

FCC Test Report

Report No.: RF190821E02A-1

FCC ID: G95FGA2230

Test Model: FGA2230TCH2

Received Date: Aug. 21, 2019

Test Date: Aug. 29, 2019 to Feb. 11, 2020

Issued Date: Mar. 23, 2020

Applicant: Technicolor Connected Home USA LLC

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RF190821E02A-1	Original release.	Mar. 23, 2020

1 Certificate of Conformity

Product: Technicolor Gateway

Brand: Technicolor

Test Model: FGA2230TCH2

Sample Status: ENGINEERING SAMPLE

Applicant: Technicolor Connected Home USA LLC

Test Date: Aug. 29, 2019 to Feb. 11, 2020

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:** Mar. 23, 2020
Joyce Kuo / Specialist

Approved by :  , **Date:** Mar. 23, 2020
Clark Lin / Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -26.86dB at 0.23984MHz.
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 -0.1dB at 5725.00MHz, 5470.00MHz.
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 i-pex(MHF) not a standard connector.

Note:

Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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	1.8 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.0 dB
	30MHz ~ 1GHz	5.1 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	5.0dB
	18GHz ~ 40GHz	5.2 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (DFS Band)

Product	Technicolor Gateway
Brand	Technicolor
Test Model	FGA2230TCH2
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz
Modulation Technology	OFDM
Transfer Rate	802.11a: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 1733.3Mbps
Operating Frequency	5.26 ~ 5.32GHz, 5.50 ~ 5.70GHz
Number of Channel	802.11a, 802.11n (HT20), 802.11ac (VHT20): 15 802.11n (HT40), 802.11ac (VHT40): 7 802.11ac (VHT80): 3
Output Power	CDD Mode: 5.26GHz ~ 5.32GHz: 245.107mW 5.50 ~ 5.70GHz: 250.784mW Beamforming Mode: 5.26GHz ~ 5.32GHz: 169.546mW 5.50 ~ 5.70GHz: 191.925mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	RJ45 cable x 1 (Unshielded, 1.5m)

Note:

- This report is prepared for FCC class II change. The difference compared with the Report No.: RF190821E02-1 as the following information:
◆ Add DFS band <5.26~ 5.32GHz, 5.50 ~ 5.70GHz> by Software.
- According to above condition, all test items need to be performed. And all data were verified to meet the requirements.
- Simultaneously transmission condition.

Condition	Technology	
1	WLAN (2.4GHz)	WLAN (5GHz)

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

- The EUT must be supplied power adapter as following table:

Brand	Model No.	Spec.
MASS POWER	E030-1M120250VU (SK00995)	Input: 100-240Vac, 0.7A, 50/60Hz Output: 12V, 2.5A DC Output cable: Unshielded, 1.2m

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

Antenna NO.	RF Chain NO.	Frequency range	Antenna Type	Connector Type
2.4G1	Chain 2	2.4~2.4835GHz	Dipole	i-pex(MHF)
2.4G2	Chain 1	2.4~2.4835GHz	Dipole	NA
2.4G3	Chain 0	2.4~2.4835GHz	PIFA	NA
5G1	Chain 3	5.15~5.25GHz	Dipole	NA
		5.25~5.35GHz		
		5.47~5.725GHz		
		5.725~5.85GHz		
5G2	Chain 2	5.15~5.25GHz	PIFA	NA
		5.25~5.35GHz		
		5.47~5.725GHz		
		5.725~5.85GHz		
5G3	Chain 1	5.15~5.25GHz	PIFA	NA
		5.25~5.35GHz		
		5.47~5.725GHz		
		5.725~5.85GHz		
5G4	Chain 0	5.15~5.25GHz	Dipole	i-pex(MHF)
		5.25~5.35GHz		
		5.47~5.725GHz		
		5.725~5.85GHz		

6. The antenna gain, please refer to the following table:

Frequency Range (GHz)	Maximum Peak Gain (dBi)	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
2.4 ~ 2.4835	3.48	4.82	Refer to Note 5	Refer to Note 5
5.15 ~ 5.25	4.92	7.58		
5.25 ~ 5.35	5.03	7.70		
5.47 ~ 5.725	3.78	7.15		
5.725 ~ 5.85	3.78	6.81		

7. The EUT incorporates a MIMO function:

2.4GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11b	3TX	3RX
802.11g	3TX	3RX
802.11n (HT20)	3TX	3RX
802.11n (HT40)	3TX	3RX
VHT20	3TX	3RX
VHT40	3TX	3RX
5GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11a	4TX	4RX
802.11n (HT20)	4TX	4RX
802.11n (HT40)	4TX	4RX
802.11ac (VHT20)	4TX	4RX
802.11ac (VHT40)	4TX	4RX
802.11ac (VHT80)	4TX	4RX

Note:

1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
2. The EUT support Beamforming and non-beamforming mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), the manufacturer will control the power for 802.11n mode is the same as the 802.11ac or more lower than it and investigated worst case to representative mode in test report. (Final test mode refer to section 3.2.1)

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	5530MHz	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

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	52 to 64 100 to 140	54	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	52 to 64 100 to 140	54	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, 69%RH	120Vac, 60Hz	Chris Lin
RE _{<} 1G	23deg. C, 67%RH	120Vac, 60Hz	Kevin Ko
PLC	25deg. C, 75%RH	120Vac, 60Hz	Kevin Ko
APCM	25deg. C, 65%RH	120Vac, 60Hz	Robert Cheng

3.3 Duty Cycle of Test Signal

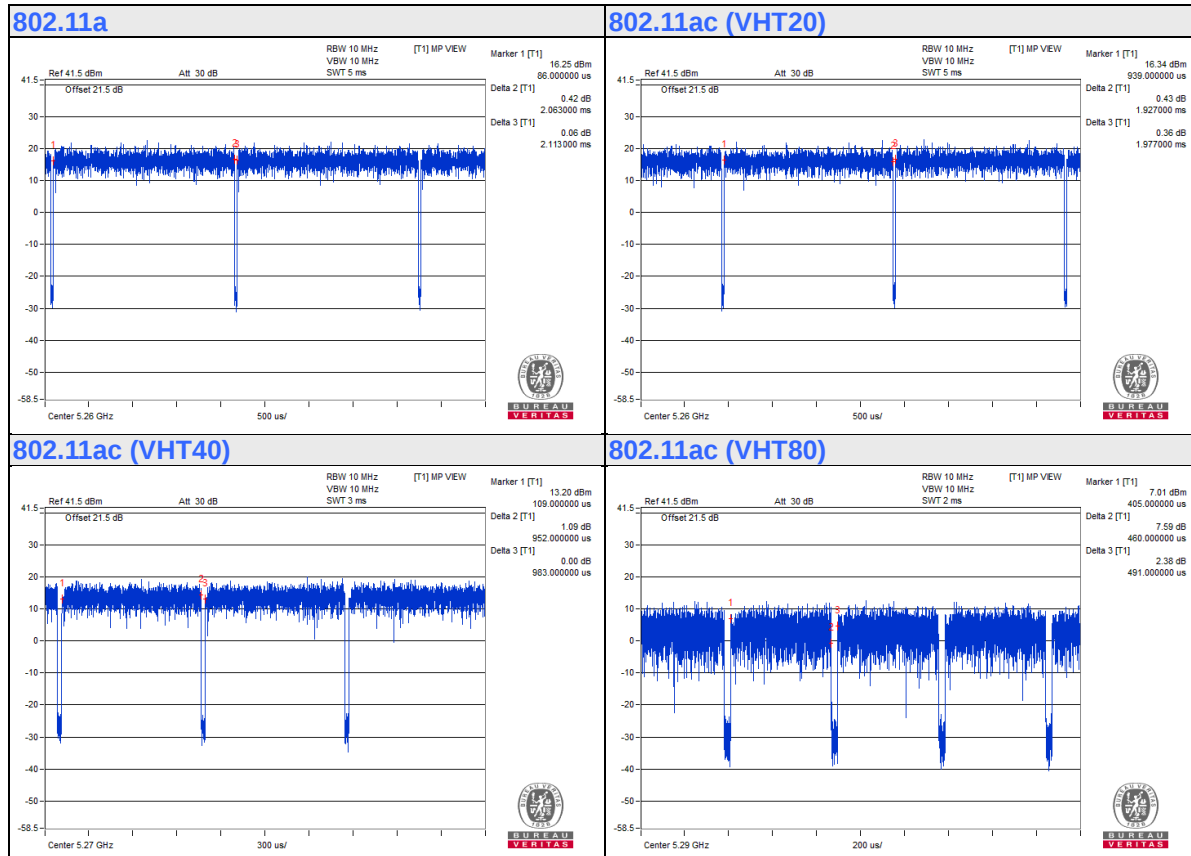
Duty cycle of test signal is < 98%, duty factor shall be considered.

802.11a: Duty cycle = 2.063 ms/2.113 ms = 0.976, Duty factor = $10 * \log(1/\text{Duty cycle}) = 0.10$

802.11ac (VHT20): Duty cycle = 1.927 ms/1.977 ms = 0.975, Duty factor = $10 * \log(1/\text{Duty cycle}) = 0.11$

802.11ac (VHT40): Duty cycle = 0.952 ms/0.983 ms = 0.968, Duty factor = $10 * \log(1/\text{Duty cycle}) = 0.14$

802.11ac (VHT80): Duty cycle = 0.46 ms/0.491 ms = 0.937, Duty factor = $10 * \log(1/\text{Duty cycle}) = 0.28$



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.

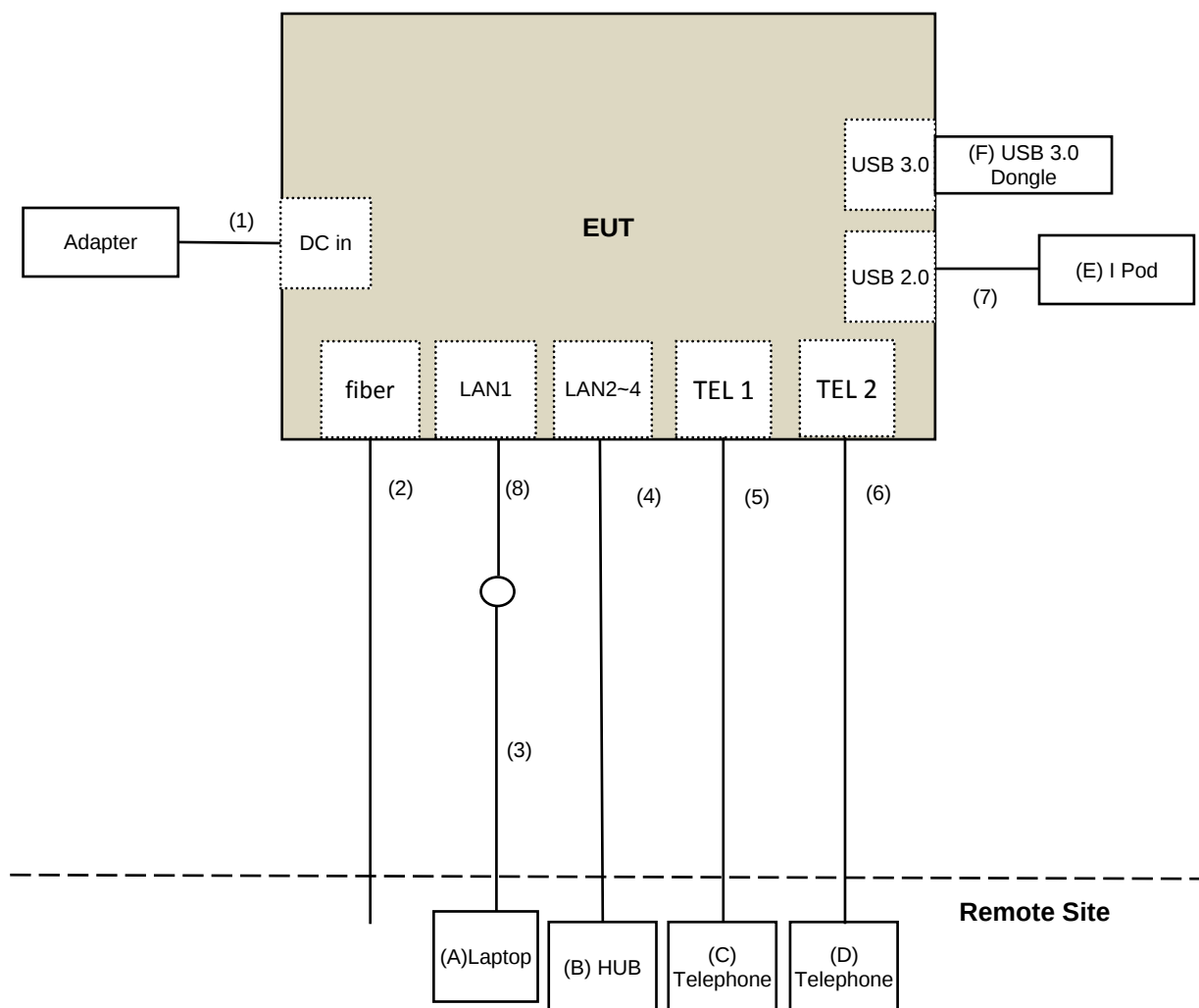
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
B.	HUB	ZYXEL	GS1100-16	S150H44000046	FCC DoC	Provided by Lab
C.	Telephone	WONDER	WD-303	7C17KA 04011	NA	Provided by Lab
D.	Telephone	DAISHO	DS-03	NA	NA	Provided by Lab
E.	I Pod	Apple	MC749TA/A	CC4DM9M8DFDM	NA	Provided by Lab
F.	USB 3.0 Dongle	Sandisk	128G	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.	DC Cable	1	1.2	No	0	Supplied by client
2.	G-pon Fiber Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	1	10	No	0	Provided by Lab
4.	RJ-45 Cable	3	10	No	0	Provided by Lab
5.	RJ-11 Cable	1	10	No	0	Provided by Lab
6.	RJ-11 Cable	1	10	No	0	Provided by Lab
7.	USB Cable	1	0.1	Yes	0	Provided by Lab
8.	RJ-45 Cable	1	1.5	No	0	Supplied by client

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard and references

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

Test Standard:

FCC Part 15, Subpart E (15.407)
ANSI C63.10-2013

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

References Test Guidance:

KDB 789033 D02 General UNII Test Procedure New Rules v02r01
KDB 662911 D01 Multiple Transmitter Output v02r01

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

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

NOTE:

- 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 v02r01			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

For Radiated Emission test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Pre-Amplifier EMC	EMC001340	980142	May 30, 2019	May 29, 2020
Loop Antenna Electro-Metrics	EM-6879	264	Jan. 22, 2019	Jan. 21, 2020
RF Cable	NA	LOOPCAB-001	Jan. 14, 2019	Jan. 13, 2020
RF Cable	NA	LOOPCAB-002	Jan. 14, 2019	Jan. 13, 2020
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	Apr. 30, 2019	Apr. 29, 2020
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 22, 2018	Nov. 21, 2019
RF Cable	8D	966-3-1	Mar. 18, 2019	Mar. 17, 2020
RF Cable	8D	966-3-2	Mar. 18, 2019	Mar. 17, 2020
RF Cable	8D	966-3-3	Mar. 18, 2019	Mar. 17, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 27, 2018	Sep. 26, 2019
Horn Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 25, 2018	Nov. 24, 2019
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	Apr. 30, 2019	Apr. 29, 2020
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 22, 2018	Nov. 21, 2019
RF Cable	EMC104-SM-SM-2000	180601	June 10, 2019	June 09, 2020
RF Cable	EMC104-SM-SM-6000	180602	June 10, 2019	June 09, 2020
Spectrum Analyzer Keysight	N9030A	MY54490679	July 17, 2019	July 16, 2020
Pre-Amplifier EMC	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 25, 2018	Nov. 24, 2019
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
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
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 09, 2019	Jan. 08, 2020
True RMS Clamp Meter FLUKE	325	31130711WS	May 21, 2019	May 20, 2020

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. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Aug. 29, 2019

For other test:

Description & Manufacturer	Model no.	Serial No.	Calibrated DATE	Calibrated Until
Spectrum Analyzer R&S	FSV40	100964	June 04, 2019	June 03, 2020
Power meter Anritsu	ML2495A	1014008	May 13, 2019	May 12, 2020
Power sensor Anritsu	MA2411B	0917122	May 13, 2019	May 12, 2020
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020

- NOTE:**
1. The test was performed in Oven room 2.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. Tested Date: Sep. 02, 2019

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. Parallel, perpendicular, and ground-parallel orientations 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 detects 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:

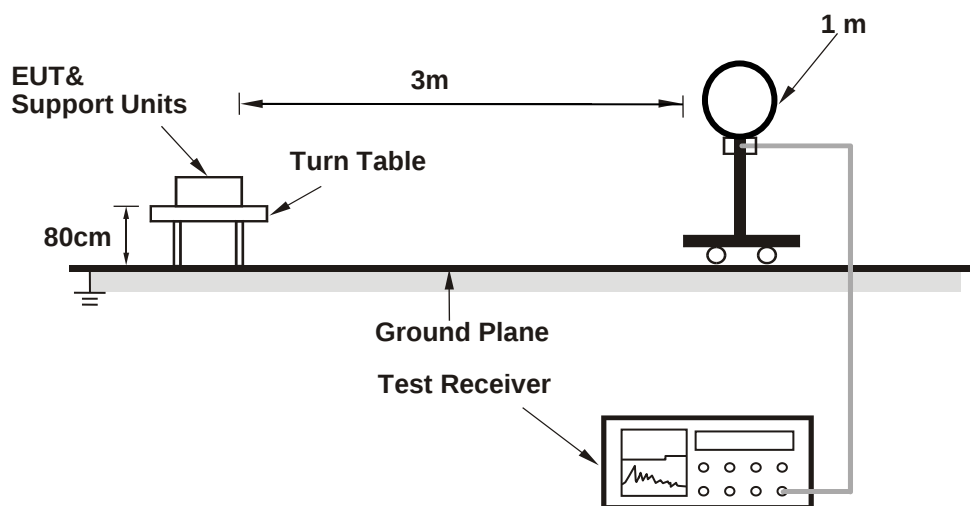
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

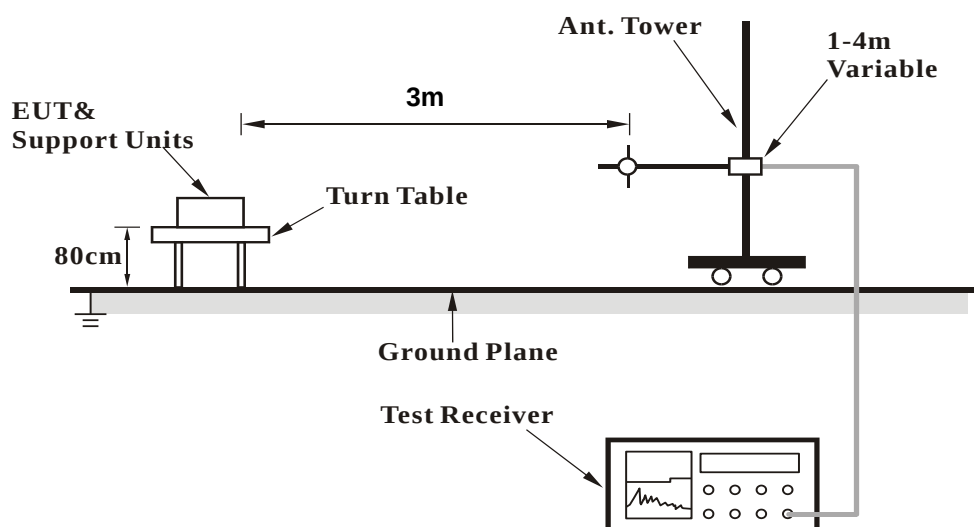
No deviation.

4.1.5 Test Setup

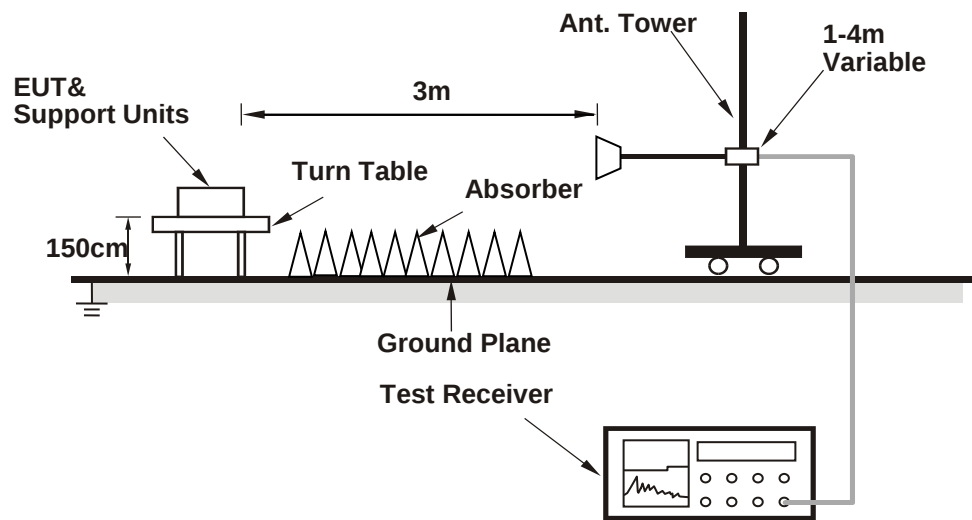
For Radiated emission below 30MHz



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.
- Controlling software (Mtool.exe v3.0.0.1) has been activated to 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	5150.00	53.3 PK	74.0	-20.7	2.07 H	214	50.0	3.3
2	5150.00	40.7 AV	54.0	-13.3	2.07 H	214	37.4	3.3
3	*5260.00	117.0 PK			2.07 H	214	114.3	2.7
4	*5260.00	107.0 AV			2.07 H	214	104.3	2.7
5	#10520.00	53.9 PK	68.2	-14.3	1.49 H	226	41.3	12.6
6	15780.00	57.3 PK	74.0	-16.7	1.74 H	260	45.3	12.0
7	15780.00	41.1 AV	54.0	-12.9	1.74 H	260	29.1	12.0
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	56.6 PK	74.0	-17.4	1.53 V	360	53.3	3.3
2	5150.00	44.3 AV	54.0	-9.7	1.53 V	360	41.0	3.3
3	*5260.00	121.1 PK			1.53 V	360	118.4	2.7
4	*5260.00	112.1 AV			1.53 V	360	109.4	2.7
5	#10520.00	56.9 PK	68.2	-11.3	1.26 V	36	44.3	12.6
6	15780.00	62.7 PK	74.0	-11.3	1.33 V	48	50.7	12.0
7	15780.00	46.7 AV	54.0	-7.3	1.33 V	48	34.7	12.0

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	*5300.00	117.4 PK			2.12 H	209	114.6	2.8
2	*5300.00	107.3 AV			2.12 H	209	104.5	2.8
3	10600.00	54.1 PK	74.0	-19.9	1.49 H	222	41.6	12.5
4	10600.00	42.3 AV	54.0	-11.7	1.49 H	222	29.8	12.5
5	15900.00	57.1 PK	74.0	-16.9	1.70 H	250	44.8	12.3
6	15900.00	40.6 AV	54.0	-13.4	1.70 H	250	28.3	12.3
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	121.2 PK			1.64 V	345	118.4	2.8
2	*5300.00	112.5 AV			1.64 V	345	109.7	2.8
3	10600.00	56.7 PK	74.0	-17.3	1.39 V	227	44.2	12.5
4	10600.00	46.5 AV	54.0	-7.5	1.39 V	227	34.0	12.5
5	15900.00	63.5 PK	74.0	-10.5	1.27 V	54	51.2	12.3
6	15900.00	46.2 AV	54.0	-7.8	1.27 V	54	33.9	12.3

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	114.7 PK			2.15 H	219	111.9	2.8
2	*5320.00	104.4 AV			2.15 H	219	101.6	2.8
3	5350.00	64.4 PK	74.0	-9.6	2.15 H	219	61.4	3.0
4	5350.00	49.8 AV	54.0	-4.2	2.15 H	219	46.8	3.0
5	10640.00	54.3 PK	74.0	-19.7	1.51 H	231	41.8	12.5
6	10640.00	42.6 AV	54.0	-11.4	1.51 H	231	30.1	12.5
7	15960.00	57.7 PK	74.0	-16.3	1.64 H	263	45.0	12.7
8	15960.00	41.1 AV	54.0	-12.9	1.64 H	263	28.4	12.7
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	*5320.00	118.1 PK			2.01 V	349	115.3	2.8
2	*5320.00	109.4 AV			2.01 V	349	106.6	2.8
3	5350.00	67.9 PK	74.0	-6.1	2.01 V	349	64.9	3.0
4	5350.00	53.6 AV	54.0	-0.4	2.01 V	349	50.6	3.0
5	10640.00	56.9 PK	74.0	-17.1	1.22 V	301	44.4	12.5
6	10640.00	46.2 AV	54.0	-7.8	1.22 V	301	33.7	12.5
7	15960.00	64.5 PK	74.0	-9.5	1.55 V	222	51.8	12.7
8	15960.00	46.7 AV	54.0	-7.3	1.55 V	222	34.0	12.7

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	#5470.00	65.0 PK	68.2	-3.2	2.10 H	208	61.7	3.3
2	*5500.00	113.7 PK			2.10 H	208	110.4	3.3
3	*5500.00	103.1 AV			2.10 H	208	99.8	3.3
4	11000.00	54.4 PK	74.0	-19.6	1.49 H	223	41.3	13.1
5	11000.00	42.9 AV	54.0	-11.1	1.49 H	223	29.8	13.1
6	#16500.00	57.5 PK	68.2	-10.7	1.59 H	265	43.2	14.3
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	68.0 PK	68.2	-0.2	1.84 V	346	64.7	3.3
2	*5500.00	118.2 PK			1.84 V	346	114.9	3.3
3	*5500.00	109.2 AV			1.84 V	346	105.9	3.3
4	11000.00	56.7 PK	74.0	-17.3	1.32 V	25	43.6	13.1
5	11000.00	46.5 AV	54.0	-7.5	1.32 V	25	33.4	13.1
6	#16500.00	64.2 PK	68.2	-4.0	1.22 V	154	49.9	14.3

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	*5580.00	114.9 PK			2.08 H	211	111.6	3.3
2	*5580.00	104.4 AV			2.08 H	211	101.1	3.3
3	11160.00	54.7 PK	74.0	-19.3	1.44 H	207	41.8	12.9
4	11160.00	43.2 AV	54.0	-10.8	1.44 H	207	30.3	12.9
5	#16740.00	57.6 PK	68.2	-10.6	1.54 H	279	42.2	15.4
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	*5580.00	121.1 PK			1.68 V	269	117.8	3.3
2	*5580.00	111.7 AV			1.68 V	269	108.4	3.3
3	11160.00	56.1 PK	74.0	-17.9	2.91 V	56	43.2	12.9
4	11160.00	46.2 AV	54.0	-7.8	2.91 V	56	33.3	12.9
5	#16740.00	64.8 PK	68.2	-3.4	2.21 V	305	49.4	15.4

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	109.8 PK			2.08 H	213	106.4	3.4
2	*5700.00	100.5 AV			2.08 H	213	97.1	3.4
3	#5725.00	65.9 PK	68.2	-2.3	2.08 H	213	62.4	3.5
4	11400.00	54.4 PK	74.0	-19.6	1.43 H	194	41.1	13.3
5	11400.00	43.1 AV	54.0	-10.9	1.43 H	194	29.8	13.3
6	#17100.00	58.0 PK	68.2	-10.2	1.56 H	277	41.6	16.4
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	115.9 PK			1.63 V	266	112.5	3.4
2	*5700.00	106.4 AV			1.63 V	266	103.0	3.4
3	#5725.00	68.1 PK	68.2	-0.1	1.63 V	266	64.6	3.5
4	11400.00	55.8 PK	74.0	-18.2	1.06 V	77	42.5	13.3
5	11400.00	46.7 AV	54.0	-7.3	1.06 V	77	33.4	13.3
6	#17100.00	63.9 PK	68.2	-4.3	1.16 V	100	47.5	16.4

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	54.5 PK	74.0	-19.5	1.89 H	191	51.2	3.3
2	5150.00	42.3 AV	54.0	-11.7	1.89 H	191	39.0	3.3
3	*5260.00	117.9 PK			1.89 H	191	115.2	2.7
4	*5260.00	108.3 AV			1.89 H	191	105.6	2.7
5	#10520.00	54.9 PK	68.2	-13.3	1.36 H	184	42.3	12.6
6	15780.00	59.1 PK	74.0	-14.9	1.62 H	235	47.1	12.0
7	15780.00	42.1 AV	54.0	-11.9	1.62 H	235	30.1	12.0
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	56.8 PK	74.0	-17.2	1.50 V	346	53.5	3.3
2	5150.00	44.5 AV	54.0	-9.5	1.50 V	346	41.2	3.3
3	*5260.00	120.9 PK			1.58 V	360	118.2	2.7
4	*5260.00	112.0 AV			1.58 V	360	109.3	2.7
5	#10520.00	56.3 PK	68.2	-11.9	1.22 V	52	43.7	12.6
6	15780.00	59.8 PK	74.0	-14.2	1.30 V	51	47.8	12.0
7	15780.00	43.6 AV	54.0	-10.4	1.30 V	51	31.6	12.0

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	*5300.00	117.5 PK			1.93 H	192	114.7	2.8
2	*5300.00	108.2 AV			1.93 H	192	105.4	2.8
3	10600.00	54.9 PK	74.0	-19.1	1.36 H	195	42.4	12.5
4	10600.00	43.5 AV	54.0	-10.5	1.36 H	195	31.0	12.5
5	15900.00	59.5 PK	74.0	-14.5	1.58 H	238	47.2	12.3
6	15900.00	42.3 AV	54.0	-11.7	1.58 H	238	30.0	12.3
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	120.9 PK			1.58 V	360	118.1	2.8
2	*5300.00	111.9 AV			1.58 V	360	109.1	2.8
3	10600.00	57.1 PK	74.0	-16.9	1.24 V	38	44.6	12.5
4	10600.00	46.0 AV	54.0	-8.0	1.24 V	38	33.5	12.5
5	15900.00	59.7 PK	74.0	-14.3	1.24 V	41	47.4	12.3
6	15900.00	43.7 AV	54.0	-10.3	1.24 V	41	31.4	12.3

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	113.0 PK			2.09 H	204	110.2	2.8
2	*5320.00	103.8 AV			2.09 H	204	101.0	2.8
3	5350.00	64.2 PK	74.0	-9.8	2.09 H	204	61.2	3.0
4	5350.00	49.9 AV	54.0	-4.1	2.09 H	204	46.9	3.0
5	10640.00	55.1 PK	74.0	-18.9	1.42 H	206	42.6	12.5
6	10640.00	43.9 AV	54.0	-10.1	1.42 H	206	31.4	12.5
7	15960.00	59.7 PK	74.0	-14.3	1.52 H	242	47.0	12.7
8	15960.00	42.8 AV	54.0	-11.2	1.52 H	242	30.1	12.7
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	*5320.00	118.4 PK			1.80 V	264	115.6	2.8
2	*5320.00	109.4 AV			1.80 V	264	106.6	2.8
3	5350.00	68.1 PK	74.0	-5.9	1.80 V	264	65.1	3.0
4	5350.00	53.8 AV	54.0	-0.2	1.80 V	264	50.8	3.0
5	10640.00	56.9 PK	74.0	-17.1	1.30 V	47	44.4	12.5
6	10640.00	45.7 AV	54.0	-8.3	1.30 V	47	33.2	12.5
7	15960.00	59.2 PK	74.0	-14.8	1.23 V	43	46.5	12.7
8	15960.00	43.2 AV	54.0	-10.8	1.23 V	43	30.5	12.7

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	#5470.00	66.1 PK	68.2	-2.1	2.03 H	195	62.8	3.3
2	*5500.00	111.8 PK			2.03 H	195	108.5	3.3
3	*5500.00	102.5 AV			2.03 H	195	99.2	3.3
4	11000.00	54.8 PK	74.0	-19.2	1.46 H	190	41.7	13.1
5	11000.00	43.4 AV	54.0	-10.6	1.46 H	190	30.3	13.1
6	#16500.00	59.6 PK	68.2	-8.6	1.52 H	250	45.3	14.3
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	68.0 PK	68.2	-0.2	1.64 V	279	64.7	3.3
2	*5500.00	117.7 PK			1.64 V	279	114.4	3.3
3	*5500.00	108.1 AV			1.64 V	279	104.8	3.3
4	11000.00	56.6 PK	74.0	-17.4	1.31 V	40	43.5	13.1
5	11000.00	45.4 AV	54.0	-8.6	1.31 V	40	32.3	13.1
6	#16500.00	59.0 PK	68.2	-9.2	1.27 V	54	44.7	14.3

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	*5580.00	115.2 PK			1.98 H	193	111.9	3.3
2	*5580.00	105.9 AV			1.98 H	193	102.6	3.3
3	11160.00	54.8 PK	74.0	-19.2	1.44 H	177	41.9	12.9
4	11160.00	43.3 AV	54.0	-10.7	1.44 H	177	30.4	12.9
5	#16740.00	59.9 PK	68.2	-8.3	1.47 H	242	44.5	15.4
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	*5580.00	120.8 PK			1.56 V	360	117.5	3.3
2	*5580.00	111.9 AV			1.56 V	360	108.6	3.3
3	11160.00	57.4 PK	74.0	-16.6	1.28 V	44	44.5	12.9
4	11160.00	46.1 AV	54.0	-7.9	1.28 V	44	33.2	12.9
5	#16740.00	60.1 PK	68.2	-8.1	1.23 V	42	44.7	15.4

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	112.2 PK			2.04 H	183	108.8	3.4
2	*5700.00	102.9 AV			2.04 H	183	99.5	3.4
3	#5725.00	65.9 PK	68.2	-2.3	2.04 H	183	62.4	3.5
4	11400.00	55.2 PK	74.0	-18.8	1.40 H	202	41.9	13.3
5	11400.00	43.5 AV	54.0	-10.5	1.40 H	202	30.2	13.3
6	#17100.00	60.0 PK	68.2	-8.2	1.56 H	239	43.6	16.4
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	117.1 PK			1.55 V	266	113.7	3.4
2	*5700.00	107.1 AV			1.55 V	266	103.7	3.4
3	#5725.00	68.0 PK	68.2	-0.2	1.55 V	266	64.5	3.5
4	11400.00	57.4 PK	74.0	-16.6	1.28 V	53	44.1	13.3
5	11400.00	46.1 AV	54.0	-7.9	1.28 V	53	32.8	13.3
6	#17100.00	60.4 PK	68.2	-7.8	1.17 V	49	44.0	16.4

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	5150.00	56.7 PK	74.0	-17.3	1.86 H	264	53.4	3.3
2	5150.00	45.4 AV	54.0	-8.6	1.86 H	264	42.1	3.3
3	*5270.00	115.3 PK			1.86 H	264	112.6	2.7
4	*5270.00	104.5 AV			1.86 H	264	101.8	2.7
5	5350.00	58.4 PK	74.0	-15.6	1.86 H	264	55.4	3.0
6	5350.00	48.6 AV	54.0	-5.4	1.86 H	264	45.6	3.0
7	#10540.00	54.3 PK	68.2	-13.9	1.41 H	173	41.7	12.6
8	15810.00	59.0 PK	74.0	-15.0	1.54 H	248	47.0	12.0
9	15810.00	42.2 AV	54.0	-11.8	1.54 H	248	30.2	12.0
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	58.3 PK	74.0	-15.7	1.79 V	262	55.0	3.3
2	5150.00	47.3 AV	54.0	-6.7	1.79 V	262	44.0	3.3
3	*5270.00	118.9 PK			1.79 V	262	116.2	2.7
4	*5270.00	108.2 AV			1.79 V	262	105.5	2.7
5	5350.00	61.3 PK	74.0	-12.7	1.79 V	262	58.3	3.0
6	5350.00	50.4 AV	54.0	-3.6	1.79 V	262	47.4	3.0
7	#10540.00	57.2 PK	68.2	-11.0	1.30 V	77	44.6	12.6
8	15810.00	60.5 PK	74.0	-13.5	1.18 V	28	48.5	12.0
9	15810.00	44.5 AV	54.0	-9.5	1.18 V	28	32.5	12.0

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)
- Margin value = Emission Level – Limit value
- The other emission levels were very low against the limit.
- " * ": Fundamental frequency.
- " # ": 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	107.0 PK			1.88 H	268	104.2	2.8
2	*5310.00	96.9 AV			1.88 H	268	94.1	2.8
3	5350.00	64.3 PK	74.0	-9.7	1.88 H	268	61.3	3.0
4	5350.00	51.0 AV	54.0	-3.0	1.88 H	268	48.0	3.0
5	10620.00	55.0 PK	74.0	-19.0	1.40 H	172	42.5	12.5
6	10620.00	43.6 AV	54.0	-10.4	1.40 H	172	31.1	12.5
7	15930.00	58.7 PK	74.0	-15.3	1.59 H	244	46.3	12.4
8	15930.00	41.9 AV	54.0	-12.1	1.59 H	244	29.5	12.4
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	*5310.00	112.1 PK			1.89 V	264	109.3	2.8
2	*5310.00	102.3 AV			1.89 V	264	99.5	2.8
3	5350.00	66.7 PK	74.0	-7.3	1.89 V	264	63.7	3.0
4	5350.00	53.6 AV	54.0	-0.4	1.89 V	264	50.6	3.0
5	10620.00	56.8 PK	74.0	-17.2	1.40 V	79	44.3	12.5
6	10620.00	45.7 AV	54.0	-8.3	1.40 V	79	33.2	12.5
7	15930.00	60.3 PK	74.0	-13.7	1.26 V	44	47.9	12.4
8	15930.00	43.6 AV	54.0	-10.4	1.26 V	44	31.2	12.4

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	62.5 PK	74.0	-11.5	1.89 H	256	59.2	3.3
2	5460.00	48.3 AV	54.0	-5.7	1.89 H	256	45.0	3.3
3	#5470.00	64.7 PK	68.2	-3.5	1.89 H	256	61.4	3.3
4	*5510.00	107.1 PK			1.89 H	256	103.8	3.3
5	*5510.00	97.2 AV			1.89 H	256	93.9	3.3
6	11020.00	55.0 PK	74.0	-19.0	1.43 H	161	42.0	13.0
7	11020.00	43.5 AV	54.0	-10.5	1.43 H	161	30.5	13.0
8	#16530.00	58.8 PK	68.2	-9.4	1.65 H	233	44.2	14.6
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	66.9 PK	74.0	-7.1	1.89 V	265	63.6	3.3
2	5460.00	52.4 AV	54.0	-1.6	1.89 V	265	49.1	3.3
3	#5470.00	68.1 PK	68.2	-0.1	1.89 V	265	64.8	3.3
4	*5510.00	112.1 PK			1.89 V	265	108.8	3.3
5	*5510.00	102.4 AV			1.89 V	265	99.1	3.3
6	11020.00	56.6 PK	74.0	-17.4	1.45 V	68	43.6	13.0
7	11020.00	45.4 AV	54.0	-8.6	1.45 V	68	32.4	13.0
8	#16530.00	60.5 PK	68.2	-7.7	1.29 V	28	45.9	14.6

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	*5550.00	116.0 PK			1.92 H	248	112.7	3.3
2	*5550.00	104.9 AV			1.92 H	248	101.6	3.3
3	11100.00	55.2 PK	74.0	-18.8	1.47 H	176	42.5	12.7
4	11100.00	43.6 AV	54.0	-10.4	1.47 H	176	30.9	12.7
5	#16650.00	58.9 PK	68.2	-9.3	1.64 H	247	43.7	15.2
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	*5550.00	119.2 PK			1.83 V	251	115.9	3.3
2	*5550.00	108.5 AV			1.83 V	251	105.2	3.3
3	11100.00	56.3 PK	74.0	-17.7	1.41 V	80	43.6	12.7
4	11100.00	44.9 AV	54.0	-9.1	1.41 V	80	32.2	12.7
5	#16650.00	60.8 PK	68.2	-7.4	1.30 V	31	45.6	15.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	110.9 PK			1.88 H	253	107.5	3.4
2	*5670.00	100.6 AV			1.88 H	253	97.2	3.4
3	#5725.00	65.7 PK	68.2	-2.5	1.88 H	253	62.2	3.5
4	11340.00	54.6 PK	74.0	-19.4	1.41 H	161	41.2	13.4
5	11340.00	43.3 AV	54.0	-10.7	1.41 H	161	29.9	13.4
6	#17010.00	59.6 PK	68.2	-8.6	1.64 H	237	43.4	16.2
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	114.5 PK			1.62 V	266	111.1	3.4
2	*5670.00	104.3 AV			1.62 V	266	100.9	3.4
3	#5725.00	68.0 PK	68.2	-0.2	1.62 V	266	64.5	3.5
4	11340.00	57.0 PK	74.0	-17.0	1.40 V	71	43.6	13.4
5	11340.00	45.7 AV	54.0	-8.3	1.40 V	71	32.3	13.4
6	#17010.00	60.2 PK	68.2	-8.0	1.34 V	41	44.0	16.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	44.3 PK	74.0	-29.7	2.22 H	209	41.0	3.3
2	5150.00	42.0 AV	54.0	-12.0	2.22 H	209	38.7	3.3
3	*5290.00	106.6 PK			2.22 H	209	103.9	2.7
4	*5290.00	94.6 AV			2.22 H	209	91.9	2.7
5	5350.00	63.2 PK	74.0	-10.8	2.22 H	209	60.2	3.0
6	5350.00	51.7 AV	54.0	-2.3	2.22 H	209	48.7	3.0
7	#10580.00	54.9 PK	68.2	-13.3	1.25 H	146	42.3	12.6
8	15870.00	59.8 PK	74.0	-14.2	1.65 H	243	47.7	12.1
9	15870.00	42.8 AV	54.0	-11.2	1.65 H	243	30.7	12.1
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	5150.00	45.1 PK	74.0	-28.9	1.83 V	279	41.8	3.3
2	5150.00	42.6 AV	54.0	-11.4	1.83 V	279	39.3	3.3
3	*5290.00	108.3 PK			1.83 V	279	105.6	2.7
4	*5290.00	96.9 AV			1.83 V	279	94.2	2.7
5	5350.00	67.3 PK	74.0	-6.7	1.83 V	279	64.3	3.0
6	5350.00	53.8 AV	54.0	-0.2	1.83 V	279	50.8	3.0
7	#10580.00	56.2 PK	68.2	-12.0	1.25 V	73	43.6	12.6
8	15870.00	60.7 PK	74.0	-13.3	1.43 V	69	48.6	12.1
9	15870.00	44.0 AV	54.0	-10.0	1.43 V	69	31.9	12.1

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)
- Margin value = Emission Level – Limit value
- The other emission levels were very low against the limit.
- " * ": Fundamental frequency.
- " # ": 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	5460.00	64.7 PK	74.0	-9.3	2.23 H	194	61.4	3.3
2	5460.00	50.5 AV	54.0	-3.5	2.23 H	194	47.2	3.3
3	#5470.00	65.9 PK	68.2	-2.3	2.23 H	194	62.6	3.3
4	*5530.00	106.8 PK			2.23 H	194	103.5	3.3
5	*5530.00	95.1 AV			2.23 H	194	91.8	3.3
6	#5725.00	57.6 PK	68.2	-10.6	2.23 H	194	54.1	3.5
7	11060.00	55.3 PK	74.0	-18.7	1.24 H	143	42.4	12.9
8	11060.00	44.2 AV	54.0	-9.8	1.24 H	143	31.3	12.9
9	#16590.00	59.2 PK	68.2	-9.0	1.68 H	238	44.3	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	66.8 PK	74.0	-7.2	1.73 V	267	63.5	3.3
2	5460.00	52.8 AV	54.0	-1.2	1.73 V	267	49.5	3.3
3	#5470.00	68.0 PK	68.2	-0.2	1.73 V	267	64.7	3.3
4	*5530.00	111.4 PK			1.73 V	267	108.1	3.3
5	*5530.00	98.2 AV			1.73 V	267	94.9	3.3
6	#5725.00	59.9 PK	68.2	-8.3	1.73 V	267	56.4	3.5
7	11060.00	56.6 PK	74.0	-17.4	1.29 V	82	43.7	12.9
8	11060.00	45.9 AV	54.0	-8.1	1.29 V	82	33.0	12.9
9	#16590.00	60.8 PK	68.2	-7.4	1.38 V	74	45.9	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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	109.9 PK			2.27 H	196	106.6	3.3
2	*5610.00	98.5 AV			2.27 H	196	95.2	3.3
3	#5725.00	65.9 PK	68.2	-2.3	2.27 H	196	62.4	3.5
4	11220.00	54.7 PK	74.0	-19.3	1.27 H	152	41.7	13.0
5	11220.00	43.7 AV	54.0	-10.3	1.27 H	152	30.7	13.0
6	#16830.00	59.4 PK	68.2	-8.8	1.63 H	237	44.1	15.3
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	115.2 PK			3.13 V	109	111.9	3.3
2	*5610.00	101.6 AV			3.13 V	109	98.3	3.3
3	#5725.00	67.7 PK	68.2	-0.5	3.13 V	109	64.2	3.5
4	11220.00	56.5 PK	74.0	-17.5	1.25 V	71	43.5	13.0
5	11220.00	45.9 AV	54.0	-8.1	1.25 V	71	32.9	13.0
6	#16830.00	61.2 PK	68.2	-7.0	1.34 V	80	45.9	15.3

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

Below 1GHz Data:

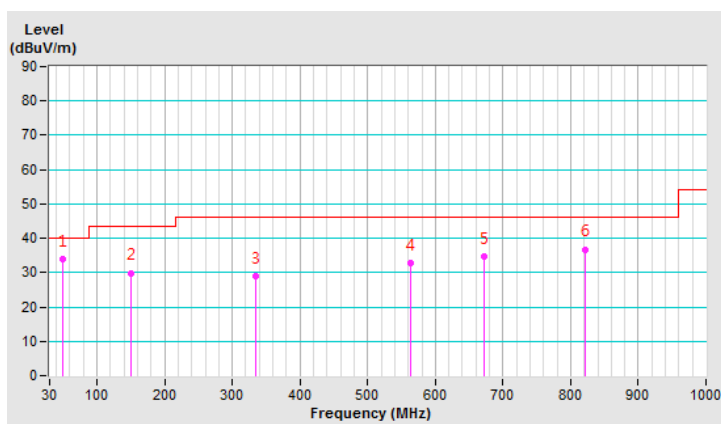
802.11ac (VHT40)

CHANNEL	TX Channel 54	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	49.59	33.8 QP	40.0	-6.2	2.00 H	311	41.5	-7.7
2	150.30	29.9 QP	43.5	-13.6	2.00 H	114	37.0	-7.1
3	334.19	29.0 QP	46.0	-17.0	2.00 H	329	34.3	-5.3
4	562.99	32.7 QP	46.0	-13.3	1.50 H	24	32.9	-0.2
5	671.56	34.6 QP	46.0	-11.4	1.00 H	210	32.6	2.0
6	821.98	36.8 QP	46.0	-9.2	1.00 H	360	31.9	4.9

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

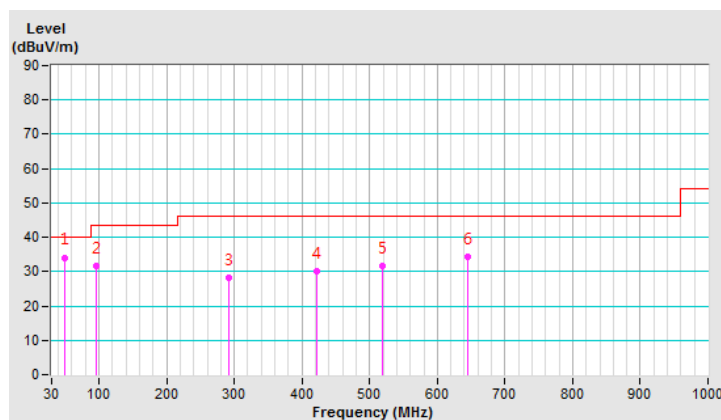


CHANNEL	TX Channel 54	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	48.99	34.1 QP	40.0	-5.9	2.00 V	360	41.8	-7.7
2	96.47	31.6 QP	43.5	-11.9	1.50 V	356	44.0	-12.4
3	292.38	28.2 QP	46.0	-17.8	2.00 V	82	34.8	-6.6
4	421.18	29.9 QP	46.0	-16.1	1.50 V	167	33.2	-3.3
5	518.52	31.6 QP	46.0	-14.4	2.00 V	85	32.7	-1.1
6	644.33	34.2 QP	46.0	-11.8	1.50 V	294	32.4	1.8

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



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. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 17, 2019	Mar. 16, 2020
50 ohms Terminator	50	3	Oct. 23, 2019	Oct. 22, 2020
RF Cable	5D-FB	COCCAB-001	Sep. 27, 2019	Sep. 26, 2020
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 14, 2019	Mar. 13, 2020
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 Conduction 1.
- 3 Tested Date: Feb. 11, 2020

4.2.3 Test Procedure

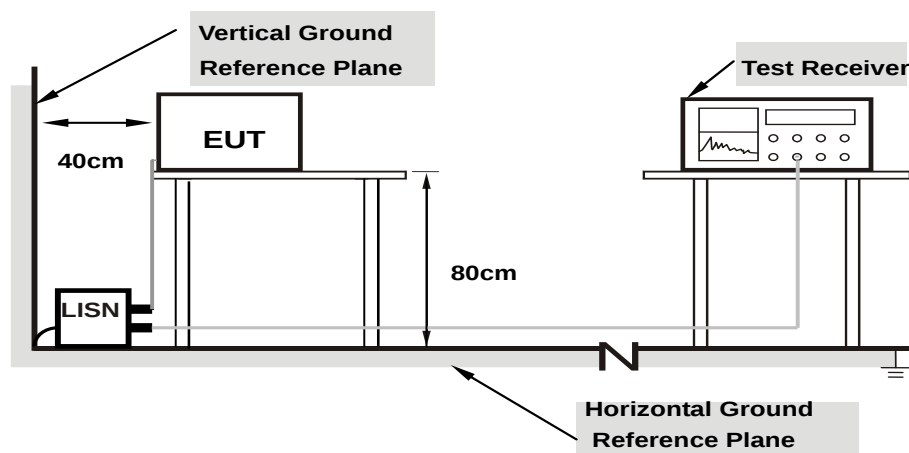
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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.

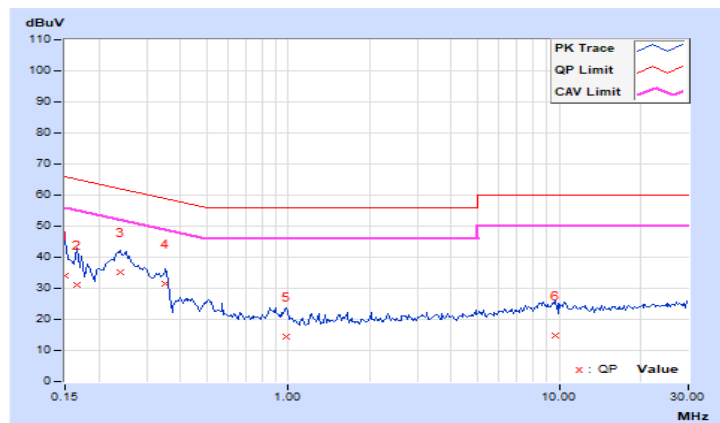
4.2.7 Test Results

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	0.15000	9.99	24.06	0.65	34.05	10.64	66.00	56.00	-31.95	-45.36
2	0.16562	9.99	21.10	-3.51	31.09	6.48	65.18	55.18	-34.09	-48.70
3	0.23984	9.99	25.25	0.45	35.24	10.44	62.10	52.10	-26.86	-41.66
4	0.35313	10.00	21.46	-2.74	31.46	7.26	58.89	48.89	-27.43	-41.63
5	0.97813	10.05	4.51	-10.37	14.56	-0.32	56.00	46.00	-41.44	-46.32
6	9.71094	10.63	4.00	-11.46	14.63	-0.83	60.00	50.00	-45.37	-50.83

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

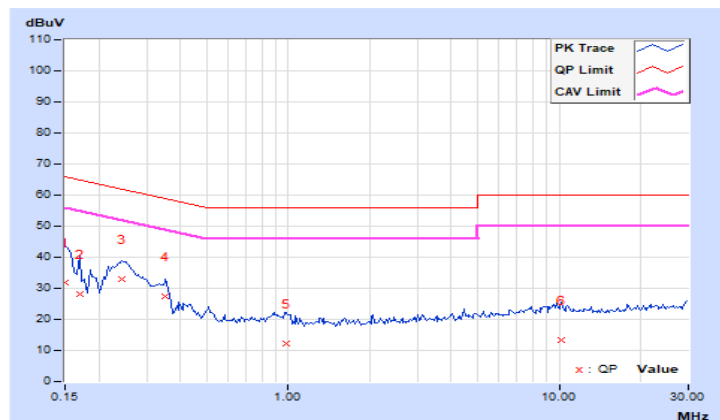


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.99	21.91	0.29	31.90	10.28	66.00	56.00	-34.10	-45.72
2	0.16953	9.99	18.22	-5.09	28.21	4.90	64.98	54.98	-36.77	-50.08
3	0.24375	9.99	23.04	-1.51	33.03	8.48	61.97	51.97	-28.94	-43.49
4	0.35313	10.01	17.25	-6.08	27.26	3.93	58.89	48.89	-31.63	-44.96
5	0.97813	10.05	2.05	-10.63	12.10	-0.58	56.00	46.00	-43.90	-46.58
6	10.19531	10.59	2.92	-11.25	13.51	-0.66	60.00	50.00	-46.49	-50.66

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



4.3 Transmit Power 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)
		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 $N_{ANT} \leq 4$;

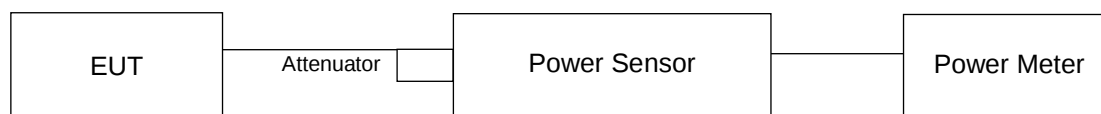
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

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

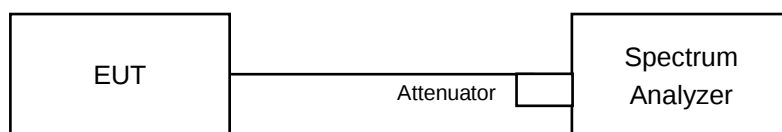
For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

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	15.90	15.89	16.21	16.59	165.107	22.18	24.00	Pass
60	5300	15.81	15.93	16.13	16.59	163.905	22.15	24.00	Pass
64	5320	15.92	15.98	15.94	16.59	163.58	22.14	24.00	Pass
100	5500	16.59	16.71	16.70	17.20	191.74	22.83	24.00	Pass
116	5580	16.74	16.45	16.70	17.03	188.603	22.76	24.00	Pass
140	5700	16.68	16.87	16.88	16.32	186.808	22.71	24.00	Pass

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	21.70	21.76	21.77	21.82
60	5300	21.69	21.84	21.88	21.80
64	5320	21.84	21.68	21.78	21.72
100	5500	21.61	21.65	21.78	21.71
116	5580	21.73	21.69	21.76	21.65
140	5700	21.73	21.68	21.72	21.75

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	21.70	24.36 > 24
60	5300	21.69	24.36 > 24
64	5320	21.68	24.36 > 24
100	5500	21.61	24.34 > 24
116	5580	21.65	24.35 > 24
140	5700	21.68	24.36 > 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	15.93	16.33	15.92	16.39	164.763	22.17	24.00	Pass
60	5300	16.02	16.45	16.09	16.43	168.749	22.27	24.00	Pass
64	5320	16.49	16.18	15.77	16.53	168.796	22.27	24.00	Pass
100	5500	16.52	16.50	16.96	17.22	191.925	22.83	24.00	Pass
116	5580	16.59	16.54	16.86	17.19	191.575	22.82	24.00	Pass
140	5700	16.71	16.92	16.99	16.06	186.453	22.71	24.00	Pass

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	21.99	22.10	21.80	21.94
60	5300	21.90	22.00	22.05	22.07
64	5320	21.94	22.03	22.14	22.04
100	5500	21.99	22.01	21.94	21.90
116	5580	22.08	22.04	21.91	21.78
140	5700	22.03	21.97	21.86	22.07

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	21.80	24.38 > 24
60	5300	21.90	24.4 > 24
64	5320	21.94	24.41 > 24
100	5500	21.90	24.4 > 24
116	5580	21.78	24.38 > 24
140	5700	21.86	24.39 > 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	17.74	17.76	17.73	18.24	245.107	23.89	24.00	Pass
62	5310	17.10	17.26	17.03	17.85	215.917	23.34	24.00	Pass
102	5510	17.79	17.80	17.86	18.37	250.174	23.98	24.00	Pass
110	5550	17.71	17.76	18.05	18.34	250.784	23.99	24.00	Pass
134	5670	17.50	17.67	18.14	18.29	247.329	23.93	24.00	Pass

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
54	5270	41.73	41.70	41.91	46.69
62	5310	41.85	41.48	42.06	41.85
102	5510	42.81	49.30	41.70	41.72
110	5550	41.55	41.90	41.81	41.73
134	5670	41.67	41.68	50.97	62.03

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	41.70	27.2 > 24
62	5310	41.48	27.17 > 24
102	5510	41.70	27.2 > 24
110	5550	41.55	27.18 > 24
134	5670	41.67	27.19 > 24

802.11ac (VHT80)

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				
58	5290	15.45	15.22	15.95	16.12	148.622	21.72	24.00	Pass
106	5530	14.99	14.55	15.34	15.46	129.414	21.12	24.00	Pass
122	5610	17.57	17.22	17.91	18.22	238.047	23.77	24.00	Pass

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
58	5290	83.94	82.95	83.37	83.31
106	5530	83.33	83.41	83.51	82.86
122	5610	83.25	83.18	83.46	90.39

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	82.95	30.18 > 24
106	5530	82.86	30.18 > 24
122	5610	83.18	30.2 > 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	15.93	16.33	15.92	16.39	164.763	22.17	22.30	Pass
60	5300	16.02	16.45	16.09	16.43	168.749	22.27	22.30	Pass
64	5320	16.49	16.18	15.77	16.53	168.796	22.27	22.30	Pass
100	5500	16.52	16.50	16.96	17.22	191.925	22.83	22.85	Pass
116	5580	16.59	16.54	16.86	17.19	191.575	22.82	22.85	Pass
140	5700	16.71	16.92	16.99	16.06	186.453	22.71	22.85	Pass

- Note: 1. For U-NII-2A: The directional gain = 7.7dBi > 6dBi, so the power limit shall be reduced to $24 - (7.7 - 6) = 22.30\text{dBm}$.
2. For U-NII-2C: The directional gain = 7.15dBi > 6dBi, so the power limit shall be reduced to $24 - (7.15 - 6) = 22.85\text{dBm}$.

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	21.99	22.10	21.80	21.94
60	5300	21.90	22.00	22.05	22.07
64	5320	21.94	22.03	22.14	22.04
100	5500	21.99	22.01	21.94	21.90
116	5580	22.08	22.04	21.91	21.78
140	5700	22.03	21.97	21.86	22.07

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	21.80	$24.38 > 24$
60	5300	21.90	$24.4 > 24$
64	5320	21.94	$24.41 > 24$
100	5500	21.90	$24.4 > 24$
116	5580	21.78	$24.38 > 24$
140	5700	21.86	$24.39 > 24$

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	16.03	16.05	16.01	16.53	165.239	22.18	22.30	Pass
62	5310	16.05	16.21	15.98	16.80	169.546	22.29	22.30	Pass
102	5510	16.54	16.55	16.61	17.12	187.605	22.73	22.85	Pass
110	5550	16.46	16.51	16.80	17.09	188.061	22.74	22.85	Pass
134	5670	16.25	16.42	16.89	17.05	185.587	22.69	22.85	Pass

Note: 1. For U-NII-2A: The directional gain = 7.7dBi > 6dBi, so the power limit shall be reduced to $24 - (7.7 - 6) = 22.30\text{dBm}$.
 2. For U-NII-2C: The directional gain = 7.15dBi > 6dBi, so the power limit shall be reduced to $24 - (7.15 - 6) = 22.85\text{dBm}$.

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
54	5270	41.73	41.70	41.91	46.69
62	5310	41.85	41.48	42.06	41.85
102	5510	42.81	49.30	41.70	41.72
110	5550	41.55	41.90	41.81	41.73
134	5670	41.67	41.68	50.97	62.03

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	41.70	$27.2 > 24$
62	5310	41.48	$27.17 > 24$
102	5510	41.70	$27.2 > 24$
110	5550	41.55	$27.18 > 24$
134	5670	41.67	$27.19 > 24$

802.11ac (VHT80)

Power Output:

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1						
58	5290	15.45	15.22	15.95	16.12	148.622	21.72	22.30	Pass
106	5530	14.99	14.55	15.34	15.46	129.414	21.12	22.85	Pass
122	5610	16.57	16.22	16.91	17.22	189.087	22.77	22.85	Pass

Note: 1. For U-NII-2A: The directional gain = 7.7dBi > 6dBi, so the power limit shall be reduced to $24-(7.7-6) = 22.30\text{dBm}$.
2. For U-NII-2C: The directional gain = 7.15dBi > 6dBi, so the power limit shall be reduced to $24-(7.15-6) = 22.85\text{dBm}$.

26dB OCCUPIED BANDWIDTH

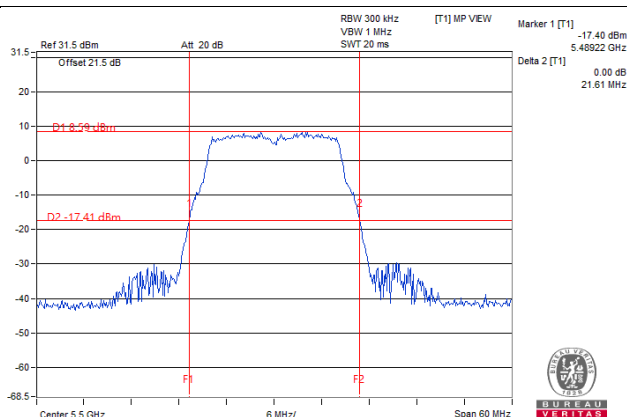
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
58	5290	83.94	82.95	83.37	83.31
106	5530	83.33	83.41	83.51	82.86
122	5610	83.25	83.18	83.46	90.39

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

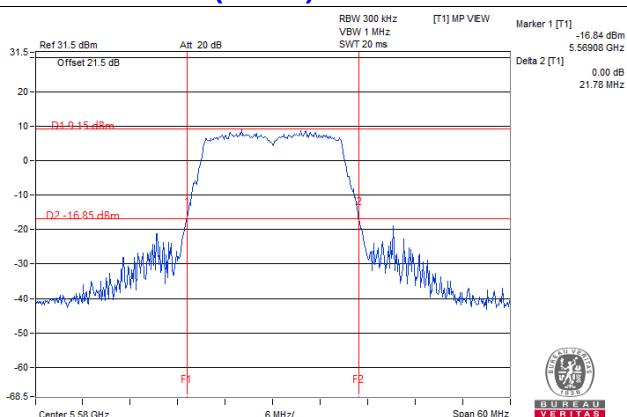
Power Limit = $11\text{dBm} + 10\log B < \text{U-NII-2A, U-NII-2C} >$			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	82.95	$30.18 > 24$
106	5530	82.86	$30.18 > 24$
122	5610	83.18	$30.2 > 24$

Spectrum Plot of Worst Value

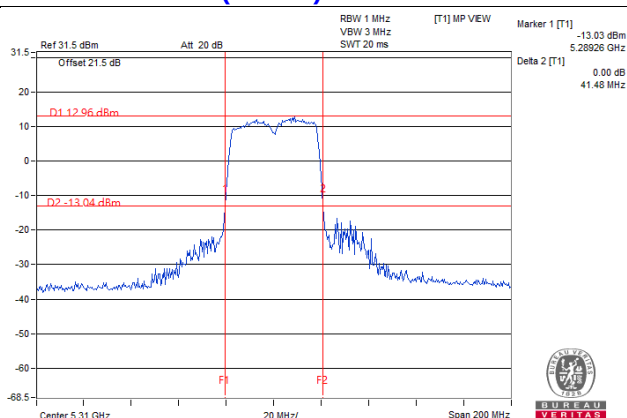
802.11a / Chain 0 : CH100



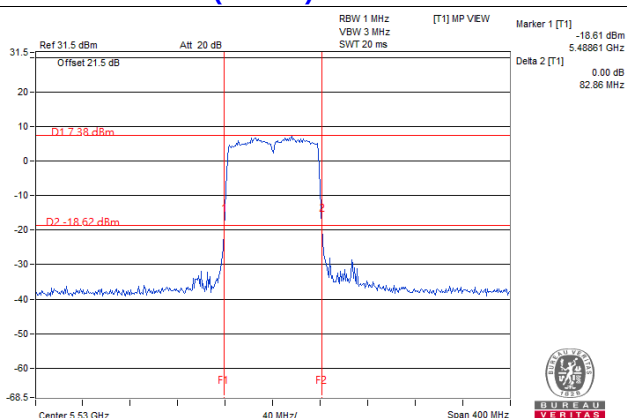
802.11ac (VHT20) / Chain 3 : CH116



802.11ac (VHT40) / Chain 1 : CH62



802.11ac (VHT80) / Chain 3 : CH106



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	17.04	16.92	16.92	17.04
60	5300	17.04	17.04	16.92	16.92
64	5320	16.92	17.04	17.04	17.04
100	5500	16.92	17.04	17.04	16.92
116	5580	17.16	16.92	16.80	16.92
140	5700	16.92	17.04	16.92	16.92

802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	18.12	18.00	18.12	18.12
60	5300	18.00	18.00	18.12	18.12
64	5320	18.00	18.00	18.00	18.12
100	5500	18.00	18.00	18.00	18.12
116	5580	18.12	18.12	18.12	18.12
140	5700	18.00	17.88	18.00	18.00

802.11ac (VHT40)

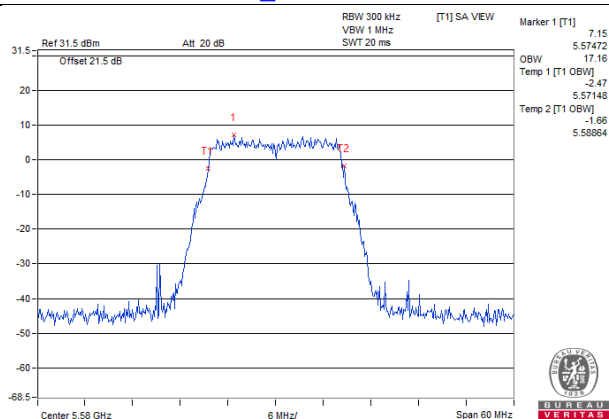
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
54	5270	36.60	36.60	36.80	36.60
62	5310	36.60	36.40	36.80	36.60
102	5510	36.60	37.00	36.60	36.60
110	5550	36.72	36.72	36.72	36.72
134	5670	36.72	36.72	36.72	36.48

802.11ac (VHT80)

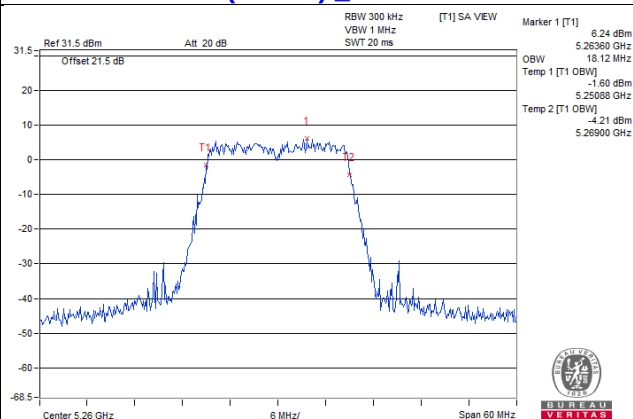
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
58	5290	76.32	76.32	76.32	76.32
106	5530	75.36	75.84	75.84	76.32
122	5610	75.84	75.84	76.32	75.84

Spectrum Plot of Max. Value

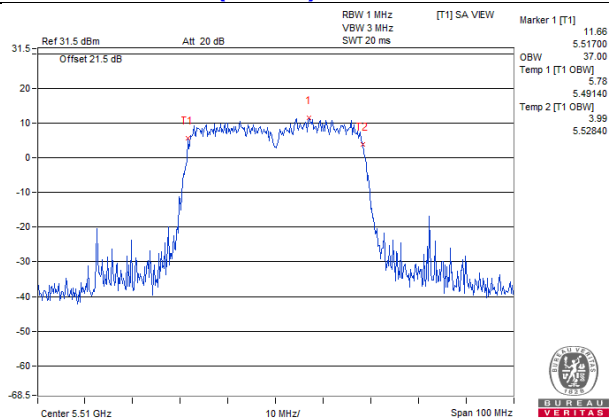
802.11a_Chain 0 / CH116



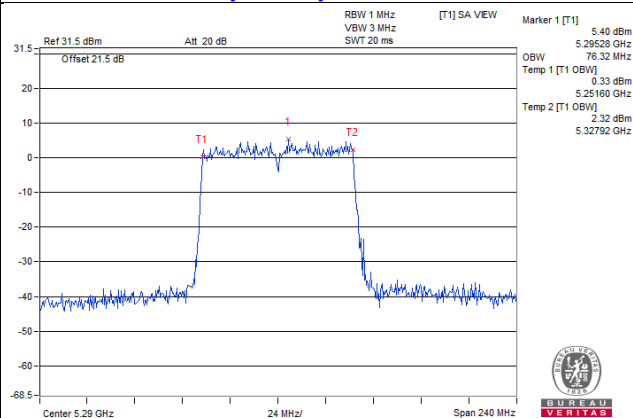
802.11ac (VHT20)_Chain 0 / CH52



802.11ac (VHT40)_Chain 1 / CH102



802.11ac (VHT80)_Chain 0 / CH58

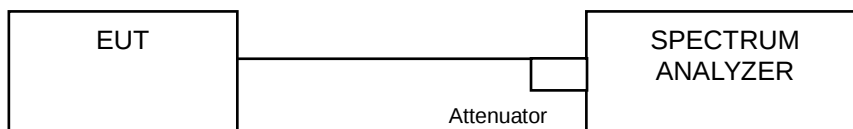


4.5 Peak Power Spectral Density Measurement

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	
		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

For U-NII-2A, U-NII-2C band:

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)

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

For U-NII-2A, U-NII-2C:

802.11a

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
52	5260	2.22	2.62	2.62	2.84	0.10	8.70	9.30	Pass
60	5300	2.55	2.55	2.59	3.11	0.10	8.83	9.30	Pass
64	5320	2.56	2.55	2.70	3.12	0.10	8.86	9.30	Pass
100	5500	3.06	3.32	3.41	3.72	0.10	9.50	9.85	Pass
116	5580	3.05	2.98	3.17	3.46	0.10	9.29	9.85	Pass
140	5700	3.08	3.13	3.46	2.96	0.10	9.28	9.85	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. For U-NII-2A: The directional gain = 7.7dBi > 6dBi, so the power density limit shall be reduced to 11-(7.7-6) = 9.30dBm
For U-NII-2C: The directional gain = 7.15dBi > 6dBi, so the power density limit shall be reduced to 11-(7.15-6) = 9.85dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
52	5260	1.97	2.42	2.28	2.48	0.11	8.42	9.30	Pass
60	5300	2.33	2.64	2.18	2.63	0.11	8.58	9.30	Pass
64	5320	2.74	2.36	2.28	2.98	0.11	8.73	9.30	Pass
100	5500	2.58	2.56	3.18	3.45	0.11	9.09	9.85	Pass
116	5580	2.49	2.67	3.12	3.25	0.11	9.02	9.85	Pass
140	5700	2.80	3.57	3.08	2.75	0.11	9.19	9.85	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. For U-NII-2A: The directional gain = 7.7dBi > 6dBi, so the power density limit shall be reduced to 11-(7.7-6) = 9.30dBm
For U-NII-2C: The directional gain = 7.15dBi > 6dBi, so the power density limit shall be reduced to 11-(7.15-6) = 9.85dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
54	5270	1.05	0.92	0.73	0.93	0.14	7.07	9.30	Pass
62	5310	0.79	0.73	0.43	0.95	0.14	6.89	9.30	Pass
102	5510	1.06	1.34	1.21	1.56	0.14	7.46	9.85	Pass
110	5550	1.07	0.84	1.20	1.55	0.14	7.33	9.85	Pass
134	5670	0.69	0.88	1.06	1.58	0.14	7.23	9.85	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. For U-NII-2A: The directional gain = 7.7dBi > 6dBi, so the power density limit shall be reduced to $11-(7.7-6) = 9.30\text{dBm}$
For U-NII-2C: The directional gain = 7.15dBi > 6dBi, so the power density limit shall be reduced to $11-(7.15-6) = 9.85\text{dBm}$.
 3. Refer to section 3.3 for duty cycle spectrum plot.

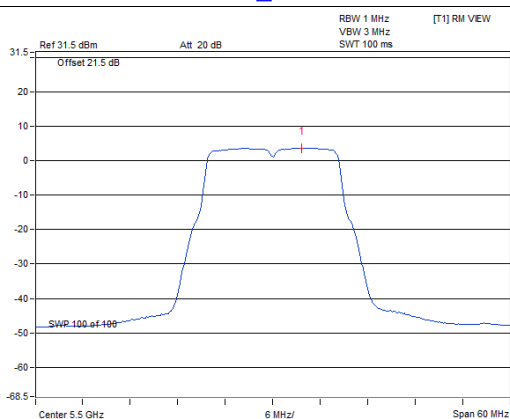
802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
58	5290	-3.43	-3.77	-3.64	-3.34	0.28	2.76	9.30	Pass
106	5530	-4.04	-5.06	-4.29	-4.39	0.28	1.87	9.85	Pass
122	5610	-2.57	-2.60	-2.09	-1.88	0.28	4.03	9.85	Pass

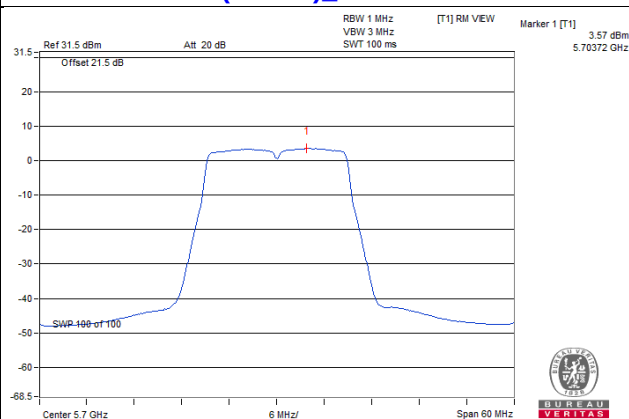
- Note:**
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
 2. For U-NII-2A: The directional gain = 7.7dBi > 6dBi, so the power density limit shall be reduced to $11-(7.7-6) = 9.30\text{dBm}$
For U-NII-2C: The directional gain = 7.15dBi > 6dBi, so the power density limit shall be reduced to $11-(7.15-6) = 9.85\text{dBm}$.
 3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

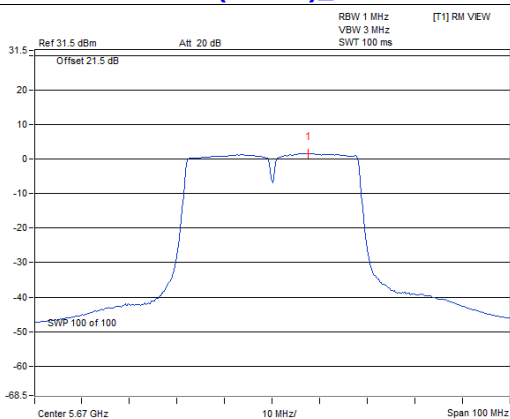
802.11a_Chain 3 / CH100



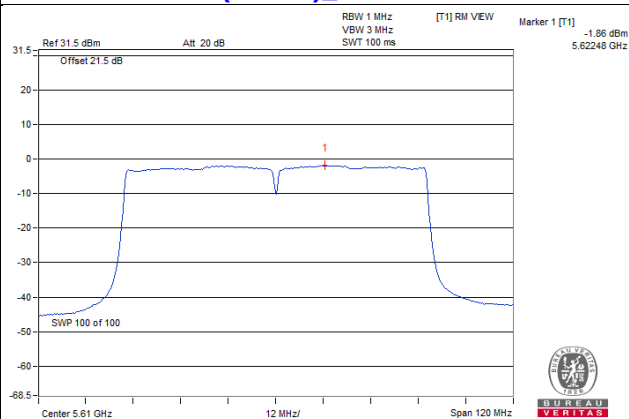
802.11ac (VHT20)_Chain 1 / CH140



802.11ac (VHT40)_Chain 3 / CH134



802.11ac (VHT80)_Chain 3 / CH122

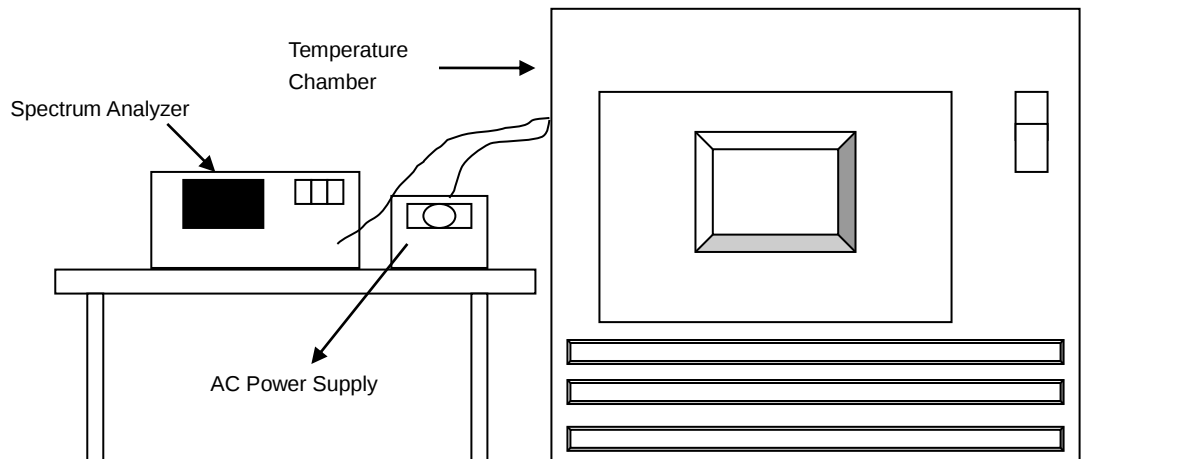


4.6 Frequency Stability Measurement

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 (d) with the temperature chamber set to the next desired temperature until measurements down to the lowest specified temperature have been completed.
- 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 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
40	120	5260.0127	PASS	5260.0157	PASS	5260.0148	PASS	5260.0127	PASS
30	120	5259.981	PASS	5259.9813	PASS	5259.9816	PASS	5259.9822	PASS
20	120	5260.0178	PASS	5260.0192	PASS	5260.0174	PASS	5260.0164	PASS
10	120	5260.0236	PASS	5260.0233	PASS	5260.0238	PASS	5260.0211	PASS
0	120	5259.976	PASS	5259.9748	PASS	5259.9787	PASS	5259.9746	PASS

Frequency Stability Versus Voltage									
Operating Frequency: 5260 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5260.0168	PASS	5260.019	PASS	5260.0175	PASS	5260.0172	PASS
	120	5260.0178	PASS	5260.0192	PASS	5260.0174	PASS	5260.0164	PASS
	102	5260.0172	PASS	5260.019	PASS	5260.0165	PASS	5260.0157	PASS

5 Pictures of Test Arrangements

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

Appendix – Information of 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 FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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

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Email: service.adt@tw.bureauveritas.com

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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