



Appendix A. Radiated Spurious Emission

| | | | |
|-----------------|----------|---------------------|---------|
| Test Engineer : | Lewis He | Temperature : | 23~24°C |
| | | Relative Humidity : | 50~51% |

15C 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) | Limit | Level | Factor | Loss | Factor | Pos | Pos | Avg. | | |
| | | | | | Line | (dBμV) | (dB/m) | (dB) | (dB) | (cm) | (deg) | (P/A) | (H/V) | |
| BT CH00 2402MHz | | 2359.79 | 42.32 | -31.68 | 74 | 42.45 | 27.14 | 33.25 | 5.98 | 233 | 349 | P | H | |
| | * | 2402.17 | 97.6 | - | - | 97.57 | 27.23 | 33.22 | 6.02 | 233 | 349 | P | H | |
| | * | 2402.17 | 72.84 | - | - | - | - | - | - | - | - | A | H | |
| | | | | | | | | | | | | | H | |
| | | | | | | | | | | | | | H | |
| | | | | | | | | | | | | | H | |
| | | | 2374.22 | 42.35 | -31.65 | 74 | 42.38 | 27.19 | 33.24 | 6.02 | 349 | 56 | P | V |
| | * | 2402.17 | 96.54 | - | - | - | 96.51 | 27.23 | 33.22 | 6.02 | 349 | 56 | P | V |
| | * | 2402.17 | 71.78 | - | - | - | - | - | - | - | - | - | A | V |
| | | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | | V |
| BT CH 39 2441MHz | | 2349.9 | 42.5 | -31.5 | 74 | 42.67 | 27.1 | 33.25 | 5.98 | 196 | 351 | P | H | |
| | * | 2441.1 | 98.4 | - | - | 98.15 | 27.37 | 33.2 | 6.08 | 196 | 351 | P | H | |
| | * | 2441.1 | 73.64 | - | - | - | - | - | - | - | - | A | H | |
| | | | 2484.61 | 42.58 | -31.42 | 74 | 42.08 | 27.46 | 33.18 | 6.22 | 196 | 351 | P | H |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | | | 2386.57 | 42.83 | -31.17 | 74 | 42.82 | 27.23 | 33.24 | 6.02 | 324 | 53 | P | V |
| | * | 2440.91 | 97.24 | - | - | - | 96.99 | 27.37 | 33.2 | 6.08 | 324 | 53 | P | V |
| | * | 2440.91 | 72.48 | - | - | - | - | - | - | - | - | - | A | V |
| | | | 2488.79 | 42.65 | -31.35 | 74 | 42.11 | 27.5 | 33.18 | 6.22 | 324 | 53 | P | V |
| | | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V | |



| | | | | | | | | | | | | | | |
|------------------------|---|---------|-------|--------|----|-------|-------|-------|------|-----|-----|---|---|---|
| BT CH 78 2480MHz | * | 2479.91 | 97.14 | - | - | 96.71 | 27.46 | 33.18 | 6.15 | 117 | 299 | P | H | |
| | * | 2479.91 | 72.38 | - | - | - | - | - | - | - | - | A | H | |
| | | 2484.81 | 43.53 | -30.47 | 74 | 43.03 | 27.46 | 33.18 | 6.22 | 117 | 299 | P | H | |
| | | | | | | | | | | | | | H | |
| | | | | | | | | | | | | | H | |
| | | | | | | | | | | | | | H | |
| | * | 2479.91 | 97.69 | - | - | 97.26 | 27.46 | 33.18 | 6.15 | 330 | 242 | P | V | |
| | * | 2479.91 | 72.93 | - | - | - | - | - | - | - | - | - | A | V |
| | | 2487.75 | 42.78 | -31.22 | 74 | 42.24 | 27.5 | 33.18 | 6.22 | 330 | 242 | P | V | |
| | | | | | | | | | | | | | 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 | Read | Antenna | Cable | Preamp | Ant | Table | Peak | Pol. | |
|------------------------|---|-----------|------------|--------|-------|----------|----------|--------|--------|--------|---------|-------|-------|---|
| | | (MHz) | (dBμV/m) | (dB) | Limit | Level | Factor | Loss | Factor | Pos | Pos | Avg. | | |
| | | | | | Line | (dBμV) | (dB/m) | (dB) | (dB) | (cm) | (deg) | (P/A) | (H/V) | |
| BT CH 00 2402MHz | | 4804 | 37.27 | -36.73 | 74 | 58.98 | 31.42 | 60.64 | 7.51 | 100 | 0 | P | H | |
| | | 4804 | 12.51 | -41.49 | 54 | - | - | - | - | - | - | A | H | |
| | | | | | | | | | | | | | H | |
| | | | | | | | | | | | | | H | |
| | | 4804 | 36.65 | -37.35 | 74 | 58.36 | 31.42 | 60.64 | 7.51 | 100 | 0 | P | V | |
| | | 4804 | 11.89 | -42.11 | 54 | - | - | - | - | - | - | - | A | V |
| | | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | | V |
| BT CH 39 2441MHz | | 4884 | 37.92 | -36.08 | 74 | 59.31 | 31.56 | 60.52 | 7.57 | - | - | P | H | |
| | | 4884 | 13.16 | -40.84 | 54 | - | - | - | - | - | - | A | H | |
| | | 7323 | 43.03 | -30.97 | 74 | 56.32 | 36.22 | 60.98 | 11.47 | 100 | 0 | P | H | |
| | | 7323 | 18.27 | -35.73 | 54 | - | - | - | - | - | - | A | H | |
| | | 4884 | 37.66 | -36.34 | 74 | 59.05 | 31.56 | 60.52 | 7.57 | | | P | V | |
| | | 4884 | 12.9 | -41.1 | 54 | - | - | - | - | - | - | A | V | |
| | | 7323 | 43.32 | -30.68 | 74 | 56.61 | 36.22 | 60.98 | 11.47 | 100 | 0 | P | V | |
| | | 7323 | 18.56 | -35.44 | 54 | - | - | - | - | - | - | A | V | |
| BT CH 78 2480MHz | | 4960 | 38.11 | -35.89 | 74 | 59.14 | 31.73 | 60.36 | 7.6 | | | P | H | |
| | | 4960 | 13.35 | -40.65 | 54 | - | - | - | - | - | - | A | H | |
| | | 7440 | 44.3 | -29.7 | 74 | 57.38 | 36.49 | 61.34 | 11.77 | 100 | 0 | P | H | |
| | | 7440 | 19.54 | -34.46 | 54 | - | - | - | - | - | - | A | H | |
| | | 4960 | 36.83 | -37.17 | 74 | 57.86 | 31.73 | 60.36 | 7.6 | | | P | V | |
| | | 4960 | 12.07 | -41.93 | 54 | - | - | - | - | - | - | A | V | |
| | | 7440 | 43.36 | -30.64 | 74 | 56.44 | 36.49 | 61.34 | 11.77 | 100 | 0 | P | V | |
| | | 7440 | 18.6 | -35.4 | 54 | - | - | - | - | - | - | A | V | |
| Remark | 1. No other spurious found. 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 | | 103.98 | 31.17 | -12.33 | 43.5 | 51.75 | 10.8 | 32.63 | 1.25 | - | - | P | H | |
| | | 123.96 | 31.21 | -12.29 | 43.5 | 50.67 | 11.94 | 32.65 | 1.25 | - | - | P | H | |
| | | 140.7 | 31.8 | -11.7 | 43.5 | 51.14 | 11.87 | 32.67 | 1.46 | 100 | 0 | P | H | |
| | | 627.6 | 20.39 | -25.61 | 46 | 30.63 | 19.93 | 33.02 | 2.85 | - | - | P | H | |
| | | 810.3 | 23.17 | -22.83 | 46 | 30.49 | 22.18 | 32.82 | 3.32 | - | - | P | H | |
| | | 964.3 | 26.69 | -27.31 | 54 | 30.56 | 24.24 | 31.61 | 3.5 | - | - | P | H | |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | | | 31.89 | 34.32 | -5.68 | 40 | 47.49 | 18.92 | 32.82 | 0.73 | 100 | 0 | P | V |
| | | | 39.45 | 29.36 | -10.64 | 40 | 46.93 | 14.5 | 32.8 | 0.73 | - | - | P | V |
| | | | 144.48 | 30.92 | -12.58 | 43.5 | 50.37 | 11.76 | 32.67 | 1.46 | - | - | P | V |
| | | | 589.1 | 20.17 | -25.83 | 46 | 30.99 | 19.39 | 33.02 | 2.81 | - | - | P | V |
| | | | 787.2 | 22.73 | -23.27 | 46 | 30.38 | 21.98 | 32.89 | 3.26 | - | - | P | V |
| | | | 966.4 | 26.42 | -27.58 | 54 | 29.93 | 24.23 | 31.58 | 3.84 | - | - | P | V |
| | | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V | |
| | | | | | | | | | | | | | V | |
| | | | | | | | | | | | | | V | |
| | | | | | | | | | | | | | V | |
| | | | | | | | | | | | | | V | |
| Remark | 1. No other spurious found. 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 | Peak or Average |
| H/V | Horizontal or Vertical |



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 |

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

For Peak Limit @ 2390MHz:

- 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)
- Over Limit(dB)
= Level(dBμV/m) – Limit Line(dBμV/m)
= 55.45(dBμV/m) – 74(dBμV/m)
= -18.55(dB)

For Average Limit @ 2390MHz:

- 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)
- 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".