.506	15.12	15.57	Pass
60	5300	8.91	8.36	9.50	10.86	35.738	15.53	15.57	Pass
64	5320	8.81	8.33	8.96	11.11	35.193	15.46	15.57	Pass
100	5500	8.76	9.07	9.80	10.15	35.489	15.50	15.57	Pass
116	5580	9.20	8.22	9.20	9.92	33.09	15.20	15.57	Pass
140	5700	8.74	8.82	9.50	9.84	33.654	15.27	15.57	Pass

Note: 1. Directional gain = $8.41\text{dBi} + 10\log(4) = 14.43\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $24 - (14.43 - 6) = 15.57\text{dBm}$.

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	20.82	20.66	20.80	20.74
60	5300	20.82	20.76	20.97	20.80
64	5320	20.91	20.79	20.77	20.76
100	5500	20.67	20.90	21.00	20.87
116	5580	20.71	21.15	21.07	20.81
140	5700	20.80	21.00	20.73	20.95

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth

Power Limit = $11\text{dBm} + 10\log B < \text{U-NII-2A, U-NII-2C} >$			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	20.66	$24.15 > 24$
60	5300	20.76	$24.17 > 24$
64	5320	20.76	$24.17 > 24$
100	5500	20.67	$24.15 > 24$
116	5580	20.71	$24.16 > 24$
140	5700	20.73	$24.16 > 24$

802.11ac (VHT40)

Power Output:

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
54	5270	8.87	8.30	9.74	10.60	35.371	15.49	15.57	Pass
62	5310	8.73	8.26	9.19	10.92	34.821	15.42	15.57	Pass
102	5510	8.56	9.13	9.56	10.21	34.894	15.43	15.57	Pass
110	5550	9.23	9.57	9.19	9.81	35.303	15.48	15.57	Pass
134	5670	9.06	8.93	9.60	10.18	35.413	15.49	15.57	Pass

Note: 1. Directional gain = $8.41\text{dBi} + 10\log(4) = 14.43\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $24 - (14.43 - 6) = 15.57\text{dBm}$.

26dB BANDWIDTH:

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
54	5270	40.94	40.97	40.86	40.83
62	5310	40.94	40.98	40.78	40.84
102	5510	41.00	41.04	40.95	40.81
110	5550	40.95	40.76	40.82	41.06
134	5670	40.93	41.44	41.01	40.91

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth

Power Limit = $11\text{dBm} + 10\log B < \text{U-NII-2A, U-NII-2C} >$			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
54	5270	40.83	$27.1 > 24$
62	5310	40.78	$27.1 > 24$
102	5510	40.81	$27.1 > 24$
110	5550	40.76	$27.1 > 24$
134	5670	40.91	$27.11 > 24$

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
58	5290	8.67	8.36	9.61	10.71	35.134	15.46	15.57	Pass
106	5530	8.73	8.94	9.65	10.25	35.117	15.46	15.57	Pass
122	5610	9.65	8.79	9.02	10.11	35.031	15.44	15.57	Pass

Note: 1. Directional gain = $8.41\text{dBi} + 10\log(4) = 14.43\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $24 - (14.43 - 6) = 15.57\text{dBm}$.

26dB OCCUPIED BANDWIDTH

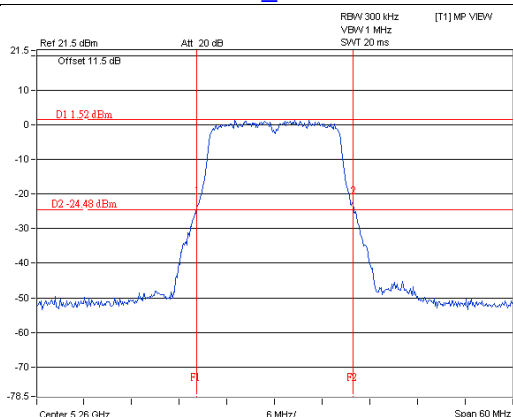
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
58	5290	84.68	84.84	84.34	85.38
106	5530	85.42	85.21	85.59	85.17
122	5610	85.55	84.38	85.16	85.22

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth

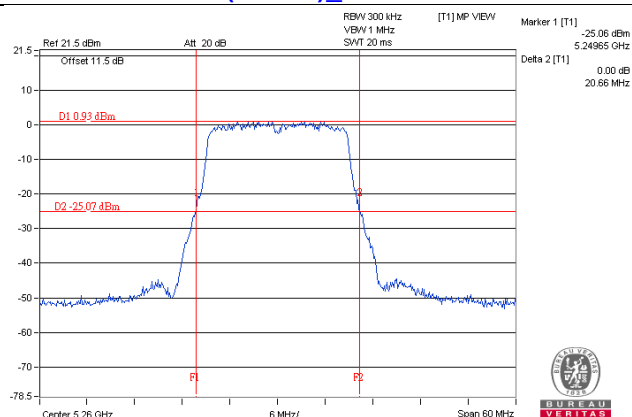
Power Limit = $11\text{dBm} + 10\log B < \text{U-NII-2A, U-NII-2C} >$			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	84.34	$30.26 > 24$
106	5530	85.17	$30.3 > 24$
122	5610	84.38	$30.26 > 24$

Spectrum Plot of Worst Value

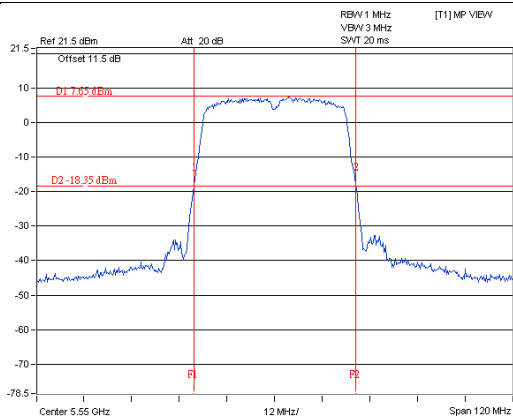
802.11a_Chain 0 / CH52



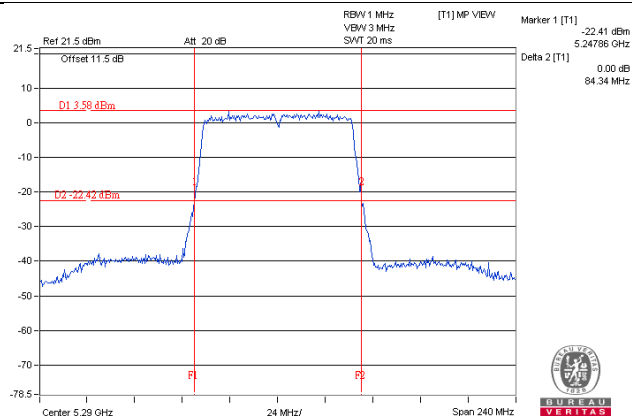
802.11ac (VHT20)_Chain 1 / CH52



8802.11ac (VHT40)_Chain 1 / CH110



802.11ac (VHT80)_Chain 2 / CH58



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 Results

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3
52	5260	16.44	16.44	16.44	16.56
60	5300	16.44	16.56	16.44	16.56
64	5320	16.44	16.68	16.44	16.56
100	5500	16.56	16.56	16.56	16.56
116	5580	16.44	16.56	16.56	16.44
140	5700	16.56	16.56	16.56	16.56

802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3
52	5260	17.76	17.64	17.64	17.64
60	5300	17.64	17.76	17.64	17.64
64	5320	17.88	17.64	17.76	17.64
100	5500	17.64	17.76	17.76	17.64
116	5580	17.64	17.76	17.64	17.64
140	5700	17.64	17.76	17.76	17.76

802.11ac (VHT40)

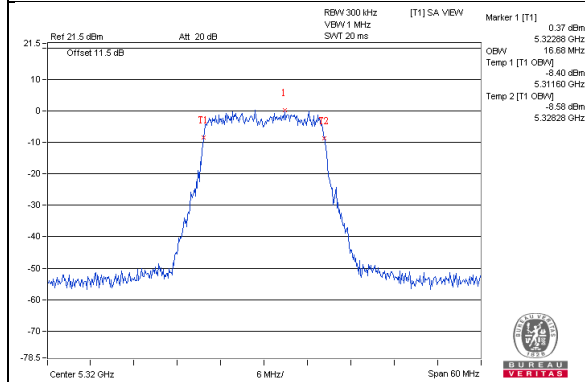
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3
54	5270	36.24	36.24	36.24	36.24
62	5310	36.24	36.24	36.24	36.24
102	5510	36.24	36.24	36.24	36.24
110	5550	36.24	36.24	36.00	36.24
134	5670	36.24	36.24	36.24	36.24

802.11ac (VHT80)

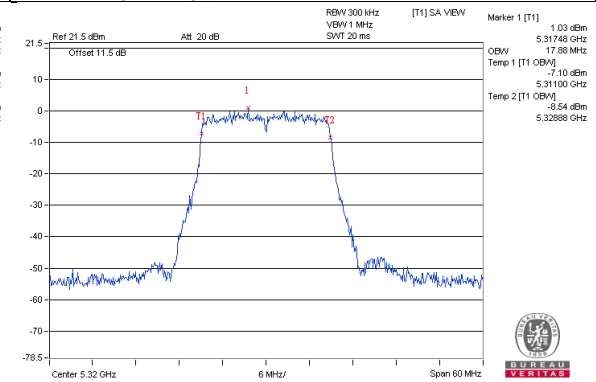
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3
58	5290	75.84	76.32	75.84	75.84
106	5530	75.84	75.84	76.32	75.36
122	5610	76.32	76.32	75.84	75.84

Spectrum Plot of Worst Value

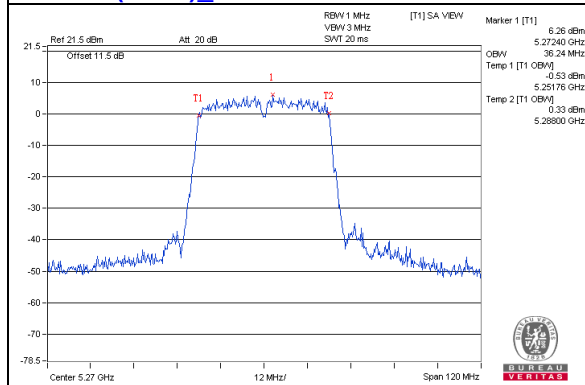
802.11a_Chain 1 / CH64



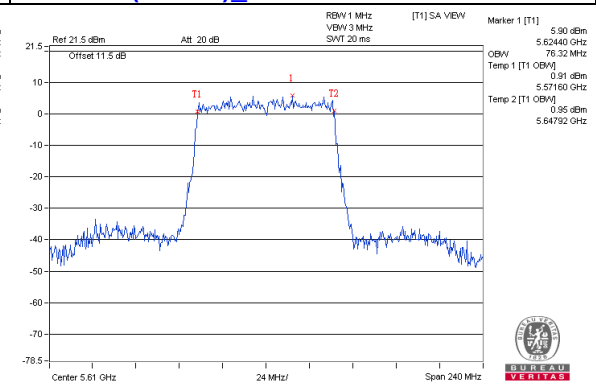
802.11n (HT20)_Chain 0 / CH64



802.11n (HT40)_Chain 0 / CH54



802.11ac (VHT80)_Chain 0 / CH122

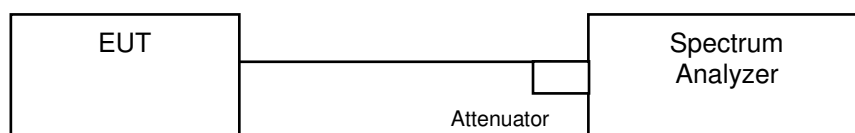


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Wireless Access Point	17dBm/ MHz
		Fixed point-to-point Wireless Access Point	
		Indoor Wireless Access Point	
		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 Procedure

802.11a, 802.11ac (VHT40), 802.11ac (VHT80)

Using method SA-2

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

802.11ac (VHT20)

Using method SA-1

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

802.11a

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
52	5260	-4.37	-5.37	-3.55	-3.31	0.13	2.07	2.57	Pass
60	5300	-4.01	-4.90	-3.48	-3.01	0.13	2.36	2.57	Pass
64	5320	-4.19	-4.64	-4.37	-2.78	0.13	2.22	2.57	Pass
100	5500	-4.48	-4.01	-2.74	-3.92	0.13	2.41	2.57	Pass
120	5600	-3.70	-4.30	-3.23	-3.94	0.13	2.38	2.57	Pass
140	5700	-3.83	-3.79	-2.94	-4.75	0.13	2.37	2.57	Pass

- Note:** 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $8.41\text{dBi} + 10\log(4) = 14.43\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $11 - (14.43 - 6) = 2.57\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
52	5260	-4.12	-4.90	-3.59	-3.31	2.08	2.57	Pass
60	5300	-4.07	-4.76	-3.69	-3.23	2.12	2.57	Pass
64	5320	-4.22	-4.77	-4.04	-2.77	2.13	2.57	Pass
100	5500	-4.08	-4.11	-3.77	-3.08	2.28	2.57	Pass
120	5600	-3.84	-4.31	-3.73	-3.07	2.31	2.57	Pass
140	5700	-4.21	-4.20	-3.92	-2.92	2.24	2.57	Pass

- Note:** 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $8.41\text{dBi} + 10\log(4) = 14.43\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $11 - (14.43 - 6) = 2.57\text{dBm}$.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
54	5270	-4.12	-4.55	-3.54	-2.74	0.12	2.46	2.57	Pass
62	5310	-4.66	-4.77	-3.67	-2.84	0.12	2.23	2.57	Pass
102	5510	-4.59	-4.53	-3.75	-2.83	0.12	2.28	2.57	Pass
110	5550	-4.59	-4.27	-3.74	-2.80	0.12	2.35	2.57	Pass
134	5670	-4.35	-4.61	-4.34	-3.24	0.12	2.04	2.57	Pass

- Note:** 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $8.41\text{dBi} + 10\log(4) = 14.43\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $11 - (14.43 - 6) = 2.57\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

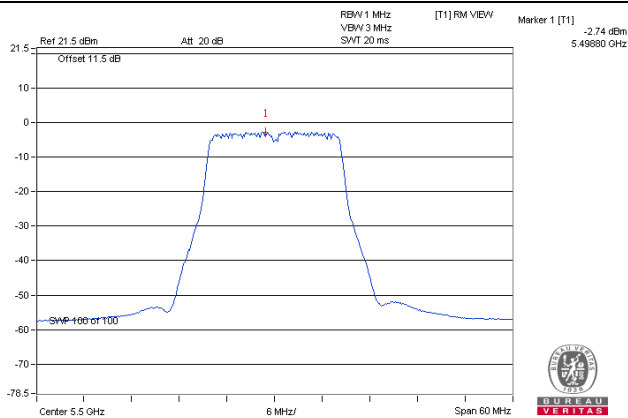
802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
58	5290	-10.35	-10.80	-8.84	-8.47	0.26	-3.22	2.57	Pass
106	5530	-10.22	-10.08	-8.67	-8.53	0.26	-3.03	2.57	Pass
122	5610	-5.20	-5.07	-5.27	-3.80	0.26	1.49	2.57	Pass

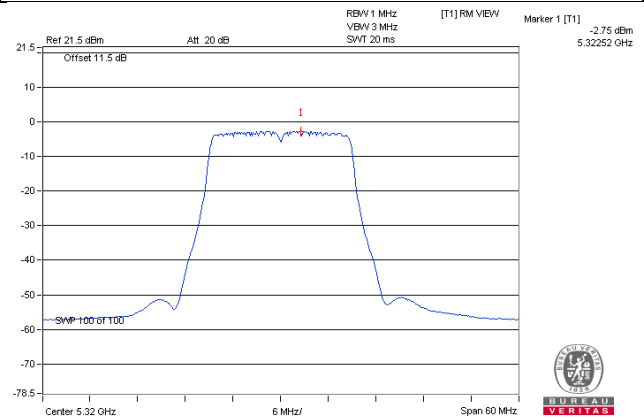
- Note:** 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $8.41\text{dBi} + 10\log(4) = 14.43\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $11 - (14.43 - 6) = 2.57\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

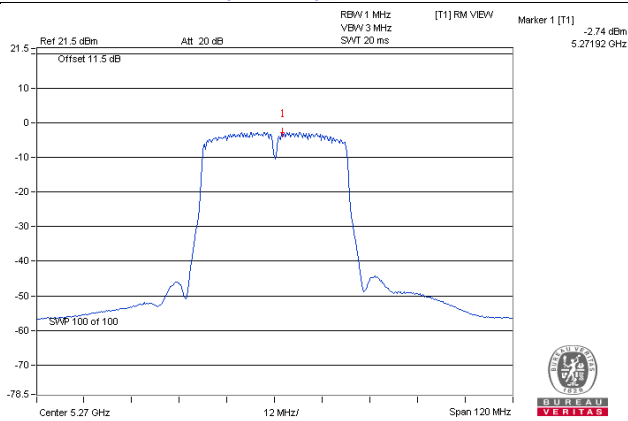
802.11a_Chain 2 / CH100



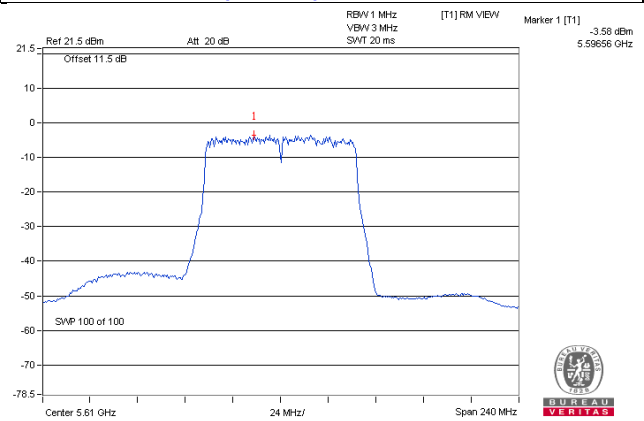
802.11ac (VHT20)_Chain 3 / CH64



802.11ac (VHT40)_Chain 3 / CH54



802.11ac (VHT80)_Chain 3 / CH122

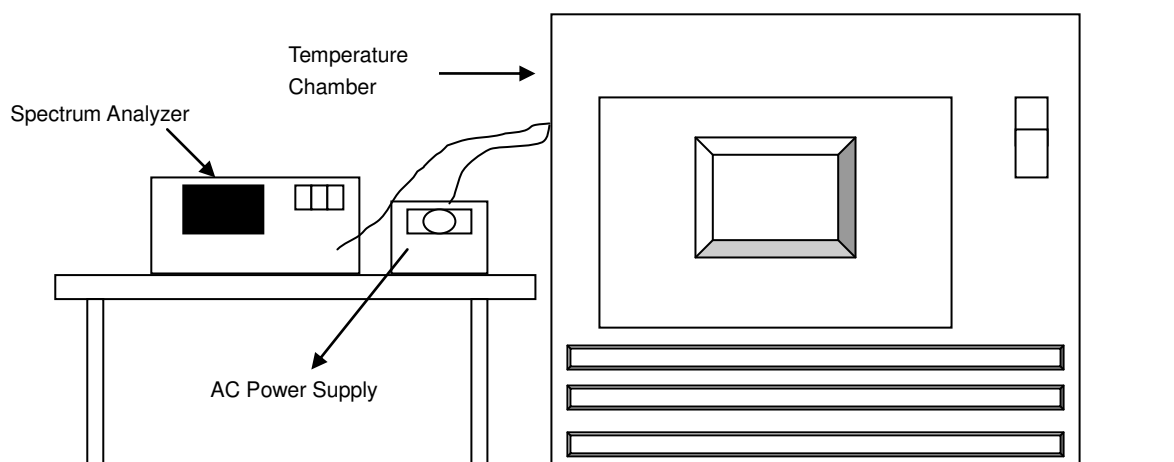


4.6 Frequency Stability Measurement

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: 5260 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
50	120	5259.9907	PASS	5259.9899	PASS	5259.9919	PASS	5259.9911	Pass
40	120	5259.9854	PASS	5259.9853	PASS	5259.9862	PASS	5259.9868	Pass
30	120	5260.024	PASS	5260.0232	PASS	5260.0249	PASS	5260.0234	Pass
20	120	5260.0031	PASS	5260.0028	PASS	5260.0025	PASS	5260.0044	Pass
10	120	5260.0163	PASS	5260.0156	PASS	5260.0149	PASS	5260.0133	Pass
0	120	5260.0243	PASS	5260.0247	PASS	5260.0262	PASS	5260.024	Pass
-10	120	5259.9949	PASS	5259.9924	PASS	5259.9959	PASS	5259.993	Pass
-20	120	5259.9794	PASS	5259.983	PASS	5259.9798	PASS	5259.9797	Pass
-30	120	5259.9951	PASS	5259.9966	PASS	5259.9942	PASS	5259.9929	Pass

Frequency Stability Versus Voltage									
Operating Frequency: 5260 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5260.0034	PASS	5260.0037	PASS	5260.0015	PASS	5260.0052	Pass
	120	5260.0031	PASS	5260.0028	PASS	5260.0025	PASS	5260.0044	Pass
	102	5260.004	PASS	5260.0023	PASS	5260.0026	PASS	5260.0051	Pass

5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Web Site: www.bureauveritas-adt.com

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

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