

FCC Test Report

Report No.: RFBDUI-WTW-P20110876-1

FCC ID: KA2R15A1

Test Model: R15

Received Date: Feb. 20, 2021

Test Date: Feb. 26 ~ Jun. 25, 2021

Issued Date: Jun. 25, 2021

Applicant: D-Link Corporation

Address: 14420 Myford Road Suite 100 Irvine California United States 92606

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

Test Location: No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City
33383, Taiwan

FCC Registration /
Designation Number: 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RFBDUI-WTW-P20110876-1	Original Release	Jun. 25, 2021

1 Certificate of Conformity

Product: AX1500 Wi-Fi 6 AI Router, AX1500 SMART ROUTER (refer to item 3.1 for more details)

Brand: D-Link

Test Model: R15

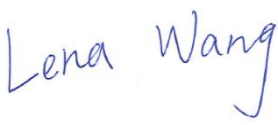
Sample Status: Engineering Sample

Applicant: D-Link Corporation

Test Date: Feb. 26 ~ Jun. 25, 2021

Standards: 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 RF characteristics under the conditions specified in this report.

Prepared by :  , Date: Jun. 25, 2021
Lena Wang / Specialist

Approved by :  , Date: Jun. 25, 2021
Dylan Chiou / Senior Project Engineer

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 -9.54 dB at 0.43370 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 -0.8 dB at 5150.00 MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6 dB 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	No antenna connector is used.

Note:

- For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOB test plots were recorded in Annex A.
- 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.
- 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	150 kHz ~ 30 MHz	2.79 dB
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AX1500 Wi-Fi 6 AI Router, AX1500 SMART ROUTER
Product Difference	For Marketing purpose
Brand	D-Link
Test Model	R15
Status of EUT	Engineering Sample
Power Supply Rating	12.0 Vdc, 1A (adapter or host equipment)
Modulation Type	1024 QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM, OFDMA
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps 802.11n: up to 300 Mbps 802.11ac: up to 866.7 Mbps 802.11ax: up to 1201.0 Mbps
Operating Frequency	5180 ~ 5240 MHz, 5745 ~ 5825 MHz
Number of Channel	5180 ~ 5240 MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20) 2 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40) 1 for 802.11ac (VHT80), 802.11ax (HE80) 5745 ~ 5825 MHz: 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20) 2 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40) 1 for 802.11ac (VHT80), 802.11ax (HE80)
Output Power	CDD Mode: 241.797 mW for 5180 ~ 5240 MHz 253.102 mW for 5745 ~ 5825 MHz Beamforming Mode: 117.66 mW for 5180 ~ 5240 MHz 126.56 mW for 5745 ~ 5825 MHz
Antenna Type	Refer to Note as below
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	N/A

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

Modulation Mode	Tx Function	CDD Mode	Beamforming Mode
802.11a	2TX	Support	Not Support
802.11n (HT20)	2TX	Support	Support
802.11n (HT40)	2TX	Support	Support
802.11ac (VHT20)	2TX	Support	Support
802.11ac (VHT40)	2TX	Support	Support
802.11ac (VHT80)	2TX	Support	Support
802.11ax (HE20)	2TX	Support	Support
802.11ax (HE40)	2TX	Support	Support
802.11ax (HE80)	2TX	Support	Support

*The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11ac mode for VHT20 / VHT40 and 802.11ax mode for HE20 / HE40 / HE80, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

2. The EUT contains following accessory devices.

3.	Product	Brand	Model	Description
	Adapter 1	Amigo	AMS159A-1201000FU (US)	I/P: 100-240 Vac, 50/60 Hz, 0.5 A O/P: 12 Vdc, 1 A
	Adapter 2	YOUNGHOPE	YHSW-120100UA (US)	I/P: 100-240 Vac, 50/60 Hz, 0.5 A O/P: 12 Vdc, 1 A
	Adapter 3	Amigo	AMS159A-1201000FV (EU)	I/P: 100-240 Vac, 50/60 Hz, 0.5 A O/P: 12 Vdc, 1 A
	Adapter 4	Amigo	AMS159A-1201000F (US+ UK) AMS159A-1201000F (EU+ UK)	I/P: 100-240 Vac, 50/60 Hz, 0.5 A O/P: 12 Vdc, 1 A
	Adapter 5	Amigo	AMS159A-1201000FS (AU)	I/P: 100-240 Vac, 50/60 Hz, 0.5 A O/P: 12 Vdc, 1 A
	Adapter 6	Amigo	AMS195-1201000FY (IN)	I/P: 100-240 Vac, 50/60 Hz, 0.5 A O/P: 12 Vdc, 1 A
	Adapter 7	Amigo	AMS195-1201000FK (KR)	I/P: 100-240 Vac, 50/60 Hz, 0.5 A O/P: 12 Vdc, 1 A
	Adapter 8	Amigo	AMS159A-1201000FX (BR)	I/P: 100-240 Vac, 50/60 Hz, 0.5 A O/P: 12 Vdc, 1 A
	Adapter 9	Amigo	AMS159A-1201000FB (UK)	I/P: 100-240 Vac, 50/60 Hz, 0.5 A O/P: 12 Vdc, 1 A
	Adapter 10	YOUNGHOPE	YHSW-120100VA (EU)	I/P: 100-240 Vac, 50/60 Hz, 0.5 A O/P: 12 Vdc, 1 A
	Adapter 11	YOUNGHOPE	YHSW-120100BA (UK)	I/P: 100-240 Vac, 50/60 Hz, 0.5 A O/P: 12 Vdc, 1 A
	Adapter 12	YOUNGHOPE	YHSW120100SA (AU)	I/P: 100-240 Vac, 50/60 Hz, 0.5 A O/P: 12 Vdc, 1 A
	Adapter 13	YOUNGHOPE	YHSW-120100BZA (BR)	I/P: 100-240 Vac, 50/60 Hz, 0.5 A O/P: 12 Vdc, 1 A
	Adapter 14	YOUNGHOPE	YHSW-120100IA (IN)	I/P: 100-240 Vac, 50/60 Hz, 0.5 A O/P: 12 Vdc, 1 A
	Adapter 15	YOUNGHOPE	YHSW-120100KA (KR)	I/P: 100-240 Vac, 50/60 Hz, 0.5 A O/P: 12 Vdc, 1 A
	CAT5E 24AWG CCA BLACK CABLE	Nienyi	NYS4709 REV.0	1M

* Adapter 1, 3-9 and Adapter 2, 10-15 only different in plug. Therefore, use US Type as a representative for test.

4. The following antennas were provided to the EUT.

Ant. Type	Router External Antenna
Connector Type	MHF compatible
Antenna Gain (dBi)	
Model	4900 ~ 5825 MHz
AOX20X-091050-00	5.3
AOX20X-091051-00	4.9

5. 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.
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. WLAN 2.4GHz and WLAN 5GHz can transmit at same time.
8. Spurious emission of the simultaneous operation (WLAN 2.4GHz, 5GHz) has been evaluated and no non-compliance was found.

3.2 Description of Test Modes

For 5180 ~ 5240 MHz

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

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

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)
42	5210

For 5745 ~ 5825 MHz:

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

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

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795

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

Channel	Frequency (MHz)
155	5775

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE $\geq$ 1G	RE<1G	PLC	APCM	
A	√	√	√	√	Adapter 1
B	-	√	√	-	Adapter 2

Where **RE $\geq$ 1G**: Radiated Emission above 1 GHz **RE<1G**: Radiated Emission below 1 GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.
2. "-" means no effect.

Radiated Emission Test (Above 1 GHz):

- ☒ 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.

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	5180-5240	802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6.0
		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
A	5745-5825	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
		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 1 GHz):

- ☒ 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.

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A, B	5180-5240	802.11ax (HE40)	38 to 46	38	OFDMA	BPSK	MCS0

Power Line Conducted Emission Test:

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

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A, B	5180-5240	802.11ax (HE40)	38 to 46	38	OFDM	BPSK	MCS0

Antenna Port Conducted Measurement:

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

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	5180-5240	802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6.0
		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
A	5745-5825	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
		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 $\geq$ 1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Greg Lin
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Greg Lin, Han Wu
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Greg Lin, Han Wu
APCM	25 deg. C, 65 % RH	120 Vac, 60 Hz	Jisyoung Wang

3.3 Duty Cycle of Test Signal

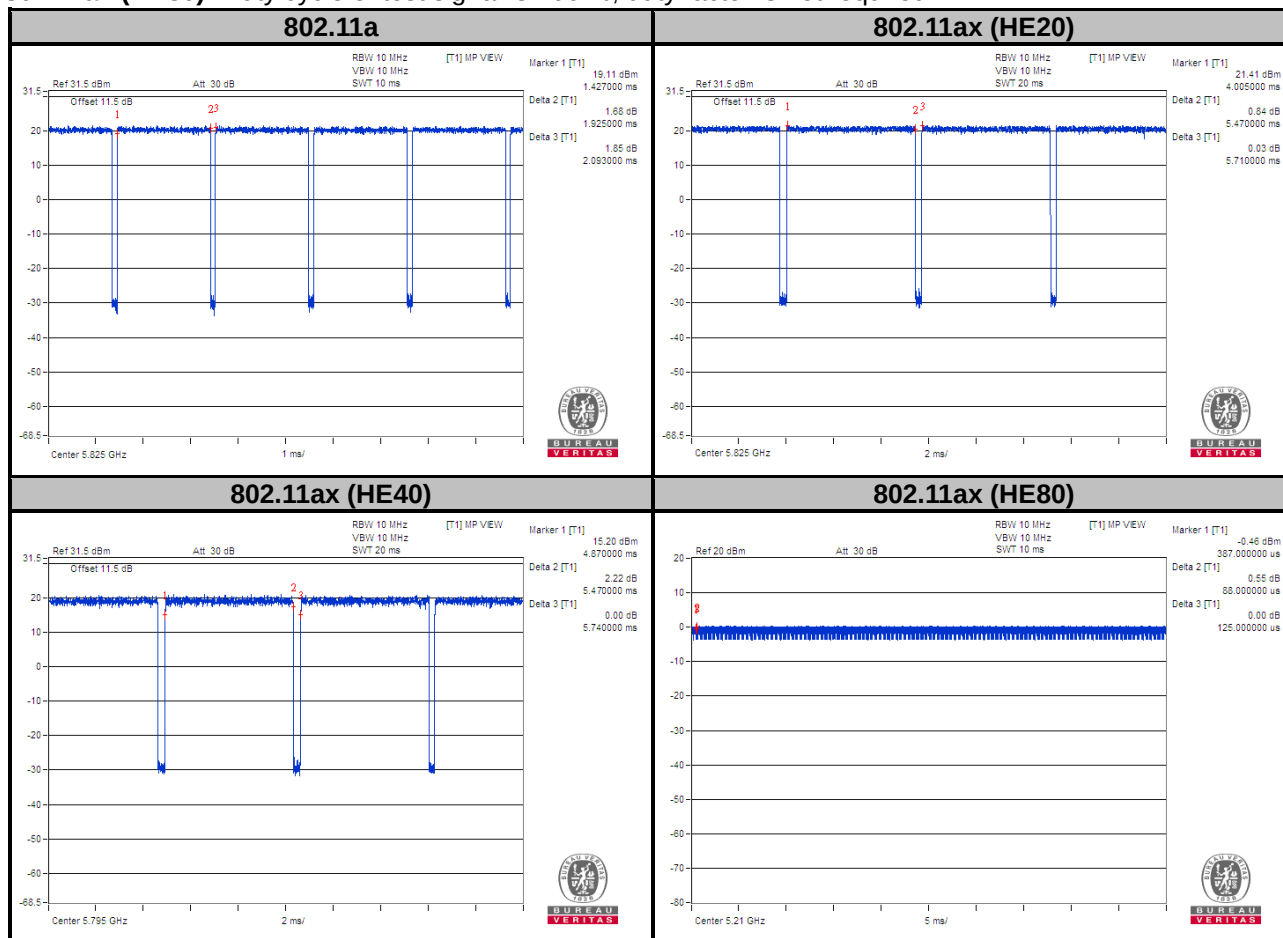
Duty cycle of test signal is < 98 %, duty factor is required.

802.11a: Duty cycle = $1.925/2.093 = 0.92$, Duty factor = $10 * \log(1/0.92) = 0.36$

802.11ax (HT20): Duty cycle = $5.47/5.71 = 0.958$, Duty factor = $10 * \log(1/0.958) = 0.19$

802.11ax (HE40): Duty cycle = $5.47/5.74 = 0.953$, Duty factor = $10 * \log(1/0.953) = 0.21$

802.11ax (HE80): Duty cycle of test signal is 100 %, duty factor is not required.



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.

No.	Product	Brand	Model No.	Serial No.	FCC ID
A	Load	N/A	N/A	N/A	N/A
B	Notebook	DELL	E5420	33MJMQ1	N/A
C	Adapter 1	Amigo	AMS159A-1201000FU	N/A	N/A
D	Adapter 2	Amigo	AMS159A-1201000FV	N/A	N/A

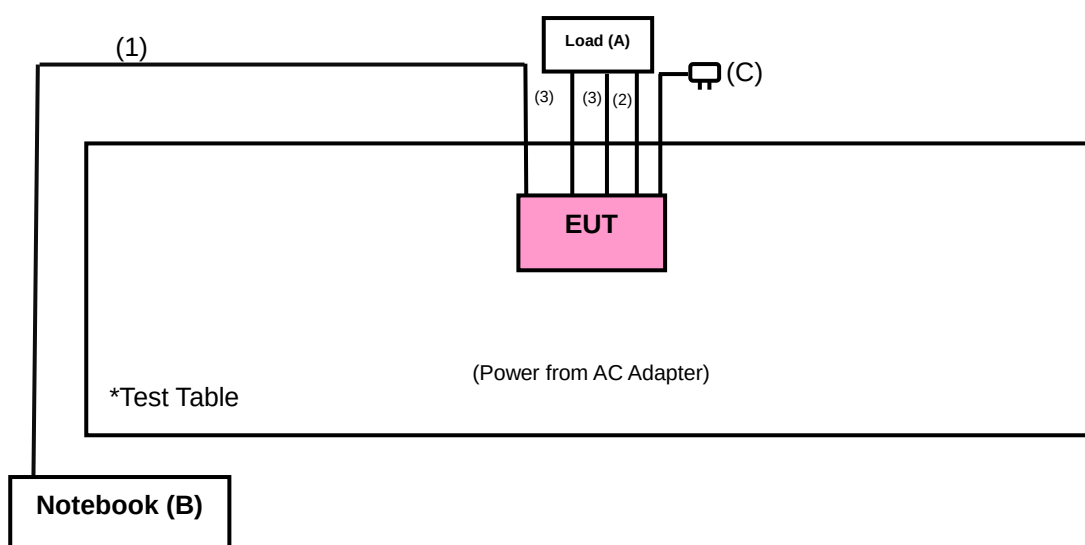
No.	Signal Cable Description of The Above Support Units
1.	LAN Cable: 10m
2.	CAT5E 24AWG CCA BLACK CABLE: 1m
3.	LAN Cable: 1.2m*2

Note:

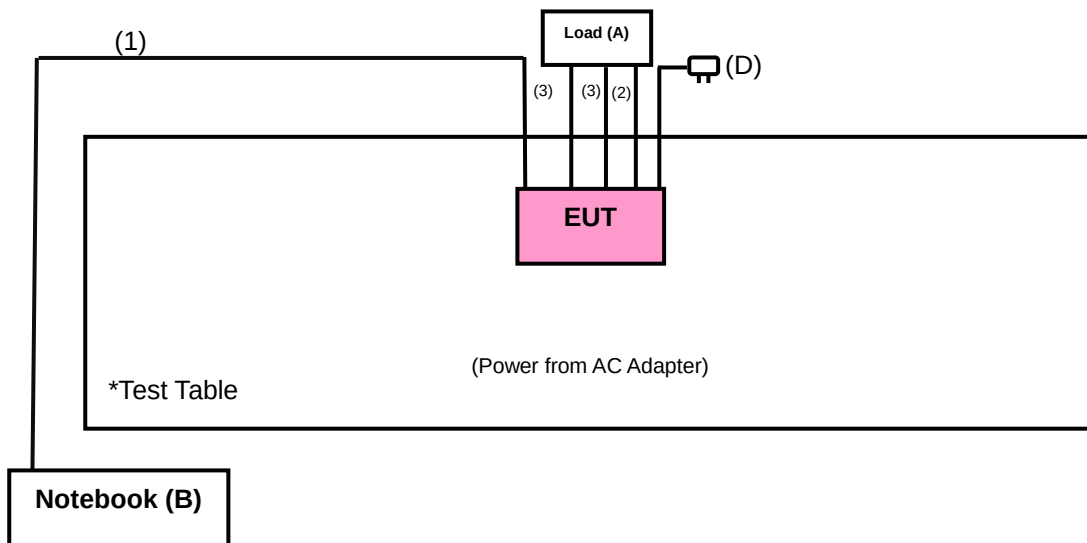
1. All power cords of the above support units are non-shielded (1.8m).
2. Items B acted as communication partners to transfer data.

3.4.1 Configuration of System under Test

Mode A



Mode B



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 Procedures 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 1000 MHz, 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 20 dB under any condition of modulation.

Limits of Unwanted Emission Out of the Restricted Bands

Applicable To		Limit	
789033 D02 General UNII Test Procedures New Rules v02r01		Field Strength at 3 m	
		PK: 74 (dBμV/m)	AV: 54 (dBμV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
5150~5250 MHz	15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	☒ 15.407(b)(4)(i)	PK:-27 (dBm/MHz) ^{*1} PK:10 (dBm/MHz) ^{*2} PK:15.6 (dBm/MHz) ^{*3} PK:27 (dBm/MHz) ^{*4}	PK: 68.2 (dBμV/m) ^{*1} PK:105.2 (dBμV/m) ^{*2} PK: 110.8 (dBμV/m) ^{*3} PK:122.2 (dBμV/m) ^{*4}
	☐ 15.407(b)(4)(ii)	Emission limits in section 15.247(d)	

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

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

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

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

Note:

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

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 22, 2020	Apr. 21, 2021
			Apr. 09, 2021	Apr. 08, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Sep. 16, 2020	Sep. 15, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Nov. 06, 2020	Nov. 05, 2021
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 22, 2020	Nov. 21, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 22, 2020	Nov. 21, 2021
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jun. 08, 2020	Jun. 07, 2021
			Jun. 05, 2021	Jun. 04, 2022
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 17, 2021	Feb. 16, 2022
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM- SM8000	CABLE-CH9-02 (248780+171006)	Jan. 16, 2021	Jan. 15, 2022
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9- (250795/4)	Jan. 16, 2021	Jan. 15, 2022
RF signal cable Woken	8D-FB	Cable-CH9-01	Jun. 08, 2020	Jun. 07, 2021
			Jun. 05, 2021	Jun. 04, 2022
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower & Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Pre-amplifier (18GHz- 40GHz) EMC	EMC184045B	980175	Sep. 04, 2020	Sep. 03, 2021
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55 190004/MY551900 07/MY55210005	Jul. 13, 2020	Jul. 12, 2021

- 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 HwaYa Chamber 9.

4.1.3 Test Procedures

For Radiated Emission below 30 MHz

- 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 9 kHz at frequency below 30 MHz.

For Radiated Emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) 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 detected 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:

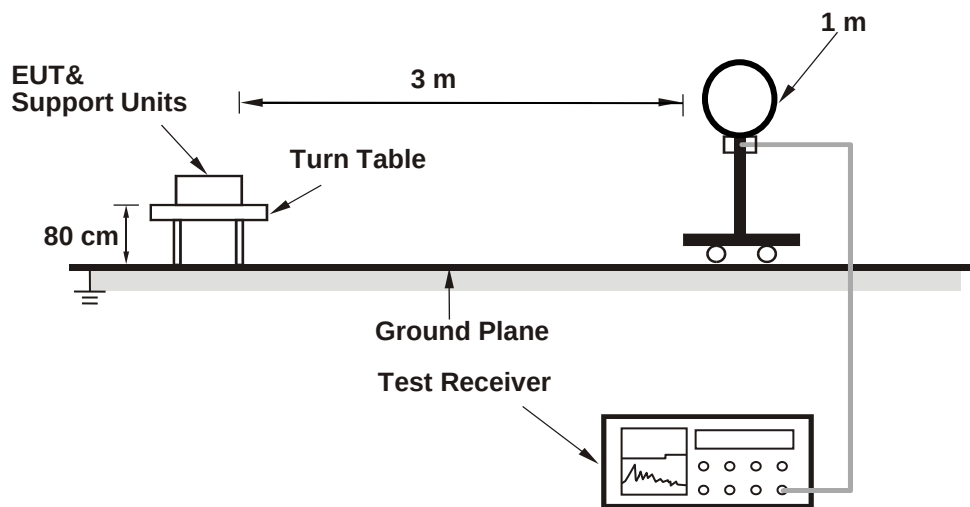
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10 Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1 GHz.
(11a: RBW = 1 MHz, VBW = 10 kHz ; 11ax (HE20): RBW = 1 MHz, VBW = 10 kHz ;
11ax (HE40): RBW = 1 MHz, VBW = 10 kHz ; 11ax (HE80): RBW = 1 MHz, VBW = 10 Hz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

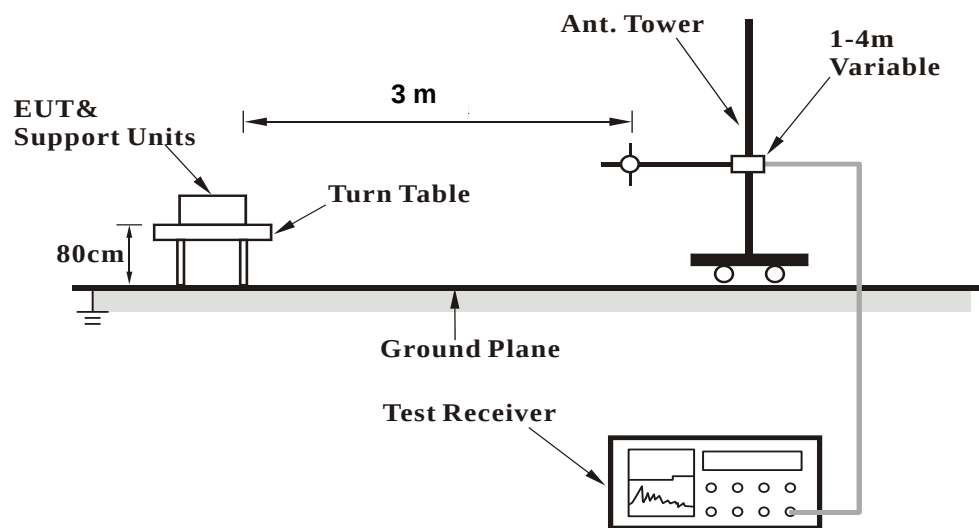
No deviation.

4.1.5 Test Setup

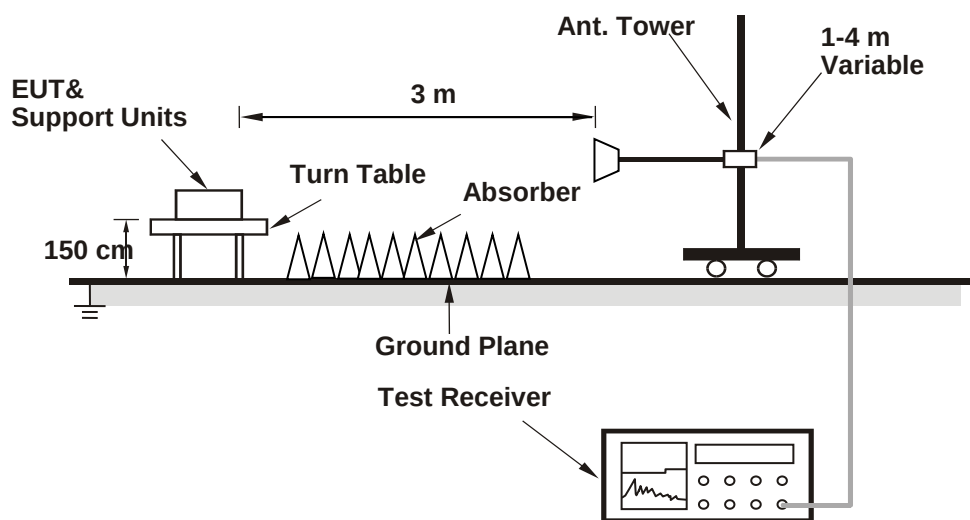
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



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

4.1.6 EUT Operating Conditions

- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1 GHz Data :

802.11a

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	56.3 PK	74.0	-17.7	2.05 H	315	54.2	2.1
2	5150.00	43.8 AV	54.0	-10.2	2.05 H	315	41.7	2.1
3	*5180.00	104.0 PK			2.05 H	315	67.6	36.4
4	*5180.00	93.9 AV			2.05 H	315	57.5	36.4
5	#10360.00	56.2 PK	68.2	-12.0	1.72 H	224	41.4	14.8
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	67.6 PK	74.0	-6.4	1.24 V	134	65.5	2.1
2	5150.00	52.8 AV	54.0	-1.2	1.24 V	134	50.7	2.1
3	*5180.00	116.3 PK			1.24 V	134	79.9	36.4
4	*5180.00	106.2 AV			1.24 V	134	69.8	36.4
5	#10360.00	57.4 PK	68.2	-10.8	1.57 V	334	42.6	14.8

Remarks:

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

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	104.9 PK			2.13 H	319	68.5	36.4
2	*5200.00	94.8 AV			2.13 H	319	58.4	36.4
3	#10400.00	56.8 PK	68.2	-11.4	1.68 H	212	41.9	14.9
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	*5200.00	116.7 PK			1.28 V	137	80.3	36.4
2	*5200.00	106.7 AV			1.28 V	137	70.3	36.4
3	#10400.00	57.7 PK	68.2	-10.5	1.60 V	325	42.8	14.9

Remarks:

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

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	*5240.00	104.8 PK			2.11 H	309	68.5	36.3
2	*5240.00	94.6 AV			2.11 H	309	58.3	36.3
3	5350.00	52.2 PK	74.0	-21.8	2.11 H	309	50.2	2.0
4	5350.00	39.4 AV	54.0	-14.6	2.11 H	309	37.4	2.0
5	#10480.00	56.1 PK	68.2	-12.1	1.72 H	217	41.2	14.9
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	*5240.00	116.6 PK			1.20 V	190	80.3	36.3
2	*5240.00	106.5 AV			1.20 V	190	70.2	36.3
3	5350.00	52.9 PK	74.0	-21.1	1.20 V	190	50.9	2.0
4	5350.00	40.1 AV	54.0	-13.9	1.20 V	190	38.1	2.0
5	#10480.00	57.5 PK	68.2	-10.7	1.57 V	319	42.6	14.9

Remarks:

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

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	#5624.40	54.1 PK	68.2	-14.1	1.94 H	309	51.4	2.7
2	*5745.00	106.5 PK			1.94 H	309	69.2	37.3
3	*5745.00	96.7 AV			1.94 H	309	59.4	37.3
4	#5942.80	55.7 PK	68.2	-12.5	1.94 H	309	52.2	3.5
5	11490.00	57.1 PK	74.0	-16.9	1.93 H	226	40.9	16.2
6	11490.00	43.3 AV	54.0	-10.7	1.93 H	226	27.1	16.2
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	#5620.00	53.5 PK	68.2	-14.7	1.60 V	232	50.8	2.7
2	*5745.00	118.1 PK			1.60 V	232	80.8	37.3
3	*5745.00	108.5 AV			1.60 V	232	71.2	37.3
4	#5974.80	54.6 PK	68.2	-13.6	1.60 V	232	51.2	3.4
5	11490.00	57.8 PK	74.0	-16.2	1.82 V	326	41.6	16.2
6	11490.00	43.9 AV	54.0	-10.1	1.82 V	326	27.7	16.2

Remarks:

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

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	#5608.00	52.1 PK	68.2	-16.1	1.92 H	300	49.3	2.8
2	*5785.00	106.8 PK			1.92 H	300	69.3	37.5
3	*5785.00	97.1 AV			1.92 H	300	59.6	37.5
4	#5945.60	53.0 PK	68.2	-15.2	1.92 H	300	49.5	3.5
5	11570.00	57.3 PK	74.0	-16.7	1.78 H	236	41.3	16.0
6	11570.00	43.4 AV	54.0	-10.6	1.78 H	236	27.4	16.0
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	#5643.60	54.2 PK	68.2	-14.0	1.69 V	234	51.4	2.8
2	*5785.00	118.5 PK			1.69 V	234	81.0	37.5
3	*5785.00	108.8 AV			1.69 V	234	71.3	37.5
4	#5974.40	55.5 PK	68.2	-12.7	1.69 V	234	52.1	3.4
5	11570.00	57.8 PK	74.0	-16.2	2.32 V	307	41.8	16.0
6	11570.00	44.0 AV	54.0	-10.0	2.32 V	307	28.0	16.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	#5646.40	54.2 PK	68.2	-14.0	1.91 H	301	51.4	2.8
2	*5825.00	106.9 PK			1.91 H	301	69.3	37.6
3	*5825.00	97.1 AV			1.91 H	301	59.5	37.6
4	#5990.40	54.2 PK	68.2	-14.0	1.91 H	301	50.8	3.4
5	11650.00	56.8 PK	74.0	-17.2	1.72 H	237	40.8	16.0
6	11650.00	43.1 AV	54.0	-10.9	1.72 H	237	27.1	16.0
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	#5622.80	54.4 PK	68.2	-13.8	1.80 V	196	51.7	2.7
2	*5825.00	118.2 PK			1.80 V	196	80.6	37.6
3	*5825.00	108.8 AV			1.80 V	196	71.2	37.6
4	#5935.20	54.7 PK	68.2	-13.5	1.80 V	196	51.2	3.5
5	11650.00	57.4 PK	74.0	-16.6	2.03 V	319	41.4	16.0
6	11650.00	43.5 AV	54.0	-10.5	2.03 V	319	27.5	16.0

Remarks:

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

802.11ax (HE20)

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	64.0 PK	74.0	-10.0	2.13 H	304	61.9	2.1
2	5150.00	46.6 AV	54.0	-7.4	2.13 H	304	44.5	2.1
3	*5180.00	103.1 PK			2.13 H	304	66.7	36.4
4	*5180.00	93.2 AV			2.13 H	304	56.8	36.4
5	#10360.00	55.7 PK	68.2	-12.5	1.72 H	224	40.9	14.8

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	73.0 PK	74.0	-1.0	1.33 V	147	70.9	2.1
2	5150.00	52.2 AV	54.0	-1.8	1.33 V	147	50.1	2.1
3	*5180.00	114.4 PK			1.33 V	147	78.0	36.4
4	*5180.00	105.0 AV			1.33 V	147	68.6	36.4
5	#10360.00	57.4 PK	68.2	-10.8	1.56 V	321	42.6	14.8

Remarks:

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

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	*5200.00	104.6 PK			2.13 H	327	68.2	36.4
2	*5200.00	94.3 AV			2.13 H	327	57.9	36.4
3	#10400.00	56.0 PK	68.2	-12.2	1.77 H	221	41.1	14.9
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	*5200.00	116.7 PK			1.28 V	136	80.3	36.4
2	*5200.00	106.3 AV			1.28 V	136	69.9	36.4
3	#10400.00	56.9 PK	68.2	-11.3	1.75 V	307	42.0	14.9

Remarks:

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

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	*5240.00	103.9 PK			1.92 H	304	67.6	36.3
2	*5240.00	94.1 AV			1.92 H	304	57.8	36.3
3	5350.00	52.2 PK	74.0	-21.8	1.92 H	304	50.2	2.0
4	5350.00	39.4 AV	54.0	-14.6	1.92 H	304	37.4	2.0
5	#10480.00	56.1 PK	68.2	-12.1	1.79 H	226	41.2	14.9
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	*5240.00	115.7 PK			1.06 V	132	79.4	36.3
2	*5240.00	106.0 AV			1.06 V	132	69.7	36.3
3	5350.00	52.8 PK	74.0	-21.2	1.06 V	132	50.8	2.0
4	5350.00	39.9 AV	54.0	-14.1	1.06 V	132	37.9	2.0
5	#10480.00	57.7 PK	68.2	-10.5	1.57 V	332	42.8	14.9

Remarks:

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

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	#5621.20	51.6 PK	68.2	-16.6	1.98 H	306	48.9	2.7
2	*5745.00	105.9 PK			1.98 H	306	68.6	37.3
3	*5745.00	96.2 AV			1.98 H	306	58.9	37.3
4	#5963.20	53.1 PK	68.2	-15.1	1.98 H	306	49.7	3.4
5	11490.00	56.9 PK	74.0	-17.1	1.91 H	221	40.7	16.2
6	11490.00	43.1 AV	54.0	-10.9	1.91 H	221	26.9	16.2
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	#5645.20	54.3 PK	68.2	-13.9	1.63 V	226	51.5	2.8
2	*5745.00	117.5 PK			1.63 V	226	80.2	37.3
3	*5745.00	107.9 AV			1.63 V	226	70.6	37.3
4	#5939.20	55.3 PK	68.2	-12.9	1.63 V	226	51.8	3.5
5	11490.00	57.5 PK	74.0	-16.5	2.93 V	274	41.3	16.2
6	11490.00	43.4 AV	54.0	-10.6	2.93 V	274	27.2	16.2

Remarks:

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

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	#5622.80	54.4 PK	68.2	-13.8	2.86 H	297	51.7	2.7
2	*5785.00	107.0 PK			1.86 H	297	69.5	37.5
3	*5785.00	97.3 AV			1.86 H	297	59.8	37.5
4	#6000.00	54.5 PK	68.2	-13.7	1.86 H	297	51.1	3.4
5	11570.00	56.3 PK	74.0	-17.7	1.77 H	231	40.3	16.0
6	11570.00	42.8 AV	54.0	-11.2	1.77 H	231	26.8	16.0
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	#5648.40	54.5 PK	68.2	-13.7	1.81 V	195	51.7	2.8
2	*5785.00	118.9 PK			1.81 V	195	81.4	37.5
3	*5785.00	109.1 AV			1.81 V	195	71.6	37.5
4	#5990.80	55.0 PK	68.2	-13.2	1.81 V	195	51.6	3.4
5	11570.00	56.6 PK	74.0	-17.4	2.36 V	315	40.6	16.0
6	11570.00	43.5 AV	54.0	-10.5	2.36 V	315	27.5	16.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	#5644.00	52.6 PK	68.2	-15.6	1.90 H	301	49.8	2.8
2	*5825.00	106.0 PK			1.90 H	301	68.4	37.6
3	*5825.00	96.3 AV			1.90 H	301	58.7	37.6
4	#5994.00	53.4 PK	68.2	-14.8	1.90 H	301	50.0	3.4
5	11650.00	56.8 PK	74.0	-17.2	1.76 H	238	40.8	16.0
6	11650.00	43.0 AV	54.0	-11.0	1.76 H	238	27.0	16.0
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	#5606.00	54.6 PK	68.2	-13.6	1.82 V	196	51.8	2.8
2	*5825.00	117.8 PK			1.82 V	196	80.2	37.6
3	*5825.00	108.0 AV			1.82 V	196	70.4	37.6
4	#5928.80	54.6 PK	68.2	-13.6	1.82 V	196	51.2	3.4
5	11650.00	57.2 PK	74.0	-16.8	2.73 V	279	41.2	16.0
6	11650.00	43.4 AV	54.0	-10.6	2.73 V	279	27.4	16.0

Remarks:

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

802.11ax (HE40)

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	54.5 PK	74.0	-19.5	2.02 H	318	52.4	2.1
2	5150.00	42.5 AV	54.0	-11.5	2.02 H	318	40.4	2.1
3	*5190.00	98.1 PK			2.02 H	318	61.7	36.4
4	*5190.00	88.4 AV			2.02 H	318	52.0	36.4
5	#10380.00	55.7 PK	68.2	-12.5	1.62 H	204	40.8	14.9

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	69.0 PK	74.0	-5.0	1.36 V	133	66.9	2.1
2	5150.00	53.2 AV	54.0	-0.8	1.36 V	133	51.1	2.1
3	*5190.00	109.0 PK			1.36 V	133	72.6	36.4
4	*5190.00	99.5 AV			1.36 V	133	63.1	36.4
5	#10380.00	57.3 PK	68.2	-10.9	1.54 V	328	42.4	14.9

Remarks:

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

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	*5230.00	104.6 PK			2.18 H	306	68.3	36.3
2	*5230.00	94.1 AV			2.18 H	306	57.8	36.3
3	5350.00	52.3 PK	74.0	-21.7	2.18 H	306	50.3	2.0
4	5350.00	39.6 AV	54.0	-14.4	2.18 H	306	37.6	2.0
5	#10460.00	55.6 PK	68.2	-12.6	1.64 H	225	40.7	14.9
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	*5230.00	115.8 PK			1.39 V	131	79.5	36.3
2	*5230.00	104.7 AV			1.39 V	131	68.4	36.3
3	5350.00	54.9 PK	74.0	-19.1	1.39 V	131	52.9	2.0
4	5350.00	41.4 AV	54.0	-12.6	1.39 V	131	39.4	2.0
5	#10460.00	57.1 PK	68.2	-11.1	2.84 V	261	42.2	14.9

Remarks:

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

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	#5603.20	52.1 PK	68.2	-16.1	1.93 H	311	49.3	2.8
2	*5755.00	103.5 PK			1.83 H	311	66.2	37.3
3	*5755.00	93.7 AV			1.83 H	311	56.4	37.3
4	#5953.20	52.8 PK	68.2	-15.4	1.83 H	311	49.3	3.5
5	11510.00	56.8 PK	74.0	-17.2	1.76 H	224	40.7	16.1
6	11510.00	42.9 AV	54.0	-11.1	1.76 H	224	26.8	16.1
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	#5646.80	59.1 PK	68.2	-9.1	1.86 V	198	56.3	2.8
2	*5755.00	114.8 PK			1.86 V	198	77.5	37.3
3	*5755.00	105.2 AV			1.86 V	198	67.9	37.3
4	#5966.40	54.9 PK	68.2	-13.3	1.86 V	198	51.5	3.4
5	11510.00	57.2 PK	74.0	-16.8	2.84 V	277	41.1	16.1
6	11510.00	43.4 AV	54.0	-10.6	2.84 V	277	27.3	16.1

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 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	#5627.20	51.7 PK	68.2	-16.5	1.97 H	300	49.0	2.7
2	*5795.00	103.9 PK			1.97 H	300	66.3	37.6
3	*5795.00	94.1 AV			1.97 H	300	56.5	37.6
4	#5930.40	52.7 PK	68.2	-15.5	1.97 H	300	49.3	3.4
5	11590.00	34.7 PK	74.0	-39.3	1.77 H	221	18.7	16.0
6	11590.00	20.5 AV	54.0	-33.5	1.77 H	221	4.5	16.0
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	#5640.40	55.0 PK	68.2	-13.2	1.82 V	206	52.2	2.8
2	*5795.00	115.7 PK			1.82 V	206	78.1	37.6
3	*5795.00	105.7 AV			1.82 V	206	68.1	37.6
4	#5925.20	60.4 PK	68.2	-7.8	1.82 V	206	57.0	3.4
5	11590.00	57.2 PK	74.0	-16.8	2.82 V	274	41.2	16.0
6	11590.00	43.0 AV	54.0	-11.0	2.82 V	274	27.0	16.0

Remarks:

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

802.11ax (HE80)

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	5150.00	54.4 PK	74.0	-19.6	2.02 H	318	52.3	2.1
2	5150.00	41.4 AV	54.0	-12.6	2.02 H	318	39.3	2.1
3	*5210.00	96.2 PK			2.02 H	318	59.8	36.4
4	*5210.00	86.1 AV			2.02 H	318	49.7	36.4
5	5350.00	52.3 PK	74.0	-21.7	2.02 H	318	50.3	2.0
6	5350.00	39.8 AV	54.0	-14.2	2.02 H	318	37.8	2.0
7	#10420.00	55.5 PK	68.2	-12.7	1.74 H	223	40.6	14.9
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	69.0 PK	74.0	-5.0	1.38 V	133	66.9	2.1
2	5150.00	53.2 AV	54.0	-0.8	1.38 V	133	51.1	2.1
3	*5210.00	106.3 PK			1.38 V	133	69.9	36.4
4	*5210.00	96.2 AV			1.38 V	133	59.8	36.4
5	5350.00	53.9 PK	74.0	-20.1	1.38 V	133	51.9	2.0
6	5350.00	40.9 AV	54.0	-13.1	1.38 V	133	38.9	2.0
7	#10420.00	56.7 PK	68.2	-11.5	1.53 V	316	41.8	14.9

Remarks:

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

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	#5618.00	54.8 PK	68.2	-13.4	1.89 H	297	52.1	2.7
2	*5775.00	99.2 PK			1.89 H	297	61.7	37.5
3	*5775.00	89.5 AV			1.89 H	297	52.0	37.5
4	#5926.80	55.7 PK	68.2	-12.5	1.89 H	297	52.3	3.4
5	11550.00	56.8 PK	74.0	-17.2	1.77 H	221	40.7	16.1
6	11550.00	42.5 AV	54.0	-11.5	1.77 H	221	26.4	16.1
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	#5647.20	66.6 PK	68.2	-1.6	1.76 V	205	63.8	2.8
2	*5775.00	110.9 PK			1.76 V	205	73.4	37.5
3	*5775.00	100.9 AV			1.76 V	205	63.4	37.5
4	#5925.20	67.3 PK	68.2	-0.9	1.76 V	205	63.9	3.4
5	11550.00	57.2 PK	74.0	-16.8	2.84 V	278	41.1	16.1
6	11550.00	43.0 AV	54.0	-11.0	2.84 V	278	26.9	16.1

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.

9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Worst-Case Data:

802.11ax (HE40)

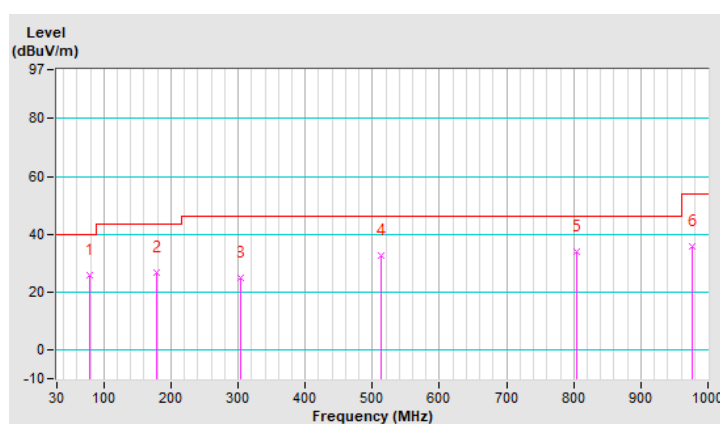
Mode A

RF Mode	TX 802.11ax (HE40)	Channel	CH 38 : 5190 MHz
Frequency Range	30MHz ~ 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	78.50	25.7 QP	40.0	-14.3	1.00 H	349	38.8	-13.1
2	178.41	26.6 QP	43.5	-16.9	1.25 H	68	36.4	-9.8
3	303.54	25.1 QP	46.0	-20.9	1.50 H	213	31.7	-6.6
4	512.09	32.5 QP	46.0	-13.5	1.25 H	163	34.4	-1.9
5	805.03	34.0 QP	46.0	-12.0	1.00 H	101	30.5	3.5
6	976.72	35.9 QP	54.0	-18.1	1.00 H	248	29.3	6.6

Remarks:

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

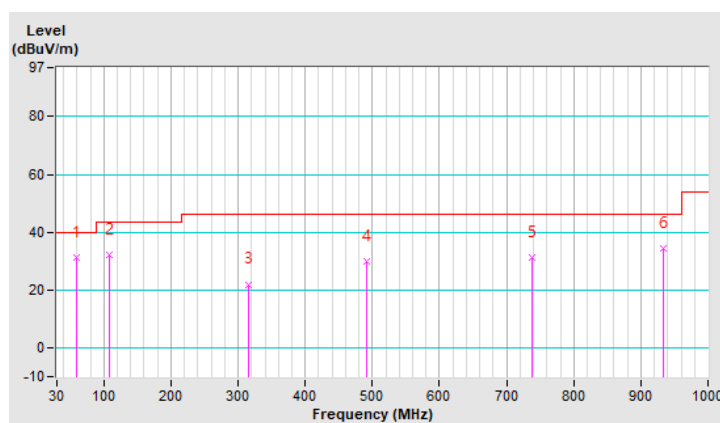


RF Mode	TX 802.11ax (HE40)	Channel	CH 38 : 5190 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	60.07	31.4 QP	40.0	-8.6	1.25 V	11	40.8	-9.4
2	108.57	32.3 QP	43.5	-11.2	1.25 V	84	44.3	-12.0
3	316.15	22.0 QP	46.0	-24.0	1.00 V	288	28.3	-6.3
4	491.72	29.7 QP	46.0	-16.3	1.00 V	326	32.2	-2.5
5	737.13	31.1 QP	46.0	-14.9	1.00 V	120	29.1	2.0
6	933.07	34.4 QP	46.0	-11.6	1.50 V	279	28.1	6.3

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 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.



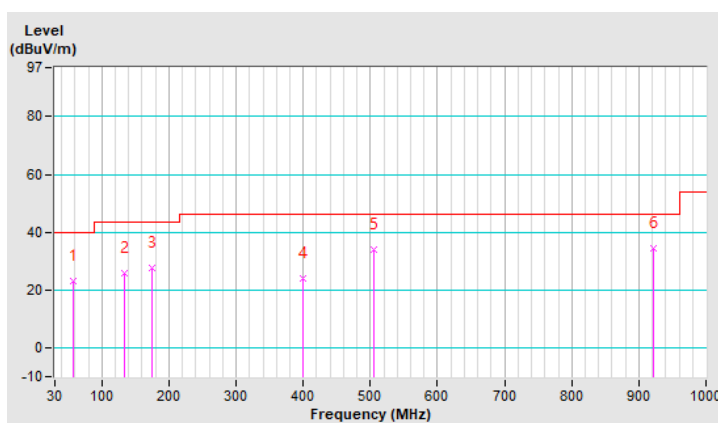
Mode B

RF Mode	TX 802.11ax (HE40)	Channel	CH 38 : 5190 MHz
Frequency Range	30MHz ~ 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	57.16	23.2 QP	40.0	-16.8	1.00 H	244	32.6	-9.4
2	132.82	25.9 QP	43.5	-17.6	1.25 H	271	35.6	-9.7
3	174.53	27.6 QP	43.5	-15.9	1.00 H	271	36.9	-9.3
4	400.54	24.1 QP	46.0	-21.9	1.00 H	286	28.8	-4.7
5	504.33	34.1 QP	46.0	-11.9	1.50 H	157	36.3	-2.2
6	922.40	34.3 QP	46.0	-11.7	1.25 H	314	28.1	6.2

Remarks:

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

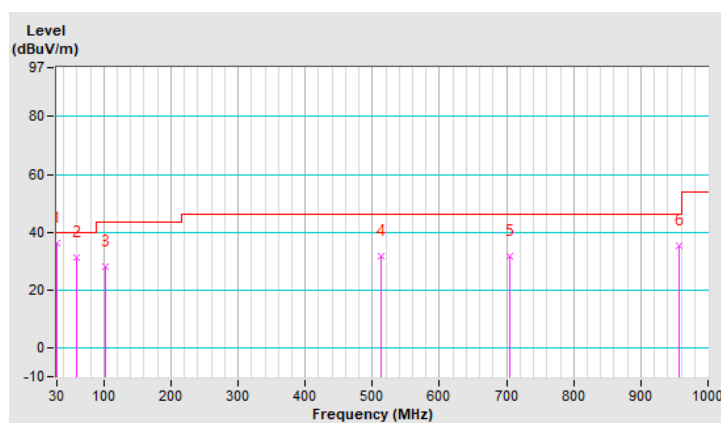


RF Mode	TX 802.11ax (HE40)	Channel	CH 38 : 5190 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	30.97	36.2 QP	40.0	-3.8	1.25 V	16	46.7	-10.5
2	60.07	31.4 QP	40.0	-8.6	1.25 V	11	40.8	-9.4
3	102.75	27.9 QP	43.5	-15.6	1.00 V	84	40.9	-13.0
4	513.06	31.7 QP	46.0	-14.3	1.00 V	17	33.6	-1.9
5	705.12	31.6 QP	46.0	-14.4	1.50 V	267	30.2	1.4
6	956.35	35.5 QP	46.0	-10.5	1.00 V	5	29.0	6.5

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 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 0.50 MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESR3	102783	Dec. 21, 2020	Dec. 20, 2021
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 04, 2020	Sep. 03, 2021
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 28, 2021	Jan. 27, 2022
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Aug. 18, 2020	Aug. 17, 2021
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 2 (Conduction 2).
 3. The VCCI Site Registration No. is C-12047.

4.2.3 Test Procedures

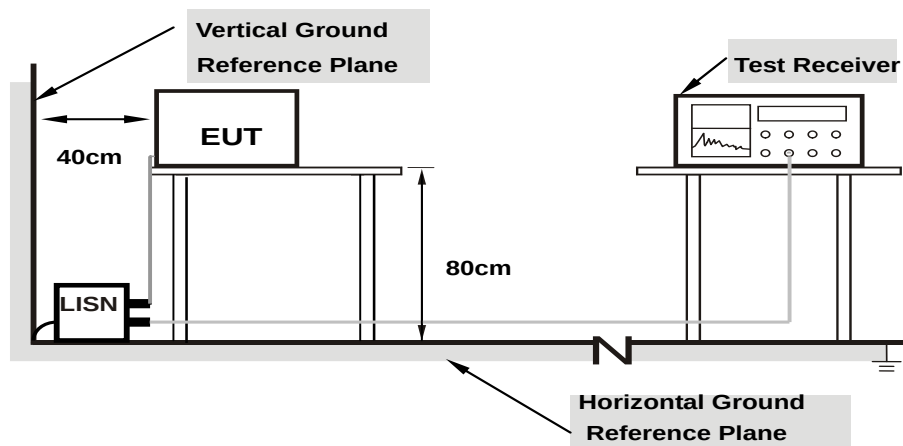
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit -20 dB) 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.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT Operating Conditions

- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.2.7 Test Results

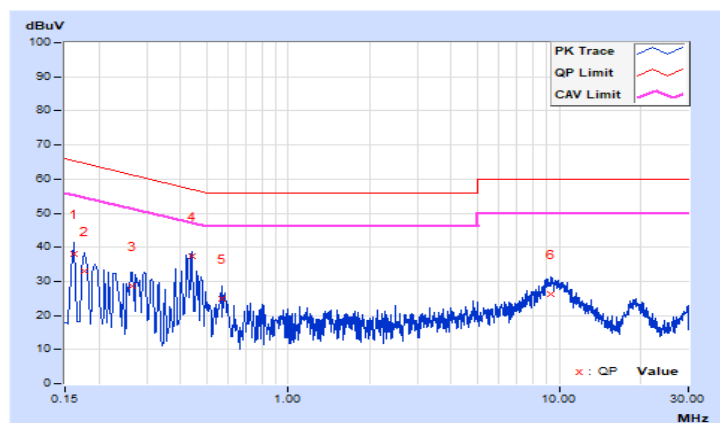
Mode A

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH
Tested by	Greg Lin	Test Date	2021/6/22

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	0.16200	10.09	28.03	11.48	38.12	21.57	65.36	55.36	-27.24	-33.79
2	0.17800	10.10	22.82	6.44	32.92	16.54	64.58	54.58	-31.66	-38.04
3	0.26569	10.14	18.33	3.89	28.47	14.03	61.25	51.25	-32.78	-37.22
4	0.44177	10.19	27.19	15.22	37.38	25.41	57.03	47.03	-19.65	-21.62
5	0.56600	10.20	14.66	3.99	24.86	14.19	56.00	46.00	-31.14	-31.81
6	9.33400	10.48	15.73	3.07	26.21	13.55	60.00	50.00	-33.79	-36.45

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

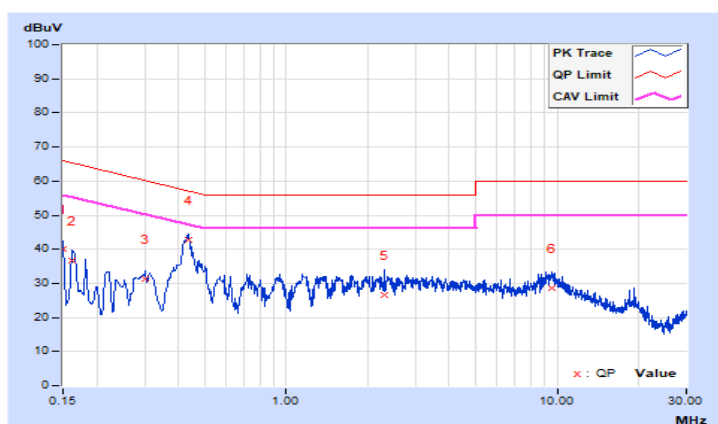


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH
Tested by	Greg Lin	Test Date	2021/6/22

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	0.15000	10.10	30.06	18.95	40.16	29.05	66.00	56.00	-25.84	-26.95
2	0.16200	10.10	26.47	14.68	36.57	24.78	65.36	55.36	-28.79	-30.58
3	0.30200	10.16	21.09	14.21	31.25	24.37	60.19	50.19	-28.94	-25.82
4	0.43370	10.20	32.71	27.44	42.91	37.64	57.18	47.18	-14.27	-9.54
5	2.31000	10.34	16.39	9.99	26.73	20.33	56.00	46.00	-29.27	-25.67
6	9.53000	10.59	18.12	10.24	28.71	20.83	60.00	50.00	-31.29	-29.17

Remarks:

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



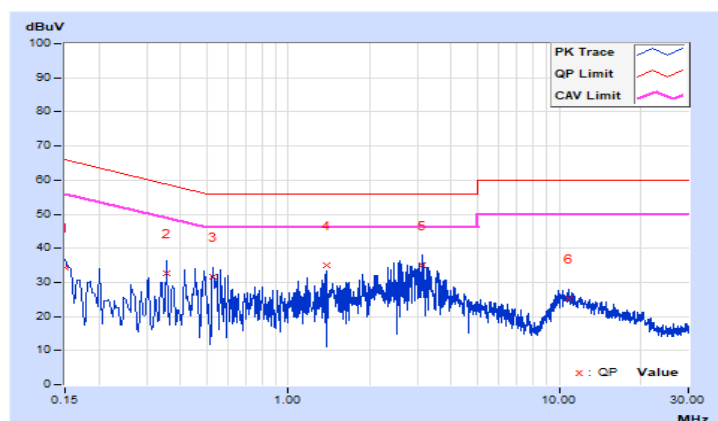
Mode B

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH
Tested by	Greg Lin	Test Date	2021/6/25

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	0.15000	10.09	24.40	12.18	34.49	22.27	66.00	56.00	-31.51	-33.73
2	0.35723	10.17	22.64	10.71	32.81	20.88	58.79	48.79	-25.98	-27.91
3	0.52927	10.20	21.44	13.80	31.64	24.00	56.00	46.00	-24.36	-22.00
4	1.37774	10.27	24.74	12.76	35.01	23.03	56.00	46.00	-20.99	-22.97
5	3.12551	10.34	24.65	11.94	34.99	22.28	56.00	46.00	-21.01	-23.72
6	10.85167	10.50	14.86	3.24	25.36	13.74	60.00	50.00	-34.64	-36.26

Remarks:

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

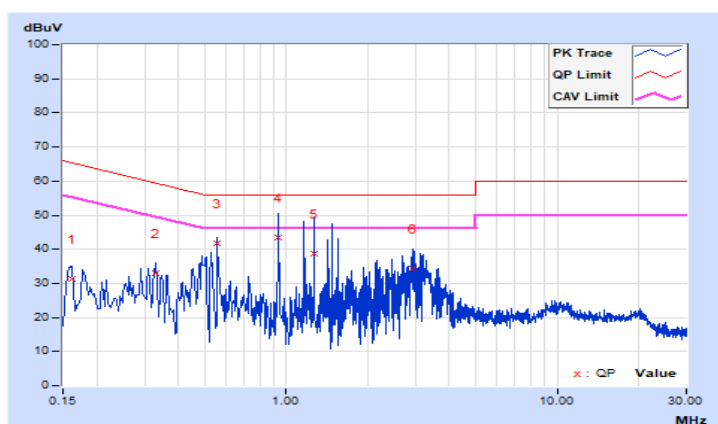


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH
Tested by	Greg Lin	Test Date	2021/6/25

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	0.16096	10.10	21.11	15.26	31.21	25.36	65.41	55.41	-34.20	-30.05
2	0.32959	10.17	22.88	11.02	33.05	21.19	59.46	49.46	-26.41	-28.27
3	0.55664	10.22	31.43	5.27	41.65	15.49	56.00	46.00	-14.35	-30.51
4	0.93591	10.27	33.13	7.16	43.40	17.43	56.00	46.00	-12.60	-28.57
5	1.26826	10.29	28.49	3.89	38.78	14.18	56.00	46.00	-17.22	-31.82
6	2.92219	10.37	23.94	8.24	34.31	18.61	56.00	46.00	-21.69	-27.39

Remarks:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p $\leq$ 125 mW (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)
		Mobile and Portable client device	250 mW (24 dBm)
U-NII-2A			250 mW (24 dBm) or 11 dBm + 10 log B*
U-NII-2C			250 mW (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 $N_{ANT} \leq 4$;

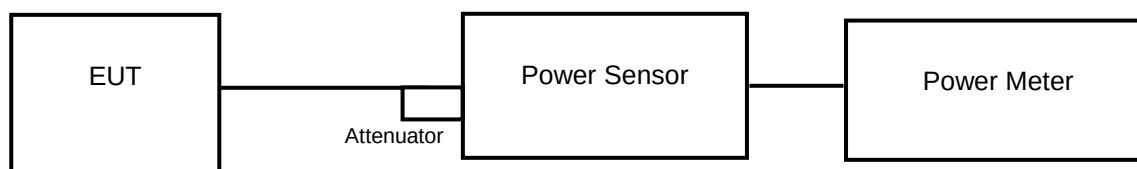
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

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

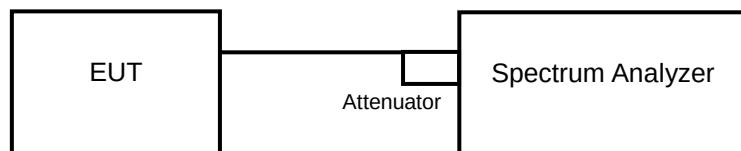
For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

4.3.2 Test Setup

<Power Output Measurement>



<26 dB Bandwidth>



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

Average Power Measurement

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

26 dB Bandwidth

- a. Set RBW = approximately 1 % of the emission bandwidth.
- b. Set the VBW $\geq 3 \times$ RBW.
- c. Detector = Peak.
- d. Trace mode = max hold.
- e. 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 Conditions

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

Power Output:

CDD Mode

802.11a

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	21.35	20.06	237.849	23.76	30	Pass
40	5200	21.43	20.12	241.797	23.83	30	Pass
48	5240	21.14	19.86	226.845	23.56	30	Pass
149	5745	21.72	19.92	246.768	23.92	30	Pass
157	5785	21.71	19.84	244.635	23.89	30	Pass
165	5825	21.85	19.93	251.51	24.01	30	Pass

802.11ax (HE20)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	21.23	20.11	235.305	23.72	30	Pass
40	5200	21.21	20.12	234.931	23.71	30	Pass
48	5240	21.04	20.02	227.519	23.57	30	Pass
149	5745	21.56	19.73	237.191	23.75	30	Pass
157	5785	21.54	19.62	234.183	23.70	30	Pass
165	5825	21.67	19.74	241.082	23.82	30	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	16.56	15.29	79.096	18.98	30	Pass
46	5230	21.04	19.82	222.997	23.48	30	Pass
151	5755	21.79	20.09	253.102	24.03	30	Pass
159	5795	21.75	20.11	252.189	24.02	30	Pass

802.11ax (HE80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	15.72	14.63	66.365	18.22	30	Pass
155	5775	19.56	17.72	149.521	21.75	30	Pass

Beamforming Mode

802.11ax (HE20)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	18.22	17.10	117.66	20.71	27.69	Pass
40	5200	18.20	17.11	117.474	20.70	27.69	Pass
48	5240	18.03	17.01	113.767	20.56	27.69	Pass
149	5745	18.55	16.72	118.604	20.74	27.69	Pass
157	5785	18.53	16.61	117.099	20.69	27.69	Pass
165	5825	18.66	16.73	120.549	20.81	27.69	Pass

Note:

For U-NII-1 Band & For U-NII-3 Band:

Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 8.31 > 6 \text{ dBi}$, so the power density limit shall be reduced to $30 - (8.31 - 6) = 27.69 \text{ dBm}$.

802.11ax (HE40)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	13.55	12.28	39.551	15.97	27.69	Pass
46	5230	18.03	16.81	111.506	20.47	27.69	Pass
151	5755	18.78	17.08	126.56	21.02	27.69	Pass
159	5795	18.74	17.10	126.103	21.01	27.69	Pass

Note:

For U-NII-1 Band & For U-NII-3 Band:

Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 8.31 > 6 \text{ dBi}$, so the power density limit shall be reduced to $30 - (8.31 - 6) = 27.69 \text{ dBm}$.

802.11ax (HE80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	12.71	11.62	33.185	15.21	27.69	Pass
155	5775	16.55	14.71	74.766	18.74	27.69	Pass

Note:

For U-NII-1 Band & For U-NII-3 Band:

Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 8.31 > 6 \text{ dBi}$, so the power density limit shall be reduced to $30 - (8.31 - 6) = 27.69 \text{ dBm}$.

26 dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	30.17	23.26
40	5200	32.84	29.02
48	5240	32.09	25.35

802.11ax (HE20)

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	34.04	28.87
40	5200	34.22	31.93
48	5240	34.35	28.11

802.11ax (HE40)

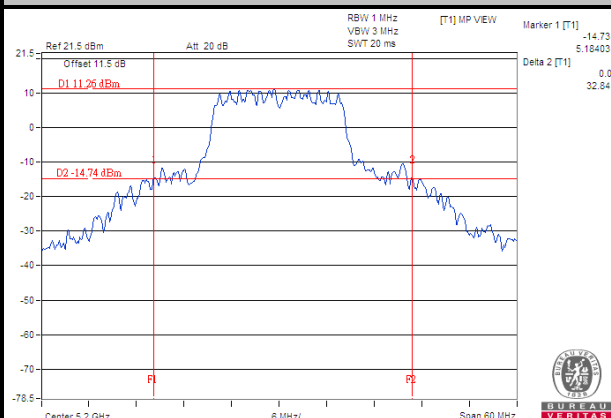
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	46.91	45.60
46	5230	78.21	77.62

802.11ax (HE80)

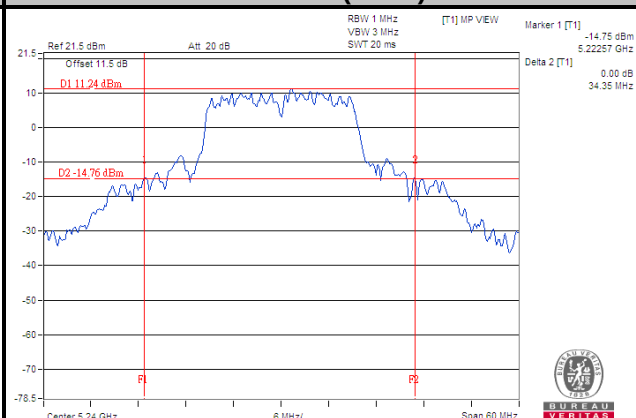
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	80.91	81.66

Spectrum Plot of Worst Value

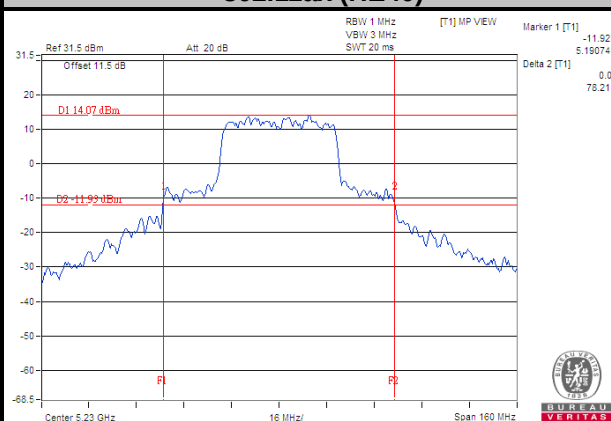
802.11a



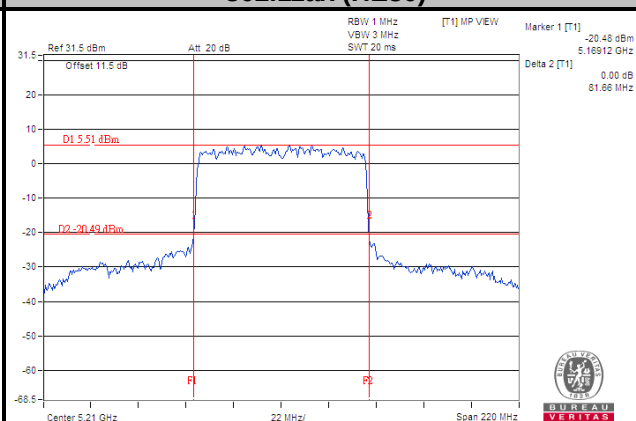
802.11ax (HE20)



802.11ax (HE40)

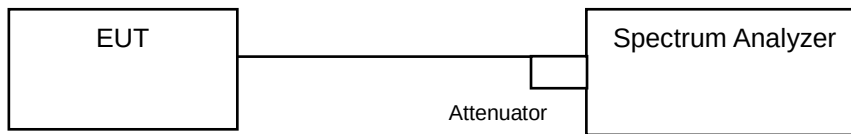


802.11ax (HE80)



4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1 % to 5 % of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to SAMPLE. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

4.4.4 Test Results

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.28	16.68
40	5200	17.40	16.68
48	5240	17.16	16.68
149	5745	18.72	16.80
157	5785	16.80	17.04
165	5825	17.76	17.04

802.11ax (HE20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	19.80	19.08
40	5200	19.68	19.20
48	5240	19.68	19.08
149	5745	19.92	19.08
157	5785	19.68	19.92
165	5825	19.92	20.28

802.11ax (HE40)

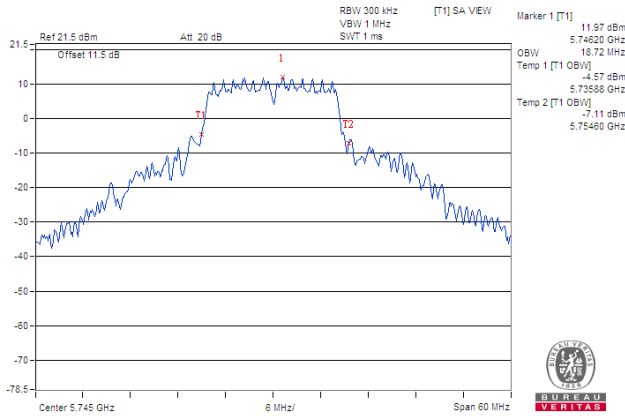
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	38.40	38.40
46	5230	38.99	39.36
151	5755	47.76	41.28
159	5795	47.76	40.56

802.11ax (HE80)

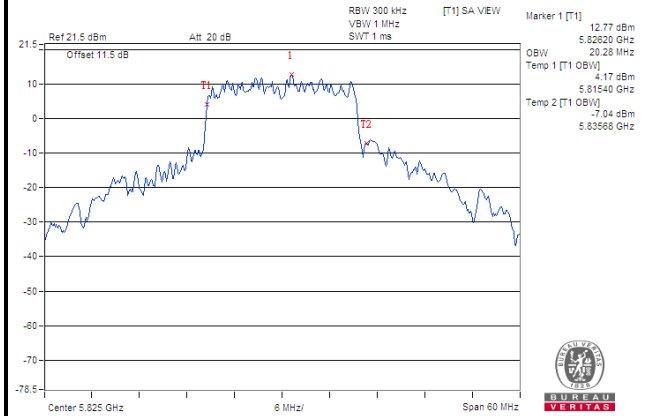
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	77.28	76.80
155	5775	77.76	77.28

Spectrum Plot of Worst Value

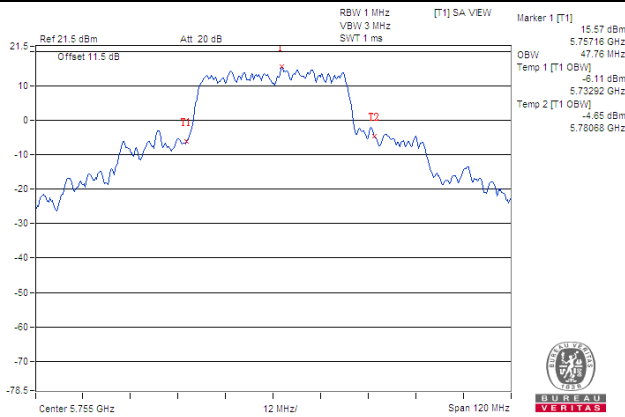
802.11a



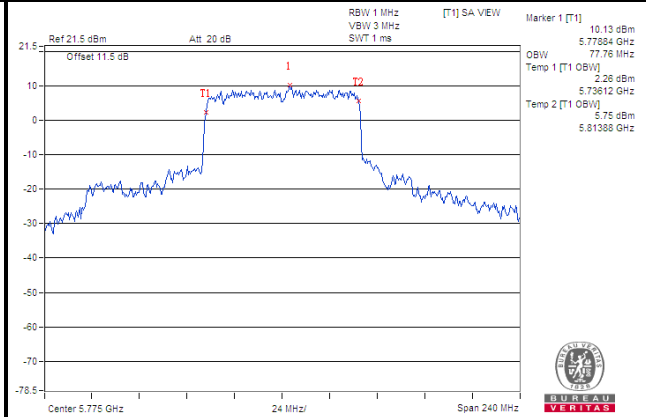
802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)

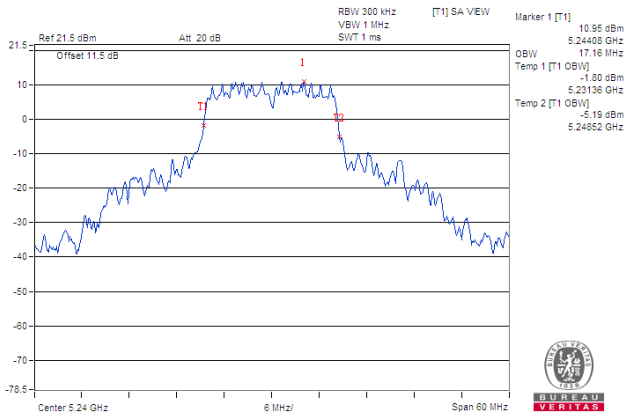


Chain 0

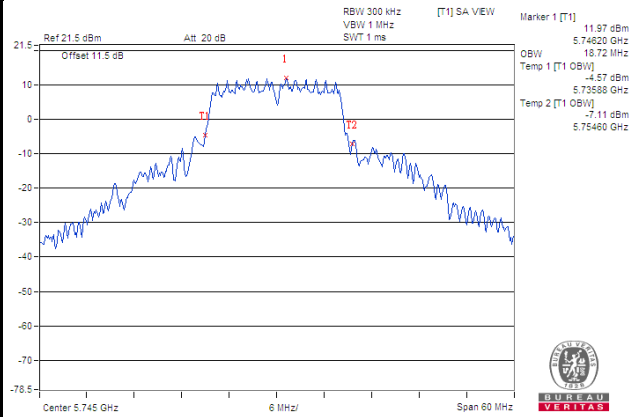
Spectrum Plot for Nearby DFS Band

802.11a

Ch 48 (5240 MHz)

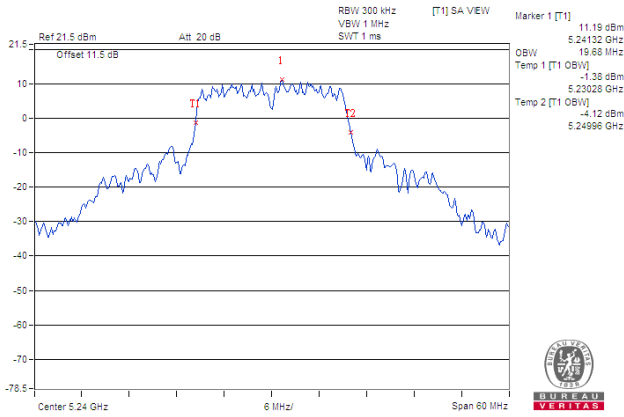


Ch 149 (5745 MHz)

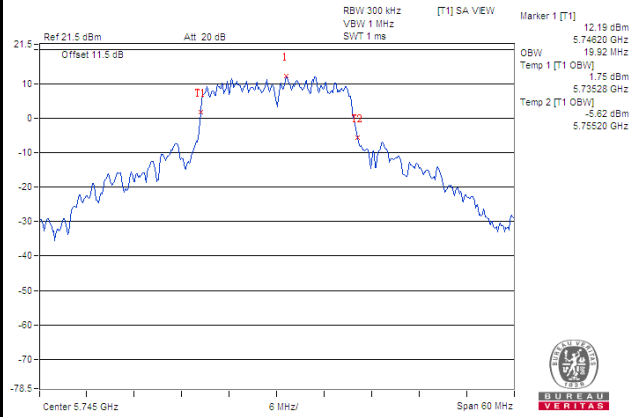


802.11ax (HE20)

Ch 48 (5240 MHz)

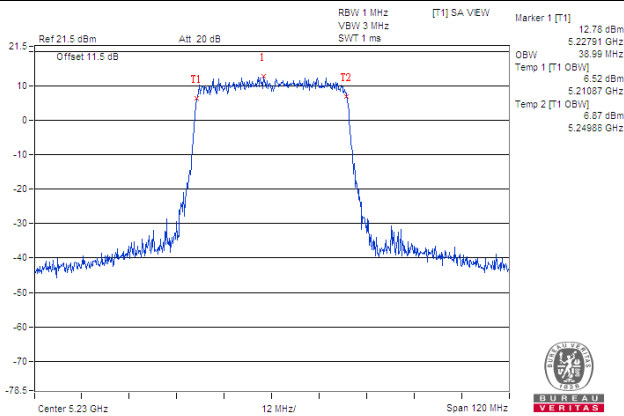


Ch 149 (5745 MHz)

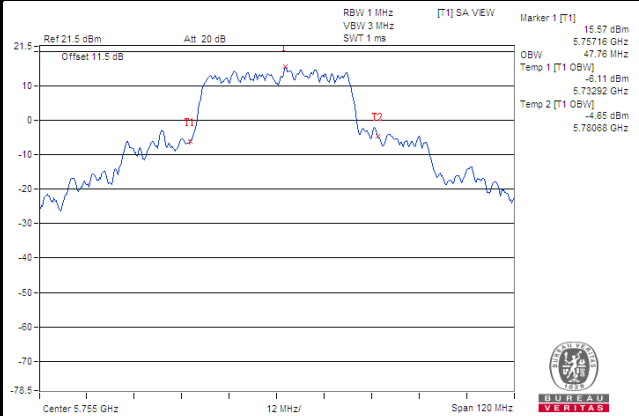


802.11ax (HE40)

Ch 46 (5230 MHz)

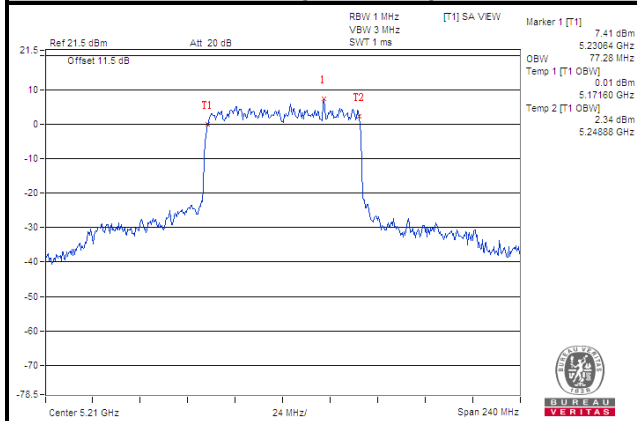


Ch 151 (5755 MHz)

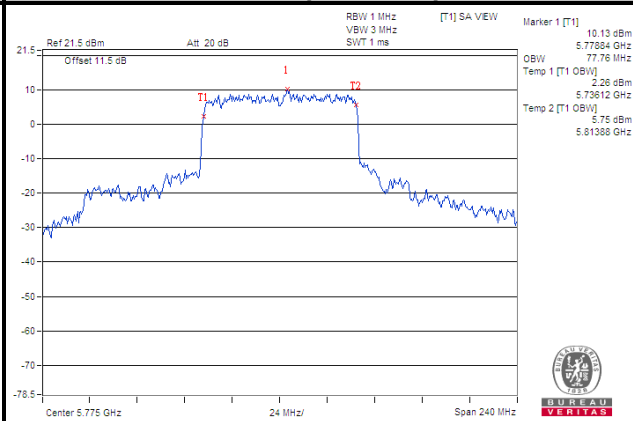


802.11ax (HE80)

Ch 42 (5210 MHz)



Ch 155 (5775 MHz)

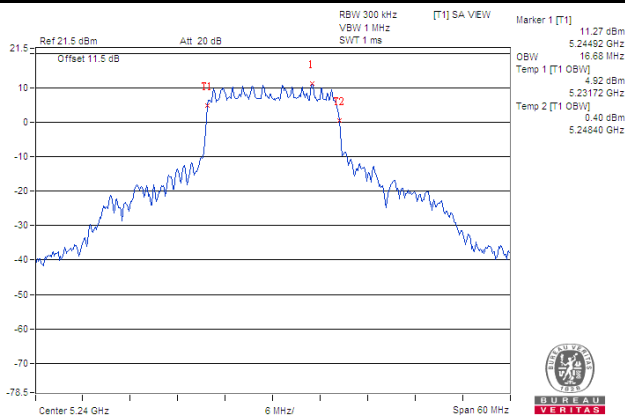


Chain 1

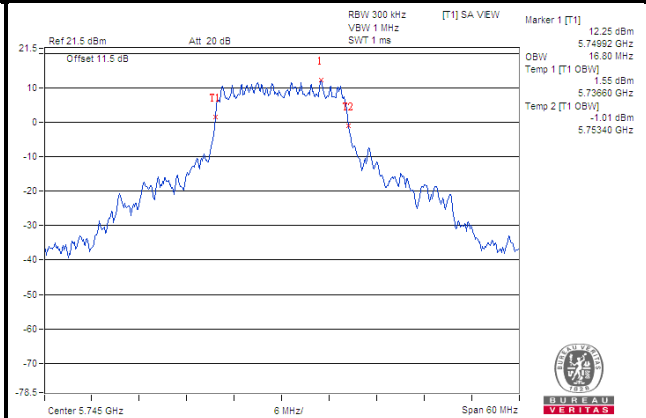
Spectrum Plot for Nearby DFS Band

802.11a

Ch 48 (5240 MHz)

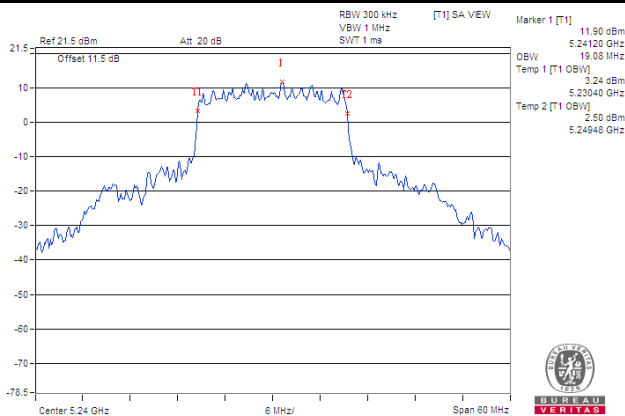


Ch 149 (5745 MHz)

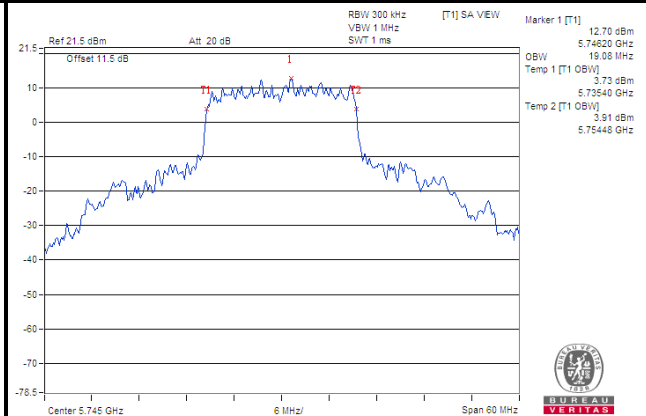


802.11ax (HE20)

Ch 48 (5240 MHz)

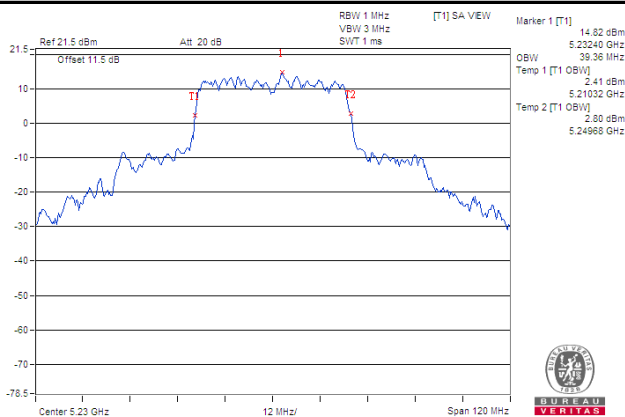


Ch 149 (5745 MHz)

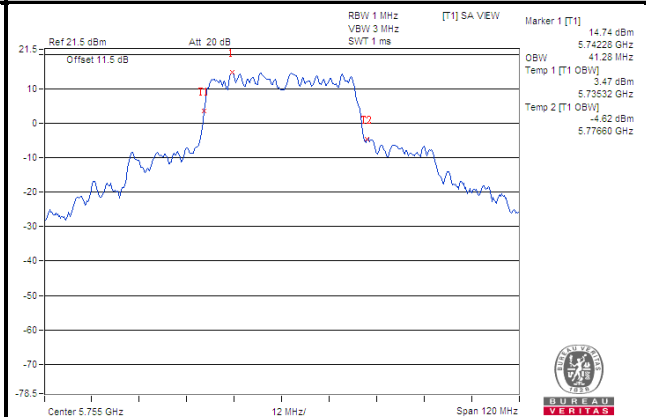


802.11ax (HE40)

Ch 46 (5230 MHz)

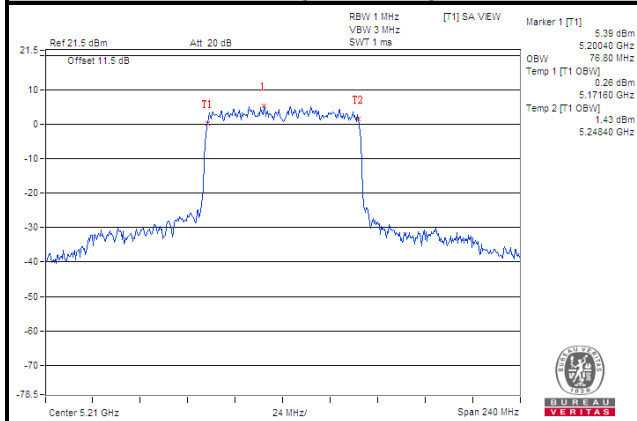


Ch 151 (5755 MHz)

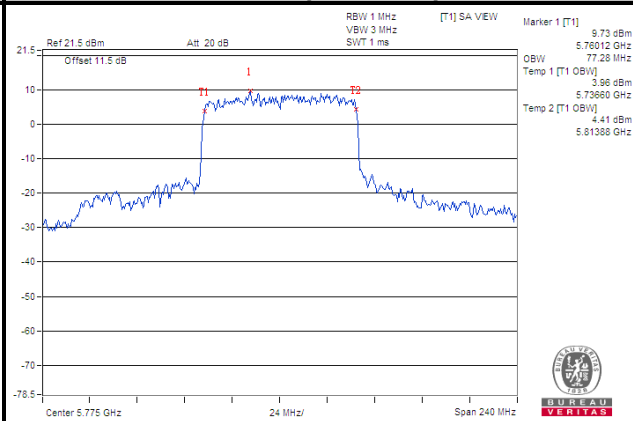


802.11ax (HE80)

Ch 42 (5210 MHz)



Ch 155 (5775 MHz)

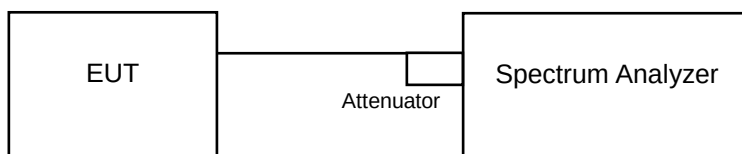


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

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 Procedures

For U-NII-1 band:

Using method SA-2 Duty cycle <98%

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW ≥ 3 RBW, Detector = RMS
3. Sweep time = auto, trigger set to “free run”.
4. Trace average at least 100 traces in power averaging mode.
5. Record the max value and add 10 log (1/duty cycle)

※ For U-NII-3: without duty cycle & Duty cycle >98 %

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW $\geq$ 1 RBW, 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 $BWCF = 10\log(500 \text{ kHz} / 300 \text{ kHz})$.
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 Conditions

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

4.5.7 Test Results

For U-NII-1 Band

802.11a

Channel	Frequency (MHz)	PSD (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	8.56	7.29	0.36	11.34	14.69	Pass
40	5200	8.60	8.48	0.36	11.91	14.69	Pass
48	5240	8.40	8.59	0.36	11.87	14.69	Pass

Note:

- 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.
- For U-NII-1 Band:**
Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 8.31 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $17 - (8.31 - 6) = 14.69 \text{ dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE20)

Channel	Frequency (MHz)	PSD (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	8.20	8.85	0.19	11.73	14.69	Pass
40	5200	8.23	8.72	0.19	11.68	14.69	Pass
48	5240	8.10	8.57	0.19	11.54	14.69	Pass

Note:

- 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.
- For U-NII-1 Band:**
Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 8.31 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $17 - (8.31 - 6) = 14.69 \text{ dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

Channel	Frequency (MHz)	PSD (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
38	5190	0.54	0.01	0.21	3.50	14.69	Pass
46	5230	5.17	4.73	0.21	8.17	14.69	Pass

Note:

- 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.
- For U-NII-1 Band:**
Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 8.31 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $17 - (8.31 - 6) = 14.69 \text{ dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE80)

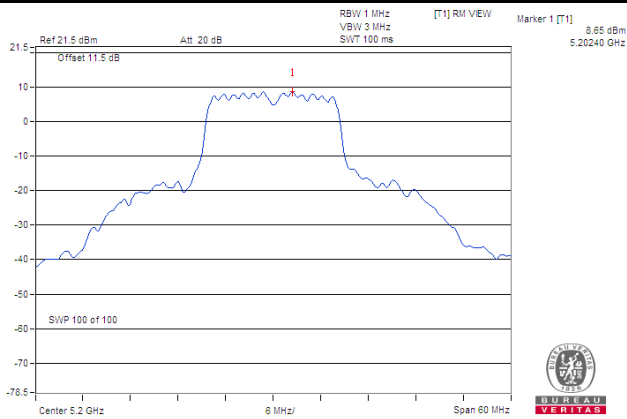
Channel	Frequency (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
42	5210	-3.42	-3.44	-0.42	14.69	Pass

Note:

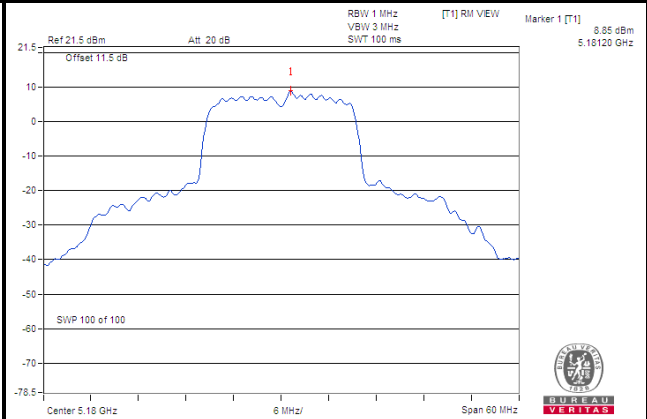
- Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1 Band:**
Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 8.31 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $17 - (8.31 - 6) = 14.69 \text{ dBm}$.

Spectrum Plot of Worst Value

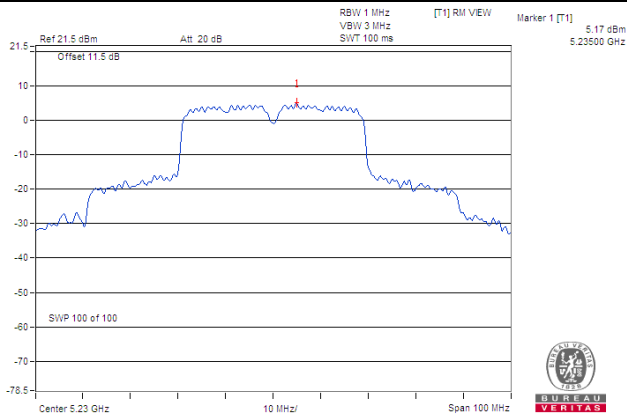
802.11a



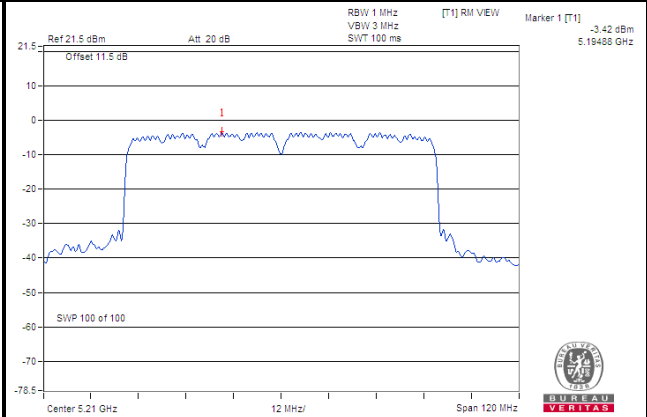
802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)



For U-NII-3 Band

802.11a

TX Chain	Channel	Frequency (MHz)	PSD w/o Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	149	5745	4.9	7.12	3.01	0.36	10.49	27.69	Pass
	157	5785	3.86	6.08	3.01	0.36	9.45	27.69	Pass
	165	5825	4.67	6.89	3.01	0.36	10.26	27.69	Pass
1	149	5745	4.31	6.53	3.01	0.36	9.9	27.69	Pass
	157	5785	3.43	5.65	3.01	0.36	9.02	27.69	Pass
	165	5825	4.55	6.77	3.01	0.36	10.14	27.69	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 8.31 > 6 \text{ dBi}$, so the power density limit shall be reduced to $30 - (8.31 - 6) = 27.69 \text{ dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE20)

TX Chain	Channel	Frequency (MHz)	PSD		10 log (N=2) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	149	5745	3.26	5.48	3.01	0.19	8.68	27.69	Pass
	157	5785	3.35	5.57	3.01	0.19	8.77	27.69	Pass
	165	5825	3.51	5.73	3.01	0.19	8.93	27.69	Pass
1	149	5745	3.8	6.02	3.01	0.19	9.22	27.69	Pass
	157	5785	4	6.22	3.01	0.19	9.42	27.69	Pass
	165	5825	4.25	6.47	3.01	0.19	9.67	27.69	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 8.31 > 6 \text{ dBi}$, so the power density limit shall be reduced to $30 - (8.31 - 6) = 27.69 \text{ dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

TX Chain	Channel	Frequency (MHz)	PSD		10 log (N=2) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	151	5755	-1.24	0.98	3.01	0.21	4.2	27.69	Pass
	159	5795	-1.26	0.96	3.01	0.21	4.18	27.69	Pass
1	151	5755	-1.66	0.56	3.01	0.21	3.78	27.69	Pass
	159	5795	-1.56	0.66	3.01	0.21	3.88	27.69	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 8.31 > 6 \text{ dBi}$, so the power density limit shall be reduced to $30 - (8.31 - 6) = 27.69 \text{ dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE80)

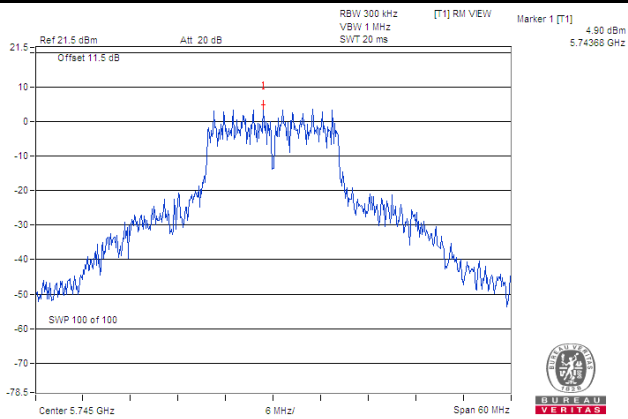
TX Chain	Channel	Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)				
0	155	5775	-7.49	-5.27	3.01	-2.26	27.69	Pass
1	155	5775	-8.03	-5.81	3.01	-2.8	27.69	Pass

Note:

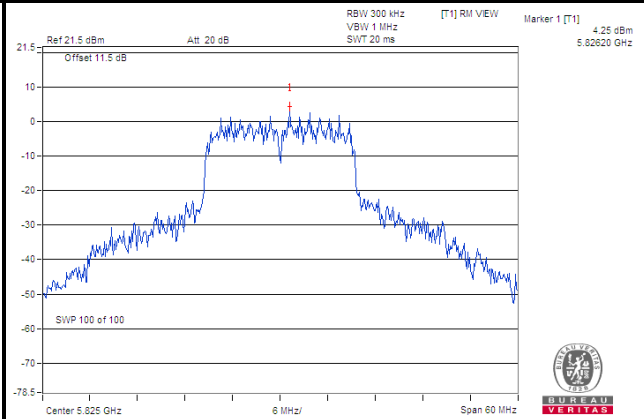
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 8.31 > 6 \text{ dBi}$, so the power density limit shall be reduced to $30 - (8.31 - 6) = 27.69 \text{ dBm}$.

Spectrum Plot of Worst Value

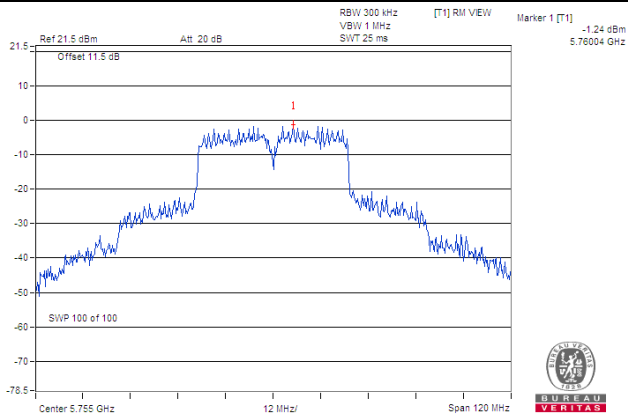
802.11a



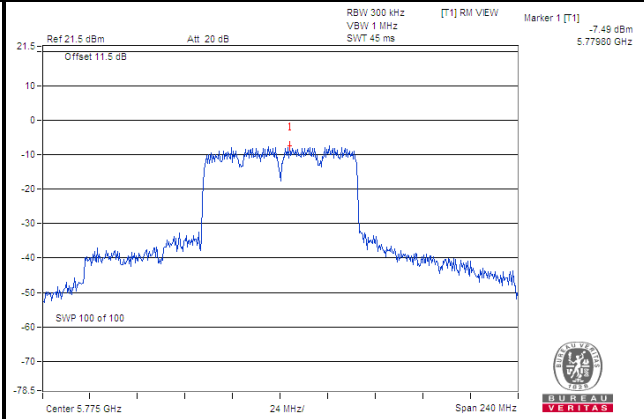
802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)

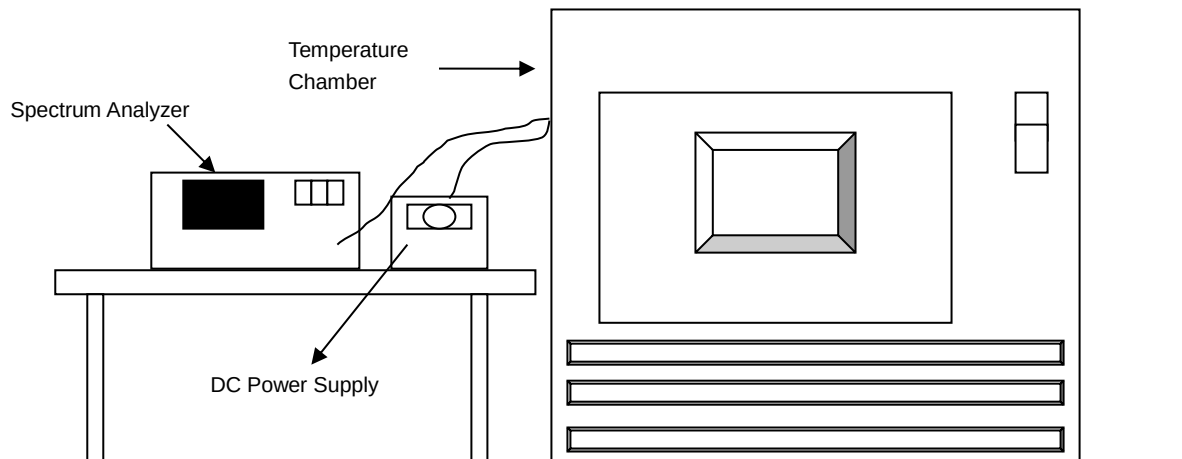


4.6 Frequency Stability

4.6.1 Limit of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.
- Repeat step (d) with the temperature chamber set to the next desired temperature until measurements down to the lowest specified temperature have been completed.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

Set the EUT transmit at un-modulation mode to test frequency stability.

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
40	120	5180.0236	PASS	5180.0219	PASS	5180.0246	PASS	5180.0221	PASS
30	120	5179.9892	PASS	5179.9847	PASS	5179.9889	PASS	5179.9881	PASS
20	120	5180.0022	PASS	5180.0027	PASS	5180.0036	PASS	5180.005	PASS
10	120	5180.0183	PASS	5180.0155	PASS	5180.0182	PASS	5180.0194	PASS
0	120	5180.0032	PASS	5180.0052	PASS	5180.0047	PASS	5180.0035	PASS

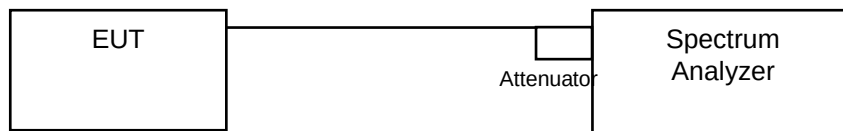
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	138	5180.0032	PASS	5180.0021	PASS	5180.0027	PASS	5180.0056	PASS
	120	5180.0022	PASS	5180.0027	PASS	5180.0036	PASS	5180.005	PASS
	102	5180.0016	PASS	5180.0033	PASS	5180.0033	PASS	5180.0041	PASS

4.7 6 dB Bandwidth Measurement

4.7.1 Limits of 6 dB Bandwidth Measurement

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

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

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	15.24	15.23	0.5	Pass
157	5785	15.24	15.23	0.5	Pass
165	5825	15.57	15.24	0.5	Pass

802.11ax (HE20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.77	17.90	0.5	Pass
157	5785	17.79	17.91	0.5	Pass
165	5825	17.79	17.91	0.5	Pass

802.11ax (HE40)

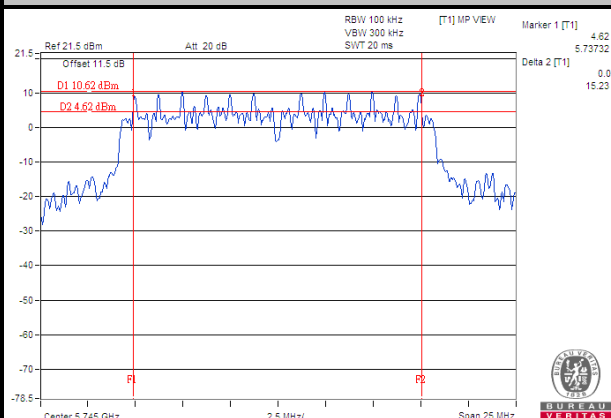
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	36.54	36.61	0.5	Pass
159	5795	36.53	36.54	0.5	Pass

802.11ax (HE80)

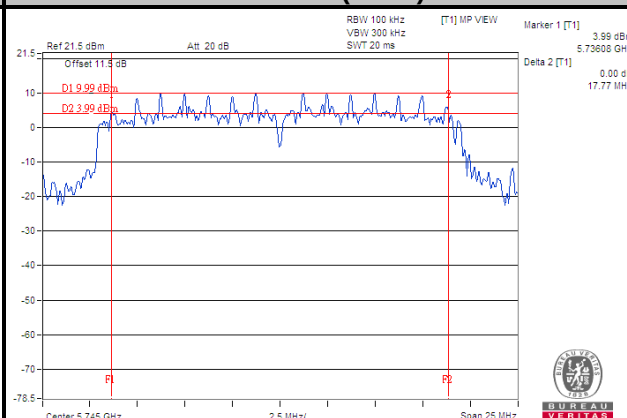
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	75.48	75.62	0.5	Pass

Spectrum Plot of Worst Value

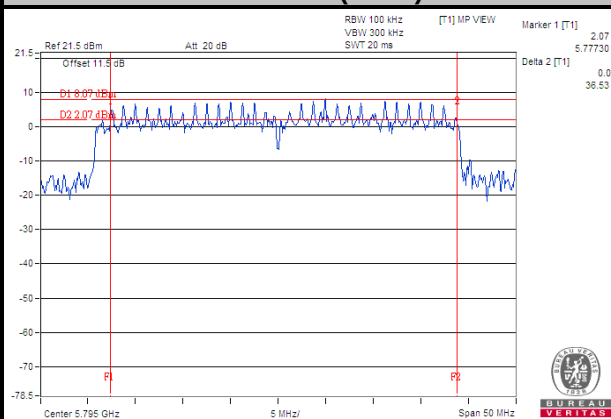
802.11a



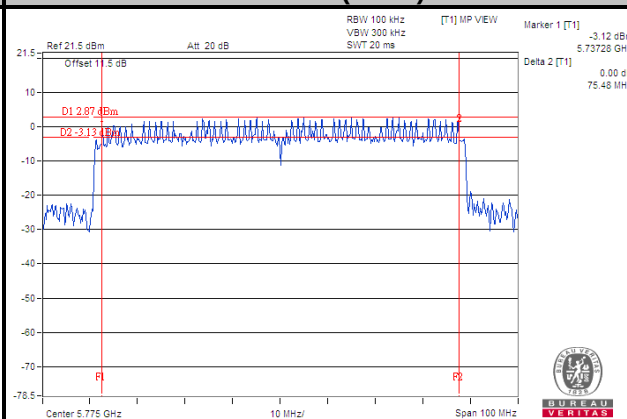
802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)



5 Pictures of Test Arrangements

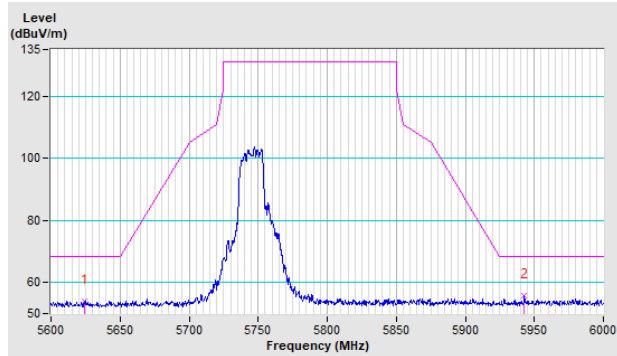
Please refer to the attached file (Test Setup Photo).

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

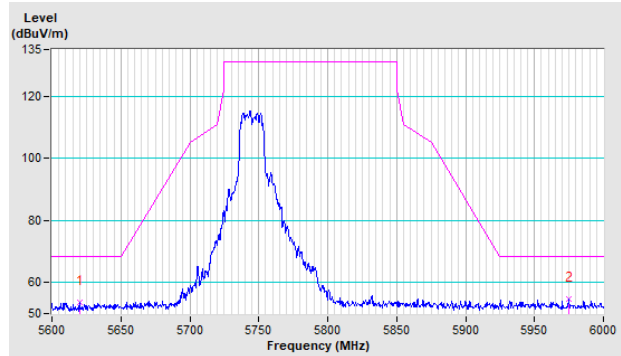
802.11a

CH 149 5745 MHz

Horizontal

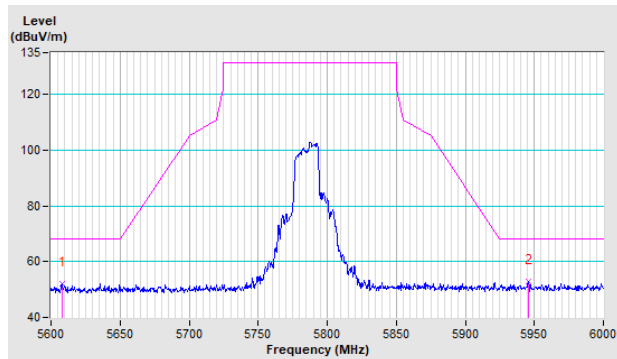


Vertical

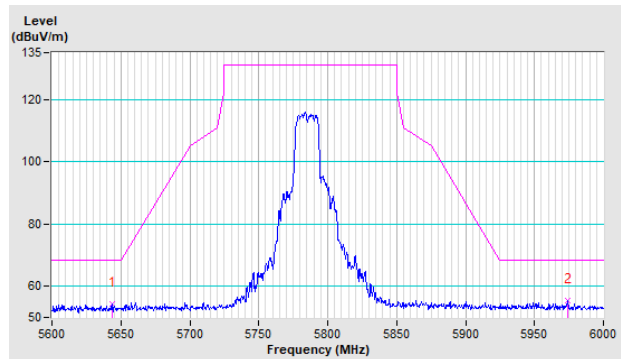


CH 157 5785 MHz

Horizontal

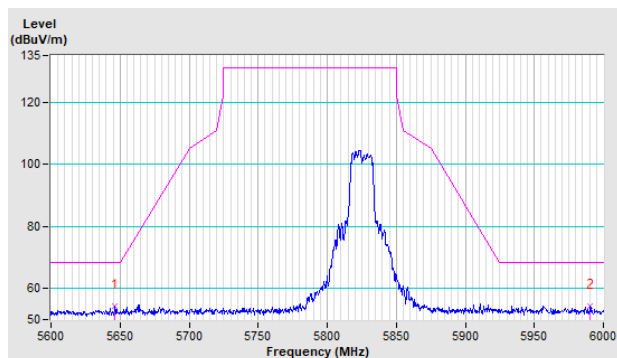


Vertical

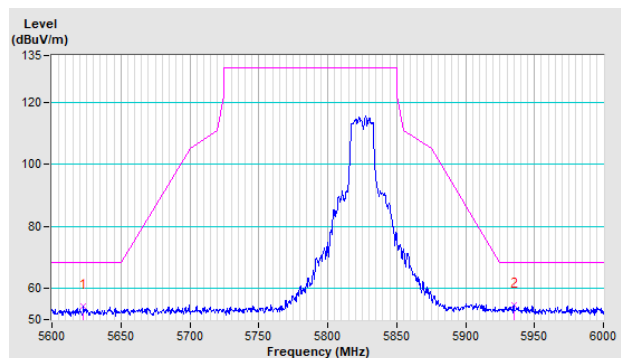


CH 165 5825 MHz

Horizontal



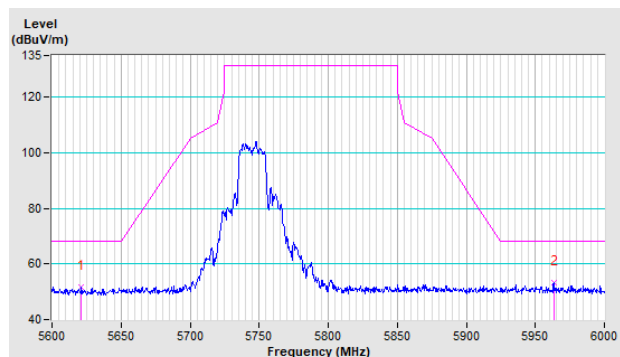
Vertical



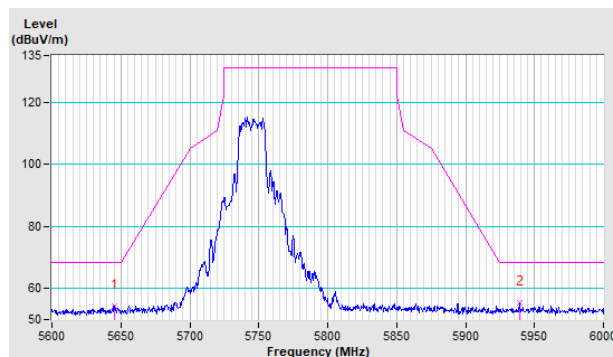
802.11ax (HE20)

CH 149 5745 MHz

Horizontal

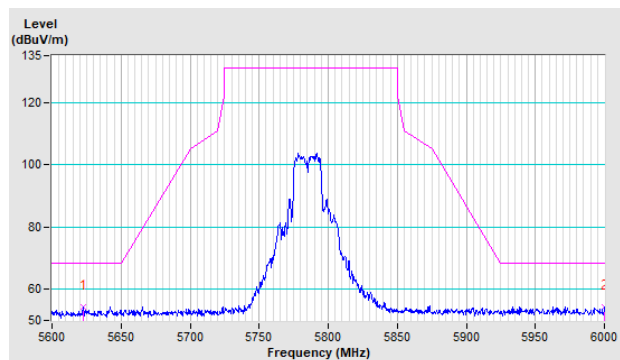


Vertical

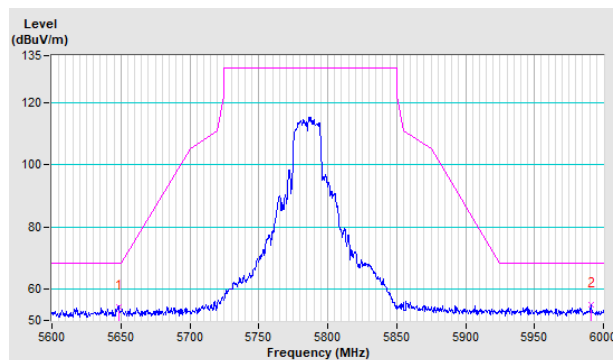


CH 157 5785 MHz

Horizontal

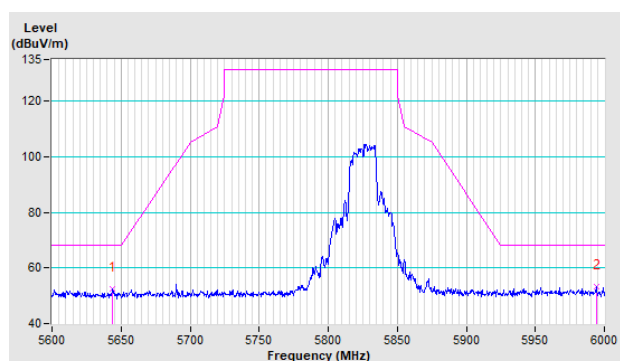


Vertical

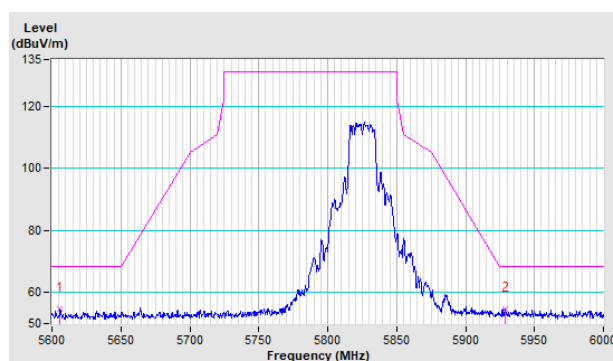


CH 165 5825 MHz

Horizontal



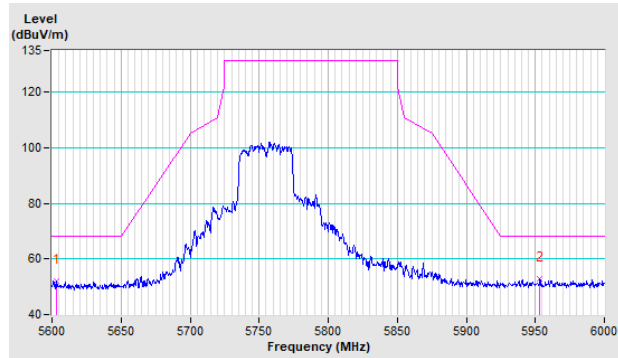
Vertical



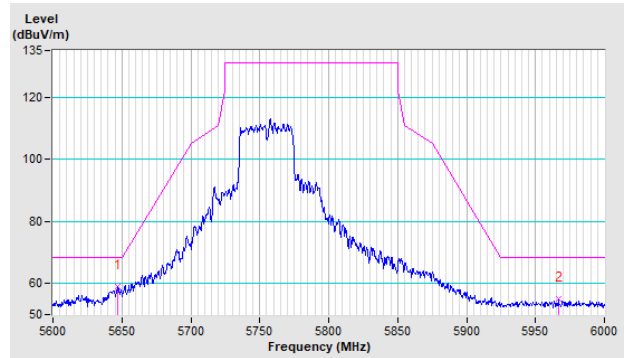
802.11ax (HE40)

CH 151 5755 MHz

Horizontal

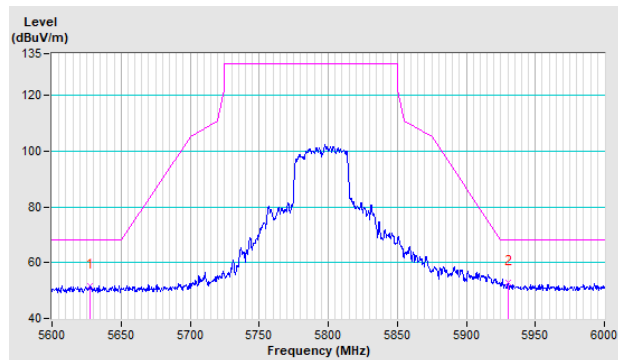


Vertical

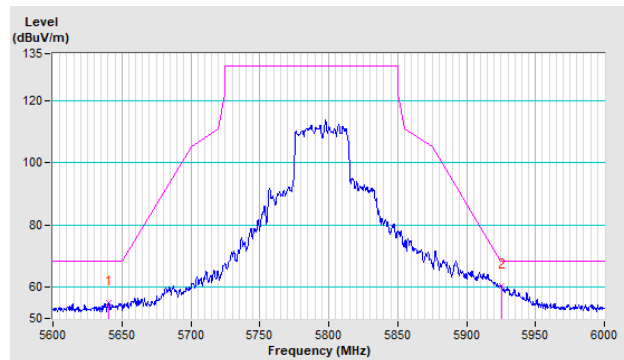


CH 159 5795 MHz

Horizontal



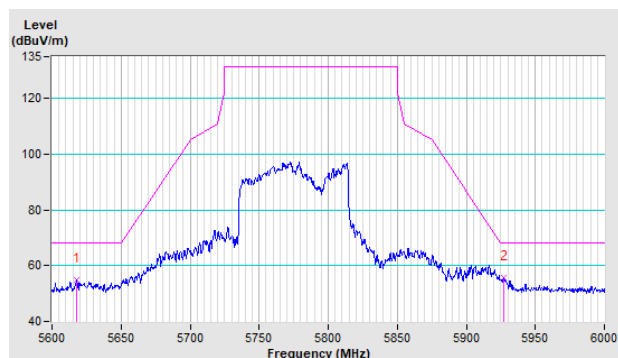
Vertical



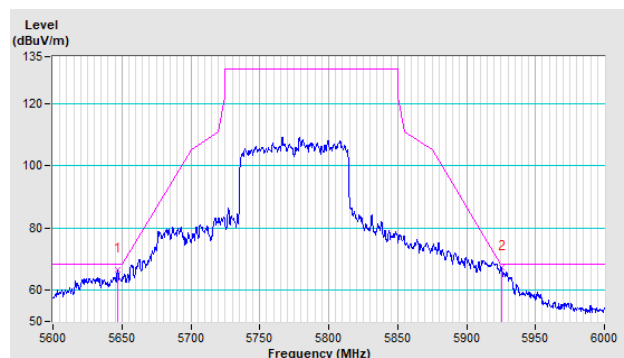
802.11ax (HE80)

CH 155 5775 MHz

Horizontal

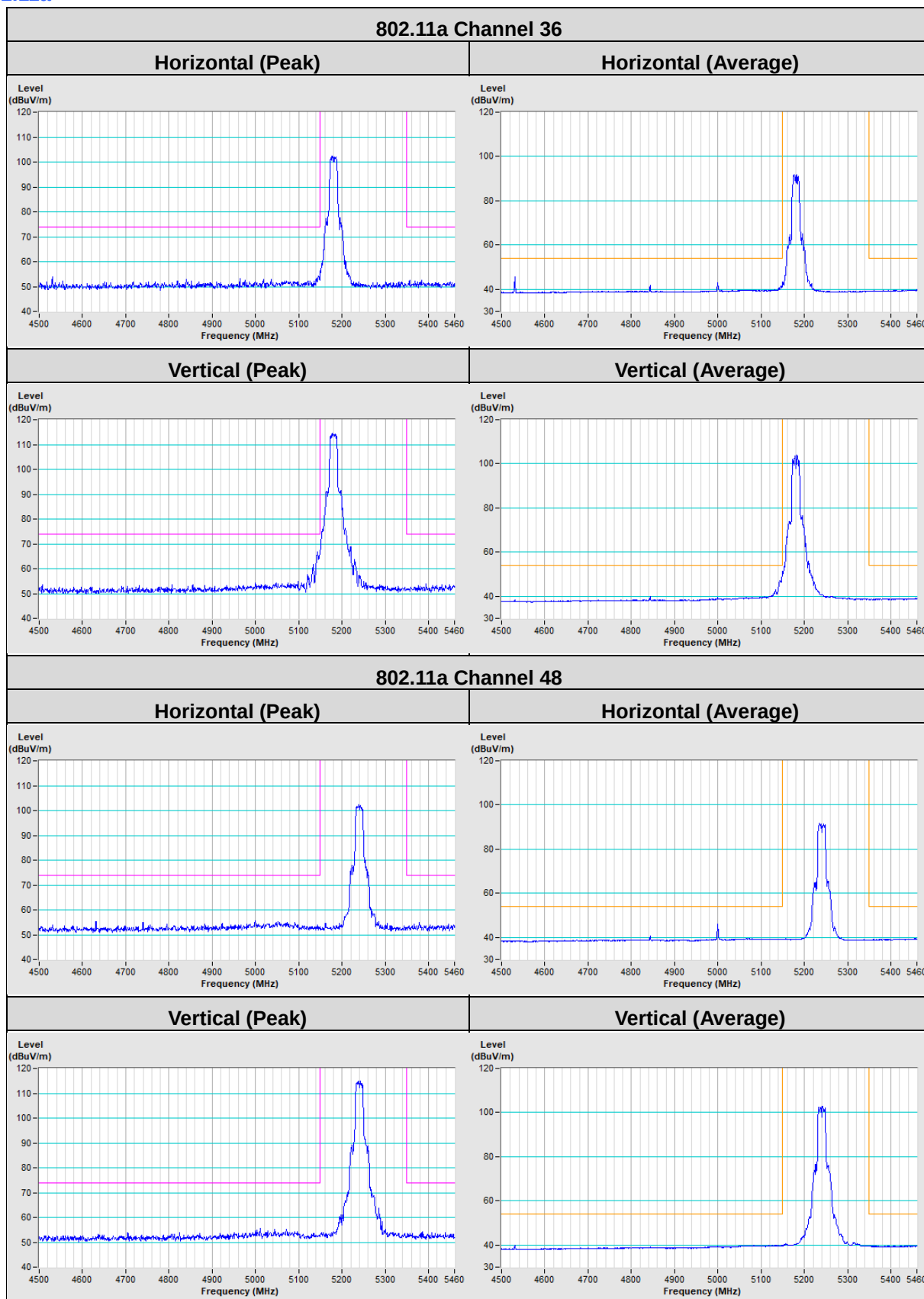


Vertical

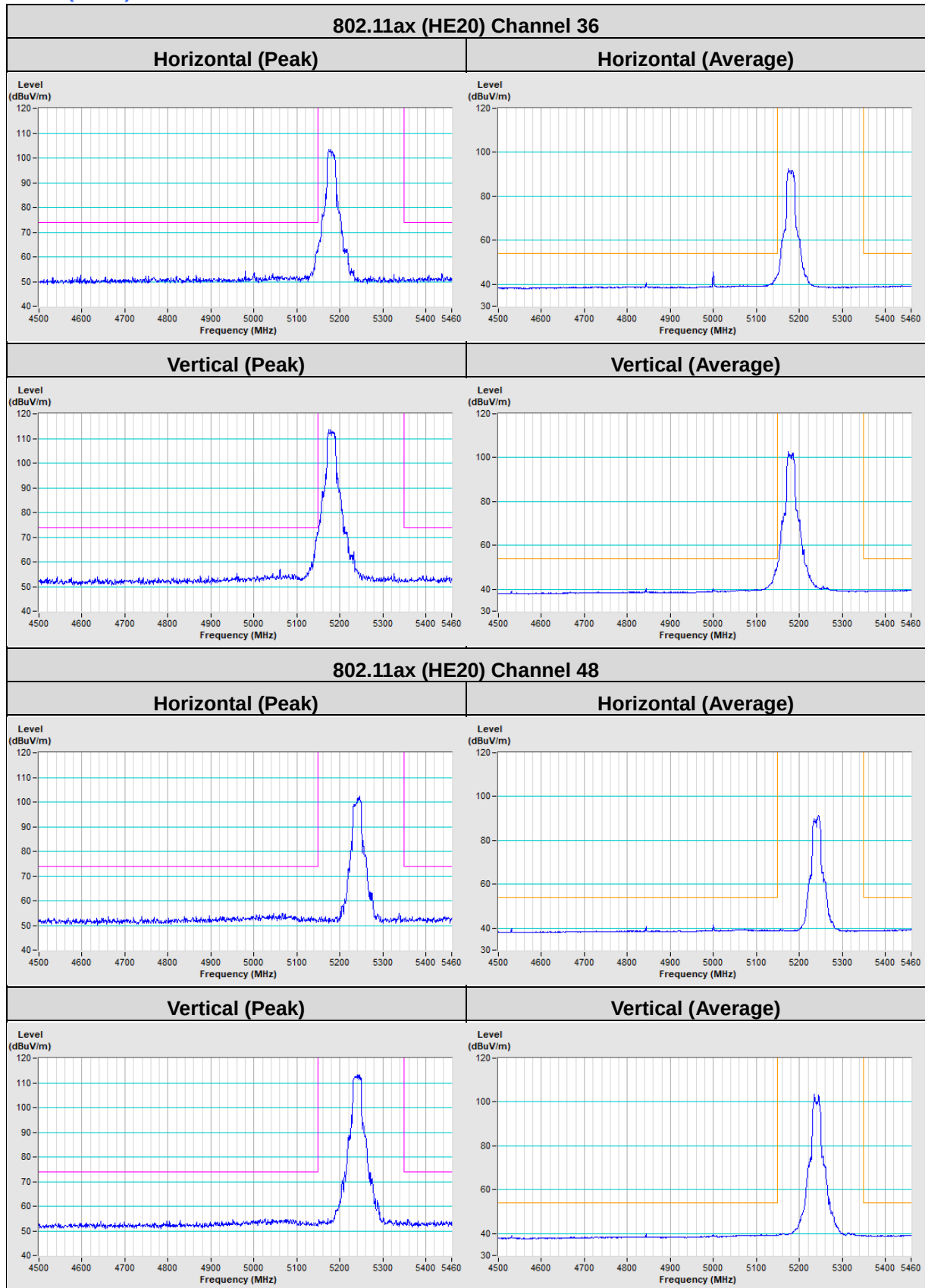


Annex B- Band Edge Measurement

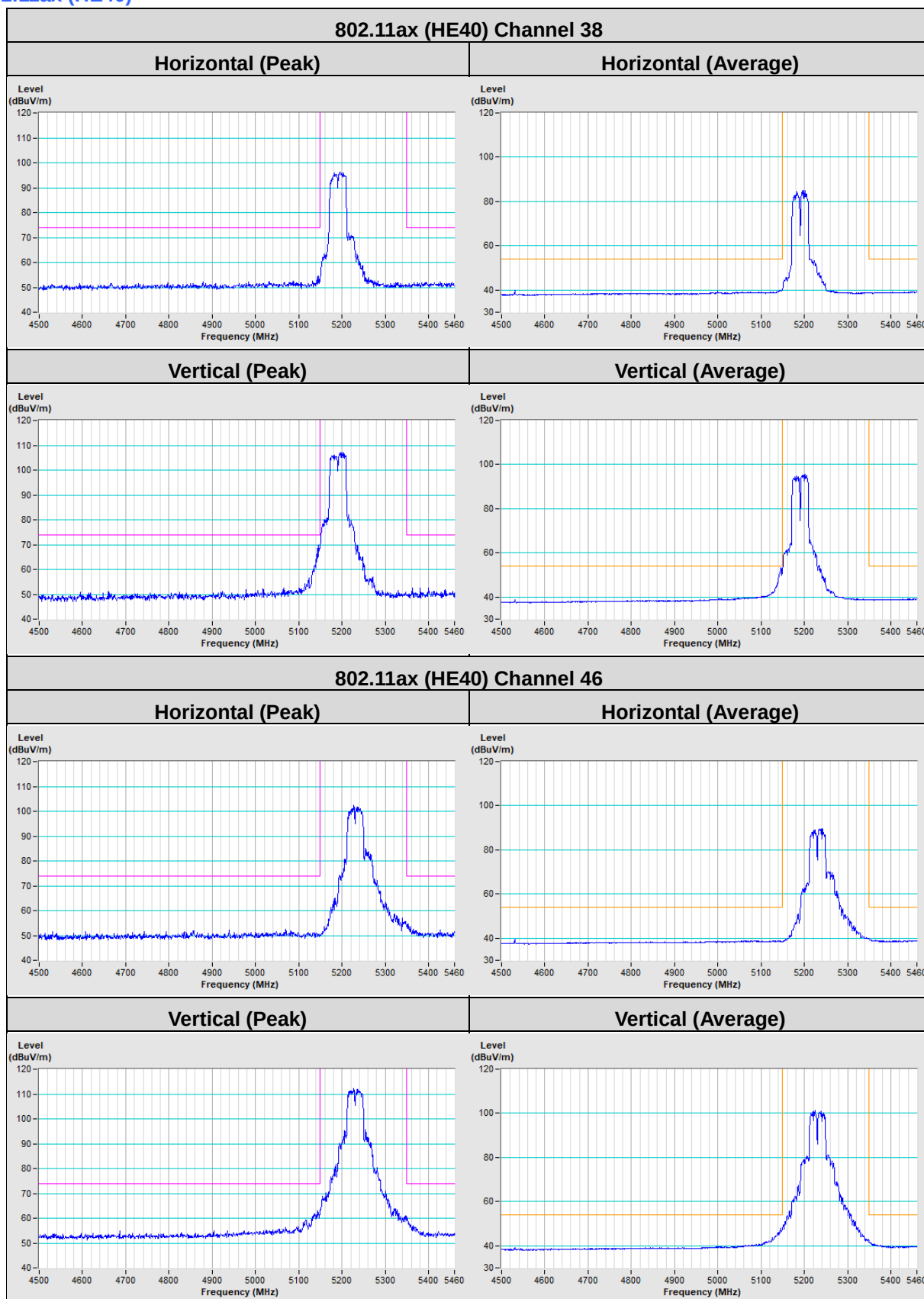
802.11a



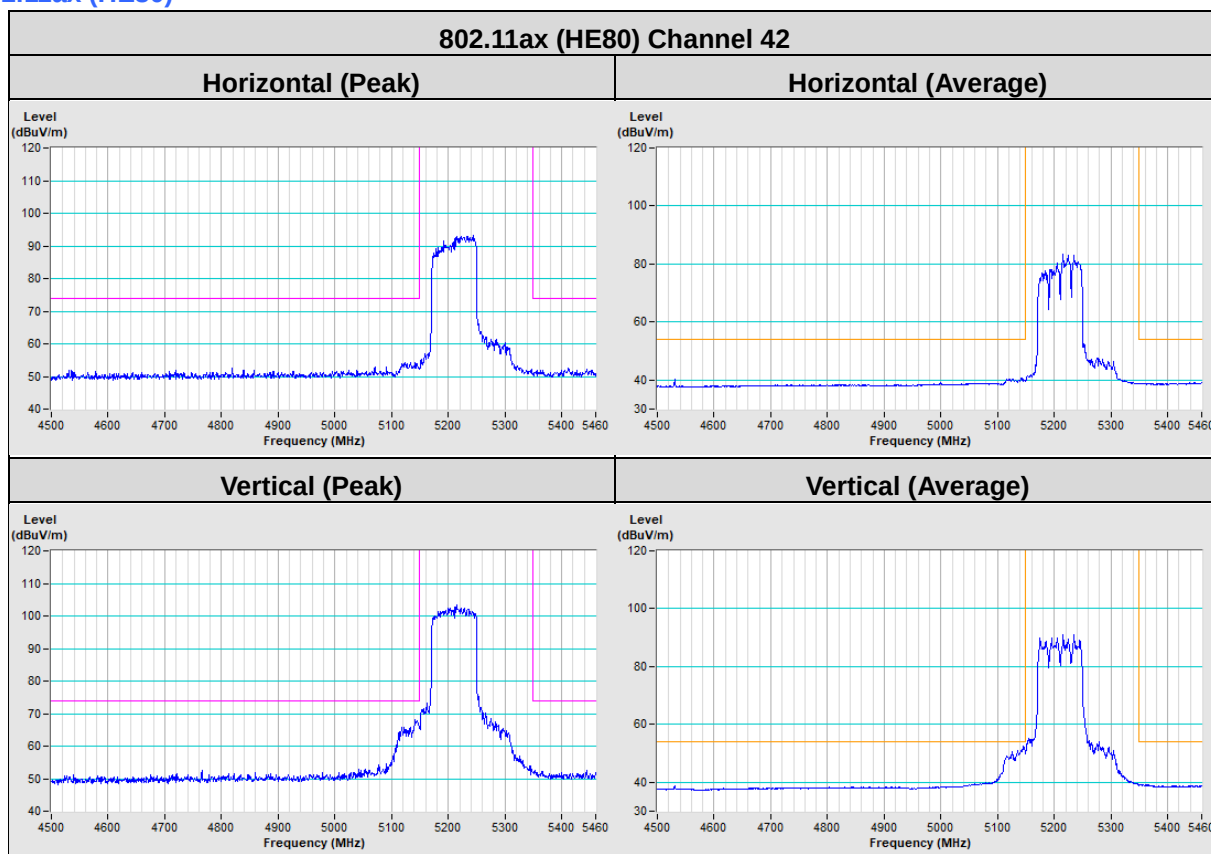
802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)



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.

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