

FCC Test Report

Report No.: RFBEMV-WTW-P20070304-1

FCC ID: XCNUBC1329

Test Model: UBC1329

Received Date: July 15, 2020

Test Date: July 18 to 24, 2020

Issued Date: Aug. 06, 2020

Applicant: Ubee Interactive Corp.

Address: 10F-1, No. 5, Taiyuan 1st St. Jhubei Ci, Hsinchu County 302, Taiwan ,
R.O.C.

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwa.

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan.

**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RFBEMV-WTW-P20070304-1	Original release.	Aug. 06, 2020

1 Certificate of Conformity

Product: DOCSIS 3.1 Advanced WiFi 6 Voice Gateway

Brand: Ubee

Test Model: UBC1329

Sample Status: Mass product

Applicant: Ubee Interactive Corp.

Test Date: July 18 to 24, 2020

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Cherry Chuo , **Date:** Aug. 06, 2020
Cherry Chuo / Specialist

Approved by : Clark Lin , **Date:** Aug. 06, 2020
Clark Lin / Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -15.62dB at 0.31016MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5150.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF) not a standard connector.

Note:

1. For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOB test plots were recorded in Annex A.
2. For U-NII-1 band compliance with rule 15.407(b) of the band-edge items, the test plots were recorded in Annex B. Test Procedures refer to report 4.1.3.
3. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.9 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.1 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.1 dB
	18GHz ~ 40GHz	5.3 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	DOCSIS 3.1 Advanced WiFi 6 Voice Gateway
Brand	Ubee
Test Model	UBC1329
Status of EUT	Mass product
Power Supply Rating	12Vdc from adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT20/40 in 2.4GHz 1024QAM for OFDMA in 11ax HE mode
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: up to 11 Mbps 802.11a/g: up to 54 Mbps 802.11n: up to 600 Mbps 802.11ac: up to 3466.7 Mbps 802.11ax: up to 4803.9 Mbps
Operating Frequency	2.4GHz: 2.412GHz ~ 2.462GHz 5GHz: 5.18 ~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	2.4GHz: 802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20): 11 802.11n (HT40), VHT40, 802.11ax (HE40): 7 5GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 9 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 4 802.11ac (VHT80), 802.11ax (HE80): 2
Output Power	CDD Mode: 2.412 ~ 2.462 GHz: 960.327 mW 5.18 ~ 5.24 GHz: 963.474 mW 5.745 ~ 5.825 GHz: 971.53 mW Beamforming Mode: 2.412 ~ 2.462 GHz: 596.914 mW 5.18 ~ 5.24 GHz: 564.943 mW 5.745 ~ 5.825 GHz: 640.463 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x1
Data Cable Supplied	RJ-45 Cable (Unshielded, 1.5m)

Note:

1. The EUT has two radios as following table:

Radio 1	Radio 2
WLAN 2.4GHz	WLAN 5GHz

2. Simultaneously transmission condition.

Condition	Technology	
1	WLAN 2.4GHz	WLAN 5GHz

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

3. The EUT power needs to be supplied from a power adapter, the information is as below table:

Brand	Model No.	Spec.
DVE	DSA-36PFN-12 FUS 120300	Input: 100-240Vac, 1.0A, 50/60Hz Output: 12Vdc, 3.0A DC output cable (Unshielded, 1.5 m)

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

Antenna NO.	RF Chain NO. ex. Chain0/1	Frequency Range (GHz)	Antenna Gain (dBi)	Antenna Type	Connector Type
1	2G Chain 0 / 5G Chain 2	2.4~2.4835	3.79	PCB	i-pex(MHF)
		5.15~5.25	1.61		
		5.725~5.85	1.01		
2	5G Chain3	2.4~2.4835	NA	PCB	i-pex(MHF)
		5.15~5.25	2.06		
		5.725~5.85	1.82		
3	2G Chain 1 / 5G Chain 1	2.4~2.4835	3.07	PCB	i-pex(MHF)
		5.15~5.25	2.76		
		5.725~5.85	1.24		
4	2G Chain 2 / 5G Chain 0	2.4~2.4835	3.5	PCB	i-pex(MHF)
		5.15~5.25	3.26		
		5.725~5.85	3.36		

5. The EUT incorporates a MIMO function:

2.4GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11b	3TX	3RX
802.11g	3TX	3RX
802.11n (HT20)	3TX	3RX
802.11n (HT40)	3TX	3RX
VHT20	3TX	3RX
VHT40	3TX	3RX
802.11ax (HE20)	3TX	3RX
802.11ax (HE40)	3TX	3RX
5GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11a	4TX	4RX
802.11n (HT20)	4TX	4RX
802.11n (HT40)	4TX	4RX
802.11ac (VHT20)	4TX	4RX
802.11ac (VHT40)	4TX	4RX
802.11ac (VHT80)	4TX	4RX
802.11ax (HE20)	4TX	4RX
802.11ax (HE40)	4TX	4RX
802.11ax (HE80)	4TX	4RX

Note:

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

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

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

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

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

Channel	Frequency
42	5210 MHz

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

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

Channel	Frequency
155	5775 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where **RE≥1G**: Radiated Emission above 1GHz
PLC: Power Line Conducted Emission

RE<1G: Radiated Emission below 1GHz
APCM: Antenna Port Conducted Measurement

Radiated Emission Test (Above 1GHz):

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

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

Radiated Emission Test (Below 1GHz):

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (HE40)	5180-5240 5745-5825	38 to 46 151 to 159	46	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.

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (HE40)	5180-5240 5745-5825	38 to 46 151 to 159	46	OFDMA	BPSK	MCS0

Antenna Port Conducted Measurement:

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

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

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

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE $\geq$ 1G	25deg. C, 75%RH	120Vac, 60Hz	Kevin Ko
RE $<$ 1G	28deg. C, 68%RH	120Vac, 60Hz	Kevin Ko
PLC	25deg. C, 75%RH	120Vac, 60Hz	Kevin Ko
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

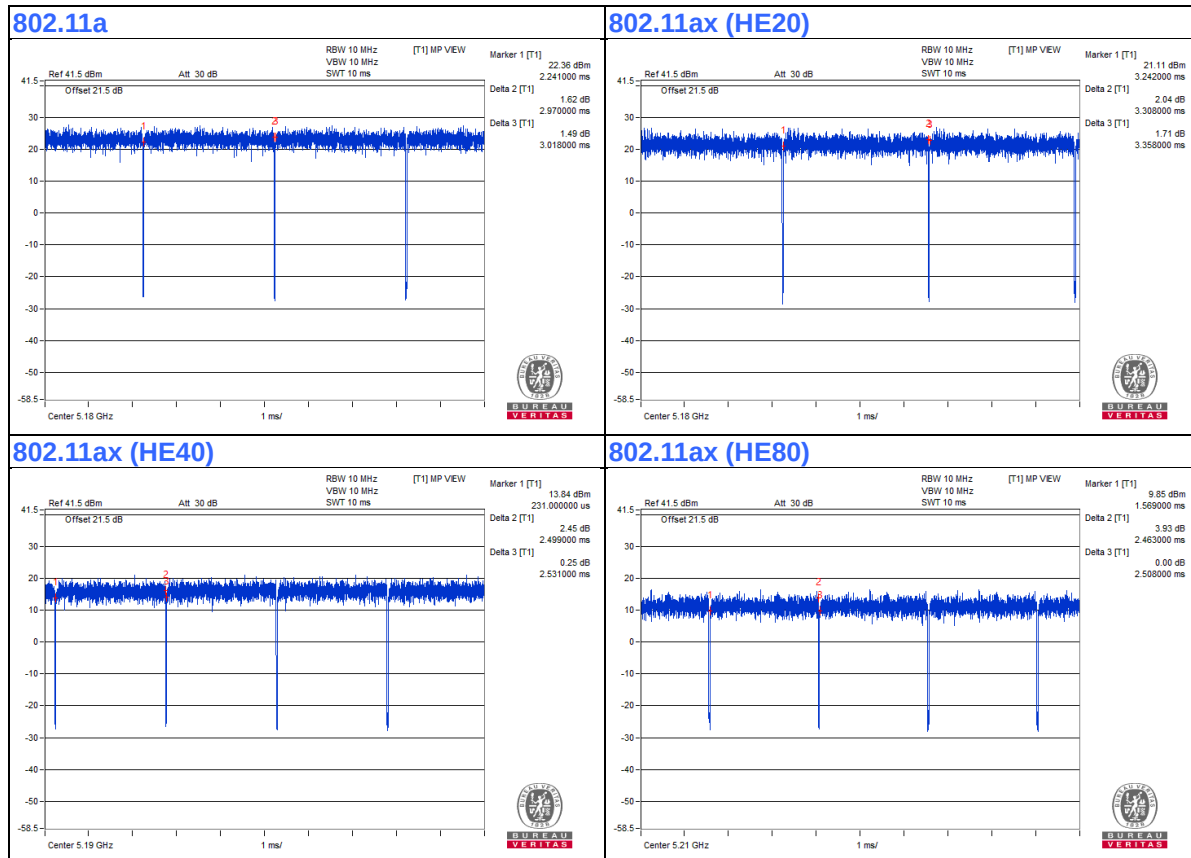
If duty cycle of test signal is $\geq 98\%$, duty factor is not required.

802.11a: Duty cycle = 2.97 ms / 3.018 ms = 0.984

802.11ax (HE20): Duty cycle = 3.308 ms / 3.358 ms = 0.985

802.11ax (HE40): Duty cycle = 2.499 ms / 2.531 ms = 0.987

802.11ax (HE80): Duty cycle = 2.463 ms / 2.508 ms = 0.982



3.4 Description of Support Units

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

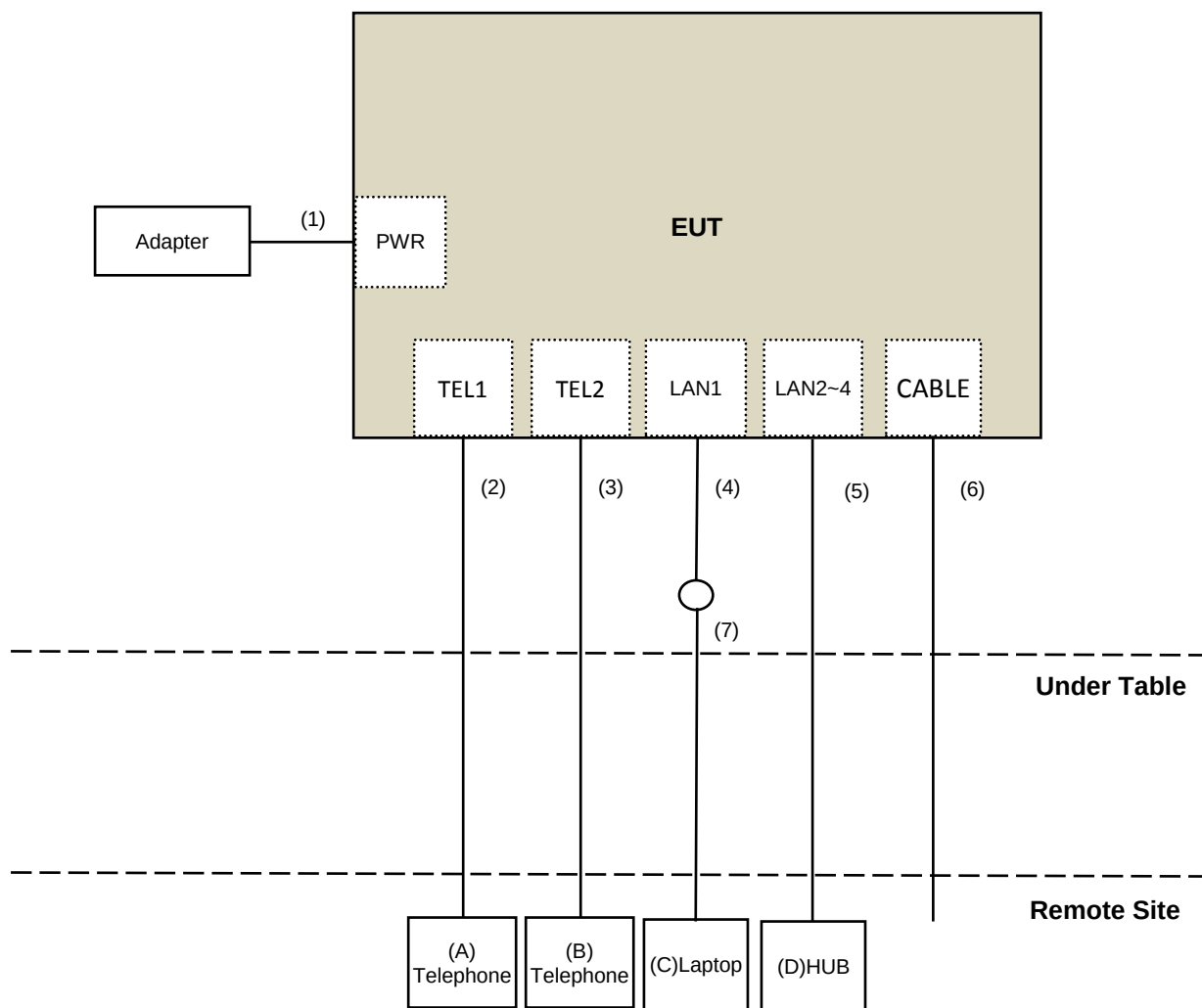
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Telephone	WONDER	WD-303	7C17KA 04011	NA	Provided by Lab
B.	Telephone	WONDER	WD-303	7C17KA 05211	NA	Provided by Lab
C.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
D.	HUB	ZyXEL	GS1100-16	S150H44000046	FCC DoC	Provided by Lab

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.4	No	0	Supplied by client
2.	RJ11 Cable	1	10	No	0	Provided by Lab
3.	RJ11 Cable	1	10	No	0	Provided by Lab
4.	RJ45 Cable	1	1	No	0	Supplied by client
5.	RJ45 Cable	3	10	No	0	Provided by Lab
6.	Coaxial Cable	1	10	Yes	0	Provided by Lab
7.	RJ45 Cable	1	10	No	0	Provided by Lab

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard and references

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

Test Standard:

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

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

References Test Guidance:

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dBuV/m)	AV:54 (dBuV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBuV/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(dBuV/m) ^{*1} PK:105.2 (dBuV/m) ^{*2} PK: 110.8(dBuV/m) ^{*3} PK:122.2 (dBuV/m) ^{*4}
^{*1} beyond 75 MHz or more above of the band edge. ^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. ^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above. ^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.			

Note:

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

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

4.1.2 Test Instruments

For Radiated emission test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 06, 2020	July 05, 2021
Pre-Amplifier EMCI	EMC001340	980142	May 25, 2020	May 24, 2021
Loop Antenna Electro-Metrics	EM-6879	264	Feb. 18, 2020	Feb. 17, 2021
RF Cable	NA	LOOPCAB-001	Jan. 08, 2020	Jan. 07, 2021
RF Cable	NA	LOOPCAB-002	Jan. 08, 2020	Jan. 07, 2021
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	Apr. 28, 2020	Apr. 27, 2021
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 11, 2019	Nov. 10, 2020
RF Cable	8D	966-3-1	Mar. 17, 2020	Mar. 16, 2021
RF Cable	8D	966-3-2	Mar. 17, 2020	Mar. 16, 2021
RF Cable	8D	966-3-3	Mar. 17, 2020	Mar. 16, 2021
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 26, 2019	Sep. 25, 2020
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC104-SM-SM-1200	160922	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC104-SM-SM-2000	180601	June 09, 2020	June 08, 2021
RF Cable	EMC104-SM-SM-6000	180602	June 09, 2020	June 08, 2021
Spectrum Analyzer Keysight	N9030A	MY54490679	July 13, 2020	July 12, 2021
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 15, 2020	Jan. 14, 2021
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
RF Cable	EMC102-KM-KM-1200	160924	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC-KM-KM-4000	200214	Mar. 11, 2020	Mar. 10, 2021
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. Tested Date: July 18 to 24, 2020

For other test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	100964	May 29, 2020	May 28, 2021
Power meter Anritsu	ML2495A	1529002	July 22, 2020	July 21, 2021
Power sensor Anritsu	MA2411B	1339443	July 22, 2020	July 21, 2021
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 14, 2020	Apr. 13, 2021
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 16, 2020	Jan. 15, 2021
True RMS Clamp Meter FLUKE	325	31130711WS	June 06, 2020	June 05, 2021
Software	ADT_RF Test Software V6.6.5.4	NA	NA	NA

- NOTE:**
1. The test was performed in Oven room 2.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. Tested Date: July 23, 2020

4.1.3 Test Procedure

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

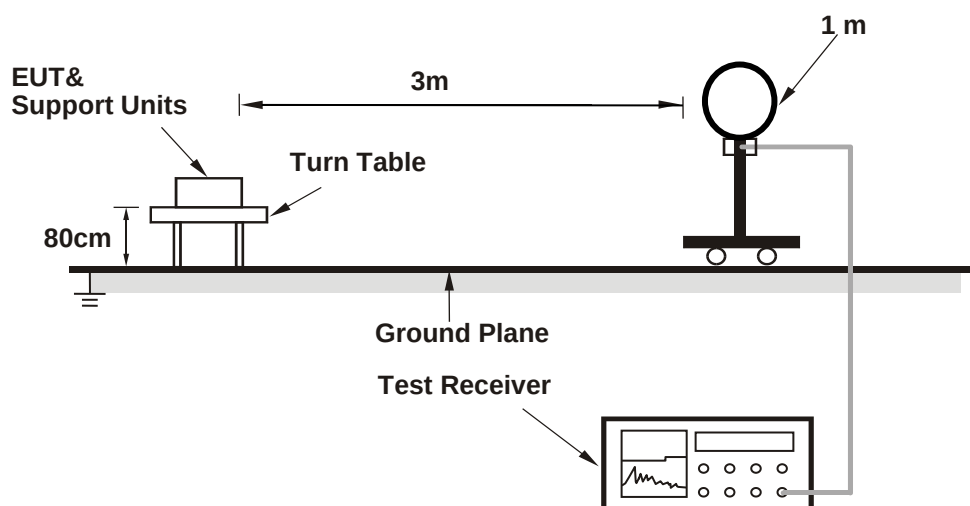
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

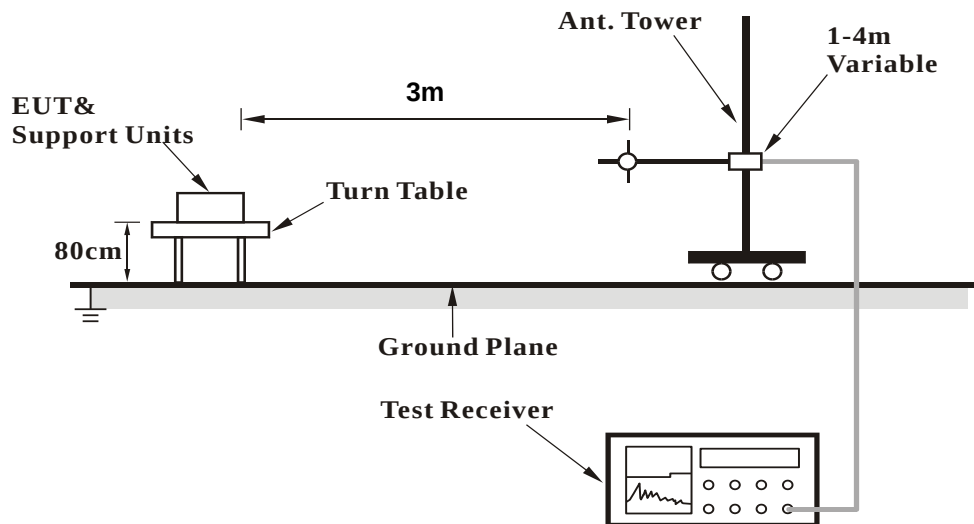
No deviation.

4.1.5 Test Setup

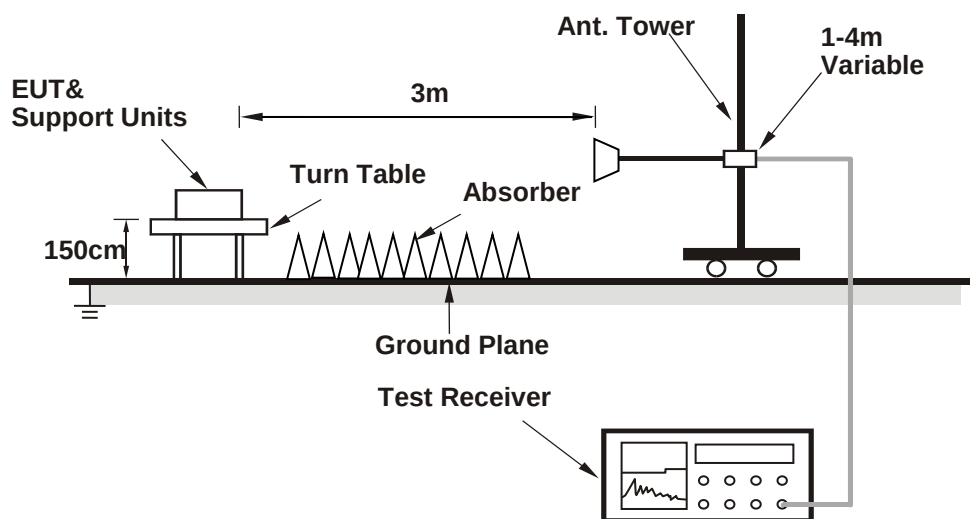
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

- Connected the EUT with the Laptop Computer which is placed on remote site.
- Controlling software (accessMTool_REL_3.1.0.3) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data:

802.11a

Channel	TX Channel 36	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	5142.10	73.4 PK	74.0	-0.6	3.11 H	267	69.7	3.7
2	5142.10	50.8 AV	54.0	-3.2	3.11 H	267	47.1	3.7
3	5150.00	70.6 PK	74.0	-3.4	3.11 H	267	66.9	3.7
4	5150.00	53.7 AV	54.0	-0.3	3.11 H	267	50.0	3.7
5	*5180.00	120.2 PK			3.11 H	267	116.6	3.6
6	*5180.00	110.9 AV			3.11 H	267	107.3	3.6
7	#10360.00	45.3 PK	68.2	-22.9	1.18 H	60	32.6	12.7
8	15540.00	56.5 PK	74.0	-17.5	2.24 H	122	43.3	13.2
9	15540.00	43.3 AV	54.0	-10.7	2.24 H	122	30.1	13.2

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	5150.00	69.4 PK	74.0	-4.6	1.63 V	274	65.7	3.7
2	5150.00	50.8 AV	54.0	-3.2	1.63 V	274	47.1	3.7
3	*5180.00	114.5 PK			1.63 V	274	110.9	3.6
4	*5180.00	104.8 AV			1.63 V	274	101.2	3.6
5	#10360.00	45.2 PK	68.2	-23.0	2.18 V	144	32.5	12.7
6	15540.00	59.3 PK	74.0	-14.7	1.49 V	60	46.1	13.2
7	15540.00	43.1 AV	54.0	-10.9	1.49 V	60	29.9	13.2

Remarks:

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

Channel	TX Channel 40	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	121.9 PK			3.14 H	269	118.4	3.5
2	*5200.00	112.6 AV			3.14 H	269	109.1	3.5
3	#10400.00	44.8 PK	68.2	-23.4	1.22 H	47	32.0	12.8
4	15600.00	56.4 PK	74.0	-17.6	2.20 H	112	42.9	13.5
5	15600.00	43.1 AV	54.0	-10.9	2.20 H	112	29.6	13.5
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5200.00	117.1 PK			1.68 V	242	113.6	3.5
2	*5200.00	106.8 AV			1.68 V	242	103.3	3.5
3	#10400.00	45.3 PK	68.2	-22.9	2.13 V	142	32.5	12.8
4	15600.00	59.4 PK	74.0	-14.6	1.49 V	60	45.9	13.5
5	15600.00	43.4 AV	54.0	-10.6	1.49 V	60	29.9	13.5

Remarks:

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

Channel	TX Channel 48	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	122.1 PK			3.08 H	269	118.6	3.5
2	*5240.00	112.4 AV			3.08 H	269	108.9	3.5
3	5405.81	56.8 PK	74.0	-17.2	3.08 H	269	53.2	3.6
4	5405.81	44.8 AV	54.0	-9.2	3.08 H	269	41.2	3.6
5	5449.85	55.3 PK	74.0	-18.7	3.08 H	269	51.6	3.7
6	5449.85	45.6 AV	54.0	-8.4	3.08 H	269	41.9	3.7
7	#10480.00	45.5 PK	68.2	-22.7	1.22 H	50	32.4	13.1
8	15720.00	56.6 PK	74.0	-17.4	2.19 H	114	42.8	13.8
9	15720.00	43.2 AV	54.0	-10.8	2.19 H	114	29.4	13.8
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	*5240.00	116.4 PK			1.68 V	252	112.9	3.5
2	*5240.00	106.3 AV			1.68 V	252	102.8	3.5
3	5449.85	53.3 PK	74.0	-20.7	1.68 V	252	49.6	3.7
4	5449.85	42.5 AV	54.0	-11.5	1.68 V	252	38.8	3.7
5	#10480.00	44.9 PK	68.2	-23.3	2.13 V	132	31.8	13.1
6	15720.00	59.5 PK	74.0	-14.5	1.46 V	56	45.7	13.8
7	15720.00	43.5 AV	54.0	-10.5	1.46 V	56	29.7	13.8

Remarks:

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

Channel	TX Channel 149	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	#5628.01	57.2 PK	68.2	-11.0	1.00 H	2	52.9	4.3
2	*5745.00	120.7 PK			1.00 H	2	116.7	4.0
3	*5745.00	110.0 AV			1.00 H	2	106.0	4.0
4	#5938.11	55.0 PK	68.2	-13.2	1.00 H	2	50.0	5.0
5	11490.00	45.5 PK	74.0	-28.5	1.17 H	51	32.2	13.3
6	11490.00	37.3 AV	54.0	-16.7	1.17 H	51	24.0	13.3
7	#17235.00	56.7 PK	68.2	-11.5	2.22 H	127	39.1	17.6

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	#5614.91	54.5 PK	68.2	-13.7	1.00 V	248	50.2	4.3
2	*5745.00	116.4 PK			1.00 V	248	112.4	4.0
3	*5745.00	106.5 AV			1.00 V	248	102.5	4.0
4	#6013.81	52.2 PK	68.2	-16.0	1.00 V	248	47.1	5.1
5	11490.00	45.2 PK	74.0	-28.8	2.21 V	149	31.9	13.3
6	11490.00	36.7 AV	54.0	-17.3	2.21 V	149	23.4	13.3
7	#17235.00	59.5 PK	68.2	-8.7	1.45 V	44	41.9	17.6

Remarks:

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

Channel	TX Channel 157	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	#5562.73	55.2 PK	68.2	-13.0	1.00 H	356	51.0	4.2
2	*5785.00	121.6 PK			1.00 H	356	117.5	4.1
3	*5785.00	110.5 AV			1.00 H	356	106.4	4.1
4	#5935.37	55.1 PK	68.2	-13.1	1.00 H	356	50.2	4.9
5	11570.00	44.8 PK	74.0	-29.2	1.16 H	47	31.6	13.2
6	11570.00	36.6 AV	54.0	-17.4	1.16 H	47	23.4	13.2
7	#17355.00	56.4 PK	68.2	-11.8	2.25 H	121	38.8	17.6

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	#5587.17	54.5 PK	68.2	-13.7	1.02 V	250	50.2	4.3
2	*5785.00	115.3 PK			1.02 V	250	111.2	4.1
3	*5785.00	106.3 AV			1.02 V	250	102.2	4.1
4	#5974.07	54.2 PK	68.2	-14.0	1.02 V	250	49.3	4.9
5	11570.00	45.5 PK	74.0	-28.5	2.14 V	159	32.3	13.2
6	11570.00	36.9 AV	54.0	-17.1	2.14 V	159	23.7	13.2
7	#17355.00	59.6 PK	68.2	-8.6	1.50 V	51	42.0	17.6

Remarks:

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

Channel	TX Channel 165	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	#5592.45	55.4 PK	68.2	-12.8	1.02 H	360	51.1	4.3
2	*5825.00	120.7 PK			1.02 H	360	116.4	4.3
3	*5825.00	110.3 AV			1.02 H	360	106.0	4.3
4	#5953.64	56.2 PK	68.2	-12.0	1.02 H	360	51.3	4.9
5	11650.00	45.5 PK	74.0	-28.5	1.19 H	54	32.2	13.3
6	11650.00	37.0 AV	54.0	-17.0	1.19 H	54	23.7	13.3
7	#17475.00	56.8 PK	68.2	-11.4	2.27 H	114	38.9	17.9

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5633.91	54.4 PK	68.2	-13.8	1.02 V	249	50.1	4.3
2	*5825.00	115.8 PK			1.02 V	249	111.5	4.3
3	*5825.00	106.1 AV			1.02 V	249	101.8	4.3
4	#6024.16	52.4 PK	68.2	-15.8	1.02 V	249	47.3	5.1
5	11650.00	44.6 PK	74.0	-29.4	2.17 V	139	31.3	13.3
6	11650.00	36.3 AV	54.0	-17.7	2.17 V	139	23.0	13.3
7	#17475.00	59.1 PK	68.2	-9.1	1.43 V	69	41.2	17.9

Remarks:

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

802.11ax (HE20)

Channel	TX Channel 36	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	66.4 PK	74.0	-7.6	3.11 H	268	62.7	3.7
2	5150.00	53.8 AV	54.0	-0.2	3.11 H	268	50.1	3.7
3	*5180.00	119.5 PK			3.11 H	268	115.9	3.6
4	*5180.00	108.4 AV			3.11 H	268	104.8	3.6
5	#10360.00	45.3 PK	68.2	-22.9	1.13 H	71	32.6	12.7
6	15540.00	57.0 PK	74.0	-17.0	2.20 H	122	43.8	13.2
7	15540.00	43.5 AV	54.0	-10.5	2.20 H	122	30.3	13.2

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	5150.00	57.2 PK	74.0	-16.8	1.05 V	265	53.5	3.7
2	5150.00	48.2 AV	54.0	-5.8	1.05 V	265	44.5	3.7
3	*5180.00	114.6 PK			1.05 V	265	111.0	3.6
4	*5180.00	102.1 AV			1.05 V	265	98.5	3.6
5	#10360.00	45.4 PK	68.2	-22.8	2.22 V	158	32.7	12.7
6	15540.00	59.5 PK	74.0	-14.5	1.54 V	70	46.3	13.2
7	15540.00	43.5 AV	54.0	-10.5	1.54 V	70	30.3	13.2

Remarks:

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

Channel	TX Channel 40	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	66.2 PK	74.0	-7.8	3.18 H	269	62.5	3.7
2	5150.00	53.0 AV	54.0	-1.0	3.18 H	269	49.3	3.7
3	*5200.00	123.3 PK			3.18 H	269	119.8	3.5
4	*5200.00	111.7 AV			3.18 H	269	108.2	3.5
5	#10400.00	45.2 PK	68.2	-23.0	1.20 H	49	32.4	12.8
6	15600.00	57.1 PK	74.0	-16.9	2.19 H	124	43.6	13.5
7	15600.00	43.7 AV	54.0	-10.3	2.19 H	124	30.2	13.5

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	60.8 PK	74.0	-13.2	1.07 V	259	57.1	3.7
2	5150.00	50.4 AV	54.0	-3.6	1.07 V	259	46.7	3.7
3	*5200.00	117.3 PK			1.07 V	259	113.8	3.5
4	*5200.00	105.3 AV			1.07 V	259	101.8	3.5
5	#10400.00	45.4 PK	68.2	-22.8	2.22 V	148	32.6	12.8
6	15600.00	58.8 PK	74.0	-15.2	1.53 V	57	45.3	13.5
7	15600.00	42.7 AV	54.0	-11.3	1.53 V	57	29.2	13.5

Remarks:

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

Channel	TX Channel 48	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	124.3 PK			3.17 H	269	120.8	3.5
2	*5240.00	112.1 AV			3.17 H	269	108.6	3.5
3	5350.00	54.9 PK	74.0	-19.1	3.17 H	269	51.5	3.4
4	5350.00	44.6 AV	54.0	-9.4	3.17 H	269	41.2	3.4
5	5364.82	55.6 PK	74.0	-18.4	3.17 H	269	52.1	3.5
6	5364.82	44.4 AV	54.0	-9.6	3.17 H	269	40.9	3.5
7	#10480.00	44.9 PK	68.2	-23.3	1.19 H	57	31.8	13.1
8	15720.00	57.0 PK	74.0	-17.0	2.30 H	132	43.2	13.8
9	15720.00	43.7 AV	54.0	-10.3	2.30 H	132	29.9	13.8
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	*5240.00	117.3 PK			1.83 V	260	113.8	3.5
2	*5240.00	105.5 AV			1.83 V	260	102.0	3.5
3	5350.00	52.1 PK	74.0	-21.9	1.83 V	260	48.7	3.4
4	5350.00	41.3 AV	54.0	-12.7	1.83 V	260	37.9	3.4
5	#10480.00	45.1 PK	68.2	-23.1	2.18 V	139	32.0	13.1
6	15720.00	59.5 PK	74.0	-14.5	1.54 V	50	45.7	13.8
7	15720.00	43.4 AV	54.0	-10.6	1.54 V	50	29.6	13.8

Remarks:

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

Channel	TX Channel 149	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	#5583.33	57.1 PK	68.2	-11.1	1.49 H	315	52.8	4.3
2	*5745.00	121.2 PK			1.49 H	315	117.2	4.0
3	*5745.00	109.3 AV			1.49 H	315	105.3	4.0
4	#5979.13	54.3 PK	68.2	-13.9	1.49 H	315	49.4	4.9
5	11490.00	45.4 PK	74.0	-28.6	1.20 H	74	32.1	13.3
6	11490.00	37.2 AV	54.0	-16.8	1.20 H	74	23.9	13.3
7	#17235.00	56.9 PK	68.2	-11.3	2.27 H	118	39.3	17.6

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	#5636.90	54.9 PK	68.2	-13.3	1.55 V	250	50.6	4.3
2	*5745.00	114.8 PK			1.55 V	250	110.8	4.0
3	*5745.00	105.2 AV			1.55 V	250	101.2	4.0
4	#5988.26	51.2 PK	68.2	-17.0	1.55 V	250	46.1	5.1
5	11490.00	45.5 PK	74.0	-28.5	2.21 V	143	32.2	13.3
6	11490.00	36.9 AV	54.0	-17.1	2.21 V	143	23.6	13.3
7	#17235.00	59.4 PK	68.2	-8.8	1.45 V	67	41.8	17.6

Remarks:

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

Channel	TX Channel 157	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	#5602.06	56.4 PK	68.2	-11.8	1.50 H	316	52.2	4.2
2	*5785.00	120.9 PK			1.50 H	316	116.8	4.1
3	*5785.00	109.6 AV			1.50 H	316	105.5	4.1
4	#5978.45	54.1 PK	68.2	-14.1	1.50 H	316	49.2	4.9
5	11570.00	45.8 PK	74.0	-28.2	1.16 H	58	32.6	13.2
6	11570.00	37.2 AV	54.0	-16.8	1.16 H	58	24.0	13.2
7	#17355.00	56.7 PK	68.2	-11.5	2.29 H	121	39.1	17.6

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	#5627.35	52.9 PK	68.2	-15.3	1.50 V	252	48.6	4.3
2	*5785.00	115.7 PK			1.50 V	252	111.6	4.1
3	*5785.00	104.7 AV			1.50 V	252	100.6	4.1
4	#5939.45	51.4 PK	68.2	-16.8	1.50 V	252	46.4	5.0
5	11570.00	45.7 PK	74.0	-28.3	2.19 V	144	32.5	13.2
6	11570.00	36.9 AV	54.0	-17.1	2.19 V	144	23.7	13.2
7	#17355.00	59.6 PK	68.2	-8.6	1.54 V	73	42.0	17.6

Remarks:

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

Channel	TX Channel 165	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	#5611.71	56.8 PK	68.2	-11.4	1.46 H	315	52.6	4.2
2	*5825.00	120.7 PK			1.46 H	315	116.4	4.3
3	*5825.00	109.0 AV			1.46 H	315	104.7	4.3
4	#5929.43	56.0 PK	68.2	-12.2	1.46 H	315	51.1	4.9
5	11650.00	45.3 PK	74.0	-28.7	1.23 H	51	32.0	13.3
6	11650.00	37.0 AV	54.0	-17.0	1.23 H	51	23.7	13.3
7	#17475.00	56.6 PK	68.2	-11.6	2.21 H	127	38.7	17.9

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5595.85	53.5 PK	68.2	-14.7	1.41 V	253	49.2	4.3
2	*5825.00	115.2 PK			1.41 V	253	110.9	4.3
3	*5825.00	104.4 AV			1.41 V	253	100.1	4.3
4	#5934.26	52.3 PK	68.2	-15.9	1.41 V	253	47.4	4.9
5	11650.00	45.9 PK	74.0	-28.1	2.14 V	145	32.6	13.3
6	11650.00	37.2 AV	54.0	-16.8	2.14 V	145	23.9	13.3
7	#17475.00	59.2 PK	68.2	-9.0	1.54 V	60	41.3	17.9

Remarks:

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

802.11ax (HE40)

Channel	TX Channel 38	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	5145.31	63.7 PK	74.0	-10.3	3.06 H	266	60.0	3.7
2	5145.31	51.9 AV	54.0	-2.1	3.06 H	266	48.2	3.7
3	5150.00	62.6 PK	74.0	-11.4	3.06 H	266	58.9	3.7
4	5150.00	53.9 AV	54.0	-0.1	3.06 H	266	50.2	3.7
5	*5190.00	114.3 PK			3.06 H	266	110.7	3.6
6	*5190.00	101.2 AV			3.06 H	266	97.6	3.6
7	#10380.00	45.8 PK	68.2	-22.4	1.18 H	74	33.1	12.7
8	15570.00	56.5 PK	74.0	-17.5	2.21 H	136	43.1	13.4
9	15570.00	43.4 AV	54.0	-10.6	2.21 H	136	30.0	13.4
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	56.5 PK	74.0	-17.5	1.04 V	265	52.8	3.7
2	5150.00	50.2 AV	54.0	-3.8	1.04 V	265	46.5	3.7
3	*5190.00	108.6 PK			1.04 V	265	105.0	3.6
4	*5190.00	96.1 AV			1.04 V	265	92.5	3.6
5	#10380.00	45.4 PK	68.2	-22.8	2.19 V	146	32.7	12.7
6	15570.00	59.0 PK	74.0	-15.0	1.44 V	73	45.6	13.4
7	15570.00	42.7 AV	54.0	-11.3	1.44 V	73	29.3	13.4

Remarks:

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

Channel	TX Channel 46	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	5146.08	69.9 PK	74.0	-4.1	3.13 H	271	66.2	3.7
2	5146.08	51.3 AV	54.0	-2.7	3.13 H	271	47.6	3.7
3	5150.00	63.8 PK	74.0	-10.2	3.13 H	271	60.1	3.7
4	5150.00	53.8 AV	54.0	-0.2	3.13 H	271	50.1	3.7
5	*5230.00	120.9 PK			3.13 H	271	117.4	3.5
6	*5230.00	107.9 AV			3.13 H	271	104.4	3.5
7	5396.93	59.4 PK	74.0	-14.6	3.13 H	271	55.8	3.6
8	5396.93	46.6 AV	54.0	-7.4	3.13 H	271	43.0	3.6
9	#10460.00	45.7 PK	68.2	-22.5	1.24 H	45	32.7	13.0
10	15690.00	56.6 PK	74.0	-17.4	2.23 H	108	42.7	13.9
11	15690.00	43.2 AV	54.0	-10.8	2.23 H	108	29.3	13.9
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5230.00	114.1 PK			1.04 V	264	110.6	3.5
2	*5230.00	102.3 AV			1.04 V	264	98.8	3.5
3	5387.33	54.2 PK	74.0	-19.8	1.04 V	264	50.6	3.6
4	5387.33	43.5 AV	54.0	-10.5	1.04 V	264	39.9	3.6
5	#10460.00	45.5 PK	68.2	-22.7	2.21 V	130	32.5	13.0
6	15690.00	59.3 PK	74.0	-14.7	1.48 V	66	45.4	13.9
7	15690.00	42.8 AV	54.0	-11.2	1.48 V	66	28.9	13.9

Remarks:

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

Channel	TX Channel 151	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	#5647.66	61.1 PK	68.2	-7.1	1.42 H	315	56.7	4.4
2	*5755.00	118.5 PK			1.42 H	315	114.5	4.0
3	*5755.00	107.5 AV			1.42 H	315	103.5	4.0
4	#5930.13	56.7 PK	68.2	-11.5	1.42 H	315	51.8	4.9
5	11510.00	44.9 PK	74.0	-29.1	1.12 H	58	31.6	13.3
6	11510.00	36.8 AV	54.0	-17.2	1.12 H	58	23.5	13.3
7	#17265.00	56.1 PK	68.2	-12.1	2.25 H	128	38.6	17.5

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5644.26	54.6 PK	68.2	-13.6	1.47 V	253	50.3	4.3
2	*5755.00	113.8 PK			1.47 V	253	109.8	4.0
3	*5755.00	101.9 AV			1.47 V	253	97.9	4.0
4	#5979.15	52.9 PK	68.2	-15.3	1.47 V	253	48.0	4.9
5	11510.00	45.1 PK	74.0	-28.9	2.15 V	144	31.8	13.3
6	11510.00	36.8 AV	54.0	-17.2	2.15 V	144	23.5	13.3
7	#17265.00	59.6 PK	68.2	-8.6	1.51 V	61	42.1	17.5

Remarks:

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

Channel	TX Channel 159	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	#5634.89	56.4 PK	68.2	-11.8	1.48 H	318	52.1	4.3
2	*5795.00	119.3 PK			1.48 H	318	115.1	4.2
3	*5795.00	107.0 AV			1.48 H	318	102.8	4.2
4	#5940.87	56.9 PK	68.2	-11.3	1.48 H	318	51.9	5.0
5	11590.00	45.2 PK	74.0	-28.8	1.22 H	53	31.9	13.3
6	11590.00	37.0 AV	54.0	-17.0	1.22 H	53	23.7	13.3
7	#17385.00	56.2 PK	68.2	-12.0	2.20 H	121	38.5	17.7

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	#5637.67	54.2 PK	68.2	-14.0	1.49 V	249	49.9	4.3
2	*5795.00	113.3 PK			1.49 V	249	109.1	4.2
3	*5795.00	101.8 AV			1.49 V	249	97.6	4.2
4	#5928.31	53.0 PK	68.2	-15.2	1.49 V	249	48.1	4.9
5	11590.00	45.2 PK	74.0	-28.8	2.21 V	129	31.9	13.3
6	11590.00	36.6 AV	54.0	-17.4	2.21 V	129	23.3	13.3
7	#17385.00	59.0 PK	68.2	-9.2	1.48 V	63	41.3	17.7

Remarks:

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

802.11ax (HE80)

Channel	TX Channel 42	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	5145.17	64.9 PK	74.0	-9.1	3.05 H	272	61.2	3.7
2	5145.17	53.6 AV	54.0	-0.4	3.05 H	272	49.9	3.7
3	5150.00	61.7 PK	74.0	-12.3	3.05 H	272	58.0	3.7
4	5150.00	53.8 AV	54.0	-0.2	3.05 H	272	50.1	3.7
5	*5210.00	109.7 PK			3.05 H	272	106.1	3.6
6	*5210.00	98.4 AV			3.05 H	272	94.8	3.6
7	5350.00	52.8 PK	74.0	-21.2	3.05 H	272	49.4	3.4
8	5350.00	43.3 AV	54.0	-10.7	3.05 H	272	39.9	3.4
9	#10420.00	46.0 PK	68.2	-22.2	1.23 H	55	33.2	12.8
10	15630.00	56.6 PK	74.0	-17.4	2.25 H	108	42.9	13.7
11	15630.00	43.1 AV	54.0	-10.9	2.25 H	108	29.4	13.7

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	57.6 PK	74.0	-16.4	1.00 V	265	53.9	3.7
2	5150.00	48.8 AV	54.0	-5.2	1.00 V	265	45.1	3.7
3	*5210.00	103.4 PK			1.00 V	265	99.8	3.6
4	*5210.00	92.0 AV			1.00 V	265	88.4	3.6
5	5350.00	50.3 PK	74.0	-23.7	1.00 V	265	46.9	3.4
6	5350.00	41.2 AV	54.0	-12.8	1.00 V	265	37.8	3.4
7	#10420.00	45.5 PK	68.2	-22.7	2.19 V	129	32.7	12.8
8	15630.00	59.2 PK	74.0	-14.8	1.43 V	53	45.5	13.7
9	15630.00	43.1 AV	54.0	-10.9	1.43 V	53	29.4	13.7

Remarks:

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

Channel	TX Channel 155	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5648.81	67.1 PK	68.2	-1.1	1.52 H	314	62.7	4.4
2	*5775.00	114.9 PK			1.52 H	314	110.8	4.1
3	*5775.00	102.5 AV			1.52 H	314	98.4	4.1
4	#5934.27	60.8 PK	68.2	-7.4	1.52 H	314	55.9	4.9
5	11550.00	45.3 PK	74.0	-28.7	1.16 H	47	32.1	13.2
6	11550.00	37.0 AV	54.0	-17.0	1.16 H	47	23.8	13.2
7	#17325.00	56.7 PK	68.2	-11.5	2.19 H	118	39.1	17.6

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5644.86	62.9 PK	68.2	-5.3	1.48 V	252	58.6	4.3
2	*5775.00	108.5 PK			1.48 V	252	104.4	4.1
3	*5775.00	97.4 AV			1.48 V	252	93.3	4.1
4	#5929.67	55.9 PK	68.2	-12.3	1.48 V	252	51.0	4.9
5	11550.00	44.9 PK	74.0	-29.1	2.16 V	145	31.7	13.2
6	11550.00	36.5 AV	54.0	-17.5	2.16 V	145	23.3	13.2
7	#17325.00	59.3 PK	68.2	-8.9	1.52 V	65	41.7	17.6

Remarks:

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

Below 1GHz Data:

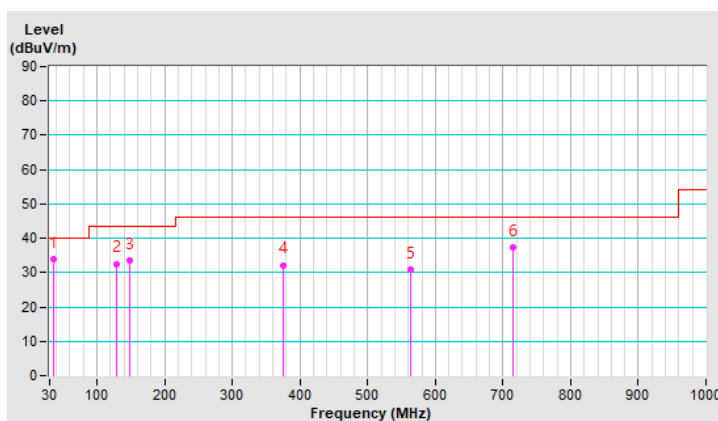
802.11ax (HE40)

Channel	TX Channel 46	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 1GHz		

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	35.36	33.8 QP	40.0	-6.2	2.00 H	360	42.4	-8.6
2	128.19	32.6 QP	43.5	-10.9	2.00 H	251	40.9	-8.3
3	148.12	33.5 QP	43.5	-10.0	2.00 H	127	40.4	-6.9
4	375.03	32.2 QP	46.0	-13.8	1.00 H	314	35.8	-3.6
5	563.09	30.8 QP	46.0	-15.2	1.50 H	0	29.9	0.9
6	713.85	37.5 QP	46.0	-8.5	1.50 H	0	33.4	4.1

Remarks:

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

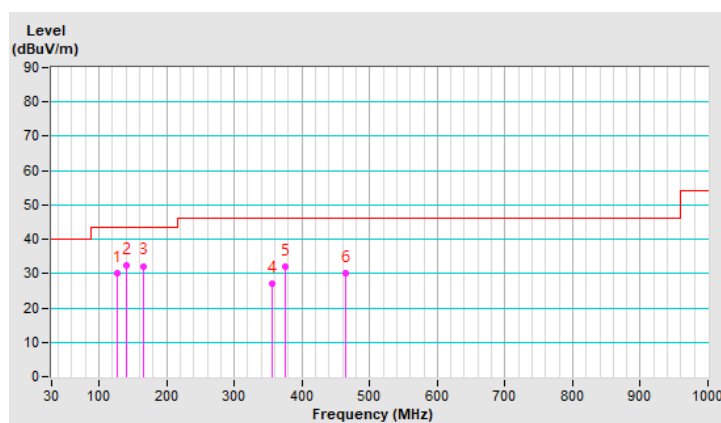


Channel	TX Channel 46	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 1GHz		

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	127.00	30.1 QP	43.5	-13.4	1.00 V	155	38.6	-8.5
2	141.19	32.4 QP	43.5	-11.1	1.00 V	283	39.7	-7.3
3	165.99	32.2 QP	43.5	-11.3	1.00 V	28	39.2	-7.0
4	355.82	27.1 QP	46.0	-18.9	1.50 V	360	31.2	-4.1
5	375.03	32.0 QP	46.0	-14.0	1.00 V	182	35.6	-3.6
6	465.46	30.0 QP	46.0	-16.0	1.00 V	83	31.2	-1.2

Remarks:

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



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 19, 2020	Mar. 18, 2021
50 ohms Terminator	50	3	Oct. 23, 2019	Oct. 22, 2020
RF Cable	5D-FB	COCCAB-001	Sep. 27, 2019	Sep. 26, 2020
Fixed attenuator EMCI	STI02-2200-10	005	Aug. 30, 2019	Aug. 29, 2020
Software BVADT	BVADT_Cond_V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
- 3 Tested Date: July 23, 2020

4.2.3 Test Procedure

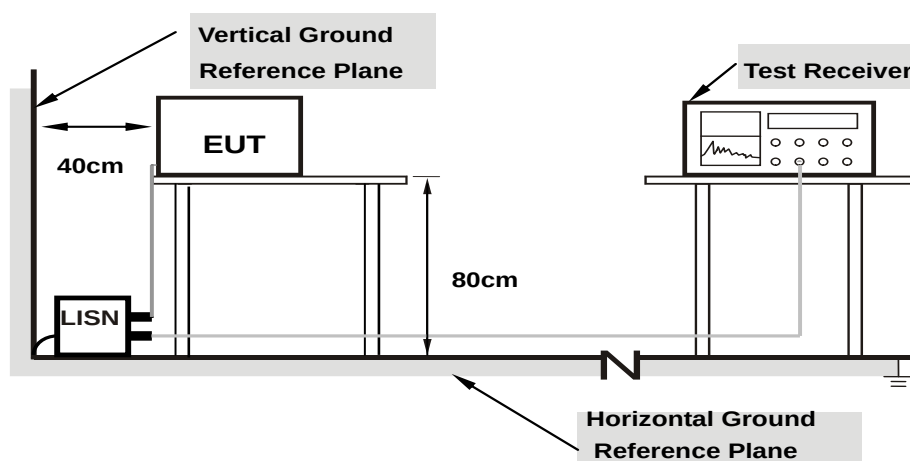
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

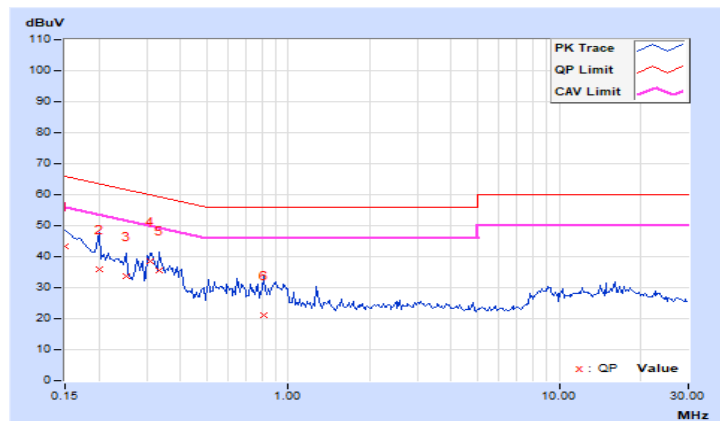
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.98	33.25	16.58	43.23	26.56	66.00	56.00	-22.77	-29.44
2	0.20078	9.99	26.02	11.89	36.01	21.88	63.58	53.58	-27.57	-31.70
3	0.25156	10.00	23.87	13.14	33.87	23.14	61.71	51.71	-27.84	-28.57
4	0.31016	10.00	28.46	24.35	38.46	34.35	59.97	49.97	-21.51	-15.62
5	0.33359	10.00	25.42	18.90	35.42	28.90	59.36	49.36	-23.94	-20.46
6	0.81016	10.04	11.02	3.89	21.06	13.93	56.00	46.00	-34.94	-32.07

Remarks:

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

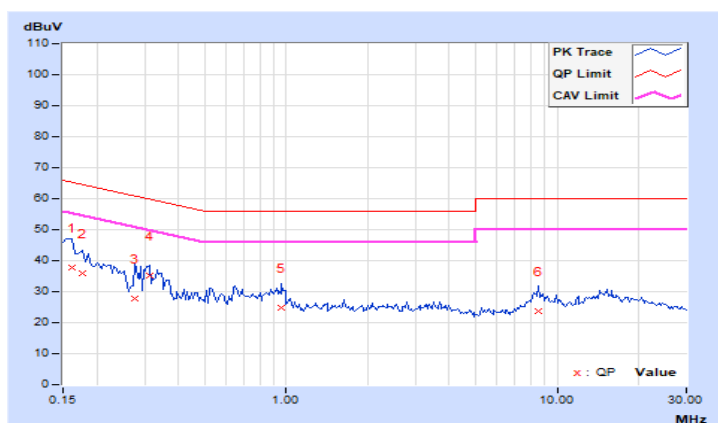


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	9.99	27.64	12.71	37.63	22.70	65.38	55.38	-27.75	-32.68
2	0.17734	10.00	25.75	11.89	35.75	21.89	64.61	54.61	-28.86	-32.72
3	0.27500	10.01	17.68	4.70	27.69	14.71	60.97	50.97	-33.28	-36.26
4	0.31406	10.02	25.12	17.50	35.14	27.52	59.86	49.86	-24.72	-22.34
5	0.95859	10.09	14.86	8.17	24.95	18.26	56.00	46.00	-31.05	-27.74
6	8.53906	10.52	13.07	7.90	23.59	18.42	60.00	50.00	-36.41	-31.58

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 $\leq$ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
	√	Indoor Access Point	1 Watt (30 dBm)
		Client device	250mW (24 dBm)
U-NII-2A			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3		√	1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

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

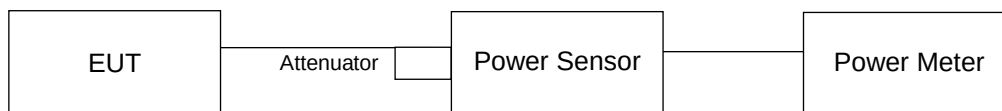
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

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

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

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

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

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

4.3.7 Test Results

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	21.49	21.23	21.44	21.75	562.608	27.50	30	Pass
40	5200	21.23	21.12	21.15	21.82	544.53	27.36	30	Pass
48	5240	21.54	21.19	21.34	21.89	564.753	27.52	30	Pass
149	5745	23.74	23.84	23.71	23.91	959.695	29.82	30	Pass
157	5785	23.79	23.82	23.62	23.43	930.759	29.69	30	Pass
165	5825	23.90	23.74	23.67	23.56	941.858	29.74	30	Pass

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	20.44	20.27	20.53	21.13	459.774	26.63	30	Pass
40	5200	21.31	21.05	21.51	21.95	560.812	27.49	30	Pass
48	5240	21.28	21.29	21.19	21.72	548.979	27.40	30	Pass
149	5745	23.67	23.58	23.38	23.31	892.903	29.51	30	Pass
157	5785	23.32	23.50	23.11	23.30	857.096	29.33	30	Pass
165	5825	23.62	23.34	23.44	23.33	881.997	29.45	30	Pass

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	17.80	17.38	17.31	18.11	233.499	23.68	30	Pass
46	5230	23.36	23.42	23.40	23.55	881.797	29.45	30	Pass
151	5755	23.75	23.44	23.61	23.17	895.044	29.52	30	Pass
159	5795	23.77	23.61	23.54	23.26	905.627	29.57	30	Pass

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	16.25	16.10	16.27	16.50	169.94	22.30	30	Pass
155	5775	23.46	22.81	23.25	23.03	825.063	29.16	30	Pass

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	20.72	20.50	20.77	21.33	485.464	26.86	30	Pass
40	5200	21.61	21.34	21.76	22.15	595.049	27.75	30	Pass
48	5240	21.53	21.49	21.46	21.97	580.519	27.64	30	Pass
149	5745	23.91	23.86	23.63	23.54	945.875	29.76	30	Pass
157	5785	23.84	23.99	23.91	23.57	966.26	29.85	30	Pass
165	5825	23.95	23.91	23.89	23.66	971.53	29.87	30	Pass

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	18.07	17.66	17.54	18.37	247.927	23.94	30	Pass
46	5230	23.74	23.81	23.84	23.88	963.474	29.84	30	Pass
151	5755	23.96	23.74	23.86	23.47	951.029	29.78	30	Pass
159	5795	24.03	23.85	23.80	23.52	960.38	29.82	30	Pass

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	16.48	16.34	16.49	16.75	179.397	22.54	30	Pass
155	5775	23.66	23.05	23.53	23.25	870.883	29.40	30	Pass

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	20.44	20.27	20.53	21.13	459.774	26.63	27.53	Pass
40	5200	21.31	21.05	21.51	21.95	560.812	27.49	27.53	Pass
48	5240	21.28	21.29	21.19	21.72	548.979	27.40	27.53	Pass
149	5745	22.01	21.95	21.74	21.65	611.027	27.86	28.07	Pass
157	5785	21.75	21.98	21.69	21.86	608.417	27.84	28.07	Pass
165	5825	21.99	21.75	21.85	21.76	610.826	27.86	28.07	Pass

Note: 1. For U-NII-1: The directional gain= $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 8.47 \text{ dBi} > 6 \text{ dBi}$, so the power limit shall be reduced to $30 - (8.47 - 6) = 27.53 \text{ dBm}$.
 2. For U-NII-3: The directional gain= $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 7.93 \text{ dBi} > 6 \text{ dBi}$, so the power limit shall be reduced to $30 - (7.93 - 6) = 28.07 \text{ dBm}$.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	17.80	17.38	17.31	18.11	233.499	23.68	27.53	Pass
46	5230	21.20	21.23	21.95	21.51	562.82	27.50	27.53	Pass
151	5755	22.04	21.83	21.95	21.52	610.942	27.86	28.07	Pass
159	5795	22.07	21.81	21.79	21.56	606.996	27.83	28.07	Pass

Note: 1. For U-NII-1: The directional gain= $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 8.47 \text{ dBi} > 6 \text{ dBi}$, so the power limit shall be reduced to $30 - (8.47 - 6) = 27.53 \text{ dBm}$.
 2. For U-NII-3: The directional gain= $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 7.93 \text{ dBi} > 6 \text{ dBi}$, so the power limit shall be reduced to $30 - (7.93 - 6) = 28.07 \text{ dBm}$.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	16.25	16.10	16.27	16.50	169.94	22.30	27.53	Pass
155	5775	22.13	21.47	22.00	21.72	610.669	27.86	28.07	Pass

Note: 1. For U-NII-1: The directional gain= $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 8.47 \text{ dBi} > 6 \text{ dBi}$, so the power limit shall be reduced to $30 - (8.47 - 6) = 27.53 \text{ dBm}$.
 2. For U-NII-3: The directional gain= $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 7.93 \text{ dBi} > 6 \text{ dBi}$, so the power limit shall be reduced to $30 - (7.93 - 6) = 28.07 \text{ dBm}$.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	20.72	20.50	20.77	21.33	485.464	26.86	27.53	Pass
40	5200	21.38	21.12	21.51	21.93	564.358	27.52	27.53	Pass
48	5240	21.42	21.38	21.35	21.83	564.943	27.52	27.53	Pass
149	5745	22.21	22.15	21.94	21.85	639.824	28.06	28.07	Pass
157	5785	21.93	22.19	21.89	22.06	636.752	28.04	28.07	Pass
165	5825	22.19	21.98	22.06	21.93	639.987	28.06	28.07	Pass

Note: 1. For U-NII-1: The directional gain= $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 8.47 \text{ dBi} > 6 \text{ dBi}$, so the power limit shall be reduced to $30 - (8.47 - 6) = 27.53 \text{ dBm}$.
 2. For U-NII-3: The directional gain= $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 7.93 \text{ dBi} > 6 \text{ dBi}$, so the power limit shall be reduced to $30 - (7.93 - 6) = 28.07 \text{ dBm}$.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	18.07	17.66	17.54	18.37	247.927	23.94	27.53	Pass
46	5230	21.40	21.44	21.48	21.65	564.177	27.51	27.53	Pass
151	5755	22.25	22.03	22.15	21.73	640.463	28.06	28.07	Pass
159	5795	22.28	22.03	22.01	21.77	637.801	28.05	28.07	Pass

Note: 1. For U-NII-1: The directional gain= $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 8.47 \text{ dBi} > 6 \text{ dBi}$, so the power limit shall be reduced to $30 - (8.47 - 6) = 27.53 \text{ dBm}$.
 2. For U-NII-3: The directional gain= $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 7.93 \text{ dBi} > 6 \text{ dBi}$, so the power limit shall be reduced to $30 - (7.93 - 6) = 28.07 \text{ dBm}$.

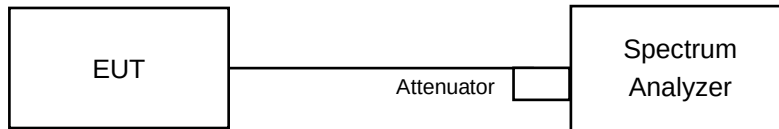
802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	16.48	16.34	16.49	16.75	179.397	22.54	27.53	Pass
155	5775	22.33	21.68	22.20	21.92	639.788	28.06	28.07	Pass

Note: 1. For U-NII-1: The directional gain= $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 8.47 \text{ dBi} > 6 \text{ dBi}$, so the power limit shall be reduced to $30 - (8.47 - 6) = 27.53 \text{ dBm}$.
 2. For U-NII-3: The directional gain= $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 7.93 \text{ dBi} > 6 \text{ dBi}$, so the power limit shall be reduced to $30 - (7.93 - 6) = 28.07 \text{ dBm}$.

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Results

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	17.04	16.92	17.04	17.04
40	5200	16.92	16.8	16.92	16.8
48	5240	16.92	16.92	17.04	16.92
149	5745	16.92	17.16	16.92	17.04
157	5785	17.04	17.16	17.04	17.16
165	5825	16.92	16.92	17.16	17.04

802.11ax (HE20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	19.2	19.08	19.2	19.2
40	5200	19.08	18.96	19.2	19.08
48	5240	19.2	19.2	19.2	19.08
149	5745	19.2	19.08	19.08	19.2
157	5785	19.2	19.08	19.08	19.2
165	5825	19.08	19.08	19.08	19.2

802.11ax (HE40)

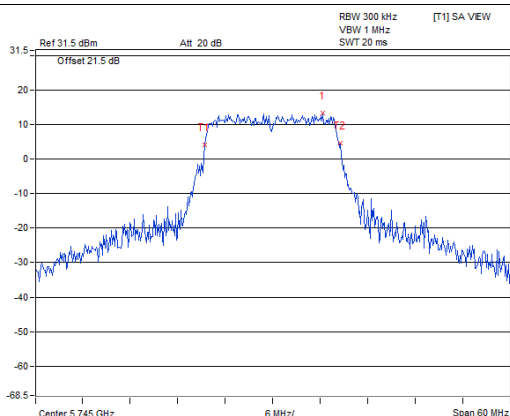
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	37.92	37.92	37.92	38.16
46	5230	37.92	37.92	37.92	38.16
151	5755	37.92	38.16	38.16	37.92
159	5795	38.16	38.16	37.92	38.16

802.11ax (HE80)

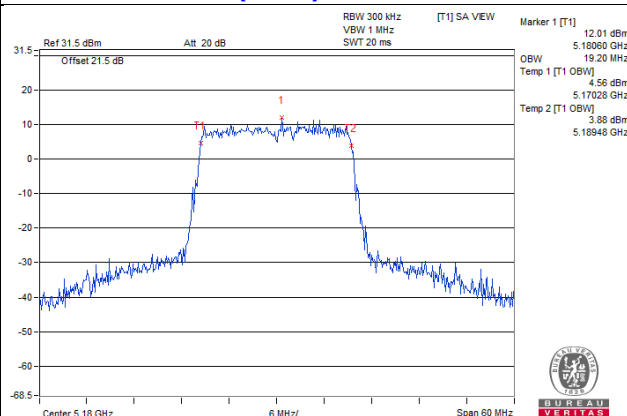
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	77.28	77.28	77.28	77.28
155	5775	77.28	77.28	77.28	77.28

Spectrum Plot of Max. Value

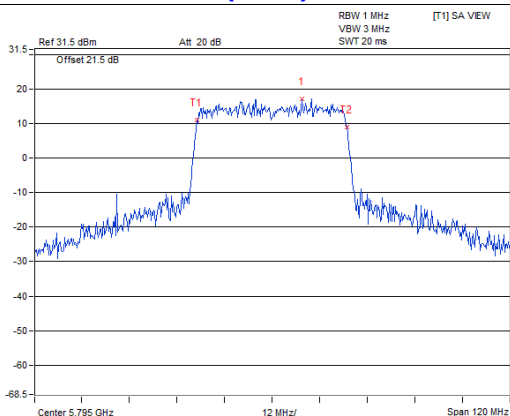
802.11a_Chain 1 / CH149



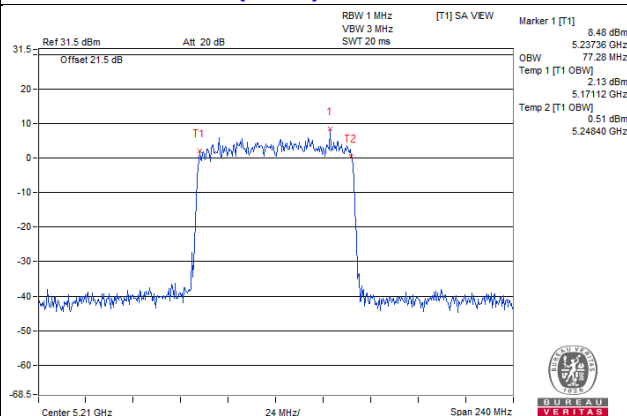
802.11ax (HE20)_Chain 0 / CH36



802.11ax (HE40)_Chain 0 / CH159

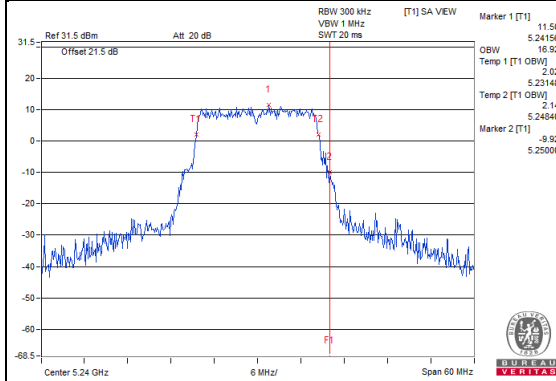


802.11ax (HE80)_Chain 0 / CH42

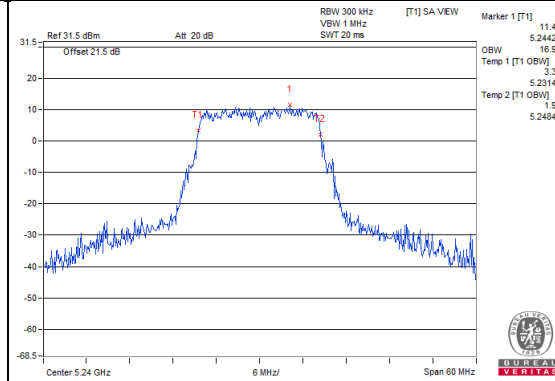


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

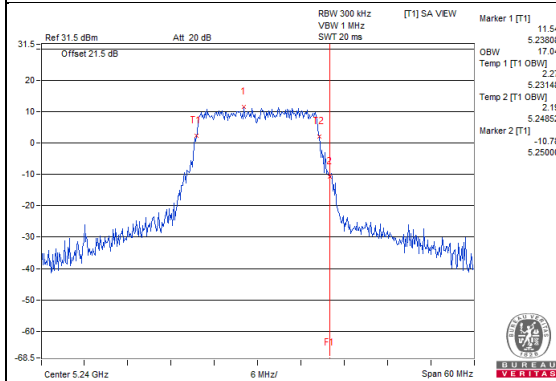
802.11a_Chain 0 / CH48



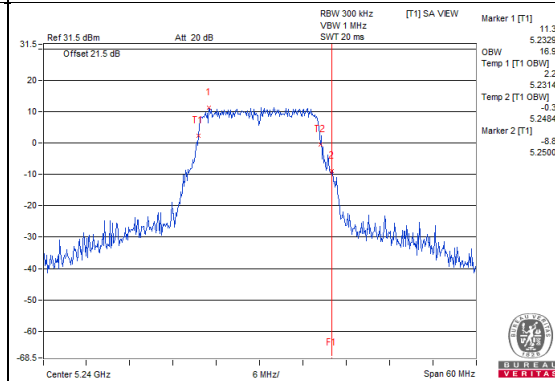
802.11a_Chain 1 / CH48



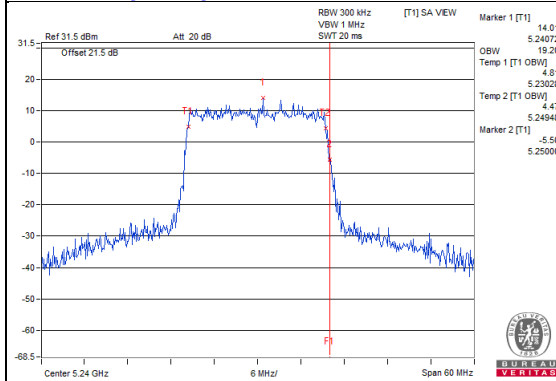
802.11a_Chain 2 / CH48



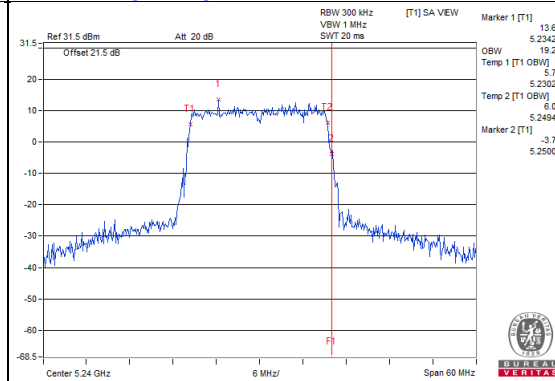
802.11a_Chain 3 / CH48



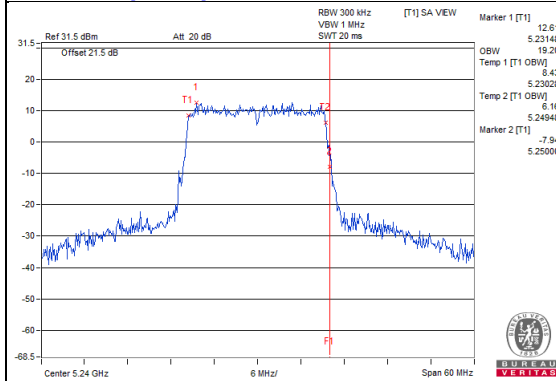
802.11ax (HE20)_Chain 0 / CH48



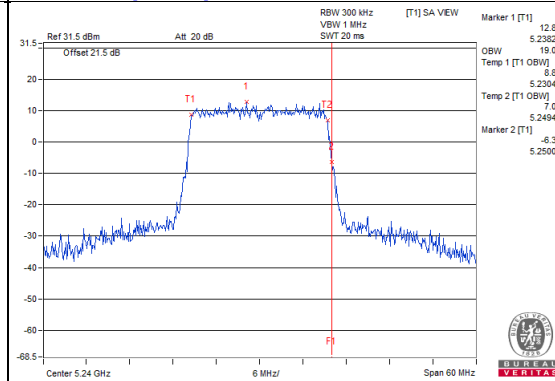
802.11ax (HE20)_Chain 1 / CH48



802.11ax (HE20)_Chain 2 / CH48

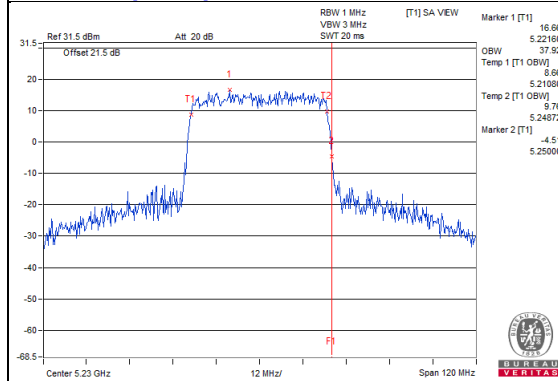


802.11ax (HE20)_Chain 3 / CH48

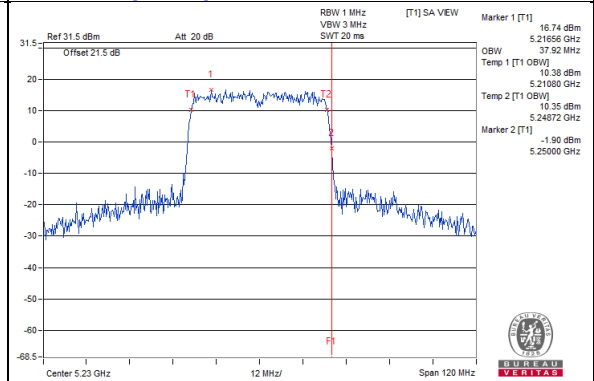


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

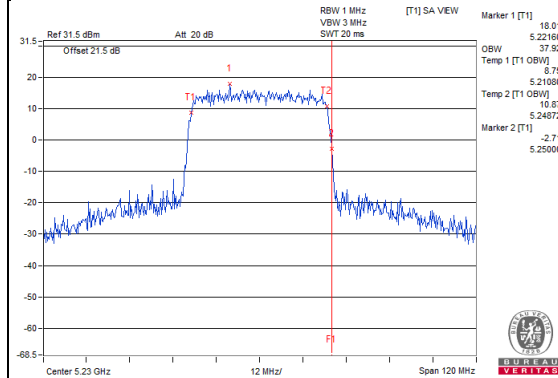
802.11ax (HE40)_Chain 0 / CH46



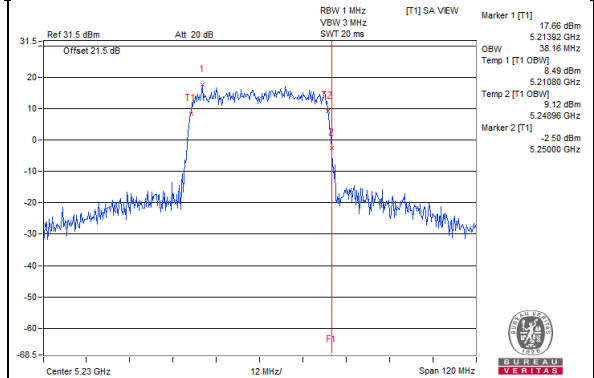
802.11ax (HE40)_Chain 1 / CH46



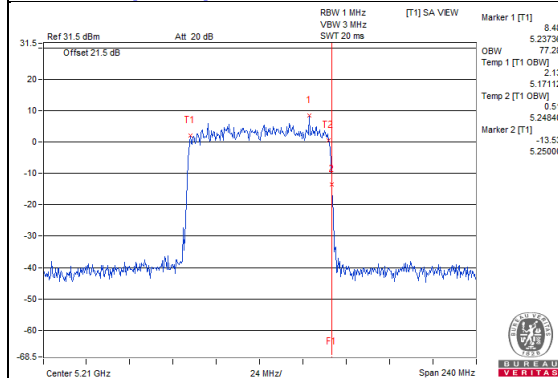
802.11ax (HE40)_Chain 2 / CH46



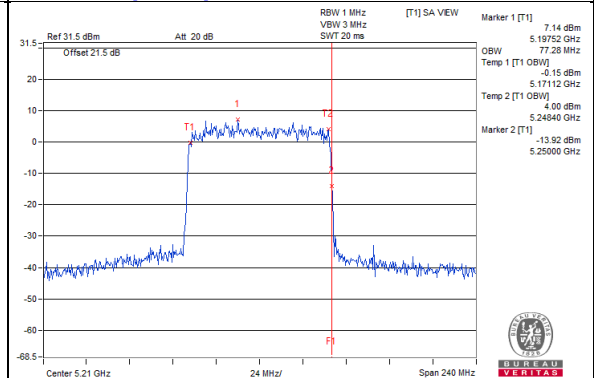
802.11ax (HE40)_Chain 3 / CH46



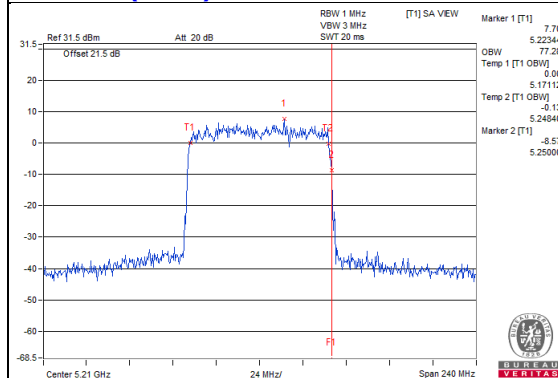
802.11ax (HE80)_Chain 0 / CH42



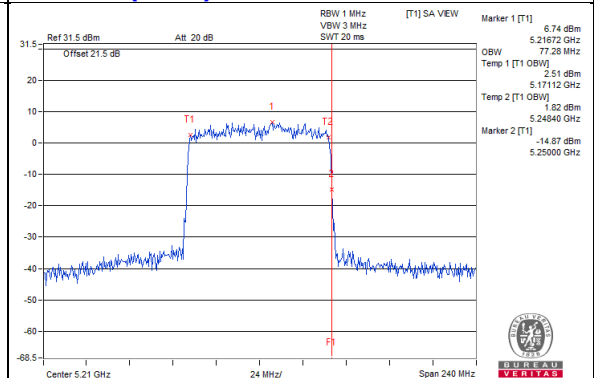
802.11ax (HE80)_Chain 1 / CH42



802.11ax (HE80)_Chain 2 / CH42

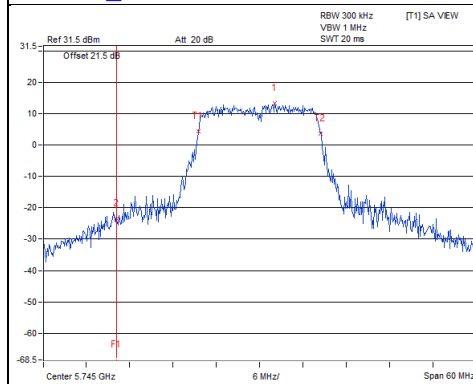


802.11ax (HE80)_Chain 3 / CH42

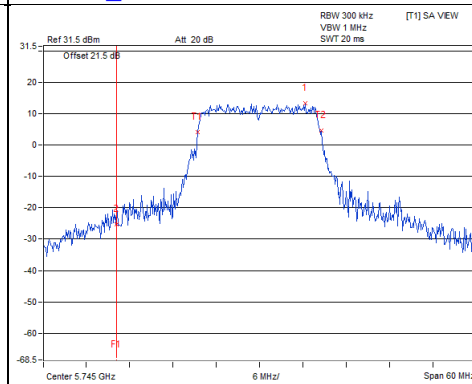


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

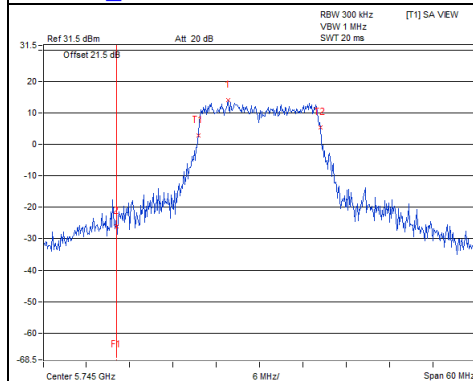
802.11a_Chain 0 / CH149



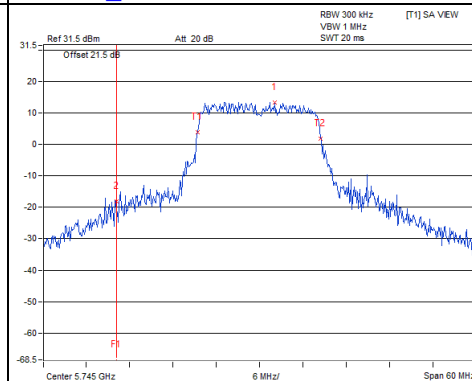
802.11a_Chain 1 / CH149



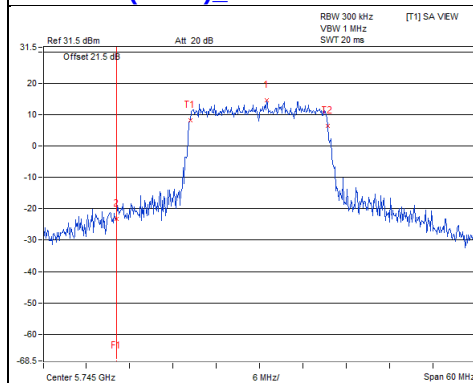
802.11a_Chain 2 / CH149



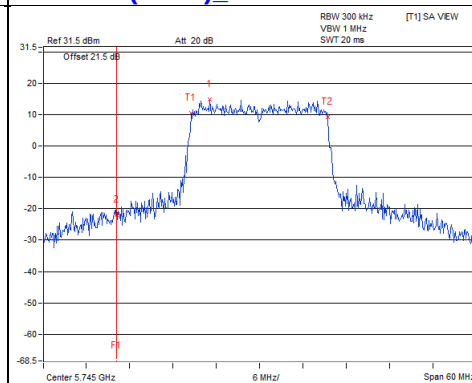
802.11a_Chain 3 / CH149



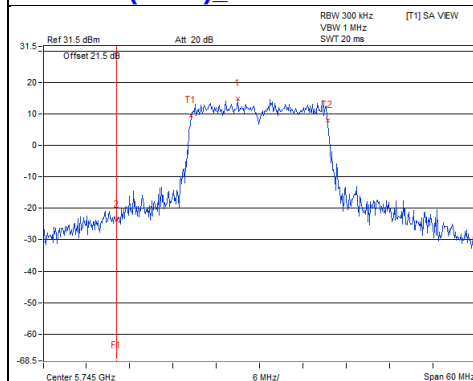
802.11ax (HE20)_Chain 0 / CH149



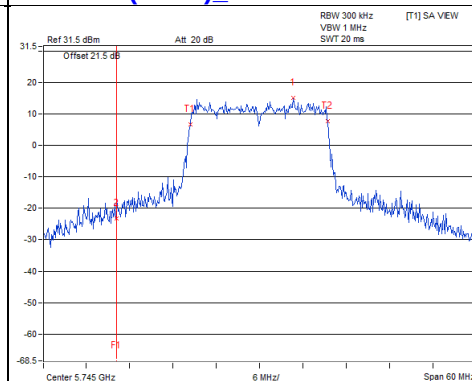
802.11ax (HE20)_Chain 1 / CH149



802.11ax (HE20)_Chain 2 / CH149

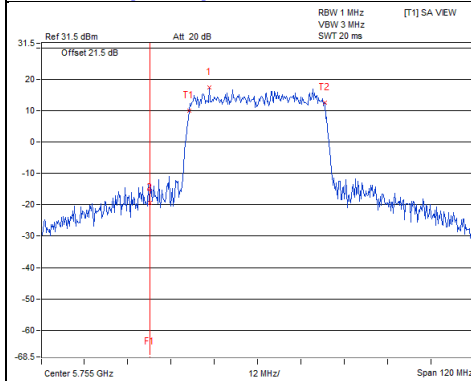


802.11ax (HE20)_Chain 3 / CH149

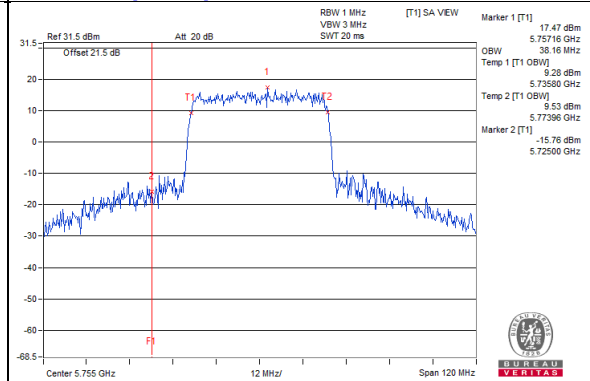


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

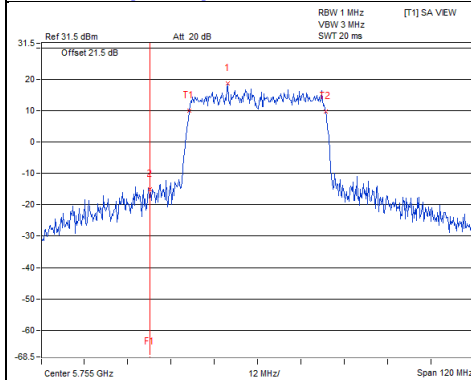
802.11ax (HE40)_Chain 0 / CH151



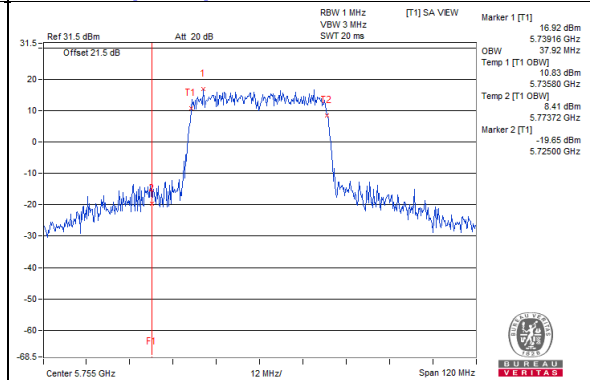
802.11ax (HE40)_Chain 1 / CH151



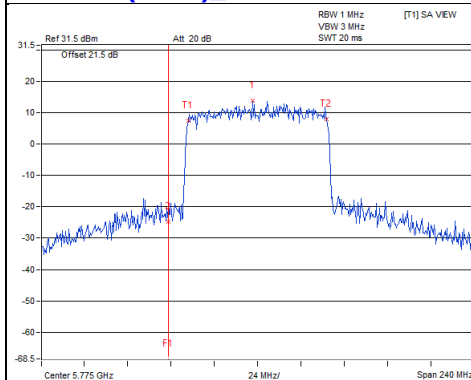
802.11ax (HE40)_Chain 2 / CH151



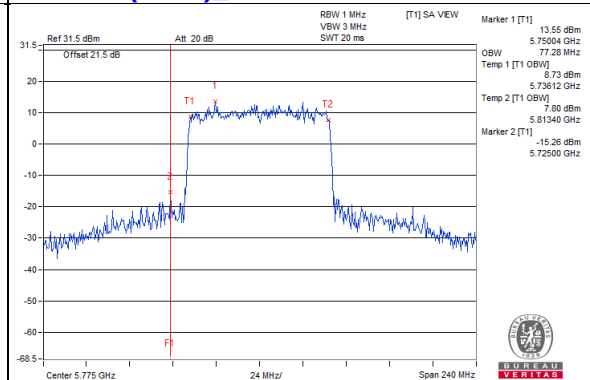
802.11ax (HE40)_Chain 3 / CH151



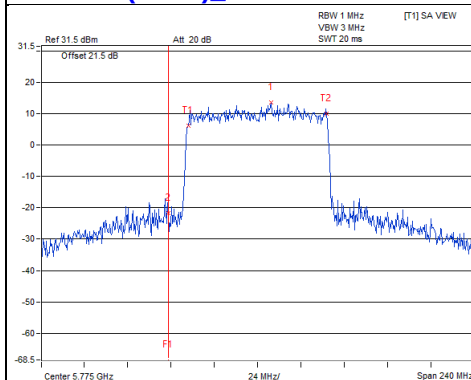
802.11ax (HE80)_Chain 0 / CH155



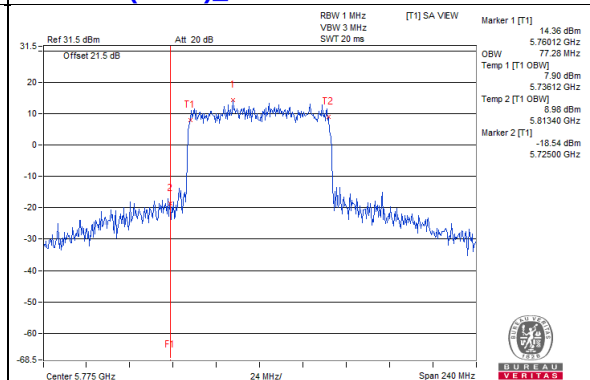
802.11ax (HE80)_Chain 1 / CH155



802.11ax (HE80)_Chain 2 / CH155



802.11ax (HE80)_Chain 3 / CH155

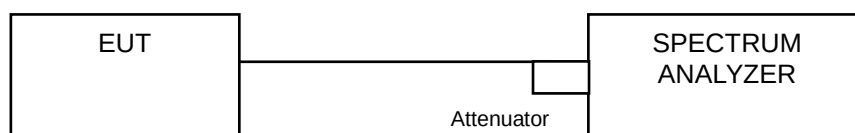


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For U-NII-1:

Using method SA-1

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

For U-NII-3:

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500 \text{ kHz}/300\text{kHz})$
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 Condition

Same as Item 4.3.6.

4.5.7 Test Results

CDD Mode

For U-NII-1:

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
36	5180	7.89	7.72	7.56	7.66	13.73	14.53	Pass
40	5200	8.02	7.56	7.66	8.14	13.87	14.53	Pass
48	5240	7.93	7.54	7.65	8.16	13.85	14.53	Pass

- Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20} / 4)] = 8.47 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $17 - (8.47 - 6) = 14.53 \text{ dBm}$.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
36	5180	6.11	6.42	6.74	6.84	12.56	14.53	Pass
40	5200	6.78	7.12	7.04	7.71	13.20	14.53	Pass
48	5240	6.77	7.49	7.51	7.30	13.30	14.53	Pass

- Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20} / 4)] = 8.47 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $17 - (8.47 - 6) = 14.53 \text{ dBm}$.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
38	5190	0.75	0.58	0.50	1.39	6.84	14.53	Pass
46	5230	6.11	6.73	5.96	6.32	12.31	14.53	Pass

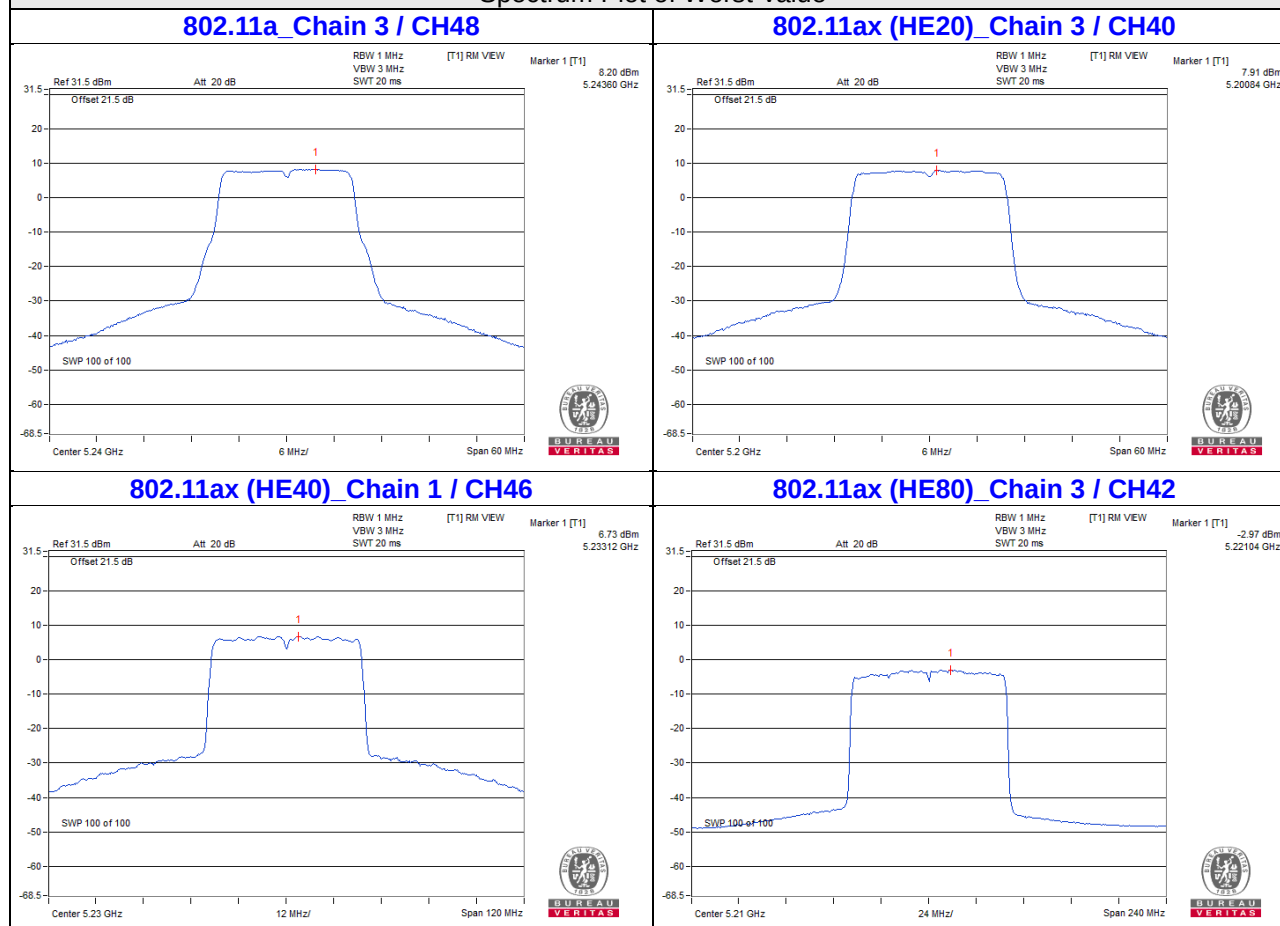
- Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20} / 4)] = 8.47 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $17 - (8.47 - 6) = 14.53 \text{ dBm}$.

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
42	5210	-3.28	-4.14	-3.82	-2.97	2.49	14.53	Pass

- Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20} / 4)] = 8.47 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $17 - (8.47 - 6) = 14.53 \text{ dBm}$.

Spectrum Plot of Worst Value



For U-NII-3:

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)				Total PSD (mW/300kHz)	Total PSD (dBm/300kHz)	Total PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3					
149	5745	1.42	1.25	1.31	1.66	5.534	7.43	9.65	28.07	PASS
157	5785	1.70	1.40	1.43	1.77	5.754	7.60	9.82	28.07	PASS
165	5825	1.91	1.49	1.51	1.26	5.715	7.57	9.79	28.07	PASS

- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
 2. The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20} / 4)] = 7.93 \text{ dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (7.93 - 6) = 28.07 \text{ dBm}$.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)				Total PSD (mW/300kHz)	Total PSD (dBm/300kHz)	Total PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3					
149	5745	0.44	0.34	0.36	0.41	4.375	6.41	8.63	28.07	PASS
157	5785	0.58	0.41	0.39	0.60	4.487	6.52	8.74	28.07	PASS
165	5825	0.54	0.41	0.43	0.41	4.436	6.47	8.69	28.07	PASS

- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
 2. The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20} / 4)] = 7.93 \text{ dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (7.93 - 6) = 28.07 \text{ dBm}$.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)				Total PSD (mW/300kHz)	Total PSD (dBm/300kHz)	Total PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3					
151	5755	-2.40	-2.44	-2.85	-3.00	2.1677	3.36	5.58	28.07	PASS
159	5795	-2.07	-2.29	-2.59	-2.71	2.2961	3.61	5.83	28.07	PASS

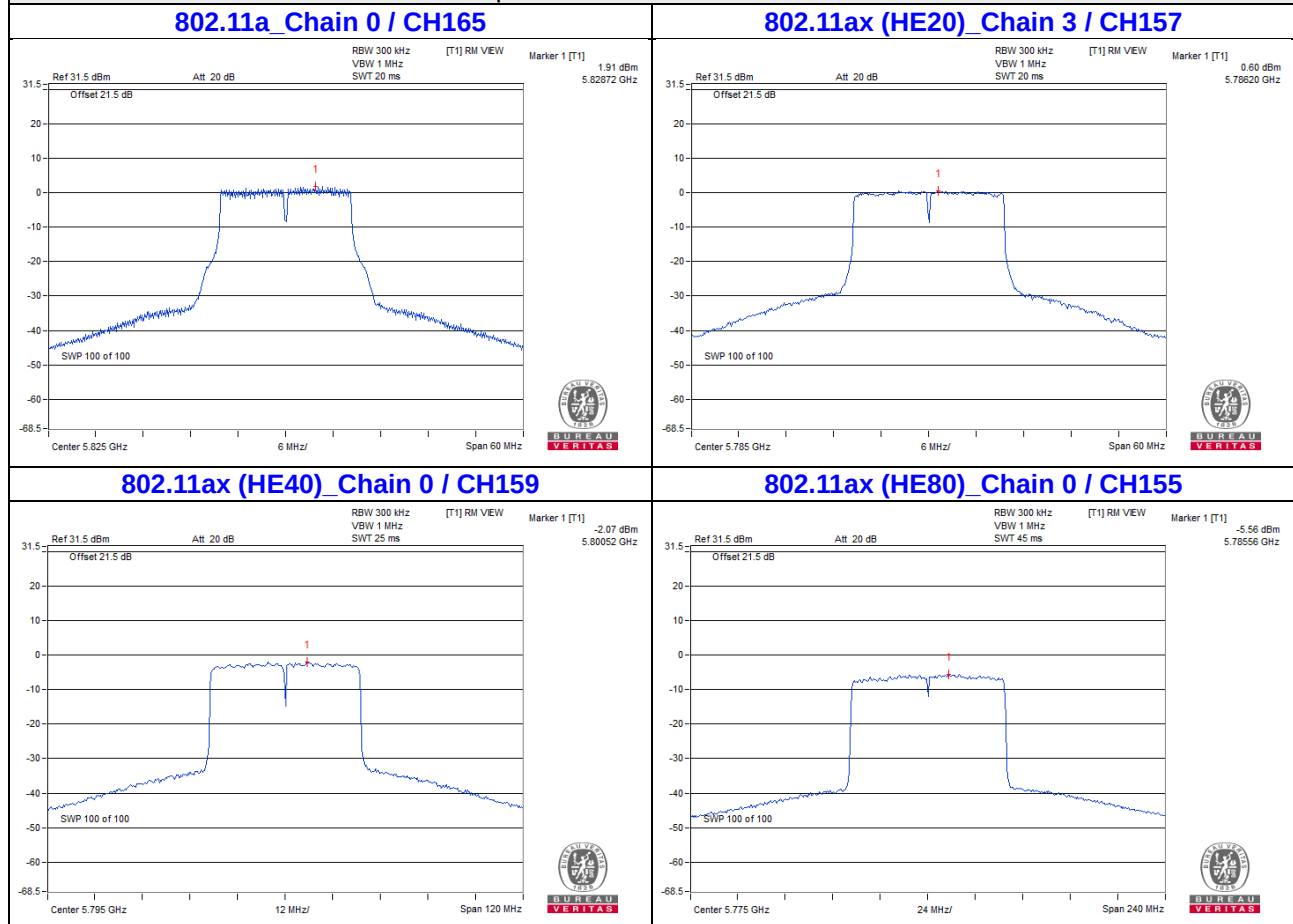
- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
 2. The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20} / 4)] = 7.93 \text{ dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (7.93 - 6) = 28.07 \text{ dBm}$.

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)				Total PSD (mW/300kHz)	Total PSD (dBm/300kHz)	Total PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3					
155	5775	-5.56	-6.32	-6.01	-5.65	1.0351	0.15	2.37	28.07	PASS

- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20} / 4)] = 7.93 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $30 - (7.93 - 6) = 28.07 \text{ dBm}$.

Spectrum Plot of Worst Value

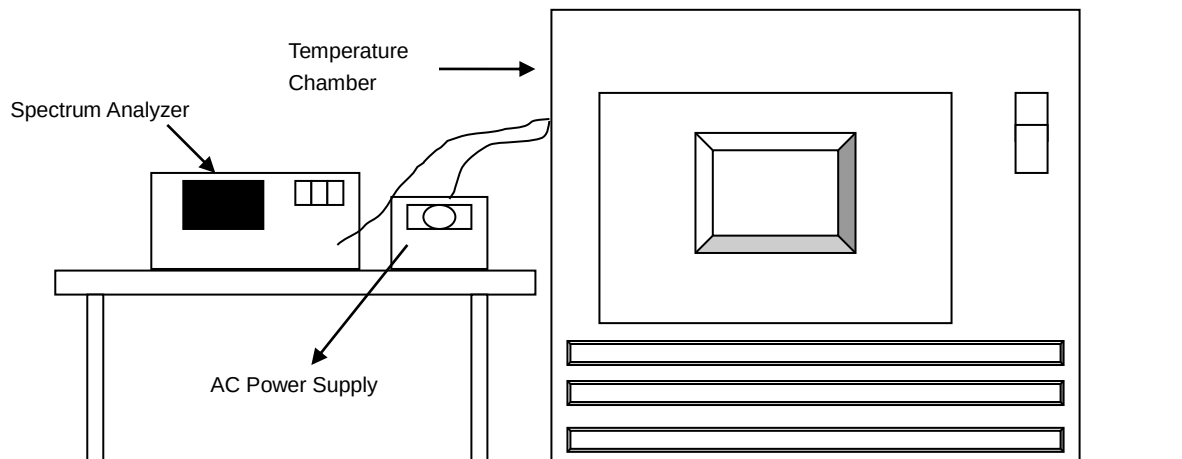


4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal AC 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 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
40	120	5179.9855	PASS	5179.9858	PASS	5179.9837	PASS	5179.9865	PASS
30	120	5179.9814	PASS	5179.9796	PASS	5179.9823	PASS	5179.9819	PASS
20	120	5179.9994	PASS	5179.9961	PASS	5179.9994	PASS	5179.995	PASS
10	120	5180.0174	PASS	5180.0167	PASS	5180.0195	PASS	5180.0164	PASS
0	120	5180.0029	PASS	5180.0022	PASS	5180.0008	PASS	5180.0035	PASS

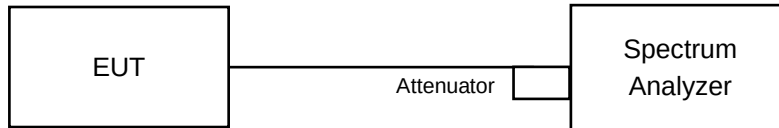
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5180.0003	PASS	5179.9971	PASS	5179.9984	PASS	5179.9949	PASS
	120	5179.9994	PASS	5179.9961	PASS	5179.9994	PASS	5179.995	PASS
	102	5179.9992	PASS	5179.9953	PASS	5179.9996	PASS	5179.9957	PASS

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

- Set resolution bandwidth (RBW) = 100kHz
- 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)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.43	16.43	16.43	16.42	0.5	Pass
157	5785	16.4	16.44	16.47	16.44	0.5	Pass
165	5825	16.44	16.43	16.45	16.43	0.5	Pass

802.11ax (HE20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	19.04	19.03	18.97	19.02	0.5	Pass
157	5785	19.12	19.05	18.97	19.04	0.5	Pass
165	5825	18.98	18.99	19.01	19.01	0.5	Pass

802.11ax (HE40)

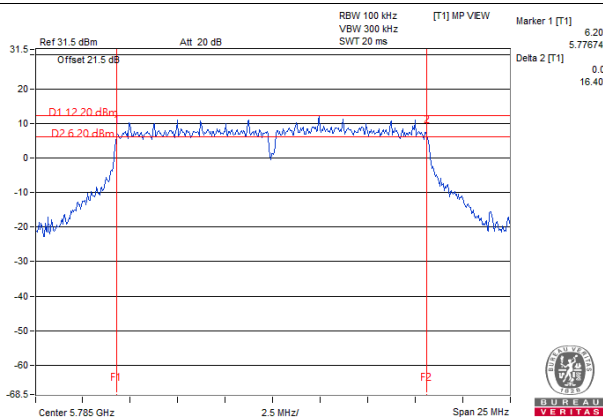
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	37.78	37.36	37.71	37.47	0.5	Pass
159	5795	37.69	37.22	37.75	37.44	0.5	Pass

802.11ax (HE80)

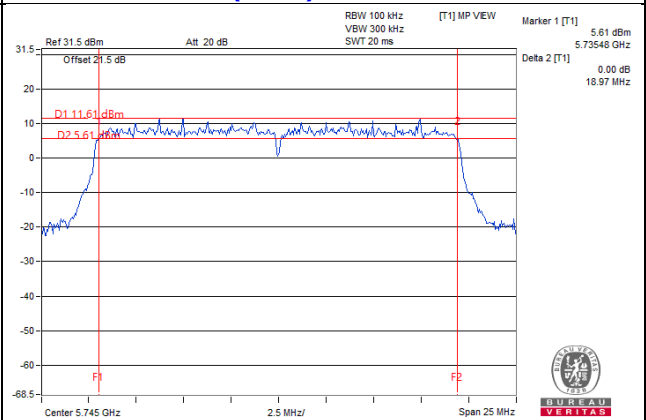
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	77.38	76.93	76.77	77.3	0.5	Pass

Spectrum Plot of Worst Value

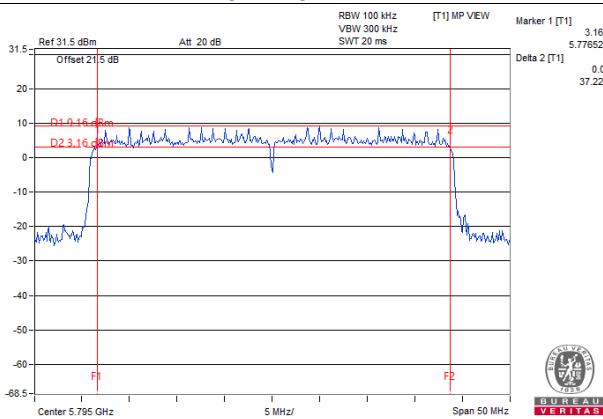
802.11a_Chain 0 / CH157



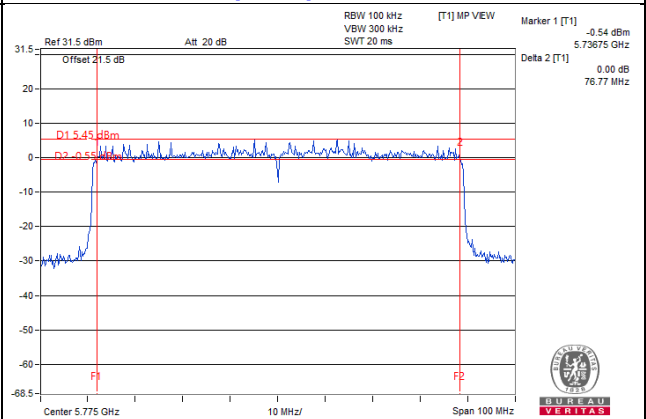
802.11ax (HE20)_Chain 2 / CH149



802.11ax (HE40)_Chain 1 / CH159



802.11ax (HE80)_Chain 2 / CH155



5 Pictures of Test Arrangements

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

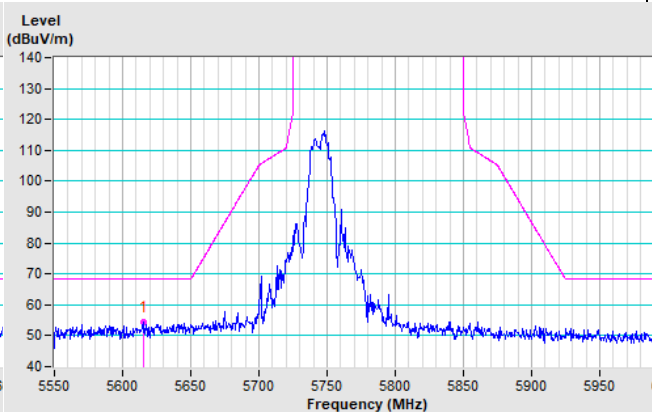
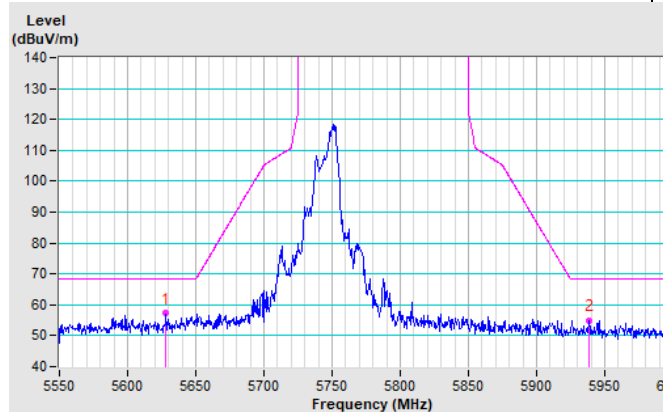
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

CH 149 5745 MHz

Horizontal

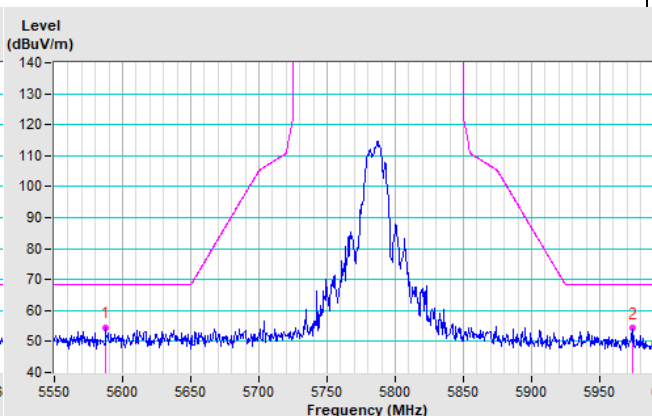
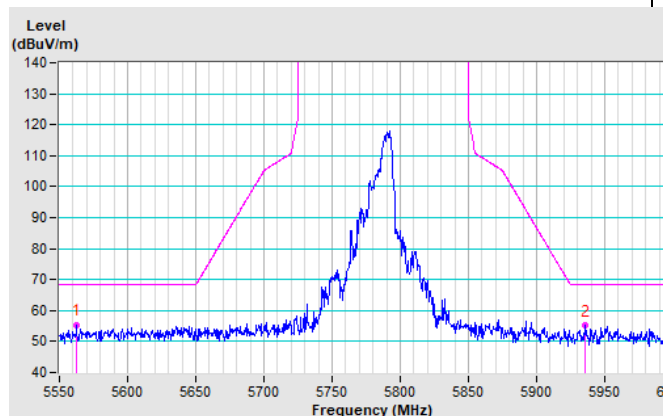
Vertical



CH 157 5785 MHz

Horizontal

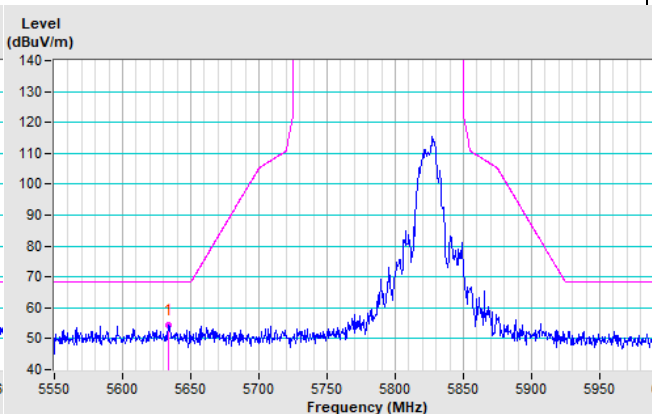
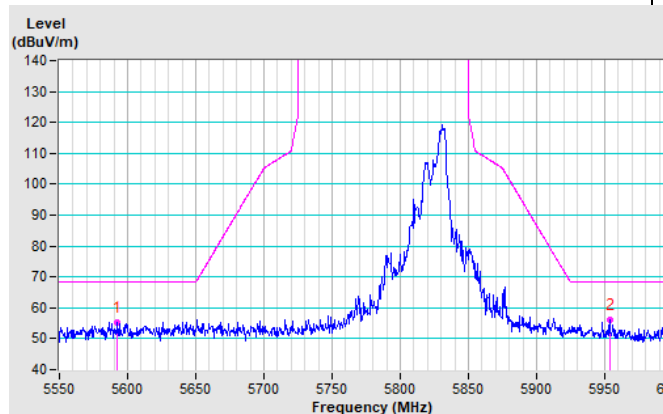
Vertical



CH 165 5825 MHz

Horizontal

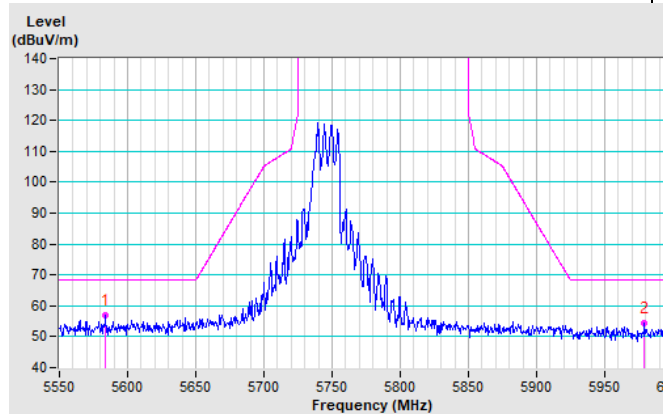
Vertical



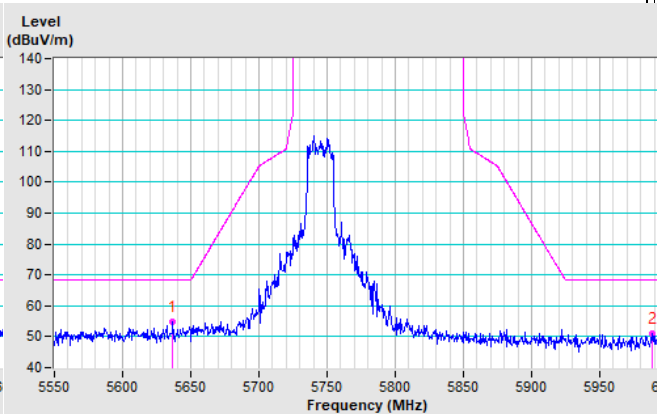
802.11ax (HE20)

CH 149 5745 MHz

Horizontal

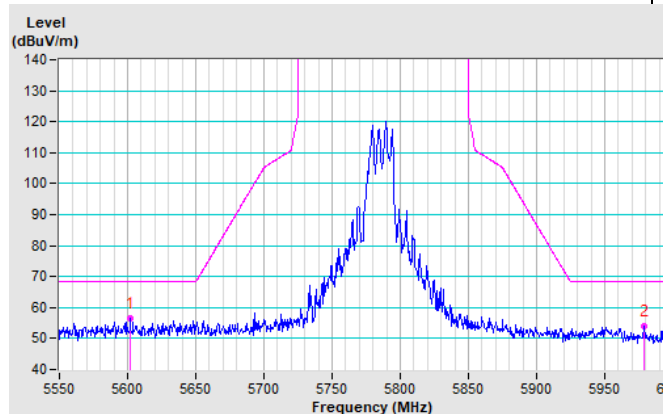


Vertical

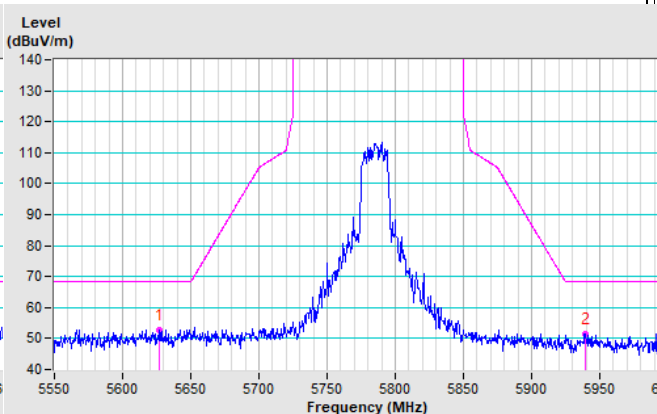


CH 157 5785 MHz

Horizontal

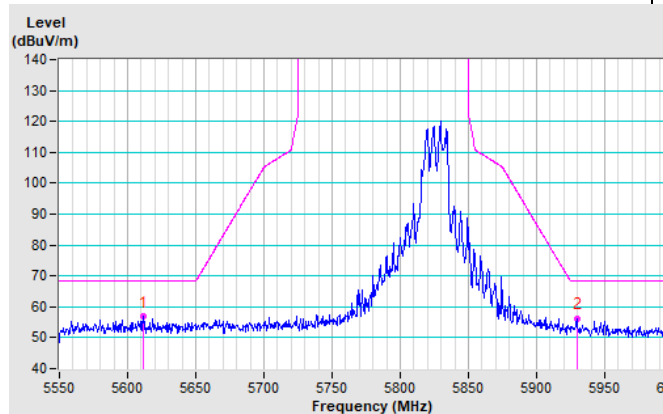


Vertical

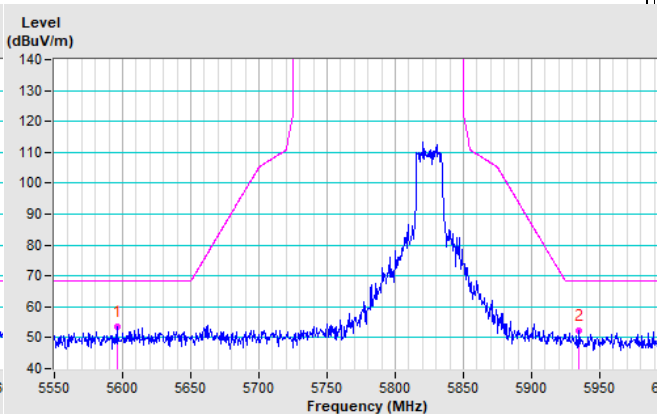


CH 165 5825 MHz

Horizontal



Vertical

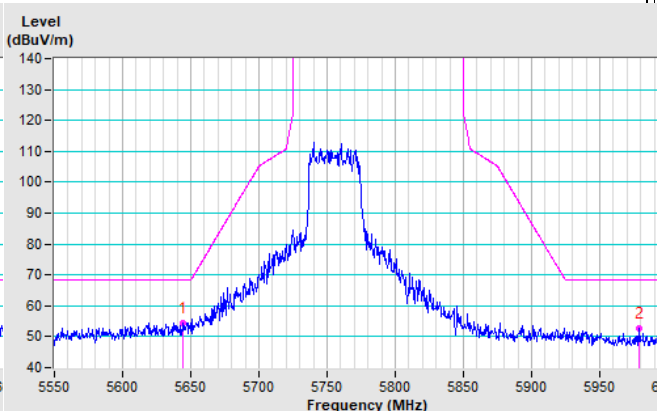
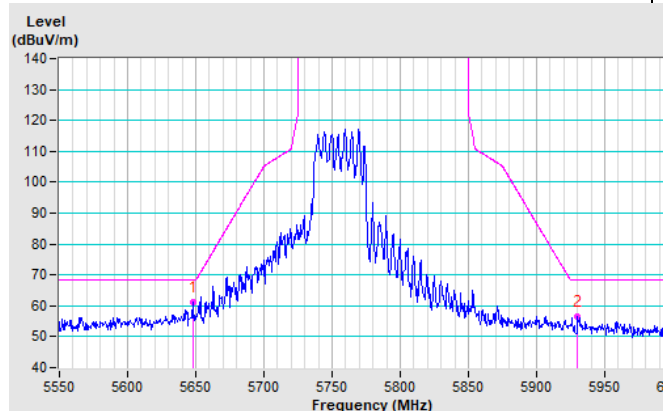


802.11ax (HE40)

CH 151 5755 MHz

Horizontal

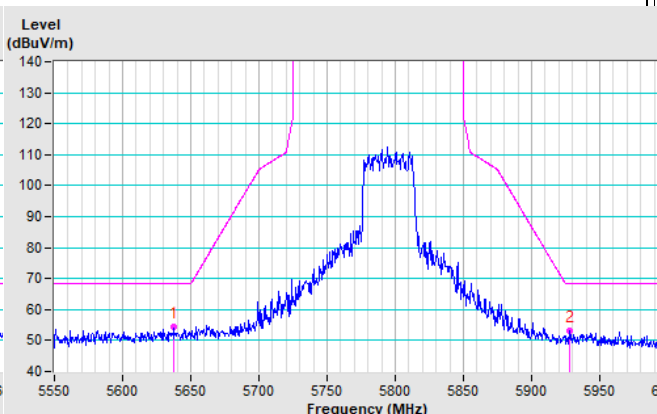
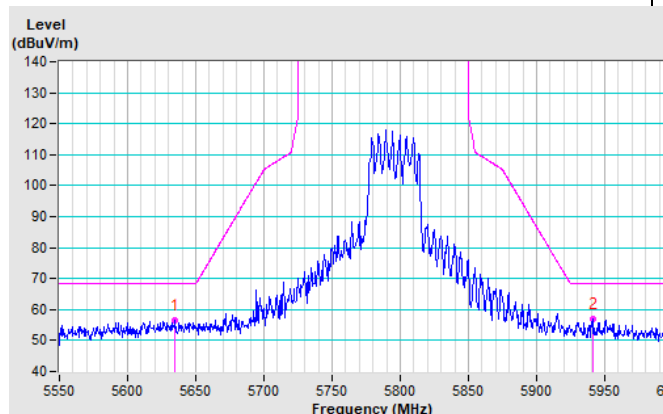
Vertical



CH 159 5795 MHz

Horizontal

Vertical

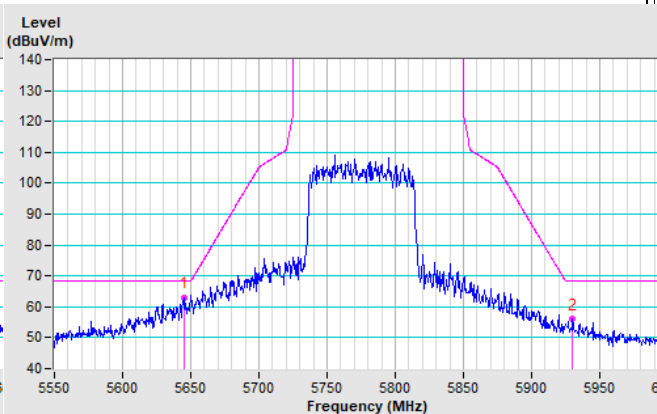
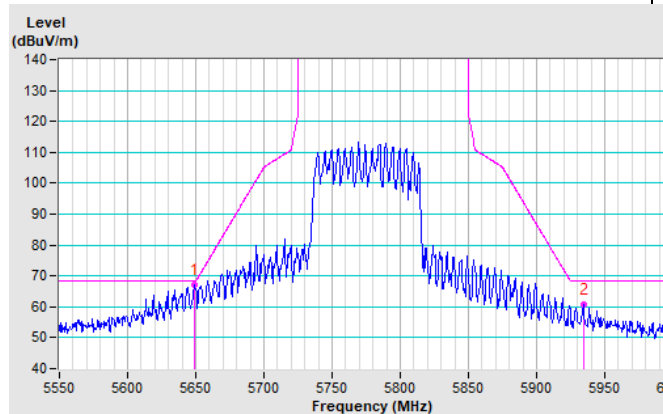


802.11ax (HE80)

CH 155 5775 MHz

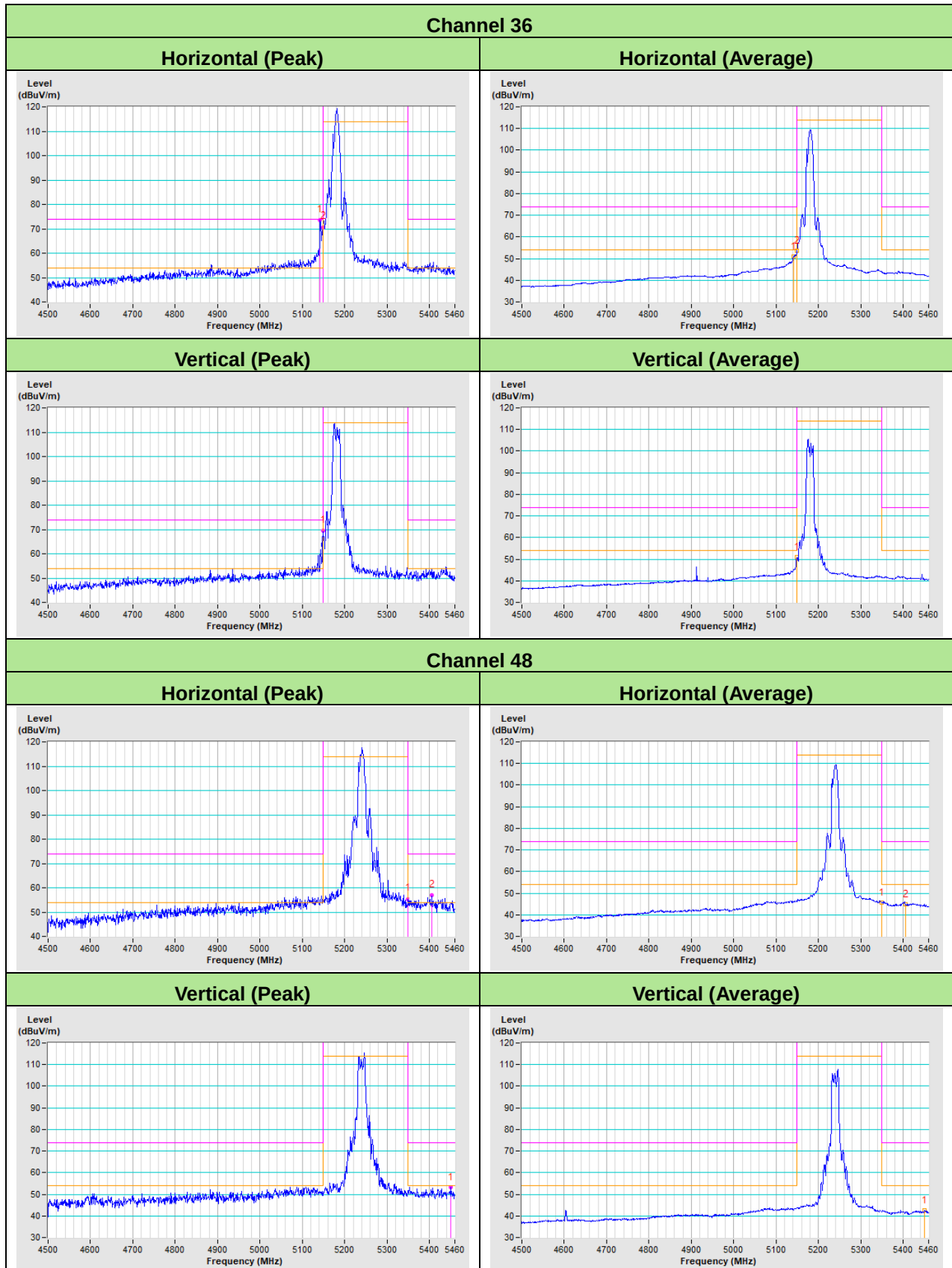
Horizontal

Vertical

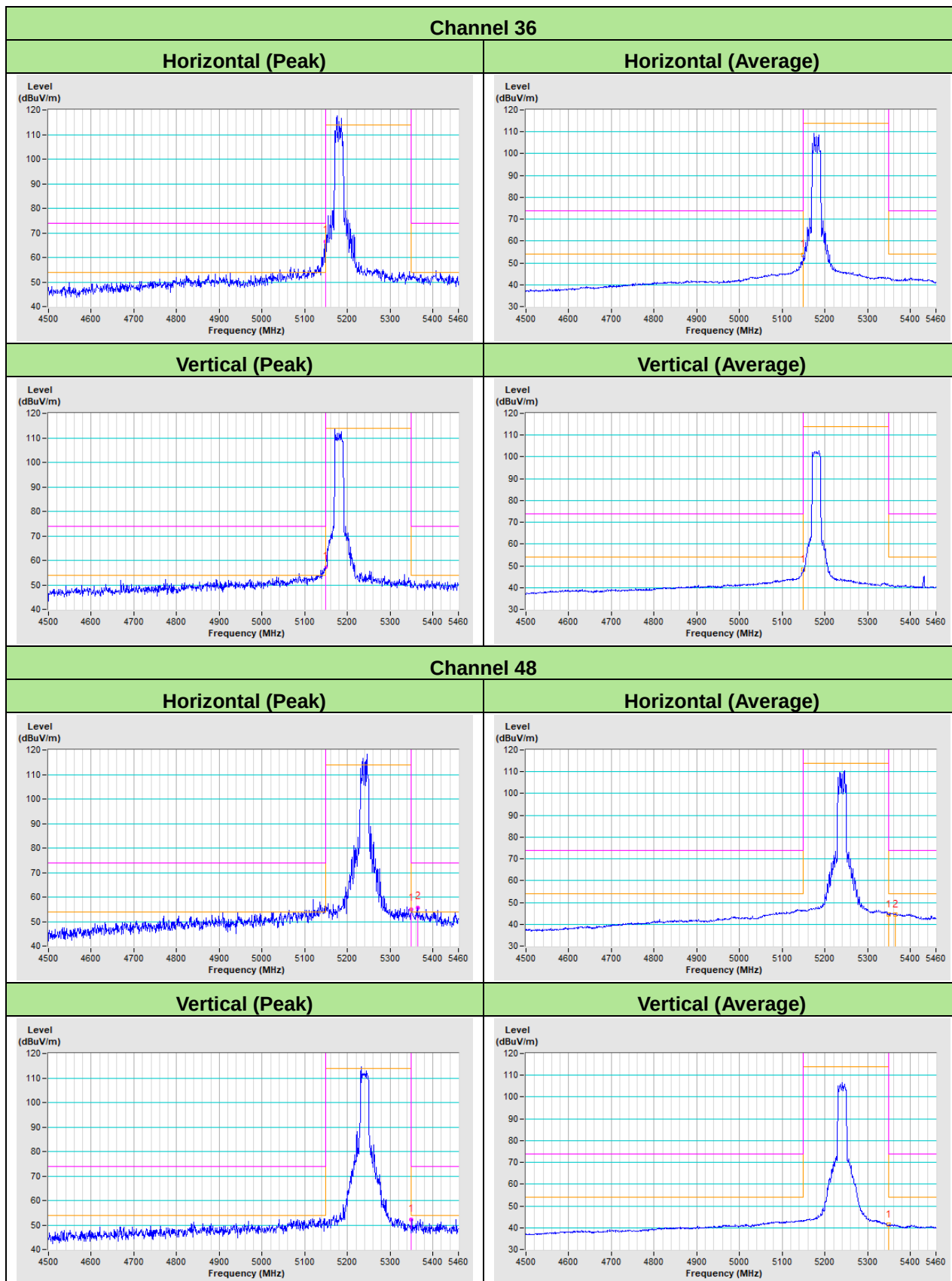


Annex B- Band-edge measurement (For U-NII-1 band)

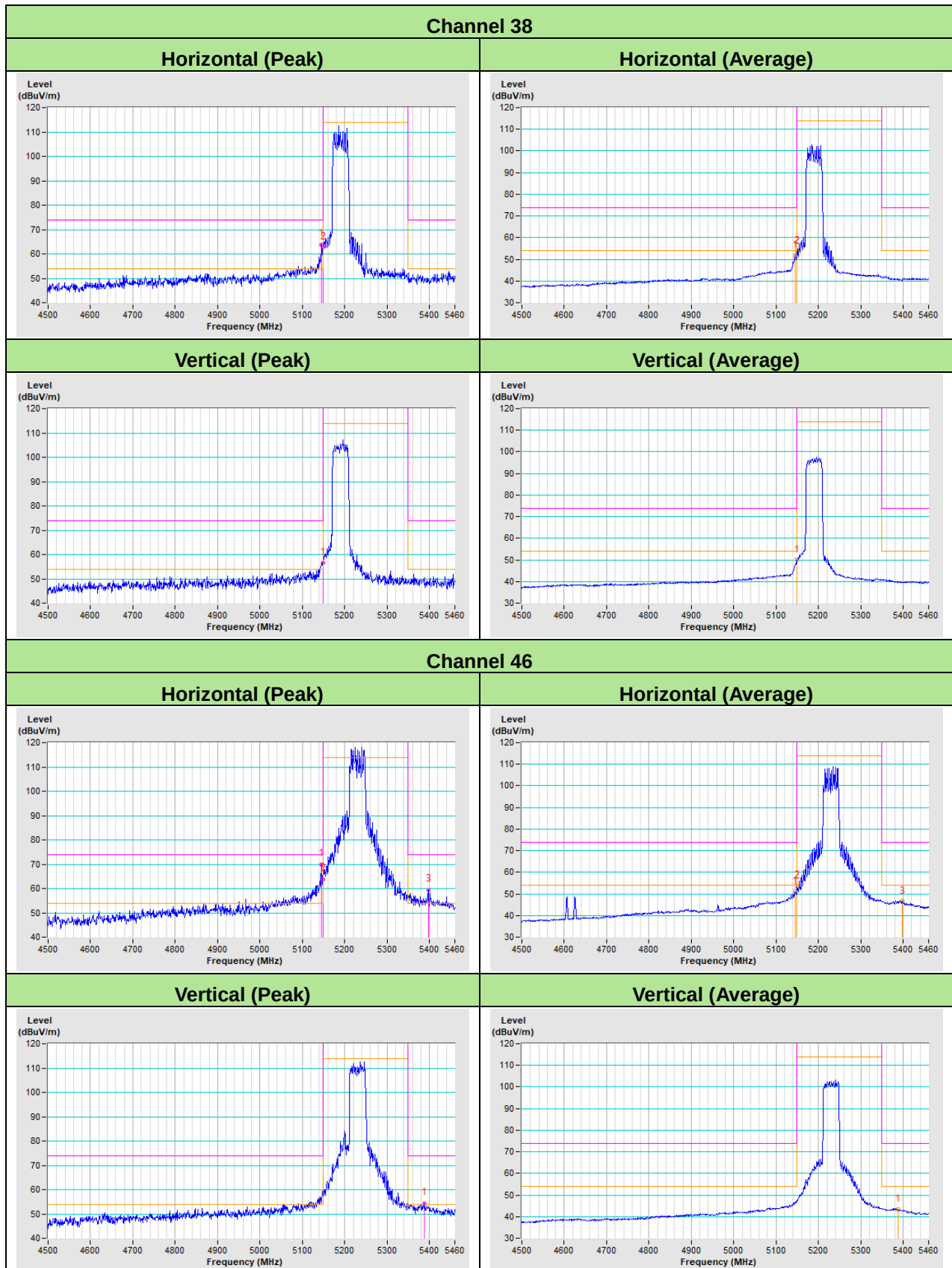
802.11a



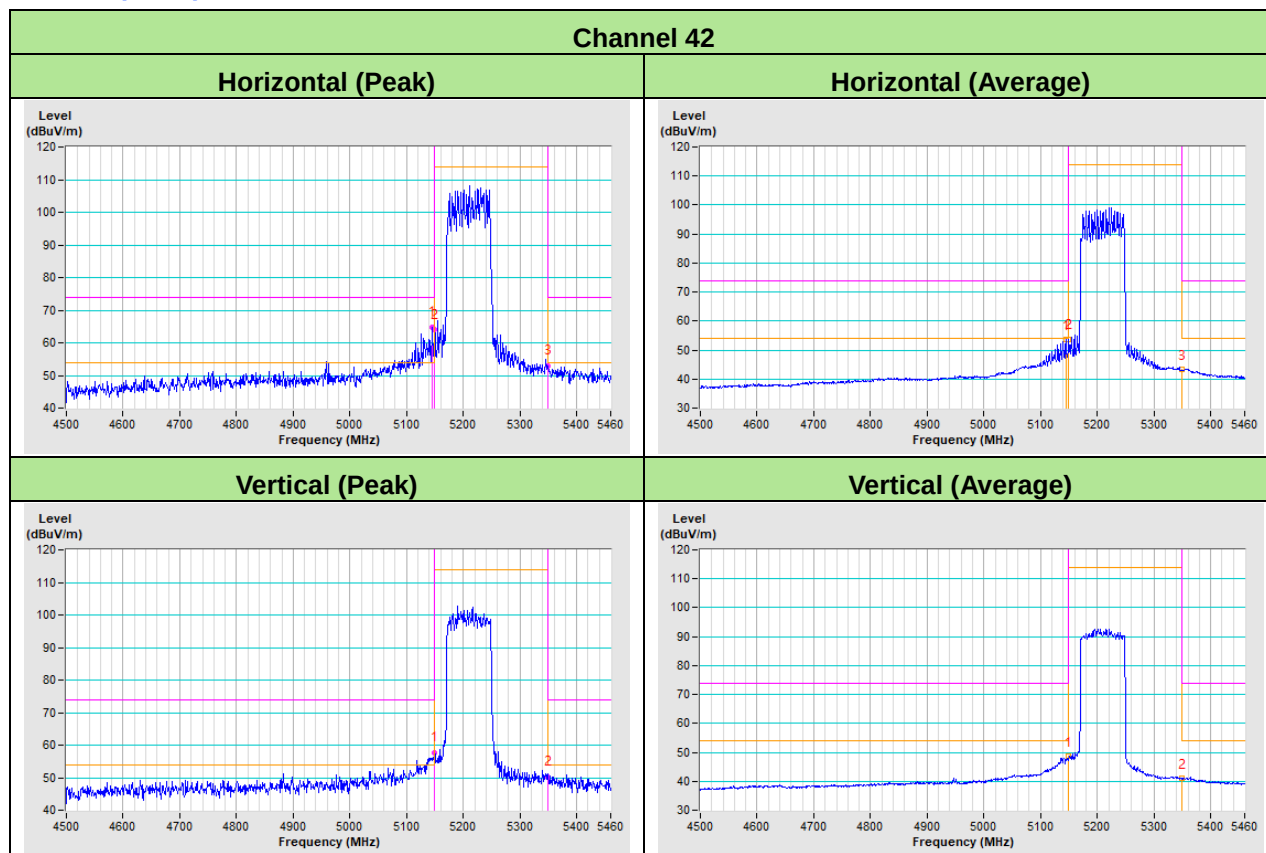
802.11ax (HE20)



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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