FCC Test Report

Report No.:	RFBERD-WTW-P22010914-1
FCC ID:	HD5-CT60L1N
Test Model:	CT60L1N
Received Date:	2022/2/11
Test Date:	2022/2/23 ~ 2022/2/26
Issued Date:	2022/5/12
Applicant:	Honeywell International Inc.
Address:	9680 Old Bailes Road, Fort Mill, SC 29707 USA
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
RFBERD-WTW-P22010914-1	Original release.	2022/5/12

1 Certificate of Conformity

Product:	Dolphin CT60
Brand:	Honeywell
Test Model:	CT60L1N
Sample Status:	Engineering sample
Applicant:	Honeywell International Inc.
Test Date:	2022/2/23 ~ 2022/2/26
Standard:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10: 2013

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

Prepared by : Vivian Huang , **Date:** 2022/5/12

Vivian Huang / Specialist

Approved by : , **Date:** 2022/5/12

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)(8)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -9.63 dB at 0.15000 MHz.
15.407(b) (1/2/3/4(i/ii)/8)	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit. Minimum passing margin is -4.6 dB at 5350.00 MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	NA	Refer to Note 1 below
---	Occupied Bandwidth Measurement	NA	Refer to Note 1 below
15.407(a)(1/2/3)	Peak Power Spectral Density	NA	Refer to Note 1 below
15.407(e)	6dB bandwidth	NA	Refer to Note 1 below
15.407(g)	Frequency Stability	NA	Refer to Note 1 below
15.203	Antenna Requirement	Pass	No antenna connector is used.

Note:
1. The Radiated Emission and AC Power Conducted Emissions test items of specific channel frequencies were performed for this addendum. The others testing data refer to original test report.
2. For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.
3. For U-NII-1, U-NII-2A, U-NII-2C band compliance with rule 15.407(b) of the band-edge items, the test plots were recorded in Annex B. Test Procedures refer to report 4.1.3.
4. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

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

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Dolphin CT60
Brand	Honeywell
Test Model	CT60L1N
Status of EUT	Engineering sample
HW Version	V1.1
HW P/N	DVT
SW Version	OS.05.001-HON.03.002
SW P/N	477D
Power Supply Rating	3.6Vdc or 3.85Vdc from battery, 5Vdc from USB interface
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode
Modulation Technology	OFDM
Transfer Rate	802.11a: up to 54 Mbps 802.11n: up to 150 Mbps 802.11ac: up to 433.3 Mbps
Operating Frequency	5.18 ~ 5.24 GHz, 5.26 ~ 5.32 GHz, 5.50 ~ 5.72 GHz, 5.745 ~ 5.825 GHz
Number of Channel	802.11a, 802.11n (HT20), 802.11ac (VHT20): 25 802.11n (HT40), 802.11ac (VHT40): 12 802.11ac (VHT80): 6
Output Power	**5.18 ~ 5.24 GHz:** 38.459 mW **5.26 ~ 5.32 GHz:** 38.371 mW **5.50 ~ 5.72 GHz:** 38.371 mW **5.745 ~ 5.825 GHz:** 38.371 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Battery x1, comfort cover x1
Data Cable Supplied	USB snap-on adapter x 1 (1.25m, Shielded with two cores)

Note:

1. This is a supplementary report of Report No.: RF171122C17-1. The differences between them are as below information:
   - Add 802.11n (HT40) modulation mode.
   - Change NFC chip.
   - Add a battery.
   - Changes as listed below information.

SOM Change list	
RF Module	Underfill Modified
RF Module	LPDDR4x Layout Optimization
RF Module	Wi-Fi Layout Optimization
RF Module	WWAN Path Optimization
RF Module	WWAN Shielding Frame Optimization
RF Module	WWAN PA Power Optimization
RF Module	SOM PAD Mask Optimization
RF Module	Change DC regulator and WLAN amplifier DC power
RF Module	BOM Change for Optimization
RF Module	B25 Duplexer-AVAGO-ACMD-6225-TR1
RF Module	B40 TRX filter-AVAGO-ACPF-8240-TR1
RF Module	Remove un-used CLK trace WCN_CLK
RF Module	WIFI 11b Power reduction from 18+/-1.5 dB to 17.5+/-1.5 dB
RF Module	LTE 7 Power reduction from 23.4 + 1 / -2.7 dB to 23 + 1 / -2.7dB
RF Module	GSM 850 Power reduction for Head with WIFI ON mode from 33.4 + 1 / - 2 dB to 32.8 + 1 / -2 dB
RF Module	CDMA2K BC0 Power reduction for Head with WIFI ON mode from 24.4 +/- 1 dB to 23.8 + /- 1dB
RF Module	CDMA2K BC10 Power reduction for Head with WIFI ON mode from 24.4 +/- 1 dB to 23.8 + /- 1dB
RF Module	Enable WIFI 2.4G N40 by software
Carrier board Change list	
Carrier Board	Scanner change to N6703 imager
Carrier Board	Add 1F/2.7V supercap
Carrier Board	Add MAX38888 DC/DC for supercap charge/ change discharge circuit
Carrier Board	Add low battery protection circuit
Carrier Board	Change speaker and add a connector for it
Carrier Board	Change ADS1014 to ADS1015 to add supercap voltage detection
Carrier Board	AUX antenna tuner circuit change placement location
Carrier Board	Upgrade the SOM to SOM4
Carrier Board	Add a new model battery
Carrier Board	NFC Controller from NQ310 to NQ410
Carrier Board	Add the second source (OV13855 Camera, S0703VE insertion)
Carrier Board	Add the second source (ESD, ADC, OPT Sensor, Translator, 6-axis sensor, Pressure sensor,Analog switch)

2. According to above conditions and the applicant requirement, only Radiated Emission and AC Power Conducted Emissions test items of specific channel frequencies need to be performed (Final test mode refer to section 3.2.1). And all data were verified to meet the requirements.
3. There are WLAN, Bluetooth, WWAN and NFC technology used for the EUT.

4. Simultaneously transmission condition.

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

5. The EUT needs to be supplied from battery, the information is as below table:

Original			
No.	Brand	Model No.	Spec.
1	Inventus	CT50-BTSC	3.6 Vdc, 4040 mAh, 14.6 Wh
Newly			
No.	Brand	Model No.	Spec.
2	Honeywell	CT50-BTSC	3.85 Vdc,4020 mAh,15.5 Wh

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

WLAN / Bluetooth Antenna Spec.				
Antenna Gain include path loss (dBi)	Frequency Range (GHz)	Antenna type	Connector type	Trace loss (dB)
0.62	2.4~2.4835	PIFA	POGO pin	1
1.14	5.15~5.25			1.7
1.14	5.25~5.35			
1.14	5.47~5.725			
1.14	5.725~5.85			

NFC Antenna Spec.			
Antenna Gain (dBi)	Frequency Range (MHz)	Antenna type	Connector type
-1	13~14	Loop	NA

WWAN Antenna Spec.					
Chain No.	Antenna Gain include path loss (dBi)	Frequency Range	Antenna type	Connector type	Trace loss (dB)
Chain 0	0	700~960 MHz	PIFA	POGO pin	0.2
	3	1.7~2.0 GHz			0.4
	2.4	2.1~2.4 GHz			0.5
	0.3	2.4~2.7 GHz			0.6
Chain 1 (RX only)	-2	700~960 MHz	PIFA	POGO pin	NA
	0.5	1.7~2.0 GHz			
	0.8	2.1~2.4 GHz			
	0.8	2.4~2.7 GHz			

7. The EUT incorporates a SISO function.

5GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11a	1TX	1RX
802.11n (HT20)	1TX	1RX
802.11n (HT40)	1TX	1RX
802.11ac (VHT20)	1TX	1RX
802.11ac (VHT40)	1TX	1RX
802.11ac (VHT80)	1TX	1RX

Note: The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore the manufacturer will control the power for 802.11n mode is the same as the 802.11ac mode or more lower than it and investigated worst case to representative mode in test report. (Final test mode refer to section 3.2.1)

8. For the radiated emissions, the EUT was pre-tested under the following modes:

Test Mode	Description
Mode A	**Power from laptop**
Mode B	Power from adapter

Note: In original report, 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.

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.

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

3.2 Description of Test Modes

FOR 5180 ~ 5240 MHz

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

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):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210 MHz

FOR 5260 ~ 5320 MHz

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

Channel	Frequency	Channel	Frequency
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

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

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290 MHz

FOR 5500 ~ 5720 MHz

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

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz	144	5720 MHz

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

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz	142	5710 MHz

3 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530 MHz	138	5690 MHz
122	5610 MHz		

FOR 5745 ~ 5825 MHz:

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	
1	√	√	√	Power from laptop
2	-	-	√	Power from adapter

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

Note: In original report, the EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane (Below 1GHz)** and **X-plane (Above 1GHz)**.

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.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5320, 5500-5720, 5745-5825	36 to 64, 100 to 144, 149 to 165	149	OFDM	BPSK	6
802.11ac (VHT80)		42, 58, 106 to 138, 155	42, 58, 106	OFDM	BPSK	29.3

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.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5180-5320, 5500-5720, 5745-5825	36 to 64, 100 to 144, 149 to 165	36	OFDM	BPSK	6.5

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.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5180-5320, 5500-5720, 5745-5825	36 to 64, 100 to 144, 149 to 165	36	OFDM	BPSK	6.5

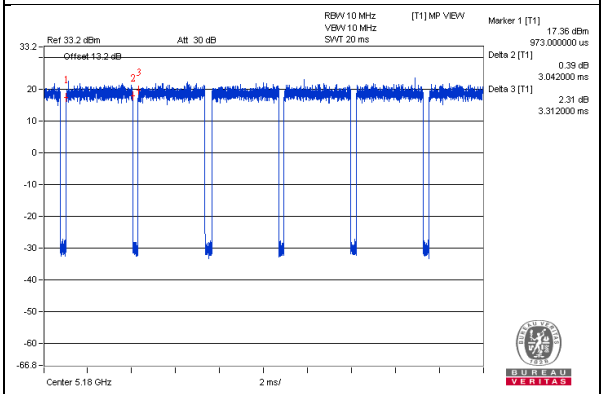
Test Condition:

Applicable To	Environmental Conditions	Input Power (System)	Tested By
RE≥1G	24~25deg. C, 67~68%RH	120Vac, 60Hz	Tom Yang
RE<1G	24deg. C, 67%RH	120Vac, 60Hz	Tom Yang
PLC	24deg. C, 67%RH	120Vac, 60Hz	Tom Yang

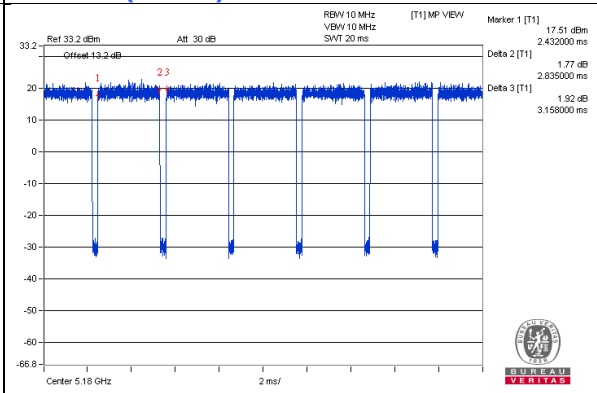
3.3 Duty Cycle of Test Signal

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 = 3.042 ms/3.312 ms = 0.918, Duty factor = 10 * log(1/0.918) = 0.37
802.11ac (VHT20): Duty cycle = 2.835 ms/3.158 ms = 0.898, Duty factor = 10 * log(1/0.898) = 0.47
802.11ac (VHT80): Duty cycle = 1.362 ms/1.613 ms = 0.844, Duty factor = 10 * log(1/0.844) = 0.73

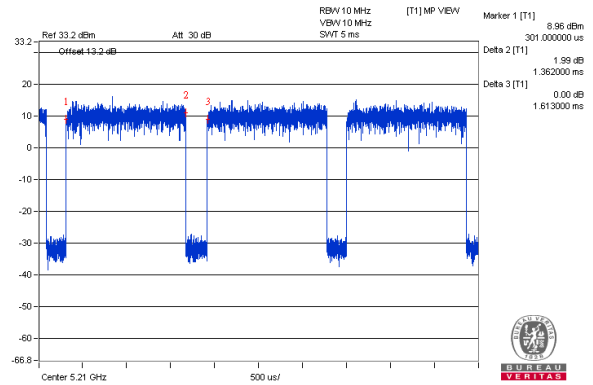
802.11a



802.11ac (VHT20)



802.11ac (VHT80)



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	ACER	N15W8	NA	NA	Supplied by applicant
B.	Micro SD Card	Transcend	16GB	NA	NA	Provided by Lab
C.	USB Adapter	ASUS	EXA1205UA	NA	NA	Provided by Lab

Note:

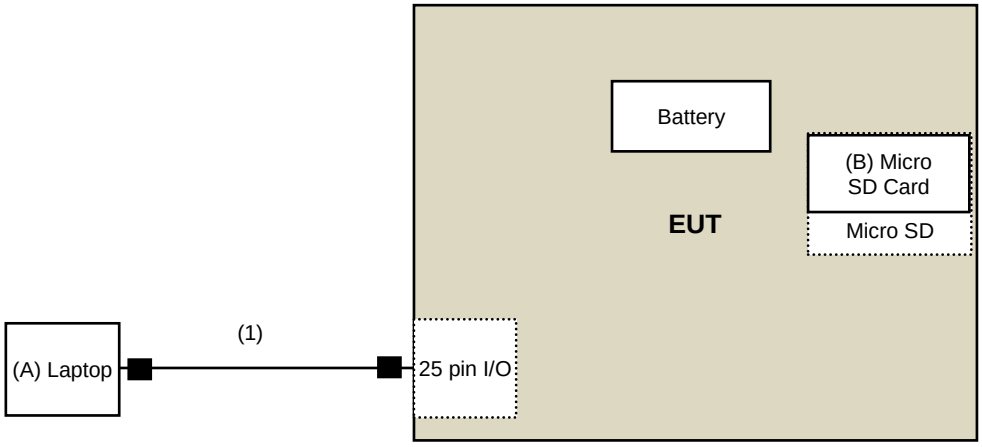
1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Charging Cable	1	1.25	Yes	2	Supplied by applicant

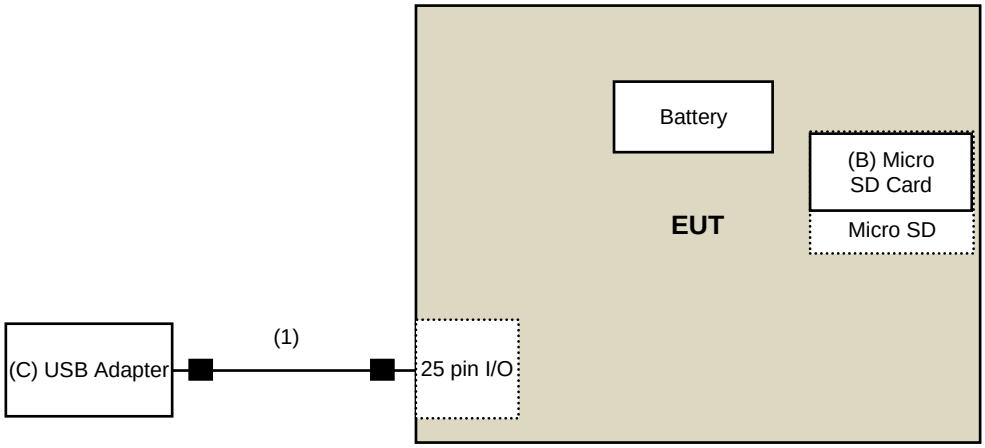
Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test

Power from laptop mode



Power from adapter mode



3.5 General Description of Applied Standard and References

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

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

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

References Test Guidance:
KDB 789033 D02 General UNII Test Procedure New Rules v02r01

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

Limits of unwanted emission out of the restricted bands

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

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

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

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

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

Note:

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

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Spectrum Analyzer KEYSIGHT	N9030B	MY57142938	2021/4/26	2022/4/25
Test Receiver KEYSIGHT	N9038A	MY59050100	2021/5/3	2022/5/2
Software	ADT_Radiated_V 8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Pre_Amplifier EMCI	EMC001340	980142	2021/5/24	2022/5/23
Loop Antenna TESEQ	HLA 6121	45745	2021/7/21	2022/7/20
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-001	2022/1/6	2023/1/5
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-002	2022/1/6	2023/1/5
Pre_Amplifier Mini-Circuits	ZFL-1000VH2	QA0838008	2021/10/19	2022/10/18
Trilog Broadband Antenna Schwarzbeck	VULB 9168	9168-361	2021/10/26	2022/10/25
RF Coaxial Cable COMMATE/PEWC	8D	966-3-1	2021/3/16	2022/3/15
RF Coaxial Cable COMMATE/PEWC	8D	966-3-2	2021/3/16	2022/3/15
RF Coaxial Cable COMMATE/PEWC	8D	966-3-3	2021/3/16	2022/3/15
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	2021/9/23	2022/9/22
Horn Antenna Schwarzbeck	BBHA9120-D	9120D-406	2021/11/14	2022/11/13
Pre_Amplifier EMCI	EMC12630SE	980384	2022/1/10	2023/1/9
RF Coaxial Cable EMCI	EMC104-SM-SM-1500	180504	2021/4/26	2022/4/25
RF Coaxial Cable EMCI	EMC104-SM-SM-2000	180601	2021/6/8	2022/6/7
RF Cable EMCI	EMC104-SM-SM-6000	210201	2021/5/13	2022/5/12
Fix tool for Boresight antenna tower BV	FBA-01	FBA_SIP01	NA	NA
Spectrum Analyzer Keysight	N9030A	MY54490679	2021/7/9	2022/7/8
Pre_Amplifier EMCI	EMC184045SE	980387	2022/1/10	2023/1/9
Horn Antenna Schwarzbeck	BBHA 9170	BBHA9170519	2021/11/14	2022/11/13
RF Cable-Frequency range: 1-40GHz EMCI	EMC102-KM-KM-1200	160924	2022/1/10	2023/1/9
RF Coaxial Cable EMCI	EMC-KM-KM-4000	200214	2021/3/10	2022/3/9

Note: 1. The test was performed in 966 Chamber No. 3.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: 2022/2/23 ~ 2022/2/25

4.1.3 Test Procedure

For Radiated emission below 30MHz

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

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

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

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

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

Note:

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

For Radiated emission above 30MHz

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

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

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

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

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

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

Note:

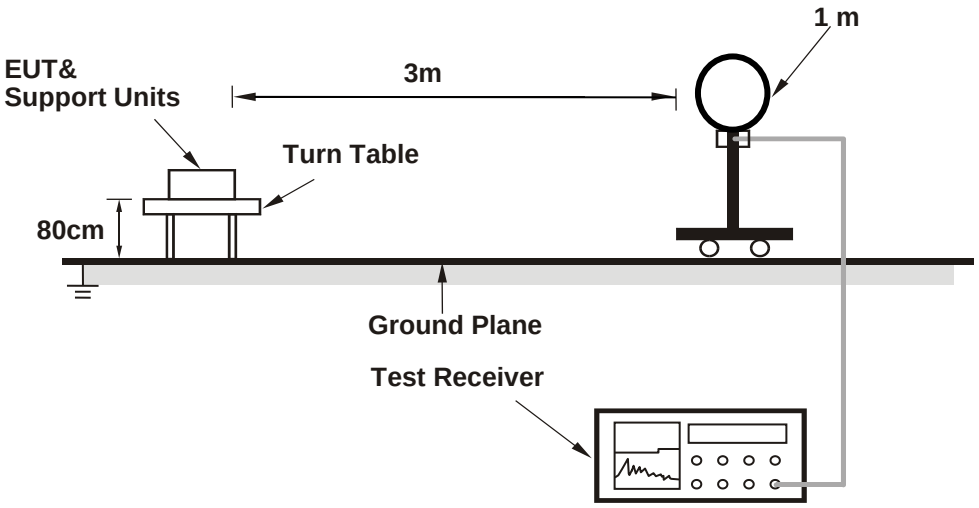
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

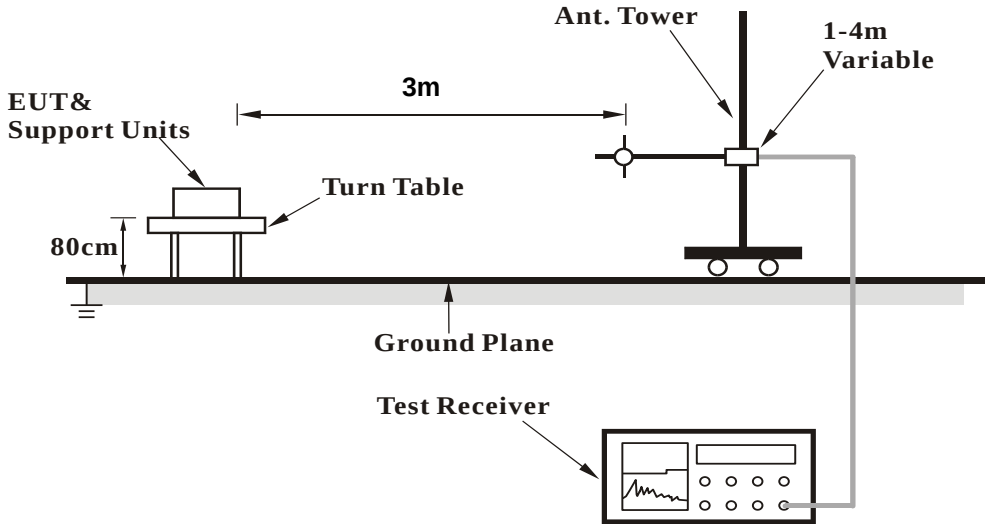
No deviation.

4.1.5 Test Setup

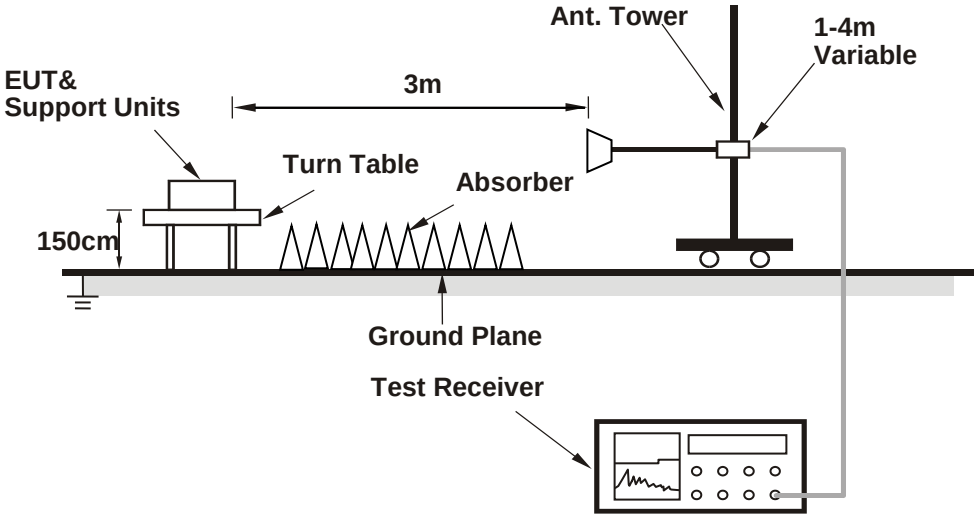
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

a. Placed the EUT on the testing table.
b. Controlling software (QDART 4.8.00073) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data:

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5574.44	52.4 PK	68.2	-15.8	1.01 H	292	47.8	4.6
2	*5745.00	104.9 PK			1.01 H	292	100.0	4.9
3	*5745.00	94.1 AV			1.01 H	292	89.2	4.9
4	#5930.48	52.6 PK	68.2	-15.6	1.01 H	292	47.3	5.3
5	11490.00	45.5 PK	74.0	-28.5	1.23 H	217	30.7	14.8
6	11490.00	32.8 AV	54.0	-21.2	1.23 H	217	18.0	14.8
7	#17235.00	46.8 PK	68.2	-21.4	1.43 H	294	28.6	18.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5641.01	52.4 PK	68.2	-15.8	1.04 V	118	47.8	4.6
2	*5745.00	104.5 PK			1.04 V	118	99.6	4.9
3	*5745.00	93.8 AV			1.04 V	118	88.9	4.9
4	#5987.23	52.5 PK	68.2	-15.7	1.04 V	118	47.2	5.3
5	11490.00	45.1 PK	74.0	-28.9	1.64 V	138	30.3	14.8
6	11490.00	32.7 AV	54.0	-21.3	1.64 V	138	17.9	14.8
7	#17235.00	47.3 PK	68.2	-20.9	1.55 V	247	29.1	18.2

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.

RF Mode	TX 802.11ac (VHT80)	Channel	CH 42：5210 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	63.1 PK	74.0	-10.9	1.11 H	66	58.5	4.6
2	5150.00	47.0 AV	54.0	-7.0	1.11 H	66	42.4	4.6
3	*5210.00	100.6 PK			1.11 H	66	96.3	4.3
4	*5210.00	89.4 AV			1.11 H	66	85.1	4.3
5	5350.00	53.2 PK	74.0	-20.8	1.11 H	66	48.9	4.3
6	5350.00	40.9 AV	54.0	-13.1	1.11 H	66	36.6	4.3
7	#10420.00	45.7 PK	68.2	-22.5	1.18 H	219	32.0	13.7
8	15630.00	46.5 PK	74.0	-27.5	1.37 H	296	32.6	13.9
9	15630.00	35.3 AV	54.0	-18.7	1.37 H	296	21.4	13.9
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	58.5 PK	74.0	-15.5	1.53 V	202	53.9	4.6
2	5150.00	44.1 AV	54.0	-9.9	1.53 V	202	39.5	4.6
3	*5210.00	95.3 PK			1.53 V	202	91.0	4.3
4	*5210.00	85.7 AV			1.53 V	202	81.4	4.3
5	5350.00	51.5 PK	74.0	-22.5	1.53 V	202	47.2	4.3
6	5350.00	39.9 AV	54.0	-14.1	1.53 V	202	35.6	4.3
7	#10420.00	45.0 PK	68.2	-23.2	1.58 V	150	31.3	13.7
8	15630.00	47.5 PK	74.0	-26.5	1.59 V	243	33.6	13.9
9	15630.00	35.7 AV	54.0	-18.3	1.59 V	243	21.8	13.9

Remarks:

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

RF Mode	TX 802.11ac (VHT80)	Channel	CH 58：5290 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	52.9 PK	74.0	-21.1	1.02 H	61	48.3	4.6
2	5150.00	40.7 AV	54.0	-13.3	1.02 H	61	36.1	4.6
3	*5290.00	98.9 PK			1.02 H	61	94.9	4.0
4	*5290.00	88.5 AV			1.02 H	61	84.5	4.0
5	5350.00	65.1 PK	74.0	-8.9	1.02 H	61	60.8	4.3
6	**5350.00**	**49.4 AV**	**54.0**	**-4.6**	**1.02 H**	**61**	**45.1**	**4.3**
7	#10580.00	45.5 PK	68.2	-22.7	1.27 H	202	31.7	13.8
8	15870.00	46.6 PK	74.0	-27.4	1.38 H	299	32.8	13.8
9	15870.00	35.9 AV	54.0	-18.1	1.38 H	299	22.1	13.8
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5059.90	52.1 PK	74.0	-21.9	1.50 V	210	48.0	4.1
2	5059.90	39.8 AV	54.0	-14.2	1.50 V	210	35.7	4.1
3	5150.00	51.4 PK	74.0	-22.6	1.50 V	210	46.8	4.6
4	5150.00	40.8 AV	54.0	-13.2	1.50 V	210	36.2	4.6
5	*5290.00	94.4 PK			1.50 V	210	90.4	4.0
6	*5290.00	84.5 AV			1.50 V	210	80.5	4.0
7	5350.00	59.9 PK	74.0	-14.1	1.50 V	210	55.6	4.3
8	5350.00	46.5 AV	54.0	-7.5	1.50 V	210	42.2	4.3
9	#10580.00	45.4 PK	68.2	-22.8	1.67 V	127	31.6	13.8
10	15870.00	46.9 PK	74.0	-27.1	1.49 V	260	33.1	13.8
11	15870.00	36.5 AV	54.0	-17.5	1.49 V	260	22.7	13.8

Remarks:

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

RF Mode	TX 802.11ac (VHT80)	Channel	CH 106：5530 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5460.00	60.2 PK	74.0	-13.8	1.03 H	295	55.8	4.4
2	5460.00	43.4 AV	54.0	-10.6	1.03 H	295	39.0	4.4
3	#5464.80	63.2 PK	68.2	-5.0	1.03 H	295	58.8	4.4
4	*5530.00	98.8 PK			1.03 H	295	94.3	4.5
5	*5530.00	88.3 AV			1.03 H	295	83.8	4.5
6	#5813.20	53.1 PK	68.2	-15.1	1.03 H	295	48.0	5.1
7	11060.00	45.3 PK	74.0	-28.7	1.25 H	230	31.0	14.3
8	11060.00	32.5 AV	54.0	-21.5	1.25 H	230	18.2	14.3
9	#16590.00	46.4 PK	68.2	-21.8	1.45 H	303	31.2	15.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5460.00	58.2 PK	74.0	-15.8	1.03 V	112	53.8	4.4
2	5460.00	42.3 AV	54.0	-11.7	1.03 V	112	37.9	4.4
3	#5464.00	58.1 PK	68.2	-10.1	1.03 V	112	53.7	4.4
4	*5530.00	97.0 PK			1.03 V	112	92.5	4.5
5	*5530.00	86.2 AV			1.03 V	112	81.7	4.5
6	#5836.80	53.0 PK	68.2	-15.2	1.03 V	112	47.9	5.1
7	11060.00	45.2 PK	74.0	-28.8	1.63 V	132	30.9	14.3
8	11060.00	32.7 AV	54.0	-21.3	1.63 V	132	18.4	14.3
9	#16590.00	47.4 PK	68.2	-20.8	1.53 V	251	32.2	15.2

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.

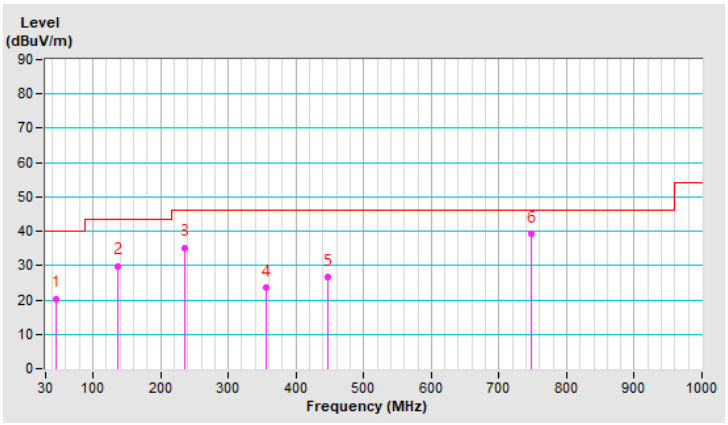
Below 1GHz Data:

RF Mode	TX 802.11ac (VHT20)	Channel	CH 36：5180 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	46.34	20.4 QP	40.0	-19.6	1.50 H	197	28.5	-8.1
2	136.38	29.9 QP	43.5	-13.6	2.00 H	282	38.1	-8.2
3	235.20	35.3 QP	46.0	-10.7	1.50 H	131	44.5	-9.2
4	356.70	23.7 QP	46.0	-22.3	1.00 H	186	28.6	-4.9
5	446.37	26.5 QP	46.0	-19.5	1.50 H	317	28.6	-2.1
6	747.00	39.2 QP	46.0	-6.8	1.00 H	29	34.4	4.8

Remarks:

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

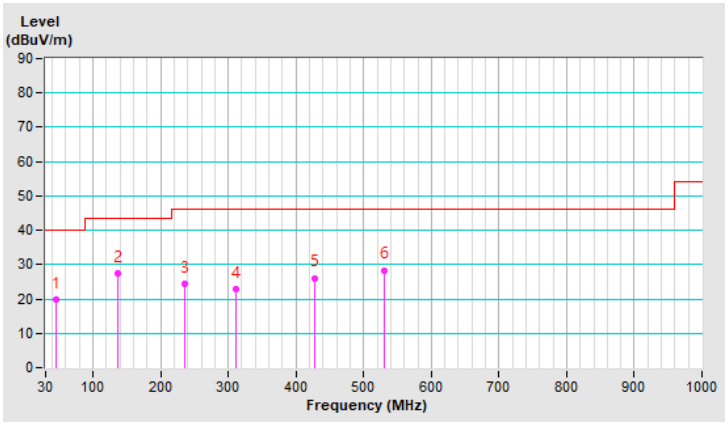


RF Mode	TX 802.11ac (VHT20)	Channel	CH 36：5180 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	46.17	19.8 QP	40.0	-20.2	2.00 V	250	27.9	-8.1
2	136.34	27.4 QP	43.5	-16.1	1.00 V	208	35.6	-8.2
3	235.40	24.4 QP	46.0	-21.6	1.50 V	237	33.6	-9.2
4	310.48	22.8 QP	46.0	-23.2	2.00 V	283	28.9	-6.1
5	428.14	26.1 QP	46.0	-19.9	1.00 V	360	28.7	-2.6
6	529.84	28.4 QP	46.0	-17.6	2.00 V	156	28.7	-0.3

Remarks:

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



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	2021/10/13	2022/10/12
LISN R&S	ESH3-Z5	848773/004	2021/10/29	2022/10/28
LISN R & S	ESH3-Z5	835239/001	2021/3/26	2022/3/25
50 ohms Terminator NA	50	3	2021/10/27	2022/10/26
RF Coaxial Cable JYEBO	5D-FB	COCCAB-001	2021/9/25	2022/9/24
Fixed attenuator STI	STI02-2200-10	005	2021/8/27	2022/8/26
Software BVADT	BVADT_Cond_V7.3.7.4	NA	NA	NA

Note: 1. The test was performed in Conduction 1.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: 2022/2/26

4.2.3 Test Procedure

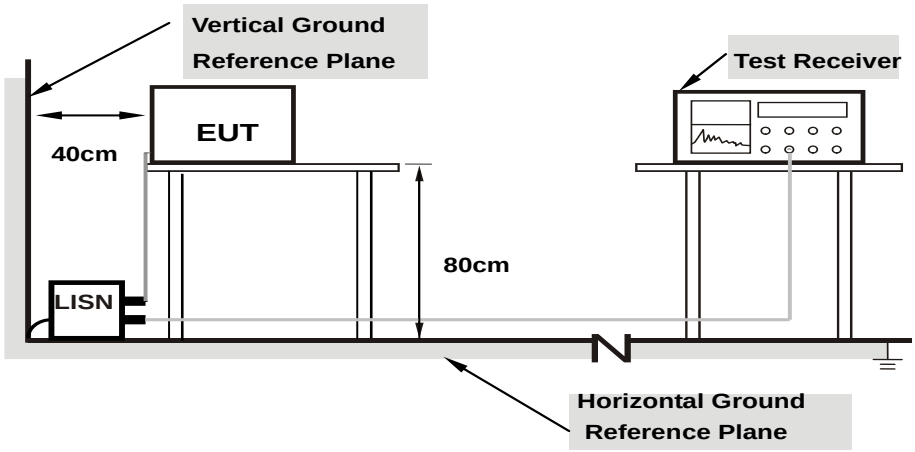
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

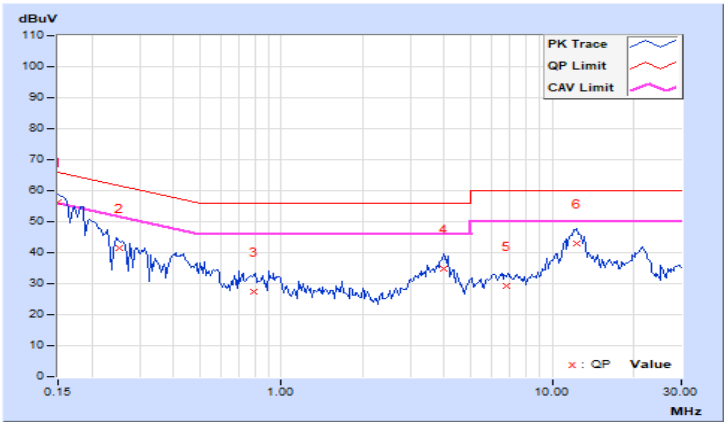
4.2.7 Test Results (Mode 1)

RF Mode	TX 802.11ac (VHT20)	Channel	CH 36：5180 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15000**	**10.05**	**46.32**	**34.92**	**56.37**	**44.97**	**66.00**	**56.00**	**-9.63**	**-11.03**
2	0.25156	10.06	31.46	18.91	41.52	28.97	61.71	51.71	-20.19	-22.74
3	0.79453	10.09	17.19	7.29	27.28	17.38	56.00	46.00	-28.72	-28.62
4	3.97266	10.26	24.43	15.61	34.69	25.87	56.00	46.00	-21.31	-20.13
5	6.78906	10.42	18.75	12.46	29.17	22.88	60.00	50.00	-30.83	-27.12
6	12.31641	10.75	32.34	26.43	43.09	37.18	60.00	50.00	-16.91	-12.82

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

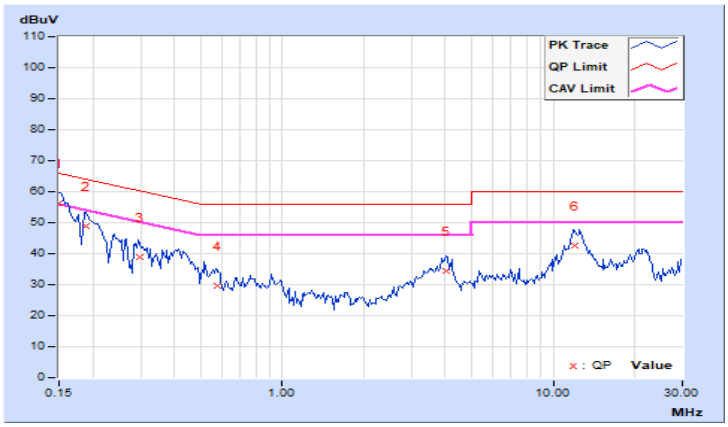


RF Mode	TX 802.11ac (VHT20)	Channel	CH 36：5180 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.02	46.24	33.01	56.26	43.03	66.00	56.00	-9.74	-12.97
2	0.18906	10.03	38.92	25.63	48.95	35.66	64.08	54.08	-15.13	-18.42
3	0.29844	10.03	28.89	16.15	38.92	26.18	60.29	50.29	-21.37	-24.11
4	0.57578	10.05	19.54	11.55	29.59	21.60	56.00	46.00	-26.41	-24.40
5	4.01953	10.21	24.07	14.91	34.28	25.12	56.00	46.00	-21.72	-20.88
6	12.07813	10.59	32.18	26.16	42.77	36.75	60.00	50.00	-17.23	-13.25

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



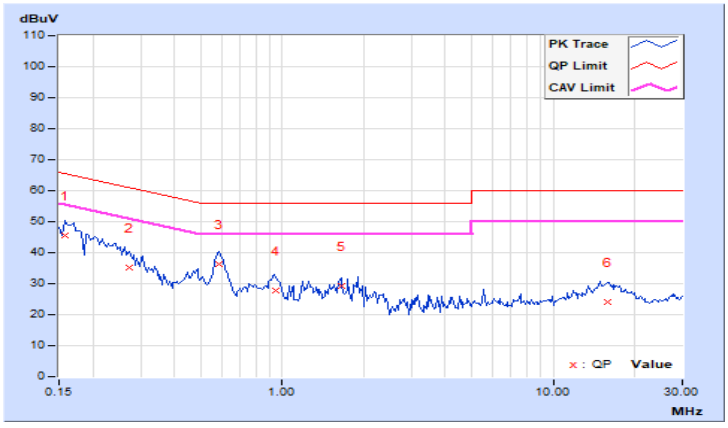
4.2.8 Test Results (Mode 2)

RF Mode	TX 802.11ac (VHT20)	Channel	CH 36：5180 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	10.07	35.40	22.57	45.47	32.64	65.58	55.58	-20.11	-22.94
2	0.27109	10.09	25.15	14.49	35.24	24.58	61.08	51.08	-25.84	-26.50
3	0.58359	10.12	26.16	17.94	36.28	28.06	56.00	46.00	-19.72	-17.94
4	0.95078	10.15	17.62	8.84	27.77	18.99	56.00	46.00	-28.23	-27.01
5	1.64844	10.19	18.98	9.98	29.17	20.17	56.00	46.00	-26.83	-25.83
6	15.84375	11.25	12.99	7.11	24.24	18.36	60.00	50.00	-35.76	-31.64

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

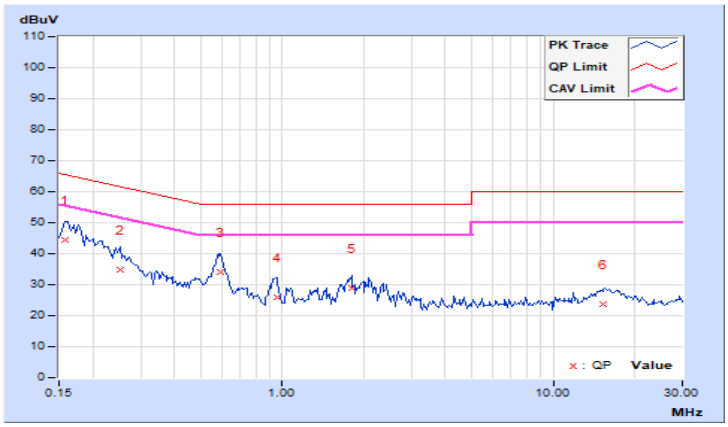


RF Mode	TX 802.11ac (VHT20)	Channel	CH 36：5180 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	10.05	34.24	21.31	44.29	31.36	65.58	55.58	-21.29	-24.22
2	0.25156	10.09	24.79	13.33	34.88	23.42	61.71	51.71	-26.83	-28.29
3	0.59531	10.11	23.80	17.03	33.91	27.14	56.00	46.00	-22.09	-18.86
4	0.95469	10.14	15.88	9.18	26.02	19.32	56.00	46.00	-29.98	-26.68
5	1.80078	10.20	18.87	9.53	29.07	19.73	56.00	46.00	-26.93	-26.27
6	15.25781	11.00	12.73	7.09	23.73	18.09	60.00	50.00	-36.27	-31.91

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

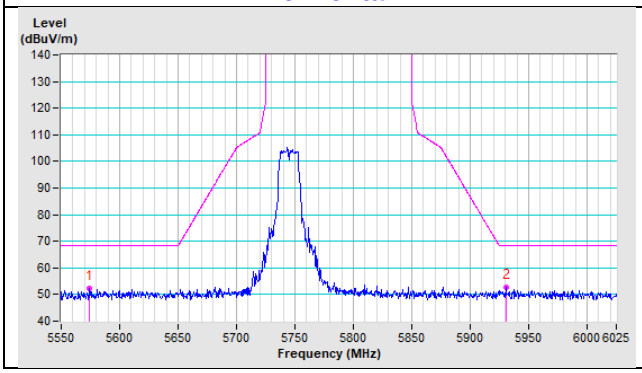
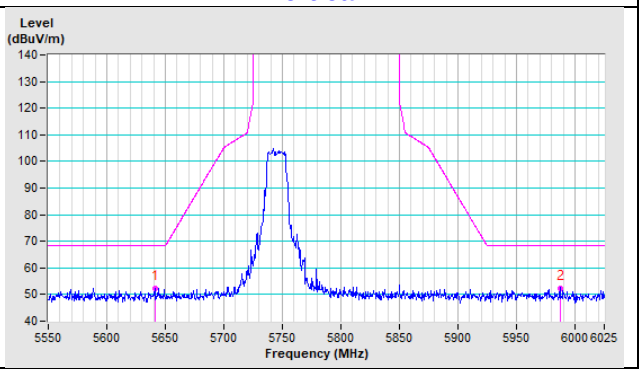


5 Pictures of Test Arrangements

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

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

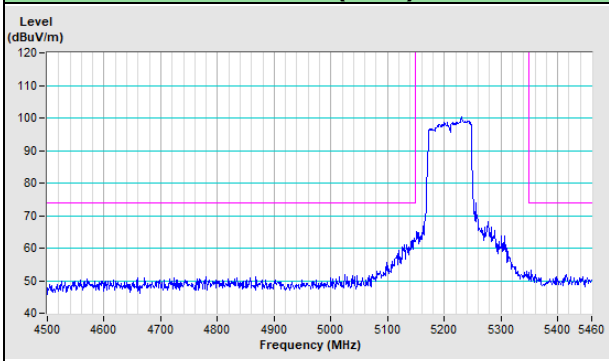
802.11a CH 149：5745 MHz

Horizontal	Vertical
	

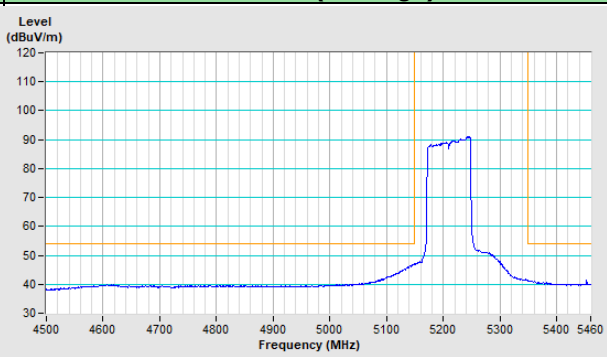
Annex B - Band-Edge Measurement (For U-NII-1, U-NII-2A, U-NII-2C band)

802.11ac (VHT80) Channel 42

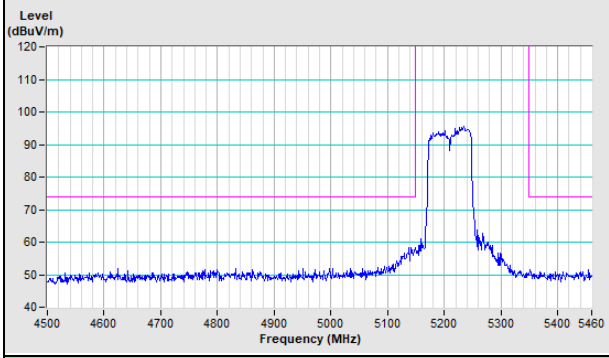
Horizontal (Peak)



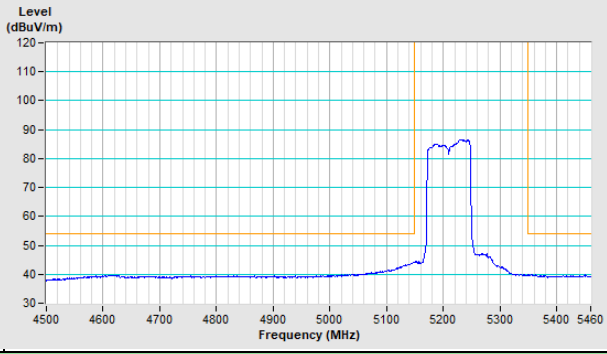
Horizontal (Average)



Vertical (Peak)

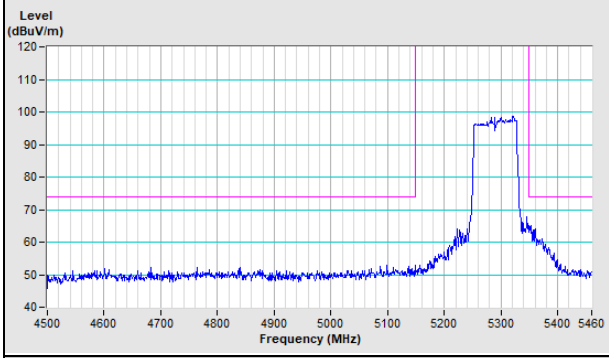


Vertical (Average)

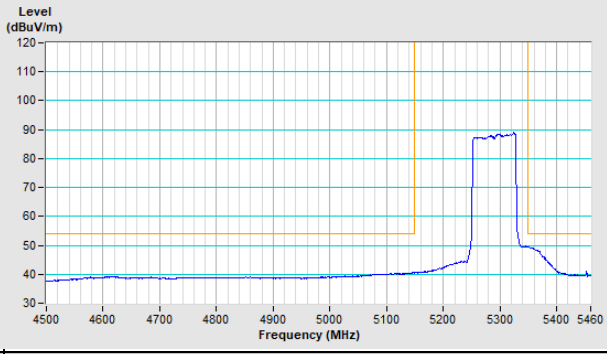


802.11ac (VHT80) Channel 58

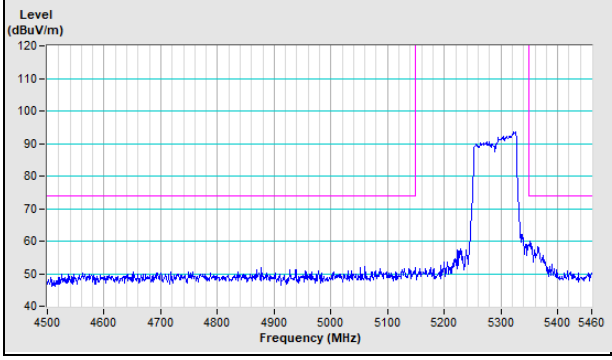
Horizontal (Peak)



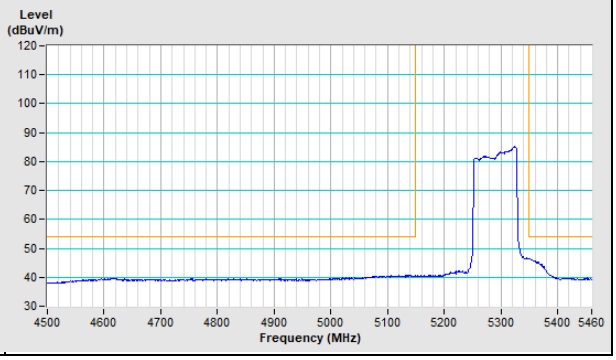
Horizontal (Average)

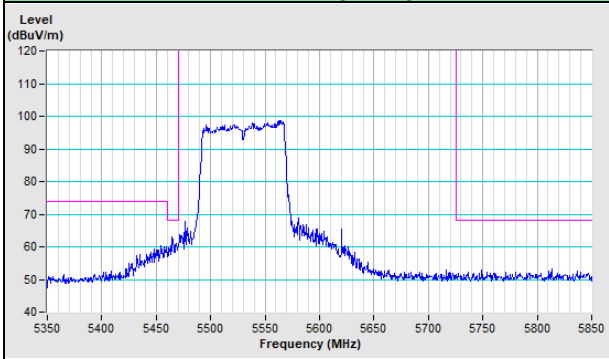
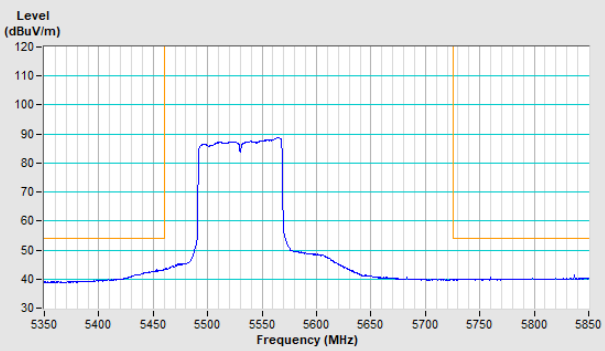
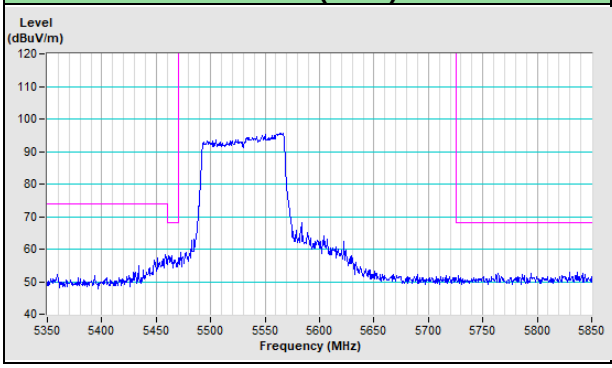
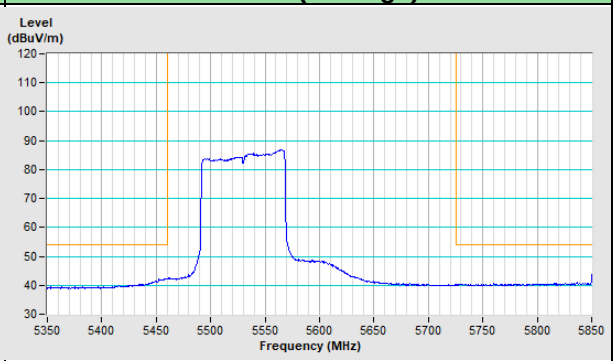


Vertical (Peak)



Vertical (Average)



802.11ac (VHT80) Channel 106	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

Appendix – Information of the Testing Laboratories

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

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

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