FCC Test Report

Report No.:	RF190806E11-1
FCC ID:	I88EX5510-B0
Test Model:	EX5510-B0, PX7511-B0, DX5510-B0
Received Date:	Aug. 06, 2019
Test Date:	Aug. 19 to Sep. 10, 2019
Issued Date:	Oct. 04, 2019
Applicant:	Zyxel Communications Corporation
Address:	No.2 Industry East RD. IX, Hsinchu Science Park, Hsinchu 30075, Taiwan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
RF190806E11-1	Original release.	Oct. 04, 2019

1 Certificate of Conformity

Product:	Dual-Band Wireless AX Gigabit Ethernet Gateway, Wireless AX 10G PON Gateway with VoIP, Wireless AX VDSL Bonding Gateway
Brand:	ZYXEL
Test Model:	EX5510-B0, PX7511-B0, DX5510-B0
Sample Status:	ENGINEERING SAMPLE
Applicant:	Zyxel Communications Corporation
Test Date:	Aug. 19 to Sep. 10, 2019
Standard:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10: 2013

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

Prepared by : Wendy Wu , **Date:** Oct. 04, 2019

Wendy Wu / Specialist

Approved by : , **Date:** Oct. 04, 2019

May Chen / 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 -11.40dB at 0.30625MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5150.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(mhf) not a standard connector.

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

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

2.1 Measurement Uncertainty

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

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

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Dual-Band Wireless AX Gigabit Ethernet Gateway, Wireless AX 10G PON Gateway with VoIP, Wireless AX VDSL Bonding Gateway
Brand	ZYXEL
Test Model	EX5510-B0, PX7511-B0, DX5510-B0
CPU Model No.	EX5510-B0: BCM68360 PX7511-B0:BCM68580X DX5510-B0:BCM63158
RF Chip Model No.	2.4G Chip:BCM43684 5G Chip:BCM43684
FW Version	EX5510-B0: V5.15(ABQX.0)C0 PX7511-B0:V5.15(ABPT.0)b4 DX5510-B0:V5.16(ABRC.0)b3
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter or UPS
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT20/40 in 2.4GHz 1024QAM for OFDMA in 11ax HE mode
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 3466.7Mbps 802.11ax: up to 4803.9Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20): 11 802.11n (HT40), VHT40, 802.11ax (HE40): 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 9 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 4 802.11ac (VHT80), 802.11ax (HE80): 2
Output Power	**Non-Beamforming Mode:** **2.4GHz:** 995.204mW **5.18 ~ 5.24GHz:** 975.47mW **5.745 ~ 5.825GHz:** 988.981mW **Beamforming Mode:** **2.4GHz:** 935.096mW **5.18 ~ 5.24GHz:** 975.47mW **5.745 ~ 5.825GHz:** 988.05mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note

Accessory Device	**for EX5510-B0** - AC Adaptor, Brand:DVE, Model:DSA-42PFH-12 FUS 120350 - Ethernet Cable , Non-shielded, 1m x1 - Wallmount kit x1 **for PX7511-B0** - AC Adaptor, Brand:DVE, Model:DSA-42PFH-12 FUS 120350 - Ethernet Cable , Non-shielded, 1.8m x1 - Phone Cable , Non-shielded, 1.8m x1 **for DX5510-B0** - AC Adaptor, Brand:DVE, Model:DSA-42PFH-12 FUS 120350 - Ethernet Cable , Non-shielded, 1.8m x1 - Phone Cable , Non-shielded, 1.8m x1 - Wallmount kit x1
Data Cable Supplied	NA

Note:

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

Equipment Name	Model	CPU	35b/g.fast Bonding	XGS-PON	WAN (2.5G)	LAN (10G/2.5G)	LAN (GE)	USB 3.1	FXS	Wi-Fi	Adapter	UPS
Dual-Band Wireless AX Gigabit Ethernet Gateway	EX5510-B0	BCM68360	-	-	x1	-	x4	x1	-	V	12V/3.5A	-
Wireless AX 10G PON Gateway with VoIP	PX7511-B0	BCM68580X	-	x1	-	x1	x4	x1	x2	V	12V/3.5A	V
Wireless AX VDSL Bonding Gateway	DX5510-B0	BCM63158	x1	-	x1	-	x4	x1	-	V	12V/3.5A	-

2. The EUT could be supplied with adapter or UPS (only for model: PX7511-B0) as the following table:

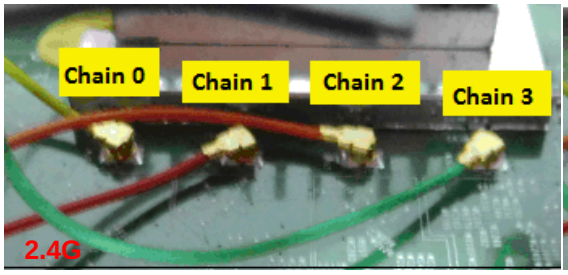
Adapter		
Brand	Model No.	Spec.
DVE	DSA-42PFH-12 FUS 120350	Input: 100-240Vac, 1.2A, 50/60Hz Output: 12V, 3.5A DC Output cable: Unshielded, 1.5m with one core
UPS (only for test, not for sale)		
Brand	Model No.	Spec.
CyberPower	DTC36U12V3-G	Input: 100-240Vac, 1.0A, 50-60Hz Output: 12V, 36W

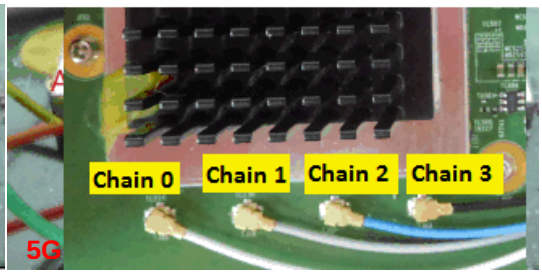
3. Simultaneously transmission condition.

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

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

Ant. No.	Chain No.	Brand	Model	Antenna Gain (dBi)	Frequency range (GHz)	Antenna Type	Connector Type	Cable Length (mm)
1	2G Chain 2	Airgain	65-034-000014B	0.12	2.4~2.4835	Dipole	i-pex (MHF)	150
2	2G Chain 3		65-034-000015B	0.12	2.4~2.4835 5.15~5.85 (5G for RX zero wait DFS)	Dipole	i-pex (MHF)	100
3	2G Chain 0		65-034-000016B	0.12	2.4~2.4835	Dipole	i-pex (MHF)	65
4	2G Chain 1		65-034-000017B	0.12	2.4~2.4835	Dipole	i-pex (MHF)	130
5	5G Chain 2	Airgain	65-034-000018B	0	5.15~5.85	Dipole	i-pex (MHF)	195
6	5G Chain 0		65-034-000019B	0	5.15~5.85	Dipole	i-pex (MHF)	150
7	5G Chain 3		65-034-000020B	0	5.15~5.85	Dipole	i-pex (MHF)	250
8	5G Chain 1		65-034-000021B	0	5.15~5.85	Dipole	i-pex (MHF)	230





* Antenna port location

5. For Model: PX7511-B0, AC power conducted emissions was pre-tested under the following modes:

Test Mode	Description
Mode A	Power from adapter
Mode B	**Power from UPS**
Note: From the above modes, the worst case was found in **Mode B**. Therefore only the test data of the mode was recorded in this report.	

6. For Model: PX7511-B0, radiated emissions was pre-tested under the following modes:

Test Mode	Description
Mode A	**Power from adapter**
Mode B	Power from UPS
Note: From the above modes, the worst case was found in **Mode A**. Therefore only the test data of the mode was recorded in this report.	

7. The EUT incorporates a MIMO function:

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

Note:
1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
2. The EUT support Beamforming and non-beamforming mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz), 802.11ac mode for 20MHz (40MHz, 80MHz, 160MHz) and 802.11ax mode for 20MHz (40MHz, 80MHz, 160MHz), therefore the manufacturer will control the 802.11n mode power as same as 802.11ac and investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

8. The power setting are list as below:

Non-Beamforming Mode							
802.11a		**802.11ax (HE20)**		**802.11ax (HE40)**		**802.11ax (HE80)**	
Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting
5180	92	5180	87	5190	79	5210	75
5200	98	5200	96	5230	85	5775	90
5240	88	5240	86	5755	97		
5745	97	5745	97	5795	97		
5785	97	5785	97				
5825	97	5825	97				

802.11ac (VHT20)		**802.11ac (VHT40)**		**802.11ac (VHT80)**	
Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting	**Frequency (MHz)**	**Power Setting**
5180	87	5190	79	5210	75
5200	96	5230	85	5775	90
5240	86	5755	97		
5745	97	5795	97		
5785	97				
5825	97				

Beamforming Mode					
802.11ax (HE20)		**802.11ax (HE40)**		**802.11ax (HE80)**	
Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting
5180	87	5190	79	5210	75
5200	96	5230	85	5775	90
5240	86	5755	97		
5745	97	5795	97		
5785	97				
5825	97				
802.11ac (VHT20)		**802.11ac (VHT40)**		**802.11ac (VHT80)**	
Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting
5180	87	5190	79	5210	75
5200	96	5230	85	5775	90
5240	86	5755	97		
5745	97	5795	97		
5785	97				
5825	97				

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

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

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

Channel	Frequency
42	5210 MHz

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
1	√	√	√	√	EX5510-B0
2	-	√	√	-	PX7511-B0
3	-	√	√	-	DX5510-B0

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

Radiated Emission Test (Above 1GHz):

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

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

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

Radiated Emission Test (Below 1GHz):

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

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

Non-Beamforming Mode (EX5510-B0)						
Mode	**FREQ. Band (MHz)**	**Available Channel**	**Tested Channel**	**Modulation Technology**	**Modulation Type**	**Data Rate Parameter**
802.11ax (HE20)	5180-5240 5745-5825	36 to 48 149 to 165	149	OFDMA	BPSK	MCS0
Non-Beamforming Mode (PX7511-B0)						
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
Non-Beamforming Mode (DX5510-B0)						
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.

Non-Beamforming Mode (EX5510-B0)						
Mode	**FREQ. Band (MHz)**	**Available Channel**	**Tested Channel**	**Modulation Technology**	**Modulation Type**	**Data Rate Parameter**
802.11ax (HE20)	5180-5240 5745-5825	36 to 48 149 to 165	149	OFDMA	BPSK	MCS0
Non-Beamforming Mode (PX7511-B0)						
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
Non-Beamforming Mode (DX5510-B0)						
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.

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

Test Condition:

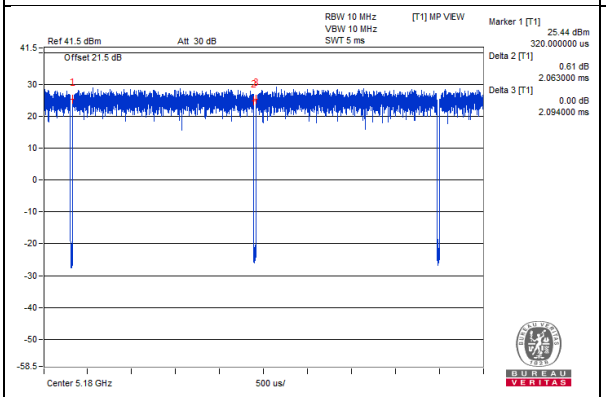
Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	23deg. C7, 68%RH	120Vac, 60Hz	Nelson Teng
RE<1G	22deg. C, 66%RH	120Vac, 60Hz	Andy Ho
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng

3.3 Duty Cycle of Test Signal

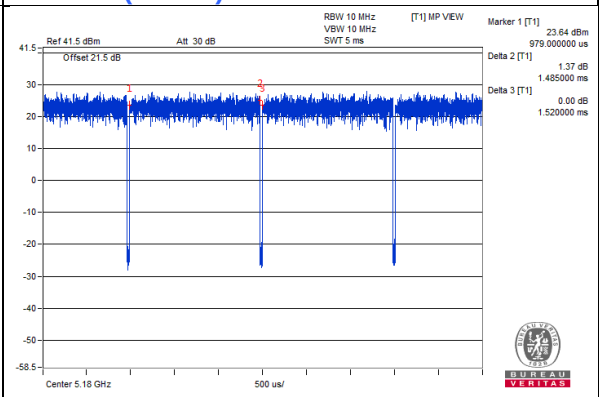
If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11a: Duty cycle = 2.063 ms/2.094 ms = 0.985
802.11ac (VHT20): Duty cycle = 1.485 ms/1.52 ms = 0.977, Duty factor = 10 * log (1/Duty cycle) = 0.1
802.11ac (VHT40): Duty cycle = 0.777 ms/0.81 ms = 0.959, Duty factor = 10 * log (1/Duty cycle) = 0.2
802.11ac (VHT80): Duty cycle = 0.413 ms/0.447 ms = 0.924, Duty factor = 10 * log (1/Duty cycle) = 0.3
802.11ax (HE20): Duty cycle = 1.485 ms/1.52 ms = 0.977, Duty factor = 10 * log (1/Duty cycle) = 0.1
802.11ax (HE40): Duty cycle = 0.777 ms/0.81 ms = 0.959, Duty factor = 10 * log (1/Duty cycle) = 0.18
802.11ax (HE80): Duty cycle = 0.413 ms/0.447 ms = 0.924, Duty factor = 10 * log (1/Duty cycle) = 0.34

802.11a



802.11ac (VHT20)



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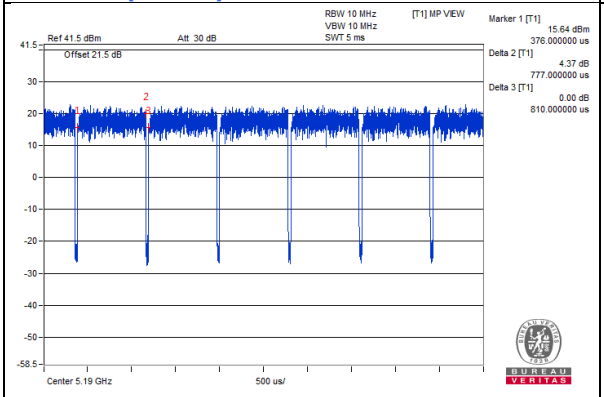

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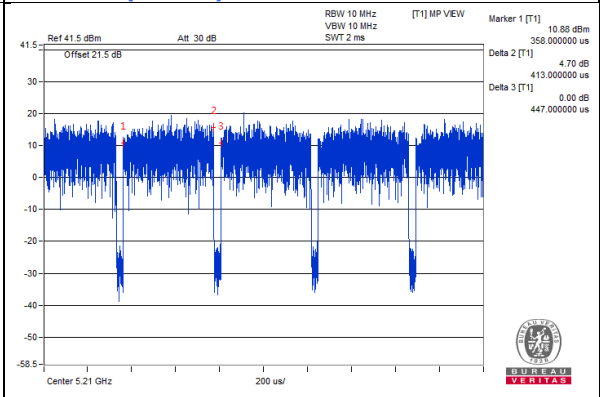
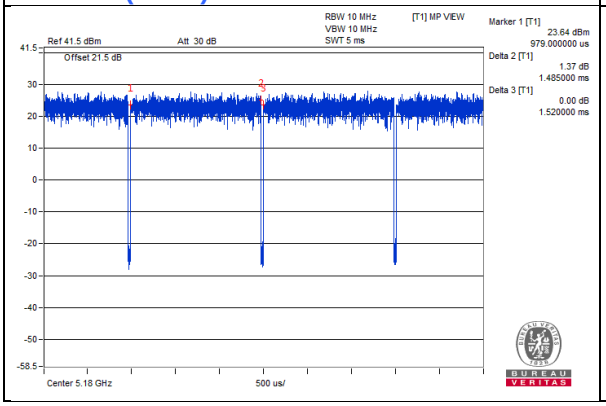
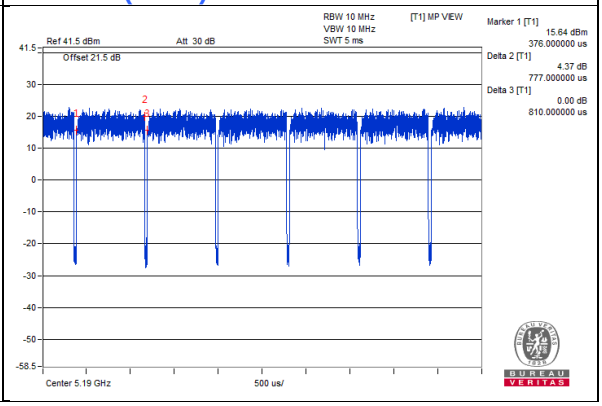


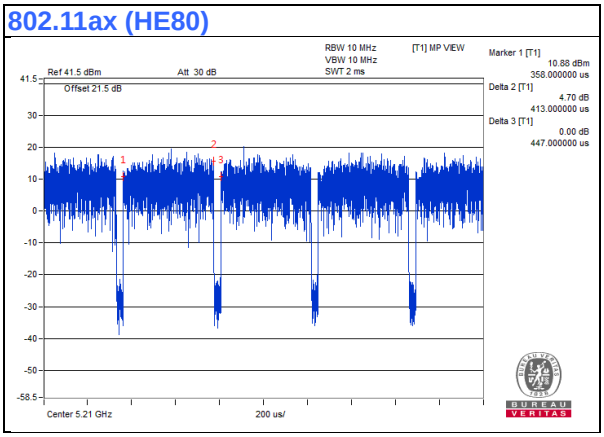
802.11ax (HE20)



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	Lenovo	81A4	YD02YN7P	PD93165NGU	Provided by Lab
B.	UPS	CyberPower	DTC36U12V3-G	NA	NA	Supplied by client

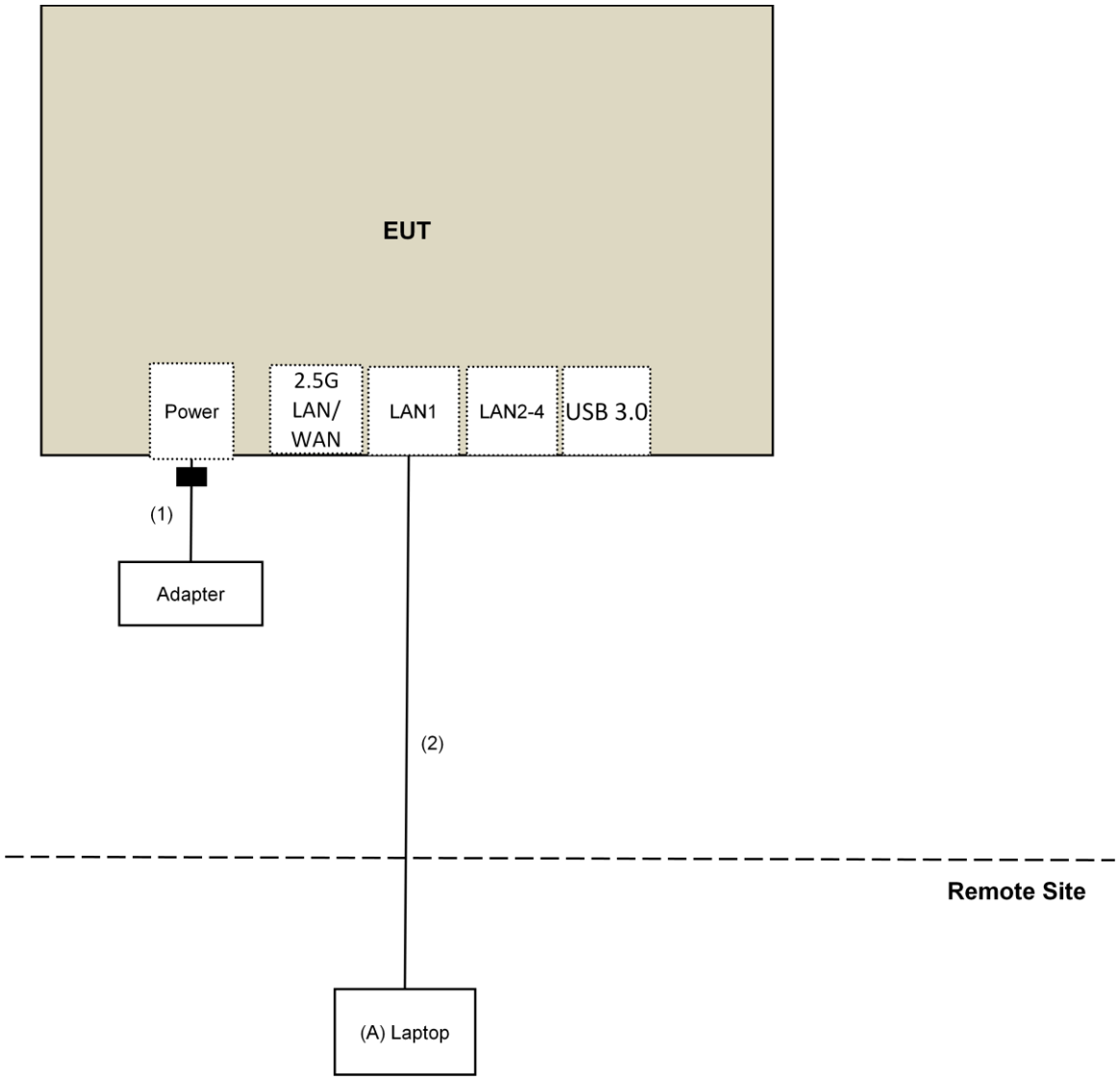
Note:

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

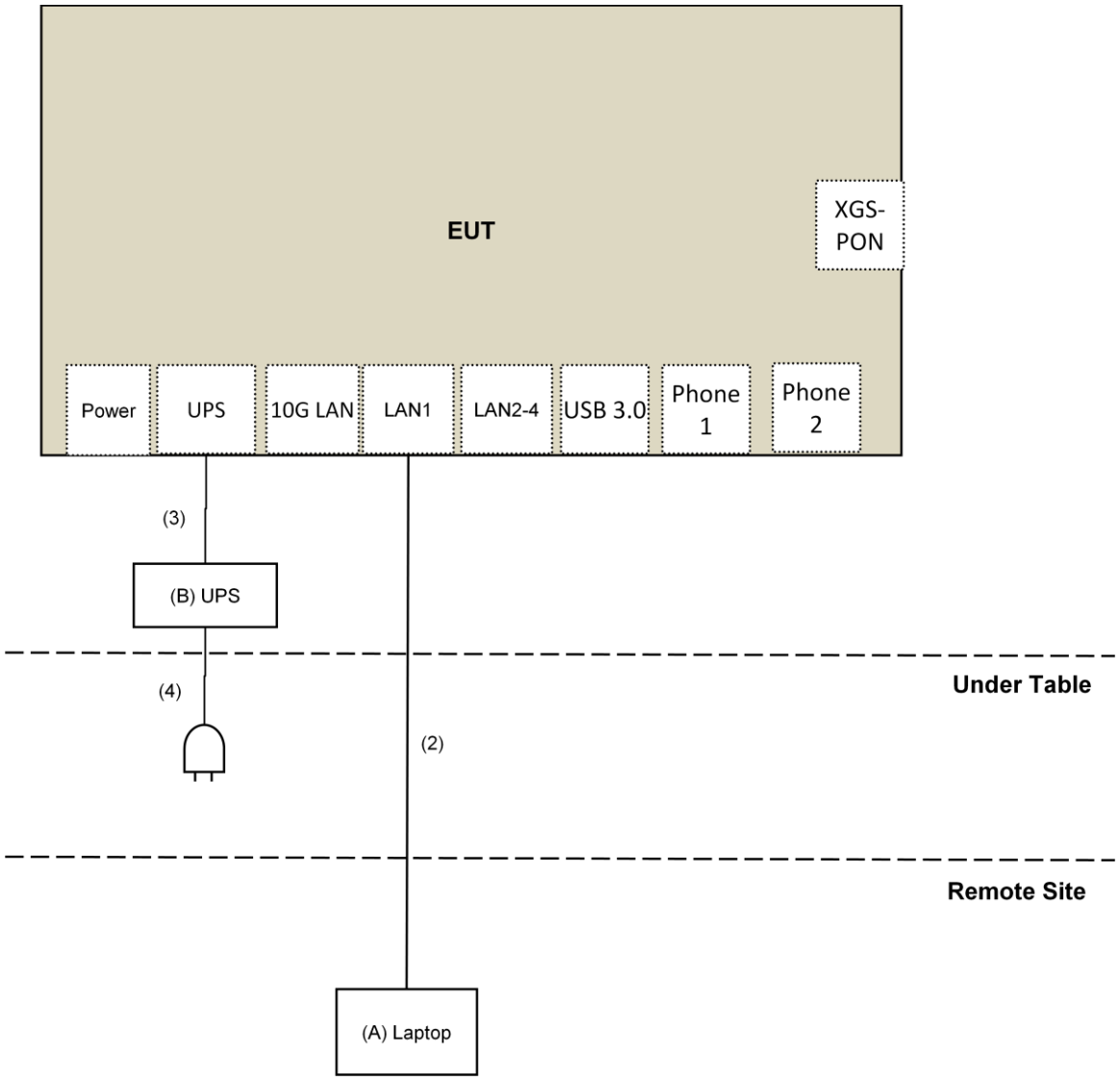
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.5	No	1	Supplied by client
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	UPS Cable	1	2.95	No	0	Supplied by client
4.	AC Cable	1	1.8	No	0	Supplied by client

3.4.1 Configuration of System under Test

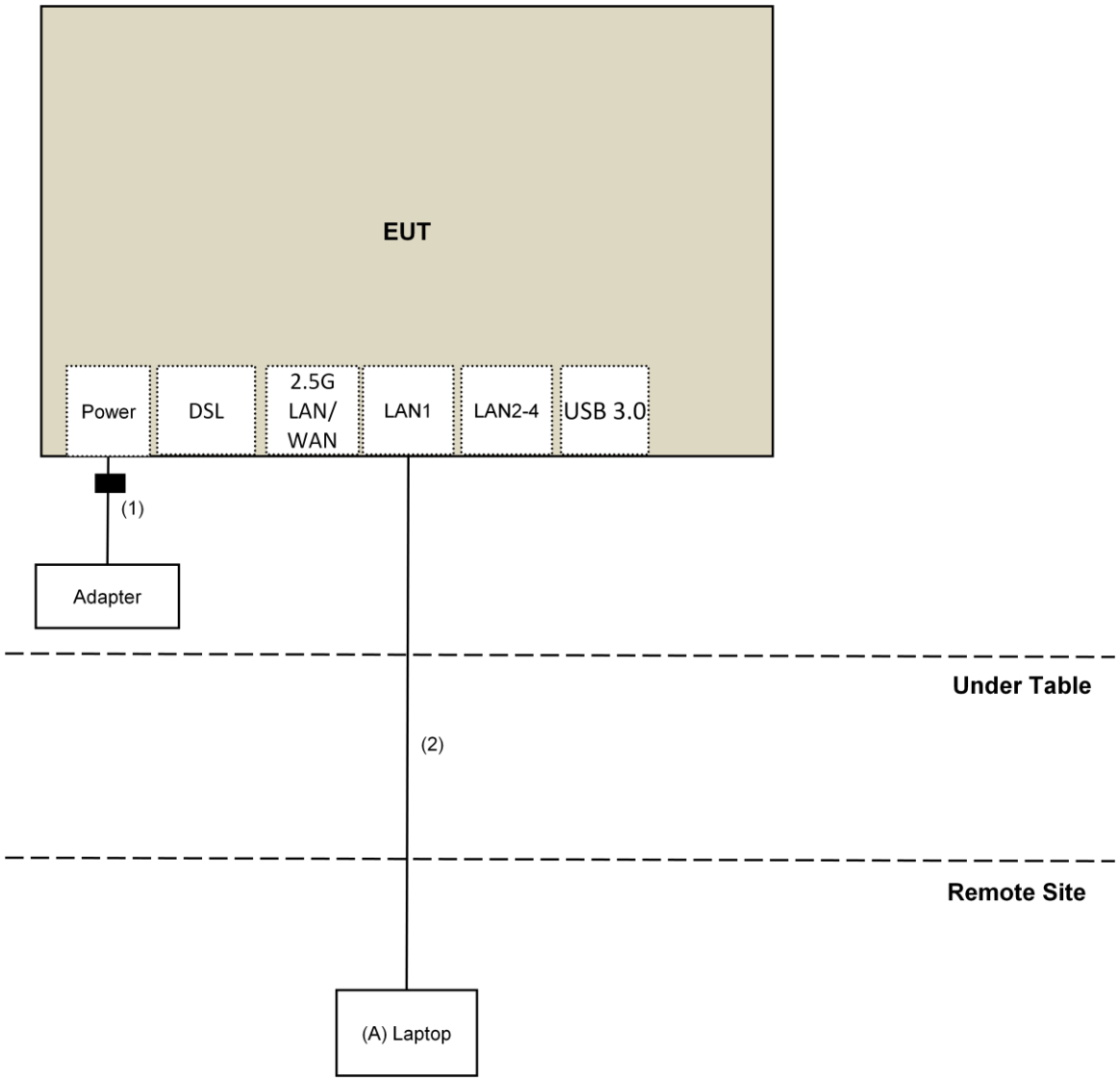
For Model: EX5501-B0 and Radiated Emission Test (Above 1GHz):



Conducted Emissions test for Model: PX7511-B0:



For Model: DX5501-B0:



3.5 General Description of Applied Standard

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

FCC Part 15, Subpart E (15.407)
KDB 789033 D02 General UNII Test Procedure New Rules v02r01
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

Limits of unwanted emission out of the restricted bands

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

Note:

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

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ESR7 R&S	ESR7	102026	Apr. 24, 2019	Apr. 23, 2020
Spectrum Analyzer Keysight	N9030B	MY57141948	May 25, 2019	May 24, 2020
Pre-Amplifier EMCI	EMC001340	980142	May 30, 2019	May 29, 2020
Loop Antenna Electro-Metrics	EM-6879	264	Jan. 22, 2019	Jan. 21, 2020
RF Cable	NA	LOOPCAB-001	Jan. 14, 2019	Jan. 13, 2020
RF Cable	NA	LOOPCAB-002	Jan. 14, 2019	Jan. 13, 2020
Pre-Amplifier EMCI	EMC330N	980538	Apr. 30, 2019	Apr. 29, 2020
Trilog Broadband Antenna SCHWARZBECK	VULB9168	9168-0842	Nov. 21, 2018	Nov. 20, 2019
RF Cable	8D	966-5-1	May 03, 2019	May 02, 2020
RF Cable	8D	966-5-2	May 03, 2019	May 02, 2020
RF Cable	8D	966-5-3	May 03, 2019	May 02, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-02	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-1819	Nov. 25, 2018	Nov. 24, 2019
Pre-Amplifier EMCI	EMC12630SE	980509	May 03, 2019	May 02, 2020
RF Cable EMCI	EMC104-SM-SM-1500	180503	May 03, 2019	May 02, 2020
RF Cable EMCI	EMC104-SM-SM-2000	180501	May 03, 2019	May 02, 2020
RF Cable EMCI	EMC104-SM-SM-6000	180505	May 03, 2019	May 02, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 25, 2018	Nov. 24, 2019
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 04, 2019	June 03, 2020
Power meter Anritsu	ML2495A	1014008	May 13, 2019	May 12, 2020
Power sensor Anritsu	MA2411B	0917122	May 13, 2019	May 12, 2020
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 09, 2019	Jan. 08, 2020

True RMS Clamp Meter FLUKE	325	31130711WS	May 21, 2019	May 20, 2020

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 5.
3. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Aug. 20 to Sep. 10, 2019

4.1.3 Test Procedure

For Radiated emission below 30MHz

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

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

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

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

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

NOTE:

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

For Radiated emission above 30MHz

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

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

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

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

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

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

Note:

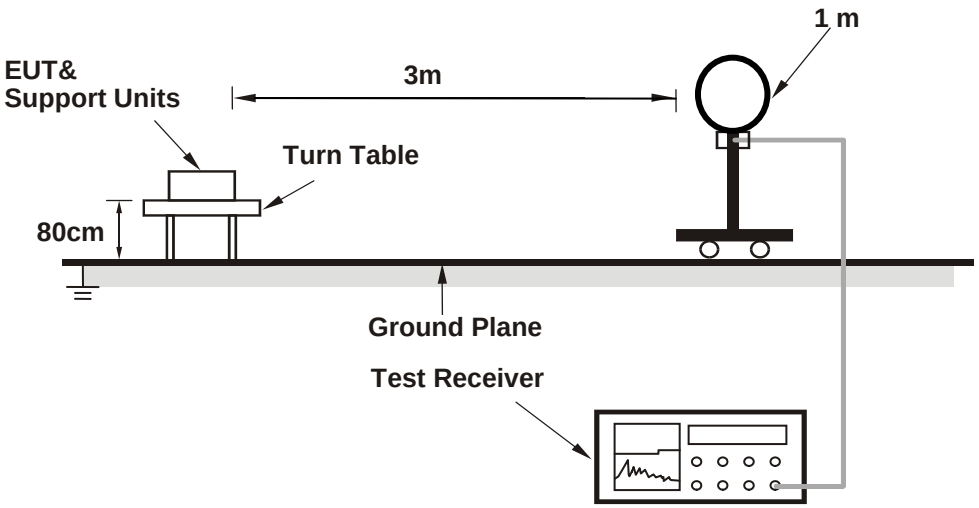
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

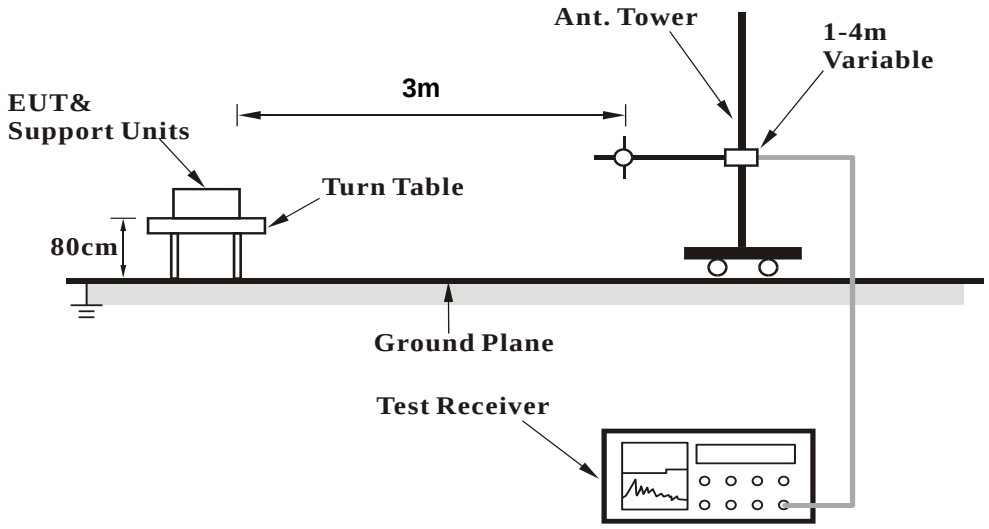
No deviation.

4.1.5 Test Setup

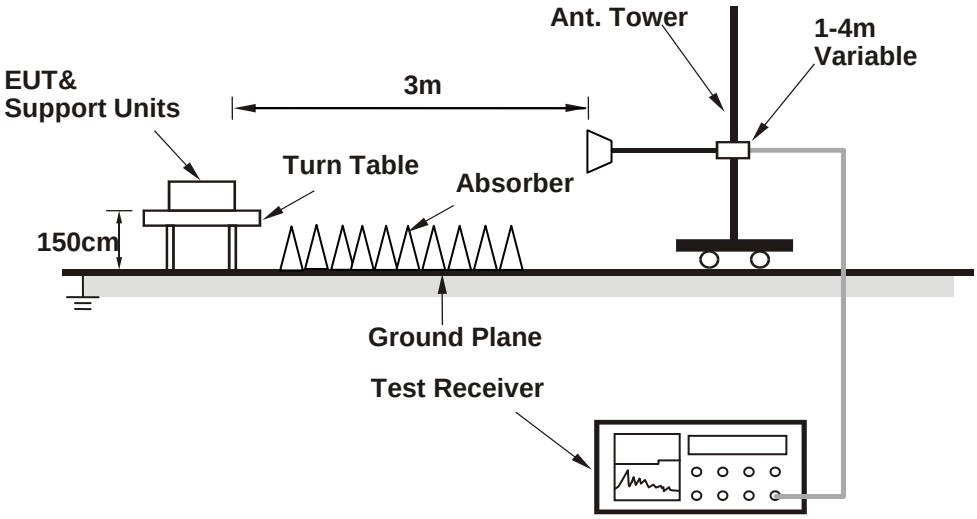
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

a. Connected the EUT with the Laptop which is placed on remote site.
b. Controlling software (5G Mtool v3.1.0.6) has been activated to set the EUT under transmission condition continuously frequency.

4.1.7 Test Results (Mode 1)

Above 1GHz Data:

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	71.8 PK	74.0	-2.2	1.50 H	219	69.7	2.1
2	5150.00	53.5 AV	54.0	-0.5	1.50 H	219	51.4	2.1
3	*5180.00	116.2 PK			1.50 H	219	114.4	1.8
4	*5180.00	106.9 AV			1.50 H	219	105.1	1.8
5	#10360.00	61.6 PK	68.2	-6.6	1.66 H	53	49.5	12.1
6	15540.00	53.9 PK	74.0	-20.1	1.35 H	46	41.7	12.2
7	15540.00	41.1 AV	54.0	-12.9	1.35 H	46	28.9	12.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	72.4 PK	74.0	-1.6	1.40 V	40	70.3	2.1
2	5150.00	53.7 AV	54.0	-0.3	1.40 V	40	51.6	2.1
3	*5180.00	119.7 PK			1.40 V	40	117.9	1.8
4	*5180.00	109.4 AV			1.40 V	40	107.6	1.8
5	#10360.00	58.4 PK	68.2	-9.8	1.42 V	229	46.3	12.1
6	15540.00	53.2 PK	74.0	-20.8	1.49 V	123	41.0	12.2
7	15540.00	39.2 AV	54.0	-14.8	1.49 V	123	27.0	12.2

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	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	*5200.00	121.1 PK			2.32 H	21	119.4	1.7
2	*5200.00	111.3 AV			2.32 H	21	109.6	1.7
3	#10400.00	64.3 PK	68.2	-3.9	1.78 H	53	51.9	12.4
4	15600.00	55.8 PK	74.0	-18.2	1.34 H	45	43.8	12.0
5	15600.00	43.8 AV	54.0	-10.2	1.34 H	45	31.8	12.0
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	*5200.00	121.3 PK			1.50 V	40	119.6	1.7
2	*5200.00	111.1 AV			1.50 V	40	109.4	1.7
3	#10400.00	60.5 PK	68.2	-7.7	1.42 V	123	48.1	12.4
4	15600.00	56.6 PK	74.0	-17.4	1.83 V	123	44.6	12.0
5	15600.00	43.3 AV	54.0	-10.7	1.83 V	123	31.3	12.0

REMARKS:

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

CHANNEL	TX Channel 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	117.7 PK			1.72 H	152	116.3	1.4
2	*5240.00	107.9 AV			1.72 H	152	106.5	1.4
3	5350.00	51.8 PK	74.0	-22.2	1.72 H	152	50.3	1.5
4	5350.00	41.3 AV	54.0	-12.7	1.72 H	152	39.8	1.5
5	#10480.00	55.2 PK	68.2	-13.0	1.50 H	272	42.4	12.8
6	15720.00	53.7 PK	74.0	-20.3	1.48 H	269	42.1	11.6
7	15720.00	42.4 AV	54.0	-11.6	1.48 H	269	30.8	11.6
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	118.6 PK			1.55 V	32	117.2	1.4
2	*5240.00	110.0 AV			1.55 V	32	108.6	1.4
3	5350.00	55.7 PK	74.0	-18.3	1.55 V	32	54.2	1.5
4	5350.00	44.6 AV	54.0	-9.4	1.55 V	32	43.1	1.5
5	#10480.00	61.8 PK	68.2	-6.4	2.71 V	56	49.0	12.8
6	15720.00	54.8 PK	74.0	-19.2	1.48 V	340	43.2	11.6
7	15720.00	42.5 AV	54.0	-11.5	1.48 V	340	30.9	11.6

REMARKS:

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

CHANNEL	TX Channel 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	#5581.90	52.7 PK	68.2	-15.5	1.62 H	340	50.6	2.1
2	*5745.00	118.2 PK			1.62 H	340	115.9	2.3
3	*5745.00	108.1 AV			1.62 H	340	105.8	2.3
4	#5951.73	52.9 PK	68.2	-15.3	1.62 H	340	50.0	2.9
5	11490.00	66.6 PK	74.0	-7.4	2.92 H	48	52.5	14.1
6	11490.00	53.3 AV	54.0	-0.7	2.92 H	48	39.2	14.1
7	#17235.00	60.2 PK	68.2	-8.0	1.53 H	133	42.5	17.7
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	#5607.03	52.9 PK	68.2	-15.3	2.14 V	40	50.8	2.1
2	*5745.00	119.7 PK			2.14 V	40	117.4	2.3
3	*5745.00	109.5 AV			2.14 V	40	107.2	2.3
4	#5975.99	54.9 PK	68.2	-13.3	2.14 V	40	52.0	2.9
5	11490.00	59.3 PK	74.0	-14.7	1.51 V	60	45.2	14.1
6	11490.00	43.9 AV	54.0	-10.1	1.51 V	60	29.8	14.1
7	#17235.00	57.7 PK	68.2	-10.5	1.97 V	58	40.0	17.7

REMARKS:

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

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	#5608.00	52.7 PK	68.2	-15.5	1.56 H	343	50.6	2.1
2	*5785.00	119.0 PK			1.56 H	343	116.6	2.4
3	*5785.00	108.5 AV			1.56 H	343	106.1	2.4
4	#5949.20	53.5 PK	68.2	-14.7	1.56 H	343	50.6	2.9
5	11570.00	63.6 PK	74.0	-10.4	1.49 H	69	49.5	14.1
6	11570.00	52.0 AV	54.0	-2.0	1.49 H	69	37.9	14.1
7	#17355.00	60.0 PK	68.2	-8.2	1.48 H	134	41.7	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	#5597.94	52.6 PK	68.2	-15.6	2.32 V	41	50.5	2.1
2	*5785.00	119.5 PK			2.32 V	41	117.1	2.4
3	*5785.00	109.2 AV			2.32 V	41	106.8	2.4
4	#5929.96	55.1 PK	68.2	-13.1	2.32 V	41	52.4	2.7
5	11570.00	60.8 PK	74.0	-13.2	2.28 V	134	46.7	14.1
6	11570.00	48.3 AV	54.0	-5.7	2.28 V	134	34.2	14.1
7	#17355.00	56.0 PK	68.2	-12.2	1.54 V	60	37.7	18.3

REMARKS:

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

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	#5635.41	50.9 PK	68.2	-17.3	1.66 H	104	48.9	2.0
2	*5825.00	118.7 PK			1.66 H	110	116.2	2.5
3	*5825.00	108.9 AV			1.66 H	110	106.4	2.5
4	#5957.29	51.7 PK	68.2	-16.5	1.66 H	104	48.8	2.9
5	11650.00	65.7 PK	74.0	-8.3	1.87 H	251	51.8	13.9
6	11650.00	52.9 AV	54.0	-1.1	1.87 H	251	39.0	13.9
7	#17475.00	62.5 PK	68.2	-5.7	1.50 H	316	43.0	19.5
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	#5637.87	53.2 PK	68.2	-15.0	1.87 V	35	51.2	2.0
2	*5825.00	119.8 PK			1.87 V	35	117.3	2.5
3	*5825.00	110.2 AV			1.87 V	35	107.7	2.5
4	#5964.48	56.4 PK	68.2	-11.8	1.87 V	35	53.5	2.9
5	11650.00	61.6 PK	74.0	-12.4	2.88 V	244	47.7	13.9
6	11650.00	49.9 AV	54.0	-4.1	2.88 V	244	36.0	13.9
7	#17475.00	56.1 PK	68.2	-12.1	1.50 V	240	36.6	19.5

REMARKS:

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

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	69.5 PK	74.0	-4.5	2.11 H	164	67.4	2.1
2	5150.00	53.4 AV	54.0	-0.6	2.11 H	164	51.3	2.1
3	*5180.00	115.8 PK			2.11 H	164	114.0	1.8
4	*5180.00	105.0 AV			2.11 H	164	103.2	1.8
5	#10360.00	54.3 PK	68.2	-13.9	1.96 H	211	42.2	12.1
6	15540.00	48.0 PK	74.0	-26.0	1.36 H	281	35.8	12.2
7	15540.00	37.5 AV	54.0	-16.5	1.36 H	281	25.3	12.2
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	73.6 PK	74.0	-0.4	1.60 V	29	71.5	2.1
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.60 V**	**29**	**51.8**	**2.1**
3	*5180.00	120.2 PK			1.60 V	29	118.4	1.8
4	*5180.00	108.4 AV			1.60 V	29	106.6	1.8
5	#10360.00	55.0 PK	68.2	-13.2	1.51 V	124	42.9	12.1
6	15540.00	48.3 PK	74.0	-25.7	1.65 V	134	36.1	12.2
7	15540.00	37.6 AV	54.0	-16.4	1.65 V	134	25.4	12.2

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	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	*5200.00	119.7 PK			1.48 H	171	118.0	1.7
2	*5200.00	108.2 AV			1.48 H	171	106.5	1.7
3	#10400.00	63.7 PK	68.2	-4.5	1.01 H	60	51.3	12.4
4	15600.00	51.7 PK	74.0	-22.3	1.52 H	181	39.7	12.0
5	15600.00	39.4 AV	54.0	-14.6	1.52 H	181	27.4	12.0
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	*5200.00	122.0 PK			1.59 V	32	120.3	1.7
2	*5200.00	111.0 AV			1.59 V	32	109.3	1.7
3	#10400.00	59.5 PK	68.2	-8.7	1.38 V	237	47.1	12.4
4	15600.00	52.0 PK	74.0	-22.0	1.70 V	126	40.0	12.0
5	15600.00	40.5 AV	54.0	-13.5	1.70 V	126	28.5	12.0

REMARKS:

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

CHANNEL	TX Channel 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	118.3 PK			1.94 H	332	116.9	1.4
2	*5240.00	105.8 AV			1.94 H	332	104.4	1.4
3	5350.00	51.6 PK	74.0	-22.4	1.94 H	332	50.1	1.5
4	5350.00	39.6 AV	54.0	-14.4	1.94 H	332	38.1	1.5
5	#10480.00	58.6 PK	68.2	-9.6	1.30 H	59	45.8	12.8
6	15720.00	48.2 PK	74.0	-25.8	1.56 H	102	36.6	11.6
7	15720.00	35.6 AV	54.0	-18.4	1.56 H	102	24.0	11.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	120.8 PK			1.65 V	31	119.4	1.4
2	*5240.00	108.4 AV			1.65 V	31	107.0	1.4
3	5350.00	55.1 PK	74.0	-18.9	1.65 V	31	53.6	1.5
4	5350.00	43.8 AV	54.0	-10.2	1.65 V	31	42.3	1.5
5	#10480.00	53.7 PK	68.2	-14.5	1.88 V	129	40.9	12.8
6	15720.00	48.6 PK	74.0	-25.4	1.43 V	238	37.0	11.6
7	15720.00	36.0 AV	54.0	-18.0	1.43 V	238	24.4	11.6

REMARKS:

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

CHANNEL	TX Channel 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	#5581.99	59.9 PK	68.2	-8.3	2.87 H	359	57.8	2.1
2	*5745.00	119.1 PK			2.87 H	259	116.8	2.3
3	*5745.00	108.2 AV			2.87 H	259	105.9	2.3
4	#5943.20	60.6 PK	68.2	-7.6	2.87 H	259	57.8	2.8
5	11490.00	63.8 PK	74.0	-10.2	2.94 H	53	49.7	14.1
6	11490.00	52.9 AV	54.0	-1.1	2.94 H	53	38.8	14.1
7	#17235.00	57.7 PK	68.2	-10.5	1.58 H	132	40.0	17.7
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	#5586.01	60.5 PK	68.2	-7.7	2.14 V	213	58.4	2.1
2	*5745.00	121.3 PK			2.14 V	213	119.0	2.3
3	*5745.00	109.1 AV			2.14 V	213	106.8	2.3
4	#5986.70	61.4 PK	68.2	-6.8	2.14 V	213	58.5	2.9
5	11490.00	59.5 PK	74.0	-14.5	1.42 V	133	45.4	14.1
6	11490.00	48.0 AV	54.0	-6.0	1.42 V	133	33.9	14.1
7	#17235.00	55.0 PK	68.2	-13.2	1.98 V	58	37.3	17.7

REMARKS:

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

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	#5627.56	59.3 PK	68.2	-8.9	2.88 H	350	57.2	2.1
2	*5785.00	120.0 PK			2.88 H	350	117.6	2.4
3	*5785.00	108.6 AV			2.88 H	350	106.2	2.4
4	#6000.66	61.2 PK	68.2	-7.0	2.88 H	350	58.3	2.9
5	11570.00	61.8 PK	74.0	-12.2	1.49 H	68	47.7	14.1
6	11570.00	51.0 AV	54.0	-3.0	1.49 H	68	36.9	14.1
7	#17355.00	58.6 PK	68.2	-9.6	1.48 H	135	40.3	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	#5642.67	60.2 PK	68.2	-8.0	2.13 V	214	58.2	2.0
2	*5785.00	122.0 PK			2.13 V	214	119.6	2.4
3	*5785.00	110.5 AV			2.13 V	214	108.1	2.4
4	#5955.41	62.0 PK	68.2	-6.2	2.13 V	214	59.1	2.9
5	11570.00	58.6 PK	74.0	-15.4	1.50 V	133	44.5	14.1
6	11570.00	47.5 AV	54.0	-6.5	1.50 V	133	33.4	14.1
7	#17355.00	54.5 PK	68.2	-13.7	1.52 V	60	36.2	18.3

REMARKS:

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

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	#5588.04	60.3 PK	68.2	-7.9	2.91 H	360	58.2	2.1
2	*5825.00	120.9 PK			2.91 H	360	118.4	2.5
3	*5825.00	108.8 AV			2.91 H	360	106.3	2.5
4	#5990.30	61.4 PK	68.2	-6.8	2.91 H	360	58.5	2.9
5	11650.00	64.6 PK	74.0	-9.4	1.63 H	121	50.7	13.9
6	11650.00	52.9 AV	54.0	-1.1	1.63 H	121	39.0	13.9
7	#17475.00	59.9 PK	68.2	-8.3	1.55 H	64	40.4	19.5
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	#5646.07	59.6 PK	68.2	-8.6	2.10 V	214	57.6	2.0
2	*5825.00	121.9 PK			2.10 V	214	119.4	2.5
3	*5825.00	109.6 AV			2.10 V	214	107.1	2.5
4	#5954.21	61.6 PK	68.2	-6.6	2.10 V	214	58.7	2.9
5	11650.00	63.0 PK	74.0	-11.0	1.33 V	66	49.1	13.9
6	11650.00	52.6 AV	54.0	-1.4	1.33 V	66	38.7	13.9
7	#17475.00	55.5 PK	68.2	-12.7	1.53 V	351	36.0	19.5

REMARKS:

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

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	72.9 PK	74.0	-1.1	2.26 H	214	70.8	2.1
2	5150.00	50.8 AV	54.0	-3.2	2.26 H	214	48.7	2.1
3	*5190.00	112.0 PK			1.52 H	34	110.2	1.8
4	*5190.00	101.1 AV			1.52 H	34	99.3	1.8
5	#10380.00	54.9 PK	68.2	-13.3	1.02 H	58	42.6	12.3
6	15570.00	44.7 PK	74.0	-29.3	1.64 H	242	32.5	12.2
7	15570.00	34.0 AV	54.0	-20.0	1.64 H	242	21.8	12.2
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	73.4 PK	74.0	-0.6	2.30 V	213	71.3	2.1
2	5150.00	52.1 AV	54.0	-1.9	2.30 V	213	50.0	2.1
3	*5190.00	113.9 PK			2.30 V	213	112.1	1.8
4	*5190.00	101.6 AV			2.30 V	213	99.8	1.8
5	#10380.00	52.0 PK	68.2	-16.2	1.79 V	234	39.7	12.3
6	15570.00	45.8 PK	74.0	-28.2	1.58 V	141	33.6	12.2
7	15570.00	33.8 AV	54.0	-20.2	1.58 V	141	21.6	12.2

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	113.9 PK			2.76 H	168	112.4	1.5
2	*5230.00	103.0 AV			2.76 H	168	101.5	1.5
3	5384.39	53.0 PK	74.0	-21.0	2.76 H	168	51.4	1.6
4	5384.39	41.8 AV	54.0	-12.2	2.76 H	168	40.2	1.6
5	#10460.00	47.9 PK	68.2	-20.3	1.87 H	249	35.2	12.7
6	15690.00	45.3 PK	74.0	-28.7	1.62 H	168	33.7	11.6
7	15690.00	33.5 AV	54.0	-20.5	1.62 H	168	21.9	11.6
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	113.7 PK			1.56 V	213	112.2	1.5
2	*5230.00	103.5 AV			1.56 V	213	102.0	1.5
3	5384.39	54.5 PK	74.0	-19.5	1.56 V	213	52.9	1.6
4	5384.39	43.1 AV	54.0	-10.9	1.56 V	213	41.5	1.6
5	#10460.00	47.5 PK	68.2	-20.7	1.63 V	198	34.8	12.7
6	15690.00	44.7 PK	74.0	-29.3	1.27 V	328	33.1	11.6
7	15690.00	33.7 AV	54.0	-20.3	1.27 V	328	22.1	11.6

REMARKS:

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

CHANNEL	TX Channel 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	#5637.54	62.2 PK	68.2	-6.0	2.80 H	357	60.2	2.0
2	*5755.00	117.4 PK			2.80 H	357	115.1	2.3
3	*5755.00	105.5 AV			2.80 H	357	103.2	2.3
4	#5953.12	61.4 PK	68.2	-6.8	2.80 H	357	58.5	2.9
5	11510.00	58.8 PK	74.0	-15.2	1.47 H	72	44.7	14.1
6	11510.00	47.0 AV	54.0	-7.0	1.47 H	72	32.9	14.1
7	#17265.00	54.5 PK	68.2	-13.7	1.62 H	132	36.7	17.8
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	#5645.63	63.0 PK	68.2	-5.2	2.19 V	213	61.0	2.0
2	*5755.00	119.2 PK			2.19 V	213	116.9	2.3
3	*5755.00	107.1 AV			2.19 V	213	104.8	2.3
4	#5964.73	62.0 PK	68.2	-6.2	2.19 V	213	59.1	2.9
5	11510.00	57.0 PK	74.0	-17.0	1.44 V	110	42.9	14.1
6	11510.00	45.2 AV	54.0	-8.8	1.44 V	110	31.1	14.1
7	#17265.00	45.6 PK	68.2	-22.6	1.83 V	58	27.8	17.8

REMARKS:

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

CHANNEL	TX Channel 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	#5635.92	60.3 PK	68.2	-7.9	2.82 H	360	58.3	2.0
2	*5795.00	117.6 PK			2.82 H	360	115.1	2.5
3	*5795.00	105.9 AV			2.82 H	360	103.4	2.5
4	#5927.90	60.6 PK	68.2	-7.6	2.82 H	360	57.9	2.7
5	11590.00	60.0 PK	74.0	-14.0	1.61 H	70	45.9	14.1
6	11590.00	47.9 AV	54.0	-6.1	1.61 H	70	33.8	14.1
7	#17385.00	55.5 PK	68.2	-12.7	1.52 H	135	37.0	18.5
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	#5638.34	60.9 PK	68.2	-7.3	2.79 V	216	58.9	2.0
2	*5795.00	118.1 PK			2.79 V	216	115.6	2.5
3	*5795.00	107.7 AV			2.79 V	216	105.2	2.5
4	#5941.87	62.4 PK	68.2	-5.8	2.79 V	216	59.6	2.8
5	11590.00	59.2 PK	74.0	-14.8	1.26 V	63	45.1	14.1
6	11590.00	47.5 AV	54.0	-6.5	1.26 V	63	33.4	14.1
7	#17385.00	50.0 PK	68.2	-18.2	1.84 V	64	31.5	18.5

REMARKS:

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

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	63.9 PK	74.0	-10.1	2.03 H	332	61.8	2.1
2	5150.00	47.4 AV	54.0	-6.6	2.03 H	332	45.3	2.1
3	*5210.00	109.4 PK			2.03 H	332	107.8	1.6
4	*5210.00	97.6 AV			2.03 H	332	96.0	1.6
5	5350.00	52.6 PK	74.0	-21.4	2.03 H	332	51.1	1.5
6	5350.00	41.2 AV	54.0	-12.8	2.03 H	332	39.7	1.5
7	#10420.00	49.8 PK	68.2	-18.4	1.69 H	135	37.4	12.4
8	15630.00	48.3 PK	74.0	-25.7	1.82 H	259	36.5	11.8
9	15630.00	35.7 AV	54.0	-18.3	1.82 H	259	23.9	11.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.7 PK	74.0	-8.3	1.37 V	212	63.6	2.1
2	5150.00	50.3 AV	54.0	-3.7	1.37 V	212	48.2	2.1
3	*5210.00	111.4 PK			1.37 V	212	109.8	1.6
4	*5210.00	98.9 AV			1.37 V	212	97.3	1.6
5	5350.00	55.6 PK	74.0	-18.4	1.37 V	212	54.1	1.5
6	5350.00	43.4 AV	54.0	-10.6	1.37 V	212	41.9	1.5
7	#10420.00	50.2 PK	68.2	-18.0	1.93 V	262	37.8	12.4
8	15630.00	49.4 PK	74.0	-24.6	1.84 V	242	37.6	11.8
9	15630.00	35.8 AV	54.0	-18.2	1.84 V	242	24.0	11.8

REMARKS:

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

CHANNEL	TX Channel 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	#5648.40	63.9 PK	68.2	-4.3	2.99 H	360	61.9	2.0
2	*5775.00	113.1 PK			2.99 H	360	110.7	2.4
3	*5775.00	100.6 AV			2.99 H	360	98.2	2.4
4	#5934.66	61.2 PK	68.2	-7.0	2.99 H	360	58.4	2.8
5	11550.00	55.3 PK	74.0	-18.7	1.54 H	72	41.1	14.2
6	11550.00	44.0 AV	54.0	-10.0	1.54 H	72	29.8	14.2
7	#17325.00	51.8 PK	68.2	-16.4	1.52 H	136	33.7	18.1
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	#5648.35	65.6 PK	68.2	-2.6	2.17 V	214	63.6	2.0
2	*5775.00	114.9 PK			2.17 V	214	112.5	2.4
3	*5775.00	102.5 AV			2.17 V	214	100.1	2.4
4	#5936.14	63.8 PK	68.2	-4.4	2.17 V	214	61.0	2.8
5	11550.00	55.4 PK	74.0	-18.6	1.28 V	62	41.2	14.2
6	11550.00	44.2 AV	54.0	-9.8	1.28 V	62	30.0	14.2
7	#17325.00	50.3 PK	68.2	-17.9	1.60 V	164	32.2	18.1

REMARKS:

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

Below 1GHz Data:

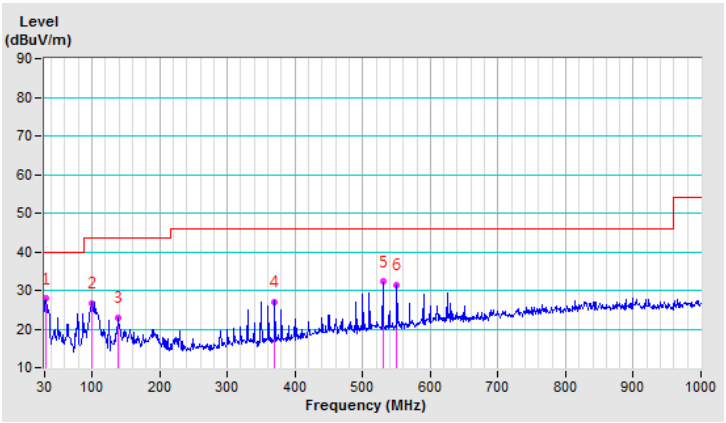
802.11ax (HE20)

CHANNEL	TX Channel 149	**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	32.08	27.8 QP	40.0	-12.2	1.50 H	35	42.2	-14.4
2	99.96	26.7 QP	43.5	-16.8	1.50 H	263	44.0	-17.3
3	139.52	22.8 QP	43.5	-20.7	1.50 H	249	36.2	-13.4
4	369.90	27.0 QP	46.0	-19.0	1.00 H	300	37.7	-10.7
5	529.79	32.2 QP	46.0	-13.8	2.00 H	10	39.3	-7.1
6	549.99	31.3 QP	46.0	-14.7	1.50 H	34	38.2	-6.9

REMARKS:

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

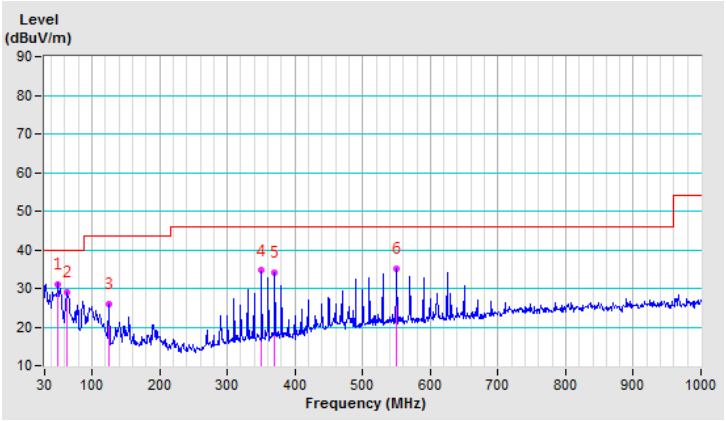


CHANNEL	TX Channel 149	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	49.10	31.2 QP	40.0	-8.8	1.50 V	155	44.2	-13.0
2	63.56	29.0 QP	40.0	-11.0	1.00 V	216	43.1	-14.1
3	124.97	25.9 QP	43.5	-17.6	1.00 V	248	40.5	-14.6
4	350.31	34.6 QP	46.0	-11.4	1.50 V	226	45.8	-11.2
5	370.00	34.2 QP	46.0	-11.8	1.50 V	89	44.8	-10.6
6	549.99	35.1 QP	46.0	-10.9	1.00 V	90	42.0	-6.9

REMARKS:

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



4.1.8 Test Results (Mode 2)

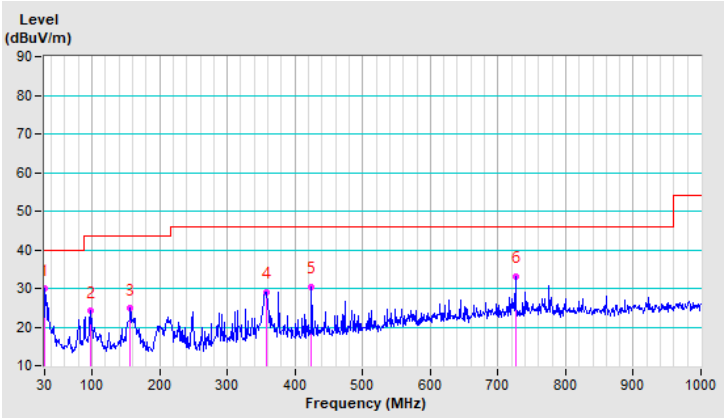
802.11a

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	30.24	29.8 QP	40.0	-10.2	1.00 H	191	44.4	-14.6
2	97.47	24.1 QP	43.5	-19.4	1.00 H	256	41.8	-17.7
3	156.88	24.8 QP	43.5	-18.7	2.00 H	258	37.6	-12.8
4	357.10	29.1 QP	46.0	-16.9	1.00 H	307	40.1	-11.0
5	424.57	30.4 QP	46.0	-15.6	1.50 H	163	39.6	-9.2
6	726.30	33.2 QP	46.0	-12.8	1.00 H	202	36.7	-3.5

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.

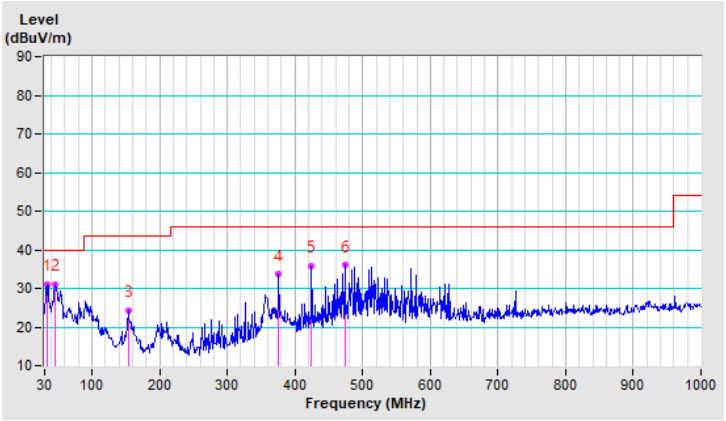


CHANNEL	TX Channel 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	33.64	31.0 QP	40.0	-9.0	1.00 V	142	45.0	-14.0
2	45.33	31.2 QP	40.0	-8.8	1.00 V	323	44.3	-13.1
3	154.31	24.4 QP	43.5	-19.1	1.00 V	210	37.1	-12.7
4	375.43	33.6 QP	46.0	-12.4	1.50 V	25	44.1	-10.5
5	424.57	35.7 QP	46.0	-10.3	1.00 V	205	44.9	-9.2
6	473.75	36.0 QP	46.0	-10.0	1.50 V	130	44.0	-8.0

REMARKS:

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



4.1.9 Test Results (Mode 3)

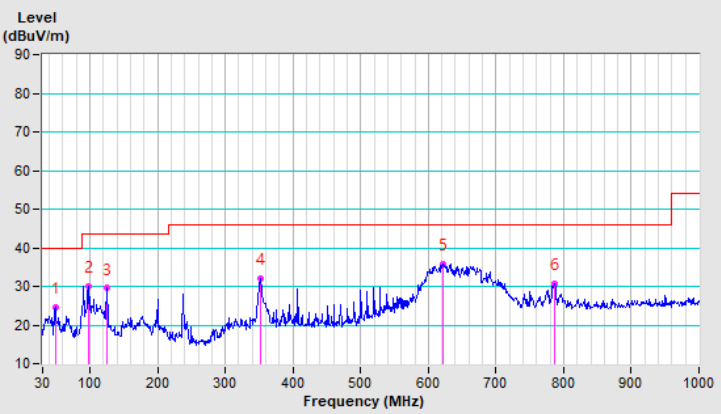
802.11a

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	48.48	24.6 QP	40.0	-15.4	1.00 H	168	37.5	-12.9
2	97.47	30.1 QP	43.5	-13.4	2.00 H	51	47.8	-17.7
3	124.97	29.5 QP	43.5	-14.0	2.00 H	285	44.1	-14.6
4	351.96	32.0 QP	46.0	-14.0	1.00 H	358	43.2	-11.2
5	622.51	35.9 QP	46.0	-10.1	1.50 H	328	40.9	-5.0
6	786.15	30.8 QP	46.0	-15.2	1.00 H	225	33.3	-2.5

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.

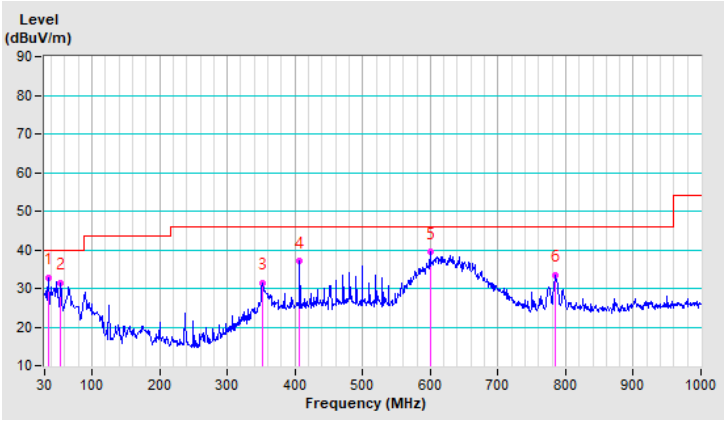


CHANNEL	TX Channel 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	35.38	32.9 QP	40.0	-7.1	1.00 V	68	47.0	-14.1
2	53.62	31.3 QP	40.0	-8.7	1.00 V	203	44.5	-13.2
3	352.35	31.5 QP	46.0	-14.5	1.50 V	296	42.6	-11.1
4	407.15	37.0 QP	46.0	-9.0	1.50 V	106	46.8	-9.8
5	600.00	39.4 QP	46.0	-6.6	1.00 V	274	44.8	-5.4
6	785.47	33.4 QP	46.0	-12.6	1.50 V	1	35.9	-2.5

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.



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. 24, 2018	Oct. 23, 2019
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 22, 2018	Oct. 21, 2019
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 17, 2019	Mar. 16, 2020
50 ohms Terminator	N/A	3	Oct. 22, 2018	Oct. 21, 2019
RF Cable	5D-FB	COCCAB-001	Sep. 28, 2018	Sep. 27, 2019
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: Aug. 19 to Sep. 06, 2019

4.2.3 Test Procedure

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

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

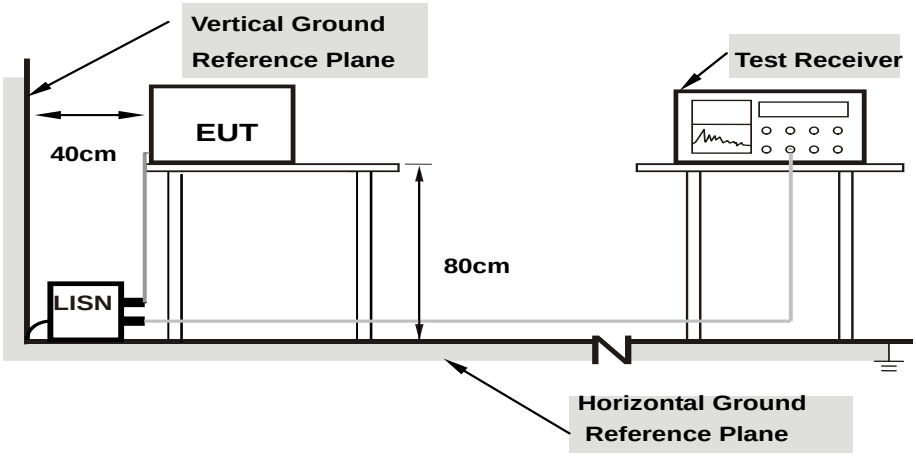
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

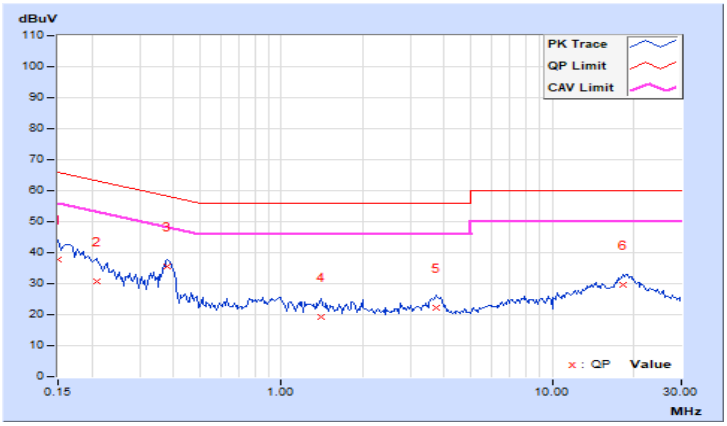
4.2.7 Test Results (Mode 1)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.97	27.98	11.71	37.95	21.68	66.00	56.00	-28.05	-34.32
2	0.20859	9.98	20.93	7.80	30.91	17.78	63.26	53.26	-32.35	-35.48
3	0.38047	9.99	25.43	16.76	35.42	26.75	58.27	48.27	-22.85	-21.52
4	1.40625	10.07	9.10	2.34	19.17	12.41	56.00	46.00	-36.83	-33.59
5	3.74219	10.25	12.08	4.84	22.33	15.09	56.00	46.00	-33.67	-30.91
6	18.30469	11.25	18.27	13.17	29.52	24.42	60.00	50.00	-30.48	-25.58

Remarks:

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

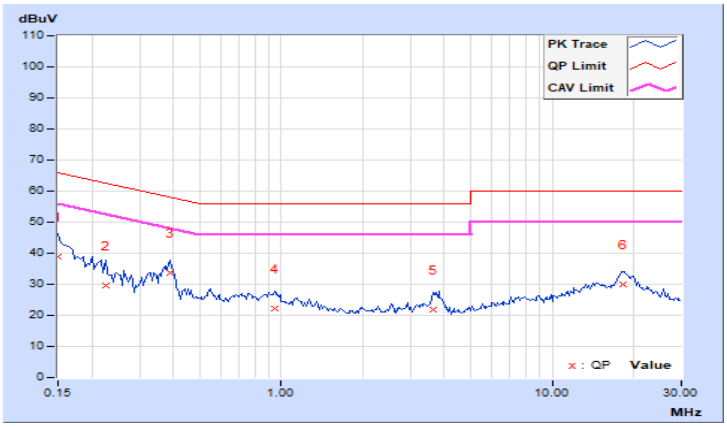


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.95	28.97	12.19	38.92	22.14	66.00	56.00	-27.08	-33.86
2	0.22422	9.96	19.69	6.72	29.65	16.68	62.66	52.66	-33.01	-35.98
3	0.38828	9.98	23.66	15.65	33.64	25.63	58.10	48.10	-24.46	-22.47
4	0.94297	10.02	12.03	5.13	22.05	15.15	56.00	46.00	-33.95	-30.85
5	3.61719	10.18	11.71	4.71	21.89	14.89	56.00	46.00	-34.11	-31.11
6	18.29297	11.01	19.07	13.99	30.08	25.00	60.00	50.00	-29.92	-25.00

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



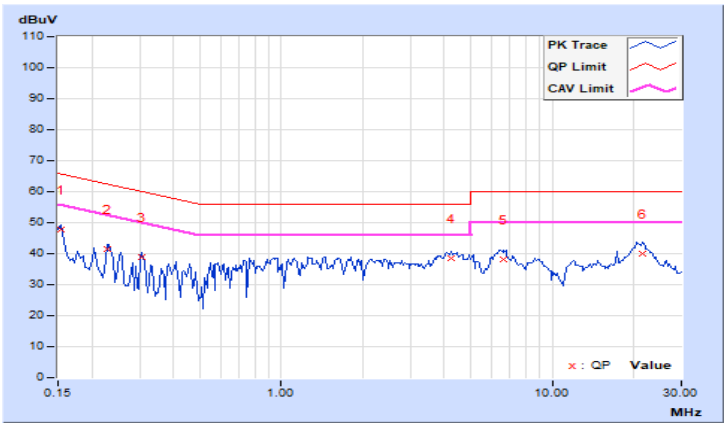
4.2.8 Test Results (Mode 2)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.95	37.86	32.08	47.81	42.03	65.79	55.79	-17.98	-13.76
2	0.22812	9.96	31.37	29.91	41.33	39.87	62.52	52.52	-21.19	-12.65
3	0.30625	9.97	29.04	28.19	39.01	38.16	60.07	50.07	-21.06	-11.91
4	4.23047	10.18	28.28	21.81	38.46	31.99	56.00	46.00	-17.54	-14.01
5	6.57813	10.30	27.94	21.68	38.24	31.98	60.00	50.00	-21.76	-18.02
6	21.61719	11.09	28.99	24.54	40.08	35.63	60.00	50.00	-19.92	-14.37

Remarks:

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

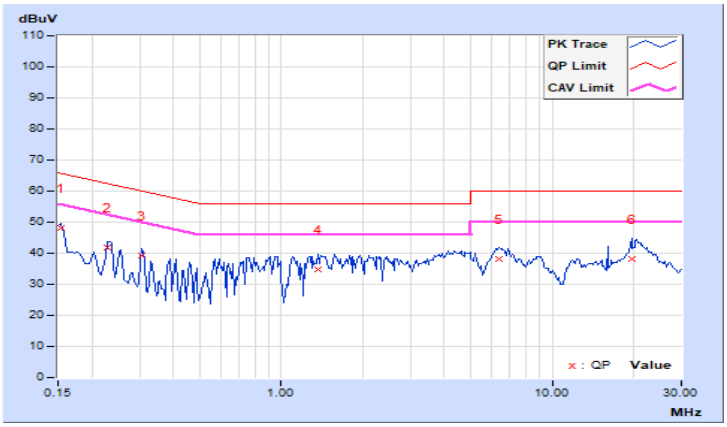


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.93	38.21	32.50	48.14	42.43	65.79	55.79	-17.65	-13.36
2	0.22812	9.94	31.78	30.35	41.72	40.29	62.52	52.52	-20.80	-12.23
3	**0.30625**	**9.95**	**29.42**	**28.72**	**39.37**	**38.67**	**60.07**	**50.07**	**-20.70**	**-11.40**
4	1.36719	10.01	24.94	10.21	34.95	20.22	56.00	46.00	-21.05	-25.78
5	6.37891	10.22	27.94	22.14	38.16	32.36	60.00	50.00	-21.84	-17.64
6	19.62500	10.77	27.23	22.59	38.00	33.36	60.00	50.00	-22.00	-16.64

Remarks:

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



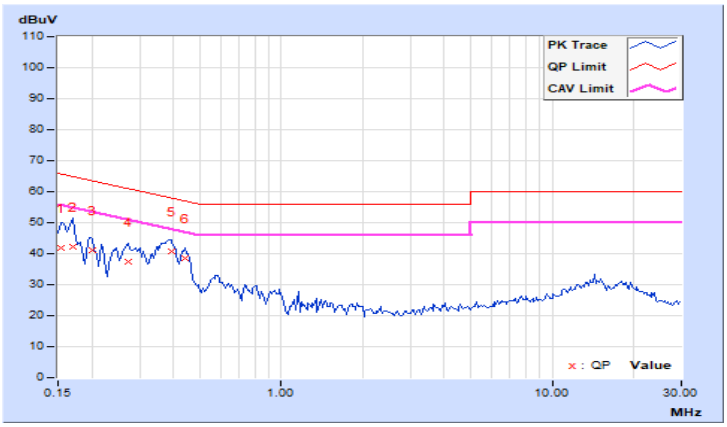
4.2.9 Test Results (Mode 3)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.97	31.91	16.43	41.88	26.40	65.79	55.79	-23.91	-29.39
2	0.16953	9.97	32.15	14.81	42.12	24.78	64.98	54.98	-22.86	-30.20
3	0.20078	9.98	31.00	19.77	40.98	29.75	63.58	53.58	-22.60	-23.83
4	0.27109	9.98	27.56	17.73	37.54	27.71	61.08	51.08	-23.54	-23.37
5	0.39219	9.99	30.80	22.18	40.79	32.17	58.02	48.02	-17.23	-15.85
6	0.43906	9.99	28.38	23.04	38.37	33.03	57.08	47.08	-18.71	-14.05

Remarks:

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

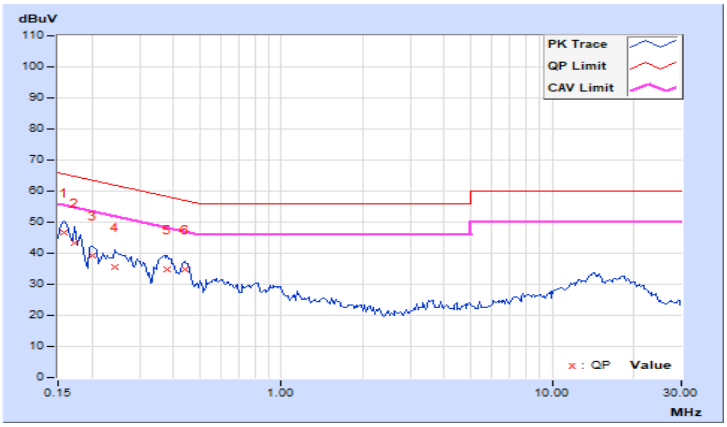


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	9.95	36.59	23.09	46.54	33.04	65.58	55.58	-19.04	-22.54
2	0.17344	9.95	33.48	16.72	43.43	26.67	64.79	54.79	-21.36	-28.12
3	0.20078	9.96	29.12	18.67	39.08	28.63	63.58	53.58	-24.50	-24.95
4	0.24375	9.96	25.75	17.24	35.71	27.20	61.97	51.97	-26.26	-24.77
5	0.38047	9.98	24.81	8.98	34.79	18.96	58.27	48.27	-23.48	-29.31
6	0.43906	9.98	24.70	19.53	34.68	29.51	57.08	47.08	-22.40	-17.57

Remarks:

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



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 Result

Non-Beamforming Mode

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	24.01	22.18	23.03	21.88	772.043	28.88	30.00	Pass
40	5200	23.80	23.43	24.22	23.82	965.408	29.85	30.00	Pass
48	5240	22.72	21.35	22.15	21.40	625.623	27.96	30.00	Pass
149	5745	24.54	23.02	24.10	23.73	977.981	29.90	30.00	Pass
157	5785	24.67	23.19	24.05	23.68	988.981	29.95	30.00	Pass
165	5825	24.64	23.11	23.99	23.62	976.471	29.90	30.00	Pass

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	22.54	21.23	21.56	21.08	583.664	27.66	30.00	Pass
40	5200	24.27	23.45	23.48	22.97	909.607	29.59	30.00	Pass
48	5240	22.34	20.86	21.72	20.89	564.633	27.52	30.00	Pass
149	5745	24.33	23.17	24.13	23.35	953.603	29.79	30.00	Pass
157	5785	24.34	23.18	23.95	23.28	940.741	29.73	30.00	Pass
165	5825	24.02	22.83	24.17	23.51	929.819	29.68	30.00	Pass

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	20.00	18.92	19.66	19.30	355.567	25.51	30.00	Pass
46	5230	21.42	20.74	21.70	21.05	532.514	27.26	30.00	Pass
151	5755	24.49	23.03	24.10	23.23	949.517	29.78	30.00	Pass
159	5795	24.14	23.08	23.90	23.30	921.921	29.65	30.00	Pass

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	18.70	18.38	18.60	18.18	281.206	24.49	30.00	Pass
155	5775	21.92	21.03	22.36	21.45	594.186	27.74	30.00	Pass

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	22.65	21.24	21.95	21.31	609.004	27.85	30.00	Pass
40	5200	24.48	23.53	23.93	23.47	975.47	29.89	30.00	Pass
48	5240	22.60	21.05	21.84	21.33	597.908	27.77	30.00	Pass
149	5745	24.62	23.31	24.22	23.42	988.05	29.95	30.00	Pass
157	5785	24.56	23.20	24.27	23.40	980.766	29.92	30.00	Pass
165	5825	24.26	23.06	24.34	23.89	985.538	29.94	30.00	Pass

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	20.26	19.39	20.13	19.53	385.848	25.86	30.00	Pass
46	5230	21.77	21.03	21.80	21.08	556.668	27.46	30.00	Pass
151	5755	24.51	23.38	24.20	23.46	985.106	29.93	30.00	Pass
159	5795	24.53	23.35	24.22	23.47	986.636	29.94	30.00	Pass

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	18.74	18.47	19.10	18.37	295.114	24.70	30.00	Pass
155	5775	22.42	21.43	22.42	21.76	638.127	28.05	30.00	Pass

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	22.54	21.23	21.56	21.08	583.664	27.66	29.98	Pass
40	5200	24.27	23.45	23.48	22.97	909.607	29.59	29.98	Pass
48	5240	22.34	20.86	21.72	20.89	564.633	27.52	29.98	Pass
149	5745	24.33	23.17	24.13	23.35	953.603	29.79	29.98	Pass
157	5785	24.34	23.18	23.95	23.28	940.741	29.73	29.98	Pass
165	5825	24.02	22.83	24.17	23.51	929.819	29.68	29.98	Pass

Note: 1. Directional gain = 0dBi + 10log(4) = 6.02dBi > 6dBi , so the power limit shall be reduced to 30-(6.02-6) = 29.98dBm

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	20.00	18.92	19.66	19.30	355.567	25.51	29.98	Pass
46	5230	21.42	20.74	21.70	21.05	532.514	27.26	29.98	Pass
151	5755	24.49	23.03	24.10	23.23	949.517	29.78	29.98	Pass
159	5795	24.14	23.08	23.90	23.30	921.921	29.65	29.98	Pass

Note: 1. Directional gain = 0dBi + 10log(4) = 6.02dBi > 6dBi , so the power limit shall be reduced to 30-(6.02-6) = 29.98dBm

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	18.70	18.38	18.60	18.18	281.206	24.49	29.98	Pass
155	5775	21.92	21.03	22.36	21.45	594.186	27.74	29.98	Pass

Note: 1. Directional gain = 0dBi + 10log(4) = 6.02dBi > 6dBi , so the power limit shall be reduced to 30-(6.02-6) = 29.98dBm

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	22.65	21.24	21.95	21.31	609.004	27.85	29.98	Pass
40	5200	24.48	23.53	23.93	23.47	975.47	29.89	29.98	Pass
48	5240	22.60	21.05	21.84	21.33	597.908	27.77	29.98	Pass
149	5745	24.62	23.31	24.22	23.42	988.05	29.95	29.98	Pass
157	5785	24.56	23.20	24.27	23.40	980.766	29.92	29.98	Pass
165	5825	24.26	23.06	24.34	23.89	985.538	29.94	29.98	Pass

Note: 1. Directional gain = 0dBi + 10log(4) = 6.02dBi > 6dBi , so the power limit shall be reduced to 30-(6.02-6) = 29.98dBm

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	20.26	19.39	20.13	19.53	385.848	25.86	29.98	Pass
46	5230	21.77	21.03	21.80	21.08	556.668	27.46	29.98	Pass
151	5755	24.51	23.38	24.20	23.46	985.106	29.93	29.98	Pass
159	5795	24.53	23.35	24.22	23.47	986.636	29.94	29.98	Pass

Note: 1. Directional gain = 0dBi + 10log(4) = 6.02dBi > 6dBi , so the power limit shall be reduced to 30-(6.02-6) = 29.98dBm

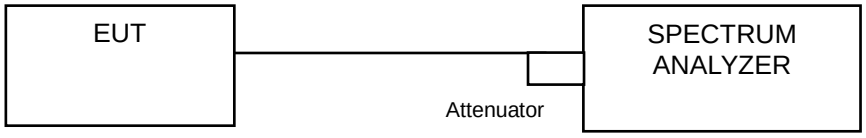
802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	18.74	18.47	19.10	18.37	295.114	24.70	29.98	Pass
155	5775	22.42	21.43	22.42	21.76	638.127	28.05	29.98	Pass

Note: 1. Directional gain = 0dBi + 10log(4) = 6.02dBi > 6dBi , so the power limit shall be reduced to 30-(6.02-6) = 29.98dBm

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Results

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	17.16	17.16	17.16	17.16
40	5200	17.16	17.28	18.36	18.96
48	5240	16.92	16.92	17.16	16.92
149	5745	17.28	17.16	17.16	17.28
157	5785	17.52	17.28	17.28	17.40
165	5825	17.76	17.16	17.40	17.16

802.11ax (HE20)

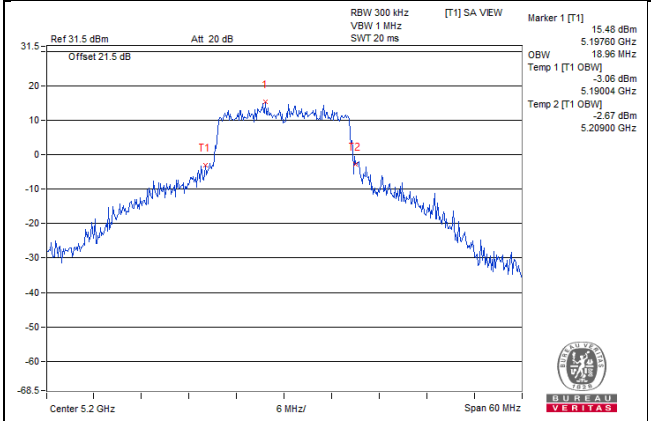
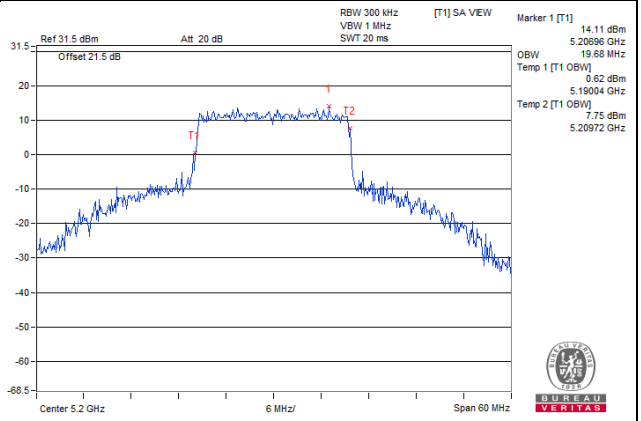
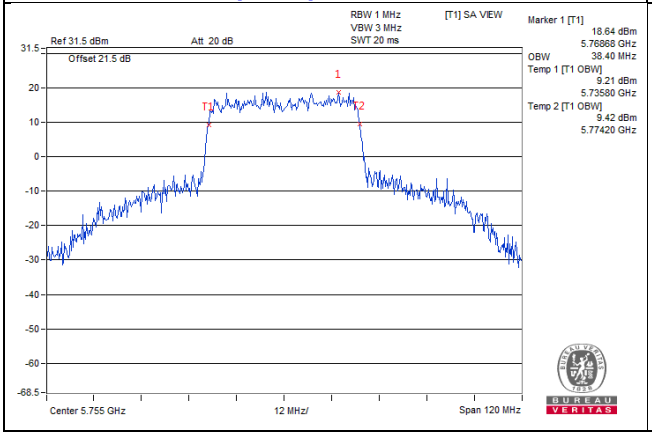
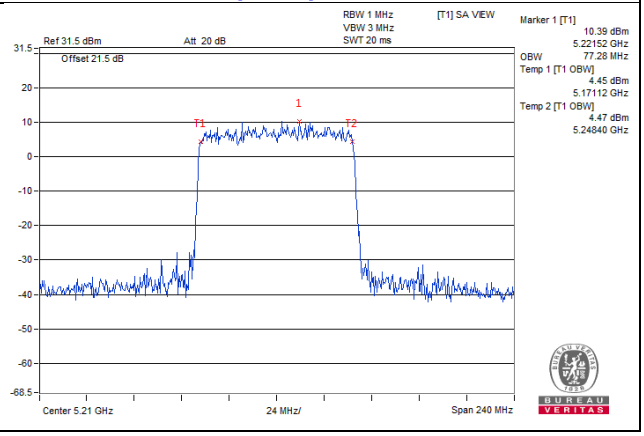
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	19.08	19.08	19.20	19.20
40	5200	19.32	19.44	19.32	19.68
48	5240	19.20	19.20	19.08	19.20
149	5745	19.32	19.20	19.20	19.08
157	5785	19.44	18.96	19.20	19.20
165	5825	19.32	19.08	19.32	19.20

802.11ax (HE40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	38.16	37.68	37.92	37.92
46	5230	38.16	37.92	37.92	37.92
151	5755	38.40	38.16	38.16	38.16
159	5795	38.40	38.16	38.16	38.16

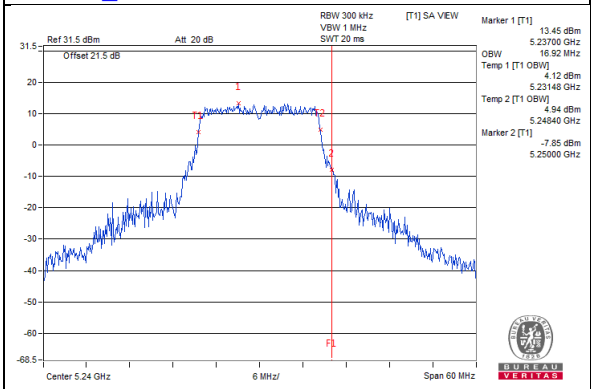
802.11ax (HE80)

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

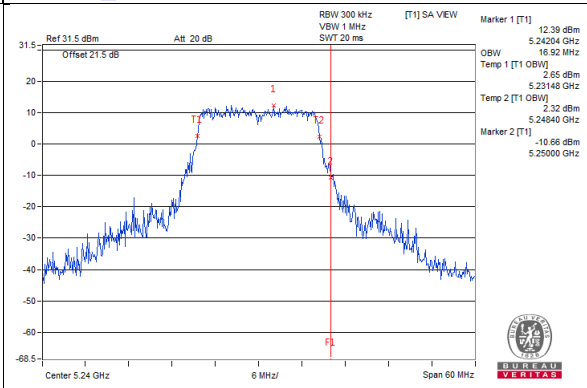
Spectrum Plot of Max. Value	
802.11a_Chain 3 / CH40	**802.11ax (HE20)_Chain 3 / CH40**
	
802.11ax (HE40)_Chain 0 / CH151	**802.11ax (HE80)_Chain 0 / CH42**
	

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

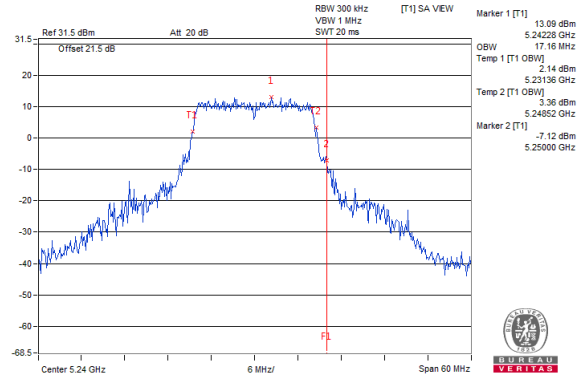
802.11a_Chain 0 / CH48



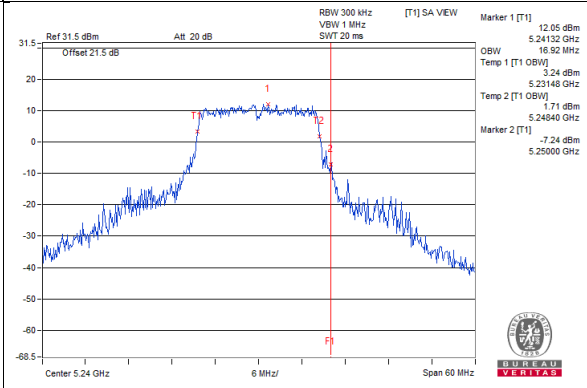
802.11a_Chain 1 / CH48



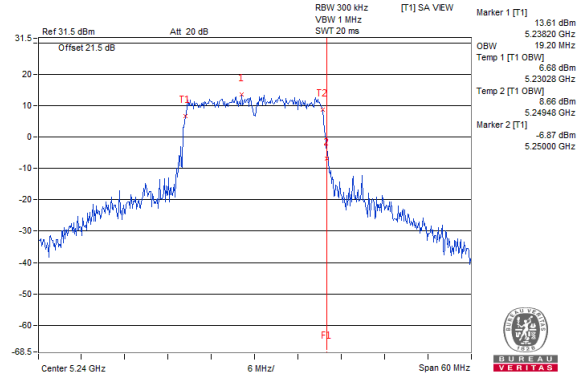
802.11a_Chain 2 / CH48



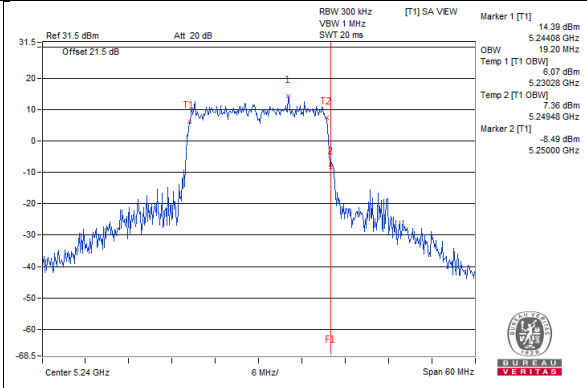
802.11a_Chain 3 / CH48



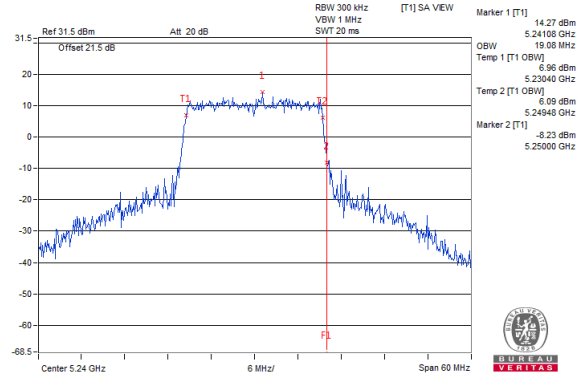
802.11ax (HE20)_Chain 0 / CH48



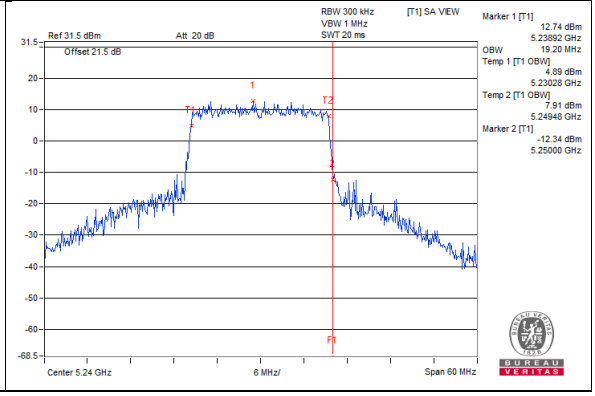
802.11ax (HE20)_Chain 1 / CH48



802.11ax (HE20)_Chain 2 / CH48

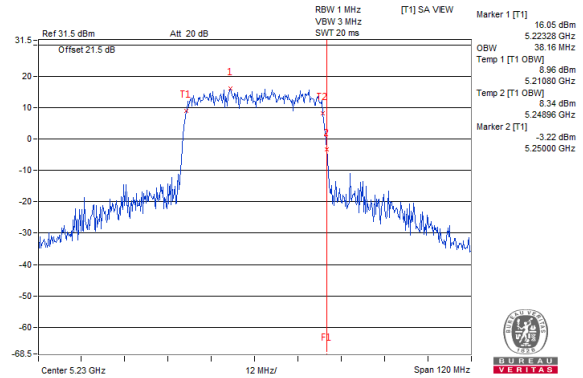


802.11ax (HE20)_Chain 3 / CH48

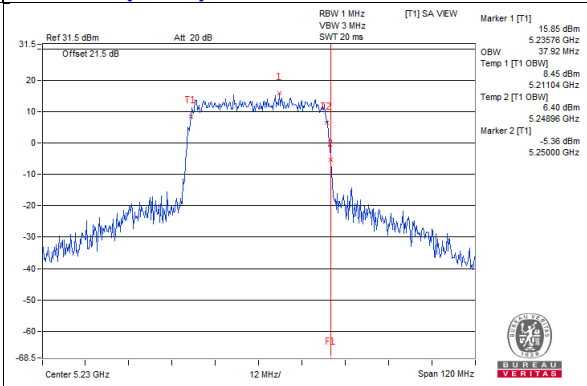


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

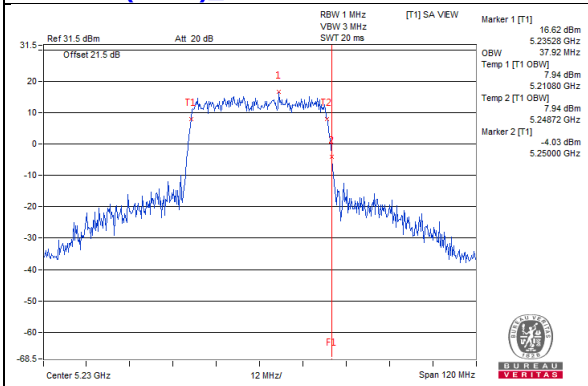
802.11ax (HE40)_Chain 0 / CH46



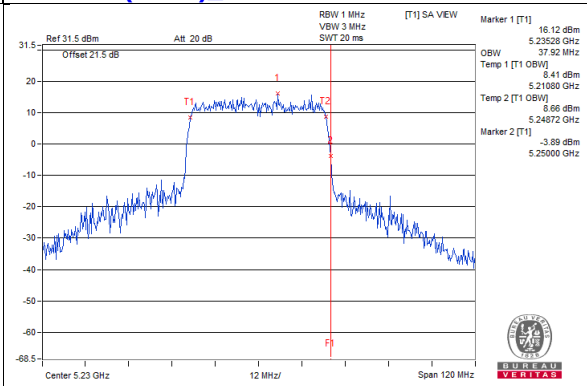
802.11ax (HE40)_Chain 1 / CH46



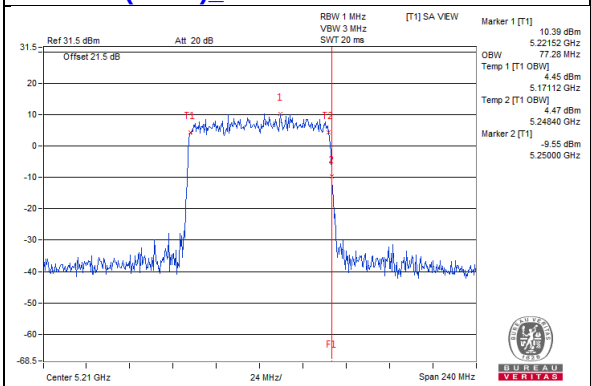
802.11ax (HE40)_Chain 2 / CH46



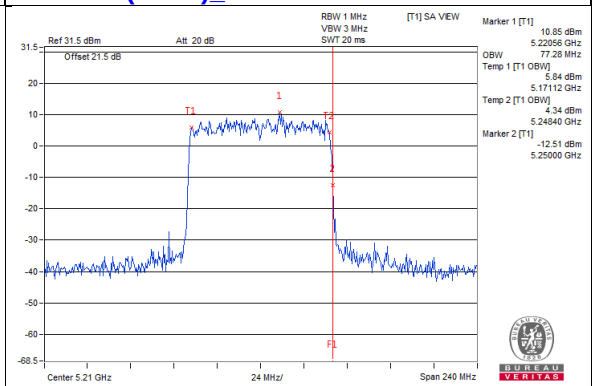
802.11ax (HE40)_Chain 3 / CH46



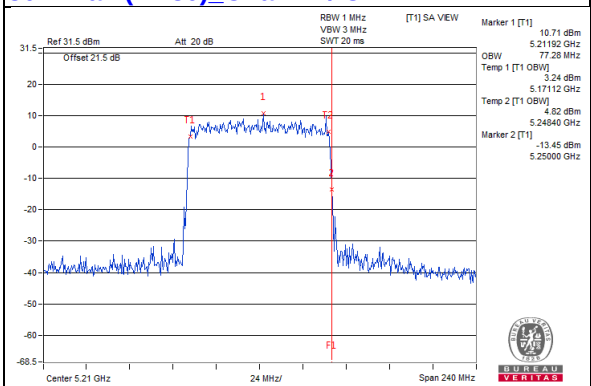
802.11ax (HE80)_Chain 0 / CH42



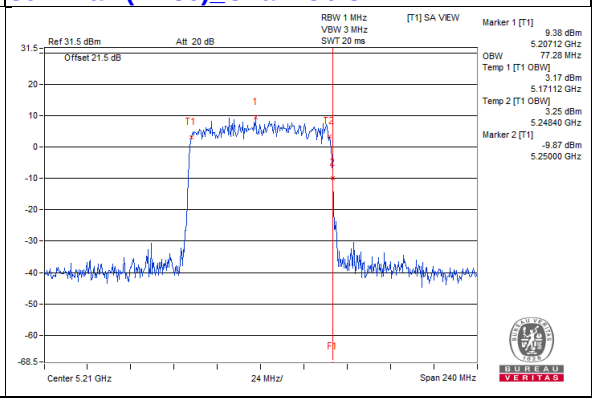
802.11ax (HE80)_Chain 1 / CH42



802.11ax (HE80)_Chain 2 / CH42

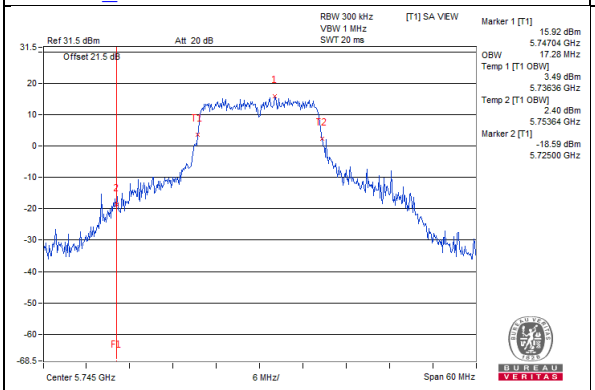


802.11ax (HE80)_Chain 3 / CH42

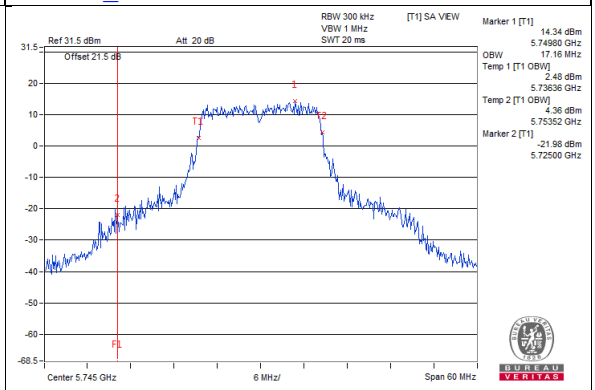


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

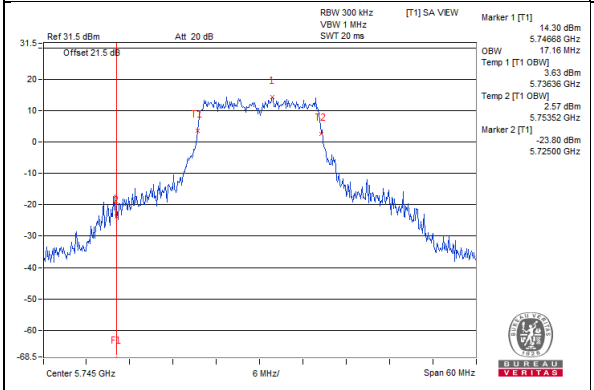
802.11a_Chain 0 / CH149



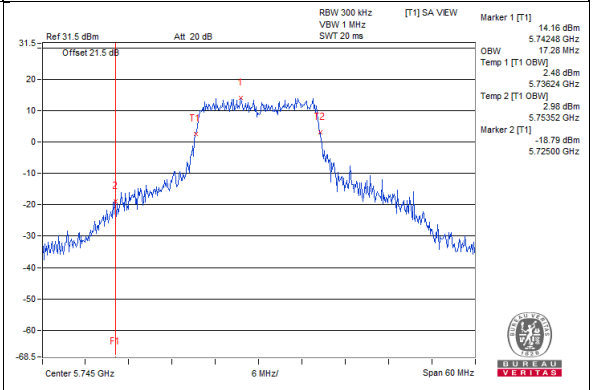
802.11a_Chain 1 / CH149



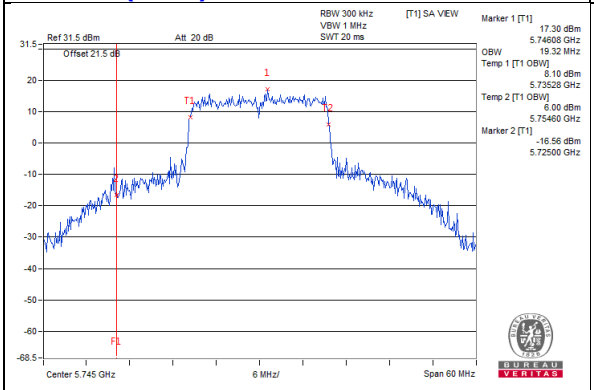
802.11a_Chain 2 / CH149



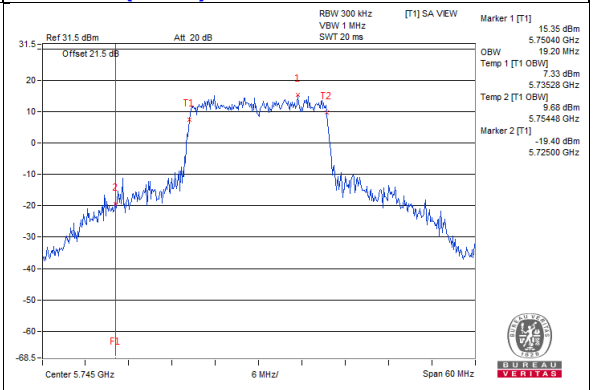
802.11a_Chain 3 / CH149



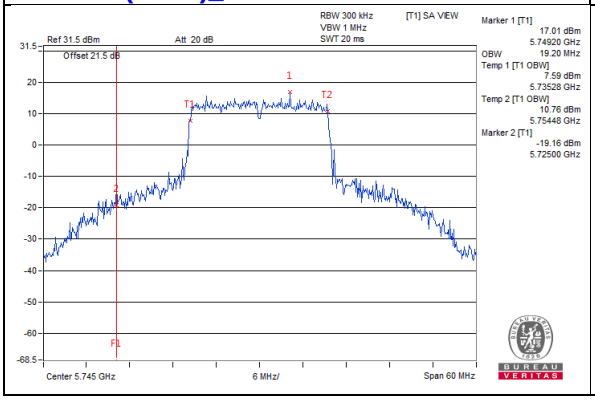
802.11ax (HE20)_Chain 0 / CH149



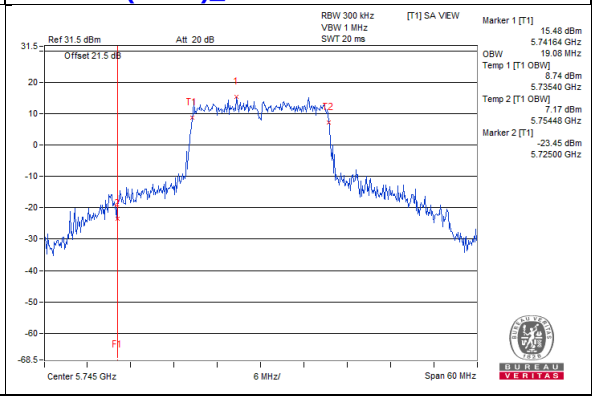
802.11ax (HE20)_Chain 1 / CH149



802.11ax (HE20)_Chain 2 / CH149

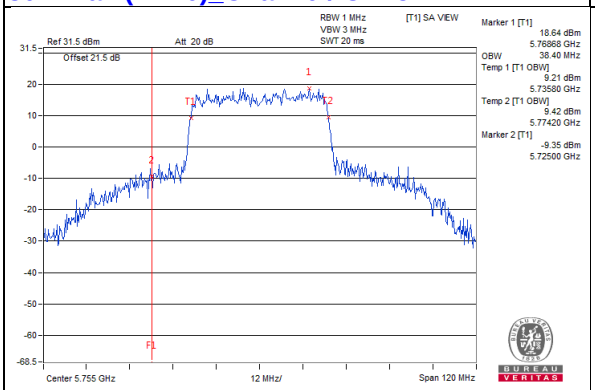


802.11ax (HE20)_Chain 3 / CH149

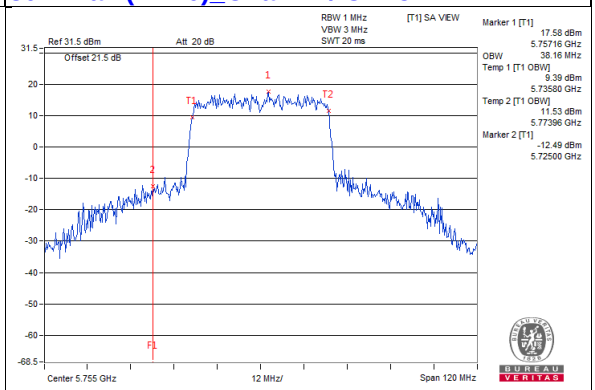


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

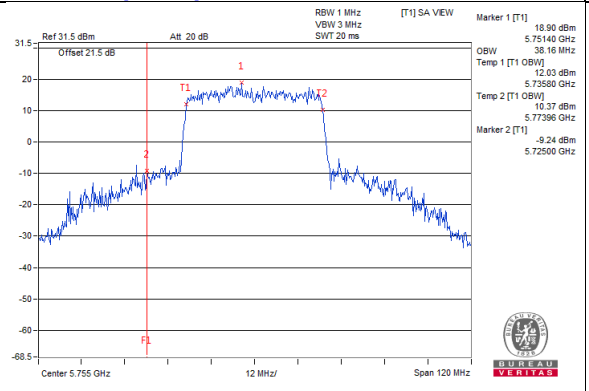
802.11ax (HE40)_Chain 0 / CH151



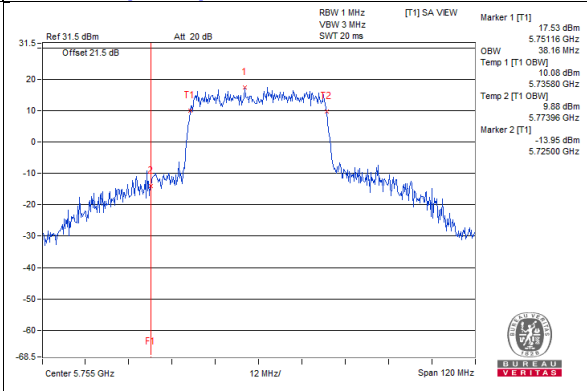
802.11ax (HE40)_Chain 1 / CH151



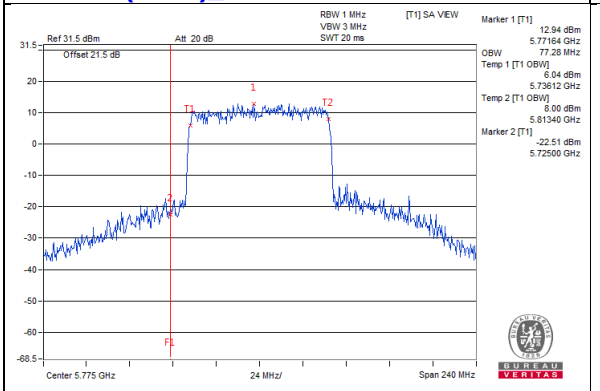
802.11ax (HE40)_Chain 2 / CH151



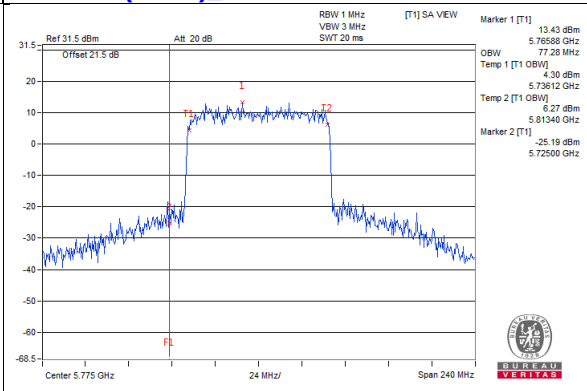
802.11ax (HE40)_Chain 3 / CH151



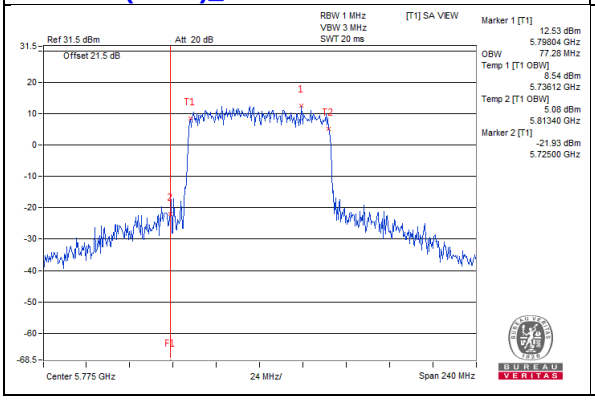
802.11ax (HE80)_Chain 0 / CH155



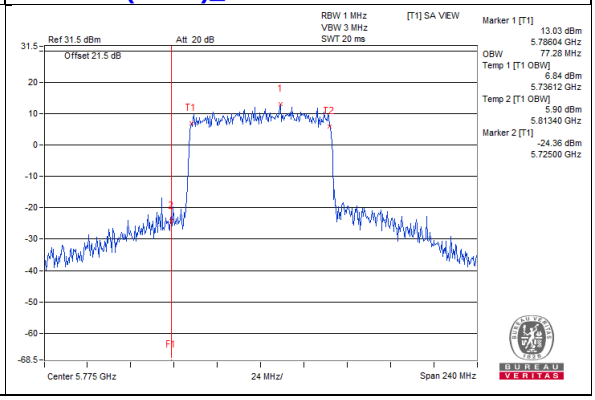
802.11ax (HE80)_Chain 1 / CH155



802.11ax (HE80)_Chain 2 / CH155



802.11ax (HE80)_Chain 3 / CH155

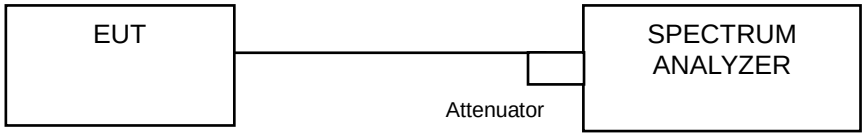


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For 802.11a:

For U-NII-1:

Using method SA-1

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

For U-NII-3:

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

For other modulation:

For U-NII-1:

Using method SA-2

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

For U-NII-3:

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

For U-NII-1:

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
36	5180	10.25	8.52	8.98	8.42	15.13	16.98	Pass
40	5200	10.32	9.92	10.54	10.39	16.32	16.98	Pass
48	5240	9.20	8.22	8.61	8.48	14.66	16.98	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. Directional gain = 0dBi + 10log(4) = 6.02dBi > 6dBi , so the Power Density limit shall be reduced to 17-(6.02-6) = 16.98dBm

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	7.89	7.20	7.44	7.17	0.10	13.56	16.98	Pass
40	5200	10.57	9.69	10.05	8.75	0.10	15.94	16.98	Pass
48	5240	8.67	7.06	7.64	6.95	0.10	13.76	16.98	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. Directional gain = 0dBi + 10log(10) = 6.02dBi > 6dBi , so the Power Density limit shall be reduced to 17-(6.02-6) = 16.98dBm
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

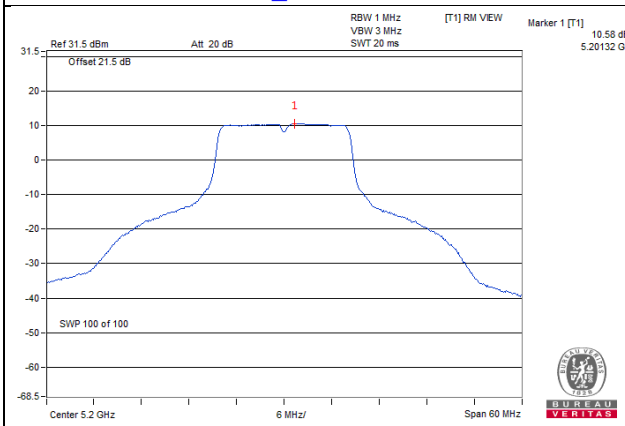
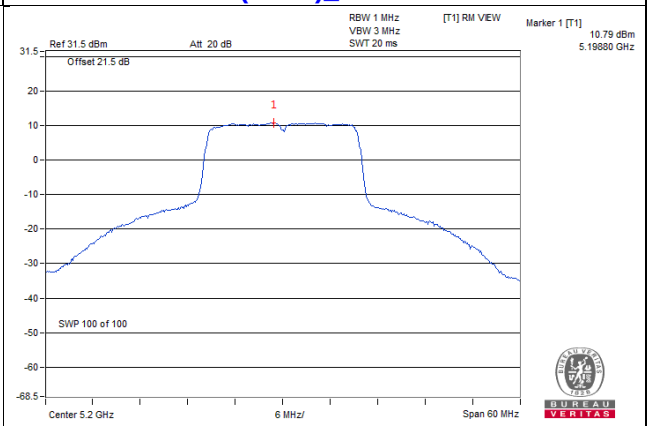
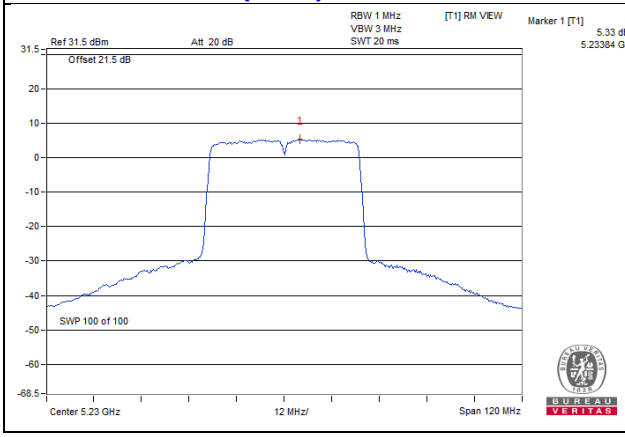
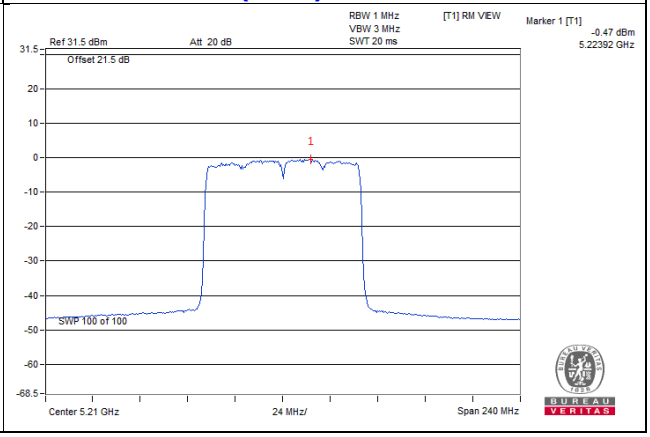
Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	2.86	2.70	3.10	2.40	0.18	8.97	16.98	Pass
46	5230	4.96	4.48	4.86	4.38	0.18	10.88	16.98	Pass

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. Directional gain = 0dBi + 10log(4) = 6.02dBi > 6dBi , so the Power Density limit shall be reduced to 17-(6.02-6) = 16.98dBm
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	-0.58	-0.75	-1.10	-1.78	0.34	5.33	16.98	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. Directional gain = 0dBi + 10log(4) = 6.02dBi > 6dBi , so the Power Density limit shall be reduced to 17-(6.02-6) = 16.98dBm
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a_Chain 2 / CH40	**802.11ax (HE20)_Chain 0 / CH40**
	
802.11ax (HE40)_Chain 0 / CH46	**802.11ax (HE80)_Chain 0 / CH42**
	

For U-NII-3:

802.11a

Chan.	Freq. (MHz)	PSD (dBm/300kHz)				Total PSD		Total PSD (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3	mW/ 300kHz	dBm/ 300kHz			
149	5745	2.98	1.78	2.36	2.04	6.8141	8.33	10.55	29.98	Pass
157	5785	2.83	1.83	1.89	1.96	6.5583	8.17	10.39	29.98	Pass
165	5825	2.77	2.05	2.18	2.17	6.7957	8.32	10.54	29.98	Pass

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = 0dBi + 10log(4) = 6.02dBi > 6dBi , so the Power Density limit shall be reduced to 30-(6.02-6) = 16.98dBm

802.11ax (HE20)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)				Duty Factor (dB)	Total PSD With Duty Factor		Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3		mW/300 kHz	dBm/300kHz			
149	5745	2.10	1.13	1.65	0.94	0.10	5.7553	7.60	9.82	29.98	Pass
157	5785	1.65	0.92	1.26	1.66	0.10	5.6299	7.51	9.73	29.98	Pass
165	5825	2.12	0.77	1.17	1.37	0.10	5.6331	7.51	9.73	29.98	Pass

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = 0dBi + 10log(4) = 6.02dBi > 6dBi , so the Power Density limit shall be reduced to 30-(6.02-6) = 16.98dBm
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

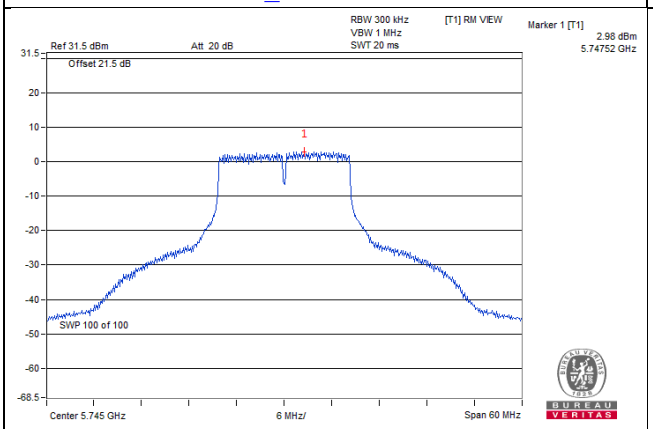
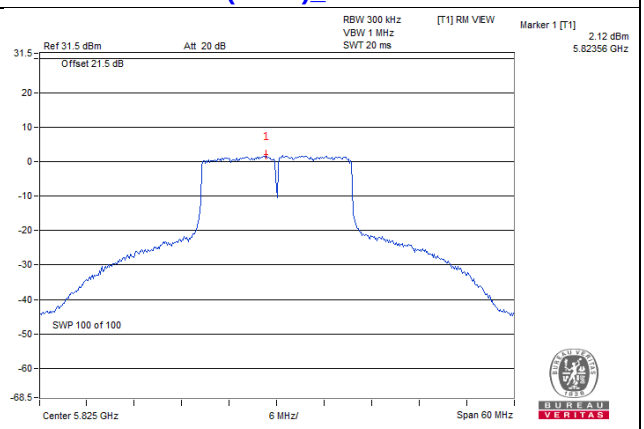
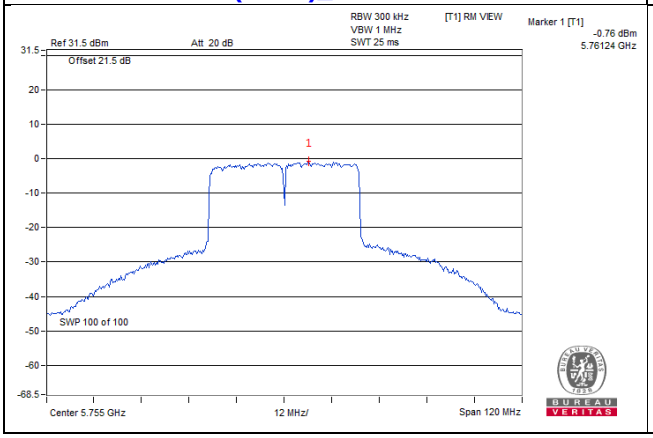
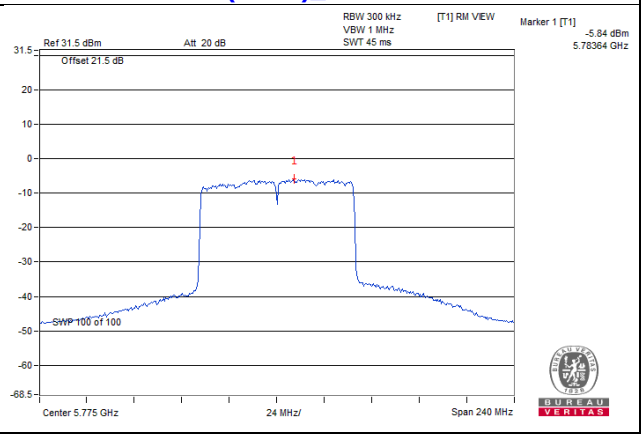
Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)				Duty Factor (dB)	Total PSD With Duty Factor		Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3		mW/300 kHz	dBm/300kHz			
151	5755	-0.76	-1.79	-1.27	-1.84	0.18	3.026	4.81	7.03	29.98	Pass
159	5795	-1.02	-1.92	-1.75	-1.99	0.18	2.8502	4.55	6.77	29.98	Pass

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = 0dBi + 10log(4) = 6.02dBi > 6dBi , so the Power Density limit shall be reduced to 30-(6.02-6) = 16.98dBm
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE80)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)				Duty Factor (dB)	Total PSD With Duty Factor		Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3		mW/300 kHz	dBm/300kHz			
155	5775	-5.84	-6.34	-6.28	-6.77	0.34	1.0161	0.07	2.29	29.98	Pass

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = 0dBi + 10log(4) = 6.02dBi > 6dBi , so the Power Density limit shall be reduced to 30-(6.02-6) = 16.98dBm
3. Refer to section 3.3 for duty cycle spectrum plot.

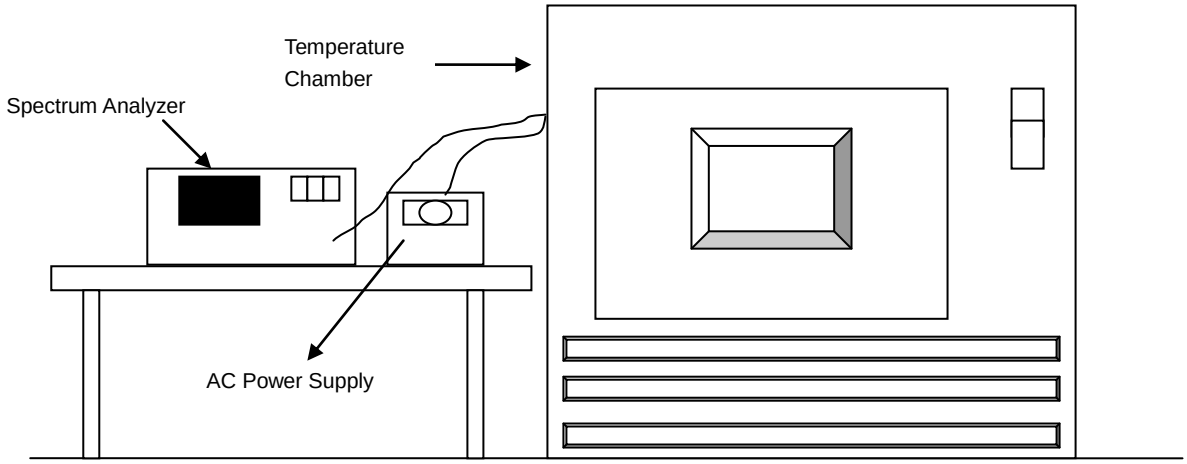
Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH149	**802.11ax (HE20)_Chain 0 / CH165**
	
802.11ax (HE40)_Chain 0 / CH151	**802.11ax (HE80)_Chain 0 / CH155**
	

4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
b. Turn the EUT on and couple its output to a spectrum analyzer.
c. Turn the EUT off and set the chamber to the highest temperature specified.
d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.
e. Repeat step (d) with the temperature chamber set to the next desired temperature until measurements down to the lowest specified temperature have been completed.
f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
40	120	5180.023	PASS	5180.0197	PASS	5180.0244	PASS	5180.0237	PASS
30	120	5179.9923	PASS	5179.9945	PASS	5179.9968	PASS	5179.9938	PASS
20	120	5179.9802	PASS	5179.9772	PASS	5179.9808	PASS	5179.9818	PASS
10	120	5180.0186	PASS	5180.0228	PASS	5180.0225	PASS	5180.0198	PASS
0	120	5180.0186	PASS	5180.017	PASS	5180.0145	PASS	5180.0165	PASS

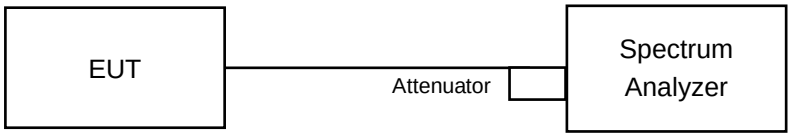
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5180.0191	PASS	5180.0234	PASS	5180.0226	PASS	5180.02	PASS
	120	5180.0186	PASS	5180.0228	PASS	5180.0225	PASS	5180.0198	PASS
	102	5180.0189	PASS	5180.0225	PASS	5180.0225	PASS	5180.0207	PASS

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.39	16.39	16.41	16.40	0.5	Pass
157	5785	16.37	16.38	16.43	16.40	0.5	Pass
165	5825	16.38	16.39	16.46	16.38	0.5	Pass

802.11ax (HE20)

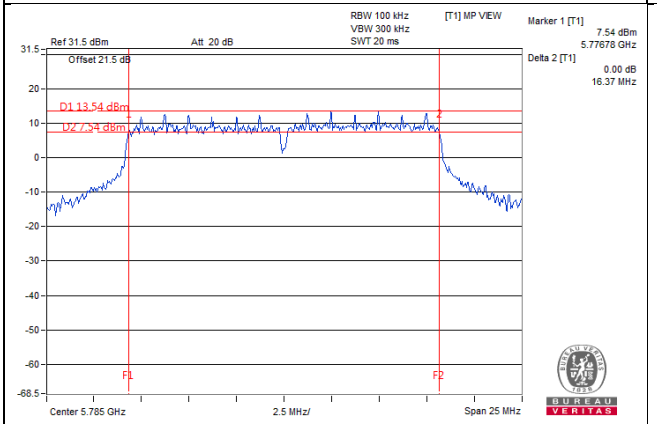
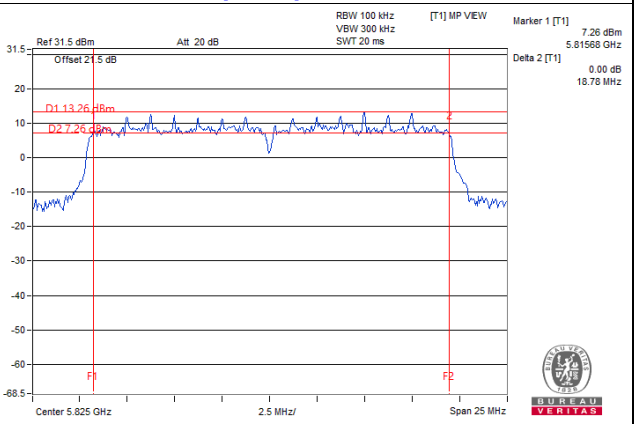
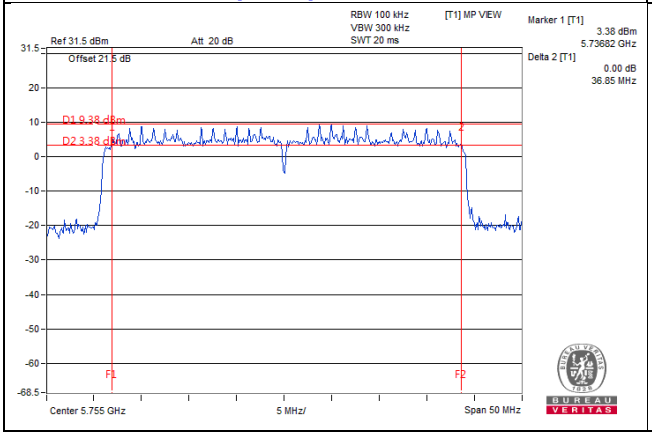
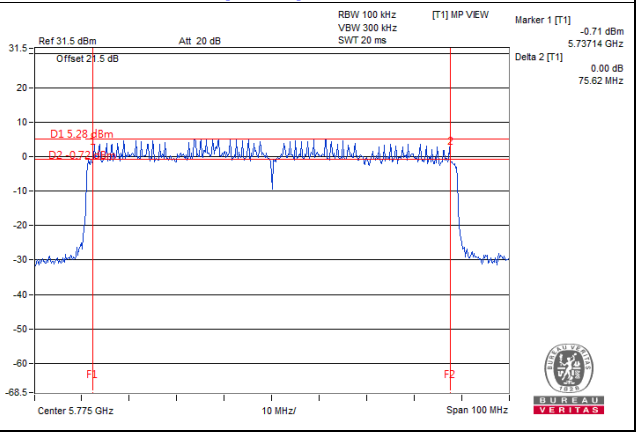
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	18.83	18.96	18.91	18.81	0.5	Pass
157	5785	18.84	18.93	18.99	18.81	0.5	Pass
165	5825	18.95	18.90	18.92	18.78	0.5	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	37.70	36.85	37.70	37.55	0.5	Pass
159	5795	37.77	37.00	37.76	37.55	0.5	Pass

802.11ax (HE80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	76.56	75.82	75.62	76.62	0.5	Pass

Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH157	**802.11ax (HE20)_Chain 3 / CH165**
	
802.11ax (HE40)_Chain 1 / CH151	**802.11ax (HE80)_Chain 2 / CH155**
	

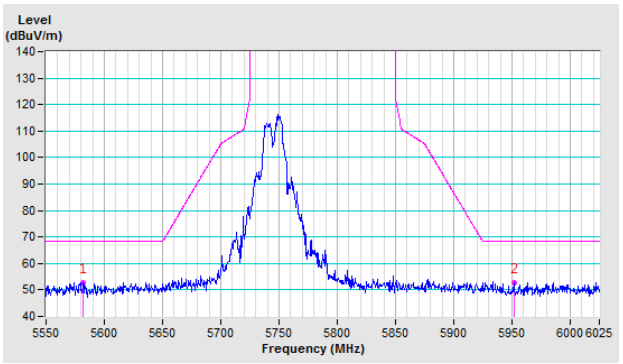
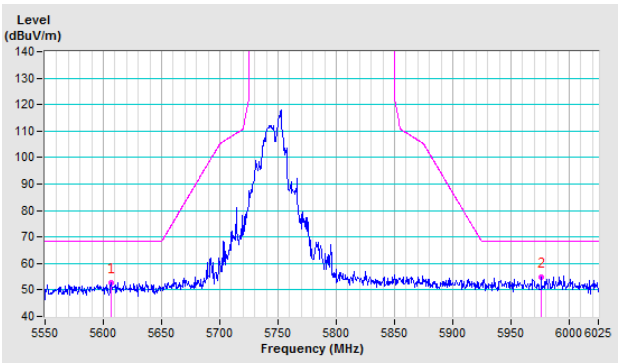
5 Pictures of Test Arrangements

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

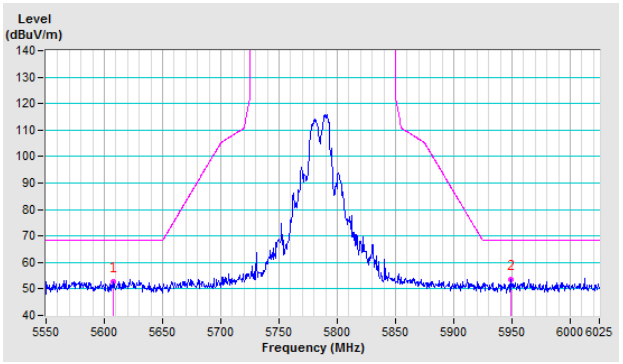
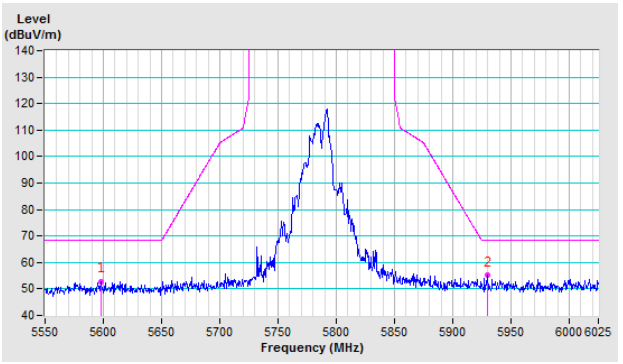
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

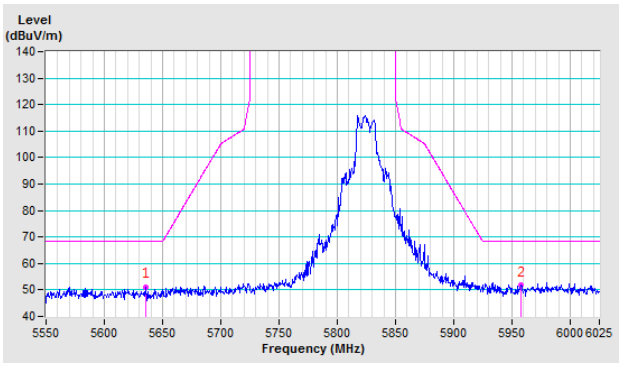
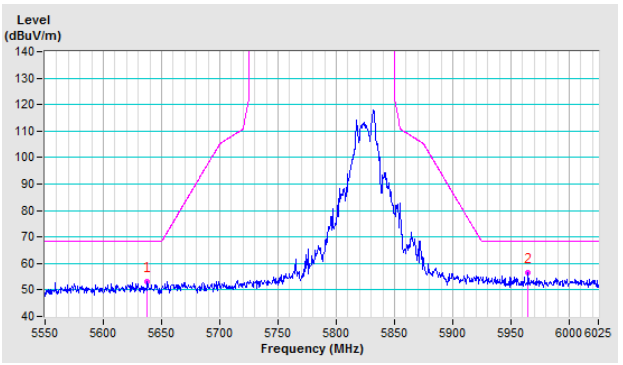
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

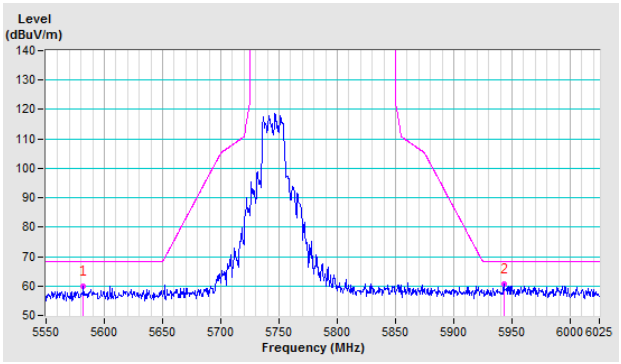
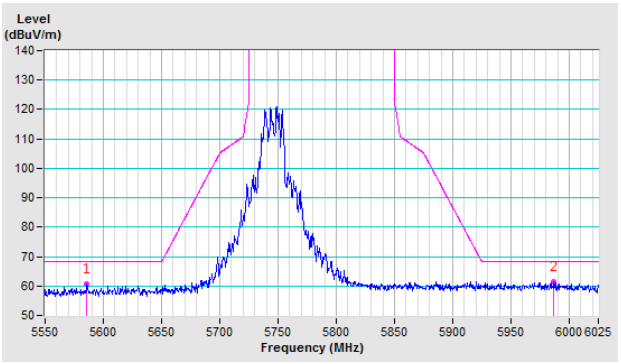
Horizontal	Vertical
	

CH 165 5825 MHz

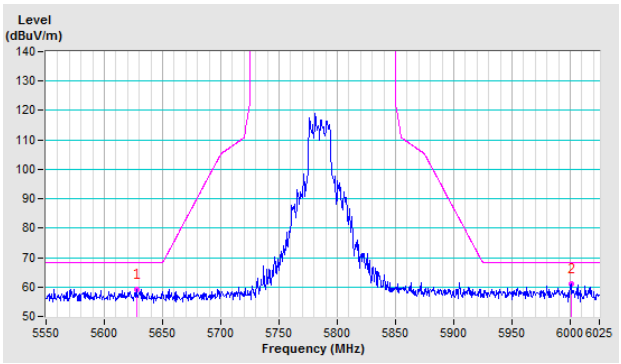
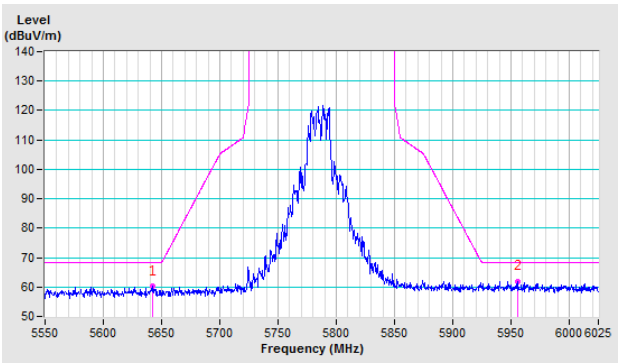
Horizontal	Vertical
	

802.11ax (HE20)

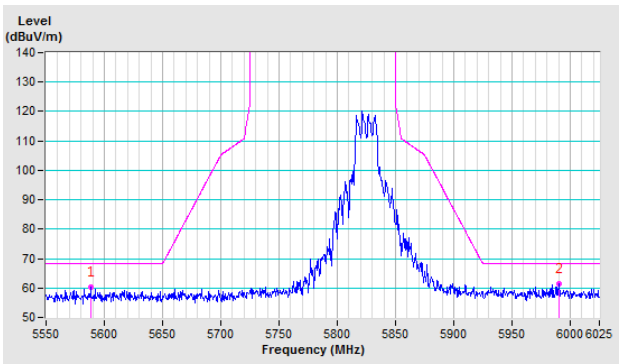
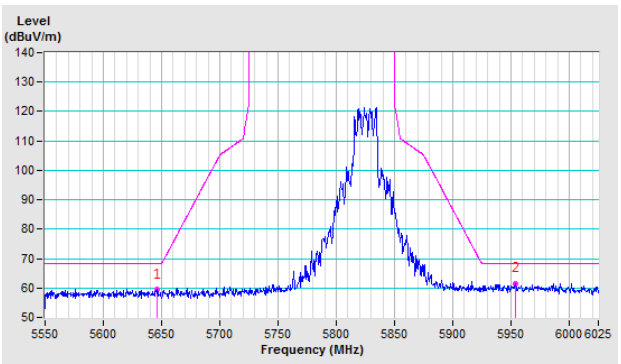
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

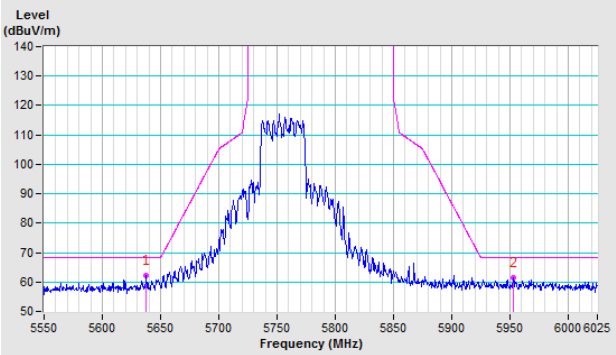
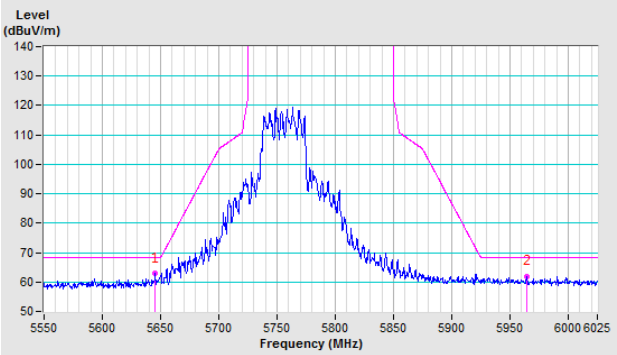
Horizontal	Vertical
	

CH 165 5825 MHz

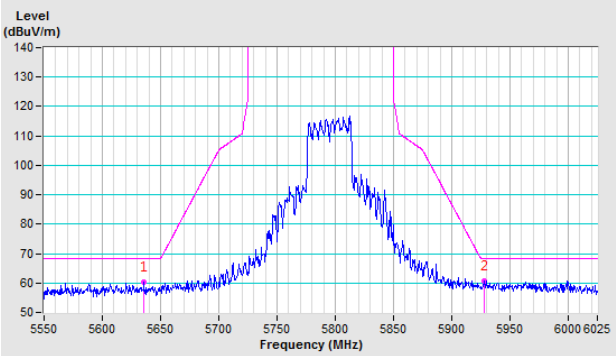
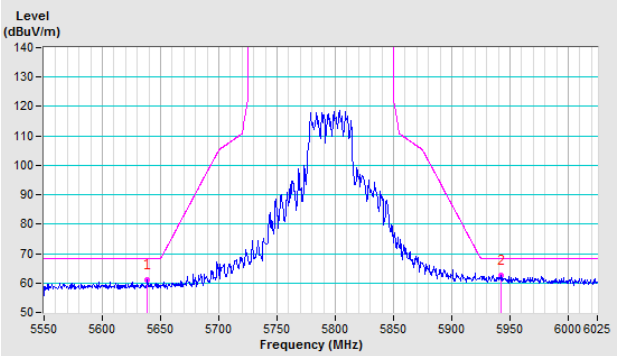
Horizontal	Vertical
	

802.11ax (HE40)

CH 151 5755 MHz

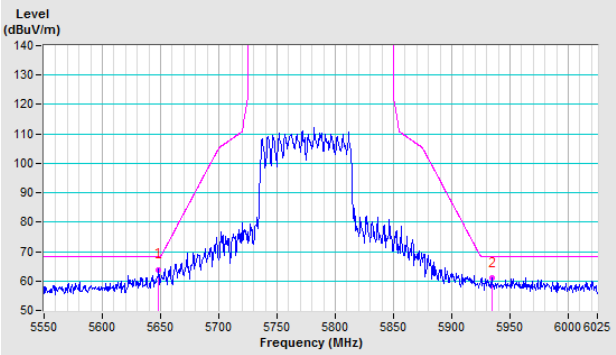
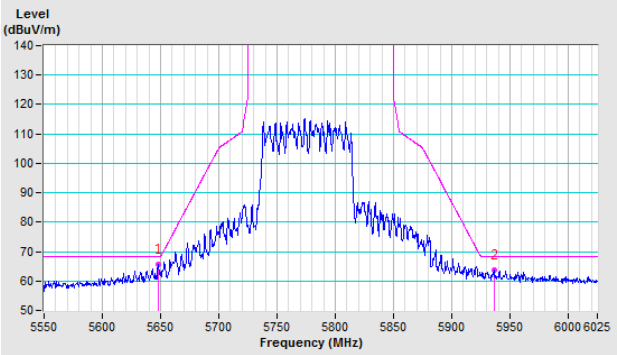
Horizontal	Vertical
	

CH 159 5795 MHz

Horizontal	Vertical
	

802.11ax (HE80)

CH 155 5775 MHz

Horizontal	Vertical
	

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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Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
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Fax: 886-3-6668323

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Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

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