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# TEST REPORT

**KCTL Inc.**
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KCTL

**1. Client**

- Name : Samsung Electronics Co., Ltd.
- Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep.of Korea
- Date of Receipt : 2018-09-27

**2. Use of Report** : -

**3. Name of Product and Model** : ARTIK-0710 / SIP007AFS00

**4. Manufacturer and Country of Origin** : Samsung Electronics Co., Ltd. / Korea

**5. FCC ID** : A3LSIP007AFS00

**6. IC ID** : 649E-SIP007AFS00

**7. Date of Test** : 2018-10-15 to 2018-10-19

**8. Test Standards** : FCC Part 15 Subpart C, 15.247
RSS-247 Issue 2, RSS-GEN Issue 5

**9. Test Results** : Refer to the test result in the test report

| | | |
|---|---|---|
| Affirmation | Tested by<br>Name : Euijung Kim (Signature) | Technical Manager<br>Name : Bongok Ko (Signature) |

2018-11-06

# KCTL Inc.

As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by KCTL Inc.

REPORT REVISION HISTORY

| Date | Revision | Page No |
|---|---|---|
| 2018-10-23 | Originally issued | - |
| 2018-11-06 | Revised notes | 16, 20 |
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# 1. Client information

| | |
|---|---|
| **Applicant:** | Samsung Electronics Co., Ltd. |
| **Address:** | 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep.of Korea |
| **Telephone number:** | +82 10 7260 5096 |
| **Contact person:** | Sungjin Kim / sj999.kim@samsung.com |

| | |
|---|---|
| **Manufacturer:** | Samsung Electronics Co., Ltd. |
| **Address:** | 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep.of Korea |

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# 2. Laboratory information

**Address**

**KCTL Inc.**

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea

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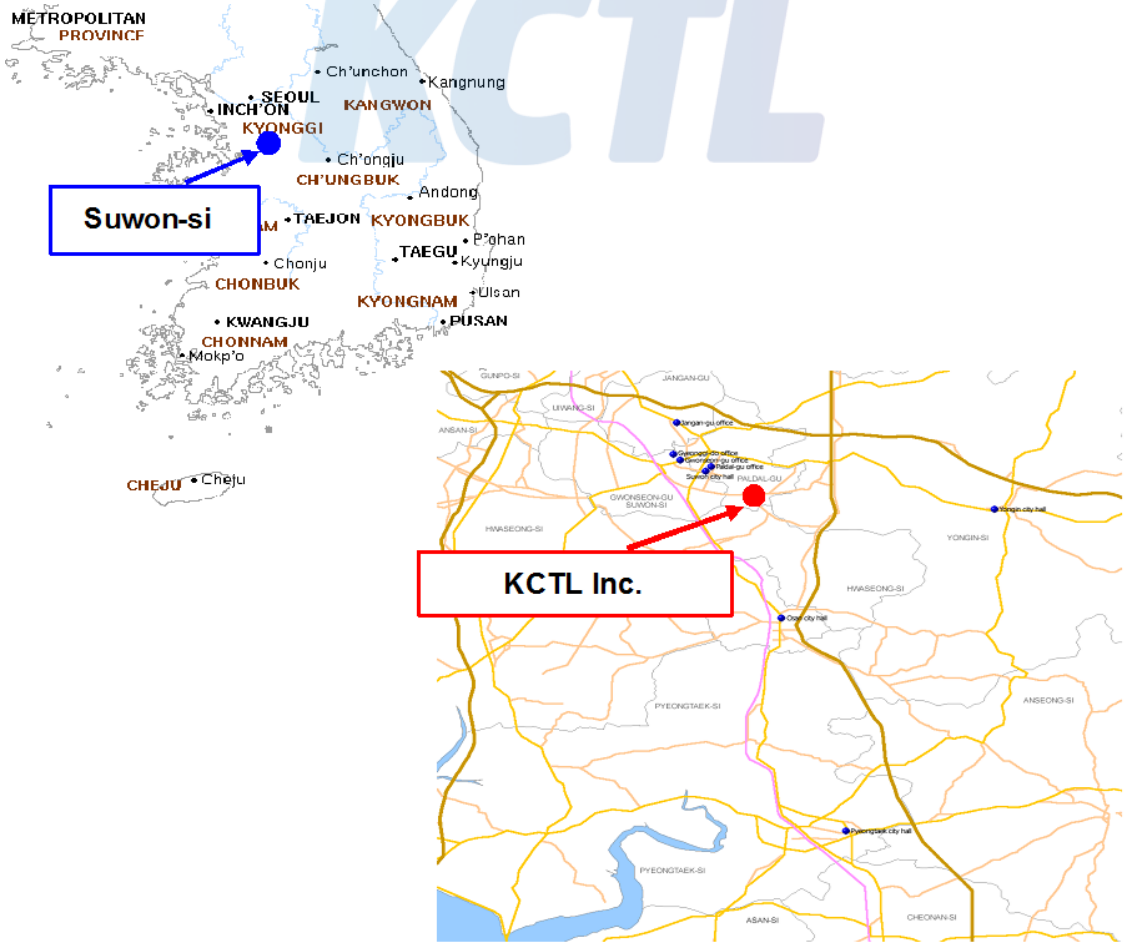
FCC Site Designation No: KR0040, FCC Site Registration No: 687132

VCCI Registration No. : R-3327, G-198, C-3706, T-1849

Industry Canada Registration No. : 8035A

KOLAS NO.: KT231

SITE MAP



# 3. Description of E.U.T.

## 3.1 Basic description

| | |
|---|---|
| Applicant | Samsung Electronics Co., Ltd. |
| Address of Applicant | 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep.of Korea |
| Manufacturer | Samsung Electronics Co., Ltd. |
| Address of Manufacturer | 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep.of Korea |
| Type of equipment | ARTIK-0710 |
| Basic Model | SIP007AFS00 |
| Serial number | N/A |

## 3.2 General description

| | |
|---|---|
| Frequency Range | 2 402 ㎒ ~ 2 480 ㎒ (Bluetooth, Bluetooth Low Energy)<br>2 402 ㎒ ~ 2 475 ㎒ (Zigbee)<br>2 412 ㎒ ~ 2 462 ㎒ (802.11b/g/n_HT20)<br>5 180 ㎒ ~ 5 240 ㎒ (802.11a/n_HT20)<br>5 190 ㎒ ~ 5 230 ㎒ (802.11n_HT40)<br>5 210 ㎒ (802.11ac_VHT80)<br>5 260 ㎒ ~ 5 320 ㎒ (802.11a/n_HT20)<br>5 270 ㎒ ~ 5 310 ㎒ (802.11n_HT40)<br>5 290 ㎒ (802.11ac_VHT80)<br>5 500 ㎒ ~ 5 720 ㎒ (802.11a/n_HT20)<br>5 510 ㎒ ~ 5 710 ㎒ (802.11n_HT40)<br>5 530 ㎒ ~ 5 690 ㎒ (802.11ac_VHT80)<br>5 745 ㎒ ~ 5 825 ㎒ (802.11a/n_HT20)<br>5 755 ㎒ ~ 5 795 ㎒ (802.11n_HT40)<br>5 775 ㎒ (802.11ac_VHT80) |
| Type of Modulation | Bluetooth: GFSK, π/4DQPSK, 8DPSK<br>Bluetooth Low Energy: GFSK<br>Zigbee: DSSS<br>WiFi: DSSS, OFDM |

| | |
|---|---|
| The number of channels | 2.4 GHz:79 ch (Bluetooth)<br>40 ch (Bluetooth Low Energy)<br>11 ch (802.11b/g/n_HT20)<br>15 ch (Zigbee)<br><br>5.0 GHz: U-NII-1: 4 ch (802.11a/n_HT20)<br>2 ch (802.11n_HT40)<br>1 ch (802.11ac_VHT80)<br>U-NII-2A: 4 ch (802.11a/n_HT20)<br>2 ch (802.11n_HT40)<br>1 ch (802.11ac_VHT80)<br>U-NII-2C: 12 ch (802.11a/n_HT20)<br>6 ch (802.11n_HT40)<br>3 ch (802.11ac_VHT80)<br>U-NII-3: 5 ch (802.11a/n_HT20)<br>2 ch (802.11n_HT40)<br>1 ch (802.11ac_VHT80) |
| Type of Antenna | Diploe Antenna, Balance Flex Antenna |
| Antenna Gain | Dipole Antenna<br>2.4 GHz: 3.8 dBi<br>5 GHz: 5.5 dBi<br><br>Balance Flex Antenna<br>2.4 GHz: 3.0 dBi<br>5 GHz: 4.0 dBi |
| Power supply | DC 4.2 V |
| Test SW Version | 0710GC0F-41F-01Q0 |
| RF power setting in TEST SW | Referred the measuring instrument from manufacturer |

Note : The above EUT information was declared by the manufacturer.

## 3.3 Peak output power

**PKPM1 Peak-reading power meter method**

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the *DTS bandwidth* and shall utilize a fast-responding diode detector.

**-Peak output power**

| Mode | Channel | Frequency [㎒] | Peak output power [dBm] |
|---|---|---|---|
| GFSK | Lowest | 2 402 | 5.65 |
| | Middle | 2 441 | 7.45 |
| | Highest | 2 480 | 6.75 |
| 8DPSK | Lowest | 2 402 | 5.55 |
| | Middle | 2 441 | 5.35 |
| | Highest | 2 480 | 4.95 |

Note1) : The above peak output power were retested results.
Note2) : The GFSK and 8DPSK power are the worst case.

## 3.4 Test frequency

| | Bluetooth |
|---|---|
| Lowest frequency | 2 402 ㎒ |
| Middle frequency | 2 441 ㎒ |
| Highest frequency | 2 480 ㎒ |

## 3.5 Normal and extreme test conditions

- Ambient Conditions

| | Temperature [℃] | Relative humidity [%] |
|---|---|---|
| Requirement for tests | 15 to 35 | 20 to 75 |
| Ambient Conditions | 23 | 51 |

-Test Conditions

| Test Condition | Temperature [°C] | Voltage [V] |
|---|---|---|
| NTNV | 23 | DC 4.20 |

*Note$_{1)}$ : N:Normal T:Temperature V:Voltage*

# 4. Summary of test results

## 4.1 Standards & results

| FCC Rule Reference | IC Rule Reference | Parameter | Report Section | Test Result |
|---|---|---|---|---|
| 15.203, 15.247(b)(4) | - | Antenna Requirement | 5.1 | C |
| 15.247(d),15.205 (a),15.209(a) | RSS-247 Issue 2 5.5<br>RSS-Gen Issue 5 8.9 | Spurious Emission,<br>Band Edge and Restricted bands | 5.2 | C |
| Note1) : C = Complies, NC = Not complies, NT = Not tested, NA = Not applicable | | | | |

Note: Measurement methods used to test this device are ANSI C63.10:2013 and KDB558074 D01 v04

## 4.2 Uncertainty

| Measurement Item | Expanded Uncertainty<br>U = *k*Uc (*k* = 2) | |
|---|---|---|
| Radiated Spurious Emissions | 9 ㎑ ~ 30 ㎒: | +2.42 ㏈, -2.42 ㏈ |
| | 30 ㎒ ~ 300 ㎒: | +4.94 ㏈, -5.06 ㏈ |
| | | +4.93 ㏈, -5.05 ㏈ |
| | 300 ㎒ ~ 1 000 ㎒: | +4.97 ㏈, -5.08 ㏈ |
| | | +4.84 ㏈, -4.96 ㏈ |
| | 1 ㎓ ~ 25 ㎓: | +6.03 ㏈, -6.05 ㏈ |

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# 5. Test results

## 5.1 Antenna Requirement

### 5.1.1 Regulation

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### 5.1.2 Result

### - Complied

The transmitter uses a unique coupling to the intentional radiator (two types of external antenna, Dipole antenna or Balance Flex antenna).

## 5.2 Spurious Emission, Band Edge, and Restricted bands

### 5.2.1 Regulation

According to §15.247(d), in any 100 ㎑ bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 ㏈ below that in the 100 ㎑ bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 ㏈ instead of 20 ㏈. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

According to §15.209(a), Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall notexceed the field strength levels specified in the following table:

| Frequency (㎒) | Field strength (㎛/m) | Measurement distance (m) |
|---|---|---|
| 0.009 - 0.490 | 2 400/F(㎑) | 300 |
| 0.490 - 1.705 | 24 000/F(㎑) | 30 |
| 1.705 - 30 | 30 | 30 |
| 30 - 88 | 100** | 3 |
| 88 - 216 | 150** | 3 |
| 216 - 960 | 200** | 3 |
| Above 960 | 500 | 3 |

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54–72 ㎒, 76–88 ㎒, 174–216 ㎒ or 470–806 ㎒. However, operation within these frequency bands is permItted under other sections of this part, e.g., §15.231 and 15.241.

According to § 15.205(a) and (b), only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.009 - 0.110<br>0.495 - 0.505<br>2.173 5 - 2.190 5<br>4.125 - 4.128<br>4.177 25 - 4.177 75<br>4.207 25 - 4.207 75<br>6.215 - 6.218<br>6.267 75 - 6.268 25<br>6.311 75 - 6.312 25<br>8.291 - 8.294<br>8.362 - 8.366<br>8.376 25 - 8.386 75<br>8.414 25 - 8.414 75<br>12.29 - 12.293<br>12.519 75 - 12.520 25<br>12.576 75 - 12.577 25<br>13.36 - 13.41 | 16.42 - 16.423<br>16.694 75 - 16.695 25<br>16.804 25 - 16.804 75<br>25.5 - 25.67<br>37.5 - 38.25<br>73 - 74.6<br>74.8 - 75.2<br>108 - 121.94<br>123 - 138<br>149.9 - 150.05<br>156.524 75 - 156.525 25<br>156.7 - 156.9<br>162.012 5 - 167.17<br>167.72 - 173.2<br>240 - 285<br>322 - 335.4 | 399.9 - 410<br>608 - 614<br>960 – 1 240<br>1 300 – 1 427<br>1 435 – 1 626.5<br>1 645.5 – 1 646.5<br>1 660 – 1 710<br>1 718.8 – 1 722.2<br>2 200 – 2 300<br>2 310 – 2 390<br>2 483.5 – 2 500<br>2 690 – 2 900<br>3 260 – 3 267<br>3 332 – 3 339<br>3 345.8 – 3 358<br>3 600 – 4 400 | 4.5 - 5.15<br>5.35 - 5.46<br>7.25 - 7.75<br>8.025 - 8.5<br>9.0 - 9.2<br>9.3 - 9.5<br>10.6 - 12.7<br>13.25 - 13.4<br>14.47 - 14.5<br>15.35 - 16.2<br>17.7 - 21.4<br>22.01 - 23.12<br>23.6 - 24.0<br>31.2 - 31.8<br>36.43 - 36.5<br>Above 38.6 |

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1 000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1 000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

## 5.2.2 Measurement Procedure

The method of measurement used to test this FHSS device is ANSI C63.10-2013.

Spurious Radiated Emissions:

1. The preliminary radiated measurements were performed to determine the frequency producing the maximum emissions in an semi-anechoic chamber at a distance of 3 meters.
2. The EUT was placed on the top of the 0.8-meter height, 1 × 1.5 meter non-metallic table. To find the maximum emission levels, the height of a measuring antenna was changed and the turntable was rotated 360°.
3. The antenna polarization was also changed from vertical to horizontal. The spectrum was scanned from 9 ㎑ to 30 ㎒ using the loop antenna, and from 30 to 1 000 ㎒ using the Bi-Log antenna, and from 1 000 ㎒ to 26 500 ㎒ using the horn antenna.
4. To obtain the final measurement data, the EUT was arranged on a turntable situated on a 4 × 4 meter in an semi-anechoic chamber. The EUT was tested at a distance 3 meters.
5. Each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.
6. The 0.8m height is for below 1 G testing, and 1.5m is for above 1G testing.

- **Procedure for unwanted emissions measurements below 1 000 ㎒**

The procedure for unwanted emissions measurements below 1 000 ㎒ is as follows:

a) Follow the requirements in 12.7.4.

b) Compliance shall be determined using CISPR quasi-peak detection; however, peak detection is permitted as an alternative to quasi-peak detection

- **Procedure for peak unwanted emissions measurements above 1 000 ㎒**

The procedure for peak unwanted emissions measurements above 1 000 ㎒ is as follows:

a) Follow the requirements in 12.7.4.

b) Peak emission levels are measured by setting the instrument as follows:

1) RBW = 1 ㎒./ VBW ≥ [3 ㎒ RBW].

2) Detector = peak.

3) Sweep time = auto.

4) Trace mode = max hold.

5) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, then the time required for the trace to stabilize will increase by a factor of approximately 1 / D, where *D* is the duty cycle. For example, at 50 % duty cycle, the measurement time will increase by a factor of two, relative to measurement time for continuous transmission.

- **Procedures for average unwanted emissions measurements above 1 000 ㎒**

Method VB-A is averaging using reduced video bandwidth. The procedure for this method is as follows:

a) RBW = 1 ㎒.

b) Video bandwidth:

1) If the EUT is configured to transmit with D ≥ 98 ％, then set VBW ≤ RBW / 100 (i.e., 10 ㎑), but not less than 10 ㎐.

2) If the EUT D is < 98%, then set VBW ≥ 1 / T, where T is defined in item a1) of 12.2.

c) Video bandwidth mode or display mode:

1) The instrument shall be set with video filtering applied in the power domain. Typically, this requires setting the detector mode to RMS (power averaging) and setting the average-VBW type to power (rms).

2) As an alternative, the instrument may be set to linear detector mode. Video filtering shall be applied in linear voltage domain (rather than in a log or ㏈ domain). Some instruments require linear display mode to accomplish this. Others have a setting for average-VBW type, which can be set to “voltage” regardless of the display mode.

d) Detector = peak.

e) Sweep time = auto.

f) Trace mode = max hold.

g) Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98% duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of 1/x, where D is the duty cycle. For example, use at least 200 traces if the duty cycle is 25%. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 50 traces should be averaged.)

**RADIATED EMISSION TEST SITES FOR MEASUREMENTS FROM 9 kHz TO 30 MHz**

According to exploratory test no any obvious emission were detected from 9 kHz to 30 MHz. Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

## 5.2.3.1 Test Result (Dipole Antenna)

**Test Condition:** Refer to the clause 3.6 Normal and extreme test conditions

## - Complied

1. Measured value of the Field strength of spurious Emissions (Radiated).
2. It tested x,y and z – 3 axis each, mentioned only worst case data at this report.
3. The worst case of this product is the y-axis.

**- Below 1 ㎓ data (worst-case)**

**Bluetooth 8DPSK Lowest Channel (2 402 ㎒)**

| Frequency [㎒] | Receiver Bandwidth [㎑] | Pol. [V/H] | Reading [dB(μV)] | Cable Loss [dB] | Amp Gain [dB] | Antenna Factor [dB] | Factor [dB] | Result [dB(μV/m)] | Limit [dB(μV/m)] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| **Quasi-Peak DATA. Emissions below 30 ㎒** | | | | | | | | | | |
| 10.98 | 9 | V | 35.50 | 3.03 | -32.67 | 18.64 | -11.00 | 24.50 | 69.50 | 45.00 |
| 25.73 | 9 | V | 34.20 | 4.61 | -32.68 | 18.27 | -9.80 | 24.40 | 69.50 | 45.10 |
| **Quasi-Peak DATA. Emissions below 1 ㎓** | | | | | | | | | | |
| 136.09 | 120 | H | 33.50 | 2.52 | -25.29 | 12.37 | -10.40 | 23.10 | 43.50 | 20.40 |
| 269.11 | 120 | H | 35.30 | 3.65 | -24.90 | 12.45 | -8.80 | 26.50 | 46.00 | 19.50 |
| 405.51 | 120 | H | 42.30 | 4.60 | -24.72 | 15.82 | -4.30 | 38.00 | 46.00 | 8.00 |
| 479.23 | 120 | H | 37.20 | 5.02 | -24.66 | 17.44 | -2.20 | 35.00 | 46.00 | 11.00 |

Note1. Factor = Cable loss + Amp gain + Antenna factor
Result = Reading + Factor

**- Above 1 ㎓ data**

**- Bluetooth GFSK**

**Lowest Channel (2 402 ㎒)**

| Frequency [㎒] | Receiver Bandwidth [㎑] | Pol. [V/H] | Reading [dB(㎶)] | Cable Loss [dB] | Amp Gain [dB] | Antenna Factor [dB] | Factor [dB] | Result [dB(㎶/m)] | Limit [dB(㎶/m)] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| **Peak DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 2 364.35 1) | 1 000 | V | 45.44 | 3.69 | -29.98 | 28.49 | 2.20 | 47.64 | 74.00 | 26.36 |
| 3 065.00 | 1 000 | H | 64.92 | 4.18 | -59.90 | 29.88 | -25.84 | 39.08 | 74.00 | 34.92 |
| 4 804.06 2) | 1 000 | V | 72.90 | 5.34 | -60.69 | 32.80 | -22.55 | 50.35 | 74.00 | 23.65 |
| 17 075.17 | 1 000 | H | 58.49 | 10.45 | -58.57 | 40.75 | -7.37 | 51.12 | 74.00 | 22.88 |
| 21 561.77 | 1 000 | V | 47.05 | 12.00 | -49.14 | 45.00 | 7.86 | 54.91 | 74.00 | 19.09 |
| 24 115.22 | 1 000 | V | 47.32 | 12.80 | -42.84 | 45.10 | 15.06 | 62.39 | 74.00 | 11.61 |
| **Average DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 2 364.35 1) | 1 000 | V | 33.84 | 3.69 | -29.98 | 28.49 | 2.20 | 36.04 | 54.00 | 17.96 |
| 4 804.06 2) | 1 000 | V | 70.69 | 5.34 | -60.69 | 32.80 | -22.55 | 48.14 | 54.00 | 5.86 |

Note. Factor = Cable loss + Amp. Gain + Antenna factor
Result = Reading + Factor
1) Restricted band
2) Harmonic

**Middle Channel (2 441 ㎒)**

| Frequency [㎒] | Receiver Bandwidth [㎑] | Pol. [V/H] | Reading [dB(㎶)] | Cable Loss [dB] | Amp Gain [dB] | Antenna Factor [dB] | Factor [dB] | Result [dB(㎶/m)] | Limit [dB(㎶/m)] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| **Peak DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 1 849.30 | 1 000 | H | 67.45 | 3.28 | -60.05 | 27.20 | -29.57 | 37.88 | 74.00 | 36.12 |
| 3 063.83 | 1 000 | H | 65.51 | 4.18 | -59.89 | 29.87 | -25.84 | 39.67 | 74.00 | 34.33 |
| 4 882.03 2) | 1 000 | V | 74.49 | 5.39 | -60.94 | 32.84 | -22.71 | 51.78 | 74.00 | 22.22 |
| 17 079.70 | 1 000 | V | 58.65 | 10.46 | -58.61 | 40.78 | -7.37 | 51.28 | 74.00 | 22.72 |
| 21 598.69 | 1 000 | V | 49.12 | 12.00 | -49.16 | 45.00 | 7.84 | 56.95 | 74.00 | 17.05 |
| 24 124.78 | 1 000 | V | 45.56 | 12.80 | -42.85 | 45.10 | 15.05 | 60.60 | 74.00 | 13.40 |
| **Average DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 4 882.03 2) | 1 000 | V | 73.50 | 5.39 | -60.94 | 32.84 | -22.71 | 50.79 | 54.00 | 3.21 |

Note. Factor = Cable loss + Amp. Gain + Antenna factor
Result = Reading + Factor
1) Restricted band
2) Harmonic

**Highest Channel (2 480 ㎒)**

| Frequency [㎒] | Receiver Bandwidth [㎑] | Pol. [V/H] | Reading [dB(㎶)] | Cable Loss [dB] | Amp Gain [dB] | Antenna Factor [dB] | Factor [dB] | Result [dB(㎶/m)] | Limit [dB(㎶/m)] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| **Peak DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 2 483.52 1) | 1 000 | V | 48.89 | 3.77 | -30.10 | 28.72 | 2.39 | 51.27 | 74.00 | 22.73 |
| 3 243.52 | 1 000 | H | 66.12 | 4.29 | -60.42 | 30.36 | -25.77 | 40.35 | 74.00 | 33.65 |
| 4 959.95 2) | 1 000 | V | 74.71 | 5.44 | -60.61 | 32.88 | -22.29 | 52.42 | 74.00 | 21.58 |
| 17 253.25 | 1 000 | V | 57.85 | 10.54 | -59.75 | 41.82 | -7.39 | 50.46 | 74.00 | 23.54 |
| 21 466.67 | 1 000 | H | 48.34 | 11.90 | -48.88 | 44.90 | 7.92 | 56.27 | 74.00 | 17.73 |
| 24 286.55 | 1 000 | H | 47.24 | 12.80 | -43.12 | 45.10 | 14.78 | 62.02 | 74.00 | 11.98 |
| **Average DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 2 483.52 1) | 1 000 | V | 36.01 | 3.77 | -30.10 | 28.72 | 2.39 | 38.40 | 54.00 | 15.60 |
| 4 959.95 2) | 1 000 | V | 71.28 | 5.44 | -60.61 | 32.88 | -22.29 | 48.99 | 54.00 | 5.01 |

Note. Factor = Cable loss + Amp. Gain + Antenna factor
Result = Reading + Factor
1) Restricted band
2) Harmonic

**- Bluetooth 8DPSK**

**Lowest Channel (2 402 ㎒)**

| Frequency [㎒] | Receiver Bandwidth [㎑] | Pol. [V/H] | Reading [dB(㎶)] | Cable Loss [dB] | Amp Gain [dB] | Antenna Factor [dB] | Factor [dB] | Result [dB(㎶/m)] | Limit [dB(㎶/m)] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| **Peak DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 2 364.71 1) | 1 000 | V | 45.44 | 3.69 | -29.98 | 28.49 | 2.20 | 47.64 | 74.00 | 26.36 |
| 3 065.00 | 1 000 | H | 64.88 | 4.18 | -59.86 | 29.88 | -25.80 | 39.08 | 74.00 | 34.92 |
| 4 803.97 2) | 1 000 | V | 71.12 | 5.34 | -60.69 | 32.80 | -22.55 | 48.57 | 74.00 | 25.43 |
| 17 095.11 | 1 000 | V | 58.31 | 10.46 | -58.70 | 40.87 | -7.37 | 50.94 | 74.00 | 23.06 |
| 21 584.08 | 1 000 | H | 48.34 | 12.00 | -49.15 | 45.00 | 7.85 | 56.19 | 74.00 | 17.81 |
| 24 039.52 | 1 000 | H | 46.17 | 12.80 | -42.61 | 45.00 | 15.19 | 61.36 | 74.00 | 12.64 |
| **Average DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 2 364.71 1) | 1 000 | V | 33.37 | 3.69 | -29.98 | 28.49 | 2.20 | 35.57 | 54.00 | 18.43 |
| 4 803.97 2) | 1 000 | V | 63.95 | 5.34 | -60.69 | 32.80 | -22.55 | 41.40 | 54.00 | 12.60 |

Note. Factor = Cable loss + Amp. Gain + Antenna factor
Result = Reading + Factor
1) Restricted band
2) Harmonic

### Middle Channel (2 441 ㎒)

| Frequency [㎒] | Receiver Bandwidth [㎑] | Pol. [V/H] | Reading [dB(㎶)] | Cable Loss [dB] | Amp Gain [dB] | Antenna Factor [dB] | Factor [dB] | Result [dB(㎶/m)] | Limit [dB(㎶/m)] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| **Peak DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 1 874.92 | 1 000 | V | 67.48 | 3.31 | -59.95 | 27.30 | -29.34 | 38.13 | 74.00 | 35.87 |
| 2 532.66 | 1 000 | H | 70.65 | 3.81 | -59.40 | 28.81 | -26.78 | 43.87 | 74.00 | 30.13 |
| 4 882.03 2) | 1 000 | V | 69.29 | 5.39 | -60.94 | 32.84 | -22.71 | 46.58 | 74.00 | 27.42 |
| 17 121.39 | 1 000 | V | 57.67 | 10.48 | -58.88 | 41.03 | -7.37 | 50.30 | 74.00 | 23.70 |
| 21 523.25 | 1 000 | V | 47.45 | 12.00 | -49.11 | 45.00 | 7.89 | 55.34 | 74.00 | 18.66 |
| 24 094.77 | 1 000 | H | 45.71 | 12.80 | -42.80 | 45.10 | 15.10 | 60.81 | 74.00 | 13.19 |
| **Average DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 4 882.03 2) | 1 000 | V | 64.25 | 5.39 | -60.94 | 32.84 | -22.71 | 41.54 | 54.00 | 12.46 |

Note. Factor = Cable loss + Amp. Gain + Antenna factor
Result = Reading + Factor
1) Restricted band
2) Harmonic

### Highest Channel (2 480 ㎒)

| Frequency [㎒] | Receiver Bandwidth [㎑] | Pol. [V/H] | Reading [dB(㎶)] | Cable Loss [dB] | Amp Gain [dB] | Antenna Factor [dB] | Factor [dB] | Result [dB(㎶/m)] | Limit [dB(㎶/m)] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| **Peak DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 2 483.50 1) | 1 000 | V | 46.43 | 3.77 | -30.10 | 28.72 | 2.39 | 48.82 | 74.00 | 25.18 |
| 3 123.83 | 1 000 | H | 66.08 | 4.22 | -60.13 | 30.03 | -25.88 | 40.20 | 74.00 | 33.80 |
| 4 959.98 2) | 1 000 | V | 68.15 | 5.44 | -60.61 | 32.88 | -22.29 | 45.86 | 74.00 | 28.14 |
| 17 116.41 | 1 000 | H | 58.34 | 10.47 | -58.84 | 41.00 | -7.37 | 50.96 | 74.00 | 23.04 |
| 21 400.27 | 1 000 | V | 48.85 | 11.90 | -48.84 | 44.90 | 7.96 | 56.81 | 74.00 | 17.19 |
| 24 027.03 | 1 000 | V | 47.71 | 12.80 | -42.59 | 45.00 | 15.21 | 62.92 | 74.00 | 11.08 |
| **Average DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 2 483.50 1) | 1 000 | V | 34.32 | 3.77 | -30.10 | 28.72 | 2.39 | 36.71 | 54.00 | 17.29 |
| 4 959.98 2) | 1 000 | V | 64.13 | 5.44 | -60.61 | 32.88 | -22.29 | 41.84 | 54.00 | 12.16 |

Note. Factor = Cable loss + Amp. Gain + Antenna factor
Result = Reading + Factor
1) Restricted band
2) Harmonic

## 5.2.3.2 Test Result (Balance Flex Antenna)

**Test Condition:** Refer to the clause 3.6 Normal and extreme test conditions

## - Complied

4. Measured value of the Field strength of spurious Emissions (Radiated).
5. It tested x,y and z – 3 axis each, mentioned only worst case data at this report.
6. The worst case of this product is the y-axis.

**- Below 1 ㎓ data (worst-case)**

**Bluetooth 8DPSK Lowest Channel (2 402 ㎒)**

| Frequency [㎒] | Receiver Bandwidth [㎑] | Pol. [V/H] | Reading [dB(μV)] | Cable Loss [dB] | Amp Gain [dB] | Antenna Factor [dB] | Factor [dB] | Result [dB(μV/m)] | Limit [dB(μV/m)] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| **Quasi-Peak DATA. Emissions below 30 ㎒** | | | | | | | | | | |
| 2.08 | 9 | V | 40.30 | 1.28 | -32.71 | 19.63 | -11.80 | 28.50 | 69.50 | 41.00 |
| 17.78 | 9 | V | 34.40 | 3.88 | -32.68 | 18.40 | -10.40 | 24.00 | 69.50 | 45.50 |
| **Quasi-Peak DATA. Emissions below 1 ㎓** | | | | | | | | | | |
| 137.43 | 120 | H | 39.90 | 2.54 | -25.32 | 12.48 | -10.30 | 29.60 | 43.50 | 13.90 |
| 268.01 | 120 | H | 37.70 | 3.64 | -24.95 | 12.41 | -8.90 | 28.80 | 46.00 | 17.20 |
| 302.33 | 120 | H | 33.10 | 3.90 | -25.05 | 13.55 | -7.60 | 25.50 | 46.00 | 20.50 |
| 425.03 | 120 | H | 32.70 | 4.71 | -24.56 | 16.25 | -3.60 | 29.10 | 46.00 | 16.90 |

Note1. Factor = Cable loss + Amp gain + Antenna factor
Result = Reading + Factor

**- Above 1 ㎓ data**

**- Bluetooth GFSK**

**Lowest Channel (2 402 ㎒)**

| Frequency [㎒] | Receiver Bandwidth [㎑] | Pol. [V/H] | Reading [dB(㎶)] | Cable Loss [dB] | Amp Gain [dB] | Antenna Factor [dB] | Factor [dB] | Result [dB(㎶/m)] | Limit [dB(㎶/m)] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| **Peak DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 2 327.11 1) | 1 000 | V | 47.40 | 3.66 | -30.03 | 28.43 | 2.06 | 49.46 | 74.00 | 24.54 |
| 3 074.84 | 1 000 | V | 65.58 | 4.19 | -59.96 | 29.90 | -25.87 | 39.71 | 74.00 | 34.29 |
| 3 843.16 1) | 1 000 | V | 69.96 | 4.68 | -60.79 | 31.98 | -24.13 | 45.83 | 74.00 | 28.17 |
| 4 803.92 2) | 1 000 | H | 77.74 | 5.34 | -60.69 | 32.80 | -22.55 | 55.19 | 74.00 | 18.81 |
| 17 637.95 | 1 000 | H | 57.86 | 10.68 | -58.63 | 40.69 | -7.26 | 50.60 | 74.00 | 23.40 |
| 21 512.36 | 1 000 | V | 48.01 | 11.90 | -49.01 | 45.00 | 7.89 | 55.90 | 74.00 | 18.10 |
| 24 025.17 | 1 000 | H | 45.45 | 12.80 | -42.59 | 45.00 | 15.21 | 60.66 | 74.00 | 13.34 |
| **Average DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 2 327.11 1) | 1 000 | V | 33.55 | 3.66 | -30.03 | 28.43 | 2.06 | 35.61 | 54.00 | 18.39 |
| 3 843.16 1) | 1 000 | V | 67.16 | 4.68 | -60.79 | 31.98 | -24.13 | 43.03 | 54.00 | 10.97 |
| 4 803.92 2) | 1 000 | H | 71.82 | 5.34 | -60.69 | 32.80 | -22.55 | 49.27 | 54.00 | 4.73 |

Note. Factor = Cable loss + Amp. Gain + Antenna factor
Result = Reading + Factor
1) Restricted band
2) Harmonic

**Middle Channel (2 441 ㎒)**

| Frequency [㎒] | Receiver Bandwidth [㎑] | Pol. [V/H] | Reading [dB(㎶)] | Cable Loss [dB] | Amp Gain [dB] | Antenna Factor [dB] | Factor [dB] | Result [dB(㎶/m)] | Limit [dB(㎶/m)] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| **Peak DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 1 842.19 | 1 000 | V | 66.73 | 3.27 | -60.07 | 27.17 | -29.63 | 37.10 | 74.00 | 36.90 |
| 3 144.77 | 1 000 | H | 65.67 | 4.23 | -60.14 | 30.09 | -25.82 | 39.85 | 74.00 | 34.15 |
| 3 905.55 1) | 1 000 | V | 68.76 | 4.72 | -60.81 | 32.14 | -23.95 | 44.82 | 74.00 | 29.18 |
| 4 881.94 2) | 1 000 | H | 78.01 | 5.39 | -60.94 | 32.84 | -22.71 | 55.30 | 74.00 | 18.70 |
| 17 066.56 | 1 000 | V | 57.98 | 10.45 | -58.16 | 40.34 | -7.37 | 50.61 | 74.00 | 23.39 |
| 21 506.25 | 1 000 | V | 48.07 | 11.90 | -49.00 | 45.00 | 7.90 | 55.97 | 74.00 | 18.03 |
| 24 044.03 | 1 000 | V | 45.49 | 12.80 | -42.62 | 45.00 | 15.18 | 60.67 | 74.00 | 13.33 |
| **Average DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 3 905.55 1) | 1 000 | V | 66.05 | 4.72 | -60.81 | 32.14 | -23.95 | 42.10 | 54.00 | 11.90 |
| 4 881.94 2) | 1 000 | H | 72.85 | 5.39 | -60.94 | 32.84 | -22.71 | 50.14 | 54.00 | 3.86 |

Note. Factor = Cable loss + Amp. Gain + Antenna factor
Result = Reading + Factor
1) Restricted band
2) Harmonic

**Highest Channel (2 480 ㎒)**

| Frequency [㎒] | Receiver Bandwidth [㎑] | Pol. [V/H] | Reading [dB(㎶)] | Cable Loss [dB] | Amp Gain [dB] | Antenna Factor [dB] | Factor [dB] | Result [dB(㎶/m)] | Limit [dB(㎶/m)] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| **Peak DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 2 483.50 1) | 1 000 | H | 48.38 | 3.77 | -30.10 | 28.72 | 2.39 | 50.77 | 74.00 | 23.23 |
| 3 145.47 | 1 000 | V | 66.60 | 4.23 | -60.14 | 30.09 | -25.82 | 40.78 | 74.00 | 33.22 |
| 4 959.99 2) | 1 000 | H | 73.60 | 5.44 | -60.61 | 32.88 | -22.29 | 51.31 | 74.00 | 22.69 |
| 17 561.38 | 1 000 | V | 59.01 | 10.68 | -61.71 | 43.67 | -7.36 | 51.65 | 74.00 | 22.35 |
| 21 526.17 | 1 000 | H | 48.18 | 12.00 | -49.12 | 45.00 | 7.88 | 56.06 | 74.00 | 17.94 |
| 24 000.20 | 1 000 | V | 46.26 | 12.80 | -42.55 | 45.00 | 15.25 | 61.51 | 74.00 | 12.49 |
| **Average DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 2 483.50 1) | 1 000 | H | 35.58 | 3.77 | -30.10 | 28.72 | 2.39 | 37.97 | 54.00 | 16.03 |
| 4 959.99 2) | 1 000 | H | 72.97 | 5.44 | -60.61 | 32.88 | -22.29 | 50.68 | 54.00 | 3.32 |

Note. Factor = Cable loss + Amp. Gain + Antenna factor
Result = Reading + Factor
1) Restricted band
2) Harmonic

**- Bluetooth 8DPSK**

**Lowest Channel (2 402 ㎒)**

| Frequency [㎒] | Receiver Bandwidth [㎑] | Pol. [V/H] | Reading [dB(㎶)] | Cable Loss [dB] | Amp Gain [dB] | Antenna Factor [dB] | Factor [dB] | Result [dB(㎶/m)] | Limit [dB(㎶/m)] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| **Peak DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 2 317.45 1) | 1 000 | H | 46.56 | 3.66 | -30.04 | 28.42 | 2.04 | 48.60 | 74.00 | 25.40 |
| 3 096.25 | 1 000 | V | 67.15 | 4.20 | -60.09 | 29.96 | -25.93 | 41.22 | 74.00 | 32.78 |
| 4 803.96 2) | 1 000 | H | 70.31 | 5.34 | -60.69 | 32.80 | -22.55 | 47.76 | 74.00 | 26.24 |
| 17 610.31 | 1 000 | H | 57.91 | 10.70 | -61.95 | 43.96 | -7.29 | 50.61 | 74.00 | 23.39 |
| 21 464.02 | 1 000 | V | 46.87 | 11.90 | -48.88 | 44.90 | 7.92 | 54.79 | 74.00 | 19.21 |
| 24 068.47 | 1 000 | H | 46.23 | 12.80 | -42.66 | 45.00 | 15.14 | 61.37 | 74.00 | 12.63 |
| **Average DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 2 317.45 1) | 1 000 | H | 33.32 | 3.66 | -30.04 | 28.42 | 2.04 | 35.36 | 54.00 | 18.64 |
| 4 803.96 2) | 1 000 | H | 58.92 | 5.34 | -60.69 | 32.80 | -22.55 | 36.37 | 54.00 | 17.63 |

Note. Factor = Cable loss + Amp. Gain + Antenna factor
Result = Reading + Factor
1) Restricted band
2) Harmonic

### Middle Channel (2 441 ㎒)

| Frequency [㎒] | Receiver Bandwidth [㎑] | Pol. [V/H] | Reading [dB(㎶)] | Cable Loss [dB] | Amp Gain [dB] | Antenna Factor [dB] | Factor [dB] | Result [dB(㎶/m)] | Limit [dB(㎶/m)] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| **Peak DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 1 842.81 | 1 000 | V | 67.06 | 3.28 | -60.08 | 27.17 | -29.63 | 37.43 | 74.00 | 36.57 |
| 3 146.48 | 1 000 | V | 67.11 | 4.23 | -60.15 | 30.10 | -25.82 | 41.29 | 74.00 | 32.71 |
| 4 881.95 2) | 1 000 | H | 71.69 | 5.39 | -60.94 | 32.84 | -22.71 | 48.97 | 74.00 | 25.03 |
| 17 623.45 | 1 000 | H | 58.37 | 10.71 | -62.03 | 44.04 | -7.28 | 51.09 | 74.00 | 22.91 |
| 21 476.23 | 1 000 | H | 47.87 | 11.90 | -48.98 | 45.00 | 7.92 | 55.78 | 74.00 | 18.22 |
| 24 410.33 | 1 000 | H | 46.70 | 12.80 | -43.32 | 45.10 | 14.58 | 61.28 | 74.00 | 12.72 |
| **Average DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 4 881.95 2) | 1 000 | H | 62.01 | 5.39 | -60.94 | 32.84 | -22.71 | 39.30 | 54.00 | 14.70 |

Note. Factor = Cable loss + Amp. Gain + Antenna factor
Result = Reading + Factor
1) Restricted band
2) Harmonic

### Highest Channel (2 480 ㎒)

| Frequency [㎒] | Receiver Bandwidth [㎑] | Pol. [V/H] | Reading [dB(㎶)] | Cable Loss [dB] | Amp Gain [dB] | Antenna Factor [dB] | Factor [dB] | Result [dB(㎶/m)] | Limit [dB(㎶/m)] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| **Peak DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 2 483.62 1) | 1 000 | H | 47.88 | 3.77 | -30.10 | 28.72 | 2.39 | 50.27 | 74.00 | 23.73 |
| 3 068.20 | 1 000 | V | 66.94 | 4.18 | -59.91 | 29.88 | -25.85 | 41.09 | 74.00 | 32.91 |
| 4 959.95 2) | 1 000 | H | 71.58 | 5.44 | -60.61 | 32.88 | -22.29 | 49.30 | 74.00 | 24.70 |
| 17 502.02 | 1 000 | H | 58.17 | 10.65 | -61.39 | 43.31 | -7.43 | 50.74 | 74.00 | 23.26 |
| 21 696.97 | 1 000 | H | 47.17 | 12.00 | -49.23 | 45.00 | 7.77 | 54.94 | 74.00 | 19.06 |
| 24 012.42 | 1 000 | H | 46.94 | 12.80 | -42.57 | 45.00 | 15.23 | 62.17 | 74.00 | 11.83 |
| **Average DATA. Emissions above 1 ㎓** | | | | | | | | | | |
| 2 483.62 1) | 1 000 | H | 34.38 | 3.77 | -30.10 | 28.72 | 2.39 | 36.77 | 54.00 | 17.23 |
| 4 959.95 2) | 1 000 | H | 61.77 | 5.44 | -60.61 | 32.88 | -22.29 | 39.48 | 54.00 | 14.52 |

Note. Factor = Cable loss + Amp. Gain + Antenna factor
Result = Reading + Factor
1) Restricted band
2) Harmonic

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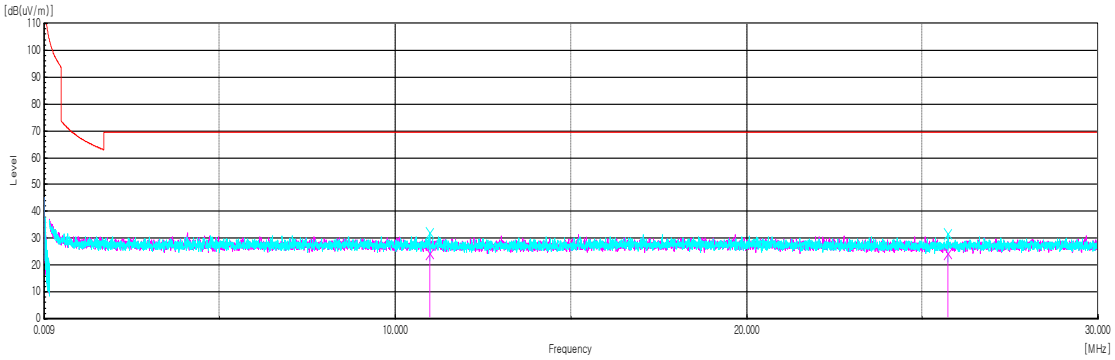
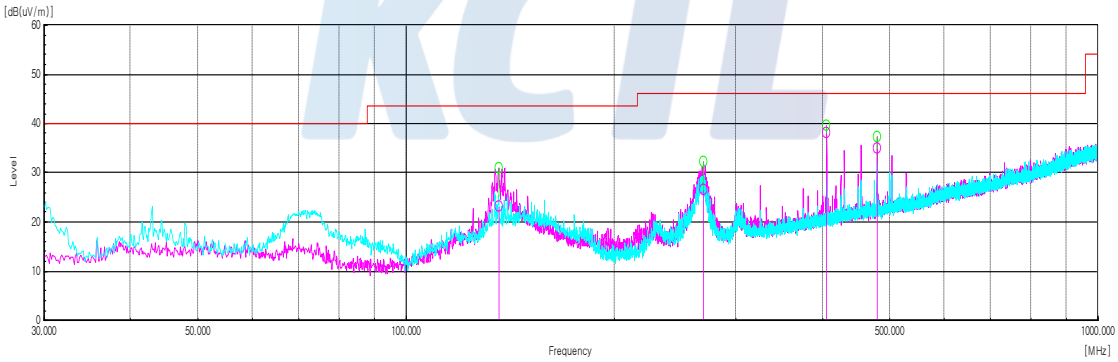
## 5.2.4.1 Test Plot (Dipole Antenna)

Figure 1. Plot of the Spurious Emissions (Radiated)

**- 9 ㎑ ~ 30 ㎒ data**



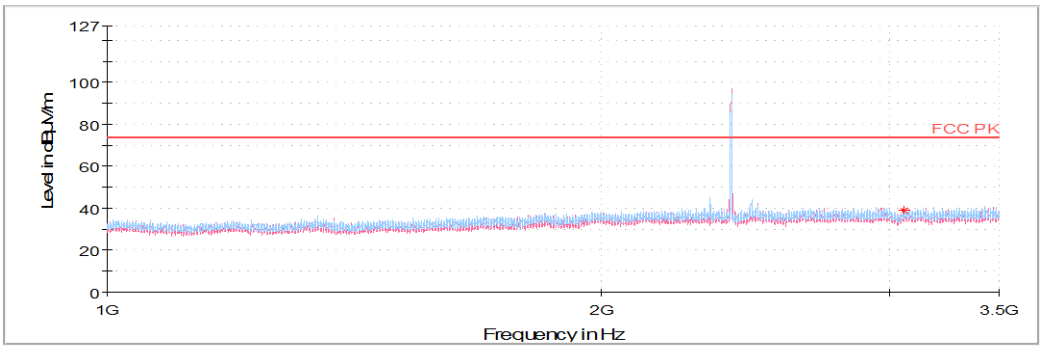

**- 30 ㎒ ~ 1 ㎓ data**



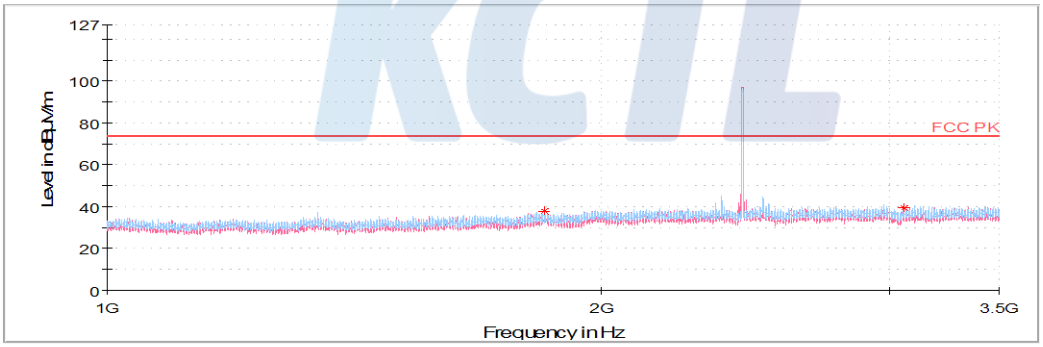
**- 1 ㎓ ~ 3.5 ㎓ data**

**- Bluetooth GFSK**

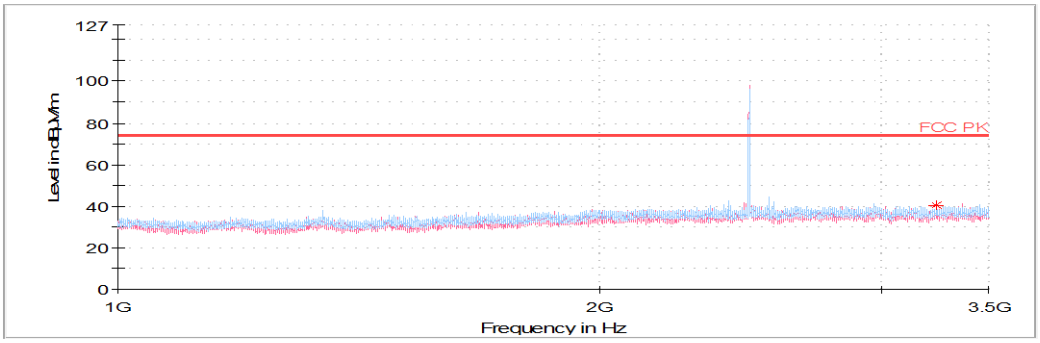
Lowest Channel (2 402 ㎒)




Middle Channel (2 441 ㎒)

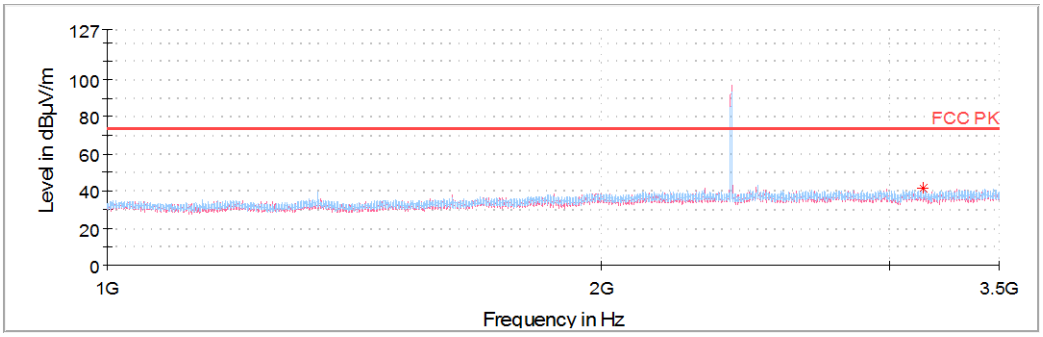



Highest Channel (2 480 ㎒)

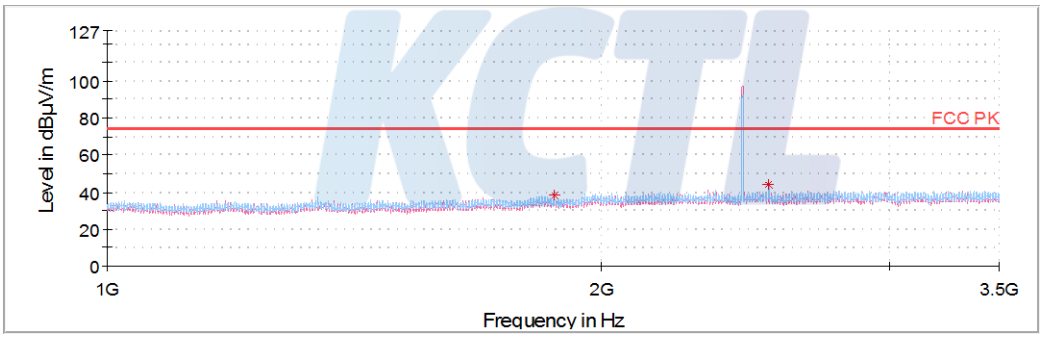


**- Bluetooth 8DPSK**

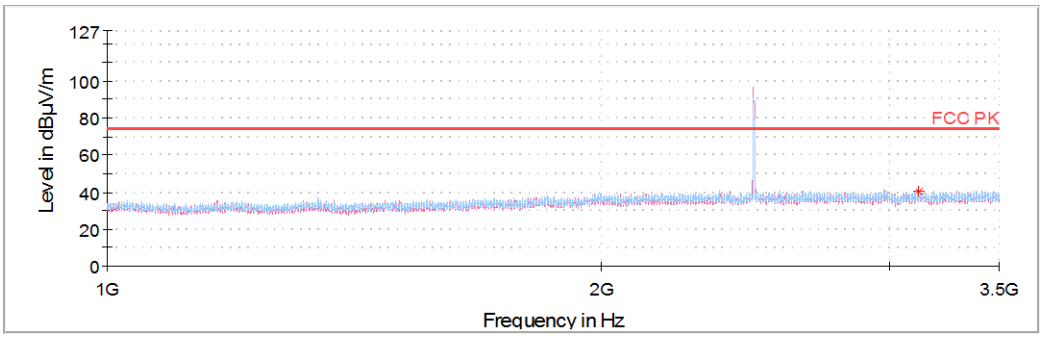
Lowest Channel (2 402 ㎒)




Middle Channel (2 441 ㎒)

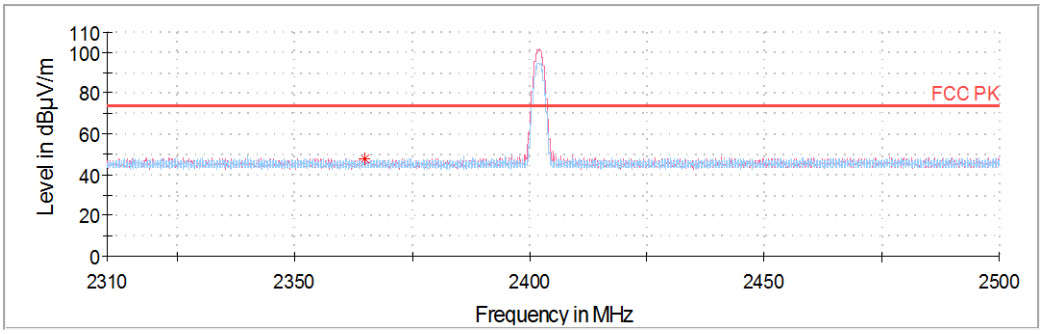



Highest Channel (2 480 ㎒)

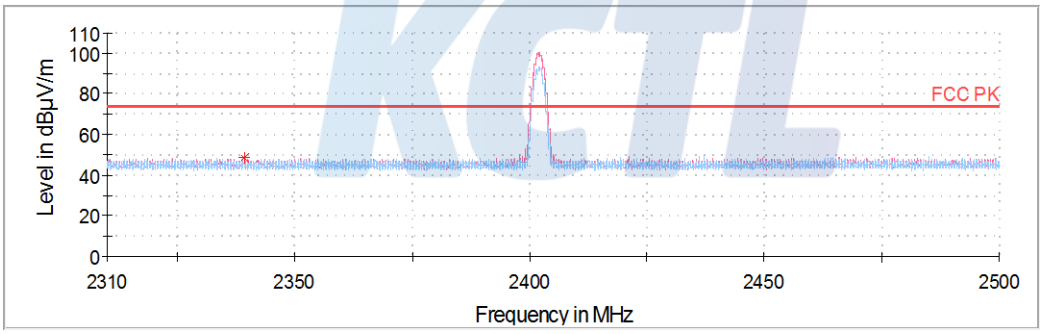


**- Restricted Bandedge data(Lowest Channel)**

**- Bluetooth GFSK**

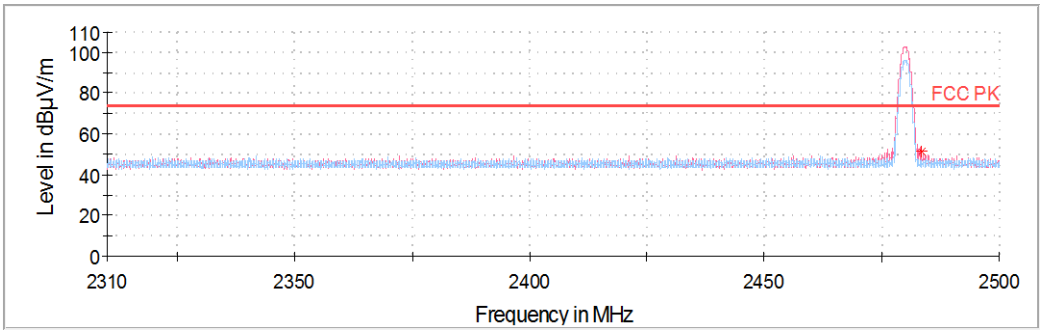



**- Bluetooth 8DPSK**

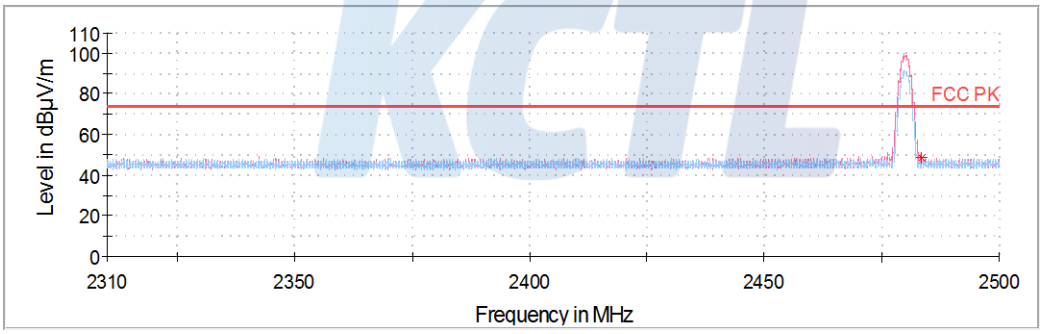


**- Restricted Bandedge data(Highest Channel)**

**- Bluetooth GFSK**



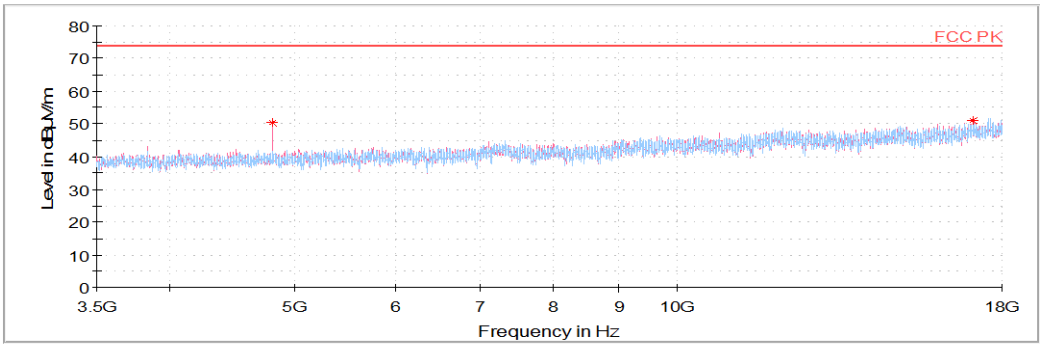

**- Bluetooth 8DPSK**



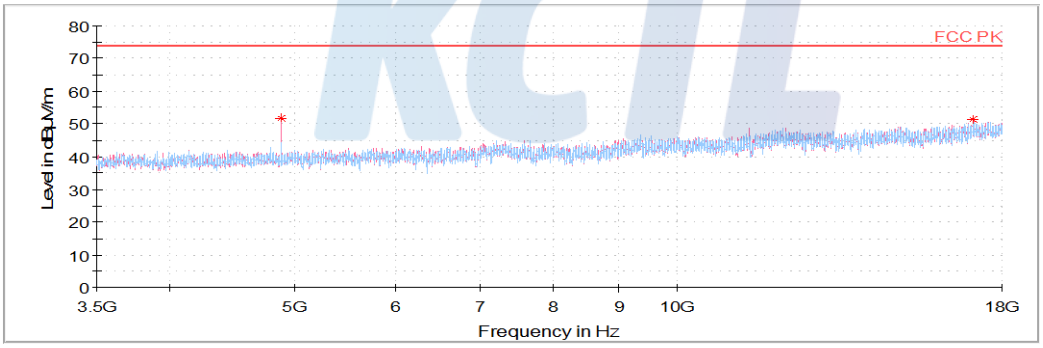
**- 3.5 ㎓ ~ 18 ㎓ data**

**- Bluetooth GFSK**

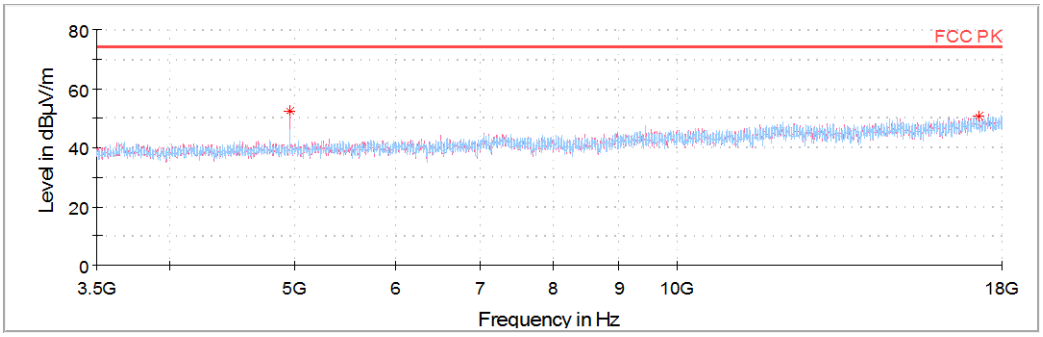
Lowest Channel (2 402 ㎒)




Middle Channel (2 441 ㎒)

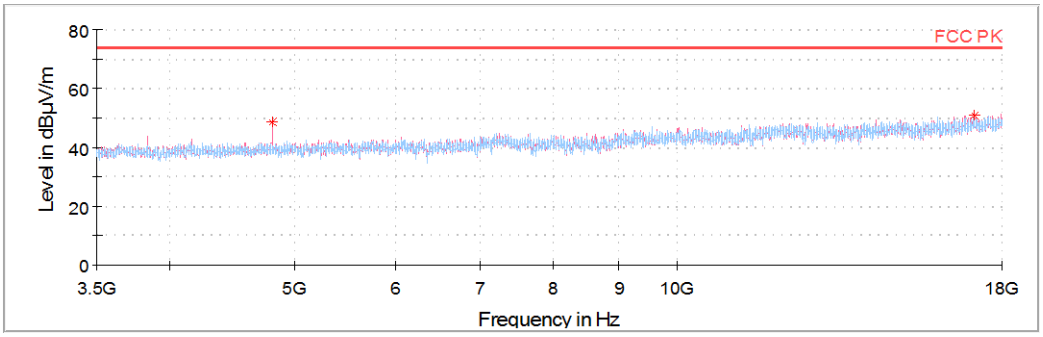



Highest Channel (2 480 ㎒)

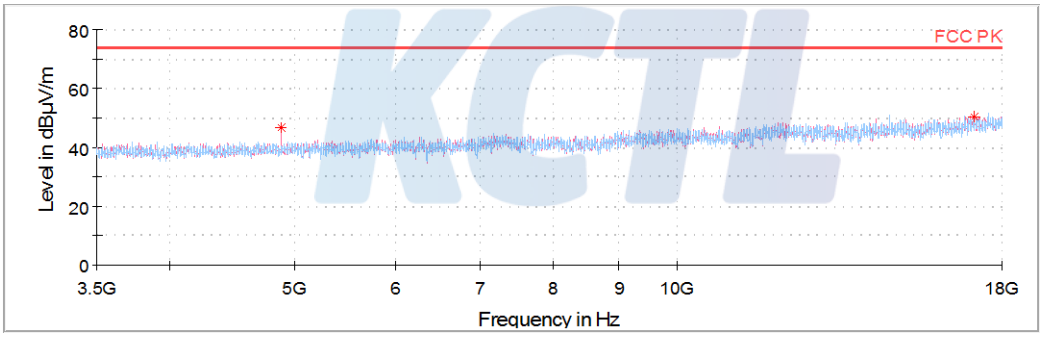


**- Bluetooth 8DPSK**

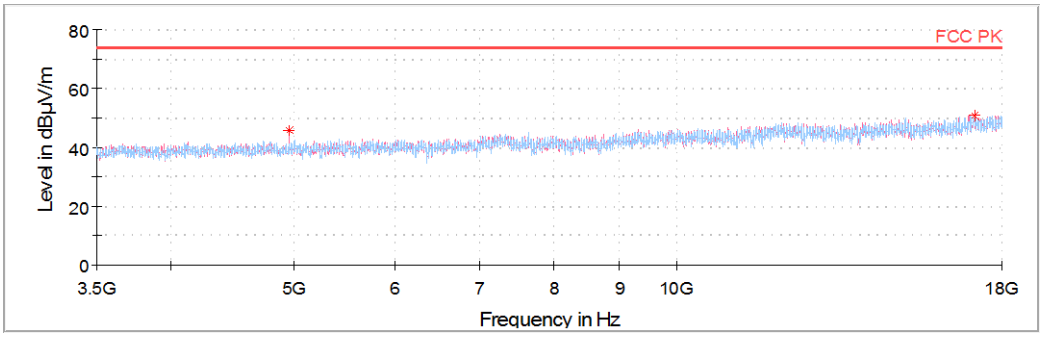
Lowest Channel (2 402 ㎒)




Middle Channel (2 441 ㎒)



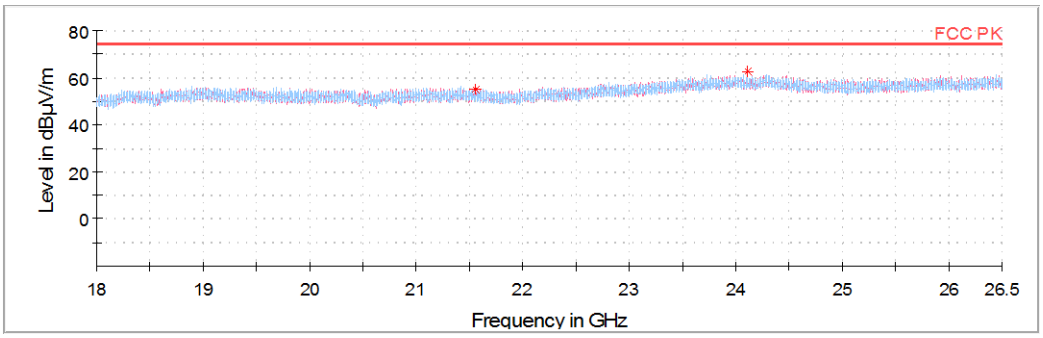

Highest Channel (2 480 ㎒)



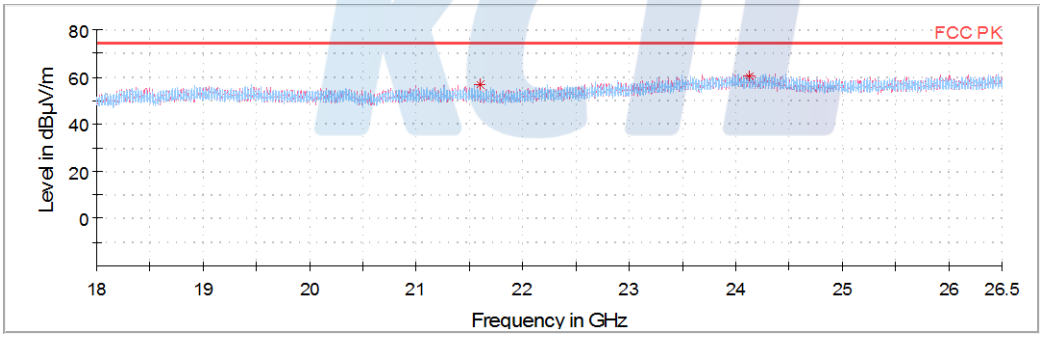
**- 18 ㎓ ~ 26.5 ㎓ data**

**- Bluetooth GFSK**

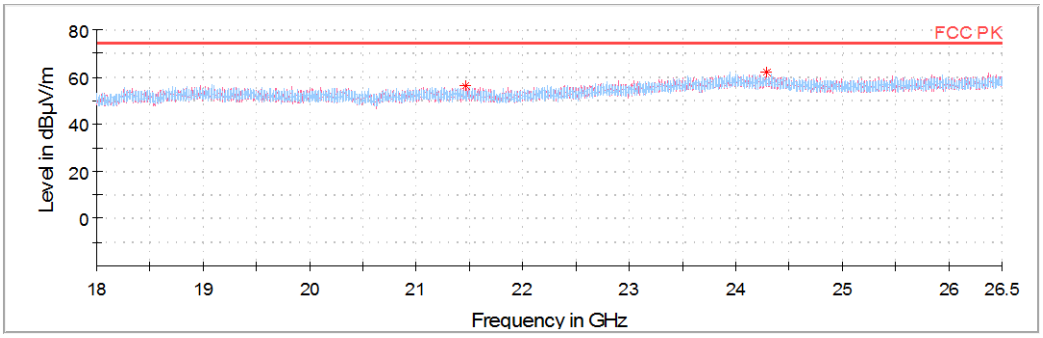
Lowest Channel (2 402 ㎒)




Middle Channel (2 441 ㎒)

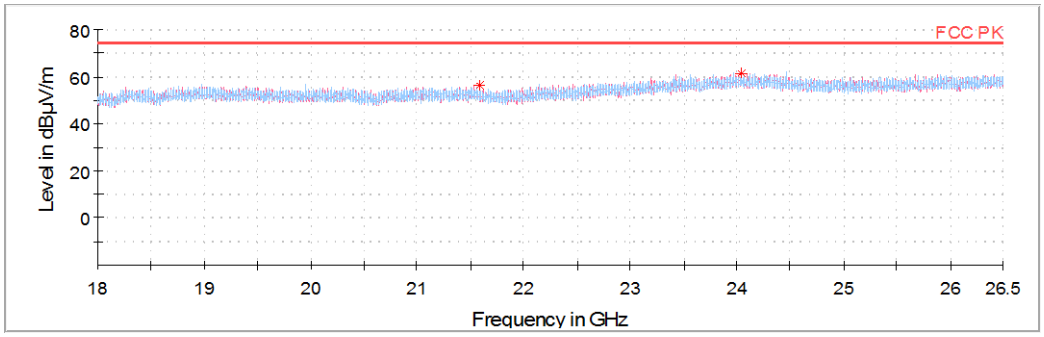



Highest Channel (2 480 ㎒)

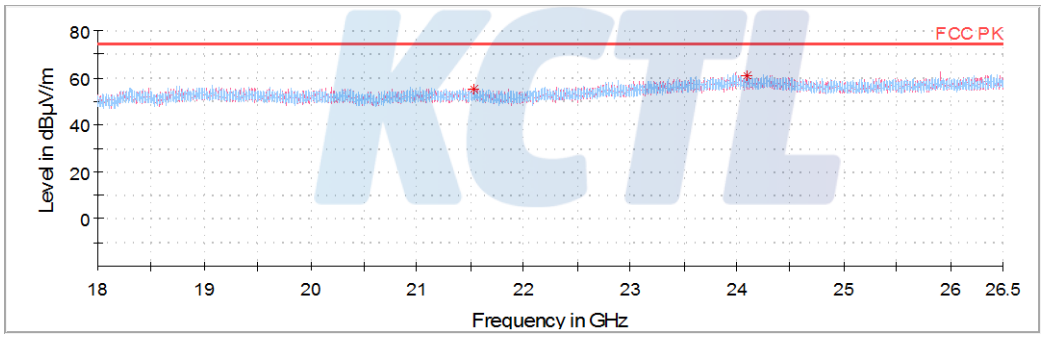


**- Bluetooth 8DPSK**

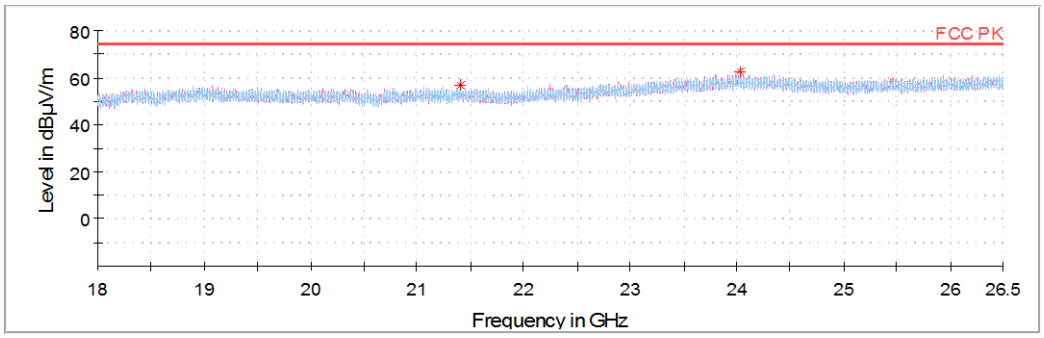
Lowest Channel (2 402 ㎒)




Middle Channel (2 441 ㎒)




Highest Channel (2 480 ㎒)



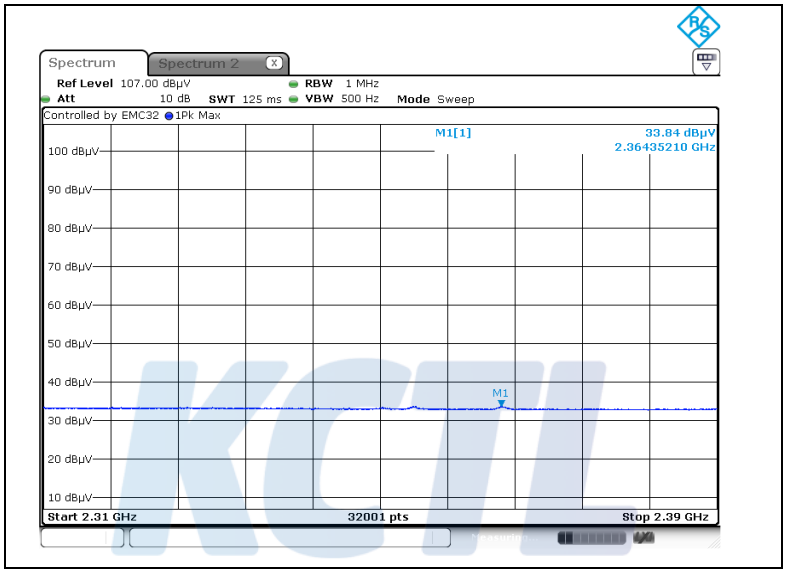
## 5.2.4.2 Test Plot (Dipole Antenna)

Figure 2. Plot of the average data emissions

**- Restricted Bandedge data(Lowest Channel)**

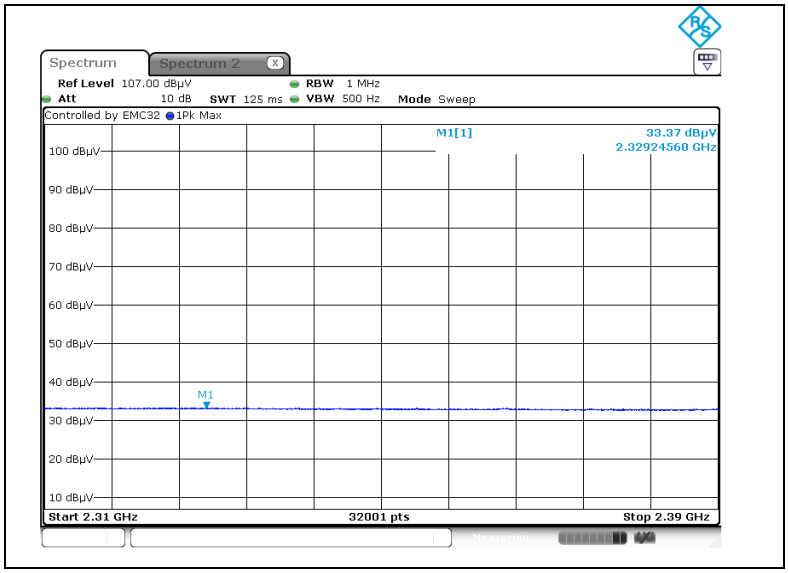
**- Bluetooth GFSK**

Worst Antenna polarization : V




**- Bluetooth 8DPSK**

Worst Antenna polarization : V



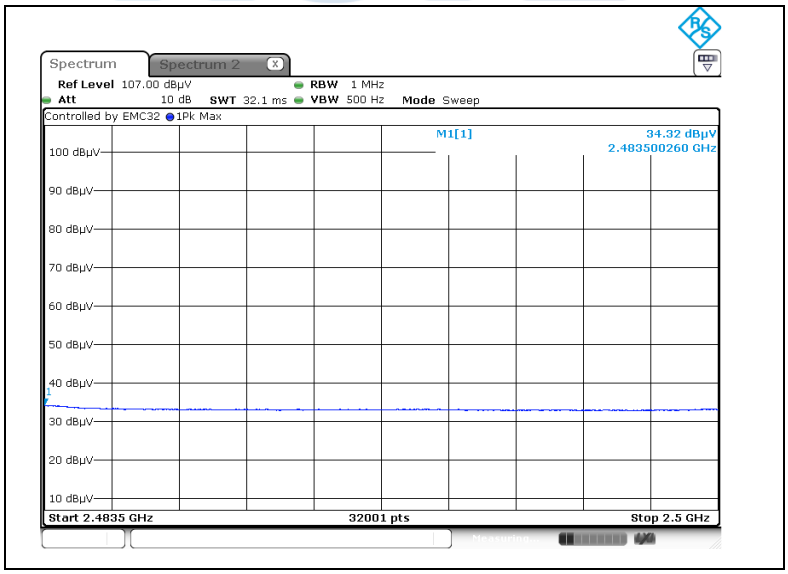
## - Restricted Bandedge data(Highest Channel)

### - Bluetooth GFSK

Worst Antenna polarization : V

### - Bluetooth 8DPSK

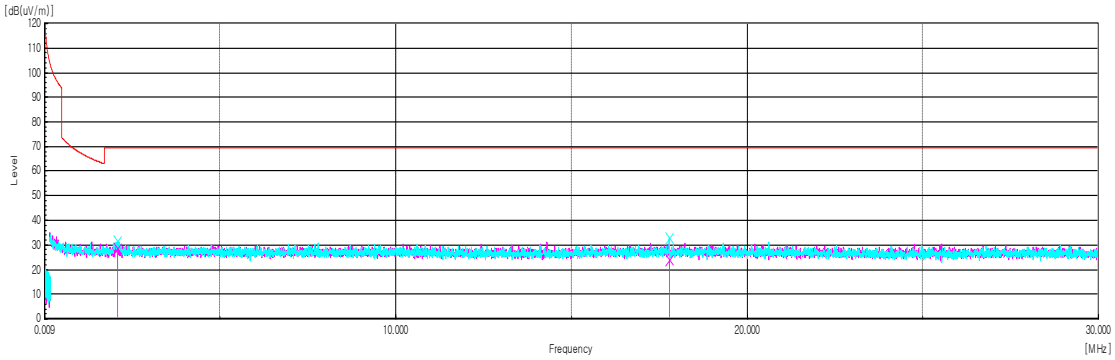
Worst Antenna polarization : V



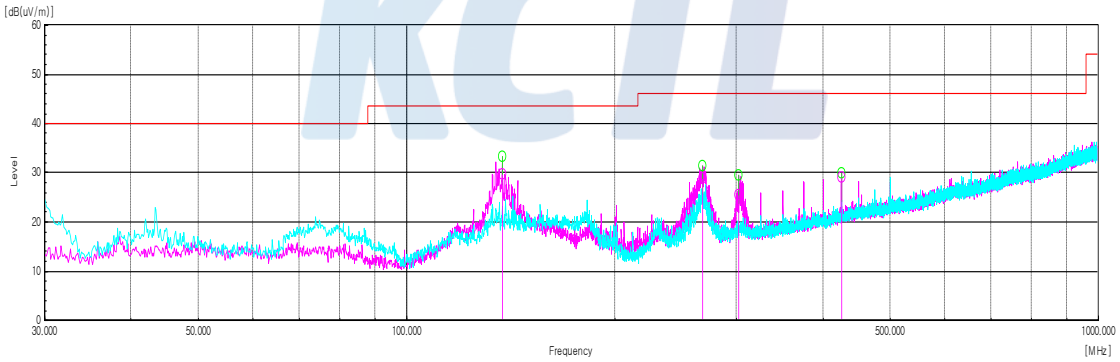
## 5.2.4.3 Test Plot (Balance Flex Antenna)

Figure 1. Plot of the Spurious Emissions (Radiated)

**- 9 ㎑ ~ 30 ㎒ data**



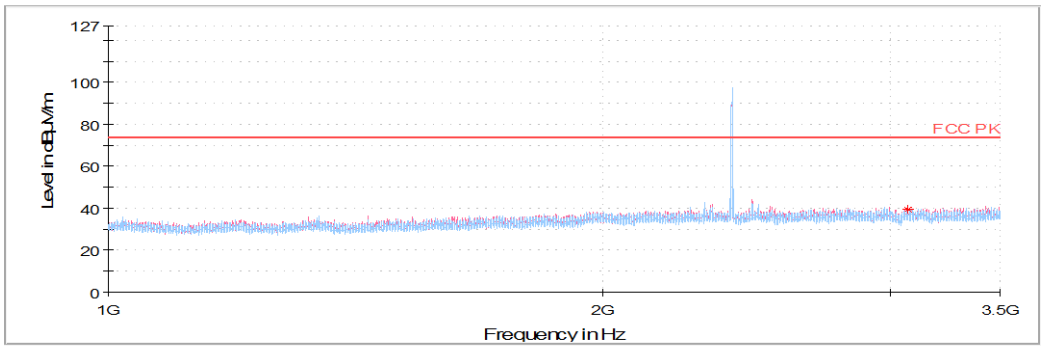

**- 30 ㎒ ~ 1 ㎓ data**



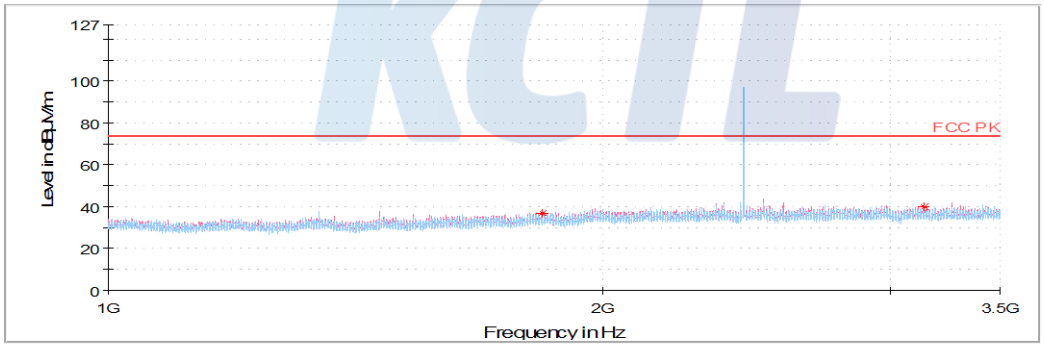
**- 1 ㎓ ~ 3.5 ㎓ data**

**- Bluetooth GFSK**

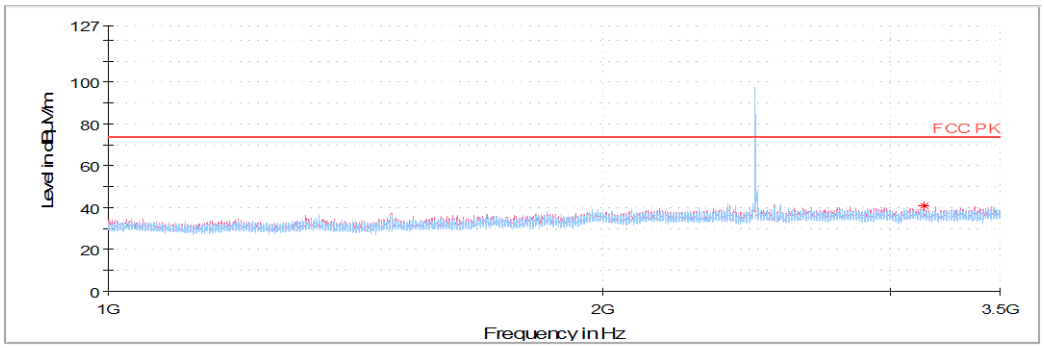
Lowest Channel (2 402 ㎒)




Middle Channel (2 441 ㎒)

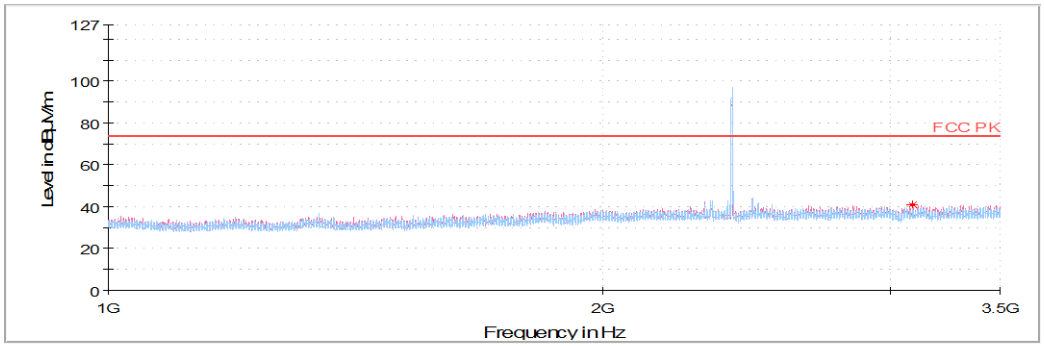



Highest Channel (2 480 ㎒)

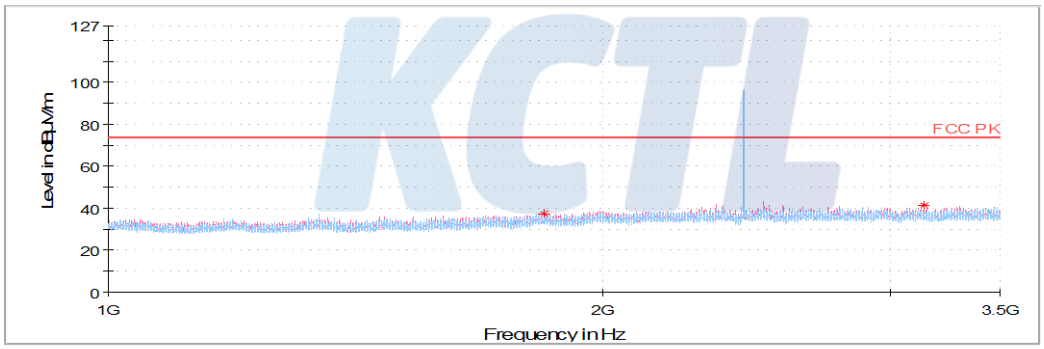


**- Bluetooth 8DPSK**

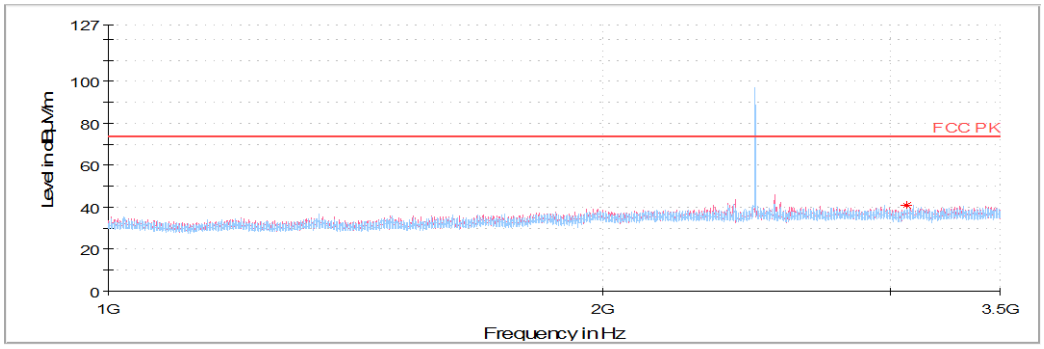
Lowest Channel (2 402 ㎒)




Middle Channel (2 441 ㎒)

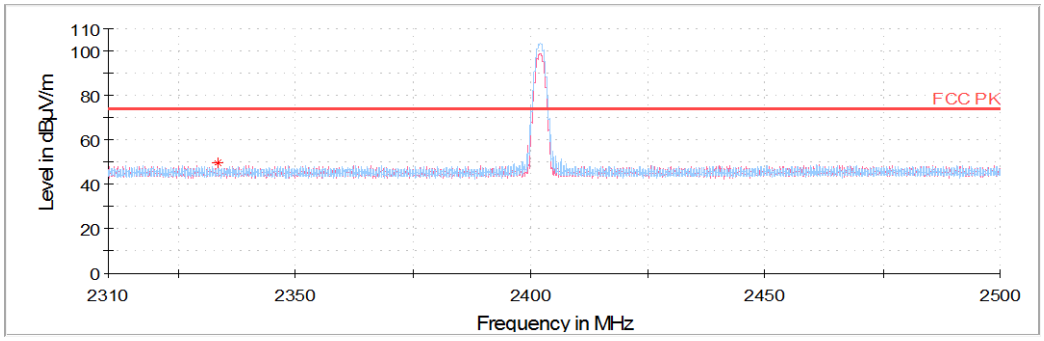



Highest Channel (2 480 ㎒)

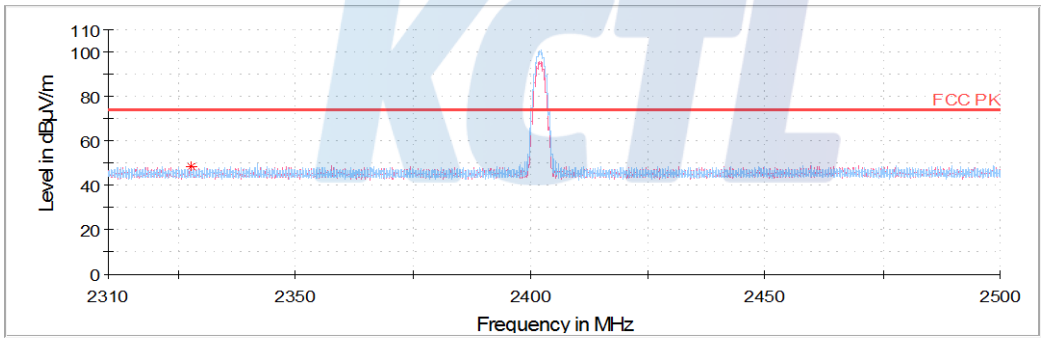


## - Restricted Bandedge data(Lowest Channel)

### - Bluetooth GFSK

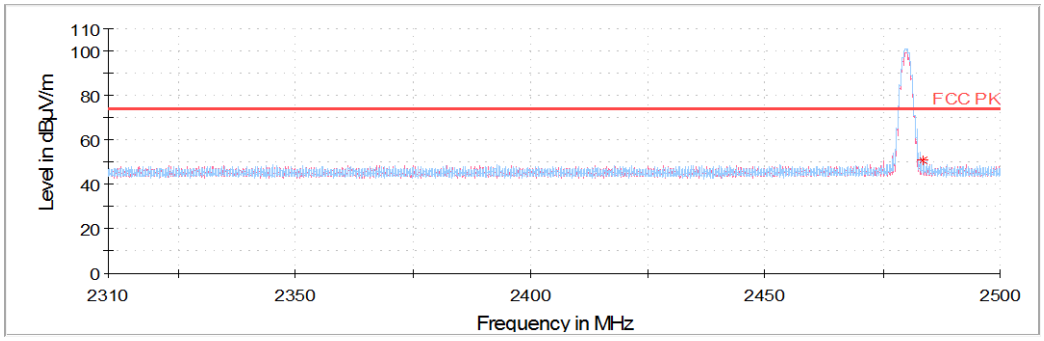



### - Bluetooth 8DPSK

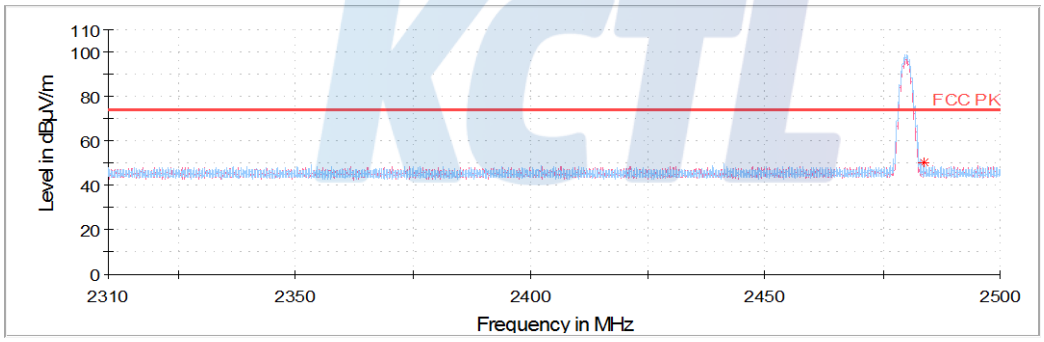


## - Restricted Bandedge data(Highest Channel)

### - Bluetooth GFSK



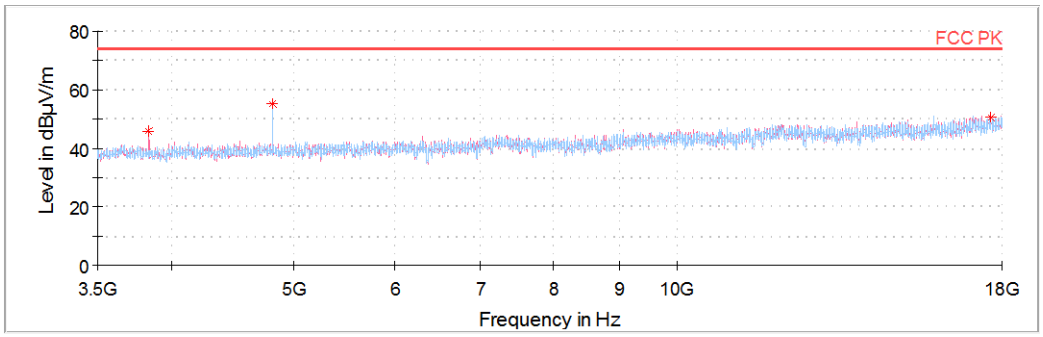

### - Bluetooth 8DPSK



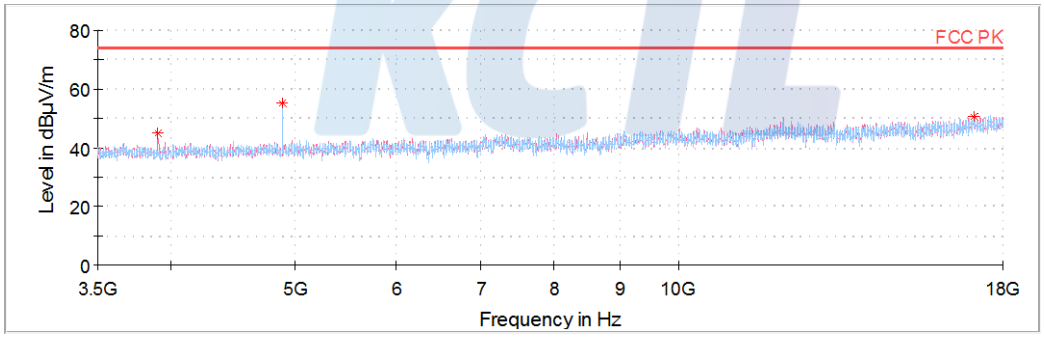
**- 3.5 ㎓ ~ 18 ㎓ data**

**- Bluetooth GFSK**

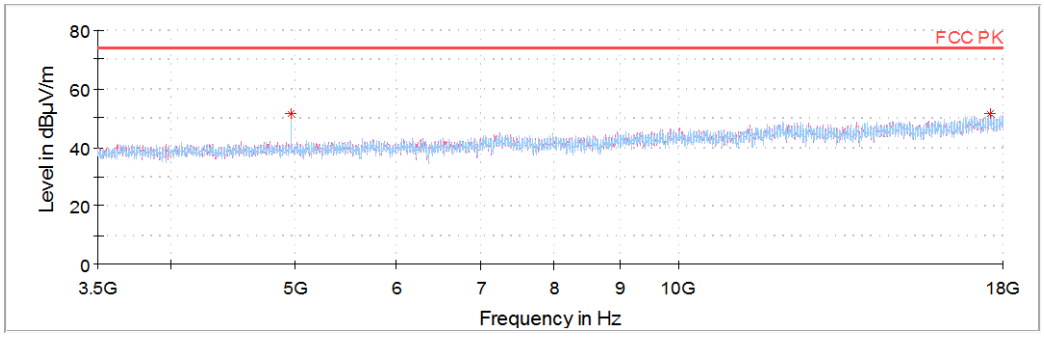
Lowest Channel (2 402 ㎒)




Middle Channel (2 441 ㎒)

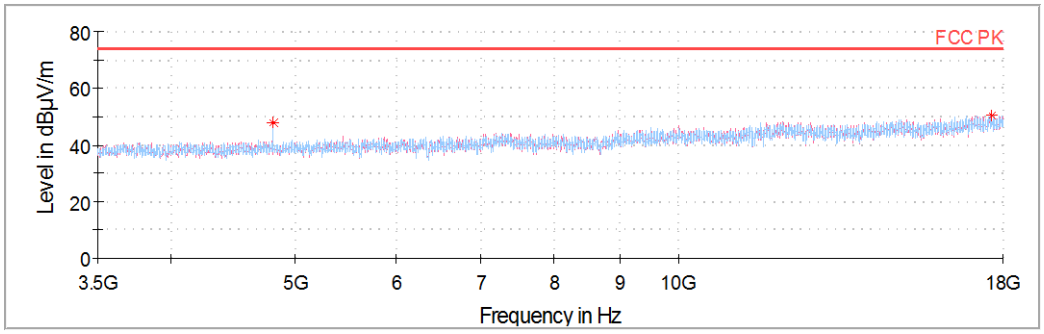



Highest Channel (2 480 ㎒)

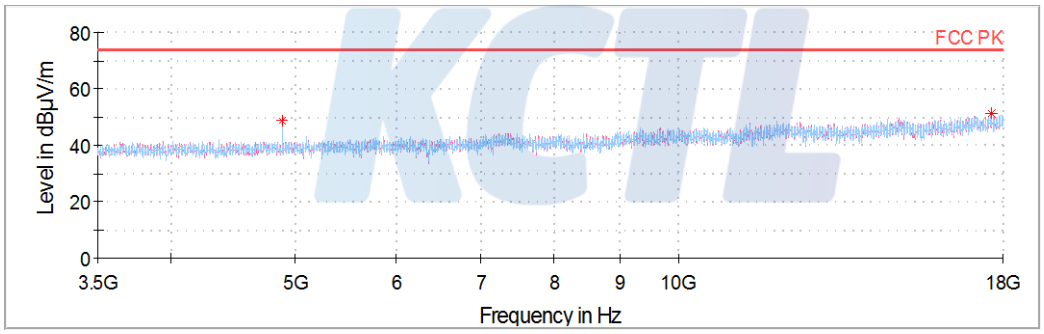


**- Bluetooth 8DPSK**

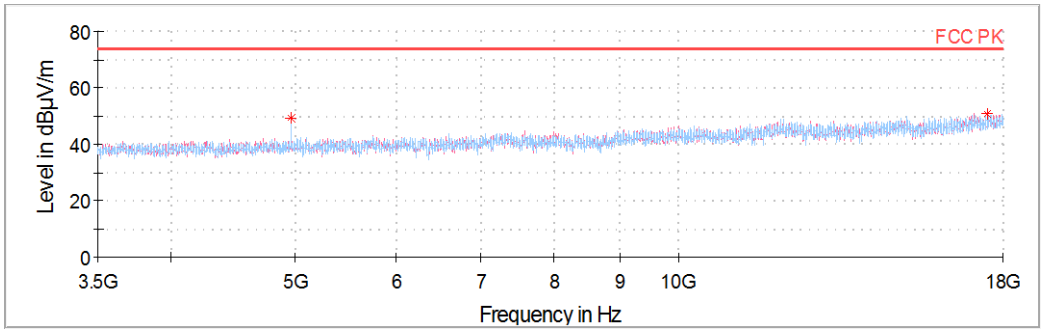
Lowest Channel (2 402 ㎒)




Middle Channel (2 441 ㎒)



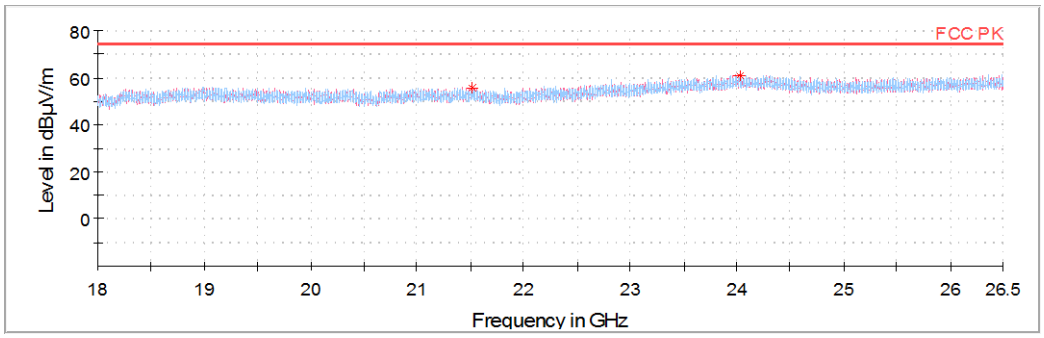

Highest Channel (2 480 ㎒)



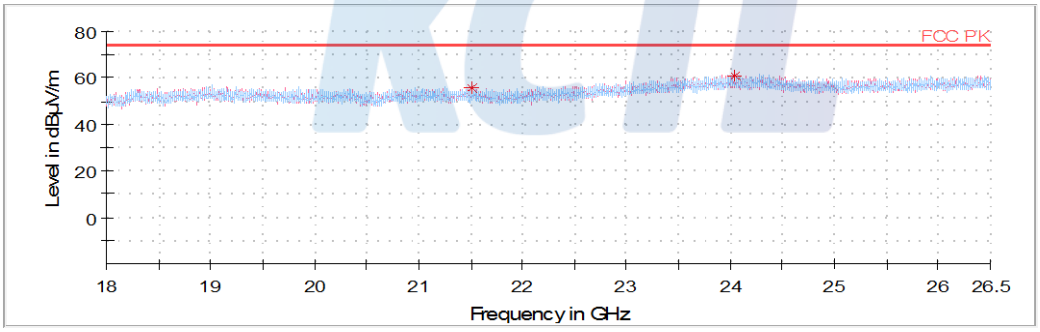
**- 18 ㎓ ~ 26.5 ㎓ data**

**- Bluetooth GFSK**

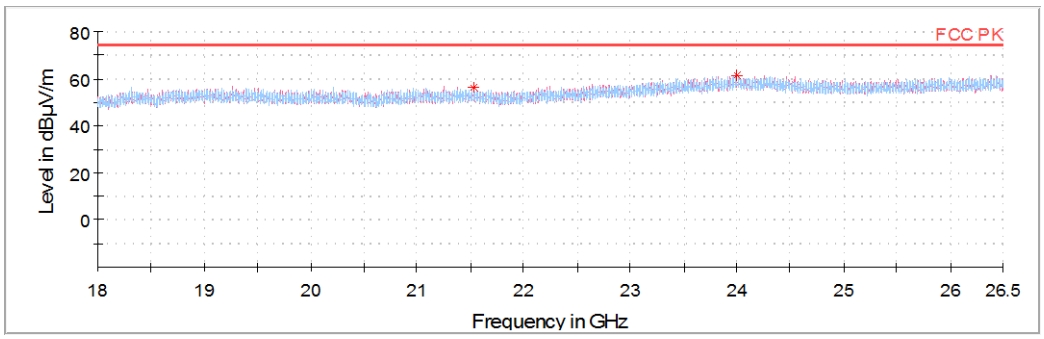
Lowest Channel (2 402 ㎒)




Middle Channel (2 441 ㎒)

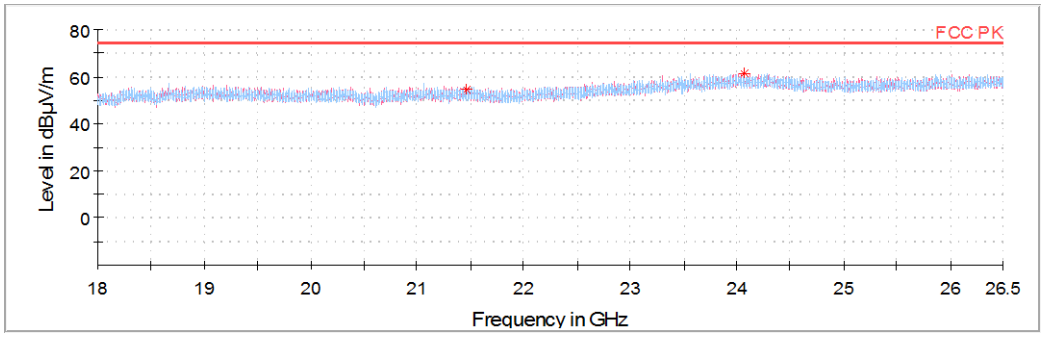



Highest Channel (2 480 ㎒)

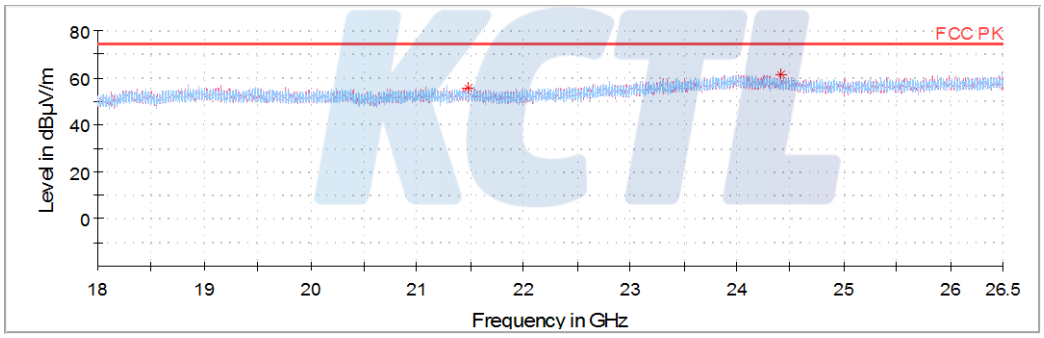


**- Bluetooth 8DPSK**

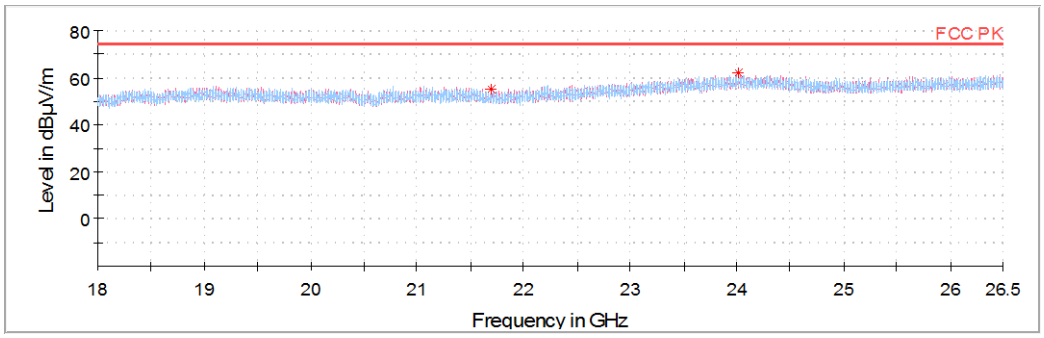
Lowest Channel (2 402 ㎒)




Middle Channel (2 441 ㎒)




Highest Channel (2 480 ㎒)



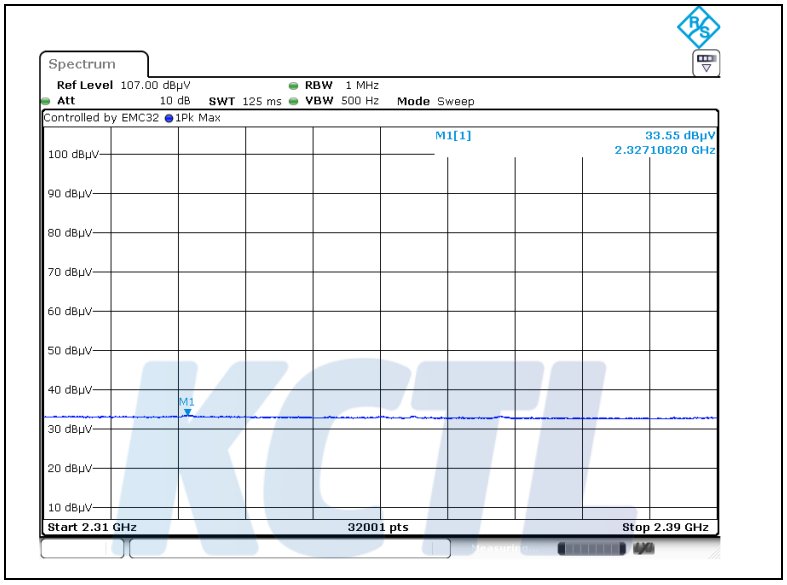
## 5.2.4.4 Test Plot (Balance Flex Antenna)

Figure 2. Plot of the average data emissions

**- Restricted Bandedge data(Lowest Channel)**

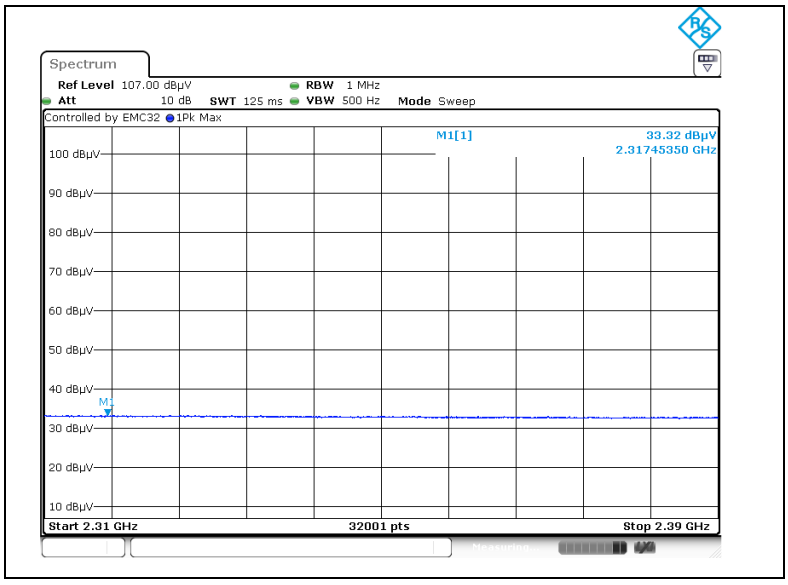
**- Bluetooth GFSK**

Worst Antenna polarization : V




**- Bluetooth 8DPSK**

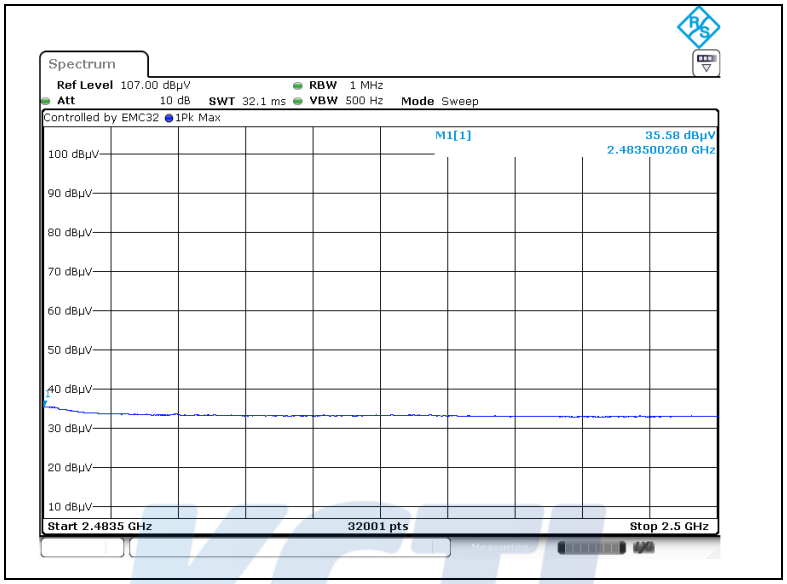
Worst Antenna polarization : H



## - Restricted Bandedge data(Highest Channel)

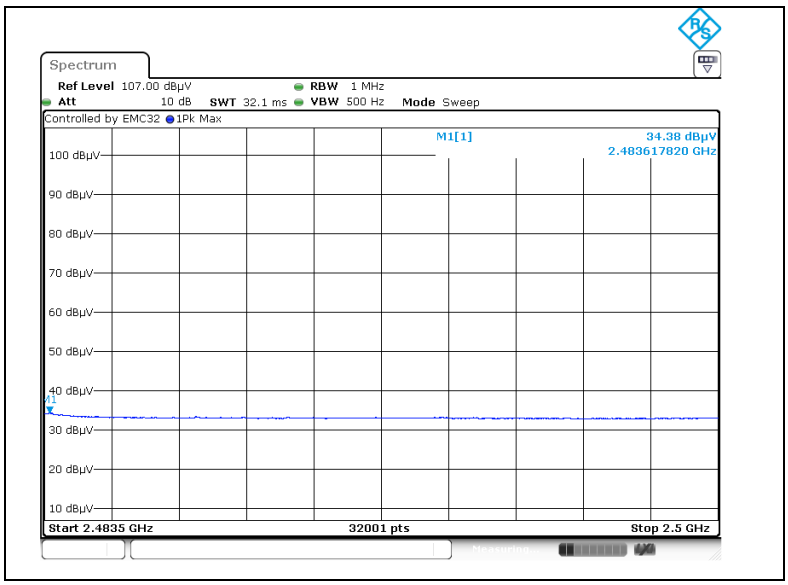
### - Bluetooth GFSK

Worst Antenna polarization : H




### - Bluetooth 8DPSK

Worst Antenna polarization : H



# 6. Test equipment used for test

| | Equipment Name | Manufacturer | Model No. | Serial No. | Next Cal. Date |
|---|---|---|---|---|---|
| ■ | Spectrum Analyzer | R&S | FSV40 | 100988 | 19.01.05 |
| ■ | Wideband Power Sensor | R&S | NRP-Z81 | 102398 | 19.01.31 |
| ■ | Bilog Antenna | SCHWARZBECK | VULB9168 | 583 | 20.04.13 |
| ■ | COAXIAL FIXED ATTENUATOR | Agilent | 8491B-003 | 2708A18758 | 20.04.13 |
| ■ | Loop Antenna | R&S | HFH2-Z2 | 100355 | 20.08.24 |
| ■ | EMI TEST RECEIVER | R&S | ESCI7 | 100732 | 19.08.23 |
| ■ | AMPLIFIER | SONOMA | 310N | 284608 | 19.08.23 |
| ■ | HORN ANTENNA | ETS-LINDGREN | 3117 | 00155787 | 18.10.20 |
| ■ | HORN ANTENNA | ETS-LINDGREN | 3116 | 00086632 | 19.04.20 |
| ■ | AMPLIFIER | L-3 Narda-MITEQ | AMF-7D-01001800-22-10P | 2031196 | 19.05.15 |
| ■ | Broadband PreAmplifier | SCHWARZBECK | BBV9718 | 216 | 19.08.01 |
| ■ | AMPLIFIER | L-3 Narda-MITEQ | JS44-18004000-33-8P | 2000997 | 19.08.02 |
| ■ | High Pass Filter | WT | WT-A1698-HS | WT160411001 | 19.05.14 |
| ■ | Antenna Mast | MATURO | AM4.0 | 079/3440509 | - |
| ■ | Turn Table | MATURO | CO2000-SOFT | - | - |
| ■ | Antenna Mast | Innco Systems | MA4000-EP | 303 | - |
| ■ | Turn Table | Innco Systems | DT2000 | 79 | - |
| ■ | TWO-LINE V - NETWORK | R&S | ENV216 | 101358 | 19.04.05 |
| ■ | Signal Generator | R&S | SMR40 | 100007 | 19.05.15 |
| ■ | Vector Signal Generator | R&S | SMBV100A | 257566 | 19.01.05 |
| ■ | Cable Assembly | RadiAll | 2301761768000 PJ | 17.30.38 | - |
| ■ | Cable Assembly | gigalane | RG-400 | - | - |
| ■ | Cable Assembly | HUER+SUHNER | SUCOFLEX 104 | MY4342/4 | - |

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