FCC Test Report

Report No.:	RF180830E03-1
FCC ID:	2APLE18300394
Test Model:	VMB5000
Received Date:	Sep. 04, 2018
Test Date:	Sep. 08 to Oct. 13, 2018
Issued Date:	Nov. 01, 2018
Applicant:	Arlo Technologies, Inc.
Address:	2200 Faraday Ave. Suite 150, Carlsbad, CA 92008, United States
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
RF180830E03-1	Original release.	Nov. 01, 2018

1 Certificate of Conformity

Product:	Alro Gen5 Entry Hub
Brand:	Arlo
Test Model:	VMB5000
Sample Status:	ENGINEERING SAMPLE
Applicant:	Arlo Technologies, Inc.
Test Date:	Sep. 08 to Oct. 13, 2018
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 : Phoenix Huang , **Date:** Nov. 01, 2018

Phoenix Huang / Specialist

Approved by : , **Date:** Nov. 01, 2018

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 -13.19dB at 0.15000MHz.
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 5150.00MHz and 5136.00MHz.
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(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex not a standard connector.

*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.

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	5.53 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.08 dB
	6GHz ~ 18GHz	4.98 dB
	18GHz ~ 40GHz	5.19 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (WLAN)

Product	Alro Gen5 Entry Hub
Brand	Arlo
Test Model	VMB5000
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	**2.412 ~ 2.462GHz:** 508.821mW **5.18 ~ 5.24GHz:** 571.179mW **5.745 ~ 5.825GHz:** 490.624mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x1
Data Cable Supplied	NA

Note:

1. There are WLAN, Z-Wave, Zigbee and Sub-GHz technology used for the EUT. The EUT has below radios as following table:

Radio 1	Radio 2	Radio 3	Radio 4
WLAN (2.4GHz+5GHz band)	Z-Wave	Zigbee	Sub-GHz

2. Simultaneously transmission condition.

Condition	Technology				
1	WLAN 2.4GHz	WLAN 5GHz	Z-Wave	Zigbee	Sub-GHz
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.					

3. The EUT must be supplied with a power adapter and following different models could be chosen as following table:

No.	Brand	Model No.	P/N No.	Spec.
1	NETGEAR	AD2076F10	332-10993-01	Input: 100-120Vac, 0.56A, 50/60Hz Output: 12Vdc, 1.5A DC output cable (Unshielded, 1.8m)
2	NETGEAR	AD2067M20	332-11074-01	Input: 100-240Vac, 1.0A, 50/60Hz Output: 12Vdc, 2.5A DC output cable (Unshielded, 1.8m)
3	NETGEAR	2ABB018F 1 NJ	332-10927-01	Input: 100-120Vac, 0.6A, 50/60Hz Output: 12Vdc, 1.5A DC output cable (Unshielded, 1.8m)
4	NETGEAR	P030WM120B	332-10345-02	Input: 100-240Vac, 1.0A, 50/60Hz Output: 12Vdc, 2.5A DC output cable (Unshielded, 1.8m)
Note: From the above models, the worst radiated emission and AC power conducted emission test was found in **Adapter 2**. Therefore only the test data of the modes were recorded in this report.				

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

Sub-GHz

Ant No.	Brand	Model	Antenna Gain (dBi)	Frequency rang (MHz)	Antenna type	Connector type
1	NA	902P00214N0	1.5	860~930	PIFA	NA

Z-Wave

Ant No.	Brand	Model	Antenna Gain (dBi)	Frequency rang (MHz)	Antenna type	Connector type
1	NA	902P00213N0	2.5	860~930	PIFA	NA

Zigbee

Ant No.	Brand	Model	Antenna Gain (dBi)	Frequency rang (GHz)	Antenna type	Connector type
1	INPAQ TECHNOLOGY CO., LTD.	ACA-5036-A2-CC-S	3.5	2.4~2.4835	CHIP	NA

WLAN

Ant No.	Brand	Model	Antenna Net Gain (dBi)	Frequency rang (GHz)	Antenna type	Connector type	Cable Length (mm)
1	NA	9 07X01052X0	2.5	2.4~2.4835	Dipole	i-pex	75
			1.8	5.15~5.25			
			2	5.25~5.35			
			2.2	5.47~5.725			
			1.6	5.725~5.85			
2	NA	9 07X00747X19	2.5	2.4~2.4835	Dipole	i-pex	90
			2.2	5.15~5.25			
			1.2	5.25~5.35			
			3.2	5.47~5.725			
			3.5	5.725~5.85			

5. The EUT incorporates a MIMO function.

2.4GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11b	1 ~ 11Mbps	2TX	2RX
802.11g	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
5GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11ac (VHT20)	MCS0~8 Nss=1	2TX	2RX
	MCS0~8 Nss=2	2TX	2RX
802.11ac (VHT40)	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX
802.11ac (VHT80)	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX

Note:
1. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

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

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210 MHz

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
1	√	√	√	√	-

Where **RE≥1G:** Radiated Emission above 1GHz **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.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	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.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5180-5240, 5745-5825	36 to 48, 149 to 165	40	OFDM	BPSK	6.5

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.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5180-5240, 5745-5825	36 to 48, 149 to 165	40	OFDM	BPSK	6.5

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.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

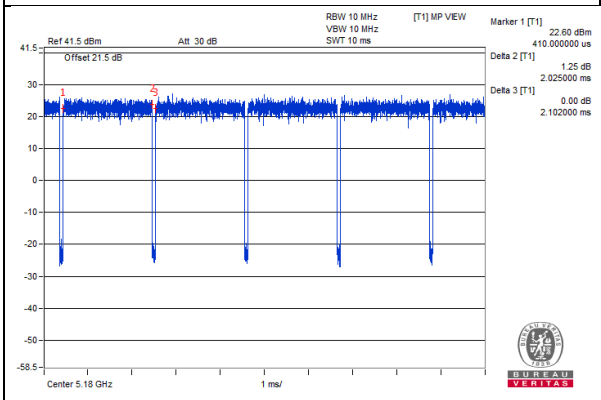
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	24deg. C, 63%RH	120Vac, 60Hz	Andy Ho
	21deg. C, 66%RH	120Vac, 60Hz	Andy Ho
RE<1G	23deg. C, 68%RH	120Vac, 60Hz	Andy Ho
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

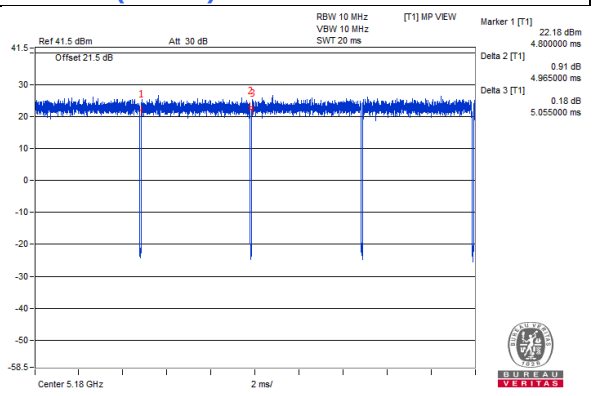
3.3 Duty Cycle of Test Signal

If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.
802.11a: Duty cycle = Duty cycle = 2.025 ms/2.102 ms = 0.963, Duty factor = 10 * log (1/Duty cycle) = 0.16
802.11ac (VHT20): Duty cycle = 4.965 ms/5.055 ms = 0.982
802.11ac (VHT40): Duty cycle = 2.415 ms/2.502 ms = 0.965, Duty factor = 10 * log (1/Duty cycle) = 0.15
802.11ac (VHT80): Duty cycle = 1.135 ms/1.215 ms = 0.934, Duty factor = 10 * log (1/Duty cycle) = 0.3

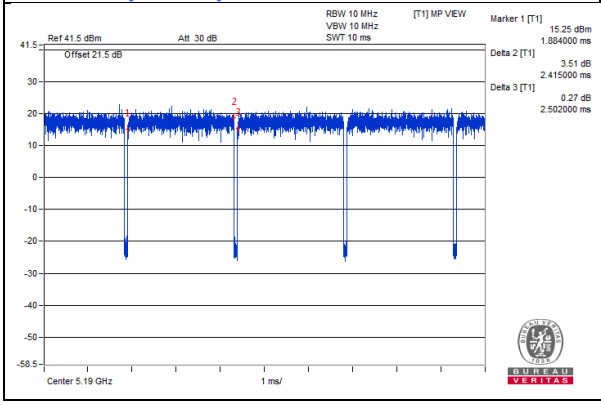
802.11a



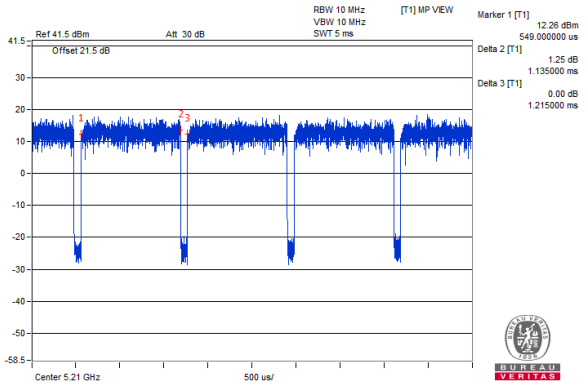
802.11ac (VHT20)



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.

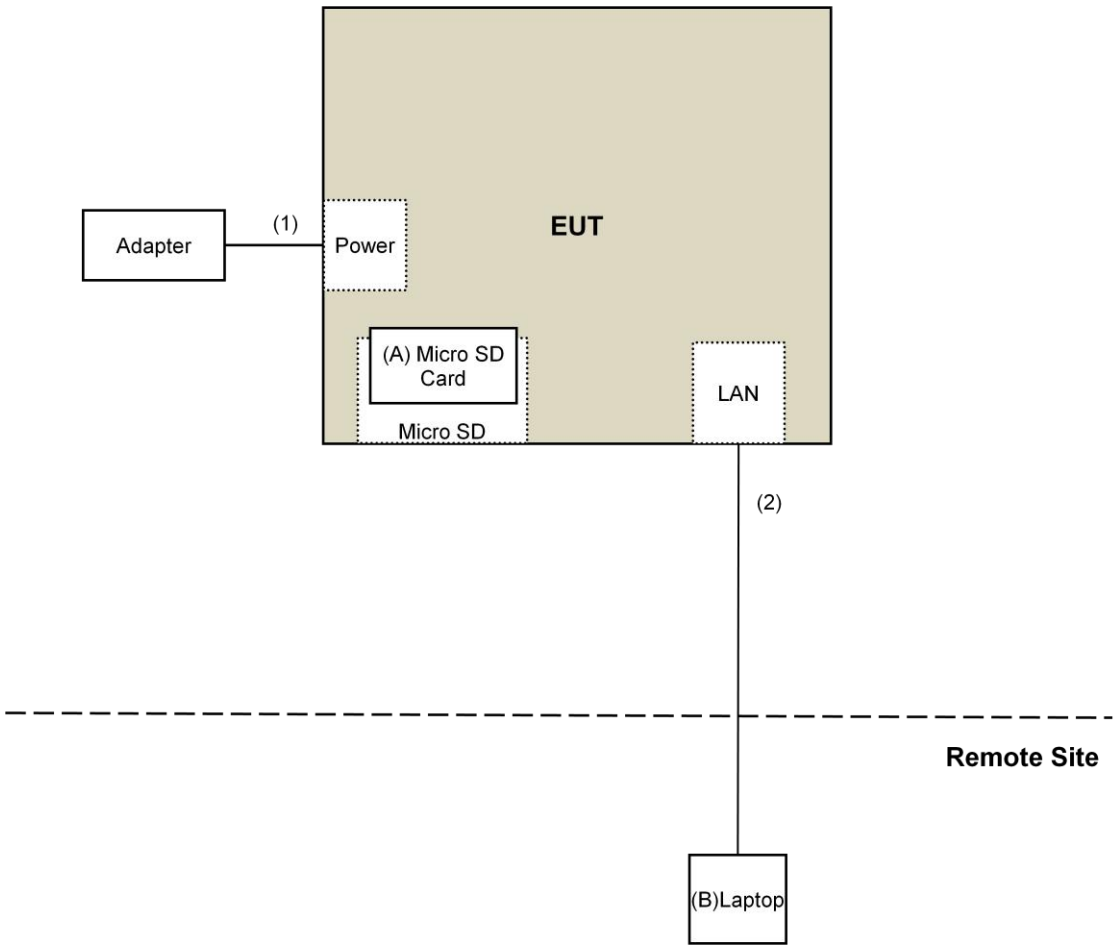
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	MicroSD Card	SanDisk	8GB	NA	NA	Provided by Lab
B.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab

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	1.8	No	0	Supplied by client
2.	RJ-45 Cable	1	10	No	0	Provided by Lab

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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

FCC Part 15, Subpart E (15.407)
KDB 789033 D02 General UNII Test Procedure New Rules v02r01
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

Limits of unwanted emission out of the restricted bands

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

Note:

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

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

4.1.2 Test Instruments

For OOBE test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	July 12, 2018	July 11, 2019
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-1200	160922	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-2000	150317	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-5000	150322	Jan. 29, 2018	Jan. 28, 2019
Spectrum Analyzer Keysight	N9030A	MY54490679	July 23, 2018	July 22, 2019
Pre-Amplifier EMCI	EMC184045SE	980386	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	EMC102-KM-KM-1200	160924	Jan. 29, 2018	Jan. 28, 2019
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

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. Tested Date: Sep. 08, 2018

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	July 12, 2018	July 11, 2019
Pre-Amplifier EMCI	EMC001340	980142	Feb. 09, 2018	Feb. 08, 2019
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001	Jan. 15, 2018	Jan. 14, 2019
RF Cable	NA	LOOPCAB-002	Jan. 15, 2018	Jan. 14, 2019
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 05, 2018	May 04, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-3-1	Mar. 20, 2018	Mar. 19, 2019
RF Cable	8D	966-3-2	Mar. 20, 2018	Mar. 19, 2019
RF Cable	8D	966-3-3	Mar. 20, 2018	Mar. 19, 2019
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 27, 2018	Sep. 26, 2019
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-1200	160922	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-2000	150317	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-5000	150322	Jan. 29, 2018	Jan. 28, 2019
Spectrum Analyzer Keysight	N9030A	MY54490679	July 23, 2018	July 22, 2019
Pre-Amplifier EMCI	EMC184045SE	980386	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	EMC102-KM-KM-1200	160924	Jan. 29, 2018	Jan. 28, 2019
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 R&S	FSV40	100964	June 20, 2018	June 19, 2019
Power meter Anritsu	ML2495A	1014008	May 09, 2018	May 08, 2019
Power sensor Anritsu	MA2411B	0917122	May 09, 2018	May 08, 2019
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 10, 2018	Jan. 09, 2019
True RMS Clamp Meter FLUKE	325	31130711WS	May 22, 2018	May 21, 2019

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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 3.
4. The CANADA Site Registration No. is 20331-1
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: Sep. 27 to Oct. 13, 2018

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:

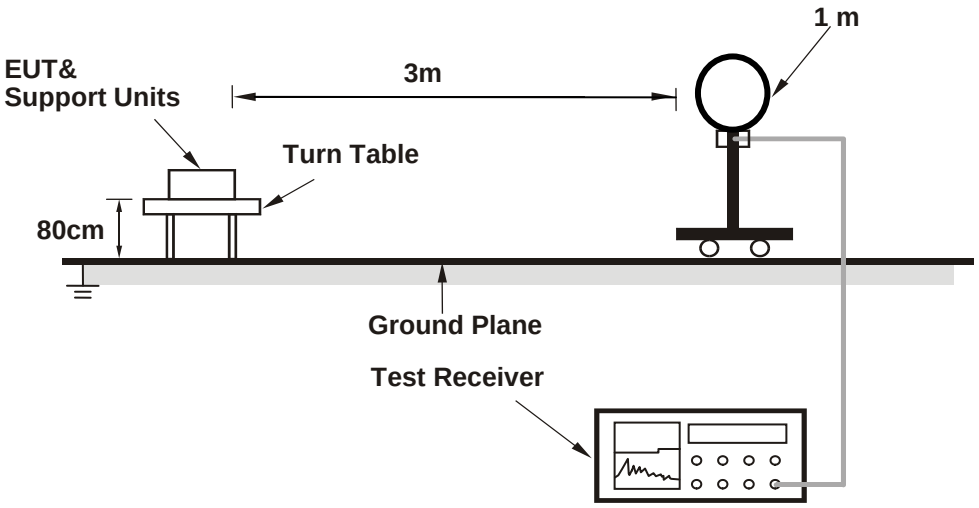
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

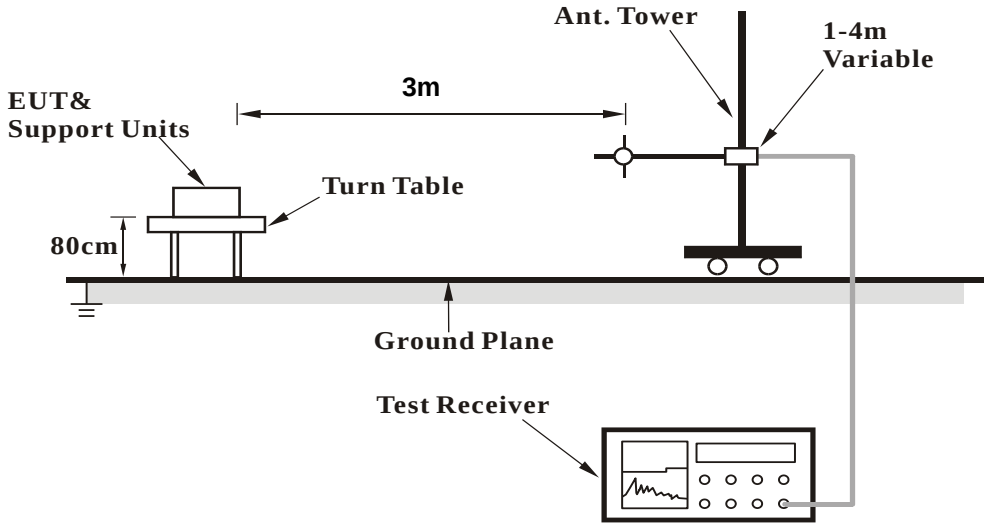
No deviation.

4.1.5 Test Setup

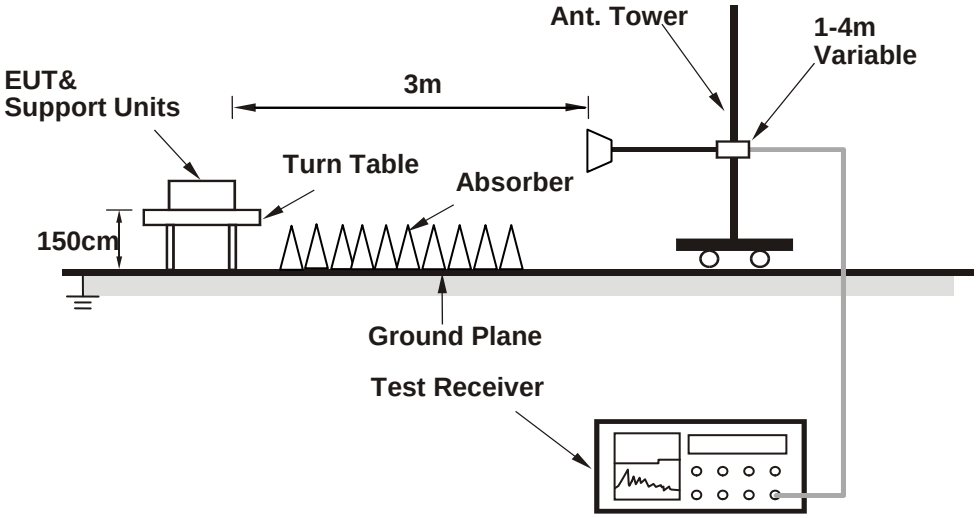
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

a. Connected the EUT with the Laptop which is placed on remote site.
b. Controlling software (QDART-Connectivity100040.exe) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data:

802.11a

CHANNEL	TX Channel 36	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	5148.30	70.4 PK	74.0	-3.6	1.06 H	312	67.8	2.6
2	5148.30	51.5 AV	54.0	-2.5	1.06 H	312	48.9	2.6
3	5150.00	67.9 PK	74.0	-6.1	1.06 H	312	65.3	2.6
4	5150.00	52.2 AV	54.0	-1.8	1.06 H	312	49.6	2.6
5	*5180.00	111.6 PK			1.06 H	312	109.1	2.5
6	*5180.00	100.8 AV			1.06 H	312	98.3	2.5
7	#10360.00	53.9 PK	68.2	-14.3	1.51 H	297	42.0	11.9
8	15540.00	53.5 PK	74.0	-20.5	1.63 H	304	41.1	12.4
9	15540.00	41.4 AV	54.0	-12.6	1.63 H	304	29.0	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	5148.30	73.1 PK	74.0	-0.9	2.74 V	22	70.5	2.6
2	5148.30	53.7 AV	54.0	-0.3	2.74 V	22	51.1	2.6
3	5150.00	63.2 PK	74.0	-10.8	2.74 V	22	60.6	2.6
4	5150.00	52.0 AV	54.0	-2.0	2.74 V	22	49.4	2.6
5	*5180.00	117.8 PK			2.74 V	22	115.3	2.5
6	*5180.00	107.8 AV			2.74 V	22	105.3	2.5
7	#10360.00	49.7 PK	68.2	-18.5	1.99 V	103	37.8	11.9
8	15540.00	56.0 PK	74.0	-18.0	1.41 V	232	43.6	12.4
9	15540.00	42.6 AV	54.0	-11.4	1.41 V	232	30.2	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. 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 40	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	64.7 PK	74.0	-9.3	1.10 H	308	62.1	2.6
2	5150.00	48.1 AV	54.0	-5.9	1.10 H	308	45.5	2.6
3	*5200.00	113.9 PK			1.10 H	308	111.5	2.4
4	*5200.00	103.0 AV			1.10 H	308	100.6	2.4
5	#6933.33	60.1 PK	68.2	-8.1	1.10 H	308	53.5	6.6
6	#10400.00	53.7 PK	68.2	-14.5	1.56 H	291	41.5	12.2
7	15600.00	53.9 PK	74.0	-20.1	1.63 H	311	41.0	12.9
8	15600.00	41.7 AV	54.0	-12.3	1.63 H	311	28.8	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	5150.00	67.4 PK	74.0	-6.6	2.65 V	16	64.8	2.6
2	5150.00	50.3 AV	54.0	-3.7	2.65 V	16	47.7	2.6
3	*5200.00	120.1 PK			2.65 V	16	117.7	2.4
4	*5200.00	110.0 AV			2.65 V	16	107.6	2.4
5	#6933.33	62.7 PK	68.2	-5.5	2.51 V	165	56.1	6.6
6	#10400.00	49.9 PK	68.2	-18.3	2.01 V	116	37.7	12.2
7	15600.00	55.9 PK	74.0	-18.1	1.43 V	234	43.0	12.9
8	15600.00	42.2 AV	54.0	-11.8	1.43 V	234	29.3	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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	112.8 PK			1.02 H	313	110.6	2.2
2	*5240.00	101.7 AV			1.02 H	313	99.5	2.2
3	5350.00	49.1 PK	74.0	-24.9	1.02 H	313	46.8	2.3
4	5350.00	38.2 AV	54.0	-15.8	1.02 H	313	35.9	2.3
5	#10480.00	53.9 PK	68.2	-14.3	1.54 H	277	41.5	12.4
6	15720.00	53.9 PK	74.0	-20.1	1.59 H	324	41.9	12.0
7	15720.00	41.6 AV	54.0	-12.4	1.59 H	324	29.6	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	*5240.00	119.0 PK			2.36 V	248	116.8	2.2
2	*5240.00	108.7 AV			2.36 V	248	106.5	2.2
3	5350.00	51.8 PK	74.0	-22.2	2.36 V	248	49.5	2.3
4	5350.00	40.4 AV	54.0	-13.6	2.36 V	248	38.1	2.3
5	#10480.00	50.4 PK	68.2	-17.8	1.96 V	118	38.0	12.4
6	15720.00	56.0 PK	74.0	-18.0	1.42 V	245	44.0	12.0
7	15720.00	42.3 AV	54.0	-11.7	1.42 V	245	30.3	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. 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 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5585.61	56.5 PK	68.2	-11.7	1.14 H	28	53.7	2.8
2	*5745.00	106.4 PK			1.14 H	28	103.5	2.9
3	*5745.00	96.5 AV			1.14 H	28	93.6	2.9
4	#5966.06	56.1 PK	68.2	-12.1	1.14 H	28	52.8	3.3
5	7660.00	53.6 PK	74.0	-20.4	1.14 H	28	45.8	7.8
6	7660.00	43.9 AV	54.0	-10.1	1.14 H	28	36.1	7.8
7	11490.00	51.1 PK	74.0	-22.9	1.53 H	61	38.8	12.3
8	11490.00	38.3 AV	54.0	-15.7	1.53 H	61	26.0	12.3
9	#17235.00	62.1 PK	68.2	-6.1	1.60 H	221	46.8	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	#5602.65	57.9 PK	68.2	-10.3	2.06 V	175	55.1	2.8
2	*5745.00	119.6 PK			2.06 V	175	116.7	2.9
3	*5745.00	109.7 AV			2.06 V	175	106.8	2.9
4	#5975.62	57.2 PK	68.2	-11.0	2.06 V	175	54.0	3.2
5	7660.00	56.3 PK	74.0	-17.7	2.69 V	245	48.5	7.8
6	7660.00	46.1 AV	54.0	-7.9	2.69 V	245	38.3	7.8
7	11490.00	51.7 PK	74.0	-22.3	1.63 V	232	39.4	12.3
8	11490.00	38.6 AV	54.0	-15.4	1.63 V	232	26.3	12.3
9	#17235.00	64.3 PK	68.2	-3.9	1.50 V	232	49.0	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. 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 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5622.65	56.5 PK	68.2	-11.7	1.02 H	28	53.7	2.8
2	*5785.00	107.5 PK			1.02 H	26	104.4	3.1
3	*5785.00	96.6 AV			1.02 H	26	93.5	3.1
4	#5951.84	56.6 PK	68.2	-11.6	1.02 H	28	53.4	3.2
5	11570.00	53.7 PK	74.0	-20.3	1.56 H	302	41.3	12.4
6	11570.00	41.7 AV	54.0	-12.3	1.56 H	302	29.3	12.4
7	#17355.00	53.7 PK	68.2	-14.5	1.62 H	307	37.7	16.0
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	#5613.32	57.3 PK	68.2	-10.9	2.39 V	177	54.5	2.8
2	*5785.00	119.7 PK			2.39 V	177	116.6	3.1
3	*5785.00	110.1 AV			2.39 V	177	107.0	3.1
4	#6000.15	57.4 PK	68.2	-10.8	2.39 V	177	54.2	3.2
5	11570.00	49.7 PK	74.0	-24.3	2.03 V	103	37.3	12.4
6	11570.00	37.5 AV	54.0	-16.5	2.03 V	103	25.1	12.4
7	#17355.00	56.2 PK	68.2	-12.0	1.48 V	247	40.2	16.0

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5609.61	57.8 PK	68.2	-10.4	1.10 H	26	55.0	2.8
2	*5825.00	107.8 PK			1.10 H	26	104.6	3.2
3	*5825.00	96.7 AV			1.10 H	26	93.5	3.2
4	#5982.94	56.7 PK	68.2	-11.5	1.10 H	26	53.5	3.2
5	11650.00	53.5 PK	74.0	-20.5	1.52 H	297	41.1	12.4
6	11650.00	41.4 AV	54.0	-12.6	1.52 H	297	29.0	12.4
7	#17475.00	53.1 PK	68.2	-15.1	1.59 H	308	35.7	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	#5609.79	57.4 PK	68.2	-10.8	2.60 V	176	54.6	2.8
2	*5825.00	120.5 PK			2.60 V	176	117.3	3.2
3	*5825.00	110.5 AV			2.60 V	176	107.3	3.2
4	#5934.83	57.0 PK	68.2	-11.2	2.60 V	176	53.6	3.4
5	11650.00	50.0 PK	74.0	-24.0	2.01 V	125	37.6	12.4
6	11650.00	37.5 AV	54.0	-16.5	2.01 V	125	25.1	12.4
7	#17475.00	56.1 PK	68.2	-12.1	1.39 V	238	38.7	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 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.9 PK	74.0	-5.1	1.03 H	308	66.3	2.6
2	5150.00	51.7 AV	54.0	-2.3	1.03 H	308	49.1	2.6
3	*5180.00	110.7 PK			1.03 H	308	108.2	2.5
4	*5180.00	99.6 AV			1.03 H	308	97.1	2.5
5	#10360.00	53.6 PK	68.2	-14.6	1.47 H	296	41.7	11.9
6	15540.00	53.7 PK	74.0	-20.3	1.58 H	304	41.3	12.4
7	15540.00	41.9 AV	54.0	-12.1	1.58 H	304	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	5150.00	71.6 PK	74.0	-2.4	2.12 V	349	69.0	2.6
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**2.12 V**	**349**	**51.3**	**2.6**
3	*5180.00	116.9 PK			2.12 V	349	114.4	2.5
4	*5180.00	106.6 AV			2.12 V	349	104.1	2.5
5	#10360.00	50.0 PK	68.2	-18.2	1.94 V	96	38.1	11.9
6	15540.00	56.5 PK	74.0	-17.5	1.36 V	222	44.1	12.4
7	15540.00	42.8 AV	54.0	-11.2	1.36 V	222	30.4	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. 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 40	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.2 PK	74.0	-7.8	1.43 H	305	63.6	2.6
2	5150.00	48.0 AV	54.0	-6.0	1.43 H	305	45.4	2.6
3	*5200.00	113.0 PK			1.43 H	305	110.6	2.4
4	*5200.00	102.1 AV			1.43 H	305	99.7	2.4
5	#10400.00	53.7 PK	68.2	-14.5	1.60 H	282	41.5	12.2
6	15600.00	53.6 PK	74.0	-20.4	1.66 H	309	40.7	12.9
7	15600.00	41.4 AV	54.0	-12.6	1.66 H	309	28.5	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	5150.00	68.9 PK	74.0	-5.1	2.53 V	201	66.3	2.6
2	5150.00	50.2 AV	54.0	-3.8	2.53 V	201	47.6	2.6
3	*5200.00	119.2 PK			2.53 V	201	116.8	2.4
4	*5200.00	109.1 AV			2.53 V	201	106.7	2.4
5	#10400.00	49.9 PK	68.2	-18.3	1.99 V	115	37.7	12.2
6	15600.00	55.7 PK	74.0	-18.3	1.44 V	247	42.8	12.9
7	15600.00	41.8 AV	54.0	-12.2	1.44 V	247	28.9	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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	113.9 PK			1.49 H	320	111.7	2.2
2	*5240.00	101.5 AV			1.49 H	320	99.3	2.2
3	5350.00	47.9 PK	74.0	-26.1	1.49 H	320	45.6	2.3
4	5350.00	35.9 AV	54.0	-18.1	1.49 H	320	33.6	2.3
5	#10480.00	54.2 PK	68.2	-14.0	1.57 H	268	41.8	12.4
6	15720.00	53.4 PK	74.0	-20.6	1.55 H	316	41.4	12.0
7	15720.00	41.2 AV	54.0	-12.8	1.55 H	316	29.2	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	*5240.00	120.1 PK			2.16 V	351	117.9	2.2
2	*5240.00	108.5 AV			2.16 V	351	106.3	2.2
3	5350.00	50.6 PK	74.0	-23.4	2.16 V	351	48.3	2.3
4	5350.00	38.1 AV	54.0	-15.9	2.16 V	351	35.8	2.3
5	#10480.00	50.7 PK	68.2	-17.5	1.93 V	120	38.3	12.4
6	15720.00	55.8 PK	74.0	-18.2	1.46 V	252	43.8	12.0
7	15720.00	42.0 AV	54.0	-12.0	1.46 V	252	30.0	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. 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 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5560.07	56.5 PK	68.2	-11.7	1.42 H	138	53.7	2.8
2	*5745.00	106.6 PK			1.42 H	138	103.7	2.9
3	*5745.00	96.4 AV			1.42 H	138	93.5	2.9
4	#5989.59	56.7 PK	68.2	-11.5	1.42 H	138	53.5	3.2
5	11490.00	53.8 PK	74.0	-20.2	1.57 H	288	41.5	12.3
6	11490.00	41.8 AV	54.0	-12.2	1.57 H	288	29.5	12.3
7	#17235.00	53.4 PK	68.2	-14.8	1.64 H	314	38.1	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	#5598.43	56.3 PK	68.2	-11.9	2.69 V	178	53.5	2.8
2	*5745.00	121.4 PK			2.69 V	178	118.5	2.9
3	*5745.00	110.2 AV			2.69 V	178	107.3	2.9
4	#5957.10	56.3 PK	68.2	-11.9	2.69 V	178	53.1	3.2
5	11490.00	50.3 PK	74.0	-23.7	2.01 V	119	38.0	12.3
6	11490.00	37.5 AV	54.0	-16.5	2.01 V	119	25.2	12.3
7	#17235.00	55.4 PK	68.2	-12.8	1.47 V	237	40.1	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. 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 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5644.69	56.7 PK	68.2	-11.5	1.28 H	146	54.0	2.7
2	*5785.00	106.5 PK			1.28 H	146	103.4	3.1
3	*5785.00	96.3 AV			1.28 H	146	93.2	3.1
4	#5951.76	56.1 PK	68.2	-12.1	1.28 H	146	52.9	3.2
5	11570.00	53.4 PK	74.0	-20.6	1.65 H	283	41.0	12.4
6	11570.00	42.0 AV	54.0	-12.0	1.65 H	283	29.6	12.4
7	#17355.00	53.8 PK	68.2	-14.4	1.65 H	322	37.8	16.0
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	#5579.62	57.6 PK	68.2	-10.6	2.59 V	181	54.8	2.8
2	*5785.00	120.8 PK			2.59 V	181	117.7	3.1
3	*5785.00	110.2 AV			2.59 V	181	107.1	3.1
4	#5992.94	58.7 PK	68.2	-9.5	2.59 V	181	55.5	3.2
5	11570.00	50.2 PK	74.0	-23.8	1.94 V	131	37.8	12.4
6	11570.00	37.6 AV	54.0	-16.4	1.94 V	131	25.2	12.4
7	#17355.00	55.7 PK	68.2	-12.5	1.42 V	258	39.7	16.0

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5572.42	58.5 PK	68.2	-9.7	1.28 H	144	55.7	2.8
2	*5825.00	107.2 PK			1.29 H	144	104.0	3.2
3	*5825.00	96.7 AV			1.29 H	144	93.5	3.2
4	#5982.21	57.3 PK	68.2	-10.9	1.28 H	144	54.1	3.2
5	11650.00	53.2 PK	74.0	-20.8	1.60 H	278	40.8	12.4
6	11650.00	41.6 AV	54.0	-12.4	1.60 H	278	29.2	12.4
7	#17475.00	53.8 PK	68.2	-14.4	1.68 H	321	36.4	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	#5621.93	57.3 PK	68.2	-10.9	2.42 V	175	54.5	2.8
2	*5825.00	121.1 PK			2.42 V	175	117.9	3.2
3	*5825.00	110.4 AV			2.42 V	175	107.2	3.2
4	#5958.43	57.4 PK	68.2	-10.8	2.42 V	175	54.2	3.2
5	11650.00	50.2 PK	74.0	-23.8	2.04 V	114	37.8	12.4
6	11650.00	37.3 AV	54.0	-16.7	2.04 V	114	24.9	12.4
7	#17475.00	56.4 PK	68.2	-11.8	1.41 V	251	39.0	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.

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CHANNEL	TX Channel 38	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	67.6 PK	74.0	-6.4	1.41 H	291	65.0	2.6
2	5150.00	51.6 AV	54.0	-2.4	1.41 H	291	49.0	2.6
3	*5190.00	106.3 PK			1.41 H	291	103.8	2.5
4	*5190.00	94.2 AV			1.41 H	291	91.7	2.5
5	5350.00	47.2 PK	74.0	-26.8	1.41 H	291	44.9	2.3
6	5350.00	36.0 AV	54.0	-18.0	1.41 H	291	33.7	2.3
7	#10380.00	53.6 PK	68.2	-14.6	1.50 H	288	41.6	12.0
8	15570.00	54.1 PK	74.0	-19.9	1.53 H	306	41.5	12.6
9	15570.00	42.3 AV	54.0	-11.7	1.53 H	306	29.7	12.6
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	70.3 PK	74.0	-3.7	1.96 V	265	67.7	2.6
2	5150.00	53.8 AV	54.0	-0.2	1.96 V	265	51.2	2.6
3	*5190.00	112.5 PK			1.96 V	265	110.0	2.5
4	*5190.00	101.2 AV			1.96 V	265	98.7	2.5
5	5350.00	49.9 PK	74.0	-24.1	1.96 V	265	47.6	2.3
6	5350.00	38.2 AV	54.0	-15.8	1.96 V	265	35.9	2.3
7	#10380.00	50.3 PK	68.2	-17.9	1.91 V	105	38.3	12.0
8	15570.00	55.8 PK	74.0	-18.2	1.34 V	235	43.2	12.6
9	15570.00	42.3 AV	54.0	-11.7	1.34 V	235	29.7	12.6

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 46	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5146.40	67.6 PK	74.0	-6.4	1.37 H	298	65.0	2.6
2	5146.40	50.9 AV	54.0	-3.1	1.37 H	298	48.3	2.6
3	5150.00	59.5 PK	74.0	-14.5	1.37 H	298	56.9	2.6
4	5150.00	47.2 AV	54.0	-6.8	1.37 H	298	44.6	2.6
5	*5230.00	110.2 PK			1.37 H	298	108.0	2.2
6	*5230.00	99.3 AV			1.37 H	298	97.1	2.2
7	5350.00	55.9 PK	74.0	-18.1	1.37 H	298	53.6	2.3
8	5350.00	42.0 AV	54.0	-12.0	1.37 H	298	39.7	2.3
9	#6973.33	57.9 PK	68.2	-10.3	1.37 H	298	51.0	6.9
10	#10460.00	54.1 PK	68.2	-14.1	1.59 H	281	41.7	12.4
11	15690.00	53.8 PK	74.0	-20.2	1.57 H	319	41.6	12.2
12	15690.00	41.4 AV	54.0	-12.6	1.57 H	319	29.2	12.2
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	5146.40	70.3 PK	74.0	-3.7	2.12 V	347	67.7	2.6
2	5146.40	53.1 AV	54.0	-0.9	2.12 V	347	50.5	2.6
3	5150.00	62.2 PK	74.0	-11.8	2.12 V	347	59.6	2.6
4	5150.00	49.4 AV	54.0	-4.6	2.12 V	347	46.8	2.6
5	*5230.00	116.4 PK			2.12 V	347	114.2	2.2
6	*5230.00	106.3 AV			2.12 V	347	104.1	2.2
7	5350.00	58.6 PK	74.0	-15.4	2.12 V	347	56.3	2.3
8	5350.00	44.2 AV	54.0	-9.8	2.12 V	347	41.9	2.3
9	#6973.33	60.6 PK	68.2	-7.6	2.63 V	360	53.7	6.9
10	#10460.00	50.8 PK	68.2	-17.4	1.88 V	117	38.4	12.4
11	15690.00	56.2 PK	74.0	-17.8	1.42 V	264	44.0	12.2
12	15690.00	42.1 AV	54.0	-11.9	1.42 V	264	29.9	12.2

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. 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 151	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5614.66	56.6 PK	68.2	-11.6	1.50 H	144	53.8	2.8
2	*5755.00	105.6 PK			1.50 H	144	102.6	3.0
3	*5755.00	94.6 AV			1.50 H	144	91.6	3.0
4	#5971.98	56.6 PK	68.2	-11.6	1.50 H	144	53.4	3.2
5	11510.00	52.9 PK	74.0	-21.1	1.60 H	262	40.6	12.3
6	11510.00	41.3 AV	54.0	-12.7	1.60 H	262	29.0	12.3
7	#17265.00	54.4 PK	68.2	-13.8	1.71 H	307	39.0	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	#5592.77	58.3 PK	68.2	-9.9	2.58 V	171	55.5	2.8
2	*5755.00	117.8 PK			2.58 V	171	114.8	3.0
3	*5755.00	107.0 AV			2.58 V	171	104.0	3.0
4	#5943.05	58.3 PK	68.2	-9.9	2.58 V	171	55.0	3.3
5	11510.00	49.9 PK	74.0	-24.1	2.01 V	125	37.6	12.3
6	11510.00	37.2 AV	54.0	-16.8	2.01 V	125	24.9	12.3
7	#17265.00	56.0 PK	68.2	-12.2	1.39 V	253	40.6	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. 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 159	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5564.30	57.1 PK	68.2	-11.1	1.30 H	138	54.3	2.8
2	*5795.00	103.5 PK			1.30 H	138	100.5	3.0
3	*5795.00	94.2 AV			1.30 H	138	91.2	3.0
4	#5982.12	56.5 PK	68.2	-11.7	1.30 H	138	53.3	3.2
5	11590.00	53.6 PK	74.0	-20.4	1.65 H	268	41.2	12.4
6	11590.00	41.8 AV	54.0	-12.2	1.65 H	268	29.4	12.4
7	#17385.00	54.0 PK	68.2	-14.2	1.65 H	303	37.8	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	#5617.55	57.2 PK	68.2	-11.0	1.90 V	2	54.4	2.8
2	*5795.00	117.3 PK			1.90 V	2	114.3	3.0
3	*5795.00	106.8 AV			1.90 V	2	103.8	3.0
4	#5968.61	57.6 PK	68.2	-10.6	1.90 V	2	54.4	3.2
5	11590.00	49.7 PK	74.0	-24.3	1.95 V	104	37.3	12.4
6	11590.00	37.2 AV	54.0	-16.8	1.95 V	104	24.8	12.4
7	#17385.00	56.1 PK	68.2	-12.1	1.43 V	259	39.9	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. 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.

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CHANNEL	TX Channel 42	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5136.00	64.7 PK	74.0	-9.3	1.50 H	139	62.1	2.6
2	5136.00	51.7 AV	54.0	-2.3	1.50 H	139	49.1	2.6
3	5150.00	64.1 PK	74.0	-9.9	1.50 H	139	61.5	2.6
4	5150.00	50.9 AV	54.0	-3.1	1.50 H	139	48.3	2.6
5	*5210.00	102.9 PK			1.50 H	139	100.5	2.4
6	*5210.00	91.2 AV			1.50 H	139	88.8	2.4
7	5350.00	52.7 PK	74.0	-21.3	1.50 H	139	50.4	2.3
8	5350.00	41.1 AV	54.0	-12.9	1.50 H	139	38.8	2.3
9	#10420.00	54.2 PK	68.2	-14.0	1.43 H	301	42.0	12.2
10	15630.00	53.8 PK	74.0	-20.2	1.58 H	310	41.1	12.7
11	15630.00	41.7 AV	54.0	-12.3	1.58 H	310	29.0	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	5136.00	67.4 PK	74.0	-6.6	2.63 V	200	64.8	2.6
2	**5136.00**	**53.9 AV**	**54.0**	**-0.1**	**2.63 V**	**200**	**51.3**	**2.6**
3	5150.00	66.8 PK	74.0	-7.2	2.63 V	200	64.2	2.6
4	5150.00	53.1 AV	54.0	-0.9	2.63 V	200	50.5	2.6
5	*5210.00	109.1 PK			2.63 V	200	106.7	2.4
6	*5210.00	98.2 AV			2.63 V	200	95.8	2.4
7	5350.00	55.4 PK	74.0	-18.6	2.63 V	200	53.1	2.3
8	5350.00	43.3 AV	54.0	-10.7	2.63 V	200	41.0	2.3
9	#10420.00	49.6 PK	68.2	-18.6	1.90 V	88	37.4	12.2
10	15630.00	56.4 PK	74.0	-17.6	1.31 V	206	43.7	12.7
11	15630.00	42.6 AV	54.0	-11.4	1.31 V	206	29.9	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. 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 155	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5641.19	58.1 PK	68.2	-10.1	1.50 H	135	55.4	2.7
2	*5775.00	99.5 PK			1.50 H	135	96.5	3.0
3	*5775.00	88.6 AV			1.50 H	135	85.6	3.0
4	#5942.18	57.7 PK	68.2	-10.5	1.50 H	135	54.4	3.3
5	11550.00	53.2 PK	74.0	-20.8	1.63 H	293	40.8	12.4
6	11550.00	41.7 AV	54.0	-12.3	1.63 H	293	29.3	12.4
7	#17325.00	53.8 PK	68.2	-14.4	1.70 H	307	38.1	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	#5617.08	66.3 PK	68.2	-1.9	2.37 V	178	63.5	2.8
2	#5641.02	67.8 PK	68.2	-0.4	2.37 V	178	65.1	2.7
3	*5775.00	113.4 PK			2.37 V	178	110.4	3.0
4	*5775.00	102.3 AV			2.37 V	178	99.3	3.0
5	#5959.13	63.2 PK	68.2	-5.0	2.37 V	178	60.0	3.2
6	11550.00	49.8 PK	74.0	-24.2	1.96 V	114	37.4	12.4
7	11550.00	37.2 AV	54.0	-16.8	1.96 V	114	24.8	12.4
8	#17325.00	56.1 PK	68.2	-12.1	1.47 V	259	40.4	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.

Below 1GHz Data:

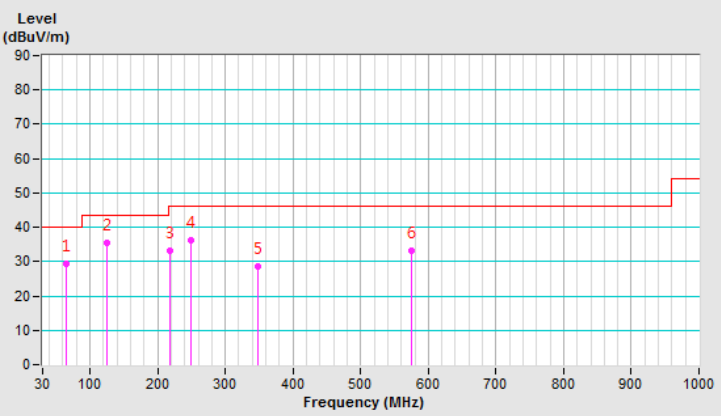
802.11ac (VHT20)

CHANNEL	TX Channel 40	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	64.53	29.3 QP	40.0	-10.7	2.50 H	113	38.5	-9.2
2	125.01	35.4 QP	43.5	-8.1	2.50 H	302	44.7	-9.3
3	217.89	33.2 QP	46.0	-12.8	1.50 H	112	44.0	-10.8
4	250.00	36.2 QP	46.0	-9.8	1.00 H	301	45.1	-8.9
5	347.84	28.6 QP	46.0	-17.4	1.50 H	314	34.3	-5.7
6	574.78	33.1 QP	46.0	-12.9	1.50 H	331	33.6	-0.5

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. Margin value = Emission Level – Limit value
4. 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.

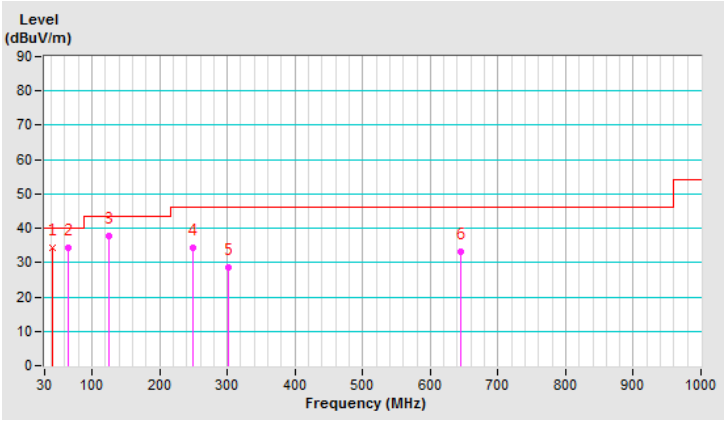


CHANNEL	TX Channel 40	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	41.70	34.2 QP	40.0	-5.8	1.00 V	203	42.3	-8.1
2	65.57	34.4 QP	40.0	-5.6	1.00 V	241	43.8	-9.4
3	124.99	37.9 QP	43.5	-5.6	1.00 V	223	47.2	-9.3
4	250.00	34.2 QP	46.0	-11.8	1.00 V	206	43.1	-8.9
5	302.30	28.6 QP	46.0	-17.4	1.00 V	94	35.4	-6.8
6	644.33	33.2 QP	46.0	-12.8	1.50 V	296	32.0	1.2

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 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	Nov. 01, 2017	Oct. 31, 2018
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Nov. 15, 2017	Nov. 14, 2018
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 04, 2018	June 03, 2019
50 ohms Terminator	N/A	EMC-04	Nov. 01, 2017	Oct. 31, 2018
RF Cable	5D-FB	COCCAB-001	Sep. 28, 2018	Sep. 27, 2019
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 16, 2018	Mar. 15, 2019
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: Oct. 10, 2018

4.2.3 Test Procedure

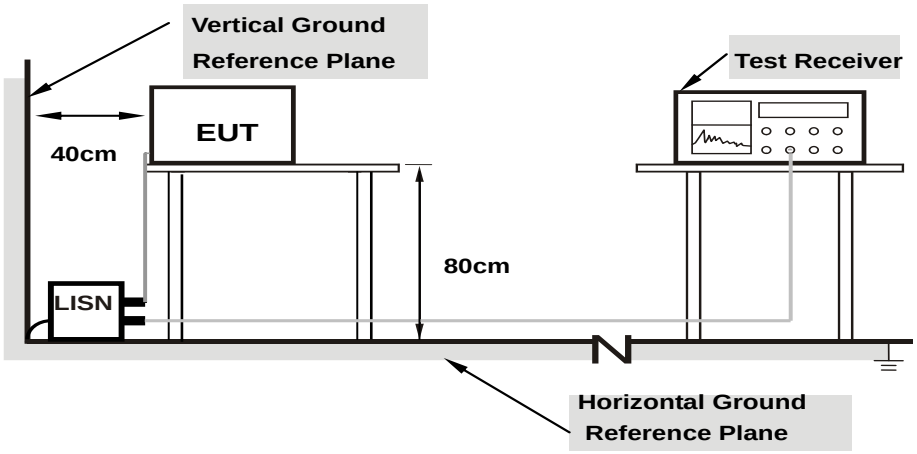
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

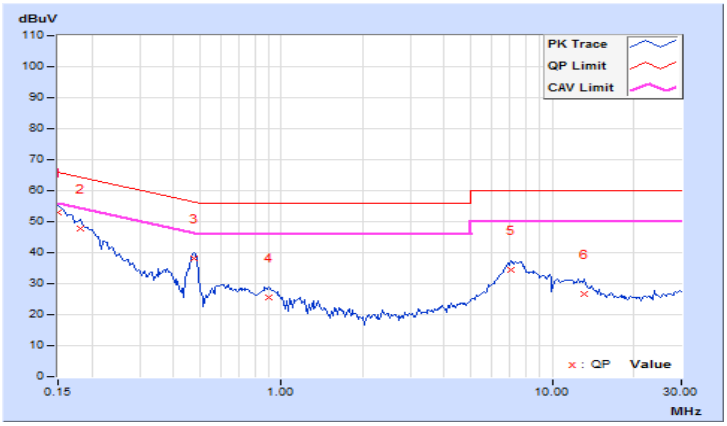
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15000**	**10.05**	**42.76**	**26.18**	**52.81**	**36.23**	**66.00**	**56.00**	**-13.19**	**-19.77**
2	0.18125	10.06	37.74	23.79	47.80	33.85	64.43	54.43	-16.63	-20.58
3	0.47422	10.13	28.04	20.94	38.17	31.07	56.44	46.44	-18.27	-15.37
4	0.90391	10.16	15.25	7.54	25.41	17.70	56.00	46.00	-30.59	-28.30
5	7.08594	10.53	24.02	19.02	34.55	29.55	60.00	50.00	-25.45	-20.45
6	13.06641	10.92	15.75	10.01	26.67	20.93	60.00	50.00	-33.33	-29.07

Remarks:

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

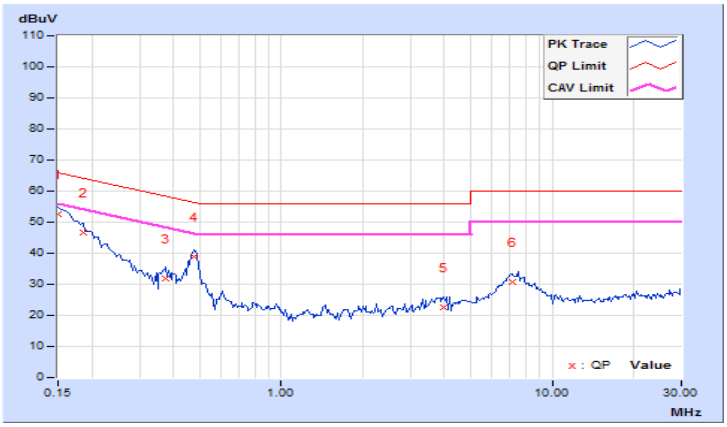


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.95	42.72	25.49	52.67	35.44	66.00	56.00	-13.33	-20.56
2	0.18516	9.97	36.61	19.48	46.58	29.45	64.25	54.25	-17.67	-24.80
3	0.37656	10.01	21.81	14.00	31.82	24.01	58.35	48.35	-26.53	-24.34
4	0.47422	10.02	28.98	21.94	39.00	31.96	56.44	46.44	-17.44	-14.48
5	3.99219	10.19	12.25	2.90	22.44	13.09	56.00	46.00	-33.56	-32.91
6	7.09375	10.37	20.42	15.51	30.79	25.88	60.00	50.00	-29.21	-24.12

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 ≦ 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			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	√		1 Watt (30 dBm)

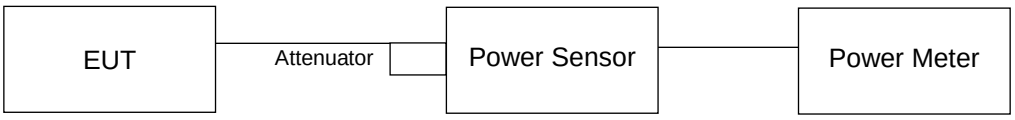
*B is the 26 dB emission bandwidth in megahertz

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



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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.

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 Results

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	21.76	21.44	289.284	24.61	30	Pass
40	5200	24.58	24.49	568.268	27.55	30	Pass
48	5240	23.07	22.78	392.439	25.94	30	Pass
149	5745	24.18	23.38	479.589	26.81	30	Pass
157	5785	23.74	23.15	443.13	26.47	30	Pass
165	5825	24.13	22.92	454.705	26.58	30	Pass

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	20.66	20.23	221.852	23.46	30	Pass
40	5200	24.70	24.41	571.179	27.57	30	Pass
48	5240	23.05	22.66	386.339	25.87	30	Pass
149	5745	24.14	23.64	490.624	26.91	30	Pass
157	5785	23.84	23.22	451.997	26.55	30	Pass
165	5825	24.22	23.09	467.945	26.70	30	Pass

802.11ac (VHT40)

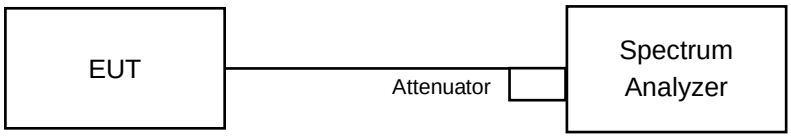
Chan.	Chan. Freq. (MHz)	Maximum Conducted (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	18.95	18.58	150.635	21.78	30	Pass
46	5230	23.45	23.38	439.08	26.43	30	Pass
151	5755	24.18	23.31	476.107	26.78	30	Pass
159	5795	24.25	23.02	466.52	26.69	30	Pass

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	18.68	18.43	143.453	21.57	30	Pass
155	5775	21.54	21.48	283.166	24.52	30	Pass

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
36	5180	16.56	16.68
40	5200	20.40	26.16
48	5240	16.68	17.28
149	5745	19.56	25.44
157	5785	19.20	26.52
165	5825	24.48	27.72

802.11ac (VHT20)

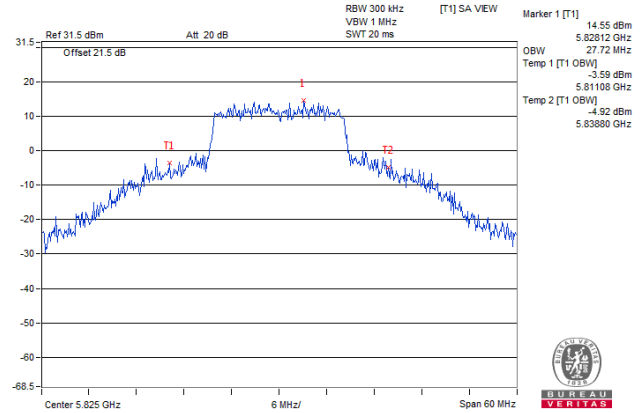
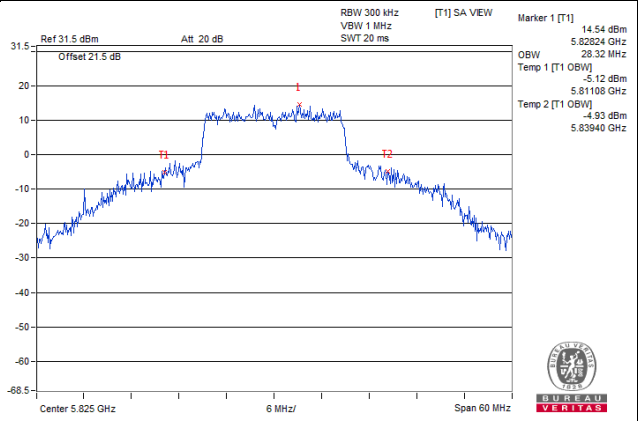
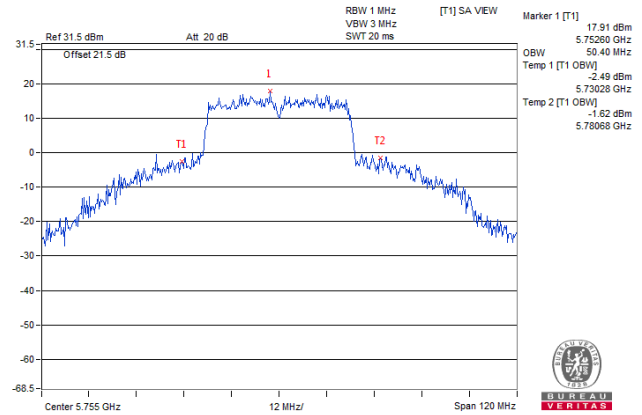
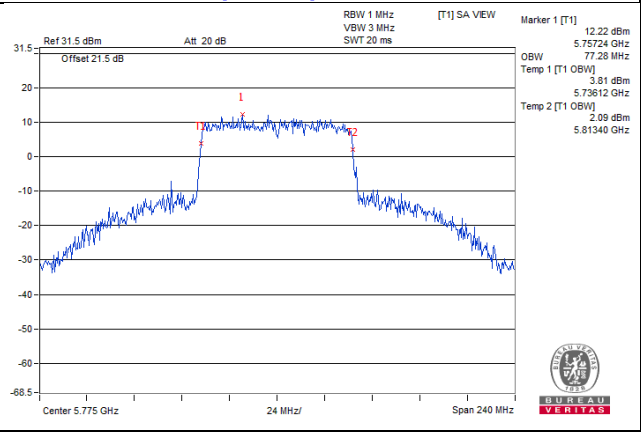
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.64	17.88
40	5200	22.20	26.76
48	5240	18.00	18.24
149	5745	20.52	27.24
157	5785	19.32	27.12
165	5825	24.72	28.32

802.11ac (VHT40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.24	36.24
46	5230	36.72	38.64
151	5755	38.16	50.40
159	5795	40.08	48.00

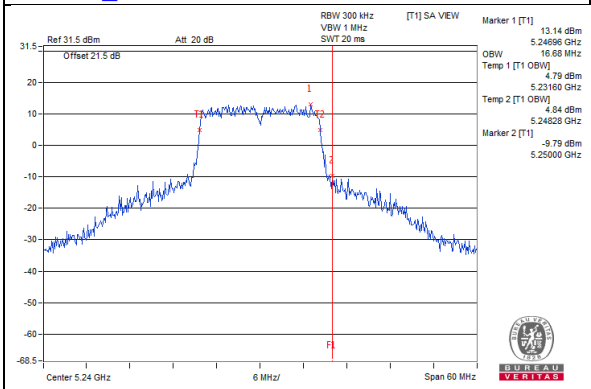
802.11ac (VHT80)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	76.32	76.32
155	5775	75.84	77.28

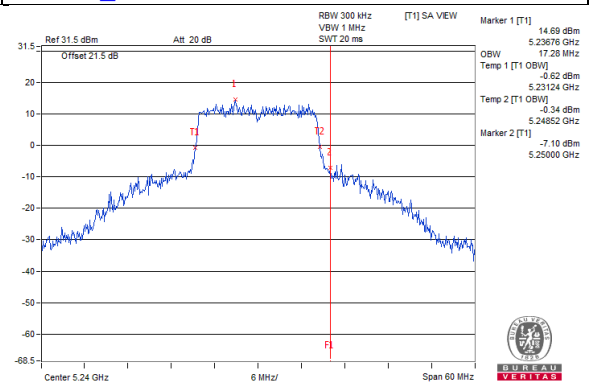
Spectrum Plot of Max. Value	
802.11a_Chain 1 / CH165	**802.11ac (VHT20)_Chain 1 / CH165**
	
802.11ac (VHT40)_Chain 1 / CH151	**802.11ac (VHT80)_Chain 1 / CH155**
	

Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

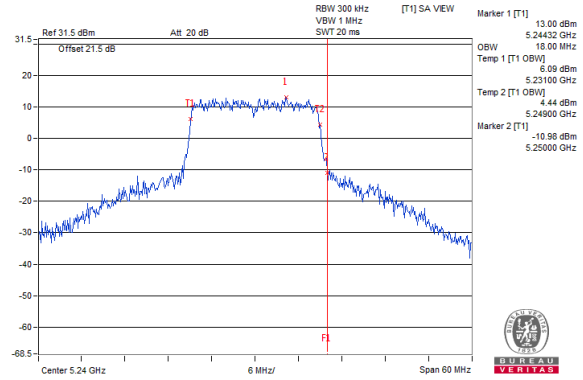
802.11a_Chain0 / CH48



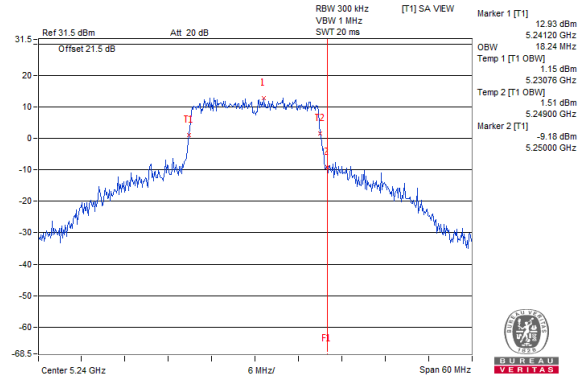
802.11a_Chain1 / CH48



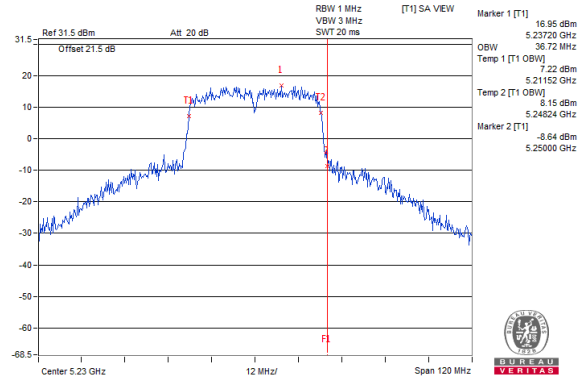
802.11ac (VHT20)_Chain0 / CH48



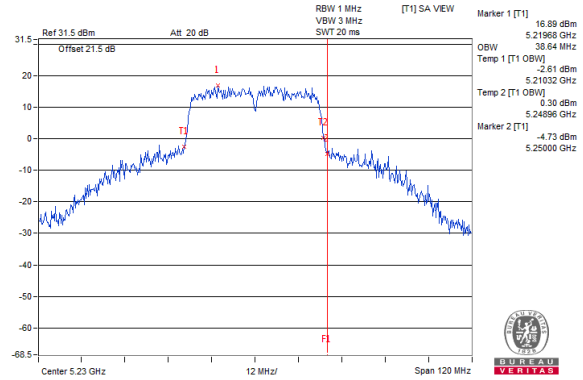
802.11ac (VHT20)_Chain1 / CH48



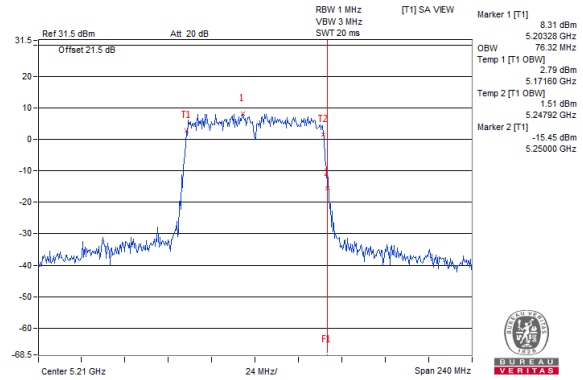
802.11ac (VHT40)_Chain0 / CH46



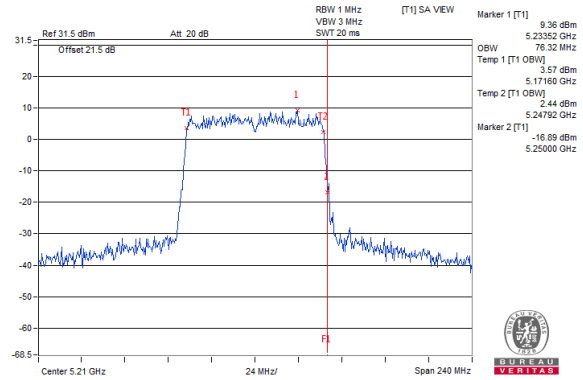
802.11ac (VHT40)_Chain1 / CH46



802.11ac (VHT80)_Chain0 / CH42

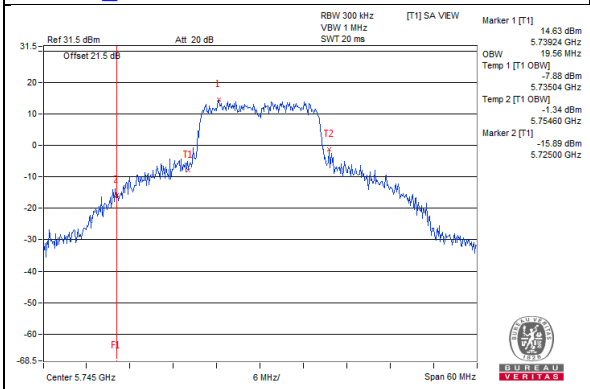


802.11ac (VHT80)_Chain1 / CH42

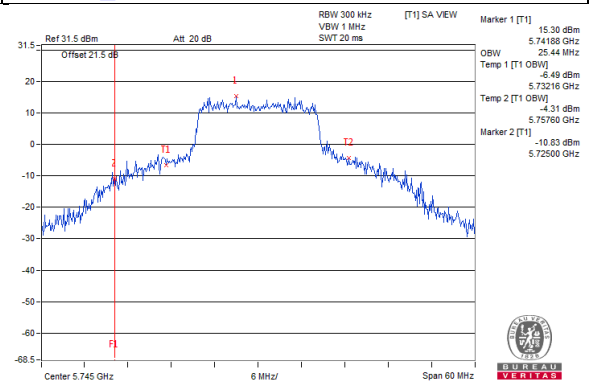


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

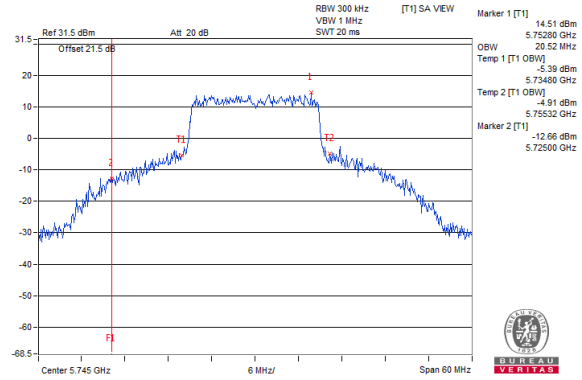
802.11a_Chain0 / CH149



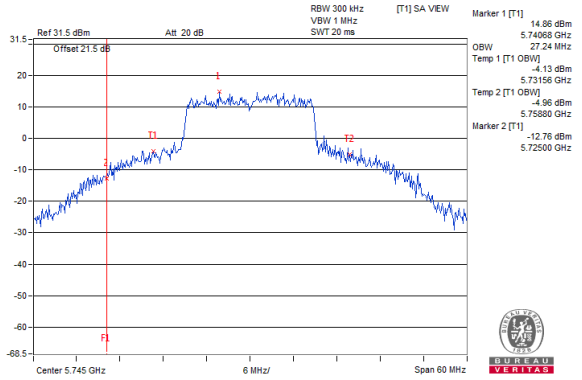
802.11a_Chain1 / CH149



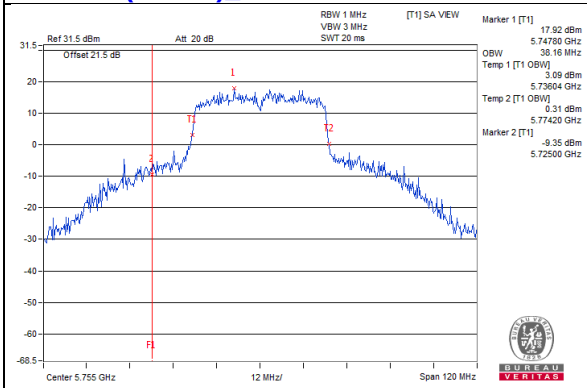
802.11ac (VHT20)_Chain0 / CH149



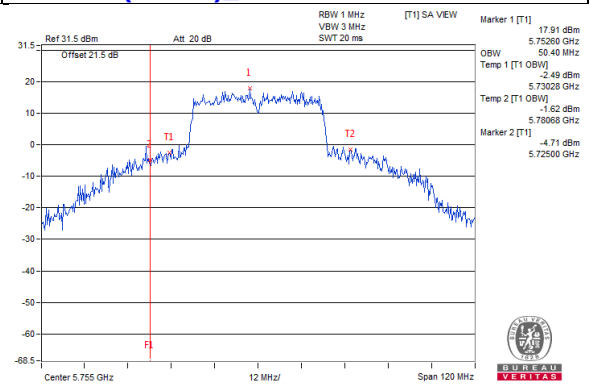
802.11ac (VHT20)_Chain1 / CH149



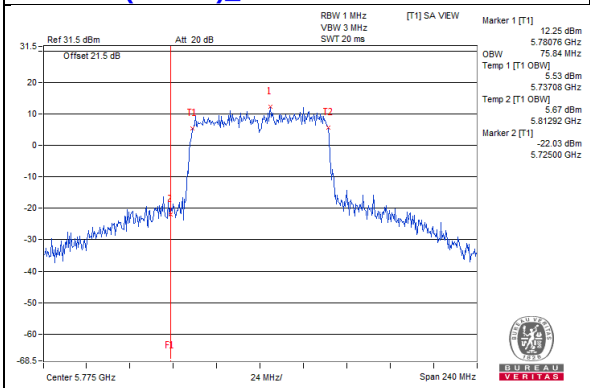
802.11ac (VHT40)_Chain0 / CH151



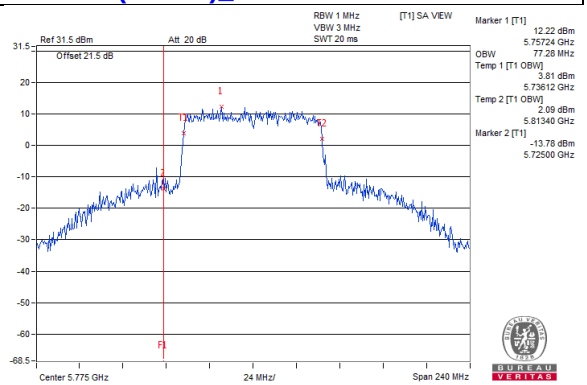
802.11ac (VHT40)_Chain1 / CH151



802.11ac (VHT80)_Chain0 / CH155



802.11ac (VHT80)_Chain1 / CH155

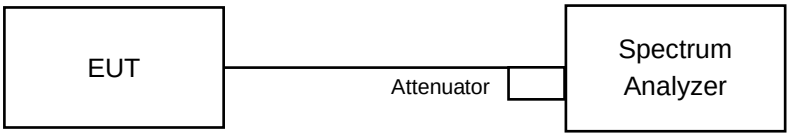


4.5 Peak Power Spectral Density Measurement

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-1 band:
For 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

For 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)

For U-NII-3:
For 802.11ac (VHT20)

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500kHz/300kHz)
5. Sweep time = auto, trigger set to “free run”.
6. Trace average at least 100 traces in power averaging mode.
7. Record the max value

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

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500kHz/300kHz)
5. Sweep time = auto, trigger set to “free run”.
6. Trace average at least 100 traces in power averaging mode.
7. 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-1:

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				
36	5180	7.43	7.48	0.16	10.63	17	Pass
40	5200	10.05	10.28	0.16	13.34	17	Pass
48	5240	9.26	9.13	0.16	12.37	17	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. The directional gain = 10 log[($10^{Chain1/20}$ + $10^{Chain2/20}$)^2 / 2] = 5.01dBi < 6dBi, so the power density limit shall not be reduced.
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			
36	5180	6.80	6.87	9.85	17	Pass
40	5200	10.00	10.28	13.15	17	Pass
48	5240	9.11	9.06	12.10	17	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. The directional gain = 10 log[($10^{Chain1/20}$ + $10^{Chain2/20}$)^2 / 2] = 5.01dBi < 6dBi, so the power density limit shall not be reduced.

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				
38	5190	1.62	2.00	0.15	4.97	17	Pass
46	5230	6.72	6.49	0.15	9.77	17	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. The directional gain = 10 log[($10^{Chain1/20}$ + $10^{Chain2/20}$)^2 / 2] = 5.01dBi < 6dBi, so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

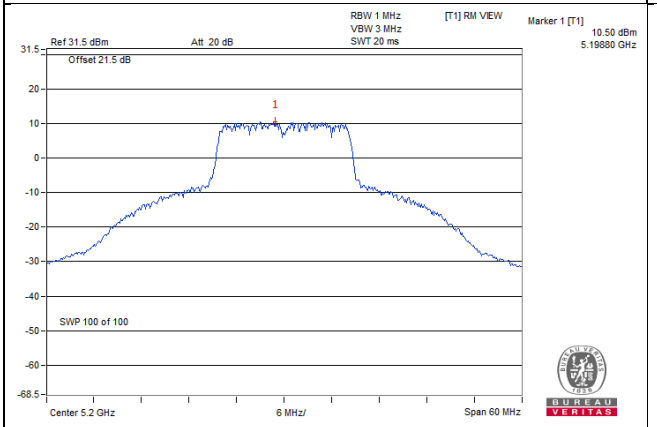
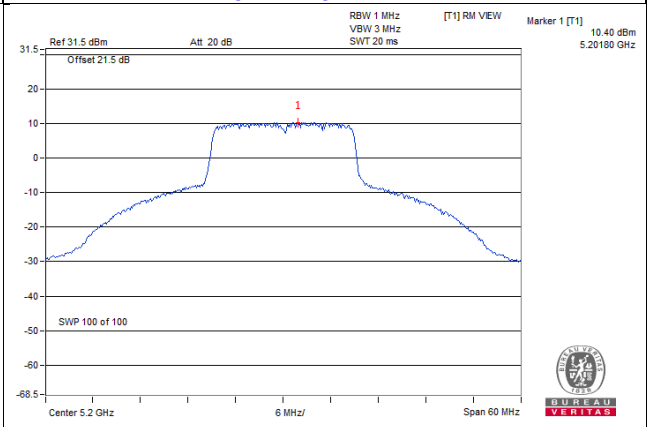
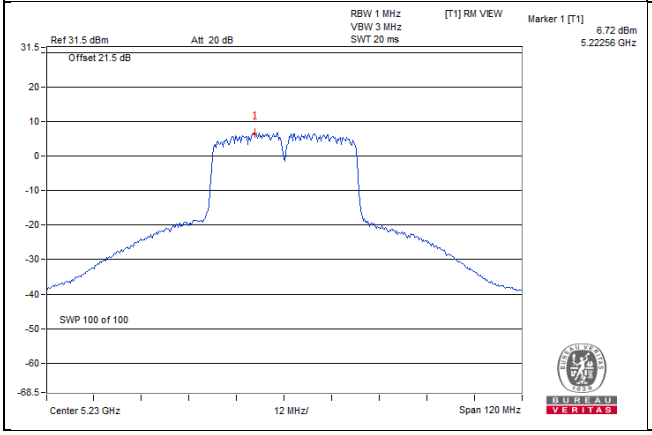
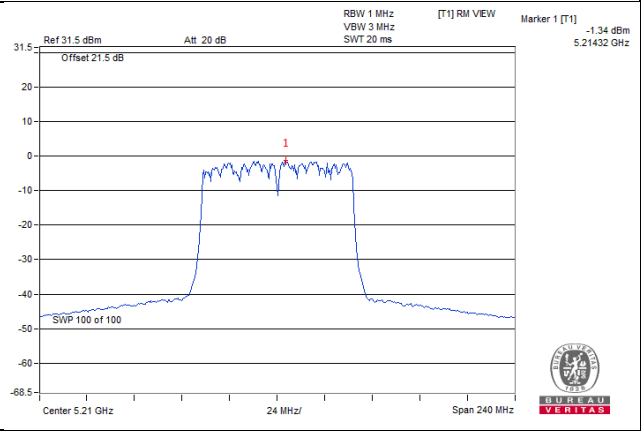
802.11ac (VHT80)

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				
42	5210	-2.16	-1.70	0.30	1.39	17	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. The directional gain = 10 log[($10^{Chain1/20}$ + $10^{Chain2/20}$)^2 / 2] = 5.01dBi < 6dBi, so the power density limit shall not be reduced.

3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a_Chain 1 / CH40	**802.11ac (VHT20)_Chain 1 / CH40**
	
802.11ac (VHT40)_Chain 0 / CH46	**802.11ac (VHT80)_Chain 1 / CH42**
	

For U-NII-3:

802.11a

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	1.91	4.13	3.01	0.16	7.30	30	Pass
	157	5785	1.44	3.66	3.01	0.16	6.83	30	Pass
	165	5825	2.14	4.36	3.01	0.16	7.53	30	Pass
1	149	5745	1.75	3.97	3.01	0.16	7.14	30	Pass
	157	5785	1.22	3.44	3.01	0.16	6.61	30	Pass
	165	5825	1.37	3.59	3.01	0.16	6.76	30	Pass

Note: 1. The directional gain = 10 log[($10^{Chain1/20}$ + $10^{Chain2/20}$)^2 / 2] = 5.61dBi < 6dBi, so the power density limit shall not be reduced.

2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	149	5745	1.99	4.21	3.01	7.22	30	Pass
	157	5785	1.56	3.78	3.01	6.79	30	Pass
	165	5825	1.84	4.06	3.01	7.07	30	Pass
1	149	5745	2.08	4.30	3.01	7.31	30	Pass
	157	5785	1.33	3.55	3.01	6.56	30	Pass
	165	5825	1.32	3.54	3.01	6.55	30	Pass

Note: 1. The directional gain = 10 log[($10^{Chain1/20}$ + $10^{Chain2/20}$)^2 / 2] = 5.61dBi < 6dBi, so the power density limit shall not be reduced.

802.11ac (VHT40)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-1.57	0.65	3.01	0.15	3.81	30	Pass
	159	5795	-1.45	0.77	3.01	0.15	3.93	30	Pass
1	151	5755	-1.34	0.88	3.01	0.15	4.04	30	Pass
	159	5795	-1.98	0.24	3.01	0.15	3.40	30	Pass

Note: 1. The directional gain = 10 log[($10^{Chain1/20}$ + $10^{Chain2/20}$)^2 / 2] = 5.61dBi < 6dBi, so the power density limit shall not be reduced.

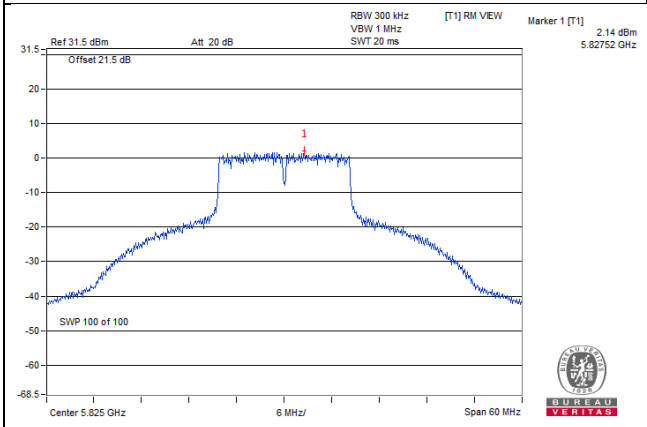
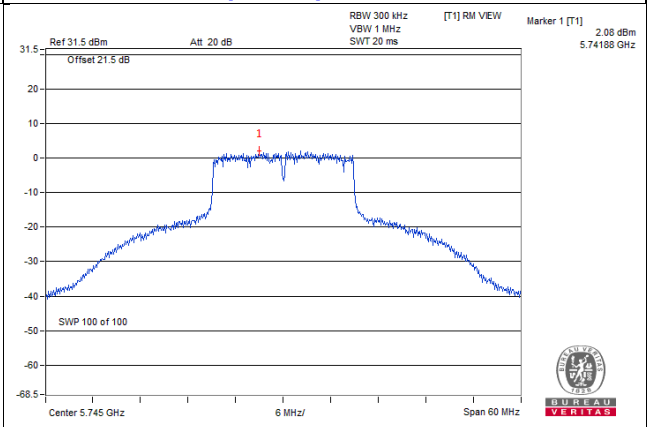
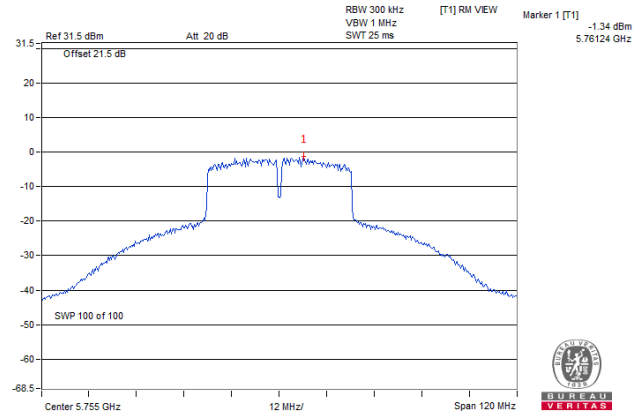
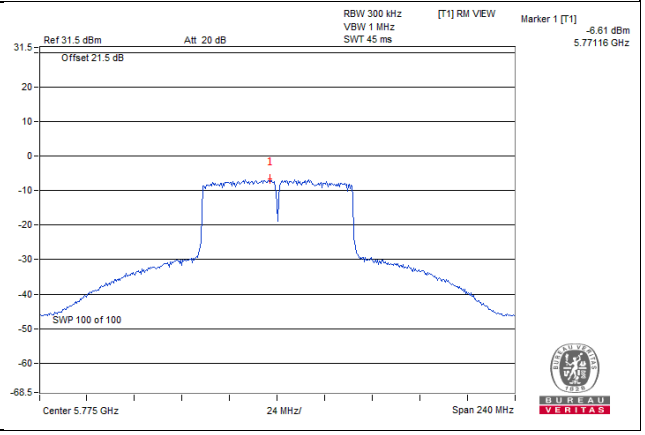
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-7.35	-5.13	3.01	0.30	-1.82	30	Pass
1	155	5775	-6.61	-4.39	3.01	0.30	-1.08	30	Pass

Note: 1. The directional gain = 10 log[($10^{Chain1/20}$ + $10^{Chain2/20}$)^2 / 2] = 5.61dBi < 6dBi, so the power density limit shall not be reduced.

2. Refer to section 3.3 for duty cycle spectrum plot.

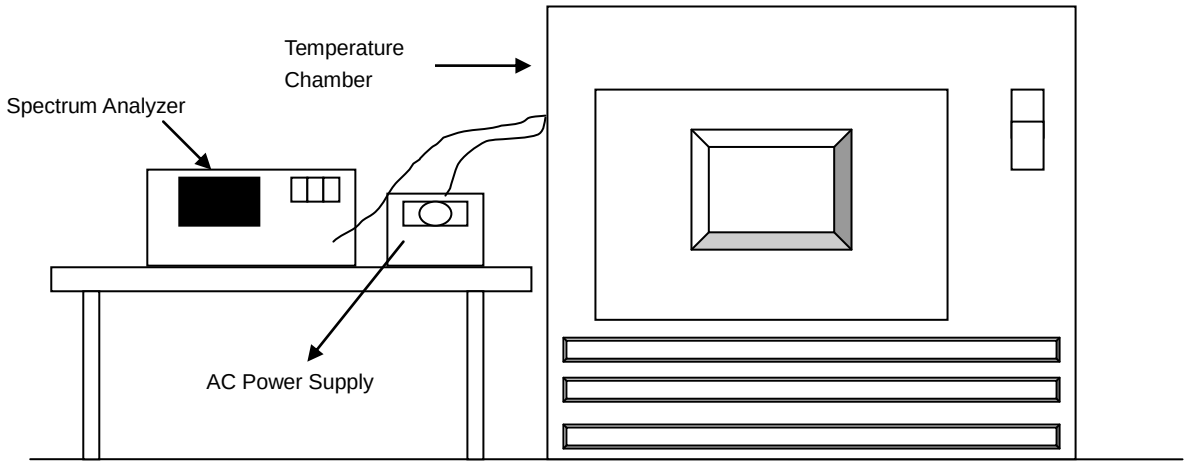
Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH165	**802.11ac (VHT20)_Chain 1 / CH149**
	
802.11ac (VHT40)_Chain 1 / CH151	**802.11ac (VHT80)_Chain 1 / CH155**
	

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

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.

b. Turn the EUT on and couple its output to a spectrum analyzer.

c. Turn the EUT off and set the chamber to the highest temperature specified.

d. 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.

e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.

f. 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: 5180 MHz									
TEMP. (℃)	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
50	120	5180.0203	Pass	5180.0197	Pass	5180.0187	Pass	5180.018	Pass
40	120	5180.0161	Pass	5180.0173	Pass	5180.016	Pass	5180.018	Pass
30	120	5180.0002	Pass	5179.9985	Pass	5179.998	Pass	5180.002	Pass
20	120	5179.9999	Pass	5180.0009	Pass	5180.0008	Pass	5179.9994	Pass
10	120	5180.0052	Pass	5180.0012	Pass	5180.003	Pass	5180.0058	Pass
0	120	5180.0007	Pass	5179.9962	Pass	5179.9983	Pass	5179.9998	Pass
-10	120	5180.0069	Pass	5180.0061	Pass	5180.0103	Pass	5180.0092	Pass
-20	120	5179.981	Pass	5179.9804	Pass	5179.9783	Pass	5179.9781	Pass
-30	120	5180.0129	Pass	5180.0121	Pass	5180.0091	Pass	5180.0113	Pass

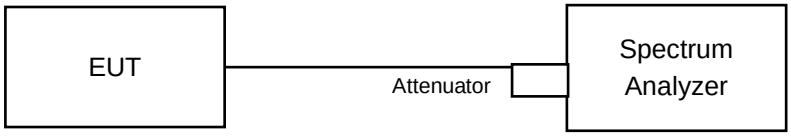
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5179.9993	Pass	5180.0012	Pass	5180.0018	Pass	5179.9998	Pass
	120	5179.9999	Pass	5180.0009	Pass	5180.0008	Pass	5179.9994	Pass
	102	5179.9992	Pass	5180.0017	Pass	5180.0005	Pass	5180.0003	Pass

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

a. Set resolution bandwidth (RBW) = 100kHz
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.38	16.36	0.5	Pass
157	5785	16.38	16.38	0.5	Pass
165	5825	16.39	16.39	0.5	Pass

802.11ac (VHT20)

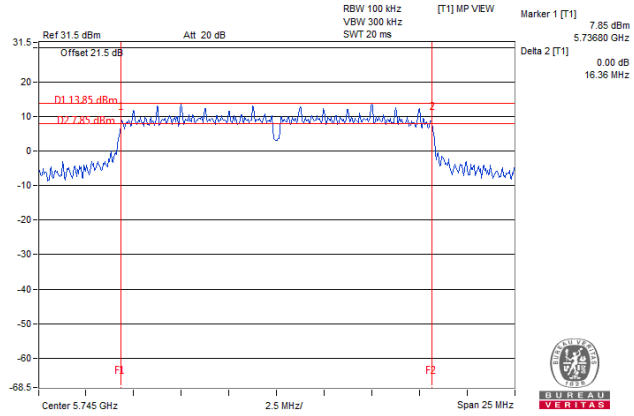
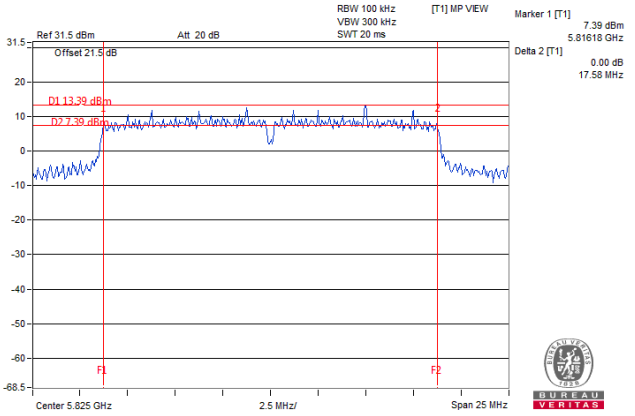
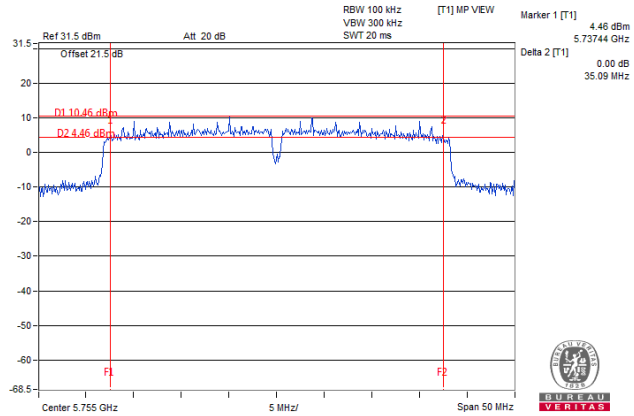
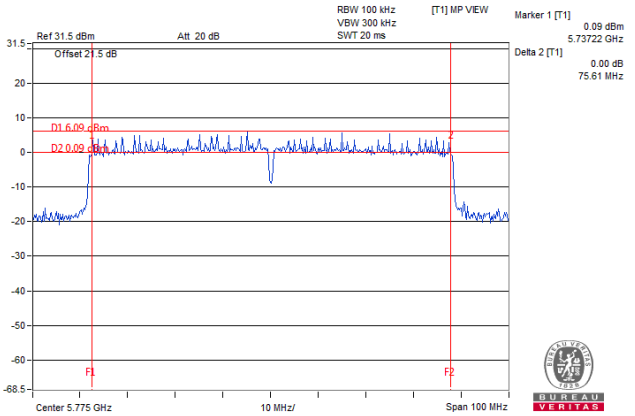
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.66	17.61	0.5	Pass
157	5785	17.65	17.65	0.5	Pass
165	5825	17.63	17.58	0.5	Pass

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.56	35.09	0.5	Pass
159	5795	36.12	35.21	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	75.99	75.61	0.5	Pass

Spectrum Plot of Worst Value	
802.11a_Chain 1 / CH149	**802.11ac (VHT20)_Chain 1 / CH165**
	
802.11ac (VHT40)_Chain 1 / CH151	**802.11ac (VHT80)_Chain 1 / CH155**
	

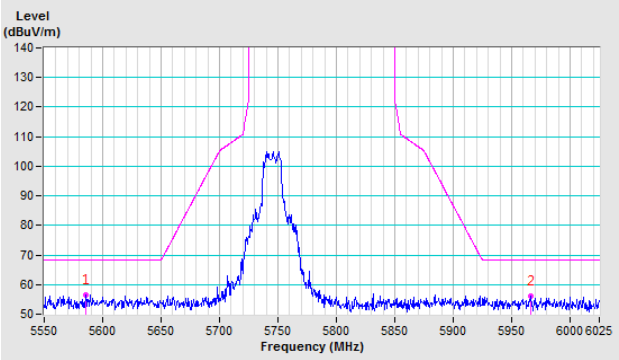
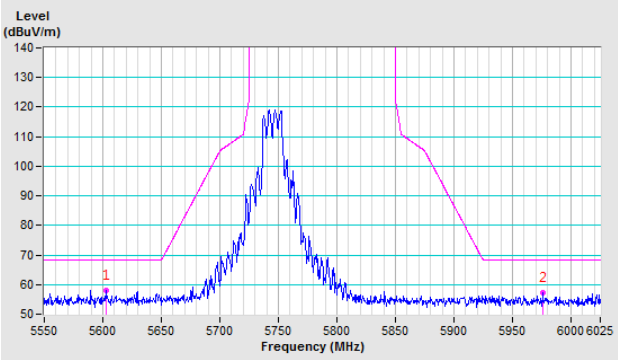
5 Pictures of Test Arrangements

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

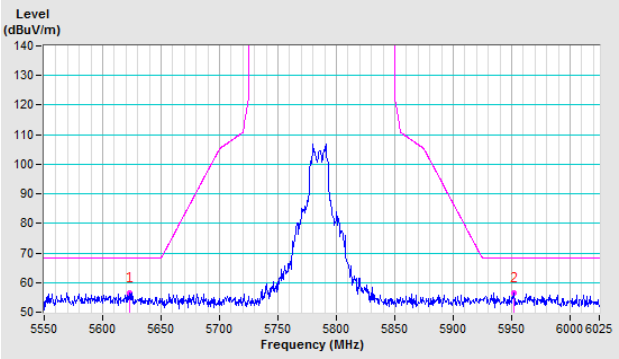
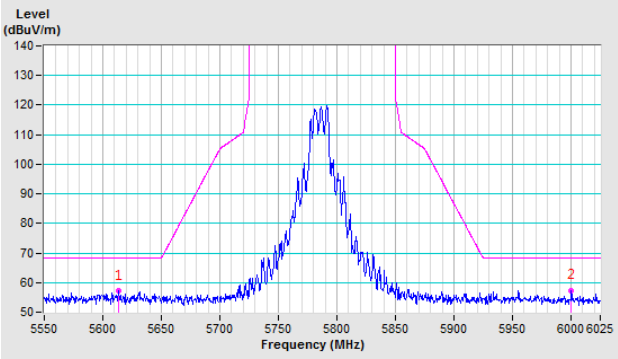
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

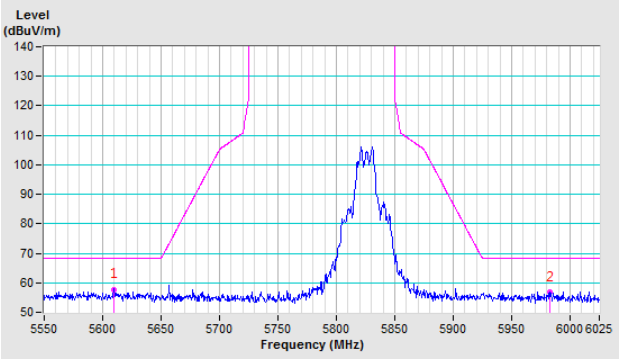
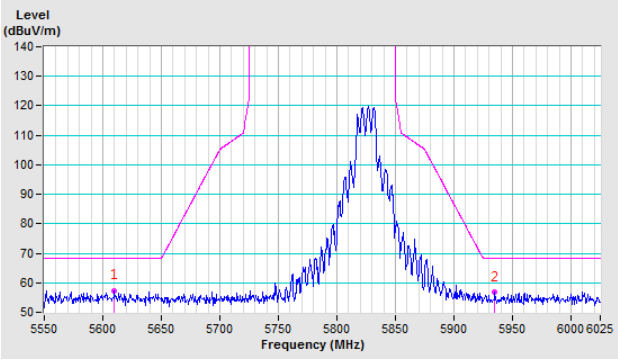
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

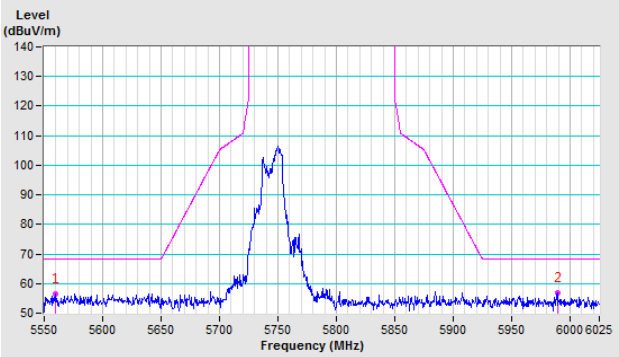
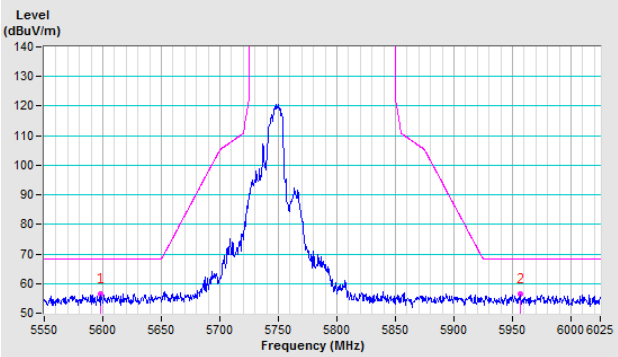
Horizontal	Vertical
	

CH 165 5825 MHz

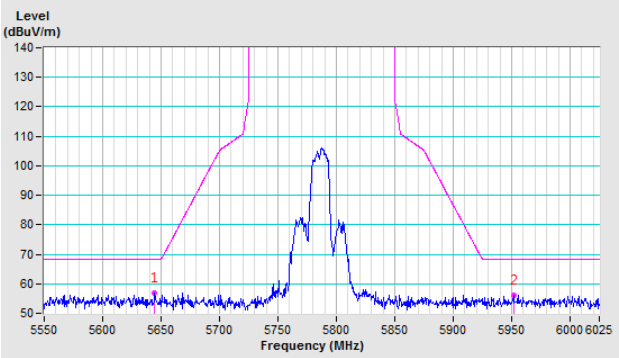
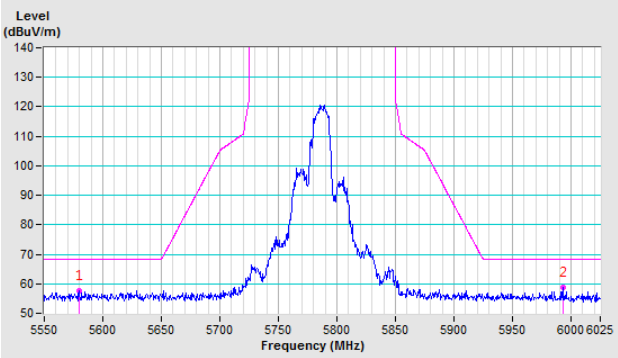
Horizontal	Vertical
	

802.11ac (VHT20)

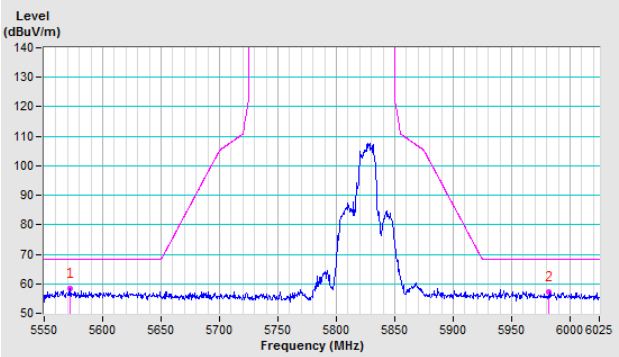
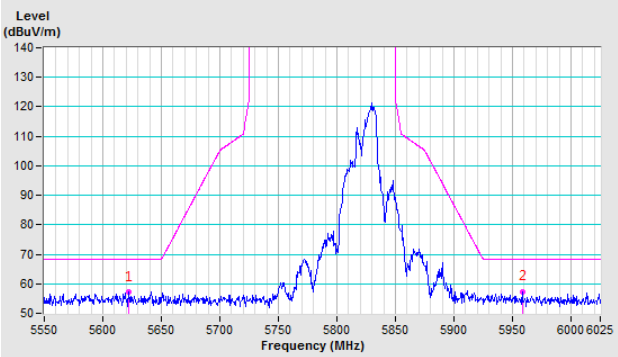
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

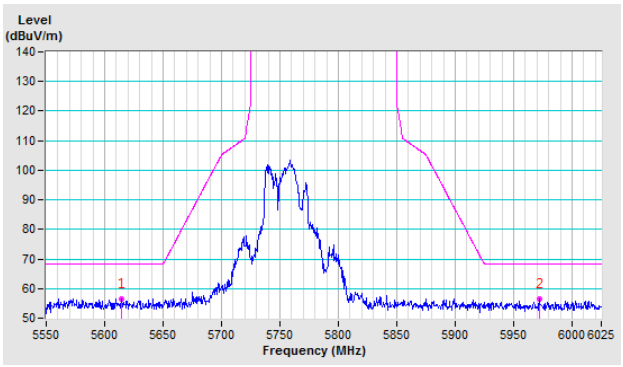
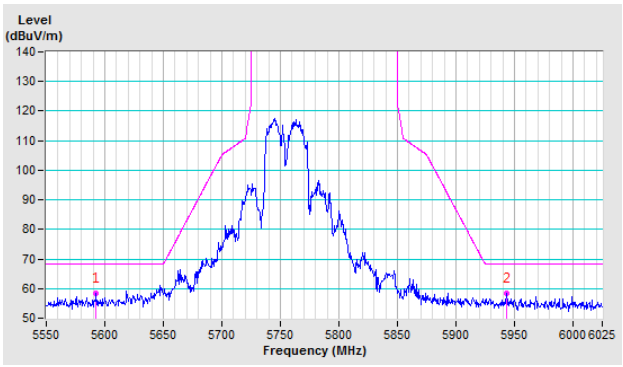
Horizontal	Vertical
	

CH 165 5825 MHz

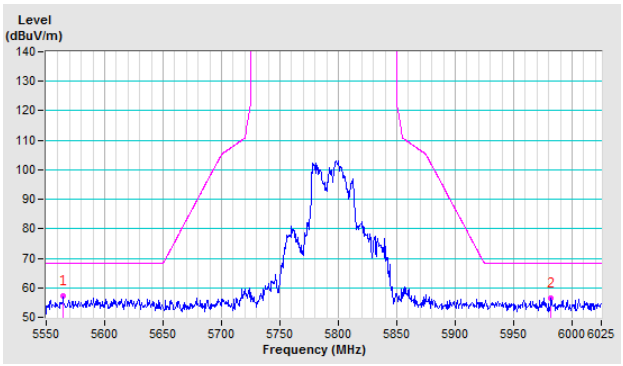
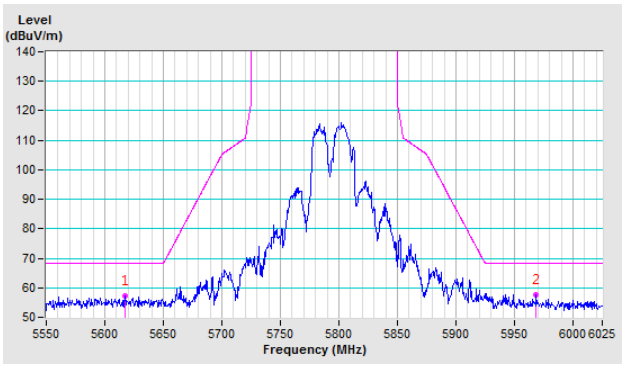
Horizontal	Vertical
	

802.11ac (VHT40)

CH 151 5755 MHz

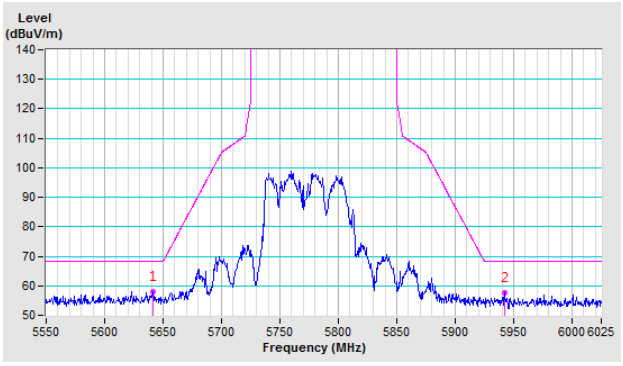
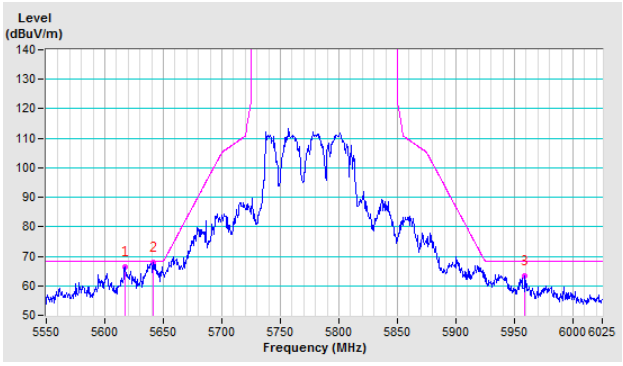
Horizontal	Vertical
	

CH 159 5795 MHz

Horizontal	Vertical
	

802.11ac (VHT80)

CH 155 5775 MHz

Horizontal	Vertical
	

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 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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