FCC Test Report (WLAN)

Report No.:	RFBCKS-WTW-P20110426
FCC ID:	K7S-03685
Test Model:	MX8500
Series Model:	MX85EC, MX85WH, MX85MS
Received Date:	Nov. 12, 2020
Test Date:	Nov. 12 to Dec. 12, 2020
Issued Date:	Dec. 15, 2020
Applicant:	Belkin International, Inc.
Address:	12045 East Waterfront Drive, Playa Vista, CA 90094
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
FCC Registration / Designation Number:	198487 / TW2021

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RFBCKS-WTW-P20110426	Original release	Dec. 15, 2020

1 Certificate of Conformity

Product:	Linksys Tri-Band 802.11ax Wireless Router
Brand:	Linksys
Test Model:	MX8500
Series Model:	MX85EC, MX85WH, MX85MS
Sample Status:	Engineering sample
Applicant:	Belkin International, Inc.
Test Date:	Nov. 12 to Dec. 12, 2020
Standards:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10:2013

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

Prepared by : Annie Chang , **Date:** Dec. 15, 2020

Annie Chang / Senior Specialist

Approved by : Rex. Lai , **Date:** Dec. 15, 2020

Rex Lai / Associate 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 -13.15dB at 0.39219MHz.
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 -1.19dB at 5150.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex (MHF) not a standard connector.

Note:
1. For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
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	3.00 dB
Conducted Emissions	9kHz ~ 40GHz	2.63 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	2.61 dB
	30MHz ~ 1GHz	5.43 dB
Radiated Emissions above 1 GHz	Above 1GHz	5.42 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Linksys Tri-Band 802.11ax Wireless Router
Brand	Linksys
Test Model	MX8500
Series Model	MX85EC, MX85WH, MX85MS
Model Difference	Marketing Differentiation
Sample Status	Engineering sample
Driver version	SPF11.3_CS_v1.12_CBP
Power Supply Rating	12Vdc from adapter
Modulation Type	802.11a: BPSK, QPSK, 16QAM, 64QAM 802.11ac: BPSK, QPSK, 16QAM, 64QAM, 256QAM 802.11ax: BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM
Modulation Technology	OFDM, OFDMA
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n (20MHz/40MHz): up to 600Mbps 802.11ac (20MHz/40MHz/80MHz): up to 1733.3Mbps 802.11ax (20MHz/40MHz/80MHz): up to 2402Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 802.11a, 802.11n (20MHz), 802.11ac (20MHz), 802.11ax (20MHz): 4 802.11n (40MHz), 802.11ac (40MHz), 802.11ax (40MHz): 2 802.11ac (80MHz), 802.11ax (80MHz): 1 5745 ~ 5825MHz: 802.11a, 802.11n (20MHz), 802.11ac (20MHz), 802.11ax (20MHz): 5 802.11n (40MHz), 802.11ac (40MHz), 802.11ax (40MHz): 2 802.11ac (80MHz), 802.11ax (80MHz): 1
Output Power	5180 ~ 5240MHz: CDD Mode: 653.703mW Beamforming Mode: 601.802mW 5745 ~ 5825MHz: CDD Mode: 689.979mW Beamforming Mode: 507.757mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Refer to Note
Cable Supplied	NA

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides 4 completed transmitters and 4 receivers.

Modulation Mode	CDD Mode	Beamforming Mode	TX Function
802.11a	Support	Not Support	4TX
802.11n (20MHz)	Support	Not Support	4TX
802.11n (40MHz)	Support	Not Support	4TX
802.11ac (20MHz)	Support	Support	4TX
802.11ac (40MHz)	Support	Support	4TX
802.11ac (80MHz)	Support	Support	4TX
802.11ax (20MHz)	Support	Support	4TX
802.11ax (40MHz)	Support	Support	4TX
802.11ax (80MHz)	Support	Support	4TX

* The bandwidth and modulation are similar for 20MHz/40MHz on 802.11n mode and 20MHz/40MHz on 802.11n mode and 20MHz/40MHz on 802.11ax mode. Therefore the investigated worst case is the representative mode in test report. (Final test mode refer section 3.2.1)

* For 802.11n/ac/ax, CDD mode and Beamforming mode are presented in power output test item. For other test items, CDD mode is the worst case for final tests after pretesting.

2. The following antennas were provided to the EUT.

Antenna Type	Dipole on PCB	
Antenna Connector	i-pex (MHF)	
Antenna No.	Gain (dBi)	
	5150MHz ~ 5250MHz	5745MHz ~ 5825MHz
Ant1=5GA	4.9	5.4
Ant2=5GB	**5.1**	4.8
Ant3=5GC	4.1	5.7
Ant4=5GD	3.0	**5.8**

The following antenna allocation table was provided to the EUT.

5G Antenna port		5G Antenna port		TX Function	
Degree -45°	5GC	Degree +45°	5GD	MIMO	Correlated
Degree -45°	5GA	Degree +45°	5GB	MIMO	

All antennas are dipole type. Thus antennas are all used the same type, the difference is only in the placement direction. According this condition, 2GA1 / 2GA2 are cross-polarization, 2GB1 / 2GB2 are cross-polarization, 5GA and 5GC locates on the opposite side of the device. The Degree -45º means the angle we see when facing towards to the antenna. This means if we look at 5GA(-45º) in front of us, the 5GC at the opposite side will be +45º. Therefore, it is sure that 5GA and 5GC have exactly 90-degree angle difference and they are cross-polarized. The same situation are with 5GB and 5GD. 6GA and 6GC locates on the opposite side of the device. The Degree +45º means the angle we see when facing towards to the antenna. This means if we look at 6GA(+45º) in front of us, the 6GC at the opposite side will be -45º. Therefore, it is sure that 6GA and 6GC have exactly 90-degree angle difference and are cross-polarized. The same situation are with 6GB and 6GD.

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

3. The following Filters were provided to the EUT.

✧Filter Soshin

✧Filter ACX

After pre-tested, **Filter Soshin** was the worst case for final tset.

4. The EUT uses following adapter.

Adapter 1	
Brand	Ktec
Model	KSAS0501200400HU
Input Power	100-240Vac, 50/60Hz, 1.2A
Output Power	12Vdc, 4.0A
Power Cord	AC 2-Pin, Non-shielded DC cable (1.5m)
Adapter 2	
Brand	APD
Model	WA-48B12FU
Input Power	100-240Vac, 50/60Hz, 1.5A
Output Power	12Vdc, 4.0A
Power Cord	AC 2-Pin, Non-shielded DC cable (1.5m)

The above two adapters were pre-tested, and Adapter 1 was the worst case for final test.

5. WiFi 2.4GHz, 5GHz & 6E technologies can transmit at same time.

6. Spurious emission of the simultaneous operation (WiFi 2.4GHz, 5GHz & 6E technologies) has been evaluated and no non-compliance was found.

7. The above EUT information is declared by manufacturer and for more detailed features description, please refer 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 (20MHz), 802.11ac (20MHz), 802.11ax (20MHz):

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

2 channels are provided for 802.11n (40MHz), 802.11ac (40MHz), 802.11ax (40MHz):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (80MHz), 802.11ax (80MHz):

Channel	Frequency
42	5210MHz

For 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (20MHz), 802.11ac (20MHz), 802.11ax (20MHz):

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

2 channels are provided for 802.11n (40MHz), 802.11ac (40MHz), 802.11ax (40MHz):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (80MHz), 802.11ax (80MHz):

Channel	Frequency
155	5775MHz

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 & Bandedge Measurement **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.

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
CDD Mode						
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11ax (20MHz)		36 to 48	36, 40, 48	OFDMA	MCS0
	802.11ax (40MHz)		38 to 46	38, 46	OFDMA	MCS0
	802.11ax (80MHz)		42	42	OFDMA	MCS0
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11ax (20MHz)		149 to 165	149, 157, 165	OFDMA	MCS0
	802.11ax (40MHz)		151 to 159	151, 159	OFDMA	MCS0
	802.11ax (80MHz)		155	155	OFDMA	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.

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
CDD Mode						
-	802.11ax (20MHz)	5180-5240	36 to 48	157	OFDMA	MCS0
-	802.11ax (20MHz)	5745-5825	149 to 165		OFDMA	MCS0

Power Line Conducted Emission Test:

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

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
CDD Mode						
-	802.11ax (20MHz)	5180-5240	36 to 48	157	OFDMA	MCS0
-	802.11ax (20MHz)	5745-5825	149 to 165		OFDMA	MCS0

Antenna Port Conducted Measurement:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
CDD Mode						
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11ac (20MHz)*		36 to 48	36, 40, 48	OFDM	6.5
	802.11ac (40MHz)*		38 to 46	38, 46	OFDM	13.5
	802.11ac (80MHz)*		42	42	OFDM	65.0
	802.11ax (20MHz)		36 to 48	36, 40, 48	OFDMA	MCS0
	802.11ax (40MHz)		38 to 46	38, 46	OFDMA	MCS0
	802.11ax (80MHz)		42	42	OFDMA	MCS0
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11ac (20MHz)*		149 to 165	149, 157, 165	OFDM	6.5
	802.11ac (40MHz)*		151 to 159	151, 159	OFDM	13.5
	802.11ac (80MHz)*		155	155	OFDM	65.0
	802.11ax (20MHz)		149 to 165	149, 157, 165	OFDMA	MCS0
	802.11ax (40MHz)		151 to 159	151, 159	OFDMA	MCS0
	802.11ax (80MHz)		155	155	OFDMA	MCS0
*802.11ac (20MHz), 802.11ac (40MHz), 802.11ac (80MHz) are for Conducted Output Power Measurement only.						
Beamforming Mode (Conducted Power Measurement only)						
-	802.11ac (20MHz)	5180-5240	36 to 48	36, 40, 48	OFDM	6.5
	802.11ac (40MHz)		38 to 46	38, 46	OFDM	13.5
	802.11ac (80MHz)		42	42	OFDM	65.0
	802.11ax (20MHz)		36 to 48	36, 40, 48	OFDMA	MCS0
	802.11ax (40MHz)		38 to 46	38, 46	OFDMA	MCS0
	802.11ax (80MHz)		42	42	OFDMA	MCS0
-	802.11ac (20MHz)	5745-5825	149 to 165	149, 157, 165	OFDM	6.5
	802.11ac (40MHz)		151 to 159	151, 159	OFDM	13.5
	802.11ac (80MHz)		155	155	OFDM	65.0
	802.11ax (20MHz)		149 to 165	149, 157, 165	OFDMA	MCS0
	802.11ax (40MHz)		151 to 159	151, 159	OFDMA	MCS0
	802.11ax (80MHz)		155	155	OFDMA	MCS0

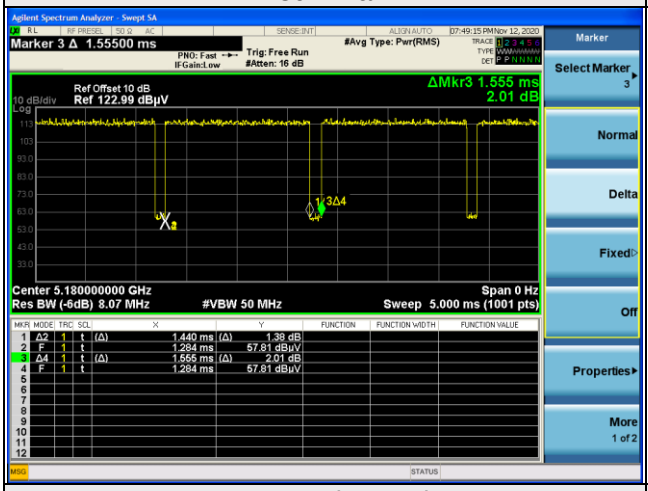
Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	22deg. C, 64%RH, 25deg. C, 68%RH	120Vac, 60Hz	Ian Chang, Dalen Dai
RE<1G	25deg. C, 68%RH	120Vac, 60Hz	Dalen Dai
PLC	25deg. C, 75%RH	120Vac, 60Hz	Ian Chang
APCM	25deg. C, 76%RH	120Vac, 60Hz	Saxon Lee

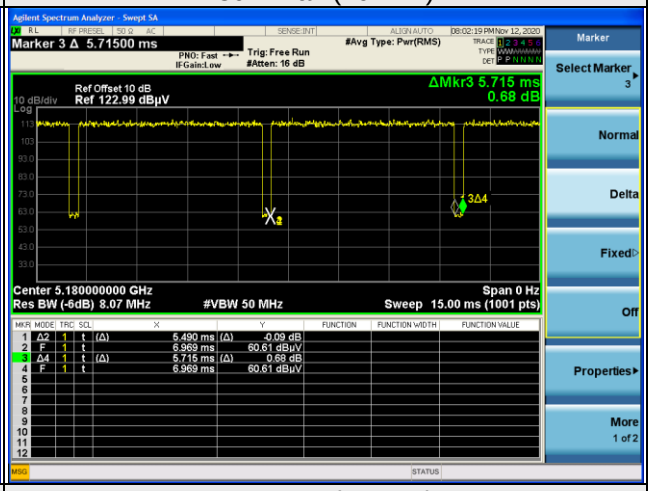
3.3 Duty Cycle of Test Signal

Duty cycle of test signal is < 98%, duty factor is required.
802.11a: Duty cycle = 1.44/1.555 = 0.926, Duty factor = 10 * log (1/0.926) = 0.33
802.11ax (20MHz): Duty cycle = 5.49/5.715 = 0.961, Duty factor = 10 * log (1/0.961) = 0.17
802.11ax (40MHz): Duty cycle = 5.475/5.685 = 0.963, Duty factor = 10 * log (1/0.963) = 0.16
802.11ax (80MHz): Duty cycle = 5.49/5.67 = 0.968, Duty factor = 10 * log (1/0.968) = 0.14

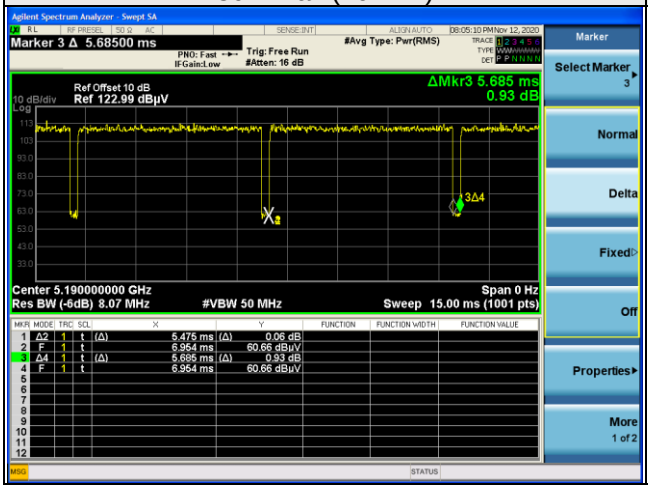
802.11a



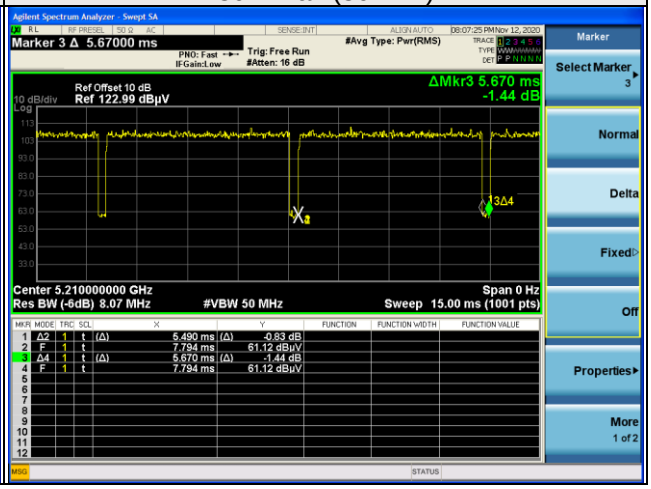
802.11ax (20MHz)



802.11ax (40MHz)



802.11ax (80MHz)



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.	Notebook PC	Lenove	81LG	PF1NF9V2	N/A	Provided by Lab
B.	LAN Load	N/A	N/A	N/A	N/A	Provided by Lab
C.	USB 3.0 Flash Drive	HP	v250w	N/A	N/A	Provided by Lab

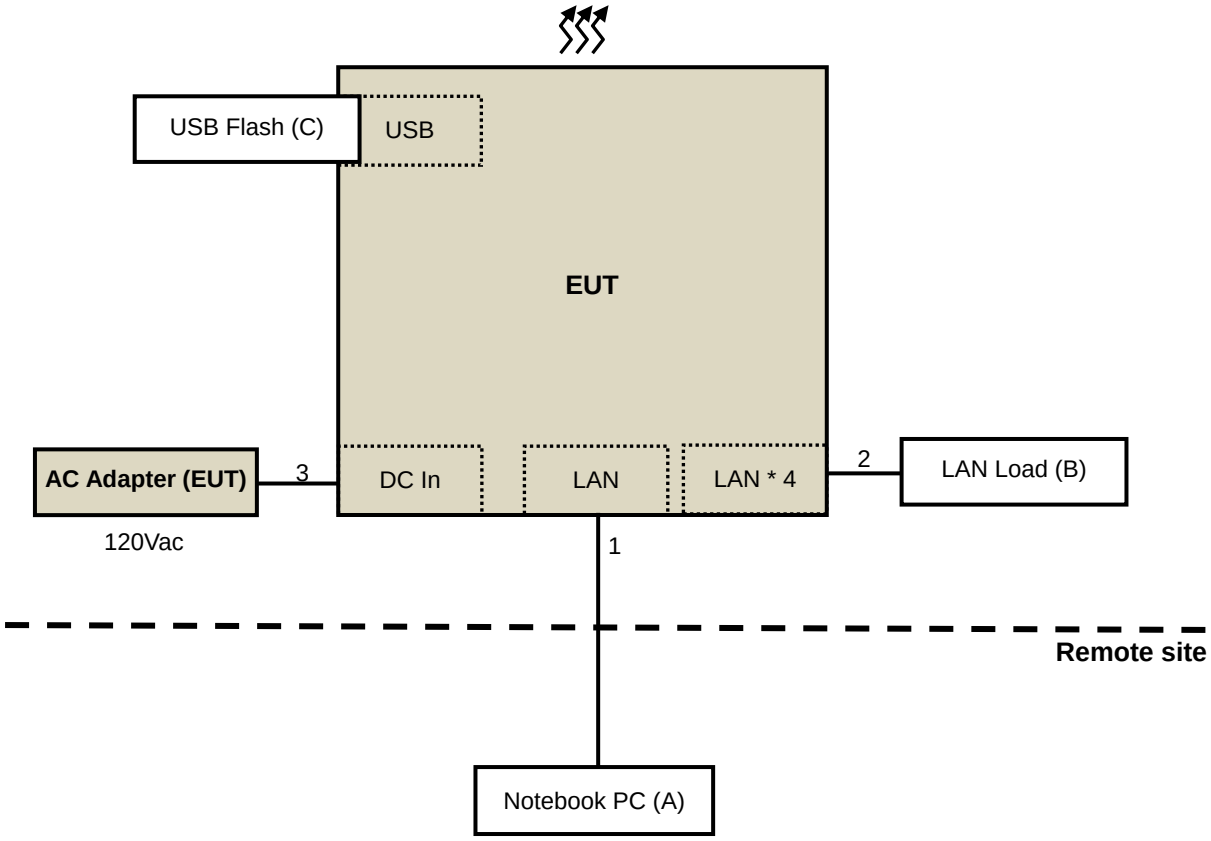
Note:

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

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	10	N	0	Provided by Lab (RJ45, Cat.5e)
2.	LAN cable	4	1	N	0	Provided by Lab (RJ45, Cat.5e)
3.	DC cable	1	1.5	N	0	Supplied by client

Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards and References

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

Test standard:

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

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

References Test Guidance:

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

Note:

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

Limits of unwanted emission out of the restricted bands

<table>
<tr><td colspan="3">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="3" rowspan="2">789033 D02 General UNII Test Procedure New Rules v02r01</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK: 74 (dBµV/m)</td><td>AV: 54 (dBµV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK: -27 (dBm/MHz)</td><td rowspan="3">PK: 68.2(dBµV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK: -27 (dBm/MHz) *1
PK: 10 (dBm/MHz) *2
PK: 15.6 (dBm/MHz) *3
PK: 27 (dBm/MHz) *4</td><td>PK: 68.2(dBµV/m) *1
PK: 105.2 (dBµV/m) *2
PK: 110.8(dBµV/m) *3
PK: 122.2 (dBµV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="5">*1 beyond 75 MHz or more above of the band edge.
*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.
*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</td></tr>
</table>

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

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 19, 2020	Feb. 18, 2021
HP Preamplifier	8449B	3008A01201	Feb. 20, 2020	Feb. 19, 2021
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Feb. 19, 2020	Feb. 18, 2021
Agilent TEST RECEIVER	N9038A	MY51210129	Mar. 18, 2020	Mar. 17, 2021
Schwarzbeck Antenna	VULB 9168	139	Nov. 6, 2020	Nov. 5, 2021
Schwarzbeck Antenna	VHBA 9123	480	Jun. 3, 2019	Jun. 2, 2021
Schwarzbeck Horn Antenna	BBHA-9170	212	Nov. 24, 2019	Nov. 23, 2020
			Nov. 22, 2020	Nov. 21, 2021
EMCO Horn Antenna	3115	00028257	Nov. 24, 2019	Nov. 23, 2020
			Nov. 22, 2020	Nov. 21, 2021
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V7.6.15.9.5	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF102	Cable-CH6-01	Jul. 9, 2020	Jul. 8, 2021
EMEC RF cable With 3/4dB PAD	EM102-KMKM	01	Aug. 21, 2020	Aug. 20, 2021
KEYSIGHT MIMO Powermeasurement Test set	U2021XA	U2021XA-001	Jun. 16, 2020	Jun. 15, 2021
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Jul. 22, 2020	Jul. 21, 2021
Loop Antenna EMCI	LPA600	270	Aug. 23, 2019	Aug. 22, 2021
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 8, 2020	Sep. 7, 2021
Anritsu Power Sensor	MA2411B	0738404	Apr. 13, 2020	Apr. 12, 2021
Anritsu Power Meter	ML2495A	0842014	Apr. 13, 2020	Apr. 12, 2021

NOTE: 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.

4.1.3 Test Procedures

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 detect 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. (802.11a: RBW = 1MHz, VBW = 750Hz; 802.11ax (20MHz): RBW = 1MHz, VBW = 200Hz; 802.11ax (40MHz): RBW = 1MHz, VBW = 200Hz; 802.11ax (80MHz): RBW = 1MHz, VBW = 200Hz)

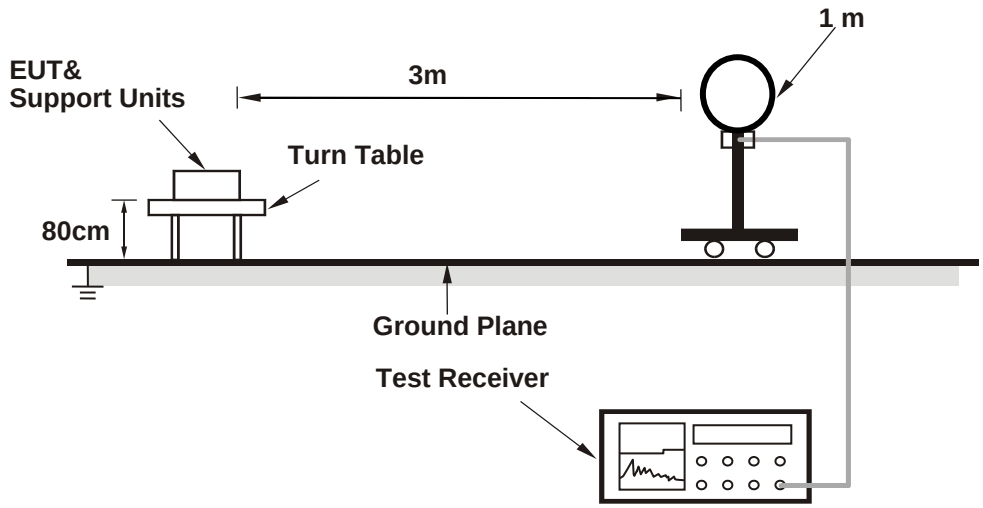
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

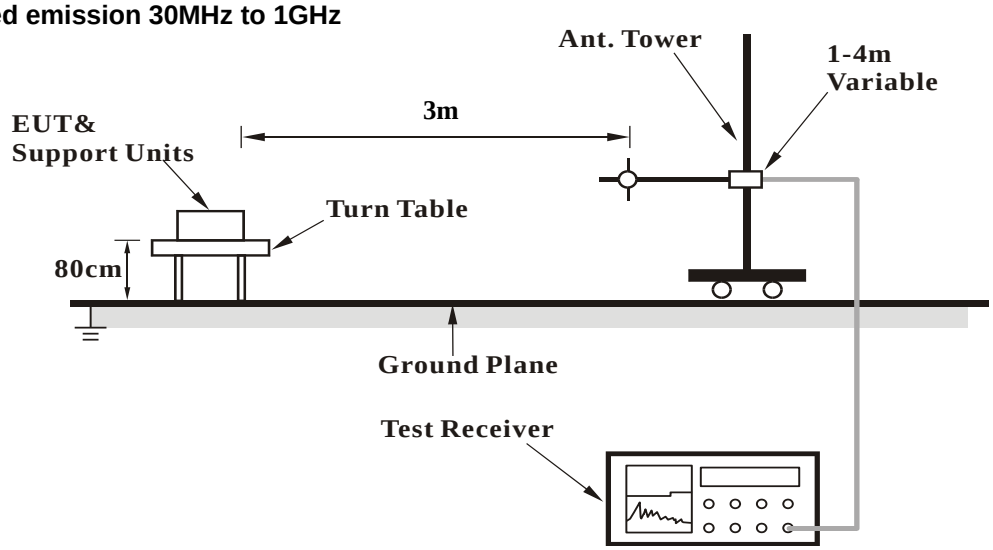
No deviation.

4.1.5 Test Setup

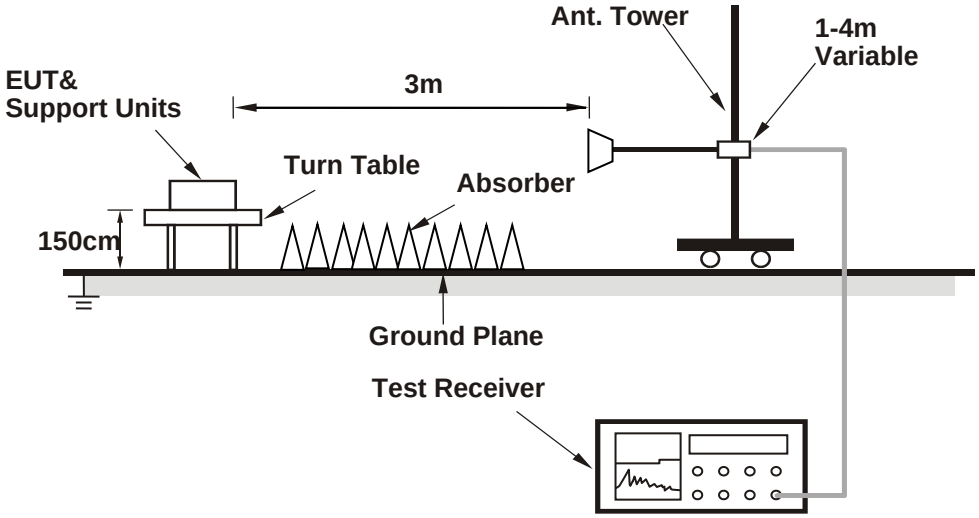
For Radiated emission below 30MHz



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 Conditions

a. Placed the EUT on the testing table.
b. Prepared a notebook to act as a communication partner and placed it outside of testing area.
c. The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
d. The communication partner sent data to EUT by command "PING".
e. The communication partner read and wrote messages from USB Flash via EUT.

4.1.7 Test Results

Above 1GHz data:

CDD Mode

802.11a

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	64.00 PK	74.00	-10.00	2.75 H	325	54.29	9.71
2	5150.00	52.61 AV	54.00	-1.39	2.75 H	325	42.90	9.71
3	*5180.00	116.77 PK			2.75 H	325	107.00	9.77
4	*5180.00	108.59 AV			2.75 H	325	98.82	9.77
5	#10360.00	57.70 PK	68.20	-10.50	4.00 H	348	41.60	16.10
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	63.60 PK	74.00	-10.40	1.42 V	43	53.89	9.71
2	5150.00	51.75 AV	54.00	-2.25	1.42 V	43	42.04	9.71
3	*5180.00	116.53 PK			1.42 V	43	106.76	9.77
4	*5180.00	108.31 AV			1.42 V	43	98.54	9.77
5	#10360.00	56.75 PK	68.20	-11.45	1.57 V	148	40.65	16.10

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5200.00	121.85 PK			2.47 H	312	112.05	9.80
2	*5200.00	113.95 AV			2.47 H	312	104.15	9.80
3	#10400.00	57.51 PK	68.20	-10.69	1.62 H	234	41.39	16.12
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	121.49 PK			1.46 V	51	111.69	9.80
2	*5200.00	113.08 AV			1.46 V	51	103.28	9.80
3	#10400.00	56.68 PK	68.20	-11.52	1.84 V	124	40.56	16.12

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	121.86 PK			2.75 H	318	111.85	10.01
2	*5240.00	114.21 AV			2.75 H	318	104.20	10.01
3	5350.00	62.86 PK	74.00	-11.14	2.75 H	318	52.18	10.68
4	5350.00	50.70 AV	54.00	-3.30	2.75 H	318	40.02	10.68
5	#10480.00	57.21 PK	68.20	-10.99	1.47 H	152	41.18	16.03
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	121.24 PK			1.41 V	56	111.23	10.01
2	*5240.00	113.68 AV			1.41 V	56	103.67	10.01
3	5350.00	62.42 PK	74.00	-11.58	1.41 V	56	51.74	10.68
4	5350.00	50.37 AV	54.00	-3.63	1.41 V	56	39.69	10.68
5	#10480.00	56.55 PK	68.20	-11.65	1.49 V	36	40.52	16.03

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5561.40	62.54 PK	68.20	-5.66	2.09 H	327	51.46	11.08
2	*5745.00	121.85 PK			2.09 H	327	111.32	10.53
3	*5745.00	113.74 AV			2.09 H	327	103.21	10.53
4	#6006.95	63.34 PK	68.20	-4.86	2.09 H	327	52.55	10.79
5	11490.00	59.45 PK	74.00	-14.55	1.86 H	253	41.15	18.30
6	11490.00	49.04 AV	54.00	-4.96	1.86 H	253	30.74	18.30
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	#5568.52	59.34 PK	68.20	-8.86	1.00 V	169	48.32	11.02
2	*5745.00	120.93 PK			1.00 V	169	110.40	10.53
3	*5745.00	113.13 AV			1.00 V	169	102.60	10.53
4	#6020.25	59.36 PK	68.20	-8.84	1.00 V	169	48.58	10.78
5	11490.00	59.23 PK	74.00	-14.77	1.08 V	314	40.93	18.30
6	11490.00	48.96 AV	54.00	-5.04	1.08 V	314	30.66	18.30

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5645.48	62.11 PK	68.20	-6.09	2.22 H	325	51.38	10.73
2	*5785.00	120.73 PK			2.22 H	325	110.28	10.45
3	*5785.00	112.81 AV			2.22 H	325	102.36	10.45
4	#5961.35	62.76 PK	68.20	-5.44	2.22 H	325	52.14	10.62
5	11570.00	59.32 PK	74.00	-14.68	1.93 H	267	40.79	18.53
6	11570.00	48.84 AV	54.00	-5.16	1.93 H	267	30.31	18.53
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	#5599.87	62.18 PK	68.20	-6.02	1.50 V	316	51.45	10.73
2	*5785.00	119.78 PK			1.50 V	316	109.33	10.45
3	*5785.00	111.90 AV			1.50 V	316	101.45	10.45
4	#6016.45	63.21 PK	68.20	-4.99	1.50 V	316	52.43	10.78
5	11570.00	59.18 PK	74.00	-14.82	1.14 V	320	40.65	18.53
6	11570.00	48.73 AV	54.00	-5.27	1.14 V	320	30.20	18.53

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5556.65	62.12 PK	68.20	-6.08	2.03 H	330	51.00	11.12
2	*5825.00	120.24 PK			2.03 H	330	109.83	10.41
3	*5825.00	112.43 AV			2.03 H	330	102.02	10.41
4	#5989.85	63.16 PK	68.20	-5.04	2.03 H	330	52.41	10.75
5	11650.00	59.29 PK	74.00	-14.71	1.90 H	258	40.99	18.30
6	11650.00	48.70 AV	54.00	-5.30	1.90 H	258	30.40	18.30
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5640.73	61.88 PK	68.20	-6.32	1.50 V	304	51.15	10.73
2	*5825.00	119.71 PK			1.50 V	304	109.30	10.41
3	*5825.00	112.04 AV			1.50 V	304	101.63	10.41
4	#5993.65	63.02 PK	68.20	-5.18	1.50 V	304	52.25	10.77
5	11650.00	59.12 PK	74.00	-14.88	1.09 V	294	40.82	18.30
6	11650.00	48.67 AV	54.00	-5.33	1.09 V	294	30.37	18.30

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 (20MHz)

RF Mode	TX 802.11ax (20MHz)	Channel	CH 36：5180 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	63.85 PK	74.00	-10.15	2.49 H	319	54.14	9.71
2	5150.00	52.50 AV	54.00	-1.50	2.49 H	319	42.79	9.71
3	*5180.00	118.82 PK			2.49 H	319	109.05	9.77
4	*5180.00	107.94 AV			2.49 H	319	98.17	9.77
5	#10360.00	57.33 PK	68.20	-10.87	1.54 H	236	41.23	16.10
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	63.35 PK	74.00	-10.65	1.38 V	53	53.64	9.71
2	5150.00	51.84 AV	54.00	-2.16	1.38 V	53	42.13	9.71
3	*5180.00	118.44 PK			1.38 V	53	108.67	9.77
4	*5180.00	107.65 AV			1.38 V	53	97.88	9.77
5	#10360.00	56.98 PK	68.20	-11.22	2.01 V	168	40.88	16.10

Remarks:

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

RF Mode	TX 802.11ax (20MHz)	Channel	CH 40：5200 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	64.16 PK	74.00	-9.84	2.63 H	328	54.45	9.71
2	5150.00	52.68 AV	54.00	-1.32	2.63 H	328	42.97	9.71
3	*5200.00	123.49 PK			2.63 H	328	113.69	9.80
4	*5200.00	112.53 AV			2.63 H	328	102.73	9.80
5	#10400.00	57.54 PK	68.20	-10.66	1.56 H	228	41.42	16.12
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	63.17 PK	74.00	-10.83	1.51 V	41	53.46	9.71
2	5150.00	51.94 AV	54.00	-2.06	1.51 V	41	42.23	9.71
3	*5200.00	122.84 PK			1.51 V	41	113.04	9.80
4	*5200.00	111.93 AV			1.51 V	41	102.13	9.80
5	#10400.00	56.38 PK	68.20	-11.82	2.14 V	156	40.26	16.12

Remarks:

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

RF Mode	TX 802.11ax (20MHz)	Channel	CH 48：5240 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	123.08 PK			2.76 H	316	113.07	10.01
2	*5240.00	112.01 AV			2.76 H	316	102.00	10.01
3	5350.00	62.58 PK	74.00	-11.42	2.76 H	316	51.90	10.68
4	5350.00	51.76 AV	54.00	-2.24	2.76 H	316	41.08	10.68
5	#10480.00	57.35 PK	68.20	-10.85	1.47 H	114	41.32	16.03
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	122.55 PK			1.44 V	42	112.54	10.01
2	*5240.00	111.27 AV			1.44 V	42	101.26	10.01
3	5350.00	61.93 PK	74.00	-12.07	1.44 V	42	51.25	10.68
4	5350.00	51.23 AV	54.00	-2.77	1.44 V	42	40.55	10.68
5	#10480.00	56.24 PK	68.20	-11.96	2.26 V	285	40.21	16.03

Remarks:

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

RF Mode	TX 802.11ax (20MHz)	Channel	CH 149：5745 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5618.87	61.73 PK	68.20	-6.47	2.06 H	334	51.00	10.73
2	*5745.00	121.16 PK			2.06 H	334	110.63	10.53
3	*5745.00	113.08 AV			2.06 H	334	102.55	10.53
4	#6009.80	63.10 PK	68.20	-5.10	2.06 H	334	52.31	10.79
5	11490.00	59.19 PK	74.00	-14.81	1.83 H	255	40.89	18.30
6	11490.00	48.65 AV	54.00	-5.35	1.83 H	255	30.35	18.30
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	#5621.73	62.65 PK	68.20	-5.55	1.50 V	313	51.91	10.74
2	*5745.00	120.33 PK			1.50 V	313	109.80	10.53
3	*5745.00	112.46 AV			1.50 V	313	101.93	10.53
4	#5986.52	62.69 PK	68.20	-5.51	1.50 V	313	51.96	10.73
5	11490.00	59.04 PK	74.00	-14.96	1.13 V	291	40.74	18.30
6	11490.00	48.51 AV	54.00	-5.49	1.13 V	291	30.21	18.30

Remarks:

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

RF Mode	TX 802.11ax (20MHz)	Channel	CH 157：5785 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5645.95	62.24 PK	68.20	-5.96	2.00 H	333	51.51	10.73
2	*5785.00	123.79 PK			2.00 H	333	113.34	10.45
3	*5785.00	112.67 AV			2.00 H	333	102.22	10.45
4	#6006.95	62.56 PK	68.20	-5.64	2.00 H	333	51.77	10.79
5	11570.00	59.31 PK	74.00	-14.69	1.88 H	259	40.78	18.53
6	11570.00	48.84 AV	54.00	-5.16	1.88 H	259	30.31	18.53
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	#5554.75	63.11 PK	68.20	-5.09	1.50 V	304	51.98	11.13
2	*5785.00	123.24 PK			1.50 V	304	112.79	10.45
3	*5785.00	112.45 AV			1.50 V	304	102.00	10.45
4	#5935.70	62.83 PK	68.20	-5.37	1.50 V	304	52.33	10.50
5	11570.00	59.22 PK	74.00	-14.78	1.07 V	295	40.69	18.53
6	11570.00	48.78 AV	54.00	-5.22	1.07 V	295	30.25	18.53

Remarks:

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

RF Mode	TX 802.11ax (20MHz)	Channel	CH 165：5825 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5615.09	61.38 PK	68.20	-6.82	2.52 H	146	50.65	10.73
2	*5825.00	121.77 PK			2.52 H	146	111.36	10.41
3	*5825.00	113.83 AV			2.52 H	146	103.42	10.41
4	#5958.71	62.33 PK	68.20	-5.87	2.52 H	146	51.73	10.60
5	11650.00	59.43 PK	74.00	-14.57	1.47 H	129	41.13	18.30
6	11650.00	48.97 AV	54.00	-5.03	1.47 H	129	30.67	18.30
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	#5615.00	61.54 PK	68.20	-6.66	1.42 V	339	50.82	10.72
2	*5825.00	120.95 PK			1.42 V	339	110.54	10.41
3	*5825.00	113.22 AV			1.42 V	339	102.81	10.41
4	#5987.11	62.73 PK	68.20	-5.47	1.42 V	339	51.99	10.74
5	11650.00	58.55 PK	74.00	-15.45	2.23 V	216	40.25	18.30
6	11650.00	48.28 AV	54.00	-5.72	2.23 V	216	29.98	18.30

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 (40MHz)

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	63.60 PK	74.00	-10.40	2.64 H	330	53.89	9.71
2	5150.00	52.73 AV	54.00	-1.27	2.64 H	330	43.02	9.71
3	*5190.00	112.03 PK			2.64 H	330	102.24	9.79
4	*5190.00	100.94 AV			2.64 H	330	91.15	9.79
5	#10380.00	57.34 PK	68.20	-10.86	2.64 H	330	41.23	16.11
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	62.95 PK	74.00	-11.05	1.45 V	67	52.94	10.01
2	5150.00	52.76 AV	54.00	-1.24	1.45 V	67	42.75	10.01
3	*5190.00	111.57 PK			1.45 V	67	101.48	10.09
4	*5190.00	100.45 AV			1.45 V	67	90.36	10.09
5	#10380.00	56.85 PK	68.20	-11.35	1.87 V	49	40.66	16.19

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	66.61 PK	74.00	-7.39	2.53 H	323	56.90	9.71
2	5150.00	52.79 AV	54.00	-1.21	2.53 H	323	43.08	9.71
3	*5230.00	119.02 PK			2.53 H	323	109.06	9.96
4	*5230.00	109.09 AV			2.53 H	323	99.13	9.96
5	5350.00	62.81 PK	74.00	-11.19	2.53 H	323	52.13	10.68
6	5350.00	52.01 AV	54.00	-1.99	2.53 H	323	41.33	10.68
7	#10460.00	57.38 PK	68.20	-10.82	1.55 H	231	41.33	16.05
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	65.18 PK	74.00	-8.82	1.47 V	55	55.47	9.71
2	5150.00	52.25 AV	54.00	-1.75	1.47 V	55	42.54	9.71
3	*5230.00	118.58 PK			1.47 V	55	108.62	9.96
4	*5230.00	108.69 AV			1.47 V	55	98.73	9.96
5	5350.00	62.52 PK	74.00	-11.48	1.47 V	55	51.84	10.68
6	5350.00	51.81 AV	54.00	-2.19	1.47 V	55	41.13	10.68
7	#10460.00	56.23 PK	68.20	-11.97	1.89 V	65	40.18	16.05

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5606.30	62.25 PK	68.20	-5.95	2.32 H	330	51.52	10.73
2	*5755.00	121.28 PK			2.32 H	330	110.78	10.50
3	*5755.00	113.14 AV			2.32 H	330	102.64	10.50
4	#5954.58	62.57 PK	68.20	-5.63	2.32 H	330	51.98	10.59
5	11510.00	58.89 PK	74.00	-15.11	1.59 H	284	40.52	18.37
6	11510.00	48.92 AV	54.00	-5.08	1.59 H	284	30.55	18.37
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5641.03	62.90 PK	68.20	-5.30	1.52 V	346	52.17	10.73
2	*5755.00	119.49 PK			1.52 V	346	108.99	10.50
3	*5755.00	111.72 AV			1.52 V	346	101.22	10.50
4	#6004.37	64.09 PK	68.20	-4.11	1.52 V	346	53.29	10.80
5	11510.00	58.26 PK	74.00	-15.74	2.41 V	51	39.89	18.37
6	11510.00	48.24 AV	54.00	-5.76	2.41 V	51	29.87	18.37

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5639.03	61.33 PK	68.20	-6.87	1.39 H	147	50.60	10.73
2	*5795.00	120.20 PK			1.39 H	147	109.76	10.44
3	*5795.00	112.02 AV			1.39 H	147	101.58	10.44
4	#5931.66	62.37 PK	68.20	-5.83	1.39 H	147	51.89	10.48
5	11590.00	59.70 PK	74.00	-14.30	2.03 H	196	41.12	18.58
6	11590.00	48.84 AV	54.00	-5.16	2.03 H	196	30.26	18.58
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	#5559.45	63.33 PK	68.20	-4.87	1.58 V	267	52.24	11.09
2	*5795.00	110.90 PK			1.58 V	267	100.46	10.44
3	*5795.00	100.60 AV			1.58 V	267	90.16	10.44
4	#5941.22	62.69 PK	68.20	-5.51	1.58 V	267	52.16	10.53
5	11590.00	58.61 PK	74.00	-15.39	2.25 V	175	40.03	18.58
6	11590.00	48.24 AV	54.00	-5.76	2.25 V	175	29.66	18.58

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 (80MHz)

RF Mode	TX 802.11ax (80MHz)	Channel	CH 42：5210 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	63.24 PK	74.00	-10.76	2.74 H	320	53.53	9.71
2	5150.00	52.72 AV	54.00	-1.28	2.74 H	320	43.01	9.71
3	*5210.00	107.82 PK			2.74 H	320	97.97	9.85
4	*5210.00	96.87 AV			2.74 H	320	87.02	9.85
5	5350.00	62.34 PK	74.00	-11.66	2.74 H	320	51.66	10.68
6	5350.00	51.34 AV	54.00	-2.66	2.74 H	320	40.66	10.68
7	#10420.00	57.53 PK	68.20	-10.67	1.66 H	251	41.44	16.09
Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	5150.00	62.73 PK	74.00	-11.27	1.52 V	61	53.02	9.71
2	**5150.00**	**52.81 AV**	**54.00**	**-1.19**	**1.52 V**	**61**	**43.10**	**9.71**
3	*5210.00	107.01 PK			1.52 V	61	97.16	9.85
4	*5210.00	96.31 AV			1.52 V	61	86.46	9.85
5	5350.00	61.92 PK	74.00	-12.08	1.52 V	61	51.24	10.68
6	5350.00	51.01 AV	54.00	-2.99	1.52 V	61	40.33	10.68
7	#10420.00	56.31 PK	68.20	-11.89	1.88 V	201	40.22	16.09

Remarks:

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

RF Mode	TX 802.11ax (80MHz)	Channel	CH 155：5775 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5645.55	64.68 PK	68.20	-3.52	2.13 H	323	53.95	10.73
2	*5775.00	113.94 PK			2.13 H	323	103.46	10.48
3	*5775.00	106.36 AV			2.13 H	323	95.88	10.48
4	#5966.99	62.40 PK	68.20	-5.80	2.13 H	323	51.75	10.65
5	11550.00	59.04 PK	74.00	-14.96	1.69 H	230	40.57	18.47
6	11550.00	49.16 AV	54.00	-4.84	1.69 H	230	30.69	18.47
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	#5646.18	63.85 PK	68.20	-4.35	1.67 V	357	53.13	10.72
2	*5775.00	112.63 PK			1.67 V	357	102.15	10.48
3	*5775.00	105.16 AV			1.67 V	357	94.68	10.48
4	#5964.19	63.65 PK	68.20	-4.55	1.67 V	357	53.02	10.63
5	11550.00	58.63 PK	74.00	-15.37	1.74 V	128	40.16	18.47
6	11550.00	51.70 AV	54.00	-2.30	1.74 V	128	33.23	18.47

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 Worst-Case Data:

CDD Mode

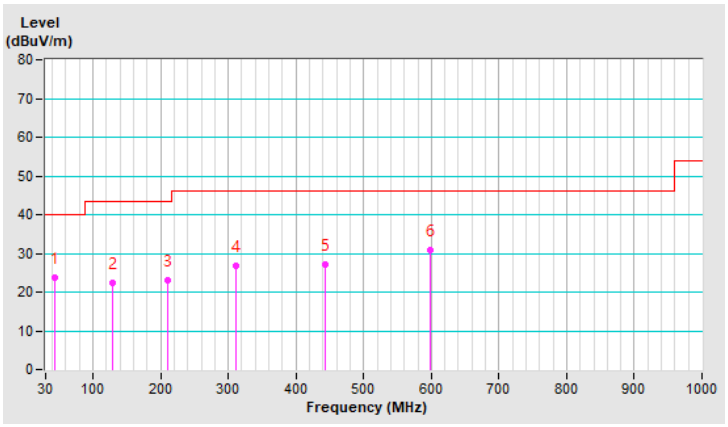
802.11ax (20MHz)

RF Mode	TX 802.11ax (20MHz)	**Channel**	CH 157：5785 MHz
Frequency Range	9kHz ~ 1GHz	**Detector Function**	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	43.29	23.85 QP	40.00	-16.15	1.46 H	33	31.36	-7.51
2	128.21	22.30 QP	43.50	-21.20	1.27 H	214	30.59	-8.29
3	211.20	23.13 QP	43.50	-20.37	1.89 H	268	32.03	-8.90
4	310.43	26.81 QP	46.00	-19.19	1.63 H	228	30.89	-4.08
5	443.32	27.21 QP	46.00	-18.79	2.37 H	268	28.17	-0.96
6	597.79	30.98 QP	46.00	-15.02	1.85 H	178	28.75	2.23

Remarks:

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

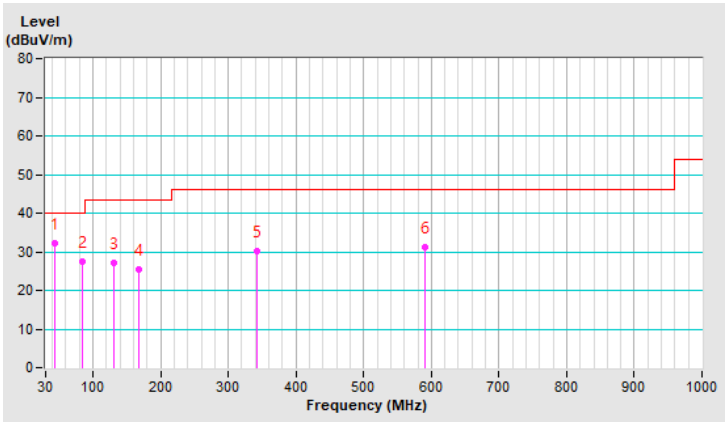


RF Mode	TX 802.11ax (20MHz)	Channel	CH 157：5785 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	42.85	32.23 QP	40.00	-7.77	1.54 V	259	39.75	-7.52
2	83.59	27.60 QP	40.00	-12.40	1.34 V	276	39.91	-12.31
3	131.12	27.27 QP	43.50	-16.23	1.27 V	208	35.27	-8.00
4	167.98	25.34 QP	43.50	-18.16	1.94 V	261	32.04	-6.70
5	342.39	30.23 QP	46.00	-15.77	1.28 V	268	33.66	-3.43
6	591.58	31.27 QP	46.00	-14.73	1.71 V	227	29.15	2.12

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.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS30	100276	Apr. 16, 2020	Apr. 15, 2021
R&S Artificial Mains Network (for EUT)	ENV216	101196	Apr. 20, 2020	Apr. 19, 2021
LISN With Adapter (for EUT)	101196	NA	Apr. 20, 2020	Apr. 19, 2021
R&S Artificial Mains Network (for peripheral)	ESH3-Z5	100220	Dec. 1, 2020	Nov. 30, 2021
Software	Cond_V7.3.7.4	NA	NA	NA
RF cable (JYEBAO) With 10dB PAD	5D-FB	Cable-C05.01	Jan. 30, 2020	Jan. 29, 2021
LYNICS Terminator (For R&S LISN)	0900510	E1-01-305	Feb. 17, 2020	Feb. 16, 2021

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. 5. (Conduction 5)

4.2.3 Test Procedures

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.

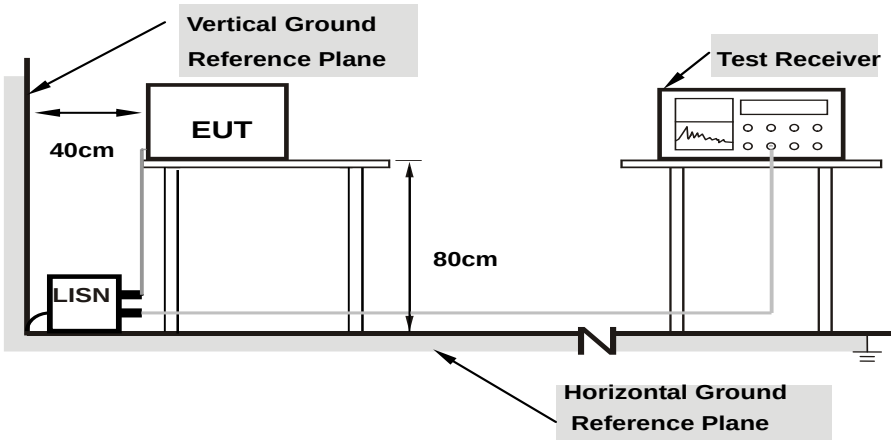
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

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 Conditions

Same as 4.1.6.

4.2.7 Test Results

CDD Mode

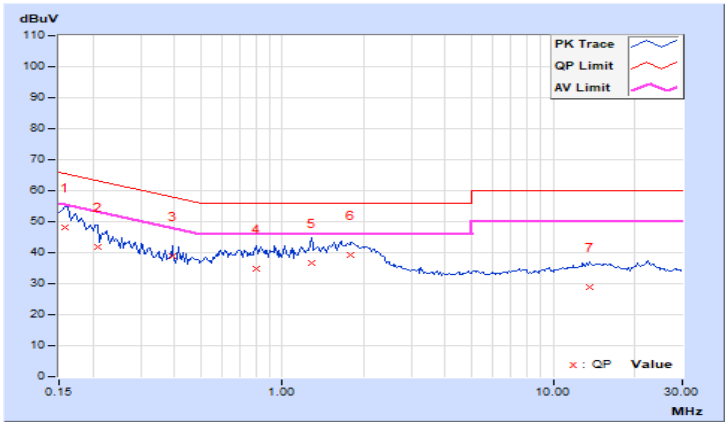
802.11ax (20MHz)

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	0.15781	19.49	28.78	11.95	48.27	31.44	65.58	55.58	-17.31	-24.14
2	0.20859	19.49	22.51	5.52	42.00	25.01	63.26	53.26	-21.26	-28.25
3	**0.39219**	**19.51**	**19.31**	**15.36**	**38.82**	**34.87**	**58.02**	**48.02**	**-19.20**	**-13.15**
4	0.80234	19.54	15.26	10.12	34.80	29.66	56.00	46.00	-21.20	-16.34
5	1.28125	19.56	16.95	9.73	36.51	29.29	56.00	46.00	-19.49	-16.71
6	1.79688	19.57	19.73	11.30	39.30	30.87	56.00	46.00	-16.70	-15.13
7	13.64844	19.98	9.00	4.45	28.98	24.43	60.00	50.00	-31.02	-25.57

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.

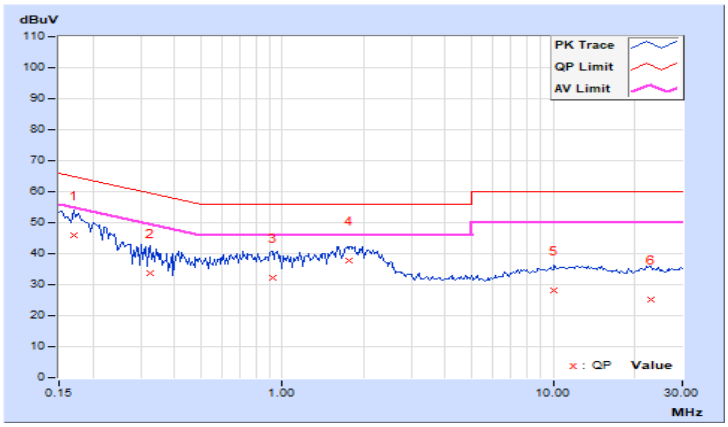


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.16953	19.53	26.26	8.58	45.79	28.11	64.98	54.98	-19.19	-26.87
2	0.32578	19.54	14.28	4.42	33.82	23.96	59.56	49.56	-25.74	-25.60
3	0.91953	19.57	12.71	4.73	32.28	24.30	56.00	46.00	-23.72	-21.70
4	1.77344	19.60	18.32	8.24	37.92	27.84	56.00	46.00	-18.08	-18.16
5	10.10547	19.83	8.17	2.53	28.00	22.36	60.00	50.00	-32.00	-27.64
6	22.99609	20.18	4.87	1.06	25.05	21.24	60.00	50.00	-34.95	-28.76

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)
		Mobile and Portable 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)

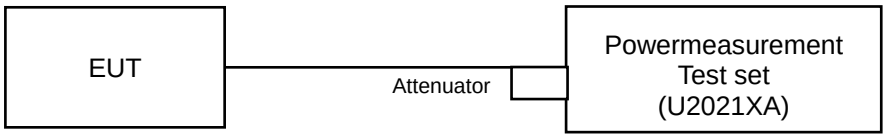
*B is the 26 dB emission bandwidth in megahertz

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

For Average Power Measurement
Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst and set the detector to AVERAGE. Duty factor is not added to measured value.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

CDD Mode

802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	18.62	18.11	17.91	18.50	270.088	24.32	30.00	Pass
40	5200	22.01	21.34	21.29	21.83	581.990	27.65	30.00	Pass
48	5240	22.09	20.66	21.71	21.96	583.509	27.66	30.00	Pass
149	5745	22.54	22.04	22.68	22.18	**689.979**	28.39	30.00	Pass
157	5785	22.63	21.96	22.57	22.19	686.562	28.37	30.00	Pass
165	5825	22.58	22.11	22.49	21.96	678.144	28.31	30.00	Pass

802.11ac (20MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	17.76	17.18	17.10	17.32	217.180	23.37	30.00	Pass
40	5200	21.72	21.23	21.29	21.61	560.796	27.49	30.00	Pass
48	5240	21.80	20.30	21.23	21.59	535.459	27.29	30.00	Pass
149	5745	21.30	20.86	21.13	20.71	504.274	27.03	30.00	Pass
157	5785	21.10	20.74	21.22	20.61	494.916	26.95	30.00	Pass
165	5825	21.05	20.82	21.14	20.47	489.578	26.90	30.00	Pass

802.11ac (40MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	14.75	14.16	14.18	14.59	110.871	20.45	30.00	Pass
46	5230	20.97	20.31	20.66	20.75	467.688	26.70	30.00	Pass
151	5755	22.07	21.20	21.42	20.72	549.598	27.40	30.00	Pass
159	5795	21.87	21.24	21.29	20.88	543.909	27.36	30.00	Pass

802.11ac (80MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	14.14	13.98	14.06	13.82	100.513	20.02	30.00	Pass
155	5775	19.94	19.23	19.26	18.82	342.922	25.35	30.00	Pass

802.11ax (20MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	18.44	17.79	17.74	18.00	252.466	24.02	30.00	Pass
40	5200	22.39	21.86	21.96	22.30	**653.703**	28.15	30.00	Pass
48	5240	22.59	21.20	22.02	22.32	643.206	28.08	30.00	Pass
149	5745	21.98	21.48	21.77	21.32	584.199	27.67	30.00	Pass
157	5785	21.71	21.38	21.87	21.26	573.131	27.58	30.00	Pass
165	5825	21.69	21.45	21.82	21.15	569.579	27.56	30.00	Pass

802.11ax (40MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	15.43	14.86	14.98	15.13	129.595	21.13	30.00	Pass
46	5230	21.63	20.97	21.33	21.44	545.719	27.37	30.00	Pass
151	5755	22.68	21.89	22.04	21.39	637.555	28.05	30.00	Pass
159	5795	22.55	21.92	21.93	21.52	633.345	28.02	30.00	Pass

802.11ax (80MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	14.79	14.38	14.65	14.28	113.512	20.55	30.00	Pass
155	5775	20.56	19.85	19.87	19.46	395.727	25.97	30.00	Pass

Beamforming Mode

802.11ac (20MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	17.76	17.18	17.10	17.32	217.180	23.37	27.99	Pass
40	5200	21.37	20.88	20.96	21.25	517.640	27.14	27.99	Pass
48	5240	21.43	19.96	20.91	21.27	495.357	26.95	27.99	Pass
149	5745	20.63	20.20	20.43	20.14	434.008	26.37	27.24	Pass
157	5785	20.45	20.07	20.60	19.97	426.669	26.30	27.24	Pass
165	5825	20.38	20.19	20.56	19.88	424.654	26.28	27.24	Pass

Note:

For 5180~5240MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=8.01dBi > 6dBi, so the power limit shall be reduced to 30-(8.01-6) = 27.99dBm.

For 5745~5825MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=8.76dBi > 6dBi, so the power limit shall be reduced to 30-(8.76-6) = 27.24dBm.

802.11ac (40MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	14.75	14.16	14.18	14.59	110.871	20.45	27.99	Pass
46	5230	20.97	20.31	20.66	20.75	467.688	26.70	27.99	Pass
151	5755	21.17	20.32	20.58	19.72	446.609	26.50	27.24	Pass
159	5795	21.07	20.34	20.42	20.03	446.929	26.50	27.24	Pass

Note:

For 5180~5240MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=8.01dBi > 6dBi, so the power limit shall be reduced to 30-(8.01-6) = 27.99dBm.

For 5745~5825MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=8.76dBi > 6dBi, so the power limit shall be reduced to 30-(8.76-6) = 27.24dBm.

802.11ac (80MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	14.14	13.98	14.06	13.82	100.513	20.02	27.99	Pass
155	5775	19.94	19.23	19.26	18.82	342.922	25.35	27.24	Pass

Note:

For 5180~5240MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=8.01dBi > 6dBi, so the power limit shall be reduced to 30-(8.01-6) = 27.99dBm.

For 5745~5825MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=8.76dBi > 6dBi, so the power limit shall be reduced to 30-(8.76-6) = 27.24dBm.

802.11ax (20MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	18.44	17.79	17.74	18.00	252.466	24.02	27.99	Pass
40	5200	22.03	21.48	21.59	21.97	**601.802**	27.79	27.99	Pass
48	5240	22.20	20.82	21.71	22.01	593.847	27.74	27.99	Pass
149	5745	21.35	20.94	21.19	20.63	**507.757**	27.06	27.24	Pass
157	5785	21.07	20.75	21.24	20.70	497.324	26.97	27.24	Pass
165	5825	20.99	20.79	21.29	20.45	491.056	26.91	27.24	Pass

Note:

For 5180~5240MHz: Directional gain = 10 log[(10$^{G1/20}$ + 10$^{G2/20}$ + ... + 10$^{GN/20}$)^2/4]=8.01dBi > 6dBi, so the power limit shall be reduced to 30-(8.01-6) = 27.99dBm.

For 5745~5825MHz: Directional gain = 10 log[(10$^{G1/20}$ + 10$^{G2/20}$ + ... + 10$^{GN/20}$)^2/4]=8.76dBi > 6dBi, so the power limit shall be reduced to 30-(8.76-6) = 27.24dBm.

802.11ax (40MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	15.43	14.86	14.98	15.13	129.595	21.13	27.99	Pass
46	5230	21.63	20.97	21.33	21.44	545.719	27.37	27.99	Pass
151	5755	21.76	21.08	21.05	20.42	515.706	27.12	27.24	Pass
159	5795	21.69	21.11	21.04	20.65	519.895	27.16	27.24	Pass

Note:

For 5180~5240MHz: Directional gain = 10 log[(10$^{G1/20}$ + 10$^{G2/20}$ + ... + 10$^{GN/20}$)^2/4]=8.01dBi > 6dBi, so the power limit shall be reduced to 30-(8.01-6) = 27.99dBm.

For 5745~5825MHz: Directional gain = 10 log[(10$^{G1/20}$ + 10$^{G2/20}$ + ... + 10$^{GN/20}$)^2/4]=8.76dBi > 6dBi, so the power limit shall be reduced to 30-(8.76-6) = 27.24dBm.

802.11ax (80MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	14.79	14.38	14.65	14.28	113.512	20.55	27.99	Pass
155	5775	20.56	19.85	19.87	19.46	395.727	25.97	27.24	Pass

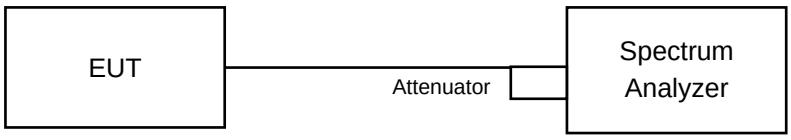
Note:

For 5180~5240MHz: Directional gain = 10 log[(10$^{G1/20}$ + 10$^{G2/20}$ + ... + 10$^{GN/20}$)^2/4]=8.01dBi > 6dBi, so the power limit shall be reduced to 30-(8.01-6) = 27.99dBm.

For 5745~5825MHz: Directional gain = 10 log[(10$^{G1/20}$ + 10$^{G2/20}$ + ... + 10$^{GN/20}$)^2/4]=8.76dBi > 6dBi, so the power limit shall be reduced to 30-(8.76-6) = 27.24dBm.

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 Result

CDD Mode

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	16.44	16.44	16.44	16.44
40	5200	16.68	16.68	16.68	16.68
48	5240	16.80	16.80	16.80	16.80

802.11ax (20MHz)

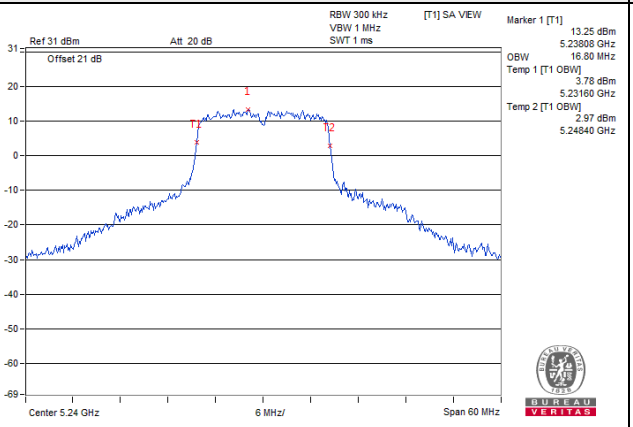
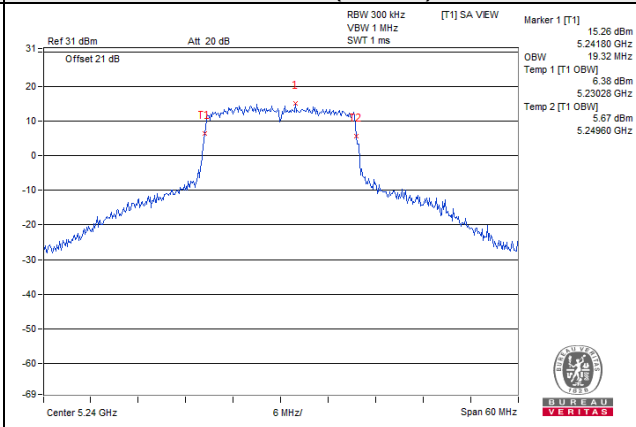
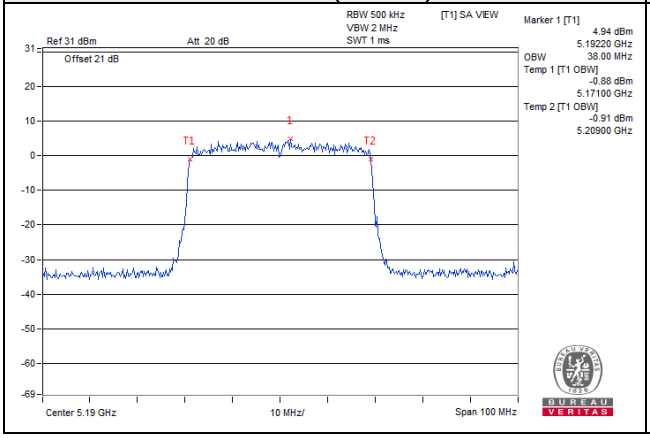
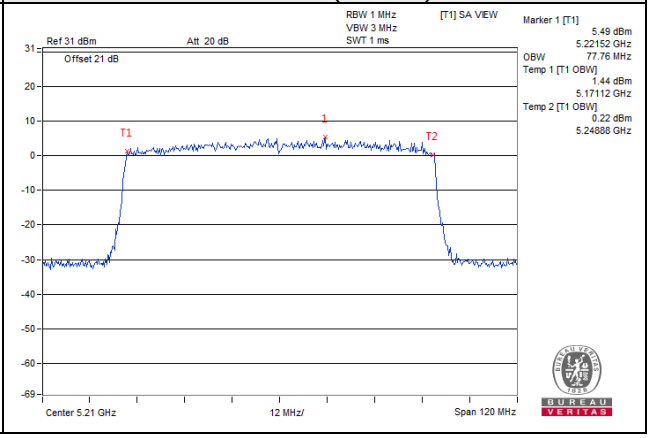
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	18.96	18.96	18.96	18.96
40	5200	19.08	19.08	19.08	19.08
48	5240	19.32	19.32	19.32	19.20

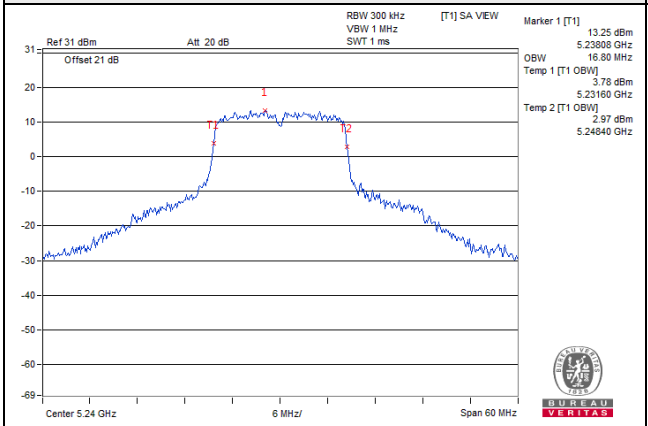
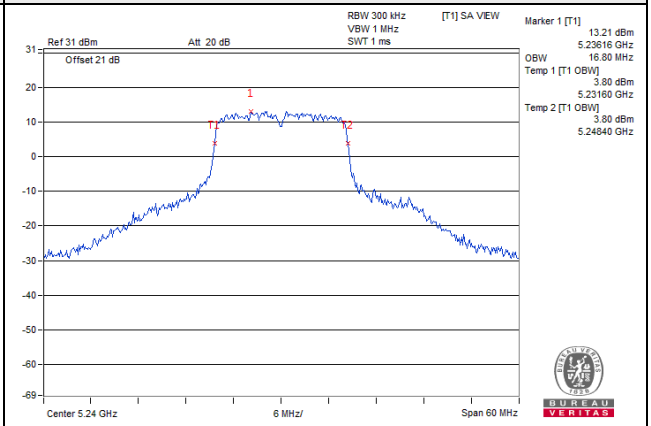
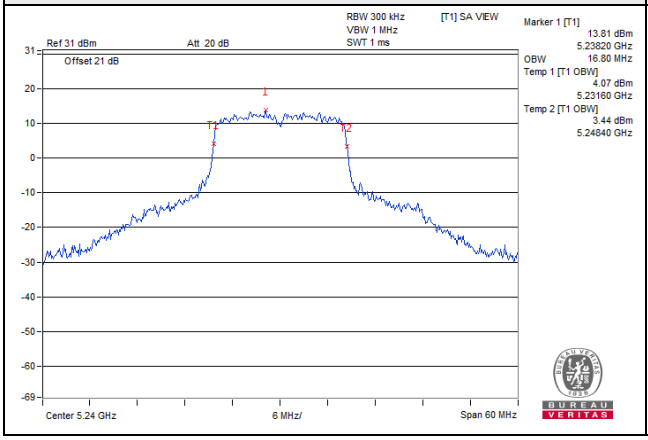
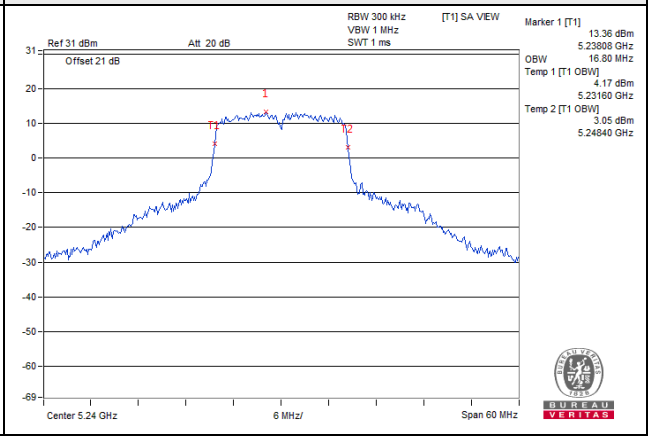
802.11ax (40MHz)

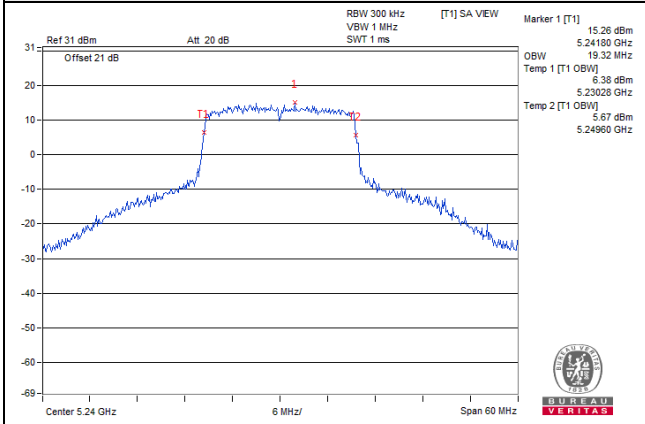
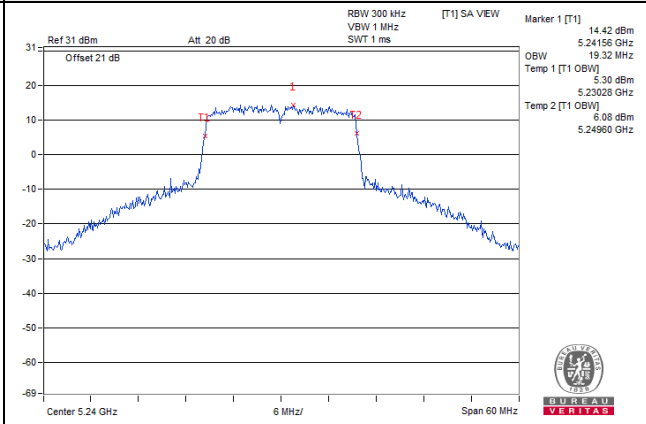
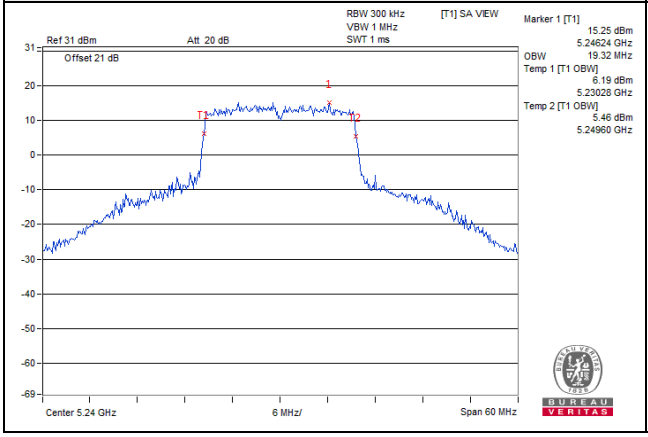
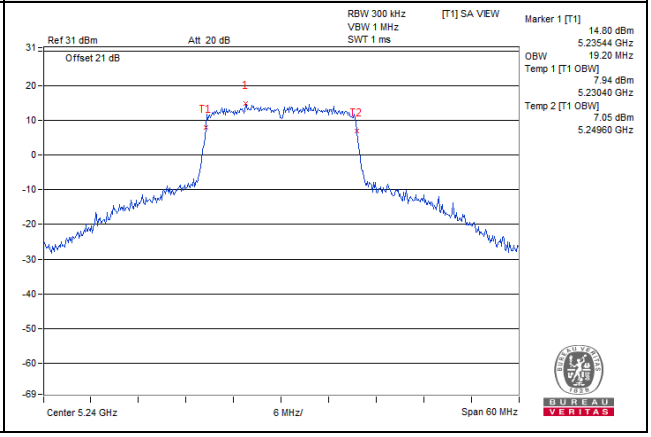
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	38.00	38.00	37.80	38.00
46	5230	37.80	38.00	37.80	37.80

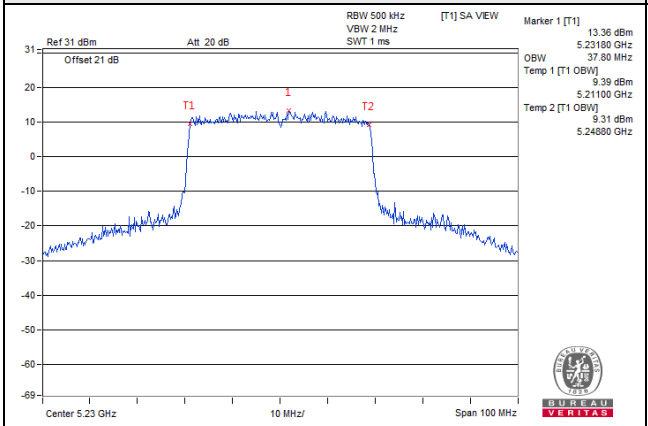
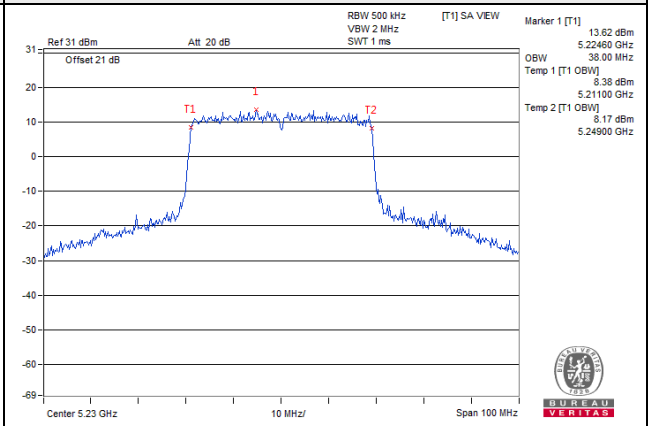
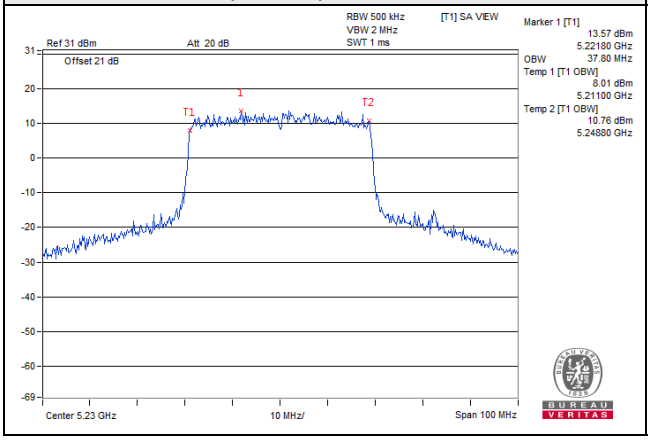
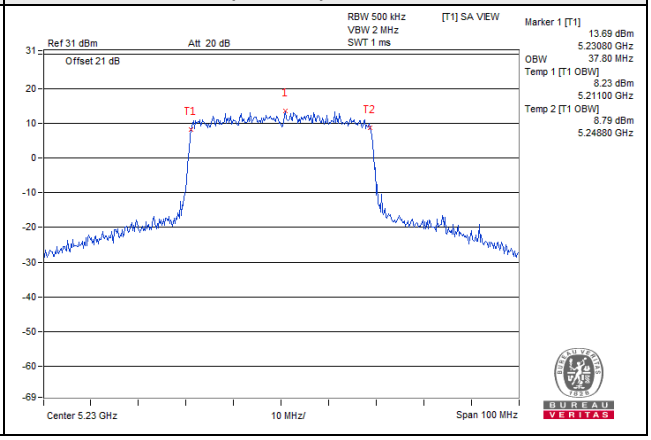
802.11ax (80MHz)

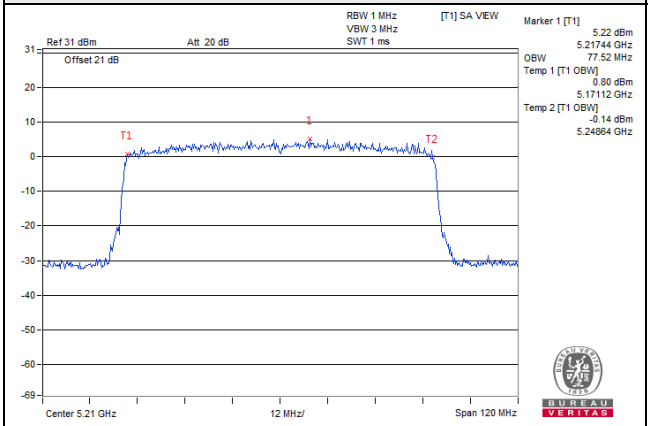
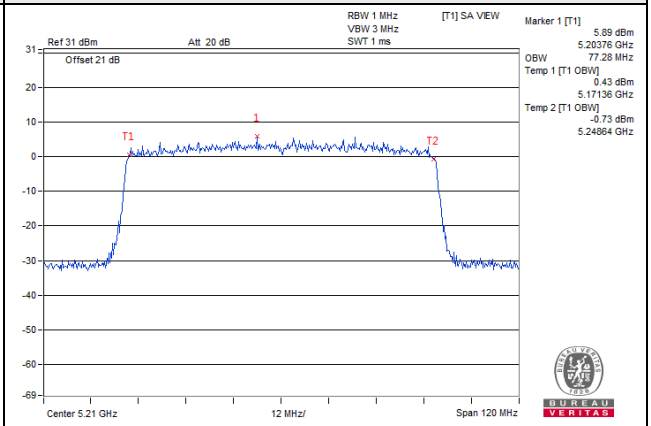
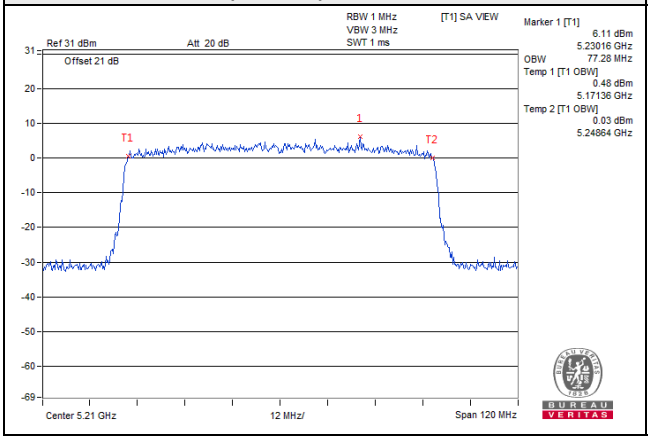
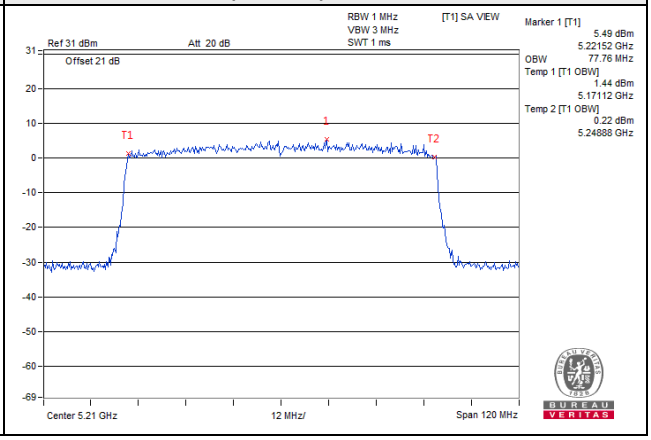
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	77.52	77.28	77.28	77.76

Spectrum Plot of Worst Value	
802.11a	802.11ax (20MHz)
	
802.11ax (40MHz)	802.11ax (80MHz)
	

Spectrum Plot for near By DFS Band	
802.11a / Chain 0 / CH 48	802.11a / Chain 1 / CH 48
	
802.11a / Chain 2 / CH 48	802.11a / Chain 3 / CH 48
	

Spectrum Plot for near By DFS Band	
802.11ax (20MHz) / Chain 0 / CH 48	802.11ax (20MHz) / Chain 1 / CH 48
	
802.11ax (20MHz) / Chain 2 / CH 48	802.11ax (20MHz) / Chain 3 / CH 48
	

Spectrum Plot for near By DFS Band	
802.11ax (40MHz) / Chain 0 / CH 46	802.11ax (40MHz) / Chain 1 / CH 46
	
802.11ax (40MHz) / Chain 2 / CH 46	802.11ax (40MHz) / Chain 3 / CH 46
	

Spectrum Plot for near By DFS Band	
802.11ax (80MHz) / Chain 0 / CH 42	802.11ax (80MHz) / Chain 1 / CH 42
	
802.11ax (80MHz) / Chain 2 / CH 42	802.11ax (80MHz) / Chain 3 / CH 42
	

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
149	5745	16.61	16.50	16.50	16.50
157	5785	16.50	16.50	16.50	16.50
165	5825	16.60	16.50	16.50	16.50

802.11ax (20MHz)

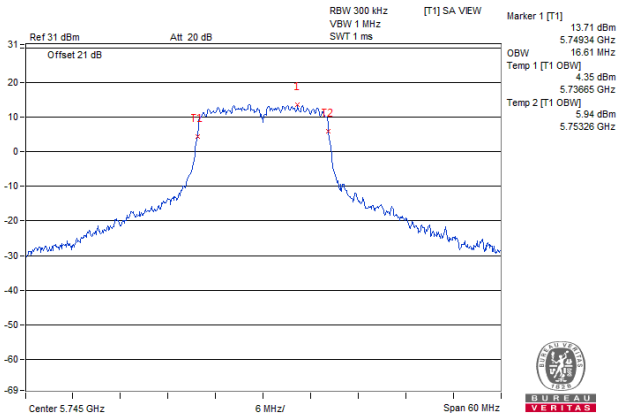
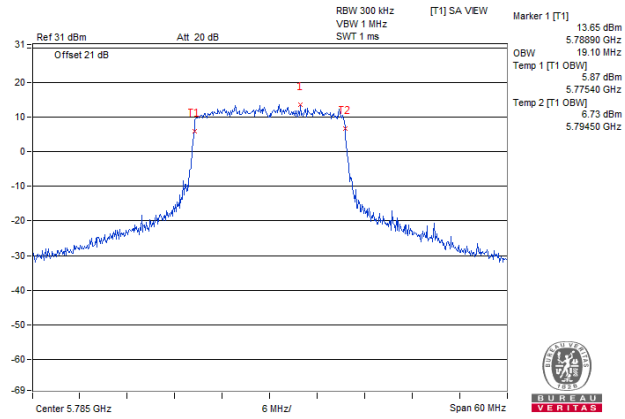
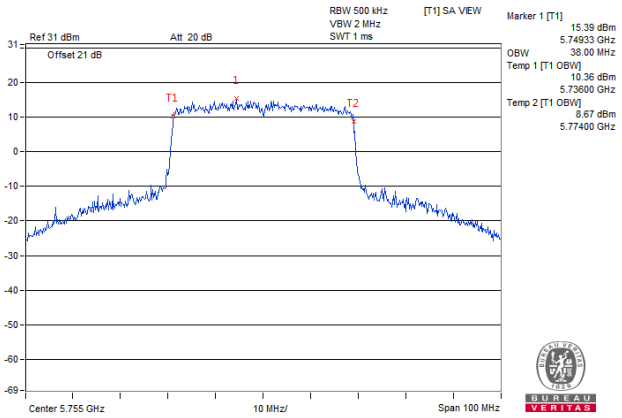
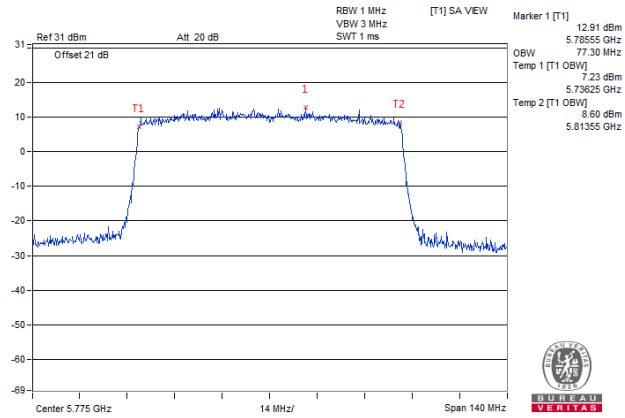
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
149	5745	18.96	19.00	19.00	19.10
157	5785	19.10	19.00	19.00	19.00
165	5825	19.00	19.10	19.10	19.10

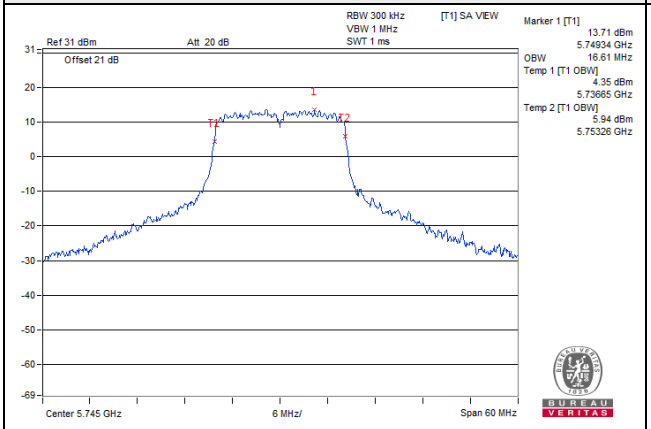
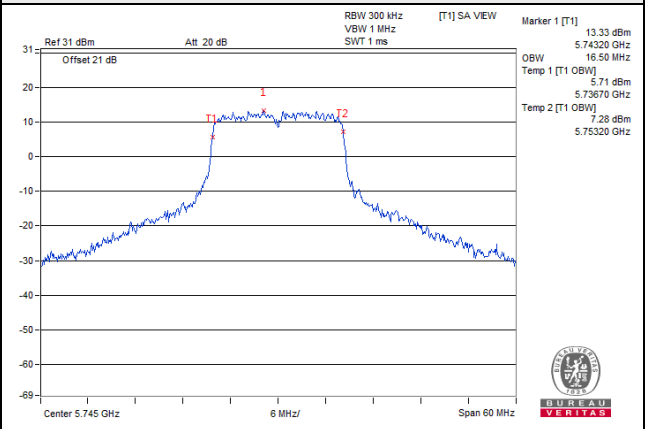
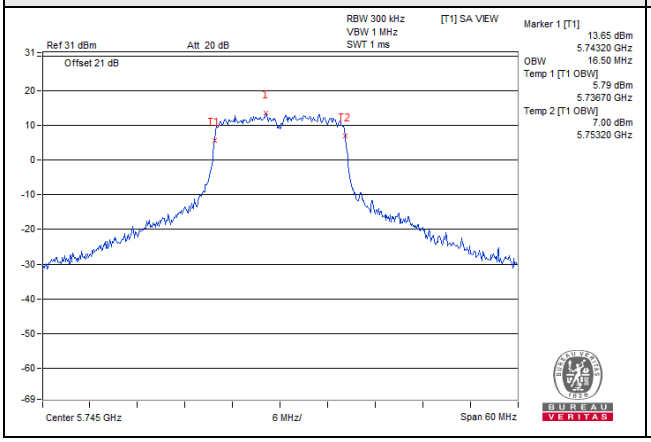
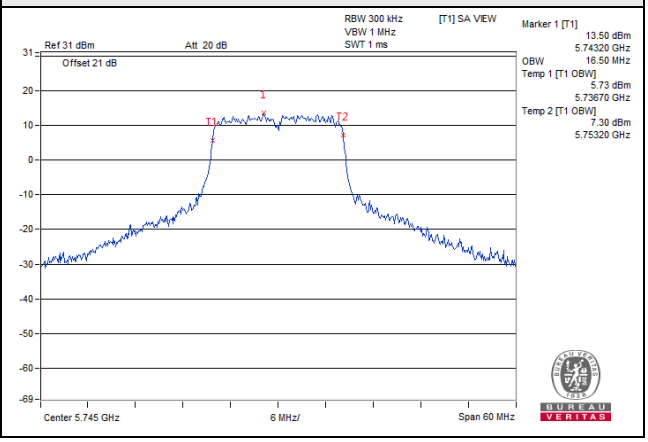
802.11ax (40MHz)

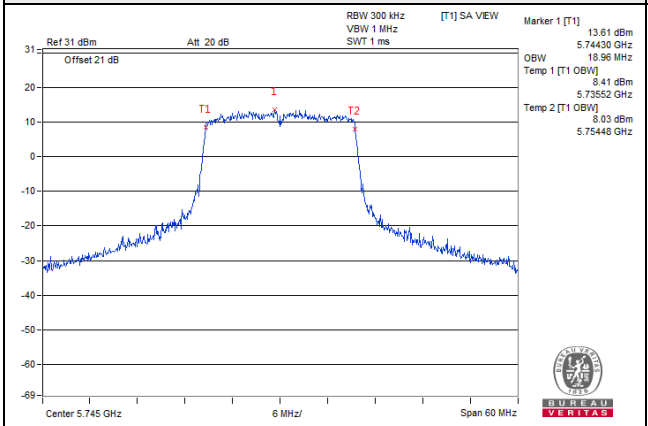
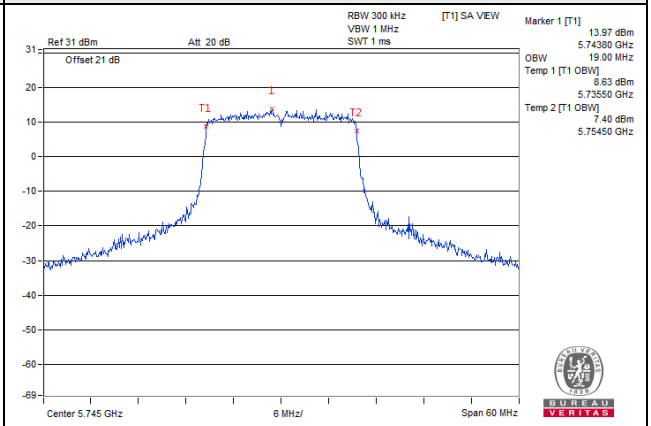
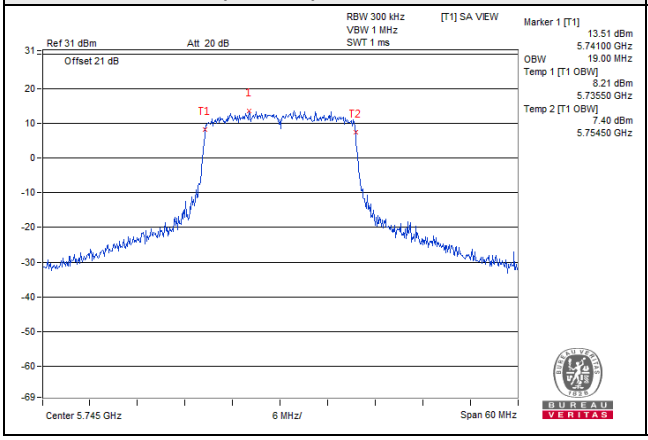
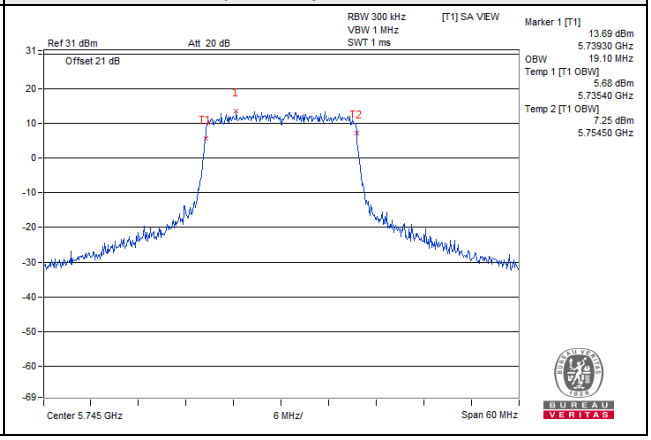
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
151	5755	37.98	37.83	38.00	38.00
159	5795	37.83	37.83	37.83	37.83

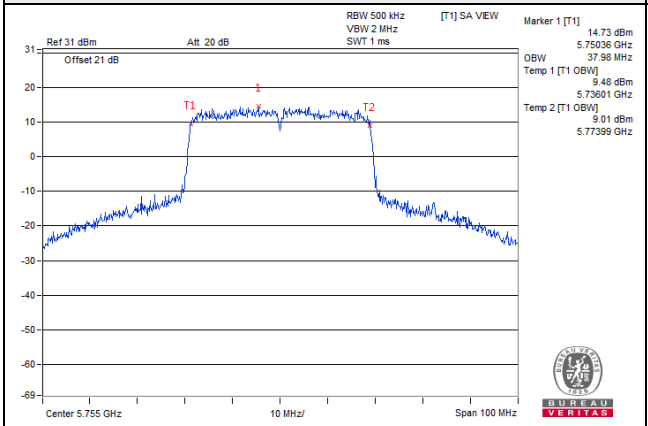
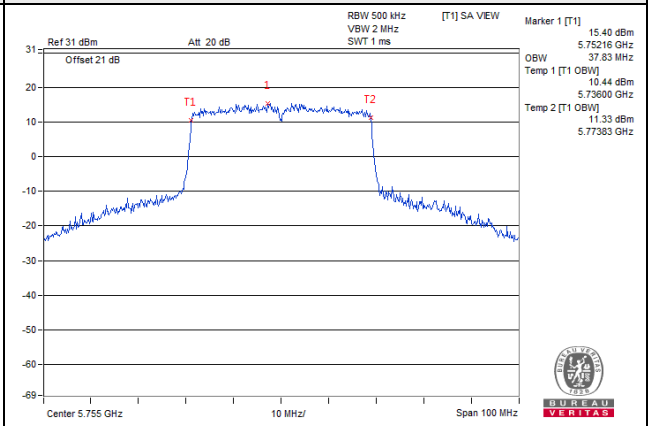
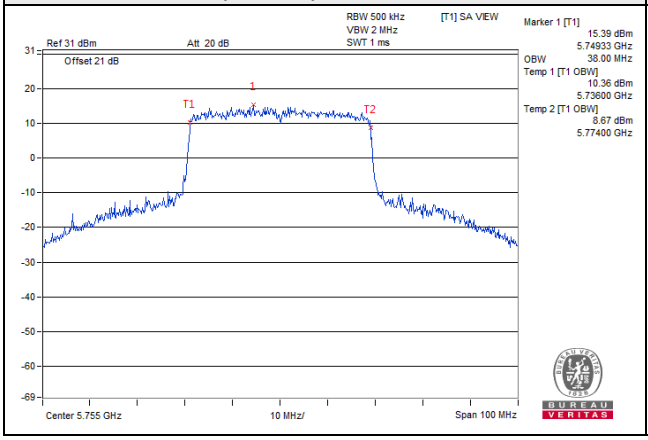
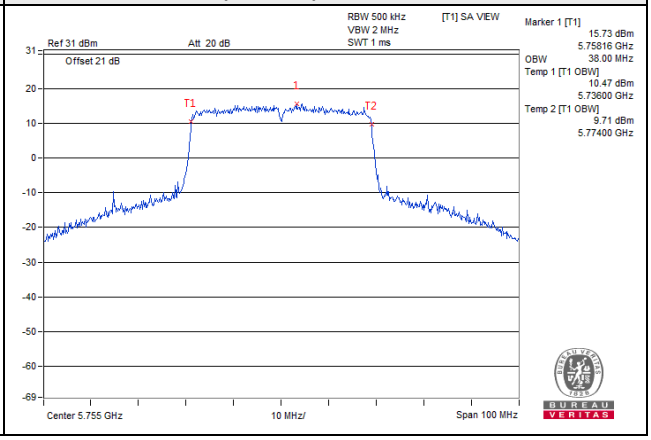
802.11ax (80MHz)

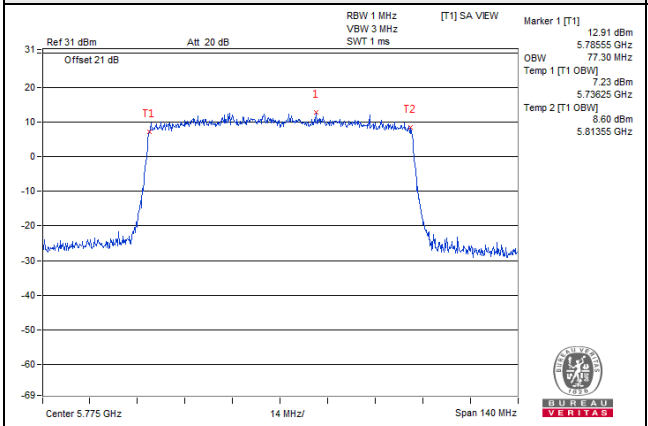
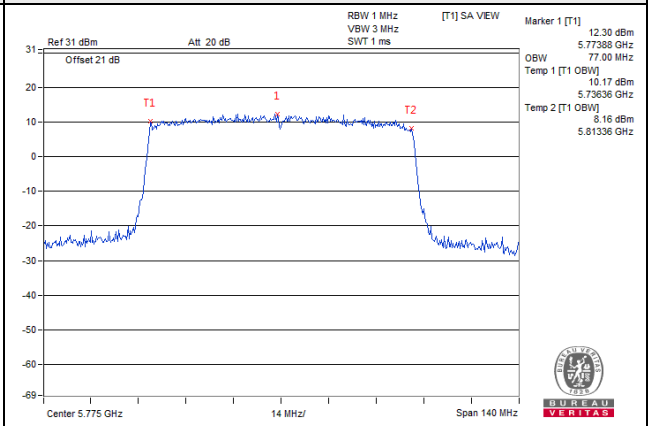
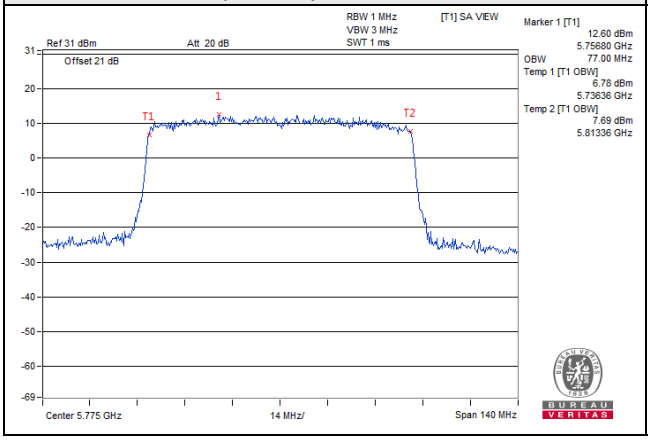
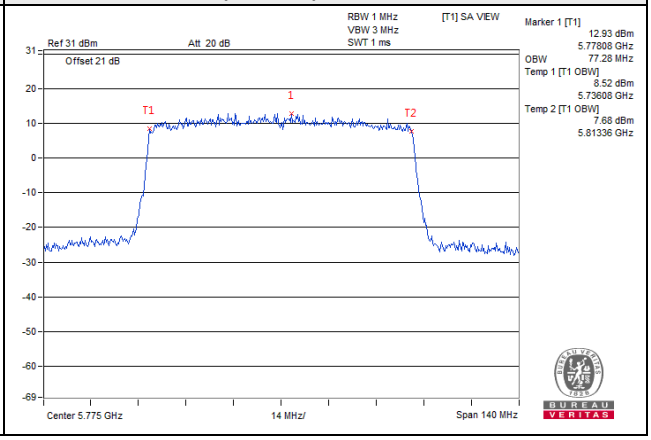
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
155	5775	77.30	77.00	77.00	77.28

Spectrum Plot of Worst Value	
802.11a	802.11ax (20MHz)
	
802.11ax (40MHz)	802.11ax (80MHz)
	

Spectrum Plot for near By DFS Band	
802.11a / Chain 0 / CH 149	802.11a / Chain 1 / CH 149
	
802.11a / Chain 2 / CH 149	802.11a / Chain 3 / CH 149
	

Spectrum Plot for near By DFS Band	
802.11ax (20MHz) / Chain 0 / CH 149	802.11ax (20MHz) / Chain 1 / CH 149
	
802.11ax (20MHz) / Chain 2 / CH 149	802.11ax (20MHz) / Chain 3 / CH 149
	

Spectrum Plot for near By DFS Band	
802.11ax (40MHz) / Chain 0 / CH 151	802.11ax (40MHz) / Chain 1 / CH 151
	
802.11ax (40MHz) / Chain 2 / CH 151	802.11ax (40MHz) / Chain 3 / CH 151
	

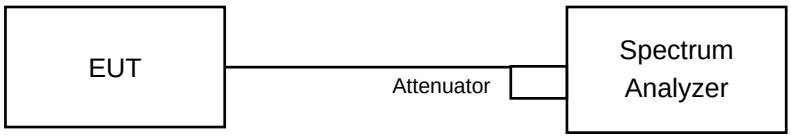
Spectrum Plot for near By DFS Band	
802.11ax (80MHz) / Chain 0 / CH 155	802.11ax (80MHz) / Chain 1 / CH 155
	
802.11ax (80MHz) / Chain 2 / CH 155	802.11ax (80MHz) / Chain 3 / CH 155
	

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	
		Mobile and Portable 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 Procedures

For U-NII-1 band:
Using method SA-2

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

For U-NII-3 band:

a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
b. Set RBW = 500 kHz, Set VBW ≥ 1 MHz, Detector = RMS
c. Use the peak marker function to determine the maximum power level in any 500 kHz band segment within the fundamental EBW.
d. Sweep time = auto, trigger set to “free run”.
e. Trace average at least 100 traces in power averaging mode.
f. 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 Conditions

Same as 4.3.6.

4.5.7 Test Results

CDD Mode

For U-NII-1 band:

802.11a

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	4.94	4.93	5.01	4.93	0.33	11.31	14.99	Pass
40	5200	8.52	8.37	8.45	8.41	0.33	14.79	14.99	Pass
48	5240	8.34	8.42	8.49	8.38	0.33	14.76	14.99	Pass

Note:
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$]=8.01dBi > 6dBi, so the power density limit shall be reduced to 17-(8.01-6) = 14.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (20MHz)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	4.26	4.28	4.36	4.47	0.17	10.54	14.99	Pass
40	5200	8.39	8.36	8.73	8.72	0.17	14.75	14.99	Pass
48	5240	8.61	8.67	8.68	8.71	0.17	14.86	14.99	Pass

Note:
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$]=8.01dBi > 6dBi, so the power density limit shall be reduced to 17-(8.01-6) = 14.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (40MHz)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	-3.77	-3.66	-3.98	-3.66	0.16	2.42	14.99	Pass
46	5230	4.57	4.45	4.59	4.58	0.16	10.73	14.99	Pass

Note:
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$]=8.01dBi > 6dBi, so the power density limit shall be reduced to 17-(8.01-6) = 14.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (80MHz)

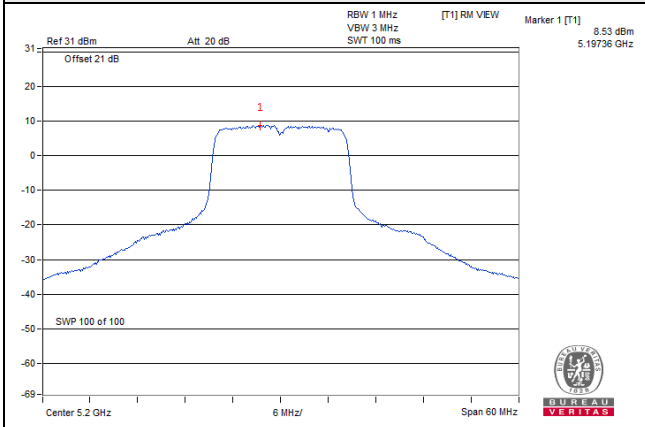
Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	-6.83	-6.63	-6.57	-6.76	0.14	-0.54	14.99	Pass

Note:

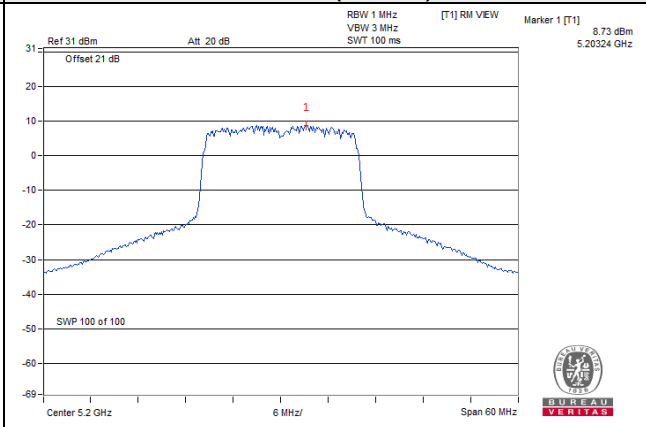
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$]=8.01dBi > 6dBi, so the power density limit shall be reduced to 17-(8.01-6) = 14.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

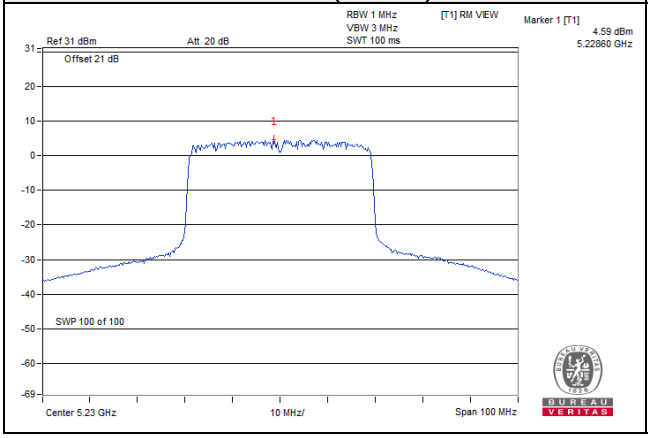
802.11a



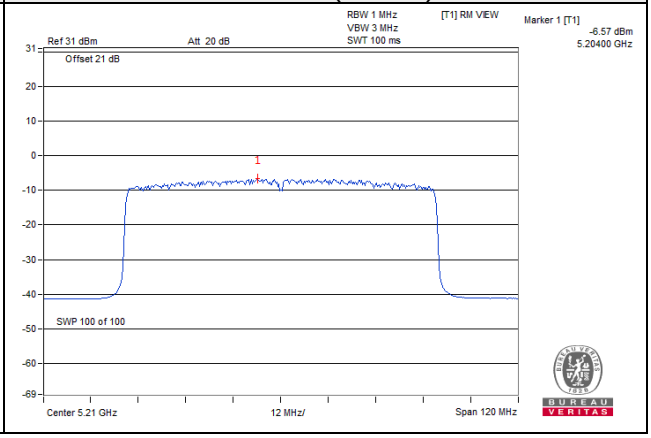
802.11ax (20MHz)



802.11ax (40MHz)



802.11ax (80MHz)



For U-NII-3 band:

802.11a

Chan.	Freq. (MHz)	PSD w/o Duty Factor(dBm/500kHz)				Duty Factor (dB)	Total PSD with Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	0.26	0.07	0.16	0.26	0.33	6.54	27.24	Pass
40	5200	-0.73	-0.90	-0.89	-0.73	0.33	5.54	27.24	Pass
48	5240	-1.07	-1.34	-1.19	-1.25	0.33	5.14	27.24	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure and add 10 log (N_{ANT}) dB.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=8.76dBi > 6dBi, so the power density limit shall be reduced to 30-(8.76-6) = 27.24dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (20MHz)

Chan.	Freq. (MHz)	PSD w/o Duty Factor(dBm/500kHz)				Duty Factor (dB)	Total PSD with Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	-1.86	-1.97	-1.92	-1.88	0.17	4.29	27.24	Pass
40	5200	-2.14	-2.10	-2.09	-2.29	0.17	4.04	27.24	Pass
48	5240	-2.97	-2.49	-2.52	-2.50	0.17	3.58	27.24	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure and add 10 log (N_{ANT}) dB.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=8.76dBi > 6dBi, so the power density limit shall be reduced to 30-(8.76-6) = 27.24dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (40MHz)

Chan.	Freq. (MHz)	PSD w/o Duty Factor(dBm/500kHz)				Duty Factor (dB)	Total PSD with Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
151	5755	-3.50	-3.54	-3.43	-3.49	0.16	2.69	27.24	Pass
159	5795	-4.82	-4.55	-4.62	-4.92	0.16	1.46	27.24	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure and add 10 log (N_{ANT}) dB.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=8.76dBi > 6dBi, so the power density limit shall be reduced to 30-(8.76-6) = 27.24dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (80MHz)

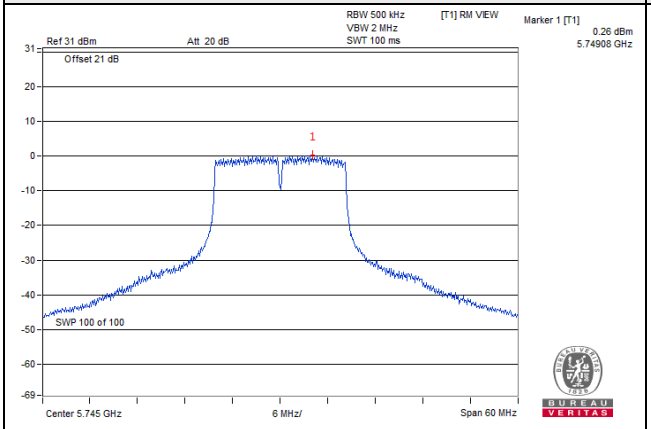
Chan.	Freq. (MHz)	PSD w/o Duty Factor(dBm/500kHz)				Duty Factor (dB)	Total PSD with Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
155	5775	-9.67	-9.47	-9.58	-9.59	0.14	-3.42	27.24	Pass

Note:

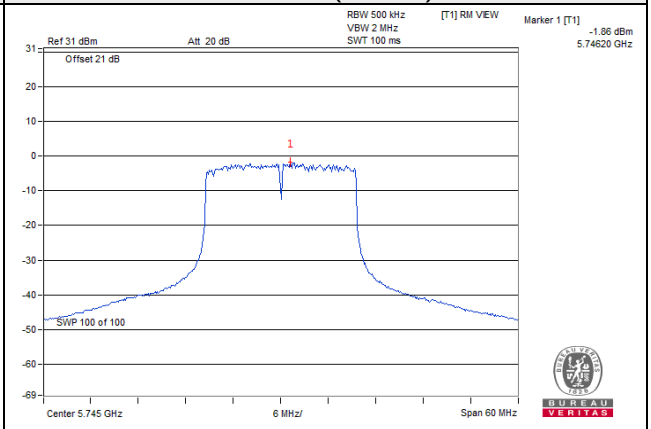
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure and add 10 log (N_{ANT}) dB.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=8.76dBi > 6dBi, so the power density limit shall be reduced to 30-(8.76-6) = 27.24dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

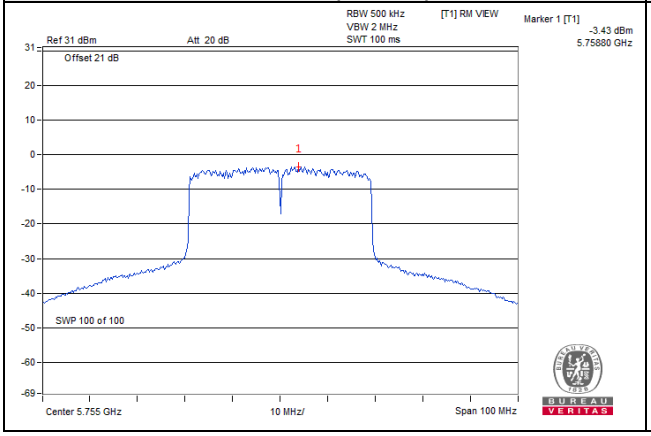
802.11a



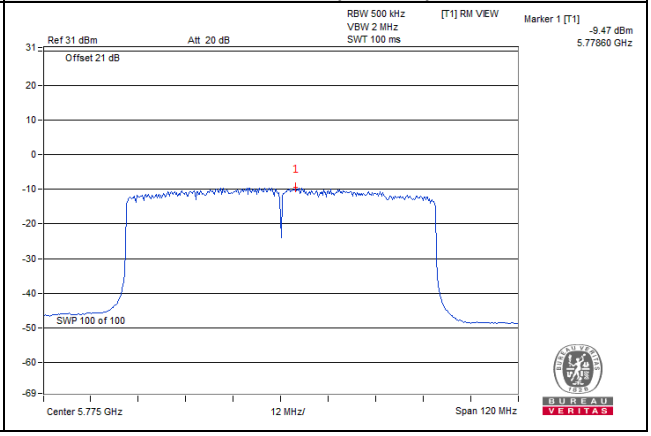
802.11ax (20MHz)



802.11ax (40MHz)



802.11ax (80MHz)

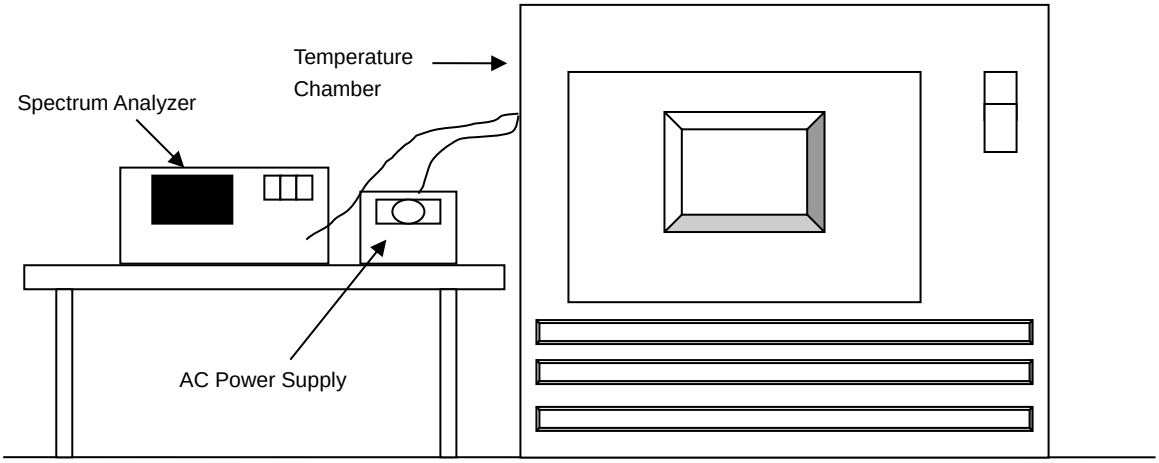


4.6 Frequency Stability

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

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
ROHDE & SCHWARZ Spectrum Analyzer	FSV 40	101042	Sep. 8, 2020	Sep. 7, 2021
Temperature & Humidity Chamber	MHU-225AU	920409	May 22, 2020	May 21, 2021
DIGITAL POWER METER IDRC	CP-240	240515	Sep. 10, 2020	Sep. 9, 2021
AC Power Source ExTech	CFW-105	E000603	NA	NA

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

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.
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

CDD Mode

Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
50	120	5179.9955	Pass	5179.9971	Pass	5179.9987	Pass	5179.9991	Pass
40	120	5180.0031	Pass	5180.0019	Pass	5180.0027	Pass	5180.0033	Pass
30	120	5179.9810	Pass	5179.9805	Pass	5179.9803	Pass	5179.9822	Pass
20	120	5180.0008	Pass	5179.9998	Pass	5180.0002	Pass	5179.9985	Pass
10	120	5179.9756	Pass	5179.9777	Pass	5179.9788	Pass	5179.9774	Pass
0	120	5179.9914	Pass	5179.9925	Pass	5179.9923	Pass	5179.9887	Pass
-10	120	5180.0135	Pass	5180.0175	Pass	5180.0138	Pass	5180.0162	Pass
-20	120	5180.0004	Pass	5180.0040	Pass	5179.9998	Pass	5179.9999	Pass
-30	120	5179.9777	Pass	5179.9782	Pass	5179.9760	Pass	5179.9782	Pass

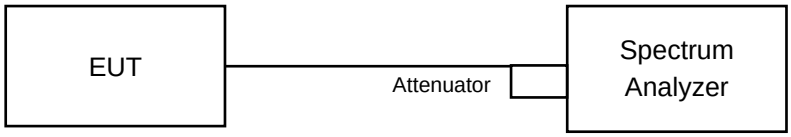
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	138	5180.0012	Pass	5179.9988	Pass	5179.9996	Pass	5179.9977	Pass
	120	5180.0008	Pass	5179.9998	Pass	5180.0002	Pass	5179.9985	Pass
	102	5179.9998	Pass	5180.0008	Pass	5180.0002	Pass	5179.9982	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

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

CDD Mode

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.34	16.34	16.34	16.34	0.5	Pass
157	5785	16.37	16.37	16.36	16.36	0.5	Pass
165	5825	16.36	16.35	16.36	16.37	0.5	Pass

802.11ax (20MHz)

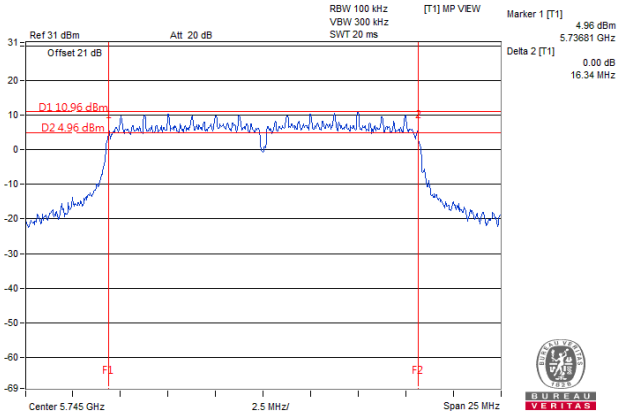
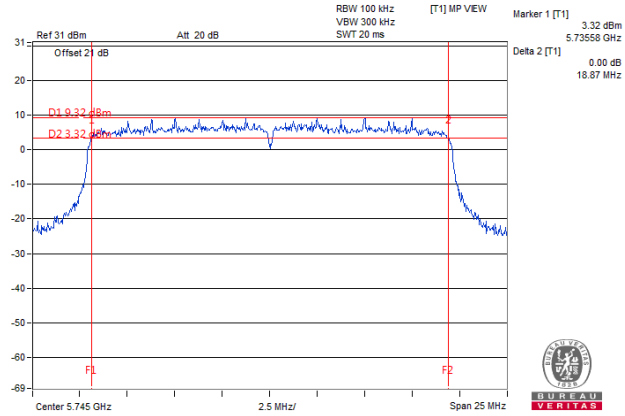
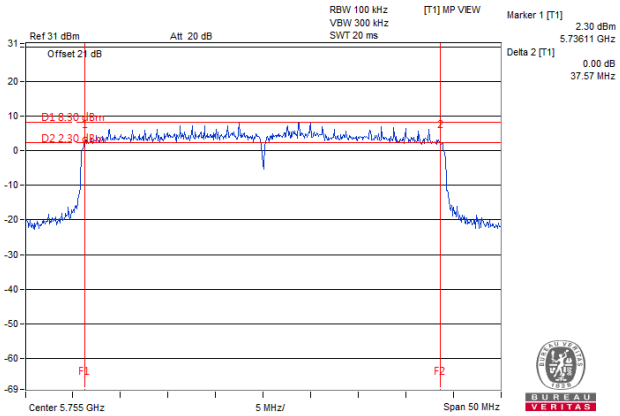
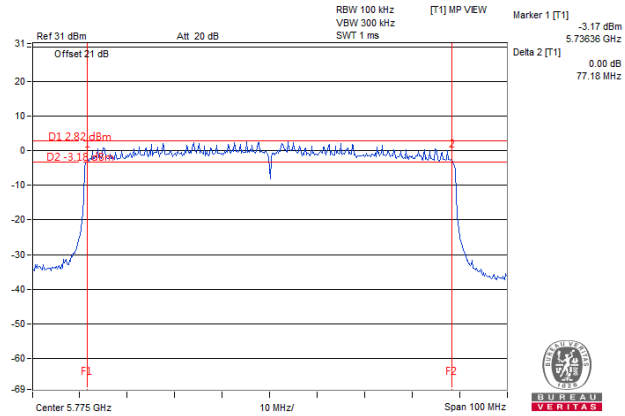
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	18.87	18.93	18.93	18.97	0.5	Pass
157	5785	18.96	18.95	18.97	18.97	0.5	Pass
165	5825	18.94	19.00	18.95	18.93	0.5	Pass

802.11ax (40MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	37.57	37.88	37.92	37.81	0.5	Pass
159	5795	37.83	37.68	37.90	37.91	0.5	Pass

802.11ax (80MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	77.37	77.18	77.44	77.97	0.5	Pass

Spectrum Plot of Worst Value	
802.11a	802.11ax (20MHz)
	
802.11ax (40MHz)	802.11ax (80MHz)
	

5 Pictures of Test Arrangements

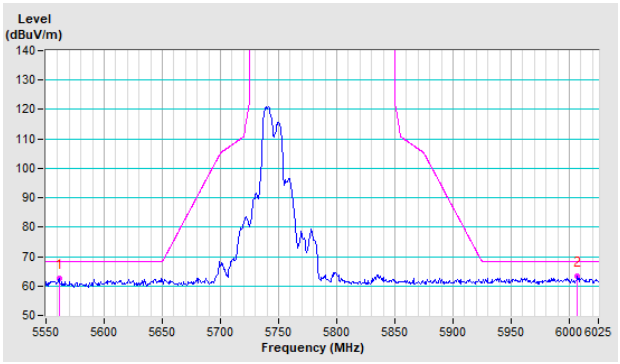
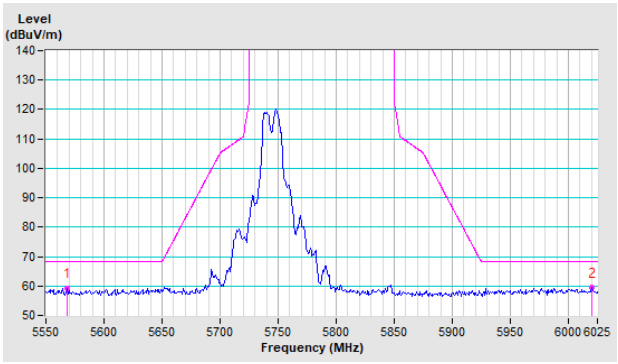
Please refer to the attached file (Test Setup Photo).

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

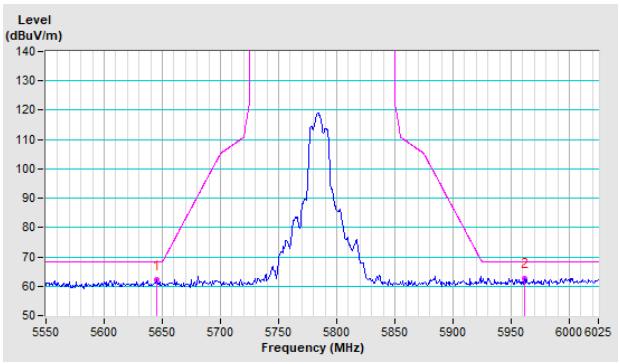
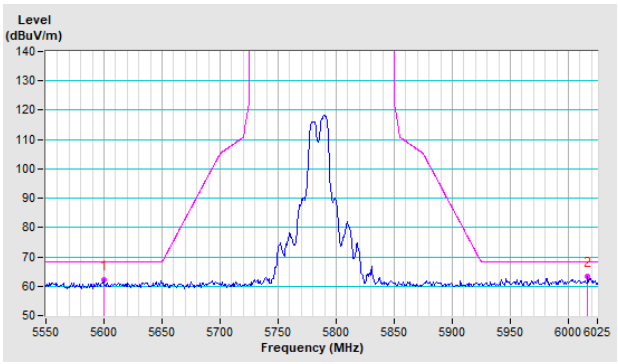
CDD Mode

802.11a

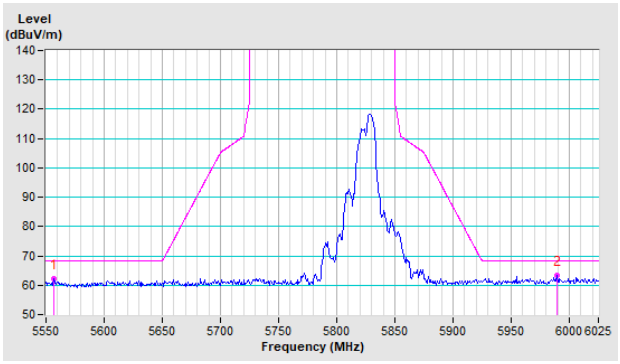
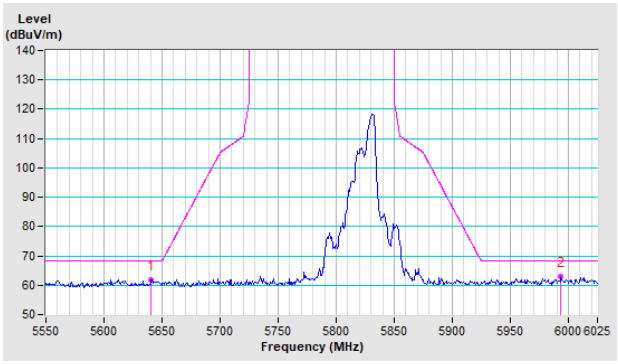
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

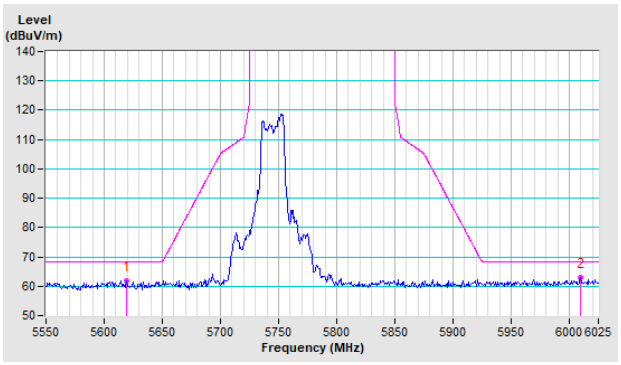
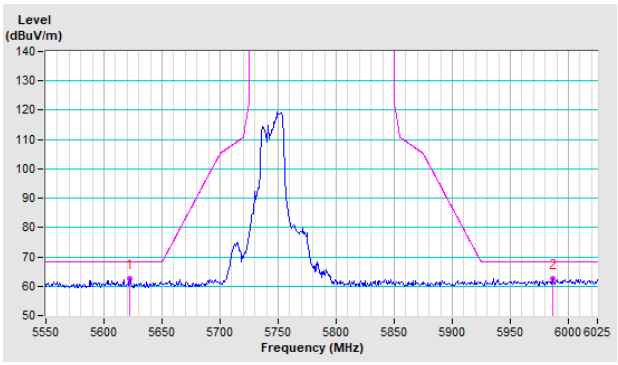
Horizontal	Vertical
	

CH 165 5825 MHz

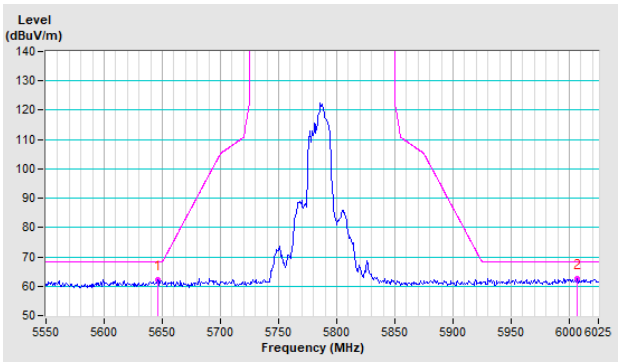
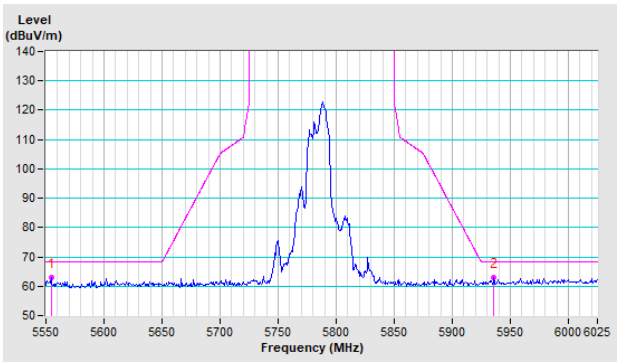
Horizontal	Vertical
	

802.11ax (20MHz)

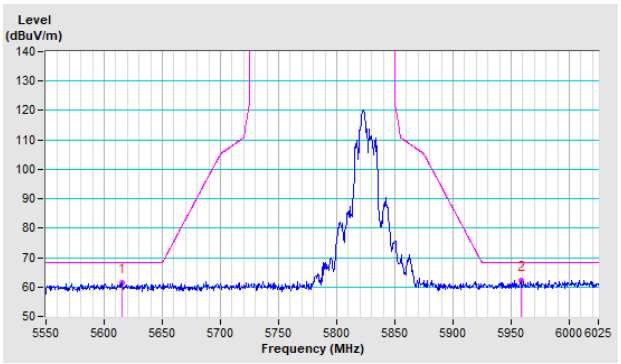
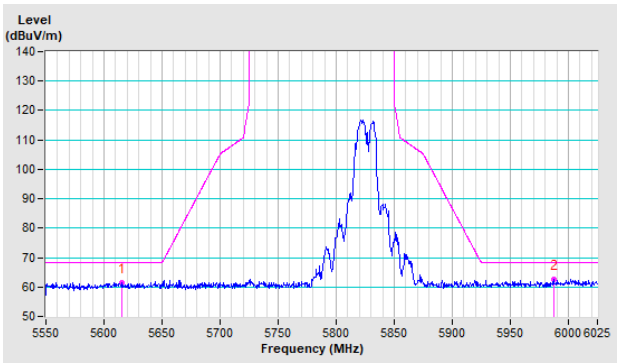
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

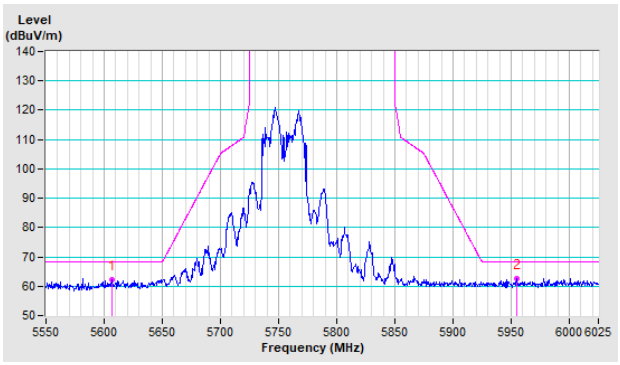
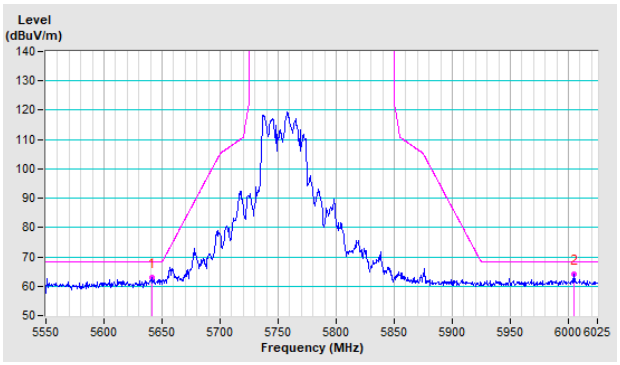
Horizontal	Vertical
	

CH 165 5825 MHz

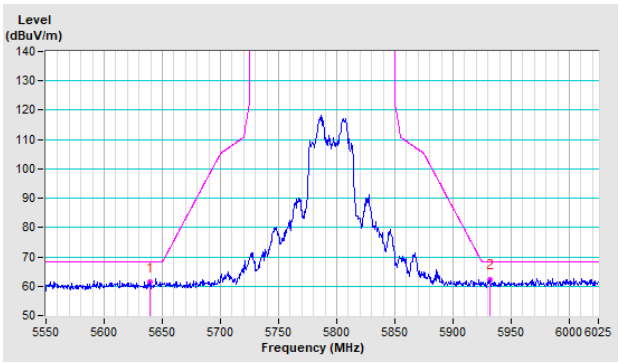
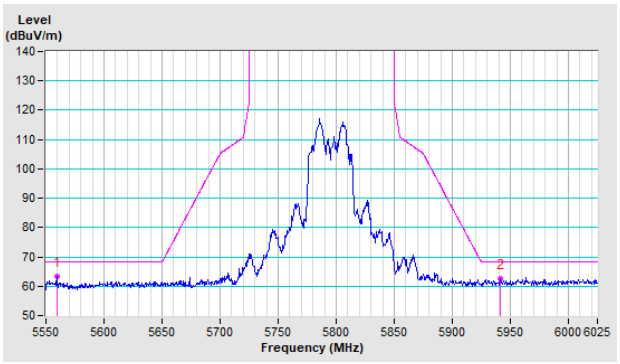
Horizontal	Vertical
	

802.11ax (40MHz)

CH 151 5755 MHz

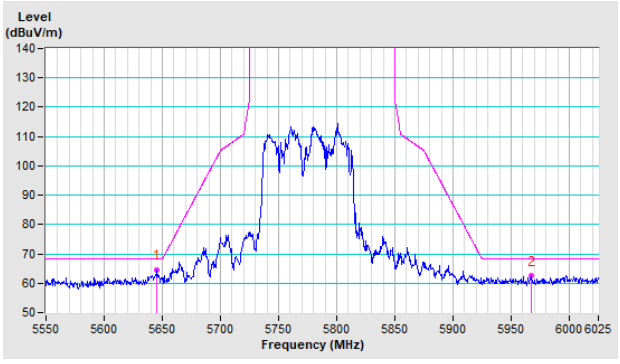
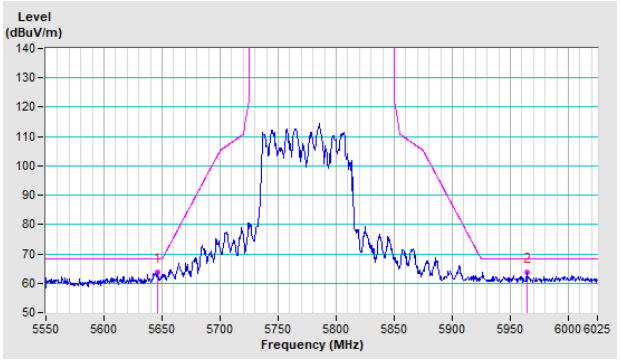
Horizontal	Vertical
	

CH 159 5795 MHz

Horizontal	Vertical
	

802.11ax (80MHz)

CH 155 5775 MHz

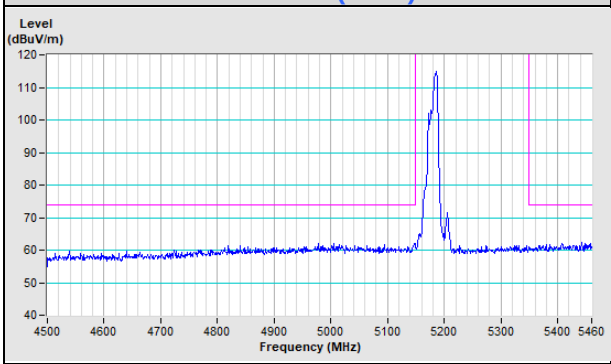
Horizontal	Vertical
	

Annex B- Band Edge Measurement

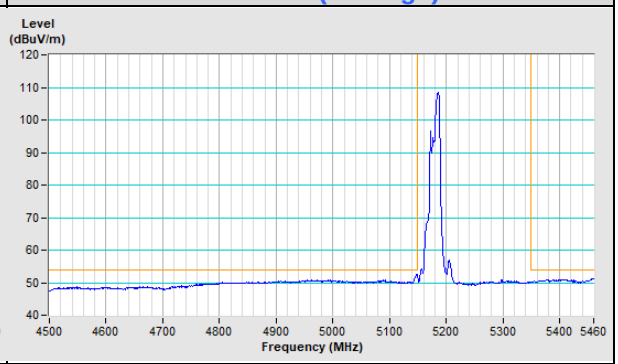
CDD Mode

802.11a Channel 36

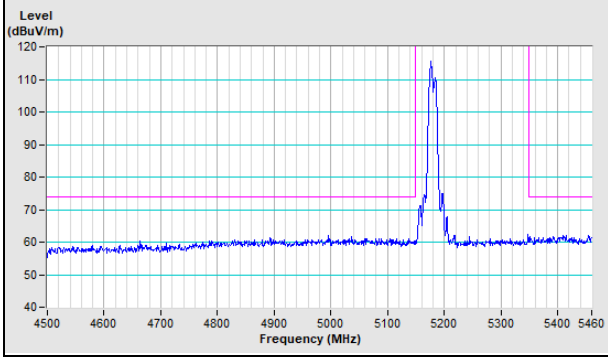
Horizontal (Peak)



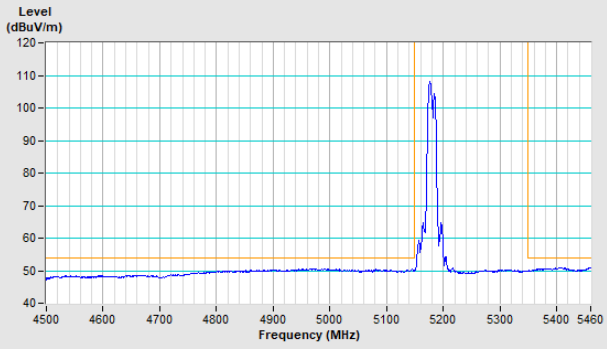
Horizontal (Average)



Vertical (Peak)

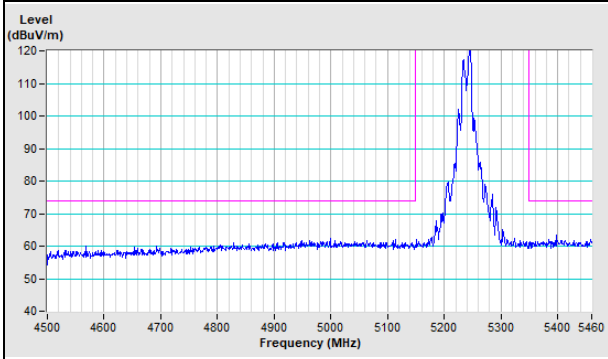


Vertical (Average)

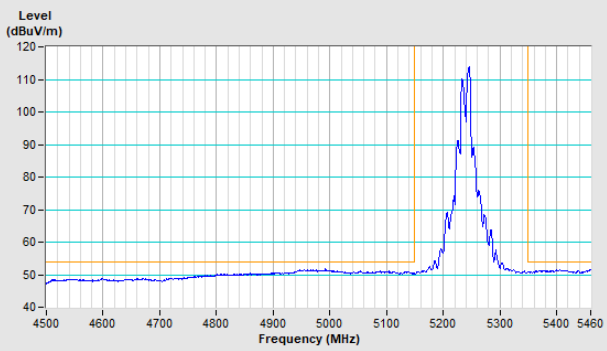


802.11a Channel 48

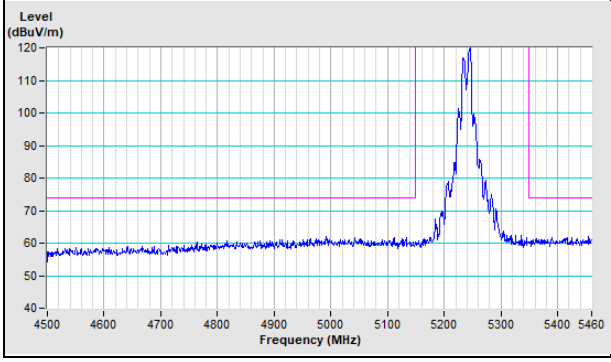
Horizontal (Peak)



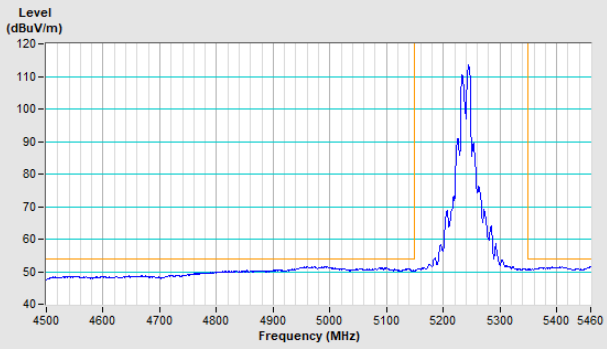
Horizontal (Average)



Vertical (Peak)

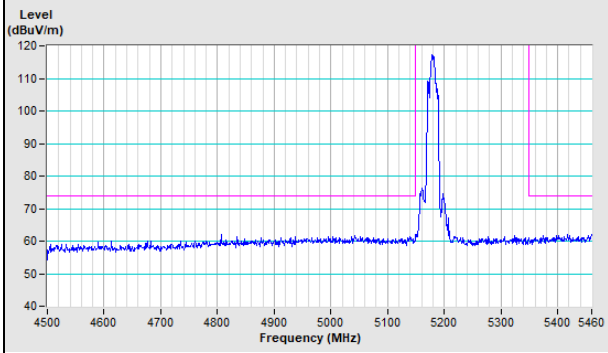


Vertical (Average)

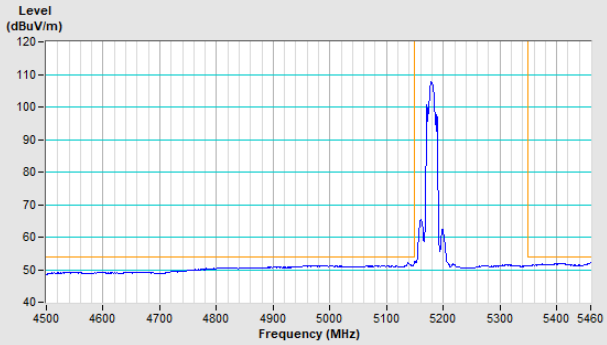


802.11ax (20MHz) Channel 36

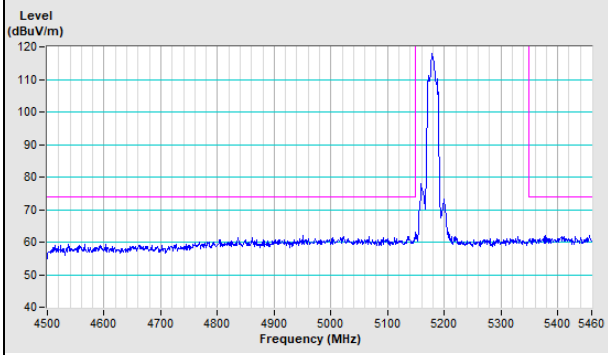
Horizontal (Peak)



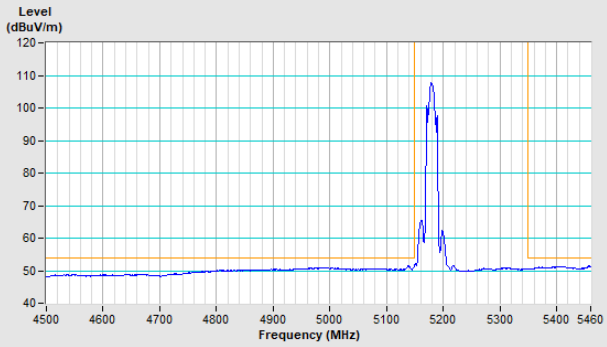
Horizontal (Average)



Vertical (Peak)

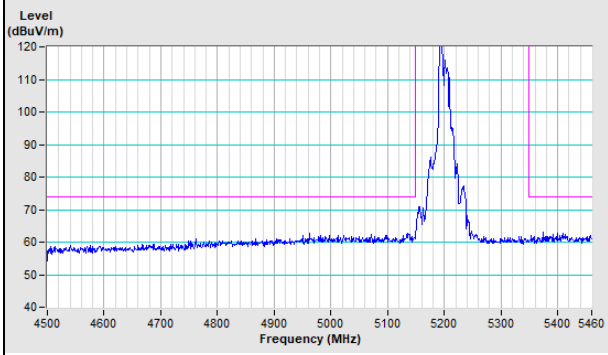


Vertical (Average)

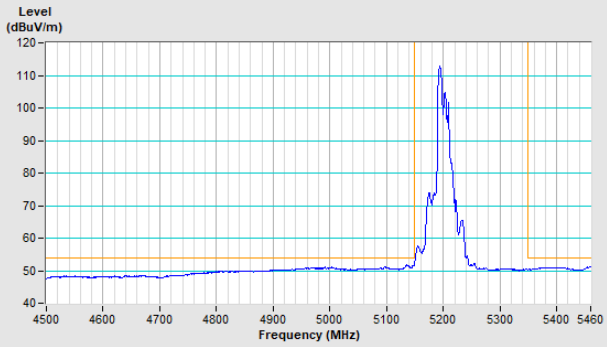


802.11ax (20MHz) Channel 40

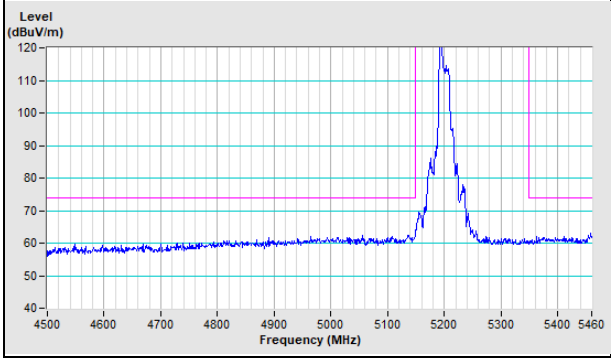
Horizontal (Peak)



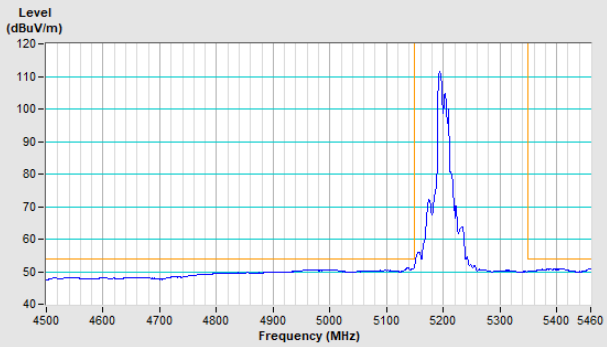
Horizontal (Average)



Vertical (Peak)

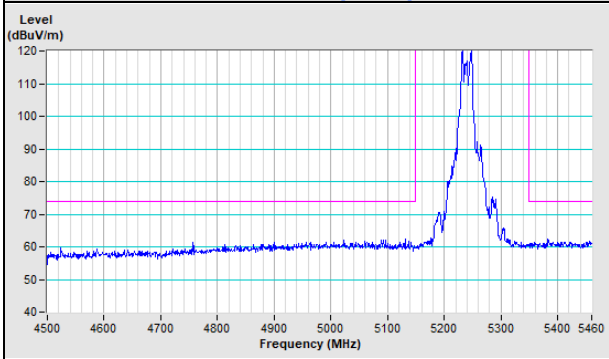


Vertical (Average)

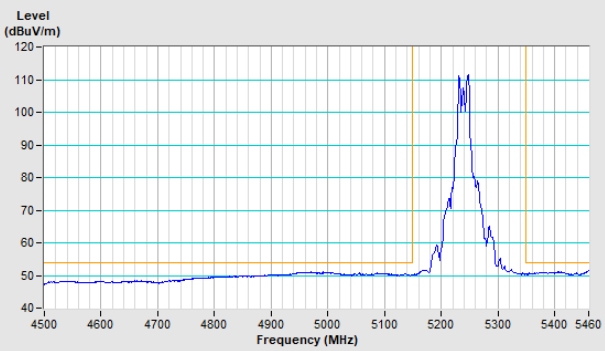


802.11ax (20MHz) Channel 48

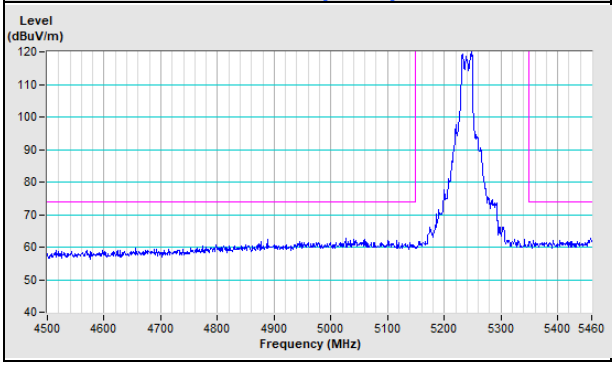
Horizontal (Peak)



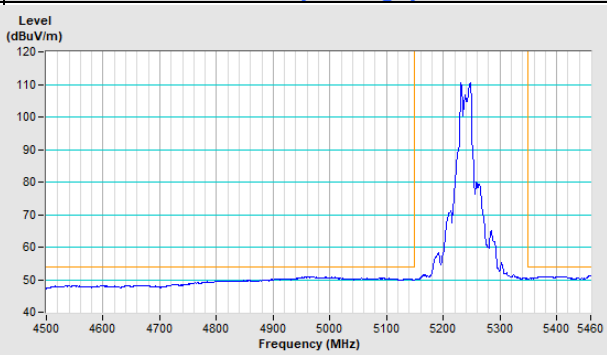
Horizontal (Average)



Vertical (Peak)

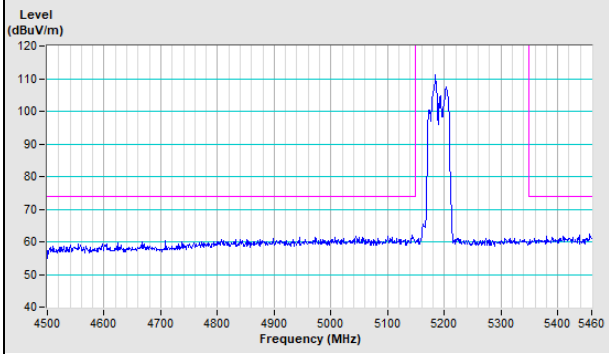


Vertical (Average)

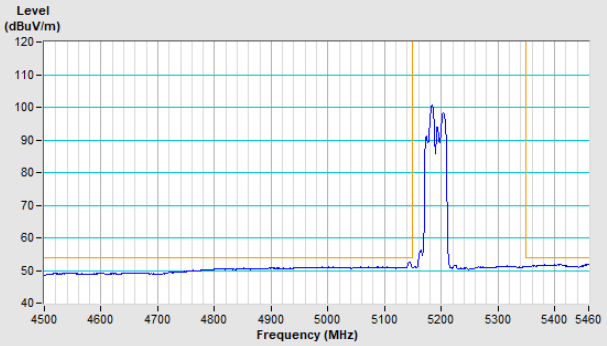


802.11ax (40MHz) Channel 38

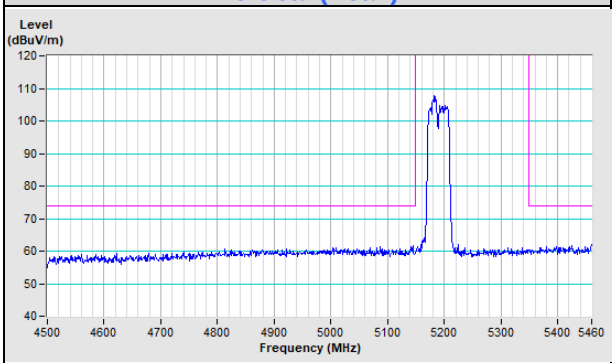
Horizontal (Peak)



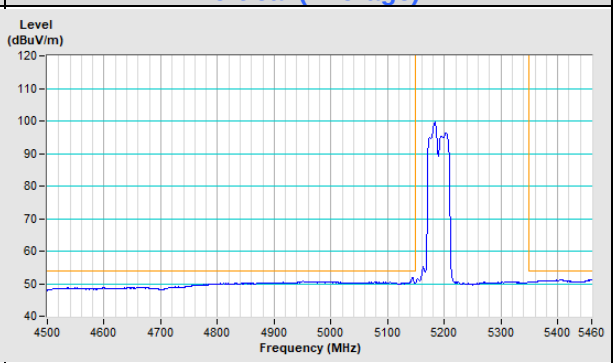
Horizontal (Average)



Vertical (Peak)

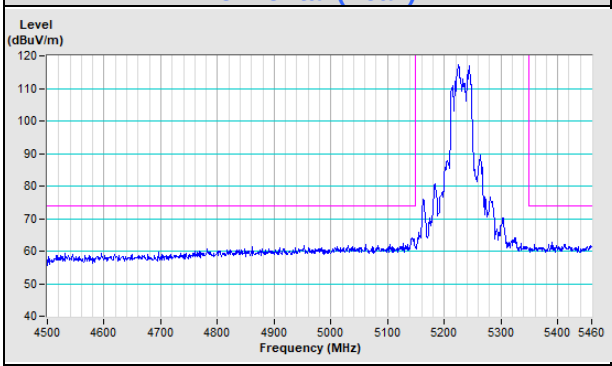


Vertical (Average)

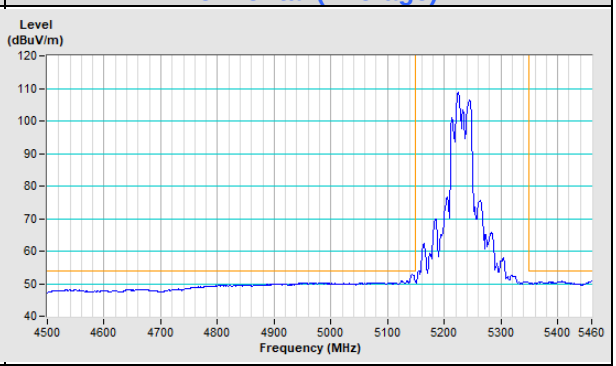


802.11ax (40MHz) Channel 46

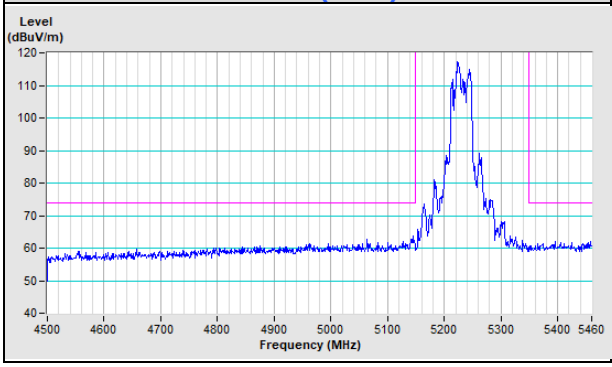
Horizontal (Peak)



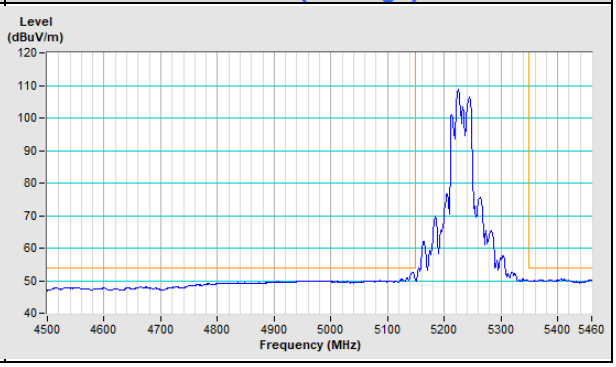
Horizontal (Average)



Vertical (Peak)

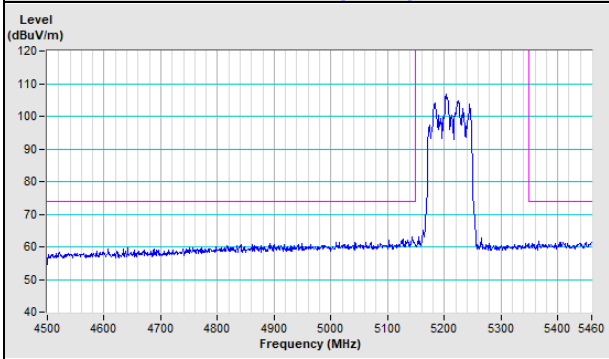


Vertical (Average)

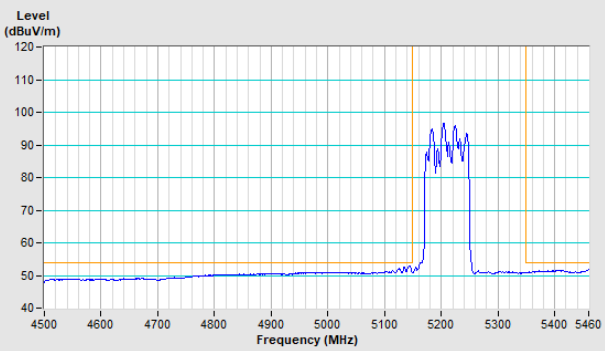


802.11ax (80MHz) Channel 42

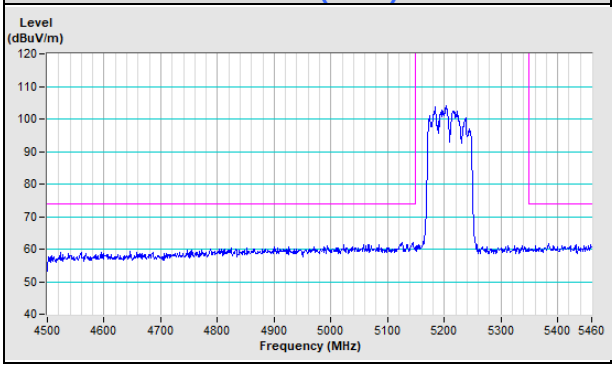
Horizontal (Peak)



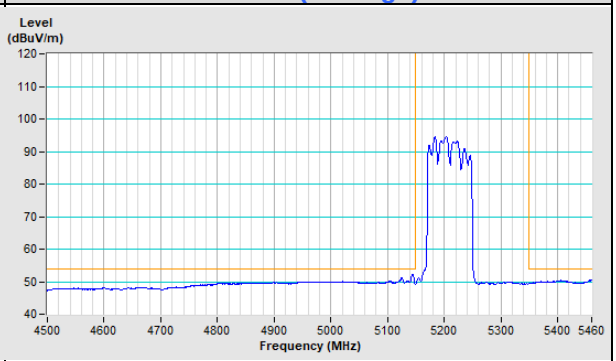
Horizontal (Average)



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 and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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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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