Report No.:	RF191129E10-1
FCC ID:	RRKC4000LG
Test Model:	C4000LG
Received Date:	Nov. 29, 2019
Test Date:	Dec. 03 to 13, 2019
Issued Date:	Dec. 30, 2019
Applicant:	Alpha Networks Inc.
Address:	No.8 Li-shing 7th Rd., Science-based Industrial Park, Hsinchu, Taiwan, R.O.C.
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
RF191129E10-1	Original release.	Dec. 30, 2019

1 Certificate of Conformity

Product:	VDSL2 integrated access device (IAD)
Brand:	CenturyLink
Test Model:	C4000LG
Sample Status:	ENGINEERING SAMPLE
Applicant:	Alpha Networks Inc.
Test Date:	Dec. 03 to 13, 2019
Standard:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10: 2013

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

Prepared by : Phoenix Huang , **Date:** Dec. 30, 2019

Phoenix Huang / Specialist

Approved by : , **Date:** Dec. 30, 2019

Clark Lin / Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -14.49 dB at 0.35313 MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit. Minimum passing margin is -0.3 dB at 5150.00 MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	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.

*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.

Note:
Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.8 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.0 dB
	30MHz ~ 1GHz	4.9 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	4.9 dB
	18GHz ~ 40GHz	5.2 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	VDSL2 integrated access device (IAD)
Brand	CenturyLink
Test Model	C4000LG
Status of EUT	ENGINEERING SAMPLE
Temperature Operating Range	0℃ ~ 40℃
Power Supply Rating	12Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz band 1024QAM for OFDMA in 11ax HE mode
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: up to 11 Mbps 802.11a/g: up to 54 Mbps 802.11n: up to 300 Mbps 802.11ac: up to 866.7 Mbps 802.11ax: up to 1201.0 Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462 GHz **5GHz:** 5.18 ~ 5.24 GHz, 5.745 ~ 5.825 GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20), VHT20, 80211ax (HE20): 11 802.11n (HT40), VHT40, 80211ax (HE40): 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20), 80211ax (HE20): 9 802.11n (HT40), 802.11ac (VHT40), 80211ax (HE40): 4 802.11ac (VHT80), 80211ax (HE80): 2
Output Power	**Non-Beamforming Mode:** **2.412 ~ 2.462 GHz:** 928.995 mW **5.18 ~ 5.24 GHz:** 881.497 mW **5.745 ~ 5.825 GHz:** 982.568 mW **Beamforming Mode:** **2.412 ~ 2.462 GHz:** 841.422 mW **5.18 ~ 5.24 GHz:** 811.019 mW **5.745 ~ 5.825 GHz:** 769.064 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	Refer to Note

Note:

1. Simultaneously transmission condition.

Condition	Technology	
1	WLAN (2.4GHz)	WLAN (5GHz)
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.		

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

Frequency Range (GHz)	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
2.4 ~ 2.5	5.1	PCB	i-pex(MHF)
5.15 ~ 5.25	6.3		
5.25 ~ 5.35	7.6		
5.47 ~ 5.725	6.4		
5.725 ~ 5.85	7.1		
Note: More detailed information, please refer to antenna specification.			

3. The EUT must be supplied with a power adapter as following table:

No.	Brand	Model No.	Spec.	Plug
1	Asian Power Devices Inc	WA-30P12FU	AC Input: 100-240Vac, 0.9A, 50-60Hz DC Output: 12V, 2.5A DC Output Cable: 1.83m, Unshielded	US
2	LEADER ELECTRONICS INC.	ML30B1120250-A1	AC Input: 100-120Vac, 0.8A, 50/60Hz DC Output: 12V, 2.5A DC Output Cable: 1.83m, Unshielded	US
Note: From the above conditions, the conducted emissions and radiated emissions worse case was found in **Adapter No. 2**. Therefore only the test data of the mode was recorded in this report.				

4. The data cable supplied as following table:

Product	Brand	Color	Quantity	Remark
RJ45 Cable	Nien-Yi/Hunter	Yellow	1	1.83M, unshielded
		White	1	1.83M, unshielded
RJ14 Cable		Green	1	3.66M, unshielded

5. The EUT incorporates a MIMO function:

2.4GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11b	1TX (Fixed Chain 0)	2RX
802.11g	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
VHT20	2TX	2RX
VHT40	2TX	2RX
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX
5GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11a	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
802.11ac (VHT20)	2TX	2RX
802.11ac (VHT40)	2TX	2RX
802.11ac (VHT80)	2TX	2RX
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX
802.11ax (HE80)	2TX	2RX

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

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

3.2 Description of Test Modes

FOR 5180 ~ 5240 MHz

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

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

Channel	Frequency
42	5210 MHz

FOR 5745 ~ 5825 MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

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

Channel	Frequency
155	5775 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

Radiated Emission Test (Above 1GHz):

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

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

Radiated Emission Test (Below 1GHz):

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

Non-Beamforming Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (HE20)	5180-5240 5745-5825	36 to 48 149 to 165	157	OFDMA	BPSK	MCS0

Power Line Conducted Emission Test:

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

Non-Beamforming Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (HE20)	5180-5240 5745-5825	36 to 48 149 to 165	157	OFDMA	BPSK	MCS0

Antenna Port Conducted Measurement:

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

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

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

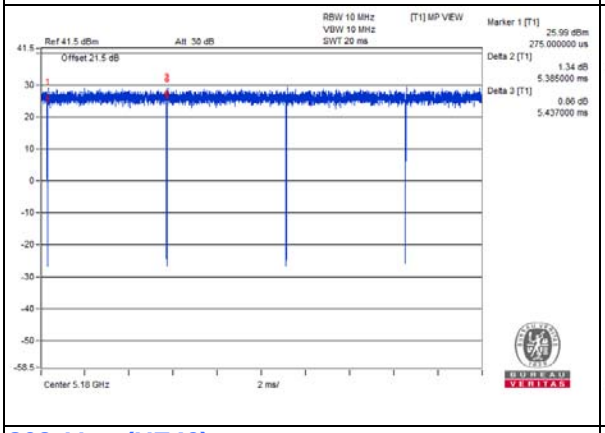
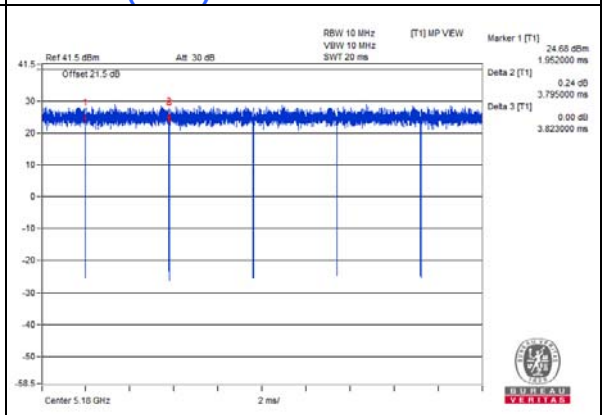
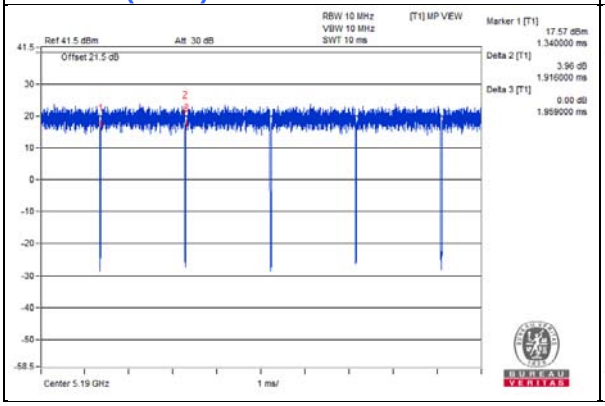
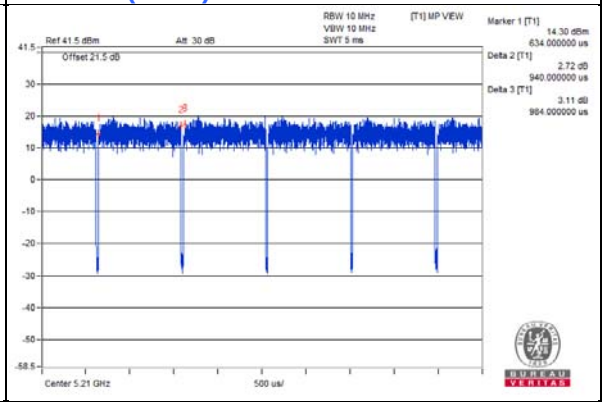
Non-Beamforming Mode						
Mode	**FREQ. Band (MHz)**	**Available Channel**	**Tested Channel**	**Modulation Technology**	**Modulation Type**	**Data Rate Parameter**
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6Mb/s
802.11ac (VHT20) (for output power)		36 to 48	36, 40, 48	OFDM	BPSK	MCS0
802.11ac (VHT40)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

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	25deg. C, 69%RH	120Vac, 60Hz	Jeff Lee
	23deg. C, 64%RH	120Vac, 60Hz	Tom Yang
RE<1G	23deg. C, 64%RH	120Vac, 60Hz	Tom Yang
PLC	23deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.
802.11a: Duty cycle = 5.385 ms/5.437 ms = 0.99
802.11ax (HE20): Duty cycle = 3.795 ms/3.823 ms = 0.993
802.11ax (HE40): Duty cycle = 1.916 ms/1.959 ms = 0.978, Duty factor = 10 * log (1/Duty cycle) = 0.1
802.11ax (HE80): Duty cycle = 0.94 ms/0.984 ms = 0.955, Duty factor = 10 * log (1/Duty cycle) = 0.2

802.11a	802.11ax (HE20)
	
802.11ax (HE40)	**802.11ax (HE80)**
	

3.4 Description of Support Units

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

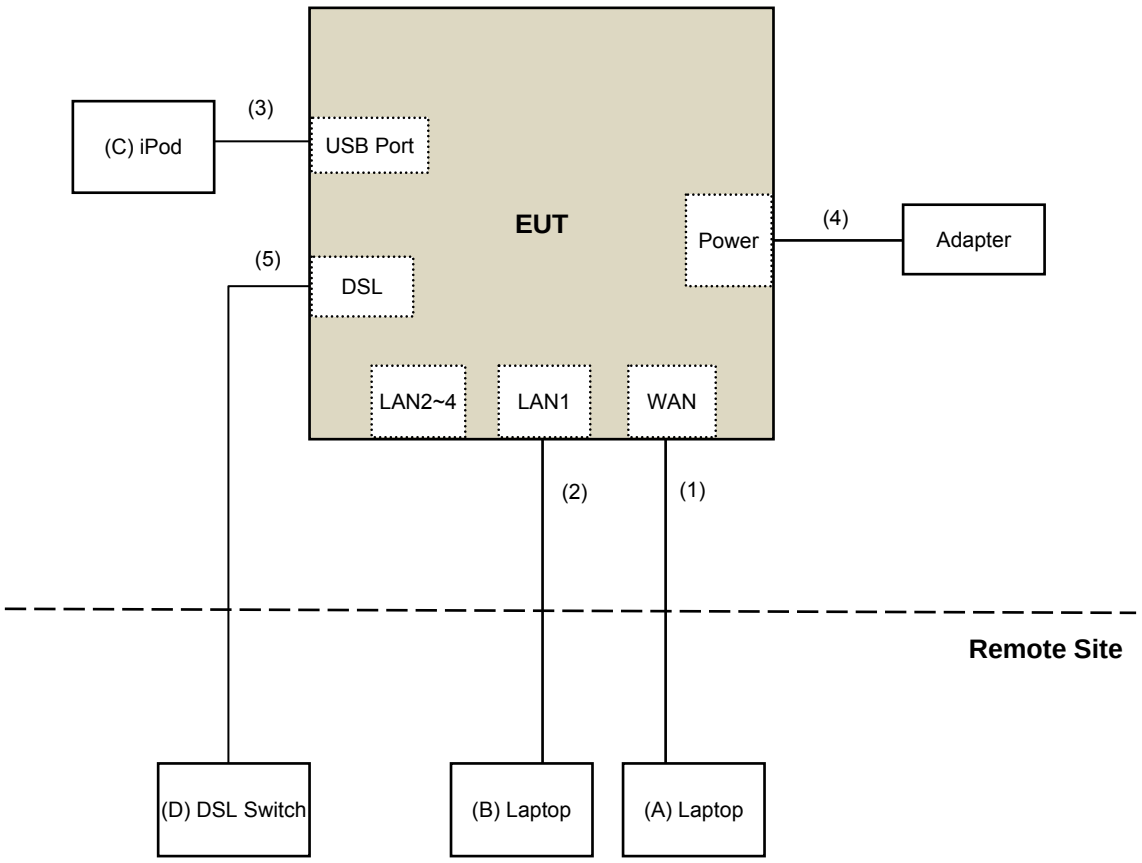
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	Laptop	DELL	E6420	FCC DoC	Provided by Lab
B.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
C.	iPod	Apple	MC749TA/A	CC4DM9M8DFDM	NA	Provided by Lab
D.	DSL Switch	D-LINK	DAS-3626	NA	NA	Supplied by client

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	USB Cable	1	0.1	Yes	0	Provided by Lab
4.	DC Cable	1	1.83	No	0	Supplied by client
5.	RJ-14 Cable	1	10	No	0	Provided by Lab

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="2">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="2" 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
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Pre-Amplifier EMCI	EMC001340	980142	May 30, 2019	May 29, 2020
Loop Antenna Electro-Metrics	EM-6879	264	Jan. 22, 2019	Jan. 21, 2020
RF Cable	NA	LOOPCAB-001	Jan. 14, 2019	Jan. 13, 2020
RF Cable	NA	LOOPCAB-002	Jan. 14, 2019	Jan. 13, 2020
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Oct. 23, 2019	Oct. 22, 2020
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 11, 2019	Nov. 10, 2020
RF Cable	8D	966-4-1	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-2	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-3	Mar. 19, 2019	Mar. 18, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Sep. 26, 2019	Sep. 25, 2020
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMCI	EMC12630SE	980385	Aug. 15, 2019	Aug. 14, 2020
RF Cable	EMC104-SM-SM-1200	160923	Jan. 28, 2019	Jan. 27, 2020
RF Cable	104 RF cable	131215	Jan. 10, 2019	Jan. 09, 2020
RF Cable	EMC104-SM-SM-6000	180418	May 03, 2019	May 02, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 04, 2019	June 03, 2020
Power meter Anritsu	ML2495A	1014008	May 13, 2019	May 12, 2020
Power sensor Anritsu	MA2411B	0917122	May 13, 2019	May 12, 2020
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 09, 2019	Jan. 08, 2020
True RMS Clamp Meter FLUKE	325	31130711WS	May 21, 2019	May 20, 2020

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Dec. 04 to 13, 2019

4.1.3 Test Procedure

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

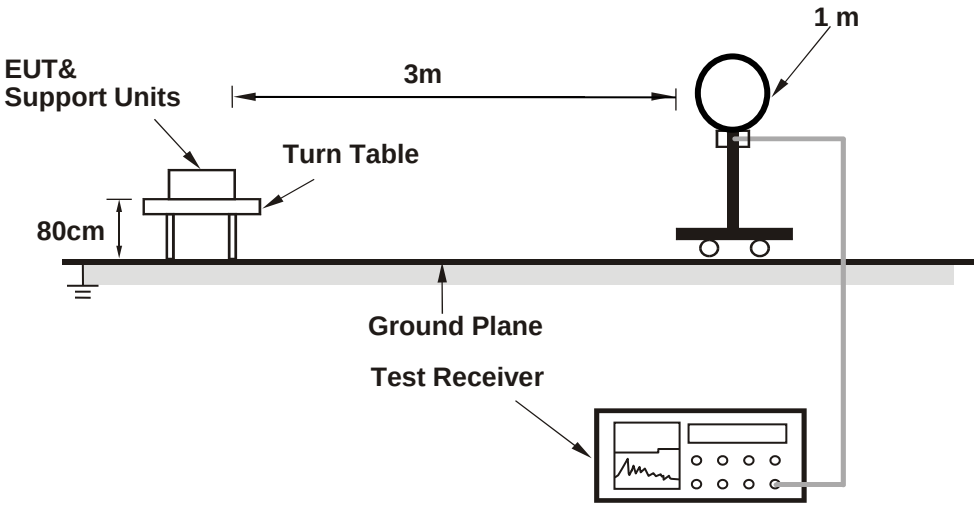
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

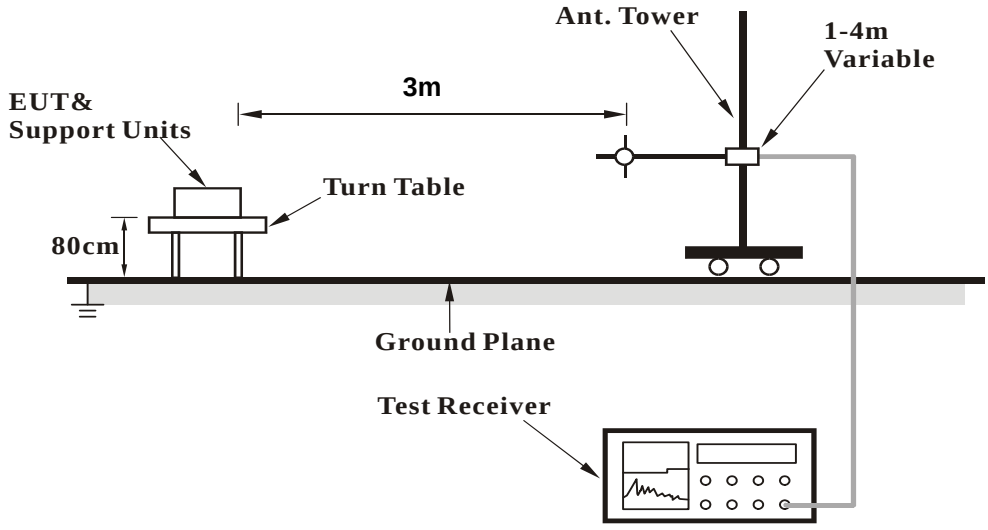
No deviation.

4.1.5 Test Setup

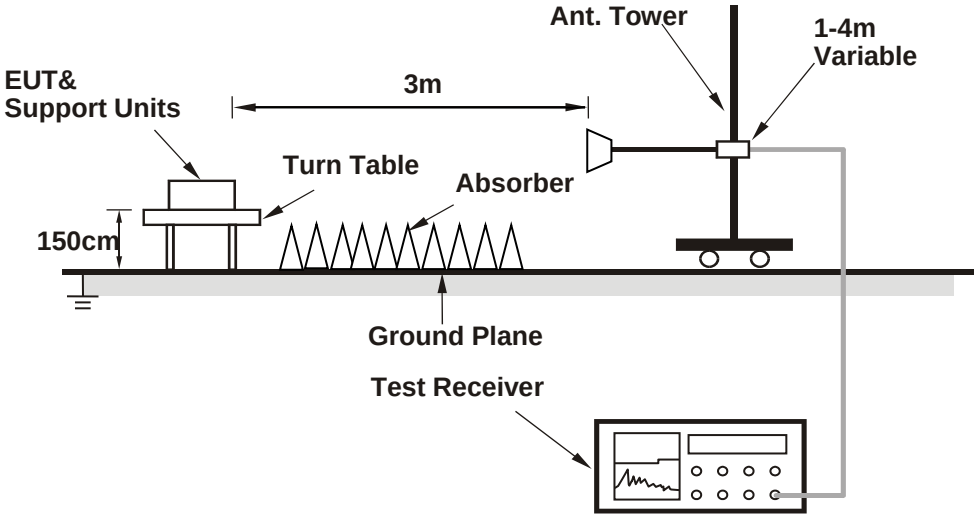
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

a. Placed the EUT on the testing table.
b. Controlling software (Intel DUT Ver.610.23) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data:

802.11a

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.3 PK	74.0	-17.7	1.54 H	55	53.2	3.1
2	5150.00	43.9 AV	54.0	-10.1	1.54 H	55	40.8	3.1
3	*5180.00	113.8 PK			1.54 H	55	110.7	3.1
4	*5180.00	101.7 AV			1.54 H	55	98.6	3.1
5	#10360.00	54.6 PK	68.2	-13.6	1.65 H	227	41.7	12.9
6	15540.00	47.7 PK	74.0	-26.3	1.56 H	76	34.4	13.3
7	15540.00	35.4 AV	54.0	-18.6	1.56 H	76	22.1	13.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.4 PK	74.0	-8.6	1.66 V	282	62.3	3.1
2	**5150.00**	**53.7 AV**	**54.0**	**-0.3**	**1.66 V**	**282**	**50.6**	**3.1**
3	*5180.00	118.4 PK			1.66 V	282	115.3	3.1
4	*5180.00	109.3 AV			1.66 V	282	106.2	3.1
5	#10360.00	56.3 PK	68.2	-11.9	1.65 V	155	43.4	12.9
6	15540.00	49.2 PK	74.0	-24.8	1.60 V	200	35.9	13.3
7	15540.00	37.2 AV	54.0	-16.8	1.60 V	200	23.9	13.3

REMARKS:

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

CHANNEL	TX Channel 40	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.3 PK	74.0	-16.7	1.50 H	42	54.2	3.1
2	5150.00	44.7 AV	54.0	-9.3	1.50 H	42	41.6	3.1
3	*5200.00	113.0 PK			1.50 H	42	110.0	3.0
4	*5200.00	104.8 AV			1.50 H	42	101.8	3.0
5	5350.00	50.6 PK	74.0	-23.4	1.50 H	42	47.5	3.1
6	5350.00	38.6 AV	54.0	-15.4	1.50 H	42	35.5	3.1
7	#10400.00	56.9 PK	68.2	-11.3	1.59 H	239	43.8	13.1
8	15600.00	48.0 PK	74.0	-26.0	1.50 H	85	34.9	13.1
9	15600.00	35.5 AV	54.0	-18.5	1.50 H	85	22.4	13.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.9 PK	74.0	-5.1	1.53 V	288	65.8	3.1
2	5150.00	53.0 AV	54.0	-1.0	1.53 V	288	49.9	3.1
3	*5200.00	121.0 PK			1.53 V	288	118.0	3.0
4	*5200.00	113.9 AV			1.53 V	288	110.9	3.0
5	5350.00	53.5 PK	74.0	-20.5	1.53 V	288	50.4	3.1
6	5350.00	42.2 AV	54.0	-11.8	1.53 V	288	39.1	3.1
7	#10400.00	57.2 PK	68.2	-11.0	1.66 V	150	44.1	13.1
8	15600.00	50.3 PK	74.0	-23.7	1.66 V	208	37.2	13.1
9	15600.00	37.1 AV	54.0	-16.9	1.66 V	208	24.0	13.1

REMARKS:

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

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	113.7 PK			1.56 H	69	110.8	2.9
2	*5240.00	102.2 AV			1.56 H	69	99.3	2.9
3	5350.00	53.8 PK	74.0	-20.2	1.56 H	69	50.7	3.1
4	5350.00	41.3 AV	54.0	-12.7	1.56 H	69	38.2	3.1
5	#10480.00	55.2 PK	68.2	-13.0	1.64 H	249	42.0	13.2
6	15720.00	48.2 PK	74.0	-25.8	1.54 H	84	35.5	12.7
7	15720.00	35.7 AV	54.0	-18.3	1.54 H	84	23.0	12.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	120.3 PK			1.19 V	0	117.4	2.9
2	*5240.00	110.2 AV			1.19 V	0	107.3	2.9
3	5350.00	57.5 PK	74.0	-16.5	1.19 V	0	54.4	3.1
4	5350.00	46.5 AV	54.0	-7.5	1.19 V	0	43.4	3.1
5	#10480.00	56.6 PK	68.2	-11.6	1.66 V	165	43.4	13.2
6	15720.00	49.5 PK	74.0	-24.5	1.63 V	195	36.8	12.7
7	15720.00	37.6 AV	54.0	-16.4	1.63 V	195	24.9	12.7

REMARKS:

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

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5564.07	50.4 PK	68.2	-17.8	1.67 H	180	47.0	3.4
2	*5745.00	112.3 PK			1.67 H	180	108.7	3.6
3	*5745.00	102.7 AV			1.67 H	180	99.1	3.6
4	#5976.25	48.6 PK	68.2	-19.6	1.67 H	180	44.5	4.1
5	11490.00	49.3 PK	74.0	-24.7	1.57 H	251	35.6	13.7
6	11490.00	36.3 AV	54.0	-17.7	1.57 H	251	22.6	13.7
7	#17235.00	53.6 PK	68.2	-14.6	1.56 H	73	36.8	16.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5642.53	64.0 PK	68.2	-4.2	1.59 V	230	60.4	3.6
2	*5745.00	123.6 PK			1.59 V	230	120.0	3.6
3	*5745.00	114.6 AV			1.59 V	230	111.0	3.6
4	#5996.13	62.9 PK	68.2	-5.3	1.59 V	230	58.5	4.4
5	11490.00	48.7 PK	74.0	-25.3	1.63 V	148	35.0	13.7
6	11490.00	35.5 AV	54.0	-18.5	1.63 V	148	21.8	13.7
7	#17235.00	51.6 PK	68.2	-16.6	1.57 V	208	34.8	16.8

REMARKS:

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

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5643.61	49.3 PK	68.2	-18.9	1.59 H	141	45.8	3.5
2	*5785.00	111.6 PK			1.59 H	141	107.9	3.7
3	*5785.00	102.5 AV			1.59 H	141	98.8	3.7
4	#5965.26	51.7 PK	68.2	-16.5	1.59 H	141	47.6	4.1
5	11570.00	48.9 PK	74.0	-25.1	1.55 H	252	35.4	13.5
6	11570.00	36.0 AV	54.0	-18.0	1.55 H	252	22.5	13.5
7	#17355.00	54.0 PK	68.2	-14.2	1.55 H	84	36.8	17.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5581.41	63.6 PK	68.2	-4.6	1.54 V	230	59.9	3.7
2	*5785.00	123.5 PK			1.54 V	230	119.8	3.7
3	*5785.00	114.6 AV			1.54 V	230	110.9	3.7
4	#5958.36	63.4 PK	68.2	-4.8	1.54 V	230	59.0	4.4
5	11570.00	48.5 PK	74.0	-25.5	1.61 V	149	35.0	13.5
6	11570.00	36.0 AV	54.0	-18.0	1.61 V	149	22.5	13.5
7	#17355.00	46.8 PK	68.2	-21.4	1.60 V	211	29.6	17.2

REMARKS:

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

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5632.73	52.8 PK	68.2	-15.4	1.63 H	147	49.4	3.4
2	*5825.00	112.1 PK			1.63 H	147	108.1	4.0
3	*5825.00	102.4 AV			1.63 H	147	98.4	4.0
4	#5978.13	52.8 PK	68.2	-15.4	1.63 H	147	48.7	4.1
5	11650.00	49.2 PK	74.0	-24.8	1.52 H	244	35.9	13.3
6	11650.00	36.2 AV	54.0	-17.8	1.52 H	244	22.9	13.3
7	#17475.00	53.8 PK	68.2	-14.4	1.50 H	74	35.5	18.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5589.51	63.0 PK	68.2	-5.2	1.47 V	228	59.3	3.7
2	*5825.00	123.9 PK			1.47 V	228	119.9	4.0
3	*5825.00	114.6 AV			1.47 V	228	110.6	4.0
4	#5929.72	63.9 PK	68.2	-4.3	1.47 V	228	59.7	4.2
5	11650.00	48.4 PK	74.0	-25.6	1.64 V	161	35.1	13.3
6	11650.00	36.2 AV	54.0	-17.8	1.64 V	161	22.9	13.3
7	#17475.00	46.6 PK	68.2	-21.6	1.61 V	217	28.3	18.3

REMARKS:

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

802.11ax (HE20)

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.7 PK	74.0	-17.3	1.54 H	73	53.6	3.1
2	5150.00	43.7 AV	54.0	-10.3	1.54 H	73	40.6	3.1
3	*5180.00	114.3 PK			1.54 H	73	111.2	3.1
4	*5180.00	100.5 AV			1.54 H	73	97.4	3.1
5	#10360.00	54.5 PK	68.2	-13.7	1.70 H	221	41.6	12.9
6	15540.00	47.9 PK	74.0	-26.1	1.59 H	68	34.6	13.3
7	15540.00	35.8 AV	54.0	-18.2	1.59 H	68	22.5	13.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.4 PK	74.0	-7.6	1.62 V	286	63.3	3.1
2	5150.00	53.5 AV	54.0	-0.5	1.62 V	286	50.4	3.1
3	*5180.00	118.1 PK			1.62 V	286	115.0	3.1
4	*5180.00	108.8 AV			1.62 V	286	105.7	3.1
5	#10360.00	56.6 PK	68.2	-11.6	1.62 V	145	43.7	12.9
6	15540.00	49.1 PK	74.0	-24.9	1.57 V	190	35.8	13.3
7	15540.00	37.1 AV	54.0	-16.9	1.57 V	190	23.8	13.3

REMARKS:

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

CHANNEL	TX Channel 40	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.3 PK	74.0	-16.7	1.57 H	48	54.2	3.1
2	5150.00	44.9 AV	54.0	-9.1	1.57 H	48	41.8	3.1
3	*5200.00	112.8 PK			1.57 H	48	109.8	3.0
4	*5200.00	104.9 AV			1.57 H	48	101.9	3.0
5	5350.00	50.4 PK	74.0	-23.6	1.57 H	48	47.3	3.1
6	5350.00	39.7 AV	54.0	-14.3	1.57 H	48	36.6	3.1
7	#10400.00	54.8 PK	68.2	-13.4	1.65 H	223	41.7	13.1
8	15600.00	48.2 PK	74.0	-25.8	1.61 H	61	35.1	13.1
9	15600.00	35.7 AV	54.0	-18.3	1.61 H	61	22.6	13.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.7 PK	74.0	-7.3	1.51 V	34	63.6	3.1
2	5150.00	53.4 AV	54.0	-0.6	1.51 V	34	50.3	3.1
3	*5200.00	124.2 PK			1.51 V	34	121.2	3.0
4	*5200.00	114.2 AV			1.51 V	34	111.2	3.0
5	5350.00	56.9 PK	74.0	-17.1	1.51 V	34	53.8	3.1
6	5350.00	43.4 AV	54.0	-10.6	1.51 V	34	40.3	3.1
7	#10400.00	56.1 PK	68.2	-12.1	1.66 V	145	43.0	13.1
8	15600.00	49.2 PK	74.0	-24.8	1.59 V	206	36.1	13.1
9	15600.00	37.2 AV	54.0	-16.8	1.59 V	206	24.1	13.1

REMARKS:

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

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	113.2 PK			1.55 H	64	110.3	2.9
2	*5240.00	101.8 AV			1.55 H	64	98.9	2.9
3	5350.00	54.1 PK	74.0	-19.9	1.55 H	64	51.0	3.1
4	5350.00	41.4 AV	54.0	-12.6	1.55 H	64	38.3	3.1
5	#10480.00	54.8 PK	68.2	-13.4	1.69 H	241	41.6	13.2
6	15720.00	47.9 PK	74.0	-26.1	1.55 H	66	35.2	12.7
7	15720.00	35.4 AV	54.0	-18.6	1.55 H	66	22.7	12.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	119.7 PK			1.19 V	10	116.8	2.9
2	*5240.00	109.8 AV			1.19 V	10	106.9	2.9
3	5350.00	57.2 PK	74.0	-16.8	1.19 V	10	54.1	3.1
4	5350.00	46.2 AV	54.0	-7.8	1.19 V	10	43.1	3.1
5	#10480.00	46.7 PK	68.2	-21.5	1.43 V	339	33.5	13.2
6	15720.00	46.3 PK	74.0	-27.7	1.53 V	234	33.6	12.7
7	15720.00	35.1 AV	54.0	-18.9	1.53 V	234	22.4	12.7

REMARKS:

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

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5623.83	53.1 PK	68.2	-15.1	1.20 H	135	49.7	3.4
2	*5745.00	112.3 PK			1.20 H	135	108.7	3.6
3	*5745.00	101.9 AV			1.20 H	135	98.3	3.6
4	#5955.12	51.3 PK	68.2	-16.9	1.20 H	135	47.2	4.1
5	11490.00	48.7 PK	74.0	-25.3	1.51 H	238	35.0	13.7
6	11490.00	36.0 AV	54.0	-18.0	1.51 H	238	22.3	13.7
7	#17235.00	53.9 PK	68.2	-14.3	1.56 H	81	37.1	16.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5620.49	61.6 PK	68.2	-6.6	1.57 V	306	57.6	4.0
2	*5745.00	121.0 PK			1.57 V	306	117.4	3.6
3	*5745.00	114.4 AV			1.57 V	306	110.8	3.6
4	#5950.02	56.9 PK	68.2	-11.3	1.57 V	306	52.1	4.8
5	#7235.00	46.6 PK	68.2	-21.6	1.44 V	229	37.9	8.7
6	11490.00	45.3 PK	74.0	-28.7	1.01 V	295	31.6	13.7
7	11490.00	37.3 AV	54.0	-16.7	1.01 V	295	23.6	13.7

REMARKS:

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

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5639.92	51.7 PK	68.2	-16.5	1.52 H	141	48.3	3.4
2	*5785.00	112.5 PK			1.52 H	141	108.8	3.7
3	*5785.00	102.3 AV			1.52 H	141	98.6	3.7
4	#5963.15	51.1 PK	68.2	-17.1	1.52 H	141	47.0	4.1
5	11570.00	48.4 PK	74.0	-25.6	1.54 H	262	34.9	13.5
6	11570.00	35.7 AV	54.0	-18.3	1.54 H	262	22.2	13.5
7	#17355.00	54.1 PK	68.2	-14.1	1.51 H	96	36.9	17.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5643.15	58.2 PK	68.2	-10.0	1.57 V	43	54.3	3.9
2	*5785.00	122.5 PK			1.57 V	43	118.8	3.7
3	*5785.00	114.3 AV			1.57 V	43	110.6	3.7
4	#5948.28	58.2 PK	68.2	-10.0	1.57 V	43	53.4	4.8
5	11570.00	45.4 PK	74.0	-28.6	1.00 V	286	31.9	13.5
6	11570.00	37.2 AV	54.0	-16.8	1.00 V	286	23.7	13.5
7	#17355.00	47.0 PK	68.2	-21.2	1.49 V	227	29.8	17.2

REMARKS:

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

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5623.96	51.5 PK	68.2	-16.7	1.65 H	141	48.1	3.4
2	*5825.00	113.1 PK			1.65 H	141	109.1	4.0
3	*5825.00	102.0 AV			1.65 H	141	98.0	4.0
4	#5955.26	52.7 PK	68.2	-15.5	1.65 H	141	48.6	4.1
5	11650.00	48.8 PK	74.0	-25.2	1.51 H	236	35.5	13.3
6	11650.00	36.1 AV	54.0	-17.9	1.51 H	236	22.8	13.3
7	#17475.00	54.4 PK	68.2	-13.8	1.52 H	77	36.1	18.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5644.30	57.6 PK	68.2	-10.6	1.52 V	43	53.7	3.9
2	*5825.00	123.0 PK			1.52 V	43	119.0	4.0
3	*5825.00	114.2 AV			1.52 V	43	110.2	4.0
4	#5933.82	61.4 PK	68.2	-6.8	1.52 V	43	56.7	4.7
5	11650.00	45.1 PK	74.0	-28.9	1.03 V	307	31.8	13.3
6	11650.00	37.3 AV	54.0	-16.7	1.03 V	307	24.0	13.3
7	#17475.00	46.6 PK	68.2	-21.6	1.47 V	243	28.3	18.3

REMARKS:

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

802.11ax (HE40)

CHANNEL	TX Channel 38	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.9 PK	74.0	-15.1	1.57 H	64	55.8	3.1
2	5150.00	45.3 AV	54.0	-8.7	1.57 H	64	42.2	3.1
3	*5190.00	106.3 PK			1.57 H	64	103.2	3.1
4	*5190.00	95.5 AV			1.57 H	64	92.4	3.1
5	#10380.00	54.4 PK	68.2	-13.8	1.68 H	249	41.4	13.0
6	15570.00	47.4 PK	74.0	-26.6	1.52 H	65	34.2	13.2
7	15570.00	35.2 AV	54.0	-18.8	1.52 H	65	22.0	13.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	72.7 PK	74.0	-1.3	1.76 V	48	69.6	3.1
2	5150.00	53.4 AV	54.0	-0.6	1.76 V	48	50.3	3.1
3	*5190.00	113.1 PK			1.76 V	48	110.0	3.1
4	*5190.00	103.1 AV			1.76 V	48	100.0	3.1
5	#10380.00	57.2 PK	68.2	-11.0	1.63 V	158	44.2	13.0
6	15570.00	49.1 PK	74.0	-24.9	1.54 V	195	35.9	13.2
7	15570.00	37.3 AV	54.0	-16.7	1.54 V	195	24.1	13.2

REMARKS:

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

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.7 PK	74.0	-15.3	1.61 H	73	55.6	3.1
2	5150.00	44.6 AV	54.0	-9.4	1.61 H	73	41.5	3.1
3	*5230.00	111.1 PK			1.61 H	73	108.2	2.9
4	*5230.00	100.4 AV			1.61 H	73	97.5	2.9
5	5350.00	50.3 PK	74.0	-23.7	1.61 H	73	47.2	3.1
6	5350.00	40.2 AV	54.0	-13.8	1.61 H	73	37.1	3.1
7	#10460.00	54.9 PK	68.2	-13.3	1.74 H	246	41.7	13.2
8	15690.00	48.2 PK	74.0	-25.8	1.57 H	80	35.4	12.8
9	15690.00	35.5 AV	54.0	-18.5	1.57 H	80	22.7	12.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	71.0 PK	74.0	-3.0	1.70 V	284	67.9	3.1
2	5150.00	53.4 AV	54.0	-0.6	1.70 V	284	50.3	3.1
3	*5230.00	116.7 PK			1.70 V	284	113.8	2.9
4	*5230.00	107.5 AV			1.70 V	284	104.6	2.9
5	5350.00	57.3 PK	74.0	-16.7	1.70 V	284	54.2	3.1
6	5350.00	46.1 AV	54.0	-7.9	1.70 V	284	43.0	3.1
7	#10460.00	56.2 PK	68.2	-12.0	1.57 V	160	43.0	13.2
8	15690.00	49.0 PK	74.0	-25.0	1.57 V	193	36.2	12.8
9	15690.00	37.2 AV	54.0	-16.8	1.57 V	193	24.4	12.8

REMARKS:

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

CHANNEL	TX Channel 151	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5646.39	58.7 PK	68.2	-9.5	1.71 H	179	55.2	3.5
2	*5755.00	110.5 PK			1.71 H	179	106.9	3.6
3	*5755.00	101.7 AV			1.71 H	179	98.1	3.6
4	#5938.93	50.0 PK	68.2	-18.2	1.71 H	179	45.9	4.1
5	11510.00	48.2 PK	74.0	-25.8	1.56 H	239	34.6	13.6
6	11510.00	35.8 AV	54.0	-18.2	1.56 H	239	22.2	13.6
7	#17265.00	53.6 PK	68.2	-14.6	1.54 H	90	36.7	16.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5646.63	67.2 PK	68.2	-1.0	1.55 V	304	63.3	3.9
2	*5755.00	119.5 PK			1.55 V	304	115.9	3.6
3	*5755.00	109.2 AV			1.55 V	304	105.6	3.6
4	#5940.40	58.9 PK	68.2	-9.3	1.55 V	304	54.2	4.7
5	11510.00	44.9 PK	74.0	-29.1	1.00 V	290	31.3	13.6
6	11510.00	37.0 AV	54.0	-17.0	1.00 V	290	23.4	13.6
7	#17265.00	47.2 PK	68.2	-21.0	1.39 V	234	30.3	16.9

REMARKS:

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

CHANNEL	TX Channel 159	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5632.47	49.3 PK	68.2	-18.9	1.66 H	157	45.9	3.4
2	*5795.00	109.8 PK			1.66 H	157	106.1	3.7
3	*5795.00	100.6 AV			1.66 H	157	96.9	3.7
4	#5941.19	50.6 PK	68.2	-17.6	1.66 H	157	46.5	4.1
5	11590.00	48.6 PK	74.0	-25.4	1.52 H	247	35.0	13.6
6	11590.00	36.2 AV	54.0	-17.8	1.52 H	247	22.6	13.6
7	#17385.00	54.2 PK	68.2	-14.0	1.53 H	66	37.0	17.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5640.01	64.3 PK	68.2	-3.9	1.54 V	305	60.4	3.9
2	*5795.00	116.9 PK			1.54 V	305	113.2	3.7
3	*5795.00	108.8 AV			1.54 V	305	105.1	3.7
4	#5924.98	67.4 PK	68.2	-0.8	1.54 V	305	62.8	4.6
5	11590.00	45.1 PK	74.0	-28.9	1.00 V	297	31.5	13.6
6	11590.00	37.0 AV	54.0	-17.0	1.00 V	297	23.4	13.6
7	#17385.00	45.8 PK	68.2	-22.4	1.48 V	242	28.6	17.2

REMARKS:

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

802.11ax (HE80)

CHANNEL	TX Channel 42	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.9 PK	74.0	-15.1	1.68 H	176	55.8	3.1
2	5150.00	44.5 AV	54.0	-9.5	1.68 H	176	41.4	3.1
3	*5210.00	100.4 PK			1.68 H	176	97.4	3.0
4	*5210.00	91.6 AV			1.68 H	176	88.6	3.0
5	5350.00	49.7 PK	74.0	-24.3	1.68 H	176	46.6	3.1
6	5350.00	38.6 AV	54.0	-15.4	1.68 H	176	35.5	3.1
7	#10420.00	54.5 PK	68.2	-13.7	1.60 H	249	41.3	13.2
8	15630.00	47.5 PK	74.0	-26.5	1.57 H	57	34.5	13.0
9	15630.00	37.1 AV	54.0	-16.9	1.57 H	57	24.1	13.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	62.4 PK	74.0	-11.6	1.50 V	165	59.3	3.1
2	**5150.00**	**53.7 AV**	**54.0**	**-0.3**	**1.50 V**	**165**	**50.6**	**3.1**
3	*5210.00	107.9 PK			1.50 V	165	104.9	3.0
4	*5210.00	100.1 AV			1.50 V	165	97.1	3.0
5	5350.00	54.1 PK	74.0	-19.9	1.50 V	165	51.0	3.1
6	5350.00	42.6 AV	54.0	-11.4	1.50 V	165	39.5	3.1
7	#10420.00	47.2 PK	68.2	-21.0	1.54 V	313	34.0	13.2
8	15630.00	45.7 PK	74.0	-28.3	1.60 V	290	32.7	13.0
9	15630.00	34.9 AV	54.0	-19.1	1.60 V	290	21.9	13.0

REMARKS:

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

CHANNEL	TX Channel 155	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5646.08	54.2 PK	68.2	-14.0	1.52 H	151	50.7	3.5
2	*5775.00	103.5 PK			1.52 H	151	99.8	3.7
3	*5775.00	94.3 AV			1.52 H	151	90.6	3.7
4	#5946.04	50.0 PK	68.2	-18.2	1.52 H	151	45.9	4.1
5	11550.00	47.7 PK	74.0	-26.3	1.55 H	249	34.1	13.6
6	11550.00	35.9 AV	54.0	-18.1	1.55 H	249	22.3	13.6
7	#17325.00	54.5 PK	68.2	-13.7	1.52 H	80	37.5	17.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5646.82	66.3 PK	68.2	-1.9	1.57 V	306	62.4	3.9
2	*5775.00	112.8 PK			1.51 V	224	109.1	3.7
3	*5775.00	103.4 AV			1.51 V	224	99.7	3.7
4	#5930.42	62.0 PK	68.2	-6.2	1.57 V	306	57.3	4.7
5	11550.00	47.8 PK	74.0	-26.2	1.00 V	289	34.2	13.6
6	11550.00	37.3 AV	54.0	-16.7	1.00 V	289	23.7	13.6
7	#17325.00	46.2 PK	68.2	-22.0	1.52 V	256	29.2	17.0

REMARKS:

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

Below 1GHz Data:

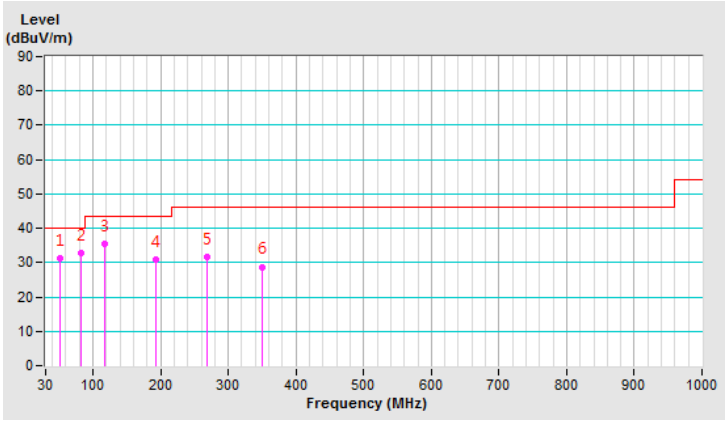
802.11ax (HE20)

CHANNEL	TX Channel 157	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	51.19	31.1 QP	40.0	-8.9	2.00 H	118	39.1	-8.0
2	81.43	32.8 QP	40.0	-7.2	4.00 H	60	46.0	-13.2
3	116.43	35.6 QP	43.5	-7.9	1.50 H	274	45.7	-10.1
4	193.83	30.7 QP	43.5	-12.8	1.50 H	96	41.5	-10.8
5	268.55	31.8 QP	46.0	-14.2	1.50 H	0	39.8	-8.0
6	349.23	28.8 QP	46.0	-17.2	1.00 H	142	34.7	-5.9

REMARKS:

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

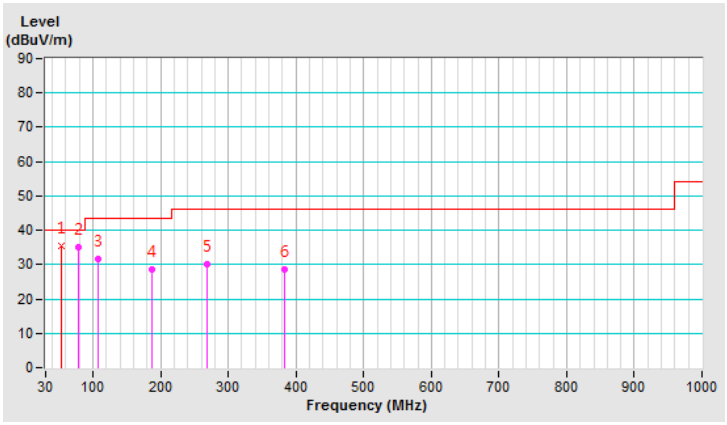


CHANNEL	TX Channel 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	53.09	35.5 QP	40.0	-4.5	1.00 V	67	43.5	-8.0
2	78.33	35.1 QP	40.0	-4.9	2.00 V	146	47.4	-12.3
3	108.33	31.8 QP	43.5	-11.7	1.00 V	252	42.5	-10.7
4	186.19	28.5 QP	43.5	-15.0	1.00 V	275	38.6	-10.1
5	268.21	30.1 QP	46.0	-15.9	1.00 V	64	38.1	-8.0
6	383.42	28.7 QP	46.0	-17.3	1.50 V	360	33.5	-4.8

REMARKS:

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



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 17, 2019	Mar. 16, 2020
50 ohms Terminator	50	3	Oct. 23, 2019	Oct. 22, 2020
RF Cable	5D-FB	COCCAB-001	Sep. 27, 2019	Sep. 26, 2020
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 14, 2019	Mar. 13, 2020
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
3 Tested Date: Dec. 03, 2019

4.2.3 Test Procedure

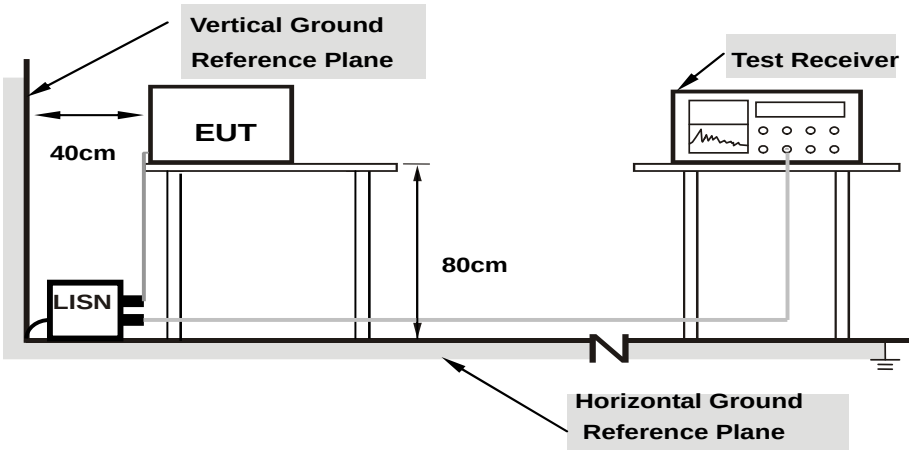
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

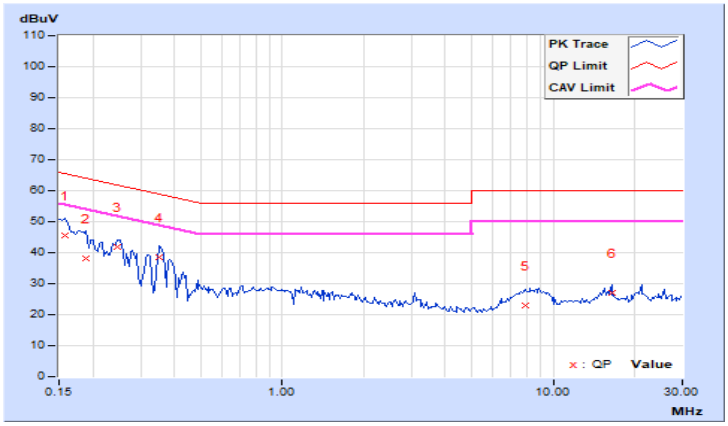
4.2.7 Test Results

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

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	9.97	35.60	21.60	45.57	31.57	65.58	55.58	-20.01	-24.01
2	0.18906	9.97	28.20	18.33	38.17	28.30	64.08	54.08	-25.91	-25.78
3	0.24766	9.97	31.71	24.85	41.68	34.82	61.84	51.84	-20.16	-17.02
4	**0.35313**	**9.98**	**28.42**	**24.42**	**38.40**	**34.40**	**58.89**	**48.89**	**-20.49**	**-14.49**
5	7.93750	10.55	12.27	6.80	22.82	17.35	60.00	50.00	-37.18	-32.65
6	16.46484	11.17	15.76	13.84	26.93	25.01	60.00	50.00	-33.07	-24.99

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

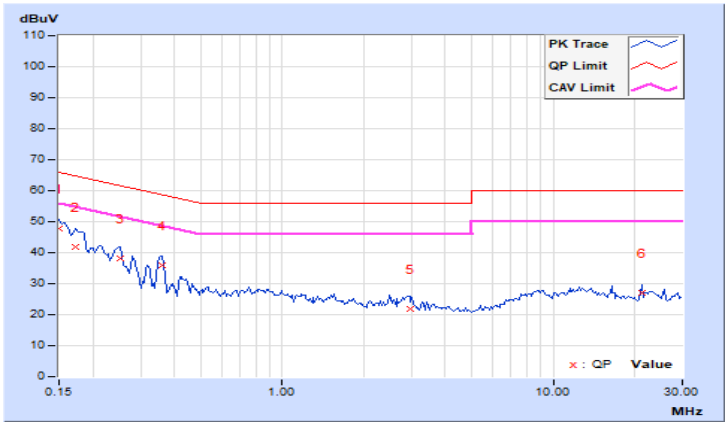


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.98	37.78	27.03	47.76	37.01	66.00	56.00	-18.24	-18.99
2	0.17344	9.98	31.89	22.43	41.87	32.41	64.79	54.79	-22.92	-22.38
3	0.25156	9.99	28.17	19.51	38.16	29.50	61.71	51.71	-23.55	-22.21
4	0.36094	10.00	26.06	22.03	36.06	32.03	58.71	48.71	-22.65	-16.68
5	2.95313	10.18	11.81	0.06	21.99	10.24	56.00	46.00	-34.01	-35.76
6	21.16797	11.22	15.74	14.81	26.96	26.03	60.00	50.00	-33.04	-23.97

Remarks:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

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

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

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

4.3.2 Test Setup

4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

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

4.3.7 Test Results

Non-Beamforming Mode

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	23.37	23.03	418.179	26.21	30	Pass
40	5200	26.68	26.19	881.497	29.45	30	Pass
48	5240	25.14	25.06	647.215	28.11	30	Pass
149	5745	26.65	25.86	847.859	29.28	30	Pass
157	5785	26.88	25.99	884.72	29.47	30	Pass
165	5825	26.94	26.19	910.222	29.59	30	Pass

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	22.26	22.09	330.075	25.19	30	Pass
40	5200	25.82	25.84	765.651	28.84	30	Pass
48	5240	24.98	24.89	623.094	27.95	30	Pass
149	5745	26.26	26.77	898.004	29.53	30	Pass
157	5785	26.48	26.86	929.92	29.68	30	Pass
165	5825	26.48	26.70	912.366	29.60	30	Pass

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	20.08	19.44	189.761	22.78	30	Pass
46	5230	24.14	23.91	505.455	27.04	30	Pass
151	5755	26.77	26.27	898.978	29.54	30	Pass
159	5795	26.10	25.05	727.27	28.62	30	Pass

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	19.37	19.13	168.343	22.26	30	Pass
155	5775	22.74	22.93	384.268	25.85	30	Pass

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	22.52	22.31	348.865	25.43	30	Pass
40	5200	26.09	26.07	811.019	29.09	30	Pass
48	5240	25.23	25.11	657.766	28.18	30	Pass
149	5745	26.50	27.05	953.675	29.79	30	Pass
157	5785	26.74	27.08	982.568	29.92	30	Pass
165	5825	26.71	26.90	958.592	29.82	30	Pass

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	20.33	19.71	201.436	23.04	30	Pass
46	5230	24.35	24.16	532.885	27.27	30	Pass
151	5755	26.99	26.50	946.719	29.76	30	Pass
159	5795	26.34	25.29	768.592	28.86	30	Pass

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	19.62	19.38	178.318	22.51	30	Pass
155	5775	22.97	23.17	405.644	26.08	30	Pass

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	22.26	22.09	330.075	25.19	29.70	Pass
40	5200	25.82	25.84	765.651	28.84	29.70	Pass
48	5240	24.98	24.89	623.094	27.95	29.70	Pass
149	5745	26.00	25.00	714.335	28.54	28.90	Pass
157	5785	26.00	25.18	727.717	28.62	28.90	Pass
165	5825	26.06	24.92	714.101	28.54	28.90	Pass

Note: 1. For U-NII-1: The directional gain is 6.3 dBi > 6 dBi, so the power limit shall be reduced to 30-(6.3-6) = 29.7 dBm.
2. For U-NII-3: The directional gain is 7.1 dB > 6 dBi, so the power limit shall be reduced to 30-(7.1-6) = 28.9 dBm.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	20.08	19.44	189.761	22.78	29.70	Pass
46	5230	24.14	23.91	505.455	27.04	29.70	Pass
151	5755	25.89	25.13	713.987	28.54	28.90	Pass
159	5795	26.11	25.04	727.473	28.62	28.90	Pass

Note: 1. For U-NII-1: The directional gain is 6.3 dBi > 6 dBi, so the power limit shall be reduced to 30-(6.3-6) = 29.7 dBm.
2. For U-NII-3: The directional gain is 7.1 dB > 6 dBi, so the power limit shall be reduced to 30-(7.1-6) = 28.9 dBm.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	19.37	19.13	168.343	22.26	29.70	Pass
155	5775	22.74	22.93	384.268	25.85	28.90	Pass

Note: 1. For U-NII-1: The directional gain is 6.3 dBi > 6 dBi, so the power limit shall be reduced to 30-(6.3-6) = 29.7 dBm.
2. For U-NII-3: The directional gain is 7.1 dB > 6 dBi, so the power limit shall be reduced to 30-(7.1-6) = 28.9 dBm.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	22.52	22.31	348.865	25.43	29.70	Pass
40	5200	26.09	26.07	811.019	29.09	29.70	Pass
48	5240	25.23	25.11	657.766	28.18	29.70	Pass
149	5745	26.23	25.22	752.419	28.76	28.90	Pass
157	5785	26.24	25.42	769.064	28.86	28.90	Pass
165	5825	26.31	25.18	757.173	28.79	28.90	Pass

Note: 1. For U-NII-1: The directional gain is 6.3 dBi > 6 dBi, so the power limit shall be reduced to 30-(6.3-6) = 29.7 dBm.
2. For U-NII-3: The directional gain is 7.1 dB > 6 dBi, so the power limit shall be reduced to 30-(7.1-6) = 28.9 dBm.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	20.33	19.71	201.436	23.04	29.70	Pass
46	5230	24.35	24.16	532.885	27.27	29.70	Pass
151	5755	26.15	25.37	756.448	28.79	28.90	Pass
159	5795	26.34	25.29	768.592	28.86	28.90	Pass

Note: 1. For U-NII-1: The directional gain is 6.3 dBi > 6 dBi, so the power limit shall be reduced to 30-(6.3-6) = 29.7 dBm.
2. For U-NII-3: The directional gain is 7.1 dB > 6 dBi, so the power limit shall be reduced to 30-(7.1-6) = 28.9 dBm.

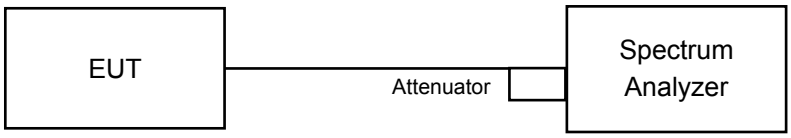
802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	19.62	19.38	178.318	22.51	29.70	Pass
155	5775	22.97	23.17	405.644	26.08	28.90	Pass

Note: 1. For U-NII-1: The directional gain is 6.3 dBi > 6 dBi, so the power limit shall be reduced to 30-(6.3-6) = 29.7 dBm.
2. For U-NII-3: The directional gain is 7.1 dB > 6 dBi, so the power limit shall be reduced to 30-(7.1-6) = 28.9 dBm.

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Results

Non-Beamforming Mode

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.28	17.52
40	5200	21.96	20.52
48	5240	17.52	17.52
149	5745	22.80	21.72
157	5785	19.44	24.24
165	5825	24.12	24.84

802.11ax (HE20)

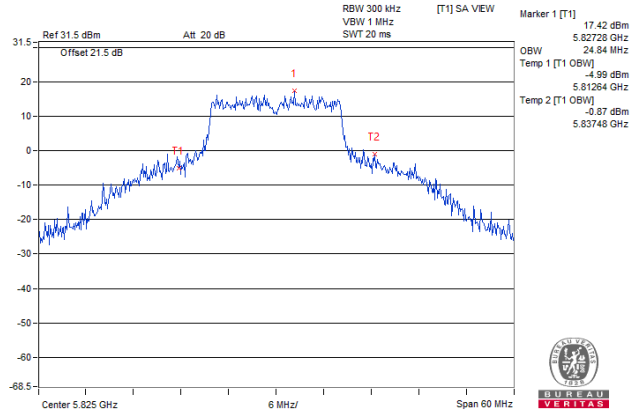
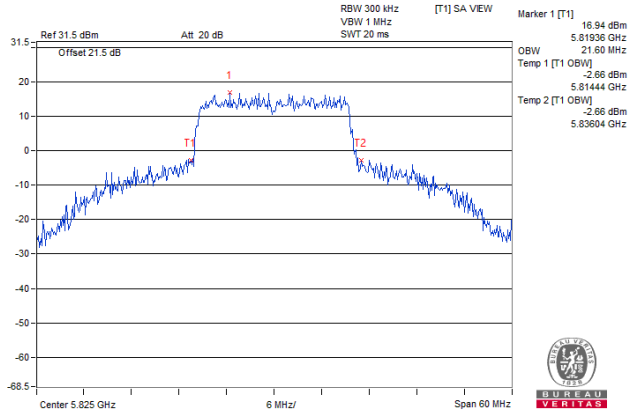
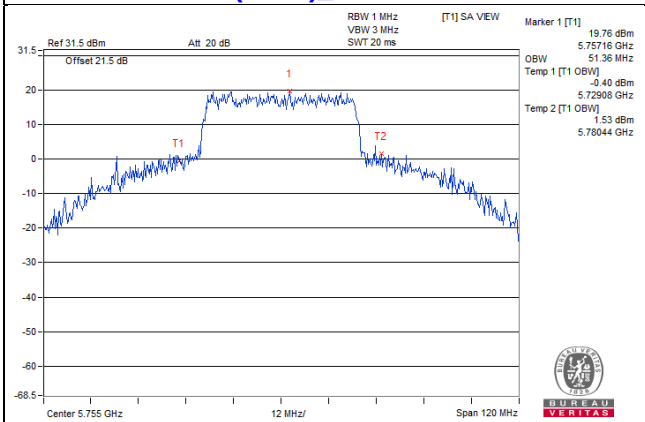
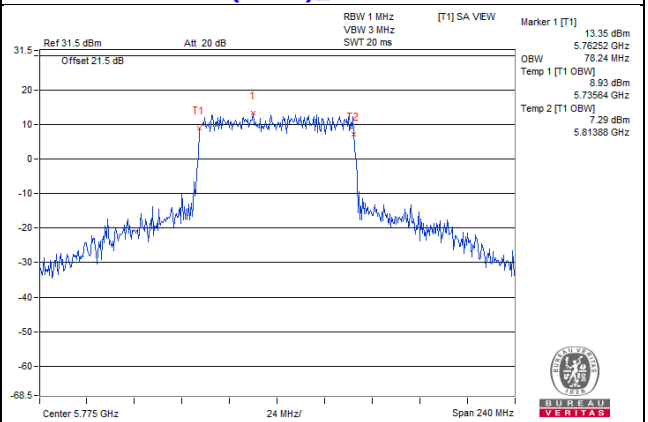
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	19.20	19.20
40	5200	20.88	19.80
48	5240	19.56	19.44
149	5745	21.00	20.16
157	5785	20.88	21.48
165	5825	20.88	21.60

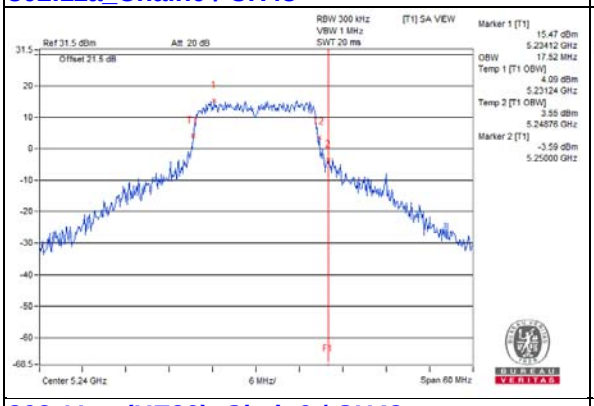
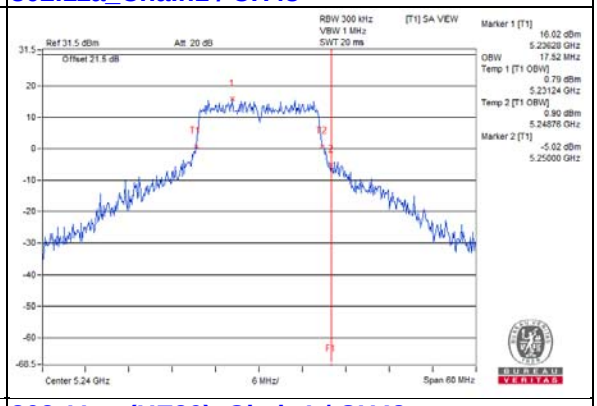
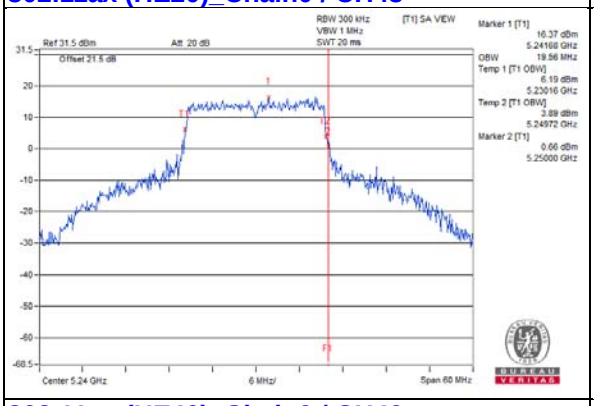
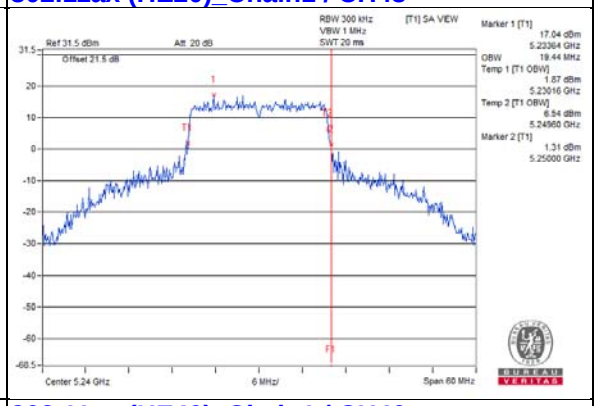
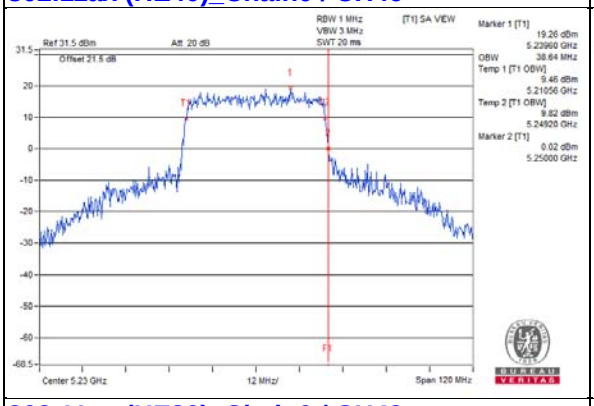
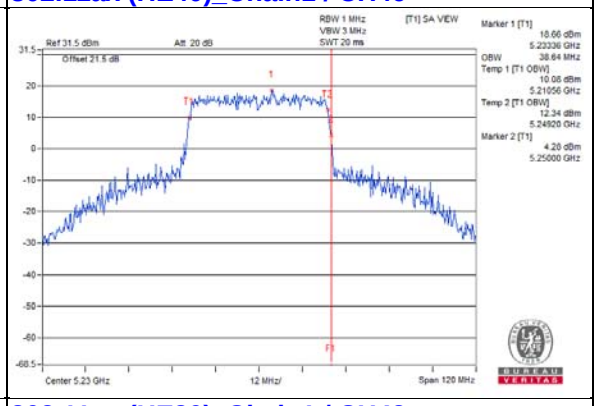
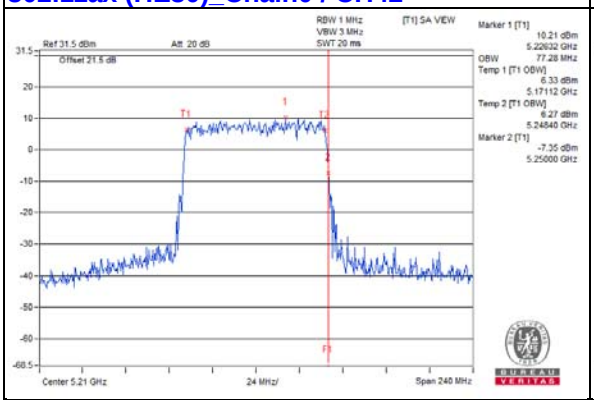
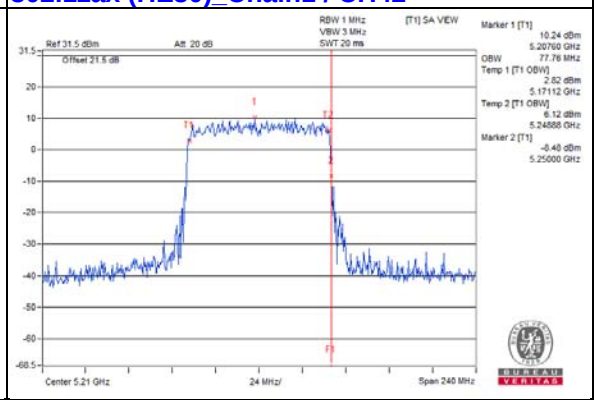
802.11ax (HE40)

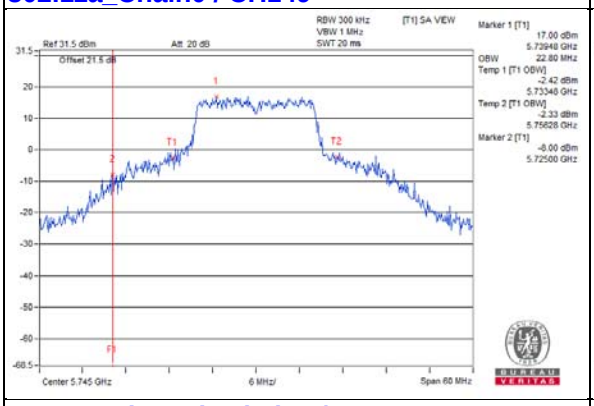
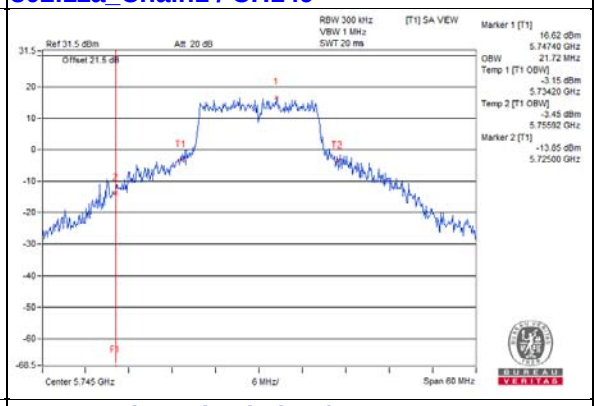
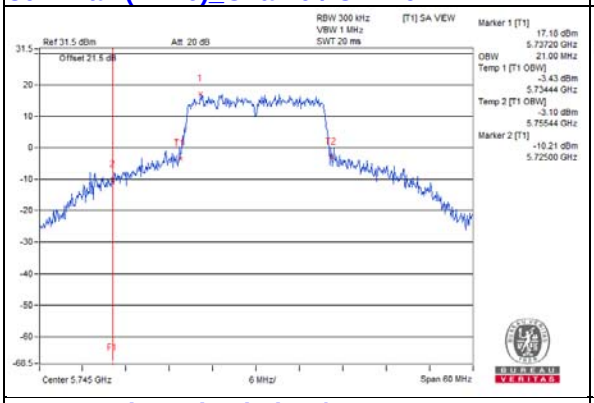
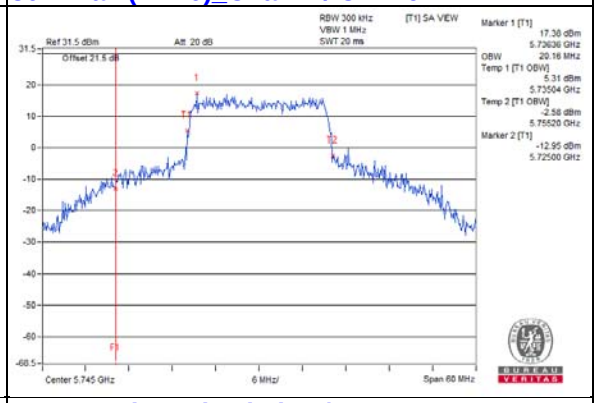
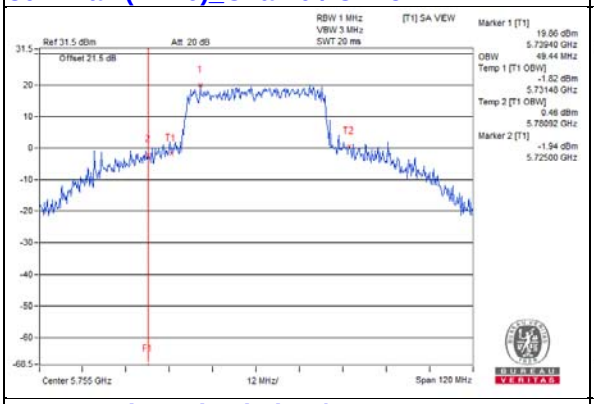
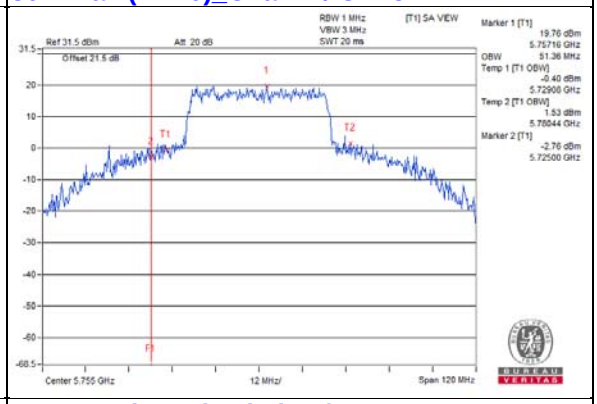
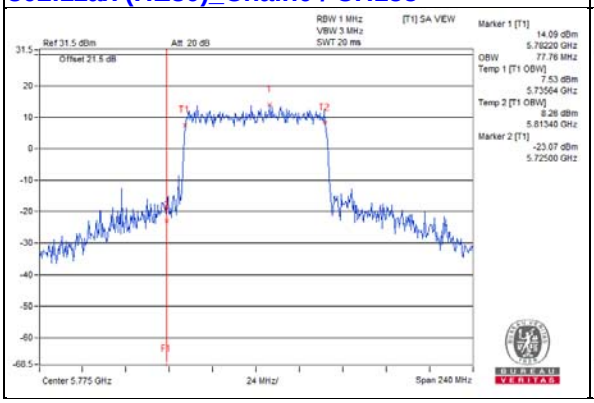
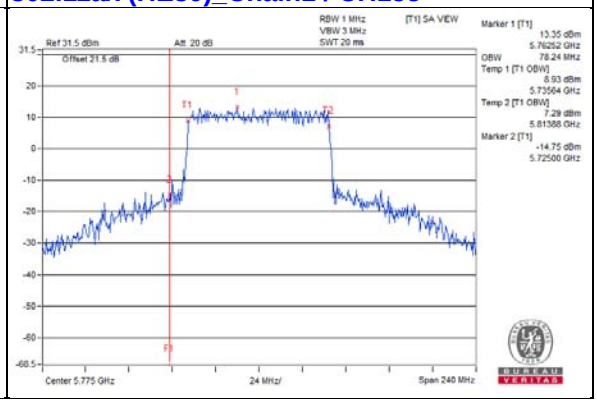
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	38.40	38.40
46	5230	38.64	38.64
151	5755	49.44	51.36
159	5795	47.52	42.24

802.11ax (HE80)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	77.28	77.76
155	5775	77.76	78.24

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

Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2A band)	
802.11a_Chain0 / CH48	**802.11a_Chain1 / CH48**
	
802.11ax (HE20)_Chain0 / CH48	**802.11ax (HE20)_Chain1 / CH48**
	
802.11ax (HE40)_Chain0 / CH46	**802.11ax (HE40)_Chain1 / CH46**
	
802.11ax (HE80)_Chain0 / CH42	**802.11ax (HE80)_Chain1 / CH42**
	

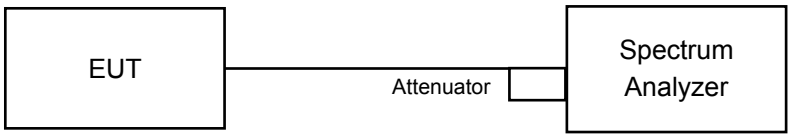
Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2C band)	
802.11a_Chain0 / CH149	**802.11a_Chain1 / CH149**
	
802.11ax (HE20)_Chain0 / CH149	**802.11ax (HE20)_Chain1 / CH149**
	
802.11ax (HE40)_Chain0 / CH151	**802.11ax (HE40)_Chain1 / CH151**
	
802.11ax (HE80)_Chain0 / CH155	**802.11ax (HE80)_Chain1 / CH155**
	

4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For U-NII-1 band:

For 801.11a, 802.11ax (HE20)

Using method SA-1

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

For 801.11ax (HE40), 802.11ax (HE80)

Using method SA-2

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

For U-NII-3 band:

For 801.11a, 802.11ax (HE20)

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

For 801.11ax (HE40), 802.11ax (HE80)

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

Non-Beamforming Mode

For U-NII-1:

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
36	5180	10.23	9.77	13.02	16.70	Pass
40	5200	13.38	12.34	15.90	16.70	Pass
48	5240	11.41	11.17	14.30	16.70	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = 6.3 dBi > 6dBi, so the power density limit shall be reduced to 17-(6.3-6) = 16.7 dBm.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
36	5180	8.79	8.44	11.63	16.70	Pass
40	5200	12.36	11.61	15.01	16.70	Pass
48	5240	11.03	11.31	14.18	16.70	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = 6.3 dBi > 6dBi, so the power density limit shall be reduced to 17-(6.3-6) = 16.7 dBm.

802.11ax (HE40)

Chan.	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				
38	5190	4.01	3.01	0.10	6.65	16.70	Pass
46	5230	7.97	7.55	0.10	10.88	16.70	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = 6.3 dBi > 6dBi, so the power density limit shall be reduced to 17-(6.3-6) = 16.7 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

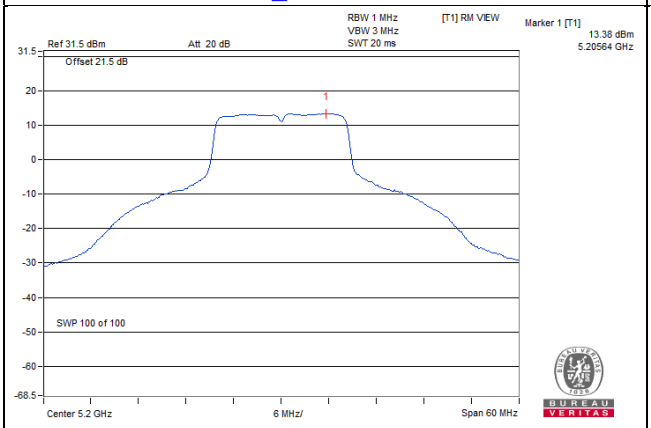
802.11ax (HE80)

Chan.	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				
42	5210	-0.12	-0.78	0.20	2.77	16.70	Pass

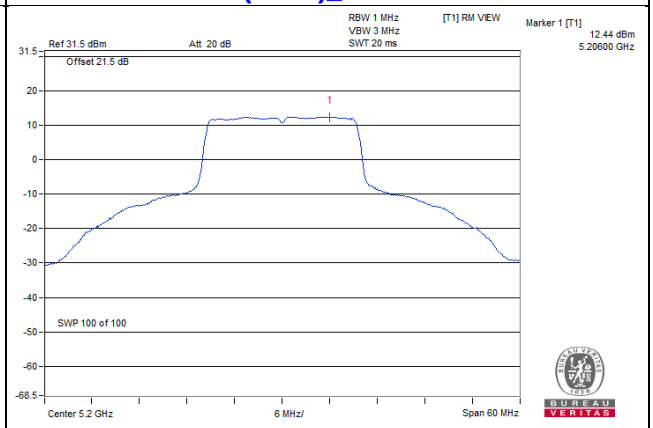
Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = 6.3 dBi > 6dBi, so the power density limit shall be reduced to 17-(6.3-6) = 16.7 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

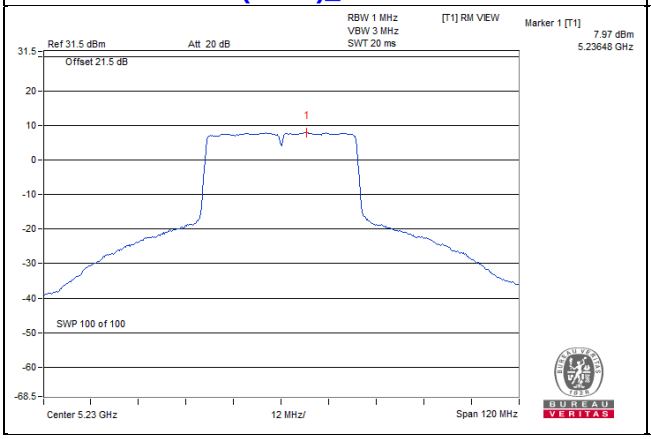
802.11a_Chain 0 / CH40



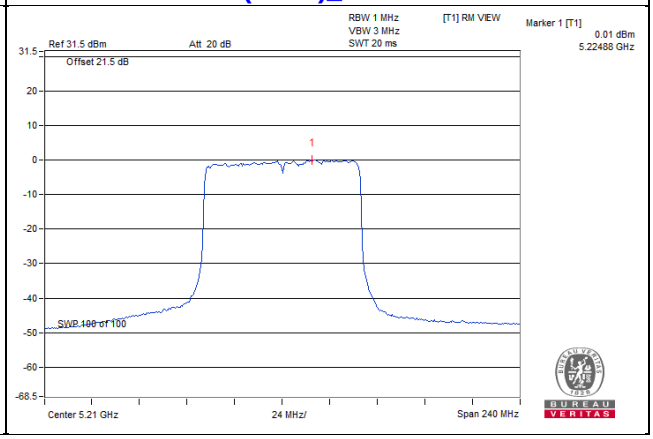
802.11ax (HE20)_Chain 0 / CH40



802.11ax (HE40)_Chain 0 / CH46



802.11ax (HE80)_Chain 0 / CH42



For U-NII-3:

802.11a

Chan.	Freq. (MHz)	PSD (dBm/300kHz)		Total PSD		Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	dBm/300kHz	dBm/500kHz		
149	5745	4.97	4.25	7.64	9.86	28.90	Pass
157	5785	3.82	4.10	6.97	9.19	28.90	Pass
165	5825	4.26	4.14	7.21	9.43	28.90	Pass

Note: 1. Method b) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = 7.1 dBi > 6dBi, so the power density limit shall be reduced to 30-(7.1-6) = 28.9 dBm.

802.11ax (HE20)

Chan.	Freq. (MHz)	PSD (dBm/300kHz)		Total PSD		Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	dBm/300kHz	dBm/500kHz		
149	5745	3.31	2.69	6.02	8.24	28.90	Pass
157	5785	2.84	2.65	5.76	7.98	28.90	Pass
165	5825	2.54	2.47	5.52	7.74	28.90	Pass

Note: 1. Method b) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = 7.1 dBi > 6dBi, so the power density limit shall be reduced to 30-(7.1-6) = 28.9 dBm.

802.11ax (HE40)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)		Duty Factor (dB)	Total PSD With Duty Factor		Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1		dBm/300kHz	dBm/500kHz		
151	5755	0.94	0.27	0.10	3.72	5.94	28.90	Pass
159	5795	0.43	-0.12	0.10	3.27	5.49	28.90	Pass

Note: 1. Method b) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = 7.1 dBi > 6dBi, so the power density limit shall be reduced to 30-(7.1-6) = 28.9 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

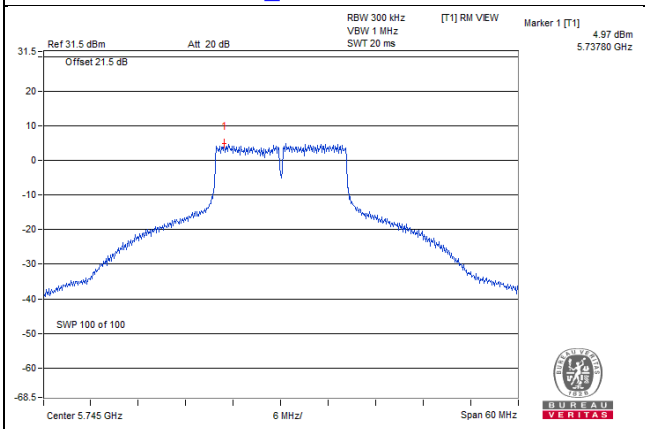
802.11ax (HE80)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)		Duty Factor (dB)	Total PSD With Duty Factor		Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1		dBm/300kHz	dBm/500kHz		
155	5775	-5.22	-5.70	0.20	-2.24	-0.02	28.90	Pass

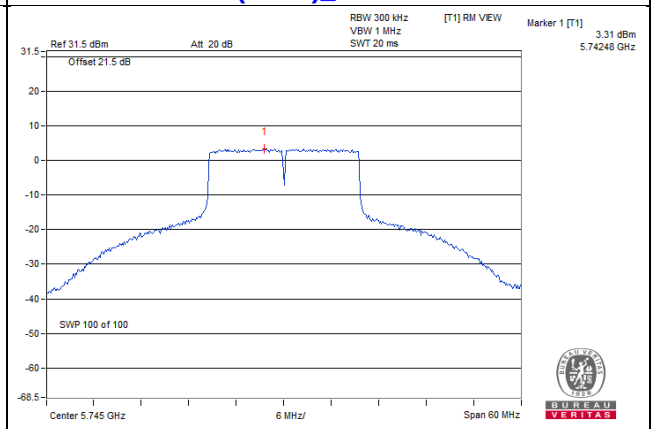
Note: 1. Method b) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = 7.1 dBi > 6dBi, so the power density limit shall be reduced to 30-(7.1-6) = 28.9 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

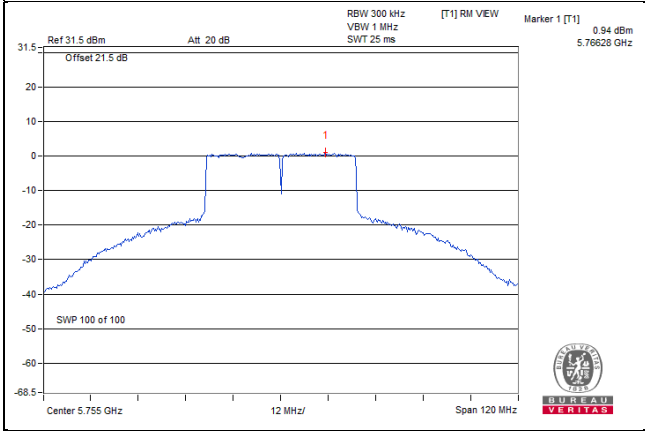
802.11a_Chain 0 / CH149



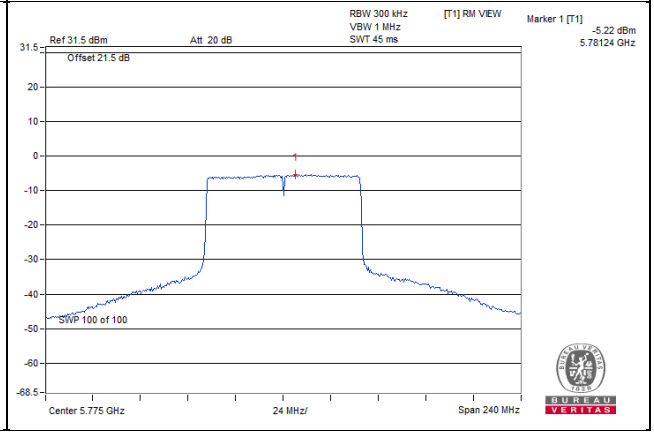
802.11ax (HE20)_Chain 0 / CH149



802.11ax (HE40)_Chain 0 / CH151



802.11ax (HE80)_Chain 0 / CH155

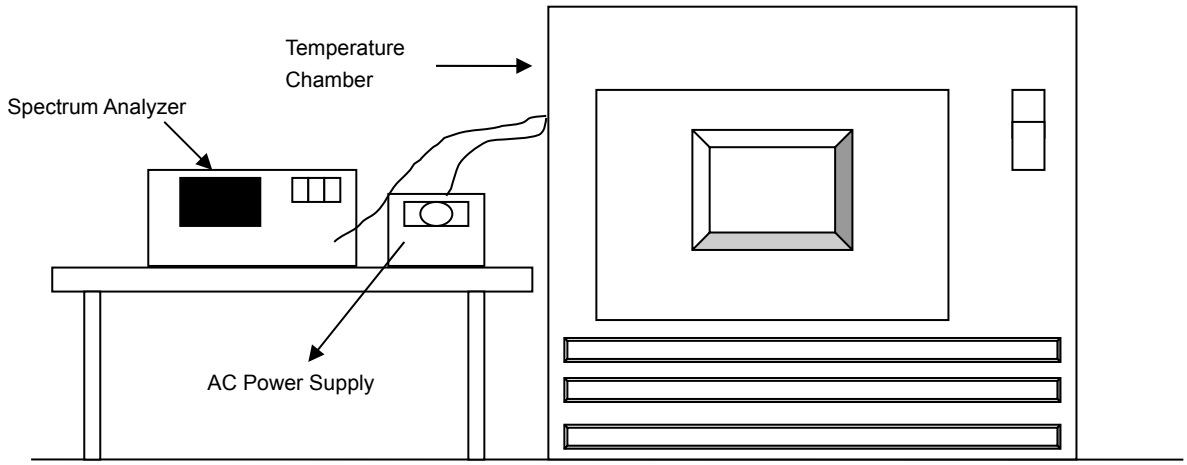


4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

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

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

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

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

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

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
40	120	5180.0127	Pass	5180.0117	Pass	5180.0084	Pass	5180.0097	Pass
30	120	5179.9965	Pass	5179.9971	Pass	5179.9978	Pass	5179.9982	Pass
20	120	5179.9779	Pass	5179.9733	Pass	5179.9752	Pass	5179.975	Pass
10	120	5180.0124	Pass	5180.0147	Pass	5180.0139	Pass	5180.0111	Pass
0	120	5179.9936	Pass	5179.9933	Pass	5179.9907	Pass	5179.9917	Pass

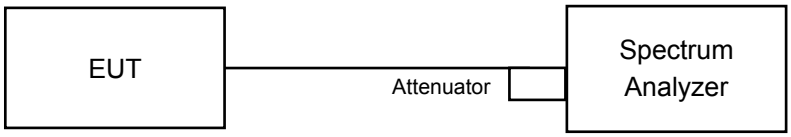
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5179.9787	Pass	5179.9738	Pass	5179.9744	Pass	5179.9757	Pass
	120	5179.9779	Pass	5179.9733	Pass	5179.9752	Pass	5179.975	Pass
	102	5179.9777	Pass	5179.9737	Pass	5179.9743	Pass	5179.9749	Pass

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

Non-Beamforming Mode

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.42	16.40	0.5	Pass
157	5785	16.40	16.39	0.5	Pass
165	5825	16.39	16.37	0.5	Pass

802.11ax (HE20)

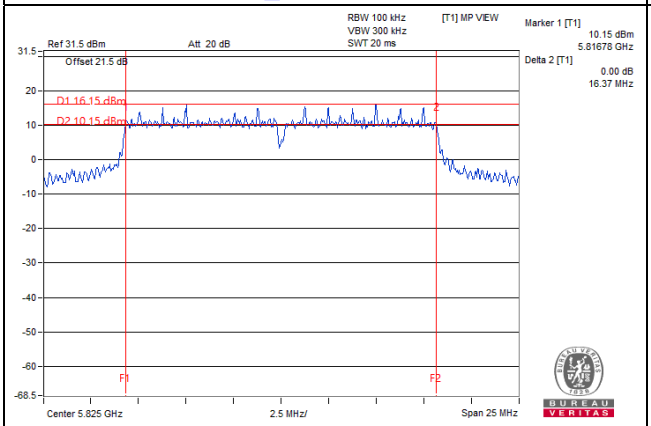
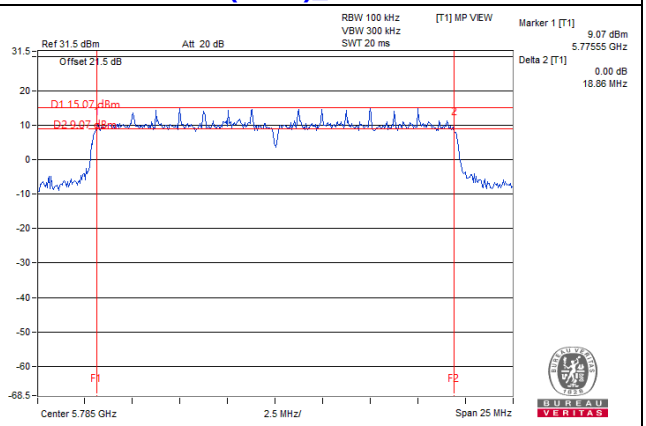
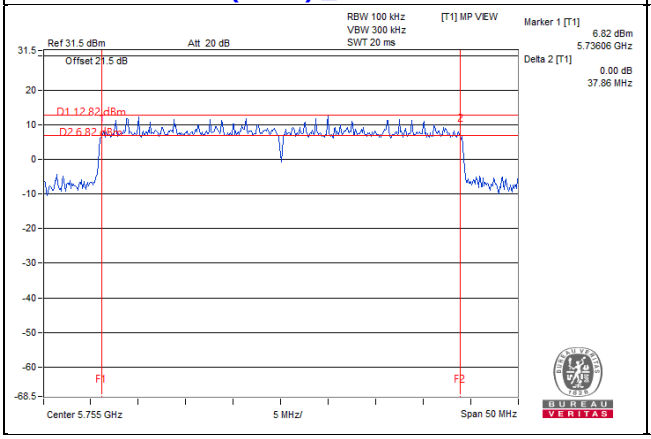
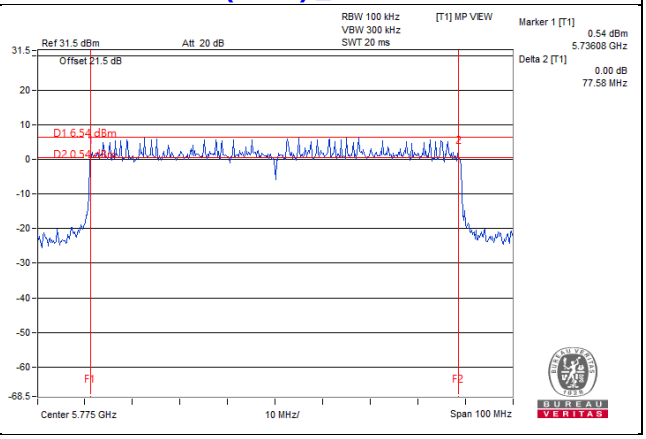
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	19.08	19.00	0.5	Pass
157	5785	18.89	18.86	0.5	Pass
165	5825	18.93	18.89	0.5	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	38.16	37.86	0.5	Pass
159	5795	37.87	38.20	0.5	Pass

802.11ax (HE80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	78.00	77.58	0.5	Pass

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

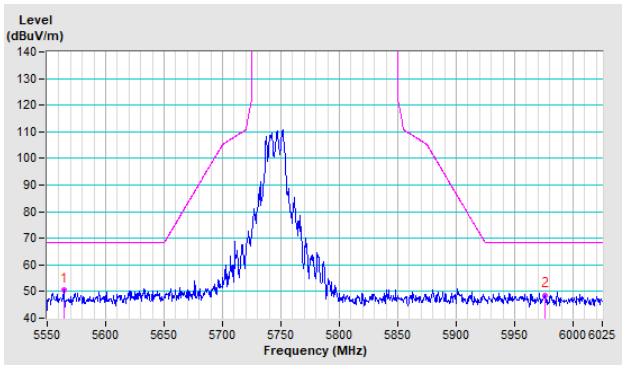
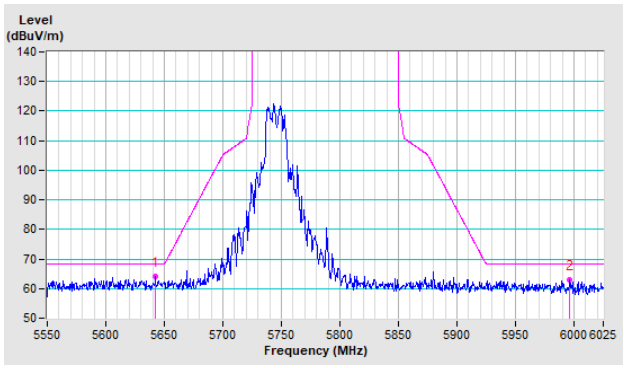
5 Pictures of Test Arrangements

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

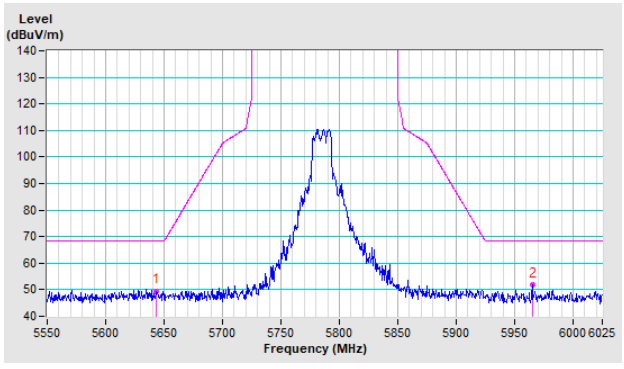
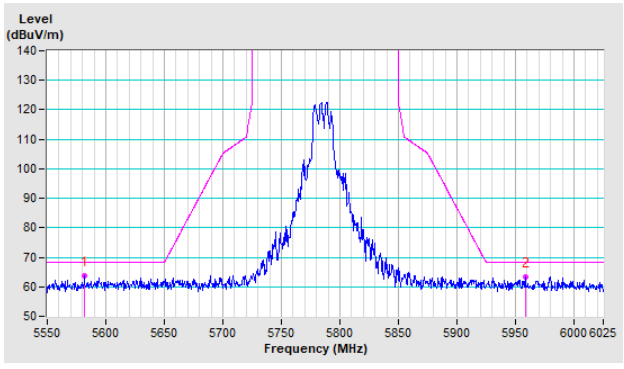
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

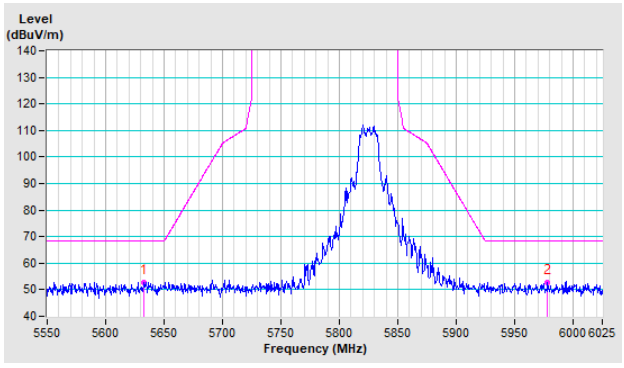
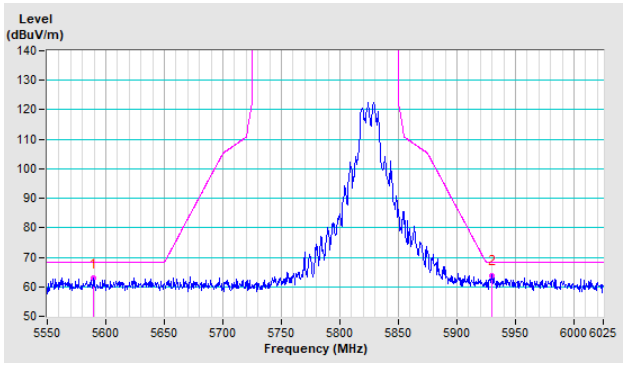
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

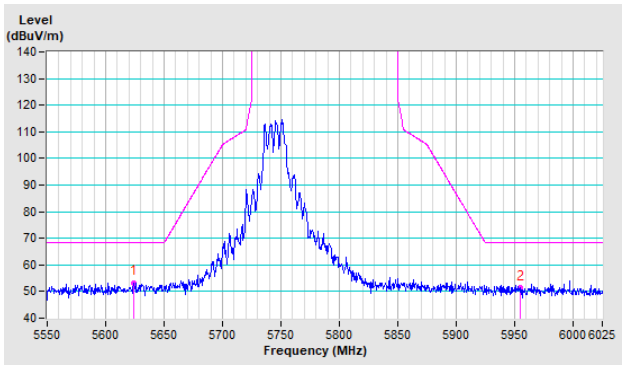
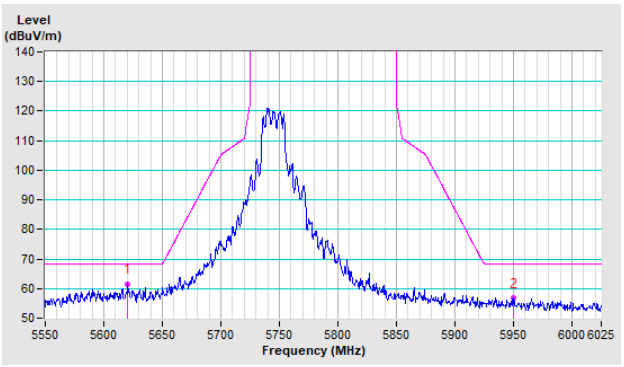
Horizontal	Vertical
	

CH 165 5825 MHz

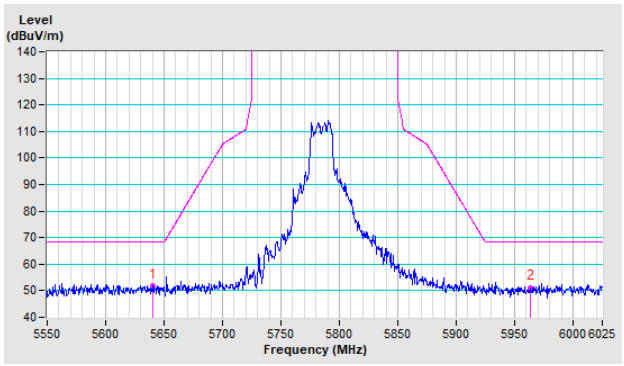
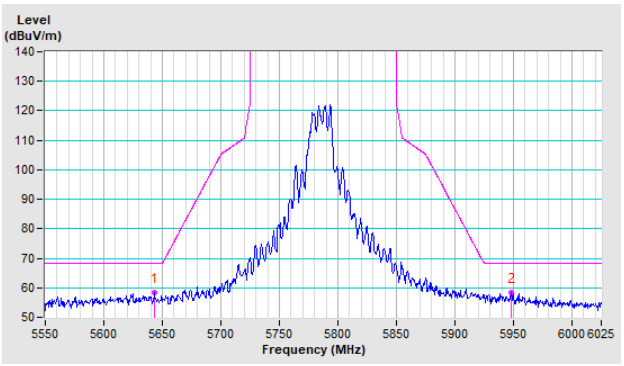
Horizontal	Vertical
	

802.11ax (HE20)

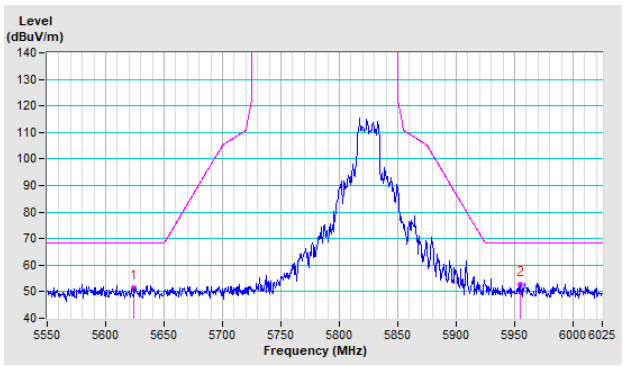
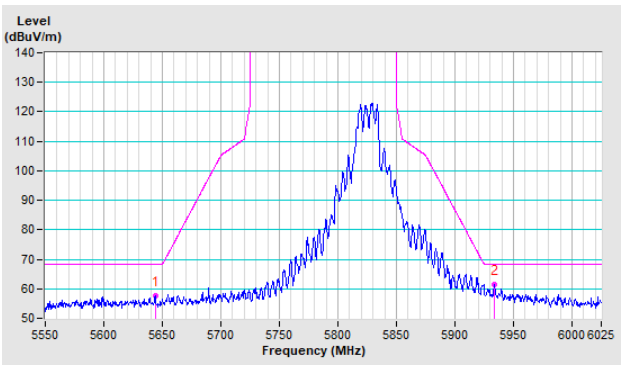
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

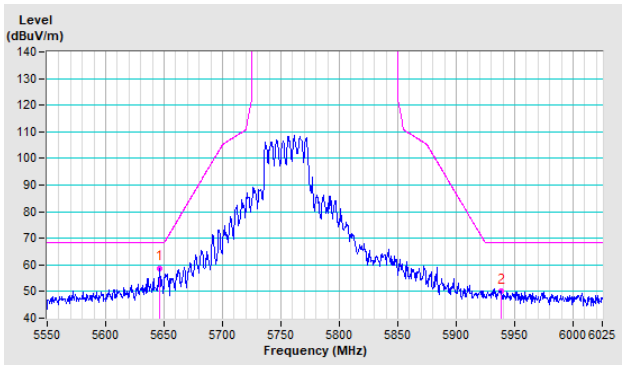
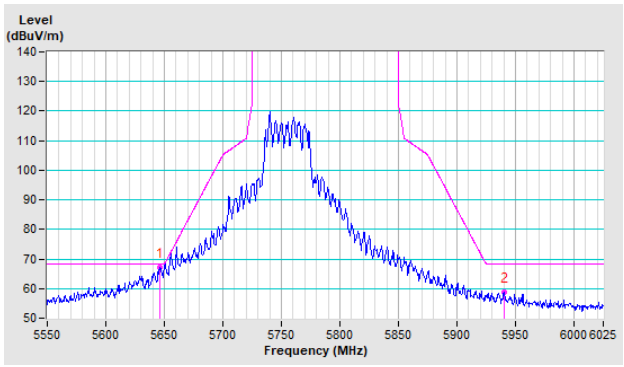
Horizontal	Vertical
	

CH 165 5825 MHz

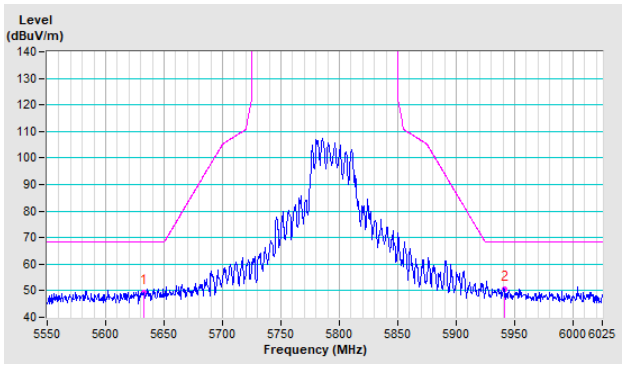
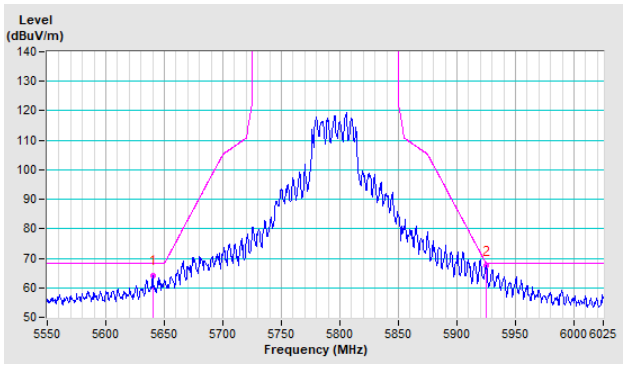
Horizontal	Vertical
	

802.11ax (HE40)

CH 151 5755 MHz

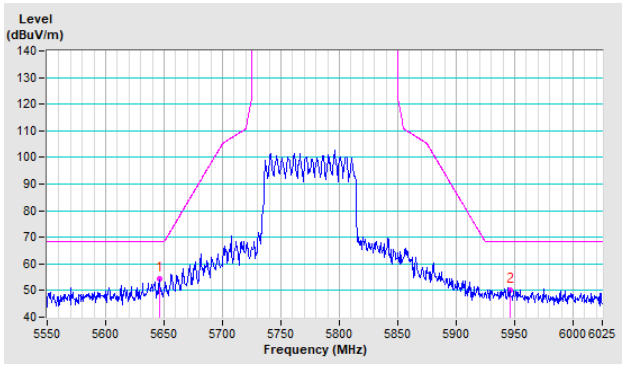
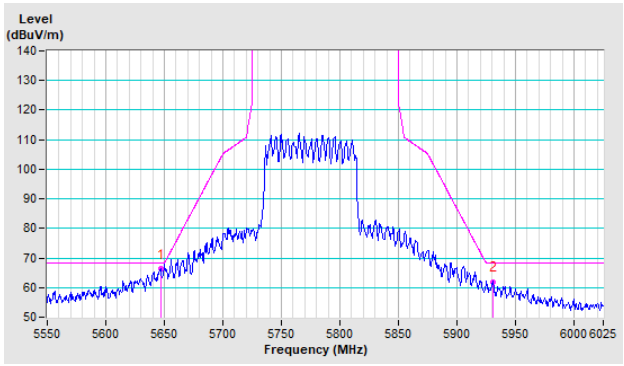
Horizontal	Vertical
	

CH 159 5795 MHz

Horizontal	Vertical
	

802.11ax (HE80)

CH 155 5775 MHz

Horizontal	Vertical
	

Appendix – Information of the Testing Laboratories

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

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

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

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