

## Appendix A

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

Product Name: Wireless bluetooth earphones

Trade Mark: RUSAM

Test Model: GA33

FCC ID: 2AVRU-GA33

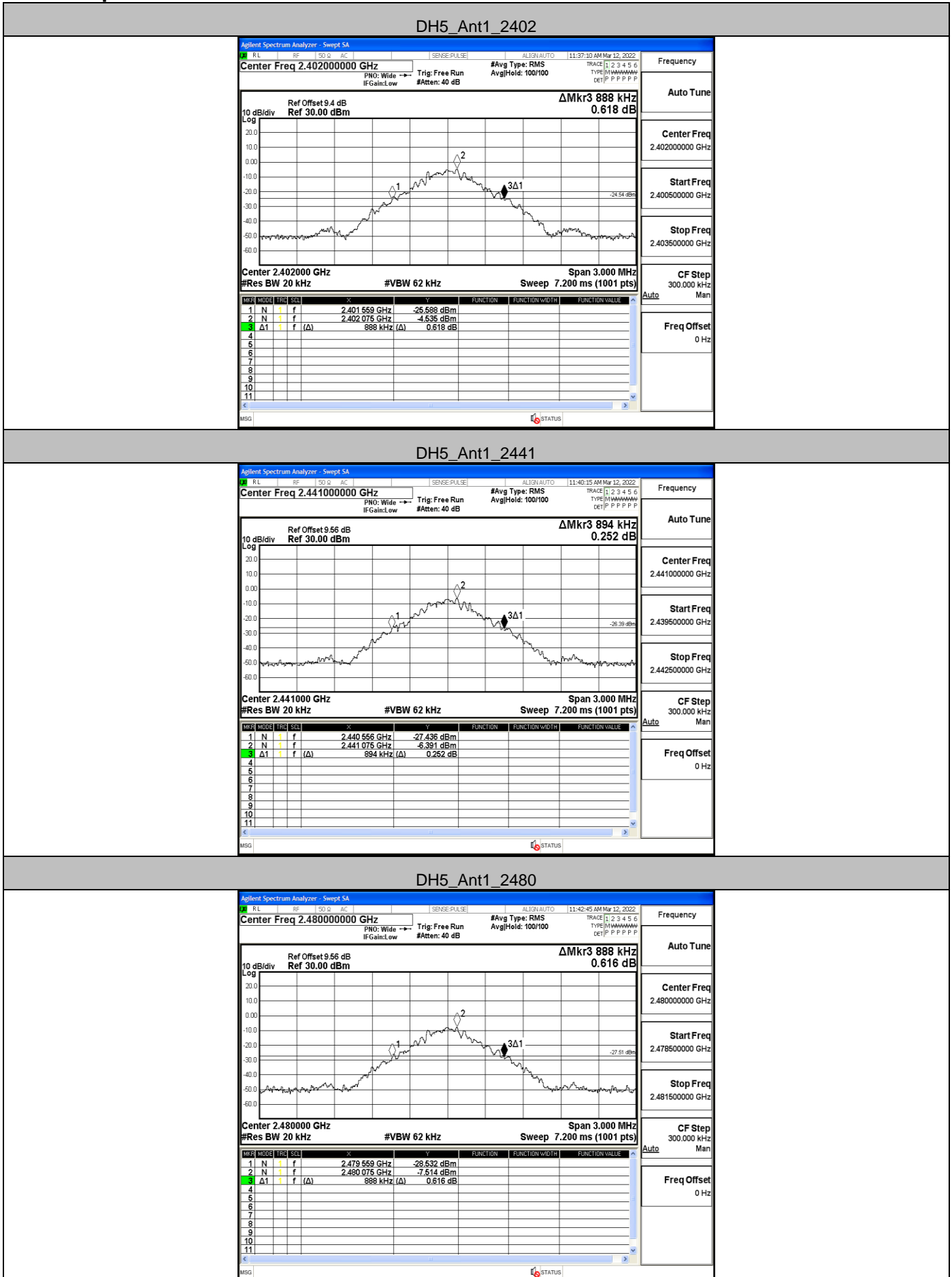
### Environmental Conditions

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

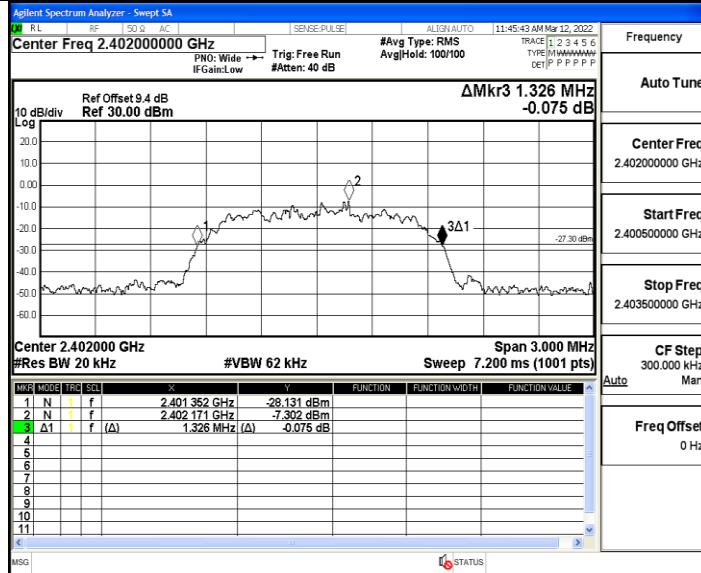
#### A.1 20 dB Bandwidth

| TestMode | Antenna | Channel | 20db EBW[MHz] | FL[MHz]  | FH[MHz]  | Limit[MHz] | Verdict |
|----------|---------|---------|---------------|----------|----------|------------|---------|
| DH5      | Ant1    | 2402    | 0.888         | 2401.559 | 2402.447 | ---        | ---     |
|          |         | 2441    | 0.894         | 2440.556 | 2441.450 | ---        | ---     |
|          |         | 2480    | 0.888         | 2479.559 | 2480.447 | ---        | ---     |
| 2DH5     | Ant1    | 2402    | 1.326         | 2401.352 | 2402.678 | ---        | ---     |
|          |         | 2441    | 1.326         | 2440.352 | 2441.678 | ---        | ---     |
|          |         | 2480    | 1.290         | 2479.379 | 2480.669 | ---        | ---     |
| 3DH5     | Ant1    | 2402    | 1.329         | 2401.349 | 2402.678 | ---        | ---     |
|          |         | 2441    | 1.299         | 2440.367 | 2441.666 | ---        | ---     |
|          |         | 2480    | 1.299         | 2479.367 | 2480.666 | ---        | ---     |

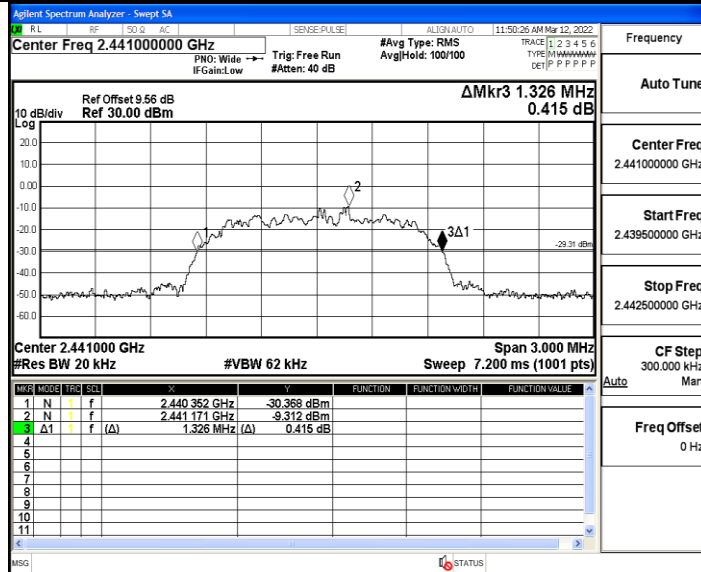
Test Graph



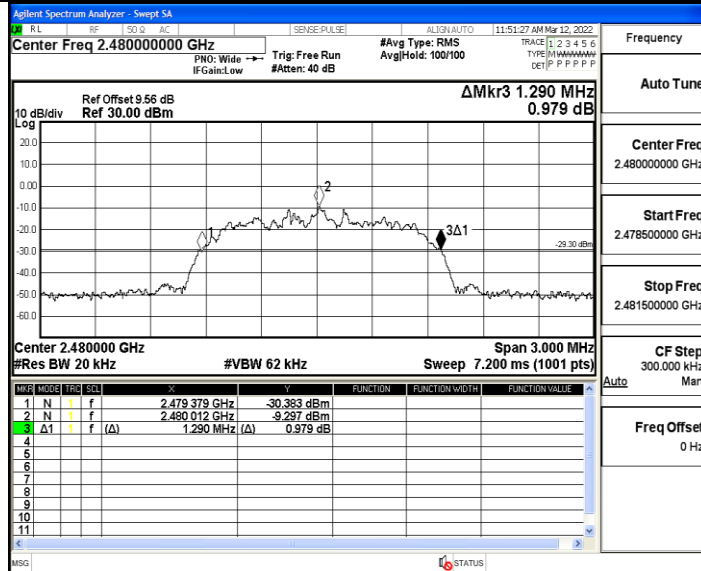
2DH5\_Ant1\_2402



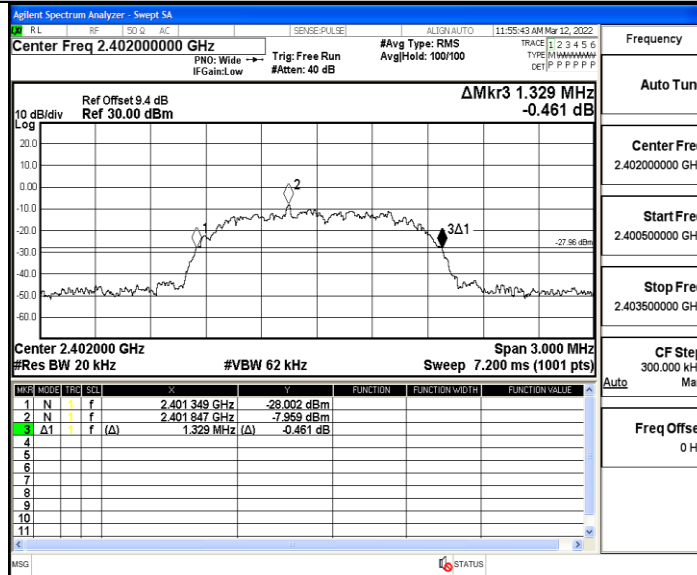
2DH5\_Ant1\_2441



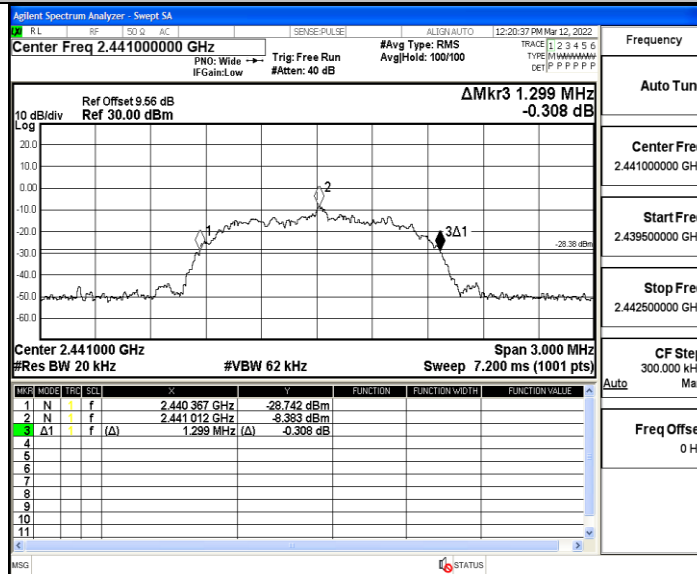
2DH5\_Ant1\_2480



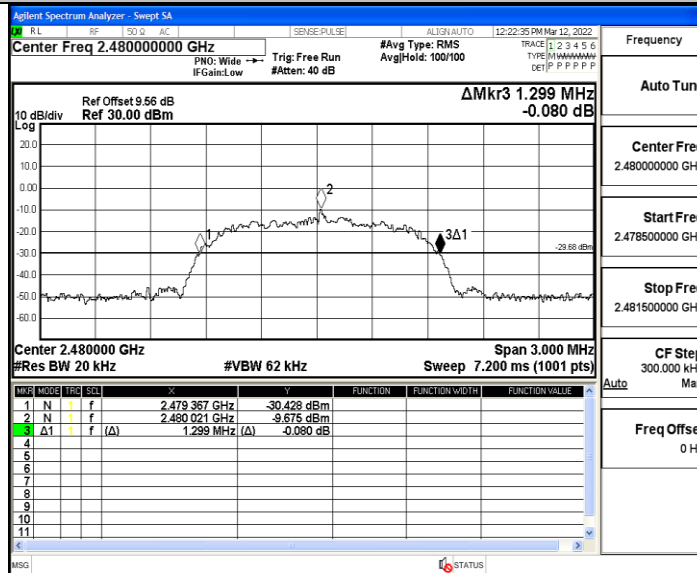
3DH5\_Ant1\_2402



3DH5\_Ant1\_2441



3DH5\_Ant1\_2480

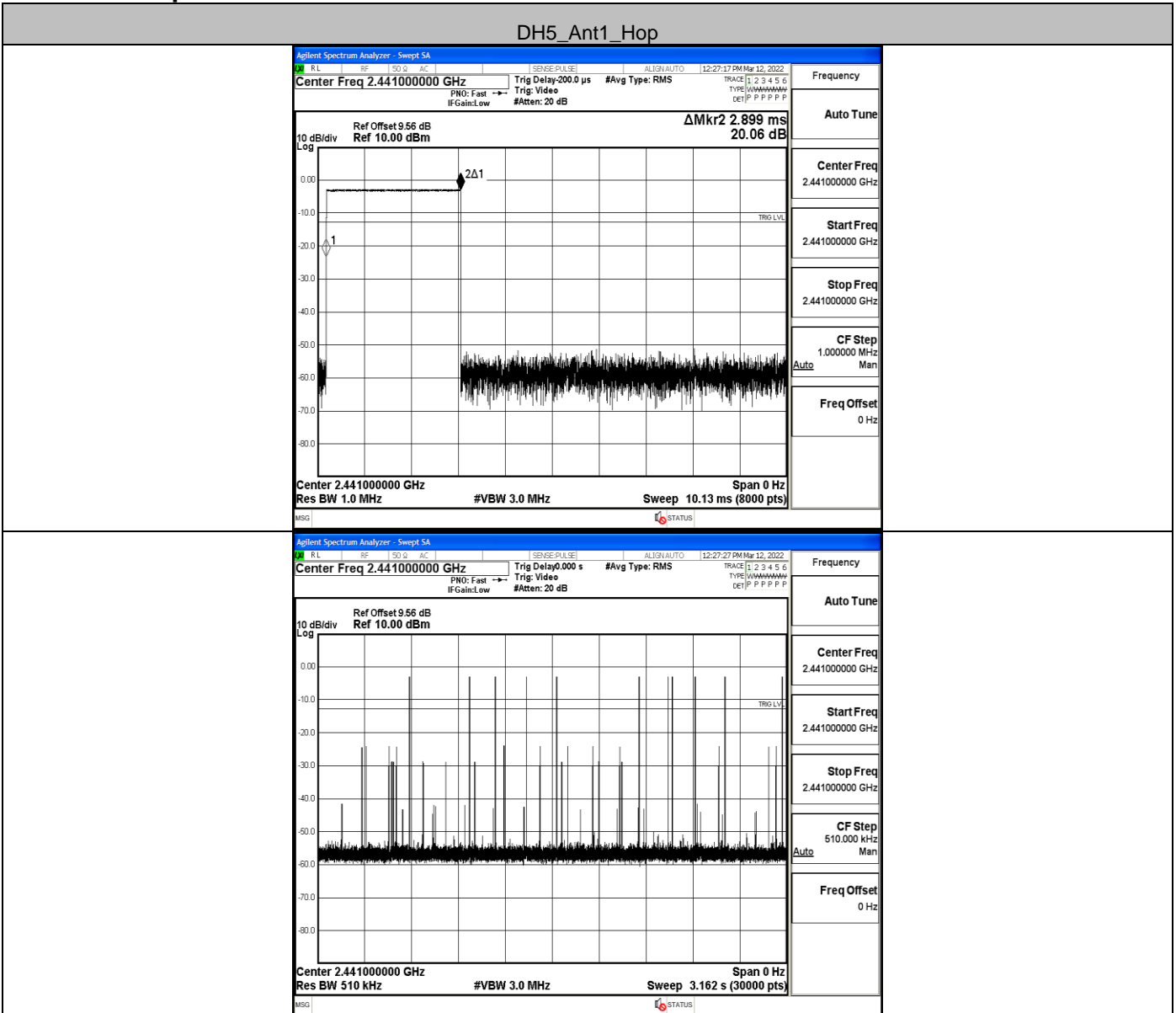


**A.2 Dwell Time**

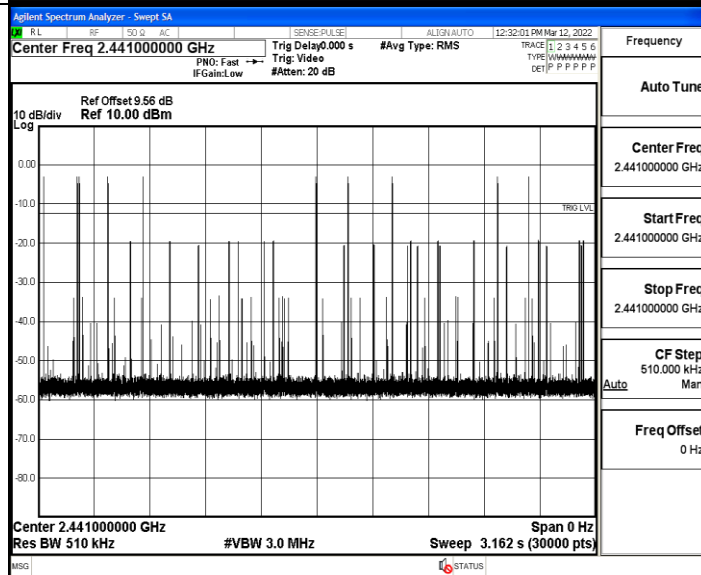
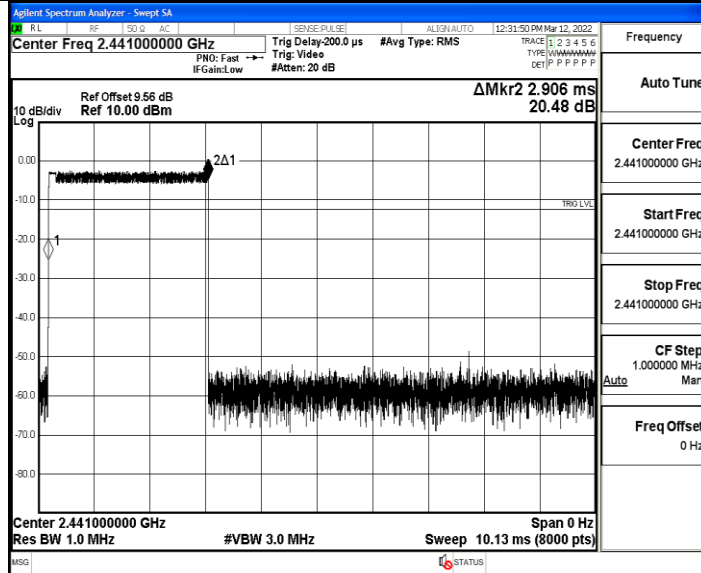
| TestMode | Antenna | Channel | BurstWidth<br>[ms] | TotalHops<br>[Num] | Result[s] | Limit[s] | Verdict |
|----------|---------|---------|--------------------|--------------------|-----------|----------|---------|
| DH5      | Ant1    | Hop     | 2.90               | 120                | 0.348     | ≤0.4     | PASS    |
| 2DH5     | Ant1    | Hop     | 2.91               | 110                | 0.32      | ≤0.4     | PASS    |
| 3DH5     | Ant1    | Hop     | 2.91               | 130                | 0.378     | ≤0.4     | PASS    |

### Test Graph

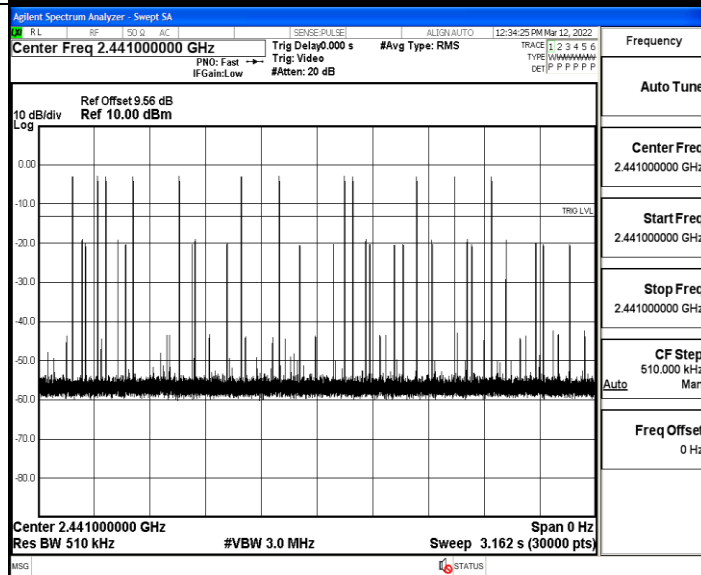
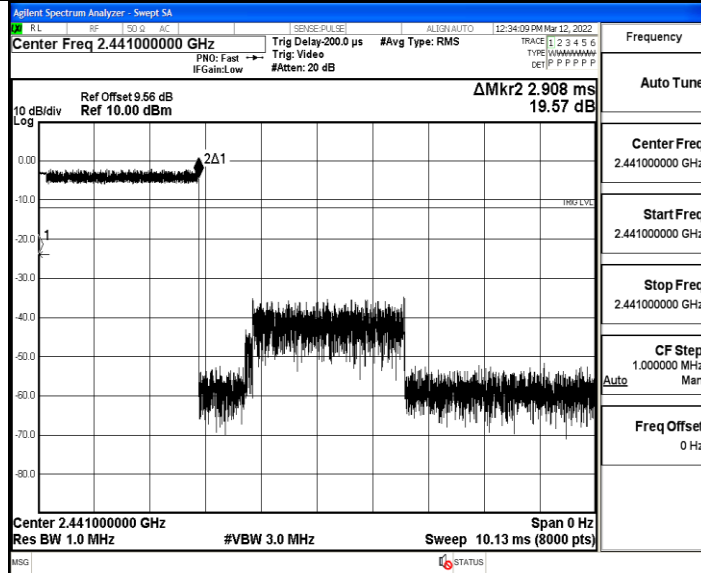
#### DH5\_Ant1\_Hop



2DH5\_Ant1\_Hop



3DH5\_Ant1\_Hop

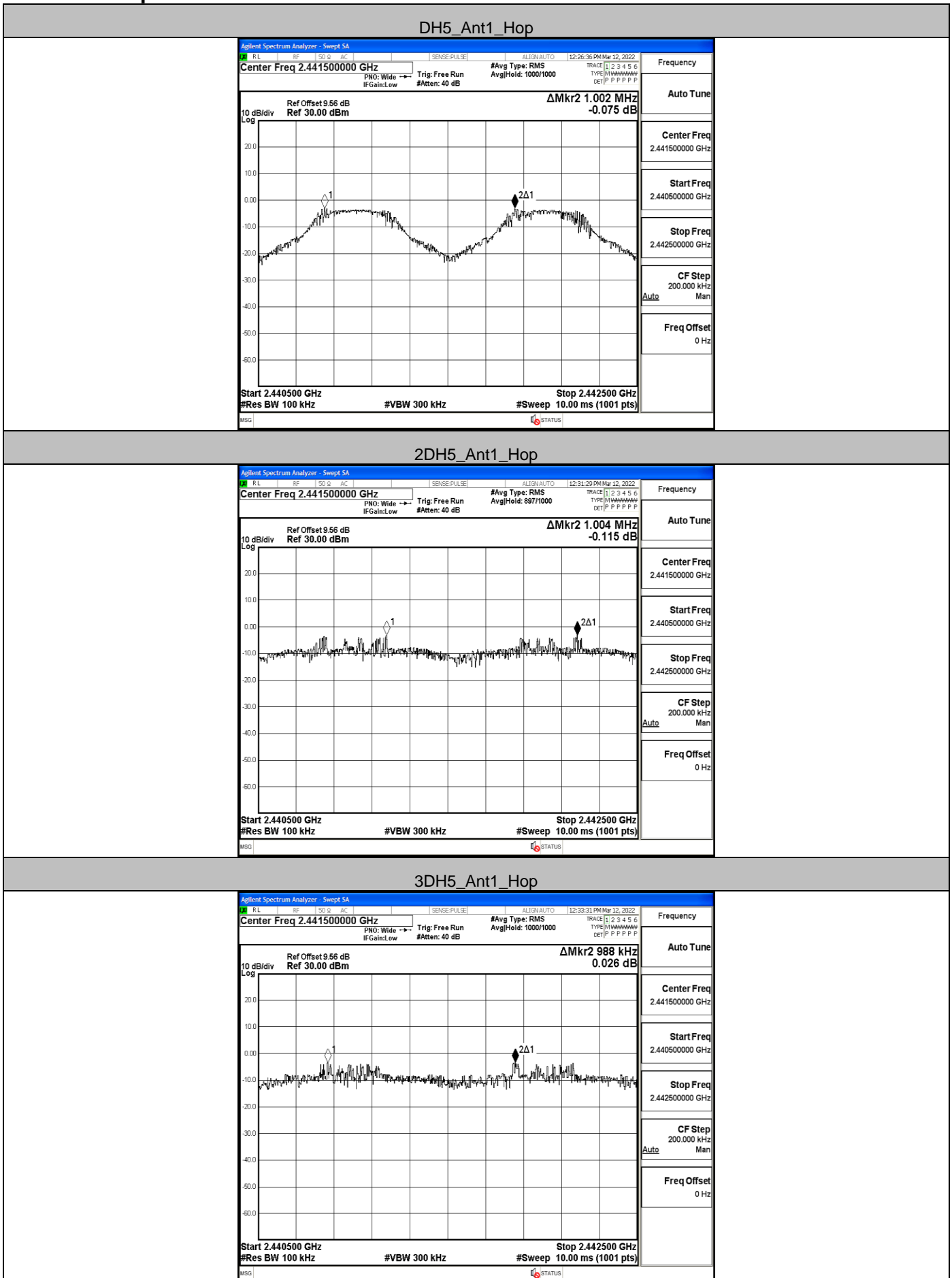




### A.3 Carrier Frequency Separation

| TestMode | Antenna | Channel | Result[MHz] | Limit[MHz]   | Verdict |
|----------|---------|---------|-------------|--------------|---------|
| DH5      | Ant1    | Hop     | 1.002       | $\geq 0.894$ | PASS    |
| 2DH5     | Ant1    | Hop     | 1.004       | $\geq 0.884$ | PASS    |
| 3DH5     | Ant1    | Hop     | 0.988       | $\geq 0.886$ | PASS    |

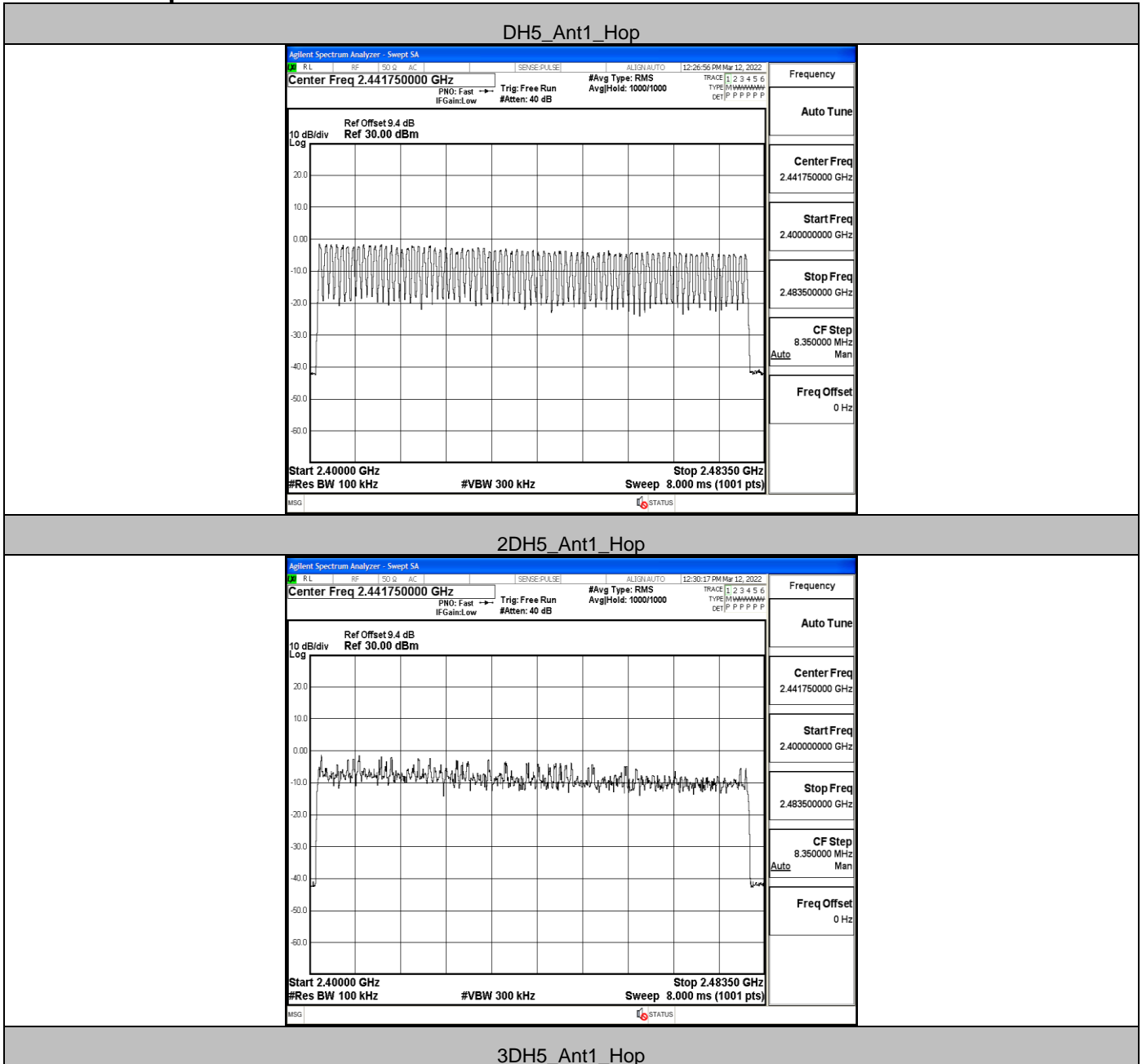
### Test Graph

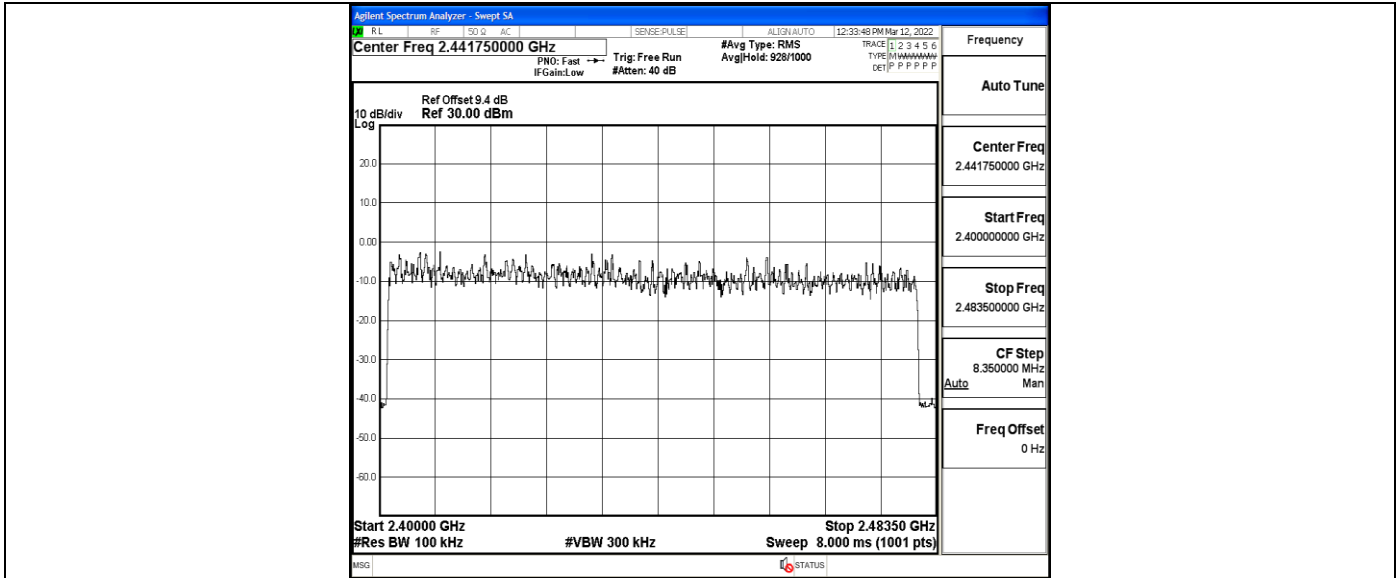


### A.4 Hopping Channel Number

| 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

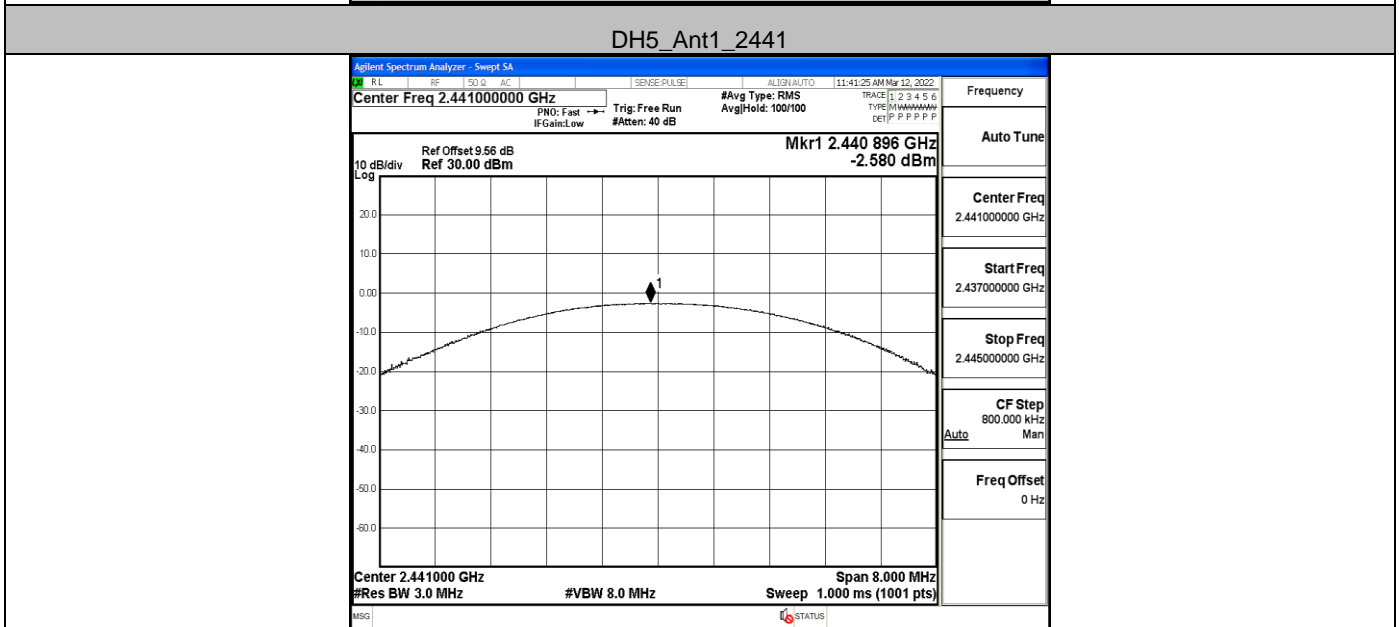
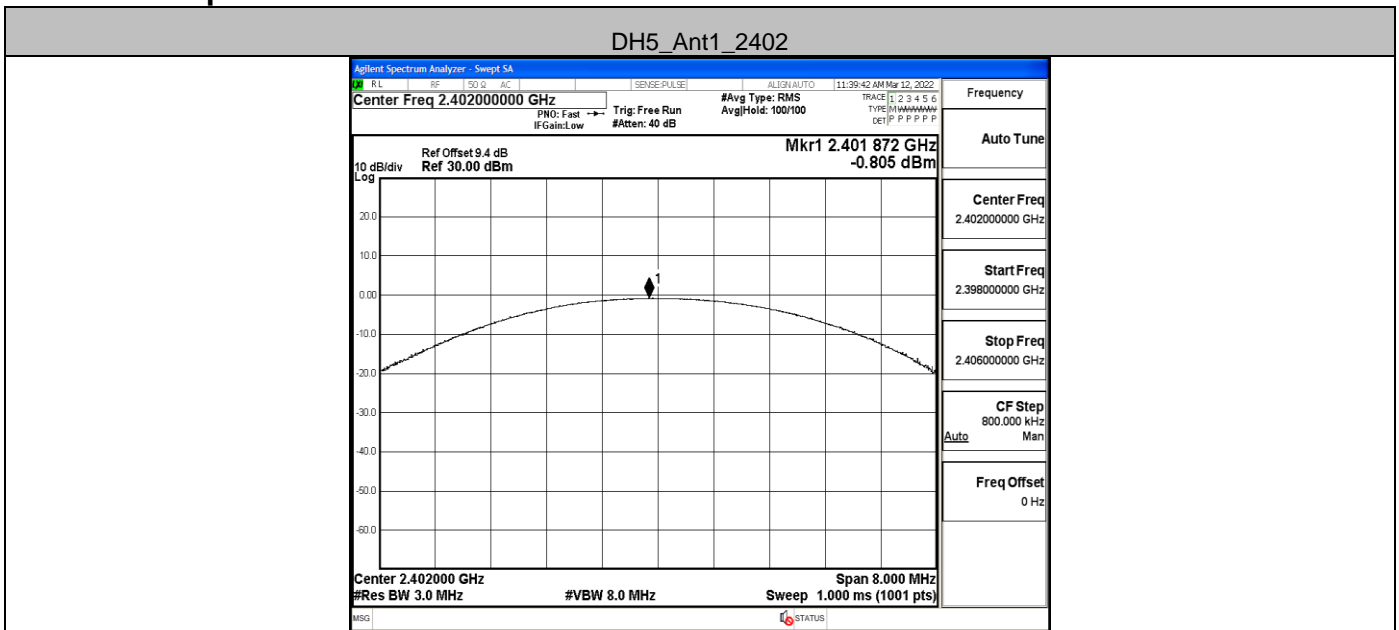




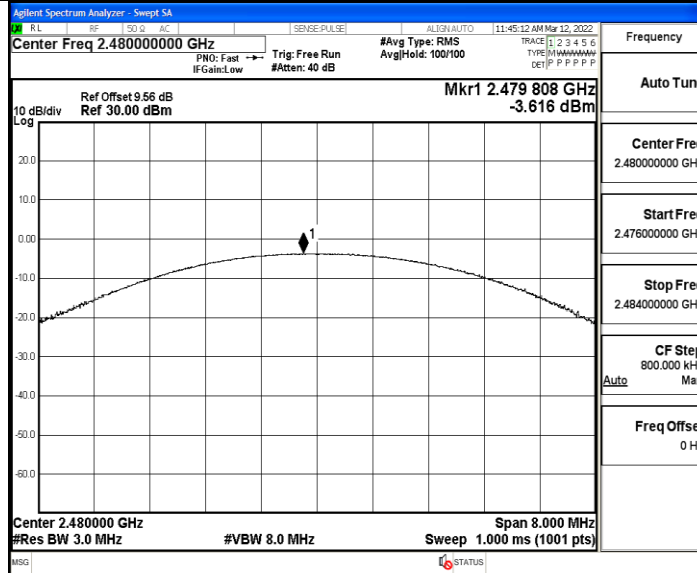
### A.5 Conducted Peak Output Power

| TestMode | Antenna | Channel | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|---------|-------------|------------|---------|
| DH5      | Ant1    | 2402    | -0.81       | ≤30        | PASS    |
|          |         | 2441    | -2.58       | ≤30        | PASS    |
|          |         | 2480    | -3.62       | ≤30        | PASS    |
| 2DH5     | Ant1    | 2402    | -0.29       | ≤20.97     | PASS    |
|          |         | 2441    | -1.97       | ≤20.97     | PASS    |
|          |         | 2480    | -3.06       | ≤20.97     | PASS    |
| 3DH5     | Ant1    | 2402    | 0.25        | ≤20.97     | PASS    |
|          |         | 2441    | -1.52       | ≤20.97     | PASS    |
|          |         | 2480    | -2.61       | ≤20.97     | PASS    |

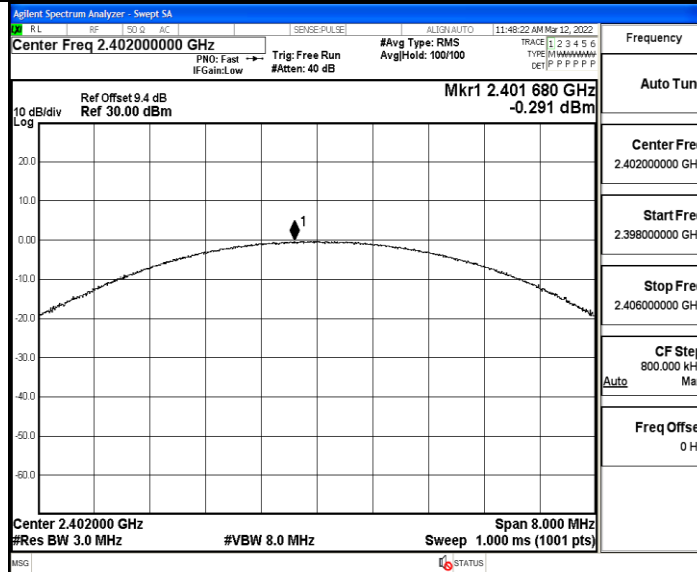
### Test Graph



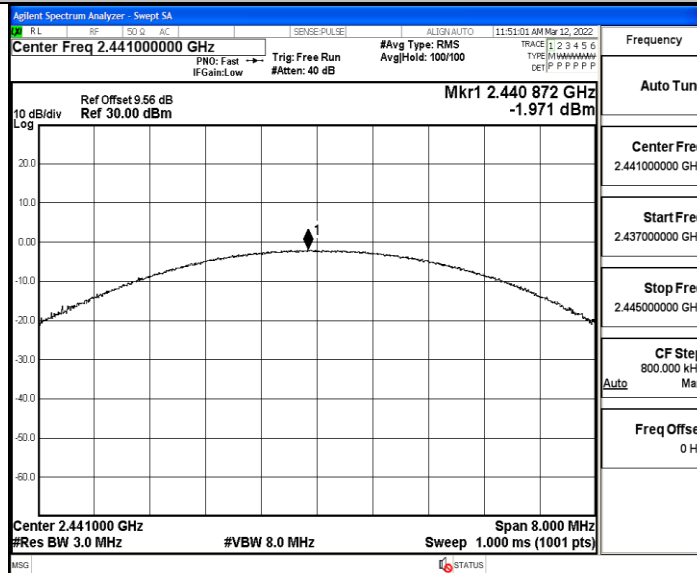
DH5\_Ant1\_2480



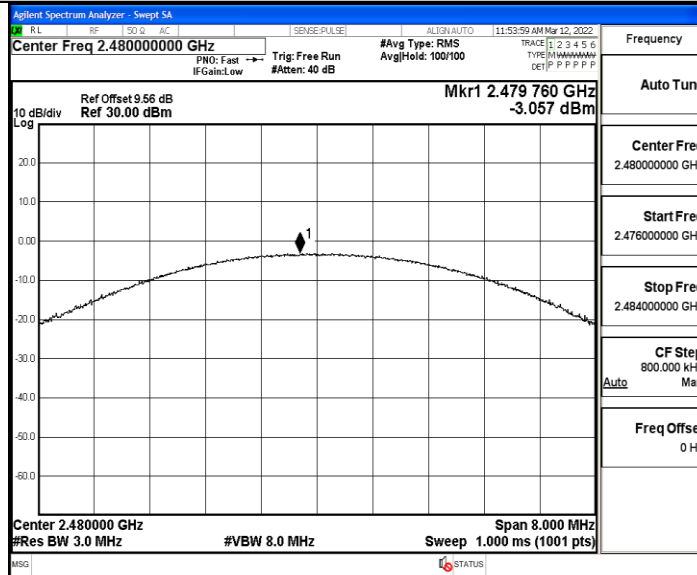
2DH5\_Ant1\_2402



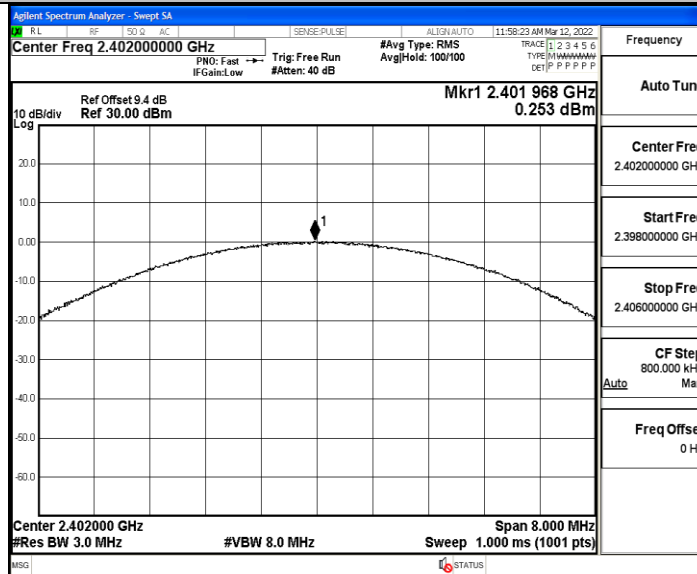
2DH5\_Ant1\_2441



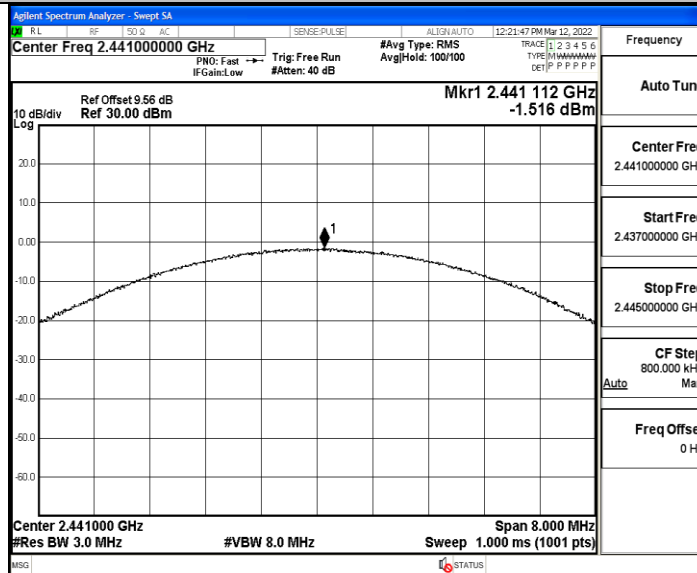
2DH5\_Ant1\_2480



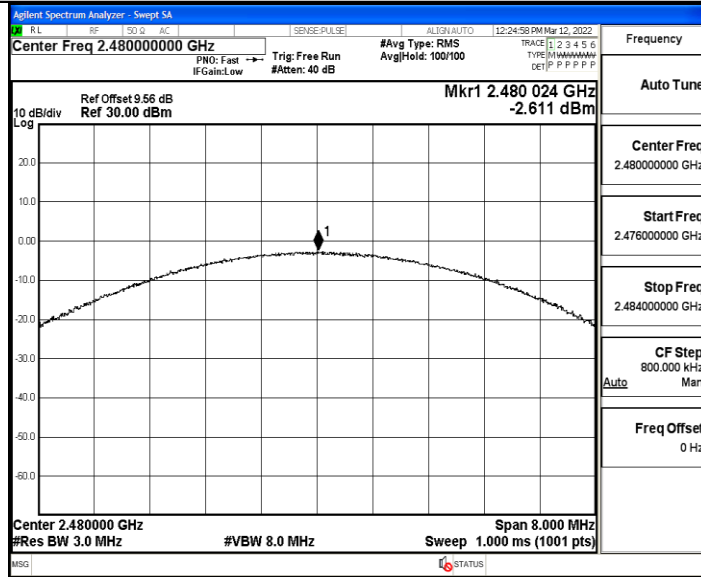
3DH5\_Ant1\_2402



3DH5\_Ant1\_2441



3DH5\_Ant1\_2480



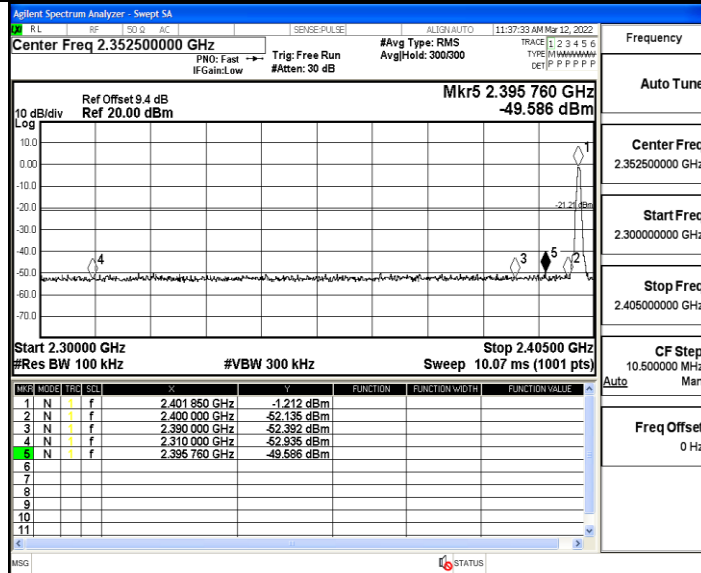


**A.6 Band-edge for RF Conducted Emissions**

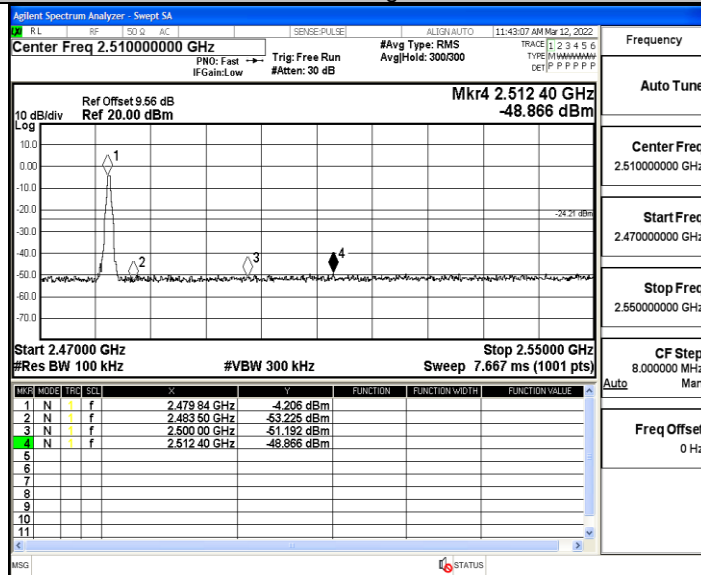
| TestMode | Antenna | ChName | Channel  | RefLevel<br>[dBm] | Result<br>[dBm] | Limit<br>[dBm] | Verdict |
|----------|---------|--------|----------|-------------------|-----------------|----------------|---------|
| DH5      | Ant1    | Low    | 2402     | -1.21             | -49.59          | ≤-21.21        | PASS    |
|          |         | High   | 2480     | -4.21             | -48.87          | ≤-24.21        | PASS    |
|          |         | Low    | Hop_2402 | -1.85             | -49.9           | ≤-21.85        | PASS    |
|          |         | High   | Hop_2480 | -3.97             | -48.43          | ≤-23.97        | PASS    |
| 2DH5     | Ant1    | Low    | 2402     | -1.23             | -46.83          | ≤-21.23        | PASS    |
|          |         | High   | 2480     | -5.64             | -47.86          | ≤-25.64        | PASS    |
|          |         | Low    | Hop_2402 | -1.96             | -49.85          | ≤-21.96        | PASS    |
|          |         | High   | Hop_2480 | -7.05             | -49.06          | ≤-27.05        | PASS    |
| 3DH5     | Ant1    | Low    | 2402     | -1.21             | -48.96          | ≤-21.21        | PASS    |
|          |         | High   | 2480     | -4.60             | -48.72          | ≤-24.6         | PASS    |
|          |         | Low    | Hop_2402 | -3.55             | -49.82          | ≤-23.55        | PASS    |
|          |         | High   | Hop_2480 | -4.68             | -48.5           | ≤-24.68        | PASS    |

Test Graph

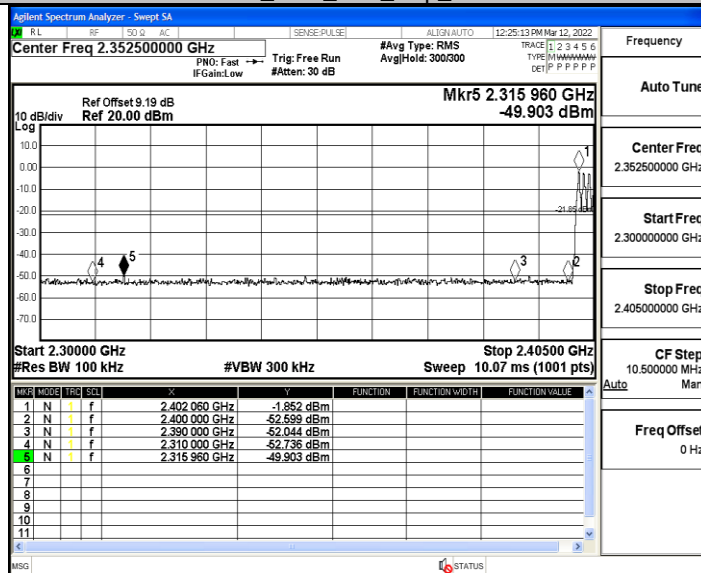
DH5\_Ant1\_Low\_2402



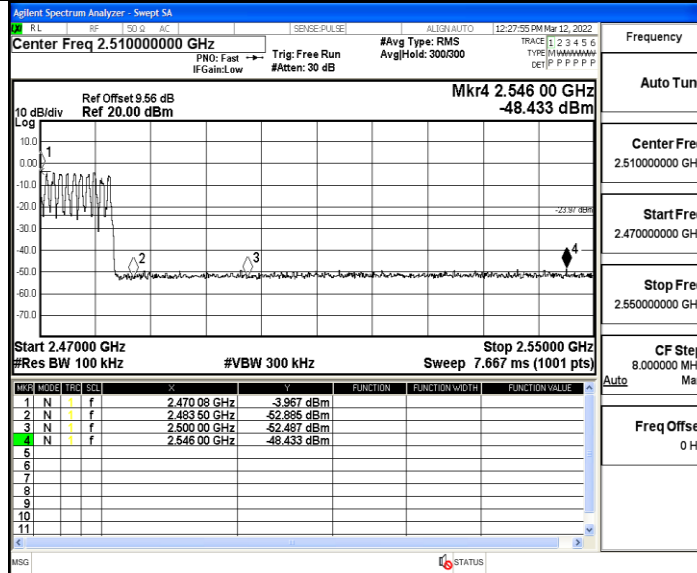
DH5\_Ant1\_High\_2480



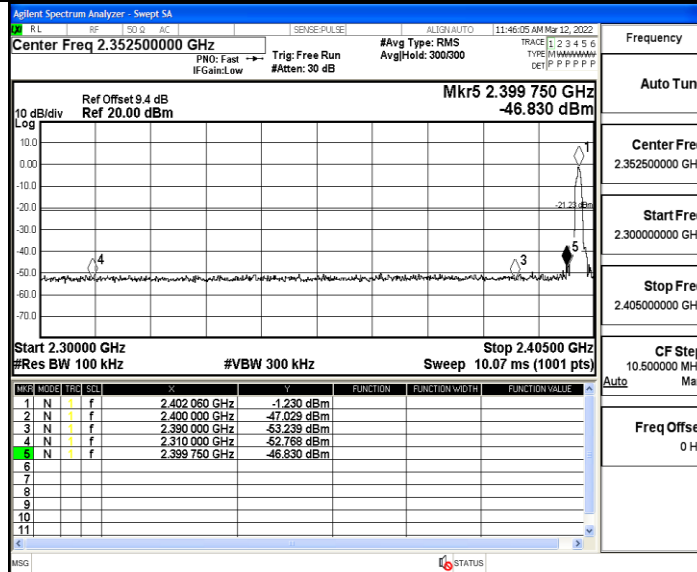
DH5\_Ant1\_Low\_Hop\_2402



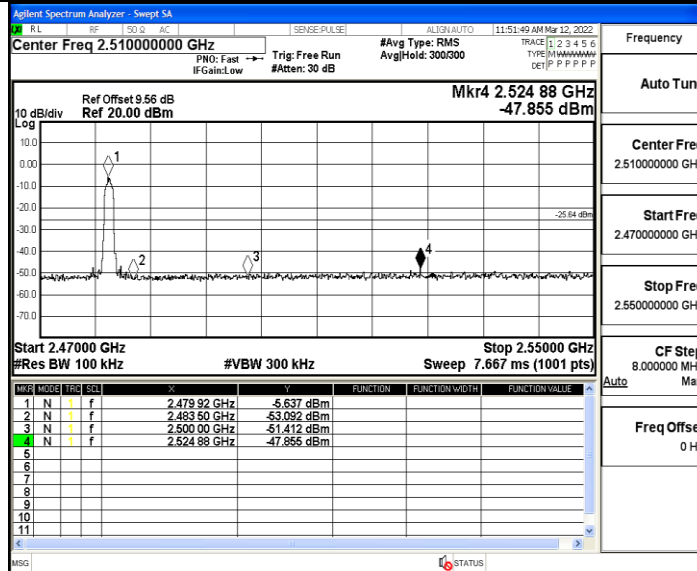
DH5\_Ant1\_High\_Hop\_2480



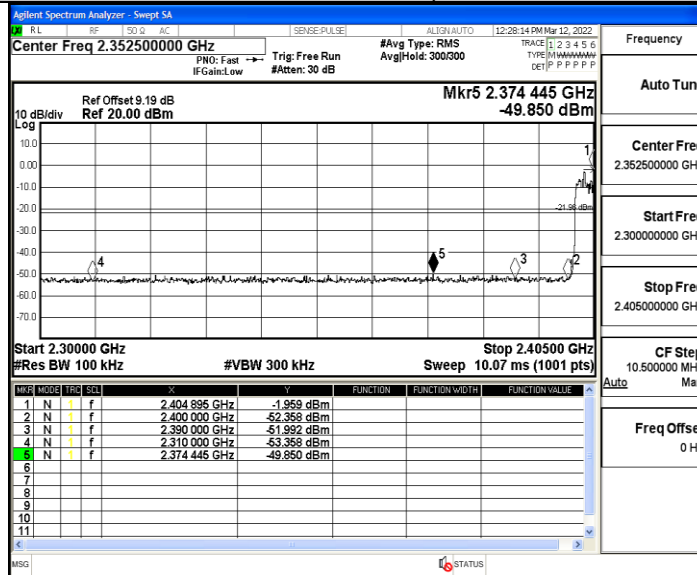
2DH5\_Ant1\_Low\_2402



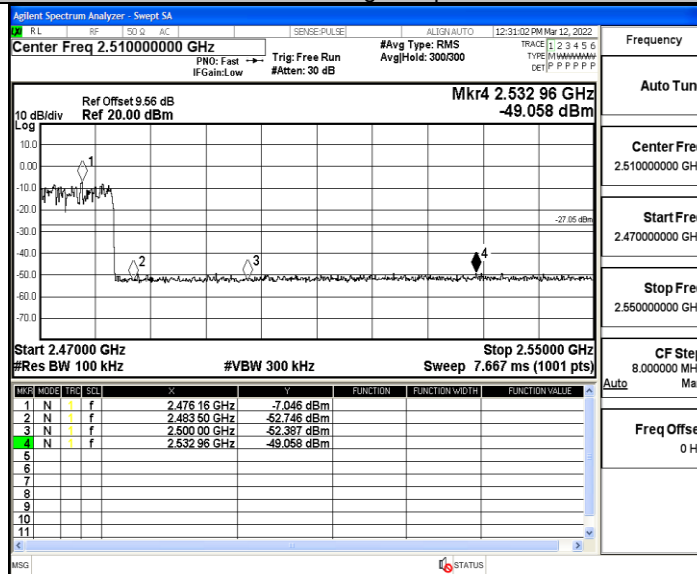
2DH5\_Ant1\_High\_2480



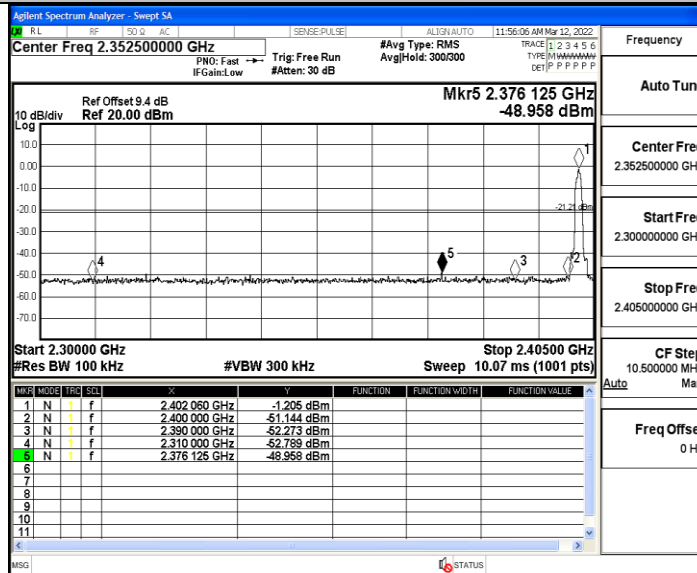
2DH5\_Ant1\_Low\_Hop\_2402



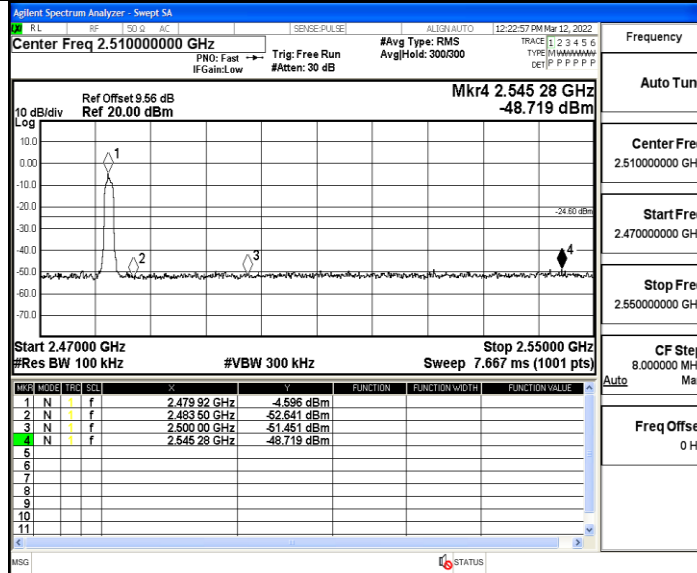
2DH5\_Ant1\_High\_Hop\_2480



3DH5\_Ant1\_Low\_2402

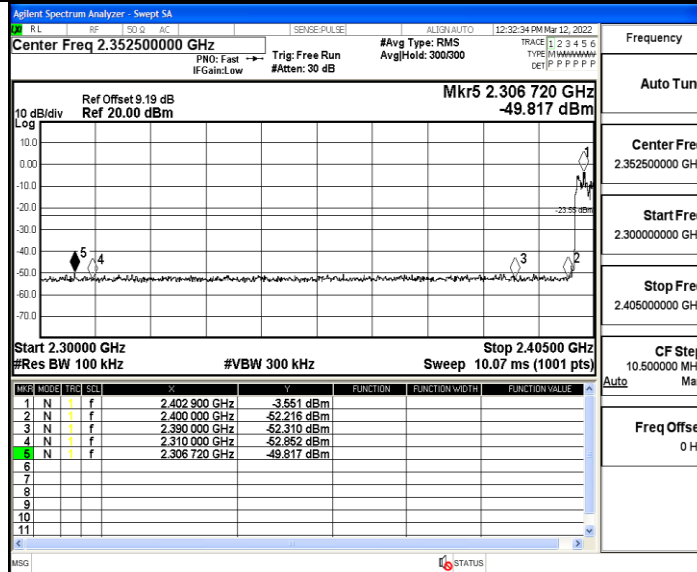


3DH5\_Ant1\_High\_2480



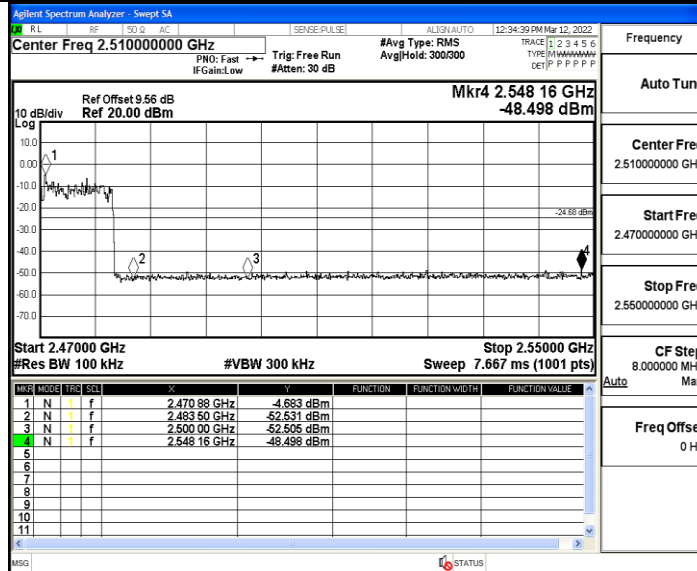
|             |                 |
|-------------|-----------------|
| Frequency   | Auto Tune       |
| Center Freq | 2.510000000 GHz |
| Start Freq  | 2.470000000 GHz |
| Stop Freq   | 2.550000000 GHz |
| CF Step     | 8.000000 MHz    |
| Freq Offset | 0 Hz            |

3DH5\_Ant1\_Low\_Hop\_2402



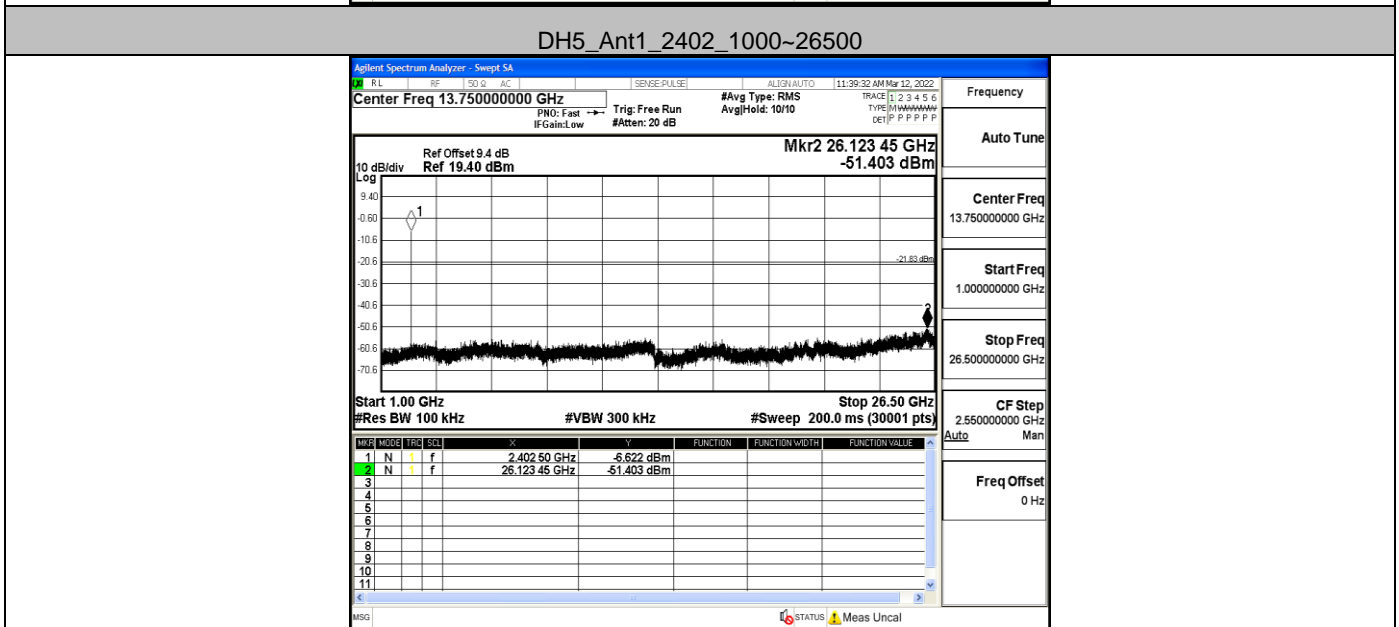
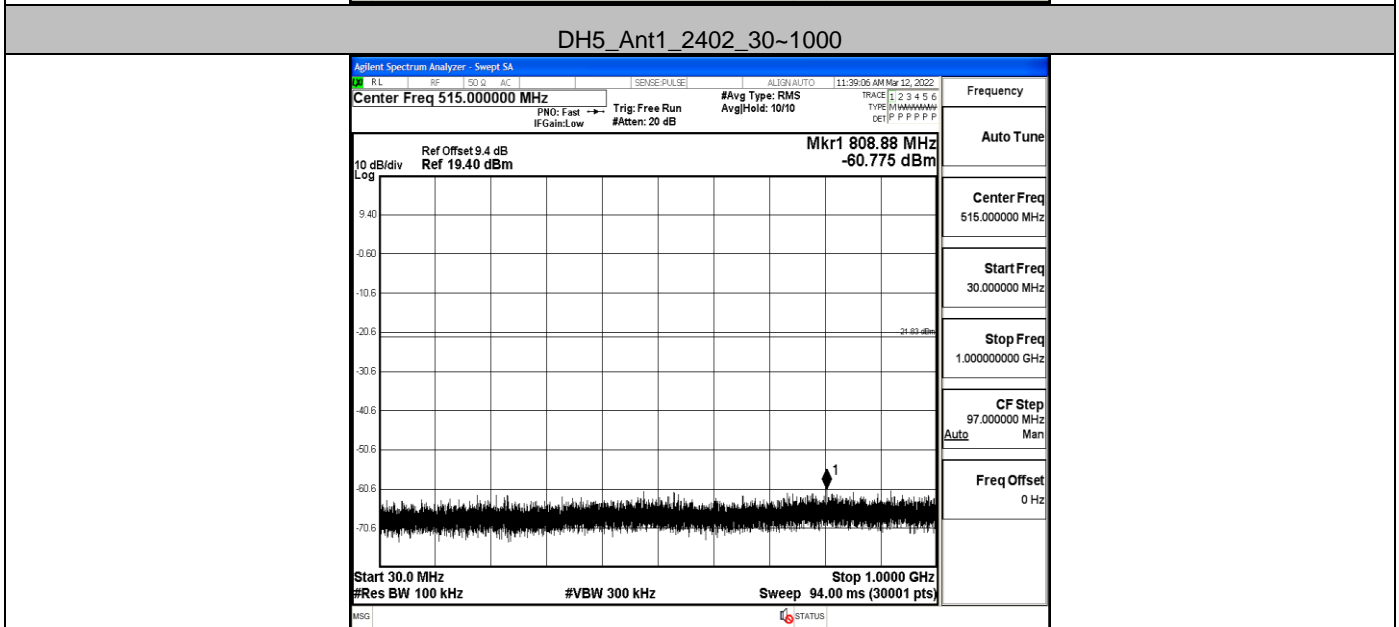
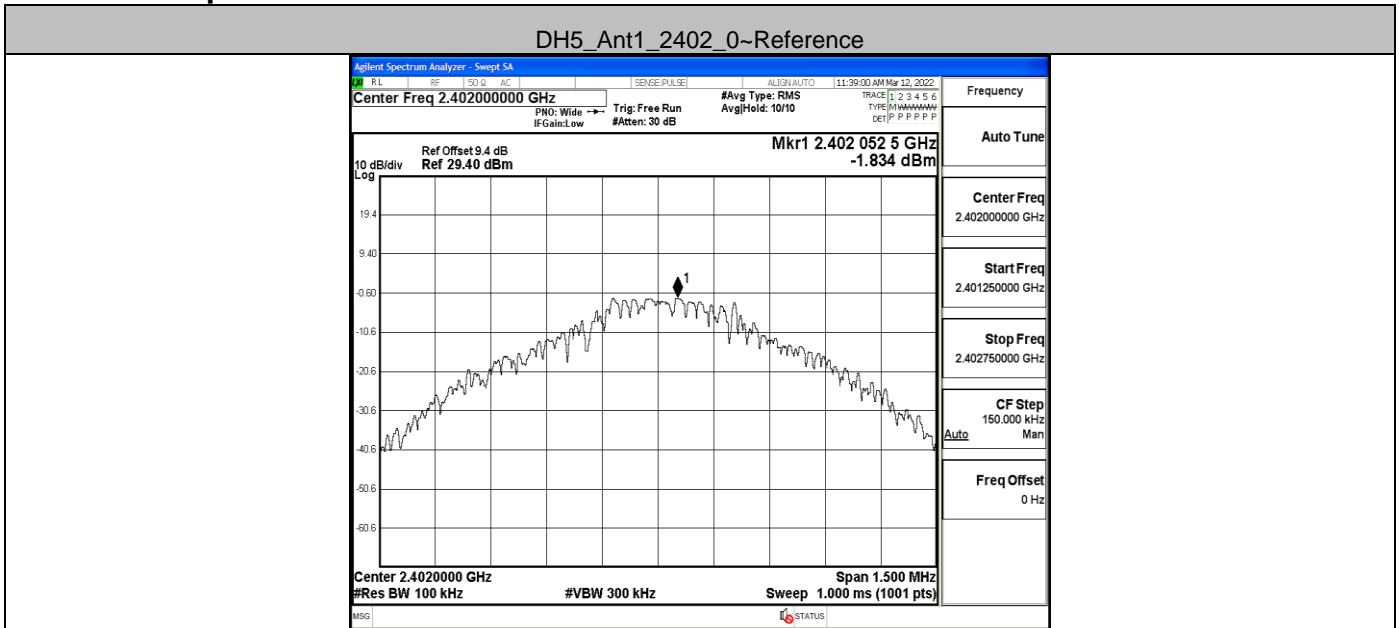
|             |                 |
|-------------|-----------------|
| Frequency   | Auto Tune       |
| Center Freq | 2.352500000 GHz |
| Start Freq  | 2.300000000 GHz |
| Stop Freq   | 2.405000000 GHz |
| CF Step     | 10.500000 MHz   |
| Freq Offset | 0 Hz            |

3DH5\_Ant1\_High\_Hop\_2480

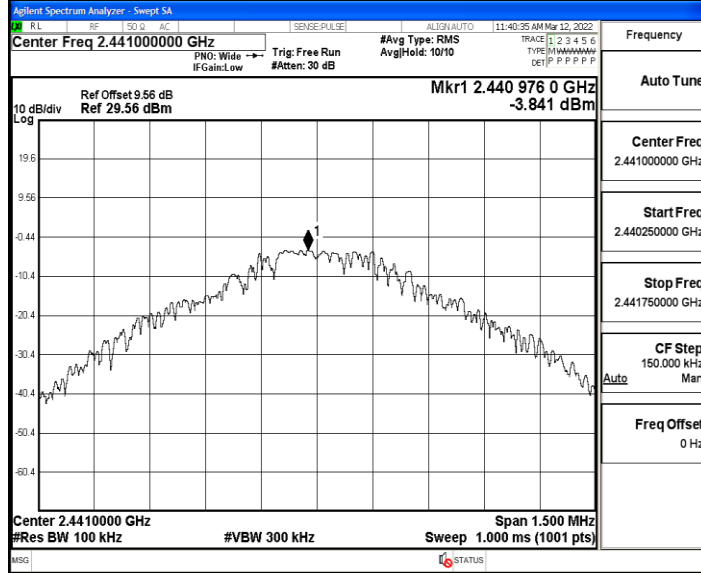


|             |                 |
|-------------|-----------------|
| Frequency   | Auto Tune       |
| Center Freq | 2.510000000 GHz |
| Start Freq  | 2.470000000 GHz |
| Stop Freq   | 2.550000000 GHz |
| CF Step     | 8.000000 MHz    |
| Freq Offset | 0 Hz            |

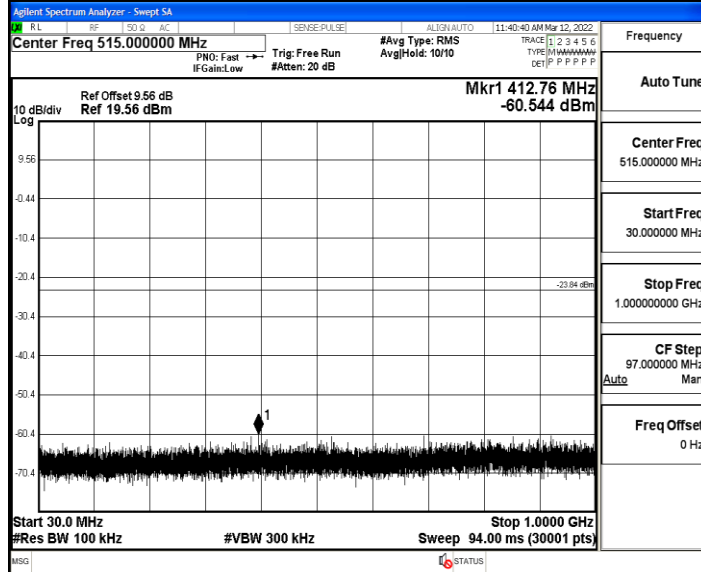
### A.7 RF Conducted Spurious Emissions Test Graph



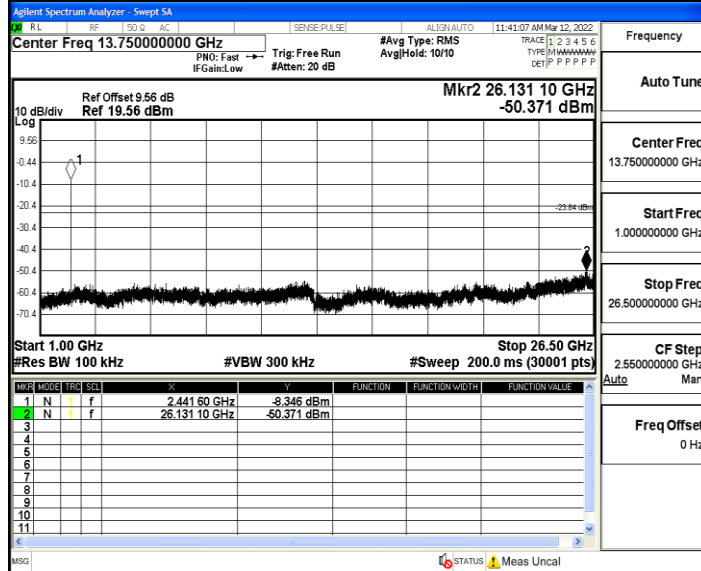
DH5\_Ant1\_2441\_0~Reference



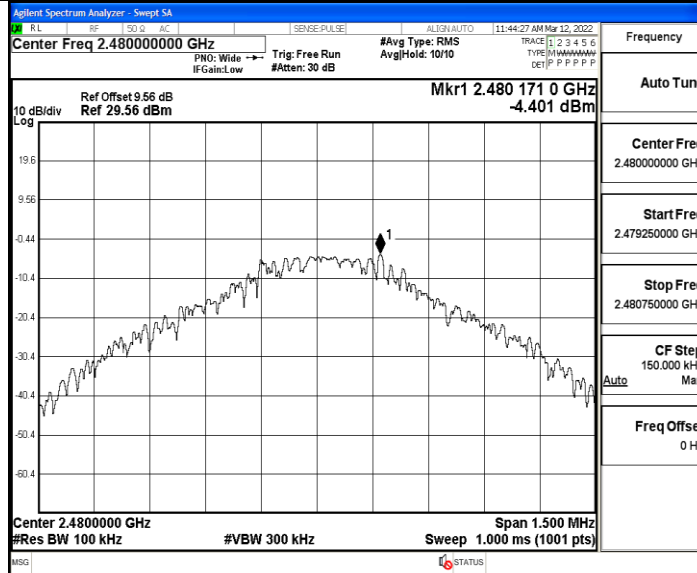
DH5\_Ant1\_2441\_30~1000



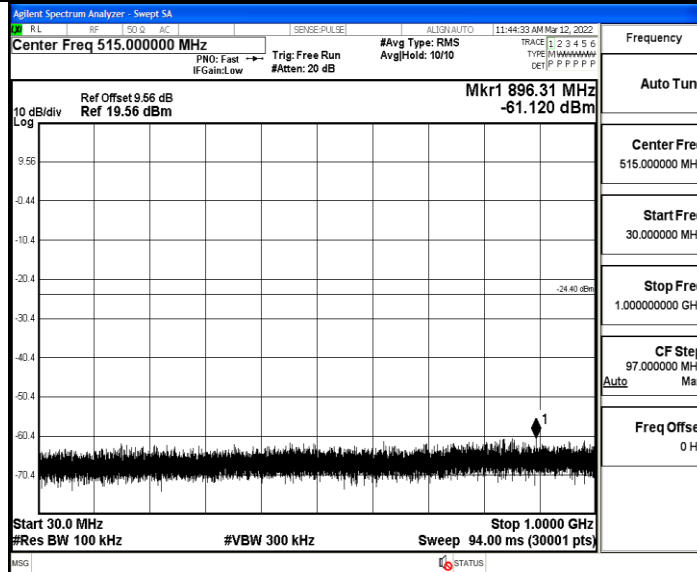
DH5\_Ant1\_2441\_1000~26500



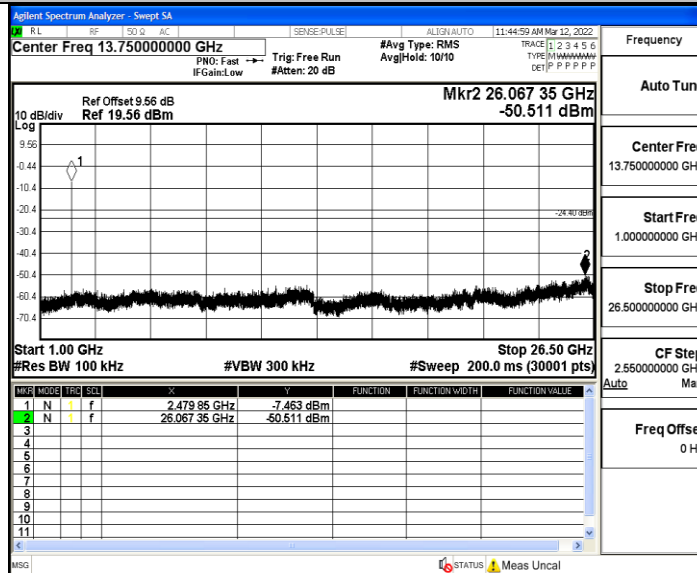
DH5\_Ant1\_2480\_0~Reference



DH5\_Ant1\_2480\_30~1000

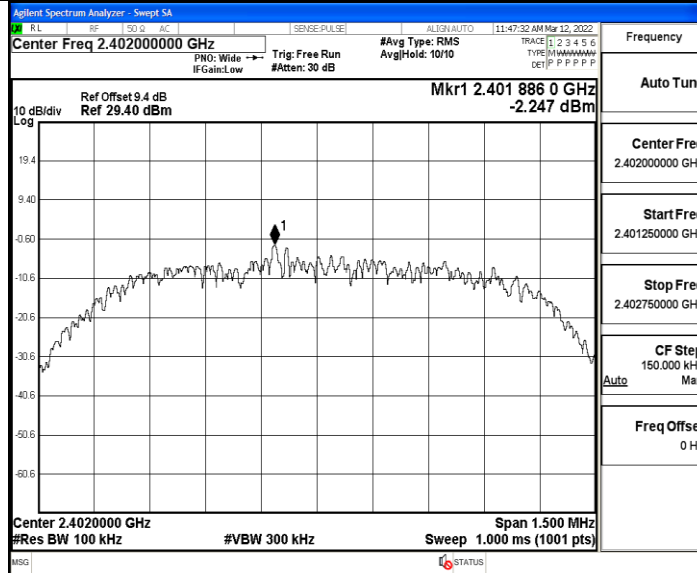


DH5\_Ant1\_2480\_1000~26500

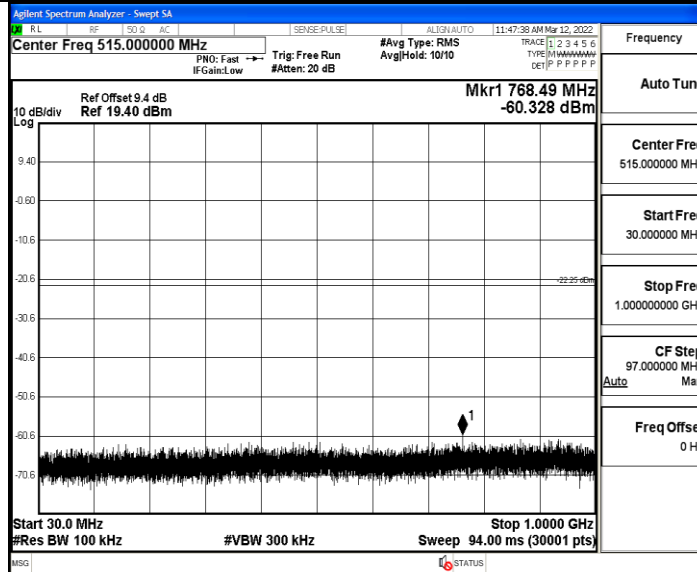




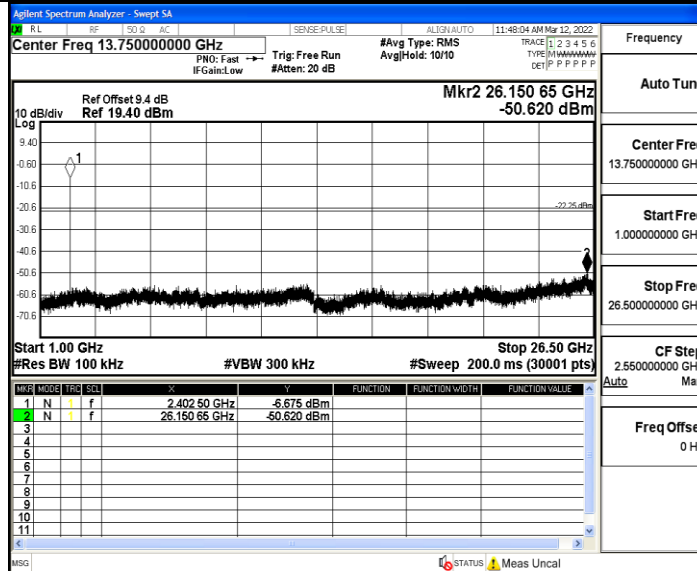
2DH5\_Ant1\_2402\_0~Reference



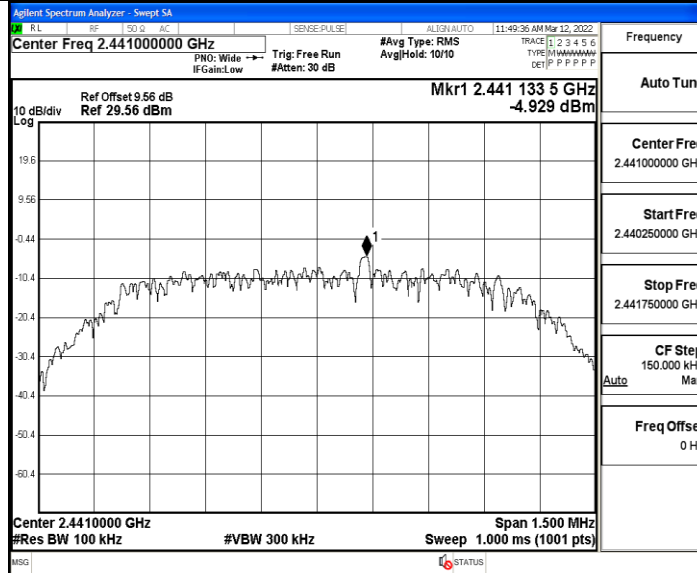
2DH5\_Ant1\_2402\_30~1000



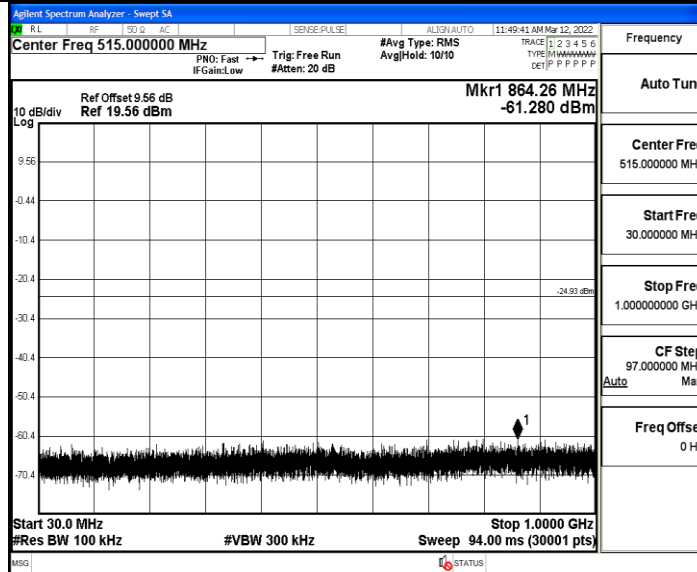
2DH5\_Ant1\_2402\_1000~26500



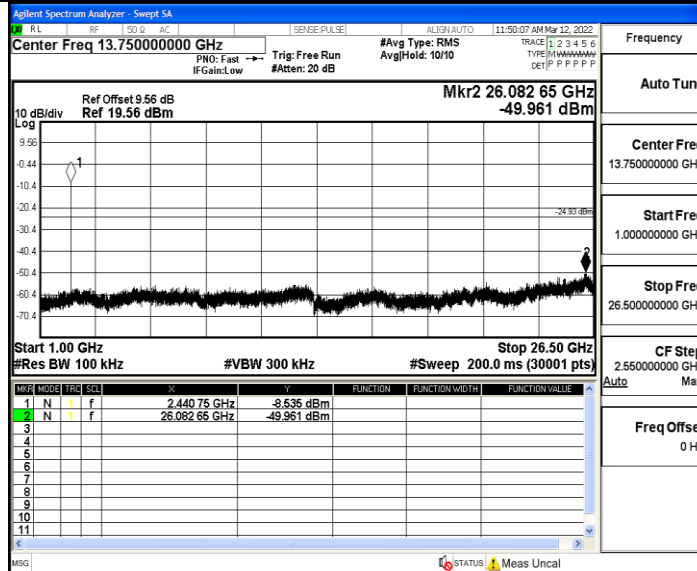
2DH5\_Ant1\_2441\_0~Reference



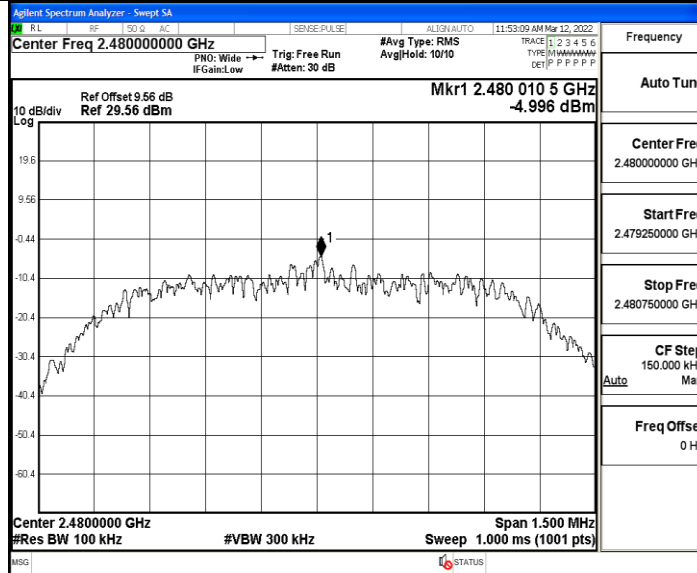
2DH5\_Ant1\_2441\_30~1000



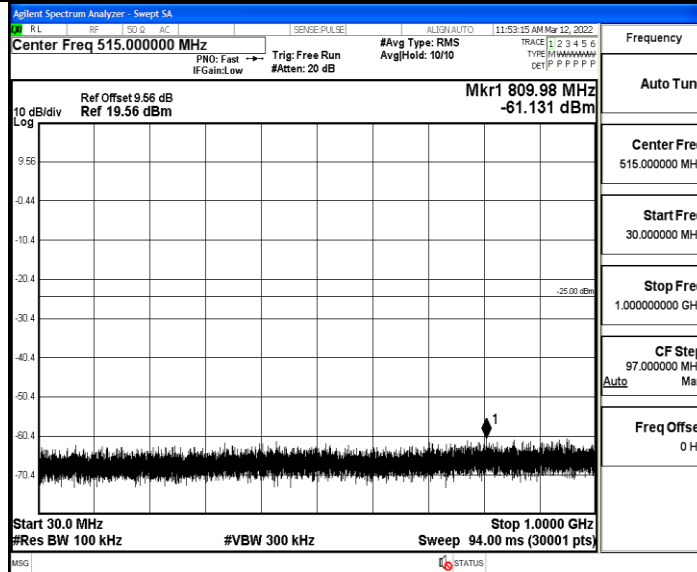
2DH5\_Ant1\_2441\_1000~26500



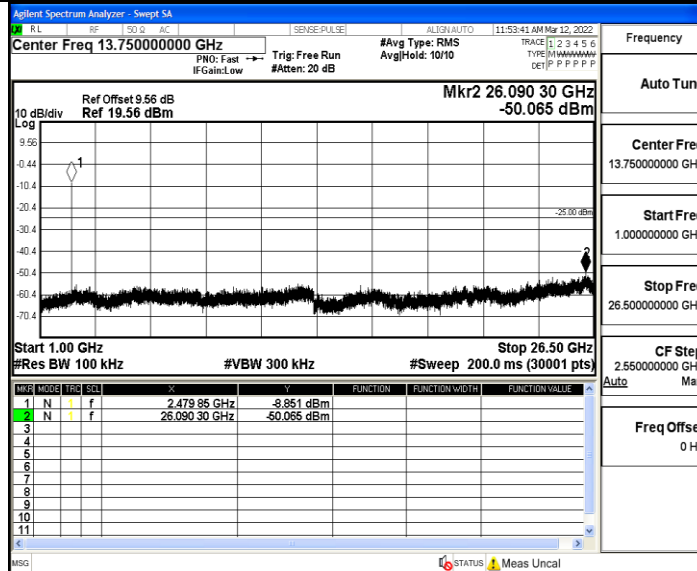
2DH5\_Ant1\_2480\_0~Reference



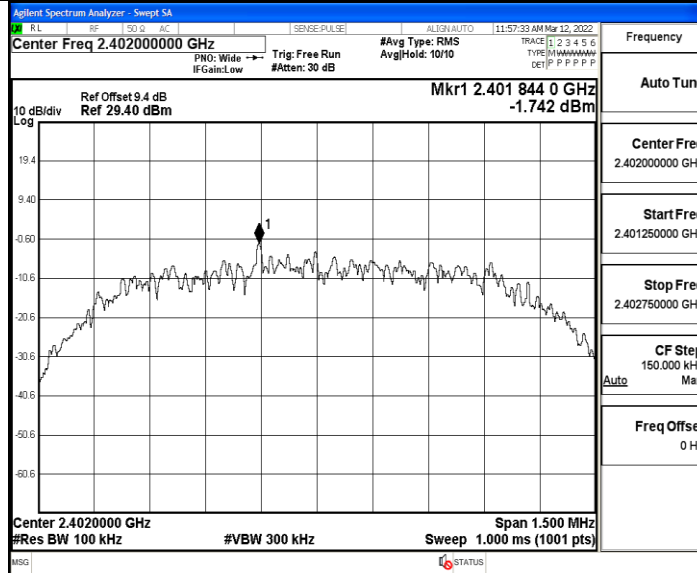
2DH5\_Ant1\_2480\_30~1000



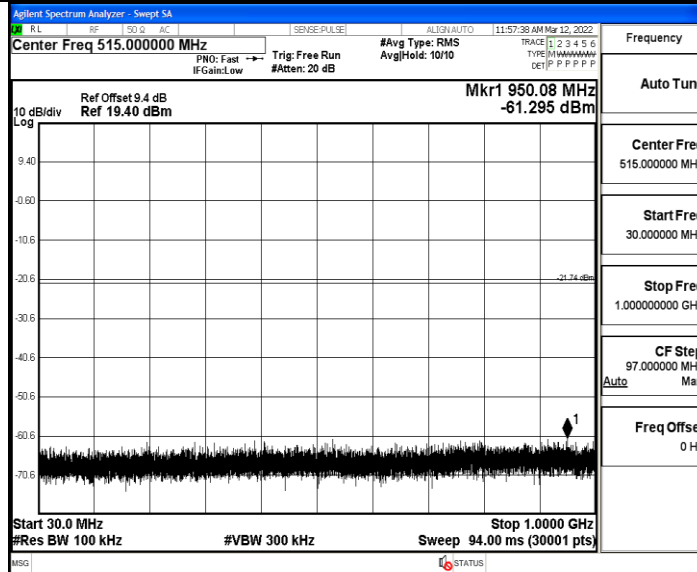
2DH5\_Ant1\_2480\_1000~26500



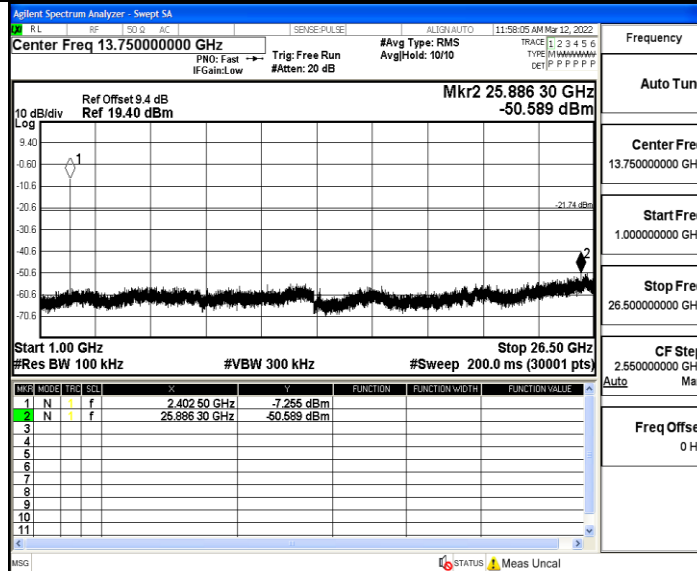
3DH5\_Ant1\_2402\_0~Reference



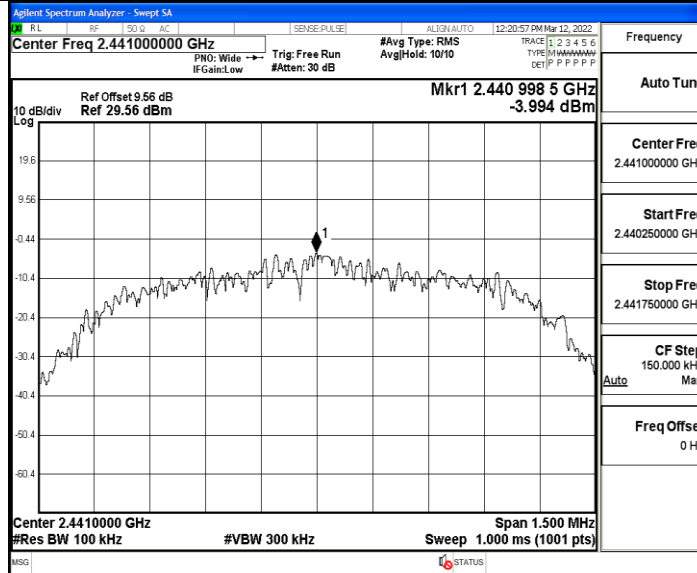
3DH5\_Ant1\_2402\_30~1000



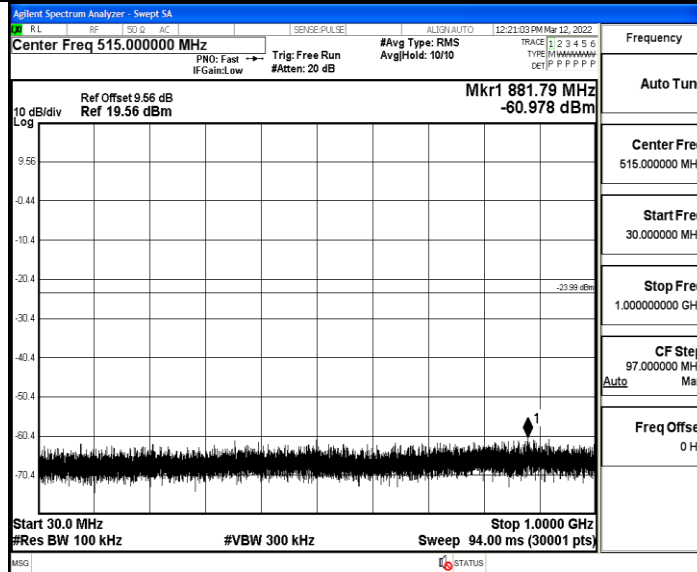
3DH5\_Ant1\_2402\_1000~26500



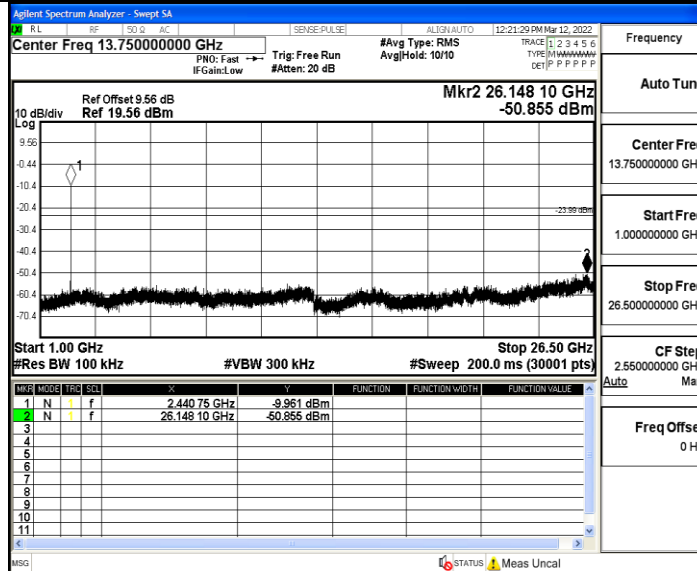
3DH5\_Ant1\_2441\_0~Reference



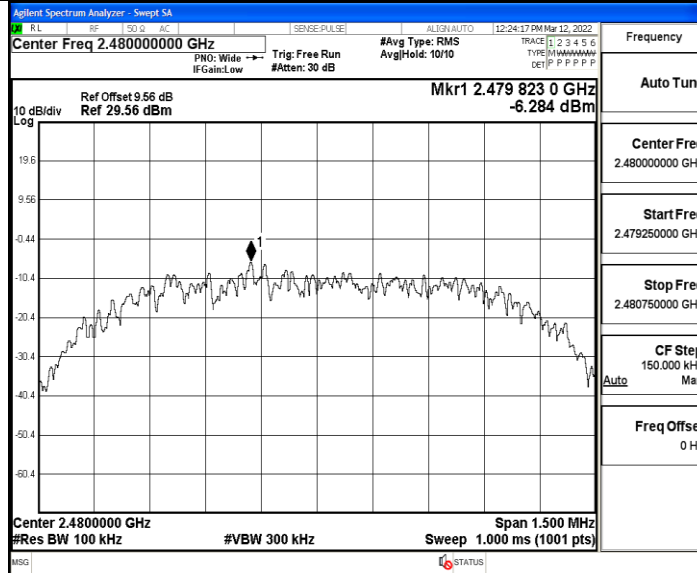
3DH5\_Ant1\_2441\_30~1000



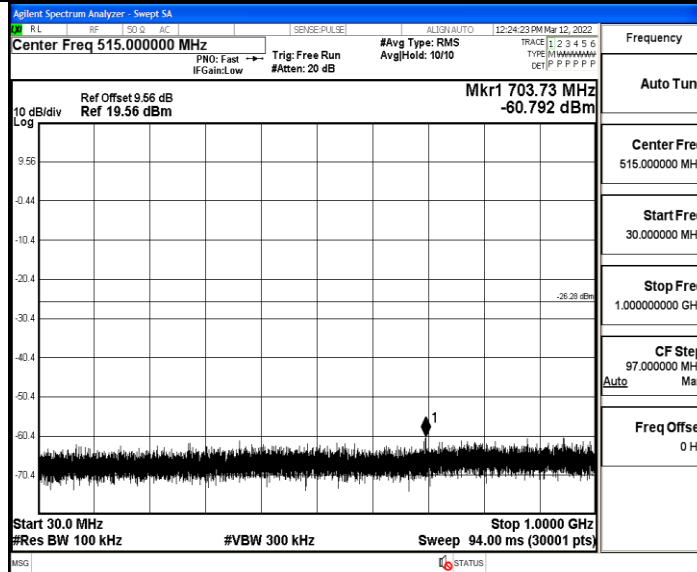
3DH5\_Ant1\_2441\_1000~26500



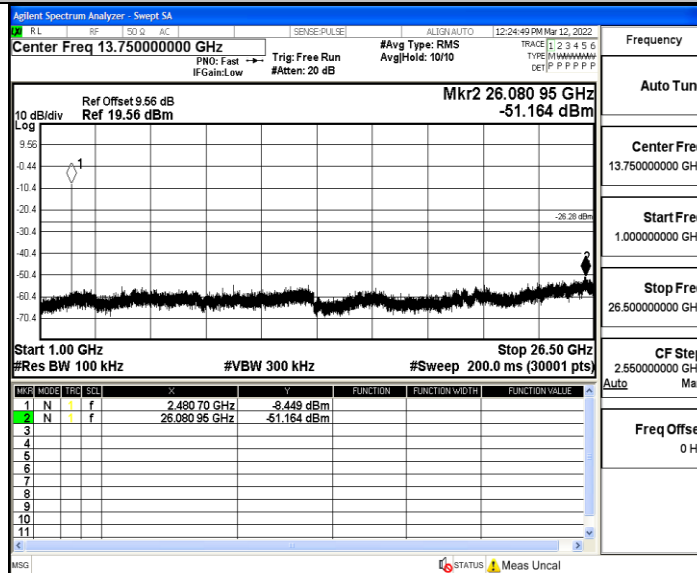
3DH5\_Ant1\_2480\_0~Reference



3DH5\_Ant1\_2480\_30~1000



3DH5\_Ant1\_2480\_1000~26500



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

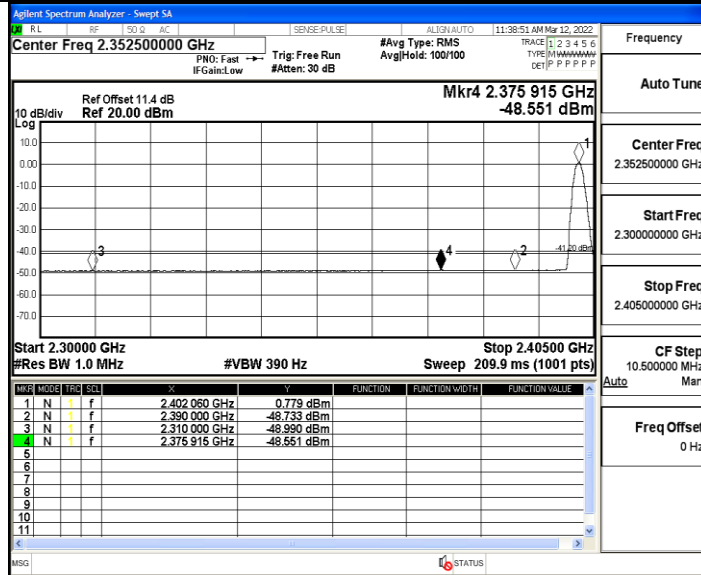
| TestMode | Antenna | ChName | Channel | Detector | Freq(MHz) | Result(dBm) | Limit(dBm) | Verdict |
|----------|---------|--------|---------|----------|-----------|-------------|------------|---------|
| DH5      | Ant1    | Low    | 2402    | AV       | 2310.000  | -48.99      | ≤-41.20    | PASS    |
|          |         |        |         | AV       | 2375.915  | -48.55      | ≤-41.20    | PASS    |
|          |         |        |         | AV       | 2390.000  | -48.73      | ≤-41.20    | PASS    |
|          |         |        |         | Peak     | 2310.000  | -42.87      | ≤-21.20    | PASS    |
|          |         |        |         | Peak     | 2366.990  | -38.36      | ≤-21.20    | PASS    |
|          |         |        |         | Peak     | 2390.000  | -39.79      | ≤-21.20    | PASS    |
|          |         | High   | 2480    | AV       | 2483.500  | -48.17      | ≤-41.20    | PASS    |
|          |         |        |         | AV       | 2498.160  | -47.98      | ≤-41.20    | PASS    |
|          |         |        |         | AV       | 2500.000  | -48.04      | ≤-41.20    | PASS    |
|          |         |        |         | Peak     | 2483.500  | -41.93      | ≤-21.20    | PASS    |
|          |         |        |         | Peak     | 2494.480  | -37.78      | ≤-21.20    | PASS    |
|          |         |        |         | Peak     | 2500.000  | -41.63      | ≤-21.20    | PASS    |
| 2DH5     | Ant1    | Low    | 2402    | AV       | 2310.000  | -48.96      | ≤-41.20    | PASS    |
|          |         |        |         | AV       | 2385.785  | -48.62      | ≤-41.20    | PASS    |
|          |         |        |         | AV       | 2390.000  | -48.85      | ≤-41.20    | PASS    |
|          |         |        |         | Peak     | 2310.000  | -42.37      | ≤-21.20    | PASS    |
|          |         |        |         | Peak     | 2361.215  | -39.12      | ≤-21.20    | PASS    |
|          |         |        |         | Peak     | 2390.000  | -42.75      | ≤-21.20    | PASS    |
|          |         | High   | 2480    | AV       | 2483.500  | -48.19      | ≤-41.20    | PASS    |
|          |         |        |         | AV       | 2497.680  | -47.93      | ≤-41.20    | PASS    |
|          |         |        |         | AV       | 2500.000  | -48.09      | ≤-41.20    | PASS    |
|          |         |        |         | Peak     | 2483.500  | -41.37      | ≤-21.20    | PASS    |
|          |         |        |         | Peak     | 2494.160  | -37.87      | ≤-21.20    | PASS    |
|          |         |        |         | Peak     | 2500.000  | -40.32      | ≤-21.20    | PASS    |
| 3DH5     | Ant1    | Low    | 2402    | AV       | 2310.000  | -49.01      | ≤-41.20    | PASS    |
|          |         |        |         | AV       | 2381.060  | -48.67      | ≤-41.20    | PASS    |
|          |         |        |         | AV       | 2390.000  | -48.8       | ≤-41.20    | PASS    |
|          |         |        |         | Peak     | 2310.000  | -40.85      | ≤-21.20    | PASS    |
|          |         |        |         | Peak     | 2338.535  | -38.06      | ≤-21.20    | PASS    |
|          |         |        |         | Peak     | 2390.000  | -40.61      | ≤-21.20    | PASS    |
|          |         | High   | 2480    | AV       | 2483.500  | -48.22      | ≤-41.20    | PASS    |
|          |         |        |         | AV       | 2497.680  | -47.93      | ≤-41.20    | PASS    |
|          |         |        |         | AV       | 2500.000  | -48.01      | ≤-41.20    | PASS    |
|          |         |        |         | Peak     | 2483.500  | -40.41      | ≤-21.20    | PASS    |
|          |         |        |         | Peak     | 2495.280  | -38.51      | ≤-21.20    | PASS    |
|          |         |        |         | Peak     | 2500.000  | -41.59      | ≤-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.

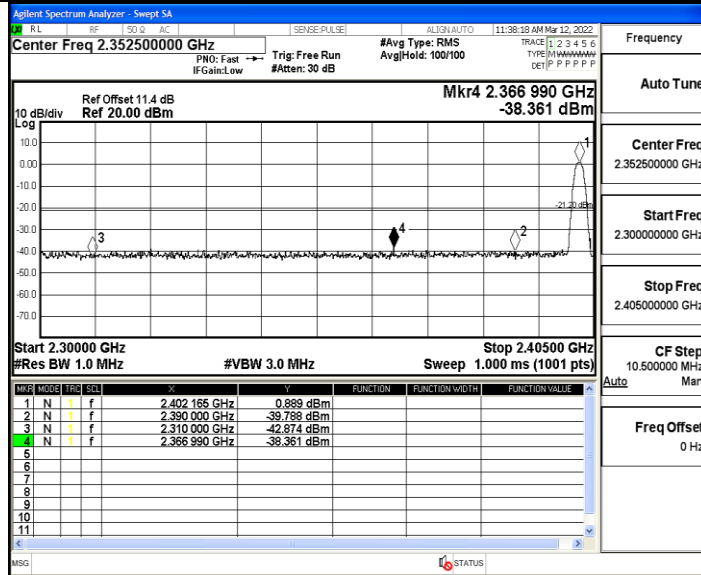


Test Graphs

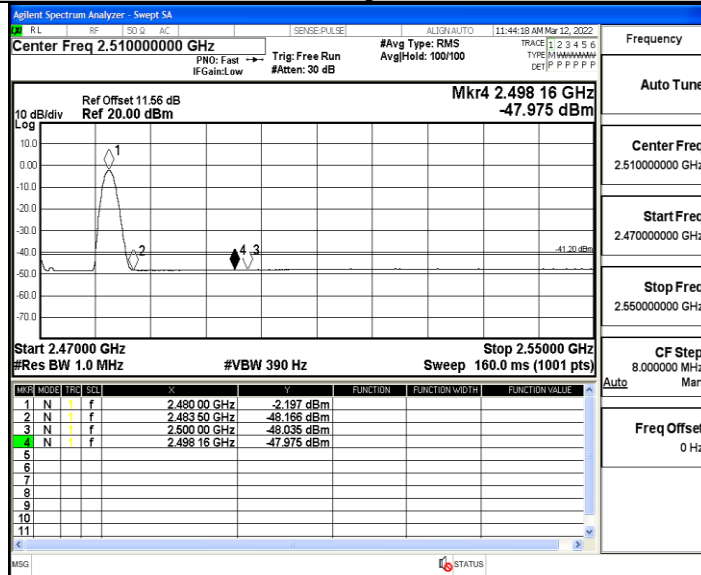
DH5\_Ant1\_Low\_2402\_AV



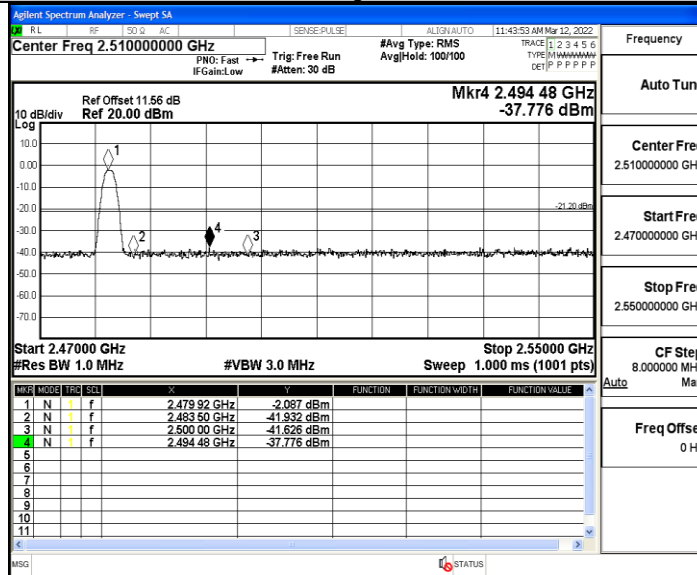
DH5\_Ant1\_Low\_2402\_Peak



DH5\_Ant1\_High\_2480\_AV

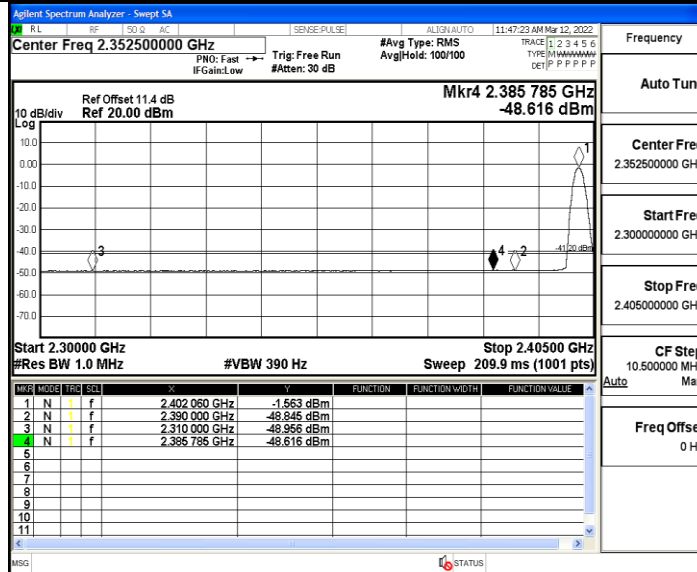


DH5\_Ant1\_High\_2480\_Peak



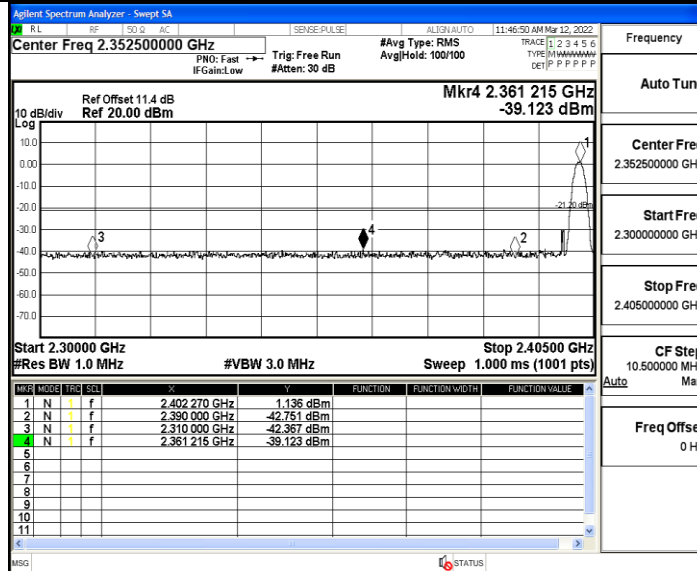
|             |                |
|-------------|----------------|
| Frequency   | Auto Tune      |
| Center Freq | 2.51000000 GHz |
| Start Freq  | 2.47000000 GHz |
| Stop Freq   | 2.55000000 GHz |
| CF Step     | 8.000000 MHz   |
| Freq Offset | 0 Hz           |

2DH5\_Ant1\_Low\_2402\_AV



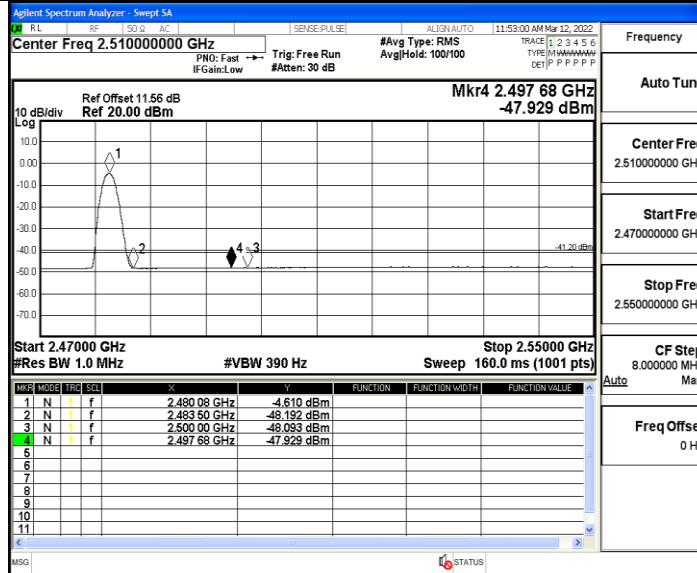
|             |                |
|-------------|----------------|
| Frequency   | Auto Tune      |
| Center Freq | 2.35250000 GHz |
| Start Freq  | 2.30000000 GHz |
| Stop Freq   | 2.40500000 GHz |
| CF Step     | 10.500000 MHz  |
| Freq Offset | 0 Hz           |

2DH5\_Ant1\_Low\_2402\_Peak

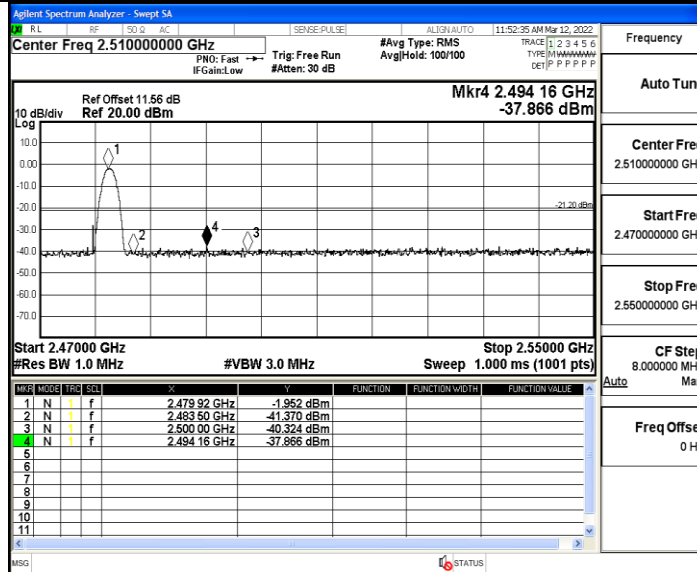


|             |                |
|-------------|----------------|
| Frequency   | Auto Tune      |
| Center Freq | 2.35250000 GHz |
| Start Freq  | 2.30000000 GHz |
| Stop Freq   | 2.40500000 GHz |
| CF Step     | 10.500000 MHz  |
| Freq Offset | 0 Hz           |

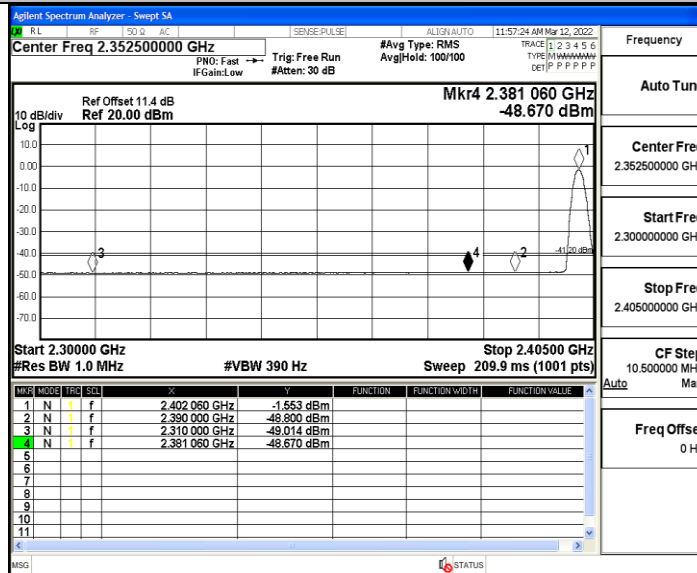
2DH5\_Ant1\_High\_2480\_AV



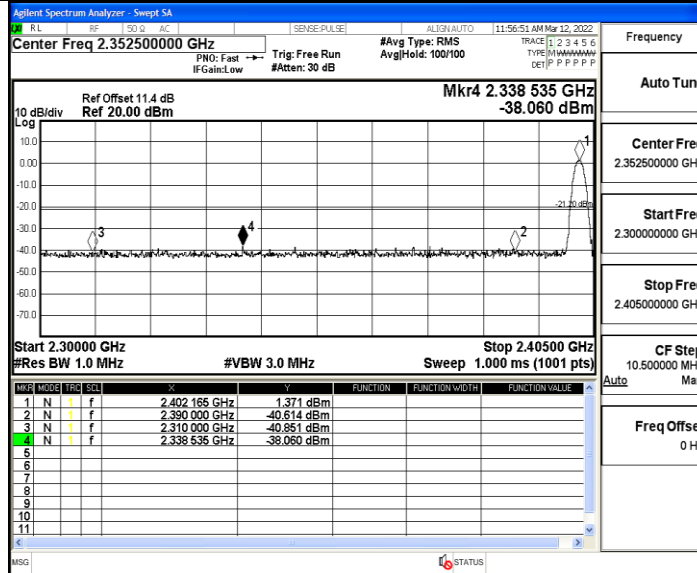
2DH5\_Ant1\_High\_2480\_Peak



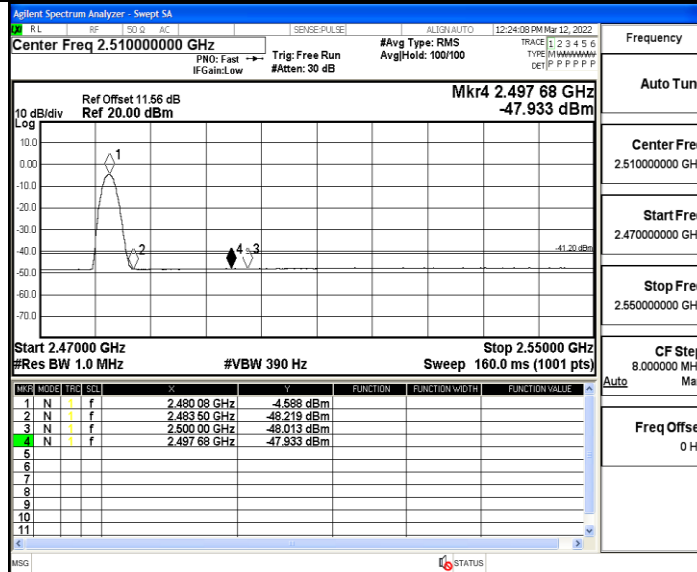
3DH5\_Ant1\_Low\_2402\_AV



3DH5\_Ant1\_Low\_2402\_Peak



3DH5\_Ant1\_High\_2480\_AV



3DH5\_Ant1\_High\_2480\_Peak

