

## Appendix D: Test Results of Radiated Spurious Emissions for PCB

### Antenna

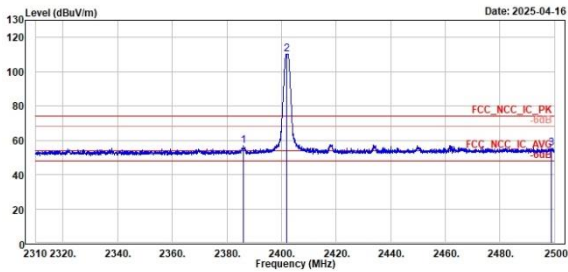
ANT 14, Main Source, ECC, PIC32WM-BZ6204UC  
Band Edges, 2.31GHz ~ 2.5GHz

#### BLE\_1M

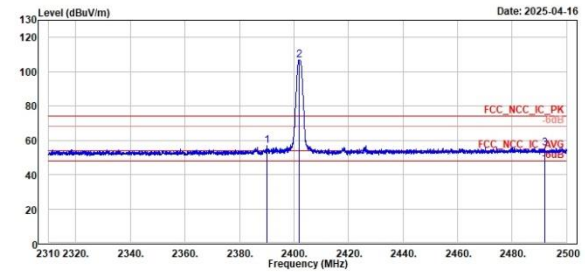
##### Low Channel (Horizontal) Peak



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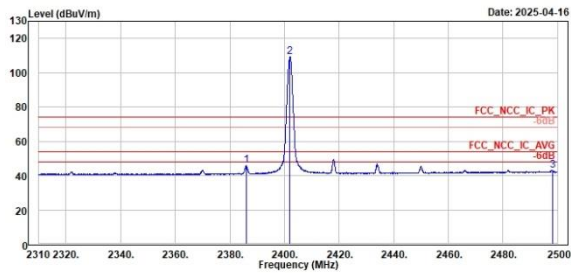


**BLE\_1M**

**Low Channel (Horizontal) Average**



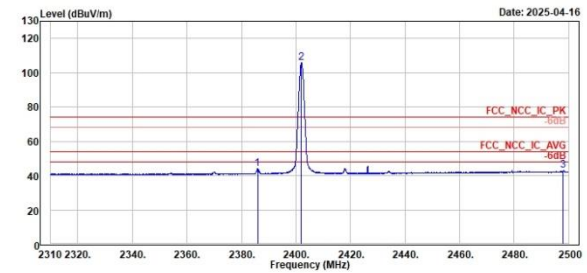
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**Low Channel (Vertical) Average**



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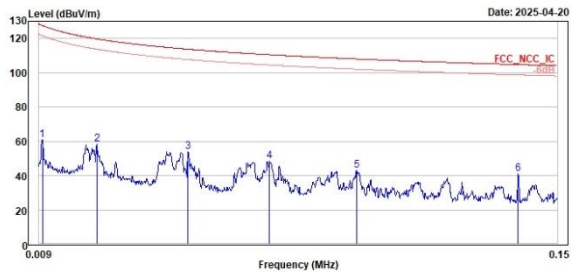
## Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

### BLE\_2M

#### Low Channel (Open) 9kHz~150kHz



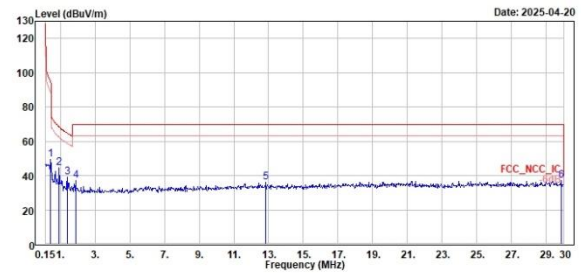
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| Freq | Level  | Read  | Level | Factor | Limit  | Over   | APos | TPos     | Remark | Pol/Phase | Note |
|------|--------|-------|-------|--------|--------|--------|------|----------|--------|-----------|------|
| MHz  | dBuV/m | dBuV  | dB/m  | dBuV/m | dB     | cm     | deg  |          |        |           |      |
| 1    | 0.01   | 61.03 | 42.92 | 18.11  | 127.60 | -66.57 | 100  | 150 Peak | Open   |           |      |
| 2    | 0.02   | 58.43 | 38.68 | 19.75  | 119.70 | -61.27 | 100  | 244 Peak | Open   |           |      |
| 3    | 0.05   | 54.02 | 35.00 | 19.02  | 113.68 | -59.66 | 100  | 244 Peak | Open   |           |      |
| 4    | 0.07   | 48.56 | 30.09 | 18.47  | 110.48 | -61.92 | 100  | 258 Peak | Open   |           |      |
| 5    | 0.10   | 42.99 | 24.96 | 18.03  | 108.00 | -65.01 | 100  | 258 Peak | Open   |           |      |
| 6    | 0.14   | 41.26 | 22.99 | 18.27  | 104.72 | -63.46 | 100  | 216 Peak | Open   |           |      |



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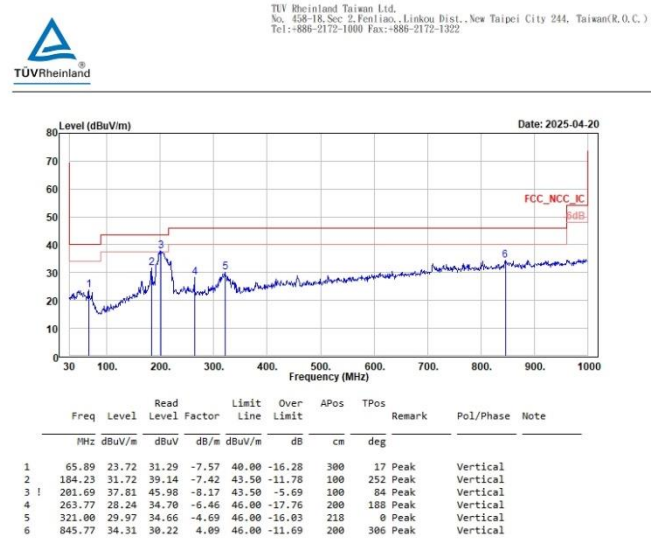
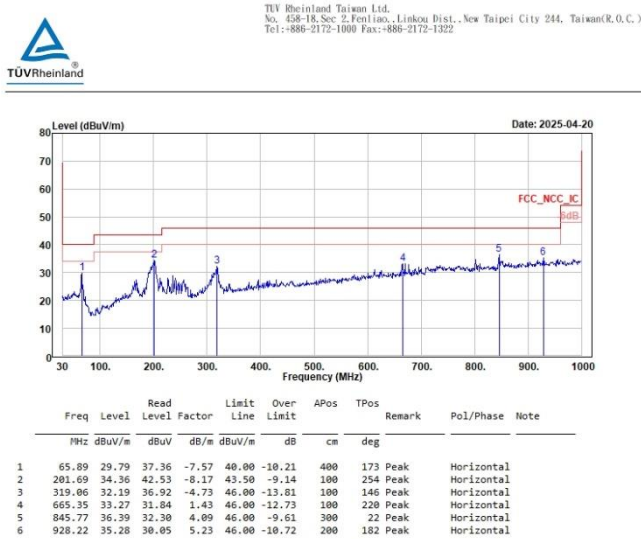
| Freq | Level  | Read  | Level | Factor | Limit | Over   | APos | TPos     | Remark | Pol/Phase | Note |
|------|--------|-------|-------|--------|-------|--------|------|----------|--------|-----------|------|
| MHz  | dBuV/m | dBuV  | dB/m  | dBuV/m | dB    | cm     | deg  |          |        |           |      |
| 1    | 0.45   | 49.67 | 30.97 | 18.70  | 94.57 | -44.90 | 100  | 217 Peak | Open   |           |      |
| 2    | 0.93   | 44.58 | 25.73 | 18.85  | 68.27 | -23.69 | 100  | 217 Peak | Open   |           |      |
| 3    | 1.40   | 39.20 | 20.39 | 18.81  | 64.66 | -25.46 | 100  | 176 Peak | Open   |           |      |
| 4    | 1.88   | 37.24 | 18.41 | 18.83  | 69.50 | -32.26 | 100  | 176 Peak | Open   |           |      |
| 5    | 12.84  | 35.87 | 14.28 | 21.59  | 69.50 | -33.63 | 100  | 161 Peak | Open   |           |      |
| 6    | 29.85  | 36.85 | 13.60 | 23.25  | 69.50 | -32.65 | 100  | 220 Peak | Open   |           |      |

# Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

## BLE\_2M

### Low Channel (Horizontal)

### Low Channel (Vertical)



## Spurious Emissions, Tx Mode, 1GHz ~ 26.5GHz

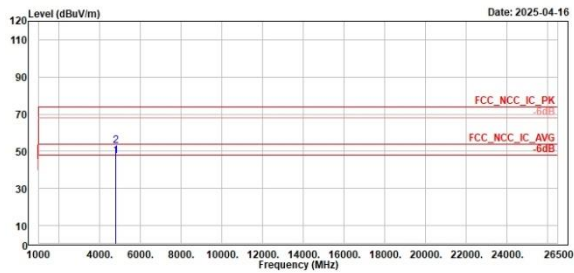
### BLE\_1M

#### Low Channel (Horizontal)

#### Low Channel (Vertical)



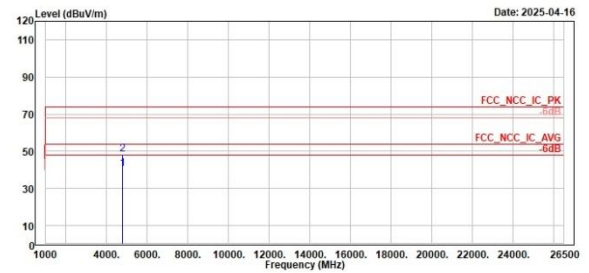
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| Freq | Level   | Read  | Level | Factor | Limit | Over   | APos | TPos | Remark  | Pol/Phase  | Note |
|------|---------|-------|-------|--------|-------|--------|------|------|---------|------------|------|
| MHz  | dBuV/m  | dBuV  | dB/m  | dBuV/m | dB    | cm     | deg  |      |         |            |      |
| 1    | 4804.00 | 47.35 | 56.43 | -9.08  | 54.00 | -6.65  | 279  | 164  | Average | Horizontal |      |
| 2    | 4804.00 | 53.02 | 62.10 | -9.08  | 74.00 | -20.98 | 279  | 164  | Peak    | Horizontal |      |



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| Freq | Level   | Read  | Level | Factor | Limit | Over   | APos | TPos | Remark  | Pol/Phase | Note |
|------|---------|-------|-------|--------|-------|--------|------|------|---------|-----------|------|
| MHz  | dBuV/m  | dBuV  | dB/m  | dBuV/m | dB    | cm     | deg  |      |         |           |      |
| 1    | 4804.00 | 48.72 | 49.08 | -9.08  | 54.00 | -13.28 | 480  | 121  | Average | Vertical  |      |
| 2    | 4804.00 | 48.16 | 57.24 | -9.08  | 74.00 | -25.84 | 480  | 121  | Peak    | Vertical  |      |

**ANT 15, Main Source, ECC, PIC32WM-BZ6204UC**  
**Band Edges, 2.31GHz ~ 2.5GHz**

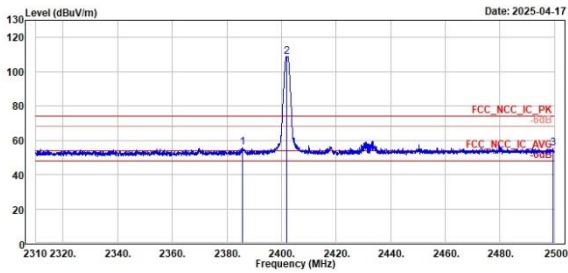
**BLE\_1M**

**Low Channel (Horizontal) Peak**

**Low Channel (Vertical) Peak**



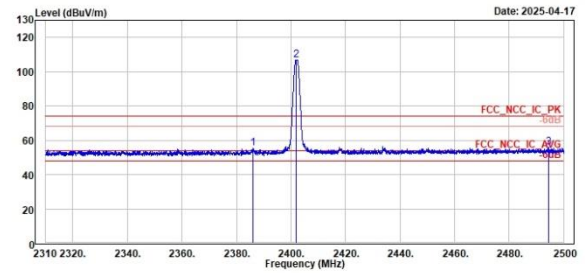
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|     | Freq    | Level  | Read  | Limit | Over   | APos   | TPos | Remark   | Pol/Phase  | Note |
|-----|---------|--------|-------|-------|--------|--------|------|----------|------------|------|
|     | MHz     | dBuV/m | dBuV  | dB/m  | dBuV/m | dB     | cm   | deg      |            |      |
| 1   | 2385.67 | 56.01  | 17.84 | 38.17 | 74.00  | -17.99 | 294  | 203 Peak | Horizontal |      |
| 2 * | 2402.00 | 100.71 | 70.40 | 38.31 | 74.00  | 34.71  | 294  | 203 Peak | Horizontal |      |
| 3   | 2499.48 | 55.58  | 16.96 | 38.62 | 74.00  | -18.42 | 294  | 203 Peak | Horizontal |      |



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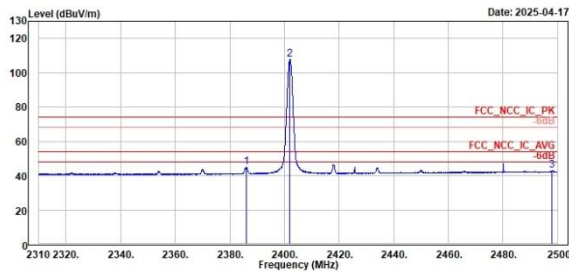
|     | Freq    | Level  | Read  | Limit | Over   | APos   | TPos | Remark   | Pol/Phase | Note |
|-----|---------|--------|-------|-------|--------|--------|------|----------|-----------|------|
|     | MHz     | dBuV/m | dBuV  | dB/m  | dBuV/m | dB     | cm   | deg      |           |      |
| 1   | 2386.14 | 55.38  | 17.21 | 38.17 | 74.00  | -18.62 | 349  | 284 Peak | Vertical  |      |
| 2 * | 2402.00 | 100.73 | 68.42 | 38.31 | 74.00  | 32.73  | 349  | 284 Peak | Vertical  |      |
| 3   | 2494.63 | 55.71  | 17.10 | 38.61 | 74.00  | -18.29 | 349  | 284 Peak | Vertical  |      |

**BLE\_1M**

**Low Channel (Horizontal) Average**



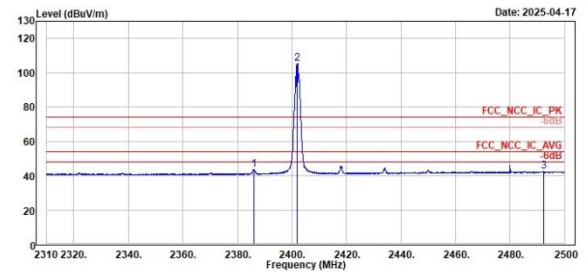
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|     | Freq    | Level  | Read  | Level | Factor | Limit  | Over | APos | TPos    | Remark     | Pol/Phase | Note |
|-----|---------|--------|-------|-------|--------|--------|------|------|---------|------------|-----------|------|
|     | MHz     | dBuV/m | dBuV  | dB/m  | dBuV/m | dB     | dB   | cm   | deg     |            |           |      |
| 1   | 2386.10 | 45.12  | 6.95  | 38.17 | 54.00  | -8.88  | 294  | 203  | Average | Horizontal |           |      |
| 2 * | 2402.00 | 107.60 | 69.29 | 38.31 | 54.00  | 53.60  | 294  | 203  | Average | Horizontal |           |      |
| 3   | 2498.05 | 42.80  | 4.18  | 38.62 | 54.00  | -11.20 | 294  | 203  | Average | Horizontal |           |      |



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|     | Freq    | Level  | Read  | Level | Factor | Limit  | Over | APos | TPos    | Remark   | Pol/Phase | Note |
|-----|---------|--------|-------|-------|--------|--------|------|------|---------|----------|-----------|------|
|     | MHz     | dBuV/m | dBuV  | dB/m  | dBuV/m | dB     | dB   | cm   | deg     |          |           |      |
| 1   | 2386.05 | 43.70  | 5.53  | 38.17 | 54.00  | -10.30 | 349  | 284  | Average | Vertical |           |      |
| 2 * | 2402.00 | 105.30 | 66.99 | 38.31 | 54.00  | 51.30  | 349  | 284  | Average | Vertical |           |      |
| 3   | 2492.40 | 42.32  | 3.71  | 38.61 | 54.00  | -11.68 | 349  | 284  | Average | Vertical |           |      |

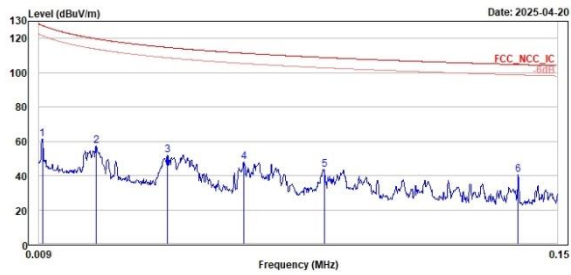
## Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

### BLE\_2M

#### Low Channel (Open) 9kHz~150kHz



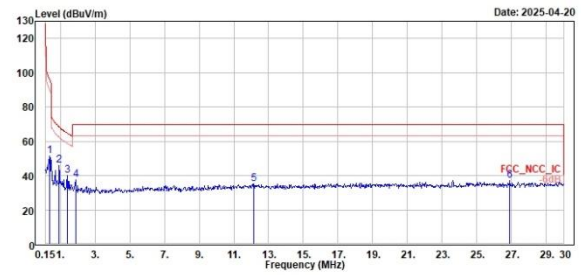
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| Freq | Level  | Read  | Level | Factor | Limit  | Over   | APos | TPos | Remark | Pol/Phase | Note |
|------|--------|-------|-------|--------|--------|--------|------|------|--------|-----------|------|
| MHz  | dBuV/m | dBuV  | dB/m  | dBuV/m | dB     | cm     | deg  |      |        |           |      |
| 1    | 0.01   | 61.36 | 43.25 | 18.11  | 127.60 | -66.24 | 100  | 180  | Peak   | Open      |      |
| 2    | 0.02   | 57.33 | 37.59 | 19.74  | 119.75 | -62.42 | 100  | 291  | Peak   | Open      |      |
| 3    | 0.04   | 51.95 | 32.94 | 19.01  | 114.73 | -62.78 | 100  | 8    | Peak   | Open      |      |
| 4    | 0.06   | 48.11 | 29.90 | 18.21  | 111.36 | -63.25 | 100  | 293  | Peak   | Open      |      |
| 5    | 0.09   | 43.74 | 25.65 | 18.09  | 108.85 | -65.11 | 100  | 293  | Peak   | Open      |      |
| 6    | 0.14   | 40.39 | 22.12 | 18.27  | 104.72 | -64.33 | 100  | 216  | Peak   | Open      |      |



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| Freq | Level  | Read  | Level | Factor | Limit | Over   | APos | TPos | Remark | Pol/Phase | Note |
|------|--------|-------|-------|--------|-------|--------|------|------|--------|-----------|------|
| MHz  | dBuV/m | dBuV  | dB/m  | dBuV/m | dB    | cm     | deg  |      |        |           |      |
| 1    | 0.39   | 51.62 | 32.98 | 18.64  | 95.81 | -44.19 | 100  | 217  | Peak   | Open      |      |
| 2    | 0.93   | 46.14 | 27.29 | 18.85  | 68.27 | -22.13 | 100  | 206  | Peak   | Open      |      |
| 3    | 1.40   | 39.80 | 20.99 | 18.81  | 64.66 | -24.86 | 100  | 206  | Peak   | Open      |      |
| 4    | 1.88   | 37.61 | 18.78 | 18.83  | 69.50 | -31.89 | 100  | 206  | Peak   | Open      |      |
| 5    | 12.15  | 35.17 | 13.45 | 21.72  | 69.50 | -34.33 | 100  | 179  | Peak   | Open      |      |
| 6    | 26.90  | 37.13 | 14.13 | 23.00  | 69.50 | -32.37 | 100  | 294  | Peak   | Open      |      |

## Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

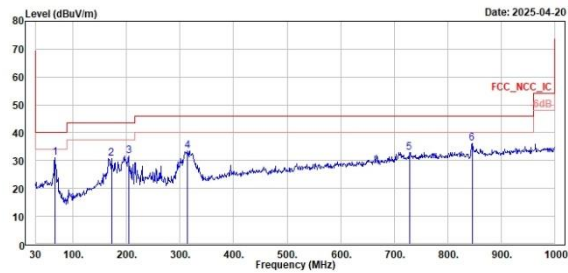
### BLE\_2M

#### Low Channel (Horizontal)

#### Low Channel (Vertical)



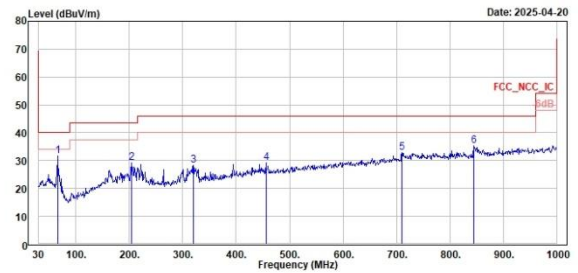
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|   | Freq   | Level  | Read  | Level | Factor | Limit  | Over | APos | TPos | Remark     | Pol/Phase | Note |
|---|--------|--------|-------|-------|--------|--------|------|------|------|------------|-----------|------|
|   | MHz    | dBuV/m | dBuV  | dB/m  | dBuV/m | dB     | dB   | cm   | deg  |            |           |      |
| 1 | 65.89  | 30.95  | 38.52 | -7.57 | 40.00  | -9.05  | 100  | 112  | Peak | Horizontal |           |      |
| 2 | 171.62 | 30.72  | 36.72 | -6.00 | 43.50  | -12.78 | 200  | 25   | Peak | Horizontal |           |      |
| 3 | 203.63 | 31.77  | 39.94 | -8.17 | 43.50  | -11.73 | 200  | 267  | Peak | Horizontal |           |      |
| 4 | 314.21 | 33.33  | 38.26 | -4.93 | 46.00  | -12.67 | 100  | 117  | Peak | Horizontal |           |      |
| 5 | 728.40 | 32.94  | 38.16 | 2.78  | 46.00  | -13.06 | 276  | 0    | Peak | Horizontal |           |      |
| 6 | 845.77 | 36.31  | 32.22 | 4.09  | 46.00  | -9.69  | 321  | 360  | Peak | Horizontal |           |      |



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|   | Freq   | Level  | Read  | Level | Factor | Limit  | Over | APos | TPos | Remark   | Pol/Phase | Note |
|---|--------|--------|-------|-------|--------|--------|------|------|------|----------|-----------|------|
|   | MHz    | dBuV/m | dBuV  | dB/m  | dBuV/m | dB     | dB   | cm   | deg  |          |           |      |
| 1 | 65.89  | 31.49  | 39.06 | -7.57 | 40.00  | -8.51  | 400  | 61   | Peak | Vertical |           |      |
| 2 | 204.60 | 29.24  | 37.42 | -8.18 | 43.50  | -14.26 | 100  | 11   | Peak | Vertical |           |      |
| 3 | 320.03 | 28.39  | 33.08 | -4.69 | 46.00  | -17.61 | 188  | 360  | Peak | Vertical |           |      |
| 4 | 455.83 | 29.26  | 31.28 | -2.02 | 46.00  | -16.74 | 100  | 195  | Peak | Vertical |           |      |
| 5 | 709.97 | 32.76  | 30.43 | 2.33  | 46.00  | -13.24 | 300  | 168  | Peak | Vertical |           |      |
| 6 | 844.80 | 35.16  | 31.09 | 4.07  | 46.00  | -10.84 | 100  | 166  | Peak | Vertical |           |      |

## Spurious Emissions, Tx Mode, 1GHz ~ 26.5GHz

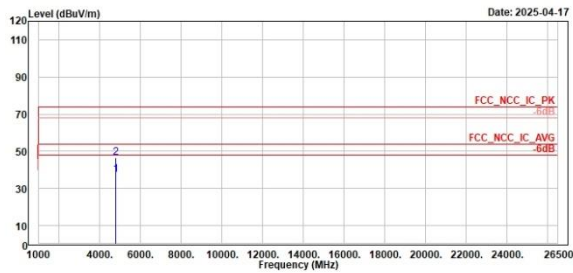
### BLE\_1M

#### Low Channel (Horizontal)

#### Low Channel (Vertical)



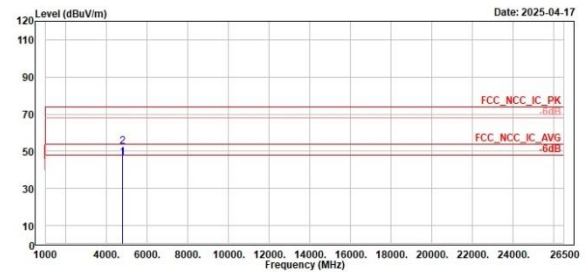
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| Freq | Level   | Read  | Level | Factor | Limit | Over   | APos | TPos | Remark  | Pol/Phase  | Note |
|------|---------|-------|-------|--------|-------|--------|------|------|---------|------------|------|
| MHz  | dBuV/m  | dBuV  | dB/m  | dBuV/m | dB    | cm     | deg  |      |         |            |      |
| 1    | 4804.00 | 37.51 | 46.59 | -9.08  | 54.00 | -16.49 | 344  | 197  | Average | Horizontal |      |
| 2    | 4804.00 | 46.65 | 55.73 | -9.08  | 74.00 | -27.35 | 344  | 197  | Peak    | Horizontal |      |



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| Freq | Level   | Read  | Level | Factor | Limit | Over   | APos | TPos | Remark  | Pol/Phase | Note |
|------|---------|-------|-------|--------|-------|--------|------|------|---------|-----------|------|
| MHz  | dBuV/m  | dBuV  | dB/m  | dBuV/m | dB    | cm     | deg  |      |         |           |      |
| 1    | 4804.00 | 46.32 | 55.40 | -9.08  | 54.00 | -7.68  | 236  | 295  | Average | Vertical  |      |
| 2    | 4804.00 | 52.27 | 61.35 | -9.08  | 74.00 | -21.73 | 236  | 295  | Peak    | Vertical  |      |