# TEST REPORT

| | | |
|---|---|---|
| **Product Name** | : | Haylou Wireless Earbuds |
| **Brand Mark** | : | Haylou |
| **Model No.** | : | Haylou-GT5 |
| **FCC ID** | : | 2AMQ6-HAYLOUGT5 |
| **Report Number** | : | BLA-EMC-202007-A5102 |
| **Date of Sample Receipt** | : | 2020/7/17 |
| **Date of Test** | : | 2020/7/17 to 2020/7/31 |
| **Date of Issue** | : | 2020/8/3 |
| **Test Standard** | : | 47 CFR Part 15, Subpart C 15.247 |
| **Test Result** | : | Pass |

Prepared for:

**Dongguan Liesheng Electronic Co., Ltd.**
**13/F, Project Phrase 2 of GaoshengTechTower, No.5, Longxi Road, Nancheng, Dongguan, Guangdong, China**

Prepared by:

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Date: 2020/8/3

**REPORT REVISE RECORD**

| Version No. | Date | Description |
|---|---|---|
| 00 | 2020/8/3 | Original |

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# 1 TEST SUMMARY

| Test item | Test Requirement | Test Method | Class/Severity | Result |
|---|---|---|---|---|
| Radiated Spurious Emissions | 47 CFR Part 15, Subpart C 15.247 | ANSI C63.10 (2013) Section 6.4,6.5,6.6 | 47 CFR Part 15, Subpart C 15.209 & 15.247(d) | Pass |
| Radiated Emissions which fall in the restricted bands | 47 CFR Part 15, Subpart C 15.247 | ANSI C63.10 (2013) Section 6.10.5 | 47 CFR Part 15, Subpart C 15.205 & 15.209 | Pass |
| Conducted Emissions at AC Power Line (150kHz-30MHz) | 47 CFR Part 15, Subpart C 15.247 | ANSI C63.10 (2013) Section 6.2 | 47 CFR Part 15, Subpart C 15.207 | Pass |
| Antenna Requirement | 47 CFR Part 15, Subpart C 15.247 | ANSI C63.10 (2013) Section 7.8.6 & Section 11.11 | 47 CFR Part 15, Subpart C 15.247(d) | Pass |
| Conducted Spurious Emissions | 47 CFR Part 15, Subpart C 15.247 | ANSI C63.10 (2013) Section 7.8.6 & Section 11.11 | 47 CFR Part 15, Subpart C 15.247(d) | Pass |
| Conducted Band Edges Measurement | 47 CFR Part 15, Subpart C 15.247 | ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2 | 47 CFR Part 15, Subpart C 15.247(d) | Pass |
| Power Spectrum Density | 47 CFR Part 15, Subpart C 15.247 | ANSI C63.10 (2013) Section 11.10.2 | 47 CFR Part 15, Subpart C 15.247(e) | Pass |
| Conducted Peak Output Power | 47 CFR Part 15, Subpart C 15.247 | ANSI C63.10 (2013) Section 7.8.5 & Section 11.9.1 | 47 CFR Part 15, Subpart C 15.247(b)(1) | Pass |
| Minimum 6dB Bandwidth | 47 CFR Part 15, Subpart C 15.247 | ANSI C63.10 (2013) Section 11.8.1 | 47 CFR Part 15, Subpart C 15.247a(2) | Pass |

## 2 GENERAL INFORMATION

| | |
|---|---|
| **Applicant** | Dongguan Liesheng Electronic Co., Ltd. |
| **Address** | 13/F, Project Phrase 2 of GaoshengTechTower,No.5, Longxi Road, Nancheng, Dongguan, Guangdong, China |
| **Manufacturer** | Dongguan Liesheng Electronic Co., Ltd. |
| **Address** | 13/F, Project Phrase 2 of GaoshengTechTower,No.5, Longxi Road, Nancheng, Dongguan, Guangdong, China |
| **Factory** | Dongguan Liesheng Electronic Co., Ltd. |
| **Address** | 13/F, Project Phrase 2 of GaoshengTechTower,No.5, Longxi Road, Nancheng, Dongguan, Guangdong, China |
| **Product Name** | Haylou Wireless Earbuds |
| **Test Model No.** | Haylou-GT5 |

## 3 GENERAL DESCRIPTION OF E.U.T.

| | |
|---|---|
| **Hardware Version** | V1.0 |
| **Software Version** | V1.0 |

| | |
|---|---|
| **Spectrum Spread Technology:** | DTS |
| **Rate:** | 1Mbps, 2Mbps |
| **Operation Frequency:** | 2402MHz-2480MHz |
| **Modulation Type:** | GFSK |
| **Channel Spacing:** | 2MHz |
| **Number of Channels:** | 40 |
| **Antenna Type:** | Internal Antenna |
| **Antenna Gain:** | 0.38 dBi(Provided by the customer) |

## 4 TEST ENVIRONMENT

| Environment | Temperature | Voltage |
|---|---|---|
| Normal | +25°C | 3.7Vdc |

## 5 TEST MODE

| TEST MODE | TEST MODE DESCRIPTION |
|---|---|
| TX | Keep the EUT in continuously transmitting mode with modulation. |
| Remark:Only the data of the worst mode would be recorded in this report. | |

## 6 MEASUREMENT UNCERTAINTY

| Parameter | Expanded Uncertainty (Confidence of 95%) |
|---|---|
| Radiated Emission | ±4.34dB |
| Radiated Emission | ±4.24dB |
| Radiated Emission | ±4.68dB |
| AC Power Line Conducted Emission | ±3.45dB |

| Parameter | Expanded Uncertainty (Confidence of 95%) |
|---|---|
| Occupied Channel Bandwidth | ±5 % |
| RF output power, conducted | ±1.5 dB |
| Power Spectral Density, conducted | ±3.0 dB |
| Unwanted Emissions, conducted | ±3.0 dB |
| Temperature | ±3 °C |
| Supply voltages | ±3 % |
| Time | ±5 % |
| Radiated Emission (30MHz ~ 1000MHz) | ±4.35 dB |
| Radiated Emission (1GHz ~ 18GHz) | ±4.44 dB |

## 7 DESCRIPTION OF SUPPORT UNIT

| Device Type | Manufacturer | Model Name | Serial No. | Remark |
|---|---|---|---|---|
| PC | HASEE | K610D | N/A | N/A |
| AC Adapter | PISEN | TS-C051 | N/A | N/A |

**Note:**
"--" means no any support device during testing.

## 8 LABORATORY LOCATION

All tests were performed at:
BlueAsia of Technical Services(Shenzhen) Co., Ltd.
IOT Test Centre of BlueAsia
No. 448 Bulong Road, Bantian Street, Longgang District, Shenzhen,China
Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673
No tests were sub-contracted.

## 9 TEST INSTRUMENTS LIST

| Test Equipment Of Radiated Spurious Emissions | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model** | **S/N** | **Cal.Date** | **Cal.Due** |
| Chamber | SKET | 966 | N/A | 5/8/2018 | 5/7/2021 |
| Spectrum | R&S | FSP40 | 100817 | 7/4/2020 | 7/3/2021 |
| Receiver | R&S | ESR7 | 101199 | 4/20/2020 | 4/19/2021 |
| broadband Antenna | Schwarzbeck | VULB9168 | 00836 P:00227 | 7/14/2019 | 7/13/2021 |
| Horn Antenna | Schwarzbeck | 9120D | 01892 P:00331 | 7/14/2019 | 7/13/2021 |
| Amplifier | SKET | LNPA-0118-45 | N/A | 7/4/2019 | 7/3/2021 |
| EMI software | EZ | EZ-EMC | N/A | N/A | N/A |
| Loop antenna | SCHNARZBECK | FMZB1519B | 00102 | 2/14/2019 | 2/13/2022 |
| Controller | SKET | N/A | N/A | N/A | N/A |
| Coaxial Cable | BlueAsia | BLA-XC-02 | N/A | N/A | N/A |
| Coaxial Cable | BlueAsia | BLA-XC-03 | N/A | N/A | N/A |
| Coaxial Cable | BlueAsia | BLA-XC-01 | N/A | N/A | N/A |

| Test Equipment Of Conducted Emissions at AC Power Line (150kHz-30MHz) | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model** | **S/N** | **Cal.Date** | **Cal.Due** |
| Shield room | SKET | 833 | N/A | 6/10/2018 | 6/9/2021 |
| Receiver | R&S | ESPI3 | 101082 | 4/20/2020 | 4/19/2021 |
| LISN | R&S | ENV216 | 3560.6550.15 | 7/4/2019 | 7/3/2021 |
| LISN | AT | AT166-2 | AKK1806000003 | 12/17/2019 | 12/16/2020 |
| EMI software | EZ | EZ-EMC | N/A | N/A | N/A |

| Test Equipment Of Radiated Emissions which fall in the restricted bands | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model** | **S/N** | **Cal.Date** | **Cal.Due** |
| Chamber | SKET | 966 | N/A | 5/8/2018 | 5/7/2021 |
| Spectrum | R&S | FSP40 | 100817 | 7/4/2019 | 7/3/2021 |
| Receiver | R&S | ESR7 | 101199 | 4/20/2020 | 4/19/2021 |
| broadband Antenna | Schwarzbeck | VULB9168 | 00836 P:00227 | 7/14/2018 | 7/13/2020 |
| Horn Antenna | Schwarzbeck | 9120D | 01892 P:00331 | 7/14/2019 | 7/13/2021 |
| Amplifier | SKET | LNPA-0118-45 | N/A | 7/4/2019 | 7/3/2021 |
| EMI software | EZ | EZ-EMC | N/A | N/A | N/A |
| Loop antenna | SCHNARZBECK | FMZB1519B | 00102 | 2/14/2019 | 2/13/2022 |
| Controller | SKET | N/A | N/A | N/A | N/A |
| Coaxial Cable | BlueAsia | BLA-XC-02 | N/A | N/A | N/A |
| Coaxial Cable | BlueAsia | BLA-XC-03 | N/A | N/A | N/A |
| Coaxial Cable | BlueAsia | BLA-XC-01 | N/A | N/A | N/A |

| Test Equipment Of Conducted Spurious Emissions | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model** | **S/N** | **Cal.Date** | **Cal.Due** |
| Spectrum | R&S | FSP40 | 100817 | 7/4/2019 | 7/3/2021 |
| Spectrum | Agilent | N9020A | MY49100060 | 12/17/2019 | 12/16/2020 |
| Signal Generator | Agilent | N5182A | MY49060650 | 12/17/2019 | 12/16/2020 |
| Signal Generator | Agilent | E8257D | MY44320250 | 4/20/2020 | 4/19/2021 |

| Test Equipment Of Conducted Band Edges Measurement | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model** | **S/N** | **Cal.Date** | **Cal.Due** |

| | | | | | |
|---|---|---|---|---|---|
| Spectrum | R&S | FSP40 | 100817 | 7/4/2019 | 7/3/2021 |
| Spectrum | Agilent | N9020A | MY49100060 | 12/17/2019 | 12/16/2020 |
| Signal Generator | Agilent | N5182A | MY49060650 | 12/17/2019 | 12/16/2020 |
| Signal Generator | Agilent | E8257D | MY44320250 | 4/20/2020 | 4/19/2021 |

| **Test Equipment Of Power Spectrum Density** | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model** | **S/N** | **Cal.Date** | **Cal.Due** |
| Spectrum | R&S | FSP40 | 100817 | 7/4/2019 | 7/3/2021 |
| Spectrum | Agilent | N9020A | MY49100060 | 12/17/2019 | 12/16/2020 |
| Signal Generator | Agilent | N5182A | MY49060650 | 12/17/2019 | 12/16/2020 |
| Signal Generator | Agilent | E8257D | MY44320250 | 4/20/2020 | 4/19/2021 |

| **Test Equipment Of Conducted Peak Output Power** | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model** | **S/N** | **Cal.Date** | **Cal.Due** |
| Spectrum | R&S | FSP40 | 100817 | 7/4/2019 | 7/3/2021 |
| Spectrum | Agilent | N9020A | MY49100060 | 12/17/2019 | 12/16/2020 |
| Signal Generator | Agilent | N5182A | MY49060650 | 12/17/2019 | 12/16/2020 |
| Signal Generator | Agilent | E8257D | MY44320250 | 4/20/2020 | 4/19/2021 |

| **Test Equipment Of 20dB Bandwidth** | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model** | **S/N** | **Cal.Date** | **Cal.Due** |
| Spectrum | R&S | FSP40 | 100817 | 7/4/2019 | 7/3/2021 |
| Spectrum | Agilent | N9020A | MY49100060 | 12/17/2019 | 12/16/2020 |
| Signal Generator | Agilent | N5182A | MY49060650 | 12/17/2019 | 12/16/2020 |

| | | | | | |
|---|---|---|---|---|---|
| Signal Generator | Agilent | E8257D | MY44320250 | 4/20/2020 | 4/19/2021 |

| Test Equipment Of Minimum 6dB Bandwidth | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model** | **S/N** | **Cal.Date** | **Cal.Due** |
| Spectrum | R&S | FSP40 | 100817 | 7/4/2019 | 7/3/2021 |
| Spectrum | Agilent | N9020A | MY49100060 | 12/17/2019 | 12/16/2020 |
| Signal Generator | Agilent | N5182A | MY49060650 | 12/17/2019 | 12/16/2020 |
| Signal Generator | Agilent | E8257D | MY44320250 | 4/20/2020 | 4/19/2021 |

## RADIATED SPURIOUS EMISSIONS

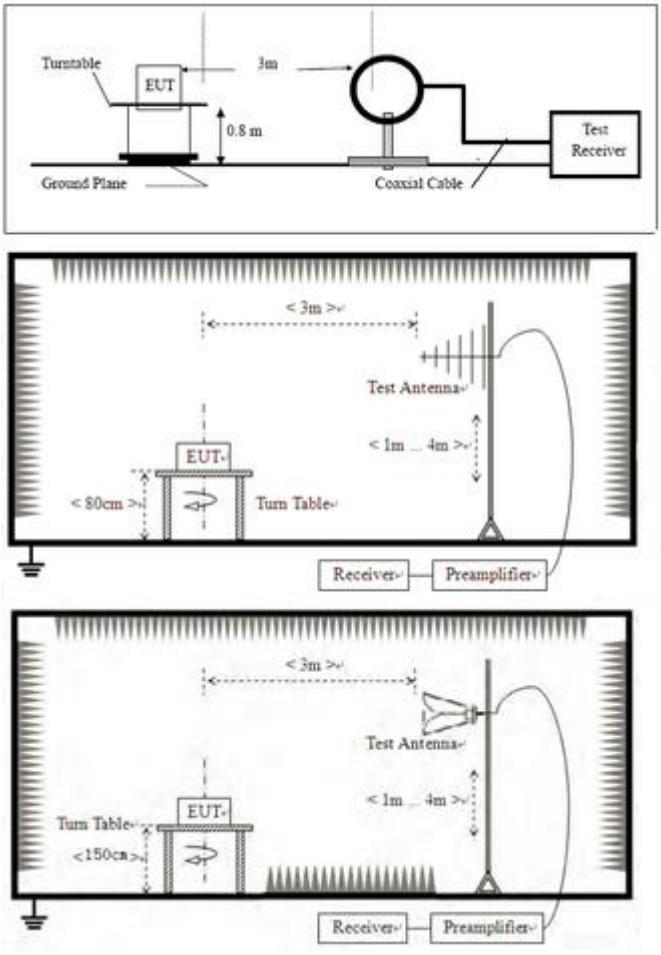
| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.247 |
| **Test Method** | ANSI C63.10 (2013) Section 6.4,6.5,6.6 |
| **Test Mode (Pre-Scan)** | TX mode (SE) below 1G;TX mode (SE) Above 1G |
| **Test Mode (Final Test)** | TX mode (SE) below 1G;TX mode (SE) Above 1G |
| **Tester:** | Eason |
| **Temperature** | 23℃ |
| **Humidity** | 48% |

**LIMITS**

| **Frequency(MHz)** | **Field strength(microvolts/meter)** | **Measurement distance(meters)** |
|---|---|---|
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30.0 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |
| Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 | | |

MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

**BLOCK DIAGRAM OF TEST SETUP**




**PROCEDURE**

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned

to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
j. Repeat above procedures until all frequencies measured was complete.

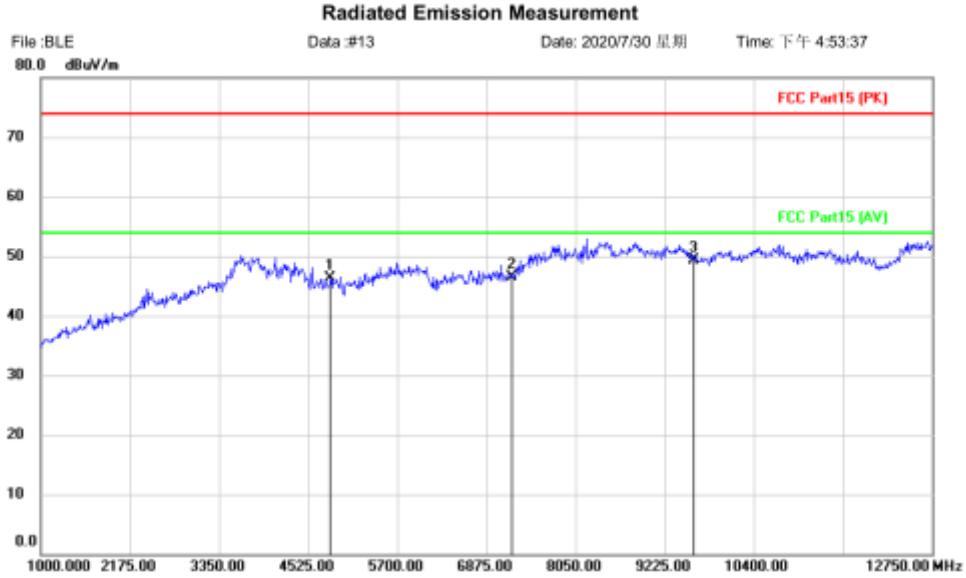
Remark:
1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading + Antenna Factor + Cable Factor ¨C Preamplifier Factor
3) Scan from 9kHz to 25GHz, the disturbance above 12750GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

**TEST DATA**

*Remark: During the test, pre-scan the 1Mbps, 2 Mbps rate, and found the 2Mbps rate which it is worse case.*

[TestMode: TX mode (SE) Above 1G]

Test channel:lowest



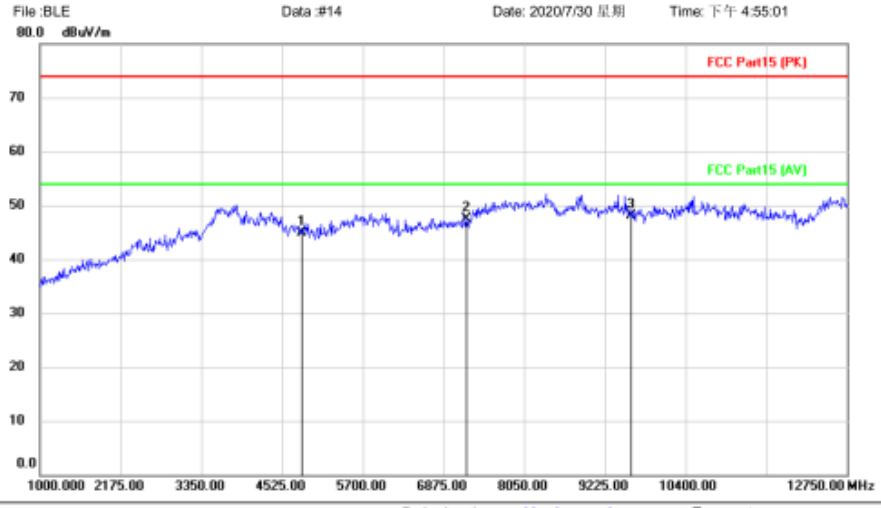

Site
Limit: FCC Part15 (PK)
EUT: Haylou Wireless Earbuds
M/N: Haylou -GT5
Mode: TX-L mode
Note:

Polarization: *Vertical*
Power:
Distance: 3m

Temperature:
Humidity: %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 4818.750 | 51.00 | -4.62 | 46.38 | 74.00 | -27.62 | peak | | | |
| 2 | | 7215.750 | 48.56 | -1.99 | 46.57 | 74.00 | -27.43 | peak | | | |
| 3 | * | 9612.750 | 48.65 | 0.63 | 49.28 | 74.00 | -24.72 | peak | | | |

**Radiated Emission Measurement**




Site
Limit: FCC Part15 (PK)
EUT: Haylou Wireless Earbuds
M/N: Haylou -GT5
Mode: TX-L mode
Note:

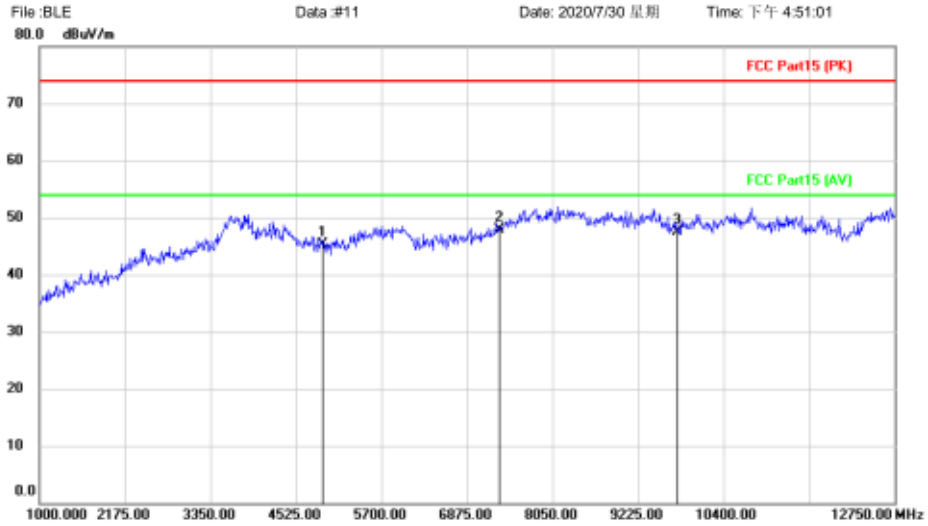
Polarization: ***Horizontal***
Power:
Distance: 3m

Temperature:
Humidity: %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 4818.750 | 49.56 | -4.62 | 44.94 | 74.00 | -29.06 | peak | | | |
| 2 | | 7215.750 | 49.68 | -2.20 | 47.48 | 74.00 | -26.52 | peak | | | |
| 3 | * | 9612.750 | 47.25 | 0.82 | 48.07 | 74.00 | -25.93 | peak | | | |

## Test channel:Middle

**Radiated Emission Measurement**



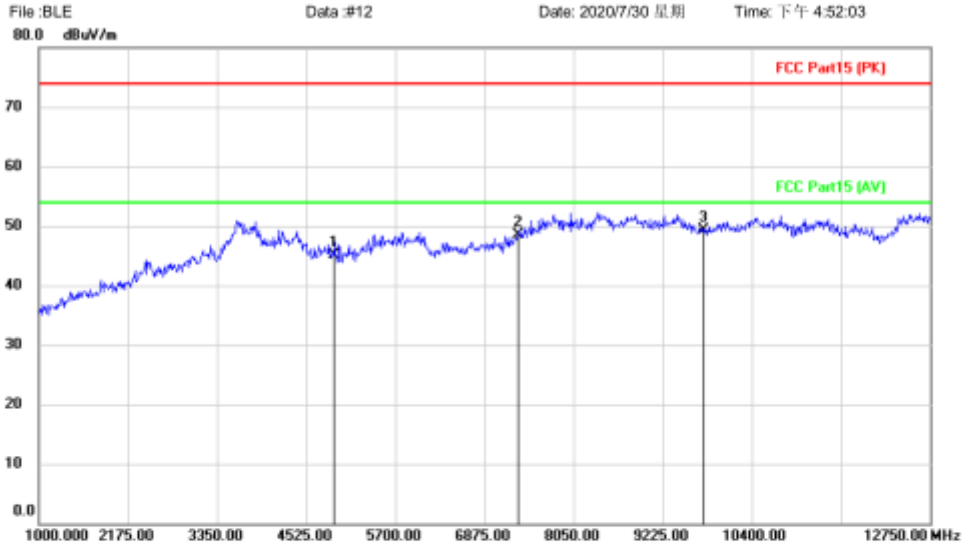

Site
Limit: FCC Part15 (PK)
EUT: Haylou Wireless Earbuds
M/N: Haylou -GT5
Mode: TX-M mode
Note:

Polarization: *Horizontal*
Power:
Distance: 3m

Temperature:
Humidity: %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 4889.250 | 50.33 | -5.12 | 45.21 | 74.00 | -28.79 | peak | | | |
| 2 | * | 7321.500 | 49.31 | -1.35 | 47.96 | 74.00 | -26.04 | peak | | | |
| 3 | | 9765.500 | 46.51 | 0.94 | 47.45 | 74.00 | -26.55 | peak | | | |

**Radiated Emission Measurement**




Site
Limit: FCC Part15 (PK)
EUT: Haylou Wireless Earbuds
M/N: Haylou -GT5
Mode: TX-M mode
Note:

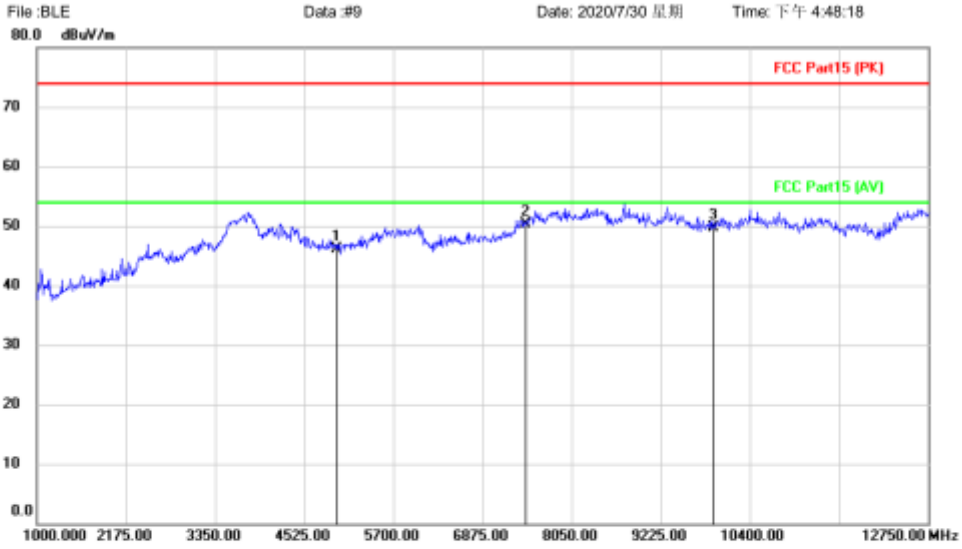
Polarization: ***Vertical***
Power:
Distance: 3m

Temperature:
Humidity: %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 4889.250 | 50.25 | -5.12 | 45.13 | 74.00 | -28.87 | peak | | | |
| 2 | | 7321.500 | 49.94 | -1.48 | 48.46 | 74.00 | -25.54 | peak | | | |
| 3 | * | 9765.500 | 48.34 | 0.91 | 49.25 | 74.00 | -24.75 | peak | | | |

Test channel:Highest

**Radiated Emission Measurement**



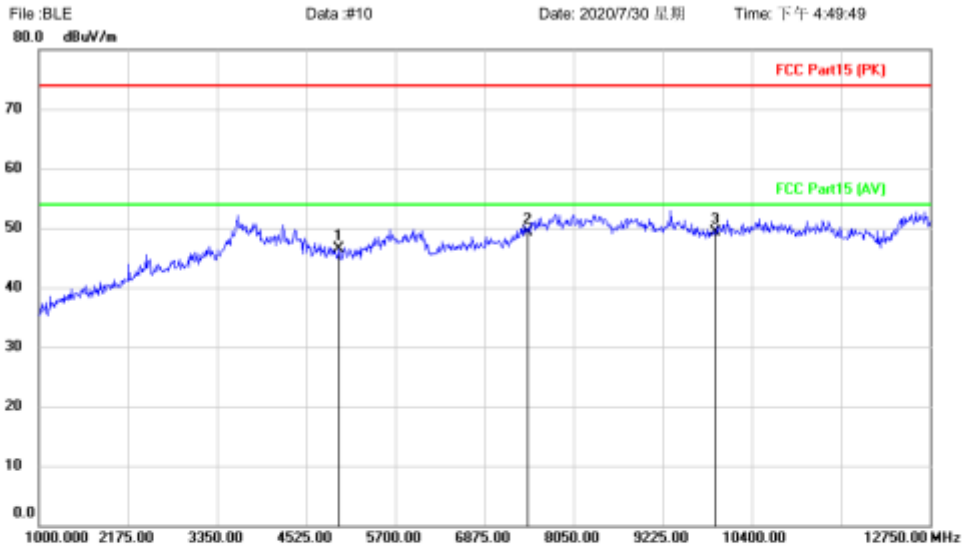

Site
Limit: FCC Part15 (PK)
EUT: Haylou Wireless Earbuds
M/N: Haylou -GT5
Mode: TX-H mode
Note:

Polarization: *Vertical*
Power:
Distance: 3m

Temperature:
Humidity: %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 4959.750 | 50.99 | -4.84 | 46.15 | 74.00 | -27.85 | peak | | | |
| 2 | * | 7450.750 | 51.29 | -1.06 | 50.23 | 74.00 | -23.77 | peak | | | |
| 3 | | 9918.250 | 48.31 | 1.41 | 49.72 | 74.00 | -24.28 | peak | | | |

**Radiated Emission Measurement**




Site
Limit: FCC Part15 (PK)
EUT: Haylou Wireless Earbuds
M/N: Haylou -GT5
Mode: TX-H mode
Note:

Polarization: *Horizontal*
Power:
Distance: 3m

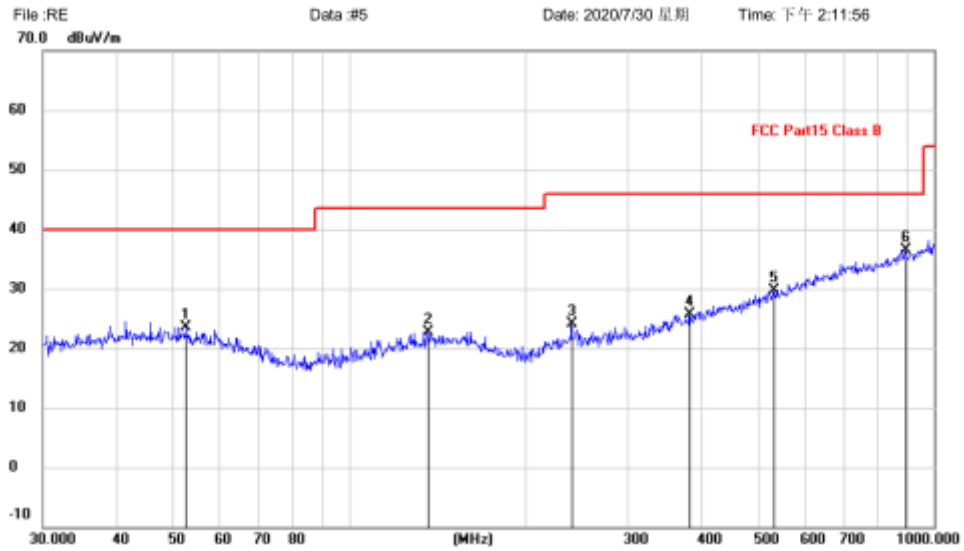
Temperature:
Humidity: %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 4959.750 | 51.42 | -4.84 | 46.58 | 74.00 | -27.42 | peak | | | |
| 2 | | 7450.750 | 49.75 | -0.52 | 49.23 | 74.00 | -24.77 | peak | | | |
| 3 | * | 9918.250 | 48.04 | 1.29 | 49.33 | 74.00 | -24.67 | peak | | | |

**Test Result: Pass**

[TestMode: TX mode (SE) below 1G]; [Polarity: Horizontal]

**Radiated Emission Measurement**




Site
Limit: FCC Part15 Class B
EUT: Haylou Wireless Earbuds
M/N: Haylou -GT5
Mode: BLE mode
Note:

Polarization: *Horizontal*
Power:
Distance: 3m

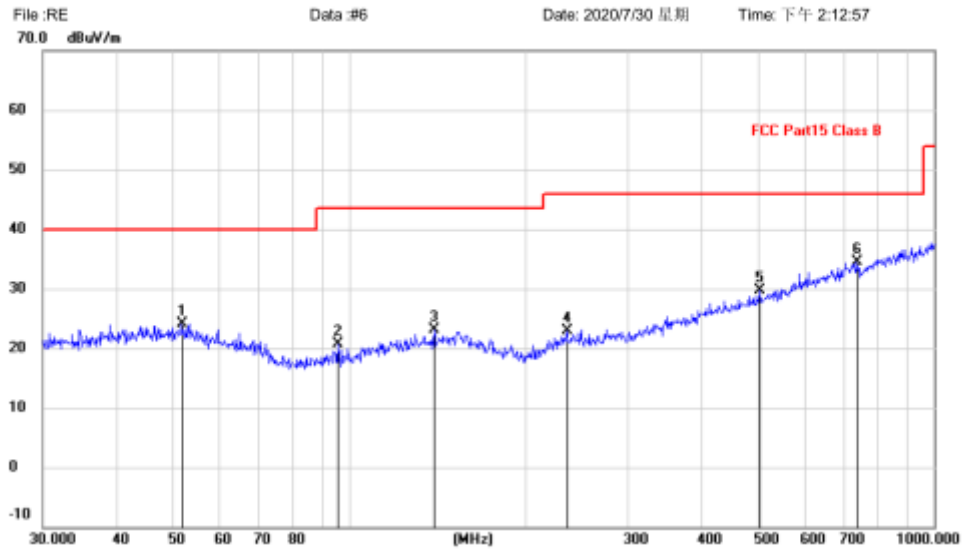
Temperature:
Humidity: %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 52.5753 | -0.45 | 23.99 | 23.54 | 40.00 | -16.46 | QP | | | |
| 2 | | 135.9822 | -0.23 | 22.97 | 22.74 | 43.50 | -20.76 | QP | | | |
| 3 | | 239.9874 | 1.17 | 22.94 | 24.11 | 46.00 | -21.89 | QP | | | |
| 4 | | 381.2487 | -0.68 | 26.41 | 25.73 | 46.00 | -20.27 | QP | | | |
| 5 | | 531.9635 | 0.10 | 29.69 | 29.79 | 46.00 | -16.21 | QP | | | |
| 6 | * | 890.7278 | 0.97 | 35.44 | 36.41 | 46.00 | -9.59 | QP | | | |

**Test Result: Pass**

[TestMode: TX mode (SE) below 1G]; [Polarity: Vertical]

**Radiated Emission Measurement**




Site
Limit: FCC Part15 Class B
EUT: Haylou Wireless Earbuds
M/N: Haylou -GT5
Mode: BLE mode
Note:

Polarization: *Vertical*
Power:
Distance: 3m

Temperature:
Humidity: %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 51.6616 | 0.04 | 24.09 | 24.13 | 40.00 | -15.87 | QP | | | |
| 2 | | 95.7622 | 0.82 | 19.97 | 20.79 | 43.50 | -22.71 | QP | | | |
| 3 | | 139.8508 | 0.02 | 23.10 | 23.12 | 43.50 | -20.38 | QP | | | |
| 4 | | 235.8164 | 0.27 | 22.61 | 22.88 | 46.00 | -23.12 | QP | | | |
| 5 | | 502.9395 | 0.59 | 29.11 | 29.70 | 46.00 | -16.30 | QP | | | |
| 6 | * | 737.0714 | 1.14 | 33.43 | 34.57 | 46.00 | -11.43 | QP | | | |

**Test Result: Pass**

## RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS

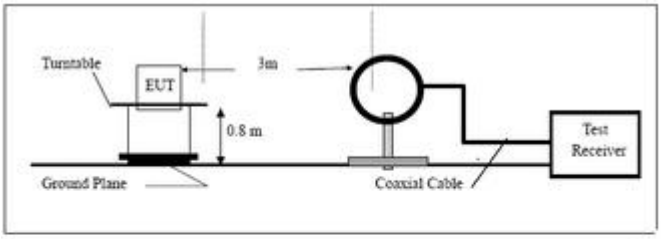
| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.247 |
| **Test Method** | ANSI C63.10 (2013) Section 6.10.5 |
| **Test Mode (Pre-Scan)** | TX mode |
| **Test Mode (Final Test)** | TX mode |
| **Tester** | Eason |
| **Temperature** | 23℃ |
| **Humidity** | 48% |

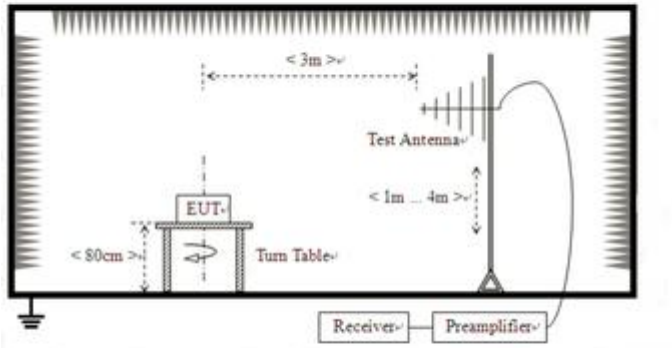
**LIMITS**

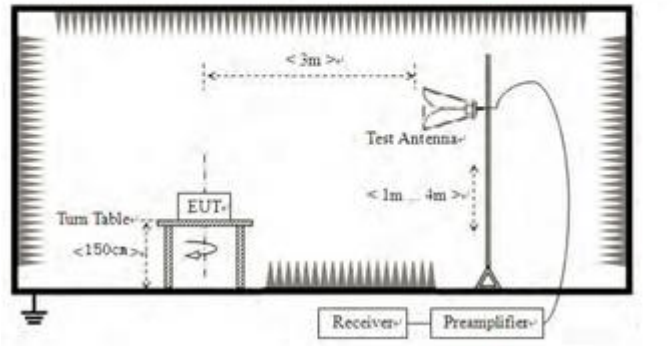
| Frequency(MHz) | Field strength(microvolts/meter) | Measurement distance(meters) |
|---|---|---|
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30.0 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

**BLOCK DIAGRAM OF TEST SETUP**




**PROCEDURE**

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not

have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
j. Repeat above procedures until all frequencies measured was complete.
Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

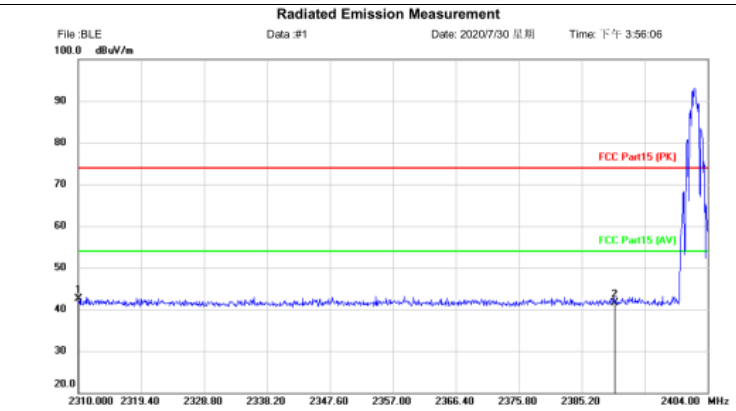
**TEST DATA**

*Remark: During the test, pre-scan the 1Mbps, 2 Mbps rate, and found the 2Mbps rate which it is worse case.*

[TestMode: TX mode]

Test channel:lowest

Peak value:

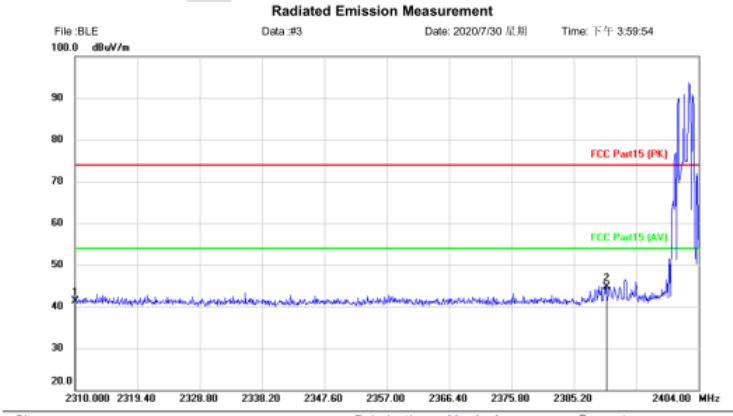



Site
Limit: FCC Part15 (PK)
EUT: Haylou Wireless Earbuds
M/N: Haylou -GT5
Mode: TX-L mode
Note:

Polarization: *Horizontal*
Power:
Distance: 3m

Temperature:
Humidity: %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 2310.000 | 56.58 | -14.01 | 42.57 | 74.00 | -31.43 | peak | | | |
| 2 | | 2390.000 | 55.08 | -13.62 | 41.46 | 74.00 | -32.54 | peak | | | |




Site
Limit: FCC Part15 (PK)
EUT: Haylou Wireless Earbuds
M/N: Haylou -GT5
Mode: TX-L mode
Note:

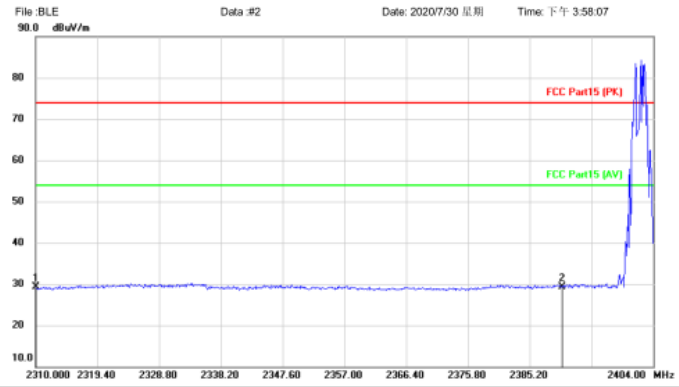
Polarization: *Vertical*
Power:
Distance: 3m

Temperature:
Humidity: %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2310.000 | 55.59 | -14.30 | 41.29 | 74.00 | -32.71 | peak | | | |
| 2 | * | 2390.000 | 58.69 | -13.95 | 44.74 | 74.00 | -29.26 | peak | | | |

Average value:

**Radiated Emission Measurement**



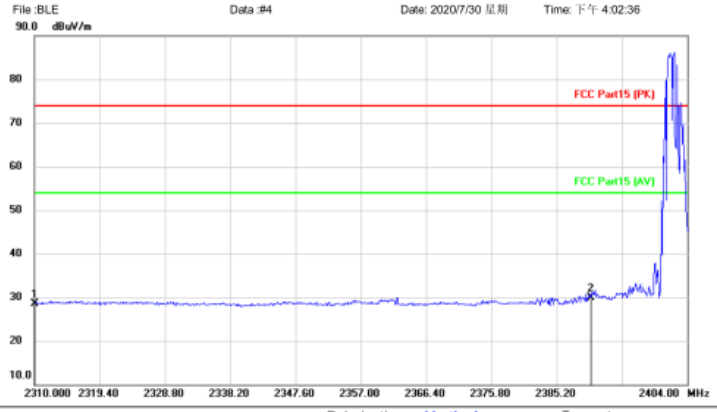

Site
Limit: FCC Part15 (PK)
EUT: Haylou Wireless Earbuds
M/N: Haylou -GT5
Mode: TX-L mode
Note:

Polarization: *Horizontal*
Power:
Distance: 3m

Temperature:
Humidity: %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 2310.000 | 43.41 | -14.01 | 29.40 | 54.00 | -24.60 | AVG | | | |
| 2 | | 2390.000 | 43.00 | -13.62 | 29.38 | 54.00 | -24.62 | AVG | | | |

**Radiated Emission Measurement**




Site
Limit: FCC Part15 (PK)
EUT: Haylou Wireless Earbuds
M/N: Haylou -GT5
Mode: TX-L mode
Note:

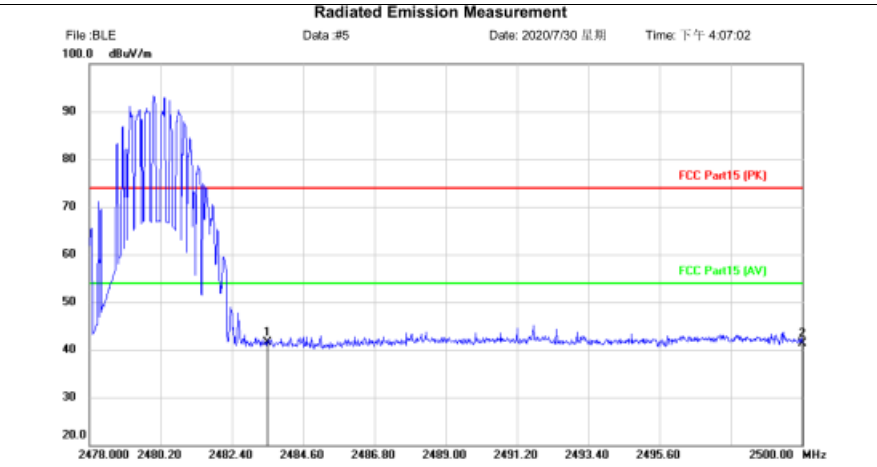
Polarization: *Vertical*
Power:
Distance: 3m

Temperature:
Humidity: %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2310.000 | 42.73 | -14.30 | 28.43 | 54.00 | -25.57 | AVG | | | |
| 2 | * | 2390.000 | 43.83 | -13.95 | 29.88 | 54.00 | -24.12 | AVG | | | |

Test channel:Highest

Peak value:

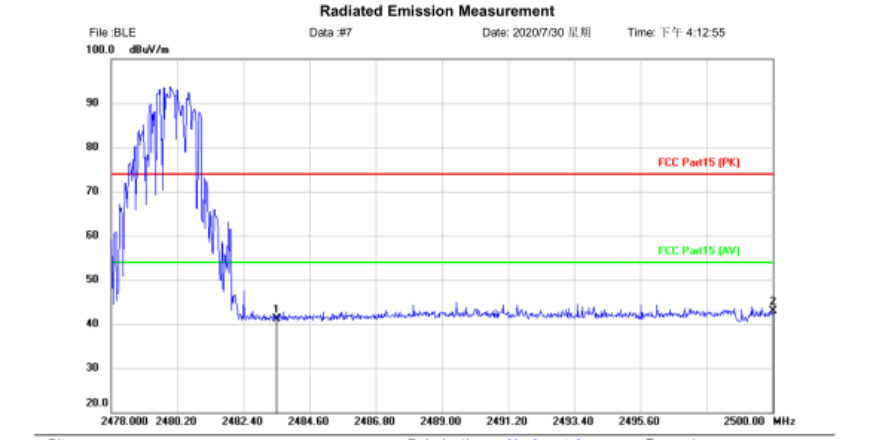



Site
Limit: FCC Part15 (PK)
EUT: Haylou Wireless Earbuds
M/N: Haylou -GT5
Mode: TX-H mode
Note:

Polarization: *Vertical*
Power:
Distance: 3m

Temperature:
Humidity: %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 2483.500 | 54.95 | -13.50 | 41.45 | 74.00 | -32.55 | peak | | | |
| 2 | | 2500.000 | 54.78 | -13.42 | 41.36 | 74.00 | -32.64 | peak | | | |



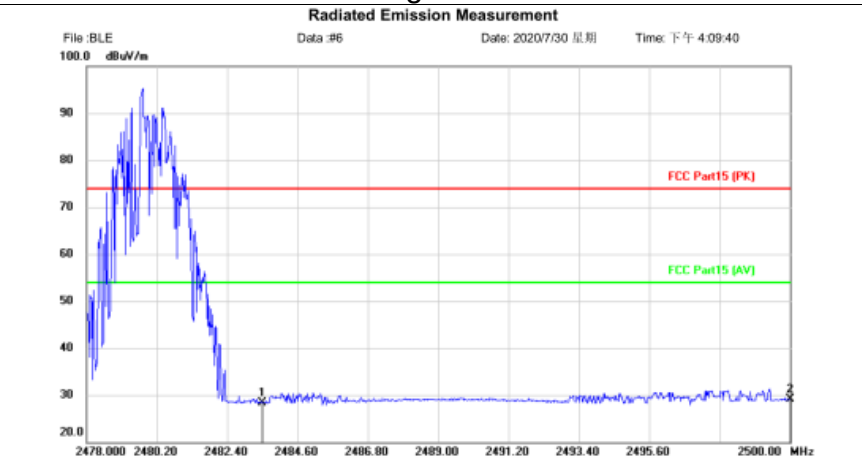

Site
Limit: FCC Part15 (PK)
EUT: Haylou Wireless Earbuds
M/N: Haylou -GT5
Mode: TX-H mode
Note:

Polarization: *Horizontal*
Power:
Distance: 3m

Temperature:
Humidity: %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2483.500 | 54.27 | -13.11 | 41.16 | 74.00 | -32.84 | peak | | | |
| 2 | * | 2500.000 | 55.99 | -13.02 | 42.97 | 74.00 | -31.03 | peak | | | |

Average value:

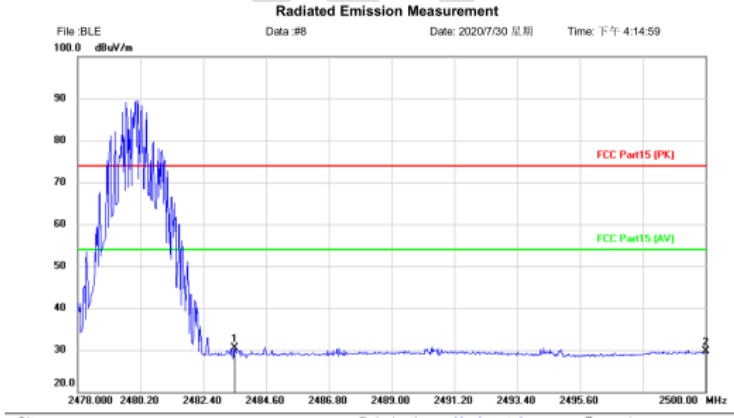



Site
Limit: FCC Part15 (PK)
EUT: Haylou Wireless Earbuds
M/N: Haylou -GT5
Mode: TX-H mode
Note:

Polarization: *Vertical*
Power:
Distance: 3m

Temperature:
Humidity: %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2483.500 | 41.89 | -13.50 | 28.39 | 54.00 | -25.61 | AVG | | | |
| 2 | * | 2500.000 | 42.51 | -13.42 | 29.09 | 54.00 | -24.91 | AVG | | | |




Site
Limit: FCC Part15 (PK)
EUT: Haylou Wireless Earbuds
M/N: Haylou -GT5
Mode: TX-H mode
Note:

Polarization: *Horizontal*
Power:
Distance: 3m

Temperature:
Humidity: %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 2483.500 | 43.60 | -13.11 | 30.49 | 54.00 | -23.51 | AVG | | | |
| 2 | | 2500.000 | 42.65 | -13.02 | 29.63 | 54.00 | -24.37 | AVG | | | |

**Test Result: Pass**

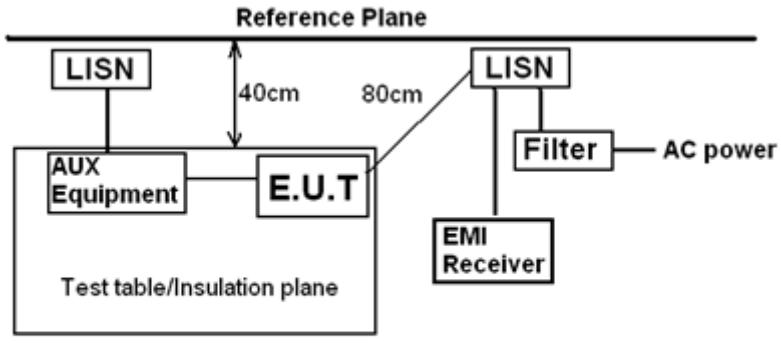
## CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)

| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.247 |
| **Test Method** | ANSI C63.10 (2013) Section 6.2 |
| **Test Mode (Pre-Scan)** | TX mode |
| **Test Mode (Final Test)** | TX mode |
| **Tester** | Eason |
| **Temperature** | 25℃ |
| **Humidity** | 58% |

### LIMITS

| Frequency of emission(MHz) | Conducted limit(dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |
| *Decreases with the logarithm of the frequency. | | |

### BLOCK DIAGRAM OF TEST SETUP




*Remark*
*E.U.T: Equipment Under Test*
*LISN: Line Impedence Stabilization Network*
*Test table height=0.8m*

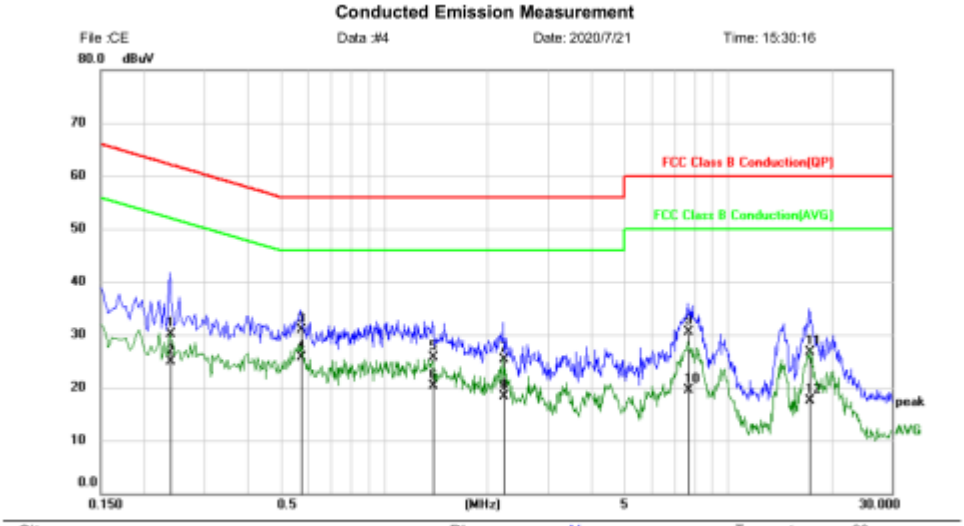
### PROCEDURE

1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50?H + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as

the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
Remark: LISN=Read Level+ Cable Loss+ LISN Factor

**TEST DATA**

[TestMode: TX mode]; [Line: Nutral]
Power:AC120V/60Hz




Site
Limit: FCC Class B Conduction(QP)
EUT: Haylou Wireless Earbuds
M/N: Haylou-GT5
Mode: BLE mode
Note:

Phase: N
Power:

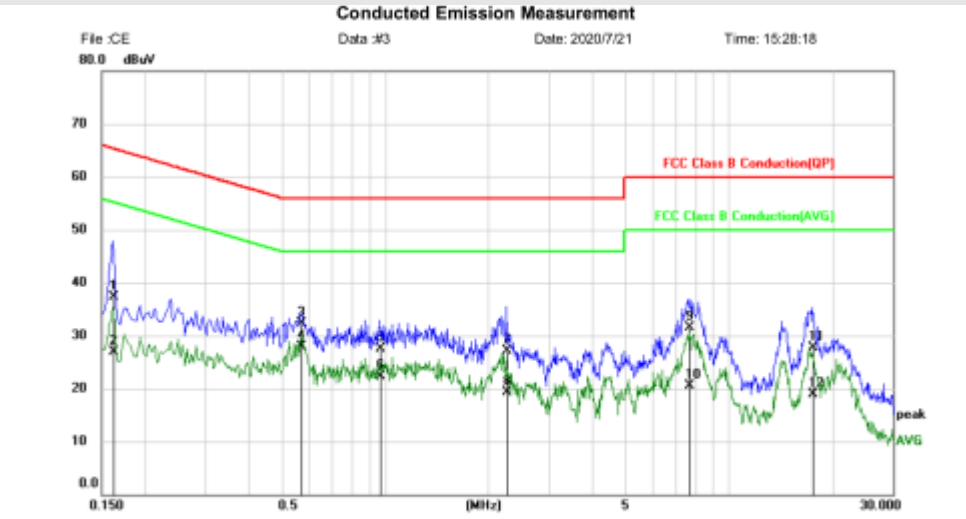
Temperature: 26
Humidity: 60 %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.2380 | 20.35 | 9.85 | 30.20 | 62.17 | -31.97 | QP | |
| 2 | | 0.2380 | 14.96 | 9.85 | 24.81 | 52.17 | -27.36 | AVG | |
| 3 | | 0.5740 | 21.12 | 9.73 | 30.85 | 56.00 | -25.15 | QP | |
| 4 | * | 0.5740 | 15.89 | 9.73 | 25.62 | 46.00 | -20.38 | AVG | |
| 5 | | 1.3860 | 15.78 | 9.83 | 25.61 | 56.00 | -30.39 | QP | |
| 6 | | 1.3860 | 10.42 | 9.83 | 20.25 | 46.00 | -25.75 | AVG | |
| 7 | | 2.2300 | 15.37 | 9.86 | 25.23 | 56.00 | -30.77 | QP | |
| 8 | | 2.2300 | 8.36 | 9.86 | 18.22 | 46.00 | -27.78 | AVG | |
| 9 | | 7.6700 | 20.60 | 9.86 | 30.46 | 60.00 | -29.54 | QP | |
| 10 | | 7.6700 | 9.68 | 9.86 | 19.54 | 50.00 | -30.46 | AVG | |
| 11 | | 17.2380 | 16.64 | 10.04 | 26.68 | 60.00 | -33.32 | QP | |
| 12 | | 17.2380 | 7.47 | 10.04 | 17.51 | 50.00 | -32.49 | AVG | |

**Test Result: Pass**

[TestMode: TX mode]; [Line: Line]

Power:AC120V/60Hz




Site Phase: L1 Temperature: 26

Limit: FCC Class B Conduction(QP) Power: Humidity: 60 %

EUT: Haylou Wireless Earbuds

M/N: Haylou-GT5

Mode: BLE mode

Note:

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.1620 | 27.37 | 9.89 | 37.26 | 65.36 | -28.10 | QP | |
| 2 | | 0.1620 | 17.00 | 9.89 | 26.89 | 55.36 | -28.47 | AVG | |
| 3 | | 0.5700 | 22.48 | 9.74 | 32.22 | 56.00 | -23.78 | QP | |
| 4 | * | 0.5700 | 18.24 | 9.74 | 27.98 | 46.00 | -18.02 | AVG | |
| 5 | | 0.9660 | 17.75 | 9.84 | 27.59 | 56.00 | -28.41 | QP | |
| 6 | | 0.9660 | 12.44 | 9.84 | 22.28 | 46.00 | -23.72 | AVG | |
| 7 | | 2.2540 | 17.30 | 9.81 | 27.11 | 56.00 | -28.89 | QP | |
| 8 | | 2.2540 | 9.45 | 9.81 | 19.26 | 46.00 | -26.74 | AVG | |
| 9 | | 7.6620 | 21.67 | 9.87 | 31.54 | 60.00 | -28.46 | QP | |
| 10 | | 7.6620 | 10.63 | 9.87 | 20.50 | 50.00 | -29.50 | AVG | |
| 11 | | 17.5380 | 17.62 | 10.01 | 27.63 | 60.00 | -32.37 | QP | |
| 12 | | 17.5380 | 8.98 | 10.01 | 18.99 | 50.00 | -31.01 | AVG | |

**Test Result: Pass**

## ANTENNA REQUIREMENT

| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.247 |
| **Test Method** | ANSI C63.10 (2013) Section 7.8.6 & Section 11.11 |

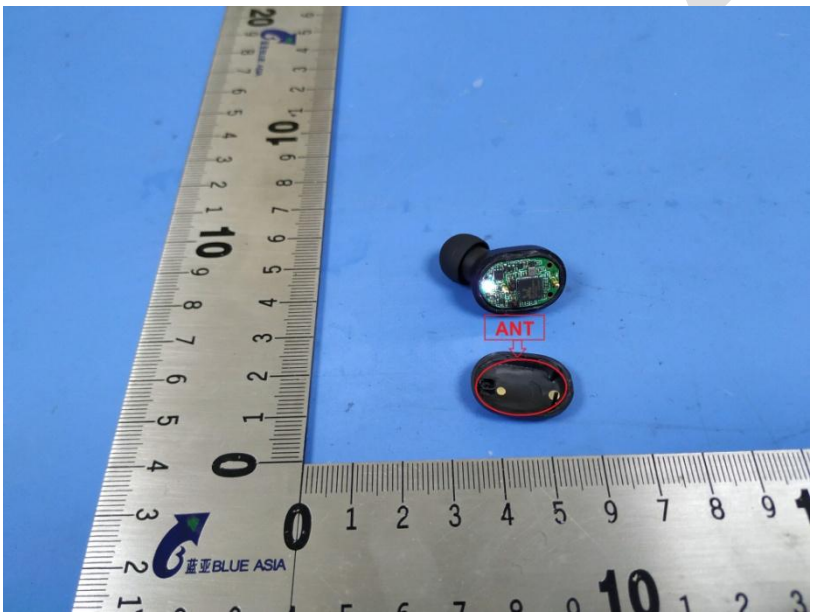
### CONCLUSION

Standard Requirement:

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 antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0.38dBi.



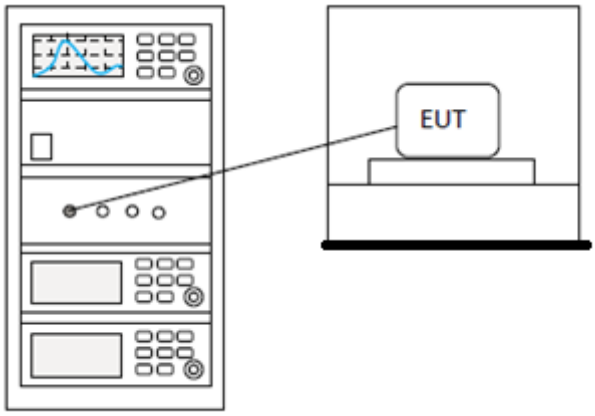
## CONDUCTED SPURIOUS EMISSIONS

| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.247 |
| **Test Method** | ANSI C63.10 (2013) Section 7.8.6 & Section 11.11 |
| **Test Mode (Pre-Scan)** | TX |
| **Test Mode (Final Test)** | TX |
| **Tester** | Eason |
| **Temperature** | 23℃ |
| **Humidity** | 48% |

### LIMITS

| | |
|---|---|
| **Limit:** | In any 100 kHz 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 dB below that in the 100 kHz 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 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)). |

### BLOCK DIAGRAM OF TEST SETUP



**TEST DATA**

**Pass: Please Refer To Appendix: Appendix1 For Details**

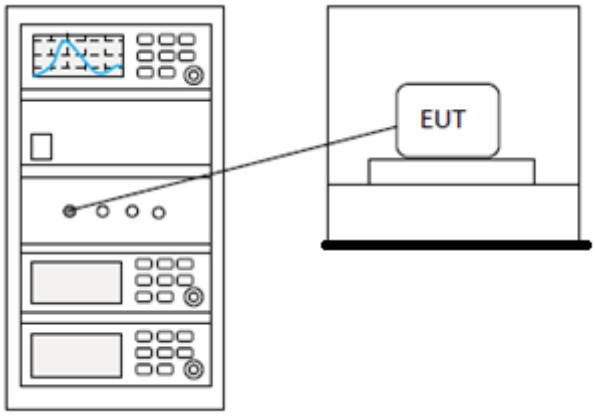
## CONDUCTED BAND EDGES MEASUREMENT

| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.247 |
| **Test Method** | ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2 |
| **Test Mode (Pre-Scan)** | TX |
| **Test Mode (Final Test)** | TX |
| **Tester** | Eason |
| **Temperature** | 23℃ |
| **Humidity** | 48% |

### LIMITS

| | |
|---|---|
| **Limit:** | In any 100 kHz 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 dB below that in the 100 kHz 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 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)). |

### BLOCK DIAGRAM OF TEST SETUP



**TEST DATA**

| Pass: Please Refer To Appendix: Appendix1 For Details |
|---|

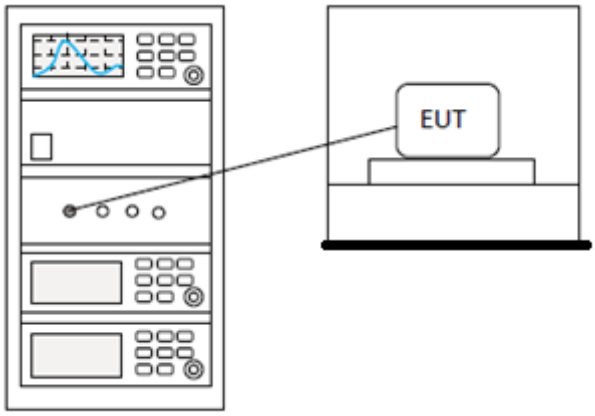
## POWER SPECTRUM DENSITY

| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.247 |
| **Test Method** | ANSI C63.10 (2013) Section 11.10.2 |
| **Test Mode (Pre-Scan)** | TX |
| **Test Mode (Final Test)** | TX |
| **Tester** | Eason |
| **Temperature** | 23℃ |
| **Humidity** | 48% |

### LIMITS

| | |
|---|---|
| **Limit:** | ≤8dBm in any 3 kHz band during any time interval of continuous transmission |

### BLOCK DIAGRAM OF TEST SETUP




### TEST DATA

**Pass: Please Refer To Appendix: Appendix1 For Details**

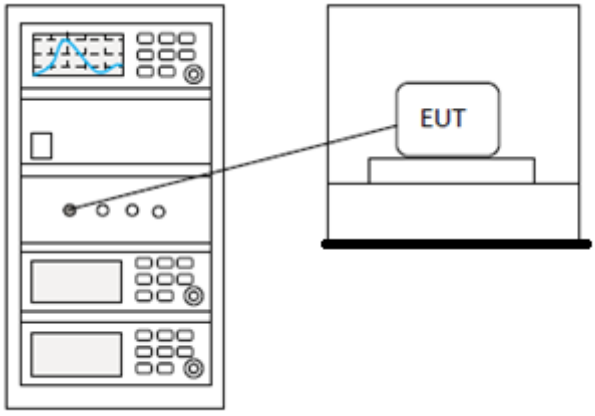
## CONDUCTED PEAK OUTPUT POWER

| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.247 |
| **Test Method** | ANSI C63.10 (2013) Section 7.8.5 & Section 11.9.1 |
| **Test Mode (Pre-Scan)** | TX |
| **Test Mode (Final Test)** | TX |
| **Tester** | Eason |
| **Temperature** | 23℃ |
| **Humidity** | 48% |

### LIMITS

| Frequency range(MHz) | Output power of the intentional radiator(watt) |
|---|---|
| 902-928 | 1 for ≥50 hopping channels |
| | 0.25 for 25≤ hopping channels <50 |
| | 1 for digital modulation |
| 2400-2483.5 | 1 for ≥75 non-overlapping hopping channels |
| | 0.125 for all other frequency hopping systems |
| | 1 for digital modulation |
| 5725-5850 | 1 for frequency hopping systems and digital modulation |

### BLOCK DIAGRAM OF TEST SETUP



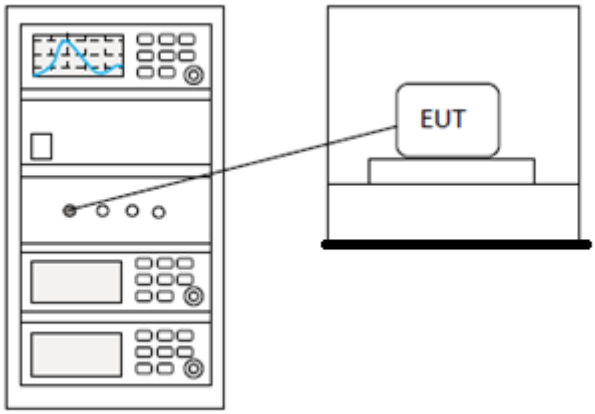
**TEST DATA**

| Pass: Please Refer To Appendix: Appendix1 For Details |
|---|

## 20DB BANDWIDTH

| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.247 |
| **Test Method** | ANSI C63.10 (2013) Section 6.9 |
| **Test Mode (Pre-Scan)** | TX |
| **Test Mode (Final Test)** | TX |
| **Tester** | Eason |
| **Temperature** | 23℃ |
| **Humidity** | 48% |

### BLOCK DIAGRAM OF TEST SETUP




### TEST DATA

| |
|---|
| **N/A** |

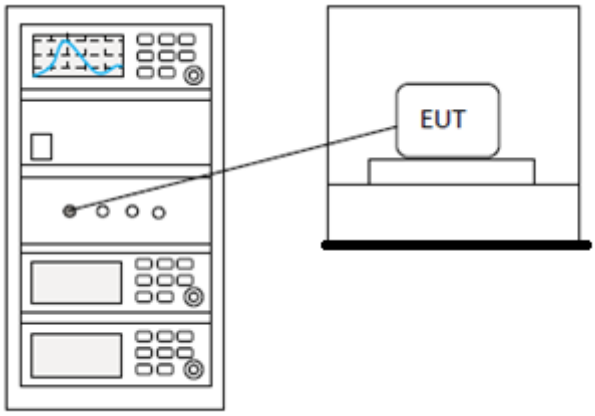
## MINIMUM 6DB BANDWIDTH

| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.247 |
| **Test Method** | ANSI C63.10 (2013) Section 11.8.1 |
| **Test Mode (Pre-Scan)** | TX |
| **Test Mode (Final Test)** | TX |
| **Tester** | Eason |
| **Temperature** | 23℃ |
| **Humidity** | 48% |

### LIMITS

| | |
|---|---|
| **Limit:** | ≥500 kHz |

### BLOCK DIAGRAM OF TEST SETUP




### TEST DATA

**Pass: Please Refer To Appendix: Appendix1 For Details**

# 10 APPENDIX

## Appendix1

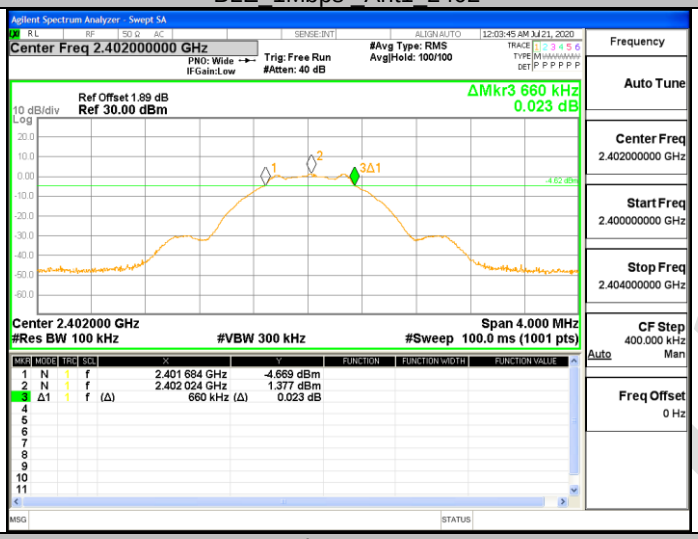
### 10.1 APPENDIXA: DTS BANDWIDTH

## Test Result

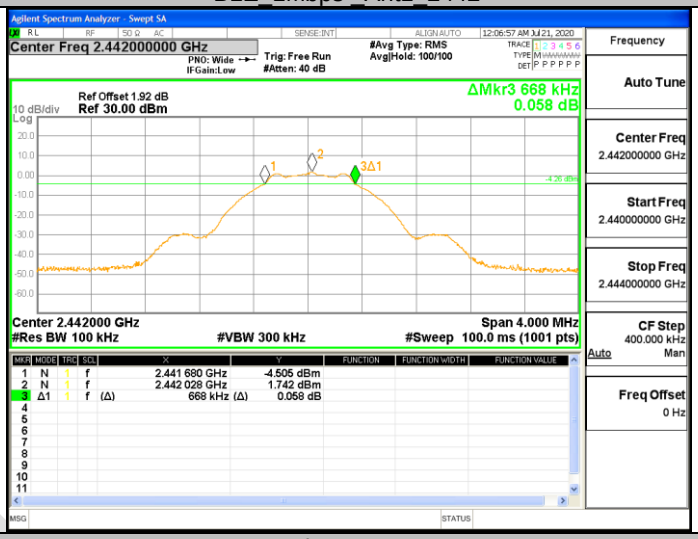
| TestMode | Antenna | Channel | DTS BW [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_1Mbps | Ant1 | 2402 | 0.660 | 2401.684 | 2402.344 | >=0.5 | PASS |
| | | 2442 | 0.668 | 2441.680 | 2442.348 | >=0.5 | PASS |
| | | 2480 | 0.672 | 2479.676 | 2480.348 | >=0.5 | PASS |
| BLE_2Mbps | Ant1 | 2402 | 1.148 | 2401.460 | 2402.608 | >=0.5 | PASS |
| | | 2442 | 1.120 | 2441.460 | 2442.580 | >=0.5 | PASS |
| | | 2480 | 1.124 | 2479.456 | 2480.580 | >=0.5 | PASS |

## Test Graphs

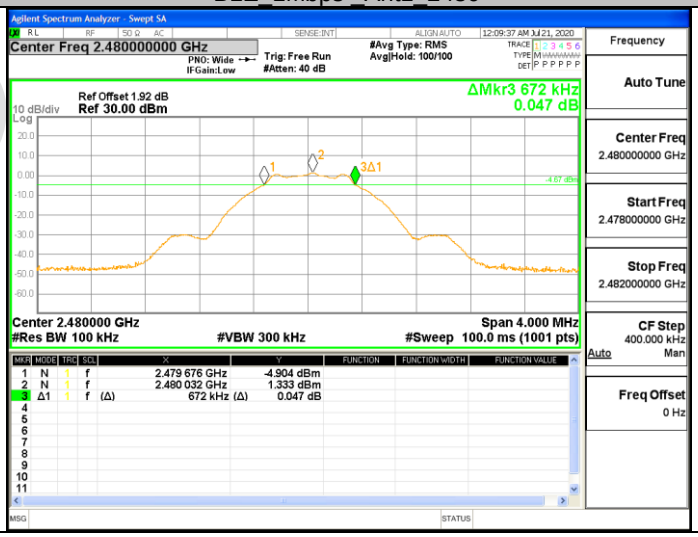
BLE_1Mbps _Ant1_2402



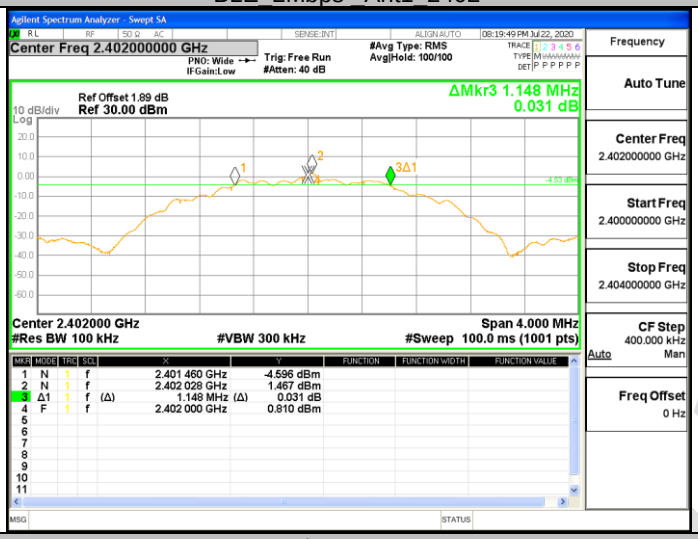

BLE_1Mbps _Ant1_2442



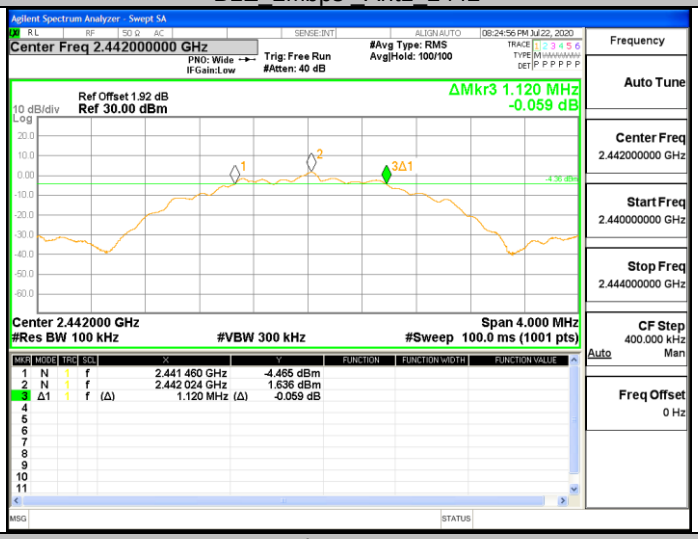

BLE_1Mbps _Ant1_2480



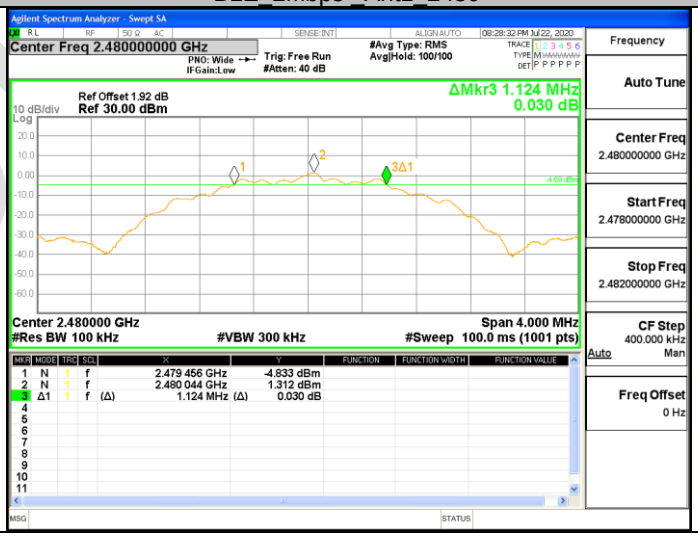
BLE_2Mbps _Ant1_2402




BLE_2Mbps _Ant1_2442




BLE_2Mbps _Ant1_2480



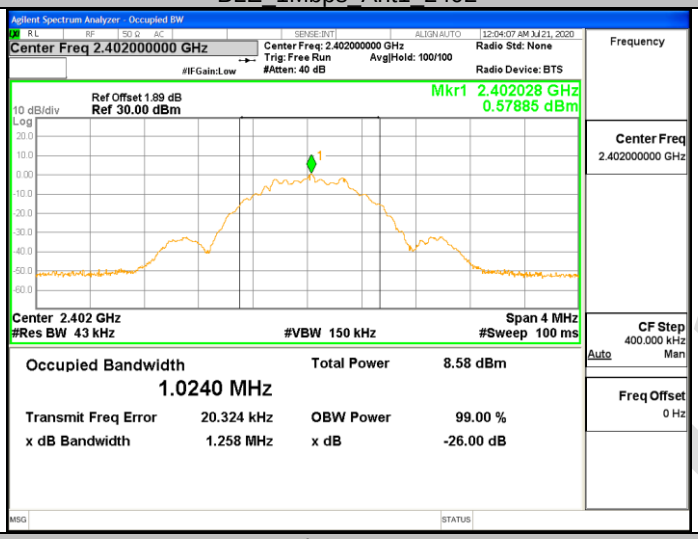
## 10.2 APPENDIXB: OCCUPIED CHANNEL BANDWIDTH

### Test Result

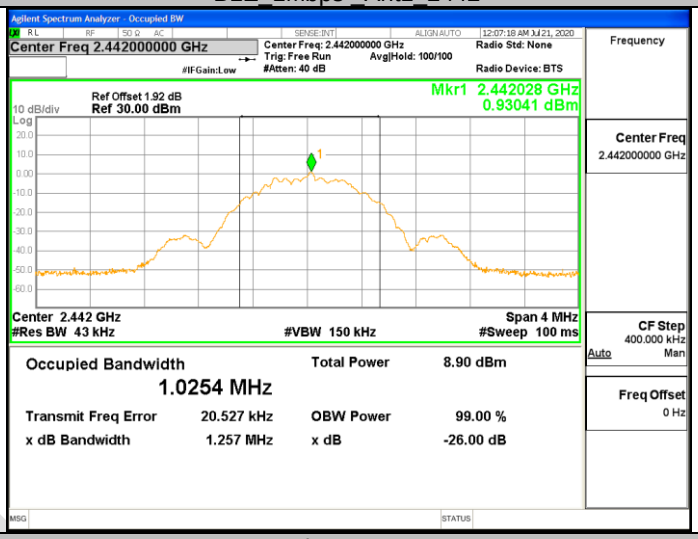
| TestMode | Antenna | Channel | OCB [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_1Mbps | Ant1 | 2402 | 1.0240 | 2401.508 | 2402.532 | --- | PASS |
| | | 2442 | 1.0254 | 2441.508 | 2442.533 | --- | PASS |
| | | 2480 | 1.0258 | 2479.507 | 2480.533 | --- | PASS |
| BLE_2Mbps | Ant1 | 2402 | 2.0475 | 2401.013 | 2403.061 | --- | PASS |
| | | 2442 | 2.0502 | 2441.011 | 2443.061 | --- | PASS |
| | | 2480 | 2.0497 | 2479.009 | 2481.059 | --- | PASS |

## Test Graphs

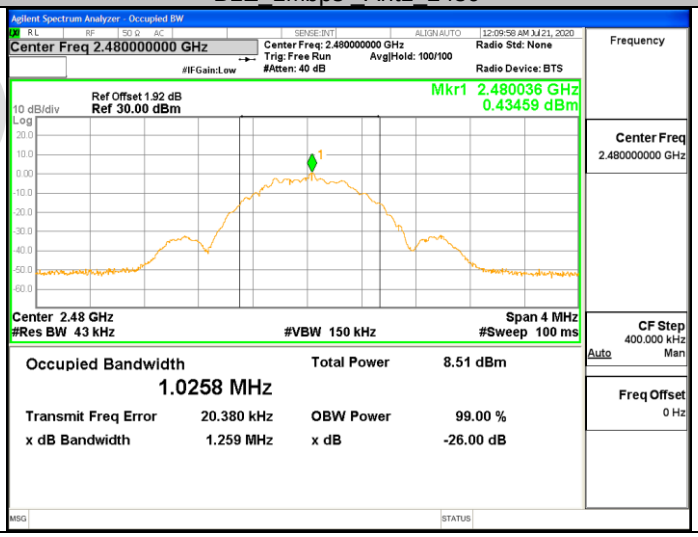
BLE_1Mbps_Ant1_2402



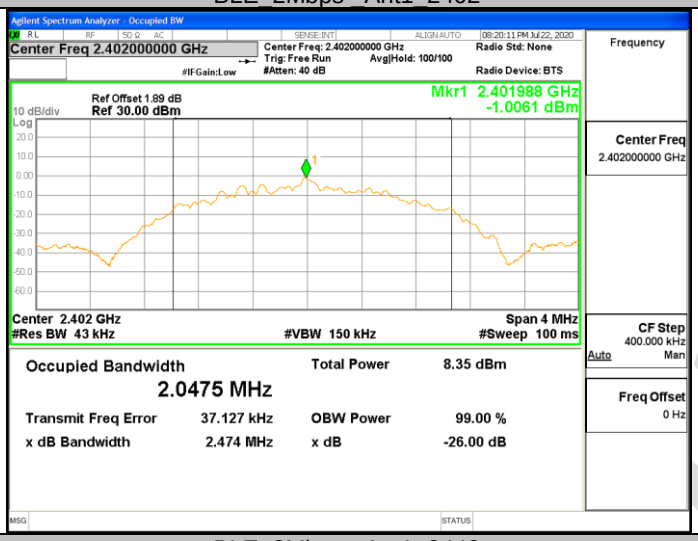

BLE_1Mbps_Ant1_2442



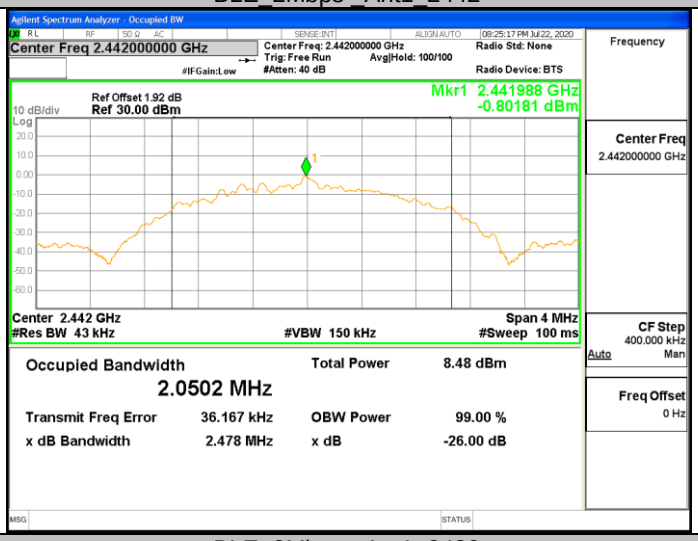

BLE_1Mbps_Ant1_2480



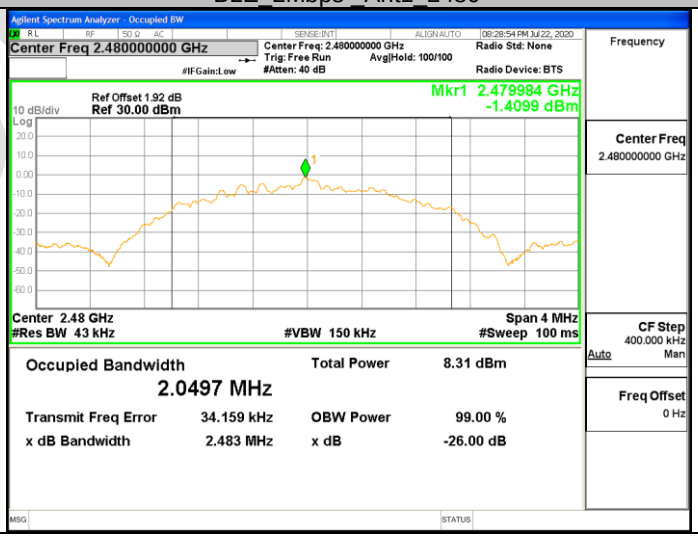
BLE_2Mbps _Ant1_2402




BLE_2Mbps _Ant1_2442




BLE_2Mbps _Ant1_2480



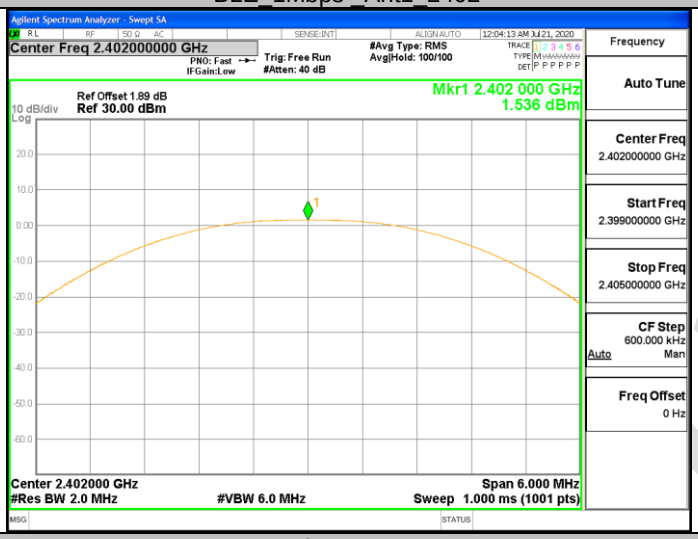
## 10.3 APPENDIXC: MAXIMUM CONDUCTED OUTPUT POWER

### Test Result

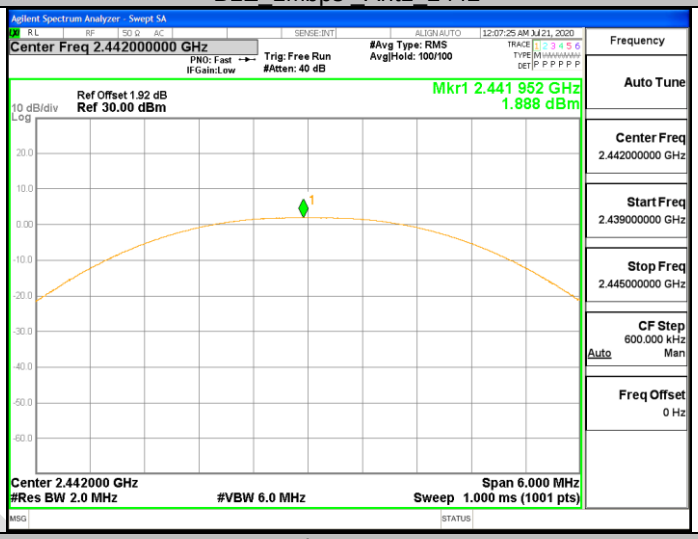
| TestMode | Antenna | Channel | Result[dBm] | Limit[dBm] | Verdict |
|---|---|---|---|---|---|
| BLE_1Mbps | Ant1 | 2402 | 1.54 | <=30 | PASS |
| | | 2442 | 1.89 | <=30 | PASS |
| | | 2480 | 1.54 | <=30 | PASS |
| BLE_2Mbps | Ant1 | 2402 | 1.62 | <=30 | PASS |
| | | 2442 | 1.84 | <=30 | PASS |
| | | 2480 | 1.58 | <=30 | PASS |

## Test Graphs

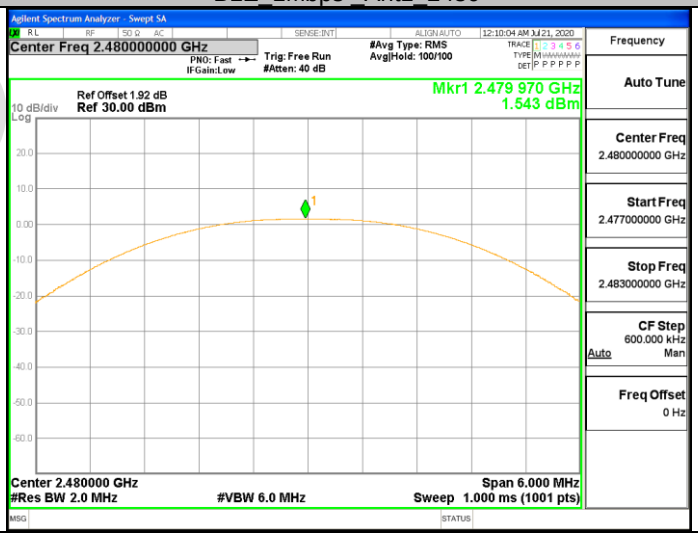
BLE_1Mbps _Ant1_2402



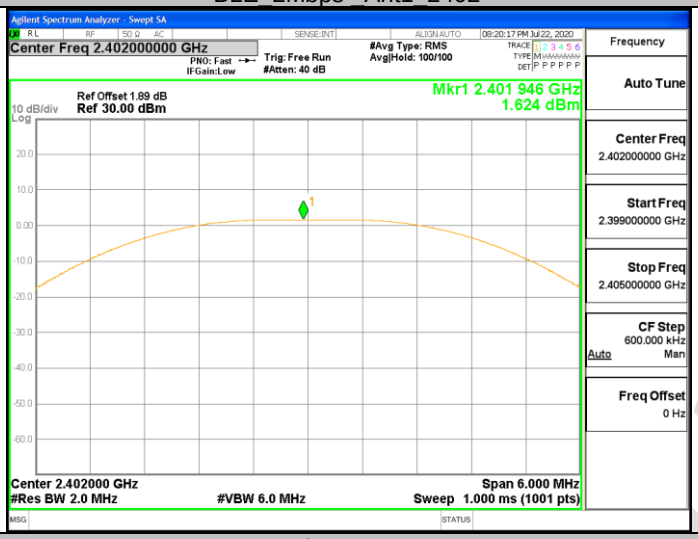

BLE_1Mbps _Ant1_2442



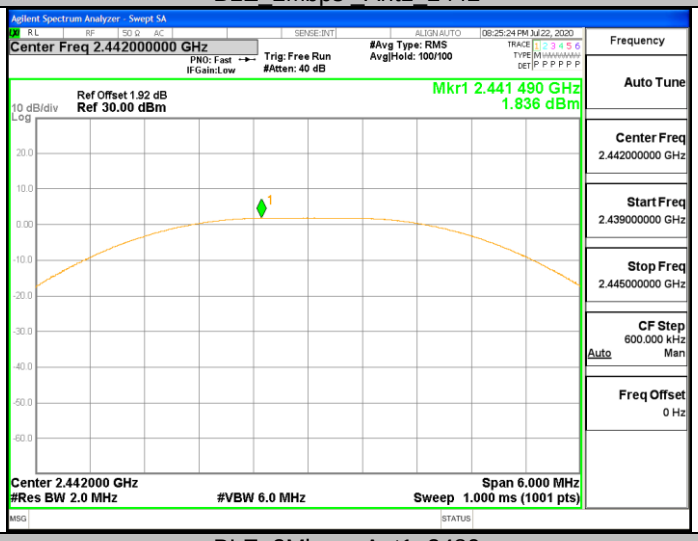

BLE_1Mbps _Ant1_2480



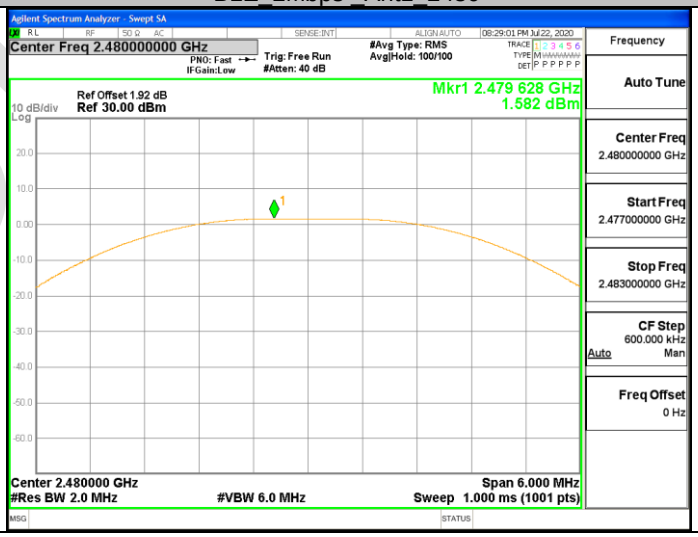
BLE_2Mbps _Ant1_2402




BLE_2Mbps _Ant1_2442




BLE_2Mbps _Ant1_2480



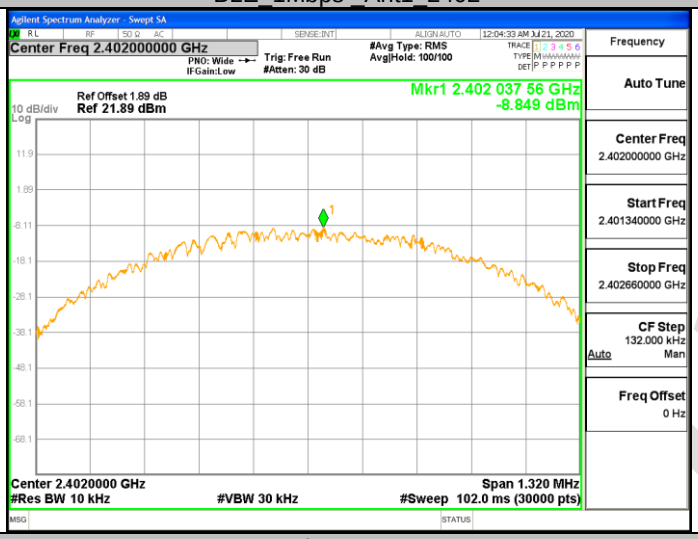
## 10.4 APPENDIXD: MAXIMUM POWER SPECTRAL DENSITY

### Test Result

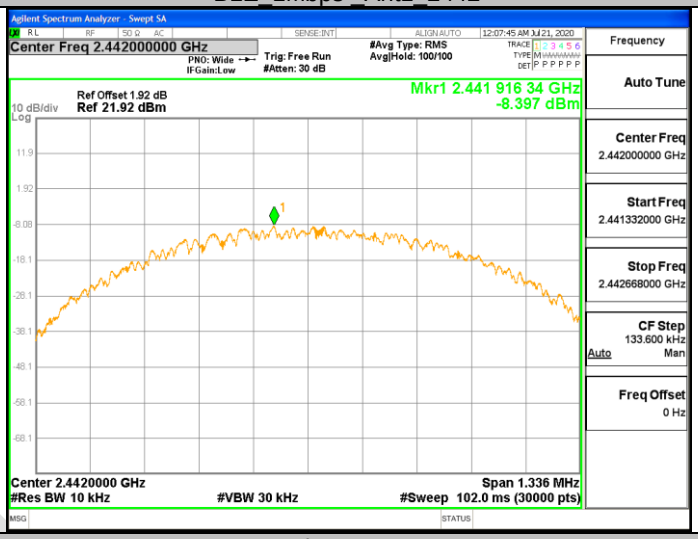
| TestMode | Antenna | Channel | Result[dBm/3-100kHz] | Limit[dBm/3kHz] | Verdict |
|---|---|---|---|---|---|
| BLE_1Mbps | Ant1 | 2402 | -8.85 | <=8 | PASS |
| | | 2442 | -8.4 | <=8 | PASS |
| | | 2480 | -8.03 | <=8 | PASS |
| BLE_2Mbps | Ant1 | 2402 | -9.62 | <=8 | PASS |
| | | 2442 | -9.5 | <=8 | PASS |
| | | 2480 | -10.16 | <=8 | PASS |

## Test Graphs

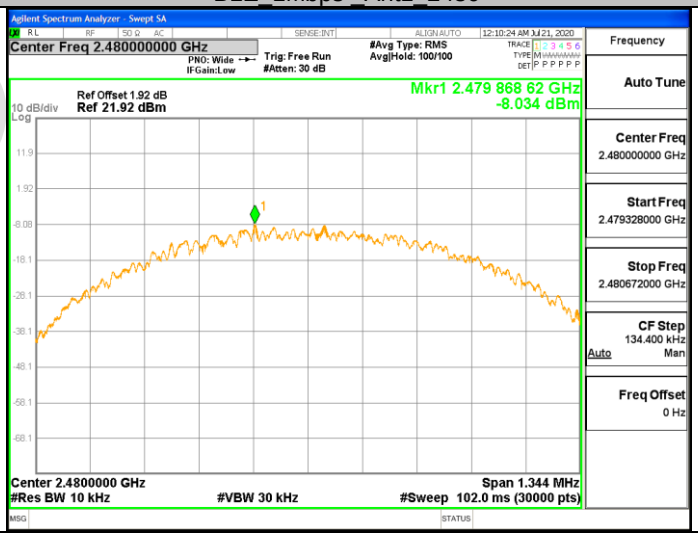
BLE_1Mbps _Ant1_2402



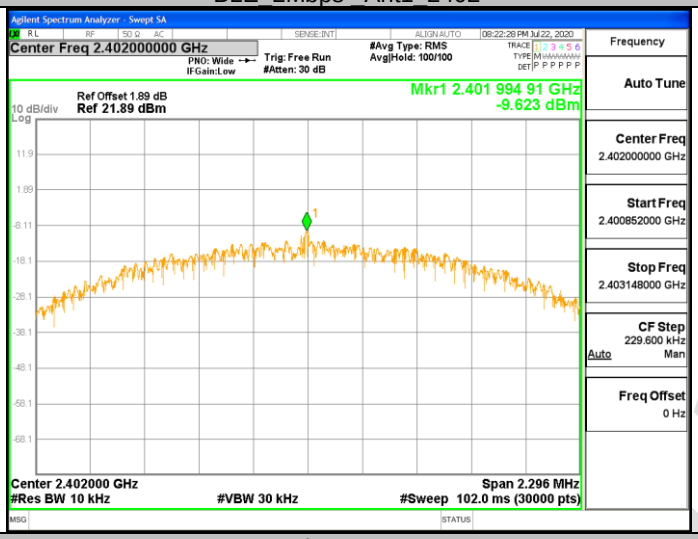

BLE_1Mbps _Ant1_2442



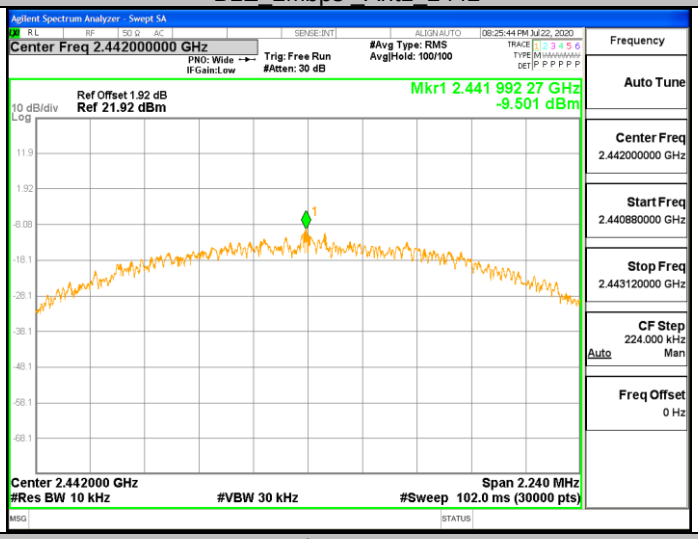

BLE_1Mbps _Ant1_2480



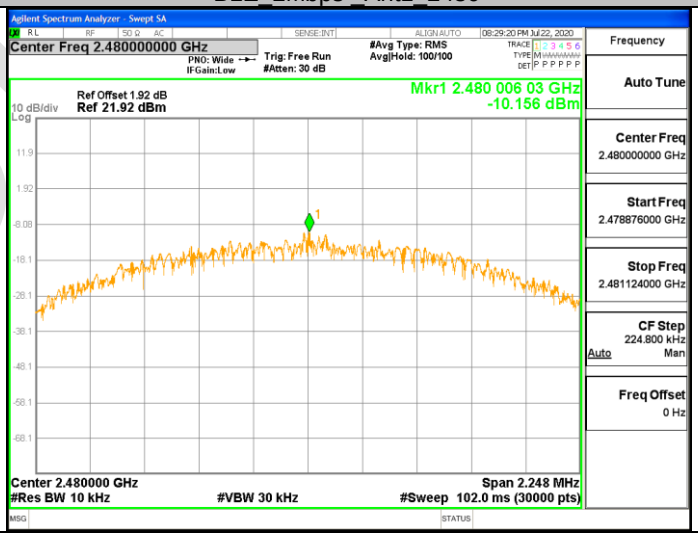
BLE_2Mbps _Ant1_2402




BLE_2Mbps _Ant1_2442




BLE_2Mbps _Ant1_2480



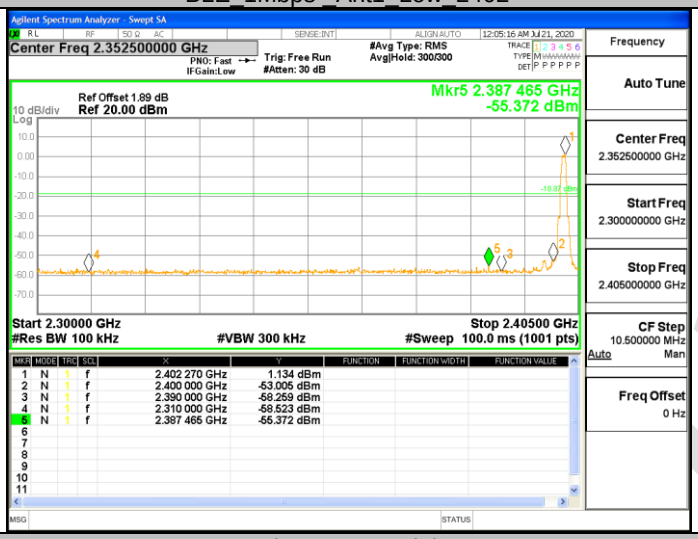
## 10.5 APPENDIXE:BAND EDGE MEASUREMENTS

### Test Result

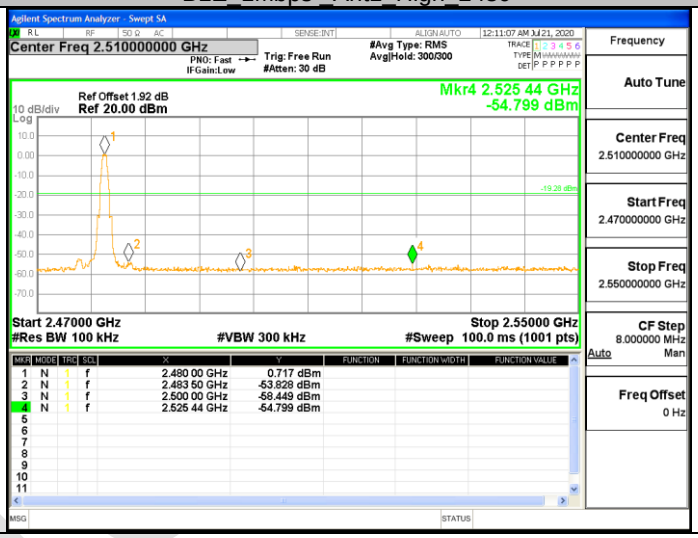
| TestMode | Antenna | ChName | Channel | RefLevel[dBm] | Result[dBm] | Limit[dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_1Mbps | Ant1 | Low | 2402 | 1.13 | -55.37 | <=-18.87 | PASS |
| | | High | 2480 | 0.72 | -54.8 | <=-19.28 | PASS |
| BLE_2Mbps | Ant1 | Low | 2402 | 1.25 | -55.87 | <=-18.75 | PASS |
| | | High | 2480 | 1.25 | -55.66 | <=-18.75 | PASS |

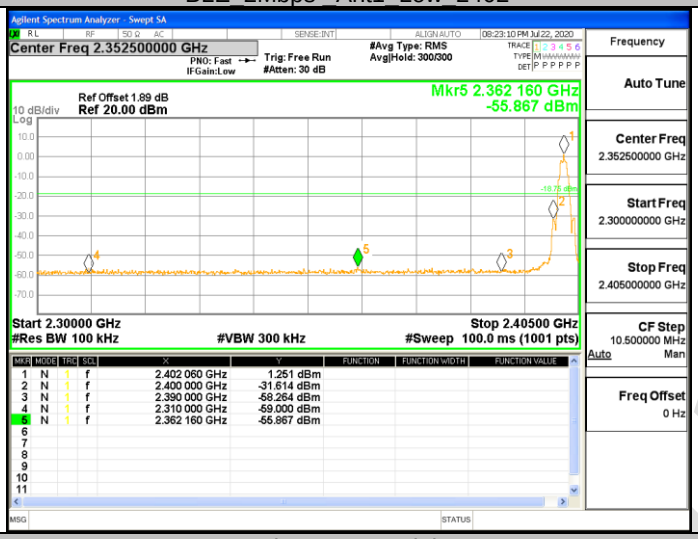
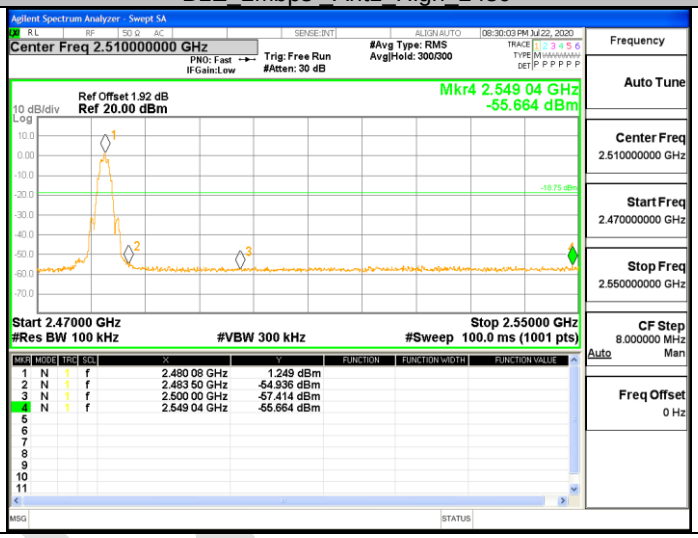
## Test Graphs

BLE_1Mbps _Ant1_Low_2402




BLE_1Mbps _Ant1_High_2480



| BLE_2Mbps _Ant1_Low_2402 |
| --- |
|  |
| BLE_2Mbps _Ant1_High_2480 |
|  |

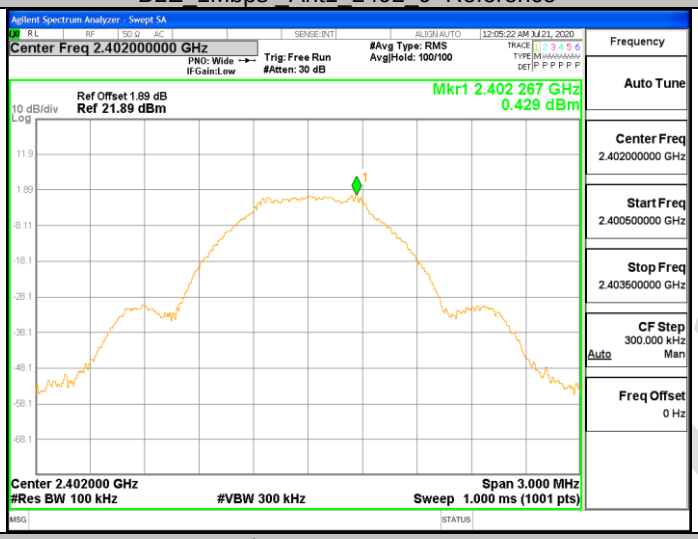
## 10.6 APPENDIXF:CONDUCTED SPURIOUS EMISSION

### Test Result

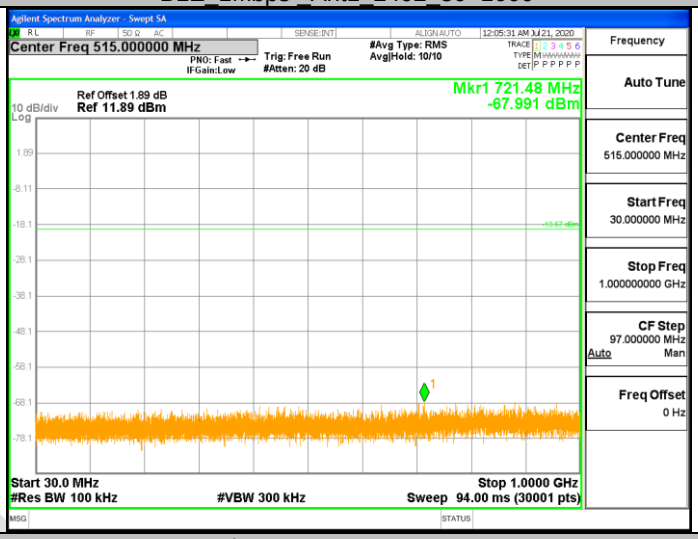
| TestMode | Antenna | Channel | FreqRange [MHz] | RefLevel [dBm] | Result[dBm] | Limit[dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_1Mbps | Ant1 | 2402 | Reference | 0.43 | 0.43 | --- | PASS |
| | | | 30~1000 | 30~1000 | -67.991 | <=-19.571 | PASS |
| | | | 1000~26500 | 1000~26500 | -53.534 | <=-19.571 | PASS |
| | | 2442 | Reference | 1.12 | 1.12 | --- | PASS |
| | | | 30~1000 | 30~1000 | -68.161 | <=-18.881 | PASS |
| | | | 1000~26500 | 1000~26500 | -53.148 | <=-18.881 | PASS |
| | | 2480 | Reference | 1.13 | 1.13 | --- | PASS |
| | | | 30~1000 | 30~1000 | -67.883 | <=-18.868 | PASS |
| | | | 1000~26500 | 1000~26500 | -53.241 | <=-18.868 | PASS |
| BLE_2Mbps | Ant1 | 2402 | Reference | 0.14 | 0.14 | --- | PASS |
| | | | 30~1000 | 30~1000 | -67.306 | <=-19.856 | PASS |
| | | | 1000~26500 | 1000~26500 | -53.562 | <=-19.856 | PASS |
| | | 2442 | Reference | 0.73 | 0.73 | --- | PASS |
| | | | 30~1000 | 30~1000 | -66.461 | <=-19.268 | PASS |
| | | | 1000~26500 | 1000~26500 | -53.667 | <=-19.268 | PASS |
| | | 2480 | Reference | 1.12 | 1.12 | --- | PASS |
| | | | 30~1000 | 30~1000 | -67.12 | <=-18.881 | PASS |
| | | | 1000~26500 | 1000~26500 | -53.689 | <=-18.881 | PASS |

## Test Graphs

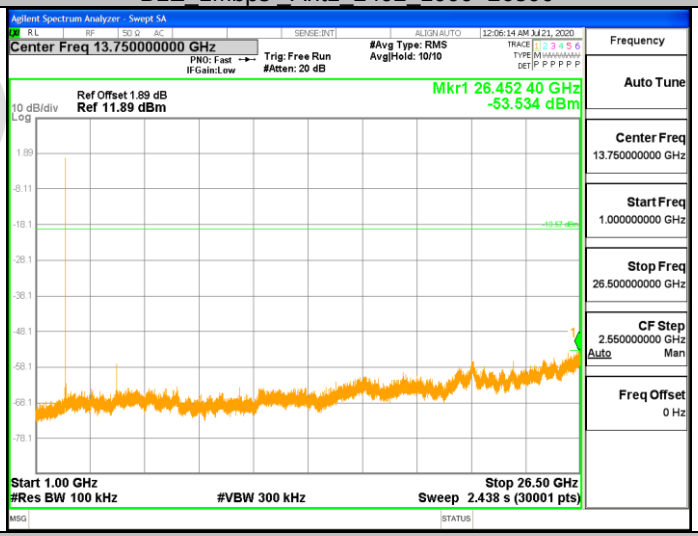
BLE_1Mbps _Ant1_2402_0~Reference



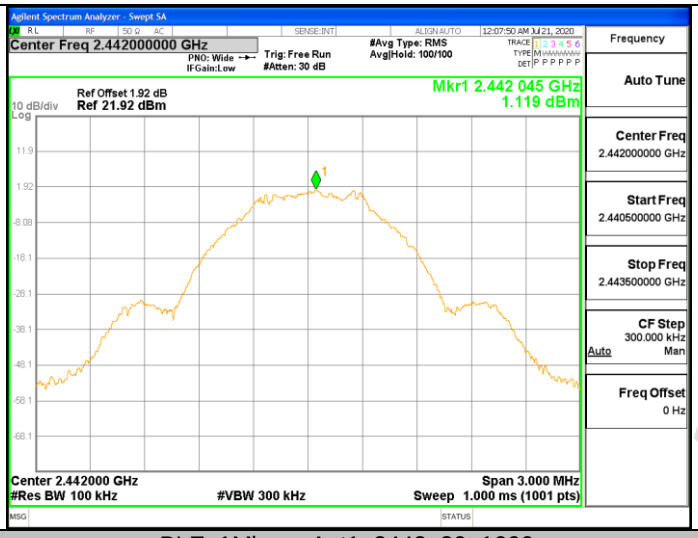

BLE_1Mbps _Ant1_2402_30~1000



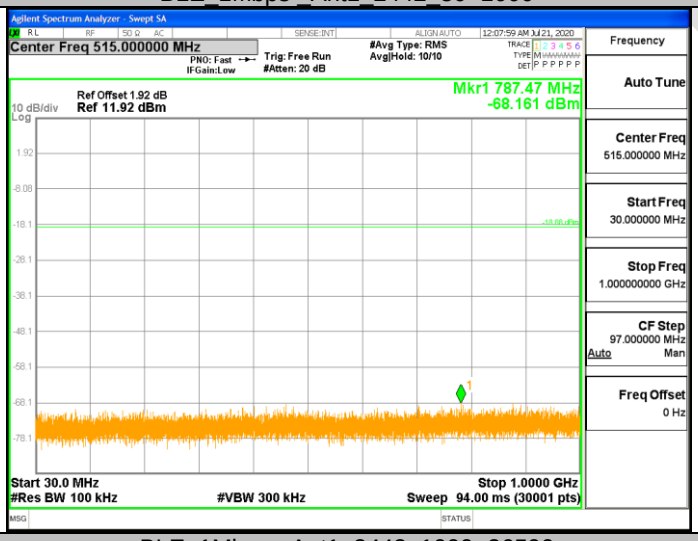

BLE_1Mbps _Ant1_2402_1000~26500



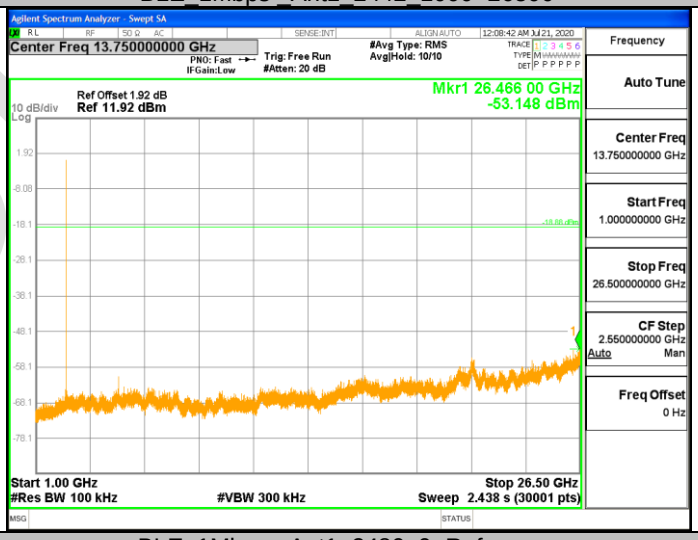

BLE_1Mbps _Ant1_2442_0~Reference



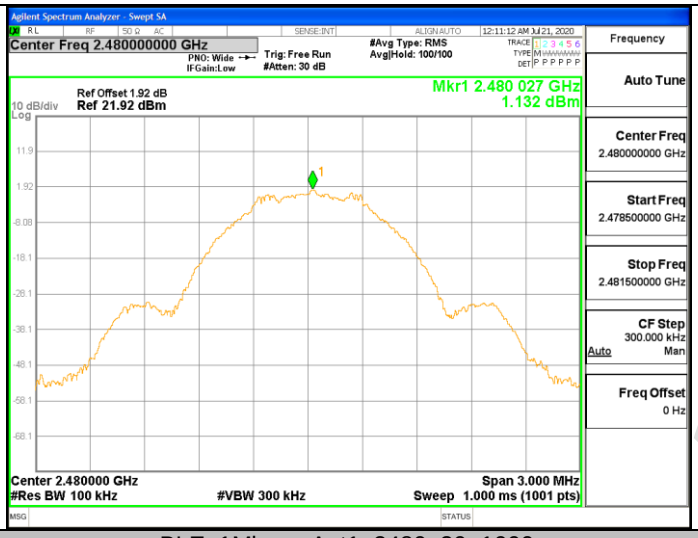

BLE_1Mbps _Ant1_2442_30~1000



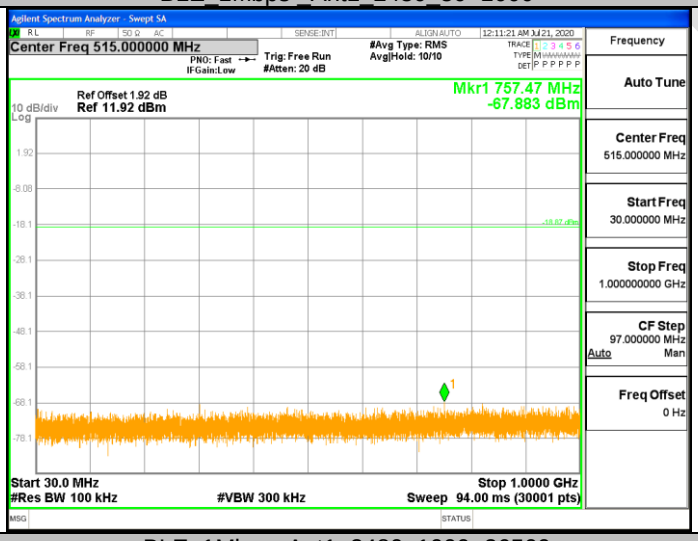

BLE_1Mbps _Ant1_2442_1000~26500



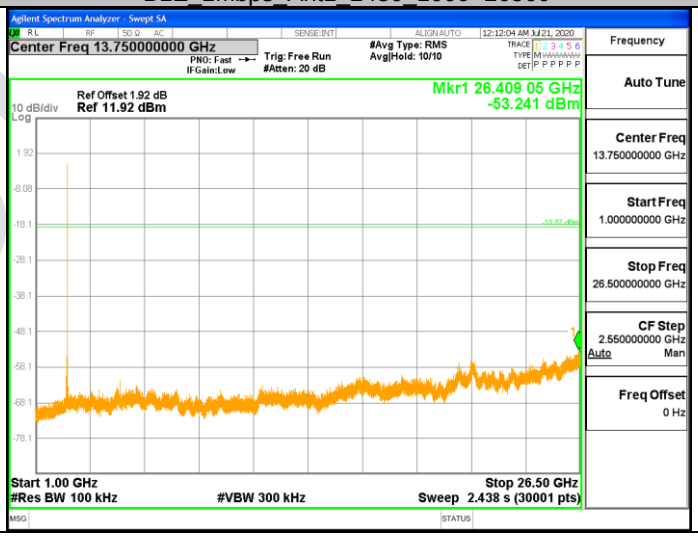

BLE_1Mbps _Ant1_2480_0~Reference



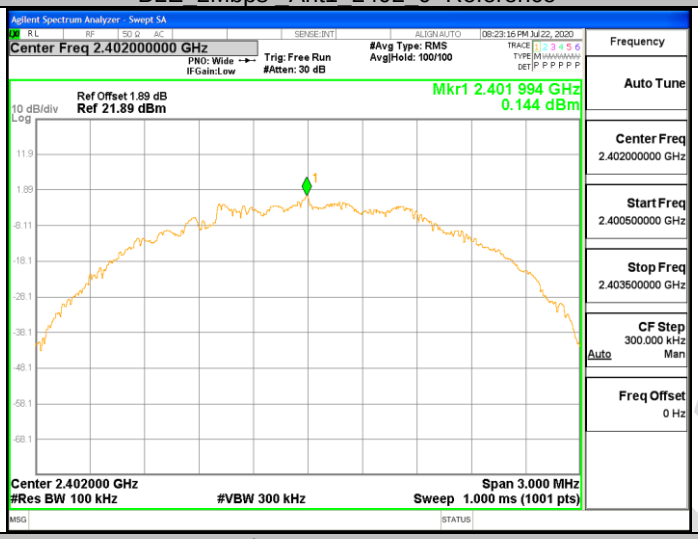

BLE_1Mbps _Ant1_2480_30~1000



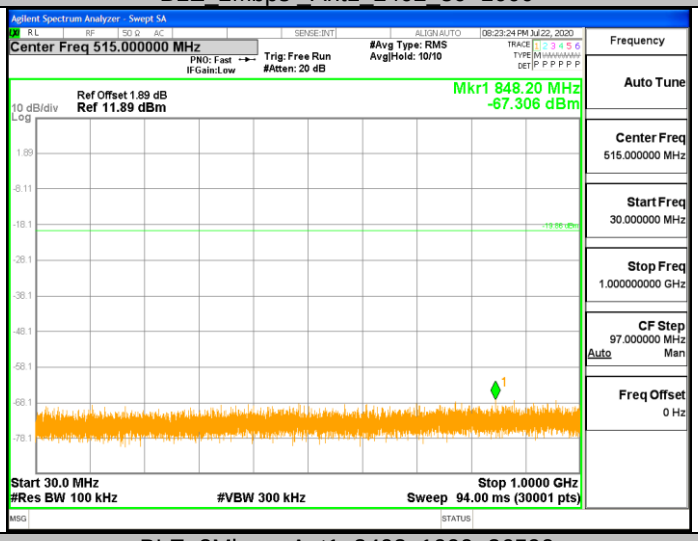

BLE_1Mbps_Ant1_2480_1000~26500



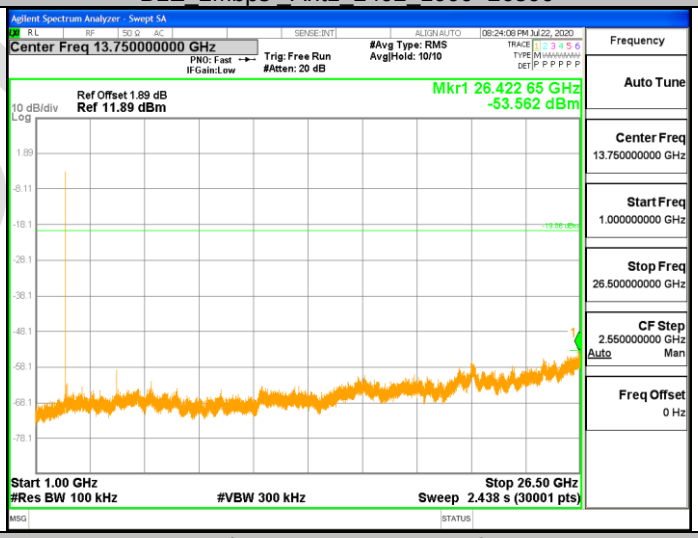
BLE_2Mbps _Ant1_2402_0~Reference



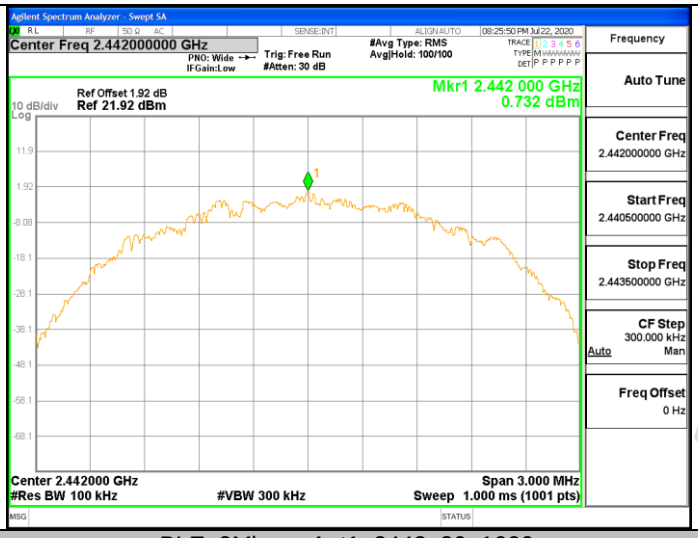

BLE_2Mbps _Ant1_2402_30~1000



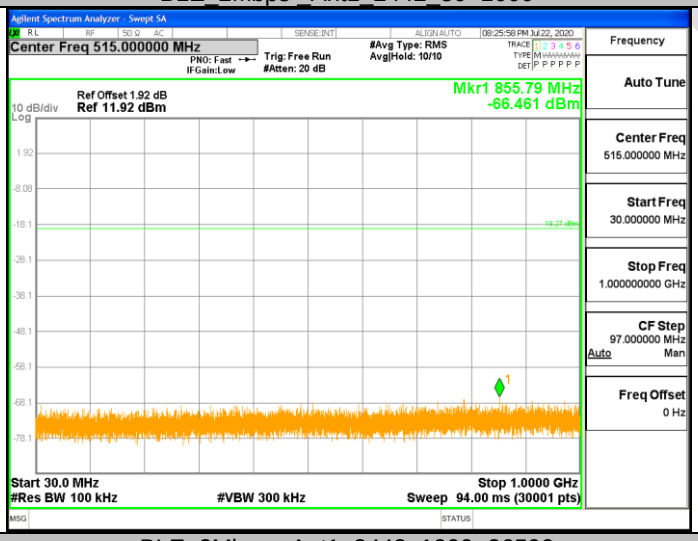

BLE_2Mbps _Ant1_2402_1000~26500



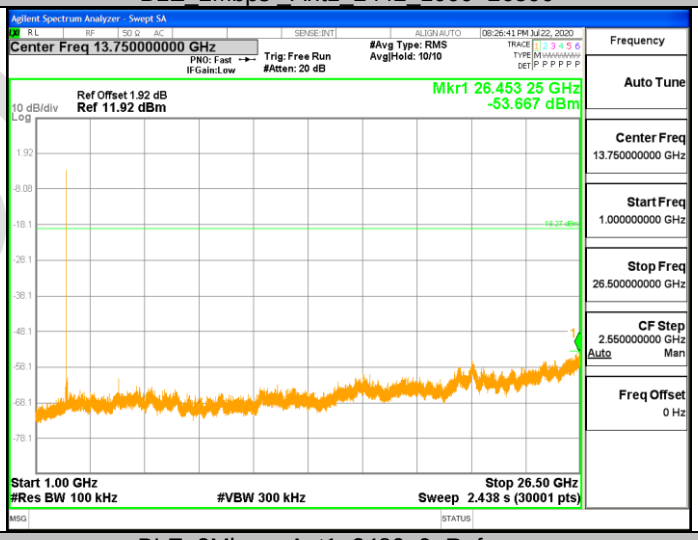

BLE_2Mbps _Ant1_2442_0~Reference



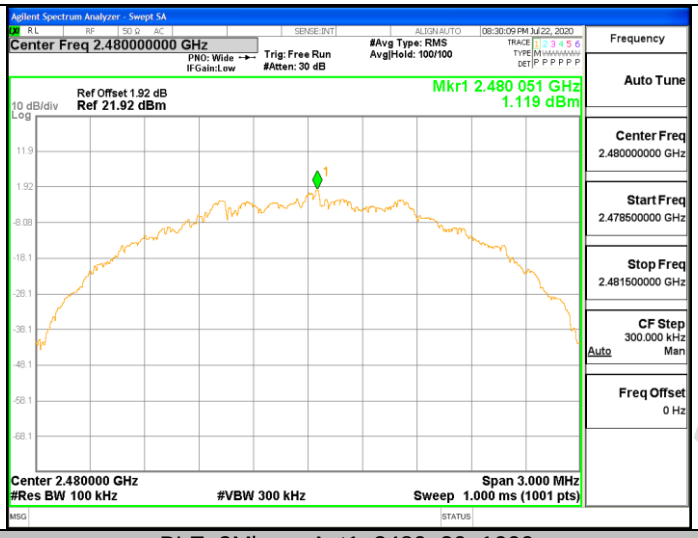

BLE_2Mbps _Ant1_2442_30~1000



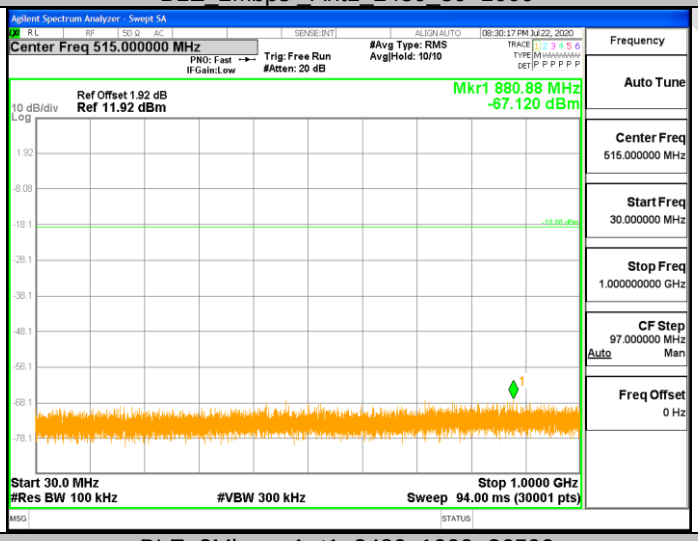

BLE_2Mbps _Ant1_2442_1000~26500



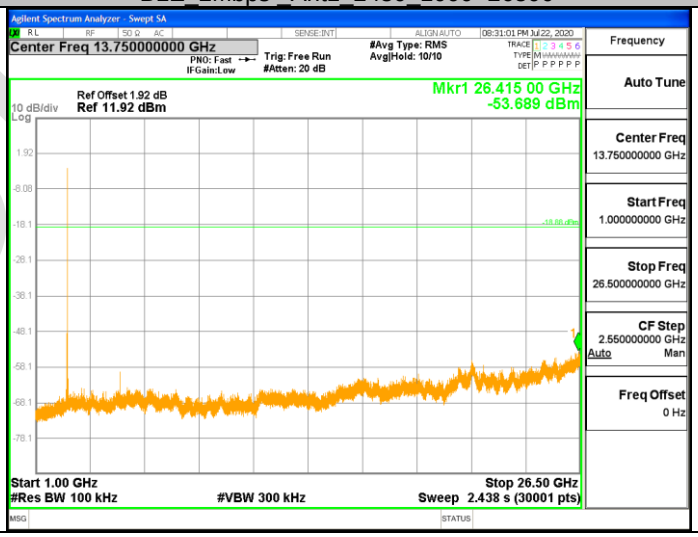

BLE_2Mbps _Ant1_2480_0~Reference




BLE_2Mbps _Ant1_2480_30~1000



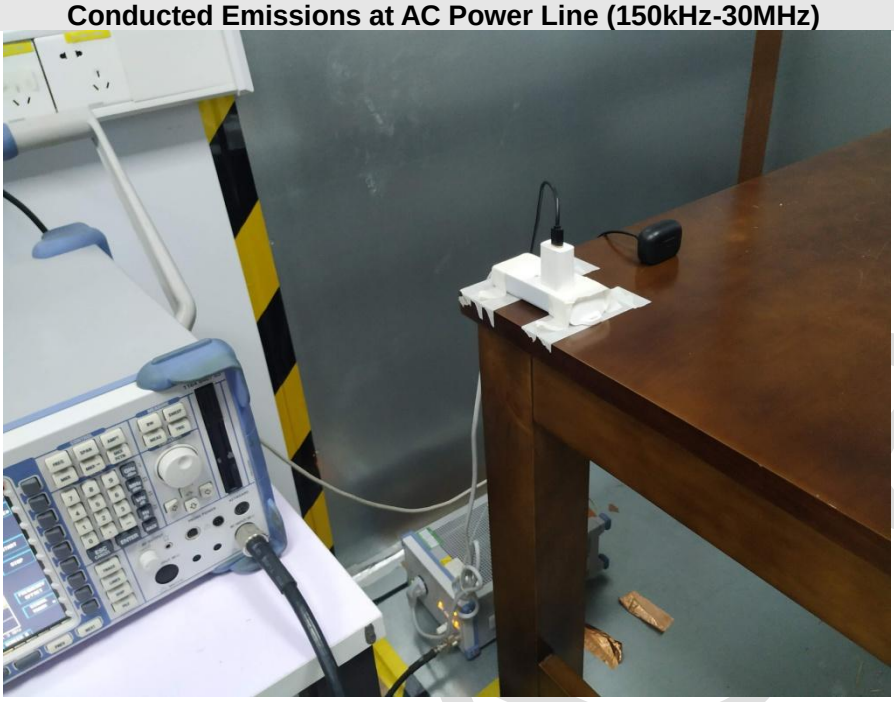

BLE_2Mbps _Ant1_2480_1000~26500



# APPENDIX A: PHOTOGRAPHS OF TEST SETUP

**Radiated Spurious Emissions**

**Conducted Emissions at AC Power Line (150kHz-30MHz)**



## APPENDIX B: PHOTOGRAPHS OF EUT

Reference to the test report No. BLA-EMC-202007-A5101

**----END OF REPORT----**