FCC Test Report (WLAN)

Report No.:	RF191227E08-1
FCC ID:	Q87-08151
Test Model:	MR7350
Series Model:	MR7340, MR7320, MR7310
Received Date:	Dec. 27, 2019
Test Date:	Dec. 27, 2019 to Feb. 25, 2020
Issued Date:	Mar. 19, 2020
Applicant:	LINKSYS LLC
Address:	121 Theory Drive Irvine California 92617 United States
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

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF191227E08-1	Original release.	Mar. 19, 2020

1 Certificate of Conformity

Product:	Linksys Dual-Band 802.11ax Wireless Router
Brand:	Linksys
Test Model:	MR7350
Series Model:	MR7340, MR7320, MR7310
Sample Status:	ENGINEERING SAMPLE
Applicant:	LINKSYS LLC
Test Date:	Dec. 27, 2019 to Feb. 25, 2020
Standard:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10: 2013

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

Prepared by : Phoenix Huang , **Date:** Mar. 19, 2020

Phoenix Huang / Specialist

Approved by : , **Date:** Mar. 19, 2020

Clark Lin / Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -11.26 dB at 0.16172 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 -1.0 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 (WLAN)

Product	Linksys Dual-Band 802.11ax Wireless Router
Brand	Linksys
Test Model	MR7350
Series Model	MR7340, MR7320, MR7310
Status of EUT	ENGINEERING SAMPLE
Driver version	v0.e.10
Test Software Version	qdart_conn.win.1.0_installer_00073.2 for CDD mode; paste Hyperterminal MR7350 TxBf EMI command for Beamforming mode
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 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, 802.11ax (HE20): 11 802.11n (HT40), VHT40, 802.11ax (HE40): 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 9 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 4 802.11ac (VHT80), 802.11ax (HE80): 2
Output Power	**CDD Mode:** **2.412 ~ 2.462 GHz:** 974.252 mW **5.18 ~ 5.24 GHz:** 918.001 mW **5.745 ~ 5.825 GHz:** 958.805 mW **Beamforming Mode:** **2.412 ~ 2.462 GHz:** 902.701 mW **5.18 ~ 5.24 GHz:** 763.779 mW **5.745 ~ 5.825 GHz:** 909.87 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	RJ-45 Cable x 1 (Unshielded, 1 m)

Note:

1. The EUT has below model names, which are identical to each other in all aspects except for the following table:

Brand Name	Model No.	Description
Linksys	MR7350	For Marketing Purpose
	MR7340	
	MR7320	
	MR7310	
Note: From the above models, model: MR7350 was selected as representative model for the test and its data was recorded in this report.		

2. The EUT has below radios as following table:

Radio 1	Radio 2
WLAN (2.4GHz+5GHz)	Bluetooth

3. Simultaneously transmission condition.

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

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

No.	Brand	Model No.	Spec.
1	Ktec	KSA-24W-120200HU	Input: 100-240Vac, 0.6A, 50/60Hz Output: 12V, 2A DC output cable: Unshielded, 1.5m
2	APD	WB-24J12FU	Input: 100-240Vac, 0.7A, 50-60Hz Output: 12V, 2A DC output cable: Unshielded, 1.5m
Note: From the above adapters, the AC Power Conducted Emission and Radiated Emissions test worse case was found in **Adapter No. 2**. Therefore only the test data of the mode was recorded in this report.			

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

Antenna No.	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connecteor Type	Cable Length (mm)
WiFi 1	2.05	2.4~2.4835	Dipole	i-pex(MHF)	330
	2.44	5.15~5.25			
	2.71	5.25~5.35			
	3.07	5.47~5.725			
	3.02	5.725~5.85			
WiFi 2	2.39	2.4~2.4835	Dipole	i-pex(MHF)	80
	3.07	5.15~5.25			
	3.03	5.25~5.35			
	3.08	5.47~5.725			
	3.13	5.725~5.85			
BT	3.6	2.4~2.4835	Metal	none	NA

6. The EUT incorporates a MIMO function:

2.4GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11b	2TX	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 CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz), 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/ac mode is the same as the 802.11ax or more lower than it and investigated worst case to representative mode in test report. (Final test mode refer to section 3.2.1)

7. The power setting are list as below:

802.11a		802.11ac (VHT20)		802.11ac (VHT40)		802.11ac (VHT80)		802.11ax (HE20)		802.11ax (HE40)		802.11ax (HE80)	
Freq. (MHz)	Power Setting	Freq. (MHz)	Power Setting	Freq. (MHz)	Power Setting	Freq. (MHz)	Power Setting	Freq. (MHz)	Power Setting	Freq. (MHz)	Power Setting	Freq. (MHz)	Power Setting
5180	20	5180	23	5190	20	5210	19	5180	23	5190	20	5210	19
5200	23.5	5200	26	5230	25	5775	25	5200	26	5230	25	5775	25
5240	23	5240	24	5755	25			5240	24	5755	25		
5745	23.5	5745	25	5795	25			5745	25	5795	25		
5785	23.5	5785	25					5785	25				
5825	23.5	5825	25					5825	25				

8. 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 ~ 5250MHz

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	5210MHz

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

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

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

Note: The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **X-plane.**

Radiated Emission Test (Above 1GHz):

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

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

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

Radiated Emission Test (Below 1GHz):

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

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11a	5180-5240 5745-5825	36 to 48 149 to 165	157	OFDM	BPSK	6Mb/s

Power Line Conducted Emission Test:

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11a	5180-5240 5745-5825	36 to 48 149 to 165	157	OFDM	BPSK	6Mb/s

Antenna Port Conducted Measurement:

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

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

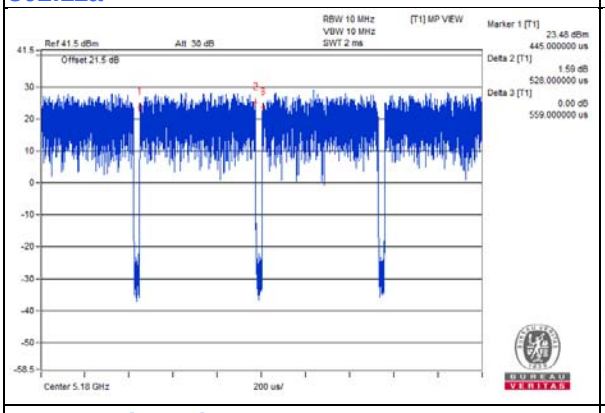
Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	25deg. C, 67%RH, 24deg. C, 68%RH	120Vac, 60Hz	Jeff Lee, Kevin Ko
RE<1G	23deg. C, 65%RH	120Vac, 60Hz	Tom Yang
PLC	25deg. C, 75%RH	120Vac, 60Hz	Kevin Ko
APCM	21deg. C, 59%RH	120Vac, 60Hz	Andy Ho

3.3 Duty Cycle of Test Signal

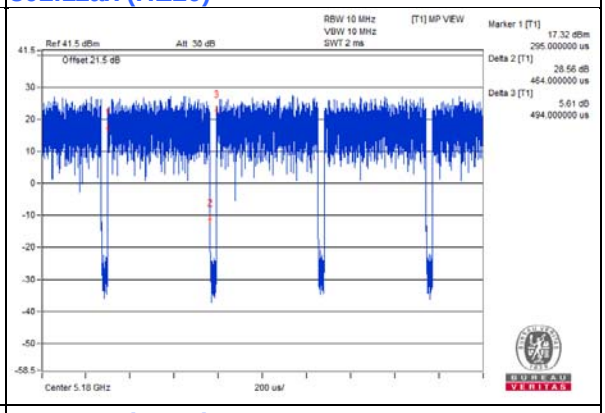
Duty cycle of test signal is < 98%, duty factor shall be considered.

802.11a: Duty cycle = 0.528 ms/0.559 ms = 0.945, Duty factor = 10 * log (1/Duty cycle) = 0.25 dB
802.11ax (HE20): Duty cycle = 0.464 ms/0.494 ms = 0.939, Duty factor = 10 * log (1/Duty cycle) = 0.27 dB
802.11ax (HE40): Duty cycle = 0.684 ms/0.717 ms = 0.954, Duty factor = 10 * log (1/Duty cycle) = 0.2 dB
802.11ax (HE80): Duty cycle = 0.685 ms/0.717 ms = 0.955, Duty factor = 10 * log (1/Duty cycle) = 0.2 dB

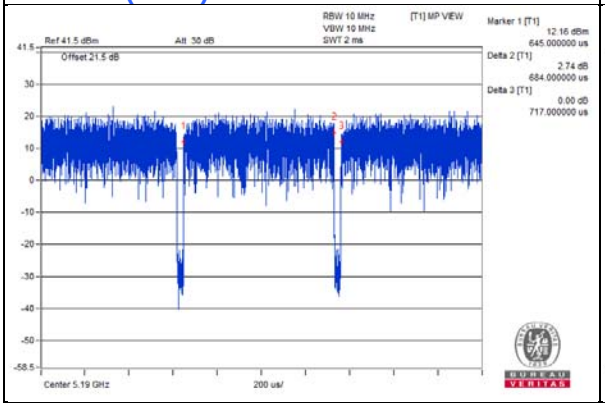
802.11a



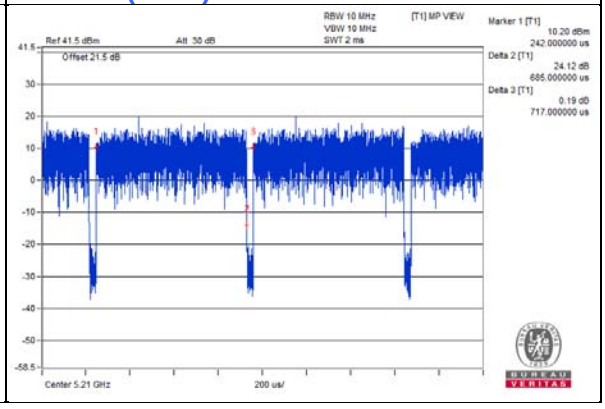
802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)



3.4 Description of Support Units

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

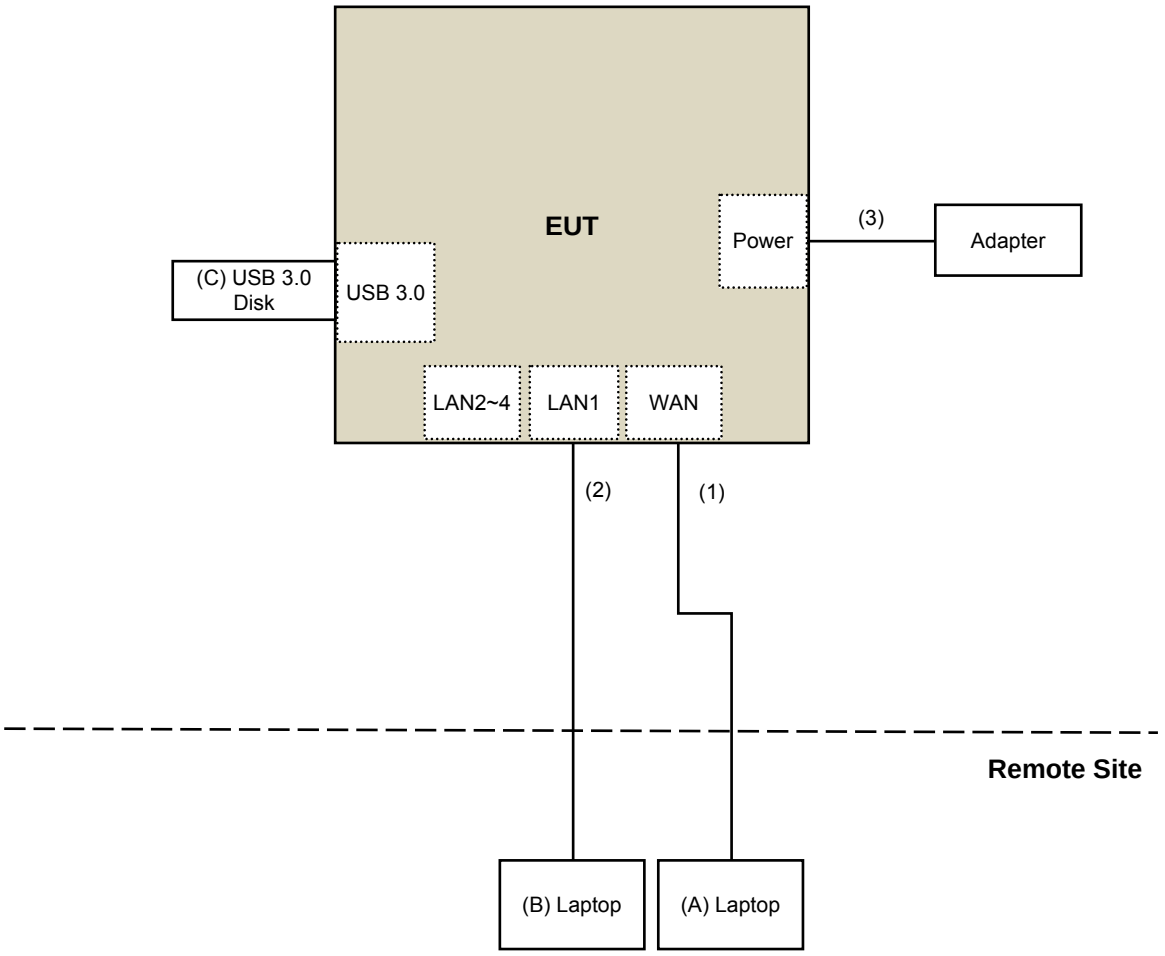
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
B.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
C.	USB 3.0 Disk	SanDisk	BM181225896Z	NA	NA	Provided by Lab

Note:

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

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

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

For OOBE test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	Dec. 13, 2019	Dec. 12, 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

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. Tested Date: Dec. 27, 2019

For Radiated Emission below 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	Dec. 13, 2019	Dec. 12, 2020
Pre-Amplifier EMCI	EMC001340	980142	May 30, 2019	May 29, 2020
Loop Antenna Electro-Metrics	EM-6879	269	Sep. 16, 2019	Sep. 15, 2020
RF Cable	NA	LOOPCAB-001	Jan. 08, 2020	Jan. 07, 2021
RF Cable	NA	LOOPCAB-002	Jan. 08, 2020	Jan. 07, 2021
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-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
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Jan. 14, 2020

For Frequency Stability test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	100964	June 04, 2019	June 03, 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. 16, 2020	Jan. 15, 2021
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: Feb. 25, 2020

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	Dec. 13, 2019	Dec. 12, 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. 15, 2020	Jan. 14, 2021
RF Cable	104 RF cable	131215	Jan. 09, 2020	Jan. 08, 2021
RF Cable	EMC104-SM-SM-6000	180418	May 03, 2019	May 02, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 15, 2020	Jan. 14, 2021
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
RF Cable	EMC102-KM-KM-1200	160924	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC102-KM-KM-4500	181205	Aug. 26, 2019	Aug. 25, 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

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. Tested Date: Jan. 15 to Feb. 25, 2020

4.1.3 Test Procedure

For Radiated emission below 30MHz

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

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

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

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

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

Note:

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

For Radiated emission above 30MHz

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

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

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

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

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

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

Note:

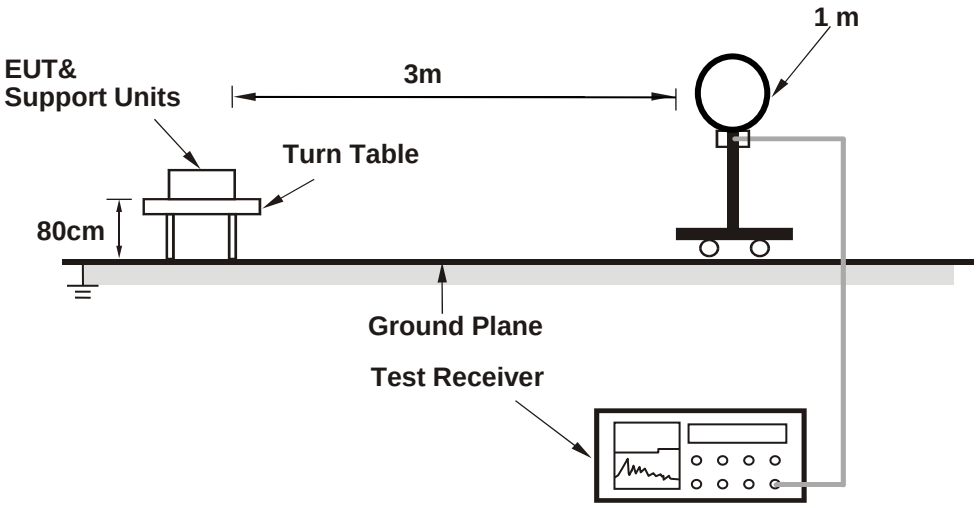
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

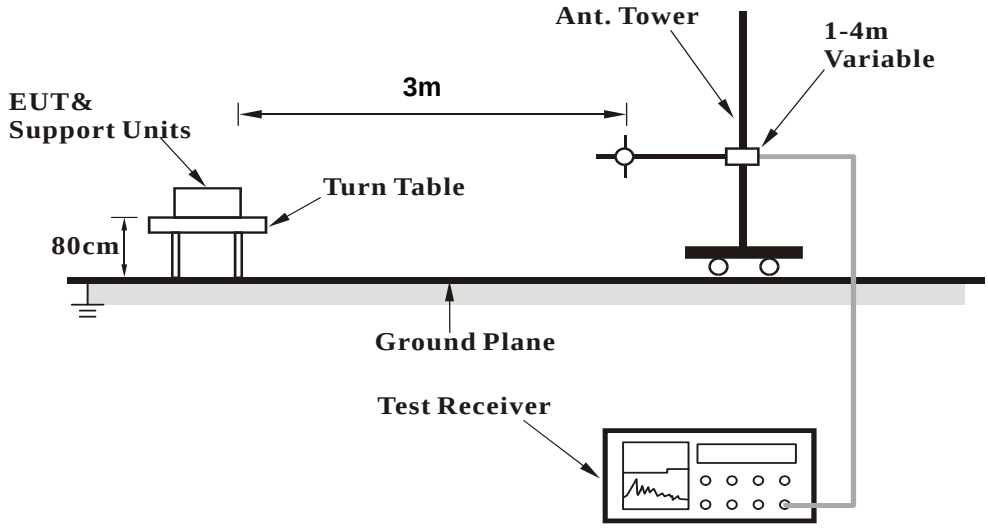
No deviation.

4.1.5 Test Setup

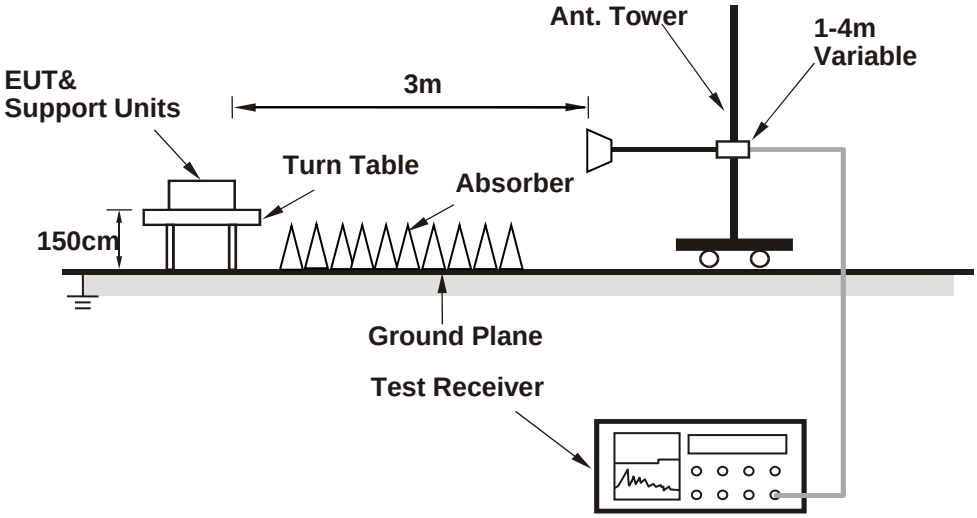
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

a. Connected the EUT with the Laptop which is placed on remote site.
b. Controlling software (qdart_conn.win.1.0_installer_00073.2 for CDD mode; paste Hyperterminal MR7350 TxBf EMI command for Beamforming mode) has been activated to set the EUT under transmission condition continuously.

4.1.7 Test Results

Above 1GHz Data:

CDD Mode

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	51.4 PK	74.0	-22.6	1.50 H	344	48.3	3.1
2	5150.00	41.6 AV	54.0	-12.4	1.50 H	344	38.5	3.1
3	*5180.00	108.3 PK			1.50 H	344	105.2	3.1
4	*5180.00	99.7 AV			1.50 H	344	96.6	3.1
5	#10360.00	45.7 PK	68.2	-22.5	3.18 H	213	32.8	12.9
6	15540.00	55.8 PK	74.0	-18.2	2.18 H	200	42.5	13.3
7	15540.00	44.9 AV	54.0	-9.1	2.18 H	200	31.6	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	60.2 PK	74.0	-13.8	1.48 V	360	57.1	3.1
2	5150.00	52.9 AV	54.0	-1.1	1.48 V	360	49.8	3.1
3	*5180.00	119.4 PK			1.48 V	360	116.3	3.1
4	*5180.00	110.6 AV			1.48 V	360	107.5	3.1
5	#10360.00	46.4 PK	68.2	-21.8	2.15 V	332	33.5	12.9
6	15540.00	61.7 PK	74.0	-12.3	1.11 V	154	48.4	13.3
7	15540.00	49.2 AV	54.0	-4.8	1.11 V	154	35.9	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	51.1 PK	74.0	-22.9	1.52 H	332	48.0	3.1
2	5150.00	41.1 AV	54.0	-12.9	1.52 H	332	38.0	3.1
3	*5200.00	116.4 PK			1.52 H	332	113.4	3.0
4	*5200.00	104.2 AV			1.52 H	332	101.2	3.0
5	#10400.00	46.7 PK	68.2	-21.5	1.82 H	268	33.6	13.1
6	15600.00	56.9 PK	74.0	-17.1	1.69 H	13	43.8	13.1
7	15600.00	45.6 AV	54.0	-8.4	1.69 H	13	32.5	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	61.9 PK	74.0	-12.1	1.73 V	12	58.8	3.1
2	5150.00	52.4 AV	54.0	-1.6	1.73 V	12	49.3	3.1
3	*5200.00	122.7 PK			1.73 V	12	119.7	3.0
4	*5200.00	113.8 AV			1.73 V	12	110.8	3.0
5	#10400.00	46.1 PK	68.2	-22.1	2.05 V	286	33.0	13.1
6	15600.00	60.8 PK	74.0	-13.2	1.13 V	140	47.7	13.1
7	15600.00	49.8 AV	54.0	-4.2	1.13 V	140	36.7	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	5150.00	47.3 PK	74.0	-26.7	1.46 H	328	44.2	3.1
2	5150.00	36.5 AV	54.0	-17.5	1.46 H	328	33.4	3.1
3	*5240.00	116.3 PK			1.46 H	328	113.4	2.9
4	*5240.00	104.3 AV			1.46 H	328	101.4	2.9
5	5350.00	50.2 PK	74.0	-23.8	1.46 H	328	47.1	3.1
6	5350.00	38.0 AV	54.0	-16.0	1.46 H	328	34.9	3.1
7	#10480.00	44.2 PK	68.2	-24.0	1.80 H	255	31.0	13.2
8	15720.00	56.9 PK	74.0	-17.1	1.66 H	18	44.2	12.7
9	15720.00	45.7 AV	54.0	-8.3	1.66 H	18	33.0	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	5150.00	56.6 PK	74.0	-17.4	1.78 V	10	53.5	3.1
2	5150.00	44.3 AV	54.0	-9.7	1.78 V	10	41.2	3.1
3	*5240.00	122.0 PK			1.78 V	10	119.1	2.9
4	*5240.00	113.6 AV			1.78 V	10	110.7	2.9
5	5350.00	56.6 PK	74.0	-17.4	1.78 V	10	53.5	3.1
6	5350.00	47.2 AV	54.0	-6.8	1.78 V	10	44.1	3.1
7	#10480.00	45.6 PK	68.2	-22.6	2.06 V	275	32.4	13.2
8	15720.00	61.3 PK	74.0	-12.7	1.08 V	153	48.6	12.7
9	15720.00	49.6 AV	54.0	-4.4	1.08 V	153	36.9	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	#5550.58	51.4 PK	68.2	-16.8	1.28 H	46	47.7	3.7
2	*5745.00	111.5 PK			1.28 H	46	107.9	3.6
3	*5745.00	102.3 AV			1.28 H	46	98.7	3.6
4	#5933.23	51.3 PK	68.2	-16.9	1.28 H	46	46.8	4.5
5	11490.00	45.4 PK	74.0	-28.6	2.17 H	4	31.7	13.7
6	11490.00	35.1 AV	54.0	-18.9	2.17 H	4	21.4	13.7
7	#17235.00	57.9 PK	68.2	-10.3	1.36 H	318	41.1	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	#5644.51	58.4 PK	68.2	-9.8	1.72 V	360	54.6	3.8
2	*5745.00	123.4 PK			1.72 V	360	119.8	3.6
3	*5745.00	114.0 AV			1.72 V	360	110.4	3.6
4	#6001.64	54.6 PK	68.2	-13.6	1.72 V	360	50.1	4.5
5	11490.00	47.0 PK	74.0	-27.0	2.21 V	57	33.3	13.7
6	11490.00	35.4 AV	54.0	-18.6	2.21 V	57	21.7	13.7
7	#17235.00	58.5 PK	68.2	-9.7	1.27 V	317	41.7	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	#5558.57	50.3 PK	68.2	-17.9	1.57 H	44	46.6	3.7
2	*5785.00	109.9 PK			1.57 H	44	106.2	3.7
3	*5785.00	101.2 AV			1.57 H	44	97.5	3.7
4	#5982.39	50.8 PK	68.2	-17.4	1.57 H	44	46.3	4.5
5	11570.00	44.9 PK	74.0	-29.1	2.13 H	7	31.4	13.5
6	11570.00	34.7 AV	54.0	-19.3	2.13 H	7	21.2	13.5
7	#17355.00	58.2 PK	68.2	-10.0	1.37 H	324	41.0	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	#5595.98	57.3 PK	68.2	-10.9	1.75 V	360	53.6	3.7
2	*5785.00	123.9 PK			1.75 V	360	120.2	3.7
3	*5785.00	114.5 AV			1.75 V	360	110.8	3.7
4	#5930.69	54.4 PK	68.2	-13.8	1.75 V	360	49.9	4.5
5	11570.00	46.9 PK	74.0	-27.1	2.19 V	55	33.4	13.5
6	11570.00	35.0 AV	54.0	-19.0	2.19 V	55	21.5	13.5
7	#17355.00	59.8 PK	68.2	-8.4	1.94 V	332	42.6	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	#5633.85	51.0 PK	68.2	-17.2	1.57 H	80	47.3	3.7
2	*5825.00	107.3 PK			1.57 H	80	103.3	4.0
3	*5825.00	100.3 AV			1.57 H	80	96.3	4.0
4	#6007.92	50.9 PK	68.2	-17.3	1.57 H	80	46.4	4.5
5	11650.00	46.2 PK	74.0	-27.8	1.75 H	227	32.9	13.3
6	11650.00	35.9 AV	54.0	-18.1	1.75 H	227	22.6	13.3
7	#17475.00	58.0 PK	68.2	-10.2	1.24 H	118	39.7	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	#5628.54	57.0 PK	68.2	-11.2	1.75 V	328	53.3	3.7
2	*5825.00	124.9 PK			1.75 V	328	120.9	4.0
3	*5825.00	114.6 AV			1.75 V	328	110.6	4.0
4	#5932.89	56.1 PK	68.2	-12.1	1.75 V	328	51.6	4.5
5	11650.00	46.9 PK	74.0	-27.1	2.31 V	244	33.6	13.3
6	11650.00	37.3 AV	54.0	-16.7	2.31 V	244	24.0	13.3
7	#17475.00	60.7 PK	68.2	-7.5	1.93 V	45	42.4	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Beamforming Mode

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	51.0 PK	74.0	-23.0	1.51 H	314	47.9	3.1
2	5150.00	42.3 AV	54.0	-11.7	1.51 H	314	39.2	3.1
3	*5180.00	109.4 PK			1.51 H	314	106.3	3.1
4	*5180.00	100.3 AV			1.51 H	314	97.2	3.1
5	#10360.00	46.6 PK	68.2	-21.6	2.20 H	270	33.7	12.9
6	15540.00	56.8 PK	74.0	-17.2	1.72 H	28	43.5	13.3
7	15540.00	45.8 AV	54.0	-8.2	1.72 H	28	32.5	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	60.8 PK	74.0	-13.2	1.65 V	339	57.7	3.1
2	5150.00	52.6 AV	54.0	-1.4	1.65 V	339	49.5	3.1
3	*5180.00	121.1 PK			1.65 V	339	118.0	3.1
4	*5180.00	110.1 AV			1.65 V	339	107.0	3.1
5	#10360.00	46.5 PK	68.2	-21.7	2.04 V	277	33.6	12.9
6	15540.00	60.1 PK	74.0	-13.9	1.13 V	286	46.8	13.3
7	15540.00	48.6 AV	54.0	-5.4	1.13 V	286	35.3	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	51.2 PK	74.0	-22.8	1.35 H	312	48.1	3.1
2	5150.00	40.4 AV	54.0	-13.6	1.35 H	312	37.3	3.1
3	*5200.00	116.9 PK			1.35 H	312	113.9	3.0
4	*5200.00	104.7 AV			1.35 H	312	101.7	3.0
5	5350.00	48.3 PK	74.0	-25.7	1.00 H	0	45.2	3.1
6	5350.00	36.7 AV	54.0	-17.3	1.00 H	0	33.6	3.1
7	#10400.00	46.7 PK	68.2	-21.5	2.17 H	268	33.6	13.1
8	15600.00	56.9 PK	74.0	-17.1	1.67 H	16	43.8	13.1
9	15600.00	44.5 AV	54.0	-9.5	1.67 H	16	31.4	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	58.5 PK	74.0	-15.5	1.67 V	348	55.4	3.1
2	5150.00	49.7 AV	54.0	-4.3	1.67 V	348	46.6	3.1
3	*5200.00	124.6 PK			1.67 V	348	121.6	3.0
4	*5200.00	113.8 AV			1.67 V	348	110.8	3.0
5	5350.00	57.2 PK	74.0	-16.8	1.67 V	348	54.1	3.1
6	5350.00	45.2 AV	54.0	-8.8	1.67 V	348	42.1	3.1
7	#10400.00	47.5 PK	68.2	-20.7	1.99 V	263	34.4	13.1
8	15600.00	58.9 PK	74.0	-15.1	1.23 V	304	45.8	13.1
9	15600.00	47.3 AV	54.0	-6.7	1.23 V	304	34.2	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	112.7 PK			1.41 H	327	109.8	2.9
2	*5240.00	102.3 AV			1.41 H	327	99.4	2.9
3	5350.00	49.8 PK	74.0	-24.2	1.41 H	327	46.7	3.1
4	5350.00	37.8 AV	54.0	-16.2	1.41 H	327	34.7	3.1
5	#10480.00	46.8 PK	68.2	-21.4	1.82 H	274	33.6	13.2
6	15720.00	56.3 PK	74.0	-17.7	1.78 H	11	43.6	12.7
7	15720.00	44.6 AV	54.0	-9.4	1.78 H	11	31.9	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	125.0 PK			1.50 V	10	122.1	2.9
2	*5240.00	112.2 AV			1.50 V	10	109.3	2.9
3	5350.00	54.6 PK	74.0	-19.4	1.50 V	10	51.5	3.1
4	5350.00	47.1 AV	54.0	-6.9	1.50 V	10	44.0	3.1
5	#10480.00	47.2 PK	68.2	-21.0	2.02 V	280	34.0	13.2
6	15720.00	57.2 PK	74.0	-16.8	1.11 V	309	44.5	12.7
7	15720.00	46.7 AV	54.0	-7.3	1.11 V	309	34.0	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	#5588.21	52.5 PK	68.2	-15.7	1.15 H	80	48.8	3.7
2	*5745.00	109.8 PK			1.15 H	80	106.2	3.6
3	*5745.00	98.3 AV			1.15 H	80	94.7	3.6
4	#5976.12	52.2 PK	68.2	-16.0	1.15 H	80	47.7	4.5
5	11490.00	47.3 PK	74.0	-26.7	2.10 H	10	33.6	13.7
6	11490.00	35.6 AV	54.0	-18.4	2.10 H	10	21.9	13.7
7	#17235.00	58.7 PK	68.2	-9.5	1.38 H	331	41.9	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	#5647.04	56.8 PK	68.2	-11.4	2.32 V	347	53.0	3.8
2	*5745.00	125.5 PK			2.32 V	347	121.9	3.6
3	*5745.00	113.5 AV			2.32 V	347	109.9	3.6
4	#5951.61	56.5 PK	68.2	-11.7	2.32 V	347	52.0	4.5
5	11490.00	47.2 PK	74.0	-26.8	2.24 V	46	33.5	13.7
6	11490.00	35.5 AV	54.0	-18.5	2.24 V	46	21.8	13.7
7	#17235.00	59.1 PK	68.2	-9.1	1.28 V	308	42.3	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	#5612.20	51.9 PK	68.2	-16.3	1.26 H	78	48.2	3.7
2	*5785.00	110.4 PK			1.26 H	78	106.7	3.7
3	*5785.00	99.8 AV			1.26 H	78	96.1	3.7
4	#5984.90	52.3 PK	68.2	-15.9	1.26 H	78	47.8	4.5
5	11570.00	46.6 PK	74.0	-27.4	1.99 H	13	33.1	13.5
6	11570.00	34.7 AV	54.0	-19.3	1.99 H	13	21.2	13.5
7	#17355.00	58.4 PK	68.2	-9.8	1.43 H	317	41.2	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	#5593.24	57.6 PK	68.2	-10.6	1.82 V	348	53.9	3.7
2	*5785.00	124.8 PK			1.82 V	348	121.1	3.7
3	*5785.00	113.5 AV			1.82 V	348	109.8	3.7
4	#5952.04	56.2 PK	68.2	-12.0	1.82 V	348	51.7	4.5
5	11570.00	46.9 PK	74.0	-27.1	2.25 V	50	33.4	13.5
6	11570.00	35.0 AV	54.0	-19.0	2.25 V	50	21.5	13.5
7	#17355.00	59.5 PK	68.2	-8.7	1.26 V	295	42.3	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	#5609.32	50.6 PK	68.2	-17.6	1.31 H	78	46.9	3.7
2	*5825.00	110.3 PK			1.31 H	78	106.3	4.0
3	*5825.00	99.1 AV			1.31 H	78	95.1	4.0
4	#5975.78	52.6 PK	68.2	-15.6	1.31 H	78	48.1	4.5
5	11650.00	46.7 PK	74.0	-27.3	1.77 H	223	33.4	13.3
6	11650.00	35.0 AV	54.0	-19.0	1.77 H	223	21.7	13.3
7	#17475.00	58.1 PK	68.2	-10.1	1.22 H	133	39.8	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	#5635.20	56.6 PK	68.2	-11.6	1.75 V	341	52.9	3.7
2	*5825.00	124.9 PK			1.75 V	341	120.9	4.0
3	*5825.00	113.1 AV			1.75 V	341	109.1	4.0
4	#5932.30	56.8 PK	68.2	-11.4	1.75 V	341	52.3	4.5
5	11650.00	47.0 PK	74.0	-27.0	2.35 V	237	33.7	13.3
6	11650.00	35.1 AV	54.0	-18.9	2.35 V	237	21.8	13.3
7	#17475.00	59.8 PK	68.2	-8.4	1.88 V	59	41.5	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	50.5 PK	74.0	-23.5	1.45 H	330	47.4	3.1
2	5150.00	42.1 AV	54.0	-11.9	1.45 H	330	39.0	3.1
3	*5190.00	106.3 PK			1.45 H	330	103.2	3.1
4	*5190.00	94.7 AV			1.45 H	330	91.6	3.1
5	#10380.00	44.7 PK	68.2	-23.5	1.81 H	261	31.7	13.0
6	15570.00	52.6 PK	74.0	-21.4	1.79 H	27	39.4	13.2
7	15570.00	43.8 AV	54.0	-10.2	1.79 H	27	30.6	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	61.4 PK	74.0	-12.6	1.58 V	331	58.3	3.1
2	**5150.00**	**53.0 AV**	**54.0**	**-1.0**	**1.58 V**	**331**	**49.9**	**3.1**
3	*5190.00	116.6 PK			1.58 V	331	113.5	3.1
4	*5190.00	105.5 AV			1.58 V	331	102.4	3.1
5	#10380.00	45.6 PK	68.2	-22.6	2.06 V	257	32.6	13.0
6	15570.00	55.7 PK	74.0	-18.3	1.09 V	315	42.5	13.2
7	15570.00	45.7 AV	54.0	-8.3	1.09 V	315	32.5	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	*5230.00	109.8 PK			1.47 H	319	106.9	2.9
2	*5230.00	101.4 AV			1.47 H	319	98.5	2.9
3	5350.00	48.1 PK	74.0	-25.9	1.47 H	319	45.0	3.1
4	5350.00	36.4 AV	54.0	-17.6	1.47 H	319	33.3	3.1
5	5375.96	51.7 PK	74.0	-22.3	1.47 H	319	48.6	3.1
6	5375.96	40.9 AV	54.0	-13.1	1.47 H	319	37.8	3.1
7	#10460.00	45.3 PK	68.2	-22.9	1.00 H	0	32.1	13.2
8	15690.00	56.7 PK	74.0	-17.3	1.00 H	0	43.9	12.8
9	15690.00	45.1 AV	54.0	-8.9	1.00 H	0	32.3	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	*5230.00	121.7 PK			1.56 V	360	118.8	2.9
2	*5230.00	111.9 AV			1.56 V	360	109.0	2.9
3	5350.00	60.2 PK	74.0	-13.8	1.56 V	360	57.1	3.1
4	5350.00	47.8 AV	54.0	-6.2	1.56 V	360	44.7	3.1
5	5375.96	61.0 PK	74.0	-13.0	1.56 V	360	57.9	3.1
6	5375.96	49.5 AV	54.0	-4.5	1.56 V	360	46.4	3.1
7	#10460.00	46.8 PK	68.2	-21.4	1.94 V	271	33.6	13.2
8	15690.00	57.1 PK	74.0	-16.9	1.12 V	293	44.3	12.8
9	15690.00	47.5 AV	54.0	-6.5	1.12 V	293	34.7	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	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	#5642.67	53.8 PK	68.2	-14.4	1.31 H	43	50.0	3.8
2	*5755.00	107.5 PK			1.31 H	43	103.9	3.6
3	*5755.00	96.0 AV			1.31 H	43	92.4	3.6
4	#5954.55	52.1 PK	68.2	-16.1	1.31 H	43	47.6	4.5
5	11510.00	44.9 PK	74.0	-29.1	1.98 H	20	31.3	13.6
6	11510.00	34.5 AV	54.0	-19.5	1.98 H	20	20.9	13.6
7	#17265.00	57.9 PK	68.2	-10.3	1.47 H	325	41.0	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	#5643.21	64.1 PK	68.2	-4.1	1.63 V	357	60.3	3.8
2	*5755.00	122.0 PK			1.63 V	357	118.4	3.6
3	*5755.00	110.7 AV			1.63 V	357	107.1	3.6
4	#5927.97	57.1 PK	68.2	-11.1	1.63 V	357	52.8	4.3
5	11510.00	47.0 PK	74.0	-27.0	2.22 V	48	33.4	13.6
6	11510.00	35.2 AV	54.0	-18.8	2.22 V	48	21.6	13.6
7	#17265.00	59.7 PK	68.2	-8.5	1.24 V	294	42.8	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	#5596.95	51.9 PK	68.2	-16.3	1.30 H	43	48.2	3.7
2	*5795.00	107.5 PK			1.30 H	43	103.8	3.7
3	*5795.00	96.4 AV			1.30 H	43	92.7	3.7
4	#5936.03	53.2 PK	68.2	-15.0	1.30 H	43	48.7	4.5
5	11590.00	45.0 PK	74.0	-29.0	1.97 H	17	31.4	13.6
6	11590.00	34.7 AV	54.0	-19.3	1.97 H	17	21.1	13.6
7	#17385.00	58.3 PK	68.2	-9.9	1.44 H	315	41.1	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	#5646.29	58.8 PK	68.2	-9.4	2.22 V	360	55.0	3.8
2	*5795.00	122.1 PK			2.22 V	360	118.4	3.7
3	*5795.00	111.4 AV			2.22 V	360	107.7	3.7
4	#5927.60	60.9 PK	68.2	-7.3	2.22 V	360	56.6	4.3
5	11590.00	46.9 PK	74.0	-27.1	2.35 V	234	33.3	13.6
6	11590.00	35.3 AV	54.0	-18.7	2.35 V	234	21.7	13.6
7	#17385.00	59.2 PK	68.2	-9.0	1.83 V	62	42.0	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	50.0 PK	74.0	-24.0	1.47 H	328	46.9	3.1
2	5150.00	42.1 AV	54.0	-11.9	1.47 H	328	39.0	3.1
3	*5210.00	103.0 PK			1.47 H	328	100.0	3.0
4	*5210.00	91.8 AV			1.47 H	328	88.8	3.0
5	5350.00	48.6 PK	74.0	-25.4	1.47 H	328	45.5	3.1
6	5350.00	34.9 AV	54.0	-19.1	1.47 H	328	31.8	3.1
7	#10420.00	44.3 PK	68.2	-23.9	1.85 H	281	31.1	13.2
8	15630.00	53.6 PK	74.0	-20.4	1.62 H	13	40.6	13.0
9	15630.00	42.7 AV	54.0	-11.3	1.62 H	13	29.7	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	61.8 PK	74.0	-12.2	2.09 V	240	58.7	3.1
2	5150.00	52.9 AV	54.0	-1.1	2.09 V	240	49.8	3.1
3	*5210.00	113.1 PK			2.09 V	240	110.1	3.0
4	*5210.00	102.2 AV			2.09 V	240	99.2	3.0
5	5350.00	53.8 PK	74.0	-20.2	2.09 V	240	50.7	3.1
6	5350.00	42.6 AV	54.0	-11.4	2.09 V	240	39.5	3.1
7	#10420.00	45.4 PK	68.2	-22.8	1.93 V	266	32.2	13.2
8	15630.00	57.0 PK	74.0	-17.0	1.11 V	281	44.0	13.0
9	15630.00	45.2 AV	54.0	-8.8	1.11 V	281	32.2	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	#5649.77	54.0 PK	68.2	-14.2	1.46 H	45	50.2	3.8
2	*5775.00	101.5 PK			1.46 H	45	97.8	3.7
3	*5775.00	90.5 AV			1.46 H	45	86.8	3.7
4	#5927.38	51.9 PK	68.2	-16.3	1.46 H	45	47.6	4.3
5	11550.00	47.0 PK	74.0	-27.0	1.94 H	18	33.4	13.6
6	11550.00	35.4 AV	54.0	-18.6	1.94 H	18	21.8	13.6
7	#17325.00	59.4 PK	68.2	-8.8	1.42 H	314	42.4	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	#5641.78	64.3 PK	68.2	-3.9	2.20 V	345	60.5	3.8
2	*5775.00	117.6 PK			2.20 V	345	113.9	3.7
3	*5775.00	106.6 AV			2.20 V	345	102.9	3.7
4	#5926.53	60.9 PK	68.2	-7.3	2.20 V	345	56.6	4.3
5	11550.00	46.9 PK	74.0	-27.1	2.39 V	236	33.3	13.6
6	11550.00	35.3 AV	54.0	-18.7	2.39 V	236	21.7	13.6
7	#17325.00	59.7 PK	68.2	-8.5	1.78 V	54	42.7	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz Data:

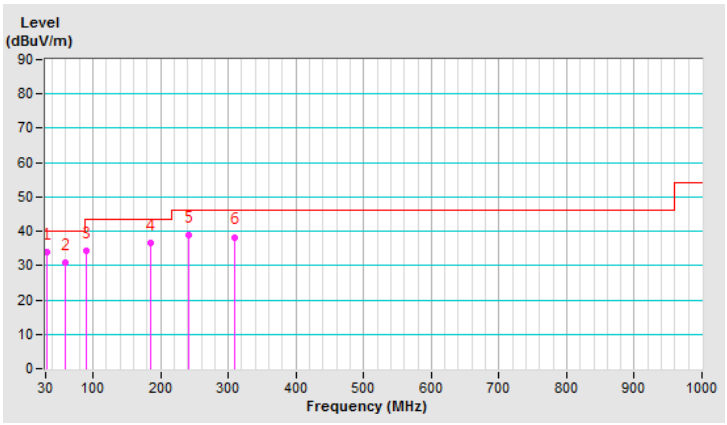
802.11a

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	32.35	34.0 QP	40.0	-6.0	1.00 H	104	43.3	-9.3
2	58.53	31.0 QP	40.0	-9.0	2.00 H	7	39.3	-8.3
3	90.05	34.2 QP	43.5	-9.3	1.50 H	136	47.9	-13.7
4	184.51	36.4 QP	43.5	-7.1	1.50 H	254	46.3	-9.9
5	240.96	38.9 QP	46.0	-7.1	1.50 H	113	48.0	-9.1
6	308.72	38.3 QP	46.0	-7.7	1.00 H	295	44.8	-6.5

REMARKS:

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

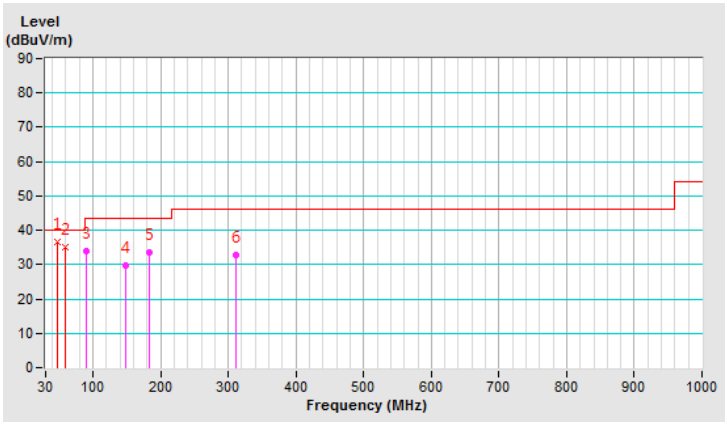


CHANNEL	TX Channel 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	47.55	36.5 QP	40.0	-3.5	1.50 V	163	44.3	-7.8
2	58.51	35.1 QP	40.0	-4.9	1.50 V	37	43.4	-8.3
3	90.20	34.0 QP	43.5	-9.5	1.00 V	193	47.7	-13.7
4	147.67	29.6 QP	43.5	-13.9	1.50 V	14	37.3	-7.7
5	183.22	33.4 QP	43.5	-10.1	1.00 V	239	43.1	-9.7
6	311.18	32.8 QP	46.0	-13.2	1.00 V	192	39.2	-6.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit 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: Jan. 13, 2020

4.2.3 Test Procedure

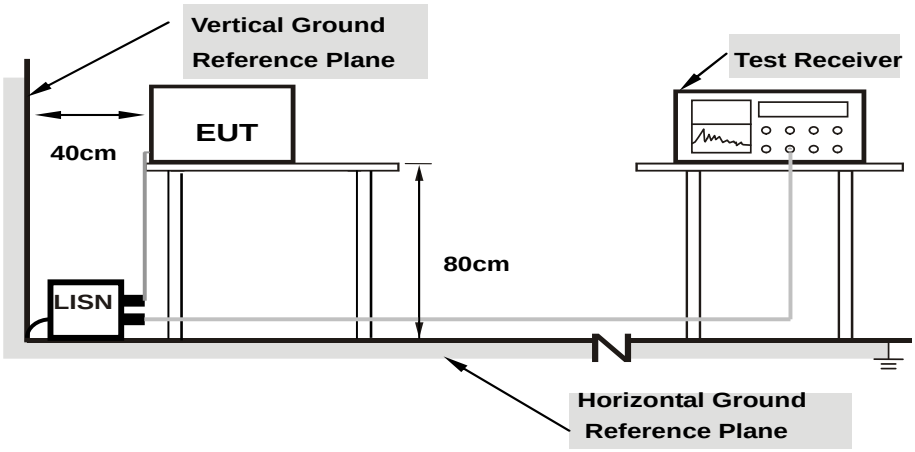
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

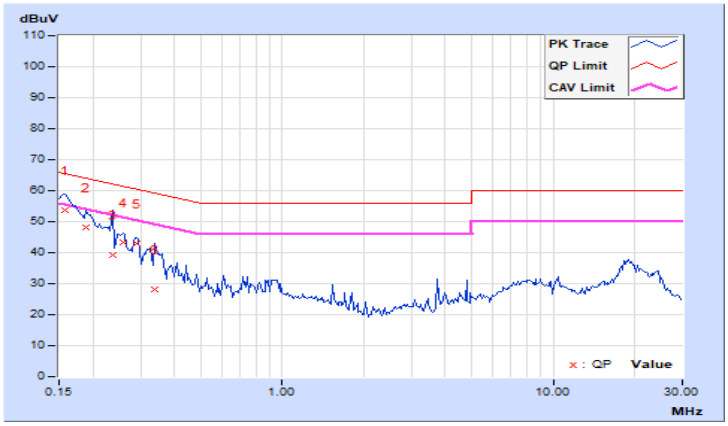
4.2.7 Test Results

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

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	9.99	43.79	33.07	53.78	43.06	65.58	55.58	-11.80	-12.52
2	0.18906	9.99	38.08	27.30	48.07	37.29	64.08	54.08	-16.01	-16.79
3	0.23594	9.99	29.20	13.87	39.19	23.86	62.24	52.24	-23.05	-28.38
4	0.25938	9.99	33.50	23.73	43.49	33.72	61.45	51.45	-17.96	-17.73
5	0.29063	9.99	32.83	25.38	42.82	35.37	60.51	50.51	-17.69	-15.14
6	0.33750	10.00	18.23	-1.76	28.23	8.24	59.26	49.26	-31.03	-41.02

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

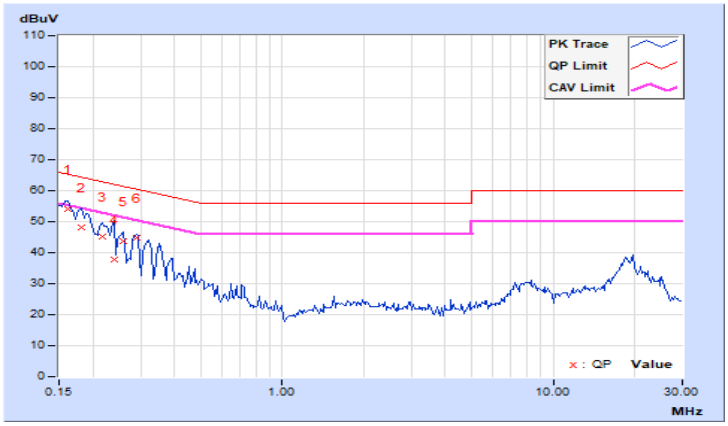


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	**0.16172**	**9.99**	**44.13**	**31.19**	**54.12**	**41.18**	**65.38**	**55.38**	**-11.26**	**-14.20**
2	0.18125	9.99	38.16	24.69	48.15	34.68	64.43	54.43	-16.28	-19.75
3	0.21641	9.99	35.35	24.47	45.34	34.46	62.96	52.96	-17.62	-18.50
4	0.23984	9.99	27.90	14.15	37.89	24.14	62.10	52.10	-24.21	-27.96
5	0.25938	10.00	33.61	23.41	43.61	33.41	61.45	51.45	-17.84	-18.04
6	0.29063	10.00	34.72	28.90	44.72	38.90	60.51	50.51	-15.79	-11.61

Remarks:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

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

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

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

4.3.2 Test Setup

4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

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

4.3.7 Test Results

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1				
36	5180	24.36	23.23	483.276	26.84	30.00	Pass
40	5200	26.45	26.78	918.001	29.63	30.00	Pass
48	5240	25.85	26.32	813.14	29.10	30.00	Pass
149	5745	26.09	27.13	922.86	29.65	30.00	Pass
157	5785	26.16	27.37	958.805	29.82	30.00	Pass
165	5825	26.06	27.21	929.663	29.68	30.00	Pass

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1				
36	5180	22.83	22.71	378.505	25.78	30.00	Pass
40	5200	25.52	25.96	750.908	28.76	30.00	Pass
48	5240	23.21	23.19	417.86	26.21	30.00	Pass
149	5745	25.96	26.78	870.888	29.40	29.91	Pass
157	5785	26.02	26.75	873.096	29.41	29.91	Pass
165	5825	26.09	26.63	866.7	29.38	29.91	Pass

Note: 1. For U-NII-1: The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.77 dBi < 6 dBi, so the power limit shall not be reduced.
2. For U-NII-3: The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 6.09 dBi > 6 dBi, so the power limit shall be reduced to 30-(6.09-6) = 29.91 dBm.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1				
38	5190	20.10	19.96	201.412	23.04	30.00	Pass
46	5230	24.95	24.75	611.146	27.86	30.00	Pass
151	5755	26.77	26.03	876.202	29.43	29.91	Pass
159	5795	26.20	25.51	772.501	28.88	29.91	Pass

Note: 1. For U-NII-1: The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.77 dBi < 6 dBi, so the power limit shall not be reduced.
2. For U-NII-3: The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 6.09 dBi > 6 dBi, so the power limit shall be reduced to 30-(6.09-6) = 29.91 dBm.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1				
42	5210	18.72	18.68	148.264	21.71	30.00	Pass
155	5775	25.22	25.77	710.232	28.51	29.91	Pass

Note: 1. For U-NII-1: The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.77 dBi < 6 dBi, so the power limit shall not be reduced.
2. For U-NII-3: The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 6.09 dBi > 6 dBi, so the power limit shall be reduced to 30-(6.09-6) = 29.91 dBm.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1				
36	5180	22.93	22.76	385.135	25.86	30.00	Pass
40	5200	25.62	26.01	763.779	28.83	30.00	Pass
48	5240	23.51	23.52	449.294	26.53	30.00	Pass
149	5745	26.21	26.92	909.87	29.59	29.91	Pass
157	5785	26.29	26.84	908.657	29.58	29.91	Pass
165	5825	26.24	26.81	900.46	29.54	29.91	Pass

Note: 1. For U-NII-1: The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.77 dBi < 6 dBi, so the power limit shall not be reduced.
2. For U-NII-3: The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 6.09 dBi > 6 dBi, so the power limit shall be reduced to 30-(6.09-6) = 29.91 dBm.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1				
38	5190	20.20	20.02	205.174	23.12	30.00	Pass
46	5230	25.11	24.91	634.082	28.02	30.00	Pass
151	5755	26.99	26.11	908.354	29.58	29.91	Pass
159	5795	26.33	25.66	797.665	29.02	29.91	Pass

Note: 1. For U-NII-1: The directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 5.77 dBi < 6 dBi, so the power limit shall not be reduced.
2. For U-NII-3: The directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 6.09 dBi > 6 dBi, so the power limit shall be reduced to 30-(6.09-6) = 29.91 dBm.

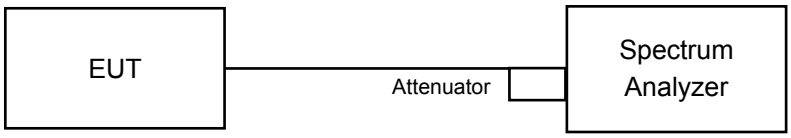
802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1				
42	5210	18.95	18.83	154.907	21.90	30.00	Pass
155	5775	25.32	25.89	728.559	28.62	29.91	Pass

Note: 1. For U-NII-1: The directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 5.77 dBi < 6 dBi, so the power limit shall not be reduced.
2. For U-NII-3: The directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 6.09 dBi > 6 dBi, so the power limit shall be reduced to 30-(6.09-6) = 29.91 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

CDD Mode

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.44	16.44
40	5200	16.68	19.44
48	5240	16.56	16.68
149	5745	16.92	20.52
157	5785	17.28	21.84
165	5825	17.52	22.56

Beamforming Mode

802.11ax (HE20)

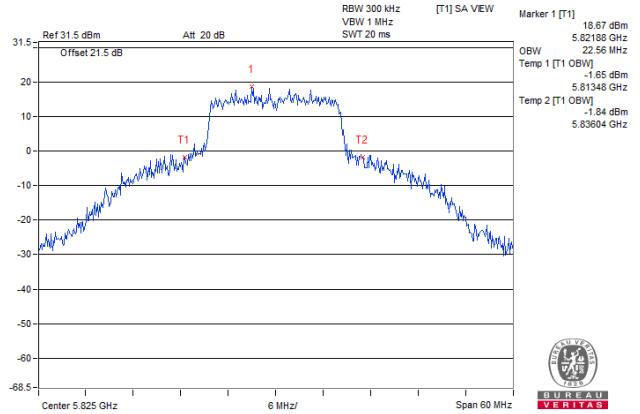
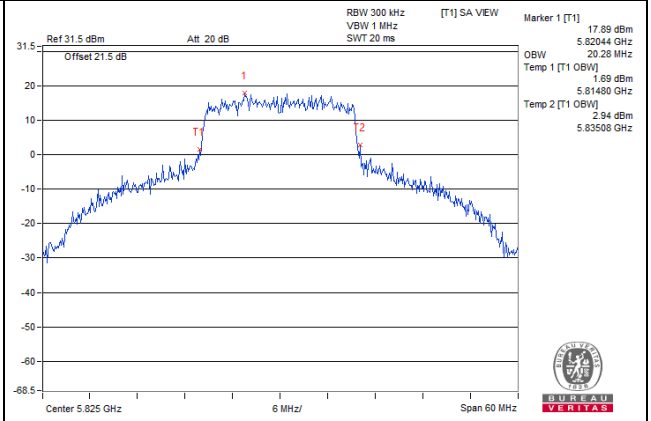
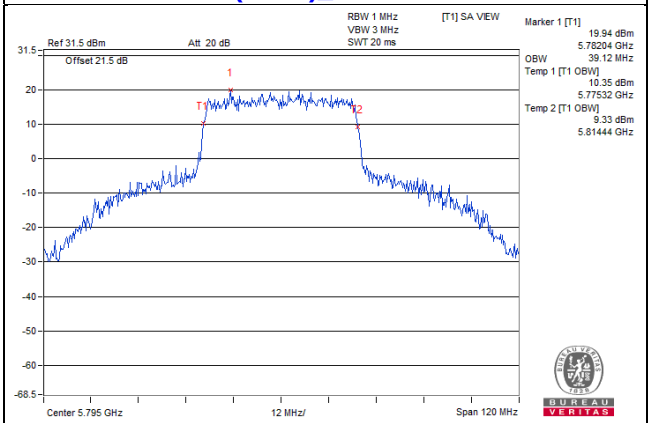
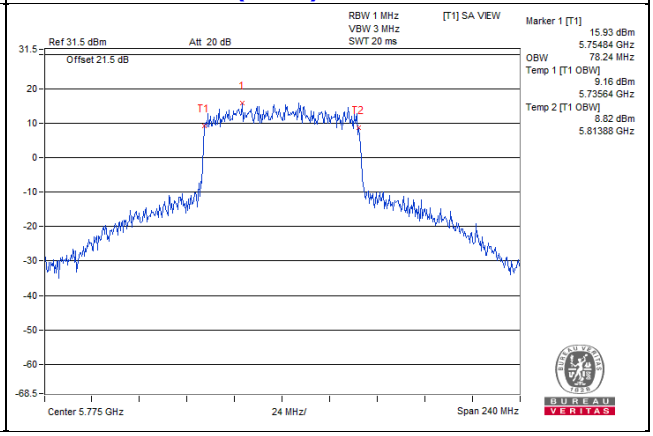
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	19.08	19.08
40	5200	19.08	19.08
48	5240	18.96	19.08
149	5745	18.96	19.44
157	5785	19.32	19.80
165	5825	19.44	20.28

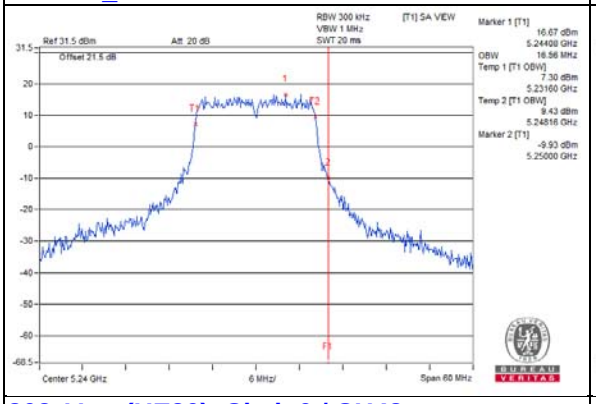
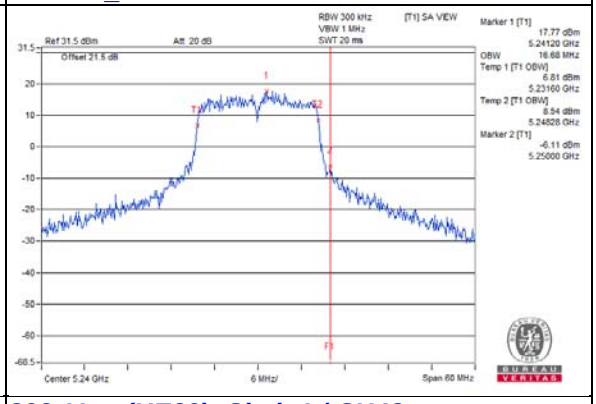
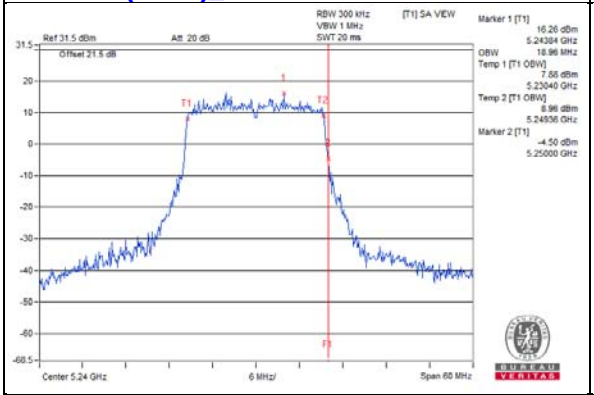
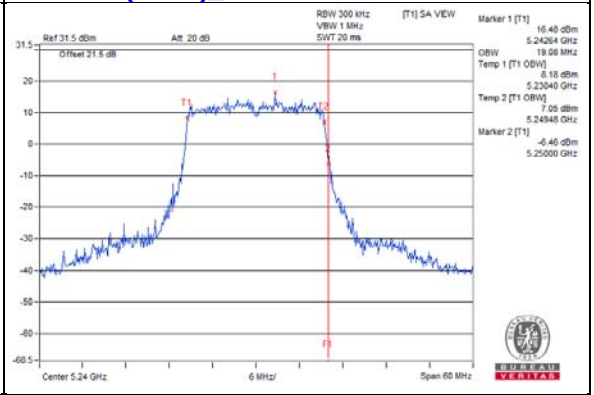
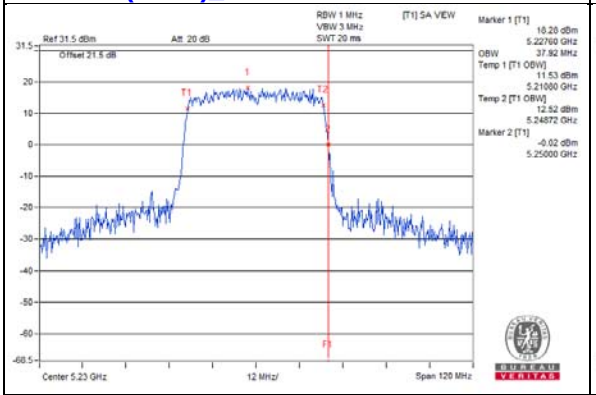
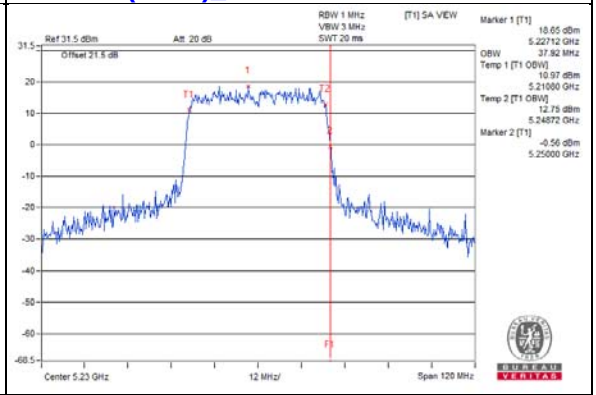
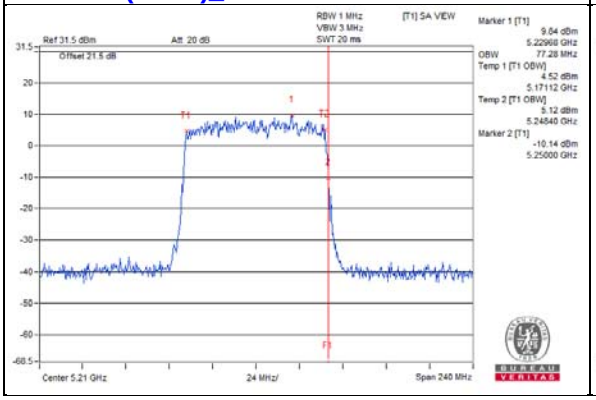
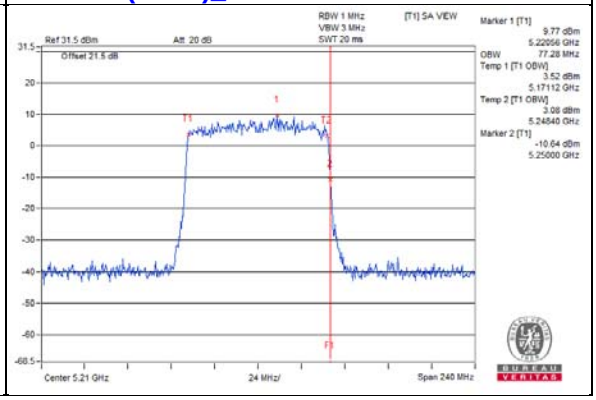
802.11ax (HE40)

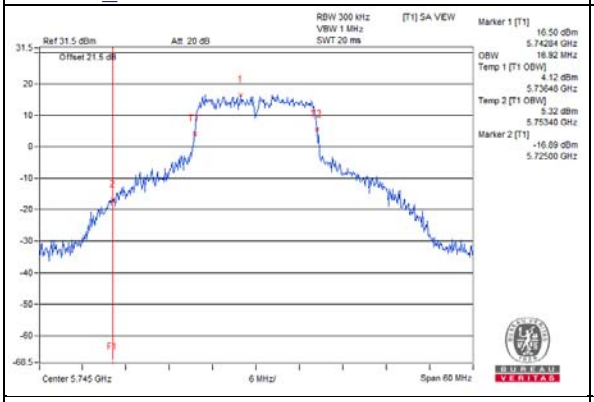
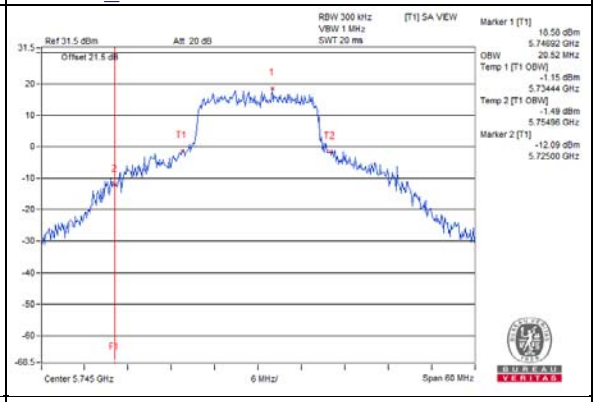
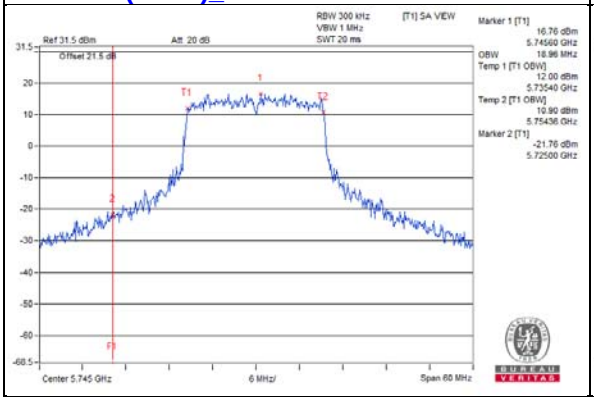
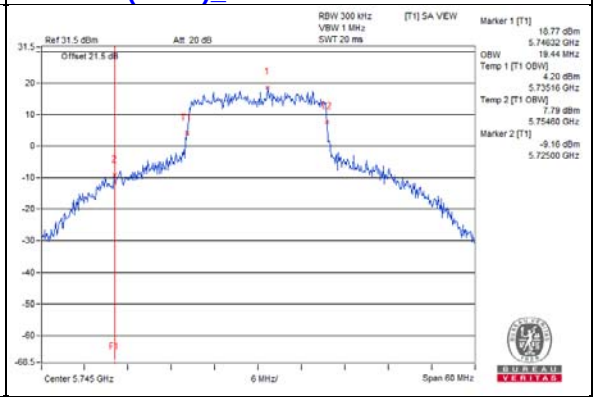
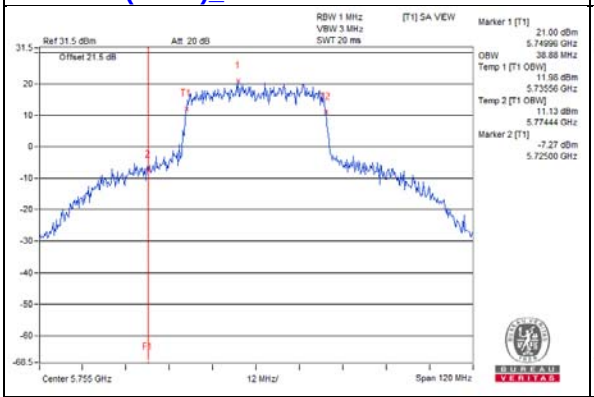
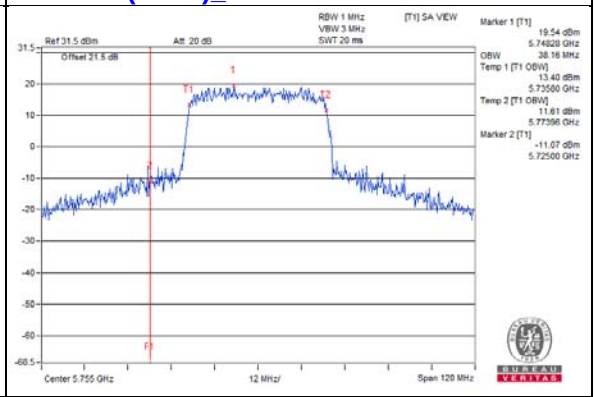
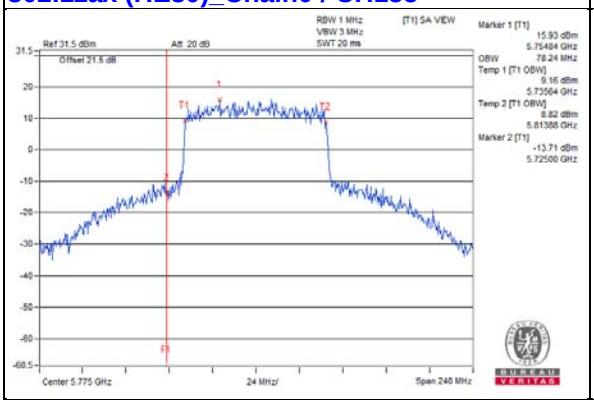
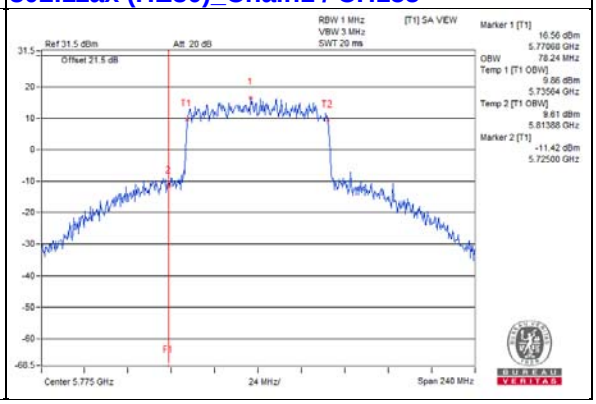
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	37.92	38.16
46	5230	37.92	37.92
151	5755	38.88	38.16
159	5795	39.12	38.40

802.11ax (HE80)

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

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

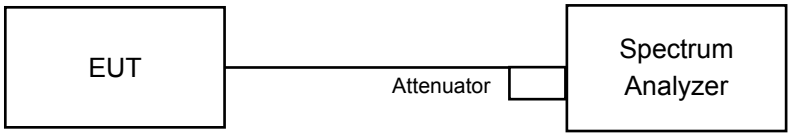
Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2C band)	
802.11a_Chain0 / CH149	**802.11a_Chain1 / CH149**
	
802.11ax (HE20)_Chain0 / CH149	**802.11ax (HE20)_Chain1 / CH149**
	
802.11ax (HE40)_Chain0 / CH151	**802.11ax (HE40)_Chain1 / CH151**
	
802.11ax (HE80)_Chain0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

Using method SA-2

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

For U-NII-3:

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 500 kHz by adjusting (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

For U-NII-1:

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Pass / Fail
		Chain0	Chain1				
36	5180	9.43	8.88	0.25	12.42	17.00	Pass
40	5200	12.40	12.02	0.25	15.47	17.00	Pass
48	5240	11.81	10.91	0.25	14.64	17.00	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 5.77 dBi < 6 dBi, so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

Beamforming Mode

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Pass / Fail
		Chain0	Chain1				
36	5180	6.54	8.50	0.27	10.91	17.00	Pass
40	5200	10.77	10.19	0.27	13.77	17.00	Pass
48	5240	8.97	8.48	0.27	12.01	17.00	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 5.77 dBi < 6 dBi, so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Pass / Fail
		Chain0	Chain1				
38	5190	1.42	1.69	0.20	4.77	17.00	Pass
46	5230	6.93	7.04	0.20	10.20	17.00	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 5.77 dBi < 6 dBi, so the power density limit shall not be reduced.
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 (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Pass / Fail
		Chain0	Chain1				
42	5210	-2.35	-2.09	0.20	0.99	17.00	Pass

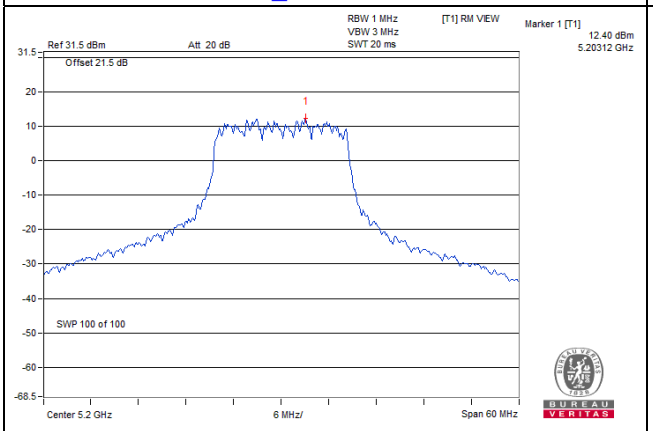
Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.77 dBi < 6 dBi, so the power density limit shall not be reduced.

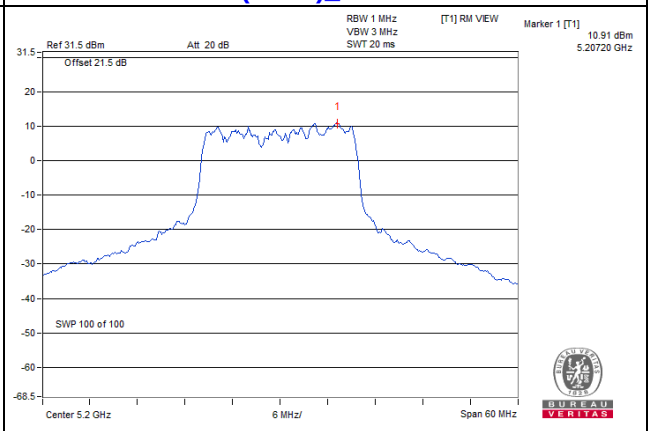
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

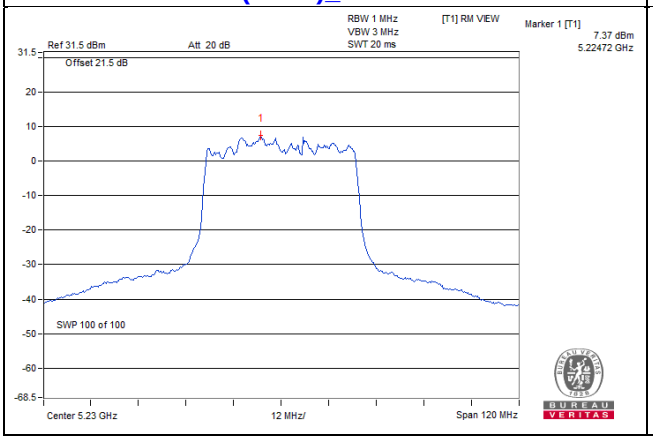
802.11a_Chain 0 / CH40



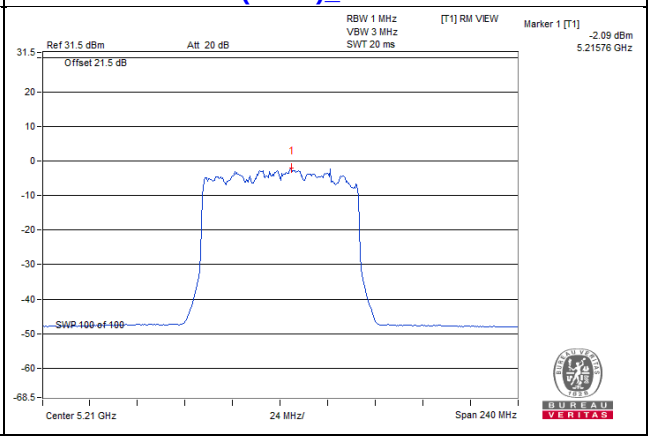
802.11ax (HE20)_Chain 0 / CH40



802.11ax (HE40)_Chain 1 / CH46



802.11ax (HE80)_Chain 1 / CH42



For U-NII-3:

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/300kHz)		Duty Factor (dB)	Total PSD (dBm/300kHz)	Total PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Pass / Fail
		Chain0	Chain1					
149	5745	3.25	5.30	0.25	7.66	9.88	29.91	Pass
157	5785	3.69	3.87	0.25	7.04	9.26	29.91	Pass
165	5825	3.57	4.16	0.25	7.14	9.36	29.91	Pass

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 6.09 dBi > 6 dBi, so the power density limit shall be reduced to 30-(6.09-6) = 29.91 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Beamforming Mode

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/300kHz)		Duty Factor (dB)	Total PSD (dBm/300kHz)	Total PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Pass / Fail
		Chain0	Chain1					
149	5745	1.98	2.83	0.27	5.71	7.93	29.91	Pass
157	5785	2.75	2.86	0.27	6.09	8.31	29.91	Pass
165	5825	2.39	2.26	0.27	5.61	7.83	29.91	Pass

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 6.09 dBi > 6 dBi, so the power density limit shall be reduced to 30-(6.09-6) = 29.91 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/300kHz)		Duty Factor (dB)	Total PSD (dBm/300kHz)	Total PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Pass / Fail
		Chain0	Chain1					
151	5755	-0.29	-1.04	0.20	2.56	4.78	29.91	Pass
159	5795	-0.55	-1.14	0.20	2.38	4.60	29.91	Pass

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 6.09 dBi > 6 dBi, so the power density limit shall be reduced to 30-(6.09-6) = 29.91 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

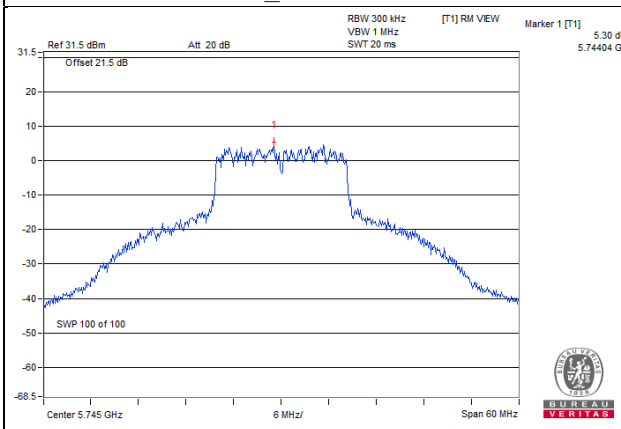
802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/300kHz)		Duty Factor (dB)	Total PSD (dBm/300kHz)	Total PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Pass / Fail
		Chain0	Chain1					
155	5775	-4.13	-3.30	0.20	-0.48	1.74	29.91	Pass

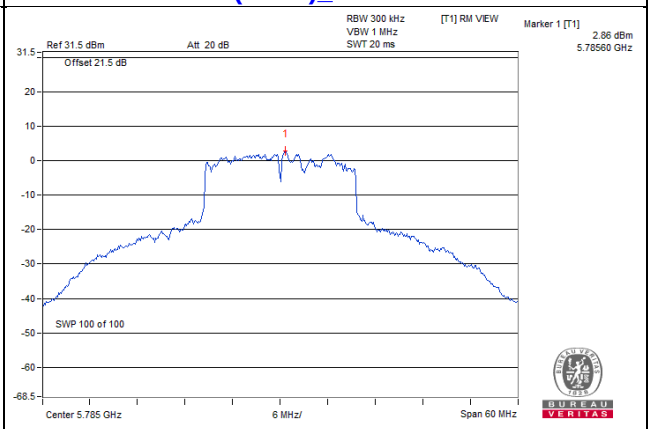
Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 6.09 dBi > 6 dBi, so the power density limit shall be reduced to 30-(6.09-6) = 29.91 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

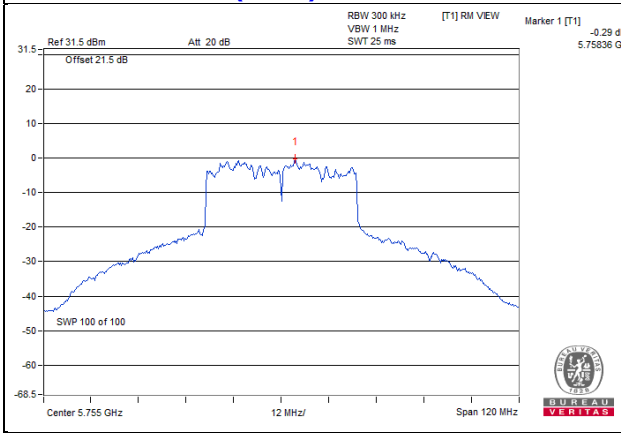
802.11a_Chain 1 / CH149



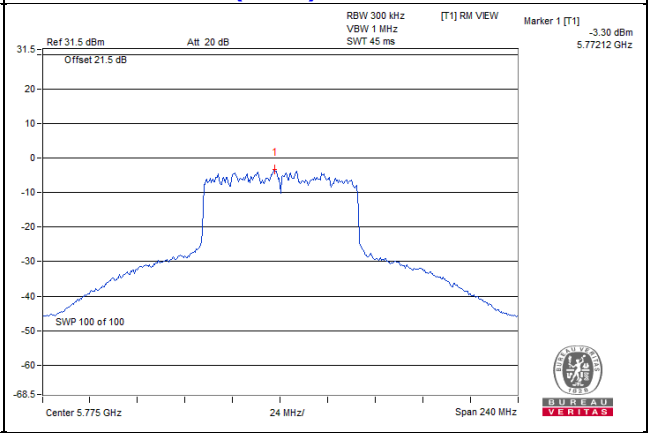
802.11ax (HE20)_Chain 1 / CH157



802.11ax (HE40)_Chain 0 / CH151



802.11ax (HE80)_Chain 1 / CH155

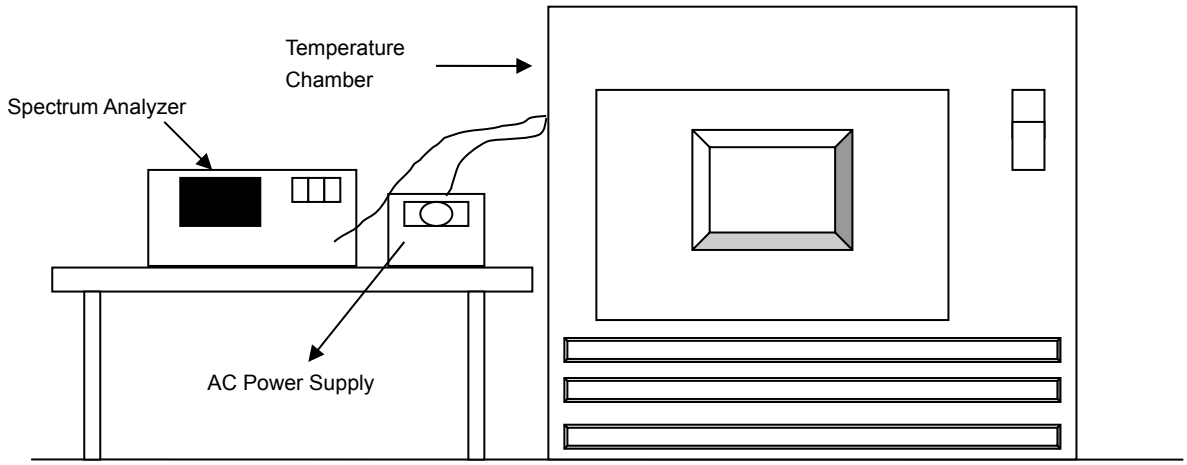


4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

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

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

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

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

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

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
40	120	5179.9809	Pass	5179.9816	Pass	5179.9852	Pass	5179.9815	Pass
30	120	5179.9777	Pass	5179.9793	Pass	5179.9775	Pass	5179.9791	Pass
20	120	5180.0183	Pass	5180.0195	Pass	5180.0187	Pass	5180.019	Pass
10	120	5180.0237	Pass	5180.0247	Pass	5180.0254	Pass	5180.0253	Pass
0	120	5180.005	Pass	5180.0028	Pass	5180.0075	Pass	5180.0075	Pass

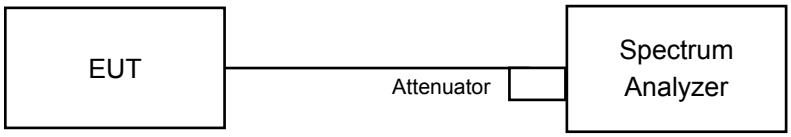
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5180.0187	Pass	5180.0204	Pass	5180.0192	Pass	5180.0196	Pass
	120	5180.0183	Pass	5180.0195	Pass	5180.0187	Pass	5180.019	Pass
	102	5180.0187	Pass	5180.0187	Pass	5180.019	Pass	5180.0187	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

CDD Mode

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	15.68	16.38	0.5	Pass
157	5785	16.08	16.35	0.5	Pass
165	5825	16.32	15.8	0.5	Pass

Beamforming Mode

802.11ax (HE20)

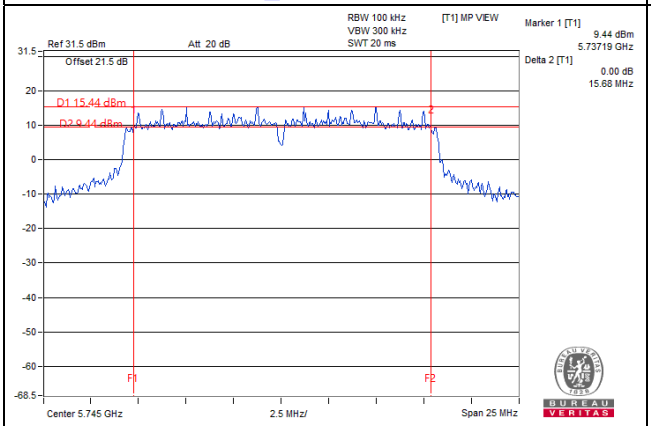
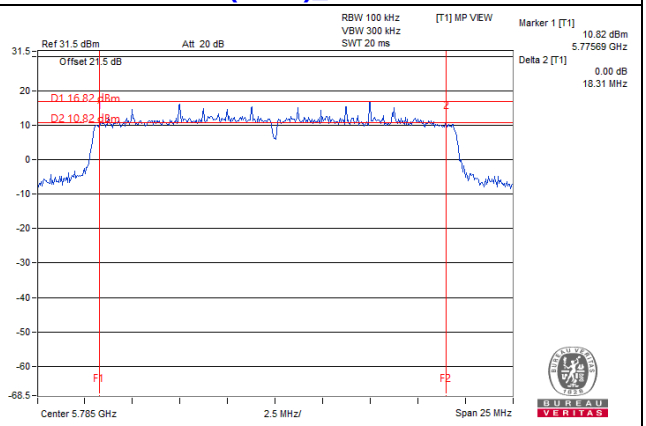
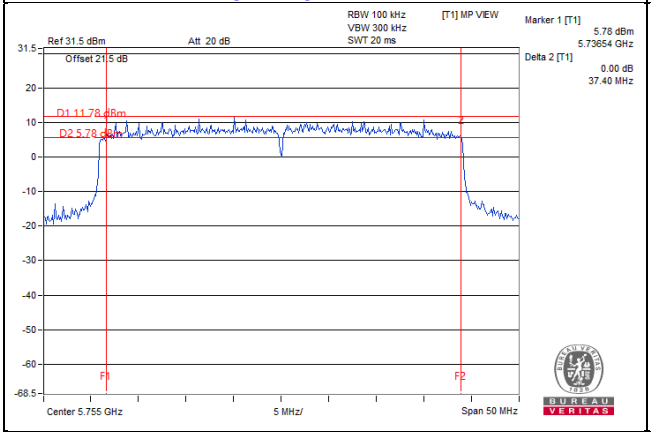
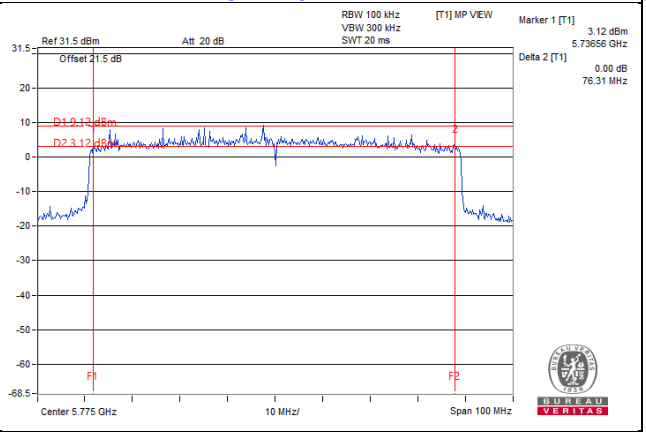
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	18.57	18.69	0.5	Pass
157	5785	18.6	18.31	0.5	Pass
165	5825	18.45	18.64	0.5	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	38.04	37.4	0.5	Pass
159	5795	37.97	37.53	0.5	Pass

802.11ax (HE80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	77.35	76.31	0.5	Pass

Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH149	**802.11ax (HE20)_Chain 1 / CH157**
	
802.11ax (HE40) _Chain 1 / CH151	**802.11ax (HE80) _Chain 1 / CH155**
	

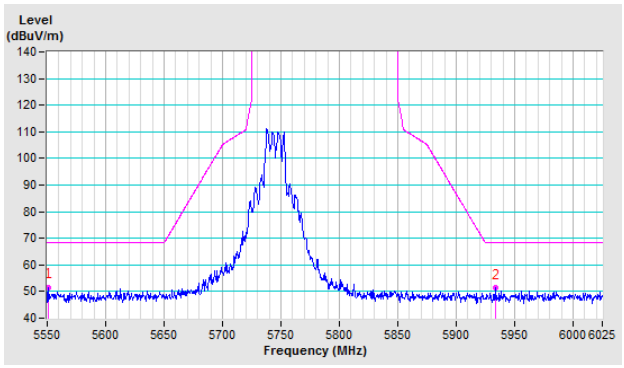
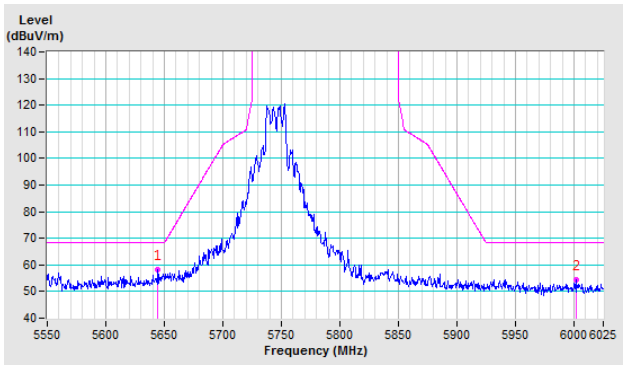
5 Pictures of Test Arrangements

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

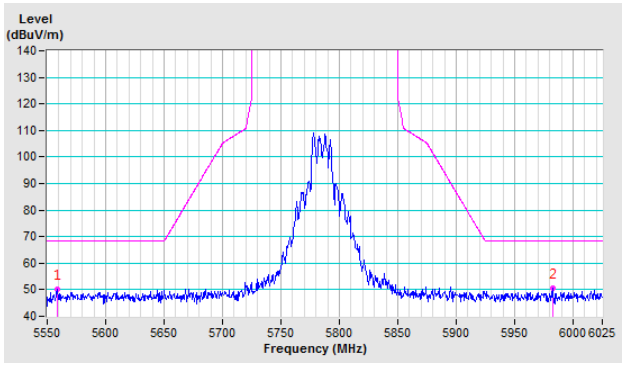
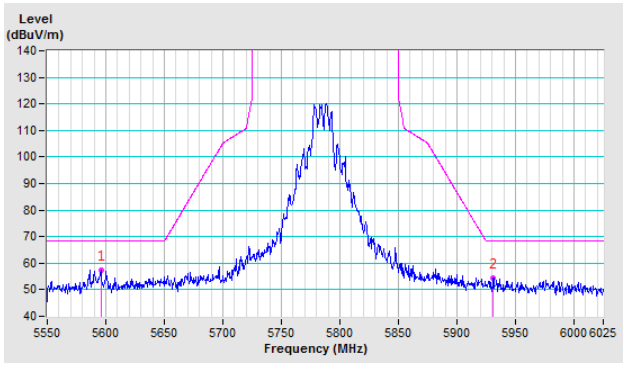
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

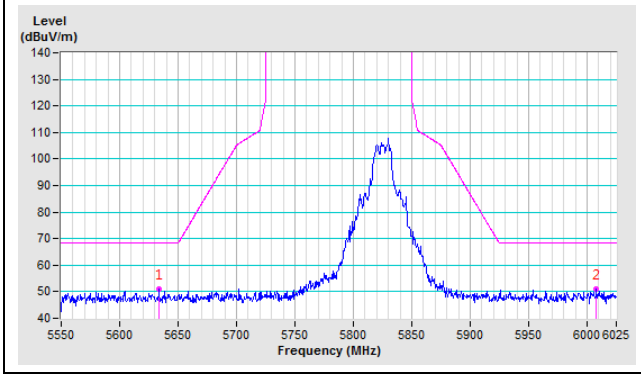
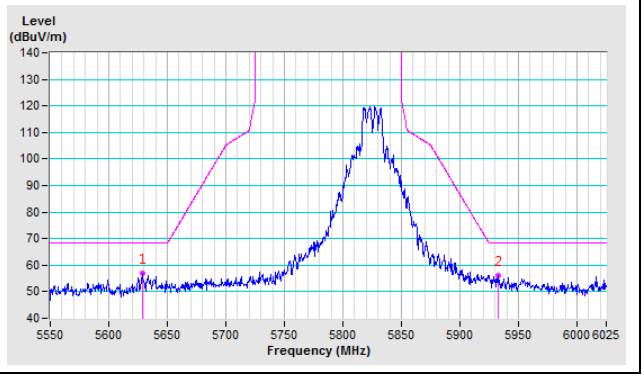
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

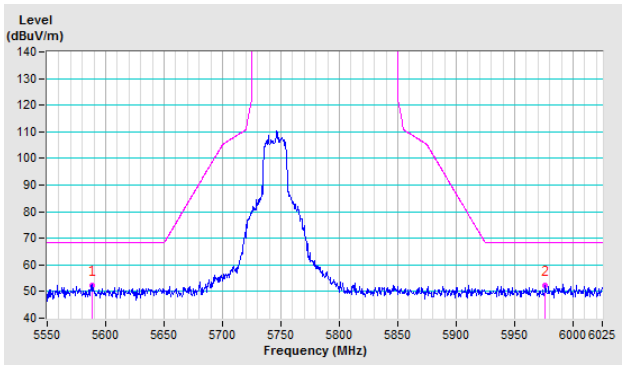
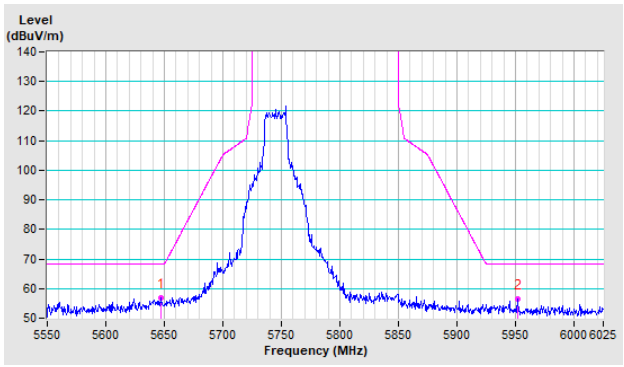
Horizontal	Vertical
	

CH 165 5825 MHz

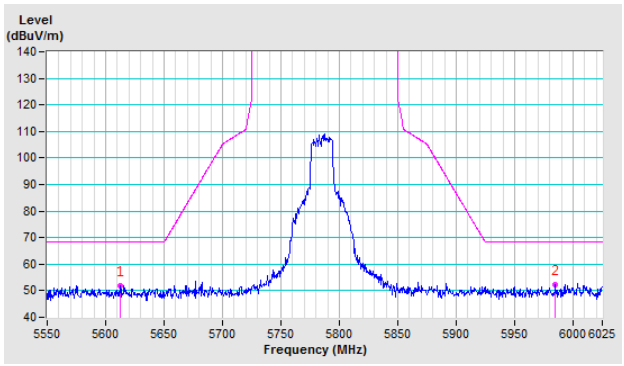
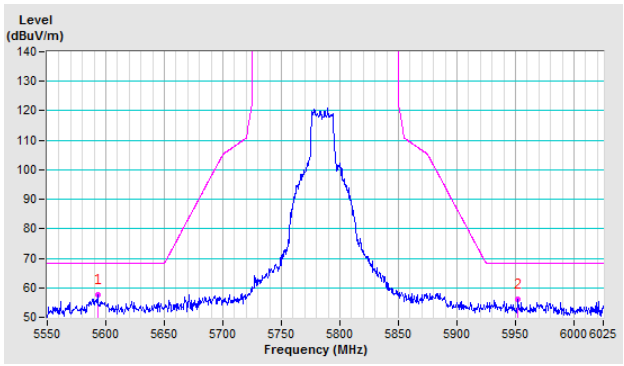
Horizontal	Vertical
	

802.11ax (HE20)

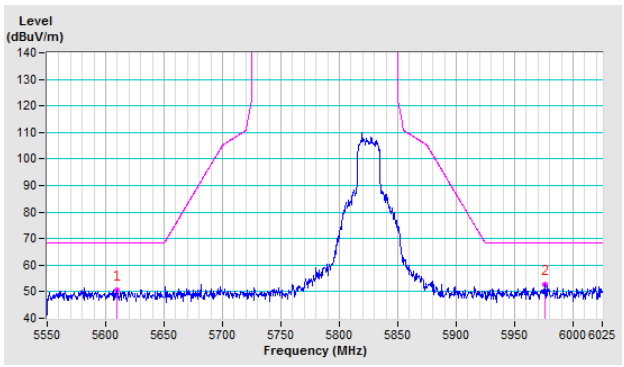
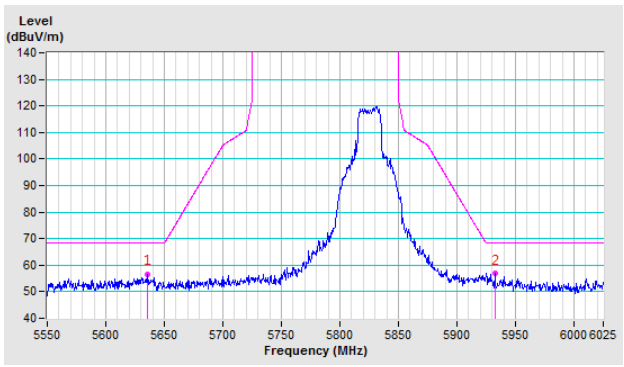
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

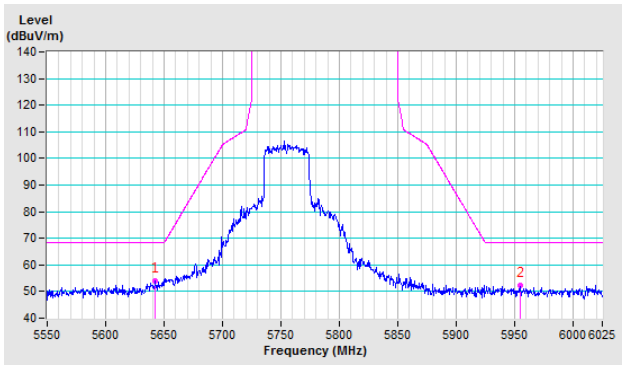
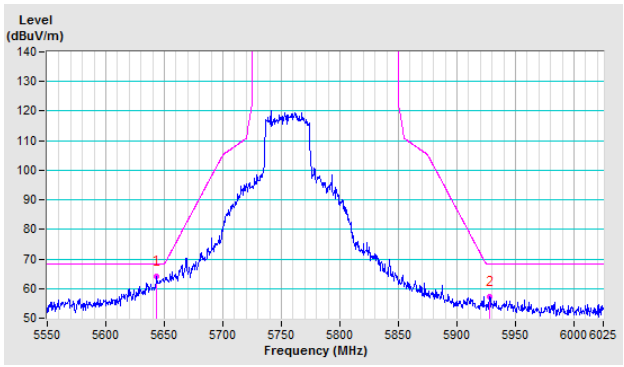
Horizontal	Vertical
	

CH 165 5825 MHz

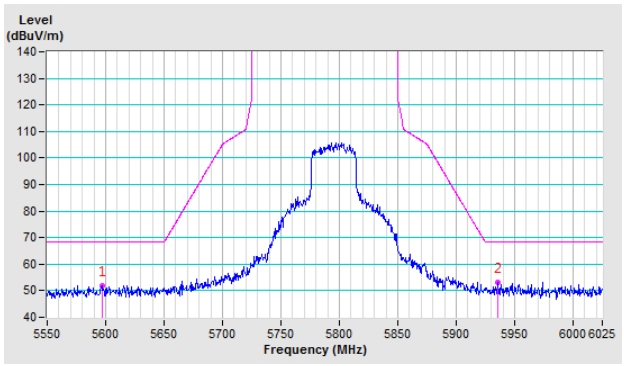
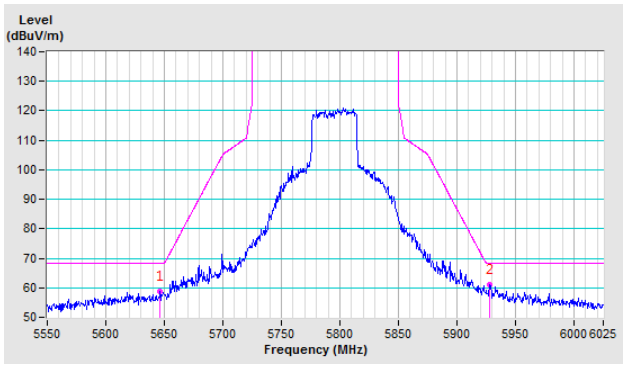
Horizontal	Vertical
	

802.11ax (HE40)

CH 151 5755 MHz

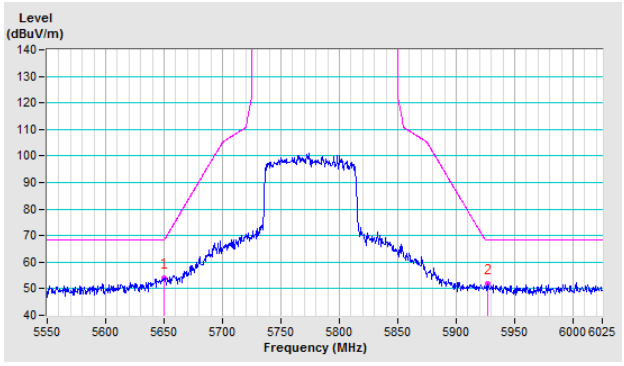
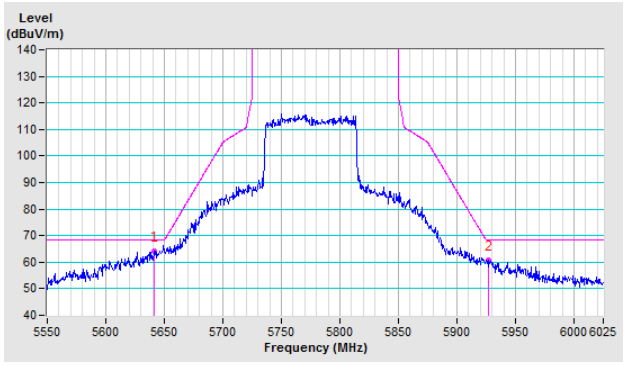
Horizontal	Vertical
	

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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