

## Appendix A

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

Product Name: True Wireless Earbuds

Trade Mark: HEADRUSH

Test Model: 8093126

FCC ID: ZHW-8093126

### Environmental Conditions

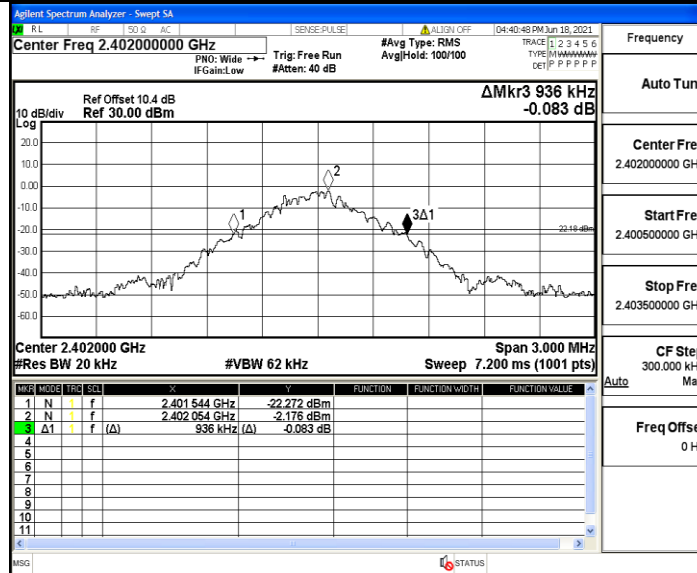
|                    |           |
|--------------------|-----------|
| Temperature:       | 22.8° C   |
| Relative Humidity: | 56%       |
| ATM Pressure:      | 100.0 kPa |
| Test Engineer:     | Nancy Li  |
| Supervised by:     | Hugo Chen |

#### A.1 20 dB Bandwidth

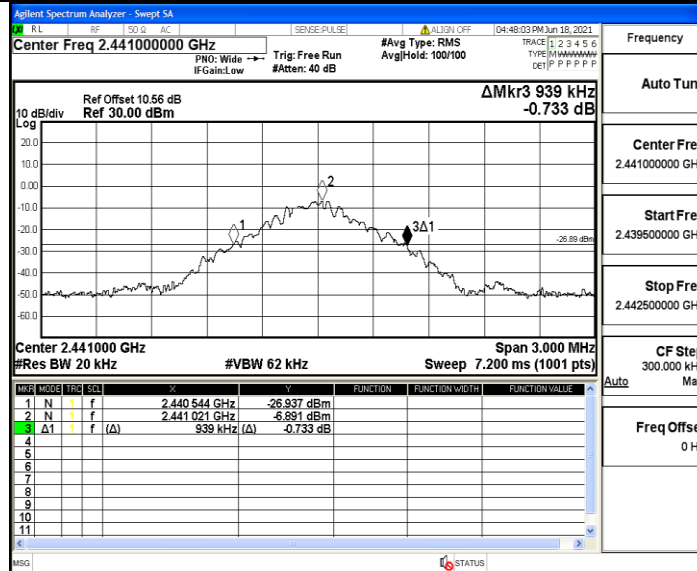
| TestMode | Antenna | Channel | 20db EBW[MHz] | FL[MHz]  | FH[MHz]  | Limit[MHz] | Verdict |
|----------|---------|---------|---------------|----------|----------|------------|---------|
| DH5      | Ant1    | 2402    | 0.936         | 2401.544 | 2402.480 | ---        | PASS    |
|          |         | 2441    | 0.939         | 2440.544 | 2441.483 | ---        | PASS    |
|          |         | 2480    | 0.945         | 2479.532 | 2480.477 | ---        | PASS    |
| 2DH5     | Ant1    | 2402    | 1.293         | 2401.361 | 2402.654 | ---        | PASS    |
|          |         | 2441    | 1.308         | 2440.340 | 2441.648 | ---        | PASS    |
|          |         | 2480    | 1.314         | 2479.337 | 2480.651 | ---        | PASS    |
| 3DH5     | Ant1    | 2402    | 1.308         | 2401.343 | 2402.651 | ---        | PASS    |
|          |         | 2441    | 1.296         | 2440.346 | 2441.642 | ---        | PASS    |
|          |         | 2480    | 1.281         | 2479.346 | 2480.627 | ---        | PASS    |

## Test Graph

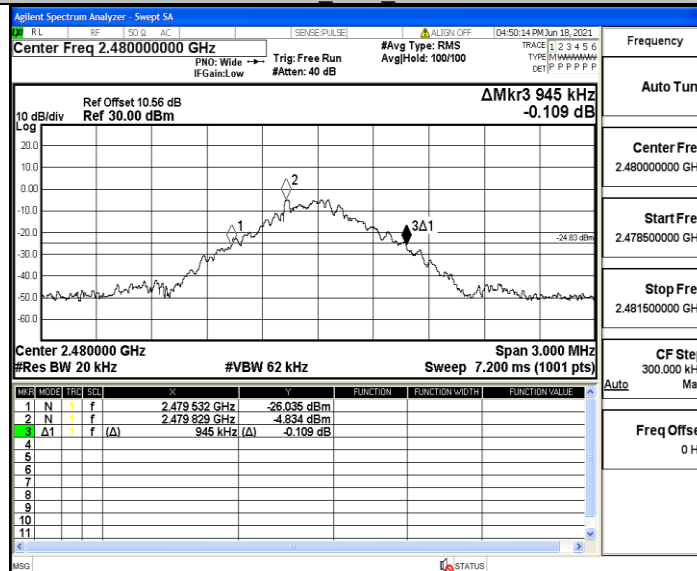
DH5\_Ant1\_2402



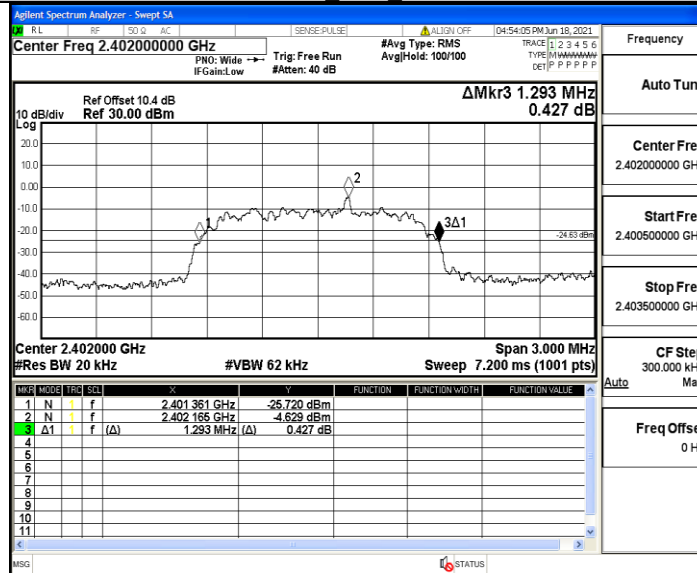
DH5\_Ant1\_2441



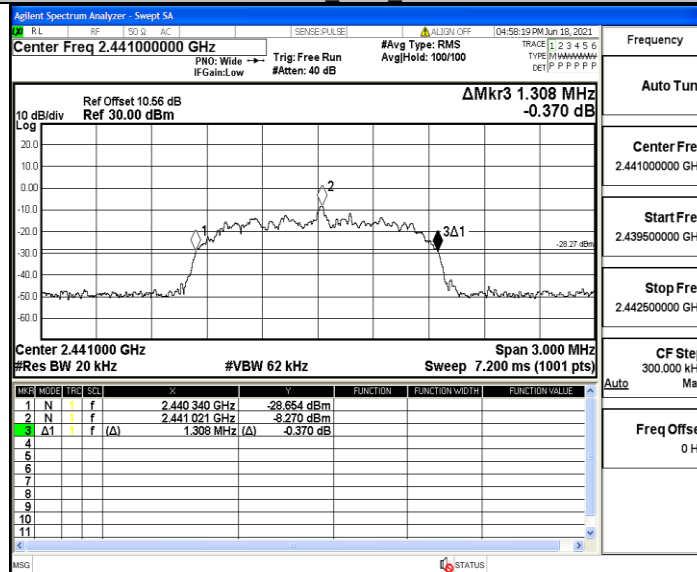
DH5\_Ant1\_2480



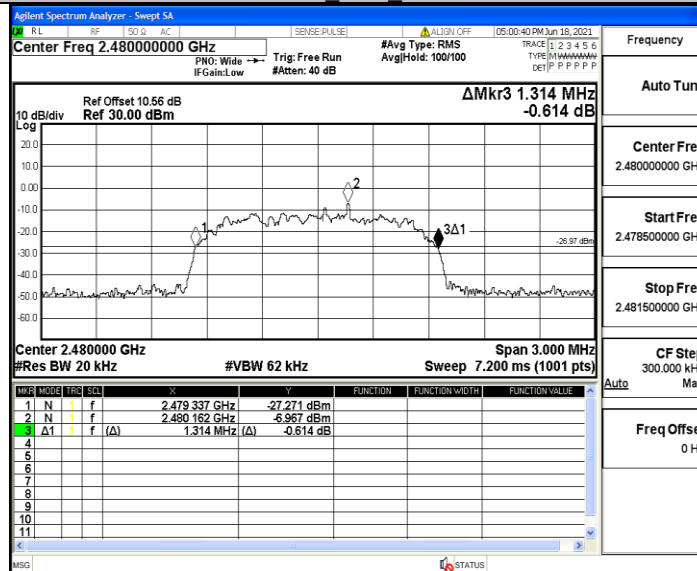
## 2DH5\_Ant1\_2402



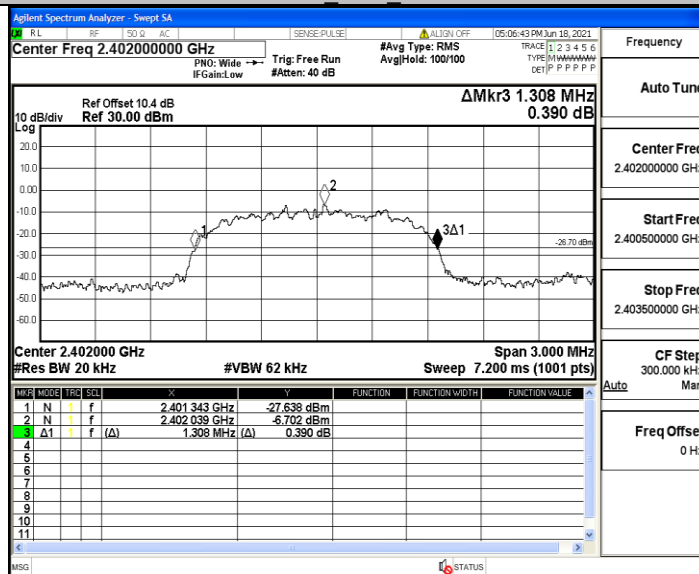
## 2DH5\_Ant1\_2441



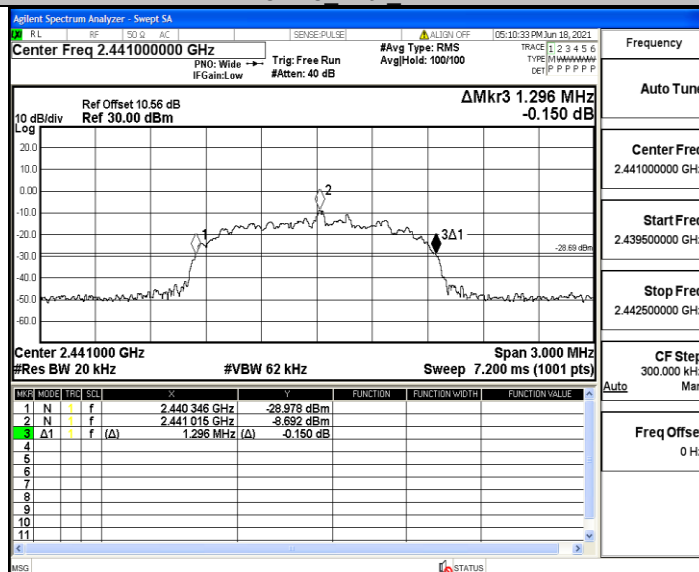
## 2DH5\_Ant1\_2480



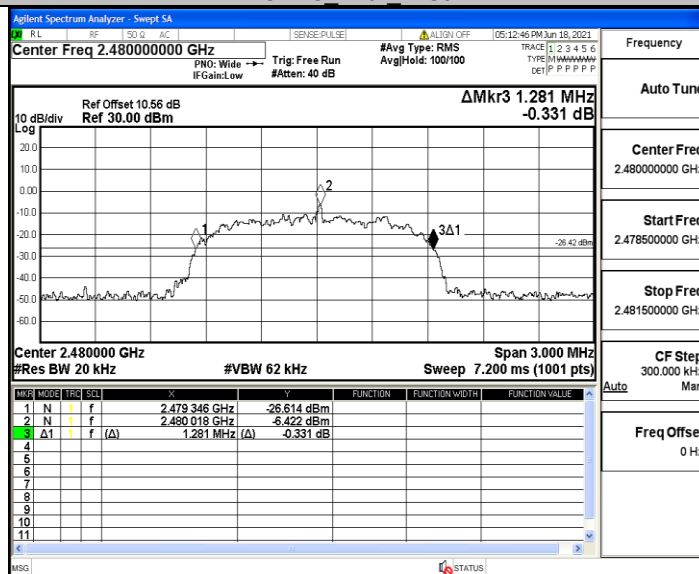
## 3DH5\_Ant1\_2402



## 3DH5\_Ant1\_2441



## 3DH5\_Ant1\_2480

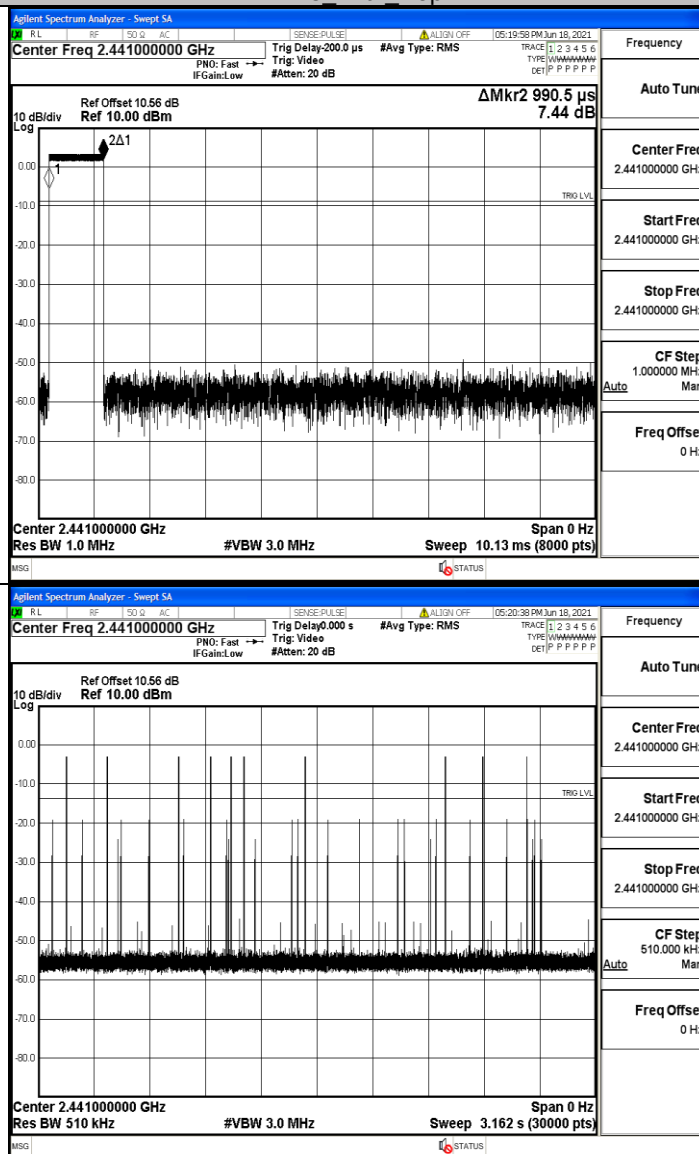


**A.2 Dwell Time**

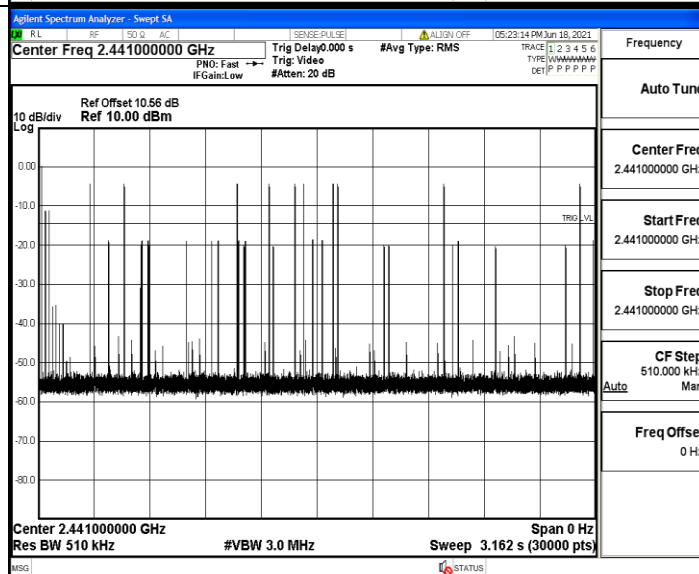
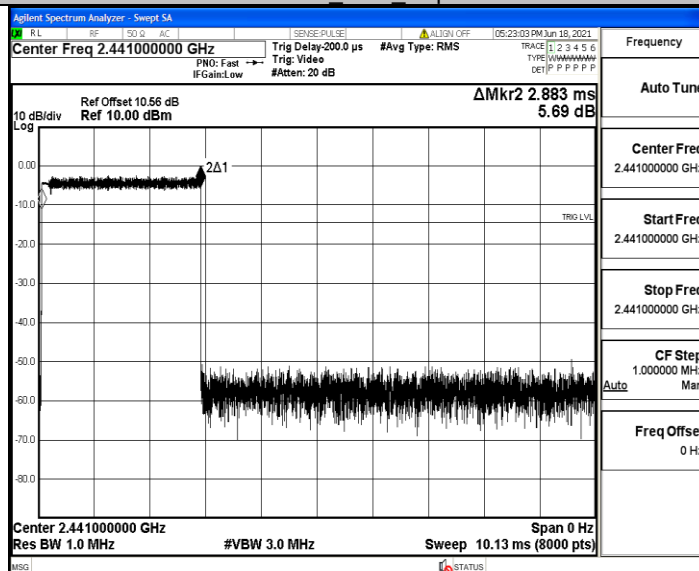
| TestMode | Antenna | Channel | BurstWidth<br>[ms] | TotalHops<br>[Num] | Result[s] | Limit[s]   | Verdict |
|----------|---------|---------|--------------------|--------------------|-----------|------------|---------|
| DH5      | Ant1    | Hop     | 0.99               | 110                | 0.109     | $\leq 0.4$ | PASS    |
| 2DH5     | Ant1    | Hop     | 2.88               | 120                | 0.346     | $\leq 0.4$ | PASS    |
| 3DH5     | Ant1    | Hop     | 0.99               | 160                | 0.158     | $\leq 0.4$ | PASS    |

## Test Graph

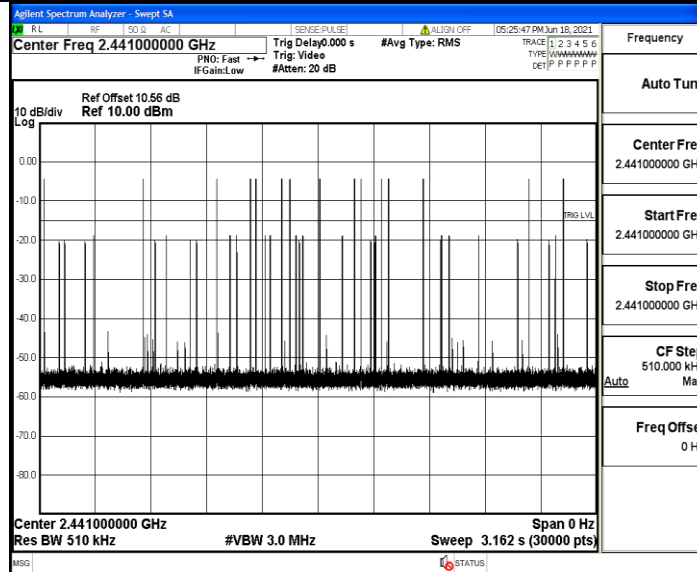
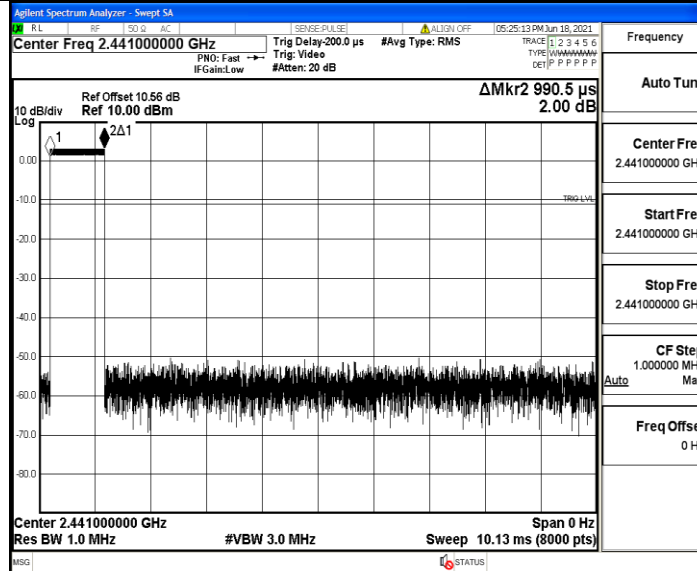
## DH5\_Ant1\_Hop



## 2DH5\_Ant1\_Hop



## 3DH5\_Ant1\_Hop



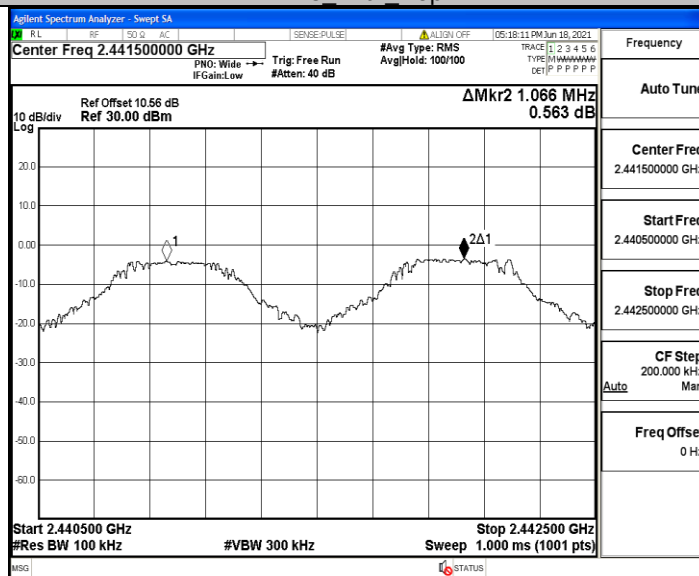


### A.3 Carrier Frequency Separation

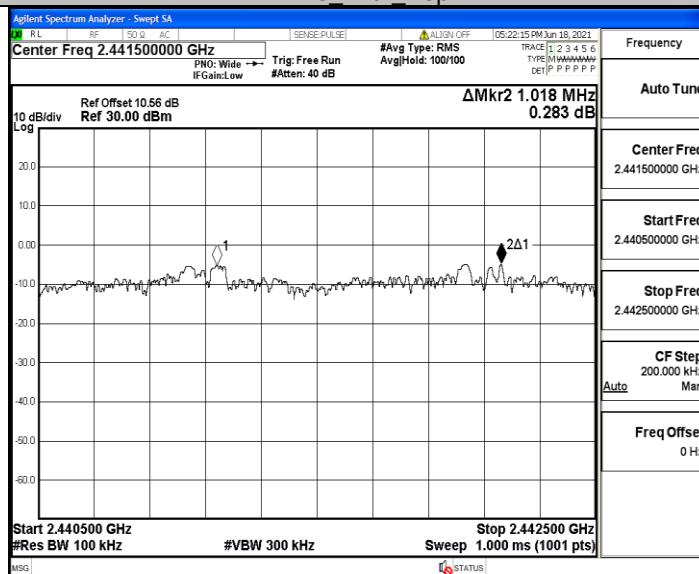
| TestMode | Antenna | Channel | Result[MHz] | Limit[MHz]   | Verdict |
|----------|---------|---------|-------------|--------------|---------|
| DH5      | Ant1    | Hop     | 1.066       | $\geq 0.945$ | PASS    |
| 2DH5     | Ant1    | Hop     | 1.018       | $\geq 0.876$ | PASS    |
| 3DH5     | Ant1    | Hop     | 0.95        | $\geq 0.872$ | PASS    |

## Test Graph

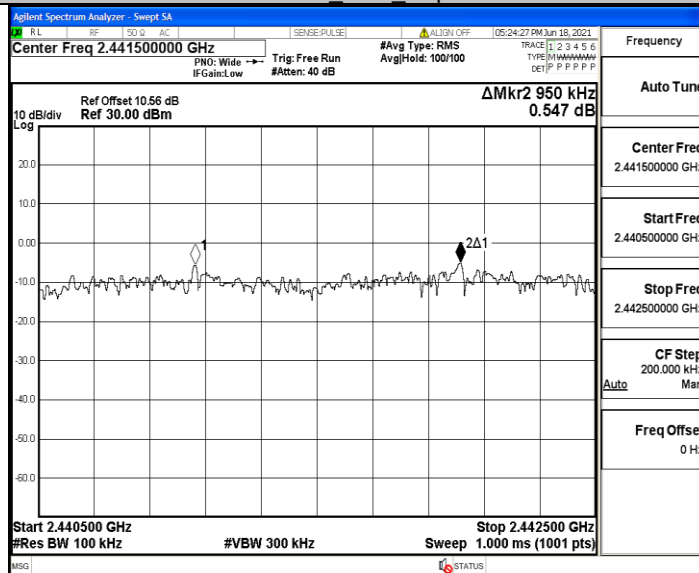
DH5\_Ant1\_Hop



2DH5\_Ant1\_Hop



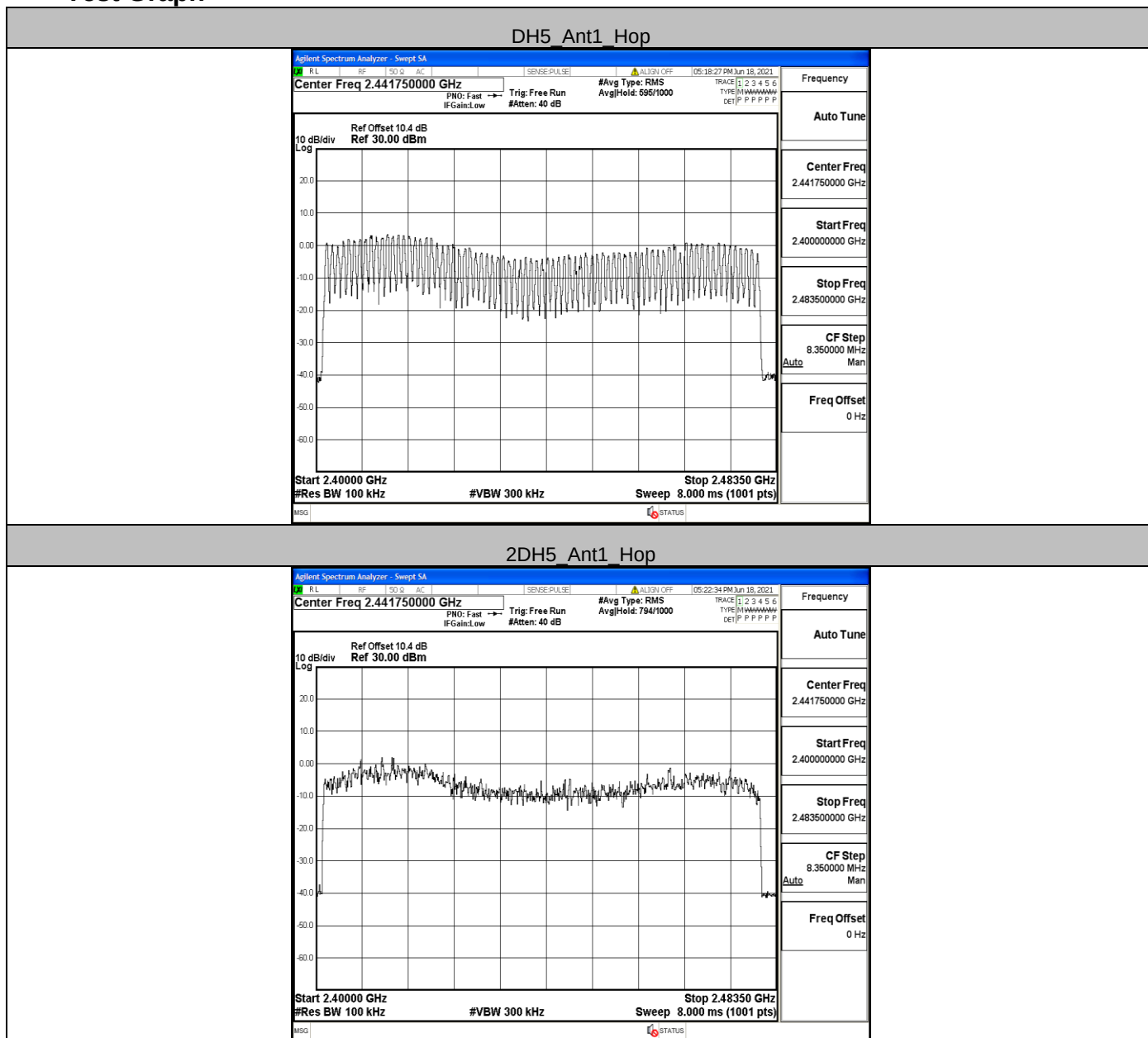
3DH5\_Ant1\_Hop

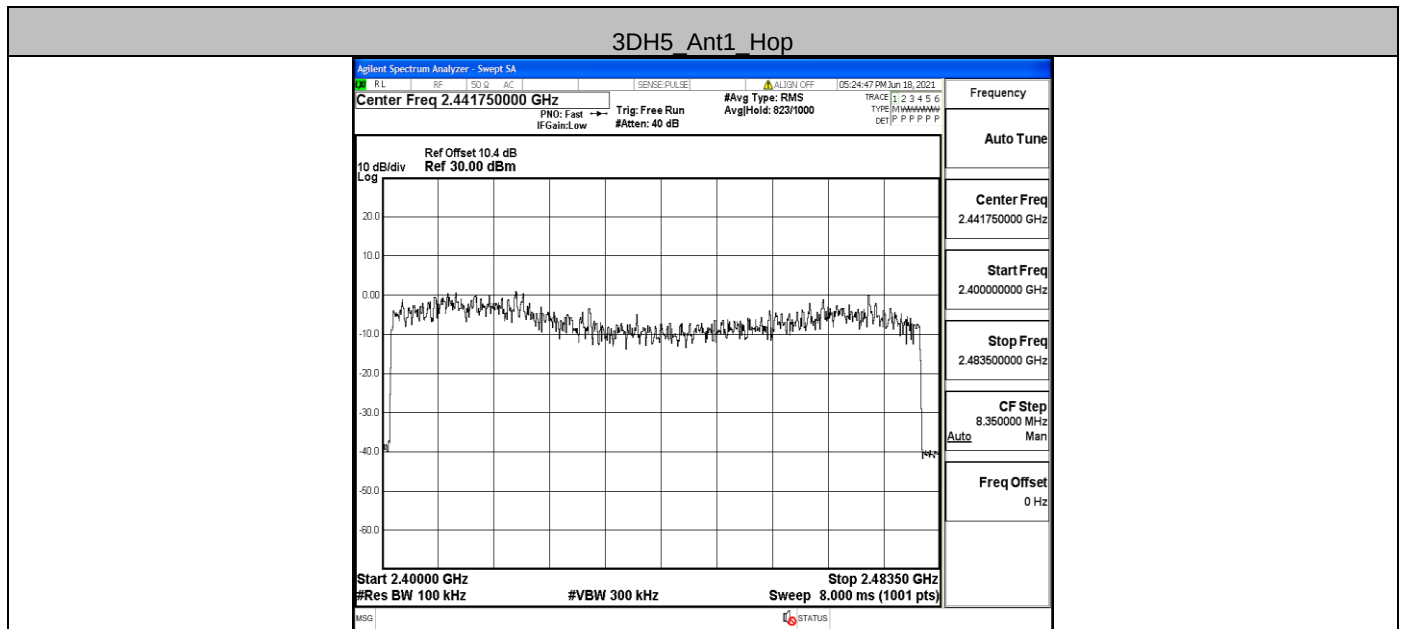


## A.4 Hopping Channel Number

| 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 Graph



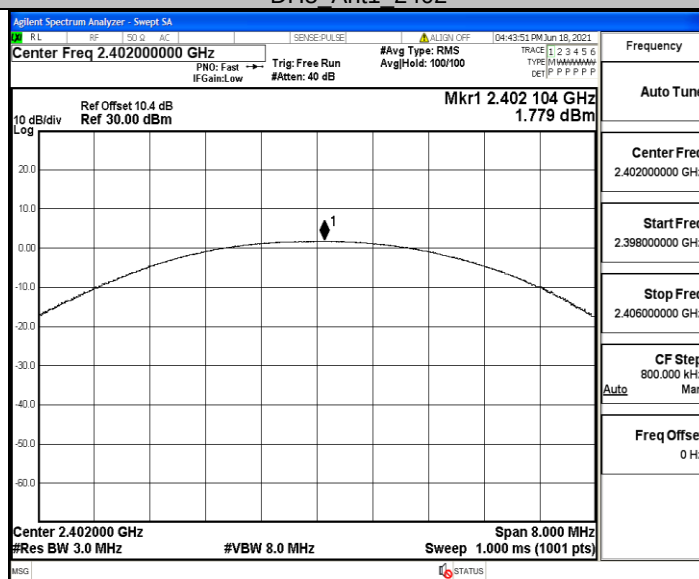


## A.5 Conducted Peak Output Power

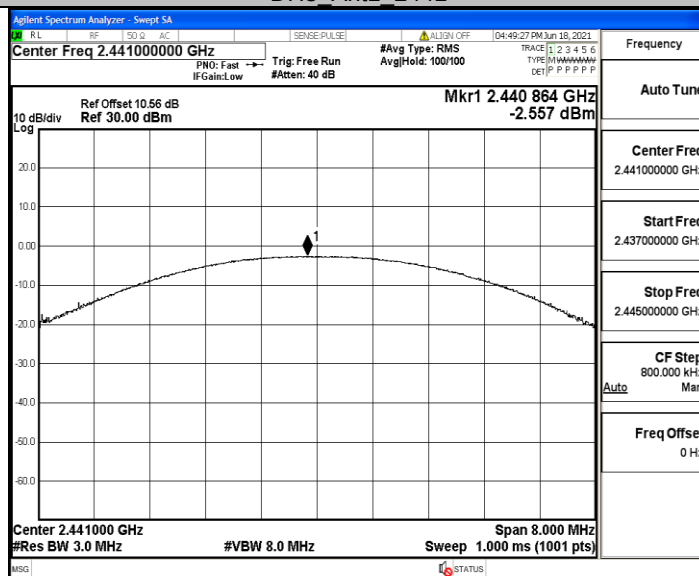
| TestMode | Antenna | Channel | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|---------|-------------|------------|---------|
| DH5      | Ant1    | 2402    | 1.78        | <=20.97    | PASS    |
|          |         | 2441    | -2.56       | <=20.97    | PASS    |
|          |         | 2480    | -0.72       | <=20.97    | PASS    |
| 2DH5     | Ant1    | 2402    | 1.86        | <=20.97    | PASS    |
|          |         | 2441    | -1.96       | <=20.97    | PASS    |
|          |         | 2480    | 0.00        | <=20.97    | PASS    |
| 3DH5     | Ant1    | 2402    | 2.16        | <=20.97    | PASS    |
|          |         | 2441    | -1.35       | <=20.97    | PASS    |
|          |         | 2480    | 0.40        | <=20.97    | PASS    |

## Test Graph

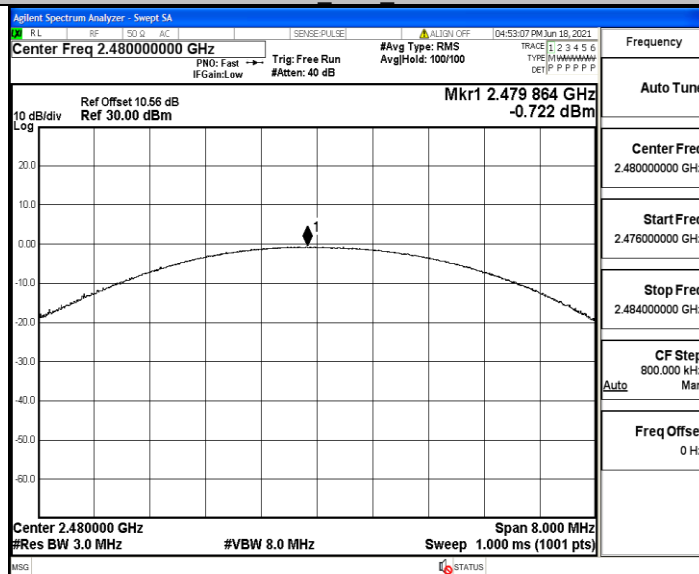
DH5 Ant1 2402



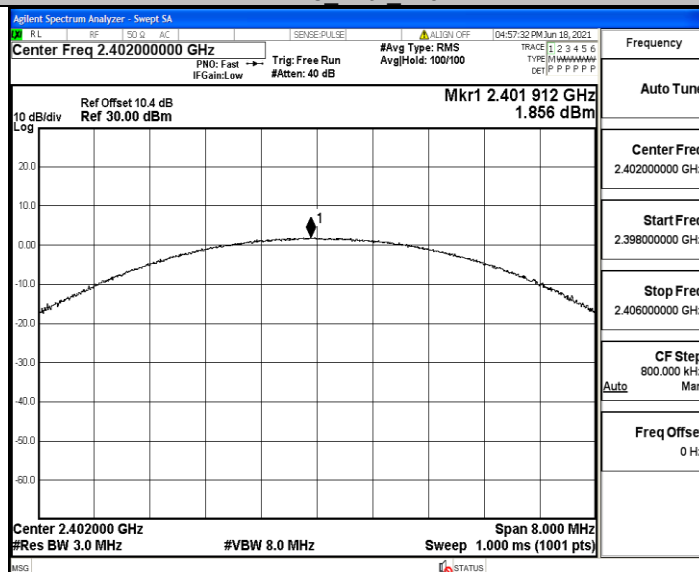
DH5 Ant1 2441



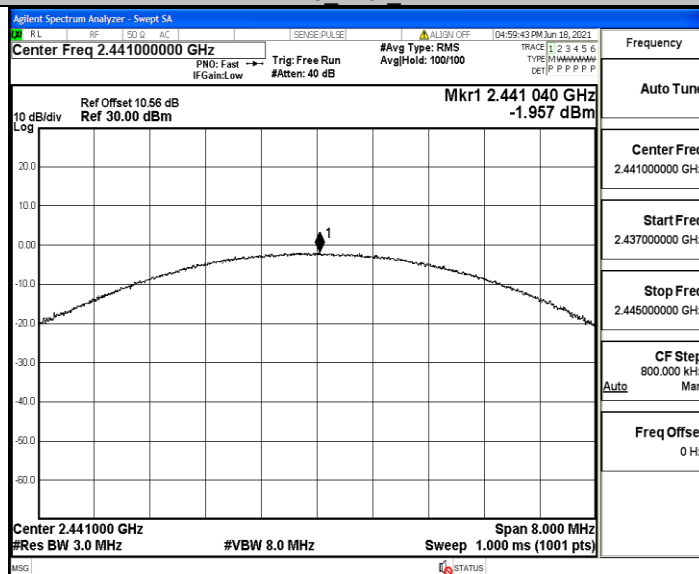
## DH5 Ant1\_2480



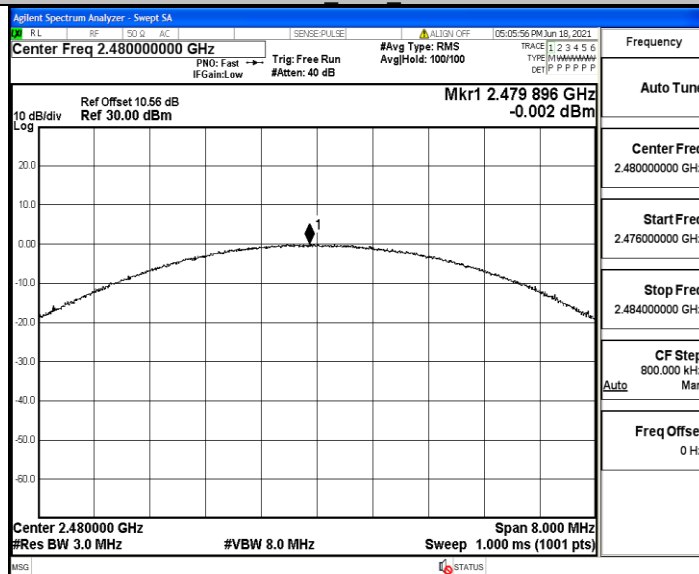
## 2DH5 Ant1\_2402



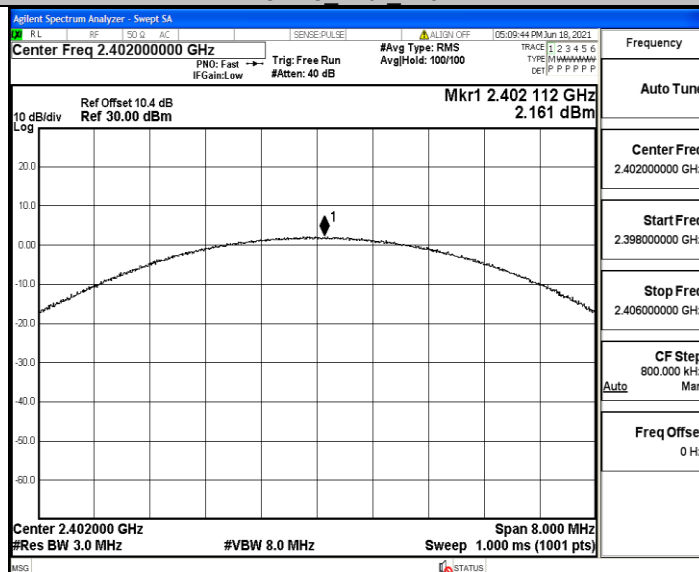
## 2DH5 Ant1\_2441



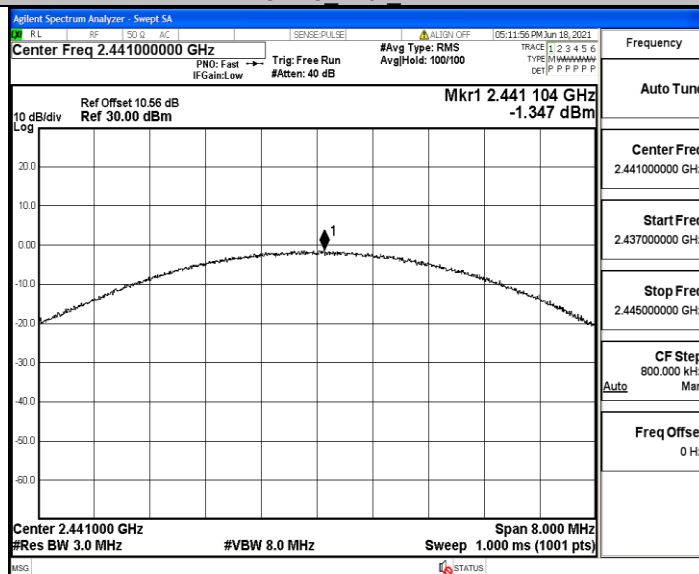
## 2DH5 Ant1 2480

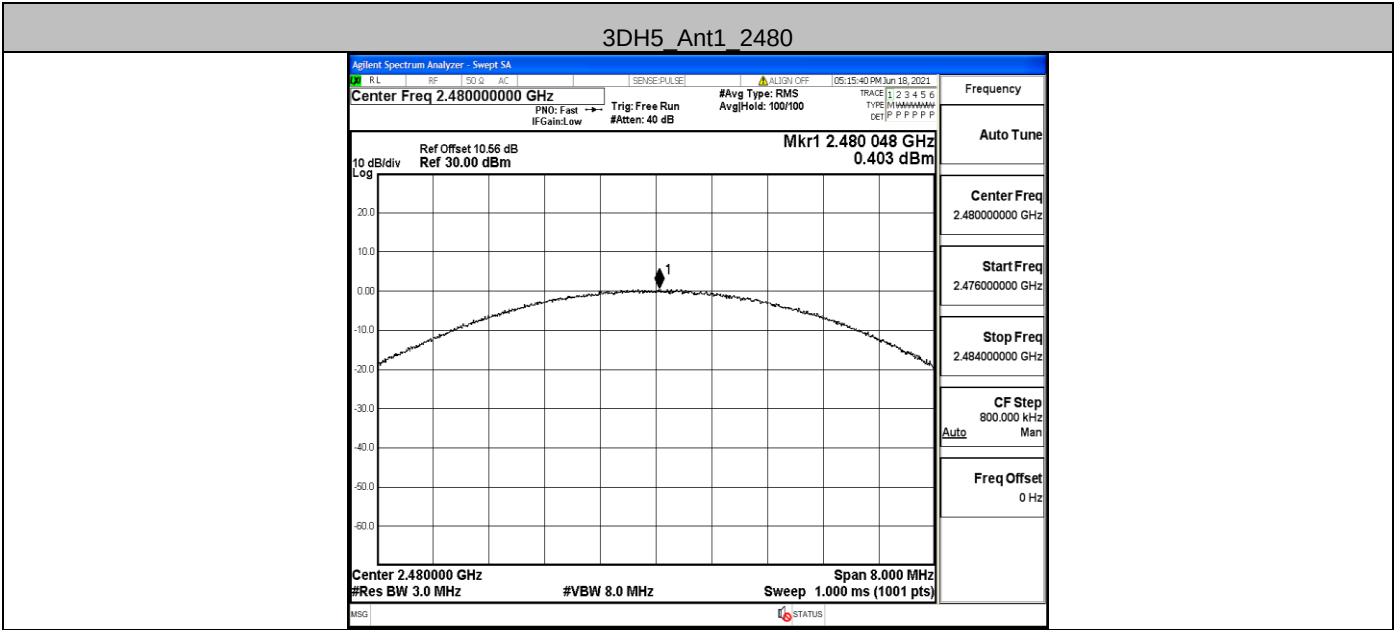


## 3DH5 Ant1 2402



## 3DH5 Ant1 2441





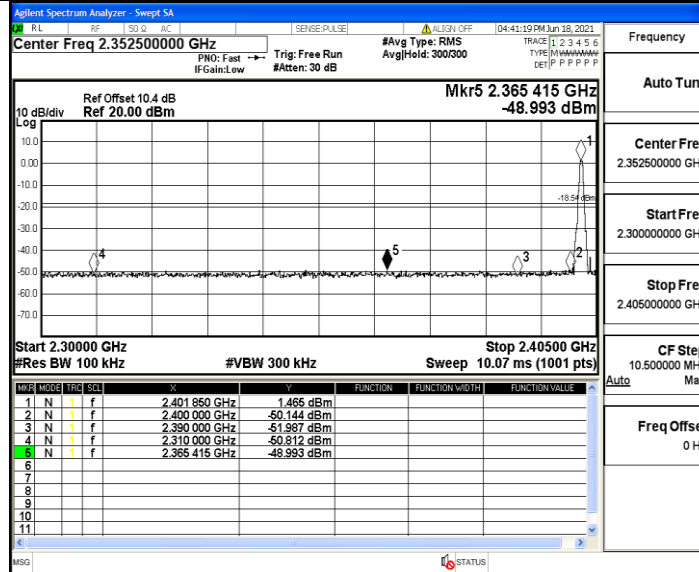


**A.6 Band-edge for RF Conducted Emissions**

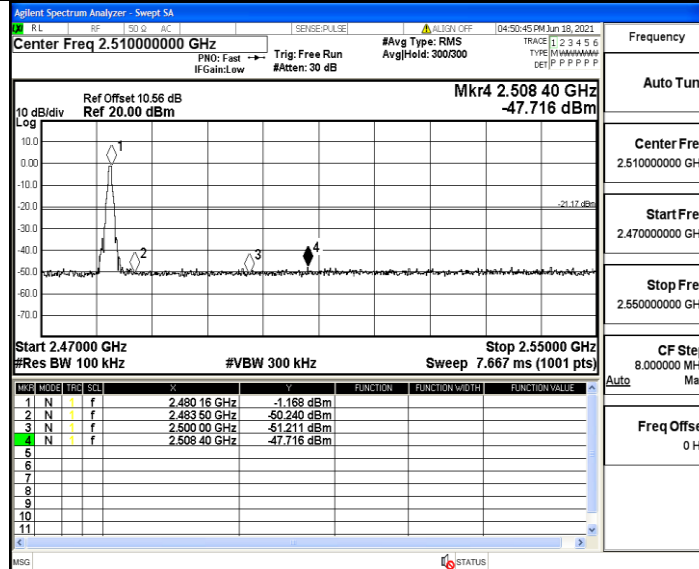
| TestMode | Antenna | ChName | Channel  | RefLevel<br>[dBm] | Result<br>[dBm] | Limit<br>[dBm] | Verdict |
|----------|---------|--------|----------|-------------------|-----------------|----------------|---------|
| DH5      | Ant1    | Low    | 2402     | 1.47              | -48.99          | <=-18.54       | PASS    |
|          |         | High   | 2480     | -1.17             | -47.72          | <=-21.17       | PASS    |
|          |         | Low    | Hop_2402 | 1.17              | -49.21          | <=-18.83       | PASS    |
|          |         | High   | Hop_2480 | 1.75              | -47.7           | <=-18.25       | PASS    |
| 2DH5     | Ant1    | Low    | 2402     | -0.44             | -45.35          | <=-20.44       | PASS    |
|          |         | High   | 2480     | -2.54             | -46.82          | <=-22.54       | PASS    |
|          |         | Low    | Hop_2402 | -3.10             | -48.45          | <=-23.1        | PASS    |
|          |         | High   | Hop_2480 | -2.50             | -47.78          | <=-22.5        | PASS    |
| 3DH5     | Ant1    | Low    | 2402     | -0.26             | -43.88          | <=-20.26       | PASS    |
|          |         | High   | 2480     | -2.45             | -46.56          | <=-22.45       | PASS    |
|          |         | Low    | Hop_2402 | -2.04             | -49.05          | <=-22.04       | PASS    |
|          |         | High   | Hop_2480 | -1.79             | -47.37          | <=-21.79       | PASS    |

## Test Graph

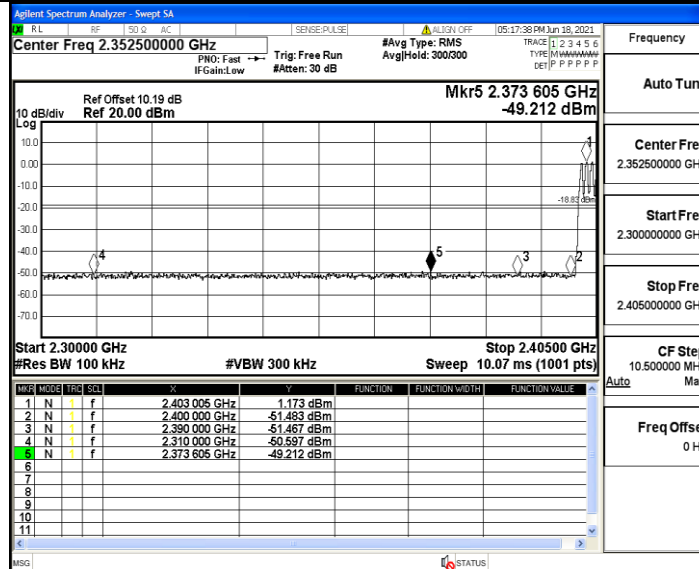
DH5\_Ant1\_Low\_2402



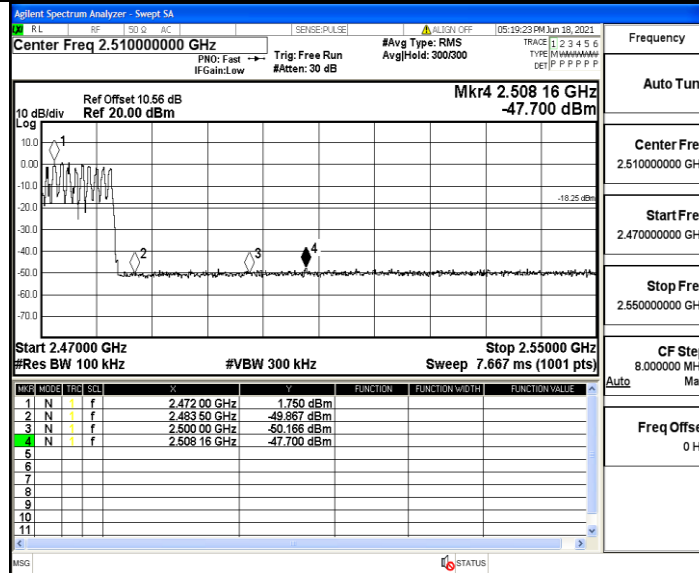
DH5\_Ant1\_High\_2480



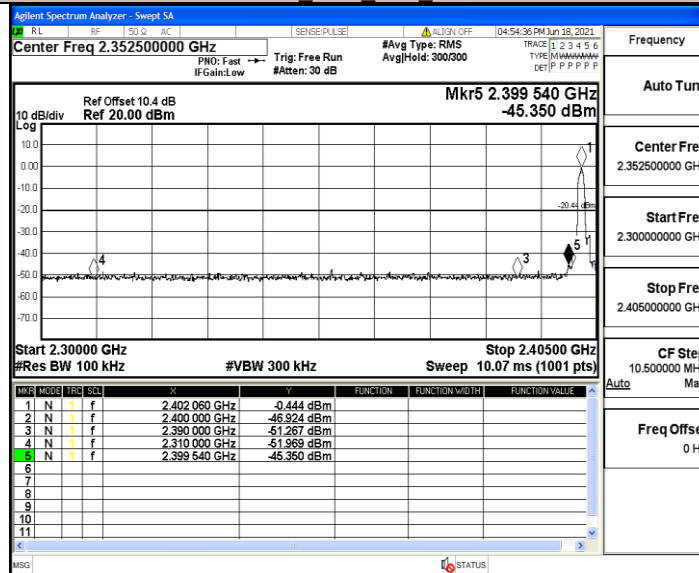
DH5\_Ant1\_Low\_Hop\_2402



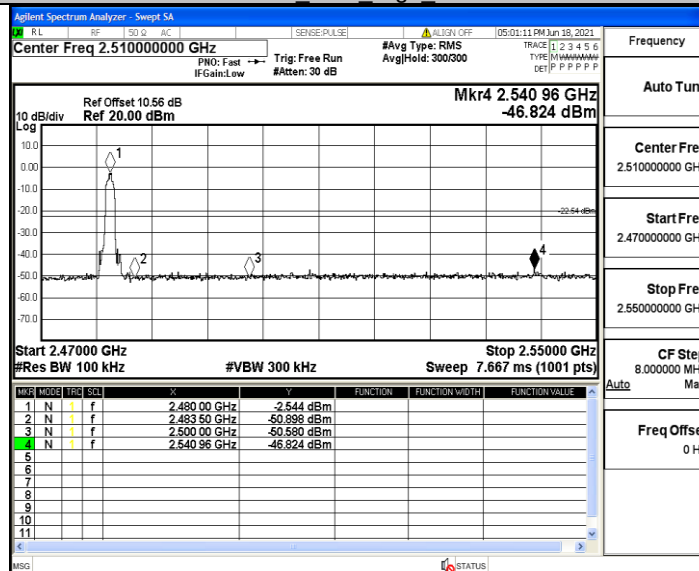
## DH5 Ant1\_High\_Hop\_2480



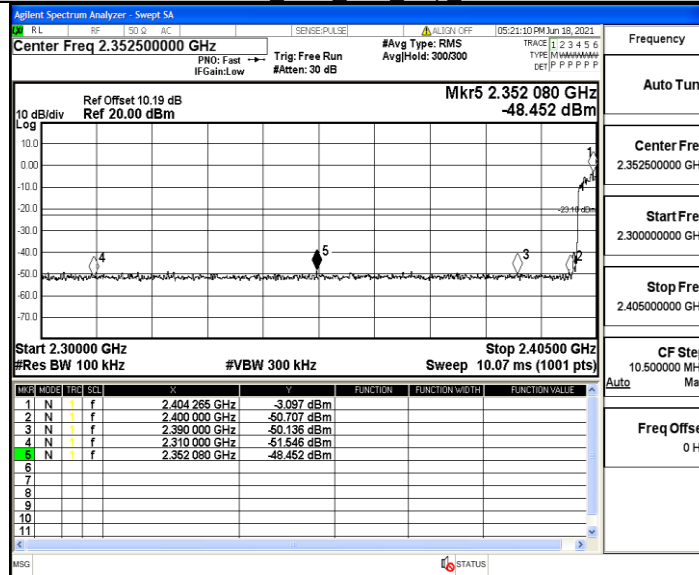
## 2DH5 Ant1\_Low\_2402



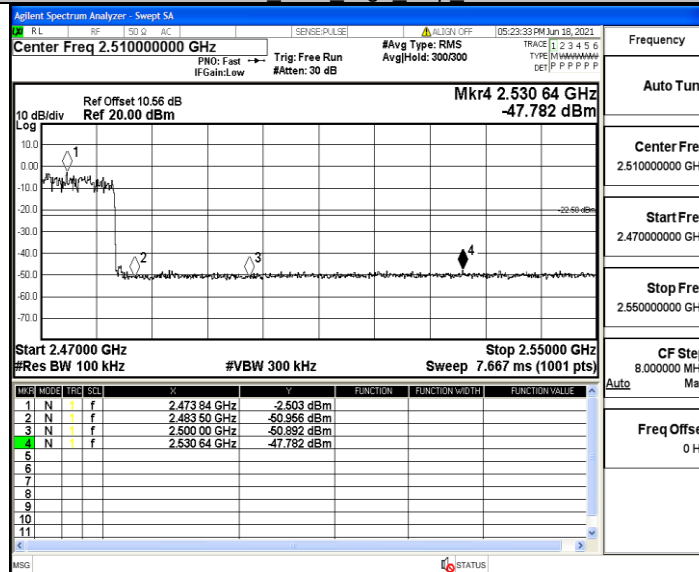
## 2DH5 Ant1\_High\_2480



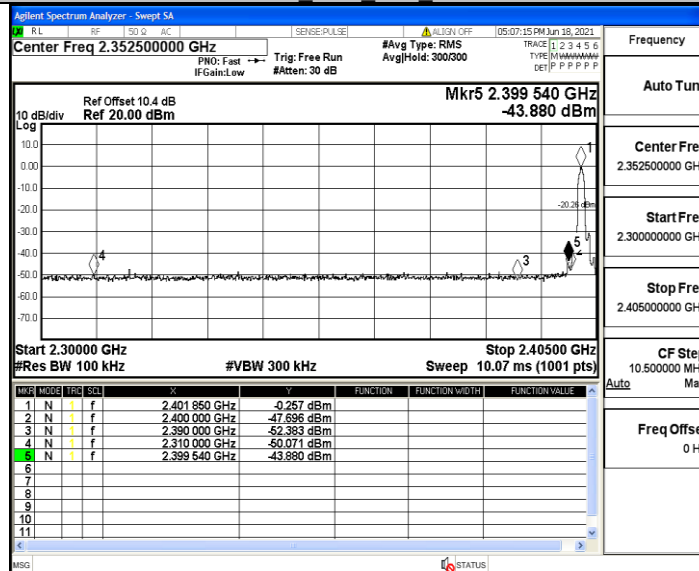
## 2DH5 Ant1 Low Hop 2402



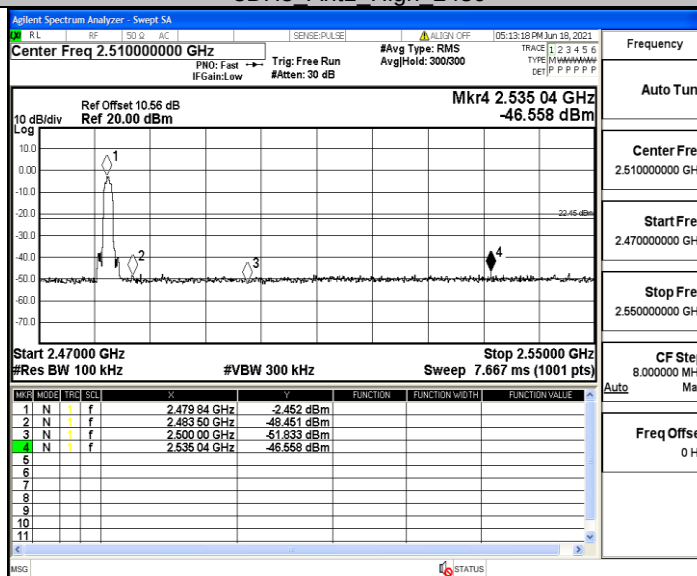
## 2DH5 Ant1 High Hop 2480



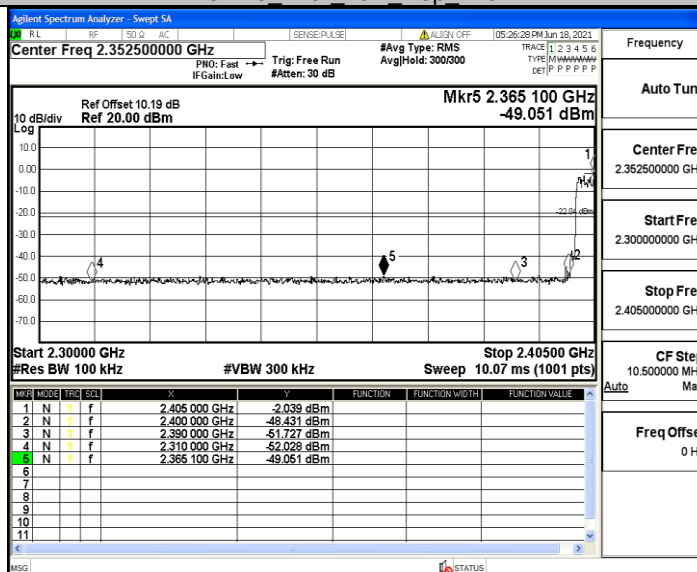
## 3DH5 Ant1 Low 2402



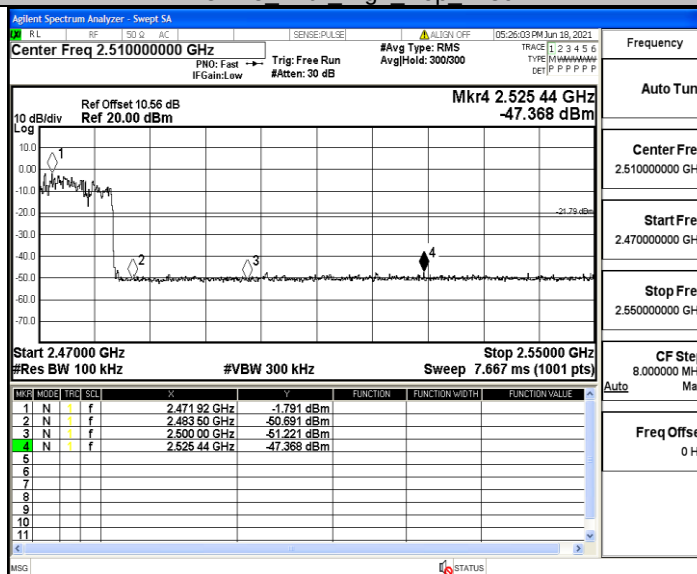
## 3DH5 Ant1\_High 2480



## 3DH5 Ant1\_Low Hop 2402



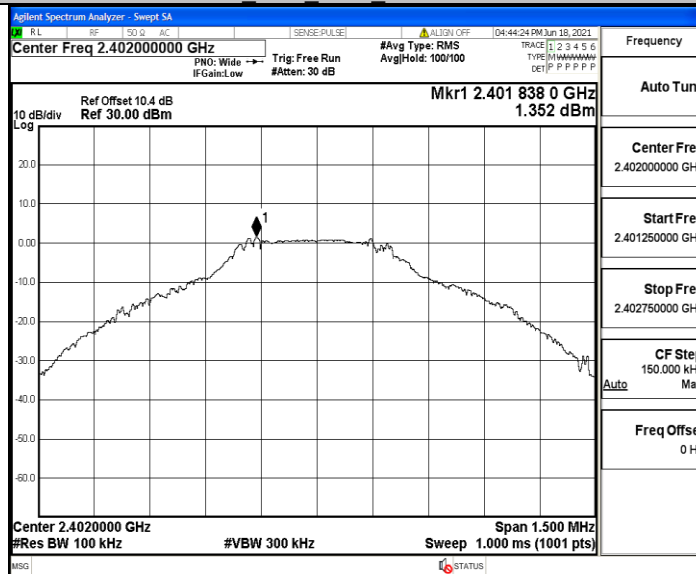
## 3DH5 Ant1\_High Hop 2480



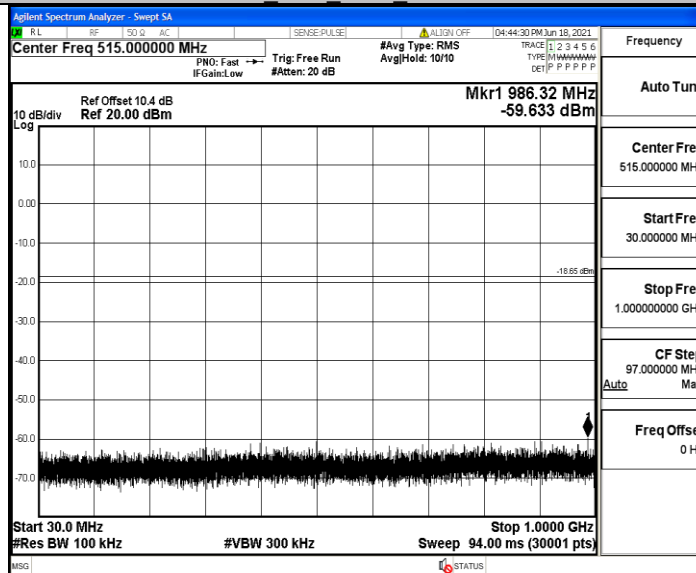
## A.7 RF Conducted Spurious Emissions

### Test Graph

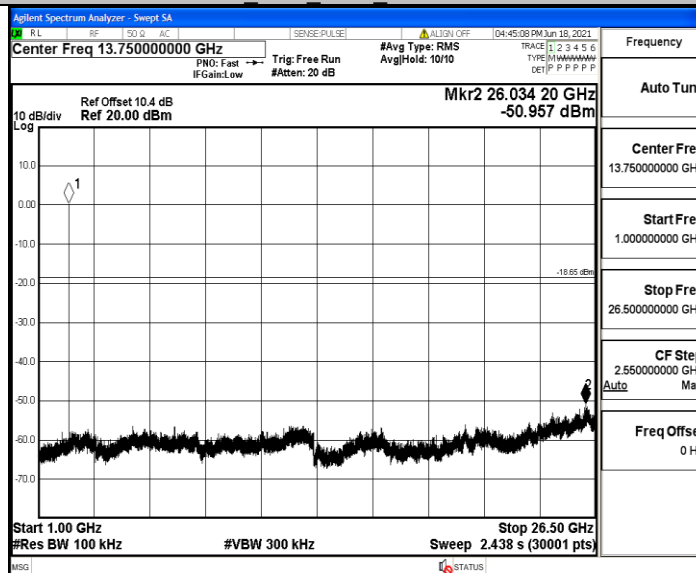
DH5\_Ant1\_2402\_0-Reference



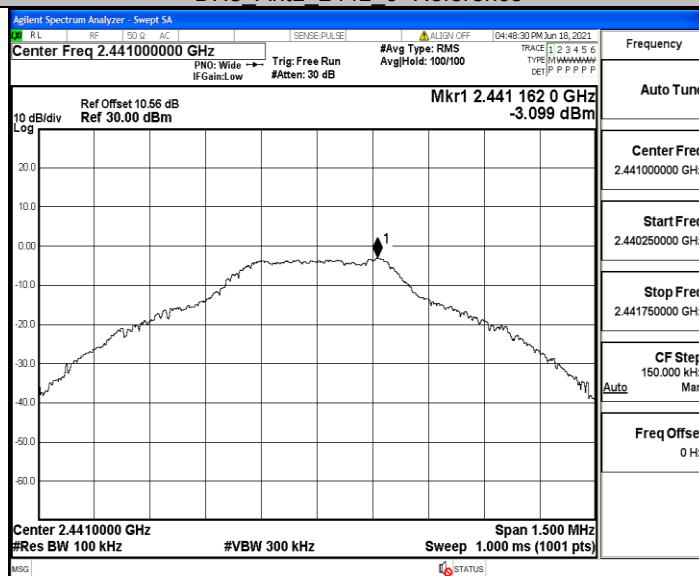
DH5\_Ant1\_2402\_30~1000



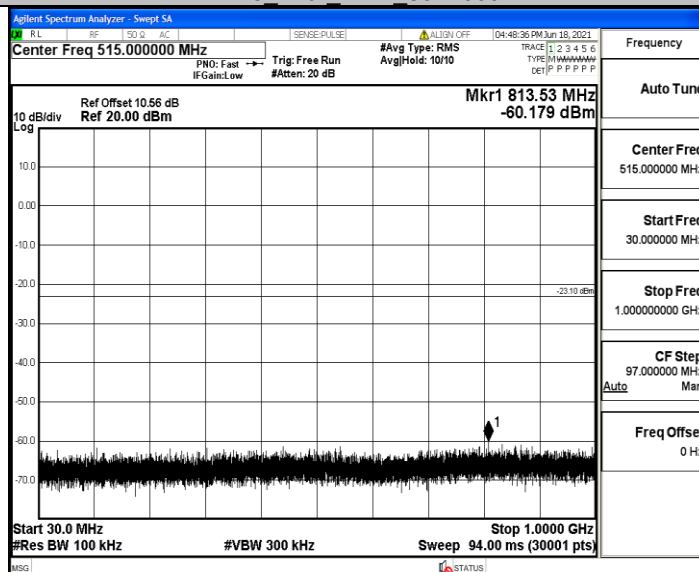
DH5\_Ant1\_2402\_1000~26500



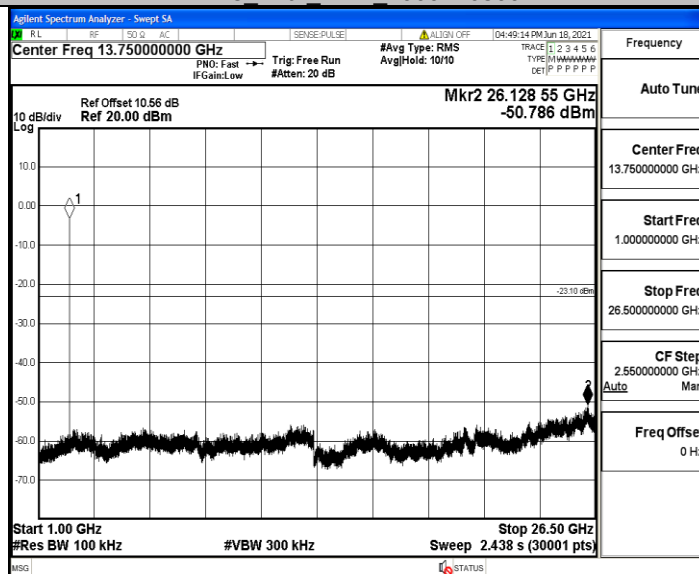
## DH5\_Ant1\_2441\_0-Reference



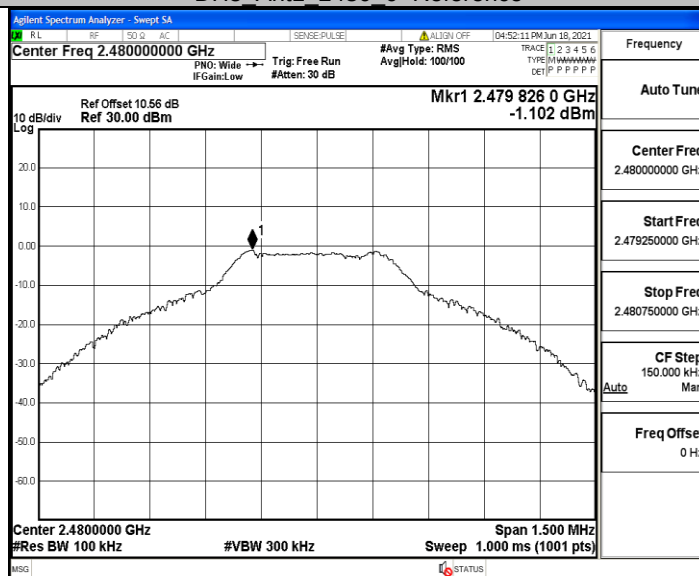
## DH5\_Ant1\_2441\_30~1000



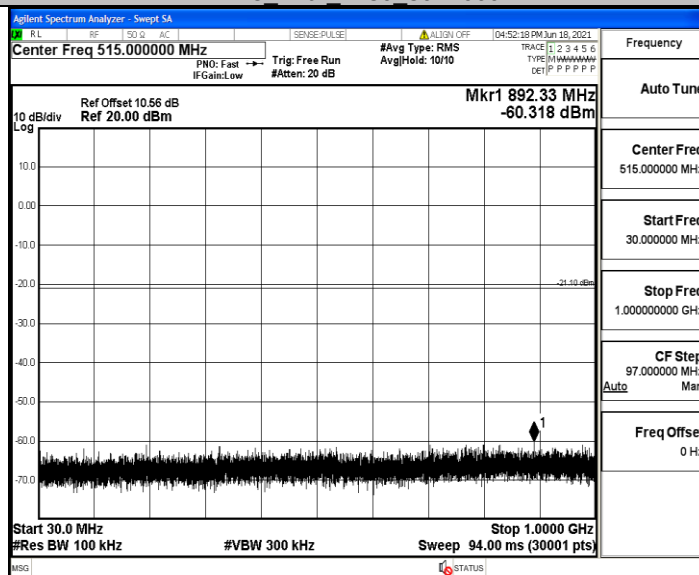
## DH5\_Ant1\_2441\_1000~26500



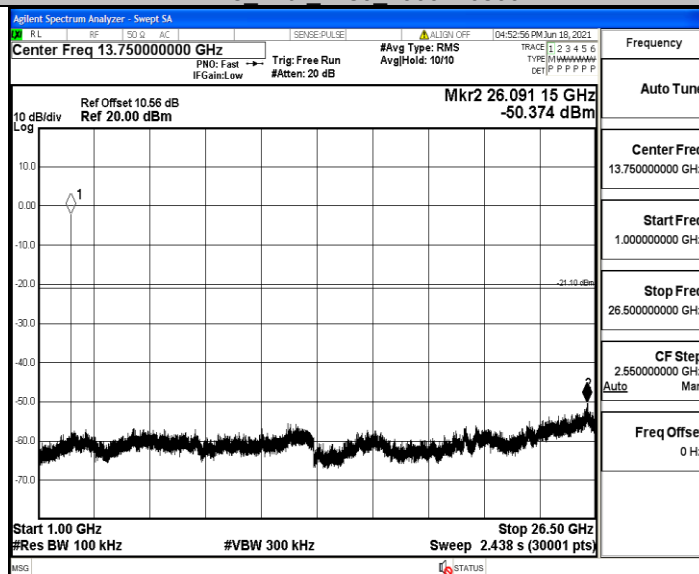
## DH5\_Ant1\_2480\_0-Reference



## DH5\_Ant1\_2480\_30~1000

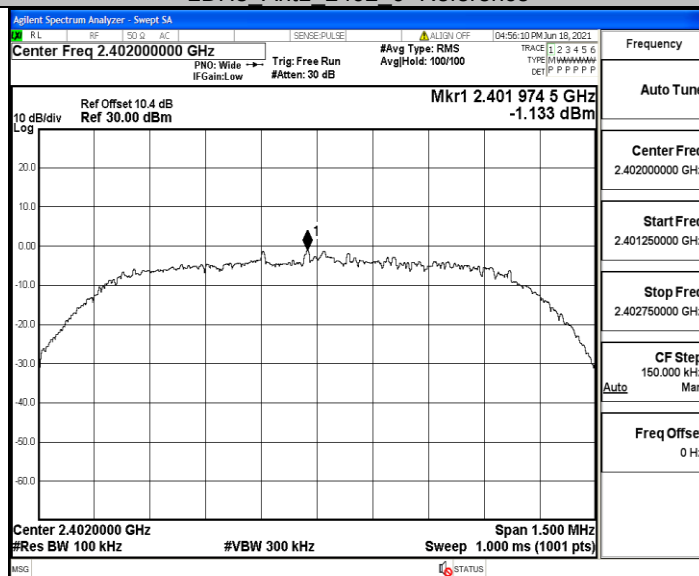


## DH5\_Ant1\_2480\_1000~26500

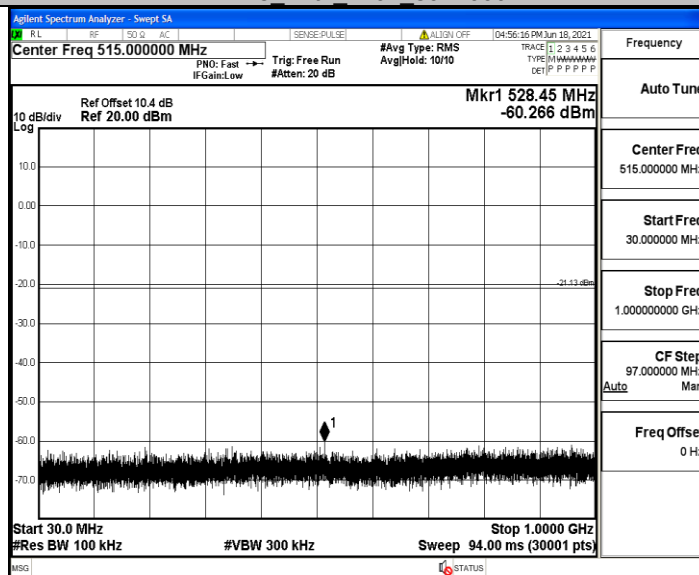




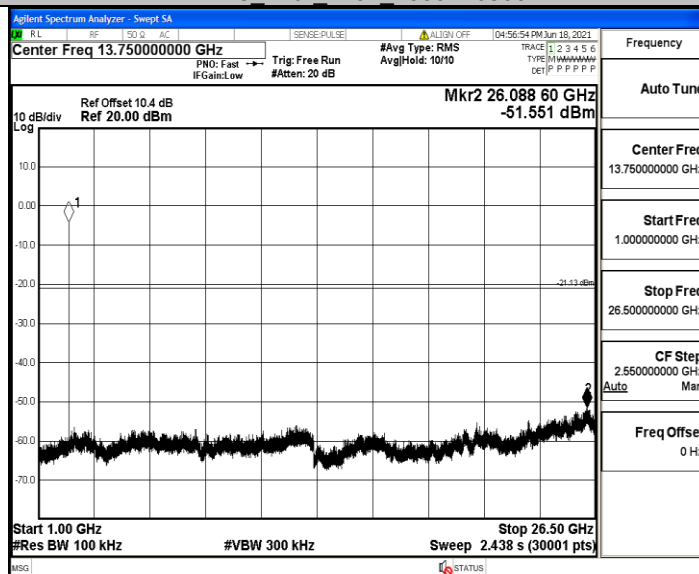
## 2DH5\_Ant1\_2402\_0~Reference



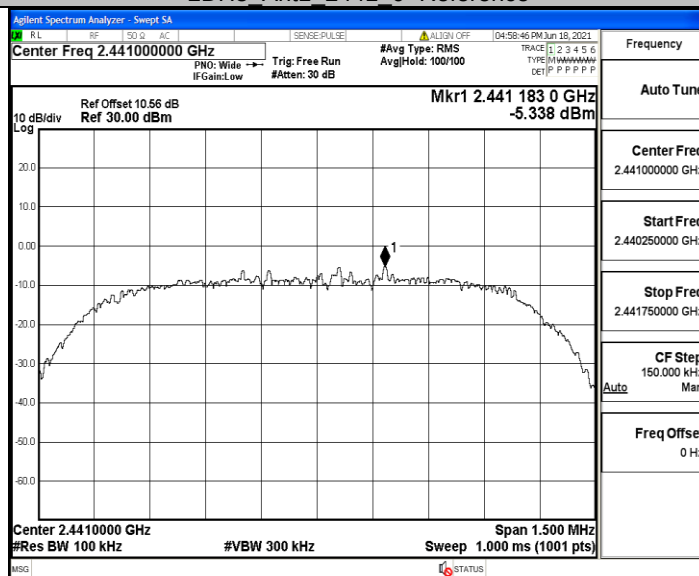
## 2DH5\_Ant1\_2402\_30~1000



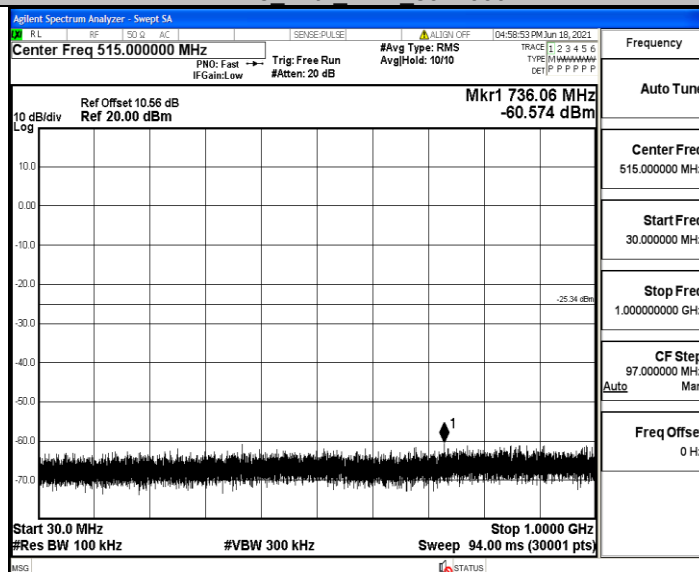
## 2DH5\_Ant1\_2402\_1000~26500



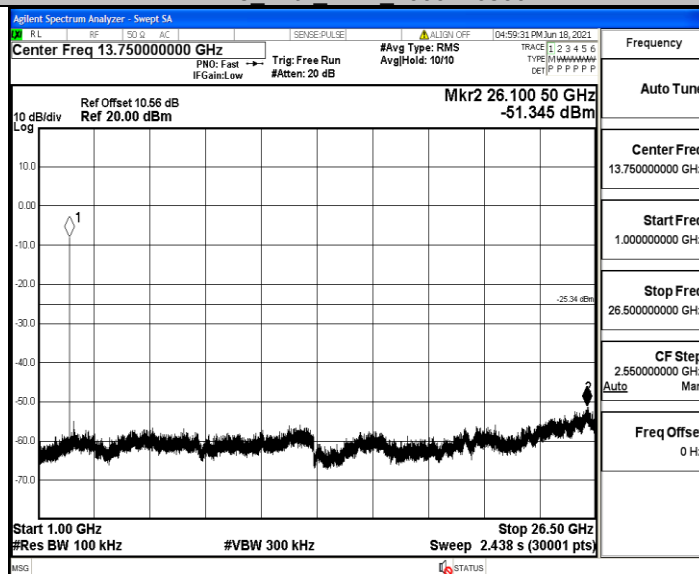
## 2DH5\_Ant1\_2441\_0~Reference



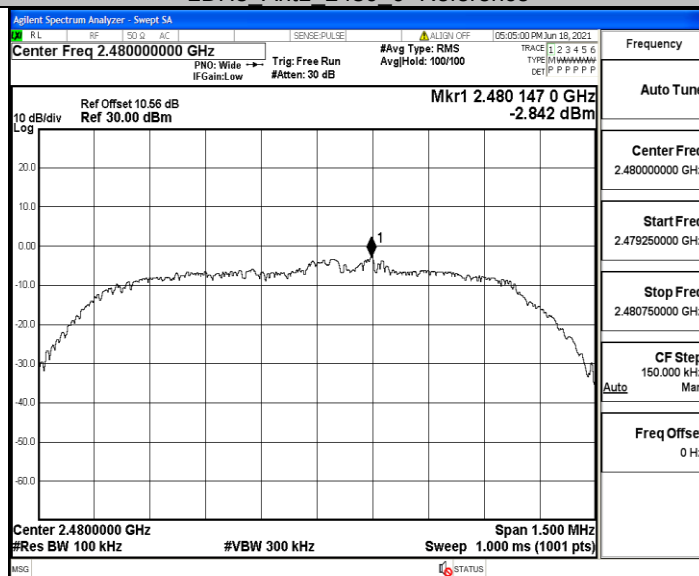
## 2DH5\_Ant1\_2441\_30~1000



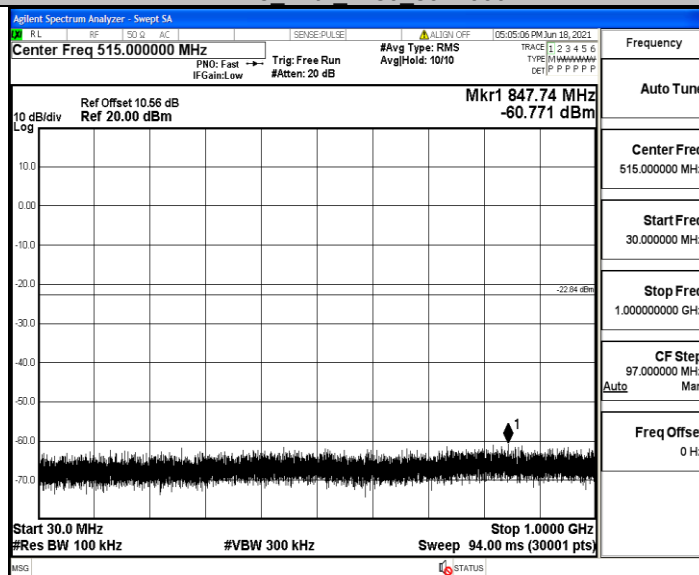
## 2DH5\_Ant1\_2441\_1000~26500



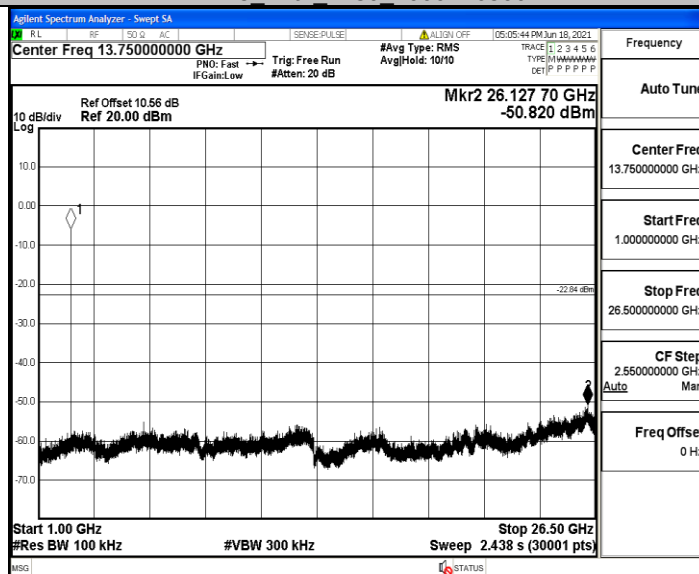
## 2DH5\_Ant1\_2480\_0~Reference



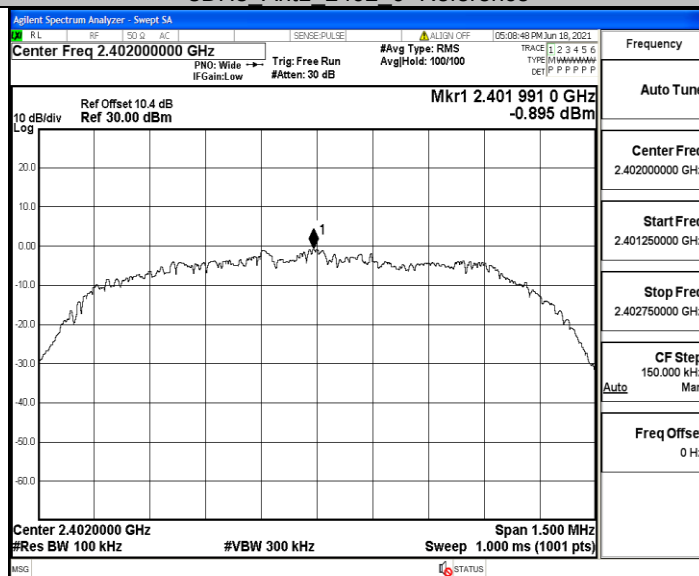
## 2DH5\_Ant1\_2480\_30~1000



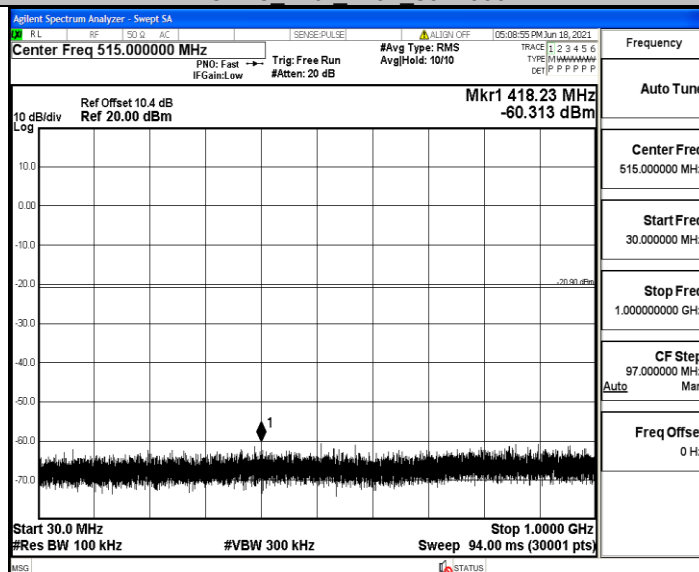
## 2DH5\_Ant1\_2480\_1000~26500



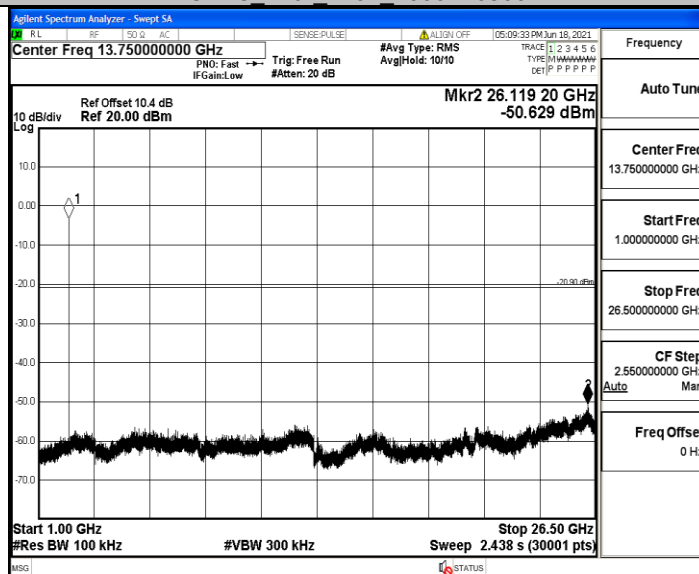
## 3DH5\_Ant1\_2402\_0~Reference



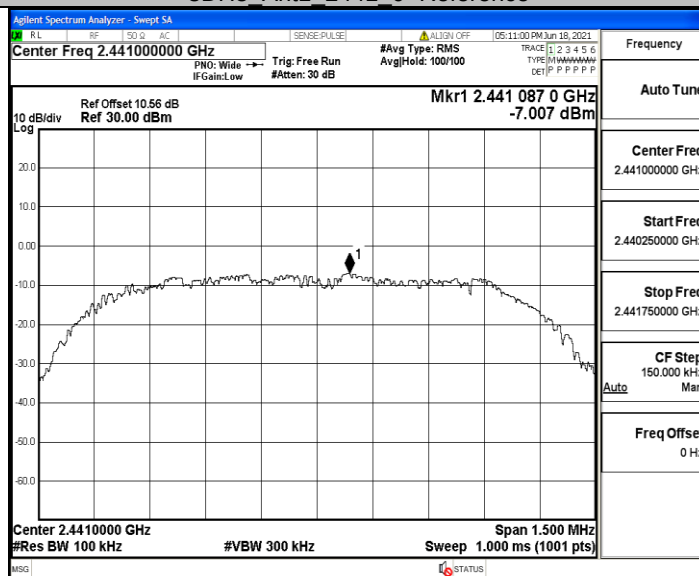
## 3DH5\_Ant1\_2402\_30~1000



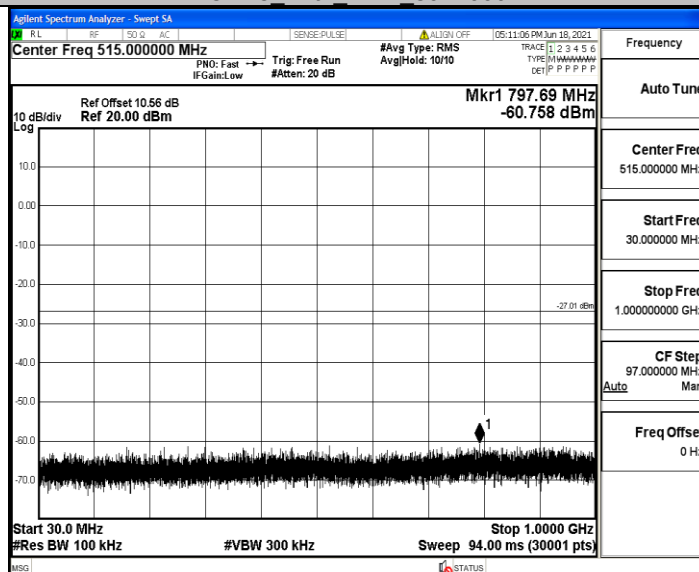
## 3DH5\_Ant1\_2402\_1000~26500



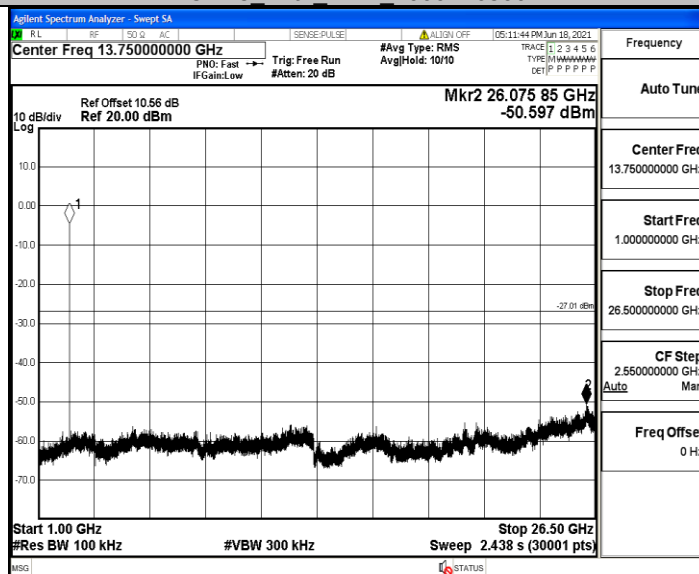
## 3DH5\_Ant1\_2441\_0~Reference



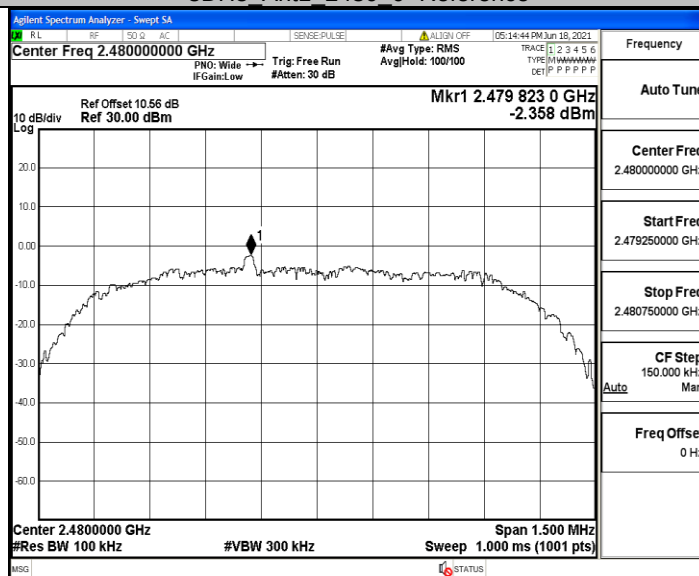
## 3DH5\_Ant1\_2441\_30~1000



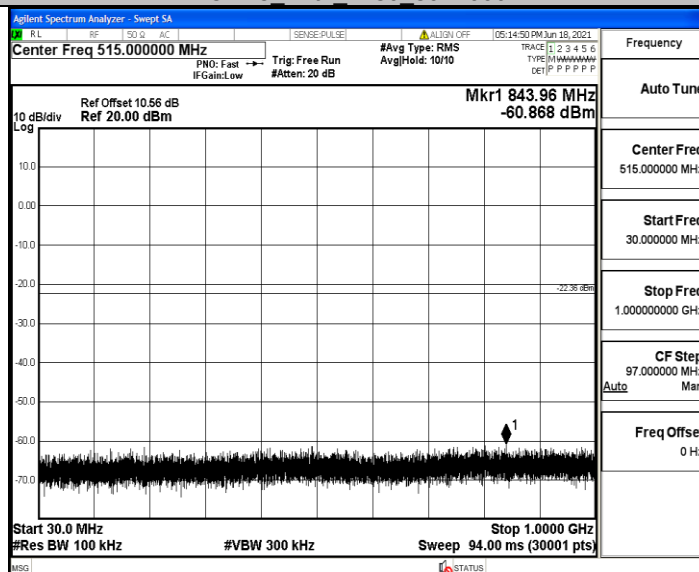
## 3DH5\_Ant1\_2441\_1000~26500



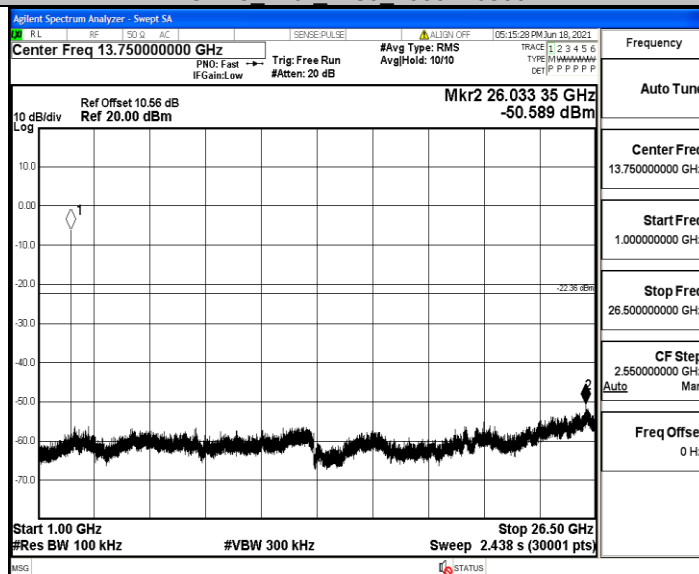
## 3DH5\_Ant1\_2480\_0~Reference



## 3DH5\_Ant1\_2480\_30~1000



## 3DH5\_Ant1\_2480\_1000~26500



## A.8 Restrict-band band-edge measurements

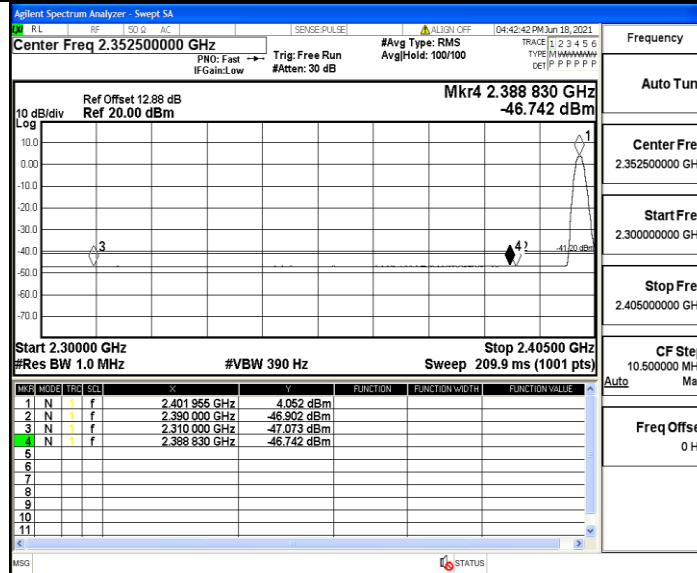
| TestMode | Antenna | ChName | Channel | Detector | Freq<br>( MHz ) | Result(dBm) | Limit(dBm) | Verdict |
|----------|---------|--------|---------|----------|-----------------|-------------|------------|---------|
| DH5      | Ant1    | Low    | 2402    | AV       | 2310.000        | -47.07      | <=-41.20   | PASS    |
|          |         |        |         | AV       | 2388.830        | -46.74      | <=-41.20   | PASS    |
|          |         |        |         | AV       | 2390.000        | -46.9       | <=-41.20   | PASS    |
|          |         |        |         | Peak     | 2310.000        | -40.52      | <=-21.20   | PASS    |
|          |         |        |         | Peak     | 2316.275        | -36.96      | <=-21.20   | PASS    |
|          |         |        |         | Peak     | 2390.000        | -40.18      | <=-21.20   | PASS    |
|          |         | High   | 2480    | AV       | 2483.500        | -46.28      | <=-41.20   | PASS    |
|          |         |        |         | AV       | 2499.520        | -46.04      | <=-41.20   | PASS    |
|          |         |        |         | AV       | 2500.000        | -46.1       | <=-41.20   | PASS    |
|          |         |        |         | Peak     | 2483.500        | -39.16      | <=-21.20   | PASS    |
|          |         |        |         | Peak     | 2499.200        | -37.3       | <=-21.20   | PASS    |
|          |         |        |         | Peak     | 2500.000        | -38.88      | <=-21.20   | PASS    |
| 2DH5     | Ant1    | Low    | 2402    | AV       | 2310.000        | -47.22      | <=-41.20   | PASS    |
|          |         |        |         | AV       | 2385.680        | -46.72      | <=-41.20   | PASS    |
|          |         |        |         | AV       | 2390.000        | -46.88      | <=-41.20   | PASS    |
|          |         |        |         | Peak     | 2310.000        | -39.98      | <=-21.20   | PASS    |
|          |         |        |         | Peak     | 2360.900        | -36.98      | <=-21.20   | PASS    |
|          |         |        |         | Peak     | 2390.000        | -39.85      | <=-21.20   | PASS    |
|          |         | High   | 2480    | AV       | 2483.500        | -46.25      | <=-41.20   | PASS    |
|          |         |        |         | AV       | 2496.880        | -46.05      | <=-41.20   | PASS    |
|          |         |        |         | AV       | 2500.000        | -46.15      | <=-41.20   | PASS    |
|          |         |        |         | Peak     | 2483.500        | -37.94      | <=-21.20   | PASS    |
|          |         |        |         | Peak     | 2500.000        | -36.49      | <=-21.20   | PASS    |
|          |         |        |         | Peak     | 2500.000        | -36.49      | <=-21.20   | PASS    |
| 3DH5     | Ant1    | Low    | 2402    | AV       | 2310.000        | -47.19      | <=-41.20   | PASS    |
|          |         |        |         | AV       | 2389.040        | -46.73      | <=-41.20   | PASS    |
|          |         |        |         | AV       | 2390.000        | -46.84      | <=-41.20   | PASS    |
|          |         |        |         | Peak     | 2310.000        | -39.13      | <=-21.20   | PASS    |
|          |         |        |         | Peak     | 2388.095        | -37.11      | <=-21.20   | PASS    |
|          |         |        |         | Peak     | 2390.000        | -39.35      | <=-21.20   | PASS    |
|          |         | High   | 2480    | AV       | 2483.500        | -46.2       | <=-41.20   | PASS    |
|          |         |        |         | AV       | 2497.360        | -46         | <=-41.20   | PASS    |
|          |         |        |         | AV       | 2500.000        | -46.2       | <=-41.20   | PASS    |
|          |         |        |         | Peak     | 2483.500        | -38.8       | <=-21.20   | PASS    |
|          |         |        |         | Peak     | 2499.440        | -36.17      | <=-21.20   | PASS    |
|          |         |        |         | Peak     | 2500.000        | -39.37      | <=-21.20   | PASS    |

1. The Antenna Gain is compensated in the graph with 2dBi and Antenna Gain which is Higher.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

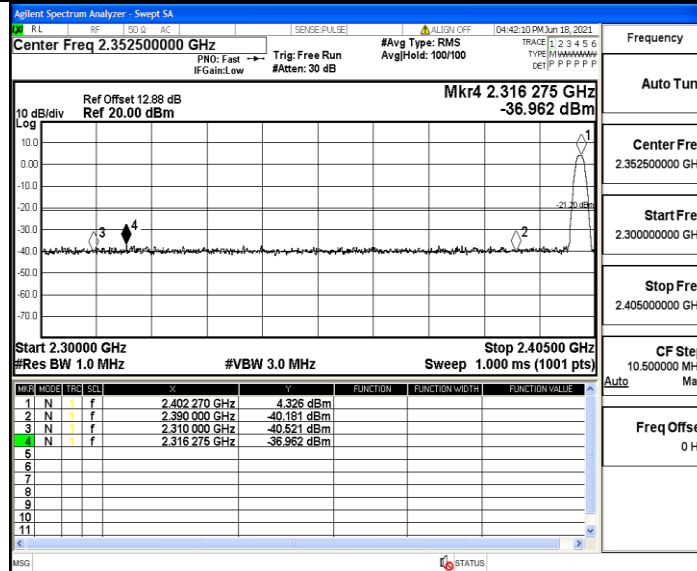


## Test Graphs

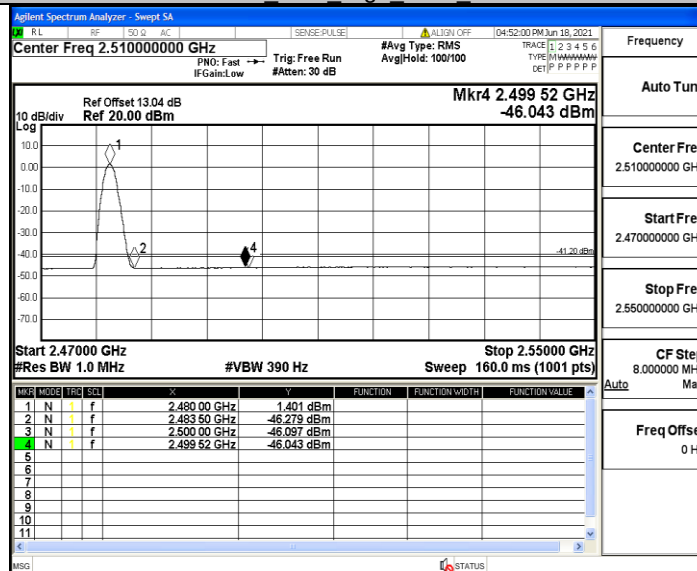
DH5 Ant1 Low 2402 AV



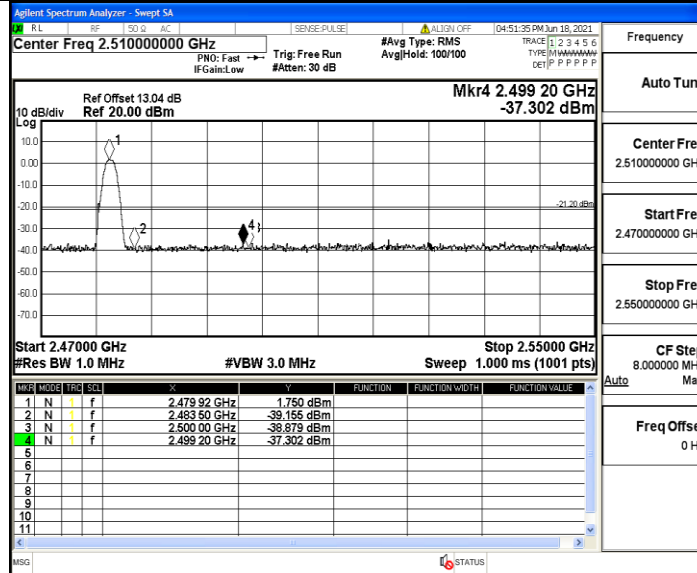
DH5 Ant1 Low 2402 Peak



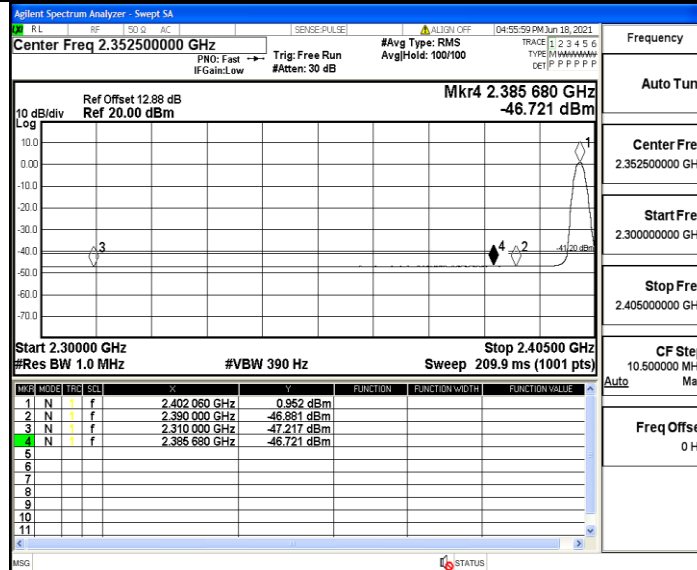
DH5 Ant1 High 2480 AV



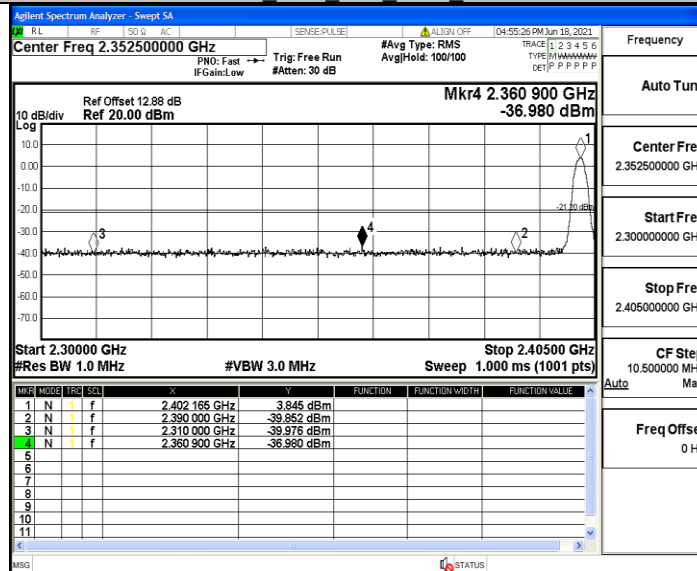
## DH5 Ant1 High 2480 Peak



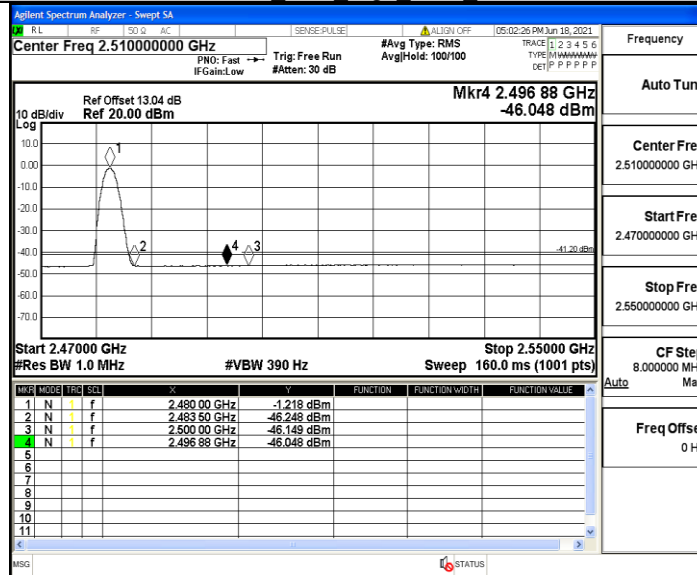
## 2DH5 Ant1 Low 2402 AV



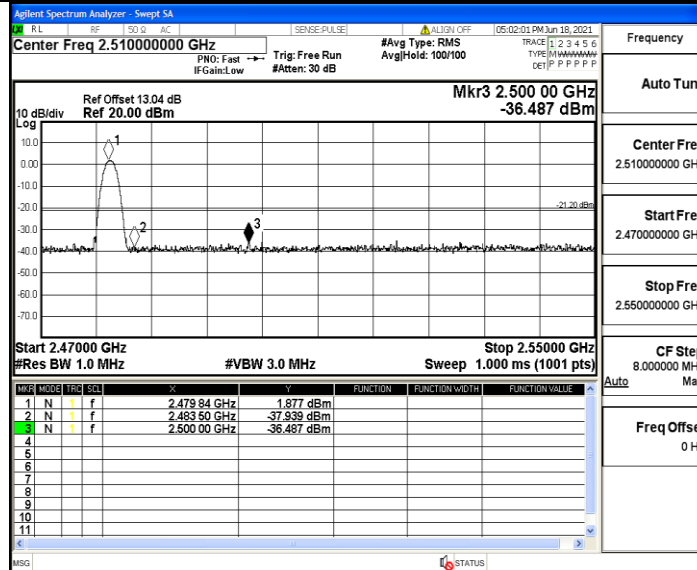
## 2DH5 Ant1 Low 2402 Peak



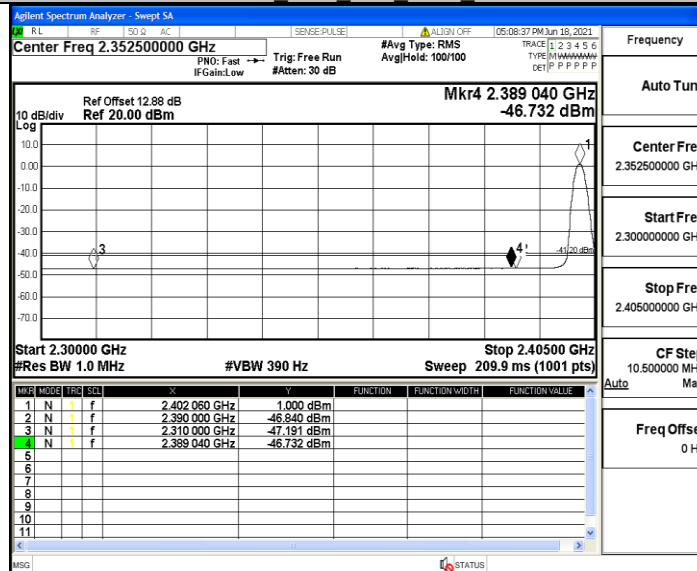
## 2DH5 Ant1\_High\_2480\_AV



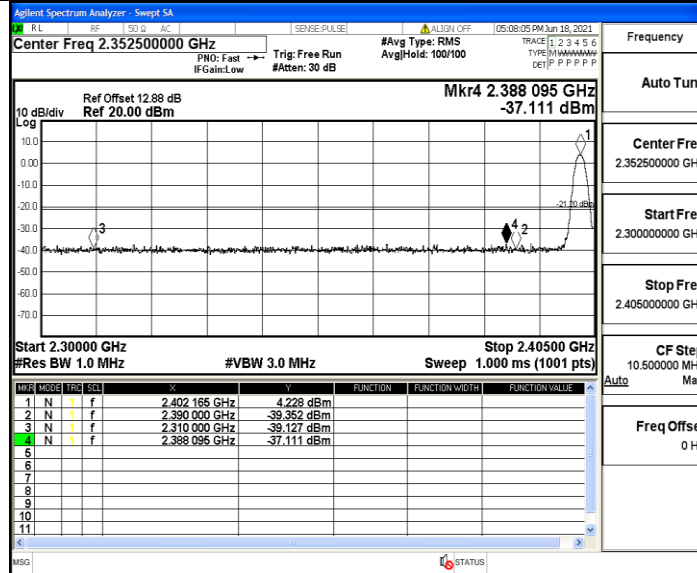
## 2DH5 Ant1\_High\_2480\_Peak



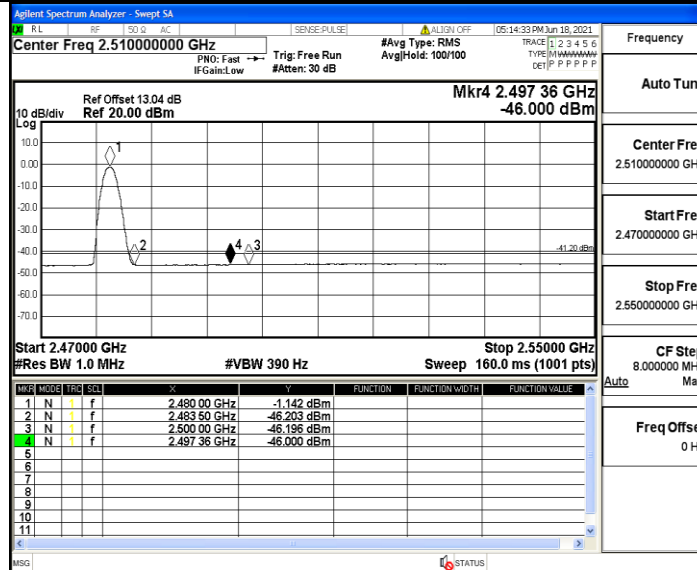
## 3DH5 Ant1\_Low\_2402\_AV



## 3DH5\_Ant1\_Low\_2402\_Peak



## 3DH5\_Ant1\_High\_2480\_AV



## 3DH5\_Ant1\_High\_2480\_Peak

