# CE Test Report

| | | |
|---|---|---|
| **Equipment** | : | **Bluetooth 4.2 Dual Mode USB Dongle** |
| **Model No.** | : | **BT851** |
| **Brand Name** | : | **Laird** |
| **Applicant** | : | **Laird Technologies, Inc.** |
| **Address** | : | **W66N220 Commerce Court, Cedarburg, Wisconsin 53012, USA** |
| **Standard** | : | **EN 300 328 V2.1.1 (2016-11)** |
| **Received Date** | : | **Sep. 28, 2017** |
| **Tested Date** | : | **Sep. 29 ~ Oct. 05, 2017** |

**We, International Certification Corp., 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 may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.**

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

**James Fan / Assistant Manager** **Gary Chang / Manager**

Testing Laboratory 2732

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# Release Record

| Report No. | Version | Description | Issued Date |
|---|---|---|---|
| ER791801-02AD | Rev. 01 | Initial issue | Nov. 30, 2017 |

# Summary of Test Results

| Ref. Std. Clause | Test Items | Measured | Result |
|---|---|---|---|
| 4.3.1.2 | RF Output Power | EIRP (dBm): 8.68 | 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 |

# 1 General Description

## 1.1 Information

### 1.1.1 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. | | | | |

### 1.1.2 Antenna Details

| Ant. No. | Band/ Model | Type | Connector | Antenna Gain (dBi) |
|---|---|---|---|---|
| 1 | ACX/AT3216-B2R7HAA | Chip | NA | 0.5 |

### 1.1.3 EUT Operational Condition

| | | | |
|---|---|---|---|
| **Power Supply Type** | 5Vdc from host | | |
| **SW Version** | NA | | |
| **Operational Climatic** | ☒ Tnom (20°C) | ☒ Tmax (85°C) | ☒ Tmin (-30°C) |

### 1.1.4 Accessories

N/A

### 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

| Test Tool | Broadcom BlueTool | |
|---|---|---|
| **Modulation Mode** | **Duty Cycle Of Test Signal (%)** | **Duty Factor (dB)** |
| BR-1Mbps | 77.42% | 1.11 |
| EDR-3Mbps | 77.69% | 1.10 |

### 1.1.7 Power Setting

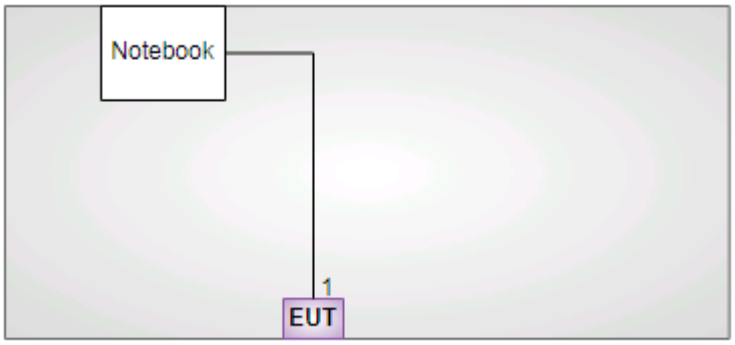
| Modulation Mode | Test Frequency (MHz) | | |
|---|---|---|---|
| | **2402** | **2441** | **2480** |
| BR-1Mbps | 8 | 8 | 8 |
| EDR-3Mbps | Power index | Power index | Power index |

## 1.2 Local Support Equipment List

| Support Equipment List | | | | | | |
|---|---|---|---|---|---|---|
| **No.** | **Equipment** | **Brand** | **Model** | **S/N** | **FCC ID** | **Signal cable / Length (m)** |
| 1 | Notebook | DELL | Latitude E6430 | J5GB4X1 | DoC | USB, 1m shielded |

## 1.3 Test Setup Chart

**Test Setup Diagram**




1. USB, 1m shielded

## 1.4 Test Equipment List and Calibration Data

| Test Item | Radiated Emissions | | | | |
|---|---|---|---|---|---|
| **Test Site** | Fully-anechoic chamber 2 / (05CH02-WS) | | | | |
| **Tested Date** | Sep. 30, 2017 | | | | |
| **Instrument** | **Manufacturer** | **Model No.** | **Serial No.** | **Calibration Date** | **Calibration Until** |
| Spectrum Analyzer | Agilent | N9010A | MY52221474 | Oct. 14, 2016 | Oct. 13, 2017 |
| Bilog Antenna 30-1000MHz | SCHWARZBECK | VULB9168 | 9168-563 | Jan. 05, 2017 | Jan. 04, 2018 |
| Horn Antenna 1G-18G | SCHWARZBECK | BBHA 9120 D | 9120D-1205 | Jan. 05, 2017 | Jan. 04, 2018 |
| Preamplifier | Agilent | 83017A | MY53270013 | Jan. 10, 2017 | Jan. 09, 2018 |
| Preamplifier 30-1000MHz | EMC | EMC02325 | 980188 | Dec. 13, 2016 | Dec. 12, 2017 |
| RF cable-1M | HUBER+SUHNER | SUCOFLEX104 | MY22622/4 | Dec. 13, 2016 | Dec. 12, 2017 |
| RF cable-1M | HUBER+SUHNER | SUCOFLEX104 | MY22623/4 | Dec. 14, 2016 | Dec. 13, 2017 |
| RF cable-3M | HUBER+SUHNER | SUCOFLEX104 | MY22621/4 | Dec. 14, 2016 | Dec. 13, 2017 |
| RF cable-4M | HUBER+SUHNER | SUCOFLEX104 | MY22579/4 | Dec. 14, 2016 | Dec. 13, 2017 |
| LF cable-0.8M | EMC | EMC8D-NM-NM-800 | EMC8D-NM-NM-800-002 | Dec. 14, 2016 | Dec. 13, 2017 |
| LF cable-3M | EMC | EMC8D-NM-NM-3000 | 131102 | Dec. 14, 2016 | Dec. 13, 2017 |
| LF cable-10M | EMC | EMC8D-NM-NM-10000 | 131101 | Dec. 14, 2016 | Dec. 13, 2017 |
| 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) | | | | |
| **Tested Date** | Sep. 29, 2017 | | | | |
| **Instrument** | **Manufacturer** | **Model No.** | **Serial No.** | **Calibration Date** | **Calibration Until** |
| Spectrum Analyzer | ROHDE&SCHWARZ | FSV40 | 101486 | Nov. 15, 2016 | Nov. 14, 2017 |
| TEMP&HUMIDITY CHAMBER | GIANT FORCE | GCT-225-40-SP-SD | MAF1212-002 | Nov. 21, 2016 | Nov. 20, 2017 |
| Power Sensor | Agilent | U2021XA | MY54070003 | Feb. 15, 2017 | Feb. 14, 2018 |
| Power Sensor | Agilent | U2021XA | MY54060013 | Feb. 15, 2017 | Feb. 14, 2018 |
| DC POWER SOURCE | GW INSTEK | GPC-6030D | EM892433 | Oct. 20, 2016 | Oct. 19, 2017 |
| Combiner(1X2) | woken | 0120A02201801O | DOM2AEW1A23 | Dec. 15, 2016 | Dec. 14, 2017 |
| Measurement Software | Sporton | Sporton_1 | 1.3.30 | 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) | | | | |
| Tested Date | Oct. 05, 2017 | | | | |
| **Instrument** | **Manufacturer** | **Model No.** | **Serial No.** | **Calibration Date** | **Calibration Until** |
| Wireless connectivity tester | ROHDE&SCHWARZ | CMW270 | 100856 | Nov. 07, 2016 | Nov. 06, 2017 |
| Signal Generator | Agilent | N5182B | MY53050081 | Apr. 21, 2017 | Apr. 20, 2018 |
| RF Cable | HUBER+SUHNER | SUCOFLEX_104 | 500202/4 | Dec. 16, 2016 | Dec. 15, 2017 |
| RF Cable | HUBER+SUHNER | SUCOFLEX_104 | 296088/4 | Dec. 16, 2016 | Dec. 15, 2017 |
| RF Cable | HUBER+SUHNER | SUCOFLEX_104 | 329023/4 | Dec. 16, 2016 | Dec. 15, 2017 |
| 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 V2.1.1 (2016-11)

## 1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. 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, conducted | ±0.537 dB | ±1,5 dB |
| Power Spectral Density, conducted | ±0.463 dB | ±3 dB |
| Unwanted Emissions, conducted | ±2.505 dB | ±3 dB |
| All emissions, radiated | ±3.401 dB | ±6 dB |
| Temperature | ±0.6 $^{o}$C | ±3 °C |
| Supply voltages | ±0.16 % | ±3 % |
| Time | ±0.1 % | ±5 % |

# 2 Test Configuration

## 2.1 Testing Condition

| Test Item | Test Site | Ambient Condition | Tested By |
|---|---|---|---|
| RF Conducted | TH01-WS | 25°C / 65% | Chris Zeng |
| Radiated Emission | 05CH02-WS | 24°C / 65% | Ryan Lee |
| Receiver Blocking | 05CH01-WS | 22.5°C / 64% | David Chiu |

## 2.2 The Worst Test Modes and Channel Details

| Test item | Modulation Mode | Test Frequency (MHz) | Data Rate | Test Configuration |
|---|---|---|---|---|
| RF Output Power | GFSK<br>8DPSK | Hopping<br>Hopping | 1 Mbps<br>3 Mbps | --- |
| Accumulated Transmit Time<br>Minimum Frequency Occupation<br>Hopping Sequence | GFSK<br>8DPSK | Hopping<br>Hopping | 1 Mbps<br>3 Mbps | --- |
| Hopping Frequency Separation | GFSK<br>8DPSK | two-adjacent | 1 Mbps<br>3 Mbps | --- |
| Occupied Channel Bandwidth | GFSK<br>8DPSK | 2402 / 2480<br>2402 / 2480 | 1 Mbps<br>3 Mbps | --- |
| Transmitter unwanted emissions in the OOB domain | GFSK<br>8DPSK | Hopping<br>Hopping | 1 Mbps<br>3 Mbps | --- |
| Transmitter Spurious Emissions<br>Receiver Spurious Emissions | GFSK<br>8DPSK | 2402 / 2480<br>2402 / 2480 | 1 Mbps<br>3 Mbps | --- |
| Receiver Blocking | GFSK | Hopping | 1 Mbps | --- |
| **NOTE:** The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Y-plane** result was found as the worst case and was shown in this report. | | | | |

# 3 Transmitter Test Results

## 3.1 RF Output Power

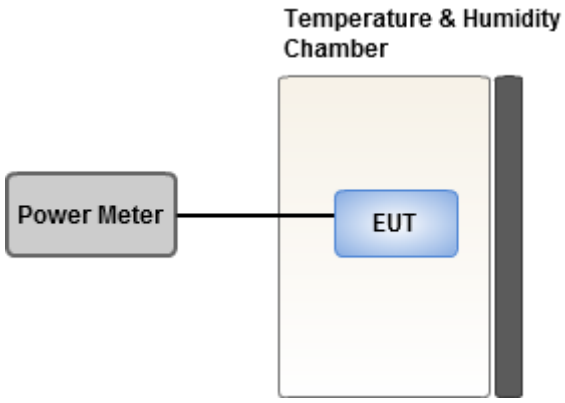
### 3.1.1 Limit of RF Output Power

The maximum RF output power 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 V2.1.1 (2016-11).

### 3.1.3 Test Setup



### 3.1.4 Test Result of RF Output Power

| Condition | Modulation Mode | Freq. (MHz) | EIRP Power | Limit (dBm) |
|---|---|---|---|---|
| TnomVnom | BR-1Mbps | Hopping | 7.80 | 20 |
| TminVnom | BR-1Mbps | Hopping | **8.68** | 20 |
| TmaxVnom | BR-1Mbps | Hopping | 7.46 | 20 |
| TnomVnom | EDR-3Mbps | Hopping | 5.31 | 20 |
| TminVnom | EDR-3Mbps | Hopping | 6.15 | 20 |
| TmaxVnom | EDR-3Mbps | Hopping | 4.80 | 20 |

## 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:

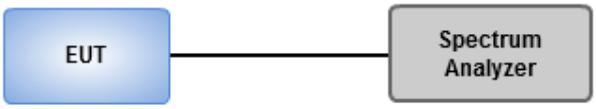
Option 1: Each hopping frequency of the hopping sequence shall be occupied at least once within a period not exceeding four times the product of the dwell time and the number of hopping frequencies in use.

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 V2.1.1 (2016-11).

### 3.2.3 Test Setup




### 3.2.4 Test Result of Hopping Sequence

| Modulation Mode | Freq. (MHz) | Hopping Mode | Hopping Channels | Hopping Channels Limits | $F_l$ 20dB (MHz) | $F_h$ 20dB (MHz) | Min. Hopping Range (%) | Min. Hopping Range Limit (%) |
|---|---|---|---|---|---|---|---|---|
| BR-1Mbps | Hopping | Non-AFH | 79 | 15 | N/A | N/A | N/A | N/A |
| EDR-3Mbps | Hopping | AFH | 20 | 20 | 2415 | 2479 | 82.05% | 70.00% |

### 3.2.5 Test Result of Accumulated Transmit Time

| Modulation Mode | Freq. (MHz) | Hopping Mode | Worst Duty Cycle Data Packet | Minimum Number of Hop Freq. (N) | Dwell Time per Hop (ms) | Number of Hop in [N x MDT] | [N x MDT] (s) | Dwell Time in [N x MDT] (ms) | Max. Dwell Time (MDT) Limit (ms) |
|---|---|---|---|---|---|---|---|---|---|
| BR-1Mbps | Hopping | Non-AFH | DH5 | 79 | 2.88 | 106.6 | 31.6 | 307.01 | 400.00 |
| EDR-3Mbps | Hopping | AFH | DH5 | 20 | 2.89 | 106.6 | 8 | 308.07 | 400.00 |

### 3.2.6 Test Result of Minimum Frequency Occupation

| Modulation Mode | Freq. (MHz) | Hopping Mode | Worst Duty Cycle Data Packet | Actual No. of Hopping Freq. (N) | Dwell Time per Hop (ms) | No. of Hop in [4 x dwell time per hop x N] | [4 x dwell time per hop x N] (ms) | Dwell Time in [4 x dwell time per hop x N] (ms) | Min. No. of Hopping Limit in [4 x dwell time per hop x N] |
|---|---|---|---|---|---|---|---|---|---|
| BR-1Mbps | Hopping | Non-AFH | DH5 | 79 | 2.88 | 3.16 | 910.08 | 9.10 | 1 |
| EDR-3Mbps | Hopping | AFH | DH5 | 20 | 2.89 | 3.16 | 231.20 | 9.13 | 1 |

## 3.3 Hopping Frequency Separation

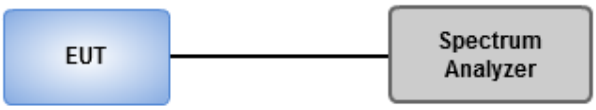
### 3.3.1 Limit of Hopping Frequency Separation

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 V2.1.1 (2016-11).

### 3.3.3 Test Setup




### 3.3.4 Test Result of Hopping Frequency Separation

| Modulation Mode | Freq. (MHz) | Hopping Mode | $F2402_{PK}$ (MHz) | $F2403_{PK}$ (MHz) | $F_{HS}$ (MHz) | Limit $F_{HS}$ (kHz) |
|---|---|---|---|---|---|---|
| BR-1Mbps | two-adjacent | Non-AFH | 2402.17 | 2403.17 | 1.0000 | 100 |
| EDR-3Mbps | two-adjacent | AFH | 2402.17 | 2403.17 | 1.0000 | 100 |

## 3.4 Occupied Channel Bandwidth

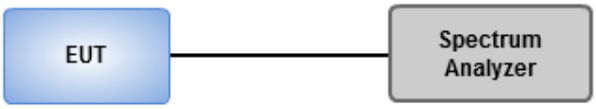
### 3.4.1 Limit of Occupied Channel Bandwidth

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 V2.1.1 (2016-11).

### 3.4.3 Test Setup

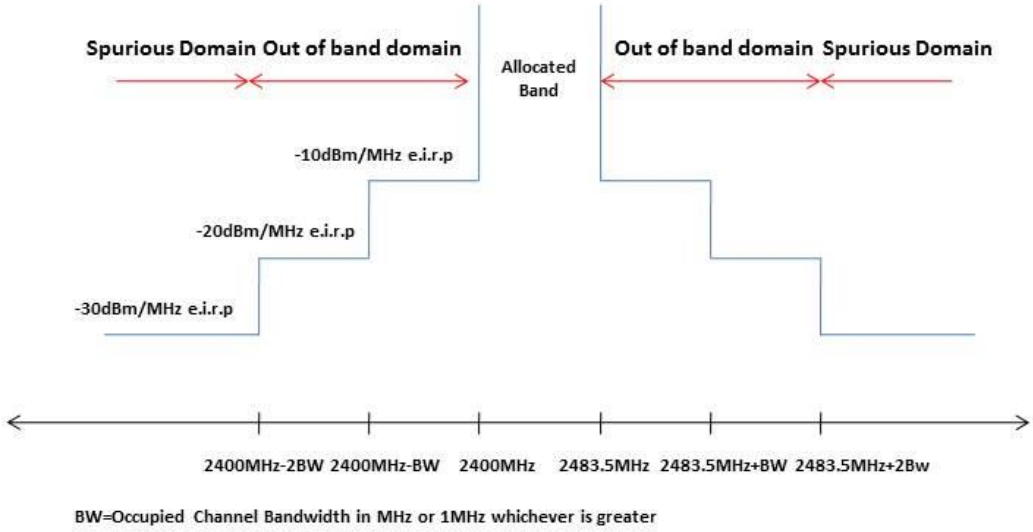



### 3.4.4 Test Result of Occupied Channel Bandwidth

| Modulation Mode | Frequency (MHz) | 99% Bandwidth (MHz) | $F_L$ at 99% BW (MHz) | $F_H$ at 99% BW (MHz) | 20dB Bandwidth (MHz) | Limit $F_L$ / $F_H$ (MHz) |
|---|---|---|---|---|---|---|
| BR-1Mbps | 2402 | 0.89 | 2401.57 | 2402.46 | 0.94 | 2400.0 |
| BR-1Mbps | 2480 | 0.89 | 2479.57 | 2480.46 | 0.95 | 2483.5 |
| EDR-3Mbps | 2402 | 1.22 | 2401.40 | 2402.62 | 1.39 | 2400.0 |
| EDR-3Mbps | 2480 | 1.23 | 2479.40 | 2480.63 | 1.39 | 2483.5 |

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

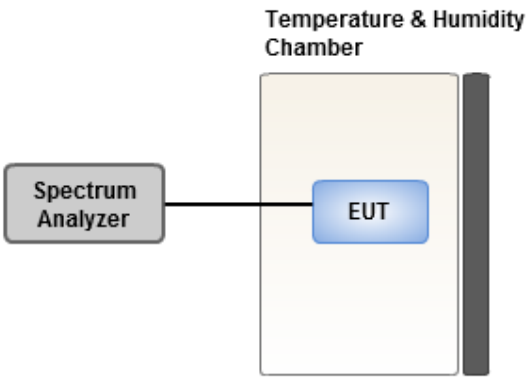
### 3.5.1 Limit of Transmitter Unwanted Emissions in the Out-Of-Band Domain




### 3.5.2 Test Procedures

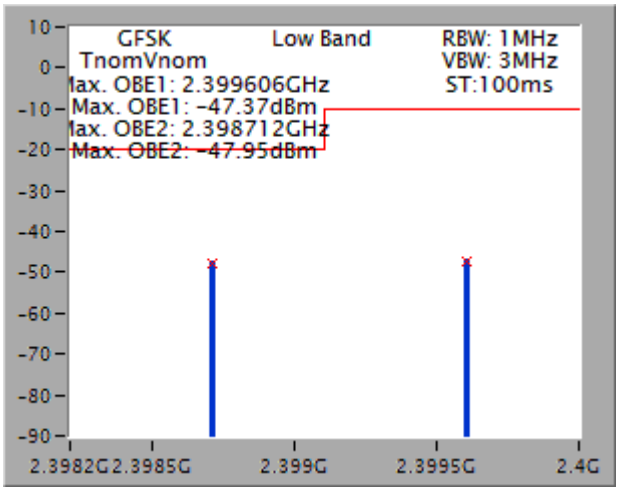
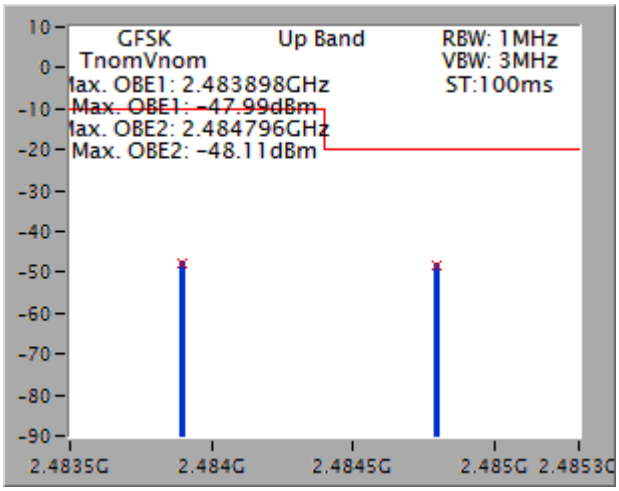
Reference to clause 5.4.8.2 of ETSI EN 300 328 V2.1.1 (2016-11).

### 3.5.3 Test Setup

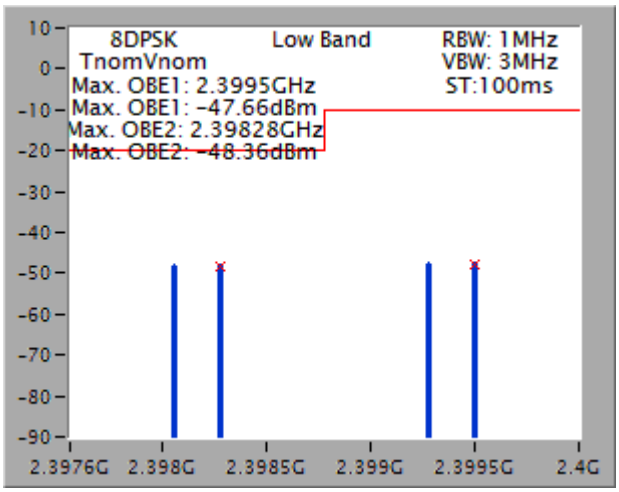


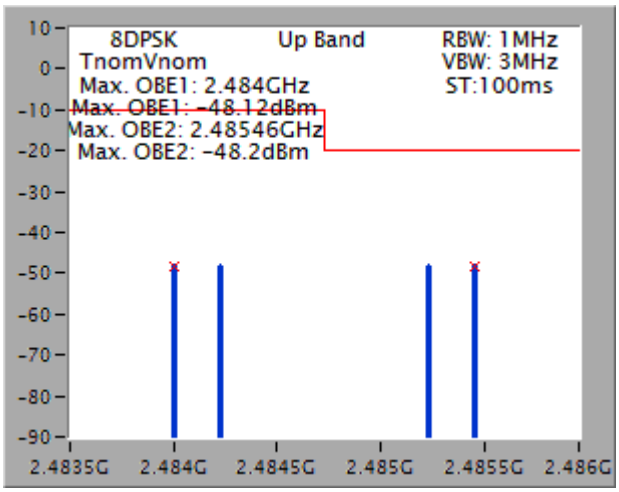
### 3.5.4 Test Result of Transmitter Unwanted Emissions in the Out-Of-Band Domain

| Condition | Modulation Mode | Freq. (MHz) | OOB Freq. (MHz) | OOB Emissions (dBm) | Limit (dBm) |
|---|---|---|---|---|---|
| TnomVnom | BR-1Mbps | Hopping | 2399.606 | -47.37 | -10 |
| TnomVnom | BR-1Mbps | Hopping | 2398.712 | -47.95 | -20 |
| TnomVnom | BR-1Mbps | Hopping | 2483.898 | -47.99 | -10 |
| TnomVnom | BR-1Mbps | Hopping | 2484.796 | -48.11 | -20 |

| Low Band | Up Band |
|---|---|
|  |  |

| Condition | Modulation Mode | Freq. (MHz) | OOB Freq. (MHz) | OOB Emissions (dBm) | Limit (dBm) |
|---|---|---|---|---|---|
| TnomVnom | EDR-3Mbps | Hopping | 2399.50 | -47.66 | -10 |
| TnomVnom | EDR-3Mbps | Hopping | 2398.28 | -48.36 | -20 |
| TnomVnom | EDR-3Mbps | Hopping | 2484.00 | -48.12 | -10 |
| TnomVnom | EDR-3Mbps | Hopping | 2485.46 | -48.20 | -20 |
| **Low Band** | | | **Up Band** | | |



## 3.6 Transmitter Unwanted Emissions in the Spurious Domain

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

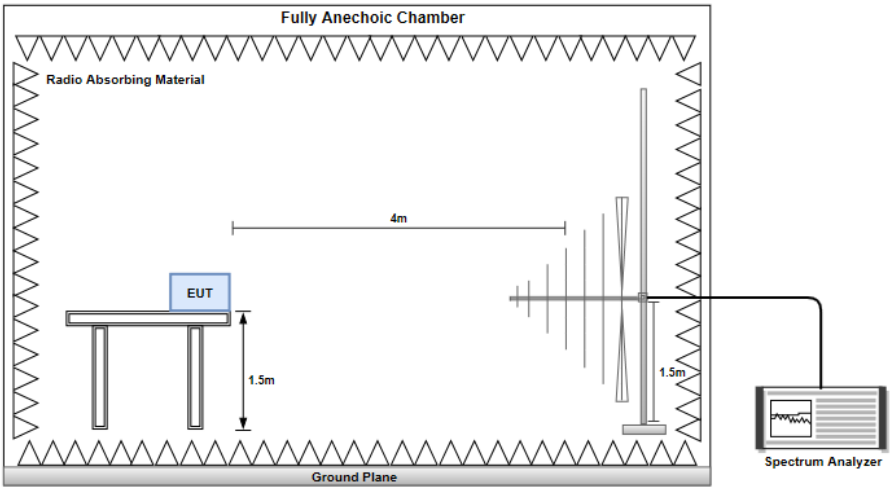
| Frequency Range (MHz) | Maximum power (dBm) | Bandwidth (kHz) |
|---|---|---|
| 30 to 47 | -36 | 100 |
| 47 to 74 | -54 | 100 |
| 74 to 87,5 | -36 | 100 |
| 87,5 to 118 | -54 | 100 |
| 118 to 174 | -36 | 100 |
| 174 to 230 | -54 | 100 |
| 230 to 470 | -36 | 100 |
| 470 to 862 | -54 | 100 |
| 862 to 1000 | -36 | 100 |
| 1000 to 12750 | -30 | 1000 |

### 3.6.2 Test Procedures

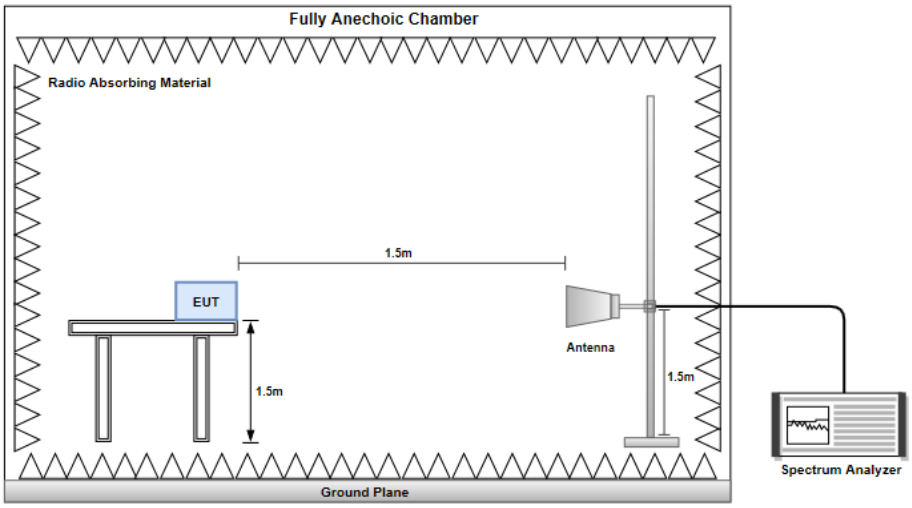
Reference to clause 5.4.9.2 of ETSI EN 300 328 V2.1.1 (2016-11).

### 3.6.3 Test Setup

**Below 1GHz**

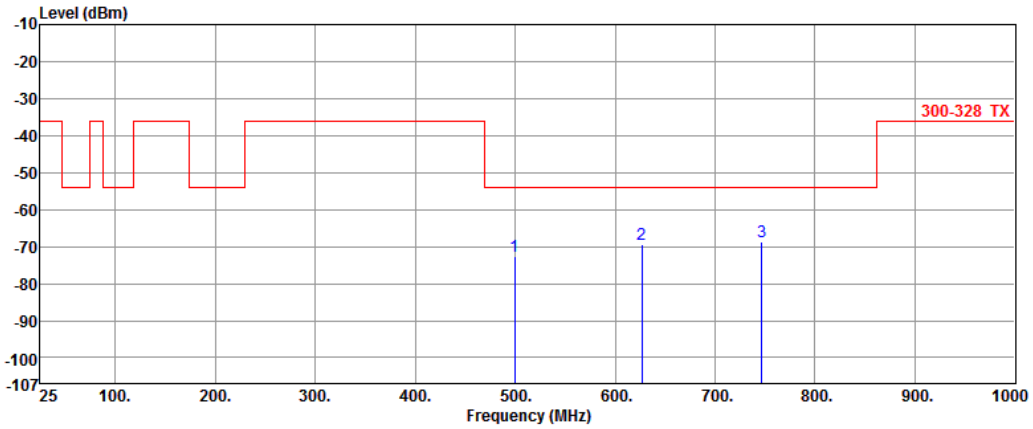



**Above 1 GHz**



### 3.6.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

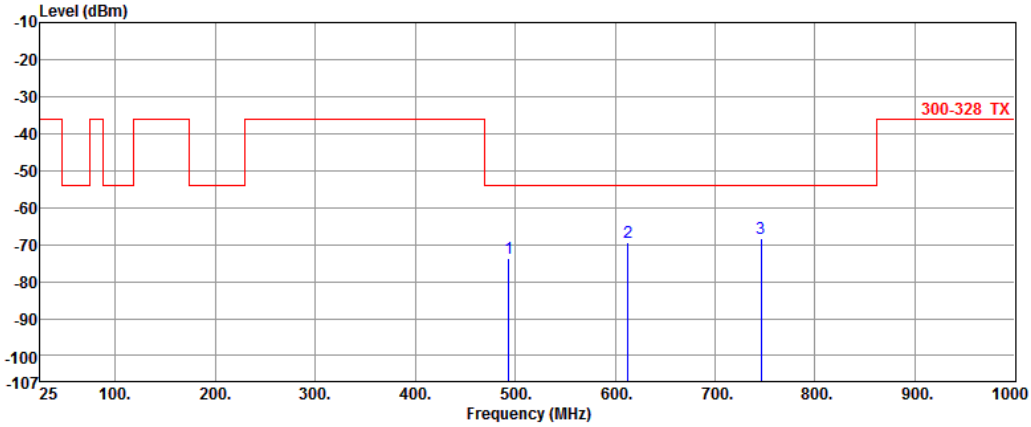
| **Modulation** | GFSK | **Test Freq. (MHz)** | 2402 |
|---|---|---|---|
| **Polarization** | Horizontal | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 499.36 | -72.52 | -54.00 | -18.52 | 3.68 | -76.20 |
| 2 | 626.69 | -69.33 | -54.00 | -15.33 | 6.81 | -76.14 |
| 3 | 746.54 | -68.82 | -54.00 | -14.82 | 9.44 | -78.26 |

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

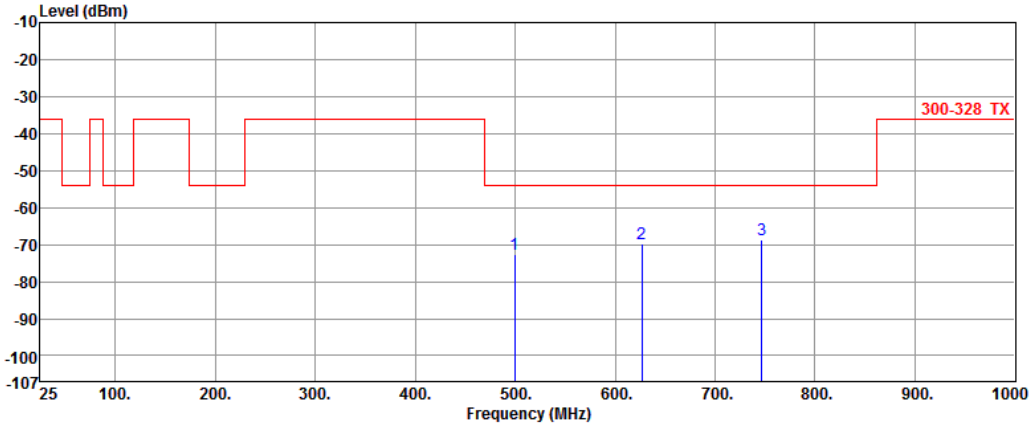
| Modulation | GFSK | Test Freq. (MHz) | 2402 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 493.33 | -73.79 | -54.00 | -19.79 | 3.58 | -77.37 |
| 2 | 612.65 | -69.46 | -54.00 | -15.46 | 7.32 | -76.78 |
| 3 | 746.42 | -68.45 | -54.00 | -14.45 | 8.48 | -76.93 |

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

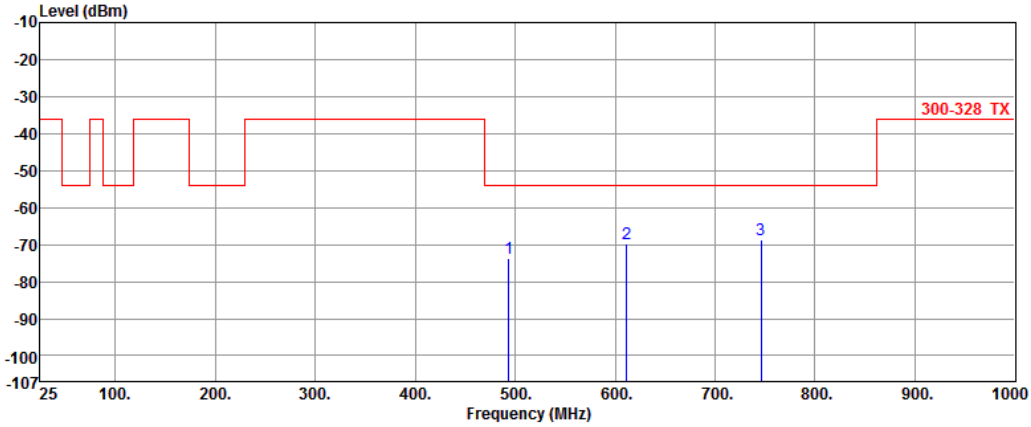
| Modulation | GFSK | Test Freq. (MHz) | 2480 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 499.36 | -72.79 | -54.00 | -18.79 | 3.68 | -76.47 |
| 2 | 626.54 | -69.66 | -54.00 | -15.66 | 6.81 | -76.47 |
| 3 | 746.63 | -68.70 | -54.00 | -14.70 | 9.44 | -78.14 |

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

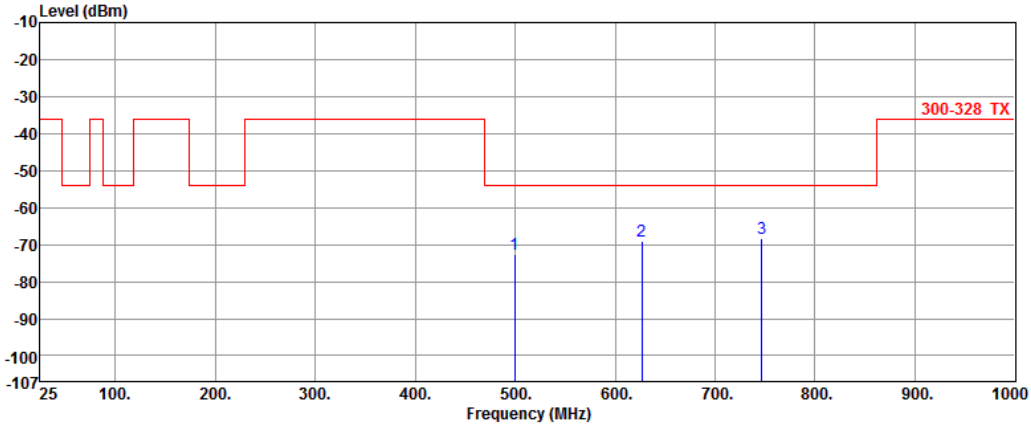
| Modulation | GFSK | Test Freq. (MHz) | 2480 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 493.35 | -73.88 | -54.00 | -19.88 | 3.58 | -77.46 |
| 2 | 611.66 | -69.66 | -54.00 | -15.66 | 7.32 | -76.98 |
| 3 | 746.41 | -68.78 | -54.00 | -14.78 | 8.48 | -77.26 |

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

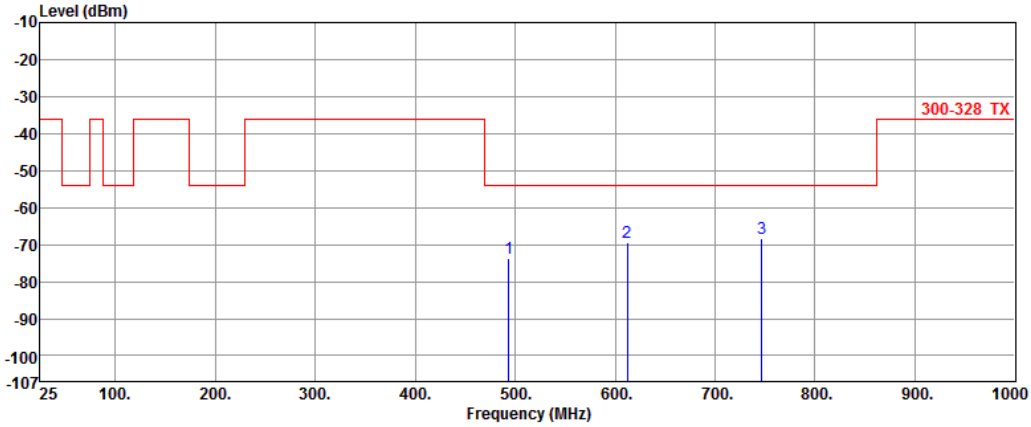
| Modulation | 8DPSK | Test Freq. (MHz) | 2402 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 499.54 | -72.64 | -54.00 | -18.64 | 3.68 | -76.32 |
| 2 | 626.87 | -69.16 | -54.00 | -15.16 | 6.81 | -75.97 |
| 3 | 746.54 | -68.32 | -54.00 | -14.32 | 9.44 | -77.76 |

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

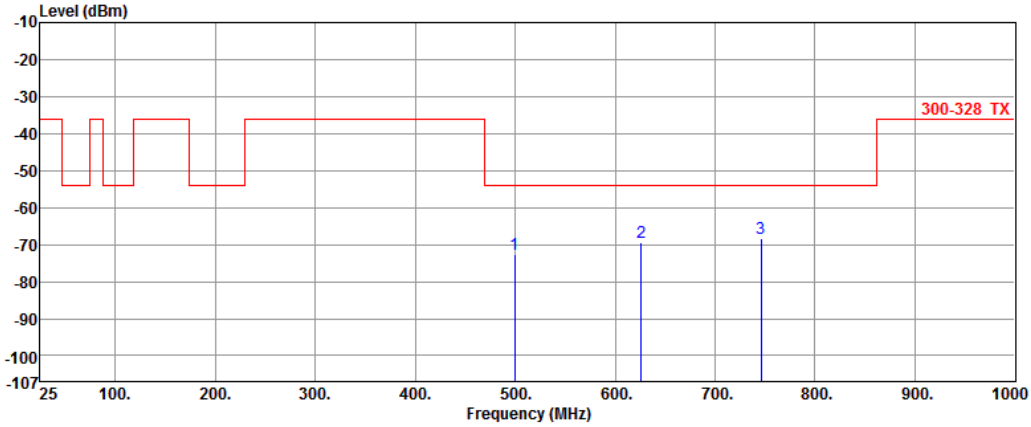
| Modulation | 8DPSK | Test Freq. (MHz) | 2402 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 493.54 | -73.58 | -54.00 | -19.58 | 3.59 | -77.17 |
| 2 | 612.37 | -69.35 | -54.00 | -15.35 | 7.32 | -76.67 |
| 3 | 746.54 | -68.51 | -54.00 | -14.51 | 8.47 | -76.98 |

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

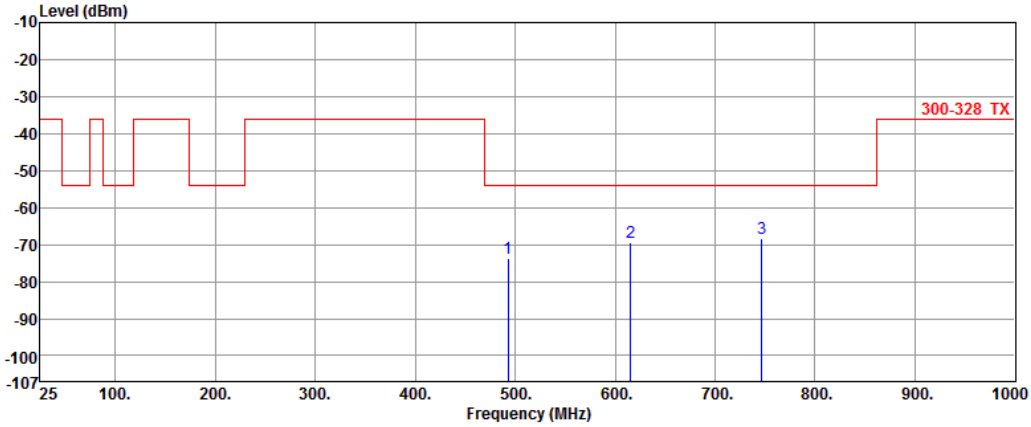
| Modulation | 8DPSK | Test Freq. (MHz) | 2480 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 499.35 | -72.79 | -54.00 | -18.79 | 3.68 | -76.47 |
| 2 | 626.35 | -69.48 | -54.00 | -15.48 | 6.82 | -76.30 |
| 3 | 746.36 | -68.42 | -54.00 | -14.42 | 9.44 | -77.86 |

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 | | |

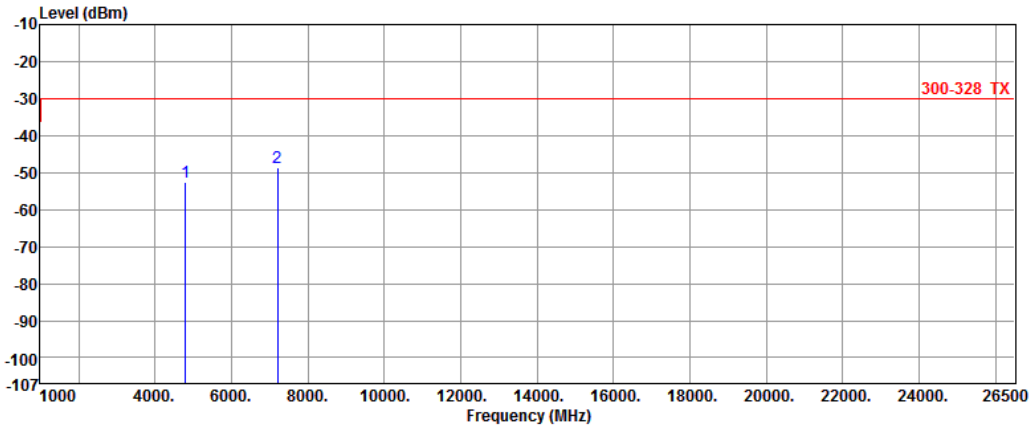



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 492.70 | -73.88 | -54.00 | -19.88 | 3.57 | -77.45 |
| 2 | 615.63 | -69.49 | -54.00 | -15.49 | 7.31 | -76.80 |
| 3 | 746.65 | -68.45 | -54.00 | -14.45 | 8.47 | -76.92 |

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

### 3.6.5 Transmitter Radiated Unwanted Emissions (Above 1GHz)

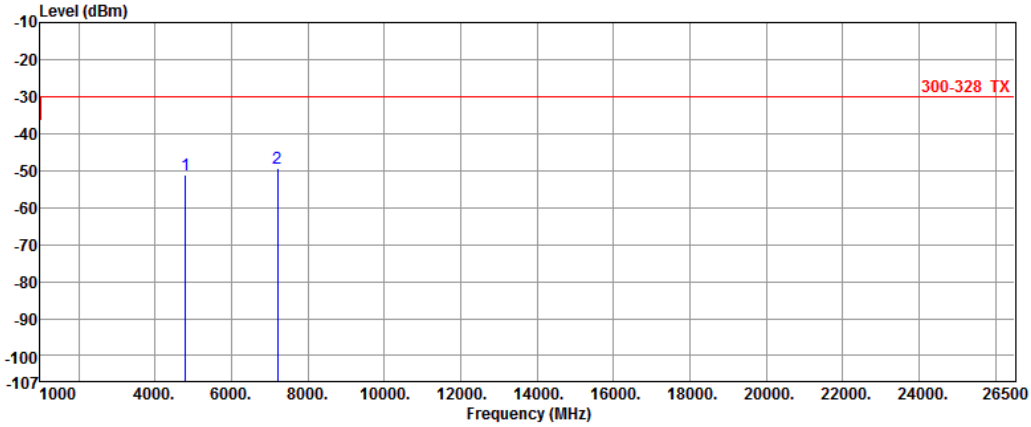
| **Modulation** | GFSK | **Test Freq. (MHz)** | 2402 |
|---|---|---|---|
| **Polarization** | Horizontal | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4804.26 | -52.48 | -30.00 | -22.48 | 11.64 | -64.12 |
| 2 | 7205.96 | -48.70 | -30.00 | -18.70 | 17.38 | -66.08 |

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

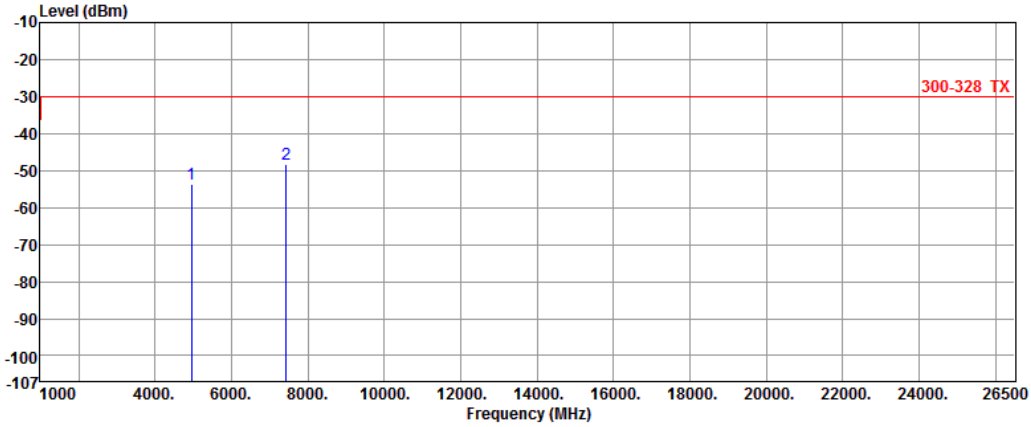
| Modulation | GFSK | Test Freq. (MHz) | 2402 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4803.98 | -51.22 | -30.00 | -21.22 | 11.89 | -63.11 |
| 2 | 7205.98 | -49.23 | -30.00 | -19.23 | 17.16 | -66.39 |

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

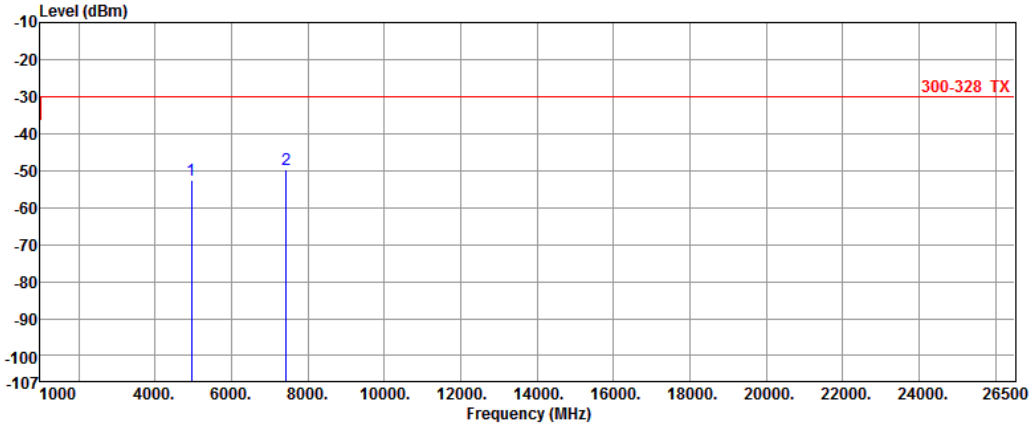
| Modulation | GFSK | Test Freq. (MHz) | 2480 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4959.98 | -53.69 | -30.00 | -23.69 | 12.23 | -65.92 |
| 2 | 7440.04 | -48.39 | -30.00 | -18.39 | 17.00 | -65.39 |

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

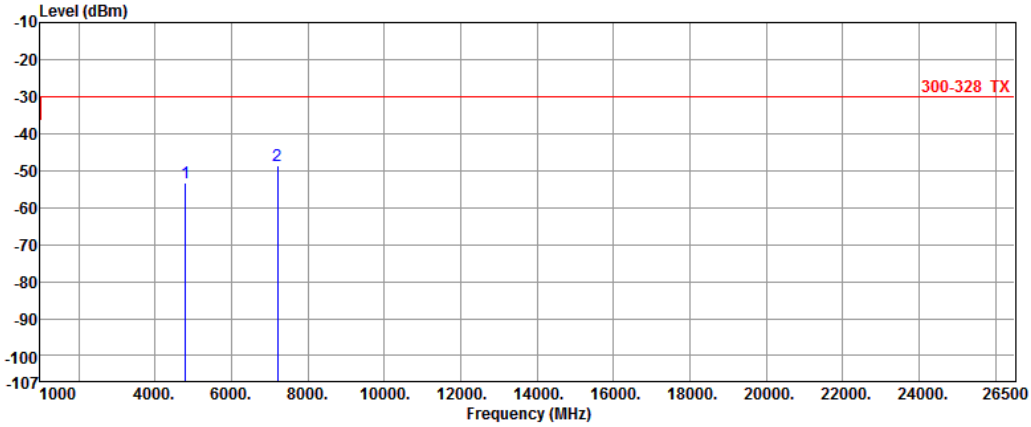
| Modulation | GFSK | Test Freq. (MHz) | 2480 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4959.90 | -52.43 | -30.00 | -22.43 | 11.66 | -64.09 |
| 2 | 7439.98 | -49.85 | -30.00 | -19.85 | 17.71 | -67.56 |

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

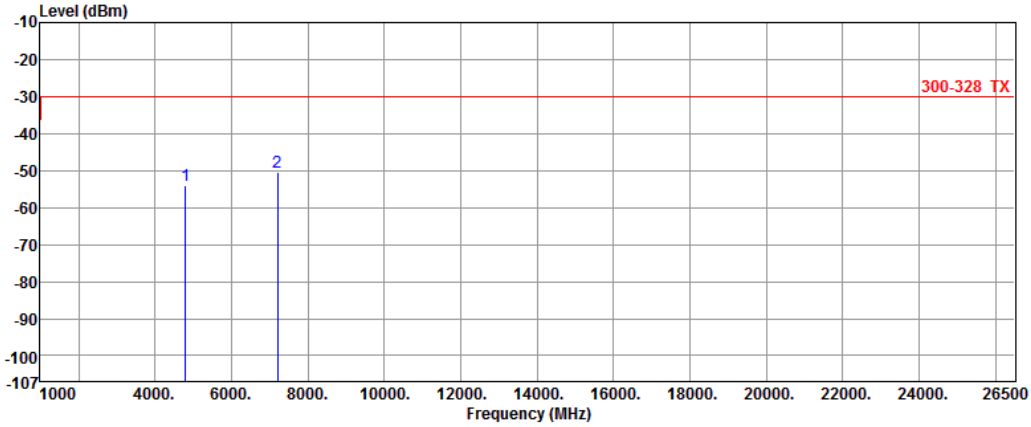
| Modulation | 8DPSK | Test Freq. (MHz) | 2402 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4804.06 | -53.28 | -30.00 | -23.28 | 11.64 | -64.92 |
| 2 | 7205.99 | -48.66 | -30.00 | -18.66 | 17.38 | -66.04 |

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

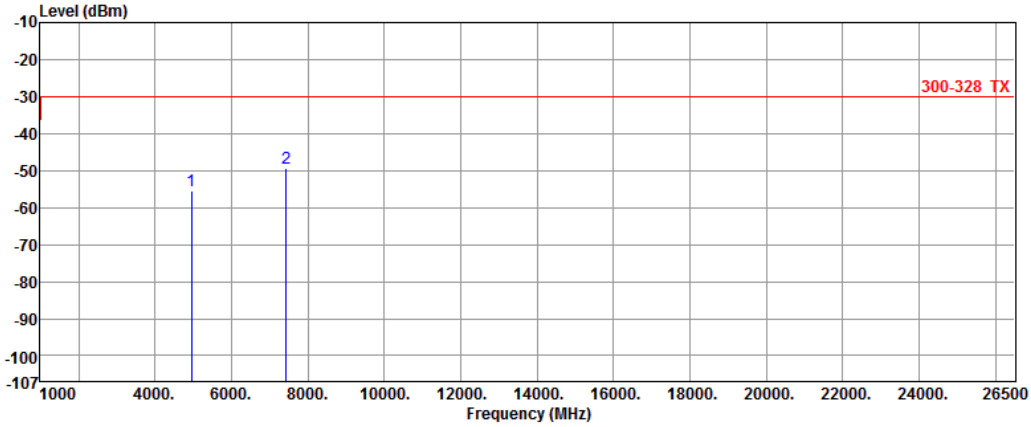
| Modulation | 8DPSK | Test Freq. (MHz) | 2402 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4803.96 | -53.99 | -30.00 | -23.99 | 11.89 | -65.88 |
| 2 | 7206.03 | -50.49 | -30.00 | -20.49 | 17.16 | -67.65 |

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

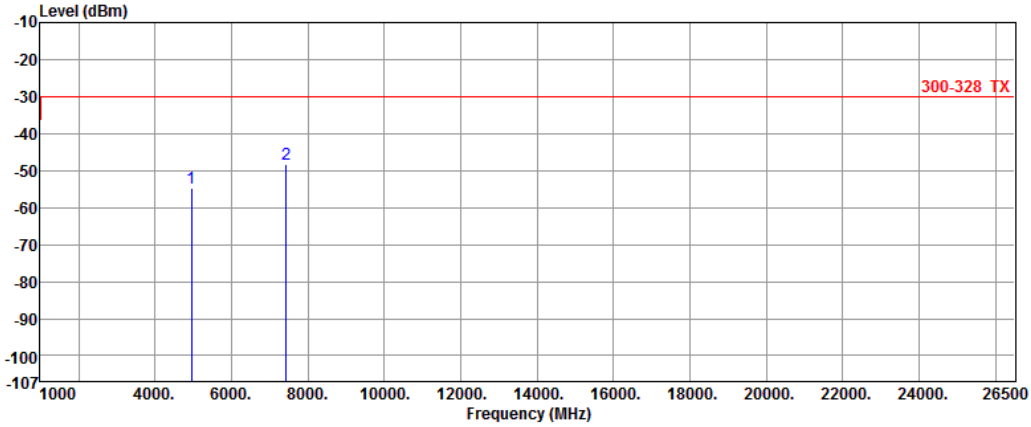
| Modulation | 8DPSK | Test Freq. (MHz) | 2480 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4959.99 | -55.33 | -30.00 | -25.33 | 12.23 | -67.56 |
| 2 | 7439.98 | -49.54 | -30.00 | -19.54 | 17.00 | -66.54 |

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 | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4960.07 | -54.87 | -30.00 | -24.87 | 11.66 | -66.53 |
| 2 | 7439.98 | -48.28 | -30.00 | -18.28 | 17.71 | -65.99 |

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

# 4 Receiver Test Results

## 4.1 Receiver Spurious Emissions

### 4.1.1 Limit of Receiver Spurious Emissions

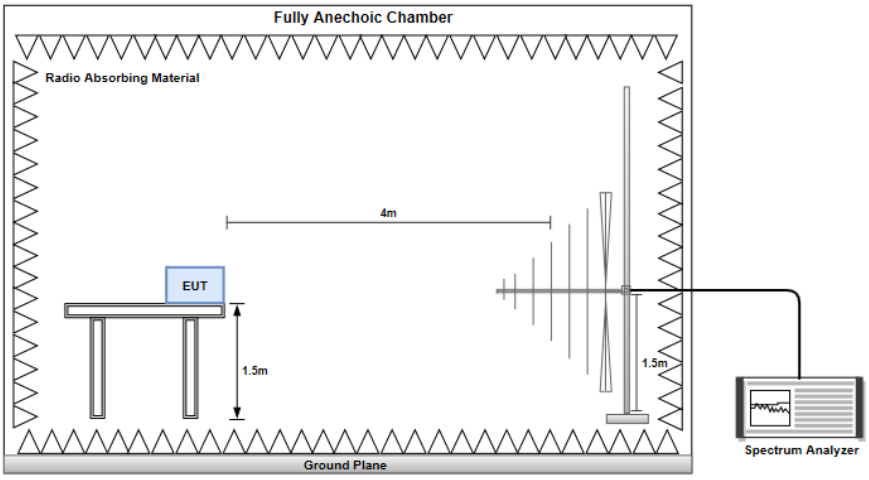
| Frequency Range | Maximum power (dBm) | Measurement bandwidth(kHz) |
|---|---|---|
| 30 MHz to 1 GHz | -57 | 100 |
| Above 1 GHz to 12,75 GHz | -47 | 1000 |

### 4.1.2 Test Procedures

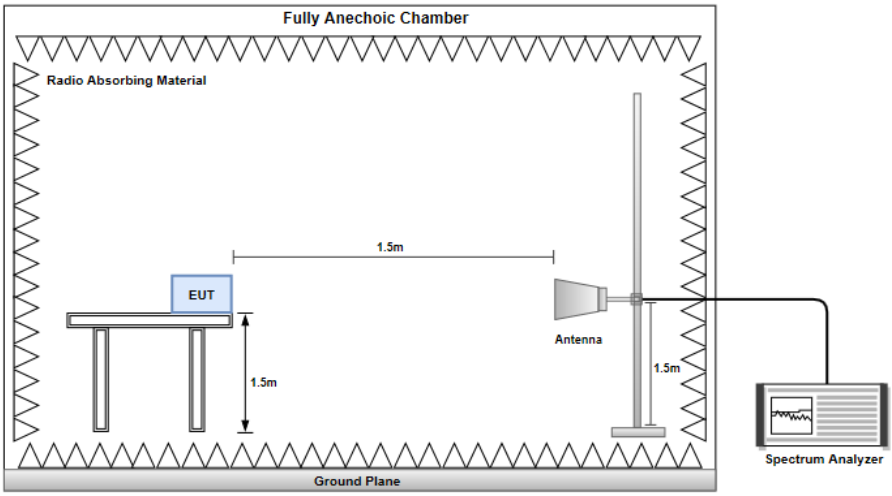
Reference to clause 5.4.10.2 of ETSI EN 300 328 V2.1.1 (2016-11).

### 4.1.3 Test Setup

**Below 1GHz**

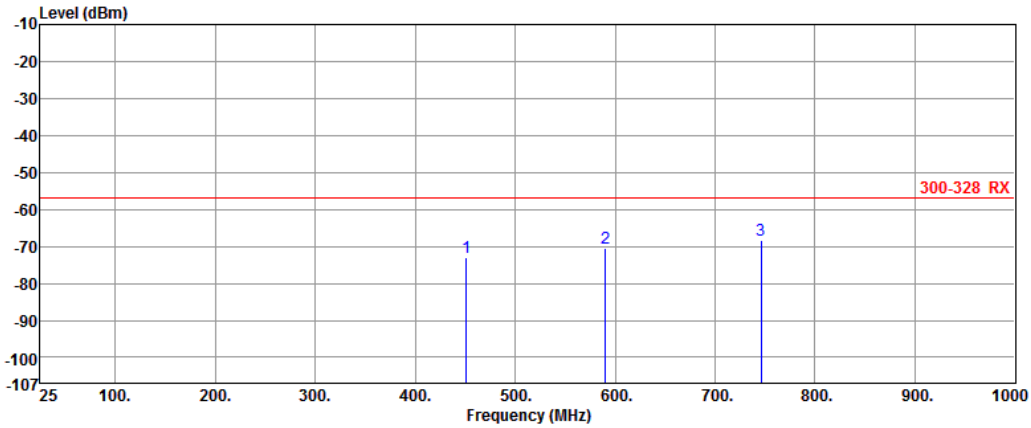



**Above 1 GHz**



### 4.1.4 Receiver Radiated Unwanted Emissions (Below 1GHz)

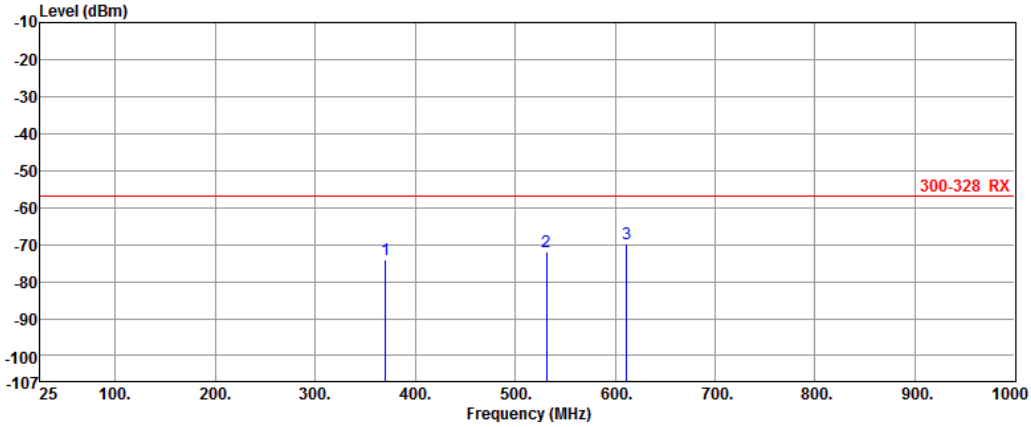
| **Modulation** | GFSK | **Test Freq. (MHz)** | 2402 |
|---|---|---|---|
| **Polarization** | Horizontal | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 451.35 | -73.15 | -57.00 | -16.15 | 2.96 | -76.11 |
| 2 | 590.35 | -70.52 | -57.00 | -13.52 | 6.36 | -76.88 |
| 3 | 746.35 | -68.48 | -57.00 | -11.48 | 9.44 | -77.92 |

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

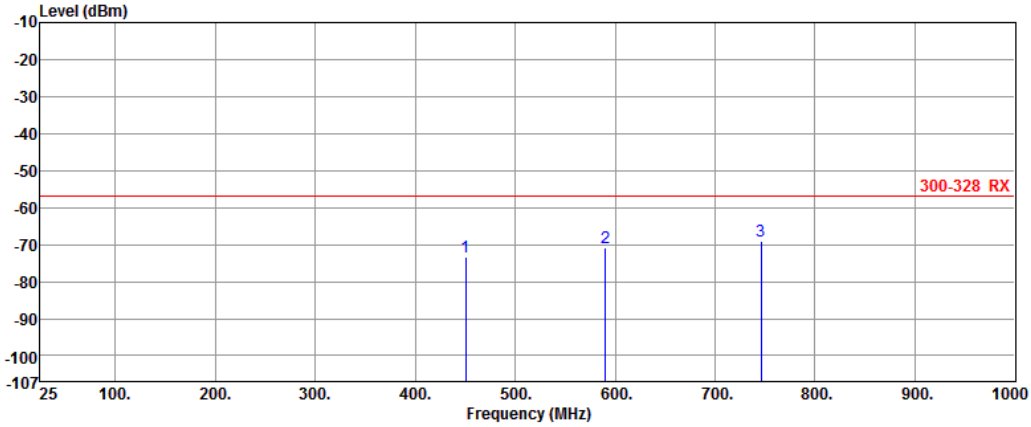
| Modulation | GFSK | Test Freq. (MHz) | 2402 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 370.65 | -74.16 | -57.00 | -17.16 | 0.99 | -75.15 |
| 2 | 531.52 | -71.78 | -57.00 | -14.78 | 5.50 | -77.28 |
| 3 | 611.52 | -69.78 | -57.00 | -12.78 | 7.32 | -77.10 |

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

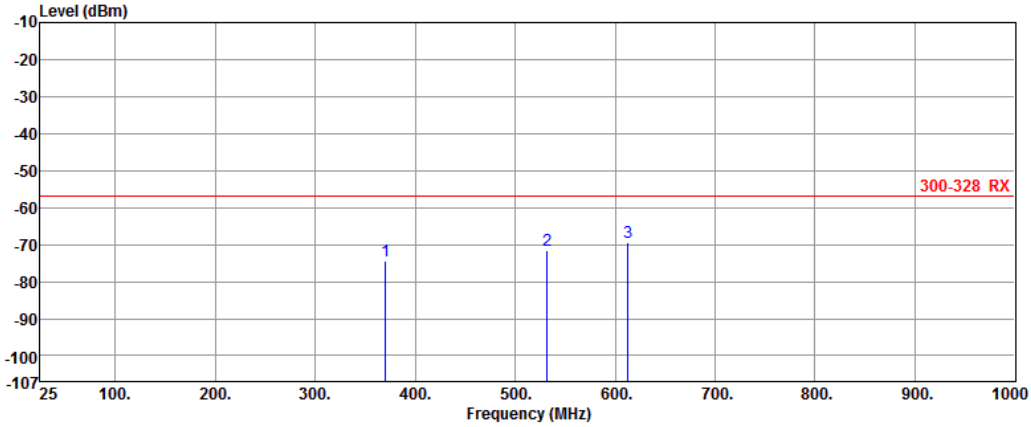
| Modulation | GFSK | Test Freq. (MHz) | 2480 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 450.69 | -73.45 | -57.00 | -16.45 | 2.97 | -76.42 |
| 2 | 590.32 | -70.99 | -57.00 | -13.99 | 6.36 | -77.35 |
| 3 | 746.35 | -68.98 | -57.00 | -11.98 | 9.44 | -78.42 |

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

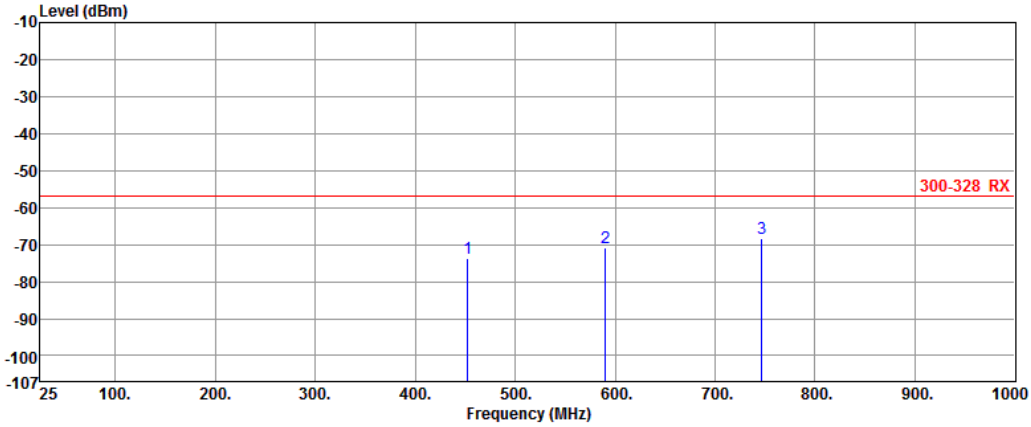
| Modulation | GFSK | Test Freq. (MHz) | 2480 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 370.32 | -74.47 | -57.00 | -17.47 | 1.00 | -75.47 |
| 2 | 531.88 | -71.45 | -57.00 | -14.45 | 5.50 | -76.95 |
| 3 | 612.63 | -69.46 | -57.00 | -12.46 | 7.32 | -76.78 |

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

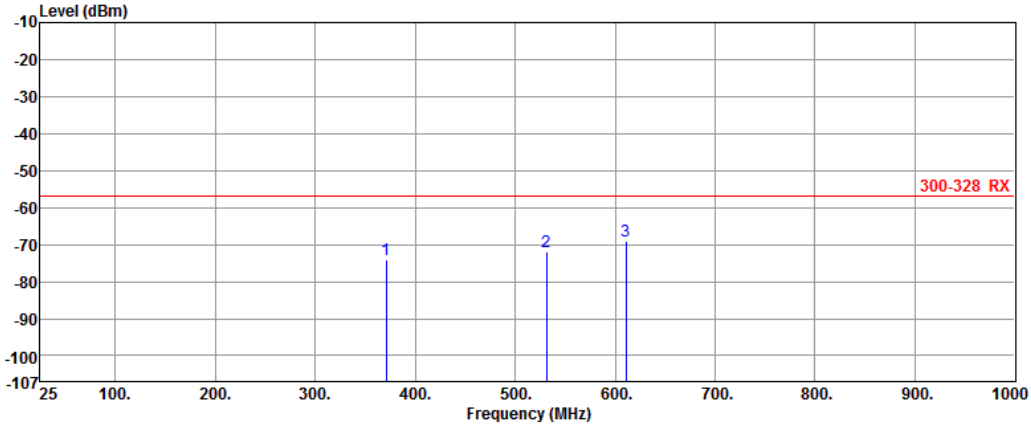
| Modulation | 8DPSK | Test Freq. (MHz) | 2402 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 452.52 | -73.65 | -57.00 | -16.65 | 2.93 | -76.58 |
| 2 | 590.47 | -70.78 | -57.00 | -13.78 | 6.36 | -77.14 |
| 3 | 746.63 | -68.32 | -57.00 | -11.32 | 9.44 | -77.76 |

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

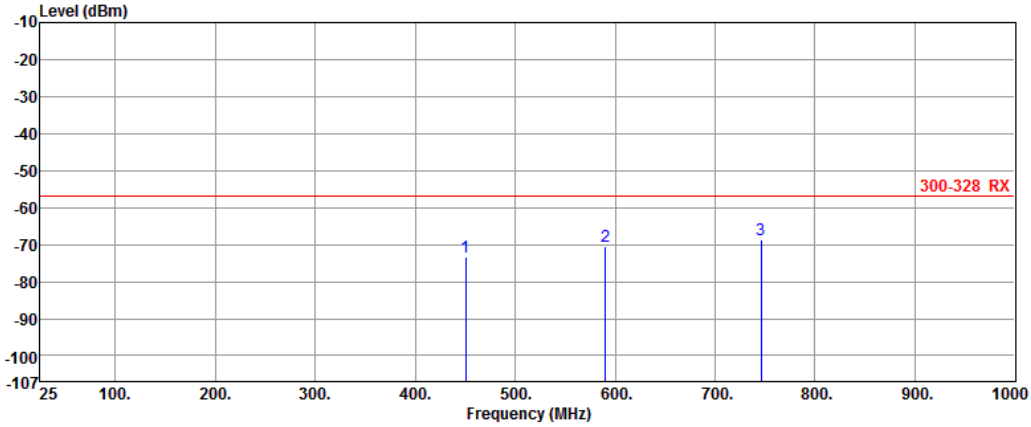
| Modulation | 8DPSK | Test Freq. (MHz) | 2402 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 370.84 | -74.16 | -57.00 | -17.16 | 0.99 | -75.15 |
| 2 | 531.32 | -71.85 | -57.00 | -14.85 | 5.49 | -77.34 |
| 3 | 610.65 | -69.16 | -57.00 | -12.16 | 7.32 | -76.48 |

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

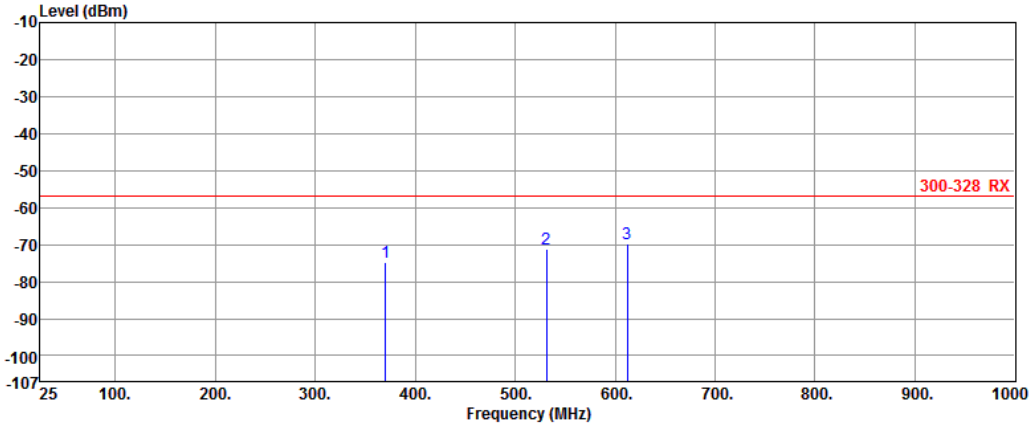
| Modulation | 8DPSK | Test Freq. (MHz) | 2480 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 450.65 | -73.45 | -57.00 | -16.45 | 2.97 | -76.42 |
| 2 | 590.65 | -70.48 | -57.00 | -13.48 | 6.37 | -76.85 |
| 3 | 746.35 | -68.87 | -57.00 | -11.87 | 9.44 | -78.31 |

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 | | |

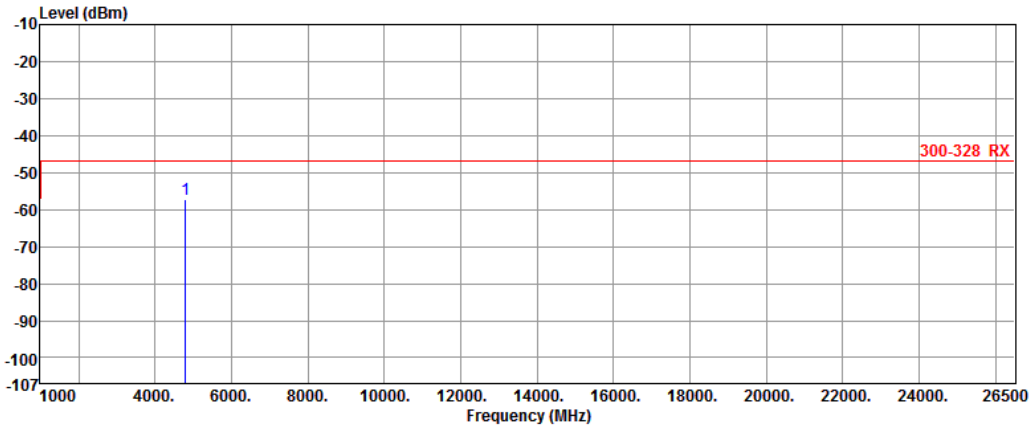



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 370.42 | -74.65 | -57.00 | -17.65 | 0.99 | -75.64 |
| 2 | 531.56 | -71.17 | -57.00 | -14.17 | 5.50 | -76.67 |
| 3 | 612.35 | -69.75 | -57.00 | -12.75 | 7.32 | -77.07 |

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

### 4.1.5 Receiver Radiated Unwanted Emissions (Above 1GHz)

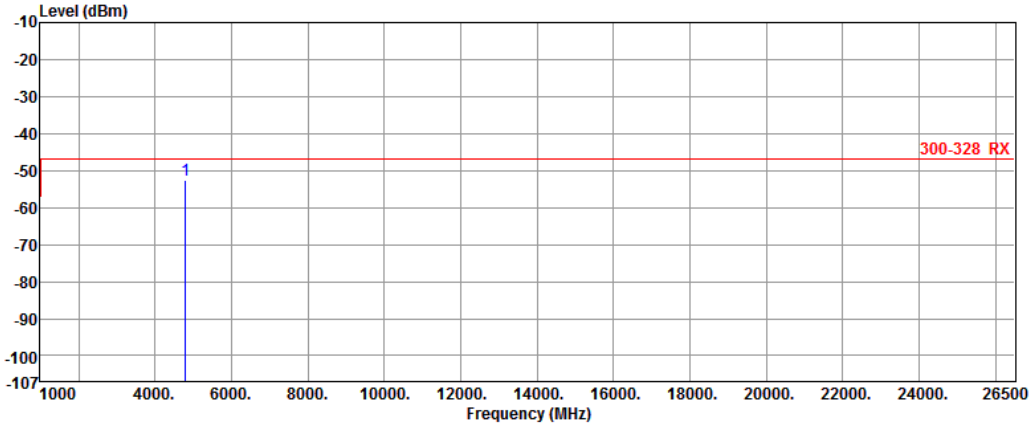
| **Modulation** | GFSK | **Test Freq. (MHz)** | 2402 |
|---|---|---|---|
| **Polarization** | Horizontal | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4794.02 | -57.13 | -47.00 | -10.13 | 11.64 | -68.77 |

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

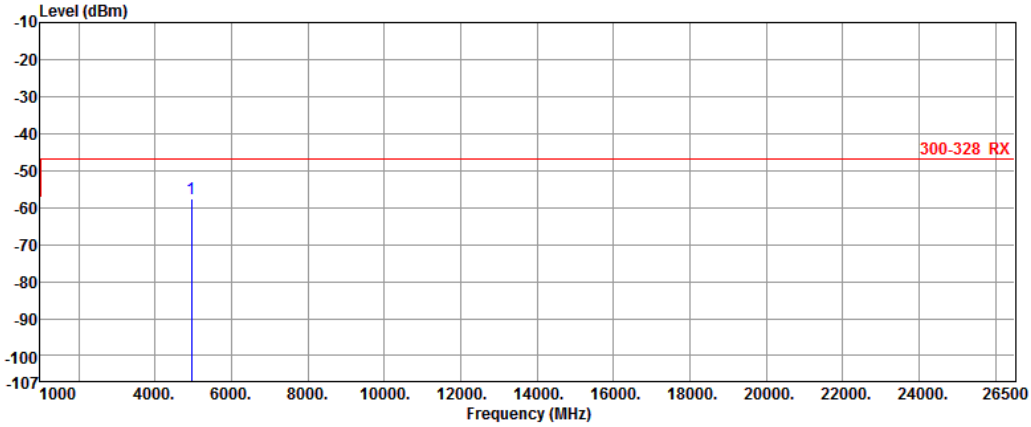
| Modulation | GFSK | Test Freq. (MHz) | 2402 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4793.98 | -52.53 | -47.00 | -5.53 | 11.84 | -64.37 |

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

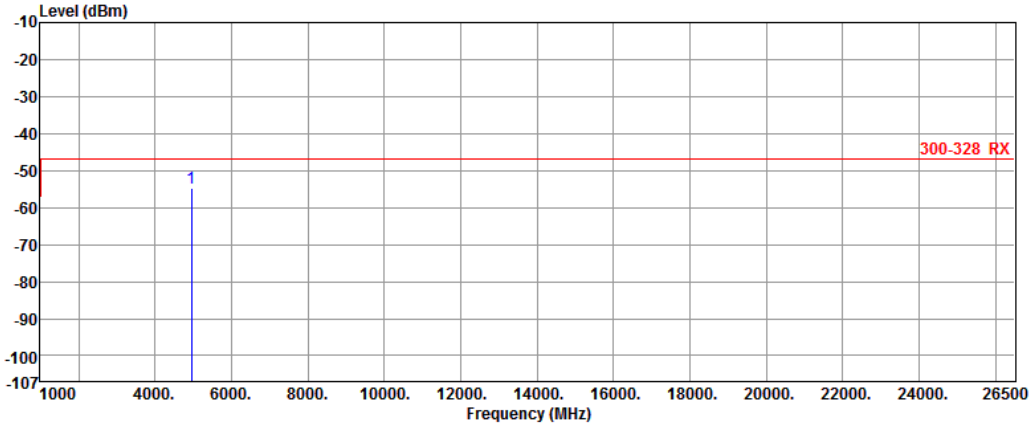
| Modulation | GFSK | Test Freq. (MHz) | 2480 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4950.02 | -57.65 | -47.00 | -10.65 | 12.12 | -69.77 |

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

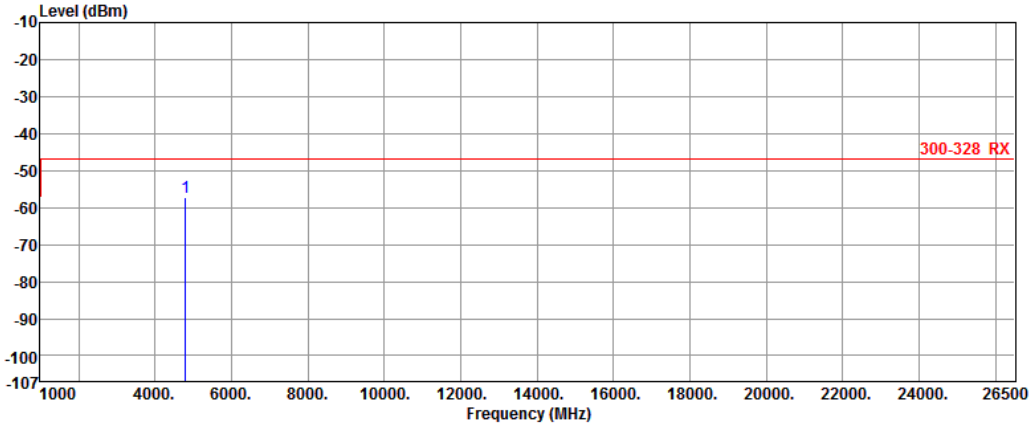
| Modulation | GFSK | Test Freq. (MHz) | 2480 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4950.06 | -54.78 | -47.00 | -7.78 | 11.61 | -66.39 |

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

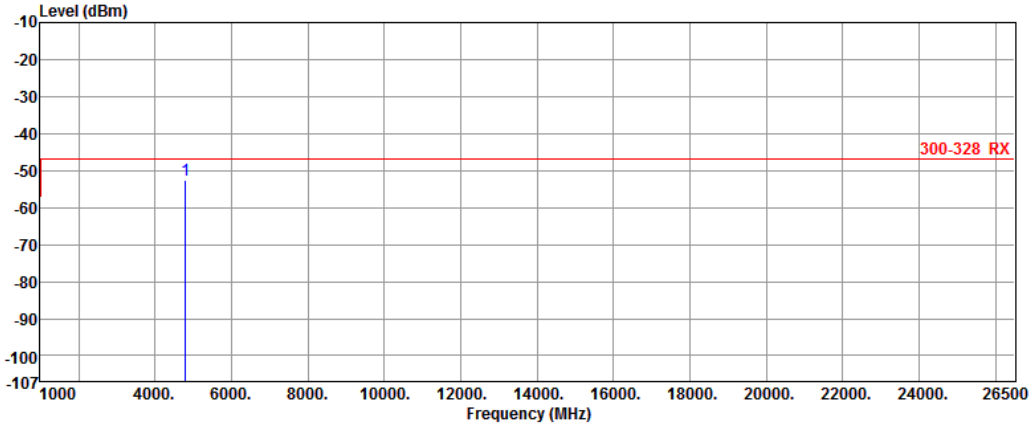
| Modulation | 8DPSK | Test Freq. (MHz) | 2402 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4794.10 | -57.24 | -47.00 | -10.24 | 11.64 | -68.88 |

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

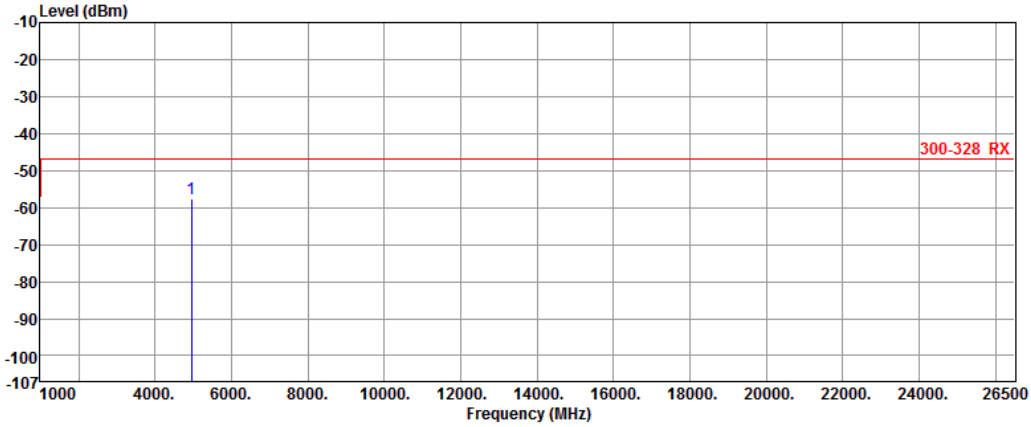
| Modulation | 8DPSK | Test Freq. (MHz) | 2402 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4793.78 | -52.65 | -47.00 | -5.65 | 11.83 | -64.48 |

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

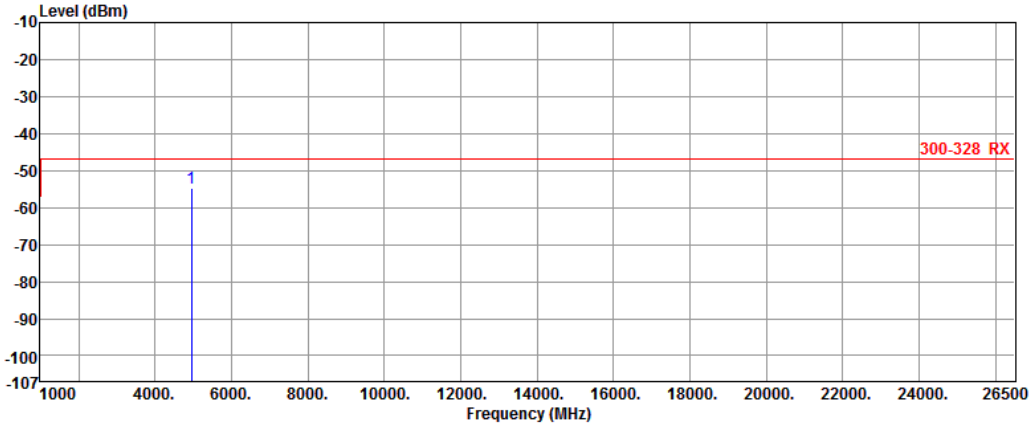
| Modulation | 8DPSK | Test Freq. (MHz) | 2480 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4950.02 | -57.65 | -47.00 | -10.65 | 12.12 | -69.77 |

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 | | |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dB | dB | dBm |
| 1 | 4950.01 | -54.85 | -47.00 | -7.85 | 11.61 | -66.46 |

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

# 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)** | **Blocking Signal Frequency (MHz)** | **Blocking Signal Power (dBm) (see Note 2)** | **Type of Blocking Signal** |
| $P_{min}$ + 6 dB | 2 380<br>2 503,5 | -53 | CW |
| $P_{min}$ + 6 dB | 2 300<br>2 330<br>2 360 | -47 | CW |
| $P_{min}$ + 6 dB | 2 523,5<br>2 553,5<br>2 583,5<br>2 613,5<br>2 643,5<br>2 673,5 | -47 | CW |
| Note 1: $P_{min}$ is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria (The minimum performance criterion shall be a PER less than or equal to 10 %) in the absence of any blocking signal.<br>Note 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain. | | | |

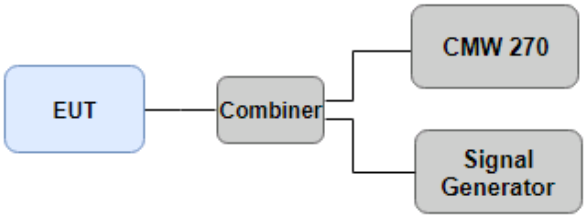
| Receiver Blocking Parameters for Receiver Category 2 Equipment Limit | | | |
|---|---|---|---|
| **Wanted Signal Mean Power from Companion Device (dBm)** | **Blocking Signal Frequency (MHz)** | **Blocking Signal Power (dBm) (see Note 2)** | **Type of Blocking Signal** |
| $P_{min}$ + 6 dB | 2 380<br>2 503,5 | -57 | CW |
| $P_{min}$ + 6 dB | 2 300<br>2 583,5 | -47 | CW |
| Note 1: $P_{min}$ is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria (The minimum performance criterion shall be a PER less than or equal to 10 %) in the absence of any blocking signal.<br>Note 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain. | | | |

| Receiver Blocking Parameters for Receiver Category 3 Equipment Limit | | | |
|---|---|---|---|
| **Wanted Signal Mean Power from Companion Device (dBm)** | **Blocking Signal Frequency (MHz)** | **Blocking Signal Power (dBm) (see Note 2)** | **Type of Blocking Signal** |
| $P_{min}$ + 12 dB | 2 380<br>2 503,5 | -57 | CW |
| $P_{min}$ + 12 dB | 2 300<br>2 583,5 | -47 | CW |
| Note 1: $P_{min}$ is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria (The minimum performance criterion shall be a PER less than or equal to 10 %) in the absence of any blocking signal.<br>Note 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain. | | | |

### 5.1.2 Test Procedures

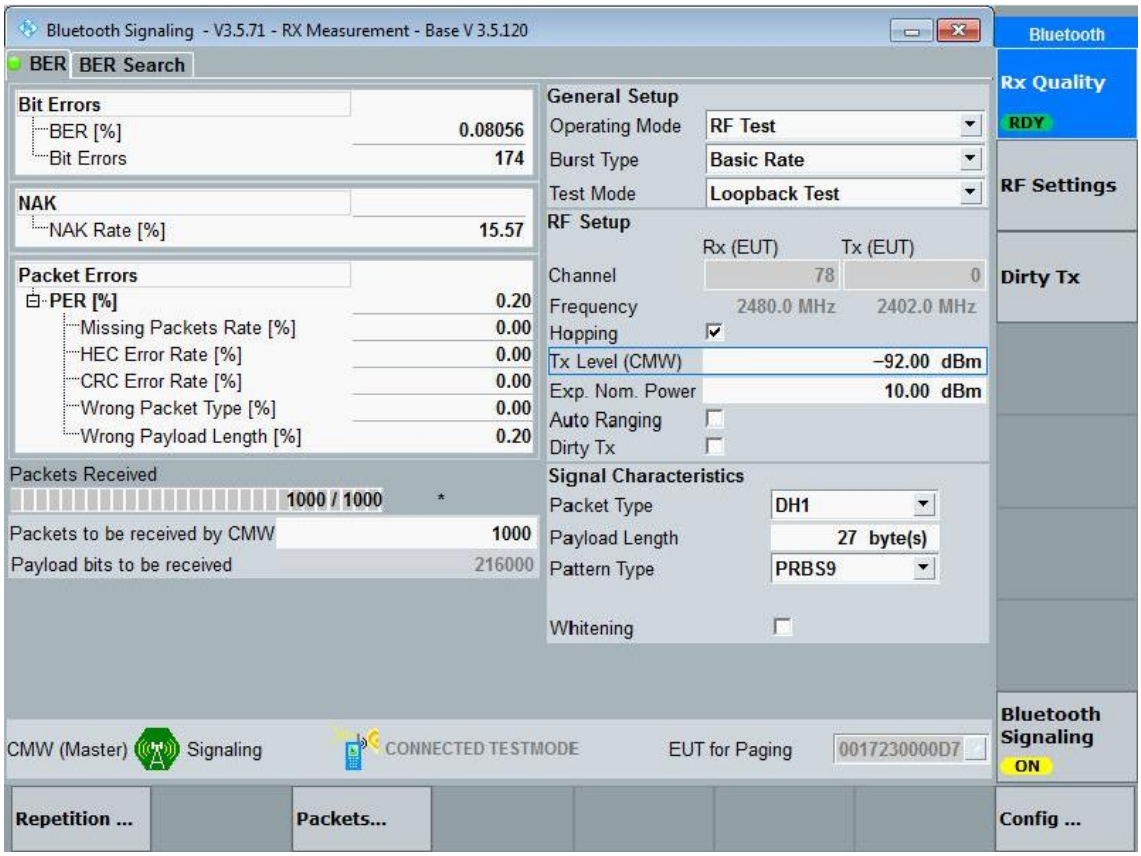
Reference to clause 5.4.11.2 of ETSI EN 300 328 V2.1.1 (2016-11).

### 5.1.3 Test Setup



### 5.1.4 Test Result of Receiver Blocking

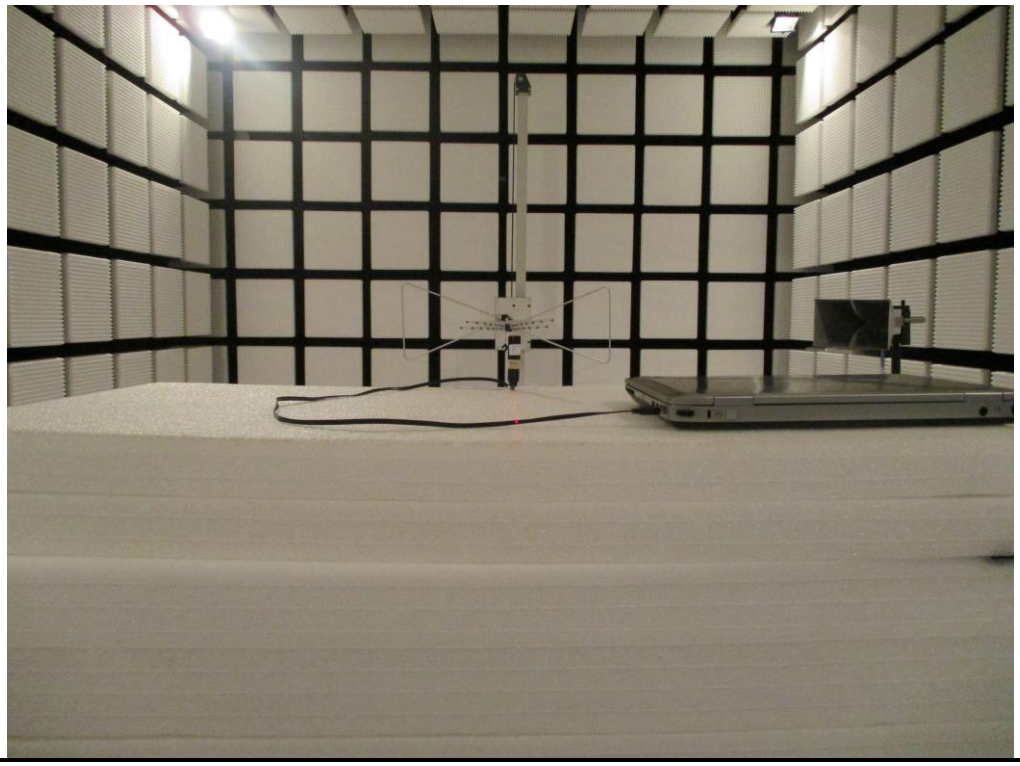
**Hopping mode**



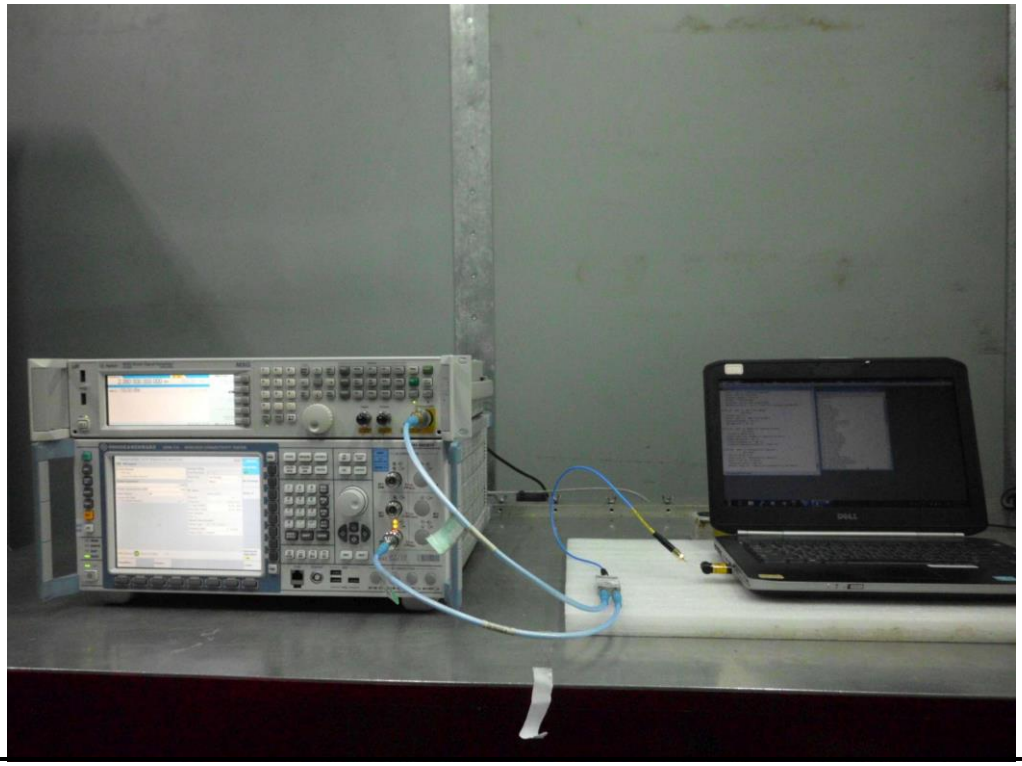

| Sensitivity Level | -92 | | dBm |
|---|---|---|---|
| **Want Signal Mean Power form Companion Device (dBm)** | **Blocking Signal Frequency (MHz)** | **Blocking Signal Power (dBm)** | **Test Result** |
| -86 | 2380.0 | -56.5 | Pass |
| -86 | 2503.5 | | Pass |
| -86 | 2300.0 | -46.5 | Pass |
| -86 | 2583.5 | | Pass |

# 6 Photographs of the Test Configuration

**Spurious Emission Test above 30MHz**



**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 Corp (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** | **Kwei Shan** | **Kwei Shan Site II** |
|---|---|---|
| Tel: 886-2-2601-1640 | Tel: 886-3-271-8666 | Tel: 886-3-271-8640 |
| No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C. | No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C. | No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.. |

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

Tel: 886-3-271-8666
Fax: 886-3-318-0155
Email: ICC_Service@icertifi.com.tw

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