China

# FCC - TEST REPORT

| | | | | |
|---|---|---|---|---|
| Report Number | : | **709502100632-00** | Date of Issue: | December 7, 2021 |

| | | |
|---|---|---|
| Model | : | **FOTRIC 326M etc. (Details refer to page 4)** |
| Product Type | : | Infrared Thermal Camera |
| FCC ID | : | 2AZTCMOTH |
| Applicant | : | FOTRIC INC. |
| Address | : | No. 14, Lane 2500, Xiupu Road, Pudong, 201201 Shanghai, PEOPLE'S REPUBLIC OF CHINA |
| Manufacturer | : | FOTRIC INC. |
| Address | : | No. 14, Lane 2500, Xiupu Road, Pudong, 201201 Shanghai, PEOPLE'S REPUBLIC OF CHINA |
| Test Result | : | ■ **Positive** ☐ **Negative** |
| Total pages including Appendices | : | 64 |

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# 1 Table of Contents





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# 2 Details about the Test Laboratory

**Details about the Test Laboratory**

| | |
|---|---|
| Test Site 1 | TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch<br>No.16 Lane, 1951 Du Hui Road,<br>Shanghai 201108,<br>P.R. China |
| Telephone: | +86 21 6141 0123 |
| Fax: | +86 21 6140 8600 |
| FCC Registration No.: | 820234 |
| FCC Designation Number: | CN1183 |
| ISED#: | 25988 |
| CAB identifier: | CN0101 |

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# 3 Description of the Equipment Under Test

| | |
|---|---|
| Product: | Infrared Thermal Camera |
| Model no.: | FOTRIC 326Q, FOTRIC 325Q, FOTRIC 325Q, FOTRIC 323Q, FOTRIC 323Q, FOTRIC 321Q, FOTRIC 316, FOTRIC 315, FOTRIC 314, FOTRIC 313, FOTRIC 312, FOTRIC 311, FOTRIC 336Q, FOTRIC 335Q, FOTRIC 334Q, FOTRIC 333Q, FOTRIC 332QA, FOTRIC 331QA, FOTRIC 336QA, FOTRIC 335QA, FOTRIC 334QA, FOTRIC 333QA, FOTRIC 332QA, FOTRIC 331QA, FOTRIC 326X, FOTRIC 325X, FOTRIC 324X, FOTRIC 323X, FOTRIC 322X, FOTRIC 321X, FOTRIC 316B, FOTRIC 315B, FOTRIC 314B, FOTRIC 313B, FOTRIC 312B, FOTRIC 311B, FOTRIC 326M, FOTRIC 325M, FOTRIC 325M, FOTRIC 323M, FOTRIC 322M, FOTRIC 321M, FOTRIC 326F, FOTRIC 325F, FOTRIC 323F, FOTRIC 322F, FOTRIC 321F, FOTRIC 326G, FOTRIC 325G, FOTRIC 324G, FOTRIC 323G, FOTRIC 322G, FOTRIC 321G, FOTRIC 329G, FOTRIC 328G, FOTRIC 327G, FOTRIC 329P, FOTRIC 328P, FOTRIC 327P, FOTRIC 326P, FOTRIC 325P, FOTRIC 324P, FOTRIC 323P, FOTRIC 322P, FOTRIC 321P, FOTRIC 326E, FOTRIC 325E, FOTRIC 324E, FOTRIC 323E, FOTRIC 322E, FOTRIC 321E, FOTRIC 329E, FOTRIC 328E, FOTRIC 327E, FOTRIC 311CE, FOTRIC 691B |
| Sample(s) Tested: | FOTRIC 326M |
| FCC ID: | 2AZTCMOTH |
| Options and accessories: | Test harness |
| Rating: | DC 3.6V Li-ion Battery |
| RF Transmission Frequency: | 2402~2480MHz for Bluetooth<br>For 2.4G & 5G Wi-Fi<br>For 802.11b/g/n-HT20: 2412~2462 MHz<br>For 802.11n-HT40: 2422~2452 MHz<br>5180~5240 MHz (U-NII-1)<br>5260~5320 MHz (U-NII-2A)<br>5500~5720 MHz (U-NII-2C)<br>5745~5825 MHz (U-NII-3) |
| No. of Operated Channel: | 79 channels for Bluetooth 4.2+EDR<br>40 channels for Bluetooth 4.2 BLE<br>For 2.4GHz Wi-Fi |


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| Operation Frequency each of channel For 802.11b/g/n(H20) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 1 | 2412MHz | 4 | 2427MHz | 7 | 2442MHz | 10 | 2457MHz |
| 2 | 2417MHz | 5 | 2432MHz | 8 | 2447MHz | 11 | 2462MHz |
| 3 | 2422MHz | 6 | 2437MHz | 9 | 2452MHz | | |

| Operation Frequency each of channel For 802.11n(H40) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| | | 4 | 2427MHz | 7 | 2442MHz | | |
| | | 5 | 2432MHz | 8 | 2447MHz | | |
| 3 | 2422MHz | 6 | 2437MHz | 9 | 2452MHz | | |

5180~5240 MHz (U-NII-1)
5260~5320 MHz (U-NII-2A)
5500~5720 MHz (U-NII-2C)
5745~5825 MHz (U-NII-3)

Modulation: Bluetooth 4.2+EDR FHSS: GFSK, π/4 DQPSK, 8DPSK
Bluetooth 4.2 BLE digital modulation: GFSK
For Wi-Fi: Direct Sequence Spread Spectrum (DSSS) for 802.11b
Orthogonal Frequency Division Multiplexing (OFDM) for 802.11a/b/g/n/ac

Hardware Version: V02

Software Version: 1.0.13

Data speed: 1. Bluetooth 4.2+EDR FHSS: 1Mbps, 2Mbps, 3Mbps
2. Bluetooth 4.2 BLE digital modulation: 1Mbps
3. Wi-Fi: 11b 1 ~ 11Mbps,
11g/a 6 ~ 54Mbps, 11n HT20 6.5 ~ 72.2Mbps,
11n HT 40 13.5 ~ 150Mbps,
11ac VHT40 13.5 ~ 200Mbps,
11ac VHT80 29.3 ~ 433.3Mbps

Duty Cycle: 100%

Antenna Type: PIFA Antenna

Antenna Gain: 2.5dBi

Description of the EUT: The Equipment Under Test (EUT) is an Infrared Thermal Camera with Bluetooth and Wi-Fi Module. The EUT support Bluetooth 4.2+EDR and support BLE function and Wi-Fi operated at 5GHz and 2.4GHz.
Only 2.4G Bluetooth 4.2+EDR included in this report.

Test sample no.: SHA-564832-1

The sample's mentioned in this report is/are submitted/ supplied/ manufactured by client. The laboratory therefore assumes no responsibility for accuracy of information on the brand name, model number, origin of manufacture, consignment, antenna gain or any information supplied.


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# 4 Summary of Test Standards

| Test Standards | |
|---|---|
| FCC Part 15 Subpart C 10-1-2020 Edition | PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators |

All the test methods were according to Public Notice DA 00-705 -Frequency Hopper Spread Spectrum Test Procedure released by FCC on March 30, 2000, KDB558074 D01 v05r02 and C63.10 (2013).


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# 5 Summary of Test Results

| Technical Requirements | | | | |
|---|---|---|---|---|
| **FCC Part 15 Subpart C** | | | | |
| Test Condition | | Pages | Test Site | Test Result |
| §15.207 | Conducted emission AC power port | 13-15 | Site 1 | Pass |
| §15.247(b)(1) | Conducted peak output power | 16-19 | Site 1 | Pass |
| §15.247(a)(2) | 6dB bandwidth | --- | --- | N/A |
| §15.247(a)(1) | 20dB Occupied Bandwidth | 20-23 | Site 1 | Pass |
| §15.247(a)(1) | Carrier frequency separation | 24-26 | Site 1 | Pass |
| §15.247(a)(1)(iii) | Number of hopping frequencies | 27-28 | Site 1 | Pass |
| §15.247(a)(1)(iii) | Dwell Time | 29-32 | Site 1 | Pass |
| §15.247(e) | Power spectral density* | --- | --- | N/A |
| §15.247(d) | Spurious RF conducted emissions | 33-49 | Site 1 | Pass |
| §15.247(d) | Band edge | 50-55 | Site 1 | Pass |
| §15.247(d) & §15.209 & | Spurious radiated emissions for transmitter and receiver | 56-60 | Site 1 | Pass |
| §15.203 | Antenna requirement | See note 1 | | Pass |

Note 1: The EUT uses a patch antenna, which gain is 2.5dBi. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.

15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

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# 6 General Remarks

**Remarks**

This submittal(s) (test report) is intended for FCC ID: 2AZTCMOTH, complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C rules.

This report in only for Bluetooth EDR. The TX and RX range is 2402MHz-2480MHz.

According to the client's declaration, all the models have the same electrical circuit board and mechanical structure, except pixel, or shell color differences, so we chose the FOTRIC 326M to perform all the tests.

**SUMMARY:**

All tests according to the regulations cited on page 7 were

■ - Performed

☐ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

☐ - **Does not** fulfill the general approval requirements.

Sample Received Date: July 9, 2021

Testing Start Date: July 13, 2021

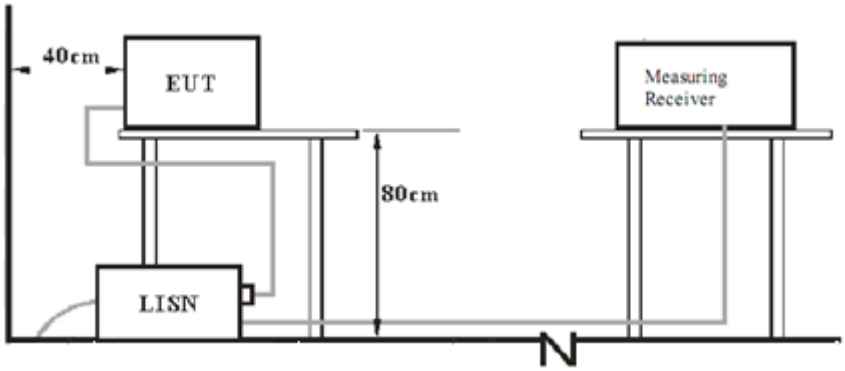
Testing End Date: December 7, 2021

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch

| Reviewed by: | Prepared by: | Tested by: |
|---|---|---|
| Hui TONG | Zhining ZHANG | Wenqiang LU |
| Review Engineer | Project Engineer | Test Engineer |

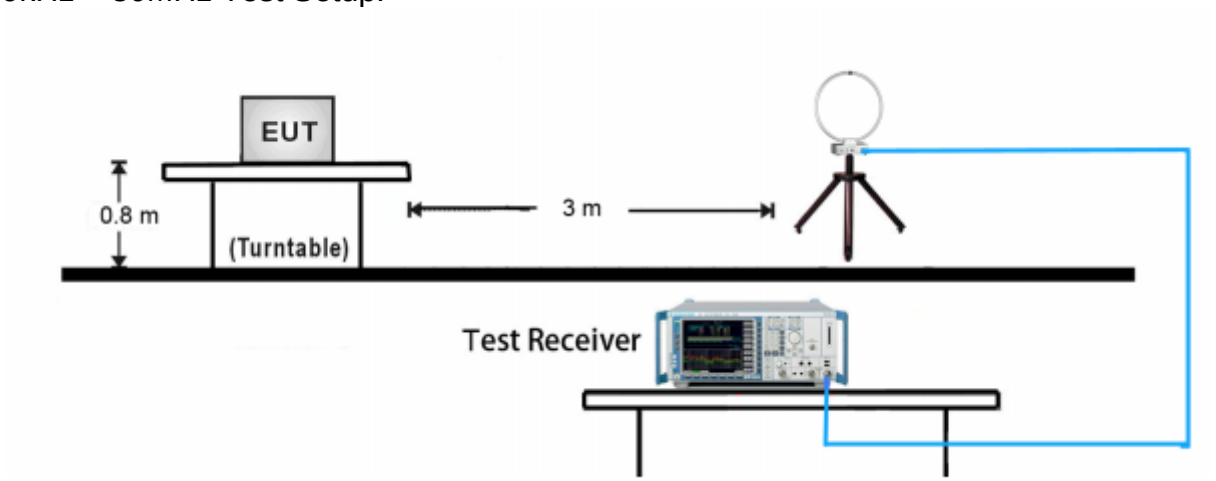
# 7 Test Setups

## 7.1 AC Power Line Conducted Emission test setups




## 7.2 Radiated test setups

9kHz ~ 30MHz Test Setup:





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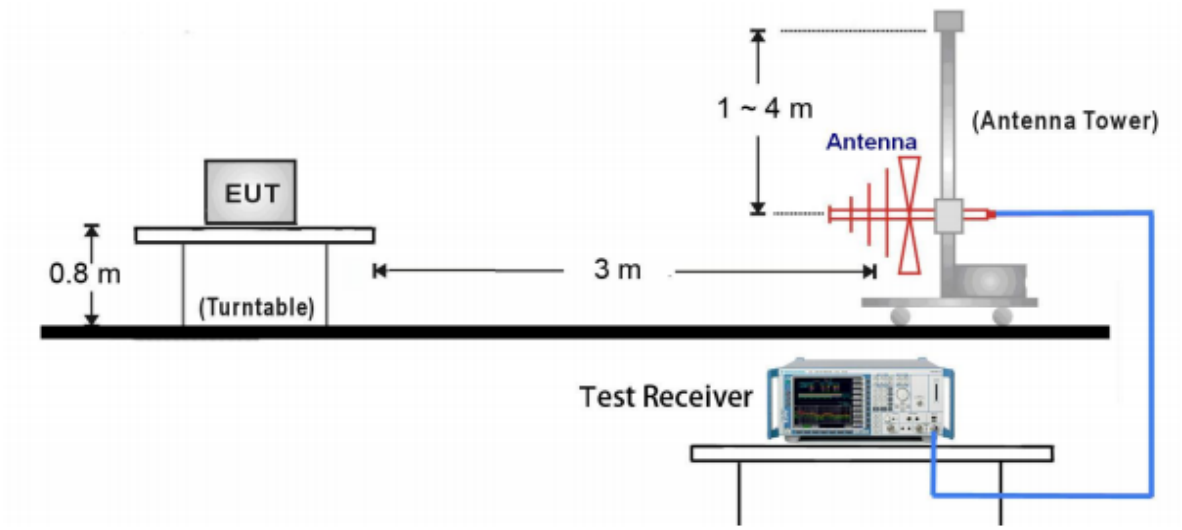
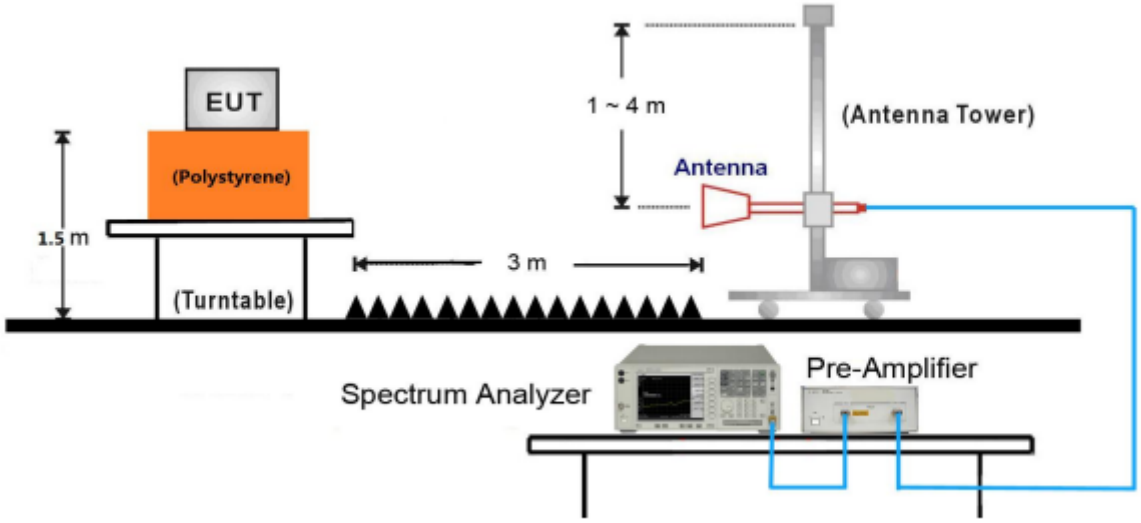
30MHz ~ 1GHz Test Setup:




1GHz ~ 18GHz Test Setup:



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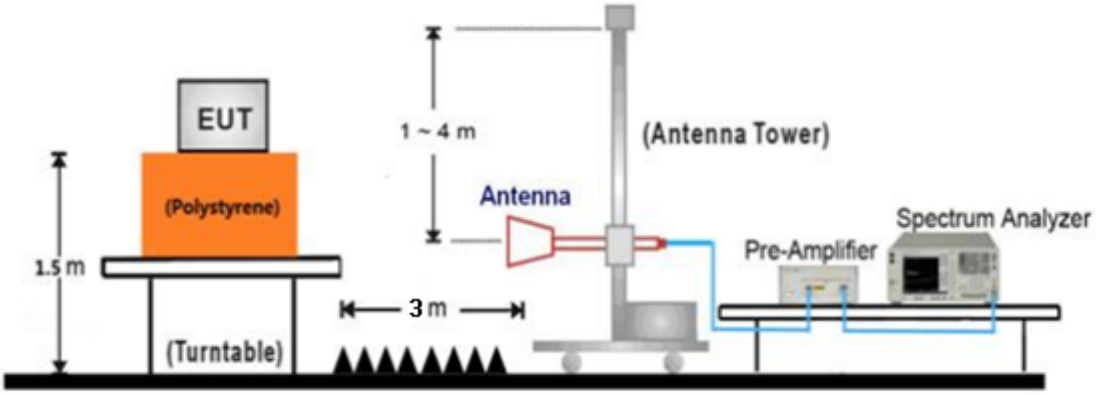
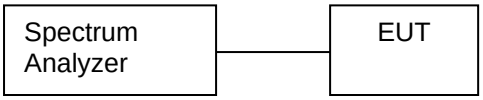
18GHz ~ 25GHz Test Setup:




7.3 Conducted RF test setups





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# 8 Systems test configuration

Auxiliary Equipment Used during Test:

| DESCRIPTION | MANUFACTURER | MODEL NO.(SHIELD) | S/N(LENGTH) |
|---|---|---|---|
| Notebook | Lenovo | X240 | -- |

Test software: QRCT.exe, which used to control the EUT in continues transmitting mode.

The system was configured to hopping mode and non-hopping mode.

Hopping mode: typical working mode (normal hopping status)

Non-hopping mode: The system was configured to operate at a signal channel transmitting. The test software allows the configuration and operation at the worst-case duty and the highest transmit power


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# 9 Technical Requirement

## 9.1 Conducted Emission

**Test Method**

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

**Limit**

| Frequency MHz | QP Limit dBµV | AV Limit dBµV |
|---|---|---|
| 0.150-0.500 | 66-56* | 56-46* |
| 0.500-5 | 56 | 46 |
| 5-30 | 60 | 50 |

Decreasing linearly with logarithm of the frequency



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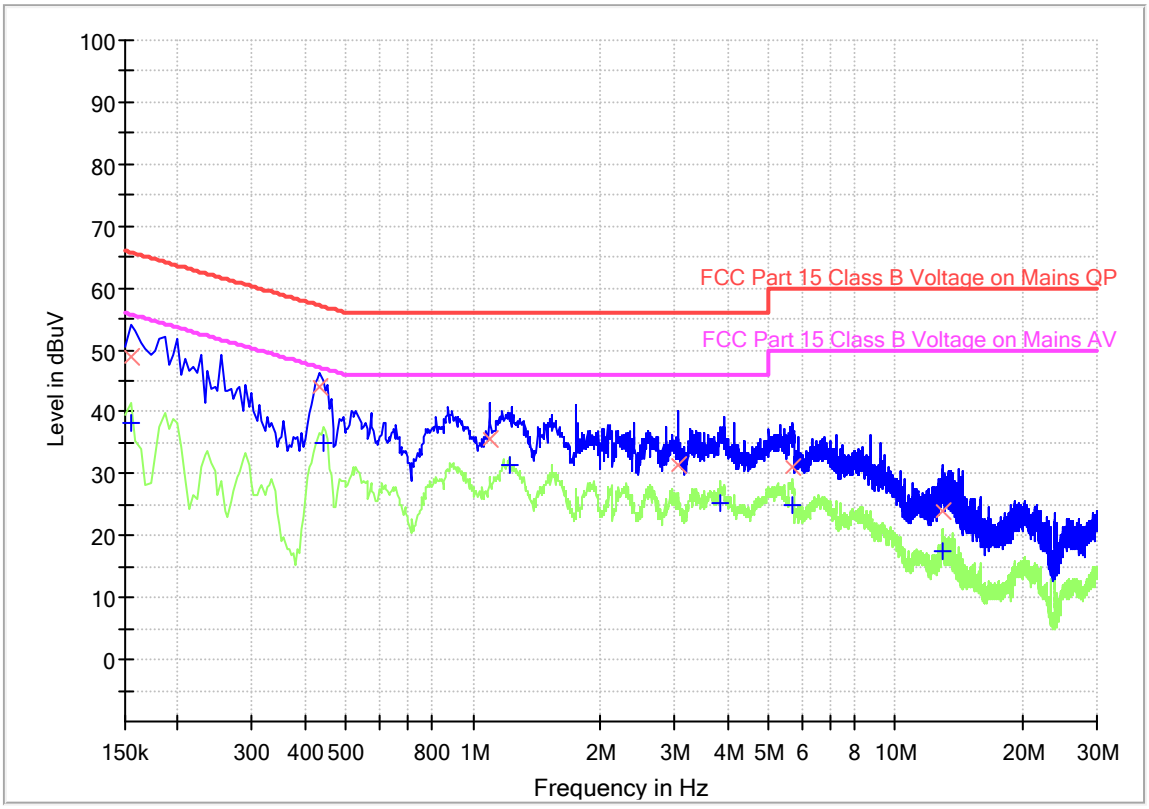
## Conducted Emission

| | | |
|---|---|---|
| Product Type | : | Infrared Thermal Camera |
| M/N | : | FOTRIC 326M |
| Operating Condition | : | Mode 1: Tx_2480MHz for 3DH5 |
| Test Specification | : | L-Line |
| Comment | : | AC 120V/60Hz (charging mode) |




# Final_Result

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.154500 | --- | 38.07 | 55.75 | 17.68 | 1000.0 | 9.000 | L1 | 19.5 |
| 0.154500 | 48.81 | --- | 65.75 | 16.94 | 1000.0 | 9.000 | L1 | 19.5 |
| 0.433500 | 44.15 | --- | 57.19 | 13.04 | 1000.0 | 9.000 | L1 | 19.5 |
| 0.442500 | --- | 34.95 | 47.01 | 12.06 | 1000.0 | 9.000 | L1 | 19.5 |
| 1.095000 | 35.65 | --- | 56.00 | 20.35 | 1000.0 | 9.000 | L1 | 19.5 |
| 1.216500 | --- | 31.29 | 46.00 | 14.71 | 1000.0 | 9.000 | L1 | 19.5 |
| 3.070500 | 31.40 | --- | 56.00 | 24.60 | 1000.0 | 9.000 | L1 | 19.5 |
| 3.840000 | --- | 25.29 | 46.00 | 20.71 | 1000.0 | 9.000 | L1 | 19.5 |
| 5.685000 | 31.10 | --- | 60.00 | 28.90 | 1000.0 | 9.000 | L1 | 19.6 |
| 5.689500 | --- | 24.91 | 50.00 | 25.09 | 1000.0 | 9.000 | L1 | 19.6 |
| 12.988500 | --- | 17.39 | 50.00 | 32.61 | 1000.0 | 9.000 | L1 | 19.7 |
| 12.988500 | 23.84 | --- | 60.00 | 36.16 | 1000.0 | 9.000 | L1 | 19.7 |



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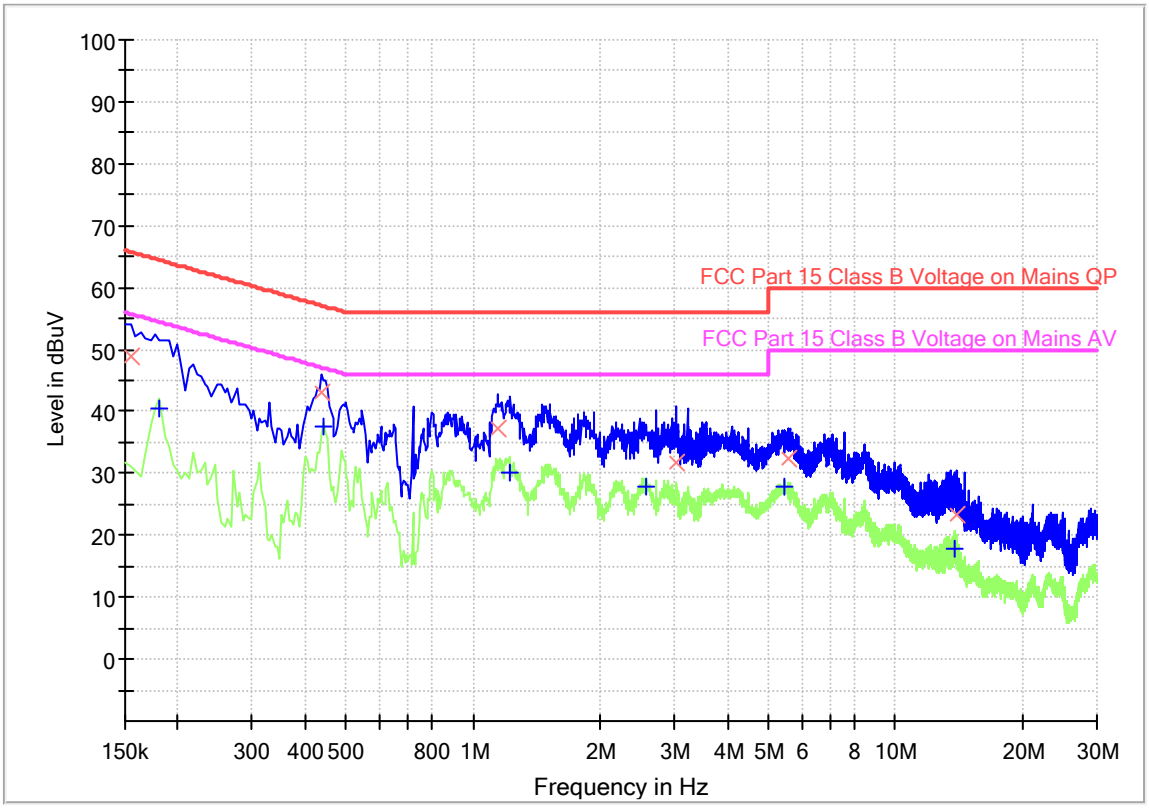
| | | |
|---|---|---|
| Product Type | : | Infrared Thermal Camera |
| M/N | : | FOTRIC 326M |
| Operating Condition | : | Mode 1: Tx_2480MHz for 3DH5 |
| Test Specification | : | N-Line |
| Comment | : | AC 120V/60Hz (charging mode) |




## Final_Result

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 0.154500 | 48.75 | --- | 65.75 | 17.00 | 1000.0 | 9.000 | N | 19.5 |
| 0.181500 | --- | 40.38 | 54.42 | 14.04 | 1000.0 | 9.000 | N | 19.5 |
| 0.438000 | 43.07 | --- | 57.10 | 14.03 | 1000.0 | 9.000 | N | 19.5 |
| 0.442500 | --- | 37.42 | 47.01 | 9.59 | 1000.0 | 9.000 | N | 19.5 |
| 1.144500 | 37.34 | --- | 56.00 | 18.66 | 1000.0 | 9.000 | N | 19.5 |
| 1.216500 | --- | 30.12 | 46.00 | 15.88 | 1000.0 | 9.000 | N | 19.5 |
| 2.580000 | --- | 27.98 | 46.00 | 18.02 | 1000.0 | 9.000 | N | 19.6 |
| 3.030000 | 31.78 | --- | 56.00 | 24.22 | 1000.0 | 9.000 | N | 19.6 |
| 5.469000 | --- | 27.94 | 50.00 | 22.06 | 1000.0 | 9.000 | N | 19.6 |
| 5.577000 | 32.35 | --- | 60.00 | 27.65 | 1000.0 | 9.000 | N | 19.6 |
| 13.875000 | --- | 17.97 | 50.00 | 32.03 | 1000.0 | 9.000 | N | 19.8 |
| 13.938000 | 23.18 | --- | 60.00 | 36.82 | 1000.0 | 9.000 | N | 19.8 |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)
Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator



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## 9.2 Conducted peak output power

**Test Method**

1. Use the following spectrum analyzer settings:
   Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
   RBW > the 20 dB bandwidth of the emission being measured, VBW≥RBW,
   Sweep = auto, Detector function = peak, Trace = max hold
2. Add a correction factor to the display.
3. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power

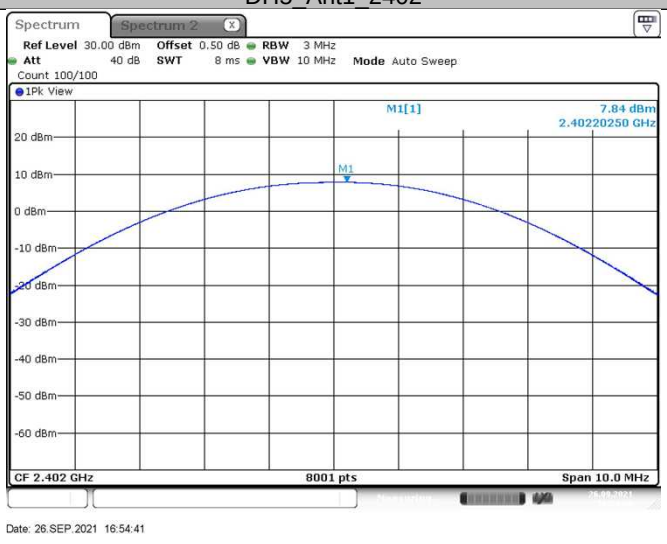
**Limits**

| Frequency Range<br>MHz | Limit<br>W | Limit<br>dBm |
|---|---|---|
| 2400-2483.5 | ≤1 | ≤30 |

**Conducted peak output power**

| TestMode | Antenna | Channel | Result[dBm] | Limit[dBm] | Verdict |
|---|---|---|---|---|---|
| DH5 | Ant1 | 2402 | 7.84 | <=30 | PASS |
| | | 2441 | 8.92 | <=30 | PASS |
| | | 2480 | 4.46 | <=30 | PASS |
| 2DH5 | Ant1 | 2402 | 7.86 | <=30 | PASS |
| | | 2441 | 8.97 | <=30 | PASS |
| | | 2480 | 4.5 | <=30 | PASS |
| 3DH5 | Ant1 | 2402 | 8.02 | <=30 | PASS |
| | | 2441 | **9.18** | <=30 | PASS |
| | | 2480 | 4.77 | <=30 | PASS |

DH5_Ant1_2402



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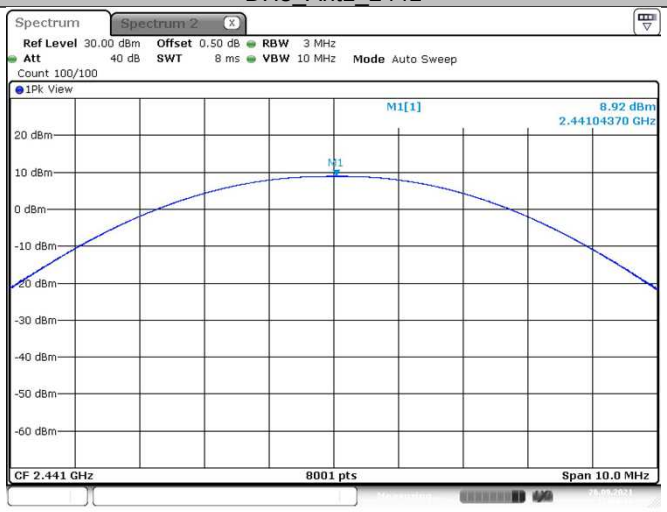
DH5_Ant1_2441

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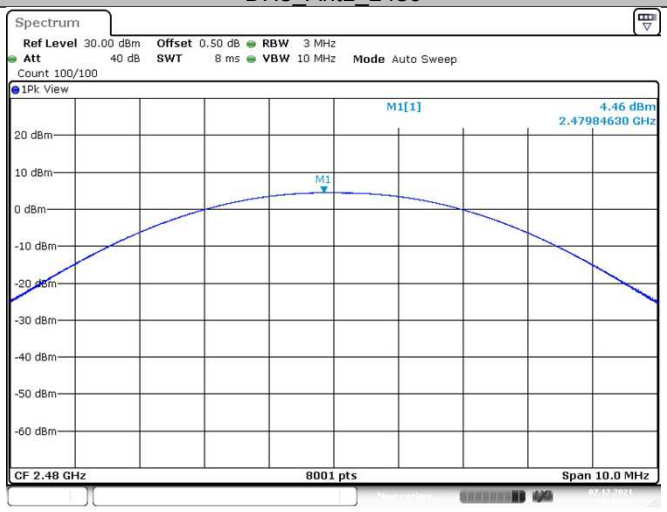


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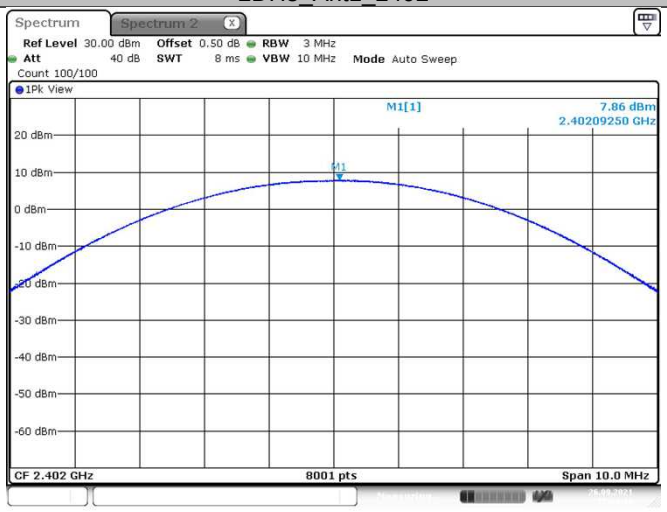


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2DH5_Ant1_2441


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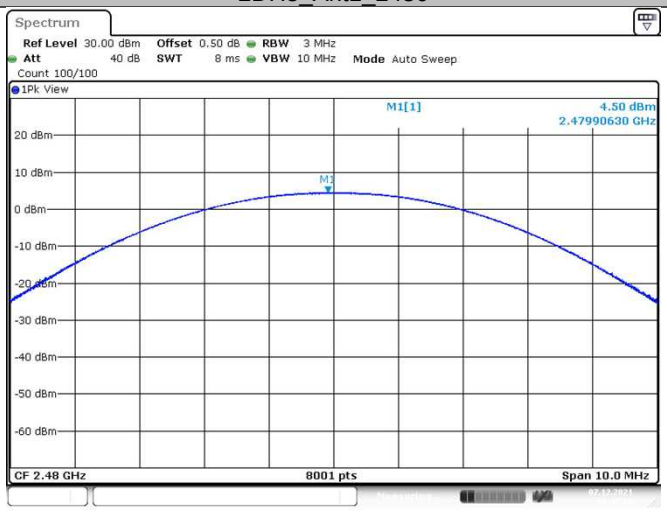
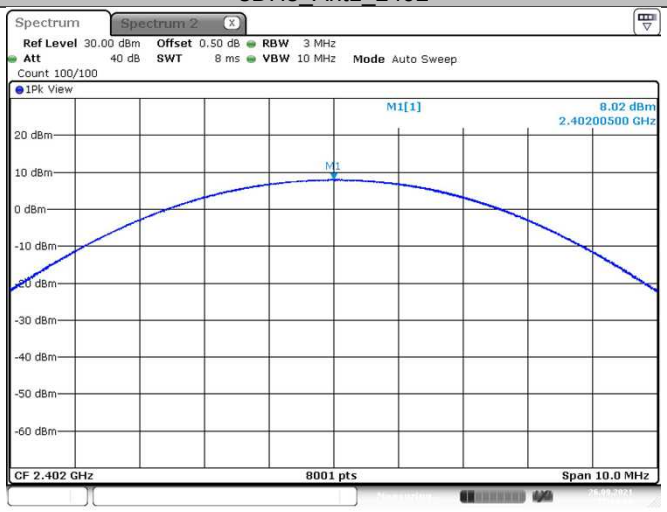



Date: 7.DEC.2021 09:47:29

3DH5_Ant1_2402




Date: 26.SEP.2021 17:14:37



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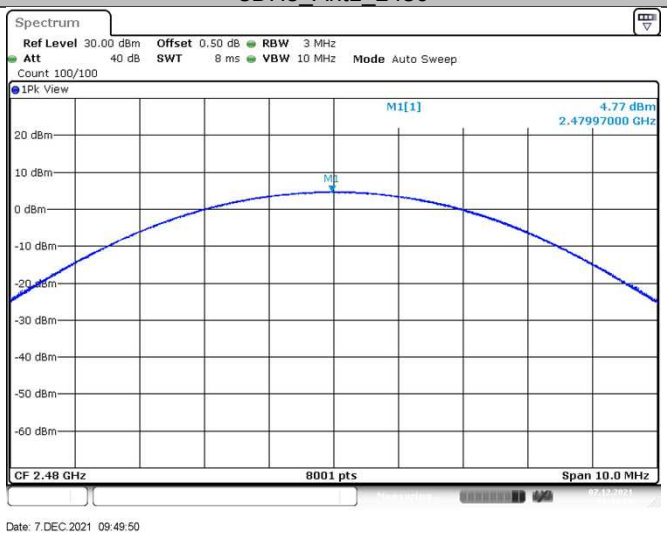
3DH5_Ant1_2441


3DH5_Ant1_2480



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## 9.3 20 dB Occupied Bandwidth

**Test Method**

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

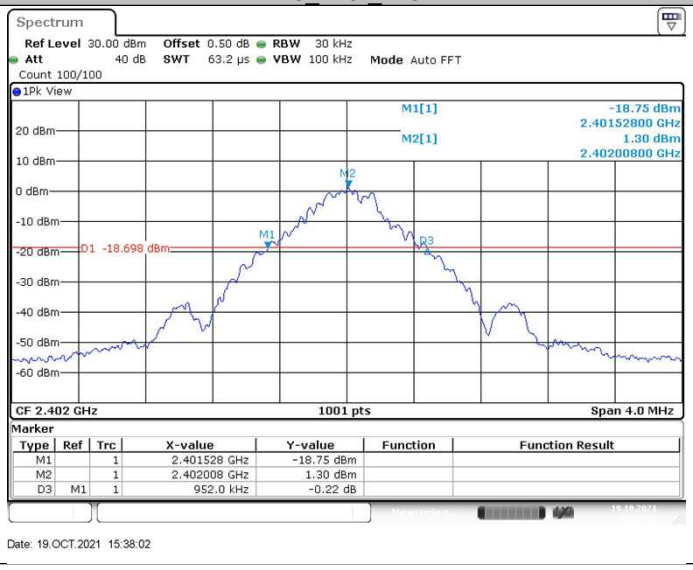
**Limit**

| Limit [kHz] |
|---|
| N/A |

### 20 dB Occupied Bandwidth

| TestMode | Antenna | Channel | 20db EBW[MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | 2402 | 0.952 | 2401.528 | 2402.480 | 0.5 | PASS |
| | | 2441 | 0.956 | 2440.524 | 2441.480 | 0.5 | PASS |
| | | 2480 | 0.956 | 2479.524 | 2480.480 | 0.5 | PASS |
| 2DH5 | Ant1 | 2402 | 1.284 | 2401.360 | 2402.644 | 0.5 | PASS |
| | | 2441 | 1.284 | 2440.360 | 2441.644 | 0.5 | PASS |
| | | 2480 | 1.284 | 2479.360 | 2480.644 | 0.5 | PASS |
| 3DH5 | Ant1 | 2402 | 1.288 | 2401.348 | 2402.636 | 0.5 | PASS |
| | | 2441 | 1.288 | 2440.348 | 2441.636 | 0.5 | PASS |
| | | 2480 | 1.288 | 2479.348 | 2480.636 | 0.5 | PASS |

DH5_Ant1_2402





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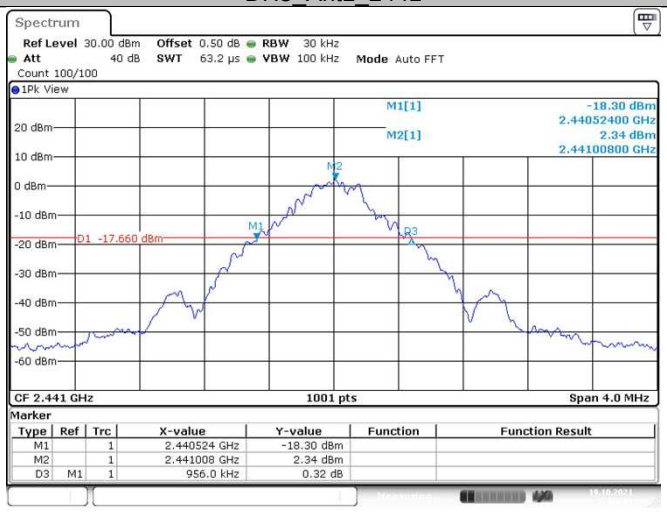
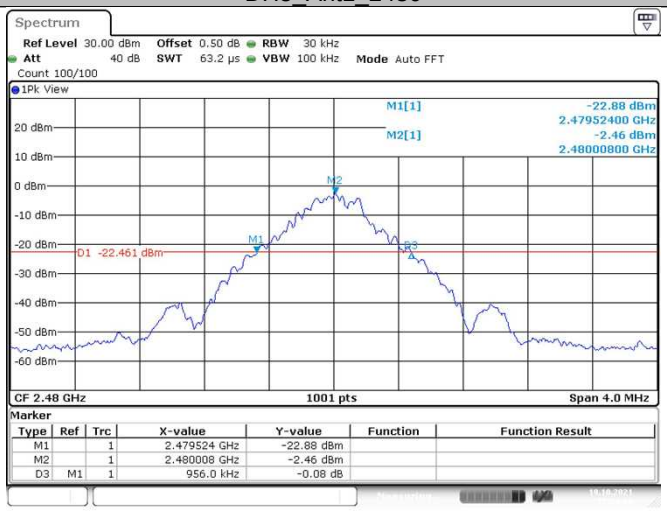
DH5_Ant1_2441



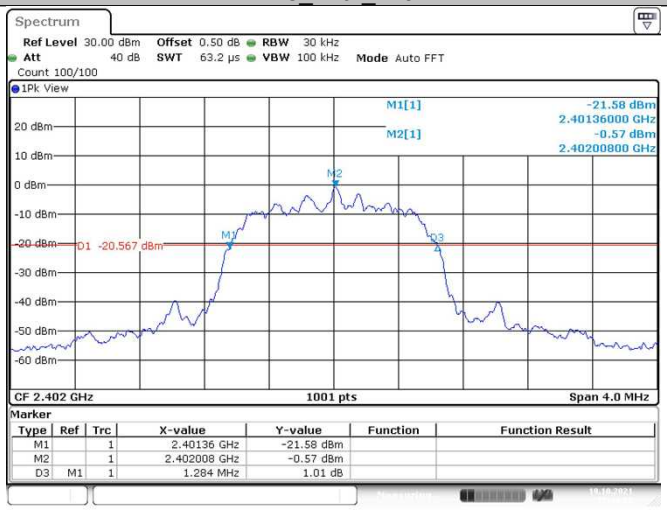

Date: 19.OCT.2021 15:38:51

DH5_Ant1_2480



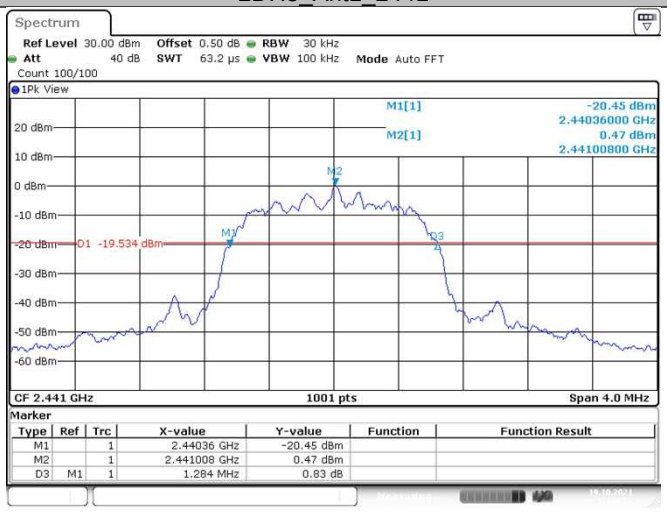

Date: 19.OCT.2021 15:39:30

2DH5_Ant1_2402



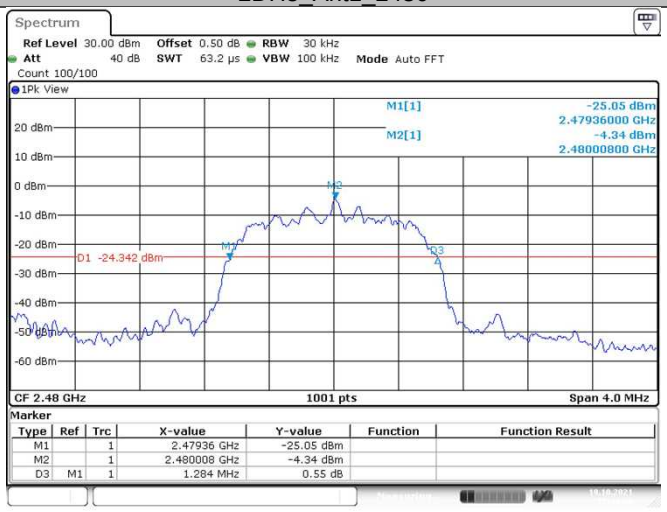

Date: 19.OCT.2021 15:40:02

2DH5_Ant1_2441




Date: 19.OCT.2021 15:40:27

2DH5_Ant1_2480




Date: 19.OCT.2021 15:40:46

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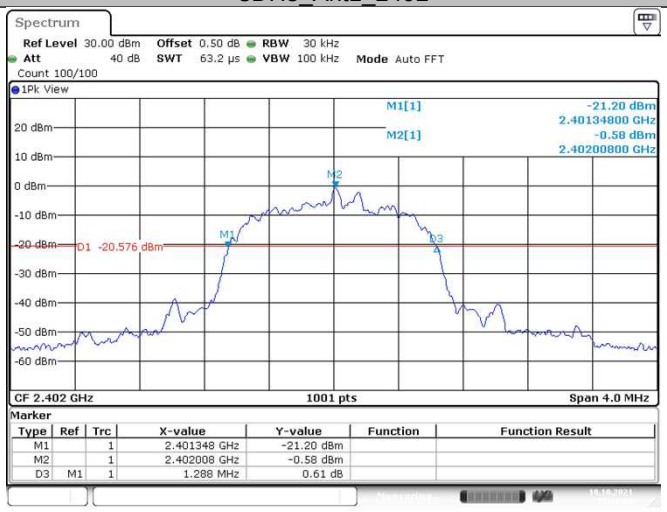
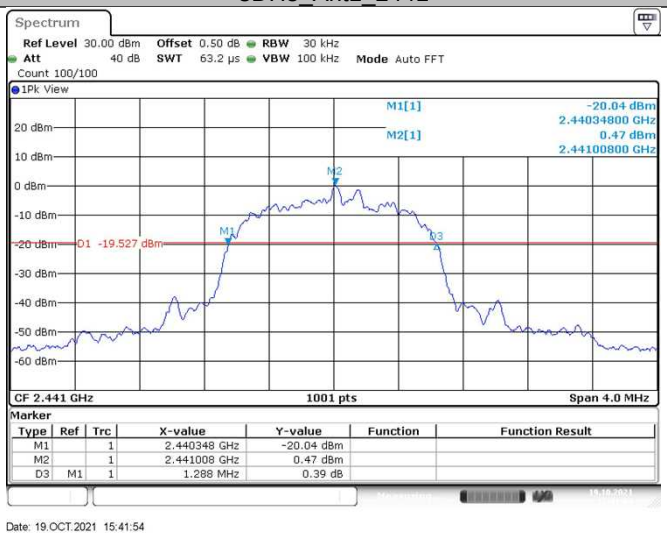
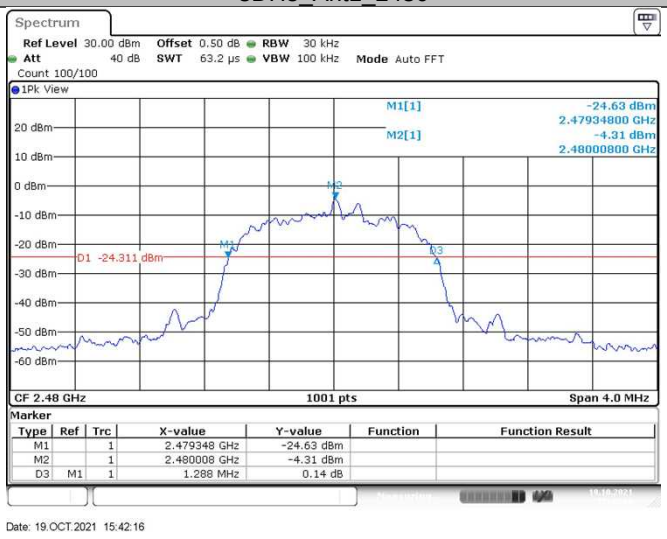



Date: 19.OCT.2021 15:41:29

| 3DH5_Ant1_2441 |
| --- |
|  |



Date: 19.OCT.2021 15:41:54

| 3DH5_Ant1_2480 |
| --- |
|  |



Date: 19.OCT.2021 15:42:16

## 9.4 Carrier Frequency Separation

**Test Method**

1. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels, RBW ≥ 1% of the span, VBW) ≥RBW, Sweep = auto, Detector function = peak
2. By using the Max-Hold function record the separation of two adjacent channels.
3. Measure the frequency difference of these two adjacent channels by spectrum analyzer marker function.
4. Repeat above procedures until all frequencies measured were complete.

**Limit**

| Limit<br>kHz |
|---|
| ≥25KHz or 2/3 of the 20 dB bandwidth which is greater |

GFSK Modulation Limit

| Mode | 2/3 of 20 dB Bandwidth<br>MHz |
|---|---|
| DH5 | 0.749 |
| 2DH5 | 0.915 |
| 3DH5 | 0.920 |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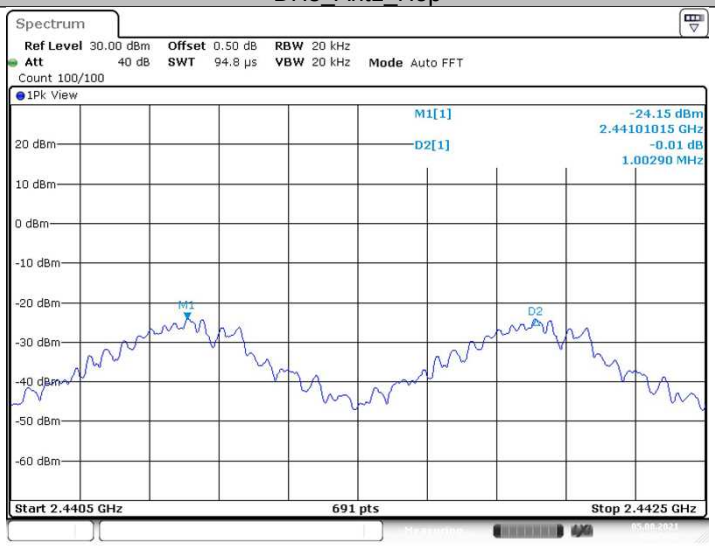
## Carrier Frequency Separation

Test result: The measurement was performed with the typical configuration (normal hopping status), here GFSK modulation mode was used to show compliance.

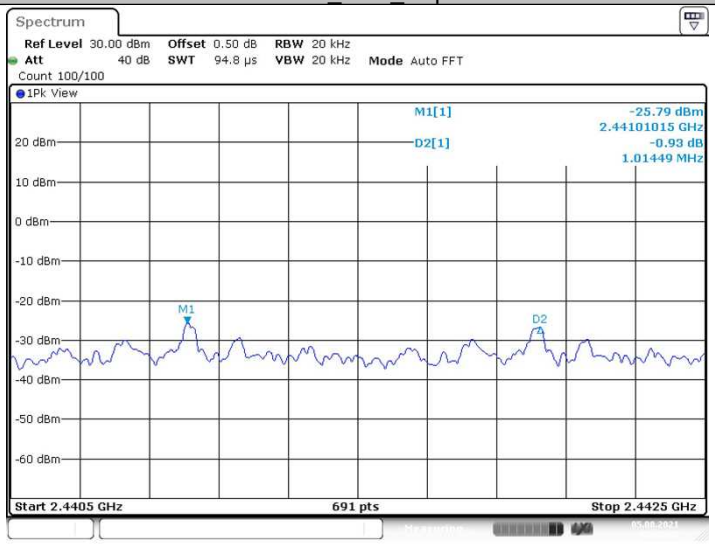
GFSK Modulation test result

| TestMode | Antenna | Channel | Result [MHz] | Limit [MHz] | Verdict |
|---|---|---|---|---|---|
| DH5 | Ant1 | Hop | 1.003 | >=0.025 | PASS |
| 2DH5 | Ant1 | Hop | 1.014 | >=0.025 | PASS |
| 3DH5 | Ant1 | Hop | 1.003 | >=0.025 | PASS |

DH5_Ant1_Hop




2DH5_Ant1_Hop



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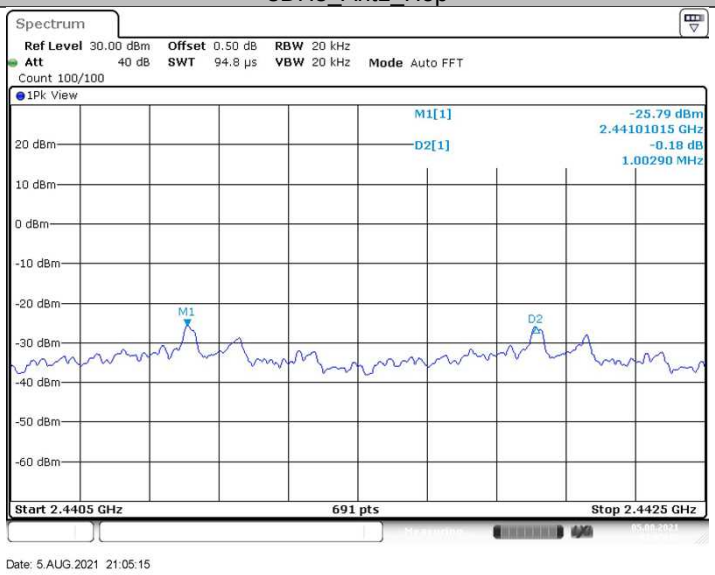
3DH5_Ant1_Hop



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## 9.5 Number of hopping frequencies

**Test Method**

1. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels, RBW ≥ 1% of the span, VBW) ≥RBW, Sweep = auto, Detector function = peak
2. Set the spectrum analyzer on Max-Hold Mode, and then keep the EUT in hopping mode.
3. Record all the signals from each channel until each one has been recorded.
4. Repeat above procedures until all frequencies measured were complete.

**Limit**

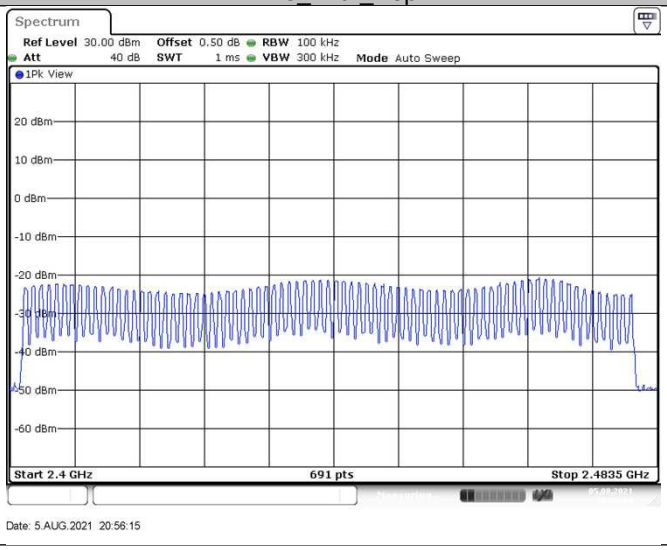
| Limit number |
|---|
| ≥ 15 |

### Number of hopping frequencies

Test result: The measurement was performed with the typical configuration (normal hopping status), and the total hopping channels is constant for the all modulation mode according with the Bluetooth Core Specification. Here GFSK modulation mode was used to show compliance.

| TestMode | Antenna | Channel | Result[Num] | Limit[Num] | Verdict |
|---|---|---|---|---|---|
| DH5 | Ant1 | Hop | 79 | >=15 | PASS |
| 2DH5 | Ant1 | Hop | 79 | >=15 | PASS |
| 3DH5 | Ant1 | Hop | 79 | >=15 | PASS |

DH5_Ant1_Hop



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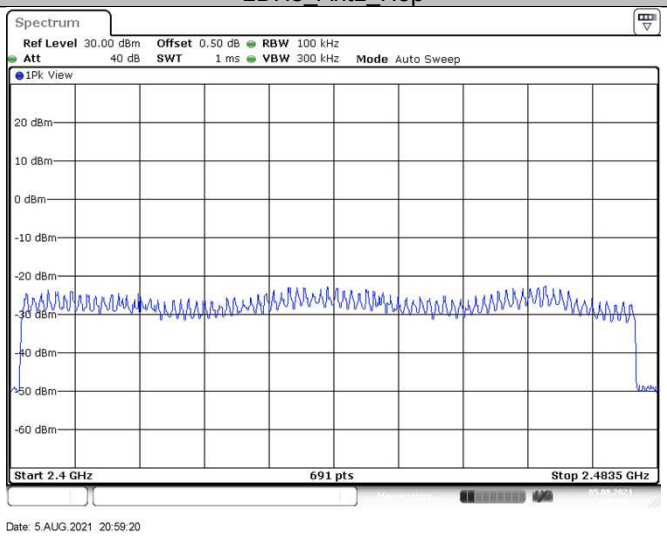
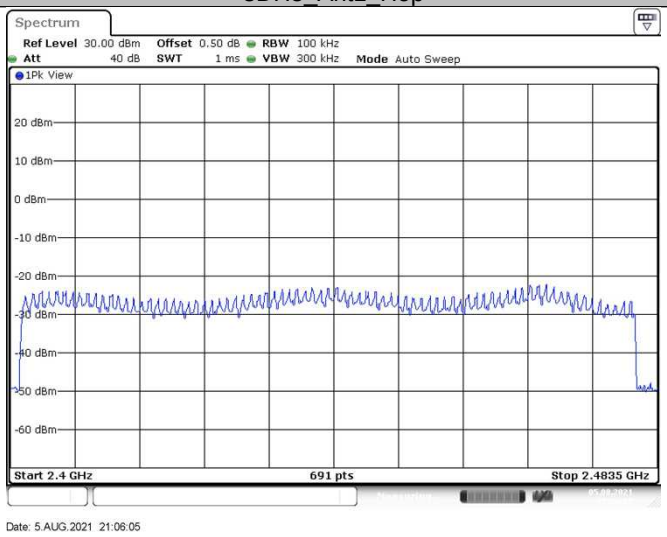
2DH5_Ant1_Hop




3DH5_Ant1_Hop



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## 9.6 Dwell Time

**Test Method**

1. Connect EUT antenna terminal to the spectrum analyzer with a low loss cable. Equipment mode: Spectrum analyzer
2. RBW: 1MHz; VBW: 1MHz; SPAN: Zero Span
3. Adjust the center frequency of spectrum analyzer on any frequency be measured.
4. Measure the Dwell Time by spectrum analyzer Marker function.
5. Repeat above procedures until all frequencies measured were complete.

**Limit**

The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

**Dwell Time**

**Dwell time**

The maximum dwell time shall be 0,4 s.
According to the Bluetooth Core Specification, the worse result (DH5 mode) was reported to show compliance.

The Dwell Time = Burst Width * Total Hops. The detailed calculations are showed as follows:
The duration for dwell time calculation: 0.4 [s] * hopping number = 0.4 [s] * 79 [ch] = 31.6 [s*ch];

The burst width, which is directly measured, refers to the duration on one channel hop.

The maximum number of hopping channels in 31.6s for DH5=1600 / 6 / 79 *31.6=106.67

Test Result

| TestMode | Antenna | Channel | BurstWidth [ms] | TotalHops [Num] | Result[s] | Limit[s] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | Hop | 1.98 | 120 | 0.238 | <=0.4 | PASS |
| 2DH5 | Ant1 | Hop | 0.44 | 90 | 0.039 | <=0.4 | PASS |
| 3DH5 | Ant1 | Hop | 1.98 | 120 | 0.237 | <=0.4 | PASS |


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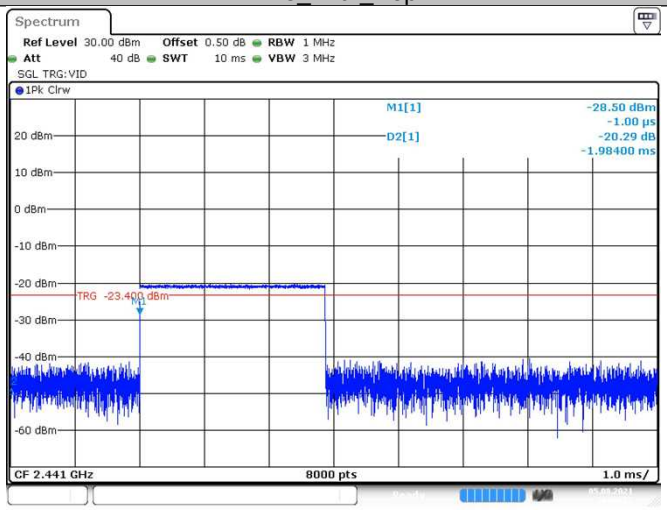
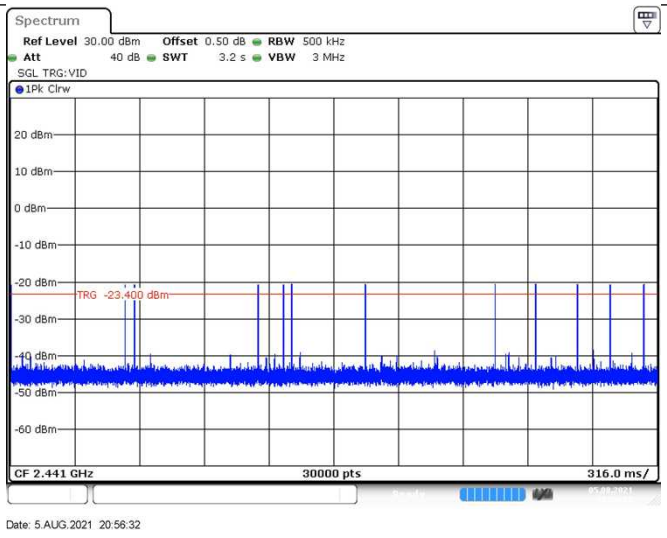
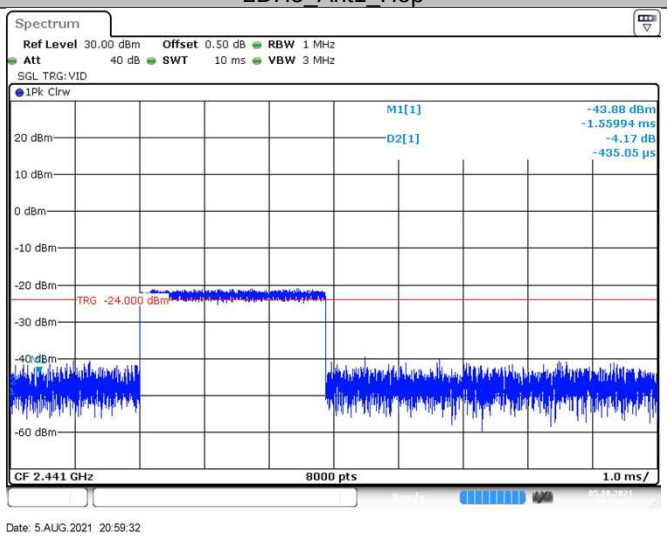
DH5_Ant1_Hop

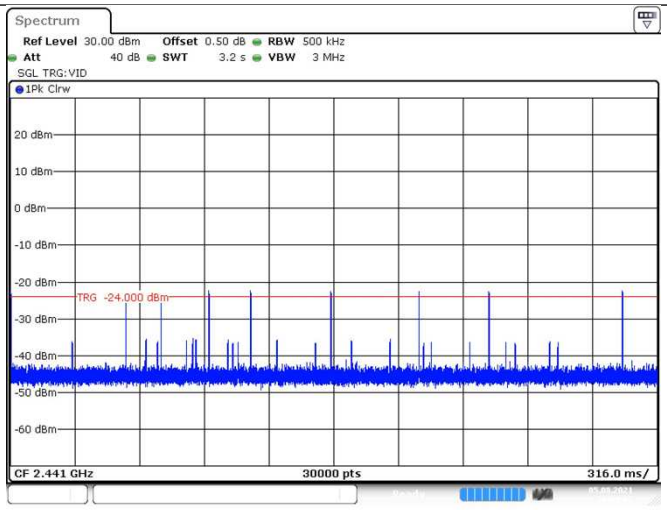



2DH5_Ant1_Hop

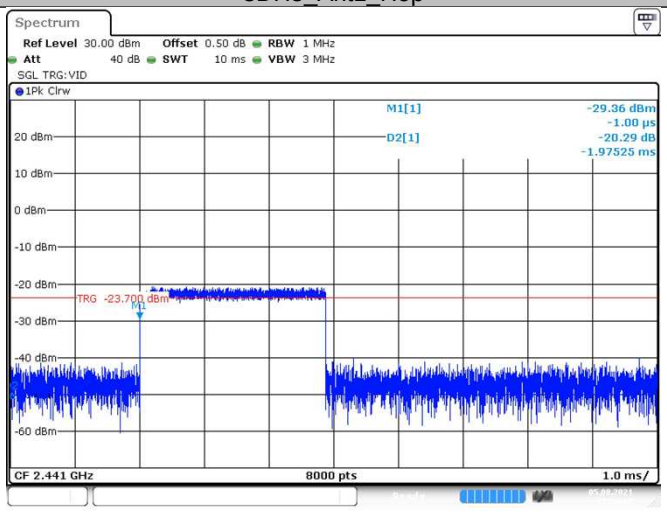


China

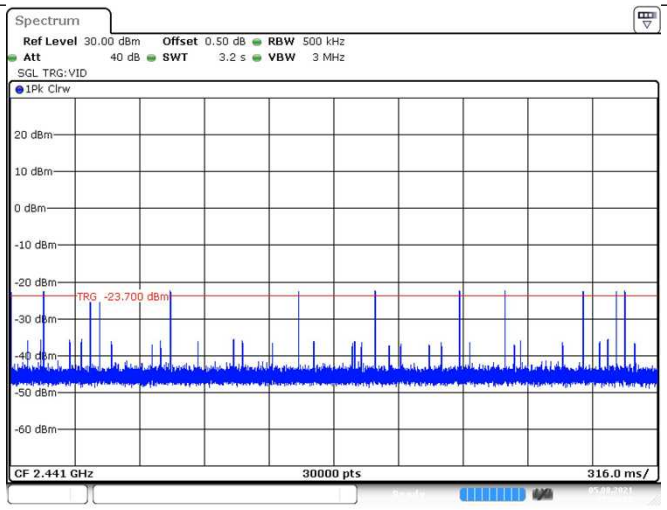



Date: 5.AUG.2021 20:59:37

3DH5_Ant1_Hop




Date: 5.AUG.2021 21:06:17




Date: 5.AUG.2021 21:06:22



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## 9.7 Spurious RF conducted emissions

**Test Method**

1. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10$^{th}$ harmonic. Typically, several plots are required to cover this entire span.
   RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold
2. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.
3. The level displayed must comply with the limit specified in this Section. Submit these plots.
4. Repeat above procedures until all frequencies measured were complete.

**Limit**

| Frequency Range MHz | Limit (dBc) |
|---|---|
| 30-25000 | -20 |


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## Spurious RF conducted emissions

| TestMode | Antenna | Channel | FreqRange [MHz] | RefLevel [dBm] | Result [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | 2402 | Reference | 7.55 | 7.55 | --- | PASS |
| | | | 30~1000 | 7.55 | -57.98 | <=-12.45 | PASS |
| | | | 1000~5000 | 7.55 | -54.71 | <=-12.45 | PASS |
| | | | 5000~26500 | 7.55 | -52.15 | <=-12.45 | PASS |
| | | 2441 | Reference | 8.58 | 8.58 | --- | PASS |
| | | | 30~1000 | 8.58 | -57.97 | <=-11.42 | PASS |
| | | | 1000~5000 | 8.58 | -54.83 | <=-11.42 | PASS |
| | | | 5000~26500 | 8.58 | -52.57 | <=-11.42 | PASS |
| | | 2480 | Reference | 4.10 | 4.10 | --- | PASS |
| | | | 30~1000 | 4.10 | -57.34 | <=-15.9 | PASS |
| | | | 1000~5000 | 4.10 | -47.94 | <=-15.9 | PASS |
| | | | 5000~26500 | 4.10 | -51.75 | <=-15.9 | PASS |
| 2DH5 | Ant1 | 2402 | Reference | 5.86 | 5.86 | --- | PASS |
| | | | 30~1000 | 5.86 | -58.95 | <=-14.14 | PASS |
| | | | 1000~5000 | 5.86 | -55.81 | <=-14.14 | PASS |
| | | | 5000~26500 | 5.86 | -51.9 | <=-14.14 | PASS |
| | | 2441 | Reference | 6.85 | 6.85 | --- | PASS |
| | | | 30~1000 | 6.85 | -58.49 | <=-13.15 | PASS |
| | | | 1000~5000 | 6.85 | -55.1 | <=-13.15 | PASS |
| | | | 5000~26500 | 6.85 | -51.62 | <=-13.15 | PASS |
| | | 2480 | Reference | 2.45 | 2.45 | --- | PASS |
| | | | 30~1000 | 2.45 | -58.42 | <=-17.55 | PASS |
| | | | 1000~5000 | 2.45 | -53.54 | <=-17.55 | PASS |
| | | | 5000~26500 | 2.45 | -51.79 | <=-17.55 | PASS |
| 3DH5 | Ant1 | 2402 | Reference | 5.92 | 5.92 | --- | PASS |
| | | | 30~1000 | 5.92 | -57.98 | <=-14.08 | PASS |
| | | | 1000~5000 | 5.92 | -54.35 | <=-14.08 | PASS |
| | | | 5000~26500 | 5.92 | -52.1 | <=-14.08 | PASS |
| | | 2441 | Reference | 6.90 | 6.90 | --- | PASS |
| | | | 30~1000 | 6.90 | -58.23 | <=-13.1 | PASS |
| | | | 1000~5000 | 6.90 | -55.53 | <=-13.1 | PASS |
| | | | 5000~26500 | 6.90 | -52.48 | <=-13.1 | PASS |
| | | 2480 | Reference | 2.46 | 2.46 | --- | PASS |
| | | | 30~1000 | 2.46 | -58.07 | <=-17.54 | PASS |
| | | | 1000~5000 | 2.46 | -51.71 | <=-17.54 | PASS |
| | | | 5000~26500 | 2.46 | -52.2 | <=-17.54 | PASS |



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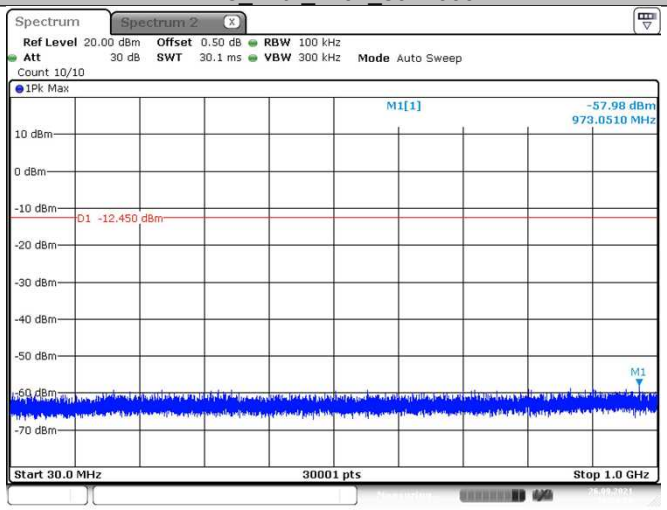
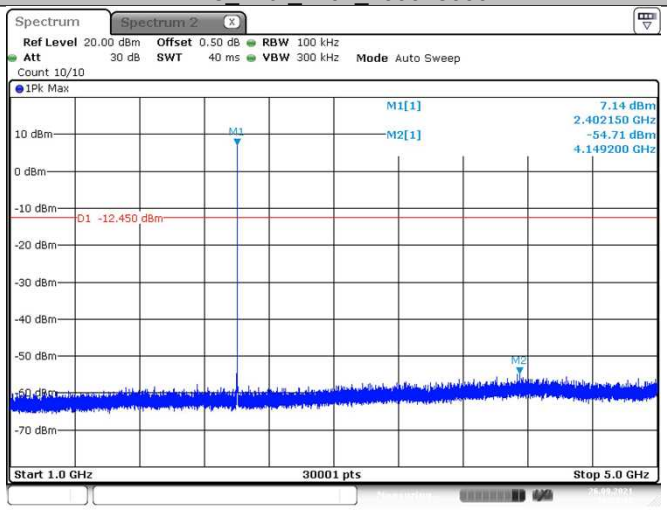
DH5_Ant1_2402_0~Reference


DH5_Ant1_2402_30~1000




DH5_Ant1_2402_1000~5000



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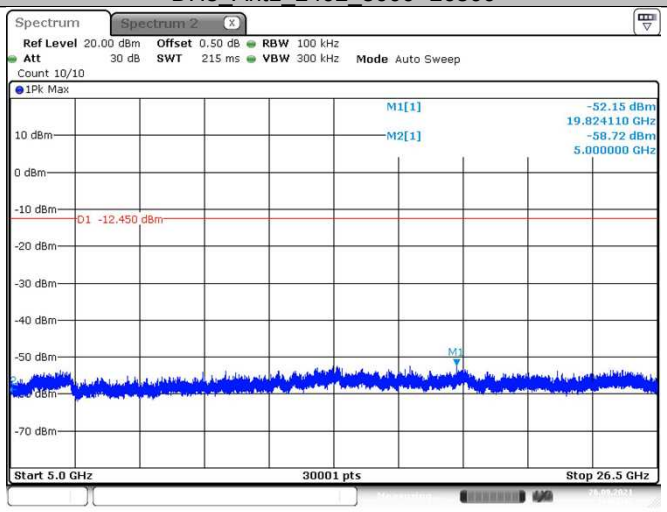
DH5_Ant1_2402_5000~26500

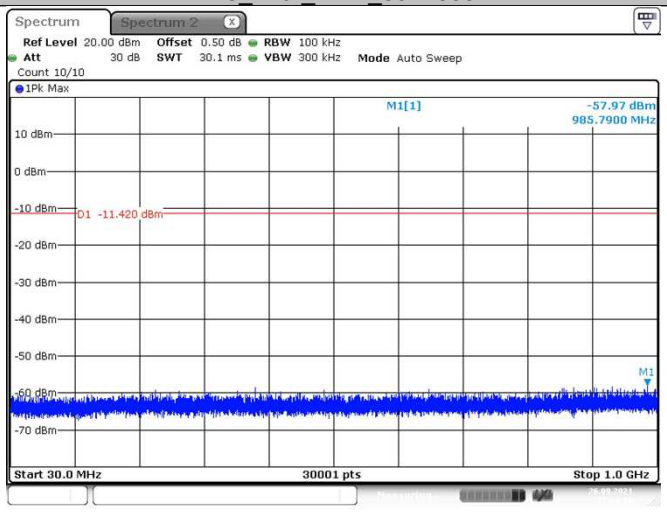



Date: 26.SEP.2021 16:55:42

DH5_Ant1_2441_0~Reference


Date: 26.SEP.2021 17:03:24

DH5_Ant1_2441_30~1000




Date: 26.SEP.2021 17:03:28



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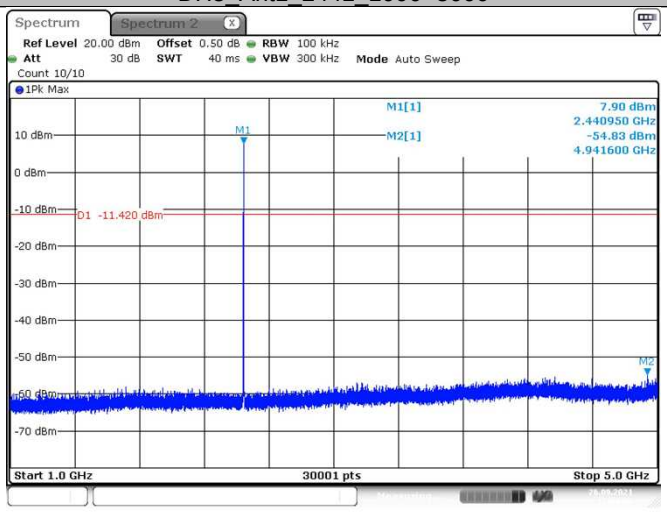
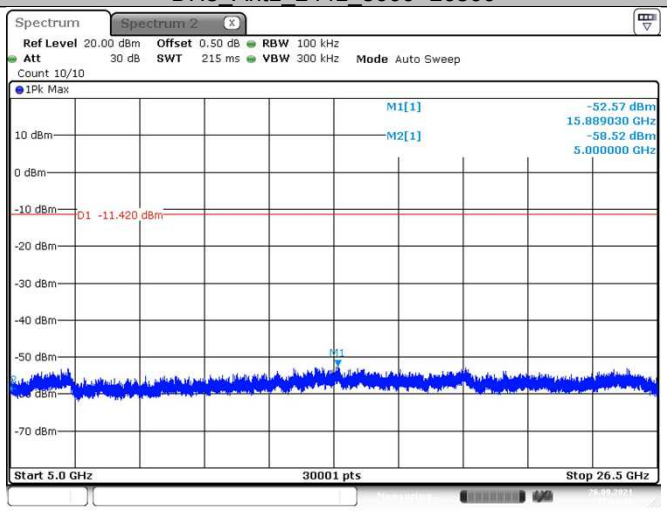
DH5_Ant1_2441_1000~5000




Date: 26.SEP.2021 17:03:40

DH5_Ant1_2441_5000~26500




Date: 26.SEP.2021 17:04:12

DH5_Ant1_2480_0~Reference


Date: 7.DEC.2021 09:45:57



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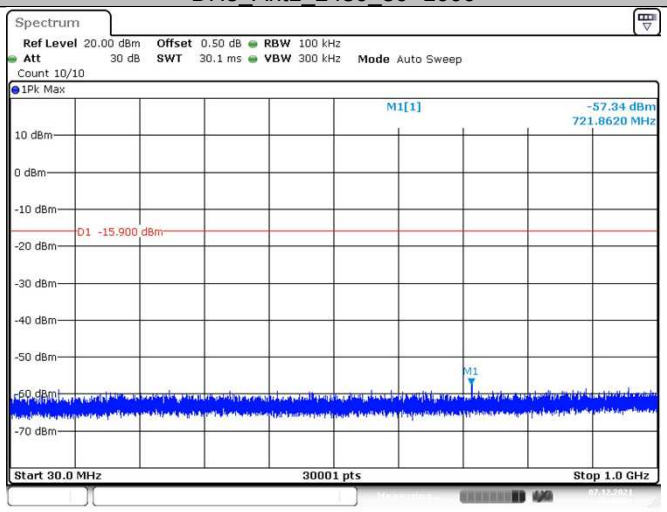
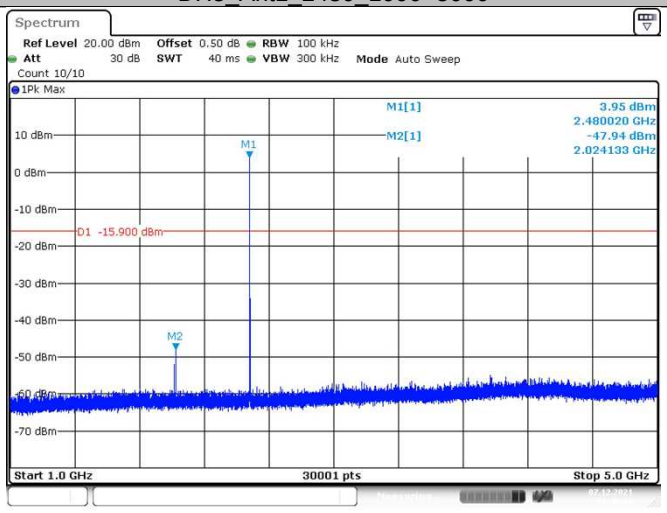
DH5_Ant1_2480_30~1000



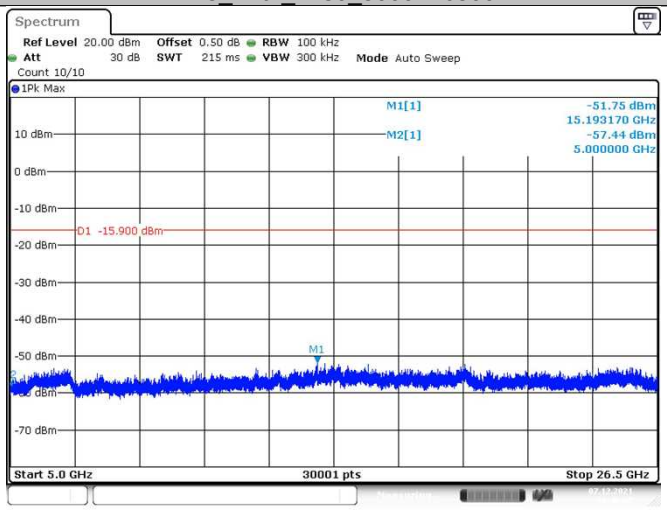

Date: 7.DEC.2021 09:46:02

DH5_Ant1_2480_1000~5000




Date: 7.DEC.2021 09:46:14

DH5_Ant1_2480_5000~26500




Date: 7.DEC.2021 09:46:45



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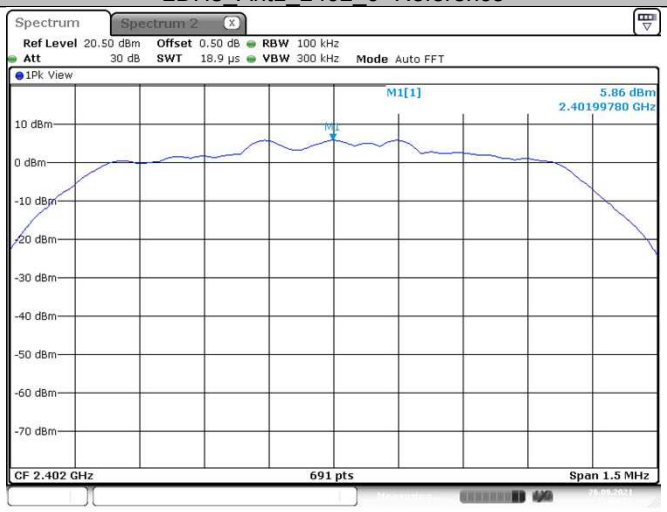
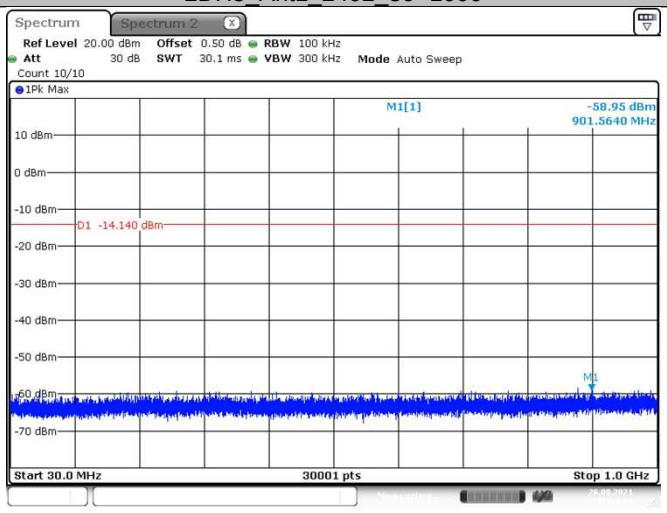
2DH5_Ant1_2402_0~Reference



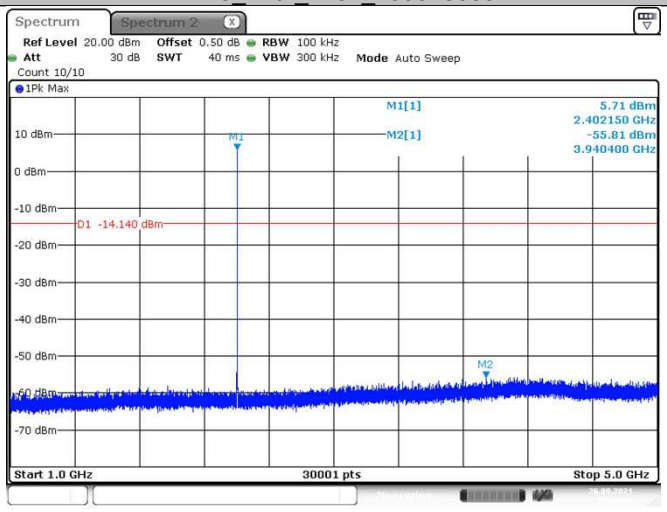

Date: 26.SEP.2021 17:08:27

2DH5_Ant1_2402_30~1000




Date: 26.SEP.2021 17:08:31

2DH5_Ant1_2402_1000~5000




Date: 26.SEP.2021 17:08:43



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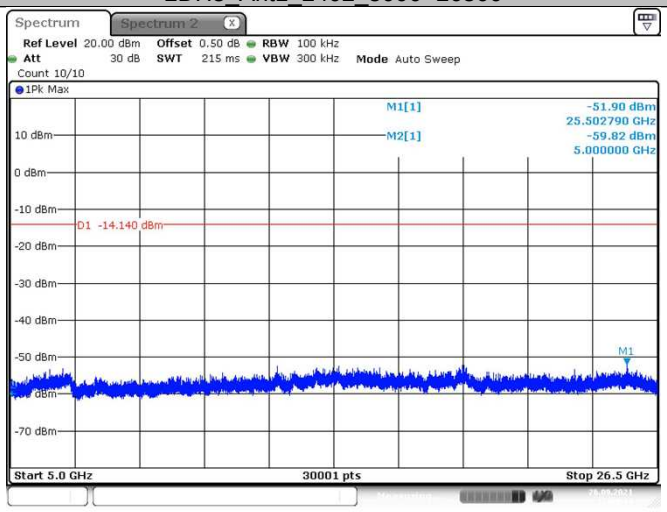
2DH5_Ant1_2402_5000~26500




Date: 26.SEP.2021 17:09:15

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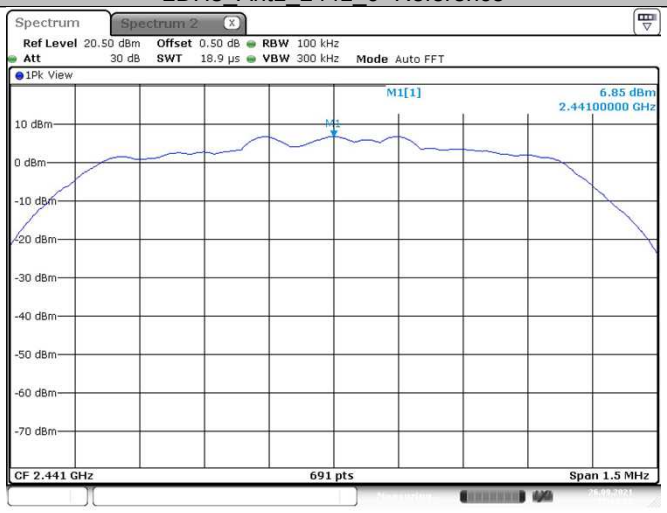


Date: 26.SEP.2021 17:10:22

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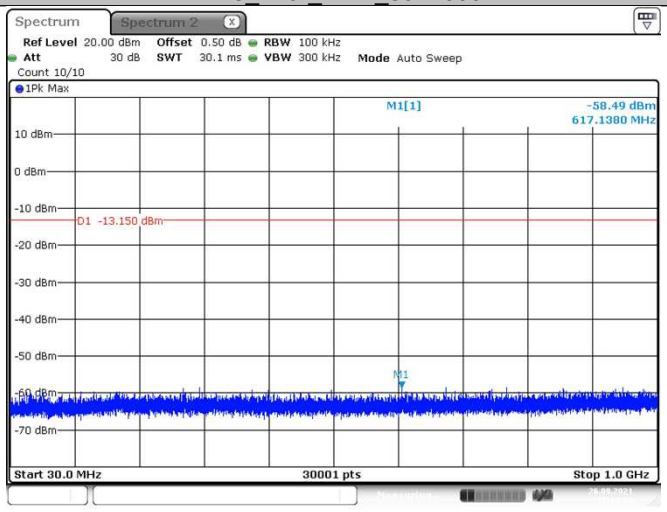


Date: 26.SEP.2021 17:10:27

China

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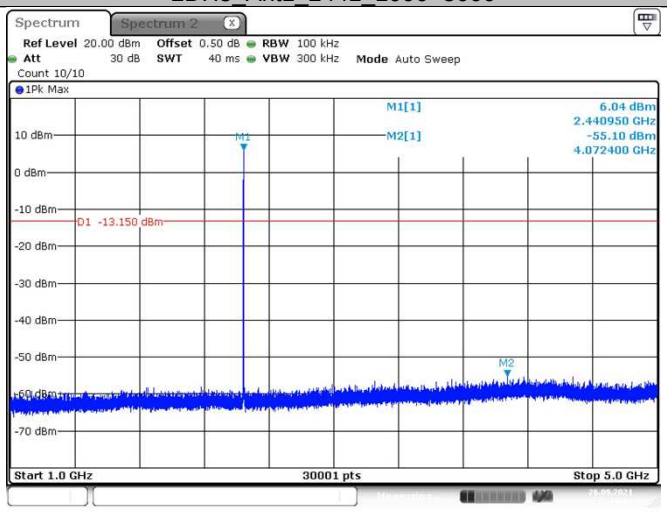


Date: 26.SEP.2021 17:10:39

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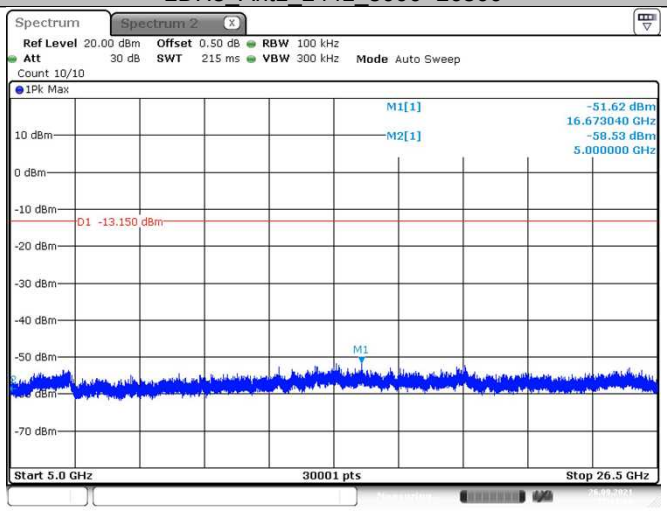
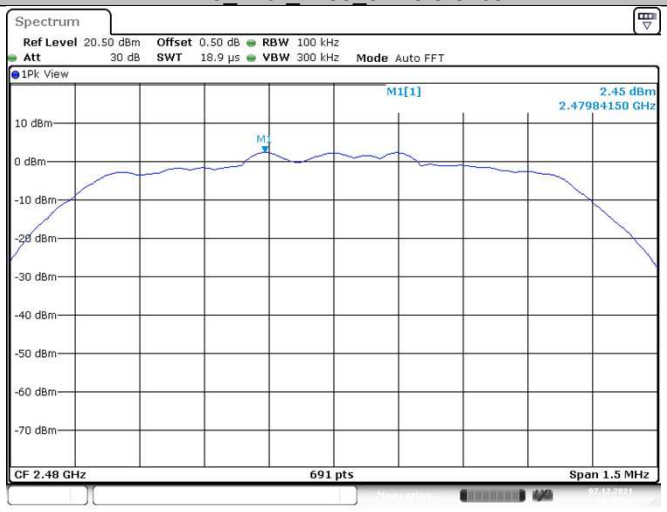



Date: 26.SEP.2021 17:11:10

2DH5_Ant1_2480_0~Reference




Date: 7.DEC.2021 09:47:43



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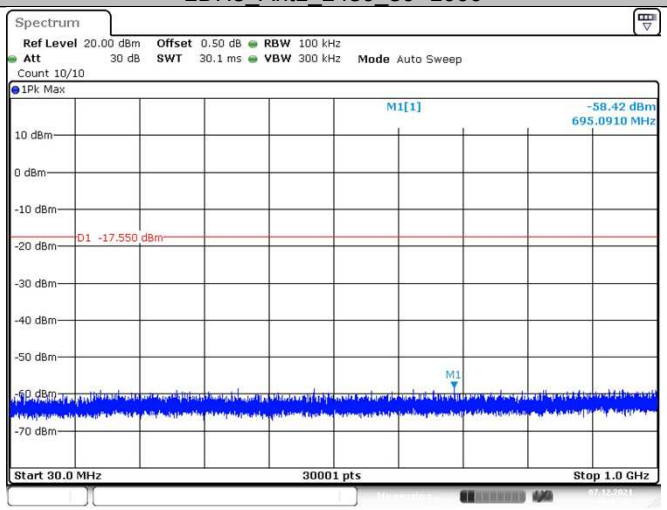
2DH5_Ant1_2480_30~1000




Date: 7.DEC.2021 09:47:47

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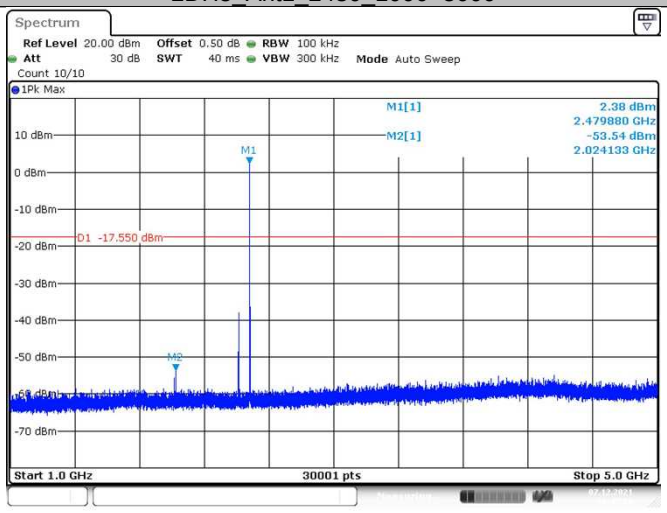


Date: 7.DEC.2021 09:47:59

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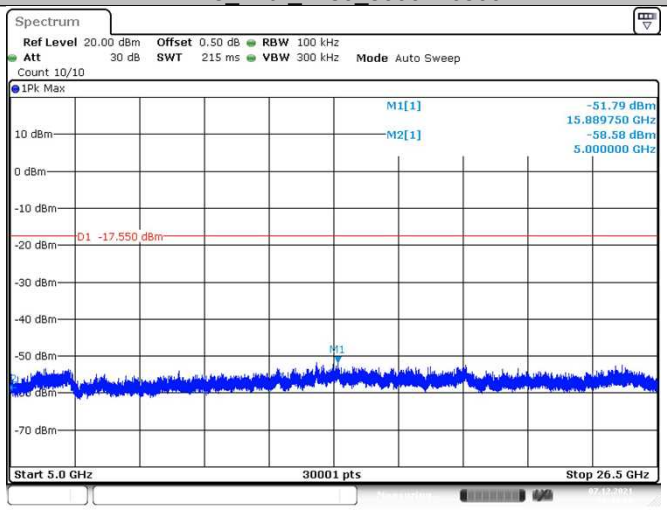


Date: 7.DEC.2021 09:48:30



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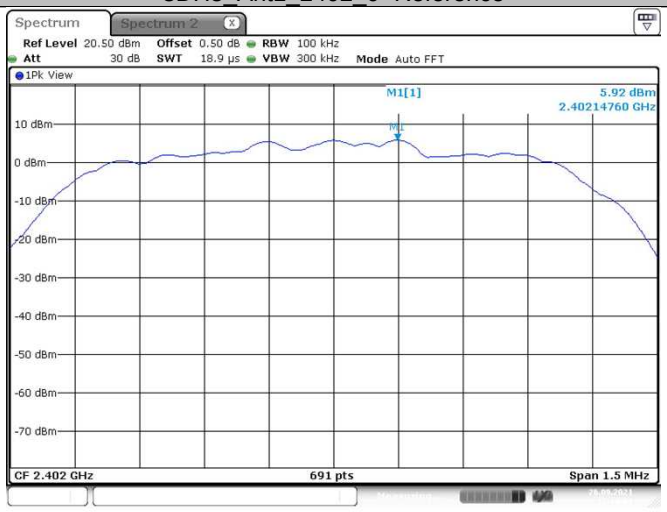
3DH5_Ant1_2402_0~Reference




Date: 26.SEP.2021 17:14:51

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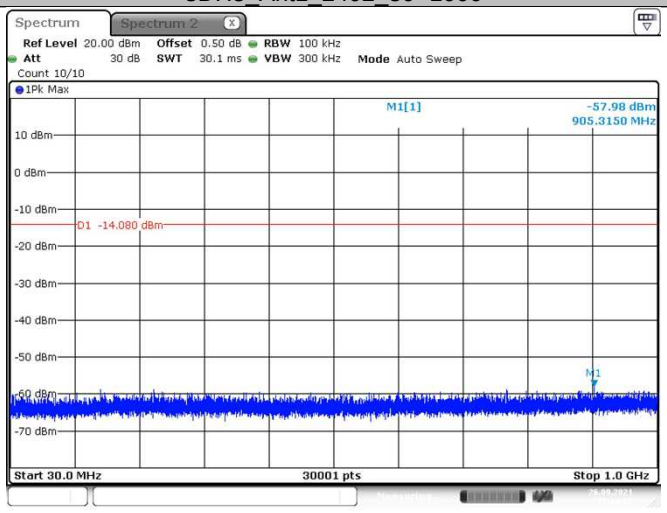
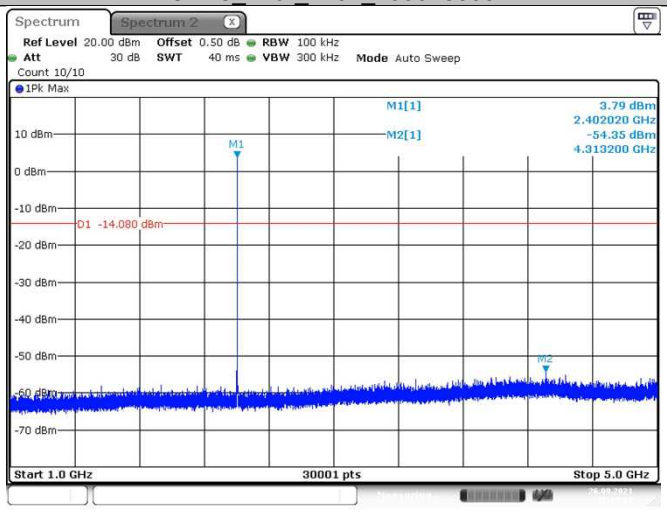



Date: 26.SEP.2021 17:14:55

3DH5_Ant1_2402_1000~5000




Date: 26.SEP.2021 17:15:07



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| 3DH5_Ant1_2402_5000~26500 |
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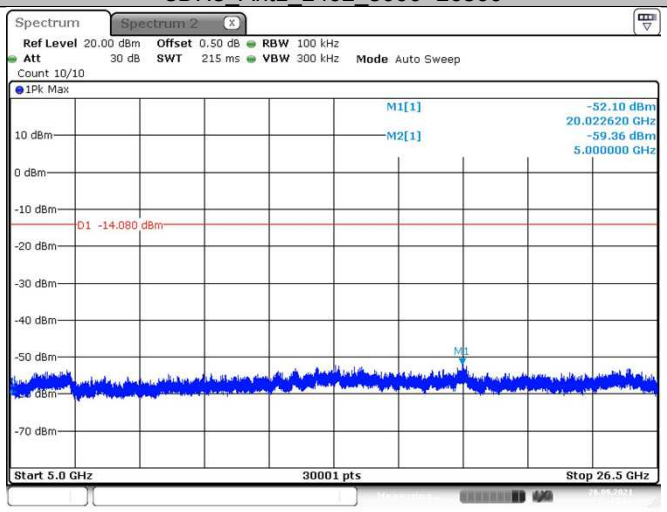
|  |
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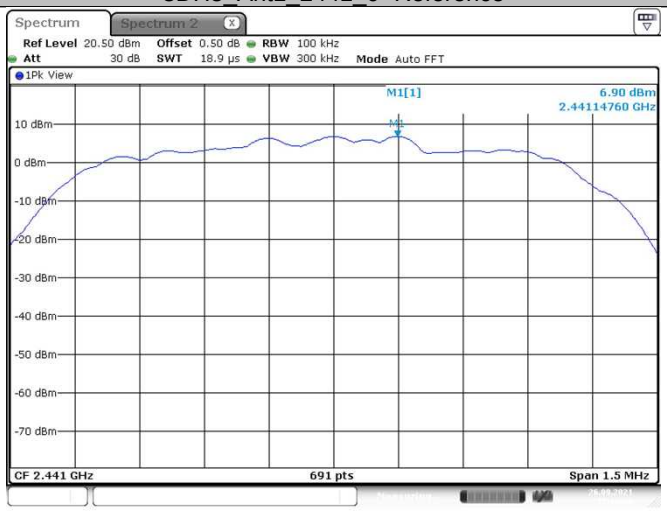
|  |
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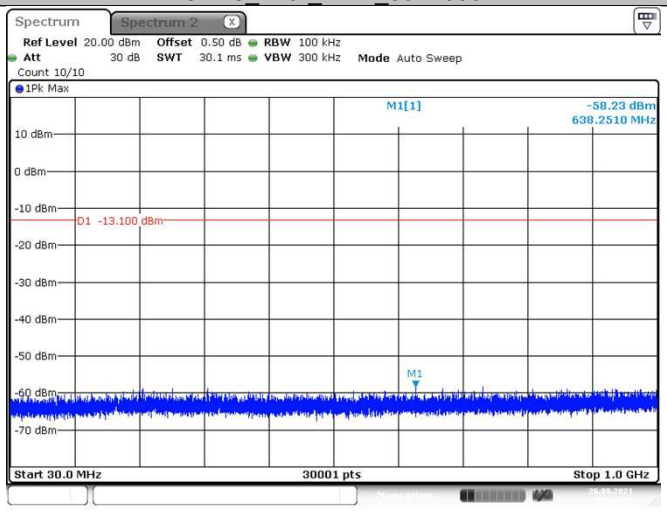
|  |
| Date: 26.SEP.2021 17:16:52 |

| 3DH5_Ant1_2441_1000~5000 |
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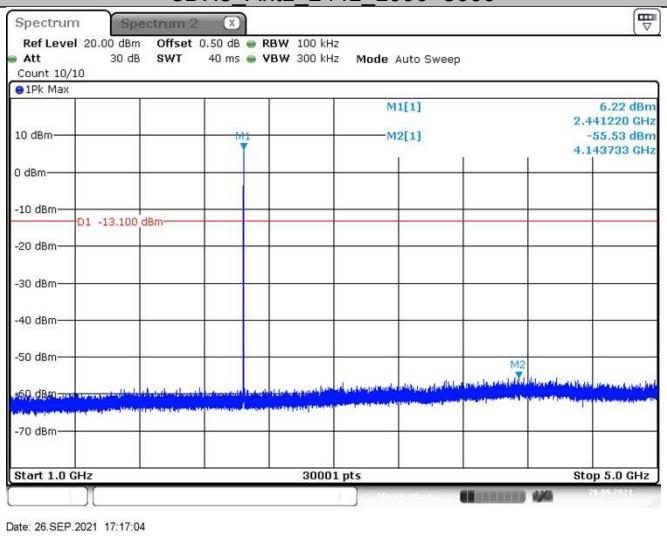
|  |



Date: 26.SEP.2021 17:17:04

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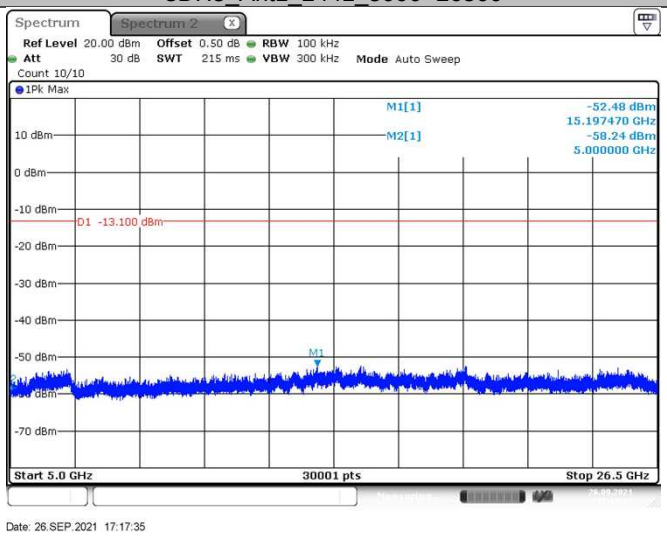
|  |



Date: 26.SEP.2021 17:17:35

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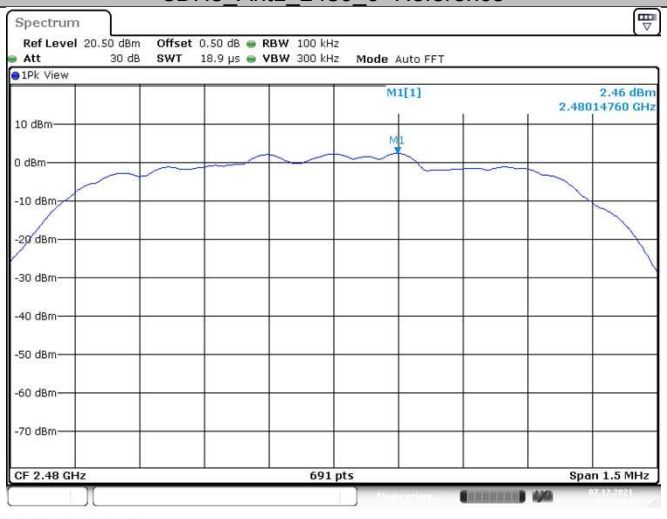
|  |



Date: 7.DEC.2021 09:50:04



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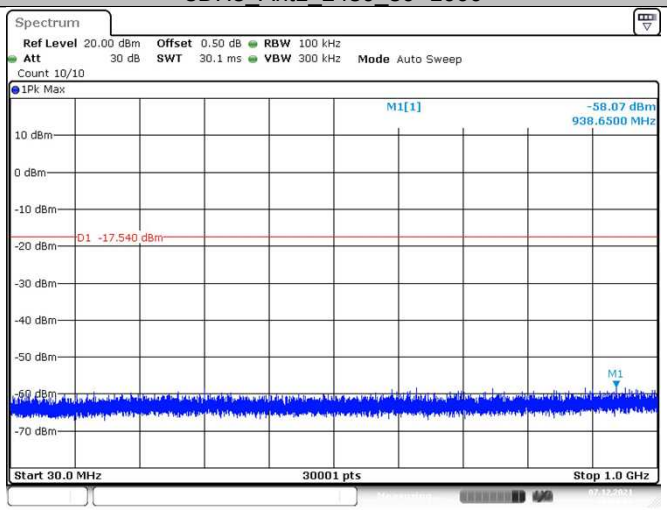
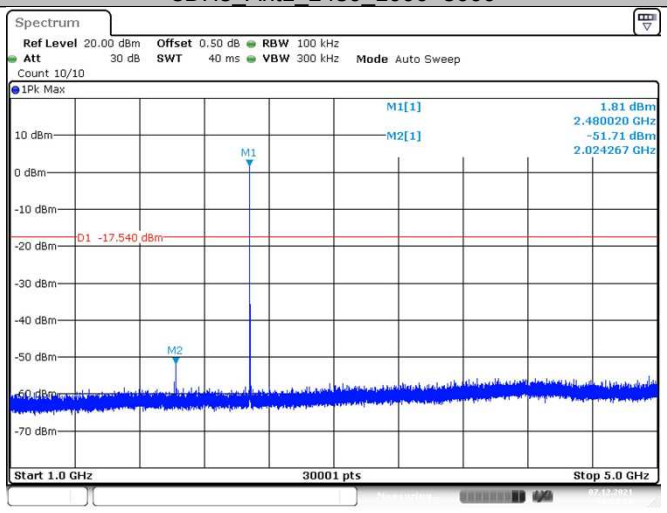
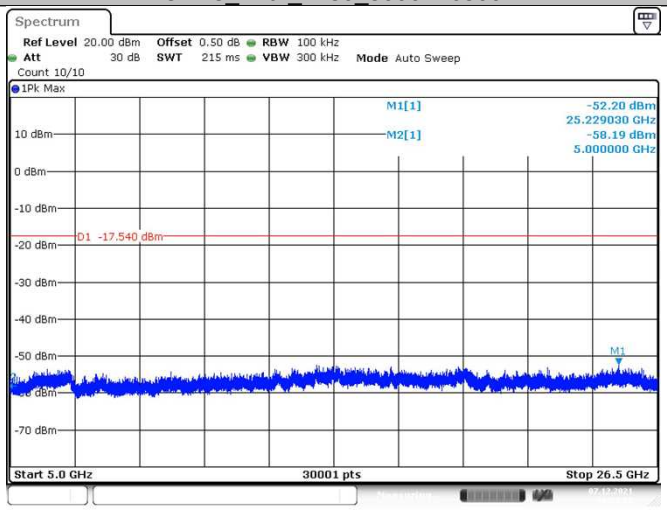
3DH5_Ant1_2480_30~1000




3DH5_Ant1_2480_1000~5000




3DH5_Ant1_2480_5000~26500



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## 9.8 Band edge testing

**Test Method**

1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold
2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
3 The level displayed must comply with the limit specified in this Section.
4 Repeat the test at the hopping off and hopping on mode, submit all the plots.

**Limit:**

In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

### Band edge testing

| TestMode | Antenna | ChName | Channel | RefLevel [dBm] | Result [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | Low | 2402 | 7.45 | -53.51 | <=-12.55 | PASS |
| | | High | 2480 | 4.15 | -57.23 | <=-15.85 | PASS |
| | | Low | Hop_2402 | 7.89 | -59.43 | <=-12.11 | PASS |
| | | High | Hop_2480 | 7.92 | -57.67 | <=-12.08 | PASS |
| 2DH5 | Ant1 | Low | 2402 | 5.81 | -52.76 | <=-14.19 | PASS |
| | | High | 2480 | 2.40 | -58 | <=-17.6 | PASS |
| | | Low | Hop_2402 | 2.55 | -59.22 | <=-17.45 | PASS |
| | | High | Hop_2480 | 6.41 | -58.19 | <=-13.59 | PASS |
| 3DH5 | Ant1 | Low | 2402 | 5.93 | -54.31 | <=-14.07 | PASS |
| | | High | 2480 | 2.50 | -57.93 | <=-17.5 | PASS |
| | | Low | Hop_2402 | 5.11 | -59.08 | <=-14.89 | PASS |
| | | High | Hop_2480 | 5.64 | -57.77 | <=-14.36 | PASS |


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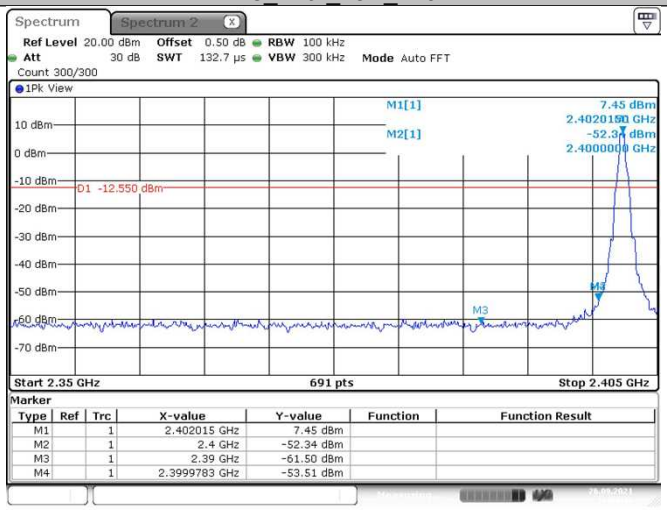
## DH5_Ant1_Low_2402

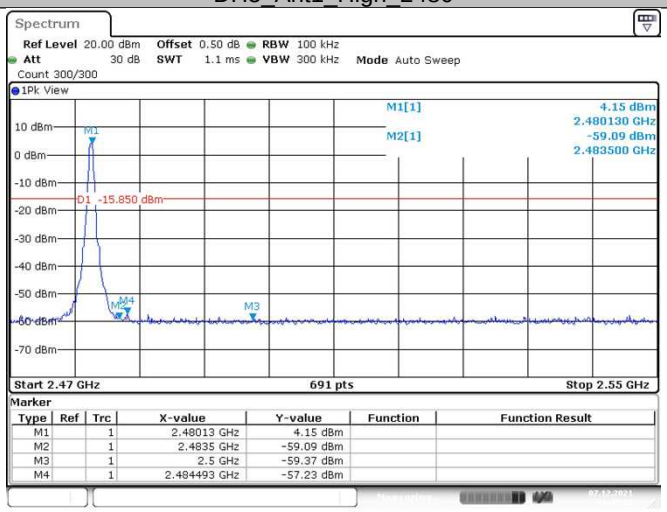



Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.402015 GHz | 7.45 dBm | | |
| M2 | | 1 | 2.4 GHz | -52.34 dBm | | |
| M3 | | 1 | 2.39 GHz | -61.50 dBm | | |
| M4 | | 1 | 2.3999783 GHz | -53.51 dBm | | |

Date: 26.SEP.2021 16:54:49

## DH5_Ant1_High_2480

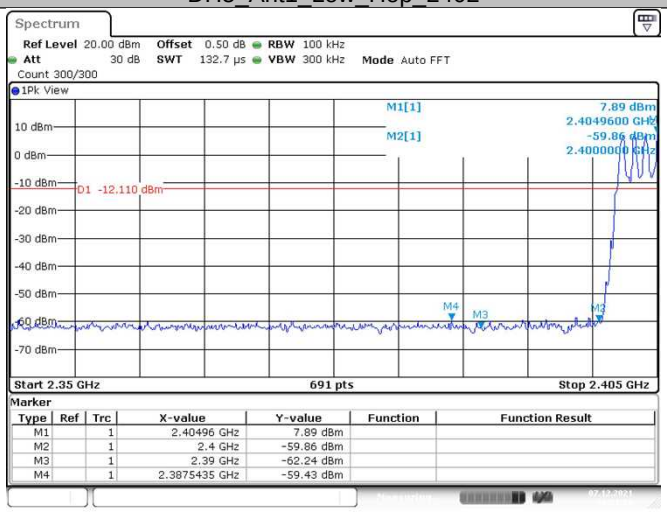



Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.48013 GHz | 4.15 dBm | | |
| M2 | | 1 | 2.4835 GHz | -59.09 dBm | | |
| M3 | | 1 | 2.5 GHz | -59.37 dBm | | |
| M4 | | 1 | 2.484493 GHz | -57.23 dBm | | |

Date: 7.DEC.2021 09:45:52

## DH5_Ant1_Low_Hop_2402




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.40496 GHz | 7.89 dBm | | |
| M2 | | 1 | 2.4 GHz | -59.86 dBm | | |
| M3 | | 1 | 2.39 GHz | -62.24 dBm | | |
| M4 | | 1 | 2.3875435 GHz | -59.43 dBm | | |

Date: 7.DEC.2021 09:51:50



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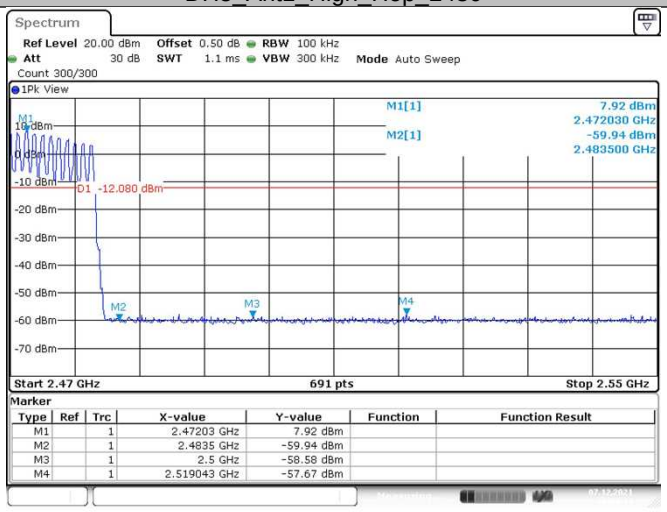
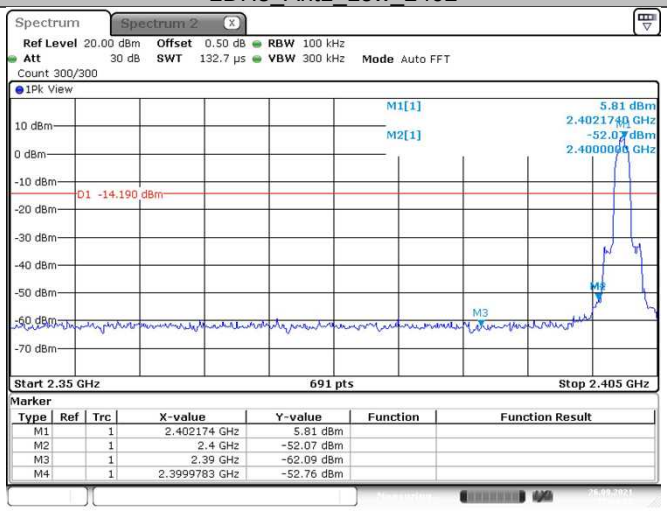
DH5_Ant1_High_Hop_2480



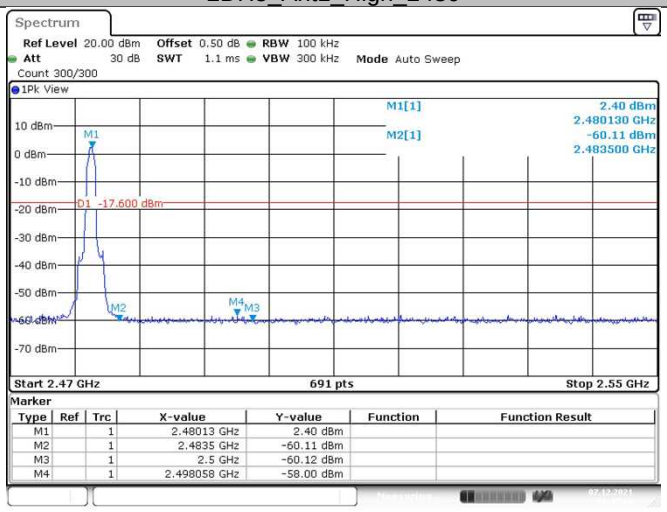

Date: 7.DEC.2021 09:53:14

2DH5_Ant1_Low_2402




Date: 26.SEP.2021 17:08:22

2DH5_Ant1_High_2480




Date: 7.DEC.2021 09:47:38



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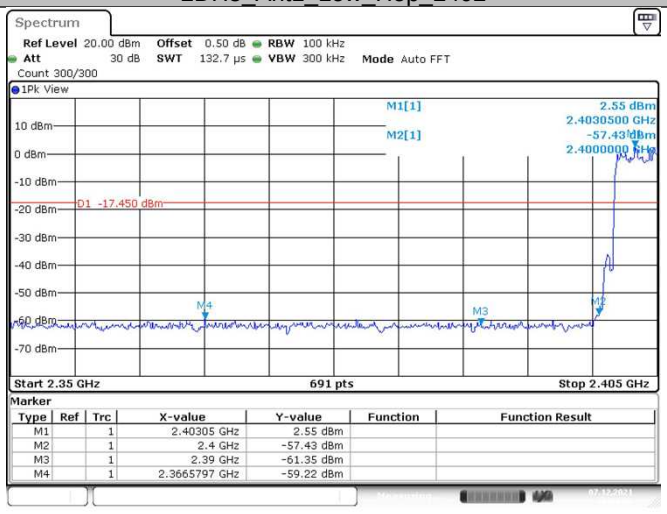
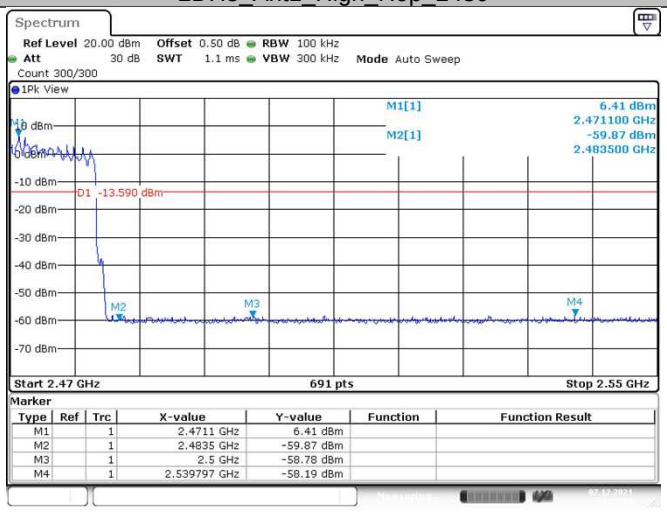
2DH5_Ant1_Low_Hop_2402



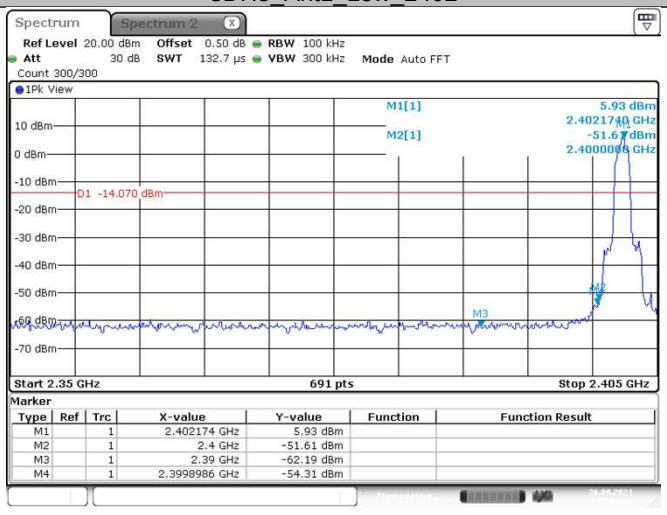

Date: 7.DEC.2021 09:53:46

2DH5_Ant1_High_Hop_2480




Date: 7.DEC.2021 09:55:57

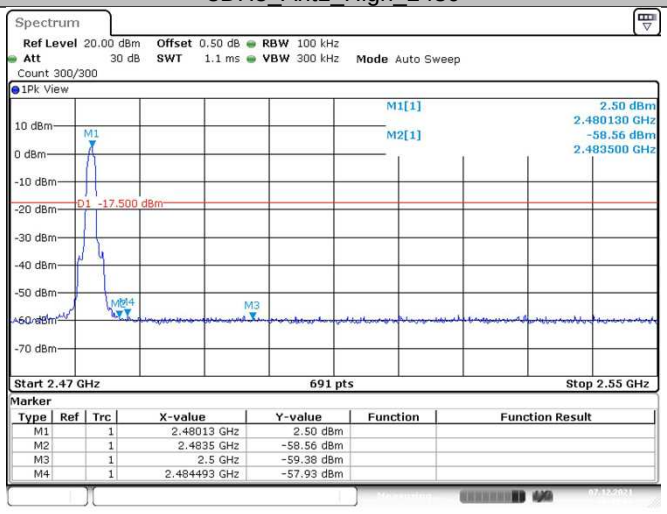
3DH5_Ant1_Low_2402




Date: 26.SEP.2021 17:14:46

China

3DH5_Ant1_High_2480




Date: 7.DEC.2021 09:49:59

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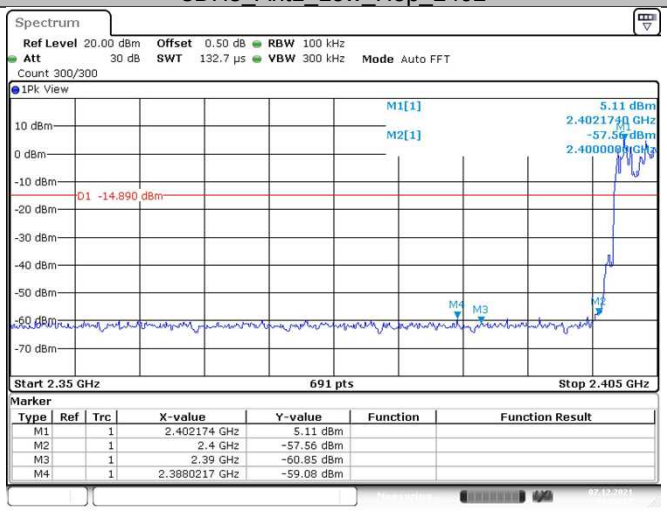
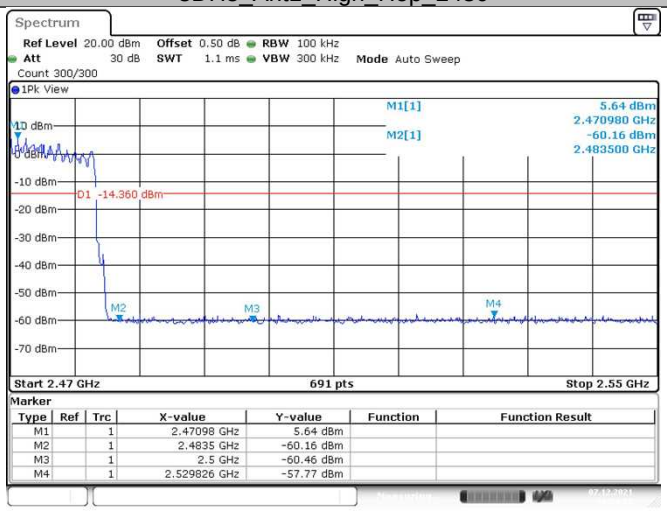



Date: 7.DEC.2021 09:56:27

3DH5_Ant1_High_Hop_2480




Date: 7.DEC.2021 09:58:21



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## 9.9 Spurious radiated emissions for transmitter and receiver

**Test Method**

1. The EUT was place on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
3. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. Use the following spectrum analyzer settings According to C63.10:

For Below 1GHz

Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz to 120 kHz, VBW≥RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

For Peak unwanted emissions Above 1GHz:

Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 1MHz, VBW≥RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

Procedures for average unwanted emissions measurements above 1000 MHz

a) RBW = 1MHz.
b) VBW ≥ [3 × RBW].
c) Detector = RMS (power averaging), if [span / (# of points in sweep)] ≤ RBW / 2. Satisfying this condition can require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, then the detector mode shall be set to peak.
d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)
e) Sweep time = auto.
f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of 1 / D, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)
g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:

1) If power averaging (rms) mode was used in the preceding step e), then the correction factor is [10 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.
2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is [20 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.
3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

**Limit**

The radio emission outside the operating frequency band shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Radiated emissions which fall in the restricted bands, as defined in section15.205, must comply with the radiated emission limits specified in section 15.209.

| Frequency MHz | Field Strength uV/m | Measured Distance Meters |
|---|---|---|
| 0.009~0.490 | 2400/F (kHz) | 300 |
| 0.490~1.705 | 24000/F (kHz) | 30 |
| 1.705~30 | 30 | 30 |

| Frequency MHz | Field Strength uV/m | Field Strength dBµV/m | Detector |
|---|---|---|---|
| 30-88 | 100 | 40 | QP |
| 88-216 | 150 | 43.5 | QP |
| 216-960 | 200 | 46 | QP |
| 960-1000 | 500 | 54 | QP |
| Above 1000 | 500 | 54 | AV |
| Above 1000 | 5000 | 74 | PK |


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## Spurious radiated emissions for transmitter and receiver

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Pre-scan with three orthogonal axis and the worst case as X axis.

The only worse case (which is subject to the maximum EIRP, 8DPSK 3DH5 mode) test results are listed in the report.

**Transmitting spurious emission test result as below:**

Bluetooth Mode 8DPSK Modulation 2402MHz Test Result

| Frequency | Emission Level | Polarization | Limit | Detector | Margin | Result |
|---|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | dBuV/m | |
| 2384.9 | 43.91 | H | 74 | PK | 30.09 | Pass |
| 4804 | 44.37 | H | 74 | PK | 29.63 | Pass |
| 2382.3 | 44.76 | V | 74 | PK | 29.24 | Pass |
| 4804 | 43.68 | V | 74 | PK | 30.32 | Pass |

Bluetooth Mode 8DPSK Modulation 2441MHz Test Result

| Frequency | Emission Level | Polarization | Limit | Detector | Margin | Result |
|---|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | dBuV/m | |
| 4882 | 44.33 | H | 74 | PK | 29.67 | Pass |
| 4882 | 44.67 | V | 74 | PK | 29.33 | Pass |

Bluetooth Mode 8DPSK Modulation 2480MHz Test Result

| Frequency | Emission Level | Polarization | Limit | Detector | Margin | Result |
|---|---|---|---|---|---|---|
| MHz | dBuV/m | | dBµV/m | | dBuV/m | |
| 2483.8 | 44.80 | H | 74 | PK | 29.20 | Pass |
| 4960 | 45.73 | H | 74 | PK | 28.27 | Pass |
| 2483.6 | 45.92 | V | 74 | PK | 28.08 | Pass |
| 4960 | 43.68 | V | 74 | PK | 30.32 | Pass |

Remark:

(1) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Pre-amplifier
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
Emission Level =Reading level +Correction Factor

(The Reading Level is recorded by software which is not shown in the sheet)



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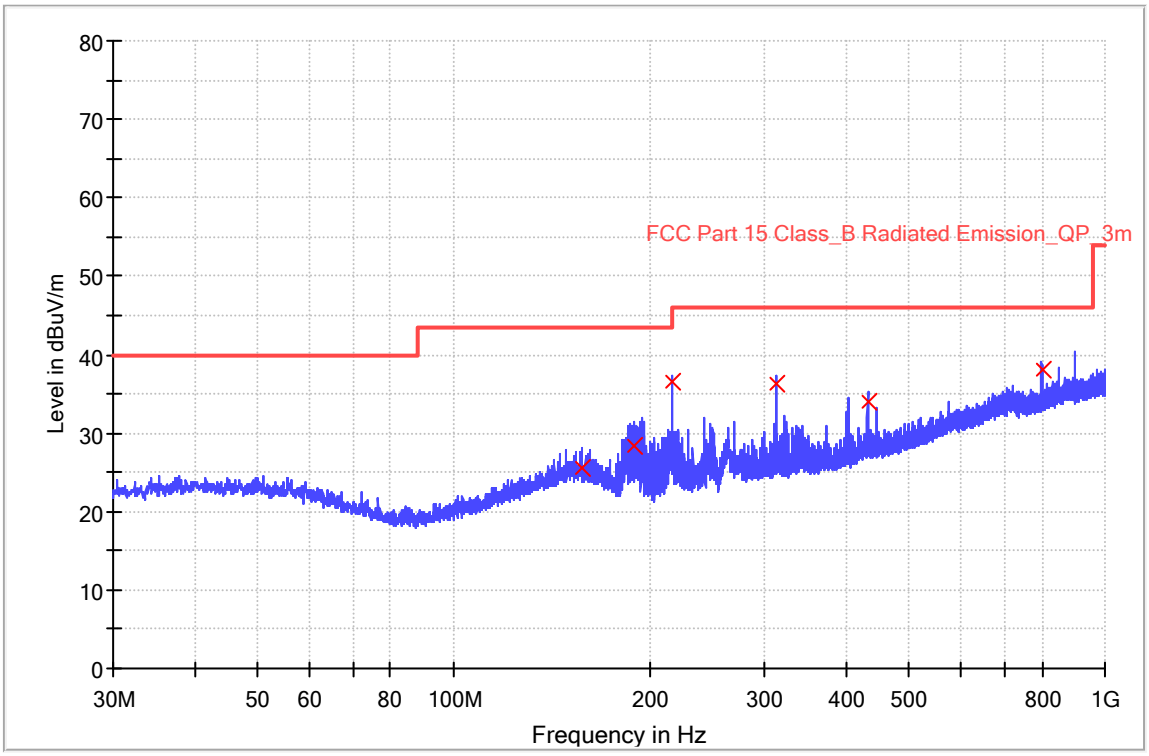
The worst case of Radiated Emission below 1GHz:

| | |
|---|---|
| Site: 3 meter chamber | Time: 2021/07/13 - 17:29 |
| Limit: FCC_Part15.109_RE(3m)_ClassB | Engineer: Wenqiang LU |
| Probe: VULB9168 | Polarity: Horizontal |
| EUT: Infrared Thermal Camera, Model no: FOTRIC 326M | Power: 120VAC, 60Hz for computer |
| Note: Transmit by at channel 2480MHz and 8DPSK mode.<br>Note: Pre-scan with three orthogonal axis and the worst case as X axis. | |

RE_VULB9168_pre_Cont_30-1000




## Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBuV/m) |
|---|---|---|---|---|---|---|---|---|---|
| 157.640000 | 25.6 | 1000.0 | 120.000 | 100.3 | H | 324.0 | 15.7 | 17.9 | 43.5 |
| 189.000000 | 28.4 | 1000.0 | 120.000 | 100.3 | H | 297.0 | 12.3 | 15.1 | 43.5 |
| 215.960000 | 36.4 | 1000.0 | 120.000 | 100.3 | H | 255.0 | 12.3 | 7.1 | 43.5 |
| 311.960000 | 36.2 | 1000.0 | 120.000 | 100.3 | H | 216.0 | 15.3 | 9.8 | 46.0 |
| 431.960000 | 34.1 | 1000.0 | 120.000 | 100.3 | H | 180.0 | 18.1 | 12.0 | 46.0 |
| 800.000000 | 38.0 | 1000.0 | 120.000 | 100.3 | H | 75.0 | 24.6 | 8.0 | 46.0 |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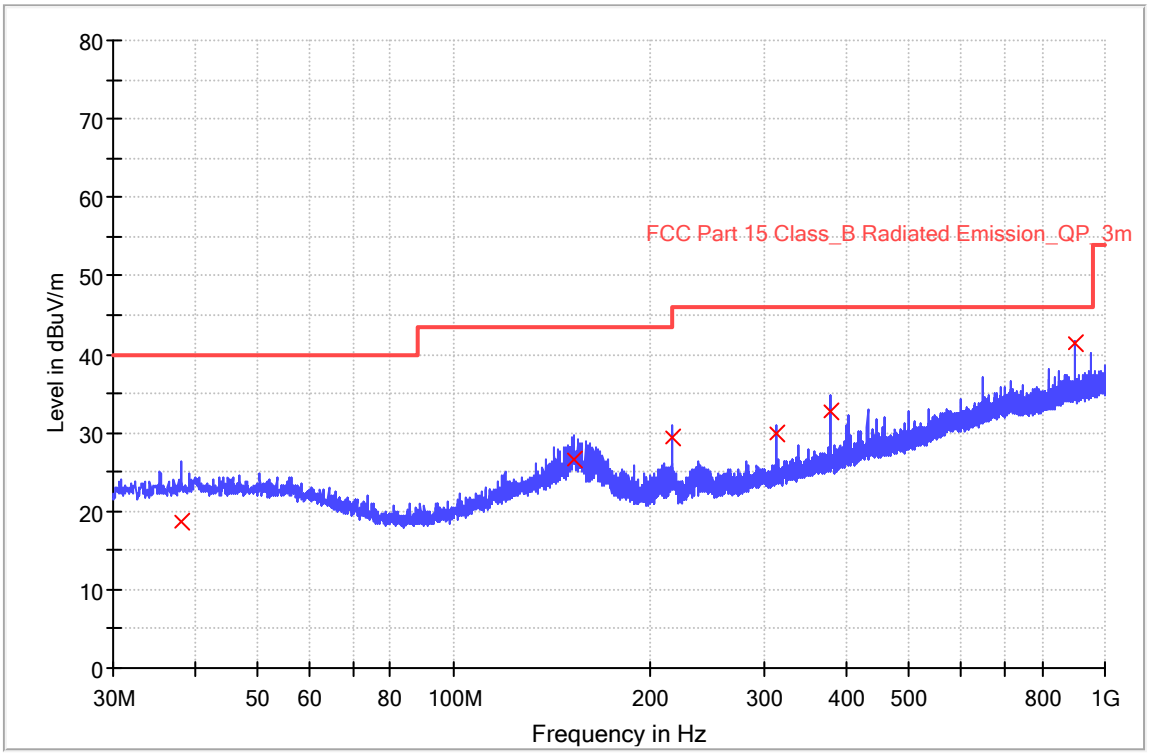
The worst case of Radiated Emission below 1GHz:

| | |
|---|---|
| Site: 3 meter chamber | Time: 2021/07/13 - 17:21 |
| Limit: FCC_Part15.109_RE(3m)_ClassB | Engineer: Wenqiang LU |
| Probe: VULB9168 | Polarity: Vertical |
| EUT: Infrared Thermal Camera, Model no: FOTRIC 326M | Power: 120VAC, 60Hz for computer |
| Note: Transmit by at channel 2480MHz and 8DPSK mode.<br>Note: Pre-scan with three orthogonal axis and the worst case as X axis. | |

RE_VULB9168_pre_Cont_30-1000




## Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBuV/m) |
|---|---|---|---|---|---|---|---|---|---|
| 38.200000 | 18.7 | 1000.0 | 120.000 | 100.3 | V | 235.0 | 14.5 | 21.3 | 40.0 |
| 153.280000 | 26.6 | 1000.0 | 120.000 | 100.3 | V | 42.0 | 15.7 | 16.9 | 43.5 |
| 215.960000 | 29.4 | 1000.0 | 120.000 | 100.3 | V | 13.0 | 12.3 | 14.1 | 43.5 |
| 311.960000 | 29.9 | 1000.0 | 120.000 | 100.3 | V | 11.0 | 15.3 | 16.1 | 46.0 |
| 379.800000 | 32.8 | 1000.0 | 120.000 | 100.3 | V | 312.0 | 16.9 | 13.2 | 46.0 |
| 900.000000 | 41.3 | 1000.0 | 120.000 | 100.3 | V | 12.0 | 25.9 | 4.7 | 46.0 |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)
Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.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# 10 Test Equipment List

## List of Test Instruments

Test Site1

| | DESCRIPTION | MANUFACTURER | MODEL NO. | SERIAL NO. | CAL. DATE | CAL. DUE DATE |
|---|---|---|---|---|---|---|
| C | Wideband power sensor | Rohde & Schwarz | NRP-Z81 | 104782 | 2020-12-23 | 2021-12-22 |
| | Signal Analyzer | Rohde & Schwarz | FSV40 | 101091 | 2020-8-4 | 2021-8-3 |
| | Signal Analyzer | Rohde & Schwarz | FSV40 | 101091 | 2021-8-2 | 2022-8-1 |
| RE | EMI Test Receiver | Rohde & Schwarz | ESR3 | 101906 | 2020-8-4 | 2021-8-3 |
| | EMI Test Receiver | Rohde & Schwarz | ESR3 | 101906 | 2021-8-2 | 2022-8-1 |
| | Signal Analyzer | Rohde & Schwarz | FSV40 | 101091 | 2020-8-4 | 2021-8-3 |
| | Signal Analyzer | Rohde & Schwarz | FSV40 | 101091 | 2021-8-2 | 2022-8-1 |
| | Trilog Super Broadband Test Antenna | Schwarzbeck | VULB 9168 | 961 | 2019-3-16 | 2022-3-15 |
| | Horn Antenna | Rohde & Schwarz | HF907 | 102393 | 2021-3-15 | 2022-3-14 |
| | Pre-amplifier | Rohde & Schwarz | SCU-18D | 19006451 | 2020-8-4 | 2021-8-3 |
| | Pre-amplifier | Rohde & Schwarz | SCU-18D | 19006451 | 2021-8-2 | 2022-8-1 |
| | Loop antenna | Rohde & Schwarz | HFH2-Z2 | 100443 | 2020-5-23 | 2021-5-22 |
| | Loop antenna | Rohde & Schwarz | HFH2-Z2 | 100443 | 2021-5-21 | 2022-5-20 |
| | DOUBLE-RIDGED WAVEGUIDE HORN WITH PRE-AMPLIFIER (18 GHZ - 40 GHZ) | ETS-Lindgren | 3116C-PA | 002222727 | 2020-9-23 | 2023-9-22 |
| | 3m Semi-anechoic chamber | TDK | 9X6X6 | ---- | 2018-5-11 | 2021-5-10 |
| | 3m Semi-anechoic chamber | TDK | 9X6X6 | ---- | 2021-5-8 | 2024-5-7 |
| CE | EMI Test Receiver | Rohde & Schwarz | ESR3 | 101907 | 2020-8-4 | 2021-8-3 |
| | EMI Test Receiver | Rohde & Schwarz | ESR3 | 101907 | 2021-8-2 | 2022-8-1 |
| | LISN | Rohde & Schwarz | ENV216 | 101924 | 2020-8-4 | 2021-8-3 |
| | LISN | Rohde & Schwarz | ENV216 | 101924 | 2021-8-2 | 2022-8-1 |

| Measurement Software Information | | | |
|---|---|---|---|
| Test Item | Software | Manufacturer | Version |
| C | Bluetooth and WiFi Test System | Shenzhen JS tonscend co.,ltd | 2.6.77.0518 |
| RE | EMC 32 | Rohde & Schwarz | V9.15.00 |
| CE | EMC 32 | Rohde & Schwarz | V9.15.03 |

C - Conducted RF tests

- Conducted peak output power
- 6dB bandwidth
- 20dB bandwidth and 99% Occupied Bandwidth
- Carrier frequency separation
- Number of hopping frequencies
- Dwell Time
- Power spectral density*
- Spurious RF conducted emissions
- Band edge

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# 11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

| Items | Extended Uncertainty |
|---|---|
| Conducted Disturbance at Mains Terminals | 150kHz to 30MHz, LISN, ±3.16dB |
| Radiated Disturbance | 30MHz to 1GHz, ±5.03dB (Horizontal)<br>±5.12dB (Vertical)<br>1GHz to 18GHz, ±5.49dB<br>18GHz to 25GHz, ±5.63dB |
| Carrier power conducted measurement | 50MHz~18GHz, ±1.238dB |
| Spurious Emission Conducted Measurement | 9kHz ~40GHz, ± 1.224dB |

Measurement Uncertainty Decision Rule:

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2007, clause 4.4.3 and 4.5.1.



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# 12 Photographs of Test Set-ups

Refer to the < Test Setup photos >.



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# 13 Photographs of EUT

Refer to the < External Photos > & < Internal Photos >.

THE END



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