FCC Test Report (WLAN)

Report No.:	RFBHYD-WTW-P21051101A-1
FCC ID:	I881WSM20
Test Model:	WSM20
Received Date:	2021/12/7
Test Date:	2021/12/16 ~ 2021/12/24
Issued Date:	2022/2/23
Applicant:	Zyxel Communications Corporation
Address:	No.2 Industry East RD. IX, Hsinchu Science Park, Hsinchu 30075, Taiwan
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

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Release Control Record

Issue No.	Description	Date Issued
RFBHYD-WTW-P21051101A-1	Original release.	2022/2/23

1 Certificate of Conformity

Product:	AX1800 Dual-Band WiFi 6 System
Brand:	ZYXEL
Test Model:	WSM20
Sample Status:	Engineering sample
Applicant:	Zyxel Communications Corporation
Test Date:	2021/12/16 ~ 2021/12/24
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 : Cherry Chuo , **Date:** 2022/2/23

Cherry Chuo / Specialist

Approved by : , **Date:** 2022/2/23

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)(8)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -9.79 dB at 0.45871 MHz.
15.407(b) (1/2/3/4(i/ii)/8)	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit. Minimum passing margin is -0.6 dB at 5150.00 MHz and 5639.50 MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF) not a standard connector.

Note:
1. For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.
2. For U-NII-1 band compliance with rule 15.407(b) of the band-edge items, the test plots were recorded in Annex B. Test Procedures refer to report 4.1.3.
3. 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	1.9 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.4 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.0 dB
	18GHz ~ 40GHz	5.3 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AX1800 Dual-Band WiFi 6 System
Brand	ZYXEL
Test Model	WSM20
RF CPU Model No.	MT7621AT
RF Chip Model No.	MT7975DN
FW Version	V1.00(ABZF.0)B6
Status of EUT	Engineering sample
Power Supply Rating	12 Vdc from power adapter
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode 1024QAM for OFDMA in 11ax HE mode
Modulation Technology	OFDM, OFDMA
Transfer Rate	802.11a: up to 54 Mbps 802.11n: up to 300 Mbps 802.11ac: up to 866.7 Mbps 802.11ax: up to 1201.0 Mbps
Operating Frequency	5.18~ 5.24 GHz, 5.745 ~ 5.825 GHz
Number of Channel	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	**CDD Mode:** **5.18 ~ 5.24 GHz:** 757.46 mW **5.745 ~ 5.825 GHz:** 865.257 mW **Beamforming Mode:** **5.18 ~ 5.24 GHz:** 757.46 mW **5.745 ~ 5.825 GHz:** 755.162 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory	- AC Adapter x1 - Ethernet Cable x1 (Unshielded, 1.5m)

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 with a power adapter and following below table:

Brand	Model No.	Spec.
APD	WB-18Q12FU	AC Input: 100-240V, 50-60Hz, 0.6A Max. DC Output: 12.0V, 1.5A 18.0W DC Cable: Unshielded, 2.0m

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

Antenna NO.	RF Chain NO.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	Cable Length (mm)
2	2.4G_Chain 0	WHAYU	56-001-000044Z	2.5	2.4~2.4835GHz	Dipole	i-pex(MHF)	115
	5G_Chain 0			3.4	5.15~5.85GHz			
3	2.4G_Chain 1	WHAYU	56-001-000045Z	2.4	2.4~2.4835GHz	PIFA	i-pex(MHF)	115
	5G_Chain 1			3.4	5.15~5.85GHz			

4. The EUT incorporates a MIMO function:

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 modulation mode.
2. The EUT support Beamforming and CDD 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/ac mode is the same as the 802.11ax or more lower than it and investigated worst case to representative mode in test report.

5. The power setting are list as below:

CDD Mode							
802.11a		802.11ac (VHT20)		802.11ac (VHT40)		802.11ac (VHT80)	
Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting
5180	22	5180	21	5190	17	5210	15.5
5200	23	5200	24	5230	24.5	5775	25
5240	22	5240	23	5755	26		
5745	26	5745	26	5795	26		
5785	26	5785	26				
5825	26	5825	26				

802.11ax (HE20)		802.11ax (HE40)		802.11ax (HE80)	
Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting
5180	21	5190	17	5210	15.5
5200	24	5230	24.5	5775	25
5240	23	5755	26		
5745	26	5795	26		
5785	26				
5825	26				

Beamforming Mode					
802.11ac (VHT20)		802.11ac (VHT40)		802.11ac (VHT80)	
Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting
5180	21	5190	17	5210	15.5
5200	24	5230	24.5	5775	25
5240	23	5755	25.5		
5745	25.5	5795	25.5		
5785	25.5				
5825	25.5				
802.11ax (HE20)		802.11ax (HE40)		802.11ax (HE80)	
Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting
5180	21	5190	17	5210	15.5
5200	24	5230	24.5	5775	25
5240	23	5755	25.5		
5745	25.5	5795	25.5		
5785	25.5				
5825	25.5				

6. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.
7. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

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.

CDD 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.

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

Power Line Conducted Emission Test:

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

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

Antenna Port Conducted Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

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

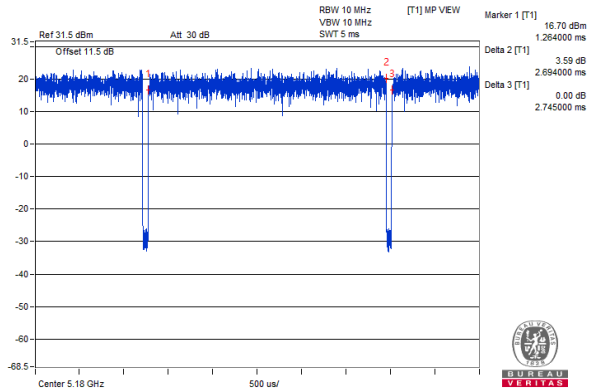
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	22deg. C, 70%RH	120Vac, 60Hz	Ryan Du
RE<1G	22deg. C, 70%RH	120Vac, 60Hz	Ryan Du
PLC	25deg. C, 75%RH	120Vac, 60Hz	Ryan Du
APCM	25deg. C, 60%RH	120Vac, 60Hz	Eric Peng

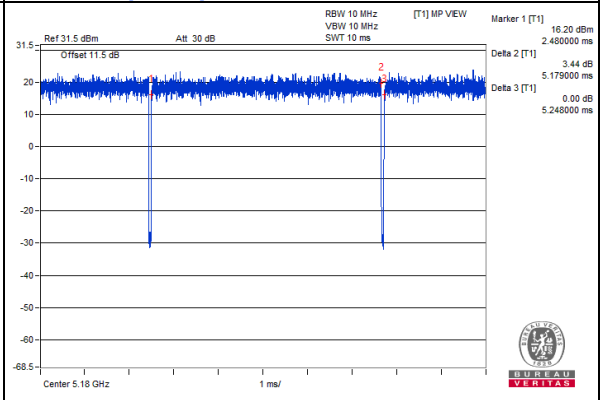
3.3 Duty Cycle of Test Signal

Duty cycle of test signal is ≥ 98 %, duty factor is not required.
802.11a: Duty cycle = 2.694 ms / 2.745 ms = 0.981
802.11ax (HE20): Duty cycle = 5.179 ms / 5.248 ms = 0.987
802.11ax (HE40): Duty cycle = 4.708 ms / 4.771 ms = 0.987
802.11ax (HE80): Duty cycle = 4.5 ms / 4.569 ms = 0.985

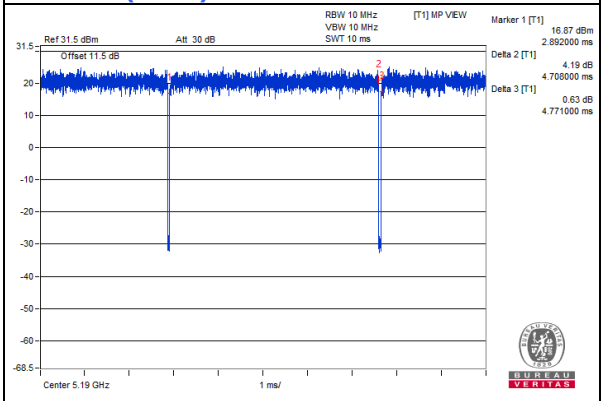
802.11a



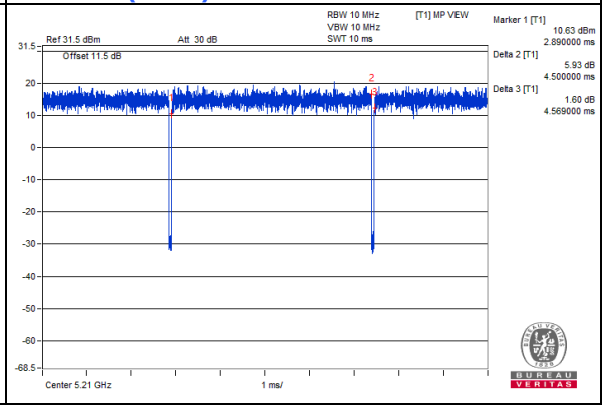
802.11ax (HE20)



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.

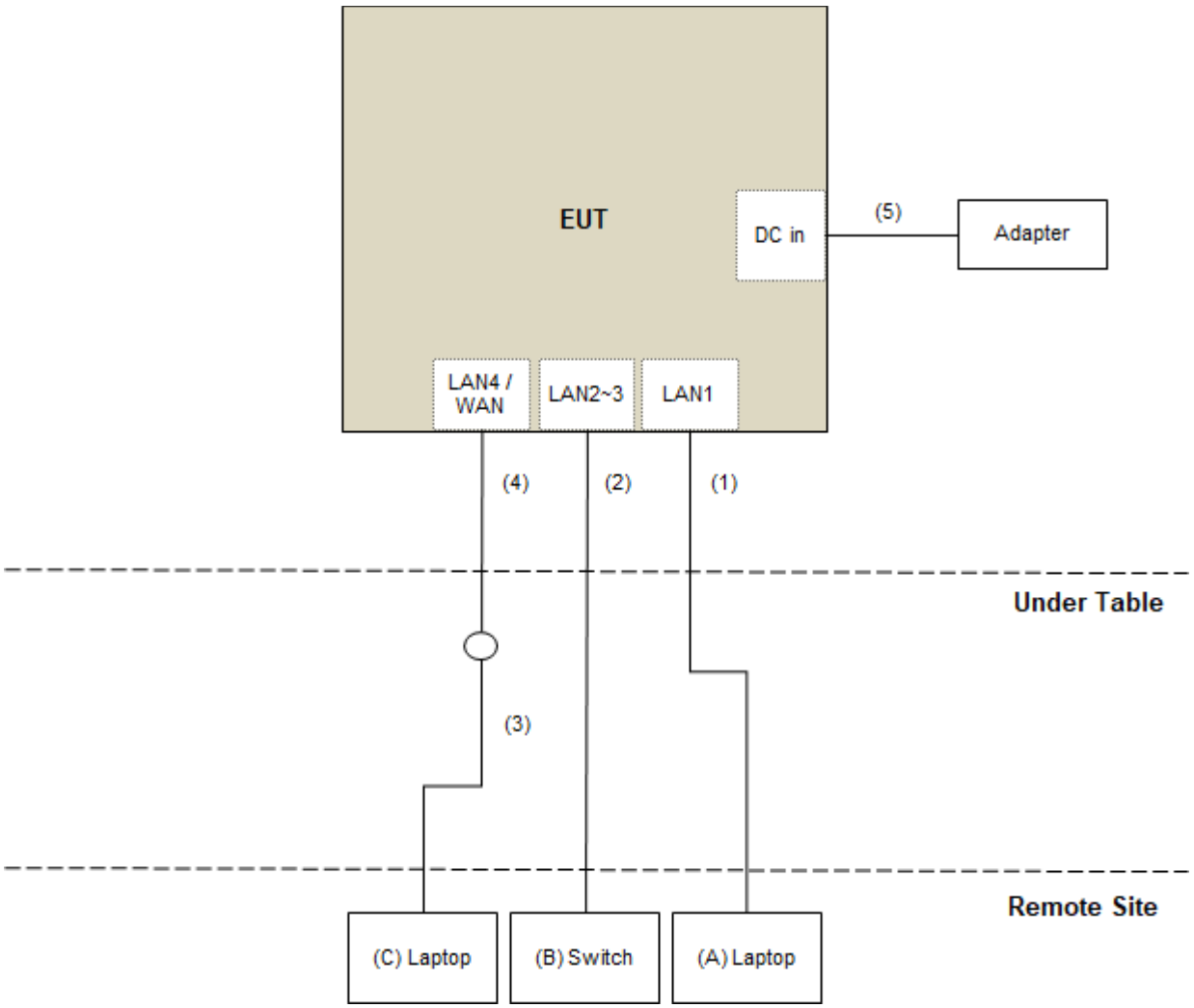
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E5430	4YV4VY1	FCC DoC	Provided by Lab
B.	Switch	D-Link	DGS-1005D	DR8WC92000523	NA	Provided by Lab
C.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab

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.	RJ-45 Cable	2	10	No	0	Provided by Lab
3.	RJ-45 Cable	1	10	No	0	Provided by Lab
4.	RJ-45 Cable	1	1.5	No	0	Supplied by applicant
5.	DC Cable	1	2	No	0	Supplied by applicant

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

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dBµV/m)	AV:54 (dBµV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBµV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	15.407(b)(4)(i)	PK: -27 (dBm/MHz) *1 PK: 10 (dBm/MHz) *2 PK: 15.6 (dBm/MHz) *3 PK: 27 (dBm/MHz) *4	PK: 68.2(dBµV/m) *1 PK: 105.2 (dBµV/m) *2 PK: 110.8(dBµV/m) *3 PK: 122.2 (dBµV/m) *4
5725~5850 MHz	15.407(b)(4)(i)	PK:-27 (dBm/MHz) *1 PK:10 (dBm/MHz) *2 PK:15.6 (dBm/MHz) *3 PK:27 (dBm/MHz) *4	PK: 68.2(dBµV/m) *1 PK:105.2 (dBµV/m) *2 PK: 110.8(dBµV/m) *3 PK:122.2 (dBµV/m) *4

*1 beyond 75 MHz or more above of the band edge.

*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Note:

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

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

4.1.2 Test Instruments

For Radiated emission & OOBE & Bandedge test:

Description & Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Spectrum Analyzer KEYSIGHT	N9030B	MY57142938	2021/4/26	2022/4/25
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Pre_Amplifier EMCI	EMC001340	980142	2021/5/24	2022/5/23
LOOP ANTENNA Electro-Metrics	EM-6879	264	2021/3/5	2022/3/4
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-001	2021/1/7	2022/1/6
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-002	2021/1/7	2022/1/6
Pre_Amplifier Mini-Circuits	ZFL-1000VH2	QA0838008	2021/10/19	2022/10/18
Trilog Broadband Antenna Schwarzbeck	VULB 9168	9168-361	2021/10/26	2022/10/25
RF Coaxial Cable COMMATE/PEWC	8D	966-3-1	2021/3/16	2022/3/15
RF Coaxial Cable COMMATE/PEWC	8D	966-3-2	2021/3/16	2022/3/15
RF Coaxial Cable COMMATE/PEWC	8D	966-3-3	2021/3/16	2022/3/15
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	2021/9/23	2022/9/22
Horn Antenna Schwarzbeck	BBHA9120-D	9120D-406	2021/11/14	2022/11/13
Pre_Amplifier EMCI	EMC12630SE	980384	2021/1/11	2022/1/10
RF Coaxial Cable EMCI	EMC104-SM-SM-1500	180504	2021/4/26	2022/4/25
RF Coaxial Cable EMCI	EMC104-SM-SM-2000	180601	2021/6/8	2022/6/7
RF Coaxial Cable EMCI	EMC104-SM-SM-6000	210201	2021/5/13	2022/5/12
Fix tool for Boresight antenna tower BV	FBA-01	FBA_SIP01	NA	NA
Spectrum Analyzer Keysight	N9030A	MY54490679	2021/7/9	2022/7/8
Pre_Amplifier EMCI	EMC184045SE	980387	2021/1/11	2022/1/10
Horn Antenna Schwarzbeck	BBHA 9170	BBHA9170519	2021/11/14	2022/11/13
RF Cable-Frequency range: 1-40GHz EMCI	EMC102-KM-KM-1200	160924	2021/1/11	2022/1/10
RF cable (40GHz) EMCI	EMC-KM-KM-4000	200214	2021/3/10	2022/3/9

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. Tested Date: 2021/12/16 ~ 2021/12/24

For other test items test:

Description & Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Spectrum Analyzer R&S	FSV40	101516	2021/3/8	2022/3/7
Power Meter Anritsu	ML2495A	1529002	2021/6/21	2022/6/20
Pulse Power Sensor Anritsu	MA2411B	1339443	2021/5/31	2022/5/30
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2021/4/13	2022/4/12
Software	ADT_RF Test Software V6.6.5.4	NA	NA	NA

NOTE: 1. The test was performed in Oven room 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: 2021/12/23

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:

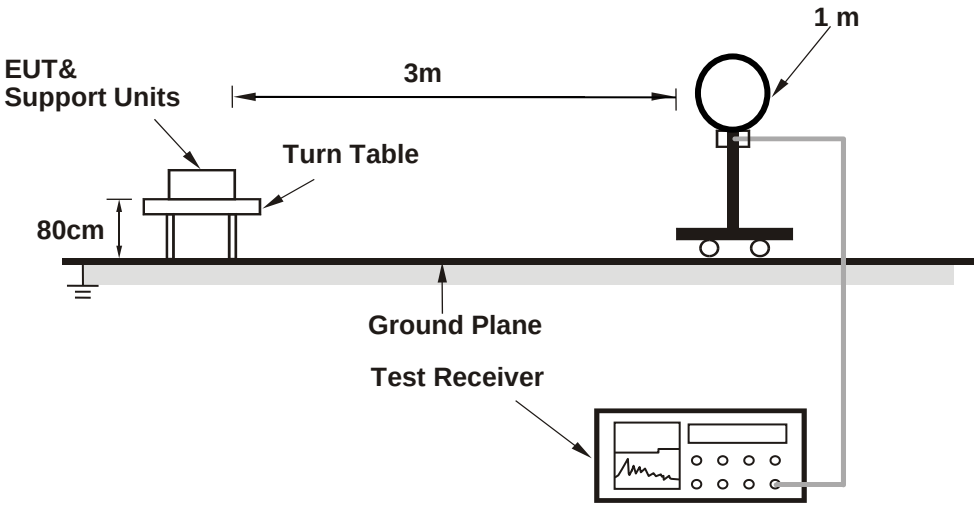
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

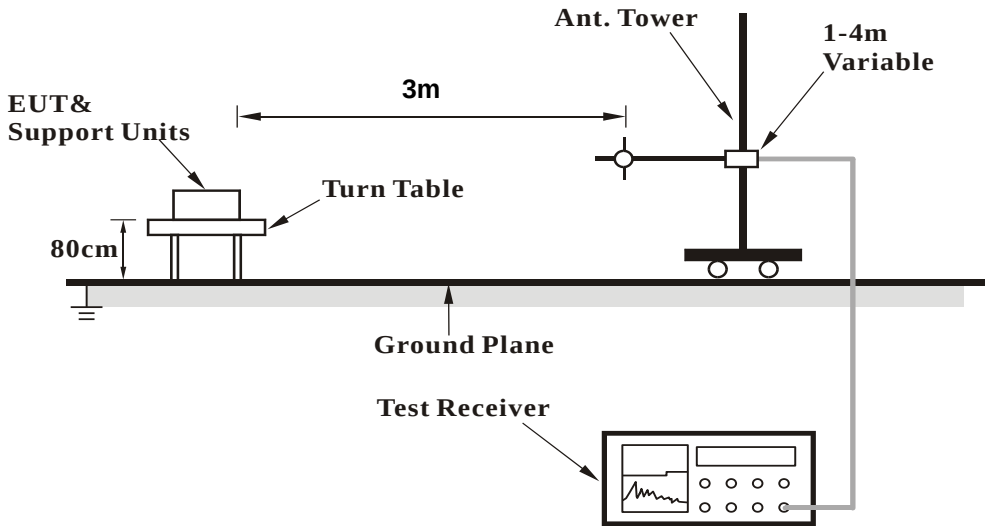
No deviation.

4.1.5 Test Setup

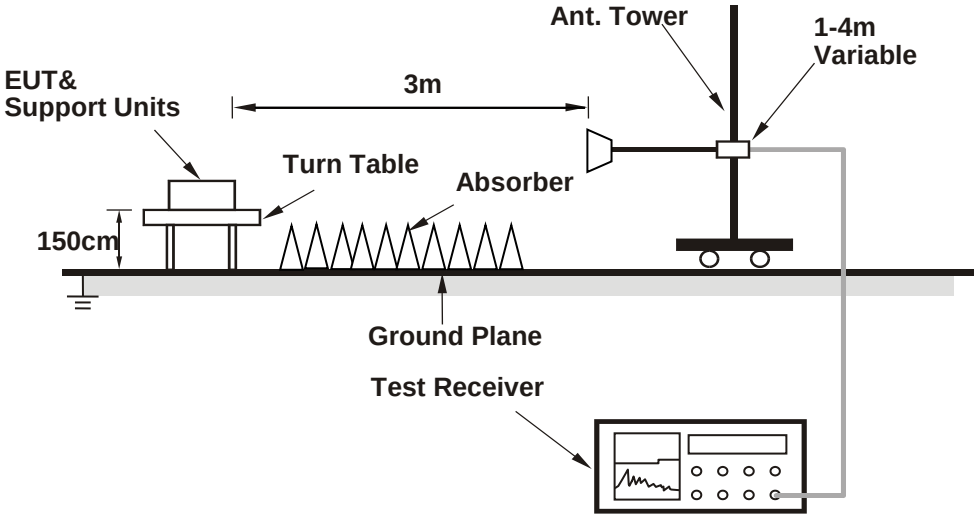
For Radiated emission below 30MHz



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. Placed the EUT on the testing table.
b. Controlling software (QA Tool 0.0.2.15) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data:

RF Mode	TX 802.11a	Channel	CH 36：5180 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (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	69.2 PK	74.0	-4.8	1.34 H	356	64.8	4.4
2	5150.00	52.6 AV	54.0	-1.4	1.34 H	356	48.2	4.4
3	*5180.00	118.3 PK			1.34 H	356	114.0	4.3
4	*5180.00	108.4 AV			1.34 H	356	104.1	4.3
5	#10360.00	56.8 PK	68.2	-11.4	1.64 H	240	43.5	13.3
6	15540.00	55.8 PK	74.0	-18.2	1.48 H	199	41.8	14.0
7	15540.00	43.4 AV	54.0	-10.6	1.48 H	199	29.4	14.0
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	63.0 PK	74.0	-11.0	1.42 V	152	58.6	4.4
2	5150.00	48.2 AV	54.0	-5.8	1.42 V	152	43.8	4.4
3	*5180.00	113.7 PK			1.42 V	152	109.4	4.3
4	*5180.00	104.9 AV			1.42 V	152	100.6	4.3
5	#10360.00	58.8 PK	68.2	-9.4	1.56 V	257	45.5	13.3
6	15540.00	55.5 PK	74.0	-18.5	1.32 V	204	41.5	14.0
7	15540.00	43.1 AV	54.0	-10.9	1.32 V	204	29.1	14.0

Remarks:

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

RF Mode	TX 802.11a	Channel	CH 40：5200 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5200.00	122.6 PK			1.34 H	360	118.4	4.2
2	*5200.00	112.4 AV			1.34 H	360	108.2	4.2
3	#10400.00	60.2 PK	68.2	-8.0	1.68 H	243	46.7	13.5
4	15600.00	59.2 PK	74.0	-14.8	1.51 H	204	45.1	14.1
5	15600.00	46.5 AV	54.0	-7.5	1.51 H	204	32.4	14.1
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5200.00	120.6 PK			1.41 V	151	116.4	4.2
2	*5200.00	110.2 AV			1.41 V	151	106.0	4.2
3	#10400.00	62.2 PK	68.2	-6.0	1.61 V	264	48.7	13.5
4	15600.00	58.2 PK	74.0	-15.8	1.28 V	209	44.1	14.1
5	15600.00	46.1 AV	54.0	-7.9	1.28 V	209	32.0	14.1

Remarks:

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

RF Mode	TX 802.11a	Channel	CH 48：5240 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (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	1.40 H	4	50.8	4.4
2	5150.00	45.4 AV	54.0	-8.6	1.40 H	4	41.0	4.4
3	*5240.00	119.1 PK			1.40 H	4	115.2	3.9
4	*5240.00	109.7 AV			1.40 H	4	105.8	3.9
5	#10480.00	56.5 PK	68.2	-11.7	1.67 H	227	42.9	13.6
6	15720.00	56.2 PK	74.0	-17.8	1.51 H	204	42.3	13.9
7	15720.00	43.8 AV	54.0	-10.2	1.51 H	204	29.9	13.9
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	54.6 PK	74.0	-19.4	1.35 V	147	50.2	4.4
2	5150.00	43.7 AV	54.0	-10.3	1.35 V	147	39.3	4.4
3	*5240.00	117.8 PK			1.35 V	147	113.9	3.9
4	*5240.00	108.3 AV			1.35 V	147	104.4	3.9
5	#10480.00	58.9 PK	68.2	-9.3	1.58 V	271	45.3	13.6
6	15720.00	56.0 PK	74.0	-18.0	1.27 V	209	42.1	13.9
7	15720.00	43.3 AV	54.0	-10.7	1.27 V	209	29.4	13.9

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.

RF Mode	TX 802.11a	Channel	CH 149：5745 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5648.31	57.2 PK	68.2	-11.0	1.75 H	54	52.9	4.3
2	*5745.00	122.7 PK			1.75 H	54	118.0	4.7
3	*5745.00	112.8 AV			1.75 H	54	108.1	4.7
4	#5938.17	53.4 PK	68.2	-14.8	1.75 H	54	48.4	5.0
5	11490.00	60.0 PK	74.0	-14.0	1.68 H	257	45.4	14.6
6	11490.00	48.6 AV	54.0	-5.4	1.68 H	257	34.0	14.6
7	#17235.00	59.4 PK	68.2	-8.8	1.48 H	209	41.4	18.0
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5584.38	54.6 PK	68.2	-13.6	1.58 V	83	50.3	4.3
2	*5745.00	120.4 PK			1.58 V	83	115.7	4.7
3	*5745.00	110.0 AV			1.58 V	83	105.3	4.7
4	#5941.53	52.3 PK	68.2	-15.9	1.58 V	83	47.3	5.0
5	11490.00	66.1 PK	74.0	-7.9	1.00 V	309	51.5	14.6
6	11490.00	52.3 AV	54.0	-1.7	1.00 V	309	37.7	14.6
7	#17235.00	57.9 PK	68.2	-10.3	1.21 V	190	39.9	18.0

Remarks:

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

RF Mode	TX 802.11a	Channel	CH 157：5785 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5626.75	55.7 PK	68.2	-12.5	1.82 H	56	51.4	4.3
2	*5785.00	122.9 PK			1.82 H	56	118.1	4.8
3	*5785.00	112.9 AV			1.82 H	56	108.1	4.8
4	#5935.14	53.3 PK	68.2	-14.9	1.82 H	56	48.3	5.0
5	11570.00	60.7 PK	74.0	-13.3	1.71 H	231	46.1	14.6
6	11570.00	49.1 AV	54.0	-4.9	1.71 H	231	34.5	14.6
7	#17355.00	59.7 PK	68.2	-8.5	1.56 H	220	41.4	18.3
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5644.68	53.6 PK	68.2	-14.6	1.54 V	78	49.3	4.3
2	*5785.00	119.7 PK			1.54 V	78	114.9	4.8
3	*5785.00	109.8 AV			1.54 V	78	105.0	4.8
4	#5927.33	52.8 PK	68.2	-15.4	1.54 V	78	47.8	5.0
5	11570.00	66.2 PK	74.0	-7.8	1.03 V	300	51.6	14.6
6	11570.00	52.3 AV	54.0	-1.7	1.03 V	300	37.7	14.6
7	#17355.00	57.8 PK	68.2	-10.4	1.24 V	201	39.5	18.3

Remarks:

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

RF Mode	TX 802.11a	Channel	CH 165：5825 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5643.55	55.7 PK	68.2	-12.5	1.78 H	55	51.4	4.3
2	*5825.00	122.5 PK			1.78 H	55	117.7	4.8
3	*5825.00	112.7 AV			1.78 H	55	107.9	4.8
4	#5950.94	53.2 PK	68.2	-15.0	1.78 H	55	48.1	5.1
5	11650.00	59.6 PK	74.0	-14.4	1.71 H	232	45.2	14.4
6	11650.00	48.3 AV	54.0	-5.7	1.71 H	232	33.9	14.4
7	#17475.00	58.6 PK	68.2	-9.6	1.49 H	196	39.6	19.0
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5617.37	55.3 PK	68.2	-12.9	1.59 V	71	51.0	4.3
2	*5825.00	120.5 PK			1.59 V	71	115.7	4.8
3	*5825.00	110.4 AV			1.59 V	71	105.6	4.8
4	#5984.02	52.5 PK	68.2	-15.7	1.59 V	71	47.4	5.1
5	11650.00	65.9 PK	74.0	-8.1	1.00 V	306	51.5	14.4
6	11650.00	51.8 AV	54.0	-2.2	1.00 V	306	37.4	14.4
7	#17475.00	57.8 PK	68.2	-10.4	1.26 V	186	38.8	19.0

Remarks:

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

RF Mode	TX 802.11ax (HE20)	Channel	CH 36：5180 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	65.9 PK	74.0	-8.1	1.38 H	4	61.5	4.4
2	5150.00	53.3 AV	54.0	-0.7	1.38 H	4	48.9	4.4
3	*5180.00	117.2 PK			1.38 H	4	112.9	4.3
4	*5180.00	106.7 AV			1.38 H	4	102.4	4.3
5	#10360.00	55.9 PK	68.2	-12.3	1.69 H	228	42.6	13.3
6	15540.00	56.6 PK	74.0	-17.4	1.53 H	200	42.6	14.0
7	15540.00	44.2 AV	54.0	-9.8	1.53 H	200	30.2	14.0
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (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	62.3 PK	74.0	-11.7	1.37 V	146	57.9	4.4
2	5150.00	51.1 AV	54.0	-2.9	1.37 V	146	46.7	4.4
3	*5180.00	114.9 PK			1.37 V	146	110.6	4.3
4	*5180.00	103.4 AV			1.37 V	146	99.1	4.3
5	#10360.00	58.4 PK	68.2	-9.8	1.55 V	263	45.1	13.3
6	15540.00	55.0 PK	74.0	-19.0	1.36 V	216	41.0	14.0
7	15540.00	42.9 AV	54.0	-11.1	1.36 V	216	28.9	14.0

Remarks:

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

RF Mode	TX 802.11ax (HE20)	Channel	CH 40：5200 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	71.2 PK	74.0	-2.8	1.42 H	14	66.8	4.4
2	**5150.00**	**53.4 AV**	**54.0**	**-0.6**	**1.42 H**	**14**	**49.0**	**4.4**
3	*5200.00	121.4 PK			1.42 H	14	117.2	4.2
4	*5200.00	110.0 AV			1.42 H	14	105.8	4.2
5	#10400.00	59.7 PK	68.2	-8.5	1.64 H	266	46.2	13.5
6	15600.00	58.8 PK	74.0	-15.2	1.52 H	199	44.7	14.1
7	15600.00	46.1 AV	54.0	-7.9	1.52 H	199	32.0	14.1
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (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	62.6 PK	74.0	-11.4	1.52 V	95	58.2	4.4
2	5150.00	51.1 AV	54.0	-2.9	1.52 V	95	46.7	4.4
3	*5200.00	120.0 PK			1.52 V	95	115.8	4.2
4	*5200.00	108.8 AV			1.52 V	95	104.6	4.2
5	#10400.00	61.9 PK	68.2	-6.3	1.66 V	262	48.4	13.5
6	15600.00	58.1 PK	74.0	-15.9	1.27 V	213	44.0	14.1
7	15600.00	45.8 AV	54.0	-8.2	1.27 V	213	31.7	14.1

Remarks:

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

RF Mode	TX 802.11ax (HE20)	Channel	CH 48：5240 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5129.16	56.1 PK	74.0	-17.9	1.44 H	356	51.7	4.4
2	5129.16	46.0 AV	54.0	-8.0	1.44 H	356	41.6	4.4
3	*5240.00	121.0 PK			1.44 H	356	117.1	3.9
4	*5240.00	109.6 AV			1.44 H	356	105.7	3.9
5	#10480.00	56.8 PK	68.2	-11.4	1.71 H	223	43.2	13.6
6	15720.00	56.1 PK	74.0	-17.9	1.52 H	211	42.2	13.9
7	15720.00	43.7 AV	54.0	-10.3	1.52 H	211	29.8	13.9
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5127.55	53.9 PK	74.0	-20.1	1.44 V	148	49.5	4.4
2	5127.55	44.0 AV	54.0	-10.0	1.44 V	148	39.6	4.4
3	*5240.00	118.3 PK			1.44 V	148	114.4	3.9
4	*5240.00	107.2 AV			1.44 V	148	103.3	3.9
5	#10480.00	59.0 PK	68.2	-9.2	1.56 V	264	45.4	13.6
6	15720.00	55.6 PK	74.0	-18.4	1.31 V	204	41.7	13.9
7	15720.00	43.4 AV	54.0	-10.6	1.31 V	204	29.5	13.9

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.

RF Mode	TX 802.11ax (HE20)	Channel	CH 149：5745 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5637.77	58.6 PK	68.2	-9.6	1.70 H	51	54.3	4.3
2	*5745.00	124.5 PK			1.70 H	51	119.8	4.7
3	*5745.00	112.5 AV			1.70 H	51	107.8	4.7
4	#5929.12	52.6 PK	68.2	-15.6	1.70 H	51	47.6	5.0
5	11490.00	60.0 PK	74.0	-14.0	1.72 H	245	45.4	14.6
6	11490.00	48.5 AV	54.0	-5.5	1.72 H	245	33.9	14.6
7	#17235.00	59.1 PK	68.2	-9.1	1.45 H	194	41.1	18.0
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5631.41	54.7 PK	68.2	-13.5	1.52 V	79	50.4	4.3
2	*5745.00	120.1 PK			1.52 V	79	115.4	4.7
3	*5745.00	108.9 AV			1.52 V	79	104.2	4.7
4	#5960.93	51.1 PK	68.2	-17.1	1.52 V	79	46.0	5.1
5	11490.00	62.4 PK	74.0	-11.6	1.62 V	277	47.8	14.6
6	11490.00	50.3 AV	54.0	-3.7	1.62 V	277	35.7	14.6
7	#17235.00	57.8 PK	68.2	-10.4	1.32 V	209	39.8	18.0

Remarks:

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

RF Mode	TX 802.11ax (HE20)	Channel	CH 157：5785 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5638.18	55.8 PK	68.2	-12.4	1.79 H	51	51.5	4.3
2	*5785.00	123.7 PK			1.79 H	51	118.9	4.8
3	*5785.00	112.4 AV			1.79 H	51	107.6	4.8
4	#5936.46	53.5 PK	68.2	-14.7	1.79 H	51	48.5	5.0
5	11570.00	59.5 PK	74.0	-14.5	1.73 H	268	44.9	14.6
6	11570.00	48.2 AV	54.0	-5.8	1.73 H	268	33.6	14.6
7	#17355.00	59.5 PK	68.2	-8.7	1.54 H	224	41.2	18.3
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5645.80	54.8 PK	68.2	-13.4	1.57 V	82	50.5	4.3
2	*5785.00	122.3 PK			1.57 V	82	117.5	4.8
3	*5785.00	110.1 AV			1.57 V	82	105.3	4.8
4	#5934.20	52.8 PK	68.2	-15.4	1.57 V	82	47.8	5.0
5	11570.00	62.2 PK	74.0	-11.8	1.60 V	279	47.6	14.6
6	11570.00	49.9 AV	54.0	-4.1	1.60 V	279	35.3	14.6
7	#17355.00	58.9 PK	68.2	-9.3	1.32 V	209	40.6	18.3

Remarks:

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

RF Mode	TX 802.11ax (HE20)	Channel	CH 165：5825 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5621.73	54.7 PK	68.2	-13.5	1.80 H	55	50.4	4.3
2	*5825.00	123.8 PK			1.80 H	55	119.0	4.8
3	*5825.00	112.6 AV			1.80 H	55	107.8	4.8
4	#6005.57	52.6 PK	68.2	-15.6	1.80 H	55	47.6	5.0
5	11650.00	59.7 PK	74.0	-14.3	1.66 H	272	45.3	14.4
6	11650.00	48.2 AV	54.0	-5.8	1.66 H	272	33.8	14.4
7	#17475.00	59.7 PK	68.2	-8.5	1.53 H	219	40.7	19.0
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5642.78	54.1 PK	68.2	-14.1	1.54 V	77	49.8	4.3
2	*5825.00	121.1 PK			1.54 V	77	116.3	4.8
3	*5825.00	109.7 AV			1.54 V	77	104.9	4.8
4	#5971.97	53.0 PK	68.2	-15.2	1.54 V	77	47.9	5.1
5	11650.00	62.4 PK	74.0	-11.6	1.57 V	253	48.0	14.4
6	11650.00	50.5 AV	54.0	-3.5	1.57 V	253	36.1	14.4
7	#17475.00	58.1 PK	68.2	-10.1	1.26 V	198	39.1	19.0

Remarks:

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

RF Mode	TX 802.11ax (HE40)	Channel	CH 38：5190 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	64.6 PK	74.0	-9.4	1.48 H	3	60.2	4.4
2	**5150.00**	**53.4 AV**	**54.0**	**-0.6**	**1.48 H**	**3**	**49.0**	**4.4**
3	*5190.00	111.4 PK			1.48 H	3	107.2	4.2
4	*5190.00	100.3 AV			1.48 H	3	96.1	4.2
5	#10380.00	56.5 PK	68.2	-11.7	1.61 H	212	43.1	13.4
6	15570.00	56.0 PK	74.0	-18.0	1.56 H	204	41.9	14.1
7	15570.00	43.7 AV	54.0	-10.3	1.56 H	204	29.6	14.1
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	61.5 PK	74.0	-12.5	1.44 V	147	57.1	4.4
2	5150.00	50.6 AV	54.0	-3.4	1.44 V	147	46.2	4.4
3	*5190.00	109.4 PK			1.44 V	147	105.2	4.2
4	*5190.00	99.1 AV			1.44 V	147	94.9	4.2
5	#10380.00	59.2 PK	68.2	-9.0	1.60 V	250	45.8	13.4
6	15570.00	56.2 PK	74.0	-17.8	1.35 V	213	42.1	14.1
7	15570.00	43.7 AV	54.0	-10.3	1.35 V	213	29.6	14.1

Remarks:

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

RF Mode	TX 802.11ax (HE40)	Channel	CH 46：5230 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (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	65.2 PK	74.0	-8.8	1.48 H	3	60.8	4.4
2	5150.00	53.1 AV	54.0	-0.9	1.48 H	3	48.7	4.4
3	*5230.00	117.5 PK			1.48 H	3	113.5	4.0
4	*5230.00	106.7 AV			1.48 H	3	102.7	4.0
5	#10460.00	56.2 PK	68.2	-12.0	1.56 H	226	42.6	13.6
6	15690.00	56.4 PK	74.0	-17.6	1.51 H	194	42.4	14.0
7	15690.00	44.1 AV	54.0	-9.9	1.51 H	194	30.1	14.0
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (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	60.2 PK	74.0	-13.8	1.44 V	149	55.8	4.4
2	5150.00	50.2 AV	54.0	-3.8	1.44 V	149	45.8	4.4
3	*5230.00	115.1 PK			1.44 V	149	111.1	4.0
4	*5230.00	104.2 AV			1.44 V	149	100.2	4.0
5	#10460.00	59.3 PK	68.2	-8.9	1.59 V	269	45.7	13.6
6	15690.00	55.2 PK	74.0	-18.8	1.25 V	215	41.2	14.0
7	15690.00	43.1 AV	54.0	-10.9	1.25 V	215	29.1	14.0

Remarks:

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

RF Mode	TX 802.11ax (HE40)	Channel	CH 151：5755 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5648.63	65.5 PK	68.2	-2.7	1.80 H	20	61.2	4.3
2	*5755.00	119.2 PK			1.80 H	20	114.5	4.7
3	*5755.00	108.0 AV			1.80 H	20	103.3	4.7
4	#5928.14	53.4 PK	68.2	-14.8	1.80 H	20	48.4	5.0
5	11510.00	56.9 PK	74.0	-17.1	1.58 H	209	42.3	14.6
6	11510.00	45.7 AV	54.0	-8.3	1.58 H	209	31.1	14.6
7	#17265.00	55.7 PK	68.2	-12.5	1.56 H	210	37.8	17.9
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5647.13	64.8 PK	68.2	-3.4	1.63 V	85	60.5	4.3
2	*5755.00	117.4 PK			1.63 V	85	112.7	4.7
3	*5755.00	106.9 AV			1.63 V	85	102.2	4.7
4	#5939.39	55.3 PK	68.2	-12.9	1.63 V	85	50.3	5.0
5	11510.00	59.1 PK	74.0	-14.9	1.56 V	260	44.5	14.6
6	11510.00	46.7 AV	54.0	-7.3	1.56 V	260	32.1	14.6
7	#17265.00	55.8 PK	68.2	-12.4	1.29 V	210	37.9	17.9

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.

RF Mode	TX 802.11ax (HE40)	Channel	CH 159：5795 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5648.47	57.6 PK	68.2	-10.6	1.76 H	16	53.3	4.3
2	*5795.00	119.5 PK			1.76 H	16	114.7	4.8
3	*5795.00	108.1 AV			1.76 H	16	103.3	4.8
4	#5925.77	58.9 PK	68.2	-9.3	1.76 H	16	53.9	5.0
5	11590.00	56.7 PK	74.0	-17.3	1.64 H	211	42.1	14.6
6	11590.00	45.3 AV	54.0	-8.7	1.64 H	211	30.7	14.6
7	#17385.00	55.5 PK	68.2	-12.7	1.52 H	205	37.0	18.5
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5641.69	56.3 PK	68.2	-11.9	1.67 V	73	52.0	4.3
2	*5795.00	117.9 PK			1.67 V	73	113.1	4.8
3	*5795.00	107.2 AV			1.67 V	73	102.4	4.8
4	#5931.86	60.3 PK	68.2	-7.9	1.67 V	73	55.3	5.0
5	11590.00	58.7 PK	74.0	-15.3	1.55 V	267	44.1	14.6
6	11590.00	46.6 AV	54.0	-7.4	1.55 V	267	32.0	14.6
7	#17385.00	55.6 PK	68.2	-12.6	1.33 V	190	37.1	18.5

Remarks:

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

RF Mode	TX 802.11ax (HE80)	Channel	CH 42：5210 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5149.63	63.7 PK	74.0	-10.3	1.39 H	7	59.3	4.4
2	5149.63	53.0 AV	54.0	-1.0	1.39 H	7	48.6	4.4
3	*5210.00	107.7 PK			1.39 H	7	103.6	4.1
4	*5210.00	96.0 AV			1.39 H	7	91.9	4.1
5	#10420.00	54.0 PK	68.2	-14.2	1.58 H	205	40.5	13.5
6	15630.00	53.1 PK	74.0	-20.9	1.60 H	220	39.0	14.1
7	15630.00	40.8 AV	54.0	-13.2	1.60 H	220	26.7	14.1
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (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	60.3 PK	74.0	-13.7	1.47 V	153	55.9	4.4
2	5150.00	50.6 AV	54.0	-3.4	1.47 V	153	46.2	4.4
3	*5210.00	106.4 PK			1.47 V	153	102.3	4.1
4	*5210.00	94.7 AV			1.47 V	153	90.6	4.1
5	#10420.00	56.1 PK	68.2	-12.1	1.58 V	256	42.6	13.5
6	15630.00	53.1 PK	74.0	-20.9	1.33 V	193	39.0	14.1
7	15630.00	40.8 AV	54.0	-13.2	1.33 V	193	26.7	14.1

Remarks:

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

RF Mode	TX 802.11ax (HE80)	Channel	CH 155：5775 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	**#5639.50**	**67.6 PK**	**68.2**	**-0.6**	**1.72 H**	**18**	**63.3**	**4.3**
2	*5775.00	114.7 PK			1.72 H	18	109.9	4.8
3	*5775.00	103.3 AV			1.72 H	18	98.5	4.8
4	#5926.50	66.6 PK	68.2	-1.6	1.72 H	18	61.6	5.0
5	11550.00	56.0 PK	74.0	-18.0	1.67 H	210	41.4	14.6
6	11550.00	45.0 AV	54.0	-9.0	1.67 H	210	30.4	14.6
7	#17325.00	55.6 PK	68.2	-12.6	1.60 H	201	37.5	18.1
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5649.20	67.0 PK	68.2	-1.2	1.57 V	77	62.7	4.3
2	*5775.00	114.2 PK			1.57 V	77	109.4	4.8
3	*5775.00	103.0 AV			1.57 V	77	98.2	4.8
4	#5929.42	66.5 PK	68.2	-1.7	1.57 V	77	61.5	5.0
5	11550.00	58.6 PK	74.0	-15.4	1.62 V	273	44.0	14.6
6	11550.00	46.5 AV	54.0	-7.5	1.62 V	273	31.9	14.6
7	#17325.00	55.7 PK	68.2	-12.5	1.27 V	195	37.6	18.1

Remarks:

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

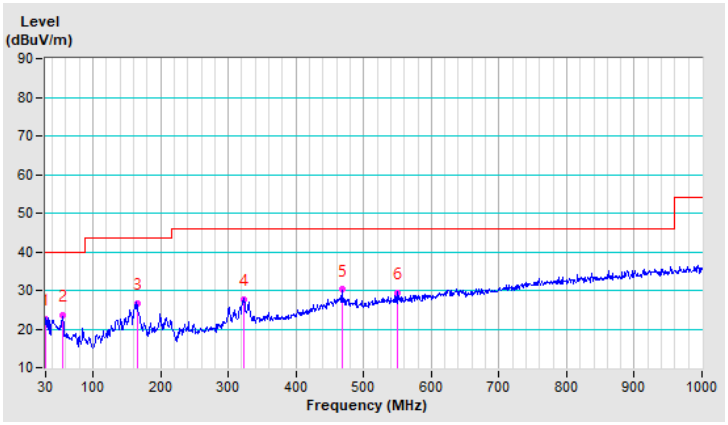
Below 1GHz Data:

RF Mode	TX 802.11a	Channel	CH 149：5745 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.33	22.6 QP	40.0	-17.4	1.00 H	48	31.6	-9.0
2	54.99	23.5 QP	40.0	-16.5	2.00 H	201	31.7	-8.2
3	164.91	26.6 QP	43.5	-16.9	1.50 H	249	34.5	-7.9
4	323.90	27.6 QP	46.0	-18.4	1.00 H	261	33.1	-5.5
5	467.92	30.2 QP	46.0	-15.8	2.00 H	142	31.9	-1.7
6	550.02	29.4 QP	46.0	-16.6	1.50 H	245	29.3	0.1

Remarks:

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

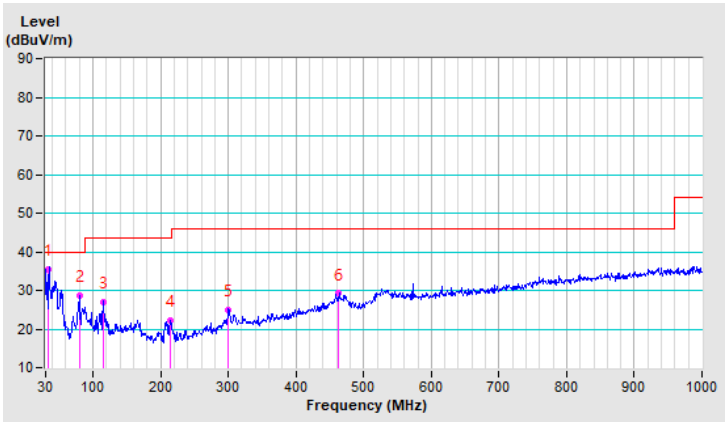


RF Mode	TX 802.11a	Channel	CH 149：5745 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	34.83	35.4 QP	40.0	-4.6	1.50 V	259	44.3	-8.9
2	79.67	28.7 QP	40.0	-11.3	1.50 V	247	41.4	-12.7
3	115.21	27.0 QP	43.5	-16.5	1.50 V	189	37.0	-10.0
4	214.94	22.3 QP	43.5	-21.2	1.50 V	325	32.7	-10.4
5	300.30	25.0 QP	46.0	-21.0	1.50 V	71	31.6	-6.6
6	463.52	29.2 QP	46.0	-16.8	1.00 V	63	30.9	-1.7

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	2021/10/13	2022/10/12
LISN R&S	ESH3-Z5	848773/004	2021/10/29	2022/10/28
LISN R & S	ESH3-Z5	835239/001	2021/3/26	2022/3/25
50 ohms Terminator	50	3	2021/10/27	2022/10/26
RF Coaxial Cable JYEBO	5D-FB	COCCAB-001	2021/9/25	2022/9/24
Fixed attenuator STI	STI02-2200-10	005	2021/8/27	2022/8/26
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: 2021/12/23

4.2.3 Test Procedure

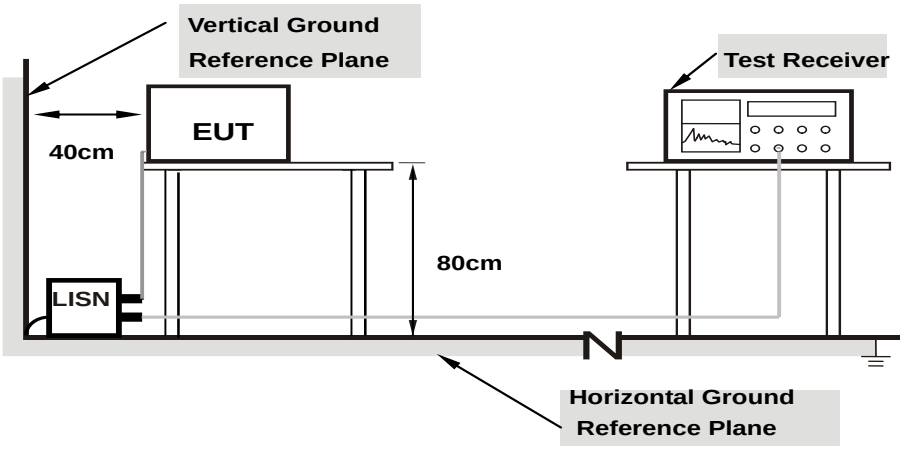
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

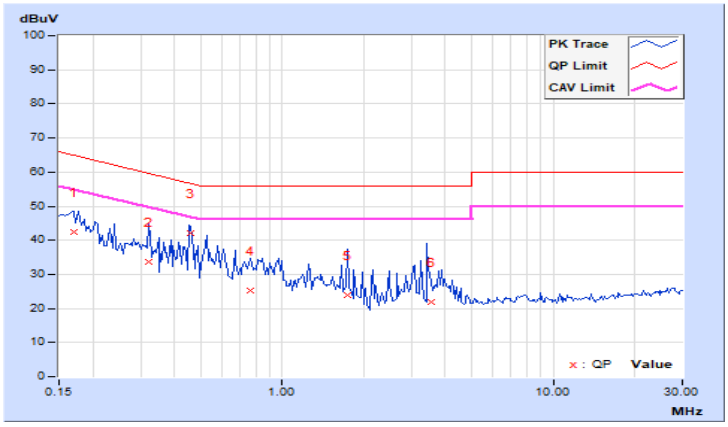
4.2.7 Test Results

RF Mode	TX 802.11a	Channel	CH 149：5745 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

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	0.16938	10.07	32.41	15.45	42.48	25.52	64.99	54.99	-22.51	-29.47
2	0.32194	10.10	23.69	9.66	33.79	19.76	59.66	49.66	-25.87	-29.90
3	**0.45871**	**10.11**	**31.95**	**26.82**	**42.06**	**36.93**	**56.72**	**46.72**	**-14.66**	**-9.79**
4	0.75949	10.13	15.13	5.89	25.26	16.02	56.00	46.00	-30.74	-29.98
5	1.73451	10.19	13.76	5.62	23.95	15.81	56.00	46.00	-32.05	-30.19
6	3.54971	10.32	11.67	1.85	21.99	12.17	56.00	46.00	-34.01	-33.83

Remarks:

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

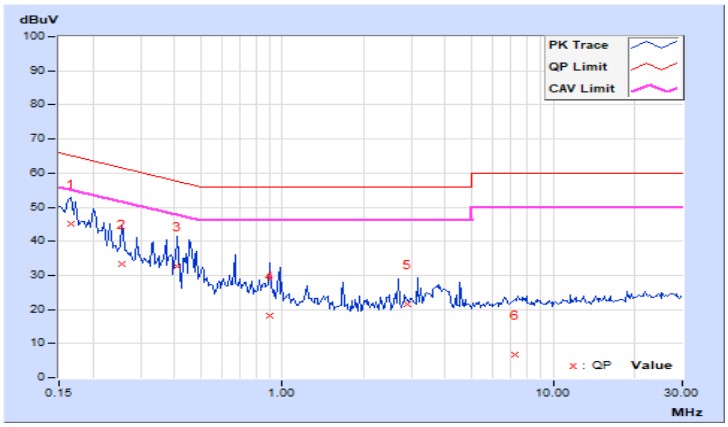


RF Mode	TX 802.11a	Channel	CH 149：5745 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

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	0.16547	10.06	35.18	20.63	45.24	30.69	65.18	55.18	-19.94	-24.49
2	0.25561	10.09	23.37	9.86	33.46	19.95	61.57	51.57	-28.11	-31.62
3	0.40793	10.10	22.71	11.57	32.81	21.67	57.69	47.69	-24.88	-26.02
4	0.90018	10.13	7.98	-6.61	18.11	3.52	56.00	46.00	-37.89	-42.48
5	2.91364	10.27	11.25	-2.79	21.52	7.48	56.00	46.00	-34.48	-38.52
6	7.20328	10.52	-3.72	-8.74	6.80	1.78	60.00	50.00	-53.20	-48.22

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

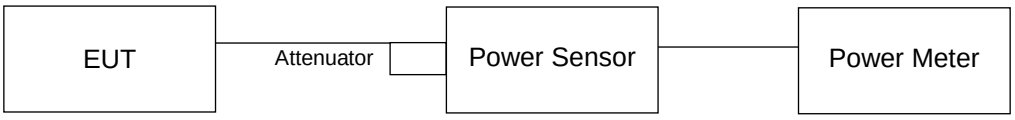
Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

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 $N_{ANT} \geq 5$.

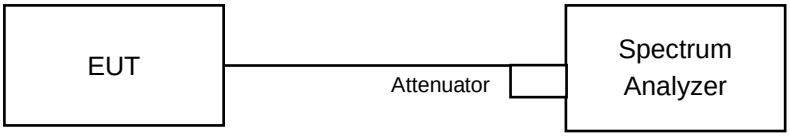
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

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

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	23.64	24.38	505.364	27.04	30	Pass
40	5200	23.67	24.43	510.141	27.08	30	Pass
48	5240	23.56	24.32	497.382	26.97	30	Pass
149	5745	26.46	26.26	865.257	29.37	30	Pass
157	5785	26.30	26.08	832.088	29.20	30	Pass
165	5825	26.54	25.98	847.095	29.28	30	Pass

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	22.21	23.35	382.613	25.83	30	Pass
40	5200	24.06	24.98	569.458	27.55	30	Pass
48	5240	23.86	24.79	544.521	27.36	30	Pass
149	5745	25.89	25.95	781.7	28.93	30	Pass
157	5785	25.80	26.02	780.134	28.92	30	Pass
165	5825	26.01	25.65	766.307	28.84	30	Pass

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	19.40	19.75	181.502	22.59	30	Pass
46	5230	25.22	25.88	719.917	28.57	30	Pass
151	5755	26.08	26.15	817.606	29.13	30	Pass
159	5795	26.14	26.00	809.257	29.08	30	Pass

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	16.42	16.58	89.352	19.51	30	Pass
155	5775	24.42	24.84	581.484	27.65	30	Pass

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	22.45	23.58	403.827	26.06	30	Pass
40	5200	24.30	25.18	598.763	27.77	30	Pass
48	5240	24.13	25.07	580.187	27.64	30	Pass
149	5745	26.11	26.16	821.367	29.15	30	Pass
157	5785	26.02	26.25	821.641	29.15	30	Pass
165	5825	26.23	25.87	806.126	29.06	30	Pass

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	19.62	19.97	190.934	22.81	30	Pass
46	5230	25.43	26.11	757.46	28.79	30	Pass
151	5755	26.30	26.36	859.093	29.34	30	Pass
159	5795	26.36	26.22	851.307	29.30	30	Pass

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	16.65	16.83	94.433	19.75	30	Pass
155	5775	24.64	25.03	609.491	27.85	30	Pass

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	22.21	23.35	382.613	25.83	29.59	Pass
40	5200	24.06	24.98	569.458	27.55	29.59	Pass
48	5240	23.86	24.79	544.521	27.36	29.59	Pass
149	5745	25.39	25.49	699.937	28.45	29.59	Pass
157	5785	25.30	25.52	695.295	28.42	29.59	Pass
165	5825	25.51	25.15	682.972	28.34	29.59	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-1, the directional gain is 6.41 dBi > 6 dBi, so the output power limit shall be reduced to 30-(6.41-6) = 29.59 dBm.
3. For U-NII-3, the directional gain is 6.41 dBi > 6 dBi, so the output power limit shall be reduced to 30-(6.41-6) = 29.59 dBm.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	19.40	19.75	181.502	22.59	29.59	Pass
46	5230	25.22	25.88	719.917	28.57	29.59	Pass
151	5755	25.58	25.65	728.692	28.63	29.59	Pass
159	5795	25.64	25.50	721.251	28.58	29.59	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-1, the directional gain is 6.41 dBi > 6 dBi, so the output power limit shall be reduced to 30-(6.41-6) = 29.59 dBm.
3. For U-NII-3, the directional gain is 6.41 dBi > 6 dBi, so the output power limit shall be reduced to 30-(6.41-6) = 29.59 dBm.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	16.42	16.58	89.352	19.51	29.59	Pass
155	5775	24.42	24.84	581.484	27.65	29.59	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-1, the directional gain is 6.41 dBi > 6 dBi, so the output power limit shall be reduced to 30-(6.41-6) = 29.59 dBm.
3. For U-NII-3, the directional gain is 6.41 dBi > 6 dBi, so the output power limit shall be reduced to 30-(6.41-6) = 29.59 dBm.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	22.45	23.58	403.827	26.06	29.59	Pass
40	5200	24.30	25.18	598.763	27.77	29.59	Pass
48	5240	24.13	25.07	580.187	27.64	29.59	Pass
149	5745	25.55	25.60	722	28.59	29.59	Pass
157	5785	25.46	25.69	722.241	28.59	29.59	Pass
165	5825	25.77	25.51	733.204	28.65	29.59	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-1, the directional gain is 6.41 dBi > 6 dBi, so the output power limit shall be reduced to 30-(6.41-6) = 29.59 dBm.
3. For U-NII-3, the directional gain is 6.41 dBi > 6 dBi, so the output power limit shall be reduced to 30-(6.41-6) = 29.59 dBm.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	19.62	19.97	190.934	22.81	29.59	Pass
46	5230	25.43	26.11	757.46	28.79	29.59	Pass
151	5755	25.74	25.80	755.162	28.78	29.59	Pass
159	5795	25.80	25.66	748.318	28.74	29.59	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-1, the directional gain is 6.41 dBi > 6 dBi, so the output power limit shall be reduced to 30-(6.41-6) = 29.59 dBm.
3. For U-NII-3, the directional gain is 6.41 dBi > 6 dBi, so the output power limit shall be reduced to 30-(6.41-6) = 29.59 dBm.

802.11ax (HE80)

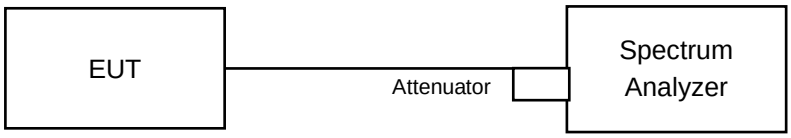
Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	16.65	16.83	94.433	19.75	29.59	Pass
155	5775	24.64	25.03	609.491	27.85	29.59	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-1, the directional gain is 6.41 dBi > 6 dBi, so the output power limit shall be reduced to 30-(6.41-6) = 29.59 dBm.
3. For U-NII-3, the directional gain is 6.41 dBi > 6 dBi, so the output power limit shall be reduced to 30-(6.41-6) = 29.59 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

CDD Mode

802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.68	16.68
40	5200	16.61	16.52
48	5240	16.7	16.52
149	5745	25.05	21.12
157	5785	25.44	19.44
165	5825	25.44	18.6

802.11ax (HE20)

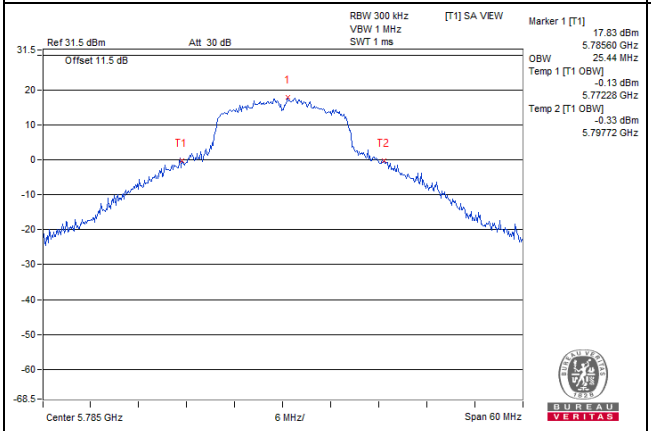
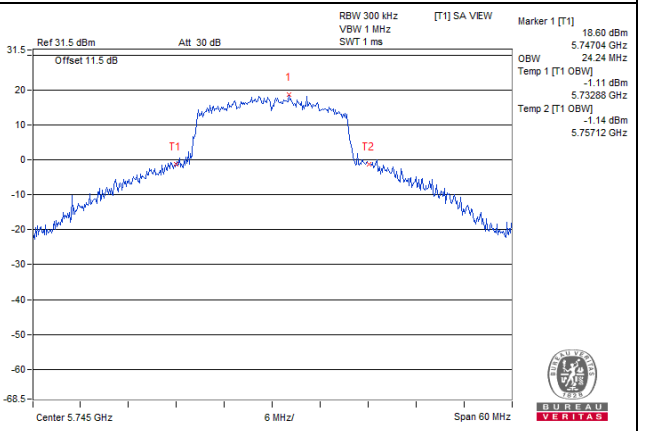
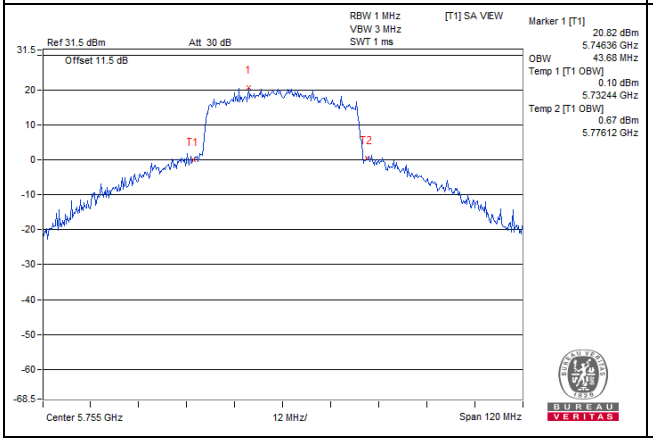
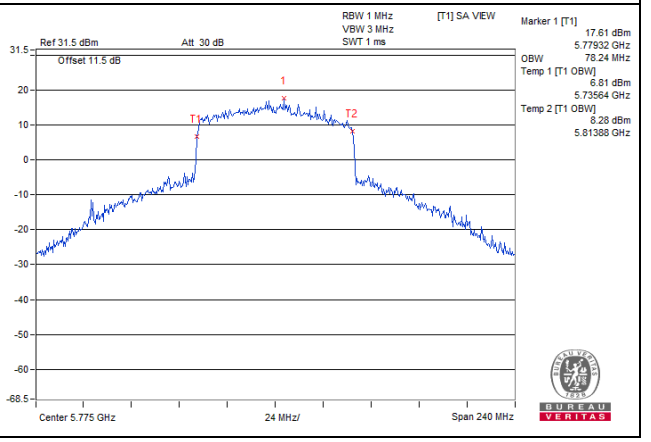
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	19.08	19.08
40	5200	18.96	19.05
48	5240	18.78	18.87
149	5745	24.24	19.56
157	5785	23.28	19.68
165	5825	22.44	19.44

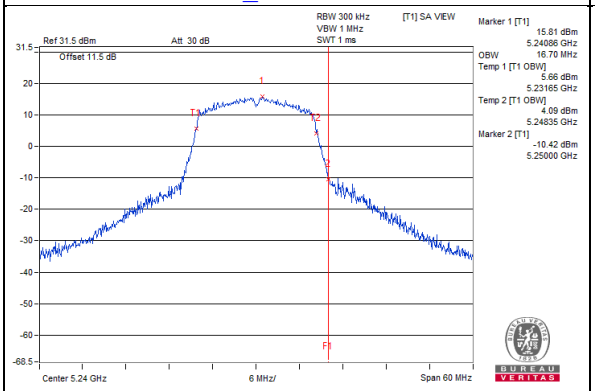
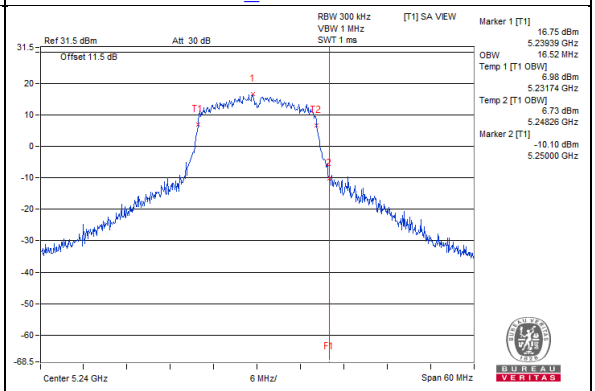
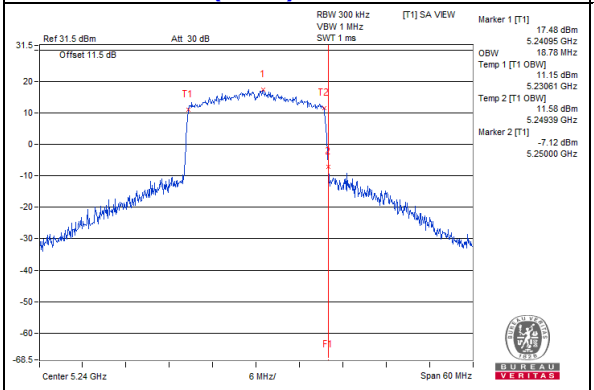
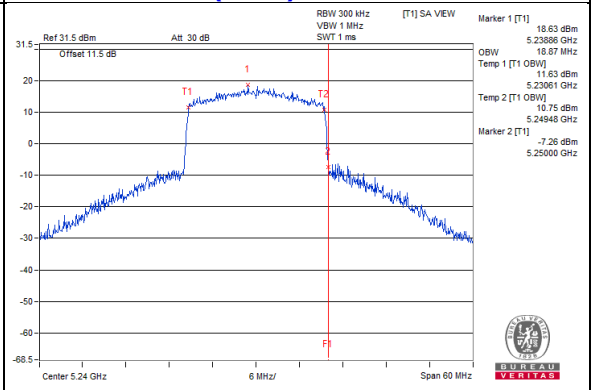
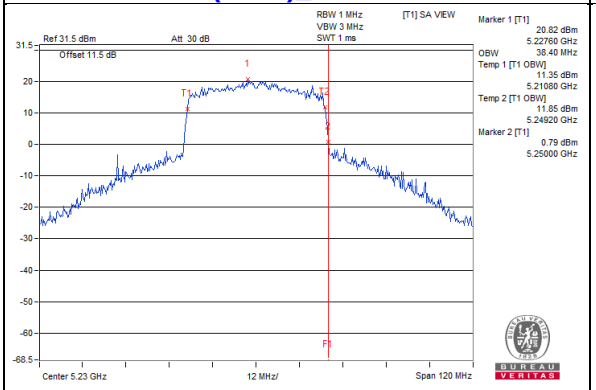
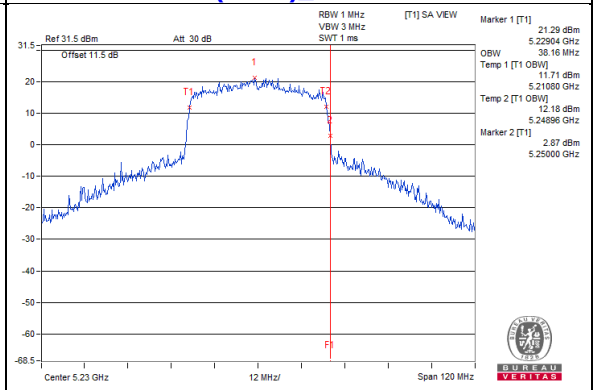
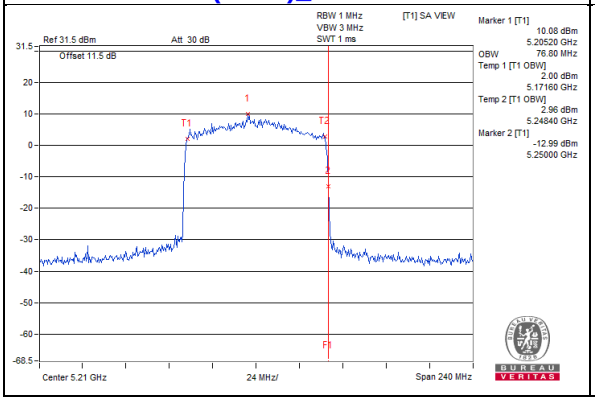
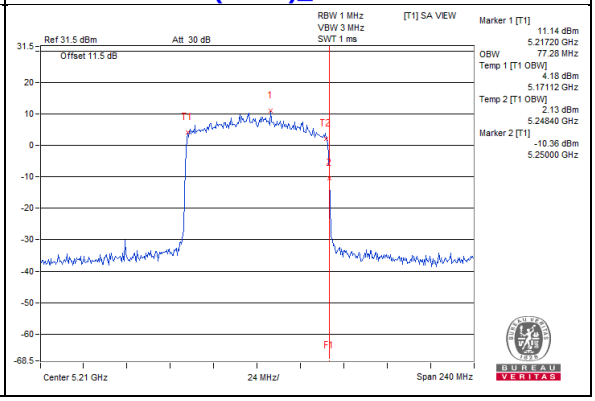
802.11ax (HE40)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	37.68	37.68
46	5230	38.4	38.16
151	5755	43.68	38.64
159	5795	42.96	38.88

802.11ax (HE80)

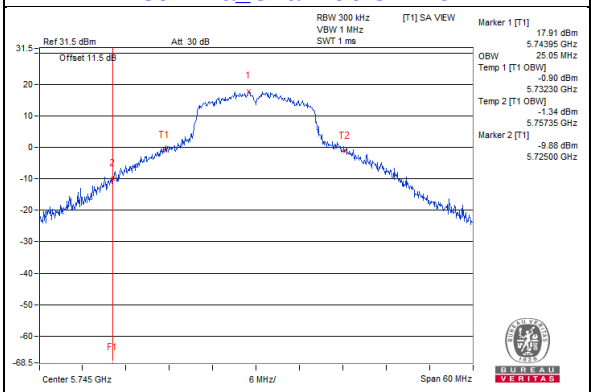
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	76.8	77.28
155	5775	78.24	77.28

Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH157	**802.11ax (HE20)_Chain 0 / CH149**
	
802.11ax (HE40)_Chain 0 / CH151	**802.11ax (HE80)_Chain 0 / CH155**
	

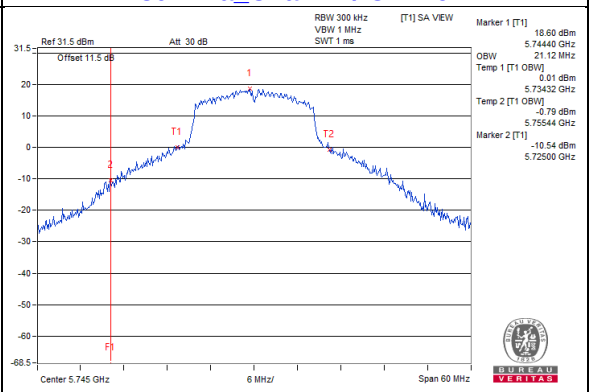
Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2A band)	
802.11a_Chain 0 / CH48	**802.11a_Chain 1 / CH48**
	
802.11ax (HE20)_Chain 0 / CH48	**802.11ax (HE20)_Chain 1 / CH48**
	
802.11ax (HE40)_Chain 0 / CH46	**802.11ax (HE40)_Chain 1 / CH46**
	
802.11ax (HE80)_Chain 0 / CH42	**802.11ax (HE80)_Chain 1 / CH42**
	

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

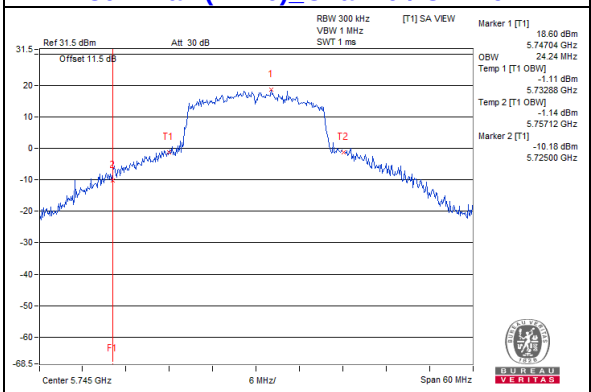
802.11a_Chain 0 / CH149



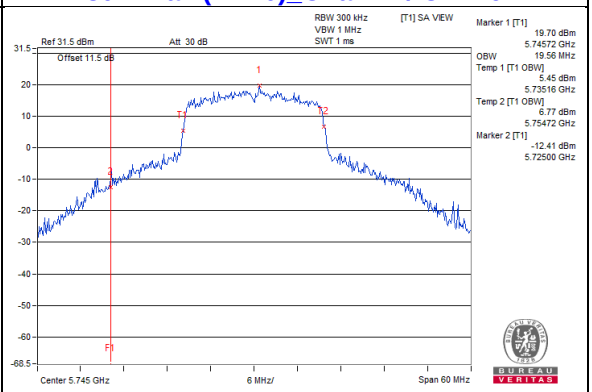
802.11a_Chain 1 / CH149



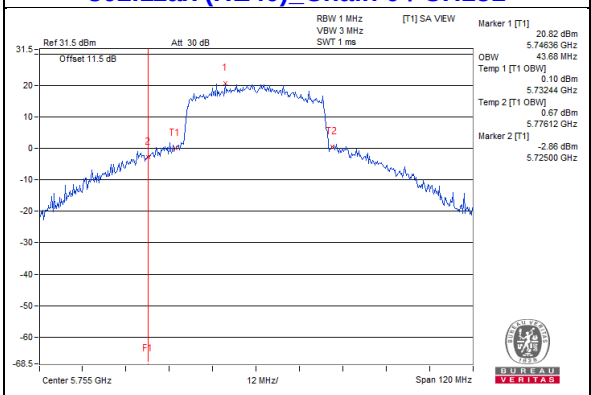
802.11ax (HE20)_Chain 0 / CH149



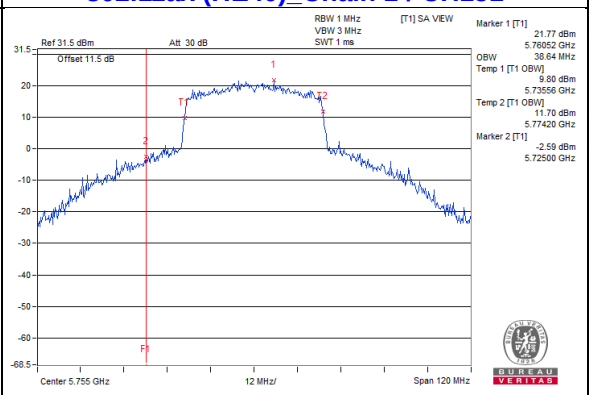
802.11ax (HE20)_Chain 1 / CH149



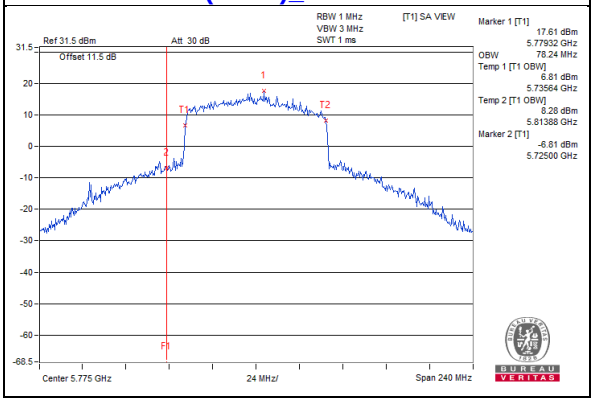
802.11ax (HE40)_Chain 0 / CH151



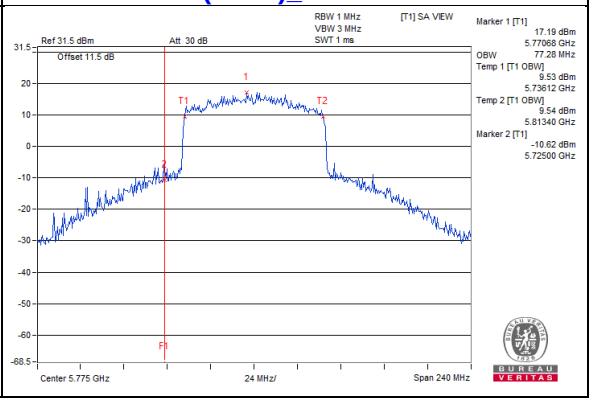
802.11ax (HE40)_Chain 1 / CH151



802.11ax (HE80)_Chain 0 / CH155



802.11ax (HE80)_Chain 1 / CH155



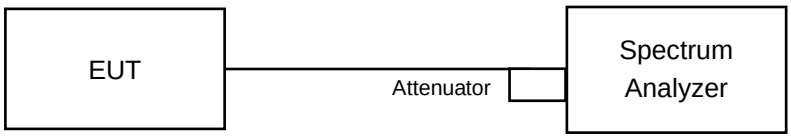
4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For U-NII-1 band:

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 U-NII-3 band:

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 (increasing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz/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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

For U-NII-1 band:

CDD Mode

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	12.59	13.90	16.30	16.59	Pass
40	5200	13.21	13.10	16.17	16.59	Pass
48	5240	13.33	13.12	16.24	16.59	Pass

Notes:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. For U-NII-1, the directional gain is 6.41 dBi > 6dBi, so the power density limit shall be reduced to 17-(6.41-6) = 16.59 dBm/MHz.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
36	5180	11.16	12.92	15.14	16.59	Pass
40	5200	13.36	13.32	16.35	16.59	Pass
48	5240	13.29	13.22	16.27	16.59	Pass

Notes:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. For U-NII-1, the directional gain is 6.41 dBi > 6dBi, so the power density limit shall be reduced to 17-(6.41-6) = 16.59 dBm/MHz.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
38	5190	5.64	6.40	9.05	16.59	Pass
46	5230	11.68	11.59	14.65	16.59	Pass

Notes:

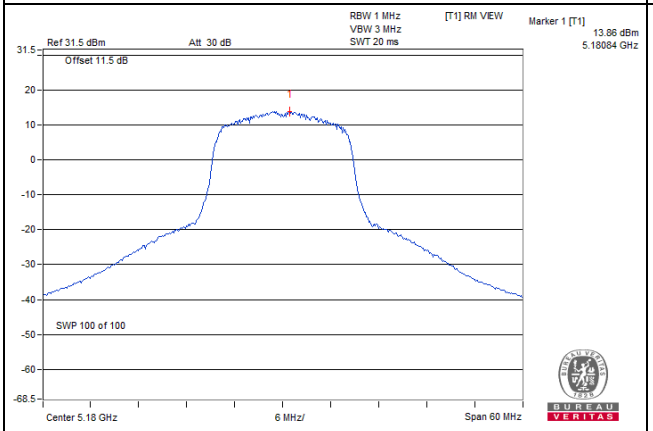
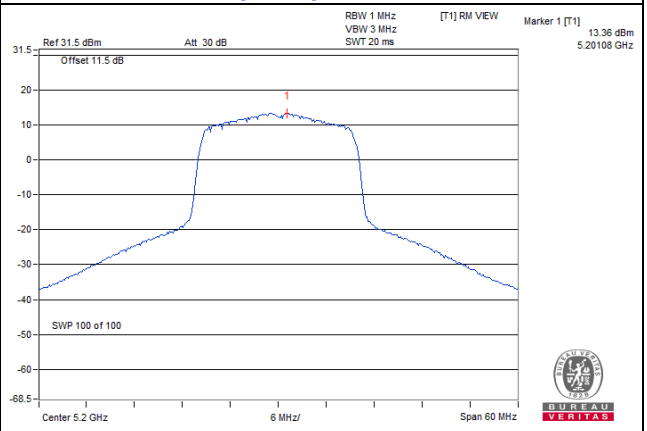
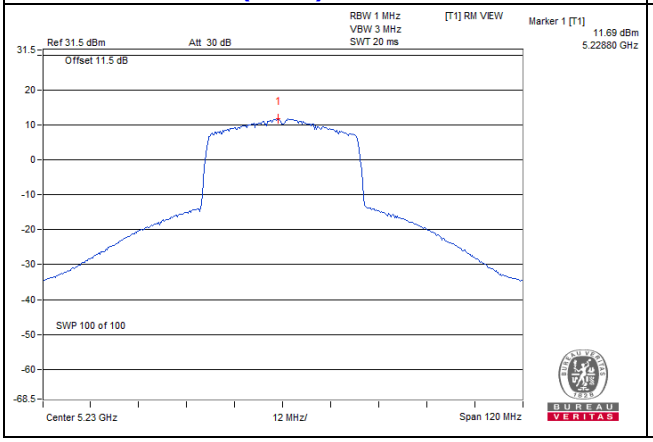
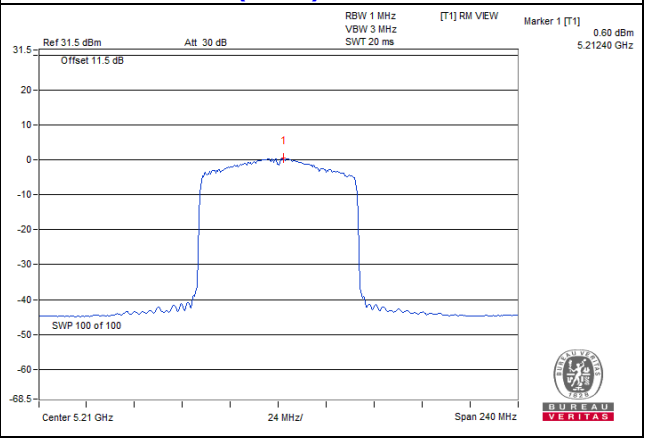
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. For U-NII-1, the directional gain is 6.41 dBi > 6dBi, so the power density limit shall be reduced to 17-(6.41-6) = 16.59 dBm/MHz.

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
42	5210	-0.18	0.54	3.21	16.59	Pass

Notes:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. For U-NII-1, the directional gain is 6.41 dBi > 6dBi, so the power density limit shall be reduced to 17-(6.41-6) = 16.59 dBm/MHz.

Spectrum Plot of Worst Value	
802.11a_Chain 1 / CH36	**802.11ax (HE20)_Chain 0 / CH40**
	
802.11ax (HE40)_Chain 0 / CH46	**802.11ax (HE80)_Chain 1 / CH42**
	

For U-NII-3 band:

CDD Mode

802.11a

Chan.	Freq. (MHz)	PSD (dBm/300kHz)		Total PSD (dBm/300kHz)	Total PSD (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass /Fail
		Chain 0	Chain 1				
149	5745	9.96	11.07	13.56	15.78	29.59	Pass
157	5785	9.48	10.54	13.05	15.27	29.59	Pass
165	5825	9.68	10.33	13.03	15.25	29.59	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-3, the directional gain is 6.41 dBi > 6 dBi, so the power density limit shall be reduced to 30-(6.41-6) = 29.59 dBm/500kHz.

802.11ax (HE20)

Chan.	Freq. (MHz)	PSD (dBm/300kHz)		Total PSD (dBm/300kHz)	Total PSD (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass /Fail
		Chain 0	Chain 1				
149	5745	9.29	9.47	12.39	14.61	29.59	Pass
157	5785	8.61	9.60	12.14	14.36	29.59	Pass
165	5825	8.53	9.47	12.04	14.26	29.59	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-3, the directional gain is 6.41 dBi > 6 dBi, so the power density limit shall be reduced to 30-(6.41-6) = 29.59 dBm/500kHz.

802.11ax (HE40)

Chan.	Freq. (MHz)	PSD (dBm/300kHz)		Total PSD (dBm/300kHz)	Total PSD (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass /Fail
		Chain 0	Chain 1				
151	5755	5.78	6.64	9.24	11.46	29.59	Pass
159	5795	5.41	6.64	9.08	11.30	29.59	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-3, the directional gain is 6.41 dBi > 6 dBi, so the power density limit shall be reduced to 30-(6.41-6) = 29.59 dBm/500kHz.

802.11ax (HE80)

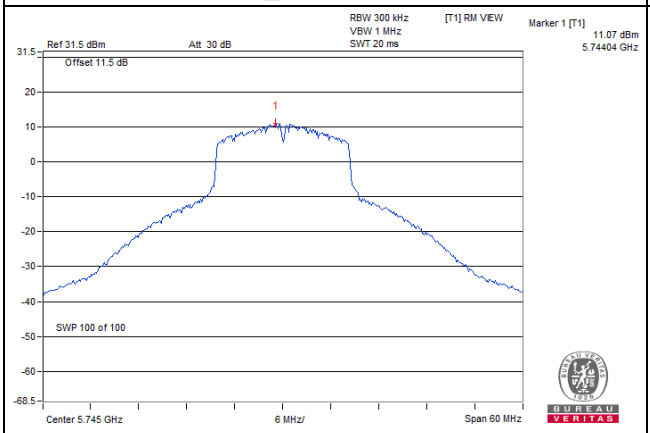
Chan.	Freq. (MHz)	PSD (dBm/300kHz)		Total PSD (dBm/300kHz)	Total PSD (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass /Fail
		Chain 0	Chain 1				
155	5775	2.12	2.42	5.28	7.50	29.59	Pass

Notes:

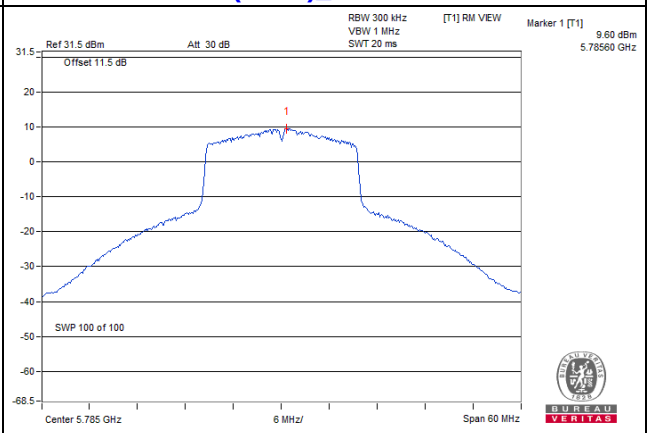
1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-3, the directional gain is 6.41 dBi > 6 dBi, so the power density limit shall be reduced to 30-(6.41-6) = 29.59 dBm/500kHz.

Spectrum Plot of Worst Value

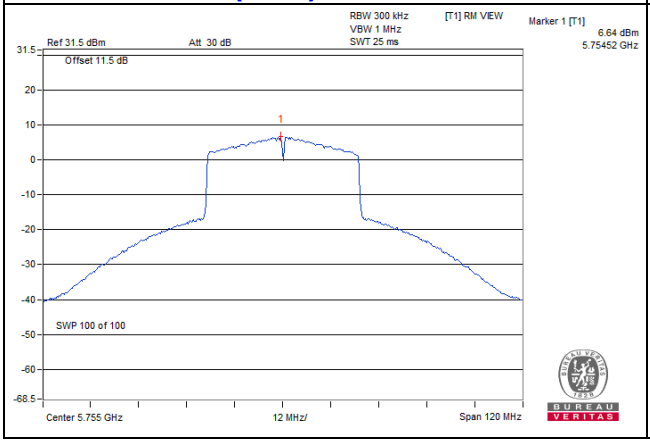
802.11a_Chain 1 / CH149



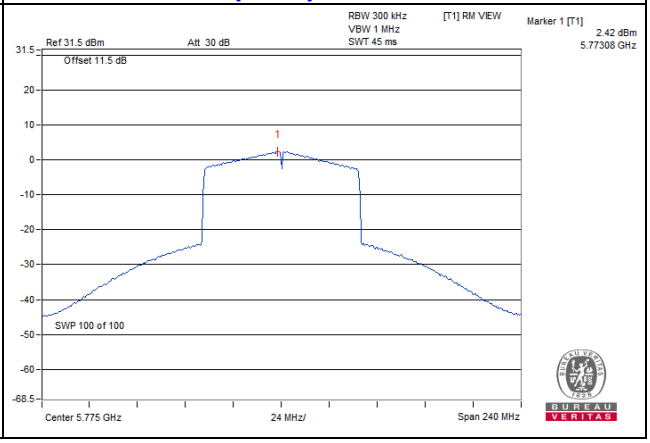
802.11ax (HE20)_Chain 1 / CH157



802.11ax (HE40)_Chain 1 / CH151



802.11ax (HE80)_Chain 1 / CH155

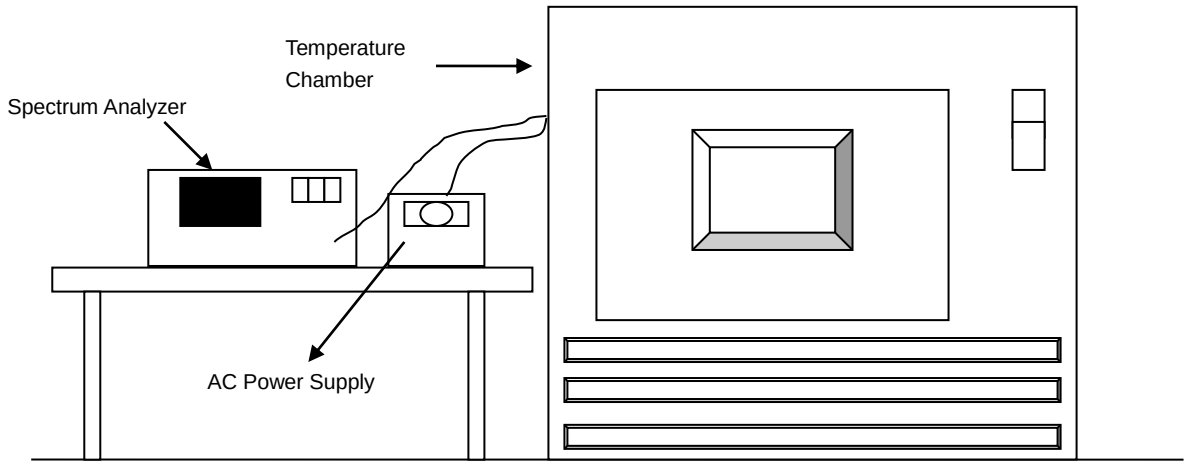


4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

The frequency of the carrier signal shall be maintained within band of operation

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

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

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

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

d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.

e. Repeat step (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	5179.9791	Pass	5179.9777	Pass	5179.9787	Pass	5179.9789	Pass
30	120	5180.0086	Pass	5180.0128	Pass	5180.0095	Pass	5180.0119	Pass
20	120	5180.0166	Pass	5180.0174	Pass	5180.0188	Pass	5180.0191	Pass
10	120	5180.0075	Pass	5180.007	Pass	5180.0081	Pass	5180.0078	Pass
0	120	5180.0247	Pass	5180.0226	Pass	5180.0233	Pass	5180.0212	Pass

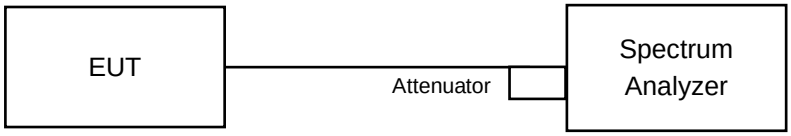
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5180.0131	Pass	5180.0147	Pass	5180.0159	Pass	5180.0141	Pass
	120	5180.0166	Pass	5180.0174	Pass	5180.0188	Pass	5180.0191	Pass
	102	5180.0151	Pass	5180.0173	Pass	5180.0168	Pass	5180.0163	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

CDD Mode

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	15.15	15.15	0.5	Pass
157	5785	15.14	15.13	0.5	Pass
165	5825	15.78	15.15	0.5	Pass

802.11ax (HE20)

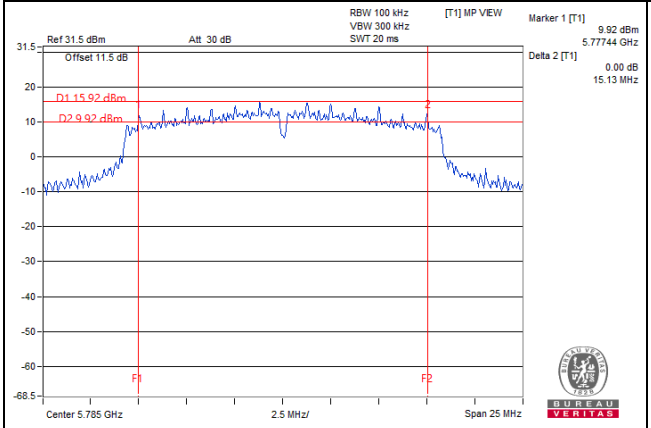
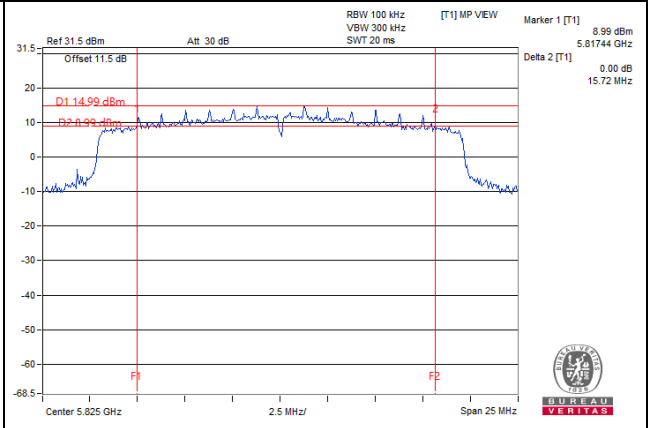
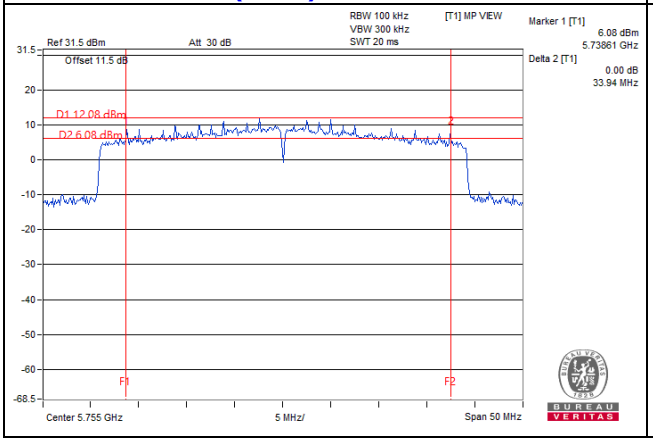
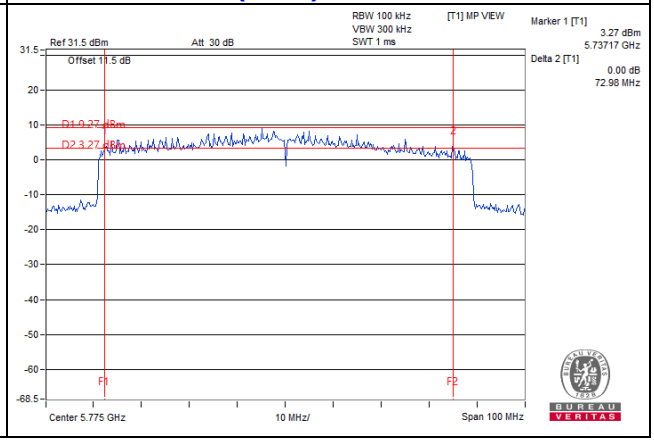
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.56	16.41	0.5	Pass
157	5785	16.68	16.36	0.5	Pass
165	5825	16.33	15.72	0.5	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.81	33.94	0.5	Pass
159	5795	35.64	35.17	0.5	Pass

802.11ax (HE80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	72.98	75.35	0.5	Pass

Spectrum Plot of Worst Value	
802.11a_Chain 1 / CH157	**802.11ax (HE20)_Chain 1 / CH165**
	
802.11ax (HE40)_Chain 1 / CH151	**802.11ax (HE80)_Chain 0 / CH155**
	

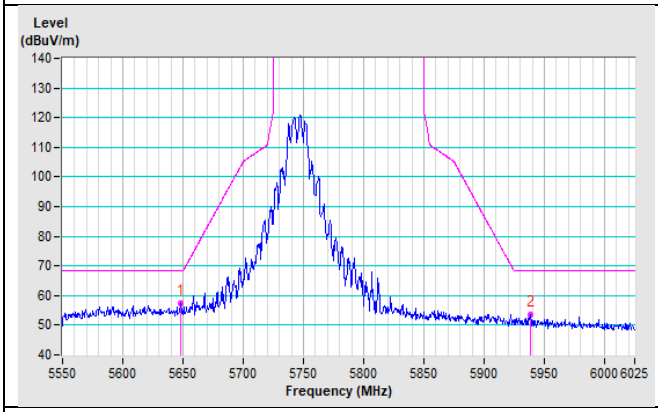
5 Pictures of Test Arrangements

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

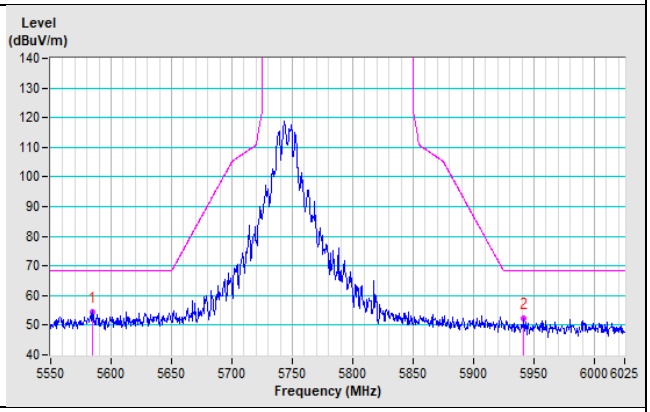
Annex A - Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a CH 149：5745 MHz

Horizontal

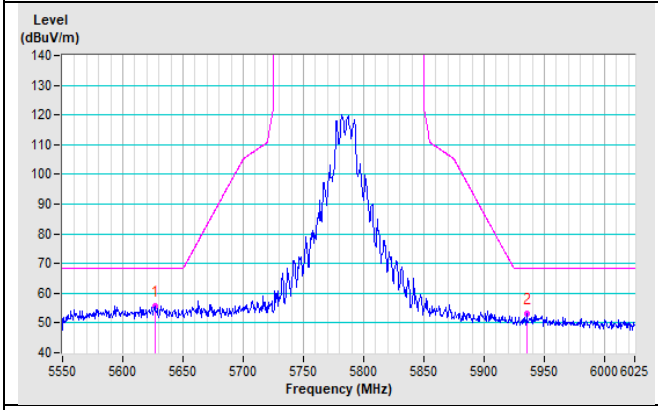


Vertical

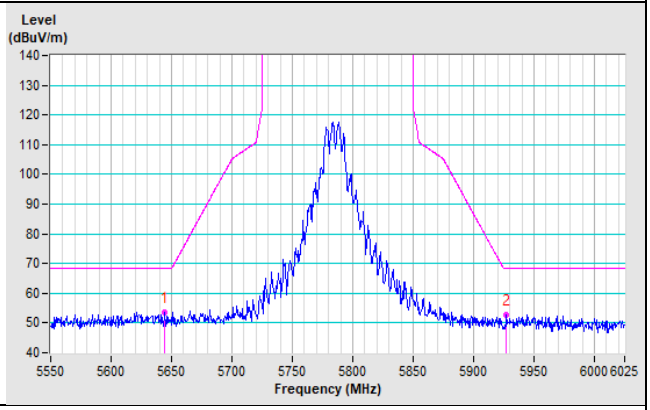


802.11a CH 157：5785 MHz

Horizontal

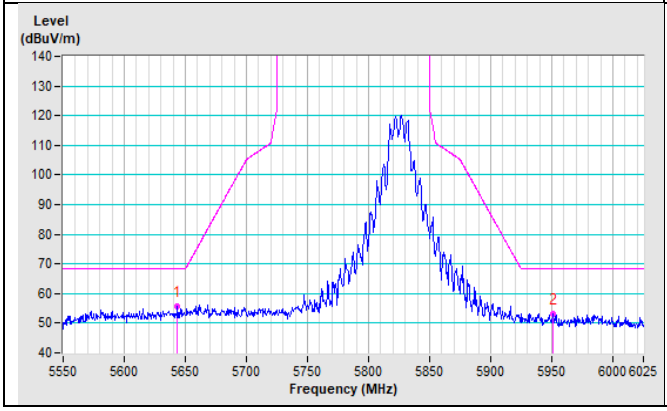


Vertical

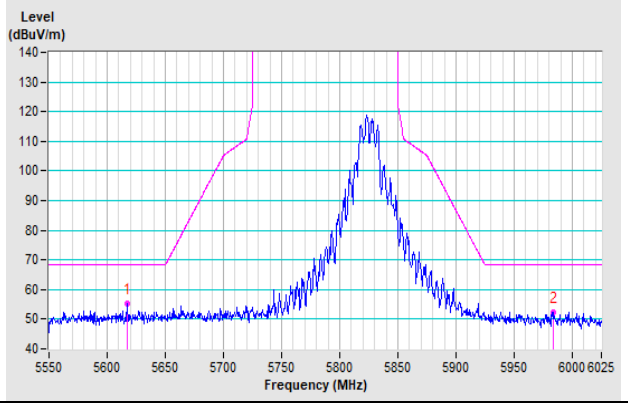


802.11a CH 165：5825 MHz

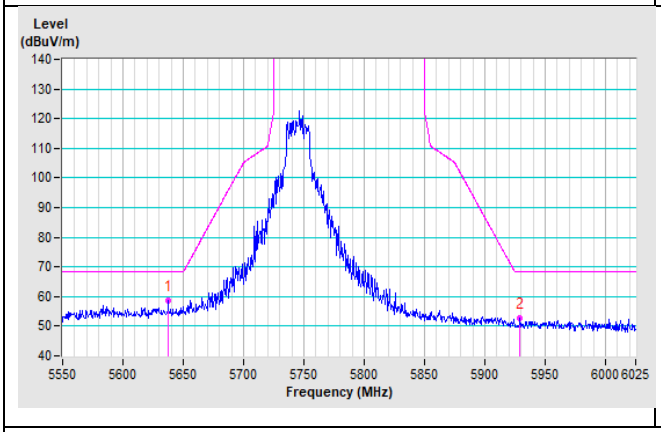
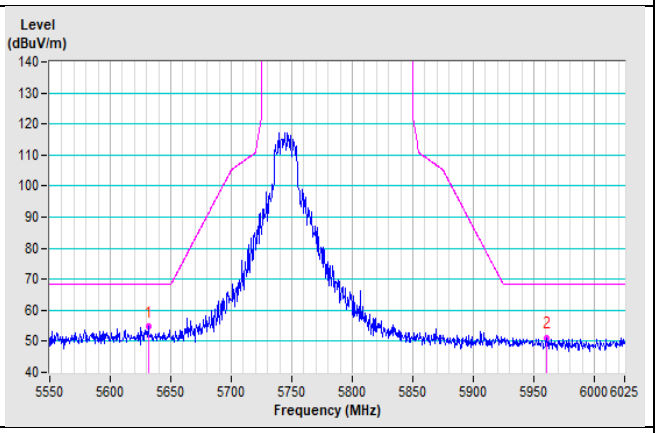
Horizontal



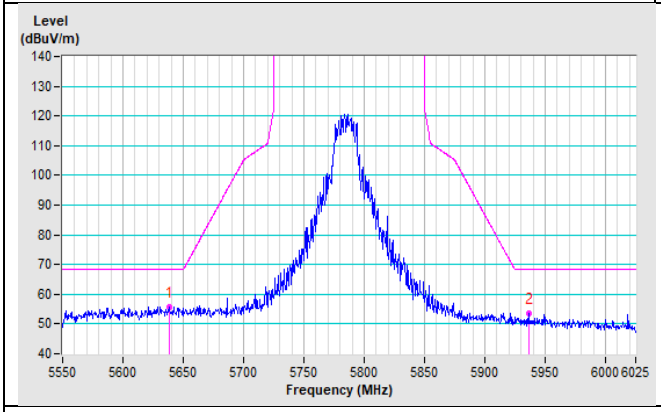
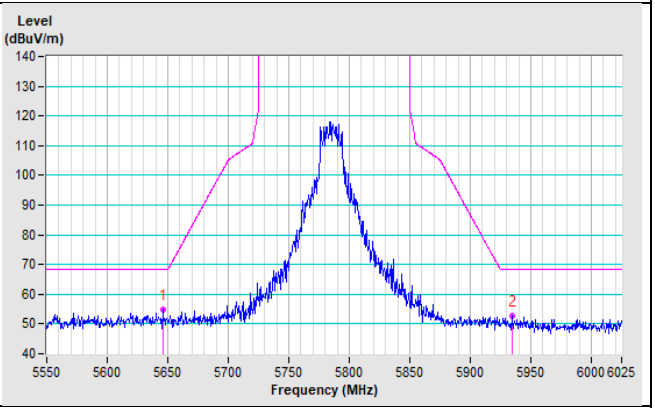
Vertical



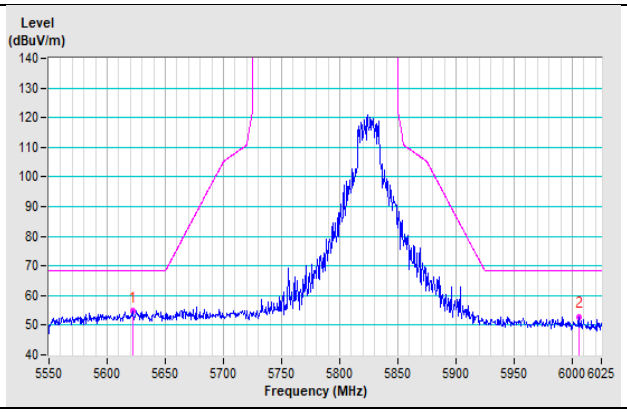
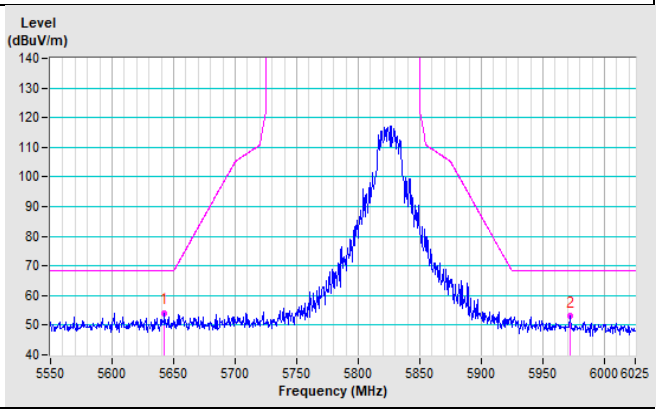
802.11ax (HE20) CH 149：5745 MHz

Horizontal	Vertical
	

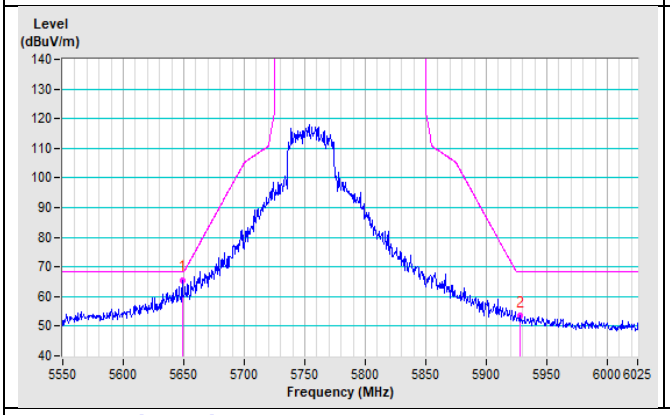
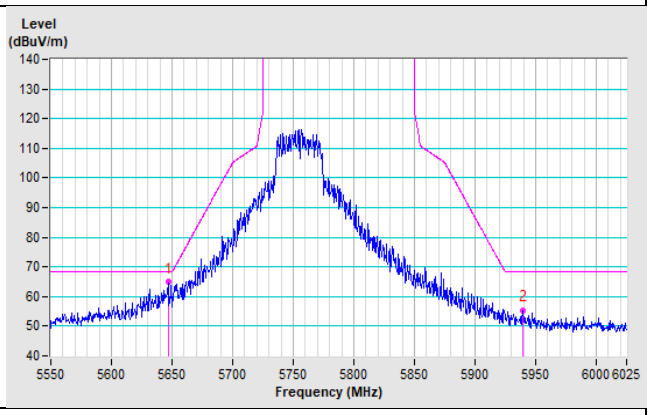
802.11ax (HE20) CH 157：5785 MHz

Horizontal	Vertical
	

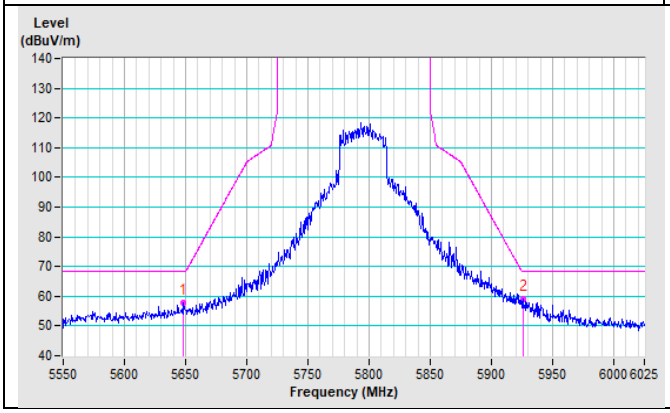
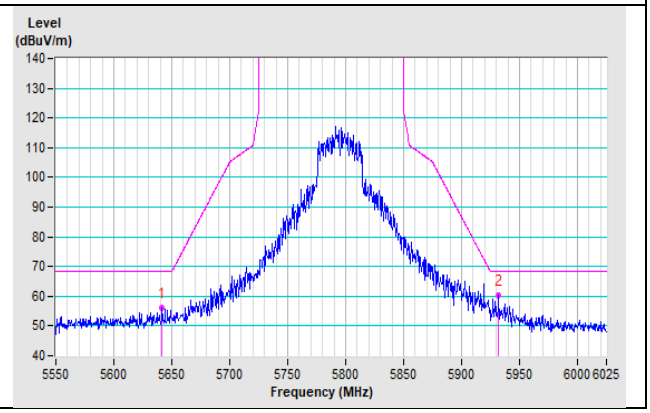
802.11ax (HE20) CH 165：5825 MHz

Horizontal	Vertical
	

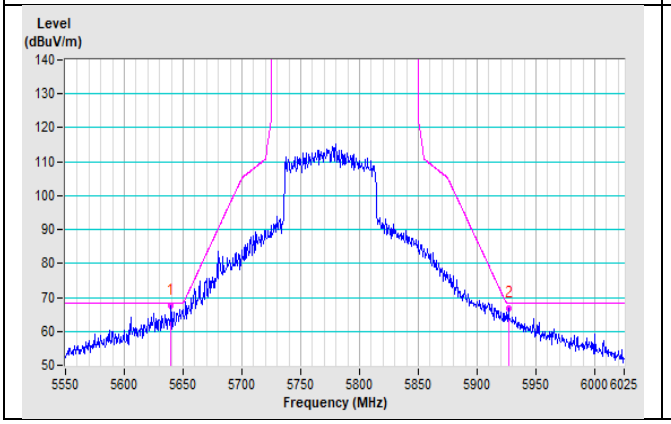
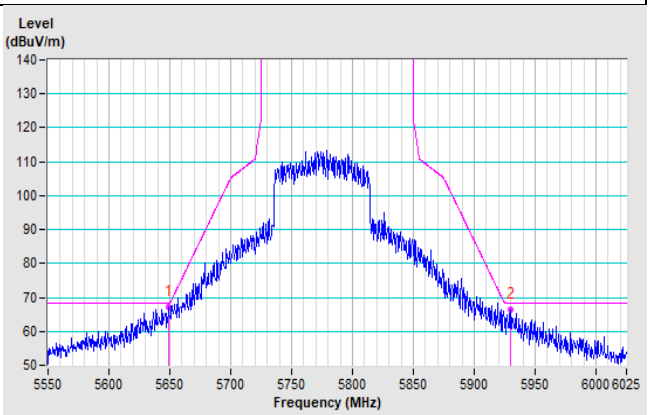
802.11ax (HE40) CH 151：5755 MHz

Horizontal	Vertical
	

802.11ax (HE40) CH 159：5795 MHz

Horizontal	Vertical
	

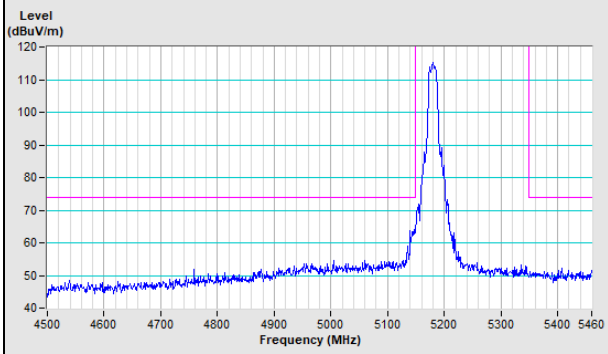
802.11ax (HE80) CH 155：5775 MHz

Horizontal	Vertical
	

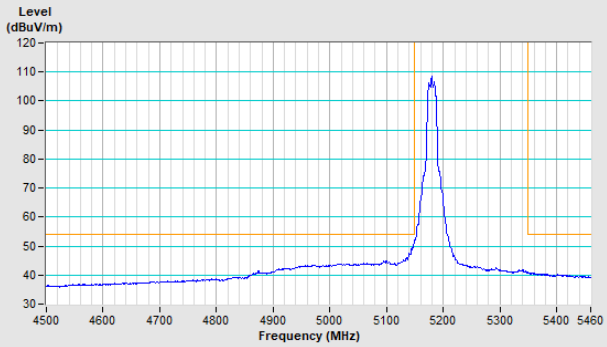
Annex B - Band-Edge Measurement (For U-NII-1 band)

802.11a Channel 36

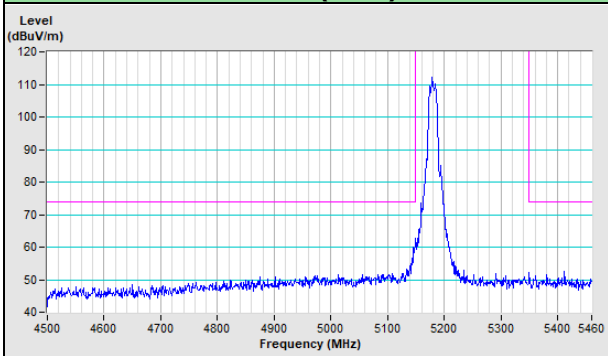
Horizontal (Peak)



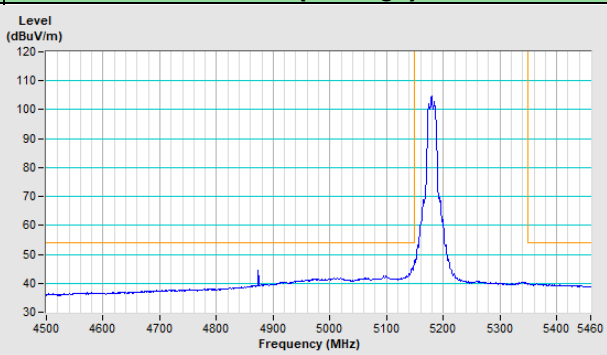
Horizontal (Average)



Vertical (Peak)

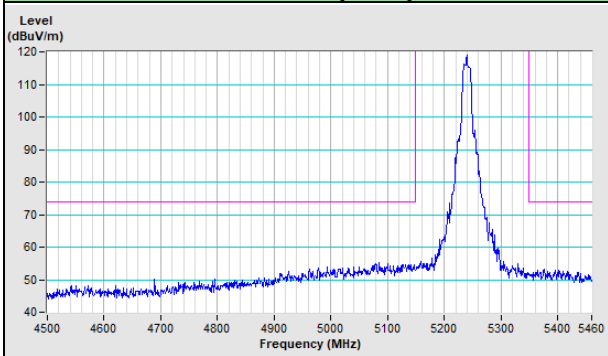


Vertical (Average)

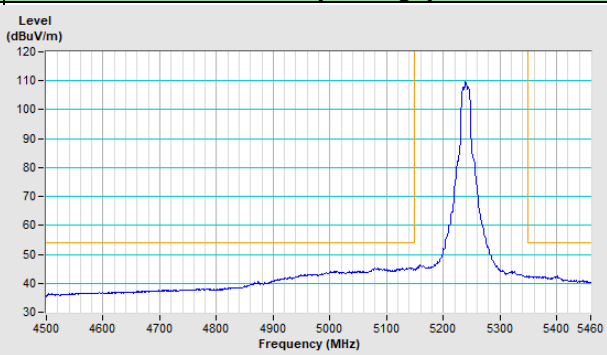


802.11a Channel 48

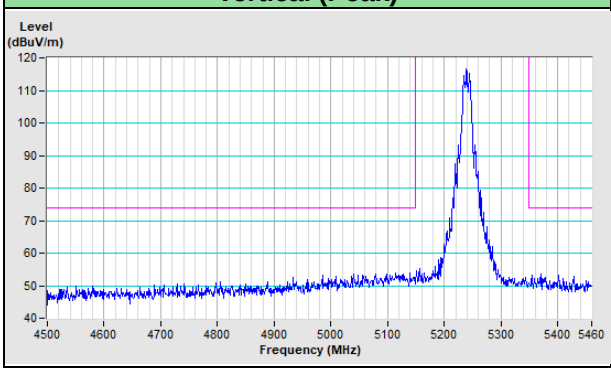
Horizontal (Peak)



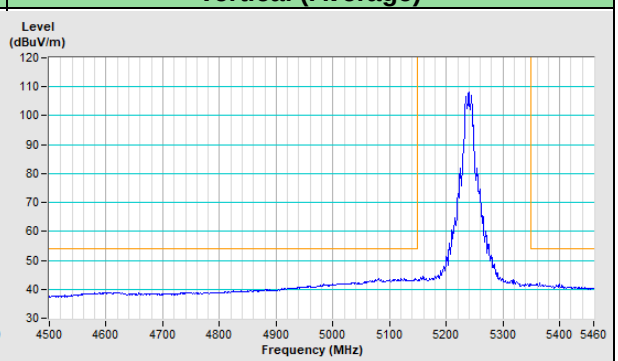
Horizontal (Average)



Vertical (Peak)

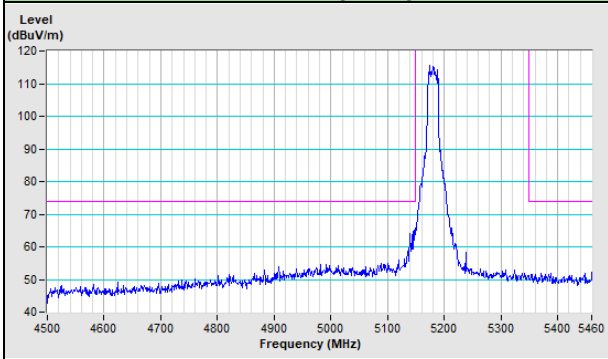


Vertical (Average)

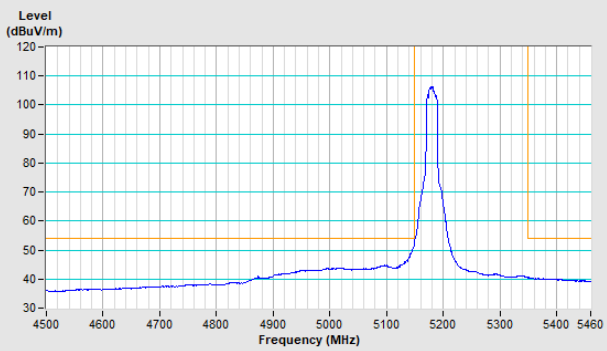


802.11ax (HE20) Channel 36

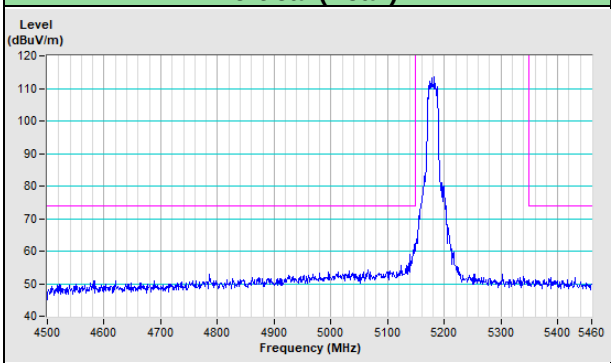
Horizontal (Peak)



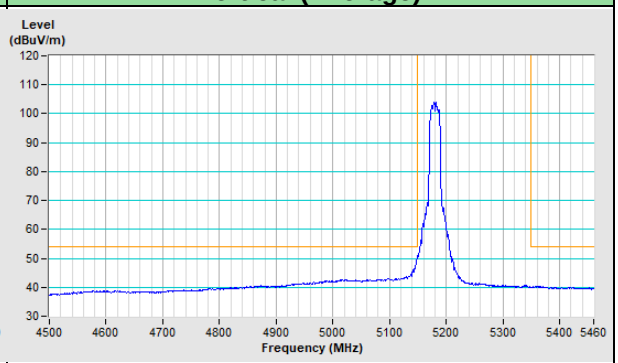
Horizontal (Average)



Vertical (Peak)

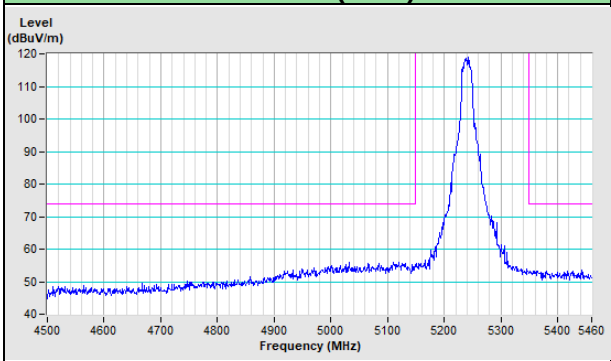


Vertical (Average)

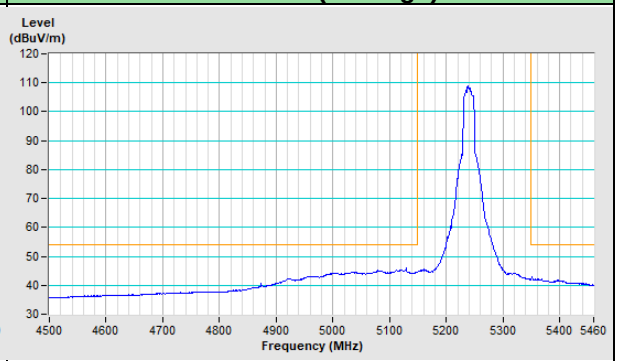


802.11ax (HE20) Channel 48

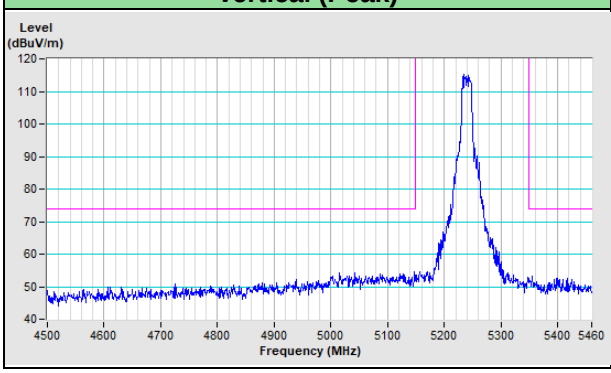
Horizontal (Peak)



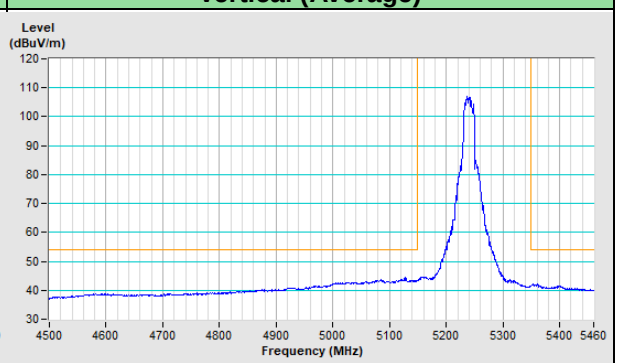
Horizontal (Average)



Vertical (Peak)

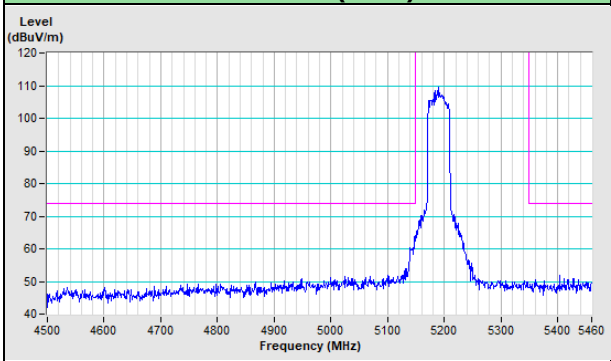


Vertical (Average)

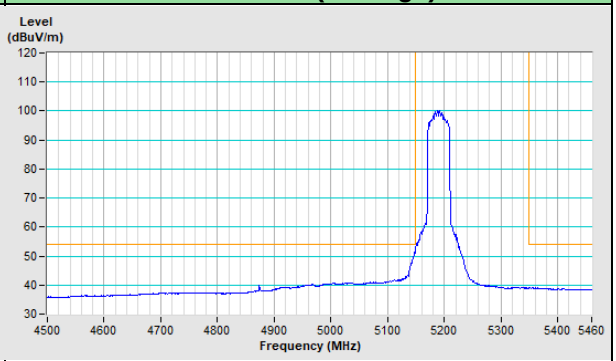


802.11ax (HE40) Channel 38

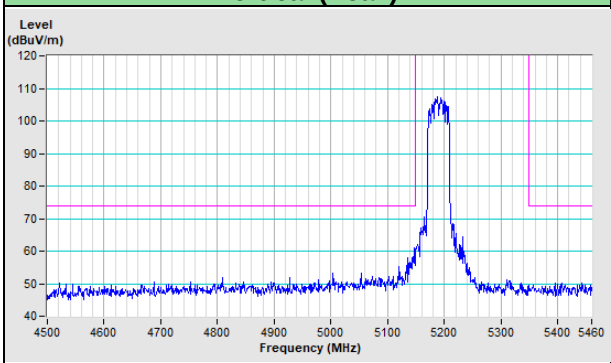
Horizontal (Peak)



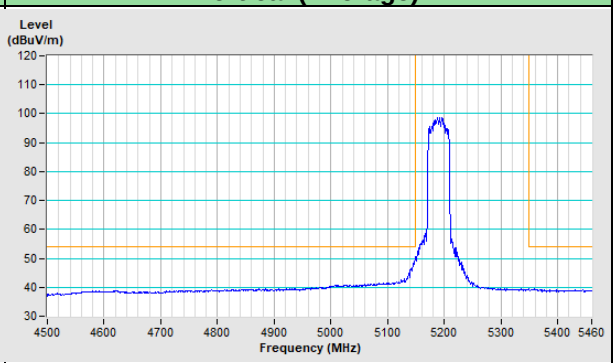
Horizontal (Average)



Vertical (Peak)

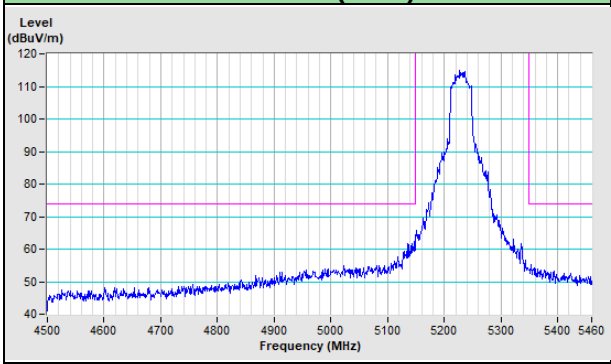


Vertical (Average)

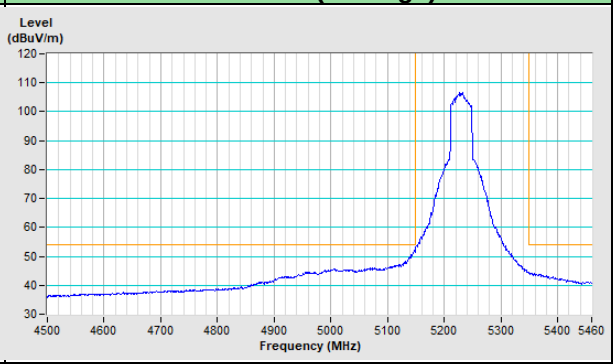


802.11ax (HE40) Channel 46

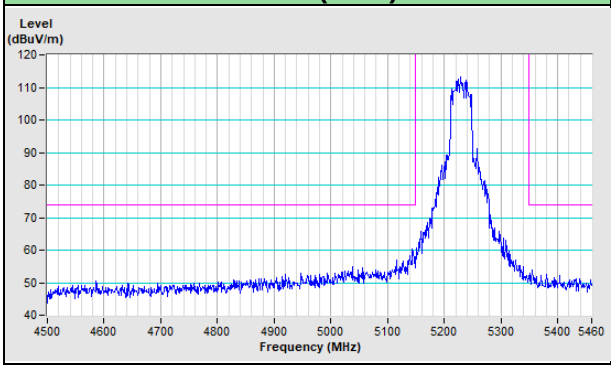
Horizontal (Peak)



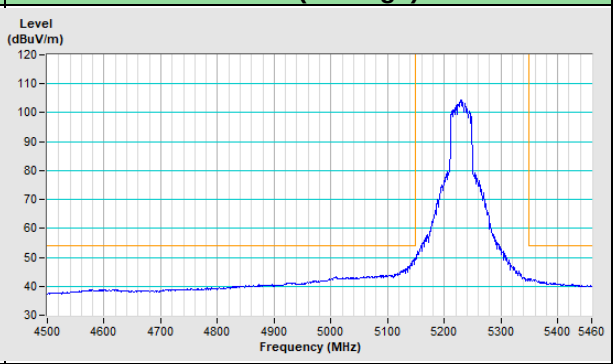
Horizontal (Average)

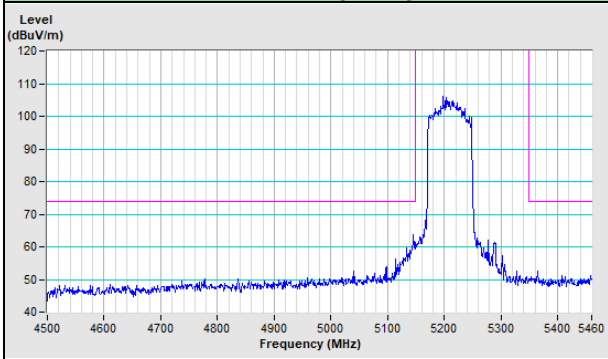
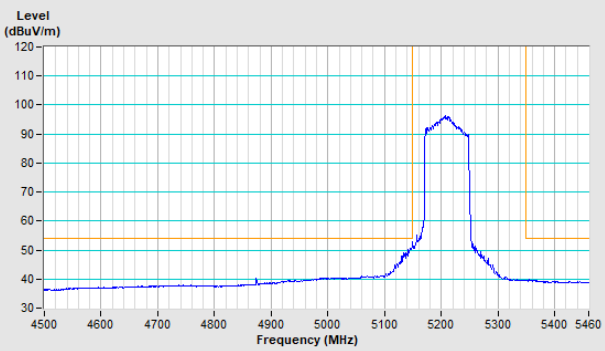
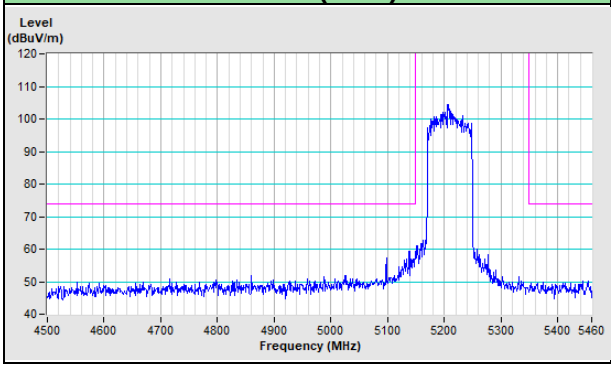
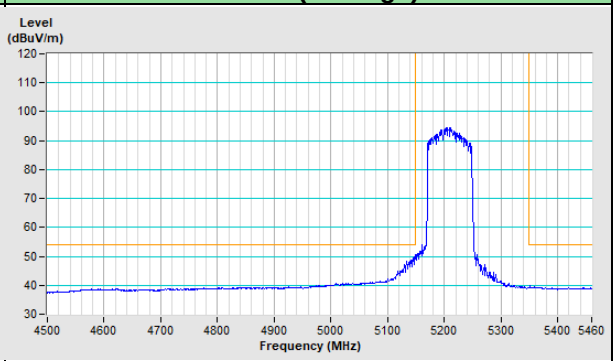


Vertical (Peak)



Vertical (Average)



802.11ax (HE80) Channel 42	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

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:

Lin Kou EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

--- END ---