FCC Test Report (WLAN)

Report No.:	RF190725E05C-1
FCC ID:	PY319300460
Test Model:	EAX20
Received Date:	Oct. 25, 2019
Test Date:	Nov. 08 to 28, 2019
Issued Date:	Dec. 10, 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
RF190725E05C-1	Original release.	Dec. 10, 2019

1 Certificate of Conformity

Product:	AX1800 Mesh Extender
Brand:	NETGEAR
Test Model:	EAX20
Sample Status:	ENGINEERING SAMPLE
Applicant:	NETGEAR, Inc.
Test Date:	Nov. 08 to 28, 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 , **Date:** Dec. 10, 2019

Phoenix Huang / Specialist

Approved by : , **Date:** Dec. 10, 2019

Clark Lin / Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -7.55dB at 0.31016MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5147.20MHz, 5150.00MHz and 5621.12MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF) 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	AX1800 Mesh Extender
Brand	NETGEAR
Test Model	EAX20
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in VHT20/40 mode 1024QAM for OFDM in 11ac mode 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 300 Mbps 802.11ac: up to 866.7 Mbps 802.11ax: up to 1201 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, 802.11ax (HE20): 11 802.11n (HT40), VHT40, 802.11ax (HE40): 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 9 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 4 802.11ac (VHT80), 802.11ax (HE80): 2
Output Power	**Non-Beamforming Mode:** **2.412 ~ 2.462 GHz:** 995.663 mW **5.18 ~ 5.24 GHz:** 880.125 mW **5.745 ~ 5.825 GHz:** 986.32 mW **Beamforming Mode:** **2.412 ~ 2.462 GHz:** 883.556 mW **5.18 ~ 5.24 GHz:** 876.053 mW **5.745 ~ 5.825 GHz:** 986.32 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. 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.		

2. 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, 1.8m
2	NETGEAR	AD2067F10	332-10797-01	Input: 100-120Vac, 1.0A, 50/60Hz Output: 12V, 2.5A DC Output cable: Unshielded, 1.8m
Note: From the above adapters, the AC Power Conducted Emissions and Radiated Emissions worse case was found in **Adapter 1**. Therefore only the test data of the mode was recorded in this report.				

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

Antenna No.	Transmitter Circuit	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
1	Chain 0	3.48	2.4~2.4835	PIFA	i-pex(MHF)
		2.56	5.15~5.25		
		2.56	5.25~5.35		
		2.58	5.47~5.725		
		3.03	5.725~5.85		
2	Chain 1	3.48	2.4~2.4835	PIFA	i-pex(MHF)
		2.56	5.15~5.25		
		2.56	5.25~5.35		
		2.58	5.47~5.725		
		3.03	5.725~5.85		

4. 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	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
802.11ac (VHT20)	2TX	2RX
802.11ac (VHT40)	2TX	2RX
802.11ac (VHT80)	2TX	2RX
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX
802.11ax (HE80)	2TX	2RX

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)

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

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 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 ~ 5825MHz:

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

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
802.11ax (HE20)	5180-5240 5745-5825	36 to 48 149 to 165	157	OFDMA	BPSK	MCS0

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
802.11ax (HE20)	5180-5240 5745-5825	36 to 48 149 to 165	157	OFDMA	BPSK	MCS0

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) (Output power only)		36 to 48	36, 40, 48	OFDM	BPSK	MCS0
802.11ac (VHT40) (Output power only)		38 to 46	38, 46	OFDM	BPSK	MCS0
802.11ac (VHT80) (Output power only)		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) (Output power only)		149 to 165	149, 157, 165	OFDM	BPSK	MCS0
802.11ac (VHT40) (Output power only)		151 to 159	151, 159	OFDM	BPSK	MCS0
802.11ac (VHT80) (Output power only)		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) (Output power only)	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	MCS0
802.11ac (VHT40) (Output power only)		38 to 46	38, 46	OFDM	BPSK	MCS0
802.11ac (VHT80) (Output power only)		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) (Output power only)	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	MCS0
802.11ac (VHT40) (Output power only)		151 to 159	151, 159	OFDM	BPSK	MCS0
802.11ac (VHT80) (Output power only)		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

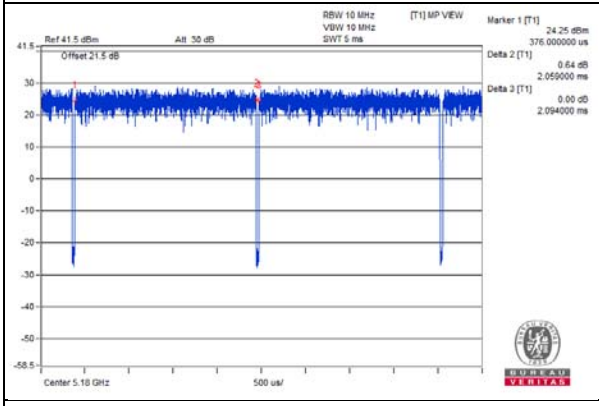
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	23deg. C, 64%RH, 24deg. C, 64%RH	120Vac, 60Hz	Kevin Ko, Tom Yang
RE<1G	25deg. C, 70%RH	120Vac, 60Hz	Kevin Ko
PLC	25deg. C, 75%RH	120Vac, 60Hz	Kevin Ko
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

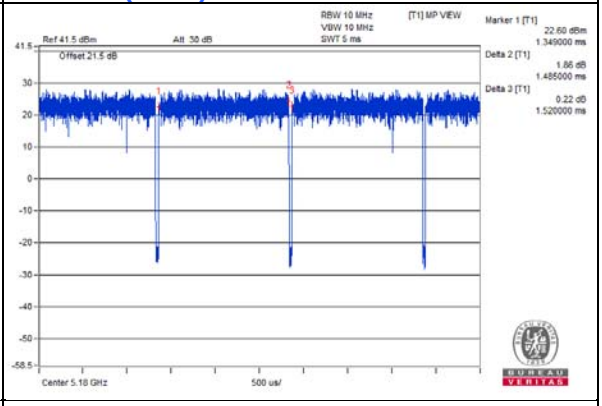
3.3 Duty Cycle of Test Signal

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 = 2.059 ms/2.094 ms = 0.983
802.11ax (HE20): Duty cycle = 1.485 ms/1.52 ms = 0.977, Duty factor = 10 * log (1/Duty cycle) = 0.1
802.11ax (HE40): Duty cycle = 0.773 ms/0.803 ms = 0.963, Duty factor = 10 * log (1/Duty cycle) = 0.17
802.11ax (HE80): Duty cycle = 0.401 ms/0.433 ms = 0.926, Duty factor = 10 * log (1/Duty cycle) = 0.33

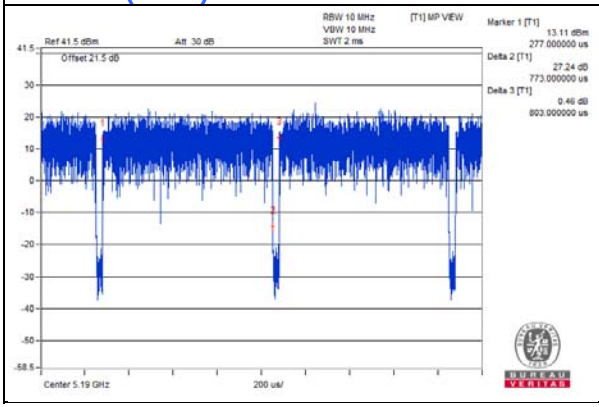
802.11a



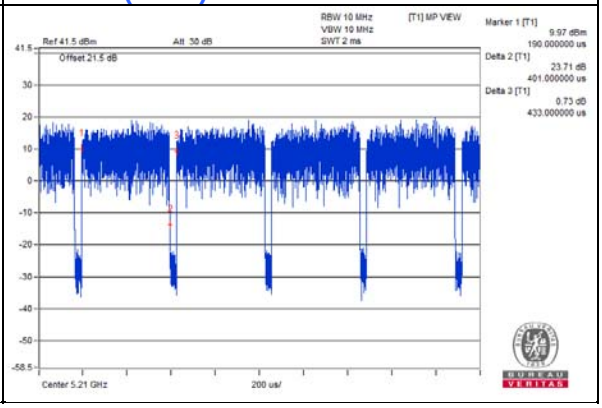
802.11ax (HE20)



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.

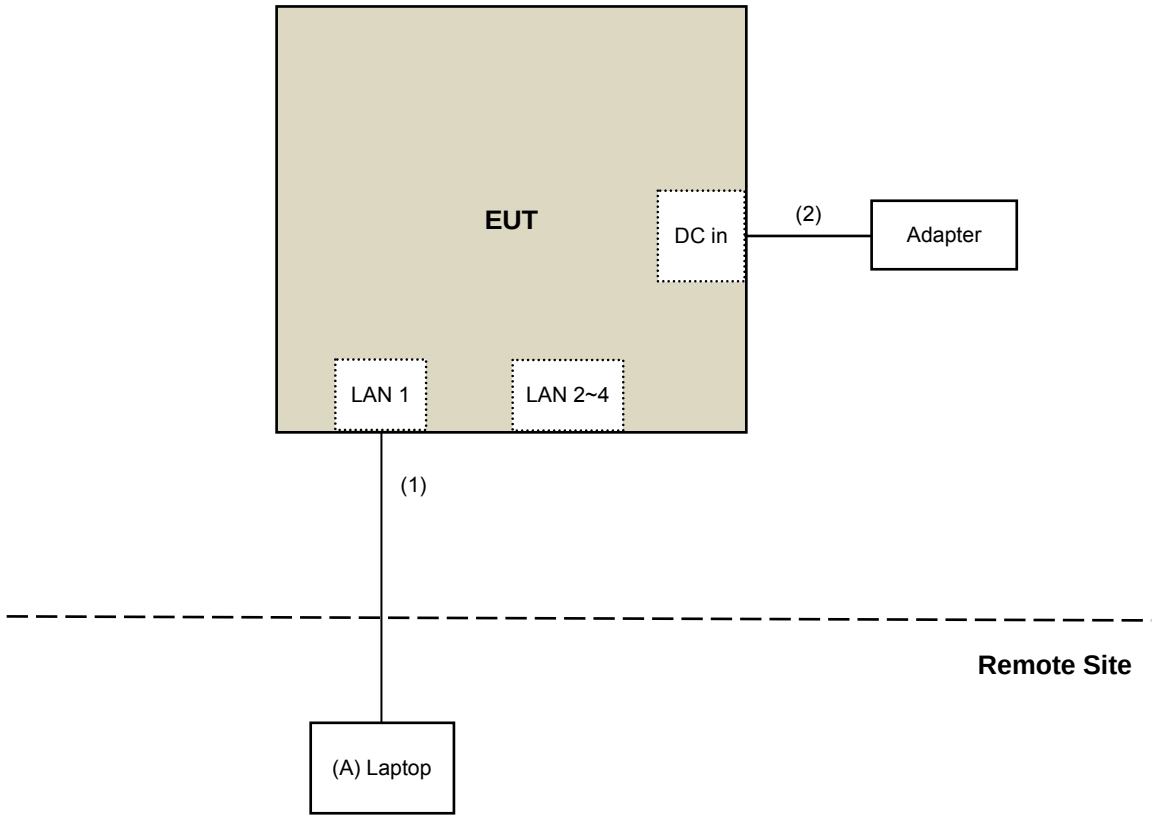
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab

Note:

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

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

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards 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

For OOBE test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 25, 2018	Nov. 24, 2019
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. 25, 2018	Nov. 24, 2019
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. Tested Date: Nov. 08, 2019

For other test:

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
DC Power Supply Topward	6603D	795558	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: Nov. 27 to 28, 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:

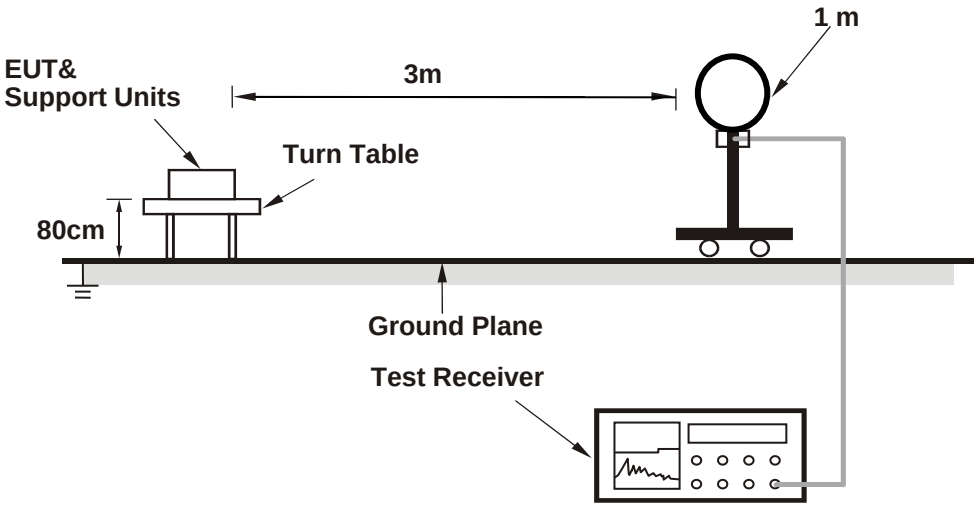
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

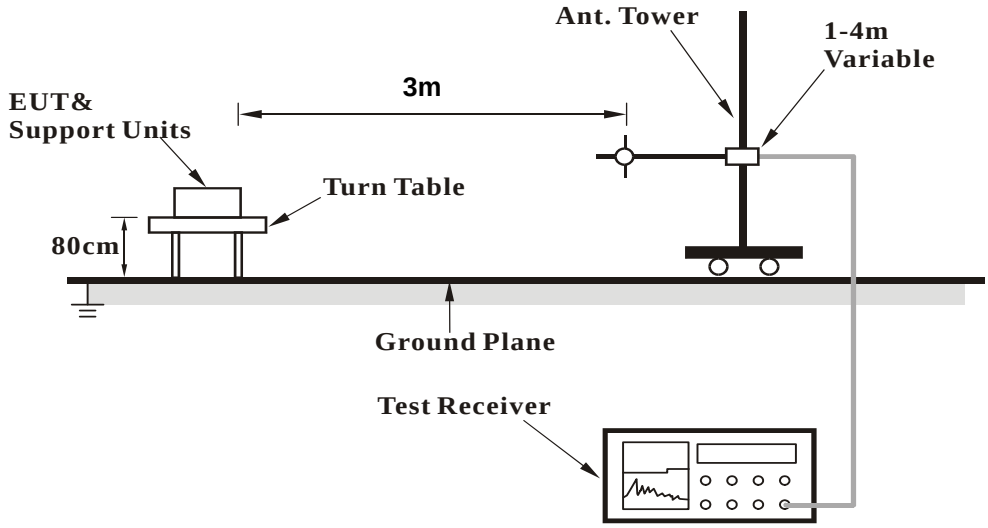
No deviation.

4.1.5 Test Setup

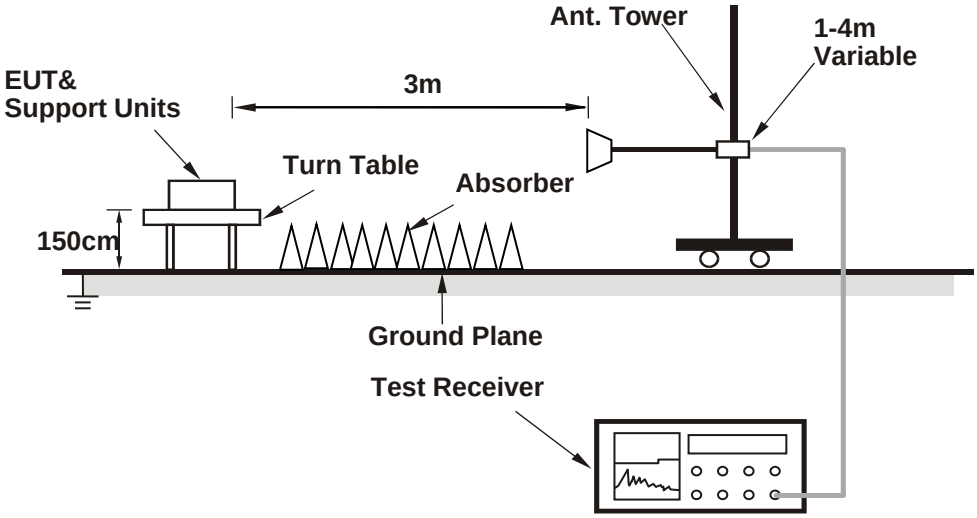
For Radiated emission below 30MHz



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.

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	59.7 PK	74.0	-14.3	1.50 H	145	56.2	3.5
2	5150.00	41.4 AV	54.0	-12.6	1.50 H	145	37.9	3.5
3	*5180.00	105.5 PK			1.50 H	145	102.1	3.4
4	*5180.00	98.1 AV			1.50 H	145	94.7	3.4
5	#10360.00	48.8 PK	68.2	-19.4	1.65 H	344	35.7	13.1
6	15540.00	51.9 PK	74.0	-22.1	2.63 H	91	38.3	13.6
7	15540.00	40.1 AV	54.0	-13.9	2.63 H	91	26.5	13.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	72.5 PK	74.0	-1.5	1.67 V	248	69.0	3.5
2	5150.00	53.6 AV	54.0	-0.4	1.67 V	248	50.1	3.5
3	*5180.00	118.9 PK			1.67 V	248	115.5	3.4
4	*5180.00	109.9 AV			1.67 V	248	106.5	3.4
5	#10360.00	48.8 PK	68.2	-19.4	1.51 V	143	35.7	13.1
6	15540.00	50.9 PK	74.0	-23.1	1.33 V	229	37.3	13.6
7	15540.00	39.7 AV	54.0	-14.3	1.33 V	229	26.1	13.6

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	55.2 PK	74.0	-18.8	1.65 H	309	51.7	3.5
2	5150.00	42.6 AV	54.0	-11.4	1.65 H	309	39.1	3.5
3	*5200.00	111.6 PK			1.65 H	309	108.2	3.4
4	*5200.00	101.2 AV			1.65 H	309	97.8	3.4
5	#10400.00	48.7 PK	68.2	-19.5	1.98 H	34	35.3	13.4
6	15600.00	51.8 PK	74.0	-22.2	1.07 H	156	38.4	13.4
7	15600.00	40.2 AV	54.0	-13.8	1.07 H	156	26.8	13.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.2 PK	74.0	-5.8	1.63 V	264	64.7	3.5
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.63 V**	**264**	**50.4**	**3.5**
3	*5200.00	122.0 PK			1.63 V	264	118.6	3.4
4	*5200.00	112.3 AV			1.63 V	264	108.9	3.4
5	#10400.00	47.9 PK	68.2	-20.3	1.96 V	345	34.5	13.4
6	15600.00	50.6 PK	74.0	-23.4	1.24 V	235	37.2	13.4
7	15600.00	39.4 AV	54.0	-14.6	1.24 V	235	26.0	13.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	5150.00	49.2 PK	74.0	-24.8	2.67 H	262	45.7	3.5
2	5150.00	44.5 AV	54.0	-9.5	2.67 H	262	41.0	3.5
3	*5240.00	105.0 PK			2.67 H	262	102.0	3.0
4	*5240.00	92.6 AV			2.67 H	262	89.6	3.0
5	5350.00	49.7 PK	74.0	-24.3	2.67 H	262	46.4	3.3
6	5350.00	41.3 AV	54.0	-12.7	2.67 H	262	38.0	3.3
7	#10480.00	49.5 PK	68.2	-18.7	2.46 H	136	36.0	13.5
8	15720.00	51.4 PK	74.0	-22.6	1.92 H	75	38.6	12.8
9	15720.00	39.6 AV	54.0	-14.4	1.92 H	75	26.8	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	62.0 PK	74.0	-12.0	1.94 V	253	58.5	3.5
2	5150.00	51.5 AV	54.0	-2.5	1.94 V	253	48.0	3.5
3	*5240.00	123.5 PK			1.94 V	253	120.5	3.0
4	*5240.00	113.6 AV			1.94 V	253	110.6	3.0
5	5350.00	60.2 PK	74.0	-13.8	1.94 V	253	56.9	3.3
6	5350.00	48.0 AV	54.0	-6.0	1.94 V	253	44.7	3.3
7	#10480.00	48.9 PK	68.2	-19.3	1.79 V	52	35.4	13.5
8	15720.00	52.3 PK	74.0	-21.7	2.46 V	205	39.5	12.8
9	15720.00	40.1 AV	54.0	-13.9	2.46 V	205	27.3	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 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	#5647.48	57.9 PK	68.2	-10.3	1.53 H	51	54.0	3.9
2	*5745.00	115.5 PK			1.53 H	51	111.6	3.9
3	*5745.00	105.5 AV			1.53 H	51	101.6	3.9
4	#5948.17	51.7 PK	68.2	-16.5	1.53 H	51	46.9	4.8
5	11490.00	49.8 PK	74.0	-24.2	1.48 H	217	35.6	14.2
6	11490.00	38.8 AV	54.0	-15.2	1.48 H	217	24.6	14.2
7	#17235.00	51.5 PK	68.2	-16.7	1.50 H	104	34.2	17.3
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	#5646.33	64.8 PK	68.2	-3.4	1.69 V	264	60.9	3.9
2	*5745.00	124.4 PK			1.69 V	264	120.5	3.9
3	*5745.00	114.2 AV			1.69 V	264	110.3	3.9
4	#5937.15	60.3 PK	68.2	-7.9	1.69 V	264	55.6	4.7
5	11490.00	48.5 PK	74.0	-25.5	1.82 V	145	34.3	14.2
6	11490.00	36.4 AV	54.0	-17.6	1.82 V	145	22.2	14.2
7	#17235.00	51.5 PK	68.2	-16.7	1.48 V	36	34.2	17.3

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 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	#5572.54	56.4 PK	68.2	-11.8	1.52 H	52	52.4	4.0
2	*5785.00	115.9 PK			1.52 H	52	111.9	4.0
3	*5785.00	105.7 AV			1.52 H	52	101.7	4.0
4	#5963.49	52.3 PK	68.2	-15.9	1.52 H	52	47.5	4.8
5	11570.00	48.9 PK	74.0	-25.1	2.51 H	208	34.7	14.2
6	11570.00	38.1 AV	54.0	-15.9	2.51 H	208	23.9	14.2
7	#17355.00	51.2 PK	68.2	-17.0	2.03 H	360	33.5	17.7
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	#5565.85	62.3 PK	68.2	-5.9	1.66 V	267	58.3	4.0
2	*5785.00	124.7 PK			1.66 V	267	120.7	4.0
3	*5785.00	114.8 AV			1.66 V	267	110.8	4.0
4	#6006.63	59.5 PK	68.2	-8.7	1.66 V	267	54.7	4.8
5	11570.00	49.1 PK	74.0	-24.9	2.33 V	208	34.9	14.2
6	11570.00	36.6 AV	54.0	-17.4	2.33 V	208	22.4	14.2
7	#17355.00	51.5 PK	68.2	-16.7	1.87 V	115	33.8	17.7

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 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	#5563.56	55.6 PK	68.2	-12.6	1.47 H	50	51.6	4.0
2	*5825.00	114.9 PK			1.47 H	50	110.7	4.2
3	*5825.00	105.1 AV			1.47 H	50	100.9	4.2
4	#5926.10	53.5 PK	68.2	-14.7	1.47 H	50	48.9	4.6
5	11650.00	49.8 PK	74.0	-24.2	2.33 H	344	35.9	13.9
6	11650.00	38.2 AV	54.0	-15.8	2.33 H	344	24.3	13.9
7	#17475.00	51.5 PK	68.2	-16.7	2.26 H	308	32.7	18.8
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	#5608.97	63.5 PK	68.2	-4.7	1.70 V	245	59.5	4.0
2	*5825.00	124.9 PK			1.70 V	245	120.7	4.2
3	*5825.00	114.6 AV			1.70 V	245	110.4	4.2
4	#5929.10	62.8 PK	68.2	-5.4	1.70 V	245	58.2	4.6
5	11650.00	47.8 PK	74.0	-26.2	1.43 V	196	33.9	13.9
6	11650.00	36.0 AV	54.0	-18.0	1.43 V	196	22.1	13.9
7	#17475.00	52.5 PK	68.2	-15.7	2.07 V	259	33.7	18.8

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.

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	51.2 PK	74.0	-22.8	1.46 H	296	47.7	3.5
2	5150.00	44.9 AV	54.0	-9.1	1.46 H	296	41.4	3.5
3	*5180.00	107.2 PK			1.46 H	296	103.8	3.4
4	*5180.00	95.4 AV			1.46 H	296	92.0	3.4
5	#10360.00	48.6 PK	68.2	-19.6	1.04 H	316	35.5	13.1
6	15540.00	50.7 PK	74.0	-23.3	1.01 H	318	37.1	13.6
7	15540.00	40.2 AV	54.0	-13.8	1.01 H	318	26.6	13.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.4 PK	74.0	-7.6	1.64 V	257	62.9	3.5
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.64 V**	**257**	**50.4**	**3.5**
3	*5180.00	120.2 PK			1.64 V	257	116.8	3.4
4	*5180.00	108.9 AV			1.64 V	257	105.5	3.4
5	#10360.00	48.9 PK	68.2	-19.3	1.86 V	182	35.8	13.1
6	15540.00	51.4 PK	74.0	-22.6	1.62 V	104	37.8	13.6
7	15540.00	39.2 AV	54.0	-14.8	1.62 V	104	25.6	13.6

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	5149.20	61.2 PK	74.0	-12.8	2.59 H	353	57.7	3.5
2	5149.20	44.5 AV	54.0	-9.5	2.59 H	353	41.0	3.5
3	5150.00	55.7 PK	74.0	-18.3	2.59 H	353	52.2	3.5
4	5150.00	41.3 AV	54.0	-12.7	2.59 H	353	37.8	3.5
5	*5200.00	107.5 PK			2.59 H	353	104.1	3.4
6	*5200.00	99.5 AV			2.59 H	353	96.1	3.4
7	#10400.00	49.4 PK	68.2	-18.8	2.37 H	338	36.0	13.4
8	15600.00	51.5 PK	74.0	-22.5	1.33 H	52	38.1	13.4
9	15600.00	39.0 AV	54.0	-15.0	1.33 H	52	25.6	13.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5149.20	65.7 PK	74.0	-8.3	1.77 V	275	62.2	3.5
2	5149.20	53.5 AV	54.0	-0.5	1.77 V	275	50.0	3.5
3	5150.00	64.5 PK	74.0	-9.5	1.77 V	275	61.0	3.5
4	5150.00	52.9 AV	54.0	-1.1	1.77 V	275	49.4	3.5
5	*5200.00	122.6 PK			1.77 V	275	119.2	3.4
6	*5200.00	111.9 AV			1.77 V	275	108.5	3.4
7	#10400.00	48.6 PK	68.2	-19.6	2.51 V	224	35.2	13.4
8	15600.00	51.1 PK	74.0	-22.9	1.11 V	126	37.7	13.4
9	15600.00	40.1 AV	54.0	-13.9	1.11 V	126	26.7	13.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	5150.00	51.6 PK	74.0	-22.4	2.20 H	151	48.1	3.5
2	5150.00	44.4 AV	54.0	-9.6	2.20 H	151	40.9	3.5
3	*5240.00	110.6 PK			2.20 H	151	107.6	3.0
4	*5240.00	100.5 AV			2.20 H	151	97.5	3.0
5	5350.00	49.2 PK	74.0	-24.8	2.20 H	151	45.9	3.3
6	5350.00	41.1 AV	54.0	-12.9	2.20 H	151	37.8	3.3
7	#10480.00	50.0 PK	68.2	-18.2	1.91 H	188	36.5	13.5
8	15720.00	52.5 PK	74.0	-21.5	1.77 H	243	39.7	12.8
9	15720.00	39.0 AV	54.0	-15.0	1.77 H	243	26.2	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	62.5 PK	74.0	-11.5	1.75 V	258	59.0	3.5
2	5150.00	51.4 AV	54.0	-2.6	1.75 V	258	47.9	3.5
3	*5240.00	124.5 PK			1.75 V	258	121.5	3.0
4	*5240.00	114.2 AV			1.75 V	258	111.2	3.0
5	5350.00	60.0 PK	74.0	-14.0	1.75 V	258	56.7	3.3
6	5350.00	48.9 AV	54.0	-5.1	1.75 V	258	45.6	3.3
7	#10480.00	47.6 PK	68.2	-20.6	2.02 V	278	34.1	13.5
8	15720.00	51.3 PK	74.0	-22.7	2.62 V	283	38.5	12.8
9	15720.00	39.1 AV	54.0	-14.9	2.62 V	283	26.3	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 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	#5643.44	57.6 PK	68.2	-10.6	1.56 H	52	53.7	3.9
2	*5745.00	116.8 PK			1.56 H	52	112.9	3.9
3	*5745.00	105.4 AV			1.56 H	52	101.5	3.9
4	#5949.26	52.2 PK	68.2	-16.0	1.56 H	52	47.4	4.8
5	11490.00	50.2 PK	74.0	-23.8	1.52 H	154	36.0	14.2
6	11490.00	38.9 AV	54.0	-15.1	1.52 H	154	24.7	14.2
7	#17235.00	51.3 PK	68.2	-16.9	2.21 H	293	34.0	17.3
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	#5645.66	64.2 PK	68.2	-4.0	1.66 V	262	60.3	3.9
2	*5745.00	125.2 PK			1.66 V	262	121.3	3.9
3	*5745.00	114.9 AV			1.66 V	262	111.0	3.9
4	#5993.26	61.0 PK	68.2	-7.2	1.66 V	262	56.2	4.8
5	11490.00	48.1 PK	74.0	-25.9	2.09 V	153	33.9	14.2
6	11490.00	36.4 AV	54.0	-17.6	2.09 V	153	22.2	14.2
7	#17235.00	52.0 PK	68.2	-16.2	1.41 V	329	34.7	17.3

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 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	#5558.70	55.8 PK	68.2	-12.4	1.50 H	50	51.8	4.0
2	*5785.00	117.1 PK			1.50 H	50	113.1	4.0
3	*5785.00	105.6 AV			1.50 H	50	101.6	4.0
4	#5955.13	52.7 PK	68.2	-15.5	1.50 H	50	47.9	4.8
5	11570.00	49.8 PK	74.0	-24.2	2.27 H	152	35.6	14.2
6	11570.00	39.2 AV	54.0	-14.8	2.27 H	152	25.0	14.2
7	#17355.00	52.3 PK	68.2	-15.9	2.49 H	21	34.6	17.7
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	#5578.26	62.5 PK	68.2	-5.7	1.62 V	266	58.5	4.0
2	*5785.00	126.2 PK			1.62 V	266	122.2	4.0
3	*5785.00	114.9 AV			1.62 V	266	110.9	4.0
4	#5977.50	60.9 PK	68.2	-7.3	1.62 V	266	56.1	4.8
5	11570.00	47.7 PK	74.0	-26.3	1.75 V	331	33.5	14.2
6	11570.00	36.5 AV	54.0	-17.5	1.75 V	331	22.3	14.2
7	#17355.00	51.1 PK	68.2	-17.1	2.08 V	352	33.4	17.7

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 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	#5583.23	56.3 PK	68.2	-11.9	1.48 H	51	52.3	4.0
2	*5825.00	116.6 PK			1.48 H	51	112.4	4.2
3	*5825.00	105.2 AV			1.48 H	51	101.0	4.2
4	#5931.59	53.7 PK	68.2	-14.5	1.48 H	51	49.0	4.7
5	11650.00	49.9 PK	74.0	-24.1	1.14 H	166	36.0	13.9
6	11650.00	38.7 AV	54.0	-15.3	1.14 H	166	24.8	13.9
7	#17475.00	51.4 PK	68.2	-16.8	1.23 H	279	32.6	18.8
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	#5577.28	63.0 PK	68.2	-5.2	1.67 V	267	59.0	4.0
2	*5825.00	126.8 PK			1.67 V	267	122.6	4.2
3	*5825.00	115.0 AV			1.67 V	267	110.8	4.2
4	#5928.87	65.9 PK	68.2	-2.3	1.67 V	267	61.3	4.6
5	11650.00	49.3 PK	74.0	-24.7	1.54 V	287	35.4	13.9
6	11650.00	36.0 AV	54.0	-18.0	1.54 V	287	22.1	13.9
7	#17475.00	51.3 PK	68.2	-16.9	1.25 V	46	32.5	18.8

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.

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	5148.70	49.1 PK	74.0	-24.9	1.65 H	352	45.6	3.5
2	5148.70	44.8 AV	54.0	-9.2	1.65 H	352	41.3	3.5
3	5150.00	52.6 PK	74.0	-21.4	1.65 H	352	49.1	3.5
4	5150.00	47.3 AV	54.0	-6.7	1.65 H	352	43.8	3.5
5	*5190.00	99.2 PK			1.65 H	352	95.8	3.4
6	*5190.00	87.1 AV			1.65 H	352	83.7	3.4
7	#10380.00	49.2 PK	68.2	-19.0	1.41 H	25	35.9	13.3
8	15570.00	50.6 PK	74.0	-23.4	2.27 H	51	37.2	13.4
9	15570.00	38.7 AV	54.0	-15.3	2.27 H	51	25.3	13.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5148.70	69.1 PK	74.0	-4.9	2.17 V	252	65.6	3.5
2	5148.70	53.8 AV	54.0	-0.2	2.17 V	252	50.3	3.5
3	5150.00	66.2 PK	74.0	-7.8	2.17 V	252	62.7	3.5
4	5150.00	53.3 AV	54.0	-0.7	2.17 V	252	49.8	3.5
5	*5190.00	112.9 PK			2.17 V	252	109.5	3.4
6	*5190.00	103.4 AV			2.17 V	252	100.0	3.4
7	#10380.00	49.2 PK	68.2	-19.0	2.36 V	81	35.9	13.3
8	15570.00	51.9 PK	74.0	-22.1	1.72 V	205	38.5	13.4
9	15570.00	39.3 AV	54.0	-14.7	1.72 V	205	25.9	13.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	55.7 PK	74.0	-18.3	2.19 H	281	52.2	3.5
2	5150.00	47.2 AV	54.0	-6.8	2.19 H	281	43.7	3.5
3	*5230.00	101.4 PK			2.19 H	281	98.3	3.1
4	*5230.00	92.5 AV			2.19 H	281	89.4	3.1
5	5350.00	51.5 PK	74.0	-22.5	2.19 H	281	48.2	3.3
6	5350.00	45.3 AV	54.0	-8.7	2.19 H	281	42.0	3.3
7	#10460.00	49.1 PK	68.2	-19.1	1.14 H	353	35.6	13.5
8	15690.00	52.5 PK	74.0	-21.5	2.63 H	131	39.6	12.9
9	15690.00	39.2 AV	54.0	-14.8	2.63 H	131	26.3	12.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.4 PK	74.0	-8.6	1.74 V	256	61.9	3.5
2	5150.00	53.7 AV	54.0	-0.3	1.74 V	256	50.2	3.5
3	*5230.00	118.5 PK			1.74 V	256	115.4	3.1
4	*5230.00	108.5 AV			1.74 V	256	105.4	3.1
5	5350.00	60.7 PK	74.0	-13.3	1.74 V	256	57.4	3.3
6	5350.00	48.5 AV	54.0	-5.5	1.74 V	256	45.2	3.3
7	#10460.00	48.6 PK	68.2	-19.6	1.21 V	268	35.1	13.5
8	15690.00	51.6 PK	74.0	-22.4	1.24 V	78	38.7	12.9
9	15690.00	39.9 AV	54.0	-14.1	1.24 V	78	27.0	12.9

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	#5650.90	59.7 PK	68.9	-9.2	1.47 H	54	55.8	3.9
2	*5755.00	110.3 PK			1.47 H	54	106.4	3.9
3	*5755.00	100.1 AV			1.47 H	54	96.2	3.9
4	#5995.27	51.7 PK	68.2	-16.5	1.47 H	54	46.9	4.8
5	11510.00	48.9 PK	74.0	-25.1	1.82 H	77	34.7	14.2
6	11510.00	37.8 AV	54.0	-16.2	1.82 H	77	23.6	14.2
7	#17265.00	50.9 PK	68.2	-17.3	2.11 H	356	33.7	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	**#5621.12**	**68.1 PK**	**68.2**	**-0.1**	**1.64 V**	**247**	**64.1**	**4.0**
2	*5755.00	120.8 PK			1.64 V	247	116.9	3.9
3	*5755.00	109.7 AV			1.64 V	247	105.8	3.9
4	#5930.56	63.7 PK	68.2	-4.5	1.64 V	247	59.0	4.7
5	11510.00	48.9 PK	74.0	-25.1	2.64 V	288	34.7	14.2
6	11510.00	36.1 AV	54.0	-17.9	2.64 V	288	21.9	14.2
7	#17265.00	52.1 PK	68.2	-16.1	1.03 V	262	34.9	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 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	#5624.85	55.8 PK	68.2	-12.4	1.46 H	51	51.8	4.0
2	*5795.00	112.0 PK			1.46 H	51	108.0	4.0
3	*5795.00	101.3 AV			1.46 H	51	97.3	4.0
4	#5956.98	56.5 PK	68.2	-11.7	1.46 H	51	51.7	4.8
5	11590.00	49.3 PK	74.0	-24.7	1.05 H	69	35.1	14.2
6	11590.00	38.9 AV	54.0	-15.1	1.05 H	69	24.7	14.2
7	#17385.00	51.0 PK	68.2	-17.2	1.27 H	336	33.2	17.8
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	#5628.74	63.9 PK	68.2	-4.3	1.67 V	260	60.0	3.9
2	*5795.00	121.7 PK			1.67 V	260	117.7	4.0
3	*5795.00	110.4 AV			1.67 V	260	106.4	4.0
4	#5925.93	67.9 PK	68.2	-0.3	1.67 V	260	63.3	4.6
5	11590.00	48.0 PK	74.0	-26.0	2.05 V	314	33.8	14.2
6	11590.00	36.2 AV	54.0	-17.8	2.05 V	314	22.0	14.2
7	#17385.00	52.1 PK	68.2	-16.1	2.04 V	348	34.3	17.8

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.

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	5147.20	55.9 PK	74.0	-18.1	2.26 H	346	52.4	3.5
2	5147.20	43.7 AV	54.0	-10.3	2.26 H	346	40.2	3.5
3	5150.00	57.2 PK	74.0	-16.8	2.26 H	346	53.7	3.5
4	5150.00	44.3 AV	54.0	-9.7	2.26 H	346	40.8	3.5
5	*5210.00	91.2 PK			2.26 H	346	87.9	3.3
6	*5210.00	88.4 AV			2.26 H	346	85.1	3.3
7	5350.00	52.4 PK	74.0	-21.6	2.26 H	346	49.1	3.3
8	5350.00	42.1 AV	54.0	-11.9	2.26 H	346	38.8	3.3
9	#10420.00	49.2 PK	68.2	-19.0	1.71 H	251	35.7	13.5
10	15630.00	51.1 PK	74.0	-22.9	1.41 H	259	37.9	13.2
11	15630.00	39.5 AV	54.0	-14.5	1.41 H	259	26.3	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	5147.20	68.4 PK	74.0	-5.6	1.72 V	254	64.9	3.5
2	**5147.20**	**53.9 AV**	**54.0**	**-0.1**	**1.72 V**	**254**	**50.4**	**3.5**
3	5150.00	66.5 PK	74.0	-7.5	1.72 V	254	63.0	3.5
4	5150.00	53.1 AV	54.0	-0.9	1.72 V	254	49.6	3.5
5	*5210.00	110.7 PK			1.72 V	254	107.4	3.3
6	*5210.00	100.4 AV			1.72 V	254	97.1	3.3
7	5350.00	57.7 PK	74.0	-16.3	1.72 V	254	54.4	3.3
8	5350.00	46.5 AV	54.0	-7.5	1.72 V	254	43.2	3.3
9	#10420.00	49.0 PK	68.2	-19.2	2.44 V	162	35.5	13.5
10	15630.00	52.4 PK	74.0	-21.6	1.67 V	106	39.2	13.2
11	15630.00	39.4 AV	54.0	-14.6	1.67 V	106	26.2	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 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	#5648.86	62.5 PK	68.2	-5.7	1.49 H	50	58.6	3.9
2	*5775.00	106.8 PK			1.49 H	50	102.9	3.9
3	*5775.00	94.5 AV			1.49 H	50	90.6	3.9
4	#5933.34	56.3 PK	68.2	-11.9	1.49 H	50	51.6	4.7
5	11550.00	49.2 PK	74.0	-24.8	1.33 H	169	35.0	14.2
6	11550.00	38.2 AV	54.0	-15.8	1.33 H	169	24.0	14.2
7	#17325.00	50.6 PK	68.2	-17.6	1.66 H	334	33.2	17.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5631.11	67.9 PK	68.2	-0.3	1.74 V	264	64.0	3.9
2	*5775.00	117.3 PK			1.74 V	264	113.4	3.9
3	*5775.00	105.2 AV			1.74 V	264	101.3	3.9
4	#5940.09	65.8 PK	68.2	-2.4	1.74 V	264	61.1	4.7
5	11550.00	49.2 PK	74.0	-24.8	1.45 V	335	35.0	14.2
6	11550.00	36.7 AV	54.0	-17.3	1.45 V	335	22.5	14.2
7	#17325.00	52.4 PK	68.2	-15.8	1.60 V	201	35.0	17.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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:

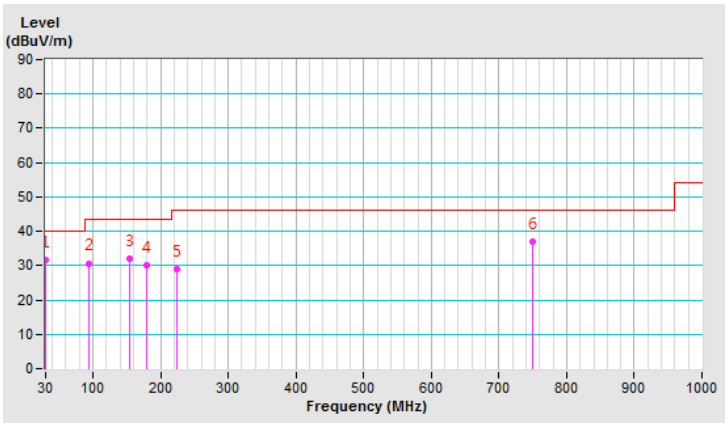
802.11ax (HE20)

CHANNEL	TX Channel 157	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	30.24	31.8 QP	40.0	-8.2	1.00 H	204	41.0	-9.2
2	93.68	30.7 QP	43.5	-12.8	2.00 H	72	43.9	-13.2
3	153.89	32.1 QP	43.5	-11.4	2.00 H	247	39.8	-7.7
4	179.84	30.0 QP	43.5	-13.5	2.00 H	272	39.3	-9.3
5	224.90	29.1 QP	46.0	-16.9	1.00 H	115	40.2	-11.1
6	750.01	36.8 QP	46.0	-9.2	1.00 H	268	33.1	3.7

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 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.

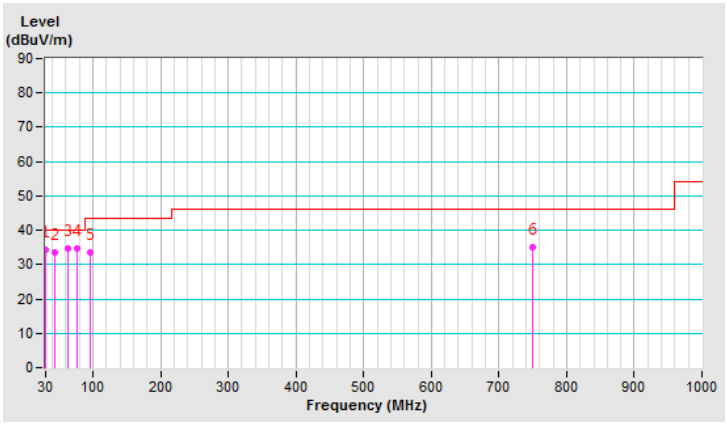


CHANNEL	TX Channel 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	30.36	34.2 QP	40.0	-5.8	3.00 V	84	43.4	-9.2
2	44.09	33.5 QP	40.0	-6.5	1.00 V	201	41.7	-8.2
3	62.40	34.8 QP	40.0	-5.2	1.00 V	273	43.6	-8.8
4	77.51	34.5 QP	40.0	-5.5	2.00 V	302	46.5	-12.0
5	95.52	33.5 QP	43.5	-10.0	1.00 V	260	46.4	-12.9
6	750.01	35.1 QP	46.0	-10.9	1.00 V	123	31.4	3.7

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 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: Nov. 28, 2019

4.2.3 Test Procedure

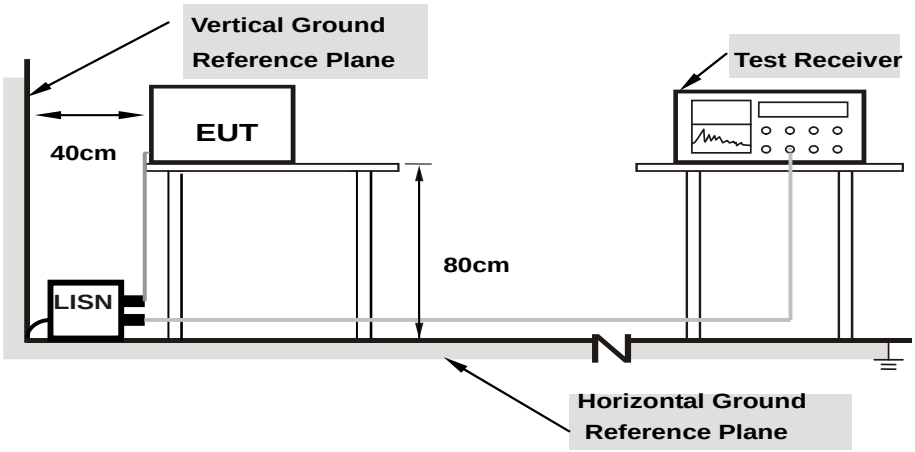
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

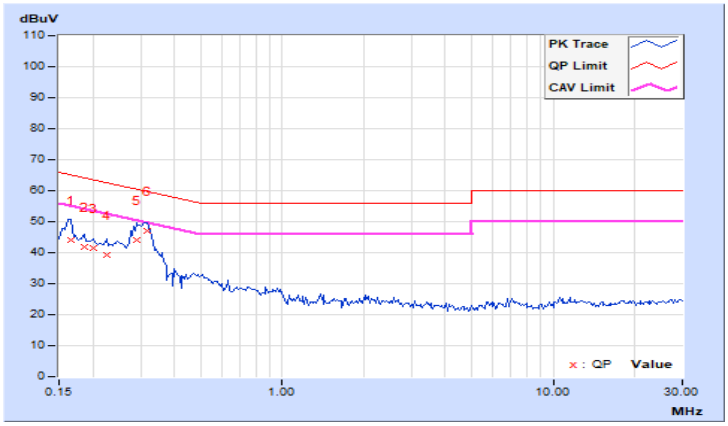
4.2.7 Test Results

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	0.16562	9.99	34.23	23.46	44.22	33.45	65.18	55.18	-20.96	-21.73
2	0.18516	9.99	32.03	23.20	42.02	33.19	64.25	54.25	-22.23	-21.06
3	0.20078	9.99	31.52	20.30	41.51	30.29	63.58	53.58	-22.07	-23.29
4	0.22422	9.99	29.11	18.62	39.10	28.61	62.66	52.66	-23.56	-24.05
5	0.29063	9.99	34.16	26.95	44.15	36.94	60.51	50.51	-16.36	-13.57
6	0.31797	10.00	37.04	30.25	47.04	40.25	59.76	49.76	-12.72	-9.51

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

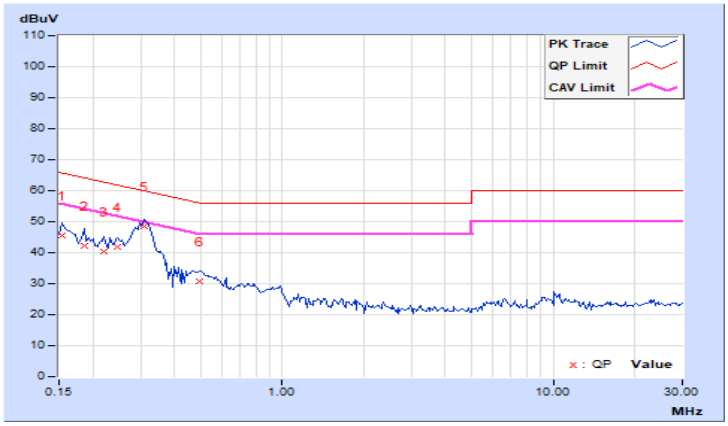


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.15391	9.99	35.40	21.64	45.39	31.63	65.79	55.79	-20.40	-24.16
2	0.18516	9.99	32.23	23.70	42.22	33.69	64.25	54.25	-22.03	-20.56
3	0.22031	9.99	30.22	19.16	40.21	29.15	62.81	52.81	-22.60	-23.66
4	0.24766	9.99	31.90	22.00	41.89	31.99	61.84	51.84	-19.95	-19.85
5	**0.31016**	**10.00**	**38.69**	**32.42**	**48.69**	**42.42**	**59.97**	**49.97**	**-11.28**	**-7.55**
6	0.49766	10.02	20.72	13.14	30.74	23.16	56.04	46.04	-25.30	-22.88

Remarks:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p ≦ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
	√	Indoor Access Point	1 Watt (30 dBm)
		Client device	250mW (24 dBm)
U-NII-2A			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	√		1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

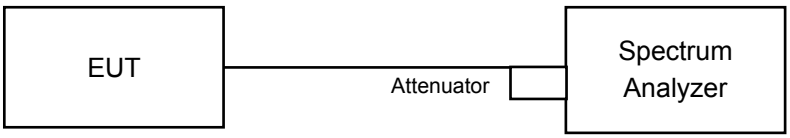
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

4.3.2 Test Setup

FOR POWER OUTPUT MEASUREMENT

FOR 26dB OCCUPIED BANDWIDTH



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

FOR POWER OUTPUT MEASUREMENT

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

FOR 26dB OCCUPIED BANDWIDTH

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

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

4.3.7 Test 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				
36	5180	22.69	22.47	362.384	25.59	30	Pass
40	5200	26.13	25.79	789.519	28.97	30	Pass
48	5240	26.40	26.47	880.125	29.45	30	Pass
149	5745	27.27	26.24	954.062	29.80	30	Pass
157	5785	27.24	26.27	953.306	29.79	30	Pass
165	5825	27.35	26.32	971.799	29.88	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				
36	5180	22.22	22.25	334.605	25.25	30	Pass
40	5200	25.98	25.85	780.87	28.93	30	Pass
48	5240	26.31	26.21	845.393	29.27	30	Pass
149	5745	27.08	26.22	929.299	29.68	30	Pass
157	5785	27.20	26.20	941.676	29.74	30	Pass
165	5825	27.07	26.08	914.84	29.61	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				
38	5190	20.43	20.36	219.051	23.41	30	Pass
46	5230	25.11	24.60	612.743	27.87	30	Pass
151	5755	26.18	25.00	731.182	28.64	30	Pass
159	5795	26.33	25.98	825.814	29.17	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				
42	5210	20.13	20.15	206.553	23.15	30	Pass
155	5775	23.79	23.50	463.204	26.66	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				
36	5180	22.35	22.38	344.773	25.38	30	Pass
40	5200	26.08	25.96	799.966	29.03	30	Pass
48	5240	26.42	26.41	876.053	29.43	30	Pass
149	5745	27.31	26.44	978.825	29.91	30	Pass
157	5785	27.41	26.39	986.32	29.94	30	Pass
165	5825	27.28	26.27	958.207	29.81	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				
38	5190	20.58	20.47	225.717	23.54	30	Pass
46	5230	25.21	24.74	629.746	27.99	30	Pass
151	5755	26.31	25.13	753.4	28.77	30	Pass
159	5795	26.44	26.08	846.064	29.27	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				
42	5210	20.14	20.17	207.268	23.17	30	Pass
155	5775	23.92	23.61	476.219	26.78	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				
36	5180	22.22	22.25	334.605	25.25	30.00	Pass
40	5200	25.98	25.85	780.87	28.93	30.00	Pass
48	5240	26.31	26.21	845.393	29.27	30.00	Pass
149	5745	27.08	26.22	929.299	29.68	29.96	Pass
157	5785	27.20	26.20	941.676	29.74	29.96	Pass
165	5825	27.07	26.08	914.84	29.61	29.96	Pass

Note: 1. For U-NII-1: The directional gain is 2.56 dBi + 10log(2) = 5.57 dBi < 6 dBi, so the power limit shall not be reduced.
2. For U-NII-3: The directional gain is 3.03 dBi + 10log(2) = 6.04 > 6 dBi, so the power limit shall be reduced to 30-(6.04-6) = 29.96 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				
38	5190	20.43	20.36	219.051	23.41	30.00	Pass
46	5230	25.11	24.60	612.743	27.87	30.00	Pass
151	5755	26.18	25.00	731.182	28.64	29.96	Pass
159	5795	26.33	25.98	825.814	29.17	29.96	Pass

Note: 1. For U-NII-1: The directional gain is 2.56 dBi + 10log(2) = 5.57 dBi < 6 dBi, so the power limit shall not be reduced.
2. For U-NII-3: The directional gain is 3.03 dBi + 10log(2) = 6.04 > 6 dBi, so the power limit shall be reduced to 30-(6.04-6) = 29.96 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				
42	5210	20.13	20.15	206.553	23.15	30.00	Pass
155	5775	23.79	23.50	463.204	26.66	29.96	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				
36	5180	22.35	22.38	344.773	25.38	30.00	Pass
40	5200	26.08	25.96	799.966	29.03	30.00	Pass
48	5240	26.42	26.41	876.053	29.43	30.00	Pass
149	5745	27.31	26.44	978.825	29.91	29.96	Pass
157	5785	27.41	26.39	986.32	29.94	29.96	Pass
165	5825	27.28	26.27	958.207	29.81	29.96	Pass

Note: 1. For U-NII-1: The directional gain is 2.56 dBi + 10log(2) = 5.57 dBi < 6 dBi, so the power limit shall not be reduced.
2. For U-NII-3: The directional gain is 3.03 dBi + 10log(2) = 6.04 > 6 dBi, so the power limit shall be reduced to 30-(6.04-6) = 29.96 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				
38	5190	20.58	20.47	225.717	23.54	30.00	Pass
46	5230	25.21	24.74	629.746	27.99	30.00	Pass
151	5755	26.31	25.13	753.4	28.77	29.96	Pass
159	5795	26.44	26.08	846.064	29.27	29.96	Pass

Note: 1. For U-NII-1: The directional gain is 2.56 dBi + 10log(2) = 5.57 dBi < 6 dBi, so the power limit shall not be reduced.
2. For U-NII-3: The directional gain is 3.03 dBi + 10log(2) = 6.04 > 6 dBi, so the power limit shall be reduced to 30-(6.04-6) = 29.96 dBm.

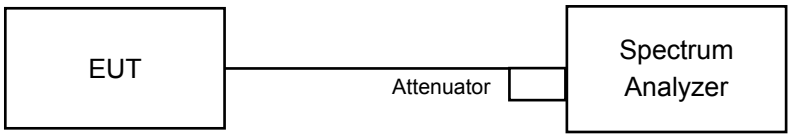
802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	20.14	20.17	207.268	23.17	30.00	Pass
155	5775	23.92	23.61	476.219	26.78	29.96	Pass

Note: 1. For U-NII-1: The directional gain is 2.56 dBi + 10log(2) = 5.57 dBi < 6 dBi, so the power limit shall not be reduced.
2. For U-NII-3: The directional gain is 3.03 dBi + 10log(2) = 6.04 > 6 dBi, so the power limit shall be reduced to 30-(6.04-6) = 29.96 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
36	5180	16.80	16.92
40	5200	17.76	17.28
48	5240	18.12	17.76
149	5745	22.20	19.56
157	5785	19.44	18.72
165	5825	18.36	17.88

802.11ax (HE20)

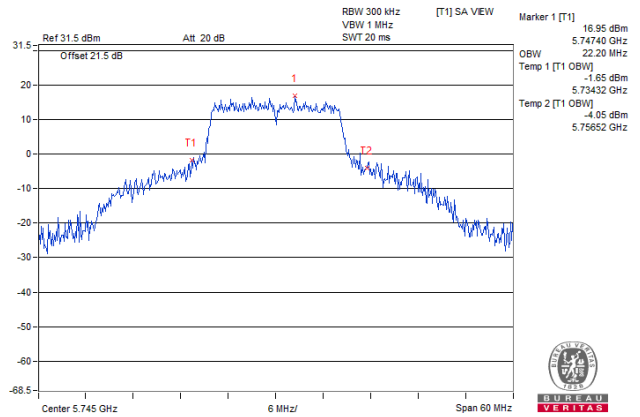
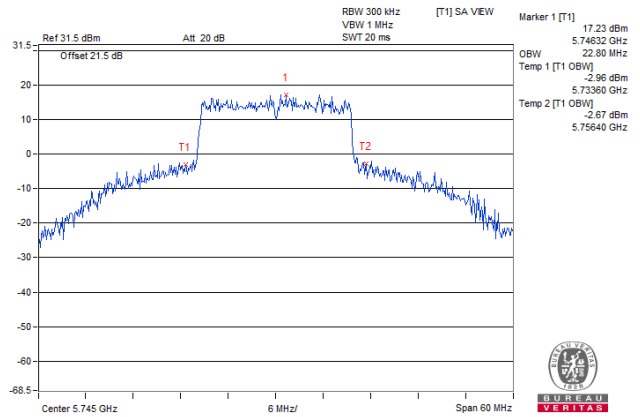
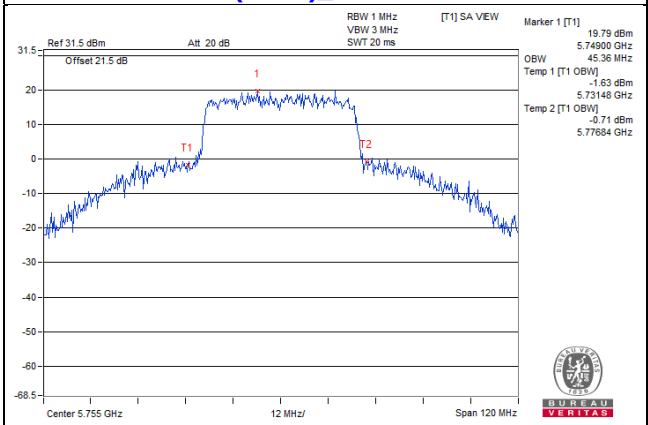
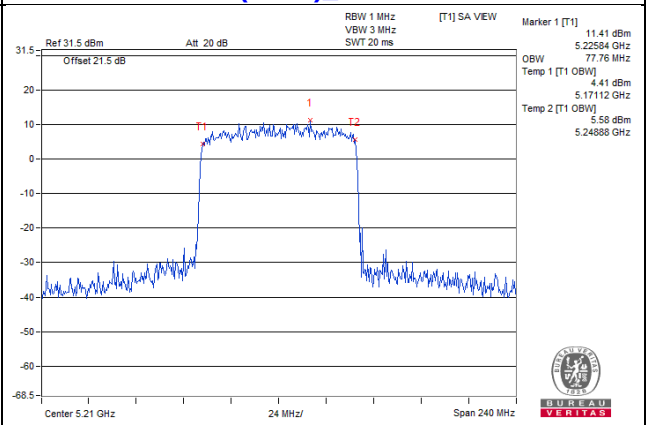
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	19.08	19.08
40	5200	19.44	19.32
48	5240	19.44	19.56
149	5745	22.80	20.76
157	5785	20.64	19.56
165	5825	19.68	19.32

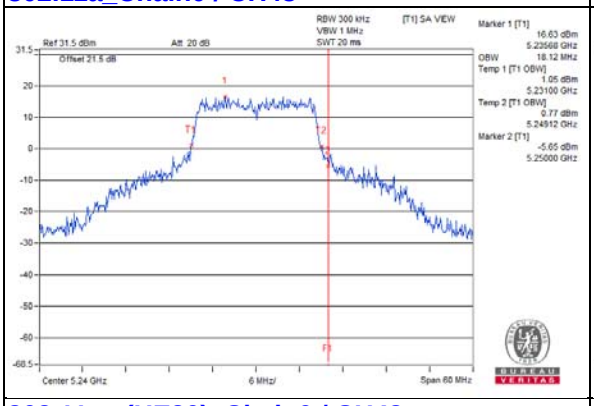
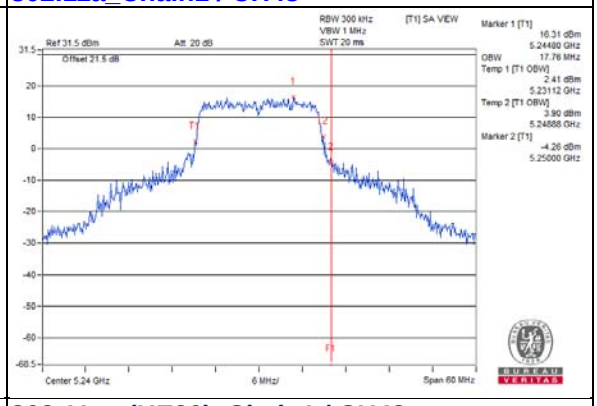
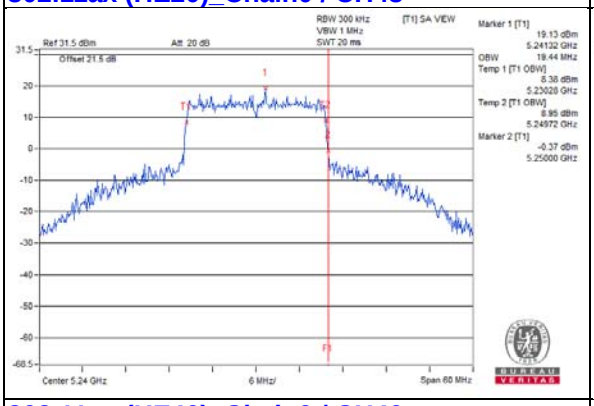
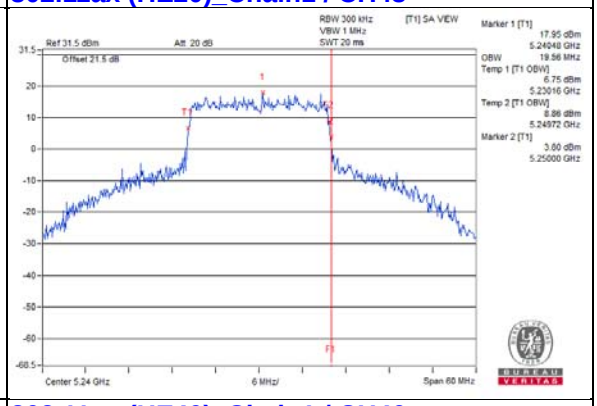
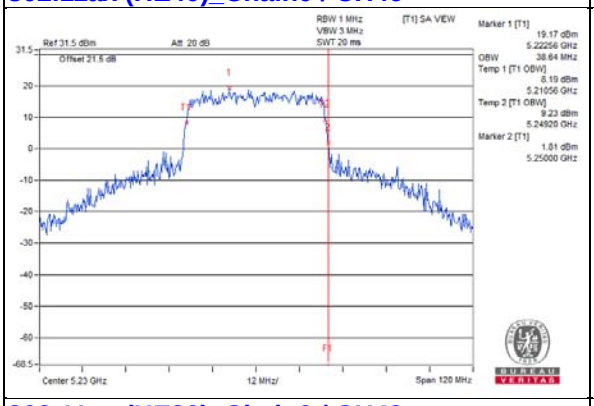
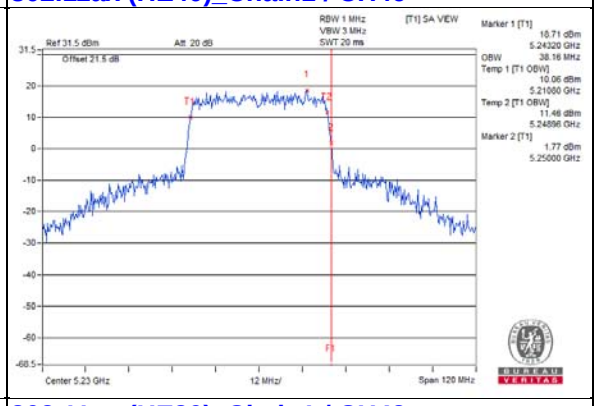
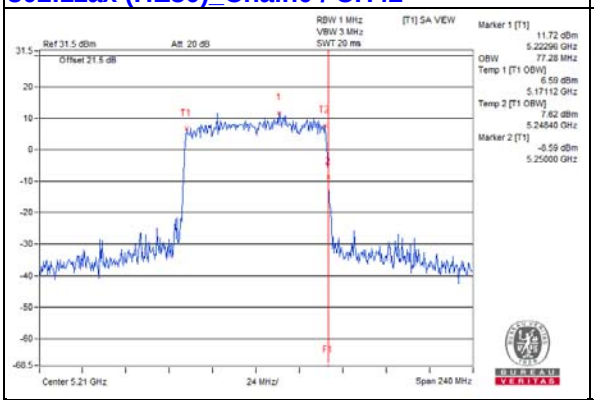
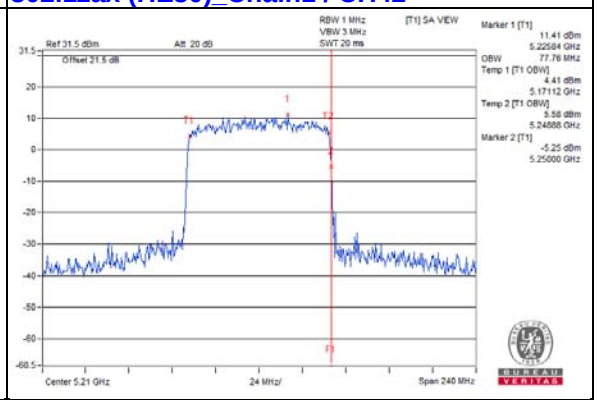
802.11ax (HE40)

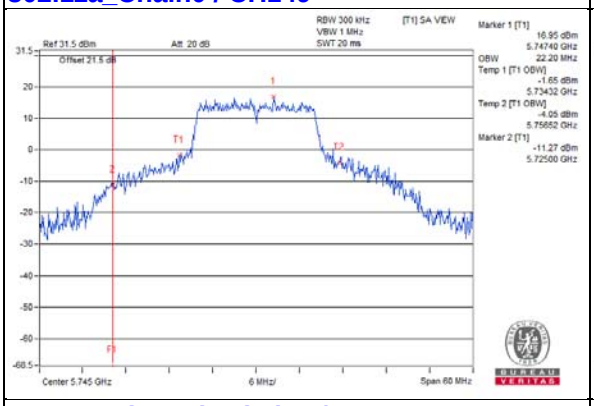
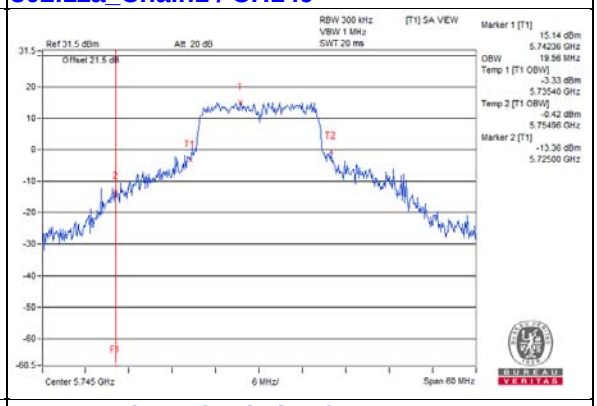
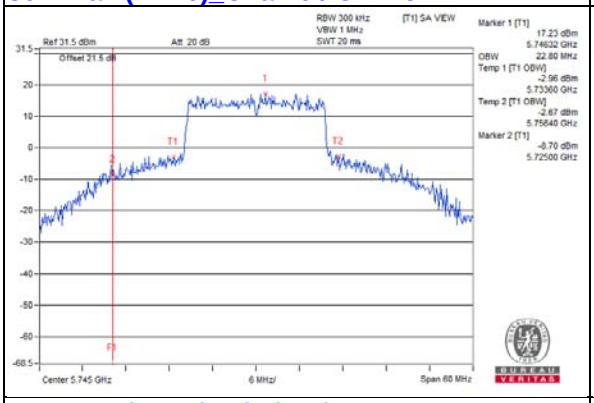
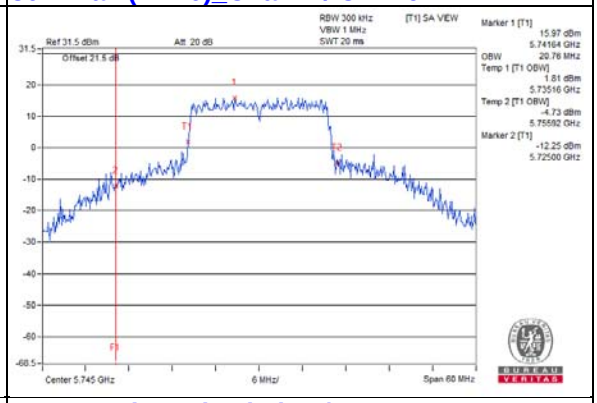
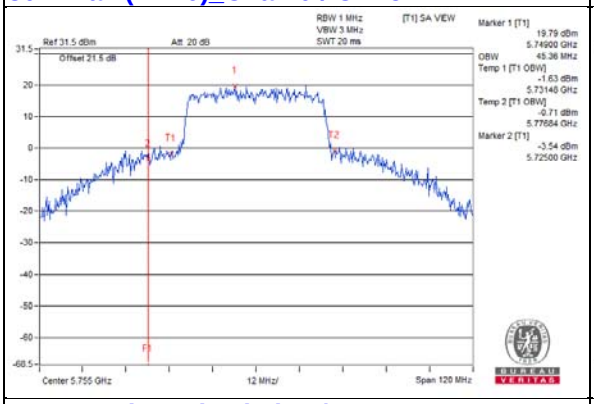
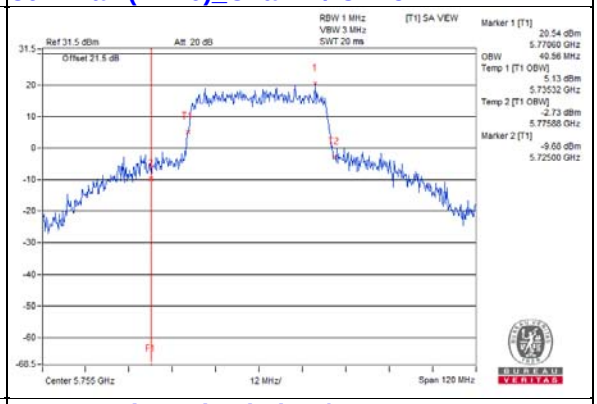
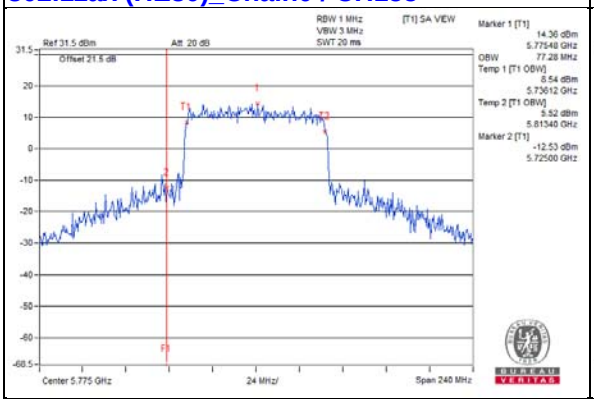
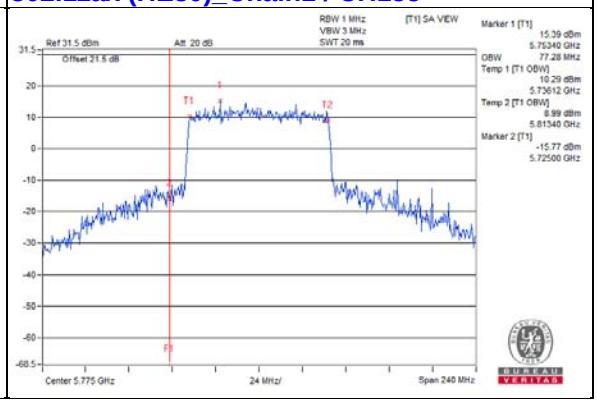
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	38.16	37.92
46	5230	38.64	38.16
151	5755	45.36	40.56
159	5795	42.00	41.28

802.11ax (HE80)

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

Spectrum Plot of Max. Value	
802.11a_Chain 0 / CH149	**802.11ax (HE20)_Chain 0 / CH149**
	
802.11ax (HE40)_Chain 0 / CH151	**802.11ax (HE80)_Chain 1 / CH42**
	

Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2A band)	
802.11a_Chain0 / CH48	**802.11a_Chain1 / CH48**
	
802.11ax (HE20)_Chain0 / CH48	**802.11ax (HE20)_Chain1 / CH48**
	
802.11ax (HE40)_Chain0 / CH46	**802.11ax (HE40)_Chain1 / CH46**
	
802.11ax (HE80)_Chain0 / CH42	**802.11ax (HE80)_Chain1 / CH42**
	

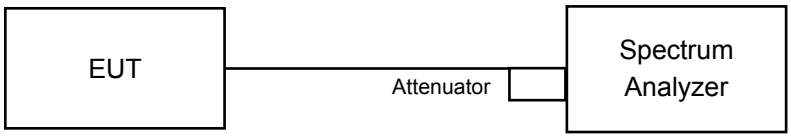
Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2C band)	
802.11a_Chain0 / CH149	**802.11a_Chain1 / CH149**
	
802.11ax (HE20)_Chain0 / CH149	**802.11ax (HE20)_Chain1 / CH149**
	
802.11ax (HE40)_Chain0 / CH151	**802.11ax (HE40)_Chain1 / CH151**
	
802.11ax (HE80)_Chain0 / CH155	**802.11ax (HE80)_Chain1 / CH155**
	

4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
	√	Indoor Access Point	
		Client device	11dBm/ MHz
U-NII-2A			11dBm/ MHz
U-NII-2C			11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For U-NII-1 Band:

For 802.11a

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 802.11ax (HE20), 802.11ax (HE40), 802.11ax (HE80)

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 Band:

For 802.11a

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 802.11ax (HE20), 802.11ax (HE40), 802.11ax (HE80)

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			
36	5180	9.30	8.95	12.14	17	Pass
40	5200	12.09	11.78	14.95	17	Pass
48	5240	12.18	12.25	15.23	17	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = 2.56 dBi + 10log(2) = 5.57 dBi < 6dBi, so the power density limit shall not be reduced.

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				
36	5180	8.08	7.97	0.10	11.14	17	Pass
40	5200	11.53	11.03	0.10	14.40	17	Pass
48	5240	11.53	11.88	0.10	14.82	17	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = 2.56 dBi + 10log(2) = 5.57 dBi < 6dBi, so the power density limit shall not be reduced.
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				
38	5190	3.38	3.49	0.17	6.62	17	Pass
46	5230	8.13	7.89	0.17	11.19	17	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = 2.56 dBi + 10log(2) = 5.57 dBi < 6dBi, so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

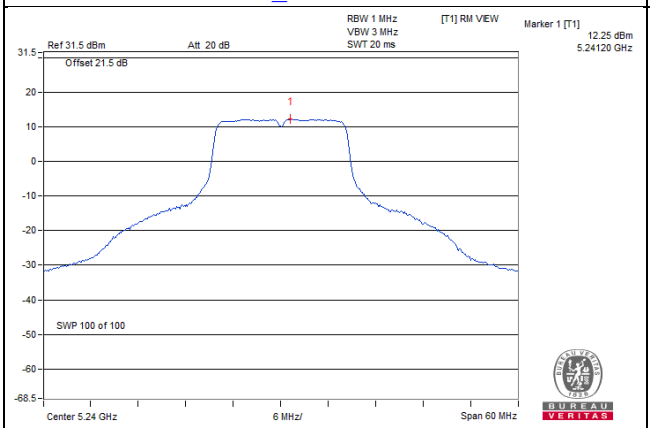
802.11ax (HE80)

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				
42	5210	0.26	0.73	0.33	3.84	17	Pass

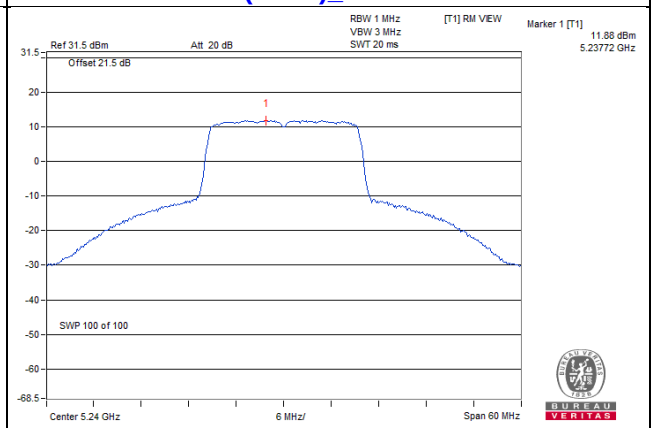
Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = 2.56 dBi + 10log(2) = 5.57 dBi < 6dBi, so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

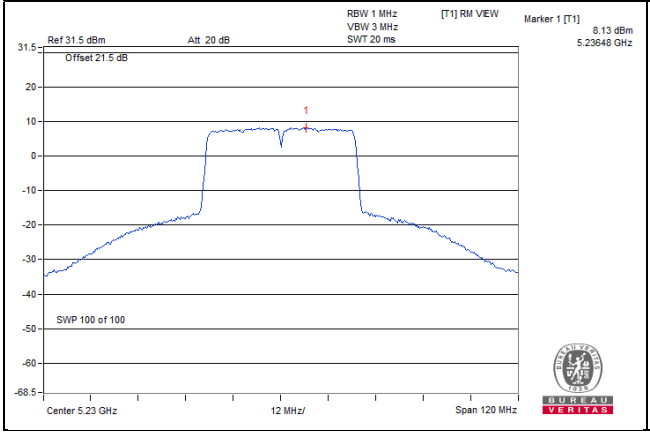
802.11a_Chain 1 / CH48



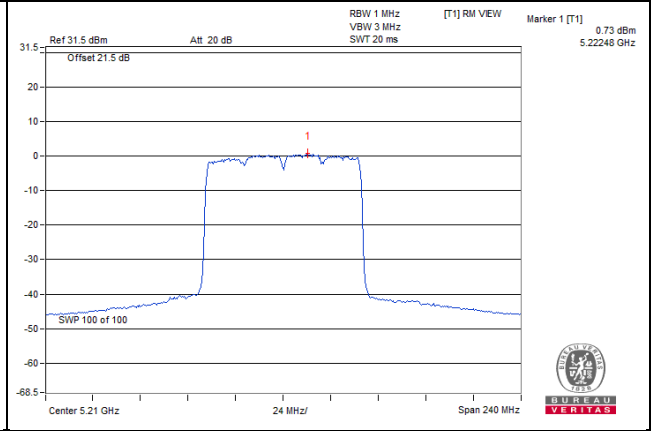
802.11ax (HE20)_Chain 1 / CH48



802.11ax (HE40)_Chain 0 / CH46



802.11ax (HE80)_Chain 1 / CH42



For U-NII-3:

802.11a

Chan.	Freq. (MHz)	PSD (dBm/300kHz)		Total PSD		Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	dBm/300kHz	dBm/500kHz		
149	5745	4.31	3.28	6.84	9.06	29.96	Pass
157	5785	3.85	3.43	6.66	8.88	29.96	Pass
165	5825	4.05	3.76	6.92	9.14	29.96	Pass

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = 3.03 dBi + 10log(2) = 6.04 dBi > 6dBi, so the power density limit shall be reduced to 30-(6.04-6) = 29.96 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		dBm/300kHz	dBm/500kHz		
149	5745	2.78	2.28	0.10	5.65	7.87	29.96	Pass
157	5785	2.84	2.14	0.10	5.62	7.84	29.96	Pass
165	5825	2.97	2.47	0.10	5.84	8.06	29.96	Pass

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = 3.03 dBi + 10log(2) = 6.04 dBi > 6dBi, so the power density limit shall be reduced to 30-(6.04-6) = 29.96 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		dBm/300kHz	dBm/500kHz		
151	5755	0.31	-0.53	0.17	3.09	5.31	29.96	Pass
159	5795	0.24	-0.06	0.17	3.27	5.49	29.96	Pass

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = 3.03 dBi + 10log(2) = 6.04 dBi > 6dBi, so the power density limit shall be reduced to 30-(6.04-6) = 29.96 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

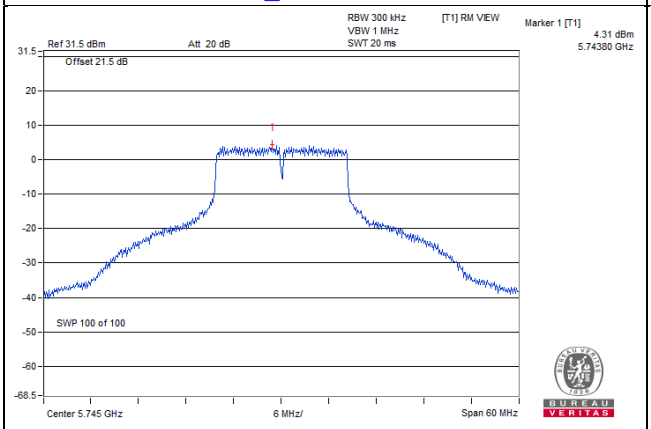
802.11ax (HE80)

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		dBm/300kHz	dBm/500kHz		
155	5775	-4.75	-4.86	0.33	-1.46	0.76	29.96	Pass

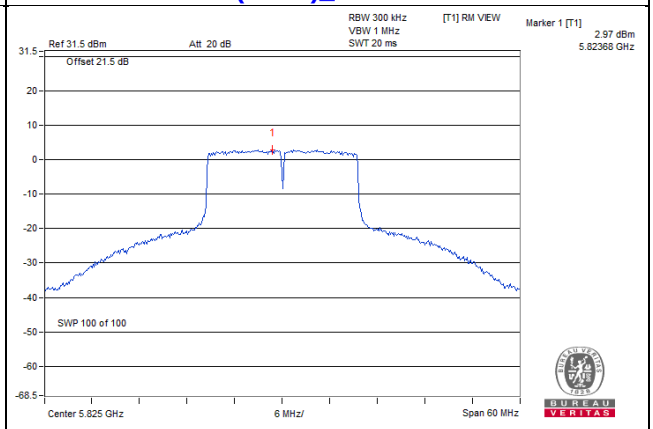
Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = 3.03 dBi + 10log(2) = 6.04 dBi > 6dBi, so the power density limit shall be reduced to 30-(6.04-6) = 29.96 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

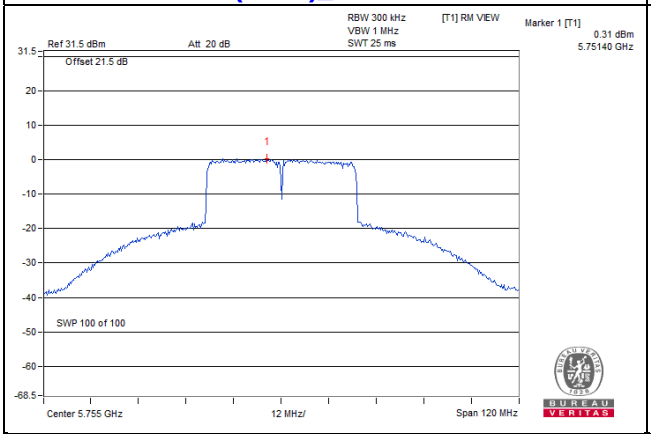
802.11a_Chain 0 / CH149



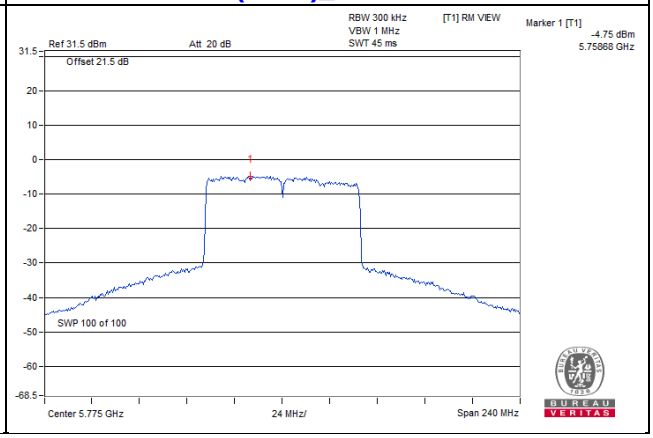
802.11ax (HE20)_Chain 0 / CH165



802.11ax (HE40)_Chain 0 / CH151



802.11ax (HE80)_Chain 0 / CH155

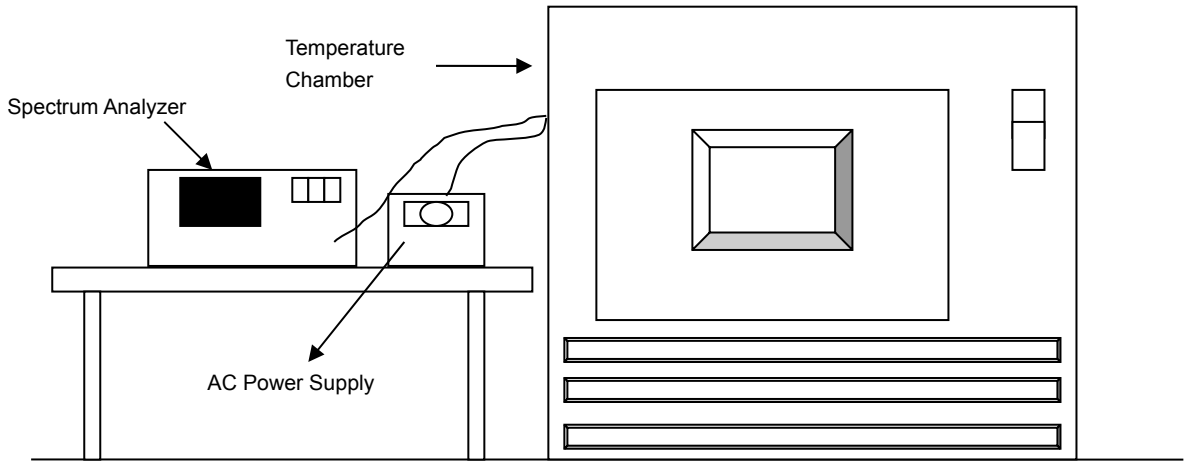


4.6 Frequency Stability Measurement

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
40	120	5179.985	Pass	5179.9833	Pass	5179.9852	Pass	5179.9879	Pass
30	120	5179.9892	Pass	5179.9897	Pass	5179.9923	Pass	5179.9927	Pass
20	120	5179.9843	Pass	5179.9839	Pass	5179.9839	Pass	5179.9832	Pass
10	120	5179.9898	Pass	5179.9885	Pass	5179.9868	Pass	5179.9899	Pass
0	120	5180.0249	Pass	5180.0232	Pass	5180.0228	Pass	5180.0239	Pass

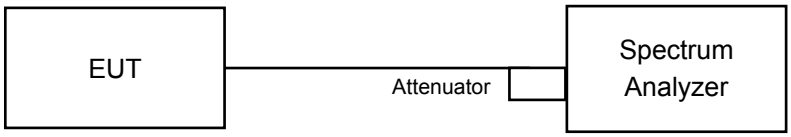
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5179.9901	Pass	5179.9888	Pass	5179.9868	Pass	5179.9892	Pass
	120	5179.9898	Pass	5179.9885	Pass	5179.9868	Pass	5179.9899	Pass
	102	5179.9893	Pass	5179.9887	Pass	5179.9875	Pass	5179.9906	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		
149	5745	16.41	16.42	0.5	Pass
157	5785	16.41	16.41	0.5	Pass
165	5825	16.43	16.41	0.5	Pass

802.11ax (HE20)

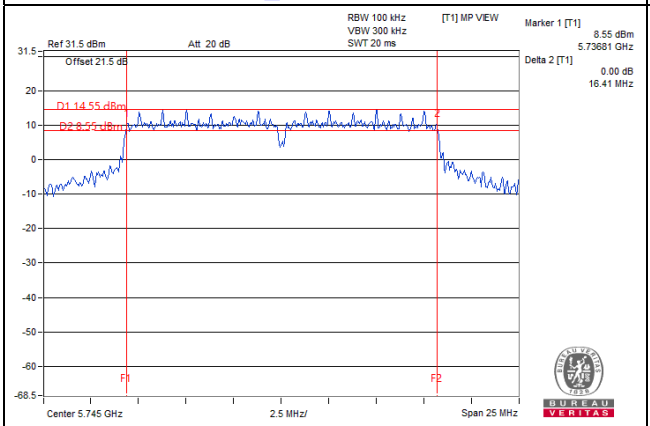
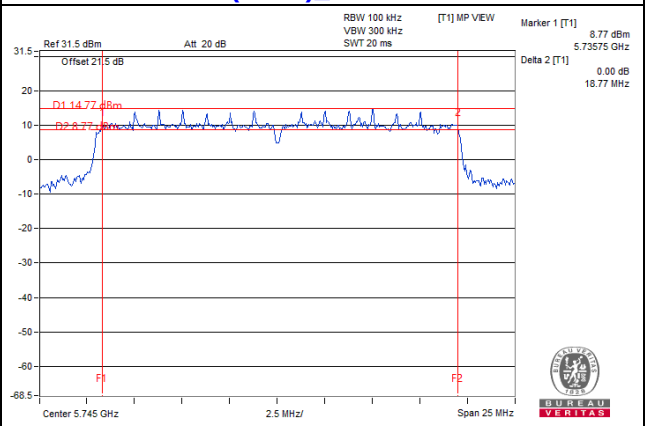
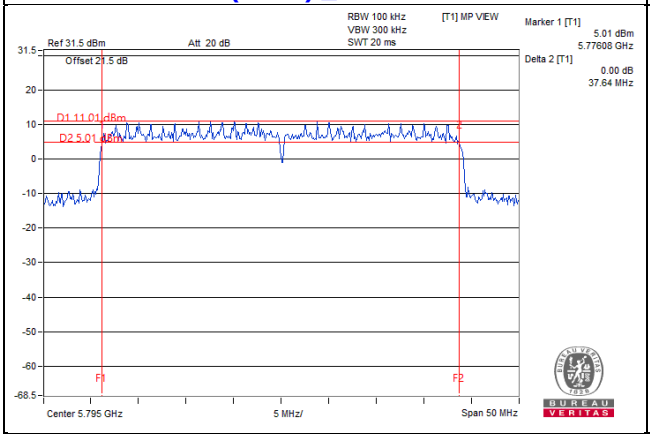
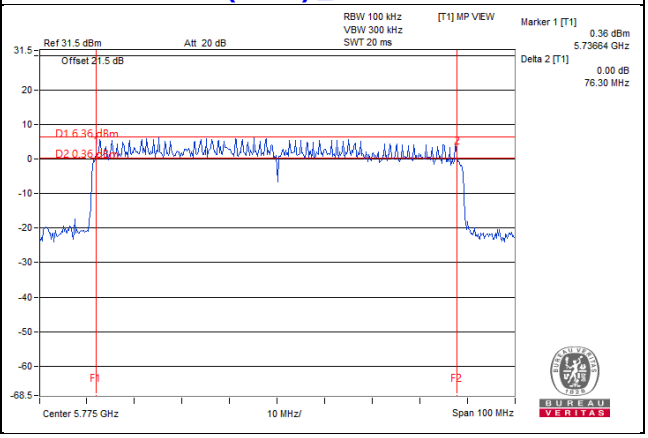
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	18.77	19.04	0.5	Pass
157	5785	18.98	19.06	0.5	Pass
165	5825	19.03	19.06	0.5	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	37.68	37.67	0.5	Pass
159	5795	37.80	37.64	0.5	Pass

802.11ax (HE80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	76.30	77.09	0.5	Pass

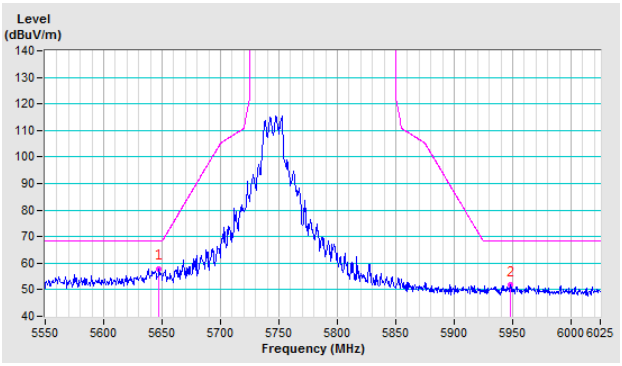
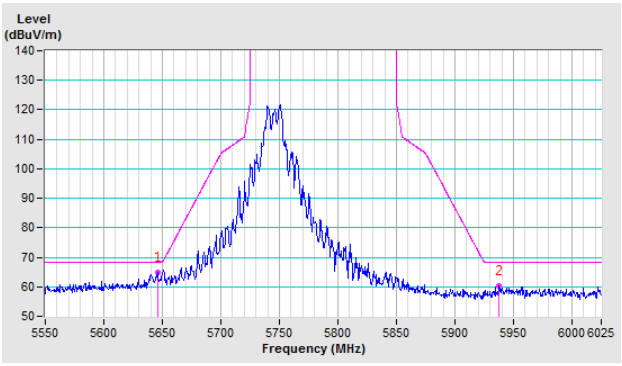
Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH149	**802.11ax (HE20)_Chain 0 / CH149**
	
802.11ax (HE40) _Chain 1 / CH159	**802.11ax (HE80) _Chain 0 / CH155**
	

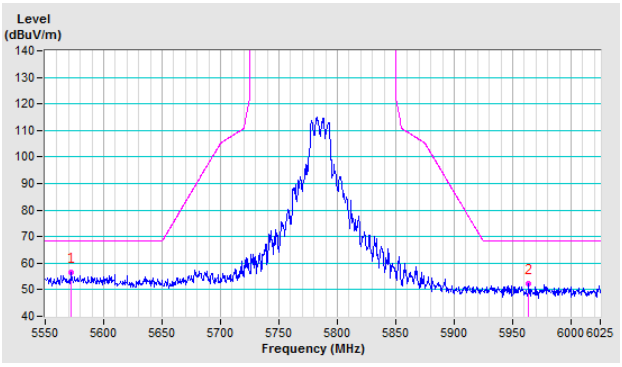
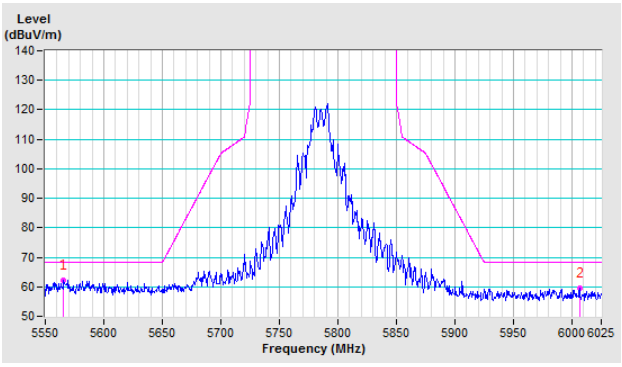
5 Pictures of Test Arrangements

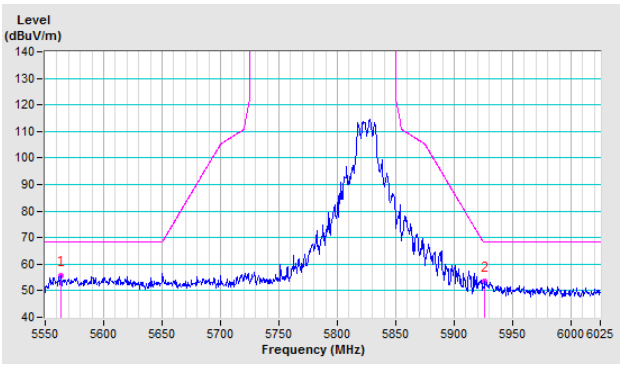
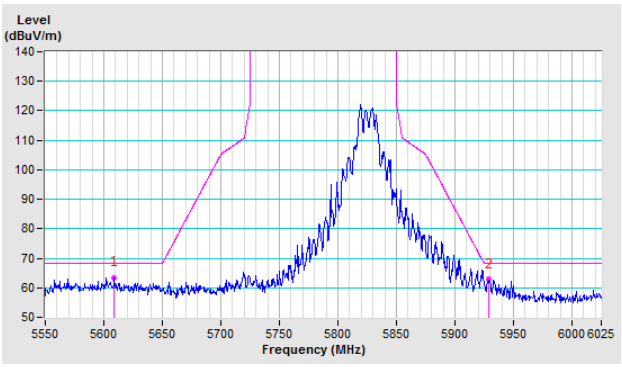
Please refer to the attached file (Test Setup Photo).

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

802.11a

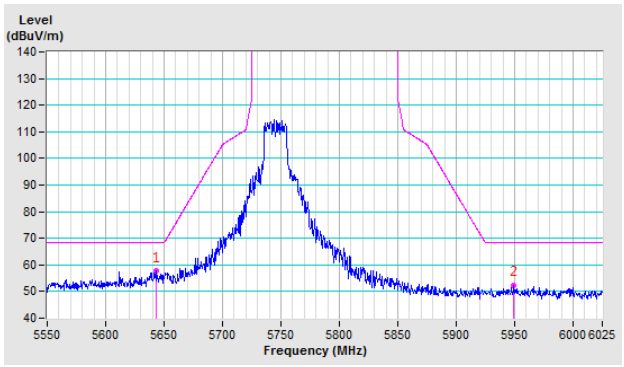
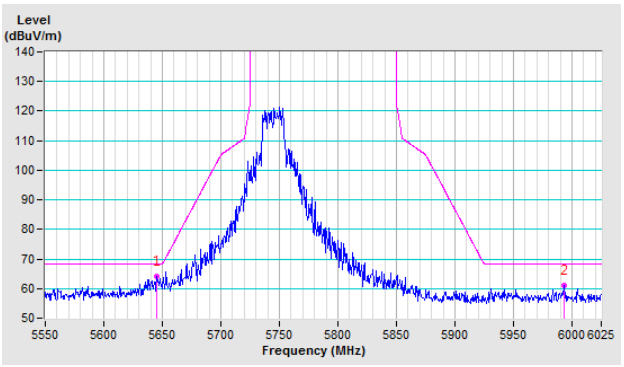
CH 149 5745 MHz	
Horizontal	**Vertical**
	

CH 157 5785 MHz	
Horizontal	**Vertical**
	

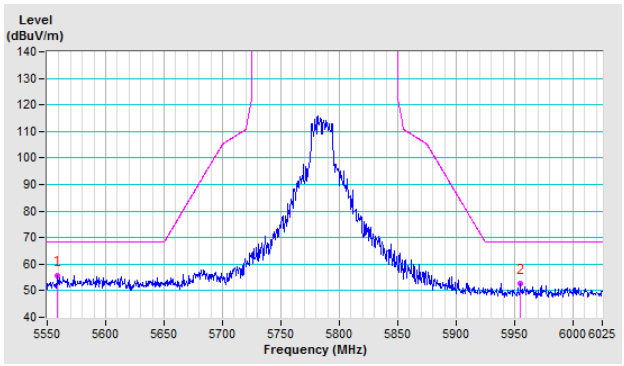
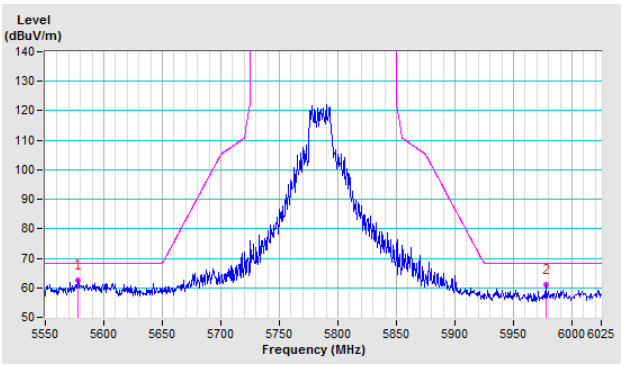
CH 165 5825 MHz	
Horizontal	**Vertical**
	

802.11ax (HE20)

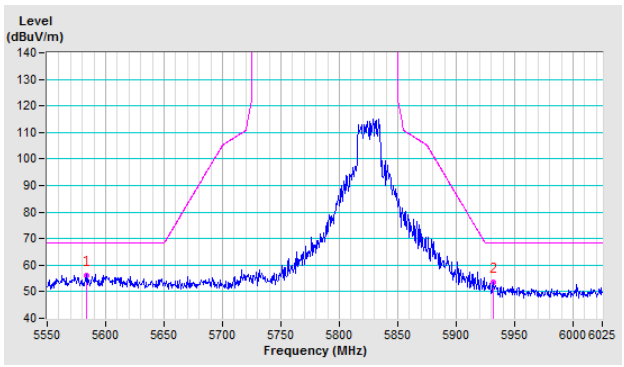
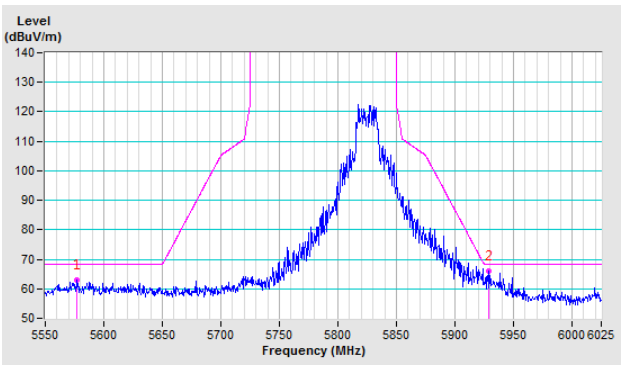
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

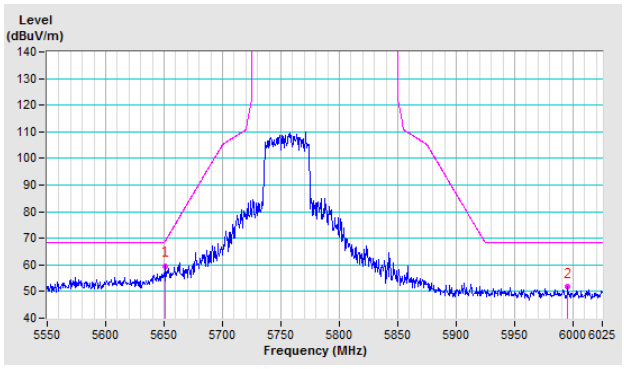
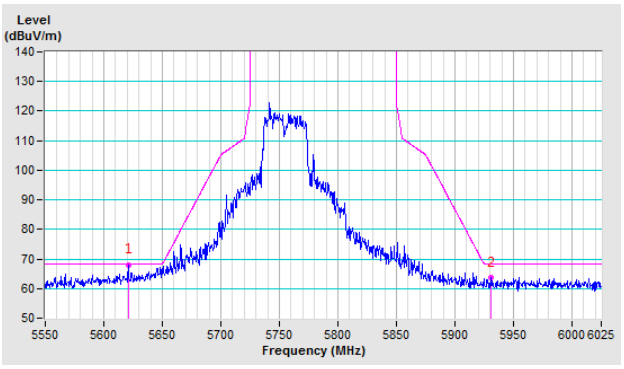
Horizontal	Vertical
	

CH 165 5825 MHz

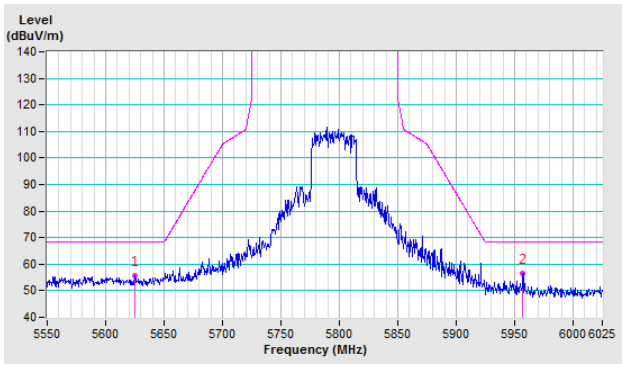
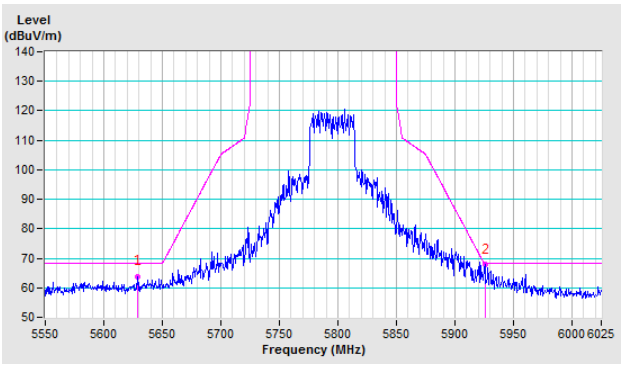
Horizontal	Vertical
	

802.11ax (HE40)

CH 151 5755 MHz

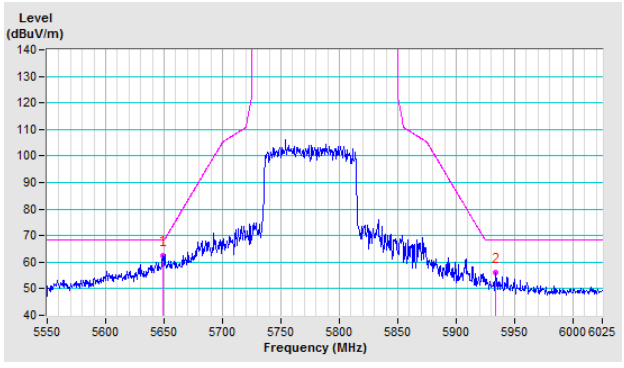
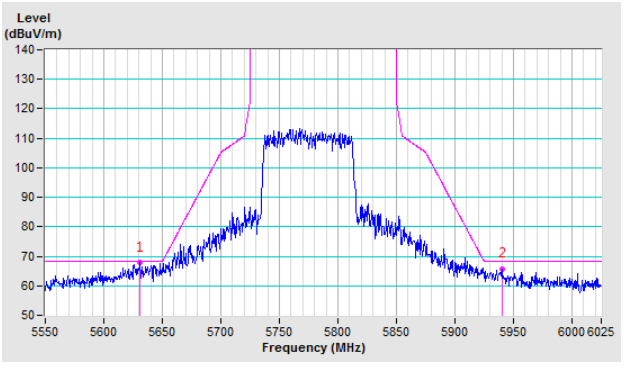
Horizontal	Vertical
	

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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