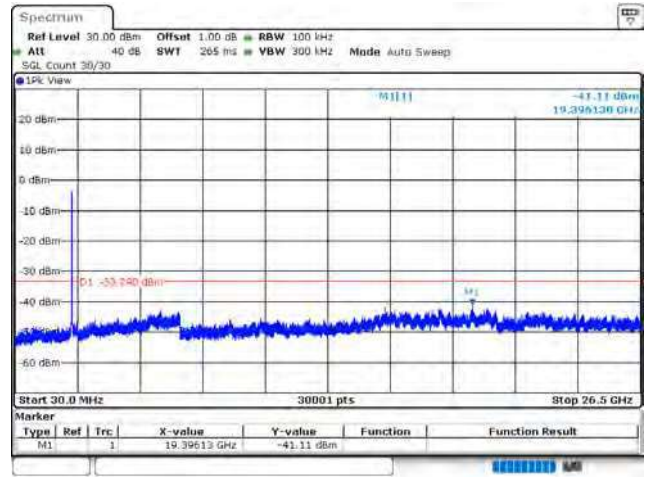
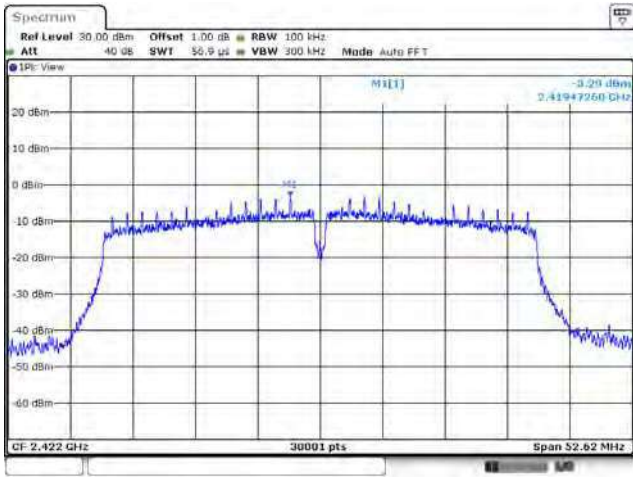
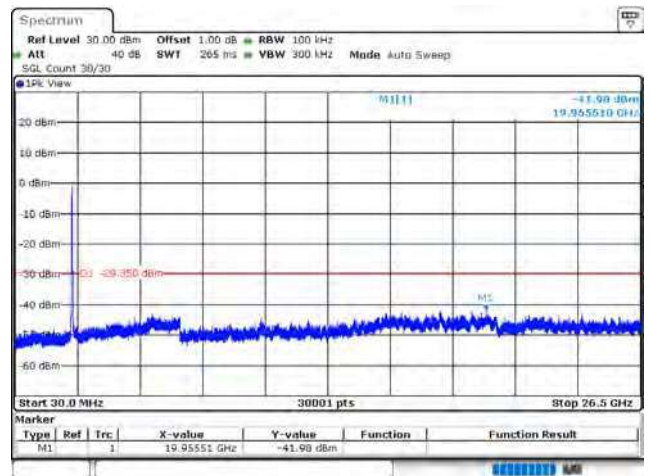
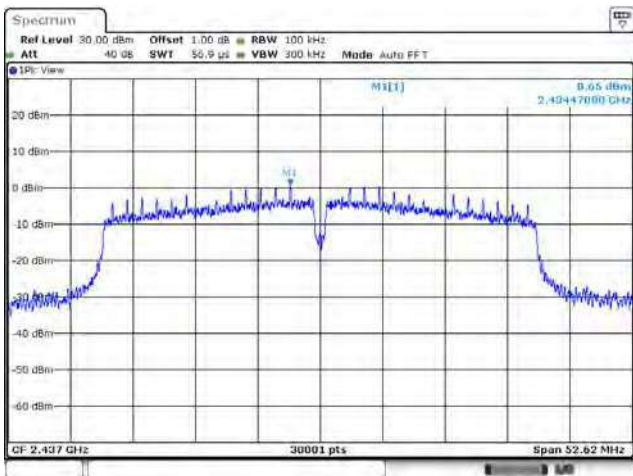


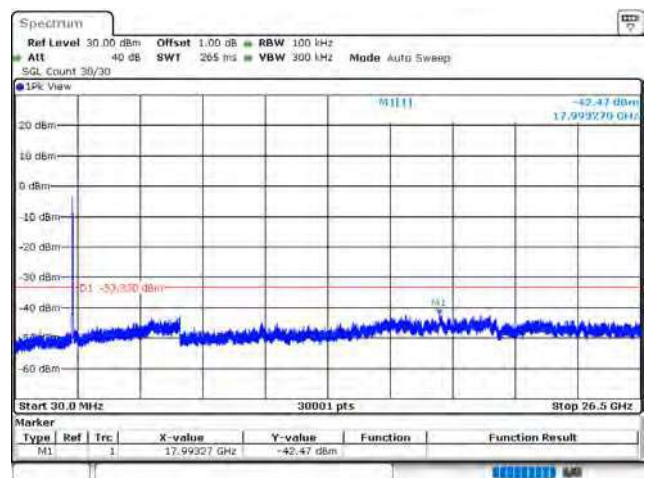
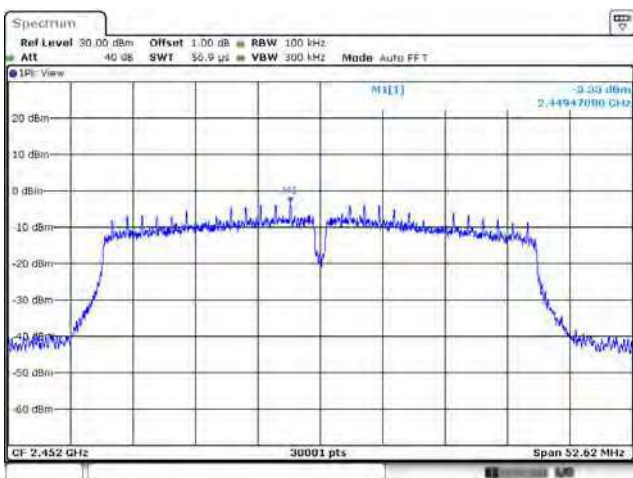
802.11n (40 MHz) / Ant. 0 / 2422 MHz



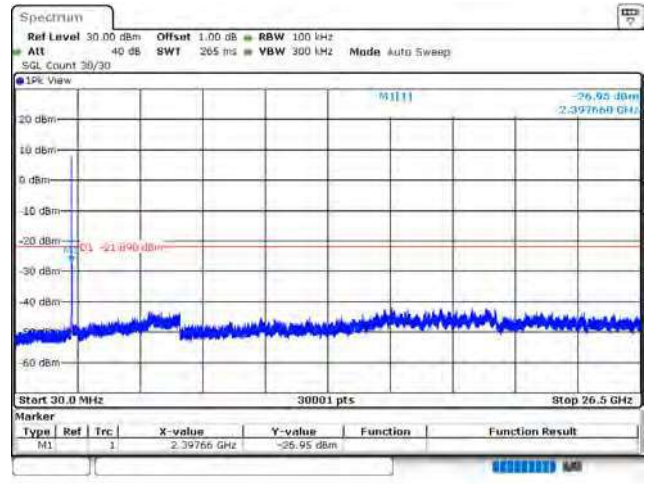
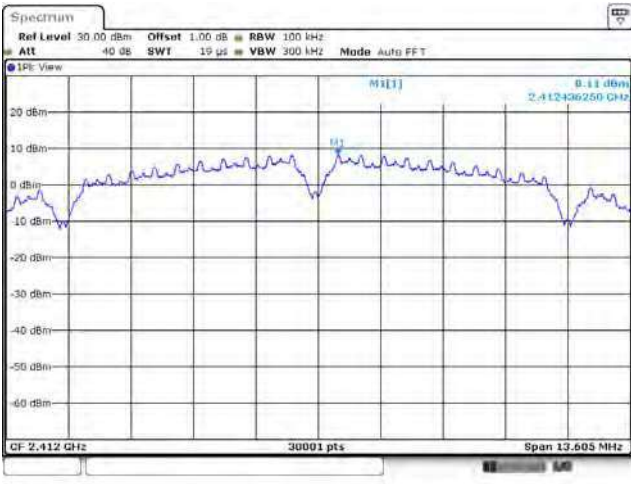
802.11n (40 MHz) / Ant. 0 / 2437 MHz



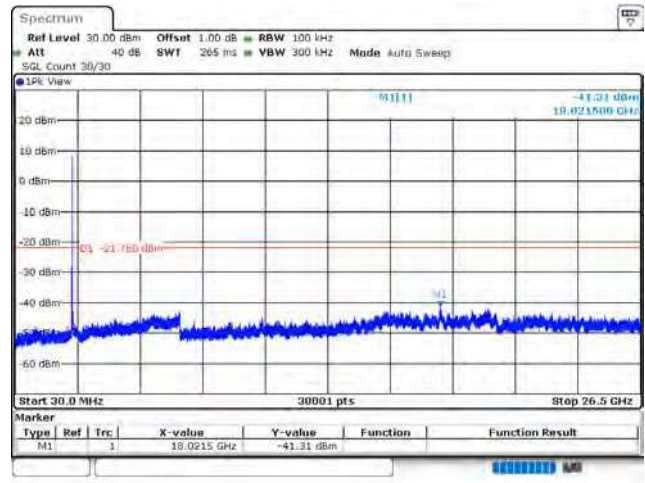
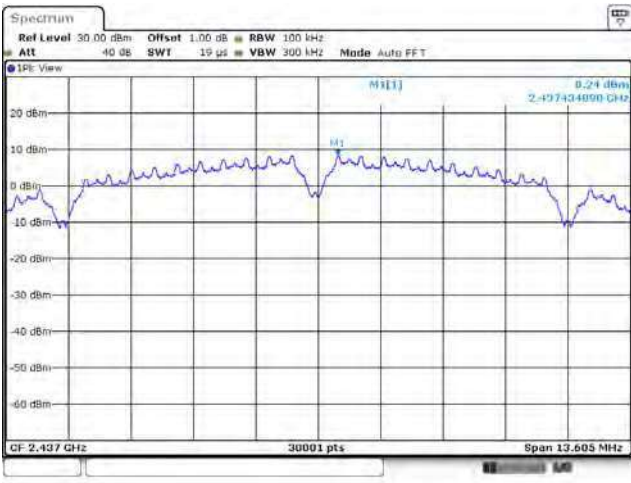
802.11n (40 MHz) / Ant. 0 / 2452 MHz



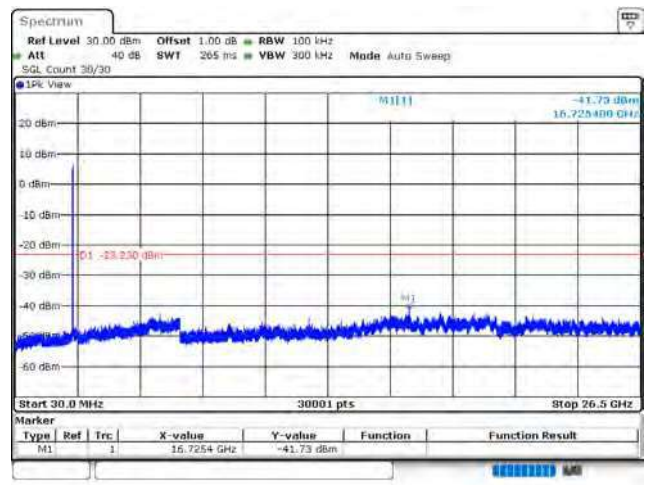
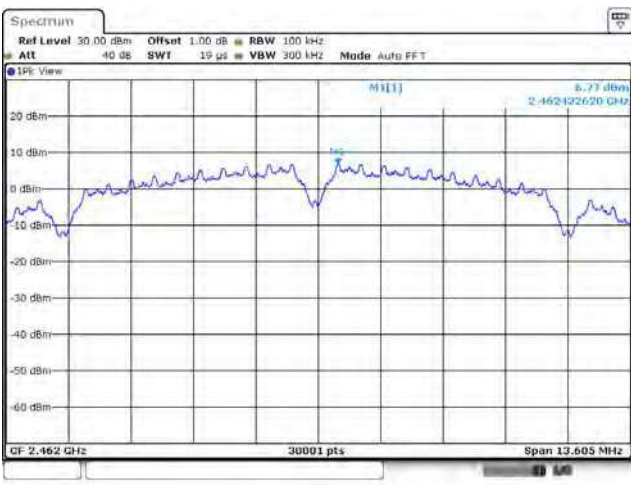
802.11b / Ant. 1 / 2412 MHz



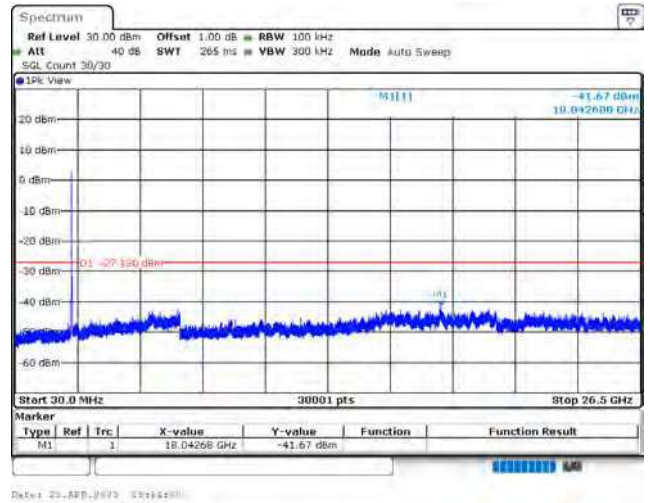
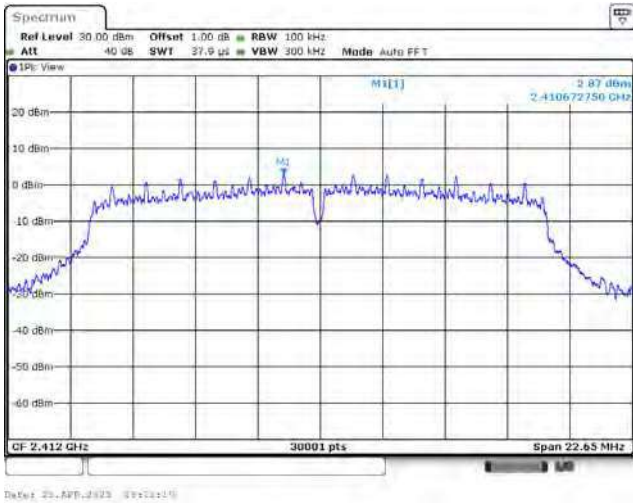
802.11b / Ant. 1 / 2437 MHz



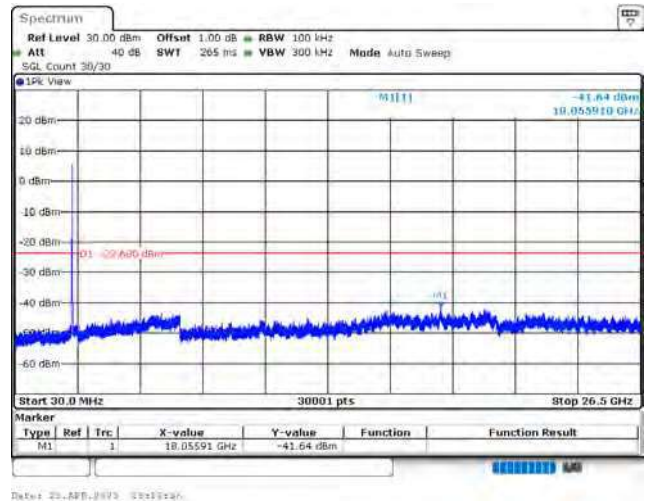
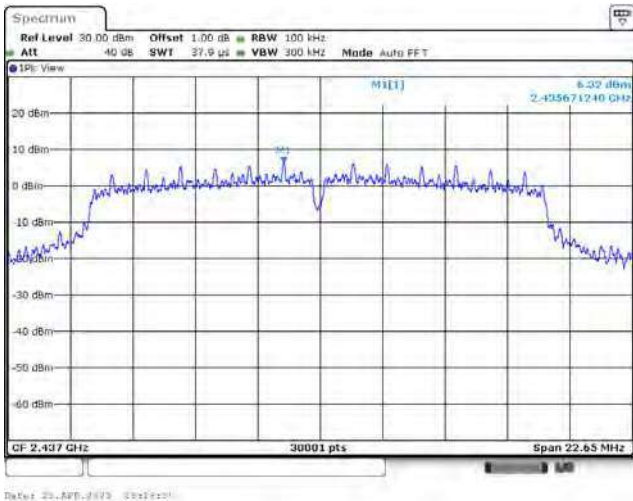
802.11b / Ant. 1 / 2462 MHz



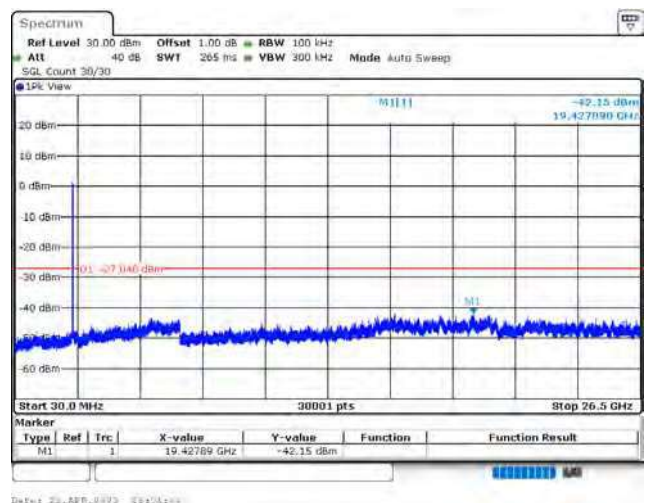
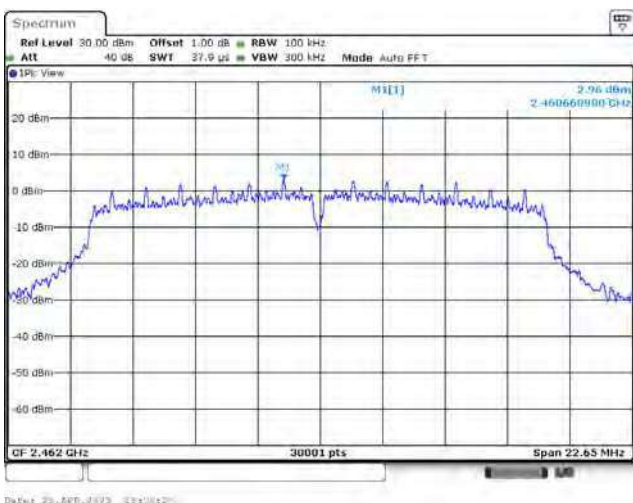
802.11g / Ant. 1 / 2412 MHz



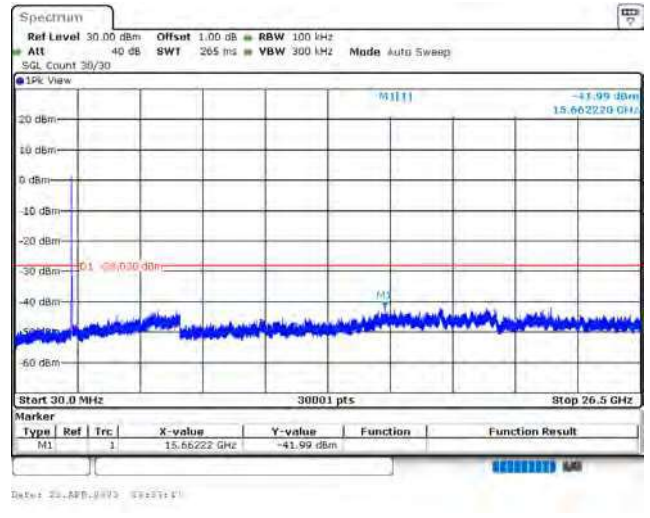
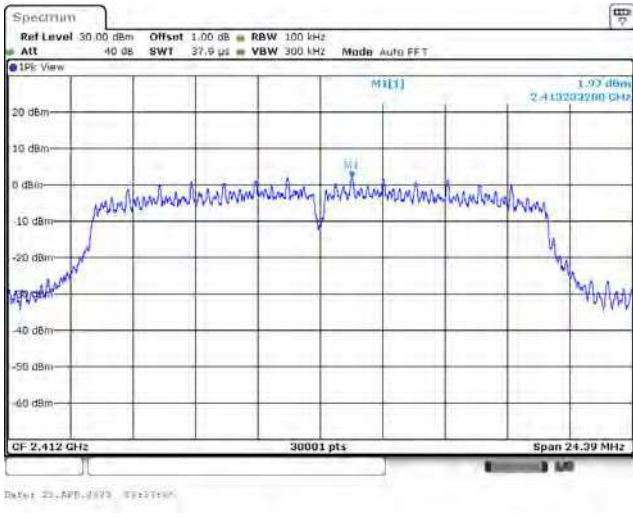
802.11g / Ant. 1 / 2437 MHz



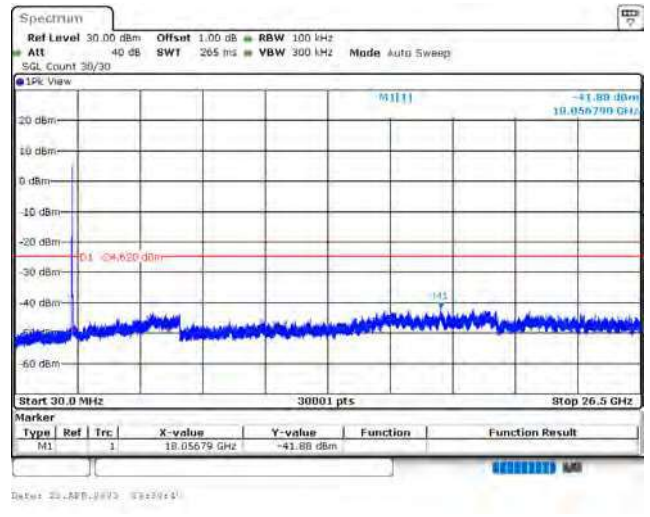
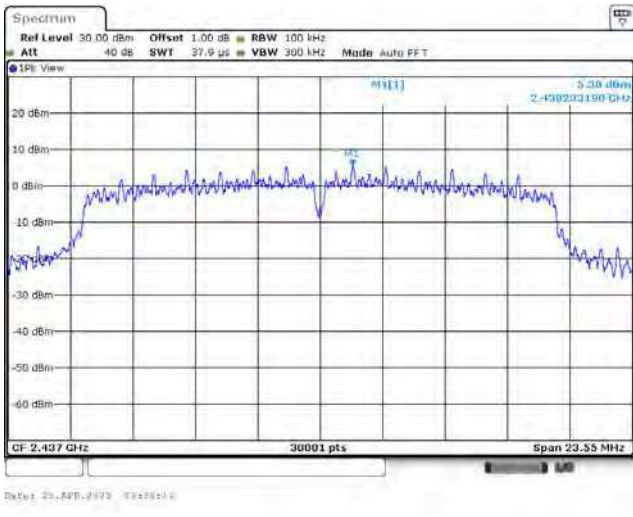
802.11g / Ant. 1 / 2462 MHz



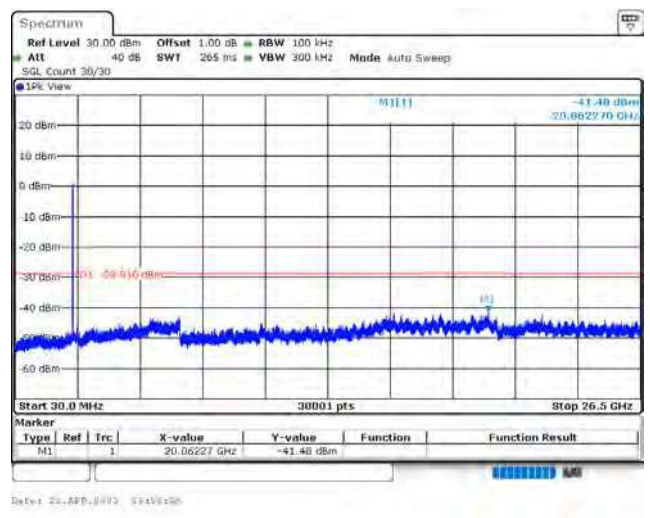
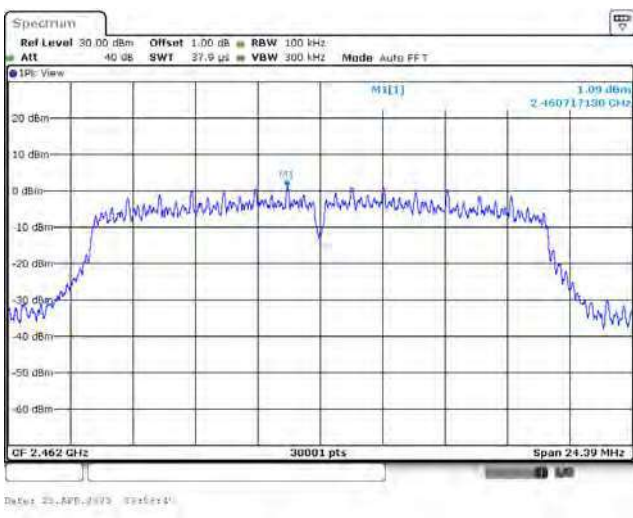
802.11n (20 MHz) / Ant. 1 / 2412 MHz



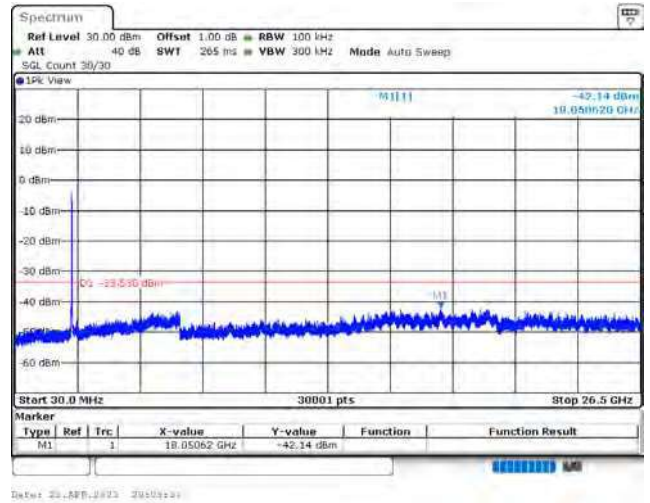
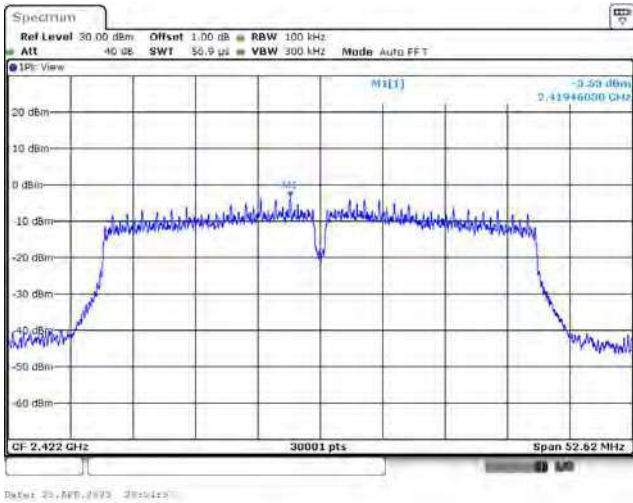
802.11n (20 MHz) / Ant. 1 / 2437 MHz



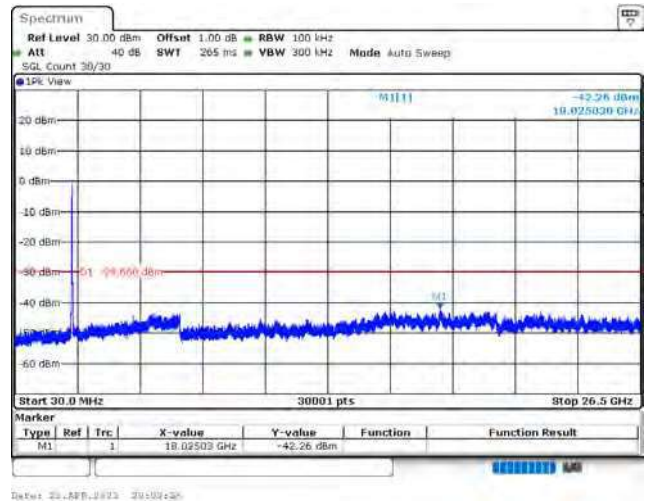
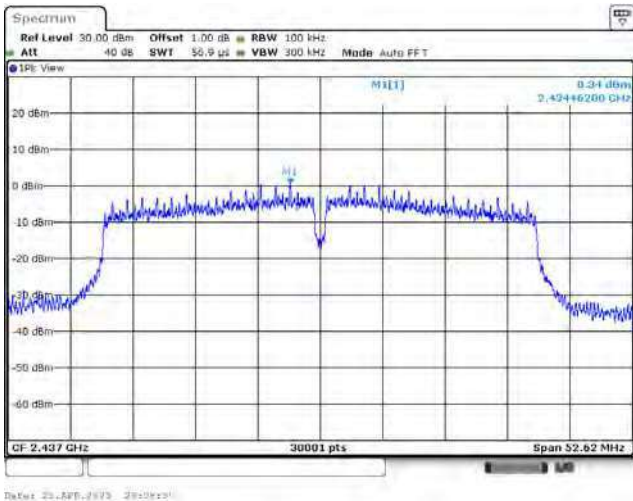
802.11n (20 MHz) / Ant. 1 / 2462 MHz



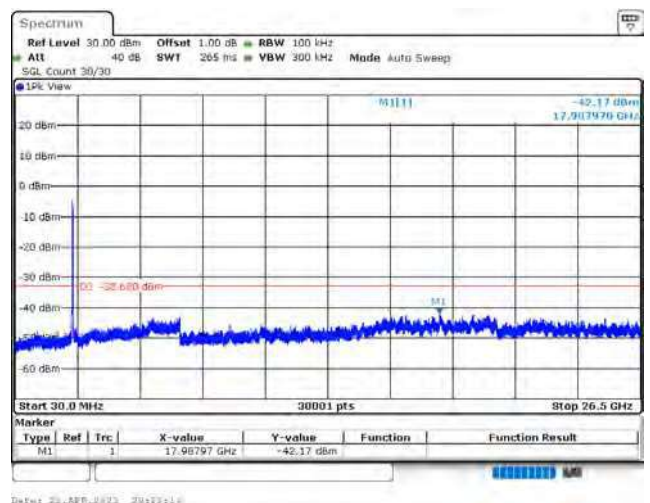
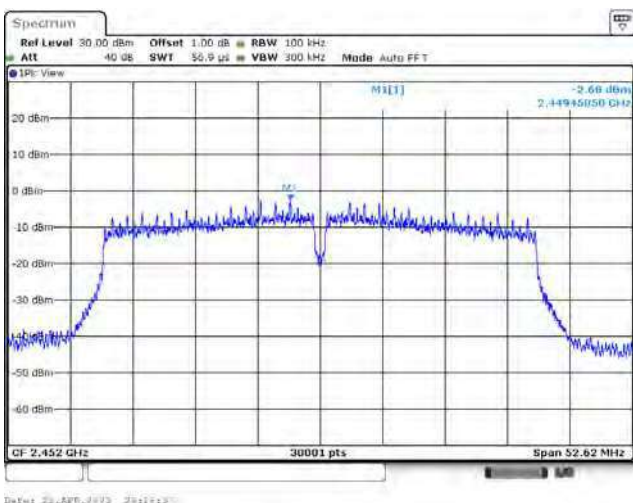
802.11n (40 MHz) / Ant. 1 / 2422 MHz



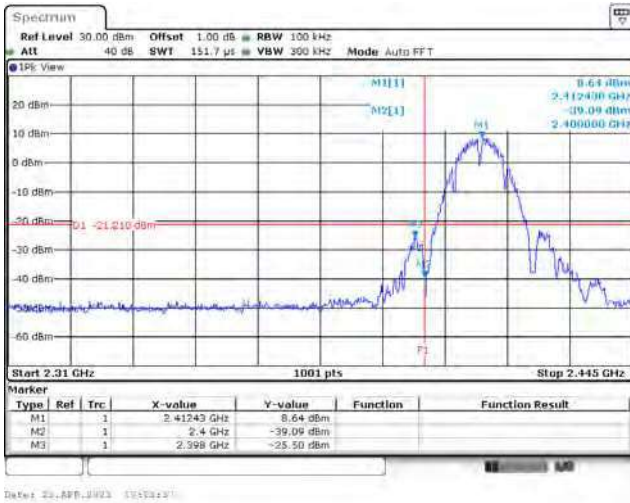
802.11n (40 MHz) / Ant. 1 / 2437 MHz



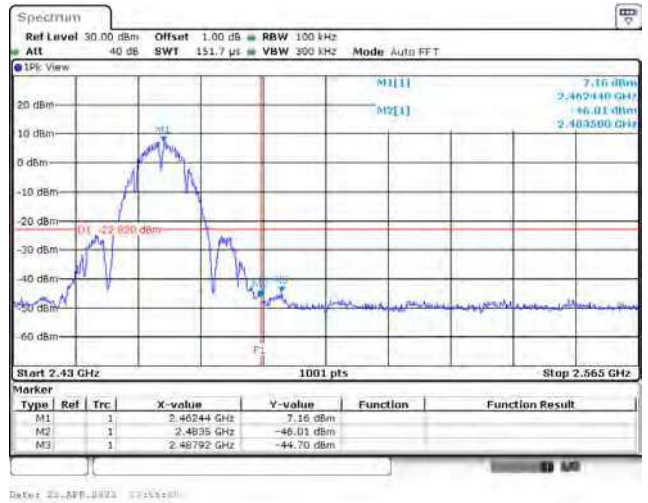
802.11n (40 MHz) / Ant. 1 / 2452 MHz



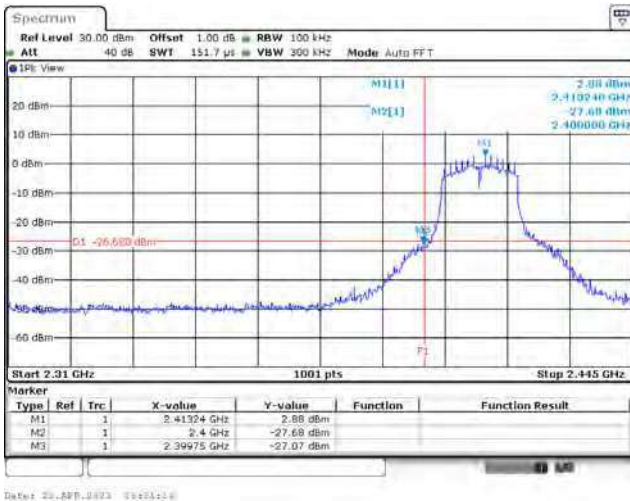
802.11b / Ant. 0 / 2412 MHz (Band Edge)



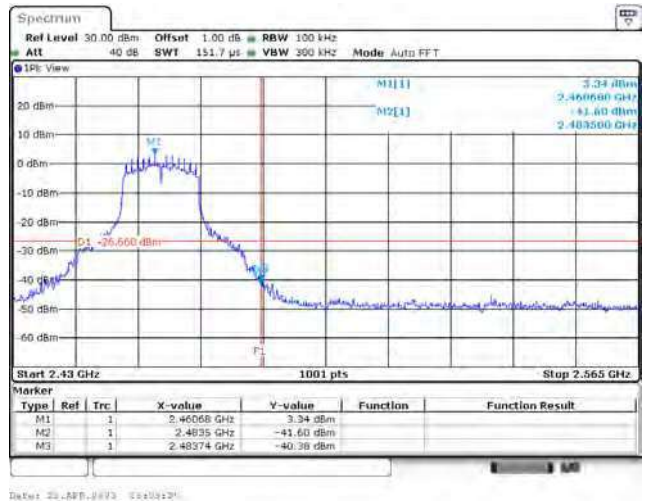
802.11b / Ant. 0 / 2462 MHz (Band Edge)



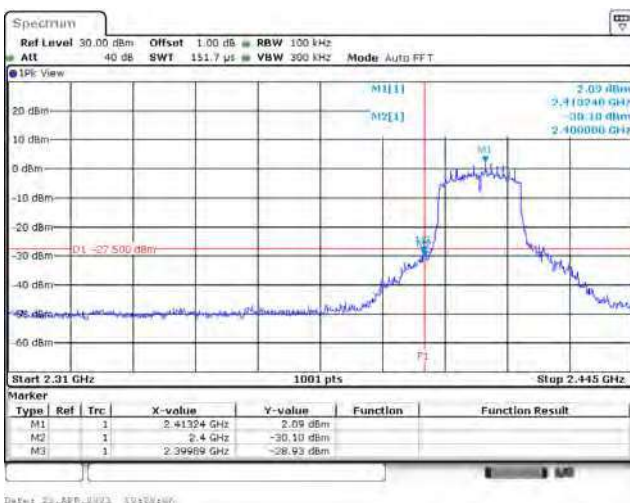
802.11g / Ant. 0 / 2412 MHz (Band Edge)



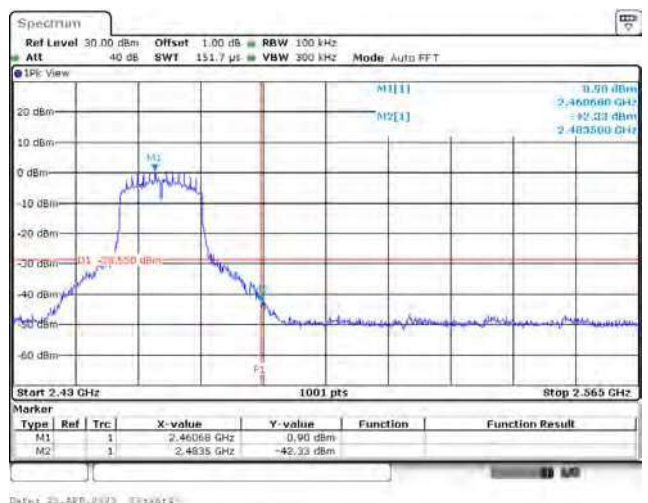
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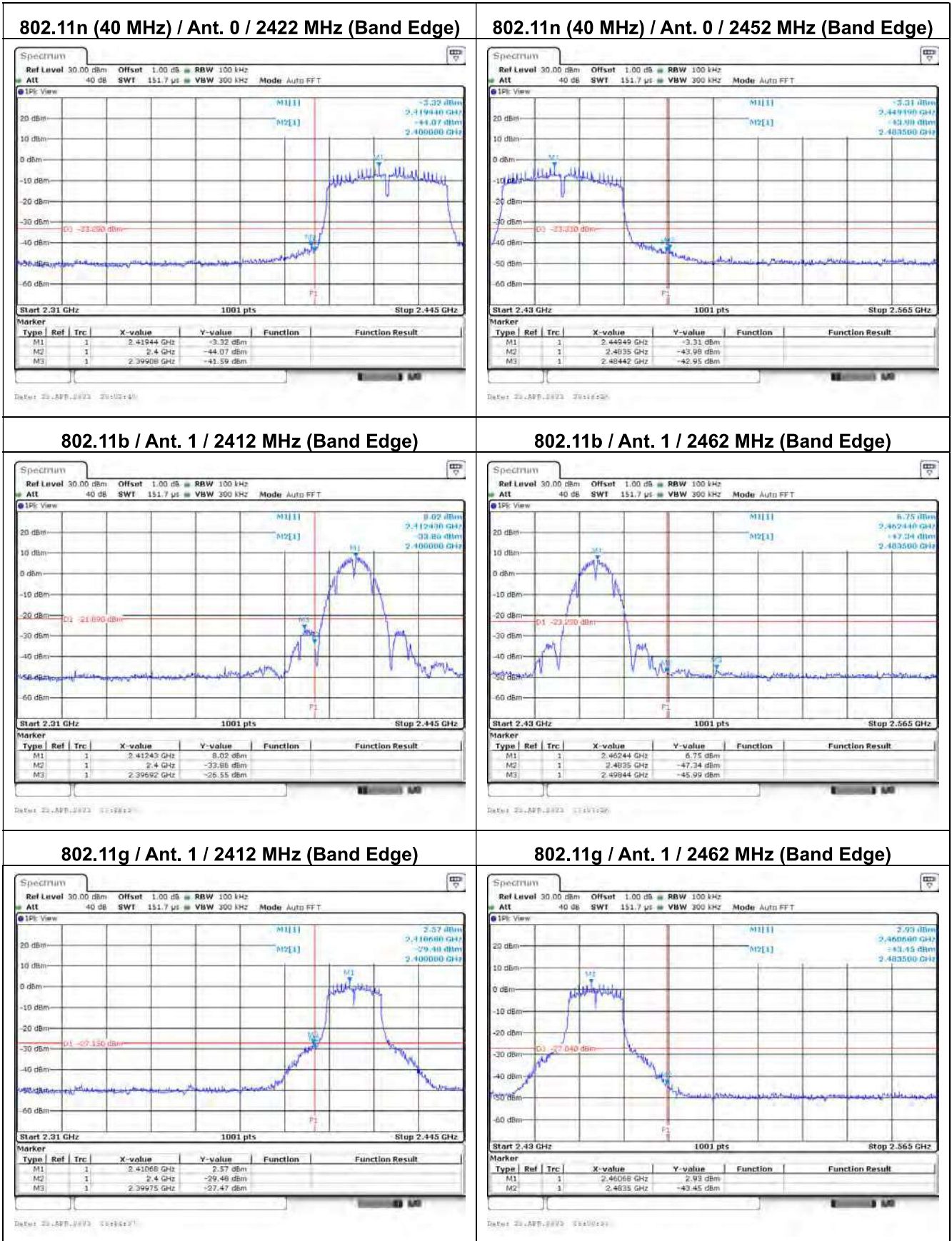


802.11n (20 MHz) / Ant. 0 / 2412 MHz (Band Edge)

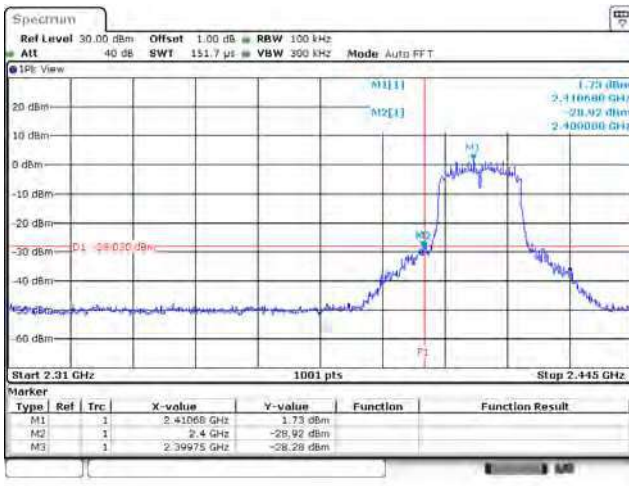


802.11n (20 MHz) / Ant. 0 / 2462 MHz (Band Edge)

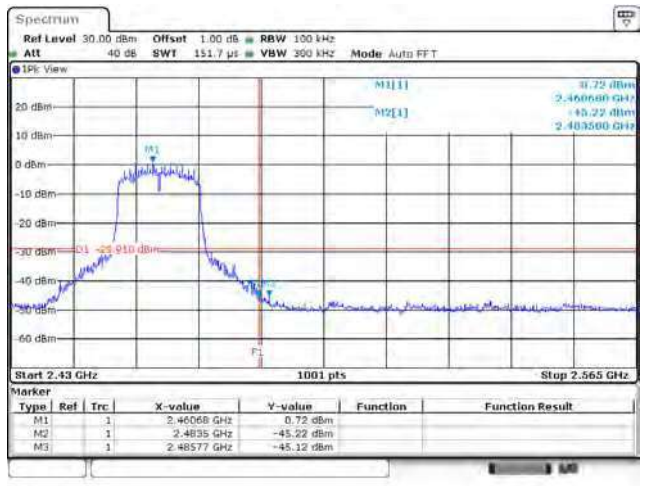




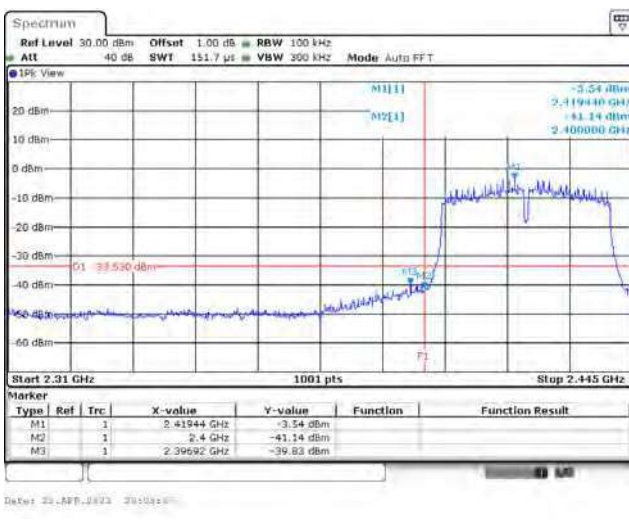
802.11n (20 MHz) / Ant. 1 / 2412 MHz (Band Edge)



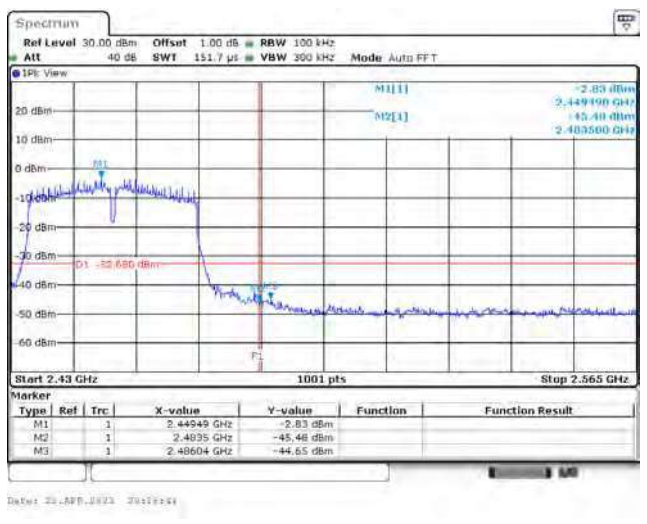
802.11n (20 MHz) / Ant. 1 / 2462 MHz (Band Edge)



802.11n (40 MHz) / Ant. 1 / 2422 MHz (Band Edge)

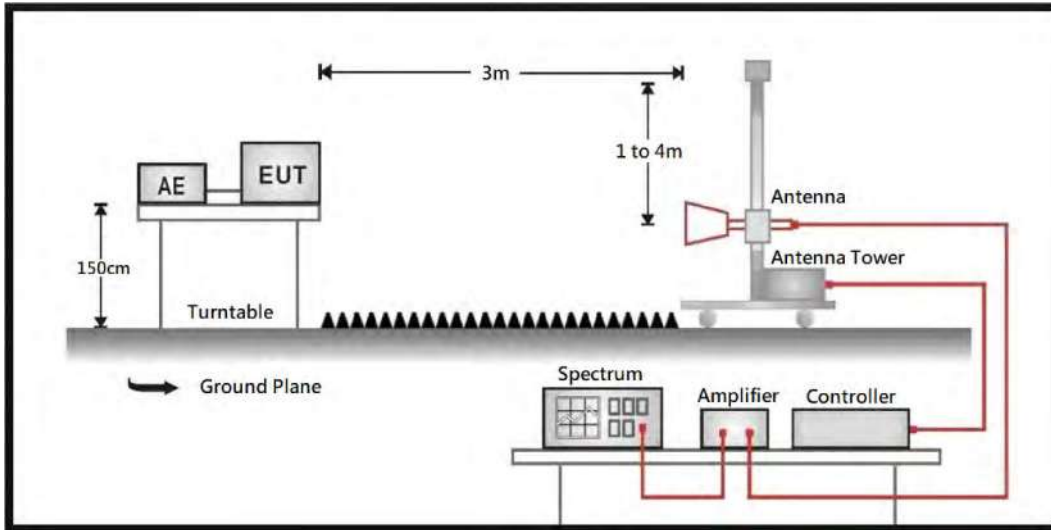


802.11n (40 MHz) / Ant. 1 / 2452 MHz (Band Edge)



6. Radiated Emission Band Edge

6.1. Test Setup



6.2. Test Limit

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 30 dB below the level of the fundamental or to the general radiated emission limit in paragraph 15.209, whichever is the lesser attenuation.

Frequency (MHz)	Field strength (uV/m)	Field strength (dBuV/m)	Measurement distance (m)
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

Remarks:

1. Field strength (dBuV/m) = 20 log Field strength (uV/m)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

6.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to the FCC KDB 558074 D01 v05r02 for compliance to FCC 47CFR 15.247 requirements.

The EUT and its simulators are placed on a turn table which is 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

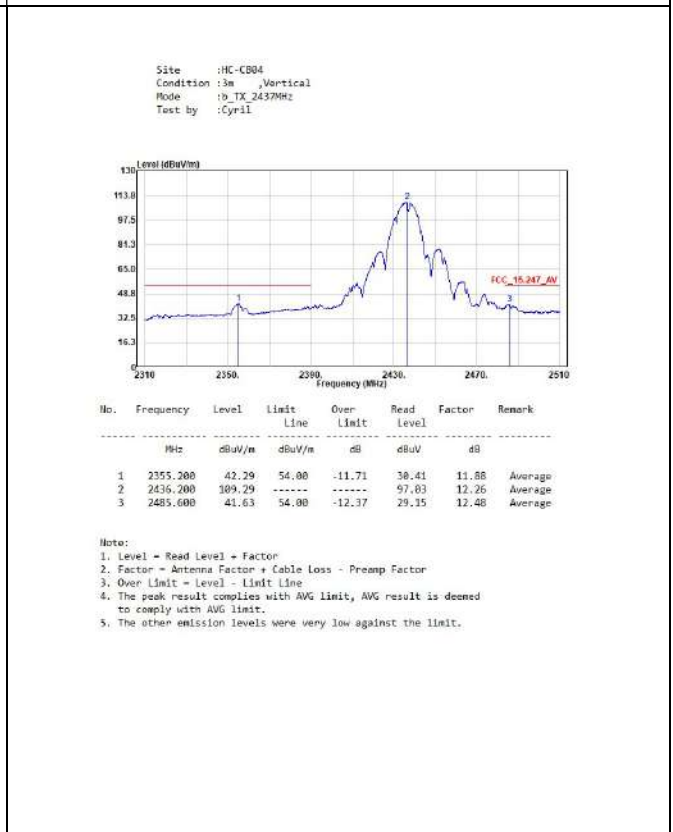
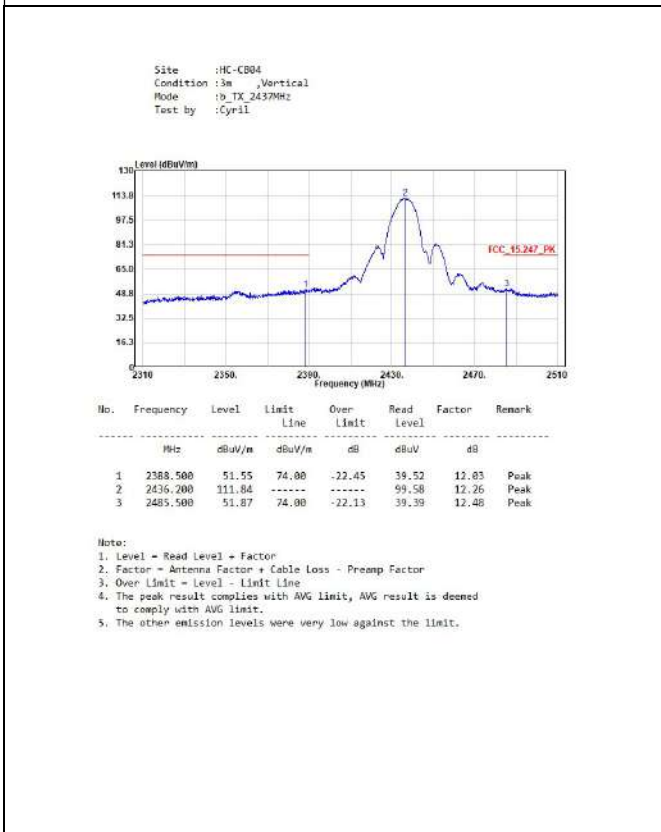
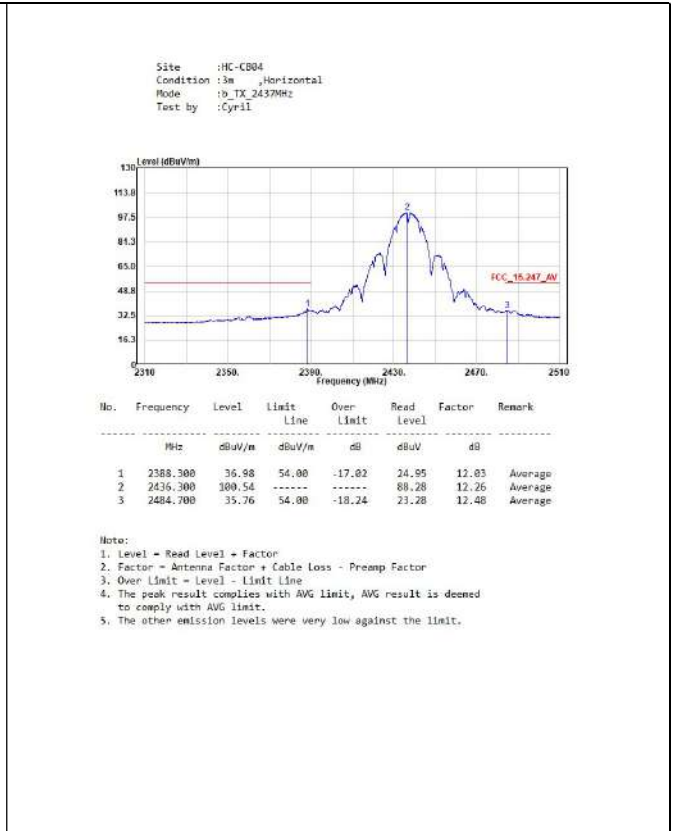
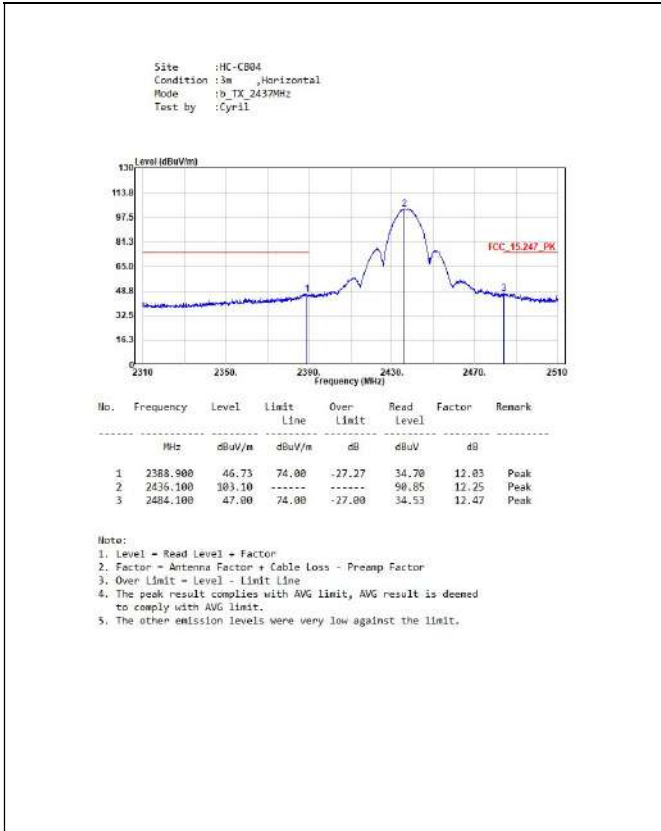
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

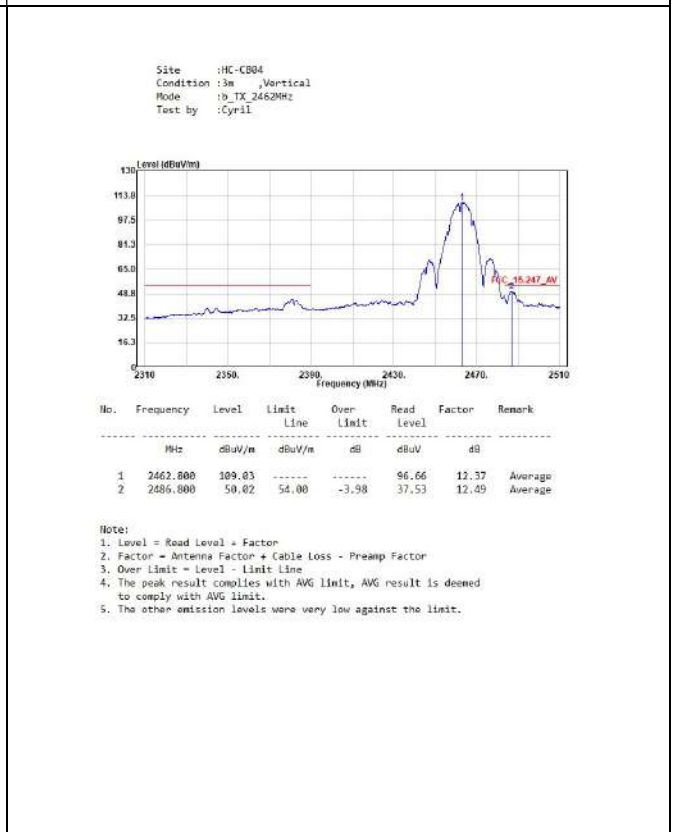
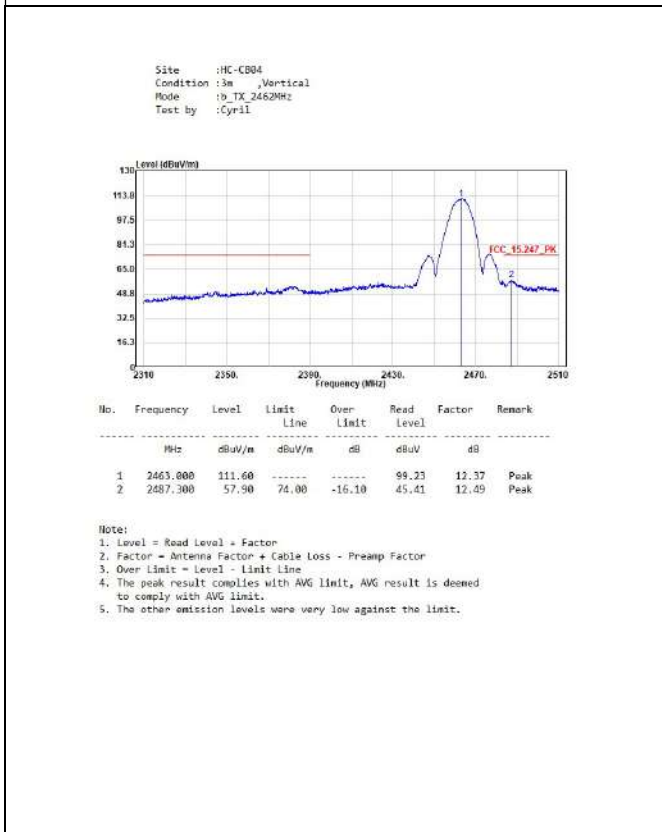
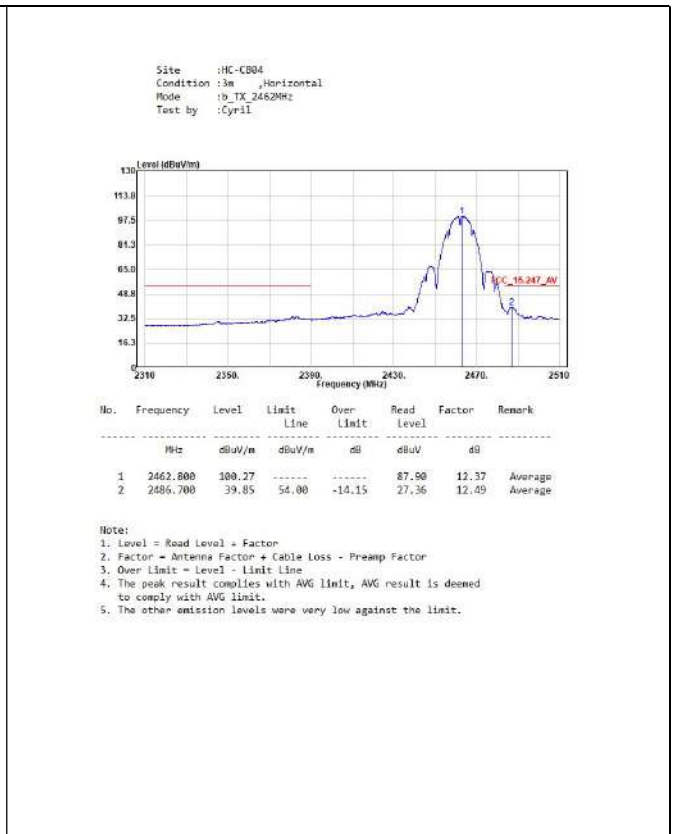
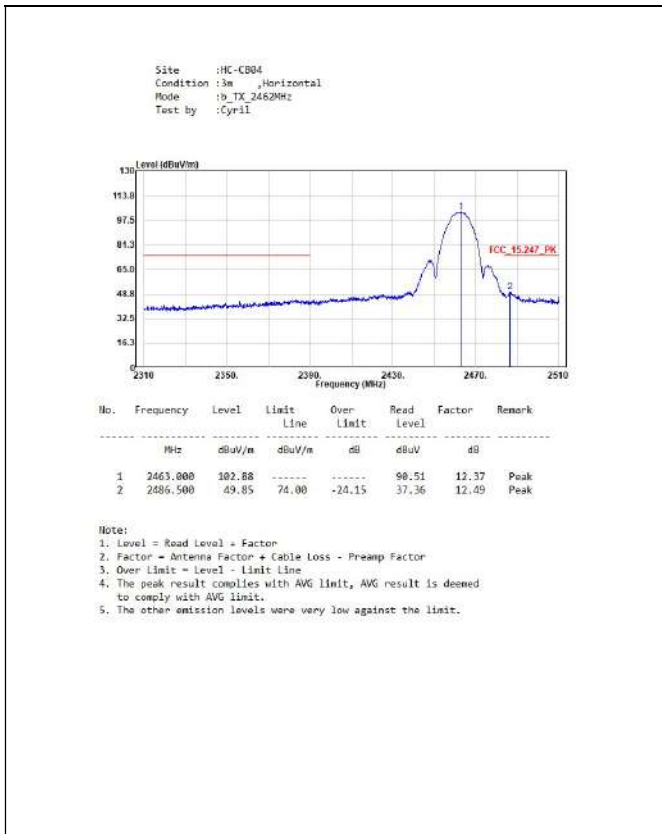
6.4. Test Specification

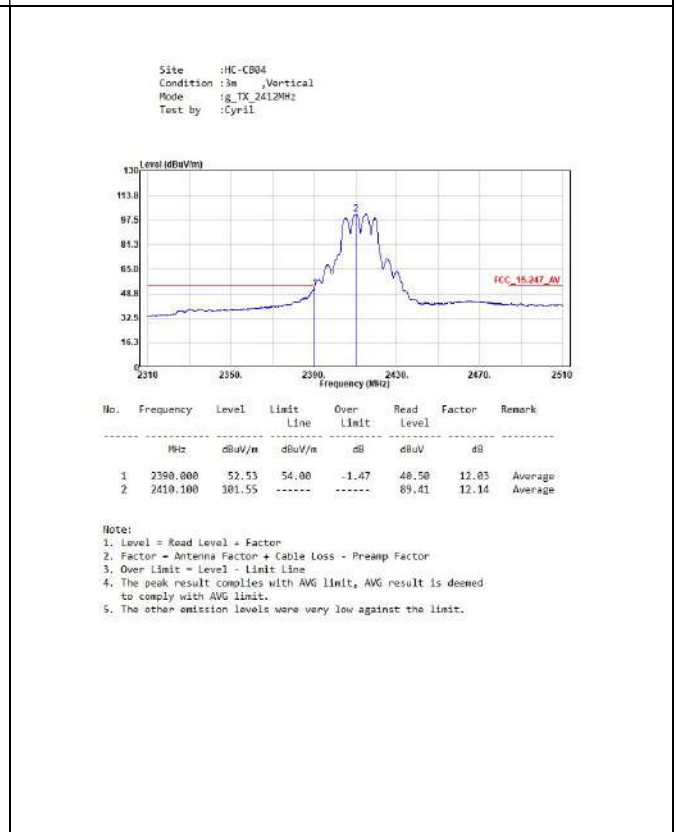
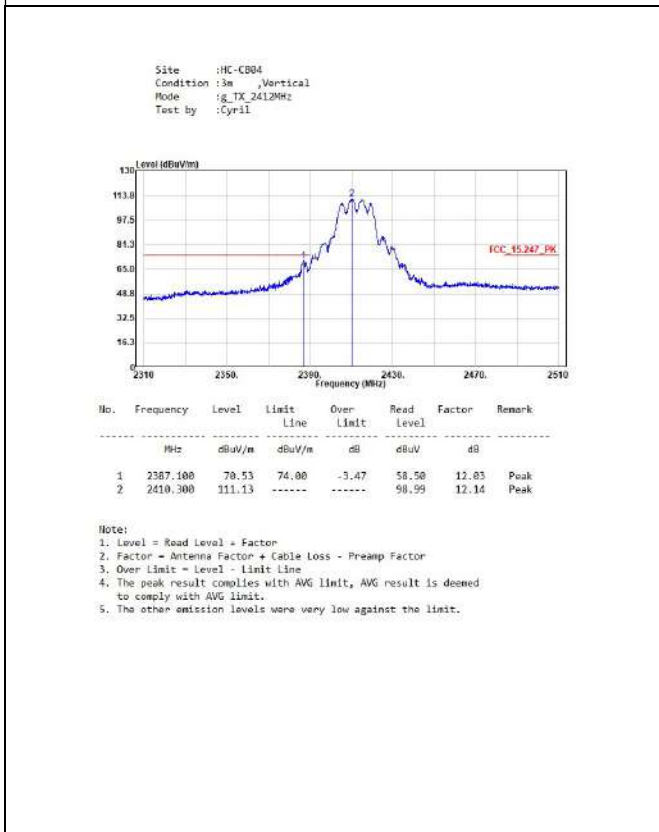
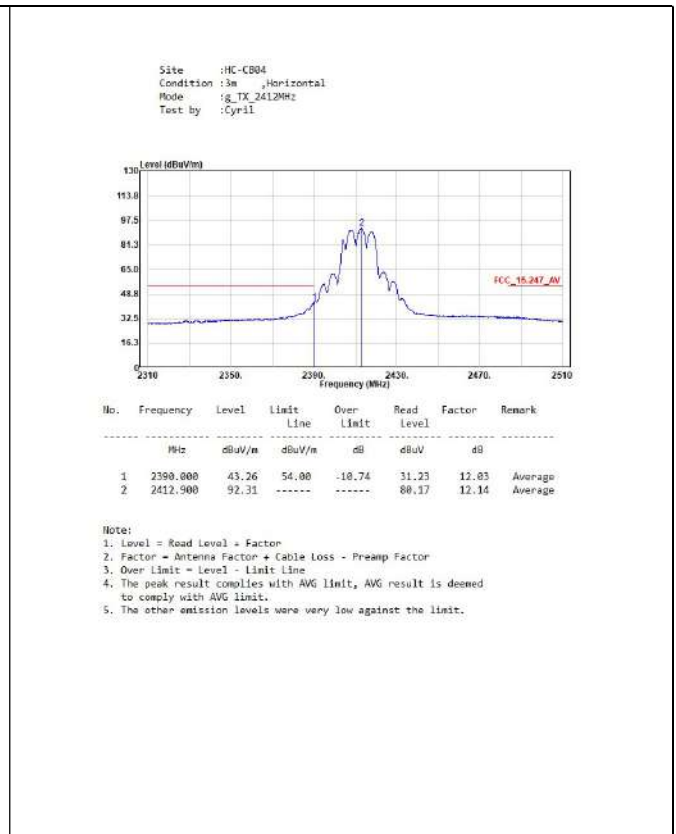
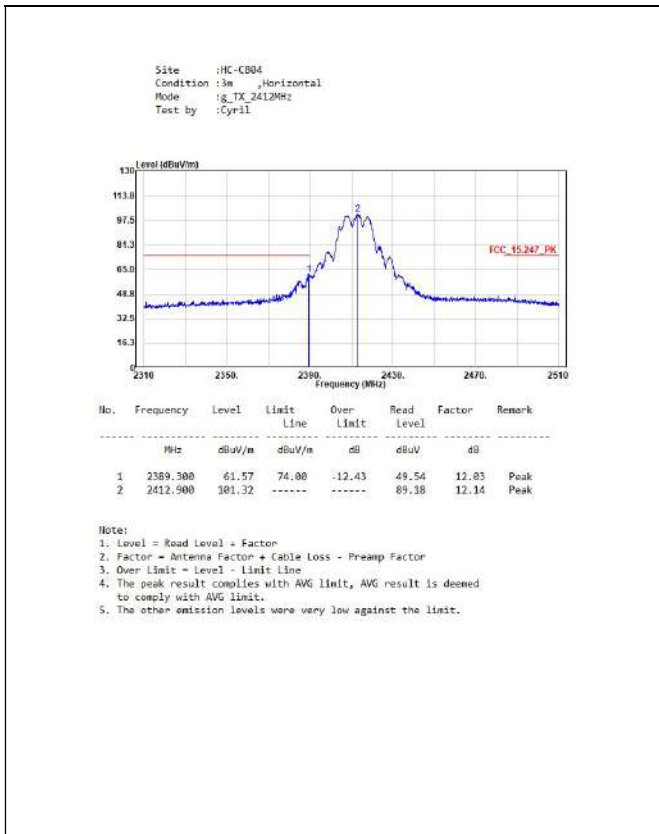
According to FCC Part 15 Subpart C Paragraph 15.247.

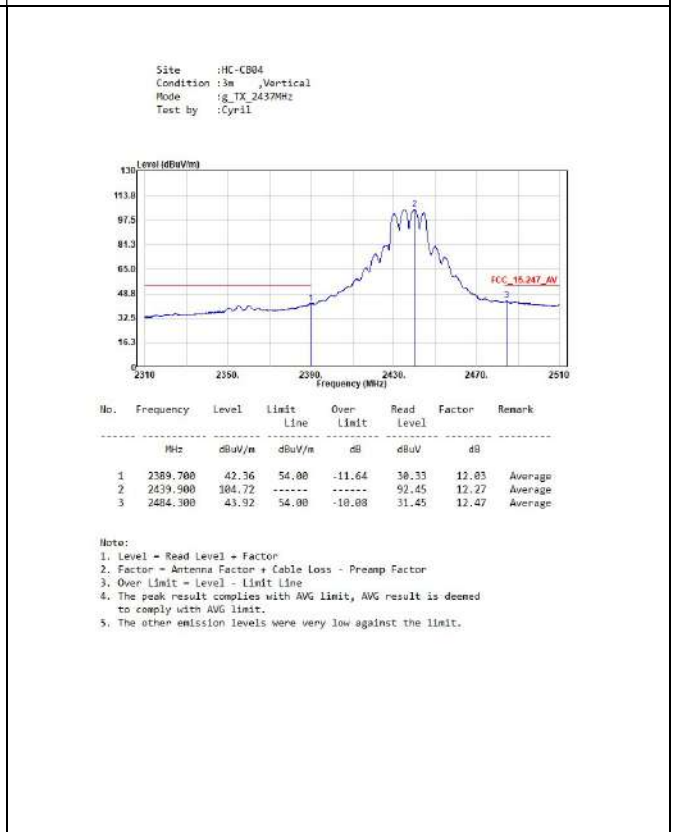
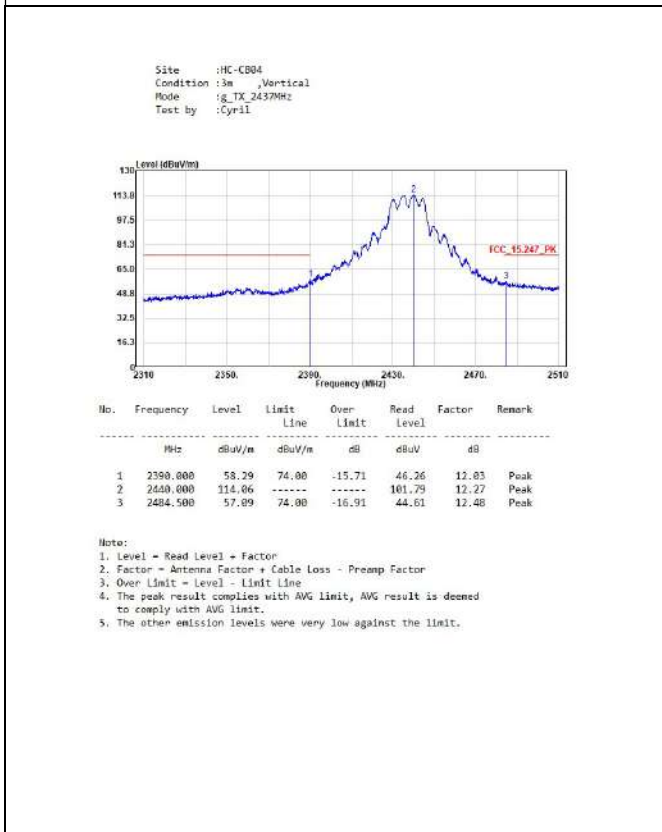
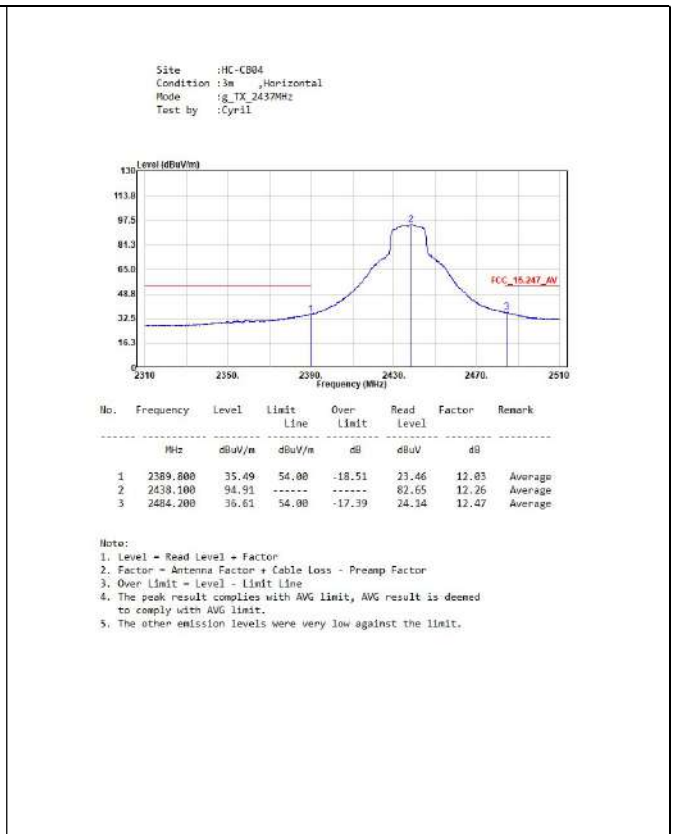
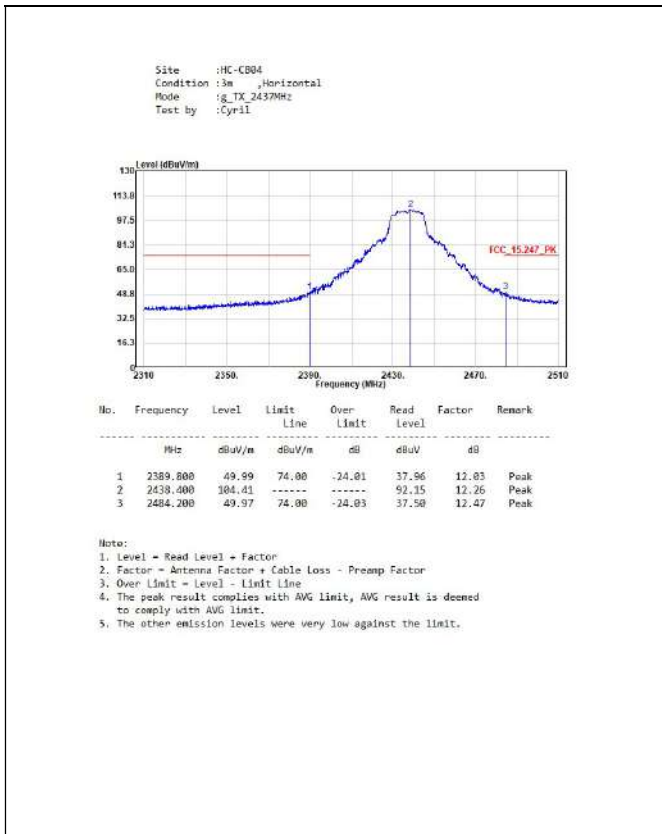
6.5. Test Result of Radiated Emission Band Edge

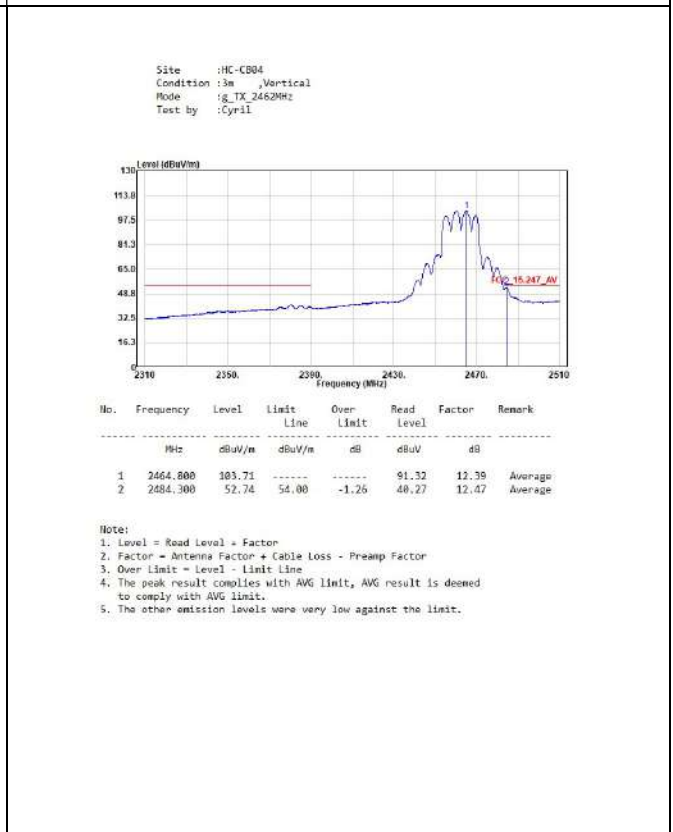
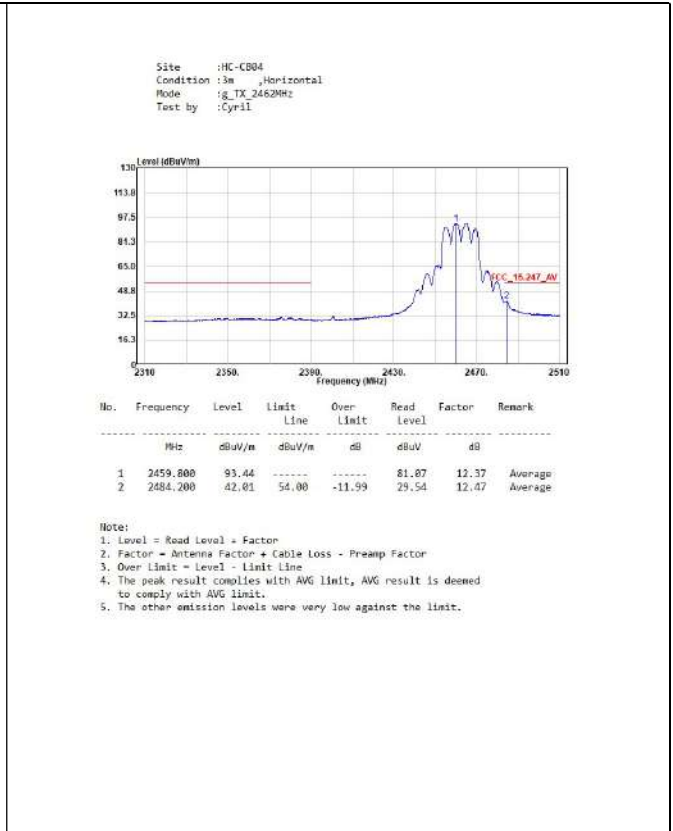
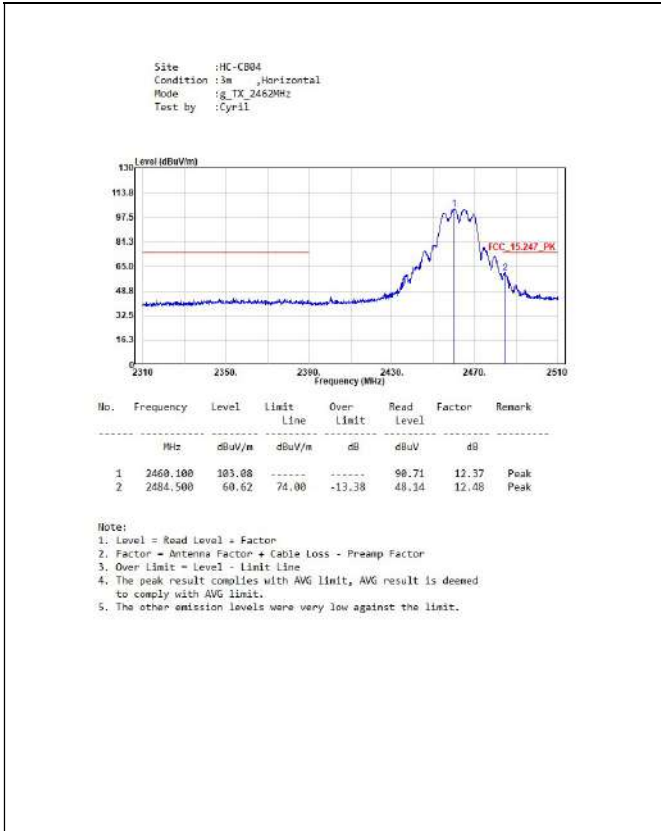
<p>Site :HC-CB04 Condition :3m ,Horizontal Mode :9_TX_2412MHz Test by :Cyril</p> <p>The graph shows a peak at 2412.900 MHz with a level of 103.22 dBuV/m. The FCC limit is 45.247 dB. The peak level is 57.97 dB above the limit.</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Frequency</th> <th>Level</th> <th>Limit</th> <th>Over</th> <th>Read</th> <th>Factor</th> <th>Remark</th> </tr> <tr> <th></th> <th>MHz</th> <th>dBuV/m</th> <th>dBuV/m</th> <th>dB</th> <th>dBuV</th> <th>dB</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2387.200</td> <td>52.76</td> <td>74.00</td> <td>-21.24</td> <td>48.73</td> <td>12.03</td> <td>Peak</td> </tr> <tr> <td>2</td> <td>2412.900</td> <td>103.22</td> <td>-----</td> <td>-----</td> <td>91.08</td> <td>12.14</td> <td>Peak</td> </tr> </tbody> </table> <p>Notes: 1. Level = Read Level + Factor 2. Factor = Antenna Factor + Cable Loss - Preamp Factor 3. Over Limit = Level - Limit Line 4. The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit. 5. The other emission levels were very low against the limit.</p>	No.	Frequency	Level	Limit	Over	Read	Factor	Remark		MHz	dBuV/m	dBuV/m	dB	dBuV	dB		1	2387.200	52.76	74.00	-21.24	48.73	12.03	Peak	2	2412.900	103.22	-----	-----	91.08	12.14	Peak	<p>Site :HC-CB04 Condition :3m ,Horizontal Mode :9_TX_2412MHz Test by :Cyril</p> <p>The graph shows a peak at 2412.800 MHz with a level of 100.70 dBuV/m. The FCC limit is 45.247 dB. The peak level is 55.45 dB above the limit.</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Frequency</th> <th>Level</th> <th>Limit</th> <th>Over</th> <th>Read</th> <th>Factor</th> <th>Remark</th> </tr> <tr> <th></th> <th>MHz</th> <th>dBuV/m</th> <th>dBuV/m</th> <th>dB</th> <th>dBuV</th> <th>dB</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2386.700</td> <td>45.28</td> <td>54.00</td> <td>-8.72</td> <td>33.25</td> <td>12.03</td> <td>Average</td> </tr> <tr> <td>2</td> <td>2412.800</td> <td>100.70</td> <td>-----</td> <td>-----</td> <td>88.56</td> <td>12.14</td> <td>Average</td> </tr> </tbody> </table> <p>Notes: 1. Level = Read Level + Factor 2. Factor = Antenna Factor + Cable Loss - Preamp Factor 3. Over Limit = Level - Limit Line 4. The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit. 5. The other emission levels were very low against the limit.</p>	No.	Frequency	Level	Limit	Over	Read	Factor	Remark		MHz	dBuV/m	dBuV/m	dB	dBuV	dB		1	2386.700	45.28	54.00	-8.72	33.25	12.03	Average	2	2412.800	100.70	-----	-----	88.56	12.14	Average
No.	Frequency	Level	Limit	Over	Read	Factor	Remark																																																										
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB																																																											
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1	2386.700	45.28	54.00	-8.72	33.25	12.03	Average																																																										
2	2412.800	100.70	-----	-----	88.56	12.14	Average																																																										
<p>Site :HC-CB04 Condition :3m ,Vertical Mode :9_TX_2412MHz Test by :Cyril</p> <p>The graph shows a peak at 2411.200 MHz with a level of 112.16 dBuV/m. The FCC limit is 45.247 dB. The peak level is 66.91 dB above the limit.</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Frequency</th> <th>Level</th> <th>Limit</th> <th>Over</th> <th>Read</th> <th>Factor</th> <th>Remark</th> </tr> <tr> <th></th> <th>MHz</th> <th>dBuV/m</th> <th>dBuV/m</th> <th>dB</th> <th>dBuV</th> <th>dB</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2387.000</td> <td>59.06</td> <td>74.00</td> <td>-14.94</td> <td>47.03</td> <td>12.03</td> <td>Peak</td> </tr> <tr> <td>2</td> <td>2411.200</td> <td>112.16</td> <td>-----</td> <td>-----</td> <td>100.02</td> <td>12.14</td> <td>Peak</td> </tr> </tbody> </table> <p>Notes: 1. Level = Read Level + Factor 2. Factor = Antenna Factor + Cable Loss - Preamp Factor 3. Over Limit = Level - Limit Line 4. The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit. 5. The other emission levels were very low against the limit.</p>	No.	Frequency	Level	Limit	Over	Read	Factor	Remark		MHz	dBuV/m	dBuV/m	dB	dBuV	dB		1	2387.000	59.06	74.00	-14.94	47.03	12.03	Peak	2	2411.200	112.16	-----	-----	100.02	12.14	Peak	<p>Site :HC-CB04 Condition :3m ,Vertical Mode :9_TX_2412MHz Test by :Cyril</p> <p>The graph shows a peak at 2411.200 MHz with a level of 109.66 dBuV/m. The FCC limit is 45.247 dB. The peak level is 64.41 dB above the limit.</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Frequency</th> <th>Level</th> <th>Limit</th> <th>Over</th> <th>Read</th> <th>Factor</th> <th>Remark</th> </tr> <tr> <th></th> <th>MHz</th> <th>dBuV/m</th> <th>dBuV/m</th> <th>dB</th> <th>dBuV</th> <th>dB</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2387.200</td> <td>52.97</td> <td>54.00</td> <td>-1.03</td> <td>40.94</td> <td>12.03</td> <td>Average</td> </tr> <tr> <td>2</td> <td>2411.200</td> <td>109.66</td> <td>-----</td> <td>-----</td> <td>97.52</td> <td>12.14</td> <td>Average</td> </tr> </tbody> </table> <p>Notes: 1. Level = Read Level + Factor 2. Factor = Antenna Factor + Cable Loss - Preamp Factor 3. Over Limit = Level - Limit Line 4. The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit. 5. The other emission levels were very low against the limit.</p>	No.	Frequency	Level	Limit	Over	Read	Factor	Remark		MHz	dBuV/m	dBuV/m	dB	dBuV	dB		1	2387.200	52.97	54.00	-1.03	40.94	12.03	Average	2	2411.200	109.66	-----	-----	97.52	12.14	Average
No.	Frequency	Level	Limit	Over	Read	Factor	Remark																																																										
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB																																																											
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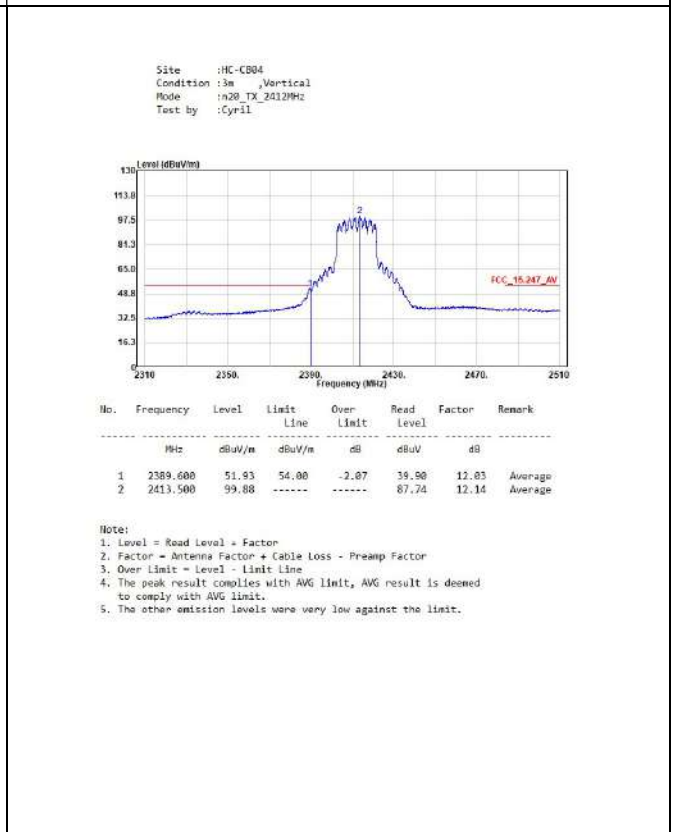
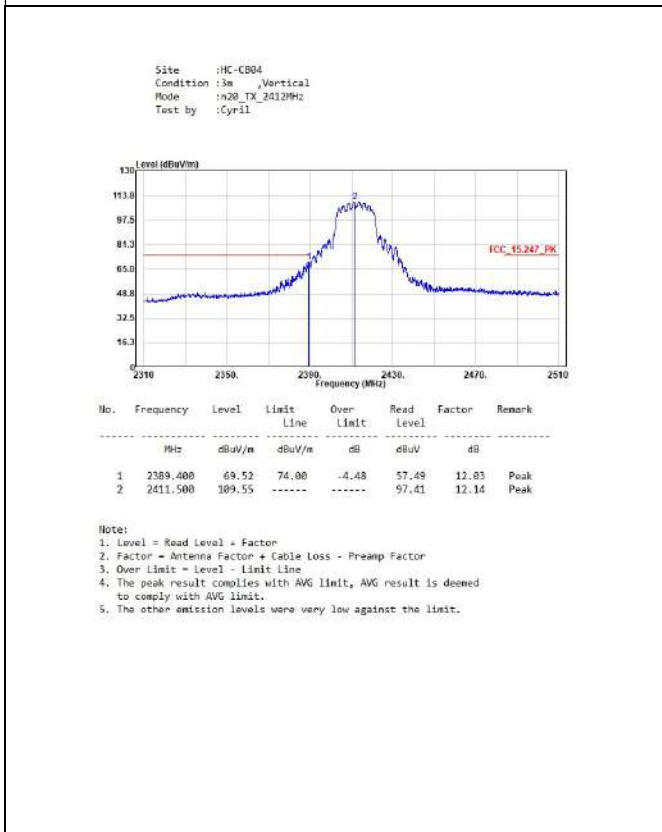
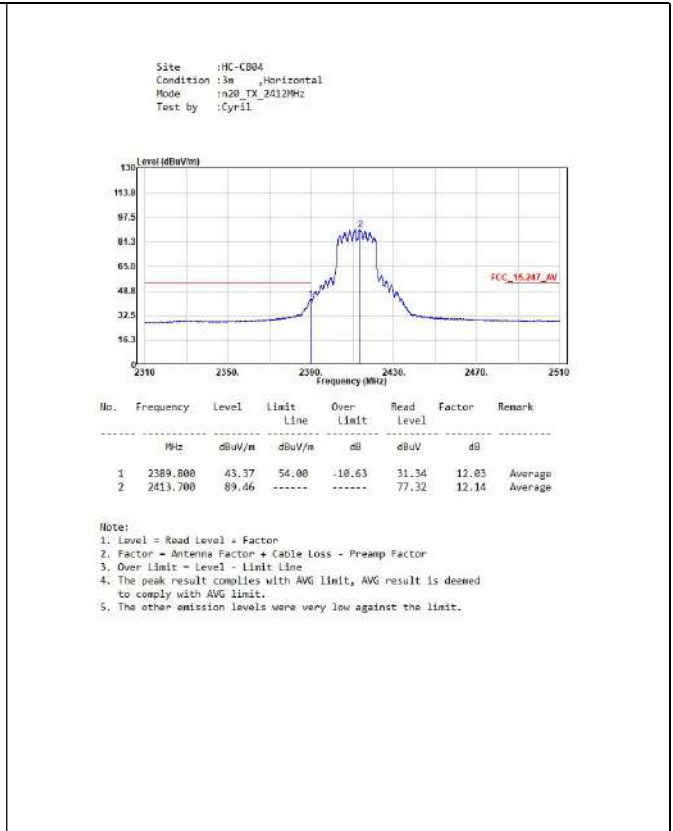
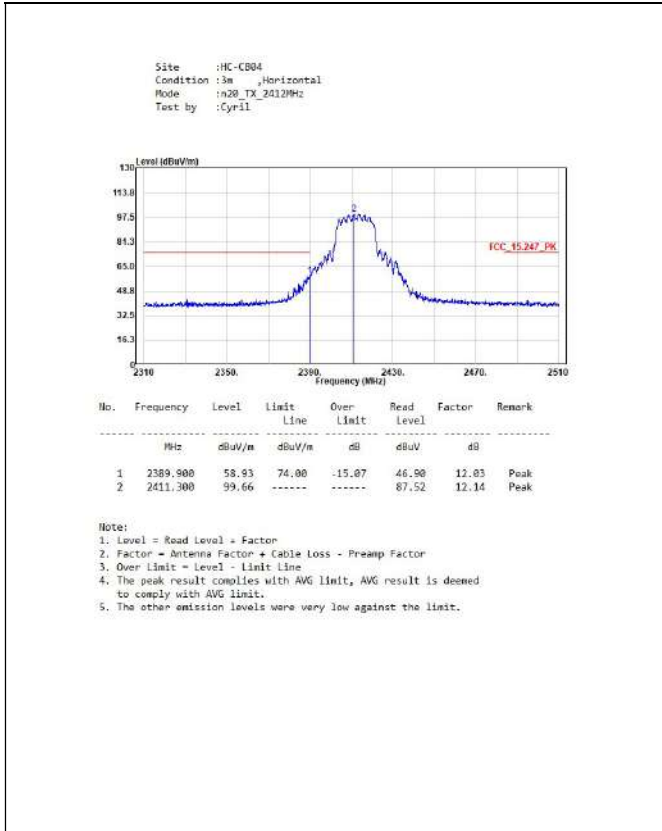


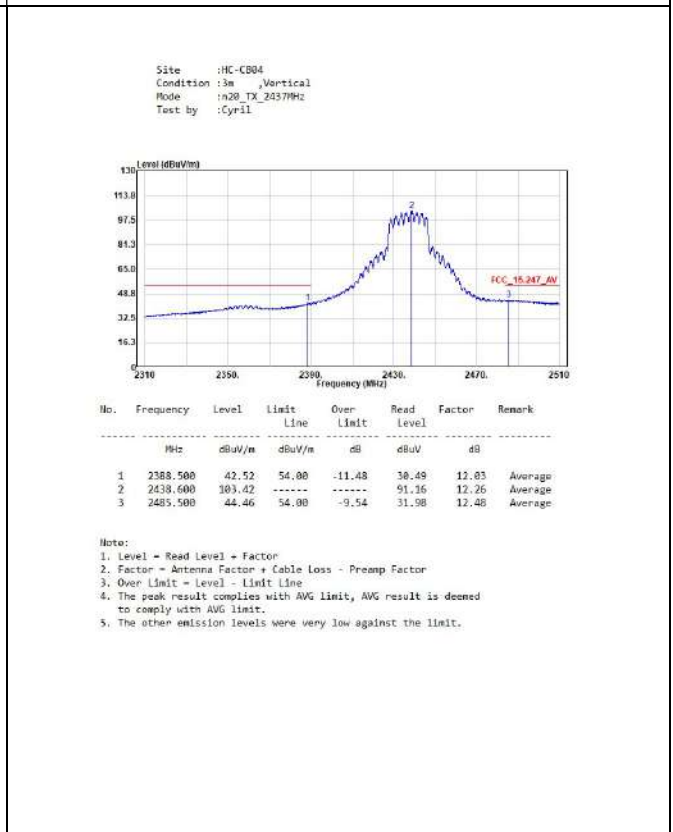
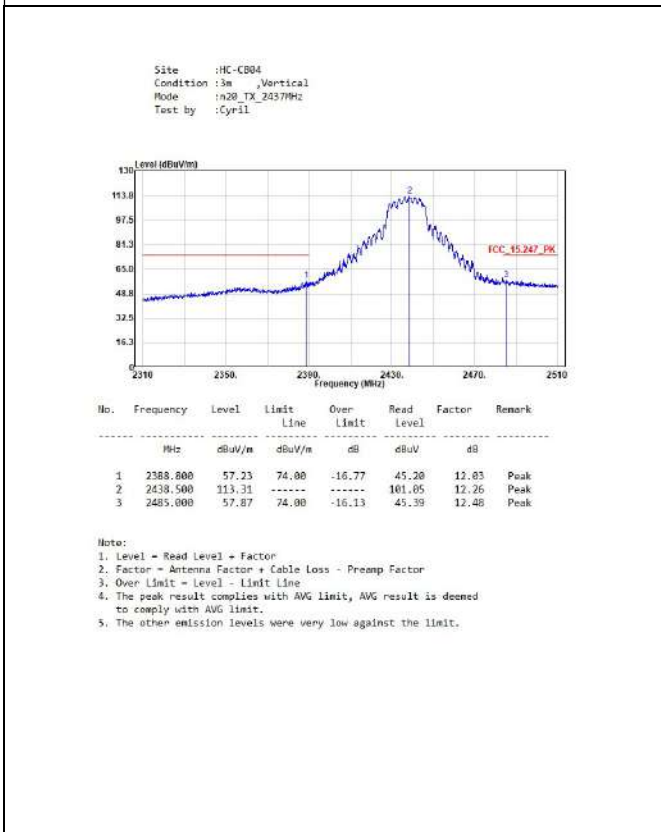
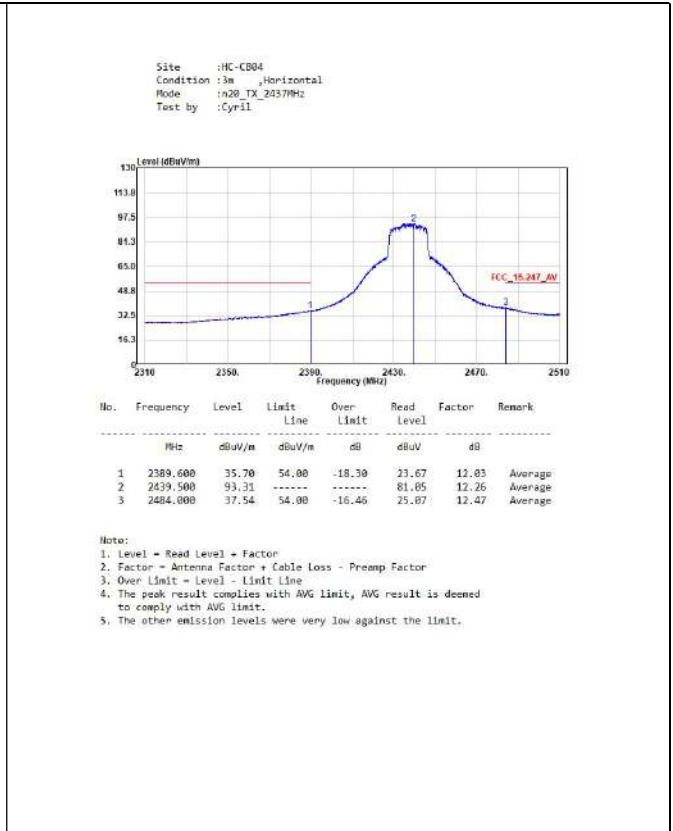
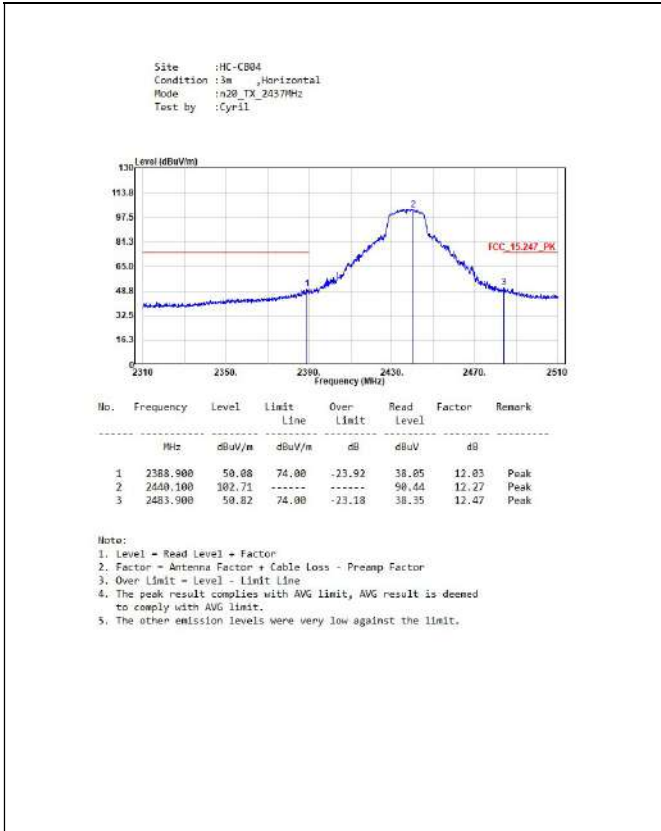


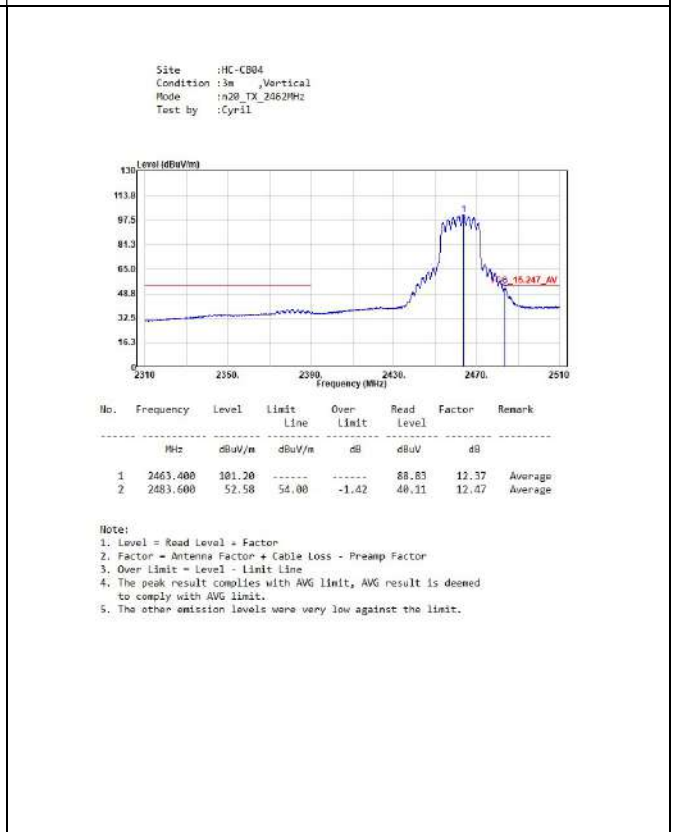
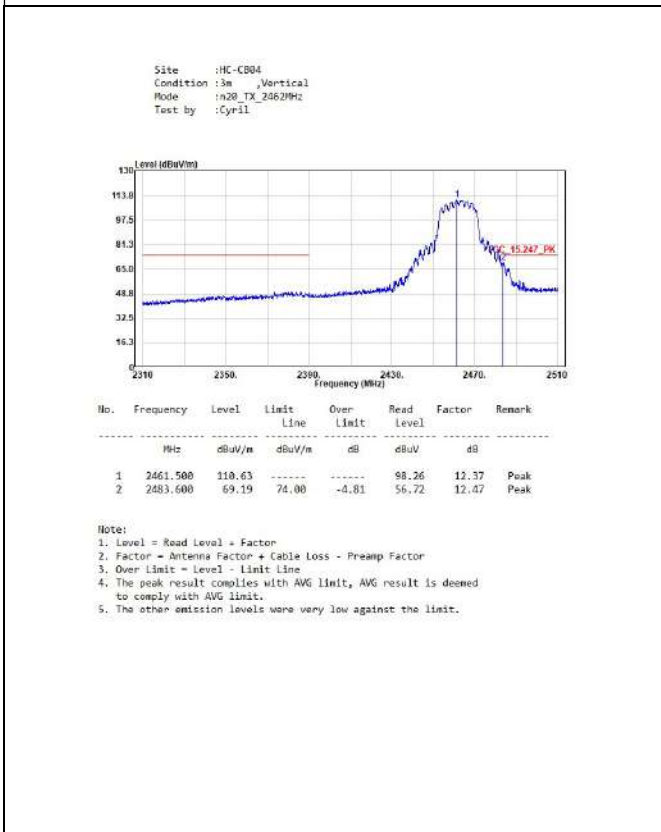
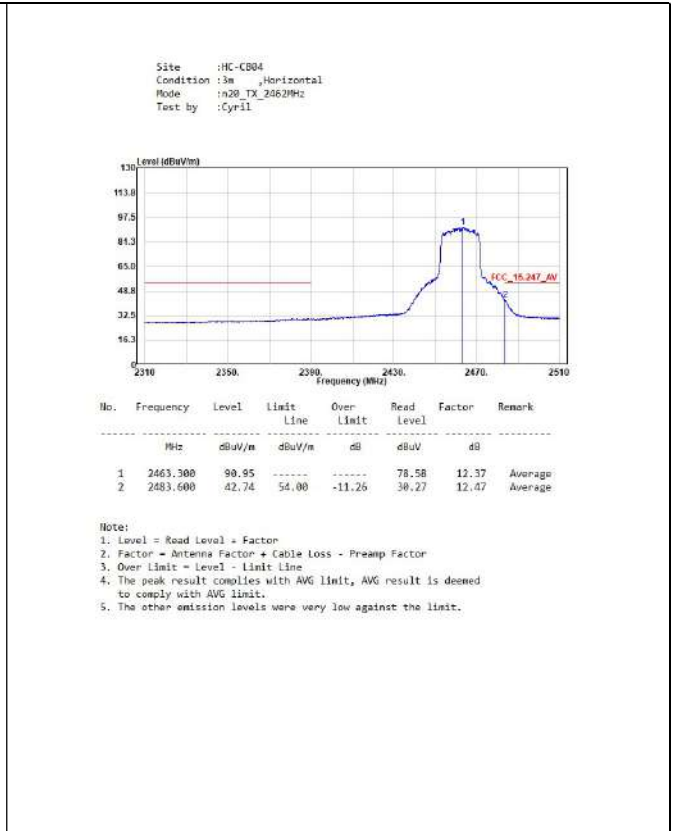


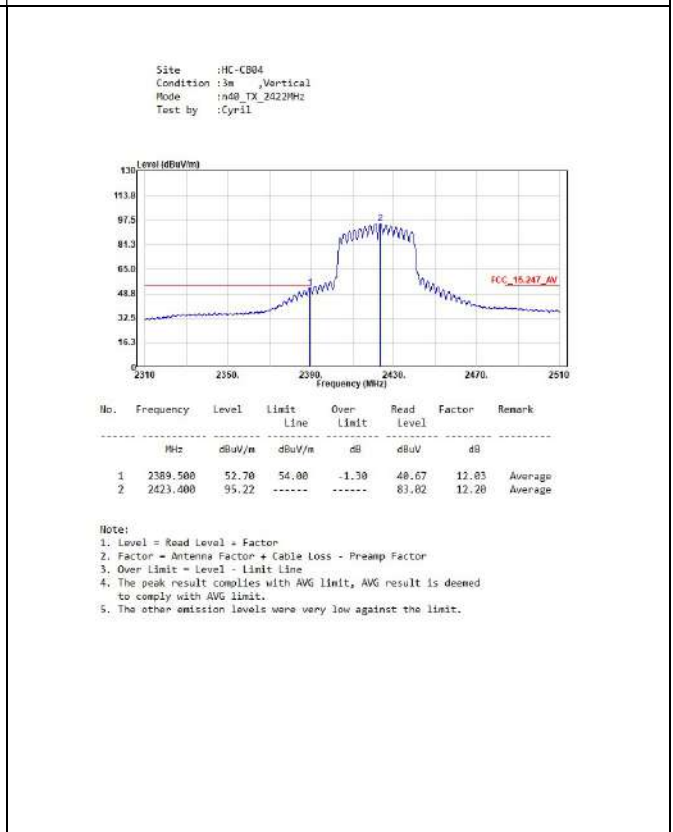
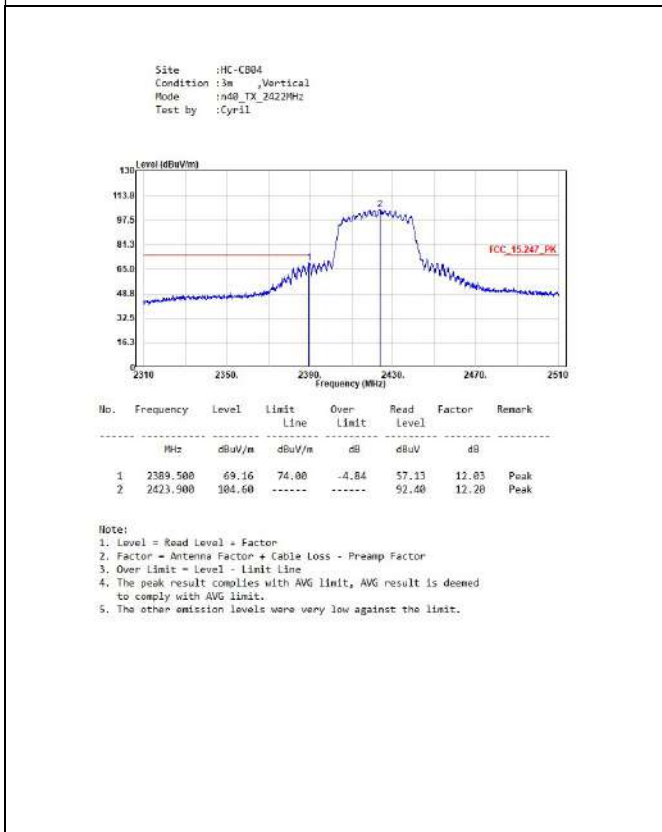
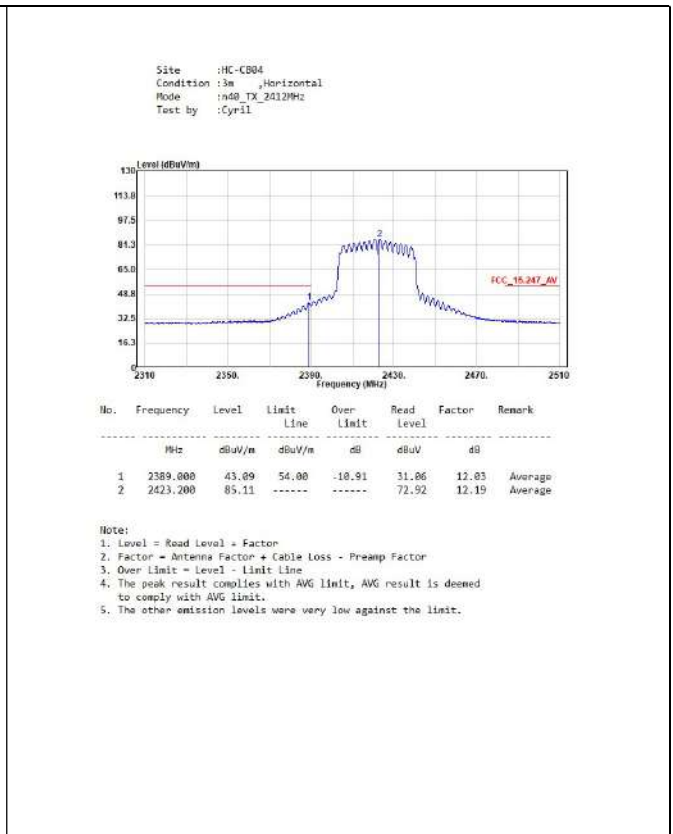
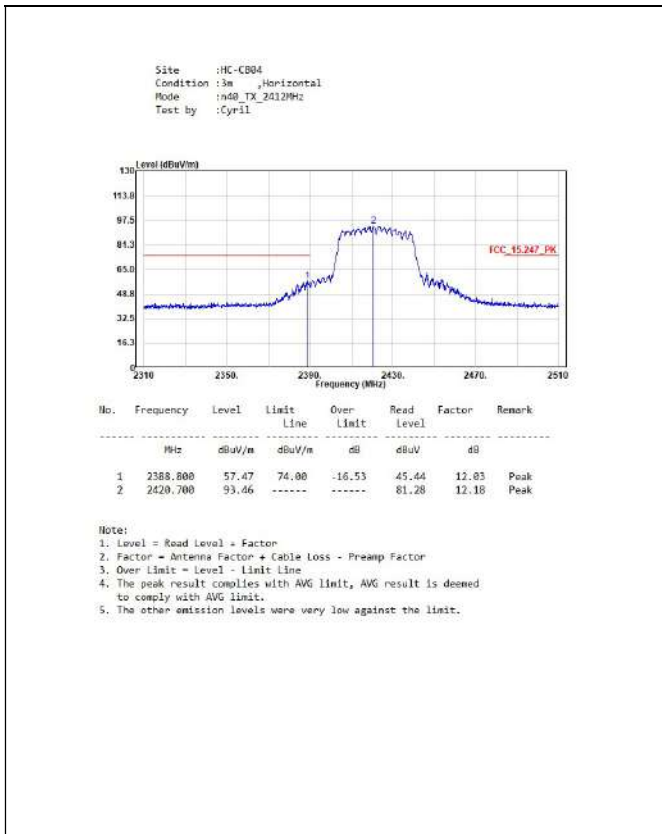


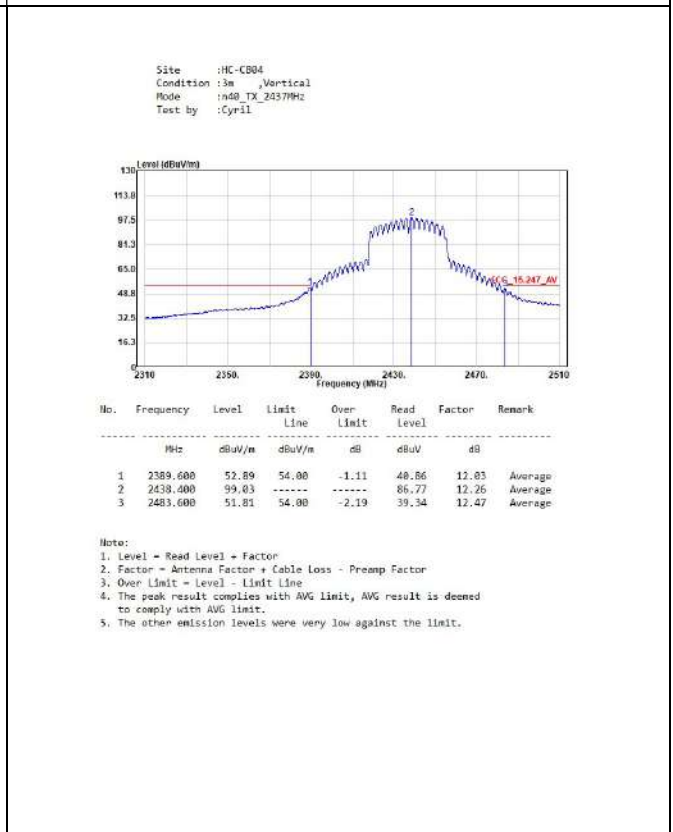
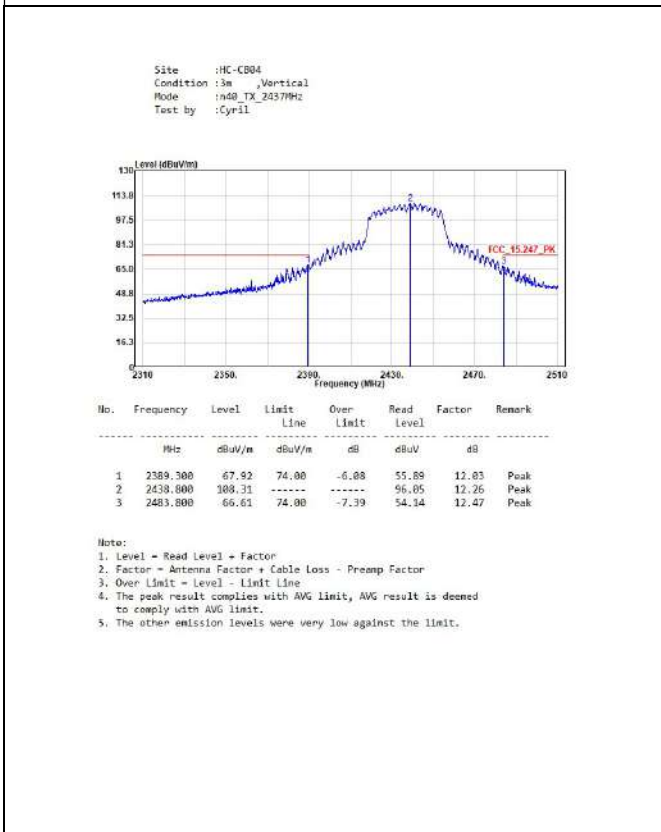
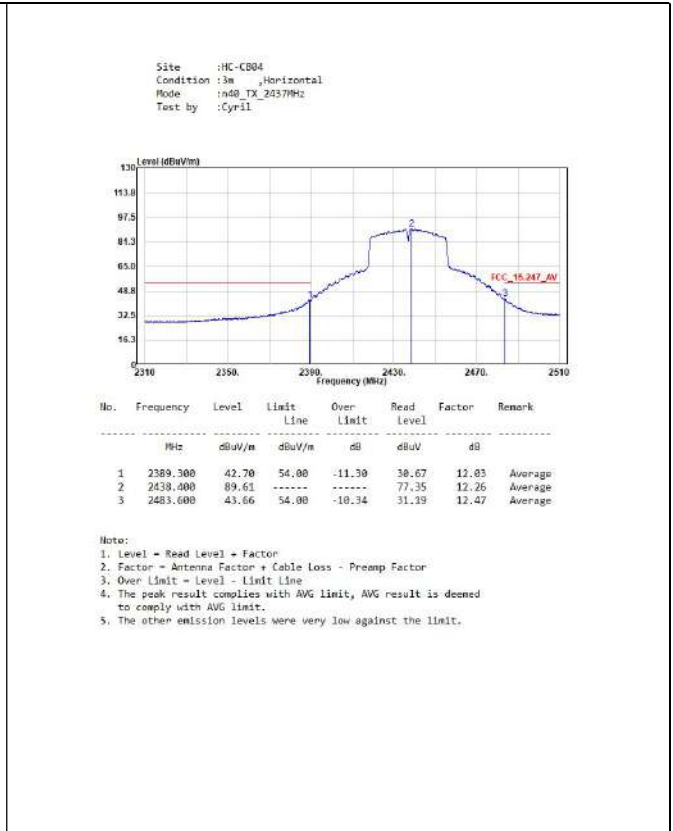
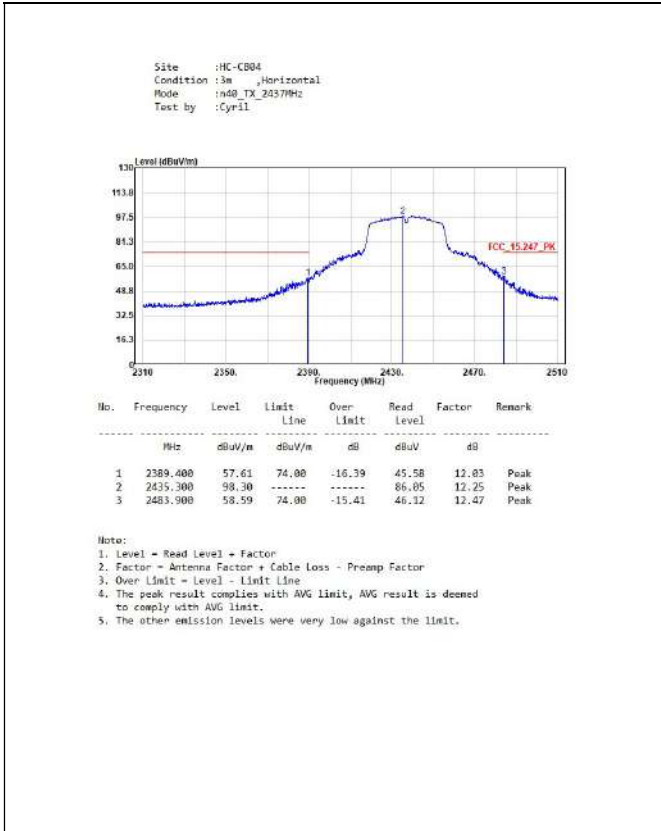


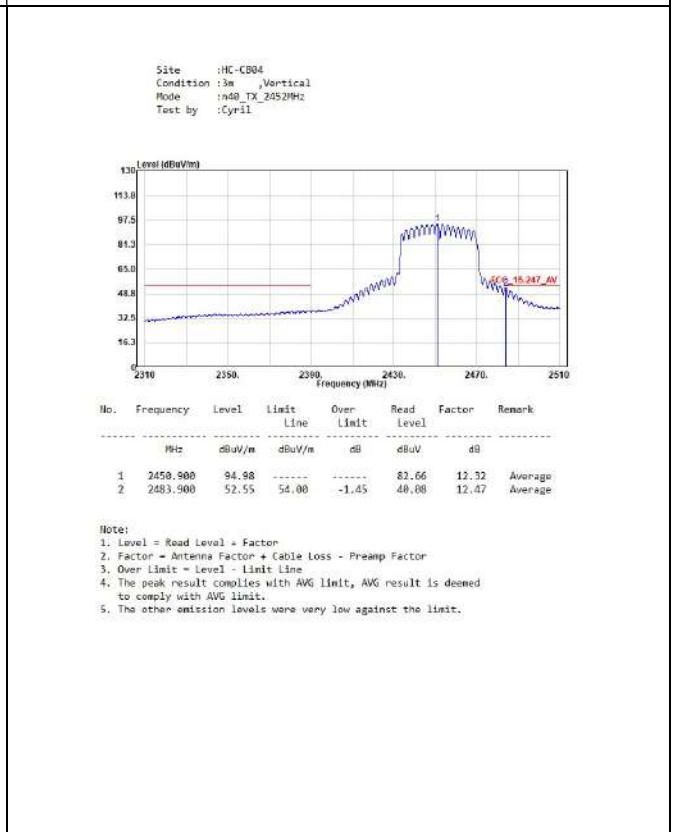
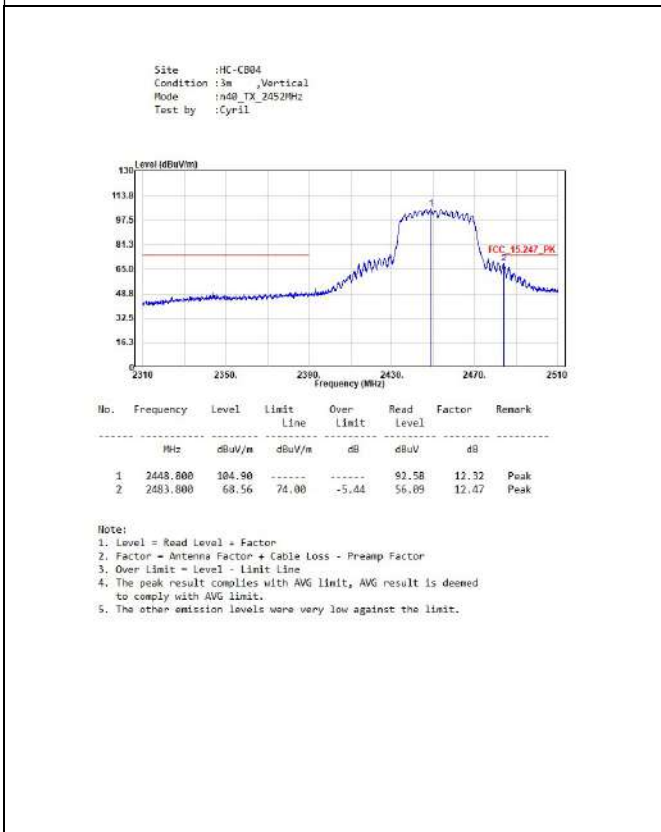
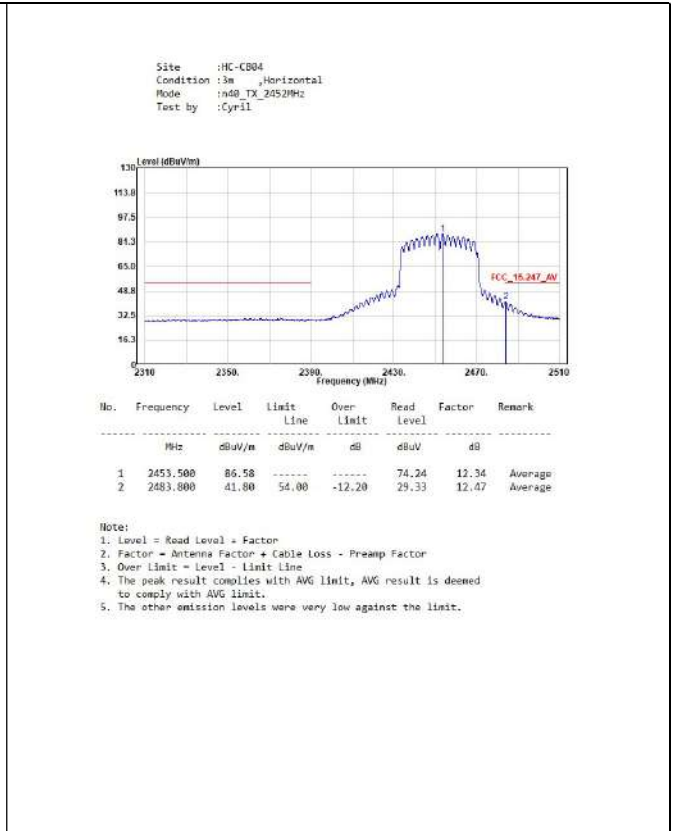






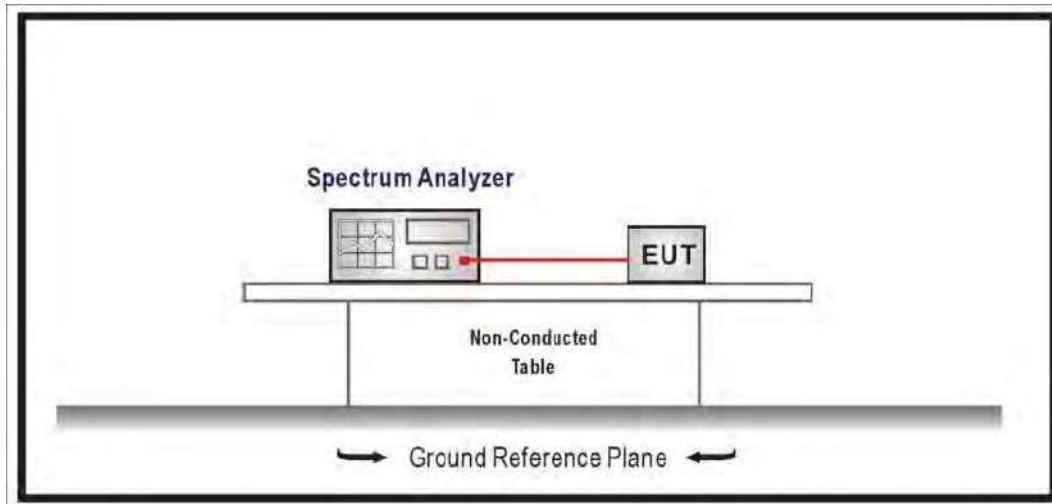






7. Occupied Bandwidth & DTS Bandwidth

7.1. Test Setup



7.2. Test Limit

The 6 dB bandwidth: ≥ 0.50 MHz.

Occupied Bandwidth: NA

7.3. Test Procedures

The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB 558074 D01 V05r02 for compliance to FCC 47CFR 15.247 requirements.

7.4. Test Specification

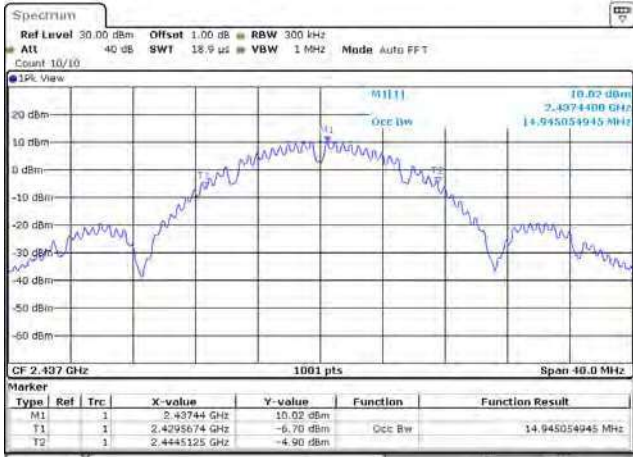
According to FCC Part 15 Subpart C Paragraph 15.247.

7.5. Test Result of Occupied Bandwidth

Modulation	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Limit (MHz)
			Ant. 0	Ant. 1	
802.11b	1	2412	14.185	14.385	-
	6	2437	14.945	14.385	-
	11	2462	14.545	13.906	-
802.11g	1	2412	17.022	16.503	-
	6	2437	20.179	17.502	-
	11	2462	17.182	16.503	-
802.11n (20 MHz)	1	2412	17.902	17.622	-
	6	2437	19.980	18.061	-
	11	2462	17.822	17.542	-
802.11n (40 MHz)	3	2422	35.884	36.203	-
	6	2437	36.123	36.363	-
	9	2452	35.884	36.203	-

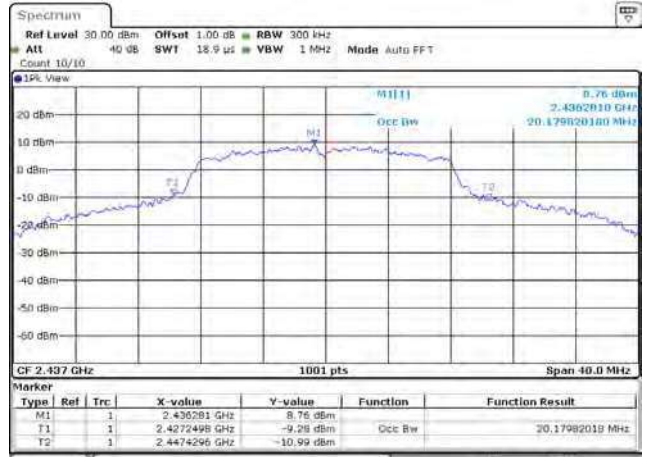
Spectrum plot of maximum value

802.11b / Ant. 0 / 2437 MHz



Date: 23-APR-2023 10:14:21

802.11g / Ant. 0 / 2437 MHz



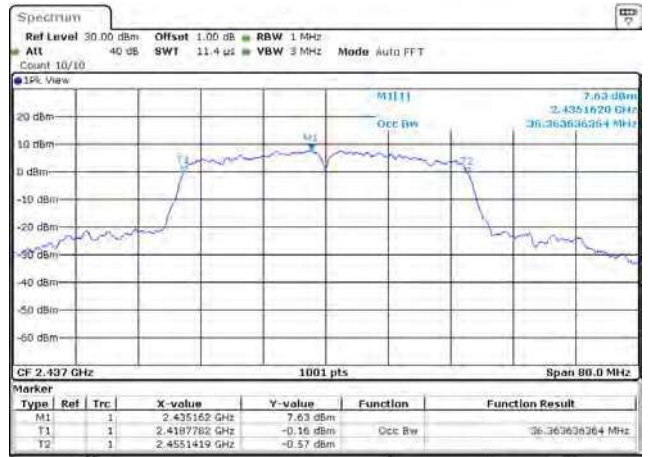
Date: 23-APR-2023 10:15:26

802.11n (20 MHz) / Ant. 0 / 2437 MHz



Date: 23-APR-2023 10:14:20

802.11n (40 MHz) / Ant. 1 / 2437 MHz



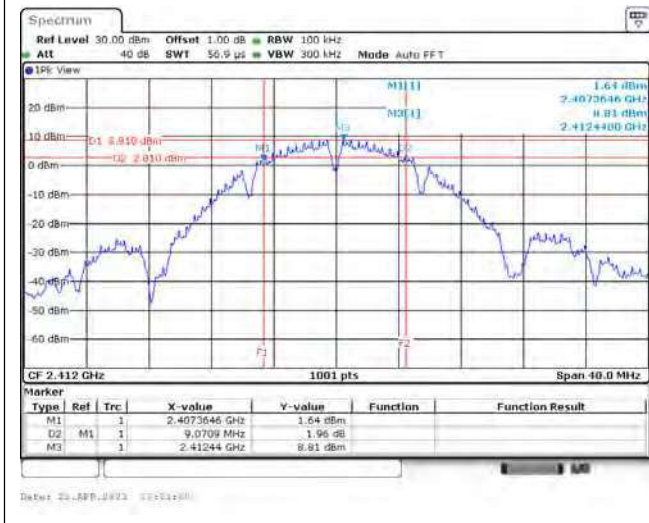
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7.6. Test Result of DTS Bandwidth

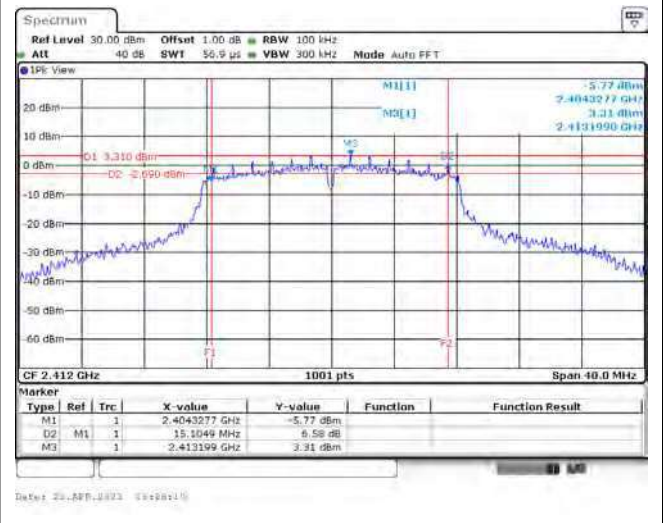
Modulation	Channel	Frequency (MHz)	DTS Bandwidth (MHz)		Limit (MHz)	Result
			Ant. 0	Ant. 1		
802.11b	1	2412	9.070	9.070	≥ 0.50	Pass
	6	2437	9.510	9.070	≥ 0.50	Pass
	11	2462	9.070	9.070	≥ 0.50	Pass
802.11g	1	2412	15.104	15.104	≥ 0.50	Pass
	6	2437	15.104	15.104	≥ 0.50	Pass
	11	2462	15.104	15.104	≥ 0.50	Pass
802.11n (20 MHz)	1	2412	15.104	16.263	≥ 0.50	Pass
	6	2437	15.104	15.704	≥ 0.50	Pass
	11	2462	15.104	16.263	≥ 0.50	Pass
802.11n (40 MHz)	3	2422	35.084	35.084	≥ 0.50	Pass
	6	2437	35.084	35.084	≥ 0.50	Pass
	9	2452	35.084	35.084	≥ 0.50	Pass

Spectrum plot of worst value

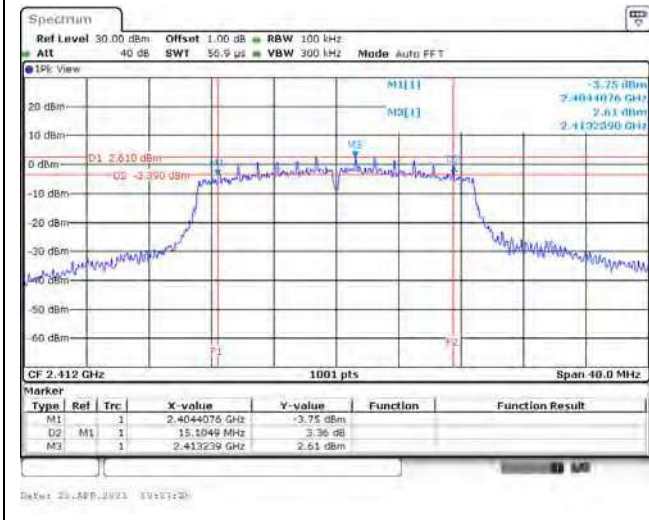
802.11b / Ant. 0 / 2412 MHz



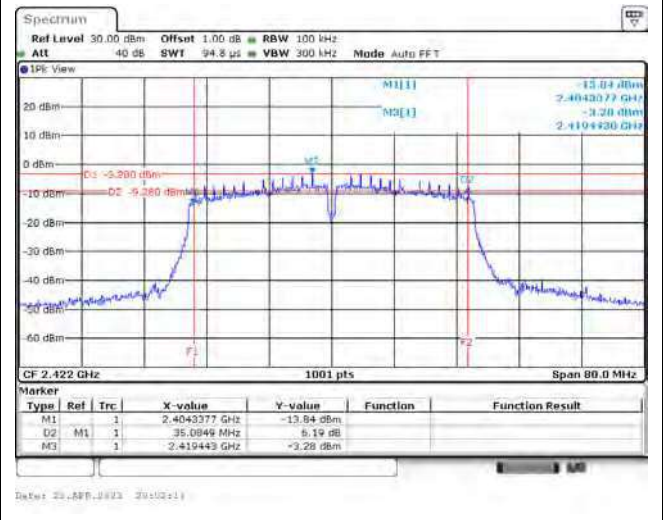
802.11g / Ant. 0 / 2412 MHz



802.11n (20 MHz) / Ant. 0 / 2412 MHz

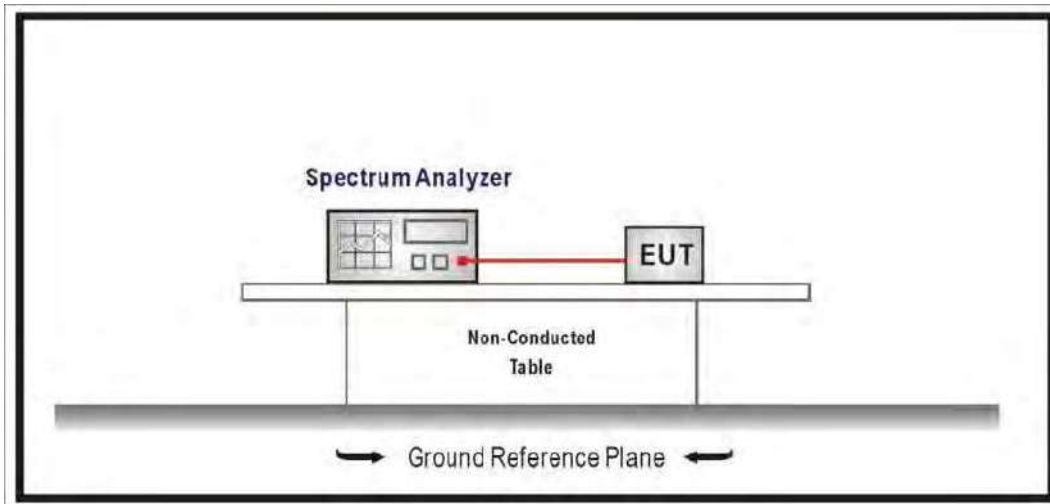


802.11n (40 MHz) / Ant. 0 / 2422 MHz



8. Maximum Power Spectral Density

8.1. Test Setup



8.2. Test Limit

The peak power spectral density conducted from the intentional radiated to the antenna shall not be greater than +8 dBm in any 3 kHz band during any time interval of continuous transmission.

8.3. Test Procedures

The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB 558074 D01 V05r02 for compliance to FCC 47CFR 15.247 requirements.

8.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

8.5. Test Result of Maximum Power Spectral Density

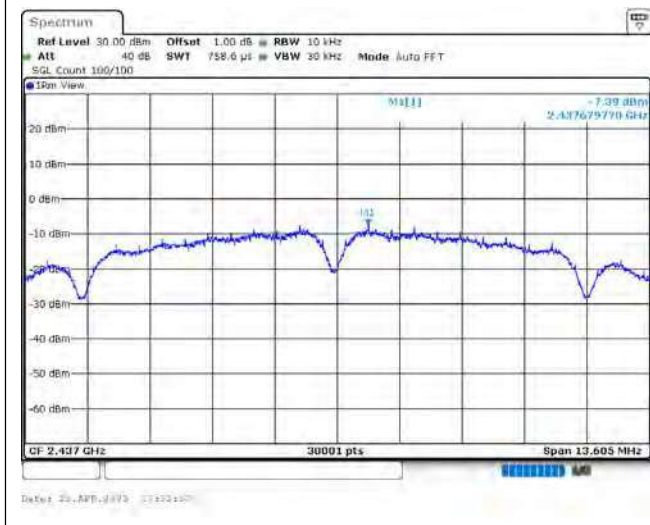
Modulation	Channel	Frequency (MHz)	Power Spectral Density (dBm / 3kHz)			Limit (dBm / 3kHz)	Result
			Ant. 0	Ant. 1	Total		
802.11b	1	2412	-7.830	-8.500	-5.101	≤ 7.84	Pass
	6	2437	-7.390	-8.490	-4.854	≤ 7.84	Pass
	11	2462	-8.470	-10.150	-6.178	≤ 7.84	Pass
802.11g	1	2412	-14.460	-14.760	-11.414	≤ 7.84	Pass
	6	2437	-11.560	-11.570	-8.371	≤ 7.84	Pass
	11	2462	-14.190	-14.590	-11.192	≤ 7.84	Pass
802.11n (20 MHz)	1	2412	-15.390	-14.820	-11.856	≤ 7.84	Pass
	6	2437	-11.790	-11.210	-8.251	≤ 7.84	Pass
	11	2462	-15.550	-15.960	-12.510	≤ 7.84	Pass
802.11n (40 MHz)	3	2422	-20.930	-20.930	-17.525	≤ 7.84	Pass
	6	2437	-17.350	-17.250	-13.894	≤ 7.84	Pass
	9	2452	-20.780	-20.960	-17.464	≤ 7.84	Pass

Note:

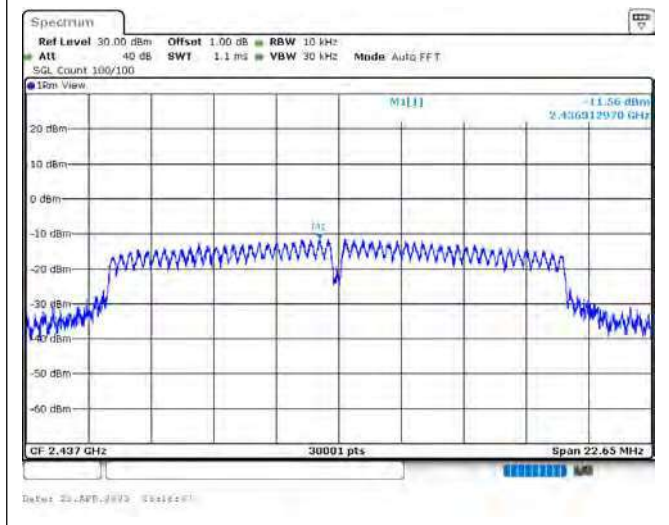
- Total power spectral density = power spectral density + duty factor, and the duty factor refer to section 1.10.
- Directional Gain = $10 \log [(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{Ant}] = 6.16 \text{dBi} > 6 \text{dBi}$, so the limit = $8 - (6.16 - 6) = 7.84 \text{dBm}/3\text{kHz}$.

Spectrum plot of worst value

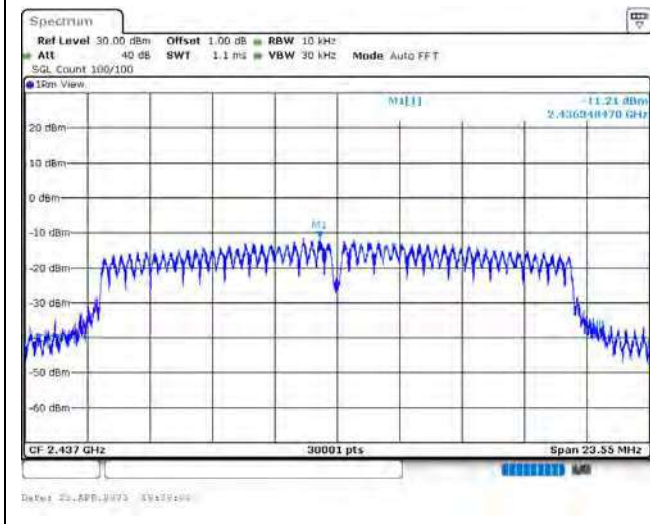
802.11b / Ant. 0 / 2437 MHz



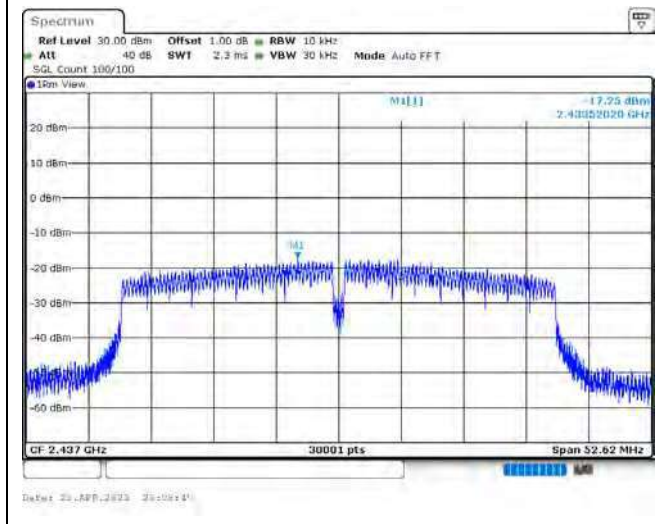
802.11g / Ant. 0 / 2437 MHz



802.11n (20 MHz) / Ant. 1 / 2437 MHz



802.11n (40 MHz) / Ant. 1 / 2437 MHz



Appendix A

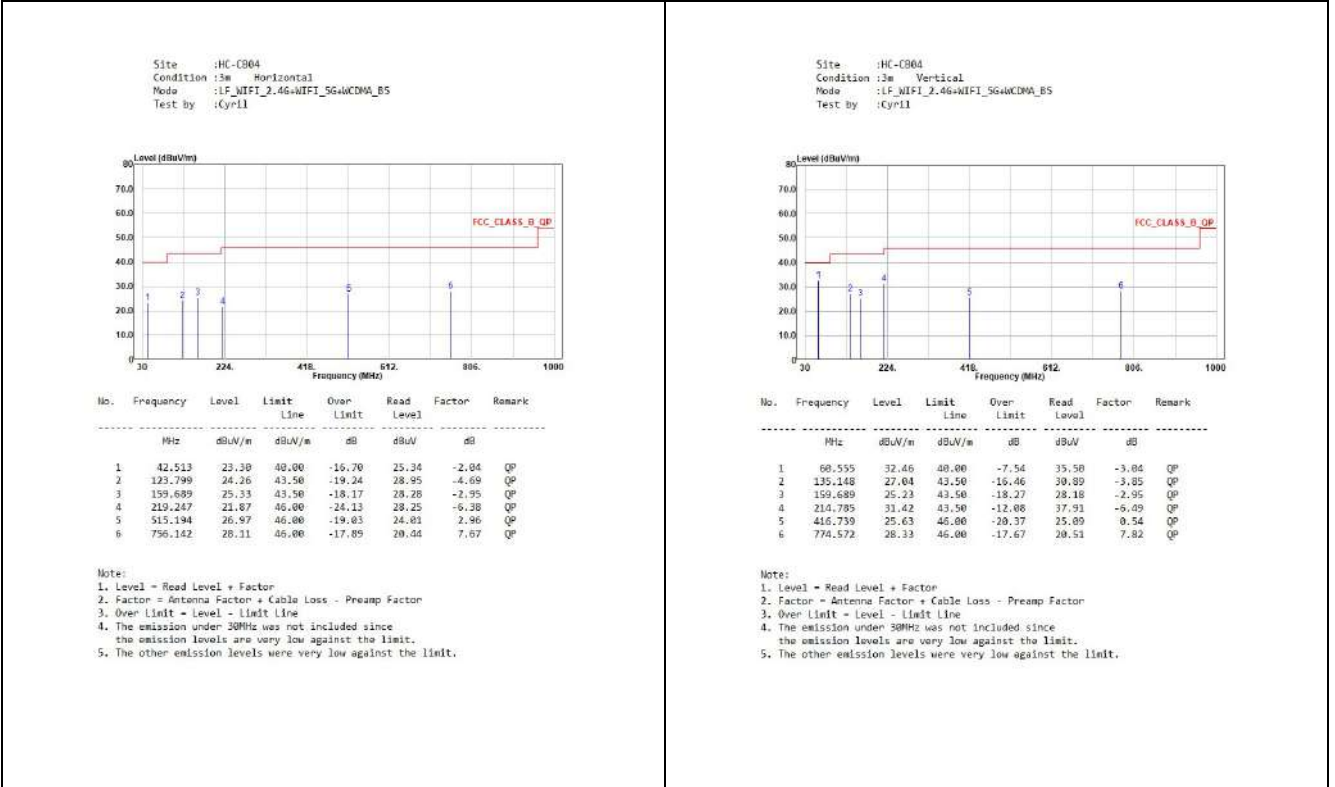
➤ Test Result of Radiated Emissions Co-location

<For EUT 1>

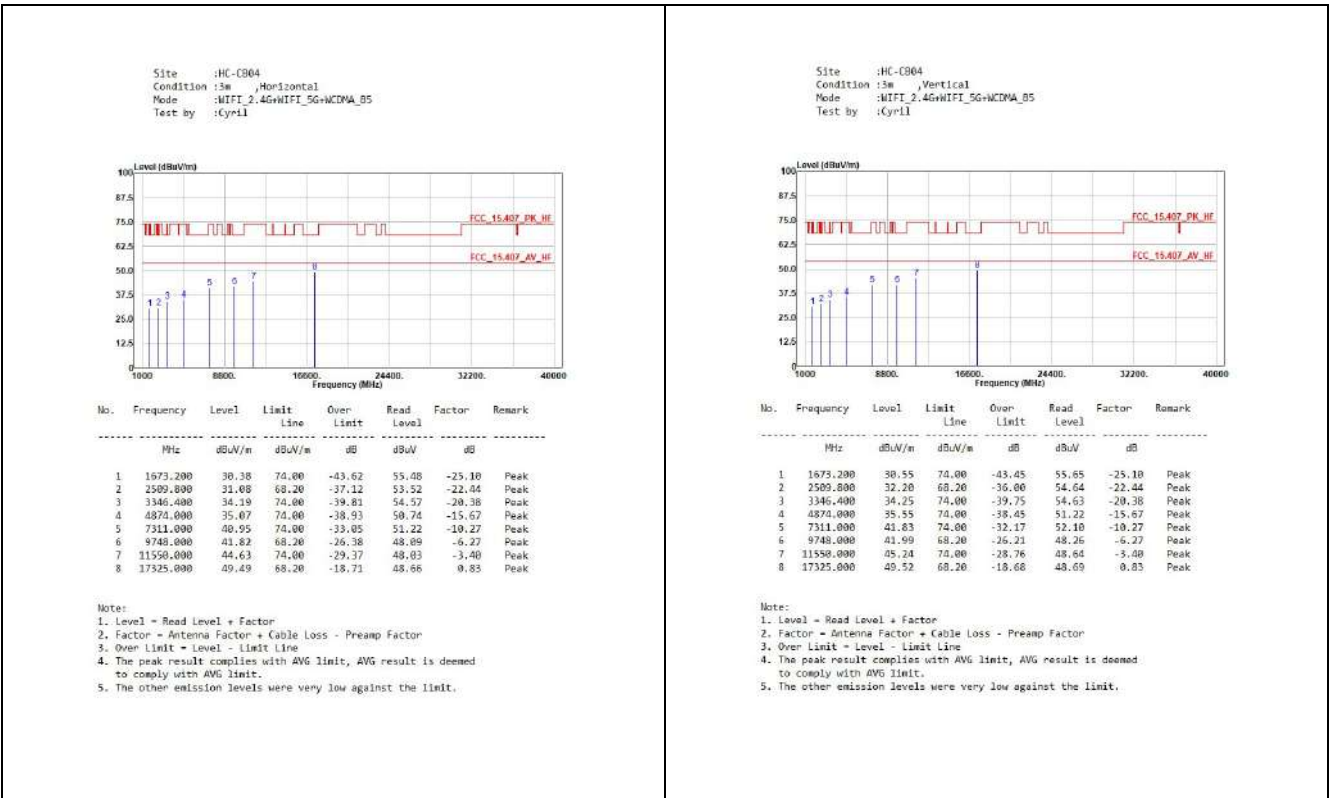
Mode 1: Transmit - power by adapter

1. WiFi 2.4 GHz + WiFi 5 GHz + WWAN module: WCDMA function

30 MHz ~ 1 GHz:

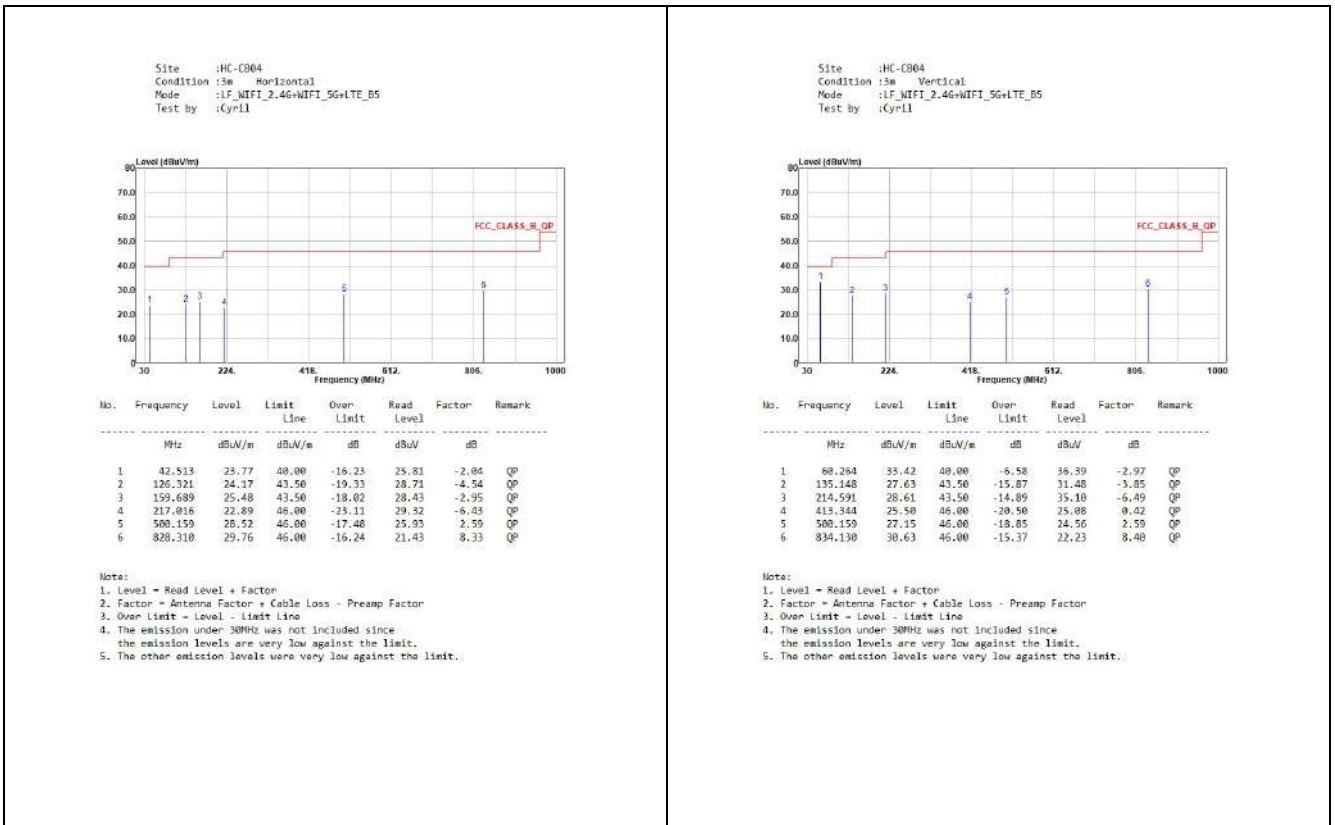


Above 1 GHz:

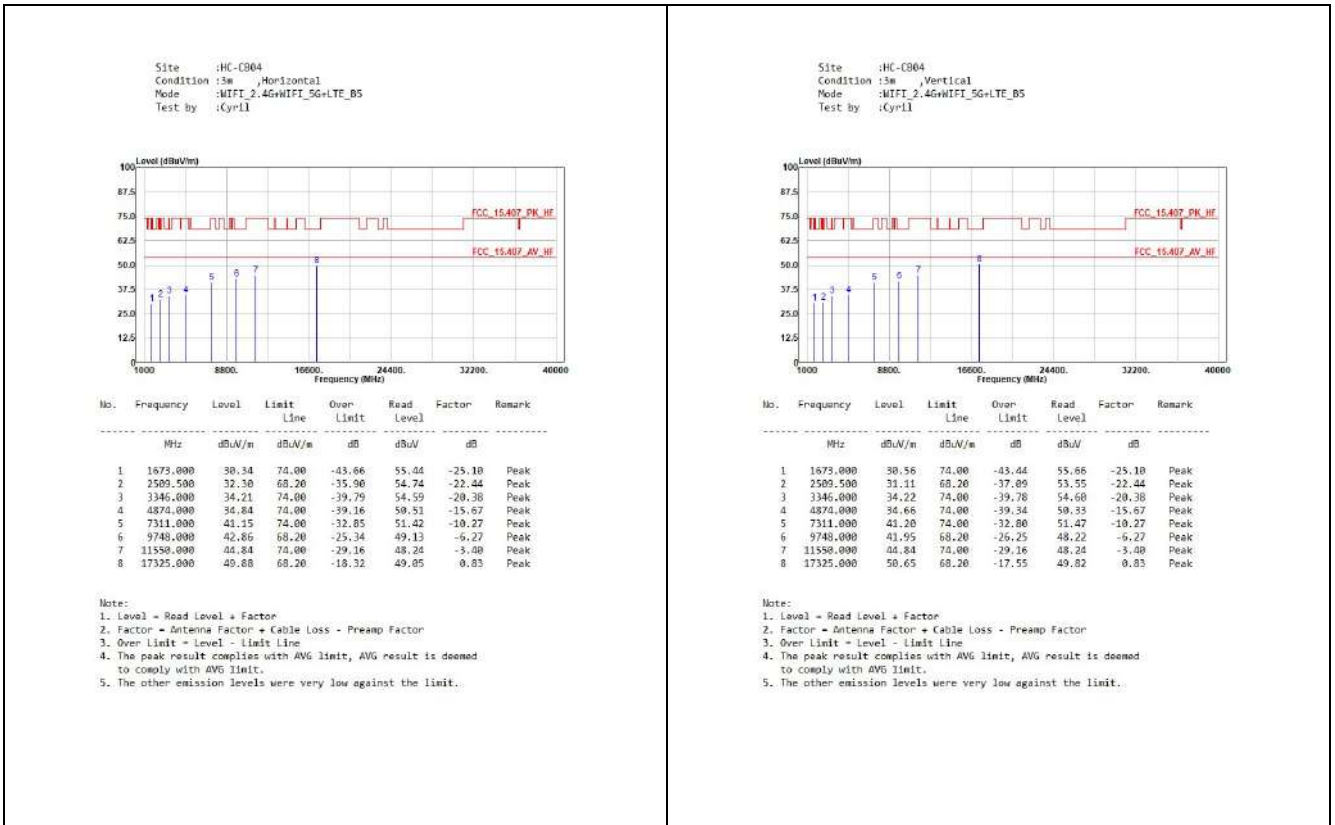


2. WiFi 2.4 GHz + WiFi 5 GHz + WWAN module: LTE function

30 MHz ~ 1 GHz:



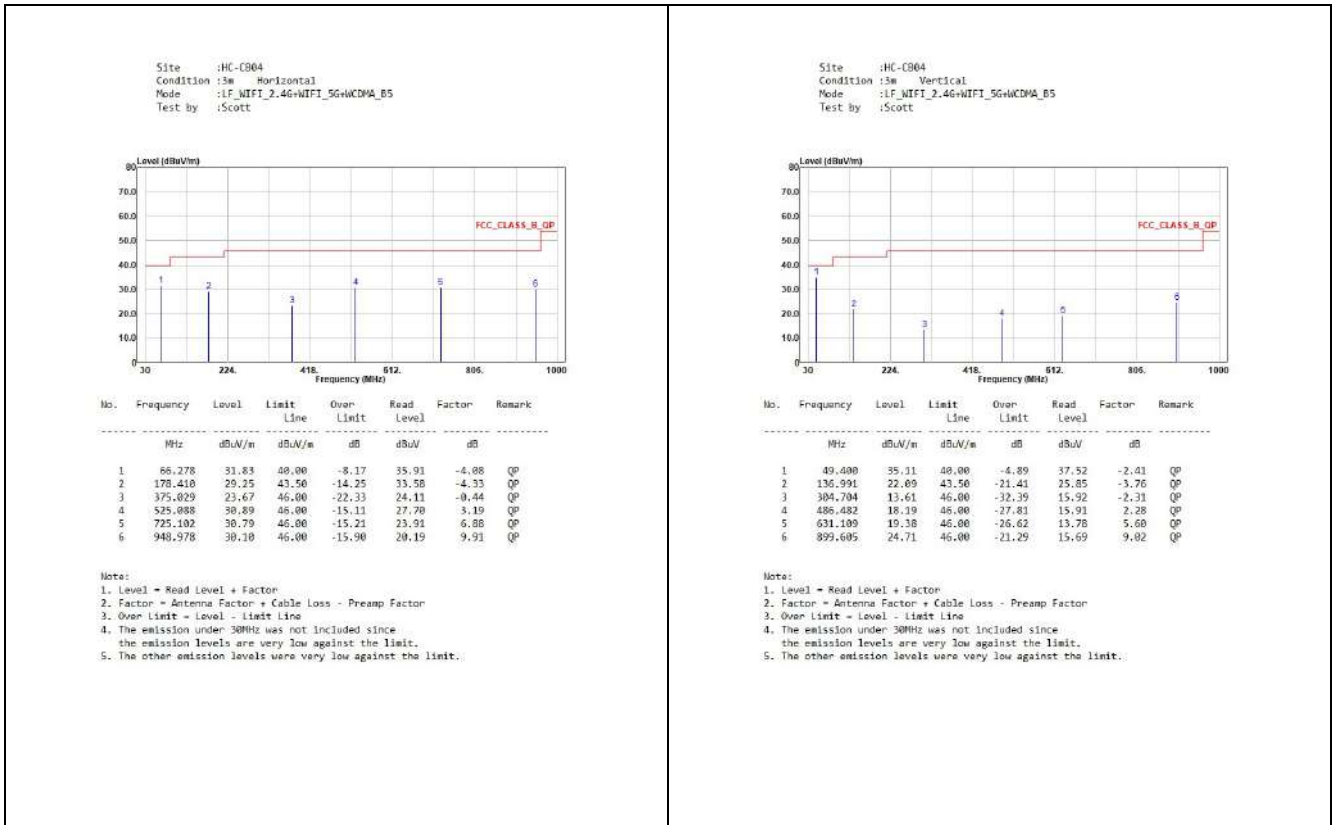
Above 1 GHz:



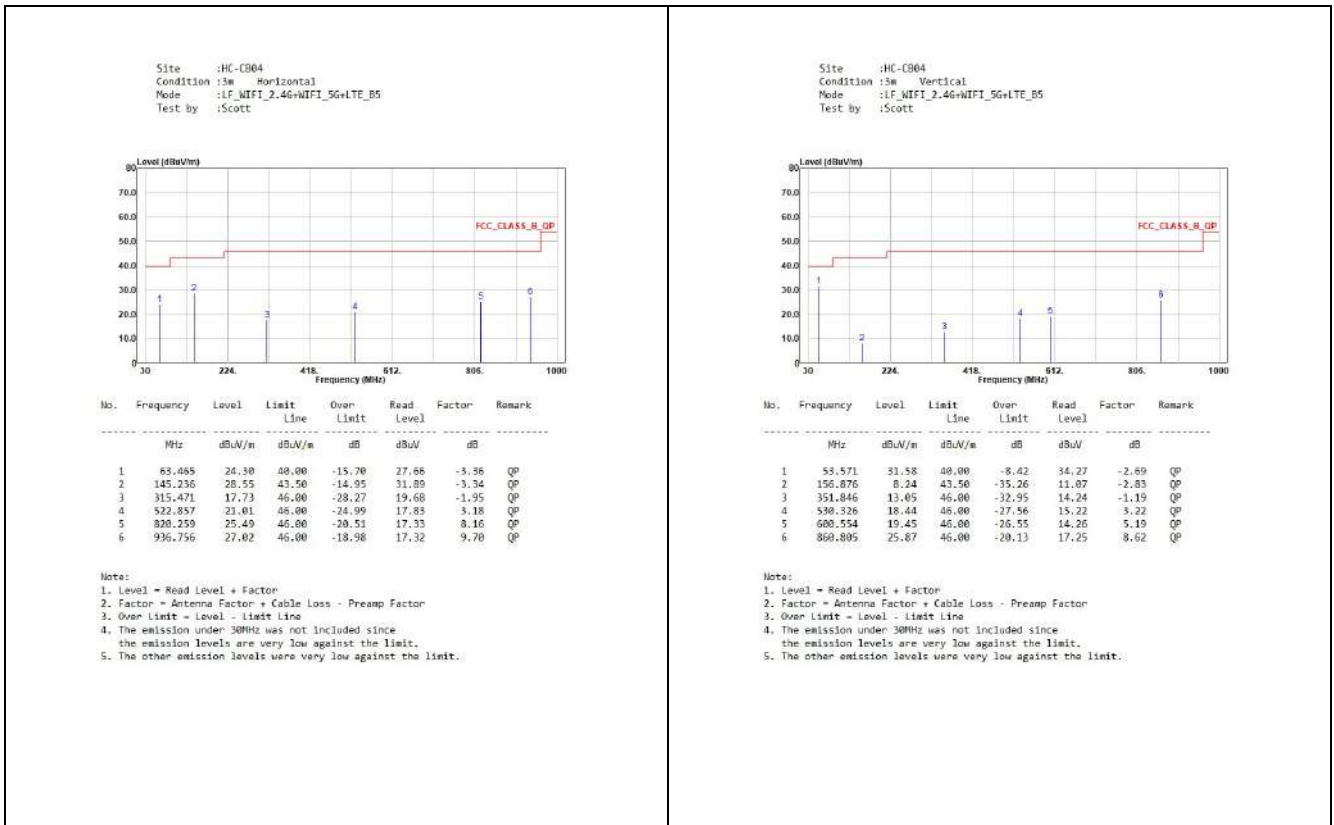
Mode 2: Transmit - power by 802.3at PoE

1. WiFi 2.4 GHz + WiFi 5 GHz + WWAN module: WCDMA function

30 MHz ~ 1 GHz:



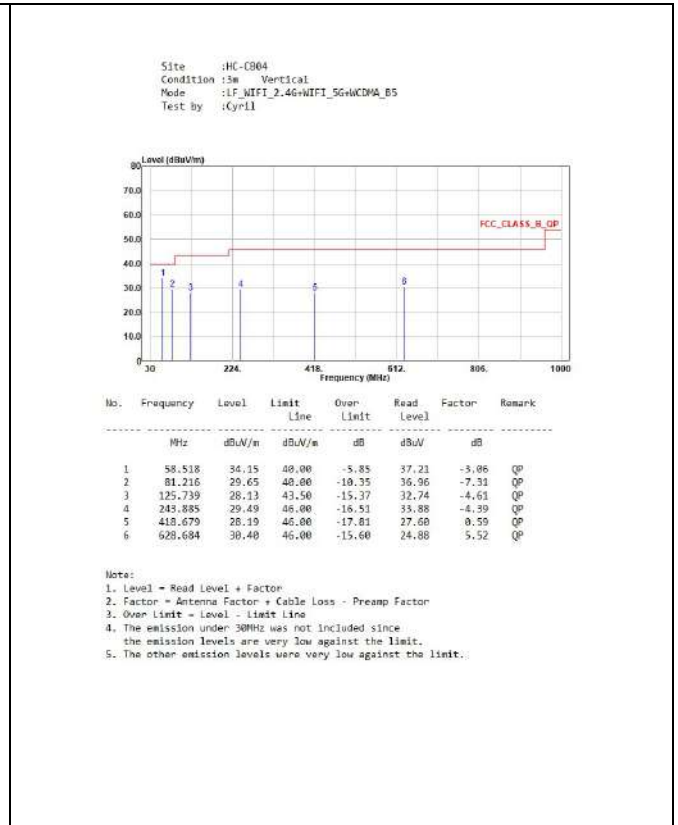
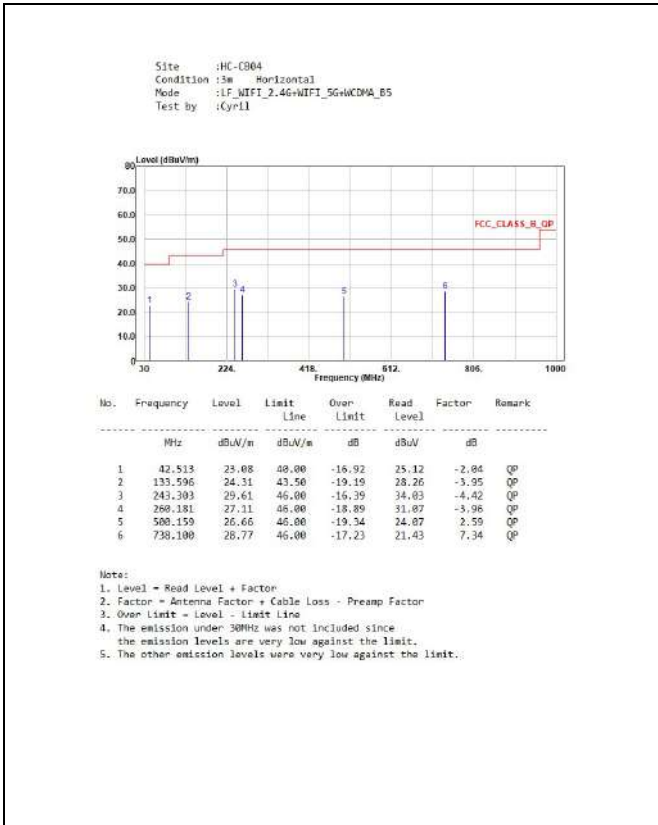
2. WiFi 2.4 GHz + WiFi 5 GHz + WWAN module: LTE function
30 MHz ~ 1 GHz:



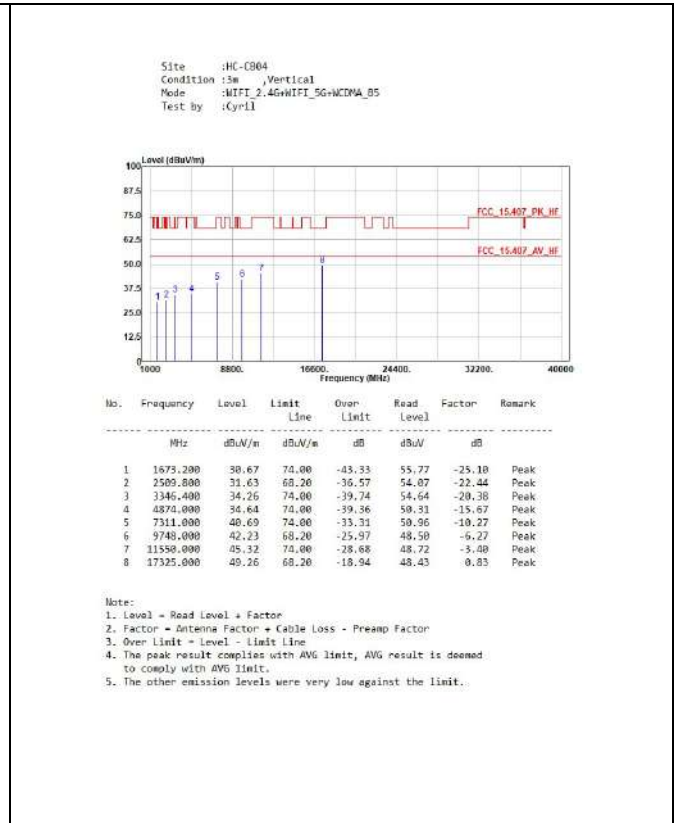
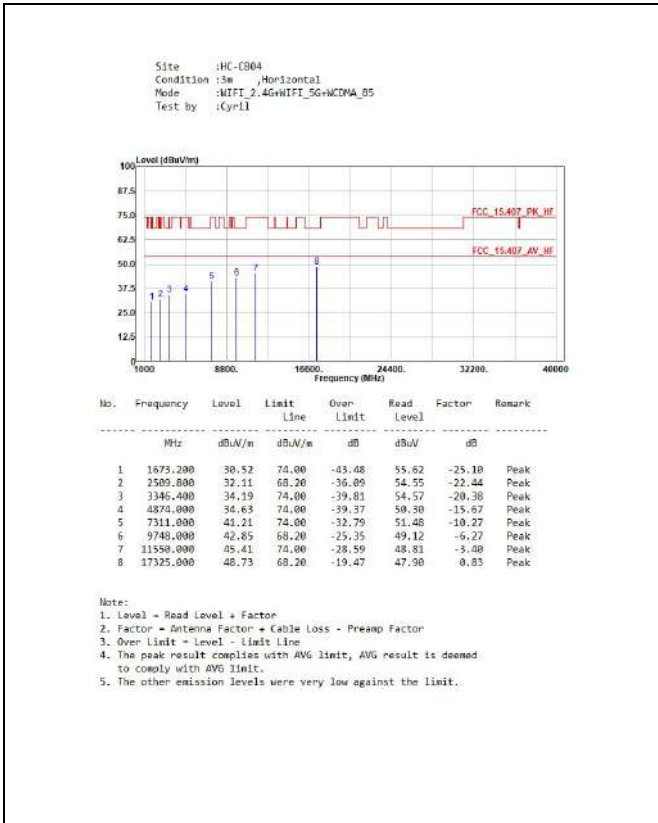
<For EUT 2>

Mode 1: Transmit - power by adapter

1. WiFi 2.4 GHz + WiFi 5 GHz + WWAN module: WCDMA function
30 MHz ~ 1 GHz:

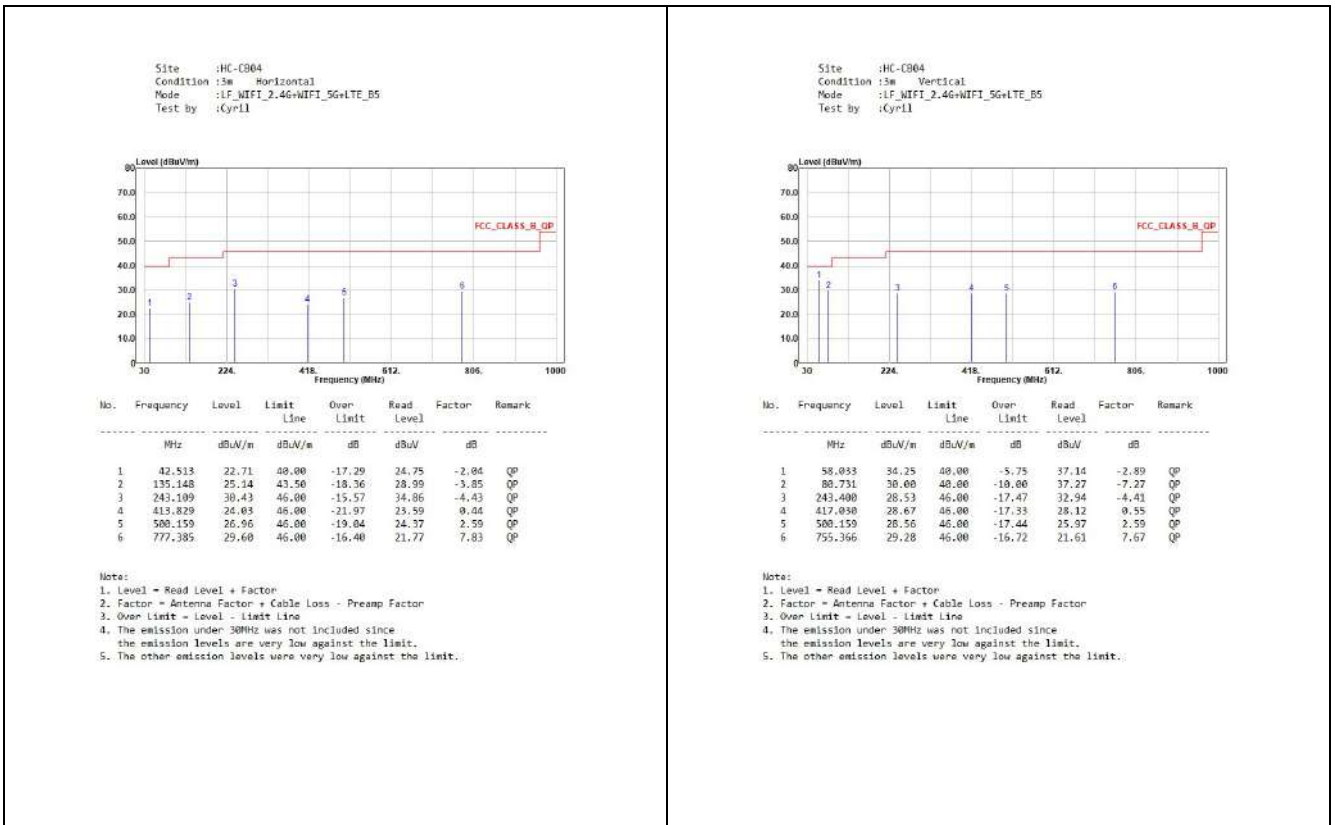


Above 1 GHz:

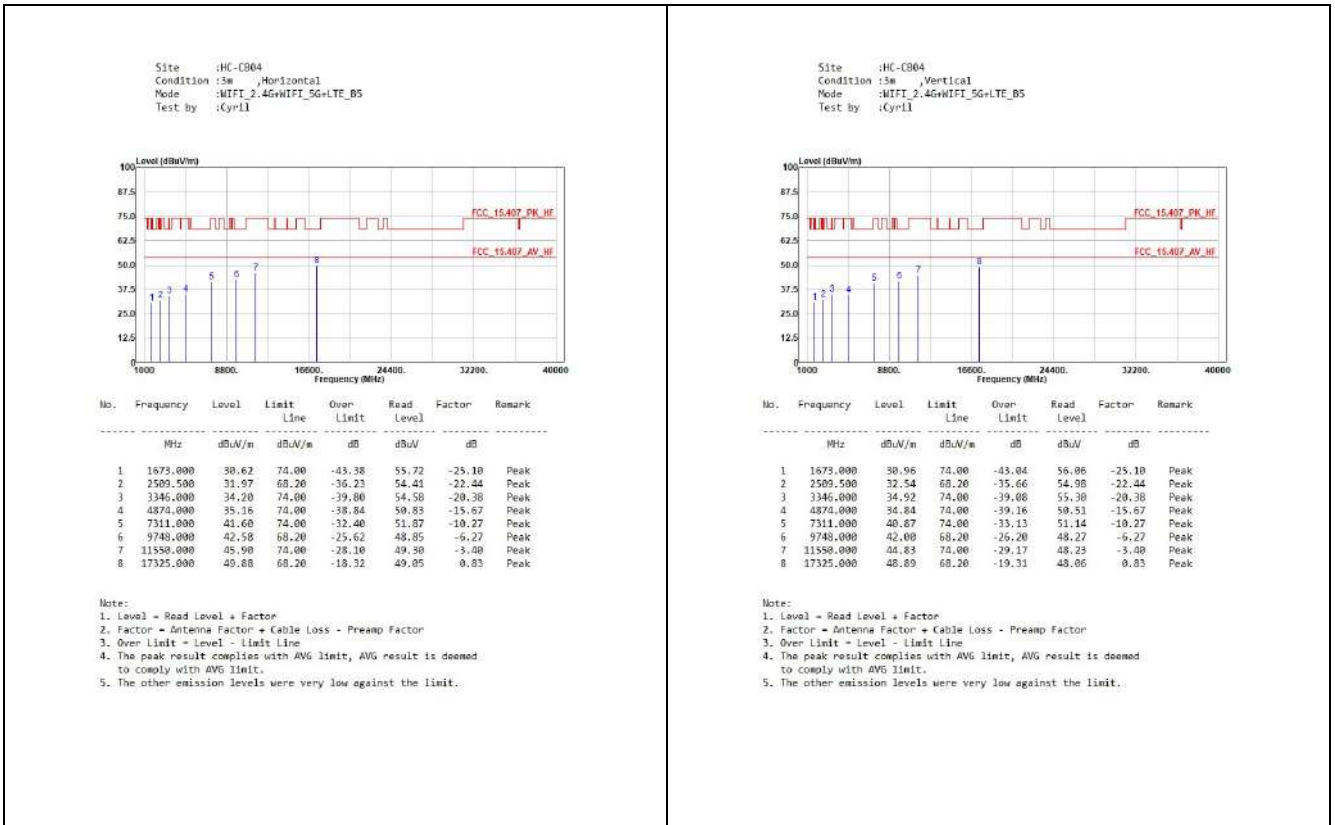


2. WiFi 2.4 GHz + WiFi 5 GHz + WWAN module: LTE function

30 MHz ~ 1 GHz:

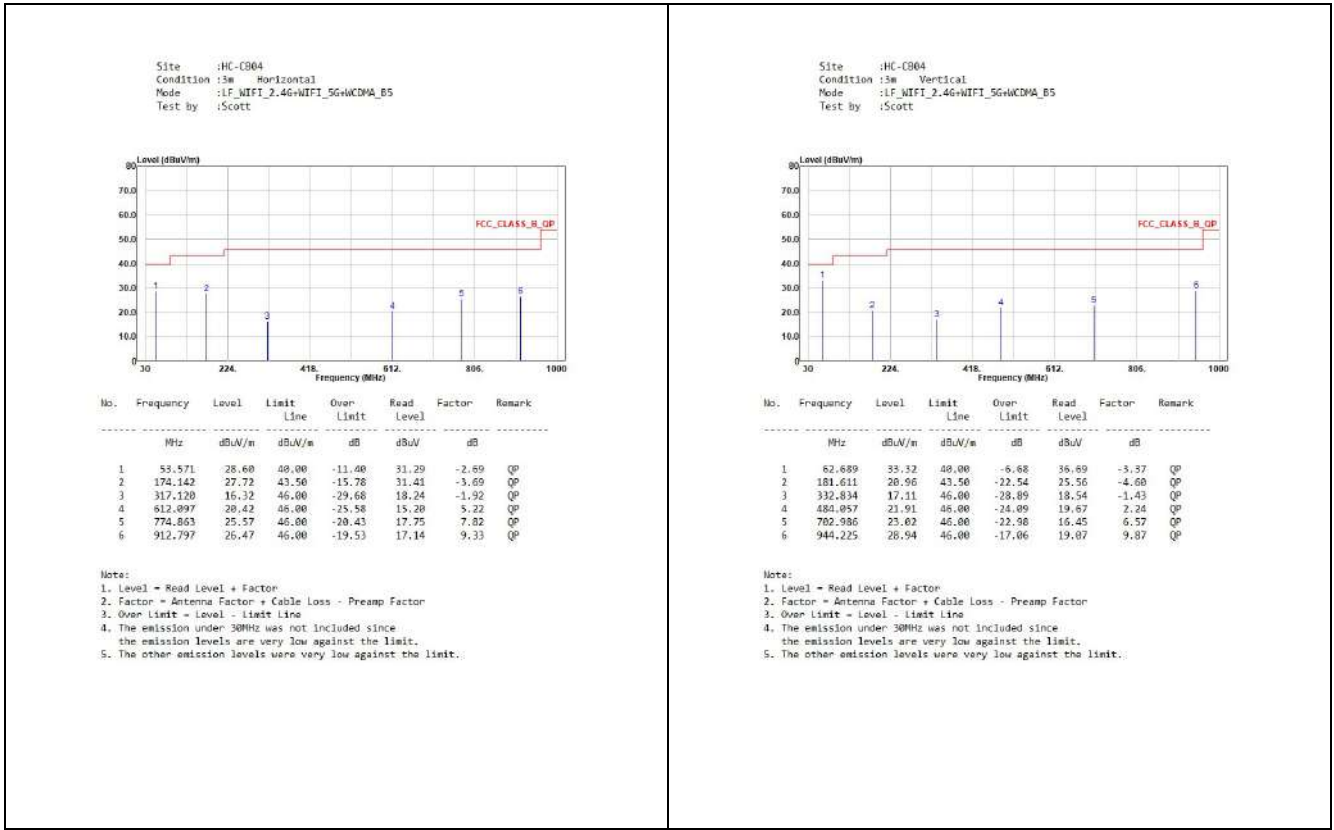


Above 1 GHz:



Mode 2: Transmit - power by 802.3at PoE

1. WiFi 2.4 GHz + WiFi 5 GHz + WWAN module: WCDMA function
 30 MHz ~ 1 GHz:



2. WiFi 2.4 GHz + WiFi 5 GHz + WWAN module: LTE function
30 MHz ~ 1 GHz:

