



## Appendix A. Radiated Spurious Emission

|                 |              |                     |         |
|-----------------|--------------|---------------------|---------|
| Test Engineer : | Derreck Chen | Temperature :       | 22~23°C |
|                 |              | Relative Humidity : | 45~47%  |

## 2.4GHz 2400~2483.5MHz

## BT (Band Edge @ 3m)

| BT                     | Note | Frequency | Level      | Over   | Limit      | Read     | Antenna  | Cable  | Preamp | Ant    | Table   | Peak    | Pol.    |
|------------------------|------|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|
|                        |      | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | ( dBμV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | ( P/A ) | ( H/V ) |
| BT<br>CH00<br>2402MHz  |      | 2361.74   | 49.25      | -24.75 | 74         | 50.21    | 27.14    | 5.95   | 34.05  | 382    | 128     | P       | H       |
|                        |      | 2361.74   | 24.49      | -29.51 | 54         | -        | -        | -      | -      | -      | -       | A       | H       |
|                        | *    | 2402.04   | 103.58     | -      | -          | 104.38   | 27.23    | 6.01   | 34.04  | 382    | 128     | P       | H       |
|                        | *    | 2402.04   | 78.82      | -      | -          | -        | -        | -      | -      | -      | -       | A       | H       |
|                        |      |           |            |        |            |          |          |        |        |        |         |         | H       |
|                        |      |           |            |        |            |          |          |        |        |        |         |         | H       |
|                        |      | 2362.26   | 46.26      | -27.74 | 74         | 47.22    | 27.14    | 5.95   | 34.05  | 191    | 329     | P       | V       |
|                        |      | 2362.26   | 21.5       | -32.5  | 54         | -        | -        | -      | -      | -      | -       | A       | V       |
|                        | *    | 2402.17   | 104.68     | -      | -          | 105.48   | 27.23    | 6.01   | 34.04  | 191    | 329     | P       | V       |
|                        | *    | 2402.17   | 79.92      | -      | -          | -        | -        | -      | -      | -      | -       | A       | V       |
|                        |      |           |            |        |            |          |          |        |        |        |         |         | V       |
|                        |      |           |            |        |            |          |          |        |        |        |         |         | V       |
| BT<br>CH 39<br>2441MHz |      | 2374.6    | 43.3       | -30.7  | 74         | 44.14    | 27.19    | 6.01   | 34.04  | 226    | 130     | P       | H       |
|                        |      | 2374.6    | 18.54      | -35.46 | 54         | -        | -        | -      | -      | -      | -       | A       | H       |
|                        | *    | 2441.1    | 103.64     | -      | -          | 104.25   | 27.37    | 6.04   | 34.02  | 226    | 130     | P       | H       |
|                        | *    | 2441.1    | 78.88      | -      | -          | -        | -        | -      | -      | -      | -       | A       | H       |
|                        |      | 2487.08   | 46.8       | -27.2  | 74         | 47.26    | 27.46    | 6.09   | 34.01  | 226    | 130     | P       | H       |
|                        |      | 2487.08   | 22.04      | -31.96 | 54         | -        | -        | -      | -      | -      | -       | A       | H       |
|                        |      | 2389.8    | 43.96      | -30.04 | 74         | 44.76    | 27.23    | 6.01   | 34.04  | 155    | 341     | P       | V       |
|                        |      | 2389.8    | 19.2       | -34.8  | 54         | -        | -        | -      | -      | -      | -       | A       | V       |
|                        | *    | 2441.1    | 105.19     | -      | -          | 105.8    | 27.37    | 6.04   | 34.02  | 155    | 341     | P       | V       |
|                        | *    | 2441.1    | 80.43      | -      | -          | -        | -        | -      | -      | -      | -       | A       | V       |
|                        |      | 2498.29   | 46.44      | -27.56 | 74         | 46.85    | 27.5     | 6.09   | 34     | 155    | 341     | P       | V       |
|                        |      | 2498.29   | 21.68      | -32.32 | 54         | -        | -        | -      | -      | -      | -       | A       | V       |



| 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) |
| BT<br>CH 78<br>2480MHz | *                                                                                           | 2480.05   | 103.68     | -      | -          | 104.16   | 27.46    | 6.07   | 34.01  | 221    | 129     | P     | H     |
|                        | *                                                                                           | 2480.05   | 78.92      | -      | -          | -        | -        | -      | -      | -      | -       | A     | H     |
|                        |                                                                                             | 2483.5    | 47.79      | -26.21 | 74         | 48.25    | 27.46    | 6.09   | 34.01  | 221    | 129     | P     | H     |
|                        |                                                                                             | 2483.5    | 23.03      | -30.97 | 54         | -        | -        | -      | -      | -      | -       | A     | H     |
|                        |                                                                                             |           |            |        |            |          |          |        |        |        |         |       | H     |
|                        |                                                                                             |           |            |        |            |          |          |        |        |        |         |       | H     |
|                        | *                                                                                           | 2479.98   | 105.32     | -      | -          | 105.8    | 27.46    | 6.07   | 34.01  | 137    | 342     | P     | V     |
|                        | *                                                                                           | 2479.98   | 80.56      | -      | -          | -        | -        | -      | -      | -      | -       | A     | V     |
|                        |                                                                                             | 2483.5    | 49.44      | -24.56 | 74         | 49.9     | 27.46    | 6.09   | 34.01  | 137    | 342     | P     | V     |
|                        |                                                                                             | 2483.5    | 24.68      | -29.32 | 54         | -        | -        | -      | -      | -      | -       | A     | V     |
|                        |                                                                                             |           |            |        |            |          |          |        |        |        |         |       | V     |
|                        |                                                                                             |           |            |        |            |          |          |        |        |        |         |       | 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 | 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) |
| BT<br>CH 00<br>2402MHz |                                                                                             | 4806      | 44.81      | -29.19 | 74         | 38.41    | 31.3     | 8.65   | 33.55  | 150    | 0       | P     | H     |
|                        |                                                                                             | 4806      | 20.05      | -33.95 | 54         | -        | -        | -      | -      | -      | -       | A     | H     |
|                        |                                                                                             |           |            |        |            |          |          |        |        |        |         |       | H     |
|                        |                                                                                             |           |            |        |            |          |          |        |        |        |         |       | H     |
|                        |                                                                                             | 4806      | 49.47      | -24.53 | 74         | 43.07    | 31.3     | 8.65   | 33.55  | 150    | 0       | P     | V     |
|                        |                                                                                             | 4806      | 24.71      | -29.29 | 54         | -        | -        | -      | -      | -      | -       | A     | V     |
|                        |                                                                                             |           |            |        |            |          |          |        |        |        |         |       | V     |
|                        |                                                                                             |           |            |        |            |          |          |        |        |        |         |       | V     |
| BT<br>CH 39<br>2441MHz |                                                                                             | 4884      | 44.92      | -29.08 | 74         | 38.31    | 31.41    | 8.74   | 33.54  | 150    | 0       | P     | H     |
|                        |                                                                                             | 4884      | 20.16      | -33.84 | 54         | -        | -        | -      | -      | -      | -       | A     | H     |
|                        |                                                                                             | 7323      | 50.89      | -23.11 | 74         | 38.59    | 36.32    | 10.44  | 34.46  | 150    | 0       | P     | H     |
|                        |                                                                                             | 7323      | 26.13      | -27.87 | 54         | -        | -        | -      | -      | -      | -       | A     | H     |
|                        |                                                                                             | 4882      | 47.87      | -26.13 | 74         | 41.26    | 31.41    | 8.74   | 33.54  | 150    | 0       | P     | V     |
|                        |                                                                                             | 4882      | 23.11      | -30.89 | 54         | -        | -        | -      | -      | -      | -       | A     | V     |
|                        |                                                                                             | 7323      | 49.83      | -24.17 | 74         | 37.53    | 36.32    | 10.44  | 34.46  | 150    | 0       | P     | V     |
|                        |                                                                                             | 7323      | 25.07      | -28.93 | 54         | -        | -        | -      | -      | -      | -       | A     | V     |
| BT<br>CH 78<br>2480MHz |                                                                                             | 4962      | 45.46      | -28.54 | 74         | 38.63    | 31.54    | 8.83   | 33.54  | 150    | 0       | P     | H     |
|                        |                                                                                             | 4962      | 20.7       | -33.3  | 54         | -        | -        | -      | -      | -      | -       | A     | H     |
|                        |                                                                                             | 7440      | 50.66      | -23.34 | 74         | 38.07    | 36.59    | 10.52  | 34.52  | 150    | 0       | P     | H     |
|                        |                                                                                             | 7440      | 25.9       | -28.1  | 54         | -        | -        | -      | -      | -      | -       | A     | H     |
|                        |                                                                                             | 4962      | 46.26      | -27.74 | 74         | 39.43    | 31.54    | 8.83   | 33.54  | 150    | 0       | P     | V     |
|                        |                                                                                             | 4962      | 21.5       | -32.5  | 54         | -        | -        | -      | -      | -      | -       | A     | V     |
|                        |                                                                                             | 7440      | 50.69      | -23.31 | 74         | 38.1     | 36.59    | 10.52  | 34.52  | 150    | 0       | P     | V     |
|                        |                                                                                             | 7440      | 25.93      | -28.07 | 54         | -        | -        | -      | -      | -      | -       | 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<br>BT<br>LF |                                                                            | 49.71     | 13.07      | -26.93 | 40         | 36.03  | 7.8      | 1.04   | 31.8   |        |         | P     | H     |
|                    |                                                                            | 122.34    | 17.8       | -25.7  | 43.5       | 36.85  | 11.45    | 1.28   | 31.78  |        |         | P     | H     |
|                    |                                                                            | 245.73    | 19.42      | -26.58 | 46         | 37.76  | 11.49    | 1.94   | 31.77  |        |         | P     | H     |
|                    |                                                                            | 451.2     | 24.5       | -21.5  | 46         | 37.27  | 16.51    | 2.57   | 31.85  | 137    | 122     | P     | H     |
|                    |                                                                            | 743.1     | 21.69      | -24.31 | 46         | 30.63  | 19.8     | 3.25   | 31.99  |        |         | P     | H     |
|                    |                                                                            | 824.3     | 23.29      | -22.71 | 46         | 31.59  | 20.1     | 3.4    | 31.8   |        |         | P     | H     |
|                    |                                                                            |           |            |        |            |        |          |        |        |        |         |       | H     |
|                    |                                                                            |           |            |        |            |        |          |        |        |        |         |       | H     |
|                    |                                                                            |           |            |        |            |        |          |        |        |        |         |       | H     |
|                    |                                                                            |           |            |        |            |        |          |        |        |        |         |       | H     |
|                    |                                                                            |           |            |        |            |        |          |        |        |        |         |       | H     |
|                    |                                                                            |           |            |        |            |        |          |        |        |        |         |       | H     |
|                    |                                                                            | 69.69     | 18.55      | -21.45 | 40         | 44.13  | 5.17     | 1.04   | 31.79  | 193    | 218     | P     | V     |
|                    |                                                                            | 132.06    | 18.45      | -25.05 | 43.5       | 37.33  | 11.44    | 1.46   | 31.78  |        |         | P     | V     |
|                    |                                                                            | 231.96    | 13.26      | -32.74 | 46         | 33.5   | 9.74     | 1.79   | 31.77  |        |         | P     | V     |
|                    |                                                                            | 332.9     | 19.47      | -26.53 | 46         | 35.41  | 13.66    | 2.17   | 31.77  |        |         | P     | V     |
|                    |                                                                            | 559       | 22.12      | -23.88 | 46         | 32.81  | 18.52    | 2.77   | 31.98  |        |         | P     | V     |
|                    |                                                                            | 835.5     | 22.06      | -23.94 | 46         | 30.25  | 20.16    | 3.4    | 31.75  |        |         | P     | V     |
|                    |                                                                            |           |            |        |            |        |          |        |        |        |         |       | V     |
|                    |                                                                            |           |            |        |            |        |          |        |        |        |         |       | V     |
|                    |                                                                            |           |            |        |            |        |          |        |        |        |         |       | V     |
|                    |                                                                            |           |            |        |            |        |          |        |        |        |         |       | V     |
|                    |                                                                            |           |            |        |            |        |          |        |        |        |         |       | V     |
|                    |                                                                            |           |            |        |            |        |          |        |        |        |         |       | V     |
|                    |                                                                            |           |            |        |            |        |          |        |        |        |         |       | V     |
|                    |                                                                            |           |            |        |            |        |          |        |        |        |         |       | V     |
| Remark             | 1. No other spurious found.<br>2. All results are PASS against limit line. |           |            |        |            |        |          |        |        |        |         |       |       |



**Note symbol**

|     |                                                                                                                                                                        |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| *   | <b>Fundamental Frequency</b> 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 <b>over limit</b> line.                                                                                                                                 |
| P/A | <b>Peak</b> or <b>Average</b>                                                                                                                                          |
| H/V | <b>Horizontal</b> or <b>Vertical</b>                                                                                                                                   |



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 |      | 2390      | 55.45      | -18.55 | 74         | 54.51    | 32.22    | 4.58   | 35.86  | 103    | 308     | P       | H       |
| CH 01   |      |           |            |        |            |          |          |        |        |        |         |         |         |
| 2412MHz |      | 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”.**