

# **FCC Test Report**

FCC ID : IPH-03616

Equipment : LinkBox
Model No. : LYWW20
Brand Name : GARMIN

Applicant : Garmin International, Inc.

Address : 1200 E. 151st Street Olathe, KS 66062 United States

Standard : 47 CFR FCC Part 15.407

Received Date : Jun. 03, 2021

Tested Date : Jun. 07 ~ Jun. 15, 2021

We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by: Approved by:

Along Chen // Assistant Manager Gary Chang / Manager

Testing Laboratory 2732

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# **Release Record**

Report No.	Version	Description	Issued Date
FR9D2401-02AN	Rev. 01	Initial issue	Jul. 01, 2021

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# **Summary of Test Results**

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	Note	N/A
15.407(b) 15.209	Radiated Emissions	[dBuV/m at 3m]: 3883.33MHz 52.82 (Margin -1.18dB) - AV	Pass
15.407(a)	Emission Bandwidth	Meet the requirement of limit	Pass
15.407(e)	6dB bandwidth	Meet the requirement of limit	Pass
15.407(a)	RF Output Power	Max Power [dBm]: 5725-5850MHz: 10.67	Pass
15.407(a)	Peak Power Spectral Density	Meet the requirement of limit	Pass
15.407(g)	Frequency Stability	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

N/A means Not Applicable.

Note: The EUT consumes DC power from battery, so the test is not required.

### **Declaration of Conformity:**

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

### **Comments and Explanations:**

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

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# 1 General Description

## 1.1 Information

## 1.1.1 Specification of the Equipment under Test (EUT)

RF General Information							
Frequency Range (MHz) IEEE Std. Ch. Freq. (MHz) Channel Transmit Data Rate Number Chains (N <sub>TX</sub> ) MCS							
5725-5850	а	5745-5825	149-165 [5]	1	6-54 Mbps		
5725-5850	n (HT20)	5745-5825	149-165 [5]	1	MCS 0-7		
5725-5850	ac (VHT20)	5745-5825	149-165 [5]	1	MCS 0-9		

Note 1: RF output power specifies that Maximum Conducted Output Power.

Note 2: 802.11a/n/ac uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.

#### 1.1.2 Antenna Details

Ant. No.	Brand Name	Model Name	Туре	Connector	Antenna Gain (dBi)
1	INPAQ TECH CO LTD	VGAP-CLB-AS-A1	Chip	N/A	3.24

## 1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	12Vdc from battery

#### 1.1.4 Accessories

N/A

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## 1.1.5 Channel List

For Frequency band 5725~5850 MHz					
802.11 a / I	HT20 / VHT20				
Channel Frequency(MHz)					
149	5745				
153	5765				
157	5785				
161	5805				
165	5825				

# 1.1.6 Test Tool and Duty Cycle

Test Tool	DUT Lab Tool, version: 1.0.0.146				
	Mode	Duty Cycle (%)	Duty Factor (dB)		
Duty Cycle and Duty Factor	11a	97.74%	0.10		
	VHT20	98.23%	0.08		

# 1.1.7 Power Index of Test Tool

For Frequency band 5725~5850 MHz						
Modulation Mode	Test Frequency (MHz)	Power Index				
11a	5745	15				
11a	5785	15				
11a	5825	15				
VHT20	5745	15				
VHT20	5785	15				
VHT20	5825	15				

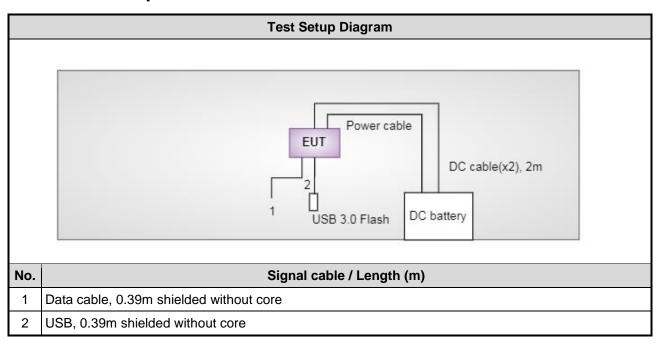
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# 1.2 Local Support Equipment List

	Support Equipment List								
No.	No. Equipment Brand Model FCC ID Remarks								
1	USB 3.0 Flash	Transcend	JetFlash 700						
2	2 DC battery Top Lite 46B24L								

# 1.3 Test Setup Chart



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# 1.4 The Equipment List

Test Item	Radiated Emission							
Test Site	966 chamber1 / (03CH01-WS)							
Test Date	Jun. 07, 2021 ~ Jun. 10, 2021							
Instrument	Brand Model No. Serial No. Calibration Date Calibration Until							
Receiver	R&S	ESR3	101657	Mar. 12, 2021	Mar. 11, 2022			
Spectrum Analyzer	R&S	FSV40	101498	Dec. 04, 2020	Dec. 03, 2021			
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 17, 2020	Nov. 16, 2021			
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jul. 10, 2020	Jul. 09, 2021			
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 11, 2020	Dec. 10, 2021			
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 06, 2020	Nov. 05, 2021			
Preamplifier	EMC	EMC02325	980225	Jul. 03, 2020	Jul. 02, 2021			
Preamplifier	Agilent	83017A	MY39501308	Sep. 26, 2020	Sep. 25, 2021			
Preamplifier	EMC	EMC184045B	980192	Jul. 21, 2020	Jul. 20, 2021			
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 06, 2020	Oct. 05, 2021			
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 06, 2020	Oct. 05, 2021			
LF cable 11M	EMC	EMCCFD400-NW-N W-11000	200801	Oct. 06, 2020	Oct. 05, 2021			
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 06, 2020	Oct. 05, 2021			
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Oct. 06, 2020	Oct. 05, 2021			
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Oct. 06, 2020	Oct. 05, 2021			
Measurement Software AUDIX e3 6.120210g NA NA								
Note: Calibration Inter	rval of instruments liste	d above is one year.						

Test Item	RF Conducted							
Test Site	(TH01-WS)	(TH01-WS)						
Test Date	Jun. 15, 2021							
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until			
Spectrum Analyzer	R&S	FSV40	101063	Apr. 19, 2021	Apr. 18, 2022			
Power Meter	Anritsu	ML2495A	1241002	Nov. 04, 2020	Nov. 03, 2021			
Power Sensor	Anritsu	MA2411B	1207366	Nov. 04, 2020	Nov. 03, 2021			
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	May 25, 2021	May 24, 2022			
DC POWER SOURCE	GW INSTEK	GPC-6030D	GES855395	Nov. 09, 2020	Nov. 08, 2021			
Measurement Software								
Note: Calibration Inter	rval of instruments liste	d above is one year.						

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## 1.5 Test Standards

47 CFR FCC Part 15.407 ANSI C63.10-2013

## 1.6 Reference Guidance

FCC KDB 412172 D01 Determining ERP and EIRP v01r01 FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01

## 1.7 Deviation from Test Standard and Measurement Procedure

None

# 1.8 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

Measurement Uncertainty				
Parameters	Uncertainty			
Bandwidth	±34.130 Hz			
Conducted power	±0.808 dB			
Frequency error	±1x10 <sup>-9</sup>			
Power density	±0.583 dB			
Conducted emission	±2.715 dB			
AC conducted emission	±2.92 dB			
Radiated emission ≤ 1GHz	±3.41 dB			
Radiated emission > 1GHz	±4.59 dB			
Time	±0.1%			
Temperature	±0.4 °C			

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# 2 Test Configuration

# 2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	03CH01-WS, TH01-WS
Address of Test Site	No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

FCC Designation No.: TW2732FCC site registration No.: 181692

➤ ISED#: 10807A

➤ CAB identifier: TW2732

## 2.2 The Worst Test Modes and Channel Details

For Frequency band 5725-5850 MHz							
Test item	Modulation Mode	Test Frequency (MHz)	Data Rate (Mbps) / MCS	Test Configuration			
Radiated Emissions ≤1GHz	VHT20	5825	MCS 0				
RF Output Power	11a VHT20	5745 / 5785 / 5825 5745 / 5785 / 5825	6 Mbps MCS 0				
Radiated Emissions >1GHz Emission Bandwidth 6dB bandwidth Peak Power Spectral Density	11a VHT20	5745 / 5785 / 5825 5745 / 5785 / 5825	6 Mbps MCS 0				
Frequency Stability	Un-modulation	5785					

#### NOTE:

The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement - X, Y, and Z-plane. The **X-plane** results were found as the worst case and were shown in this report.

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## 3 Transmitter Test Results

## 3.1 Emission Bandwidth

#### 3.1.1 Limit of Emission bandwidth

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

#### 3.1.2 Test Procedures

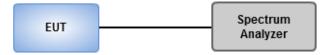
### **Occupied Bandwidth**

- 1. Set RBW = 1 % to 5 % of the OBW.
- Set VBW ≥ 3 RBW.
- 3. Sample detection and single sweep mode shall be used.
- 4. Use the 99 % power bandwidth function of the instrument.

#### 6dB Bandwidth

- 1. Set RBW = 100kHz, VBW = 300kHz.
- 2. Detector = Peak, Trace mode = max hold.
- 3. Allow the trace to stabilize.
- 4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 3.1.3 Test Setup



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### 3.1.4 Test Result of Emission Bandwidth

Ambient Condition	24°C / 67%	Tested By	Aska Huang
		,	

**Summary** 

Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW
	(Hz)	(Hz)		(Hz)	(Hz)
5.725-5.85GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_1TX	16.449M	16.643M	16M6D1D	16.377M	16.57M
802.11ac VHT20_Nss1,(MCS0)_1TX	17.609M	17.656M	17M7D1D	17.609M	17.656M

Max-N dB = Maximum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band;

Max-OBW = Maximum 99% occupied bandwidth;
Min-N dB = Minimum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band;
Min-OBW = Minimum 99% occupied bandwidth;

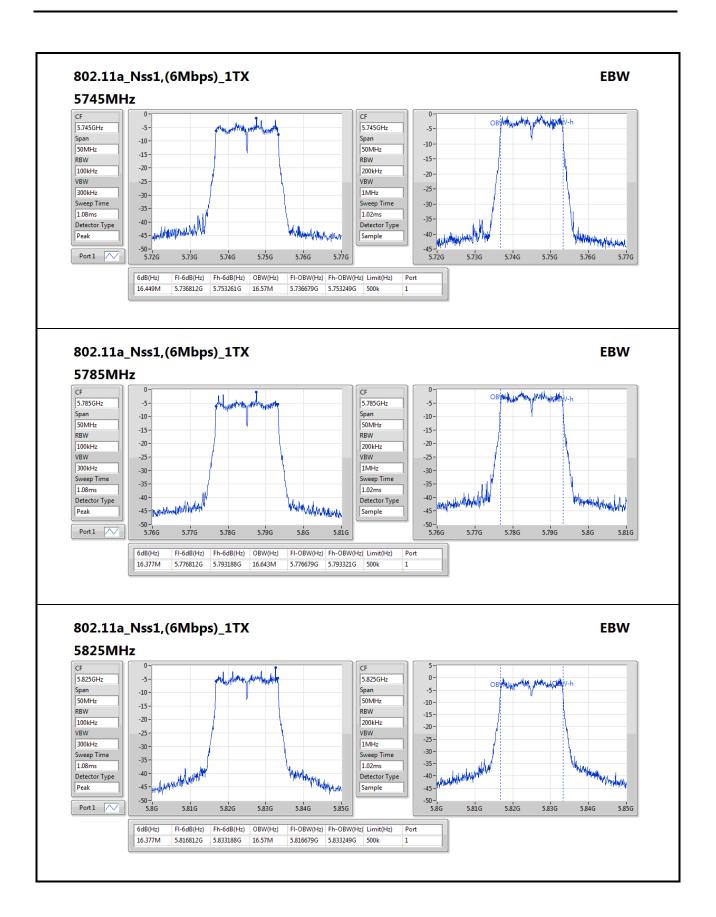
#### Result

Mode	Result	Limit	Port 1-N dB	Port 1-OBW	
		(Hz)	(Hz)	(Hz)	
802.11a_Nss1,(6Mbps)_1TX	-	-	-	-	
5745MHz	Pass	500k	16.449M	16.57M	
5785MHz	Pass	500k	16.377M	16.643M	
5825MHz	Pass	500k	16.377M	16.57M	
802.11ac VHT20_Nss1,(MCS0)_1TX	-	-	-	-	
5745MHz	Pass	500k	17.609M	17.656M	
5785MHz	Pass	500k	17.609M	17.656M	
5825MHz	Pass	500k	17.609M	17.656M	

**Port X-N dB** = Port **X** 6dB down bandwidth for 5.725-5.85GHz band / 26dB down bandwidth for other band **Port X-OBW** = Port **X** 99% occupied bandwidth;

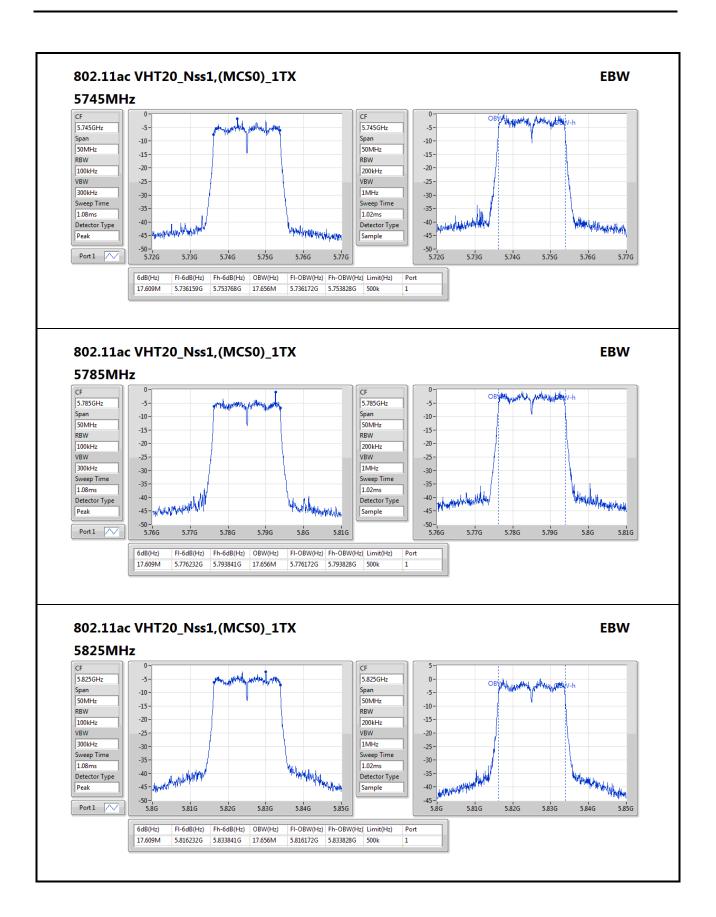
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## 3.2 RF Output Power

## 3.2.1 Limit of RF Output Power

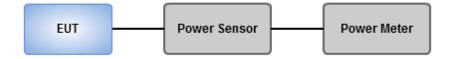
The maximum conducted output power over the frequency band of operation shall not exceed 1 W

#### 3.2.2 Test Procedures

### Method PM-G (Measurement using a gated RF average power meter)

Measurements may is performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

### 3.2.3 Test Setup



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# 3.2.4 Test Result of Maximum Conducted Output Power

Ambient Condition	24°C / 67%	Tested By	Aska Huang
		,	

**Summary** 

Mode	Total Power (dBm)	Total Power (W)	EIRP (dBm)	EIRP (W)
5.725-5.85GHz	-	-	-	-
802.11a_Nss1,(6Mbps)_1TX	10.43	0.01104	13.67	0.02328
802.11ac VHT20_Nss1,(MCS0)_1TX	10.67	0.01167	13.91	0.02460

#### Result

Mode	Result	DG	Port 1	Total Power	Power Limit	EIRP	EIRP Limit
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
802.11a_Nss1,(6Mbps)_1TX	-	-	-	-	-	-	-
5745MHz	Pass	3.24	10.37	10.37	30.00	13.61	36.00
5785MHz	Pass	3.24	10.38	10.38	30.00	13.62	36.00
5825MHz	Pass	3.24	10.43	10.43	30.00	13.67	36.00
802.11ac VHT20_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
5745MHz	Pass	3.24	10.45	10.45	30.00	13.69	36.00
5785MHz	Pass	3.24	10.55	10.55	30.00	13.79	36.00
5825MHz	Pass	3.24	10.67	10.67	30.00	13.91	36.00

**DG** = Directional Gain;**Port X** = Port X output power

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# 3.3 Peak Power Spectral Density

## 3.3.1 Limit of Peak Power Spectral Density

The maximum power spectral density shall not exceed 30 dBm in any 500 kHz band.

#### 3.3.2 Test Procedures

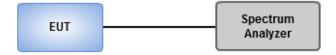
Duty cycle ≥ 98 %

- Set RBW = 500 kHz, VBW = 3 MHz, Sweep time = auto, Detector = RMS.
- 2. Trace average 100 traces.
- 3. Use the peak marker function to determine the maximum amplitude level.

Duty cycle < 98 %

- 1. Set RBW = 500 kHz, VBW = 3 MHz, Detector = RMS.
- 2. Set sweep time ≥ 10 \* (number of points in sweep) \* (total on/off period of the transmitted signal).
- 3. Perform a single sweep.
- 4. Use the peak marker function to determine the maximum amplitude level.
- 5. Add  $10 \log(1/x)$ , where x is the duty cycle.

## 3.3.3 Test Setup



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# 3.3.4 Test Result of Peak Power Spectral Density

<b>Ambient Condition</b>	24°C / 67%	Tested By	Aska Huang
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**Summary** 

Mode	PD	EIRP PD
	(dBm/500kHz)	(dBm/500kHz)
5.725-5.85GHz	-	-
802.11a_Nss1,(6Mbps)_1TX	-3.58	-0.34
802.11ac VHT20_Nss1,(MCS0)_1TX	-3.60	-0.36

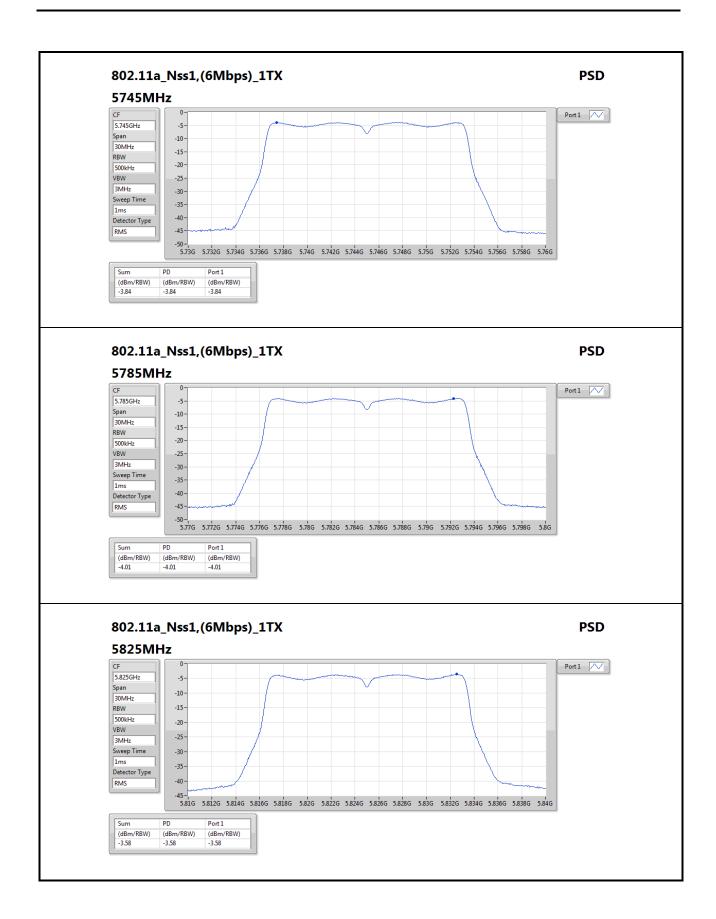
#### Result

Mode	Result	DG	Port 1	PD	PD Limit	EIRP PD	EIRP PD Limit
		(dBi)	(dBm/ 500kHz)	(dBm/ 500kHz)	(dBm/ 500kHz)	(dBm/ 500kHz)	(dBm/ 500kHz)
802.11a_Nss1,(6Mbps)_1TX	-	-	-	-	-	-	-
5745MHz	Pass	3.24	-3.84	-3.84	30.00	-0.60	36.00
5785MHz	Pass	3.24	-4.01	-4.01	30.00	-0.77	36.00
5825MHz	Pass	3.24	-3.58	-3.58	30.00	-0.34	36.00
802.11ac VHT20_Nss1,(MCS0)_1TX	1	1	-	-	-	-	-
5745MHz	Pass	3.24	-3.89	-3.89	30.00	-0.65	36.00
5785MHz	Pass	3.24	-4.10	-4.10	30.00	-0.86	36.00
5825MHz	Pass	3.24	-3.60	-3.60	30.00	-0.36	36.00

**PD** = Power density; **Port X** = Port X power density;

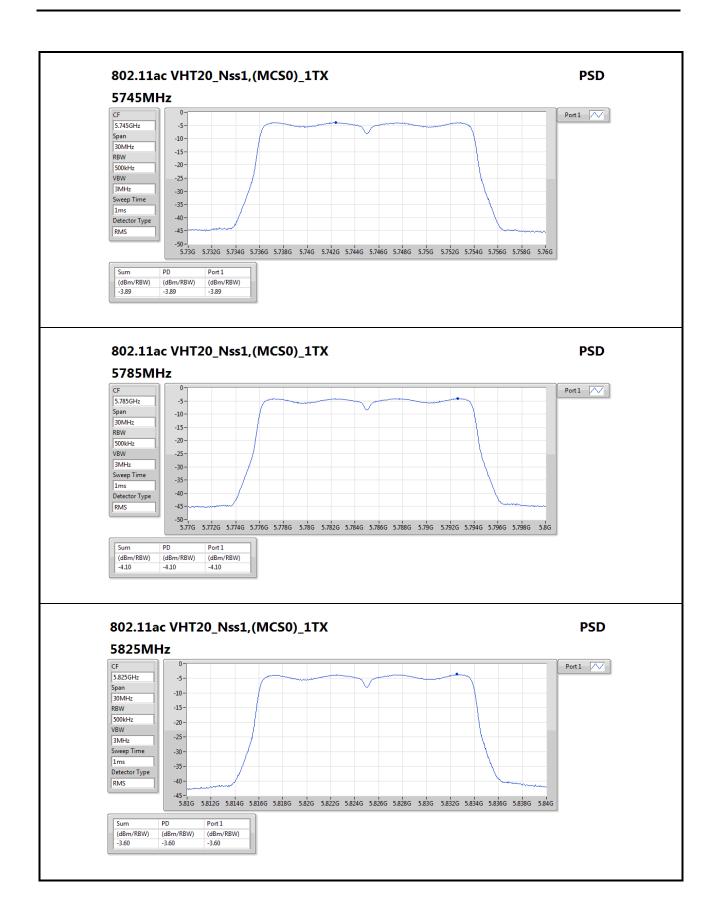
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## 3.4 Transmitter Radiated and Band Edge Emissions

### 3.4.1 Limit of Transmitter Radiated and Band Edge Emissions

Restricted Band Emissions Limit						
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)			
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300			
0.490~1.705	24000/F(kHz)	33.8 - 23	30			
1.705~30.0	30	29	30			
30~88	100	40	3			
88~216	150	43.5	3			
216~960	200	46	3			
Above 960	500	54	3			

#### Note 1:

Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

#### Note 2

Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

Un-restricted band emissions above 1GHz Limit				
Operating Band	Limit			
5.725 - 5.850 GHz	All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.			

Note 1: Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

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#### 3.4.2 Test Procedures

- 1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
- 2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
- 3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

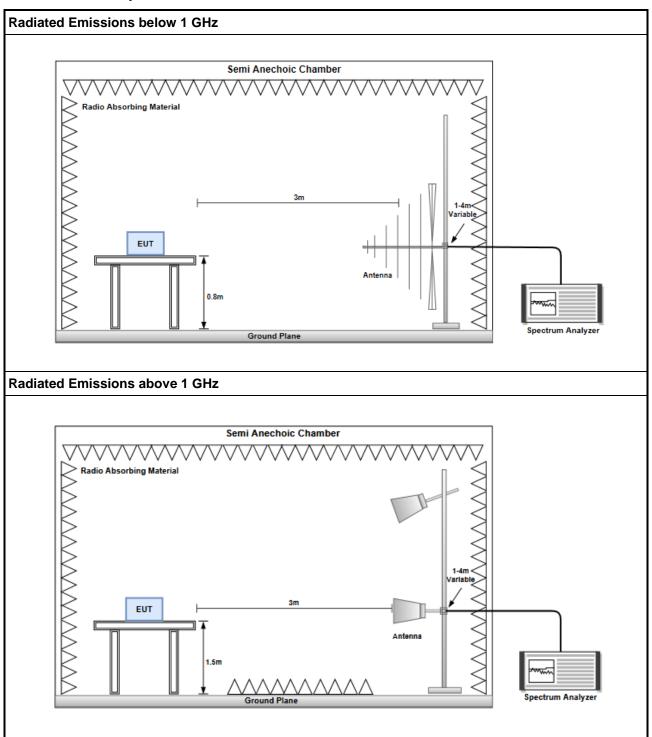
#### Note:

- 1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
- 2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
- RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

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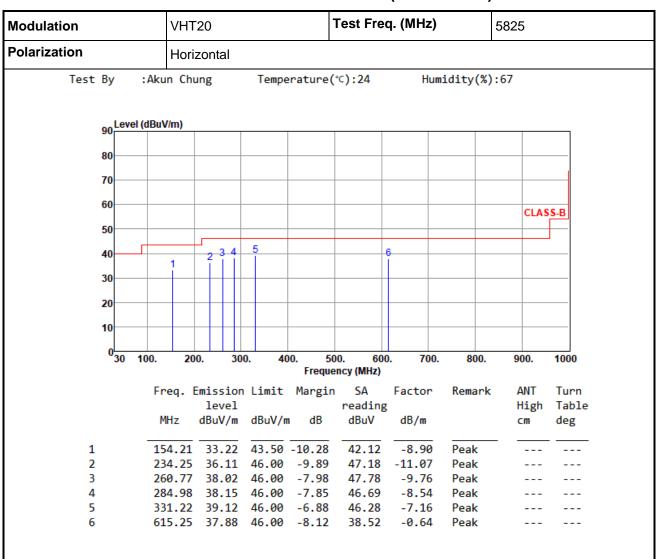
## 3.4.3 Test Setup



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## 3.4.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)



Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) - Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

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Modulation		VHT20		Test Freq. (MHz)			5825	5825		
Polarization		Vertical								
Test By	:Aku	n Chung	;	Tempe	erature(	℃):24	Н	lumidity(	%):67	
<sub>oo</sub> Le	vel (dBuV	//m)								
90										
80										
70										
60									CLA	SS-B
50										
40 -										_
40 1		2	3   5				6 			
30										
20										
10										
0 30	100.	200.	300	). 40	00. 50 Freque	0. 60 ncy (MHz)	0. 70	00. 800	). 900.	1000
	En	ea Emi	ssion	limit	Margin		Facto	r Remar	rk ANT	Turn
		-	evel.	LIMIT	riai gan	reading		. remai	High	
	М	Hz dB	Bu <b>V/m</b>	dBuV/r	n dB	dBuV	dB/m		cm	deg
1	5	0.63	5.45	40.00	-4.55	43.91	-8.4	- — 6 Peak		
2			1.32		-12.18	40.17	-8.8			
3					-13.13	43.68				
4					-9.55	46.14				
5					-13.12	41.29				
6	61	5.22	0.00	46.00	-10.00	36.64	-0.6	4 Peak		

\*Factor includes antenna factor, cable loss and amplifier gain

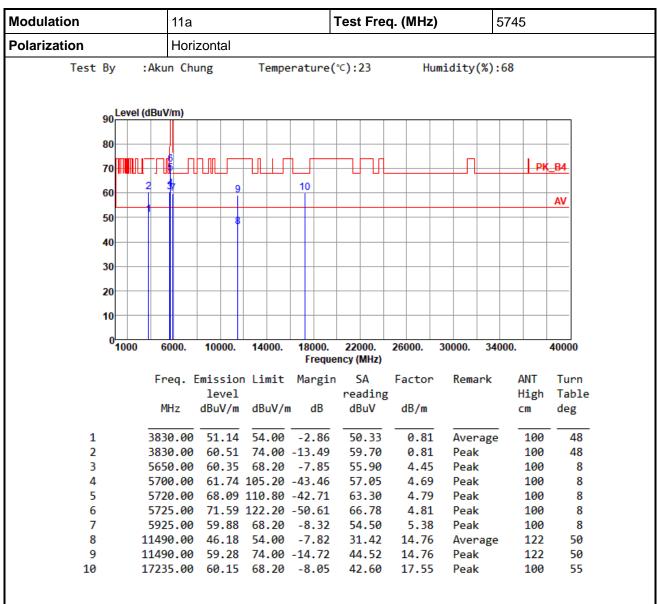
Note 2: Margin (dB) = Emission level (dBuV/m) - Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

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## 3.4.5 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11a



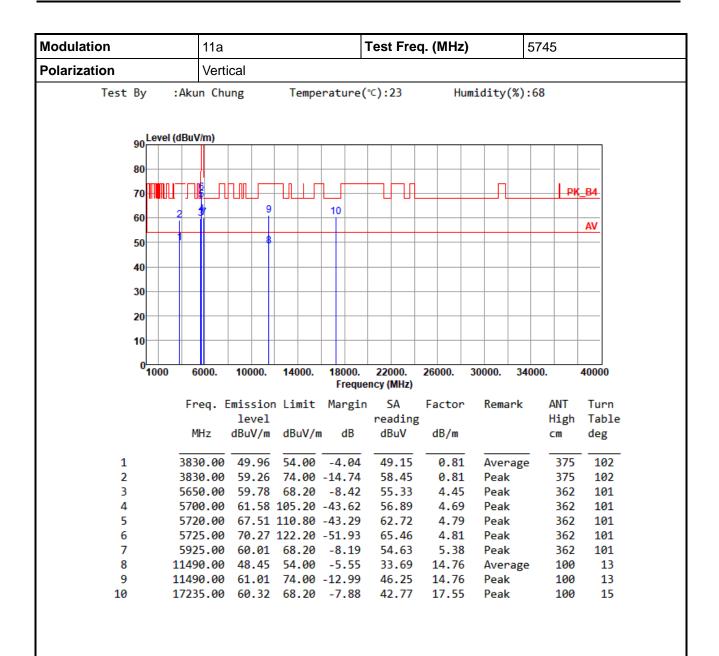
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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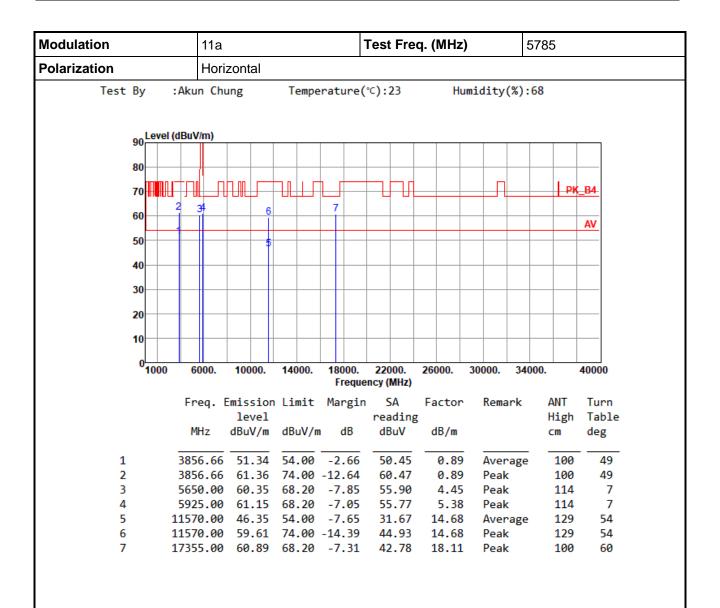


\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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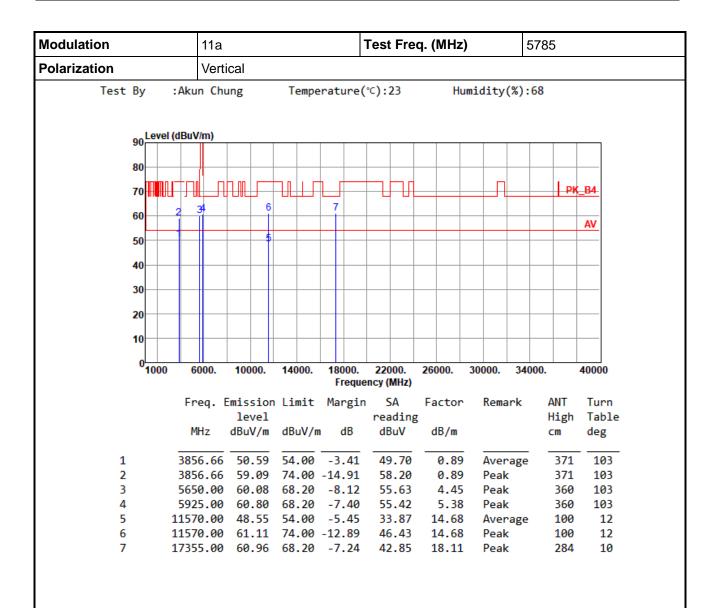


\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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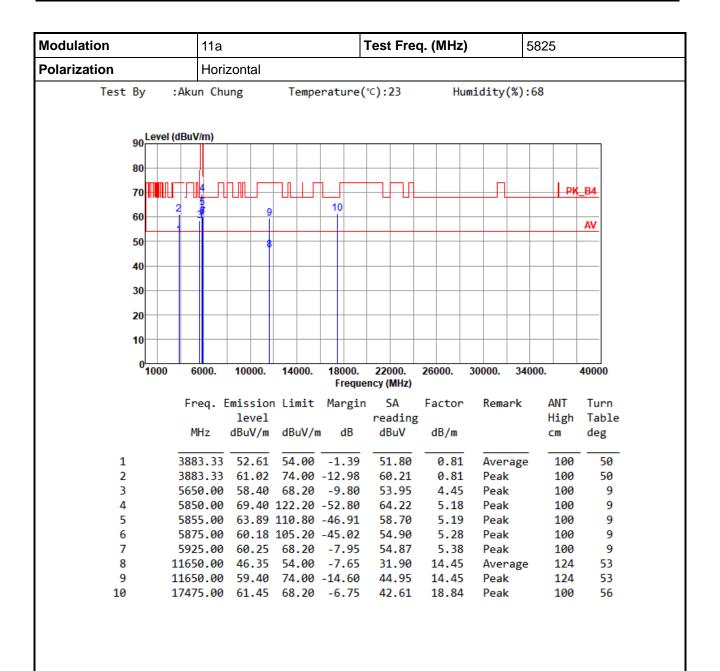


\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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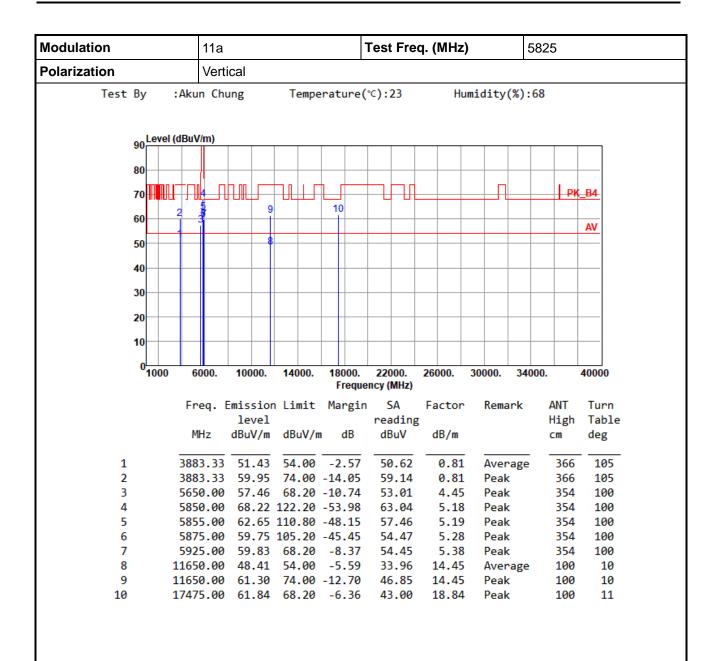


\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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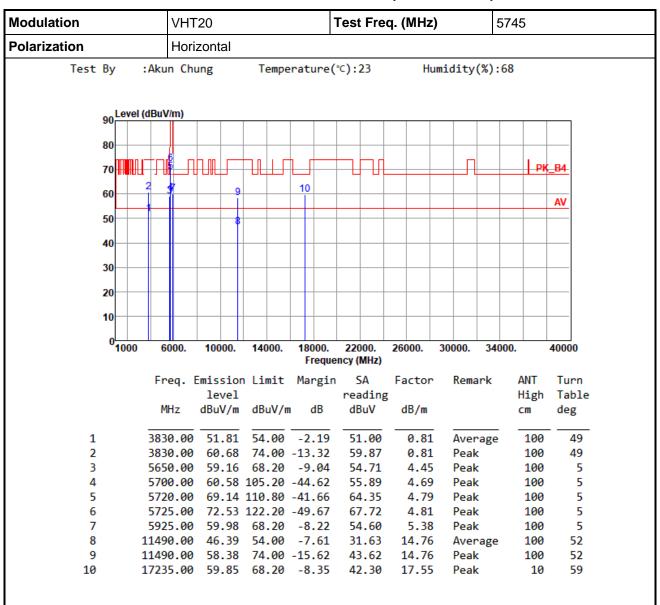
\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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## 3.4.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for VHT20



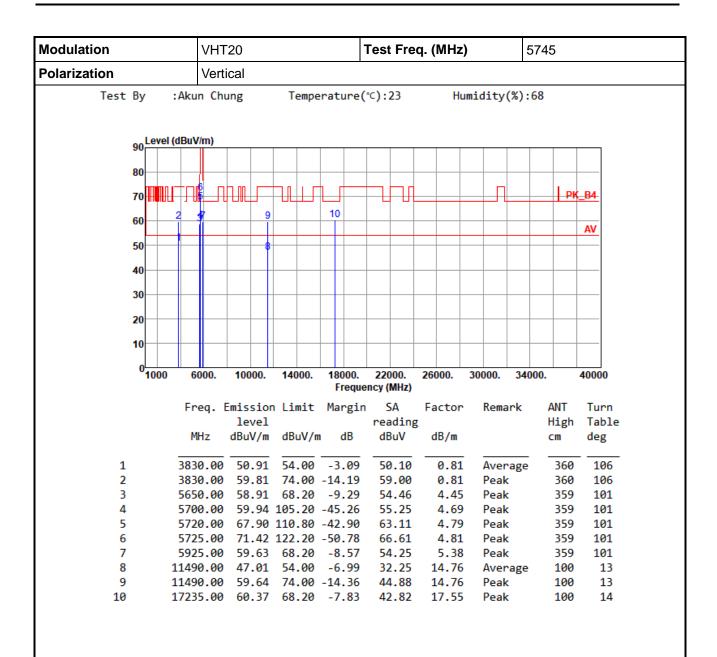
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) - Limit (dBuV/m).

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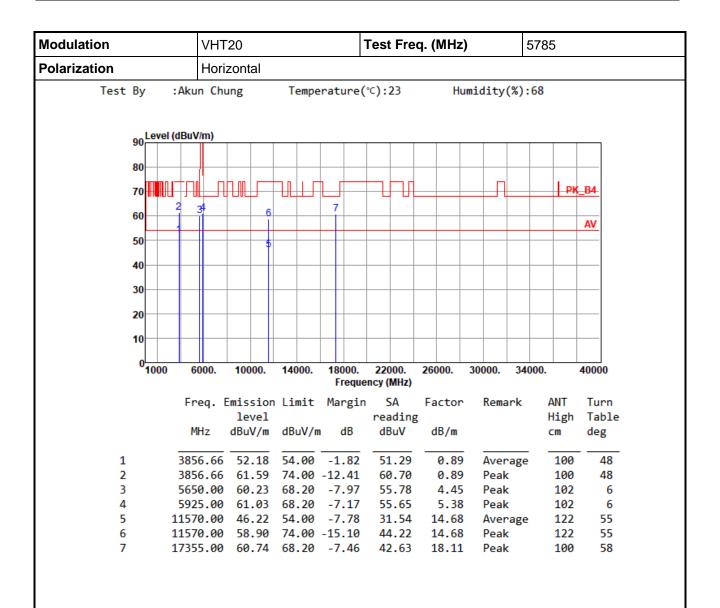


\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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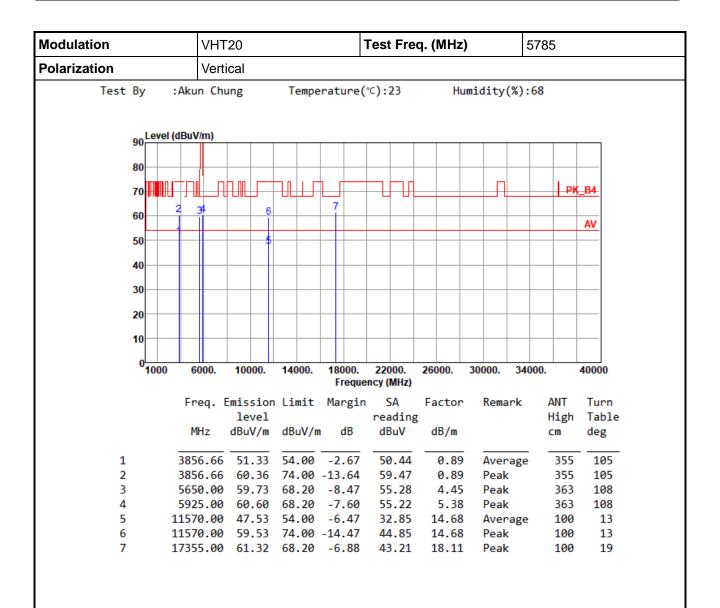


\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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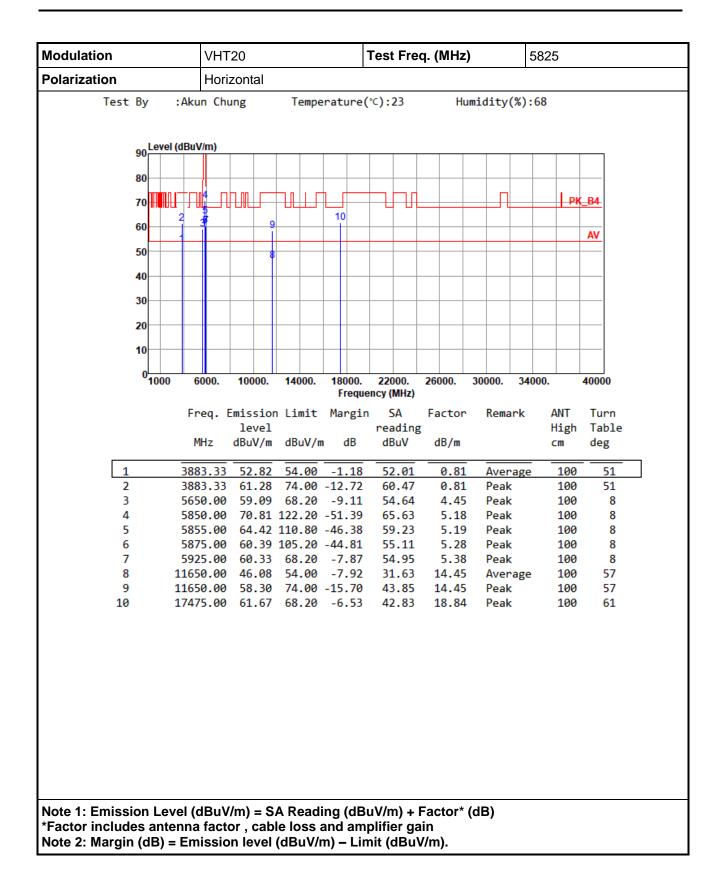


\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

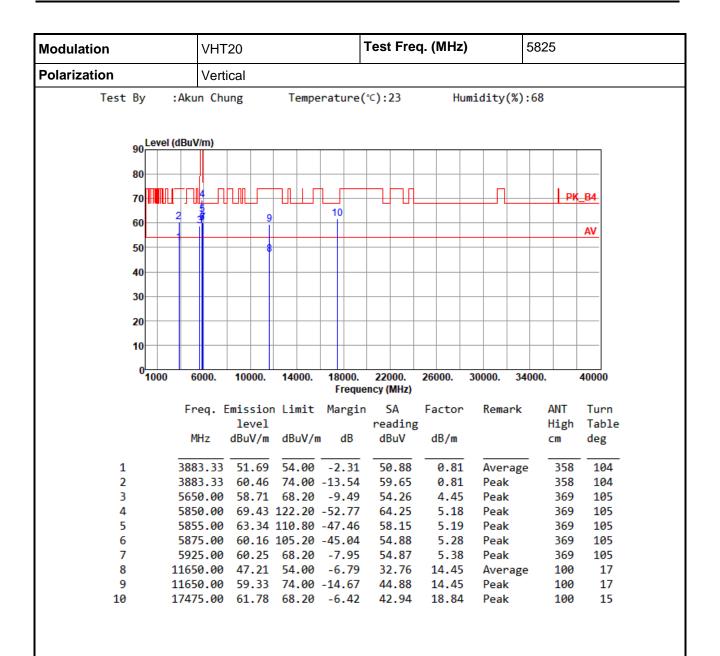
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\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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# 3.5 Frequency Stability

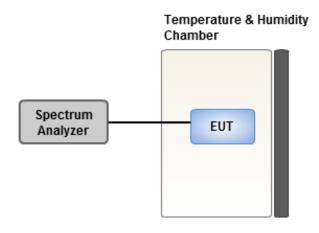
## 3.5.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

#### 3.5.2 Test Procedures

- 1. The EUT is installed in an environment test chamber with external power source.
- 2. Set the chamber to operate at 20 centigrade and external power source to output at nominal voltage of EUT.
- 3. A sufficient stabilization period at each temperature is used prior to each frequency measurement.
- 4. When temperature is stabled, measure the frequency stability.
- 5. The test shall be performed under normal and extreme condition for temperature and voltage.

### 3.5.3 Test Setup



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# 3.5.4 Test Result of Frequency Stability

<b>Ambient Condition</b>	24°C / 67%	Tested By	Aska Huang
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Frequency: 5785 MHz	Frequency Drift (ppm)					
Temperature (°C)	0 minute	2 minutes	5 minutes	10 minutes		
T20°CVmax	0.63	1.18	0.50	0.92		
T20°CVmin	0.43	0.91	0.31	0.46		
T60°CVnom	-0.13	0.21	0.54	0.22		
T50°CVnom	0.26	-0.11	0.24	0.69		
T40°CVnom	-0.42	-0.29	-0.19	-0.25		
T30°CVnom	-0.44	-0.47	0.16	-0.38		
T20°CVnom	1.34	1.24	1.69	1.94		
T10°CVnom	-3.29	-3.16	-2.94	-3.40		
T0°CVnom	-4.11	-3.41	-3.87	-4.20		
T-10°CVnom	-1.77	-1.43	-1.43	-1.90		
T-20°CVnom	-5.82	-5.52	-5.83	-5.20		
T-30°CVnom	-7.51	-7.32	-7.87	-7.11		
Vnom [V]: 12	Vmax [V]: 16		Vmin [V]: 9			
Tnom [°C]: 20	Tmax [°C]: 60 Tmin [°C]: -30		30			

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# 4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corporation (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <a href="http://www.icertifi.com.tw">http://www.icertifi.com.tw</a>.

#### Linkou

Tel: 886-2-2601-1640 No.30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan

(R.O.C.)

#### Kwei Shan

Tel: 886-3-271-8666 No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.) No.2-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan

City 33381, Taiwan (R.O.C.)

#### Kwei Shan Site II

Tel: 886-3-271-8640 No.14-1, Lane 19, Wen San 3rd St., Kwei Shan Dist., Tao Yuan

City 333, Taiwan (R.O.C.)

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666 Fax: 886-3-318-0345

Email: ICC\_Service@icertifi.com.tw

\_\_END\_\_

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