

## ANNEX A: Test Result

### 1. Unwanted Emission

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the loop antenna is coplanar, the others are vertical and horizontal. and the worst case was recorded.

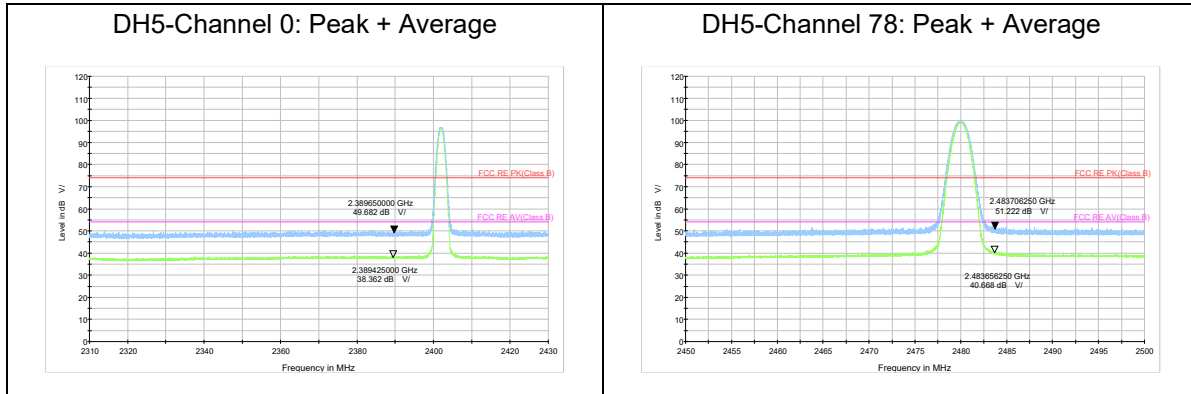
## 1.1. Bluetooth

The following graphs display the maximum values of horizontal and vertical by software. Blue trace uses the peak detection, Green trace uses the average detection.

A symbol ( $\text{dB } \mu\text{V/m}$ ) in the test plot below means (dB $\mu\text{V/m}$ )

**The signal beyond the limit is carrier.**

The bandage was performed in all mode (DH5, 2DH5 and 3DH5), DH5 was selected as the worse condition. The test data of the worst-case condition was recorded in this report.



## Result of RE

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier. The Radiates Emission from 9kHz to 30MHz and 18GHz to 26.5GHz are more than 20dB below the limit are not reported.

### Remark:

1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)
2. Margin = Limit – Quasi-Peak/ MAX Peak/ Average
3. A symbol (dB  $\mu$ V/m) in the test plot below means (dB $\mu$ V/m)
4. The following graphs display the maximum values of horizontal and vertical by software.
5. For below 1GHz

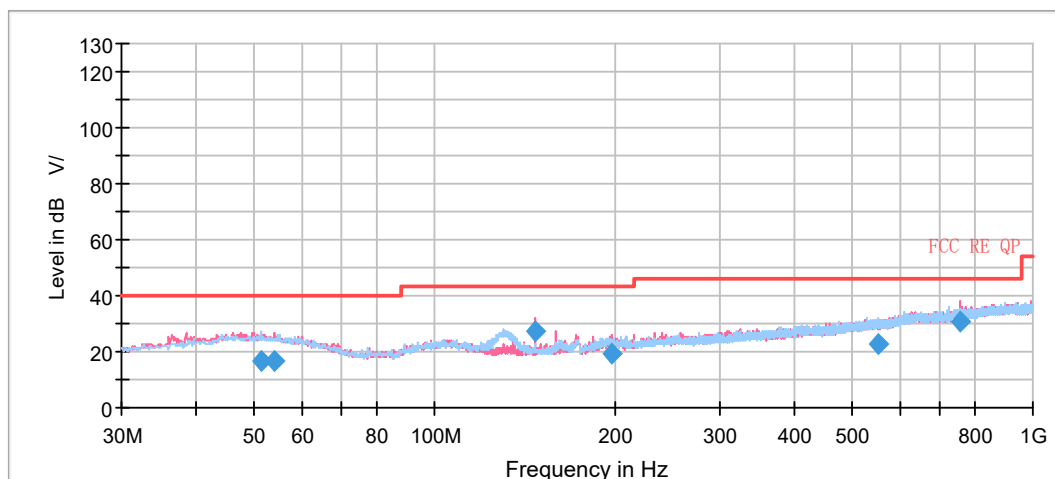
 QP Level @Spectrum Overview H
  QP Level @Spectrum Overview V
  QP Level @Final Results
  QP Limit

### For above 1GHz

 PK Level @Spectrum Overview H
  PK Level @Spectrum Overview V
  PK Level @Final Results
  PK Limit  
 AVG Level @Spectrum Overview H
  AVG Level @Spectrum Overview V
  AVG Level @Final Results
  AVG Limit

### Continuous TX mode:

During the test, the Radiates Emission from 30MHz to 1GHz was performed in all modes with all channels, Bluetooth GFSK Channel 0 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

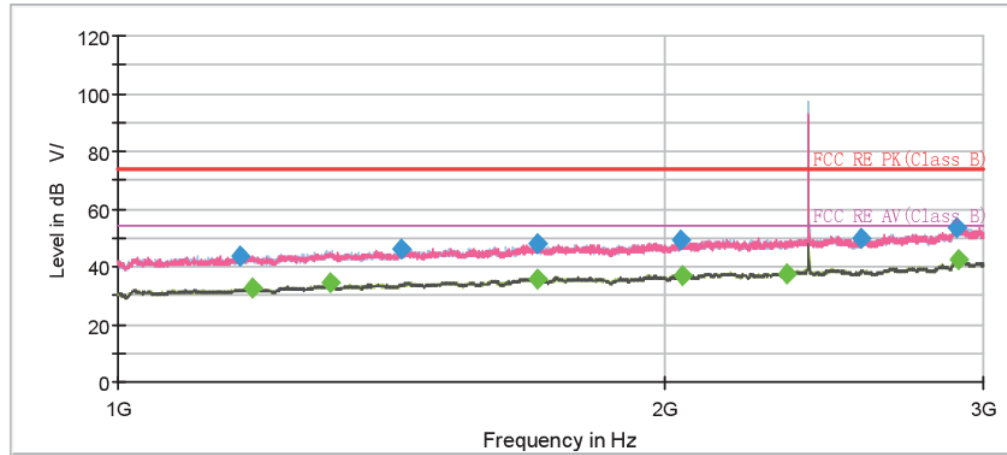


Radiates Emission from 30MHz to 1GHz

| Frequency (MHz) | Quasi-Peak (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) |
|-----------------|---------------------------|----------------------|-------------|-------------|--------------|---------------|---------------------|
| 51.218750       | 16.80                     | 40.00                | 23.20       | 199.0       | H            | 235.0         | 21.1                |
| 54.007500       | 16.62                     | 40.00                | 23.38       | 193.0       | V            | 337.0         | 20.9                |
| 147.491250      | 27.53                     | 43.50                | 15.97       | 100.0       | V            | 0.0           | 15.6                |
| 197.931250      | 19.23                     | 43.50                | 24.27       | 100.0       | V            | 266.0         | 19.0                |
| 550.041250      | 22.80                     | 46.00                | 23.20       | 106.0       | H            | 51.0          | 26.2                |
| 757.015000      | 30.35                     | 46.00                | 15.65       | 104.0       | V            | 323.0         | 29.4                |

The Radiates Emission was performed in all mode (DH5, 2DH5 and 3DH5), DH5 was selected as the worse condition. The test data of the worst-case condition was recorded in this report.

### DH5-Channel 0

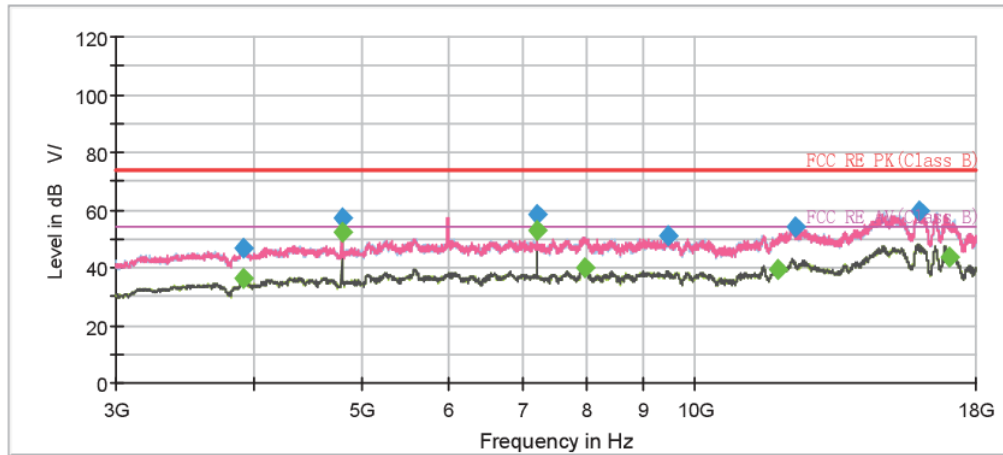


### Final Result

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1168.500000     | 43.74            | ---              | 74.00          | 30.26       | 500.0           | 100.0       | V   | 318.0         | -4.5         |
| 1186.000000     | ---              | 32.56            | 54.00          | 21.44       | 500.0           | 100.0       | V   | 2.0           | -4.0         |
| 1309.000000     | ---              | 34.54            | 54.00          | 19.46       | 500.0           | 100.0       | H   | 120.0         | -2.1         |
| 1431.750000     | 46.06            | ---              | 74.00          | 27.94       | 500.0           | 200.0       | V   | 202.0         | -1.9         |
| 1701.750000     | ---              | 35.90            | 54.00          | 18.10       | 500.0           | 200.0       | V   | 193.0         | 0.4          |
| 1702.250000     | 47.93            | ---              | 74.00          | 26.07       | 500.0           | 200.0       | V   | 0.0           | 0.4          |
| 2044.250000     | 49.03            | ---              | 74.00          | 24.97       | 500.0           | 100.0       | V   | 0.0           | 2.5          |
| 2045.750000     | ---              | 37.14            | 54.00          | 16.86       | 500.0           | 100.0       | H   | 202.0         | 2.5          |
| 2336.500000     | ---              | 37.81            | 54.00          | 16.19       | 500.0           | 100.0       | V   | 122.0         | 3.4          |
| 2570.250000     | 49.79            | ---              | 74.00          | 24.21       | 500.0           | 100.0       | H   | 295.0         | 4.9          |
| 2899.000000     | 53.70            | ---              | 74.00          | 20.30       | 500.0           | 200.0       | V   | 260.0         | 8.5          |
| 2906.500000     | ---              | 42.42            | 54.00          | 11.58       | 500.0           | 200.0       | V   | 202.0         | 8.5          |

Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

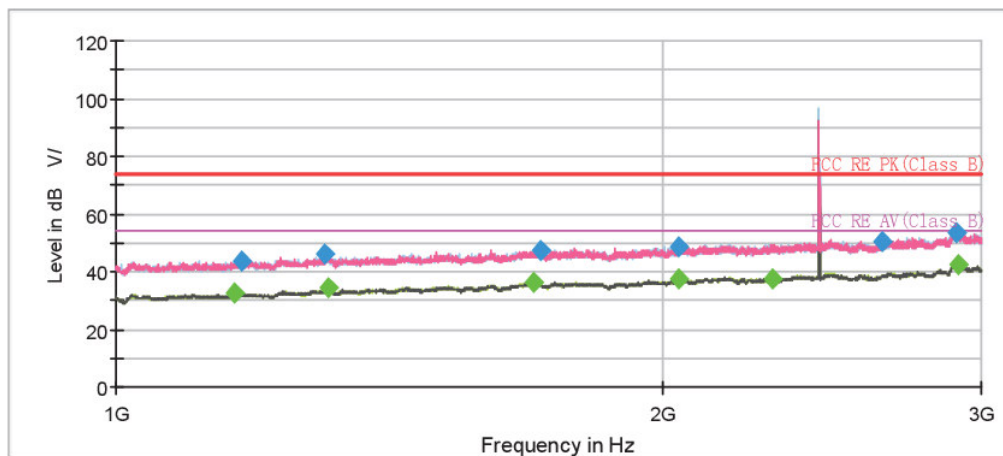


### Final Result

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 3905.625000     | 46.70            | ---              | 74.00          | 27.30       | 500.0           | 100.0       | V   | 340.0         | 3.5          |
| 3916.875000     | ---              | 36.24            | 54.00          | 17.76       | 500.0           | 200.0       | H   | 94.0          | 3.2          |
| 4803.750000     | ---              | 52.23            | 54.00          | 1.77        | 500.0           | 200.0       | H   | 94.0          | 2.2          |
| 4803.750000     | 57.27            | ---              | 74.00          | 16.73       | 500.0           | 200.0       | H   | 94.0          | 2.2          |
| 7205.625000     | 58.42            | ---              | 74.00          | 15.58       | 500.0           | 200.0       | H   | 291.0         | 7.2          |
| 7205.625000     | ---              | 53.06            | 54.00          | 0.94        | 500.0           | 200.0       | H   | 291.0         | 7.2          |
| 7980.000000     | ---              | 39.80            | 54.00          | 14.20       | 500.0           | 200.0       | V   | 85.0          | 9.9          |
| 9468.750000     | 50.84            | ---              | 74.00          | 23.16       | 500.0           | 200.0       | H   | 322.0         | 9.4          |
| 11926.875000    | ---              | 39.13            | 54.00          | 14.87       | 500.0           | 200.0       | H   | 46.0          | 11.1         |
| 12339.375000    | 53.87            | ---              | 74.00          | 20.13       | 500.0           | 200.0       | V   | 0.0           | 13.6         |
| 16003.125000    | 59.75            | ---              | 74.00          | 14.25       | 500.0           | 200.0       | V   | 324.0         | 20.1         |
| 17021.250000    | ---              | 43.54            | 54.00          | 10.46       | 500.0           | 100.0       | H   | 273.0         | 17.5         |

Radiates Emission from 3GHz to 18GHz

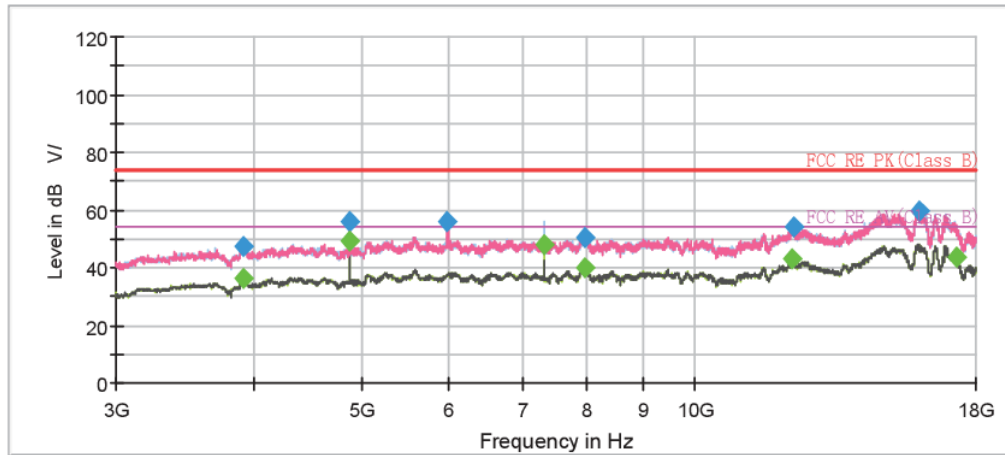
DH5-Channel 39



Final\_Result

| Frequency (MHz) | MaxPeak (dB $\mu$ V/m) | Average (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------------|------------------------|----------------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1163.250000     | ---                    | 32.38                  | 54.00                | 21.62       | 500.0           | 200.0       | V   | 213.0         | -4.7         |
| 1173.250000     | 43.91                  | ---                    | 74.00                | 30.09       | 500.0           | 100.0       | V   | 121.0         | -4.3         |
| 1304.250000     | 45.98                  | ---                    | 74.00                | 28.02       | 500.0           | 200.0       | V   | 41.0          | -2.4         |
| 1308.500000     | ---                    | 34.31                  | 54.00                | 19.69       | 500.0           | 100.0       | V   | 301.0         | -2.1         |
| 1700.000000     | ---                    | 36.01                  | 54.00                | 17.99       | 500.0           | 200.0       | H   | 51.0          | 0.4          |
| 1712.750000     | 47.51                  | ---                    | 74.00                | 26.49       | 500.0           | 100.0       | V   | 129.0         | 0.4          |
| 2041.750000     | ---                    | 37.31                  | 54.00                | 16.69       | 500.0           | 200.0       | V   | 327.0         | 2.5          |
| 2043.250000     | 48.82                  | ---                    | 74.00                | 25.18       | 500.0           | 100.0       | V   | 246.0         | 2.5          |
| 2302.750000     | ---                    | 37.52                  | 54.00                | 16.48       | 500.0           | 200.0       | H   | 60.0          | 3.4          |
| 2643.750000     | 50.24                  | ---                    | 74.00                | 23.76       | 500.0           | 200.0       | V   | 358.0         | 4.7          |
| 2906.000000     | 53.84                  | ---                    | 74.00                | 20.16       | 500.0           | 100.0       | V   | 54.0          | 8.5          |
| 2912.750000     | ---                    | 42.23                  | 54.00                | 11.77       | 500.0           | 100.0       | H   | 187.0         | 8.4          |

Note: The signal beyond the limit is carrier.  
Radiates Emission from 1GHz to 3GHz

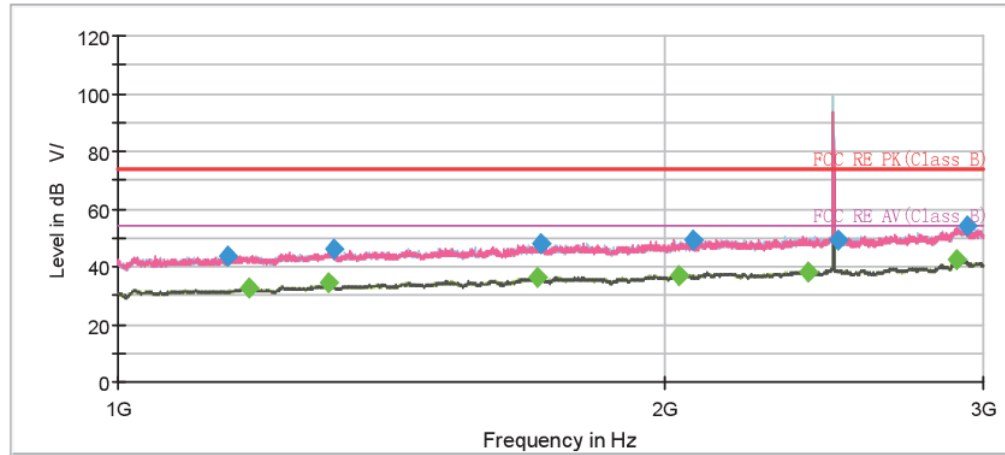


### Final Result

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 3913.125000     | 47.08            | ---              | 74.00          | 26.92       | 500.0           | 100.0       | V   | 293.0         | 3.4          |
| 3918.750000     | ---              | 36.15            | 54.00          | 17.85       | 500.0           | 100.0       | V   | 3.0           | 3.1          |
| 4880.625000     | ---              | 49.17            | 54.00          | 4.83        | 500.0           | 200.0       | H   | 109.0         | 3.0          |
| 4880.625000     | 56.07            | ---              | 74.00          | 17.93       | 500.0           | 200.0       | H   | 109.0         | 3.0          |
| 5977.500000     | 56.01            | ---              | 74.00          | 17.99       | 500.0           | 100.0       | V   | 131.0         | 6.0          |
| 7321.875000     | ---              | 48.16            | 54.00          | 5.84        | 500.0           | 200.0       | H   | 292.0         | 5.9          |
| 7974.375000     | 50.61            | ---              | 74.00          | 23.39       | 500.0           | 200.0       | H   | 48.0          | 9.9          |
| 7978.125000     | ---              | 40.12            | 54.00          | 13.88       | 500.0           | 100.0       | V   | 122.0         | 9.9          |
| 12286.875000    | ---              | 42.83            | 54.00          | 11.17       | 500.0           | 100.0       | V   | 169.0         | 14.4         |
| 12324.375000    | 54.06            | ---              | 74.00          | 19.94       | 500.0           | 100.0       | V   | 179.0         | 13.8         |
| 15997.500000    | 59.52            | ---              | 74.00          | 14.48       | 500.0           | 200.0       | H   | 92.0          | 20.0         |
| 17272.500000    | ---              | 43.47            | 54.00          | 10.53       | 500.0           | 200.0       | V   | 198.0         | 16.8         |

Radiates Emission from 3GHz to 18GHz

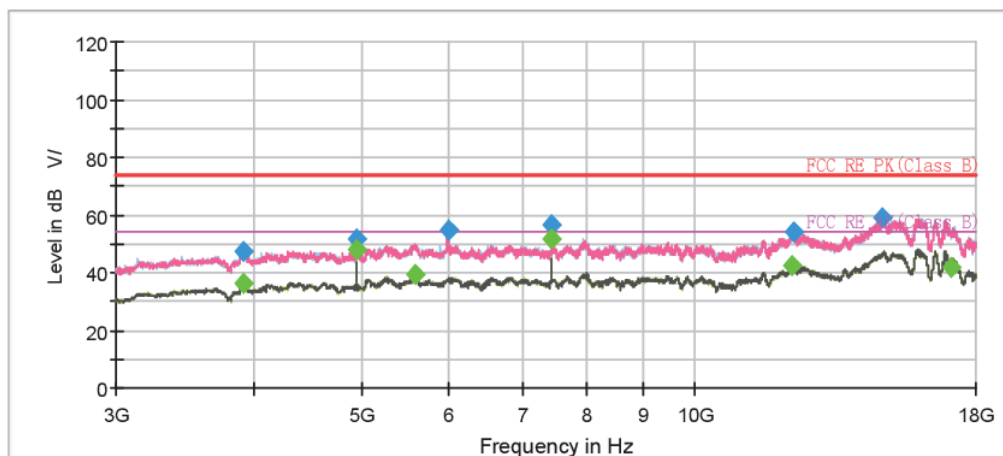
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## Final Result

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 1150.000000     | 43.82            | ---              | 74.00          | 30.18       | 500.0           | 100.0       | H   | 245.0         | -5.2         |
| 1180.000000     | ---              | 32.65            | 54.00          | 21.35       | 500.0           | 100.0       | H   | 338.0         | -4.0         |
| 1307.500000     | ---              | 34.50            | 54.00          | 19.50       | 500.0           | 200.0       | V   | 189.0         | -2.1         |
| 1315.750000     | 45.92            | ---              | 74.00          | 28.08       | 500.0           | 100.0       | H   | 321.0         | -3.0         |
| 1705.000000     | ---              | 36.20            | 54.00          | 17.80       | 500.0           | 200.0       | H   | 304.0         | 0.4          |
| 1712.000000     | 47.87            | ---              | 74.00          | 26.13       | 500.0           | 100.0       | H   | 305.0         | 0.5          |
| 2040.000000     | ---              | 37.07            | 54.00          | 16.93       | 500.0           | 100.0       | H   | 330.0         | 2.4          |
| 2076.000000     | 49.14            | ---              | 74.00          | 24.86       | 500.0           | 100.0       | H   | 270.0         | 2.1          |
| 2402.250000     | ---              | 37.90            | 54.00          | 16.10       | 500.0           | 100.0       | H   | 52.0          | 4.3          |
| 2494.750000     | 49.30            | ---              | 74.00          | 24.70       | 500.0           | 100.0       | H   | 145.0         | 4.9          |
| 2902.000000     | ---              | 42.26            | 54.00          | 11.74       | 500.0           | 200.0       | V   | 271.0         | 8.6          |
| 2936.750000     | 53.85            | ---              | 74.00          | 20.15       | 500.0           | 100.0       | H   | 245.0         | 7.8          |

Note: The signal beyond the limit is carrier.  
Radiates Emission from 1GHz to 3GHz



## Final Result

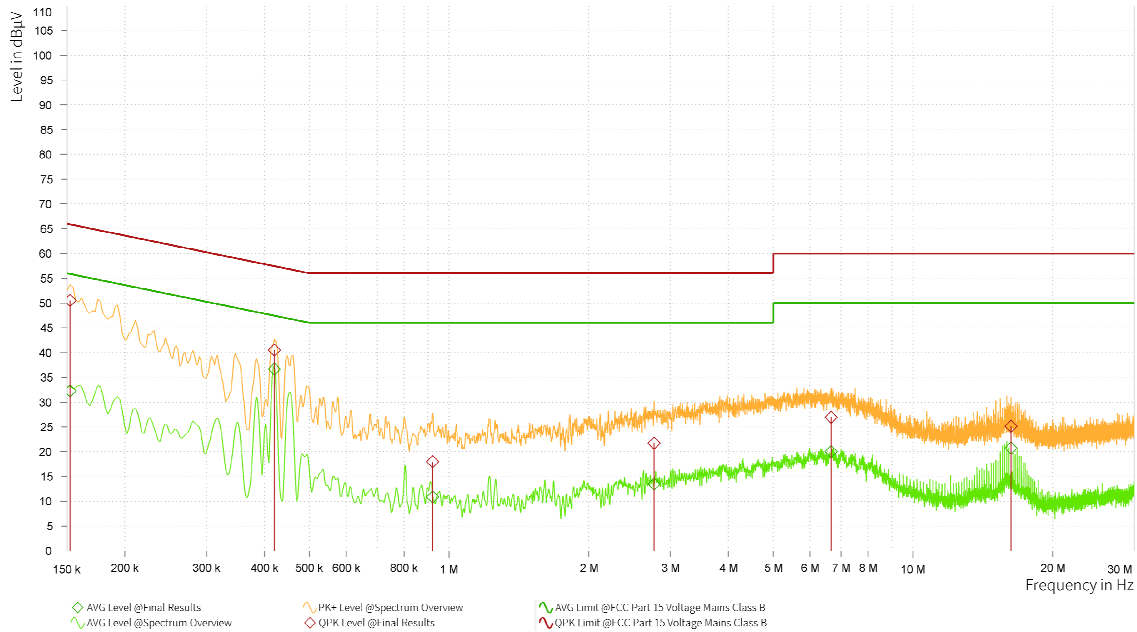
| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-------------|-----|---------------|--------------|
| 3905.625000     | 47.19            | ---              | 74.00          | 26.81       | 500.0           | 100.0       | H   | 349.0         | 3.5          |
| 3909.375000     | ---              | 36.10            | 54.00          | 17.90       | 500.0           | 200.0       | V   | 234.0         | 3.7          |
| 4959.375000     | ---              | 48.11            | 54.00          | 5.89        | 500.0           | 200.0       | H   | 102.0         | 3.3          |
| 4959.375000     | 51.93            | ---              | 74.00          | 22.07       | 500.0           | 200.0       | H   | 102.0         | 3.3          |
| 5596.875000     | ---              | 39.36            | 54.00          | 14.64       | 500.0           | 200.0       | V   | 102.0         | 7.9          |
| 5988.750000     | 54.88            | ---              | 74.00          | 19.12       | 500.0           | 100.0       | V   | 0.0           | 6.2          |
| 7438.125000     | 56.44            | ---              | 74.00          | 17.56       | 500.0           | 200.0       | H   | 292.0         | 7.3          |
| 7440.000000     | ---              | 51.53            | 54.00          | 2.47        | 500.0           | 200.0       | H   | 292.0         | 7.3          |
| 12273.750000    | ---              | 42.56            | 54.00          | 11.44       | 500.0           | 100.0       | V   | 323.0         | 14.6         |
| 12292.500000    | 54.03            | ---              | 74.00          | 19.97       | 500.0           | 100.0       | H   | 225.0         | 14.3         |
| 14816.250000    | 58.92            | ---              | 74.00          | 15.08       | 500.0           | 100.0       | V   | 87.0          | 19.3         |
| 17105.625000    | ---              | 42.11            | 54.00          | 11.89       | 500.0           | 200.0       | H   | 55.0          | 17.5         |

Radiates Emission from 3GHz to 18GHz

## 2. Conducted Emission

### 2.1. Bluetooth

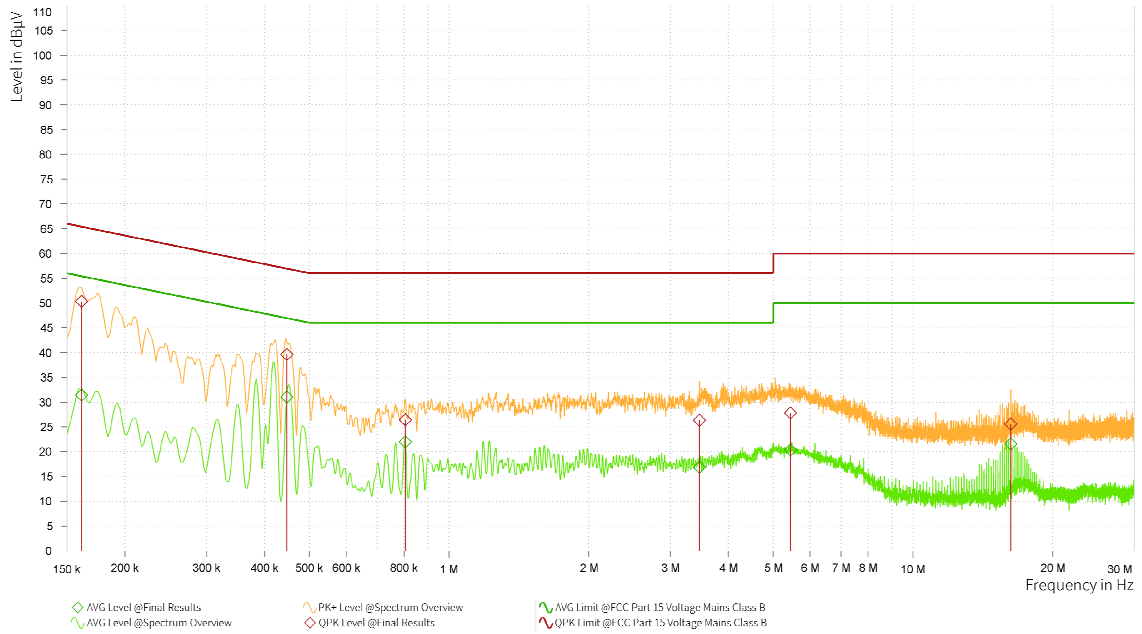
During the test, the Conducted Emission was performed in all modes with all channels, Bluetooth GFSK Channel 0 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.



| Frequency [MHz] | QPK Level [dBμV] | QPK Limit [dBμV] | QPK Margin [dB] | AVG Level [dBμV] | AVG Limit [dBμV] | AVG Margin [dB] | Correction [dB] | Line | Meas. BW [kHz] | Meas. Time [s] |
|-----------------|------------------|------------------|-----------------|------------------|------------------|-----------------|-----------------|------|----------------|----------------|
| 0.152           | 50.53            | 65.88            | 15.34           | 32.24            | 55.88            | 23.64           | 20.90           | L1   | 9.000          | 1.000          |
| 0.420           | 40.50            | 57.45            | 16.94           | 36.69            | 47.45            | 10.76           | 20.86           | L1   | 9.000          | 1.000          |
| 0.922           | 17.97            | 56.00            | 38.03           | 10.84            | 46.00            | 35.16           | 20.22           | L1   | 9.000          | 1.000          |
| 2.767           | 21.74            | 56.00            | 34.26           | 13.49            | 46.00            | 32.51           | 19.51           | L1   | 9.000          | 1.000          |
| 6.662           | 26.93            | 60.00            | 33.07           | 20.01            | 50.00            | 29.99           | 19.41           | L1   | 9.000          | 1.000          |
| 16.276          | 25.16            | 60.00            | 34.84           | 20.71            | 50.00            | 29.29           | 19.54           | L1   | 9.000          | 1.000          |

**Remark: Correct factor=cable loss + LISN factor**

L line Conducted Emission from 150 kHz to 30 MHz



| Frequency [MHz] | QPK Level [dBµV] | QPK Limit [dBµV] | QPK Margin [dB] | AVG Level [dBµV] | AVG Limit [dBµV] | AVG Margin [dB] | Correction [dB] | Line | Meas. BW [kHz] | Meas. Time [s] |
|-----------------|------------------|------------------|-----------------|------------------|------------------|-----------------|-----------------|------|----------------|----------------|
| 0.161           | 50.33            | 65.40            | 15.07           | 31.41            | 55.40            | 23.99           | 20.90           | N    | 9.000          | 1.000          |
| 0.447           | 39.61            | 56.93            | 17.32           | 31.01            | 46.93            | 15.92           | 20.84           | N    | 9.000          | 1.000          |
| 0.805           | 26.43            | 56.00            | 29.57           | 21.97            | 46.00            | 24.03           | 20.33           | N    | 9.000          | 1.000          |
| 3.467           | 26.35            | 56.00            | 29.65           | 16.83            | 46.00            | 29.17           | 19.46           | N    | 9.000          | 1.000          |
| 5.444           | 27.78            | 60.00            | 32.22           | 20.35            | 50.00            | 29.65           | 19.41           | N    | 9.000          | 1.000          |
| 16.262          | 25.59            | 60.00            | 34.41           | 21.53            | 50.00            | 28.47           | 19.58           | N    | 9.000          | 1.000          |

Remark: Correct factor=cable loss + LISN factor

N line Conducted Emission from 150 kHz to 30 MHz