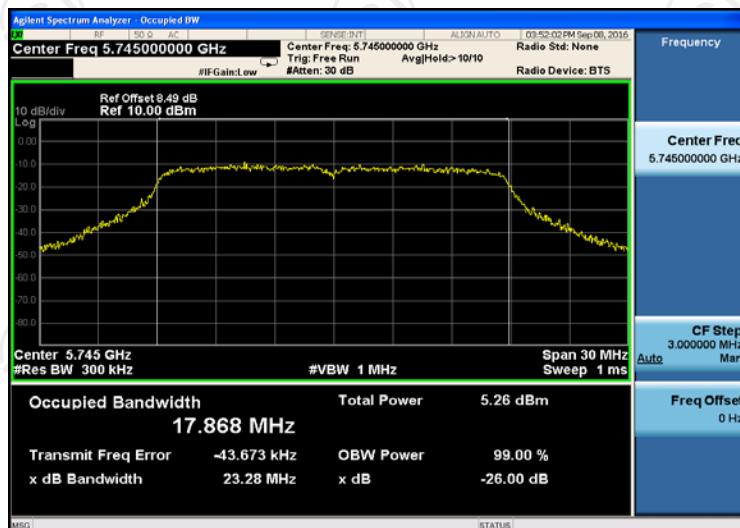
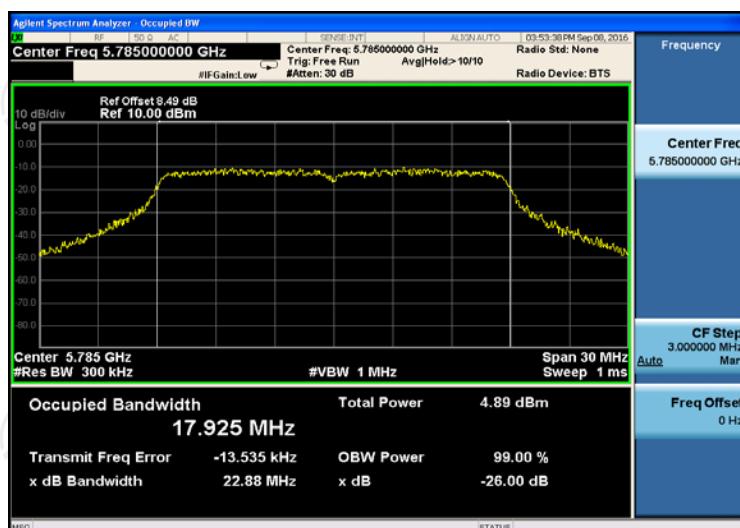


11n(HT20)

CH149



CH157

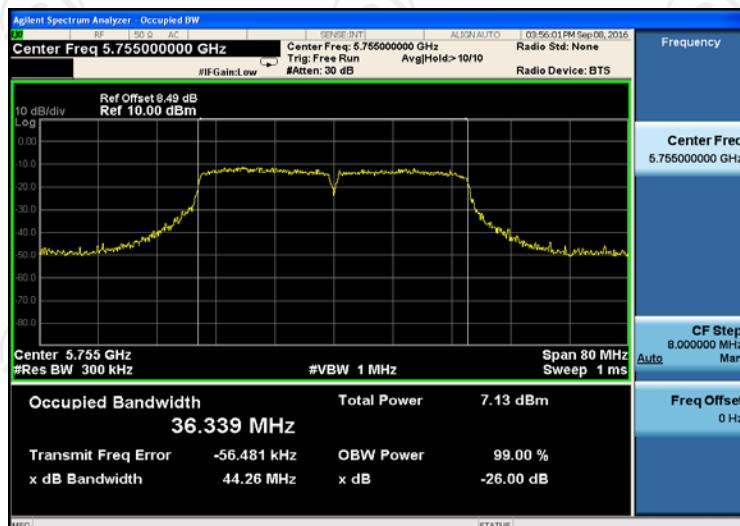


CH161

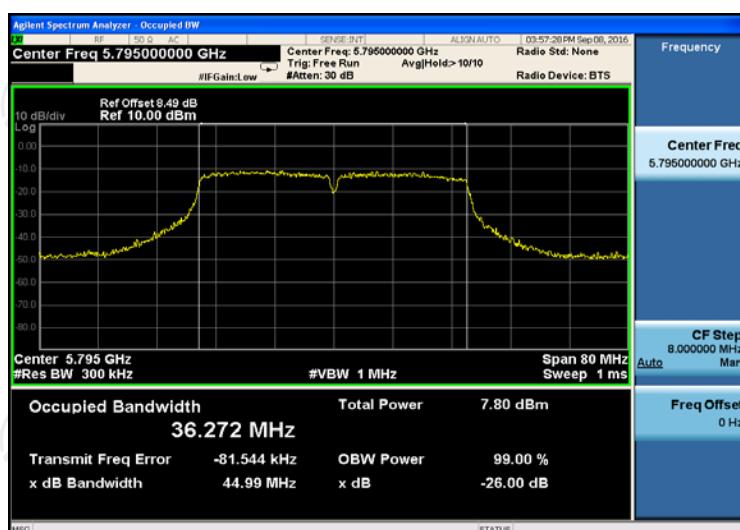


11n(HT40)

CH151

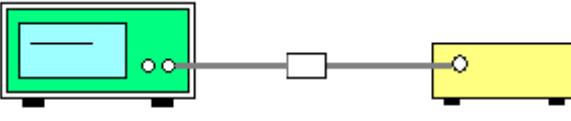


CH159



## 6.6. Power Spectral Density

### 6.6.1. Test Specification

<b>Test Requirement:</b>	FCC Part15 E Section 15.407 (a)
<b>Test Method:</b>	KDB662911 D01 Multiple Transmitter Output v02r01 KDB789033 D02 General UNII Test Procedures New Rules v01r02 Section F
<b>Limit:</b>	$\leq 17.00 \text{dBm/MHz}$ for Band I 5150MHz-5250MHz $\leq 11.00 \text{dBm/MHz}$ for Band II 5250MHz-5350MHz $\leq 11.00 \text{dBm/MHz}$ for Band III 5450MHz-5725MHz $\leq 30.00 \text{dBm/500KHz}$ for Band IV 5725MHz-5850MHz The e.i,r,p spectral density for Band I 5150MHz – 5250 MHz should not exceed 10dBm/MHz
<b>Test Setup:</b>	 <b>Spectrum Analyzer</b> <b>EUT</b>
<b>Test Mode:</b>	Transmitting mode with modulation
<b>Test Procedure:</b>	<ol style="list-style-type: none"> <li>Set the spectrum analyzer or EMI receiver span to view the entire emission bandwidth.</li> <li>Set RBW = 510 kHz/1 MHz, VBW <math>\geq 3 \times</math> RBW, Sweep time = Auto, Detector = RMS.</li> <li>Allow the sweeps to continue until the trace stabilizes.</li> <li>Use the peak marker function to determine the maximum amplitude level.</li> <li>The E.I.R.P spectral density used radiated test method. At a test site that has been validated using the procedures of ANSI C63.4 or the latest CISPR 16-1-4 for measurements above 1 GHz, so as to simulate a near free-space environment.</li> </ol>
<b>Test Result:</b>	PASS

### 6.6.2. Test Instruments

RF Test Room				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY49100060	Aug 12, 2017
RF cable	TCT	RE-06	N/A	Aug 12, 2017
Antenna Connector	TCT	RFC-01	N/A	Aug 12, 2017

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

### 6.6.3. Test data

#### 6.6.4.

Configuration Band I (5150 - 5250 MHz) / Antenna 0+Antenna 1						
Mode	Test channel	Power Spectral Density			FCC Limit (dBm/MHz)	Result
		Ant0	Ant1	Total		
11a	CH36	0.900	1.257	4.09	16.99	PASS
11a	CH44	0.397	0.816	3.62	16.99	PASS
11a	CH48	-0.447	-0.350	2.61	16.99	PASS
11n(HT20)	CH36	1.087	0.522	3.82	16.99	PASS
11n(HT20)	CH44	0.721	1.122	3.94	16.99	PASS
11n(HT20)	CH48	-1.308	-1.093	1.81	16.99	PASS
11n(HT40)	CH38	-3.481	-2.761	-0.10	16.99	PASS
11n(HT40)	CH46	-3.170	-4.166	-0.63	16.99	PASS

Note: 1. All antennas have the same gain.  $G_{ANT}=3\text{dBi}$ , Array Gain= $10\log(N_{ANT}/N_{SS})=3.01\text{dBi}$

Directional Gain= $G_{ANT} + \text{Array Gain}=6.01\text{dBi}$ , so limit= $17-(6.01-6)=16.99\text{ dBm/MHz}$

2. The total PSD method used the sum spectra maxima across the outputs.

Configuration Band IV (5725 - 5850 MHz) / Antenna 0+Antenna 1						
Mode	Test channel	Power Spectral Density			Limit (dBm/500kHz)	Result
		Ant0	Ant1	Total		
11a	CH149	8.472	7.943	11.23	29.99	PASS
11a	CH157	9.141	9.200	12.18	29.99	PASS
11a	CH161	8.014	7.260	10.66	29.99	PASS
11n(HT20)	CH149	8.297	7.303	10.84	29.99	PASS
11n(HT20)	CH157	8.234	7.011	10.68	29.99	PASS
11n(HT20)	CH161	7.051	7.284	10.18	29.99	PASS
11n(HT40)	CH151	7.012	6.751	9.89	29.99	PASS
11n(HT40)	CH159	6.139	5.710	8.94	29.99	PASS

Note: 1. All antennas have the same gain.  $G_{ANT}=3\text{dBi}$ , Array Gain= $10\log(N_{ANT}/N_{SS})=3.01\text{dBi}$

Directional Gain= $G_{ANT} + \text{Array Gain}=6.01\text{dBi}$ , so limit= $30-(6.01-6)=29.99\text{ dBm/500kHz}$

2. The total PSD method used the sum spectra maxima across the outputs.

Test plots as follows:

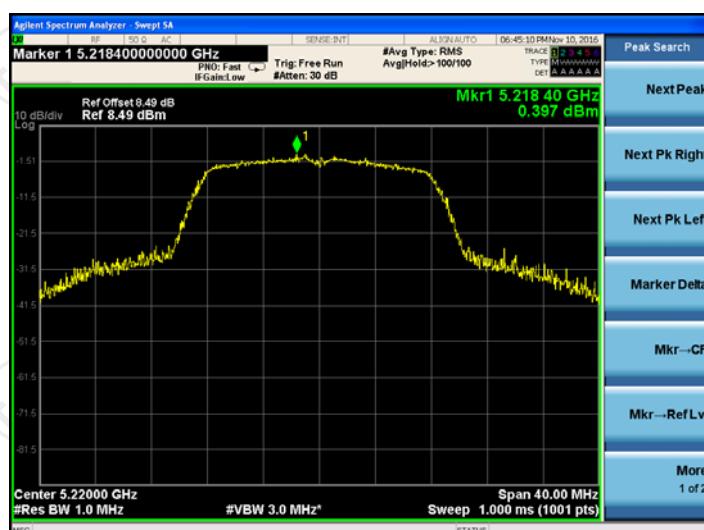
**ANT 0**
**Band I (5150 – 5250 MHz)**

11a

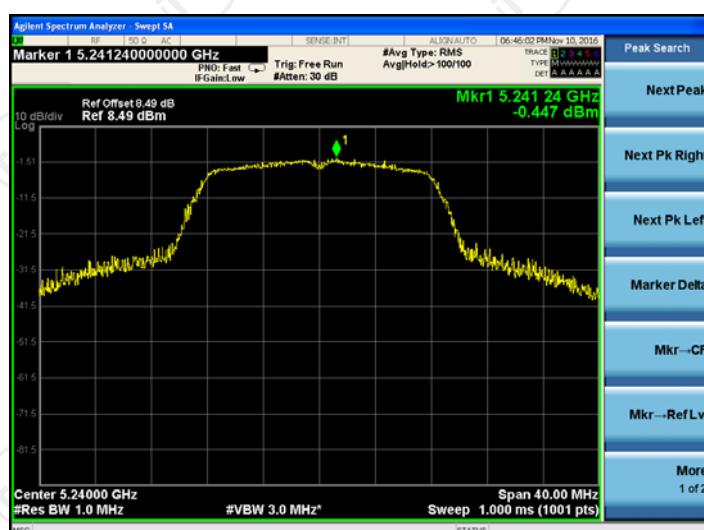
CH36



CH44



CH48



11n(HT20)

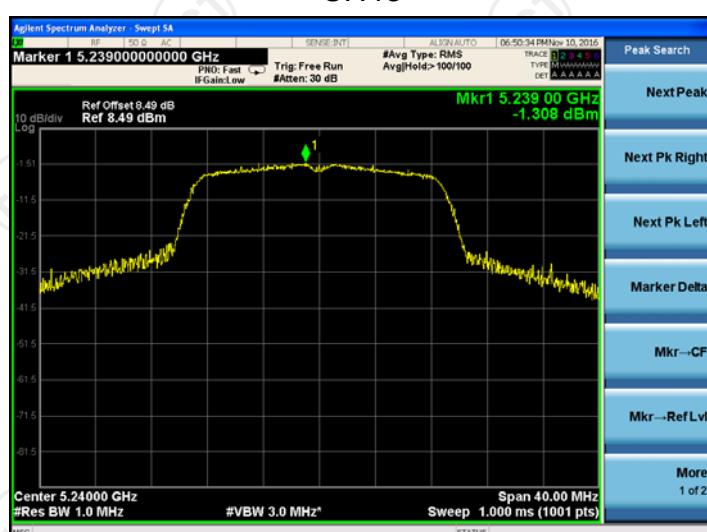
CH36



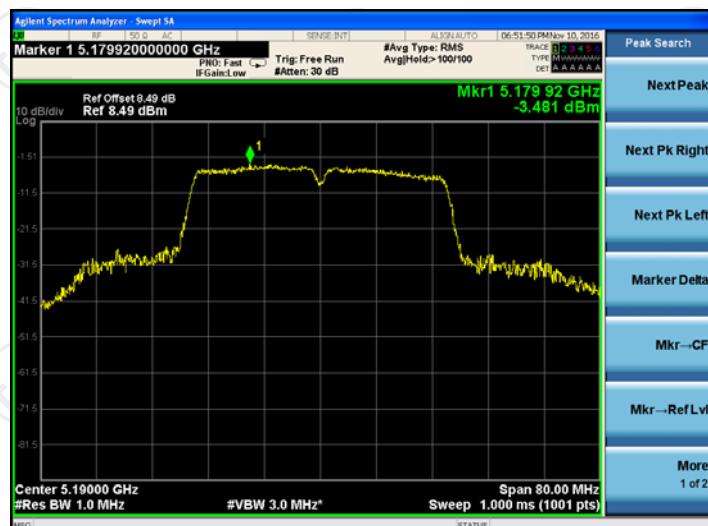
CH44



CH48



11n(HT40)



CH46

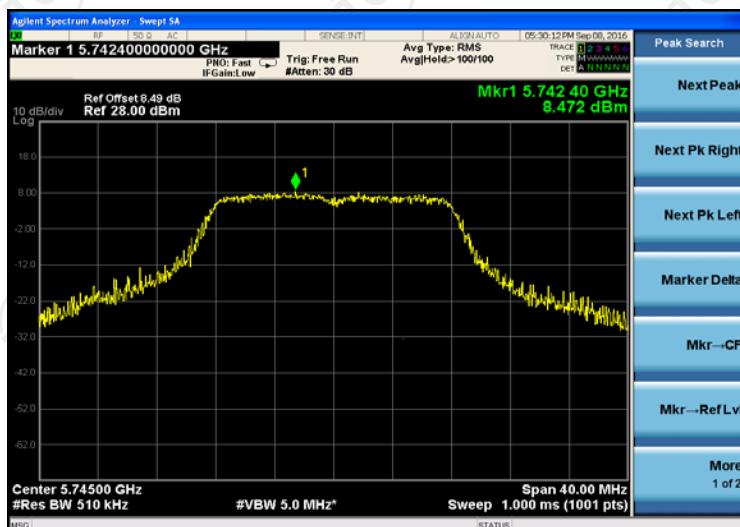


CH44

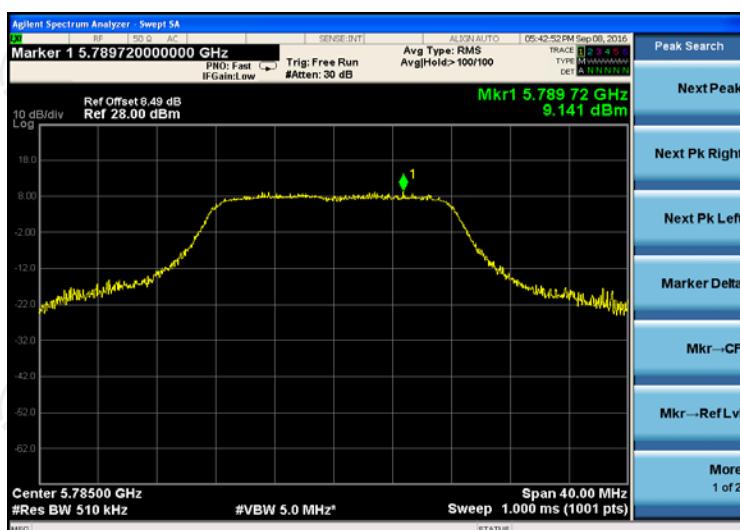
Band IV (5725 – 5850 MHz)

11a

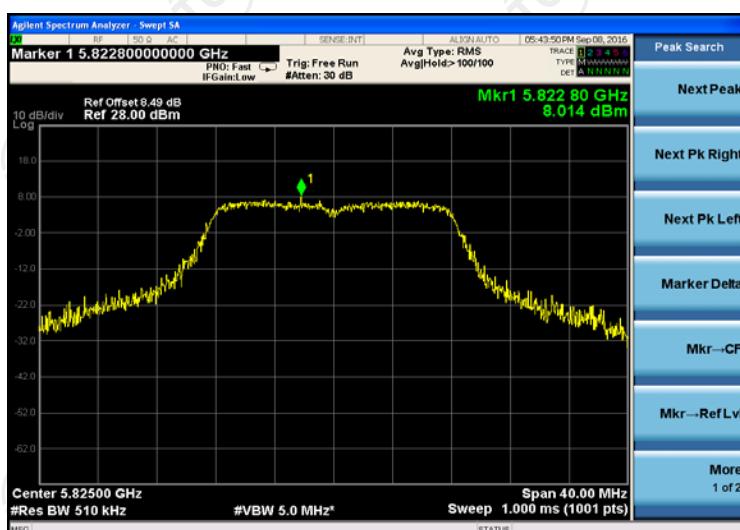
CH149



CH157

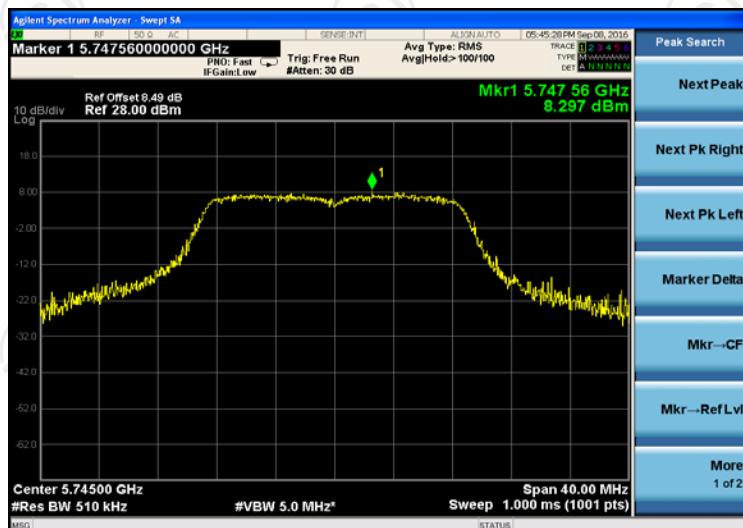


CH161

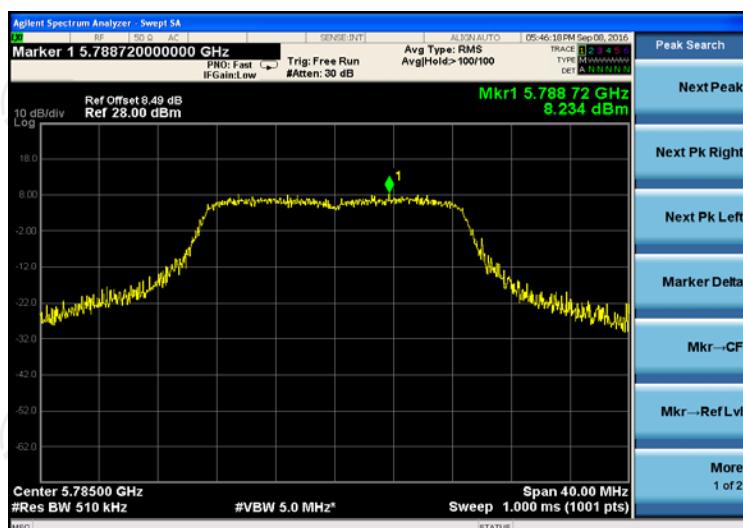


11n(HT20)

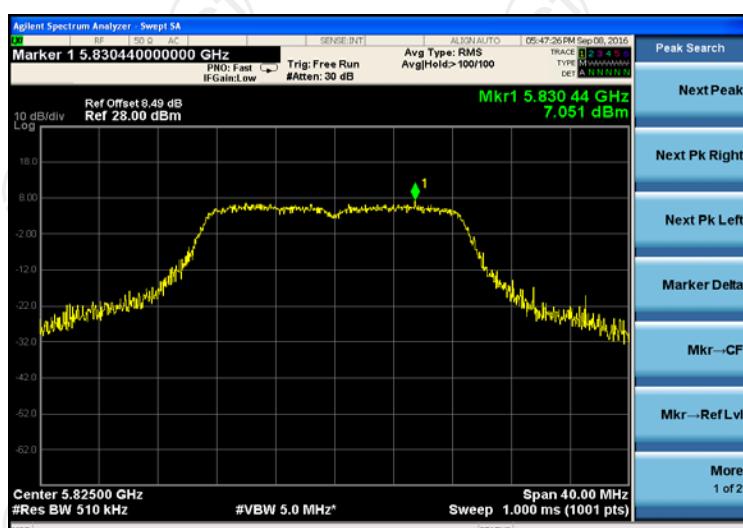
CH149



CH157



CH161

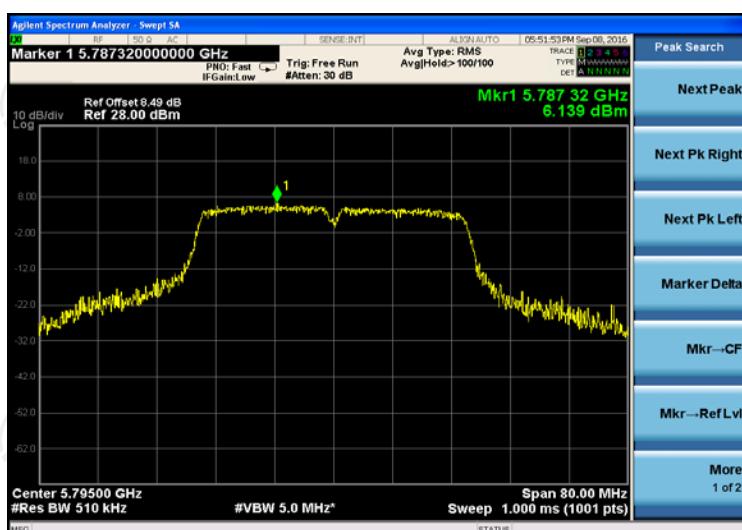


11n(HT40)

CH151



CH159



**ANT 1**

**Band I (5150 – 5250 MHz)**

11a

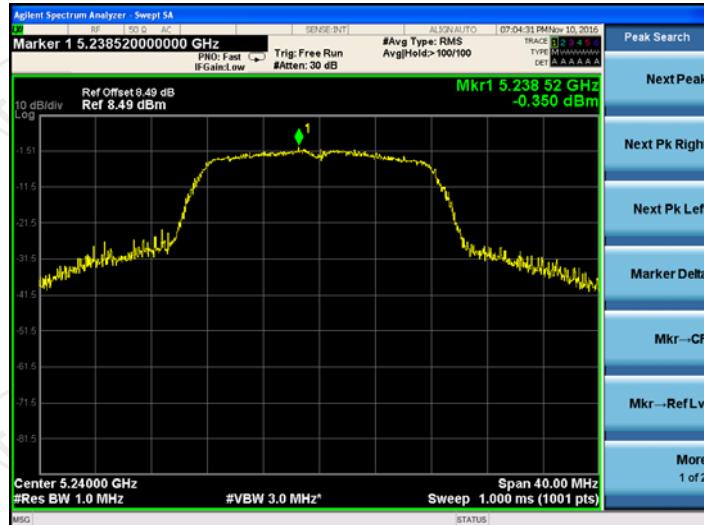
CH36



CH44



CH48



11n(HT20)

CH36



CH44



CH48



11n(HT40)

CH38



CH46

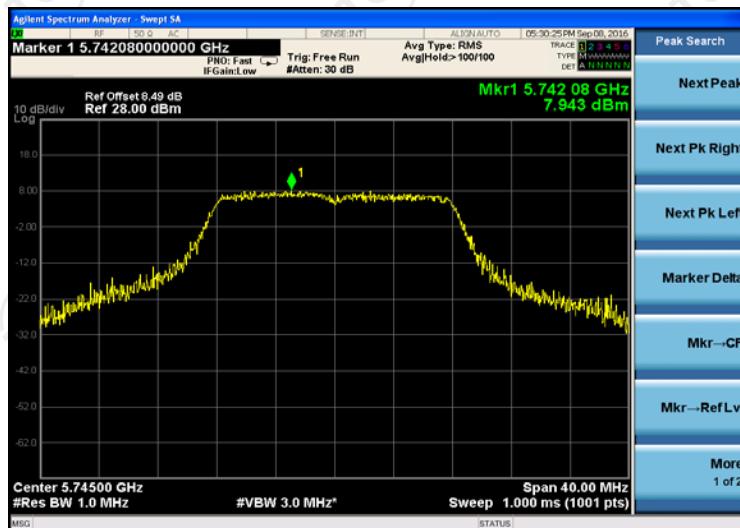


CH48

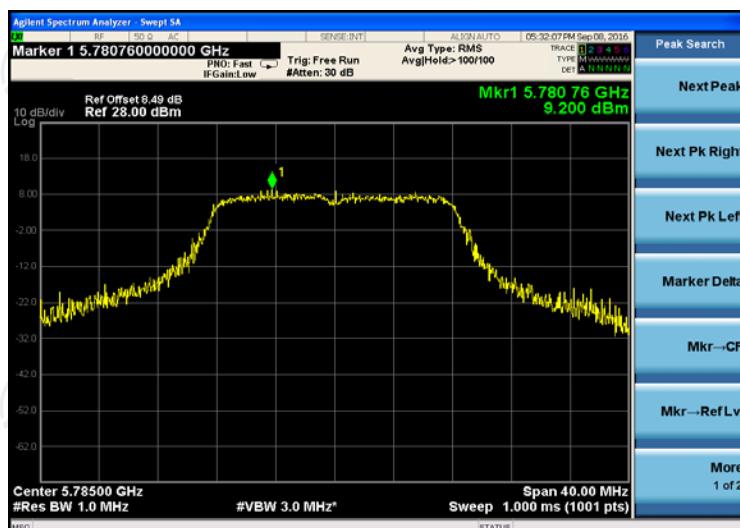
## Band IV (5725 – 5850 MHz)

11a

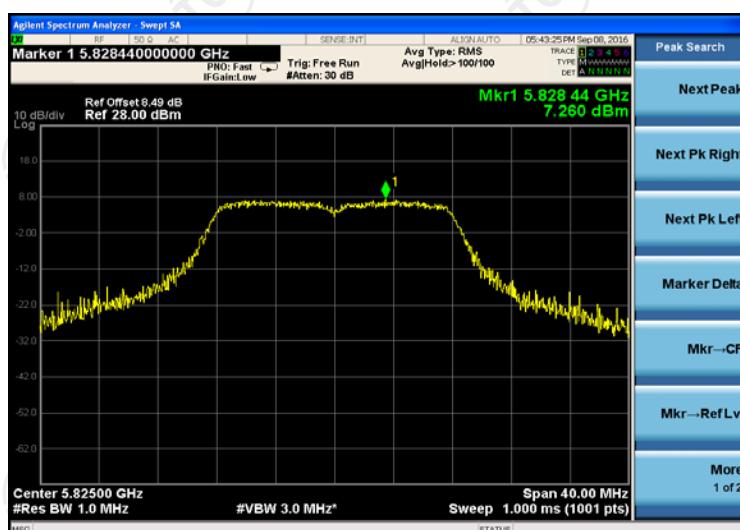
CH149



CH157

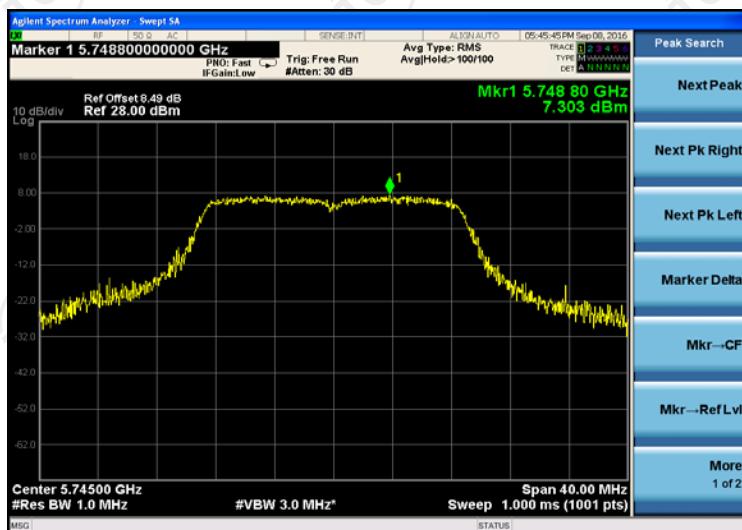


CH161

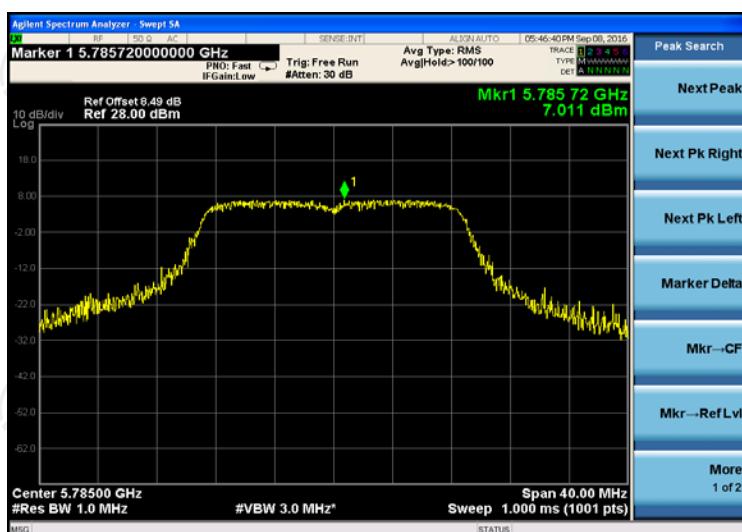


11n(HT20)

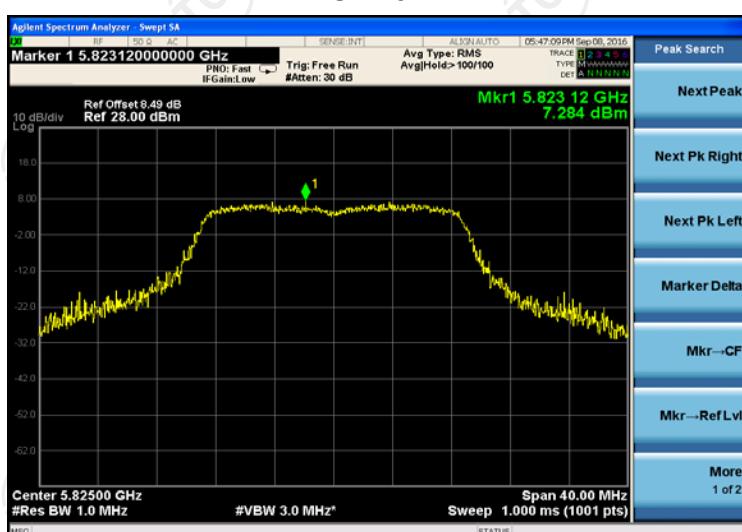
CH149



CH157



CH161

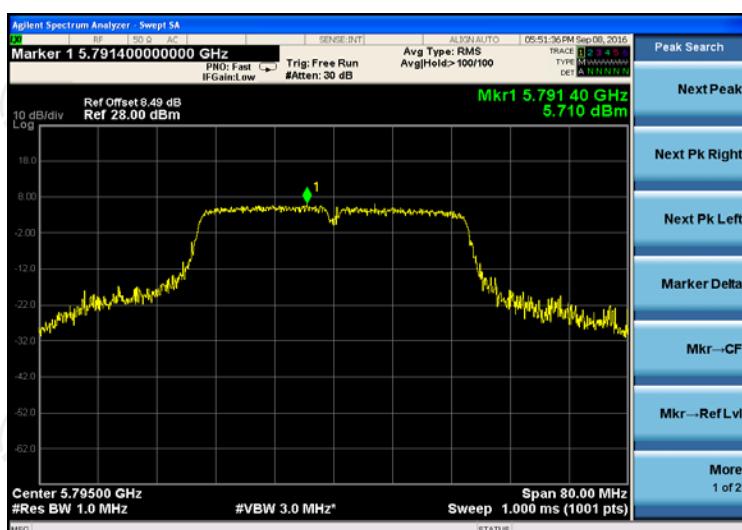


11n(HT40)

CH151

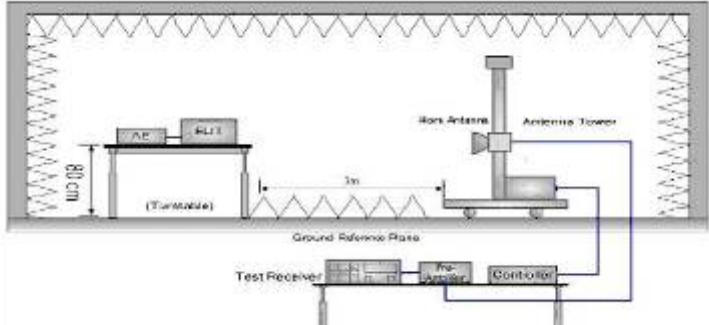


CH159



## 6.7. Band edge

### 6.7.1. Test Specification

<b>Test Requirement:</b>	FCC CFR47 Part 15E Section 15.407		
<b>Test Method:</b>	ANSI C63.10 2013		
<b>Limit:</b>	Bands	Limit (dB $\mu$ V/m @3m)	Remark
	For band I&II&III	68.2	Peak Value
		54.0	Average Value
	For band IV	78.2	Peak Value
		54.0	Average Value
	<p>Remark:            For band I&amp;II&amp;III, <math>E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 68.2 \text{ dB}\mu\text{V}/\text{m}</math>,            for EIRP(dBm)= <b>-27dBm</b>            For band IV, <math>E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 78.2 \text{ dB}\mu\text{V}/\text{m}</math>, for            EIRP(dBm)= <b>-17dBm</b></p>		
<b>Test Setup:</b>			
<b>Test Mode:</b>	Transmitting mode with modulation		
<b>Test Procedure:</b>	<ol style="list-style-type: none"> <li>The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>If the emission level of the EUT in peak mode was</li> </ol>		

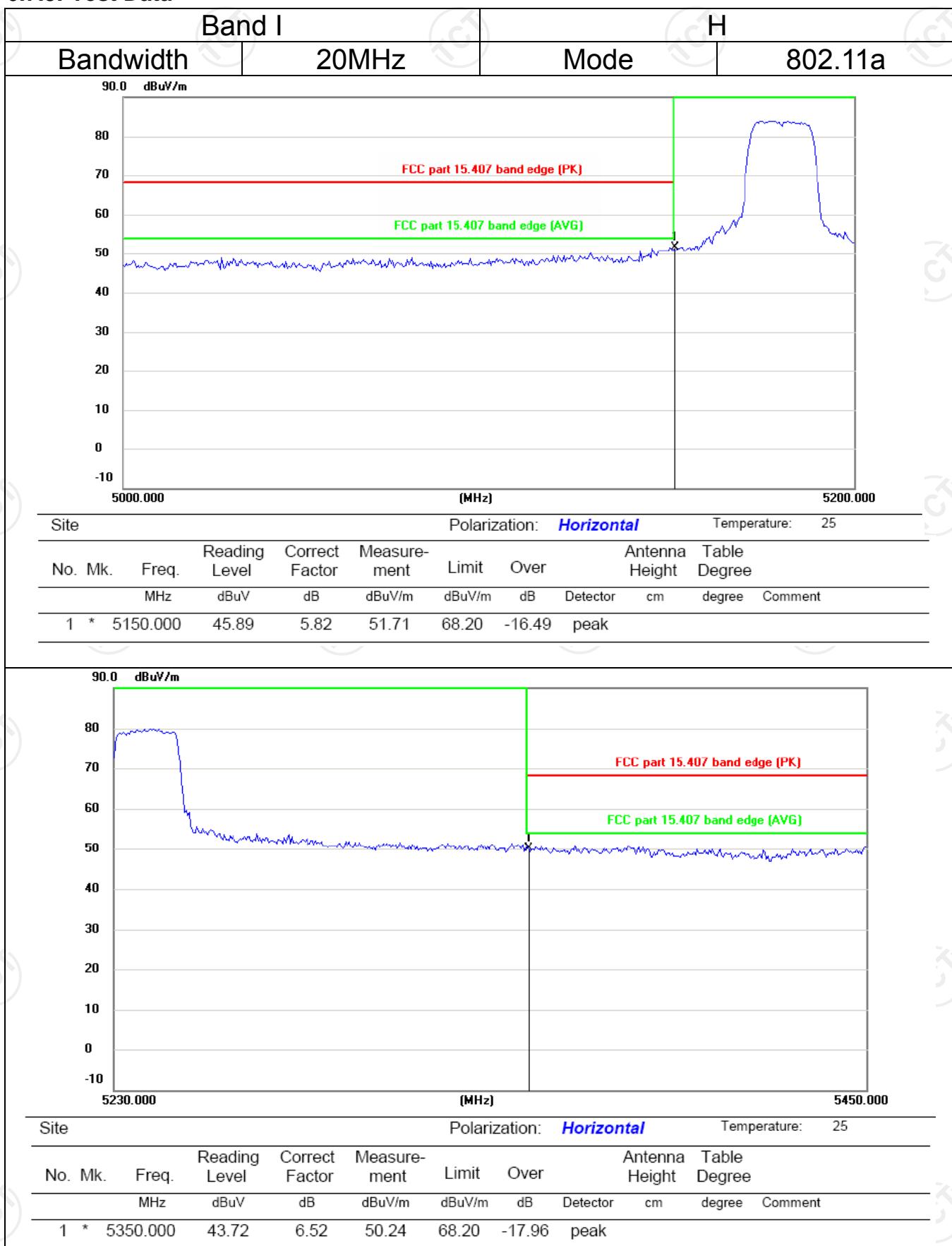
	10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasipeak or average method as specified and then reported in a data sheet.
<b>Test Result:</b>	PASS

### 6.7.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
ESPI Test Receiver	ROHDE&SCHW ARZ	ESVD	100008	Aug. 11, 2017
Spectrum Analyzer	ROHDE&SCHW ARZ	FSEM	848597/001	Aug. 11, 2017
Spectrum Analyzer	ROHDE&SCHW ARZ	FSP40	100056	Aug. 11, 2017
Spectrum Analyzer	Agilent	N9020A	MY49100060	Aug. 12, 2017
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Aug. 11, 2017
Pre-amplifier	HP	8447D	2727A05017	Aug. 11, 2017
Loop antenna	ZHINAN	ZN30900A	12024	Aug. 13, 2017
Broadband Antenna	Schwarzbeck	VULB9163	340	Aug. 13, 2017
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Aug. 13, 2017
Horn Antenna	Schwarzbeck	BBHA 9170	373	Aug. 13, 2017
Coax cable	TCT	RE-low-01	N/A	Aug. 11, 2017
Coax cable	TCT	RE-high-02	N/A	Aug. 11, 2017
Coax cable	TCT	RE-low-03	N/A	Aug. 11, 2017
Coax cable	TCT	RE-High-04	N/A	Aug. 11, 2017
Antenna Mast	CCS	CC-A-4M	N/A	Aug. 11, 2017
EMI Test Software	Shurples Technology	EZ-EMC	N/A	N/A

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

### 6.7.3. Test Data



## Band I

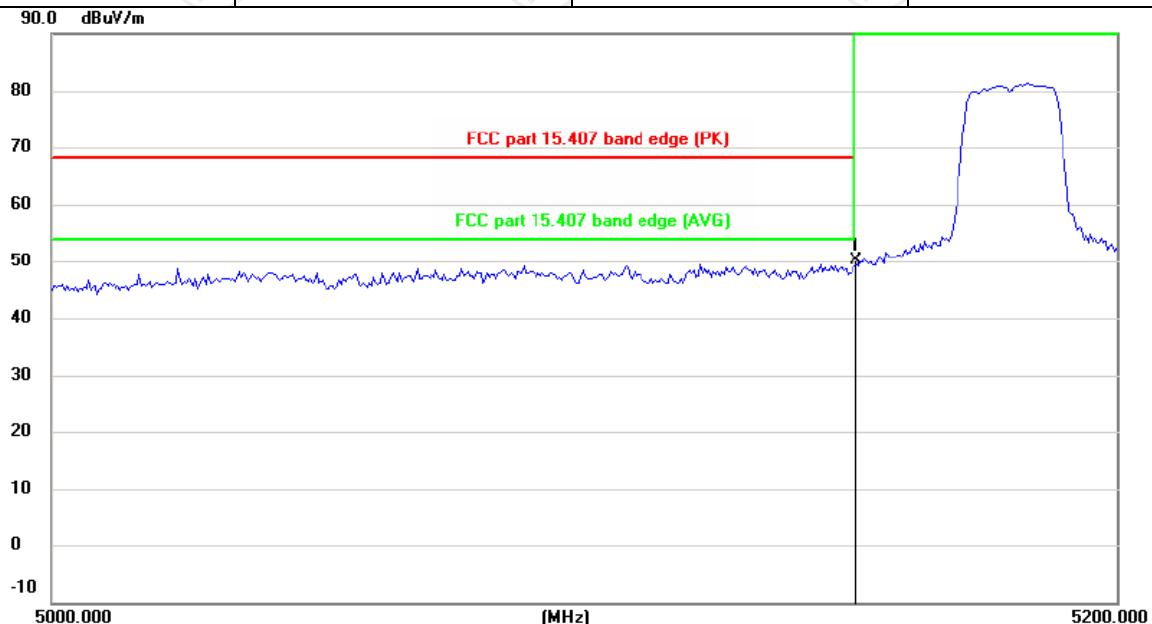
V

Bandwidth

20MHz

Mode

802.11a

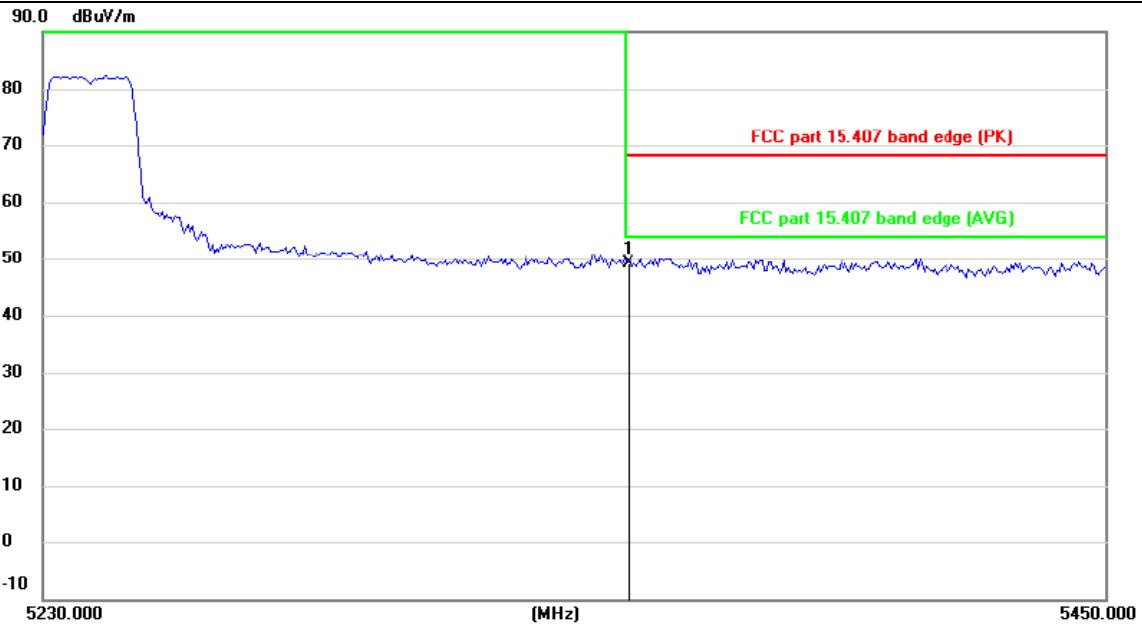


Site

 Polarization: **Vertical**

Temperature: 25

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	5150.000	44.30	5.82	50.12	68.20	-18.08	peak		

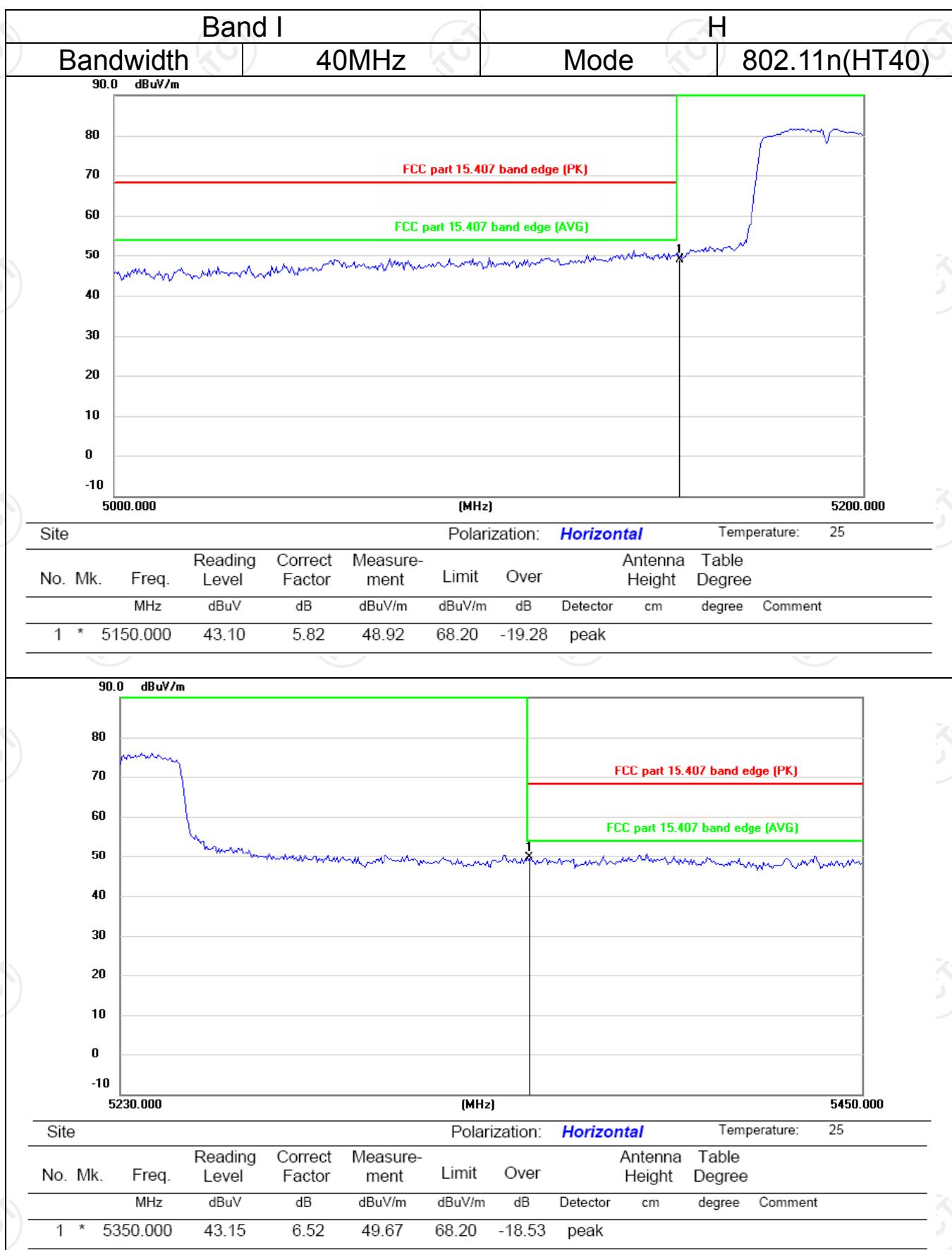


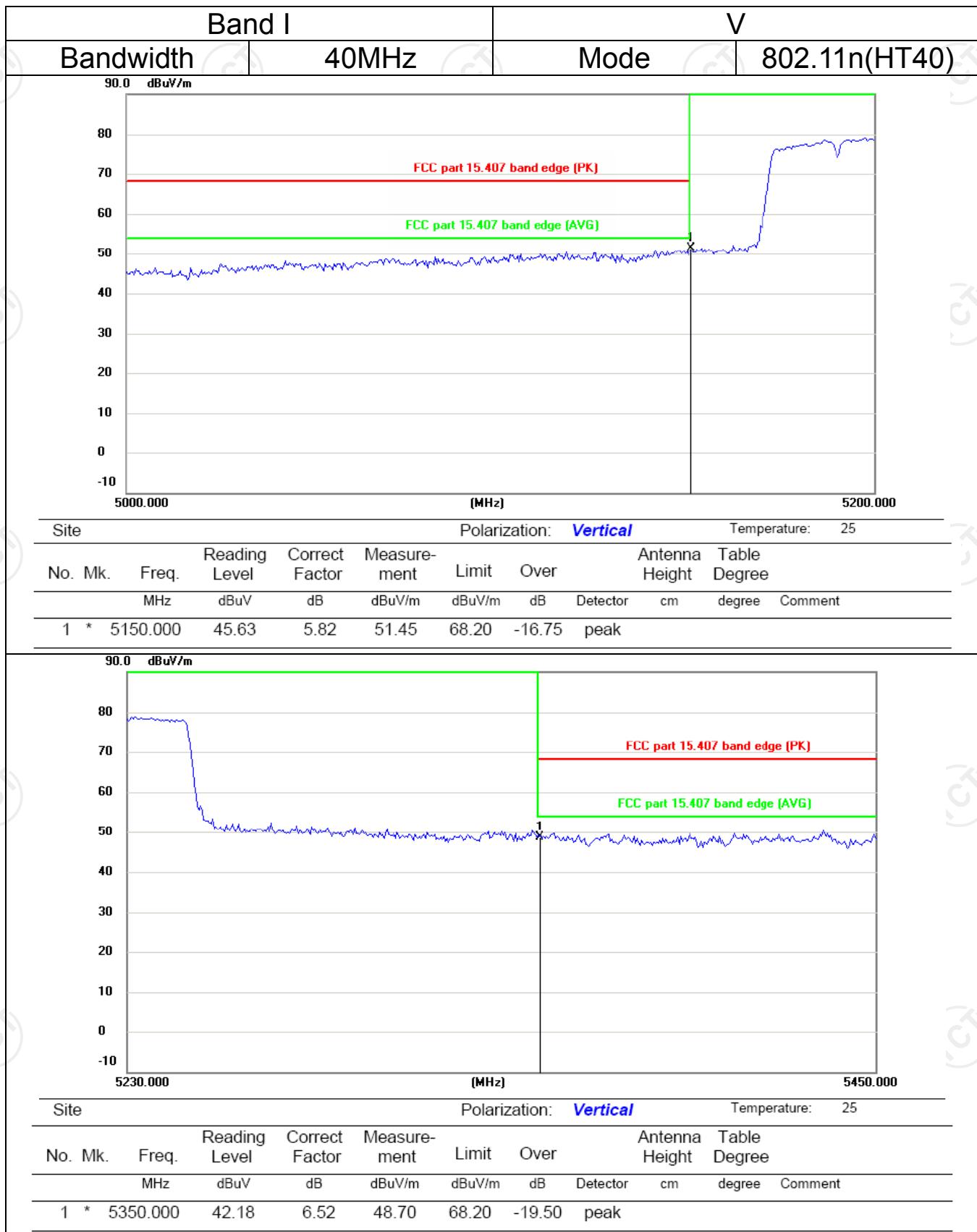
Site

 Polarization: **Vertical**

Temperature: 25

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	5350.000	42.73	6.52	49.25	68.20	-18.95	peak		

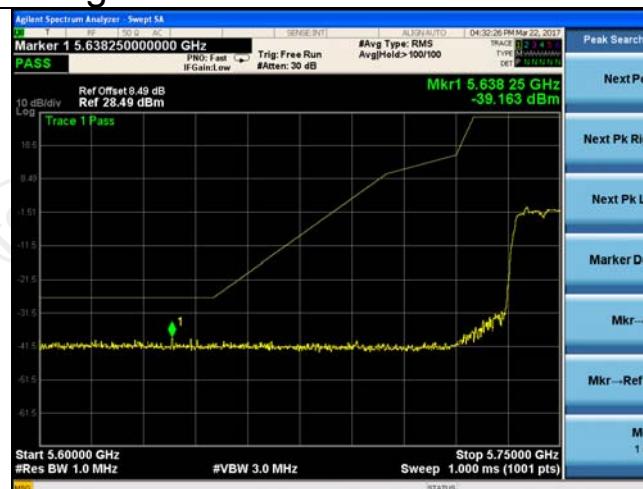




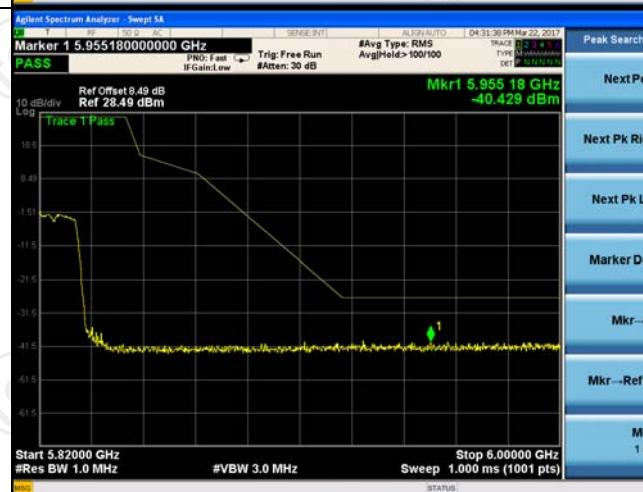
**Note:** All the 20MHz bandwidth modulation are tested, the 802.11a was the worst and record in the report.

### Band IV Band-edge for RF Conducted Emissions

802.11a /LCH



802.11a / HCH

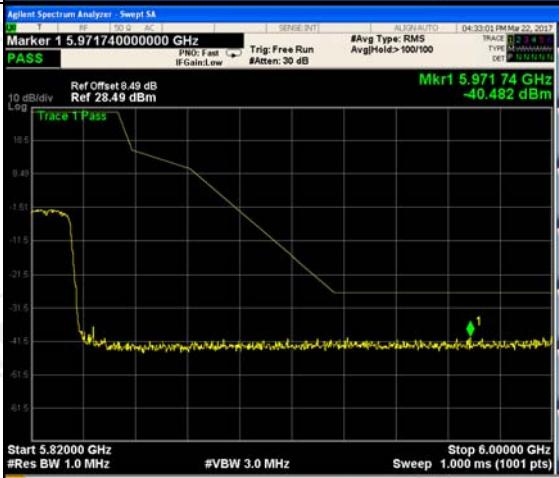


## Band IV Band-edge for RF Conducted Emissions

802.11n  
HT20 /LCH



802.11n  
HT20 / HCH

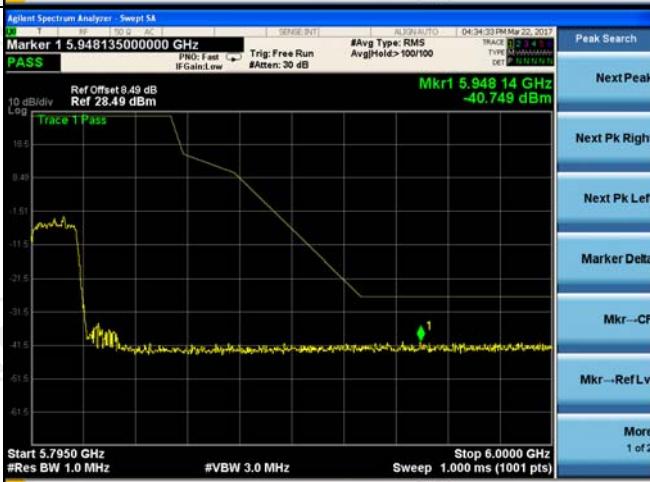


## Band IV Band-edge for RF Conducted Emissions

802.11n  
HT40 /LCH



802.11n  
HT40 / HCH

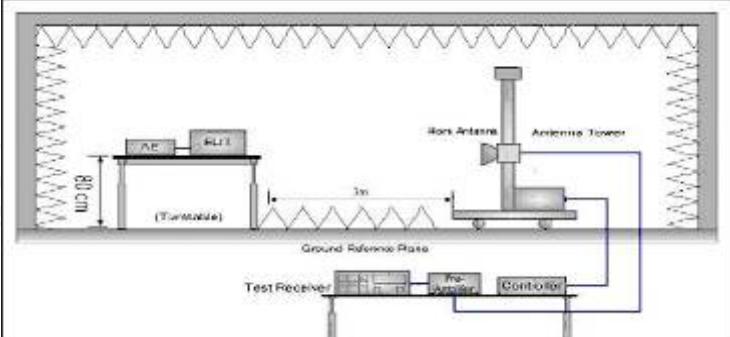


**Note:** All the 20MHz bandwidth modulation are tested and all antennas are tested, the 802.11a and the ANT 0 was the worst and record in the report. All the 40MHz bandwidth modulation are tested, the 802.11n (HT40) and the ANT 0 was the worst and record in the report.

## 6.8. Spurious Emission

### 6.8.1. Restrict Bands Measurement

#### 6.8.1.1. Test Specification

<b>Test Requirement:</b>	FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205							
<b>Test Method:</b>	KDB 789033 D02 v01r02							
<b>Frequency Range:</b>	Band I & II: 4.5 GHz to 5.15 GHz and 5.35GHz to 5.46GHz Band III & IV: 5.35 GHz to 5.46 GHz							
<b>Measurement Distance:</b>	3 m							
<b>Antenna Polarization:</b>	Horizontal & Vertical							
<b>Operation mode:</b>	Transmitting mode with modulation							
<b>Receiver Setup:</b>	Frequency	Detector	RBW	VBW	Remark			
	Above 1GHz	Peak	1MHz	3MHz	Peak Value			
		RMS	1MHz	3MHz	Average Value			
<b>Limit:</b>	Frequency	Limit (dBuV/m @3m)	Remark					
	Above 1GHz	74	Peak Value					
		54	Average Value					
<b>Test setup:</b>	Above 1GHz 							
<b>Test Procedure:</b>	1. The testing follows FCC KDB Publication No. 789033 D02 General UNII Test Procedures New Rules v01r02. Section G) Unwanted emissions measurement. 2. For the radiated emission test below 1GHz: The EUT was placed on a turntable with 0.8 meter above ground. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable							

	<p>(from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high PASS filter are used for the test in order to get better signal level.</p> <p>For the radiated emission test above 1GHz:</p> <p>Place the measurement antenna on a turntable with 1.5 meter above ground, which is away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.</p> <p>3. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level</p> <p>4. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.</p> <p>5. Use the following spectrum analyzer settings:</p> <ul style="list-style-type: none"><li>(1) Span shall wide enough to fully capture the emission being measured;</li><li>(2) Set RBW=100 kHz for <math>f &lt; 1</math> GHz; VBW <math>\geq</math> RBW; Sweep = auto; Detector function = peak; Trace = max hold;</li><li>(3) Set RBW = 1 MHz, VBW= 3MHz for <math>f &gt; 1</math> GHz for peak measurement.</li></ul> <p>For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW <math>\geq 1/T</math>, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.</p> <p>(4) A 5.8GHz high –PASS filter is used during radiated emissions above 1GHz measurement.</p>
<b>Test results:</b>	PASS

### 6.8.1.1 Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
ESPI Test Receiver	ROHDE&SCHW ARZ	ESVD	100008	Aug. 11, 2017
Spectrum Analyzer	ROHDE&SCHW ARZ	FSEM	848597/001	Aug. 11, 2017
Spectrum Analyzer	ROHDE&SCHW ARZ	FSP40	100056	Aug. 11, 2017
Spectrum Analyzer	Agilent	N9020A	MY49100060	Aug. 12, 2017
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Aug. 11, 2017
Pre-amplifier	HP	8447D	2727A05017	Aug. 11, 2017
Loop antenna	ZHINAN	ZN30900A	12024	Aug. 13, 2017
Broadband Antenna	Schwarzbeck	VULB9163	340	Aug. 13, 2017
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Aug. 13, 2017
Horn Antenna	Schwarzbeck	BBHA 9170	373	Aug. 13, 2017
Coax cable	TCT	RE-low-01	N/A	Aug. 11, 2017
Coax cable	TCT	RE-high-02	N/A	Aug. 11, 2017
Coax cable	TCT	RE-low-03	N/A	Aug. 11, 2017
Coax cable	TCT	RE-High-04	N/A	Aug. 11, 2017
Antenna Mast	CCS	CC-A-4M	N/A	Aug. 12, 2017
EMI Test Software	Shurples Technology	EZ-EMC	N/A	N/A

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

### 6.8.1.2 Test Data

#### Restrict band around fundamental

11a CH36: 5180MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
5137.57	H	48.72	---	0.53	49.25	---	74	54	-4.75
5187.19	H	49.83	---	0.59	50.42	---	74	54	-3.58
5186.28	H	48.62	---	0.57	49.19	---	74	54	-4.81
5137.09	V	51.65	---	0.53	52.18	---	74	54	-1.82
5186.28	V	51.43	---	0.54	51.97	---	74	54	-2.03
5186.28	V	52.35	---	0.57	52.92	---	74	54	-1.08
11n (HT20) CH36: 5180MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (Db $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (Db/m)	Emission Level		Peak limit (Db $\mu$ V/m)	AV limit (Db $\mu$ V/m)	Margin (Db)
					Peak (Db $\mu$ V/m)	AV (Db $\mu$ V/m)			
5142.20	H	51.36	---	0.55	51.91	---	74	54	-2.09
5150.00	H	51.88	---	0.66	52.54	---	74	54	-1.46
5183.20	H	48.76	---	0.86	49.62	---	74	54	-4.38
5150.00	H	49.38	---	0.66	50.04	---	74	54	-3.96
5187.19	H	49.51	---	0.85	50.36	---	74	54	-3.64
5142.65	V	49.82	---	0.55	50.37	---	74	54	-3.63
5150.03	V	51.37	---	0.66	52.03	---	74	54	-1.97
5183.29	V	48.29	---	0.58	48.87	---	74	54	-5.13
5150.00	V	49.43	---	0.66	50.09	---	74	54	-3.91
5187.28	V	50.16	---	0.57	50.73	---	74	54	-3.27

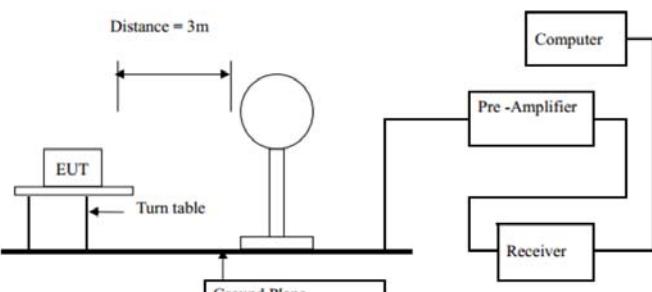
#### 11n(HT40) CH38: 5190MHz

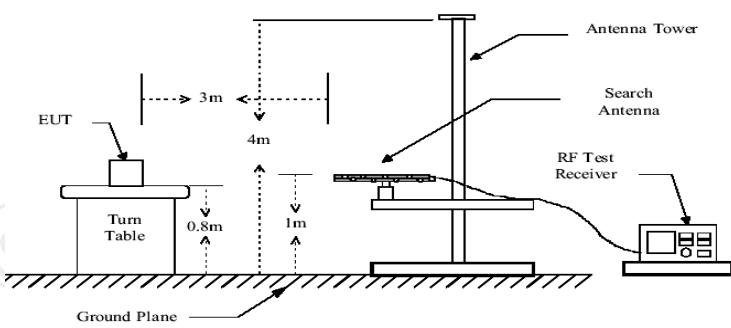
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
5135.98	H	50.12	---	0.57	50.69	---	74	54	-3.31
5207.33	H	53.45	---	0.86	54.31	---	74	54	0.31
5135.98	V	51.37	---	0.57	51.94	---	74	54	-2.06
5207.33	V	40.65	---	0.85	50.55	---	74	54	-3.45

**Note:** All the 20MHz bandwidth modulation are tested, the 802.11a was the worst and record in the report. All the 40MHz bandwidth modulation are tested, the 802.11n (HT40) was the worst and record in the report.

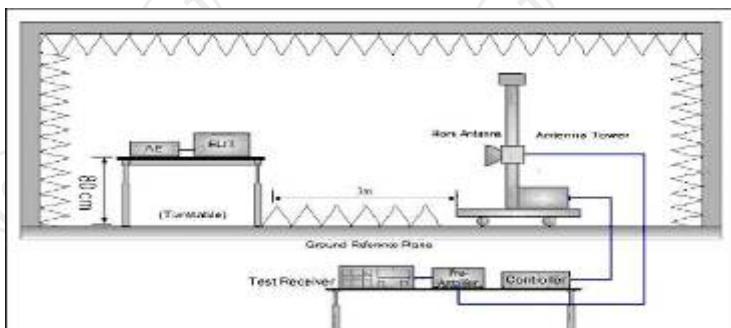
## 6.8.2. Unwanted Emissions out of the Restricted Bands

### 6.8.2.1. Test Specification

<b>Test Requirement:</b>	FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205																																				
<b>Test Method:</b>	KDB 789033 D02 v01r02																																				
<b>Frequency Range:</b>	9kHz to 40GHz																																				
<b>Measurement Distance:</b>	3 m																																				
<b>Antenna Polarization:</b>	Horizontal & Vertical																																				
<b>Operation mode:</b>	Transmitting mode with modulation																																				
<b>Receiver Setup:</b>	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Detector</th> <th>RBW</th> <th>VBW</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>9kHz- 150kHz</td> <td>Quasi-peak</td> <td>200Hz</td> <td>1kHz</td> <td>Quasi-peak Value</td> </tr> <tr> <td>150kHz- 30MHz</td> <td>Quasi-peak</td> <td>9kHz</td> <td>30kHz</td> <td>Quasi-peak Value</td> </tr> <tr> <td>30MHz-1GHz</td> <td>Quasi-peak</td> <td>100KHz</td> <td>300KHz</td> <td>Quasi-peak Value</td> </tr> <tr> <td rowspan="2">Above 1GHz</td><td>Peak</td> <td>1MHz</td> <td>3MHz</td> <td>Peak Value</td> </tr> <tr> <td>Peak</td> <td>1MHz</td> <td>10Hz</td> <td>Average Value</td> </tr> </tbody> </table>					Frequency	Detector	RBW	VBW	Remark	9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value	150kHz- 30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value	Above 1GHz	Peak	1MHz	3MHz	Peak Value	Peak	1MHz	10Hz	Average Value			
Frequency	Detector	RBW	VBW	Remark																																	
9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value																																	
150kHz- 30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value																																	
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value																																	
Above 1GHz	Peak	1MHz	3MHz	Peak Value																																	
	Peak	1MHz	10Hz	Average Value																																	
<b>Limit:</b>	<p>Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,</p> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Field Strength (microvolts/meter)</th> <th>Measurement Distance (meters)</th> </tr> </thead> <tbody> <tr> <td>0.009-0.490</td> <td>2400/F(KHz)</td> <td>300</td> </tr> <tr> <td>0.490-1.705</td> <td>24000/F(KHz)</td> <td>30</td> </tr> <tr> <td>1.705-30</td> <td>30</td> <td>30</td> </tr> <tr> <td>30-88</td> <td>100</td> <td>3</td> </tr> <tr> <td>88-216</td> <td>150</td> <td>3</td> </tr> <tr> <td>216-960</td> <td>200</td> <td>3</td> </tr> <tr> <td>Above 960</td> <td>500</td> <td>3</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Limit (dBuV/m @3m)</th> <th>Detector</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Above 1G</td><td>74.0</td> <td>Peak</td> </tr> <tr> <td>54.0</td> <td>Average</td> </tr> </tbody> </table>					Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)	0.009-0.490	2400/F(KHz)	300	0.490-1.705	24000/F(KHz)	30	1.705-30	30	30	30-88	100	3	88-216	150	3	216-960	200	3	Above 960	500	3	Frequency	Limit (dBuV/m @3m)	Detector	Above 1G	74.0	Peak	54.0	Average
Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)																																			
0.009-0.490	2400/F(KHz)	300																																			
0.490-1.705	24000/F(KHz)	30																																			
1.705-30	30	30																																			
30-88	100	3																																			
88-216	150	3																																			
216-960	200	3																																			
Above 960	500	3																																			
Frequency	Limit (dBuV/m @3m)	Detector																																			
Above 1G	74.0	Peak																																			
	54.0	Average																																			
<b>Test setup:</b>	<p>For radiated emissions below 30MHz</p>  <p>Distance = 3m</p> <p>EUT</p> <p>Turn table</p> <p>Ground Plane</p> <p>Computer</p> <p>Pre -Amplifier</p> <p>Receiver</p> <p>30MHz to 1GHz</p>																																				



Above 1GHz



- Test Procedure:**
1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
  2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
  3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
  4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.
  5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
  6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

<b>Test results:</b>	PASS
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### 6.8.3. Test Data

Please refer to following diagram for individual

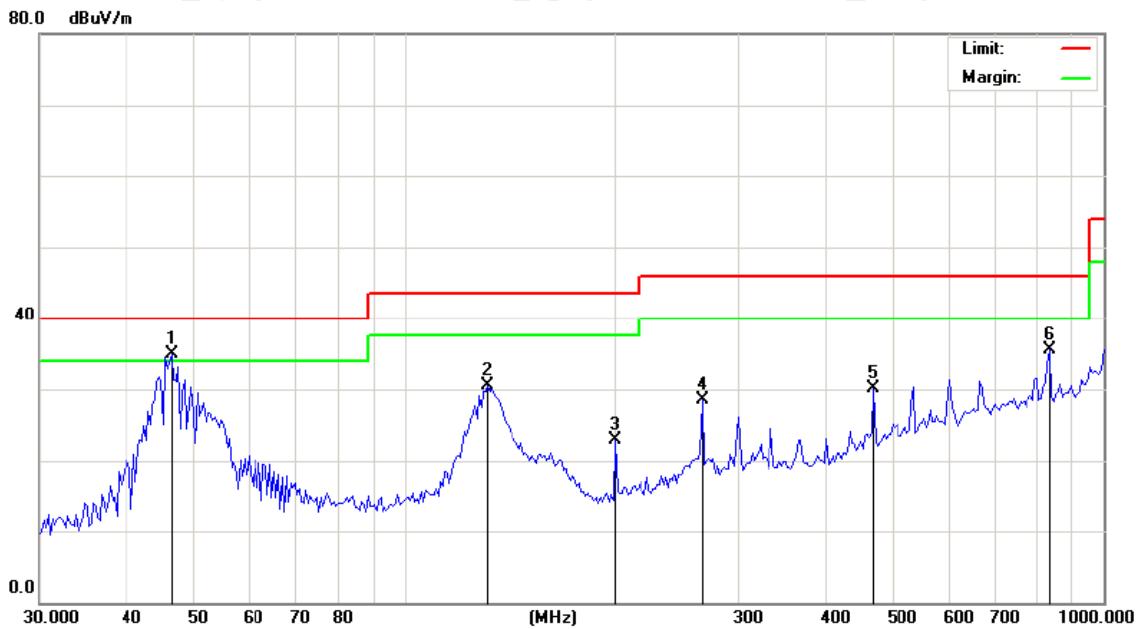
Below 1GHz

Horizontal:



Site		Polarization: <i>Horizontal</i>				Temperature: 25			
Limit: FCC Part 15B Class B RE_3 m		Power: AC 120V/60Hz				Humidity: 56 %			
No.	Mk.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	Comment
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	44.1544	38.77	-12.29	26.48	40.00	-13.52	QP		0
2	266.8394	42.72	-9.38	33.34	46.00	-12.66	QP		0
3	300.6988	39.36	-8.25	31.11	46.00	-14.89	QP		0
4	334.1254	39.00	-7.54	31.46	46.00	-14.54	QP		0
5 *	669.9523	34.55	-0.49	34.06	46.00	-11.94	QP		0
6	804.2522	32.49	1.51	34.00	46.00	-12.00	QP		0

Vertical:



Site

Polarization: **Vertical**

Temperature: 25

Limit: FCC Part 15B Class B RE\_3 m

Power: AC 120V/60Hz

Humidity: 56 %

No.	Mk.	Freq. MHz	Reading Level	Correct Factor	Measure- ment	Limit	Over	Antenna Height	Table Degree	Comment
			dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	
1	*	46.3806	47.05	-12.19	34.86	40.00	-5.14	QP	0	
2		131.2235	45.53	-15.06	30.47	43.50	-13.03	QP	0	
3		200.0432	34.54	-11.67	22.87	43.50	-20.63	QP	0	
4		266.8394	37.96	-9.38	28.58	46.00	-17.42	QP	0	
5		468.1650	34.09	-3.99	30.10	46.00	-15.90	QP	0	
6		838.8870	33.61	1.93	35.54	46.00	-10.46	QP	0	

**Note:** 1. The low frequency, which started from 9KHz~30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported

2. Measurements were conducted in all three channels (high, middle, low) and all modulation (802.11a, 802.11n), and the worst case Mode (Lowest channel and 802.11a) was submitted only.

Modulation Type: Band I

11a CH36: 5180MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
10360	H	51.35	---	0.66	52.01	---	74	54	-1.99
15540	H	41.08	---	9.5	50.58	---	74	54	-3.42
---	H	---	---	---	---	---	---	---	---
10360	V	50.28	---	0.66	50.94	---	74	54	-3.06
15540	V	43.25	---	9.5	52.75	---	74	54	-1.25
---	V	---	---	---	---	---	---	---	---

11a CH44: 5220MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
10440	H	51.78	---	0.99	52.77	---	74	54	-1.23
15660	H	39.82	---	9.85	49.67	---	74	54	-4.33
---	H	---	---	---	---	---	---	---	---
10440	V	51.62	---	0.99	52.61	---	74	54	-1.39
15660	V	42.21	---	9.85	52.06	---	74	54	-1.94
---	V	---	---	---	---	---	---	---	---

11a CH48: 5240MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
10480	H	48.52	---	1.33	49.85	---	74	54	-4.15
15720	H	42.27	---	10.22	52.49	---	74	54	-1.51
---	H	---	---	---	---	---	---	---	---
10480	V	51.62	---	1.33	52.95	---	74	54	-1.05
15720	V	41.35	---	10.22	51.57	---	74	54	-2.43
---	V	---	---	---	---	---	---	---	---

11n(HT20) CH36: 5180MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
10360	H	50.48	---	0.66	51.14	---	74	54	-2.86
15540	H	42.35	---	9.5	51.85	---	74	54	-2.15
---	H	---	---	---	---	---	---	---	---
10360	V	49.62	---	0.66	50.28	---	74	54	-3.72
15540	V	44.15	---	9.5	53.65	---	74	54	-0.35
---	V	---	---	---	---	---	---	---	---

11n(HT20) CH44: 5220MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
10440	H	52.62	---	0.99	53.61	---	74	54	-0.39
15660	H	40.29	---	9.85	50.14	---	74	54	-3.86
---	H	---	---	---	---	---	---	---	---
10440	V	50.78	---	0.99	51.77	---	74	54	-2.23
15660	V	43.52	---	9.85	53.37	---	74	54	-0.63
---	V	---	---	---	---	---	---	---	---

11n(HT20) CH48: 5240MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
10480	H	49.25	---	1.33	50.58	---	74	54	-3.42
15720	H	43.92	---	10.22	54.14	---	74	54	0.14
---	H	---	---	---	---	---	---	---	---
10480	V	51.23	---	1.33	52.56	---	74	54	-1.44
15720	V	42.64	---	10.22	52.86	---	74	54	-1.14
---	V	---	---	---	---	---	---	---	---
11n(HT40) CH38: 5190MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
10380	H	49.82	---	0.66	50.48	---	74	54	-3.52
15570	H	41.07	---	9.5	50.57	---	74	54	-3.43
---	H	---	---	---	---	---	---	---	---
10380	V	50.13	---	0.66	50.79	---	74	54	-3.21
15570	V	43.08	---	9.5	52.58	---	74	54	-1.42
---	V	---	---	---	---	---	---	---	---
11n(HT40) CH46: 5230MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
10460	H	51.33	---	0.99	52.32	---	74	54	-1.68
15690	H	41.26	---	9.85	51.11	---	74	54	-2.89
---	H	---	---	---	---	---	---	---	---
10460	V	51.67	---	0.99	52.66	---	74	54	-1.34
15690	V	42.32	---	9.85	52.17	---	74	54	-1.83
---	V	---	---	---	---	---	---	---	---

**Note:**

1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier
2. Margin (dB) = Emission Level (Peak) (dB $\mu$ V/m)-Average limit (dB $\mu$ V/m)
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency. The highest test frequency is 40GHz.
5. Data of measurement shown “---”in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

Modulation Type: Band IV

11a CH149: 5745MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
11490	H	51.57	---	0.66	52.23	---	74	54	-1.77
17235	H	42.38	---	9.5	51.88	---	74	54	-2.12
---	H	---	---	---	---	---	---	---	---
11490	V	50.49	---	0.66	51.15	---	74	54	-2.85
17235	V	43.13	---	9.5	52.63	---	74	54	-1.37
---	V	---	---	---	---	---	---	---	---

11a CH157: 5785MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
11570	H	50.62	---	0.99	51.61	---	74	54	-2.39
17355	H	42.22	---	9.85	52.07	---	74	54	-1.93
---	H	---	---	---	---	---	---	---	---
11570	V	48.72	---	0.99	49.71	---	74	54	-4.29
17355	V	41.57	---	9.85	51.42	---	74	54	-2.58
---	V	---	---	---	---	---	---	---	---

11a CH161: 5825MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
11650	H	50.63	---	1.33	51.96	---	74	54	-2.04
17475	H	41.51	---	10.22	51.73	---	74	54	-2.27
---	H	---	---	---	---	---	---	---	---
11650	V	51.49	---	1.33	52.82	---	74	54	-1.18
17475	V	41.87	---	10.22	52.09	---	74	54	-1.91
---	V	---	---	---	---	---	---	---	---

11n(HT20) CH149: 5745MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
11490	H	51.16	---	0.66	51.82	---	74	54	-2.18
17235	H	42.88	---	9.5	52.38	---	74	54	-1.62
---	H	---	---	---	---	---	---	---	---
11490	V	51.74	---	0.66	52.4	---	74	54	-1.6
17235	V	43.55	---	9.5	53.05	---	74	54	-0.95
---	V	---	---	---	---	---	---	---	---

11n(HT20) CH157: 5785MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
11570	H	51.28	---	0.66	51.94	---	74	54	-2.06
17355	H	40.53	---	9.5	50.03	---	74	54	-3.97
---	H	---	---	---	---	---	---	---	---
11570	V	50.15	---	0.66	50.81	---	74	54	-3.19
17355	V	41.67	---	9.5	51.17	---	74	54	-2.83
---	V	---	---	---	---	---	---	---	---

11n(HT20) CH161: 5825MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
11650	H	51.24	---	0.99	52.23	---	74	54	-1.77
17475	H	39.05	---	9.85	48.9	---	74	54	-5.1
---	H	---	---	---	---	---	---	---	---
11650	V	50.25	---	0.99	51.24	---	74	54	-2.76
17475	V	40.96	---	9.85	50.81	---	74	54	-3.19
---	V	---	---	---	---	---	---	---	---

11n(HT40) CH151: 5755MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
11510	H	50.53	---	1.33	51.86	---	74	54	-2.14
17265	H	41.62	---	10.22	51.84	---	74	54	-2.16
---	H	---	---	---	---	---	---	---	---
11510	V	51.68	---	1.33	53.01	---	74	54	-0.99
17265	V	41.46	---	10.22	51.68	---	74	54	-2.32
---	V	---	---	---	---	---	---	---	---

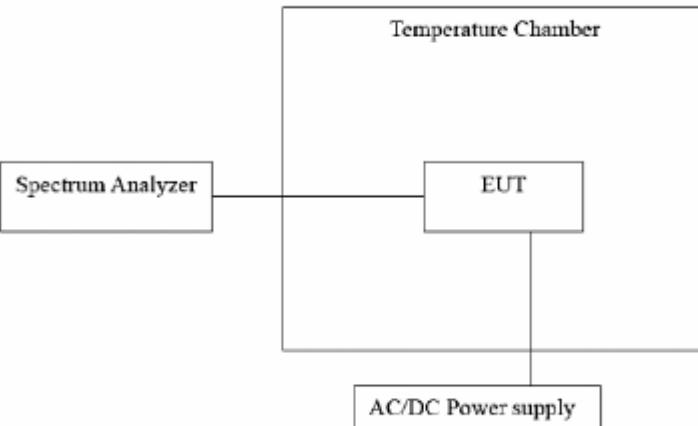
11n(HT40) CH159: 5795MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
11590	H	51.39	---	0.66	52.05	---	74	54	-1.95
17385	H	39.86	---	9.5	49.36	---	74	54	-4.64
---	H	---	---	---	---	---	---	---	---
11590	V	50.77	---	0.66	51.43	---	74	54	-2.57
17385	V	40.56	---	9.5	50.06	---	74	54	-3.94
---	V	---	---	---	---	---	---	---	---

**Note:**

1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier
2. Margin (dB) = Emission Level (Peak) (dB $\mu$ V/m)-Average limit (dB $\mu$ V/m)
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency. The highest test frequency is 40GHz.
5. Data of measurement shown “---”in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

## 6.9. Frequency Stability Measurement

### 6.9.1. Test Specification

<b>Test Requirement:</b>	FCC Part15 Section 15.407(g) &Part2 J Section 2.1055
<b>Test Method:</b>	ANSI C63.10: 2013
<b>Limit:</b>	The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of 0 degrees to 35 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.
<b>Test Setup:</b>	 <pre> graph LR     SA[Spectrum Analyzer] --- EUT[EUT]     EUT --- AC[AC/DC Power supply]     EUT --- TC[Temperature Chamber]   </pre>
<b>Test Procedure:</b>	<p>The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage.</p> <ol style="list-style-type: none"> <li>Turn the EUT on and couple its output to a spectrum analyzer.</li> <li>Turn the EUT off and set the chamber to the highest temperature specified.</li> <li>Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize.</li> <li>Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.</li> <li>The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.</li> </ol>
<b>Test Result:</b>	PASS
<b>Remark:</b>	Pre-scan was performed at Antenna 0, Antenna 1 and Antenna 2, no worst case was found. Only the test data of Antenna 0 was shown in this report.

Test plots as follows:

Test mode:		802.11a	Frequency(MHz):	5180	
Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result	
45	3.3	5180.0021	2100	PASS	
35		5180.0057	5700	PASS	
25		5179.9867	-13300	PASS	
15		5179.9978	-2200	PASS	
5		5180.0032	3200	PASS	
0		5180.0051	5100	PASS	
20		3.795	5179.9836	-16400	PASS
		3.3	5180.0035	3500	PASS
		2.805	5179.9819	-18100	PASS

Test mode:		802.11a	Frequency(MHz):	5200	
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result	
45	3.3	5200.0087	8700	PASS	
35		5200.0092	9200	PASS	
25		5200.0073	7300	PASS	
15		5200.0051	5100	PASS	
5		5199.989	-11000	PASS	
0		5199.9872	-12800	PASS	
20		3.795	5199.9949	-5100	PASS
		3.3	5200.0035	3500	PASS
		2.805	5200.0056	5600	PASS

Test mode:		802.11a	Frequency(MHz):	5240	
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result	
45	3.3	5240.0038	3800	PASS	
35		5240.0025	2500	PASS	
25		5240.0031	3100	PASS	
15		5239.9987	-1300	PASS	
5		5239.9979	-2100	PASS	
0		5239.9982	-1800	PASS	
20		3.795	5240.0043	4300	PASS
		3.3	5240.0032	3200	PASS
		2.805	5239.9989	-1100	PASS

Test mode:		802.11n(HT20)	Frequency(MHz):	5180	
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result	
45	3.3	5180.0079	7900	PASS	
35		5180.0028	2800	PASS	
25		5179.9981	-1900	PASS	
15		5179.9989	-1100	PASS	
5		5180.0026	2600	PASS	
0		5180.0041	4100	PASS	
20		3.795	5180.0029	2900	PASS
		3.3	5179.9988	-1200	PASS
		2.805	5179.9993	-700	PASS

Test mode:		802.11n(HT20)	Frequency(MHz):	5200	
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result	
45	3.3	5200.0085	8500	PASS	
35		5200.0041	4100	PASS	
25		5200.0038	3800	PASS	
15		5200.0016	1600	PASS	
5		5200.0025	2500	PASS	
0		5200.0037	3700	PASS	
20		3.795	5199.9976	-2400	PASS
		3.3	5199.9987	-1300	PASS
		2.805	5200.0039	3900	PASS

Test mode:		802.11n(HT20)	Frequency(MHz):	5240	
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result	
45	3.3	5240.0095	9500	PASS	
35		5240.0022	2200	PASS	
25		5240.0039	3900	PASS	
15		5240.0015	1500	PASS	
5		5240.0037	3700	PASS	
0		5240.0049	4900	PASS	
20		3.795	5240.0018	1800	PASS
		3.3	5239.9985	-1500	PASS
		2.805	5239.9979	-2100	PASS

Test mode:		802.11n(HT40)	Frequency(MHz):	5190
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.3	5190.0132	13200	PASS
35		5190.0121	12100	PASS
25		5190.0115	11500	PASS
15		5190.0027	2700	PASS
5		5190.0059	5900	PASS
0		5190.0075	7500	PASS
20		5189.9923	-7700	PASS
	3.795	5189.9975	-2500	PASS
	3.3	5190.0039	3900	PASS

Test mode:		802.11n(HT40)	Frequency(MHz):	5230
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.3	5230.0118	11800	PASS
35		5230.0115	11500	PASS
25		5230.0088	8800	PASS
15		5229.9976	-2400	PASS
5		5229.9979	-2100	PASS
0		5230.0049	4900	PASS
20		5230.0035	3500	PASS
	3.795	5230.0025	2500	PASS
	3.3	5229.9962	-3800	PASS
	2.805			

\*\*\*\*\*END OF REPORT\*\*\*\*\*