# Appendix C. Radiated Spurious Emission

**2.4GHz 2400~2483.5MHz**

**BT (Band Edge @ 3m)**

| BT | Note | Frequency | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Ant Pos | Table Pos | Peak Avg. | Pol. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ( MHz ) | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | ( dBμV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | (P/A) | (H/V) |
| BT CH00 2402MHz | | 2388.54 | 50.18 | -23.82 | 74 | 46.47 | 27.82 | 7.8 | 31.91 | 100 | 278 | P | H |
| | | 2388.54 | 25.39 | -28.61 | 54 | - | - | - | - | 100 | 278 | P | H |
| | * | 2402 | 113.22 | - | - | 109.52 | 27.79 | 7.81 | 31.9 | 100 | 278 | P | H |
| | * | 2402 | 88.43 | - | - | - | - | - | - | 100 | 278 | A | H |
| | | 2325.85 | 43.87 | -30.13 | 74 | 40.17 | 27.95 | 7.72 | 31.97 | 110 | 340 | P | V |
| | | 2325.85 | 19.08 | -34.92 | 54 | - | - | - | - | 110 | 340 | P | V |
| | * | 2402 | 101.23 | - | - | 97.53 | 27.79 | 7.81 | 31.9 | 110 | 340 | P | V |
| | * | 2402 | 76.44 | - | - | - | - | - | - | 110 | 340 | A | V |
| BT CH 39 2441MHz | | 2374.68 | 45.21 | -28.79 | 74 | 41.51 | 27.85 | 7.78 | 31.93 | 100 | 281 | P | H |
| | | 2374.68 | 20.42 | -33.58 | 54 | - | - | - | - | 100 | 281 | P | H |
| | * | 2441 | 113.62 | - | - | 109.98 | 27.64 | 7.86 | 31.86 | 100 | 281 | P | H |
| | * | 2441 | 88.83 | - | - | - | - | - | - | 100 | 281 | A | H |
| | | 2483.97 | 45.25 | -28.75 | 74 | 41.56 | 27.6 | 7.91 | 31.82 | 100 | 281 | P | H |
| | | 2483.97 | 20.46 | -33.54 | 54 | - | - | - | - | 100 | 281 | A | H |
| | | 2369.92 | 44.56 | -29.44 | 74 | 40.85 | 27.86 | 7.78 | 31.93 | 100 | 340 | P | V |
| | | 2369.92 | 19.77 | -34.23 | 54 | - | - | - | - | 100 | 340 | P | V |
| | * | 2441 | 103.31 | - | - | 99.67 | 27.64 | 7.86 | 31.86 | 100 | 340 | P | V |
| | * | 2441 | 78.52 | - | - | - | - | - | - | 100 | 340 | A | V |
| | | 2488.38 | 43.54 | -30.46 | 74 | 39.83 | 27.6 | 7.92 | 31.81 | 100 | 340 | P | V |
| | | 2488.38 | 18.75 | -35.25 | 54 | - | - | - | - | 100 | 340 | A | V |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BT CH 78 2480MHz | * | 2480 | 112.26 | - | - | 108.57 | 27.6 | 7.91 | 31.82 | 100 | 280 | P | H |
| | * | 2480 | 87.47 | - | - | - | - | - | - | 100 | 280 | A | H |
| | | 2483.52 | 59.68 | -14.32 | 74 | 55.99 | 27.6 | 7.91 | 31.82 | 100 | 280 | P | H |
| | | 2483.52 | 34.89 | -19.11 | 54 | - | - | - | - | 100 | 280 | A | H |
| | * | 2480 | 101.11 | - | - | 97.42 | 27.6 | 7.91 | 31.82 | 109 | 339 | P | V |
| | * | 2480 | 76.32 | - | - | - | - | - | - | 109 | 339 | A | V |
| | | 2483.56 | 49.47 | -24.53 | 74 | 45.78 | 27.6 | 7.91 | 31.82 | 109 | 339 | P | V |
| | | 2483.56 | 24.68 | -29.32 | 54 | - | - | - | - | 109 | 339 | A | V |
| **Remark** | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. | | | | | | | | | | | | |

## 2.4GHz 2400~2483.5MHz

## BT (Harmonic @ 3m)

| BT | Note | Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level ( dBμV ) | Antenna Factor ( dB/m ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Peak Avg. (P/A) | Pol. (H/V) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BT CH 00 2402MHz | | 4804 | 44.21 | -29.79 | 74 | 52.08 | 31.3 | 10.37 | 49.54 | 151 | 219 | P | H |
| | | 4804 | 19.42 | -34.58 | 54 | - | - | - | - | 151 | 219 | A | H |
| | | 4804 | 43.78 | -30.22 | 74 | 51.65 | 31.3 | 10.37 | 49.54 | 178 | 97 | P | V |
| | | 4804 | 18.99 | -35.01 | 54 | - | - | - | - | 178 | 97 | A | V |
| BT CH 39 2441MHz | | 4882 | 43.27 | -30.73 | 74 | 51.05 | 31.3 | 10.44 | 49.52 | 150 | 258 | P | H |
| | | 4882 | 18.48 | -35.52 | 54 | - | - | - | - | 150 | 258 | A | H |
| | | 7323 | 47.16 | -26.84 | 74 | 49.4 | 36.04 | 12.11 | 50.39 | 152 | 309 | P | H |
| | | 7323 | 22.37 | -31.63 | 54 | - | - | - | - | 152 | 309 | A | H |
| | | 4882 | 42.76 | -31.24 | 74 | 50.54 | 31.3 | 10.44 | 49.52 | 100 | 211 | P | V |
| | | 4882 | 17.97 | -36.03 | 54 | - | - | - | - | 100 | 211 | A | V |
| | | 7323 | 47.41 | -26.59 | 74 | 49.65 | 36.04 | 12.11 | 50.39 | 169 | 338 | P | V |
| | | 7323 | 22.62 | -31.38 | 54 | - | - | - | - | 169 | 338 | A | V |
| BT CH 78 2480MHz | | 4960 | 44.27 | -29.73 | 74 | 51.77 | 31.5 | 10.51 | 49.51 | 118 | 289 | P | H |
| | | 4960 | 19.48 | -34.52 | 54 | - | - | - | - | 118 | 289 | A | H |
| | | 7440 | 47.8 | -26.2 | 74 | 49.69 | 36.34 | 12.23 | 50.46 | 158 | 273 | P | H |
| | | 7440 | 23.01 | -30.99 | 54 | - | - | - | - | 158 | 273 | A | H |
| | | 4960 | 44.85 | -29.15 | 74 | 52.35 | 31.5 | 10.51 | 49.51 | 120 | 269 | P | V |
| | | 4960 | 20.06 | -33.94 | 54 | - | - | - | - | 120 | 269 | A | V |
| | | 7440 | 47.13 | -26.87 | 74 | 49.02 | 36.34 | 12.23 | 50.46 | 184 | 278 | P | V |
| | | 7440 | 22.34 | -31.66 | 54 | - | - | - | - | 184 | 278 | A | V |
| **Remark** | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. | | | | | | | | | | | | |

## Emission below 1GHz

## 2.4GHz BT (LF)

| BT | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Preamp | Ant | Table | Peak | Pol. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Limit | Line | Level | Factor | Loss | Factor | Pos | Pos | Avg. | |
| | | ( MHz ) | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | (dBμV) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | (P/A) | (H/V) |
| 2.4GHz BT LF | | 46.49 | 18.41 | -21.59 | 40 | 31.06 | 20.26 | 2.15 | 35.06 | - | - | P | H |
| | | 91.11 | 22.88 | -20.62 | 43.5 | 41.74 | 13.94 | 2.38 | 35.18 | - | - | P | H |
| | | 160.95 | 24.77 | -18.73 | 43.5 | 37.96 | 19.32 | 2.59 | 35.1 | - | - | P | H |
| | | 270.56 | 26.68 | -19.32 | 46 | 39.74 | 18.91 | 2.99 | 34.96 | - | - | P | H |
| | | 399.57 | 24.28 | -21.72 | 46 | 33.68 | 22.09 | 3.31 | 34.8 | - | - | P | H |
| | | 855.47 | 29.07 | -16.93 | 46 | 30.64 | 28.65 | 4.08 | 34.3 | 120 | 64 | P | H |
| | | 50.37 | 22.85 | -17.15 | 40 | 35.43 | 20.29 | 2.23 | 35.1 | - | - | P | V |
| | | 91.11 | 34.93 | -8.57 | 43.5 | 53.79 | 13.94 | 2.38 | 35.18 | 174 | 99 | P | V |
| | | 162.89 | 32.53 | -10.97 | 43.5 | 45.72 | 19.31 | 2.6 | 35.1 | - | - | P | V |
| | | 256.01 | 27.9 | -18.1 | 46 | 41.63 | 18.37 | 2.89 | 34.99 | - | - | P | V |
| | | 316.15 | 24.29 | -21.71 | 46 | 35.87 | 20.12 | 3.2 | 34.9 | - | - | P | V |
| | | 401.51 | 24.47 | -21.53 | 46 | 33.84 | 22.12 | 3.31 | 34.8 | - | - | P | V |
| **Remark** | 1. No other spurious found.<br>2. All results are PASS against limit line. | | | | | | | | | | | | |

**Note symbol**

| | |
|---|---|
| * | **Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency. |
| ! | Test result is **over limit** line. |
| P/A | **P**eak or **A**verage |
| H/V | **H**orizontal or **V**ertical |

## A calculation example for radiated spurious emission is shown as below:

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Preamp | Ant | Table | Peak | Pol. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ant. | | | | Limit | Line | Level | Factor | Loss | Factor | Pos | Pos | Avg. | |
| 1+2 | | ( MHz ) | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | ( dBμV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | (P/A) | (H/V) |
| 802.11b CH 01 2412MHz | | 2390 | 55.45 | -18.55 | 74 | 54.51 | 32.22 | 4.58 | 35.86 | 103 | 308 | P | H |
| | | 2390 | 43.54 | -10.46 | 54 | 42.6 | 32.22 | 4.58 | 35.86 | 103 | 308 | A | H |

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

**For Peak Limit @ 2390MHz:**

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

**For Average Limit @ 2390MHz:**

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

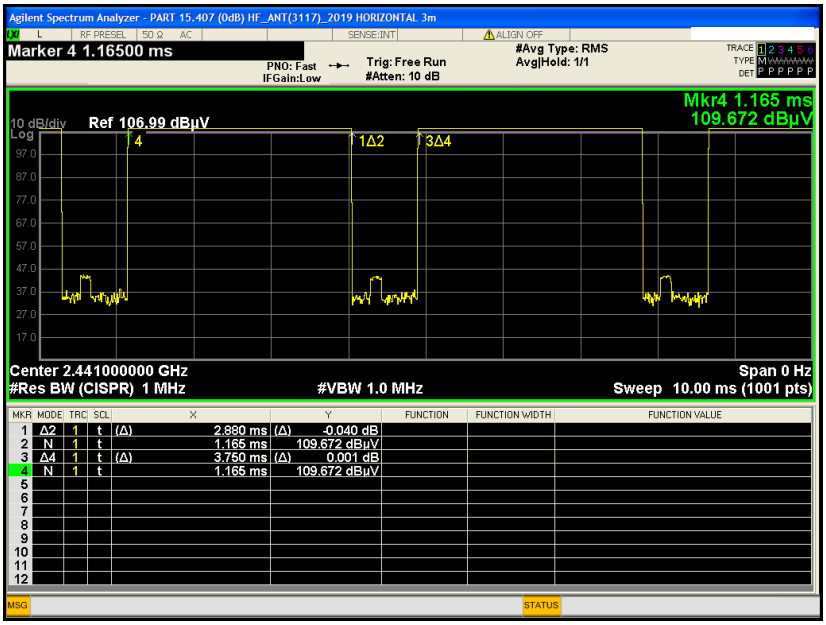
= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

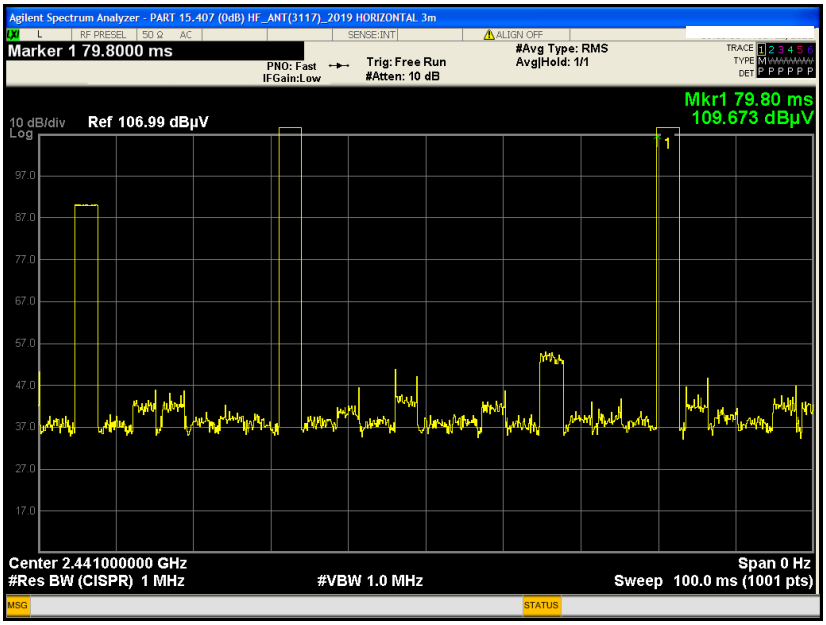
**Both peak and average measured complies with the limit line, so test result is “PASS”.**

# Appendix D. Duty Cycle Plots

## DH5 on time (One Pulse) Plot on Channel 39




## DH5 on time (Count Pulses) Plot on Channel 39




**Note:**

1. Worst case Duty cycle = on time/100 milliseconds = 2 * 2.88 / 100 = 5.76 %
2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -24.79 dB
3. DH5 has the highest duty cycle worst case and is reported.