

FCC Test Report

FCC ID : U6Y-M120000015

Equipment : IEEE 802.11A/B/G/N/AC DUAL 3T3R WIFI PCIE

Model No. : M120000015

Brand Name : Panasonic

Applicant : Panasonic Avionics Corporation

Address : 26200 ENTERPRISE WAY, LAKE FOREST, CA

92630-8400 USA

Standard : 47 CFR FCC Part 15.407

Received Date : Nov. 28, 2016

Tested Date : Dec. 02, 2016 ~ Feb. 03, 2017

We, International Certification Corp., 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 Chew/ Assistant Manager Gary Chang / Manager

Testing Laboratory

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Release Record

Report No.	Version	Description	Issued Date
FR6N2801AN	Rev. 01	Initial issue	Apr. 06, 2017

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Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.484MHz 30.59 (Margin -15.68dB) - AV	Pass
15.407(b) 15.209	Radiated Emissions	[dBuV/m at 3m]: 5350.000MHz 53.00 (Margin -1.00dB) - 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]: 5150~5250MHz: 23.32 5250~5350MHz: 23.16 5470~5725MHz: 23.39 5725~5850MHz: 24.70	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

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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. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	Data Rate / MCS	
5150-5250 5250-5350 5470-5725 5725-5850	а	5180-5240 5260-5320 5500-5720 5745-5825	36-48 [4] 52-64 [4] 100-144 [9] 149-165 [5]	3	6-54 Mbps	
5150-5250 5250-5350 5470-5725 5725-5850	n (HT20)	5180-5240 5260-5320 5500-5720 5745-5825	36-48 [4] 52-64 [4] 100-144 [9] 149-165 [5]	3	MCS 0-23	
5150-5250 5250-5350 5470-5725 5725-5850	n (HT40)	5190-5230 5270-5310 5510-5710 5755-5795	38-46 [2] 54-62 [2] 102-142 [4] 151-159 [2]	3	MCS 0-23	
5150-5250 5250-5350 5470-5725 5725-5850	ac (VHT20)	5180-5240 5260-5320 5500-5720 5745-5825	36-48 [4] 52-64 [4] 100-144 [9] 149-165 [5]	3	MCS 0-9	
5150-5250 5250-5350 5470-5725 5725-5850	ac (VHT40)	5190-5230 5270-5310 5510-5710 5755-5795	38-46 [2] 54-62 [2] 102-142 [4] 151-159 [2]	3	MCS 0-9	
5150-5250 5250-5350 5470-5725 5725-5850	ac (VHT80)	5210 5290 5530~5690 5775	42 [1] 58 [1] 106-138 [2] 155 [1]	3	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.

Note 3: The device has disabled the 5600-5650MHz band by S/W setting.

1.1.2 Antenna Details

Ant.	Model	Туре	Operating Frequencies (GHz) / A		Antenna Gai	n (dBi)		
No.	Model	Турс	Connector	2.4~2.4835 5.15~5.25 5.25~5.35 5.47~5.725 5.		5.725~5.85		
1	RD-NB2573-PULSE SN11	Dipole	R-SMA	3		;	5	
2	RD-NB2573-PULSE SN02	Dipole	R-SMA	3		;	5	
3	RD-NB2573-PULSE SN03	Dipole	R-SMA	3			5	

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1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	3.3Vdc from host
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1.1.4 Accessories

N/A

1.1.5 Channel List

802.11 a / H	T20 / VHT20	HT40 /	VHT40
Channel	Frequency(MHz)	Channel	Frequency(MHz)
36	5180	38	5190
40	5200	46	5230
44	5220	54	5270
48	5240	62	5310
52	5260	102	5510
56	5280	110	5550
60	5300	134	5670
64	5320	142	5710
100	5500	151	5755
104	5520	159	5795
108	5540	VH	T80
112	5560	42	5210
116	5580	58	5290
132	5660	106	5530
136	5680	138	5690
140	5700	155	5775
144	5720		
149	5745		
153	5765		
157	5785		
161	5805		
165	5825		

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1.1.6 Test Tool and Duty Cycle

Test Tool	ART2, Version: 4.9.802.1				
	Mode	Duty cycle (%)	Duty factor (dB)		
	11a	98.34%	0.07		
Duty Cycle and Duty Factor	VHT20	98.15%	0.08		
	VHT40	94.78%	0.23		
	VHT80	90.37%	0.44		

1.1.7 Power Setting

	For Frequency band 5150-5250 MHz				
Modulation Mode	Test Frequency (MHz)	Power Set			
11a	5180	14			
11a	5200	14			
11a	5240	14			
HT20	5180	14			
HT20	5200	14			
HT20	5240	14.5			
HT40	5190	11.5			
HT40	5230	18.5			
VHT20	5180	14			
VHT20	5200	14			
VHT20	5240	14.5			
VHT40	5190	11.5			
VHT40	5230	18.5			
VHT80	5210	9			

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	For Frequency band 5250~5350 MHz			
Modulation Mode	Test Frequency (MHz)	Power Set		
11a	5260	14.5		
11a	5300	15		
11a	5320	15		
HT20	5260	14.5		
HT20	5300	15		
HT20	5320	15		
HT40	5270	19		
HT40	5310	13		
VHT20	5260	14.5		
VHT20	5300	15		
VHT20	5320	15		
VHT40	5270	19		
VHT40	5310	13		
VHT80	5290	10.5		

F	For Frequency band 5470~5725 MHz				
Modulation Mode	Test Frequency (MHz)	Power Set			
11a	5500	14.5			
11a	5580	14.5			
11a	5700	14.5			
HT20	5500	14			
HT20	5580	14.5			
HT20	5700	14.5			
HT40	5510	12			
HT40	5550	19			
HT40	5670	19			
VHT20	5500	14			
VHT20	5580	14.5			
VHT20	5700	14.5			
VHT40	5510	12			
VHT40	5550	19			
VHT40	5670	19			
VHT80	5530	9			

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Channel that extends across the 5.725 GHz boundary

For Frequency band 5470~5725 MHz				
Modulation Mode	Test Frequency (MHz)	Power Set		
11a	5720	15.5		
HT20	5720	16		
HT40	5710	20		
VHT20	5720	16		
VHT40	5710	20		
VHT80	5690	20		

i	For Frequency band 5725~5850 MHz								
Modulation Mode	Test Frequency (MHz)	Power Set							
11a	5745	21							
11a	5785	21							
11a	5825	21							
HT20	5745	21							
HT20	5785	21							
HT20	5825	21							
HT40	5755	21							
HT40	5795	21							
VHT20	5745	21							
VHT20	5785	21							
VHT20	5825	21							
VHT40	5755	21							
VHT40	5795	21							
VHT80	5775	19.5							

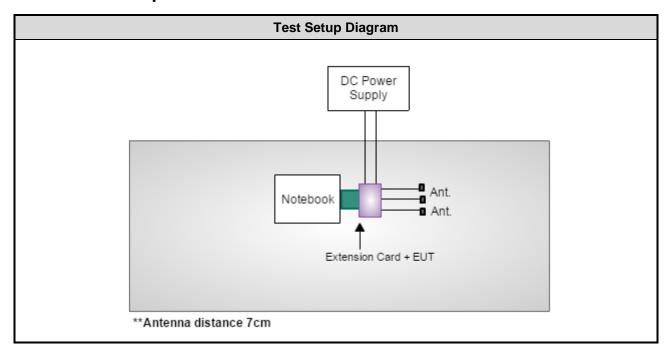
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1.2 Local Support Equipment List

	Support Equipment List									
No.	Equipment	Equipment Brand Model FCC ID		Signal cable / Length (m)						
1	Notebook	Latitude E6430	9ZFB4X1	DoC						
2	DC Power Supply	GWINSTEK	GPC-3060D							
3	Extension Card									

1.3 Test Setup Chart



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1.4 The Equipment List

Test Item	Conducted Emission	Conducted Emission								
Test Site	Conduction room 1 /	Conduction room 1 / (CO01-WS)								
Tested date	Dec. 23, 2016	Dec. 23, 2016								
Instrument	Manufacturer	Manufacturer Model No.		Calibration Date	Calibration Until					
Receiver	R&S	ESR3	101657	Jan. 12, 2016	Jan. 11, 2017					
Receiver	R&S	ESR3	101657	Dec. 21, 2016	Dec. 20, 2017					
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 08, 2016	Nov. 07, 2017					
RF Cable-CON	EMC	EMCCFD300-BM-BM-6000	50821	Dec. 20, 2016	Dec. 19, 2017					
Measurement Software	AUDIX	e3	6.120210k	NA	NA					
Note: Calibration Int	Note: Calibration Interval of instruments listed above is one year.									

Test Item	Radiated Emission	Radiated Emission								
Test Site	66 chamber3 / (03CH03-WS)									
Tested date	Dec. 06, 2016 ~ Feb. 03, 2017									
Instrument	Manufacturer Model No. Serial No. Calibration Date Calibration Unti									
Spectrum Analyzer	Agilent	N9010A	MY53400091	Sep. 09, 2016	Sep. 08, 2017					
Receiver	Agilent	N9038A	MY53290044	Oct. 06, 2016	Oct. 05, 2017					
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 26, 2016	Apr. 25, 2017					
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Feb. 24, 2016	Feb. 23, 2017					
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Oct. 25, 2016	Oct. 24, 2017					
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 10, 2016	Nov. 09, 2017					
Preamplifier	EMC	EMC02325	980187	Sep. 08, 2016	Sep. 07, 2017					
Preamplifier	Agilent	83017A	MY53270014	Aug. 22, 2016	Aug. 21, 2017					
Preamplifier	EMC	EMC184045B	980192	Aug. 24, 2016	Aug. 23, 2017					
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Feb. 05, 2016	Feb. 04, 2017					
RF cable-8M	HUBER+SUHNER	SUCOFLEX104	MY22600/4	Feb. 05, 2016	Feb. 04, 2017					
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Feb. 05, 2016	Feb. 04, 2017					
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Feb. 05, 2016	Feb. 04, 2017					
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Feb. 05, 2016	Feb. 04, 2017					
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Feb. 05, 2016	Feb. 04, 2017					
Measurement Software	AUDIX	e3	6.120210g	NA	NA					
Note: Calibration Int	erval of instruments lis	ted above is one year.								

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Test Item	RF Conducted										
Test Site	(TH01-WS)	TH01-WS)									
Tested date	Dec. 02, 2016 ~ Feb.	03, 2017									
Instrument	Manufacturer	Manufacturer Model No. Serial No. Calibration Date Calibration Until									
Spectrum Analyzer	R&S	FSV40	101063	Feb. 17, 2016	Feb. 16, 2017						
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	Nov. 21, 2016	Nov. 20, 2017						
Power Meter	Anritsu	ML2495A	1241002	Oct. 06, 2016	Oct. 05, 2017						
Power Sensor	Anritsu	MA2411B	1207366	Oct. 06, 2016	Oct. 05, 2017						
DC POWER SOURCE	GW INSTEK	GPC-6030D	EM892433	Oct. 20, 2016	Oct. 19, 2017						
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA						
Note: Calibration Inter	rval of instruments liste	d above is one year.									

1.5 Testing Applied Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.407

ANSI C63.10-2013

FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03

FCC KDB 644545 D03 Guidance for IEEE 802 11ac New Rules v01

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

FCC KDB 412172 D01 Determining ERP and EIRP v01r01

1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Measurement Uncertainty							
Parameters	Uncertainty						
Bandwidth	±34.134 Hz						
Conducted power	±0.808 dB						
Frequency error	±34.134 Hz						
Power density	±0.463 dB						
Conducted emission	±2.670 dB						
AC conducted emission	±2.90 dB						
Radiated emission ≤ 1GHz	±3.72 dB						
Radiated emission > 1GHz	±5.65 dB						
Time	±0.1%						
Temperature	±0.6 °C						

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2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	17°C / 61%	Howard Huang
Radiated Emissions	03CH03-WS	22°C / 65%	Brad Wu Kevin Lee Vincent Yeh
RF Conducted	TH01-WS	21°C / 64%	Alex Huang

FCC Designation No.: TW0009
 FCC site registration No.: 207696
 IC site registration No.: 10807C-1

2.2 The Worst Test Modes and Channel Details

Frequency	Frequency band 5150~5250 MHz / 5250~5350 MHz / 5470~5725 MHz									
Test item	Modulation Mode	Test Frequency (MHz)	Data Rate (Mbps) / MCS	Test Configuration						
Conducted Emissions	VHT40	5670	MCS 0							
Radiated Emissions ≤1GHz	VHT40	5670	MCS 0							
	11a	5180 / 5200 / 5240 / 5260 / 5300 5320 / 5500 / 5580 / 5700 / 5720	6 Mbps							
	HT20	5180 / 5200 / 5240 / 5260 / 5300 5320 / 5500 / 5580 / 5700 / 5720	MCS 0							
RF Output Power	HT40	5190 / 5230/ 5270 / 5310 / 5510 5550 / 5670 / 5710	MCS 0							
	VHT20	5180 / 5200 / 5240 / 5260 / 5300 5320 / 5500 / 5580 / 5700 / 5720	MCS 0							
	VHT40	5190 / 5230/ 5270 / 5310 / 5510 5550 / 5670 / 5710	MCS 0							
	VHT80	5210 / 5290 / 5530 / 5690	MCS 0							
	11a	5180 / 5200 / 5240 / 5260 / 5300 5320 / 5500 / 5580 / 5700 / 5720	6 Mbps							
Radiated Emissions >1GHz Emission Bandwidth	VHT20	5180 / 5200 / 5240 / 5260 / 5300 5320 / 5500 / 5580 / 5700 / 5720	MCS 0							
Peak Power Spectral Density	VHT40	5190 / 5230/ 5270 / 5310 / 5510 5550 / 5670 / 5710	MCS 0							
	VHT80	5210 / 5290 / 5530 / 5690	MCS 0							
Frequency Stability	Un-modulation	5320								

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Frequency band 5725-5850 MHz									
Test item	Modulation Mode	Test Frequency (MHz)	Data Rate (Mbps) / MCS	Test Configuration					
Conducted Emissions	VHT20	5745	MCS 0						
Radiated Emissions ≤1GHz	VHT20	5745	MCS 0						
	11a	5745 / 5785 / 5825	6 Mbps						
	HT20	5745 / 5785 / 5825	MCS 0						
RF Output Power	HT40	5755 / 5795	MCS 0						
Tri Odiput i Owei	VHT20	5745 / 5785 / 5825	MCS 0						
	VHT40	5755 / 5795	MCS 0						
	VHT80	5775	MCS 0						
Radiated Emissions >1GHz	11a	5745 / 5785 / 5825	6 Mbps						
Emission Bandwidth	VHT20	5745 / 5785 / 5825	MCS 0						
6dB bandwidth	VHT40	5755 / 5795	MCS 0						
Peak Power Spectral Density	VHT80	5775	MCS 0						
Frequency Stability	Un-modulation	5785							

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3 Transmitter Test Results

3.1 Conducted Emissions

3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit								
Frequency Emission (MHz)	Average							
0.15-0.5	66 - 56 *	56 - 46 *						
0.5-5	56	46						
5-30	60	50						
Note 1: * Decreases with the logarithm of the frequency.								

3.1.2 Test Procedures

- 1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
- 2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
- 3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
- 4. This measurement was performed with AC 120V/60Hz

3.1.3 Test Setup



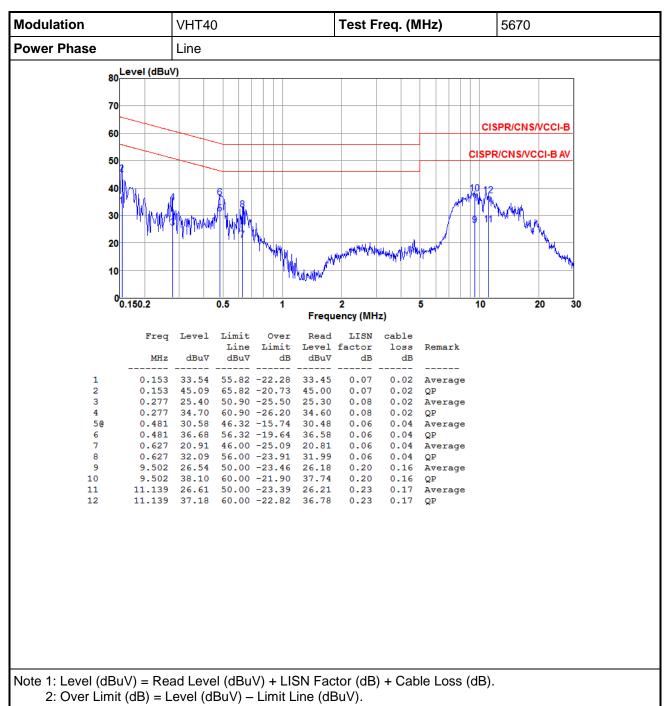
Note: 1. Support units were connected to second LISN.

Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

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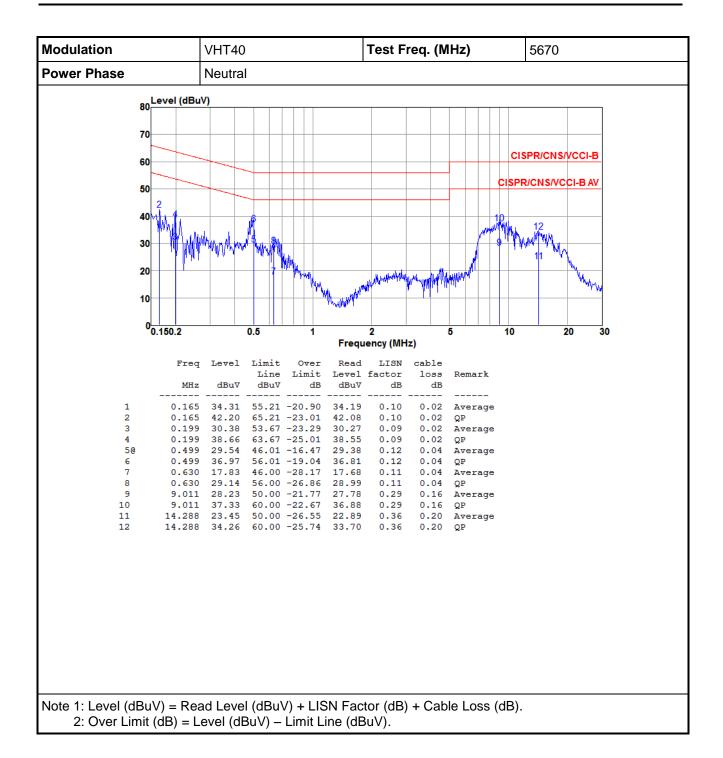


3.1.4 Test Result of Conducted Emissions



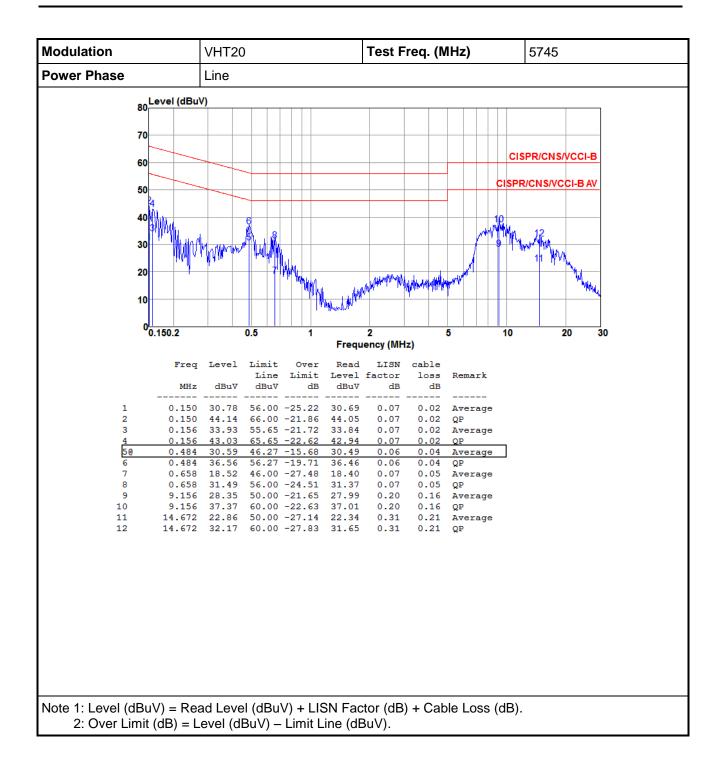
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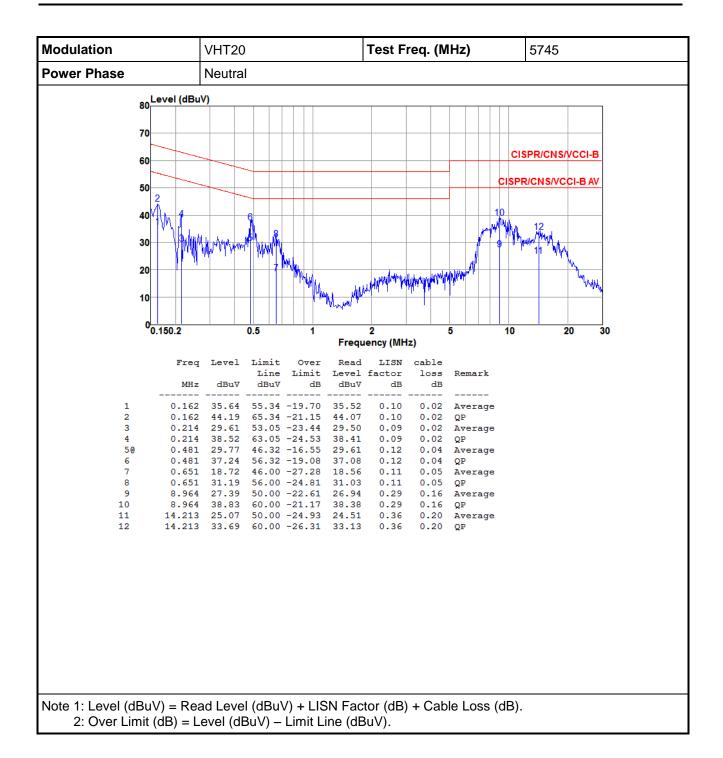
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3.2 Emission Bandwidth

3.2.1 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.

3.2.2 Test Procedures

26dB Bandwidth

- 1. Set RBW = approximately 1% of the emission bandwidth.
- 2. Set the VBW > RBW, Detector = Peak.
- 3. Trace mode = max hold.
- 4. Measure the maximum width of the emission that is 26 dB down from the peak of the emission.

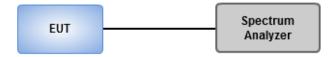
Occupied Bandwidth

- 1. Set RBW = 1 % to 5 % of the OBW
- 2. 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

3.2.3 Test Setup



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3.2.4 Test Result of Emission Bandwidth

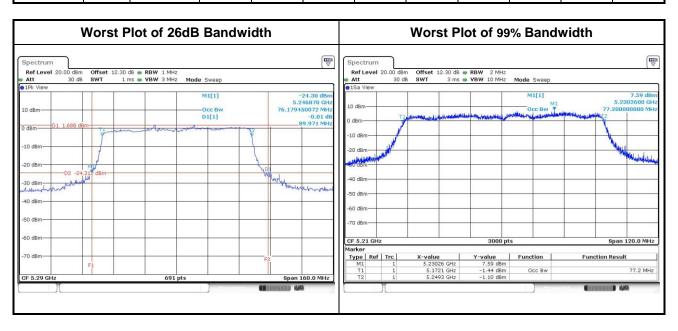
	For Frequency band 5150~5250 MHz									
	Emission Bandwidth									
Mada		Freq.	2	6dB Band	width (MHz	z)	9	99% Bandy	width (MHz)
Mode	N _{TX}	(MHz)	Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3
11a	3	5180	24.00	23.83	24.29		16.87	16.86	16.78	
11a	3	5200	24.46	23.94	24.64		16.89	16.78	16.70	
11a	3	5240	23.83	23.94	23.59		16.77	16.74	16.67	
VHT20	3	5180	25.57	25.16	24.64		17.93	17.89	17.86	
VHT20	3	5200	25.04	24.64	25.45		17.94	17.92	17.92	
VHT20	3	5240	24.87	24.75	23.48		17.89	17.91	17.99	
VHT40	3	5190	45.91	45.33	45.91		36.80	36.82	36.76	
VHT40	3	5230	86.23	85.36	81.01		37.86	37.78	37.66	
VHT80	3	5210	87.42	87.65	88.58		76.84	76.84	77.20	

	For Frequency band 5250~5350 MHz										
Mode	NI	Freq.	26dB Bandwidth (MHz)			99	9% Bandv	vidth (MH	z)	Power Limit	
Wode	N _{TX}	(MHz)	Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3	(dBm)
11a	3	5260	23.71	23.25	24.06		16.90	16.82	16.71		24.00
11a	3	5300	24.06	22.26	23.48		16.88	16.81	16.69		24.00
11a	3	5320	23.48	23.19	22.72		16.81	16.83	16.71		24.00
VHT20	3	5260	24.41	24.46	23.25		17.95	17.92	17.71		24.00
VHT20	3	5300	24.70	24.52	24.46		17.96	17.95	17.71		24.00
VHT20	3	5320	23.94	24.70	24.29		17.96	17.98	17.71		24.00
VHT40	3	5270	72.35	59.01	54.61		37.04	36.96	36.76		24.00
VHT40	3	5310	46.73	44.87	45.33		36.90	37.00	36.90		24.00
VHT80	3	5290	89.97	86.03	86.49		76.48	76.56	76.12		24.00

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			Fo	r Frequer	ncy band	5470~572	25 MHz				
Mode	NI	Freq.	26	dB Band	width (MF	łz)	99	9% Bandv	vidth (MH	lz)	Power Limit
Wode	N _{TX}	(MHz)	Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3	(dBm)
11a	3	5500	23.65	23.01	22.90		16.79	16.70	16.69		24.00
11a	3	5580	23.71	23.01	22.20		16.77	16.79	16.63		24.00
11a	3	5700	22.96	23.42	22.55		16.78	16.82	16.72		24.00
VHT20	3	5500	23.65	24.35	23.42		17.89	17.74	17.72		24.00
VHT20	3	5580	24.00	24.35	23.88		17.85	17.71	17.77		24.00
VHT20	3	5700	23.94	24.64	23.94		17.94	18.01	17.90		24.00
VHT40	3	5510	47.07	46.03	46.03		36.84	36.84	36.58		24.00
VHT40	3	5550	69.80	60.41	51.36		37.04	37.18	36.96		24.00
VHT40	3	5670	61.80	60.52	50.55		37.02	37.16	36.84		24.00
VHT80	3	5530	87.65	86.73	86.26		76.52	76.64	76.56		24.00



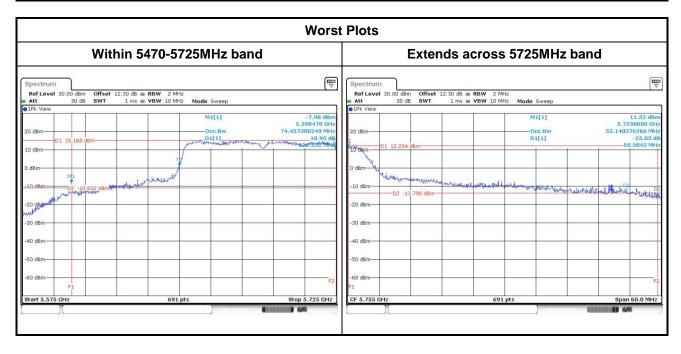
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Channel that extends across the 5.725 GHz boundary

Fred	quency b	and		UNII Emission Bandwidth Result (Within 5470-5725MHz band)										
Mode	N	Freq.	26	dB Band	width (MF	łz)	99	9% Bandv	vidth (MH	z)	Power			
Wode	N _{TX}	(MHz)	Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3	Limit (dBm)			
11a	3	5720	16.88	18.05	16.51		13.40	13.38	13.37		23.18			
VHT20	3	5720	16.45	17.55	17.68		13.99	13.99	13.94		23.16			
VHT40	3	5710	51.74	55.39	48.29		33.65	33.73	33.51		24.00			
VHT80	3	5690	125.87	126.52	91.96		73.62	73.82	73.46		24.00			

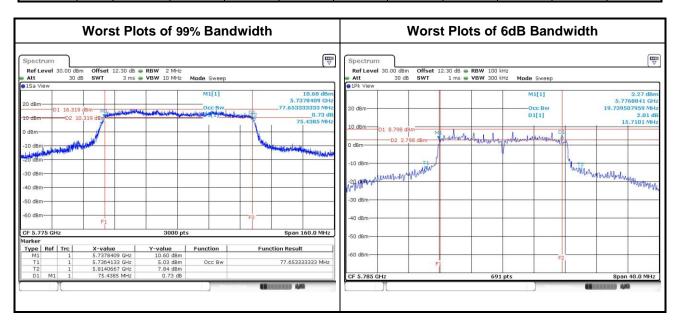
Fred	quency b	and	UNII Emission Bandwidth Result (Extends across 5725MHz band)										
Mode	N	Freq.	26	dB Band	width (MF	łz)	99	9% Bandv	vidth (MH	z)	Power Limit		
Wode	N _{TX}	(MHz)	Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3	(dBm)		
11a	3	5720	7.61	8.91	7.24		3.40	3.41	3.35		30.00		
VHT20	3	5720	27.83	30.09	22.67		3.98	4.00	3.92		30.00		
VHT40	3	5710	53.04	59.30	40.61		3.59	3.65	3.49		30.00		
VHT80	3	5690	7.61	8.91	7.24		3.34	3.54	3.22		30.00		



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	For Frequency band 5725-5850 MHz														
	Emission Bandwidth														
			0	BW Band	width (MH	z)	6dB Bandwidth (MHz)								
Mode	N _{TX}	Freq. (MHz)	Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3	6dB BW Limit (MHz)				
11a	3	5745	20.49	21.84	21.97		16.29	15.94	16.35		0.5				
11a	3	5785	21.77	21.31	22.09		15.71	16.06	16.35		0.5				
11a	3	5825	20.33	22.60	20.64		16.35	16.35	15.71		0.5				
VHT20	3	5745	20.08	21.47	18.48		17.16	17.57	17.57		0.5				
VHT20	3	5785	19.85	22.05	21.39		17.57	16.06	17.57		0.5				
VHT20	3	5825	21.36	22.48	20.92		17.57	17.57	17.57		0.5				
VHT40	3	5755	38.35	39.25	40.35		35.36	35.94	36.29		0.5				
VHT40	3	5795	38.45	40.03	39.49		36.29	35.13	35.13		0.5				
VHT80	3	5775	77.65	77.44	77.55		71.42	73.04	66.78		0.5				



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3.3 RF Output Power

3.3.1 Limit of RF Output Power

	Frequ	iency band 5150-5250 MHz
Оре	erating Mode	Limit
	Outdoor access point	Conducted Power: 1 W The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm)
	Indoor access point	Conducted Power: 1 W
	Fixed point-to-point access points	Conducted Power: 1 W
\boxtimes	Client devices	Conducted Power: 250 mW

Fred	quency Band (MHz)	Limit
\boxtimes	5250 ~ 5350	250mW or 11dBm+10 log B
	5470 ~ 5725	250mW or 11dBm+10 log B
\boxtimes	5725 ~ 5850	1 W
Note	e: "B" is the 26dB emission bandwidth i	n MHz.

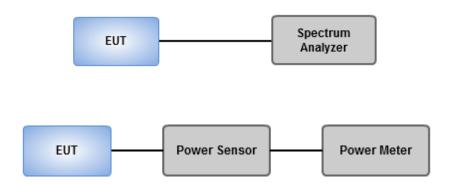
3.3.2 Test Procedures

- Power meter (For channel that does not extends across the 5.725 GHz boundary)
 - Measurements 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
- Spectrum analyzer (For channel that extends across the 5.725 GHz boundary)
- Set RBW=1MHz, VBW=3MHz, Sweep time= Auto, Detector = RMS
- 2. Trace average at least 100 traces in power averaging mode
- 3. Compute power by integrating the spectrum across the 26 dB EBW

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3.3.3 Test Setup



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3.3.4 Test Result of Maximum Conducted Output Power

			For Frequ	uency band	1 5150~5250) MHz			
			С	onducted I	Power (dBn	n)	Total	Total	Limit
Mode	N _{TX}	Freq. (MHz)	Chain 0	Chain 1	Chain 2	Chain 3	Power (mW)	Power (dBm)	(dBm)
11a	3	5180	15.81	15.02	13.85		94.141	19.74	24.00
11a	3	5200	15.57	14.83	14.39		93.946	19.73	24.00
11a	3	5240	15.12	14.26	13.56		81.876	19.13	24.00
HT20	3	5180	16.05	15.09	14.15		98.558	19.94	24.00
HT20	3	5200	16.21	15.26	14.30		102.272	20.10	24.00
HT20	3	5240	16.08	14.91	13.59		94.381	19.75	24.00
HT40	3	5190	12.99	12.05	11.80		51.075	17.08	24.00
HT40	3	5230	18.86	18.41	18.15		211.569	23.25	24.00
VHT20	3	5180	16.09	15.15	14.21		99.742	19.99	24.00
VHT20	3	5200	16.26	15.32	14.38		103.723	20.16	24.00
VHT20	3	5240	16.11	14.97	13.66		95.464	19.80	24.00
VHT40	3	5190	13.06	12.14	11.86		51.945	17.16	24.00
VHT40	3	5230	18.93	18.46	18.22		214.683	23.32	24.00
VHT80	3	5210	10.25	9.22	8.86		26.640	14.26	24.00

			For Frequ	uency band	5250~5350) MHz			
			С	onducted I	Power (dBn	n)	Total	Total	Limit
Mode	N _{TX}	Freq. (MHz)	Chain 0	Chain 1	Chain 2	Chain 3	Power (mW)	Power (dBm)	(dBm)
11a	3	5260	14.64	14.73	13.49		81.160	19.09	24.00
11a	3	5300	14.46	14.4	13.75		79.181	18.99	24.00
11a	3	5320	14.66	14.78	13.61		82.264	19.15	24.00
HT20	3	5260	14.63	14.69	13.47		80.718	19.07	24.00
HT20	3	5300	14.39	14.30	13.64		77.515	18.89	24.00
HT20	3	5320	14.61	14.59	13.71		81.177	19.09	24.00
HT40	3	5270	18.47	18.61	17.79		203.035	23.08	24.00
HT40	3	5310	11.59	11.25	11.02		40.404	16.06	24.00
VHT20	3	5260	14.67	14.76	13.53		81.774	19.13	24.00
VHT20	3	5300	14.45	14.36	13.69		78.539	18.95	24.00
VHT20	3	5320	14.68	14.65	13.75		82.265	19.15	24.00
VHT40	3	5270	18.55	18.68	17.88		206.781	23.16	24.00
VHT40	3	5310	11.68	11.29	11.09		41.035	16.13	24.00
VHT80	3	5290	9.95	9.86	9.52		28.522	14.55	24.00

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			For Frequ	uency band	5470~5725	5 MHz			
			С	onducted I	Power (dBn	n)	Total	Total	Limit
Mode	N _{TX}	Freq. (MHz)	Chain 0	Chain 1	Chain 2	Chain 3	Power (mW)	Power (dBm)	(dBm)
11a	3	5500	14.67	15.02	13.38		82.855	19.18	24.00
11a	3	5580	14.61	15.04	13.46		83.004	19.19	24.00
11a	3	5700	14	15.01	14.42		84.484	19.27	24.00
HT20	3	5500	14.58	14.81	13.29		80.307	19.05	24.00
HT20	3	5580	14.79	14.69	13.58		82.378	19.16	24.00
HT20	3	5700	13.97	15.01	13.81		80.685	19.07	24.00
HT40	3	5510	12.29	11.72	11.42		45.670	16.60	24.00
HT40	3	5550	18.70	18.97	17.88		214.393	23.31	24.00
HT40	3	5670	18.29	19.12	18.21		215.333	23.33	24.00
VHT20	3	5500	14.62	14.85	13.35		81.150	19.09	24.00
VHT20	3	5580	14.86	14.75	13.66		83.701	19.23	24.00
VHT20	3	5700	14.02	15.03	13.85		81.343	19.10	24.00
VHT40	3	5510	12.31	11.76	11.48		46.079	16.64	24.00
VHT40	3	5550	18.75	19.01	17.93		216.692	23.36	24.00
VHT40	3	5670	18.37	19.16	18.23		217.648	23.38	24.00
VHT80	3	5530	9.86	9.72	8.86		26.750	14.27	24.00

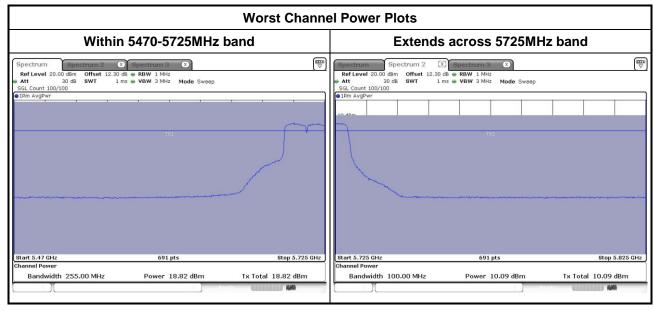
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Channel that extends across the 5.725 GHz boundary

		Max	imum Co	nducted C	Output Po	wer (With	in 5470-5	725MHz b	and)		
			Cond	ducted Po	wer with	out duty fa	actor	Duty	Total	Total	
Mode	N _{TX}	Freq. (MHz)	Chain 0	Chain 1	Chain 2	Chain 3	Total Power (dBm)	factor (dB)	Power (mW)	Power (dBm)	Limit (dBm)
11a	3	5720	13.77	14.56	13.68		18.79	0.00	75.734	18.79	23.18
HT20	3	5720	13.68	14.92	13.77		18.93	0.00	78.203	18.93	23.16
HT40	3	5710	18.11	18.73	17.44		22.90	0.23	205.417	23.13	24.00
VHT20	3	5720	13.76	14.99	13.89		19.02	0.00	79.809	19.02	23.16
VHT40	3	5710	18.23	18.82	17.41		22.96	0.23	208.575	23.19	24.00
VHT80	3	5690	18.20	18.59	17.71		22.95	0.44	218.410	23.39	24.00

		Maxin	num Cond	lucted Ou	tput Powe	er (Extend	ls across	5725MHz	band)		
			Cond	ducted Po	wer with	out duty fa	actor	Duty	Total	Total	
Mode	N _{TX}	Freq. (MHz)	Chain 0	Chain 1	Chain 2	Chain 3	Total Power (dBm)	factor (dB)	Power (mW)	Power (dBm)	Limit (dBm)
11a	3	5720	7.50	8.42	7.56		12.62	0.00	18.275	12.62	30.00
HT20	3	5720	8.69	10.09	7.96		13.78	0.00	23.857	13.78	30.00
HT40	3	5710	7.00	7.31	7.04		11.89	0.23	16.293	12.12	30.00
VHT20	3	5720	8.71	10.09	8.08		13.81	0.00	24.066	13.81	30.00
VHT40	3	5710	7.09	7.34	7.12		11.96	0.23	16.542	12.19	30.00
VHT80	3	5690	3.26	4.34	2.92		8.32	0.44	7.518	8.76	30.00



Note: Above plots are without duty factor.

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			For Freq	uency band	5725-5850	MHz			
			С	onducted	Power (dBn	n)	Total	Total	Limit
Mode	N _{TX}	Freq. (MHz)	Chain 0	Chain 1	Chain 2	Chain 3	Power (mW)	Power (dBm)	(dBm)
11a	3	5745	19.56	19.51	19.65		271.953	24.34	30.00
11a	3	5785	19.53	19.54	20.32		287.339	24.58	30.00
11a	3	5825	19.53	19.56	19.71		273.648	24.37	30.00
HT20	3	5745	19.59	19.81	20.25		292.636	24.66	30.00
HT20	3	5785	19.47	19.71	19.47		270.564	24.32	30.00
HT20	3	5825	19.48	19.71	19.80		277.755	24.44	30.00
HT40	3	5755	19.46	19.48	19.54		266.973	24.26	30.00
HT40	3	5795	19.49	19.47	19.98		276.972	24.42	30.00
VHT20	3	5745	19.62	19.84	20.31		295.404	24.70	30.00
VHT20	3	5785	19.54	19.76	19.53		274.316	24.38	30.00
VHT20	3	5825	19.52	19.75	19.84		280.325	24.48	30.00
VHT40	3	5755	19.52	19.52	19.57		269.646	24.31	30.00
VHT40	3	5795	19.53	19.52	20.02		279.741	24.47	30.00
VHT80	3	5775	18.11	17.67	18.04		186.873	22.72	30.00

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3.4 Peak Power Spectral Density

3.4.1 Limit of Peak Power Spectral Density

	Frequency band 5150-5250 MHz				
Оре	erating Mode	Limit			
	Outdoor access point	17 dBm / MHz			
	Indoor access point	17 dBm / MHz			
	Fixed point-to-point access points	17 dBm / MHz			
\boxtimes	Client devices	11 dBm / MHz			

Frequency Band (MHz)		Limit
\boxtimes	5250 ~ 5350	11 dBm / MHz
\boxtimes	5470 ~ 5725	11 dBm / MHz
\boxtimes	5725 ~ 5850	30 dBm /500 kHz

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3.4.2 Test Procedures

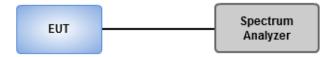
For 5150~5250 MHz, 5250~5350 MHz, 5470~5725 MHz

- Method SA-1 (For 11a / 11ac VHT20)
 - 1. Set RBW = 1 MHz, 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.
- Method SA-2 Alternative (For 11ac VHT40 / VHT80)
 - 1. Set RBW = 1 MHz, 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.

For 5725~5850 MHz

- Method SA-1 (For 11a / 11ac VHT20)
 - 1. Set RBW = 500 kHz, VBW = 2 MHz, Sweep time = auto, Detector = RMS.
 - 2. Trace average 100 traces.
 - 3. Use the peak marker function to determine the maximum amplitude level.
- Method SA-2 Alternative(For 11ac VHT40 / VHT80)
 - 1. Set RBW = 500 kHz, VBW = 2 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.

3.4.3 Test Setup



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3.4.4 Test Result of Peak Power Spectral Density

Fre	quency	band	5150~5250 MHz / 5250~5350 MHz				
Condition			Peak Power Spectral Density (dBm/MHz)				
Mode	N _{TX}	Freq. (MHz)	PPSD w/o D.F (dBm/MHz)	Duty Factor (dB)	PPSD with D.F (dBm/MHz)	PPSD Limit (dBm/MHz)	
11a	3	5180	7.02	0.00	7.02	7.23	
11a	3	5200	7.11	0.00	7.11	7.23	
11a	3	5240	6.45	0.00	6.45	7.23	
VHT20	3	5180	6.84	0.00	6.84	7.23	
VHT20	3	5200	6.95	0.00	6.95	7.23	
VHT20	3	5240	6.82	0.00	6.82	7.23	
VHT40	3	5190	-2.58	0.23	-2.35	7.23	
VHT40	3	5230	6.93	0.23	7.16	7.23	
VHT80	3	5210	-8.68	0.44	-8.24	7.23	
11a	3	5260	6.77	0.00	6.77	7.23	
11a	3	5300	6.67	0.00	6.67	7.23	
11a	3	5320	6.77	0.00	6.77	7.23	
VHT20	3	5260	6.67	0.00	6.67	7.23	
VHT20	3	5300	6.78	0.00	6.78	7.23	
VHT20	3	5320	6.91	0.00	6.91	7.23	
VHT40	3	5270	6.46	0.23	6.69	7.23	
VHT40	3	5310	0.07	0.23	0.30	7.23	
VHT80	3	5290	-4.82	0.44	-4.38	7.23	

Note:

- 1. D.F is duty factor.
- 2. Test results are bin-by-bin summing measured value of each TX port.
- 3. Directional gain =5 + 10 * log(3/1) = 9.77 dBi > 6 dBiLimit shall be reduced to 11 dBm - log(9.77 dBi - 6 dBi) = 7.23 dBm

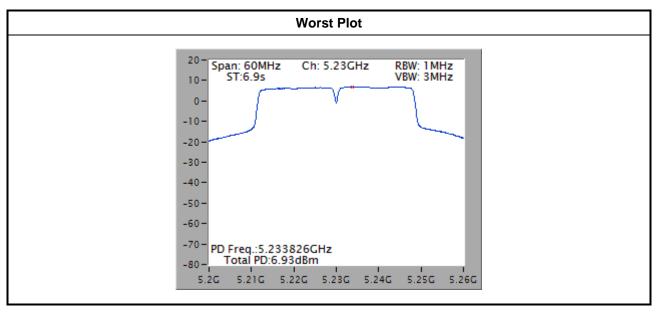
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Frequency band			5470~5725 MHz					
(Condition			Peak Power Spectral Density (dBm/MHz)				
Mode	N _{TX}	Freq. (MHz)	PPSD w/o D.F (dBm/MHz)	Duty Factor (dB)	PPSD with D.F (dBm/MHz)	PPSD Limit (dBm/MHz)		
11a	3	5500	7.07	0.00	7.07	7.23		
11a	3	5580	6.96	0.00	6.96	7.23		
11a	3	5700	6.85	0.00	6.85	7.23		
11a	3	5720	6.93	0.00	6.93	7.23		
VHT20	3	5500	6.59	0.00	6.59	7.23		
VHT20	3	5580	7.02	0.00	7.02	7.23		
VHT20	3	5700	6.65	0.00	6.65	7.23		
VHT20	3	5720	7.13	0.00	7.13	7.23		
VHT40	3	5510	0.42	0.23	0.65	7.23		
VHT40	3	5550	6.82	0.23	7.05	7.23		
VHT40	3	5670	6.59	0.23	6.82	7.23		
VHT40	3	5710	6.86	0.23	7.09	7.23		
VHT80	3	5530	-6.09	0.44	-5.65	7.23		
VHT80	3	5690	3.91	0.44	4.35	7.23		

Note:

- 1. D.F is duty factor.
- 2. Test results are bin-by-bin summing measured value of each TX port.
- 3. Directional gain =5 + 10 * log(3/1) = 9.77 dBi > 6 dBiLimit shall be reduced to 11 dBm - (9.77 dBi - 6 dBi) = 7.23 dBm



Note: Power density plot without duty factor.

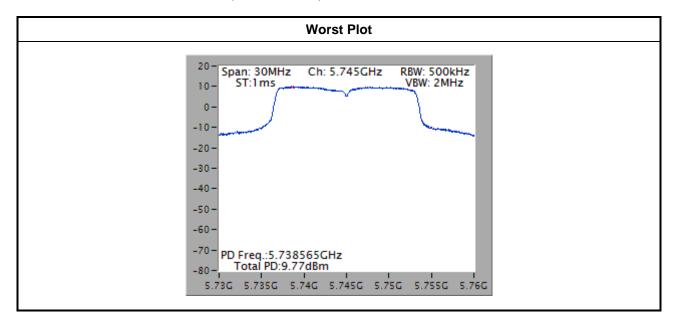
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Free	quency	band	5725-5850 MHz					
(Condition			Peak Power Spectral Density (dBm/500kHz)				
Mode	N _{TX}	Freq. (MHz)	PPSD w/o D.F (dBm/500kHz)	Duty Factor (dB)	PPSD with D.F (dBm/500kHz)	PPSD Limit (dBm/500kHz)		
11a	3	5745	9.77	0.00	9.77	26.23		
11a	3	5785	9.58	0.00	9.58	26.23		
11a	3	5825	9.29	0.00	9.29	26.23		
VHT20	3	5745	9.33	0.00	9.33	26.23		
VHT20	3	5785	9.30	0.00	9.30	26.23		
VHT20	3	5825	9.05	0.00	9.05	26.23		
VHT40	3	5755	5.57	0.23	5.80	26.23		
VHT40	3	5795	5.63	0.23	5.86	26.23		
VHT80	3	5775	0.81	0.44	1.25	26.23		

Note:

- 1. D.F is duty factor.
- 2. Test results are bin-by-bin summing measured value of each TX port.
- 3. Directional gain =5 + 10 * log(3/1) = 9.77 dBi > 6 dBiLimit shall be reduced to 30 dBm - (9.77 dBi - 6 dBi) = 26.23 dBm



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3.5 Transmitter Radiated and Band Edge Emissions

3.5.1 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				
5.15 - 5.25 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]				
5.25 - 5.35 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]				
5.47 - 5.725 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]				
5.725 - 5.850 GHz	15.407(b)(4)(i) 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.				
	15.407(b)(4)(ii) ,compliance with the emission limits in § 15.247(d) Shall be at least 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power,. Attenuation below the general limits specified in §15.209(a) is not required. In addition,radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see § 15.205(c))				

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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3.5.2 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.

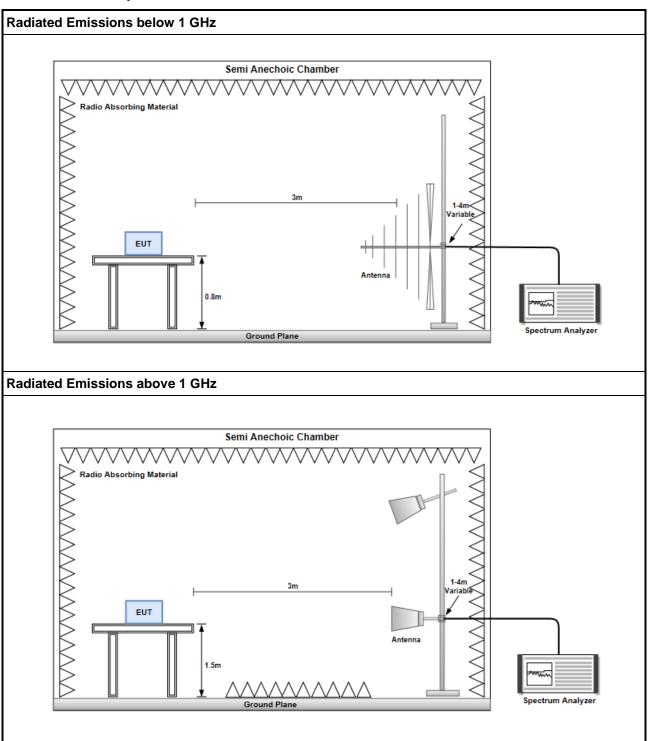
Note:

- 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.
- 3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

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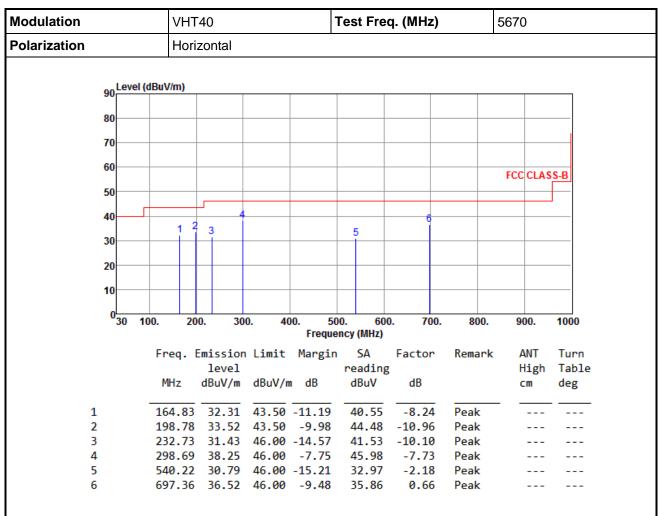
3.5.3 Test Setup



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3.5.4 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	VHT40	Test Freq. (MHz)	5670
Polarization	Vertical		•
90 Level (dBu 80 70 60 50 40 30	<u> </u>	5	FCC CLASS-B
10 0 30 100.	200. 300. 400.	500. 600. 700.	800. 900. 1000
		Frequency (MHz)	
	req. Emission Limit level MHz dBuV/m dBuV/m	reading	Remark ANT Turn High Tabl cm deg
1	52.31 31.43 40.00	-8.57 39.42 -7.99	Peak
2	70.74 29.87 40.00 -	10.13 40.58 -10.71	Peak
	32.82 29.90 43.50 -		Peak
	239.52 28.41 46.00 -		Peak
	40.31		Peak 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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Modulation		VHT20 Horizontal			7	Test Freq. (MHz) 5				5745		
Polarization					•							
90 <u>Lev</u>	el (dBuV	/m)									,	
80												
70												
60												
00									FCC (CLASS-B	ĺ	
50											ĺ	
40			4				6				ĺ	
20		1 2	3			5	Ì				ĺ	
30											ĺ	
20												
10											ĺ	
030	100.	20	0. 30	0. 40	00. 50	0. 60 ncy (MHz)	0. 700.	800.	900	0. 100	0	
	En	oa F	miccion	limi+	Margin		Factor	Remark	AN	NT Tu	nn	
	FF	eq. ı	level	LIMIT	nargin	reading		Kelliark		igh Tal		
	Mi	Hz	dBuV/m	dBuV/r	n dB	dBuV	dB		cn	_		
4	10	4 65	32.46	42.50	11 01	40.70	- 24	DI-				
1 2		8.82			-11.04	40.70 44.34		Peak Peak				
3		2.64				41.40		Peak	_			
4	298	8.45	38.46			46.19		Peak	-			
5		0.55	30.86			33.03		Peak	-			
6	69	7.65	36.68	46.00	-9.32	36.02	0.66	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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Modulation	VHT	VHT20			Test Fre	q. (MHz)	5745		
Polarization	Verti	cal		•					
	<u>.</u>								
90 Level (dBuV/m)								
00									
80									
70									
60									
								FCC CL	ASS-B
50									
40				_			6		
30 12	3	4		5					
20									
10									
0									
030 1	00. 20	0. 300	0. 40	00. 50 Freque	0. 600 ncy (MHz)	0. 700.	800.	900.	1000
	Freq. E	mission	Limit	Margin	SA	Factor	Remark	ANT	Turn
		level			reading			Hig	
	MHz	dBuV/m	dBuV/r	n dB	dBuV	dB		cm	deg
1	52.45	31.58	40.00	-8.42	39.59	-8.01	Peak		
2	70.85			-10.36	40.37	-10.73	Peak		
3	132.58			-13.66	39.29	-9.45	Peak		
4	239.34	28.32		-17.68	37.94	-9.62	Peak		
5 6	440.44 771.25	32.66		-13.34 -10.19	36.54 33.61	-3.88 2.20	Peak Peak		

*Factor includes antenna factor, cable loss and amplifier gain

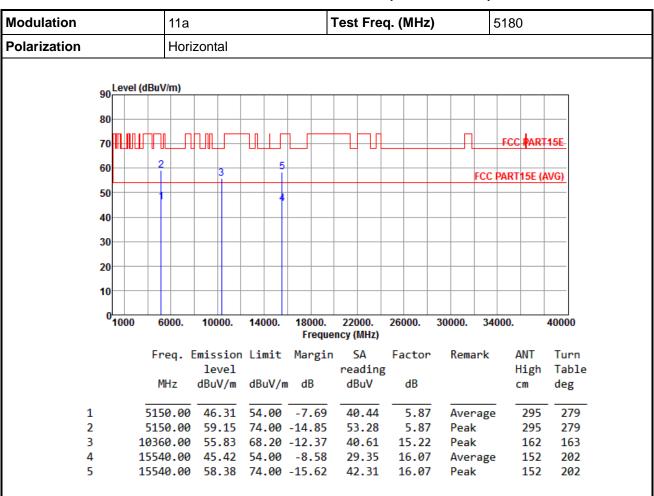
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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

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



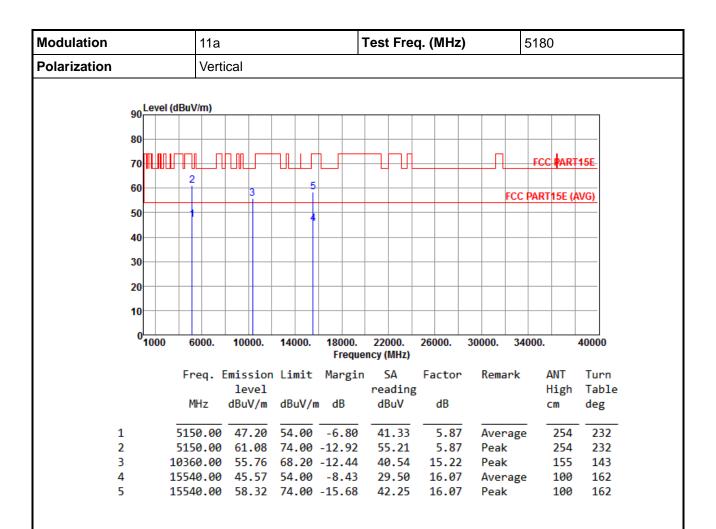
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

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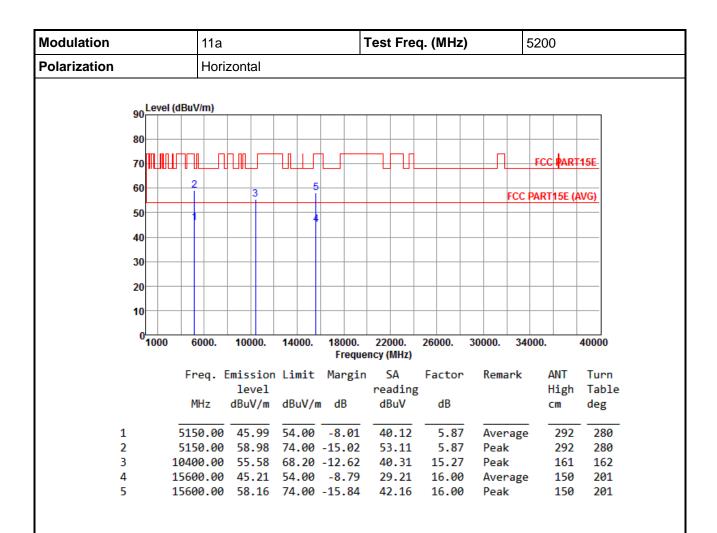


*Factor includes antenna factor, cable loss and amplifier gain

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

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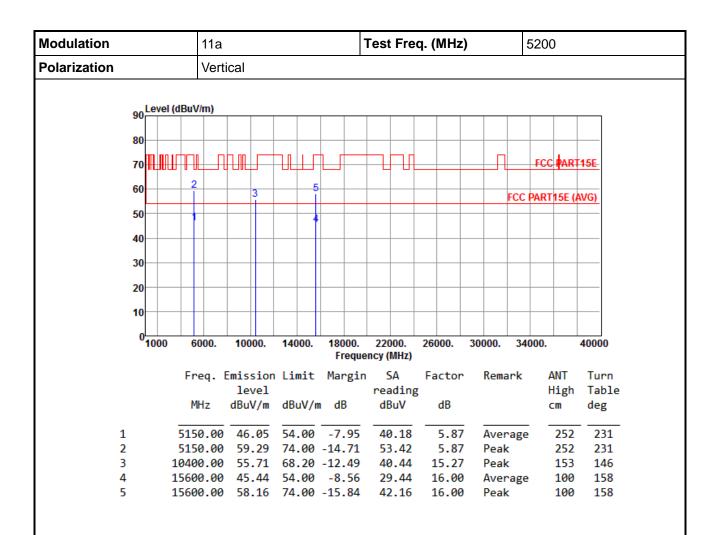


*Factor includes antenna factor, cable loss and amplifier gain

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

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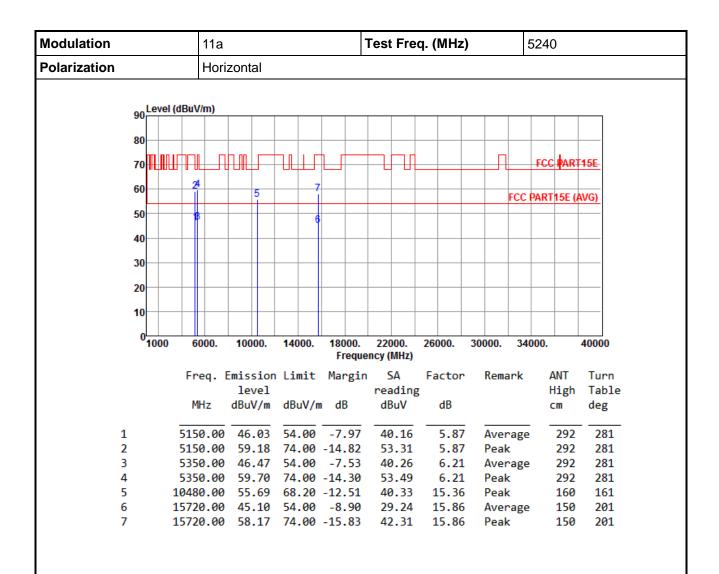


*Factor includes antenna factor, cable loss and amplifier gain

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

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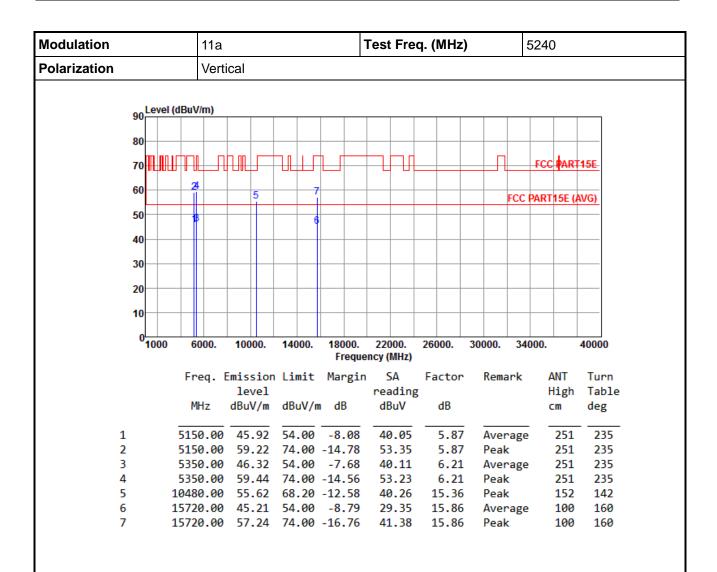


*Factor includes antenna factor, cable loss and amplifier gain

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

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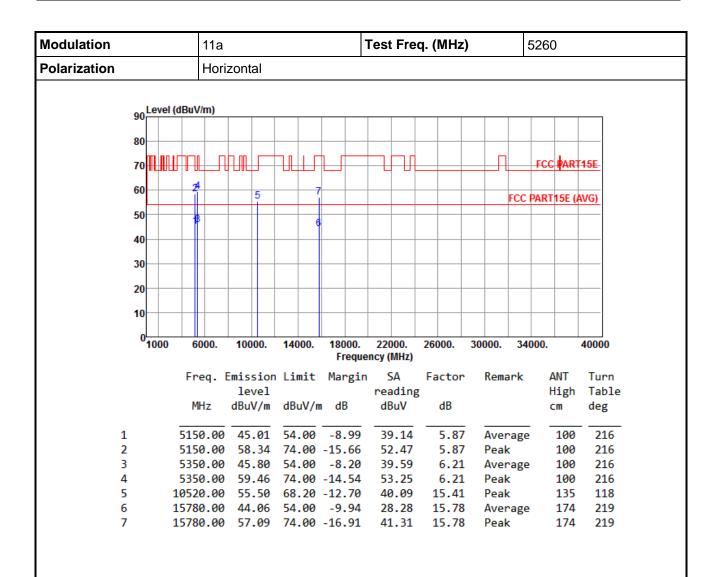


*Factor includes antenna factor, cable loss and amplifier gain

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

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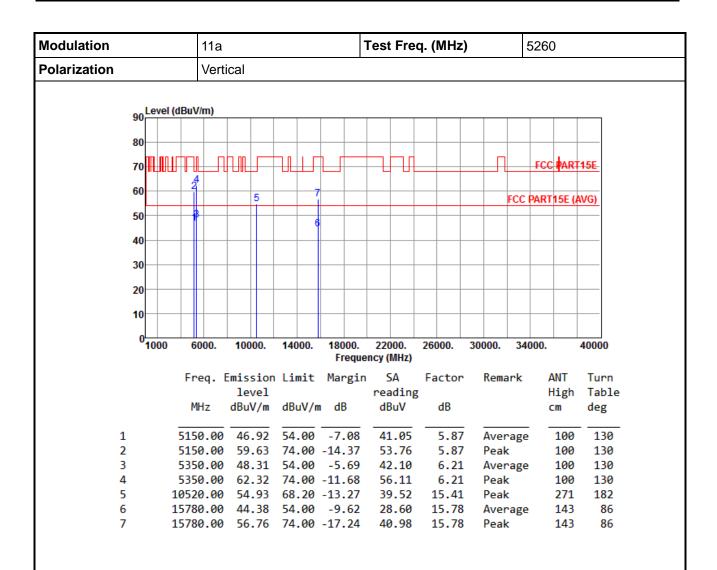


*Factor includes antenna factor, cable loss and amplifier gain

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

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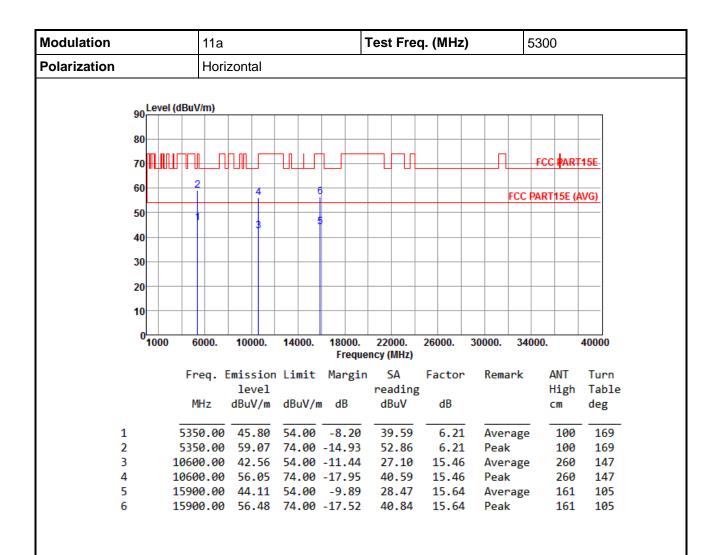


*Factor includes antenna factor, cable loss and amplifier gain

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

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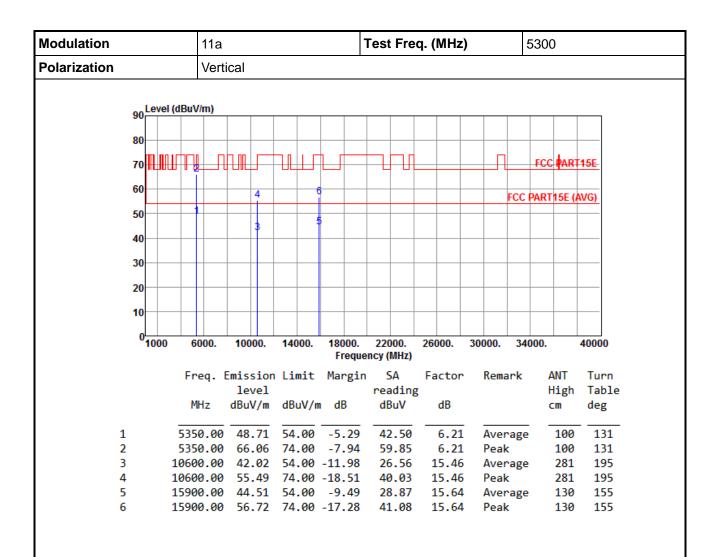


*Factor includes antenna factor, cable loss and amplifier gain

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

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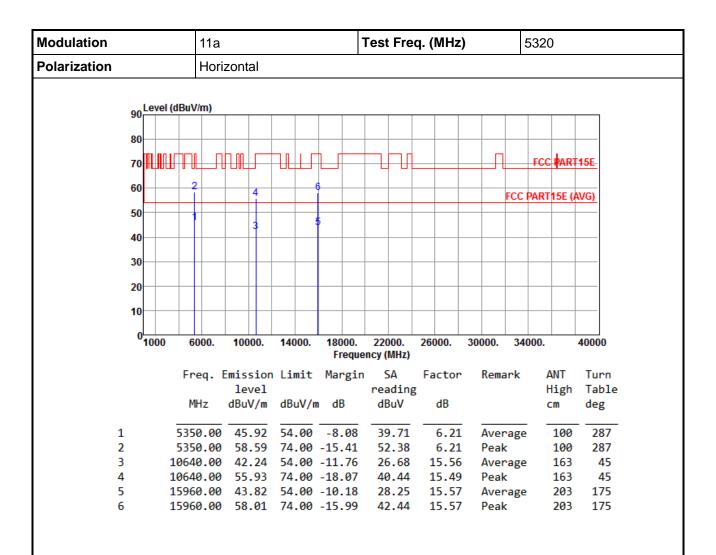


*Factor includes antenna factor, cable loss and amplifier gain

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

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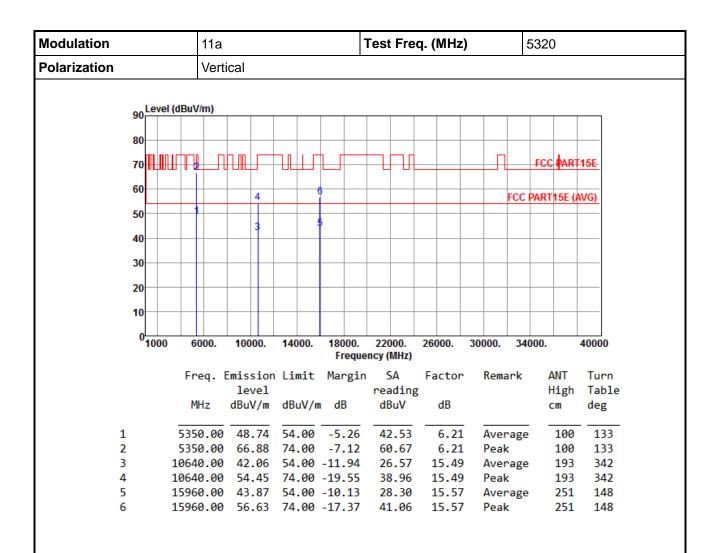


*Factor includes antenna factor, cable loss and amplifier gain

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

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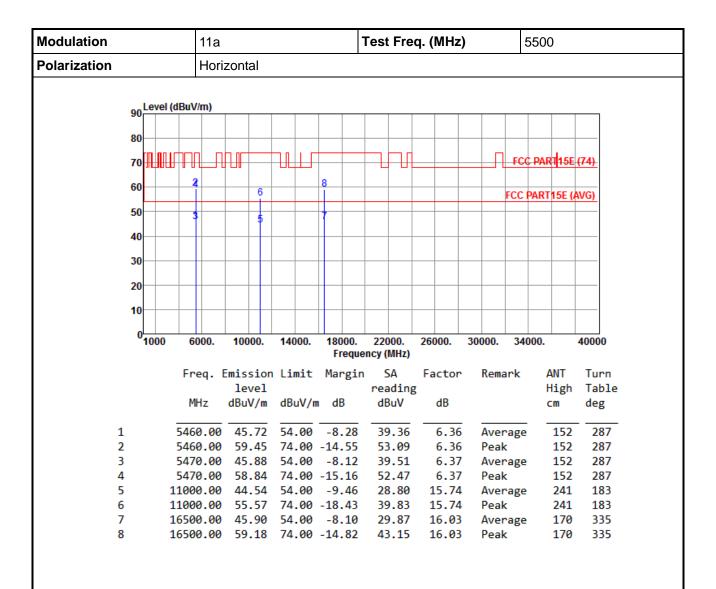


*Factor includes antenna factor, cable loss and amplifier gain

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

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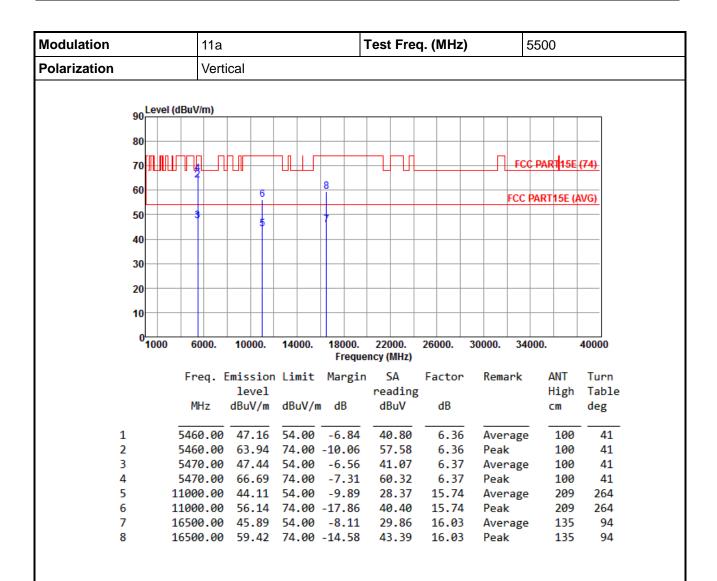


*Factor includes antenna factor, cable loss and amplifier gain

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

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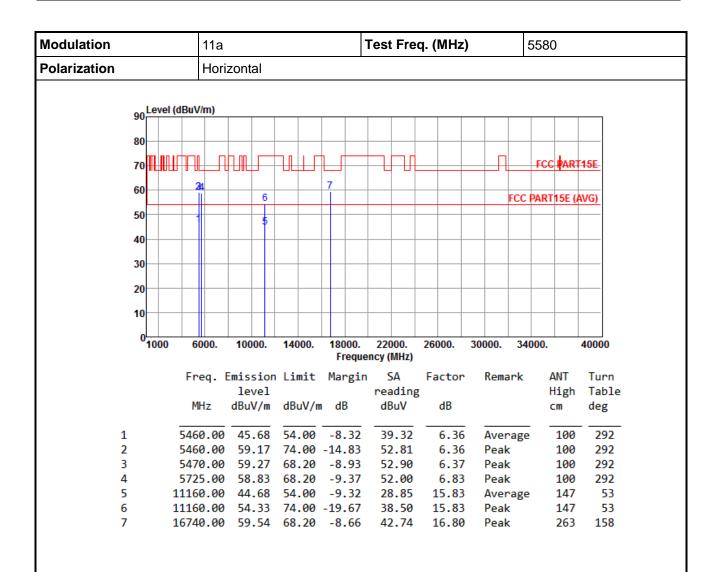


*Factor includes antenna factor, cable loss and amplifier gain

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

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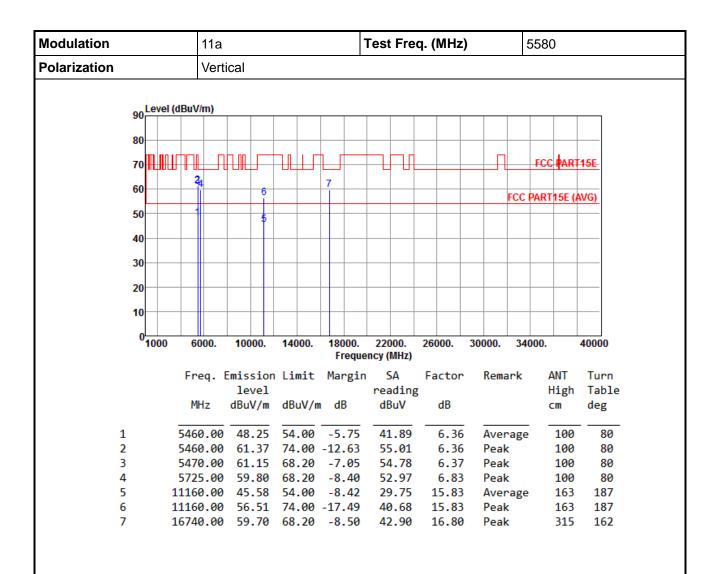


*Factor includes antenna factor, cable loss and amplifier gain

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

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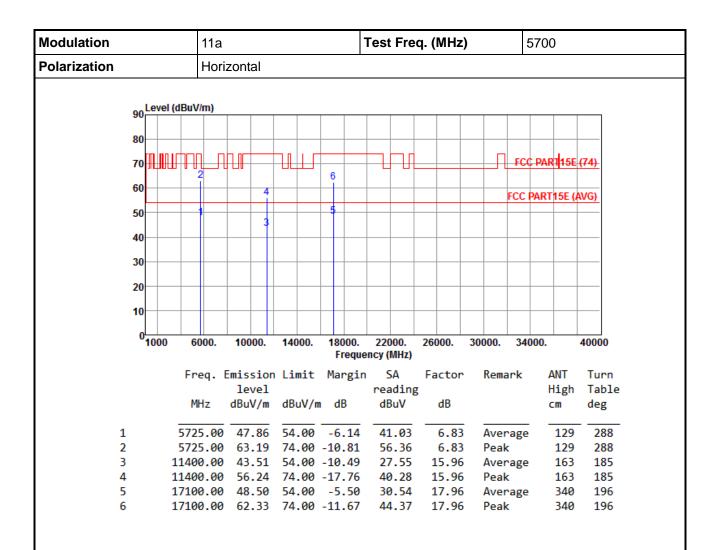


*Factor includes antenna factor, cable loss and amplifier gain

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

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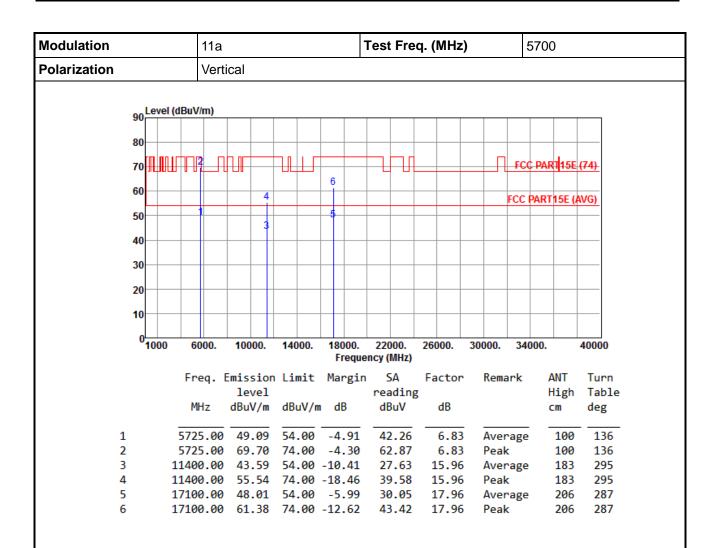


*Factor includes antenna factor, cable loss and amplifier gain

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

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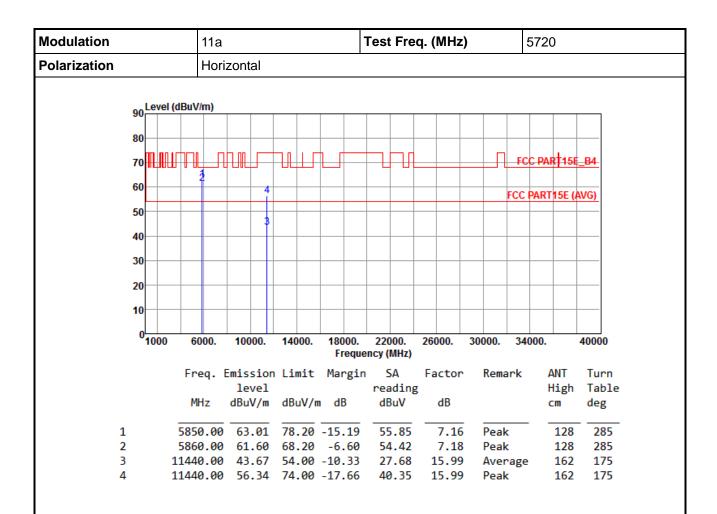


*Factor includes antenna factor, cable loss and amplifier gain

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

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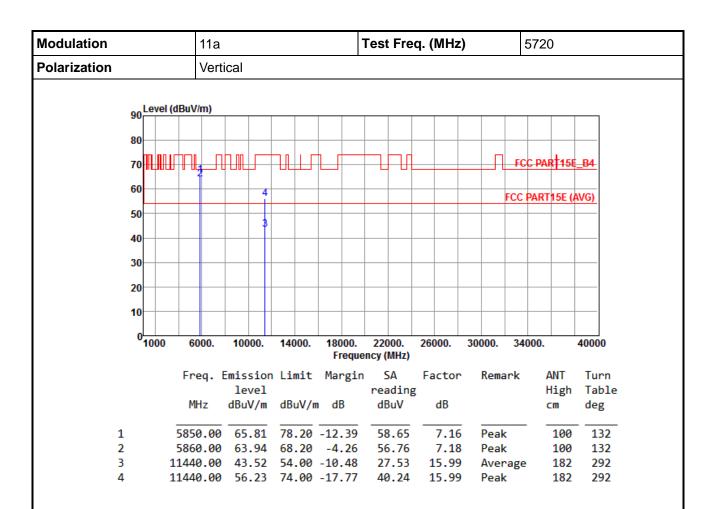


*Factor includes antenna factor, cable loss and amplifier gain

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

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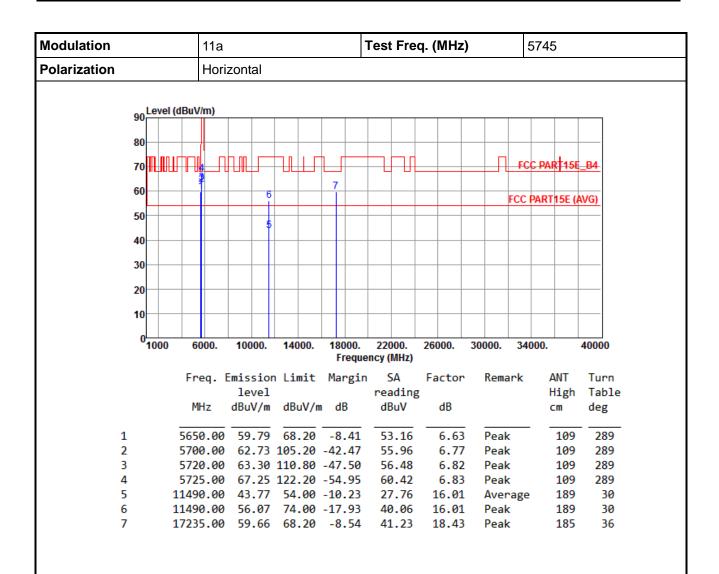


*Factor includes antenna factor, cable loss and amplifier gain

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

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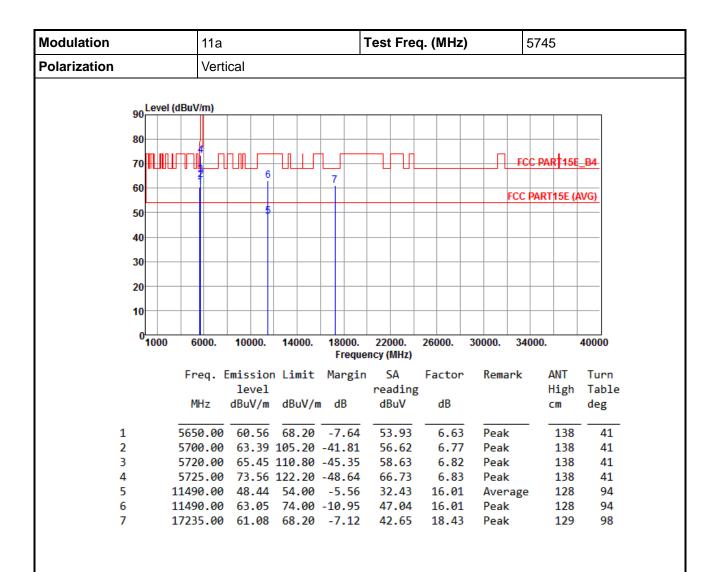


*Factor includes antenna factor, cable loss and amplifier gain

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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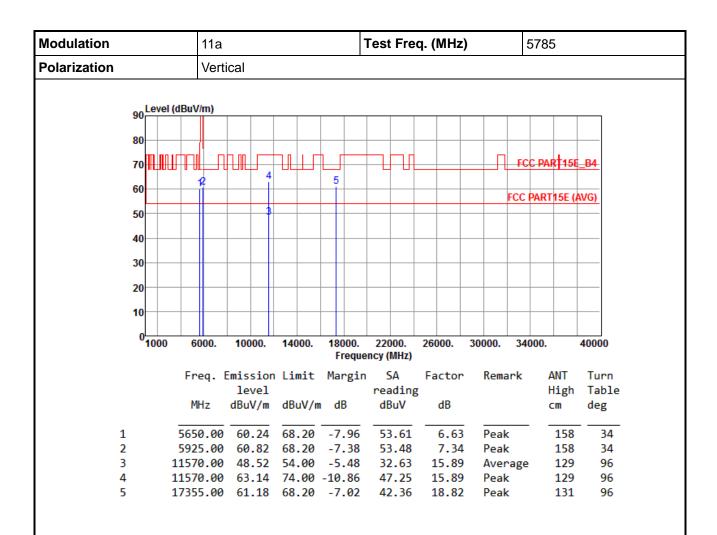


*Factor includes antenna factor, cable loss and amplifier gain

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

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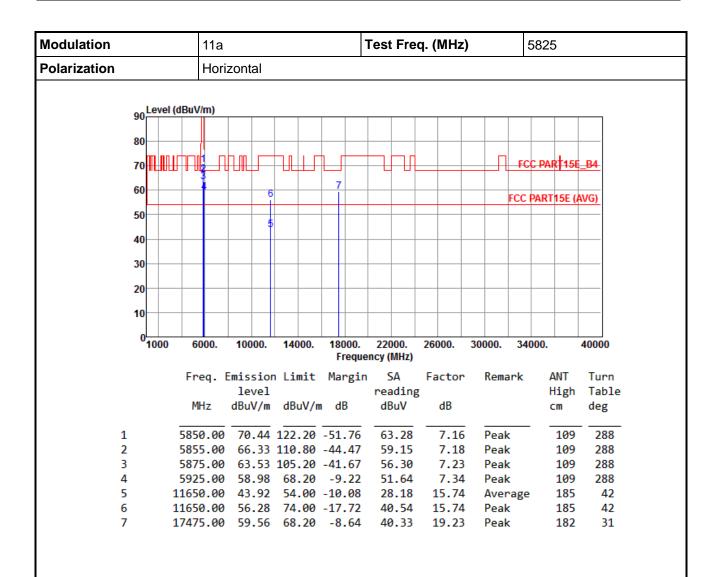


*Factor includes antenna factor, cable loss and amplifier gain

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

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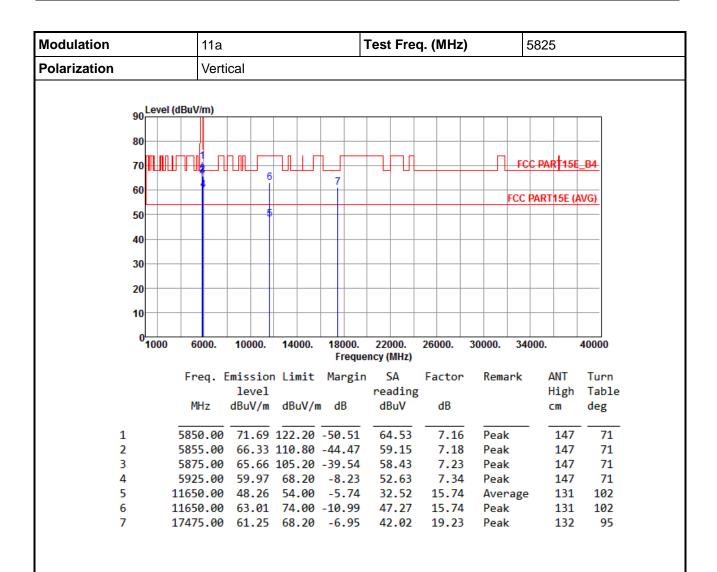


*Factor includes antenna factor, cable loss and amplifier gain

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

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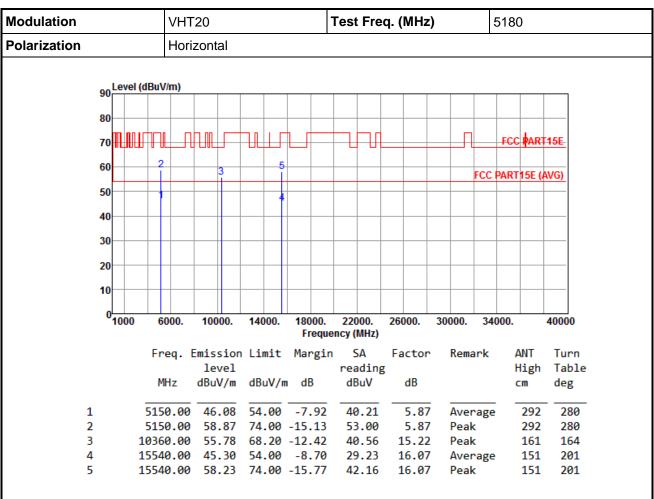
*Factor includes antenna factor, cable loss and amplifier gain

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

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3.5.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for VHT20



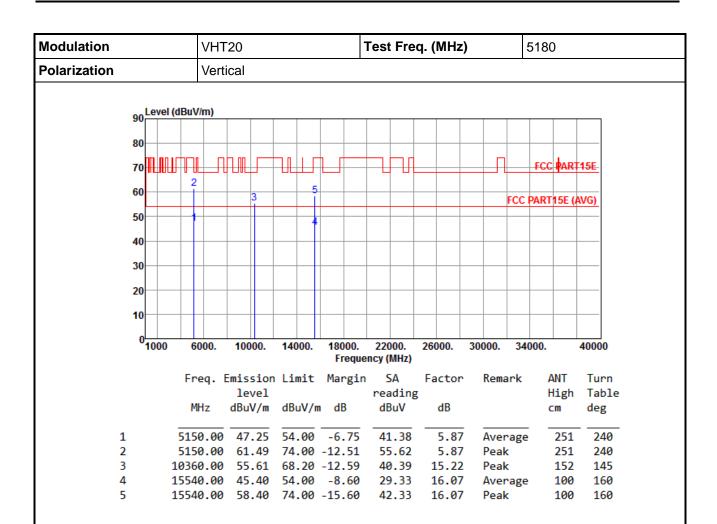
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

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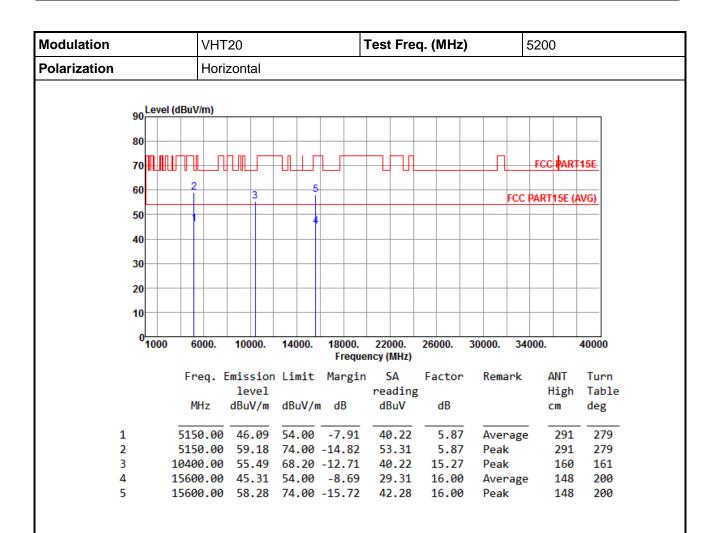


*Factor includes antenna factor, cable loss and amplifier gain

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

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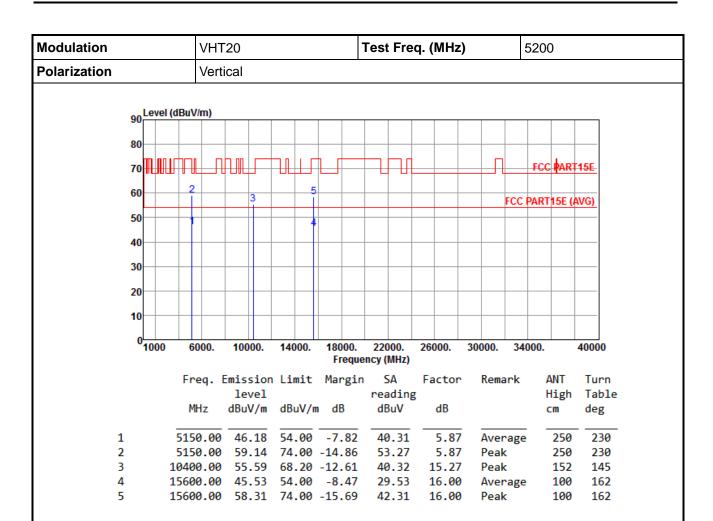


*Factor includes antenna factor, cable loss and amplifier gain

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

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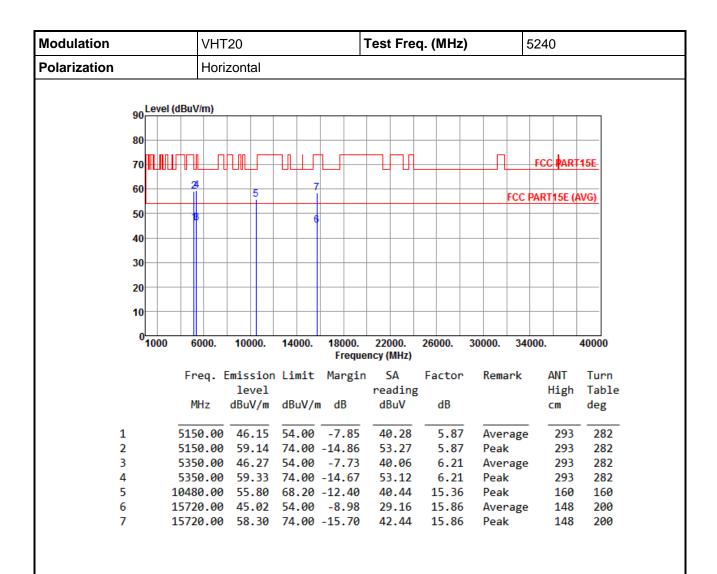


*Factor includes antenna factor, cable loss and amplifier gain

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

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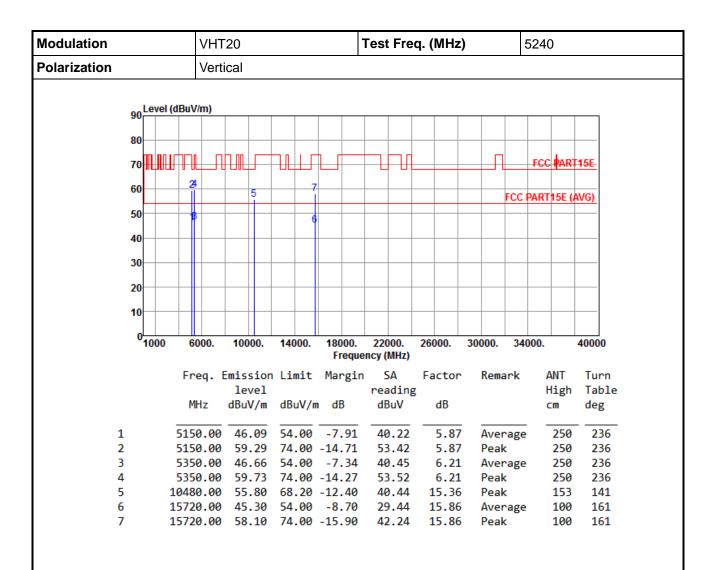


*Factor includes antenna factor, cable loss and amplifier gain

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

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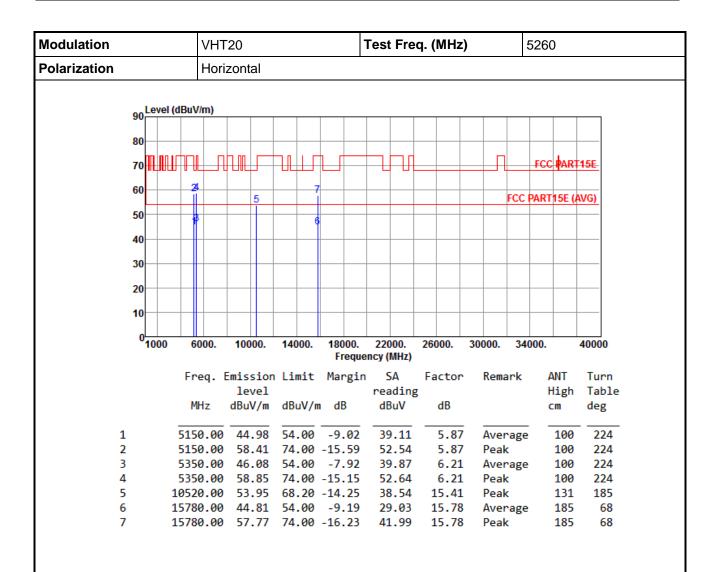


*Factor includes antenna factor, cable loss and amplifier gain

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

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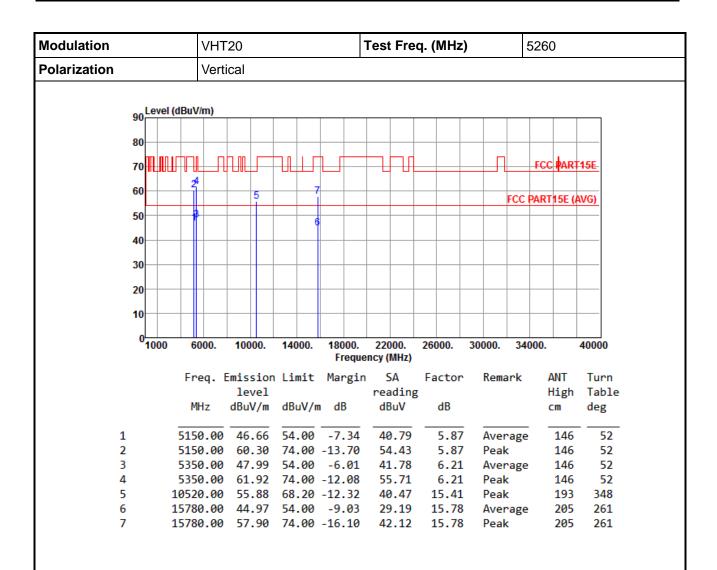


*Factor includes antenna factor, cable loss and amplifier gain

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

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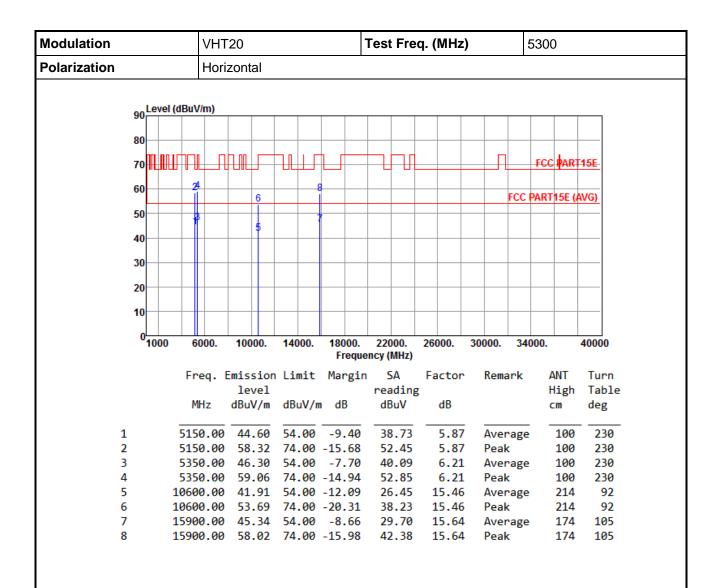


*Factor includes antenna factor, cable loss and amplifier gain

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

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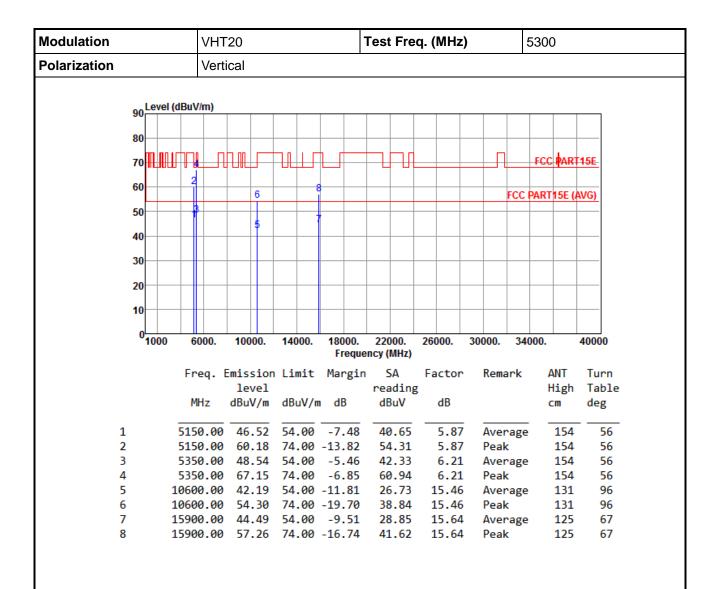


*Factor includes antenna factor, cable loss and amplifier gain

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

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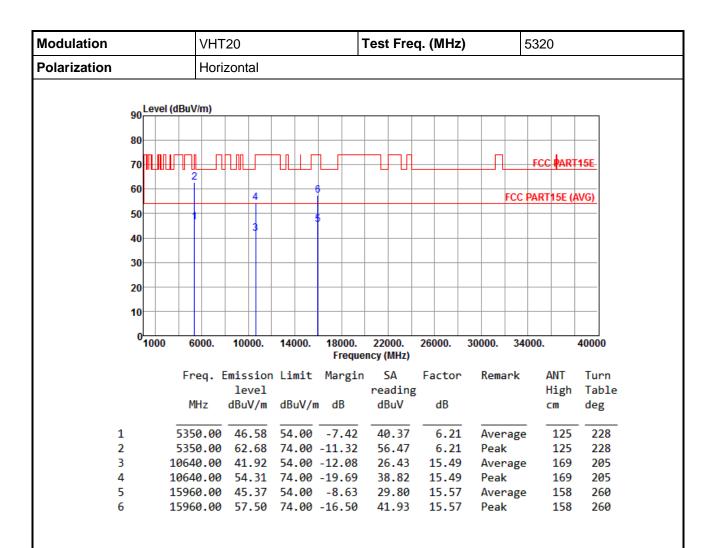


*Factor includes antenna factor, cable loss and amplifier gain

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

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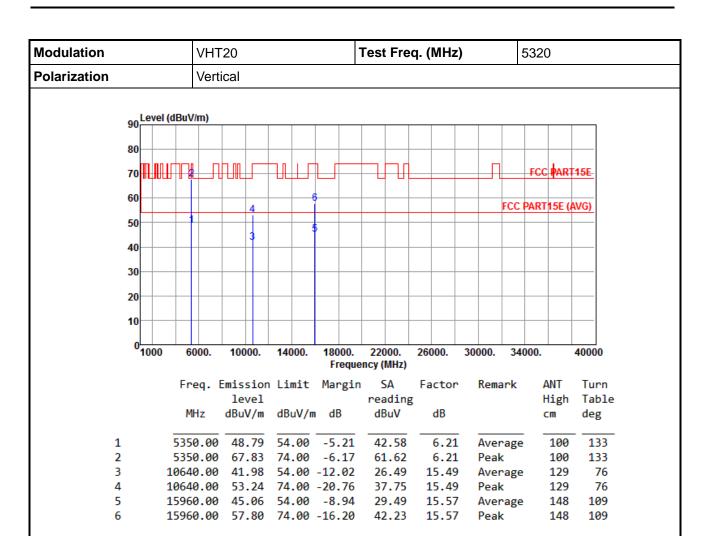


*Factor includes antenna factor, cable loss and amplifier gain

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

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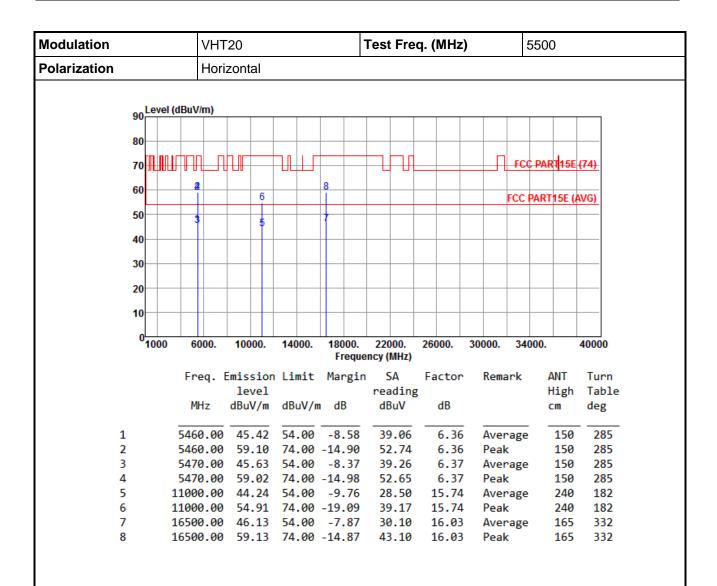


*Factor includes antenna factor, cable loss and amplifier gain

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

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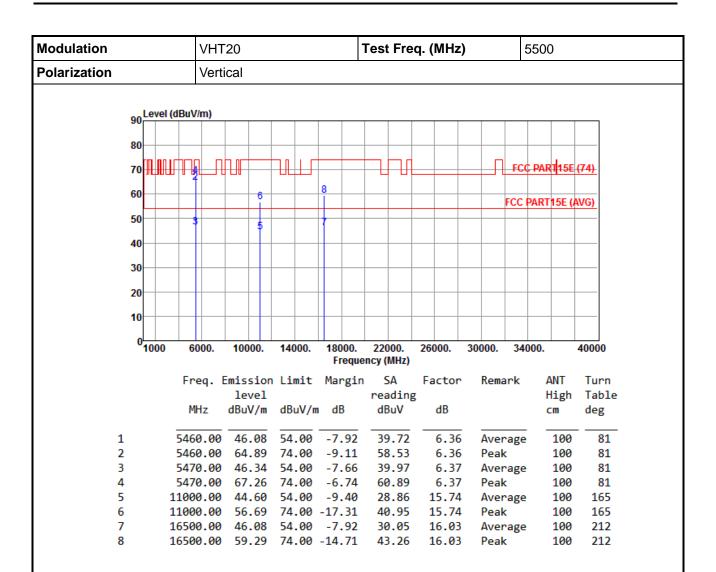


*Factor includes antenna factor, cable loss and amplifier gain

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

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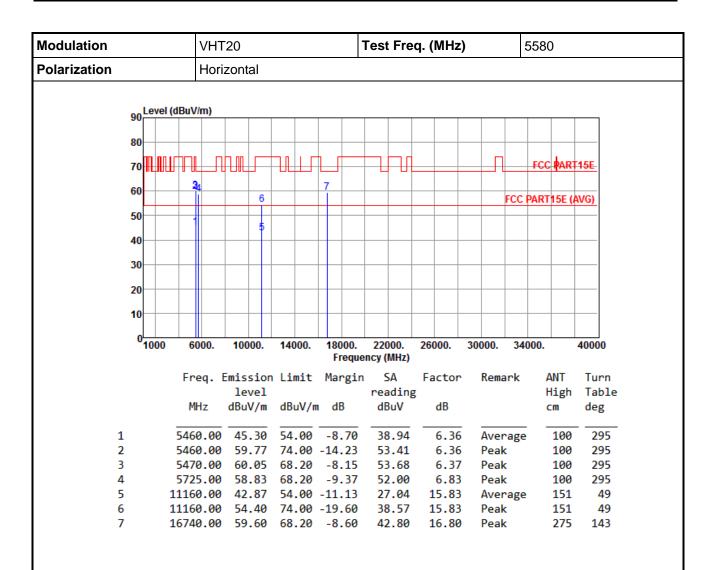


*Factor includes antenna factor, cable loss and amplifier gain

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

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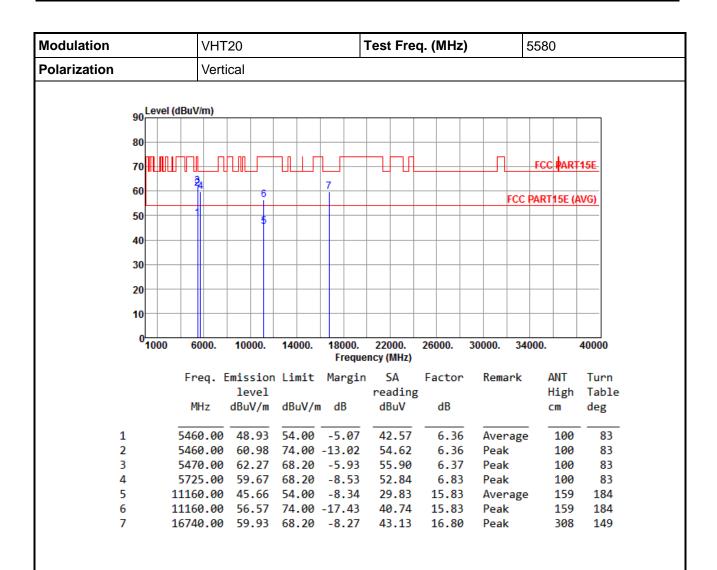


*Factor includes antenna factor, cable loss and amplifier gain

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

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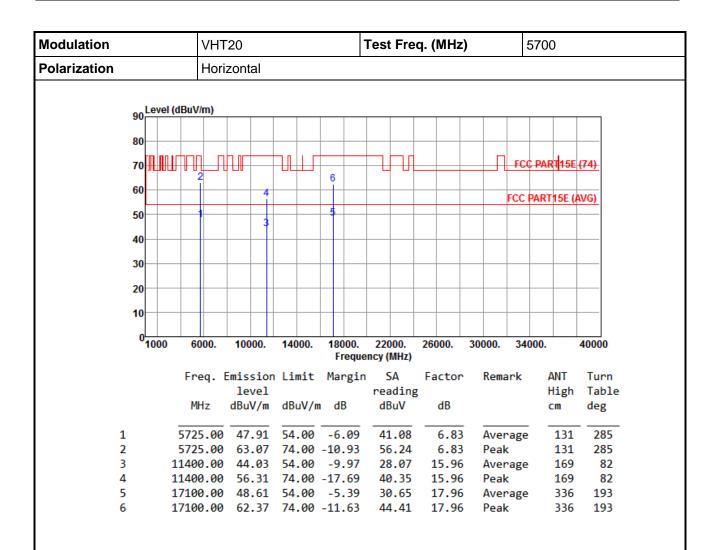


*Factor includes antenna factor, cable loss and amplifier gain

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

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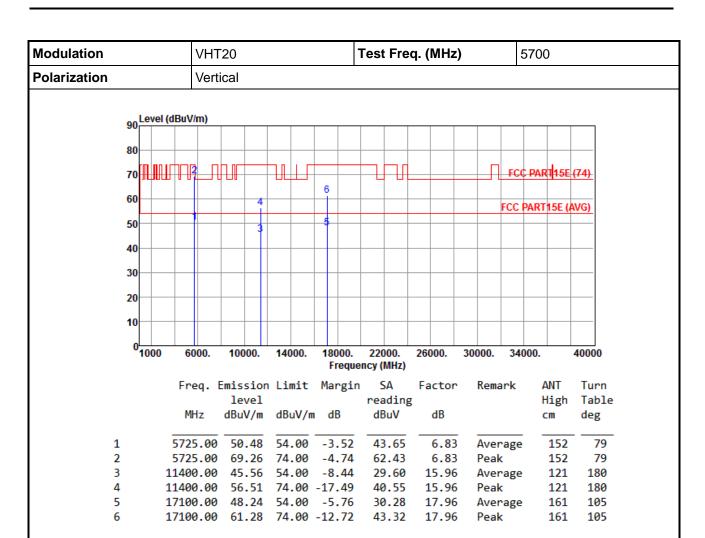


*Factor includes antenna factor, cable loss and amplifier gain

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

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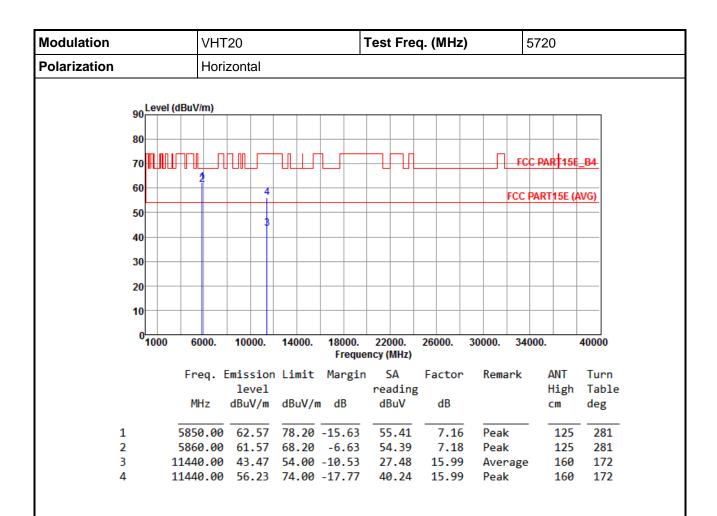


*Factor includes antenna factor, cable loss and amplifier gain

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

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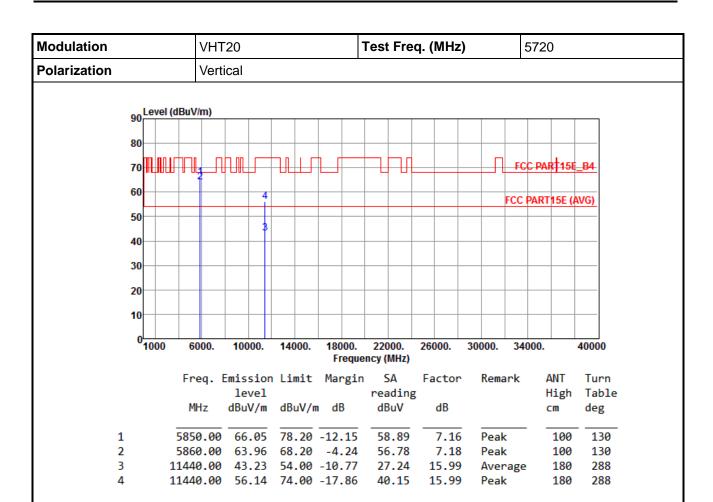


*Factor includes antenna factor, cable loss and amplifier gain

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

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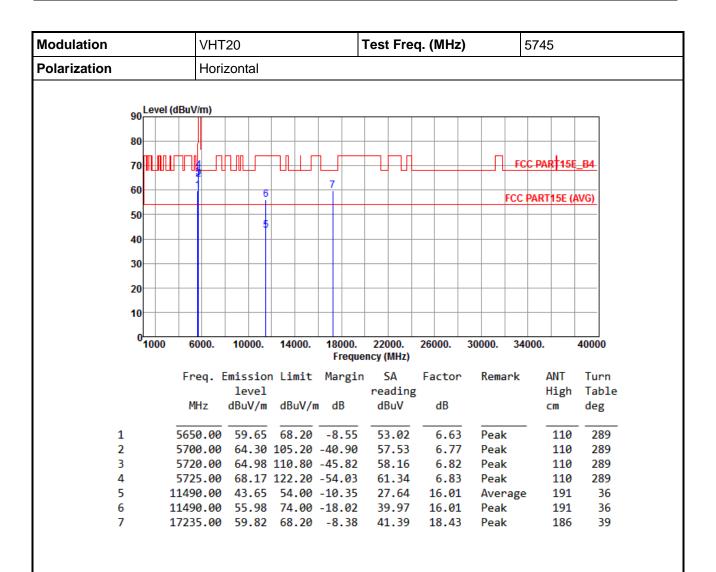


*Factor includes antenna factor, cable loss and amplifier gain

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

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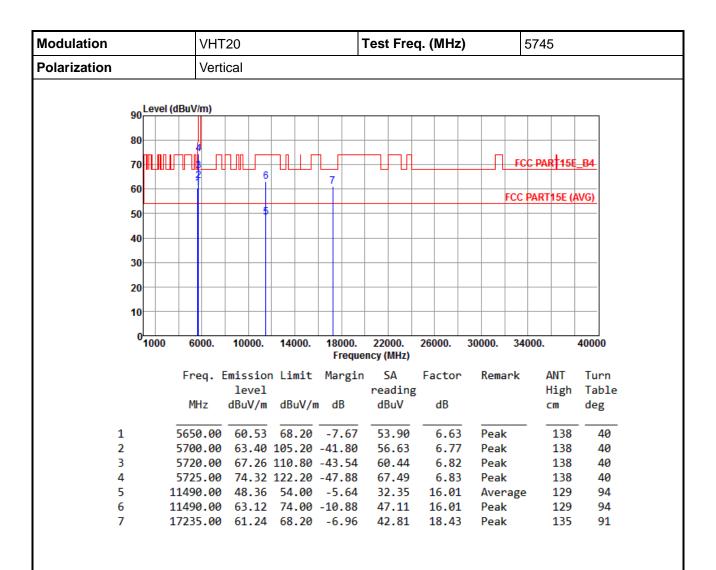


*Factor includes antenna factor, cable loss and amplifier gain

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

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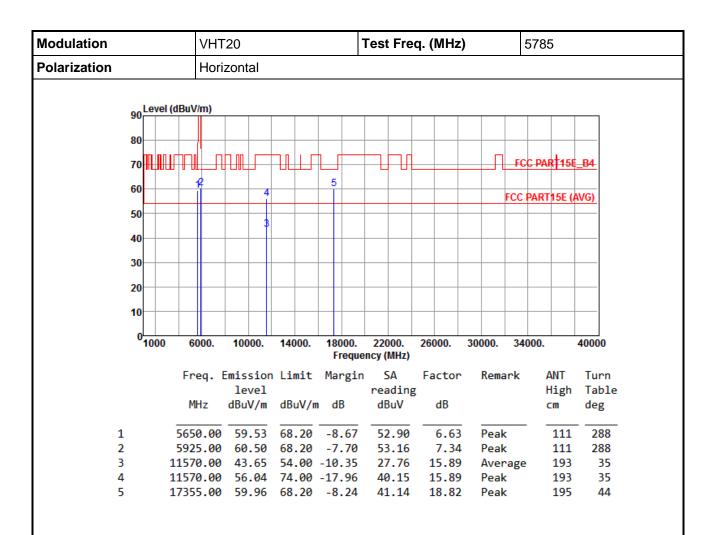


*Factor includes antenna factor, cable loss and amplifier gain

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

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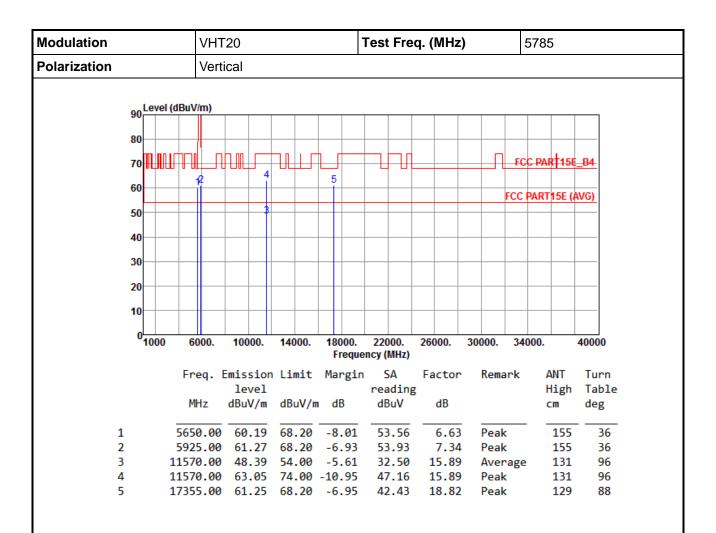


*Factor includes antenna factor, cable loss and amplifier gain

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

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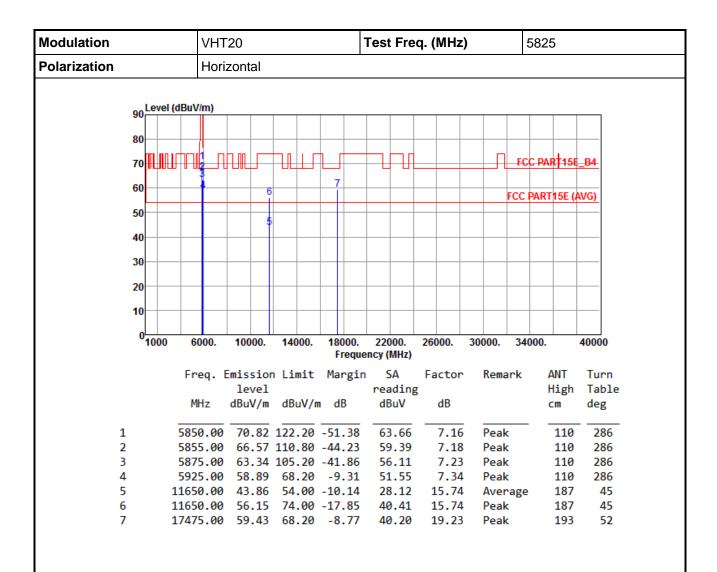


*Factor includes antenna factor, cable loss and amplifier gain

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

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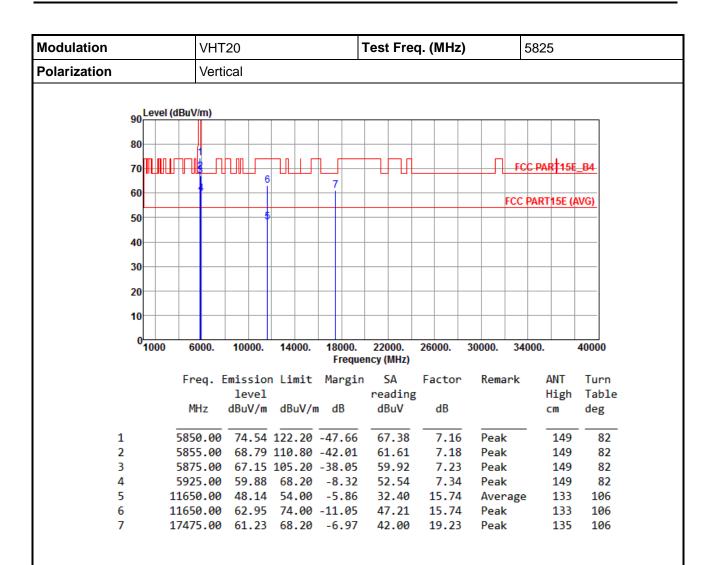


*Factor includes antenna factor, cable loss and amplifier gain

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

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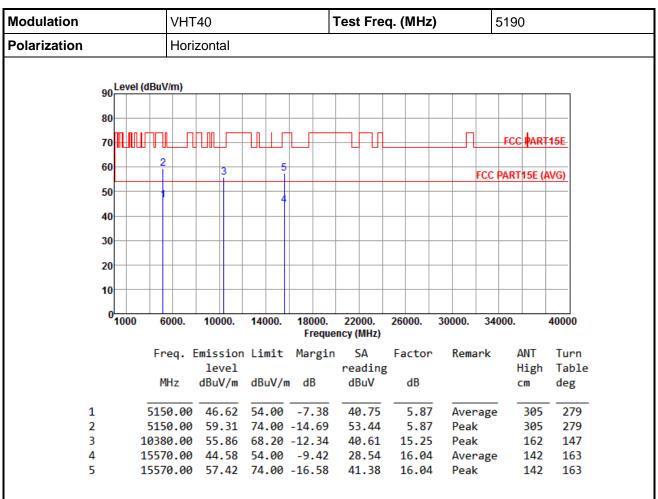
*Factor includes antenna factor, cable loss and amplifier gain

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

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3.5.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for VHT40



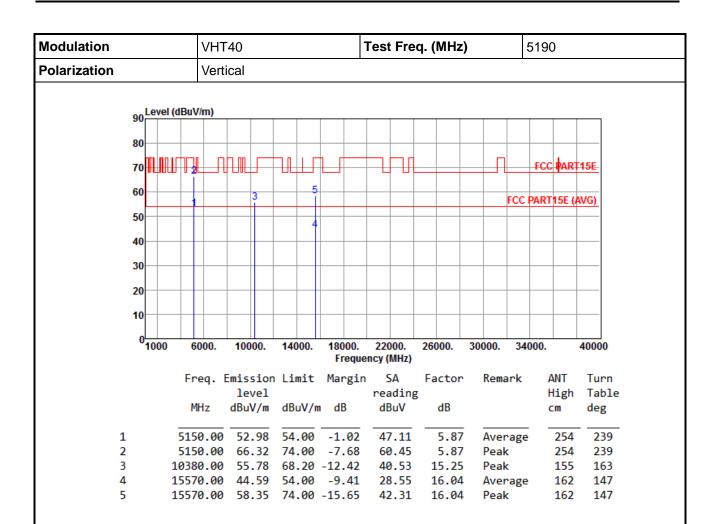
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

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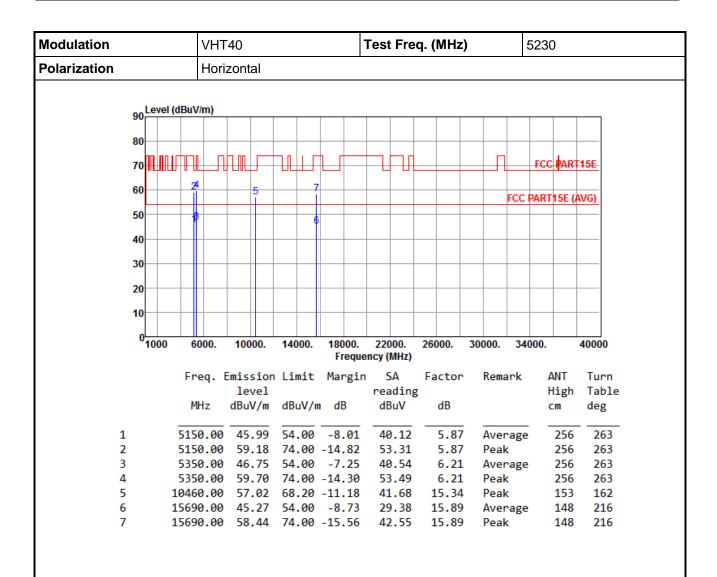


*Factor includes antenna factor, cable loss and amplifier gain

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

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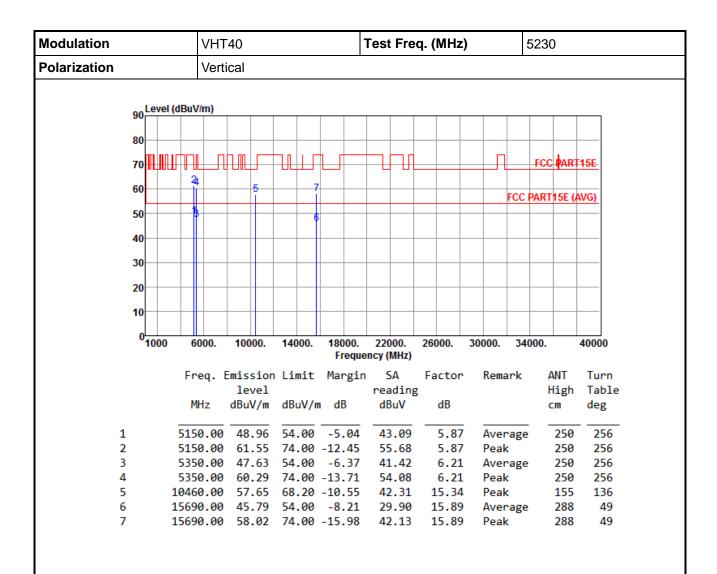


*Factor includes antenna factor, cable loss and amplifier gain

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

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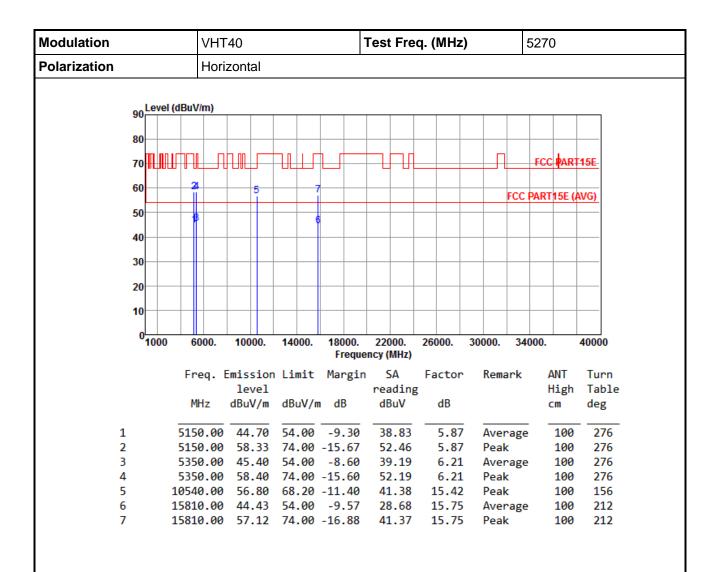


*Factor includes antenna factor, cable loss and amplifier gain

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

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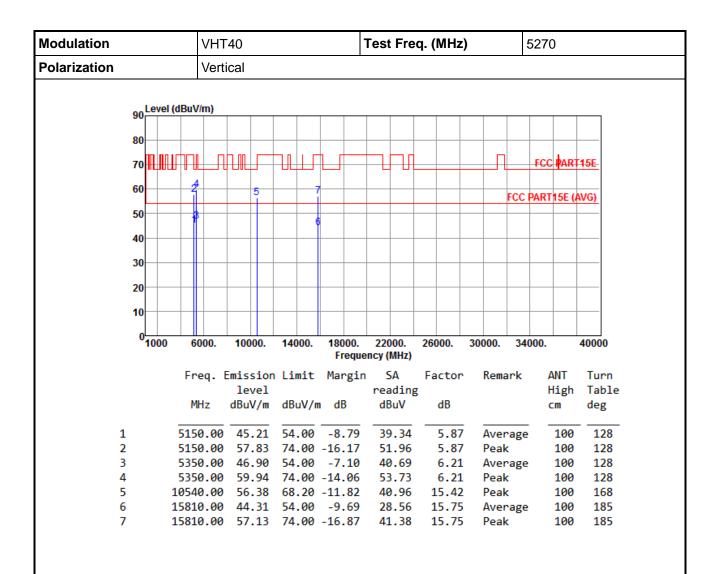


*Factor includes antenna factor, cable loss and amplifier gain

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

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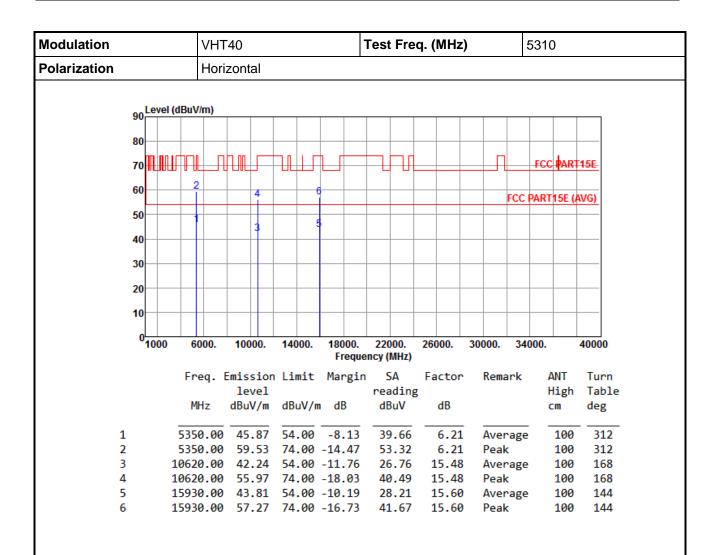


*Factor includes antenna factor, cable loss and amplifier gain

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

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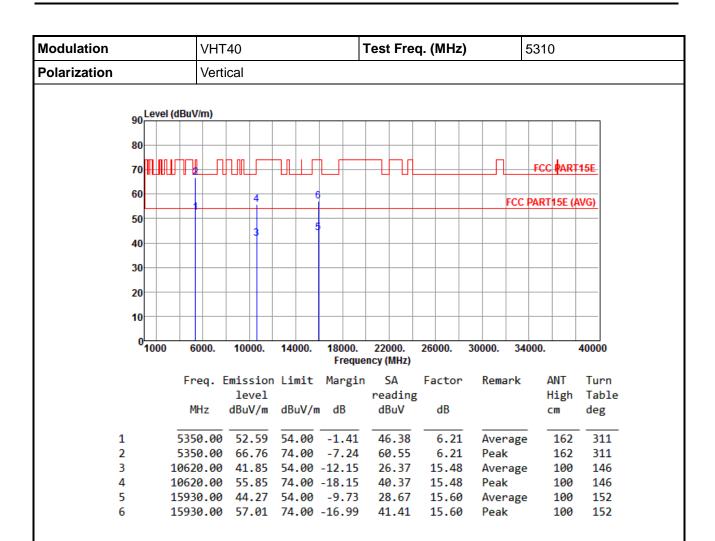


*Factor includes antenna factor, cable loss and amplifier gain

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

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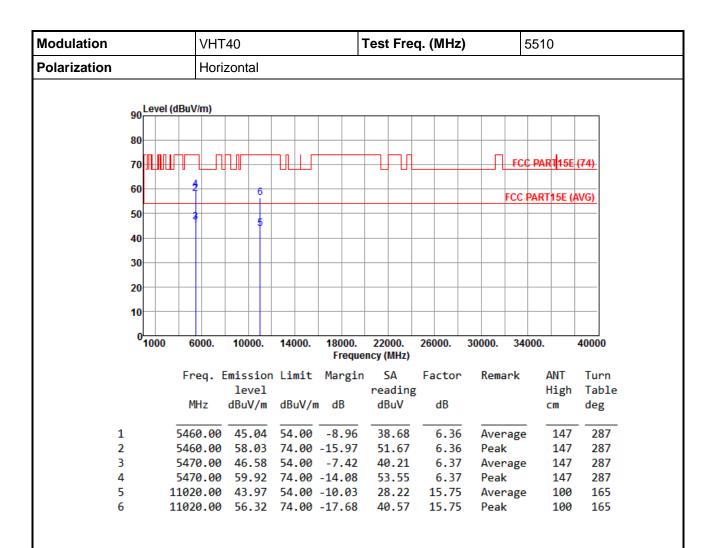


*Factor includes antenna factor, cable loss and amplifier gain

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

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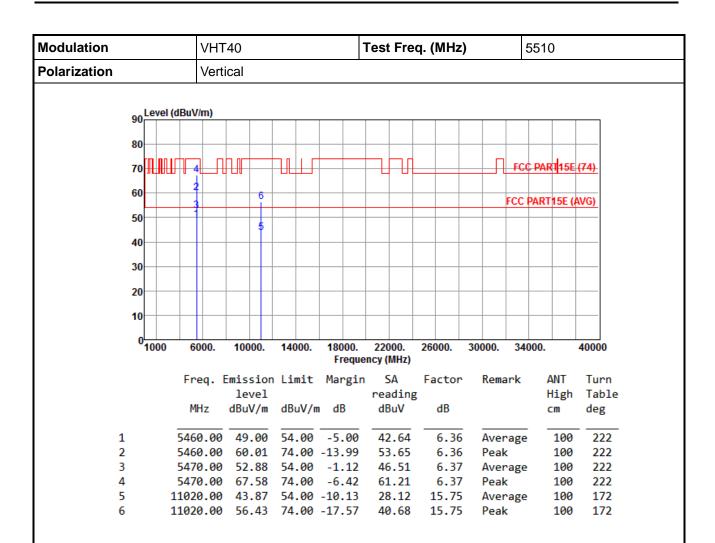


*Factor includes antenna factor, cable loss and amplifier gain

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

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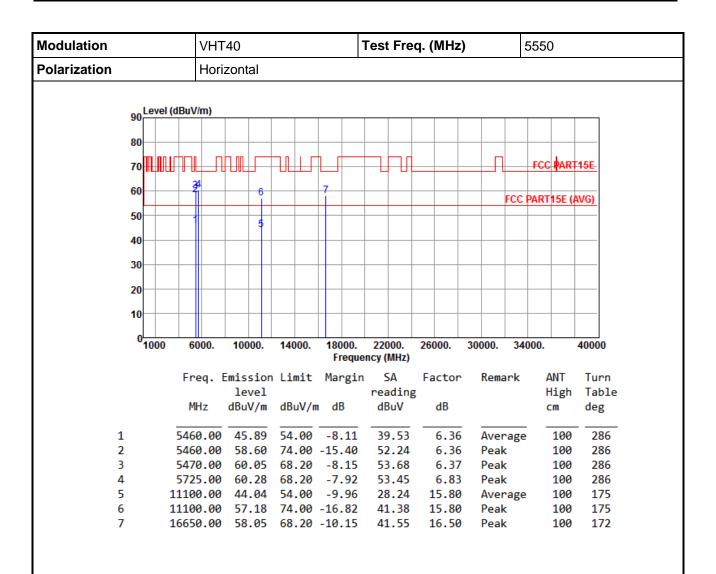


*Factor includes antenna factor, cable loss and amplifier gain

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

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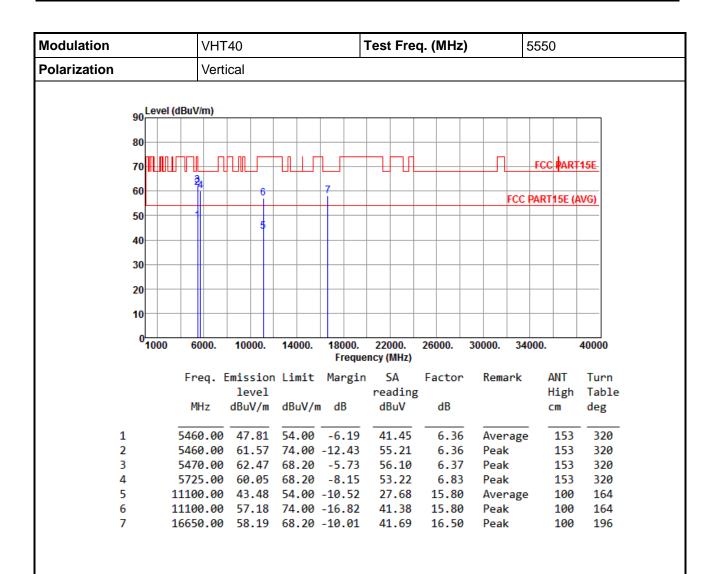


*Factor includes antenna factor, cable loss and amplifier gain

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

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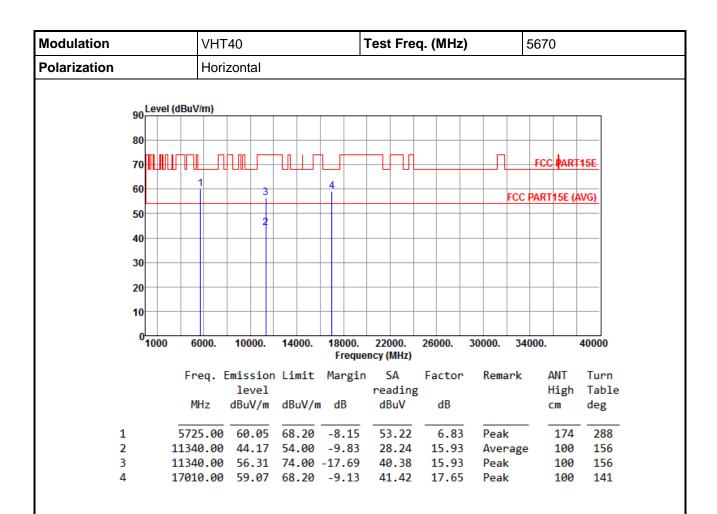


*Factor includes antenna factor, cable loss and amplifier gain

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

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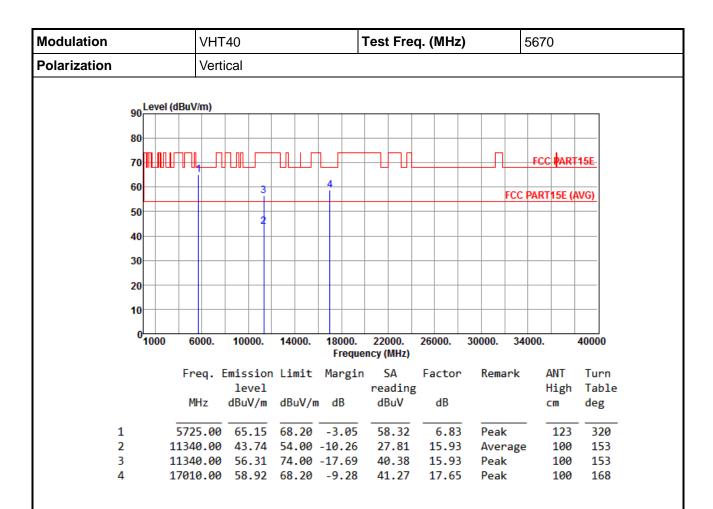


*Factor includes antenna factor, cable loss and amplifier gain

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

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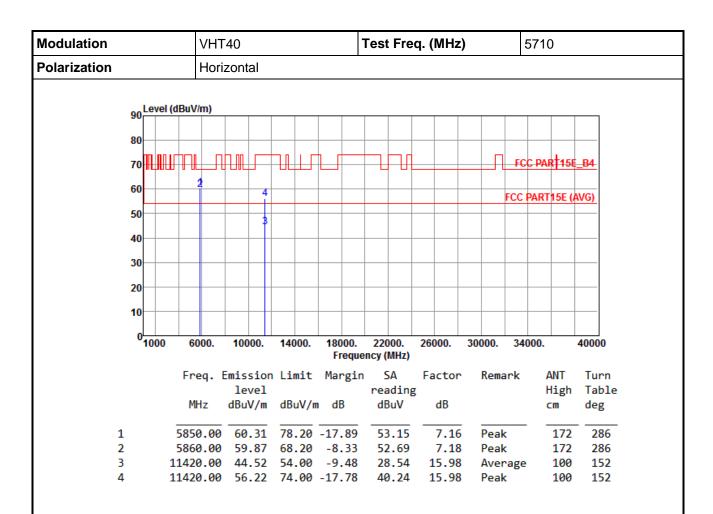


*Factor includes antenna factor, cable loss and amplifier gain

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

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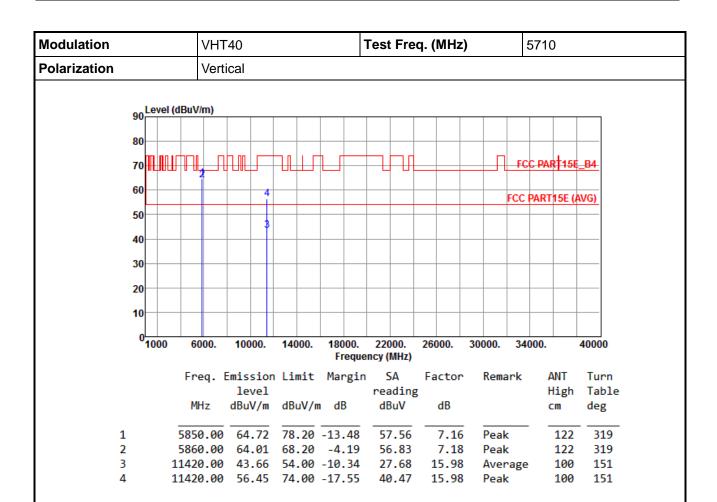


*Factor includes antenna factor, cable loss and amplifier gain

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

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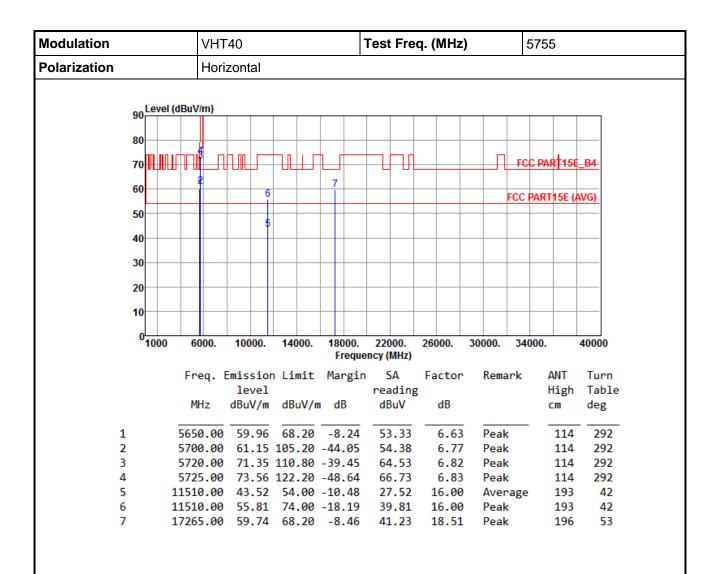


*Factor includes antenna factor, cable loss and amplifier gain

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

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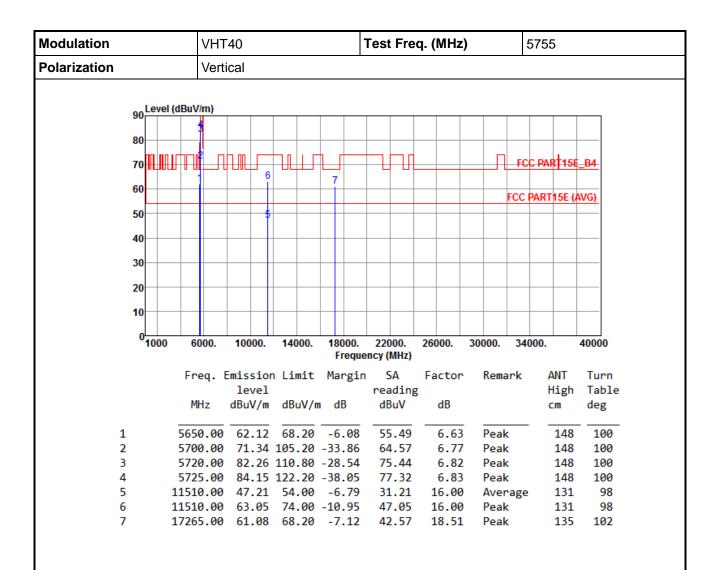


*Factor includes antenna factor, cable loss and amplifier gain

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

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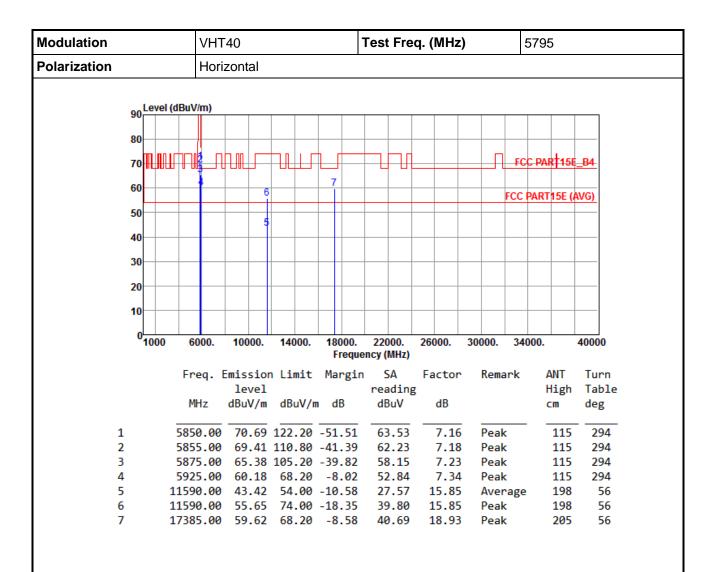


*Factor includes antenna factor, cable loss and amplifier gain

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

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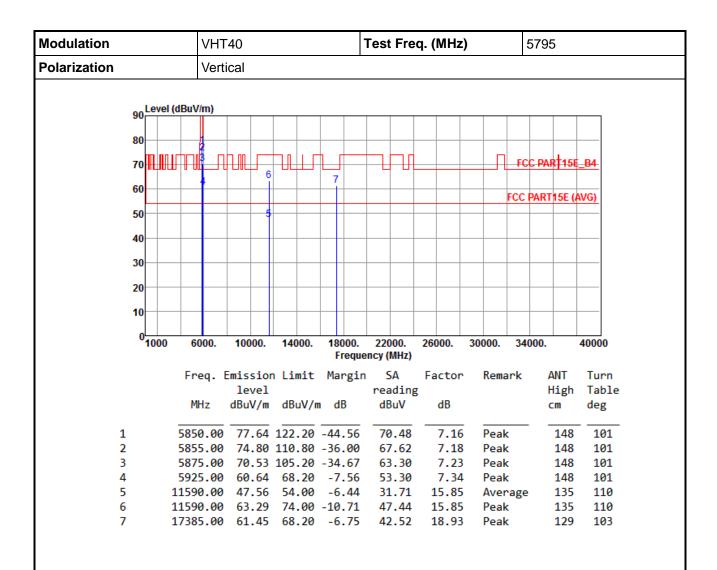


*Factor includes antenna factor, cable loss and amplifier gain

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

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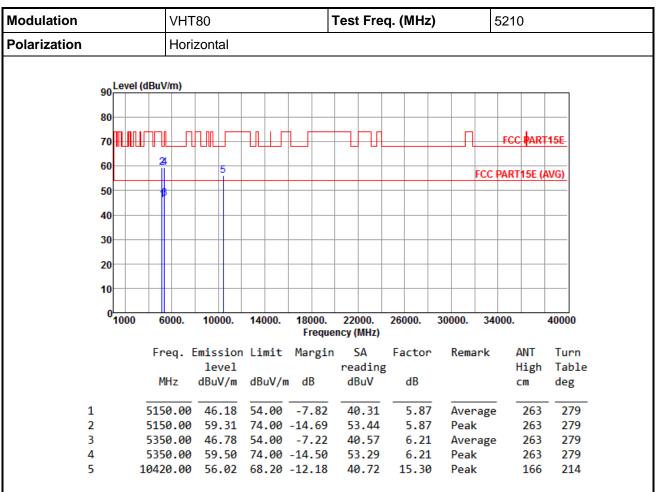
*Factor includes antenna factor, cable loss and amplifier gain

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

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3.5.8 Transmitter Radiated Unwanted Emissions (Above 1GHz) for VHT80



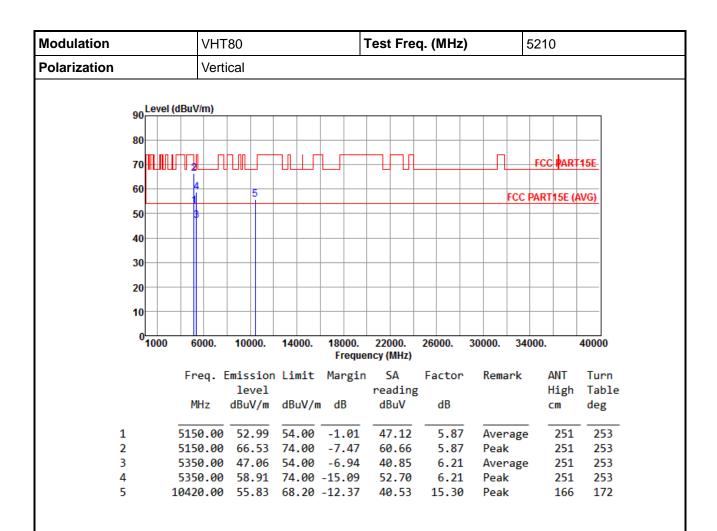
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

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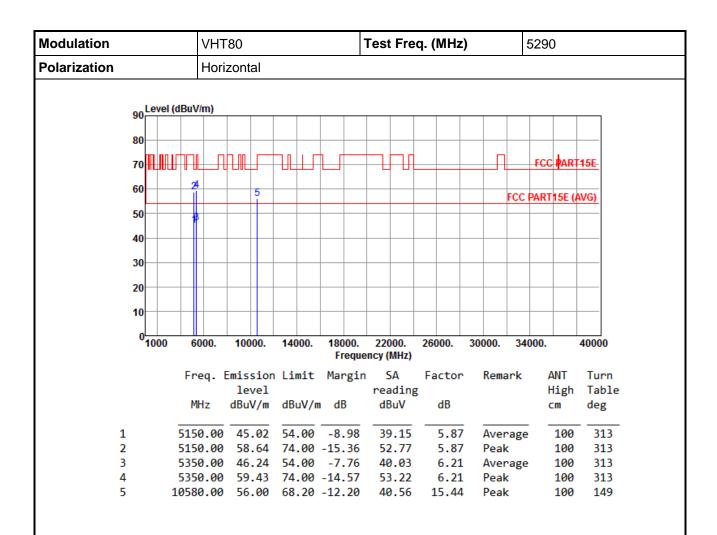


*Factor includes antenna factor, cable loss and amplifier gain

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

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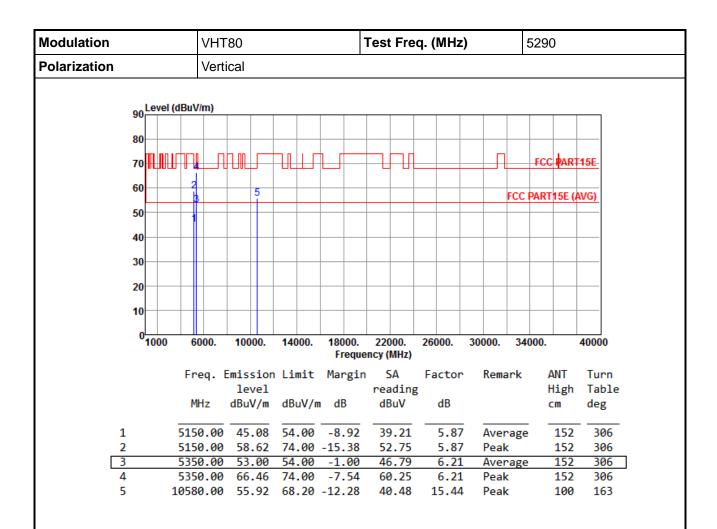


*Factor includes antenna factor, cable loss and amplifier gain

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

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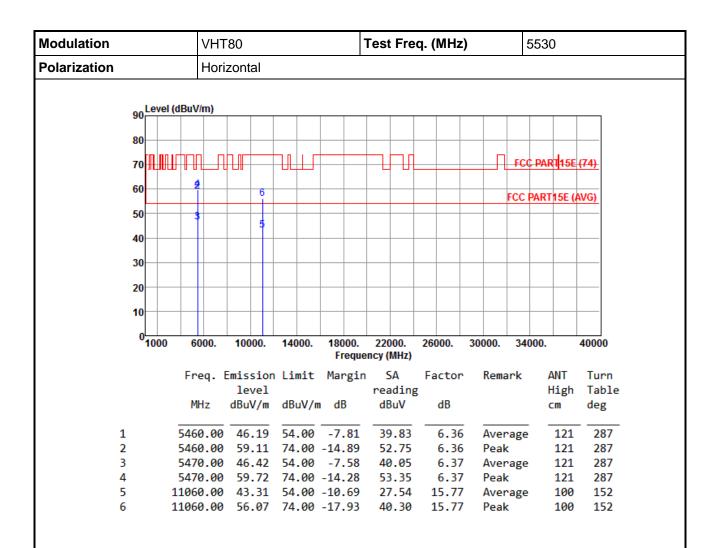


*Factor includes antenna factor, cable loss and amplifier gain

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

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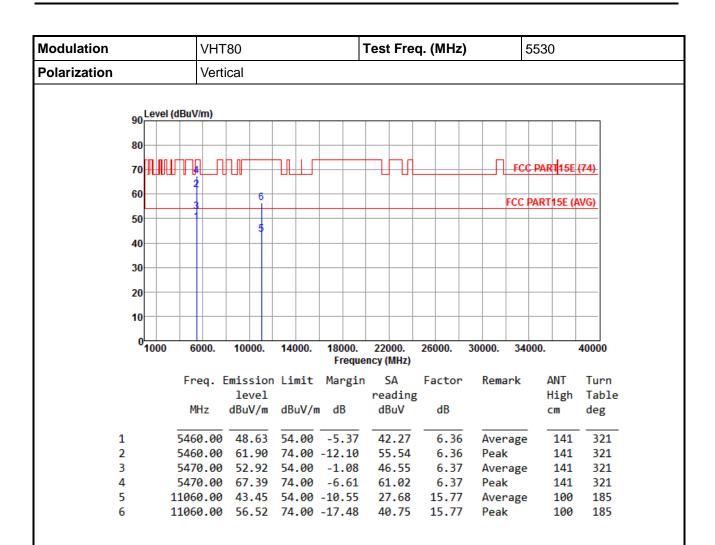


*Factor includes antenna factor, cable loss and amplifier gain

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

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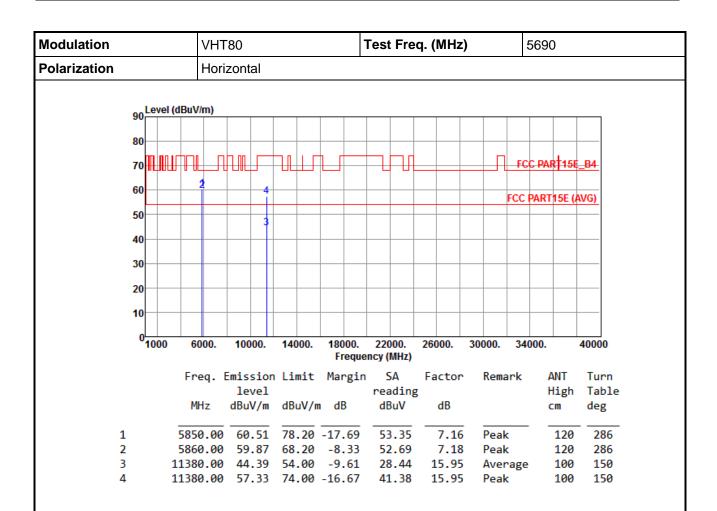


*Factor includes antenna factor, cable loss and amplifier gain

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

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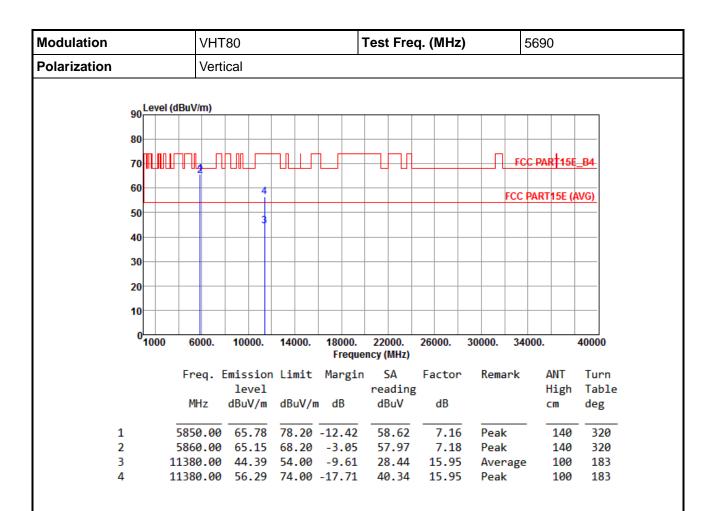


*Factor includes antenna factor, cable loss and amplifier gain

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

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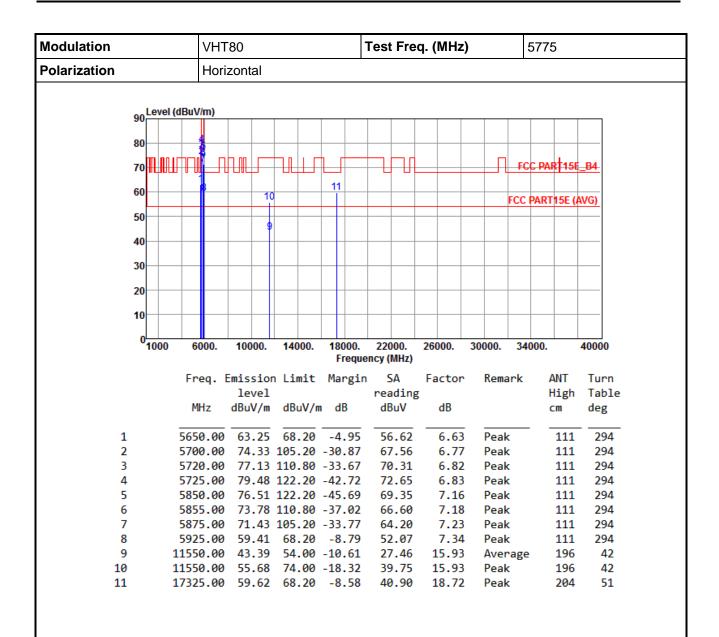


*Factor includes antenna factor, cable loss and amplifier gain

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

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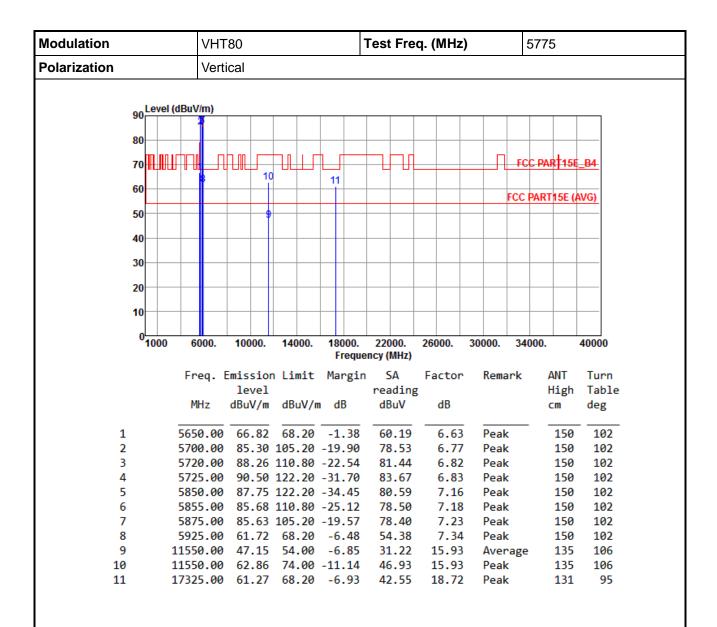


*Factor includes antenna factor, cable loss and amplifier gain

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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3.6 Frequency Stability

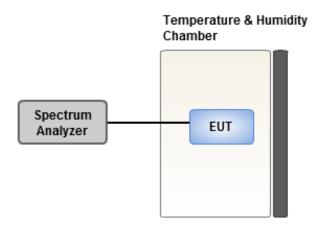
3.6.1 Limit of Frequency Stability

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.

3.6.2 Test Procedures

- 1. The EUT is installed in an environment test chamber with external power source.
- Set the chamber to operate at 55 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 -30 to 55 centigrade and 85 to 115 percent of the nominal voltage. Change setting of chamber and external power source to complete all conditions.

3.6.3 Test Setup



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3.6.4 Test Result of Frequency Stability

Frequency: 5320 MHz	Frequency Drift (ppm)				
Temperature (°C)	0 minute	2 minutes	5 minutes	10 minutes	
T20°CVmax	0.05	-0.39	0.40	0.02	
T20°CVmin	0.19	0.57	0.91	0.47	
T55°CVnom	1.38	1.21	1.63	1.27	
T50°CVnom	0.56	1.20	0.51	0.61	
T40°CVnom	0.46	0.34	0.45	0.48	
T30°CVnom	0.33	0.77	0.31	0.30	
T20°CVnom	0.42	0.49	0.59	0.89	
T10°CVnom	-0.17	0.05	0.10	0.27	
T0°CVnom	0.30	0.34	0.13	0.57	
T-10°CVnom	0.77	1.44	0.34	1.21	
T-20°CVnom	-0.20	0.56	0.32	0.12	
T-30°CVnom	0.12	0.39	-0.14	-0.08	
Vnom [Vac]: 120		Vmax [Vac]: 138		Vmin [Vac]: 102	
Tnom [°C]: 20		Tmax [°C]: 55		Tmin [°C]: -30	

Frequency: 5785 MHz	Frequency Drift (ppm)				
Temperature (°C)	0 minute	2 minutes	5 minutes	10 minutes	
T20°CVmax	-0.11	-0.22	0.22	0.16	
T20°CVmin	0.43	0.71	0.79	0.36	
T55°CVnom	0.08	0.15	0.36	-0.25	
T50°CVnom	0.31	0.58	0.39	0.39	
T40°CVnom	0.44	0.00	0.02	0.39	
T30°CVnom	0.85	1.02	1.13	0.87	
T20°CVnom	0.10	0.27	0.42	-0.06	
T10°CVnom	0.03	0.75	0.63	0.51	
T0°CVnom	0.29	0.26	0.15	0.68	
T-10°CVnom	0.27	0.67	0.87	0.04	
T-20°CVnom	-0.20	0.14	-0.14	-0.01	
T-30°CVnom	0.23	0.46	0.63	0.66	
Vnom [Vac]: 120		Vmax [Vac]: 138		Vmin [Vac]: 102	
Tnom [°C]: 20		Tmax [°C]: 55		Tmin [°C]: -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 Corp (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 http://www.icertifi.com.tw.

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 District, Tao Yuan City 333, Taiwan, R.O.C.

Kwei Shan Site II

Tel: 886-3-271-8640

No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan District, 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: 886-3-318-0155

Email: ICC_Service@icertifi.com.tw

==END==

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