

**FCC - TEST REPORT**

Report Number : **68.950.22.0918.01** Date of Issue: **2022-12-12**

Model : **CCAmpV1**

Product Type : **Bluetooth Audio Amplifier**

Applicant : **Club Car LLC**

Address : **4125 Washington Rd, Evans, Georgia, United States**

Manufacturer : **Club Car LLC**

Address : **4125 Washington Rd, Evans, Georgia, United States**

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including Appendices : **62**

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## 2 Details about the Test Laboratory

### Details about the Test Laboratory

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch  
Building 12 & 13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road  
2, Nanshan District  
Shenzhen 518052  
P.R. China

Telephone: 86 755 8828 6998  
Fax: 86 755 828 5299

FCC Registration No.: 514049

FCC Designation Number: CA5009

IC Registration No.: 10320A

### 3 Description of the Equipment Under Test

|                            |                                                                                                                                                     |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Product:                   | Bluetooth Audio Amplifier                                                                                                                           |
| Model no.:                 | CCampV1                                                                                                                                             |
| Brand name:                | Club Car                                                                                                                                            |
| FCC ID:                    | 2A9KH-CCAMPV1                                                                                                                                       |
| Options and accessories:   | N/A                                                                                                                                                 |
| Rating:                    | Supplied by 12VDC                                                                                                                                   |
| RF Transmission Frequency: | 2402MHz-2480MHz                                                                                                                                     |
| No. of Operated Channel:   | 79                                                                                                                                                  |
| Modulation:                | GFSK, $\pi/4$ -DQPSK, 8DPSK                                                                                                                         |
| Antenna Type:              | Chip Antenna                                                                                                                                        |
| Antenna:                   | Gain: 2.1dBi                                                                                                                                        |
| Description of the EUT:    | The Equipment Under Test (EUT) is a Bluetooth Audio Amplifier which support Bluetooth function.<br>Only Bluetooth (BR+EDR) included in this report. |

NOTE 1: The above EUT's information is declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 4 Summary of Test Standards

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

All the test methods were according to KDB 558074 D01 15.247 Meas Guidance v05r02 Measurement Guidance and ANSI C63.10 (2013).

## 5 Summary of Test Results

| Technical Requirements |                                                      |            |             |
|------------------------|------------------------------------------------------|------------|-------------|
| FCC Part 15 Subpart C  |                                                      |            |             |
| Test Condition         |                                                      | Pages      | Test Result |
| §15.207                | Conducted emission AC power port                     | See note 2 | N/A         |
| §15.247(b)(1)          | Conducted peak output power                          | 10         | Pass        |
| RSS-247 5.4(b)         | Equivalent Isotropic Radiated Power                  | 10         | Pass        |
| §15.247(e)             | Power spectral density                               | --         | N/A         |
| §15.247(a)(2)          | 6dB bandwidth and 99% Occupied Bandwidth             | --         | N/A         |
| §15.247(a)(1)          | 20dB bandwidth and 99% Occupied Bandwidth            | 15         | Pass        |
| §15.247(a)(1)          | Min. of Hopping Channel Carrier Frequency Separation | 25         | Pass        |
| §15.247(a)(1)(iii)     | Min number of hopping frequencies                    | 28         | Pass        |
| §15.247(a)(1)(iii)     | Dwell Time - Average Time of Occupancy               | 31         | Pass        |
| §15.247(d)             | Spurious RF conducted emissions                      | 35         | Pass        |
| §15.247(d)             | Band edge                                            | 46         | Pass        |
| §15.247(d) & §15.209   | Spurious radiated emissions for transmitter          | 52         | Pass        |
| §15.203                | Antenna requirement                                  | See note 3 | Pass        |

Note 1: N/A=Not Applicable.

Note 2: The EUT is used in car and the power by car battery.

Note 3: The EUT uses an external antenna and manufacturer will stick it down with glue, which gain is 2.1dBi. In accordance to §15.203, it is considered sufficiently to comply with the provisions of this section.

## 6 General Remarks

### Remarks

This submittal(s) (test report) is intended for FCC ID: 2A9KH-CCAMPV1, complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C rules.

### SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment Under Test

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

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

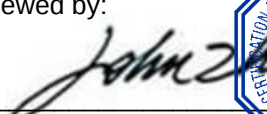
Sample Received Date: 2022-09-23

Testing Start Date: 2022-09-23

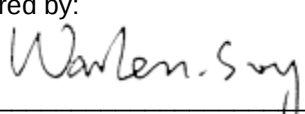
Testing End Date: 2022-09-28

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

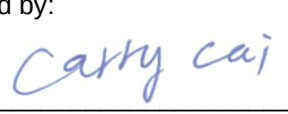
Reviewed by:

  
John Zhi  
Section Manager

Prepared by:

  
Warlen Song  
Project Engineer

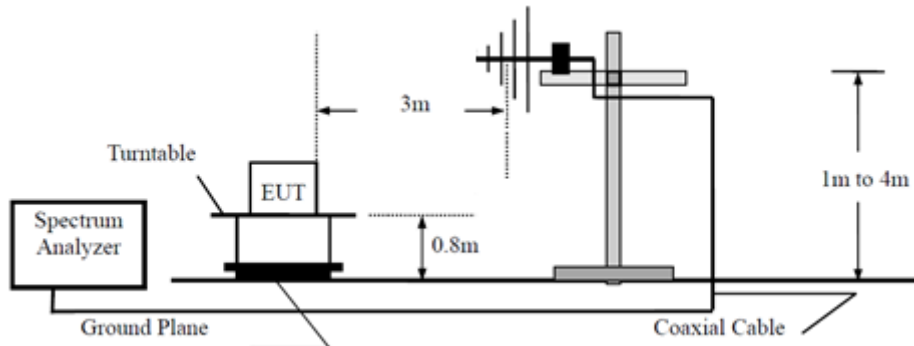
Tested by:

  
Carry Cai  
Test Engineer

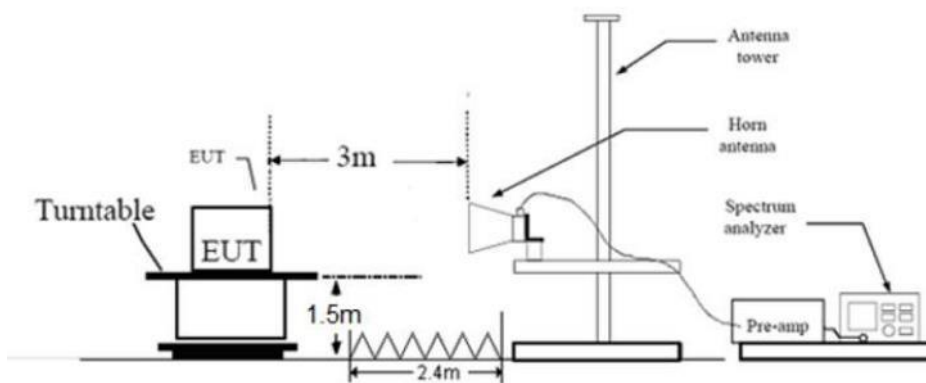
## 7 Test Setups

### 7.1 Radiated test setups

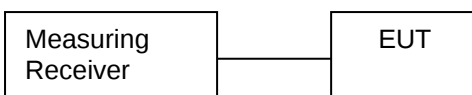
Below 1GHz



Above 1GHz



### 7.2 Conducted RF test setups



## 8 Systems Test Configuration

### Auxiliary Equipment Used during Test:

| Description | Manufacturer | Model NO. | S/N     |
|-------------|--------------|-----------|---------|
| Laptop      | Thinkpad     | X230      | 0A72162 |

### Cables Used During Test:

| Cable | Length | Shielded/unshielded | With / without ferrite |
|-------|--------|---------------------|------------------------|
| --    | --     | --                  | --                     |

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

## 9 Technical Requirement

### 9.1 Conducted Peak Output Power

#### Test Method

1. The RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following test receiver settings:  
Span = approximately 5 times the 20dB bandwidth, centered on a hopping channel  
RBW > the 20dB bandwidth of the emission being measured, VBW ≥ RBW,  
Sweep = auto, Detector function = peak, Trace = max hold
4. 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 and record the results in the test report.
5. Repeat above procedures until all frequencies measured were complete.

#### Limits

According to §15.247 (b) (1), conducted peak output power limit as below:

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

## Conducted Peak Output Power

### Bluetooth Mode GFSK modulation Test Result

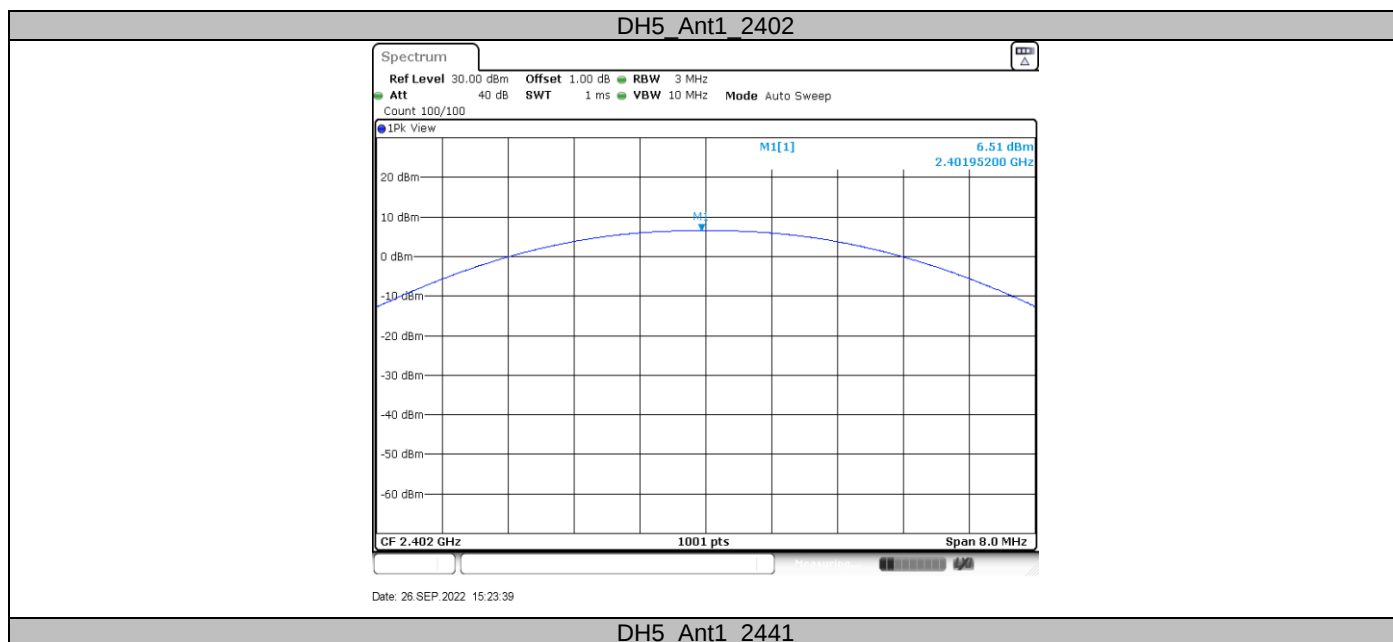
| Frequency<br>MHz       | Conducted Peak<br>Output Power<br>dBm | Result |
|------------------------|---------------------------------------|--------|
| Low channel 2402MHz    | 6.51                                  | Pass   |
| Middle channel 2441MHz | 6.85                                  | Pass   |
| High channel 2480MHz   | 6.63                                  | Pass   |

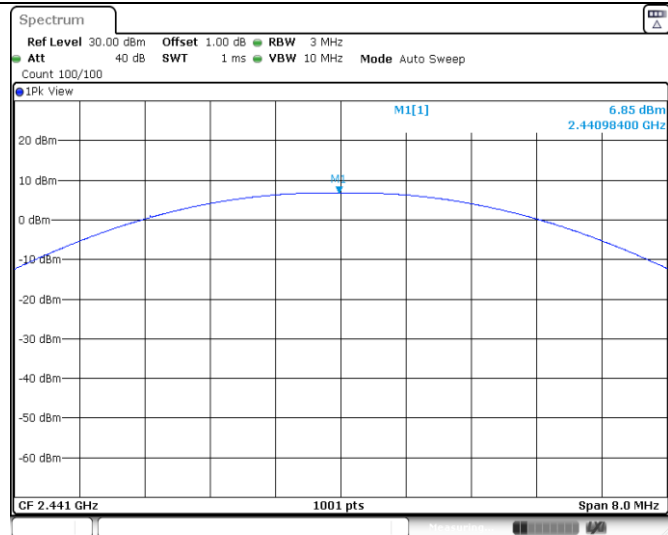
### Bluetooth Mode $\pi/4$ -DQPSK modulation Test Result

| Frequency<br>MHz       | Conducted Peak<br>Output Power<br>dBm | Result |
|------------------------|---------------------------------------|--------|
| Low channel 2402MHz    | 8.65                                  | Pass   |
| Middle channel 2441MHz | 9.12                                  | Pass   |
| High channel 2480MHz   | 9.17                                  | Pass   |

### Bluetooth Mode 8DPSK modulation Test Result

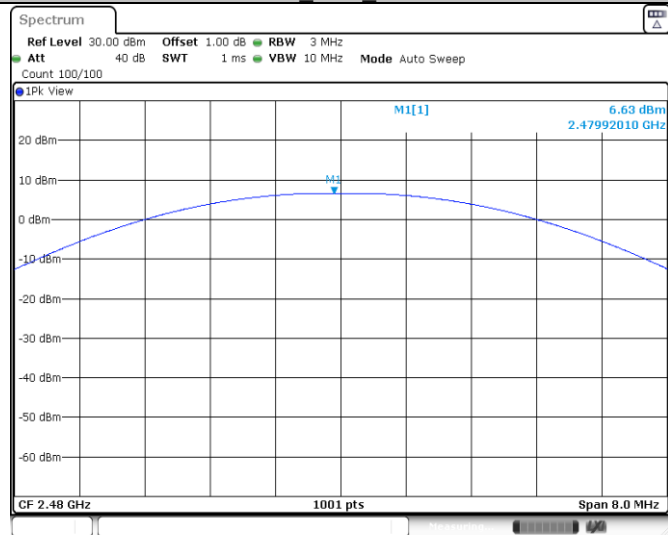
| Frequency<br>MHz       | Conducted Peak<br>Output Power<br>dBm | Result |
|------------------------|---------------------------------------|--------|
| Low channel 2402MHz    | 9.39                                  | Pass   |
| Middle channel 2441MHz | 9.75                                  | Pass   |
| High channel 2480MHz   | 9.70                                  | Pass   |





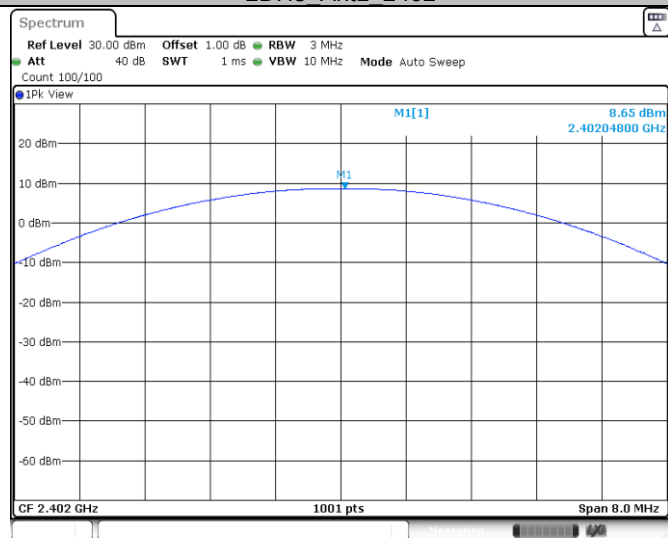
Date: 26 SEP 2022 15:26:07

## DH5 Ant1 2480



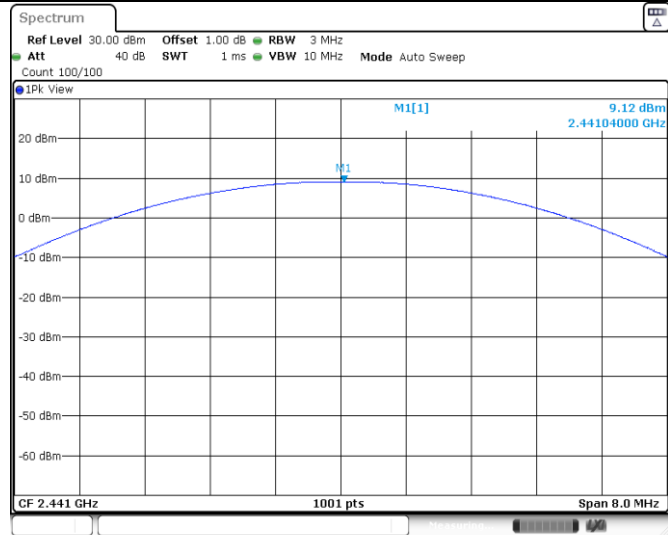
Date: 26 SEP 2022 15:27:53

## 2DH5 Ant1 2402



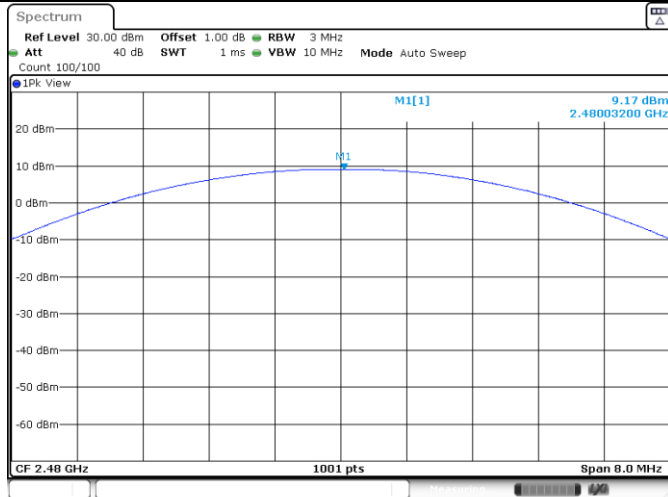
Date: 26 SEP 2022 15:32:20

## 2DH5 Ant1 2441



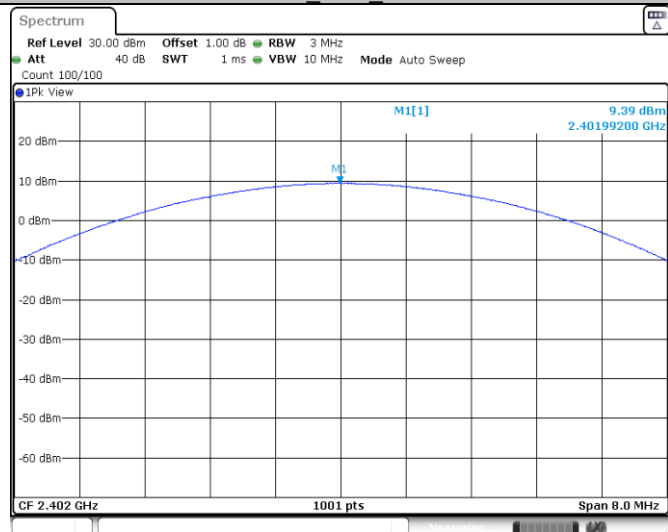
Date: 26 SEP 2022 16:07:24

## 2DH5\_Ant1\_2480



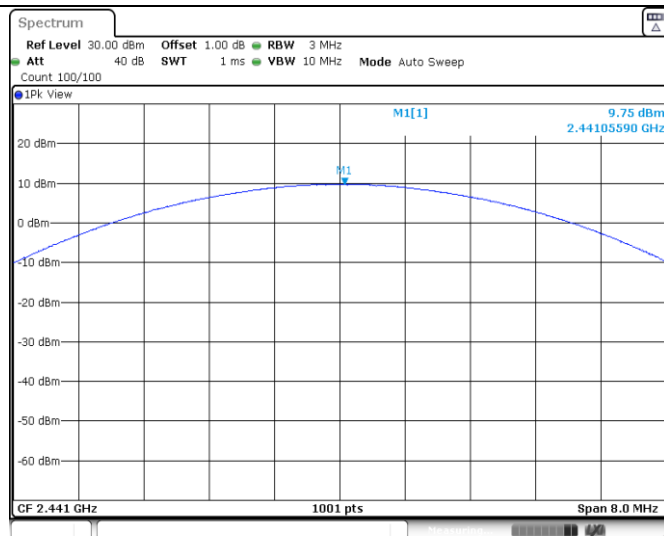
Date: 26 SEP 2022 15:36:57

## 3DH5\_Ant1\_2402



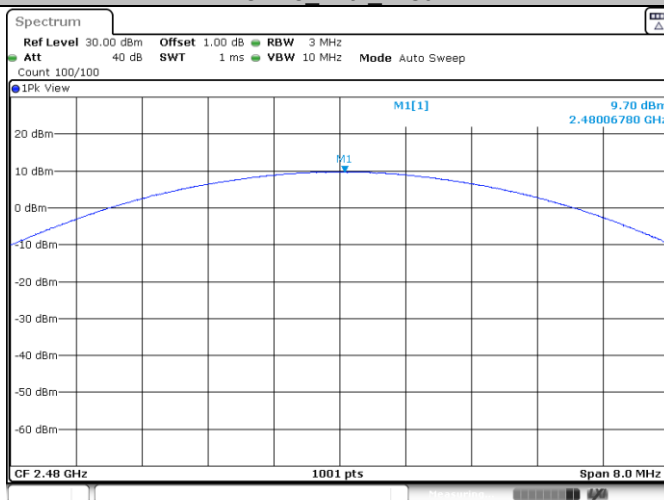
Date: 26 SEP 2022 15:41:27

## 3DH5\_Ant1\_2441



Date: 26 SEP 2022 15:44:03

### 3DH5\_Ant1\_2480



Date: 26 SEP 2022 15:45:43

## 9.2 20 dB Bandwidth

### Test Method

1. The RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Use the following test receiver settings:  
Span = approximately 5 times the 20dB bandwidth, centered on a hopping channel  
RBW > the 20dB bandwidth of the emission being measured, VBW $\geq$ RBW,  
Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth. Record the results.
5. Repeat above procedures until all frequencies measured were complete.

### Limit

Limit [kHz]

---

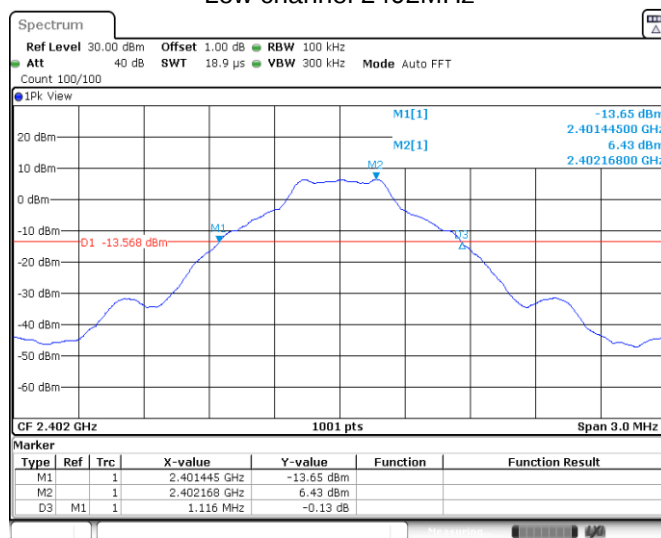
N/A

## 20 dB bandwidth

### Bluetooth Mode GFSK Modulation test result

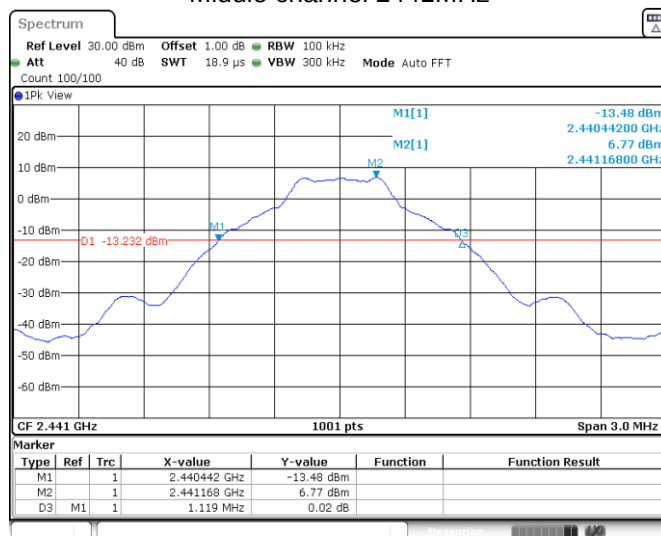
| Frequency<br>MHz | 20 dB Bandwidth<br>MHz | Limit<br>MHz | Result |
|------------------|------------------------|--------------|--------|
| 2402             | 1.116                  | --           | Pass   |
| 2441             | 1.119                  | --           | Pass   |
| 2480             | 1.116                  | --           | Pass   |

Low channel 2402MHz



Date: 26 SEP 2022 15:23:01

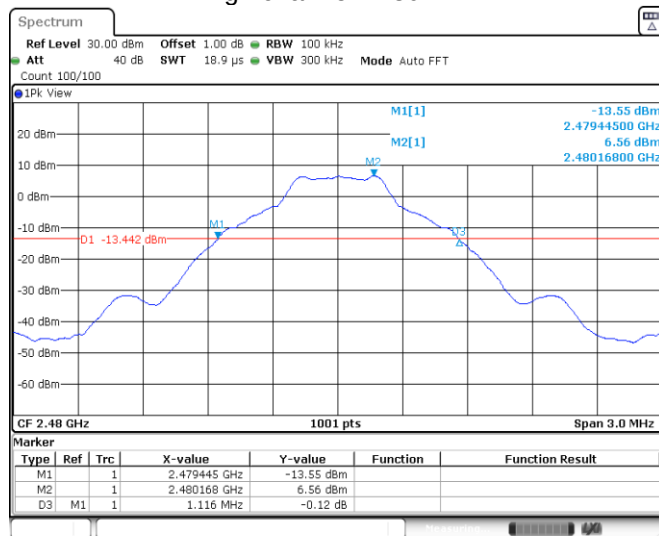
Middle channel 2441MHz



Date: 26 SEP 2022 15:25:30

**20 dB bandwidth and 99% Occupied Bandwidth**

High channel 2480MHz

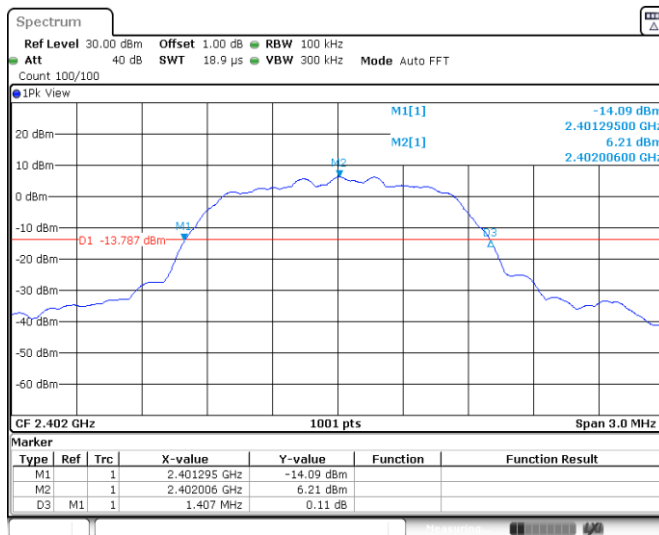


Date: 26 SEP 2022 15:27:16

Bluetooth Mode  $\pi/4$ -DQPSK Modulation test result

| Frequency<br>MHz | 20 dB Bandwidth<br>MHz | Limit<br>MHz | Result |
|------------------|------------------------|--------------|--------|
| 2402             | 1.407                  | --           | Pass   |
| 2441             | 1.404                  | --           | Pass   |
| 2480             | 1.402                  | --           | Pass   |

Low channel 2402MHz

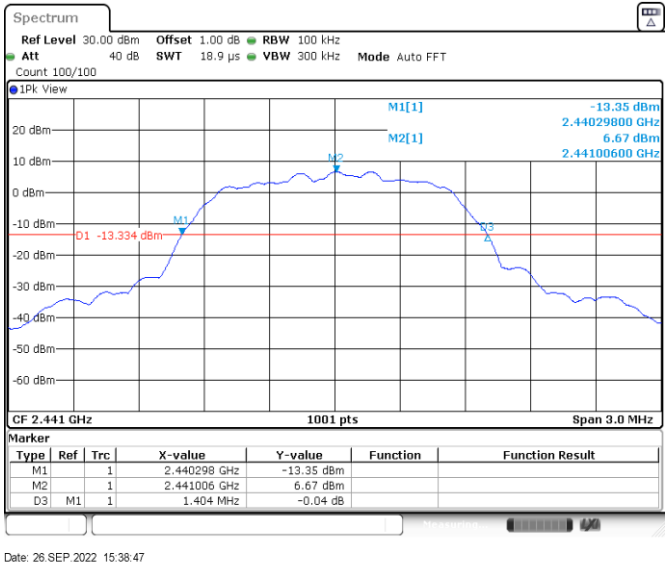


Date: 26 SEP 2022 15:31:44

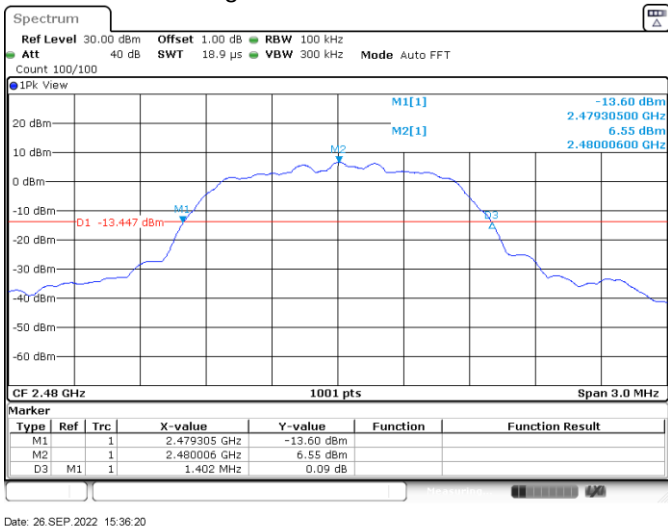


20 dB bandwidth and 99% Occupied Bandwidth

Middle channel 2441MHz



High channel 2480MHz

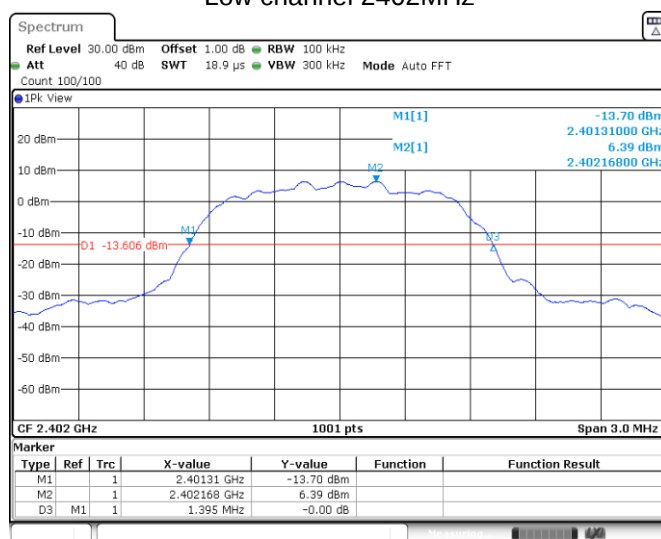


## 20 dB bandwidth

### Bluetooth Mode 8DPSK Modulation test result

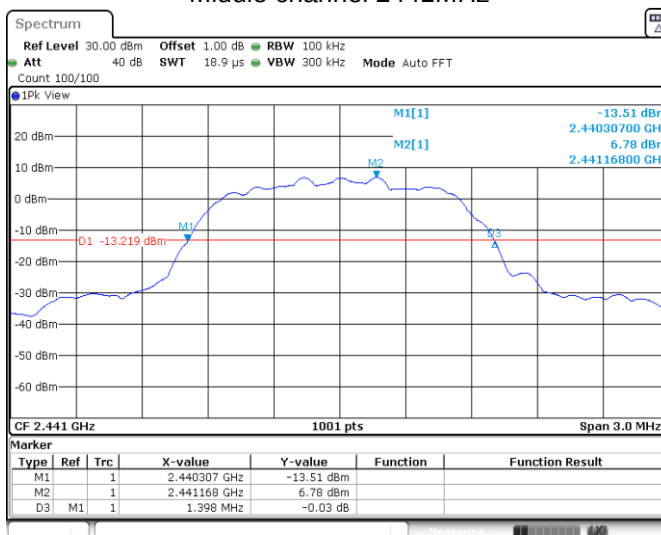
| Frequency<br>MHz | 20 dB Bandwidth<br>MHz | Limit<br>MHz | Result |
|------------------|------------------------|--------------|--------|
| 2402             | 1.395                  | --           | Pass   |
| 2441             | 1.398                  | --           | Pass   |
| 2480             | 1.394                  | --           | Pass   |

Low channel 2402MHz



Date: 26 SEP 2022 15:40:51

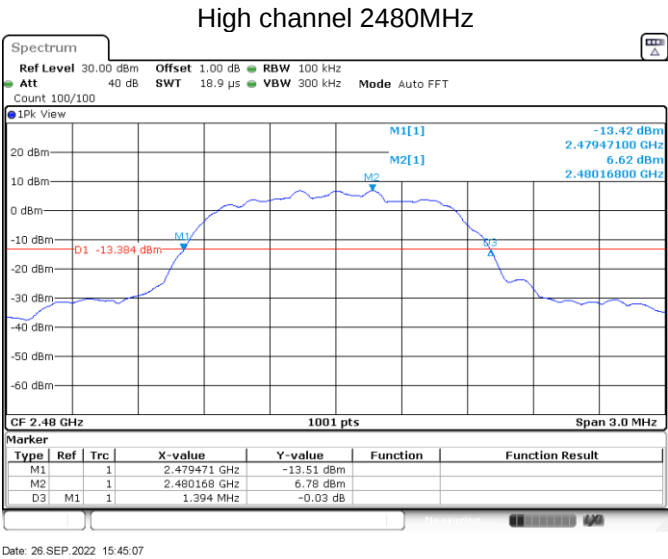
Middle channel 2441MHz



Date: 26 SEP 2022 15:43:27



20 dB bandwidth and 99% Occupied Bandwidth



### 9.3 Carrier Frequency Separation

#### Test Method

1. The RF output of EUT was connected to the test receiver by RF cable The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit to hopping mode.
3. Use the following spectrum analyzer settings:  
Span = wide enough to capture the peaks of two adjacent channels,  $RBW \geq 1\%$  of the span,  $VBW \geq RBW$ , Sweep = auto, Detector function = peak
4. By using the Max-Hold function record the separation of two adjacent channels.
5. Measure the frequency difference of these two adjacent channels by spectrum analyzer marker function. Record the results.
6. Repeat above procedures until all frequencies measured were complete.

#### Limit

| Limit<br>kHz                                                         |
|----------------------------------------------------------------------|
| $\geq 25\text{kHz}$ or $2/3$ of the 20 dB bandwidth which is greater |

#### Limit

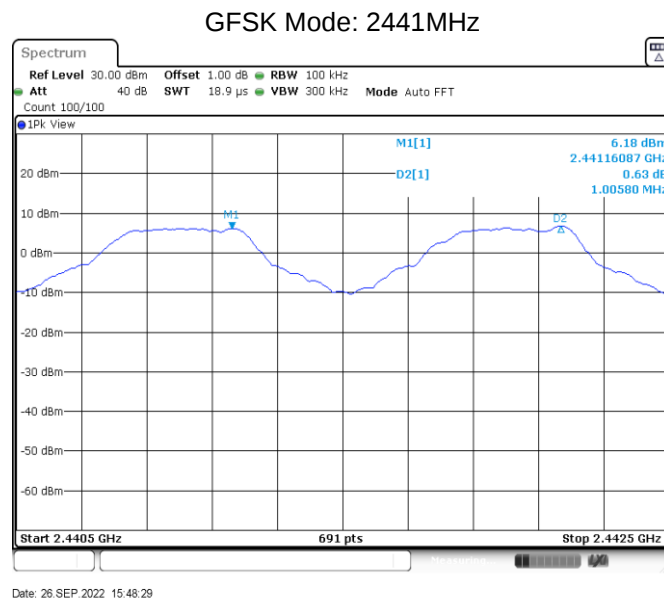
| Frequency<br>MHz | 2/3 of 20 dB Bandwidth<br>kHz |
|------------------|-------------------------------|
| 2402             | 744                           |
| 2441             | 746                           |
| 2480             | 744                           |

## Carrier Frequency Separation

Test result: The measurement was performed with the typical configuration (normal hopping status).

GFSK Modulation test result

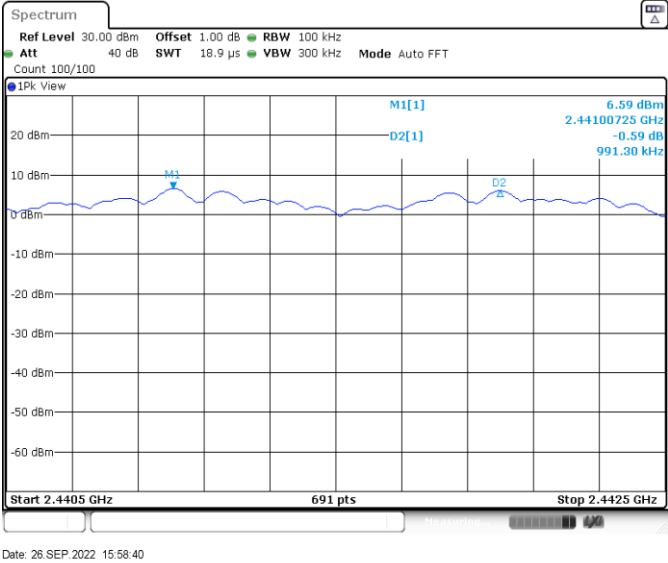
| Modulation     | Frequency<br>MHz | Carrier Frequency Separation<br>MHz | Result |
|----------------|------------------|-------------------------------------|--------|
| GFSK           | 2441             | 1.006                               | Pass   |
| $\pi/4$ -DQPSK | 2441             | 0.991                               | Pass   |
| 8DPSK          | 2441             | 1.000                               | Pass   |



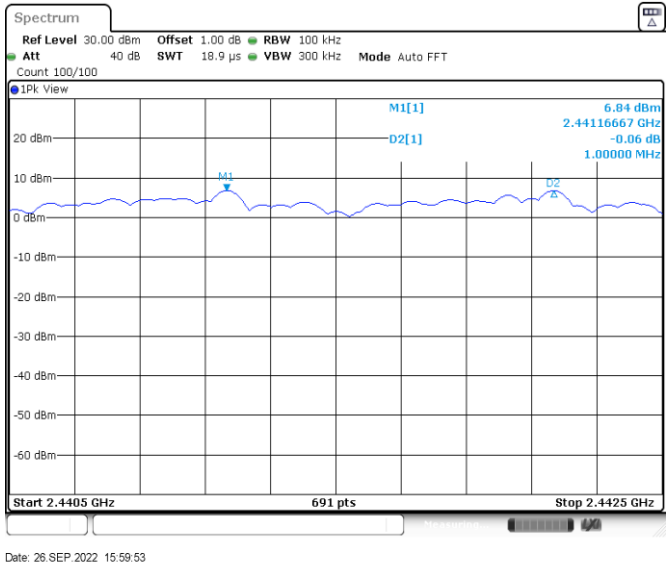


Carrier Frequency Separation

$\pi/4$ -DQPSK Mode: 2441MHz



8DPSK Mode: 2480MHz



## 9.4 Number of Hopping Frequencies

### Test Method

1. The RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit to hopping mode.
3. Use the following spectrum analyzer settings:  
Span = wide enough to capture the peaks of two adjacent channels,  $RBW \geq 1\%$  of the span,  $VBW \geq RBW$ , Sweep = auto, Detector function = peak
4. Set the spectrum analyzer on Max-Hold Mode,
5. Record all the signals from each channel until each one has been recorded.
6. Repeat above procedures until all frequencies measured were complete.

### Limit

Limit  
number

---

$\geq 15$

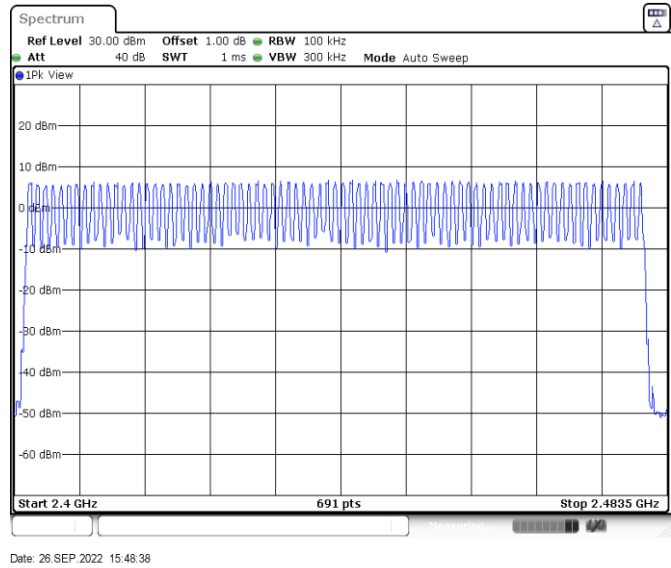


Number of Hopping Frequencies

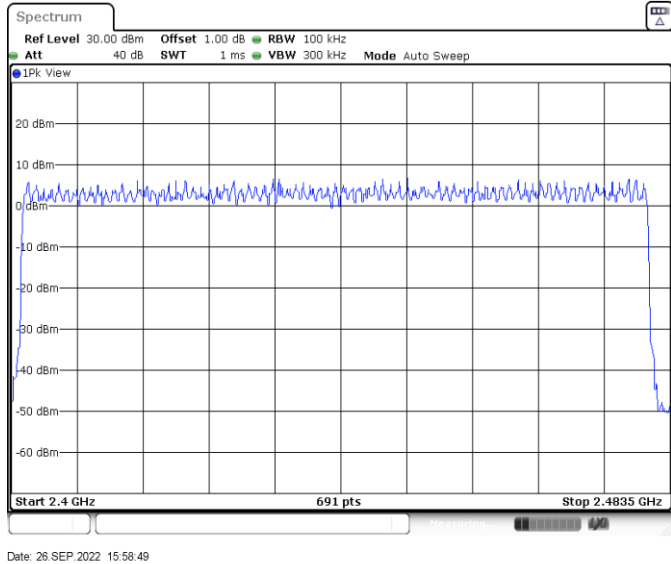
Test result: The measurement was performed with the typical configuration (normal hopping status), and the total hopping channels is constant for the all modulation mode according with the Bluetooth Core Specification.

| Number of hopping frequencies | Result |
|-------------------------------|--------|
| 79                            | Pass   |

GFSK Mode

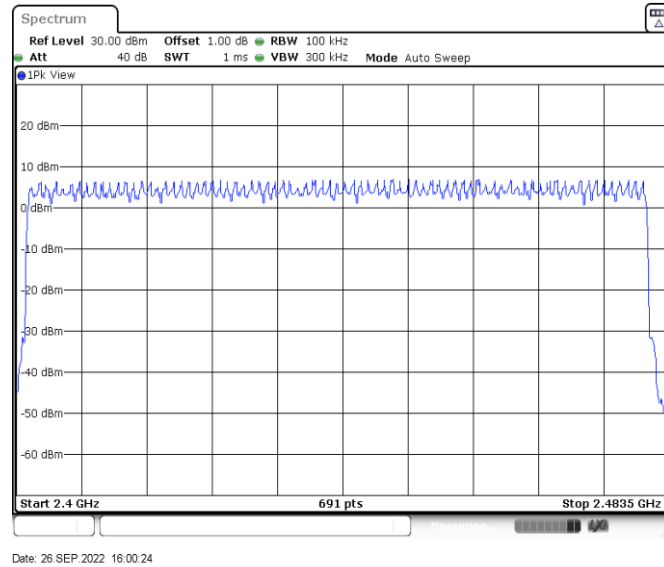


$\pi/4$ -DQPSK Mode



## Number of Hopping Frequencies

### 8DPSK Mode



## 9.5 Dwell Time

### Test Method

1. The RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit to hopping mode.
3. Use the following spectrum analyzer settings:  
RBW: 1MHz; VBW: 1MHz; SPAN: Zero Span  
Set the spectrum analyzer on Max-Hold Mode,
4. Adjust the center frequency of spectrum analyzer on any frequency be measured.
5. Measure the Dwell Time by spectrum analyzer Marker function. Record the results.  
 $\text{Dwell Time} = \text{Burst Width} * \text{Total Hops}$
6. 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.

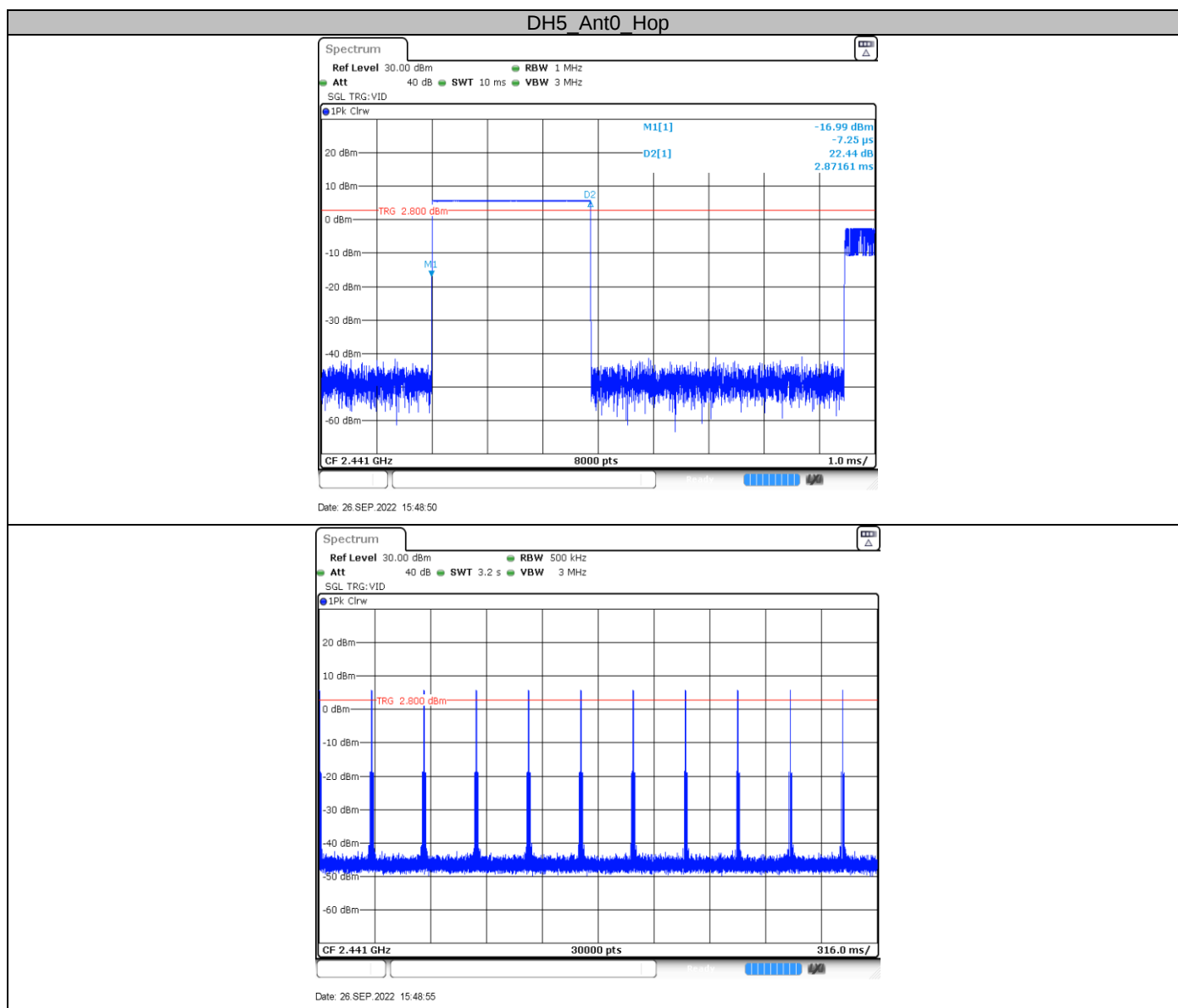
The Dwell Time = Burst Width \* Total Hops. The detailed calculations are showed as follows:

The duration for dwell time calculation: 0.4 [s] \* hopping number = 0.4 [s] \* 79 [ch] = 31.6 [s\*ch];

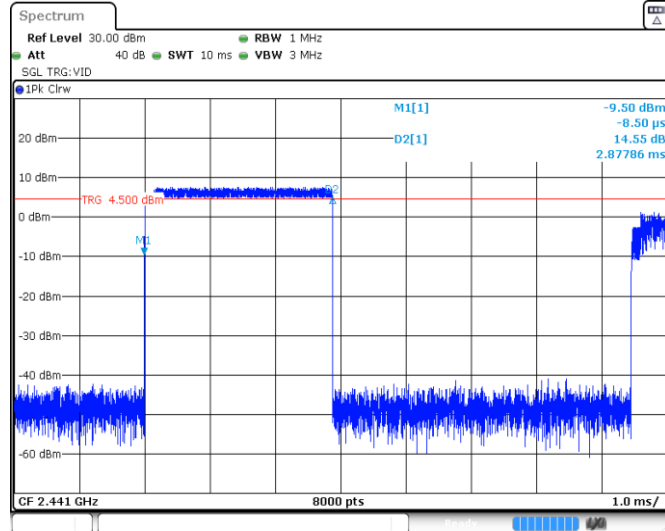
The burst width, which is directly measured, refers to the duration on one channel hop.

### Test Result

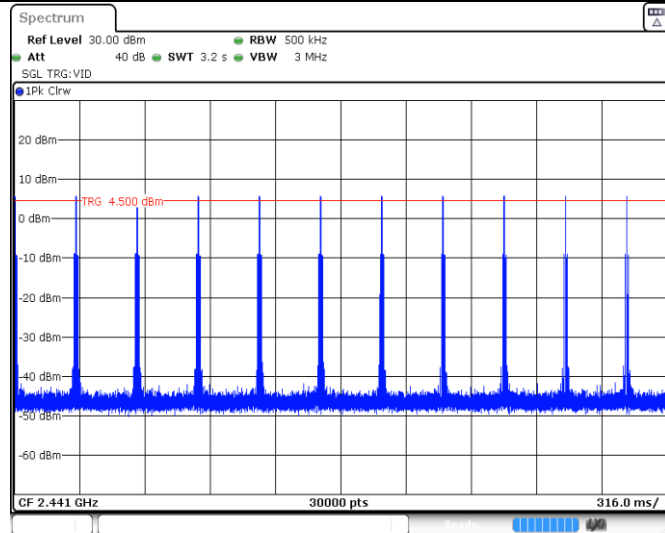
| Test Mode | Antenna | Channel | Burst Width (ms) | Total Hops | Result (s) | Limit (s) | Verdict |
|-----------|---------|---------|------------------|------------|------------|-----------|---------|
| DH5       | Ant0    | Hop     | 2.87             | 110        | 0.316      | <=0.4     | PASS    |
| 2DH5      | Ant0    | Hop     | 2.88             | 110        | 0.317      | <=0.4     | PASS    |
| 3DH5      | Ant0    | Hop     | 2.88             | 110        | 0.317      | <=0.4     | PASS    |



## 2DH5\_Ant0\_Hop

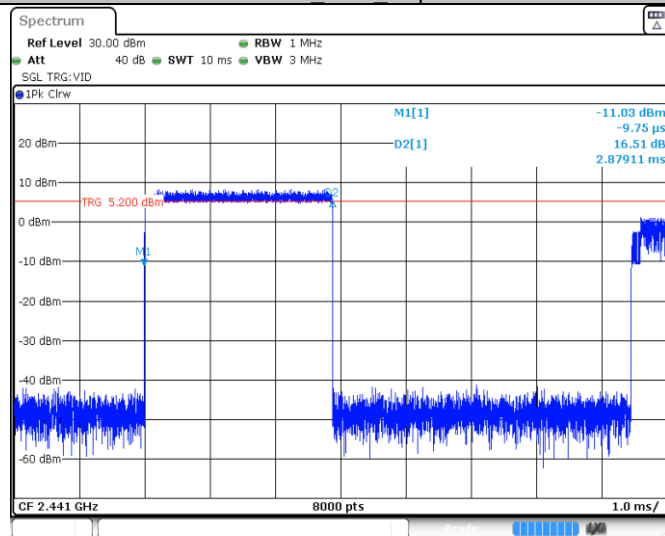


Date: 26 SEP 2022 15:59:01

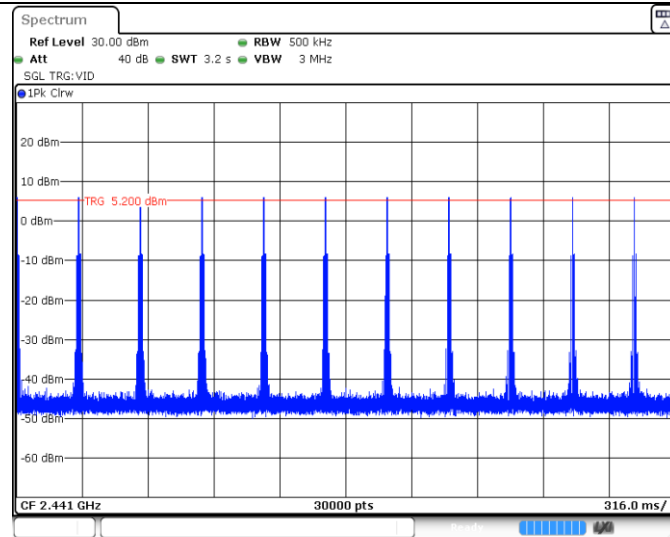


Date: 26 SEP 2022 15:59:06

## 3DH5\_Ant0\_Hop



Date: 26 SEP 2022 16:00:36



Date: 26 SEP 2022 16:00:41

## 9.6 Spurious RF Conducted Emissions

### Test Method

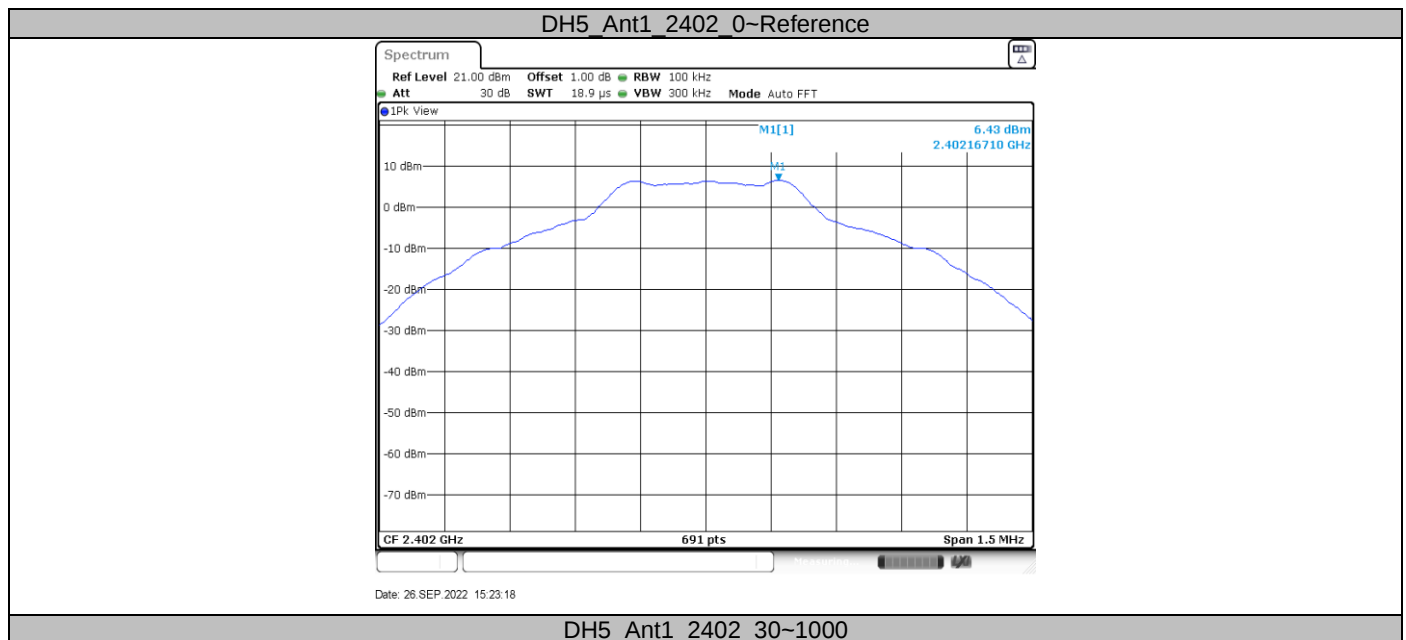
1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
4. Measure and record the results in the test report.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency

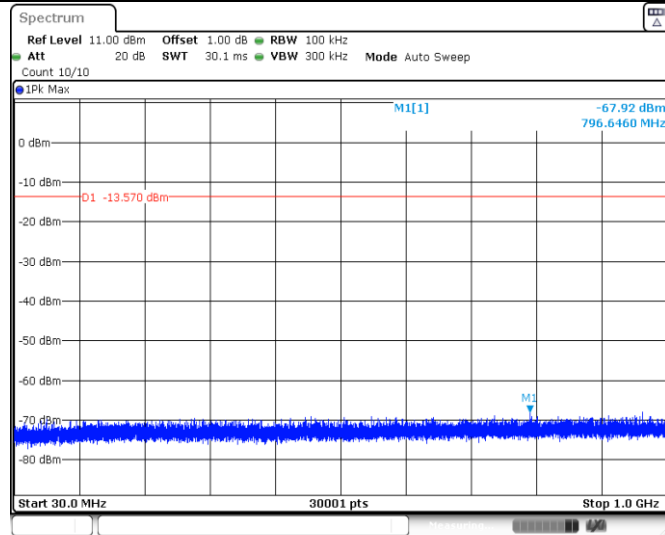
### Limit

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

## Spurious RF Conducted Emissions

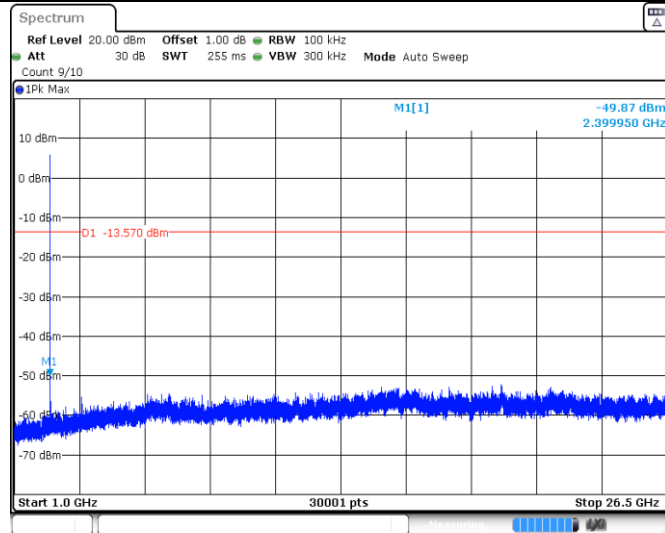
| Test Mode | Antenna | Channel (MHz) | Frequency Range (MHz) | Reference Level | Result (dBm) | Limit (dBm) | Verdict |
|-----------|---------|---------------|-----------------------|-----------------|--------------|-------------|---------|
| DH5       | Ant0    | 2402          | Reference             | 6.43 dBm        | 6.43         | ---         | PASS    |
|           |         |               | 30~1000               | 30~1000 MHz     | -67.92       | <=-13.57    | PASS    |
|           |         |               | 1000~26500            | 1000~26500 MHz  | -49.87       | <=-13.57    | PASS    |
|           |         | 2441          | Reference             | 6.80 dBm        | 6.80         | ---         | PASS    |
|           |         |               | 30~1000               | 30~1000 MHz     | -67.49       | <=-13.2     | PASS    |
|           |         |               | 1000~26500            | 1000~26500 MHz  | -52.01       | <=-13.2     | PASS    |
|           |         | 2480          | Reference             | 6.54 dBm        | 6.54         | ---         | PASS    |
|           |         |               | 30~1000               | 30~1000 MHz     | -67.81       | <=-13.46    | PASS    |
|           |         |               | 1000~26500            | 1000~26500 MHz  | -52.04       | <=-13.46    | PASS    |
| 2DH5      | Ant0    | 2402          | Reference             | 6.19 dBm        | 6.19         | ---         | PASS    |
|           |         |               | 30~1000               | 30~1000 MHz     | -68.14       | <=-13.81    | PASS    |
|           |         |               | 1000~26500            | 1000~26500 MHz  | -41.67       | <=-13.81    | PASS    |
|           |         | 2441          | Reference             | 6.71 dBm        | 6.71         | ---         | PASS    |
|           |         |               | 30~1000               | 30~1000 MHz     | -68.17       | <=-13.29    | PASS    |
|           |         |               | 1000~26500            | 1000~26500 MHz  | -52.65       | <=-13.29    | PASS    |
|           |         | 2480          | Reference             | 6.53 dBm        | 6.53         | ---         | PASS    |
|           |         |               | 30~1000               | 30~1000 MHz     | -68.17       | <=-13.47    | PASS    |
|           |         |               | 1000~26500            | 1000~26500 MHz  | -51.61       | <=-13.47    | PASS    |
| 3DH5      | Ant0    | 2402          | Reference             | 6.38 dBm        | 6.38         | ---         | PASS    |
|           |         |               | 30~1000               | 30~1000 MHz     | -67.99       | <=-13.62    | PASS    |
|           |         |               | 1000~26500            | 1000~26500 MHz  | -39.27       | <=-13.62    | PASS    |
|           |         | 2441          | Reference             | 6.82 dBm        | 6.82         | ---         | PASS    |
|           |         |               | 30~1000               | 30~1000 MHz     | -68.52       | <=-13.18    | PASS    |
|           |         |               | 1000~26500            | 1000~26500 MHz  | -51.58       | <=-13.18    | PASS    |
|           |         | 2480          | Reference             | 6.59 dBm        | 6.59         | ---         | PASS    |
|           |         |               | 30~1000               | 30~1000 MHz     | -68.05       | <=-13.41    | PASS    |
|           |         |               | 1000~26500            | 1000~26500 MHz  | -51.73       | <=-13.41    | PASS    |





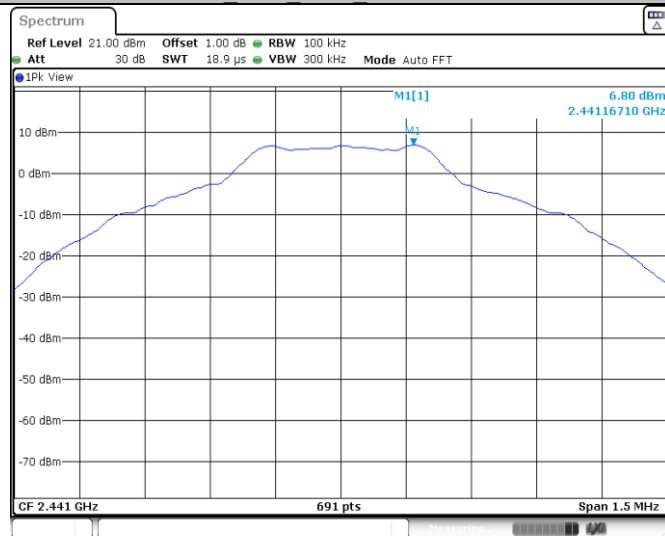
Date: 26 SEP 2022 15:23:24

## DH5\_Ant1\_2402\_1000-26500



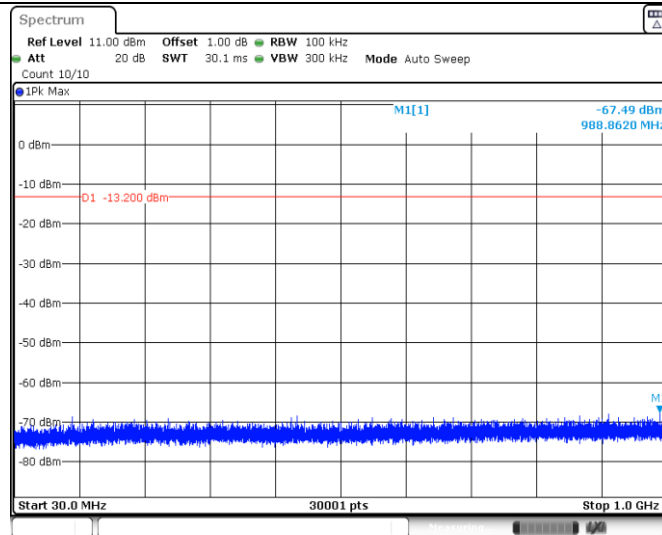
Date: 26 SEP 2022 15:23:32

## DH5\_Ant1\_2441\_0-Reference



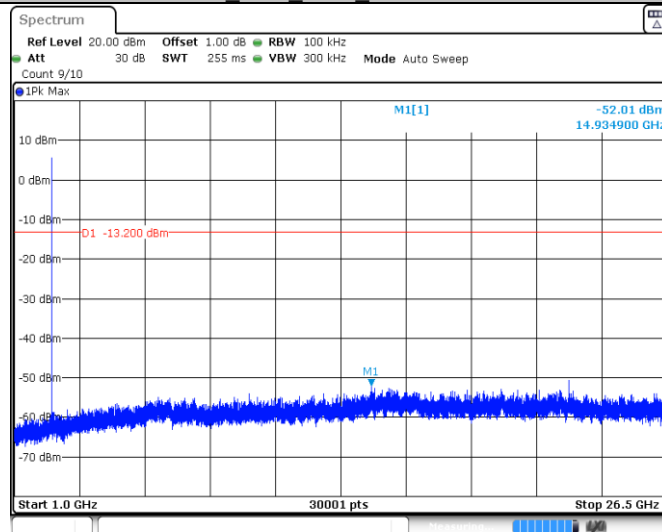
Date: 26 SEP 2022 15:25:47

## DH5\_Ant1\_2441\_30-1000



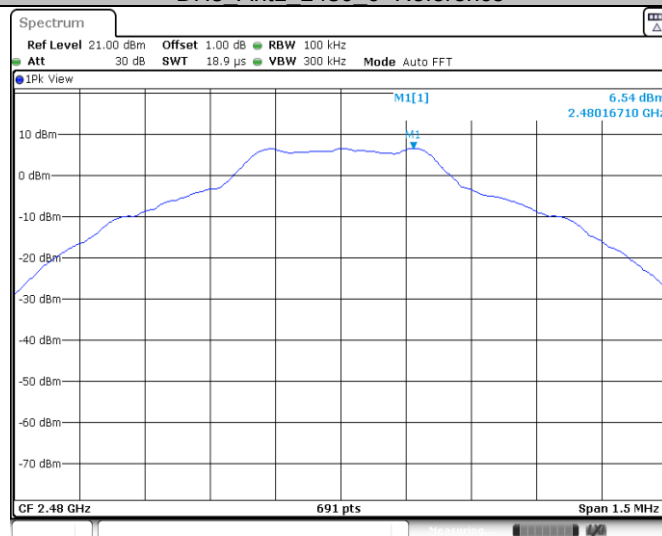
Date: 26 SEP 2022 15:25:53

## DH5\_Ant1\_2441\_1000-26500



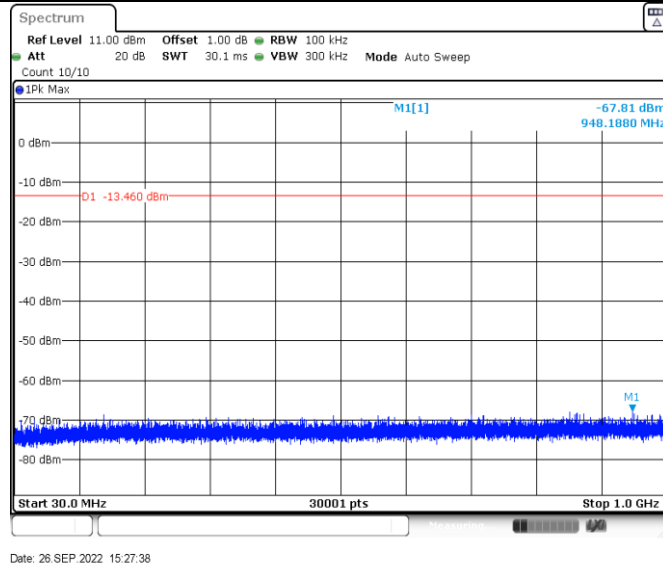
Date: 26 SEP 2022 15:26:01

## DH5\_Ant1\_2480\_0-Reference

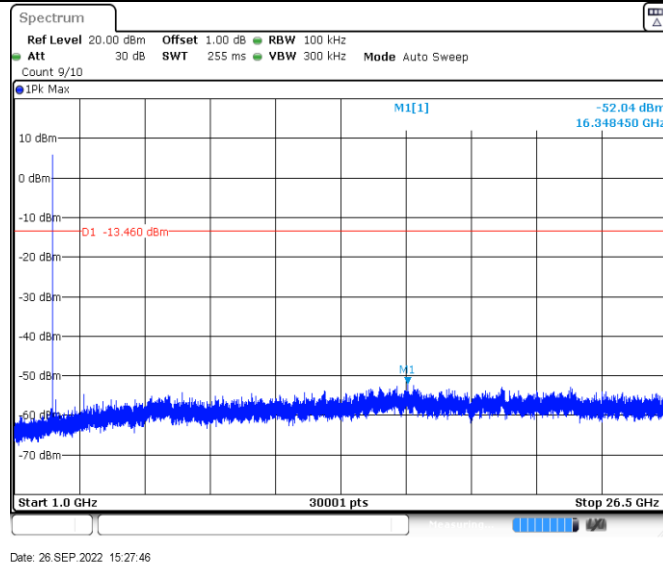


Date: 26 SEP 2022 15:27:32

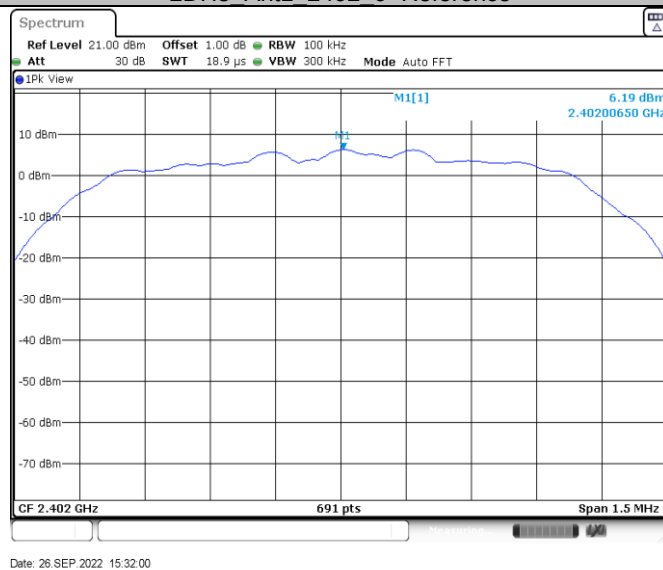
## DH5\_Ant1\_2480\_30-1000



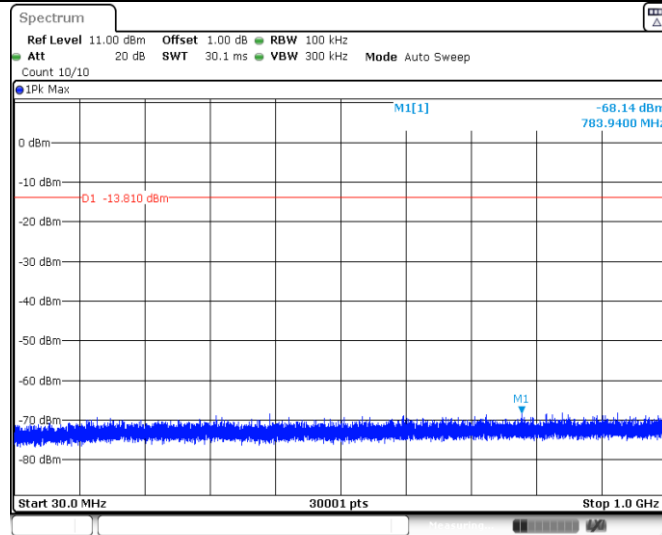
DH5\_Ant1\_2480\_1000-26500



2DH5\_Ant1\_2402\_0-Reference

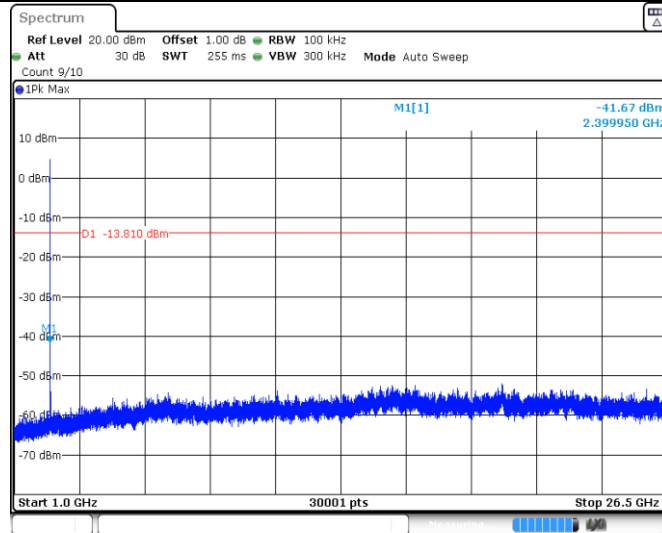


2DH5\_Ant1\_2402\_30-1000



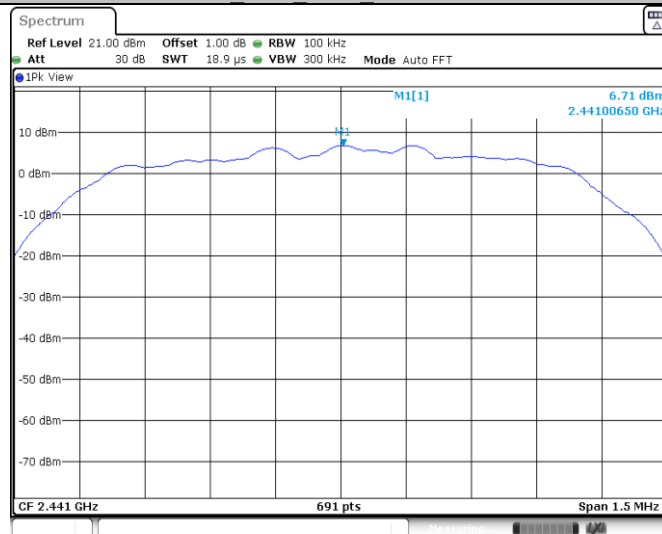
Date: 26 SEP 2022 15:32:06

## 2DH5 Ant1 2402 1000~26500



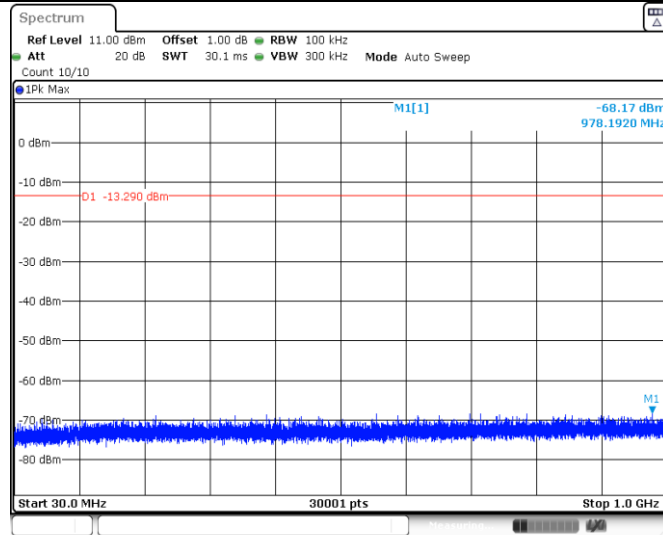
Date: 26 SEP 2022 15:32:14

## 2DH5 Ant1 2441 0~Reference



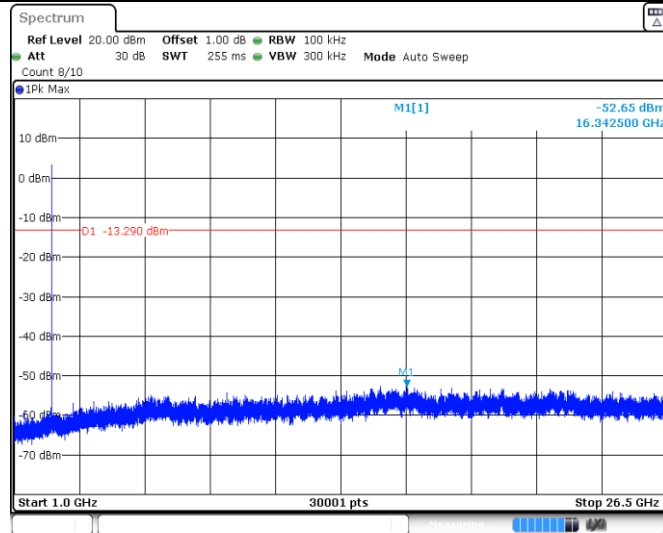
Date: 26 SEP 2022 15:39:03

## 2DH5 Ant1 2441 30~1000



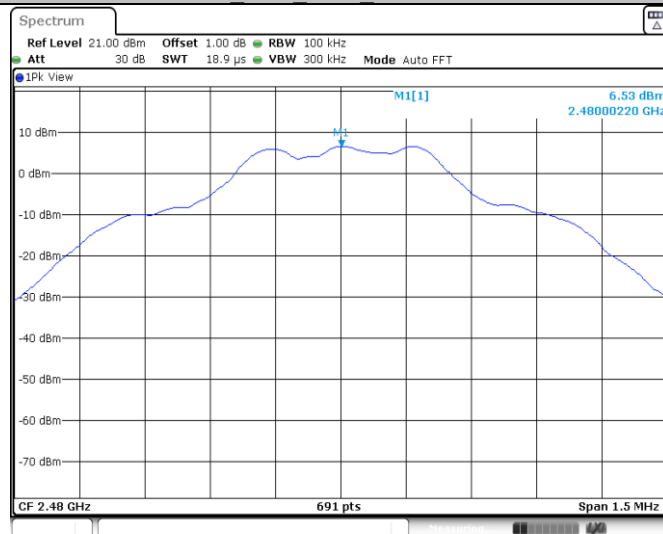
Date: 26 SEP 2022 15:39:09

## 2DH5 Ant1 2441 1000~26500



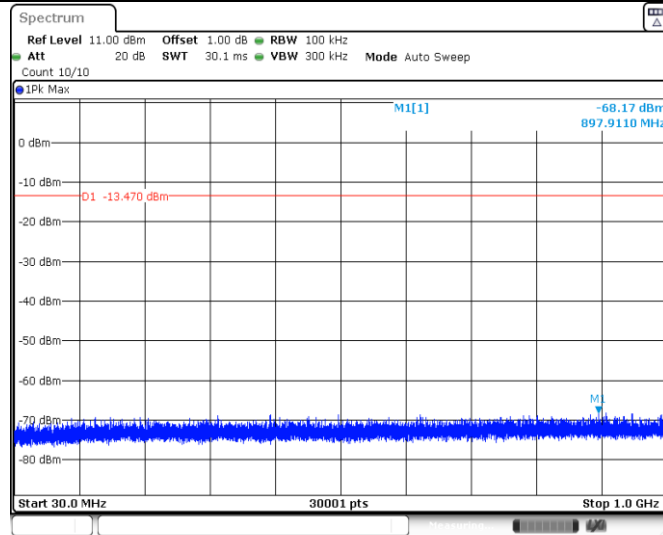
Date: 26 SEP 2022 15:39:17

## 2DH5 Ant1 2480 0~Reference



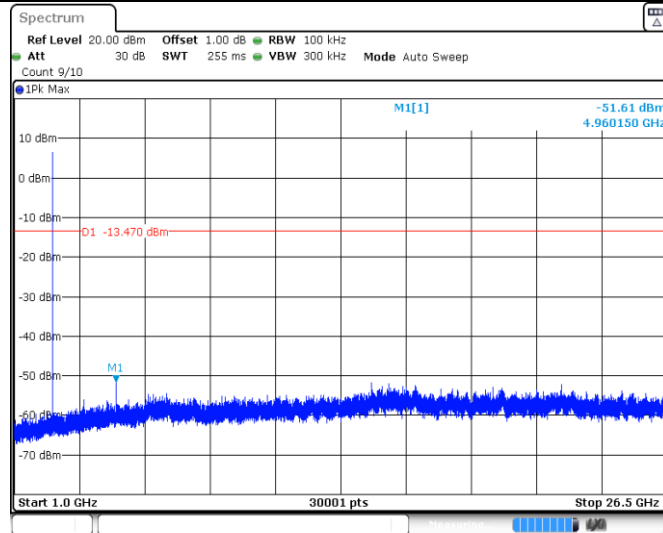
Date: 26 SEP 2022 15:36:36

## 2DH5 Ant1 2480 30~1000



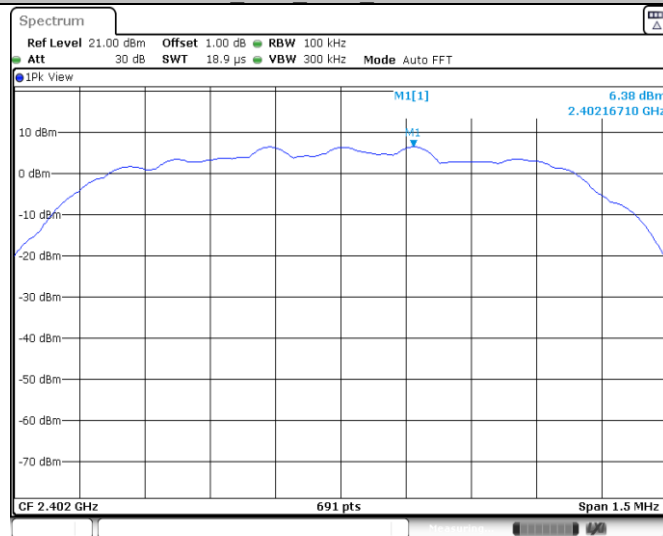
Date: 26 SEP 2022 15:36:43

## 2DH5 Ant1 2480 1000-26500



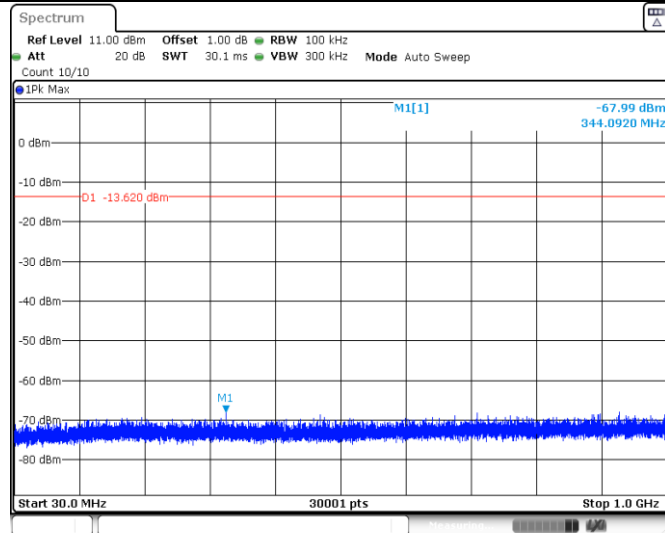
Date: 26 SEP 2022 15:36:50

## 3DH5 Ant1 2402 0-Reference



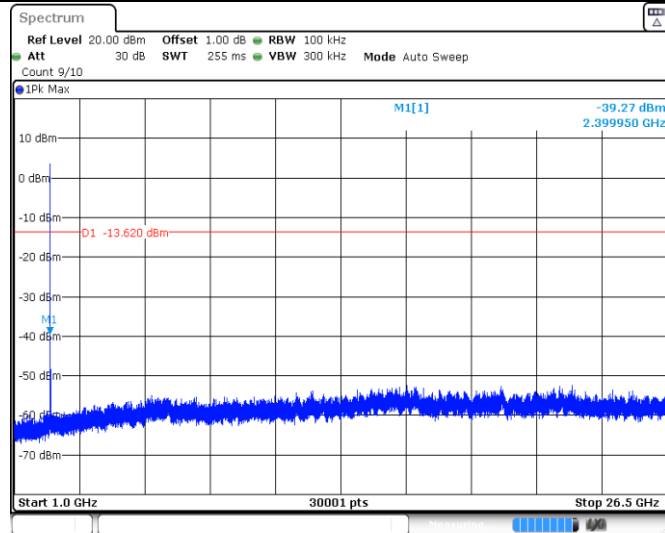
Date: 26 SEP 2022 15:41:07

## 3DH5 Ant1 2402 30-1000



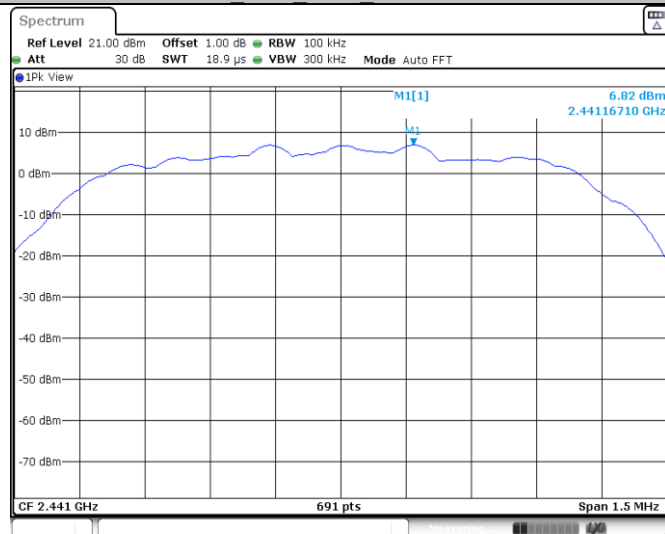
Date: 26 SEP 2022 15:41:13

## 3DH5 Ant1 2402 1000~26500



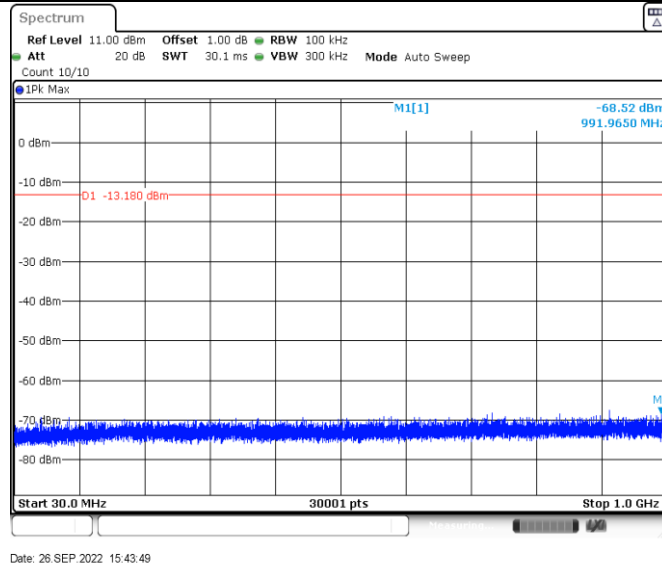
Date: 26 SEP 2022 15:41:21

## 3DH5 Ant1 2441 0~Reference

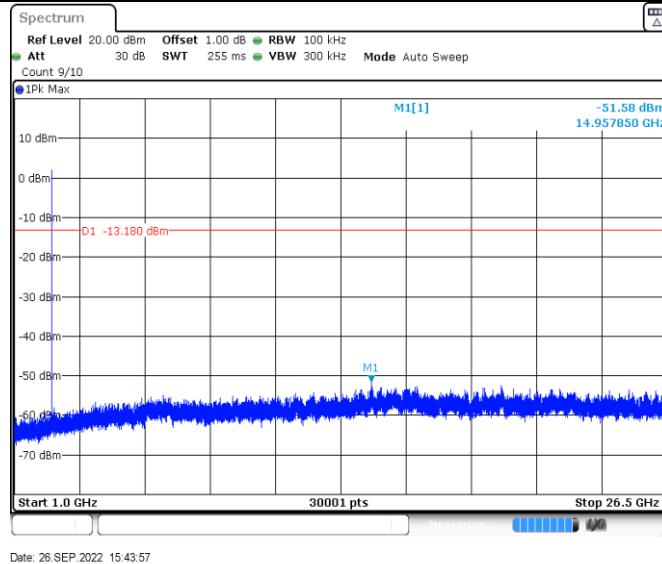


Date: 26 SEP 2022 15:43:43

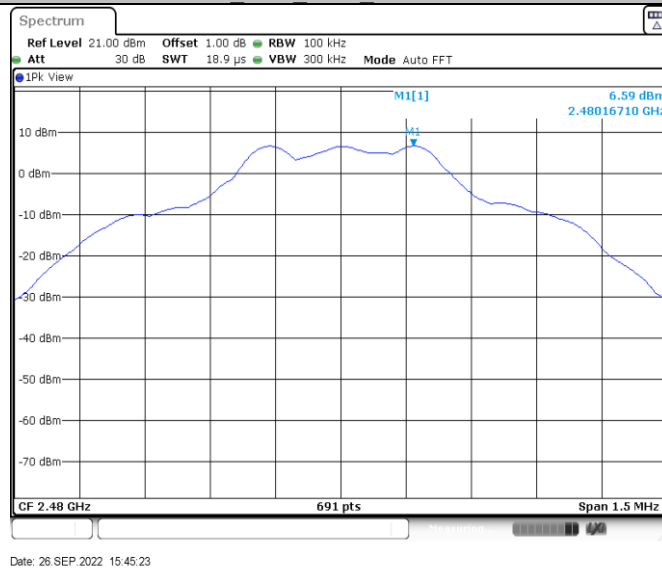
## 3DH5 Ant1 2441 30~1000



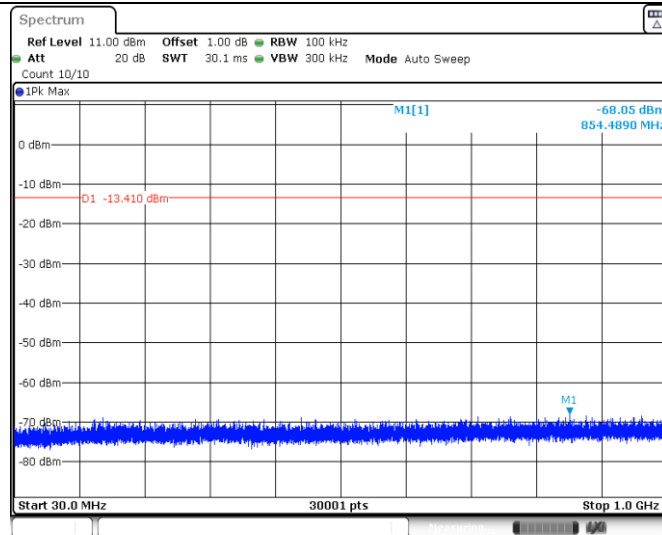
## 3DH5 Ant1 2441 1000~26500



## 3DH5 Ant1 2480 0~Reference

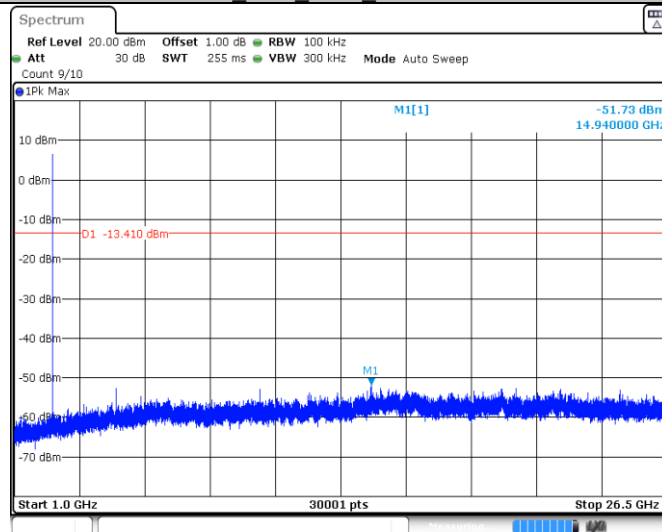


## 3DH5 Ant1 2480 30~1000



Date: 26 SEP 2022 15:45:29

### 3DH5 Ant1 2480 1000~26500



Date: 26 SEP 2022 15:45:37

## 9.7 Band Edge Testing

### Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
4. Measure and record the results in the test report.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency
6. Set to the maximum power setting and enable the EUT hopping mode, repeat the test.

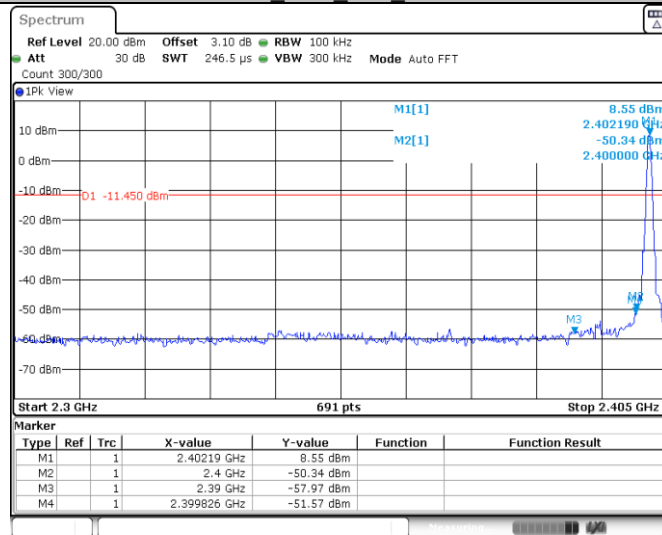
### Limit:

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

## Band Edge

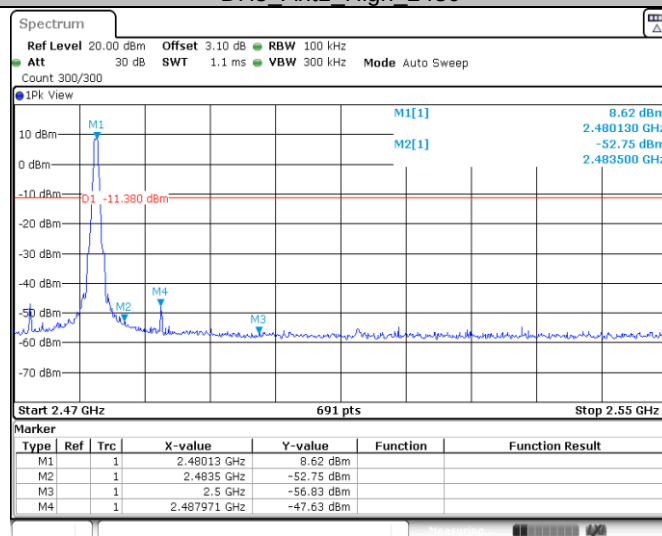
| Test Mode | Antenna | Channel | Channel (MHz) | Reference Level (dBm) | Result (dBm) | Limit (dBm) | Verdict |
|-----------|---------|---------|---------------|-----------------------|--------------|-------------|---------|
| DH5       | Ant0    | Low     | 2402          | 8.55                  | -51.57       | <=-11.45    | PASS    |
|           |         | High    | 2480          | 8.62                  | -47.63       | <=-11.38    | PASS    |
|           |         | Low     | Hop_2402      | 7.47                  | -56.79       | -12.53      | PASS    |
|           |         | High    | Hop_2480      | 8.39                  | -55.35       | -11.61      | PASS    |
| 2DH5      | Ant0    | Low     | 2402          | 8.30                  | -48.43       | <=-11.7     | PASS    |
|           |         | High    | 2480          | 8.62                  | -44.83       | <=-11.38    | PASS    |
|           |         | Low     | Hop_2402      | 4.94                  | -57.08       | -15.06      | PASS    |
|           |         | High    | Hop_2480      | 8.49                  | -54.72       | -11.51      | PASS    |
| 3DH5      | Ant0    | Low     | 2402          | 8.48                  | -45.69       | <=-11.52    | PASS    |
|           |         | High    | 2480          | 8.65                  | -47.11       | <=-11.35    | PASS    |
|           |         | Low     | Hop_2402      | 5.29                  | -56.6        | -14.71      | PASS    |
|           |         | High    | Hop_2480      | 8.61                  | -54.94       | -11.39      | PASS    |

### DH5\_Ant1\_Low\_2402



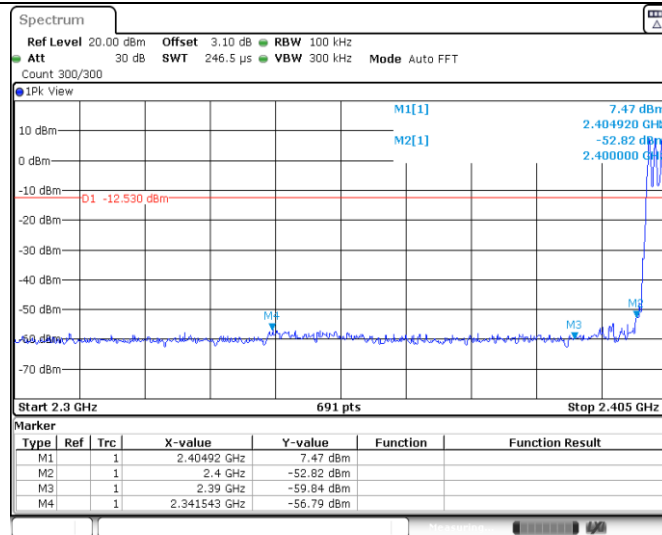
Date: 26 SEP 2022 15:24:14

### DH5\_Ant1\_High\_2480



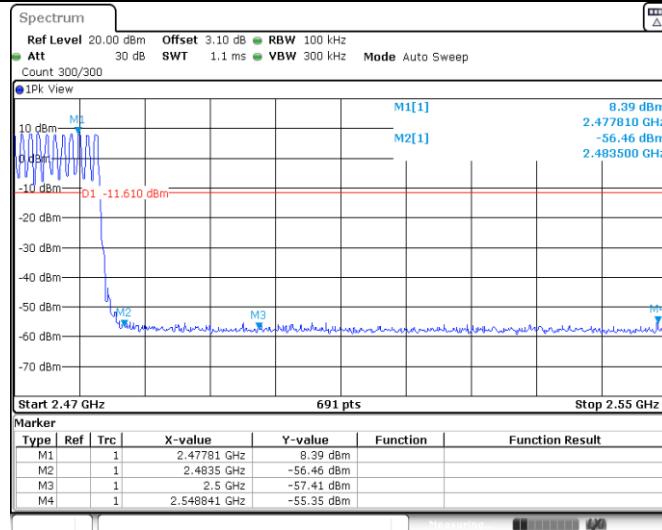
Date: 26 SEP 2022 15:29:18

### DH5\_Ant1\_Low\_Hop\_2402



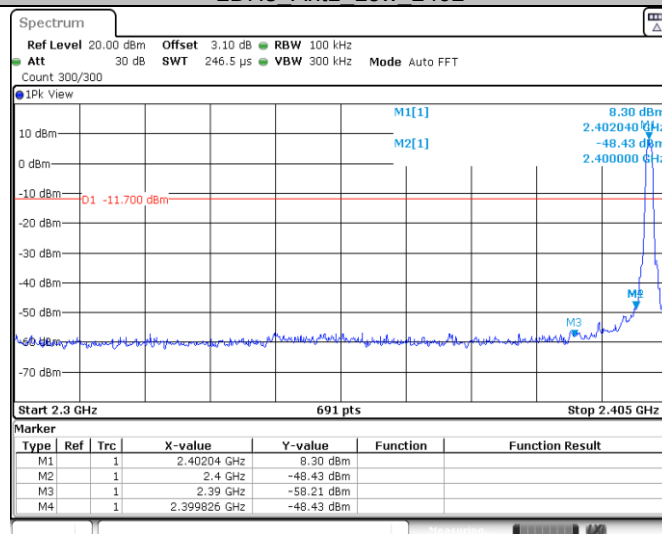
Date: 26 SEP 2022 15:49:24

## DH5 Ant1 High Hop 2480



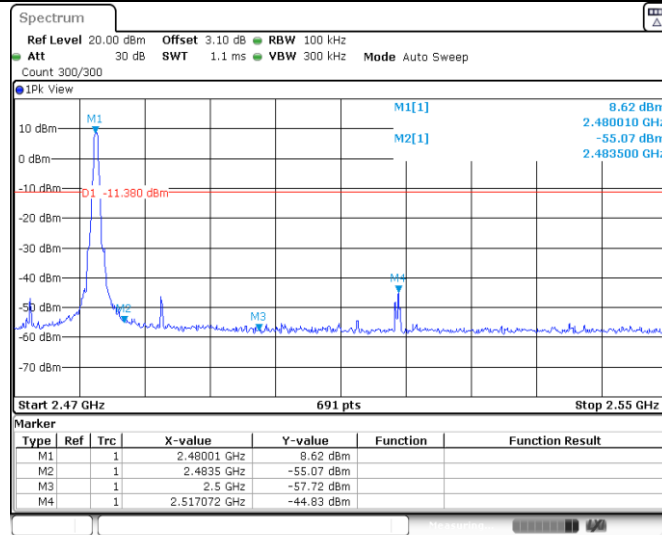
Date: 26 SEP 2022 15:50:48

## 2DH5 Ant1 Low 2402



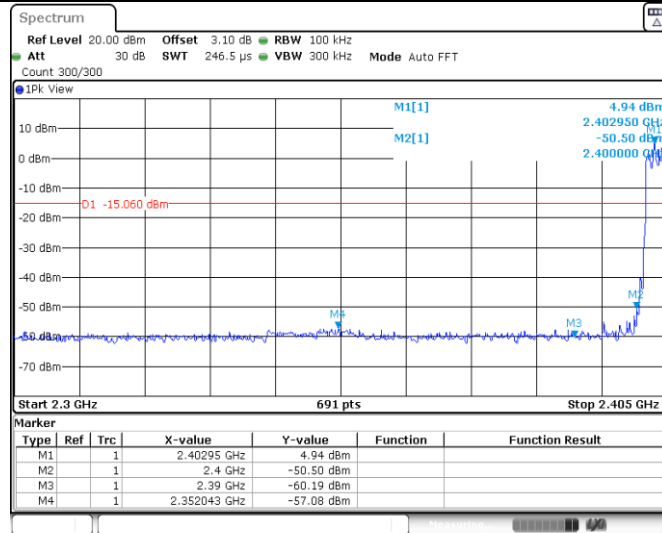
Date: 26 SEP 2022 15:33:10

## 2DH5 Ant1 High 2480



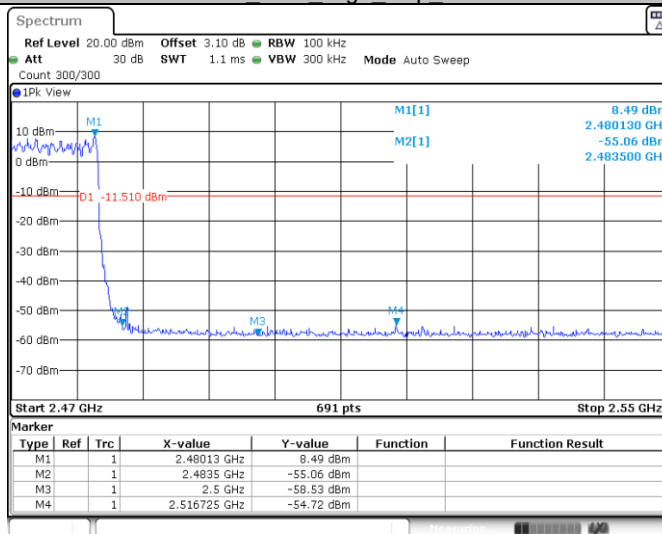
Date: 26 SEP 2022 15:37:22

## 2DH5 Ant1 Low Hop 2402



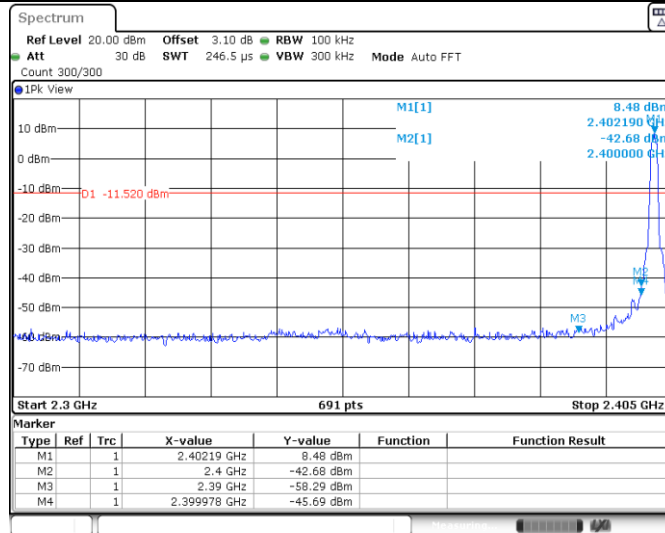
Date: 26 SEP 2022 15:57:33

## 2DH5 Ant1 High Hop 2480



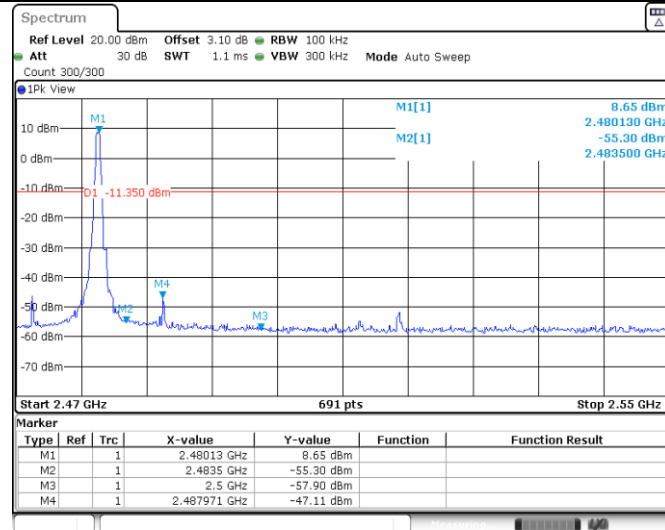
Date: 26 SEP 2022 15:57:44

## 3DH5 Ant1 Low 2402



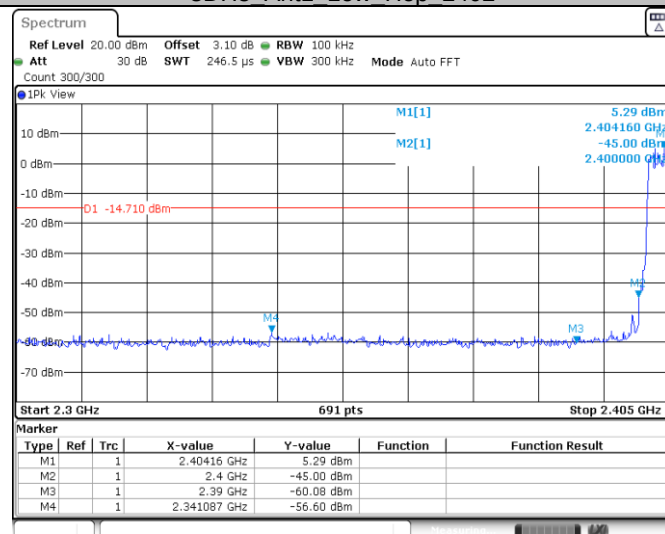
Date: 26 SEP 2022 15:42:00

## 3DH5 Ant1 High 2480



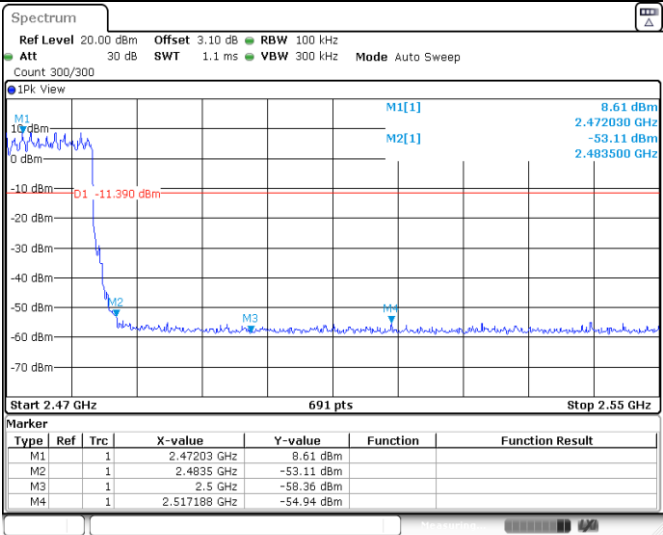
Date: 26 SEP 2022 15:46:46

## 3DH5 Ant1 Low Hop 2402



Date: 26 SEP 2022 16:02:25

## 3DH5 Ant1 High Hop 2480



Date: 26 SEP 2022 16:03:18

## 9.8 Spurious Radiated Emissions for Transmitter

### Test Method

1. The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meters chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
4. 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.
5. 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.
6. Use the following spectrum analyzer settings According to C63.10:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 kHz for  $f < 1$  GHz; VBW RBW; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW= 3MHz for  $f \geq 1$  GHz for peak measurement.For average measurement:  
VBW = 10 Hz, when duty cycle is no less than 98 percent.  
VBW  $\geq 1/T$ , when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
7. Repeat above procedures until all frequencies measured were complete.

### Note:

- 1: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for peak detection (PK) at frequency above 1GHz.
- 3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average ((duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ( $20\log(1/\text{duty cycle})$ ).
- 4: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.

## Spurious Radiated Emissions for Transmitter

### 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 section 15.205, must comply with the radiated emission limits specified in section 15.209.

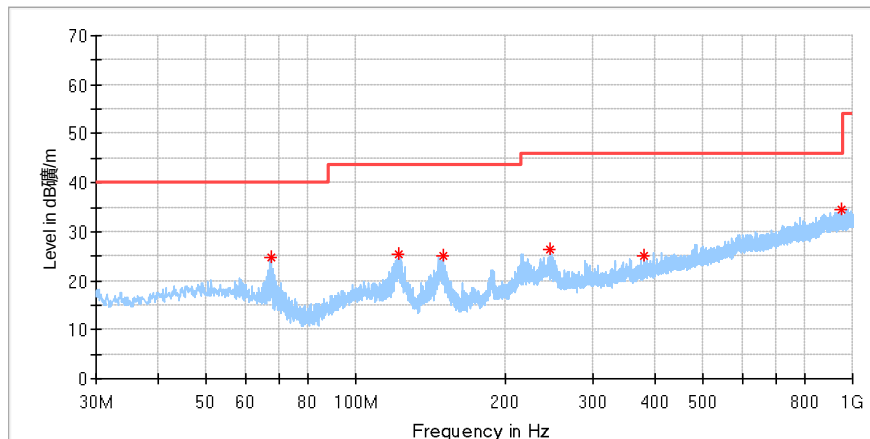
| Frequency<br>MHz | Field Strength<br>uV/m | Field Strength<br>dBµV/m | Detector |
|------------------|------------------------|--------------------------|----------|
| 30-88            | 100                    | 40                       | QP       |
| 88-216           | 150                    | 43.5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

## Spurious radiated emissions for transmitter

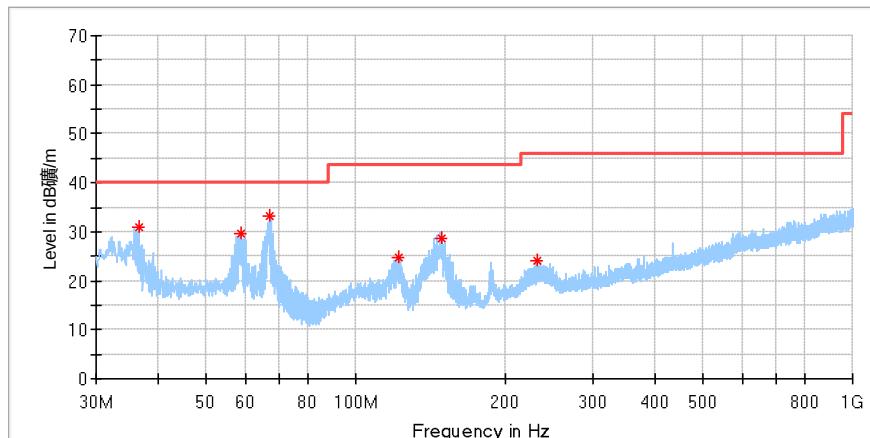
According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

### Transmitting spurious emission test result as below:

GFSK Modulation 2402MHz\_30M-1000MHz Test Result:

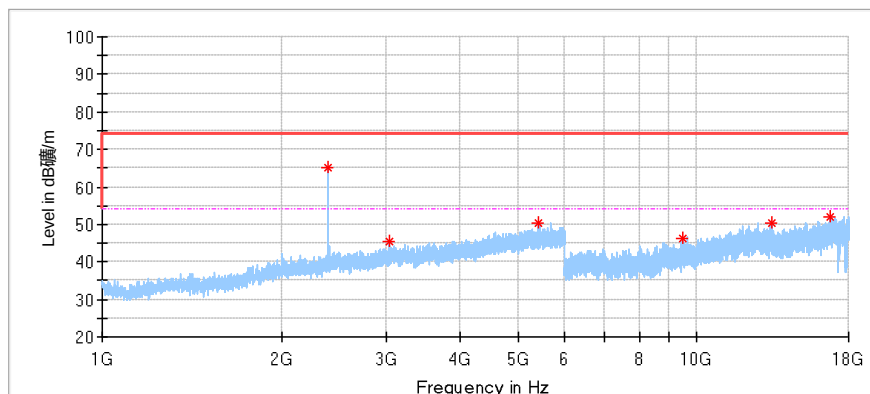


| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 67.648125       | 24.59            | 40.00          | 15.41       | 100.0       | H   | 162.0         | 17.77        |
| 121.665000      | 25.54            | 43.50          | 17.96       | 200.0       | H   | 155.0         | 16.79        |
| 150.158750      | 25.10            | 43.50          | 18.40       | 100.0       | H   | 263.0         | 15.49        |
| 245.764375      | 26.47            | 46.00          | 19.53       | 100.0       | H   | 272.0         | 20.60        |
| 380.897500      | 24.91            | 46.00          | 21.09       | 100.0       | H   | 107.0         | 23.66        |
| 950.590625      | 34.57            | 46.00          | 11.43       | 200.0       | H   | 0.0           | 32.88        |

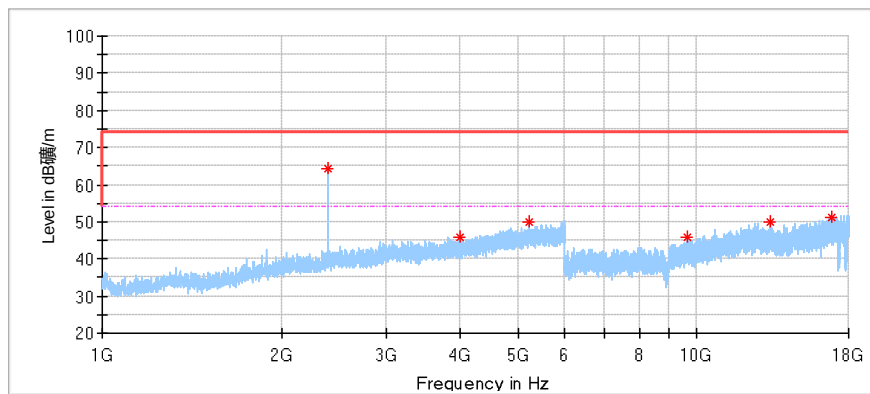


| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 36.608125       | 30.88            | 40.00          | 9.12        | 100.0       | V   | 194.0         | 18.42        |
| 58.736250       | 29.52            | 40.00          | 10.48       | 100.0       | V   | 66.0          | 20.00        |
| 67.223750       | 33.25            | 40.00          | 6.75        | 100.0       | V   | 194.0         | 17.91        |
| 122.028750      | 24.79            | 43.50          | 18.71       | 100.0       | V   | 213.0         | 16.76        |
| 149.128125      | 28.57            | 43.50          | 14.93       | 100.0       | V   | 231.0         | 15.48        |
| 232.002500      | 23.98            | 46.00          | 22.02       | 100.0       | V   | 194.0         | 19.99        |

DH5\_2402MHz\_1GHz – 18GHz:

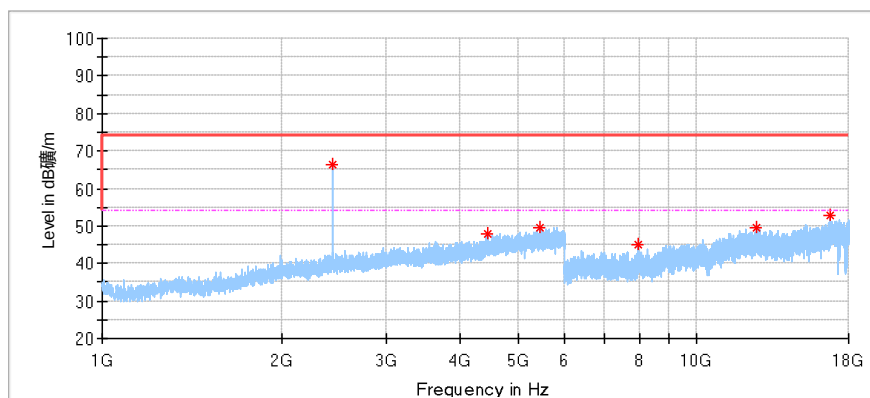


| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 2402.000000     | 65.25            | 74.00          | 8.75        | 150.0       | H   | 131.0         | -2.84        |
| 3032.000000     | 45.40            | 74.00          | 28.60       | 150.0       | H   | 338.0         | -0.43        |
| 5426.000000*    | 50.21            | 74.00          | 23.79       | 150.0       | H   | 50.0          | 5.64         |
| 9457.000000*    | 46.44            | 74.00          | 27.56       | 150.0       | H   | 64.0          | 13.94        |
| 13340.000000*   | 50.51            | 74.00          | 23.49       | 150.0       | H   | 356.0         | 17.83        |
| 16782.500000    | 52.19            | 74.00          | 21.81       | 150.0       | H   | 84.0          | 23.74        |

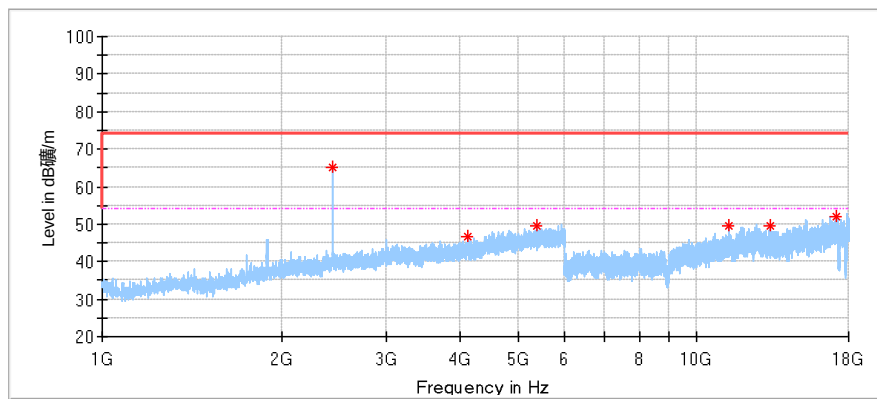


| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 2402.000000     | 64.30            | 74.00          | 9.70        | 150.0       | V   | 62.0          | -2.84        |
| 3994.500000*    | 45.93            | 74.00          | 28.07       | 150.0       | V   | 48.0          | 1.28         |
| 5224.500000     | 49.90            | 74.00          | 24.10       | 150.0       | V   | 35.0          | 5.44         |
| 9646.000000     | 46.00            | 74.00          | 28.00       | 150.0       | V   | 311.0         | 13.30        |
| 13282.500000*   | 49.76            | 74.00          | 24.24       | 150.0       | V   | 64.0          | 18.14        |
| 16856.500000    | 51.13            | 74.00          | 22.87       | 150.0       | V   | 25.0          | 23.93        |

DH5\_2441MHz\_1GHz – 18GHz:

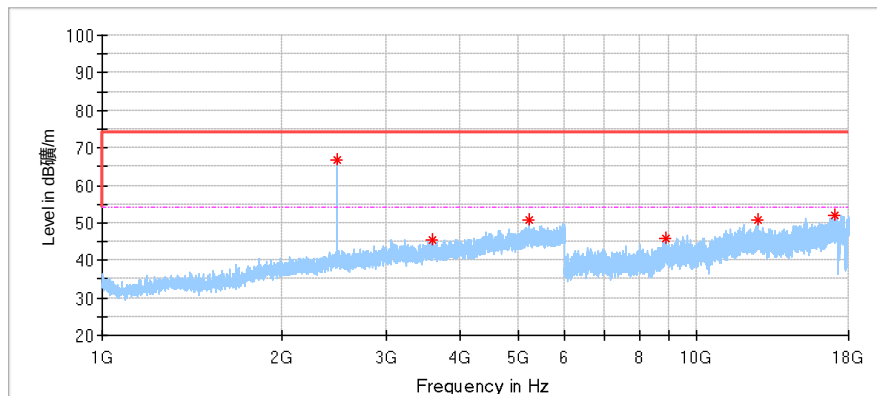


| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 2441.000000     | 66.43            | 74.00          | 7.57        | 150.0       | H   | 129.0         | -2.40        |
| 4461.500000     | 47.74            | 74.00          | 26.26       | 150.0       | H   | 291.0         | 3.07         |
| 5458.500000     | 49.54            | 74.00          | 24.46       | 150.0       | H   | 222.0         | 5.90         |
| 7990.000000     | 45.16            | 74.00          | 28.84       | 150.0       | H   | 269.0         | 11.03        |
| 12587.500000    | 49.67            | 74.00          | 24.33       | 150.0       | H   | 290.0         | 18.07        |
| 16760.500000    | 52.81            | 74.00          | 21.19       | 150.0       | H   | 107.0         | 23.65        |

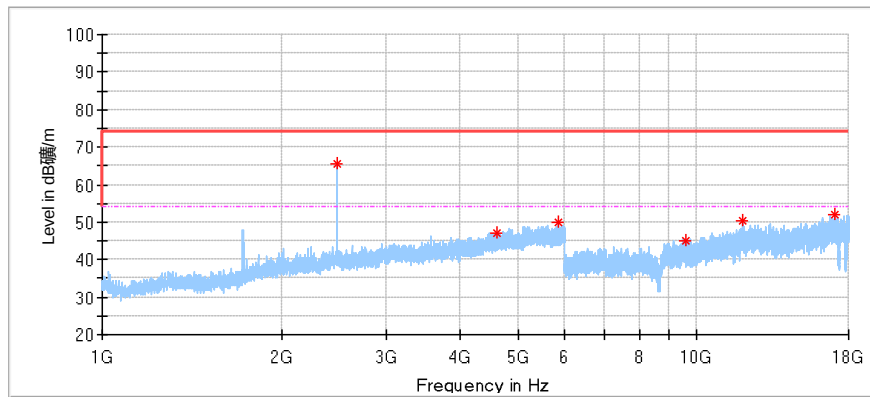


| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 2441.000000     | 65.04            | 74.00          | 8.96        | 150.0       | V   | 171.0         | -2.40        |
| 4130.000000*    | 46.82            | 74.00          | 27.18       | 150.0       | V   | 15.0          | 1.54         |
| 5374.000000*    | 49.54            | 74.00          | 24.46       | 150.0       | V   | 48.0          | 5.31         |
| 11345.000000*   | 49.41            | 74.00          | 24.59       | 150.0       | V   | 227.0         | 15.85        |
| 13280.500000*   | 49.39            | 74.00          | 24.61       | 150.0       | V   | 227.0         | 18.11        |
| 17147.500000    | 51.81            | 74.00          | 22.19       | 150.0       | V   | 248.0         | 24.19        |

DH5\_2480MHz\_1GHz – 18GHz:

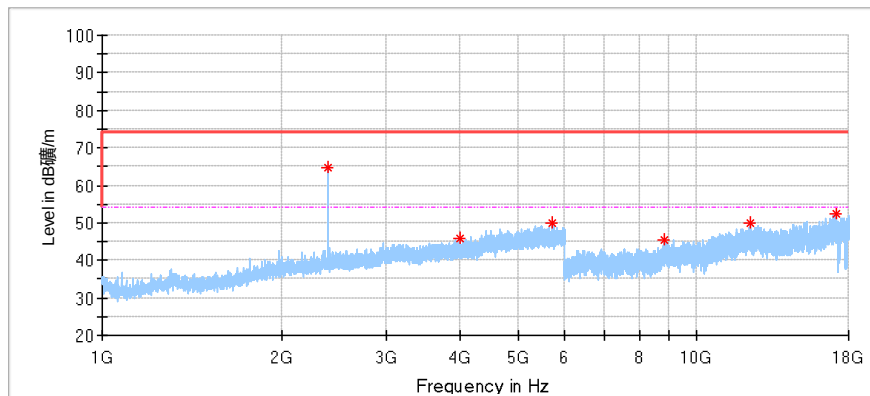


| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 2480.000000     | 66.92            | 74.00          | 7.08        | 150.0       | H   | 129.0         | -2.21        |
| 3581.500000     | 45.59            | 74.00          | 28.41       | 150.0       | H   | 22.0          | 0.84         |
| 5224.000000     | 50.90            | 74.00          | 23.10       | 150.0       | H   | 89.0          | 5.44         |
| 8845.000000     | 45.78            | 74.00          | 28.22       | 150.0       | H   | 269.0         | 13.20        |
| 12648.500000*   | 50.91            | 74.00          | 23.09       | 150.0       | H   | 356.0         | 18.64        |
| 17108.000000    | 52.03            | 74.00          | 21.97       | 150.0       | H   | 86.0          | 24.14        |

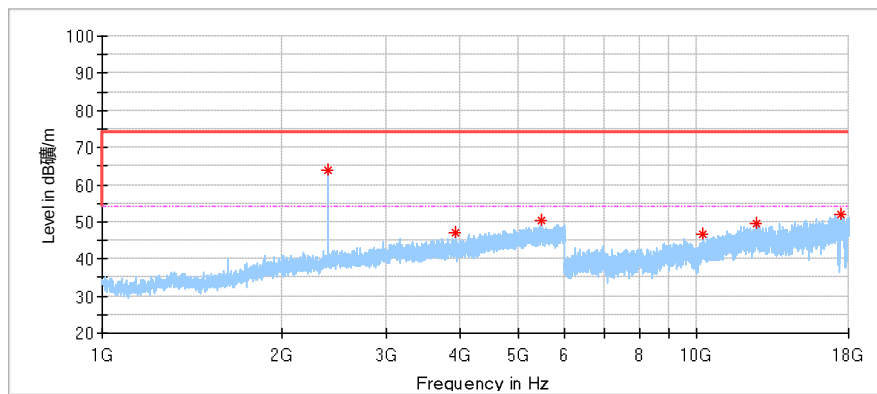


| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 2480.000000     | 65.53            | 74.00          | 8.47        | 150.0       | V   | 169.0         | -2.21        |
| 4602.500000*    | 47.20            | 74.00          | 26.80       | 150.0       | V   | 309.0         | 3.26         |
| 5858.000000     | 49.89            | 74.00          | 24.11       | 150.0       | V   | 296.0         | 5.74         |
| 9559.000000     | 45.18            | 74.00          | 28.82       | 150.0       | V   | 165.0         | 13.20        |
| 11973.000000*   | 50.31            | 74.00          | 23.69       | 150.0       | V   | 248.0         | 17.15        |
| 17094.000000    | 51.91            | 74.00          | 22.09       | 150.0       | V   | 227.0         | 24.13        |

3DH5\_2402MHz\_1GHz – 18GHz:

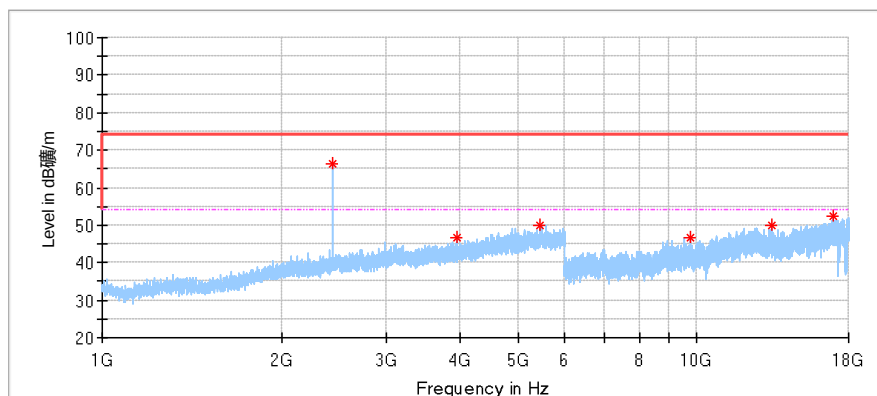


| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 2402.000000     | 64.86            | 74.00          | 9.14        | 150.0       | H   | 129.0         | -2.84        |
| 3995.500000*    | 46.04            | 74.00          | 27.96       | 150.0       | H   | 351.0         | 1.27         |
| 5715.500000     | 49.93            | 74.00          | 24.07       | 150.0       | H   | 245.0         | 5.40         |
| 8809.500000     | 45.48            | 74.00          | 28.52       | 150.0       | H   | 333.0         | 12.95        |
| 12305.500000*   | 49.82            | 74.00          | 24.18       | 150.0       | H   | 290.0         | 17.33        |
| 17145.500000    | 52.26            | 74.00          | 21.74       | 150.0       | H   | 269.0         | 24.19        |

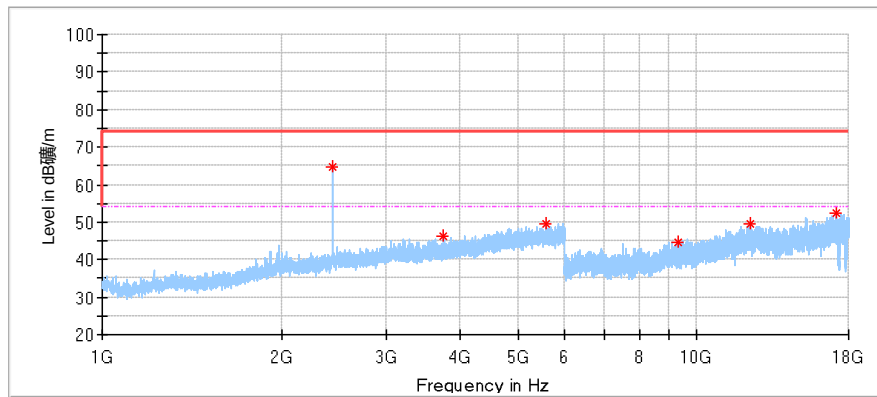


| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 2402.000000     | 64.04            | 74.00          | 9.96        | 150.0       | V   | 169.0         | -2.84        |
| 3936.000000*    | 46.95            | 74.00          | 27.05       | 150.0       | V   | 309.0         | 1.01         |
| 5474.000000     | 50.33            | 74.00          | 23.68       | 150.0       | V   | 102.0         | 6.00         |
| 10247.000000    | 46.58            | 74.00          | 27.42       | 150.0       | V   | 0.0           | 14.08        |
| 12612.000000*   | 49.56            | 74.00          | 24.44       | 150.0       | V   | 28.0          | 18.32        |
| 17471.000000*   | 51.97            | 74.00          | 22.03       | 150.0       | V   | 166.0         | 23.69        |

### 3DH5\_2441MHz\_1GHz – 18GHz:

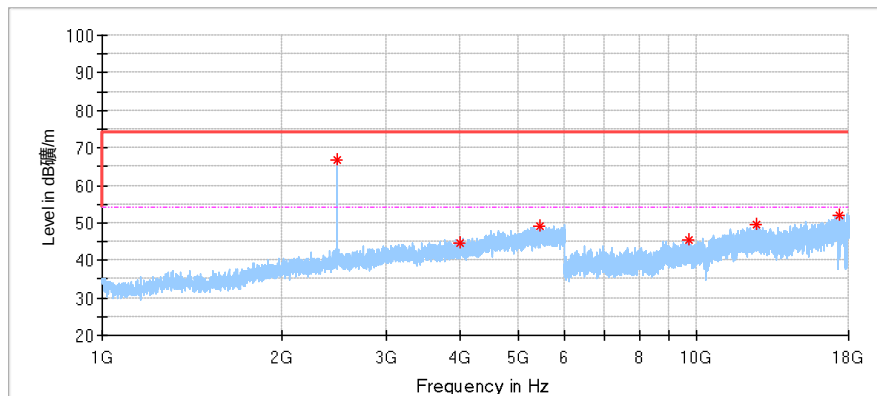


| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 2441.000000     | 66.49            | 74.00          | 7.51        | 150.0       | H   | 131.0         | -2.40        |
| 3950.000000*    | 46.66            | 74.00          | 27.34       | 150.0       | H   | 218.0         | 1.05         |
| 5460.000000*    | 49.93            | 74.00          | 24.07       | 150.0       | H   | 68.0          | 5.91         |
| 9755.000000     | 46.74            | 74.00          | 27.26       | 150.0       | H   | 290.0         | 13.57        |
| 13336.000000*   | 49.95            | 74.00          | 24.05       | 150.0       | H   | 122.0         | 17.87        |
| 16958.500000    | 52.26            | 74.00          | 21.74       | 150.0       | H   | 205.0         | 24.15        |

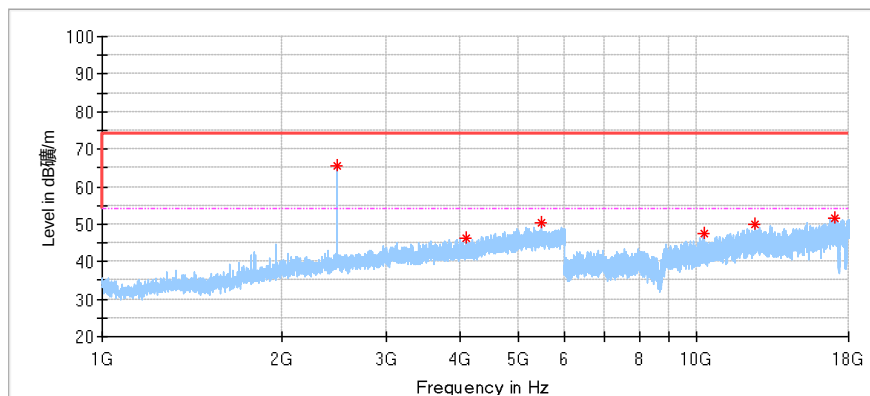


| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 2441.000000     | 64.75            | 74.00          | 9.25        | 150.0       | V   | 169.0         | -2.40        |
| 3755.500000*    | 46.07            | 74.00          | 27.93       | 150.0       | V   | 28.0          | 0.75         |
| 5574.500000     | 49.66            | 74.00          | 24.34       | 150.0       | V   | 0.0           | 5.72         |
| 9305.500000*    | 44.65            | 74.00          | 29.35       | 150.0       | V   | 108.0         | 12.97        |
| 12337.500000*   | 49.46            | 74.00          | 24.54       | 150.0       | V   | 207.0         | 17.25        |
| 17127.000000    | 52.38            | 74.00          | 21.62       | 150.0       | V   | 187.0         | 24.16        |

3DH5\_2480MHz\_1GHz – 18GHz:

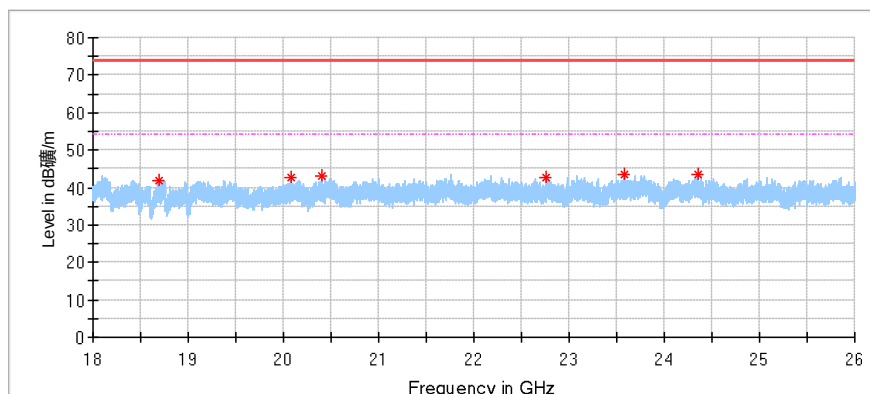


| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 2480.000000     | 66.73            | 74.00          | 7.27        | 150.0       | H   | 135.0         | -2.21        |
| 3990.500000*    | 44.53            | 74.00          | 29.47       | 150.0       | H   | 182.0         | 1.30         |
| 5458.000000*    | 49.06            | 74.00          | 24.94       | 150.0       | H   | 4.0           | 5.90         |
| 9722.500000     | 45.26            | 74.00          | 28.74       | 150.0       | H   | 311.0         | 13.52        |
| 12618.500000*   | 49.62            | 74.00          | 24.38       | 150.0       | H   | 248.0         | 18.39        |
| 17419.500000    | 51.99            | 74.00          | 22.01       | 150.0       | H   | 186.0         | 23.65        |

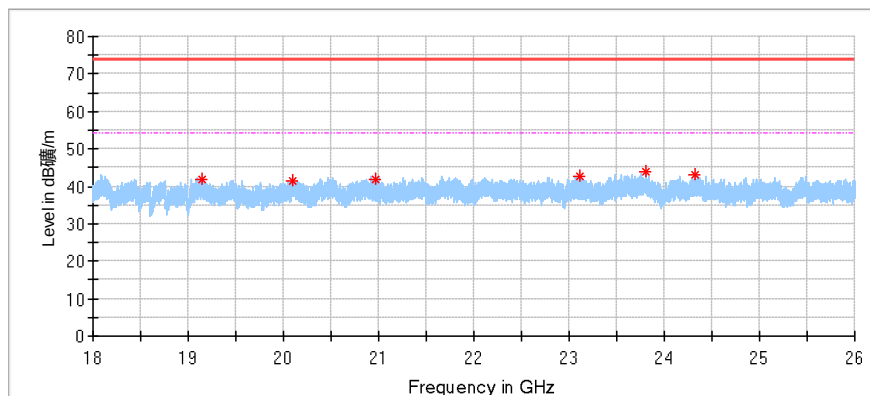


| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 2480.000000     | 65.46            | 74.00          | 8.54        | 150.0       | V   | 162.0         | -2.21        |
| 4093.000000*    | 46.11            | 74.00          | 27.89       | 150.0       | V   | 9.0           | 1.55         |
| 5475.000000     | 50.38            | 74.00          | 23.62       | 150.0       | V   | 312.0         | 6.01         |
| 10285.500000    | 47.69            | 74.00          | 26.31       | 150.0       | V   | 248.0         | 14.10        |
| 12559.000000*   | 49.81            | 74.00          | 24.19       | 150.0       | V   | 147.0         | 17.78        |
| 17088.500000    | 51.59            | 74.00          | 22.41       | 150.0       | V   | 333.0         | 24.13        |

## DH5\_2402MHz\_ Above 18GHz:

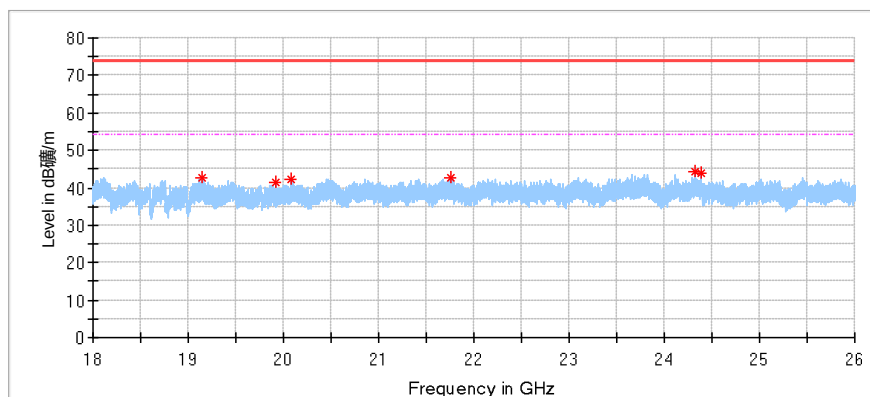


| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 18698.250000    | 41.98            | 74.00          | 32.02       | 100.0       | H   | 0.0           | -2.1         |
| 20087.500000    | 42.64            | 74.00          | 31.36       | 100.0       | H   | 0.0           | -1.8         |
| 20397.000000    | 43.26            | 74.00          | 30.74       | 100.0       | H   | 93.0          | -1.2         |
| 22760.500000    | 42.80            | 74.00          | 31.20       | 100.0       | H   | 139.0         | 0.5          |
| 23584.500000    | 43.44            | 74.00          | 30.56       | 100.0       | H   | 307.0         | 0.9          |
| 24358.750000    | 43.57            | 74.00          | 30.43       | 100.0       | H   | 0.0           | 1.1          |

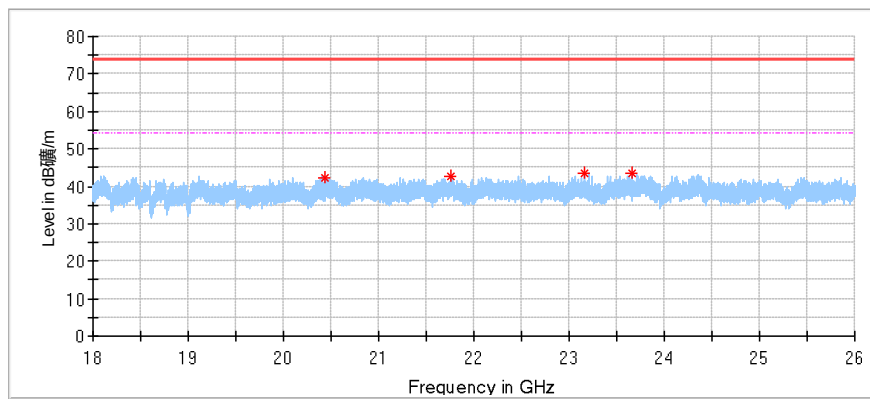


| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 19141.000000    | 41.84            | 74.00          | 32.16       | 100.0       | V   | 199.0         | -1.9         |
| 20104.750000    | 41.28            | 74.00          | 32.72       | 100.0       | V   | 0.0           | -1.8         |
| 20961.750000    | 41.92            | 74.00          | 32.08       | 100.0       | V   | 5.0           | -0.2         |
| 23115.500000    | 42.66            | 74.00          | 31.34       | 100.0       | V   | 245.0         | 0.7          |
| 23800.750000    | 43.80            | 74.00          | 30.20       | 100.0       | V   | 314.0         | 1.1          |
| 24318.500000    | 43.07            | 74.00          | 30.93       | 100.0       | V   | 199.0         | 1.1          |

DH5\_2441MHz\_ Above 18GHz:

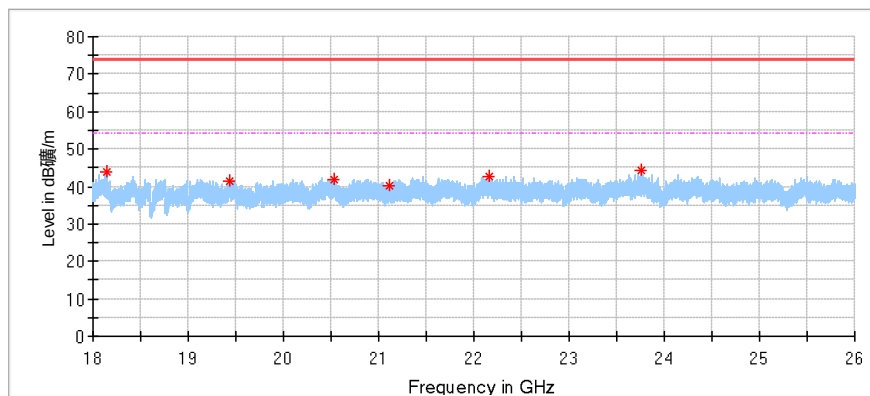


| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 19140.000000    | 42.47            | 74.00          | 31.53       | 100.0       | H   | 0.0           | -1.9         |
| 19920.500000    | 41.43            | 74.00          | 32.57       | 100.0       | H   | 205.0         | -2.0         |
| 20085.250000    | 42.42            | 74.00          | 31.58       | 100.0       | H   | 5.0           | -1.8         |
| 21751.250000    | 42.68            | 74.00          | 31.32       | 100.0       | H   | 243.0         | 0.1          |
| 24323.250000    | 44.31            | 74.00          | 29.69       | 100.0       | H   | 312.0         | 1.1          |
| 24383.500000    | 43.71            | 74.00          | 30.29       | 100.0       | H   | 324.0         | 1.1          |

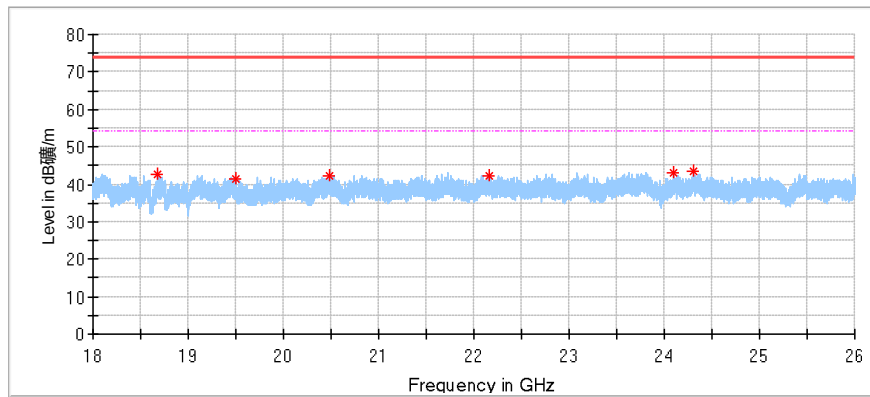


| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 20429.250000    | 42.20            | 74.00          | 31.80       | 100.0       | V   | 0.0           | -1.1         |
| 21759.500000    | 42.70            | 74.00          | 31.30       | 100.0       | V   | 78.0          | 0.1          |
| 23161.000000    | 43.46            | 74.00          | 30.54       | 100.0       | V   | 21.0          | 0.6          |
| 23658.000000    | 43.52            | 74.00          | 30.48       | 100.0       | V   | 180.0         | 1.0          |

DH5\_2480MHz\_Above 18GHz:



| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 18144.500000    | 43.94            | 74.00          | 30.06       | 100.0       | H   | 3.0           | -2.2         |
| 19441.000000    | 41.60            | 74.00          | 32.40       | 100.0       | H   | 17.0          | -1.9         |
| 20530.000000    | 41.79            | 74.00          | 32.21       | 100.0       | H   | 210.0         | -0.8         |
| 21120.500000    | 40.23            | 74.00          | 33.77       | 100.0       | H   | 0.0           | -0.3         |
| 22154.000000    | 42.73            | 74.00          | 31.27       | 100.0       | H   | 343.0         | 0.3          |
| 23756.250000    | 44.22            | 74.00          | 29.78       | 100.0       | H   | 60.0          | 1.1          |



| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 18679.250000    | 42.54            | 74.00          | 31.46       | 100.0       | V   | 240.0         | -2.1         |
| 19501.500000    | 41.50            | 74.00          | 32.50       | 100.0       | V   | 181.0         | -1.9         |
| 20477.000000    | 42.30            | 74.00          | 31.70       | 100.0       | V   | 111.0         | -0.8         |
| 22160.000000    | 42.05            | 74.00          | 31.95       | 100.0       | V   | 0.0           | 0.4          |
| 24104.500000    | 43.20            | 74.00          | 30.80       | 100.0       | V   | 30.0          | 0.7          |
| 24311.000000    | 43.36            | 74.00          | 30.64       | 100.0       | V   | 273.0         | 1.1          |

## Remark:

- (1) “\*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
- (2) Corrected Amplitude = Read level + Corrector factor  
 Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain  
 Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

## 10 Test Equipment List

### List of Test Instruments

#### Radiated Emission Test

| DESCRIPTION                         | MANUFACTURER    | MODEL NO.         | EQUIPMENT ID       | SERIAL NO.       | CAL INTERVAL (YEAR) | CAL. DUE DATE |
|-------------------------------------|-----------------|-------------------|--------------------|------------------|---------------------|---------------|
| EMI Test Receiver                   | Rohde & Schwarz | ESR 26            | 68-4-74-14-002     | 101269           | 1                   | 2023-5-28     |
| Trilog Super Broadband Test Antenna | Schwarzbeck     | VULB 9162         | 68-4-80-19-003     | 284              | 1                   | 2023-1-17     |
| Wave Guide Antenna                  | ETS             | 3117              | 68-4-80-19-001     | 00218954         | 1                   | 2023-5-9      |
| Pre-amplifier                       | Rohde & Schwarz | SCU 18F           | 68-4-29-19-001     | 100745           | 1                   | 2023-5-28     |
| Pre-amplifier                       | Rohde & Schwarz | SCU 18F           | 68-4-29-19-002     | 100746           | 1                   | 2023-5-28     |
| Sideband Horn Antenna               | Q-PAR           | QWH-SL-18-40-K-SG | 68-4-80-14-008     | 12827            | 1                   | 2023-7-12     |
| Pre-amplifier                       | Rohde & Schwarz | SCU 40A           | 68-4-29-14-002     | 100432           | 1                   | 2023-7-27     |
| Attenuator                          | Mini-circuits   | UNAT-6+           | 68-4-81-21-002     | 15542            | 1                   | 2023-5-27     |
| 3m Semi-anechoic chamber            | TDK             | SAC-3 #2          | 68-4-90-19-006     | ----             | 2                   | 2023-5-28     |
| Test software                       | Rohde & Schwarz | EMC32             | 68-4-90-19-006-A01 | Version10.3 5.02 | N/A                 | N/A           |

#### Conducted Emission Test

| DESCRIPTION      | MANUFACTURER    | MODEL NO.          | EQUIPMENT ID       | SERIAL NO.          | CAL INTERVAL (YEAR) | CAL. DUE DATE |
|------------------|-----------------|--------------------|--------------------|---------------------|---------------------|---------------|
| Signal Analyzer  | Rohde & Schwarz | FSV40              | 68-4-74-14-004     | 101030              | 1                   | 2023-5-27     |
| RF Switch Module | Rohde & Schwarz | OSP120/OSP-B157    | 68-4-93-14-003     | 101226/100851       | 1                   | 2023-5-27     |
| Power Splitter   | Weinschel       | 1580               | 68-4-85-14-001     | SC319               | 1                   | 2023-5-28     |
| Test software    | Rohde & Schwarz | EMC32              | 68-4-48-14-003-A10 | Version 10.60.10    | N/A                 | N/A           |
| Test software    | Tonscend        | System for BT/WIFI | 68-4-74-14-006-A13 | Version 2.6.77.0518 | N/A                 | N/A           |
| Shielding Room   | TDK             | TS8997             | 68-4-90-19-003     | ----                | 3                   | 2025-10-15    |

## 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:

| System Measurement Uncertainty                                                        |                                                                                      |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Test Items                                                                            | Extended Uncertainty                                                                 |
| Uncertainty for Radiated Emission in new 3m chamber (68-4-90-19-006) 30MHz-1000MHz    | Horizontal: 4.33dB;<br>Vertical: 4.41dB;                                             |
| Uncertainty for Radiated Emission in new 3m chamber (68-4-90-19-006) 1000MHz-18000MHz | Horizontal: 4.27dB;<br>Vertical: 4.26dB;                                             |
| Uncertainty for Radiated Emission 18000MHz-40000MHz                                   | Horizontal: 4.52dB;<br>Vertical: 4.51dB;                                             |
| Uncertainty for Conducted RF test                                                     | RF Power Conducted: 1.31dB<br>Frequency test involved:<br>0.6×10 <sup>-8</sup> or 1% |

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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THE END