# Appendix A. Radiated Spurious Emission

| Test Engineer : | Derreck Chen | Temperature : | 23~25°C |
|---|---|---|---|
| | | Relative Humidity : | 48~51% |

**15C 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 | | 2316.63 | 47.86 | -26.14 | 74 | 43.21 | 32.07 | 6.8 | 34.22 | 100 | 0 | P | H |
| | | 2316.63 | 0.12 | -53.88 | 54 | - | - | - | - | - | - | A | H |
| | * | 2402 | 44.75 | - | - | 39.96 | 32.18 | 6.91 | 34.3 | 100 | 0 | P | H |
| | * | 2402 | -2.99 | - | - | - | - | - | - | - | - | A | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | 2327.68 | 46.57 | -27.43 | 74 | 41.9 | 32.09 | 6.8 | 34.22 | 100 | 0 | P | V |
| | | 2327.68 | -1.17 | -55.17 | 54 | - | - | - | - | - | - | A | V |
| | * | 2402 | 45.52 | - | - | 40.73 | 32.18 | 6.91 | 34.3 | 100 | 0 | P | V |
| | * | 2402 | -2.22 | - | - | - | - | - | - | - | - | A | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| BT CH 39 2441MHz | | 2363.96 | 47.24 | -26.76 | 74 | 42.49 | 32.13 | 6.87 | 34.25 | 100 | 0 | P | H |
| | | 2363.96 | -0.5 | -54.5 | 54 | - | - | - | - | - | - | A | H |
| | * | 2441 | 44.24 | - | - | 39.44 | 32.24 | 6.95 | 34.39 | 100 | 0 | P | H |
| | * | 2441 | -3.5 | - | - | - | - | - | - | - | - | A | H |
| | | 2487.27 | 46.52 | -27.48 | 74 | 41.67 | 32.28 | 7 | 34.43 | 100 | 0 | P | H |
| | | 2487.27 | -1.22 | -55.22 | 54 | - | - | - | - | - | - | A | H |
| | | 2340.78 | 46.87 | -27.13 | 74 | 42.17 | 32.11 | 6.84 | 34.25 | 100 | 0 | P | V |
| | | 2340.78 | -0.87 | -54.87 | 54 | - | - | - | - | - | - | A | V |
| | * | 2441 | 45.21 | - | - | 40.41 | 32.24 | 6.95 | 34.39 | 100 | 0 | P | V |
| | * | 2441 | -2.53 | - | - | - | - | - | - | - | - | A | V |
| | | 2494.49 | 46.49 | -27.51 | 74 | 41.67 | 32.3 | 7 | 34.48 | 100 | 0 | P | V |
| | | 2494.49 | -1.25 | -55.25 | 54 | - | - | - | - | - | - | A | V |

| 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 CH 78 2480MHz | * | 2480 | 44.47 | - | - | 39.62 | 32.28 | 7 | 34.43 | 100 | 0 | P | H |
| | * | 2480 | -3.27 | - | - | - | - | - | - | - | - | A | H |
| | | 2498.04 | 47.5 | -26.5 | 74 | 42.68 | 32.3 | 7 | 34.48 | 100 | 0 | P | H |
| | | 2498.04 | -0.24 | -54.24 | 54 | - | - | - | - | - | - | A | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | * | 2480 | 44.55 | - | - | 39.7 | 32.28 | 7 | 34.43 | 100 | 0 | P | V |
| | * | 2480 | -3.19 | - | - | - | - | - | - | - | - | A | V |
| | | 2497.97 | 44.92 | -29.08 | 74 | 40.1 | 32.3 | 7 | 34.48 | 100 | 0 | P | V |
| | | 2497.97 | -2.82 | -56.82 | 54 | - | - | - | - | - | - | A | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |

**Remark**

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.

**15C 2.4GHz 2400~2483.5MHz**

**BT (Harmonic @ 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 CH 00 2402MHz | | 4806 | 40.63 | -33.37 | 74 | 54.23 | 34.25 | 11.11 | 58.96 | 100 | 0 | P | H |
| | | 4806 | -7.11 | -61.11 | 54 | - | - | - | - | - | - | A | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | 4806 | 41.44 | -32.56 | 74 | 55.04 | 34.25 | 11.11 | 58.96 | 100 | 0 | P | V |
| | | 4806 | -6.3 | -60.3 | 54 | - | - | - | - | - | - | A | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| BT CH 39 2441MHz | | 4884 | 41.24 | -32.76 | 74 | 54.56 | 34.3 | 11.21 | 58.83 | 100 | 0 | P | H |
| | | 4884 | -6.5 | -60.5 | 54 | - | - | - | - | - | - | A | H |
| | | 7323 | 42.19 | -31.81 | 74 | 49.25 | 35.6 | 15.08 | 57.74 | 100 | 0 | P | H |
| | | 7323 | -5.55 | -59.55 | 54 | - | - | - | - | - | - | A | H |
| | | 4884 | 42.04 | -31.96 | 74 | 55.36 | 34.3 | 11.21 | 58.83 | 100 | 0 | P | V |
| | | 4884 | -5.7 | -59.7 | 54 | - | - | - | - | - | - | A | V |
| | | 7323 | 41.73 | -32.27 | 74 | 48.79 | 35.6 | 15.08 | 57.74 | 100 | 0 | P | V |
| | | 7323 | -6.01 | -60.01 | 54 | - | - | - | - | - | - | A | V |
| BT CH 78 2480MHz | | 4962 | 40.92 | -33.08 | 74 | 53.89 | 34.37 | 11.32 | 58.66 | 100 | 0 | P | H |
| | | 4962 | -6.82 | -60.82 | 54 | - | - | - | - | - | - | A | H |
| | | 7440 | 42.02 | -31.98 | 74 | 49.14 | 35.6 | 15.13 | 57.85 | 100 | 0 | P | H |
| | | 7440 | -5.72 | -59.72 | 54 | - | - | - | - | - | - | A | H |
| | | 4962 | 41.72 | -32.28 | 74 | 54.69 | 34.37 | 11.32 | 58.66 | 100 | 0 | P | V |
| | | 4962 | -6.02 | -60.02 | 54 | - | - | - | - | - | - | A | V |
| | | 7440 | 41.14 | -32.86 | 74 | 48.26 | 35.6 | 15.13 | 57.85 | 100 | 0 | P | V |
| | | 7440 | -6.6 | -60.6 | 54 | - | - | - | - | - | - | A | V |
| **Remark** | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. | | | | | | | | | | | | |

## 15C 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 | | 74.28 | 9.06 | -30.94 | 40 | 31.4 | 6.8 | 2.06 | 31.2 | | | P | H |
| | | 118.83 | 20.36 | -23.14 | 43.5 | 37.74 | 11.35 | 2.38 | 31.11 | | | P | H |
| | | 240.06 | 14.12 | -31.88 | 46 | 30.76 | 11.4 | 2.96 | 31 | | | P | H |
| | | 415.5 | 20.36 | -25.64 | 46 | 31.21 | 16.45 | 3.52 | 30.82 | | | P | H |
| | | 568.8 | 22.22 | -23.78 | 46 | 29.18 | 19.75 | 4.01 | 30.72 | | | P | H |
| | | 866.3 | 25.74 | -20.26 | 46 | 28.37 | 23.08 | 4.66 | 30.37 | 102 | 23 | P | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | 65.91 | 10.28 | -29.72 | 40 | 33.36 | 6.08 | 2.06 | 31.22 | | | P | V |
| | | 154.47 | 12.42 | -31.08 | 43.5 | 30.24 | 10.72 | 2.61 | 31.15 | | | P | V |
| | | 245.46 | 16.79 | -29.21 | 46 | 32.93 | 11.9 | 2.96 | 31 | | | P | V |
| | | 396.6 | 27.36 | -18.64 | 46 | 38.98 | 15.78 | 3.52 | 30.92 | | | P | V |
| | | 666.8 | 30.09 | -15.91 | 46 | 35.85 | 20.36 | 4.35 | 30.47 | | | P | V |
| | | 897.1 | 32.59 | -13.41 | 46 | 35.13 | 23.11 | 4.66 | 30.31 | 198 | 269 | P | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | 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 per 15.209(c). |
| ! | 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".**