# FCC Radio Test Report

## FCC ID: 2BCGWTBE552E

| | | |
|---|---|---|
| **Report No.** | : | BTL-FCCP-2-2403G002 |
| **Equipment** | : | BE9300 Wi-Fi 7 Bluetooth PCIe Adapter |
| **Model Name** | : | Archer TBE552E |
| **Brand Name** | : | tp-link |
| **Applicant** | : | TP-LINK CORPORATION PTE. LTD. |
| **Address** | : | 7 Temasek Boulevard #29-03 Suntec Tower One, Singapore 038987 |
| **Radio Function** | : | Bluetooth EDR |
| **FCC Rule Part(s)** | : | FCC CFR Title 47, Part 15, Subpart C (15.247) |
| **Measurement Procedure(s)** | : | ANSI C63.10-2013 |
| **Date of Receipt** | : | 2024/4/19 |
| **Date of Test** | : | 2024/4/19 ~ 2024/5/8 |
| **Issued Date** | : | 2024/7/24 |

The above equipment has been tested and found in compliance with the requirement of the above standards by BTL Inc.

**Prepared by** : Poken Huang, Engineer

**Approved by** : Peter Chen, Manager

**BTL Inc.**
No.18, Ln. 171, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 114, Taiwan
Tel: +886-2-2657-3299 Fax: +886-2-2657-3331 Web: www.newbtl.com Service mail: btl_qa@newbtl.com

**Declaration**

**BTL** represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

**BTL**'s reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** assumes no responsibility for the data provided by the Customer, any statements, inferences or generalizations drawn by the customer or others from the reports issued by **BTL**.

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**BTL**'s laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

**BTL** is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

**Limitation**

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

**CONTENTS**

## REVISION HISTORY

| Report No. | Version | Description | Issued Date | Note |
|---|---|---|---|---|
| BTL-FCCP-2-2403G002 | R00 | Original Report. | Jul. 01, 2024 | Invalid |
| BTL-FCCP-2-2403G002 | R01 | Revised report to address comments. | Jul. 24, 2024 | Valid |

# 1 SUMMARY OF TEST RESULTS

Test procedures according to the technical standards.

| Standard(s) Section | Description | Test Result | Judgement | Remark |
|---|---|---|---|---|
| 15.207 | AC Power Line Conducted Emissions | APPENDIX A | Pass | ------ |
| 15.205<br>15.209<br>15.247(d) | Radiated Emissions | APPENDIX B<br>APPENDIX C | Pass | ------ |
| 15.247<br>(a)(1)(iii) | Number of Hopping Frequency | APPENDIX D | Pass | ------ |
| 15.247<br>(a)(1)(iii) | Average Time of Occupancy | APPENDIX E | Pass | ------ |
| 15.247<br>(a)(1) | Hopping Channel Separation | APPENDIX F | Pass | ------ |
| 15.247<br>(a)(1) | Bandwidth | APPENDIX G | Pass | ------ |
| 15.247<br>(b)(1) | Output Power | APPENDIX H | Pass | ------ |
| 15.247(d) | Antenna conducted Spurious Emission | APPENDIX I | Pass | ------ |
| 15.203 | Antenna Requirement | ------ | Pass | **NOTE (3)** |

NOTE:
(1) ”N/A” denotes test is not applicable in this Test Report.
(2) The report format version is TP.1.1.1.
(3) The device what use replaceable antennas with non-standard interfaces are considered sufficient to com ply with the provisions of 15.203.

## 1.1 TEST FACILITY

The test locations stated below are under the TAF Accreditation Number 0659.
The test location(s) used to collect the test data in this report are:
(FCC DN: TW0659)
No.64, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)
☒ CB20 ☒ TR01 ☒ C20

## 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y ± U**, where expanded uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k = 2**, providing a level of confidence of approximately **95 %**. The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 $U_{cispr}$ requirement.

A. AC power line conducted emissions test:

| Test Site | Method | Measurement Frequency Range | U (dB) |
|---|---|---|---|
| C20 | CISPR | 150 kHz ~ 30MHz | 2.4498 |

B. Radiated emissions test:

| Test Site | Measurement Frequency Range | U,(dB) |
|---|---|---|
| CB20 | 0.03 GHz ~ 0.2 GHz | 4.17 |
| | 0.2 GHz ~ 1 GHz | 4.72 |
| | 1 GHz ~ 6 GHz | 5.20 |
| | 6 GHz ~ 18 GHz | 5.50 |
| | 18 GHz ~ 26 GHz | 3.69 |
| | 26 GHz ~ 40 GHz | 4.23 |

C. Conducted test:

| Test Item | U,(dB) |
|---|---|
| Occupied Bandwidth | 0.53 |
| Output power | 0.37 |
| Conducted Spurious emissions | 0.53 |
| Conducted Band edges | 0.53 |
| Dwell time | 0.66 |
| Channel separation | 0.66 |
| Channel numbers | 0.66 |

NOTE:
Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

### 1.3 TEST ENVIRONMENT CONDITIONS

| Test Item | Environment Condition | Test Voltage | Tested by |
|---|---|---|---|
| AC Power Line Conducted Emissions | 25°C, 45% | AC 120 V | Ken Lu |
| Radiated emissions below 1 GHz | 25°C, 65% | AC 120 V | Barry Tsui |
| Radiated emissions above 1 GHz | 25°C, 65% | AC 120 V | Ken Lu |
| Number of Hopping Frequency | 24°C, 50% | AC 120 V | Cheng Tsai |
| Average Time of Occupancy | 24°C, 50% | AC 120 V | Cheng Tsai |
| Hopping Channel Separation | 24°C, 50% | AC 120 V | Cheng Tsai |
| Bandwidth | 24°C, 50% | AC 120 V | Cheng Tsai |
| Output Power | 24°C, 50% | AC 120 V | Cheng Tsai |
| Antenna conducted Spurious Emission | 24°C, 50% | AC 120 V | Cheng Tsai |

### 1.4 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

| Test Software | WCN_Combo_Tool #1 | | | |
|---|---|---|---|---|
| Modulation Mode | 2402 MHz | 2441 MHz | 2480 MHz | Data Rate |
| GFSK | 1.5 | 1.5 | 1.5 | 1 Mbps |
| π/4-DQPSK | 4 | 4 | 4 | 2 Mbps |
| 8DPSK | 4 | 4 | 4 | 3 Mbps |

# 2 GENERAL INFORMATION

## 2.1 DESCRIPTION OF EUT

| | |
|---|---|
| Equipment | BE9300 Wi-Fi 7 Bluetooth PCIe Adapter |
| Brand Name | tp-link |
| Model Name | Archer TBE552E |
| Model Difference(s) | N/A |
| Hardware Version | 1.0 |
| Software Version | 1.0 |
| Power Source | Supplied from PCIe Slot. |
| Power Rating | DC 3.3V |
| Operation Band | 2400 MHz ~ 2483.5 MHz |
| Operation Frequency | 2402 MHz ~ 2480 MHz |
| Modulation Type | GFSK, π/4-DQPSK, 8DPSK |
| Modulation Technology | FHSS |
| Transfer Rate | 1 Mbps, 2 Mbps, 3Mbps |
| Output Power Max. | 3Mbps: 13.47 dBm (0.0222 W) |
| Test Model | Archer TBE552E |
| Sample Status | Engineering Sample |
| EUT Modification(s) | N/A |

NOTE:
(1) The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

(2) Channel List:

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|---|---|
| 00 | 2402 | 27 | 2429 | 54 | 2456 |
| 01 | 2403 | 28 | 2430 | 55 | 2457 |
| 02 | 2404 | 29 | 2431 | 56 | 2458 |
| 03 | 2405 | 30 | 2432 | 57 | 2459 |
| 04 | 2406 | 31 | 2433 | 58 | 2460 |
| 05 | 2407 | 32 | 2434 | 59 | 2461 |
| 06 | 2408 | 33 | 2435 | 60 | 2462 |
| 07 | 2409 | 34 | 2436 | 61 | 2463 |
| 08 | 2410 | 35 | 2437 | 62 | 2464 |
| 09 | 2411 | 36 | 2438 | 63 | 2465 |
| 10 | 2412 | 37 | 2439 | 64 | 2466 |
| 11 | 2413 | 38 | 2440 | 65 | 2467 |
| 12 | 2414 | 39 | 2441 | 66 | 2468 |
| 13 | 2415 | 40 | 2442 | 67 | 2469 |
| 14 | 2416 | 41 | 2443 | 68 | 2470 |
| 15 | 2417 | 42 | 2444 | 69 | 2471 |
| 16 | 2418 | 43 | 2445 | 70 | 2472 |
| 17 | 2419 | 44 | 2446 | 71 | 2473 |
| 18 | 2420 | 45 | 2447 | 72 | 2474 |
| 19 | 2421 | 46 | 2448 | 73 | 2475 |
| 20 | 2422 | 47 | 2449 | 74 | 2476 |
| 21 | 2423 | 48 | 2450 | 75 | 2477 |
| 22 | 2424 | 49 | 2451 | 76 | 2478 |
| 23 | 2425 | 50 | 2452 | 77 | 2479 |
| 24 | 2426 | 51 | 2453 | 78 | 2480 |
| 25 | 2427 | 52 | 2454 | | |
| 26 | 2428 | 53 | 2455 | | |

(3) Table for Filed Antenna:

| Ant. | Brand Name | Model Name | Type | Connector | Gain (dBi) |
|---|---|---|---|---|---|
| 1 | TP-LINK CORPORATION PTE. LTD. | 3101504215 | Dipole | N/A | 1.00 |

(4) The above Antenna information are derived from the antenna data sheet provided by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

## 2.2 TEST MODES

| Test Items | Test mode | Channel | Note |
|---|---|---|---|
| AC power line conducted emissions | Normal/Idle | - | - |
| Transmitter Radiated Emissions (below 1GHz) | 3 Mbps | 00 | - |
| Transmitter Radiated Emissions (above 1GHz) | 1/3 Mbps | 00/78 | Bandedge |
| | 1/3 Mbps | 00/39/78 | Harmonic |
| Number of Hopping Frequency | 1/3 Mbps | 00~78 | - |
| Average Time of Occupancy | 1/3 Mbps | 00/39/78 | - |
| Hopping Channel Separation | 1/3 Mbps | 00/39/78 | - |
| Bandwidth | 1/3 Mbps | 00/39/78 | - |
| Peak Output Power | 1/2/3 Mbps | 00/39/78 | - |
| Antenna conducted Spurious Emission | 1/3 Mbps | 00/39/78 | - |

Note:

(1) The measurements for Output Power were tested with DH1/3/5 during 1Mbps, 2Mbps and 3Mbps, the worst case were 1Mbps (DH5) and 3Mbps (3DH5), only worst case were documented for other test items except Average Time of Occupancy.

(2) This product has the mode of BT AFH, which was considered during testing. 800/20/X(X = 2 of DH1, X = 4 of DH3 or X = 6 of DH5) with 20, 10 or 6.67 hops per second in a channel, and then multiply 0.4*20 (20 # of hopping). But this mode is not the worst case mode as duration of the packet is same, and this report only shows the worst case mode.

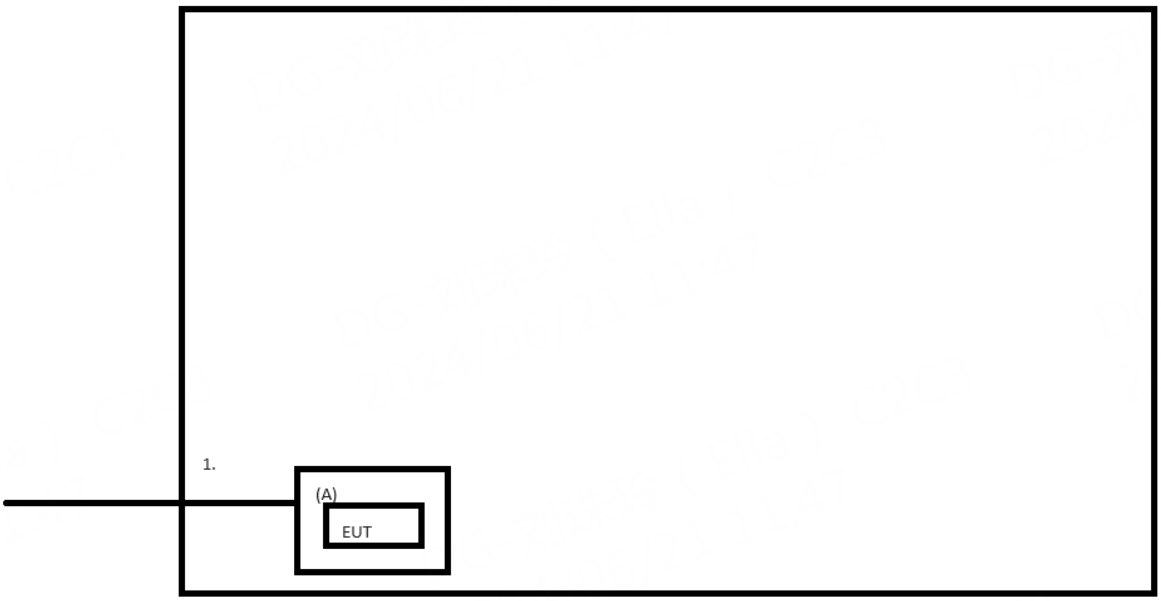
(3) For AC power line conducted emissions and radiated spurious emissions below 1 GHz test, the 3 Mbps channel 00 are found to be the worst case and recorded.

(4) For radiated emission band edge test, both Vertical and Horizontal are evaluated, but only the worst case (Horizontal) is recorded.

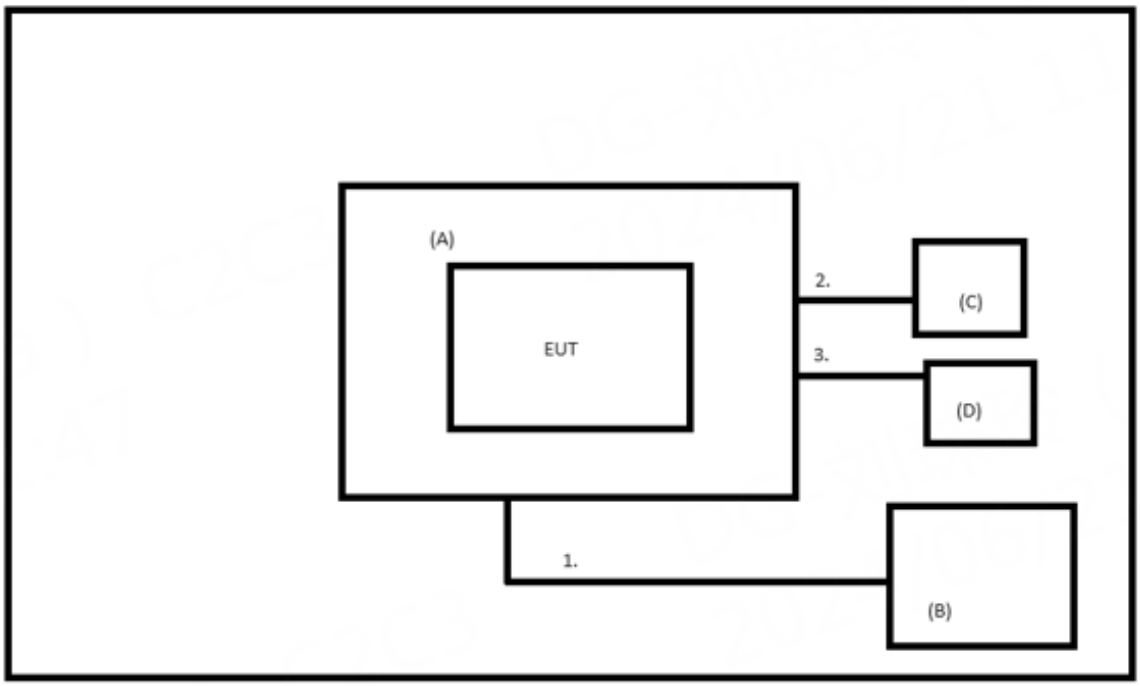
## 2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Equipment letters and Cable numbers refer to item numbers described in the tables of clause 2.4.

AC power line conducted emissions




Radiated Emissions



## 2.4 SUPPORT UNITS

AC power line conducted emissions

| Item | Equipment | Brand | Model No. | Series No. | Remarks |
|---|---|---|---|---|---|
| A | Host computer | HP | DESKTOP-TBTO665 | N/A | Furnished by test lab. |

| Item | Shielded | Ferrite Core | Length | Cable Type | Remarks |
|---|---|---|---|---|---|
| 1 | Power cable | N | N | 0.5m | Supplied by test requester. |

Radiated Emissions

| Item | Equipment | Brand | Model No. | Series No. | Remarks |
|---|---|---|---|---|---|
| A | Host computer | HP | DESKTOP-TBTO665 | N/A | Furnished by test lab. |
| B | Computer screen | PHILIPS | 221S8LDAB22" LED | N/A | Furnished by test lab. |
| C | Mouse | Lenovo | Moiuuo | 8SSM50L24505A VLC25M019Z | Furnished by test lab. |
| D | Keyboard | Lenovo | SK-8823 | 8SSD51B37225A VLC25JOMX4 | |

| Item | Shielded | Ferrite Core | Length | Cable Type | Remarks |
|---|---|---|---|---|---|
| 1 | VGA toVGA | N | N | 1m | Furnished by test lab. |
| 2 | Power cable | N | N | 1.8m | Furnished by test lab. |
| 3 | Power cable | N | N | 1.8m | Furnished by test lab. |

# 3 AC POWER LINE CONDUCTED EMISSIONS TEST

## 3.1 LIMIT

| Frequency (MHz) | Limit (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 - 0.5 | 66 - 56 * | 56 - 46 * |
| 0.50 - 5.0 | 56 | 46 |
| 5.0 - 30.0 | 60 | 50 |

NOTE:
(1) The tighter limit applies at the band edges.
(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.
(3) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor (if use)
Margin Level = Measurement Value – Limit Value
Calculation example:

| Reading Level | | Correct Factor | | Measurement Value |
|---|---|---|---|---|
| 38.22 | + | 3.45 | = | 41.67 |

| Measurement Value | | Limit Value | | Margin Level |
|---|---|---|---|---|
| 41.67 | - | 60 | = | -18.33 |

The following table is the setting of the receiver.

| Receiver Parameter | Setting |
|---|---|
| Attenuation | 10 dB |
| Start Frequency | 0.15 MHz |
| Stop Frequency | 30 MHz |
| IF Bandwidth | 9 KHz |

## 3.2 TEST PROCEDURE

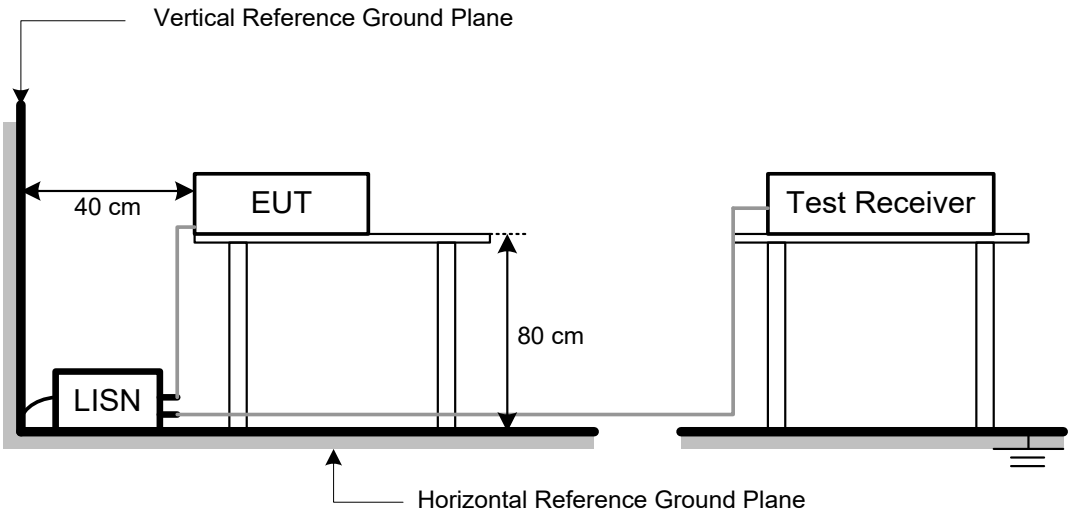
a. The EUT was placed 0.8 m above the horizontal ground plane with the EUT being connected to the power mains through a line impedance stabilization network (LISN).
All other support equipment were powered from an additional LISN(s).
The LISN provides 50 Ohm/50uH of impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle to keep the cable above 40 cm.
c. Excess I/O cables that are not connected to a peripheral shall be bundled in the center.
The end of the cable will be terminated, using the correct terminating impedance.
The overall length shall not exceed 1 m.
d. The LISN is spaced at least 80 cm from the nearest part of the EUT chassis.
e. For the actual test configuration, please refer to the related Item - EUT TEST PHOTO.

**NOTE:**
(1) In the results, each reading is marked as Peak, QP or AVG per the detector used.
BW=9 kHz (6 dB Bandwidth)
(2) All readings are Peak unless otherwise stated QP or AVG in column of Note. Both the QP and the AVG readings must be less than the limit for compliance.

## 3.3 DEVIATION FROM TEST STANDARD

No deviation.

### 3.4 TEST SETUP




### 3.5 TEST RESULT

Please refer to the APPENDIX A.

# 4 RADIATED EMISSIONS TEST

## 4.1 LIMIT

In case the emission fall within the restricted band specified on 15.205, then the 15.209 limit in the table below has to be followed.

LIMITS OF RADIATED EMISSIONS MEASUREMENT (9 kHz to 1000 MHz)

| Frequency (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009~0.490 | 2400/F(KHz) | 300 |
| 0.490~1.705 | 24000/F(KHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| 960~1000 | 500 | 3 |

LIMITS OF RADIATED EMISSIONS MEASUREMENT (Above 1000 MHz)

| Frequency (MHz) | Radiated Emissions (dBuV/m) | | Measurement Distance (meters) |
|---|---|---|---|
| | Peak | Average | |
| Above 1000 | 74 | 54 | 3 |

NOTE:
(1) The limit for radiated test was performed according to FCC CFR Title 47, Part 15, Subpart C.
(2) The tighter limit applies at the band edges.
(3) Emission level (dBuV/m)=20log Emission level (uV/m).
(4) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
Margin Level = Measurement Value - Limit Value
Calculation example:

| Reading Level | | Correct Factor | | Measurement Value |
|---|---|---|---|---|
| 35.45 | + | -11.37 | = | 24.08 |

| Measurement Value | | Limit Value | | Margin Level |
|---|---|---|---|---|
| 24.08 | - | 40 | = | -15.92 |

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start Frequency | 1000 MHz |
| Stop Frequency | 10th carrier harmonic |
| RBW / VBW (Emission in restricted band) | 1MHz / 3MHz for Peak, 1MHz / 1/T for Average |

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start ~ Stop Frequency | 9KHz~90KHz for PK/AVG detector |
| Start ~ Stop Frequency | 90KHz~110KHz for QP detector |
| Start ~ Stop Frequency | 110KHz~490KHz for PK/AVG detector |
| Start ~ Stop Frequency | 490KHz~30MHz for QP detector |
| Start ~ Stop Frequency | 30MHz~1000MHz for QP detector |

## 4.2 TEST PROCEDURE

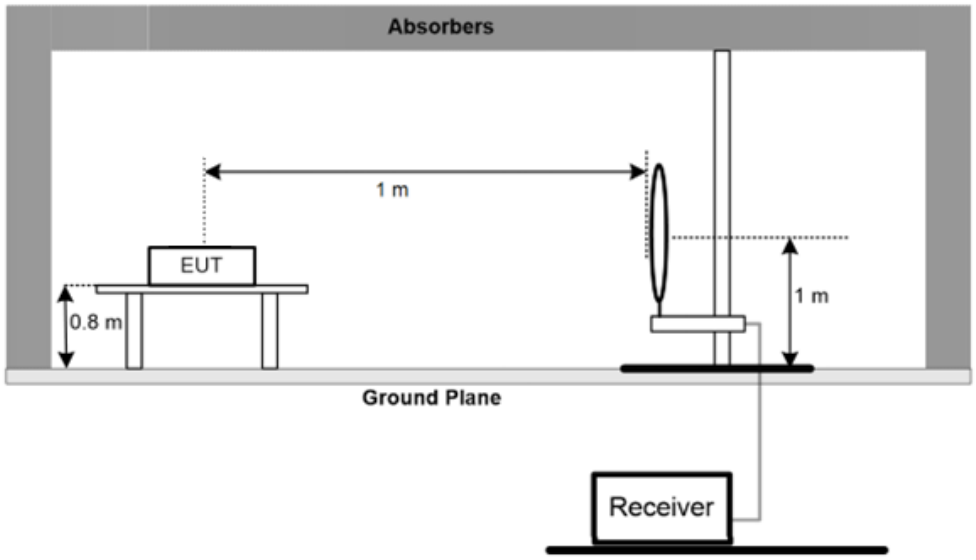
a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
b. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
c. The height of the equipment or of the substitution antenna shall be 0.8 m or 1.5 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn‘t perform. (below 1GHz)
h. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn‘t perform. (above 1GHz)
i. For the actual test configuration, please refer to the related Item – EUT TEST PHOTO.

## 4.3 DEVIATION FROM TEST STANDARD

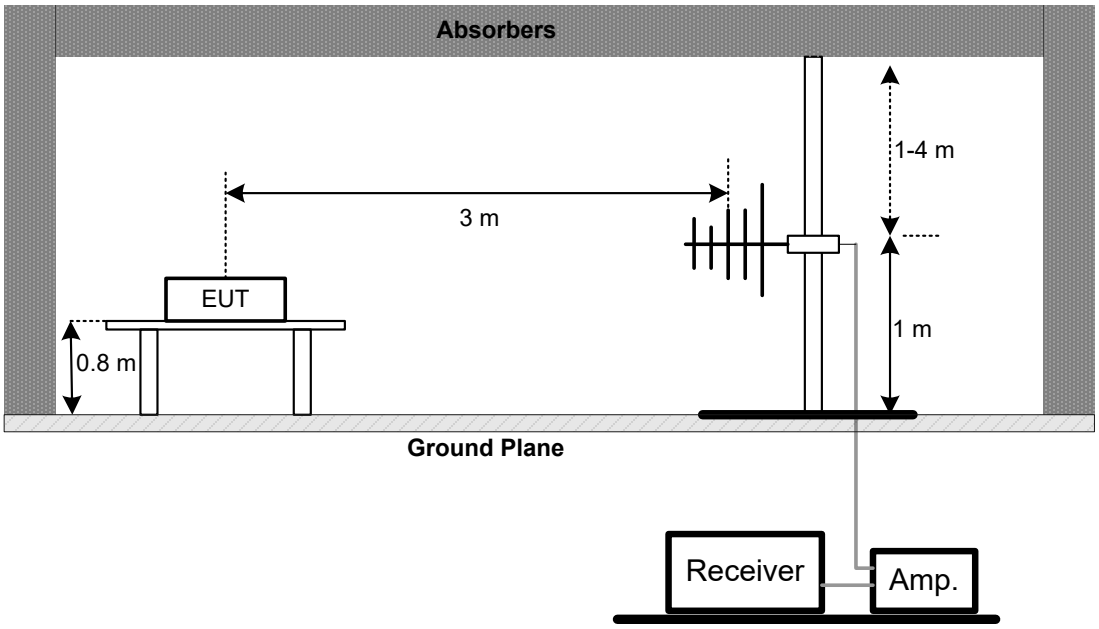
No deviation.

## 4.4 TEST SETUP

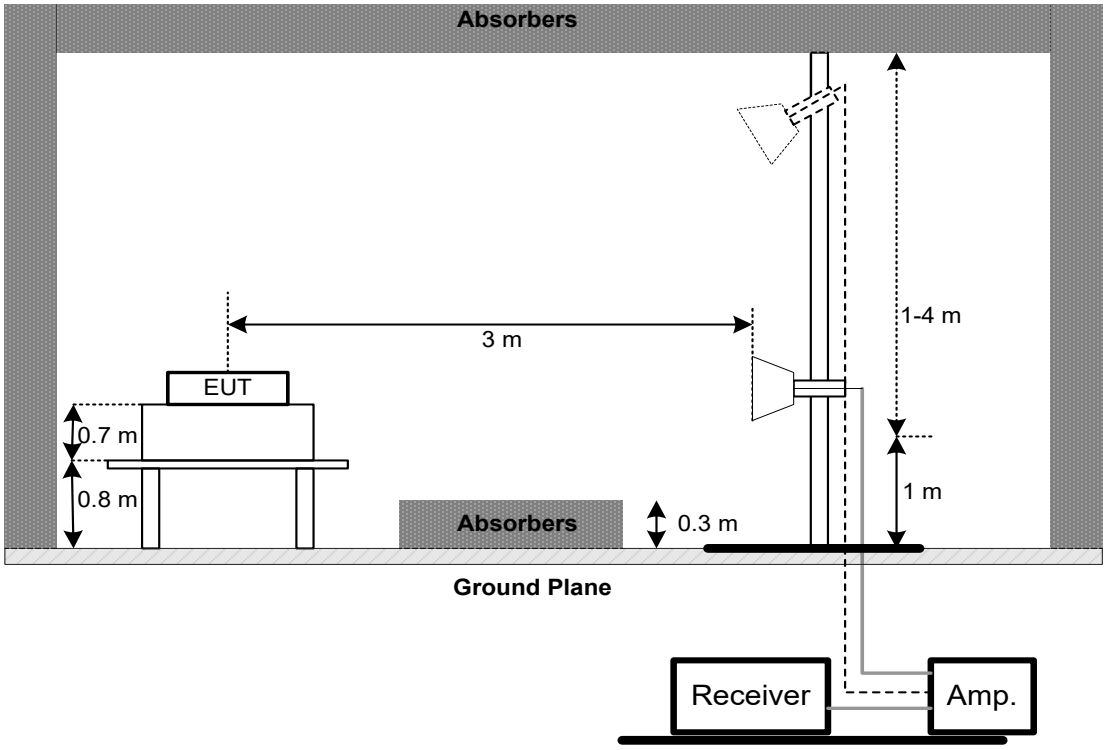
**9 kHz to 30 MHz**



**30 MHz to 1 GHz**




**Above 1 GHz**




## 4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

### 4.6 TEST RESULT – BELOW 30 MHZ

There were no emissions found below 30 MHz within 20 dB of the limit.

### 4.7 TEST RESULT – 30 MHZ TO 1 GHZ

Please refer to the APPENDIX B.

### 4.8 TEST RESULT – ABOVE 1 GHZ

Please refer to the APPENDIX C.

NOTE:

(1) No limit: This is fundamental signal, the judgment is not applicable.
For fundamental signal judgment was referred to Peak output test.

# 5 NUMBER OF HOPPING CHANNEL

## 5.1 APPLIED PROCEDURES

| FCC Part15 (15.247) , Subpart C | | | |
|---|---|---|---|
| Section | Test Item | Frequency Range (MHz) | Result |
| 15.247(a)(1)(iii) | Number of Hopping Channel | 2400-2483.5 | PASS |

| Spectrum Parameters | Setting |
|---|---|
| Attenuation | Auto |
| Span Frequency | > Operating Frequency Range |
| RBW | 100 KHz |
| VBW | 100 KHz |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

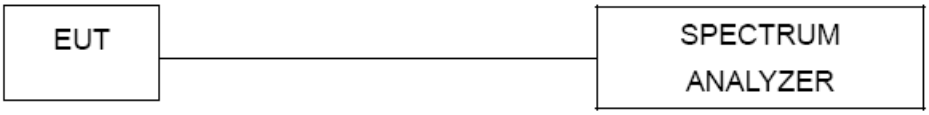
## 5.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting: RBW=100KHz, VBW=100KHz, Sweep time = Auto.

## 5.3 DEVIATION FROM STANDARD

No deviation.

## 5.4 TEST SETUP




## 5.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

## 5.6 TEST RESULTS

Please refer to the APPENDIX D.

# 6 AVERAGE TIME OF OCCUPANCY

## 6.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---|---|---|---|---|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247(a)(1)(iii) | Average Time of Occupancy | 0.4sec | 2400-2483.5 | PASS |

## 6.2 TEST PROCEDURE

a. The transmitter output (antenna port) was connected to the spectrum analyzer
b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
d. Sweep Time is more than once pulse time.
e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
f. Measure the maximum time duration of one single pulse.
g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
h. Measure the maximum time duration of one single pulse.
i. Measure the maximum time duration of one single pulse.
A Period Time = (channel number) * 0.4

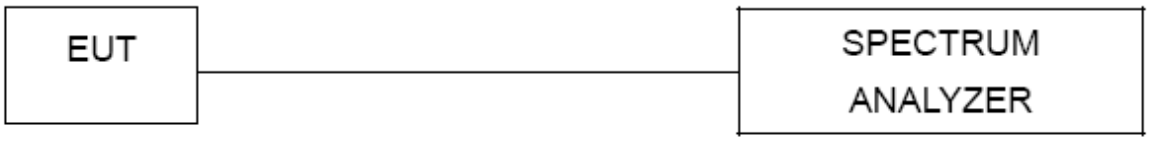
For Non-AFH Mode (79 Channel):
DH1 Time Solt: Reading * (1600/2)/79 * (0.4 * 79)
DH3 Time Solt: Reading * (1600/4)/79 * (0.4 * 79)
DH5 Time Solt: Reading * (1600/6)/79 * (0.4 * 79)

For AFH Mode (20 Channel):
DH1 Time Solt: Reading * (800/2)/20 * (0.4 * 20)
DH3 Time Solt: Reading * (800/4)/20 * (0.4 * 20)
DH5 Time Solt: Reading * (800/6)/20 * (0.4 * 20)

## 6.3 DEVIATION FROM STANDARD

No deviation.

## 6.4 TEST SETUP




## 6.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

## 6.6 TEST RESULTS

Please refer to the APPENDIX E.

# 7 HOPPING CHANNEL SEPARATION MEASUREMENT

## 7.1 APPLIED PROCEDURES / LIMIT

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 KHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Span Frequency | > Measurement Bandwidth or Channel Separation |
| RBW | 30 KHz |
| VBW | 100 KHz |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

## 7.2 TEST PROCEDURE

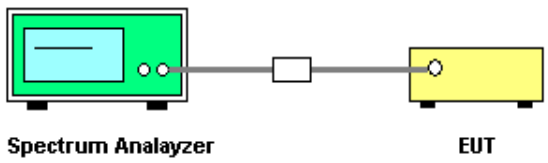
a. The EUT must have its hopping function enabled

b. Span = wide enough to capture the peaks of two adjacent channels
Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span
Video (or Average) Bandwidth (VBW) ≥ RBW
Sweep = Auto
Detector function = Peak
Trace = Max Hold

## 7.3 DEVIATION FROM STANDARD

No deviation.

## 7.4 TEST SETUP




## 7.5 TEST RESULTS

Please refer to the APPENDIX F.

# 8 BANDWIDTH TEST

## 8.1 APPLIED PROCEDURES

| FCC Part15 (15.247) , Subpart C | | |
|---|---|---|
| Section | Test Item | Frequency Range (MHz) |
| 15.247(a)(1) | Bandwidth | 2400-2483.5 |

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Span Frequency | > Measurement Bandwidth or Channel Separation |
| RBW | 30 KHz (20dB Bandwidth) / 30 KHz (Channel Separation) |
| VBW | 100 KHz (20dB Bandwidth) / 100 KHz (Channel Separation) |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

## 8.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting: RBW= 30KHz, VBW=100KHz, Sweep Time = Auto.

## 8.3 DEVIATION FROM STANDARD

No deviation.

## 8.4 TEST SETUP


## 8.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

## 8.6 TEST RESULTS

Please refer to the APPENDIX G.

# 9 OUTPUT POWER TEST

## 9.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---|---|---|---|---|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247(b)(1) | Peak Output Power | 0.125Watt or 21dBm | 2400-2483.5 | PASS |

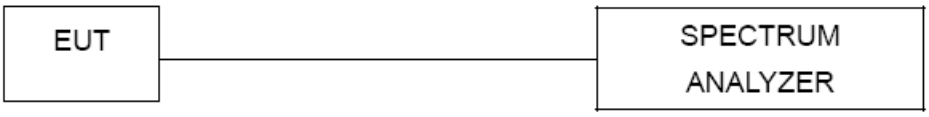
## 9.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting: RBW= 3MHz, VBW= 3MHz, Sweep time = Auto.

## 9.3 DEVIATION FROM STANDARD

No deviation.

## 9.4 TEST SETUP




## 9.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

## 9.6 TEST RESULTS

Please refer to the APPENDIX H.

# 10 ANTENNA CONDUCTED SPURIOUS EMISSION

## 10.1 APPLIED PROCEDURES / LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits.

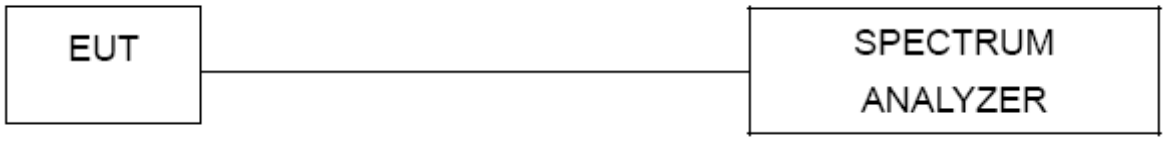
## 10.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting: RBW= 100KHz, VBW=100KHz, Sweep time = Auto.
c. Offset=antenna gain+cable loss

## 10.3 DEVIATION FROM STANDARD

No deviation.

## 10.4 TEST SETUP




## 10.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

## 10.6 TEST RESULTS

Please refer to the APPENDIX I.

# 11 LIST OF MEASURING EQUIPMENTS

| AC Power Line Conducted Emissions | | | | | | |
|---|---|---|---|---|---|---|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated Date | Calibrated Until |
| 1 | Two-Line V-Network | R&S | ENV216 | 101051 | 2023/7/21 | 2024/7/20 |
| 2 | Test Cable | EMCI | EMCRG58-BM-BM-9000 | 210501 | 2023/12/11 | 2024/12/10 |
| 3 | EXA Spectrum Analyzer | keysight | N9038A | MY54130009 | 2023/6/26 | 2024/6/25 |
| 4 | Measurement Software | Farad | EZ_EMC (Ver. NB-03A1-01) | N/A | N/A | N/A |

| Radiated Emissions | | | | | | |
|---|---|---|---|---|---|---|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated Date | Calibrated Until |
| 1 | Broad-Band Horn Antenna | RFSPIN | DRH18-E | 210109A18E | 2024/1/10 | 2025/1/9 |
| 2 | Pre-Amplifier | EMCI | EMC051845SE | 980779 | 2023/12/11 | 2024/12/10 |
| 3 | Test Cable | EMCI | EMC105-SM-SM-1000 | 210119 | 2023/12/11 | 2024/12/10 |
| 4 | Test Cable | EMCI | EMC105-SM-SM-3000 | 210118 | 2023/12/11 | 2024/12/10 |
| 5 | Test Cable | EMCI | EMC105-SM-SM-7000 | 210117 | 2023/12/11 | 2024/12/10 |
| 6 | EXA Spectrum Analyzer | keysight | N9010A | MY56480554 | 2023/9/12 | 2024/9/11 |
| 7 | Trilog-Broadband Antenna | Schwarzbeck | VULB 9168 | 01207 | 2023/12/18 | 2024/12/17 |
| 8 | EMI Test Receiver | Keysight | N9038A | MY54130009 | 2023/6/26 | 2024/6/25 |
| 9 | Pre-Amplifier | EMCI | EMC001330-20201222 | 980807 | 2023/12/11 | 2024/12/10 |
| 10 | Test Cable | EMCI | EMC-8D-NM-NM-5000 | 150106 | 2023/12/11 | 2024/12/10 |
| 11 | Test Cable | EMCI | EMC-CFD-400-NM-NM-8000 | 200348 | 2023/12/11 | 2024/12/10 |
| 12 | Measurement Software | Farad | EZ_EMC (Ver. NB-03A1-01) | N/A | N/A | N/A |

| Number of Hopping Frequency | | | | | | |
|---|---|---|---|---|---|---|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated Date | Calibrated Until |
| 1 | Spectrum Analyzer | R&S | FSP 30 | 100854 | 2023/6/26 | 2024/6/25 |

| Average Time of Occupancy | | | | | | |
|---|---|---|---|---|---|---|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated Date | Calibrated Until |
| 1 | Spectrum Analyzer | R&S | FSP 30 | 100854 | 2023/6/26 | 2024/6/25 |

| Hopping Channel Separation | | | | | | |
|---|---|---|---|---|---|---|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated Date | Calibrated Until |
| 1 | Spectrum Analyzer | R&S | FSP 30 | 100854 | 2023/6/26 | 2024/6/25 |

| Bandwidth | | | | | | |
|---|---|---|---|---|---|---|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated Date | Calibrated Until |
| 1 | Spectrum Analyzer | R&S | FSP 30 | 100854 | 2023/6/26 | 2024/6/25 |

| Output Power | | | | | | |
|---|---|---|---|---|---|---|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated Date | Calibrated Until |
| 1 | Spectrum Analyzer | R&S | FSP 30 | 100854 | 2023/6/26 | 2024/6/25 |

| Antenna conducted Spurious Emission | | | | | | |
|---|---|---|---|---|---|---|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated Date | Calibrated Until |
| 1 | Spectrum Analyzer | R&S | FSP 30 | 100854 | 2023/6/26 | 2024/6/25 |

Remark: “N/A” denotes no model name, no serial no. or no calibration specified.
All calibration period of equipment list is one year.

## 12 EUT TEST PHOTO

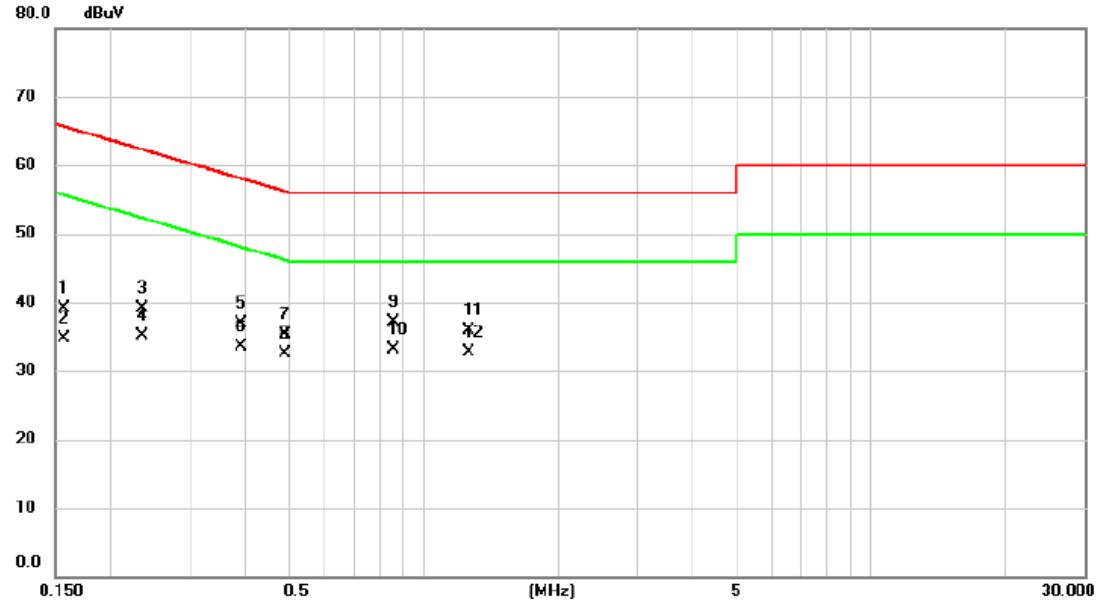
Please refer to document Appendix No.: TP-2403G002-FCCP-1 (APPENDIX-TEST PHOTOS).

## 13 EUT PHOTOS

Please refer to document Appendix No.: EP-2403G002-1 (APPENDIX-EUT PHOTOS).

# APPENDIX A AC POWER LINE CONDUCTED EMISSIONS

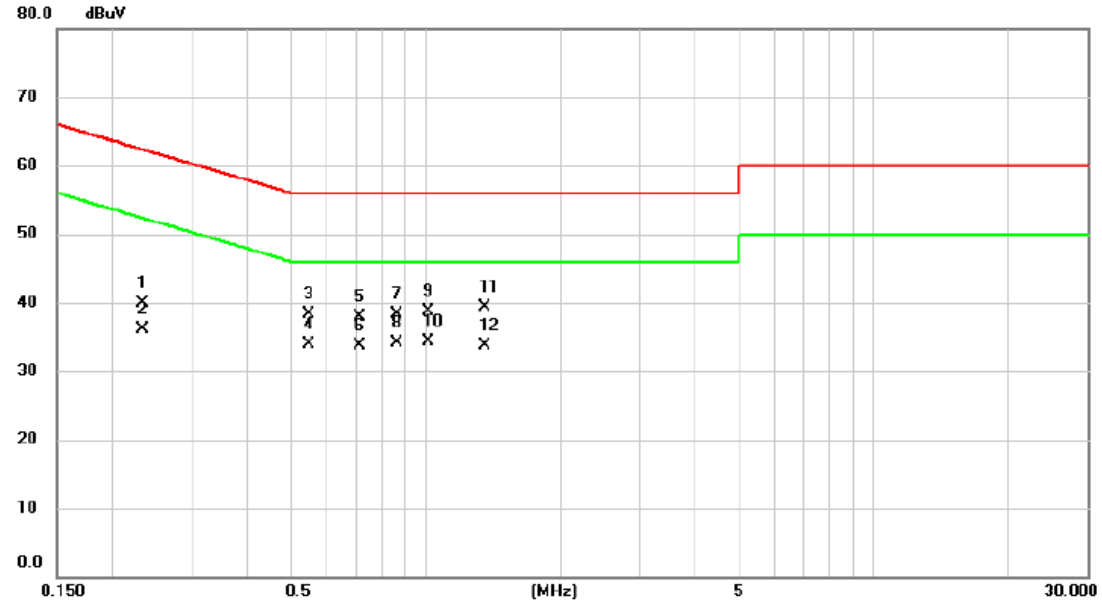
| Test Mode | Normal | Tested Date | 2024/5/3 |
|---|---|---|---|
| Test Frequency | - | Phase | Line |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.1566 | 29.46 | 9.65 | 39.11 | 65.64 | -26.53 | QP | |
| 2 | | 0.1566 | 25.06 | 9.65 | 34.71 | 55.64 | -20.93 | AVG | |
| 3 | | 0.2343 | 29.39 | 9.64 | 39.03 | 62.30 | -23.27 | QP | |
| 4 | | 0.2343 | 25.44 | 9.64 | 35.08 | 52.30 | -17.22 | AVG | |
| 5 | | 0.3908 | 27.27 | 9.65 | 36.92 | 58.05 | -21.13 | QP | |
| 6 | | 0.3908 | 23.76 | 9.65 | 33.41 | 48.05 | -14.64 | AVG | |
| 7 | | 0.4910 | 25.64 | 9.66 | 35.30 | 56.15 | -20.85 | QP | |
| 8 | | 0.4910 | 22.75 | 9.66 | 32.41 | 46.15 | -13.74 | AVG | |
| 9 | | 0.8554 | 27.44 | 9.69 | 37.13 | 56.00 | -18.87 | QP | |
| 10 | * | 0.8554 | 23.43 | 9.69 | 33.12 | 46.00 | -12.88 | AVG | |
| 11 | | 1.2604 | 26.14 | 9.72 | 35.86 | 56.00 | -20.14 | QP | |
| 12 | | 1.2604 | 22.92 | 9.72 | 32.64 | 46.00 | -13.36 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

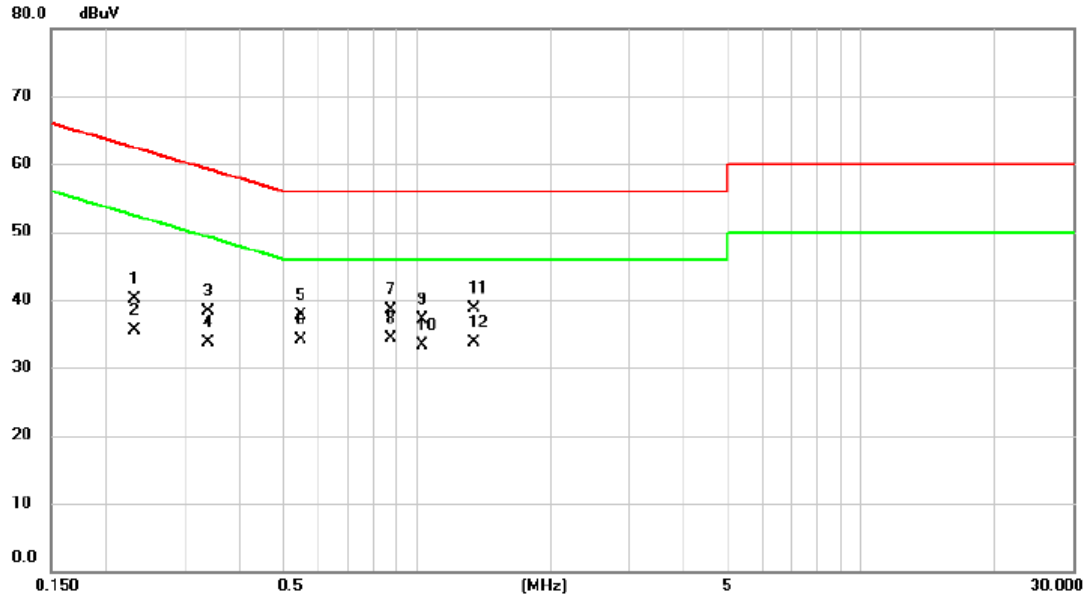
| Test Mode | Normal | Tested Date | 2024/5/3 |
|---|---|---|---|
| Test Frequency | - | Phase | Neutral |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.2340 | 30.31 | 9.63 | 39.94 | 62.31 | -22.37 | QP | |
| 2 | | 0.2340 | 26.43 | 9.63 | 36.06 | 52.31 | -16.25 | AVG | |
| 3 | | 0.5494 | 28.58 | 9.64 | 38.22 | 56.00 | -17.78 | QP | |
| 4 | | 0.5494 | 24.29 | 9.64 | 33.93 | 46.00 | -12.07 | AVG | |
| 5 | | 0.7114 | 28.29 | 9.67 | 37.96 | 56.00 | -18.04 | QP | |
| 6 | | 0.7114 | 24.02 | 9.67 | 33.69 | 46.00 | -12.31 | AVG | |
| 7 | | 0.8600 | 28.59 | 9.68 | 38.27 | 56.00 | -17.73 | QP | |
| 8 | | 0.8600 | 24.40 | 9.68 | 34.08 | 46.00 | -11.92 | AVG | |
| 9 | | 1.0174 | 29.07 | 9.69 | 38.76 | 56.00 | -17.24 | QP | |
| 10 | * | 1.0174 | 24.64 | 9.69 | 34.33 | 46.00 | -11.67 | AVG | |
| 11 | | 1.3504 | 29.52 | 9.72 | 39.24 | 56.00 | -16.76 | QP | |
| 12 | | 1.3504 | 23.98 | 9.72 | 33.70 | 46.00 | -12.30 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

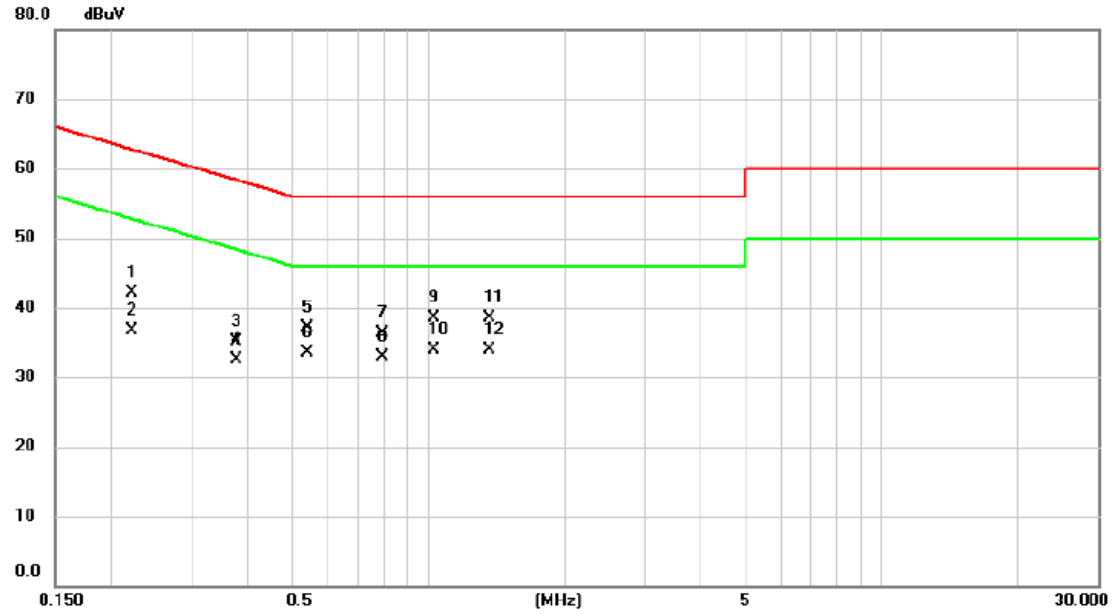
| Test Mode | Idle | Tested Date | 2024/5/3 |
|---|---|---|---|
| Test Frequency | - | Phase | Line |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.2315 | 30.48 | 9.64 | 40.12 | 62.40 | -22.28 | QP | |
| 2 | | 0.2315 | 25.92 | 9.64 | 35.56 | 52.40 | -16.84 | AVG | |
| 3 | | 0.3400 | 28.56 | 9.65 | 38.21 | 59.20 | -20.99 | QP | |
| 4 | | 0.3400 | 24.07 | 9.65 | 33.72 | 49.20 | -15.48 | AVG | |
| 5 | | 0.5494 | 28.00 | 9.66 | 37.66 | 56.00 | -18.34 | QP | |
| 6 | | 0.5494 | 24.46 | 9.66 | 34.12 | 46.00 | -11.88 | AVG | |
| 7 | | 0.8734 | 28.86 | 9.69 | 38.55 | 56.00 | -17.45 | QP | |
| 8 | * | 0.8734 | 24.56 | 9.69 | 34.25 | 46.00 | -11.75 | AVG | |
| 9 | | 1.0310 | 27.42 | 9.70 | 37.12 | 56.00 | -18.88 | QP | |
| 10 | | 1.0310 | 23.59 | 9.70 | 33.29 | 46.00 | -12.71 | AVG | |
| 11 | | 1.3414 | 29.04 | 9.73 | 38.77 | 56.00 | -17.23 | QP | |
| 12 | | 1.3414 | 23.97 | 9.73 | 33.70 | 46.00 | -12.30 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

| Test Mode | Idle | Tested Date | 2024/5/3 |
|---|---|---|---|
| Test Frequency | - | Phase | Neutral |

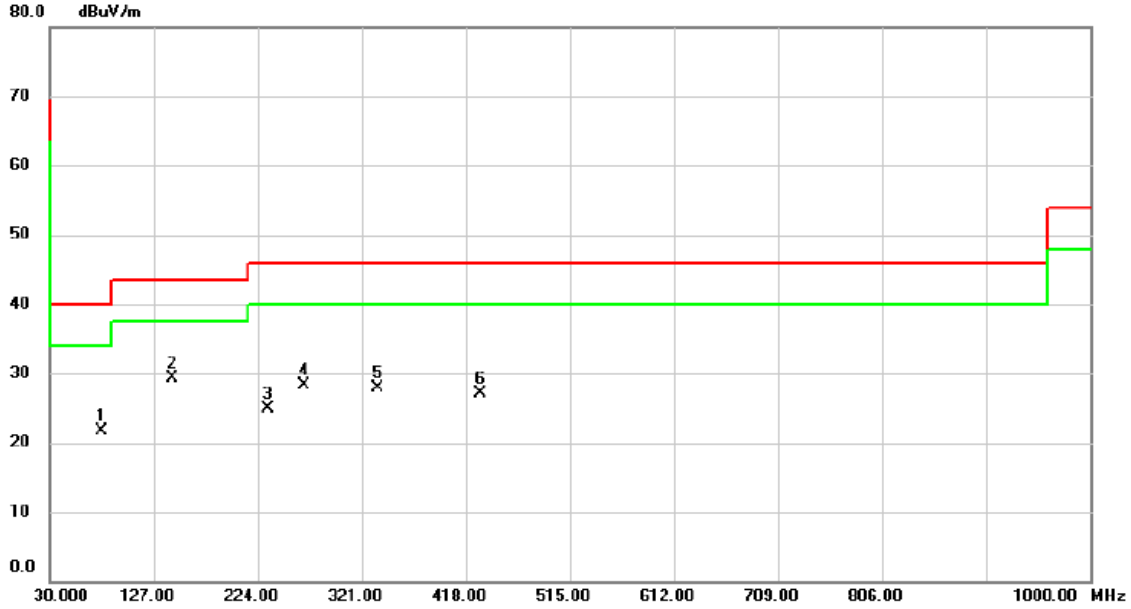



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.2224 | 32.44 | 9.63 | 42.07 | 62.73 | -20.66 | QP | |
| 2 | | 0.2224 | 27.08 | 9.63 | 36.71 | 52.73 | -16.02 | AVG | |
| 3 | | 0.3772 | 25.57 | 9.63 | 35.20 | 58.34 | -23.14 | QP | |
| 4 | | 0.3772 | 22.94 | 9.63 | 32.57 | 48.34 | -15.77 | AVG | |
| 5 | | 0.5404 | 27.48 | 9.64 | 37.12 | 56.00 | -18.88 | QP | |
| 6 | | 0.5404 | 23.81 | 9.64 | 33.45 | 46.00 | -12.55 | AVG | |
| 7 | | 0.7925 | 26.64 | 9.67 | 36.31 | 56.00 | -19.69 | QP | |
| 8 | | 0.7925 | 23.15 | 9.67 | 32.82 | 46.00 | -13.18 | AVG | |
| 9 | | 1.0265 | 28.78 | 9.69 | 38.47 | 56.00 | -17.53 | QP | |
| 10 | | 1.0265 | 24.18 | 9.69 | 33.87 | 46.00 | -12.13 | AVG | |
| 11 | | 1.3595 | 28.82 | 9.72 | 38.54 | 56.00 | -17.46 | QP | |
| 12 | * | 1.3595 | 24.18 | 9.72 | 33.90 | 46.00 | -12.10 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

# APPENDIX B RADIATED EMISSIONS - 30 MHZ TO 1 GHZ

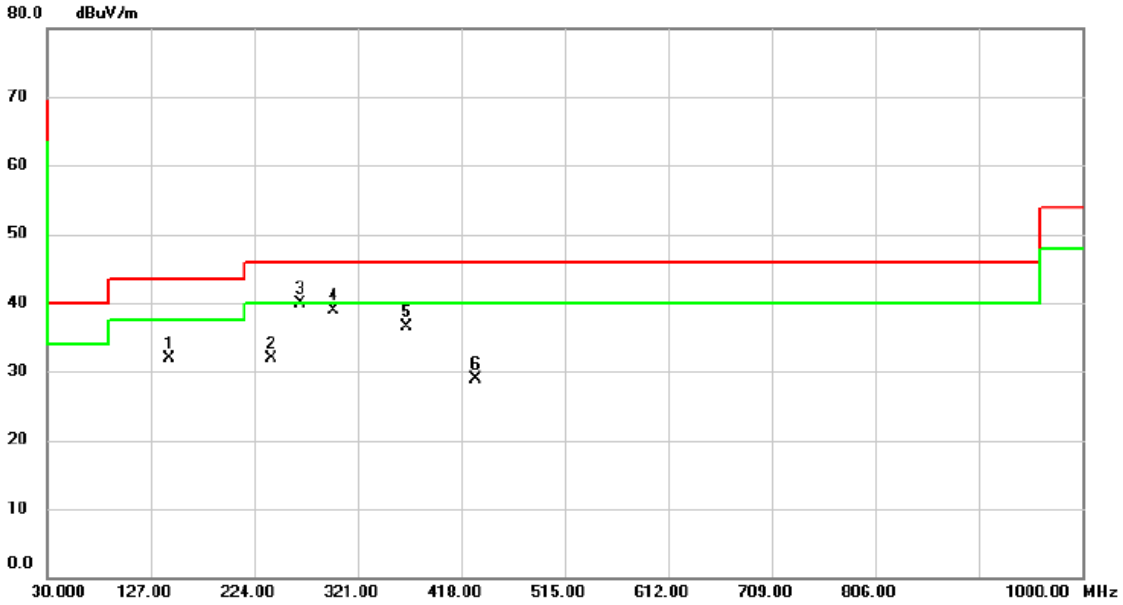
| Test Mode | BT(3Mbps) | Test Date | 2024/4/29 |
|---|---|---|---|
| Test Frequency | 2402MHz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 78.5000 | 37.54 | -15.78 | 21.76 | 40.00 | -18.24 | peak | 200 | 161 | |
| 2 | * | 144.4600 | 40.98 | -11.59 | 29.39 | 43.50 | -14.11 | peak | 100 | 163 | |
| 3 | | 233.7000 | 38.13 | -13.22 | 24.91 | 46.00 | -21.09 | peak | 200 | 343 | |
| 4 | | 266.6800 | 39.67 | -11.42 | 28.25 | 46.00 | -17.75 | peak | | | |
| 5 | | 335.5500 | 37.13 | -9.30 | 27.83 | 46.00 | -18.17 | peak | 200 | 200 | |
| 6 | | 431.5800 | 33.69 | -6.54 | 27.15 | 46.00 | -18.85 | peak | 200 | 250 | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

| Test Mode | BT(3Mbps) | Test Date | 2024/4/29 |
|---|---|---|---|
| Test Frequency | 2402MHz | Polarization | Horizontal |

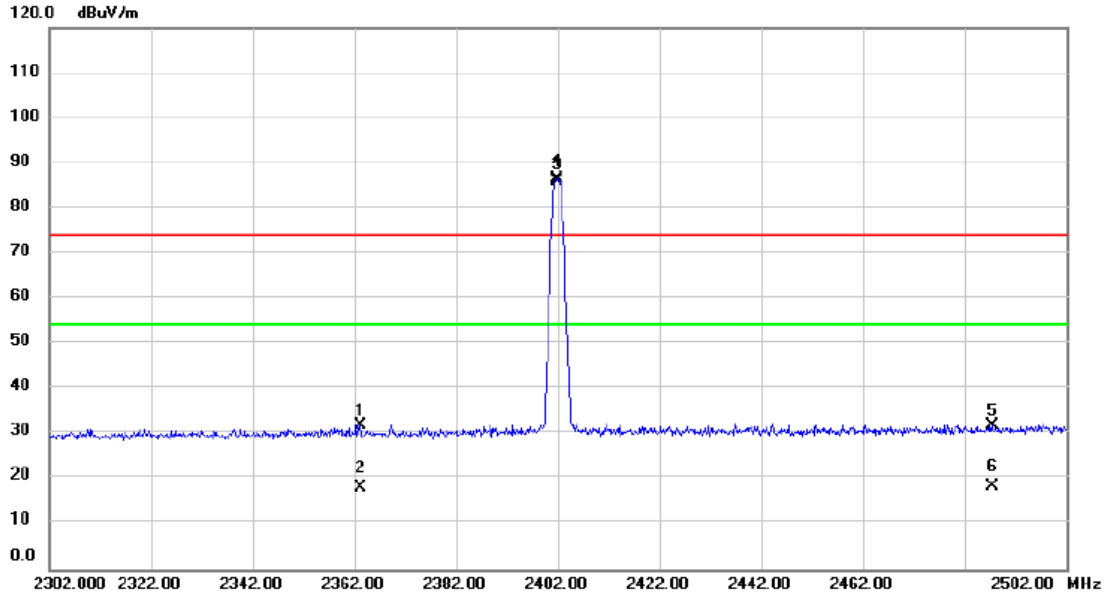



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 144.4600 | 43.52 | -11.59 | 31.93 | 43.50 | -11.57 | peak | 200 | 234 | |
| 2 | | 240.4900 | 44.12 | -12.25 | 31.87 | 46.00 | -14.13 | peak | 100 | 191 | |
| 3 | * | 266.6800 | 51.33 | -11.42 | 39.91 | 46.00 | -6.09 | peak | 100 | 254 | |
| 4 | | 298.6900 | 49.23 | -10.26 | 38.97 | 46.00 | -7.03 | peak | 100 | 254 | |
| 5 | | 366.5900 | 44.90 | -8.44 | 36.46 | 46.00 | -9.54 | peak | 100 | 299 | |
| 6 | | 431.5800 | 35.54 | -6.54 | 29.00 | 46.00 | -17.00 | peak | | | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

# APPENDIX C RADIATED EMISSIONS - ABOVE 1 GHZ

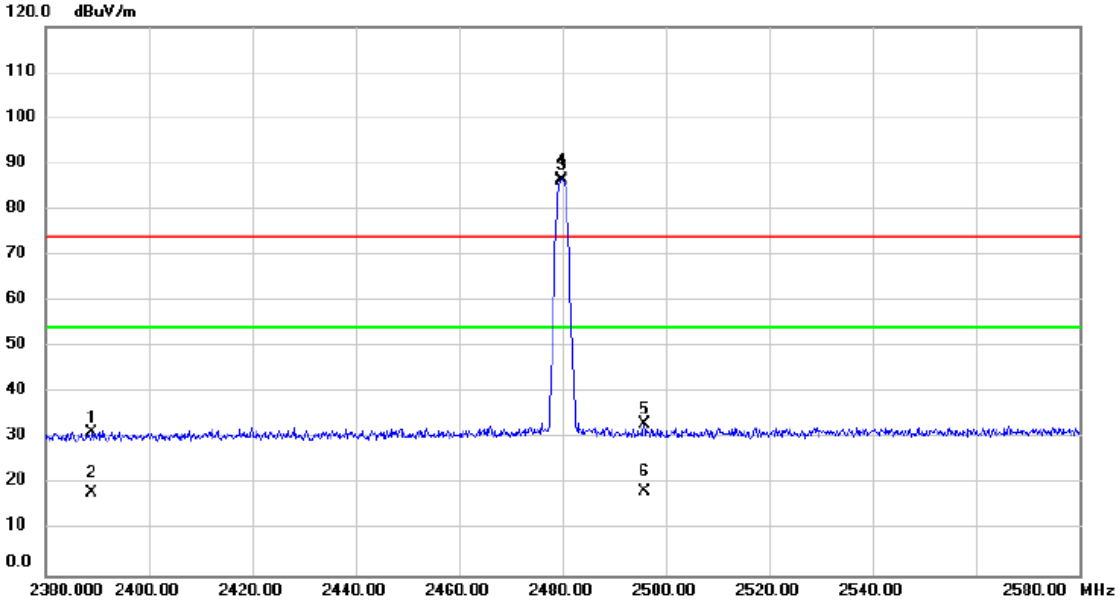
| Test Mode | BT(1Mbps) | Test Date | 2024/4/26 |
|---|---|---|---|
| Test Frequency | 2402MHz | Polarization | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2363.200 | 38.21 | -6.17 | 32.04 | 74.00 | -41.96 | peak | | | |
| 2 | | 2363.200 | 24.40 | -6.17 | 18.23 | 54.00 | -35.77 | AVG | | | |
| 3 | X | 2401.800 | 92.58 | -6.09 | 86.49 | 74.00 | 12.49 | peak | | | No Limit |
| 4 | * | 2401.800 | 92.15 | -6.09 | 86.06 | 54.00 | 32.06 | AVG | | | No Limit |
| 5 | | 2487.400 | 37.99 | -5.91 | 32.08 | 74.00 | -41.92 | peak | | | |
| 6 | | 2487.400 | 24.47 | -5.91 | 18.56 | 54.00 | -35.44 | AVG | | | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

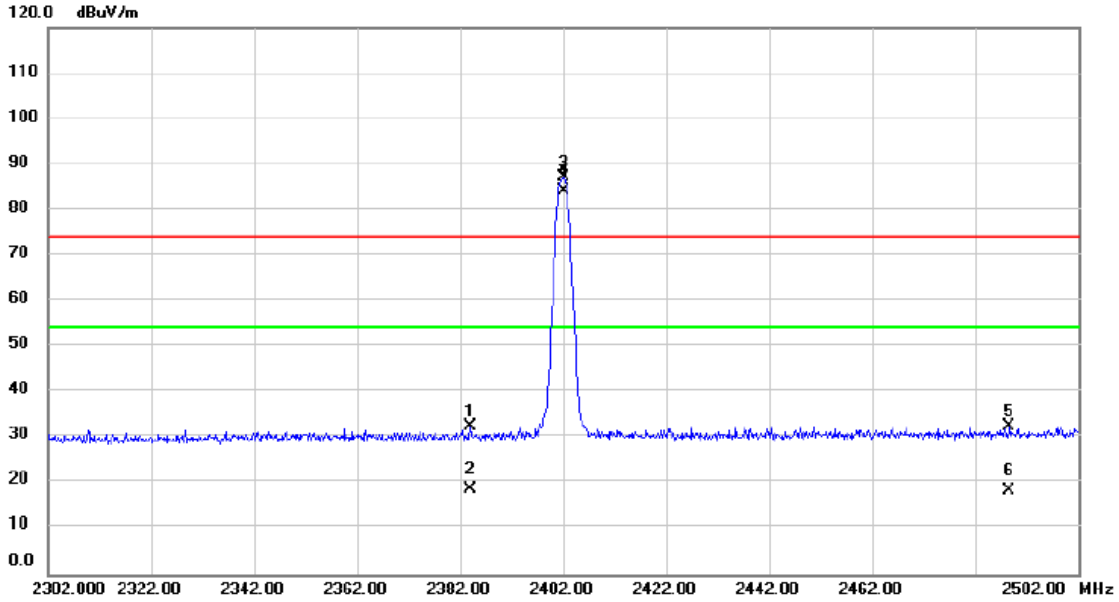
| Test Mode | BT(1Mbps) | Test Date | 2024/4/26 |
|---|---|---|---|
| Test Frequency | 2480MHz | Polarization | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2389.000 | 37.61 | -6.12 | 31.49 | 74.00 | -42.51 | peak | | | |
| 2 | | 2389.000 | 24.39 | -6.12 | 18.27 | 54.00 | -35.73 | AVG | | | |
| 3 | X | 2479.800 | 92.43 | -5.92 | 86.51 | 74.00 | 12.51 | peak | | | No Limit |
| 4 | * | 2479.800 | 92.07 | -5.92 | 86.15 | 54.00 | 32.15 | AVG | | | No Limit |
| 5 | | 2495.800 | 38.93 | -5.89 | 33.04 | 74.00 | -40.96 | peak | | | |
| 6 | | 2495.800 | 24.47 | -5.89 | 18.58 | 54.00 | -35.42 | AVG | | | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

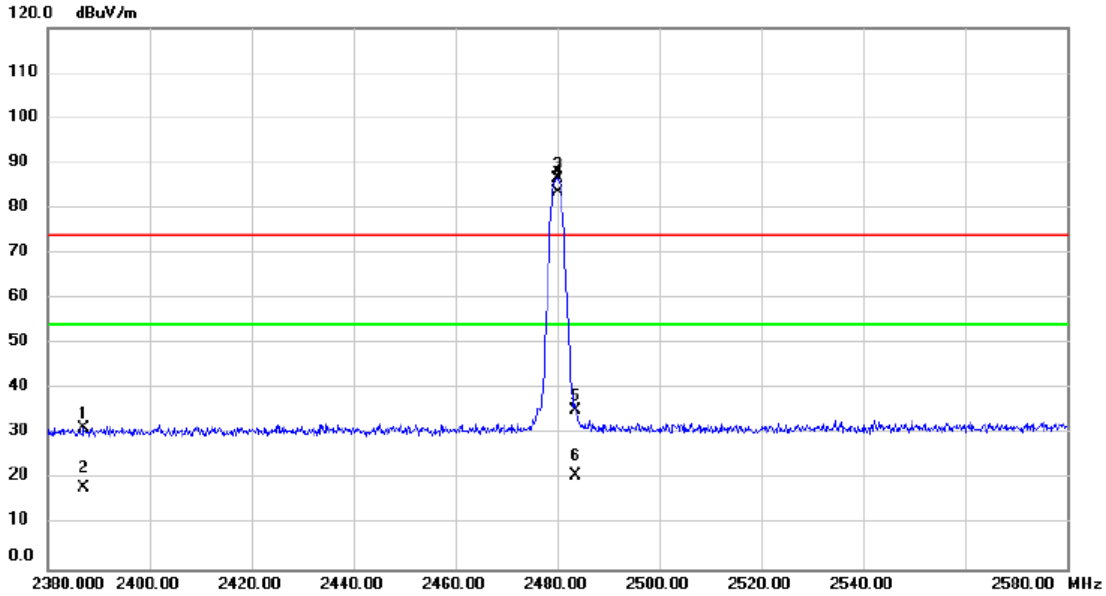
| Test Mode | BT(3Mbps) | Test Date | 2024/4/26 |
|---|---|---|---|
| Test Frequency | 2402MHz | Polarization | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2384.000 | 38.56 | -6.13 | 32.43 | 74.00 | -41.57 | peak | | | |
| 2 | | 2384.000 | 24.76 | -6.13 | 18.63 | 54.00 | -35.37 | AVG | | | |
| 3 | X | 2402.000 | 93.18 | -6.09 | 87.09 | 74.00 | 13.09 | peak | | | No Limit |
| 4 | * | 2402.000 | 90.31 | -6.09 | 84.22 | 54.00 | 30.22 | AVG | | | No Limit |
| 5 | | 2488.600 | 38.51 | -5.90 | 32.61 | 74.00 | -41.39 | peak | | | |
| 6 | | 2488.600 | 24.40 | -5.90 | 18.50 | 54.00 | -35.50 | AVG | | | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

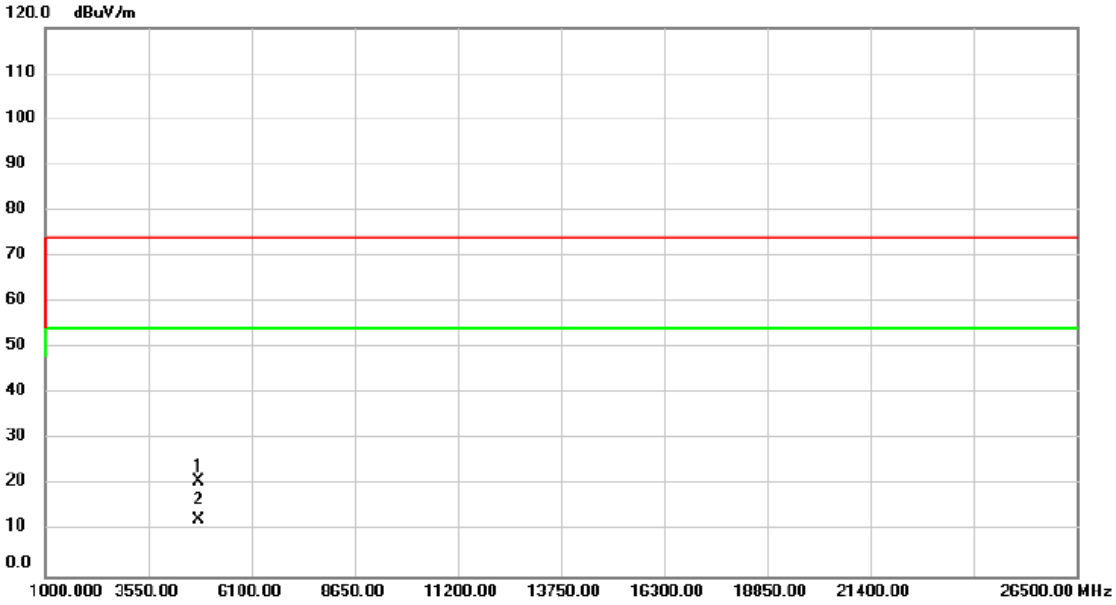
| Test Mode | BT(3Mbps) | Test Date | 2024/4/26 |
|---|---|---|---|
| Test Frequency | 2480MHz | Polarization | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2387.200 | 37.60 | -6.13 | 31.47 | 74.00 | -42.53 | peak | | | |
| 2 | | 2387.200 | 24.34 | -6.13 | 18.21 | 54.00 | -35.79 | AVG | | | |
| 3 | X | 2480.000 | 92.46 | -5.92 | 86.54 | 74.00 | 12.54 | peak | | | No Limit |
| 4 | * | 2480.000 | 89.54 | -5.92 | 83.62 | 54.00 | 29.62 | AVG | | | No Limit |
| 5 | | 2483.500 | 41.18 | -5.92 | 35.26 | 74.00 | -38.74 | peak | | | |
| 6 | | 2483.500 | 26.83 | -5.92 | 20.91 | 54.00 | -33.09 | AVG | | | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

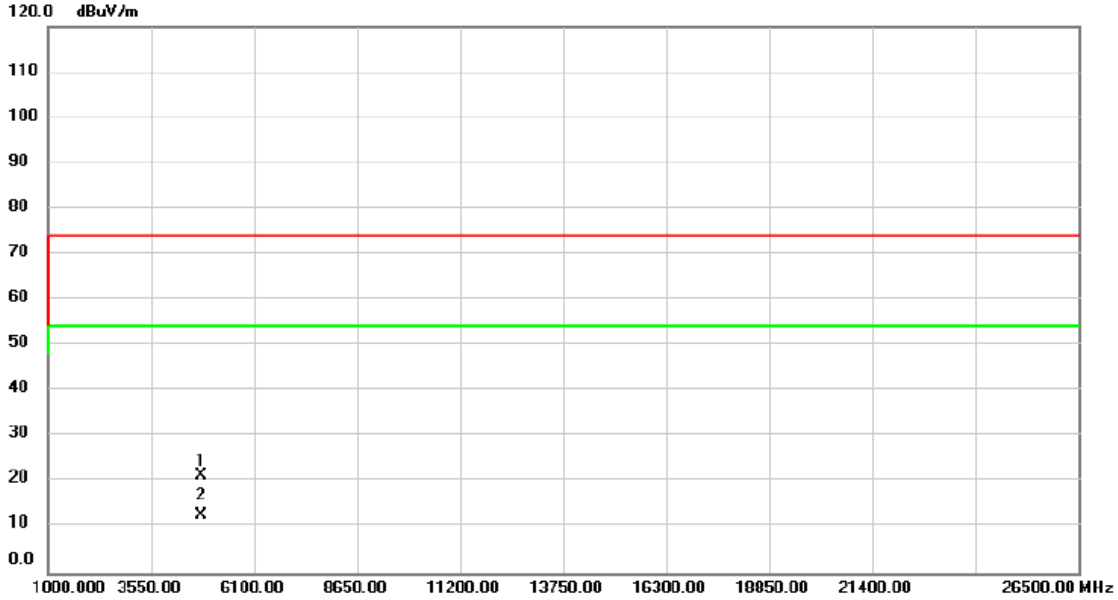
| Test Mode | BT(1Mbps) | Test Date | 2024/4/26 |
|---|---|---|---|
| Test Frequency | 2402MHz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 4804.000 | 29.44 | -8.62 | 20.82 | 74.00 | -53.18 | peak | | | |
| 2 | * | 4804.000 | 21.11 | -8.62 | 12.49 | 54.00 | -41.51 | AVG | | | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

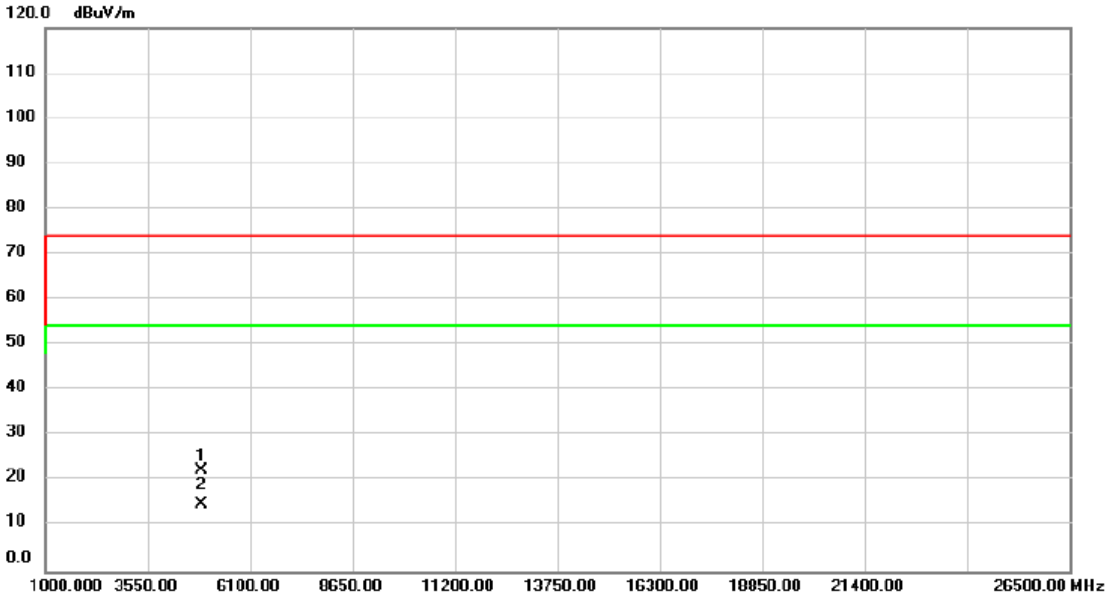
| Test Mode | BT(1Mbps) | Test Date | 2024/4/26 |
|---|---|---|---|
| Test Frequency | 2402MHz | Polarization | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 4804.000 | 30.00 | -8.62 | 21.38 | 74.00 | -52.62 | peak | | | |
| 2 | * | 4804.000 | 21.31 | -8.62 | 12.69 | 54.00 | -41.31 | AVG | | | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

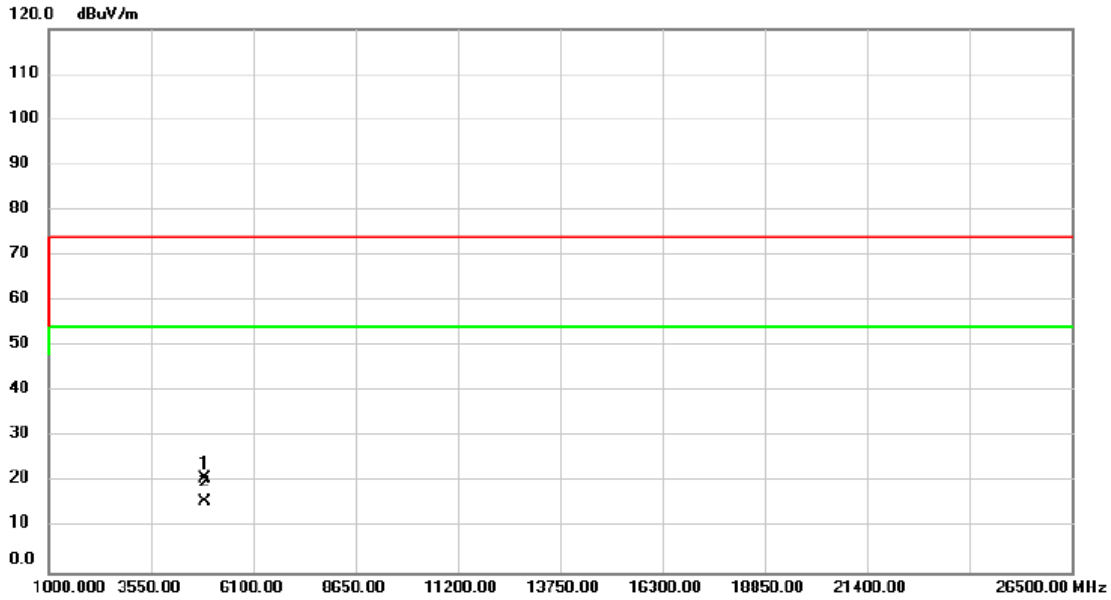
| Test Mode | BT(1Mbps) | Test Date | 2024/4/26 |
|---|---|---|---|
| Test Frequency | 2441MHz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 4882.000 | 30.76 | -8.42 | 22.34 | 74.00 | -51.66 | peak | | | |
| 2 | * | 4882.000 | 23.28 | -8.42 | 14.86 | 54.00 | -39.14 | AVG | | | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

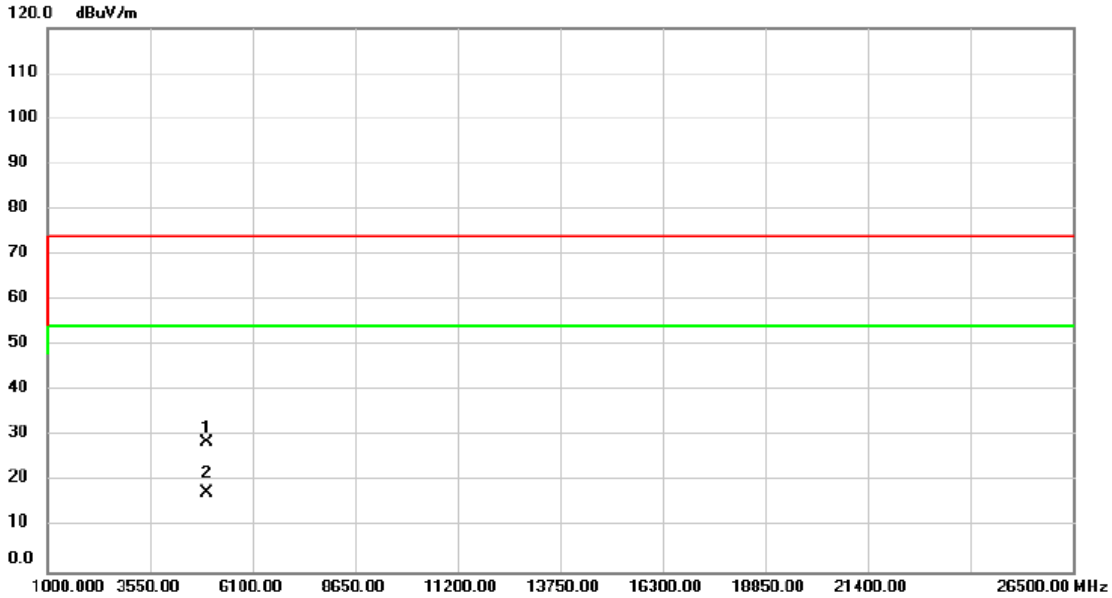
| Test Mode | BT(1Mbps) | Test Date | 2024/4/26 |
|---|---|---|---|
| Test Frequency | 2441MHz | Polarization | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 4882.000 | 29.14 | -8.42 | 20.72 | 74.00 | -53.28 | peak | | | |
| 2 | * | 4882.000 | 24.31 | -8.42 | 15.89 | 54.00 | -38.11 | AVG | | | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

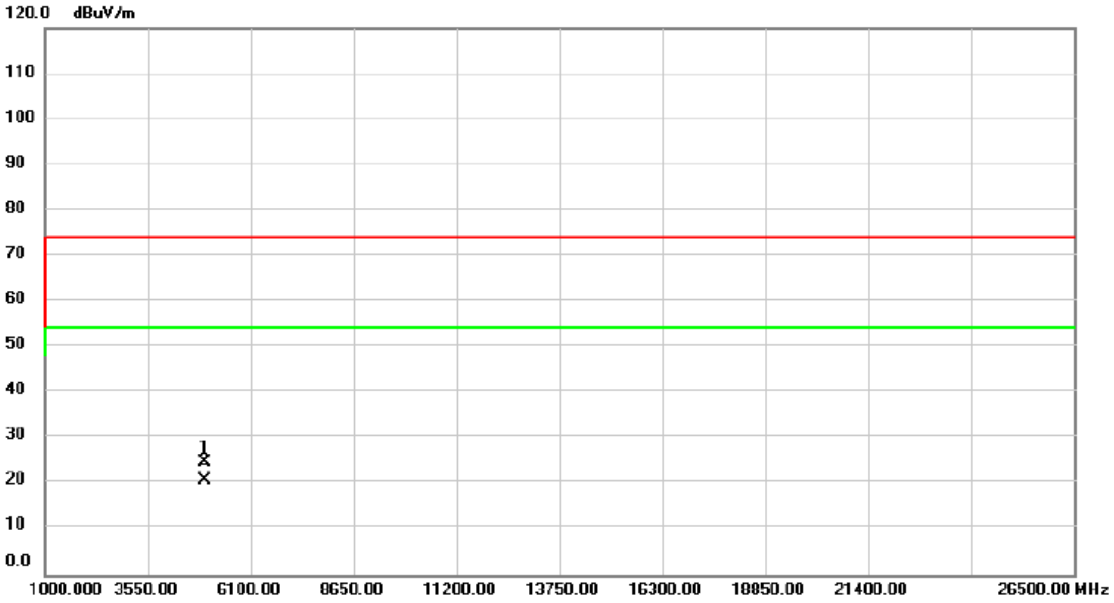
| Test Mode | BT(1Mbps) | Test Date | 2024/4/26 |
|---|---|---|---|
| Test Frequency | 2480MHz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 4960.000 | 36.89 | -8.23 | 28.66 | 74.00 | -45.34 | peak | | | |
| 2 | * | 4960.000 | 25.77 | -8.23 | 17.54 | 54.00 | -36.46 | AVG | | | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

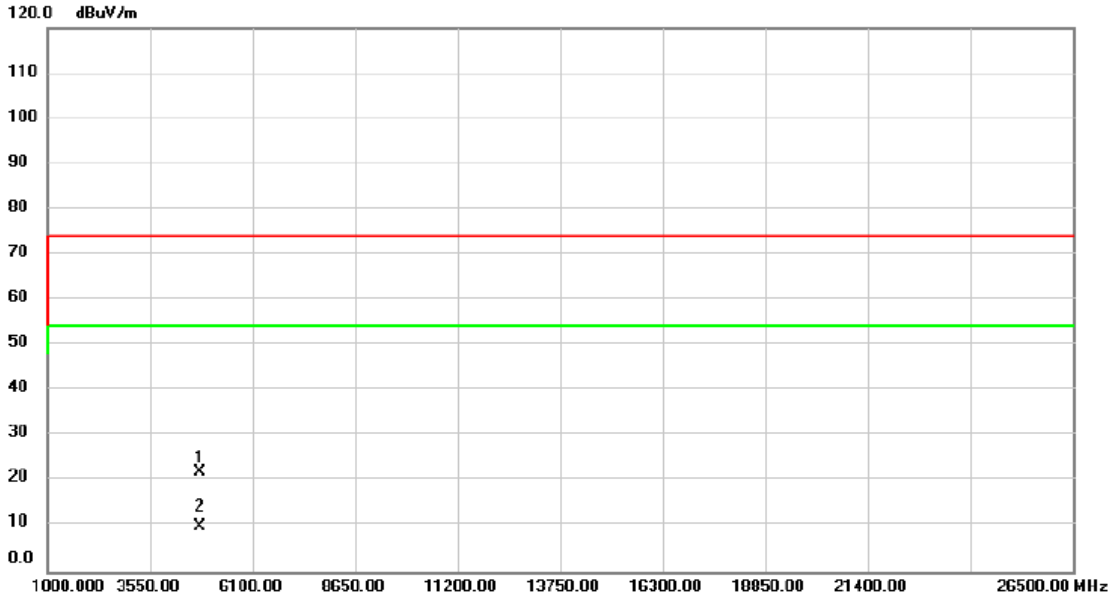
| Test Mode | BT(1Mbps) | Test Date | 2024/4/26 |
|---|---|---|---|
| Test Frequency | 2480MHz | Polarization | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 4944.000 | 33.09 | -8.27 | 24.82 | 74.00 | -49.18 | peak | | | |
| 2 | * | 4944.000 | 29.05 | -8.27 | 20.78 | 54.00 | -33.22 | AVG | | | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

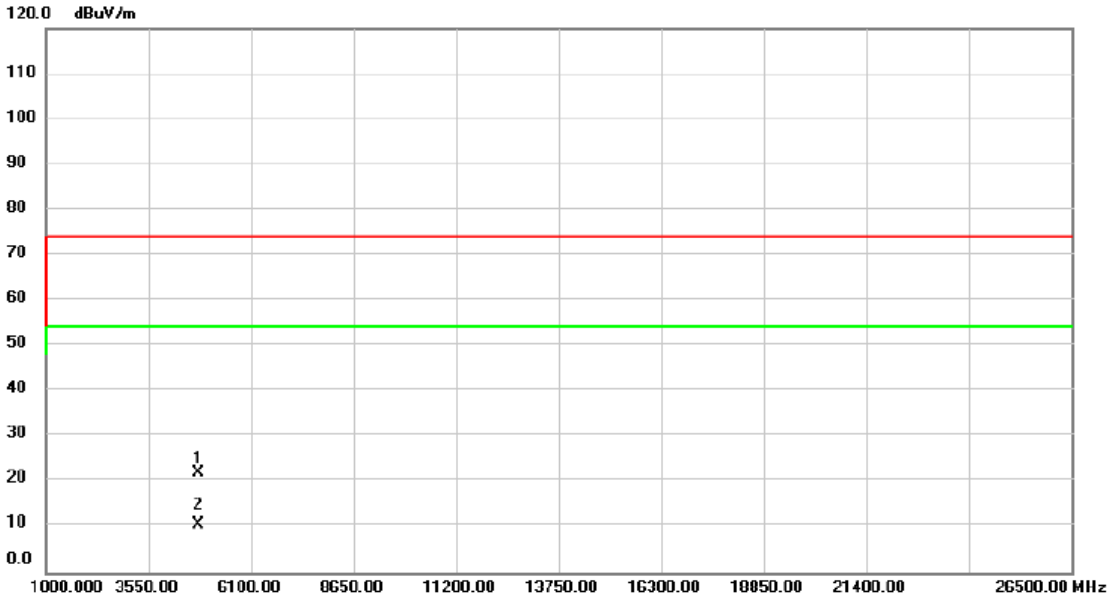
| Test Mode | BT(3Mbps) | Test Date | 2024/4/26 |
|---|---|---|---|
| Test Frequency | 2402MHz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 4804.000 | 30.60 | -8.62 | 21.98 | 74.00 | -52.02 | peak | | | |
| 2 | * | 4804.000 | 18.75 | -8.62 | 10.13 | 54.00 | -43.87 | AVG | | | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

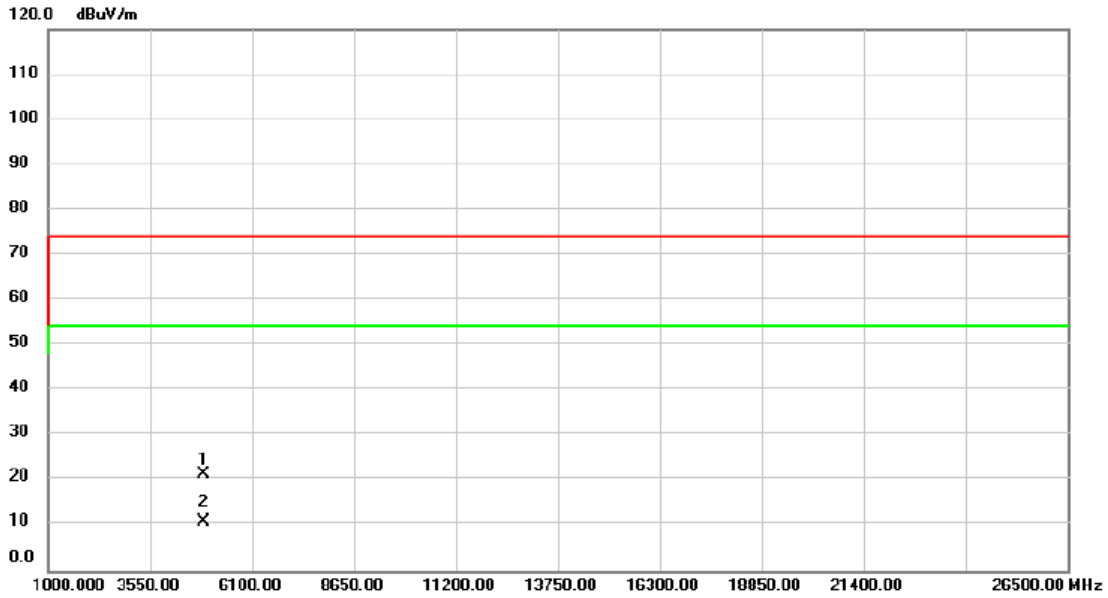
| Test Mode | BT(3Mbps) | Test Date | 2024/4/26 |
|---|---|---|---|
| Test Frequency | 2402MHz | Polarization | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 4804.000 | 30.81 | -8.62 | 22.19 | 74.00 | -51.81 | peak | | | |
| 2 | * | 4804.000 | 19.25 | -8.62 | 10.63 | 54.00 | -43.37 | AVG | | | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

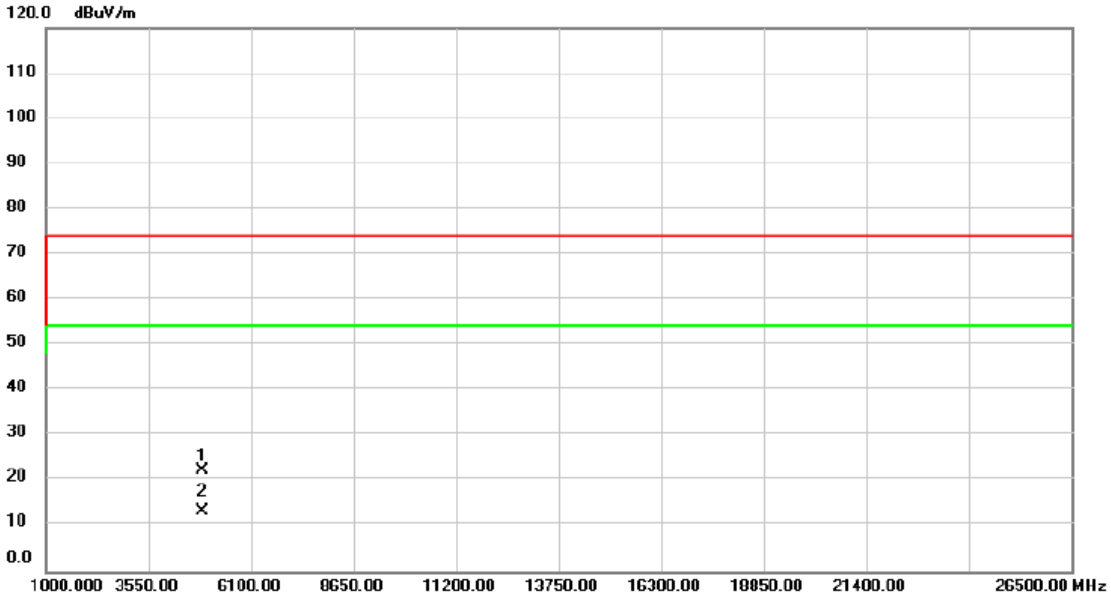
| Test Mode | BT(3Mbps) | Test Date | 2024/4/26 |
|---|---|---|---|
| Test Frequency | 2441MHz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 4882.000 | 29.85 | -8.42 | 21.43 | 74.00 | -52.57 | peak | | | |
| 2 | * | 4882.000 | 19.28 | -8.42 | 10.86 | 54.00 | -43.14 | AVG | | | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

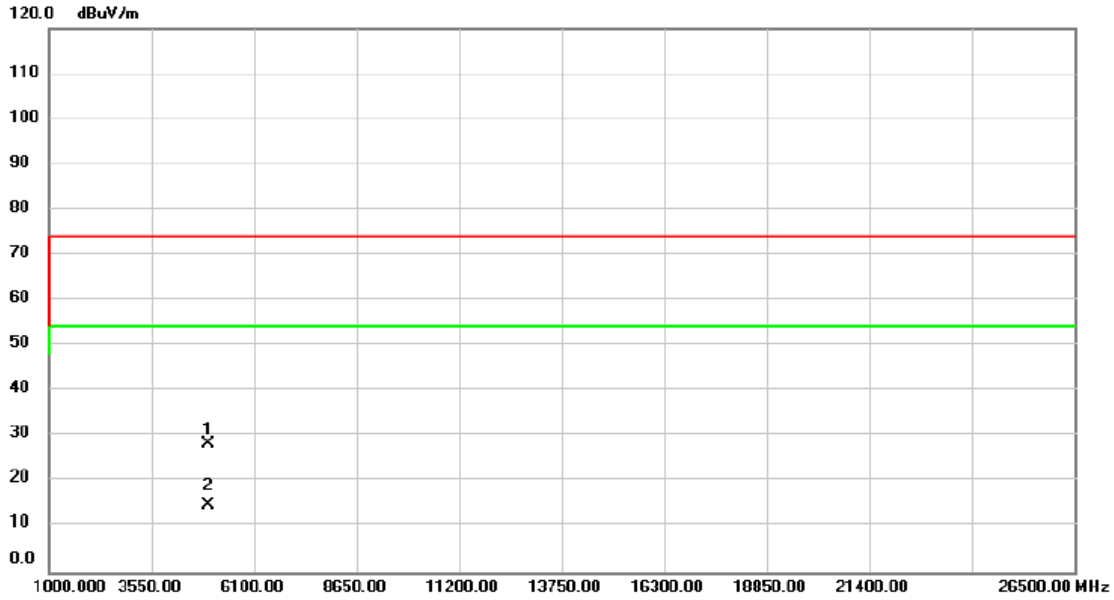
| Test Mode | BT(3Mbps) | Test Date | 2024/4/26 |
|---|---|---|---|
| Test Frequency | 2441MHz | Polarization | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 4882.000 | 30.88 | -8.42 | 22.46 | 74.00 | -51.54 | peak | | | |
| 2 | * | 4882.000 | 21.90 | -8.42 | 13.48 | 54.00 | -40.52 | AVG | | | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

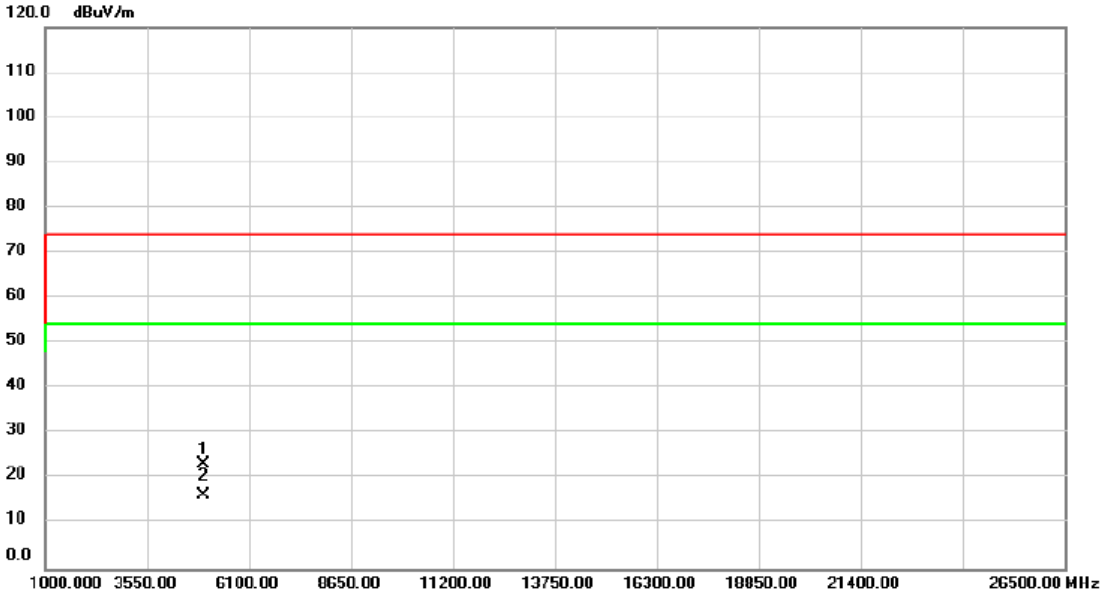
| Test Mode | BT(3Mbps) | Test Date | 2024/4/26 |
|---|---|---|---|
| Test Frequency | 2480MHz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 4960.000 | 36.57 | -8.23 | 28.34 | 74.00 | -45.66 | peak | | | |
| 2 | * | 4960.000 | 22.98 | -8.23 | 14.75 | 54.00 | -39.25 | AVG | | | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

| Test Mode | BT(3Mbps) | Test Date | 2024/4/26 |
|---|---|---|---|
| Test Frequency | 2480MHz | Polarization | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 4960.000 | 31.63 | -8.23 | 23.40 | 74.00 | -50.60 | peak | | | |
| 2 | * | 4960.000 | 24.62 | -8.23 | 16.39 | 54.00 | -37.61 | AVG | | | |

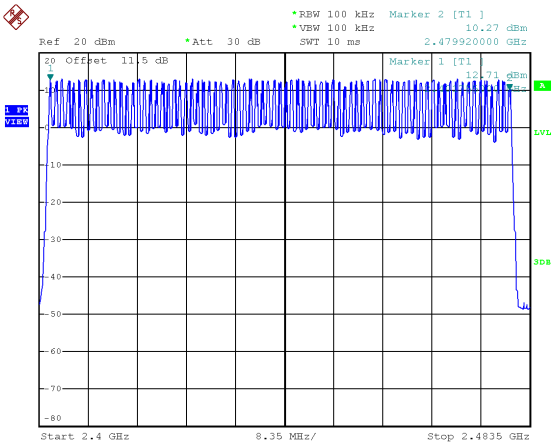
REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

# APPENDIX D NUMBER OF HOPPING CHANNEL

| Test Mode | 1/3Mbps |
|---|---|

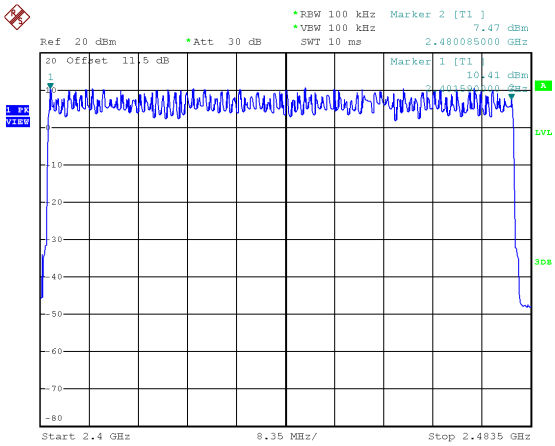
| Test Mode | Number of Hopping Channel | ≥ Limit | Test Result |
|---|---|---|---|
| 1 Mbps | 79 | 15 | Pass |
| 3 Mbps | 79 | 15 | Pass |

1 Mbps




Date: 6.MAY.2024 20:56:51

3 Mbps



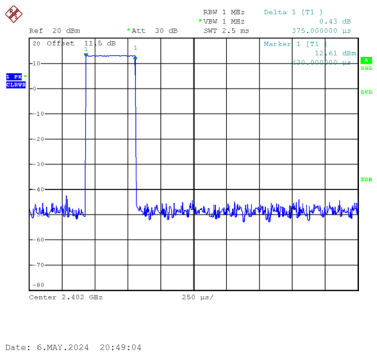

Date: 17.MAY.2024 14:34:58

# APPENDIX E AVERAGE TIME OF OCCUPANCY

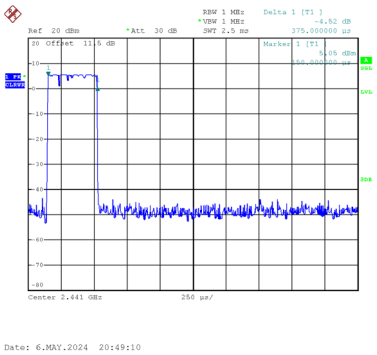
| Test Mode : | 1Mbps |
|---|---|

| Data Packet | Frequency (MHz) | Pulse Duration (ms) | Dwell Time (s) | Limits (s) | Test Result |
|---|---|---|---|---|---|
| DH5 | 2402 | 0.3750 | 0.1200 | 0.4000 | Pass |
| DH3 | 2402 | 1.6400 | 0.2624 | 0.4000 | Pass |
| DH1 | 2402 | 2.8800 | 0.3072 | 0.4000 | Pass |
| DH5 | 2441 | 0.3750 | 0.1200 | 0.4000 | Pass |
| DH3 | 2441 | 1.6400 | 0.2624 | 0.4000 | Pass |
| DH1 | 2441 | 2.8800 | 0.3072 | 0.4000 | Pass |
| DH5 | 2480 | 0.3750 | 0.1200 | 0.4000 | Pass |
| DH3 | 2480 | 1.6400 | 0.2624 | 0.4000 | Pass |
| DH1 | 2480 | 2.8800 | 0.3072 | 0.4000 | Pass |

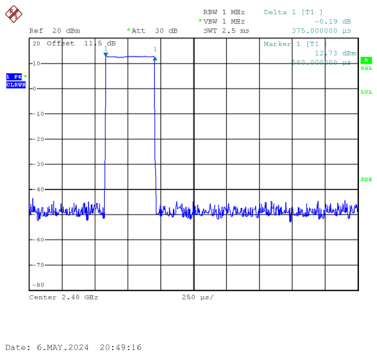
**CH00-DH1**



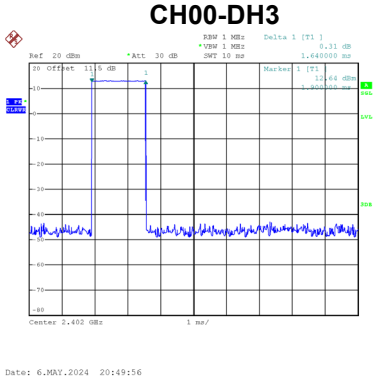
**CH39-DH1**



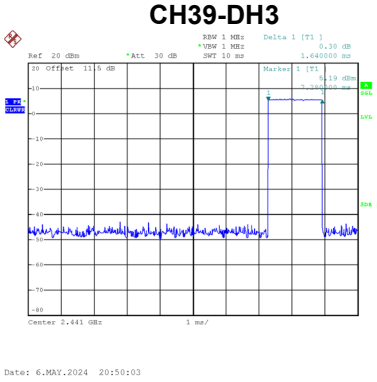
**CH78-DH1**



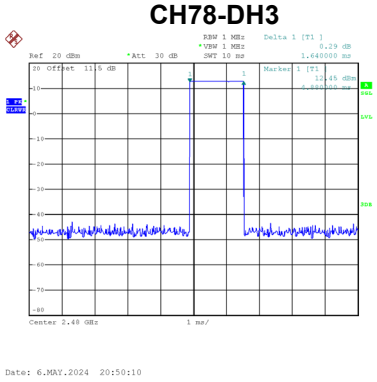
**CH00-DH3**



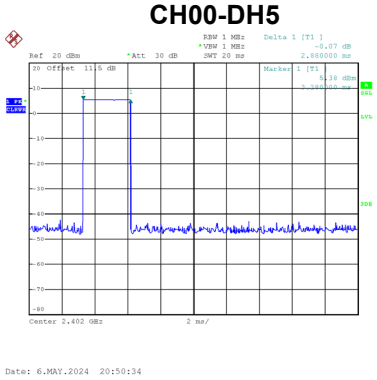
**CH39-DH3**



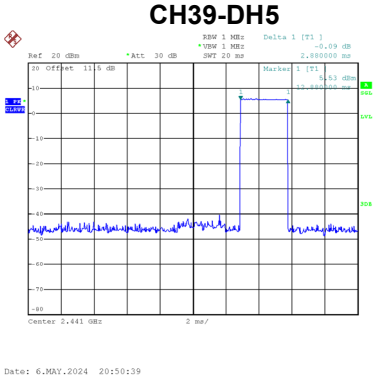
**CH78-DH3**



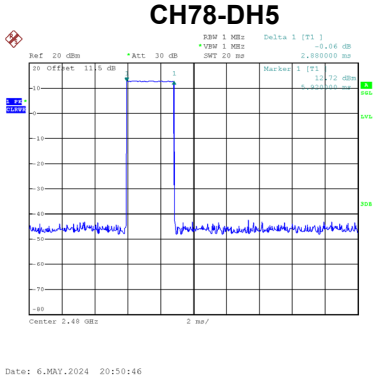
**CH00-DH5**



**CH39-DH5**



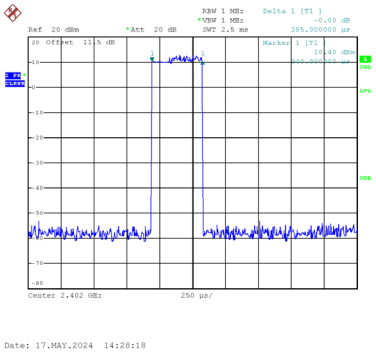
**CH78-DH5**



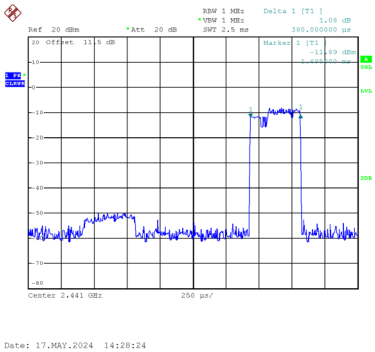
| Test Mode : | 3Mbps |
|---|---|

| Data Packet | Frequency (MHz) | Pulse Duration(ms) | Dwell Time(s) | Limits(s) | Test Result |
|---|---|---|---|---|---|
| 3DH5 | 2402 | 0.3850 | 0.1232 | 0.4000 | Pass |
| 3DH3 | 2402 | 1.6400 | 0.2624 | 0.4000 | Pass |
| 3DH1 | 2402 | 2.8800 | 0.3072 | 0.4000 | Pass |
| 3DH5 | 2441 | 0.3800 | 0.1216 | 0.4000 | Pass |
| 3DH3 | 2441 | 1.6400 | 0.2624 | 0.4000 | Pass |
| 3DH1 | 2441 | 2.9200 | 0.3115 | 0.4000 | Pass |
| 3DH5 | 2480 | 0.3800 | 0.1216 | 0.4000 | Pass |
| 3DH3 | 2480 | 1.6400 | 0.2624 | 0.4000 | Pass |
| 3DH1 | 2480 | 2.8800 | 0.3072 | 0.4000 | Pass |

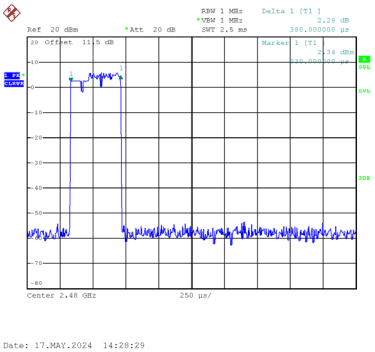
**CH00-3DH1**



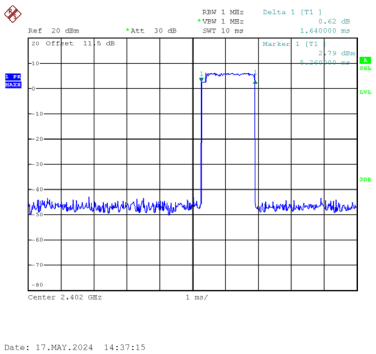
**CH39-3DH1**



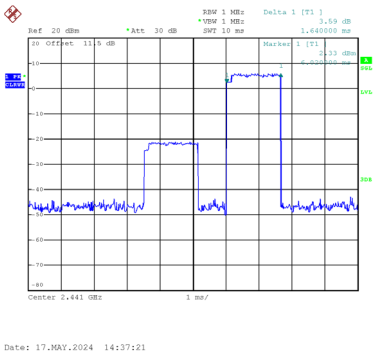
**CH78-3DH1**



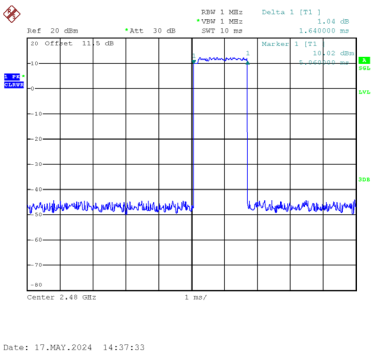
**CH00-3DH3**



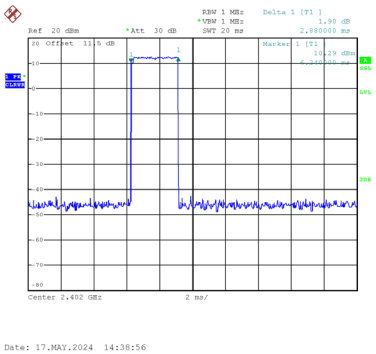
**CH39-3DH3**



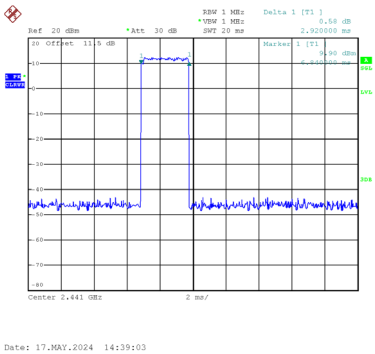
**CH78-3DH3**



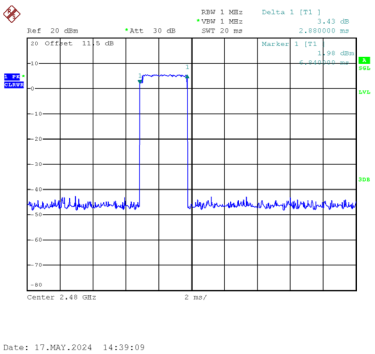
**CH00-3DH5**



**CH39-3DH5**



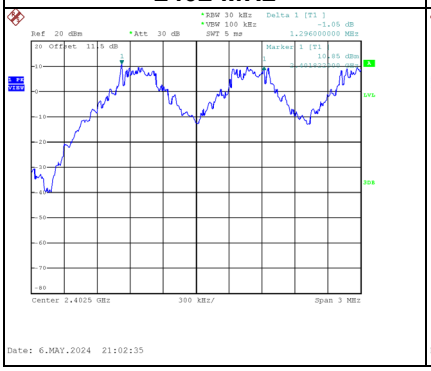
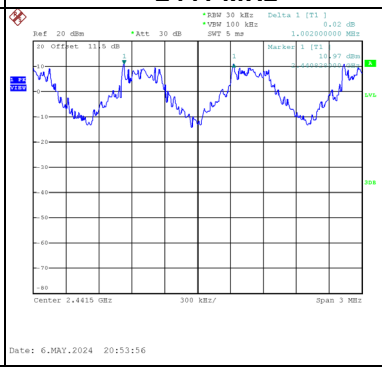
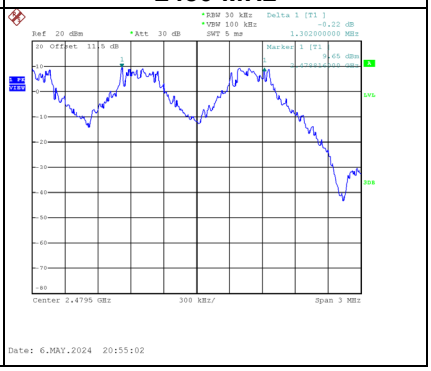
**CH78-3DH5**



# APPENDIX F HOPPING CHANNEL SEPARATION MEASUREMENT

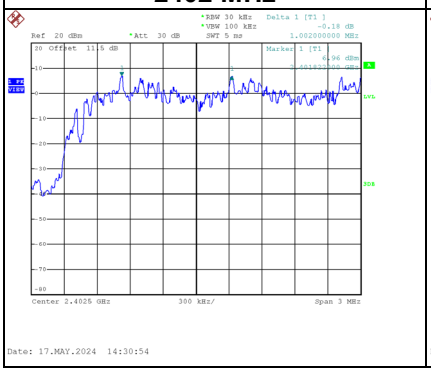
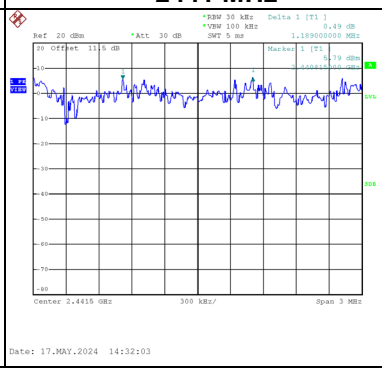
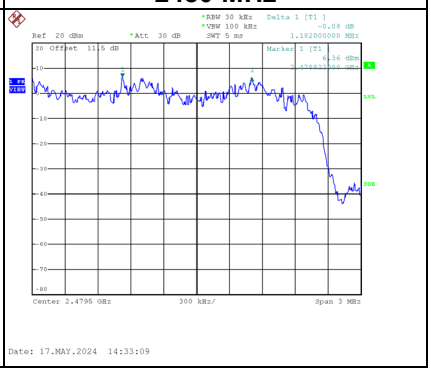
| Test Mode : | Hopping on _1Mbps |
|---|---|

| Frequency (MHz) | Channel Separation (MHz) | 2/3 of 20dB Bandwidth (MHz) | Test Result |
|---|---|---|---|
| 2402 | 1.296 | 0.639 | Pass |
| 2441 | 1.002 | 0.639 | Pass |
| 2480 | 1.302 | 0.641 | Pass |

| 2402 MHz | 2441 MHz | 2480 MHz |
|---|---|---|
|  |  |  |

| Test Mode : | Hopping on _3Mbps |
|---|---|

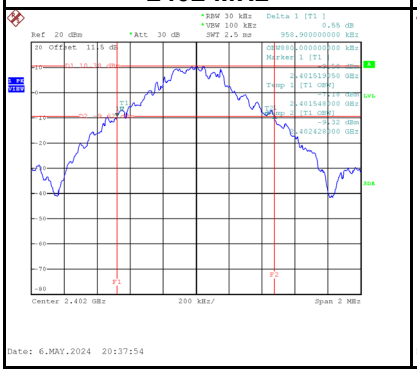
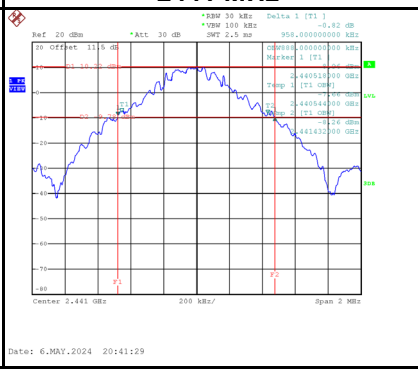
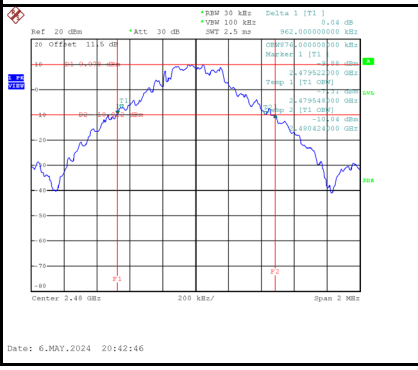
| Frequency (MHz) | Channel Separation (MHz) | 2/3 of 20dB Bandwidth (MHz) | Test Result |
|---|---|---|---|
| 2402 | 1.002 | 0.884 | Pass |
| 2441 | 1.189 | 0.876 | Pass |
| 2480 | 1.182 | 0.865 | Pass |

| 2402 MHz | 2441 MHz | 2480 MHz |
|---|---|---|
|  |  |  |

# APPENDIX G BANDWIDTH

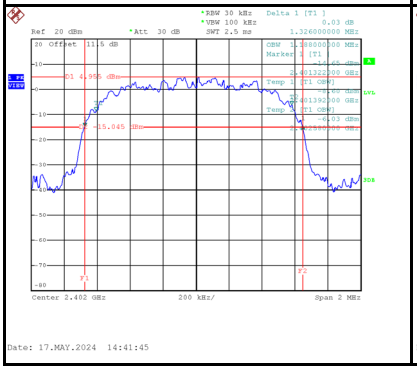
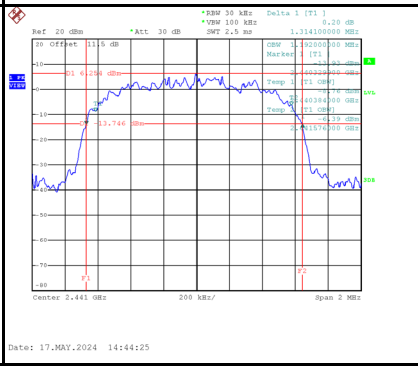
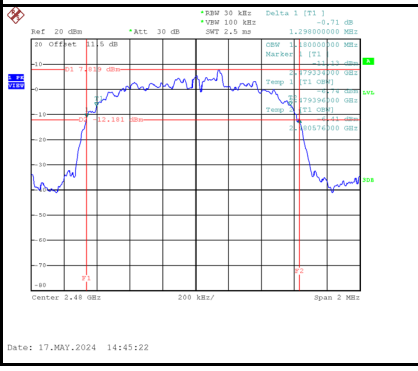
| Test Mode : | 1Mbps |
|---|---|

| Frequency (MHz) | 20dB Bandwidth (MHz) | 99% Occupied BW (MHz) | Test Result |
|---|---|---|---|
| 2402 | 0.959 | 0.880 | Pass |
| 2441 | 0.958 | 0.888 | Pass |
| 2480 | 0.962 | 0.876 | Pass |

| 2402 MHz | 2441 MHz | 2480 MHz |
|---|---|---|
|  |  |  |

| Test Mode : | 3Mbps |
|---|---|

| Frequency (MHz) | 20dB Bandwidth (MHz) | 99% Occupied BW (MHz) | Test Result |
|---|---|---|---|
| 2402 | 1.326 | 0.880 | Pass |
| 2441 | 1.314 | 0.880 | Pass |
| 2480 | 1.298 | 0.880 | Pass |

| 2402 MHz | 2441 MHz | 2480 MHz |
|---|---|---|
|  |  |  |

# APPENDIX H OUTPUT POWER

| Test Mode : | 1Mbps | Tested Date | 2024/5/6 |
|---|---|---|---|

| Frequency (MHz) | Conducted Power (dBm) | Conducted Power (W) | Max. Limit (dBm) | Max. Limit (W) | Test Result |
|---|---|---|---|---|---|
| 2402 | 13.33 | 0.0215 | 21.00 | 0.1250 | Pass |
| 2441 | 13.13 | 0.0206 | 21.00 | 0.1250 | Pass |
| 2480 | 13.04 | 0.0201 | 21.00 | 0.1250 | Pass |

| Test Mode : | 2Mbps | Tested Date | 2024/5/6 |
|---|---|---|---|

| Frequency (MHz) | Conducted Power (dBm) | Conducted Power (W) | Max. Limit (dBm) | Max. Limit (W) | Test Result |
|---|---|---|---|---|---|
| 2402 | 13.36 | 0.0217 | 21.00 | 0.1250 | Pass |
| 2441 | 13.29 | 0.0213 | 21.00 | 0.1250 | Pass |
| 2480 | 12.90 | 0.0195 | 21.00 | 0.1250 | Pass |

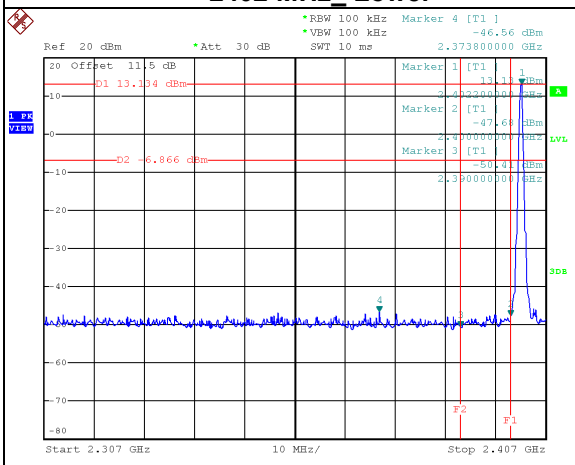
| Test Mode : | 3Mbps | Tested Date | 2024/5/6 |
|---|---|---|---|

| Frequency (MHz) | Conducted Power (dBm) | Conducted Power (W) | Max. Limit (dBm) | Max. Limit (W) | Test Result |
|---|---|---|---|---|---|
| 2402 | 13.47 | 0.0222 | 21.00 | 0.1250 | Pass |
| 2441 | 13.38 | 0.0218 | 21.00 | 0.1250 | Pass |
| 2480 | 13.02 | 0.0200 | 21.00 | 0.1250 | Pass |

# APPENDIX I ANTENNA CONDUCTED SPURIOUS EMISSION

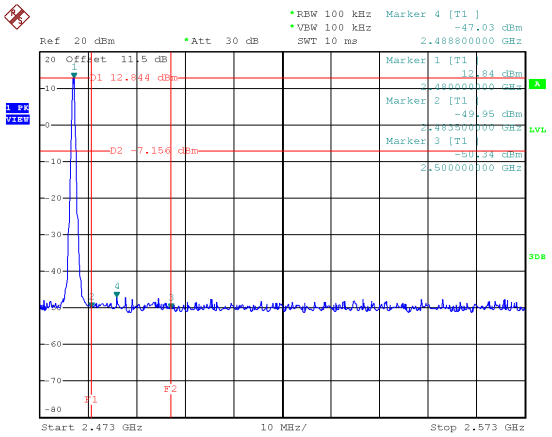
| Test Mode | 1Mbps |
|---|---|

**2402 MHz_ Lower**



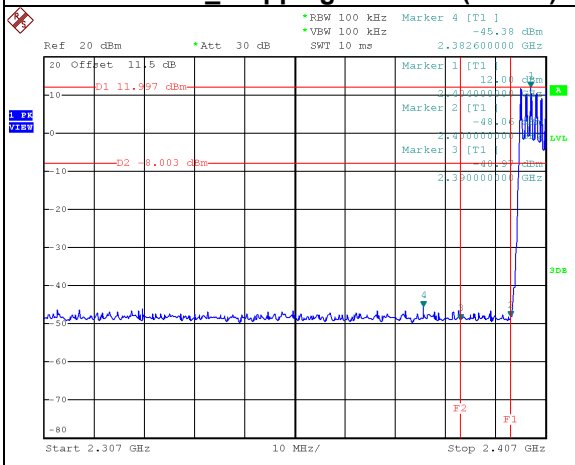

Date: 6.MAY.2024 20:37:25

**2480 MHz_ Upper**



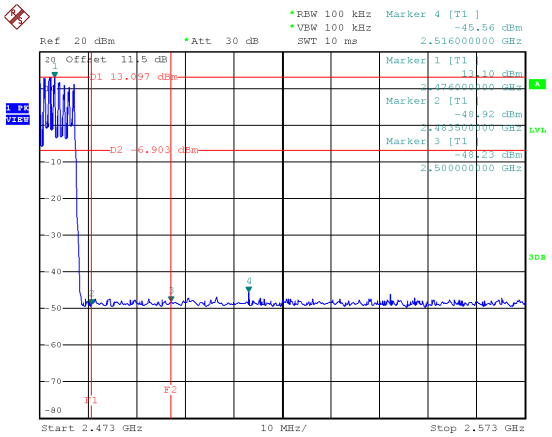

Date: 6.MAY.2024 20:42:16

**2402 MHz_ Hopping on mode (Lower)**



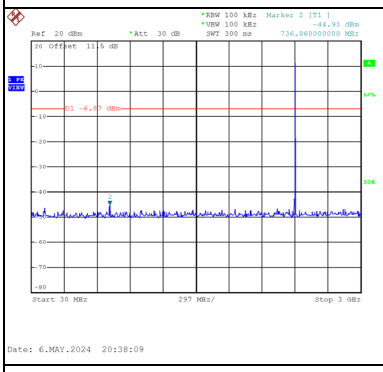

Date: 6.MAY.2024 20:57:27

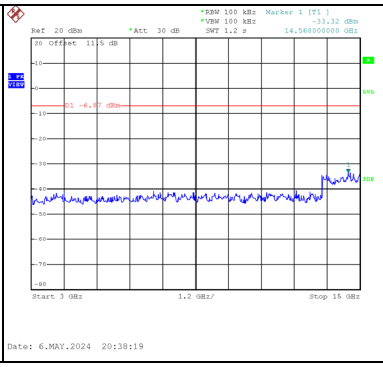
**2480 MHz_ Hopping on mode (Upper)**

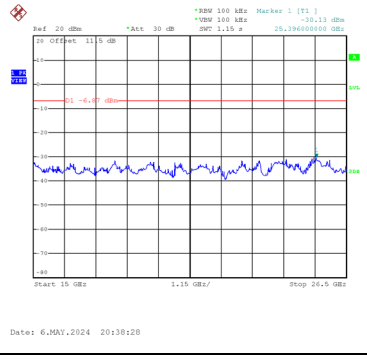



Date: 6.MAY.2024 20:58:04

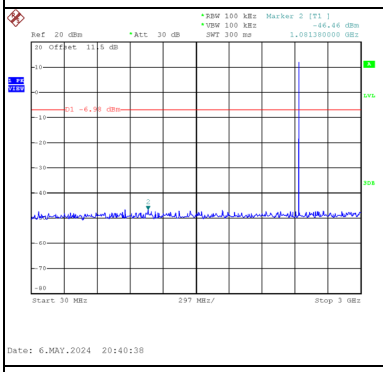
## 2402 MHz – 10th Harmonics

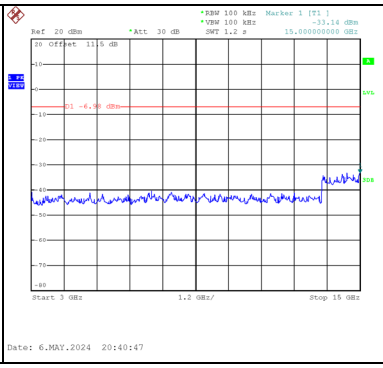


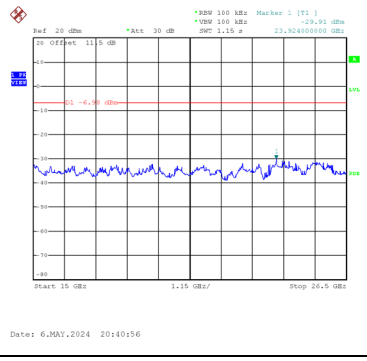




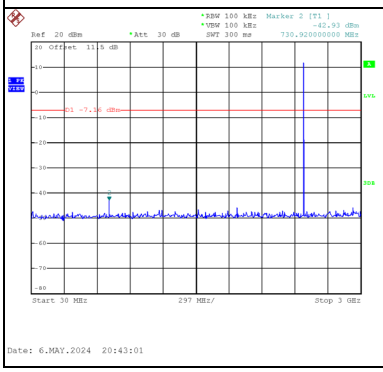
## 2441 MHz – 10th Harmonics

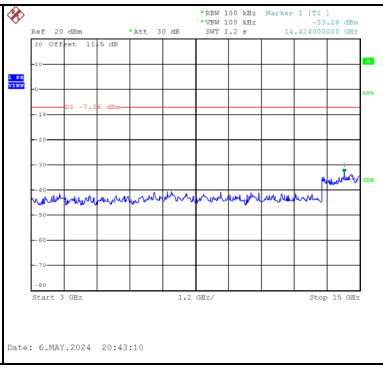


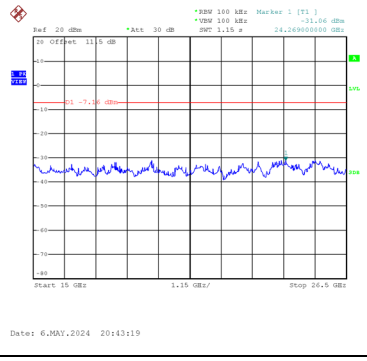




## 2480 MHz – 10th Harmonics

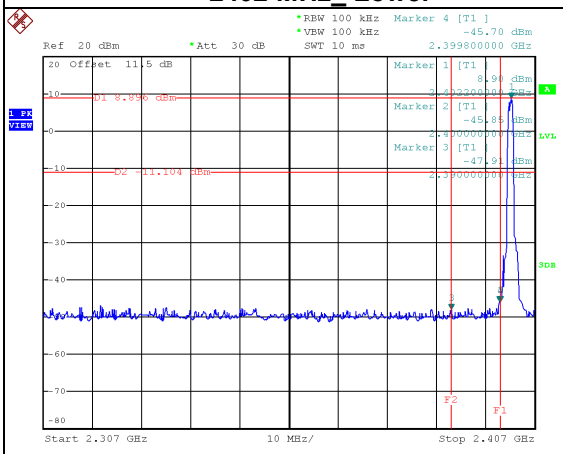






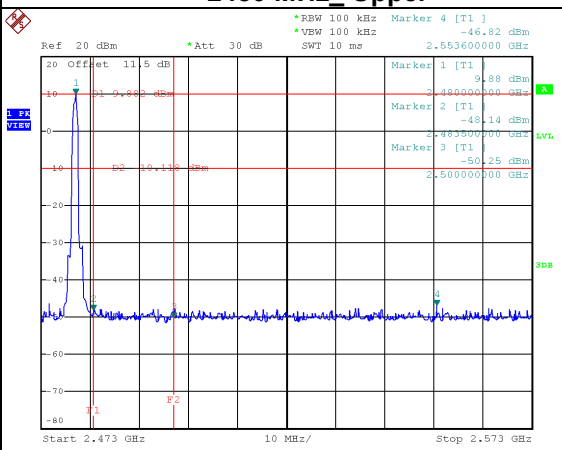
| Test Mode | 3Mbps |
|---|---|

**2402 MHz_ Lower**



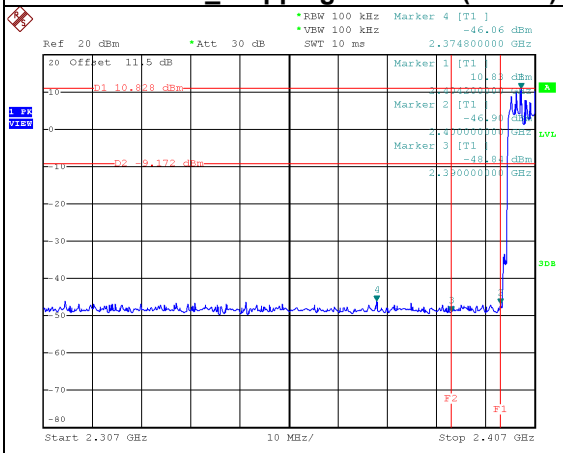

Date: 17.MAY.2024 14:41:22

**2480 MHz_ Upper**



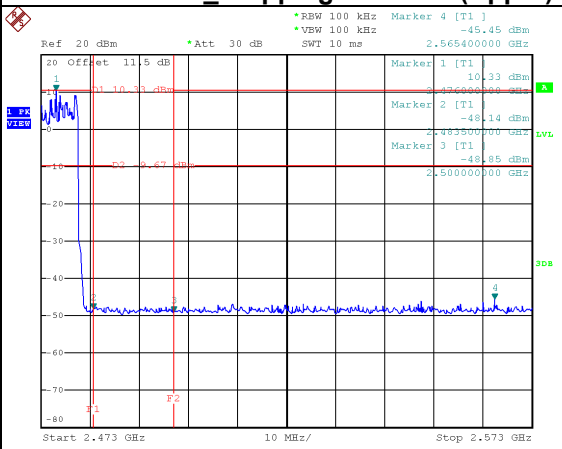

Date: 17.MAY.2024 14:44:58

**2402 MHz_ Hopping on mode (Lower)**



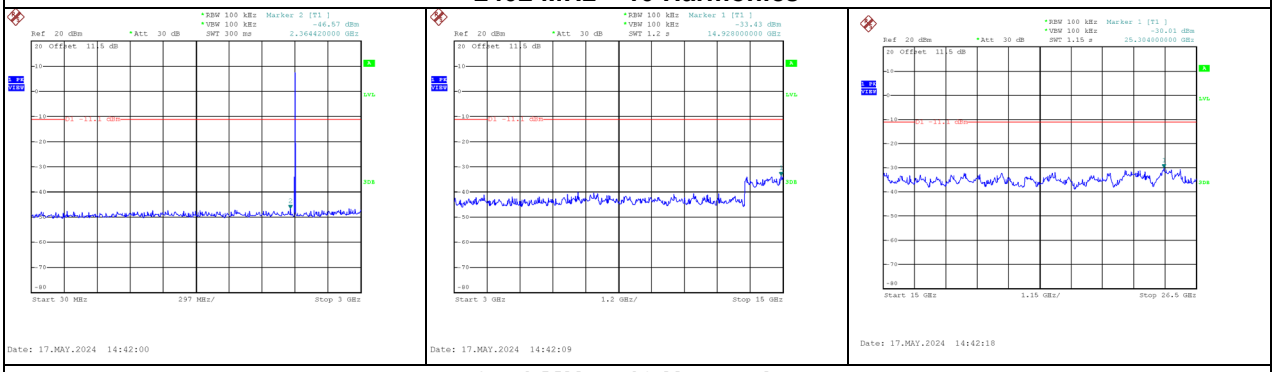

Date: 17.MAY.2024 14:35:34

**2480 MHz_ Hopping on mode (Upper)**

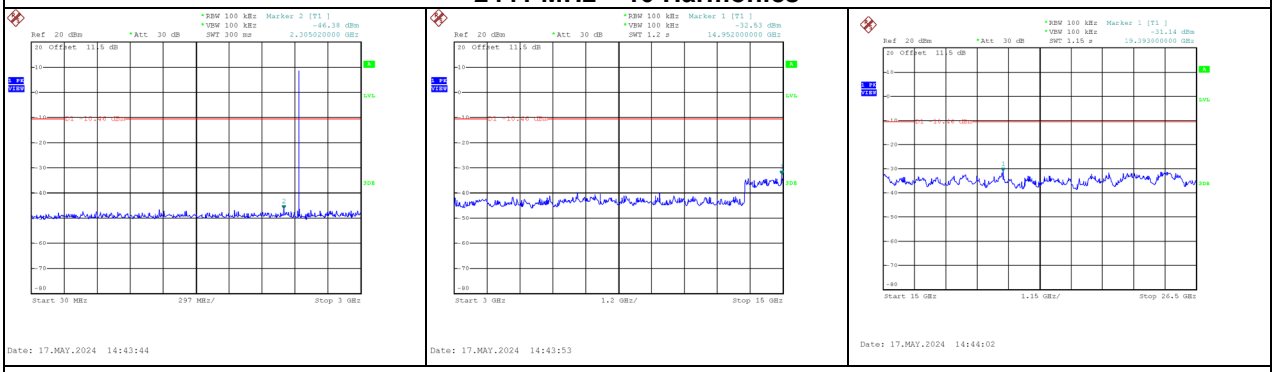



Date: 17.MAY.2024 14:36:11

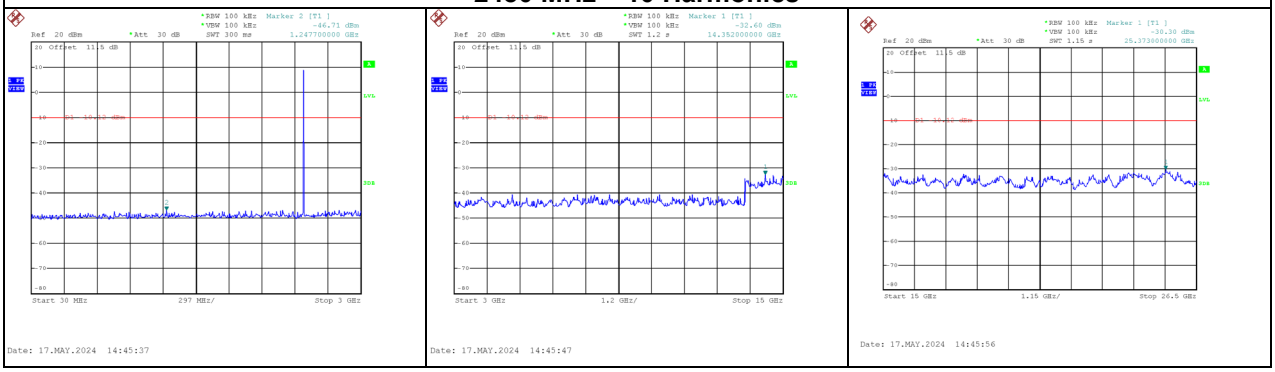
## 2402 MHz – 10 Harmonics



## 2441 MHz – 10 Harmonics



## 2480 MHz – 10 Harmonics



**End of Test Report**