

## Appendix Test Data for BT(BDR/EDR) (Conducted Measurement)

Product Name: TWS Bluetooth headset

Trade Mark: N/A

Test Model: TWS-S19

FCC ID: 2A96C-S19

### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 22.8° C   |
| Relative Humidity: | 56%       |
| ATM Pressure:      | 100.0 kPa |
| Test Engineer:     | Anna Hu   |
| Supervised by:     | Hugo Chen |
| NOTE               | N/A       |

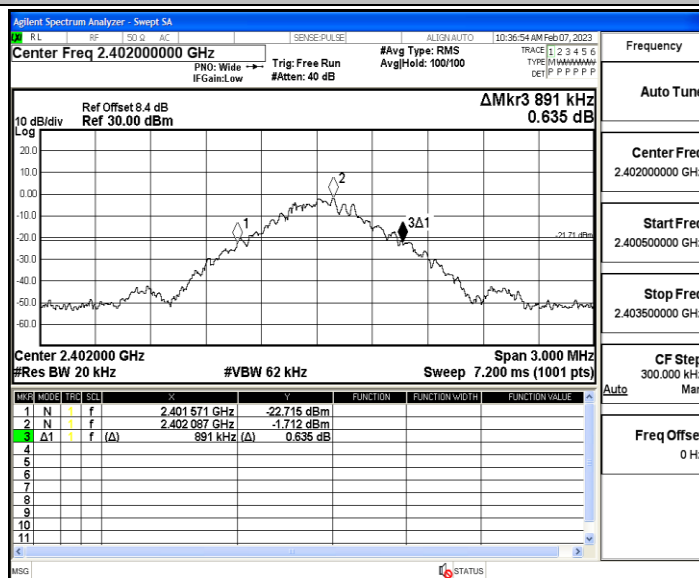
## Appendix A: 20dB Emission Bandwidth

### Test Result

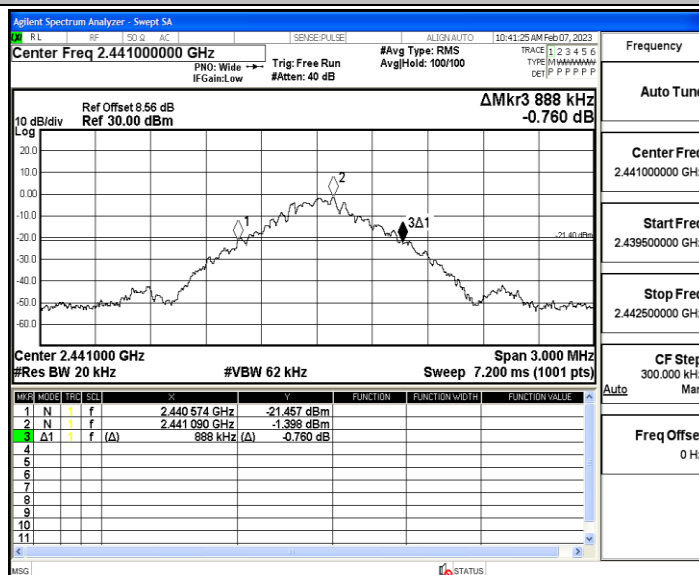
| TestMode | Antenna | Channel | 20db<br>EBW[MHz] | FL[MHz]  | FH[MHz]  | Limit[MHz] | Verdict |
|----------|---------|---------|------------------|----------|----------|------------|---------|
| DH5      | Ant1    | 2402    | 0.891            | 2401.571 | 2402.462 | ---        | ---     |
|          |         | 2441    | 0.888            | 2440.574 | 2441.462 | ---        | ---     |
|          |         | 2480    | 0.882            | 2479.580 | 2480.462 | ---        | ---     |
| 2DH5     | Ant1    | 2402    | 1.320            | 2401.370 | 2402.690 | ---        | ---     |
|          |         | 2441    | 1.314            | 2440.373 | 2441.687 | ---        | ---     |
|          |         | 2480    | 1.317            | 2479.373 | 2480.690 | ---        | ---     |
| 3DH5     | Ant1    | 2402    | 1.263            | 2401.394 | 2402.657 | ---        | ---     |
|          |         | 2441    | 1.269            | 2440.391 | 2441.660 | ---        | ---     |
|          |         | 2480    | 1.251            | 2479.406 | 2480.657 | ---        | ---     |

## Test Graphs

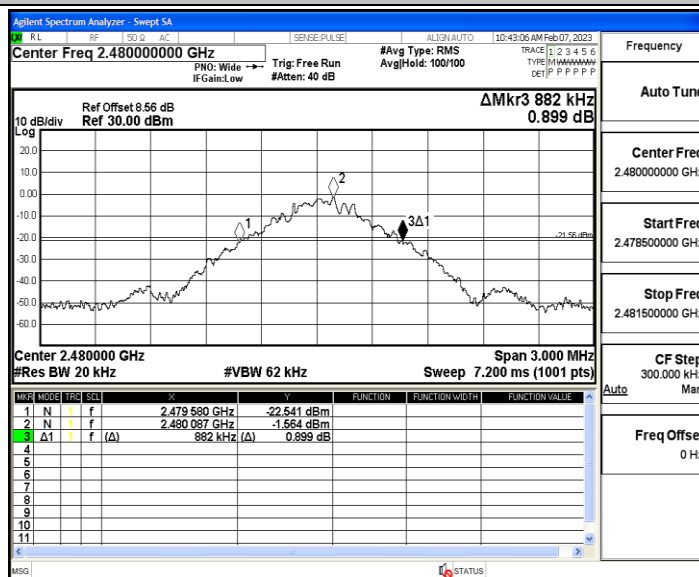
DH5\_Ant1\_2402



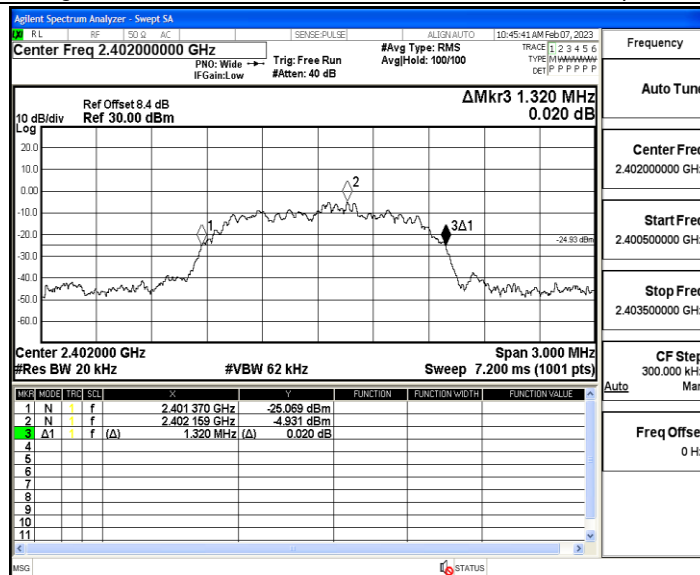
DH5\_Ant1\_2441



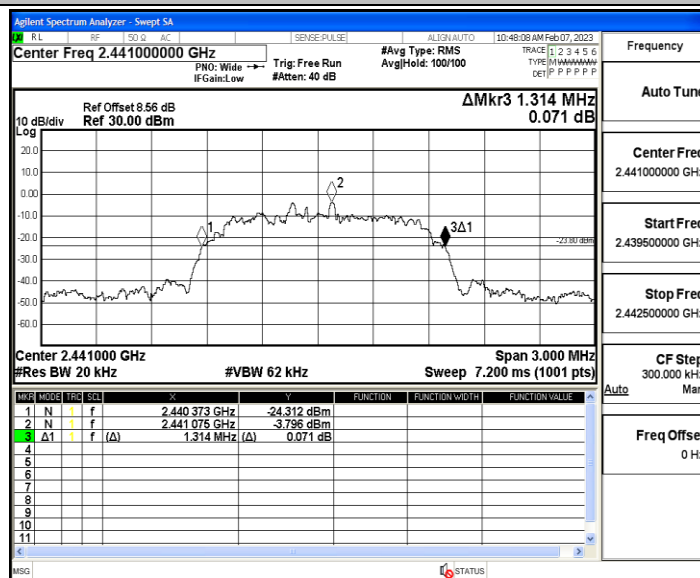
DH5\_Ant1\_2480



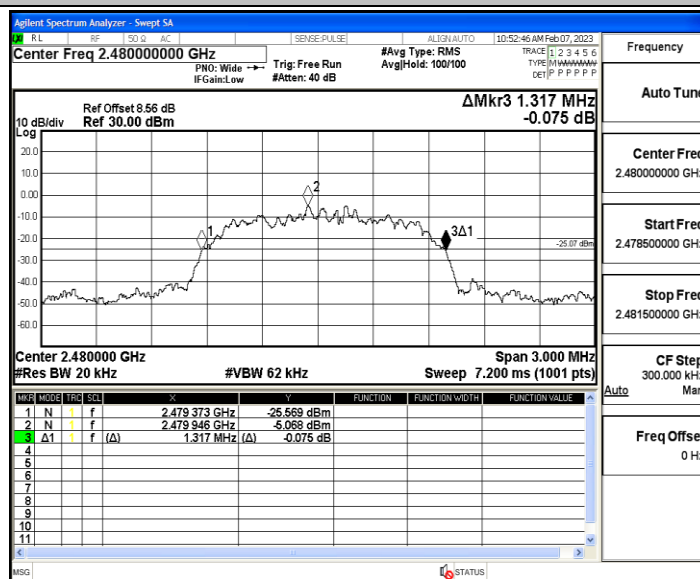
2DH5\_Ant1\_2402



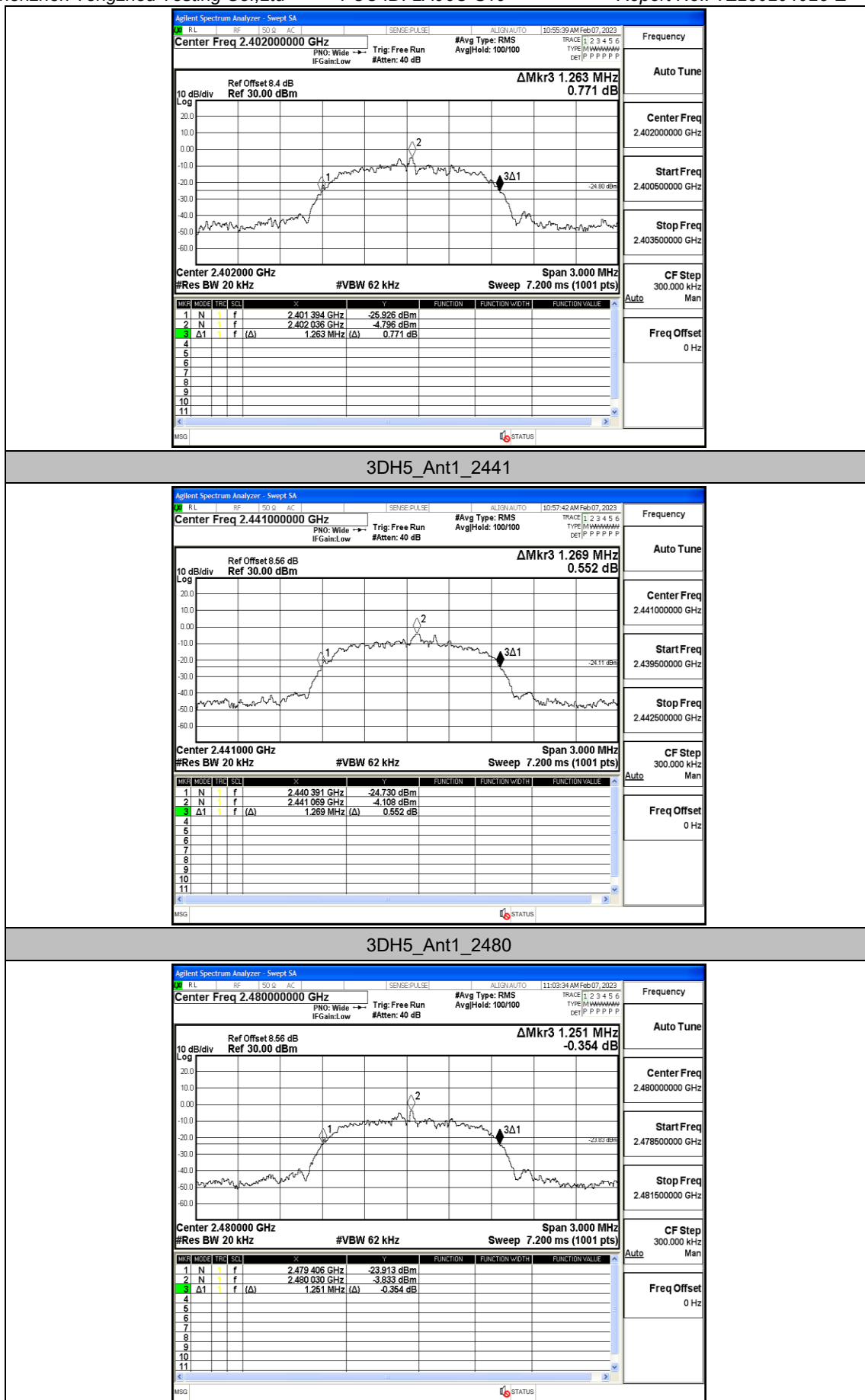
2DH5\_Ant1\_2441



2DH5\_Ant1\_2480



3DH5\_Ant1\_2402



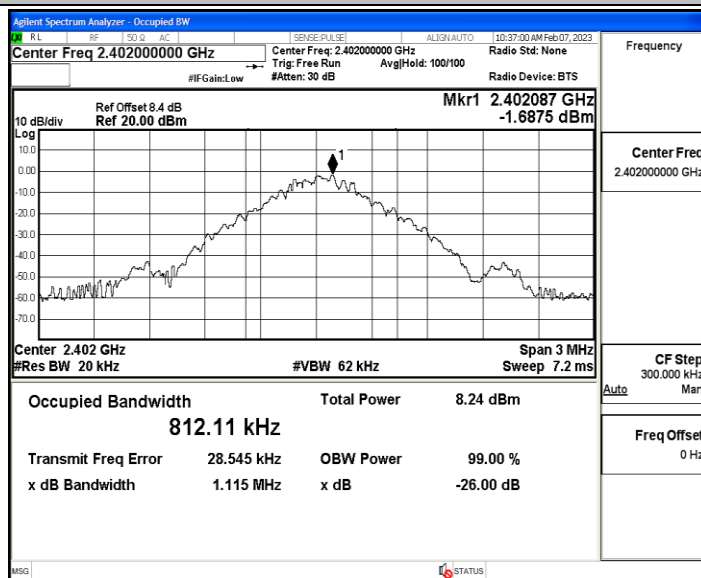
## Appendix B: Occupied Channel Bandwidth

### Test Result

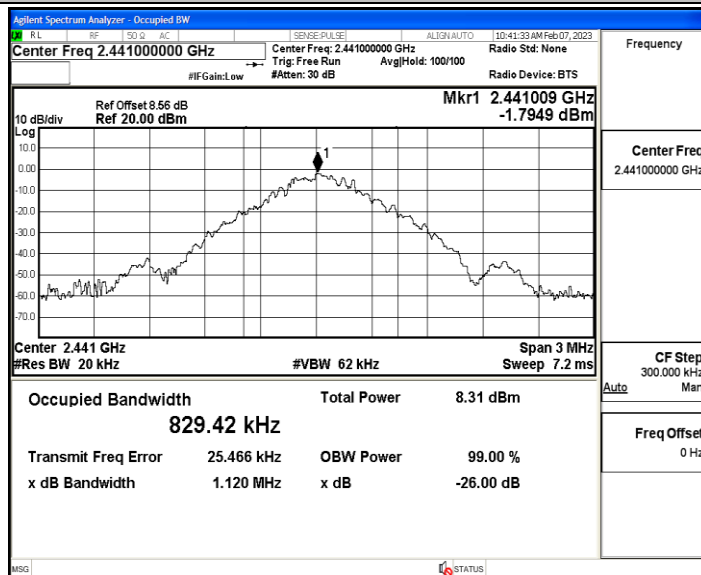
| TestMode | Antenna | Channel | OCB [MHz] | FL[MHz]   | FH[MHz]   | Limit[MHz] | Verdict |
|----------|---------|---------|-----------|-----------|-----------|------------|---------|
| DH5      | Ant1    | 2402    | 0.81211   | 2401.6225 | 2402.4346 | ---        | ---     |
|          |         | 2441    | 0.82942   | 2440.6108 | 2441.4402 | ---        | ---     |
|          |         | 2480    | 0.81237   | 2479.6233 | 2480.4356 | ---        | ---     |
| 2DH5     | Ant1    | 2402    | 1.1613    | 2401.4468 | 2402.6081 | ---        | ---     |
|          |         | 2441    | 1.1657    | 2440.4446 | 2441.6103 | ---        | ---     |
|          |         | 2480    | 1.1602    | 2479.4490 | 2480.6092 | ---        | ---     |
| 3DH5     | Ant1    | 2402    | 1.1617    | 2401.4451 | 2402.6068 | ---        | ---     |
|          |         | 2441    | 1.1633    | 2440.4442 | 2441.6075 | ---        | ---     |
|          |         | 2480    | 1.1674    | 2479.4427 | 2480.6101 | ---        | ---     |

## Test Graphs

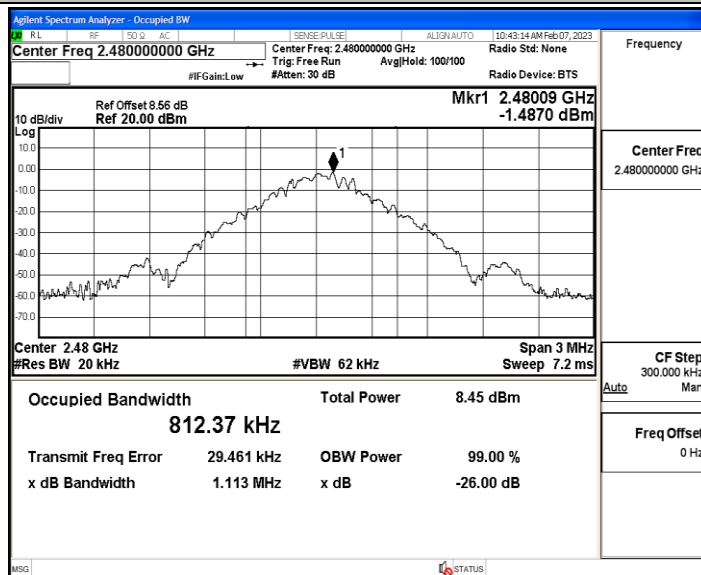
DH5\_Ant1\_2402



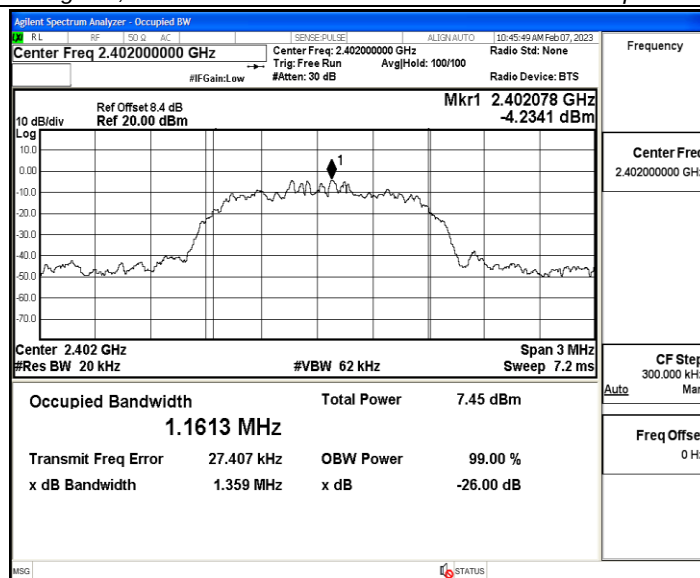
DH5\_Ant1\_2441



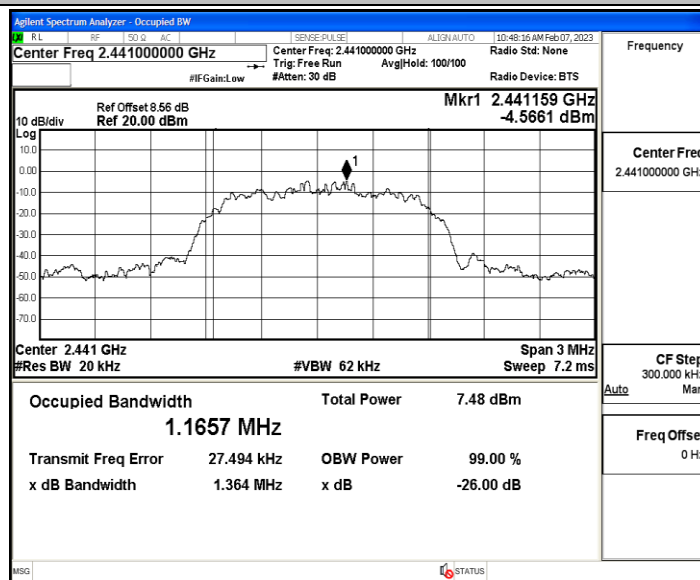
DH5\_Ant1\_2480



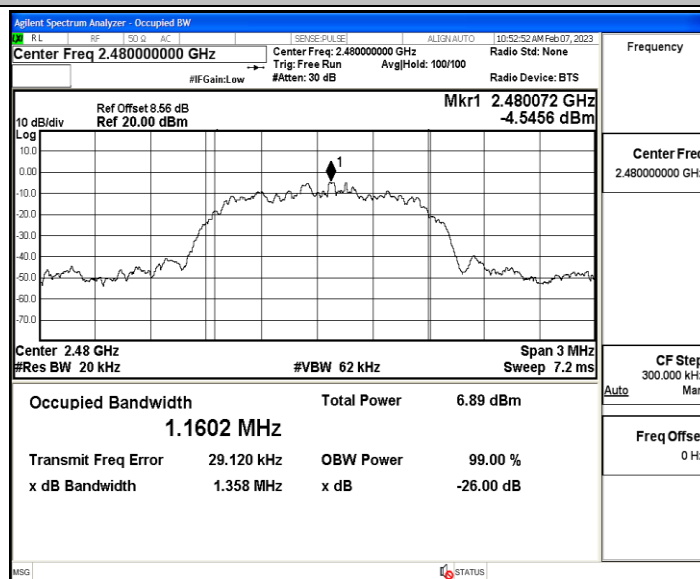
2DH5\_Ant1\_2402



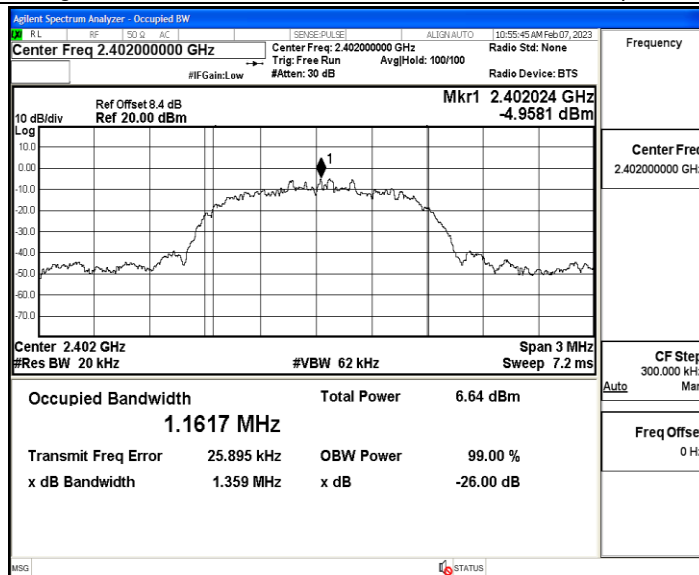
2DH5\_Ant1\_2441



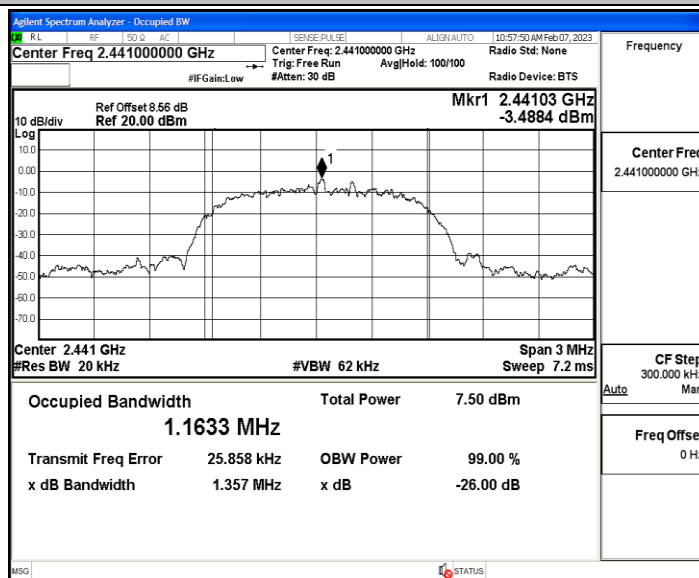
2DH5\_Ant1\_2480



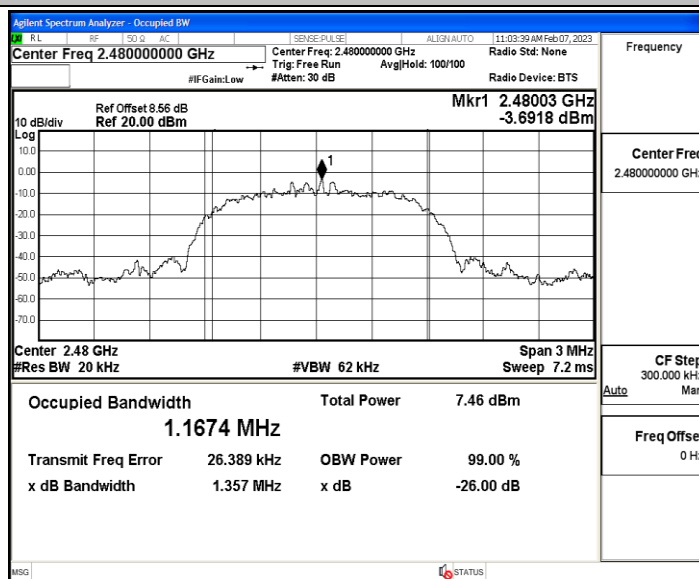
3DH5\_Ant1\_2402



## 3DH5\_Ant1\_2441



## 3DH5\_Ant1\_2480



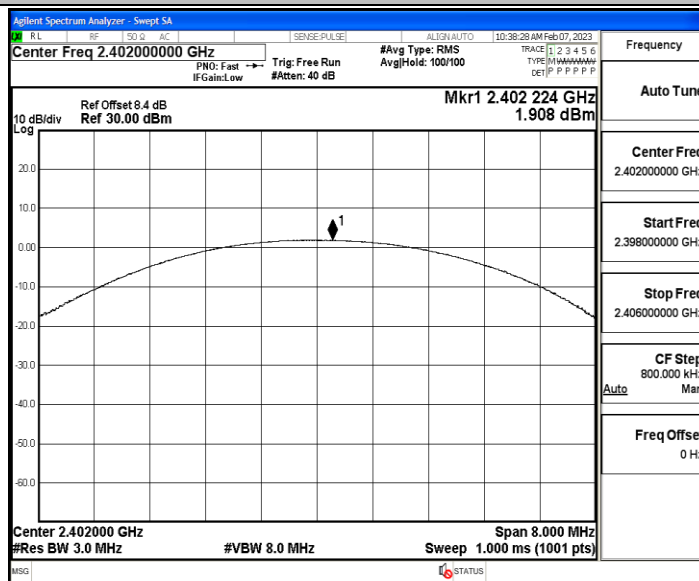
## Appendix C: Maximum Peak conducted output power

### Test Result

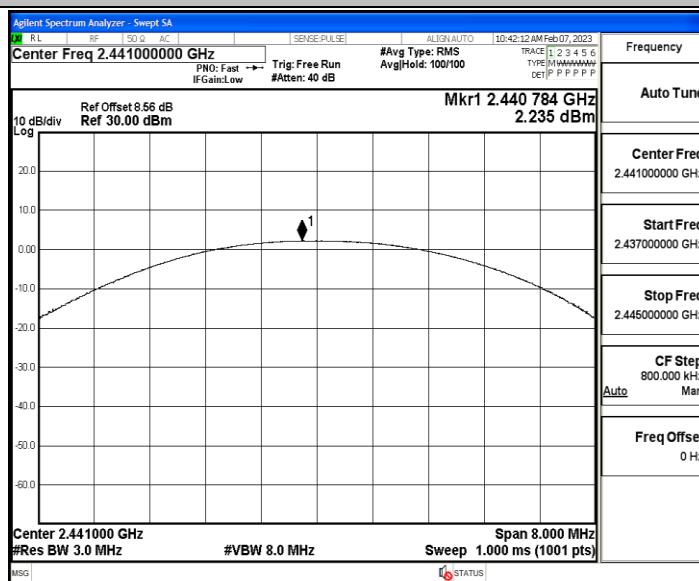
| TestMode | Antenna | Channel | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|---------|-------------|------------|---------|
| DH5      | Ant1    | 2402    | 1.91        | ≤30        | PASS    |
|          |         | 2441    | 2.24        | ≤30        | PASS    |
|          |         | 2480    | 2.13        | ≤30        | PASS    |
| 2DH5     | Ant1    | 2402    | 2.37        | ≤20.97     | PASS    |
|          |         | 2441    | 2.23        | ≤20.97     | PASS    |
|          |         | 2480    | 1.86        | ≤20.97     | PASS    |
| 3DH5     | Ant1    | 2402    | 2.27        | ≤20.97     | PASS    |
|          |         | 2441    | 2.39        | ≤20.97     | PASS    |
|          |         | 2480    | 2.32        | ≤20.97     | PASS    |

## Test Graphs

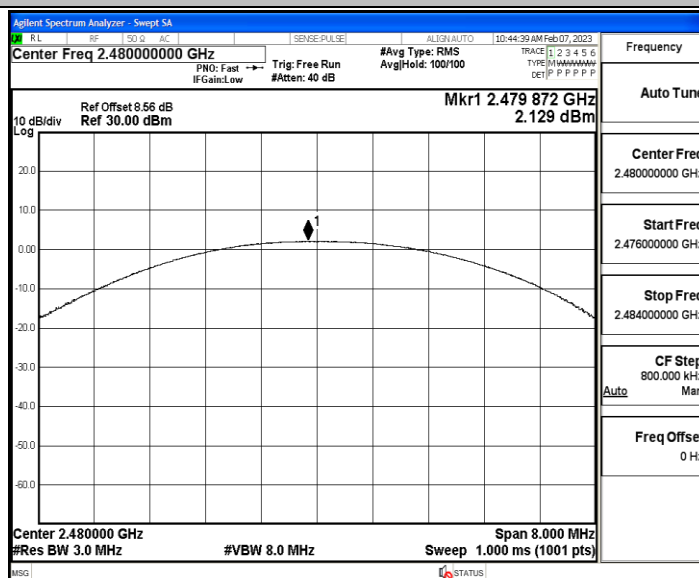
DH5\_Ant1\_2402



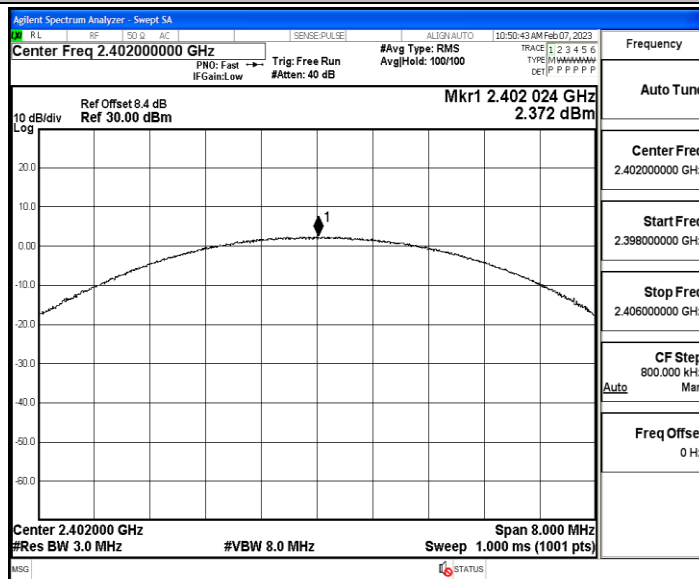
DH5\_Ant1\_2441



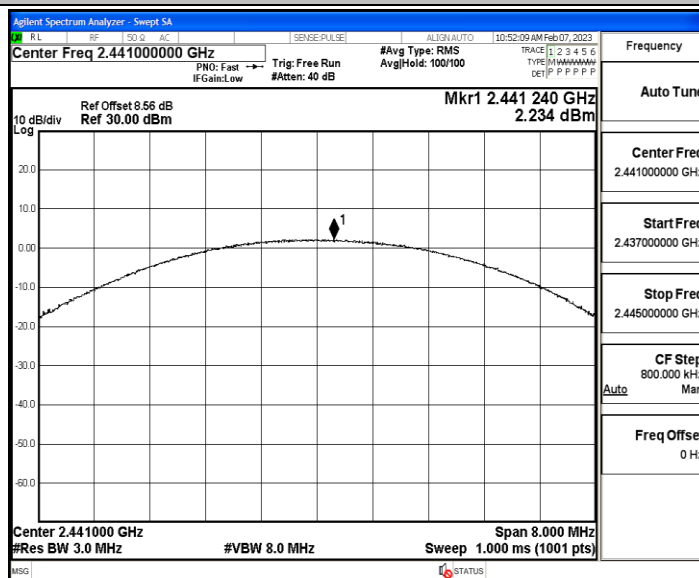
DH5\_Ant1\_2480



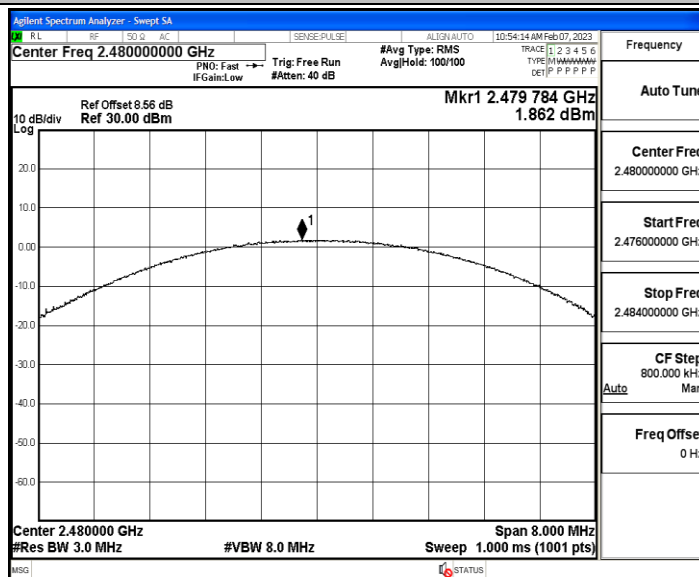
## 2DH5\_Ant1\_2402



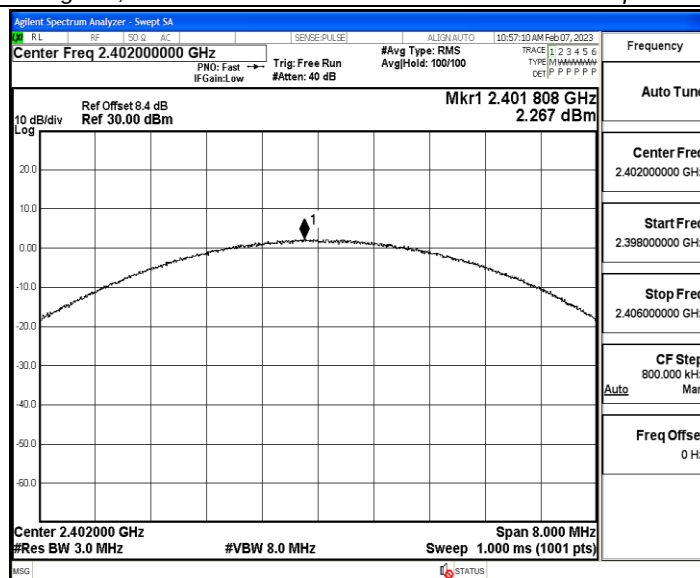
## 2DH5\_Ant1\_2441



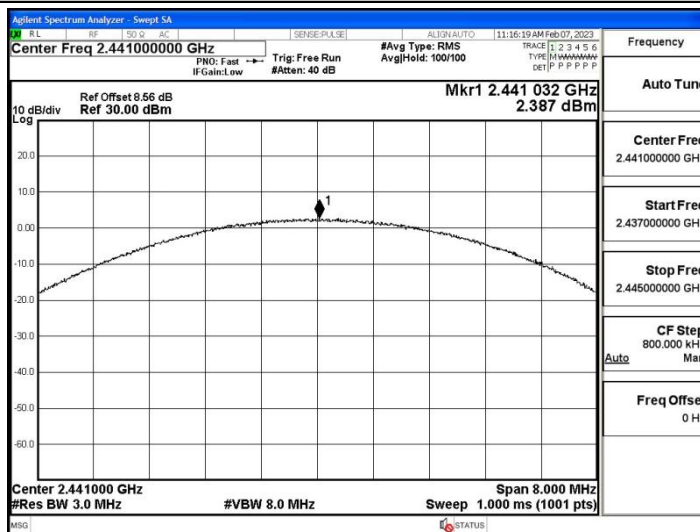
## 2DH5\_Ant1\_2480



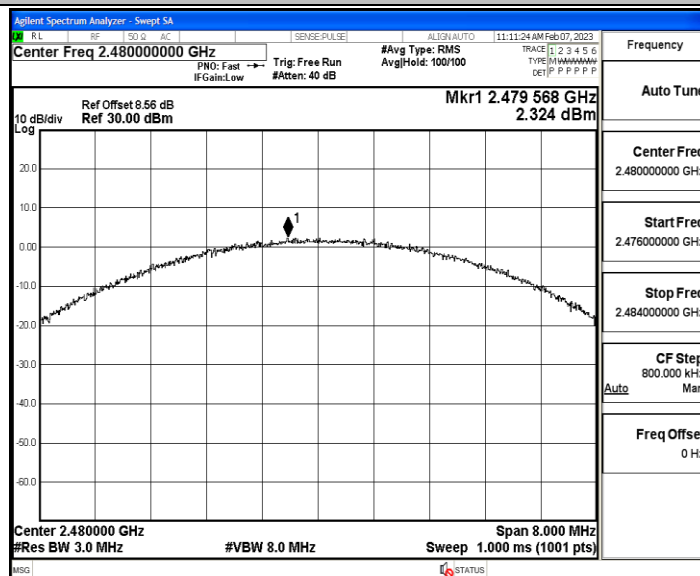
## 3DH5\_Ant1\_2402



3DH5\_Ant1\_2441



3DH5\_Ant1\_2480

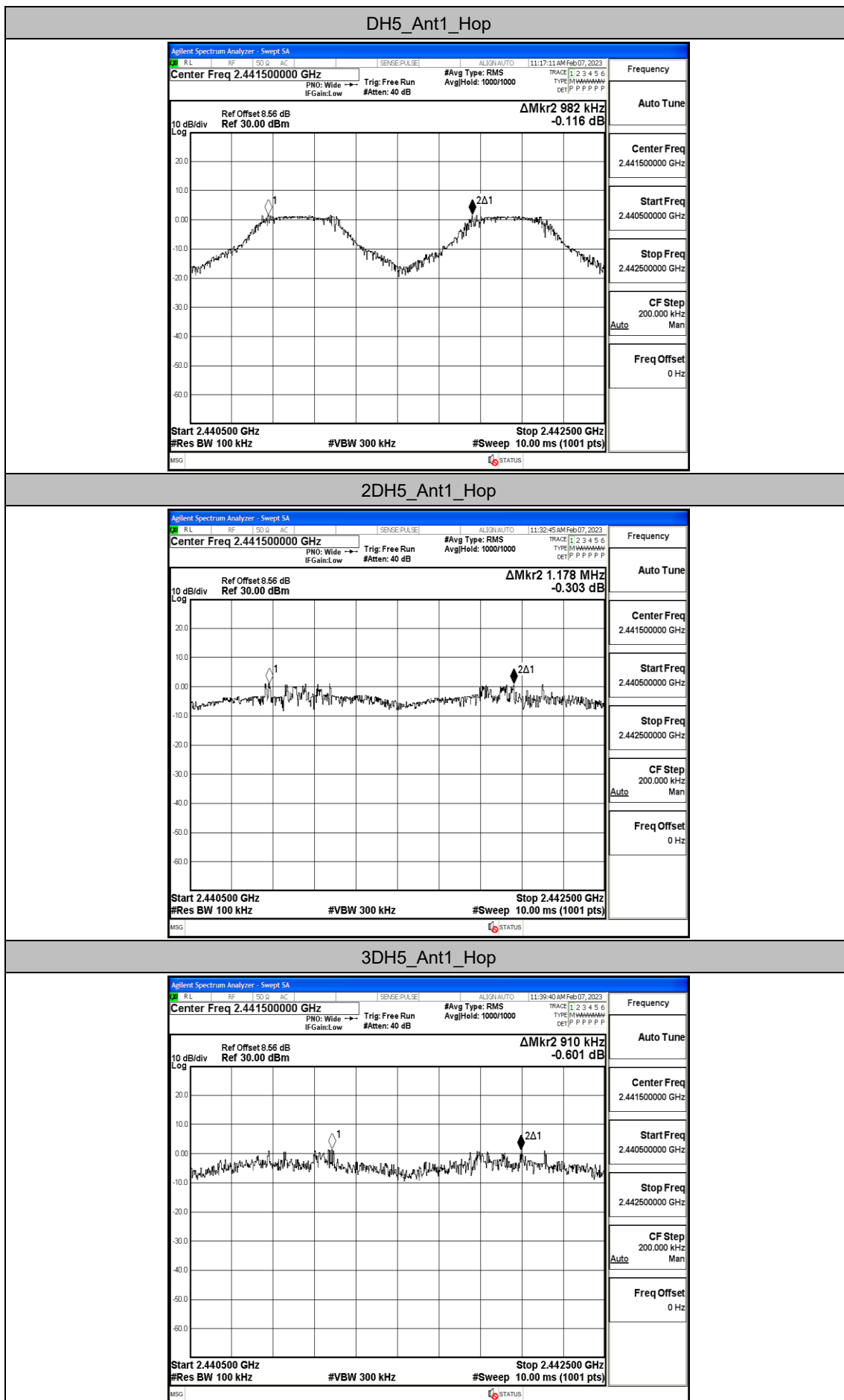


## Appendix D: Carrier frequency separation

### Test Result

| TestMode | Antenna | Channel | Result[MHz] | Limit[MHz]   | Verdict |
|----------|---------|---------|-------------|--------------|---------|
| DH5      | Ant1    | Hop     | 0.982       | $\geq 0.891$ | PASS    |
| 2DH5     | Ant1    | Hop     | 1.178       | $\geq 0.880$ | PASS    |
| 3DH5     | Ant1    | Hop     | 0.91        | $\geq 0.846$ | PASS    |

## Test Graphs

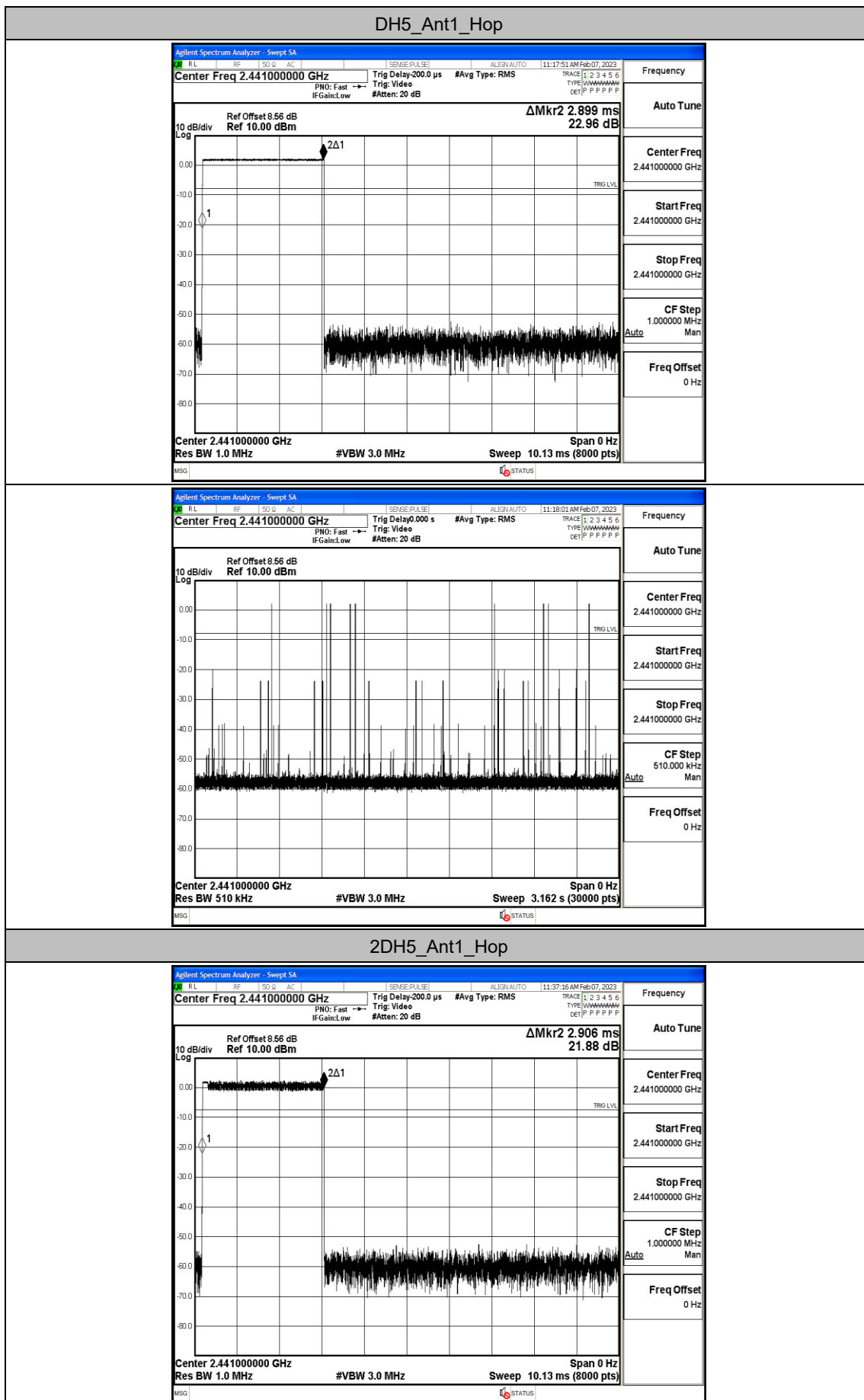


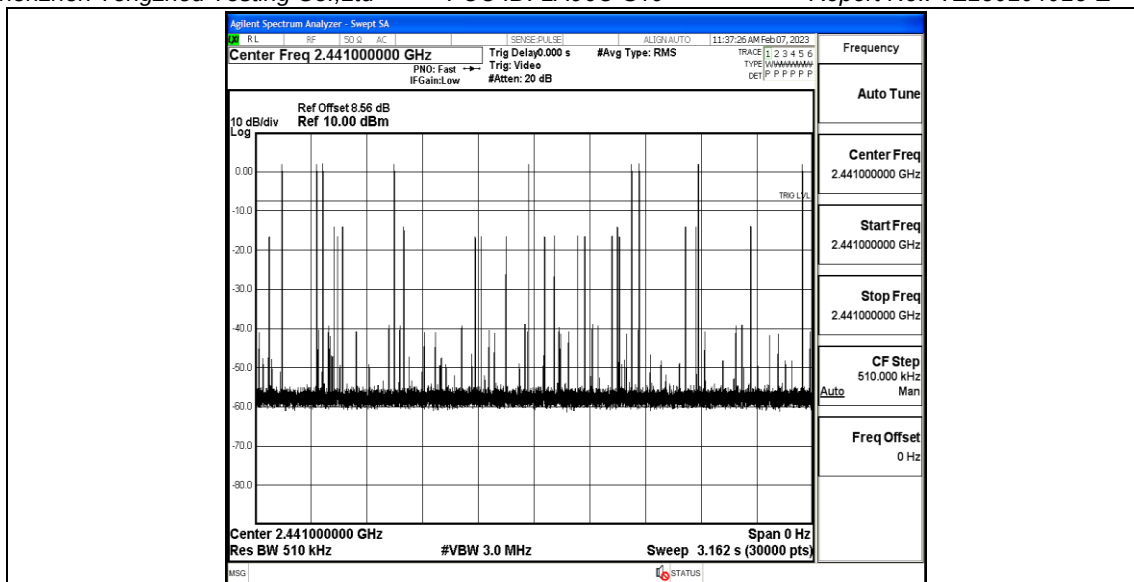
## Appendix E: Time of occupancy

### Test Result

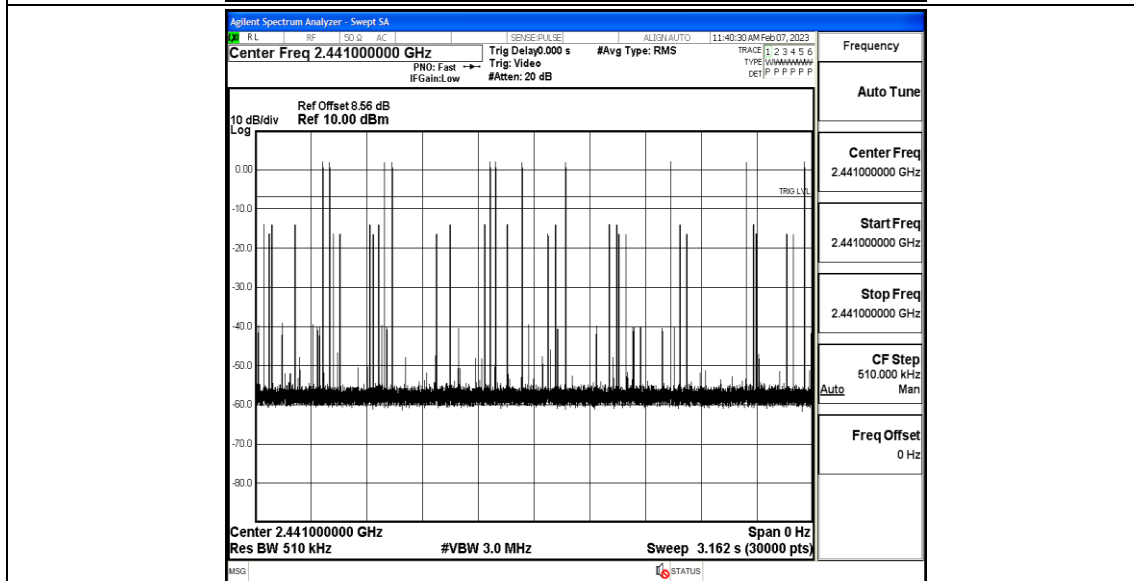
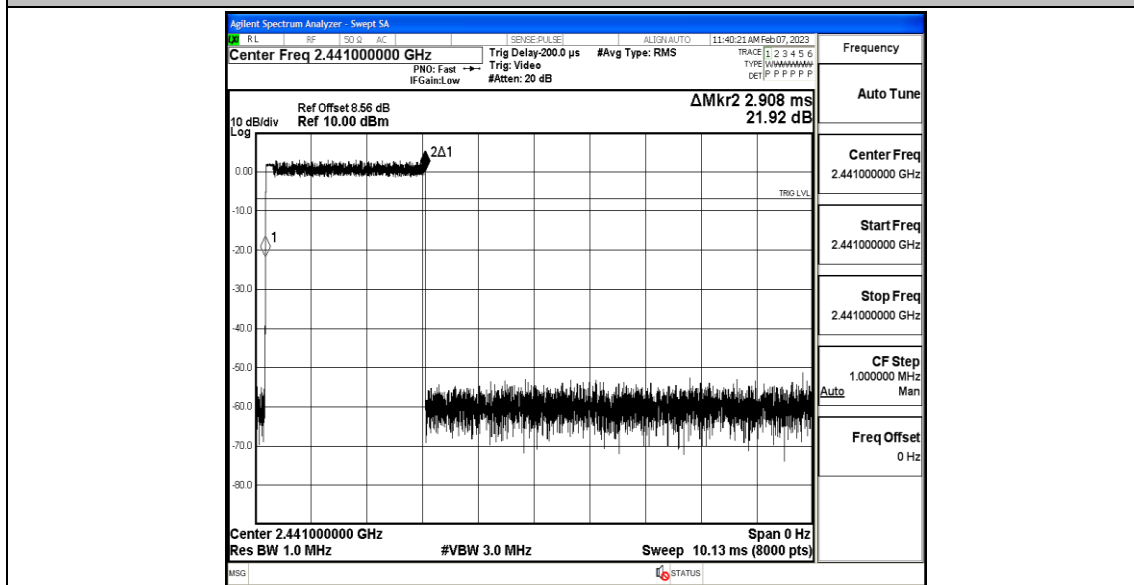
| TestMode | Antenna | Channel | BurstWidth<br>[ms] | TotalHops<br>[Num] | Result[s] | Limit[s] | Verdict |
|----------|---------|---------|--------------------|--------------------|-----------|----------|---------|
| DH5      | Ant1    | Hop     | 2.899              | 100                | 0.29      | ≤0.4     | PASS    |
| 2DH5     | Ant1    | Hop     | 2.906              | 100                | 0.291     | ≤0.4     | PASS    |
| 3DH5     | Ant1    | Hop     | 2.908              | 120                | 0.349     | ≤0.4     | PASS    |

## Test Graphs





## 3DH5\_Ant1\_Hop

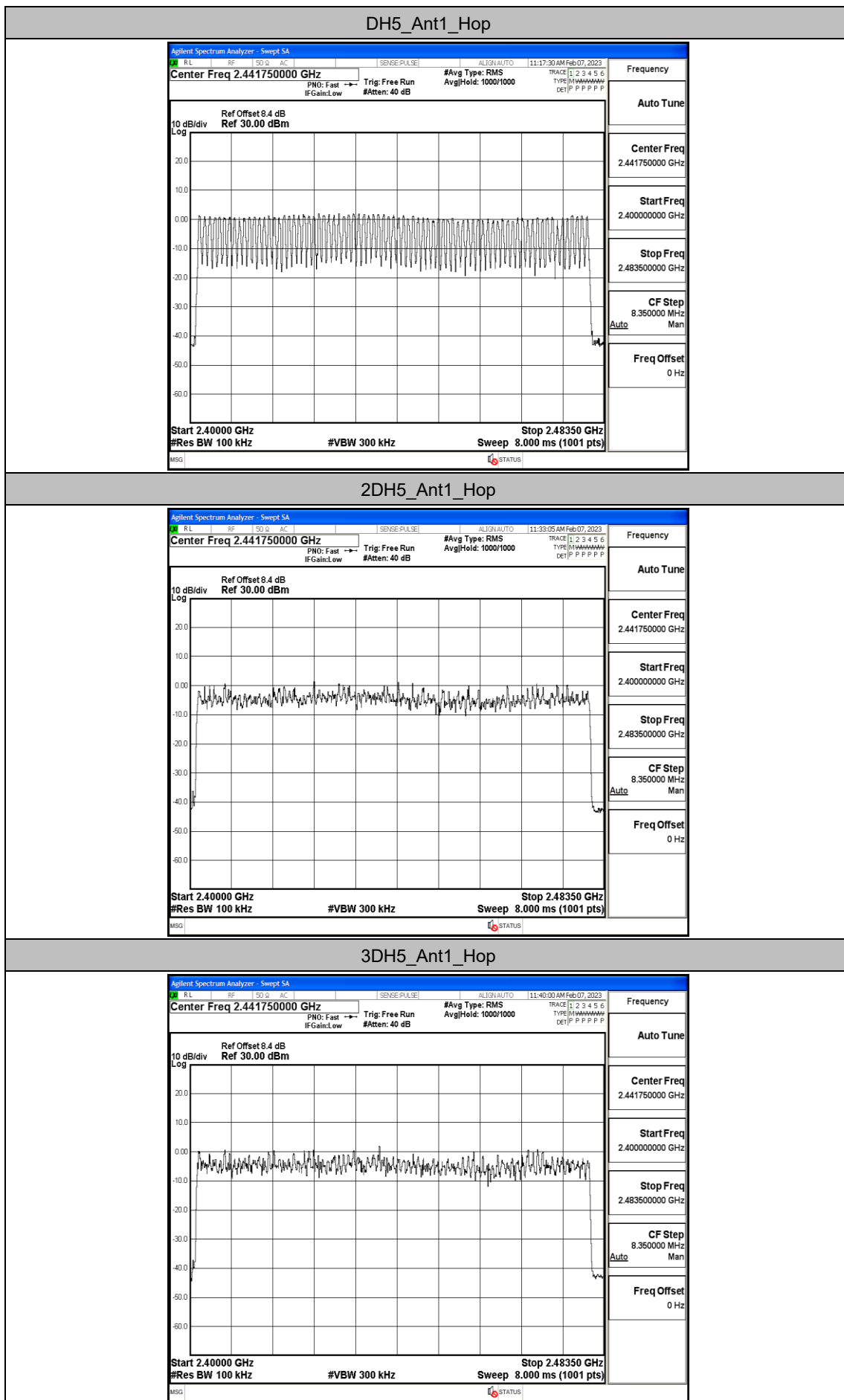


## Appendix F: Number of hopping channels

### Test Result

| 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    |

## Test Graphs



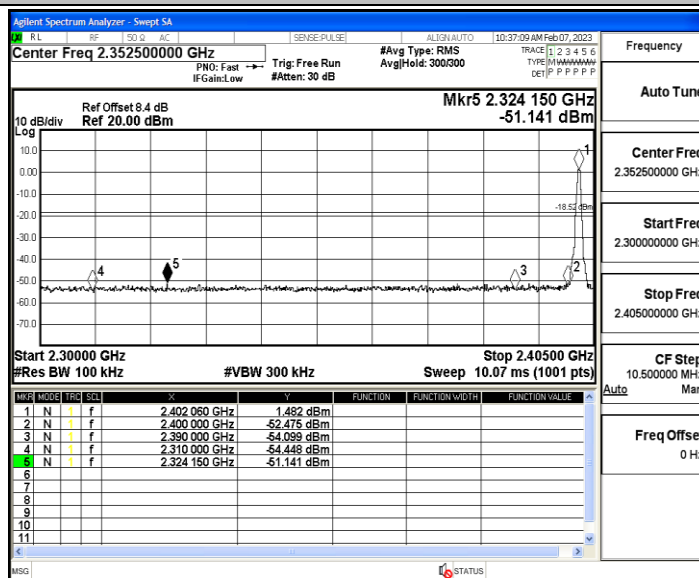
## Appendix G: Band edge measurements

### Test Result

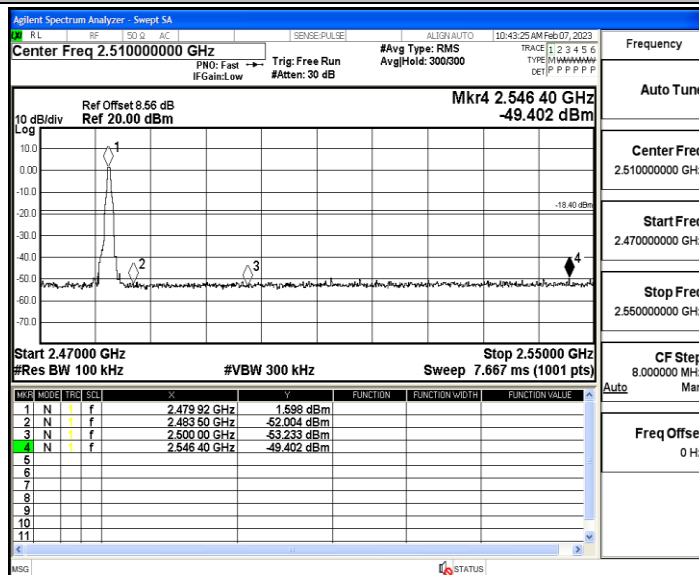
| TestMode | Antenna | ChName | Channel  | RefLevel<br>[dBm] | Result<br>[dBm] | Limit<br>[dBm] | Verdict |
|----------|---------|--------|----------|-------------------|-----------------|----------------|---------|
| DH5      | Ant1    | Low    | 2402     | 1.48              | -51.14          | $\leq -18.52$  | PASS    |
|          |         | High   | 2480     | 1.60              | -49.4           | $\leq -18.4$   | PASS    |
|          |         | Low    | Hop_2402 | 1.02              | -50.77          | $\leq -18.98$  | PASS    |
|          |         | High   | Hop_2480 | 1.64              | -50             | $\leq -18.36$  | PASS    |
| 2DH5     | Ant1    | Low    | 2402     | 0.87              | -50.73          | $\leq -19.13$  | PASS    |
|          |         | High   | 2480     | 0.07              | -49.97          | $\leq -19.93$  | PASS    |
|          |         | Low    | Hop_2402 | 0.62              | -51.17          | $\leq -19.38$  | PASS    |
|          |         | High   | Hop_2480 | 0.50              | -49.67          | $\leq -19.5$   | PASS    |
| 3DH5     | Ant1    | Low    | 2402     | -0.25             | -51.15          | $\leq -20.25$  | PASS    |
|          |         | High   | 2480     | -0.09             | -49.73          | $\leq -20.09$  | PASS    |
|          |         | Low    | Hop_2402 | -2.71             | -51.34          | $\leq -22.71$  | PASS    |
|          |         | High   | Hop_2480 | 0.70              | -49.61          | $\leq -19.3$   | PASS    |

## Test Graphs

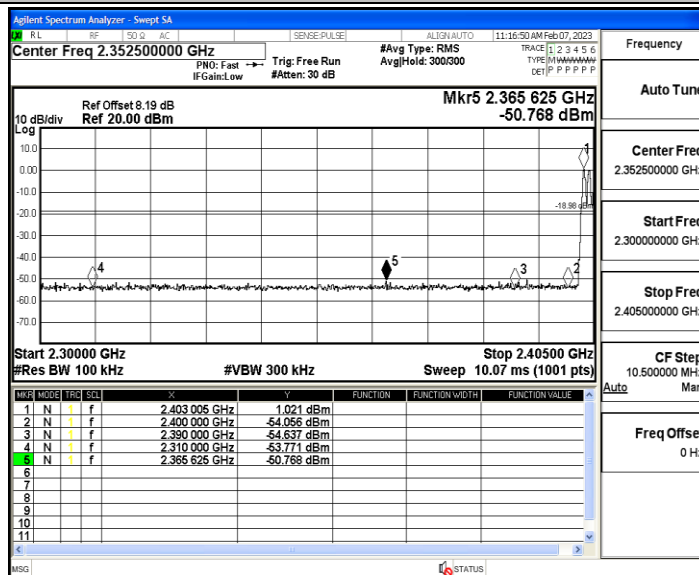
DH5\_Ant1\_Low\_2402



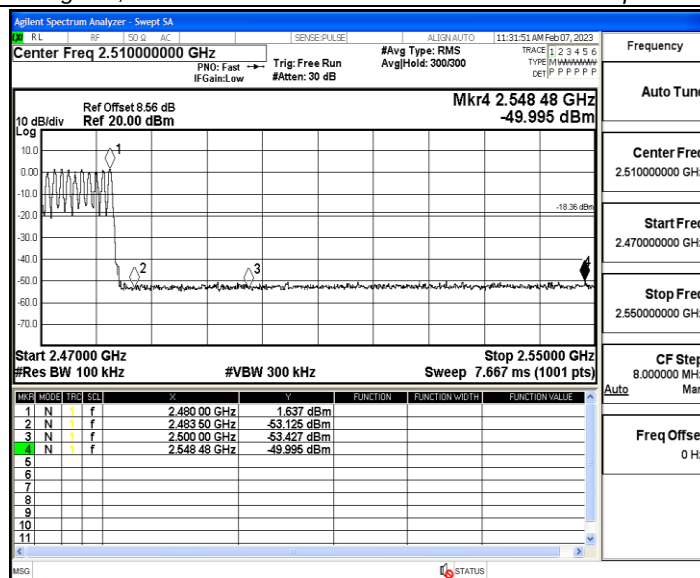
DH5\_Ant1\_High\_2480



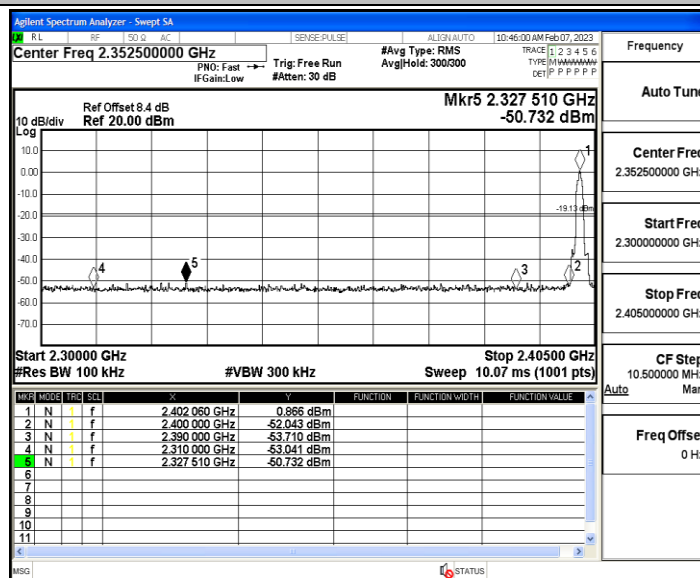
DH5\_Ant1\_Low\_Hop\_2402



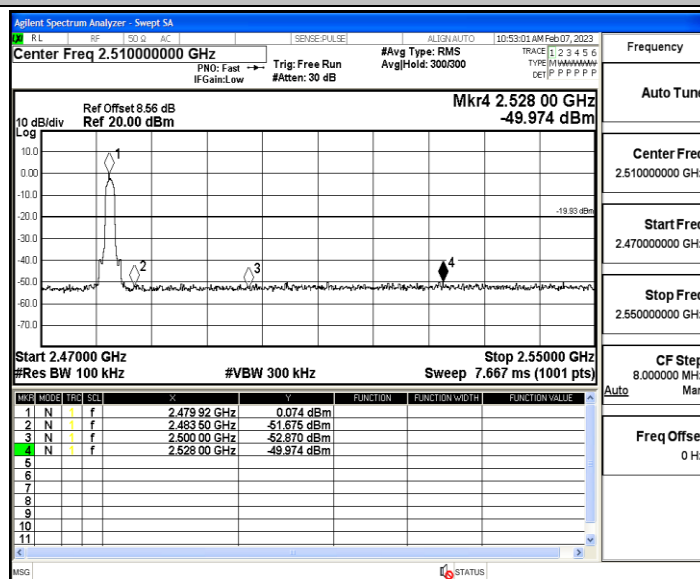
DH5\_Ant1\_High\_Hop\_2480



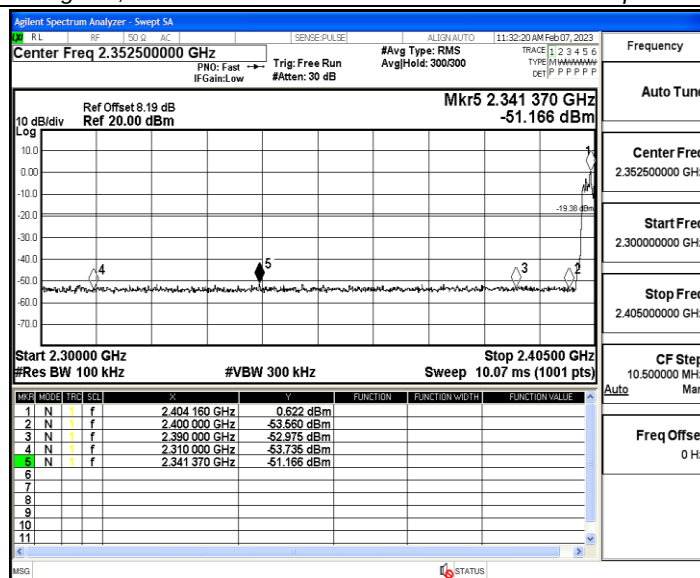
2DH5\_Ant1\_Low\_2402



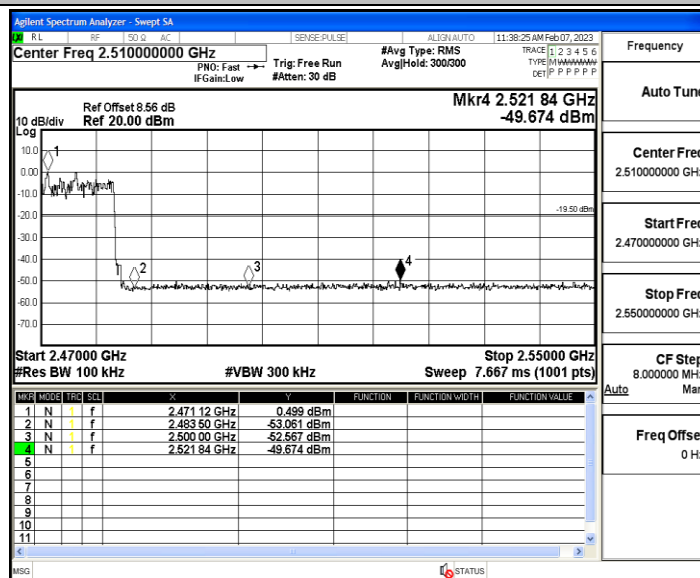
2DH5\_Ant1\_High\_2480



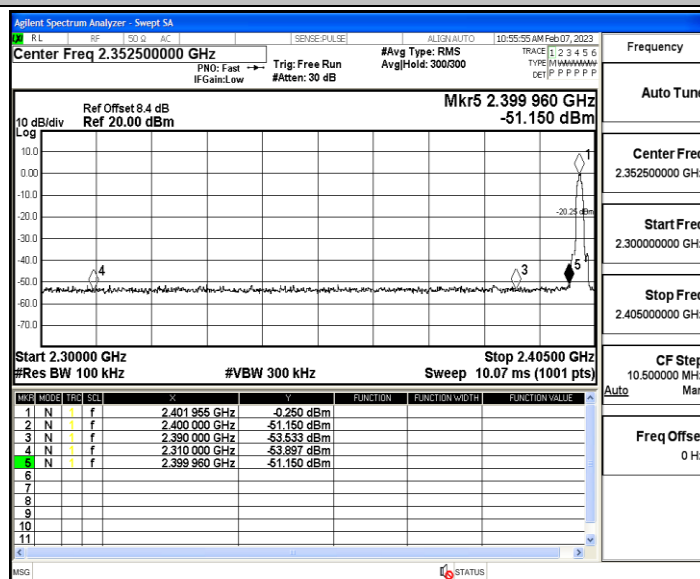
2DH5\_Ant1\_Low\_Hop\_2402



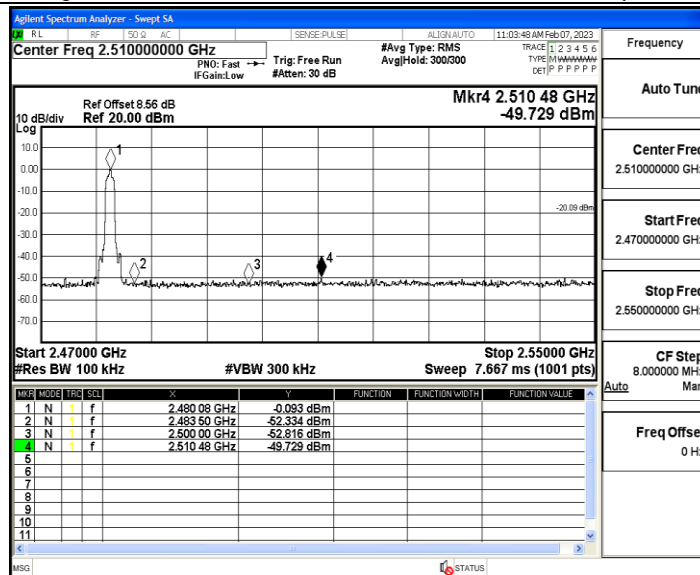
## 2DH5\_Ant1\_High\_Hop\_2480



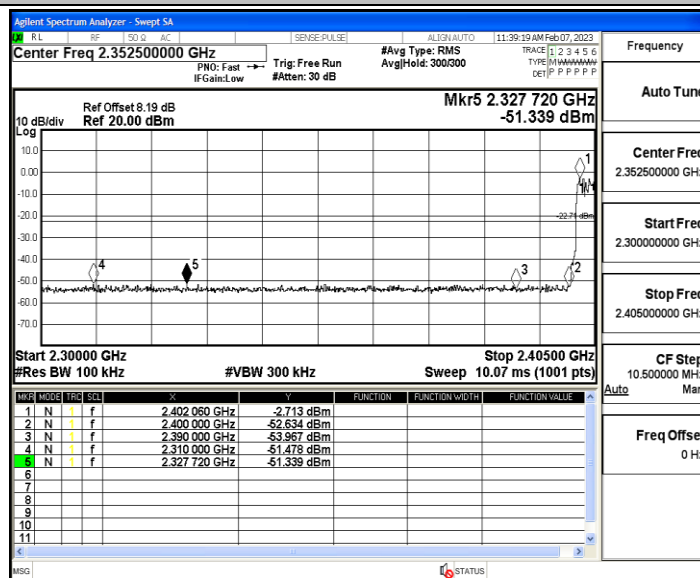
## 3DH5\_Ant1\_Low\_2402



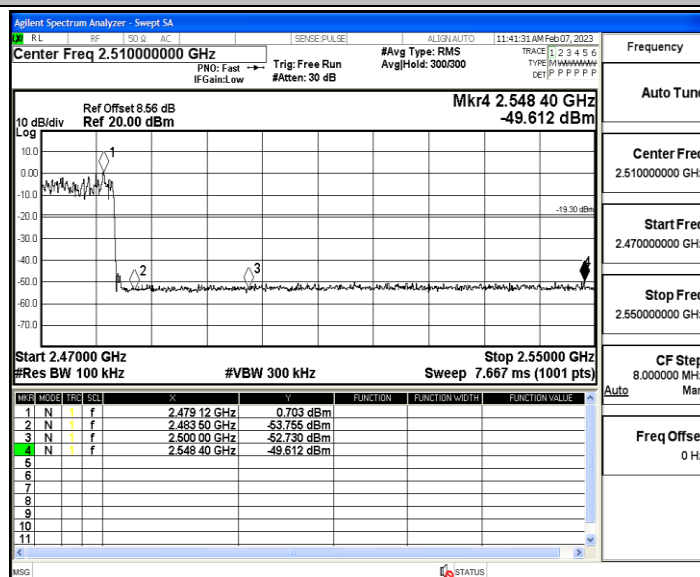
## 3DH5\_Ant1\_High\_2480



## 3DH5\_Ant1\_Low\_Hop\_2402



## 3DH5\_Ant1\_High\_Hop\_2480



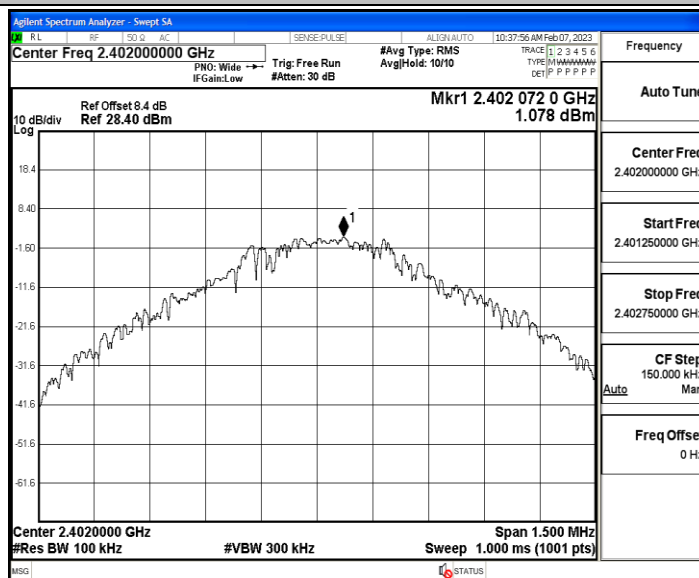
## Appendix H: Conducted Spurious Emission

### Test Result

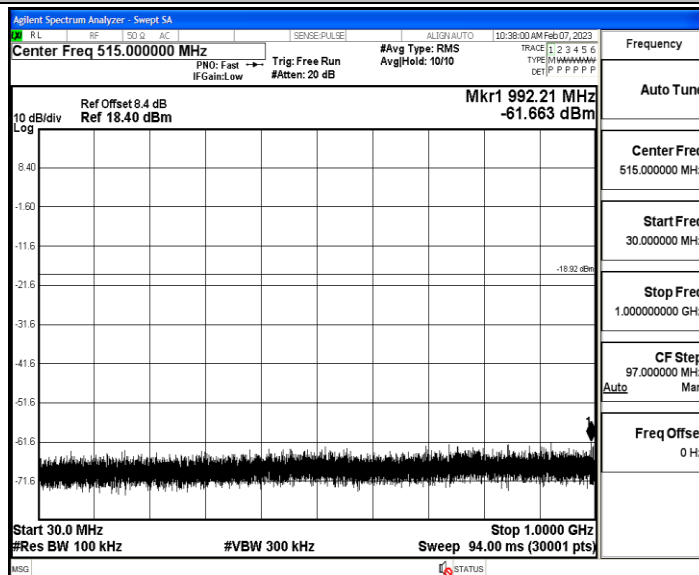
| TestMode | Antenna | Channel | FreqRange<br>[MHz] | RefLevel<br>[dBm] | Result<br>[dBm] | Limit<br>[dBm] | Verdict |
|----------|---------|---------|--------------------|-------------------|-----------------|----------------|---------|
| DH5      | Ant1    | 2402    | Reference          | 1.08              | 1.08            | ---            | PASS    |
|          |         |         | 30~1000            | 1.08              | -61.66          | ≤-18.92        | PASS    |
|          |         |         | 1000~26500         | 1.08              | -44.16          | ≤-18.92        | PASS    |
|          |         | 2441    | Reference          | 1.26              | 1.26            | ---            | PASS    |
|          |         |         | 30~1000            | 1.26              | -61.12          | ≤-18.74        | PASS    |
|          |         |         | 1000~26500         | 1.26              | -44.76          | ≤-18.74        | PASS    |
|          |         | 2480    | Reference          | 1.15              | 1.15            | ---            | PASS    |
|          |         |         | 30~1000            | 1.15              | -62.28          | ≤-18.85        | PASS    |
|          |         |         | 1000~26500         | 1.15              | -47.21          | ≤-18.85        | PASS    |
| 2DH5     | Ant1    | 2402    | Reference          | -1.53             | -1.53           | ---            | PASS    |
|          |         |         | 30~1000            | -1.53             | -61.78          | ≤-21.53        | PASS    |
|          |         |         | 1000~26500         | -1.53             | -47.67          | ≤-21.53        | PASS    |
|          |         | 2441    | Reference          | 1.11              | 1.11            | ---            | PASS    |
|          |         |         | 30~1000            | 1.11              | -61.04          | ≤-18.89        | PASS    |
|          |         |         | 1000~26500         | 1.11              | -48.37          | ≤-18.89        | PASS    |
|          |         | 2480    | Reference          | 0.40              | 0.40            | ---            | PASS    |
|          |         |         | 30~1000            | 0.40              | -61.88          | ≤-19.6         | PASS    |
|          |         |         | 1000~26500         | 0.40              | -48.46          | ≤-19.6         | PASS    |
| 3DH5     | Ant1    | 2402    | Reference          | -3.36             | -3.36           | ---            | PASS    |
|          |         |         | 30~1000            | -3.36             | -52.48          | ≤-23.36        | PASS    |
|          |         |         | 1000~26500         | -3.36             | -46.98          | ≤-23.36        | PASS    |
|          |         | 2441    | Reference          | 1.00              | 1.00            | ---            | PASS    |
|          |         |         | 30~1000            | 1.00              | -54.97          | ≤-19           | PASS    |
|          |         |         | 1000~26500         | 1.00              | -49.43          | ≤-19           | PASS    |
|          |         | 2480    | Reference          | -1.78             | -1.78           | ---            | PASS    |
|          |         |         | 30~1000            | -1.78             | -54.64          | ≤-21.78        | PASS    |
|          |         |         | 1000~26500         | -1.78             | -48.36          | ≤-21.78        | PASS    |

## Test Graphs

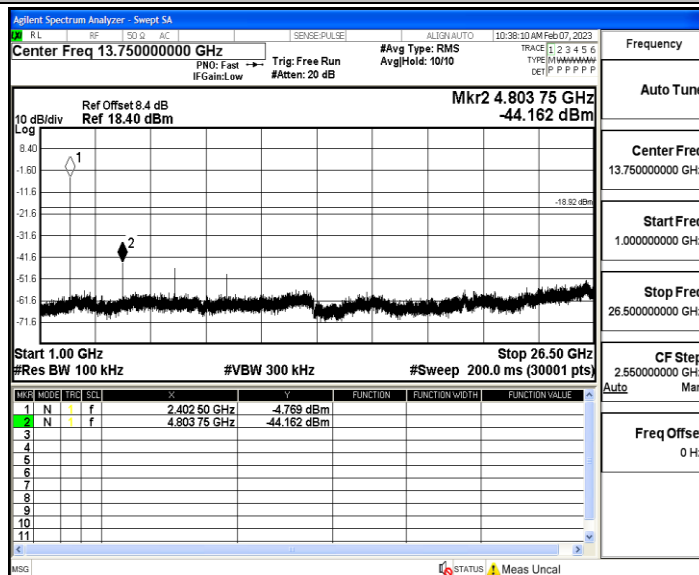
DH5\_Ant1\_2402\_0~Reference



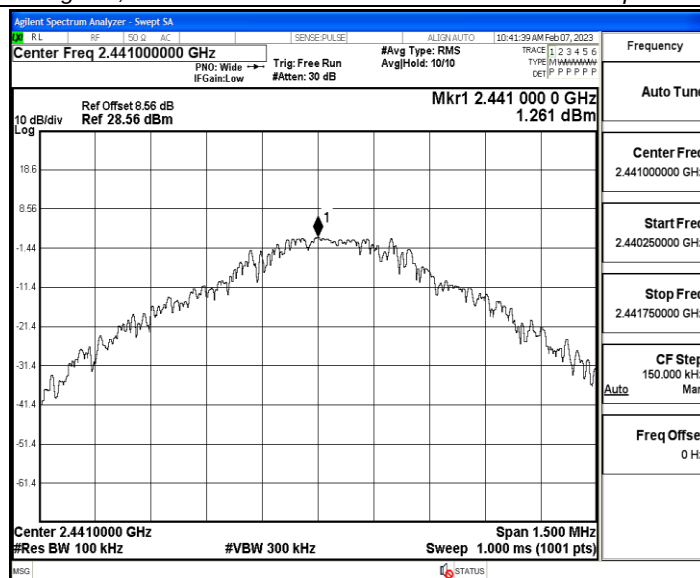
DH5\_Ant1\_2402\_30~1000



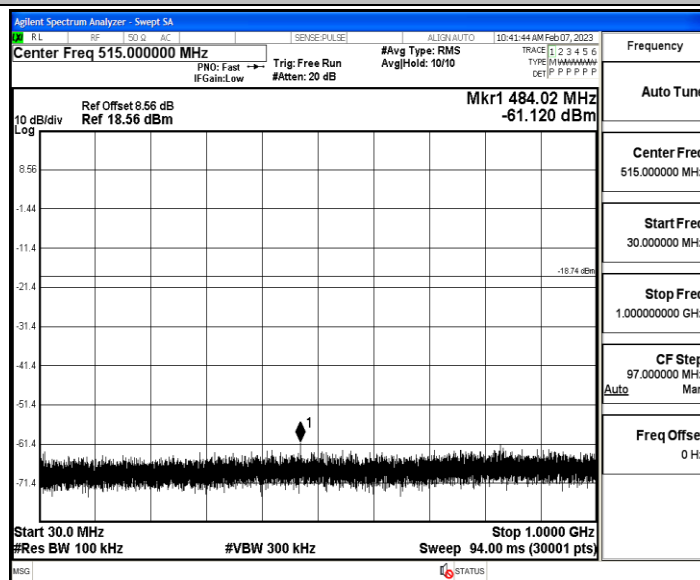
DH5\_Ant1\_2402\_1000~26500



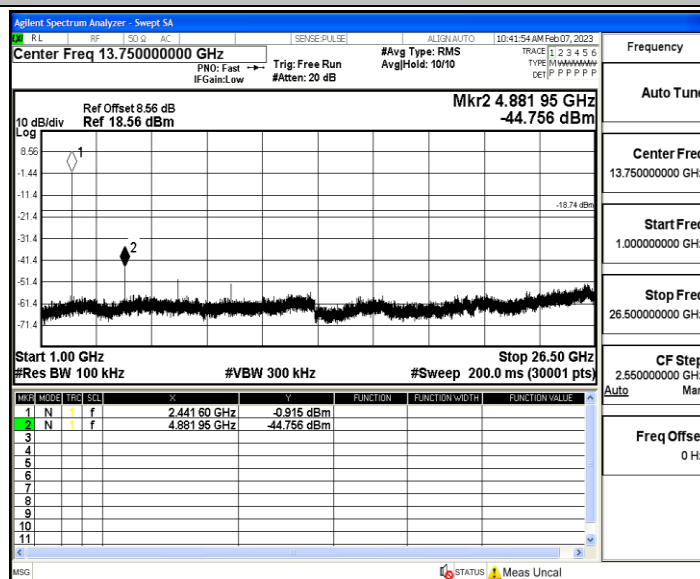
DH5\_Ant1\_2441\_0~Reference



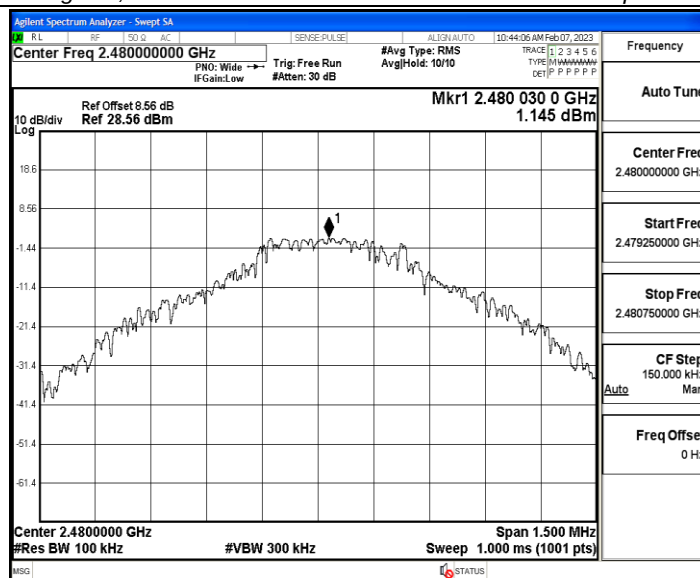
DH5\_Ant1\_2441\_30~1000



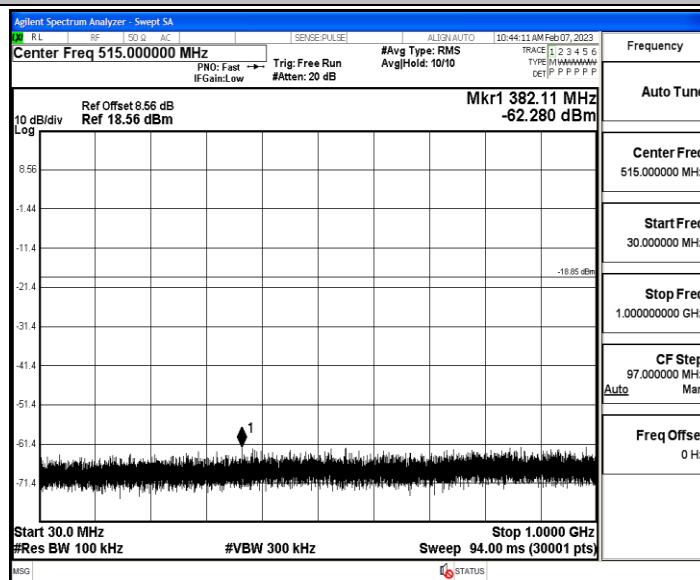
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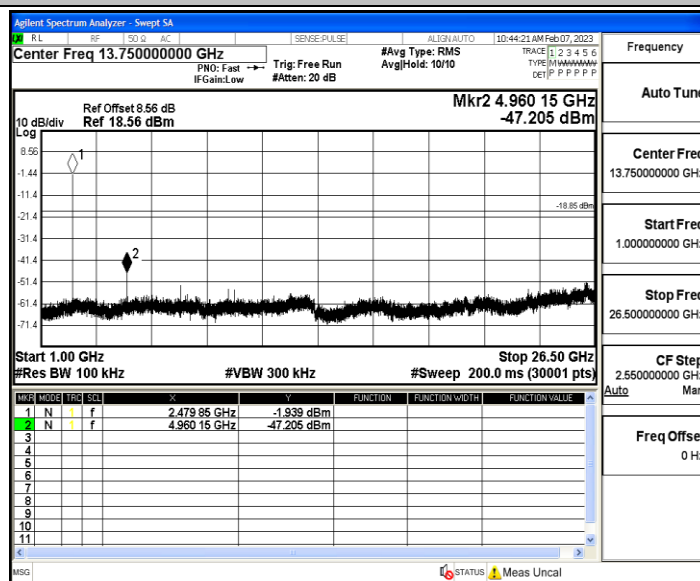
DH5\_Ant1\_2480\_0~Reference



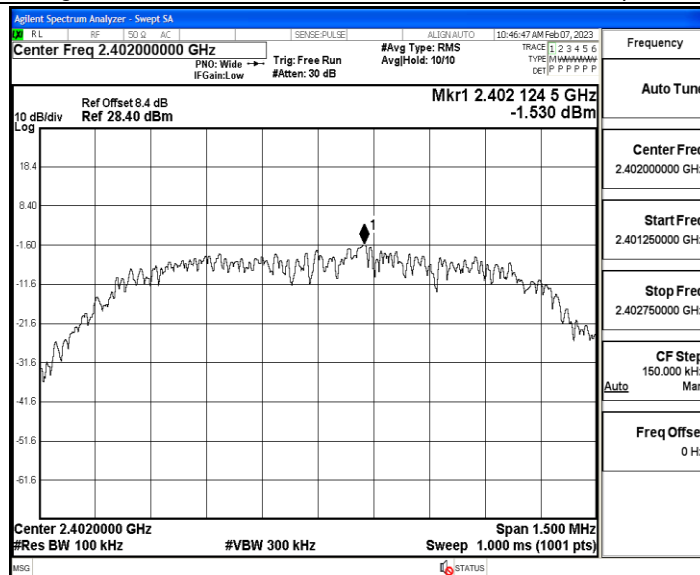
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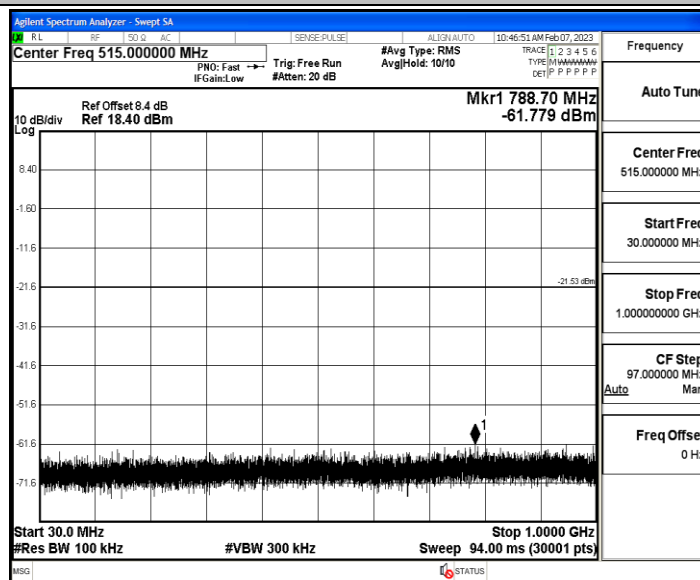
DH5\_Ant1\_2480\_1000~26500



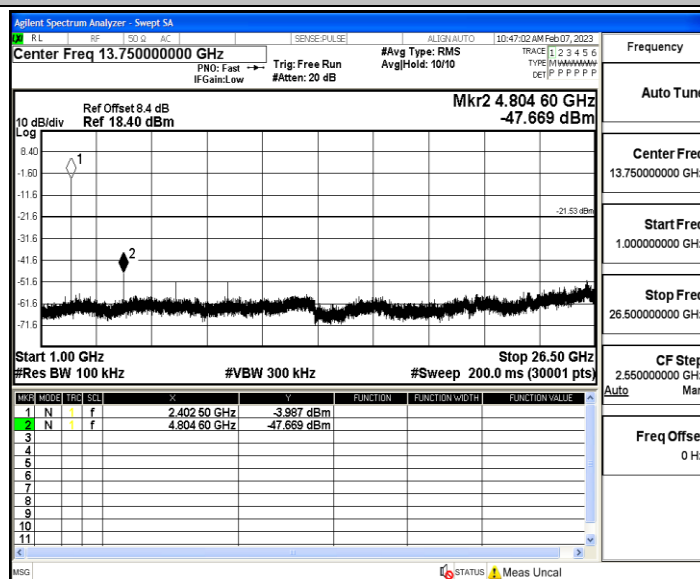
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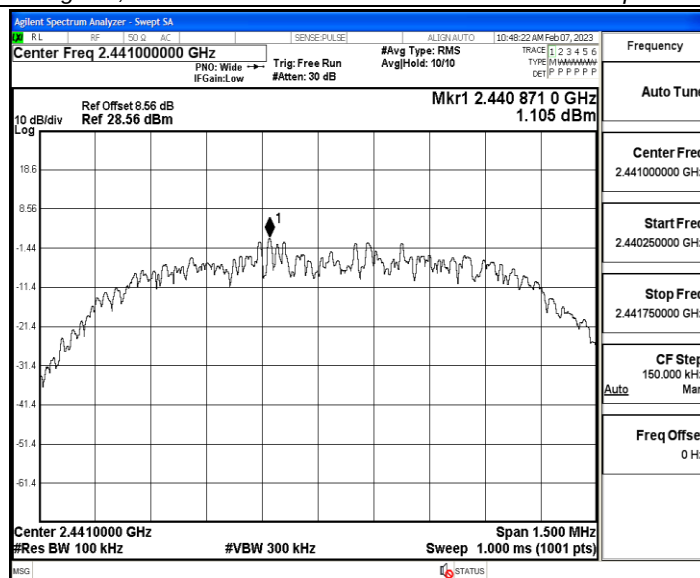
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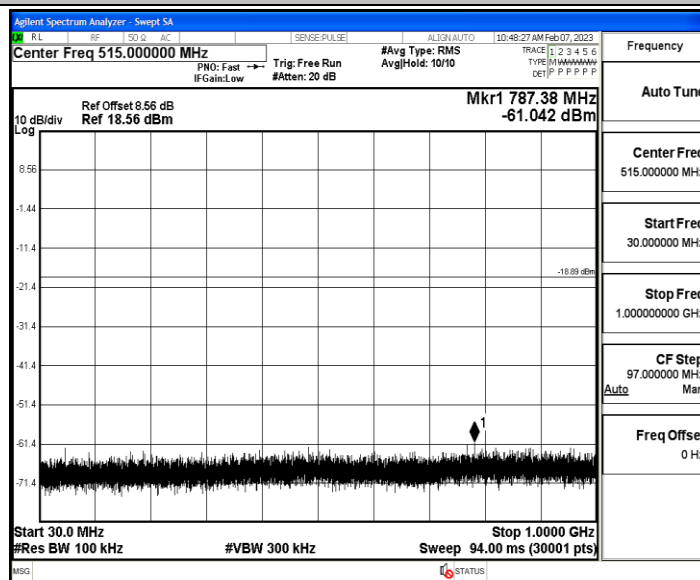
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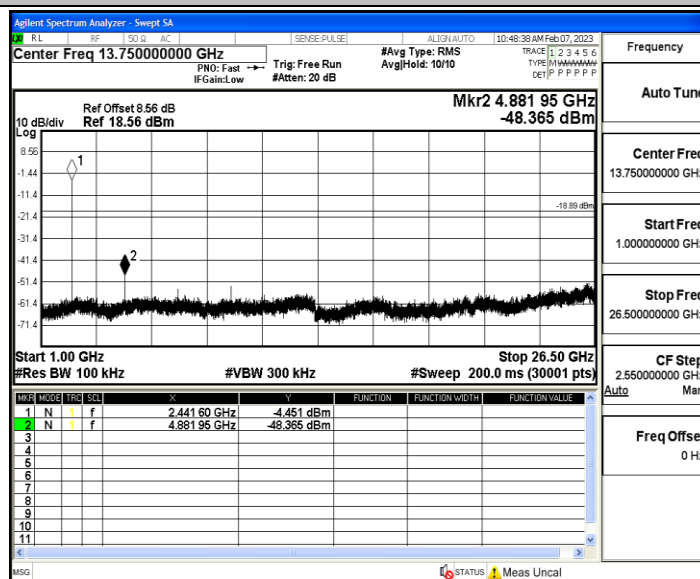
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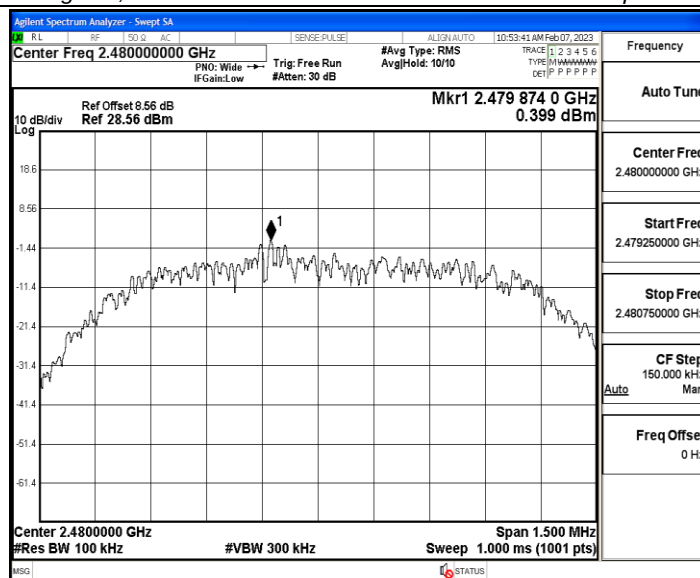
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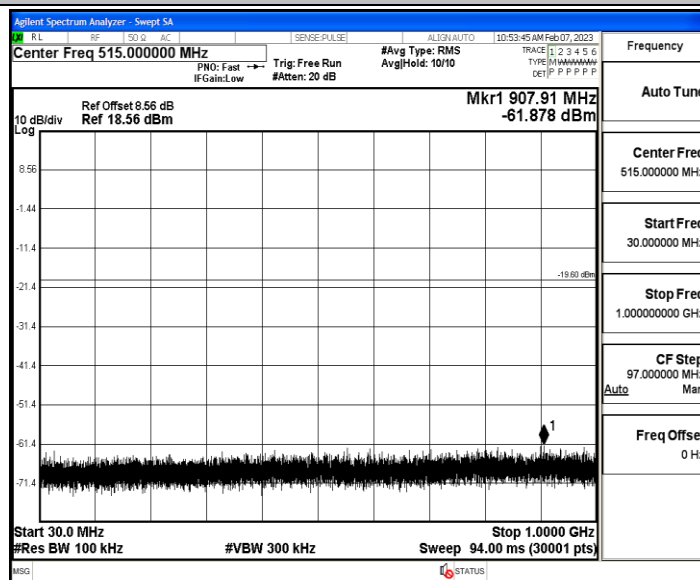
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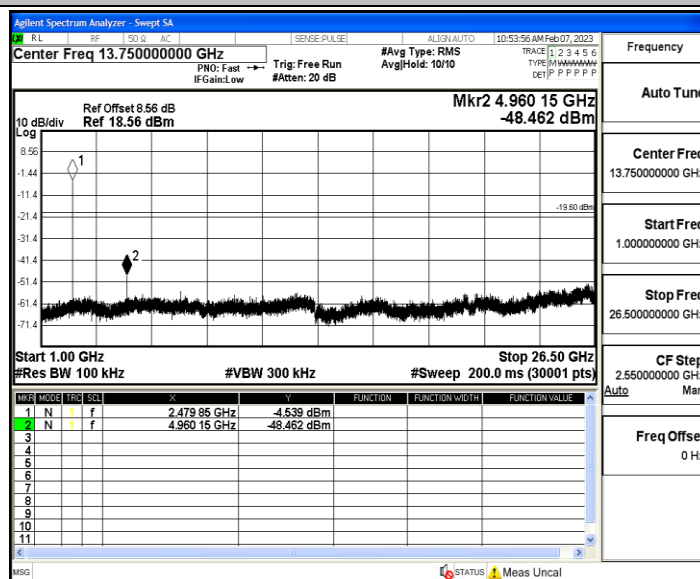
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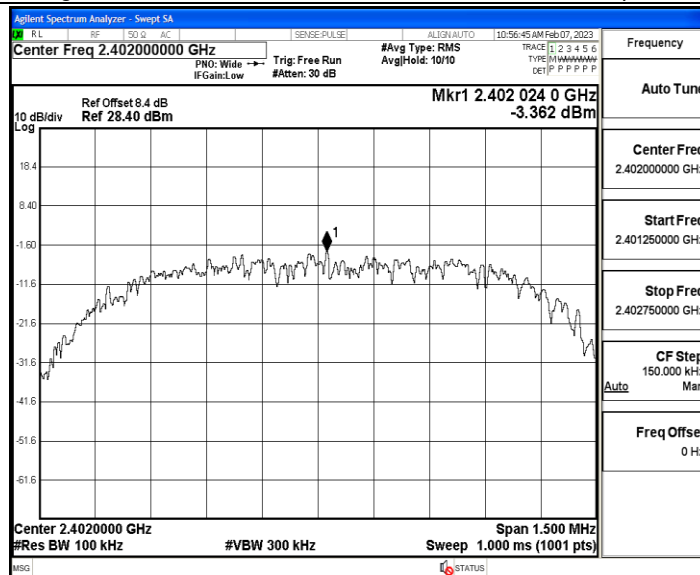
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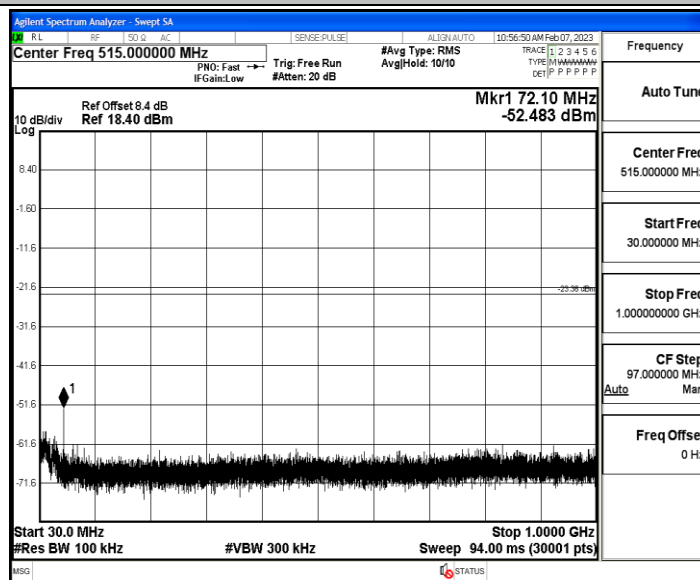
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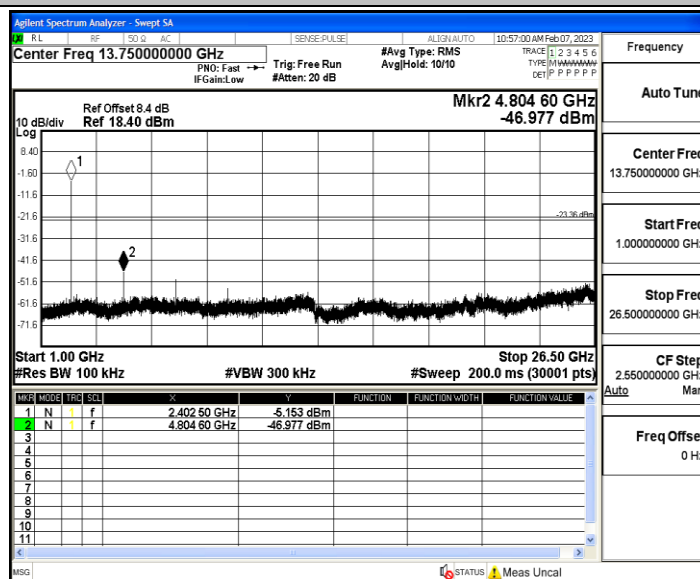
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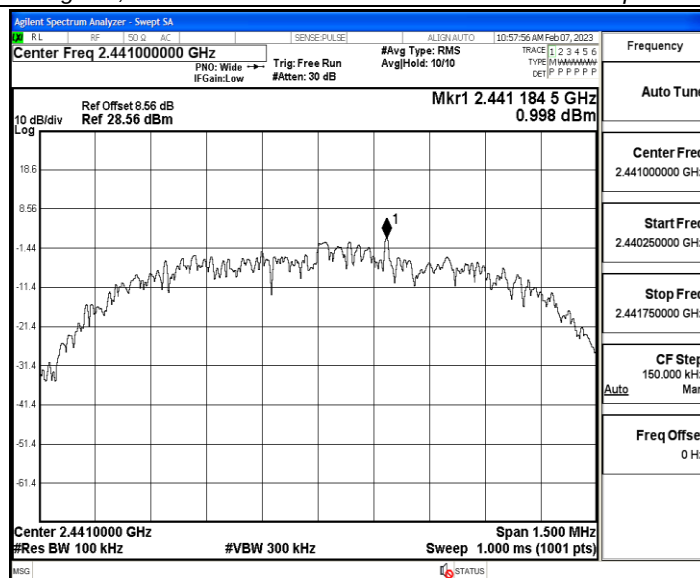
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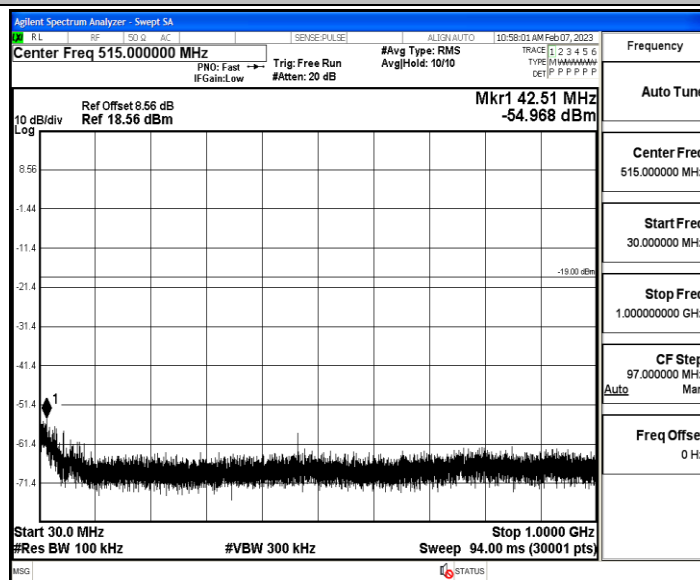
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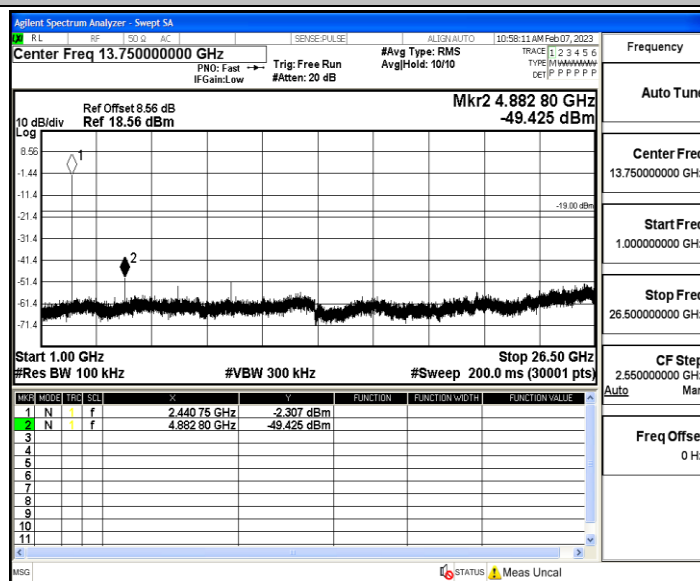
3DH5\_Ant1\_2441\_0~Reference



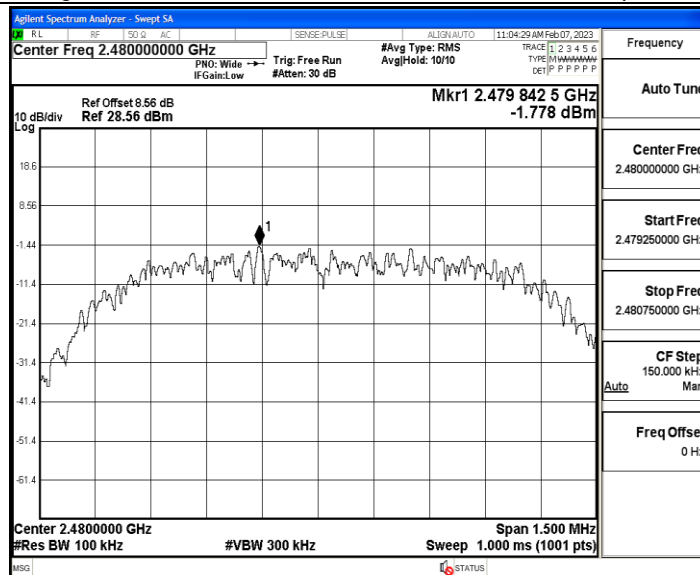
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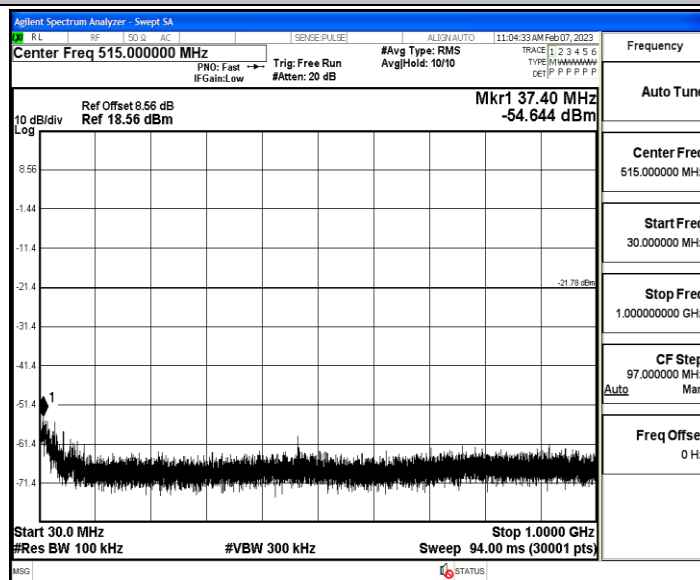
3DH5\_Ant1\_2441\_1000~26500



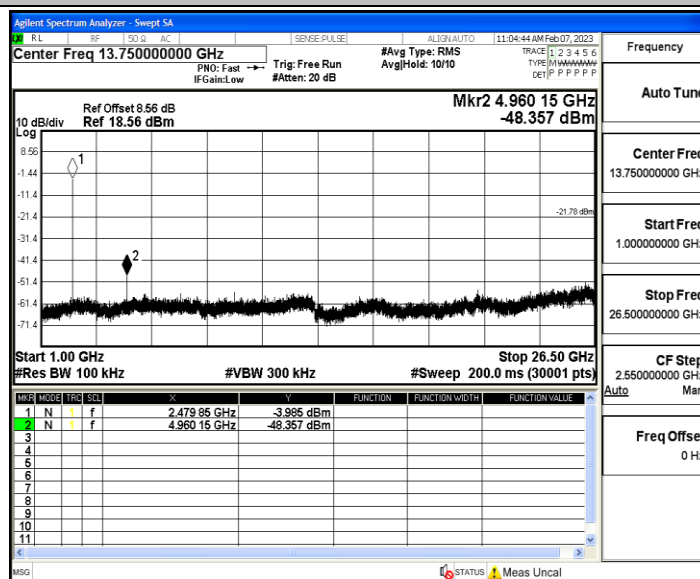
3DH5\_Ant1\_2480\_0~Reference



3DH5\_Ant1\_2480\_30~1000



3DH5\_Ant1\_2480\_1000~26500



## Appendix I: Duty Cycle

### Test Result

| TestMode | Antenna | Channel | Transmission<br>Duration [ms] | Transmission<br>Period [ms] | Duty Cycle [%] | 1/T[kHz] |
|----------|---------|---------|-------------------------------|-----------------------------|----------------|----------|
| DH5      | Ant1    | 2402    | 2.90                          | 3.75                        | 77.33          | 0.34     |
|          |         | 2441    | 2.90                          | 3.75                        | 77.33          | 0.34     |
|          |         | 2480    | 2.90                          | 3.75                        | 77.33          | 0.34     |
| 2DH5     | Ant1    | 2402    | 2.91                          | 3.75                        | 77.60          | 0.34     |
|          |         | 2441    | 2.91                          | 3.75                        | 77.60          | 0.34     |
|          |         | 2480    | 2.91                          | 3.75                        | 77.60          | 0.34     |
| 3DH5     | Ant1    | 2402    | 2.91                          | 3.75                        | 77.60          | 0.34     |
|          |         | 2441    | 2.90                          | 3.74                        | 77.54          | 0.34     |
|          |         | 2480    | 2.90                          | 3.74                        | 77.54          | 0.34     |