# CE Test Report

| | | |
|---|---|---|
| **Equipment** | : | **Sona IF513 802.11ax Wi-Fi 6E Module with Bluetooth 5.4** |
| **Model No.** | : | **Sona IF513** |
| **Brand Name** | : | **Ezurio** |
| **Applicant** | : | **Ezurio LLC** |
| **Address** | : | **W66N220 Commerce Court, Cedarburg, WI 53012 United States Of America** |
| **Standard** | : | **EN 300 328 V2.2.2 (2019-07)** |
| **Received Date** | : | **Jun. 06, 2024** |
| **Tested Date** | : | **Jun. 06 ~ Nov. 04, 2024** |

**We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It shall not be reproduced except in full without the written approval of our laboratory.**

**Reviewed by:** **Approved by:**

Alex Huang, Gary Chang

**Alex Huang / Supervisor** **Gary Chang / Manager**

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**Appendix F. Transmitter Spurious Emissions**

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**Appendix H. Receiver Blocking**

# Release Record

| Report No. | Version | Description | Issued Date |
|---|---|---|---|
| ER460601AD | Rev. 01 | Initial issue | Dec. 06, 2024 |
| ER460601AD | Rev. 02 | 1. Modified antenna gain<br>2. Modified Appendix<br>3. Update to the EIRP | Dec. 25, 2024 |

# Summary of Test Results

| Ref. Std. Clause | Test Items | Measured | Result |
|---|---|---|---|
| 4.3.1.2 | RF Output Power (EIRP) | EIRP (dBm): 9.68 | Pass |
| 4.3.1.3 | Duty cycle, Tx-Sequence, Tx-gap | Only for non-adaptive equipment | N/A |
| 4.3.1.4 | Dwell time, Minimum Frequency Occupation & Hopping Sequence | Meet the requirement of limit. | Pass |
| 4.3.1.5 | Hopping Frequency Separation | Meet the requirement of limit. | Pass |
| 4.3.1.6 | Medium Utilisation (MU) factor | Only for non-adaptive equipment | N/A |
| 4.3.1.7 | Adaptivity | The RF Output power is less than 10 dBm e.i.r.p. This item is not applicable | N/A |
| 4.3.1.8 | Occupied Channel Bandwidth | Meet the requirement of limit. | Pass |
| 4.3.1.9 | Transmitter unwanted emissions in the out of band domain | Meet the requirement of limit. | Pass |
| 4.3.1.10 | Transmitter unwanted emissions in the spurious domain | Meet the requirement of limit. | Pass |
| 4.3.1.11 | Receiver spurious emissions | Meet the requirement of limit. | Pass |
| 4.3.1.12 | Receiver Blocking | Meet the requirement of limit. | Pass |
| 4.3.1.13 | Geo-location capability | The device has no geo-location capability. | N/A |

| **Declaration of Conformity:** |
|---|
| The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. |
| **Comments and Explanations:** |
| The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification. |

# 1 General Description

## 1.1 Information

### 1.1.1 Product Details

The four configurations of the EUT are shown on the following:

| Model Name | Part No. | Description |
|---|---|---|
| Sona IF513 | 453-00184 | Module, Sona IF513, MHF4L |
| | 453-00185 | Module, Sona IF513, Trace Pin |
| | 453-00193 | Module, Sona IF513, Antenna Diversity, MHF4L |
| | 453-00194 | Module, Sona IF513, Antenna Diversity, Trace Pin |
| | 453-00186 | Module, Sona IF513, M.2, Key E, SDIO, UART |
| | 453-00195 | Module, Sona IF513, Antenna Diversity, M.2, Key E, SDIO, UART |
| | 453-00213 | Module, Sona IF513, M.2, Key E, SDIO, UART, Ext. OSC |
| | 453-00214 | Module, Sona IF513, Antenna Diversity, M.2, Key E, SDIO, UART, Ext. OSC |

### 1.1.2 Specification of the Equipment under Test (EUT)

| RF General Information | | | | |
|---|---|---|---|---|
| Frequency Range (MHz) | Bluetooth Mode | Ch. Frequency (MHz) | Channel Number | Data Rate |
| 2400-2483.5 | BR | 2402-2480 | 0-78 [79] | 1 Mbps |
| 2400-2483.5 | EDR | 2402-2480 | 0-78 [79] | 2 Mbps |
| 2400-2483.5 | EDR | 2402-2480 | 0-78 [79] | 3 Mbps |
| Note 1: Bluetooth BR uses a GFSK modulation.<br>Note 2: Bluetooth EDR uses a combination of π/4-DQPSK and 8DPSK modulation. | | | | |

### 1.1.3 Antenna Details

| Ant. No. | Manufacturer | Model | Part Number | Type | Connector | Gain (dBi) |
|---|---|---|---|---|---|---|
| 1 | Joymax Inc. | TWX-100BRS3B | NA | Dipole | RP-SMA | 2 |
| 2 | Ezurio | FlexMIMO 6E | EFD2471A3S-10MH4L | PIFA | MHF4L | 2.2 |
| 3 | Ezurio | Mini NanoBlade Flex 6 GHz | EMF2471A3S-10MH4L | PCB Dipole | MHF4L | 2.4 |
| 4 | Ezurio | FlexPIFA 6E | EFB2471A3S-10MH4L | PIFA | MHF4L | 2.2 |

### 1.1.4 EUT Operational Condition

| | | | |
|---|---|---|---|
| **Power Supply Type** | 3.3Vdc from host | | |
| **SW Version** | v28.10.301 | | |
| **Operational Climatic** | ☒ Tnom (20°C) | ☒ Tmax (85°C) | ☒ Tmin (-40°C) |

### 1.1.5 Channel List

| **Frequency band (MHz)** | | | | **2400~2483.5** | | | |
|---|---|---|---|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **Channel** | **Frequency (MHz)** | **Channel** | **Frequency (MHz)** | **Channel** | **Frequency (MHz)** |
| 0 | 2402 | 20 | 2422 | 40 | 2442 | 60 | 2462 |
| 1 | 2403 | 21 | 2423 | 41 | 2443 | 61 | 2463 |
| 2 | 2404 | 22 | 2424 | 42 | 2444 | 62 | 2464 |
| 3 | 2405 | 23 | 2425 | 43 | 2445 | 63 | 2465 |
| 4 | 2406 | 24 | 2426 | 44 | 2446 | 64 | 2466 |
| 5 | 2407 | 25 | 2427 | 45 | 2447 | 65 | 2467 |
| 6 | 2408 | 26 | 2428 | 46 | 2448 | 66 | 2468 |
| 7 | 2409 | 27 | 2429 | 47 | 2449 | 67 | 2469 |
| 8 | 2410 | 28 | 2430 | 48 | 2450 | 68 | 2470 |
| 9 | 2411 | 29 | 2431 | 49 | 2451 | 69 | 2471 |
| 10 | 2412 | 30 | 2432 | 50 | 2452 | 70 | 2472 |
| 11 | 2413 | 31 | 2433 | 51 | 2453 | 71 | 2473 |
| 12 | 2414 | 32 | 2434 | 52 | 2454 | 72 | 2474 |
| 13 | 2415 | 33 | 2435 | 53 | 2455 | 73 | 2475 |
| 14 | 2416 | 34 | 2436 | 54 | 2456 | 74 | 2476 |
| 15 | 2417 | 35 | 2437 | 55 | 2457 | 75 | 2477 |
| 16 | 2418 | 36 | 2438 | 56 | 2458 | 76 | 2478 |
| 17 | 2419 | 37 | 2439 | 57 | 2459 | 77 | 2479 |
| 18 | 2420 | 38 | 2440 | 58 | 2460 | 78 | 2480 |
| 19 | 2421 | 39 | 2441 | 59 | 2461 | -- | -- |

### 1.1.6 Test Tool and Duty Cycle

***Part No. 453-00184***

| Test Tool | AIRPCBluetoothTool | |
|---|---|---|
| **Modulation Mode** | **Duty Cycle Of Test Signal (%)** | **Duty Factor (dB)** |
| BR-1Mbps | 78.28% | 1.06 |
| EDR-3Mbps | 76.14% | 1.18 |

***Part No. 453-00193***

| Test Tool | AIRPCBluetoothTool | |
|---|---|---|
| **Modulation Mode** | **Duty Cycle Of Test Signal (%)** | **Duty Factor (dB)** |
| BR-1Mbps | 74.93% | 1.25 |
| EDR-3Mbps | 78.39% | 1.06 |

***Part No. 453-00213***

| Test Tool | AIRPCBluetoothTool | |
|---|---|---|
| **Modulation Mode** | **Duty Cycle Of Test Signal (%)** | **Duty Factor (dB)** |
| BR-1Mbps | 78.28% | 1.06 |
| EDR-3Mbps | 74.05% | 1.30 |

***Part No. 453-00214***

| Test Tool | AIRPCBluetoothTool | |
|---|---|---|
| **Modulation Mode** | **Duty Cycle Of Test Signal (%)** | **Duty Factor (dB)** |
| BR-1Mbps | 74.01% | 1.31 |
| EDR-3Mbps | 75.88% | 1.20 |

### 1.1.7 Power Index of Test Tool

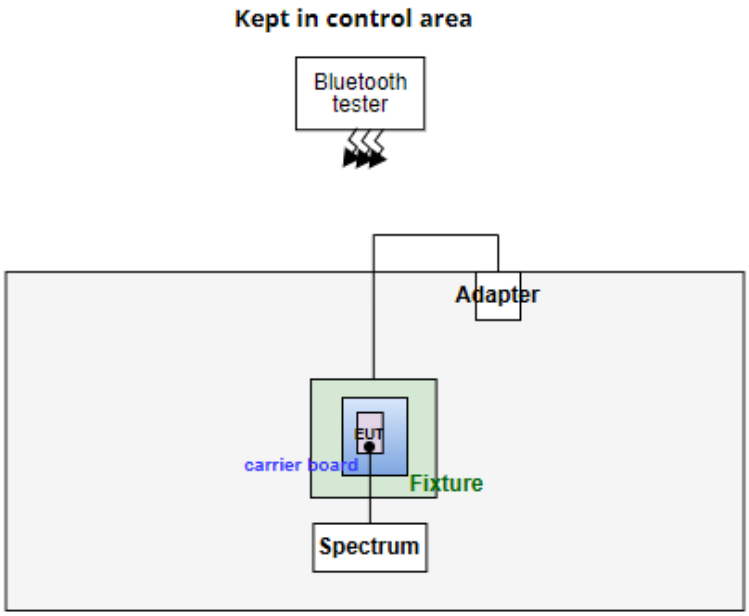
| **Modulation Mode** | **Test Frequency (MHz)** | | |
|---|---|---|---|
| | **hopping** | **hopping** | **hopping** |
| BR-1Mbps | Default | Default | Default |
| EDR-3Mbps | Default | Default | Default |

## 1.2 Local Support Equipment List

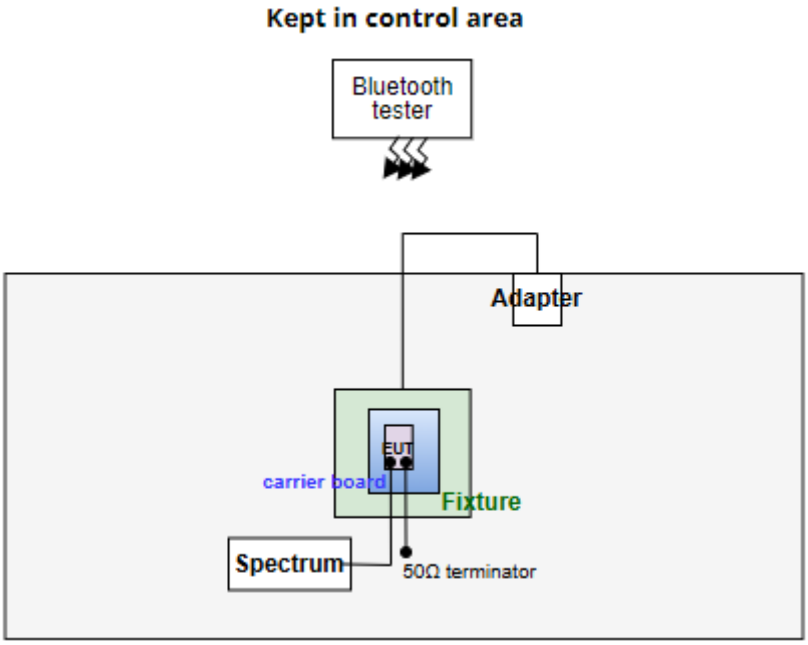
| Support Equipment List | | | | | |
|---|---|---|---|---|---|
| **No.** | **Equipment** | **Brand** | **Model** | **S/N** | **Remarks** |
| 1 | Laptop | DELL | Latitude 5400 | FKZLWZ2 | --- |
| 2 | Fixture | Ezurio | 750-00001-2-0 | --- | Provided by applicant. |
| 3 | Fixture's adapter | Chenzhou Frecom Electronics Co. | F36L7-120300S PACP | --- | Provided by applicant. |
| 4 | 50Ω terminator | Woken | WTER-18S2 | --- | --- |

## 1.3 Test Setup Chart

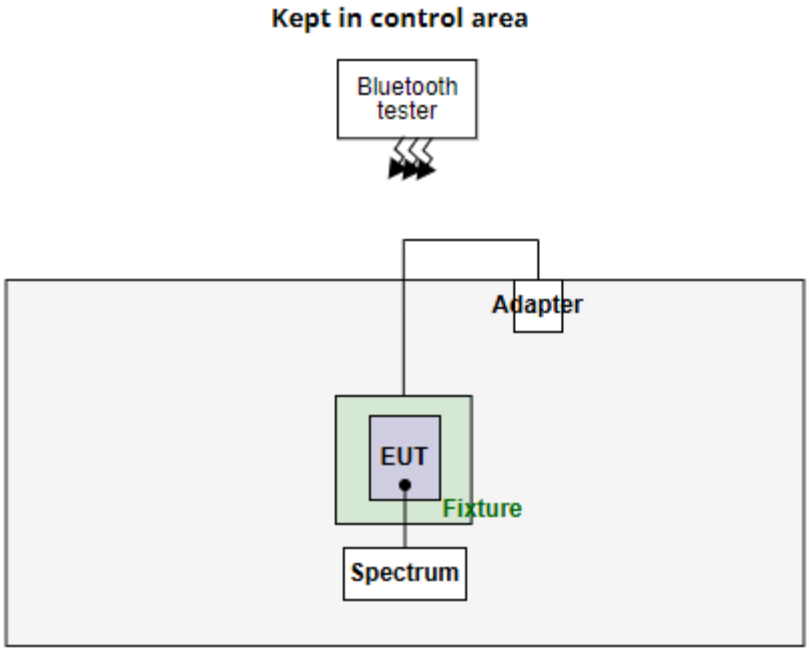
**Test Setup Diagram (Conducted Test –Laird part number: 453-00184)**



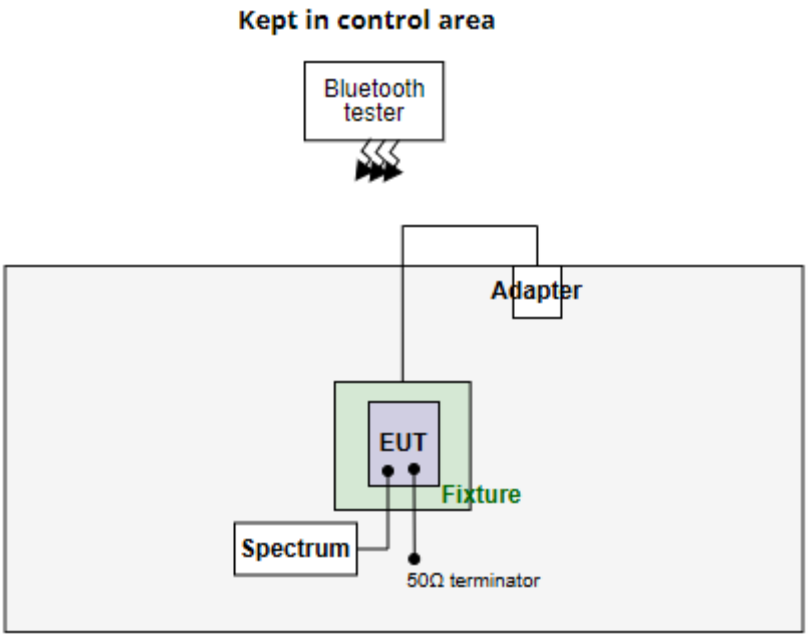

**Test Setup Diagram (Conducted Test –Laird part number: 453-00193)**



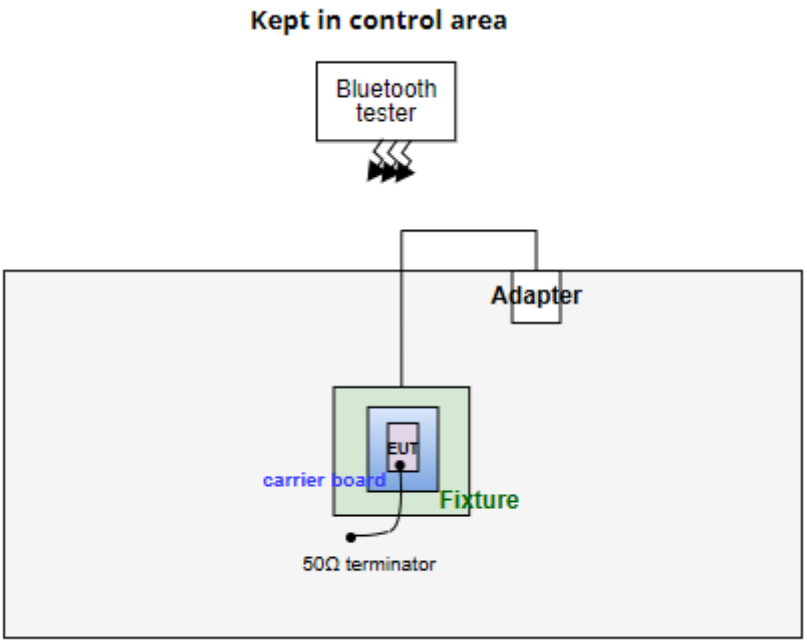
**Test Setup Diagram (Conducted Test –Laird part number: 453-00213)**



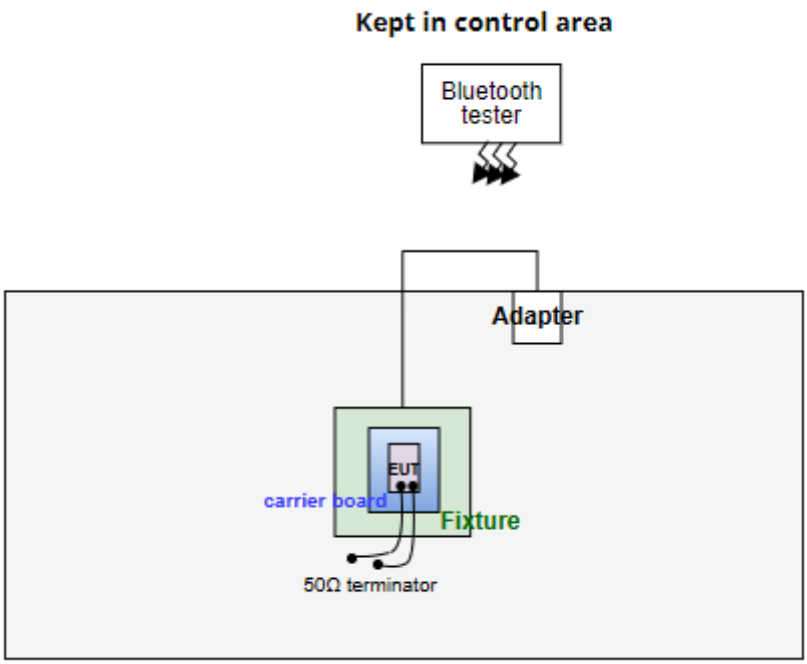

**Test Setup Diagram (Conducted Test – Laird part number: 453-00214)**



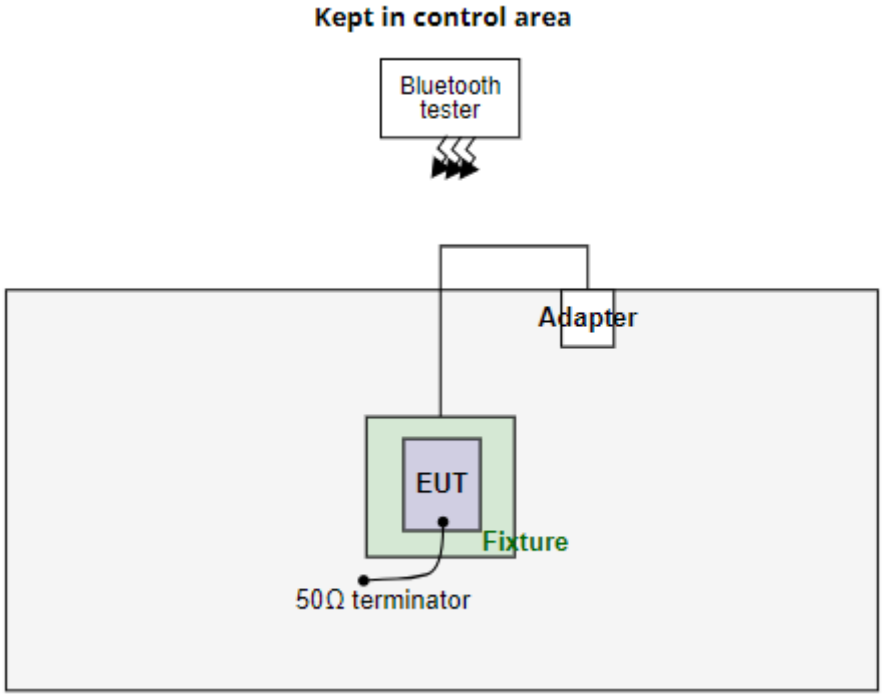
**Test Setup Diagram (Radiated Test – Laird part number: 453-00184)**



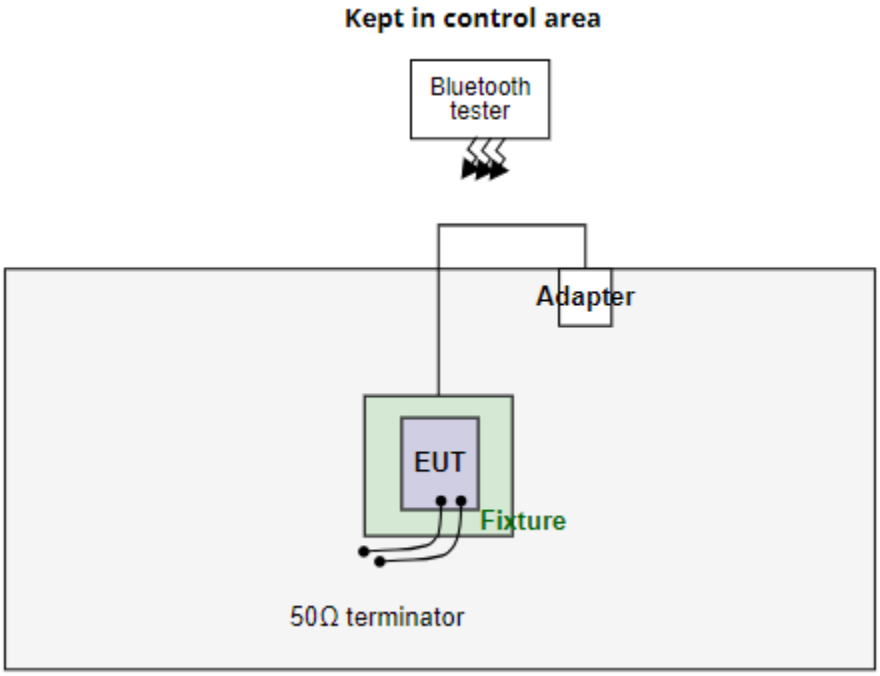

**Test Setup Diagram (Radiated Test –Laird part number: 453-00193)**



**Test Setup Diagram (Radiated Test – Laird part number: 453-00213)**




**Test Setup Diagram (Radiated Test –Laird part number: 453-00214)**



## 1.4 Test Equipment List and Calibration Data

| Test Item | Radiated Emissions | | | | |
|---|---|---|---|---|---|
| **Test Site** | Fully –anechoic chamber 2 / (05CH02-WS) | | | | |
| **Test Date** | Oct. 30 ~ Nov. 04, 2024 | | | | |
| **Instrument** | **Brand** | **Model No.** | **Serial No.** | **Calibration Date** | **Calibration Until** |
| Spectrum Analyzer | Agilent | N9010A | MY52221474 | Nov. 14, 2023 | Nov. 13, 2024 |
| Bilog Antenna 30-1000MHz | SCHWARZBECK | VULB9168 | 9168-563 | Mar. 20, 2024 | Mar. 19, 2025 |
| Horn Antenna 1G-18G | SCHWARZBECK | BBHA 9120 D | 9120D-1205 | Feb. 16, 2024 | Feb. 15, 2025 |
| Preamplifier | Agilent | 83017A | MY53270013 | Feb. 19, 2024 | Feb. 18, 2025 |
| Preamplifier | EMC | EMC02325 | 980188 | Jan. 02, 2024 | Jan. 01, 2025 |
| RF Cable-1M | EMC | EMC104-35M-35M-1000 | S/N:210926 | Oct. 09, 2024 | Oct. 08, 2025 |
| RF Cable-1M | EMC | EMC104-35M-35M-1000 | S/N:210927 | Oct. 09, 2024 | Oct. 08, 2025 |
| RF cable-3M | HUBER+SUHNER | SUCOFLEX104 | MY22621/4 | Oct. 09, 2024 | Oct. 08, 2025 |
| RF cable-4M | HUBER+SUHNER | SUCOFLEX104 | MY32489/4 | Oct. 09, 2024 | Oct. 08, 2025 |
| LF cable-0.8M | EMC | EMC8D-NM-NM-800 | EMC8D-NM-NM-800-002 | Oct. 09, 2024 | Oct. 08, 2025 |
| LF cable-3M | EMC | EMC8D-NM-NM-3000 | 131102 | Oct. 09, 2024 | Oct. 08, 2025 |
| LF cable-10M | EMC | EMC8D-NM-NM-10000 | 131101 | Oct. 09, 2024 | Oct. 08, 2025 |
| Wireless connectivity tester | R&S | CMW270 | 100856 | Nov. 14, 2023 | Nov. 13, 2024 |
| Measurement Software | AUDIX | e3 | 6.120210g | NA | NA |
| Note: Calibration Interval of instruments listed above is one year. | | | | | |

| Test Item | RF Conducted | | | | |
|---|---|---|---|---|---|
| Test Site | (TH01-WS) | | | | |
| Test Date | Jun. 13, 2024 | | | | |
| **Instrument** | **Brand** | **Model No.** | **Serial No.** | **Calibration Date** | **Calibration Until** |
| Spectrum Analyzer | R&S | FSV40 | 101486 | Mar. 05, 2024 | Mar. 04, 2025 |
| Wireless connectivity tester | R&S | CMW270 | 100856 | Nov. 14, 2023 | Nov. 13, 2024 |
| TEMP&HUMIDITY CHAMBER | GIANT FORCE | GCT-225-40-SP-SD | MAF1212-002 | Jun. 21, 2023 | Jun. 20, 2024 |
| Power Sensor | Agilent | U2021XA | MY53480019 | Mar. 09, 2024 | Mar. 08, 2025 |
| Power Sensor | Agilent | U2021XA | MY53510003 | Mar. 09, 2024 | Mar. 08, 2025 |
| Power Sensor | Agilent | U2021XA | MY54070003 | Mar. 26, 2024 | Mar. 25, 2025 |
| Power Sensor | Agilent | U2021XA | MY54060013 | Mar. 26, 2024 | Mar. 25, 2025 |
| RF Cable-1M | EMC | EMC104-35M-35M-1000 | S/N:210928 | Oct. 13, 2023 | Oct. 12, 2024 |
| RF Cable-1M | EMC | EMC104-35M-35M-1000 | S/N:210929 | Oct. 13, 2023 | Oct. 12, 2024 |
| RF Cable-1M | EMC | EMC104-35M-35M-1000 | S/N:210930 | Oct. 13, 2023 | Oct. 12, 2024 |
| RF Cable-1M | EMC | EMC104-35M-35M-1000 | S/N:210931 | Oct. 13, 2023 | Oct. 12, 2024 |
| Measurement Software | Sporton | SENSE | 5.10.7 | NA | NA |
| Measurement Software | Agilent | EN RF test | 1.1501125 | NA | NA |
| Note: Calibration Interval of instruments listed above is one year. | | | | | |

| Test Item | Receiver Blocking | | | | |
|---|---|---|---|---|---|
| Test Site | 05CH01-WS | | | | |
| Test Date | Jun. 06, 2024 | | | | |
| **Instrument** | **Brand** | **Model No.** | **Serial No.** | **Calibration Date** | **Calibration Until** |
| Wireless connectivity tester | R&S | CMW270 | 100856 | Nov. 14, 2023 | Nov. 13, 2024 |
| Signal Generator | R&S | SMB100A | 175727 | May. 22, 2024 | May. 21, 2025 |
| RF cable-0.5M | HUBER+SUHNER | SUCOFLEX_104 | 500202/4 | Oct. 12, 2023 | Oct. 11, 2024 |
| RF cable-0.5M | HUBER+SUHNER | SUCOFLEX_104 | 296088/4 | Oct. 12, 2023 | Oct. 11, 2024 |
| RF cable-0.2M | HUBER+SUHNER | SUCOFLEX_104 | 329023/4 | Oct. 12, 2023 | Oct. 11, 2024 |
| Combiner(1X2) | WOKEN | 2WAYDIV | 12101200003 | Oct. 12, 2023 | Oct. 11, 2024 |
| Attenuator | woken | PE7013-10 | 10-1 | Oct. 13, 2023 | Oct. 12, 2024 |
| Attenuator | woken | PE7013-10 | 10-2 | Oct. 13, 2023 | Oct. 12, 2024 |
| Attenuator | woken | PE7013-20 | 20-1 | Oct. 13, 2023 | Oct. 12, 2024 |
| Attenuator | woken | PE7013-20 | 20-2 | Oct. 13, 2023 | Oct. 12, 2024 |
| 20dB Attenuator | MVE | MVE2462-20 | 16050401 | Oct. 13, 2023 | Oct. 12, 2024 |
| 30dB Attenuator | MVE | MVE2462-30 | 16050401 | Oct. 13, 2023 | Oct. 12, 2024 |
| Note: Calibration Interval of instruments listed above is one year. | | | | | |

## 1.5 Testing Applied Standards

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

EN 300 328 V2.2.2 (2019-07)

## 1.6 Deviation from Test Standard and Measurement Procedure

None

## 1.7 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

| Measurement Uncertainty | | |
|---|---|---|
| **Parameters** | **Uncertainty** | **Limit** |
| Occupied Channel Bandwidth | ±0.0034 % | ±5 % |
| RF output power (EIRP), conducted | ±0.592 dB | ±1.5 dB |
| Power Spectral Density, conducted | ±0.583 dB | ±3 dB |
| Unwanted Emissions, conducted | ±2.715 dB | ±3 dB |
| All emissions, radiated | ±3.14 dB | ±6 dB |
| Temperature | ±0.4 ºC | ±3 °C |
| Supply voltages | ±0.15 % | ±3 % |
| Time | ±0.1 % | ±5 % |

# 2 Test Configuration

## 2.1 Testing Facility

| | |
|---|---|
| **Test Laboratory** | International Certification Corporation |
| **Test Site** | TH01-WS, 05CH01-WS |
| **Address of Test Site** | No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.) |
| **Test Site** | 05CH02-WS |
| **Address of Test Site** | No.14-1, Lane 19, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.) |

## 2.2 The Worst Test Modes and Channel Details

| Test item | Modulation Mode | Test Frequency (MHz) | Data Rate | Test method | Mode | Test Configuration | Note |
|---|---|---|---|---|---|---|---|
| RF Output Power (EIRP) | GFSK<br>8DPSK | Hopping<br>Hopping | 1 Mbps<br>3 Mbps | Conducted | TX | 1, 2, 3 , 4 | - |
| Accumulated Transmit Time<br>Minimum Frequency Occupation<br>Hopping Sequence<br>Transmitter unwanted emissions in the OOB domain | GFSK<br>8DPSK | Hopping<br>Hopping | 1 Mbps<br>3 Mbps | Conducted | TX | 1 | - |
| Hopping Frequency Separation | GFSK<br>8DPSK | Hopping<br>Hopping | 1 Mbps<br>3 Mbps | Conducted | TX | 1 | - |
| Occupied Channel Bandwidth | GFSK<br>8DPSK | 2402 / 2441 / 2480<br>2402 / 2441 / 2480 | 1 Mbps<br>3 Mbps | Conducted | TX | 1 | - |
| Transmitter Spurious Emissions | GFSK<br>8DPSK | 2402 / 2480<br>2402 / 2480 | 1 Mbps<br>3 Mbps | Conducted | TX | 1 | - |
| | | | | Radiated | | | Note 2 |
| Receiver Spurious Emissions | GFSK<br>8DPSK | 2402 / 2480<br>2402 / 2480 | 1 Mbps<br>3 Mbps | Conducted | RX | 1 | - |
| | | | | Radiated | | | Note 2 |
| Receiver Blocking | GFSK | Hopping | 1 Mbps | Conducted | RX | 1 | - |
| Adaptivity | GFSK<br>8DPSK | 2402 / 2480<br>2402 / 2480 | 1 Mbps<br>3 Mbps | Conducted | TX | 1 | - |

**NOTE:**

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Z-plane** result was found as the worst case and was shown in this report.
2. The 50Ω terminator is connected to antenna port of EUT for radiated emission measurement.
3. Test configurations are listed as below:

   Configuration 1: Laird part number: 453-00184

   Configuration 2: Laird part number: 453-00193

   Configuration 3: Laird part number: 453-00213

   Configuration 4: Laird part number: 453-00214

# 3 Transmitter Test Results

## 3.1 RF Output Power (EIRP)

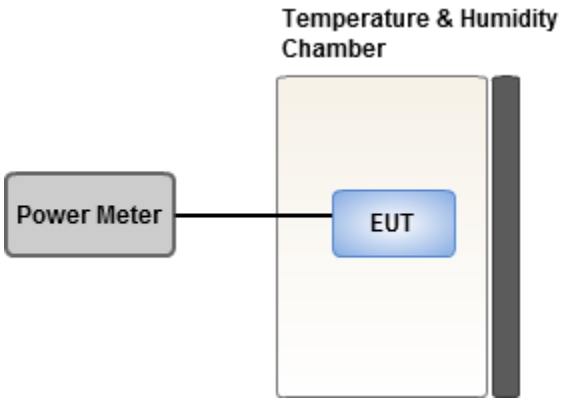
### 3.1.1 Limit of RF Output Power (EIRP)

The maximum RF output power (EIRP) shall be equal to or less than 20 dBm

### 3.1.2 Test Procedures

Reference to clause 5.4.2.2 of ETSI EN 300 328 V2.2.2 (2019-07).

### 3.1.3 Test Setup




### 3.1.4 Test Results

| | | | |
|---|---|---|---|
| **Ambient Condition** | 24°C / 70% | **Tested By** | Jack Li |

Refer to Appendix A.

## 3.2 Accumulated Transmit Time, Minimum Frequency Occupation and Hopping Sequence

### 3.2.1 Limit of Accumulated Transmit Time, Minimum Frequency Occupation and Hopping Sequence

Adaptive mode

Adaptive Frequency Hopping equipment shall be capable of operating over a minimum of 70 % of the band 2.4GHz to 2.4835GHz. The Accumulated Transmit Time on any hopping frequency shall not be greater than 400 ms within any observation period of 400 ms multiplied by the minimum number of hopping frequencies (N) that have to be used. In order for the equipment to comply with the Frequency Occupation requirement, it shall meet either of the following two options:

Option 1: Each hopping frequency of the hopping sequence shall be occupied at least once within a period not exceeding four times the product of the dwell time and the number of hopping frequencies in use.

Option 2: The occupation probability for each frequency shall be between ((1 / U) × 25 %) and 77 % where U is the number of hopping frequencies in use. The hopping sequence(s) shall contain at least N hopping frequencies at all times, where N is 15 or 15 divided by the minimum Hopping Frequency Separation in MHz, whichever is the greater.

Non-Adaptive mode

The Accumulated Transmit Time on any hopping frequency shall not be greater than 15 ms within any observation period of 15 ms multiplied by the minimum number of hopping frequencies (N) that have to be used. Non-adaptive medical devices requiring reverse compatibility with other medical devices placed on the market that are compliant with version 1.7.1 or earlier versions of ETSI EN 300 328, are allowed to have an operating mode in which the maximum Accumulated Transmit Time is 400 ms within any observation period of 400 ms multiplied by the minimum number of hopping frequencies (N) that have to be used, only when communicating to these legacy devices already placed on the market. In order for the equipment to comply with the Frequency Occupation requirement, it shall meet either of the following two options:

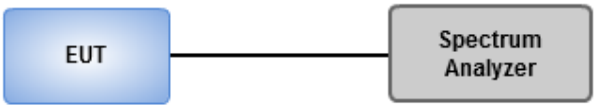
Option 1: Each hopping frequency of the hopping sequence shall be occupied at least once within a period not exceeding four times the product of the dwell time and the number of hopping frequencies in use.

Option 2: The occupation probability for each frequency shall be between ((1 / U) × 25 %) and 77 % where U is the number of hopping frequencies in use. The hopping sequence(s) shall contain at least N hopping frequencies where N is 15 or 15 divided by the minimum Hopping Frequency Separation in MHz, whichever is the greater.

### 3.2.2 Test Procedures

Reference to clause 5.4.4.2 of ETSI EN 300 328 V2.2.2 (2019-07).

### 3.2.3 Test Setup




### 3.2.4 Test Results

| | | | |
|---|---|---|---|
| **Ambient Condition** | 24°C / 70% | **Tested By** | Jack Li |

Refer to Appendix B.

## 3.3 Hopping Frequency Separation

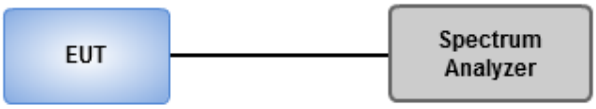
### 3.3.1 Limit of Hopping Frequency Separation

For adaptive Frequency Hopping equipment, the minimum Hopping Frequency Separation shall be 100 kHz. For non-adaptive Frequency Hopping equipment, the Hopping Frequency Separation shall be equal or greater than the Occupied Channel Bandwidth, with a minimum separation of 100 kHz.

### 3.3.2 Test Procedures

Reference to clause 5.4.5.2 of ETSI EN 300 328 V2.2.2 (2019-07).

### 3.3.3 Test Setup




### 3.3.4 Test Results

| | | | |
|---|---|---|---|
| **Ambient Condition** | 24°C / 70% | **Tested By** | Jack Li |

Refer to Appendix C.

## 3.4 Occupied Channel Bandwidth

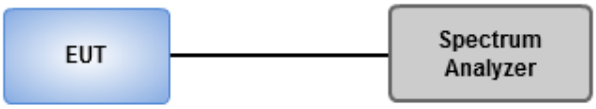
### 3.4.1 Limit of Occupied Channel Bandwidth

The Occupied Channel Bandwidth for each hopping frequency shall fall completely within 2.4~2.4835 GHz. For non-adaptive Frequency Hopping equipment with e.i.r.p greater than 10 dBm, the Occupied Channel Bandwidth for every occupied hopping frequency shall be equal to or less than the value declared by the supplier. This declared value shall not be greater than 5 MHz.

### 3.4.2 Test Procedures

Reference to clause 5.4.7.2 of ETSI EN 300 328 V2.2.2 (2019-07).

### 3.4.3 Test Setup



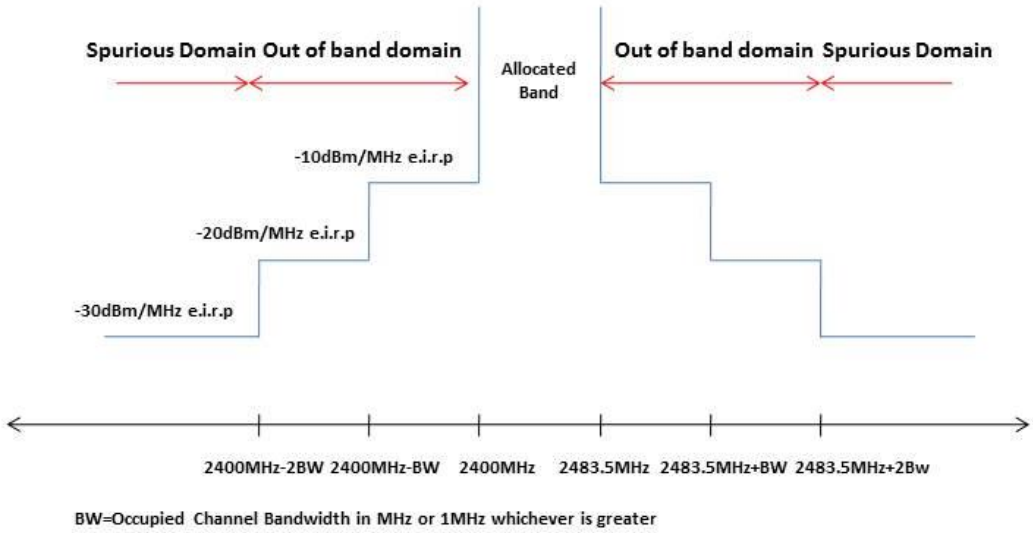

### 3.4.4 Test Results

| | | | |
|---|---|---|---|
| **Ambient Condition** | 24°C / 70% | **Tested By** | Jack Li |

Refer to Appendix D.

## 3.5 Transmitter Unwanted Emissions in the Out-Of-Band Domain

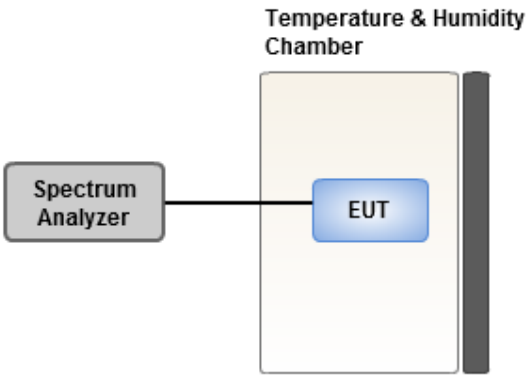
### 3.5.1 Limit of Transmitter Unwanted Emissions in the Out-Of-Band Domain




### 3.5.2 Test Procedures

Reference to clause 5.4.8.2 of ETSI EN 300 328 V2.2.2 (2019-07).

### 3.5.3 Test Setup




### 3.5.4 Test Results

| | | | |
|---|---|---|---|
| **Ambient Condition** | 24°C / 70% | **Tested By** | Jack Li |

Refer to Appendix E.

## 3.6 Transmitter Unwanted Emissions in the Spurious Domain

### 3.6.1 Limit of Transmitter Unwanted Emissions in the Spurious Domain

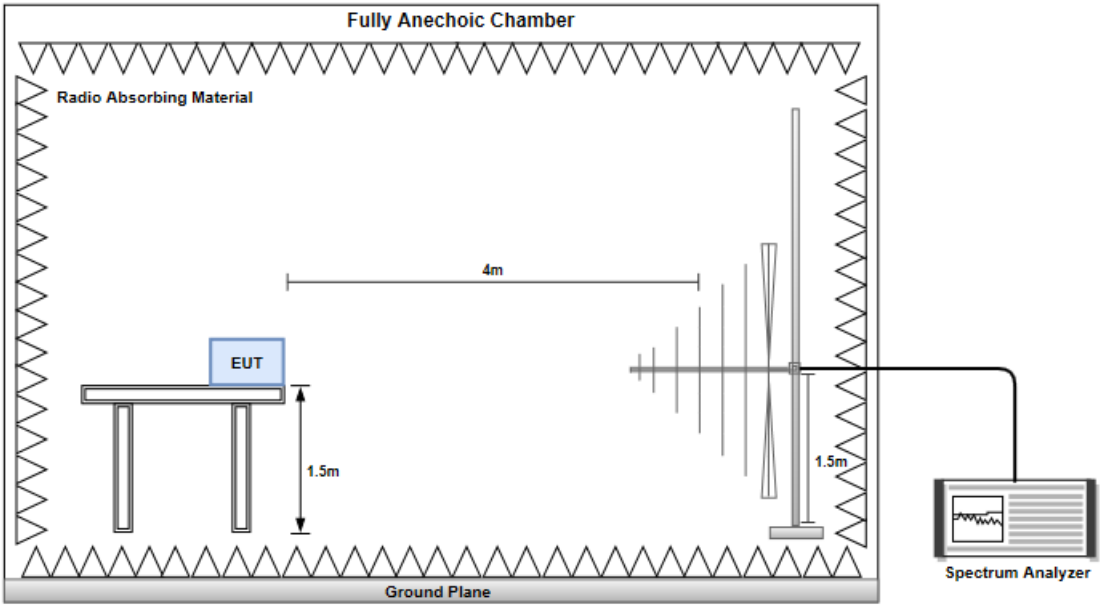
| Frequency Range (MHz) | Maximum power (dBm) | Bandwidth (kHz) |
|---|---|---|
| 30 to 47 | -36 | 100 |
| 47 to 74 | -54 | 100 |
| 74 to 87,5 | -36 | 100 |
| 87,5 to 118 | -54 | 100 |
| 118 to 174 | -36 | 100 |
| 174 to 230 | -54 | 100 |
| 230 to 470 | -36 | 100 |
| 470 to 694 | -54 | 100 |
| 694 to 1000 | -36 | 100 |
| 1000 to 12750 | -30 | 1000 |

### 3.6.2 Test Procedures

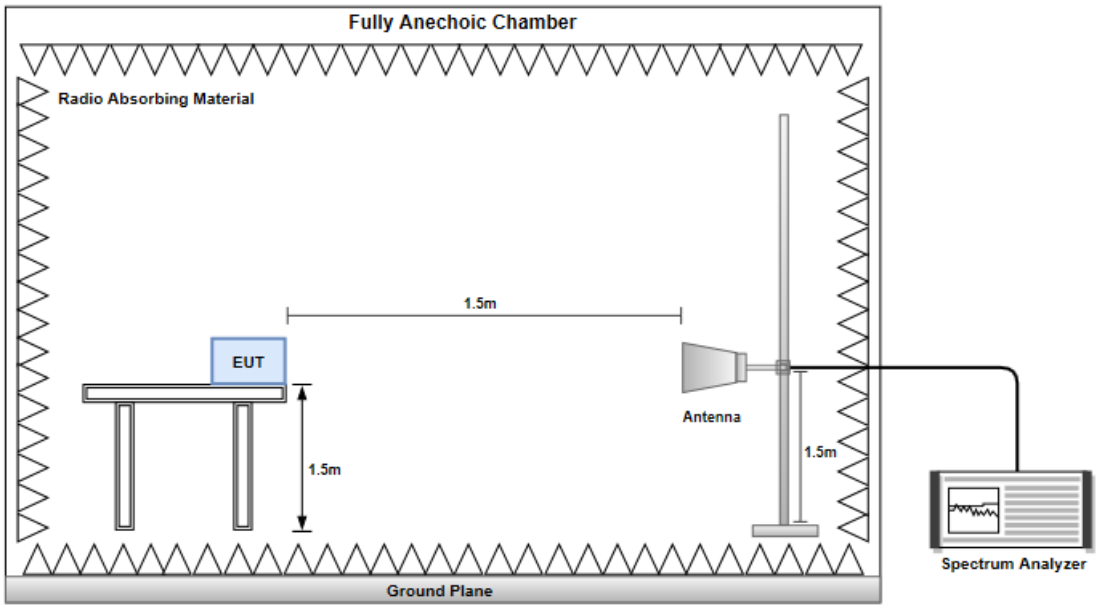
Reference to clause 5.4.9.2 of ETSI EN 300 328 V2.2.2 (2019-07).

### 3.6.3 Test Setup

**Below 1GHz**




**Above 1 GHz**




### 3.6.4 Test Results

Refer to Appendix F.

# 4 Receiver Test Results

## 4.1 Receiver Spurious Emissions

### 4.1.1 Limit of Receiver Spurious Emissions

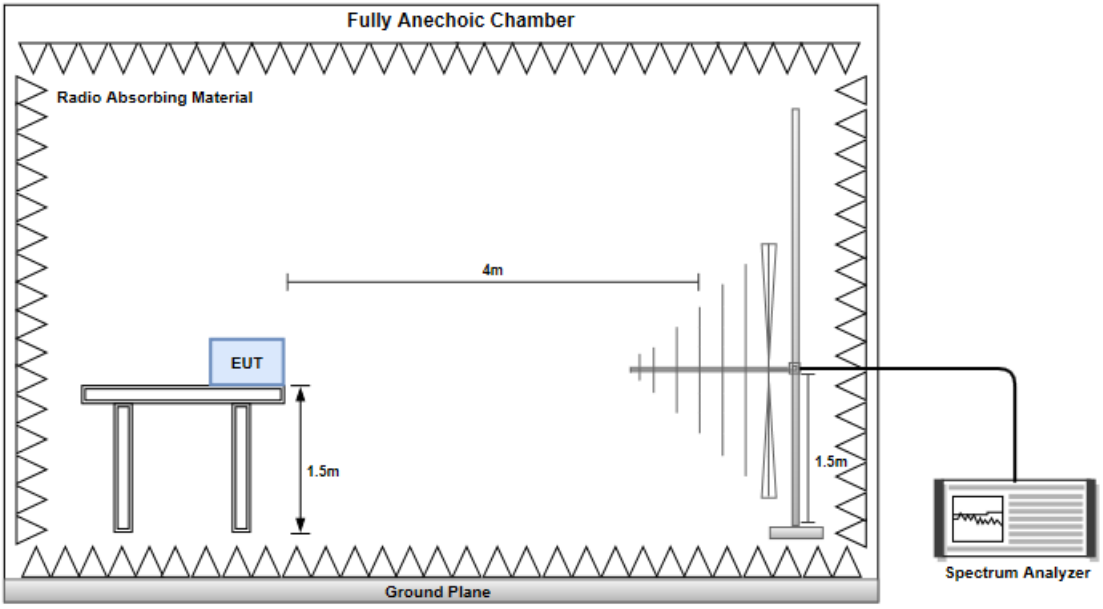
| Frequency Range | Maximum power (dBm) | Measurement bandwidth(kHz) |
|---|---|---|
| 30 MHz to 1 GHz | -57 | 100 |
| Above 1 GHz to 12,75 GHz | -47 | 1000 |

### 4.1.2 Test Procedures

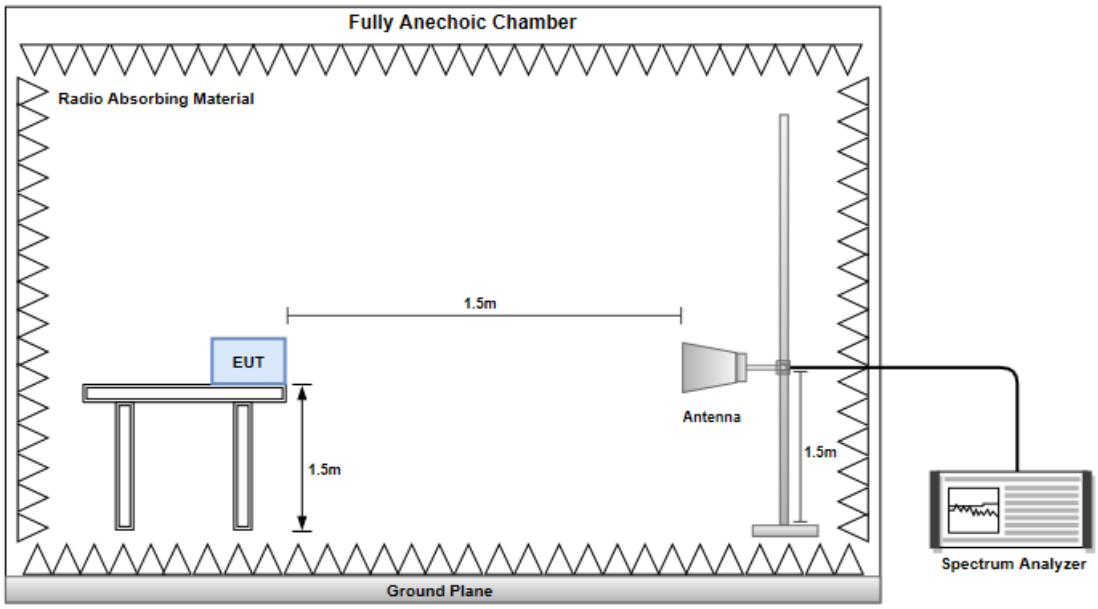
Reference to clause 5.4.10.2 of ETSI EN 300 328 V2.2.2 (2019-07).

### 4.1.3 Test Setup

**Below 1GHz**




**Above 1 GHz**




### 4.1.4 Test Results

Refer to Appendix G.

# 5 Receiver Blocking Test Results

## 5.1 Receiver Blocking

### 5.1.1 Limit of Receiver Blocking

| Receiver Blocking Parameters for Receiver Category 1 Equipment Limit | | | |
|---|---|---|---|
| **Wanted Signal Mean Power from Companion Device (dBm) (see notes 1 and 4)** | **Blocking Signal Frequency (MHz)** | **Blocking Signal Power (dBm) (see note 4)** | **Type of Blocking Signal** |
| (-133 dBm + 10 × log10(OCBW)) or -68 dBm whichever is less (see note 2) | 2 380<br>2 504 | -34 | CW |
| (-139 dBm + 10 × log10(OCBW)) or -74 dBm whichever is less (see note 3) | 2 300<br>2 330<br>2 360<br>2 524<br>2 584<br>2 674 | | |

Note 1: OCBW is in Hz.
Note 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{min}$ + 26 dB where $P_{min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.
Note 3: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{min}$ + 20 dB where $P_{min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.
Note 4: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned.

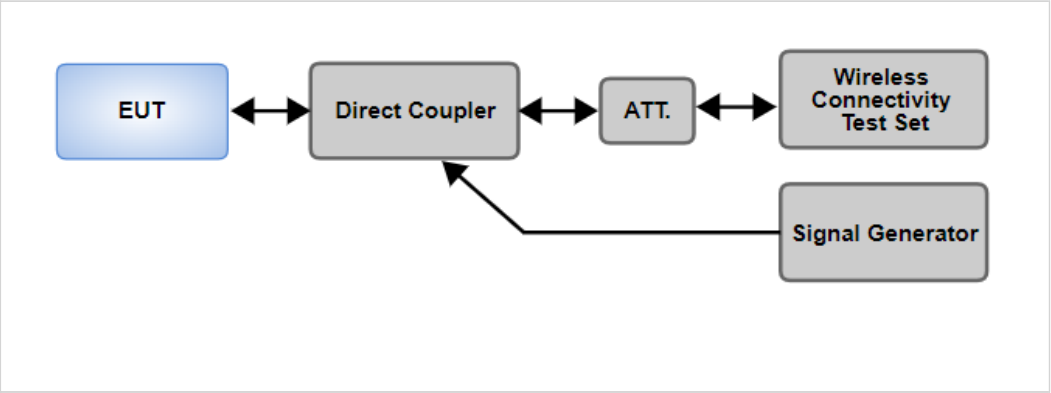
| Receiver Blocking Parameters for Receiver Category 2 Equipment Limit | | | |
|---|---|---|---|
| **Wanted Signal Mean Power from Companion Device (dBm) (see notes 1 and 3)** | **Blocking Signal Frequency (MHz)** | **Blocking Signal Power (dBm) (see note 3)** | **Type of Blocking Signal** |
| (-139 dBm + 10 × log10(OCBW) + 10 dB) or (-74 dBm + 10 dB) whichever is less (see note 2) | 2 380<br>2 504<br>2 300<br>2 584 | -34 | CW |
| Note 1: OCBW is in Hz.<br>Note 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{min}$ + 26 dB where $P_{min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.<br>Note 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned. | | | |

| Receiver Blocking Parameters for Receiver Category 3 Equipment Limit | | | |
|---|---|---|---|
| **Wanted Signal Mean Power from Companion Device (dBm) (see notes 1 and 3)** | **Blocking Signal Frequency (MHz)** | **Blocking Signal Power (dBm) (see note 3)** | **Type of Blocking Signal** |
| (-139 dBm + 10 × log10(OCBW) + 20 dB) or (-74 dBm + 20 dB) whichever is less | 2 380<br>2 504<br>2 300<br>2 584 | -34 | CW |
| Note 1: OCBW is in Hz.<br>Note 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative the test may be performed using a wanted signal up to $P_{min}$ + 30 dB where $P_{min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal<br>Note 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned. | | | |

### 5.1.2 Test Procedures

Reference to clause 5.4.11.2 of ETSI EN 300 328 V2.2.2 (2019-07).

### 5.1.3 Test Setup



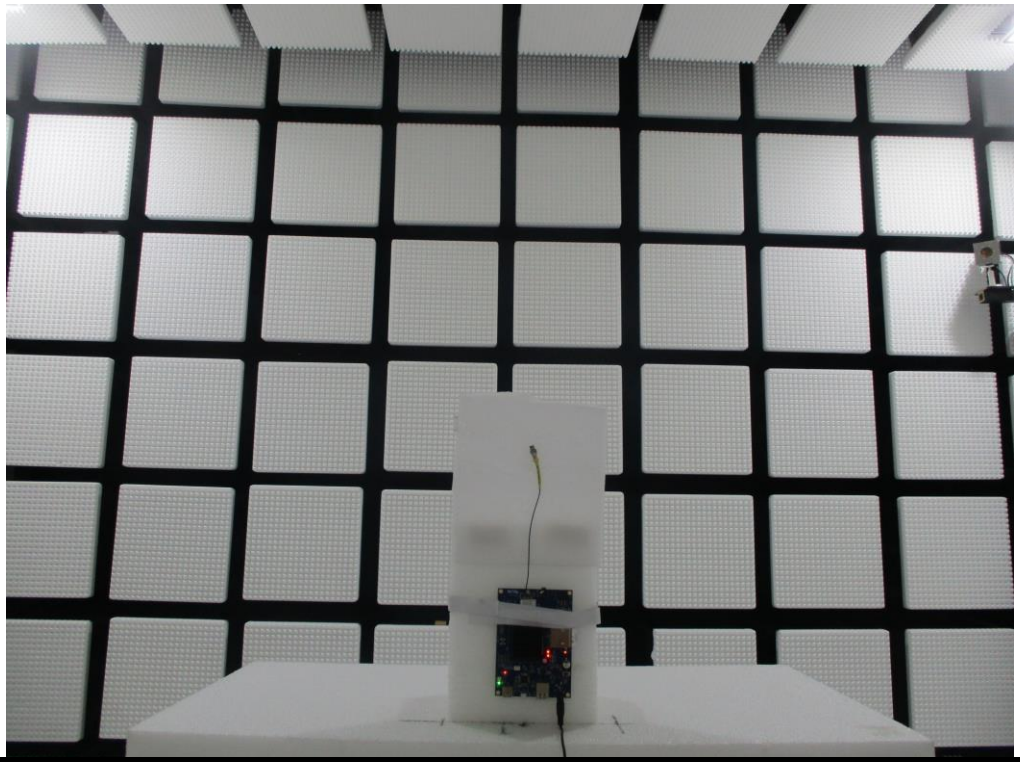

### 5.1.4 Test Results

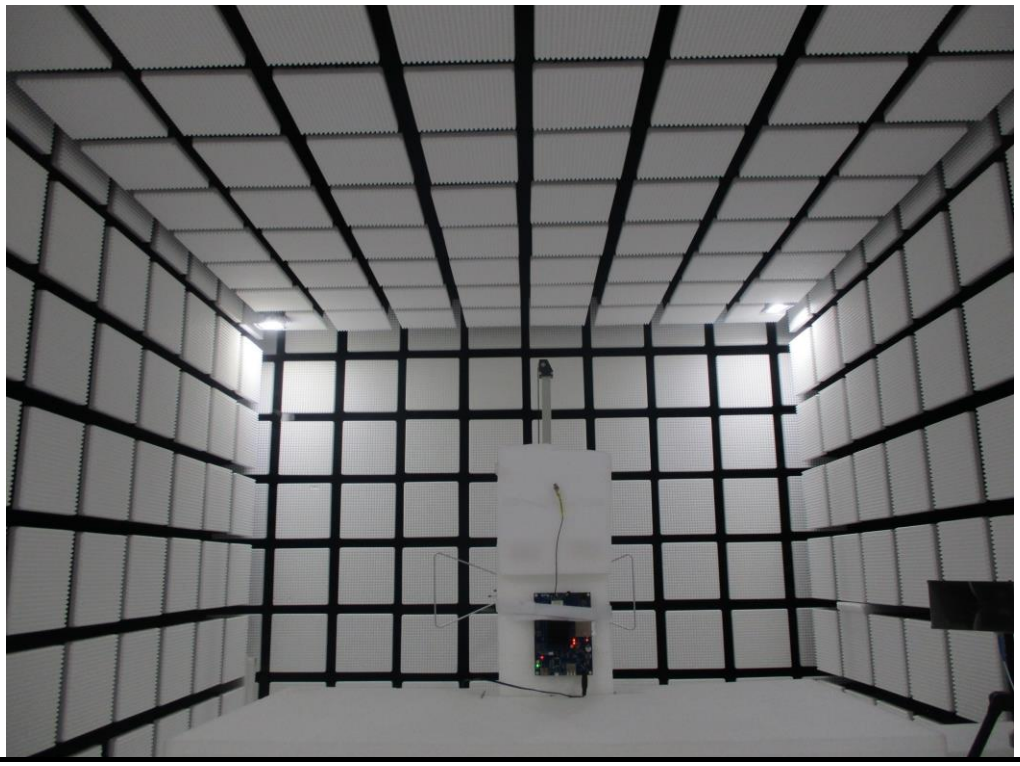
| | | | |
|---|---|---|---|
| **Ambient Condition** | 25°C / 65% | **Tested By** | Jack Li |

Refer to Appendix H.

# 6 Photographs of the Test Configuration

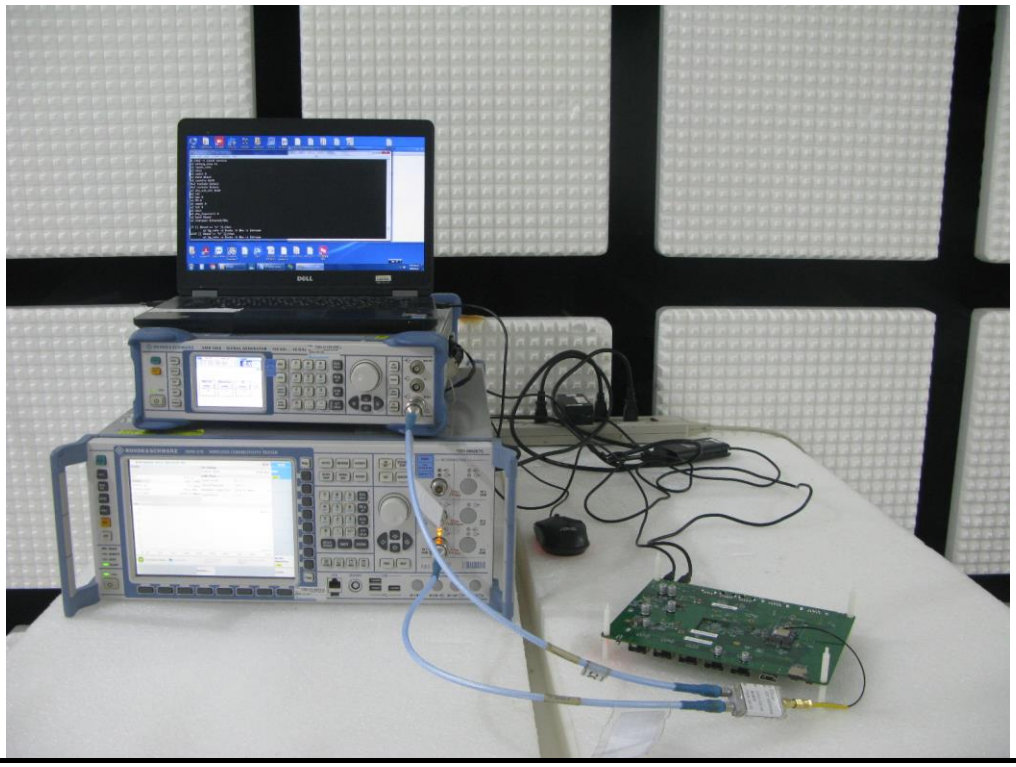
**Spurious Emission Test (RSE)**





**Spurious Emission Test (CSE)**

**Receiver Blocking Test**



# 7 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corporation (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website http://www.icertifi.com.tw.

**Linkou**

Tel: 886-2-2601-1640

No.30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan (R.O.C.)

**Kwei Shan**

Tel: 886-3-271-8666

No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

No.2-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

**Kwei Shan Site II**

Tel: 886-3-271-8640

No.14-1, Lane 19, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666
Fax: 886-3-318-0345
Email: ICC_Service@icertifi.com.tw

**══END══**

## *Configuration 1: Laird part number: 453-00184*

| Condition | Modulation Mode | Freq. (MHz) | EIRP Power(dBm) | Limit (dBm) |
|---|---|---|---|---|
| TnomVnom | BR-1Mbps | Hopping | 9.31 | 20 |
| TminVnom | BR-1Mbps | Hopping | 9.68 | 20 |
| TmaxVnom | BR-1Mbps | Hopping | 9.05 | 20 |
| TnomVnom | EDR-3Mbps | Hopping | 5.27 | 20 |
| TminVnom | EDR-3Mbps | Hopping | 5.62 | 20 |
| TmaxVnom | EDR-3Mbps | Hopping | 4.99 | 20 |

Note: EIRP = Measured conducted power + Antenna gain.

**Summary**

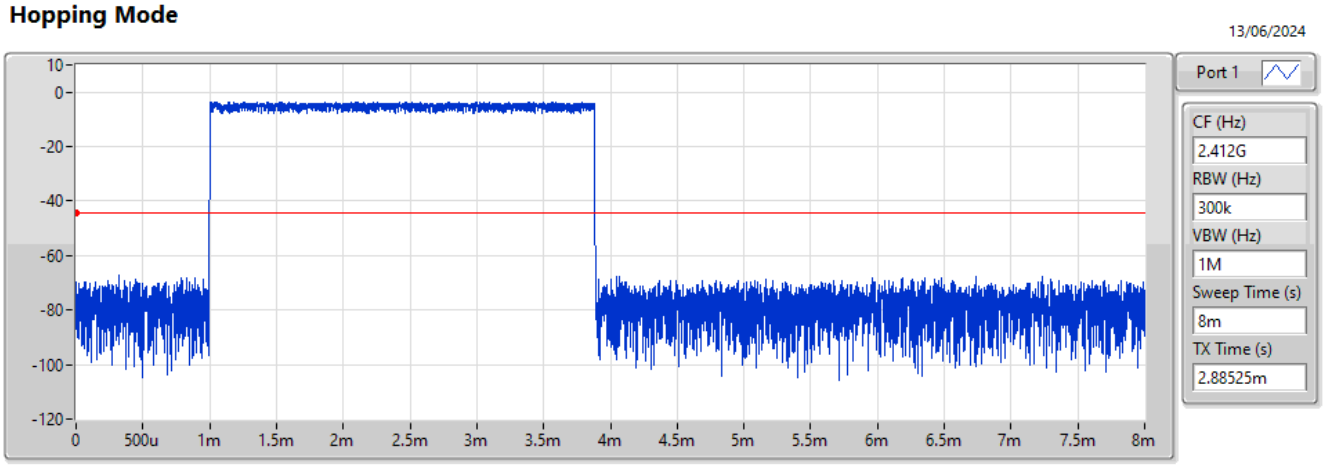
| **2.4-2.4835GHz** | **-** |
|---|---|
| BT-BR(1Mbps) | 153.897047m |
| BT-EDR(3Mbps) | 154.17703m |

**Result**

| **Mode** | **Result** | **Function** | **Hopping Ch** | **ATT Period (s)** | **ATT (s)** | **ATT Limit (s)** | **Dwell/Ch (s)** | **FO Period (s)** | **FO (Hop)** | **FO Limit (Hop)** |
|---|---|---|---|---|---|---|---|---|---|---|
| BT-BR(1Mbps) | - | - | - | - | - | - | - | - | - | - |
| Hopping Mode_Tnom | Pass | Non-AFH | 79 | 1.185 | 11.541m | 15m | 3.75m | 1.185 | 4 | 1 |
| Hopping Mode_Tnom | Pass | AFH | 20 | 8 | 153.897047m | 400m | 7.5m | 600m | 4 | 1 |
| BT-EDR(3Mbps) | - | - | - | - | - | - | - | - | - | - |
| Hopping Mode_Tnom | Pass | Non-AFH | 79 | 1.185 | 11.563m | 15m | 3.75m | 1.185 | 4 | 1 |
| Hopping Mode_Tnom | Pass | AFH | 20 | 8 | 154.17703m | 400m | 7.5m | 600m | 4 | 1 |

**2.4-2.4835GHz_BT-BR(1Mbps)** **ATT-FS Non-AFH**

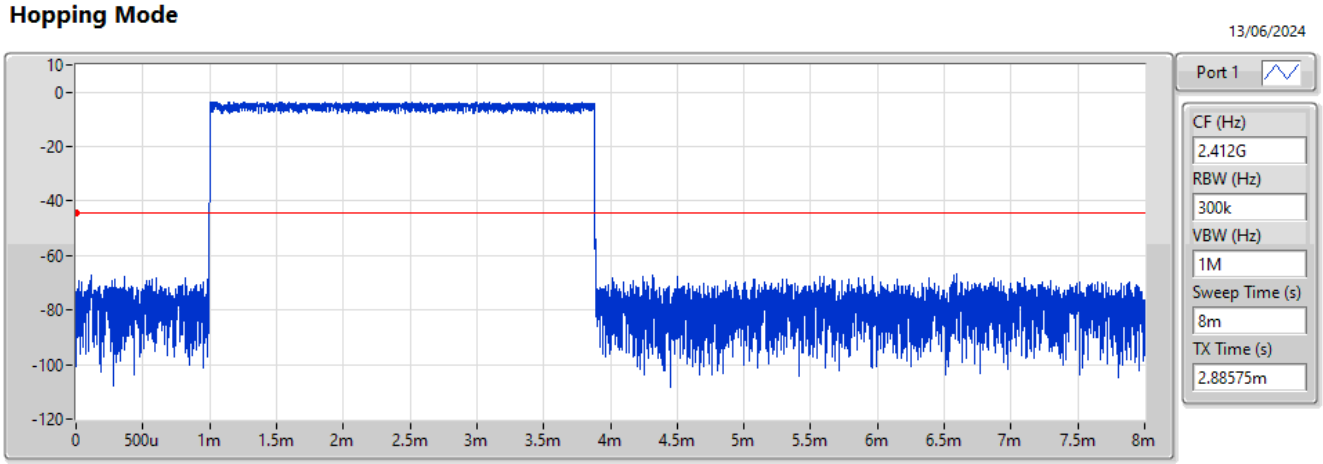
**Hopping Mode**




| Function | Hopping Ch | ATT Period(s) | ATT(s) | ATT Limit(s) | Dwell/Ch(s) | FO Period(s) | FO(Hop) | FO Limit(Hop) |
|---|---|---|---|---|---|---|---|---|
| Non-AFH | 79 | 1.185 | 11.541m | 15m | 3.75m | 1.185 | 4 | 1 |

**2.4-2.4835GHz_BT-BR(1Mbps)** **ATT-FS AFH**

**Hopping Mode**

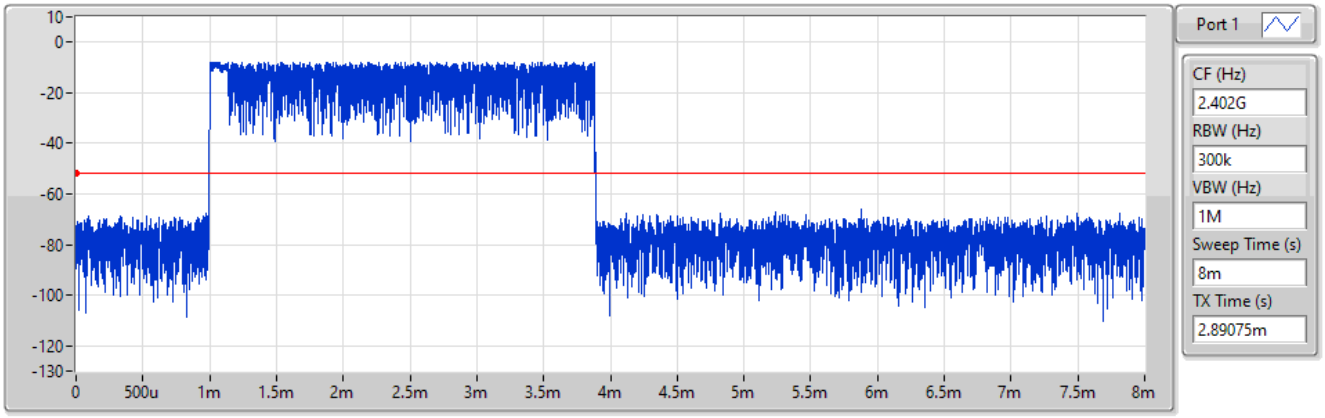



| Function | Hopping Ch | ATT Period(s) | ATT(s) | ATT Limit(s) | Dwell/Ch(s) | FO Period(s) | FO(Hop) | FO Limit(Hop) |
|---|---|---|---|---|---|---|---|---|
| AFH | 20 | 8 | 153.897047m | 400m | 7.5m | 600m | 4 | 1 |

**2.4-2.4835GHz_BT-EDR(3Mbps)** **ATT-FS Non-AFH**

**Hopping Mode**

13/06/2024

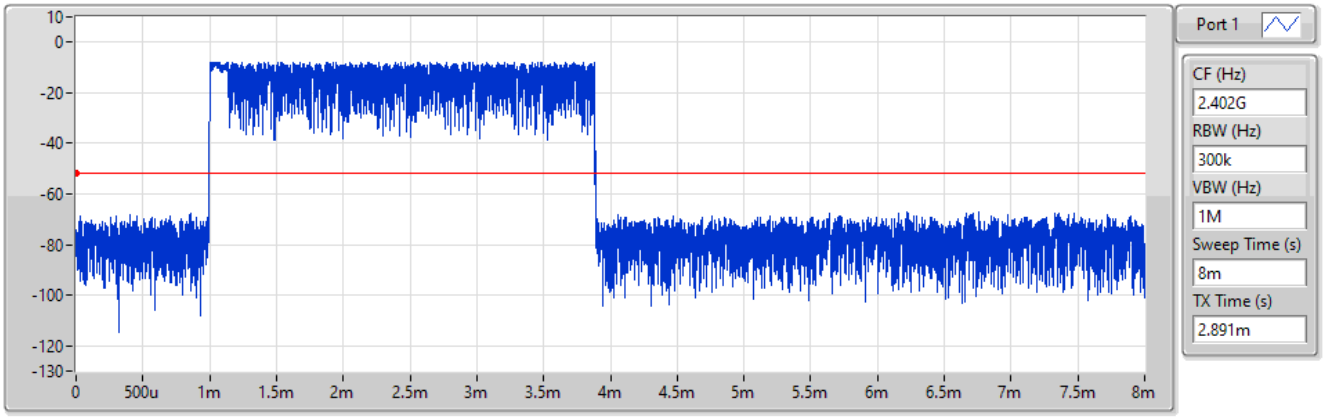



| Function | Hopping Ch | ATT Period(s) | ATT(s) | ATT Limit(s) | Dwell/Ch(s) | FO Period(s) | FO(Hop) | FO Limit(Hop) |
|---|---|---|---|---|---|---|---|---|
| Non-AFH | 79 | 1.185 | 11.563m | 15m | 3.75m | 1.185 | 4 | 1 |

**2.4-2.4835GHz_BT-EDR(3Mbps)** **ATT-FS AFH**

**Hopping Mode**

13/06/2024




| Function | Hopping Ch | ATT Period(s) | ATT(s) | ATT Limit(s) | Dwell/Ch(s) | FO Period(s) | FO(Hop) | FO Limit(Hop) |
|---|---|---|---|---|---|---|---|---|
| AFH | 20 | 8 | 154.17703m | 400m | 7.5m | 600m | 4 | 1 |

**Summary**

| Mode<br>2.4-2.4835GHz | Max-Hop No<br>- |
|---|---|
| BT-BR(1Mbps) | 79 |
| BT-EDR(3Mbps) | 79 |

**Result**

| Mode<br>BT-BR(1Mbps) | Result<br>- | Hopping No<br>- | Limit<br>- |
|---|---|---|---|
| Hopping Mode_Tnom | Pass | 79 | 15 |
| BT-EDR(3Mbps) | - | - | - |
| Hopping Mode_Tnom | Pass | 79 | 15 |

**Summary**

| Mode | Max-Space (Hz) | Min-Space (Hz) |
|---|---|---|
| 2.4-2.4835GHz | - | - |
| BT-BR(1Mbps) | 841.5k | 841.5k |
| BT-EDR(3Mbps) | 997.5k | 997.5k |

**Result**

| Mode | Result | Fl (Hz) | Fh (Hz) | Ch.Space (Hz) | Limit (Hz) |
|---|---|---|---|---|---|
| BT-BR(1Mbps) | - | - | - | - | - |
| Hopping_Mode_Tnom | Pass | 2.441151G | 2.441992G | 841.5k | 100k |
| BT-EDR(3Mbps) | - | - | - | - | - |
| Hopping_Mode_Tnom | Pass | 2.440993G | 2.441991G | 997.5k | 100k |

**2.4-2.4835GHz_BT-BR(1Mbps)** **Channel Separation-FS**

**2.441G/2.442GHz**

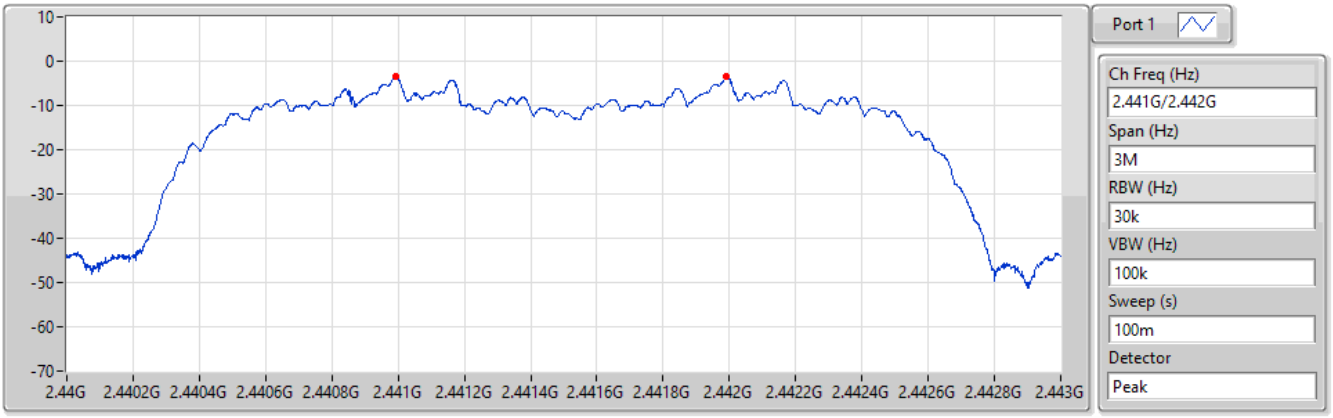
13/06/2024

| Fl(Hz) | Fh(Hz) | Ch.Space(Hz) |
|---|---|---|
| 2.441151G | 2.441992G | 841.5k |

**2.4-2.4835GHz_BT-EDR(3Mbps)** **Channel Separation-FS**

**2.441G/2.442GHz**

13/06/2024




| Fl(Hz) | Fh(Hz) | Ch.Space(Hz) |
|---|---|---|
| 2.440993G | 2.441991G | 997.5k |

**Summary**

| Mode | OBW (Hz) | ITU-Code |
|---|---|---|
| 2.4-2.4835GHz | - | - |
| BT-BR(1Mbps) | 877.295k | 877KF1D |
| BT-EDR(3Mbps) | 1.216M | 1M22G1D |

OBW = 99% occupied bandwidth

**Result**

| Mode | Result | Limit (Hz) | fl-OBW (Hz) | fh-OBW (Hz) | OBW (Hz) | N dB (Hz) |
|---|---|---|---|---|---|---|
| BT-BR(1Mbps) | - | - | - | - | - | - |
| 2402MHz_Tnom | Pass | 2.4-2.4835G | 2.401571G | 2.402447G | 875.7k | 923k |
| 2441MHz_Tnom | Pass | 2.4-2.4835G | 2.440563G | 2.44144G | 877.053k | 923k |
| 2480MHz_Tnom | Pass | 2.4-2.4835G | 2.479556G | 2.480434G | 877.295k | 922k |
| BT-EDR(3Mbps) | - | - | - | - | - | - |
| 2402MHz_Tnom | Pass | 2.4-2.4835G | 2.401401G | 2.402614G | 1.213M | 1.362M |
| 2441MHz_Tnom | Pass | 2.4-2.4835G | 2.440393G | 2.441607G | 1.214M | 1.366M |
| 2480MHz_Tnom | Pass | 2.4-2.4835G | 2.479385G | 2.480601G | 1.216M | 1.368M |

fl-OBW = fl lower edge 99% occupied bandwidth; fh-OBW = fh higher edge 99% occupied bandwidth; OBW = 99% occupied bandwidth;
N dB = 20dB down bandwidth

**2.4-2.4835GHz_BT-BR(1Mbps)** **EBW-FS**

**2402MHz**

13/06/2024

| 20dB(Hz) | Fl-20dB(Hz) | Fh-20dB(Hz) | OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Port |
|---|---|---|---|---|---|---|---|
| 923k | 2.401559G | 2.402482G | 875.7k | 2.401571G | 2.402447G | 2.4-2.4835G | 1 |

**2.4-2.4835GHz_BT-BR(1Mbps)** **EBW-FS**

**2441MHz**

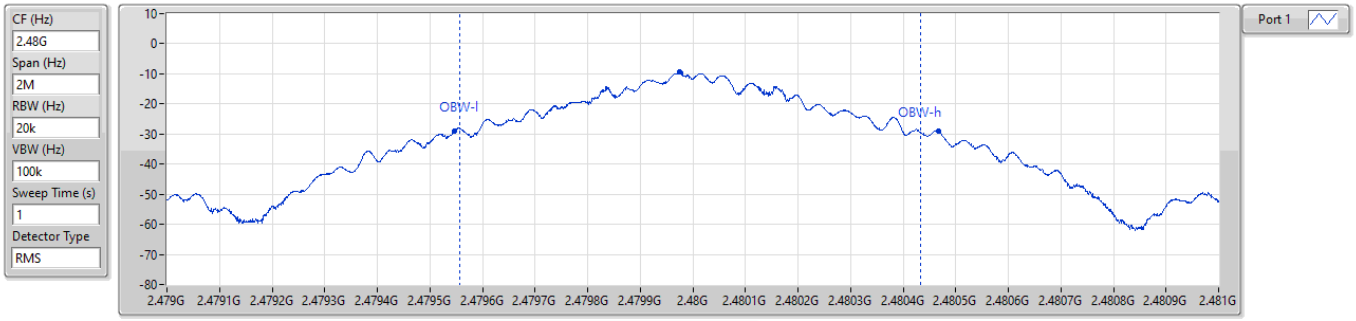
13/06/2024

| 20dB(Hz) | Fl-20dB(Hz) | Fh-20dB(Hz) | OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Port |
|---|---|---|---|---|---|---|---|
| 923k | 2.440552G | 2.441475G | 877.053k | 2.440563G | 2.44144G | 2.4-2.4835G | 1 |

**2.4-2.4835GHz_BT-BR(1Mbps)** **EBW-FS**

**2480MHz**

13/06/2024

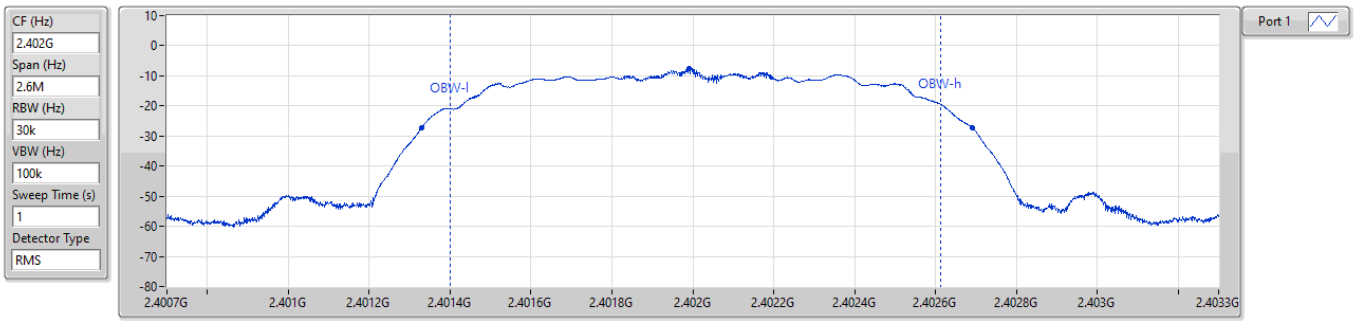



| 20dB(Hz) | Fl-20dB(Hz) | Fh-20dB(Hz) | OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Port |
|---|---|---|---|---|---|---|---|
| 922k | 2.479546G | 2.480468G | 877.295k | 2.479556G | 2.480434G | 2.4-2.4835G | 1 |

**2.4-2.4835GHz_BT-EDR(3Mbps)** **EBW-FS**

**2402MHz**

13/06/2024

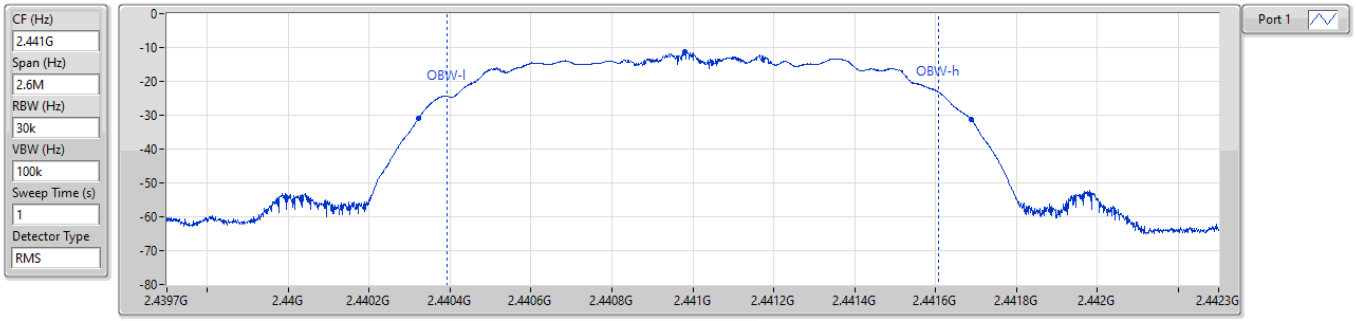



| 20dB(Hz) | Fl-20dB(Hz) | Fh-20dB(Hz) | OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Port |
|---|---|---|---|---|---|---|---|
| 1.362M | 2.401329G | 2.402692G | 1.213M | 2.401401G | 2.402614G | 2.4-2.4835G | 1 |

**2.4-2.4835GHz_BT-EDR(3Mbps)** **EBW-FS**

**2441MHz**

13/06/2024

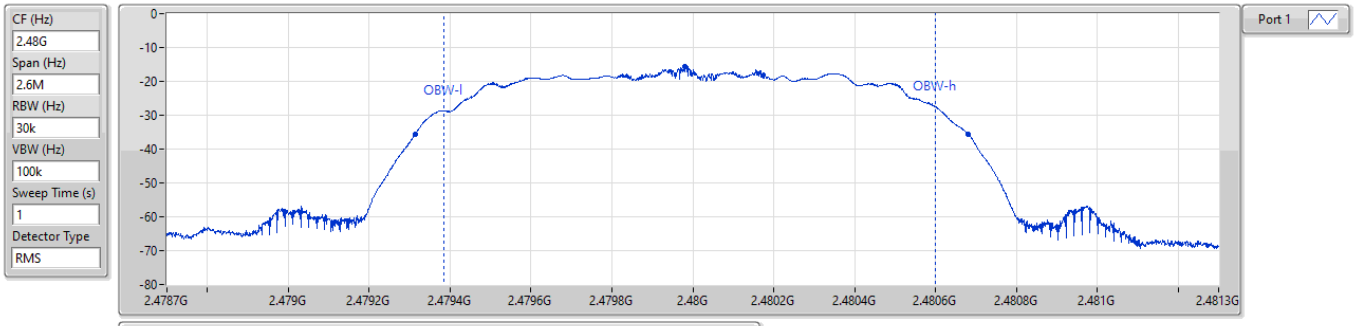



| 20dB(Hz) | Fl-20dB(Hz) | Fh-20dB(Hz) | OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Port |
|---|---|---|---|---|---|---|---|
| 1.366M | 2.440321G | 2.441688G | 1.214M | 2.440393G | 2.441607G | 2.4-2.4835G | 1 |

**2.4-2.4835GHz_BT-EDR(3Mbps)** **EBW-FS**

**2480MHz**

13/06/2024




| 20dB(Hz) | Fl-20dB(Hz) | Fh-20dB(Hz) | OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Port |
|---|---|---|---|---|---|---|---|
| 1.368M | 2.479314G | 2.480681G | 1.216M | 2.479385G | 2.480601G | 2.4-2.4835G | 1 |

**Summary**

| Mode | EIRP-A (dBm) | Limit-A (dBm) | EIRP-B (dBm) | Limit-B (dBm) |
|---|---|---|---|---|
| 2.4-2.4835GHz | - | - | - | - |
| BT-BR(1Mbps) | -48.92 | -10 | -47.39 | -20 |
| BT-EDR(3Mbps) | -48.17 | -10 | -47.5 | -20 |

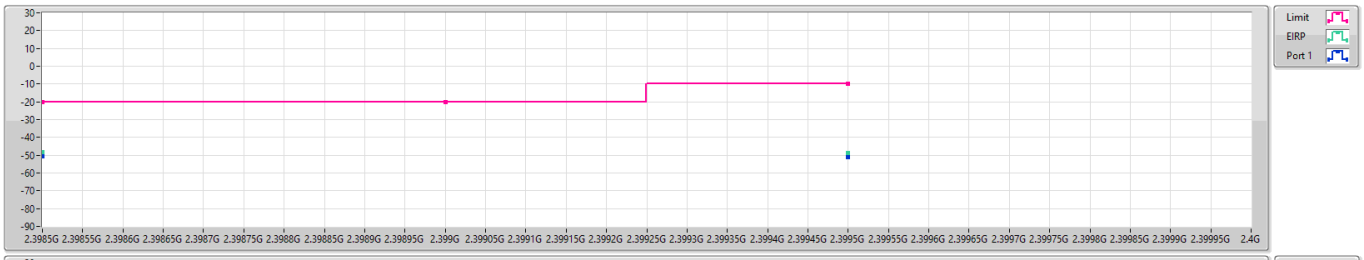
**Result**

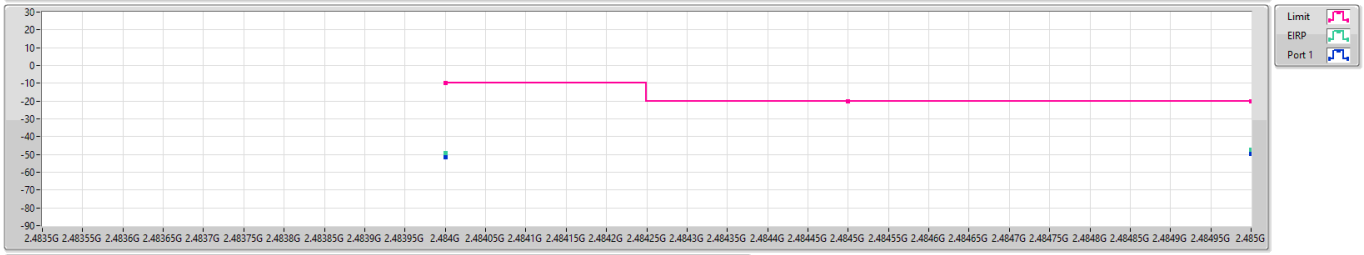
| Mode | Result | Freq (Hz) | EIRP (dBm) | Limit (dBm) | Freq (Hz) | EIRP (dBm) | Limit (dBm) |
|---|---|---|---|---|---|---|---|
| BT-BR(1Mbps) | - | - | - | - | - | - | - |
| Hopping Mode_Tnom | Pass | 2.3985G | -48.22 | -20 | 2.3995G | -48.92 | -10 |
| Hopping Mode_Tnom | Pass | 2.485G | -47.39 | -20 | 2.484G | -48.99 | -10 |
| BT-EDR(3Mbps) | - | - | - | - | - | - | - |
| Hopping Mode_Tnom | Pass | 2.3982G | -47.55 | -20 | 2.3992G | -48.17 | -10 |
| Hopping Mode_Tnom | Pass | 2.4856G | -47.50 | -20 | 2.484G | -48.43 | -10 |

**2.4-2.4835GHz_BT-BR(1Mbps)** **MASK-FS**

**Hopping Mode_Tnom**

13/06/2024



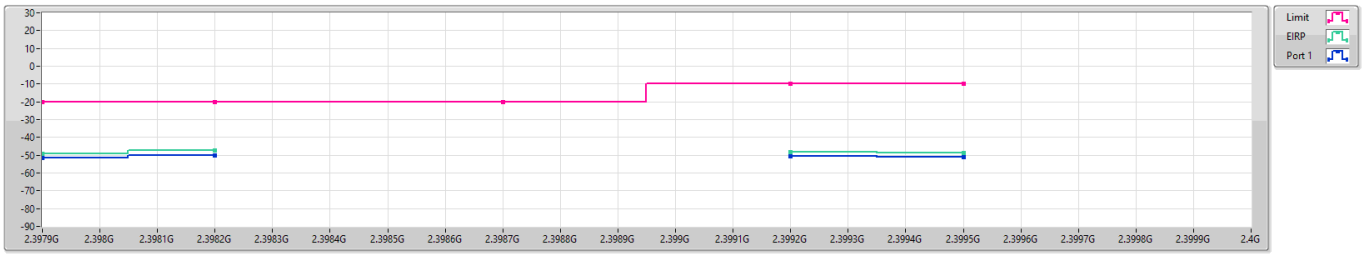



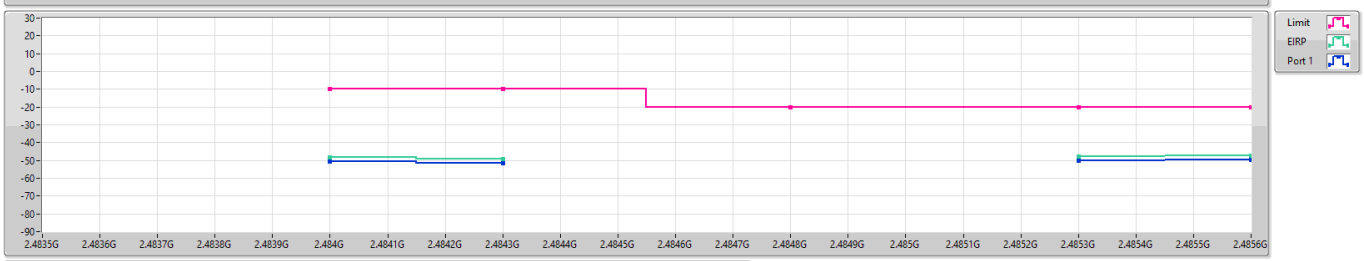

| Freq(Hz) | EIRP(dBm) | Limit(dBm) | Freq(Hz) | EIRP(dBm) | Limit(dBm) | Freq(Hz) | EIRP(dBm) | Limit(dBm) | Freq(Hz) | EIRP(dBm) | Limit(dBm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.3985G | -48.22 | -20 | 2.3995G | -48.92 | -10 | 2.484G | -48.99 | -10 | 2.485G | -47.39 | -20 |

**2.4-2.4835GHz_BT-EDR(3Mbps)** **MASK-FS**

**Hopping Mode_Tnom**

13/06/2024



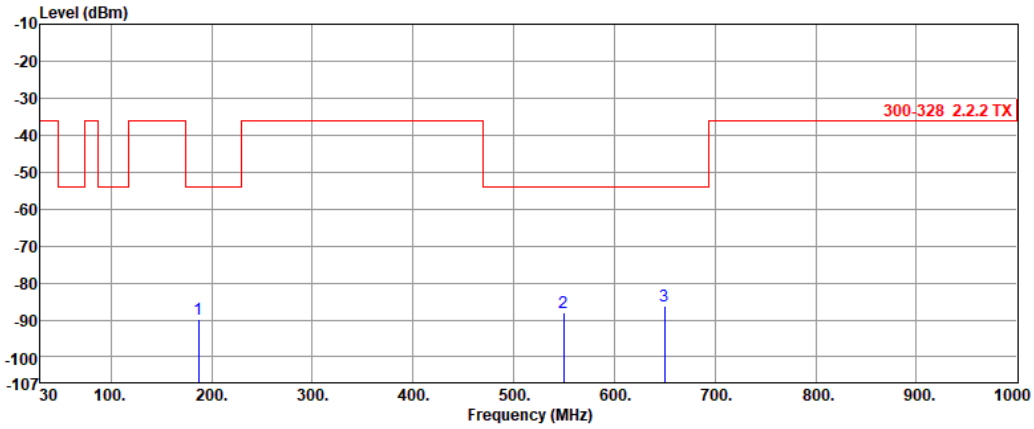




| Freq(Hz) | EIRP(dBm) | Limit(dBm) | Freq(Hz) | EIRP(dBm) | Limit(dBm) | Freq(Hz) | EIRP(dBm) | Limit(dBm) | Freq(Hz) | EIRP(dBm) | Limit(dBm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.3982G | -47.55 | -20 | 2.3992G | -48.17 | -10 | 2.484G | -48.43 | -10 | 2.4856G | -47.50 | -20 |

## Emissions (Below 1GHz)

| | |
|---|---|
| **Modulation** | GFSK |
| **Test Freq. (MHz)** | 2402 |

Test By :Hugo Zhen Temperature:23 Humidity(%):64

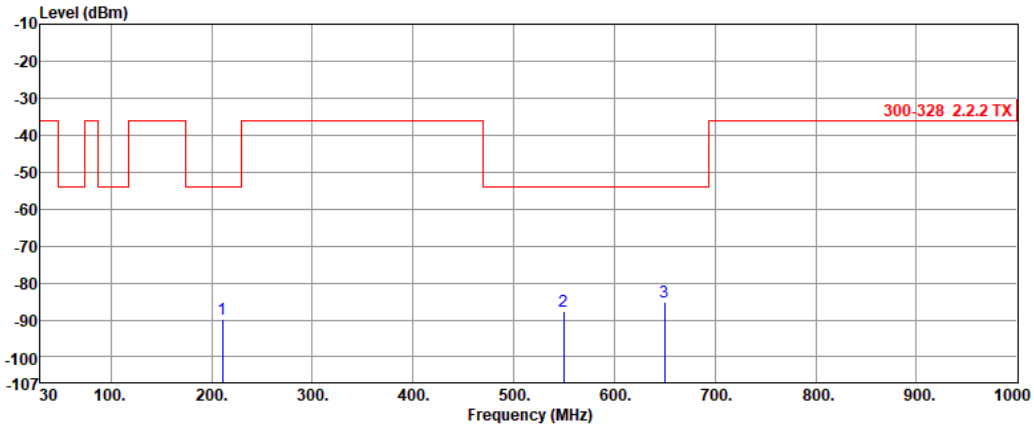



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 187.14 | -89.98 | -54.00 | -35.98 | 0.00 | -89.98 |
| 2 | 549.92 | -87.97 | -54.00 | -33.97 | 0.00 | -87.97 |
| 3 | 649.83 | -86.41 | -54.00 | -32.41 | 0.00 | -86.41 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | GFSK |
|---|---|
| **Test Freq. (MHz)** | 2480 |

Test By :Hugo Zhen Temperature:23 Humidity(%):64

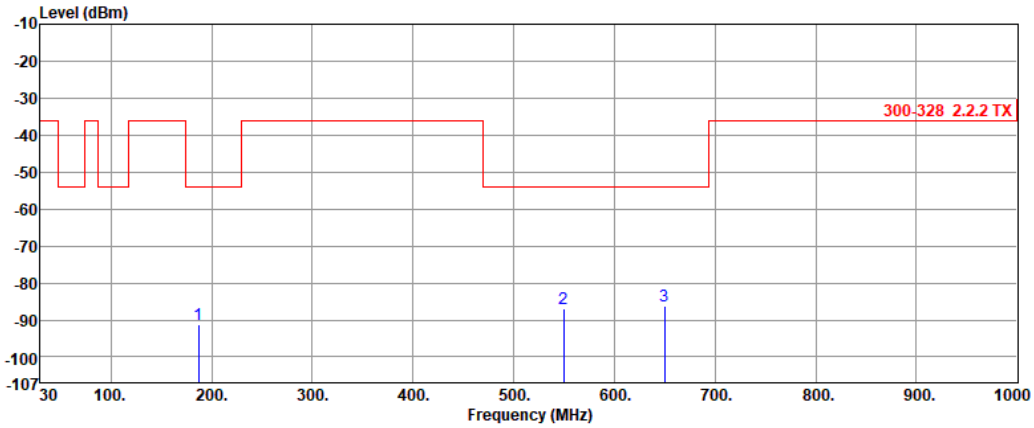



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 210.42 | -89.99 | -54.00 | -35.99 | 0.00 | -89.99 |
| 2 | 549.92 | -87.59 | -54.00 | -33.59 | 0.00 | -87.59 |
| 3 | 649.83 | -85.20 | -54.00 | -31.20 | 0.00 | -85.20 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK |
|---|---|
| **Test Freq. (MHz)** | 2402 |

Test By :Hugo Zhen Temperature:23 Humidity(%):64

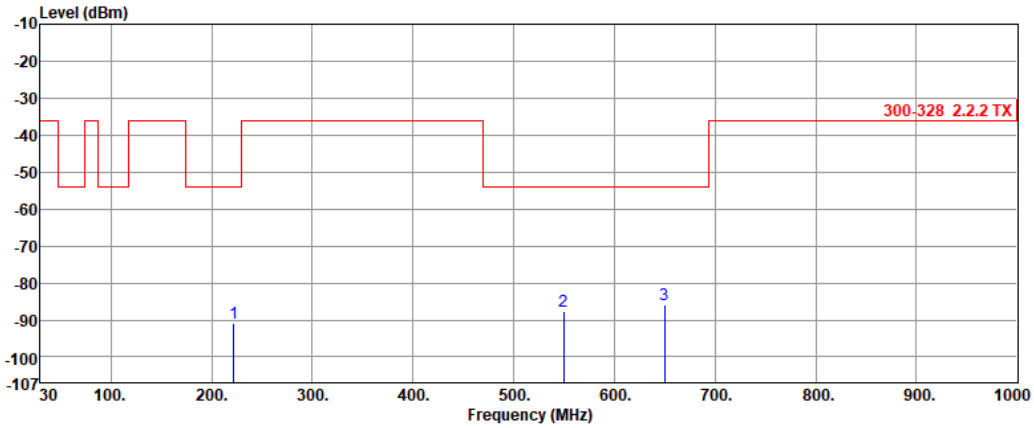



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 187.14 | -91.32 | -54.00 | -37.32 | 0.00 | -91.32 |
| 2 | 549.92 | -86.89 | -54.00 | -32.89 | 0.00 | -86.89 |
| 3 | 649.83 | -86.07 | -54.00 | -32.07 | 0.00 | -86.07 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK |
|---|---|
| **Test Freq. (MHz)** | 2480 |

Test By :Hugo Zhen Temperature:23 Humidity(%):64



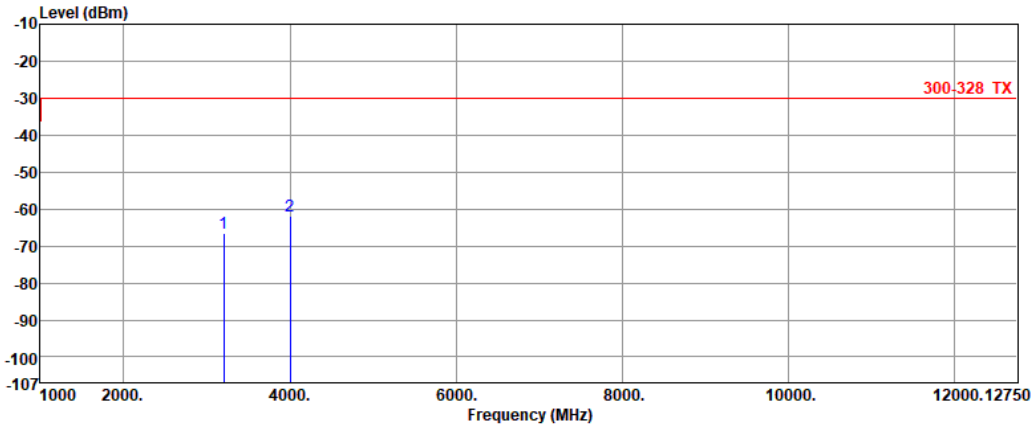

| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 222.06 | -90.82 | -54.00 | -36.82 | 0.00 | -90.82 |
| 2 | 549.92 | -87.66 | -54.00 | -33.66 | 0.00 | -87.66 |
| 3 | 649.83 | -85.74 | -54.00 | -31.74 | 0.00 | -85.74 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

## Emissions (Above 1GHz)

| | |
|---|---|
| **Modulation** | GFSK |
| **Test Freq. (MHz)** | 2402 |

Test By :Hugo Zhen Temperature:23 Humidity(%):64

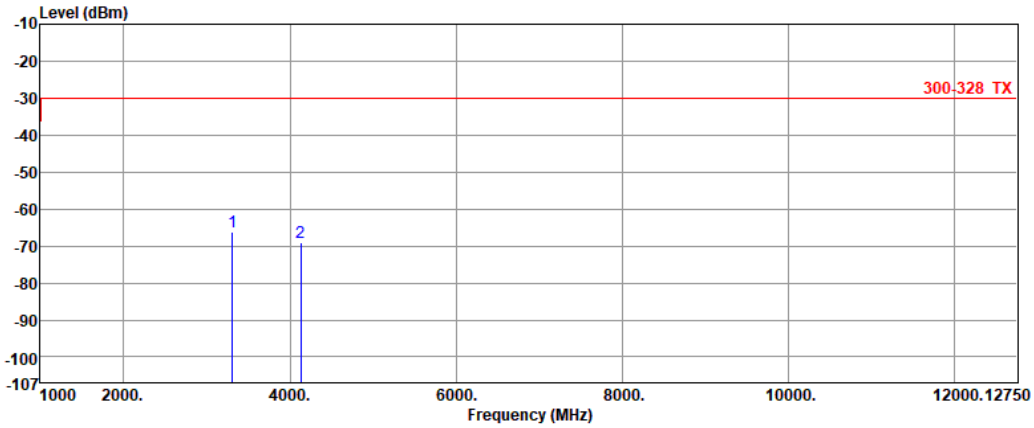



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 3202.59 | -66.69 | -30.00 | -36.69 | 0.00 | -66.69 |
| 2 | 4003.39 | -62.07 | -30.00 | -32.07 | 0.00 | -62.07 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | GFSK |
|---|---|
| **Test Freq. (MHz)** | 2480 |

Test By :Hugo Zhen Temperature:23 Humidity(%):64

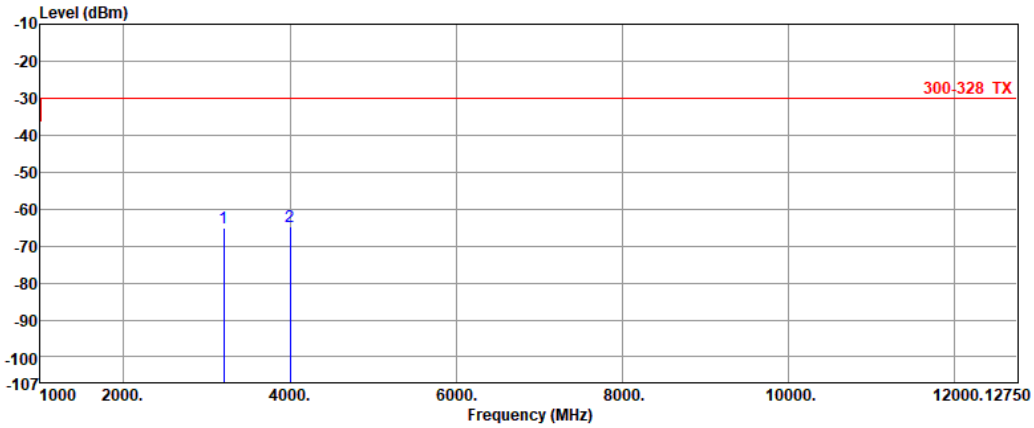



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 3307.82 | -66.07 | -30.00 | -36.07 | 0.00 | -66.07 |
| 2 | 4133.35 | -69.20 | -30.00 | -39.20 | 0.00 | -69.20 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK |
|---|---|
| **Test Freq. (MHz)** | 2402 |

Test By :Hugo Zhen Temperature:23 Humidity(%):64

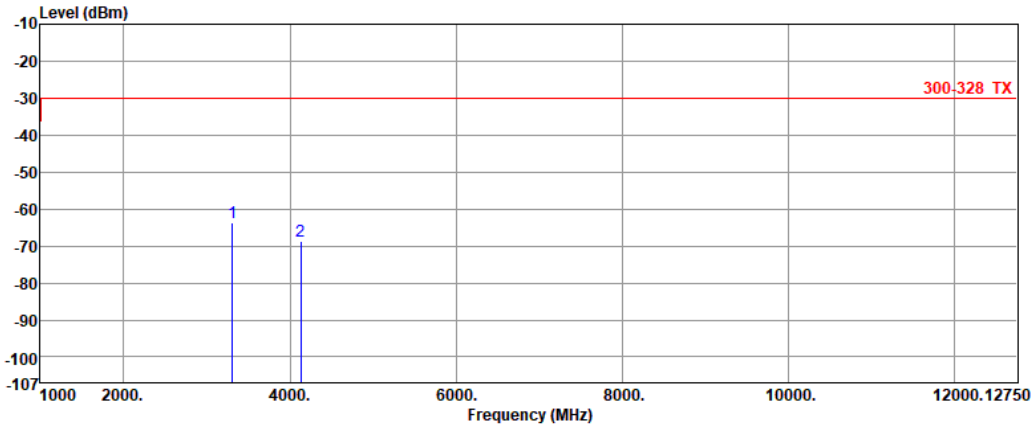



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 3202.69 | -65.08 | -30.00 | -35.08 | 0.00 | -65.08 |
| 2 | 4003.12 | -64.92 | -30.00 | -34.92 | 0.00 | -64.92 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK |
|---|---|
| **Test Freq. (MHz)** | 2480 |

Test By :Hugo Zhen Temperature:25 Humidity(%):65



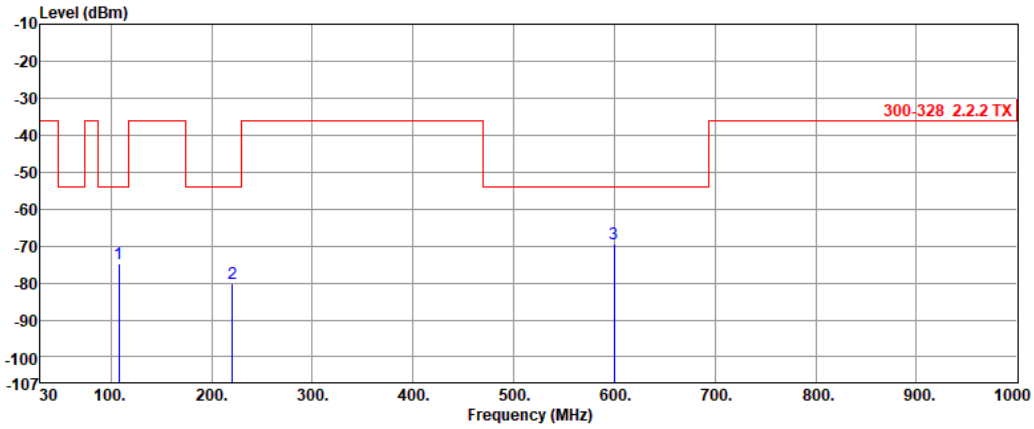

| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 3306.73 | -63.59 | -30.00 | -33.59 | 0.00 | -63.59 |
| 2 | 4133.27 | -68.80 | -30.00 | -38.80 | 0.00 | -68.80 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

## Emissions (Below 1GHz)

| | | | |
|---|---|---|---|
| **Modulation** | GFSK | **Test Freq. (MHz)** | 2402 |
| **Polarization** | Horizontal | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

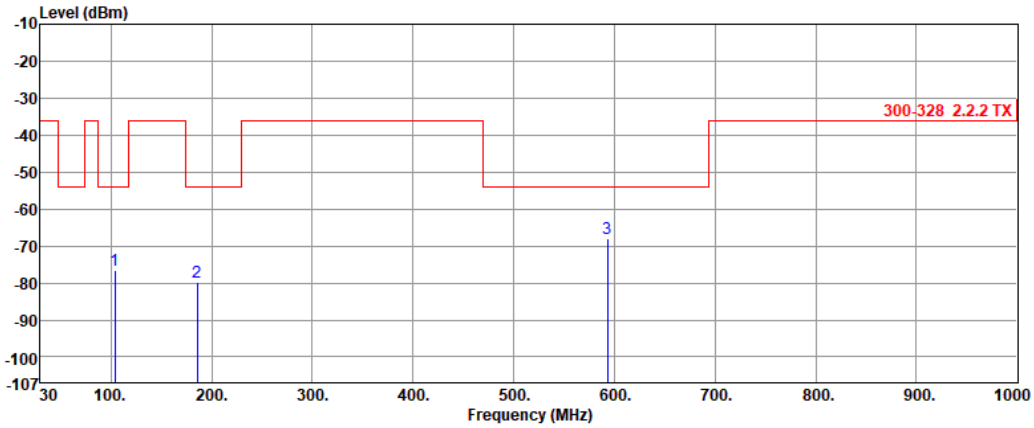



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 107.62 | -74.62 | -54.00 | -20.62 | -4.02 | -70.60 |
| 2 | 220.81 | -80.22 | -54.00 | -26.22 | -5.25 | -74.97 |
| 3 | 599.88 | -69.25 | -54.00 | -15.25 | 5.78 | -75.03 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | GFSK | **Test Freq. (MHz)** | 2402 |
|---|---|---|---|
| **Polarization** | Vertical | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

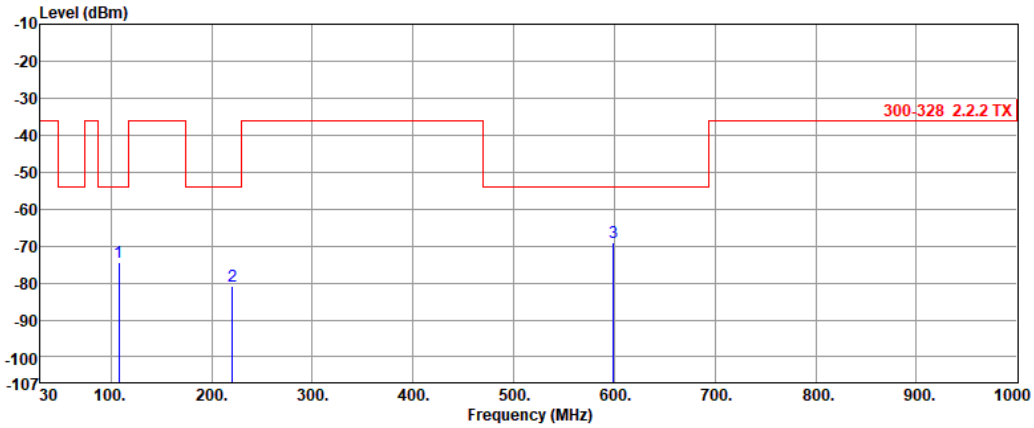



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 104.10 | -76.54 | -54.00 | -22.54 | -3.65 | -72.89 |
| 2 | 185.31 | -79.87 | -54.00 | -25.87 | -4.92 | -74.95 |
| 3 | 593.17 | -68.03 | -54.00 | -14.03 | 5.42 | -73.45 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | GFSK | **Test Freq. (MHz)** | 2480 |
|---|---|---|---|
| **Polarization** | Horizontal | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

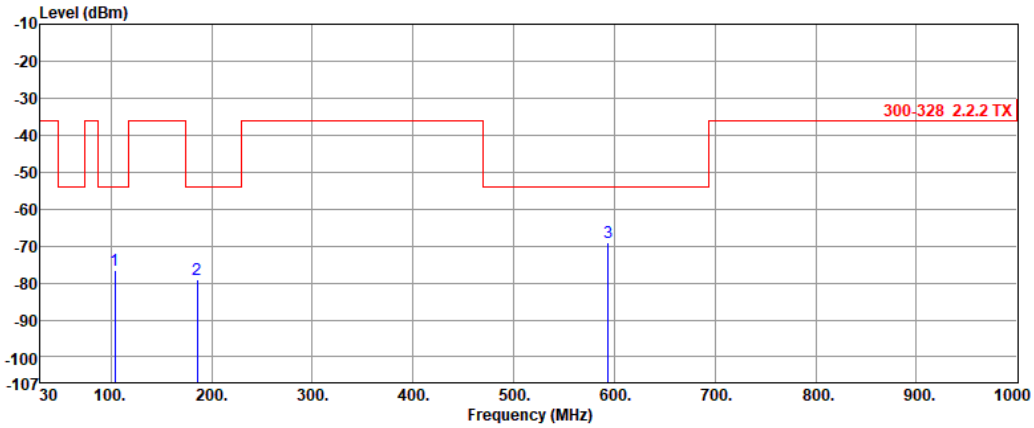



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 107.65 | -74.40 | -54.00 | -20.40 | -4.01 | -70.39 |
| 2 | 220.38 | -80.78 | -54.00 | -26.78 | -5.26 | -75.52 |
| 3 | 599.12 | -69.20 | -54.00 | -15.20 | 5.75 | -74.95 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | GFSK | **Test Freq. (MHz)** | 2480 |
|---|---|---|---|
| **Polarization** | Vertical | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

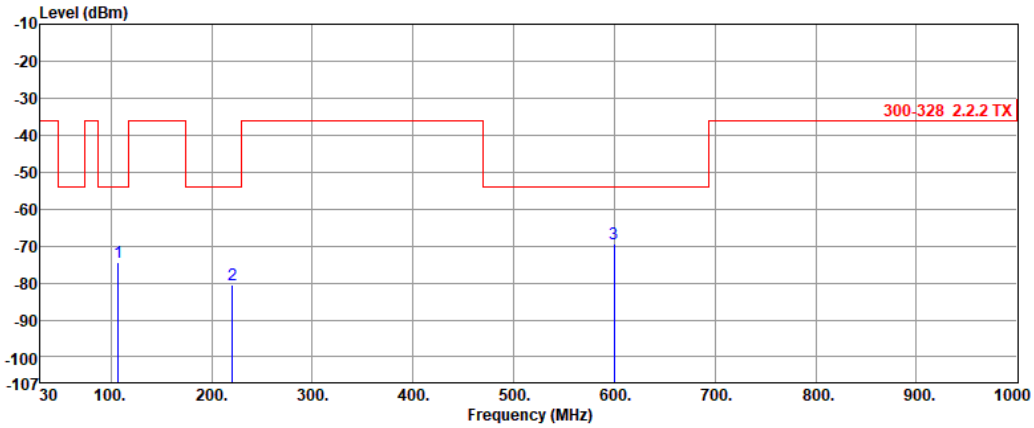



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 104.08 | -76.61 | -54.00 | -22.61 | -3.66 | -72.95 |
| 2 | 185.41 | -79.21 | -54.00 | -25.21 | -4.93 | -74.28 |
| 3 | 593.96 | -69.00 | -54.00 | -15.00 | 5.44 | -74.44 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK | **Test Freq. (MHz)** | 2402 |
|---|---|---|---|
| **Polarization** | Horizontal | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

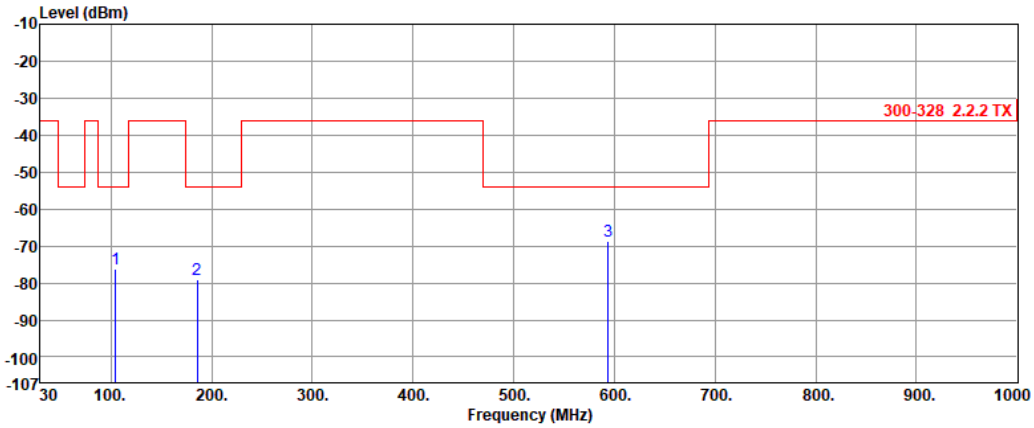



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 107.01 | -74.25 | -54.00 | -20.25 | -4.21 | -70.04 |
| 2 | 220.78 | -80.41 | -54.00 | -26.41 | -5.25 | -75.16 |
| 3 | 599.78 | -69.34 | -54.00 | -15.34 | 5.78 | -75.12 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK | **Test Freq. (MHz)** | 2402 |
|---|---|---|---|
| **Polarization** | Vertical | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

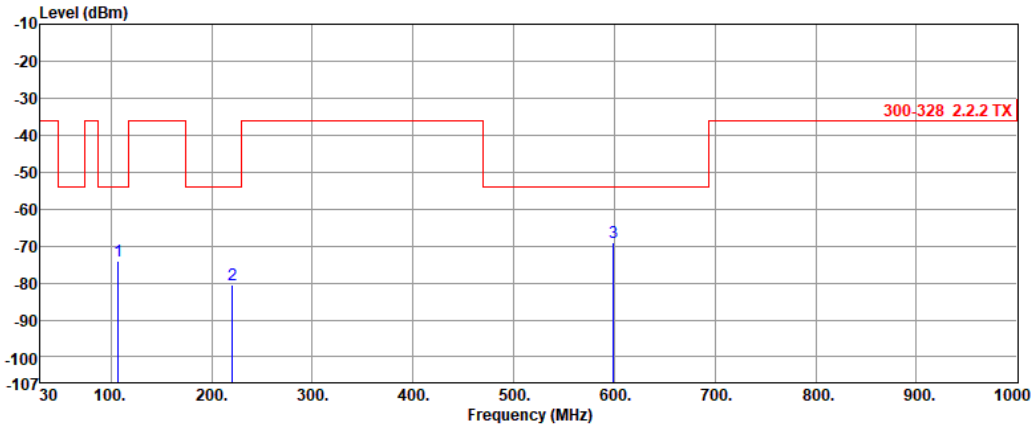



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 104.59 | -76.15 | -54.00 | -22.15 | -3.60 | -72.55 |
| 2 | 185.37 | -79.02 | -54.00 | -25.02 | -4.93 | -74.09 |
| 3 | 593.75 | -68.57 | -54.00 | -14.57 | 5.43 | -74.00 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK | **Test Freq. (MHz)** | 2480 |
|---|---|---|---|
| **Polarization** | Horizontal | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

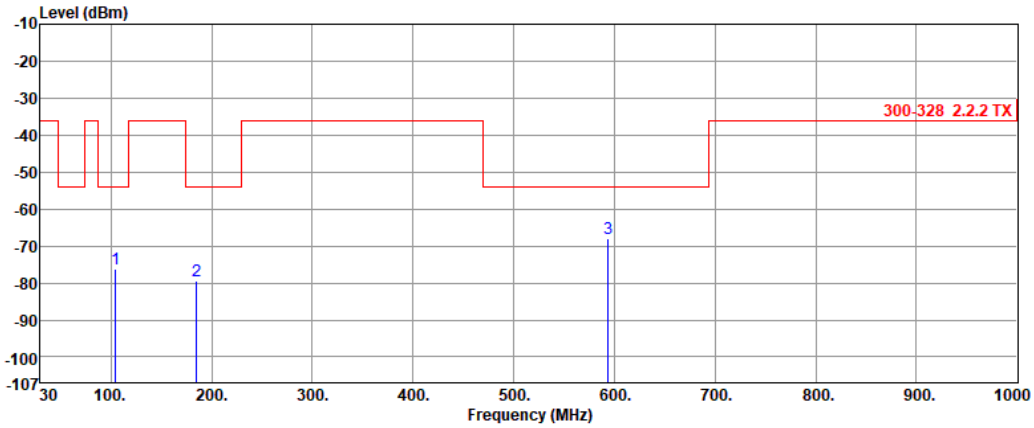



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 107.46 | -74.12 | -54.00 | -20.12 | -4.07 | -70.05 |
| 2 | 220.28 | -80.46 | -54.00 | -26.46 | -5.26 | -75.20 |
| 3 | 599.10 | -69.22 | -54.00 | -15.22 | 5.75 | -74.97 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK | **Test Freq. (MHz)** | 2480 |
|---|---|---|---|
| **Polarization** | Vertical | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65



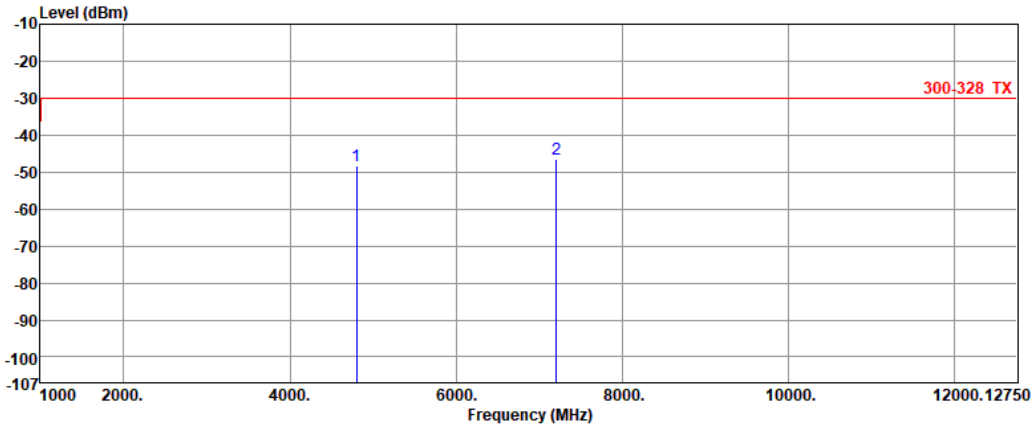

| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 104.41 | -76.12 | -54.00 | -22.12 | -3.62 | -72.50 |
| 2 | 185.03 | -79.46 | -54.00 | -25.46 | -4.90 | -74.56 |
| 3 | 593.98 | -68.06 | -54.00 | -14.06 | 5.44 | -73.50 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

## Emissions (Above 1GHz)

| | | | |
|---|---|---|---|
| **Modulation** | GFSK | **Test Freq. (MHz)** | 2402 |
| **Polarization** | Horizontal | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

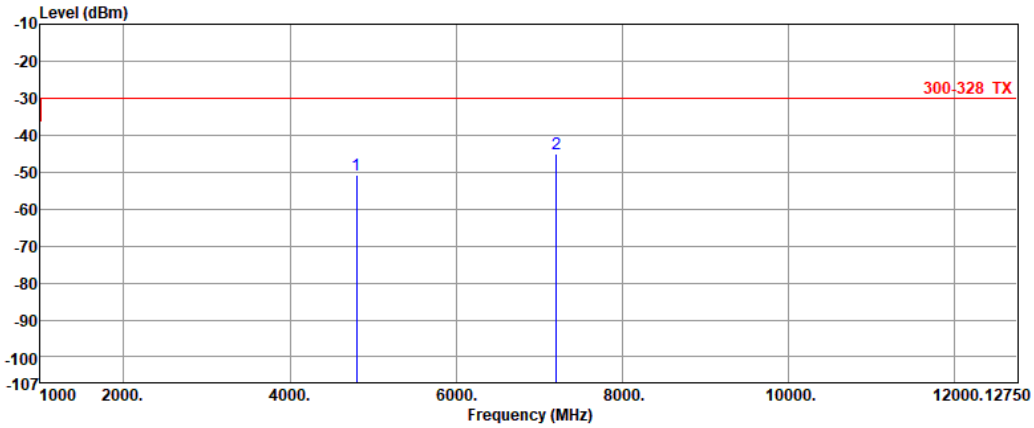



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4803.94 | -48.27 | -30.00 | -18.27 | 13.38 | -61.65 |
| 2 | 7205.82 | -46.52 | -30.00 | -16.52 | 19.31 | -65.83 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | GFSK | **Test Freq. (MHz)** | 2402 |
|---|---|---|---|
| **Polarization** | Vertical | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

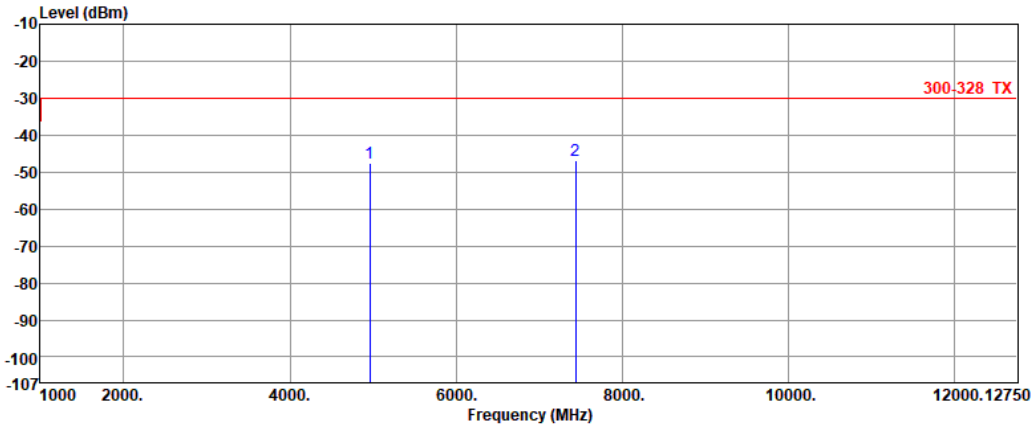



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4803.92 | -50.94 | -30.00 | -20.94 | 13.33 | -64.27 |
| 2 | 7206.18 | -45.22 | -30.00 | -15.22 | 19.77 | -64.99 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | GFSK | **Test Freq. (MHz)** | 2480 |
|---|---|---|---|
| **Polarization** | Horizontal | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

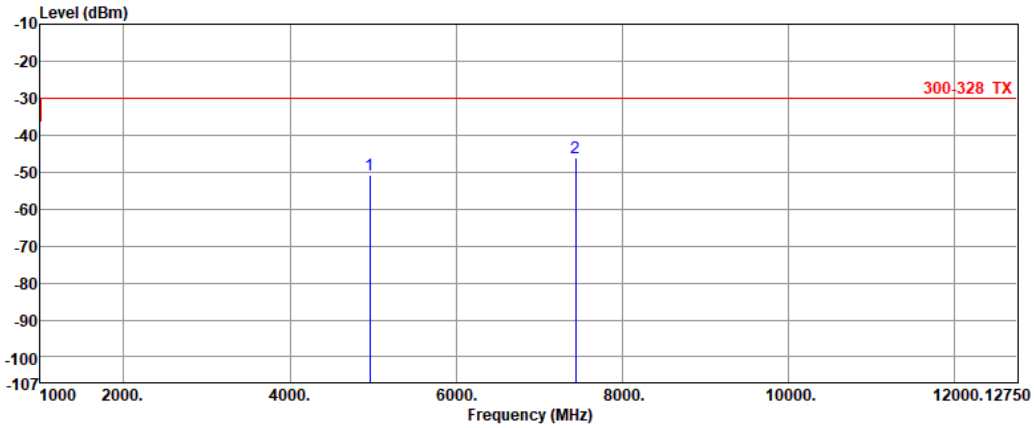



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4959.59 | -47.52 | -30.00 | -17.52 | 14.02 | -61.54 |
| 2 | 7440.36 | -46.89 | -30.00 | -16.89 | 18.65 | -65.54 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | GFSK | **Test Freq. (MHz)** | 2480 |
|---|---|---|---|
| **Polarization** | Vertical | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

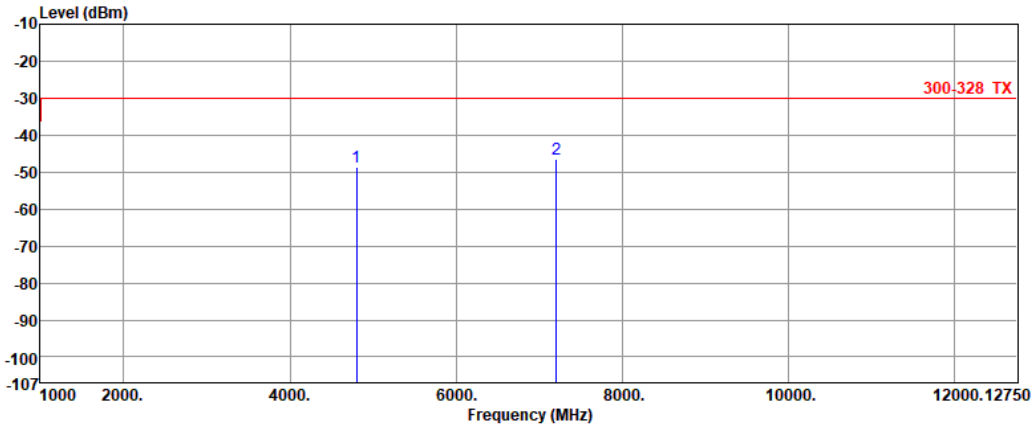



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4959.90 | -50.63 | -30.00 | -20.63 | 14.09 | -64.72 |
| 2 | 7440.14 | -45.98 | -30.00 | -15.98 | 19.35 | -65.33 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK | **Test Freq. (MHz)** | 2402 |
|---|---|---|---|
| **Polarization** | Horizontal | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

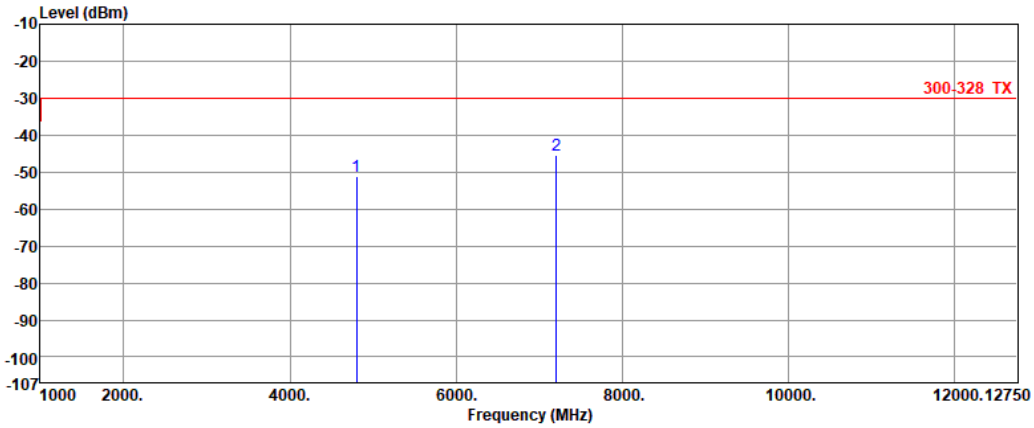



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4804.32 | -48.55 | -30.00 | -18.55 | 13.38 | -61.93 |
| 2 | 7206.32 | -46.46 | -30.00 | -16.46 | 19.31 | -65.77 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK | **Test Freq. (MHz)** | 2402 |
|---|---|---|---|
| **Polarization** | Vertical | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

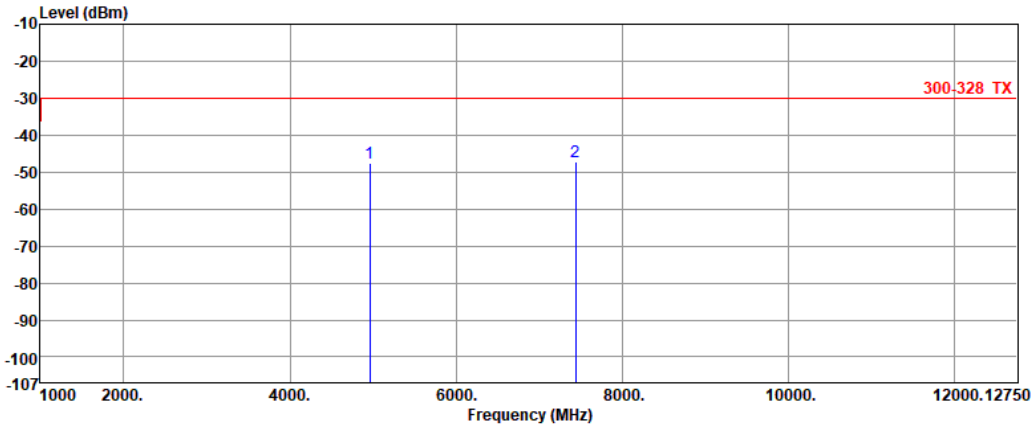



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4804.48 | -51.27 | -30.00 | -21.27 | 13.33 | -64.60 |
| 2 | 7205.52 | -45.54 | -30.00 | -15.54 | 19.76 | -65.30 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK | **Test Freq. (MHz)** | 2480 |
|---|---|---|---|
| **Polarization** | Horizontal | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

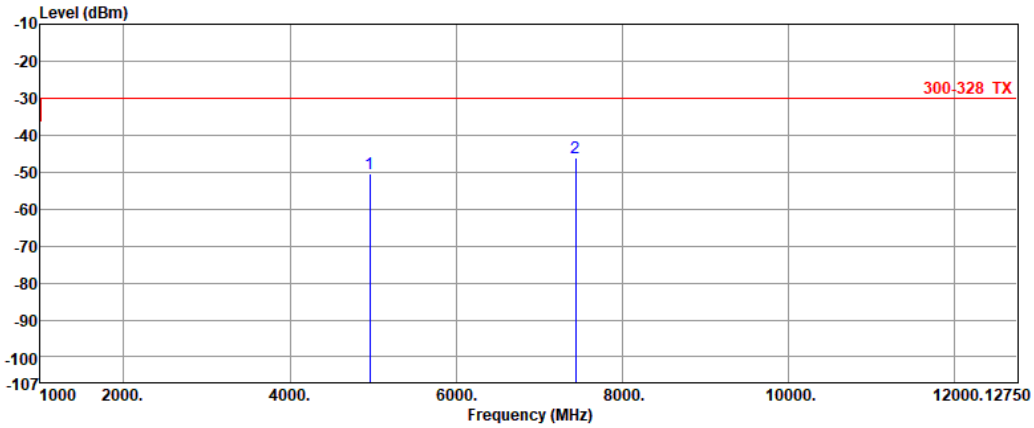



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4959.54 | -47.54 | -30.00 | -17.54 | 14.02 | -61.56 |
| 2 | 7439.74 | -47.31 | -30.00 | -17.31 | 18.66 | -65.97 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK | **Test Freq. (MHz)** | 2480 |
|---|---|---|---|
| **Polarization** | Vertical | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65



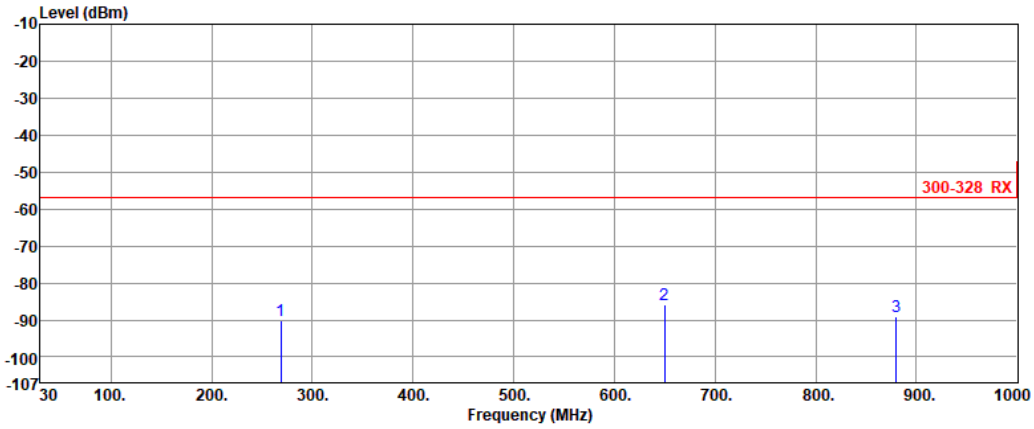

| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4959.93 | -50.46 | -30.00 | -20.46 | 14.09 | -64.55 |
| 2 | 7440.07 | -46.31 | -30.00 | -16.31 | 19.35 | -65.66 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

## Emissions (Below 1GHz)

| | |
|---|---|
| **Modulation** | GFSK |
| **Test Freq. (MHz)** | 2402 |

Test By :Hugo Zhen Temperature:23 Humidity(%):64

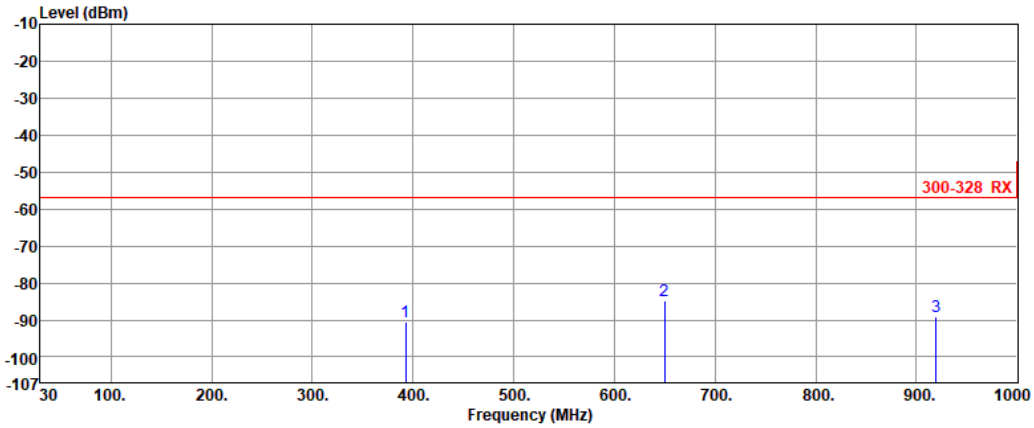



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 268.62 | -90.11 | -57.00 | -33.11 | 0.00 | -90.11 |
| 2 | 649.83 | -85.96 | -57.00 | -28.96 | 0.00 | -85.96 |
| 3 | 879.72 | -88.96 | -57.00 | -31.96 | 0.00 | -88.96 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | GFSK |
|---|---|
| **Test Freq. (MHz)** | 2480 |

Test By :Hugo Zhen Temperature:23 Humidity(%):64

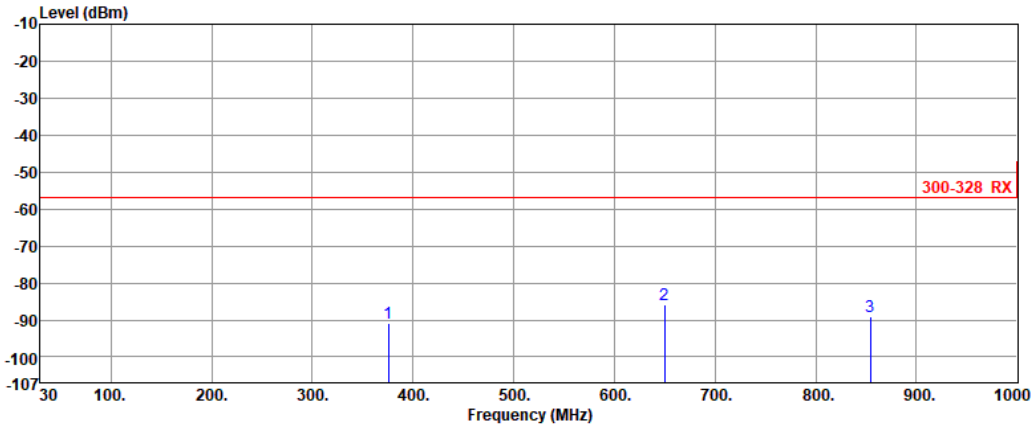



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 392.78 | -90.63 | -57.00 | -33.63 | 0.00 | -90.63 |
| 2 | 649.83 | -84.98 | -57.00 | -27.98 | 0.00 | -84.98 |
| 3 | 919.49 | -89.27 | -57.00 | -32.27 | 0.00 | -89.27 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| Modulation | 8DPSK |
|---|---|
| Test Freq. (MHz) | 2402 |

Test By :Hugo Zhen Temperature:23 Humidity(%):64

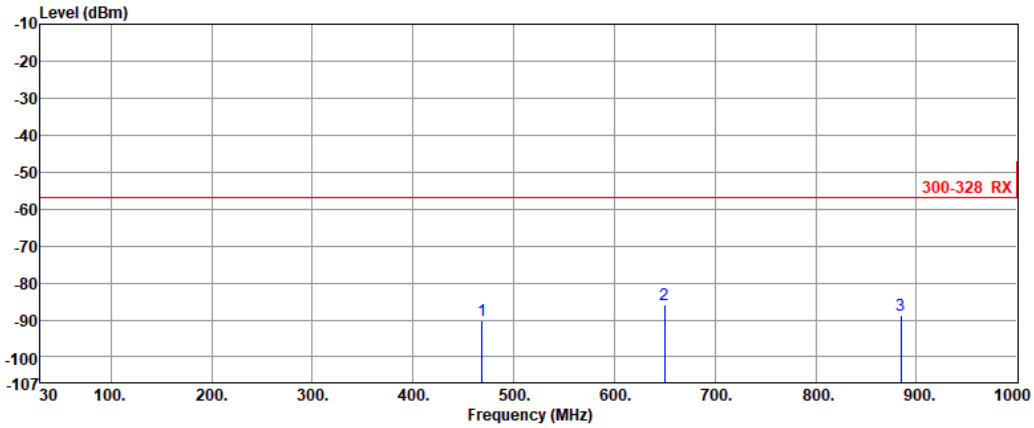



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 375.32 | -90.96 | -57.00 | -33.96 | 0.00 | -90.96 |
| 2 | 649.83 | -86.01 | -57.00 | -29.01 | 0.00 | -86.01 |
| 3 | 854.50 | -89.10 | -57.00 | -32.10 | 0.00 | -89.10 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK |
|---|---|
| **Test Freq. (MHz)** | 2480 |

Test By :Hugo Zhen Temperature:23 Humidity(%):64



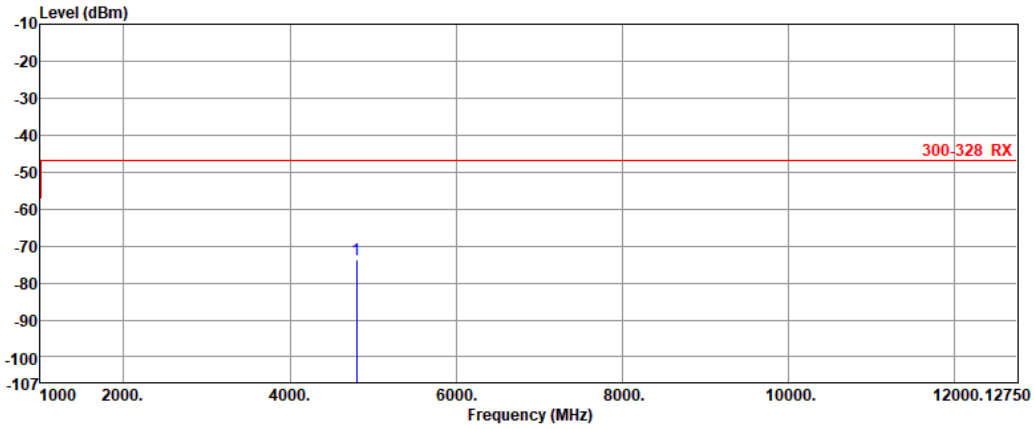

| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 468.44 | -90.34 | -57.00 | -33.34 | 0.00 | -90.34 |
| 2 | 649.83 | -85.92 | -57.00 | -28.92 | 0.00 | -85.92 |
| 3 | 884.57 | -88.73 | -57.00 | -31.73 | 0.00 | -88.73 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

## Emissions (Above 1GHz)

| | |
|---|---|
| **Modulation** | GFSK |
| **Test Freq. (MHz)** | 2402 |

Test By :Hugo Zhen Temperature:23 Humidity(%):64

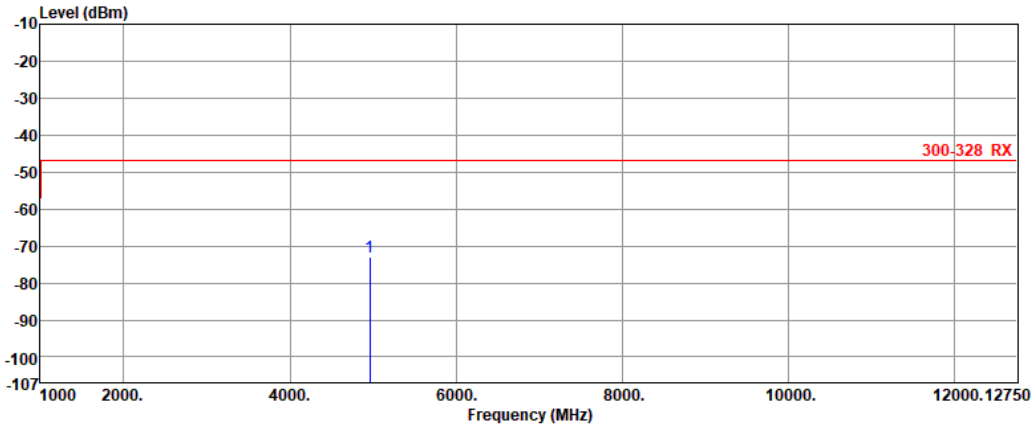



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4804.26 | -73.67 | -47.00 | -26.67 | 0.00 | -73.67 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| | |
|---|---|
| **Modulation** | GFSK |
| **Test Freq. (MHz)** | 2480 |

Test By :Hugo Zhen Temperature:23 Humidity(%):64

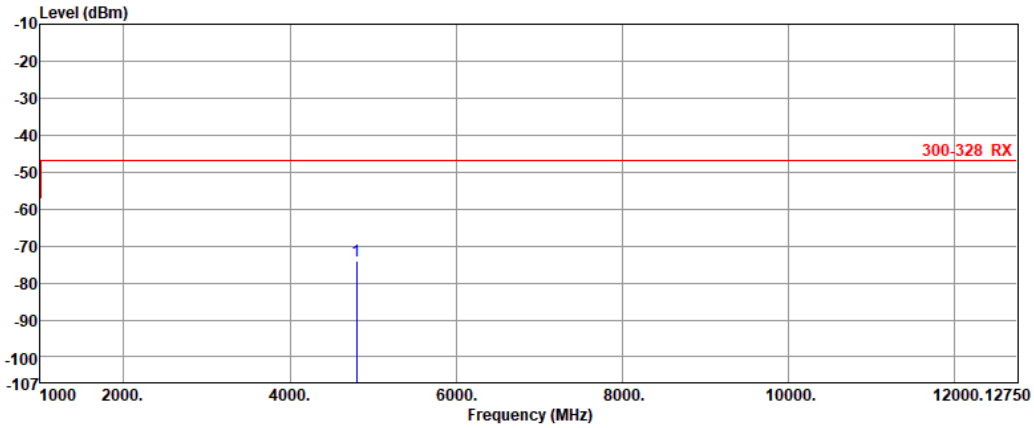



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4960.31 | -72.82 | -47.00 | -25.82 | 0.00 | -72.82 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| | |
|---|---|
| **Modulation** | 8DPSK |
| **Test Freq. (MHz)** | 2402 |

Test By :Hugo Zhen Temperature:23 Humidity(%):64

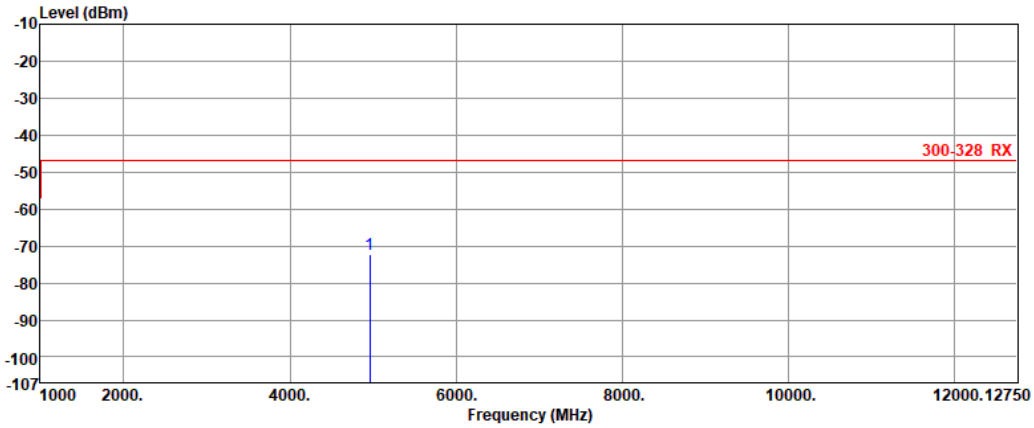



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4804.44 | -74.10 | -47.00 | -27.10 | 0.00 | -74.10 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK |
|---|---|
| **Test Freq. (MHz)** | 2480 |

Test By :Hugo Zhen Temperature:23 Humidity(%):64



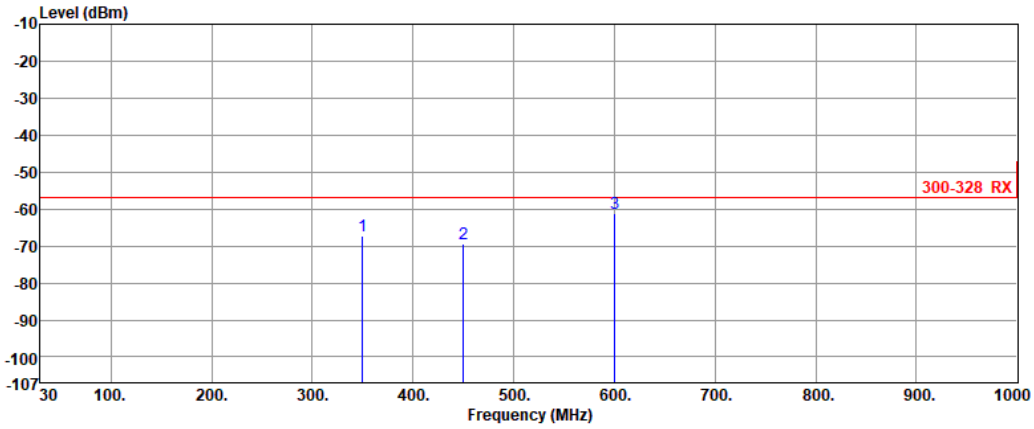

| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4959.67 | -72.40 | -47.00 | -25.40 | 0.00 | -72.40 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

## Emissions (Below 1GHz)

| **Modulation** | GFSK | **Test Freq. (MHz)** | 2402 |
|---|---|---|---|
| **Polarization** | Horizontal | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

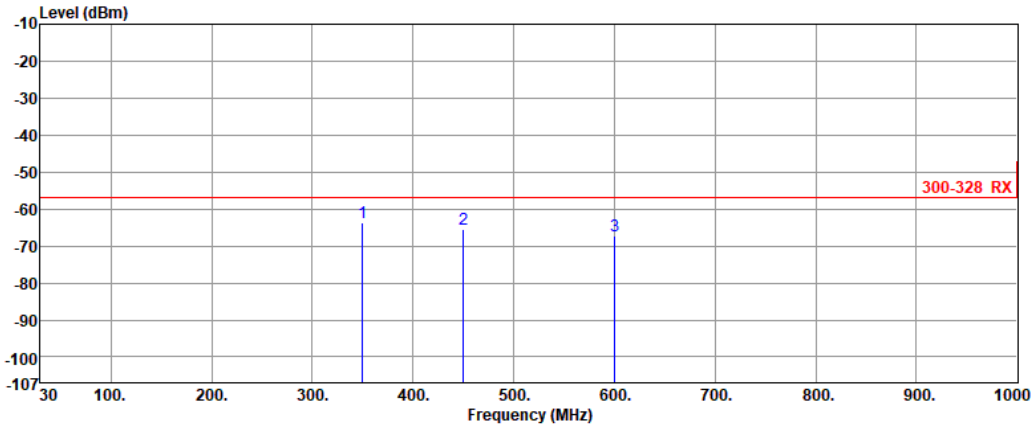



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 350.10 | -67.34 | -57.00 | -10.34 | -0.02 | -67.32 |
| 2 | 450.01 | -69.42 | -57.00 | -12.42 | 2.99 | -72.41 |
| 3 | 600.36 | -61.07 | -57.00 | -4.07 | 5.81 | -66.88 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | GFSK | **Test Freq. (MHz)** | 2402 |
|---|---|---|---|
| **Polarization** | Vertical | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

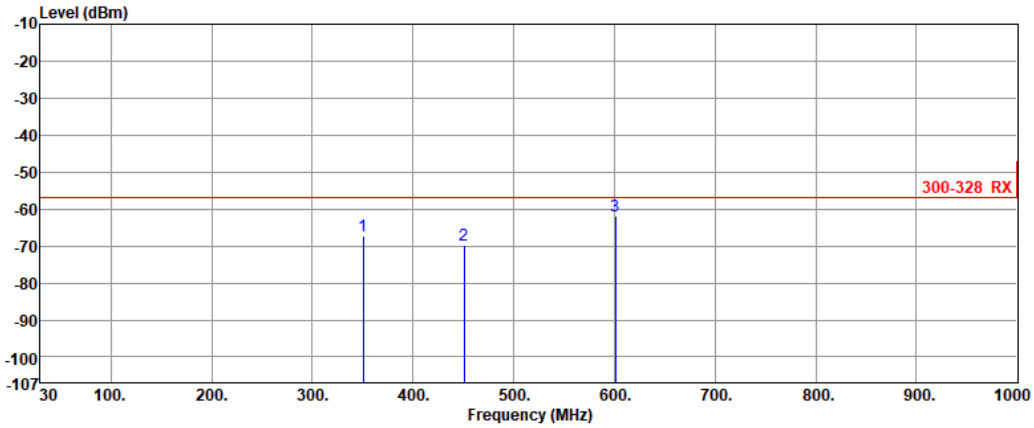



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 350.10 | -63.65 | -57.00 | -6.65 | 0.06 | -63.71 |
| 2 | 450.01 | -65.55 | -57.00 | -8.55 | 2.40 | -67.95 |
| 3 | 600.36 | -67.14 | -57.00 | -10.14 | 5.61 | -72.75 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | GFSK | **Test Freq. (MHz)** | 2480 |
|---|---|---|---|
| **Polarization** | Horizontal | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

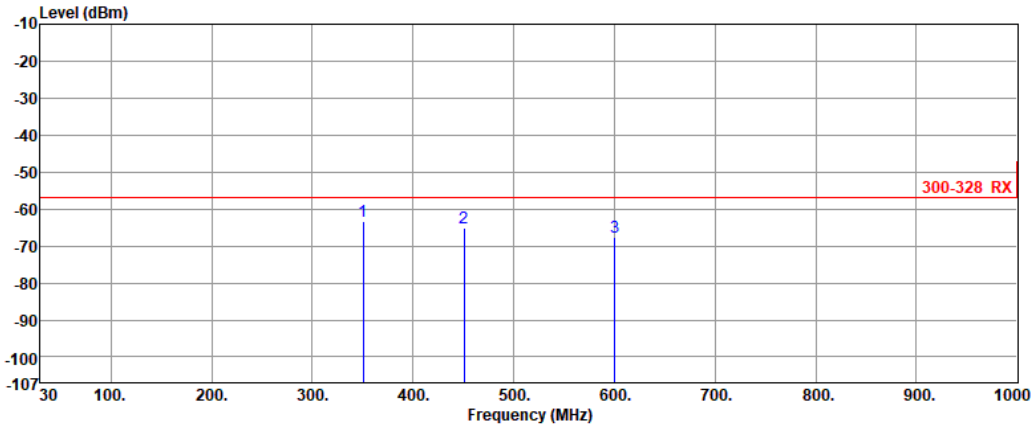



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 350.52 | -67.45 | -57.00 | -10.45 | -0.01 | -67.44 |
| 2 | 450.53 | -69.76 | -57.00 | -12.76 | 3.01 | -72.77 |
| 3 | 600.74 | -61.86 | -57.00 | -4.86 | 5.83 | -67.69 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | GFSK | **Test Freq. (MHz)** | 2480 |
|---|---|---|---|
| **Polarization** | Vertical | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

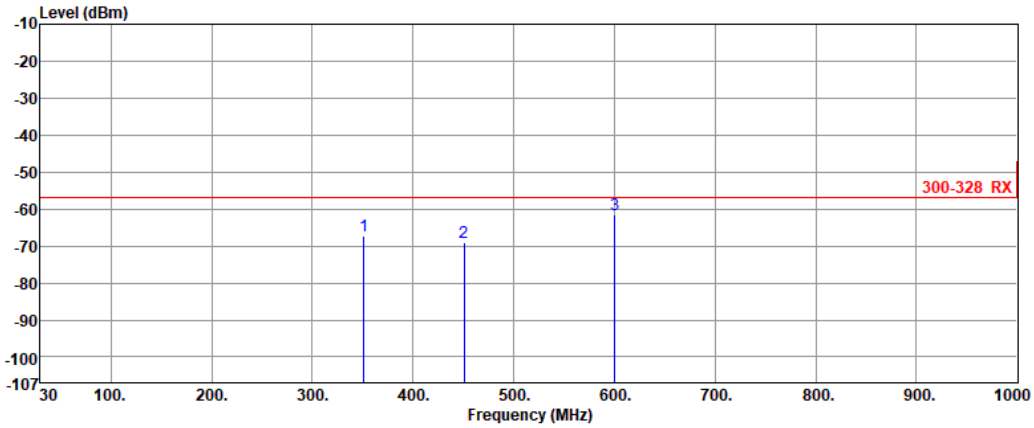



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 350.39 | -63.17 | -57.00 | -6.17 | 0.07 | -63.24 |
| 2 | 450.49 | -65.18 | -57.00 | -8.18 | 2.41 | -67.59 |
| 3 | 600.56 | -67.51 | -57.00 | -10.51 | 5.61 | -73.12 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK | **Test Freq. (MHz)** | 2402 |
|---|---|---|---|
| **Polarization** | Horizontal | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

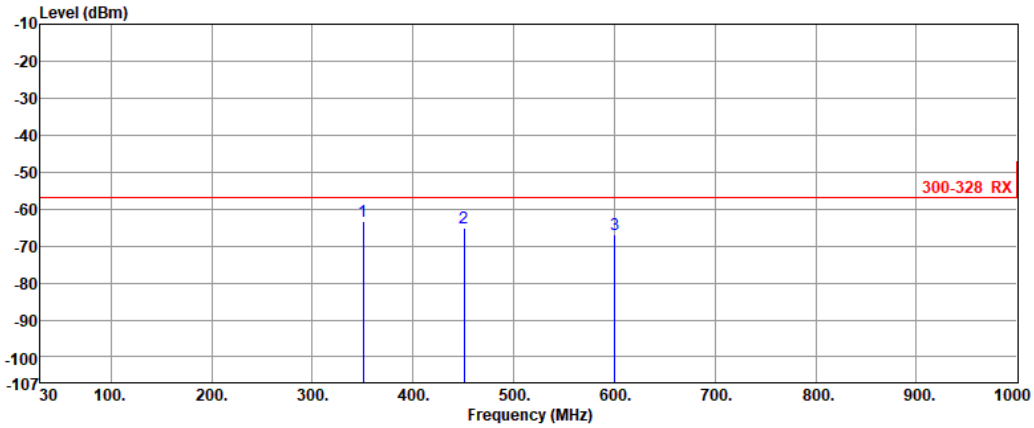



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 350.87 | -67.14 | -57.00 | -10.14 | 0.00 | -67.14 |
| 2 | 450.96 | -69.08 | -57.00 | -12.08 | 3.03 | -72.11 |
| 3 | 600.42 | -61.52 | -57.00 | -4.52 | 5.81 | -67.33 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| Modulation | 8DPSK | Test Freq. (MHz) | 2402 |
|---|---|---|---|
| Polarization | Vertical | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

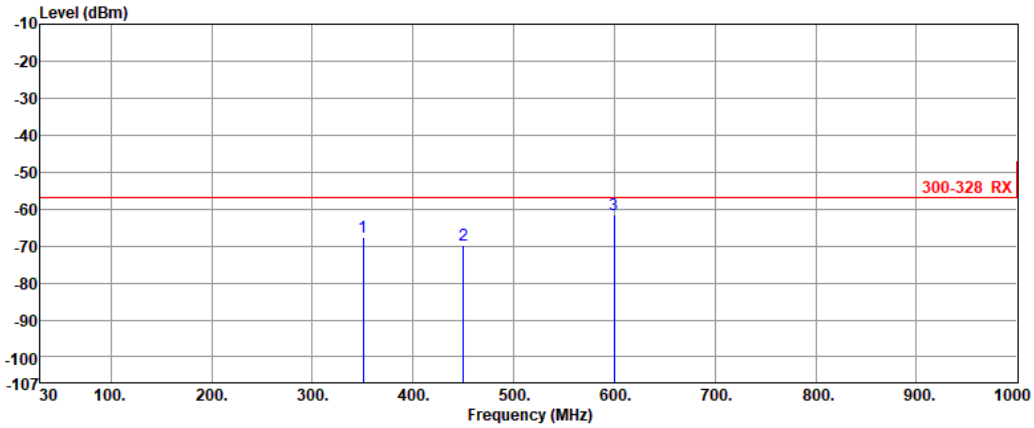



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 350.39 | -63.43 | -57.00 | -6.43 | 0.07 | -63.50 |
| 2 | 450.45 | -65.11 | -57.00 | -8.11 | 2.41 | -67.52 |
| 3 | 600.53 | -67.04 | -57.00 | -10.04 | 5.61 | -72.65 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK | **Test Freq. (MHz)** | 2480 |
|---|---|---|---|
| **Polarization** | Horizontal | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

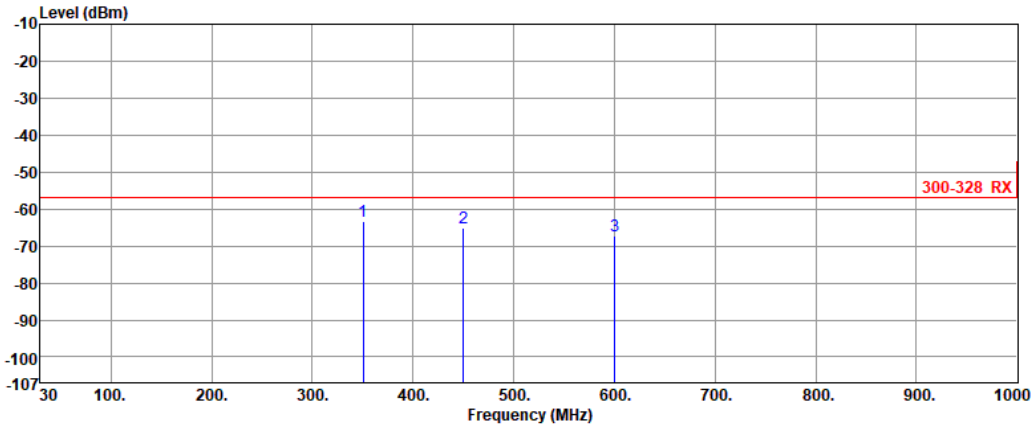



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 350.59 | -67.62 | -57.00 | -10.62 | -0.01 | -67.61 |
| 2 | 450.02 | -69.63 | -57.00 | -12.63 | 2.99 | -72.62 |
| 3 | 600.02 | -61.50 | -57.00 | -4.50 | 5.79 | -67.29 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK | **Test Freq. (MHz)** | 2480 |
|---|---|---|---|
| **Polarization** | Vertical | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65



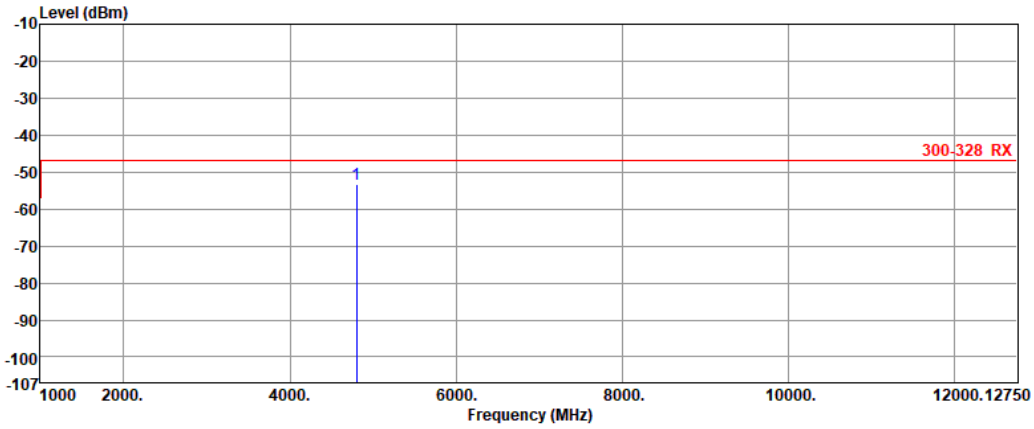

| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 350.54 | -63.49 | -57.00 | -6.49 | 0.08 | -63.57 |
| 2 | 450.14 | -65.07 | -57.00 | -8.07 | 2.40 | -67.47 |
| 3 | 600.36 | -67.16 | -57.00 | -10.16 | 5.61 | -72.77 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

## Emissions (Above 1GHz)

| **Modulation** | GFSK | **Test Freq. (MHz)** | 2402 |
|---|---|---|---|
| **Polarization** | Horizontal | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

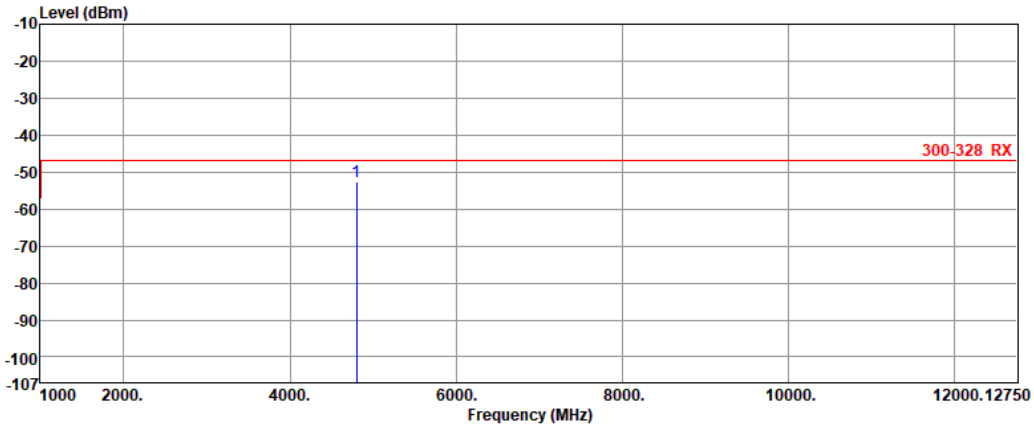



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4804.28 | -53.30 | -47.00 | -6.30 | 13.38 | -66.68 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | GFSK | **Test Freq. (MHz)** | 2402 |
|---|---|---|---|
| **Polarization** | Vertical | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

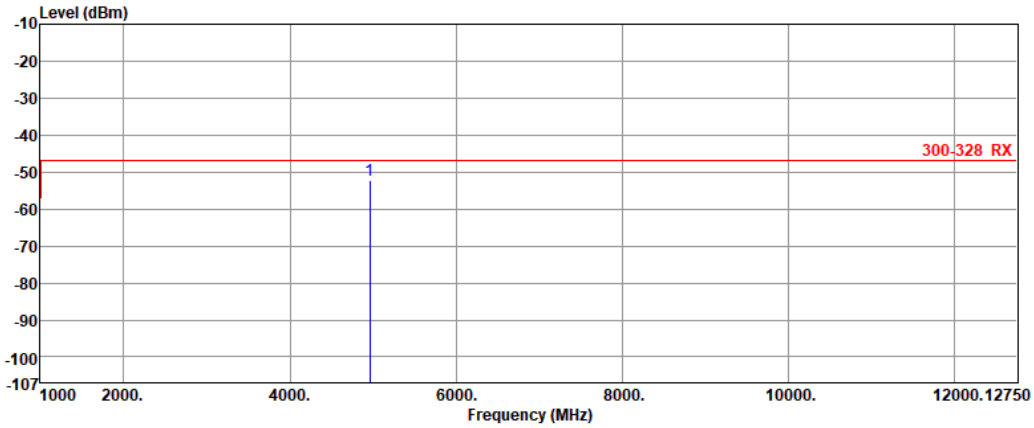



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4803.85 | -52.74 | -47.00 | -5.74 | 13.32 | -66.06 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | GFSK | **Test Freq. (MHz)** | 2480 |
|---|---|---|---|
| **Polarization** | Horizontal | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

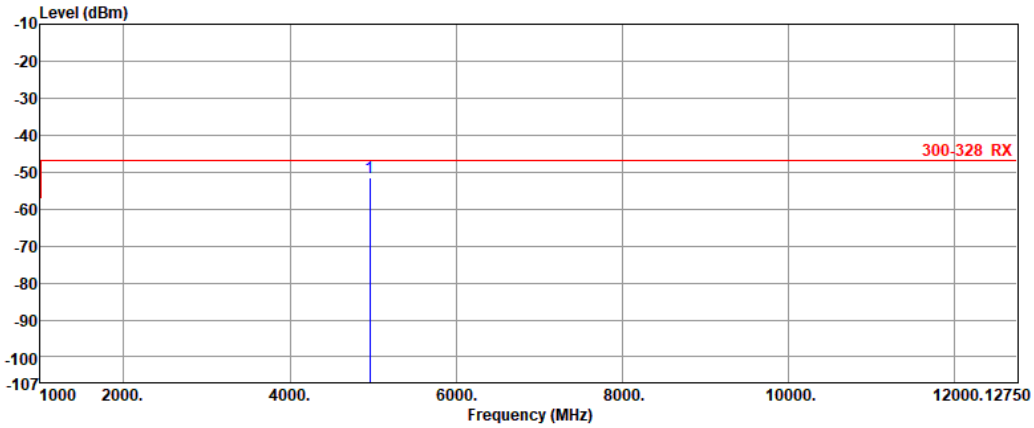



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4959.70 | -52.40 | -47.00 | -5.40 | 14.02 | -66.42 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | GFSK | **Test Freq. (MHz)** | 2480 |
|---|---|---|---|
| **Polarization** | Vertical | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

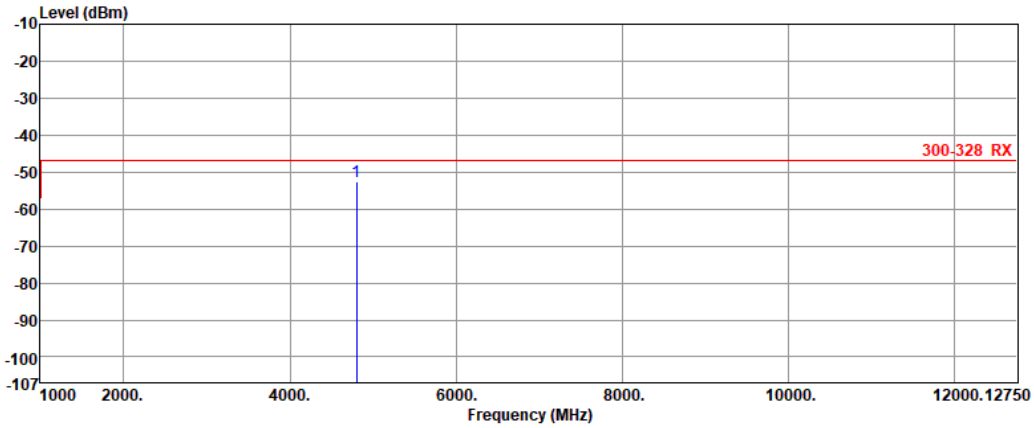



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4960.30 | -51.37 | -47.00 | -4.37 | 14.10 | -65.47 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK | **Test Freq. (MHz)** | 2402 |
|---|---|---|---|
| **Polarization** | Horizontal | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

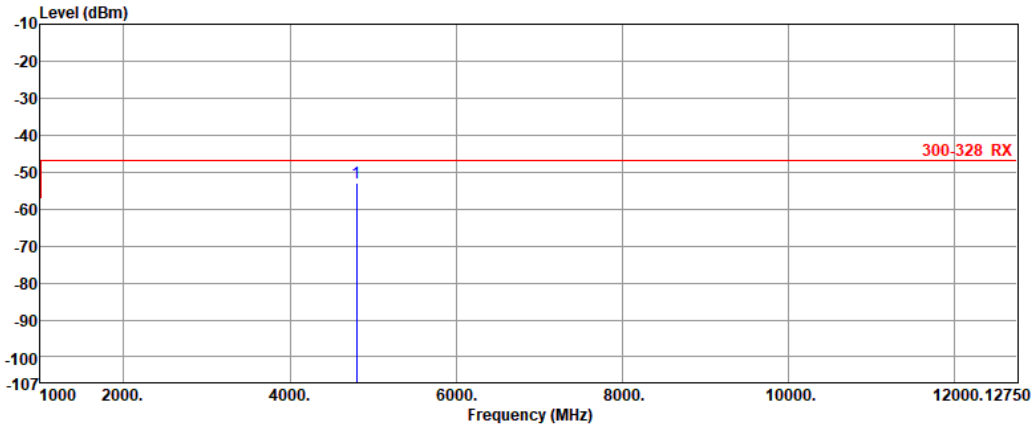



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4803.97 | -52.73 | -47.00 | -5.73 | 13.38 | -66.11 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK | **Test Freq. (MHz)** | 2402 |
|---|---|---|---|
| **Polarization** | Vertical | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

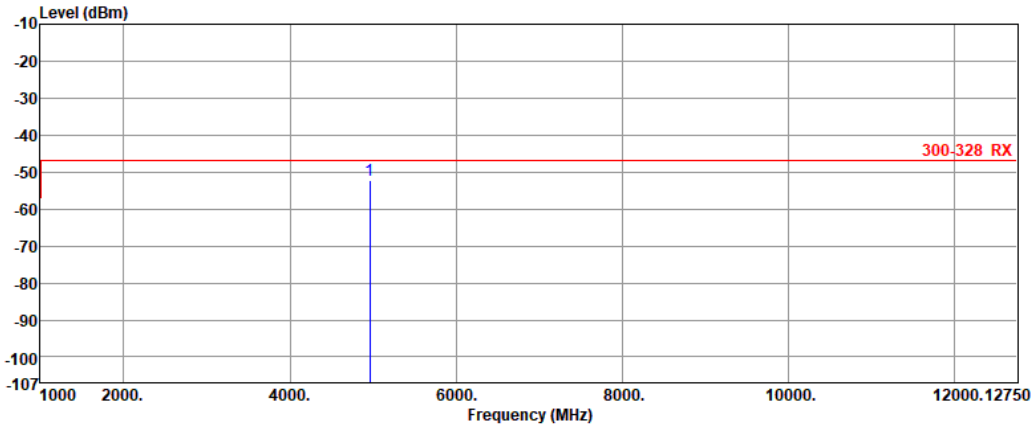



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4803.76 | -53.11 | -47.00 | -6.11 | 13.32 | -66.43 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK | **Test Freq. (MHz)** | 2480 |
|---|---|---|---|
| **Polarization** | Horizontal | | |

Test By :Hugo Zhen Temperature:25 Humidity(%):65

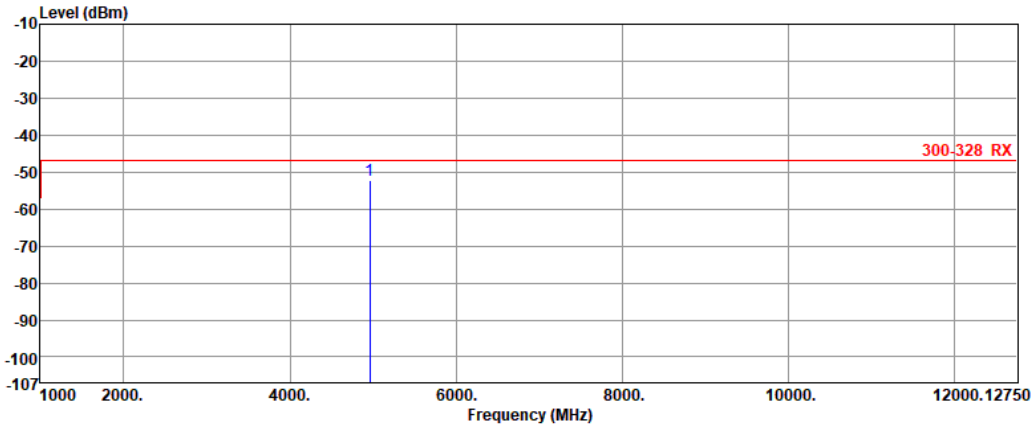



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4960.19 | -52.22 | -47.00 | -5.22 | 14.02 | -66.24 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | 8DPSK | **Test Freq. (MHz)** | 2480 |
|---|---|---|---|
| **Polarization** | Vertical | | |

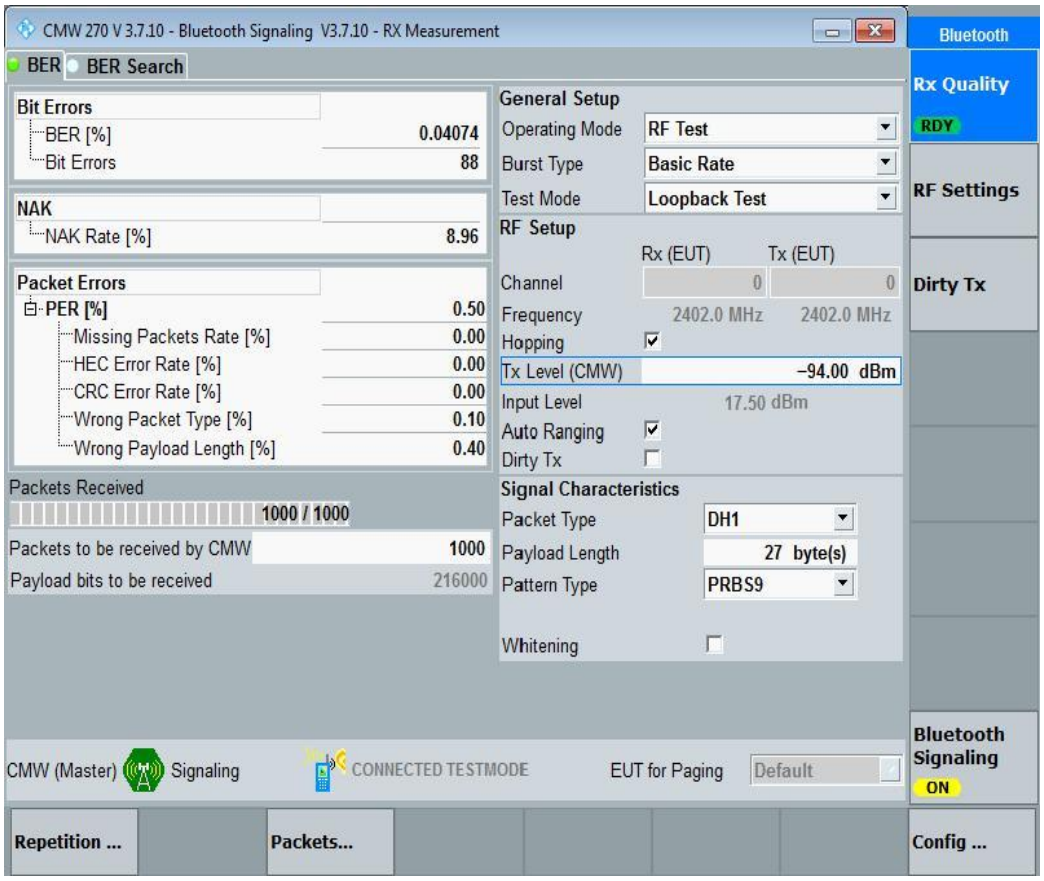
Test By :Hugo Zhen Temperature:25 Humidity(%):65




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4959.59 | -52.39 | -47.00 | -5.39 | 14.09 | -66.48 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

**Hopping mode**




| Receiver Category | 2 | | |
|---|---|---|---|
| Performance Criteria Limit | PER ≤ 10 % | | |
| Wanted Signal Mean Power from Companion Device (dBm) | Blocking Signal Frequency (MHz) | Blocking Signal Power (dBm) | Test Result |
| -67.18 | 2380 | -31.6 | Pass |
| -67.18 | 2504 | -31.6 | Pass |
| -67.18 | 2300 | -31.6 | Pass |
| -67.18 | 2584 | -31.6 | Pass |

## *Configuration 2: Laird part number: 453-00193*

| Condition | Modulation Mode | Freq. (MHz) | EIRP Power(dBm) | Limit (dBm) |
|---|---|---|---|---|
| TnomVnom | BR-1Mbps | Hopping | 8.24 | 20 |
| TnomVnom | EDR-3Mbps | Hopping | 4.03 | 20 |

Note: EIRP = Measured conducted power + Antenna gain.

## *Configuration 3: Laird part number: 453-00213*

| Condition | Modulation Mode | Freq. (MHz) | EIRP Power(dBm) | Limit (dBm) |
|---|---|---|---|---|
| TnomVnom | BR-1Mbps | Hopping | 9.30 | 20 |
| TnomVnom | EDR-3Mbps | Hopping | 5.15 | 20 |

Note: EIRP = Measured conducted power + Antenna gain.

## *Configuration 4: Laird part number: 453-00214*

| Condition | Modulation Mode | Freq. (MHz) | EIRP Power(dBm) | Limit (dBm) |
|---|---|---|---|---|
| TnomVnom | BR-1Mbps | Hopping | 8.62 | 20 |
| TnomVnom | EDR-3Mbps | Hopping | 4.49 | 20 |

Note: EIRP = Measured conducted power + Antenna gain.