Report No.: ET-26083913E02

# TEST REPORT

| | |
|---|---|
| Applicant: | Dongguan Sunvol Information Technology Co., Ltd. |
| Address of Applicant: | Unit 1, Building 11, No. 5, Keji 10th Road, Songshanhu Park, Dongguan City, Guangdong Province, China |
| Manufacturer: | Dongguan Sunvol Information Technology Co., Ltd. |
| Address of Manufacturer: | Unit 1, Building 11, No. 5, Keji 10th Road, Songshanhu Park, Dongguan City, Guangdong Province, China |
| Product Name: | SMART WHITEBOARD |
| Model No.: | S4G650F2 |
| Trade Mark: | AMDOXTECH |
| FCC ID: | 2BXEY-S4G650F2 |
| Applicable standards: | CFR Title 47 Part 15.247 |
| Date of Test: | Aug.08, 2026-Aug.12, 2026 |
| Date of report issued: | Aug.13, 2026 |

*Remark:*

*The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full without prior written permission of the company.*

*The report would be invalid without specific stamp of test institute and the signatures of compiler and approver*

## Prepared By

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| Compiled by: | Reviewed by: | Approved by: |
|---|---|---|
| Project Engineer | Project Manager | Authorized Signature |

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| Report Revision History | | |
|---|---|---|
| Report No. | Description | Issue Date |
| ET-26083913E02 | Original | Aug.13, 2026 |
| | | |

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# 1. Test Summary

| Test Item | Section | Result | Test by |
|---|---|---|---|
| Antenna requirement | 47CFR part 15.203/15.247 (b)(4) | Pass | / |
| AC Power Line Conducted Emission | 47CFR part 15.207 | Pass | Jason Huang |
| Conducted Peak Output Power | 47CFR part 15.247 (b)(3) | Pass | Oliver Wang |
| 6dB Bandwidth | 47CFR part 15.247 (a)(2) | Pass | Oliver Wang |
| Power Spectral Density | 47CFR part 15.247 (e) | Pass | Oliver Wang |
| Band Edge | 47CFR part 15.247(d)<br>47CFR part 15.205/15.209 | Pass | Oliver Wang |
| Spurious Emission | 47CFR part 15.247(d)<br>47CFR part 15.205/15.209 | Pass | Leo Zhong |

*Remarks:*

*1. Pass: The EUT complies with the essential requirements in the standard.*

*2. Test according to ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 and KDB558074 D01 15.247 Meas Guidance v05r02.*

*3. Note: Compliance determination rules*

*1).The Compliance determination of test results does not take into account measurement uncertainty. Measurement results are determined based on regulatory limitations or requirements specified by the applicant/manufacturer. If measurement uncertainty is taken into account, the applicant/manufacturer will bear all possible risks of non-compliance.*

*2).The measurement uncertainty please refer to each test result in the "Measurement Uncertainty"*

**Measurement Uncertainty**

| Test Item | Measurement Uncertainty | Notes |
|---|---|---|
| Occupied Channel Bandwidth | 0.72% | (1) |
| RF output power, conducted | ±0.67 dB | (1) |
| Power Spectral Density, conducted | ±0.51 dB | (1) |
| Unwanted Emissions, conducted | ±0.64 dB | (1) |
| AC Power Line Conducted Emission | ± 3.38 dB | (1) |
| Radiated emissions 9K-30MHz | ±4.26 dB | (1) |
| Radiated emissions 30M- 1GHz | ±4.88 dB | (1) |
| Radiated emissions 1GHz-18GHz | ± 4.16 dB | (1) |
| Radiated emissions 18GHz-40GHz | ±4.14 dB | (1) |
| Frequency error | Uc=6X10-7 | (1) |
| Duty Cycle | 0.03 | (1) |
| Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%. | | |

# 2. General Information

## 2.1 General Description of EUT

| | |
|---|---|
| Product Name: | SMART WHITEBOARD |
| Model No.: | S4G650F2 |
| Difference of model(s) | N/A |
| Test Model: | S4G650F2 |
| Hardware version: | N/A |
| Software version: | N/A |
| Power supply: | AC 100-240V,50/60Hz 2A |
| Adapter information: | N/A |
| Battery: | N/A |
| Radio Technology: | BT(LE) |
| Operation Frequency: | 2402MHz~2480MHz |
| Channel Numbers: | 40 |
| Channel separation: | 2MHz |
| Modulation technology: | GFSK |
| Antenna Type: | FPC antenna |
| Antenna gain: | 3.72dBi |

*Note:*
*1. Other information please Reference user manual.*
*2. Antenna information is provided by applicant, Testing lab is not responsible for the accuracy of the information.*

| Operation Frequency each of channel | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 1 | 2402 MHz | 11 | 2422 MHz | 21 | 2442 MHz | 31 | 2462 MHz |
| 2 | 2404 MHz | 12 | 2424 MHz | 22 | 2444 MHz | 32 | 2464 MHz |
| 3 | 2406 MHz | 13 | 2426 MHz | 23 | 2446 MHz | 33 | 2466 MHz |
| 4 | 2408 MHz | 14 | 2428 MHz | 24 | 2448 MHz | 34 | 2468 MHz |
| 5 | 2410 MHz | 15 | 2430 MHz | 25 | 2450 MHz | 35 | 2470 MHz |
| 6 | 2412 MHz | 16 | 2432 MHz | 26 | 2452 MHz | 36 | 2472 MHz |
| 7 | 2414 MHz | 17 | 2434 MHz | 27 | 2454 MHz | 37 | 2474 MHz |
| 8 | 2416 MHz | 18 | 2436 MHz | 28 | 2456 MHz | 38 | 2476 MHz |
| 9 | 2418 MHz | 19 | 2438 MHz | 29 | 2458 MHz | 39 | 2478 MHz |
| 10 | 2420 MHz | 20 | 2440 MHz | 30 | 2460 MHz | 40 | 2480 MHz |

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

| **Test channel** | **Frequency (MHz)** |
|---|---|
| Lowest channel | 2402MHz |
| Middle channel | 2440MHz |
| Highest channel | 2480MHz |

## 2.2 Test mode

| | |
|---|---|
| Transmitting mode | Keep the EUT in continuously transmitting mode. |
| *Remark: the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.* | |

## 2.3 Description of Support Units

| No. | Description | Manufacturer | Model | Serial Number |
|---|---|---|---|---|
| 1 | Monitor | SKYWORTH | 2BU1 | / |
| 2 | MOUSE | DELL | MS116 | / |

## 2.4 Test Facility

| | |
|---|---|
| Test laboratory: | Shenzhen ETR Standard Technology Co., Ltd. |
| CNAS Registration Number: | L11864 |
| A2LA Certificate Number: | 6640.01 |
| FCC Designation Number: | CN1326 |
| FCC Test Firm Registration: | 183064 |
| IC Company Number: | 28440 |
| IC CAB identifier: | CN0132 |
| Laboratory location: | No.103, No.10, Phase I, Zone 3, Xinxing Industrial Park, Xinhe, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China |

## 2.5 Additional Instructions

| | |
|---|---|
| Test Software | Manufacturer's special serial port method |
| Power level setup | Default |

## 3. Test Instruments list

| Item | Equipment name | Manufacturer | Model | Serial No. | Calibration date | Due date |
|---|---|---|---|---|---|---|
| 1 | EMI Test Receiver | Rohde&schwarz | ESCI7 | 101214 | 2026.3.05 | 2027.3.04 |
| 2 | EMI Test Receiver | Rohde&schwarz | ESCI3 | 102696 | 2026.3.05 | 2027.3.04 |
| 3 | Loop Antenna | schwarabeck | FMZB 1519 B | 128 | 2026.3.08 | 2028.3.07 |
| 4 | Broadband antenna | schwarabeck | VULB9168 | 1064 | 2026.3.11 | 2028.3.10 |
| 5 | Horn antenna | schwarabeck | BBHA9120D | 2288 | 2026.3.08 | 2028.3.07 |
| 6 | amplifier | EMtrace | RP01A | 50117 | 2026.3.05 | 2027.3.04 |
| 7 | AMN | schwarabeck | NSLK8127 | 8127483 | 2026.3.05 | 2027.3.04 |
| 8 | AMN | ETS | 3186/2NM | 1132 | 2026.3.05 | 2027.3.04 |
| 9 | 10dB attenuator | HUBER+SUHNR | 10dB | / | 2026.3.05 | 2027.3.04 |
| 10 | amplifier | Space-Dtronics | EWLAN0118G-P40 | 19113001 | 2026.3.05 | 2027.3.04 |
| 11 | Filter | Xingbo | XBLBQ-GTA19 | 210410-3-1 | 2026.3.05 | 2027.3.04 |
| 12 | Spectrum analyzer | KEYSIGHT | N9020A | MY55370280 | 2026.3.05 | 2027.3.04 |
| 13 | Power control box | MWRFtest | MW100-PSB | MW201020JYT | 2026.3.05 | 2027.3.04 |
| 14 | Power Sensor | Keysight | U2021XA | MY54111006 | 2026.3.05 | 2027.3.04 |
| 15 | amplifier | SKET | LNPA_1840-50 (18-40GHz) | 19113001 | 2026.3.05 | 2027.3.04 |
| 16 | Horn antenna | schwarabeck | BBHA 9170 | 946 | 2026.3.08 | 2028.3.07 |
| 17 | Temp. & Humidity Chamber | Jiecheng Instrument | QA-LP-80 | 20160705001 | 2026/3/06 | 2027/3/05 |

Note: the calibration interval of the above test instruments is 12 or 24 months and the calibrations are traceable to international system unit (SI).

| Software Name | Manufacturer | Model | Version |
|---|---|---|---|
| RF test software | MWRFtest | MTS 8310 | V2.0.0.0 |
| Conducted test software | EZ-EMC | Farad | Ver.EMC-CON 3A1.1 |
| Radiated test software | EZ-EMC | Farad | Ver.FA-03A2 RE |

# 4. Test results and Measurement Data

## 4.1 Antenna requirement

| **Standard requirement:** | 47CFR Part 15.203 /247(b)(4) |
|---|---|
| **15.203 requirement:**<br>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.<br>**15.247(b) (4) requirement:**<br>If transmitting antennas of directional gain greater than 6dBi are used, the conducted output power limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. | |
| **EUT Antenna:** | |
| The antenna is FPC antenna, the best case gain of the antenna is 3.72 dBi, reference to the ET-26083913IP for details. | |

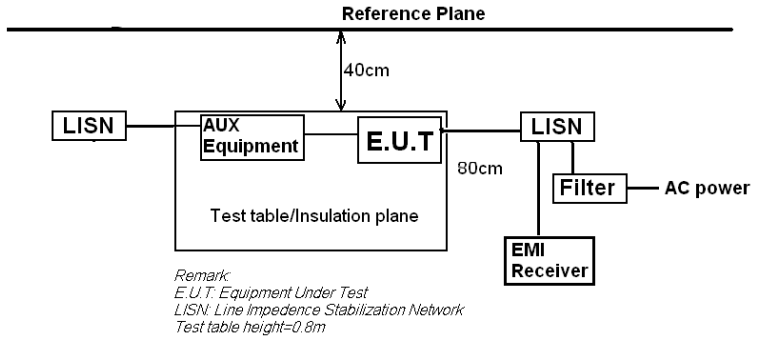
## 4.2 Conducted Emissions

| | |
|---|---|
| Test Requirement: | 47CFR part 15.207 |
| Test Method: | ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 § 6.2 |
| Test Frequency Range: | 150KHz to 30MHz |
| Receiver setup: | RBW=9KHz, VBW=30KHz, Sweep time=auto |
| Limit: | |

| Frequency range (MHz) | Limit (dBuV) | |
|---|---|---|
| | 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.

Test setup:




Test procedure:

1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 on conducted measurement.

| | | | | | | |
|---|---|---|---|---|---|---|
| Test Instruments: | Refer to section 3.0 for details | | | | | |
| Test mode: | Refer to section 2.2 for details | | | | | |
| Test environment: | Temp.: | 27.4°C | Humid.: | 66% | Press.: | 1012mbar |
| Test voltage: | AC 120V 60HZ | | | | | |
| Test results: | Pass | | | | | |

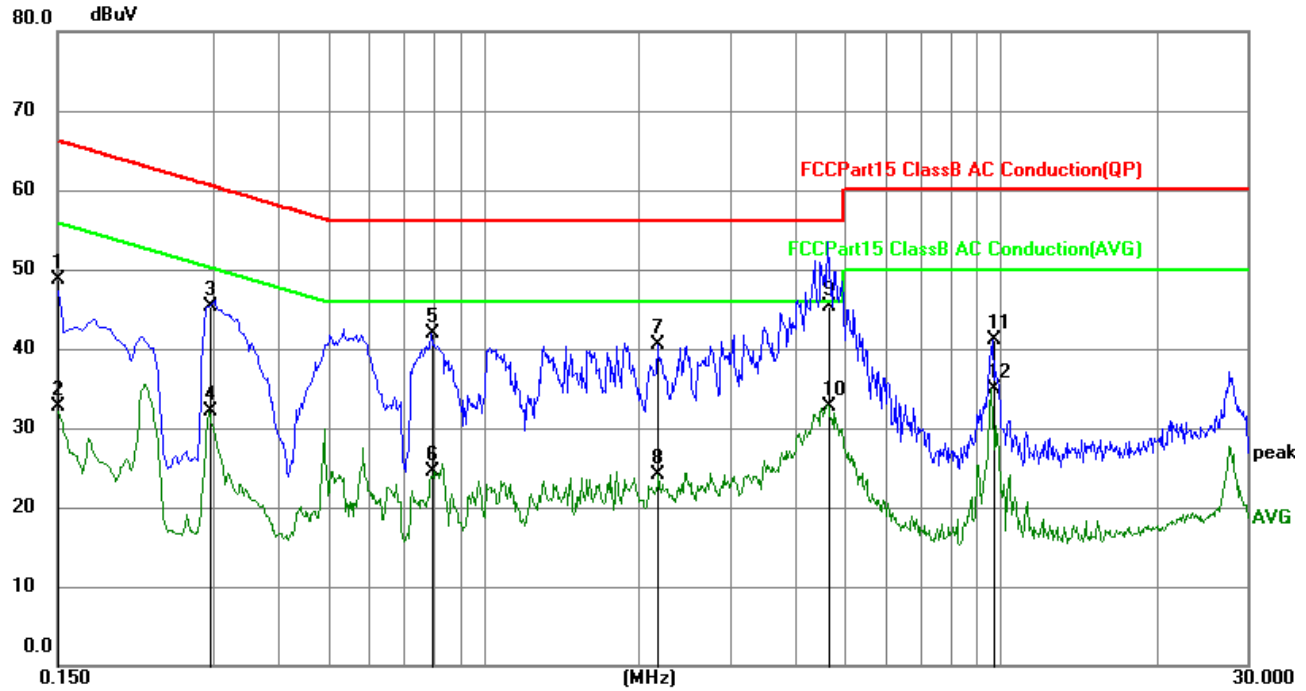
*Remark:*

*1. Both high voltage and low voltage have been tested, and the report only shows the worst case data with AC 120V/60Hz.*

*2. All mode have been tested, the report only shows the worst mode (2440MHz) data.*

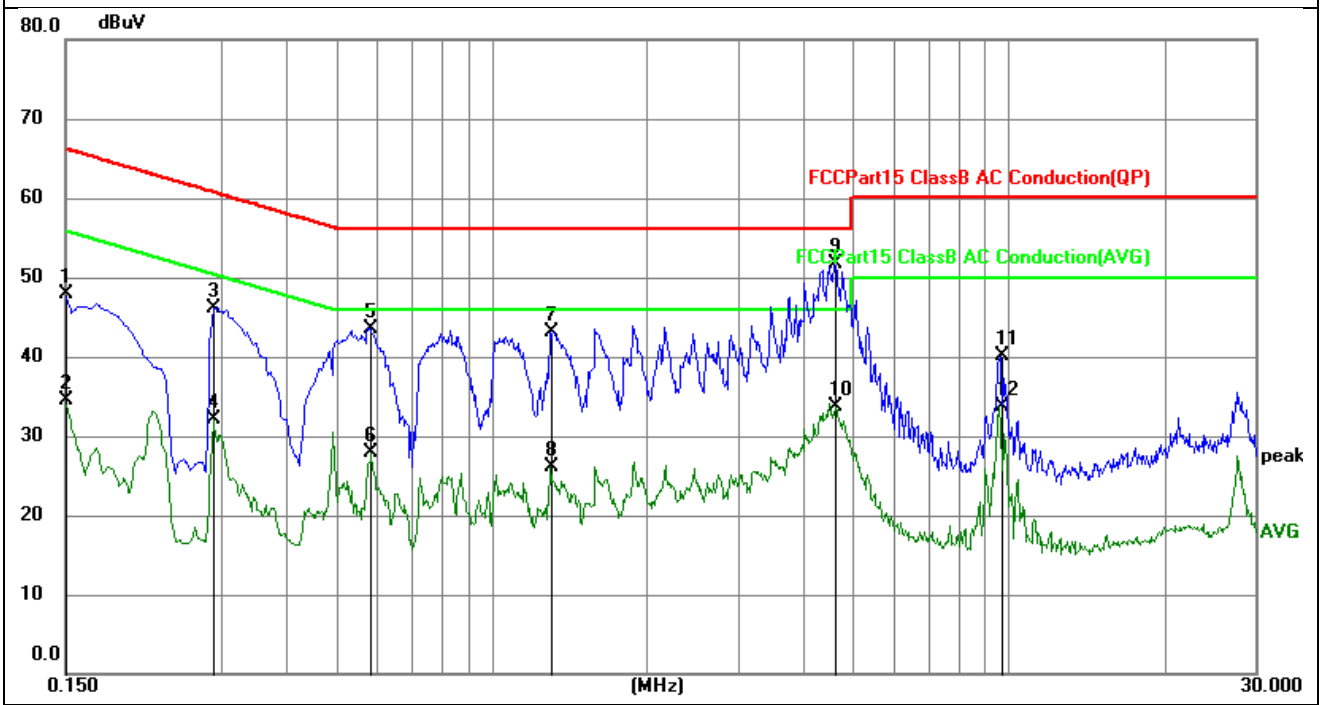
**Measurement data**

**Line:**




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 0.1500 | 38.65 | 9.97 | 48.62 | 66.00 | -17.38 | QP |
| 2 | 0.1500 | 22.67 | 9.97 | 32.64 | 56.00 | -23.36 | AVG |
| 3 | 0.2940 | 35.35 | 10.00 | 45.35 | 60.41 | -15.06 | QP |
| 4 | 0.2940 | 22.06 | 10.00 | 32.06 | 50.41 | -18.35 | AVG |
| 5 | 0.7934 | 31.81 | 10.09 | 41.90 | 56.00 | -14.10 | QP |
| 6 | 0.7934 | 14.48 | 10.09 | 24.57 | 46.00 | -21.43 | AVG |
| 7 | 2.1749 | 30.48 | 10.00 | 40.48 | 56.00 | -15.52 | QP |
| 8 | 2.1749 | 14.02 | 10.00 | 24.02 | 46.00 | -21.98 | AVG |
| 9 | 4.6455 | 35.27 | 10.03 | 45.30 | 56.00 | -10.70 | QP |
| 10 | 4.6455 | 22.77 | 10.03 | 32.80 | 46.00 | -13.20 | AVG |
| 11 | 9.6540 | 31.05 | 10.08 | 41.13 | 60.00 | -18.87 | QP |
| 12 | 9.6540 | 24.73 | 10.08 | 34.81 | 50.00 | -15.19 | AVG |

**Neutral:**

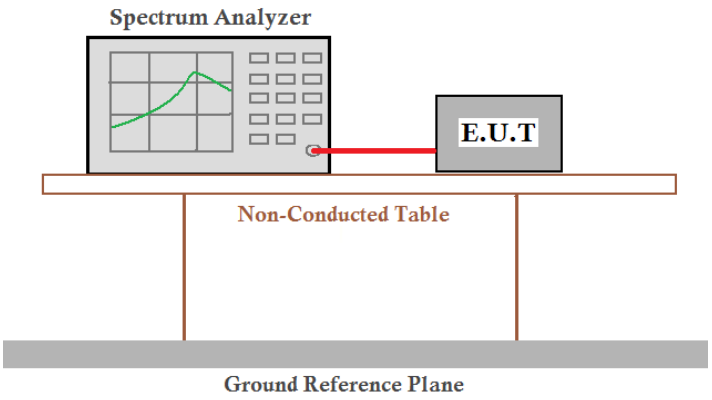



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 0.1500 | 37.91 | 9.97 | 47.88 | 66.00 | -18.12 | QP |
| 2 | 0.1500 | 24.58 | 9.97 | 34.55 | 56.00 | -21.45 | AVG |
| 3 | 0.2895 | 36.07 | 10.00 | 46.07 | 60.54 | -14.47 | QP |
| 4 | 0.2895 | 22.12 | 10.00 | 32.12 | 50.54 | -18.42 | AVG |
| 5 | 0.5823 | 33.34 | 10.08 | 43.42 | 56.00 | -12.58 | QP |
| 6 | 0.5823 | 17.89 | 10.08 | 27.97 | 46.00 | -18.03 | AVG |
| 7 | 1.3018 | 33.05 | 10.06 | 43.11 | 56.00 | -12.89 | QP |
| 8 | 1.3018 | 16.09 | 10.06 | 26.15 | 46.00 | -19.85 | AVG |
| 9 | 4.6095 | 41.58 | 10.03 | 51.61 | 56.00 | -4.39 | QP |
| 10 | 4.6095 | 23.59 | 10.03 | 33.62 | 46.00 | -12.38 | AVG |
| 11 | 9.6540 | 29.93 | 10.08 | 40.01 | 60.00 | -19.99 | QP |
| 12 | 9.6540 | 23.68 | 10.08 | 33.76 | 50.00 | -16.24 | AVG |

*Notes:*

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Level =Receiver Read level + Factor (Factor= LISN Factor + Cable Loss+ Attenuator Factor)
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

## 4.3 Duty cycle

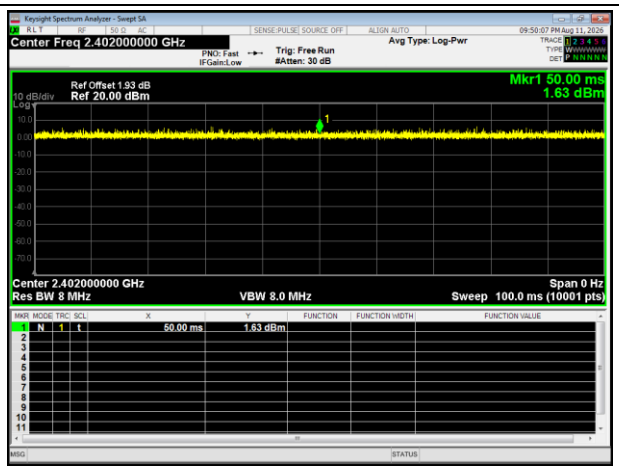
| | | |
|---|---|---|
| Test Method : | ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 § 11.6 | |
| Limit: | / | |
| Test setup: |  | |
| Test Instruments: | Refer to section 3.0 for details | |
| Test mode: | Refer to section 2.2 for details | |
| Test environment: | Temp.: 22.3°C | Humid.: 59%RH |
| Test voltage: | AC 120V 60HZ | |
| Test results: | Pass | |

**Measurement Result**

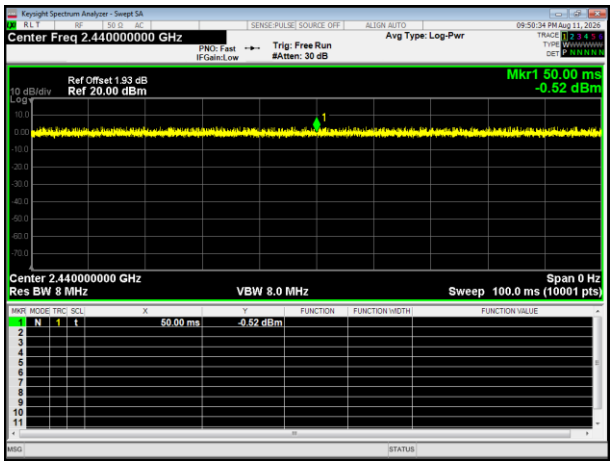
| Test channel | Duty Cycle (%) | Correction Factor (dB) |
|---|---|---|
| Lowest | 100 | 0 |
| Middle | 100 | 0 |
| Highest | 100 | 0 |

*Note: Duty cycle factor (dB) =10 * log (1/ Duty cycle)*

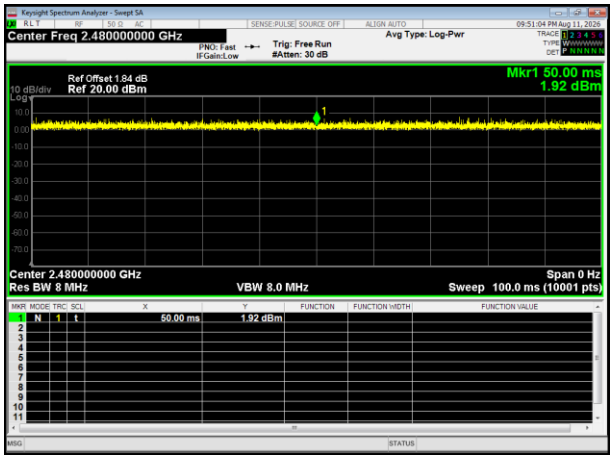
**Test plot as follows:**




Lowest channel

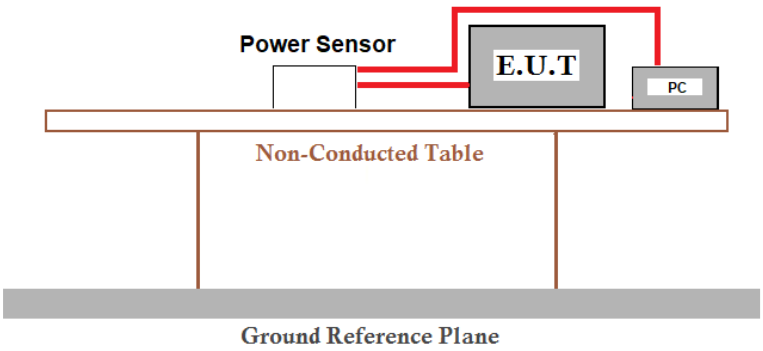



Middle channel




Highest channel

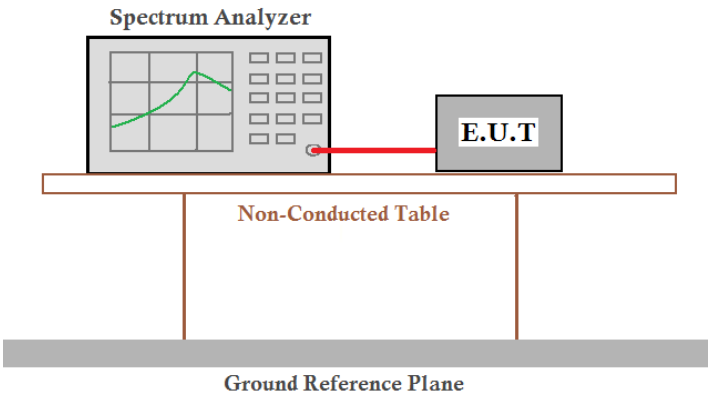
## 4.4 Conducted Output Power

| | | |
|---|---|---|
| Test Requirement : | 47CFR Part 15.247 (b)(3) | |
| Test Method : | ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 § 11.9.1.2<br>KDB558074 D01 15.247 Meas Guidance v05r02 | |
| Limit: | 30dBm for conducted | |
| Test setup: |  | |
| Test Instruments: | Refer to section 3.0 for details | |
| Test mode: | Refer to section 2.2 for details | |
| Test environment: | Temp.: 22.3°C | Humid.: 59%RH |
| Test voltage: | AC 120V 60HZ | |
| Test results: | Pass | |

**Measurement Result**

| Test channel | Output Power (dBm) | Limit(dBm) | Result |
|---|---|---|---|
| Lowest | 3.47 | 30.00 | Pass |
| Middle | 3.92 | | |
| Highest | 2.41 | | |

## 4.5 6dB Bandwidth

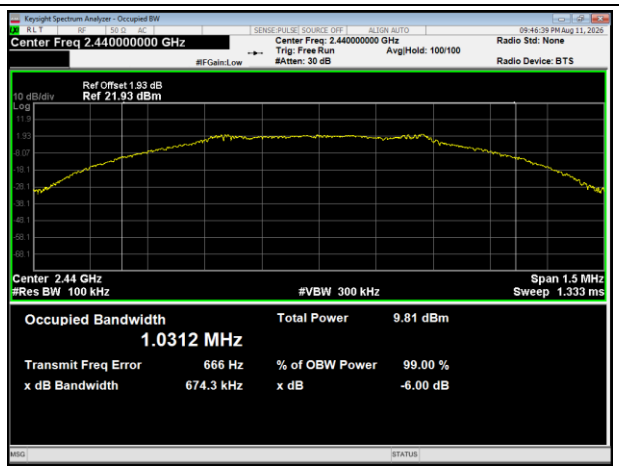
| | | |
|---|---|---|
| Test Requirement : | 47CFR part 15.247 (a)(2) | |
| Test Method : | ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 § 11.8.2 | |
| Limit: | >500KHz | |
| Test setup: |  | |
| Test Instruments: | Refer to section 3.0 for details | |
| Test mode: | Refer to section 2.2 for details | |
| Test environment: | Temp.: 22.3°C | Humid.: 59%RH |
| Test voltage: | AC 120V 60HZ | |
| Test results: | Pass | |

**Measurement Result**

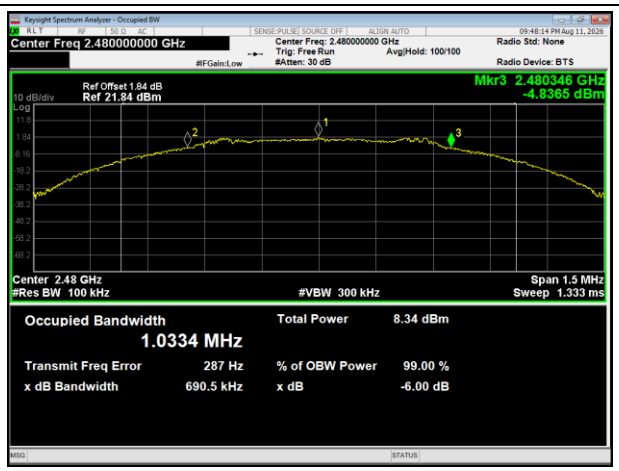
| Test channel | 6dB Bandwidth (MHz) | Limit(KHz) | Result |
|---|---|---|---|
| Lowest | 0.6549 | >500 | Pass |
| Middle | 0.6743 | | |
| Highest | 0.6905 | | |

**Test plot as follows:**

Lowest channel

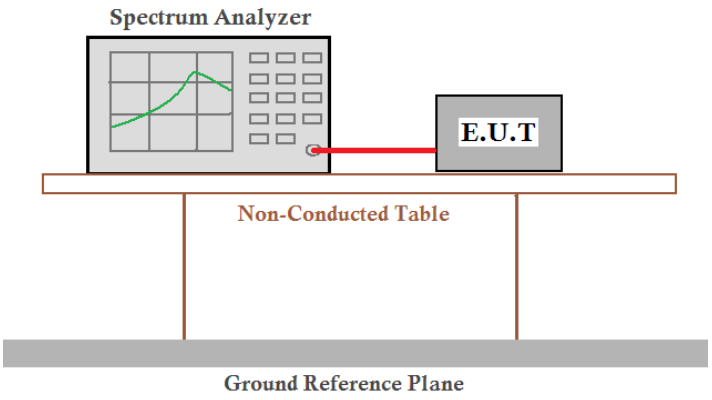



Middle channel




Highest channel

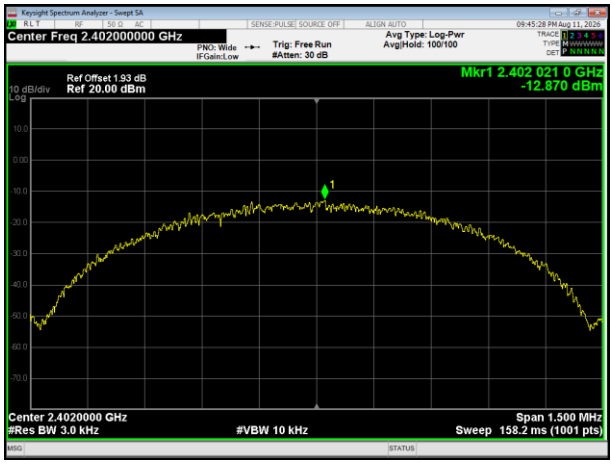
## 4.6 Power Spectral Density

| | | |
|---|---|---|
| Test Requirement: | 47CFR Part 15.247 (e) | |
| Test Method: | ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 § 11.10.2<br>KDB558074 D01 15.247 Meas Guidance v05r02 | |
| Limit: | 8dBm/3kHz | |
| Test setup: |  | |
| Test Instruments: | Refer to section 3.0 for details | |
| Test mode: | Refer to section 2.2 for details | |
| Test environment: | Temp.: 22.3°C | Humid.: 59%RH |
| Test voltage: | AC 120V 60HZ | |
| Test results: | Pass | |

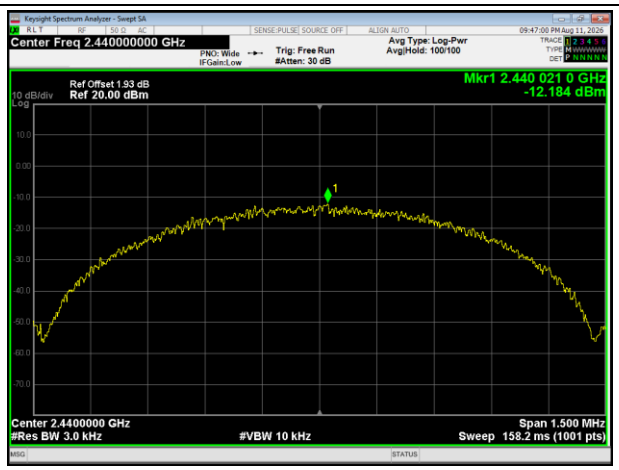
**Measurement Result**

| Test channel | Power Spectral Density (dBm/3kHz) | Limit(dBm/3kHz) | Result |
|---|---|---|---|
| Lowest | -12.870 | 8.00 | Pass |
| Middle | -12.184 | | |
| Highest | -13.661 | | |

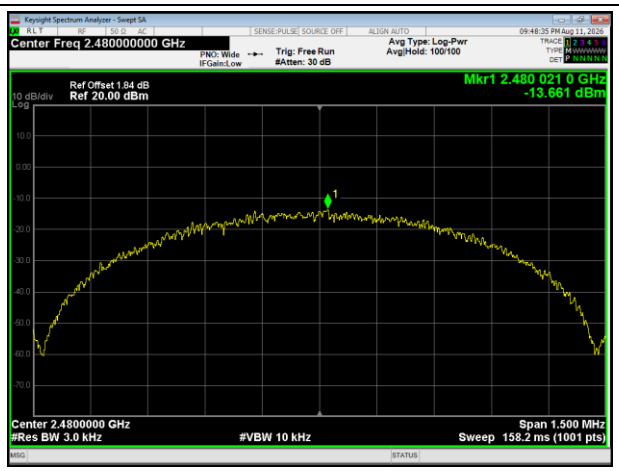
**Test plot as follows:**




Lowest channel



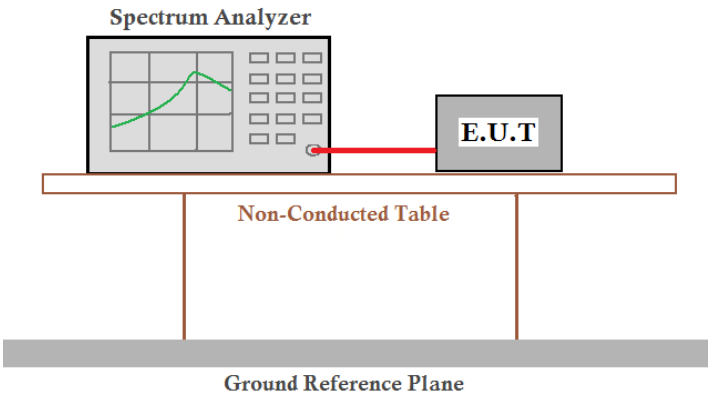

Middle channel

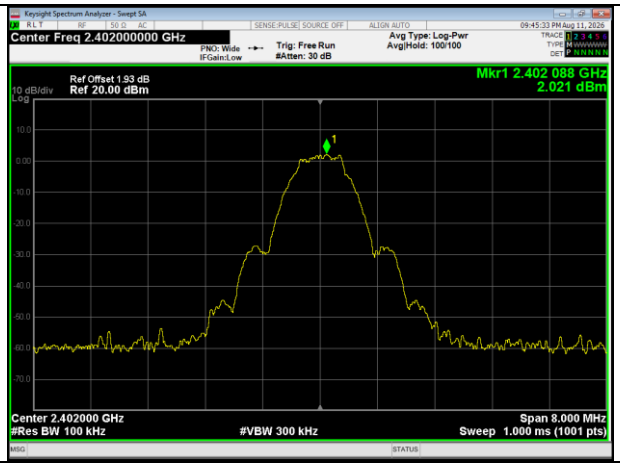


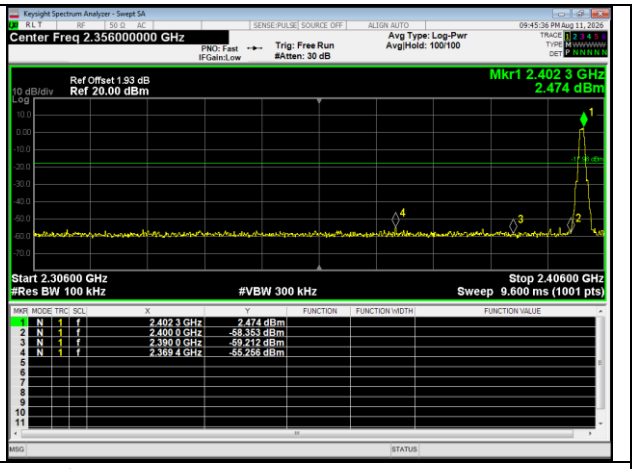

Highest channel

## 4.7 Band edges

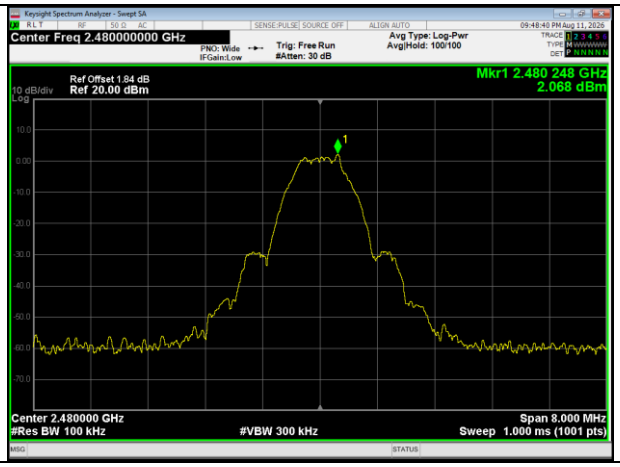
### Conducted Emission Method

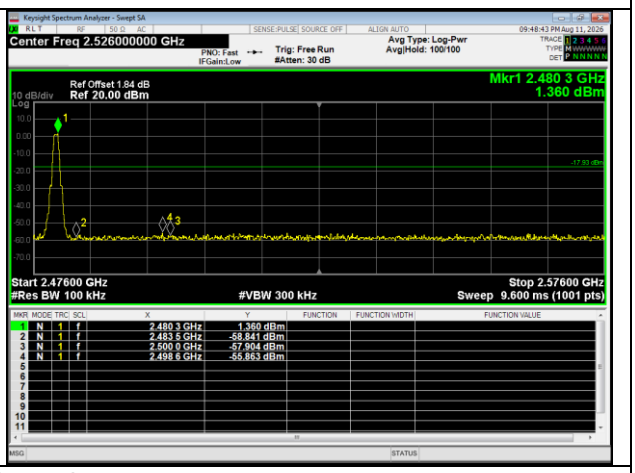
| | | |
|---|---|---|
| Test Requirement: | 47CFR Part 15.247 (d) | |
| Test Method: | ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 § 6.10.2 | |
| Limit: | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio 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. | |
| Test setup: |  | |
| Test Instruments: | Refer to section 3.0 for details | |
| Test mode: | Refer to section 2.2 for details | |
| Test environment: | Temp.: 22.3°C | Humid.: 59%RH |
| Test voltage: | AC 120V 60HZ | |
| Test results: | Pass | |




Lowest channel




Highest channel

## Radiated Emission Method

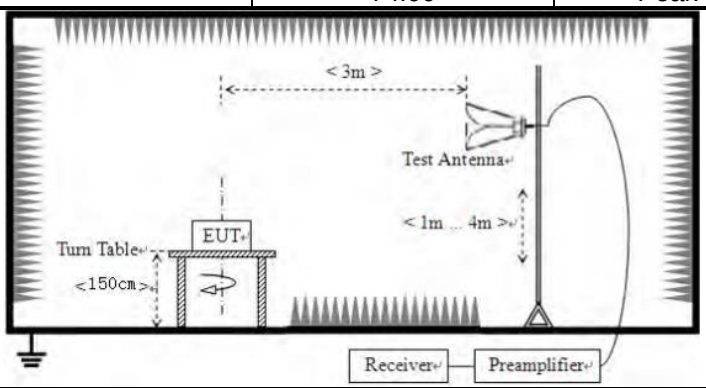
| | |
|---|---|
| Test Requirement: | 47CFR Part 15.209 and 15.205 |
| Test Method: | ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 § 6.10.4&11.12.1 |
| Test Frequency Range: | All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed. |
| Test site: | Measurement Distance: 3m |
| Receiver setup: | |

| Frequency | Detector | RBW | VBW | Value |
|---|---|---|---|---|
| Above 1GHz | Peak | 1MHz | 3MHz | Peak |
| | Average | 1MHz | 3MHz | Average |

Limit:

| Frequency | Limit (dBuV/m @3m) | Value |
|---|---|---|
| Above 1GHz | 54.00 | Average |
| | 74.00 | Peak |

Test setup:




Test Procedure:

1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. 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.
4. 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 rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. 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.
7. The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.

| | | |
|---|---|---|
| Test Instruments: | Refer to section 3.0 for details | |
| Test mode: | Refer to section 2.2 for details | |
| Test environment: | Temp.: 22.3°C | Humid.: 59%RH |
| Test voltage: | AC 120V 60HZ | |
| Test results: | Pass | |

**Measurement Result:**

| Test channel: | Lowest |
|---|---|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Polarization |
|---|---|---|---|---|---|---|
| 2310.00 | 54.21 | -13.36 | 40.85 | 74.00 | -33.15 | Horizontal |
| 2390.00 | 59.15 | -13.03 | 46.12 | 74.00 | -27.88 | Horizontal |
| 2310.00 | 54.76 | -13.36 | 41.40 | 74.00 | -32.60 | Vertical |
| 2390.00 | 58.64 | -13.03 | 45.61 | 74.00 | -28.39 | Vertical |

**Average value:**

| Frequency (MHz) | Read Level (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|---|---|---|---|---|---|---|
| 2310.00 | 46.60 | -13.36 | 33.24 | 54.00 | -20.76 | Horizontal |
| 2390.00 | 51.03 | -13.03 | 38.00 | 54.00 | -16.00 | Horizontal |
| 2310.00 | 46.97 | -13.36 | 33.61 | 54.00 | -20.39 | Vertical |
| 2390.00 | 51.45 | -13.03 | 38.42 | 54.00 | -15.58 | Vertical |

| Test channel: | Highest |
|---|---|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|---|---|---|---|---|---|---|
| 2483.50 | 57.96 | -12.64 | 45.32 | 74.00 | -28.68 | Horizontal |
| 2500.00 | 53.89 | -12.57 | 41.32 | 74.00 | -32.68 | Horizontal |
| 2483.50 | 58.11 | -12.64 | 45.47 | 74.00 | -28.53 | Vertical |
| 2500.00 | 53.57 | -12.57 | 41.00 | 74.00 | -33.00 | Vertical |

**Average value:**

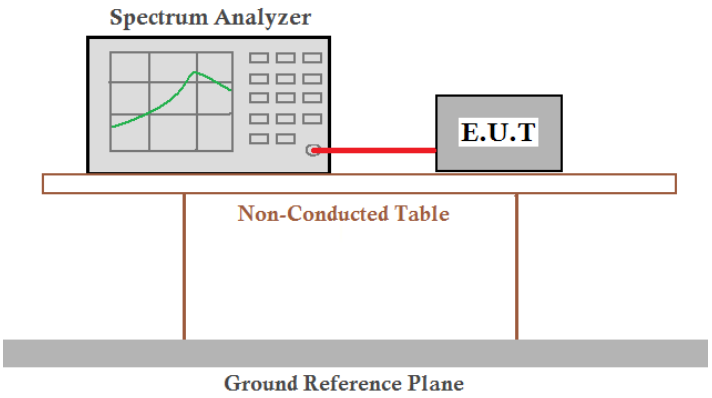
| Frequency (MHz) | Read Level (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|---|---|---|---|---|---|---|
| 2483.50 | 47.14 | -12.64 | 34.50 | 54.00 | -19.50 | Horizontal |
| 2500.00 | 49.30 | -12.57 | 36.73 | 54.00 | -17.27 | Horizontal |
| 2483.50 | 48.36 | -12.64 | 35.72 | 54.00 | -18.28 | Vertical |
| 2500.00 | 48.26 | -12.57 | 35.69 | 54.00 | -18.31 | Vertical |

*Remarks:*

1. *Level = Read level + Factor*
2. *Factor=Antenna Factor + Cable Loss – Preamplifier Factor*
3. *Emissions more than 20 dB below the limit do not need to be reported.*
4. *The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.*

## 4.8 Spurious Emission

### Conducted Emission Method

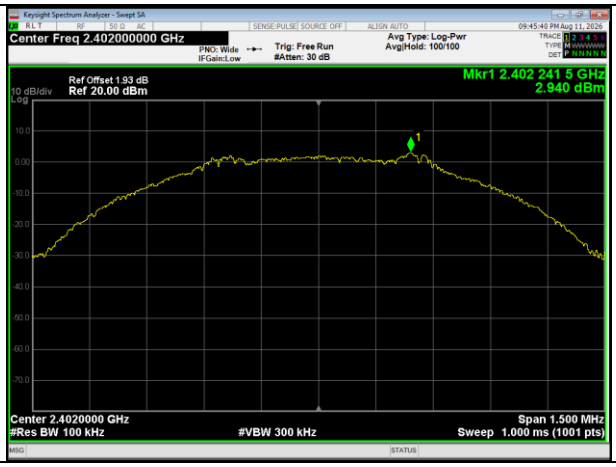
| | | |
|---|---|---|
| Test Requirement: | 47CFR Part 15.247(d),47CFR Part 15.209 and 15.205 | |
| Test Method: | ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 § 11.12.2 | |
| Limit: | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional 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. | |
| Test setup: |  | |
| Test Instruments: | Refer to section 3.0 for details | |
| Test mode: | Refer to section 2.2 for details | |
| Test environment: | Temp.: 22.3°C | Humid.: 59%RH |
| Test voltage: | AC 120V 60HZ | |
| Test results: | Pass | |

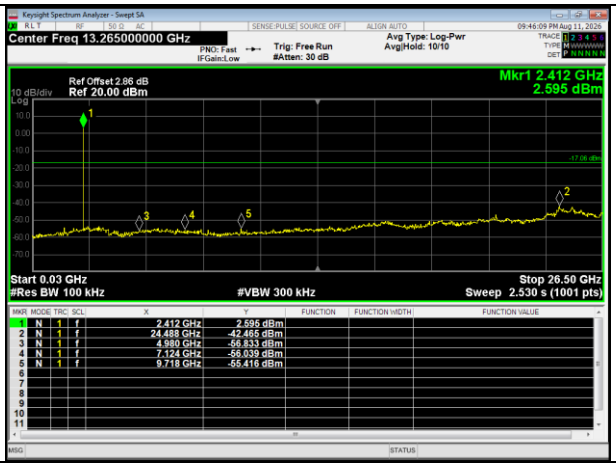
*Remark:*

*1. Cable loss data included in Offset.*

**Test plot as follows:**

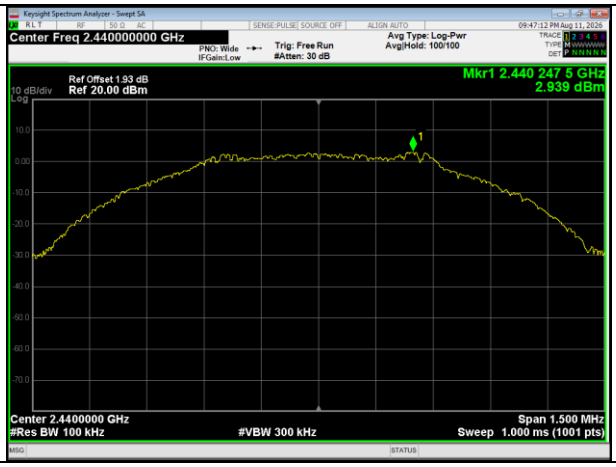
**Lowest channel**

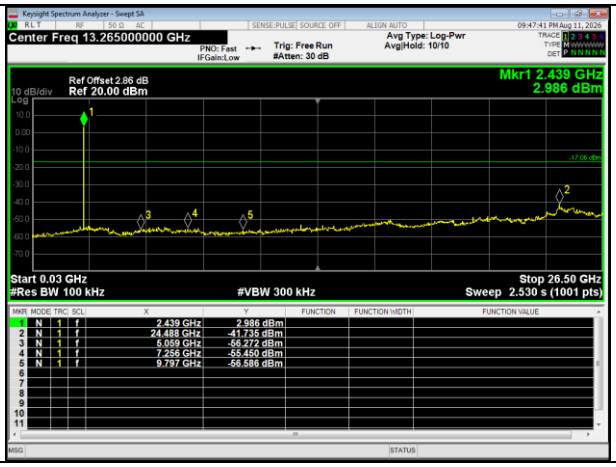



30MHz~25GHz

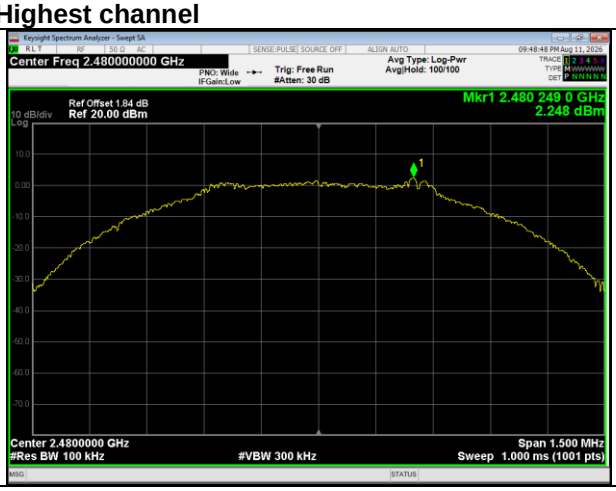
**Middle channel**

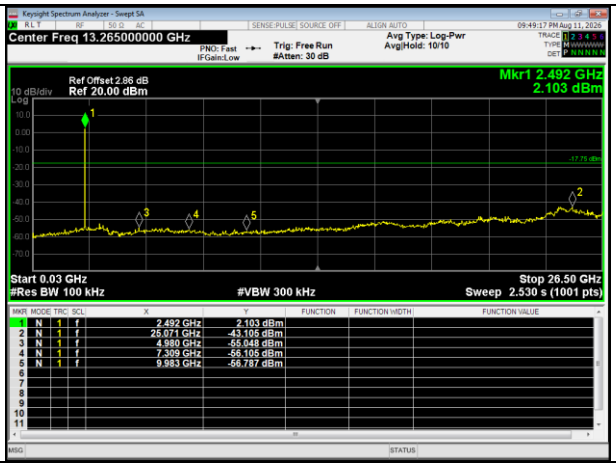



30MHz~25GHz

**Highest channel**




30MHz~25GHz

## Radiated Emission Method

| | |
|---|---|
| Test Requirement: | 47CFR part 15.247(d),47CFR Part 15.209 and 15.205 |
| Test Method: | ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 § 6.4&6.5&6.6 |
| Test Frequency Range: | 9kHz to 25GHz |
| Test site: | Measurement Distance: 3m |

Receiver setup:

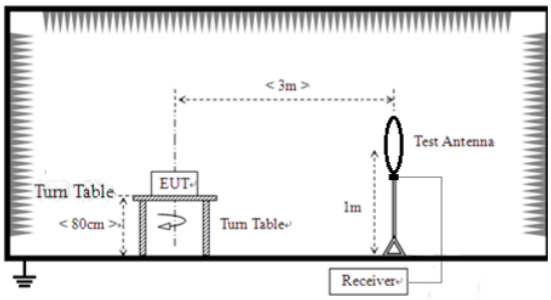
| Frequency | Detector | RBW | VBW | Value |
|---|---|---|---|---|
| 9KHz-150KHz | Quasi-peak | 200Hz | 600Hz | Quasi-peak |
| 150KHz-30MHz | Quasi-peak | 9KHz | 30KHz | Quasi-peak |
| 30MHz-1GHz | Quasi-peak | 120KHz | 360KHz | Quasi-peak |
| Above 1GHz | Peak | 1MHz | 3MHz | Peak |
| | Peak | 1MHz | 10Hz | Average |

Limit:

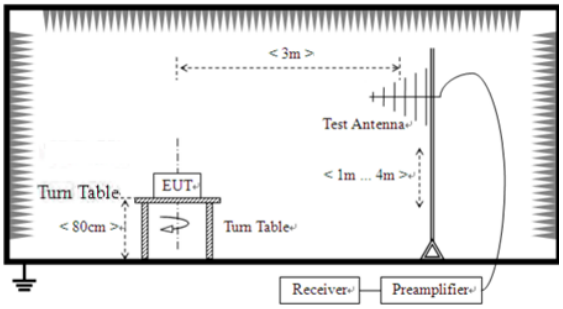
| Frequency | Limit (uV/m) | Value | Measurement Distance |
|---|---|---|---|
| 0.009MHz-0.490MHz | 2400/F(KHz) | QP | 300m |
| 0.490MHz-1.705MHz | 24000/F(KHz) | QP | 300m |
| 1.705MHz-30MHz | 30 | QP | 30m |
| 30MHz-88MHz | 100 | QP | 3m |
| 88MHz-216MHz | 150 | QP | |
| 216MHz-960MHz | 200 | QP | |
| 960MHz-1GHz | 500 | QP | |
| Above 1GHz | 500 | Average | |
| | 5000 | Peak | |

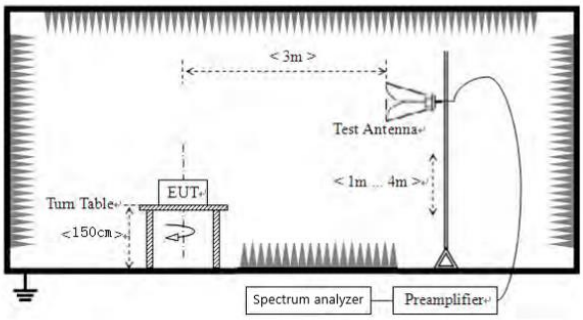
Test setup:

For radiated emissions from 9kHz to 30MHz




For radiated emissions from 30MHz to1GHz



| | |
|---|---|
| | For radiated emissions above 1GHz<br>  <br> |
| Test Procedure: | 1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.<br>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.<br>3. 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.<br>4. 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 rota table was turned from 0 degrees to 360 degrees to find the maximum reading.<br>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.<br>6. 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. |
| Test Instruments: | Refer to section 3.0 for details |
| Test mode: | Refer to section 2.2 for details |
| Test results: | Pass |

*Remarks:*

1. *The report only shows the worst mode.*
2. *Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.*
3. *All models and modes have been tested, and the report only displays the worst mode (2440MHz) data.*

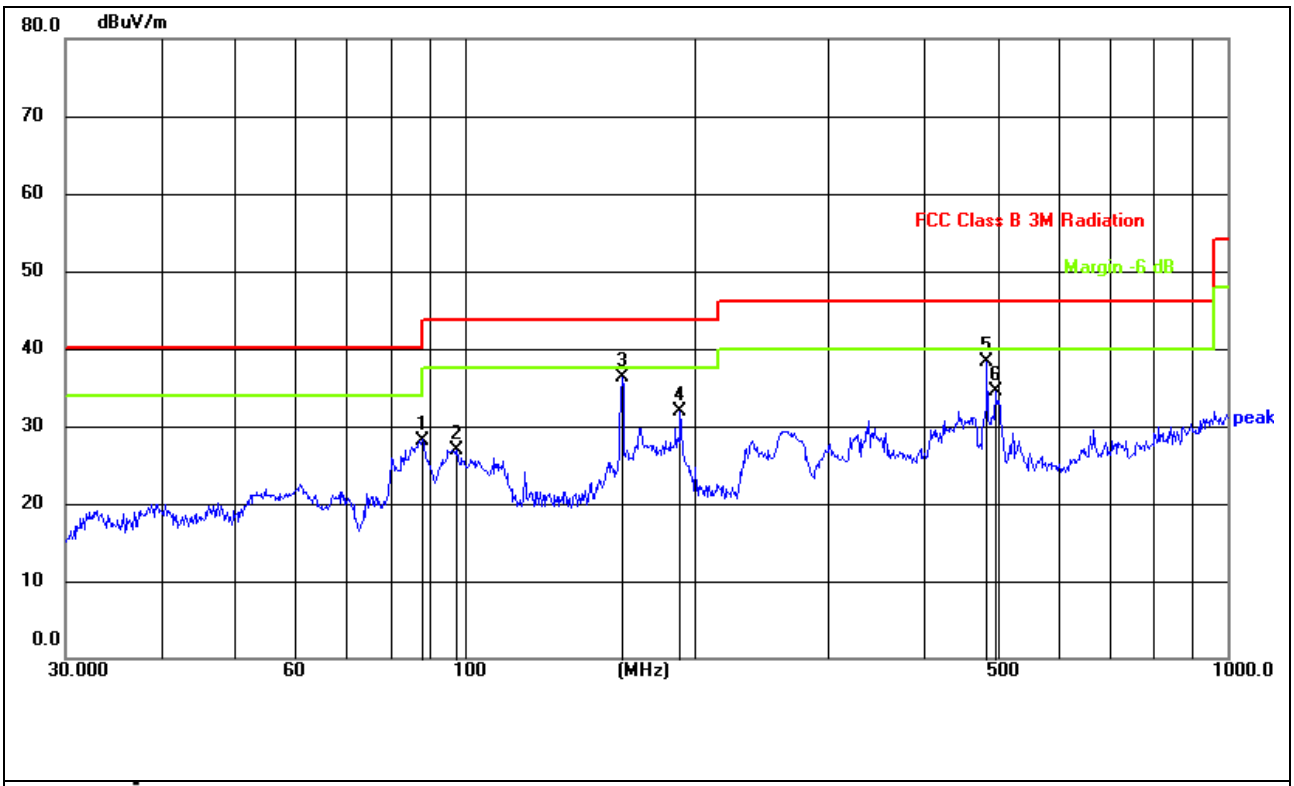
**Measurement Result:**

■ **9kHz~30MHz**

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 47CFR part 15.31(o), the test result no need to reported.

■ **Below 1GHz**

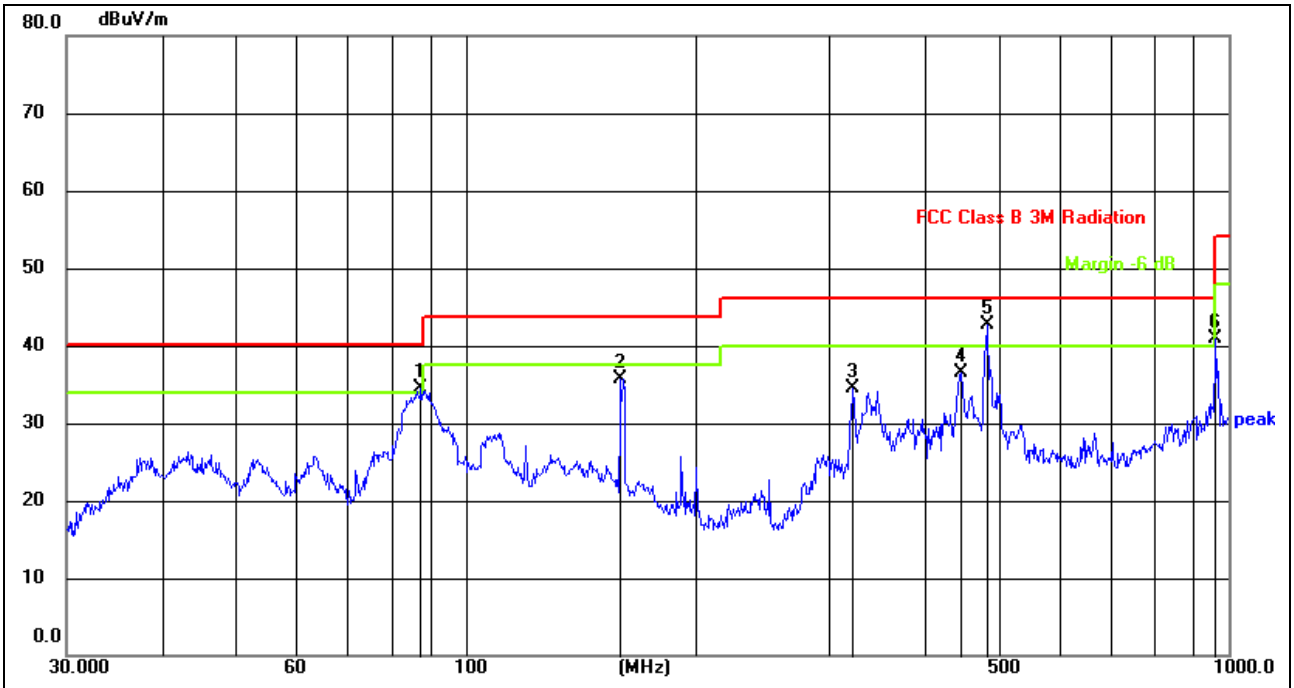
| Test polarization: | Vertical | Test voltage: | AC 120V 60HZ |
|---|---|---|---|
| Temp.: | 22.3°C | Humid.: | 59%RH |




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 88.0327 | 54.03 | -25.83 | 28.20 | 43.50 | -15.30 | QP |
| 2 | 97.7980 | 52.44 | -25.52 | 26.92 | 43.50 | -16.58 | QP |
| 3 | 160.9088 | 57.33 | -20.99 | 36.34 | 43.50 | -7.16 | QP |
| 4 | 191.7450 | 55.52 | -23.60 | 31.92 | 43.50 | -11.58 | QP |
| 5 | 483.9094 | 53.24 | -14.89 | 38.35 | 46.00 | -7.65 | QP |
| 6 | 495.9343 | 48.62 | -14.17 | 34.45 | 46.00 | -11.55 | QP |

*Factor= Antenna Factor + Cable Loss – Preamplifier Factor*
*Level = Reading + Factor, Margin=level-Limit*

| | | | |
|---|---|---|---|
| Test polarization: | Horizontal | Test voltage: | AC 120V 60HZ |
| Temp.: | 22.3°C | Humid.: | 59%RH |




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 87.4175 | 60.37 | -25.88 | 34.49 | 40.00 | -5.51 | QP |
| 2 | 159.7844 | 56.71 | -20.96 | 35.75 | 43.50 | -7.75 | QP |
| 3 | 322.1884 | 54.28 | -19.75 | 34.53 | 46.00 | -11.47 | QP |
| 4 | 446.4139 | 52.17 | -15.71 | 36.46 | 46.00 | -9.54 | QP |
| 5 | 482.2155 | 57.67 | -14.98 | 42.69 | 46.00 | -3.31 | QP |
| 6 | 962.1621 | 44.35 | -3.40 | 40.95 | 54.00 | -13.05 | QP |

*Remarks:*

*Level =Receiver Reading + Factor*

*Factor= Antenna Factor + Cable Factor – Preamplifier Factor*

■ **1GHz-25GHz**

| | | | |
|---|---|---|---|
| Temp.: | 22.3°C | Humid.: | 59%RH |
| Test voltage: | AC 120V 60HZ | | |
| Test channel: | Lowest | | |

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|
| 4804.00 | 60.32 | -7.69 | 52.63 | 74.00 | -21.37 | Vertical |
| 7206.00 | 55.89 | -1.70 | 54.19 | 74.00 | -19.81 | Vertical |
| 9608.00 | 52.95 | 1.31 | 54.26 | 74.00 | -19.74 | Vertical |
| 12010.00 | * | -- | -- | 74.00 | -- | Vertical |
| 14412.00 | * | -- | -- | 74.00 | -- | Vertical |
| 4804.00 | 61.24 | -7.69 | 53.55 | 74.00 | -20.45 | Horizontal |
| 7206.00 | 56.29 | -1.70 | 54.59 | 74.00 | -19.41 | Horizontal |
| 9608.00 | 53.68 | 1.31 | 54.99 | 74.00 | -19.01 | Horizontal |
| 12010.00 | * | -- | -- | 74.00 | -- | Horizontal |
| 14412.00 | * | -- | -- | 74.00 | -- | Horizontal |

**Average value:**

| Frequency (MHz) | Read Level (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|
| 4804.00 | 48.00 | -7.69 | 40.31 | 54.00 | -13.69 | Vertical |
| 7206.00 | 44.35 | -1.70 | 42.65 | 54.00 | -11.35 | Vertical |
| 9608.00 | 40.77 | 1.31 | 42.08 | 54.00 | -11.92 | Vertical |
| 12010.00 | * | -- | -- | 54.00 | -- | Vertical |
| 14412.00 | * | -- | -- | 54.00 | -- | Vertical |
| 4804.00 | 48.84 | -7.69 | 41.15 | 54.00 | -12.85 | Horizontal |
| 7206.00 | 44.50 | -1.70 | 42.80 | 54.00 | -11.20 | Horizontal |
| 9608.00 | 41.21 | 1.31 | 42.52 | 54.00 | -11.48 | Horizontal |
| 12010.00 | * | -- | -- | 54.00 | -- | Horizontal |
| 14412.00 | * | -- | -- | 54.00 | -- | Horizontal |

*Remarks:*

1. *Level = Read level + Factor*
2. *Factor =Antenna Factor + Cable Loss – Preamplifier Factor*
3. *"*", means this data is the too weak instrument of signal is unable to test.*
4. *Emissions more than 20 dB below the limit do not need to be reported.*

| Test channel: | Middle |
|---|---|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|
| 4880.00 | 58.43 | -7.56 | 50.87 | 74.00 | -23.13 | Vertical |
| 7320.00 | 52.95 | -1.38 | 51.57 | 74.00 | -22.43 | Vertical |
| 9760.00 | 51.54 | 1.19 | 52.73 | 74.00 | -21.27 | Vertical |
| 12200.00 | * | -- | -- | 74.00 | -- | Vertical |
| 14640.00 | * | -- | -- | 74.00 | -- | Vertical |
| 4880.00 | 57.51 | -7.56 | 49.95 | 74.00 | -24.05 | Horizontal |
| 7320.00 | 52.67 | -1.38 | 51.29 | 74.00 | -22.71 | Horizontal |
| 9760.00 | 49.70 | 1.19 | 50.89 | 74.00 | -23.11 | Horizontal |
| 12200.00 | * | -- | -- | 74.00 | -- | Horizontal |
| 14640.00 | * | -- | -- | 74.00 | -- | Horizontal |

**Average value:**

| Frequency (MHz) | Read Level (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|
| 4880.00 | 46.12 | -7.56 | 38.56 | 54.00 | -15.44 | Vertical |
| 7320.00 | 42.12 | -1.38 | 40.74 | 54.00 | -13.26 | Vertical |
| 9760.00 | 40.05 | 1.19 | 41.24 | 54.00 | -12.76 | Vertical |
| 12200.00 | * | -- | -- | 54.00 | -- | Vertical |
| 14640.00 | * | -- | -- | 54.00 | -- | Vertical |
| 4880.00 | 47.07 | -7.56 | 39.51 | 54.00 | -14.49 | Horizontal |
| 7320.00 | 42.91 | -1.38 | 41.53 | 54.00 | -12.47 | Horizontal |
| 9760.00 | 39.65 | 1.19 | 40.84 | 54.00 | -13.16 | Horizontal |
| 12200.00 | * | -- | -- | 54.00 | -- | Horizontal |
| 14640.00 | * | -- | -- | 54.00 | -- | Horizontal |

*Remarks:*

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *"*", means this data is the too weak instrument of signal is unable to test.*
3. *Emissions more than 20 dB below the limit do not need to be reported.*

| Test channel: | Highest |
|---|---|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|
| 4960.00 | 59.74 | -7.43 | 52.31 | 74.00 | -21.69 | Vertical |
| 7440.00 | 55.05 | -1.02 | 54.03 | 74.00 | -19.97 | Vertical |
| 9920.00 | 51.70 | 1.08 | 52.78 | 74.00 | -21.22 | Vertical |
| 12400.00 | * | -- | -- | 74.00 | -- | Vertical |
| 14880.00 | * | -- | -- | 74.00 | -- | Vertical |
| 4960.00 | 60.75 | -7.43 | 53.32 | 74.00 | -20.68 | Horizontal |
| 7440.00 | 54.13 | -1.02 | 53.11 | 74.00 | -20.89 | Horizontal |
| 9920.00 | 53.10 | 1.08 | 54.18 | 74.00 | -19.82 | Horizontal |
| 12400.00 | * | -- | -- | 74.00 | -- | Horizontal |
| 14880.00 | * | -- | -- | 74.00 | -- | Horizontal |

**Average value:**

| Frequency (MHz) | Read Level (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|
| 4960.00 | 48.10 | -7.43 | 40.67 | 54.00 | -13.33 | Vertical |
| 7440.00 | 43.34 | -1.02 | 42.32 | 54.00 | -11.68 | Vertical |
| 9920.00 | 40.65 | 1.08 | 41.73 | 54.00 | -12.27 | Vertical |
| 12400.00 | * | -- | -- | 54.00 | -- | Vertical |
| 14880.00 | * | -- | -- | 54.00 | -- | Vertical |
| 4960.00 | 48.44 | -7.43 | 41.01 | 54.00 | -12.99 | Horizontal |
| 7440.00 | 43.98 | -1.02 | 42.96 | 54.00 | -11.04 | Horizontal |
| 9920.00 | 41.12 | 1.08 | 42.20 | 54.00 | -11.80 | Horizontal |
| 12400.00 | * | -- | -- | 54.00 | -- | Horizontal |
| 14880.00 | * | -- | -- | 54.00 | -- | Horizontal |

*Remarks:*

1. *Level = Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *"*", means this data is the too weak instrument of signal is unable to test.*
3. *Emissions more than 20 dB below the limit do not need to be reported.*

## 5. Test Setup Photo

Reference to the file No.: ET-26083913SP for details.

## 6. EUT Constructional Details

Reference to the file No.: ET-26083913EP and ET-26083913IP for details.

------End------