# TEST REPORT

| | | |
|---|---|---|
| Applicant | : | Guangdong Hongshuo Lighting Technology Co., Ltd. |
| Address | : | No. 13-3, Huancheng North Road, Yongxing Industrial Zone, Henglan Town, Zhongshan City, W Building, 8th floor, Guangdong, China |
| Manufacturer | : | Guangdong Hongshuo Lighting Technology Co., Ltd. |
| Address | : | No. 13-3, Huancheng North Road, Yongxing Industrial Zone, Henglan Town, Zhongshan City, W Building, 8th floor, Guangdong, China |
| Product Name | : | Smart downlight |
| Model Number | : | HS-L-TYZN014-RGBZZ |
| Trademark | : | N/A |
| FCC ID | : | 2BTZB-GC-14RGB |
| Test Date | : | Dec. 09, 2025 to Dec. 23, 2025 |
| Date of Report | : | Dec. 30, 2025 |
| Test Result | : | This device described above has been tested by BKC, and the test results show that the equipment under test (EUT) is in compliance with the Standard requirements. And it is applicable only to the tested sample identified in the report. |

Test Procedure Used:

| | | |
|---|---|---|
| Standards | : | FCC CFR Title 47 Part 15 Subpart C Section 15.249<br>ANSI C63.10:2020 |

Prepared by(Test Engineer):
Carey Zheng

Reviewer(Supervisor):
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Approved(Manager):
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| Revision History of This Test Report | | |
|---|---|---|
| Report Number | Description | Issued Date |
| BKC25125284ME-1 | Initial Issue | 2025-12-30 |
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# 1. General Information

## 1.1.Description of Device (EUT)

| | | |
|---|---|---|
| EUT Name | : | Smart downlight |
| Model No. | : | HS-L-TYZN014-RGBZZ |
| Model Difference | : | N/A |
| Power supply | : | 108-132V~, 60Hz |
| Operation frequency | : | 2402-2480MHz |
| Max. RF output power: | : | 102.08dBuV/m |
| Modulation | : | GFSK |
| Antenna Type | : | PCB antenna, Maximum Gain is 1.08dBi |
| Hardware Version | : | V1.0 |
| Software Version | : | V1.4 |
| Intend use environment | : | Residential, commercial and light industrial environment |

## 1.2.Channel List

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|---|---|
| 00 | **2402** | 14 | 2430 | 28 | 2458 |
| 01 | 2404 | 15 | 2432 | 29 | 2460 |
| 02 | 2406 | 16 | 2434 | 30 | 2462 |
| 03 | 2408 | 17 | 2436 | 31 | 2464 |
| 04 | 2410 | 18 | 2438 | 32 | 2466 |
| 05 | 2412 | **19** | **2440** | 33 | 2468 |
| 06 | 2414 | 20 | 2442 | 34 | 2470 |
| 07 | 2416 | 21 | 2444 | 35 | 2472 |
| 08 | 2418 | 22 | 2446 | 36 | 2474 |
| 09 | 2420 | 23 | 2448 | 37 | 2476 |
| 10 | 2422 | 24 | 2450 | 38 | 2478 |
| 11 | 2424 | 25 | 2452 | 39 | **2480** |
| 12 | 2426 | 26 | 2454 | | |
| 13 | 2428 | 27 | 2456 | | |

## 1.3.Summary of test result

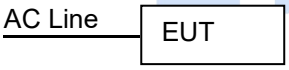
| RF PART | | |
|---|---|---|
| **Test Items** | **Test Requirement** | **Result** |
| Antenna requirement | FCC part 15.203 | PASS |
| AC Power Line Conducted Emission | FCC part 15.207 | PASS |
| Field strength of the fundamental signal | FCC part 15.249 (a) | PASS |
| Spurious emissions | FCC part 15.249 (a) (d)/15.209 | PASS |
| Band edge | FCC part 15.249 (d)/15.205 | PASS |
| 20dB Occupied Bandwidth | FCC part 15.215 (c) | PASS |
| Remark:<br>N/A is an abbreviation for Not Applicable.<br>Measurement Uncertainty is not taken into account for conformity statement | | |

## 1.4.Special Accessories and Auxiliary Equipment

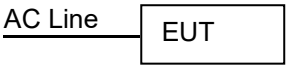
| Description | Manufacturer | Model No. | Hardware Version | Software Version |
|---|---|---|---|---|
| Serial port board | - | USB-TTL-01 | - | - |

## 1.5.Block Diagram

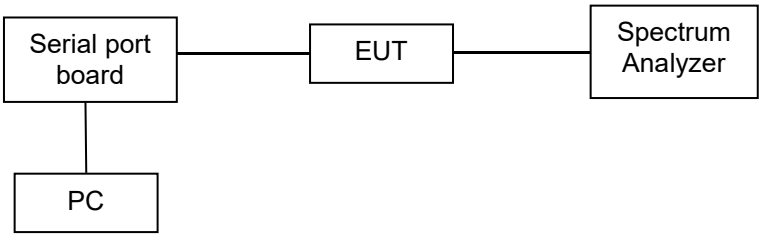
Conducted Emission




Radiated Emission




RF Conducted Test



## 1.6.Test mode

The special RF test software was used to control EUT work in Continuous BLE TX mode, and select test channel, wireless mode.

| Test mode | Low channel | Middle channel | High channel |
|---|---|---|---|
| GFSK | 2402MHz | 2440MHz | 2480MHz |
| Note：Only the worst data is shown. | | | |

## 1.7.Test Conditions

| Category | Normal Conditions | Extreme Conditions |
|---|---|---|
| Temperature range | 15-35℃ | N/A |
| Humidity range | 20-75% | N/A |
| Pressure range | 86-106kPa | N/A |
| Power supply | 108-132V~, 60Hz | N/A |
| Note: N/A is an abbreviation for Not Applicable. | | |

## 1.8.Measurement Uncertainty (95% confidence levels, k=2)

| Item | MU | Remark |
|---|---|---|
| Uncertainty for radio frequency | ±7×10-8 | |
| Conducted Emissions (150kHz~30MHz) | ±2.54dB | |
| Radiated Emission(9KHz~30MHz) | ±1.6 dB | |
| Radiated Emission(30MHz~1GHz) | Vertical:±4.14dB<br>Horizontal:±4.25dB | |
| Radiated Emission(1GHz~6GHz) | ±3.9dB | |
| Radiated Emission(6GHz~18GHz) | ±4.3dB | |
| Radiated Emission(18GHz~40GHz) | ±3.38dB | |
| Uncertainty for conducted RF Power | ±0.20dB | |
| Conducted spurious emissions | ±0.24dB | |
| Uncertainty for temperature | 0.6℃ | |
| Uncertainty for humidity | 1% | |
| Bandwidth | ± 1.5 x 10-6 | |
| Time | ±2% | |
| Duty Cycle | ±2% | |
| Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95% | | |

## 1.9.Test Facility

| Site Description | | |
|---|---|---|
| Name of Firm | : | Shenzhen BKC Testing Co., Ltd. |
| Site Location | : | Room 103, 1/F, Huaya Building, Huaya Industrial Park, Longhua Community, Longhua District, Shenzhen, Guangdong, China. |
| ISED CAB identifier | : | CN0188 |
| ISED Company Number | : | 34333 |
| FCC Designation Number | : | CN1416 |
| FCC Test Firm Registration Number | : | 701543 |

## 1.10.Test Equipment

### Conducted Test Site

| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until |
|---|---|---|---|---|---|---|
| 1 | LISN | R&S | ENV216 | 102762 | Mar. 10. 2025 | Mar. 09. 2026 |
| 2 | EMI Test Receiver | R&S | ESCI | 101424 | Mar. 10. 2025 | Mar. 09. 2026 |
| 3 | Rf cables | HTEC | HCE 2M-CE | N/A | Mar. 10. 2025 | Mar. 09. 2026 |
| 4 | Coupling/ Decoupling Network | Diamond | CX210 | N/A | Mar. 10. 2025 | Mar. 09. 2026 |
| 5 | CE Testing software | EZ | EZ-EMC | / | / | / |

### Radiated Test Site(Below 1G and Above 1G)

| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until |
|---|---|---|---|---|---|---|
| 1 | Antenna | Schwarzbeck | VULB 9168 | 01321 | Mar. 20. 2025 | Mar. 19. 2028 |
| 2 | EMI Test Receiver | R&S | ESRP | 101478 | Mar. 10. 2025 | Mar. 09. 2026 |
| 3 | Preamplifier | HP | 8447D | 2727A05345 | Mar. 10. 2025 | Mar. 09. 2026 |
| 4 | Double Ridged Broadband | SCHWARZBECK | BBHA 9120D | 02621 | Mar. 10. 2025 | Mar. 19. 2028 |
| 5 | Preamplifier | Schwarzbeck | BBV 9718D | 00041 | Mar. 10. 2025 | Mar. 09. 2026 |
| 6 | Rf cables | HUBER+SUHNER | 8M-RE | N/A | Mar. 10. 2025 | Mar. 09. 2026 |
| 7 | Rf cables | HUBER+SUHNER | 1.5M-RE | N/A | Mar. 10. 2025 | Mar. 09. 2026 |
| 8 | Rf cables | HUBER+SUHNER | 1.5M-AP-RE | N/A | Mar. 10. 2025 | Mar. 09. 2026 |
| 9 | Loop antenna | TESEQ | HLA6121 | 58357 | Mar. 09. 2025 | Mar. 10. 2026 |
| 10 | Spectrum analyzer | R&S | FSP40 | 200061 | Feb. 13. 2025 | Feb. 12. 2026 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 11 | Double Ridged Broadband Horn Antenna | COM-POWER | AH-1840 | 10100009 | Mar. 10. 2025 | Mar. 09. 2026 |
| 12 | Spectrum | Agilent | N9020A | MY50510311 | Mar. 09. 2025 | Mar. 10. 2026 |
| 13 | RE Testing software | EZ | EZ-EMC | / | / | / |

## RF Test Site

| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until |
|---|---|---|---|---|---|---|
| 1 | Spectrum | Agilent | N9020A | MY50510311 | Mar. 09. 2025 | Mar. 10. 2026 |
| 2 | Vector source | Agilent | N5182A | MY47420223 | Mar. 09. 2025 | Mar. 10. 2026 |
| 3 | All instrument | Rohde & Schwarz | CMW 500 | 101131 | Mar. 09. 2025 | Mar. 10. 2026 |
| 4 | control unit | MW | MW100-RFCB | MW200411BK-34 | Mar. 09. 2025 | Mar. 10. 2026 |
| 5 | RF Testing software | MW | MTS 8310 | / | Mar. 09. 2025 | / |
| 6 | Spectrum analyzer | R&S | FSP40 | 200061 | Feb. 13. 2025 | Feb. 12. 2026 |

| DUT Test | Manufacturer | Model | version | Test power levels |
|---|---|---|---|---|
| Software | / | EMI_TEST_ | V1.4 | Maximum |

Test software

| | |
|---|---|
| Software name | RF Testing software |
| Software version | 2.0.0.0 |
| Software name | RE Testing software |
| Software version | EMEC-03A2 RE+ |
| Software name | CE Testing software |
| Software version | EMEC-3A1+ |

# 2. Conducted emission at the mains terminals test

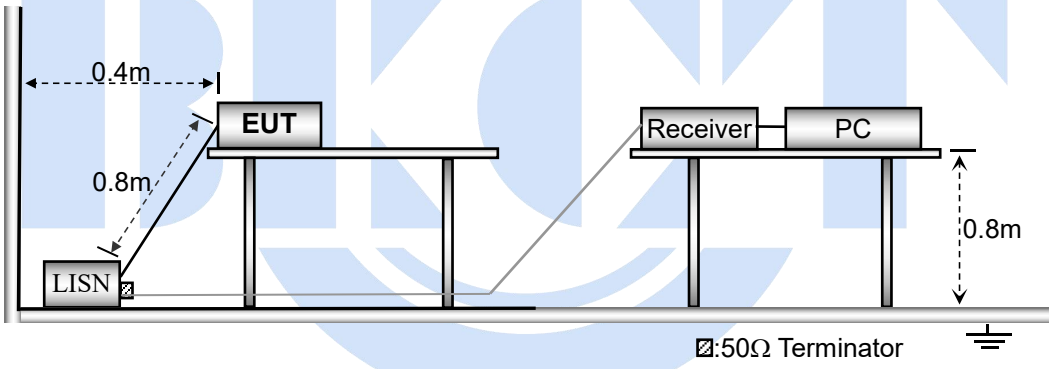
## 2.1.Limit

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.207 |
| Test Method: | ANSI C63.10:2020 |
| Test Frequency Range: | 150KHz to 30MHz |
| Receiver setup: | RBW=9KHz, VBW=30KHz, Sweep time=auto |

| Frequency MHz | Limits dB(μV) | |
|---|---|---|
| | Quasi-peak Level | Average Level |
| 0.15 ~ 0.50 | 66 ~ 56* | 56 ~ 46* |
| 0.50 ~ 5.00 | 56 | 46 |
| 5.00 ~ 30.00 | 60 | 50 |

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

## 2.2.Test Setup

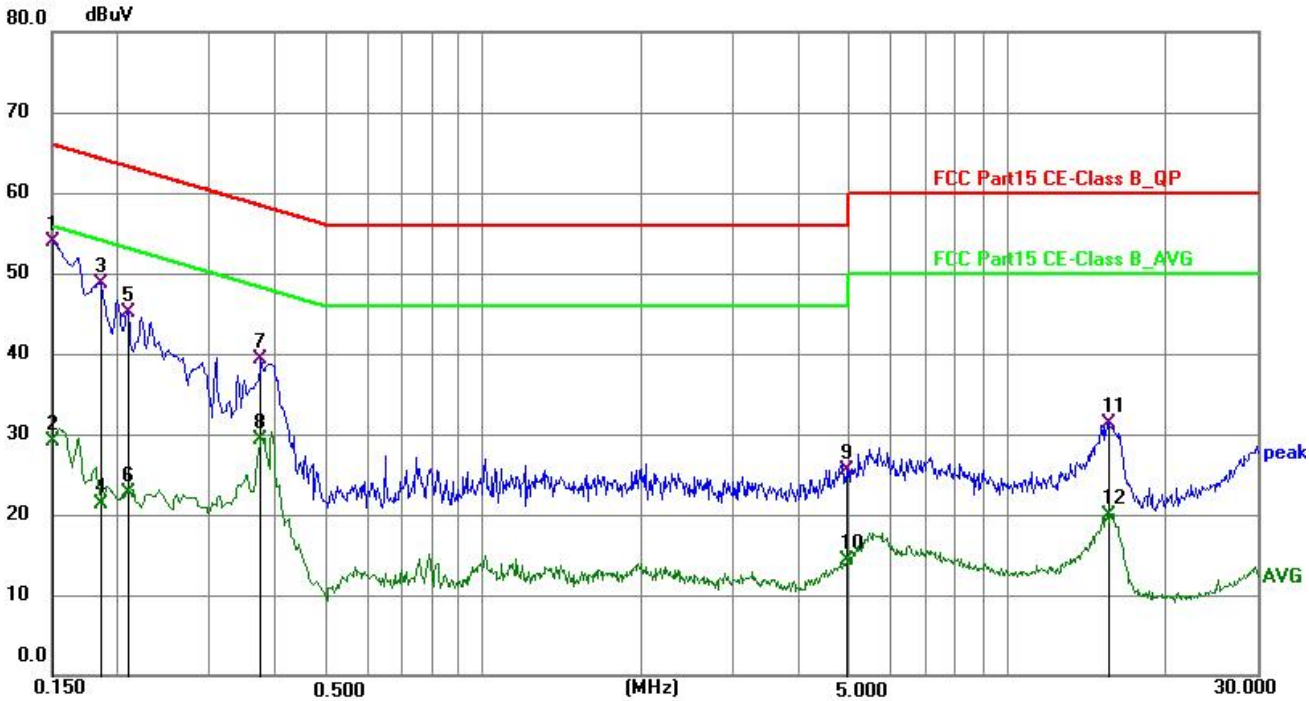



## 2.3.Test Procedure

1. The EUT was placed 0.1 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
2. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
3. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
4. LISN at least 80 cm from nearest part of EUT chassis.
5.For the actual test configuration, please refer to the related Item – EUT Test Photos.

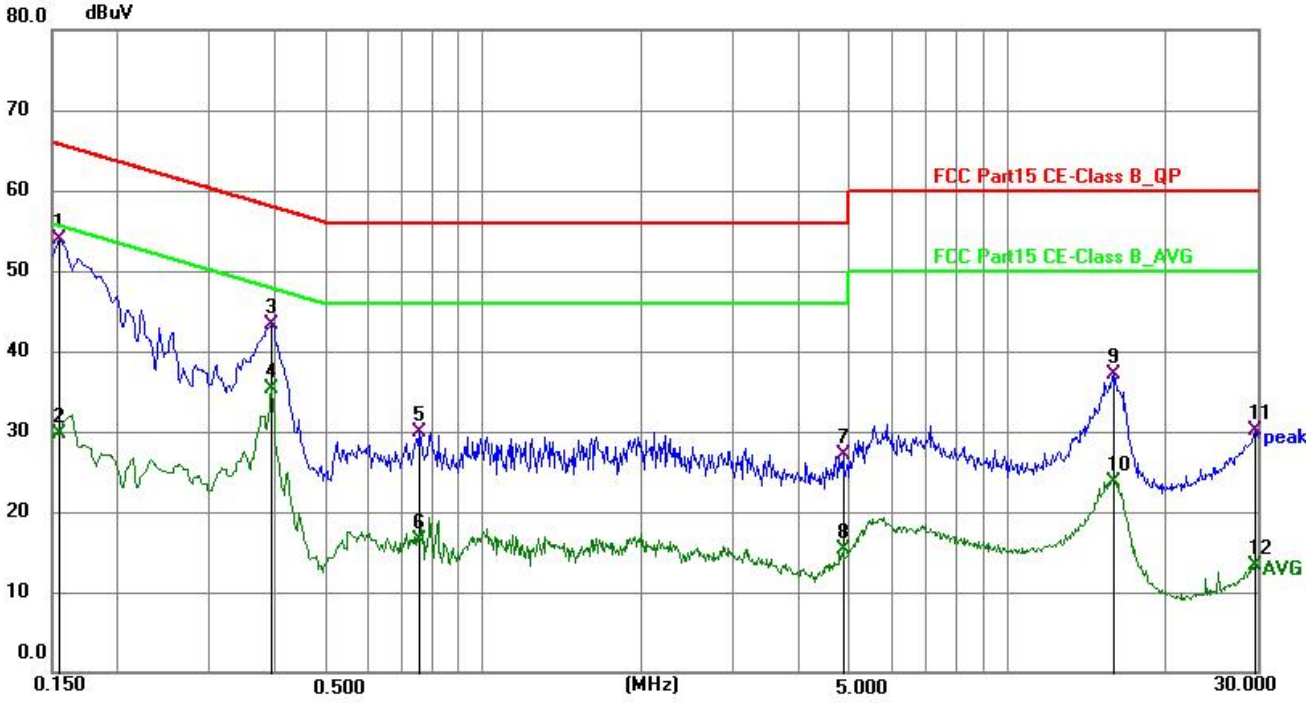
## 2.4.Test Result

| Conducted Emission At The Mains Terminals Test Data | | | |
|---|---|---|---|
| Temperature: | 25.1℃ | Relative Humidity: | 56% |
| Pressure: | 1008hPa | Phase : | Line |
| Test Voltage : | AC 120V/60Hz | Test Mode: | Transmitting |




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F |
|---|---|---|---|---|---|---|---|---|
| 1 * | 0.1500 | 44.24 | 9.76 | 54.00 | 66.00 | -12.00 | QP | P |
| 2 | 0.1500 | 19.37 | 9.76 | 29.13 | 56.00 | -26.87 | AVG | P |
| 3 | 0.1860 | 38.83 | 9.79 | 48.62 | 64.21 | -15.59 | QP | P |
| 4 | 0.1860 | 11.44 | 9.79 | 21.23 | 54.21 | -32.98 | AVG | P |
| 5 | 0.2085 | 35.32 | 9.81 | 45.13 | 63.26 | -18.13 | QP | P |
| 6 | 0.2085 | 12.83 | 9.81 | 22.64 | 53.26 | -30.62 | AVG | P |
| 7 | 0.3750 | 29.60 | 9.77 | 39.37 | 58.39 | -19.02 | QP | P |
| 8 | 0.3750 | 19.62 | 9.77 | 29.39 | 48.39 | -19.00 | AVG | P |
| 9 | 4.9335 | 15.71 | 9.81 | 25.52 | 56.00 | -30.48 | QP | P |
| 10 | 4.9335 | 4.40 | 9.81 | 14.21 | 46.00 | -31.79 | AVG | P |
| 11 | 15.6750 | 21.59 | 9.76 | 31.35 | 60.00 | -28.65 | QP | P |
| 12 | 15.6750 | 10.09 | 9.76 | 19.85 | 50.00 | -30.15 | AVG | P |

| Conducted Emission At The Mains Terminals Test Data | | | |
|---|---|---|---|
| Temperature: | 25.1℃ | Relative Humidity: | 56% |
| Pressure: | 1008hPa | Phase : | Neutral |
| Test Voltage : | AC 120V/60Hz | Test Mode: | Transmitting |




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F |
|---|---|---|---|---|---|---|---|---|
| 1 * | 0.1545 | 44.23 | 9.68 | 53.91 | 65.75 | -11.84 | QP | P |
| 2 | 0.1545 | 20.04 | 9.68 | 29.72 | 55.75 | -26.03 | AVG | P |
| 3 | 0.3930 | 33.55 | 9.70 | 43.25 | 58.00 | -14.75 | QP | P |
| 4 | 0.3930 | 25.66 | 9.70 | 35.36 | 48.00 | -12.64 | AVG | P |
| 5 | 0.7530 | 20.31 | 9.69 | 30.00 | 56.00 | -26.00 | QP | P |
| 6 | 0.7530 | 6.86 | 9.69 | 16.55 | 46.00 | -29.45 | AVG | P |
| 7 | 4.8705 | 17.37 | 9.73 | 27.10 | 56.00 | -28.90 | QP | P |
| 8 | 4.8705 | 5.53 | 9.73 | 15.26 | 46.00 | -30.74 | AVG | P |
| 9 | 15.8865 | 27.48 | 9.71 | 37.19 | 60.00 | -22.81 | QP | P |
| 10 | 15.8865 | 14.09 | 9.71 | 23.80 | 50.00 | -26.20 | AVG | P |
| 11 | 29.8320 | 20.30 | 9.72 | 30.02 | 60.00 | -29.98 | QP | P |
| 12 | 29.8320 | 3.49 | 9.72 | 13.21 | 50.00 | -36.79 | AVG | P |

# 3. Radiated Spurious Emissions

## 3.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.249

Test Result: PASS

Measurement Distance: 3m

| Frequency | Detector | RBW | VBW | Value |
|---|---|---|---|---|
| 9KHz-150KHz | Quasi-peak | 200Hz | 600Hz | Quasi-peak |
| 150KHz-30MHz | Quasi-peak | 9KHz | 30KHz | Quasi-peak |
| 30MHz-1GHz | Quasi-peak | 100KHz | 300KHz | Quasi-peak |
| Above 1GHz | Peak | 1MHz | 3MHz | Peak |
| | Peak | 1MHz | 10Hz | Average |

Limit 1:

| Frequency (MHz) | Field Strength | | Field Strength Limit at 3m Measurement Dist | |
|---|---|---|---|---|
| | uV/m | Distance (m) | uV/m | dBuV/m |
| 0.009 ~ 0.490 | 2400/F(kHz) | 300 | 10000 * 2400/F(kHz) | 20log(2400/F(kHz)) + 80 |
| 0.490 ~ 1.705 | 24000/F(kHz) | 30 | 100 * 24000/F(kHz) | 20log(24000/F(kHz)) + 40 |
| 1.705 ~ 30 | 30 | 30 | 100 * 30 | 20log(30) + 40 |
| 30 ~ 88 | 100 | 3 | 100 | 20log(100) |
| 88 ~ 216 | 150 | 3 | 150 | 20log(150) |
| 216 ~ 960 | 200 | 3 | 200 | 20log(200) |
| Above 960 | 500 | 3 | 500 | 20log(500) |

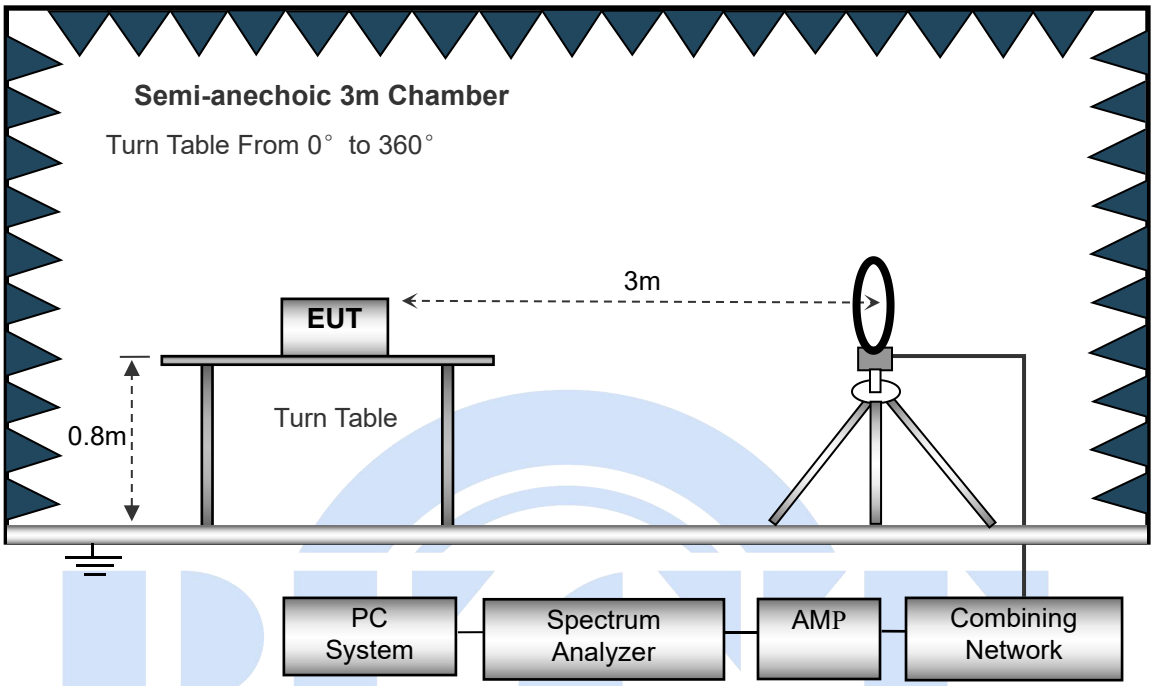
Limit 2:

§ 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

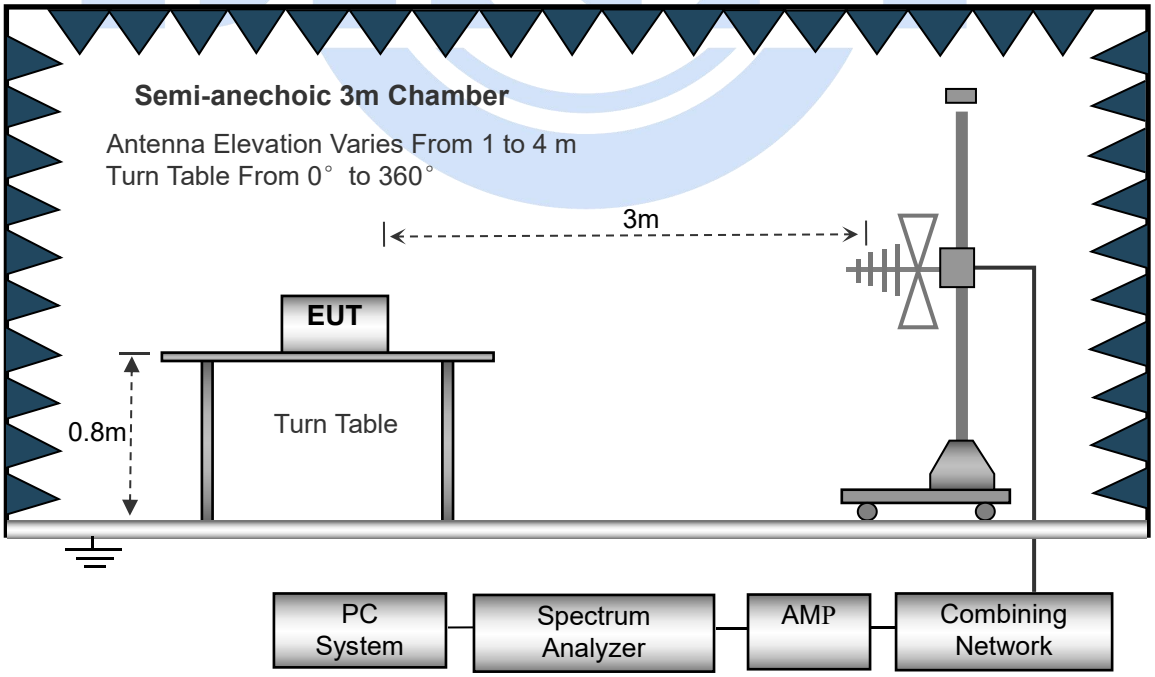
## 3.2.Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10.

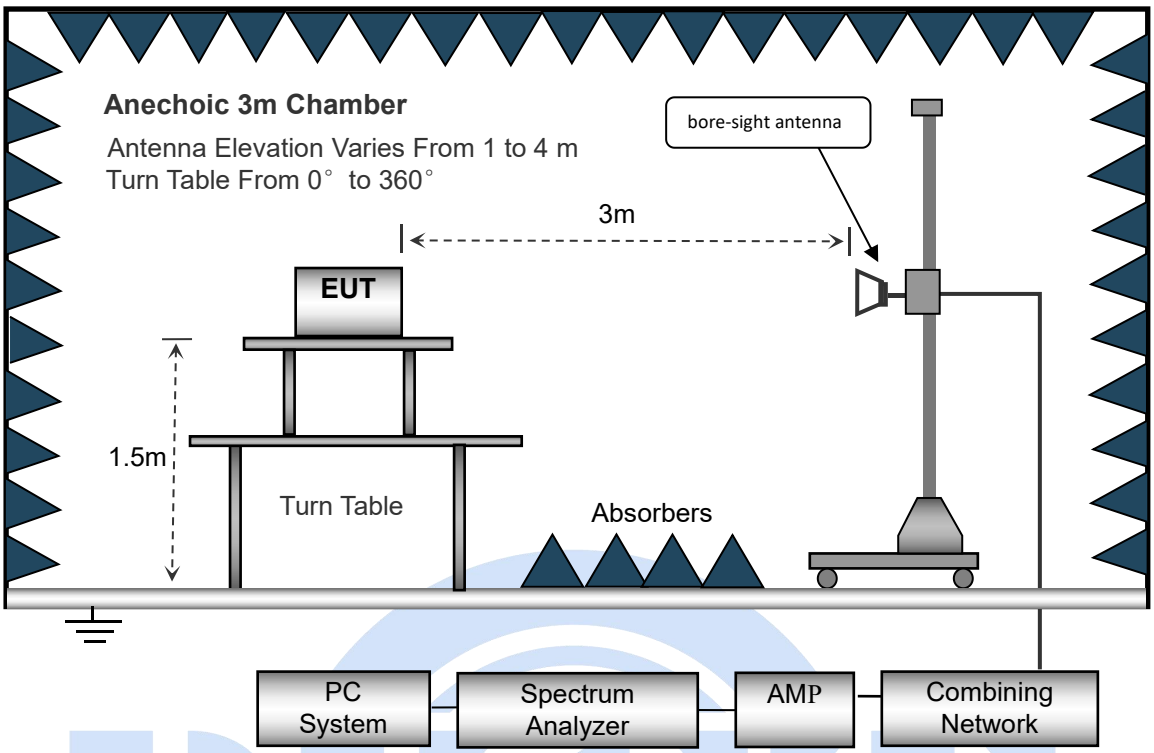
The test setup for emission measurement below 30MHz.

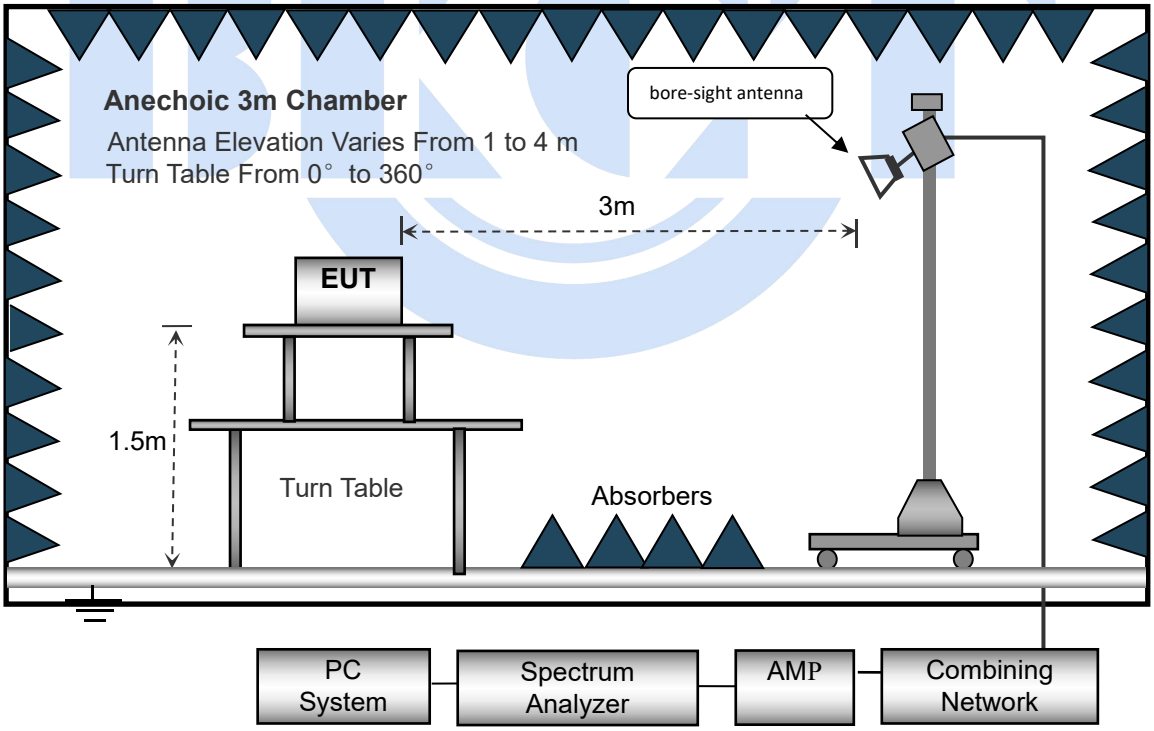



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



## 3.3.Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane for below 1GHz and 1.5m for above 1GHz.

2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.

4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

6. Repeat above procedures until the measurements for all frequencies are complete.

7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in Z axis,so the worst data were shown as follow.

8. A 2.4GHz high - pass filter is used druing radiated emissions above 1GHz measurement.

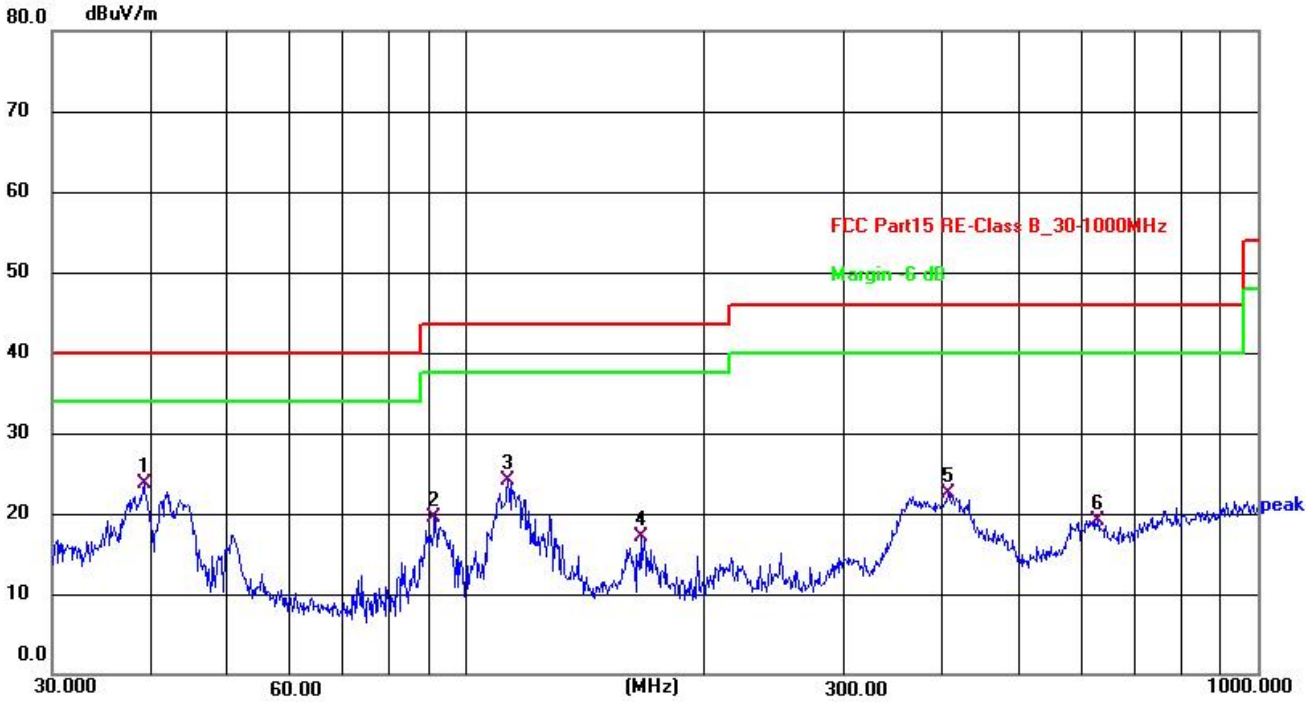
## 3.4.Test Result

Test Frequency: 9KHz~30MHz

The measurements were more than 20 dB below the limit and not reported.

Test Frequency : 30MHz ~ 1GHz

| Radiation Emission Test Data | | | |
|---|---|---|---|
| Temperature: | 25.1℃ | Relative Humidity: | 56% |
| Pressure: | 1008hPa | Phase : | Horizontal |
| Test Voltage : | AC 120V/60Hz | Test Mode | Transmitting |




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 * | 39.1615 | 40.01 | -16.34 | 23.67 | 40.00 | -16.33 | QP |
| 2 | 91.1745 | 40.16 | -20.67 | 19.49 | 43.50 | -24.01 | QP |
| 3 | 112.9196 | 42.76 | -18.73 | 24.03 | 43.50 | -19.47 | QP |
| 4 | 166.0680 | 33.41 | -16.37 | 17.04 | 43.50 | -26.46 | QP |
| 5 | 406.0880 | 37.18 | -14.59 | 22.59 | 46.00 | -23.41 | QP |
| 6 | 627.2737 | 30.24 | -11.11 | 19.13 | 46.00 | -26.87 | QP |

| Radiation Emission Test Data | | | |
|---|---|---|---|
| Temperature: | 25.1˚C | Relative Humidity: | 56% |
| Pressure: | 1008hPa | Phase : | Vertical |
| Test Voltage : | AC 120V/60Hz | Test Mode | Transmitting |

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 35.4992 | 50.07 | -16.77 | 33.30 | 40.00 | -6.70 | QP |
| 2 * | 39.2991 | 53.72 | -16.32 | 37.40 | 40.00 | -2.60 | QP |
| 3 | 50.2324 | 49.53 | -16.66 | 32.87 | 40.00 | -7.13 | QP |
| 4 | 92.4624 | 51.47 | -20.58 | 30.89 | 43.50 | -12.61 | QP |
| 5 | 115.3205 | 45.91 | -18.45 | 27.46 | 43.50 | -16.04 | QP |
| 6 | 424.0356 | 37.10 | -14.21 | 22.89 | 46.00 | -23.11 | QP |

Test Frequency 1GHz-25GHz:

| Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Pre-amplifier (dB) | Cable Loss (dB) | Antenna Factor (dB) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|---|---|---|
| Low Channel:2402MHz | | | | | | | | | |
| V | 4804.00 | 55.32 | 30.55 | 5.77 | 24.66 | 55.20 | 74.00 | -18.80 | Pk |
| V | 4804.00 | 43.28 | 30.55 | 5.77 | 24.66 | 43.16 | 54.00 | -10.84 | AV |
| V | 7206.00 | 52.30 | 30.33 | 6.32 | 24.55 | 52.84 | 74.00 | -21.16 | Pk |
| V | 7206.00 | 43.97 | 30.33 | 6.32 | 24.55 | 44.51 | 54.00 | -9.49 | AV |
| V | 9608.00 | 50.75 | 30.85 | 7.45 | 24.69 | 52.04 | 74.00 | -21.96 | Pk |
| V | 9608.00 | 43.06 | 30.85 | 7.45 | 24.69 | 44.35 | 54.00 | -9.65 | AV |
| V | 12010.00 | 50.30 | 31.02 | 8.99 | 25.57 | 53.84 | 74.00 | -20.16 | Pk |
| V | 12010.00 | 44.00 | 31.02 | 8.99 | 25.57 | 47.54 | 54.00 | -6.46 | AV |
| H | 4804.00 | 53.96 | 30.55 | 5.77 | 24.66 | 53.84 | 74.00 | -20.16 | Pk |
| H | 4804.00 | 43.56 | 30.55 | 5.77 | 24.66 | 43.44 | 54.00 | -10.56 | AV |
| H | 7206.00 | 53.28 | 30.33 | 6.32 | 24.55 | 53.82 | 74.00 | -20.18 | Pk |
| H | 7206.00 | 43.36 | 30.33 | 6.32 | 24.55 | 43.90 | 54.00 | -10.10 | AV |
| H | 9608.00 | 54.99 | 30.85 | 7.45 | 24.69 | 56.28 | 74.00 | -17.72 | Pk |
| H | 9608.00 | 43.58 | 30.85 | 7.45 | 24.69 | 44.87 | 54.00 | -9.13 | AV |
| H | 12010.00 | 53.75 | 31.02 | 8.99 | 25.57 | 57.29 | 74.00 | -16.71 | Pk |
| H | 12010.00 | 43.96 | 31.02 | 8.99 | 25.57 | 47.50 | 54.00 | -6.50 | AV |

| Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Pre-amplifier (dB) | Cable Loss (dB) | Antenna Factor (dB) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|---|---|---|
| Middle Channel:2440MHz | | | | | | | | | |
| V | 4880.00 | 50.32 | 30.55 | 5.77 | 24.66 | 50.20 | 74.00 | -23.80 | Pk |
| V | 4880.00 | 43.87 | 30.55 | 5.77 | 24.66 | 43.75 | 54.00 | -10.25 | AV |
| V | 7320.00 | 53.62 | 30.33 | 6.32 | 24.55 | 54.16 | 74.00 | -19.84 | Pk |
| V | 7320.00 | 43.31 | 30.33 | 6.32 | 24.55 | 43.85 | 54.00 | -10.15 | AV |
| V | 9760.00 | 54.82 | 30.85 | 7.45 | 24.69 | 56.11 | 74.00 | -17.89 | Pk |
| V | 9760.00 | 43.93 | 30.85 | 7.45 | 24.69 | 45.22 | 54.00 | -8.78 | AV |
| V | 12200.00 | 54.10 | 31.02 | 8.99 | 25.57 | 57.64 | 74.00 | -16.36 | Pk |
| V | 12200.00 | 43.25 | 31.02 | 8.99 | 25.57 | 46.79 | 54.00 | -7.21 | AV |
| H | 4880.00 | 51.63 | 30.55 | 5.77 | 24.66 | 51.51 | 74.00 | -22.49 | Pk |
| H | 4880.00 | 43.64 | 30.55 | 5.77 | 24.66 | 43.52 | 54.00 | -10.48 | AV |
| H | 7320.00 | 52.64 | 30.33 | 6.32 | 24.55 | 53.18 | 74.00 | -20.82 | Pk |
| H | 7320.00 | 43.16 | 30.33 | 6.32 | 24.55 | 43.70 | 54.00 | -10.30 | AV |
| H | 9760.00 | 52.43 | 30.85 | 7.45 | 24.69 | 53.72 | 74.00 | -20.28 | Pk |
| H | 9760.00 | 43.39 | 30.85 | 7.45 | 24.69 | 44.68 | 54.00 | -9.32 | AV |
| H | 12200.00 | 54.40 | 31.02 | 8.99 | 25.57 | 57.94 | 74.00 | -16.06 | Pk |
| H | 12200.00 | 43.79 | 31.02 | 8.99 | 25.57 | 47.33 | 54.00 | -6.67 | AV |

| Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Pre-amplifier (dB) | Cable Loss (dB) | Antenna Factor (dB) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|---|---|---|
| High Channel:2480MHz | | | | | | | | | |
| V | 4960.00 | 52.40 | 30.55 | 5.77 | 24.66 | 52.28 | 74.00 | -21.72 | Pk |
| V | 4960.00 | 43.44 | 30.55 | 5.77 | 24.66 | 43.32 | 54.00 | -10.68 | AV |
| V | 7440.00 | 54.05 | 30.33 | 6.32 | 24.55 | 54.59 | 74.00 | -19.41 | Pk |
| V | 7440.00 | 43.53 | 30.33 | 6.32 | 24.55 | 44.07 | 54.00 | -9.93 | AV |
| V | 9920.00 | 51.07 | 30.85 | 7.45 | 24.69 | 52.36 | 74.00 | -21.64 | Pk |
| V | 9920.00 | 43.40 | 30.85 | 7.45 | 24.69 | 44.69 | 54.00 | -9.31 | AV |
| V | 12400.00 | 53.29 | 31.02 | 8.99 | 25.57 | 56.83 | 74.00 | -17.17 | Pk |
| V | 12400.00 | 43.70 | 31.02 | 8.99 | 25.57 | 47.24 | 54.00 | -6.76 | AV |
| H | 4960.00 | 54.65 | 30.55 | 5.77 | 24.66 | 54.53 | 74.00 | -19.47 | Pk |
| H | 4960.00 | 43.72 | 30.55 | 5.77 | 24.66 | 43.60 | 54.00 | -10.40 | AV |
| H | 7440.00 | 51.66 | 30.33 | 6.32 | 24.55 | 52.20 | 74.00 | -21.80 | Pk |
| H | 7440.00 | 43.90 | 30.33 | 6.32 | 24.55 | 44.44 | 54.00 | -9.56 | AV |
| H | 9920.00 | 53.14 | 30.85 | 7.45 | 24.69 | 54.43 | 74.00 | -19.57 | Pk |
| H | 9920.00 | 43.96 | 30.85 | 7.45 | 24.69 | 45.25 | 54.00 | -8.75 | AV |
| H | 12400.00 | 52.80 | 31.02 | 8.99 | 25.57 | 56.34 | 74.00 | -17.66 | Pk |
| H | 12400.00 | 43.96 | 31.02 | 8.99 | 25.57 | 47.50 | 54.00 | -6.50 | AV |

Note: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Band Edge:

| | Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Pre-amplifier (dB) | Cable Loss (dB) | Antenna Factor (dB/m) | Emission level (dBuV/m) | Limit (dBuV/m) | Detector Type | Result |
|---|---|---|---|---|---|---|---|---|---|---|
| GFSK | Low Channel: 2402MHz | | | | | | | | | |
| | H | 2310.00 | 54.22 | 30.22 | 4.85 | 23.98 | 52.83 | 74.00 | PK | PASS |
| | H | 2310.00 | 44.21 | 30.22 | 4.85 | 23.98 | 42.82 | 54.00 | AV | PASS |
| | H | 2390.00 | 54.90 | 30.22 | 4.85 | 23.98 | 53.51 | 74.00 | PK | PASS |
| | H | 2390.00 | 44.29 | 30.22 | 4.85 | 23.98 | 42.90 | 54.00 | AV | PASS |
| | H | 2400.00 | 53.50 | 30.22 | 4.85 | 23.98 | 52.11 | 74.00 | PK | PASS |
| | H | 2400.00 | 44.85 | 30.22 | 4.85 | 23.98 | 43.46 | 54.00 | AV | PASS |
| | V | 2310.00 | 54.63 | 30.22 | 4.85 | 23.98 | 53.24 | 74.00 | PK | PASS |
| | V | 2310.00 | 44.56 | 30.22 | 4.85 | 23.98 | 43.17 | 54.00 | AV | PASS |
| | V | 2390.00 | 54.99 | 30.22 | 4.85 | 23.98 | 53.60 | 74.00 | PK | PASS |
| | V | 2390.00 | 44.72 | 30.22 | 4.85 | 23.98 | 43.33 | 54.00 | AV | PASS |
| | V | 2400.00 | 54.42 | 30.22 | 4.85 | 23.98 | 53.03 | 74.00 | PK | PASS |
| | V | 2400.00 | 44.22 | 30.22 | 4.85 | 23.98 | 42.83 | 54.00 | AV | PASS |
| | High Channel: 2480MHz | | | | | | | | | |
| | H | 2483.50 | 53.90 | 30.22 | 4.85 | 23.98 | 52.51 | 74.00 | PK | PASS |
| | H | 2483.50 | 44.04 | 30.22 | 4.85 | 23.98 | 42.65 | 54.00 | AV | PASS |
| | H | 2500.00 | 53.43 | 30.22 | 4.85 | 23.98 | 52.04 | 74.00 | PK | PASS |
| | H | 2500.00 | 44.43 | 30.22 | 4.85 | 23.98 | 43.04 | 54.00 | AV | PASS |
| | V | 2483.50 | 54.02 | 30.22 | 4.85 | 23.98 | 52.63 | 74.00 | PK | PASS |
| | V | 2483.50 | 44.07 | 30.22 | 4.85 | 23.98 | 42.68 | 54.00 | AV | PASS |
| | V | 2500.00 | 53.91 | 30.22 | 4.85 | 23.98 | 52.52 | 74.00 | PK | PASS |
| | V | 2500.00 | 44.56 | 30.22 | 4.85 | 23.98 | 43.17 | 54.00 | AV | PASS |

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss − Pre-amplifier, Margin= Emission Level - Limit

Field Strength of The Fundamental Signal Data

GFSK

| Frequency | Receiver Reading | Detector | Turn table Angle | RX Antenna | | Corrected Factor | Corrected Amplitude | Limit | Margin |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Height | Polar | | | | |
| (MHz) | (dBμV) | (PK/QP/Ave) | Degree | (m) | (H/V) | (dB) | (dBμV/m) | (dBμV/m) | (dB) |
| Low Channel: 2402MHz | | | | | | | | | |
| 2402 | 103.14 | PK | 230 | 1.8 | V | -1.06 | **102.08** | 114.00 | -11.92 |
| 2402 | 88.32 | Ave | 289 | 1.9 | V | -1.06 | 87.26 | 94.00 | -6.74 |
| 2402 | 102.99 | PK | 130 | 1.4 | H | -1.06 | 101.93 | 114.00 | -12.07 |
| 2402 | 87.65 | Ave | 130 | 1.4 | H | -1.06 | 86.59 | 94.00 | -7.41 |

Mid CH

| Frequency | Receiver Reading | Detector | Turn table Angle | RX Antenna | | Corrected Factor | Corrected Amplitude | Limit | Margin |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Height | Polar | | | | |
| (MHz) | (dBμV) | (PK/QP/Ave) | Degree | (m) | (H/V) | (dB) | (dBμV/m) | (dBμV/m) | (dB) |
| Middle Channel:2440MHz | | | | | | | | | |
| 2440 | 103.11 | PK | 229 | 1.3 | V | -1.32 | 101.79 | 114.00 | -12.21 |
| 2440 | 88.24 | Ave | 229 | 1.3 | V | -1.32 | 86.92 | 94.00 | -7.08 |
| 2440 | 102.01 | PK | 156 | 1.6 | H | -1.32 | 100.69 | 114.00 | -13.31 |
| 2440 | 88.09 | Ave | 156 | 1.6 | H | -1.32 | 86.77 | 94.00 | -7.23 |

High CH

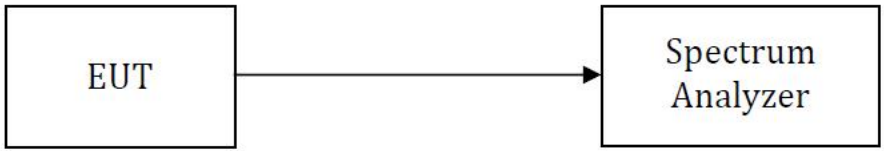
| Frequency | Receiver Reading | Detector | Turn table Angle | RX Antenna | | Corrected Factor | Corrected Amplitude | Limit | Margin |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Height | Polar | | | | |
| (MHz) | (dBμV) | (PK/QP/Ave) | Degree | (m) | (H/V) | (dB) | (dBμV/m) | (dBμV/m) | (dB) |
| High Channel: 2480MHz | | | | | | | | | |
| 2480 | 103.22 | PK | 164 | 1.7 | V | -1.78 | 101.44 | 114.00 | -12.56 |
| 2480 | 87.62 | Ave | 164 | 1.7 | V | -1.78 | 85.84 | 94.00 | -8.16 |
| 2480 | 102.84 | PK | 264 | 1.9 | H | -1.78 | 101.06 | 114.00 | -12.94 |
| 2480 | 86.99 | Ave | 264 | 1.9 | H | -1.78 | 85.21 | 94.00 | -8.79 |

# 4. -20 dB Bandwidth Measurement

## 4.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.215

## 4.2.Test Setup

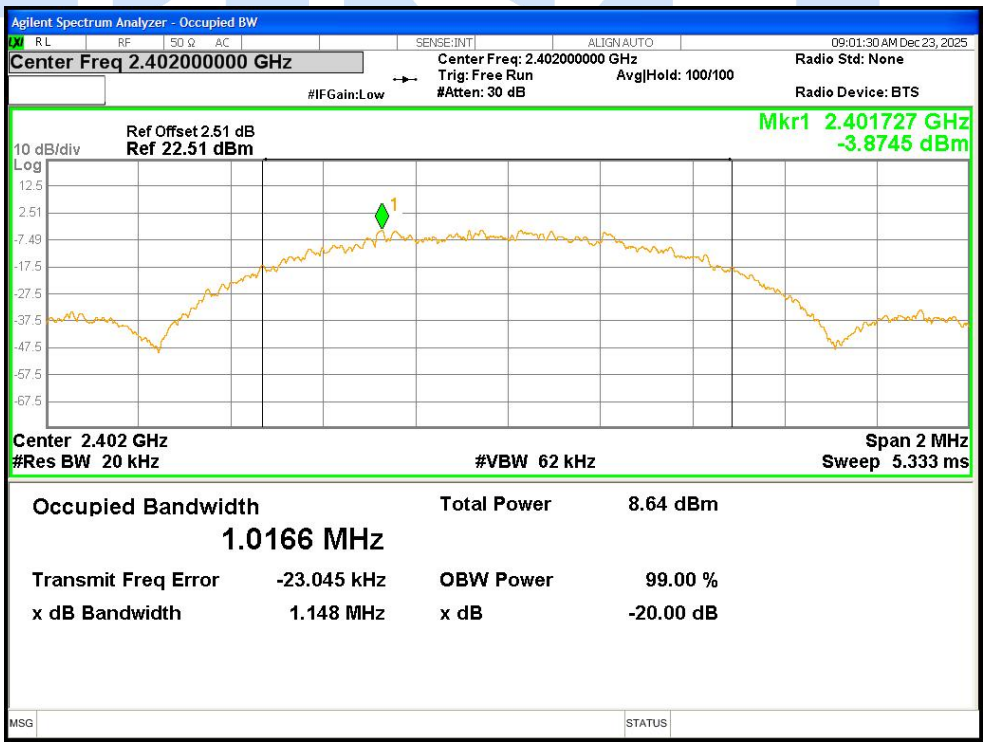



## 4.3.Test Procedure

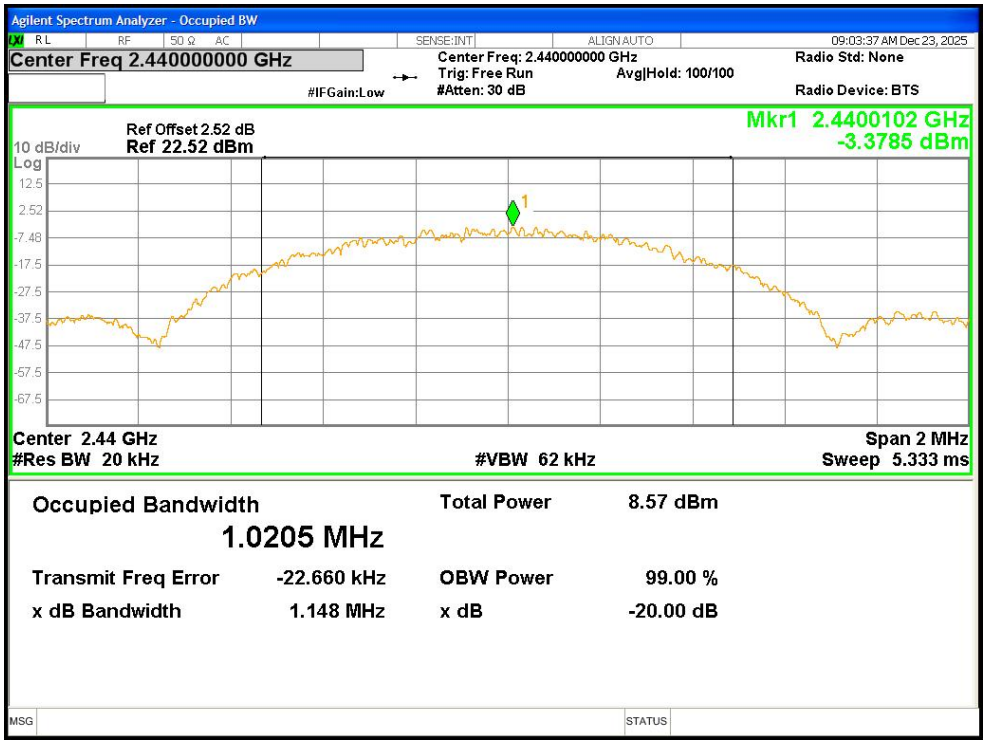
1. Set the spectrum analyzer: RBW = 1%-5% OBW
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by -20 dB relative to the maximum level measured in the fundamental emission

## 4.4.Test Result

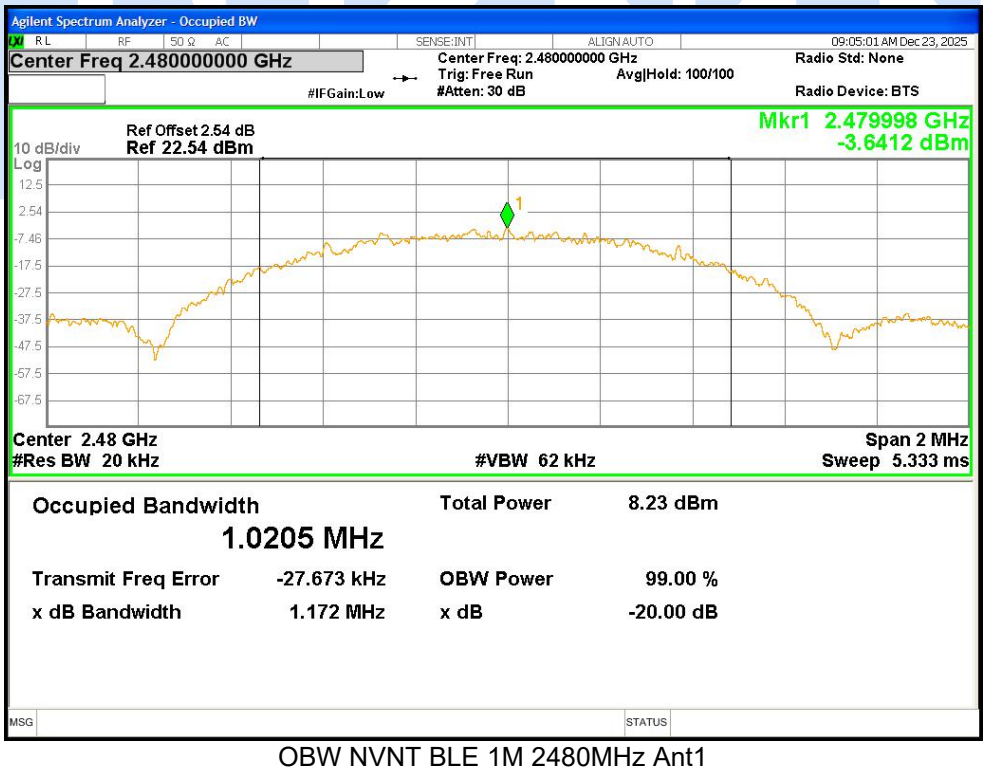
| Mode | Frequency (MHz) | Antenna | 99% OBW (MHz) | -20dB OBW (MHz) |
|---|---|---|---|---|
| BLE 1M | 2402 | Ant1 | 1.017 | 1.148 |
| BLE 1M | 2440 | Ant1 | 1.021 | 1.148 |
| BLE 1M | 2480 | Ant1 | 1.020 | 1.172 |




OBW NVNT BLE 1M 2402MHz Ant1




OBW NVNT BLE 1M 2440MHz Ant1




OBW NVNT BLE 1M 2480MHz Ant1

# 5. Antenna Requirement

According to the FCC Part 15 Paragraph 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. This product has an PCB antenna fulfill the requirement of this section.

# 6. Test Photographs

Please see Attachment BKC25125284ME-3.

# 7. Appendix I: Photos of the EUT

Please see Attachment BKC25125284ME-4 and BKC25125284ME-5.