FCC Test Report

Report No.:	RF200511E11-1
FCC ID:	MSQ-CMAXI800
Test Model:	CMAX6000
Series Model:	CMAX6000V
Received Date:	May 11, 2020
Test Date:	May 16 to June 01, 2020
Issued Date:	Sep. 14, 2020
Applicant:	ASUSTeK Computer Inc.
Address:	1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, 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
RF200511E11-1	Original release.	Sep. 14, 2020

1 Certificate of Conformity

Product:	AX6000 Dual Band DOCSIS 3.1 Cable Modem Router , AX6000 Dual Band DOCSIS 3.1 Cable Modem Voice Router
Brand:	ASUS
Test Model:	CMAX6000
Series Model:	CMAX6000V
Sample Status:	ENGINEERING SAMPLE
Applicant:	ASUSTeK Computer Inc.
Test Date:	May 16 to June 01, 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 : Vivian Huang , **Date:** Sep. 14, 2020

Vivian Hunag / Specialist

Approved by : , **Date:** Sep. 14, 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 -11.59dB at 0.33359MHz.
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 -0.4dB at 5628.80MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF) not a standard connector.

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.9 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.4 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.0 dB
	18GHz ~ 40GHz	5.3 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AX6000 Dual Band DOCSIS 3.1 Cable Modem Router , AX6000 Dual Band DOCSIS 3.1 Cable Modem Voice Router
Brand	ASUS
Test Model	CMAX6000
Series Model	CMAX6000V
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT20/40 in 2.4GHz 1024QAM for OFDMA in 11ax HE mode
Modulation Technology	DSSS,OFDM, OFDMA
Transfer Rate	802.11b: up to 11 Mbps 802.11a/g: up to 54 Mbps 802.11n: up to 600 Mbps 802.11ac: up to 1733.3 Mbps 802.11ax: up to 2401.9 Mbps
Operating Frequency	**2.4GHz:** 2.412GHz ~ 2.462GHz **5GHz:** 5.18 ~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20), VHT20, 80211ax (HE20): 11 802.11n (HT40), VHT40, 80211ax (HE40): 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20), 80211ax (HE20): 9 802.11n (HT40), 802.11ac (VHT40), 80211ax (HE40): 4 802.11ac (VHT80), 80211ax (HE80): 2
Output Power	**CDD Mode:** **2.412 ~ 2.462 GHz:** 984.387 mW **5.18 ~ 5.24 GHz:** 901.087 mW **5.745 ~ 5.825 GHz:** 862.325 mW **Beamforming Mode:** **2.412 ~ 2.462 GHz:** 618.439 mW **5.18 ~ 5.24 GHz:** 686.722 mW **5.745 ~ 5.825 GHz:** 694.634 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x1
Data Cable Supplied	RJ-45 Cable x 1(Unshielded, 1m)

Note:

1. The EUT has two model names which are identical to each other in all aspects except for the followings:

Brand Name	Product Name	Model Name	Description
ASUS	AX6000 Dual Band DOCSIS 3.1 Cable Modem Voice Router	CMAX6000V	Main board has FXS RJ11 port X2, RF board has battery status port X1.
	AX6000 Dual Band DOCSIS 3.1 Cable Modem Router	CMAX6000	Main board hasn't FXS RJ11 port, RF board hasn't battery status port.
Note: From the above models, the radiated emission and conducted emission worse case was found in Model: **CMAX6000**. Therefore only the test data of the mode was recorded in this report.			

2. The EUT has two radios as following table:

Radio 1	Radio 2
WLAN 2.4GHz	WLAN 5GHz

3. 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.		

4. The EUT must be supplied with a power adapter and following different models could be chosen:

No.	Brand	Model No.	Spec.
1	Asian Power Devices Inc	WA-36A12FU	Input: 100-240Vac, 0.9A, 50/60Hz Output: 12Vdc, 3.0A DC Output cable: Unshielded, 1.5m
2	HONOR	ADS-36FKJ-12 12036EPCU	Input: 100-240Vac, 1A, 50/60Hz Output: 12Vdc, 3.0A DC Output cable: Unshielded, 1.5m
Note: From the above models, the worst radiated emission test and conducted emission test were found in **Adapter 2**. Therefore only the test data of the models were recorded in this report.			

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

Antenna NO.	Chain No.	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	Cable Length (mm)
1	0	2.42	2.4~2.4835GHz	PIFA	i-pex(MHF)	227
		0.49	5.15~5.85GHz			
2	1	0.09	2.4~2.4835GHz	PIFA	i-pex(MHF)	171
		1.42	5.15~5.85GHz			
3	2	1.38	2.4~2.4835GHz	PIFA	i-pex(MHF)	145
		1.44	5.15~5.85GHz			
4	3	3.69	2.4~2.4835GHz	PIFA	i-pex(MHF)	73
		2.46	5.15~5.85GHz			

6. The EUT incorporates a MIMO function:

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

Note:
1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
2. The EUT support Beamforming and CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz), and 802.11ax mode for 20MHz (40MHz, 80MHz), therefore the manufacturer will control the power for 802.11n mode is the same as the 802.11ax 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)

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

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

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

Channel	Frequency
42	5210 MHz

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

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

Channel	Frequency
155	5775 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

Radiated Emission Test (Above 1GHz):

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

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

Radiated Emission Test (Below 1GHz):

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (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:

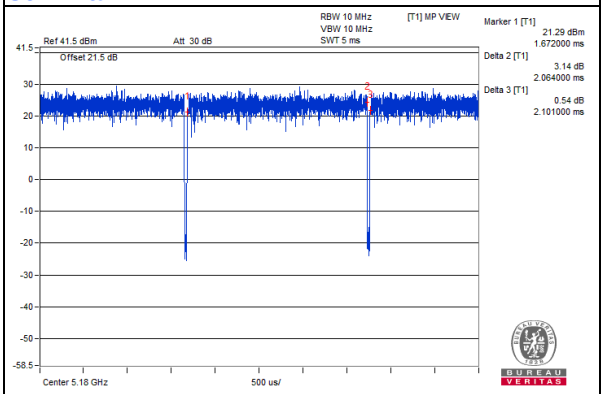
Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	24deg. C, 68%RH	120Vac, 60Hz	Nelson Teng
RE<1G	22deg. C, 67%RH	120Vac, 60Hz	Kevien Ko
PLC	22deg. C, 68%RH	120Vac, 60Hz	Nick Lo
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

3.3 Duty Cycle of Test Signal

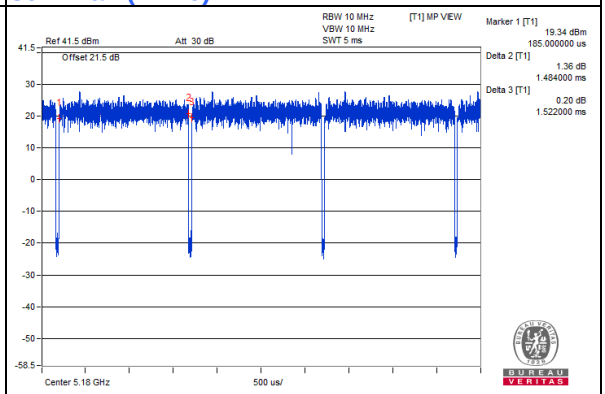
If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11a: Duty cycle = 2.064 ms /2.101 ms=0.982
802.11ax (HE20): Duty cycle = 1.484 ms /1.522 ms=0.975, Duty factor = 10 * log (1/Duty cycle) = 0.11 dB
802.11ax (HE40): Duty cycle = 0.77 ms /0.804 ms=0.958, Duty factor = 10 * log (1/Duty cycle) = 0.19 dB
802.11ax (HE80): Duty cycle = 0.401 ms /0.434 ms=0.924, Duty factor = 10 * log (1/Duty cycle) = 0.34 dB

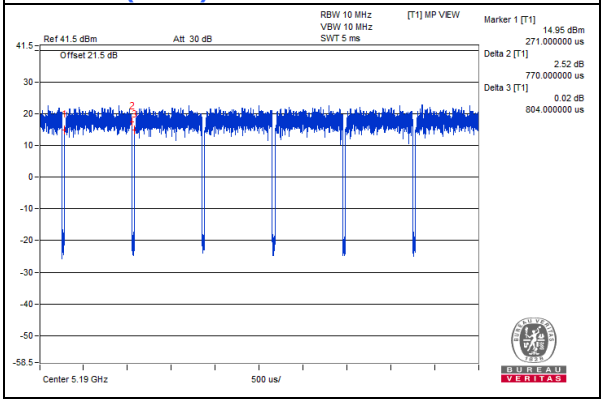
802.11a



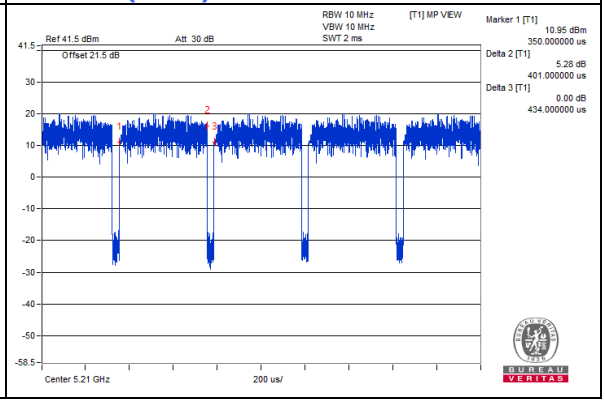
802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)



3.4 Description of Support Units

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

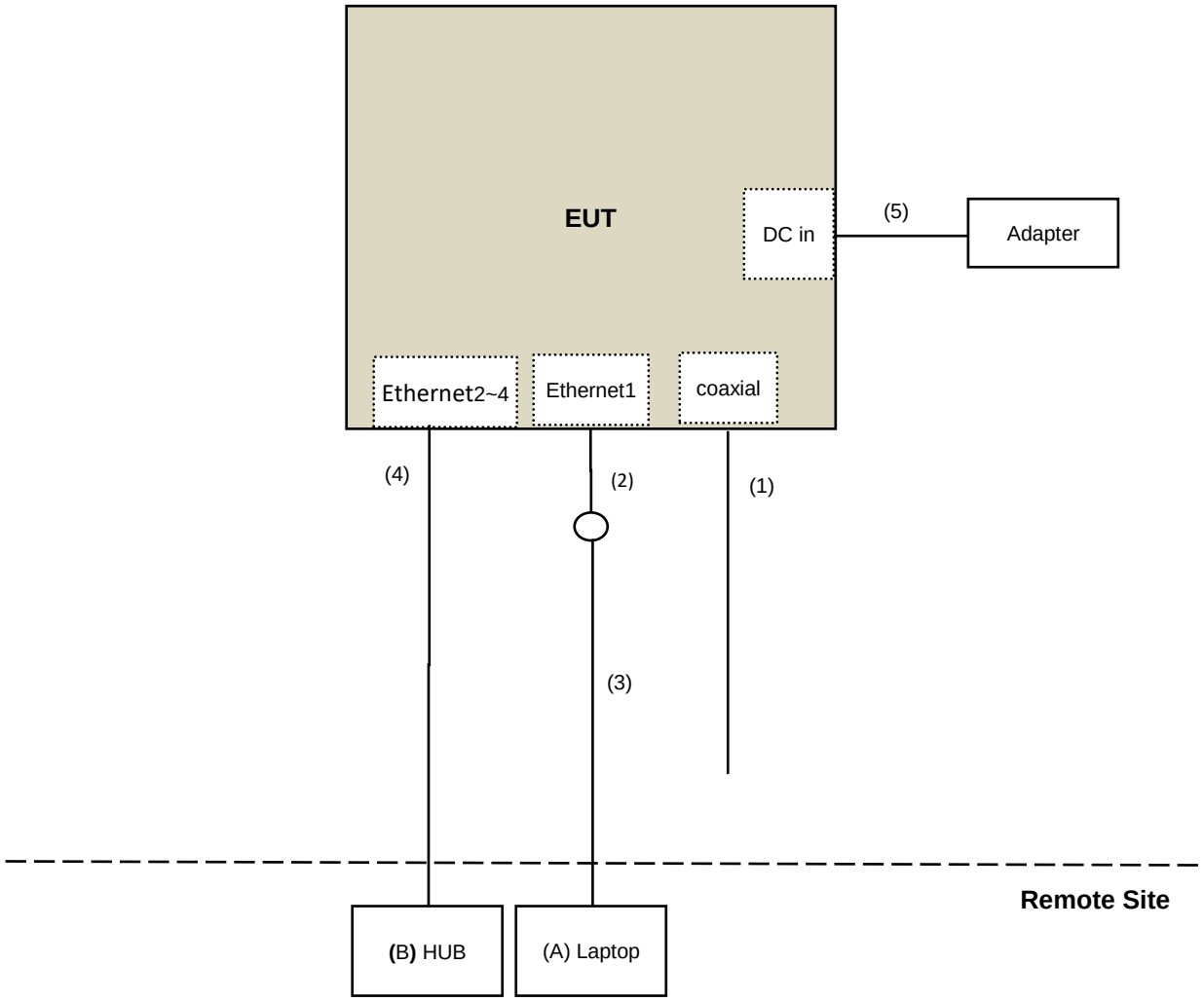
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
B.	HUB	D-Link	DGS-1005D	DR8WC92000968	NA	Provided by Lab

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Coaxial Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	1	No	0	Provided by Lab
3.	RJ-45 Cable	1	10	No	0	Provided by Lab
4.	RJ-45 Cable	3	10	No	0	Provided by Lab
5.	DC Cable	1	1.5	No	0	Supplied by client

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard and References

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

Test Standard:

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

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

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

Limits of unwanted emission out of the restricted bands

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

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

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

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

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

Note:

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

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

4.1.2 Test Instruments

For Radiated emission test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Pre-Amplifier EMCI	EMC001340	980142	May 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 10, 2019	June 09, 2020
RF Cable	EMC104-SM-SM-6000	180602	June 10, 2019	June 09, 2020
Spectrum Analyzer Keysight	N9030A	MY54490679	July 17, 2019	July 16, 2020
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: May 30 to June 01, 2020

For Bandedge & OOBE test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Horn_Antenna SCHWARZBECK	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 10, 2019	June 09, 2020
RF Cable	EMC104-SM-SM-6000	180602	June 10, 2019	June 09, 2020
Spectrum Analyzer Keysight	N9030A	MY54490679	July 17, 2019	July 16, 2020
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: May 16 to 22, 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 26, 2019	July 25, 2020
Power sensor Anritsu	MA2411B	1339443	July 26, 2019	July 25, 2020
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
Voltage Meter FLUKE	179	89610322	Sep. 25, 2019	Sep. 24, 2020
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: May 30, 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:

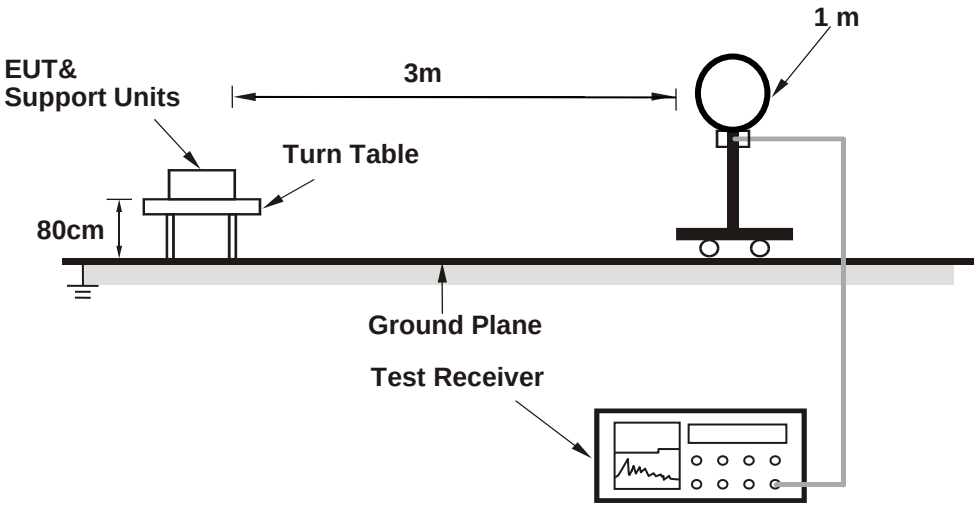
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

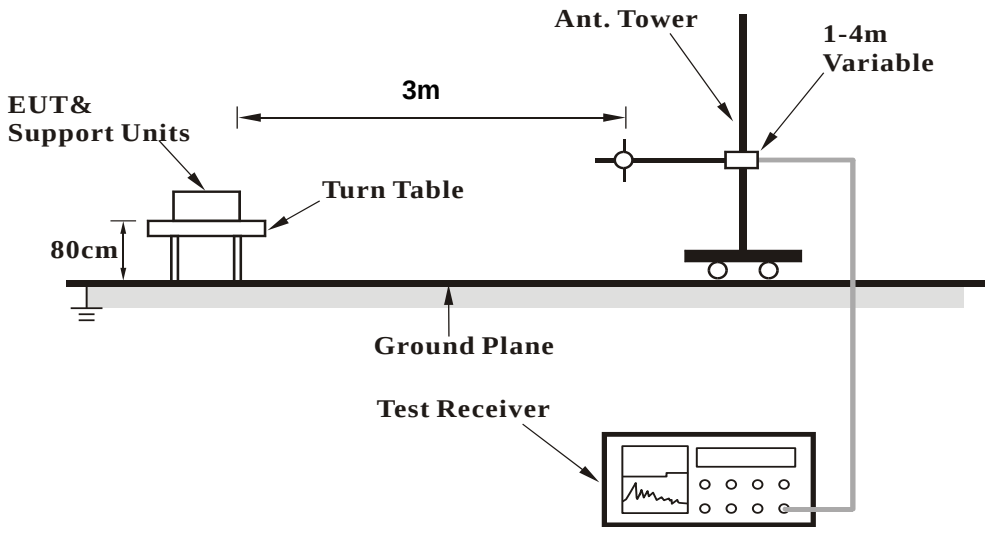
No deviation.

4.1.5 Test Setup

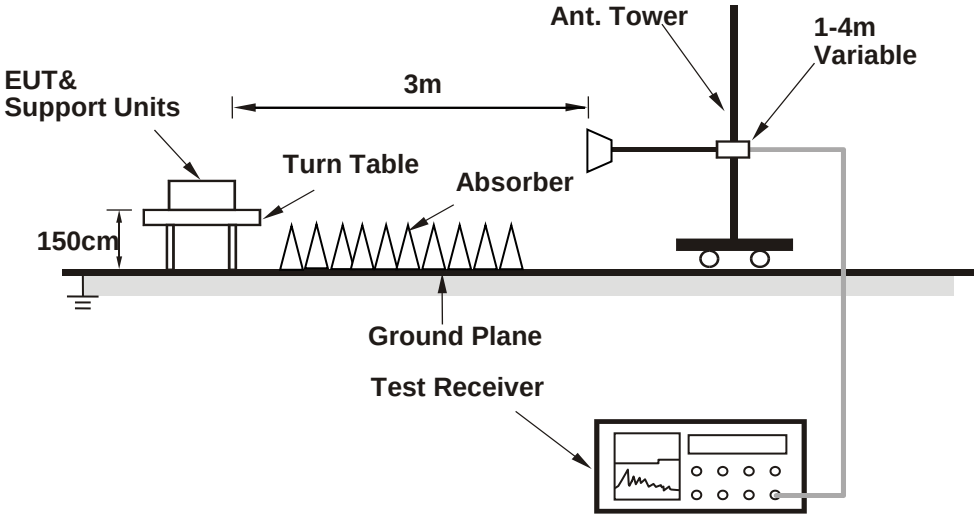
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

a. Connected the EUT with the Laptop Computer which is placed on remote site.
b. Controlling software (accessMtool v3.1.01) 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) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	72.4 PK	74.0	-1.6	1.64 H	280	68.7	3.7
2	5150.00	49.7 AV	54.0	-4.3	1.64 H	280	46.0	3.7
3	*5180.00	116.3 PK			1.64 H	280	112.7	3.6
4	*5180.00	106.1 AV			1.64 H	280	102.5	3.6
5	#10360.00	47.6 PK	68.2	-20.6	2.05 H	85	34.9	12.7
6	15540.00	48.0 PK	74.0	-26.0	2.29 H	136	34.8	13.2
7	15540.00	34.7 AV	54.0	-19.3	2.29 H	136	21.5	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	73.4 PK	74.0	-0.6	1.91 V	118	69.7	3.7
2	5150.00	52.6 AV	54.0	-1.4	1.91 V	118	48.9	3.7
3	*5180.00	119.9 PK			1.91 V	118	116.3	3.6
4	*5180.00	109.2 AV			1.91 V	118	105.6	3.6
5	#10360.00	46.8 PK	68.2	-21.4	1.51 V	135	34.1	12.7
6	15540.00	46.0 PK	74.0	-28.0	2.83 V	224	32.8	13.2
7	15540.00	33.6 AV	54.0	-20.4	2.83 V	224	20.4	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) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	120.2 PK			1.59 H	296	116.7	3.5
2	*5200.00	109.6 AV			1.59 H	296	106.1	3.5
3	#10400.00	47.5 PK	68.2	-20.7	2.09 H	96	34.7	12.8
4	15600.00	48.0 PK	74.0	-26.0	2.21 H	118	34.5	13.5
5	15600.00	34.3 AV	54.0	-19.7	2.21 H	118	20.8	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	122.1 PK			1.77 V	117	118.6	3.5
2	*5200.00	111.2 AV			1.77 V	117	107.7	3.5
3	#10400.00	46.9 PK	68.2	-21.3	1.53 V	140	34.1	12.8
4	15600.00	46.2 PK	74.0	-27.8	2.88 V	239	32.7	13.5
5	15600.00	33.4 AV	54.0	-20.6	2.88 V	239	19.9	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) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	120.1 PK			1.68 H	293	116.6	3.5
2	*5240.00	109.3 AV			1.68 H	293	105.8	3.5
3	5350.00	57.6 PK	74.0	-16.4	1.68 H	293	54.2	3.4
4	5350.00	45.7 AV	54.0	-8.3	1.68 H	293	42.3	3.4
5	#10480.00	46.8 PK	68.2	-21.4	2.11 H	105	33.7	13.1
6	15720.00	47.4 PK	74.0	-26.6	2.26 H	126	33.6	13.8
7	15720.00	34.7 AV	54.0	-19.3	2.26 H	126	20.9	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	122.3 PK			1.76 V	117	118.8	3.5
2	*5240.00	111.4 AV			1.76 V	117	107.9	3.5
3	5350.00	59.7 PK	74.0	-14.3	1.76 V	117	56.3	3.4
4	5350.00	47.2 AV	54.0	-6.8	1.76 V	117	43.8	3.4
5	#10480.00	47.1 PK	68.2	-21.1	1.50 V	131	34.0	13.1
6	15720.00	45.8 PK	74.0	-28.2	2.92 V	253	32.0	13.8
7	15720.00	33.6 AV	54.0	-20.4	2.92 V	253	19.8	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) Average (AV)
Frequency Range	1GHz ~ 40GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5643.95	64.0 PK	68.2	-4.2	2.69 H	151	60.1	3.9
2	*5745.00	126.0 PK			2.69 H	151	122.0	4.0
3	*5745.00	115.8 AV			2.69 H	151	111.8	4.0
4	#5981.19	58.1 PK	68.2	-10.1	2.69 H	151	53.4	4.7
5	11490.00	47.4 PK	74.0	-26.6	2.11 H	121	34.1	13.3
6	11490.00	36.1 AV	54.0	-17.9	2.11 H	121	22.8	13.3
7	#17235.00	46.8 PK	68.2	-21.4	2.26 H	112	29.2	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	#5633.12	59.4 PK	68.2	-8.8	2.16 V	57	55.6	3.8
2	*5745.00	120.0 PK			2.16 V	57	116.0	4.0
3	*5745.00	109.7 AV			2.16 V	57	105.7	4.0
4	#5930.53	54.0 PK	68.2	-14.2	2.16 V	57	49.5	4.5
5	11490.00	47.2 PK	74.0	-26.8	1.53 V	125	33.9	13.3
6	11490.00	35.8 AV	54.0	-18.2	1.53 V	125	22.5	13.3
7	#17235.00	45.3 PK	68.2	-22.9	2.87 V	247	27.7	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.

Channel	TX Channel 157	Detector Function	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	#5604.26	64.0 PK	68.2	-4.2	2.69 H	158	60.3	3.7
2	*5785.00	127.1 PK			2.69 H	158	123.0	4.1
3	*5785.00	117.1 AV			2.69 H	158	113.0	4.1
4	#5926.52	60.2 PK	68.2	-8.0	2.69 H	158	55.7	4.5
5	11570.00	47.8 PK	74.0	-26.2	2.10 H	97	34.6	13.2
6	11570.00	36.5 AV	54.0	-17.5	2.10 H	97	23.3	13.2
7	#17355.00	46.4 PK	68.2	-21.8	2.21 H	127	28.8	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	#5635.06	59.0 PK	68.2	-9.2	2.37 V	48	55.2	3.8
2	*5785.00	112.0 PK			2.37 V	48	107.9	4.1
3	*5785.00	109.5 AV			2.37 V	48	105.4	4.1
4	#5961.42	54.7 PK	68.2	-13.5	2.37 V	48	50.1	4.6
5	11570.00	46.9 PK	74.0	-27.1	1.48 V	125	33.7	13.2
6	11570.00	35.5 AV	54.0	-18.5	1.48 V	125	22.3	13.2
7	#17355.00	45.6 PK	68.2	-22.6	2.87 V	261	28.0	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) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	#5574.38	64.1 PK	68.2	-4.1	2.56 H	156	60.3	3.8
2	*5825.00	126.7 PK			2.56 H	156	122.4	4.3
3	*5825.00	116.3 AV			2.56 H	156	112.0	4.3
4	#5939.79	61.1 PK	68.2	-7.1	2.56 H	156	56.4	4.7
5	11650.00	47.4 PK	74.0	-26.6	2.04 H	110	34.1	13.3
6	11650.00	36.0 AV	54.0	-18.0	2.04 H	110	22.7	13.3
7	#17475.00	47.9 PK	68.2	-20.3	2.19 H	109	30.0	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	#5646.28	60.6 PK	68.2	-7.6	2.10 V	51	56.7	3.9
2	*5825.00	120.4 PK			2.10 V	51	116.1	4.3
3	*5825.00	110.0 AV			2.10 V	51	105.7	4.3
4	#5965.94	55.1 PK	68.2	-13.1	2.10 V	51	50.5	4.6
5	11650.00	47.1 PK	74.0	-26.9	1.52 V	142	33.8	13.3
6	11650.00	35.9 AV	54.0	-18.1	1.52 V	142	22.6	13.3
7	#17475.00	45.4 PK	68.2	-22.8	2.90 V	249	27.5	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) Average (AV)
Frequency Range	1GHz ~ 40GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	65.8 PK	74.0	-8.2	1.61 H	273	62.1	3.7
2	5150.00	50.1 AV	54.0	-3.9	1.61 H	273	46.4	3.7
3	*5180.00	116.1 PK			1.61 H	273	112.5	3.6
4	*5180.00	106.0 AV			1.61 H	273	102.4	3.6
5	#10360.00	47.8 PK	68.2	-20.4	2.08 H	76	35.1	12.7
6	15540.00	47.1 PK	74.0	-26.9	2.20 H	100	33.9	13.2
7	15540.00	34.1 AV	54.0	-19.9	2.20 H	100	20.9	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	66.7 PK	74.0	-7.3	1.52 V	148	63.0	3.7
2	5150.00	53.5 AV	54.0	-0.5	1.52 V	148	49.8	3.7
3	*5180.00	120.0 PK			1.52 V	148	116.4	3.6
4	*5180.00	109.3 AV			1.52 V	148	105.7	3.6
5	#10360.00	47.1 PK	68.2	-21.1	1.49 V	126	34.4	12.7
6	15540.00	46.3 PK	74.0	-27.7	2.84 V	222	33.1	13.2
7	15540.00	33.8 AV	54.0	-20.2	2.84 V	222	20.6	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) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	117.7 PK			1.56 H	278	114.2	3.5
2	*5200.00	107.3 AV			1.56 H	278	103.8	3.5
3	#10400.00	47.8 PK	68.2	-20.4	2.08 H	90	35.0	12.8
4	15600.00	48.3 PK	74.0	-25.7	2.19 H	115	34.8	13.5
5	15600.00	34.3 AV	54.0	-19.7	2.19 H	115	20.8	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	121.4 PK			1.67 V	111	117.9	3.5
2	*5200.00	110.6 AV			1.67 V	111	107.1	3.5
3	#10400.00	47.2 PK	68.2	-21.0	1.56 V	138	34.4	12.8
4	15600.00	47.1 PK	74.0	-26.9	2.98 V	249	33.6	13.5
5	15600.00	34.3 AV	54.0	-19.7	2.98 V	249	20.8	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) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	117.7 PK			1.52 H	267	114.2	3.5
2	*5240.00	107.4 AV			1.52 H	267	103.9	3.5
3	5350.00	57.9 PK	74.0	-16.1	1.52 H	267	54.5	3.4
4	5350.00	44.9 AV	54.0	-9.1	1.52 H	267	41.5	3.4
5	#10480.00	47.6 PK	68.2	-20.6	2.02 H	91	34.5	13.1
6	15720.00	47.7 PK	74.0	-26.3	2.31 H	134	33.9	13.8
7	15720.00	34.6 AV	54.0	-19.4	2.31 H	134	20.8	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	121.4 PK			1.72 V	117	117.9	3.5
2	*5240.00	110.9 AV			1.72 V	117	107.4	3.5
3	5350.00	59.1 PK	74.0	-14.9	1.72 V	117	55.7	3.4
4	5350.00	47.8 AV	54.0	-6.2	1.72 V	117	44.4	3.4
5	#10480.00	47.4 PK	68.2	-20.8	1.55 V	136	34.3	13.1
6	15720.00	45.6 PK	74.0	-28.4	2.93 V	237	31.8	13.8
7	15720.00	33.1 AV	54.0	-20.9	2.93 V	237	19.3	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) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	#5641.71	64.6 PK	68.2	-3.6	2.69 H	154	60.7	3.9
2	*5745.00	127.8 PK			2.69 H	154	123.8	4.0
3	*5745.00	117.8 AV			2.69 H	154	113.8	4.0
4	#5982.64	58.9 PK	68.2	-9.3	2.69 H	154	54.2	4.7
5	11490.00	46.9 PK	74.0	-27.1	2.16 H	115	33.6	13.3
6	11490.00	35.9 AV	54.0	-18.1	2.16 H	115	22.6	13.3
7	#17235.00	46.7 PK	68.2	-21.5	2.25 H	110	29.1	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	#5643.28	59.9 PK	68.2	-8.3	2.05 V	50	56.0	3.9
2	*5745.00	120.8 PK			2.05 V	50	116.8	4.0
3	*5745.00	110.1 AV			2.05 V	50	106.1	4.0
4	#5931.49	55.2 PK	68.2	-13.0	2.05 V	50	50.7	4.5
5	11490.00	47.0 PK	74.0	-27.0	1.58 V	127	33.7	13.3
6	11490.00	35.8 AV	54.0	-18.2	1.58 V	127	22.5	13.3
7	#17235.00	45.3 PK	68.2	-22.9	2.83 V	236	27.7	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.

Channel	TX Channel 157	Detector Function	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	#5616.66	63.3 PK	68.2	-4.9	2.40 H	156	59.5	3.8
2	*5785.00	128.1 PK			2.40 H	156	124.0	4.1
3	*5785.00	117.3 AV			2.40 H	156	113.2	4.1
4	#5999.34	58.2 PK	68.2	-10.0	2.40 H	156	53.3	4.9
5	11570.00	46.7 PK	74.0	-27.3	2.08 H	84	33.5	13.2
6	11570.00	35.8 AV	54.0	-18.2	2.08 H	84	22.6	13.2
7	#17355.00	47.0 PK	68.2	-21.2	2.18 H	125	29.4	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	#5649.23	59.8 PK	68.2	-8.4	2.29 V	52	55.8	4.0
2	*5785.00	120.8 PK			2.29 V	52	116.7	4.1
3	*5785.00	110.7 AV			2.29 V	52	106.6	4.1
4	#6014.22	54.6 PK	68.2	-13.6	2.29 V	52	49.8	4.8
5	11570.00	47.0 PK	74.0	-27.0	1.56 V	142	33.8	13.2
6	11570.00	35.6 AV	54.0	-18.4	1.56 V	142	22.4	13.2
7	#17355.00	44.8 PK	68.2	-23.4	2.81 V	250	27.2	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) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	#5617.81	64.7 PK	68.2	-3.5	2.53 H	158	60.9	3.8
2	*5825.00	127.5 PK			2.53 H	158	123.2	4.3
3	*5825.00	117.0 AV			2.53 H	158	112.7	4.3
4	#5947.32	60.1 PK	68.2	-8.1	2.53 H	158	55.5	4.6
5	11650.00	47.0 PK	74.0	-27.0	2.11 H	103	33.7	13.3
6	11650.00	36.2 AV	54.0	-17.8	2.11 H	103	22.9	13.3
7	#17475.00	46.9 PK	68.2	-21.3	2.24 H	105	29.0	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	#5587.10	60.6 PK	68.2	-7.6	2.09 V	51	56.8	3.8
2	*5825.00	121.2 PK			2.09 V	51	116.9	4.3
3	*5825.00	110.5 AV			2.09 V	51	106.2	4.3
4	#5943.07	54.3 PK	68.2	-13.9	2.09 V	51	49.7	4.6
5	11650.00	46.7 PK	74.0	-27.3	1.64 V	137	33.4	13.3
6	11650.00	35.5 AV	54.0	-18.5	1.64 V	137	22.2	13.3
7	#17475.00	44.4 PK	68.2	-23.8	2.78 V	237	26.5	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) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	66.3 PK	74.0	-7.7	1.38 H	291	62.6	3.7
2	5150.00	46.9 AV	54.0	-7.1	1.38 H	291	43.2	3.7
3	*5190.00	110.1 PK			1.38 H	291	106.5	3.6
4	*5190.00	99.7 AV			1.38 H	291	96.1	3.6
5	#10380.00	46.2 PK	68.2	-22.0	2.14 H	126	33.5	12.7
6	15570.00	46.3 PK	74.0	-27.7	2.23 H	117	32.9	13.4
7	15570.00	35.1 AV	54.0	-18.9	2.23 H	117	21.7	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	72.1 PK	74.0	-1.9	1.91 V	120	68.4	3.7
2	5150.00	53.1 AV	54.0	-0.9	1.91 V	120	49.4	3.7
3	*5190.00	113.7 PK			1.91 V	120	110.1	3.6
4	*5190.00	102.6 AV			1.91 V	120	99.0	3.6
5	#10380.00	47.0 PK	68.2	-21.2	1.52 V	116	34.3	12.7
6	15570.00	46.0 PK	74.0	-28.0	2.83 V	228	32.6	13.4
7	15570.00	33.5 AV	54.0	-20.5	2.83 V	228	20.1	13.4

Remarks:

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

Channel	TX Channel 46	Detector Function	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	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	5145.74	57.9 PK	74.0	-16.1	1.53 H	284	54.2	3.7
2	5145.74	46.9 AV	54.0	-7.1	1.53 H	284	43.2	3.7
3	*5230.00	114.6 PK			1.53 H	284	111.1	3.5
4	*5230.00	105.4 AV			1.53 H	284	101.9	3.5
5	5352.14	56.7 PK	74.0	-17.3	1.53 H	284	53.3	3.4
6	5352.14	45.3 AV	54.0	-8.7	1.53 H	284	41.9	3.4
7	#10460.00	47.4 PK	68.2	-20.8	2.13 H	111	34.4	13.0
8	15690.00	46.3 PK	74.0	-27.7	2.21 H	123	32.4	13.9
9	15690.00	35.0 AV	54.0	-19.0	2.21 H	123	21.1	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	5145.74	64.0 PK	74.0	-10.0	2.58 V	163	60.3	3.7
2	5145.74	51.7 AV	54.0	-2.3	2.58 V	163	48.0	3.7
3	*5230.00	118.2 PK			2.58 V	163	114.7	3.5
4	*5230.00	107.1 AV			2.58 V	163	103.6	3.5
5	5352.14	60.1 PK	74.0	-13.9	2.58 V	163	56.7	3.4
6	5352.14	49.7 AV	54.0	-4.3	2.58 V	163	46.3	3.4
7	#10460.00	47.5 PK	68.2	-20.7	1.50 V	110	34.5	13.0
8	15690.00	46.0 PK	74.0	-28.0	2.79 V	212	32.1	13.9
9	15690.00	33.7 AV	54.0	-20.3	2.79 V	212	19.8	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) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	#5640.55	67.4 PK	68.2	-0.8	2.73 H	155	63.5	3.9
2	*5755.00	124.4 PK			2.73 H	155	120.4	4.0
3	*5755.00	115.0 AV			2.73 H	155	111.0	4.0
4	#5943.17	59.2 PK	68.2	-9.0	2.73 H	155	54.6	4.6
5	11510.00	46.1 PK	74.0	-27.9	2.09 H	100	32.8	13.3
6	11510.00	35.4 AV	54.0	-18.6	2.09 H	100	22.1	13.3
7	#17265.00	47.3 PK	68.2	-20.9	2.19 H	145	29.8	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	#5648.78	61.2 PK	68.2	-7.0	1.72 V	51	57.2	4.0
2	*5755.00	117.3 PK			1.72 V	51	113.3	4.0
3	*5755.00	107.1 AV			1.72 V	51	103.1	4.0
4	#5963.89	54.5 PK	68.2	-13.7	1.72 V	51	49.9	4.6
5	11510.00	46.3 PK	74.0	-27.7	1.51 V	143	33.0	13.3
6	11510.00	35.2 AV	54.0	-18.8	1.51 V	143	21.9	13.3
7	#17265.00	45.2 PK	68.2	-23.0	2.83 V	235	27.7	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) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	#5629.16	65.0 PK	68.2	-3.2	2.74 H	156	61.2	3.8
2	*5795.00	126.2 PK			2.74 H	155	122.0	4.2
3	*5795.00	115.2 AV			2.74 H	155	111.0	4.2
4	#5928.81	64.1 PK	68.2	-4.1	2.74 H	156	59.6	4.5
5	11590.00	46.8 PK	74.0	-27.2	2.10 H	75	33.5	13.3
6	11590.00	35.6 AV	54.0	-18.4	2.10 H	75	22.3	13.3
7	#17385.00	47.0 PK	68.2	-21.2	2.14 H	139	29.3	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	#5596.06	60.1 PK	68.2	-8.1	2.20 V	49	56.3	3.8
2	*5795.00	117.6 PK			2.20 V	49	113.4	4.2
3	*5795.00	107.9 AV			2.20 V	49	103.7	4.2
4	#5945.61	57.8 PK	68.2	-10.4	2.20 V	49	53.2	4.6
5	11590.00	46.8 PK	74.0	-27.2	1.56 V	143	33.5	13.3
6	11590.00	35.3 AV	54.0	-18.7	1.56 V	143	22.0	13.3
7	#17385.00	45.4 PK	68.2	-22.8	2.79 V	261	27.7	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) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	60.7 PK	74.0	-13.3	1.52 H	277	57.0	3.7
2	5150.00	49.4 AV	54.0	-4.6	1.52 H	277	45.7	3.7
3	*5210.00	108.4 PK			1.52 H	277	104.8	3.6
4	*5210.00	97.8 AV			1.52 H	277	94.2	3.6
5	5350.00	55.6 PK	74.0	-18.4	1.52 H	277	52.2	3.4
6	5350.00	43.1 AV	54.0	-10.9	1.52 H	277	39.7	3.4
7	#10420.00	46.6 PK	68.2	-21.6	2.16 H	107	33.8	12.8
8	15630.00	46.5 PK	74.0	-27.5	2.30 H	120	32.8	13.7
9	15630.00	34.2 AV	54.0	-19.8	2.30 H	120	20.5	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	65.3 PK	74.0	-8.7	2.16 V	157	61.6	3.7
2	5150.00	53.4 AV	54.0	-0.6	2.16 V	157	49.7	3.7
3	*5210.00	110.5 PK			2.16 V	157	106.9	3.6
4	*5210.00	100.8 AV			2.16 V	157	97.2	3.6
5	5350.00	58.1 PK	74.0	-15.9	2.16 V	157	54.7	3.4
6	5350.00	46.8 AV	54.0	-7.2	2.16 V	157	43.4	3.4
7	#10420.00	46.6 PK	68.2	-21.6	1.52 V	138	33.8	12.8
8	15630.00	46.7 PK	74.0	-27.3	2.84 V	211	33.0	13.7
9	15630.00	34.2 AV	54.0	-19.8	2.84 V	211	20.5	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) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	**#5628.80**	**67.8 PK**	**68.2**	**-0.4**	**2.36 H**	**155**	**64.0**	**3.8**
2	*5775.00	121.0 PK			2.36 H	155	116.9	4.1
3	*5775.00	109.8 AV			2.36 H	155	105.7	4.1
4	#5929.80	62.6 PK	68.2	-5.6	2.36 H	155	58.1	4.5
5	11550.00	46.2 PK	74.0	-27.8	2.11 H	92	33.0	13.2
6	11550.00	35.5 AV	54.0	-18.5	2.11 H	92	22.3	13.2
7	#17325.00	46.8 PK	68.2	-21.4	2.20 H	132	29.2	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	#5647.65	67.3 PK	68.2	-0.9	2.28 V	50	63.3	4.0
2	*5775.00	114.9 PK			2.28 V	50	110.8	4.1
3	*5775.00	102.4 AV			2.28 V	50	98.3	4.1
4	#5928.26	65.1 PK	68.2	-3.1	2.28 V	50	60.6	4.5
5	11550.00	47.1 PK	74.0	-26.9	1.52 V	143	33.9	13.2
6	11550.00	36.0 AV	54.0	-18.0	1.52 V	143	22.8	13.2
7	#17325.00	44.8 PK	68.2	-23.4	2.80 V	262	27.2	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:

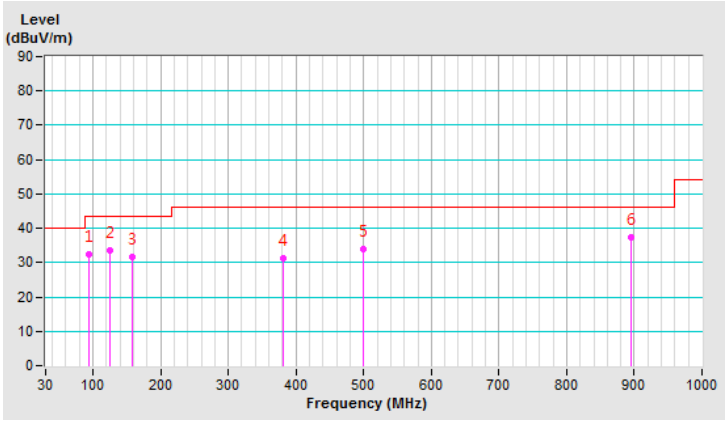
802.11ax (HE40)

CHANNEL	TX Channel 46	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	94.97	32.5 QP	43.5	-11.0	2.00 H	273	45.1	-12.6
2	124.99	33.7 QP	43.5	-9.8	3.00 H	57	42.3	-8.6
3	157.77	31.5 QP	43.5	-12.0	2.00 H	72	38.3	-6.8
4	381.67	31.4 QP	46.0	-14.6	1.00 H	74	34.9	-3.5
5	500.01	33.8 QP	46.0	-12.2	1.50 H	49	34.2	-0.4
6	895.77	37.5 QP	46.0	-8.5	3.00 H	66	30.2	7.3

REMARKS:

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

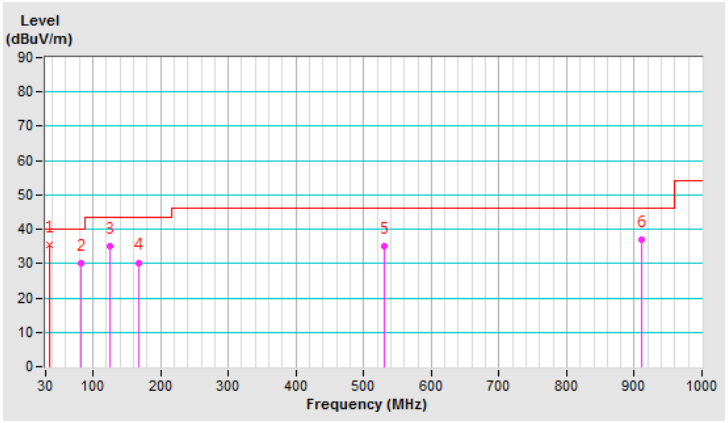


CHANNEL	TX Channel 46	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	35.73	35.5 QP	40.0	-4.5	1.00 V	360	44.1	-8.6
2	81.41	30.2 QP	40.0	-9.8	2.00 V	4	43.0	-12.8
3	125.01	35.0 QP	43.5	-8.5	1.00 V	353	43.6	-8.6
4	168.59	30.3 QP	43.5	-13.2	1.00 V	94	37.5	-7.2
5	530.86	35.2 QP	46.0	-10.8	1.00 V	308	35.0	0.2
6	910.93	37.1 QP	46.0	-8.9	1.00 V	138	29.3	7.8

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 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: June 01, 2020

4.2.3 Test Procedure

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

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

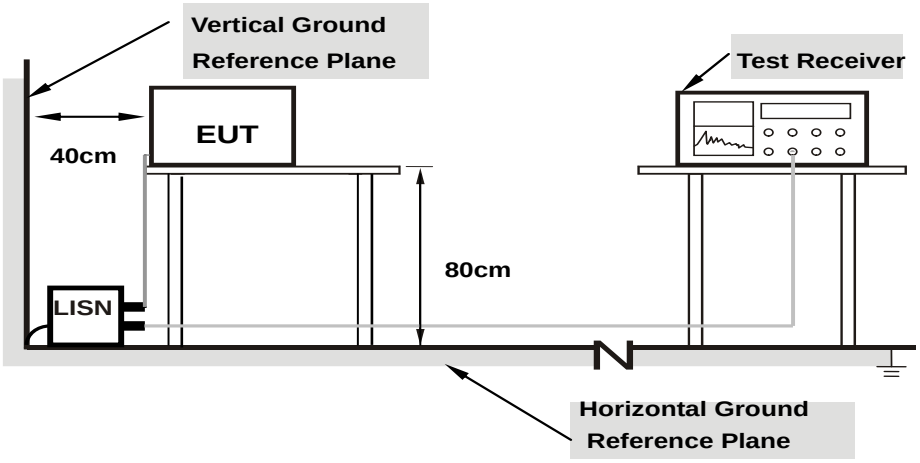
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

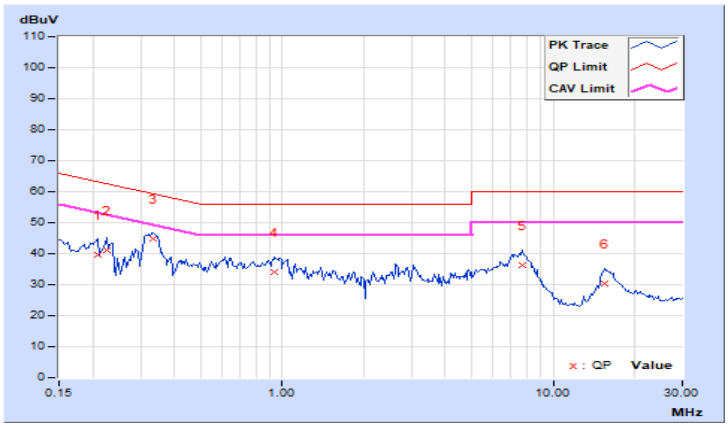
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.20859	10.04	29.42	24.02	39.46	34.06	63.26	53.26	-23.80	-19.20
2	0.22422	10.04	31.17	23.33	41.21	33.37	62.66	52.66	-21.45	-19.29
3	**0.33359**	**10.05**	**34.70**	**27.72**	**44.75**	**37.77**	**59.36**	**49.36**	**-14.61**	**-11.59**
4	0.93125	10.09	24.08	17.62	34.17	27.71	56.00	46.00	-21.83	-18.29
5	7.71875	10.60	25.60	21.00	36.20	31.60	60.00	50.00	-23.80	-18.40
6	15.41406	11.14	19.30	15.22	30.44	26.36	60.00	50.00	-29.56	-23.64

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

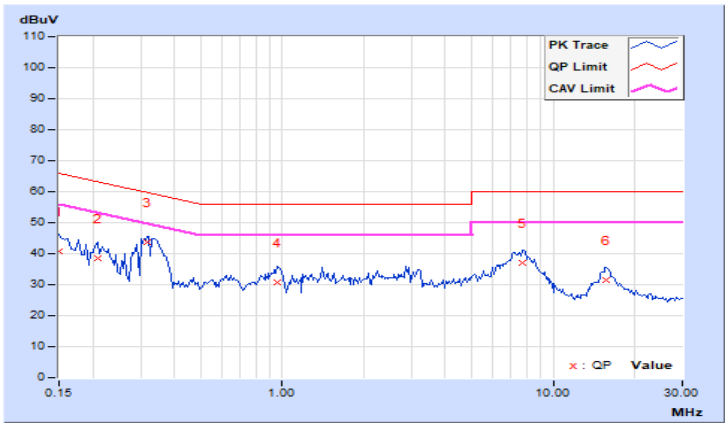


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.02	30.68	23.23	40.70	33.25	66.00	56.00	-25.30	-22.75
2	0.20859	10.03	28.54	22.36	38.57	32.39	63.26	53.26	-24.69	-20.87
3	0.31797	10.04	33.50	27.74	43.54	37.78	59.76	49.76	-16.22	-11.98
4	0.96250	10.09	20.80	13.18	30.89	23.27	56.00	46.00	-25.11	-22.73
5	7.72656	10.52	26.66	21.94	37.18	32.46	60.00	50.00	-22.82	-17.54
6	15.74609	10.97	20.38	16.30	31.35	27.27	60.00	50.00	-28.65	-22.73

Remarks:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

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

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

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

4.3.2 Test Setup

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	21.14	22.15	22.41	22.17	633.073	28.01	30	Pass
40	5200	22.19	22.03	22.48	22.40	675.956	28.30	30	Pass
48	5240	21.84	22.05	22.47	22.43	664.67	28.23	30	Pass
149	5745	22.55	22.89	24.15	22.54	813.912	29.11	30	Pass
157	5785	22.67	22.64	24.07	22.37	796.435	29.01	30	Pass
165	5825	22.17	22.67	23.85	22.22	759.129	28.80	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	19.12	19.72	20.33	19.75	377.715	25.77	30	Pass
40	5200	21.81	21.76	22.88	22.14	659.444	28.19	30	Pass
48	5240	21.89	21.91	22.39	22.42	657.727	28.18	30	Pass
149	5745	22.42	22.32	24.13	21.99	762.137	28.82	30	Pass
157	5785	22.35	22.57	23.73	21.91	743.795	28.71	30	Pass
165	5825	21.95	22.04	23.94	21.95	721.048	28.58	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	17.81	18.85	18.78	18.31	280.404	24.48	30	Pass
46	5230	22.73	22.78	23.42	22.67	781.883	28.93	30	Pass
151	5755	21.88	22.57	23.31	21.54	691.737	28.40	30	Pass
159	5795	22.37	22.36	23.32	22.11	722.109	28.59	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	18.18	18.66	19.30	18.78	299.84	24.77	30	Pass
155	5775	19.06	19.60	20.72	18.74	364.588	25.62	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	19.36	19.92	20.51	19.95	395.788	25.97	30	Pass
40	5200	22.31	22.55	23.22	22.56	740.299	28.69	30	Pass
48	5240	22.52	22.33	23.12	22.79	744.874	28.72	30	Pass
149	5745	22.83	23.09	24.46	22.73	862.325	29.36	30	Pass
157	5785	22.67	23.05	24.45	22.66	849.877	29.29	30	Pass
165	5825	22.44	22.76	24.33	22.51	813.444	29.10	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	18.57	19.18	19.47	18.65	316.533	25.00	30	Pass
46	5230	23.19	23.45	24.10	23.31	901.087	29.55	30	Pass
151	5755	22.28	22.98	23.71	22.05	762.941	28.82	30	Pass
159	5795	23.17	23.01	24.02	22.51	838.063	29.23	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	18.73	19.45	19.81	19.14	340.504	25.32	30	Pass
155	5775	19.85	20.15	21.14	19.29	415.054	26.18	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	19.12	19.72	20.33	19.75	377.715	25.77	28.50	Pass
40	5200	21.42	21.55	22.41	21.90	610.627	27.86	28.50	Pass
48	5240	21.89	21.91	22.39	22.42	657.727	28.18	28.50	Pass
149	5745	21.85	21.63	23.62	21.29	663.385	28.22	28.50	Pass
157	5785	21.62	22.07	22.98	21.41	643.242	28.08	28.50	Pass
165	5825	21.50	21.58	23.38	21.56	646.123	28.10	28.50	Pass

Note: 1. Directional gain= 10 log[($10^{G0/20}$+ $10^{G1/20}$ + $10^{G2/20}$ +$10^{G3/20}$)2 / 4] = 7.5dBi > 6dBi , so the power limit shall be reduced to 30-(7.5-6) = 28.50dBm.

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	17.81	18.85	18.78	18.31	280.404	24.48	28.50	Pass
46	5230	21.78	21.85	22.76	22.09	654.377	28.16	28.50	Pass
151	5755	21.31	22.08	22.66	20.83	602.204	27.80	28.50	Pass
159	5795	22.11	21.78	22.67	21.78	648.803	28.12	28.50	Pass

Note: 1. Directional gain= 10 log[($10^{G0/20}$+ $10^{G1/20}$ + $10^{G2/20}$ +$10^{G3/20}$)2 / 4] = 7.5dBi > 6dBi , so the power limit shall be reduced to 30-(7.5-6) = 28.50dBm.

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	18.18	18.66	19.30	18.78	299.84	24.77	28.50	Pass
155	5775	19.06	19.60	20.72	18.74	364.588	25.62	28.50	Pass

Note: 1. Directional gain= 10 log[($10^{G0/20}$+ $10^{G1/20}$ + $10^{G2/20}$ +$10^{G3/20}$)2 / 4] = 7.5dBi > 6dBi , so the power limit shall be reduced to 30-(7.5-6) = 28.50dBm.

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	19.36	19.92	20.51	19.95	395.788	25.97	28.50	Pass
40	5200	21.83	21.96	22.51	22.09	649.487	28.13	28.50	Pass
48	5240	22.08	22.03	22.71	22.53	686.722	28.37	28.50	Pass
149	5745	21.85	22.08	23.58	21.82	694.634	28.42	28.50	Pass
157	5785	21.72	21.80	23.45	21.73	670.195	28.26	28.50	Pass
165	5825	21.65	21.64	23.44	21.53	655.132	28.16	28.50	Pass

Note: 1. Directional gain= 10 log[($10^{G0/20}$+ $10^{G1/20}$ + $10^{G2/20}$ +$10^{G3/20}$)2 / 4] = 7.5dBi > 6dBi , so the power limit shall be reduced to 30-(7.5-6) = 28.50dBm.

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	18.57	19.18	19.47	18.65	316.533	25.00	28.50	Pass
46	5230	21.94	22.20	23.04	21.95	680.321	28.33	28.50	Pass
151	5755	21.36	22.15	23.03	21.17	632.659	28.01	28.50	Pass
159	5795	22.23	22.49	23.02	21.68	692.206	28.40	28.50	Pass

Note: 1. Directional gain= 10 log[($10^{G0/20}$+ $10^{G1/20}$ + $10^{G2/20}$ +$10^{G3/20}$)2 / 4] = 7.5dBi > 6dBi , so the power limit shall be reduced to 30-(7.5-6) = 28.50dBm.

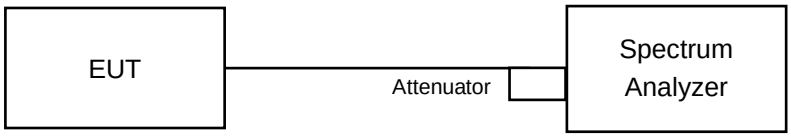
802.11ax (HE80)

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	18.73	19.45	19.81	19.14	340.504	25.32	28.50	Pass
155	5775	19.85	20.15	21.14	19.29	415.054	26.18	28.50	Pass

Note: 1. Directional gain= 10 log[($10^{G0/20}$+ $10^{G1/20}$ + $10^{G2/20}$ +$10^{G3/20}$)2 / 4] = 7.5dBi > 6dBi , so the power limit shall be reduced to 30-(7.5-6) = 28.50dBm.

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	17.16	17.16	17.04
40	5200	17.04	17.16	17.16	17.04
48	5240	17.16	17.28	17.28	17.04
149	5745	17.04	17.28	17.28	17.04
157	5785	17.16	17.28	17.4	17.04
165	5825	17.16	17.4	17.52	17.16

802.11ax (HE20)

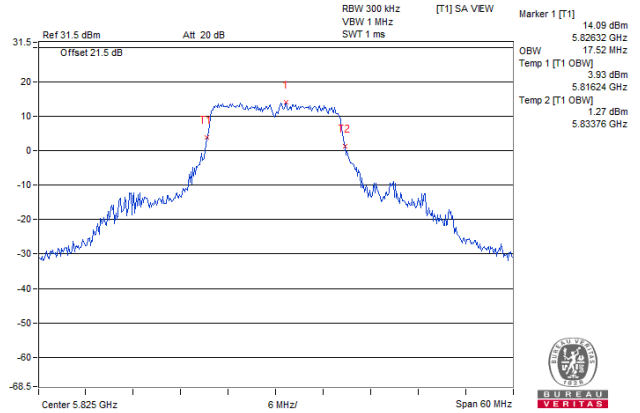
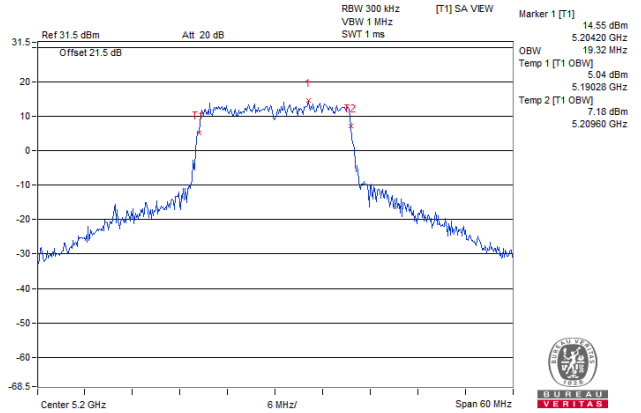
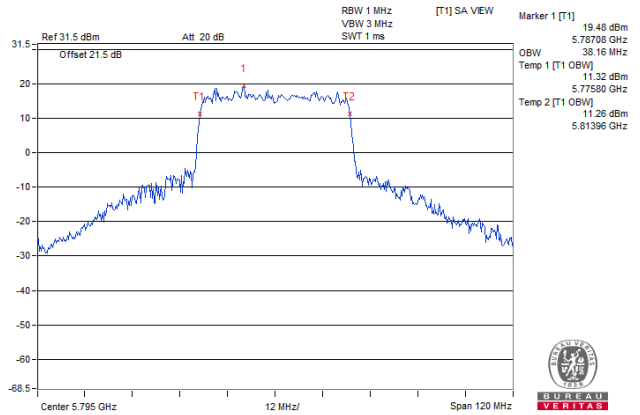
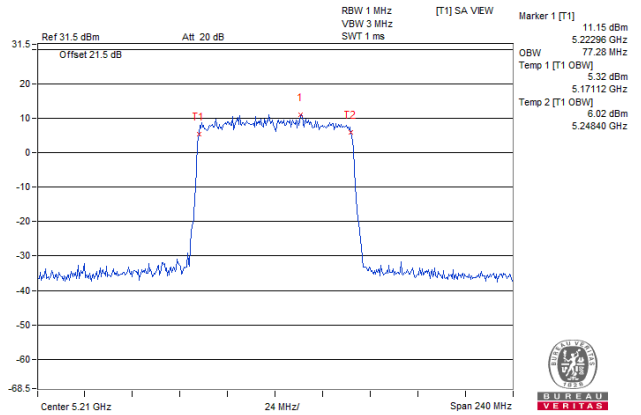
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	19.08	19.2	19.08	19.2
40	5200	19.08	19.32	19.32	19.2
48	5240	19.08	19.32	19.32	19.2
149	5745	19.2	19.32	19.32	19.32
157	5785	19.2	19.32	19.32	19.32
165	5825	19.2	19.2	19.32	19.32

802.11ax (HE40)

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

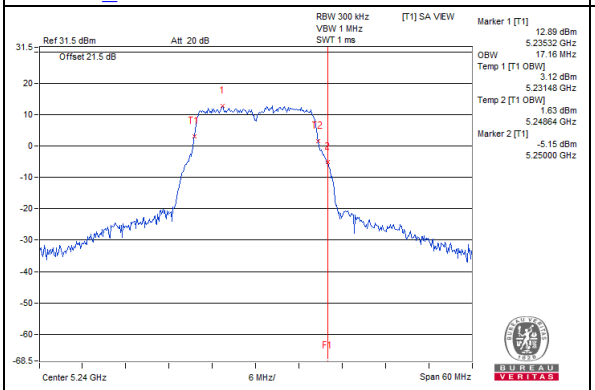
802.11ax (HE80)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	77.28	76.8	76.8	77.28
155	5775	77.28	77.22	77.28	77.28

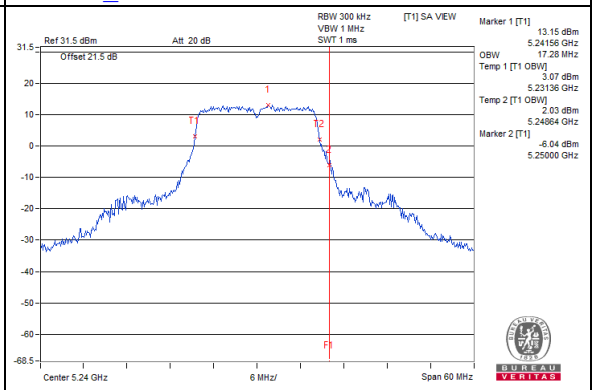
Spectrum Plot of Max. Value	
802.11a_Chain 2 / CH165	**802.11ax (HE20)_Chain 1 / CH40**
	
802.11ax (HE40)_Chain 0 / CH159	**802.11ax (HE80)_Chain 0 / CH42**
	

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

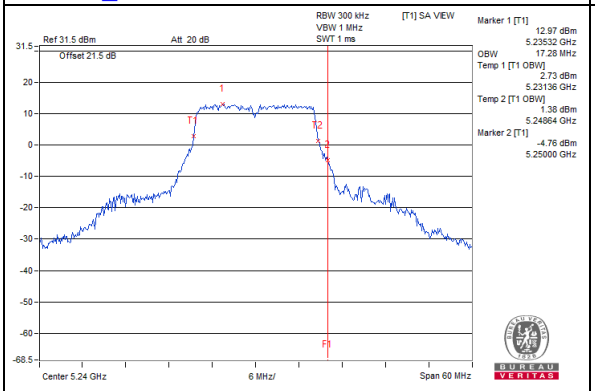
802.11a_Chain 0 / CH48



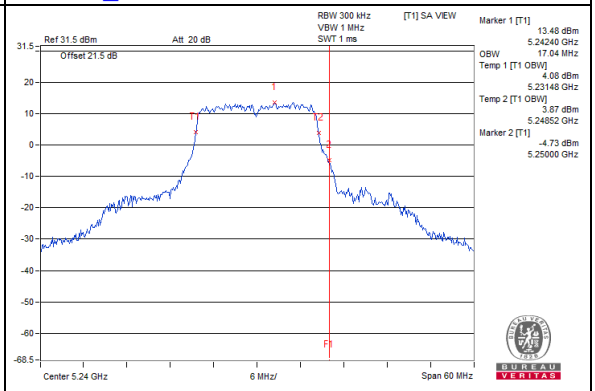
802.11a_Chain 1 / CH48



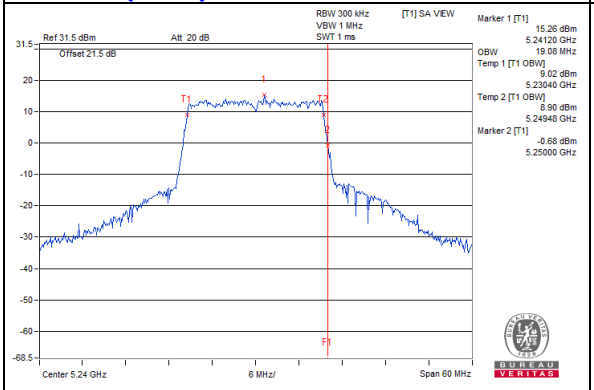
802.11a_Chain 2 / CH48



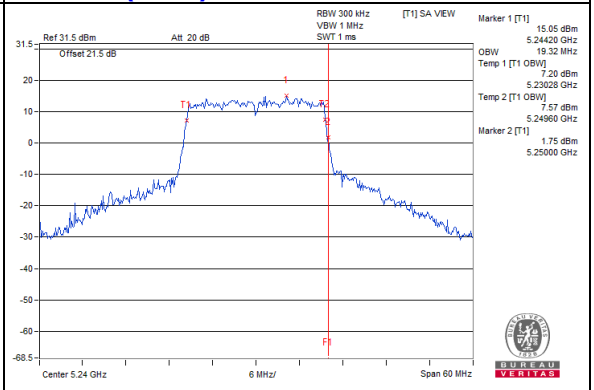
802.11a_Chain 3 / CH48



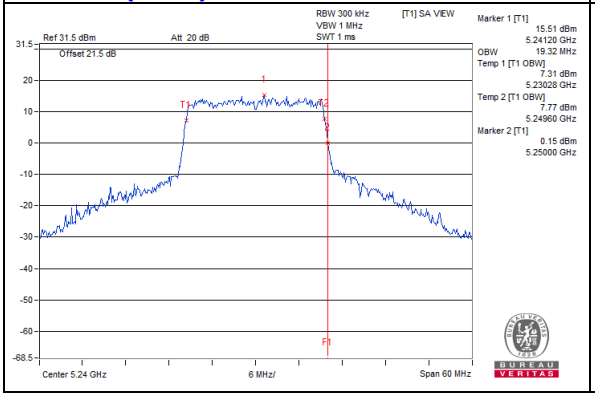
802.11ax (HE20)_Chain 0 / CH48



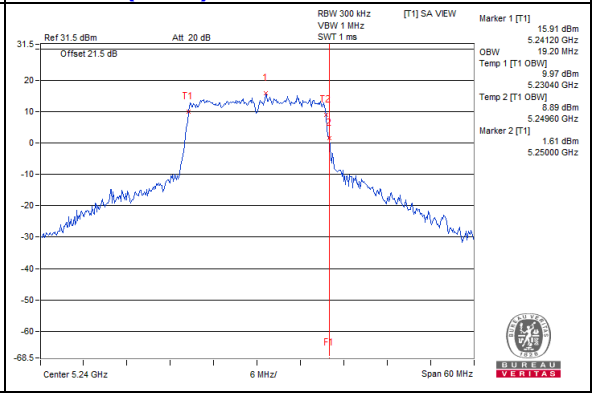
802.11ax (HE20)_Chain 1 / CH48



802.11ax (HE20)_Chain 2 / CH48

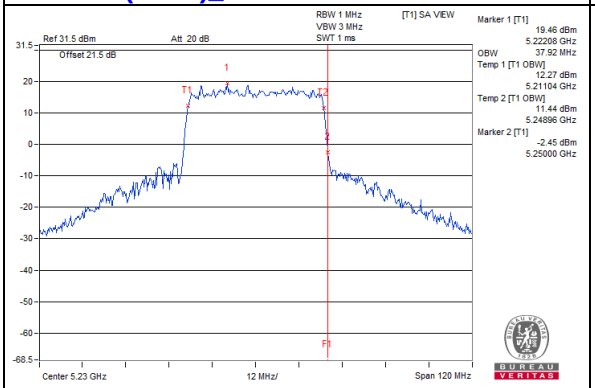


802.11ax (HE20)_Chain 3 / CH48

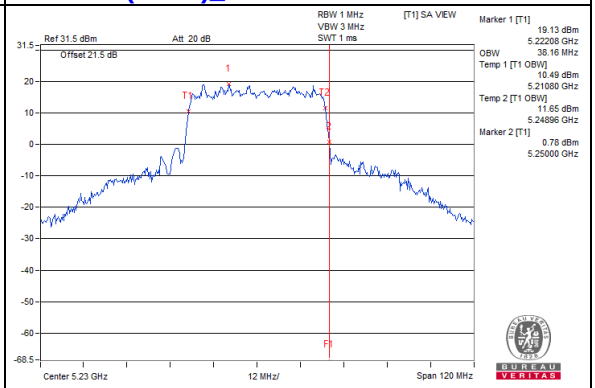


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

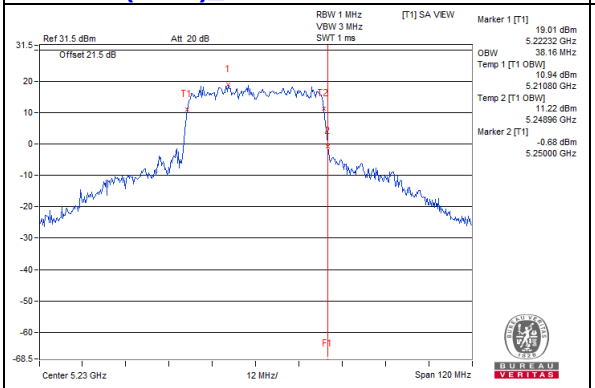
802.11ax (HE40)_Chain 0 / CH46



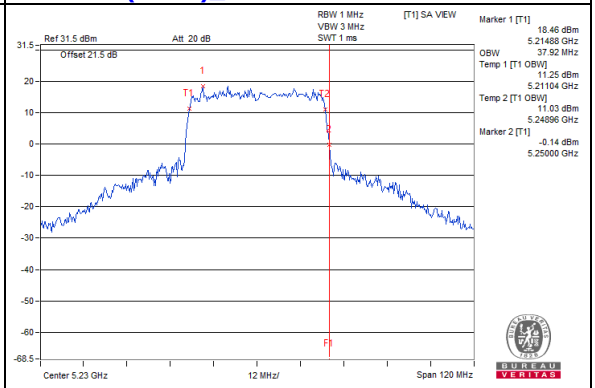
802.11ax (HE40)_Chain 1 / CH46



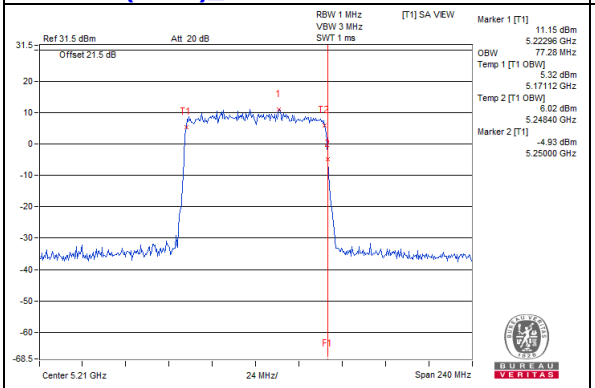
802.11ax (HE40)_Chain 2 / CH46



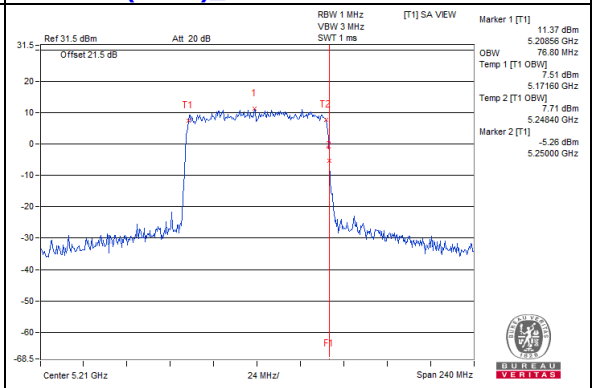
802.11ax (HE40)_Chain 3 / CH46



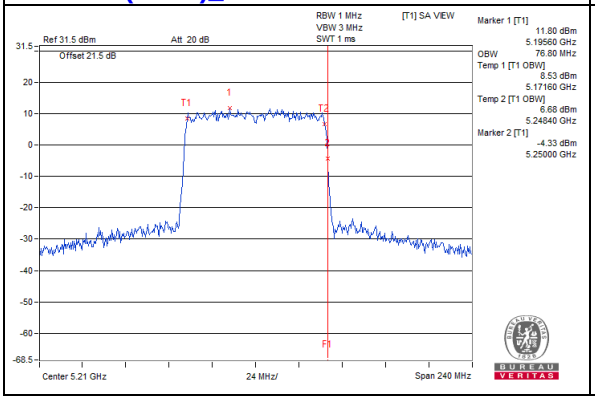
802.11ax (HE80)_Chain 0 / CH42



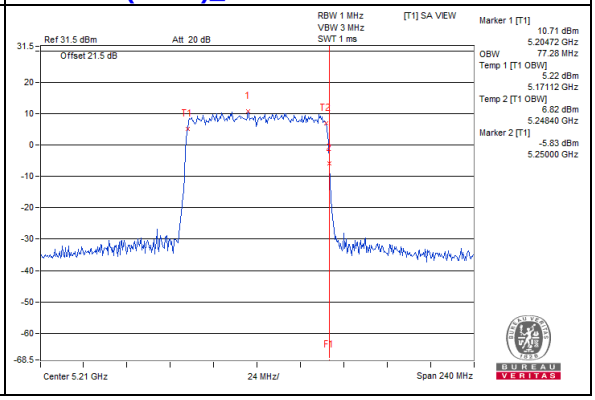
802.11ax (HE80)_Chain 1 / CH42



802.11ax (HE80)_Chain 2 / CH42

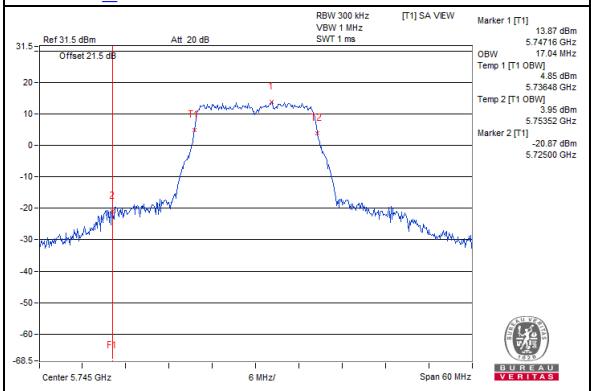


802.11ax (HE80)_Chain 3 / CH42

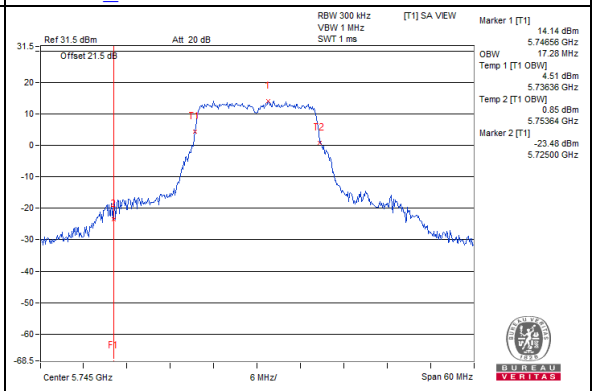


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

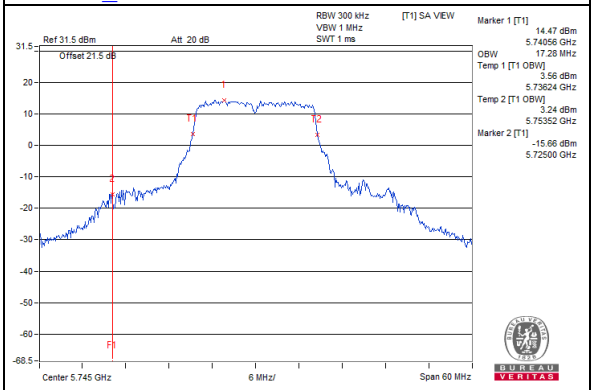
802.11a_Chain 0 / CH149



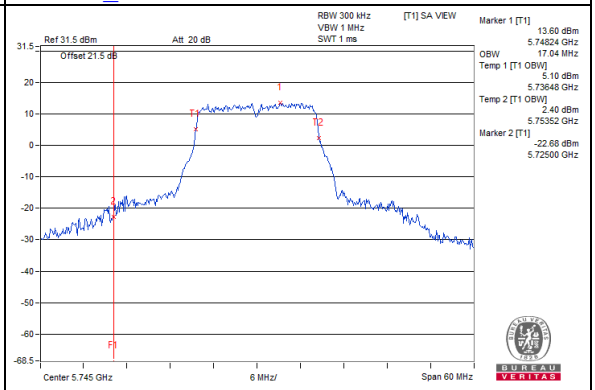
802.11a_Chain 1 / CH149



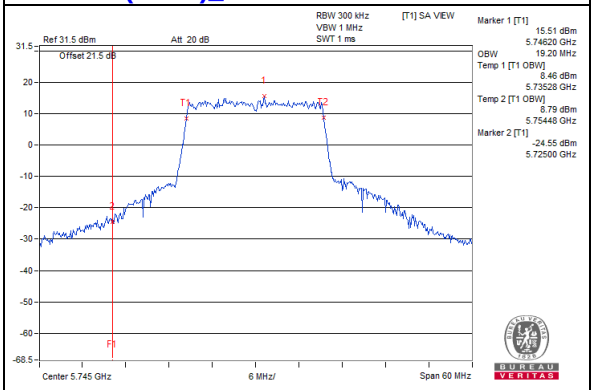
802.11a_Chain 2 / CH149



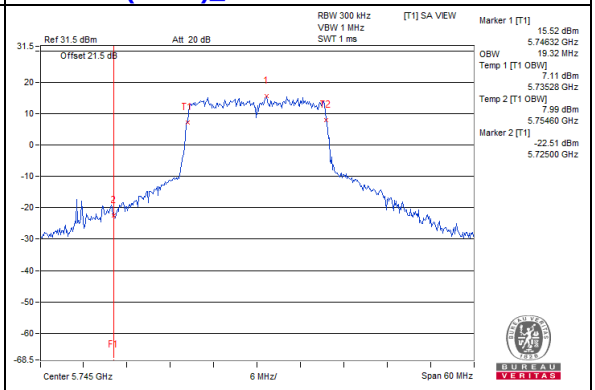
802.11a_Chain 3 / CH149



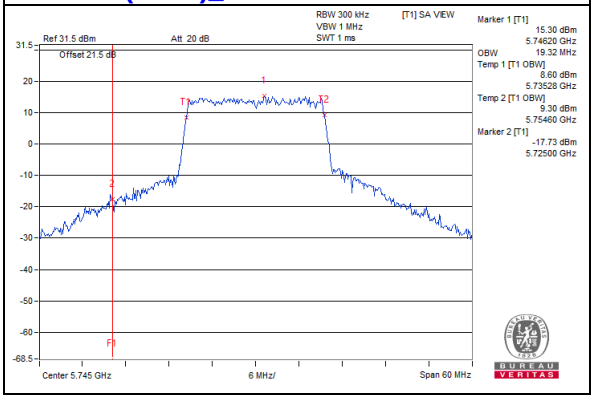
802.11ax (HE20)_Chain 0 / CH149



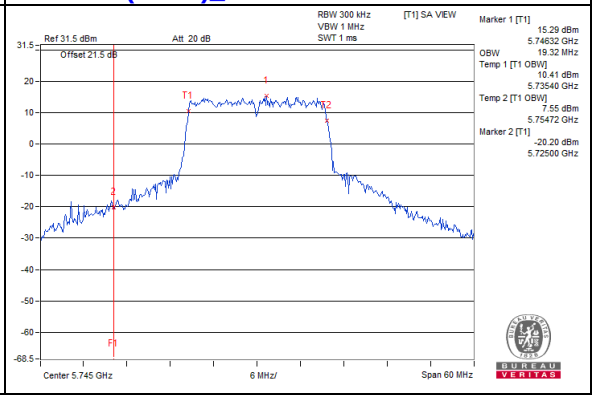
802.11ax (HE20)_Chain 1 / CH149



802.11ax (HE20)_Chain 2 / CH149

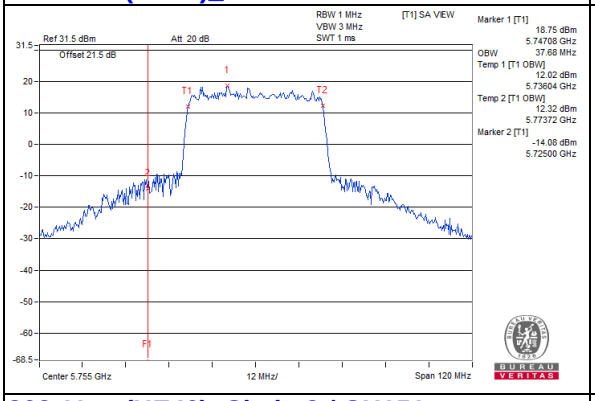


802.11ax (HE20)_Chain 3 / CH149

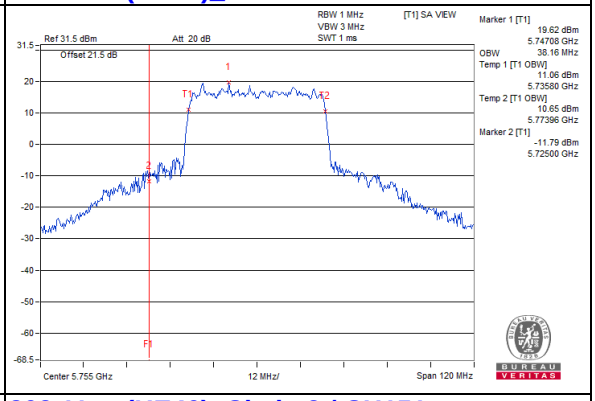


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

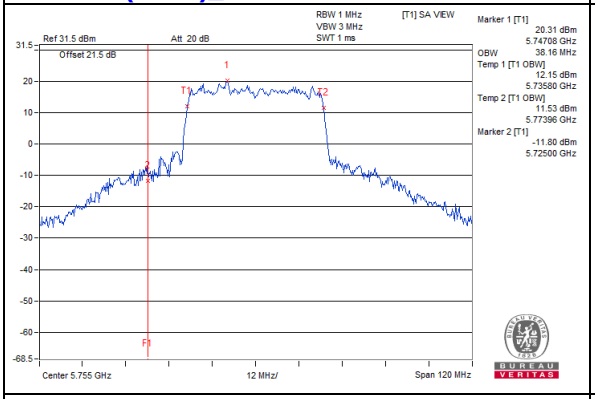
802.11ax (HE40)_Chain 0 / CH151



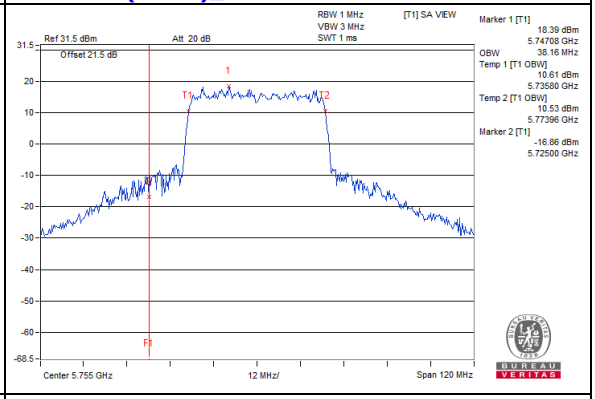
802.11ax (HE40)_Chain 1 / CH151



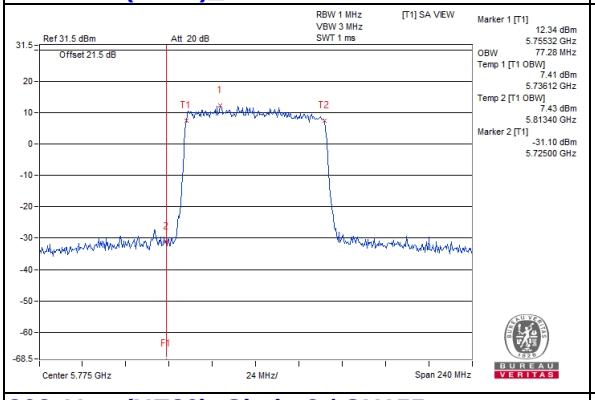
802.11ax (HE40)_Chain 2 / CH151



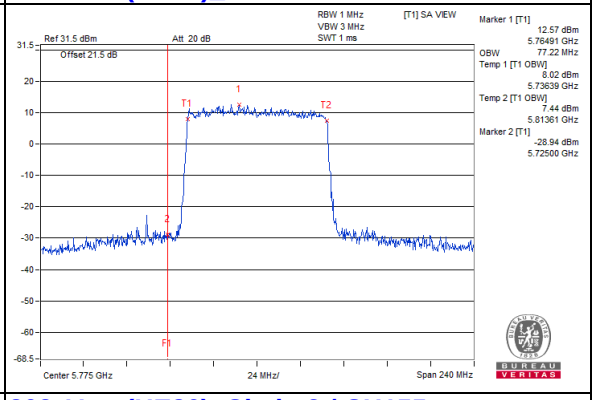
802.11ax (HE40)_Chain 3 / CH151



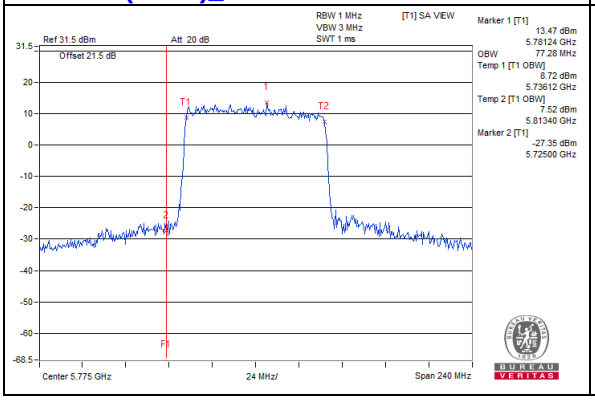
802.11ax (HE80)_Chain 0 / CH155



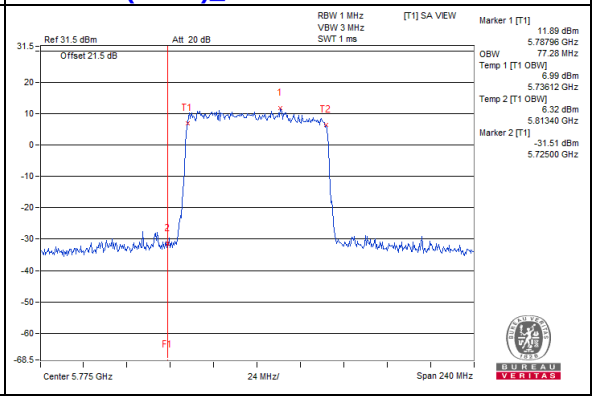
802.11ax (HE80)_Chain 1 / CH155



802.11ax (HE80)_Chain 2 / CH155



802.11ax (HE80)_Chain 3 / CH155

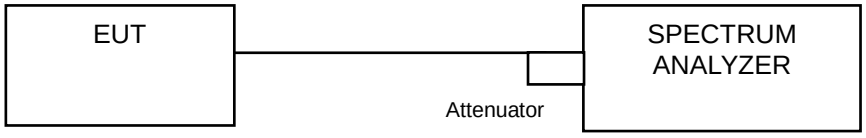


4.5 Peak Power Spectral Density Measurement

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 802.11a

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 (increasing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz/300kHz)
5. Sweep time = auto, trigger set to “free run”.
6. Trace average at least 100 traces in power averaging mode.
7. Record the max value

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

For U-NII-1:

Using method SA-2

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

For U-NII-3:

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 500 kHz by adjusting (increasing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz/300kHz)
5. Sweep time = auto, trigger set to “free run”.
6. Trace average at least 100 traces in power averaging mode.
7. Record the max value and add 10 log (1/duty cycle)

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

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	8.21	8.69	9.11	8.77	14.73	15.50	Pass
40	5200	9.34	8.85	9.26	9.31	15.22	15.50	Pass
48	5240	8.78	9.02	9.23	9.48	15.16	15.50	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 = 7.5 dBi > 6dBi, so the power density limit shall be reduced to 17-(7.5-6) = 15.50 dBm.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Duty Factor (dB)	Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	5.68	6.18	6.87	6.25	0.11	12.40	15.50	Pass
40	5200	8.98	8.23	9.88	8.68	0.11	15.12	15.50	Pass
48	5240	8.87	8.27	9.16	9.11	0.11	15.00	15.50	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 = 7.5 dBi > 6dBi, so the power density limit shall be reduced to 17-(7.5-6) = 15.50 dBm.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Duty Factor (dB)	Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	2.14	2.49	2.70	2.09	0.19	8.57	15.50	Pass
46	5230	6.45	6.50	6.94	5.84	0.19	12.66	15.50	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 = 7.5 dBi > 6dBi, so the power density limit shall be reduced to 17-(7.5-6) = 15.50 dBm.

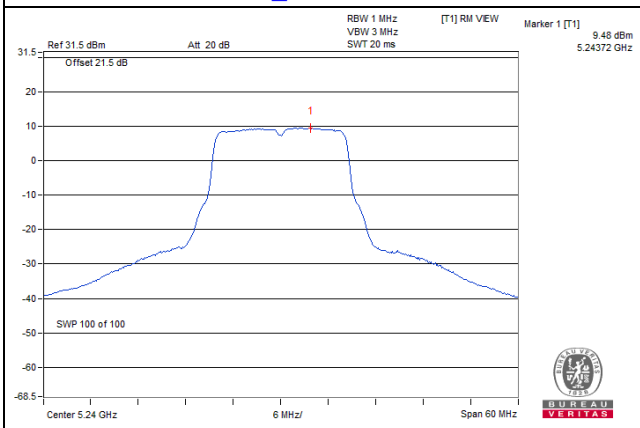
802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Duty Factor (dB)	Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	-0.51	0.17	0.48	-0.62	0.34	6.27	15.50	Pass

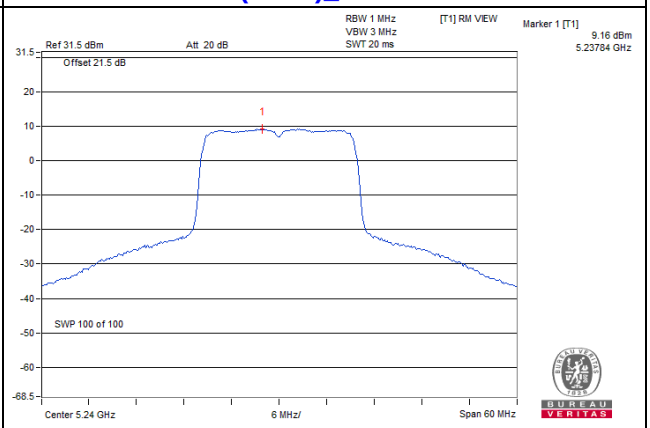
Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = 7.5 dBi > 6dBi, so the power density limit shall be reduced to 17-(7.5-6) = 15.50 dBm.

Spectrum Plot of Worst Value

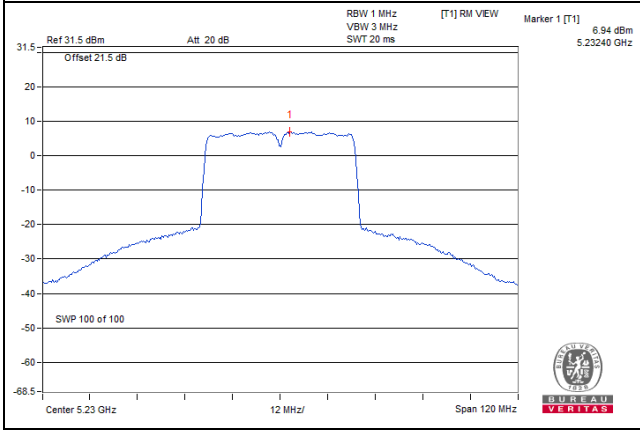
802.11a_Chain 3 / CH48



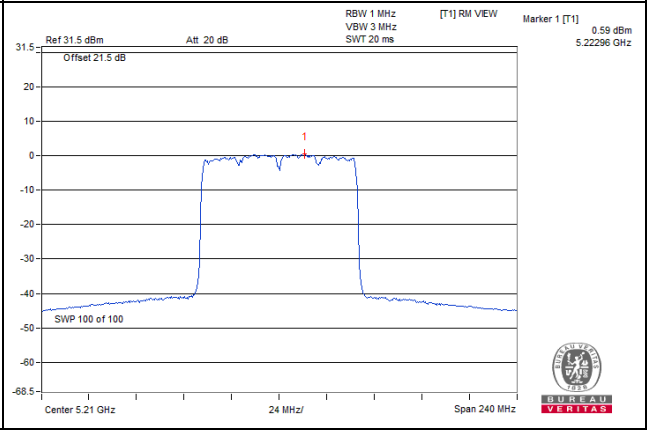
802.11ax (HE20)_Chain 2 / CH48



802.11ax (HE40)_Chain 2 / CH46



802.11ax (HE80)_Chain 2 / CH42



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	1.29	1.22	1.86	1.06	5.483	7.39	9.61	28.50	PASS
157	5785	1.15	1.52	2.07	1.00	5.598	7.48	9.70	28.50	PASS
165	5825	0.91	1.25	2.51	1.17	5.662	7.53	9.75	28.50	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 = 7.5 dBi > 6dBi, so the power density limit shall be reduced to 17-(7.5-6) = 28.50 dBm.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)				Duty Factor (dB)	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	0.06	0.17	0.68	0.41	0.11	4.436	6.47	8.69	28.50	PASS
157	5785	0.21	0.31	0.97	0.17	0.11	4.529	6.56	8.78	28.50	PASS
165	5825	0.02	-0.01	0.91	-0.27	0.11	4.2855	6.32	8.54	28.50	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 = 7.5 dBi > 6dBi, so the power density limit shall be reduced to 17-(7.5-6) = 28.50 dBm.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)				Duty Factor (dB)	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	-3.28	-2.69	-1.96	-3.55	0.19	2.1777	3.38	5.60	28.50	PASS
159	5795	-2.55	-2.61	-1.44	-3.07	0.19	2.421	3.84	6.06	28.50	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 = 7.5 dBi > 6dBi, so the power density limit shall be reduced to 17-(7.5-6) = 28.50 dBm.

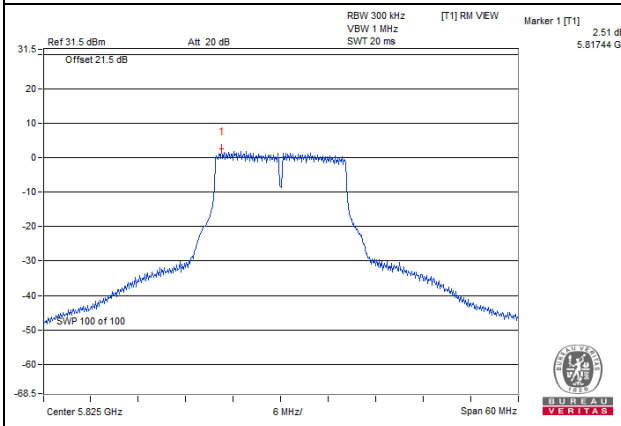
802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)				Duty Factor (dB)	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	-8.33	-8.44	-7.29	-8.89	0.34	0.6546	-1.84	0.38	28.50	PASS

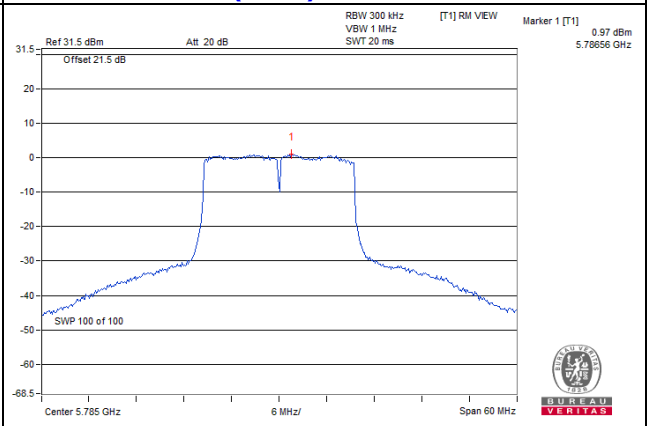
Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = 7.5 dBi > 6dBi, so the power density limit shall be reduced to 17-(7.5-6) = 28.50 dBm.

Spectrum Plot of Worst Value

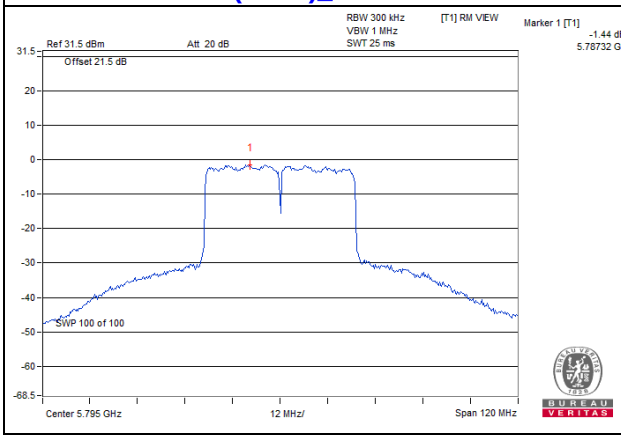
802.11a_Chain 2 / CH165



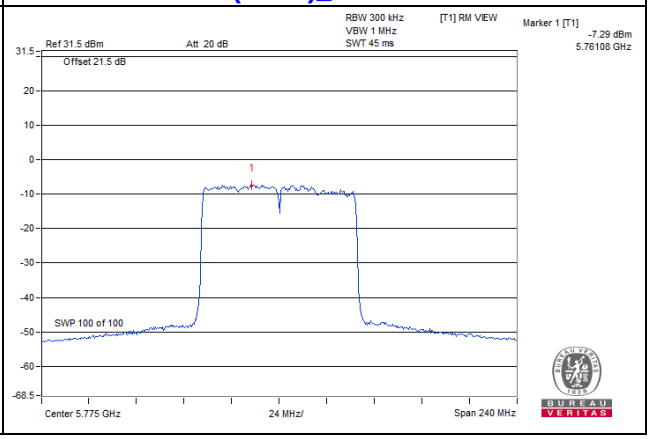
802.11ax (HE20)_Chain 2 / CH157



802.11ax (HE40)_Chain 2 / CH159



802.11ax (HE80)_Chain 2 / CH155

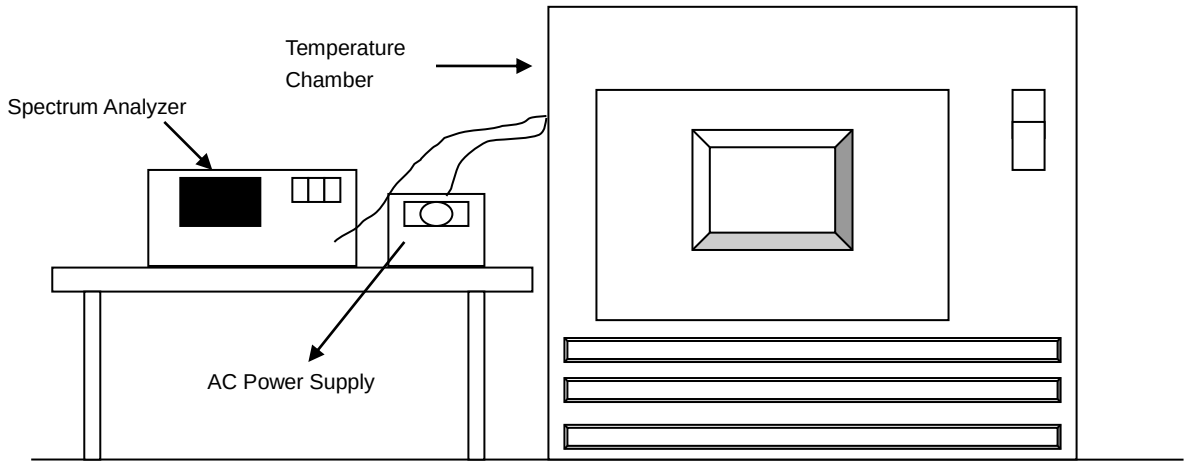


4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

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

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

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

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

e. Repeat step (d) with the temperature chamber set to the next desired temperature until measurements down to the lowest specified temperature have been completed.

f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
40	120	5179.9901	Pass	5179.9873	Pass	5179.9911	Pass	5179.9869	Pass
30	120	5179.9895	Pass	5179.987	Pass	5179.9871	Pass	5179.9883	Pass
20	120	5179.9772	Pass	5179.9773	Pass	5179.9746	Pass	5179.9756	Pass
10	120	5180.0073	Pass	5180.0048	Pass	5180.0058	Pass	5180.0097	Pass
0	120	5179.9907	Pass	5179.9938	Pass	5179.9932	Pass	5179.9937	Pass

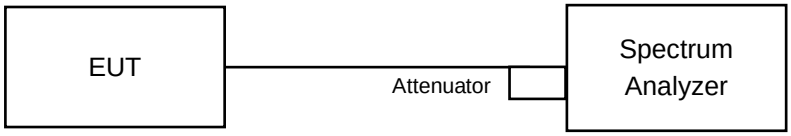
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5180.0066	Pass	5180.0045	Pass	5180.0065	Pass	5180.0092	Pass
	120	5180.0073	Pass	5180.0048	Pass	5180.0058	Pass	5180.0097	Pass
	102	5180.0064	Pass	5180.0045	Pass	5180.0051	Pass	5180.0095	Pass

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.44	16.46	16.42	16.42	0.5	Pass
157	5785	16.44	16.46	16.42	16.42	0.5	Pass
165	5825	16.45	16.44	16.42	16.45	0.5	Pass

802.11ax (HE20)

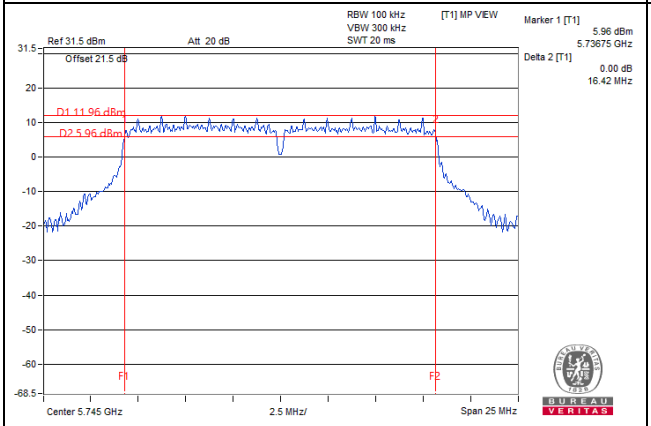
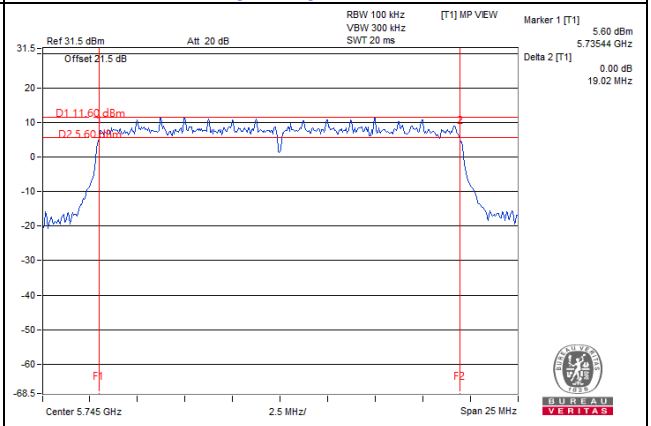
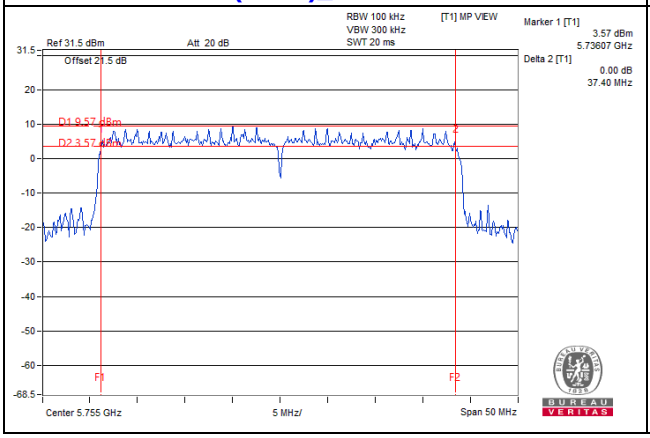
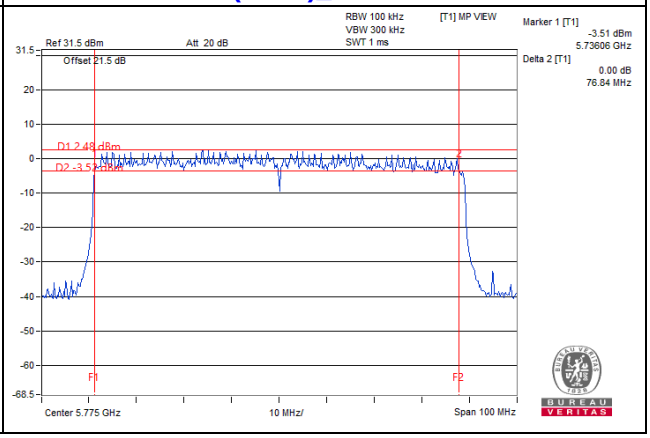
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	19.07	19.09	19.02	19.03	0.5	Pass
157	5785	19.08	19.08	19.03	19.04	0.5	Pass
165	5825	19.05	19.13	19.02	19.08	0.5	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	37.53	37.48	37.4	37.57	0.5	Pass
159	5795	37.69	37.47	37.45	37.48	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	77.1	77.74	76.86	76.84	0.5	Pass

Spectrum Plot of Worst Value	
802.11a_Chain 2 / CH149	**802.11ax (HE20)_Chain 2 / CH149**
	
802.11ax (HE40)_Chain 2 / CH151	**802.11ax (HE80)_Chain 3 / CH155**
	

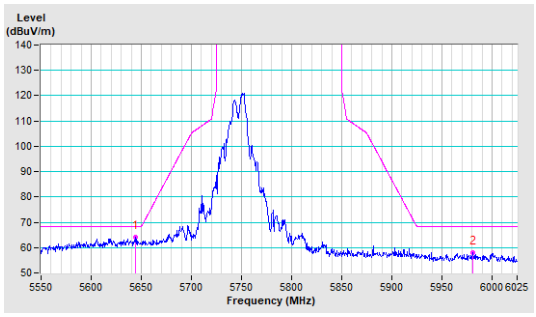
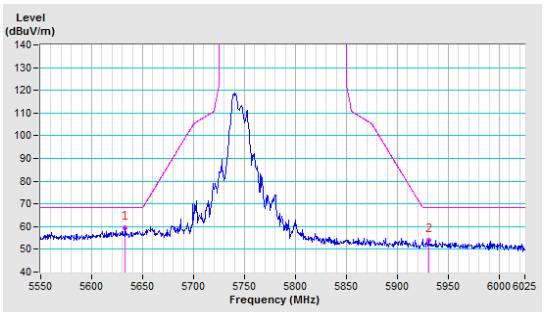
5 Pictures of Test Arrangements

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

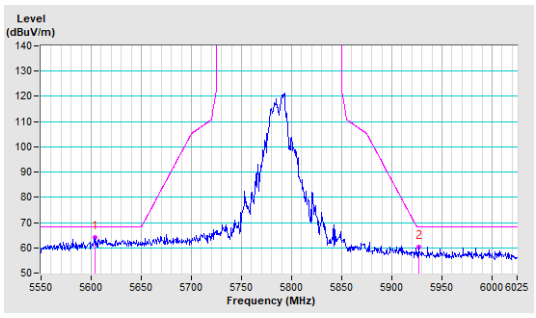
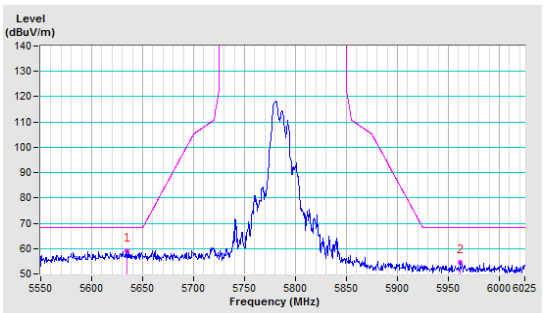
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

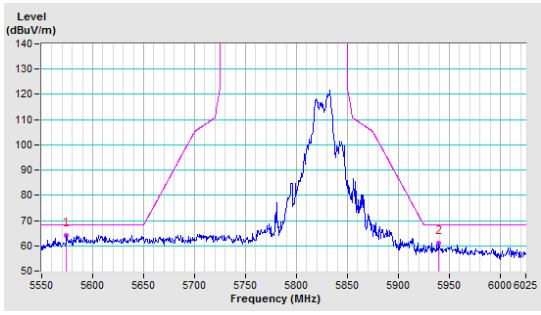
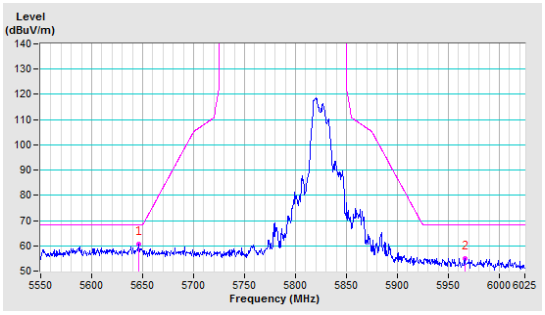
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

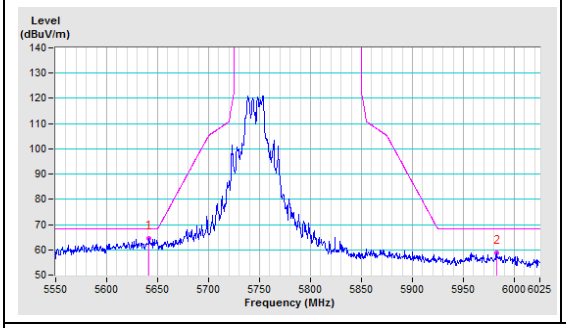
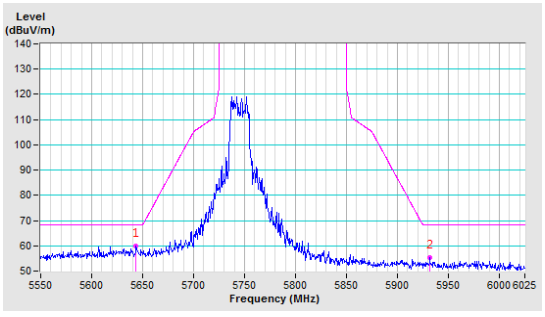
Horizontal	Vertical
	

CH 165 5825 MHz

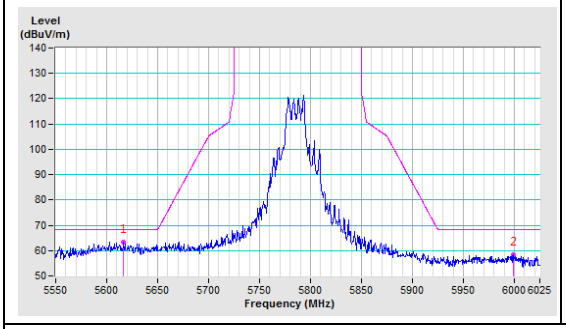
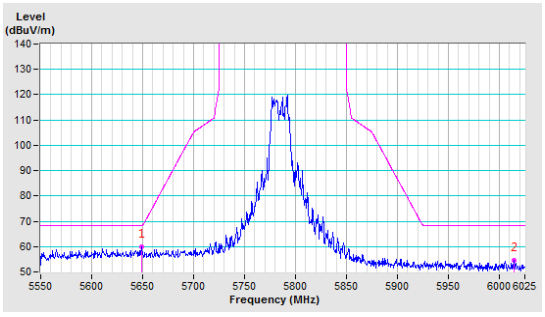
Horizontal	Vertical
	

802.11ax (HE20)

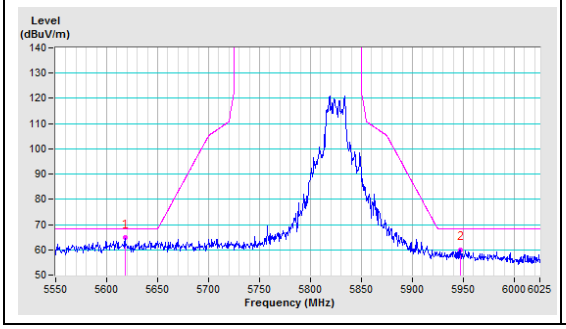
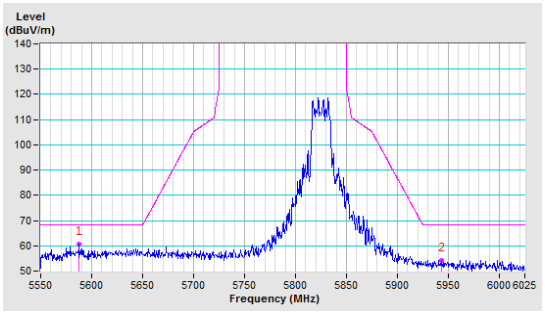
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

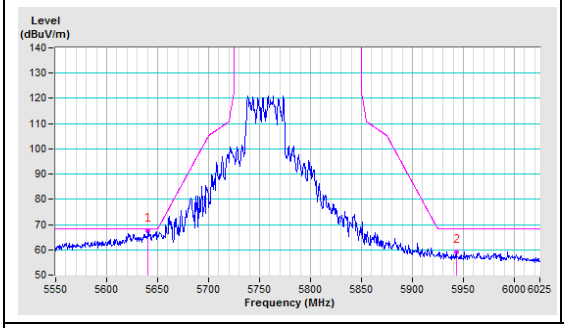
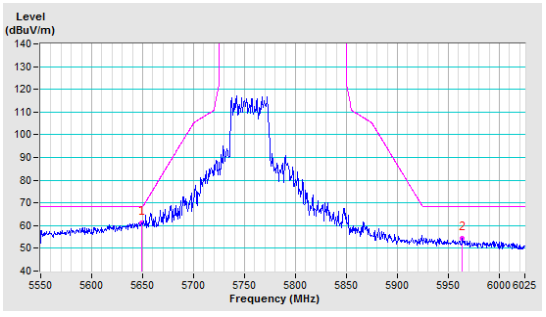
Horizontal	Vertical
	

CH 165 5825 MHz

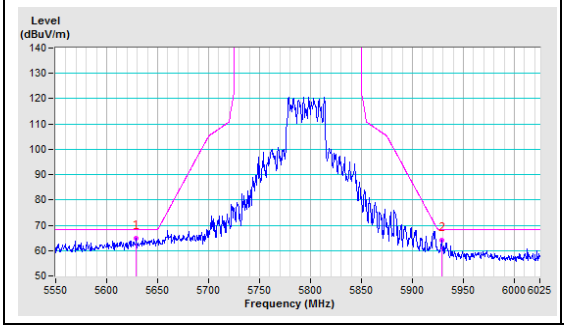
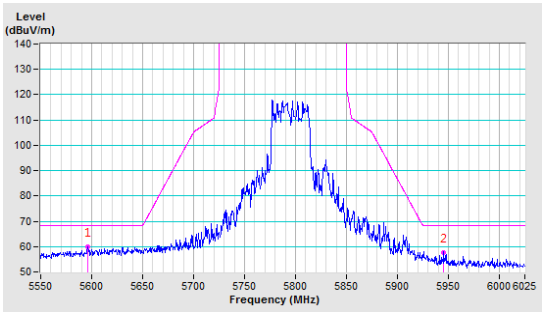
Horizontal	Vertical
	

802.11ax (HE40)

CH 151 5755 MHz

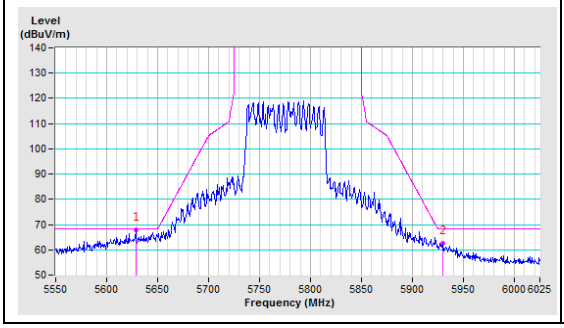
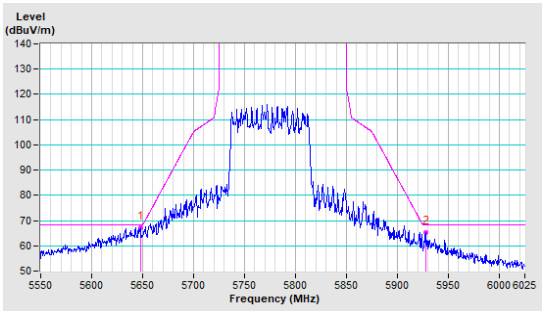
Horizontal	Vertical
	

CH 159 5795 MHz

Horizontal	Vertical
	

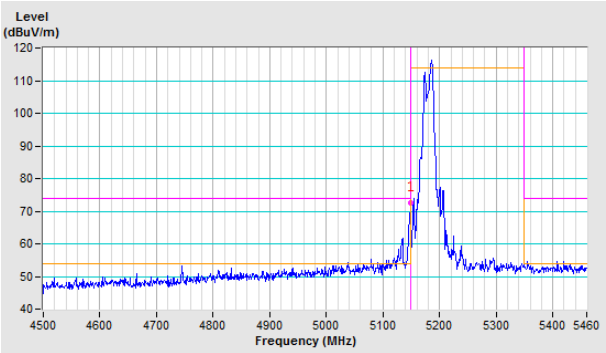
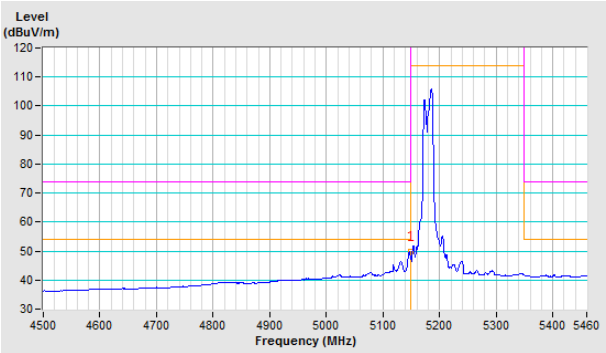
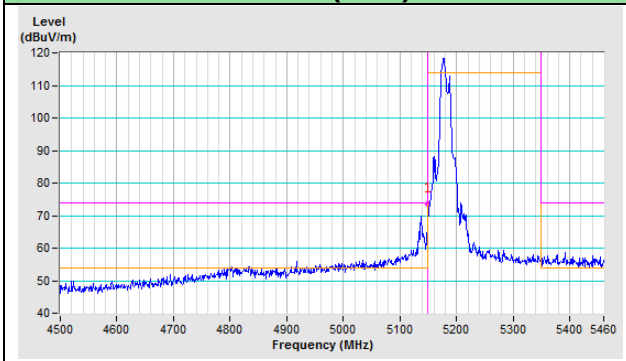
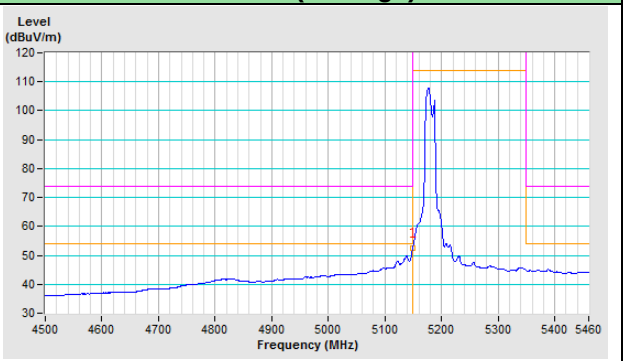
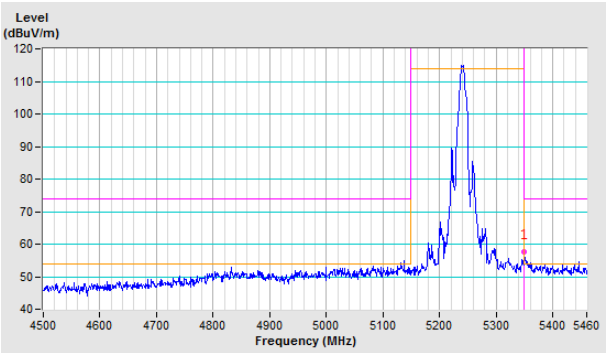
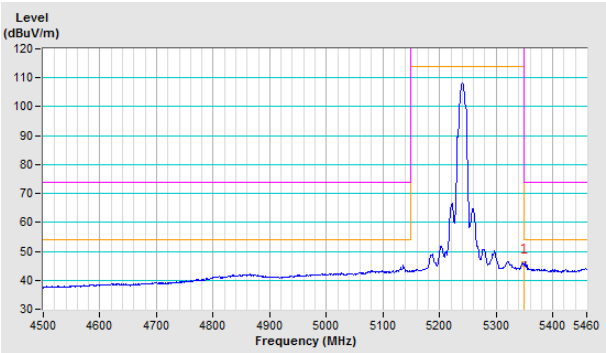
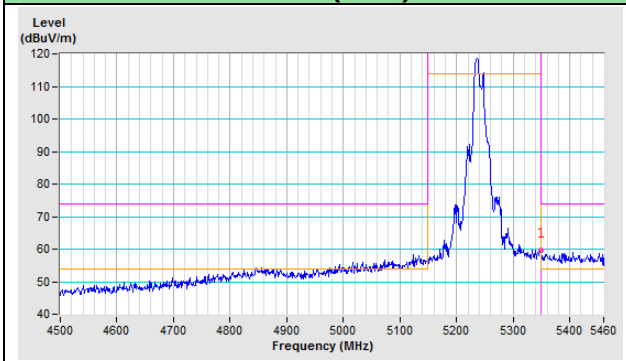
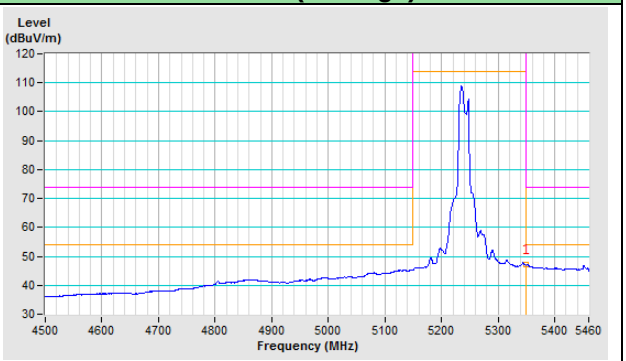
802.11ax (HE80)

CH 155 5775 MHz

Horizontal	Vertical
	

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

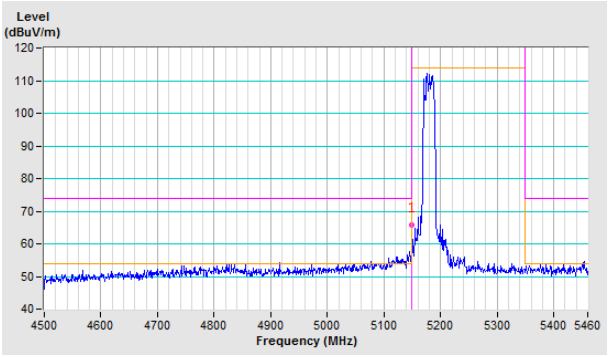
802.11a

Channel 36	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	
Channel 48	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

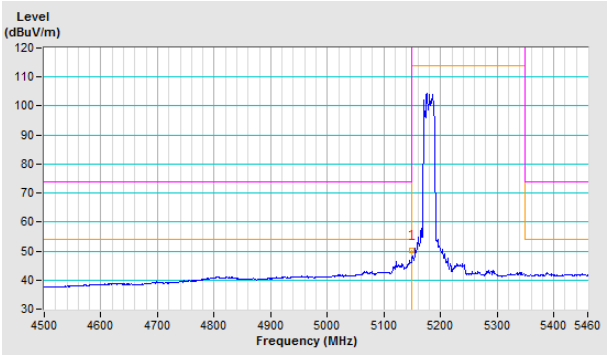
802.11ax (HE20)

Channel 36

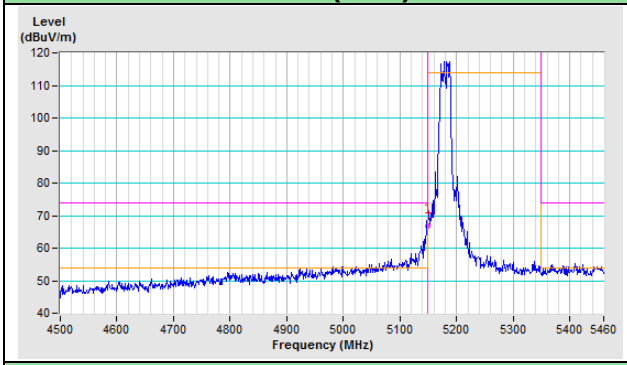
Horizontal (Peak)



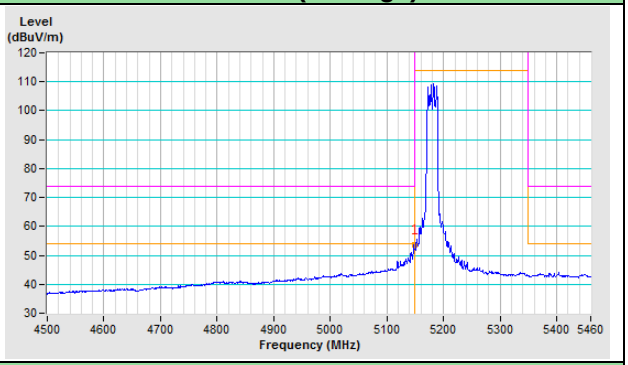
Horizontal (Average)



Vertical (Peak)

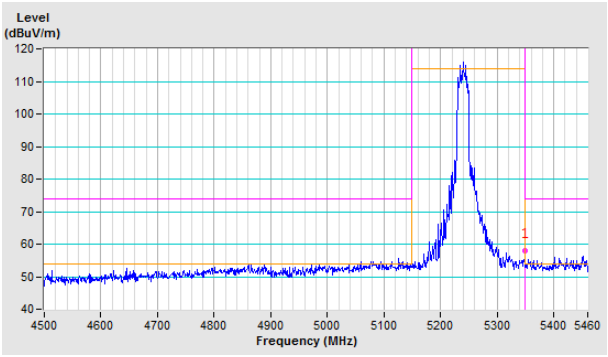


Vertical (Average)

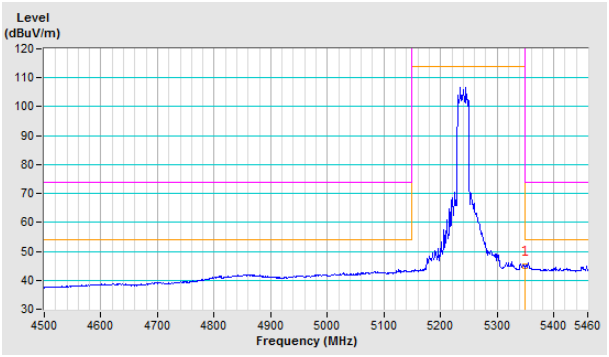


Channel 48

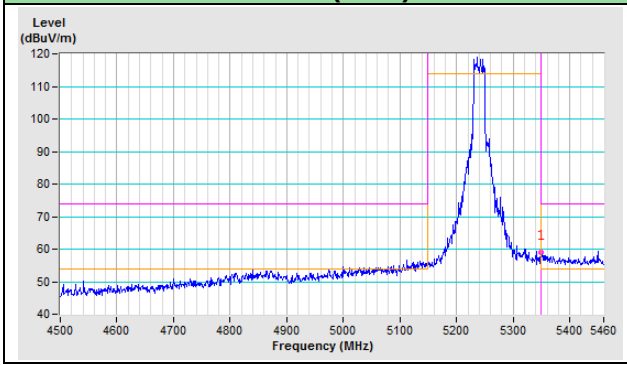
Horizontal (Peak)



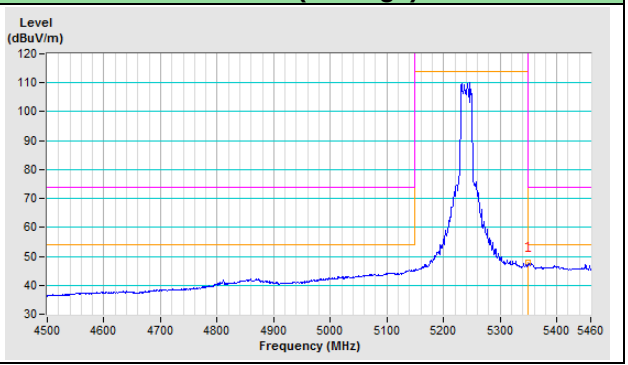
Horizontal (Average)



Vertical (Peak)



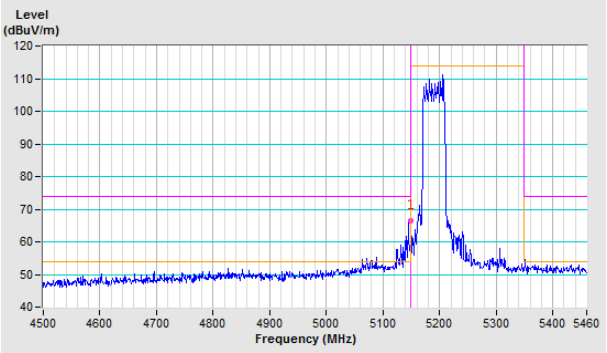
Vertical (Average)



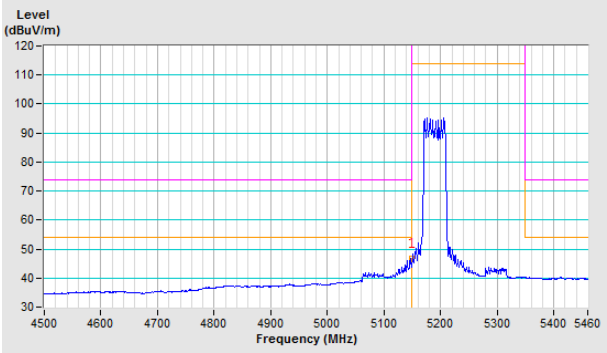
802.11ax (HE40)

Channel 38

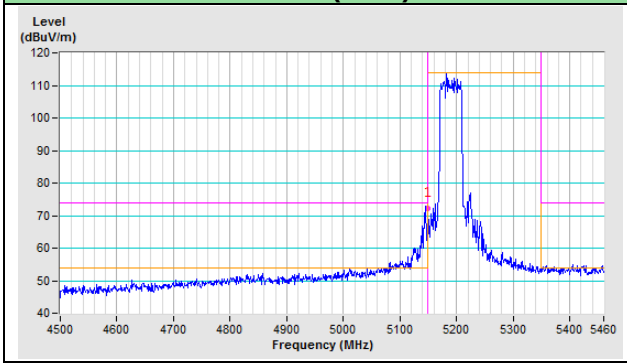
Horizontal (Peak)



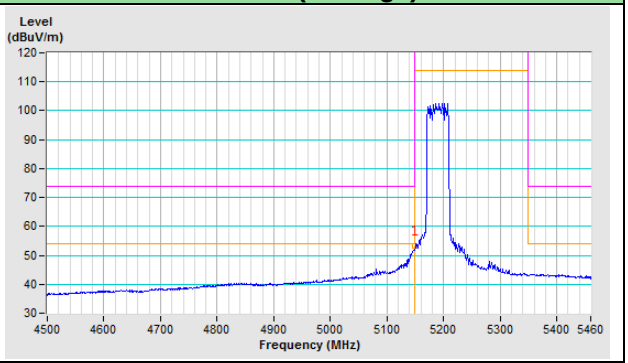
Horizontal (Average)



Vertical (Peak)

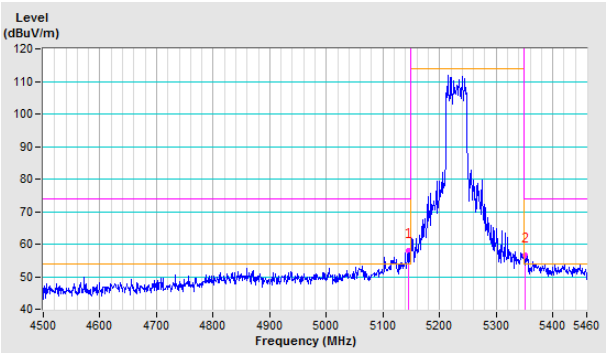


Vertical (Average)

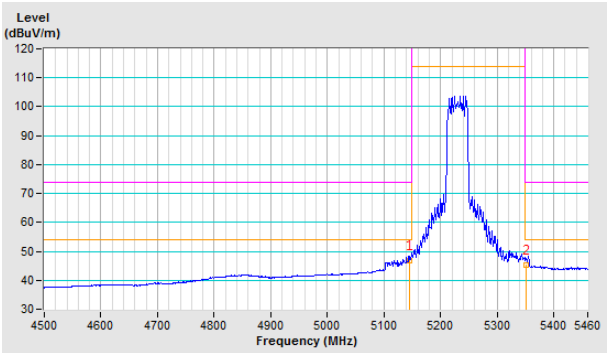


Channel 46

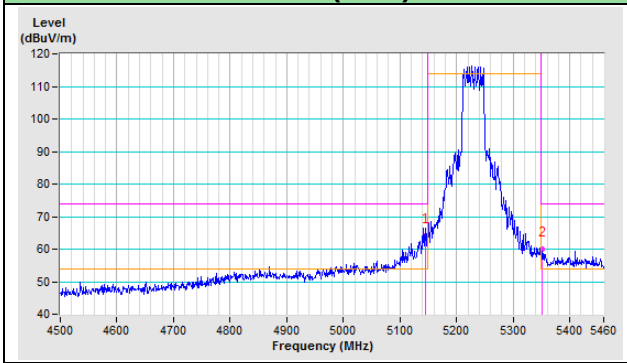
Horizontal (Peak)



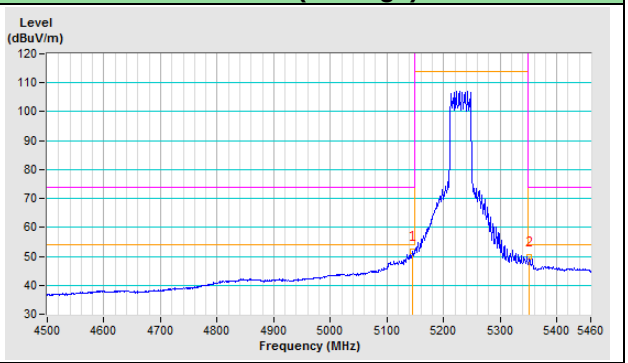
Horizontal (Average)



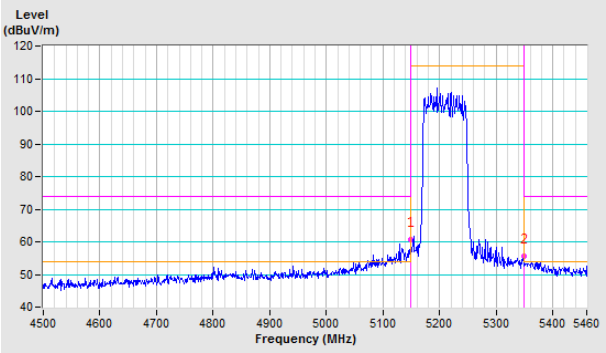
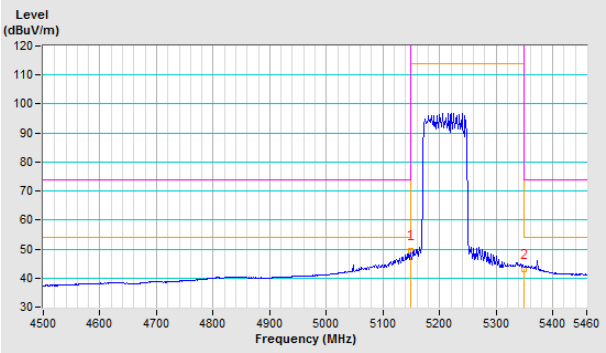
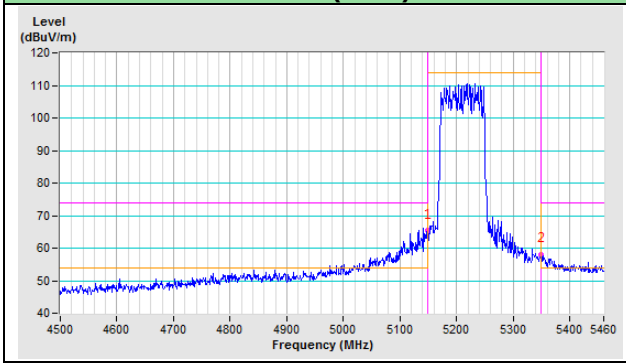
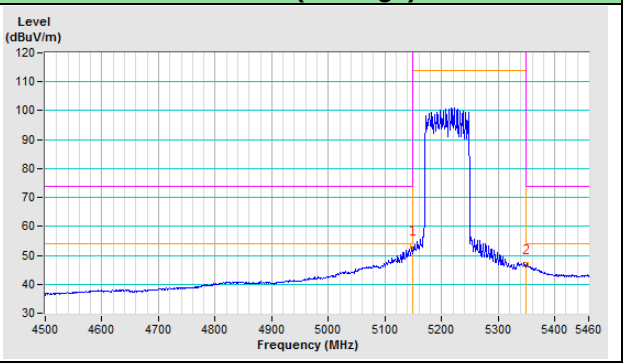
Vertical (Peak)



Vertical (Average)



802.11ax (HE80)

Channel 42	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

Appendix – Information of the Testing Laboratories

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

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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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