

FCC RADIO TEST REPORT

FCC 47 CFR PART 15 SUBPART E

Test Standard	FCC Part 15.407
FCC ID	M82-MITW101A1
Brand name	ADVANTECH
Product name	Computer
Model No.	MIT-W101, MIT-W101XXXXXXXXXXXXXXXXXX (where "X" may be any alphanumeric character , "-" or blank)
Test Result	Pass

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report.

The test Report of full or partial shall not copy. Without written approval of CCS. Inc.



Approved by:

Tested by:

Handwritten signature of Sam Chuang in black ink.

Handwritten signature of Ed Chiang in black ink.

Sam Chuang
Manager

Ed Chiang
Engineer

Revision History

Rev.	Issue Date	Revisions	Revised By
00	June 29, 2017	Initial Issue	Vicki Huang
01	September 1, 2017	<ol style="list-style-type: none"> 1. Add the measured uncertainty of conducted test in P.6 2. Clause 1.8 add the KDB 905462 in P.8 3. Add the DFS test item into the test summary in P.9 4. Modify UNII-2C channels number in P.10 5. Remove the test mode 3 from AC power line conducted emission test in P.11 6. Add PSD limit unit in P.39 7. Remove Non-occupancy period data 	Vicki Huang
02	September 11, 2017	<ol style="list-style-type: none"> 1. Added Antenna description in P.6 2. Modify clause 1.8 KDB 905462 Version in P.8 3. Modify U-NII-2C band channel number in P.10 4. Modify Duty cycle data in P.12 5. Added 802.11acVHT20/VHT40 bandwidth and power data in P.17~20, 24~40 6. Added PSD limit unit in P.48 	Vicki Huang
03	September 22, 2017	<ol style="list-style-type: none"> 1. Modify U-NII-2C band channel number in P.10 2. Delete PSD EIRP limit in P.48, 50 	Vicki Huang
04	September 29, 2017	<ol style="list-style-type: none"> 1. Remove cross Band channel of UNII-2C. 	Vicki Huang
05	September 30, 2017	<ol style="list-style-type: none"> 1. Modify U-NII-2C band frequency range in P.4 	Vicki Huang

Table of contents

1. GENERAL INFORMATION	4
1.1 EUT INFORMATION	4
1.2 EUT CHANNEL INFORMATION	5
1.3 ANTENNA INFORMATION	6
1.4 MEASUREMENT UNCERTAINTY	6
1.5 FACILITIES AND TEST LOCATION	7
1.6 INSTRUMENT CALIBRATION	7
1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT	8
1.8 TEST METHODOLOGY AND APPLIED STANDARDS	8
1.9 TABLE OF ACCREDITATIONS AND LISTINGS	8
2. TEST SUMMERY	9
3. DESCRIPTION OF TEST MODES	10
3.1 THE WORST MODE OF OPERATING CONDITION	10
3.2 THE WORST MODE OF MEASUREMENT	11
3.3 EUT DUTY CYCLE	12
4. TEST RESULT	13
4.1 AC POWER LINE CONDUCTED EMISSION	13
4.2 26DB BANDWIDTH, 6DB BANDWIDTH AND OCCUPIED BANDWIDTH(99%)	16
4.3 OUTPUT POWER MEASUREMENT	41
4.4 POWER SPECTRAL DENSITY	47
4.5 RADIATION BANDEDGE AND SPURIOUS EMISSION	67
4.6 FREQUENCY STABILITY	203
4.7 DYNAMIC FREQUENCY SELECTION	206
APPENDIX 1 - PHOTOGRAPHS OF EUT	

1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	Advantech Co.Ltd. No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R.O.C.				
Equipment	Computer				
Model Name	MIT-W101, MIT-W101XXXXXXXXXXXXXXXXXXXX (where "X" may be any alphanumeric character , "-" or blank)				
Model Discrepancy	All models are electrically identical, different model names are for marketing purpose				
Received Date	April 11, 2017				
Date of Test	May 19 ~ June 29, 2017				
Power Supply	1. VDC from Power Adapter (1)FSP / FSP065-REBN2 I/P: 100-240Vac, 1.5A, 50-60Hz O/P: 19Vdc, 3.42A (2)SINPRO/ HPU63A-107 I/P: 100-240Vac, 1.62-0.72A, 47-63Hz O/P: 18Vdc, 3.5A max 2. Battery (1) ADVANTECH / MIT101-BATC Rating: 11.1V, 2860mAh				
Output Power(W)	Band	Mode	Frequency Range (MHz)	Output Power (W)	EIRP Output Power (w)
	U-NII-1	IEEE 802.11a	5180 ~ 5240	0.0315	0.1039
		IEEE 802.11n HT 20 MHz	5180 ~ 5240	0.0248	0.0820
		IEEE 802.11n HT 40 MHz	5190 ~ 5230	0.0238	0.0786
		IEEE 802.11ac VHT 80 MHz	5210	0.0094	0.0786
	U-NII-2a	IEEE 802.11a	5260 ~ 5320	0.0313	0.1034
		IEEE 802.11n HT 20 MHz	5260 ~ 5320	0.0243	0.0801
		IEEE 802.11n HT 40 MHz	5270 ~ 5310	0.0247	0.0814
		IEEE 802.11ac VHT 80 MHz	5290	0.0097	0.0320
	U-NII-2c	IEEE 802.11a	5500 ~ 5700	0.0316	0.1044
		IEEE 802.11n HT 20 MHz	5500 ~ 5700	0.0250	0.0825
		IEEE 802.11n HT 40 MHz	5510 ~ 5670	0.0230	0.0758
		IEEE 802.11ac VHT 80 MHz	5530 ~ 5610	0.0123	0.0407
	U-NII-3	IEEE 802.11a	5745 ~ 5825	0.0316	-
		IEEE 802.11n HT 20 MHz	5745 ~ 5825	0.0248	-
		IEEE 802.11n HT 40 MHz	5755 ~ 5795	0.0247	-
IEEE 802.11ac VHT 80 MHz		5775	0.0156	-	

Remark:

1. For Canada the EUT Frequency Range 5600~5650MHz will be disabled.

1.2 EUT CHANNEL INFORMATION

Frequency Range	UNII-1	
	IEEE 802.11a	5180 ~ 5240 MHz
	IEEE 802.11n HT 20 MHz	5180 ~ 5240 MHz
	IEEE 802.11n HT 40 MHz	5190 ~ 5230 MHz
	IEEE 802.11ac VHT 20 MHz	5180 ~ 5240 MHz
	IEEE 802.11ac VHT 40 MHz	5190 ~ 5230 MHz
	IEEE 802.11ac VHT 80 MHz	5210 MHz
	UNII-2a	
	IEEE 802.11a	5260 ~ 5320 MHz
	IEEE 802.11n HT 20 MHz	5260 ~ 5320 MHz
	IEEE 802.11n HT 40 MHz	5270 ~ 5310 MHz
	IEEE 802.11ac VHT 20 MHz	5260 ~ 5320 MHz
	IEEE 802.11ac VHT 40 MHz	5270 ~ 5310 MHz
	IEEE 802.11ac VHT 80 MHz	5290 MHz
	UNII-2c	
	IEEE 802.11a	5500 ~ 5700 MHz
	IEEE 802.11n HT 20 MHz	5500 ~ 5700 MHz
	IEEE 802.11n HT 40 MHz	5510 ~ 5670 MHz
	IEEE 802.11ac VHT 20 MHz	5500 ~ 5700 MHz
	IEEE 802.11ac VHT 40 MHz	5510 ~ 5670 MHz
	IEEE 802.11ac VHT 80 MHz	5530 ~ 5610 MHz
	UNII-3	
	IEEE 802.11a	5745 ~ 5825 MHz
	IEEE 802.11n HT 20 MHz	5745 ~ 5825 MHz
	IEEE 802.11n HT 40 MHz	5755 ~ 5795 MHz
	IEEE 802.11ac VHT 20 MHz	5745 ~ 5825 MHz
	IEEE 802.11ac VHT 40 MHz	5755 ~ 5795 MHz
IEEE 802.11ac VHT 80 MHz	5775 MHz	
Modulation Type	<ol style="list-style-type: none"> 1. IEEE 802.11a mode: OFDM 2. IEEE 802.11n HT 20 MHz mode: OFDM 3. IEEE 802.11n HT 40 MHz mode: OFDM 4. IEEE 802.11ac VHT 20 MHz mode: OFDM 5. IEEE 802.11ac VHT 40 MHz mode: OFDM 5. IEEE 802.11ac VHT 80 MHz mode: OFDM 	

Remark:

Refer as ANSI 63.10:2013 clause 5.6.1 Table 4 for test channels

Number of frequencies to be tested		
Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
<input type="checkbox"/> 1 MHz or less	1	Middle
<input type="checkbox"/> 1 MHz to 10 MHz	2	1 near top and 1 near bottom
<input checked="" type="checkbox"/> More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

1.3 ANTENNA INFORMATION

Antenna Type	<input checked="" type="checkbox"/> PIFA <input type="checkbox"/> PCB <input type="checkbox"/> Dipole <input type="checkbox"/> Coils
Antenna Gain	<p>Main Antenna Model: BJTEK NAVIGATION,INC. Part number: BJHEM851101830B00A-A Gain: 4.29dBi</p> <p>AUX Antenna Model: INVAX System Technology Corp. Part number: IVX0035-C30BLF Gain: 5.18679dBi</p>

1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 30 to 1000 MHz	+/- 3.97
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 1 to 18GHz	+/- 3.58
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 18 to 26 GHz	+/- 3.59
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 26 to 40 GHz	+/- 3.81
Conducted Emission (Mains Terminals), 9kHz to 30MHz	+/- 2.48
AC Powerline Conducted Emission	+/- 1.2575
Emission bandwidth, 20dB bandwidth	+/- 1.4003
RF output power, conducted	+/- 1.1372
Power density, conducted	+/- 1.4003

Remark:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at
NO. 989-1 Wen Shan Rd., Shang Shan Village, Qionglin Township, Hsinchu County 30741,
Taiwan (R.O.C.)

Test site	Test Engineer	Remark
AC Conduction Room	Stemmi Guo	
Radiation	Ed Chiang	
RF Conducted	Eric Lee	

Remark: The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

1.6 INSTRUMENT CALIBRATION

RF Conducted Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Power Meter	Anritsu	ML2495A	1012009	07/04/2016	07/03/2017
Power Sensor	Anritsu	MA2411B	917072	07/04/2016	07/03/2017
Spectrum Analyzer	R&S	FSV 40	101073	10/05/2016	10/04/2017

3M 966 Chamber Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Bilog Antenna	Sunol Sciences	JB3	A030105	07/03/2016	07/02/2017
Horn Antenna	EMCO	3117	00055165	02/20/2017	02/19/2018
Pre-Amplifier	EMCI	EMC 012635	980151	6/21/2017	06/20/2018
Pre-Amplifier	E MEC	EM330	060609	06/16/2017	06/15/2018
Spectrum Analyzer	Agilent	E4446A	US42510252	12/05/2016	12/04/2017
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R

AC Conducted Emissions Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
LISN	R&S	ENV216	101054	05/18/2017	05/17/2018
LISN	SCHWARZBECK	NSLK 8127	8127-541	02/14/2017	02/13/2018
Receiver	R&S	ESCI	101073	08/20/2016	08/19/2017

Remark: Each piece of equipment is scheduled for calibration once a year.

1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT



EUT Accessories Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
	N/A				

Support Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
	N/A				

1.8 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.407, KDB 662911 D01 v02r01, KDB 789033 D02 v01r03, KDB 644545 D03 v01, KDB 905462 D02 V02.

1.9 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2

2. TEST SUMMERY

FCC Standard Sec.	IC Standard Sec.	Chapter	Test Item	Result
15.203	-	1.2	Antenna Requirement	Pass
15.207	RSS-Gen(8.8)	4.1	AC Conducted Emission	Pass
15.403(i)	-	4.2	26dB Bandwidth	Pass
15.403(i)	RSS-247(6.2.4)	4.2	6dB Bandwidth	Pass
15.403(i)	RSS-Gen(6.6)	4.2	Occupied Bandwidth (99%)	Pass
15.407(a)	RSS-247(6.2.1)(1) RSS-247(6.2.2)(1) RSS-247(6.2.3)(1) RSS-247(6.2.4)(1)	4.3	Output Power Measurement	Pass
15.407(a)	RSS-247(6.2.1)(1) RSS-247(6.2.2)(1) RSS-247(6.2.3)(1) RSS-247(6.2.4)(1)	4.4	Power Spectral Density	Pass
15.407(b)	RSS-247(6.2.1)(2) RSS-247(6.2.2)(2) RSS-247(6.2.3)(2) RSS-247(6.2.4)(2)	4.5	Radiation Band Edge	Pass
15.407(b)	RSS-247(6.2.1)(2) RSS-247(6.2.2)(2) RSS-247(6.2.3)(2) RSS-247(6.2.4)(2)	4.5	Radiation Spurious Emission	Pass
15.407(g)	RSS-Gen(6.11)	4.6	Frequency Stability	Pass
15.407(h)	RSS-247(6.3)	4.7	Dynamic Frequency Selection	Pass

3. DESCRIPTION OF TEST MODES

3.1 THE WORST MODE OF OPERATING CONDITION

<p>Operation mode</p>	<p>1. IEEE 802.11a mode: 6Mbps 2. IEEE 802.11n HT 20 MHz mode: MCS8 3. IEEE 802.11n HT 40 MHz mode: MCS8 4. IEEE 802.11ac VHT 20 MHz mode: MCS8 5. IEEE 802.11ac VHT 40 MHz mode: MCS8 5. IEEE 802.11ac VHT 80 MHz mode: MCS8</p>			
<p>Operating Frequency Range & Number of Channels</p>		<p>Mode</p>	<p>Frequency Range (MHz)</p>	<p>Number of Channels</p>
	<p>U-NII-1</p>	<p>IEEE 802.11a</p>	<p>5180 ~ 5240</p>	<p>4 Channels</p>
		<p>IEEE 802.11n HT 20 MHz</p>	<p>5180 ~ 5240</p>	<p>4 Channels</p>
		<p>IEEE 802.11n HT 40 MHz</p>	<p>5190 ~ 5230</p>	<p>2 Channels</p>
		<p>IEEE 802.11ac VHT 20 MHz</p>	<p>5180 ~ 5240</p>	<p>4 Channels</p>
		<p>IEEE 802.11ac VHT 40 MHz</p>	<p>5190 ~ 5230</p>	<p>2 Channels</p>
		<p>IEEE 802.11ac VHT 80 MHz</p>	<p>5210</p>	<p>1 Channels</p>
	<p>U-NII-2a</p>	<p>IEEE 802.11a</p>	<p>5260 ~ 5320</p>	<p>4 Channels</p>
		<p>IEEE 802.11n HT 20 MHz</p>	<p>5260 ~ 5320</p>	<p>4 Channels</p>
		<p>IEEE 802.11n HT 40 MHz</p>	<p>5270 ~ 5310</p>	<p>2 Channels</p>
		<p>IEEE 802.11ac VHT 20 MHz</p>	<p>5260 ~ 5320</p>	<p>4 Channels</p>
		<p>IEEE 802.11ac VHT 40 MHz</p>	<p>5270 ~ 5310</p>	<p>2 Channels</p>
		<p>IEEE 802.11ac VHT 80 MHz</p>	<p>5290</p>	<p>1 Channels</p>
	<p>U-NII-2c</p>	<p>IEEE 802.11a</p>	<p>5500 ~ 5700</p>	<p>11 Channels</p>
		<p>IEEE 802.11n HT 20 MHz</p>	<p>5500 ~ 5700</p>	<p>11 Channels</p>
		<p>IEEE 802.11n HT 40 MHz</p>	<p>5510 ~ 5670</p>	<p>5 Channels</p>
		<p>IEEE 802.11ac VHT 20 MHz</p>	<p>5500 ~ 5700</p>	<p>11 Channels</p>
		<p>IEEE 802.11ac VHT 40 MHz</p>	<p>5510 ~ 5670</p>	<p>5 Channels</p>
		<p>IEEE 802.11ac VHT 80 MHz</p>	<p>5530 ~ 5610</p>	<p>2 Channels</p>
	<p>U-NII-3</p>	<p>IEEE 802.11a</p>	<p>5745 ~ 5825</p>	<p>5 Channels</p>
		<p>IEEE 802.11n HT 20 MHz</p>	<p>5745 ~ 5825</p>	<p>5 Channels</p>
		<p>IEEE 802.11n HT 40 MHz</p>	<p>5755 ~ 5795</p>	<p>2 Channels</p>
		<p>IEEE 802.11ac VHT 20 MHz</p>	<p>5745 ~ 5825</p>	<p>5 Channels</p>
		<p>IEEE 802.11ac VHT 40 MHz</p>	<p>5755 ~ 5795</p>	<p>2 Channels</p>
		<p>IEEE 802.11ac VHT 80 MHz</p>	<p>5775</p>	<p>1 Channels</p>

Remark:

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.
2. Covered modes are test reduction modes. The output powers on the covered modes are equal to or less than the mode referenced and use the same module
3. The mode IEEE 802.11ac VHT20 and VHT40 are only different in control messages with IEEE 802.11n HT20 and HT40, and have same power setting. Therefore, the highest power(IEEE 802.11n HT20 and HT40) were test conducted and radiated measurement and recorded in this report.

3.2 THE WORST MODE OF MEASUREMENT

AC Power Line Conducted Emission	
Test Condition	AC Power line conducted emission for line and neutral
Voltage/Hz	120V/60Hz
Test Mode	Mode 1: EUT power by AC adapter via power cable.(HPU63A-107) Mode 2: EUT power by AC adapter via power cable. (FSP065-REBN2)
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4

Radiated Emission Measurement Above 1G	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Voltage/Hz	120V/60Hz
Test Mode	Mode 1: EUT power by AC adapter via power cable.(HPU63A-107) Mode 2: EUT power by AC adapter via power cable. (FSP065-REBN2) Mode 3: EUT power by Battery
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4
Worst Position	<input type="checkbox"/> Placed in fixed position. <input type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane) <input checked="" type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane) <input type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane)
Worst Polarity	<input checked="" type="checkbox"/> Horizontal <input type="checkbox"/> Vertical

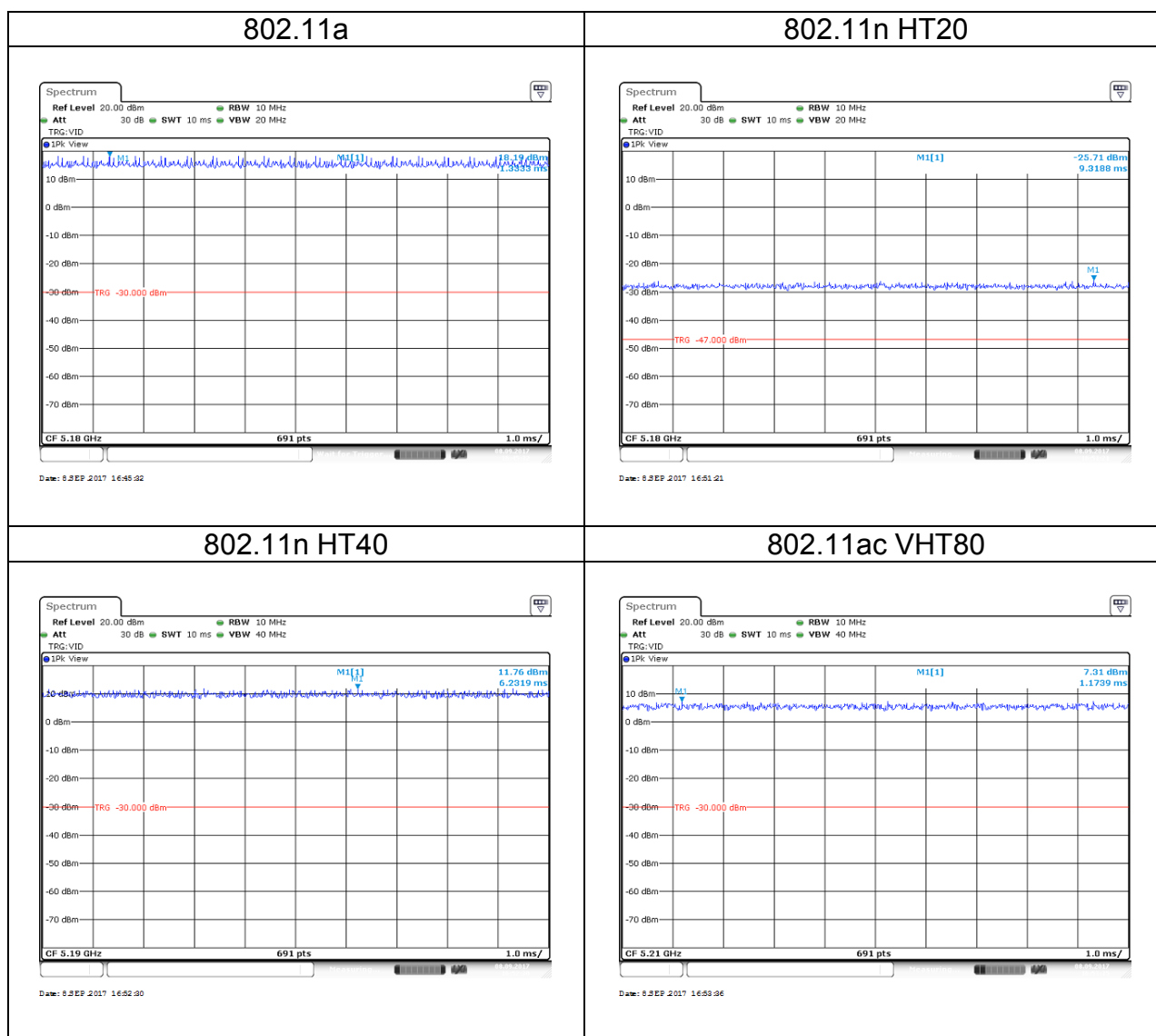
Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Voltage/Hz	120V/60Hz
Test Mode	Mode 1: EUT power by AC adapter via power cable.(HPU63A-107) Mode 2: EUT power by AC adapter via power cable. (FSP065-REBN2) Mode 3: EUT power by Battery
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4

Remark:

- 1. The worst mode was record in this test report.*
- 2. EUT pre-scanned in three axis ,X, Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case(Y-Plane and Horizontal) were recorded in this report*
- 3. AC power line conducted emission and for below 1G radiation emission were performed the EUT transmit at the highest output power channel as worse case.*

3.3 EUT DUTY CYCLE

Duty Cycle				
Configuration	TX ON (ms)	TX ALL (ms)	Duty Cycle (%)	Duty Factor(dB)
802.11a	100.0000	100.0000	--	0.00
802.11n HT20	100.0000	100.0000	--	0.00
802.11n HT40	100.0000	100.0000	--	0.00
802.11ac VHT80	100.0000	100.0000	--	0.00



4. TEST RESULT

4.1 AC POWER LINE CONDUCTED EMISSION

4.1.1 Test Limit

According to §15.207(a) and RSS-GEN section 8.8,

Frequency Range (MHz)	Limits(dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

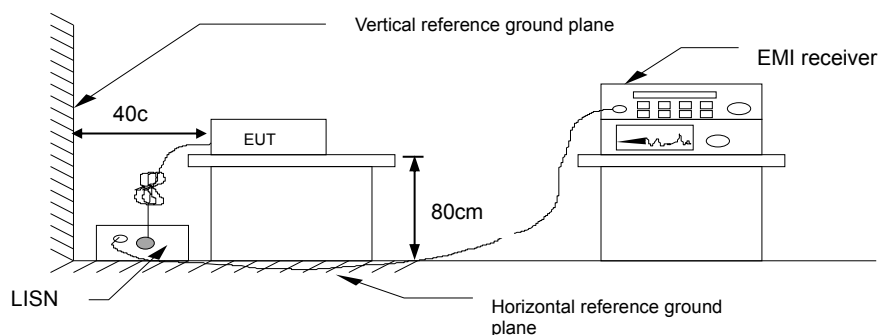
* Decreases with the logarithm of the frequency.

4.1.2 Test Procedure

Test method Refer as ANSI 63.10:2013 clause 6.2,

1. The EUT was placed on a non-conducted table, which is 0.8m above horizontal ground plane and 0.4m above vertical ground plane.
2. EUT connected to the line impedance stabilization network (LISN)
3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Recorded Line for Neutral and Line.

4.1.3 Test Setup

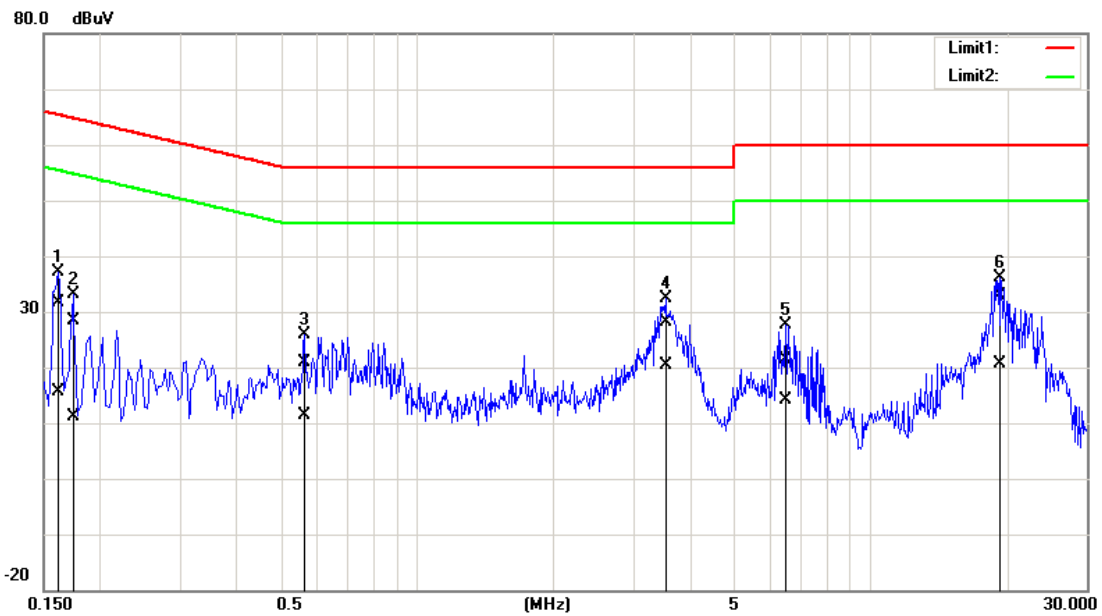


4.1.4 Test Result

Pass.

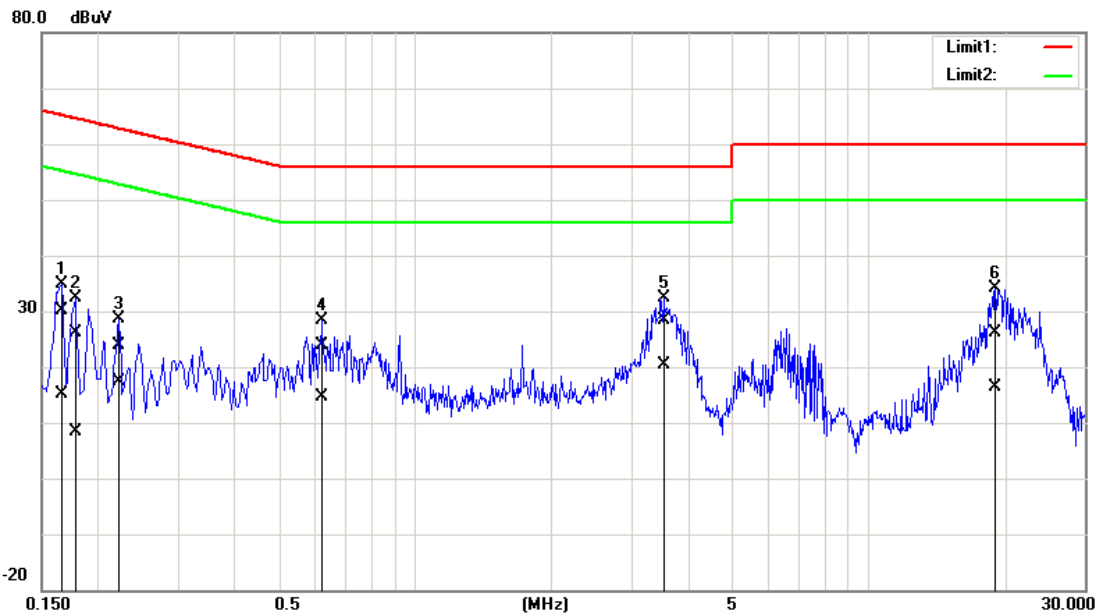
Test Data

Test Mode	Mode 1	Temp/Hum	24(°C) / 50%RH
Test Voltage	120Vac / 60Hz	Test Date	June 22, 2017
Phase	Line	Test Engineer	Stemmi Guo



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.1620	31.54	15.68	-0.02	31.52	15.66	65.36	55.36	-33.84	-39.70	Pass
0.1740	28.35	11.10	-0.02	28.33	11.08	64.77	54.77	-36.44	-43.69	Pass
0.5660	21.00	11.48	-0.05	20.95	11.43	56.00	46.00	-35.05	-34.57	Pass
3.5460	28.26	20.32	-0.05	28.21	20.27	56.00	46.00	-27.79	-25.73	Pass
6.5220	21.39	14.08	0.06	21.45	14.14	60.00	50.00	-38.55	-35.86	Pass
19.3540	33.25	20.91	-0.31	32.94	20.60	60.00	50.00	-27.06	-29.40	Pass

Test Mode	Mode 1	Temp/Hum	24(°C)/ 50%RH
Test Voltage	120Vac / 60Hz	Test Date	June 22, 2017
Phase	Neutral	Test Engineer	Stemmi Guo



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.1660	30.16	15.28	-0.09	30.07	15.19	65.16	55.16	-35.09	-39.97	Pass
0.1780	26.33	8.60	-0.10	26.23	8.50	64.58	54.58	-38.35	-46.08	Pass
0.2220	24.09	17.47	-0.10	23.99	17.37	62.74	52.74	-38.75	-35.37	Pass
0.6260	23.95	14.66	-0.13	23.82	14.53	56.00	46.00	-32.18	-31.47	Pass
3.5460	28.55	20.63	-0.13	28.42	20.50	56.00	46.00	-27.58	-25.50	Pass
19.0980	26.52	16.62	-0.33	26.19	16.29	60.00	50.00	-33.81	-33.71	Pass

4.2 26DB BANDWIDTH, 6DB BANDWIDTH AND OCCUPIED BANDWIDTH(99%)

4.2.1 Test Limit

26 dB Bandwidth : For reporting purposes only.

6 dB Bandwidth : Least 500kHz.

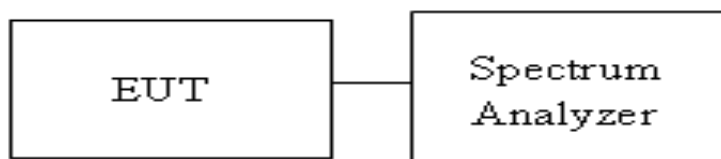
Occupied Bandwidth(99%) : For reporting purposes only.

4.2.2 Test Procedure

Test method Refer as KDB 789033 D02 v01r03 Section C, D, and ANSI 63.10:2013 clause 6.9.2,

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. UNII-1, UNII-2a and UNII-2c,
 - (1) BW=20MHz : SA set RBW = 300kHz, VBW = 1MHz and Detector = Peak, to measurement 26 dB Bandwidth and 99% Bandwidth
 - (2) BW=40MHz : SA set RBW = 1MHz, VBW = 3MHz and Detector = Peak, to measurement 26 dB Bandwidth and 99% Bandwidth
 - (3) BW=80MHz : SA set RBW = 1MHz, VBW = 3MHz and Detector = Peak, to measurement 26 dB Bandwidth and 99% Bandwidth
4. UNII-3, SA set RBW = 100kHz, VBW = 300kHz and Detector = Peak, to measurement 26 dB Bandwidth and 99% Bandwidth
5. Measure and record the result of 6 dB Bandwidth and 99% Bandwidth. in the test report.

4.2.3 Test Setup



4.2.4 Test Result

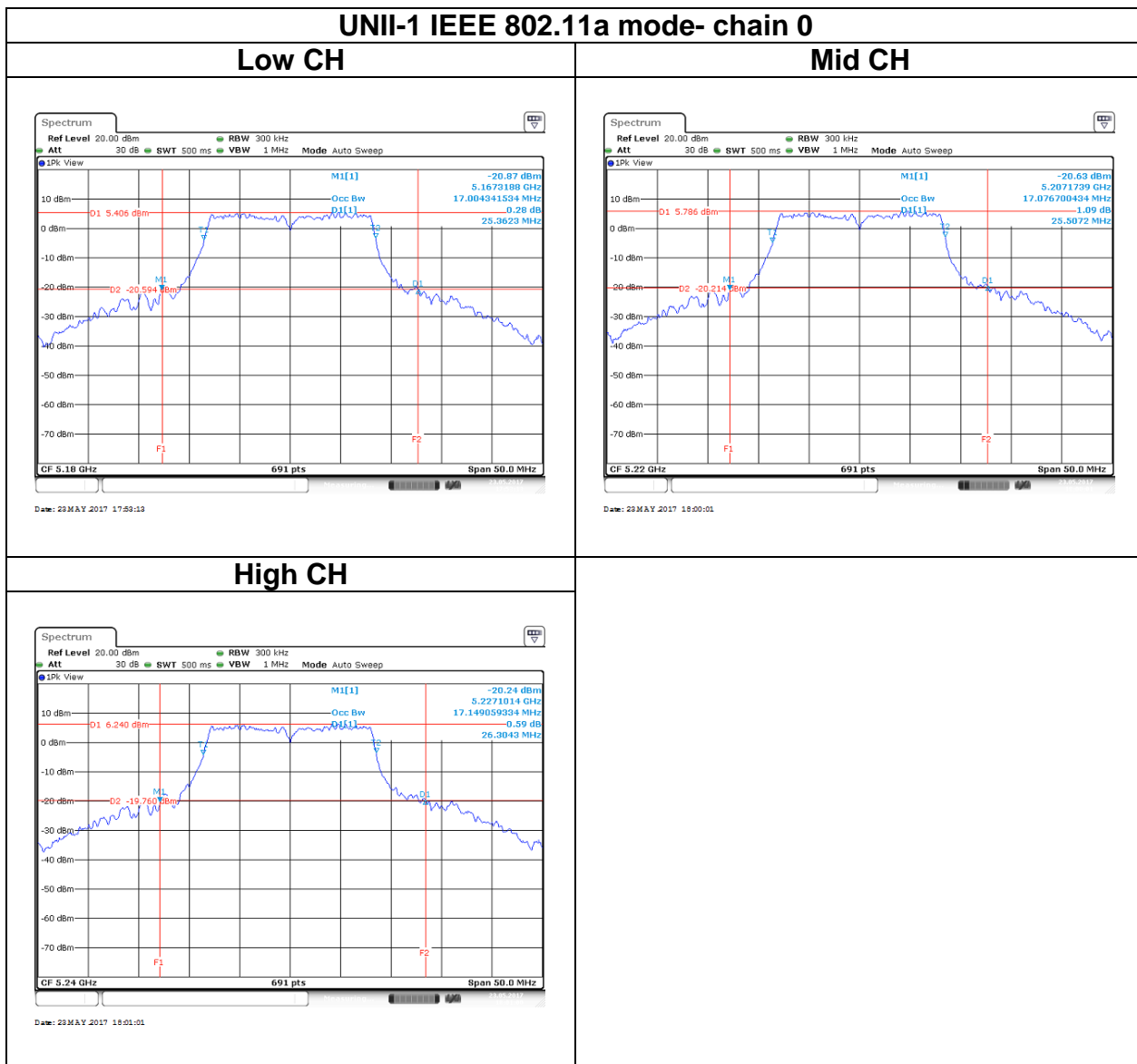
UNII-1 5150-5250 MHz					
Test mode: IEEE 802.11a mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5180	17.0043	-	25.3623	-
Mid	5220	17.0760	-	25.5072	-
High	5240	17.1490	-	26.3043	-
Test mode: IEEE 802.11n HT20 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5180	18.0173	-	22.4638	-
Mid	5220	18.0897	-	23.6957	-
High	5240	18.0897	-	23.6957	-
Test mode: IEEE 802.11n HT40 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5190	37.3950	-	45.7970	-
High	5230	37.3950	-	45.9130	-
Test mode: IEEE 802.11ac VHT20 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5180	17.9450	-	22.3188	-
Mid	5220	17.9450	-	22.1739	-
High	5240	17.9450	-	22.1739	-
Test mode: IEEE 802.11ac VHT40 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5190	37.3950	-	45.565	-
High	5230	37.3950	-	45.797	-
Test mode: IEEE 802.11ac VHT80 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Mid	5210	75.2532	--	83.2460	--

UNII-2a 5250-5350 MHz					
Test mode: IEEE 802.11a mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5260	17.2214	-	30.7971	-
Mid	5280	17.2937	-	31.1594	-
High	5320	17.0043	-	25.1449	-
Test mode: IEEE 802.11n HT20 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5260	18.1620	-	28.3333	-
Mid	5280	18.2344	-	28.5507	-
High	5320	18.0897	-	22.2464	-
Test mode: IEEE 802.11n HT40 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5270	37.3950	-	45.7970	-
High	5310	37.3950	-	46.0290	-
Test mode: IEEE 802.11n VHT20 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5260	17.9450	-	22.1739	-
Mid	5280	17.9450	-	22.1739	-
High	5320	17.9450	-	22.1739	-
Test mode: IEEE 802.11n VHT40 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5270	37.3950	-	45.681	-
High	5310	37.3950	-	45.797	-
Test mode: IEEE 802.11ac VHT80 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Mid	5290	75.2532	--	83.2460	--

UNII-2c 5475-5725 MHz					
Test mode: IEEE 802.11a mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5500	17.8002	--	32.4638	--
Mid	5580	21.2735	--	35.5797	--
High	5700	16.9319	--	21.8116	--
Test mode: IEEE 802.11n HT20 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5500	18.3068	--	29.7826	--
Mid	5580	18.2344	--	27.0290	--
High	5700	17.9450	--	22.1739	--
Test mode: IEEE 802.11n HT40 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5510	37.3950	--	45.6810	--
Mid	5550	37.5108	--	50.0870	--
High	5670	37.6266	--	50.2030	--
Test mode: IEEE 802.11ac VHT20 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5500	17.9450	--	22.1014	--
Mid	5580	17.9450	--	21.9565	--
High	5700	17.9450	--	22.0290	--
Test mode: IEEE 802.11ac VHT40 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Low	5510	37.3950	--	45.681	--
Mid	5550	37.5108	--	49.855	--
High	5670	37.6266	--	50.435	--
Test mode: IEEE 802.11ac VHT80 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
Mid	5530	75.2532	--	83.2460	--

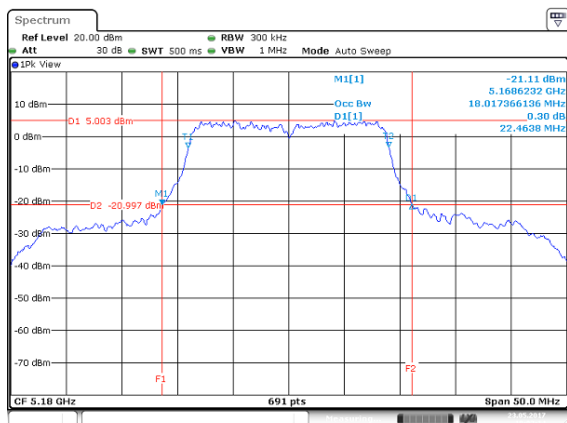
UNII-3 5725-5825MHz					
Test mode: IEEE 802.11a mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)
Low	5745	16.6425	--	16.5942	--
Mid	5785	16.6425	--	16.5942	--
High	5825	16.7872	--	16.5942	--
Test mode: IEEE 802.11n HT20 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)
Low	5745	17.7279	--	17.8261	--
Mid	5785	17.8002	--	17.7537	--
High	5825	17.8726	--	17.7536	--
Test mode: IEEE 802.11n HT40 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)
Low	5755	36.2373	--	36.6380	--
High	5795	36.3531	--	36.6380	--
Test mode: IEEE 802.11ac VHT20 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)
Low	5745	17.6555	--	17.8261	--
Mid	5785	17.6555	--	17.7536	--
High	5825	17.6555	--	17.7536	--
Test mode: IEEE 802.11ac VHT40 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)
Low	5755	36.2373	--	36.638	--
High	5795	36.2373	--	36.754	--
Test mode: IEEE 802.11ac VHT80 mode					
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)
Mid	5775	75.7163	--	76.0580	--

Test Data

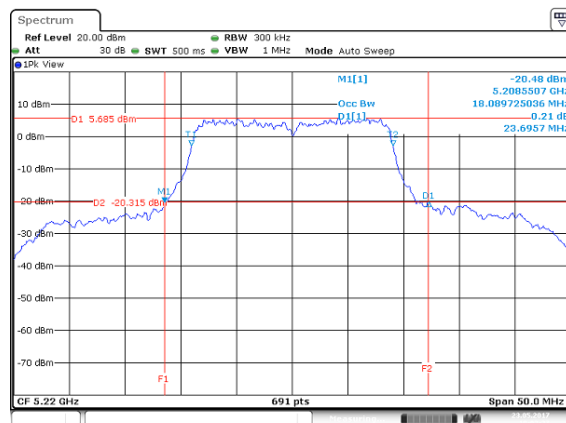


UNII-1 IEEE 802.11n HT20 mode- chain 0

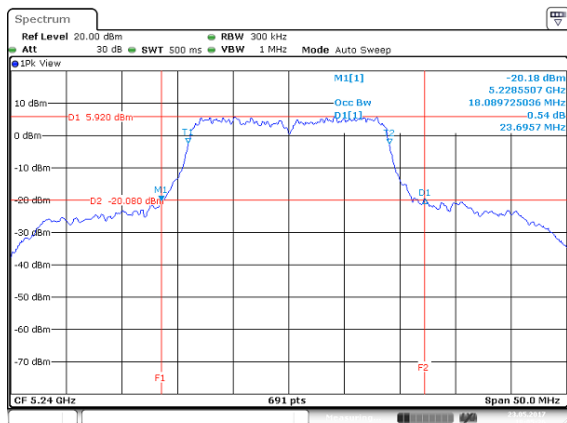
Low CH

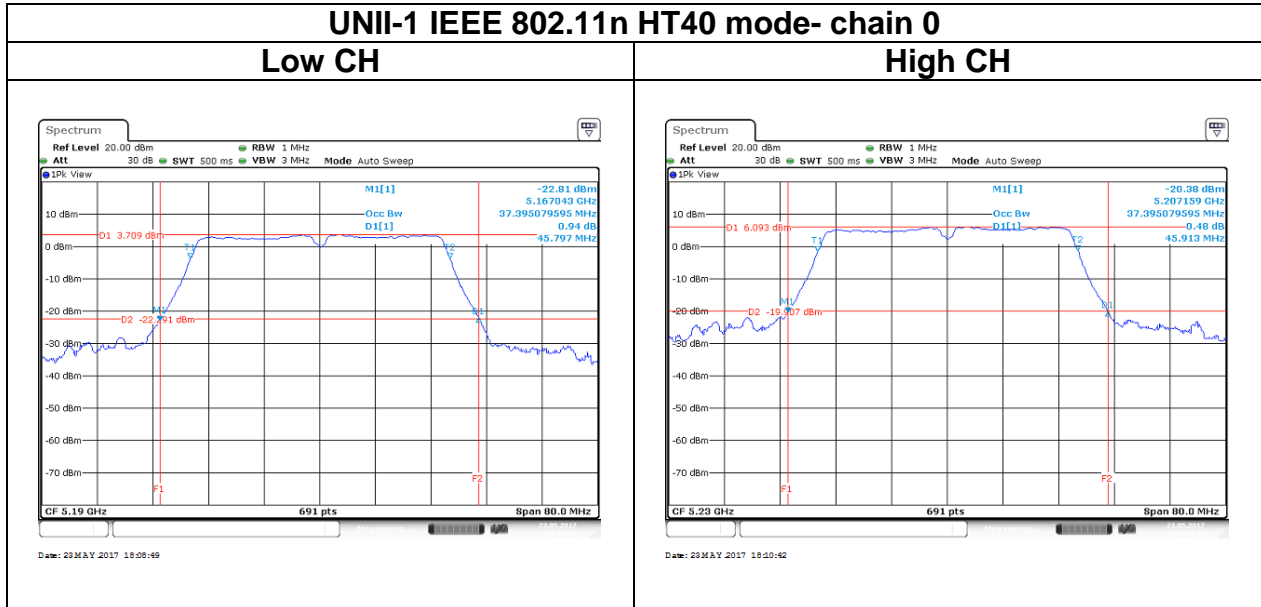


Mid CH



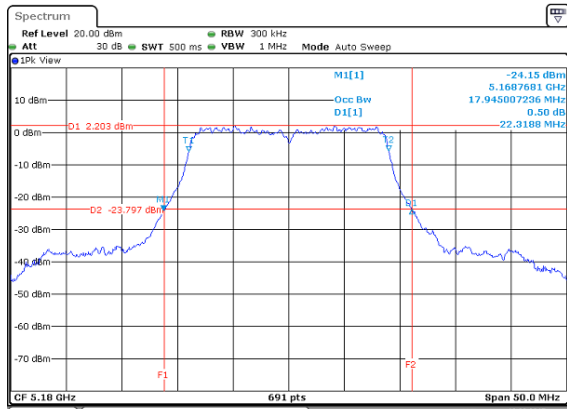
High CH





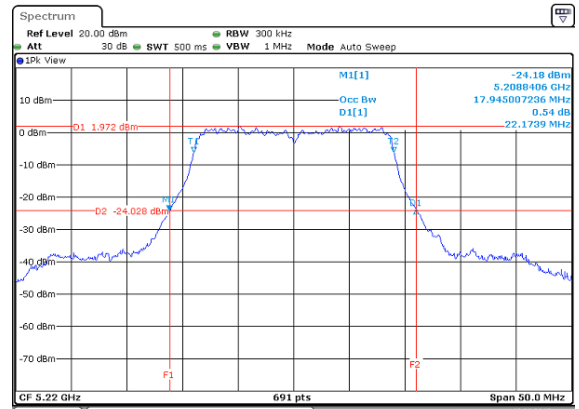
UNII-1 IEEE 802.11n VHT20 mode- chain 0

Low CH



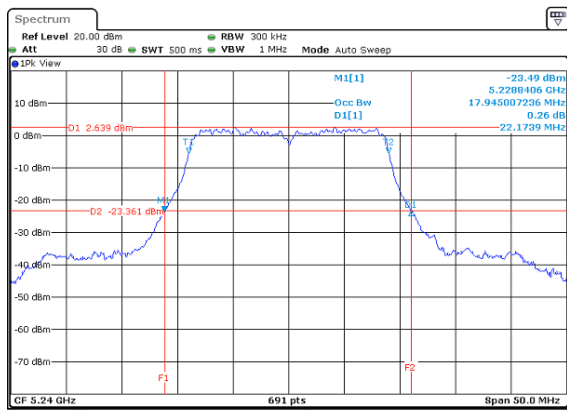
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Mid CH

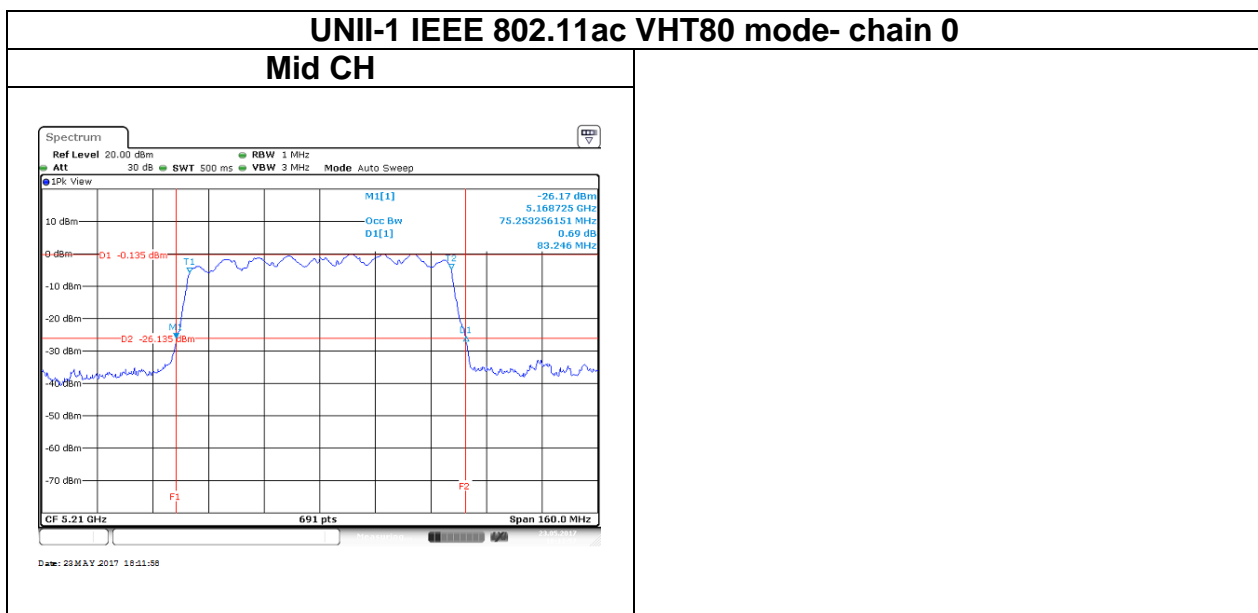
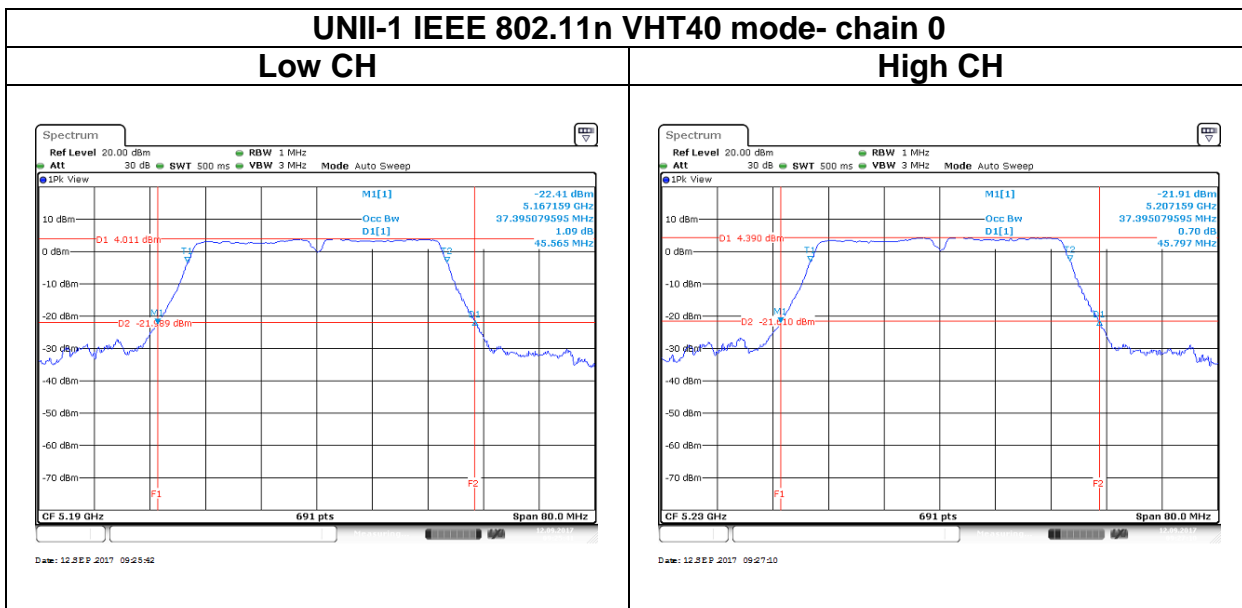


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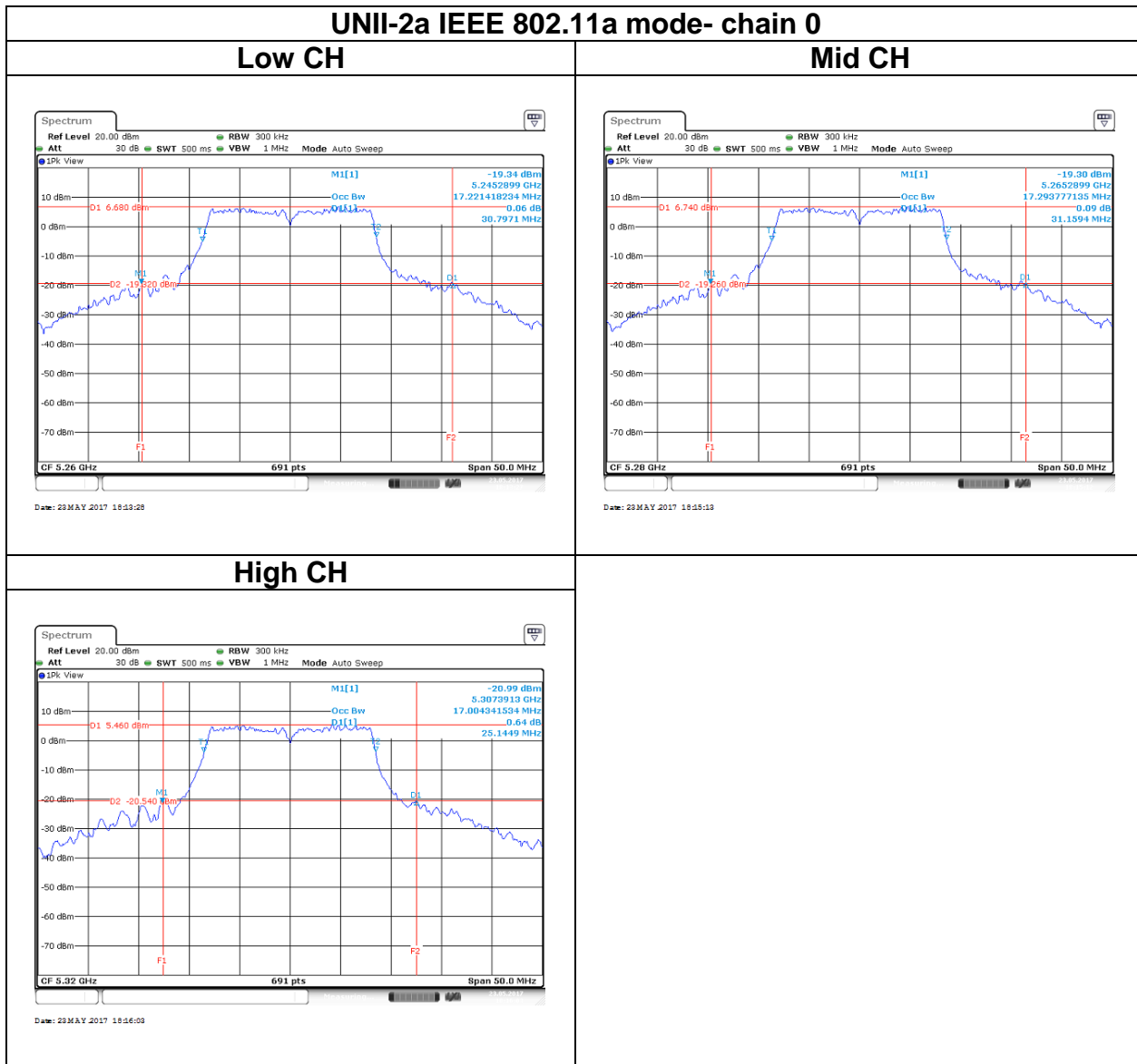
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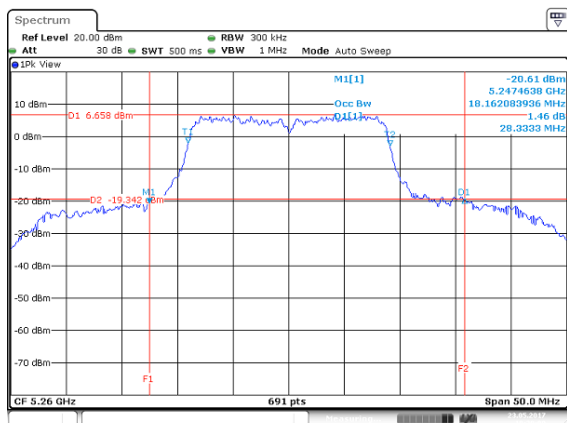


Test Data



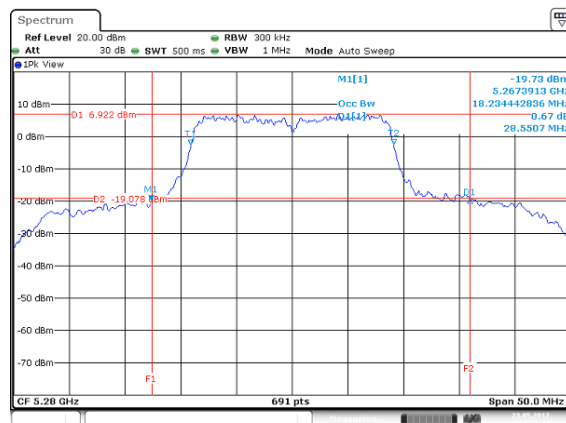
UNII-2a IEEE 802.11n HT20 mode- chain 0

Low CH



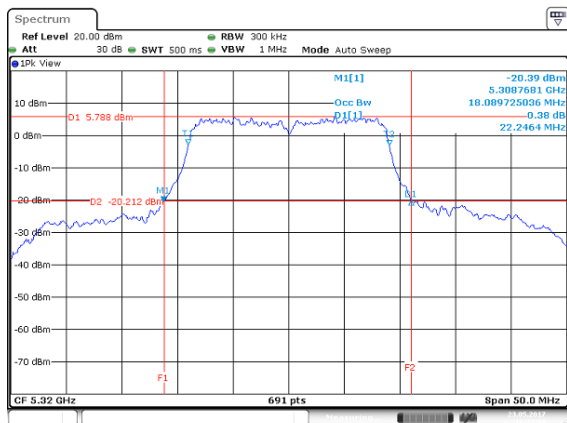
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Mid CH

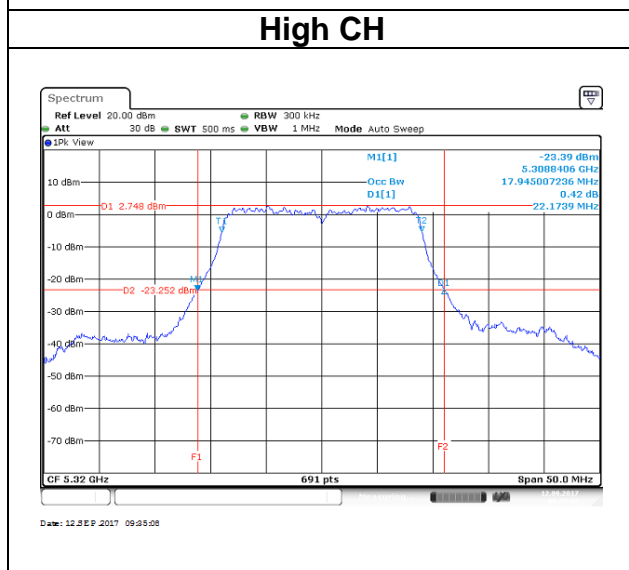
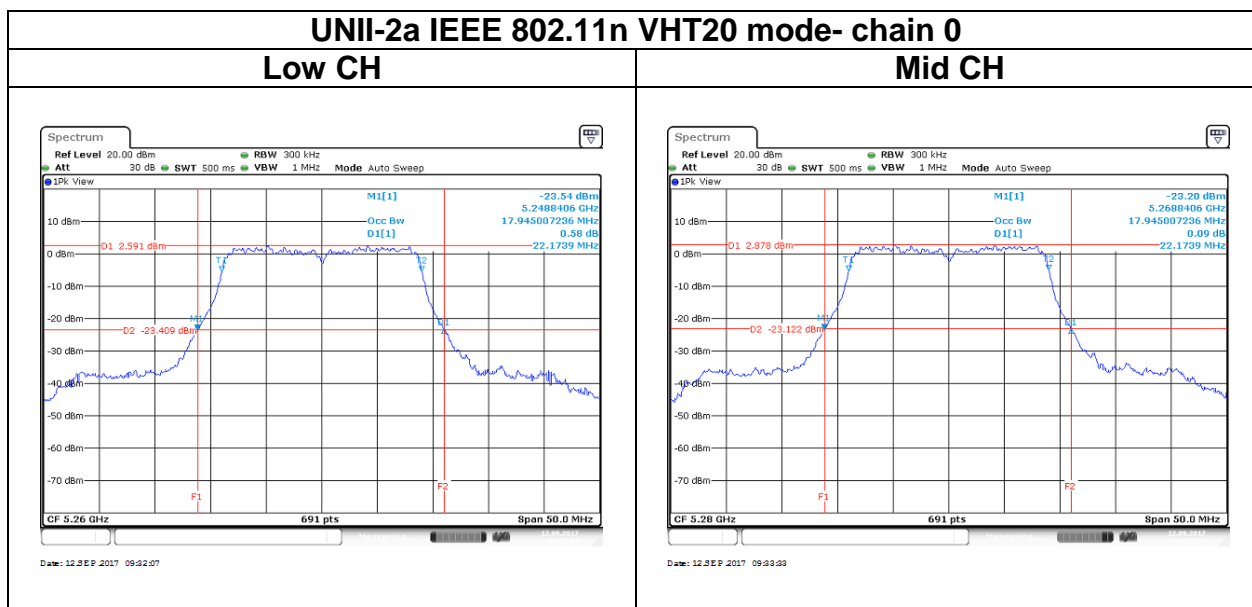
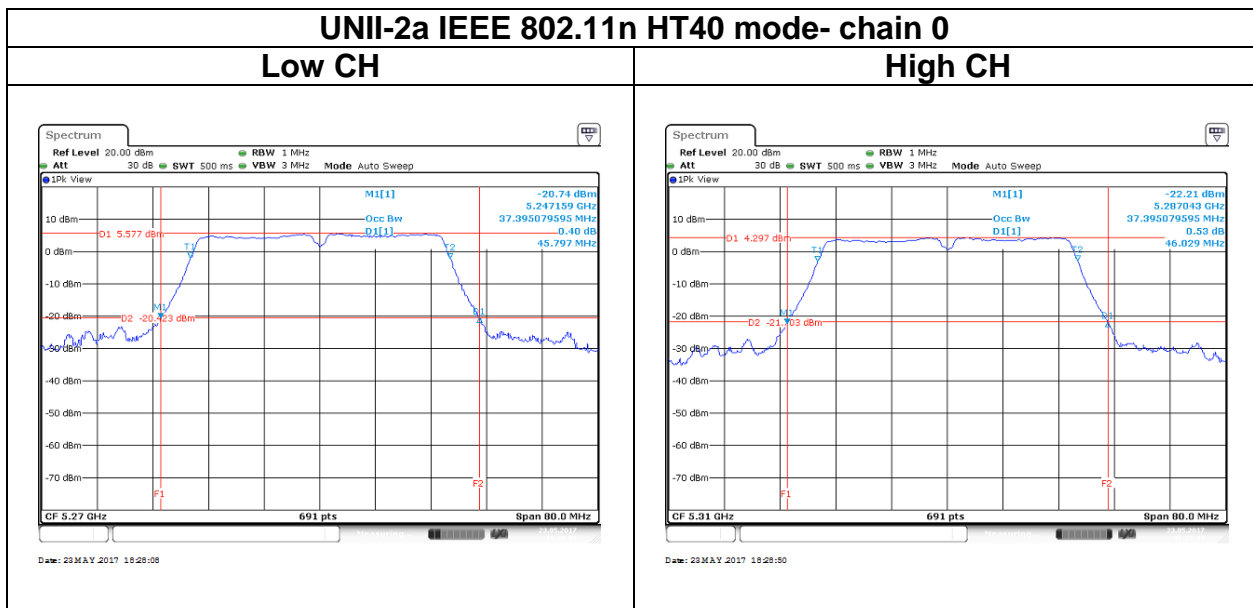


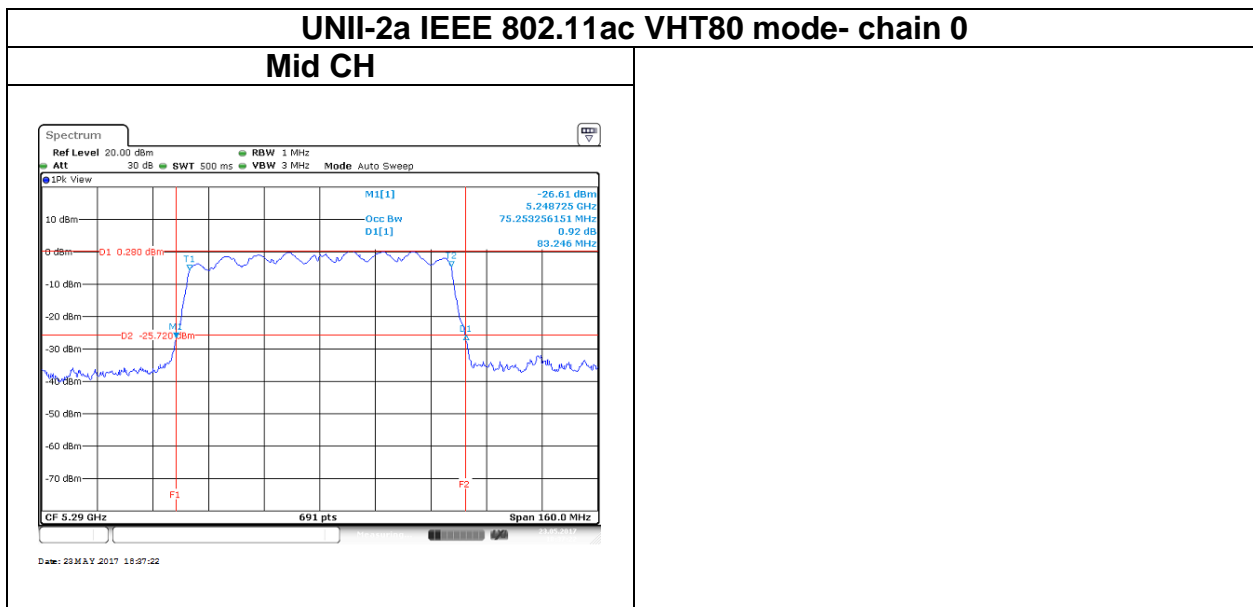
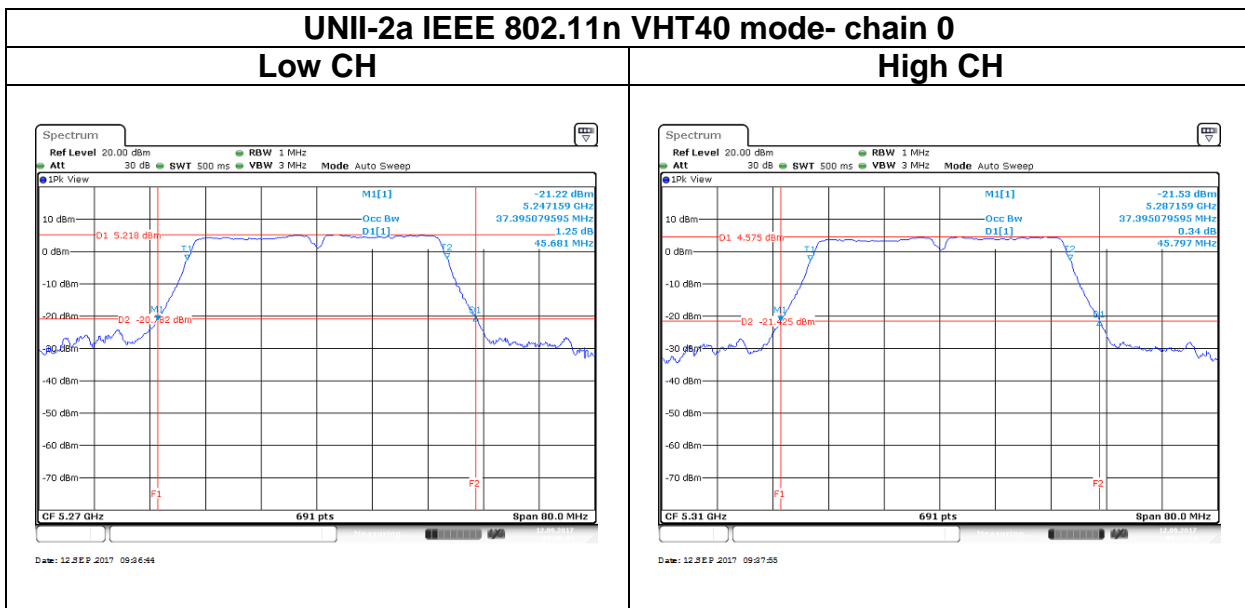
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High CH

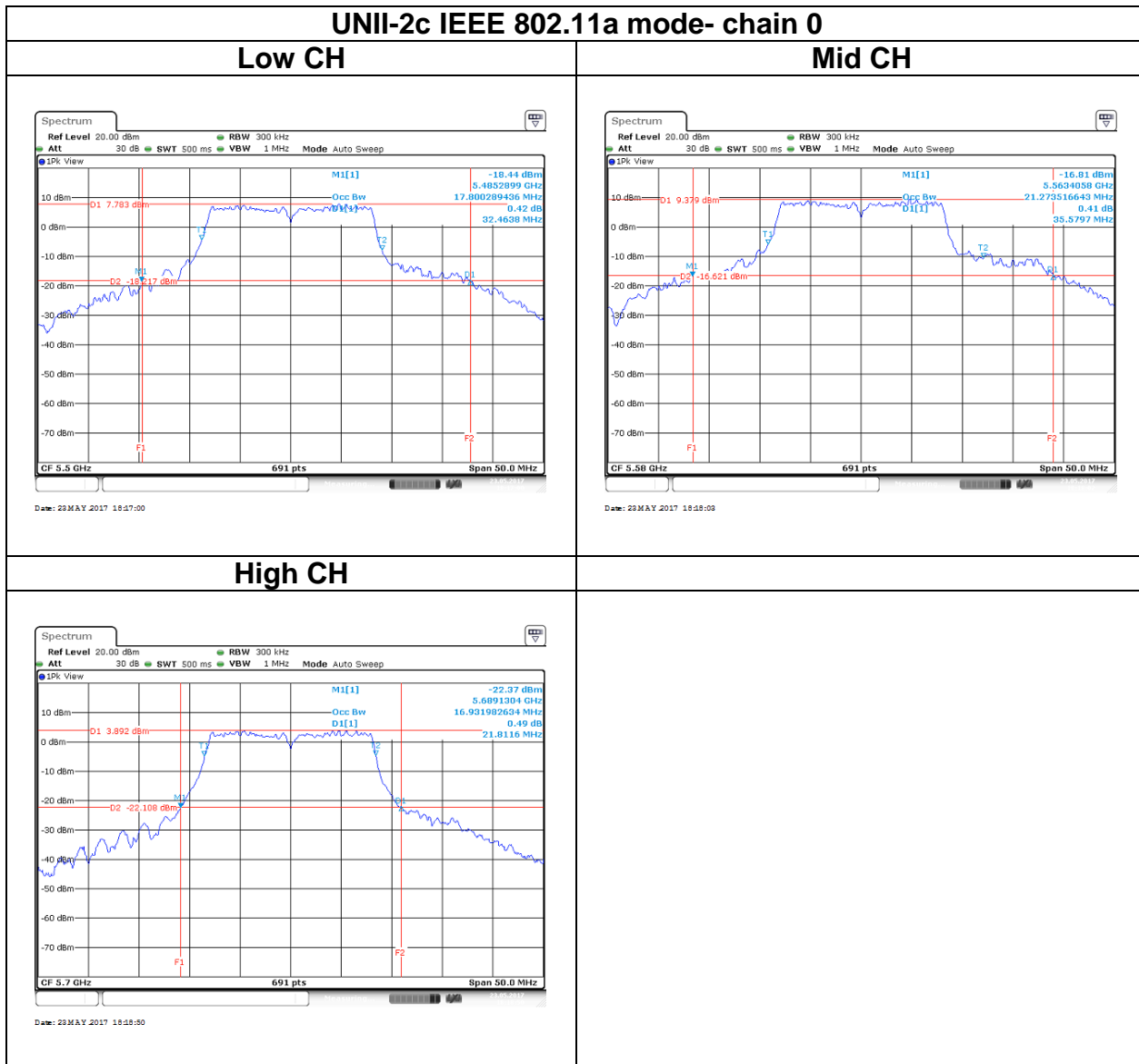


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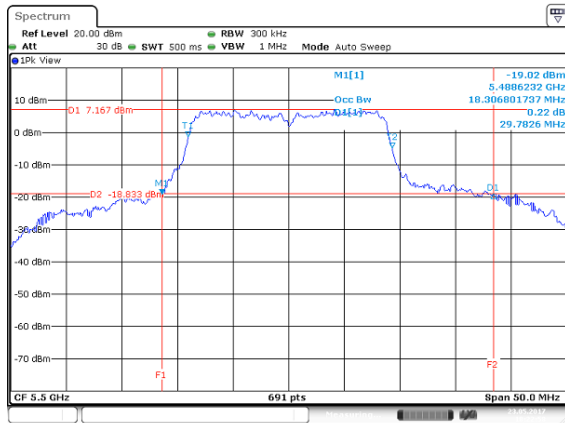


Test Data

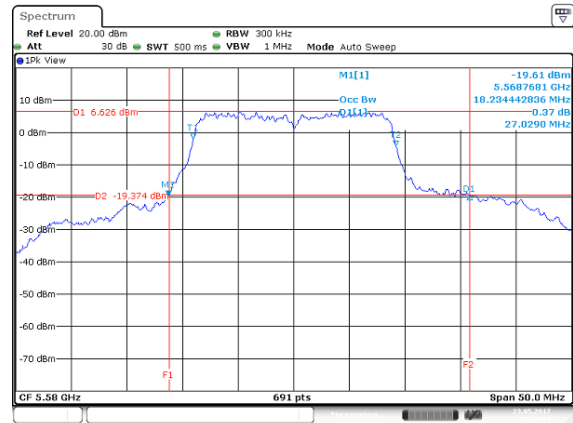


UNII-2c IEEE 802.11n HT20 mode- chain 0

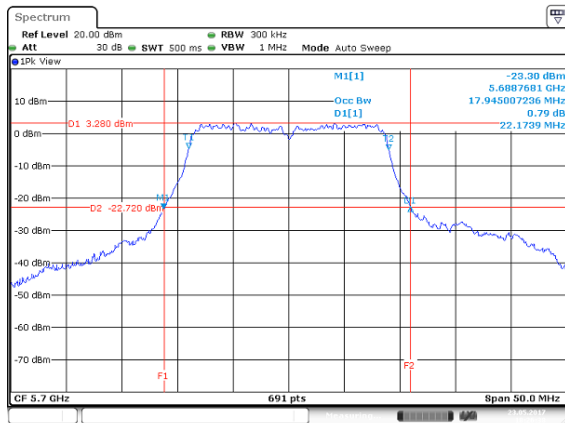
Low CH



Mid CH

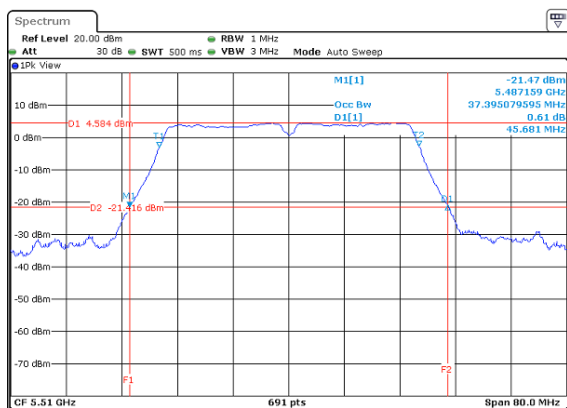


High CH



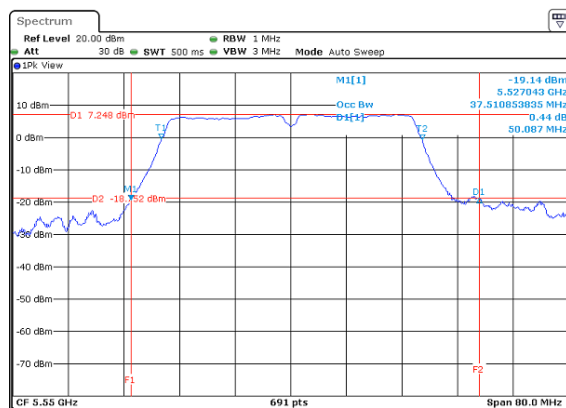
UNII-2c IEEE 802.11n HT40 mode- chain 0

Low CH



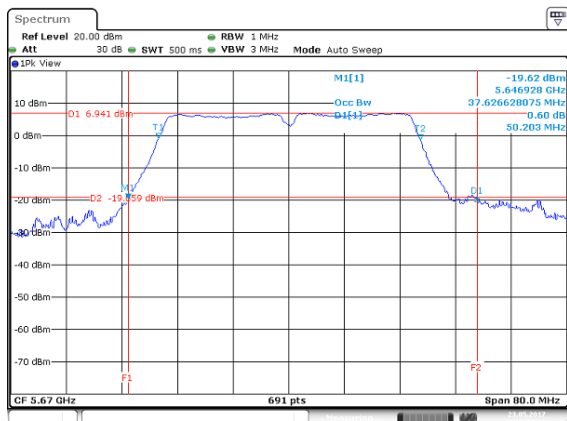
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Mid CH

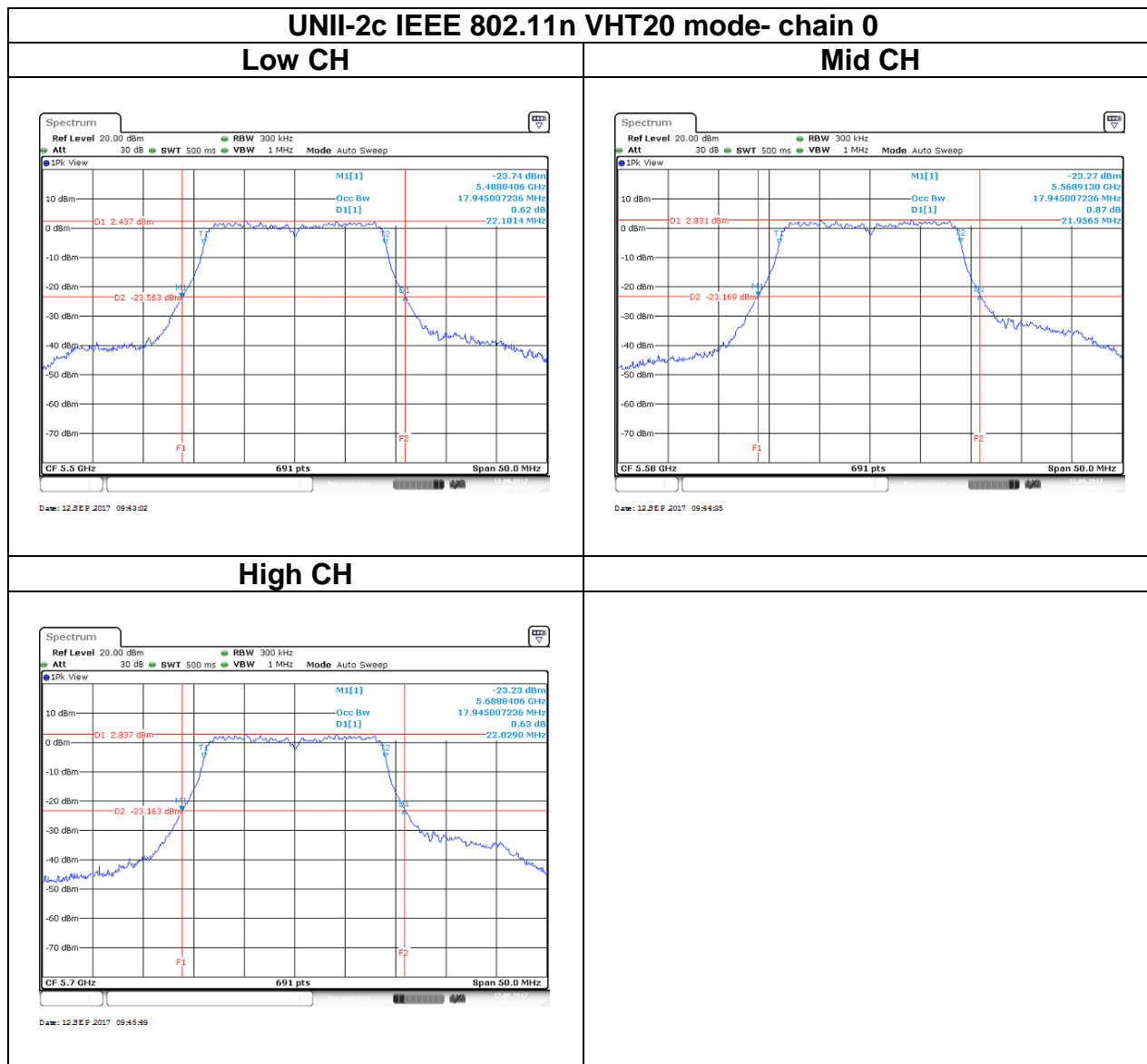


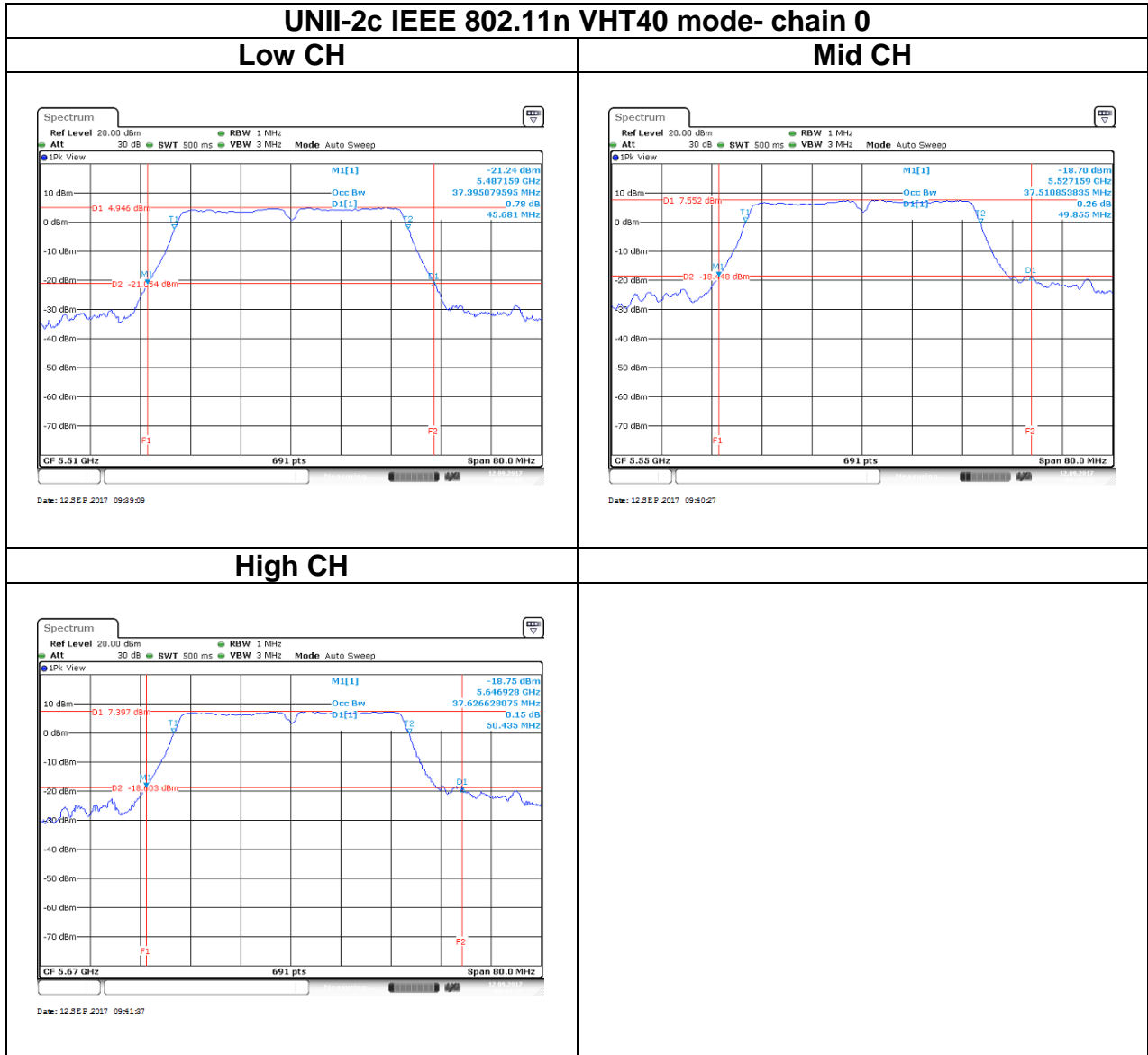
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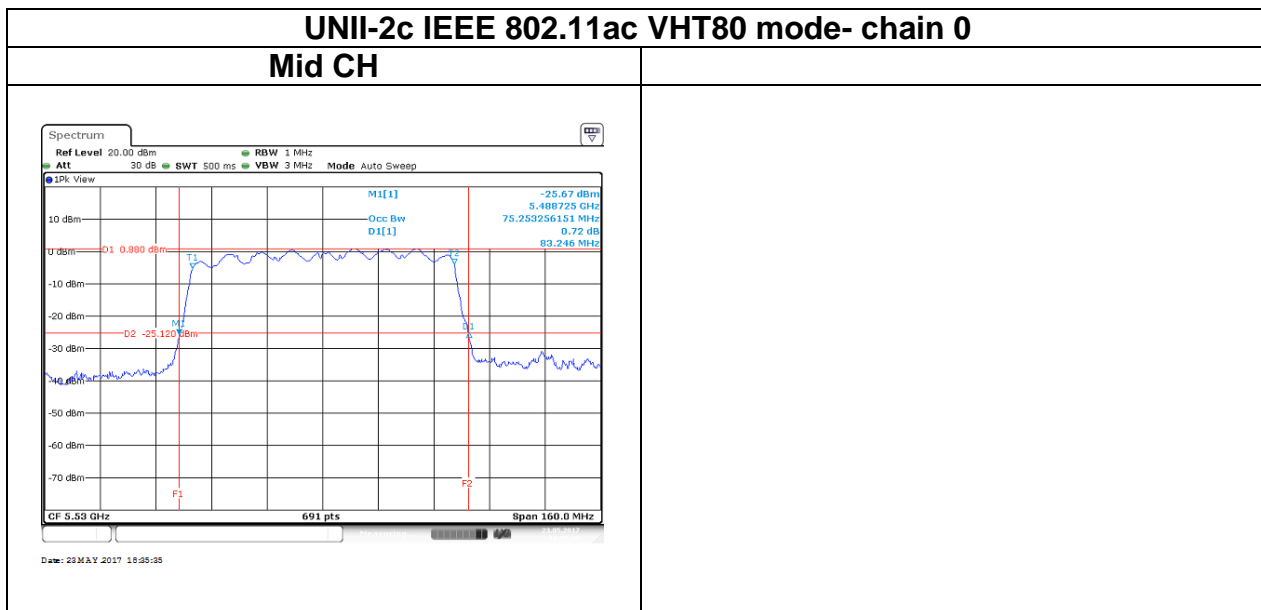
High CH



Date: 23 MAY 2017 18:23:13

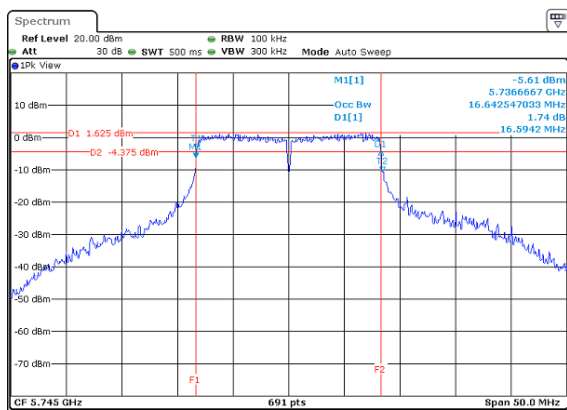






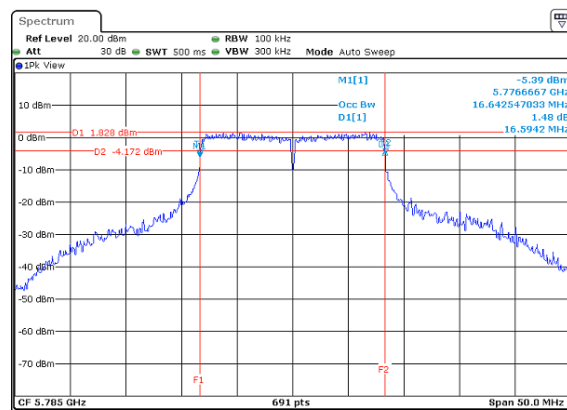
UNII-3 IEEE 802.11a mode- chain 0

Low CH



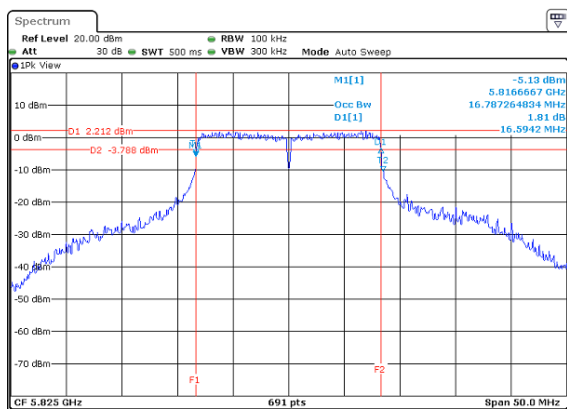
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Mid CH

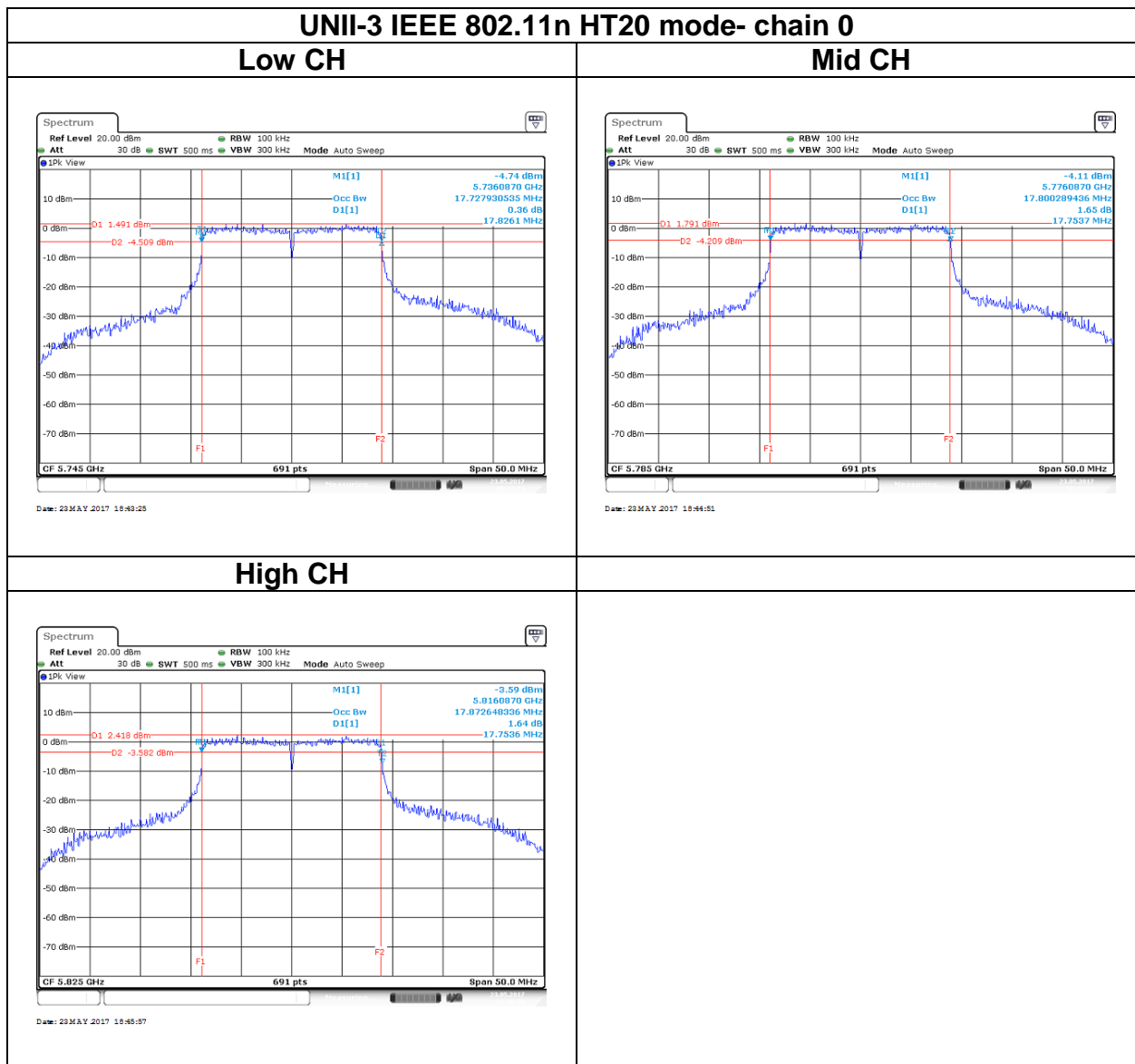


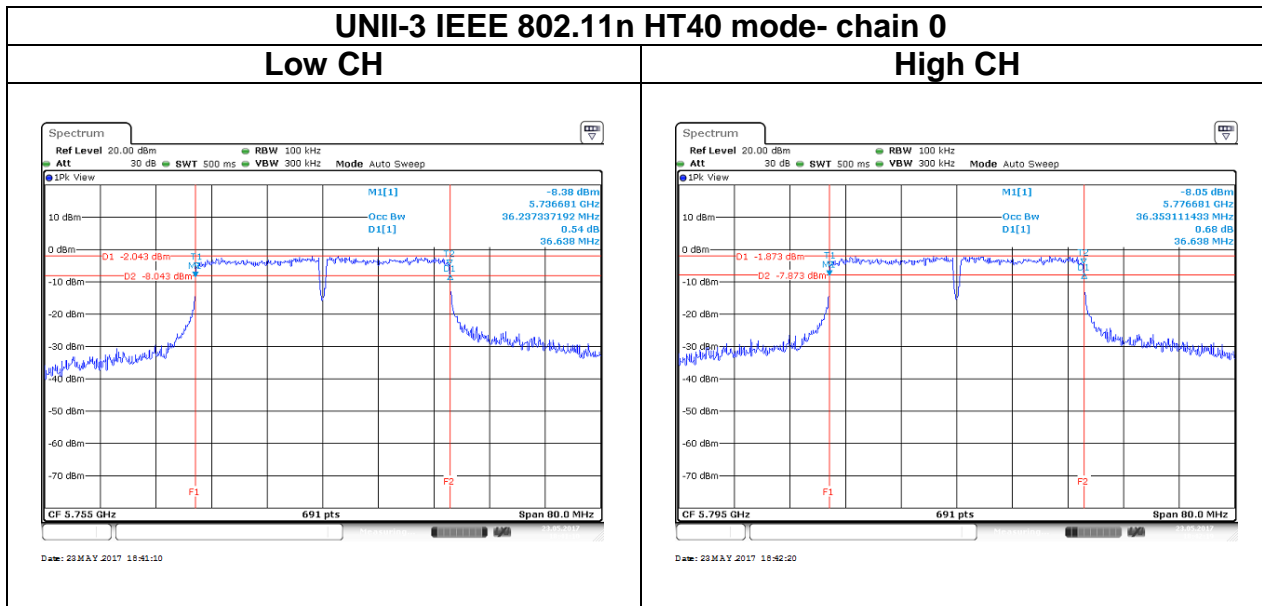
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High CH



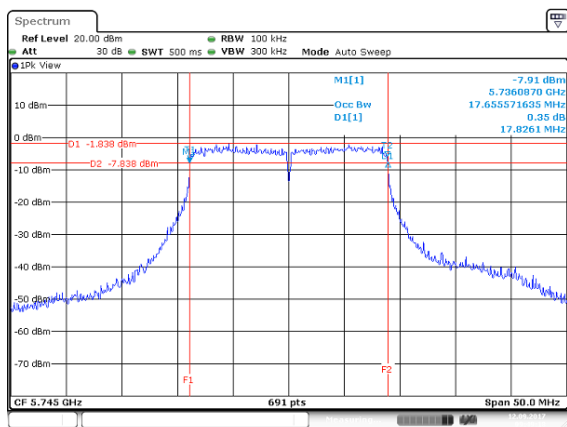
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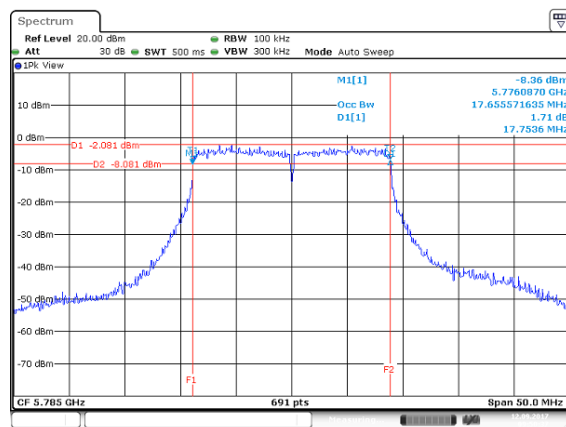
UNII-3 IEEE 802.11n VHT20 mode- chain 0

Low CH



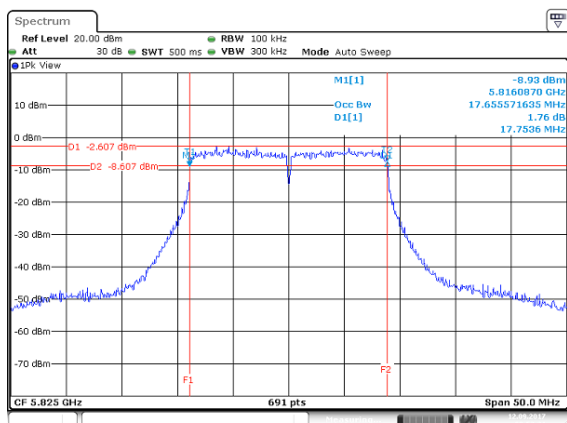
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Mid CH

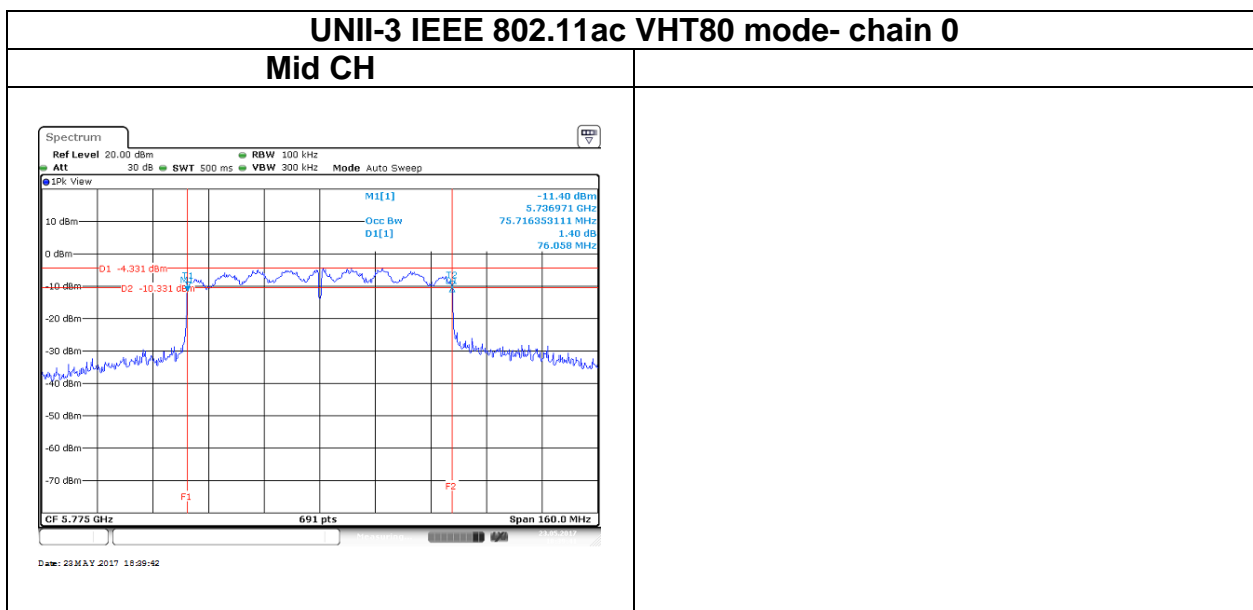
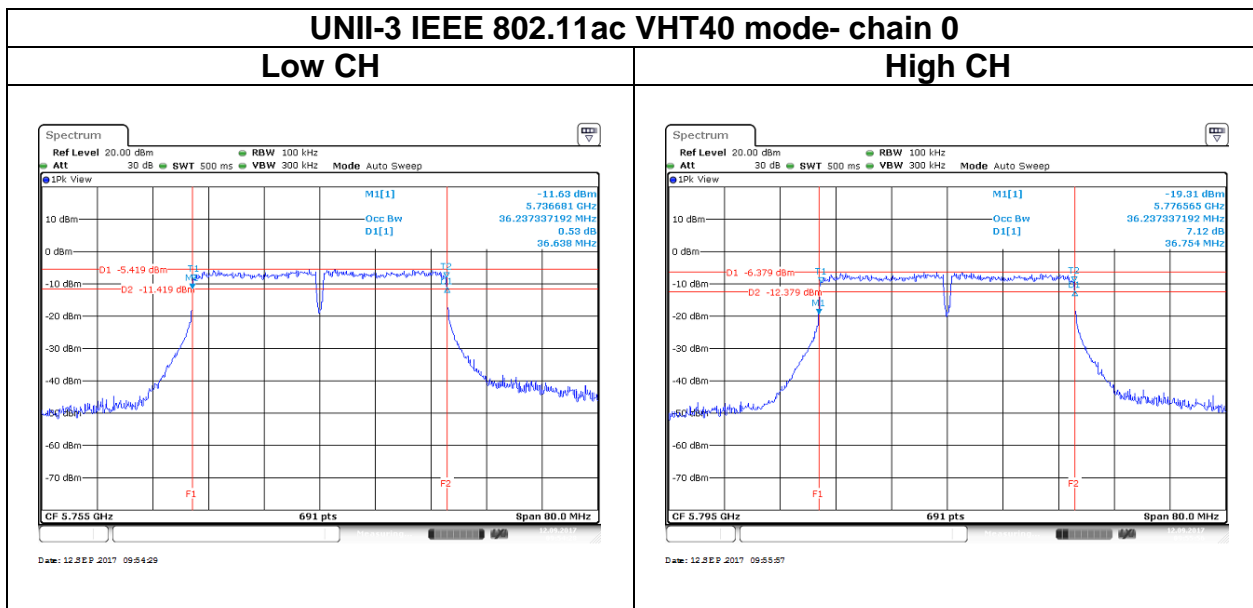


Date: 12 SEP 2017 09:50:28

High CH



Date: 12 SEP 2017 09:52:22



4.3 OUTPUT POWER MEASUREMENT

4.3.1 Test Limit

According to §15.407 (a)(1), 15.407(a)(2) and 15.407(a)(3) and RSS-247 section 6.2.1(1), section 6.2.2(1), section 6.2.3(1) and section 6.2.4(1)

UNII-1 :

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW(24 dBm) and The maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz ,provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

UNII-2a and 2c:

the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. and The maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \text{ Log}_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

UNII-3:

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

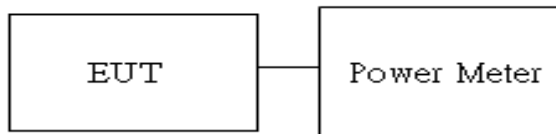
UNII-1 Limit	<input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 24dBm (EIRP : 23dBm) <input type="checkbox"/> Antenna with DG greater than 6 dBi : [Limit = $30 - (DG - 6)$]
UNII-2a/2c Limit	<input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 24dBm (EIRP : 30dBm) <input type="checkbox"/> Antenna with DG greater than 6 dBi : [Limit = $30 - (DG - 6)$]
UNII-3 Limit	<input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 30dBm <input type="checkbox"/> Antenna with DG greater than 6 dBi : [Limit = $30 - (DG - 6)$]

4.3.2 Test Procedure

Test method Refer as KDB 789033 D02 v01r03, Section E.3.b.

1. The EUT RF output connected to the power meter by RF cable.
2. Setting maximum power transmit of EUT.
3. The path loss was compensated to the results for each measurement.
4. Measure and record the result of Average output power. in the test report.

4.3.3 Test Setup



4.3.4 Test Result

Conducted output power :

UNII-1													
Config	CH	Freq. (MHz)	Power Set		AV Power(dBm)		AV Total Power (dBm)	ERP AV Total Power (dBm)	AV Total Power (W)	ERP AV Total Power (W)	DG (dBi)	Limit (dBm)	ERP Limit (dBm)
			chain0	chain1	chain0	chain1							
IEEE 802.11a Data rate: 6Mbps	36	5180	59.00	-	14.29	-	14.29	19.48	0.0269	0.0887	5.19	24	23
	44	5220	57.00	-	14.98	-	14.98	20.17	0.0315	0.1039			
	48	5240	56.00	-	14.89	-	14.89	20.08	0.0308	0.1018			
IEEE 802.11n HT20 Data rate: MCS8	36	5180	56.00	-	13.95	-	13.95	19.14	0.0248	0.0820			
	44	5220	54.00	-	13.72	-	13.72	18.91	0.0236	0.0777			
	48	5240	54.00	-	13.84	-	13.84	19.03	0.0242	0.0799			
IEEE 802.11n HT40 Data rate: MCS8	38	5190	55.00	-	12.16	-	12.16	17.35	0.0164	0.0543			
	46	5230	54.00	-	13.77	-	13.77	18.96	0.0238	0.0786			
IEEE 802.11ac VHT20 Data rate: MCS8	36	5180	56.00	-	12.08	-	12.08	11.55	0.0161	0.0143			
	44	5220	54.00	-	12.25	-	12.25	11.72	0.0168	0.0149			
	48	5240	54.00	-	12.68	-	12.68	12.15	0.0185	0.0164			
IEEE 802.11ac VHT40 Data rate: MCS8	38	5190	55.00	-	11.39	-	11.39	10.86	0.0138	0.0122			
	46	5230	54.00	-	11.86	-	11.86	11.33	0.0153	0.0136			
IEEE 802.11ac VHT80 Data rate: MCS8	42	5210	50.00	-	9.75	-	9.75	14.94	0.0094	0.0312			

UNII-2a													
Config	CH	Freq. (MHz)	Power Set		AV Power(dBm)		AV Total Power (dBm)	ERP AV Total Power (dBm)	AV Total Power (dBm)	ERP AV Total Power (W)	DG (dBi)	Limit (dBm)	ERP Limit (dBm)
			chain0	chain1	chain0	chain1							
IEEE 802.11a Data rate: 6Mbps	52	5260	55	-	14.95	-	14.95	20.14	0.0313	0.1032	5.19	24	30
	56	5280	55	-	14.96	-	14.96	20.15	0.0313	0.1034			
	64	5320	53	-	14.87	-	14.87	20.06	0.0307	0.1013			
IEEE 802.11n HT20 Data rate: MCS8	52	5260	53	-	13.73	-	13.73	18.92	0.0236	0.0779			
	56	5280	53	-	13.85	-	13.85	19.04	0.0243	0.0801			
	64	5320	50	-	13.52	-	13.52	18.71	0.0225	0.0742			
IEEE 802.11n HT40 Data rate: MCS8	54	5270	54	-	13.92	-	13.92	19.11	0.0247	0.0814			
	62	5310	50	-	12.83	-	12.83	18.02	0.0192	0.0633			
IEEE 802.11ac VHT20 Data rate: MCS8	52	5260	53	-	12.56	-	12.56	12.03	0.0180	0.0160			
	56	5280	53	-	13.07	-	13.07	12.54	0.0203	0.0179			
	64	5320	50	-	13.18	-	13.18	12.65	0.0208	0.0184			
IEEE 802.11ac VHT40 Data rate: MCS8	54	5270	54	-	12.34	-	12.34	11.81	0.0171	0.0152			
	62	5310	50	-	12.15	-	12.15	11.62	0.0164	0.0145			
IEEE 802.11ac VHT80 Data rate: MCS8	58	5290	46	-	9.87	-	9.87	15.06	0.0097	0.0320			

UNII-2c													
Config	CH	Freq. (MHz)	Power Set		AV Power(dBm)		AV Total Power (dBm)	ERP AV Total Power (dBm)	AV Total Power (W)	ERP AV Total Power (W)	DG (dBi)	Limit (dBm)	ERP Limit (dBm)
			chain0	chain1	chain0	chain1							
IEEE 802.11a Data rate: 6Mbps	100	5500	52	-	14.98	-	14.98	20.17	0.0315	0.1039	5.19	24	24
	116	5580	49	-	14.96	-	14.96	20.15	0.0313	0.1034			
	140	5700	45	-	15.00	-	15.00	20.19	0.0316	0.1044			
IEEE 802.11n HT20 Data rate: MCS8	100	5500	50	-	13.98	-	13.98	19.17	0.0250	0.0825			
	116	5580	46	-	13.81	-	13.81	19.00	0.0240	0.0794			
	140	5700	42	-	13.75	-	13.75	18.94	0.0237	0.0783			
IEEE 802.11n HT40 Data rate: MCS8	102	5510	50	-	12.75	-	12.75	17.94	0.0188	0.0622			
	110	5550	54	-	13.61	-	13.61	18.80	0.0230	0.0758			
	134	5670	48	-	11.46	-	11.46	16.65	0.0140	0.0462			
IEEE 802.11ac VHT20 Data rate: MCS8	100	5500	50	-	12.38	-	12.38	11.85	0.0173	0.0153			
	116	5580	46	-	12.63	-	12.63	12.10	0.0183	0.0162			
	140	5700	42	-	12.85	-	12.85	12.32	0.0193	0.0171			
IEEE 802.11ac VHT40 Data rate: MCS8	102	5510	50	-	11.93	-	11.93	11.40	0.0156	0.0138			
	110	5550	54	-	12.03	-	12.03	11.50	0.0160	0.0141			
	134	5670	48	-	11.12	-	11.12	10.59	0.0129	0.0115			
IEEE 802.11ac VHT80 Data rate: MCS8	106	5530	46	-	10.91	-	10.91	16.10	0.0123	0.0407			

UNII-3										
Config	CH	Freq. (MHz)	Power Set		AV Power(dBm)		AV Total Power (dBm)	AV Total Power (W)	DG (dBi)	Limit (dBm)
			chain0	chain1	chain0	chain1				
IEEE 802.11a Data rate: 6Mbps	149	5745	55	-	14.98	-	14.98	0.0315	5.19	30
	157	5785	57	-	15.00	-	15.00	0.0316		
	165	5825	53	-	14.95	-	14.95	0.0313		
IEEE 802.11n HT20 Data rate: MCS0	149	5745	52	-	13.94	-	13.94	0.0248		
	157	5785	51	-	13.85	-	13.85	0.0243		
	165	5825	50	-	13.87	-	13.87	0.0244		
IEEE 802.11n HT40 Data rate: MCS0	151	5755	53	-	13.93	-	13.93	0.0247		
	159	5795	51	-	13.72	-	13.72	0.0236		
IEEE 802.11ac VHT20 Data rate: MCS0	149	5745	52	-	12.50	-	12.50	0.0178		
	157	5785	51	-	12.18	-	12.18	0.0165		
	165	5825	50	-	11.88	-	11.88	0.0154		
IEEE 802.11ac VHT40 Data rate:	151	5755	53	-	12.00	-	12.00	0.0158		
	159	5795	51	-	11.27	-	11.27	0.0134		
IEEE 802.11ac VHT80 Data rate: MCS0	155	5775	49	-	11.92	-	11.92	0.0156		

4.4 POWER SPECTRAL DENSITY

4.4.1 Test Limit

According to §15.407 (a)(1), 15.407(a)(2) and 15.407(a)(3) and RSS-247 section 6.2.1(1), section 6.2.2(1), section 6.2.3(1) and section 6.2.4(1)

UNII-1 :

FCC: The maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

IC: The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

UNII-2a and 2c:

The maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

UNII-3:

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

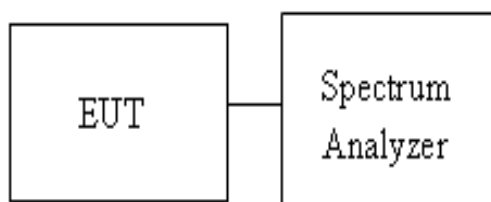
UNII-1 Limit	<input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 11 dBm/MHz <input type="checkbox"/> Antenna with DG greater than 6 dBi : [Limit = 17 – (DG – 6) dBm/MHz]
UNII-2a/2c Limit	<input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 11 dBm/MHz <input type="checkbox"/> Antenna with DG greater than 6 dBi : [Limit = 17 – (DG – 6) dBm/MHz]
UNII-3 Limit	<input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 30 dBm/500KHz <input type="checkbox"/> Antenna with DG greater than 6 dBi : [Limit = 30 – (DG – 6) dBm/500KHz]

4.4.2 Test Procedure

Test method Refer as KDB 789033 D02 v01r03, Section F

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. UNII-1, UNII-2a and UNII-2c, SA set RBW = 1MHz, VBW = 3MHz and Detector = RMS, to measurement Power Density.
4. UNII-3, SA set RBW = 500kHz, VBW = 2MHz and Detector = RMS, to measurement Power Density
5. The path loss and Duty Factor were compensated to the results for each measurement by SA.
6. Mark the maximum level.
7. Measure and record the result of power spectral density. in the test report.

4.4.3 Test Setup



4.4.4 Test Result

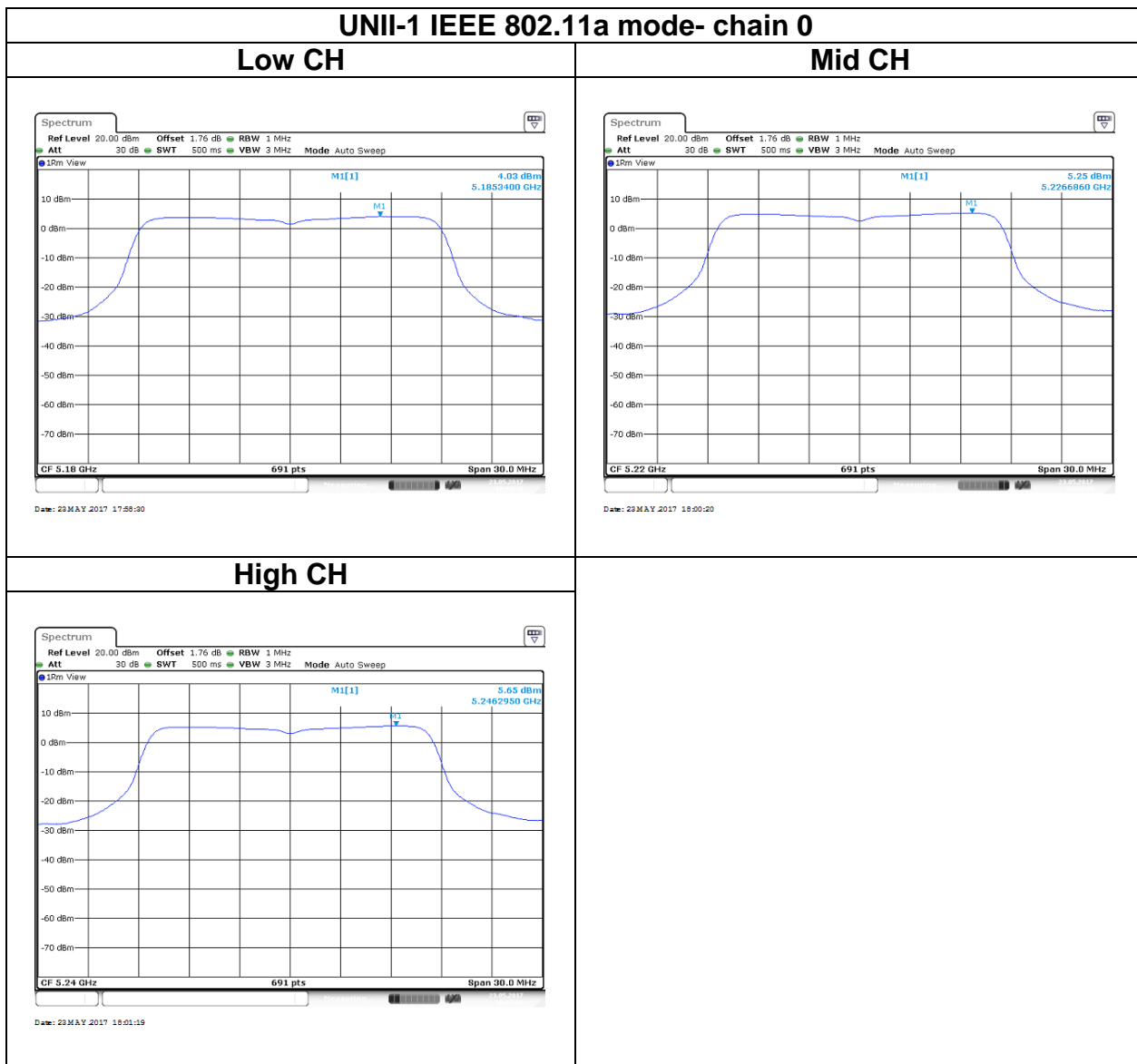
UNII-1 5150-5250 MHz			
Test mode: IEEE 802.11a mode			
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)
Low	5180	4.03	11
Mid	5220	5.25	
High	5240	5.65	
Test mode: IEEE 802.11n HT20 mode			
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)
Low	5180	3.89	11
Mid	5220	4.77	
High	5240	5.37	
Test mode: IEEE 802.11n HT40 mode			
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)
Low	5190	-2.79	11
High	5230	-0.38	
Test mode: IEEE 802.11ac VHT80 mode			
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)
Mid	5210	-5.68	11

UNII-2a 5250-5350 MHz			
Test mode: IEEE 802.11a mode			
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)
Low	5260	5.89	11
Mid	5280	6.27	
High	5320	4.86	
Test mode: IEEE 802.11n HT20 mode			
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)
Low	5260	5.56	11
Mid	5280	5.94	
High	5320	4.87	
Test mode: IEEE 802.11n HT40 mode			
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)
Low	5270	-0.78	11
High	5310	-2.10	
Test mode: IEEE 802.11ac VHT80 mode			
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)
Mid	5290	-6.29	11

UNII-2c 5470-5725 MHz			
Test mode: IEEE 802.11a mode			
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)
Low	5500	6.96	11
Mid	5580	8.45	
High	5700	3.35	
Test mode: IEEE 802.11n HT20 mode			
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)
Low	5500	6.12	11
Mid	5580	5.63	
High	5700	2.47	
Test mode: IEEE 802.11n HT40 mode			
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)
Low	5510	-1.96	11
Mid	5550	0.73	
High	5670	0.58	
Test mode: IEEE 802.11ac VHT80 mode			
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)
Mid	5530	-5.38	11

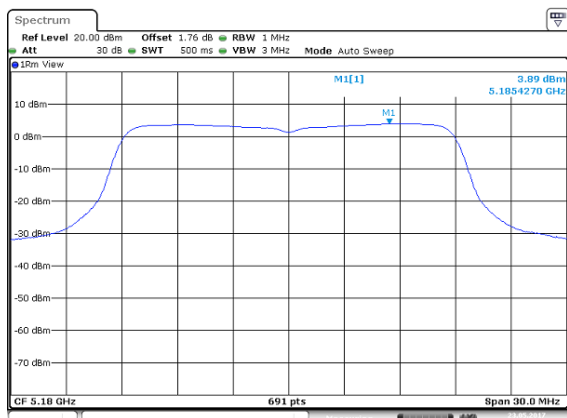
UNII-3 5725-5825 MHz			
Test mode: IEEE 802.11a mode			
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)
Low	5745	10.37	30
Mid	5785	10.65	
High	5825	10.98	
Test mode: IEEE 802.11n HT20 mode			
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)
Low	5745	10.18	30
Mid	5785	10.72	
High	5825	10.94	
Test mode: IEEE 802.11n HT40 mode			
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)
Low	5755	7.36	30
High	5795	-0.37	
Test mode: IEEE 802.11ac VHT80 mode			
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)
Mid	5775	5.01	30

Test Data

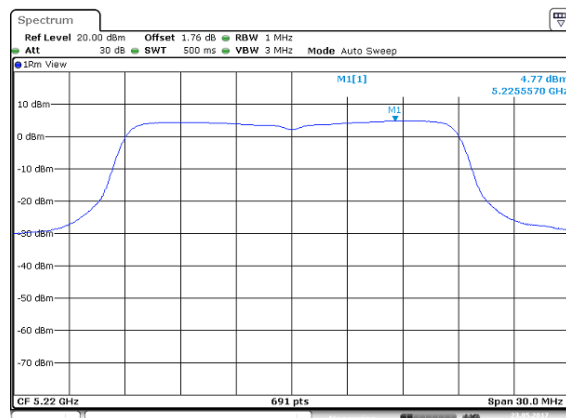


UNII-1 IEEE 802.11n HT20 mode- chain 0

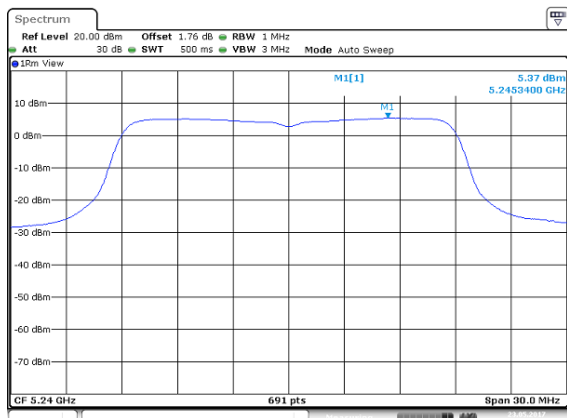
Low CH



Mid CH



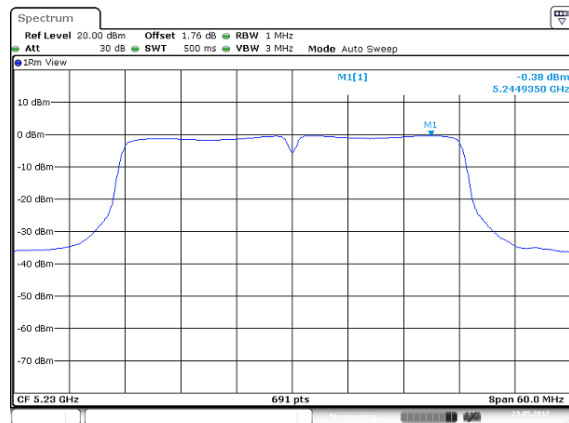
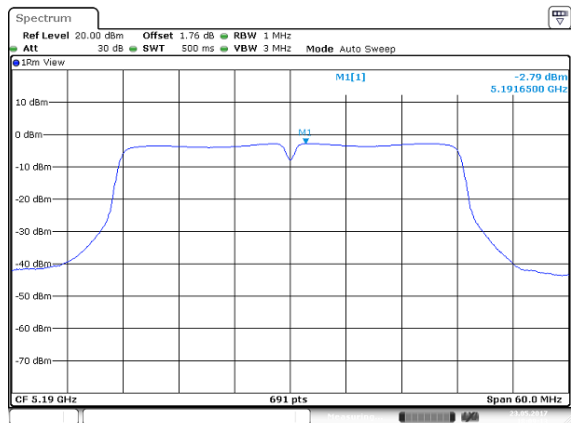
High CH



UNII-1 IEEE 802.11n HT40 mode- chain 0

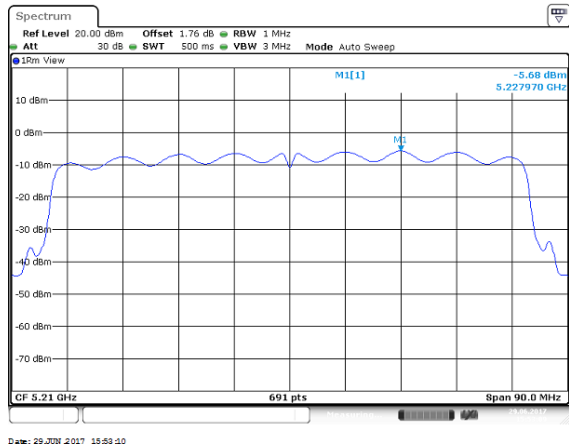
Low CH

High CH

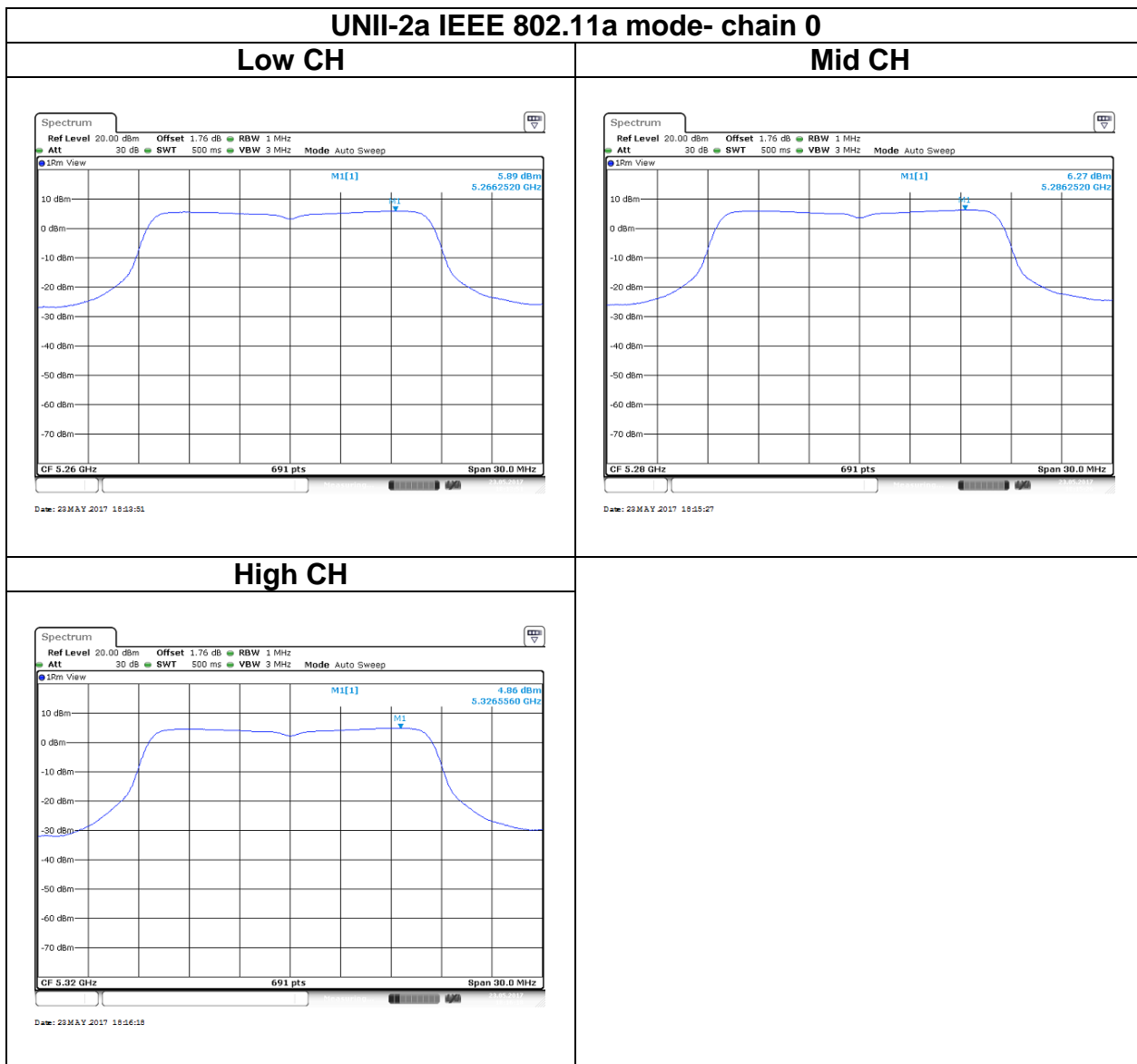


UNII-1 IEEE 802.11ac VHT80 mode- chain 0

Mid CH

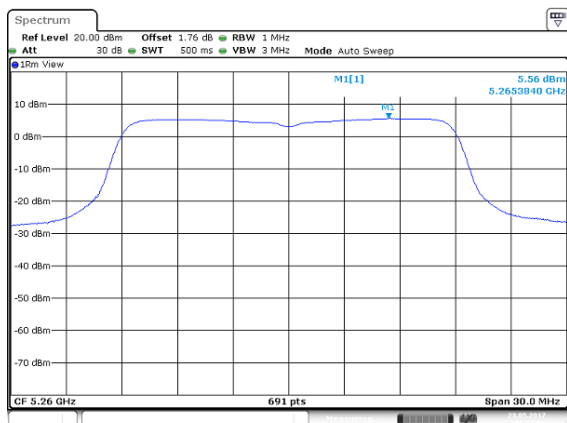


Test Data

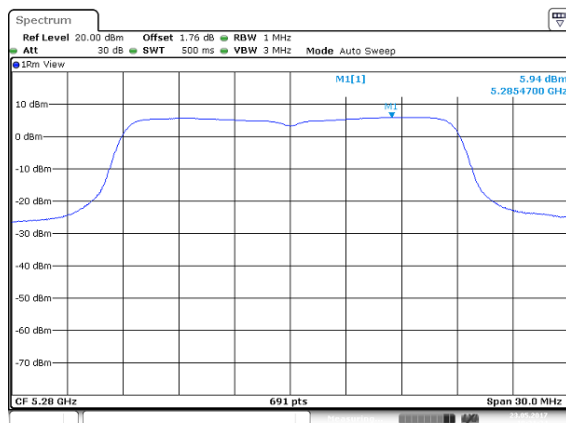


UNII-2a IEEE 802.11n HT20 mode- chain 0

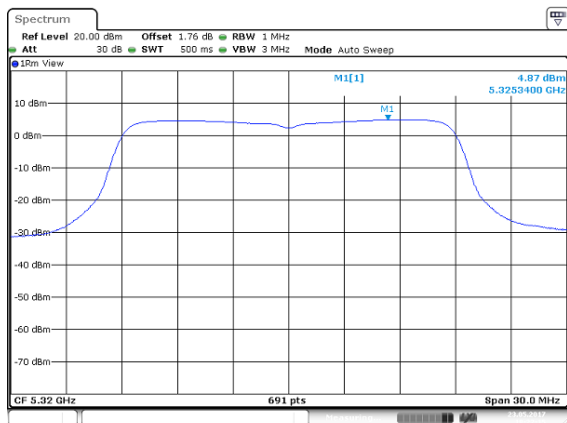
Low CH

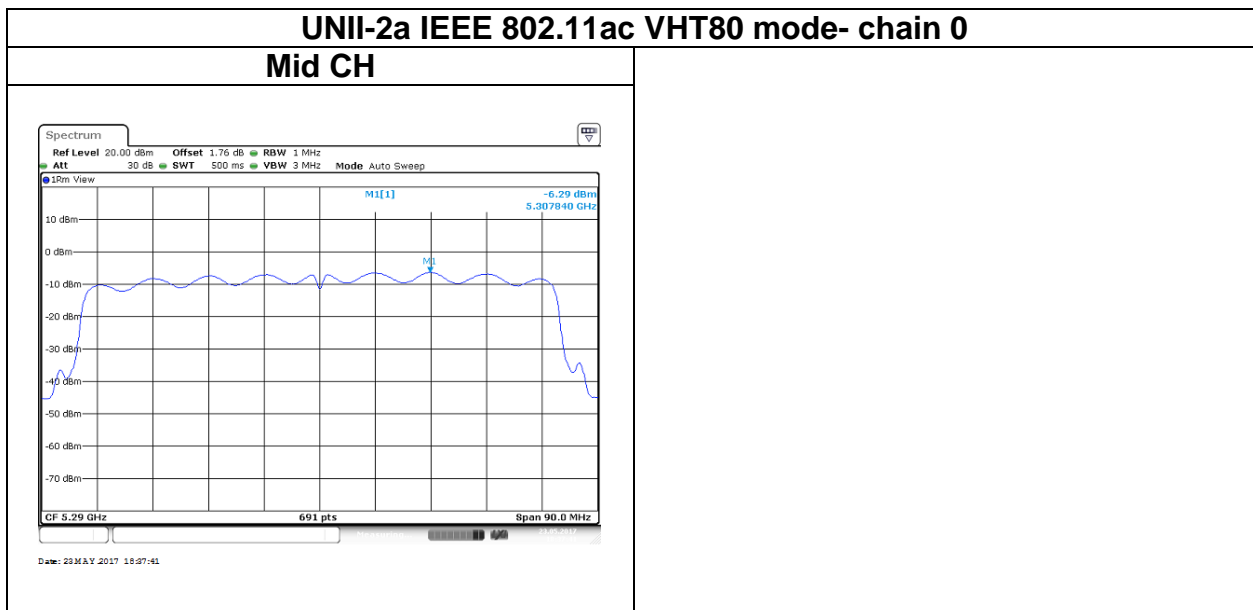
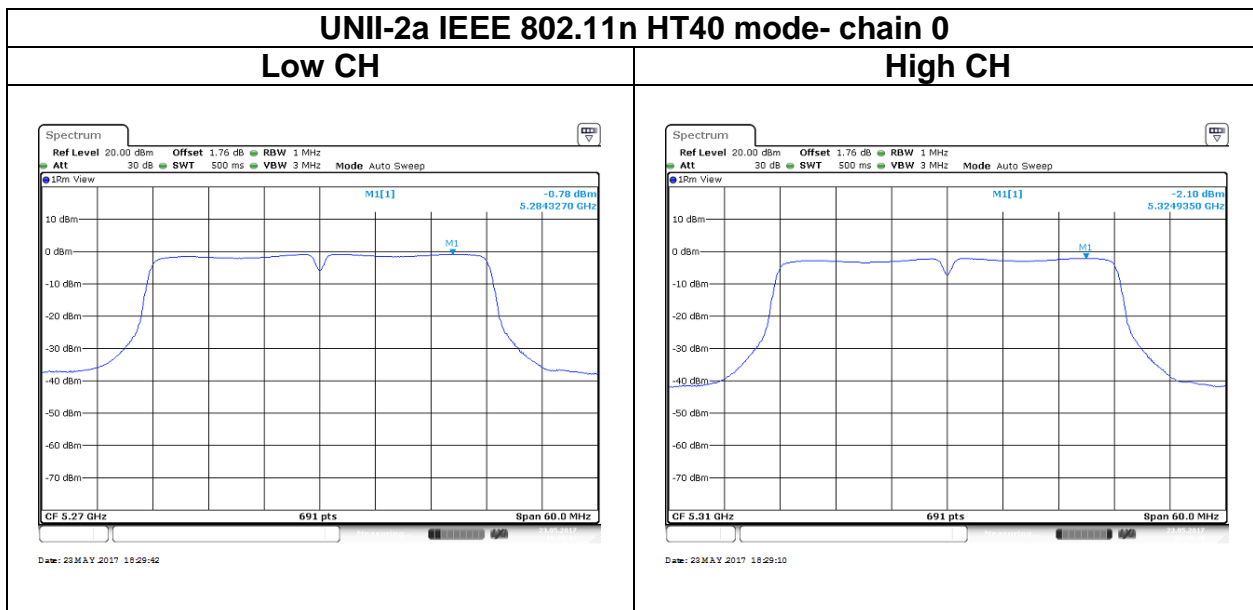


Mid CH

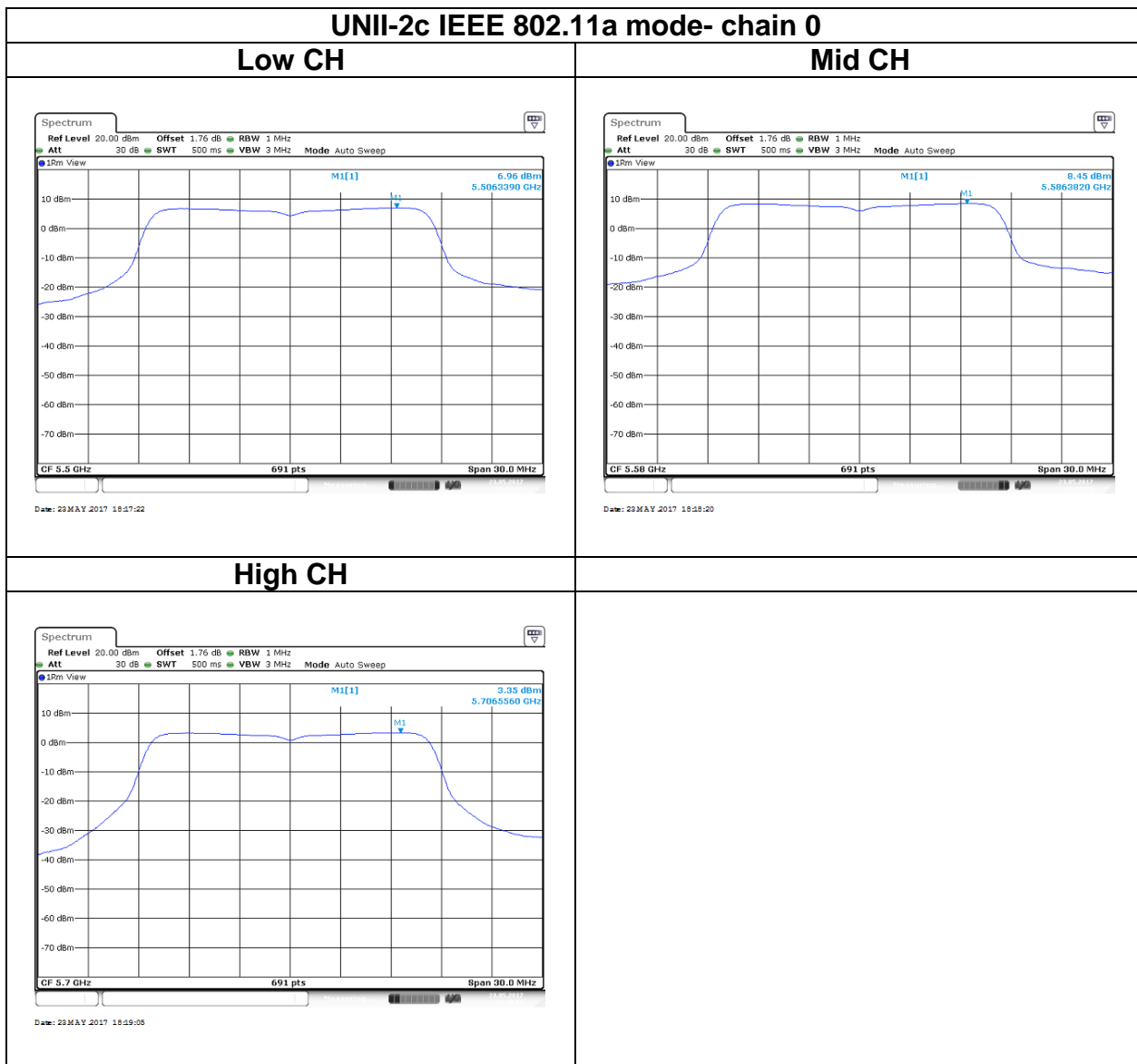


High CH



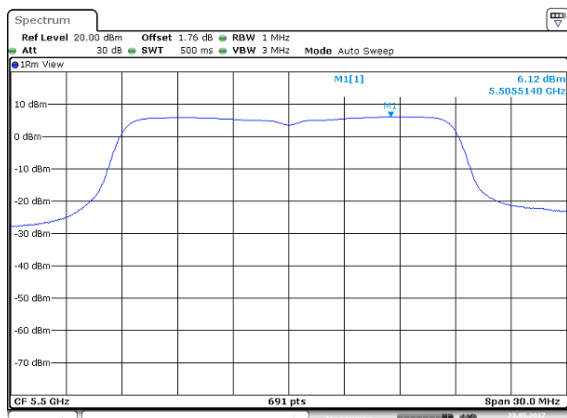


Test Data

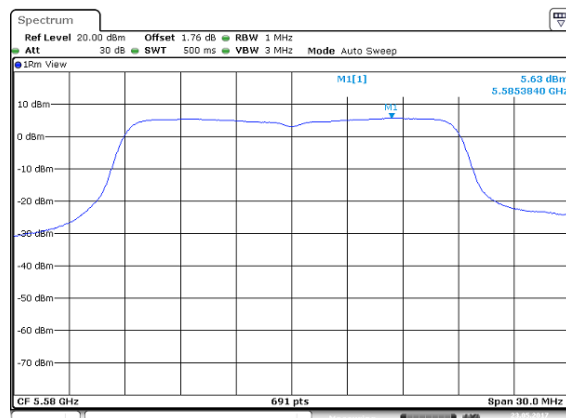


UNII-2c IEEE 802.11n HT20 mode- chain 0

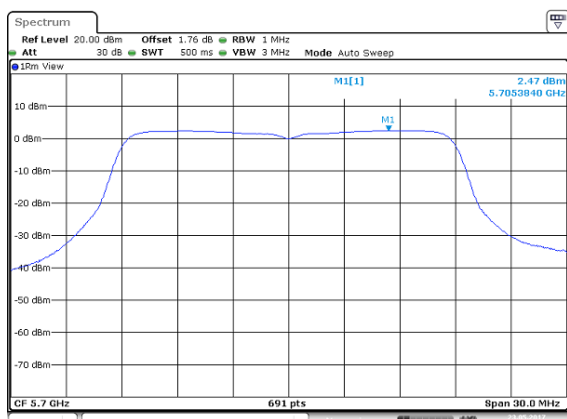
Low CH



Mid CH

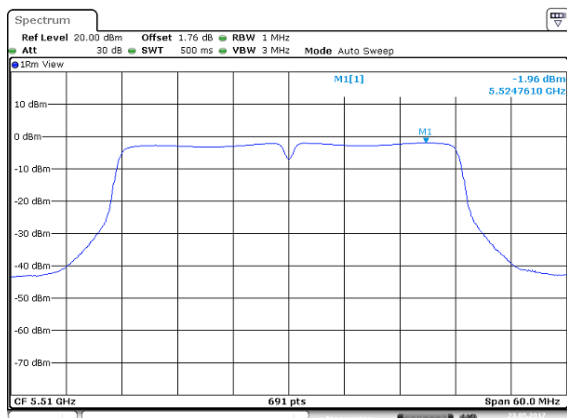


High CH

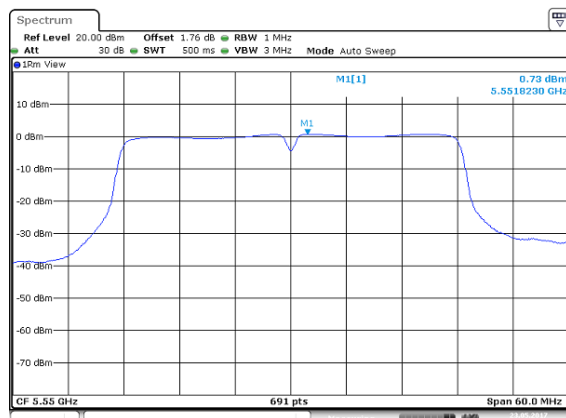


UNII-2c IEEE 802.11n HT40 mode- chain 0

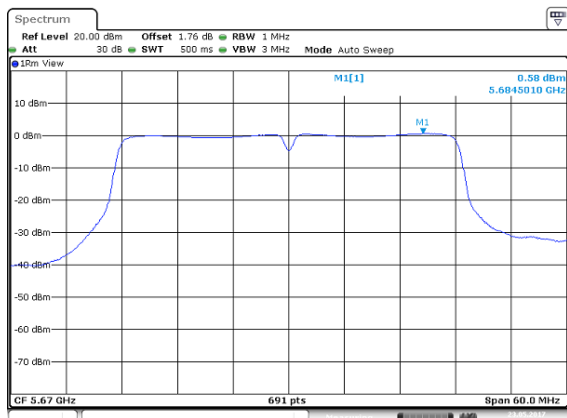
Low CH



Mid CH

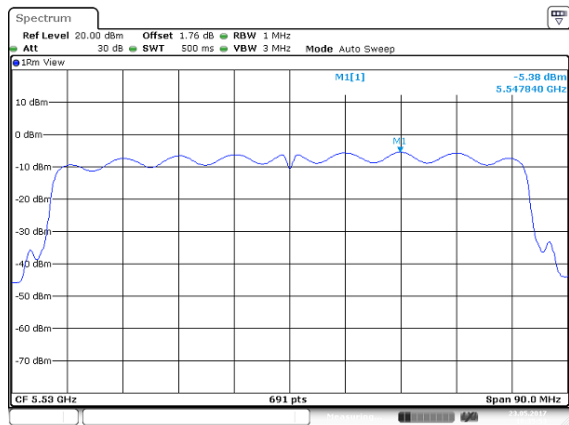


High CH

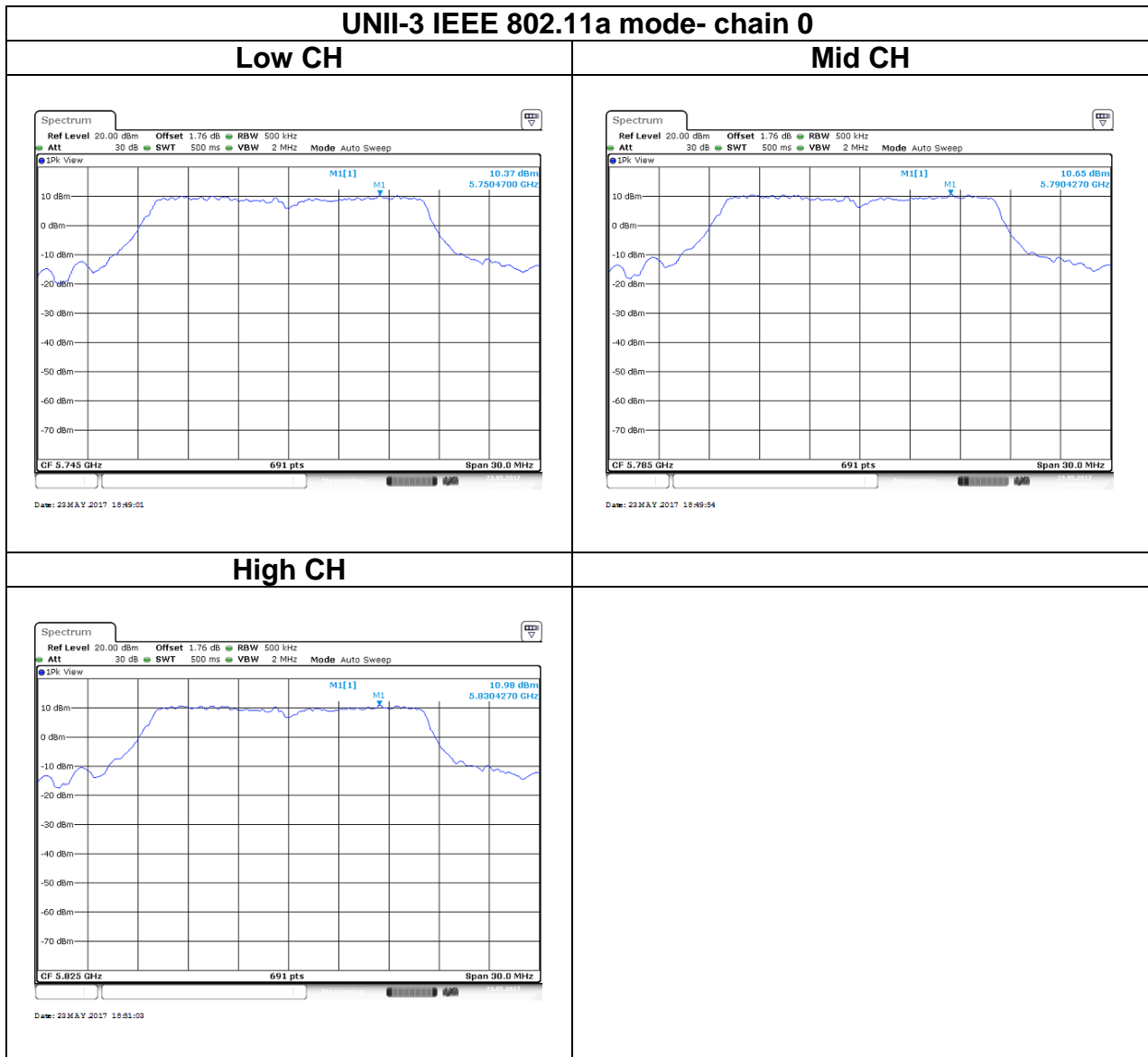


UNII-2c IEEE 802.11ac VHT80 mode- chain 0

Mid CH

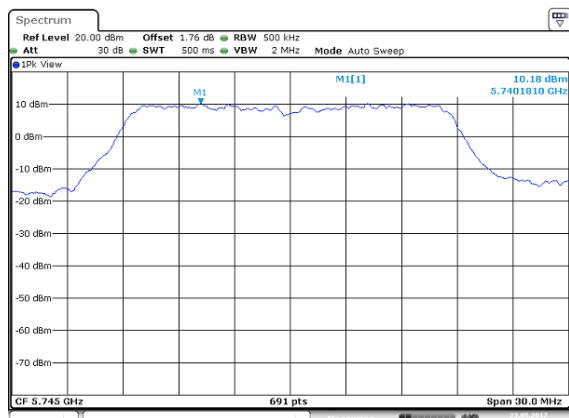


Test Data



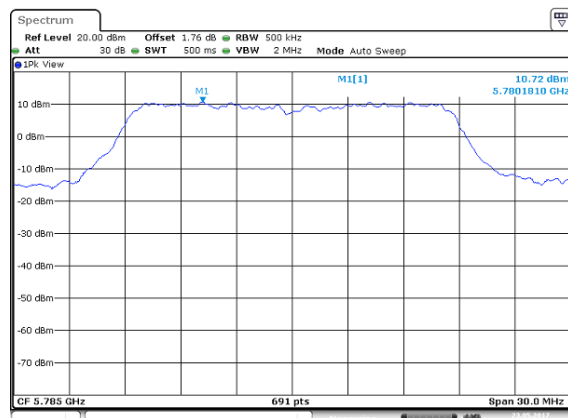
UNII-3 IEEE 802.11n HT20 mode- chain 0

Low CH



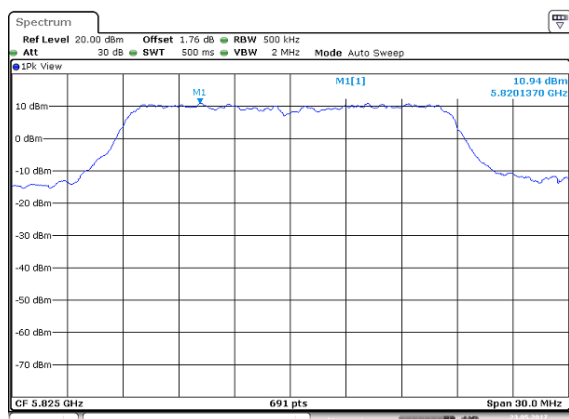
Date: 23 MAY 2017 18:54:00

Mid CH



Date: 23 MAY 2017 18:47:31

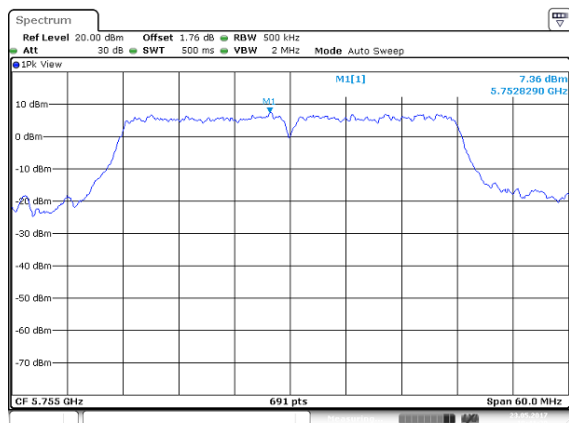
High CH



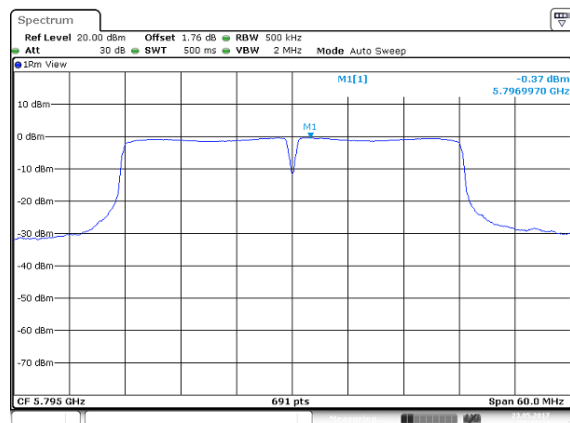
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UNII-3 IEEE 802.11n HT40 mode- chain 0

Low CH

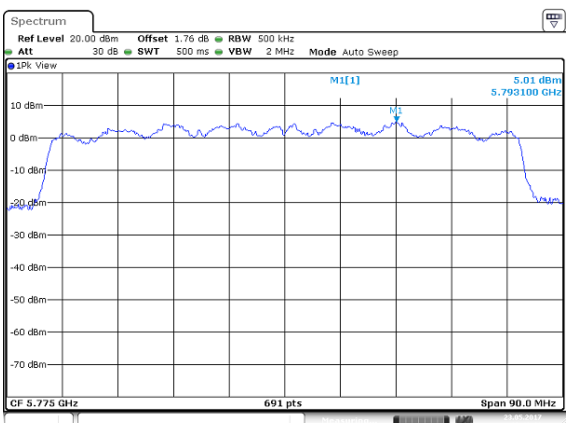


High CH



UNII-3 IEEE 802.11ac VHT80 mode- chain 0

Mid CH



4.5 RADIATION BANEDGE AND SPURIOUS EMISSION

4.5.1 Test Limit

FCC according to §15.407, §15.209 and §15.205,

Below 30 MHz

Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/F (F in kHz)	30
1.705-30 MHz	30	N/A	30

Above 30 MHz

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

IC according to RSS-247 section 6.2.1(2), section 6.2.2(2), section 6.2.3(2) and section 6.2.4(2)

UNII-1 :

For transmitters operating in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. However, any unwanted emissions that fall into the band 5250-5350 MHz must be 26 dBc, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth, above 5.25 GHz. Otherwise, the transmission is considered as intentional and the devices shall implement dynamic frequency selection (DFS) and transmitter power control (TPC) as per the requirements for the band 5250-5350 MHz

UNII-2a and 2c :

For devices with operating frequencies in the band 5250-5350 MHz but having a channel bandwidth that overlaps the band 5150-5250 MHz, the devices' unwanted emission shall not exceed -27 dBm/MHz e.i.r.p. outside the band 5150-5350 MHz and its power shall comply with the spectral power density for operation within the band 5150-5250 MHz. The device shall be labelled "for indoor use only." Emissions outside the band 5470-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p.

UNII-3:

For the band 5725-5850 MHz, emissions at frequencies from the band edges to 10 MHz above or below the band edges shall not exceed -17 dBm/MHz e.i.r.p.

For emissions at frequencies more than 10 MHz above or below the band edges, the emissions power shall not exceed -27 dBm/MHz

4.5.2 Test Procedure

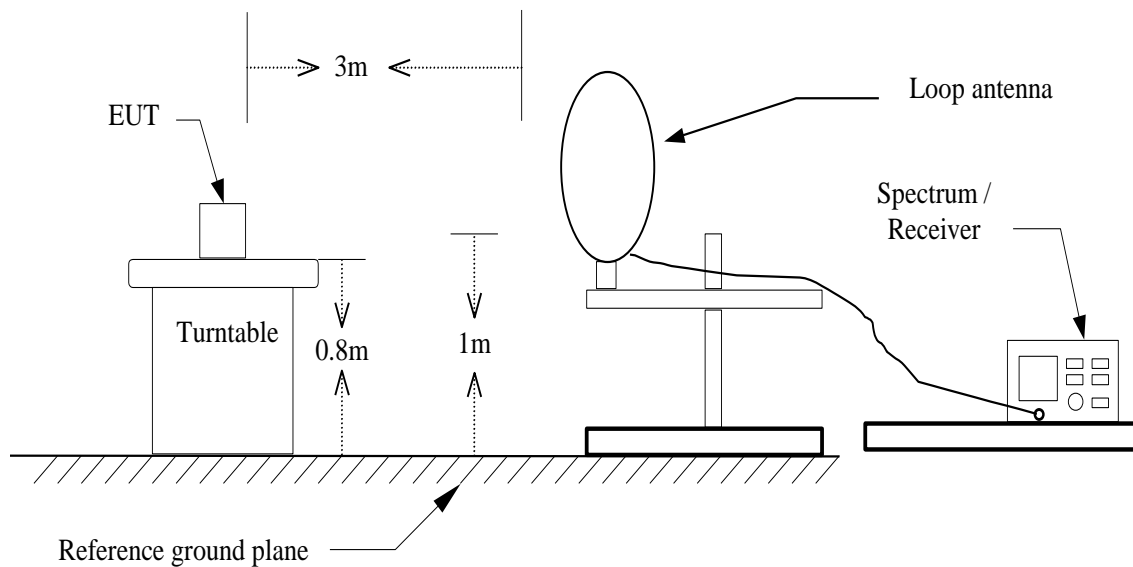
Test method Refer as KDB 789033 D02 v01r03, Section G.3, G.4, G.5, and G.6,.

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m and below 1 GHz is 0.8m above ground plane. The EUT Configured un accordance with ANSI C63.10, and the EUT set in a continuous mode.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. And EUT is set 3m away from the receiving antenna, which is scanned from 1m to 4m above the ground plane to find out the highest emissions. Measurement are made polarized in both the vertical and the horizontal positions with antenna.
3. Span shall wide enough to full capture the emission measured. The SA from 30MHz to 26.5GHz set to the low, Mid and High channels with the EUT transmit.
5. The SA setting following :
 - (1) Below 1G : RBW = 100kHz, VBW \geq 3*RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
 - (2) Above 1G :
 - (2.1) For Peak measurement : RBW = 1MHz, VBW \geq 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
 - (2.2) For Average measurement : RBW = 1MHz, VBW
 - If Duty Cycle \geq 98%, VBW=10Hz.
 - If Duty Cycle < 98%, VBW=1/T.

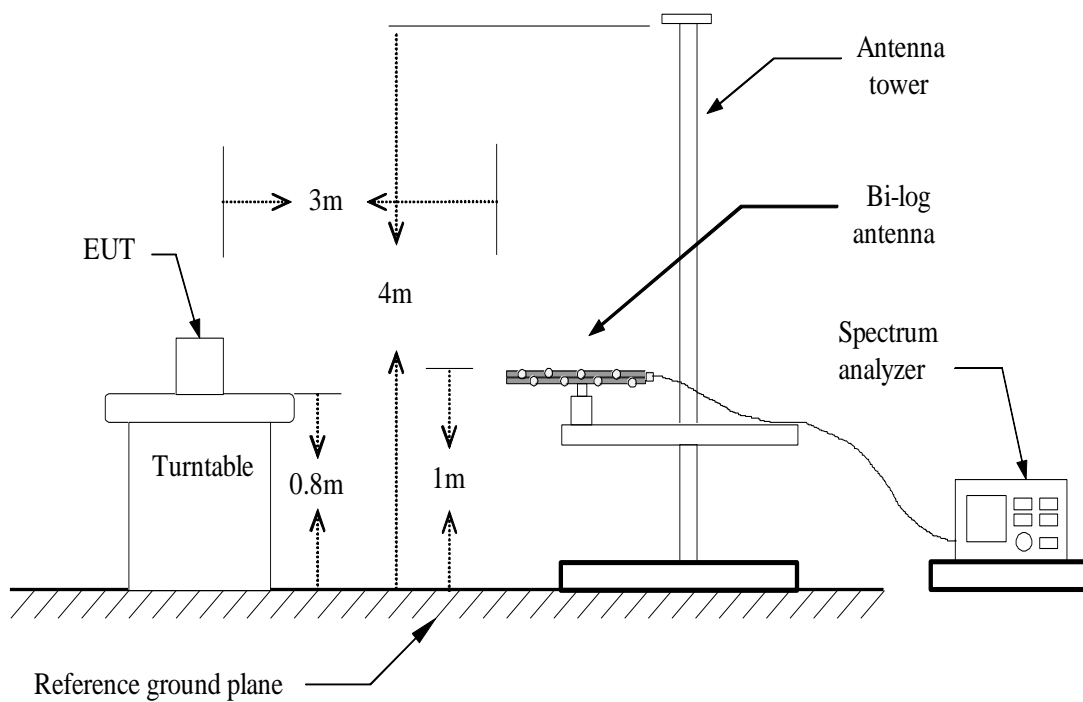
Configuration	Duty Cycle (%)	VBW
802.11a	91%	750Hz
802.11n HT20	88%	750Hz
802.11n HT40	76%	2KHz
802.11ac VHT80	61%	3.9KHz

4.5.3 Test Setup

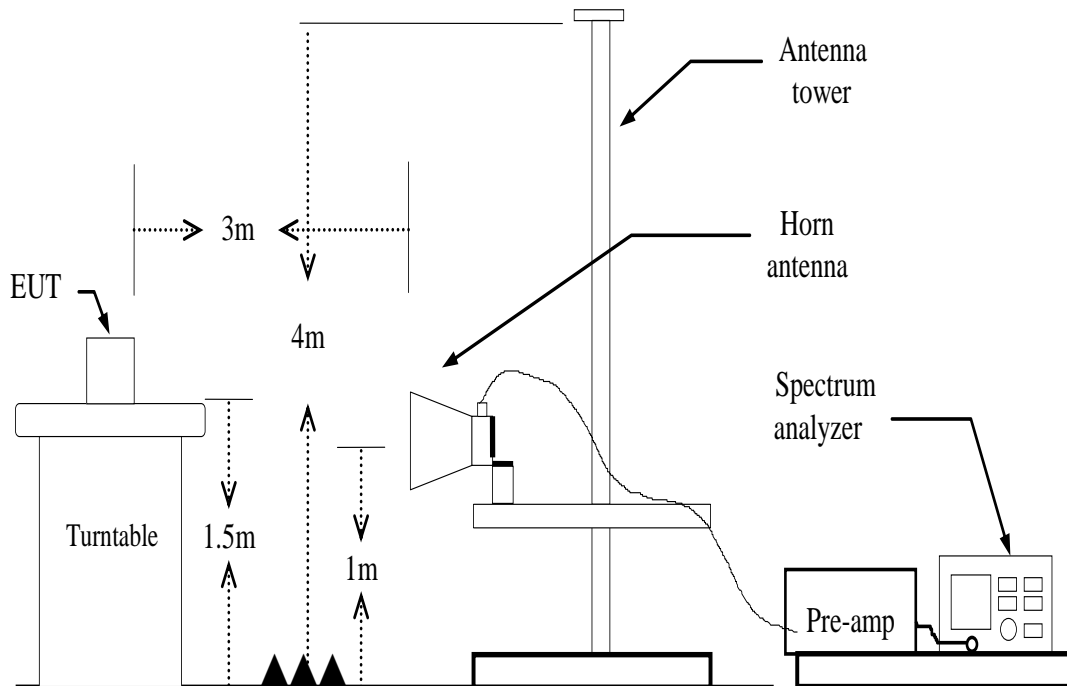
9kHz ~ 30MHz



30MHz ~ 1GHz



Above 1 GHz

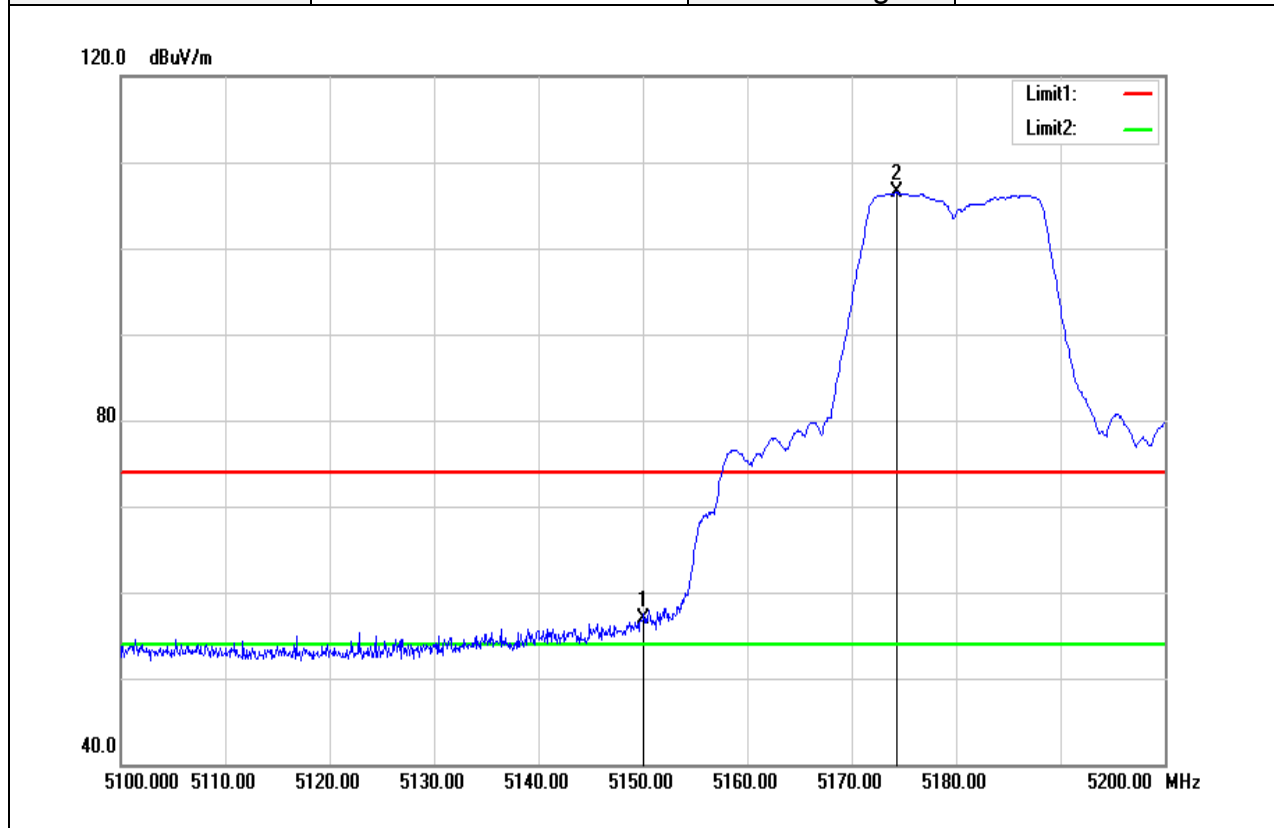


4.5.4 Test Result

Test Data

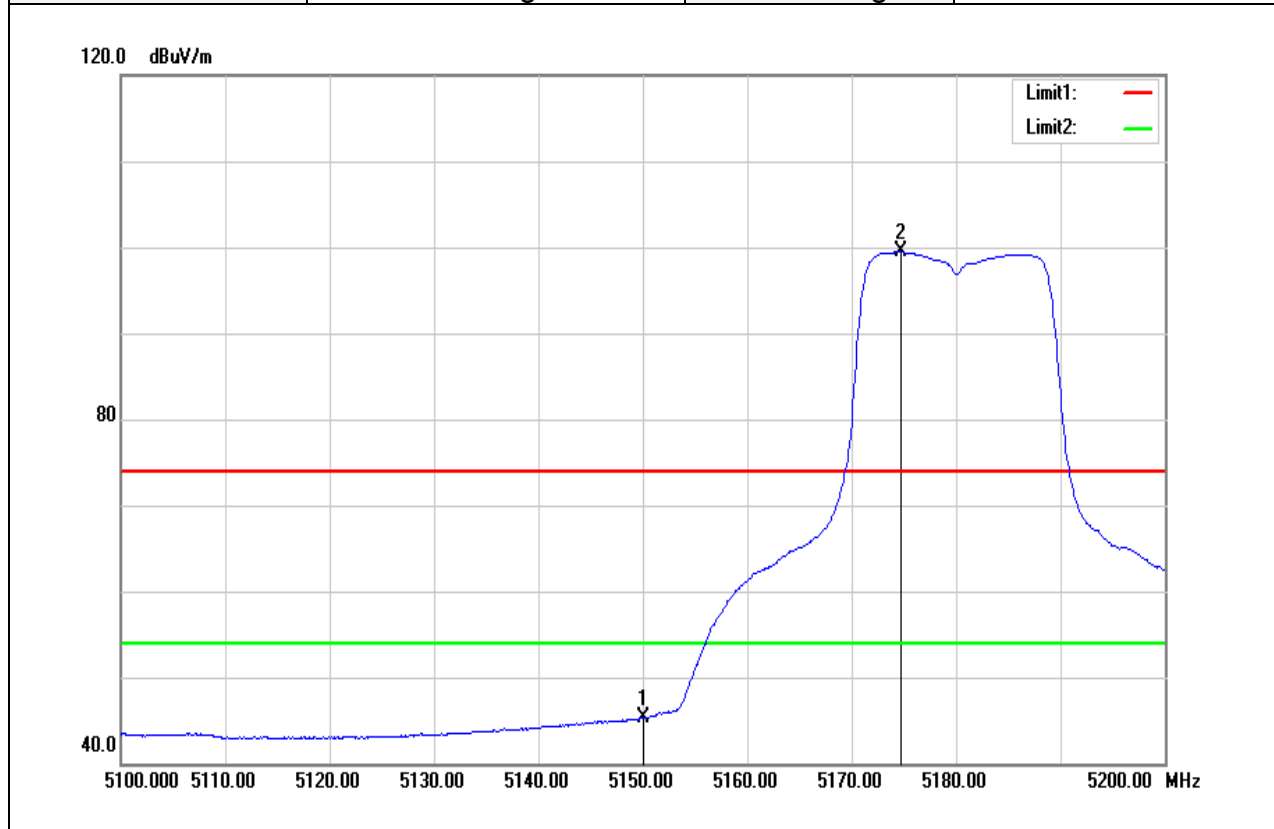
Band Edge Test Data for UNII-1

Test Mode	IEEE 802.11a Low CH	Temp/Hum	22(°C) / 35%RH
Test Item	Band Edge	Test Date	May 19, 2017
Polarize	Vertical	Test Engineer	Ed.Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



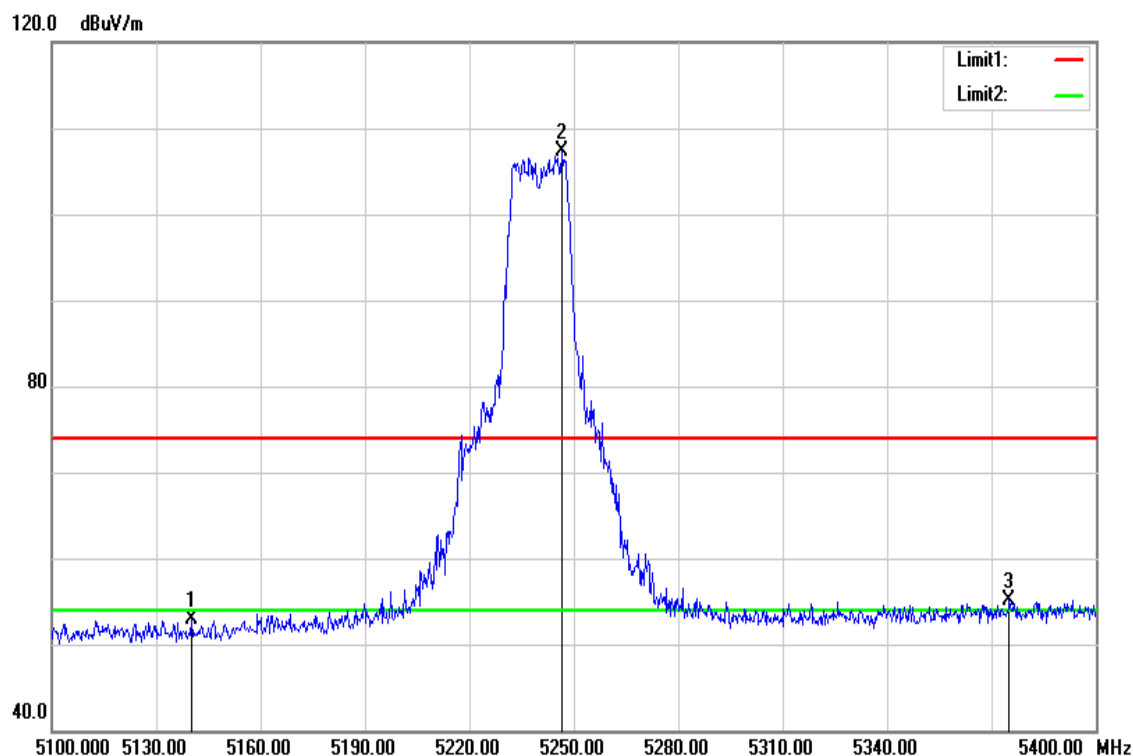
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5150.000	53.91	3.04	56.95	74.00	-17.05	peak
5174.300	102.71	3.74	106.45	--	--	peak

Test Mode	IEEE 802.11a Low CH	Temperature	22(°C)/ 35%RH
Test Item	Band Edge	Test Date	May 19, 2017
Polarize	Vertical	Test Engineer	Ed.Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



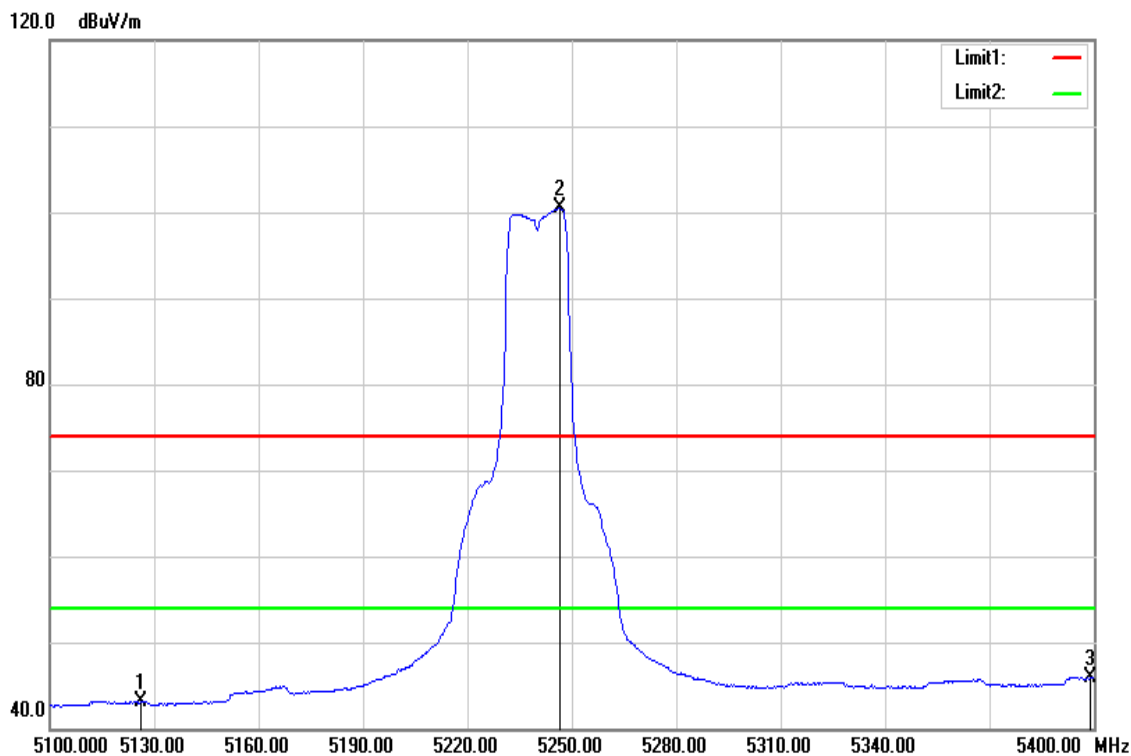
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5150.000	42.24	3.04	45.28	54.00	-8.72	AVG
5174.700	95.68	3.76	99.44	--	--	AVG

Test Mode	IEEE 802.11a High CH	Temp/Hum	22(°C)/ 35%RH
Test Item	Band Edge	Test Date	May 19, 2017
Polarize	Vertical	Test Engineer	Ed.Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



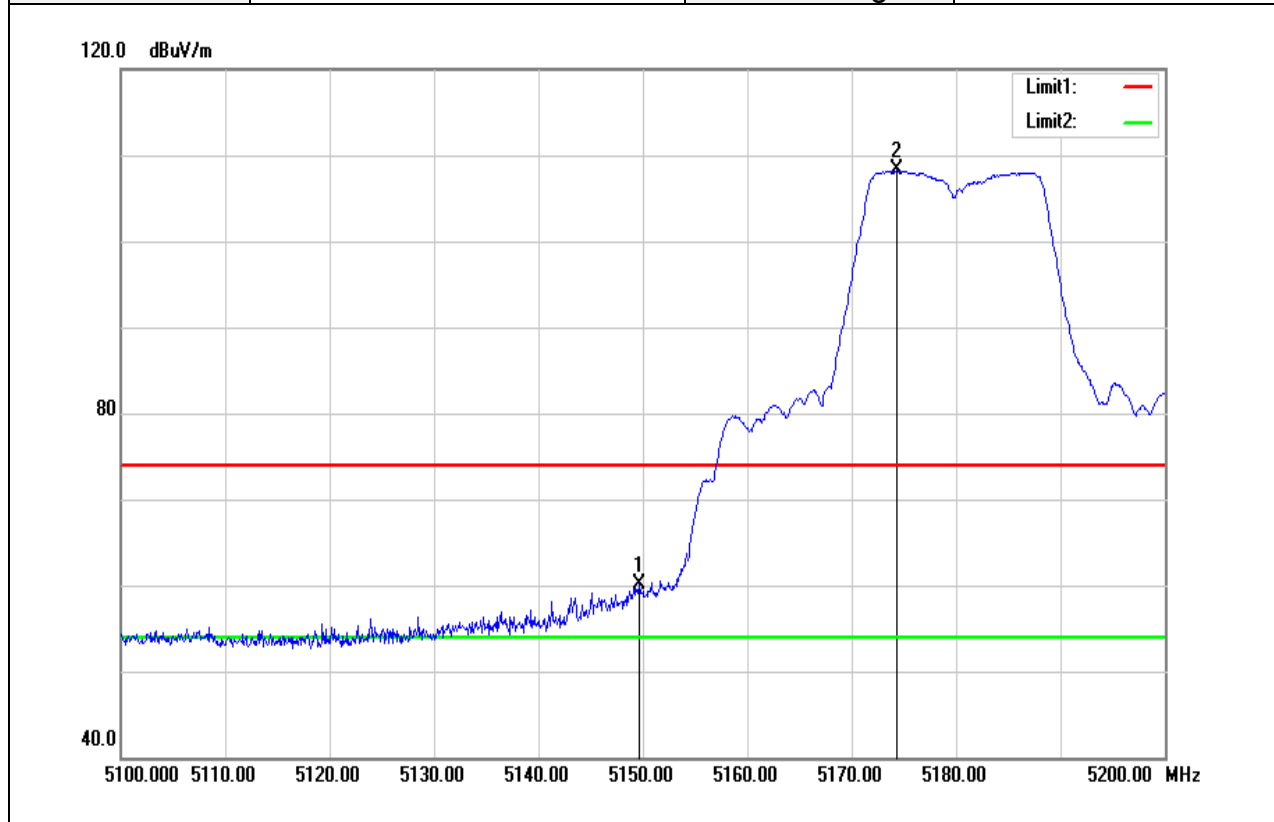
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5140.200	49.88	2.97	52.85	74.00	-21.15	peak
5246.700	102.60	4.65	107.25	--	--	peak
5375.100	49.63	5.52	55.15	74.00	-18.85	peak

Test Mode	IEEE 802.11a High CH	Temperature	22(°C)/ 35%RH
Test Item	Band Edge	Test Date	May 19, 2017
Polarize	Vertical	Test Engineer	Ed.Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



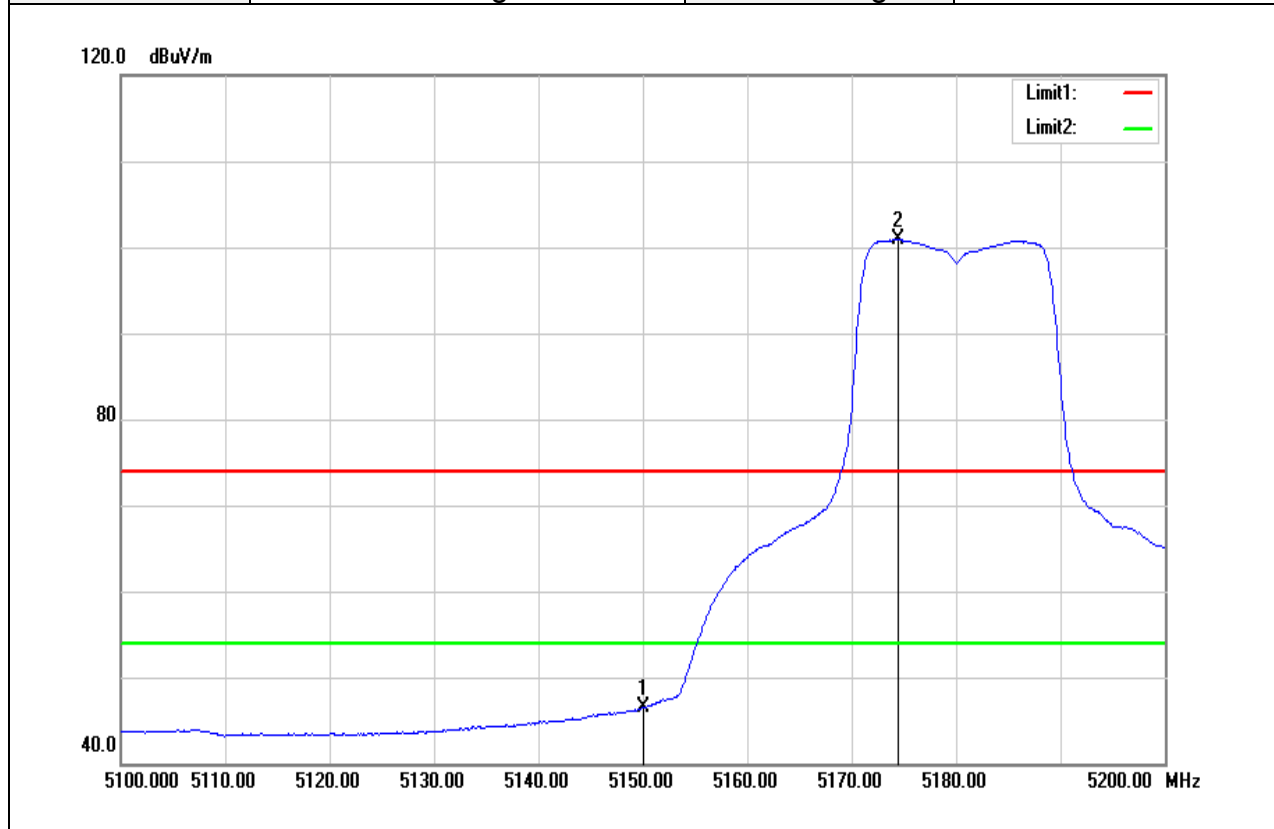
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5126.100	40.29	2.88	43.17	74.00	-30.83	peak
5246.400	95.78	4.65	100.43	--	--	AVG
5398.800	40.23	5.71	45.94	74.00	-28.06	peak

Test Mode	IEEE 802.11n HT20 Low CH	Temp/Hum	22(°C) / 35%RH
Test Item	Band Edge	Test Date	May 19, 2017
Polarize	Vertical	Test Engineer	Ed.Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



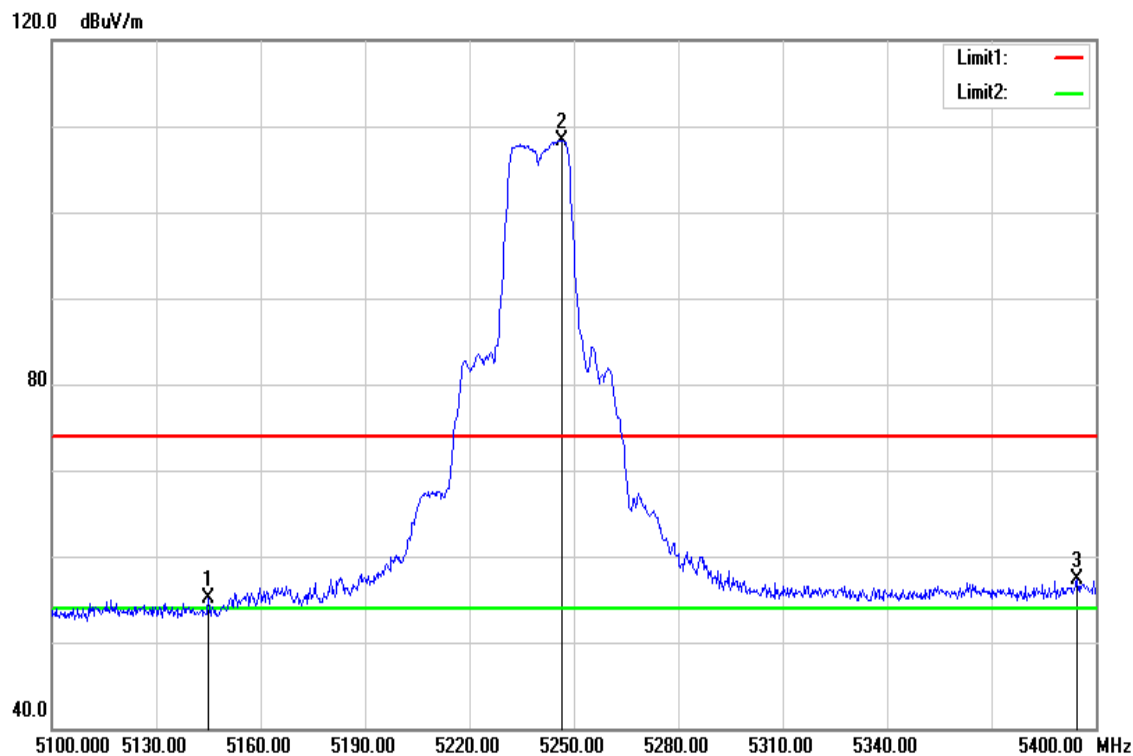
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5149.700	57.04	3.04	60.08	74.00	-13.92	peak
5174.300	104.48	3.74	108.22	--	--	peak

Test Mode	IEEE 802.11n HT20 Low CH	Temperature	22(°C)/ 35%RH
Test Item	Band Edge	Test Date	May 19, 2017
Polarize	Vertical	Test Engineer	Ed.Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



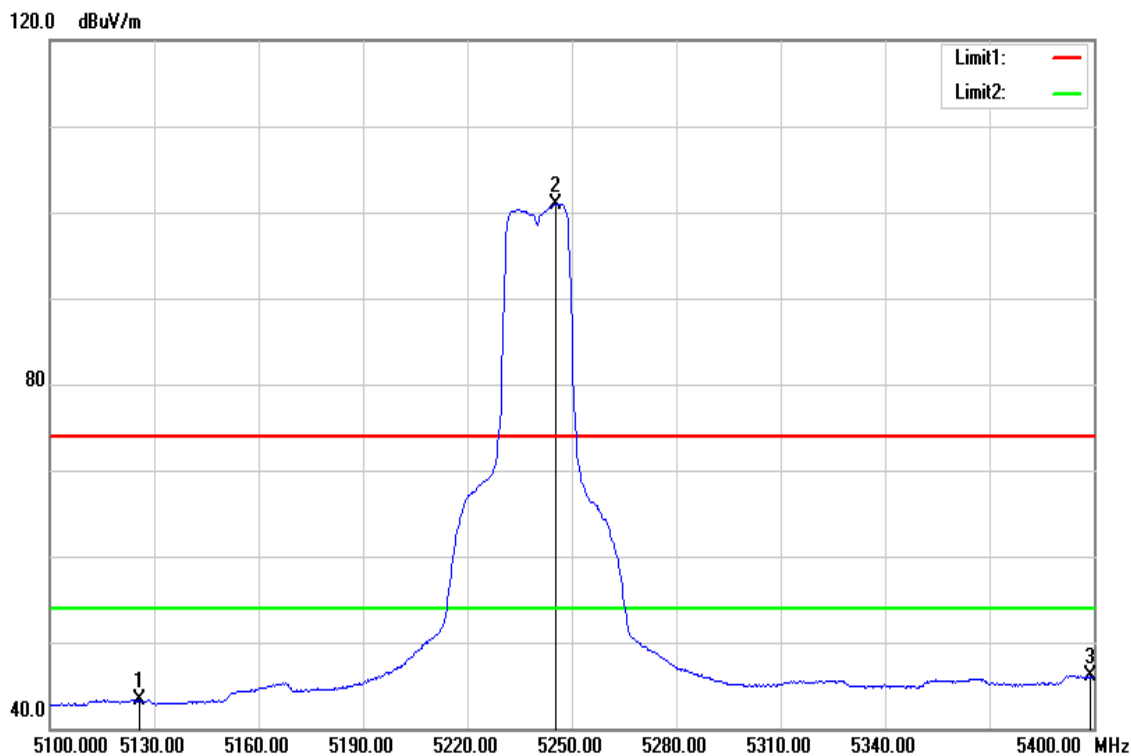
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5150.000	43.41	3.04	46.45	54.00	-7.55	AVG
5174.400	97.11	3.75	100.86	--	--	AVG

Test Mode	IEEE 802.11n HT20 High CH	Temp/Hum	22(°C)/ 35%RH
Test Item	Band Edge	Test Date	May 19, 2017
Polarize	Vertical	Test Engineer	Ed.Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



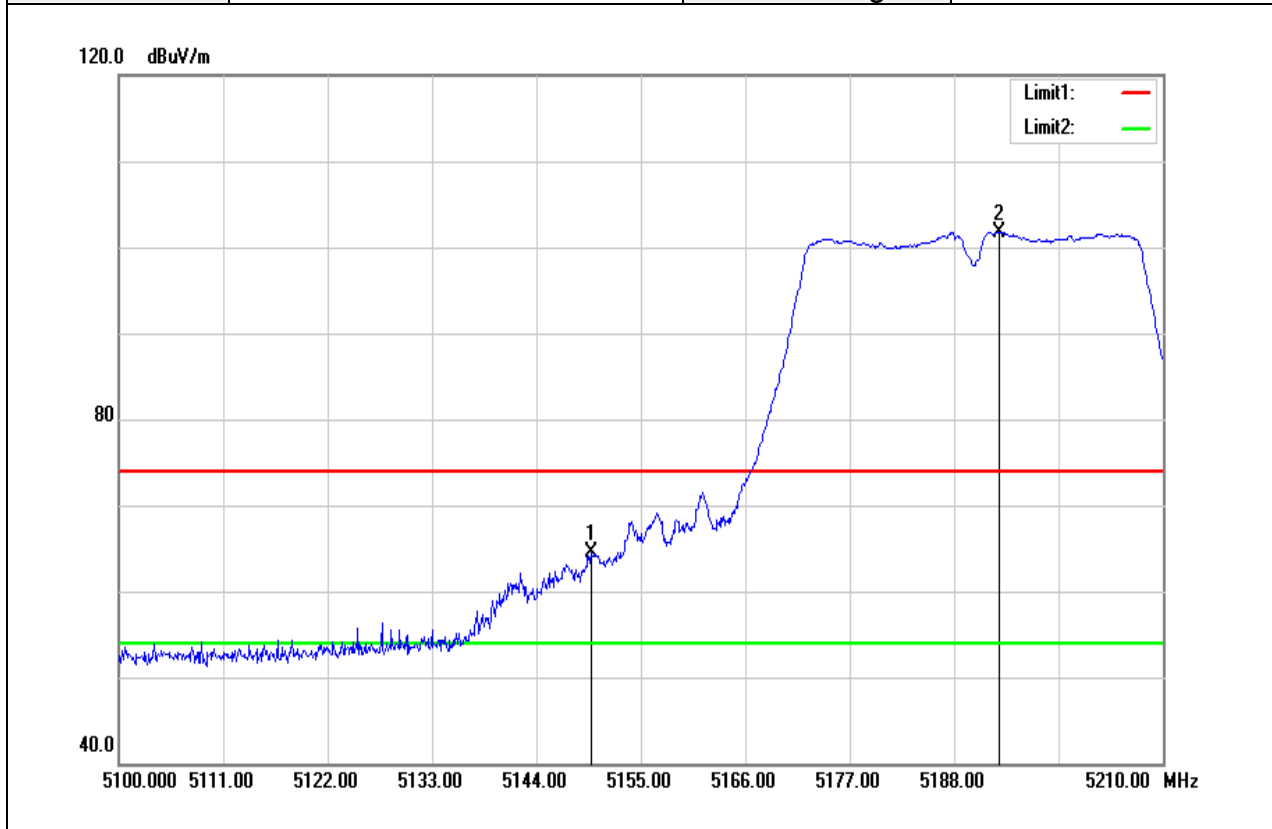
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5145.000	52.12	3.01	55.13	74.00	-18.87	peak
5246.700	103.73	4.65	108.38	--	--	peak
5394.600	51.54	5.68	57.22	74.00	-16.78	peak

Test Mode	IEEE 802.11n HT20 High CH	Temperature	22(°C)/ 35%RH
Test Item	Band Edge	Test Date	May 19, 2017
Polarize	Vertical	Test Engineer	Ed.Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



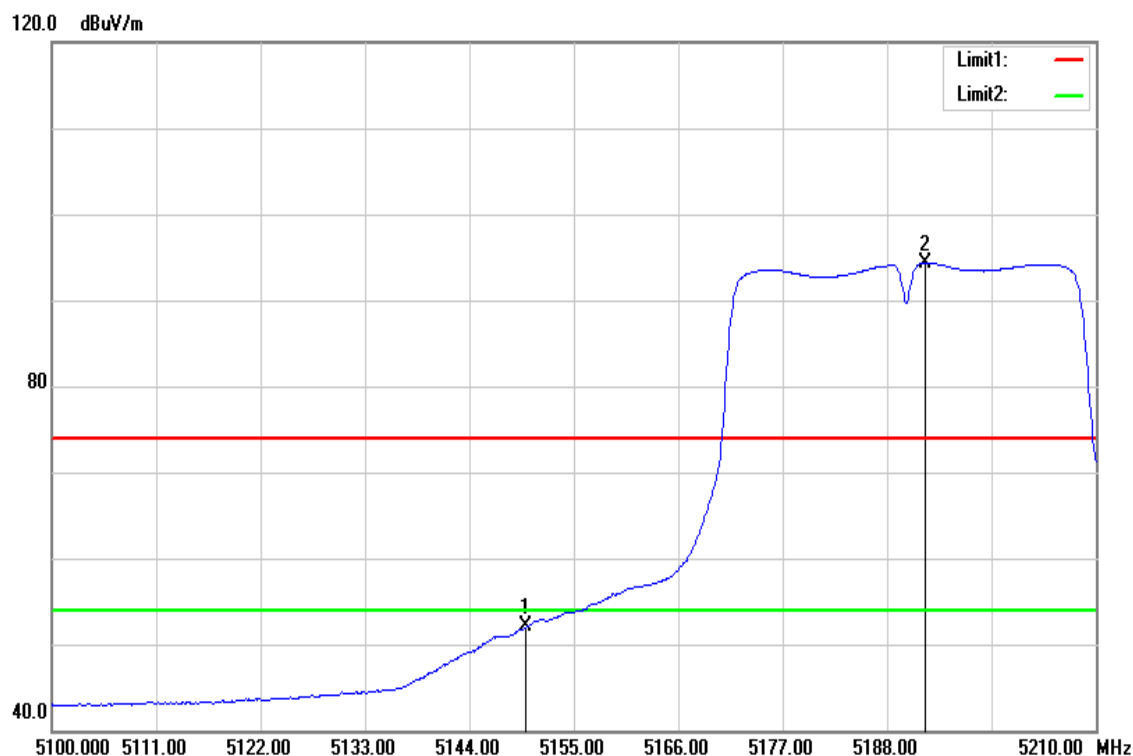
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5125.800	40.51	2.88	43.39	54.00	-10.61	AVG
5245.500	96.31	4.64	100.95	--	--	AVG
5398.800	40.40	5.71	46.11	54.00	-7.89	AVG

Test Mode	IEEE 802.11n HT40 Low CH	Temp/Hum	22(°C)/ 35%RH
Test Item	Band Edge	Test Date	May 20, 2017
Polarize	Vertical	Test Engineer	Ed.Chiang
Detector	Peak	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5149.830	61.40	3.04	64.44	74.00	-9.56	peak
5192.730	97.47	4.28	101.75	--	--	peak

Test Mode	IEEE 802.11n HT40 Low CH	Temperature	22(°C)/ 35%RH
Test Item	Band Edge	Test Date	May 20, 2017
Polarize	Vertical	Test Engineer	Ed.Chiang
Detector	Average	Test Voltage	120Vac / 60Hz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5150.000	49.02	3.04	52.06	54.00	-1.94	AVG
5191.960	90.06	4.26	94.32	--	--	AVG