FCC Test Report

Report No.:	RF191118E09-1
FCC ID:	PY319400466
Test Model:	RAX50
Series Model:	RAX45
Received Date:	Nov. 19, 2019
Test Date:	Dec. 12 to 13, 2019
Issued Date:	Dec. 27, 2019
Applicant:	NETGEAR, Inc.
Address:	350 East Plumeria Drive San Jose, CA 95134
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
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF191118E09-1	Original release.	Dec. 27, 2019

1 Certificate of Conformity

Product:	NIGHTHAWK AX6 AX5400 6-Stream WiFi Router, NIGHTHAWK AX6 AX4300 6-Stream WiFi Router
Brand:	NETGEAR
Test Model:	RAX50
Series Model:	RAX45
Sample Status:	ENGINEERING SAMPLE
Applicant:	NETGEAR, Inc.
Test Date:	Dec. 12 to 13, 2019
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 / Specialist , **Date:** Dec. 27, 2019

Approved by : Clark Lin / Technical Manager , **Date:** Dec. 27, 2019

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 -9.34 dB at 0.30234 MHz.
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 -0.1 dB at 5150.00 MHz.
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 R-SMA 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.

Note:

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

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.8 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.0 dB
	30MHz ~ 1GHz	4.9 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	4.9 dB
	18GHz ~ 40GHz	5.2 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	NIGHTHAWK AX6 AX5400 6-Stream WiFi Router, NIGHTHAWK AX6 AX4300 6-Stream WiFi Router
Brand	NETGEAR
Test Model	RAX50
Series Model	RAX45
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT20/40 in 2.4GHz 1024QAM for OFDMA in 11ax HE mode
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: up to 11 Mbps 802.11a/g: up to 54 Mbps 802.11n: up to 600 Mbps 802.11ac: up to 1733.3 Mbps 802.11ax: up to 2401.9 Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462 GHz **5GHz:** 5.18 ~ 5.24 GHz, 5.745 ~ 5.825 GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20), VHT20, 80211ax (HE20): 11 802.11n (HT40), VHT40, 80211ax (HE40): 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20), 80211ax (HE20): 9 802.11n (HT40), 802.11ac (VHT40), 80211ax (HE40): 4 802.11ac (VHT80), 80211ax (HE80): 2
Output Power	**Non-Beamforming Mode:** **2.412 ~ 2.462 GHz:** 917.02 mW **5.18 ~ 5.24 GHz:** 935.58 mW **5.745 ~ 5.825 GHz:** 997.865 mW **Beamforming Mode:** **2.412 ~ 2.462 GHz:** 874.052 mW **5.18 ~ 5.24 GHz:** 863.139 mW **5.745 ~ 5.825 GHz:** 797.393 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	RJ-45 Cable x 1 (Unshielded, 1.8 m)

Note:

1. All models are listed as below.

Product Name	Model Name	Description
NIGHTHAWK AX6 AX5400 6-Stream WiFi Router	RAX50	The hardware are the same, just only the Link Rate is different. - Link Rate RAX50: 2.4GHz 600 Mbps, 5GHz 4800 Mbps RAX45: 2.4GHz 480 Mbps, 5GHz 3840 Mbps
NIGHTHAWK AX6 AX4300 6-Stream WiFi Router	RAX45	
Note: From the above models, model: RAX50 was selected as representative model for the test and its data was recorded in this report.		

2. Simultaneously transmission condition.

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

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

No.	Brand	Model No.	P/N	Spec.
1	NETGEAR	2ABL030F 1 NA	332-10758-01	Input: 100-120Vac, 1.0A, 50/60Hz Output: 12V, 2.5A DC Output cable: Unshielded, 1.8 m
2	NETGEAR	AD2067F10	332-10797-01	Input: 100-120Vac, 1.0A, 50/60Hz Output: 12V, 2.5A DC Output cable: Unshielded, 1.8 m
Note: From the above models, the worst AC Power Conducted Emissions and Radiated Emissions test was found in **Adapter 1**. 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:

Antenna Operation 1	Antenna Operation 2
Dual_Ant0	Dual_Ant0
Dual_Ant1	Dual_Ant1
Single_Ant2	Dual_Ant2
Single_Ant3	Dual_Ant3
Note: From the above antenna conditions, the worst case was found in Antenna Operation 1. Therefore only the test data of the mode was recorded in this report.	

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

Frequency Range (GHz)	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
2.4~2.4835	3.73	Dipole	R-SMA
5.15 ~ 5.25	6.61		
5.25 ~ 5.35	6.53		
5.47 ~ 5.725	6.64		
5.725 ~ 5.85	6.66		
Note: More detailed information, please refer to antenna specification.			

6. The EUT incorporates a MIMO function:

2.4GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11b	2TX	2RX
802.11g	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
VHT20	2TX	2RX
VHT40	2TX	2RX
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX
5GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11a	4TX	4RX
802.11n (HT20)	4TX	4RX
802.11n (HT40)	4TX	4RX
802.11ac (VHT20)	4TX	4RX
802.11ac (VHT40)	4TX	4RX
802.11ac (VHT80)	4TX	4RX
802.11ax (HE20)	4TX	4RX
802.11ax (HE40)	4TX	4RX
802.11ax (HE80)	4TX	4RX

Note:
1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
2. The EUT support Beamforming and Non-Beamforming mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz), 802.11ac mode for 20MHz (40MHz, 80MHz) and 802.11ax mode for 20MHz (40MHz, 80MHz), therefore the manufacturer will control the power for 802.11n mode is the same as the 802.11ac or more lower than it and investigated worst case to representative mode in test report. (Final test mode refer to section 3.2.1)

7. 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 ~ 5240 MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

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), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency
42	5210 MHz

FOR 5745 ~ 5825 MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

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), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

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	
-	√	√	√	√	-

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement
Note: The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **X-plane**.

Radiated Emission Test (Above 1GHz):

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

Non-Beamforming Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6Mb/s
802.11ax (HE20)		36 to 48	36, 40, 48	OFDMA	BPSK	MCS0
802.11ax (HE40)		38 to 46	38, 46	OFDMA	BPSK	MCS0
802.11ax (HE80)		42	42	OFDMA	BPSK	MCS0
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6Mb/s
802.11ax (HE20)		149 to 165	149, 157, 165	OFDMA	BPSK	MCS0
802.11ax (HE40)		151 to 159	151, 159	OFDMA	BPSK	MCS0
802.11ax (HE80)		155	155	OFDMA	BPSK	MCS0

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.

Non-Beamforming Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11a	5180-5240 5745-5825	36 to 48 149 to 165	149	OFDM	BPSK	6Mb/s

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.

Non-Beamforming Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11a	5180-5240 5745-5825	36 to 48 149 to 165	149	OFDM	BPSK	6Mb/s

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.

Non-Beamforming Mode						
Mode	**FREQ. Band (MHz)**	**Available Channel**	**Tested Channel**	**Modulation Technology**	**Modulation Type**	**Data Rate Parameter**
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6Mb/s
802.11ac (VHT20) (for output power)		36 to 48	36, 40, 48	OFDM	BPSK	MCS0
802.11ac (VHT40) (for output power)		38 to 46	38, 46	OFDM	BPSK	MCS0
802.11ac (VHT80) (for output power)		42	42	OFDM	BPSK	MCS0
802.11ax (HE20)		36 to 48	36, 40, 48	OFDMA	BPSK	MCS0
802.11ax (HE40)		38 to 46	38, 46	OFDMA	BPSK	MCS0
802.11ax (HE80)		42	42	OFDMA	BPSK	MCS0
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6Mb/s
802.11ac (VHT20) (for output power)		149 to 165	149, 157, 165	OFDM	BPSK	MCS0
802.11ac (VHT40) (for output power)		151 to 159	151, 159	OFDM	BPSK	MCS0
802.11ac (VHT80) (for output power)		155	155	OFDM	BPSK	MCS0
802.11ax (HE20)		149 to 165	149, 157, 165	OFDMA	BPSK	MCS0
802.11ax (HE40)		151 to 159	151, 159	OFDMA	BPSK	MCS0
802.11ax (HE80)		155	155	OFDMA	BPSK	MCS0
Beamforming Mode (output power only)						
Mode	**FREQ. Band (MHz)**	**Available Channel**	**Tested Channel**	**Modulation Technology**	**Modulation Type**	**Data Rate Parameter**
802.11ac (VHT20)	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	MCS0
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	MCS0
802.11ac (VHT80)		42	42	OFDM	BPSK	MCS0
802.11ax (HE20)		36 to 48	36, 40, 48	OFDMA	BPSK	MCS0
802.11ax (HE40)		38 to 46	38, 46	OFDMA	BPSK	MCS0
802.11ax (HE80)		42	42	OFDMA	BPSK	MCS0
802.11ac (VHT20)	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	MCS0
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	MCS0
802.11ac (VHT80)		155	155	OFDM	BPSK	MCS0
802.11ax (HE20)		149 to 165	149, 157, 165	OFDMA	BPSK	MCS0
802.11ax (HE40)		151 to 159	151, 159	OFDMA	BPSK	MCS0
802.11ax (HE80)		155	155	OFDMA	BPSK	MCS0

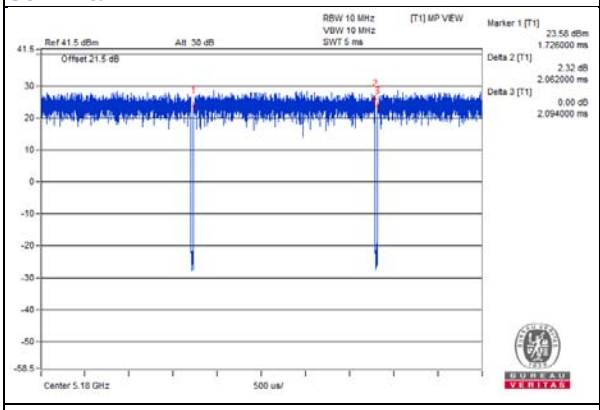
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	24deg. C, 64%RH	120Vac, 60Hz	Kevin Ko
	24deg. C, 65%RH	120Vac, 60Hz	Tom Yang
RE<1G	25deg. C, 73%RH	120Vac, 60Hz	Kevin Ko
PLC	25deg. C, 75%RH	120Vac, 60Hz	Kevin Ko
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

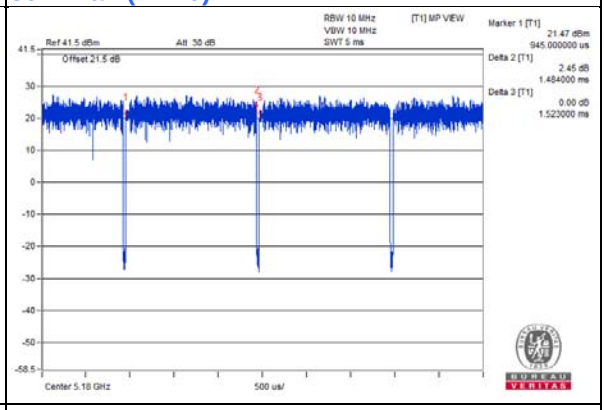
3.3 Duty Cycle of Test Signal

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 = 2.062 ms/2.094 ms = 0.985
802.11ax (HE20): Duty cycle = 1.484 ms/1.523 ms = 0.974, Duty factor = 10 * log (1/Duty cycle) = 0.11
802.11ax (HE40): Duty cycle = 0.771 ms/0.804 ms = 0.959, Duty factor = 10 * log (1/Duty cycle) = 0.18
802.11ax (HE80): Duty cycle = 0.4 ms/0.433 ms = 0.924, Duty factor = 10 * log (1/Duty cycle) = 0.34

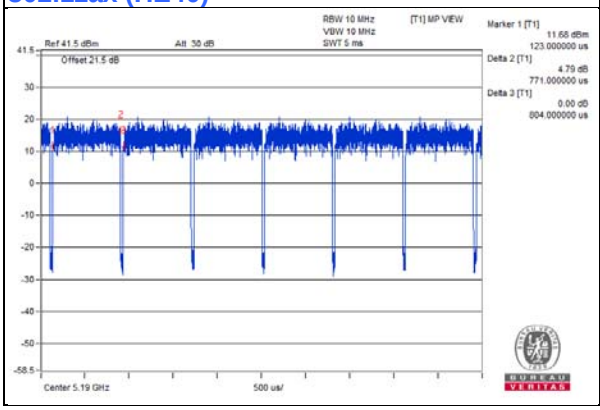
802.11a



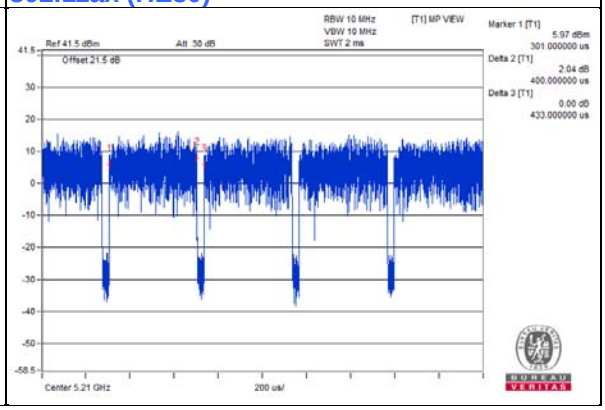
802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)



3.4 Description of Support Units

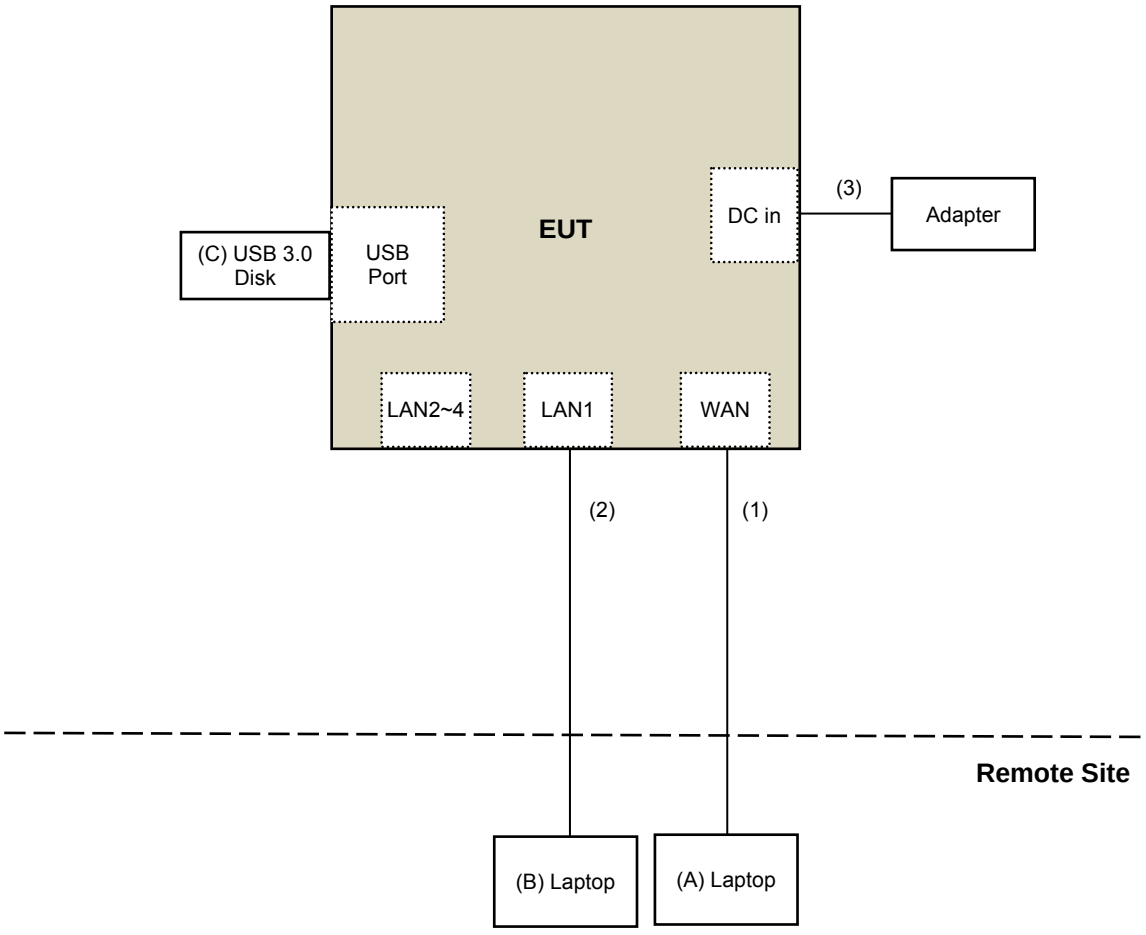
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
B.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
C.	USB 3.0 Disk	SanDisk	MSIP-REM-TAD-S DCZ73	NA	NA	Provided by Lab

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	DC Cable	1	1.8	No	0	Supplied by client

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard and References

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

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

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

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

All test items have been performed as a reference to the above KDB test guidance.

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="2">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="2" 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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Pre-Amplifier EMCI	EMC001340	980142	May 30, 2019	May 29, 2020
Loop Antenna Electro-Metrics	EM-6879	264	Jan. 22, 2019	Jan. 21, 2020
RF Cable	NA	LOOPCAB-001	Jan. 14, 2019	Jan. 13, 2020
RF Cable	NA	LOOPCAB-002	Jan. 14, 2019	Jan. 13, 2020
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Oct. 23, 2019	Oct. 22, 2020
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 11, 2019	Nov. 10, 2020
RF Cable	8D	966-4-1	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-2	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-3	Mar. 19, 2019	Mar. 18, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Sep. 26, 2019	Sep. 25, 2020
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMCI	EMC12630SE	980385	Aug. 15, 2019	Aug. 14, 2020
RF Cable	EMC104-SM-SM-1200	160923	Jan. 28, 2019	Jan. 27, 2020
RF Cable	104 RF cable	131215	Jan. 10, 2019	Jan. 09, 2020
RF Cable	EMC104-SM-SM-6000	180418	May 03, 2019	May 02, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 04, 2019	June 03, 2020
Power meter Anritsu	ML2495A	1014008	May 13, 2019	May 12, 2020
Power sensor Anritsu	MA2411B	0917122	May 13, 2019	May 12, 2020
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 09, 2019	Jan. 08, 2020
True RMS Clamp Meter FLUKE	325	31130711WS	May 21, 2019	May 20, 2020

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Dec. 12 to 13, 2019

4.1.3 Test Procedure

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

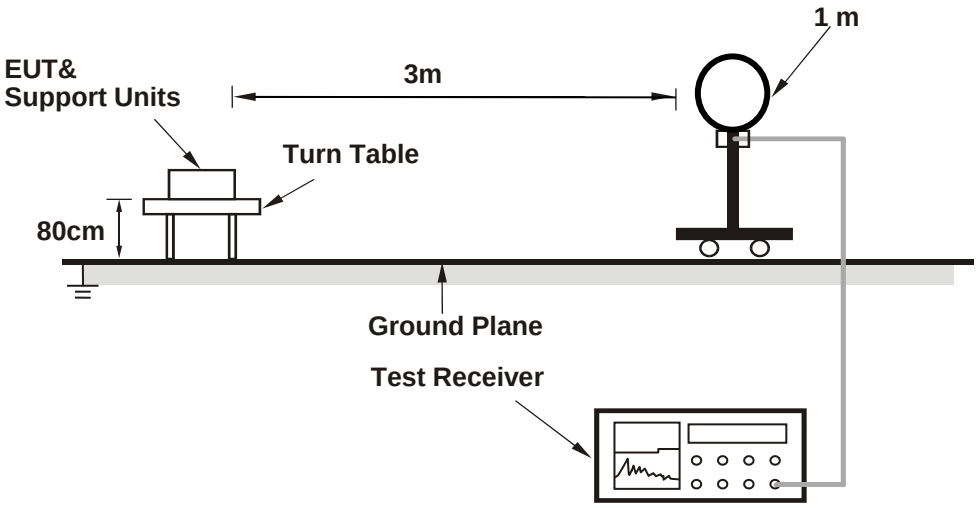
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

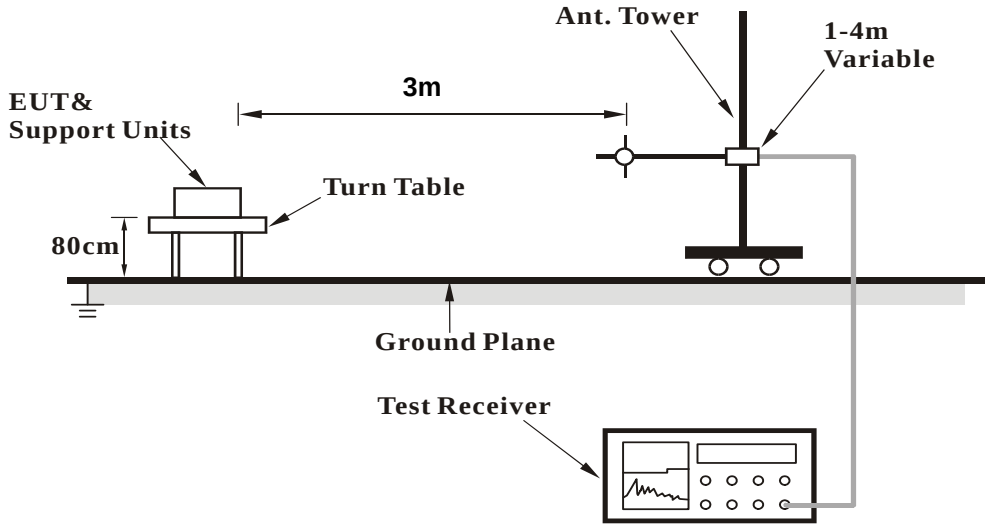
No deviation.

4.1.5 Test Setup

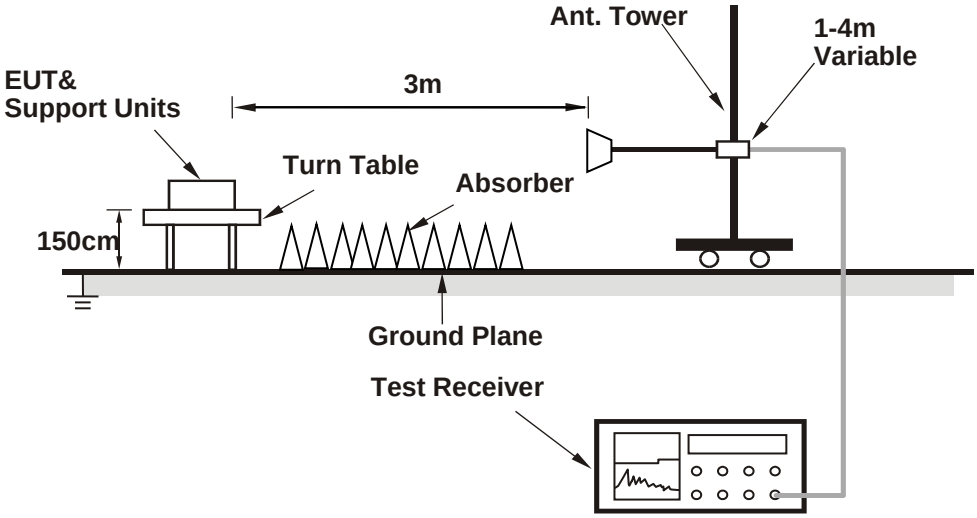
For Radiated emission below 30MHz



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 (Mtool 3.1.0.1) has been activated to set the EUT under transmission condition continuously at specific channel frenquency.

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	5150.00	63.6 PK	74.0	-10.4	2.68 H	270	60.5	3.1
2	5150.00	47.2 AV	54.0	-6.8	2.68 H	270	44.1	3.1
3	*5180.00	114.9 PK			2.68 H	270	111.8	3.1
4	*5180.00	103.6 AV			2.68 H	270	100.5	3.1
5	#10360.00	47.2 PK	68.2	-21.0	2.46 H	285	34.3	12.9
6	15540.00	47.6 PK	74.0	-26.4	1.05 H	222	34.3	13.3
7	15540.00	35.4 AV	54.0	-18.6	1.05 H	222	22.1	13.3
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	5150.00	72.1 PK	74.0	-1.9	2.74 V	338	69.0	3.1
2	5150.00	53.7 AV	54.0	-0.3	2.74 V	338	50.6	3.1
3	*5180.00	121.3 PK			2.74 V	338	118.2	3.1
4	*5180.00	111.3 AV			2.74 V	338	108.2	3.1
5	#10360.00	47.5 PK	68.2	-20.7	1.00 V	156	34.6	12.9
6	15540.00	47.8 PK	74.0	-26.2	1.95 V	295	34.5	13.3
7	15540.00	35.6 AV	54.0	-18.4	1.95 V	295	22.3	13.3

REMARKS:

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

CHANNEL	TX Channel 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	57.8 PK	74.0	-16.2	1.67 H	164	54.7	3.1
2	5150.00	40.6 AV	54.0	-13.4	1.67 H	164	37.5	3.1
3	*5200.00	116.3 PK			1.67 H	164	113.3	3.0
4	*5200.00	106.0 AV			1.67 H	164	103.0	3.0
5	#10400.00	46.7 PK	68.2	-21.5	1.36 H	253	33.6	13.1
6	15600.00	47.2 PK	74.0	-26.8	2.16 H	351	34.1	13.1
7	15600.00	35.2 AV	54.0	-18.8	2.16 H	351	22.1	13.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.9 PK	74.0	-7.1	2.21 V	340	63.8	3.1
2	5150.00	47.2 AV	54.0	-6.8	2.21 V	340	44.1	3.1
3	*5200.00	122.5 PK			2.21 V	340	119.5	3.0
4	*5200.00	113.1 AV			2.21 V	340	110.1	3.0
5	#10400.00	47.3 PK	68.2	-20.9	2.24 V	260	34.2	13.1
6	15600.00	47.2 PK	74.0	-26.8	1.91 V	292	34.1	13.1
7	15600.00	36.2 AV	54.0	-17.8	1.91 V	292	23.1	13.1

REMARKS:

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

CHANNEL	TX Channel 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	115.9 PK			1.42 H	227	113.0	2.9
2	*5240.00	106.2 AV			1.42 H	227	103.3	2.9
3	5350.00	58.3 PK	74.0	-15.7	1.42 H	227	55.2	3.1
4	5350.00	41.0 AV	54.0	-13.0	1.42 H	227	37.9	3.1
5	#10480.00	46.7 PK	68.2	-21.5	2.22 H	78	33.5	13.2
6	15720.00	47.3 PK	74.0	-26.7	1.46 H	12	34.6	12.7
7	15720.00	35.3 AV	54.0	-18.7	1.46 H	12	22.6	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	*5240.00	122.9 PK			1.94 V	152	120.0	2.9
2	*5240.00	113.7 AV			1.94 V	152	110.8	2.9
3	5350.00	61.4 PK	74.0	-12.6	1.94 V	152	58.3	3.1
4	5350.00	47.2 AV	54.0	-6.8	1.94 V	152	44.1	3.1
5	#10480.00	48.1 PK	68.2	-20.1	1.36 V	52	34.9	13.2
6	15720.00	47.0 PK	74.0	-27.0	2.51 V	206	34.3	12.7
7	15720.00	35.9 AV	54.0	-18.1	2.51 V	206	23.2	12.7

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
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	#5574.80	53.6 PK	68.2	-14.6	1.14 H	193	49.9	3.7
2	*5745.00	116.3 PK			1.14 H	193	112.7	3.6
3	*5745.00	106.6 AV			1.14 H	193	103.0	3.6
4	#5983.00	53.0 PK	68.2	-15.2	1.14 H	193	48.5	4.5
5	11490.00	46.4 PK	74.0	-27.6	1.14 H	158	32.7	13.7
6	11490.00	35.5 AV	54.0	-18.5	1.14 H	158	21.8	13.7
7	#17235.00	47.5 PK	68.2	-20.7	1.37 H	263	30.7	16.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5562.35	59.5 PK	68.2	-8.7	2.45 V	349	55.8	3.7
2	*5745.00	123.9 PK			2.45 V	349	120.3	3.6
3	*5745.00	113.7 AV			2.45 V	349	110.1	3.6
4	#5955.09	56.3 PK	68.2	-11.9	2.45 V	349	51.8	4.5
5	11490.00	47.6 PK	74.0	-26.4	1.85 V	142	33.9	13.7
6	11490.00	32.9 AV	54.0	-21.1	1.85 V	142	19.2	13.7
7	#17235.00	47.4 PK	68.2	-20.8	1.98 V	244	30.6	16.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	#5644.18	53.0 PK	68.2	-15.2	1.22 H	200	49.2	3.8
2	*5785.00	116.8 PK			1.22 H	200	113.1	3.7
3	*5785.00	106.3 AV			1.22 H	200	102.6	3.7
4	#5987.97	52.3 PK	68.2	-15.9	1.22 H	200	47.8	4.5
5	11570.00	46.6 PK	74.0	-27.4	1.97 H	269	33.1	13.5
6	11570.00	35.0 AV	54.0	-19.0	1.97 H	269	21.5	13.5
7	#17355.00	48.3 PK	68.2	-19.9	2.62 H	146	31.1	17.2
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	#5596.81	59.9 PK	68.2	-8.3	1.53 V	284	56.2	3.7
2	*5785.00	122.4 PK			1.53 V	284	118.7	3.7
3	*5785.00	112.5 AV			1.53 V	284	108.8	3.7
4	#5960.51	56.3 PK	68.2	-11.9	1.53 V	284	51.8	4.5
5	11570.00	46.8 PK	74.0	-27.2	1.28 V	342	33.3	13.5
6	11570.00	32.7 AV	54.0	-21.3	1.28 V	342	19.2	13.5
7	#17355.00	47.5 PK	68.2	-20.7	2.08 V	280	30.3	17.2

REMARKS:

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

CHANNEL	TX Channel 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	#5583.30	54.9 PK	68.2	-13.3	1.45 H	163	51.2	3.7
2	*5825.00	115.6 PK			1.45 H	163	111.6	4.0
3	*5825.00	105.7 AV			1.45 H	163	101.7	4.0
4	#5967.72	52.6 PK	68.2	-15.6	1.45 H	163	48.1	4.5
5	11650.00	48.0 PK	74.0	-26.0	1.30 H	338	34.7	13.3
6	11650.00	35.2 AV	54.0	-18.8	1.30 H	338	21.9	13.3
7	#17475.00	47.7 PK	68.2	-20.5	1.31 H	265	29.4	18.3
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	#5617.43	60.0 PK	68.2	-8.2	1.86 V	279	56.3	3.7
2	*5825.00	122.8 PK			1.86 V	279	118.8	4.0
3	*5825.00	112.2 AV			1.86 V	279	108.2	4.0
4	#5964.03	56.9 PK	68.2	-11.3	1.86 V	279	52.4	4.5
5	11650.00	47.5 PK	74.0	-26.5	1.53 V	2	34.2	13.3
6	11650.00	32.7 AV	54.0	-21.3	1.53 V	2	19.4	13.3
7	#17475.00	47.3 PK	68.2	-20.9	1.45 V	153	29.0	18.3

REMARKS:

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

802.11ax (HE20)

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	61.3 PK	74.0	-12.7	1.08 H	39	58.2	3.1
2	5150.00	46.7 AV	54.0	-7.3	1.08 H	39	43.6	3.1
3	*5180.00	114.6 PK			1.08 H	39	111.5	3.1
4	*5180.00	102.4 AV			1.08 H	39	99.3	3.1
5	#10360.00	47.0 PK	68.2	-21.2	2.22 H	275	34.1	12.9
6	15540.00	48.3 PK	74.0	-25.7	1.89 H	353	35.0	13.3
7	15540.00	35.3 AV	54.0	-18.7	1.89 H	353	22.0	13.3
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	5150.00	72.7 PK	74.0	-1.3	1.93 V	289	69.6	3.1
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.93 V**	**289**	**50.8**	**3.1**
3	*5180.00	121.5 PK			1.93 V	289	118.4	3.1
4	*5180.00	110.9 AV			1.93 V	289	107.8	3.1
5	#10360.00	48.4 PK	68.2	-19.8	2.17 V	48	35.5	12.9
6	15540.00	48.0 PK	74.0	-26.0	2.61 V	182	34.7	13.3
7	15540.00	35.4 AV	54.0	-18.6	2.61 V	182	22.1	13.3

REMARKS:

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

CHANNEL	TX Channel 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	56.3 PK	74.0	-17.7	1.39 H	336	53.2	3.1
2	5150.00	40.7 AV	54.0	-13.3	1.39 H	336	37.6	3.1
3	*5200.00	116.8 PK			1.39 H	336	113.8	3.0
4	*5200.00	106.3 AV			1.39 H	336	103.3	3.0
5	#10400.00	47.5 PK	68.2	-20.7	1.45 H	162	34.4	13.1
6	15600.00	47.5 PK	74.0	-26.5	2.30 H	144	34.4	13.1
7	15600.00	35.8 AV	54.0	-18.2	2.30 H	144	22.7	13.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	61.6 PK	74.0	-12.4	2.49 V	68	58.5	3.1
2	5150.00	48.2 AV	54.0	-5.8	2.49 V	68	45.1	3.1
3	*5200.00	125.3 PK			2.49 V	68	122.3	3.0
4	*5200.00	112.9 AV			2.49 V	68	109.9	3.0
5	#10400.00	47.0 PK	68.2	-21.2	1.29 V	248	33.9	13.1
6	15600.00	48.3 PK	74.0	-25.7	1.73 V	291	35.2	13.1
7	15600.00	35.9 AV	54.0	-18.1	1.73 V	291	22.8	13.1

REMARKS:

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

CHANNEL	TX Channel 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	116.8 PK			1.94 H	110	113.9	2.9
2	*5240.00	106.1 AV			1.94 H	110	103.2	2.9
3	5350.00	54.5 PK	74.0	-19.5	1.94 H	110	51.4	3.1
4	5350.00	40.4 AV	54.0	-13.6	1.94 H	110	37.3	3.1
5	#10480.00	47.1 PK	68.2	-21.1	2.53 H	5	33.9	13.2
6	15720.00	48.0 PK	74.0	-26.0	1.78 H	240	35.3	12.7
7	15720.00	35.3 AV	54.0	-18.7	1.78 H	240	22.6	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	*5240.00	124.3 PK			1.99 V	154	121.4	2.9
2	*5240.00	112.1 AV			1.99 V	154	109.2	2.9
3	5350.00	59.6 PK	74.0	-14.4	1.99 V	154	56.5	3.1
4	5350.00	47.4 AV	54.0	-6.6	1.99 V	154	44.3	3.1
5	#10480.00	46.6 PK	68.2	-21.6	2.60 V	239	33.4	13.2
6	15720.00	47.0 PK	74.0	-27.0	1.86 V	333	34.3	12.7
7	15720.00	34.9 AV	54.0	-19.1	1.86 V	333	22.2	12.7

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
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	#5577.87	53.1 PK	68.2	-15.1	1.45 H	169	49.4	3.7
2	*5745.00	115.8 PK			1.45 H	169	112.2	3.6
3	*5745.00	104.3 AV			1.45 H	169	100.7	3.6
4	#5950.61	52.5 PK	68.2	-15.7	1.45 H	169	48.0	4.5
5	11490.00	47.6 PK	74.0	-26.4	1.03 H	356	33.9	13.7
6	11490.00	34.9 AV	54.0	-19.1	1.03 H	356	21.2	13.7
7	#17235.00	47.5 PK	68.2	-20.7	1.85 H	208	30.7	16.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5579.38	59.7 PK	68.2	-8.5	1.35 V	285	56.0	3.7
2	*5745.00	122.2 PK			1.35 V	286	118.6	3.6
3	*5745.00	111.2 AV			1.35 V	286	107.6	3.6
4	#5932.87	56.8 PK	68.2	-11.4	1.35 V	285	52.3	4.5
5	11490.00	48.4 PK	74.0	-25.6	1.85 V	132	34.7	13.7
6	11490.00	33.3 AV	54.0	-20.7	1.85 V	132	19.6	13.7
7	#17235.00	47.5 PK	68.2	-20.7	1.09 V	261	30.7	16.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	#5631.66	53.2 PK	68.2	-15.0	1.42 H	170	49.5	3.7
2	*5785.00	116.3 PK			1.42 H	170	112.6	3.7
3	*5785.00	104.7 AV			1.42 H	170	101.0	3.7
4	#5974.08	51.9 PK	68.2	-16.3	1.42 H	170	47.4	4.5
5	11570.00	48.0 PK	74.0	-26.0	2.50 H	156	34.5	13.5
6	11570.00	34.9 AV	54.0	-19.1	2.50 H	156	21.4	13.5
7	#17355.00	46.7 PK	68.2	-21.5	1.51 H	250	29.5	17.2
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	#5598.13	59.2 PK	68.2	-9.0	1.83 V	54	55.5	3.7
2	*5785.00	123.8 PK			1.83 V	54	120.1	3.7
3	*5785.00	113.1 AV			1.83 V	54	109.4	3.7
4	#5952.02	56.2 PK	68.2	-12.0	1.83 V	54	51.7	4.5
5	11570.00	46.9 PK	74.0	-27.1	1.73 V	3	33.4	13.5
6	11570.00	33.3 AV	54.0	-20.7	1.73 V	3	19.8	13.5
7	#17355.00	47.0 PK	68.2	-21.2	2.48 V	171	29.8	17.2

REMARKS:

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

CHANNEL	TX Channel 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	#5568.96	53.6 PK	68.2	-14.6	1.32 H	169	49.9	3.7
2	*5825.00	117.7 PK			1.32 H	169	113.7	4.0
3	*5825.00	105.5 AV			1.32 H	169	101.5	4.0
4	#5957.50	52.0 PK	68.2	-16.2	1.32 H	169	47.5	4.5
5	11650.00	46.5 PK	74.0	-27.5	2.53 H	299	33.2	13.3
6	11650.00	34.9 AV	54.0	-19.1	2.53 H	299	21.6	13.3
7	#17475.00	48.3 PK	68.2	-19.9	1.91 H	94	30.0	18.3
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	#5591.15	60.5 PK	68.2	-7.7	1.81 V	67	56.8	3.7
2	*5825.00	124.7 PK			1.81 V	67	120.7	4.0
3	*5825.00	113.3 AV			1.81 V	67	109.3	4.0
4	#5938.17	56.4 PK	68.2	-11.8	1.81 V	67	51.9	4.5
5	11650.00	48.3 PK	74.0	-25.7	1.71 V	357	35.0	13.3
6	11650.00	33.1 AV	54.0	-20.9	1.71 V	357	19.8	13.3
7	#17475.00	48.3 PK	68.2	-19.9	1.84 V	32	30.0	18.3

REMARKS:

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

802.11ax (HE40)

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	57.6 PK	74.0	-16.4	2.30 H	340	54.5	3.1
2	5150.00	47.2 AV	54.0	-6.8	2.30 H	340	44.1	3.1
3	*5190.00	107.2 PK			2.30 H	340	104.1	3.1
4	*5190.00	96.8 AV			2.30 H	340	93.7	3.1
5	#10380.00	47.2 PK	68.2	-21.0	1.11 H	50	34.2	13.0
6	15570.00	46.9 PK	74.0	-27.1	1.40 H	312	33.7	13.2
7	15570.00	35.4 AV	54.0	-18.6	1.40 H	312	22.2	13.2
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	5150.00	72.0 PK	74.0	-2.0	1.92 V	62	68.9	3.1
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.92 V**	**62**	**50.8**	**3.1**
3	*5190.00	118.0 PK			1.92 V	62	114.9	3.1
4	*5190.00	105.5 AV			1.92 V	62	102.4	3.1
5	#10380.00	47.3 PK	68.2	-20.9	2.05 V	346	34.3	13.0
6	15570.00	48.7 PK	74.0	-25.3	1.79 V	191	35.5	13.2
7	15570.00	35.1 AV	54.0	-18.9	1.79 V	191	21.9	13.2

REMARKS:

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

CHANNEL	TX Channel 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	5150.00	57.4 PK	74.0	-16.6	1.20 H	312	54.3	3.1
2	5150.00	46.6 AV	54.0	-7.4	1.20 H	312	43.5	3.1
3	*5230.00	110.3 PK			1.20 H	312	107.4	2.9
4	*5230.00	100.6 AV			1.20 H	312	97.7	2.9
5	5350.00	53.4 PK	74.0	-20.6	1.20 H	312	50.3	3.1
6	5350.00	40.8 AV	54.0	-13.2	1.20 H	312	37.7	3.1
7	#10460.00	48.1 PK	68.2	-20.1	2.10 H	209	34.9	13.2
8	15690.00	48.3 PK	74.0	-25.7	1.51 H	130	35.5	12.8
9	15690.00	35.2 AV	54.0	-18.8	1.51 H	130	22.4	12.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.9 PK	74.0	-8.1	2.11 V	152	62.8	3.1
2	5150.00	53.8 AV	54.0	-0.2	2.11 V	152	50.7	3.1
3	*5230.00	119.7 PK			2.11 V	152	116.8	2.9
4	*5230.00	108.9 AV			2.11 V	152	106.0	2.9
5	5350.00	59.5 PK	74.0	-14.5	2.11 V	152	56.4	3.1
6	5350.00	48.0 AV	54.0	-6.0	2.11 V	152	44.9	3.1
7	#10460.00	47.8 PK	68.2	-20.4	1.52 V	106	34.6	13.2
8	15690.00	48.0 PK	74.0	-26.0	2.16 V	127	35.2	12.8
9	15690.00	36.3 AV	54.0	-17.7	2.16 V	127	23.5	12.8

REMARKS:

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

CHANNEL	TX Channel 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	#5645.70	55.1 PK	68.2	-13.1	1.34 H	194	51.3	3.8
2	*5755.00	113.8 PK			1.34 H	194	110.2	3.6
3	*5755.00	103.1 AV			1.34 H	194	99.5	3.6
4	#5988.15	52.0 PK	68.2	-16.2	1.34 H	194	47.5	4.5
5	11510.00	47.9 PK	74.0	-26.1	1.46 H	317	34.3	13.6
6	11510.00	35.4 AV	54.0	-18.6	1.46 H	317	21.8	13.6
7	#17265.00	48.2 PK	68.2	-20.0	1.09 H	109	31.3	16.9
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	#5648.69	64.0 PK	68.2	-4.2	1.95 V	55	60.2	3.8
2	*5755.00	120.8 PK			1.95 V	55	117.2	3.6
3	*5755.00	112.2 AV			1.95 V	55	108.6	3.6
4	#5963.89	58.4 PK	68.2	-9.8	1.95 V	55	53.9	4.5
5	11510.00	47.4 PK	74.0	-26.6	1.96 V	340	33.8	13.6
6	11510.00	33.2 AV	54.0	-20.8	1.96 V	340	19.6	13.6
7	#17265.00	48.5 PK	68.2	-19.7	2.30 V	17	31.6	16.9

REMARKS:

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

CHANNEL	TX Channel 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	#5639.35	54.8 PK	68.2	-13.4	1.50 H	168	51.1	3.7
2	*5795.00	115.1 PK			1.50 H	168	111.4	3.7
3	*5795.00	103.2 AV			1.50 H	168	99.5	3.7
4	#5935.09	52.9 PK	68.2	-15.3	1.50 H	168	48.4	4.5
5	11590.00	47.6 PK	74.0	-26.4	2.14 H	240	34.0	13.6
6	11590.00	35.5 AV	54.0	-18.5	2.14 H	240	21.9	13.6
7	#17385.00	46.7 PK	68.2	-21.5	1.09 H	52	29.5	17.2
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	#5642.67	60.3 PK	68.2	-7.9	2.01 V	56	56.5	3.8
2	*5795.00	123.4 PK			2.01 V	56	119.7	3.7
3	*5795.00	112.4 AV			2.01 V	56	108.7	3.7
4	#5931.06	59.5 PK	68.2	-8.7	2.01 V	56	55.0	4.5
5	11590.00	47.9 PK	74.0	-26.1	1.01 V	186	34.3	13.6
6	11590.00	33.8 AV	54.0	-20.2	1.01 V	186	20.2	13.6
7	#17385.00	47.9 PK	68.2	-20.3	1.43 V	346	30.7	17.2

REMARKS:

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

802.11ax (HE80)

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	5150.00	57.7 PK	74.0	-16.3	2.57 H	176	54.6	3.1
2	5150.00	46.7 AV	54.0	-7.3	2.57 H	176	43.6	3.1
3	*5210.00	103.6 PK			2.57 H	176	100.6	3.0
4	*5210.00	92.8 AV			2.57 H	176	89.8	3.0
5	5350.00	49.3 PK	74.0	-24.7	2.57 H	176	46.2	3.1
6	5350.00	38.9 AV	54.0	-15.1	2.57 H	176	35.8	3.1
7	#10420.00	46.5 PK	68.2	-21.7	1.58 H	123	33.3	13.2
8	15630.00	48.2 PK	74.0	-25.8	1.48 H	330	35.2	13.0
9	15630.00	35.8 AV	54.0	-18.2	1.48 H	330	22.8	13.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	71.1 PK	74.0	-2.9	2.01 V	290	68.0	3.1
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**2.01 V**	**290**	**50.8**	**3.1**
3	*5210.00	116.5 PK			2.01 V	290	113.5	3.0
4	*5210.00	105.0 AV			2.01 V	290	102.0	3.0
5	5350.00	56.8 PK	74.0	-17.2	2.01 V	290	53.7	3.1
6	5350.00	45.1 AV	54.0	-8.9	2.01 V	290	42.0	3.1
7	#10420.00	47.6 PK	68.2	-20.6	1.02 V	60	34.4	13.2
8	15630.00	47.0 PK	74.0	-27.0	1.53 V	255	34.0	13.0
9	15630.00	36.0 AV	54.0	-18.0	1.53 V	255	23.0	13.0

REMARKS:

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

CHANNEL	TX Channel 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	#5645.25	58.6 PK	68.2	-9.6	1.19 H	194	54.8	3.8
2	*5775.00	110.6 PK			1.19 H	194	106.9	3.7
3	*5775.00	98.7 AV			1.19 H	194	95.0	3.7
4	#5925.50	56.7 PK	68.2	-11.5	1.19 H	194	52.4	4.3
5	11550.00	46.3 PK	74.0	-27.7	1.53 H	159	32.7	13.6
6	11550.00	35.0 AV	54.0	-19.0	1.53 H	159	21.4	13.6
7	#17325.00	48.3 PK	68.2	-19.9	1.31 H	29	31.3	17.0
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	#5650.93	66.9 PK	68.9	-2.0	1.82 V	55	63.1	3.8
2	*5775.00	119.0 PK			1.82 V	55	115.3	3.7
3	*5775.00	107.7 AV			1.82 V	55	104.0	3.7
4	#5943.51	62.9 PK	68.2	-5.3	1.82 V	55	58.4	4.5
5	11550.00	46.6 PK	74.0	-27.4	1.82 V	92	33.0	13.6
6	11550.00	33.1 AV	54.0	-20.9	1.82 V	92	19.5	13.6
7	#17325.00	48.1 PK	68.2	-20.1	1.32 V	353	31.1	17.0

REMARKS:

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

Below 1GHz Data:

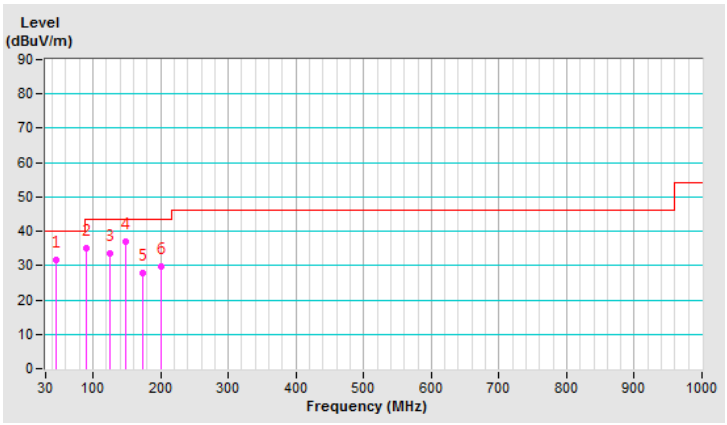
802.11a

CHANNEL	TX Channel 149	**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	45.98	31.8 QP	40.0	-8.2	3.00 H	297	39.7	-7.9
2	90.29	35.0 QP	43.5	-8.5	2.00 H	258	48.7	-13.7
3	125.01	33.5 QP	43.5	-10.0	3.00 H	56	42.9	-9.4
4	148.36	36.9 QP	43.5	-6.6	2.00 H	107	44.6	-7.7
5	174.21	27.8 QP	43.5	-15.7	3.00 H	297	36.4	-8.6
6	199.99	29.8 QP	43.5	-13.7	2.00 H	80	40.7	-10.9

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

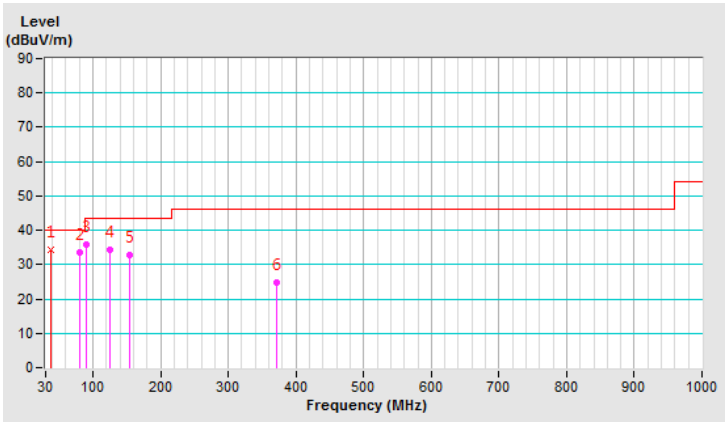


CHANNEL	TX Channel 149	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	37.98	34.3 QP	40.0	-5.7	1.00 V	345	42.5	-8.2
2	79.74	33.6 QP	40.0	-6.4	1.00 V	273	46.2	-12.6
3	89.63	35.7 QP	43.5	-7.8	2.00 V	312	49.4	-13.7
4	125.01	34.1 QP	43.5	-9.4	1.00 V	115	43.5	-9.4
5	154.57	32.6 QP	43.5	-10.9	1.00 V	360	40.1	-7.5
6	372.22	24.7 QP	46.0	-21.3	1.00 V	64	29.6	-4.9

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 17, 2019	Mar. 16, 2020
50 ohms Terminator	50	3	Oct. 23, 2019	Oct. 22, 2020
RF Cable	5D-FB	COCCAB-001	Sep. 27, 2019	Sep. 26, 2020
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 14, 2019	Mar. 13, 2020
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
3 Tested Date: Dec. 12, 2019

4.2.3 Test Procedure

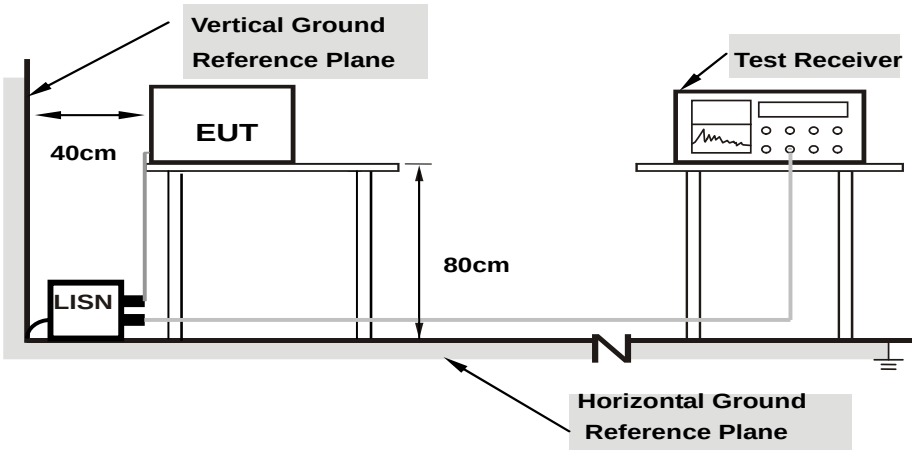
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

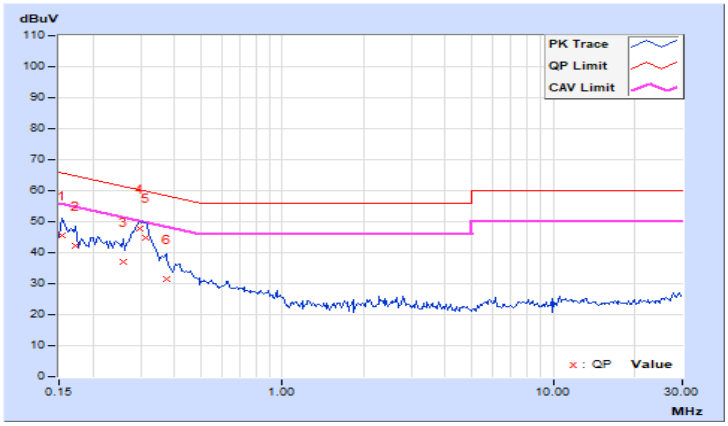
4.2.7 Test Results

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

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.99	35.39	17.43	45.38	27.42	65.79	55.79	-20.41	-28.37
2	0.17344	9.99	32.07	15.96	42.06	25.95	64.79	54.79	-22.73	-28.84
3	0.25938	9.99	27.21	18.13	37.20	28.12	61.45	51.45	-24.25	-23.33
4	0.29844	9.99	37.76	28.49	47.75	38.48	60.29	50.29	-12.54	-11.81
5	0.31406	10.00	34.87	28.89	44.87	38.89	59.86	49.86	-14.99	-10.97
6	0.37266	10.00	21.38	14.27	31.38	24.27	58.44	48.44	-27.06	-24.17

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

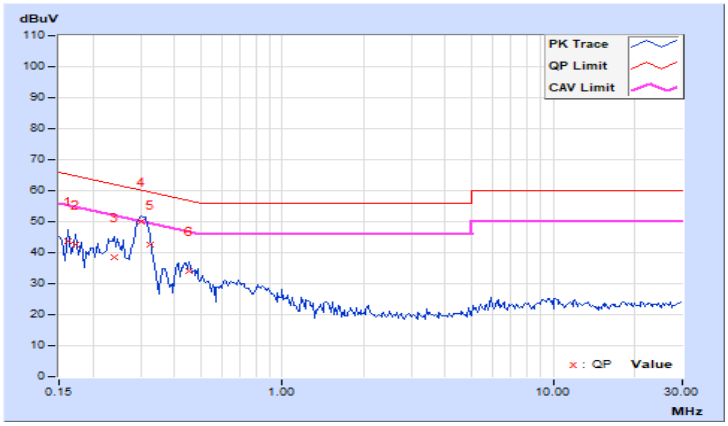


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	9.99	33.59	20.69	43.58	30.68	65.38	55.38	-21.80	-24.70
2	0.17344	9.99	32.53	16.98	42.52	26.97	64.79	54.79	-22.27	-27.82
3	0.23984	9.99	28.66	21.57	38.65	31.56	62.10	52.10	-23.45	-20.54
4	**0.30234**	**10.00**	**40.11**	**30.84**	**50.11**	**40.84**	**60.18**	**50.18**	**-10.07**	**-9.34**
5	0.32578	10.00	32.65	23.48	42.65	33.48	59.56	49.56	-16.91	-16.08
6	0.45469	10.01	23.88	16.52	33.89	26.53	56.79	46.79	-22.90	-20.26

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

Note: This device can support different category application which switched by access point mode and client mode by software.

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

Non-Beamforming Mode

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	23.16	23.23	24.20	23.00	879.945	29.44	30	Pass
40	5200	23.00	23.30	23.89	23.10	862.402	29.36	30	Pass
48	5240	23.02	23.32	23.99	23.02	866.288	29.38	30	Pass
149	5745	23.60	24.02	24.70	23.45	997.865	29.99	30	Pass
157	5785	23.32	23.24	24.44	23.28	916.431	29.62	30	Pass
165	5825	23.18	23.22	24.50	23.03	900.611	29.55	30	Pass

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	21.60	21.90	22.73	21.48	627.53	27.98	30	Pass
40	5200	23.18	23.47	24.07	23.49	908.928	29.59	30	Pass
48	5240	23.32	23.48	24.09	23.35	910.347	29.59	30	Pass
149	5745	23.38	23.82	24.51	23.27	953.574	29.79	30	Pass
157	5785	23.61	23.46	24.38	23.31	939.881	29.73	30	Pass
165	5825	23.11	23.19	24.53	23.00	896.411	29.53	30	Pass

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	19.58	20.08	20.97	20.12	420.469	26.24	30	Pass
46	5230	23.17	22.98	24.08	23.10	866.133	29.38	30	Pass
151	5755	24.50	23.14	24.26	22.84	946.896	29.76	30	Pass
159	5795	24.47	23.15	23.90	22.69	917.687	29.63	30	Pass

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	20.39	20.38	20.43	20.44	439.61	26.43	30	Pass
155	5775	24.13	23.29	24.28	22.64	923.696	29.66	30	Pass

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	21.74	22.06	22.87	21.65	649.833	28.13	30	Pass
40	5200	23.34	23.56	24.21	23.54	932.337	29.70	30	Pass
48	5240	23.42	23.62	24.23	23.44	935.58	29.71	30	Pass
149	5745	23.53	23.98	24.68	23.44	990.024	29.96	30	Pass
157	5785	23.79	23.63	24.56	23.47	978.097	29.90	30	Pass
165	5825	23.32	23.35	24.71	23.17	934.347	29.71	30	Pass

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	19.70	20.22	21.09	20.27	433.464	26.37	30	Pass
46	5230	23.29	23.07	24.21	23.16	886.719	29.48	30	Pass
151	5755	24.68	23.31	24.42	23.01	984.734	29.93	30	Pass
159	5795	24.64	23.31	24.09	22.84	954.118	29.80	30	Pass

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	20.53	20.54	20.57	20.61	455.325	26.58	30	Pass
155	5775	24.24	23.40	24.40	22.73	947.159	29.76	30	Pass

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	21.60	21.90	22.73	21.48	627.53	27.98	29.39	Pass
40	5200	22.80	23.01	23.67	23.01	823.327	29.16	29.39	Pass
48	5240	22.83	23.05	23.70	22.89	822.663	29.15	29.39	Pass
149	5745	22.36	22.78	23.47	22.27	752.844	28.77	29.34	Pass
157	5785	22.63	22.46	23.37	22.26	744.966	28.72	29.34	Pass
165	5825	22.12	22.16	23.50	22.08	712.675	28.53	29.34	Pass

Note: 1. For U-NII-1: The directional gain = 6.61 dBi > 6 dBi, so the power limit shall be reduced to 30-(6.61-6) = 29.39 dBm.
2. For U-NII-3: The directional gain = 6.66 dB > 6 dBi, so the power limit shall be reduced to 30-(6.66-6) = 29.34 dBm.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	19.58	20.08	20.97	20.12	420.469	26.24	29.39	Pass
46	5230	23.02	22.78	23.91	22.86	829.352	29.19	29.39	Pass
151	5755	23.48	22.10	23.20	22.02	753.176	28.77	29.34	Pass
159	5795	23.43	22.12	22.97	22.63	764.607	28.83	29.34	Pass

Note: 1. For U-NII-1: The directional gain = 6.61 dBi > 6 dBi, so the power limit shall be reduced to 30-(6.61-6) = 29.39 dBm.
2. For U-NII-3: The directional gain = 6.66 dB > 6 dBi, so the power limit shall be reduced to 30-(6.66-6) = 29.34 dBm.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	20.39	20.38	20.43	20.44	439.61	26.43	29.39	Pass
155	5775	23.47	21.98	22.99	22.27	747.814	28.74	29.34	Pass

Note: 1. For U-NII-1: The directional gain = 6.61 dBi > 6 dBi, so the power limit shall be reduced to 30-(6.61-6) = 29.39 dBm.
2. For U-NII-3: The directional gain = 6.66 dB > 6 dBi, so the power limit shall be reduced to 30-(6.66-6) = 29.34 dBm.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	21.74	22.06	22.87	21.65	649.833	28.13	29.39	Pass
40	5200	22.99	23.21	23.86	23.19	860.147	29.35	29.39	Pass
48	5240	23.07	23.27	23.88	23.09	863.139	29.36	29.39	Pass
149	5745	22.53	22.98	23.68	22.44	786.404	28.96	29.34	Pass
157	5785	22.79	22.63	23.56	22.45	776.117	28.90	29.34	Pass
165	5825	22.32	22.36	23.70	22.26	745.485	28.72	29.34	Pass

Note: 1. For U-NII-1: The directional gain = 6.61 dBi > 6 dBi, so the power limit shall be reduced to 30-(6.61-6) = 29.39 dBm.
2. For U-NII-3: The directional gain = 6.66 dB > 6 dBi, so the power limit shall be reduced to 30-(6.66-6) = 29.34 dBm.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	19.70	20.22	21.09	20.27	433.464	26.37	29.39	Pass
46	5230	23.19	22.94	24.06	23.02	860.368	29.35	29.39	Pass
151	5755	23.68	22.31	23.40	22.23	789.447	28.97	29.34	Pass
159	5795	23.62	22.30	23.12	22.84	797.393	29.02	29.34	Pass

Note: 1. For U-NII-1: The directional gain = 6.61 dBi > 6 dBi, so the power limit shall be reduced to 30-(6.61-6) = 29.39 dBm.
2. For U-NII-3: The directional gain = 6.66 dB > 6 dBi, so the power limit shall be reduced to 30-(6.66-6) = 29.34 dBm.

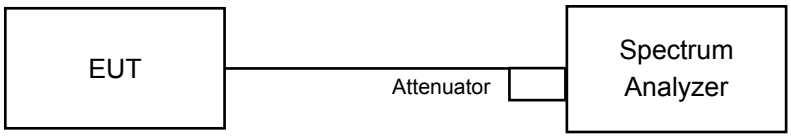
802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	20.53	20.54	20.57	20.61	455.325	26.58	29.39	Pass
155	5775	23.66	22.17	23.16	22.43	779.089	28.92	29.34	Pass

Note: 1. For U-NII-1: The directional gain = 6.61 dBi > 6 dBi, so the power limit shall be reduced to 30-(6.61-6) = 29.39 dBm.
2. For U-NII-3: The directional gain = 6.66 dB > 6 dBi, so the power limit shall be reduced to 30-(6.66-6) = 29.34 dBm.

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

Non-Beamforming Mode

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	16.80	16.80	16.92	17.04
40	5200	17.04	17.16	17.04	16.80
48	5240	16.92	17.04	16.92	17.04
149	5745	17.16	17.16	17.40	17.04
157	5785	17.28	16.92	17.40	17.28
165	5825	17.16	17.04	17.52	17.16

802.11ax (HE20)

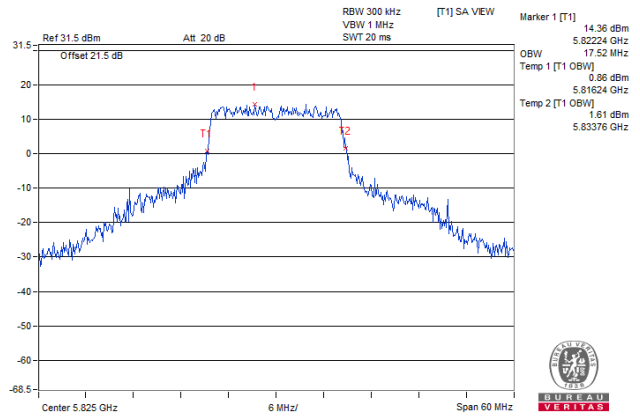
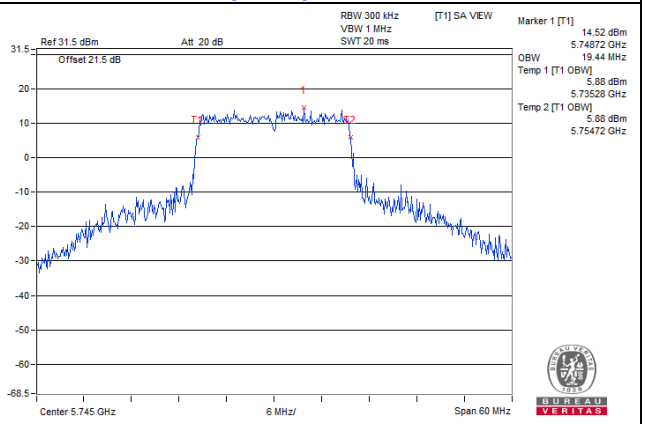
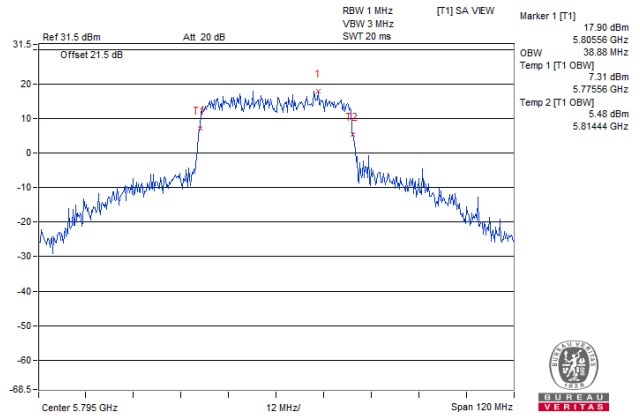
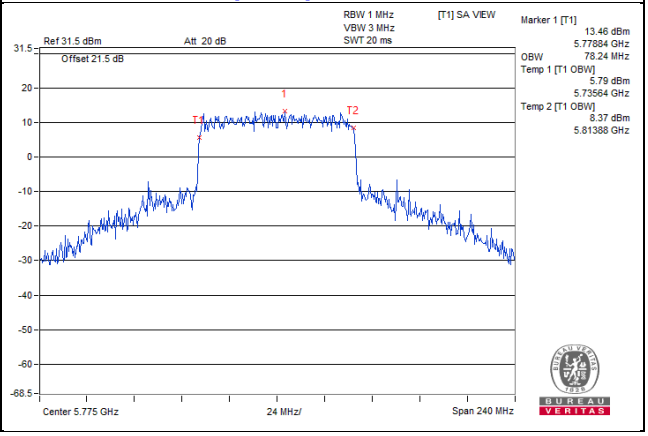
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	19.08	19.20	19.08	19.20
40	5200	19.08	19.08	19.08	19.20
48	5240	19.20	19.20	19.08	19.20
149	5745	19.44	19.32	19.32	19.08
157	5785	19.32	19.20	19.32	19.08
165	5825	19.20	19.20	19.32	19.20

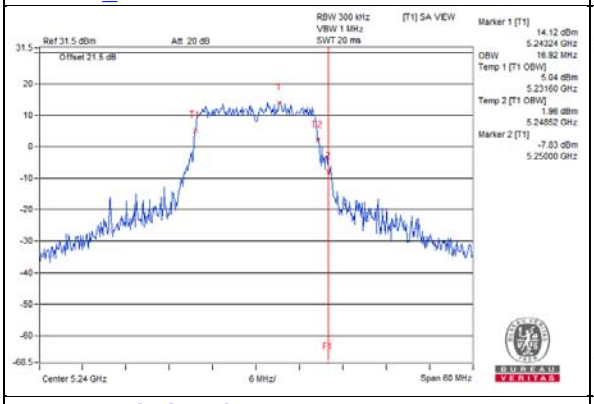
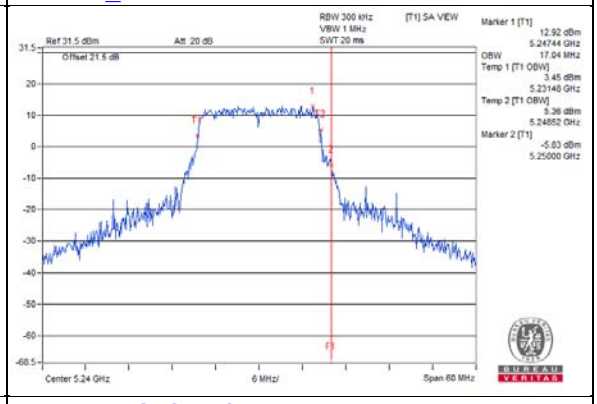
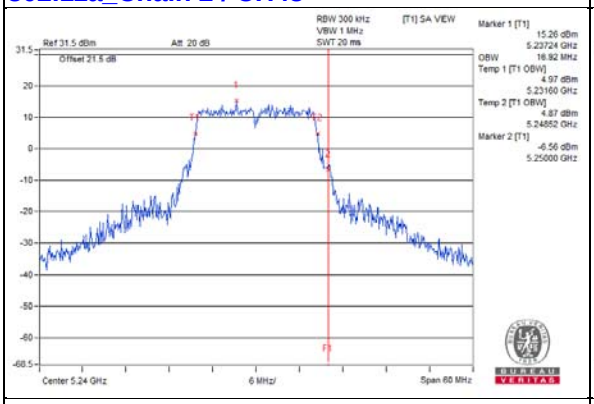
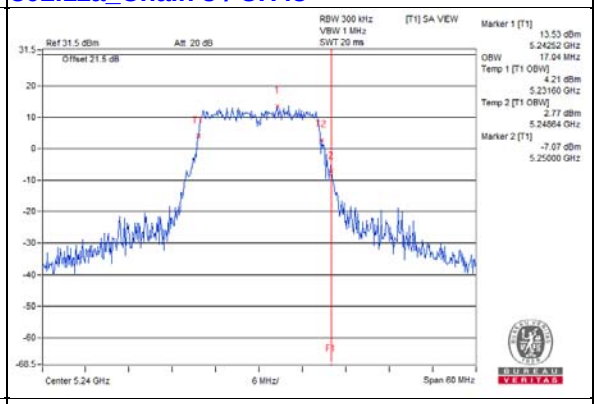
802.11ax (HE40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	37.68	37.92	37.92	37.68
46	5230	37.92	37.92	37.92	37.92
151	5755	38.64	38.16	37.92	37.92
159	5795	38.88	38.16	37.92	38.16

802.11ax (HE80)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	77.76	77.28	77.28	77.28
155	5775	78.24	77.28	77.76	77.76

Spectrum Plot of Max. Value	
802.11a_Chain 2 / CH165	**802.11ax (HE20)_Chain 0 / CH149**
	
802.11ax (HE40)_Chain 0 / CH159	**802.11ax (HE80)_Chain 0 / CH155**
	

Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2A band)	
802.11a_Chain 0 / CH48	**802.11a_Chain 1 / CH48**
	
802.11a_Chain 2 / CH48	**802.11a_Chain 3 / CH48**
	
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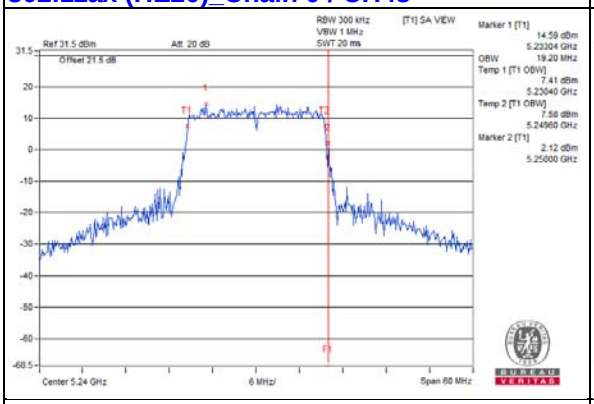
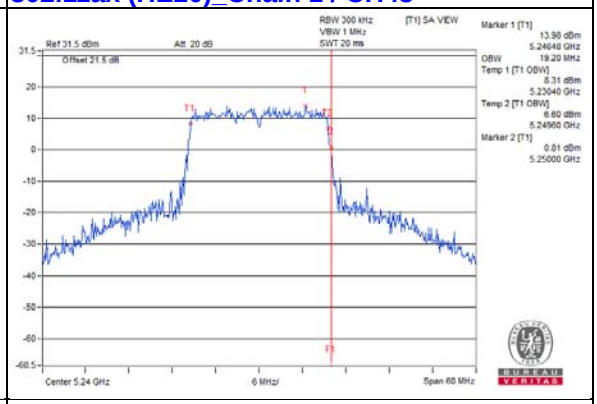
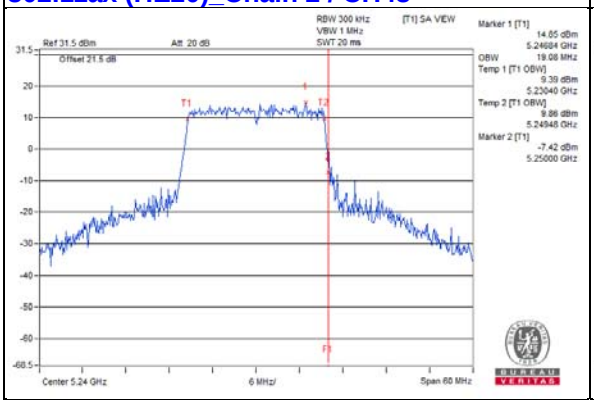
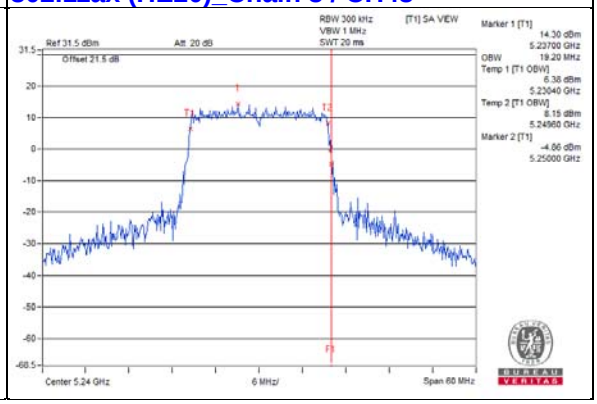
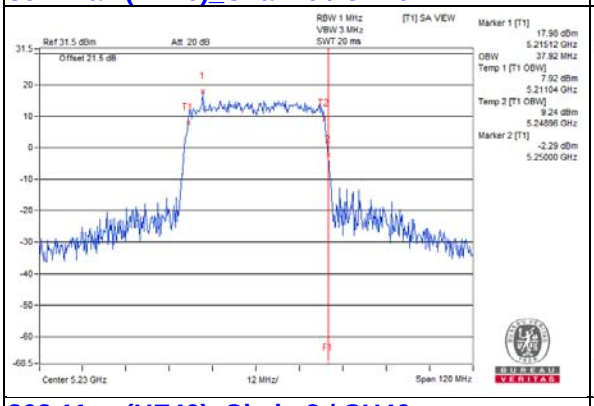
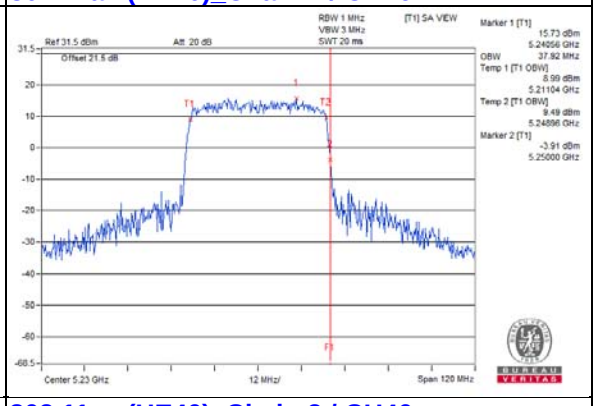
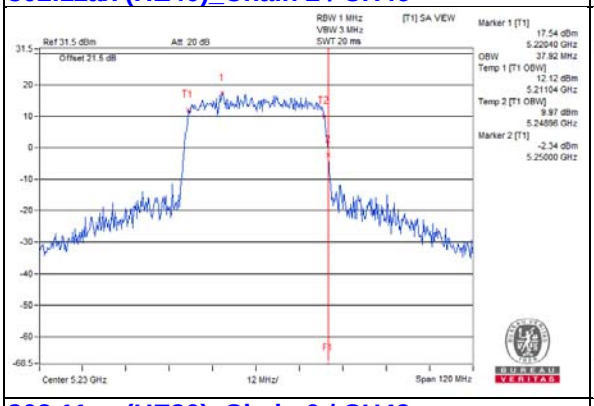
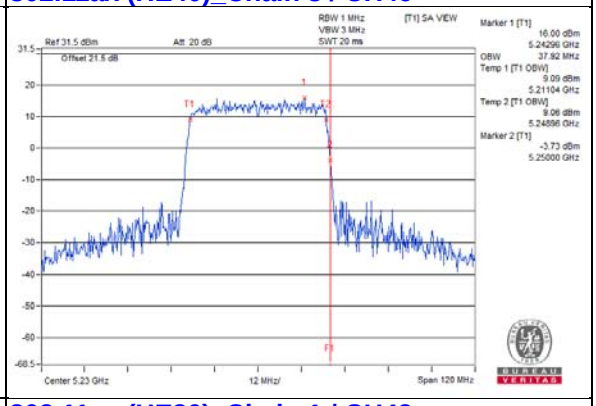
	
802.11ax (HE20)_Chain 2 / CH48	**802.11ax (HE20)_Chain 3 / CH48**
	

Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2A band)	
802.11ax (HE40)_Chain 0 / CH46	**802.11ax (HE40)_Chain 1 / CH46**
	
802.11ax (HE40)_Chain 2 / CH46	**802.11ax (HE40)_Chain 3 / CH46**
	
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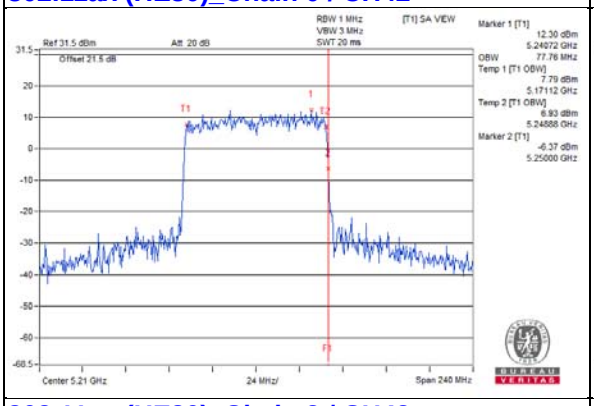	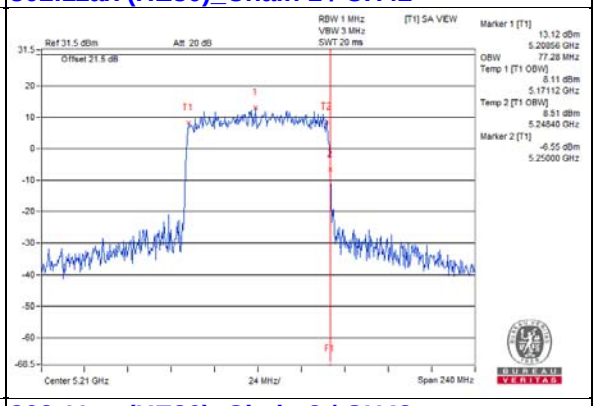
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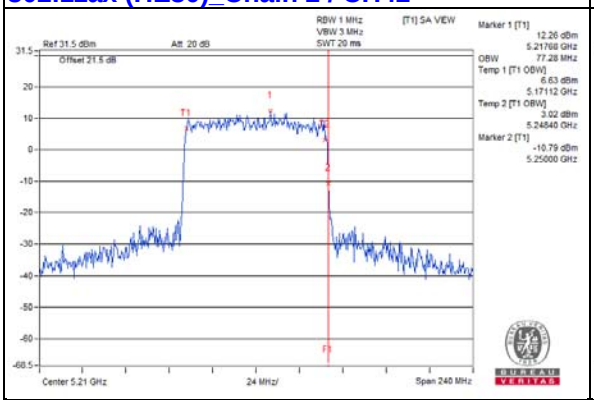	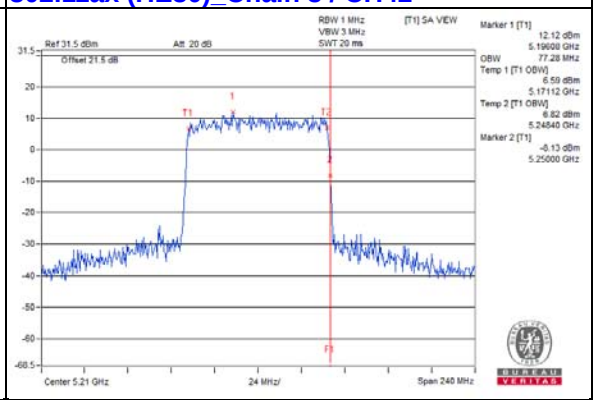

Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2C band)	
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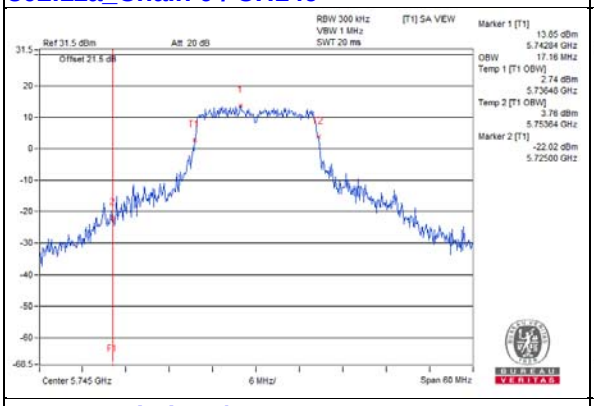	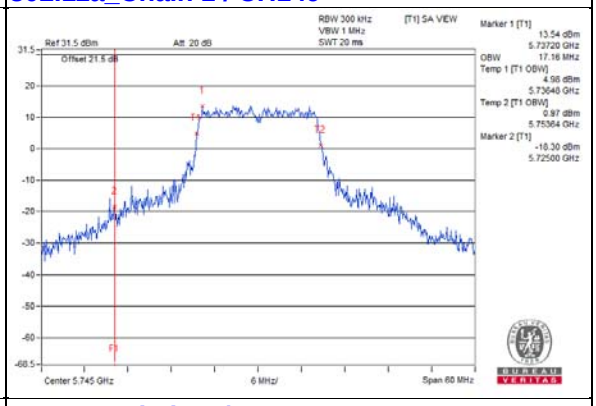
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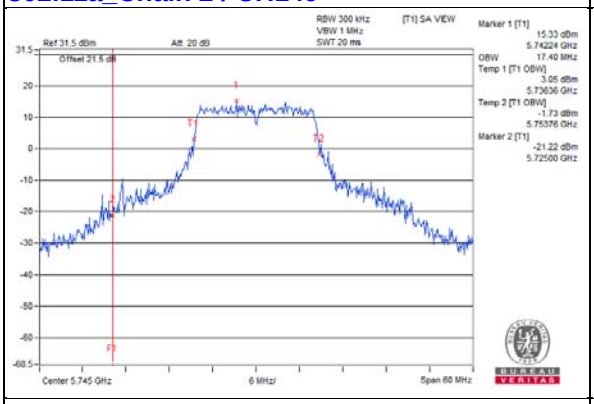	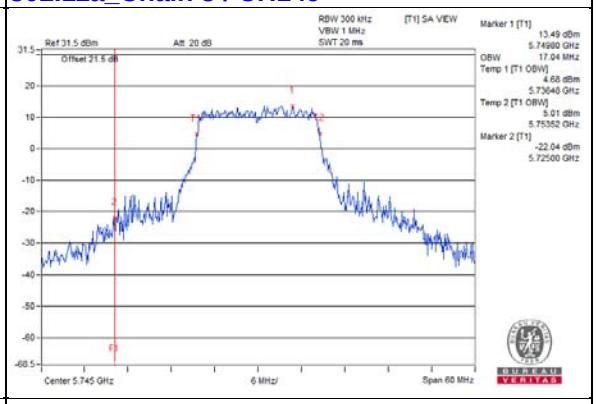
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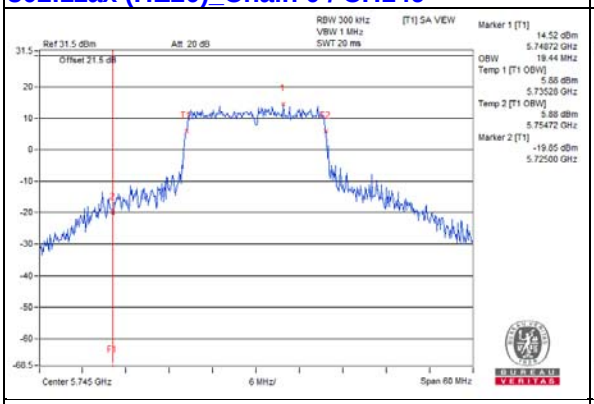	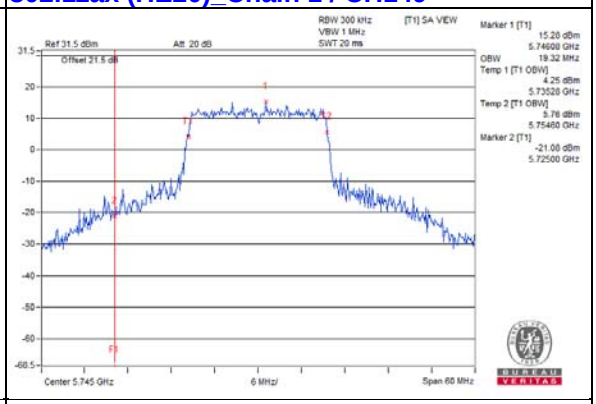
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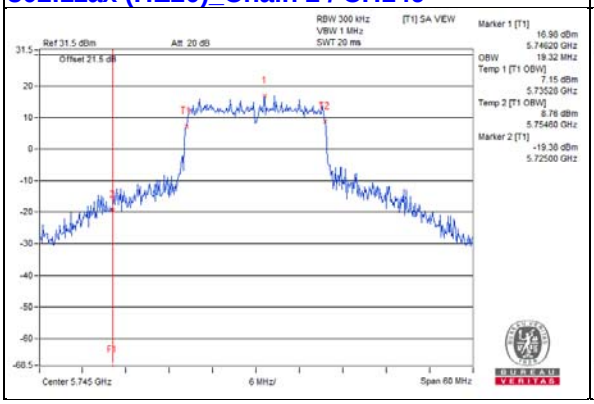
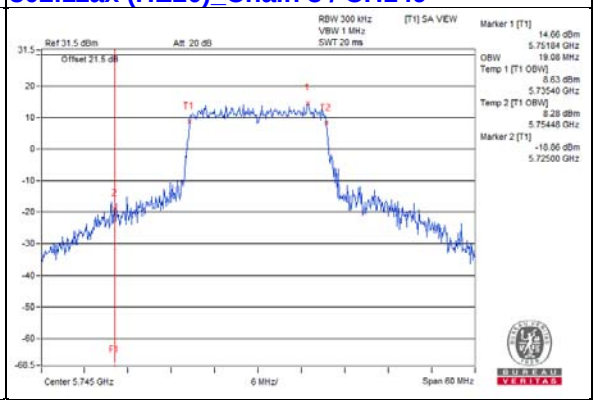
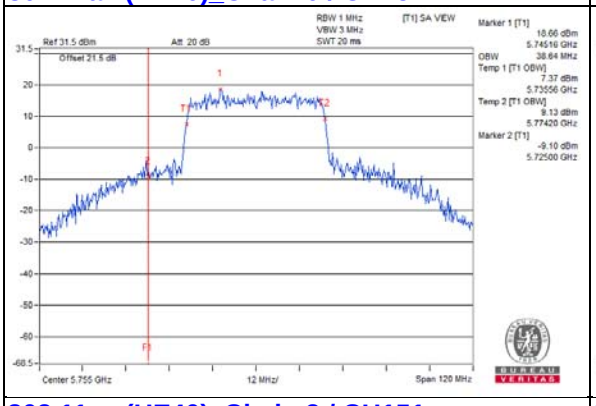
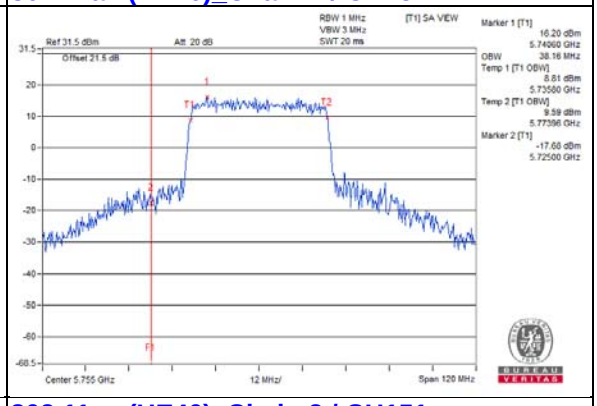
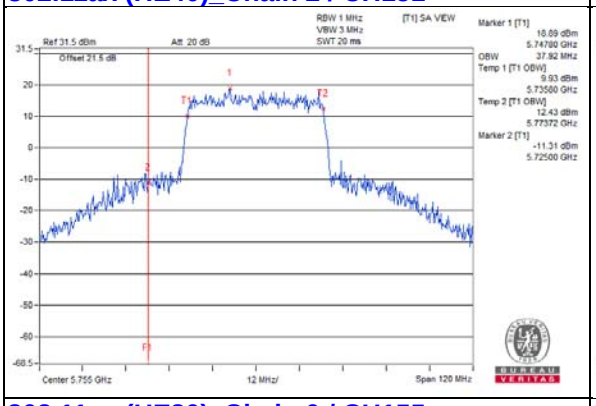
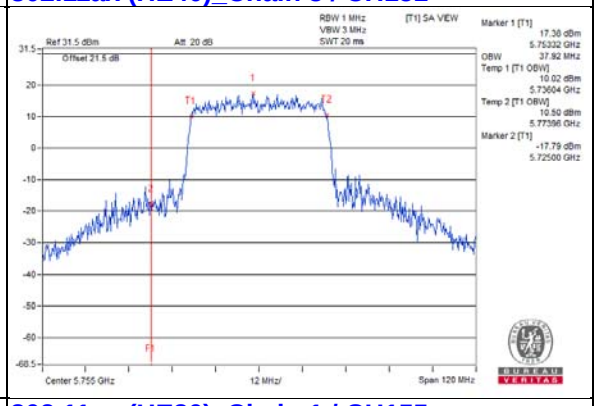
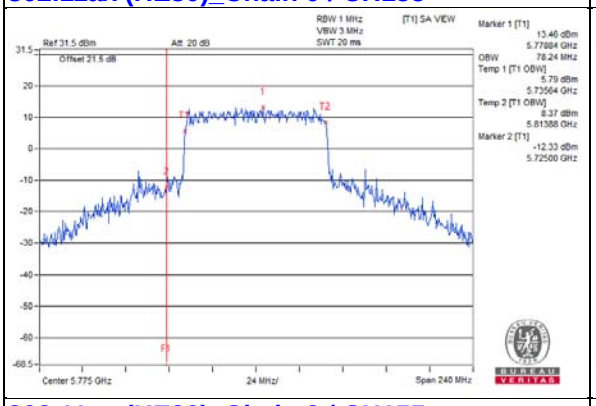
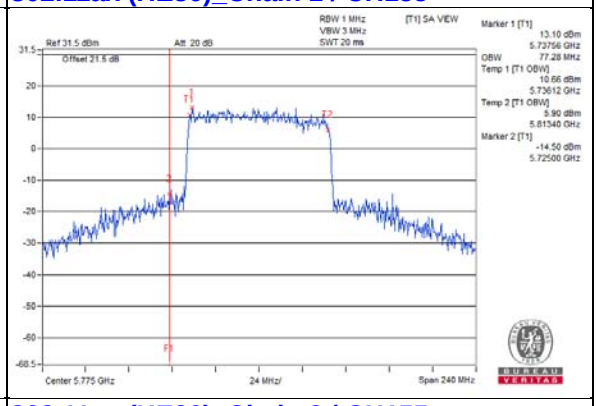
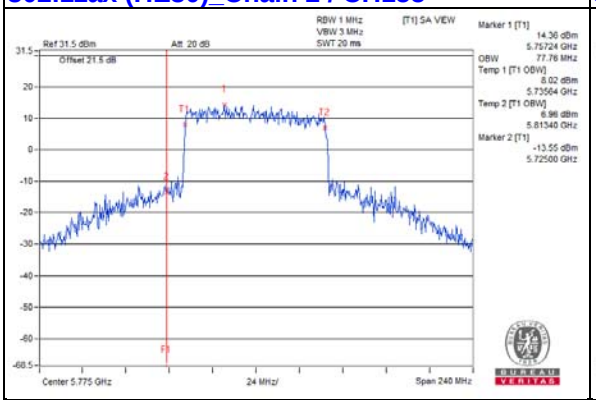
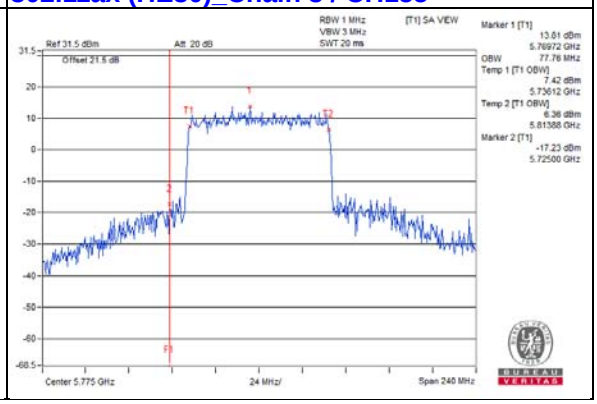
	

Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2C band)	
802.11ax (HE40)_Chain 0 / CH151	**802.11ax (HE40)_Chain 1 / CH151**
	
802.11ax (HE40)_Chain 2 / CH151	**802.11ax (HE40)_Chain 3 / CH151**
	
802.11ax (HE80)_Chain 0 / CH155	**802.11ax (HE80)_Chain 1 / CH155**
	
802.11ax (HE80)_Chain 2 / CH155	**802.11ax (HE80)_Chain 3 / CH155**
	

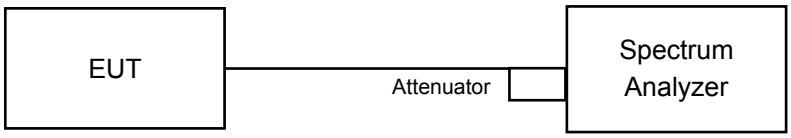
4.5 Peak Power Spectral Density Measurement

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

Note: This device can support different category application which switched by access point mode and client mode by software.

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 801.11a

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 other modulation mode

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 801.11a

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 other modulation mode

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

Non-Beamforming Mode

For U-NII-1:

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
36	5180	9.04	8.66	9.66	8.41	14.99	16.39	Pass
40	5200	9.58	9.50	9.85	9.14	15.55	16.39	Pass
48	5240	9.64	9.60	9.90	9.00	15.57	16.39	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 = 6.61 dBi > 6dBi, so the power density limit shall be reduced to 17-(6.61-6) = 16.39 dBm.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	6.72	6.90	7.41	6.54	0.11	13.04	16.39	Pass
40	5200	8.71	8.78	9.38	8.64	0.11	15.02	16.39	Pass
48	5240	8.82	8.76	9.41	8.54	0.11	15.03	16.39	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 = 6.61 dBi > 6dBi, so the power density limit shall be reduced to 17-(6.61-6) = 16.39 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	3.98	3.13	3.06	3.93	0.18	9.75	16.39	Pass
46	5230	5.12	4.92	5.93	4.84	0.18	11.43	16.39	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 = 6.61 dBi > 6dBi, so the power density limit shall be reduced to 17-(6.61-6) = 16.39 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

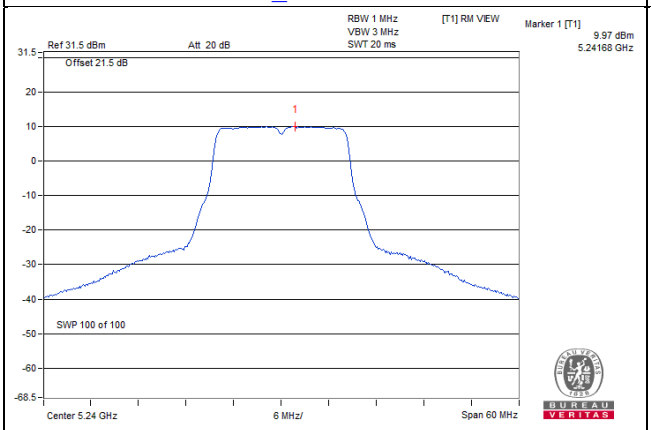
802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	1.84	1.35	1.05	1.54	0.34	7.82	16.39	Pass

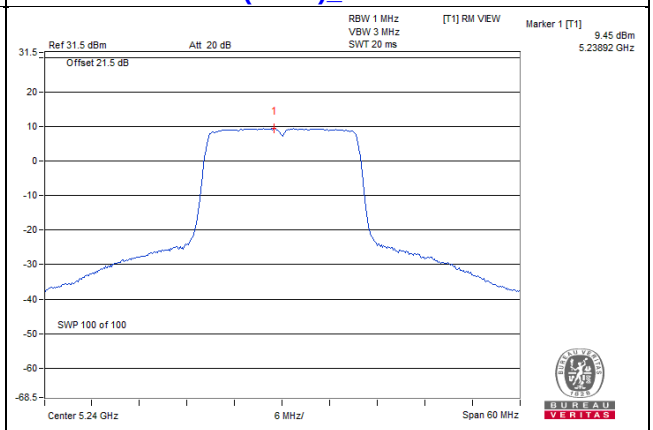
Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = 6.61 dBi > 6dBi, so the power density limit shall be reduced to 17-(6.61-6) = 16.39 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

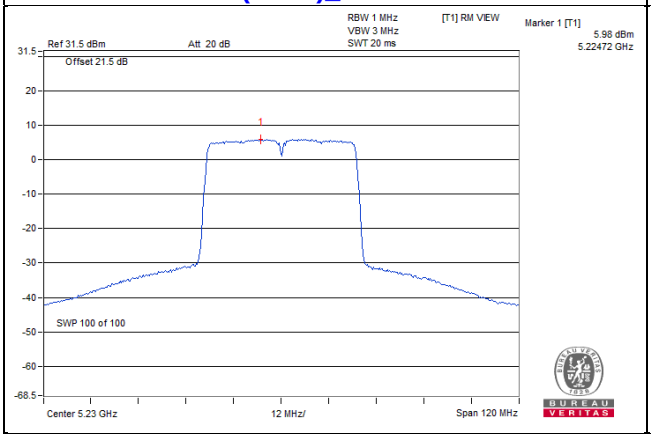
802.11a_Chain 2 / CH48



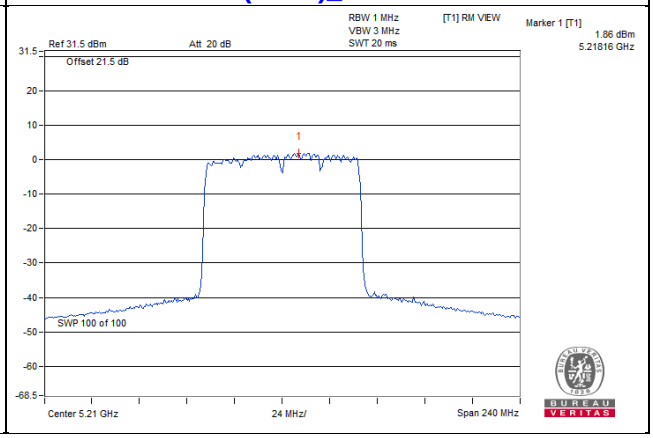
802.11ax (HE20)_Chain 2 / CH48



802.11ax (HE40)_Chain 2 / CH46



802.11ax (HE80)_Chain 0 / CH42



For U-NII-3:

802.11a

Chan.	Freq. (MHz)	PSD (dBm/300kHz)				Total PSD		Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3	dBm/300kHz	dBm/500kHz		
149	5745	1.59	1.67	2.77	1.68	7.98	10.20	29.34	Pass
157	5785	1.25	1.24	2.60	1.47	7.70	9.92	29.34	Pass
165	5825	1.00	1.07	2.45	1.29	7.51	9.73	29.34	Pass

Note: 1. Method b) 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 = 6.66 dBi > 6dBi, so the power density limit shall be reduced to 30-(6.66-6) = 29.34 dBm.

802.11ax (HE20)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)				Duty Factor (dB)	Total PSD With Duty Factor		Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3		dBm/300kHz	dBm/500kHz		
149	5745	0.52	0.61	1.64	0.48	0.11	6.97	9.19	29.34	Pass
157	5785	0.69	0.68	1.64	0.37	0.11	7.01	9.23	29.34	Pass
165	5825	0.14	0.41	1.80	-0.19	0.11	6.74	8.96	29.34	Pass

Note: 1. Method b) 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 = 6.66 dBi > 6dBi, so the power density limit shall be reduced to 30-(6.66-6) = 29.34 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)				Duty Factor (dB)	Total PSD With Duty Factor		Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3		dBm/300kHz	dBm/500kHz		
151	5755	-1.66	-2.66	-1.70	-2.84	0.18	4.02	6.24	29.34	Pass
159	5795	-1.72	-2.48	-2.02	-3.24	0.18	3.87	6.09	29.34	Pass

Note: 1. Method b) 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 = 6.66 dBi > 6dBi, so the power density limit shall be reduced to 30-(6.66-6) = 29.34 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

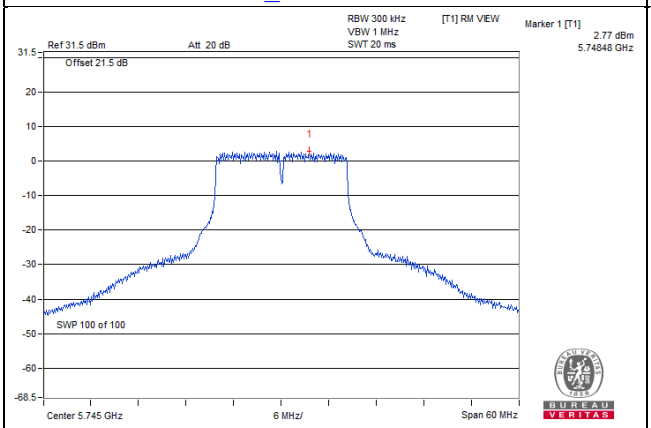
802.11ax (HE80)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)				Duty Factor (dB)	Total PSD With Duty Factor		Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3		dBm/300kHz	dBm/500kHz		
155	5775	-5.10	-5.26	-4.52	-6.09	0.34	1.16	3.38	29.34	Pass

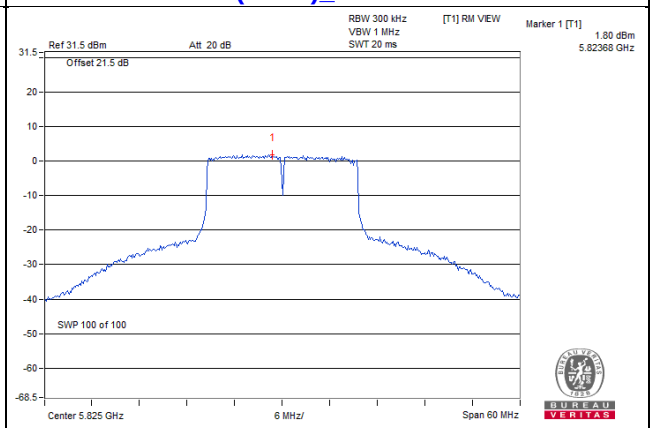
Note: 1. Method b) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = 6.66 dBi > 6dBi, so the power density limit shall be reduced to 30-(6.66-6) = 29.34 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

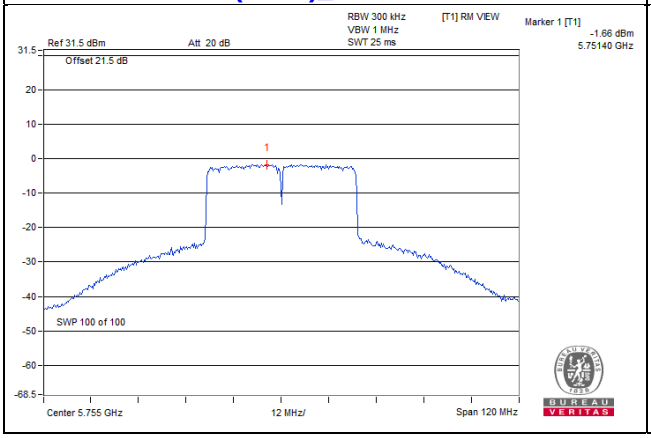
802.11a_Chain 2 / CH149



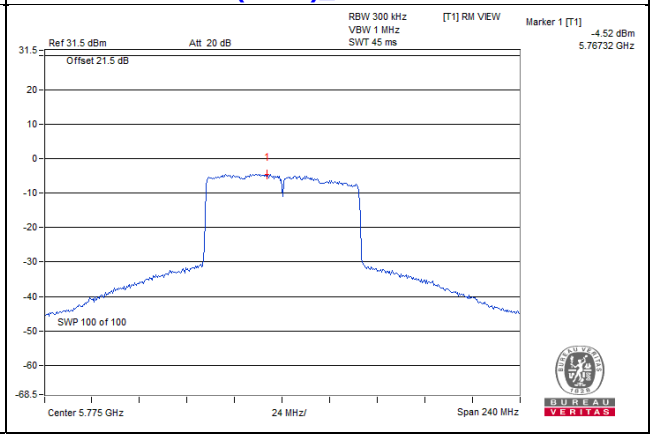
802.11ax (HE20)_Chain 2 / CH165



802.11ax (HE40)_Chain 0 / CH151



802.11ax (HE80)_Chain 2 / CH155

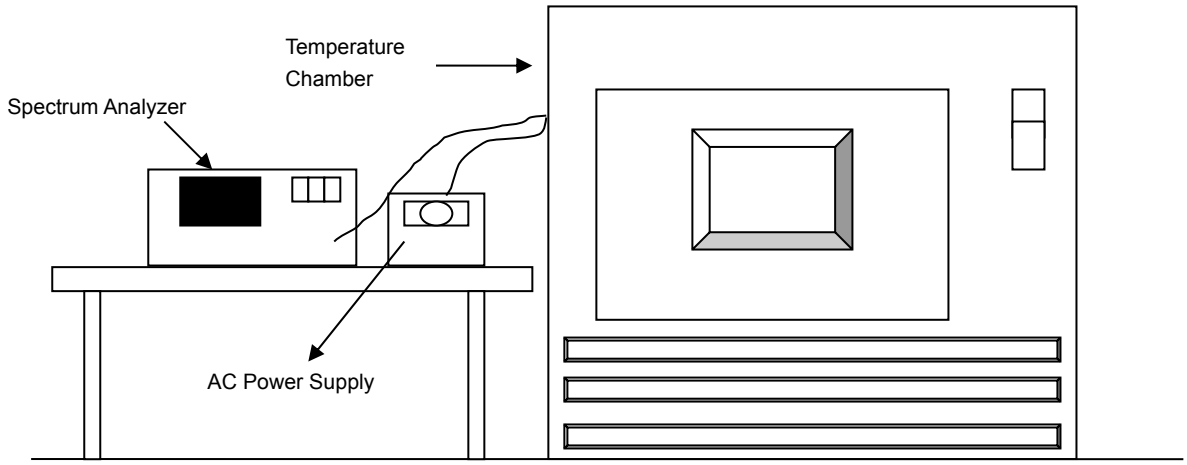


4.6 Frequency Stability Measurement

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 (d) with the temperature chamber set to the next desired temperature until measurements down to the lowest specified temperature have been completed.
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	5179.9788	Pass	5179.98	Pass	5179.9806	Pass	5179.9804	Pass
40	120	5180.0187	Pass	5180.0146	Pass	5180.019	Pass	5180.0187	Pass
30	120	5180.0148	Pass	5180.0153	Pass	5180.0175	Pass	5180.0164	Pass
20	120	5180.0045	Pass	5180.0041	Pass	5180.0058	Pass	5180.0009	Pass
10	120	5179.9972	Pass	5179.9988	Pass	5180.0009	Pass	5179.9981	Pass
0	120	5180.025	Pass	5180.0239	Pass	5180.0213	Pass	5180.0204	Pass
-10	120	5180.0192	Pass	5180.0226	Pass	5180.0233	Pass	5180.0201	Pass
-20	120	5179.9817	Pass	5179.9793	Pass	5179.9805	Pass	5179.9769	Pass
-30	120	5180.0135	Pass	5180.015	Pass	5180.0122	Pass	5180.0143	Pass

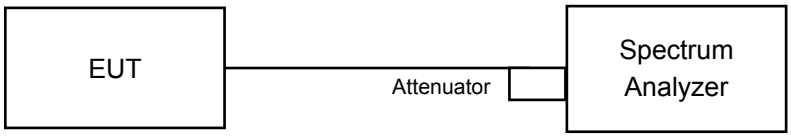
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5180.0039	Pass	5180.0044	Pass	5180.0062	Pass	5180.001	Pass
	120	5180.0045	Pass	5180.0041	Pass	5180.0058	Pass	5180.0009	Pass
	102	5180.0041	Pass	5180.004	Pass	5180.0051	Pass	5180.0013	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

Non-Beamforming Mode

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.42	16.42	16.44	16.42	0.5	Pass
157	5785	16.42	16.45	16.42	16.43	0.5	Pass
165	5825	16.42	16.44	16.44	16.42	0.5	Pass

802.11ax (HE20)

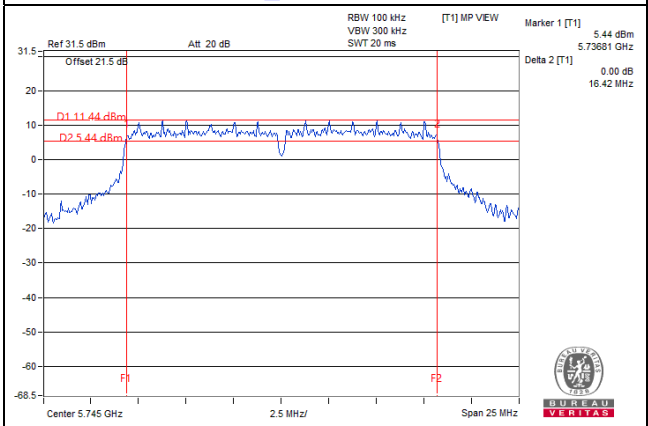
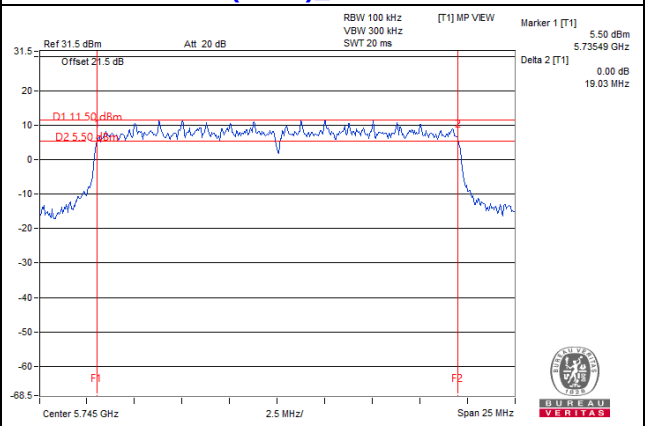
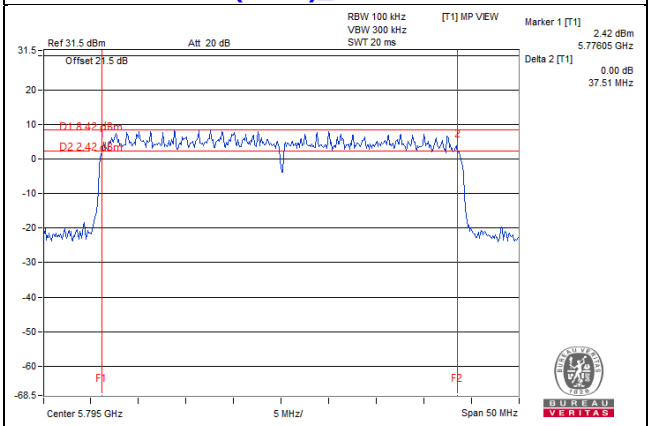
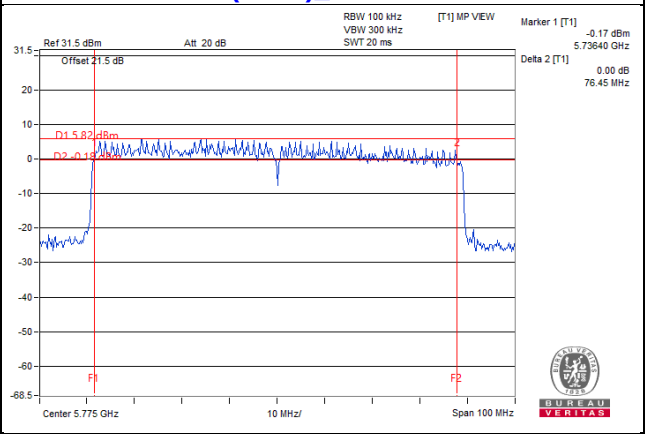
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	19.03	19.08	19.09	19.04	0.5	Pass
157	5785	19.06	19.09	19.08	19.10	0.5	Pass
165	5825	19.08	19.04	19.07	19.08	0.5	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	37.74	37.72	37.71	37.75	0.5	Pass
159	5795	37.75	37.51	37.52	37.84	0.5	Pass

802.11ax (HE80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	77.22	76.45	76.56	77.18	0.5	Pass

Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH149	**802.11ax (HE20)_Chain 0 / CH149**
	
802.11ax (HE40)_Chain 1 / CH159	**802.11ax (HE80)_Chain 1 / CH155**
	

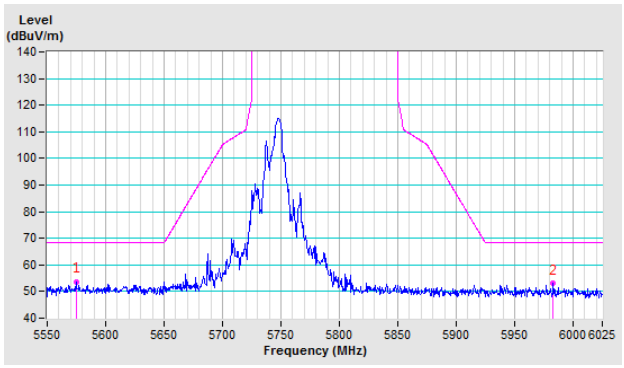
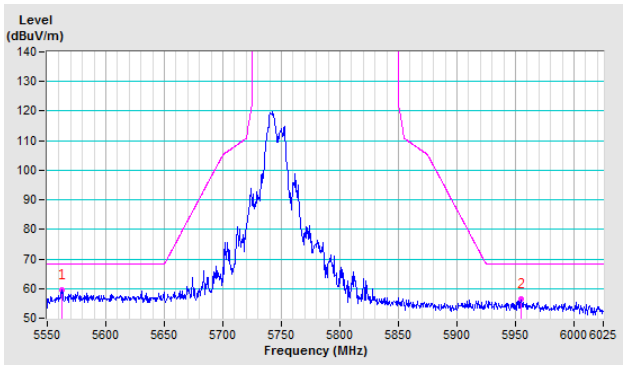
5 Pictures of Test Arrangements

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

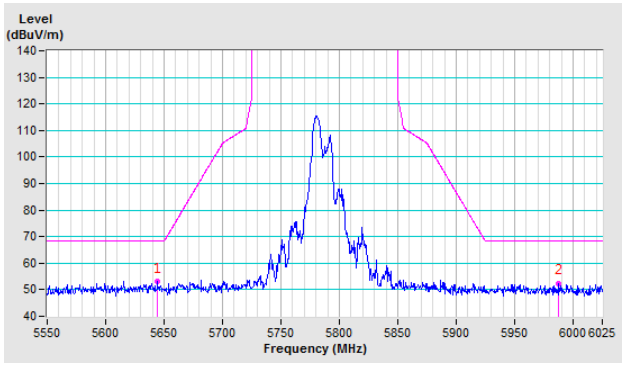
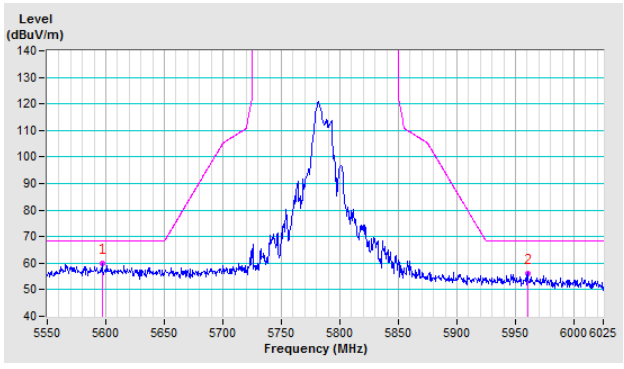
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

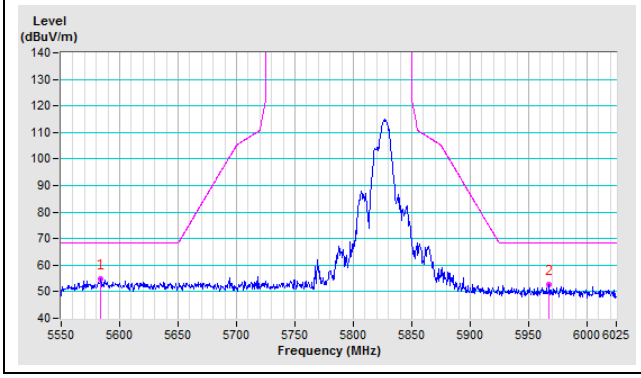
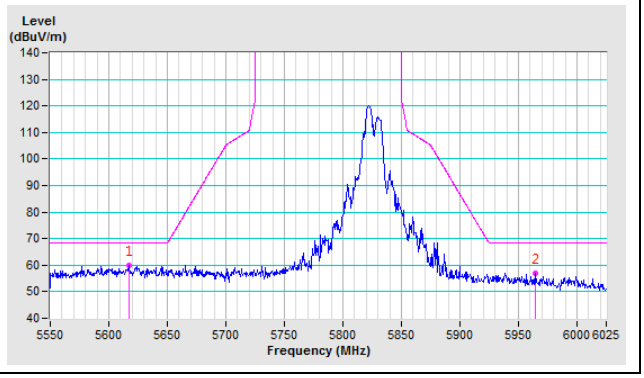
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

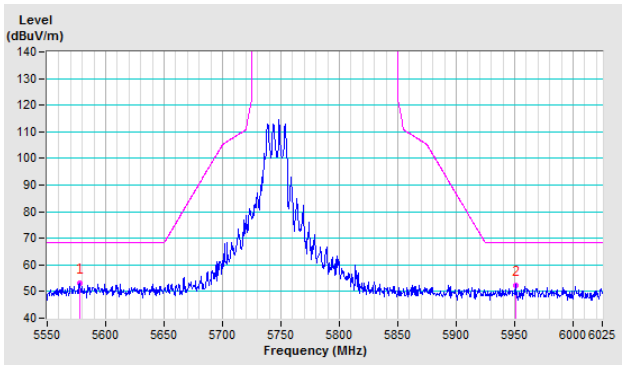
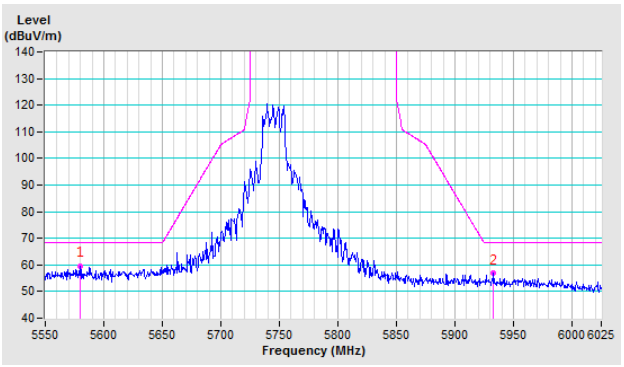
Horizontal	Vertical
	

CH 165 5825 MHz

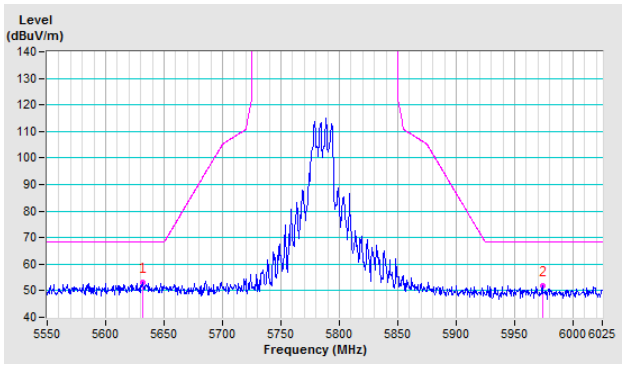
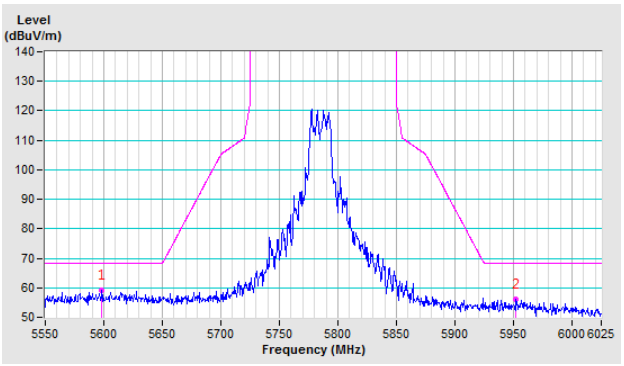
Horizontal	Vertical
	

802.11ax (HE20)

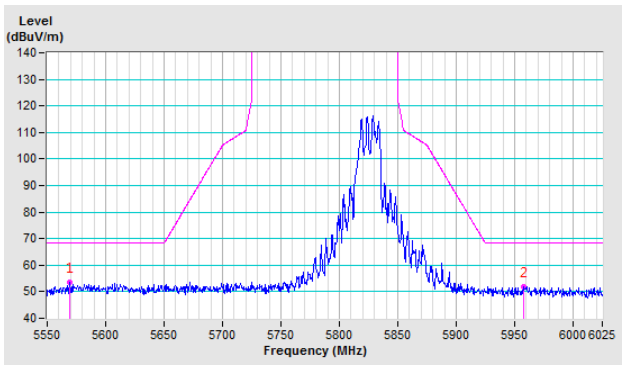
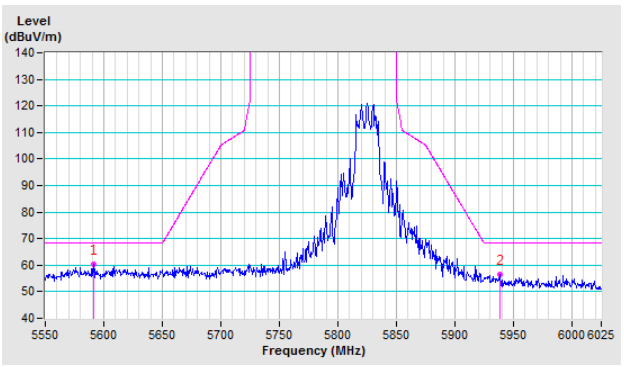
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

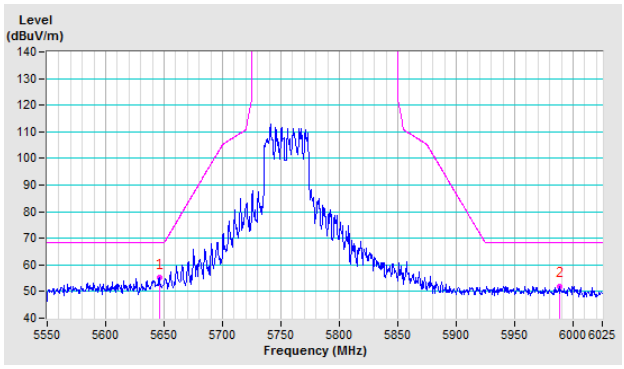
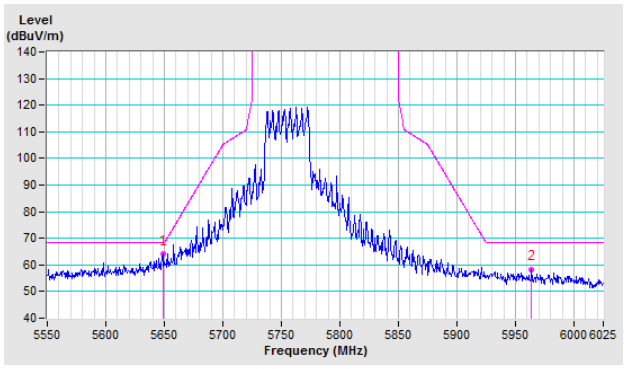
Horizontal	Vertical
	

CH 165 5825 MHz

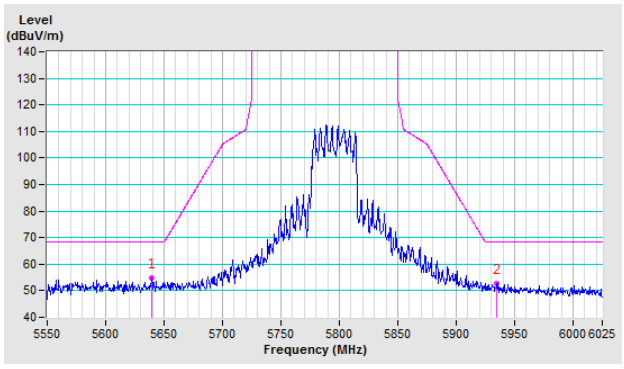
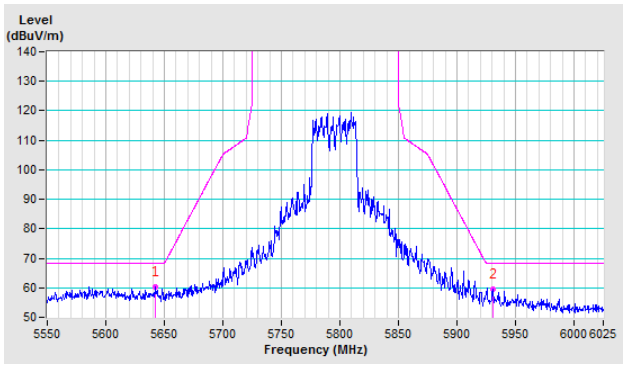
Horizontal	Vertical
	

802.11ax (HE40)

CH 151 5755 MHz

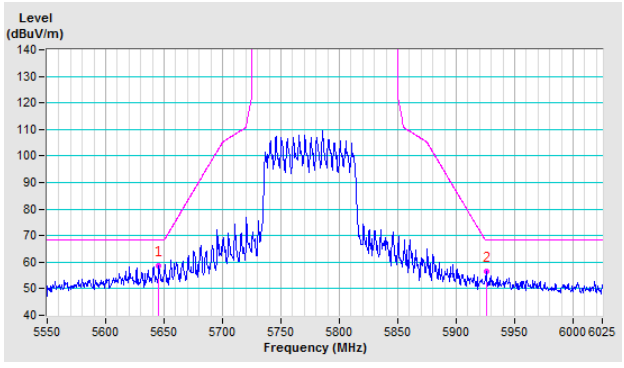
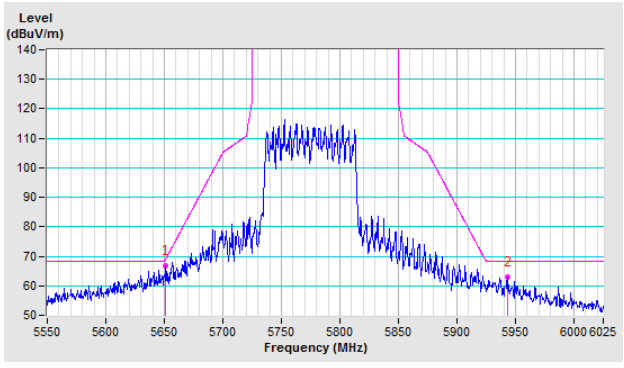
Horizontal	Vertical
	

CH 159 5795 MHz

Horizontal	Vertical
	

802.11ax (HE80)

CH 155 5775 MHz

Horizontal	Vertical
	

Appendix – Information of the Testing Laboratories

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

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

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

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