# FCC RADIO TEST REPORT

| | | |
|---|---|---|
| Applicant | : | Ningbo Kangruida Sports Equipment Co.,Ltd |
| Address | : | 2st Floor, Building 3, No. 66, Lane 520, Tongning Road, Jiangbei District, Ningbo City, Zhejiang Province, China |
| Manufacturer | : | Ningbo Zhuangmei Electronic Co., Ltd |
| Address | : | Hongxin Village, Gaoqian Town, Haishu District, Ningbo |
| Factory | : | Ningbo Zhuangmei Electronic Co., Ltd |
| Address | : | Hongxin Village, Gaoqian Town, Haishu District, Ningbo |
| Product Name | : | TREADMILL REMOTE CONTROL |
| Brand Name | : | N/A |
| Model No. | : | QHL020_813310KB02, QHL020 series (For model difference refer to section 2) |
| FCC ID | : | 2A48O-813310KB02 |
| Measurement Standard | : | 47 CFR FCC Part 15, Subpart C (Section 15.249) |
| Receipt Date of Samples | : | March 02, 2022 |
| Date of Tested | : | March 02, 2022 to April 07, 2022 |
| Date of Report | : | April 08, 2022 |

This report shows that above equipment is technically compliant with the requirements of the standards above. All test results in this report apply only to the tested sample(s). Without prior written approval of Dongguan Nore Testing Center Co., Ltd, this report shall not be reproduced except in full.

Prepared by

Rose Hu / Project Engineer

Approved by

Iori Fan / Authorized Signatory

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## Revision History

| Report Number | Description | Issued Date |
|---|---|---|
| NTC2203025FV00 | Initial Issue | 2022-04-08 |
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## 1. Summary of Test Result

| FCC Rules | Description of Test | Result | Remarks |
|---|---|---|---|
| §15.207 (a) | AC Power Conducted Emission | N/A | --- |
| §15.249(a)/ 15.209 | Radiated Emissions | PASS | --- |
| §15.249(d)/ 15.205 | Band Edge | PASS | --- |
| §15.215(c) | 20dB Bandwidth | PASS | --- |
| §15.203 | Antenna Requirement | PASS | --- |

## 2. General Description of EUT

| | |
|---|---|
| **Product Information** | |
| Product name: | TREADMILL REMOTE CONTROL |
| Main Model Name: | QHL020_813310KB02 |
| Additional Model Name: | QHL020 series |
| Model Difference: | Both of models have the same circuitry, electrical mechanical, PCB Layout and physical construction. The difference is model name due to marketing purpose. |
| S/N: | 2203-0716-1 |
| Brand Name: | N/A |
| Hardware version: | V2.0 |
| Software version: | V1.0 |
| Rating: | DC 3.0V CR2032 battery |
| Typical arrangement: | Table-top |
| I/O Port: | N/A |
| **Accessories Information** | |
| Adapter: | N/A |
| Cable: | N/A |
| Other: | N/A |
| **Additional information** | |
| Note: | 1. According to the model difference, all the tests were performed on model QHL020_813310KB02.<br>2. The product consists of the treadmill and TREADMILL REMOTE CONTROL. This report only applies to the TREADMILL REMOTE CONTROL. |
| Remark: | All the information above are provided by the manufacturer. More detailed feature of the EUT please refers to the user manual. |

| Technical Specification (2.4G Function ) | |
|---|---|
| Frequency Range: | 2402-2480MHz |
| Modulation Type: | GFSK |
| Number of Channel: | 79 (refer to following channel list for details) |
| Channel Space: | 1MHz |
| Antenna Type: | PCB antenna |
| Antenna Gain: | 0 dBi (Declared by manufacturer) |

| Channel List | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **Channel** | **Frequency (MHz)** | **Channel** | **Frequency (MHz)** | **Channel** | **Frequency (MHz)** |
| 1 | 2402 | 21 | 2422 | 41 | 2442 | 61 | 2462 |
| 2 | 2403 | 22 | 2423 | 42 | 2443 | 62 | 2463 |
| 3 | 2404 | 23 | 2424 | 43 | 2444 | 63 | 2464 |
| 4 | 2405 | 24 | 2425 | 44 | 2445 | 64 | 2465 |
| 5 | 2406 | 25 | 2426 | 45 | 2446 | 65 | 2466 |
| 6 | 2407 | 26 | 2427 | 46 | 2447 | 66 | 2467 |
| 7 | 2408 | 27 | 2428 | 47 | 2448 | 67 | 2468 |
| 8 | 2409 | 28 | 2429 | 48 | 2449 | 68 | 2469 |
| 9 | 2410 | 29 | 2430 | 49 | 2450 | 69 | 2470 |
| 10 | 2411 | 30 | 2431 | 50 | 2451 | 70 | 2471 |
| 11 | 2412 | 31 | 2432 | 51 | 2452 | 71 | 2472 |
| 12 | 2413 | 32 | 2433 | 52 | 2453 | 72 | 2473 |
| 13 | 2414 | 33 | 2434 | 53 | 2454 | 73 | 2474 |
| 14 | 2415 | 34 | 2435 | 54 | 2455 | 74 | 2475 |
| 15 | 2416 | 35 | 2436 | 55 | 2456 | 75 | 2476 |
| 16 | 2417 | 36 | 2437 | 56 | 2457 | 76 | 2477 |
| 17 | 2418 | 37 | 2438 | 57 | 2458 | 77 | 2478 |
| 18 | 2419 | 38 | 2439 | 58 | 2459 | 78 | 2479 |
| 19 | 2420 | 39 | 2440 | 59 | 2460 | 79 | 2480 |
| 20 | 2421 | 40 | 2441 | 60 | 2461 | --- | --- |

## 3. Test Channels and Modes Detail

| Mode | | Channel | | Frequency (MHz) | Modulation | Data Rate (Mbps) |
|---|---|---|---|---|---|---|
| 1 | TX | Low | 1 | 2402 | GFSK | 1 |
| 2 | TX | Mid | 39 | 2440 | GFSK | 1 |
| 3 | TX | High | 79 | 2480 | GFSK | 1 |
| 4. | Normal Mode | --- | --- | --- | --- | --- |

Note: TX mode means that the EUT was programmed to be in continuously transmitting mode.

## 4. Configuration of EUT

**TX Mode**

EUT

**Normal Mode**

EUT

## 5. Modification of EUT

No modifications are made to the EUT during all test items.

## 6. Description of Support Device

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| No. | Equipment | Brand | M/N | S/N | Cable Specification | Remarks |
|---|---|---|---|---|---|---|
| --- | --- | --- | --- | --- | --- | --- |

## 7. Test Facility and Location

| Test Site | : | Dongguan Nore Testing Center Co., Ltd. (Dongguan NTC Co., Ltd.) |
|---|---|---|
| Accreditations and Authorizations | : | The Laboratory has been assessed and proved to be in compliance with CNAS/CL01<br>Listed by CNAS, August 13, 2018<br>The Certificate Registration Number is L5795.<br>The Certificate is valid until August 13, 2024<br><br>The Laboratory has been assessed and proved to be in compliance with ISO17025<br>Listed by A2LA, November 01, 2017<br>The Certificate Registration Number is 4429.01<br>The Certificate is valid until December 31, 2023<br><br>Listed by FCC, November 06, 2017<br>Test Firm Registration Number: 907417<br><br>Listed by Industry Canada, June 08, 2017<br>The Certificate Registration Number. Is 46405-9743A |
| Test Site Location | : | Building D, Gaosheng Science and Technology Park, Hongtu Road, Nancheng District, Dongguan City, Guangdong Province, China |

## 8. Applicable Standards and References

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

**Test Standards:**

47 CFR Part 15, Subpart C, 15.249

ANSI C63.10-2013

**References Test Guidance:**

N/A

## 9. Deviations and Abnormalities from Standard Conditions

No additions, deviations and exclusions from the standard.

## 10. Test Conditions

| No. | Test Item | Test Mode | Test Voltage | Tested by | Remarks |
|---|---|---|---|---|---|
| 1. | AC Power Conducted Emission | --- | --- | --- | --- |
| 2. | Radiated Emissions | 1-4 | DC 3.0V | Ray | See note 1 |
| 3. | Band Edge | 1-3 | DC 3.0V | Ray | See note 1 |
| 4. | 20dB Bandwidth | 1-3 | DC 3.0V | Ray | See note 1 |
| 5. | Antenna Requirement | --- | --- | --- | --- |

Note:

1. The testing climatic conditions for temperature, humidity, and atmospheric pressure are within: 15~35℃, 30~70%, 86~106kPa
2. As the EUT can be operated multiple positions, all X,Y,Z axis were considered during the test and only the worst case X was recorded.
3. This product will not be connected to the AC mains during normal use, therefore the AC Power Conducted Emission test is not applicable.

## 11. Measurement Uncertainty

| No. | Test Item | Frequency | Uncertainty | Remarks |
|---|---|---|---|---|
| 1. | Conducted Emission | 150KHz ~ 30MHz | ±2.52 dB | --- |
| 2. | Radiated Emission Test | 9kHz ~ 30MHz | ±2.60 dB | --- |
| | | 30MHz ~ 1GHz | ±4.68 dB | --- |
| | | 1GHz ~ 18GHz | ±5.14 dB | --- |
| | | 18GHz ~ 40GHz | ±5.14 dB | --- |
| 3. | RF Conducted Test | 10Hz ~ 40GHz | ±1.06 dB | --- |
| 4. | Occupied Channel Bandwidth | --- | ±1.42 x10-4% MHz | --- |

**Note:**

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The measurement uncertainly levels above are estimated and calculated according to CISPR 16-4-2.
3. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

## 12. Sample Calculations

| Conducted Emission | | | | | | |
|---|---|---|---|---|---|---|
| **Freq. (MHz)** | **Reading Level (dBuV)** | **Correct Factor (dB)** | **Measurement (dBuV)** | **Limit (dBuV)** | **Over (dB)** | **Detector** |
| 0.1980 | 41.60 | 10.60 | 52.20 | 63.69 | -11.49 | QP |

Where,

| | |
|---|---|
| Freq. | = Emission frequency in MHz |
| Reading Level | = Spectrum Analyzer/Receiver Reading |
| Corrector Factor | = Insertion loss of LISN + Cable Loss + RF Switching Unit attenuation |
| Measurement | = Reading + Corrector Factor |
| Limit | = Limit stated in standard |
| Margin | = Measurement - Limit |
| Detector | = Reading for Quasi-Peak / Average / Peak |

| Radiated Spurious Emissions and Restricted Bands | | | | | | |
|---|---|---|---|---|---|---|
| **Freq. (MHz)** | **Reading Level (dBuV)** | **Correct Factor (dB/m)** | **Measurement (dBuV/m)** | **Limit (dBuV/m)** | **Over (dB)** | **Detector** |
| 83.3500 | 33.52 | -11.07 | 22.45 | 40.00 | -17.55 | QP |

Where,

| | |
|---|---|
| Freq. | = Emission frequency in MHz |
| Reading Level | = Spectrum Analyzer/Receiver Reading |
| Corrector Factor | = Antenna Factor + Cable Loss - Pre-amplifier |
| Measurement | = Reading + Corrector Factor |
| Limit | = Limit stated in standard |
| Over | = Margin, which calculated by Measurement - Limit |
| Detector | = Reading for Quasi-Peak / Average / Peak |

Note: For all conducted test items, the spectrum analyzer offset or transducer is derived from RF cable loss and attenuator factor. The offset or transducer is equal to the RF cable loss plus attenuator factor.

# 13. Test Items and Results

## 13.1 Conducted Emissions Measurement

### LIMITS

According to the requirements of FCC PART 15.207, the limits are as follows:

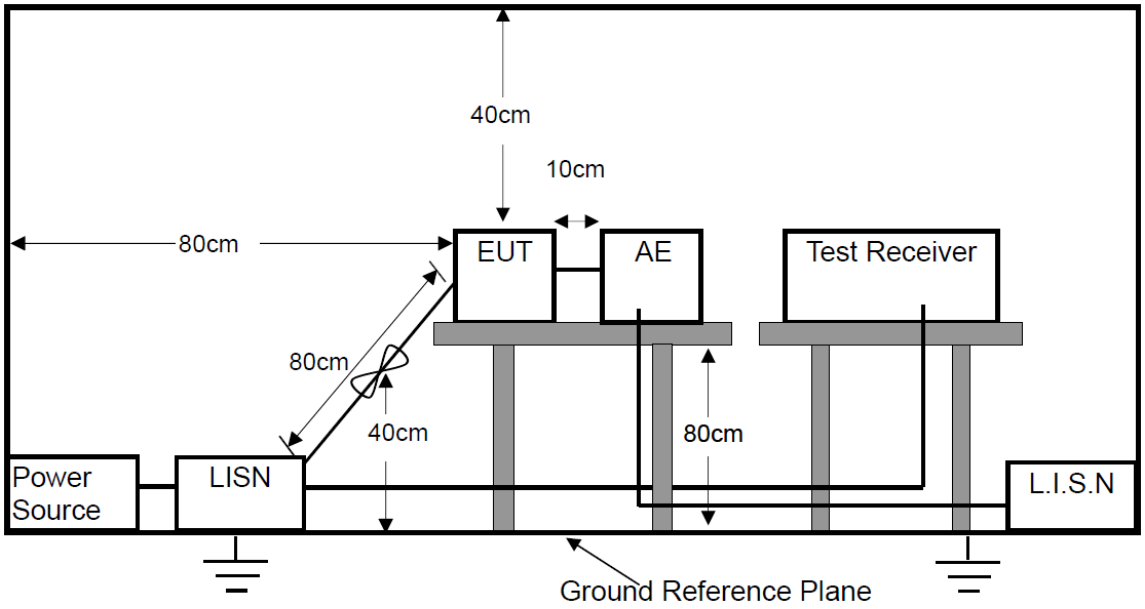
| Frequency (MHz) | Quasi-peak | Average |
|---|---|---|
| 0.15 to 0.5 | 66 to 56 | 56 to 46 |
| 0.5 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

Note: 1. If the limits for the average detector are met when using the quasi-peak detector, then the limits for the measurements with the average detector are considered to be met.

2. The lower limit shall apply at the transition frequencies.

3. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz.

### BLOCK DIAGRAM OF TEST SETUP



## TEST PROCEDURES

a. The EUT was placed on a wooden table 0.8m height from the metal ground plan and 0.4m from the conducting wall of the shielding room and it was kept at 0.8m from any other grounded conducting surface.

b. All I/O cables and support devices were positioned as per ANSI C63.10.

c. Connect mains power port of the EUT to a line impedance stabilization network (LISN).

d. Connect all support devices to the other LISN and AAN, if needed.

e. Scan the frequency range from 150KHz to 30MHz at both sides of AC line for maximum conducted interference checking and record the test data.

## TEST RESULTS

Not Applicable.

## 13.2 Radiated Spurious Emissions and Restricted Bands Measurement

**LIMITS**

| Frequency range MHz | Distance Meters | Field Strengths Limit (15.209) | |
|---|---|---|---|
| | | μV/m | |
| 0.009 ~ 0.490 | 300 | 2400/F(kHz) | |
| 0.490 ~ 1.705 | 30 | 24000/F(kHz) | |
| 1.705 ~ 30 | 30 | 30 | |
| 30 ~ 88 | 3 | 100 | |
| 88 ~ 216 | 3 | 150 | |
| 216 ~ 960 | 3 | 200 | |
| Above 960 | 3 | 500 | |
| Frequency range MHz | Distance Meters | Field Strengths Limit (15.249) | |
| | | mV/m (Field strength of fundamental) | μV/m (Field strength of Harmonics) |
| 902 ~ 928 | 3 | 50 | 500 |
| 2400 ~ 2483.5 | 3 | 50 | 500 |
| 5725 ~ 5875 | 3 | 50 | 500 |
| 24000 ~ 2425000 | 3 | 250 | 2500 |

Remark: (1) Emission level (dB)μV = 20 log Emission level μV/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

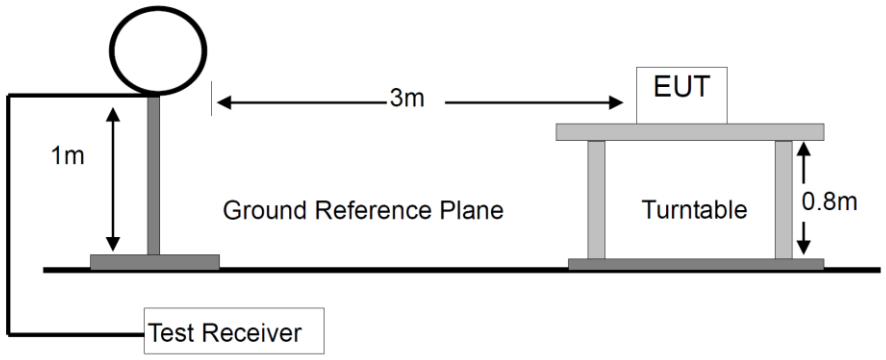
(3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

(4) The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

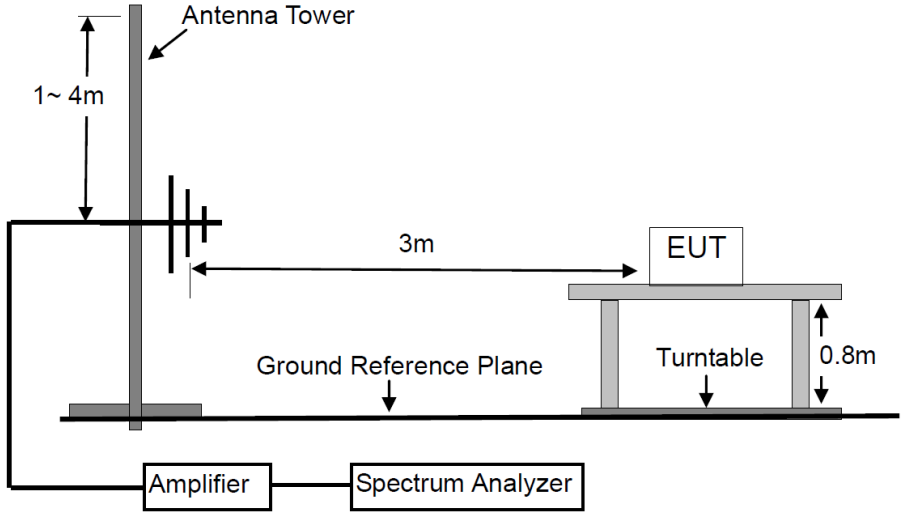
(5) §15.249(d) specifies that emissions which fall in the restricted bands, as defined in §15.205 comply with radiated emission limits specified in §15.209.

## BLOCK DIAGRAM OF TEST SETUP

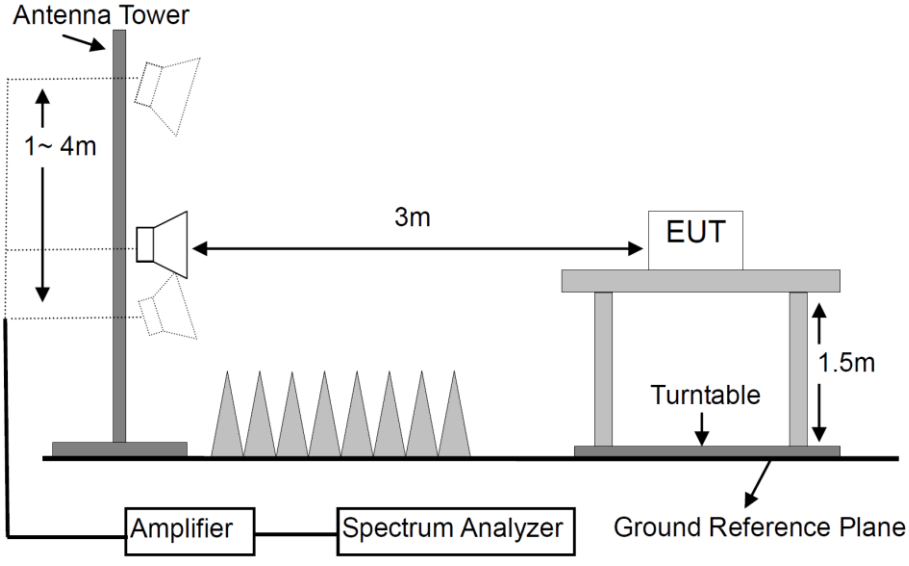
For Radiated Emission below 30MHz




For Radiated Emission 30-1000MHz




For Radiated Emission Above 1000MHz.



**TEST PROCEDURES**

a. Below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room.

b. For the radiated emission test above 1GHz:

The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter full anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The height of antenna 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 and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode.

f. A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

| Frequency Band (MHz) | Detector | Resolution Bandwidth | Video Bandwidth |
|---|---|---|---|
| 30 to 1000 | QP | 120 kHz | 300 kHz |
| Above 1000 | Peak | 1 MHz | 3 MHz |
| | Average | 1 MHz | 10 Hz |

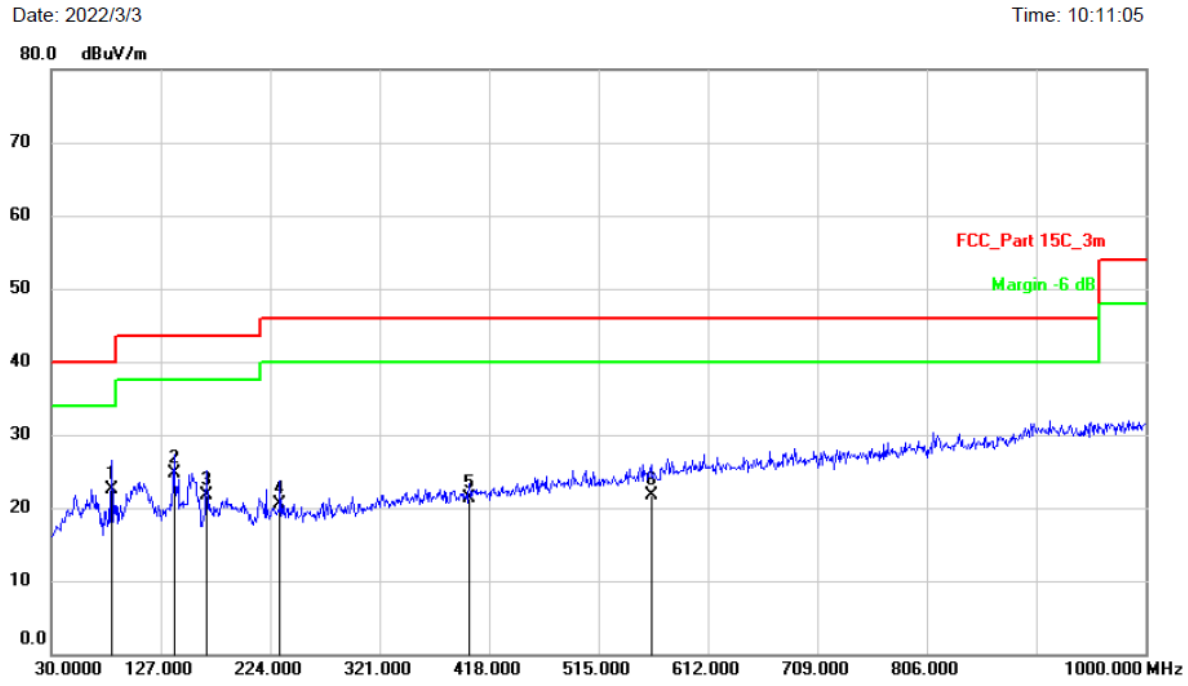
**TEST RESULTS**

PASS

Please refer to the following pages.

| | |
|---|---|
| M/N: QHL020_813310KB02 | Testing Voltage: DC 3.0V |
| Polarization: Horizontal | Detector: QP |
| Test Mode: 4 | Distance: 3m |

# Radiated Emission Measurement

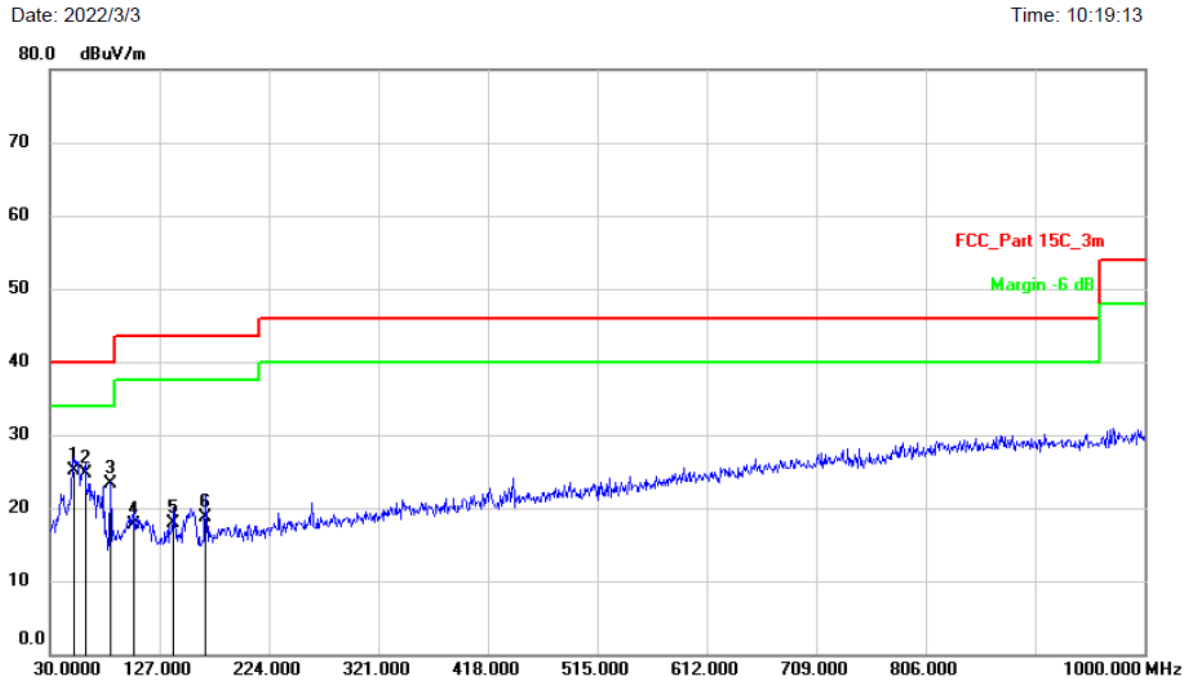



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | * | 83.3500 | 33.52 | -11.07 | 22.45 | 40.00 | -17.55 | QP | |
| 2 | | 138.6400 | 35.59 | -10.90 | 24.69 | 43.50 | -18.81 | QP | |
| 3 | | 167.7400 | 31.76 | -10.11 | 21.65 | 43.50 | -21.85 | QP | |
| 4 | | 232.7300 | 27.46 | -6.87 | 20.59 | 46.00 | -25.41 | QP | |
| 5 | | 400.5400 | 24.68 | -3.32 | 21.36 | 46.00 | -24.64 | QP | |
| 6 | | 561.5600 | 22.23 | -0.44 | 21.79 | 46.00 | -24.21 | QP | |

Note: Below 30MHz, the emissions are lower than 20dB below the allowable limit.

| | |
|---|---|
| M/N: QHL020_813310KB02 | Testing Voltage: DC 3.0V |
| Polarization: Vertical | Detector: QP |
| Test Mode: 4 | Distance: 3m |

# Radiated Emission Measurement




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | * | 51.3400 | 32.25 | -7.13 | 25.12 | 40.00 | -14.88 | QP | |
| 2 | | 61.0400 | 32.63 | -7.96 | 24.67 | 40.00 | -15.33 | QP | |
| 3 | | 83.3500 | 34.49 | -11.27 | 23.22 | 40.00 | -16.78 | QP | |
| 4 | | 103.7200 | 26.77 | -9.08 | 17.69 | 43.50 | -25.81 | QP | |
| 5 | | 139.6100 | 29.42 | -11.48 | 17.94 | 43.50 | -25.56 | QP | |
| 6 | | 167.7400 | 29.08 | -10.41 | 18.67 | 43.50 | -24.83 | QP | |

Note: Below 30MHz, the emissions are lower than 20dB below the allowable limit.

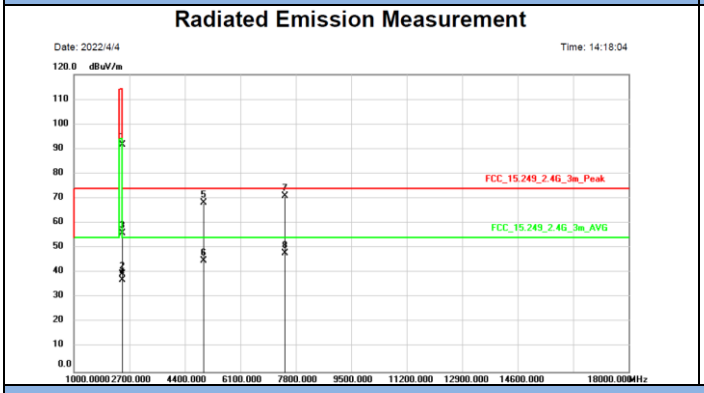
| Modulation: GFSK | | Test Result: PASS | | | | | Test frequency range: 1-25GHz | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Freq. (MHz) | Ant. Pol. (H/V) | Reading Level(dBuV) | | Factor (dB/m) | Emission Level (dBuV/m) | | Limit 3m (dBuV/m) | | Margin (dB) | |
| | | PK | AV | | PK | AV | PK | AV | PK | AV |
| **Operation Mode: TX Mode (Low)** | | | | | | | | | | |
| 2402 | V | 79.47 | 39.49 | 0.13 | 79.60 | 39.62 | 114.00 | 94.00 | -34.40 | -54.38 |
| 4804 | V | 52.38 | 36.32 | 6.30 | 58.68 | 42.62 | 74.00 | 54.00 | -15.32 | -11.38 |
| 7206 | V | 59.15 | 37.08 | 10.44 | 69.59 | 47.52 | 74.00 | 54.00 | -4.41 | -6.48 |
| --- | | | | | | | | | | |
| 2402 | H | 92.22 | 40.63 | 0.13 | 92.35 | 40.73 | 114.00 | 94.00 | -21.65 | -53.24 |
| 4804 | H | 60.81 | 37.57 | 6.30 | 67.11 | 43.87 | 74.00 | 54.00 | -6.89 | -10.13 |
| 7206 | H | 59.76 | 37.08 | 10.44 | 70.20 | 47.52 | 74.00 | 54.00 | -3.80 | -6.48 |
| --- | | | | | | | | | | |
| **Operation Mode: TX Mode (Mid)** | | | | | | | | | | |
| 2440 | V | 82.21 | 39.85 | 0.23 | 82.44 | 40.08 | 114.00 | 94.00 | -31.56 | -53.92 |
| 4880 | V | 54.33 | 37.17 | 6.60 | 60.93 | 43.77 | 74.00 | 54.00 | -13.07 | -10.23 |
| 7320 | V | 58.90 | 36.91 | 10.55 | 69.45 | 47.46 | 74.00 | 54.00 | -4.55 | -6.54 |
| --- | | | | | | | | | | |
| 2440 | H | 93.15 | 41.00 | 0.23 | 93.38 | 41.23 | 114.00 | 94.00 | -20.62 | -52.77 |
| 4880 | H | 61.96 | 37.92 | 6.60 | 68.56 | 44.52 | 74.00 | 54.00 | -5.44 | -9.48 |
| 7320 | H | 59.23 | 37.22 | 10.55 | 69.78 | 47.77 | 74.00 | 54.00 | -4.22 | -6.23 |
| --- | | | | | | | | | | |
| **Operation Mode: TX Mode (High)** | | | | | | | | | | |
| 2480 | V | 85.28 | 39.95 | 0.34 | 85.62 | 40.29 | 114.00 | 94.00 | -28.38 | -53.71 |
| 4960 | V | 55.71 | 37.39 | 6.89 | 62.60 | 44.28 | 74.00 | 54.00 | -11.40 | -9.72 |
| 7440 | V | 56.65 | 36.87 | 10.60 | 67.25 | 47.47 | 74.00 | 54.00 | -6.75 | -6.53 |
| --- | | | | | | | | | | |
| 2480 | H | 91.18 | 39.11 | 0.34 | 91.52 | 39.45 | 114.00 | 94.00 | -22.48 | -54.55 |
| 4960 | H | 61.38 | 37.85 | 6.89 | 68.27 | 44.74 | 74.00 | 54.00 | -5.73 | -9.26 |
| 7440 | H | 60.39 | 37.18 | 10.60 | 70.99 | 47.78 | 74.00 | 54.00 | -3.01 | -6.22 |
| --- | | | | | | | | | | |

Remark: Data of measurement within this frequency range shown “---” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits.

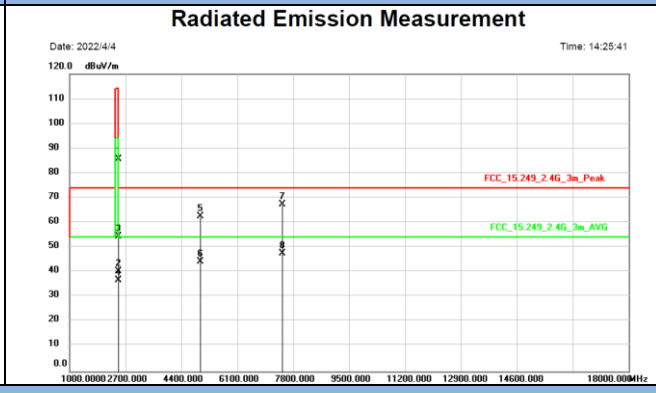
| Band edge | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 2390.000 | H | 59.42 | 36.81 | 0.09 | 59.51 | 36.90 | 74.00 | 54.00 | -14.49 | -17.10 |
| 2390.000 | V | 53.12 | 36.19 | 0.09 | 53.21 | 36.28 | 74.00 | 54.00 | -20.79 | -17.72 |
| 2483.500 | H | 55.67 | 36.78 | 0.34 | 56.01 | 37.12 | 74.00 | 54.00 | -17.99 | -16.88 |
| 2483.500 | V | 54.21 | 36.46 | 0.34 | 54.55 | 36.80 | 74.00 | 54.00 | -19.45 | -17.20 |
| Note: Other band edge, the emissions are lower than 20dB below the allowable limit. | | | | | | | | | | |

**Low channel**

Horizontal

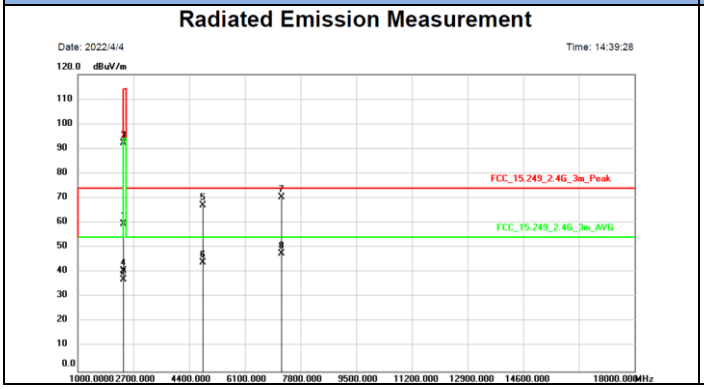



Vertical

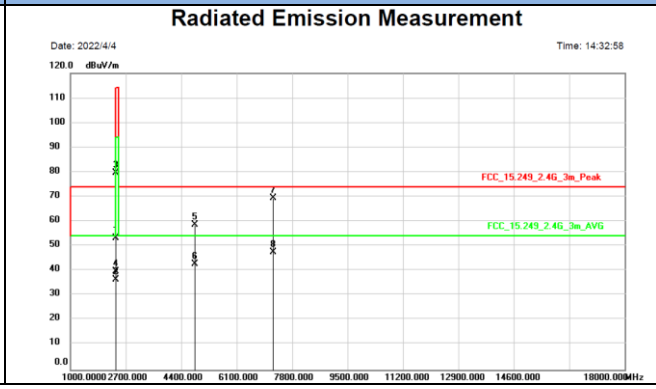



**High channel**

Horizontal




Vertical



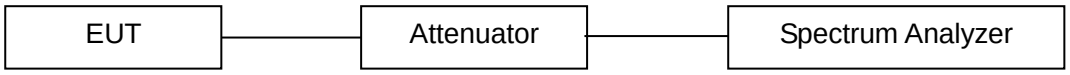

Remark: The emissions for frequency above 18GHz are attenuated 20dB below the limit, it does not record in report.

## 13.3 20dB Bandwidth Measurement

**LIMITS**

There is no limit.

**BLOCK DIAGRAM OF TEST SETUP**




**TEST PROCEDURES**

The 20dB bandwidth of the emission was contained within the frequency band designated which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered, FCC Rule 15.215(c):

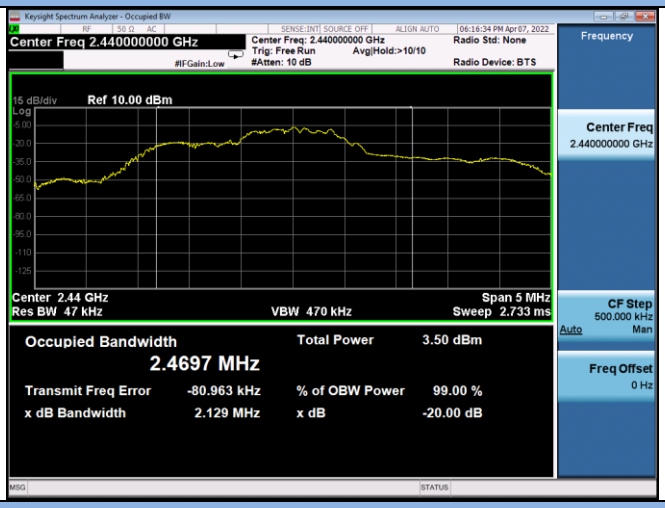
The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW was chosen so that the display was a result of the hopping channel modulation. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. Use the spectrum 20dB down delta function to measure the bandwidth.

**TEST RESULTS**

PASS

Please refer to the following table.

| GFSK | | | | |
|---|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **Data Rate (Mbps)** | **20dB Bandwidth (KHz)** | **Result** |
| 1 | 2402 | 1 | 1451 | PASS |
| 39 | 2440 | 1 | 2129 | PASS |
| 79 | 2480 | 1 | 1206 | PASS |

| 2402MHz | 2440MHz |
|---|---|
|  |  |
| 2480MHz | ---- |
|  | ---- |

## 13.4 Antenna Requirement

**STANDARD APPLICABLE**

According to of FCC part 15C section 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, 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.

**ANTENNA CONNECTED CONSTRUCTION**

The antenna is PCB antenna that no antenna other than furnished by the responsible party shall be used with the device, and the best case gain of the antenna is 0 dBi, Therefore, the antenna is consider meet the requirement.

## 14. Test Equipment List

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | Test Receiver | Rohde & Schwarz | ESCI7 | 100837 | Mar. 13, 2022 | 1 Year |
| 2. | Antenna | Schwarzbeck | VULB9162 | 9162-010 | Mar. 23, 2022 | 1 Year |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3. | Spectrum Analyzer | Rohde & Schwarz | FSU26 | 200409/026 | Mar. 13, 2022 | 1 Year |
| 4. | Spectrum Analyzer | Keysight | N9020A | MY54200831 | Mar. 13, 2022 | 1 Year |
| 5. | Spectrum Analyzer | Rohde & Schwarz | FSV40 | 101094 | Mar. 13, 2022 | 1 Year |
| 6. | Horn Antenna | Schwarzbeck | BBHA9170 | 9170-172 | Mar. 23, 2022 | 2 Year |
| 7. | Power Sensor | DARE | RPR3006W | 15I00041SNO 64 | Mar. 13, 2022 | 1 Year |
| 8. | Horn Antenna | COM-Power | AH-118 | 071078 | Mar. 23, 2022 | 1 Year |
| 9. | Pre-Amplifier | HP | HP 8449B | 3008A00964 | Mar. 13, 2022 | 1 Year |
| 10. | Pre-Amplifier | HP | HP 8447D | 1145A00203 | Mar. 13, 2022 | 1 Year |
| 11. | Loop Antenna | Schwarzbeck | FMZB 1513 | 1513-272 | Mar. 23, 2022 | 1 Year |
| 12. | Test Receiver | Rohde & Schwarz | ESCI | 101152 | Mar. 13, 2022 | 1 Year |
| 13. | L.I.S.N | Rohde & Schwarz | ENV 216 | 101317 | Mar. 13, 2022 | 1 Year |
| 14. | RF Switching Unit | Compliance Direction Systems Inc. | RSU-M2 | 38311 | Mar.13, 2022 | 1 Year |
| 15. | Temporary antenna connector | TESCOM | SS402 | N/A | N/A | N/A |
| 16. | Test Software | EZ | EZ_EMC | N/A | N/A | N/A |

Note: For photographs of EUT and measurement, please refer to appendix in separate documents.

---End---