

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

Product Name: TWS Earbuds Ball

Trade Mark: N/A

Test Model: YS-TWS049

FCC ID: 2AWHS-TWS049

Environmental Conditions

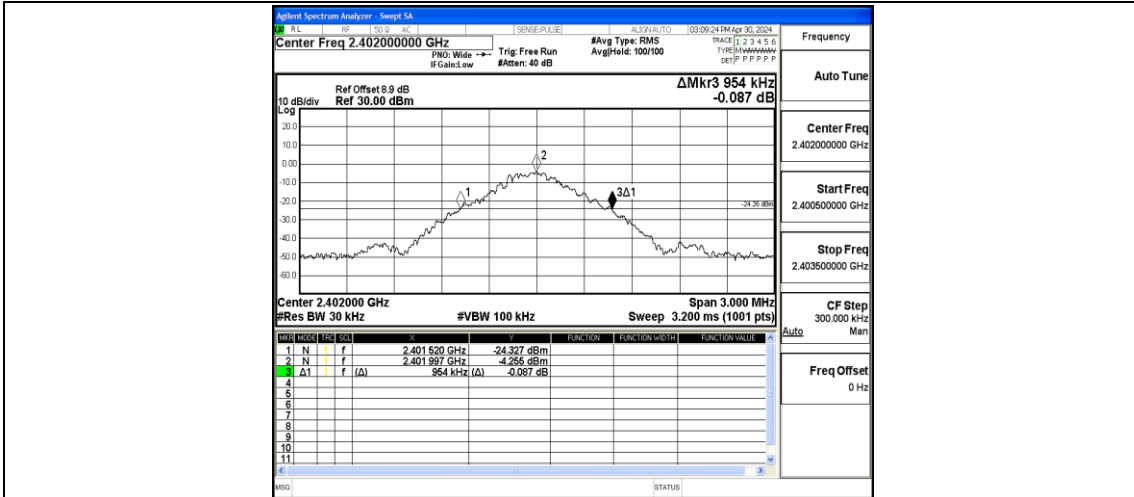
| | |
|--------------------|-----------|
| Temperature: | 23.8℃ |
| Relative Humidity: | 58% |
| ATM Pressure: | 100.0 kPa |
| Test Engineer: | Allen Lai |
| Supervised by: | Hugo Chen |
| NOTE | N/A |

Appendix A: 20dB Emission Bandwidth

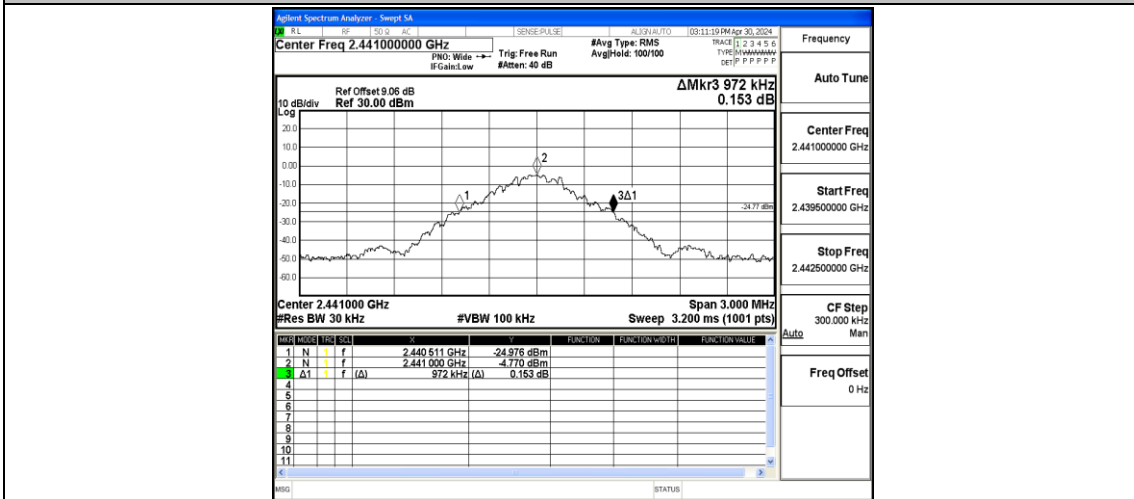
Test Result

| TestMode | Antenna | Frequency[MHz] | 20db EBW[MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|----------|---------|----------------|------------------|----------|----------|------------|---------|
| DH5 | Ant1 | 2402 | 0.954 | 2401.520 | 2402.474 | --- | --- |
| DH5 | Ant1 | 2441 | 0.972 | 2440.511 | 2441.483 | --- | --- |
| DH5 | Ant1 | 2480 | 0.996 | 2479.484 | 2480.480 | --- | --- |
| 2DH5 | Ant1 | 2402 | 1.314 | 2401.319 | 2402.633 | --- | --- |
| 2DH5 | Ant1 | 2441 | 1.284 | 2440.349 | 2441.633 | --- | --- |
| 2DH5 | Ant1 | 2480 | 1.311 | 2479.325 | 2480.636 | --- | --- |

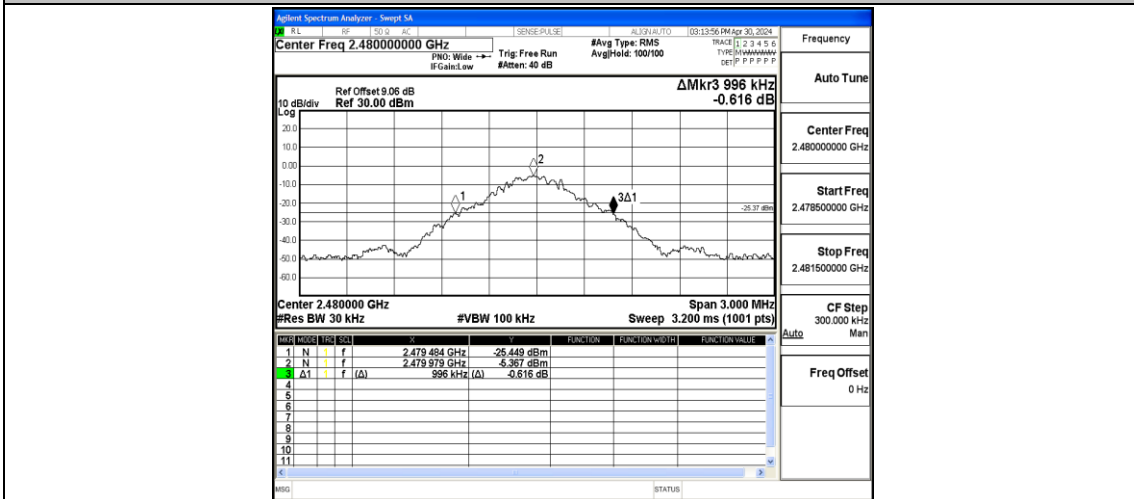
Test Graphs



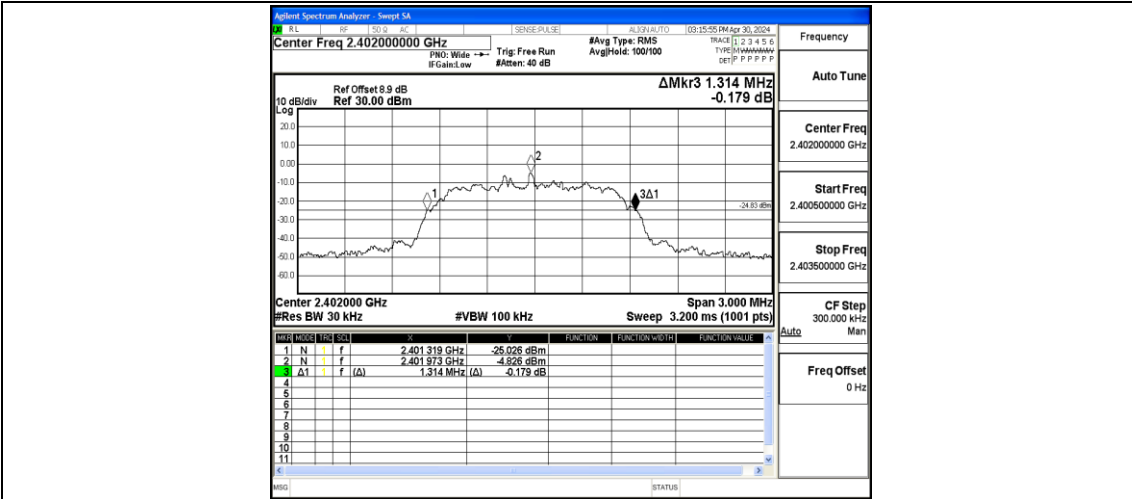
DH5-Ant1-2402



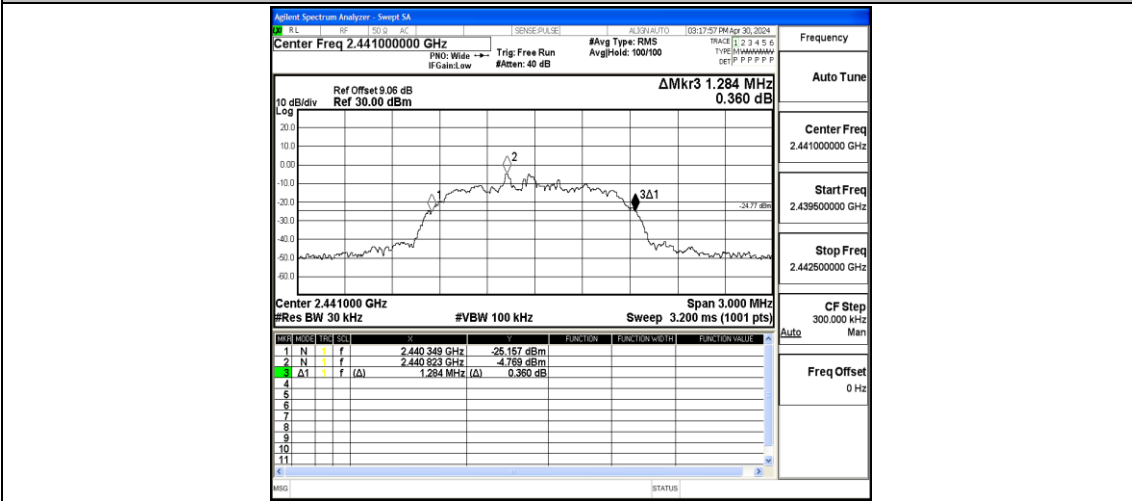
DH5-Ant1-2441



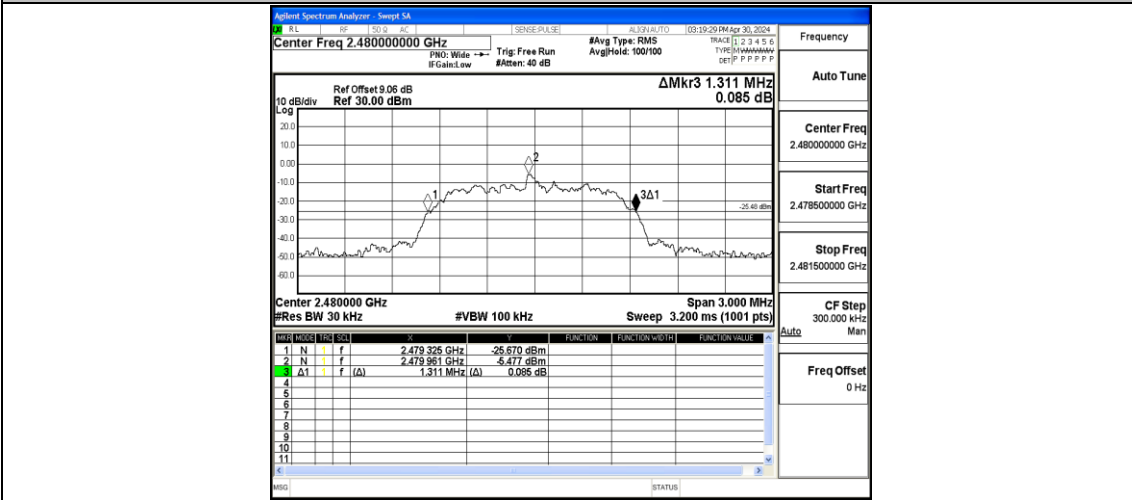
DH5-Ant1-2480



2DH5-Ant1-2402



2DH5-Ant1-2441



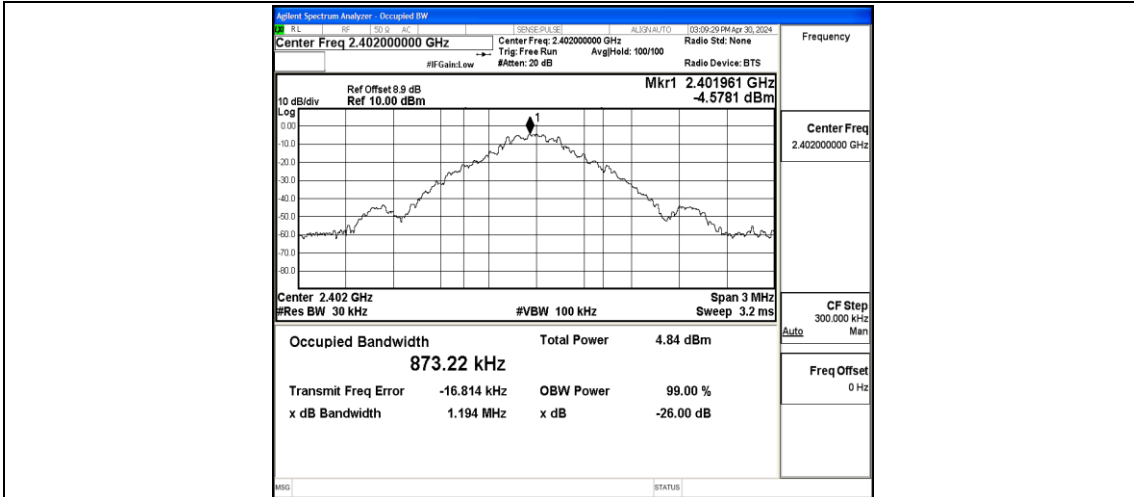
2DH5-Ant1-2480

Appendix B: Occupied Channel Bandwidth

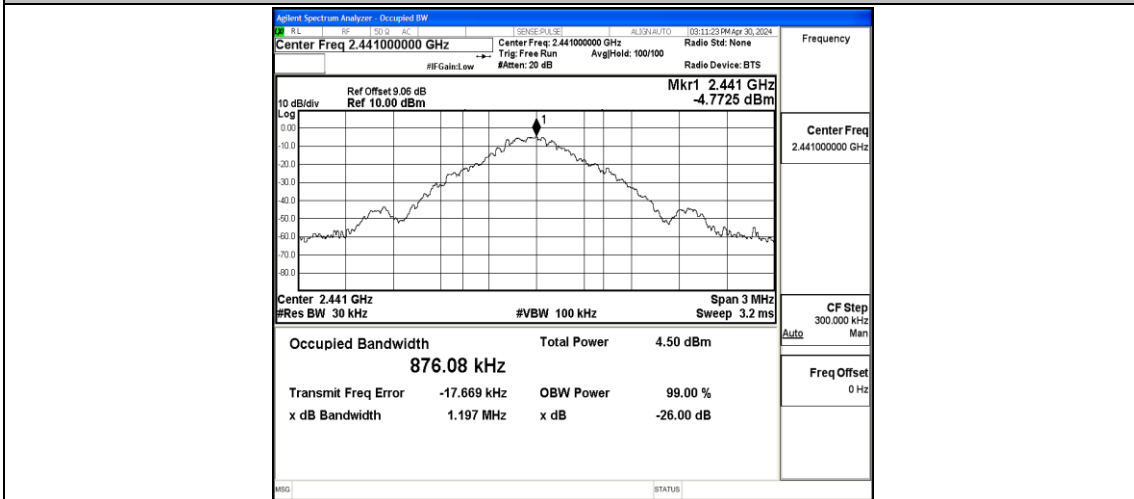
Test Result

| TestMode | Antenna | Frequency[MHz] | OCB [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|----------|---------|----------------|-----------|-----------|-----------|------------|---------|
| DH5 | Ant1 | 2402 | 0.87322 | 2401.5466 | 2402.4198 | --- | --- |
| DH5 | Ant1 | 2441 | 0.87608 | 2440.5443 | 2441.4204 | --- | --- |
| DH5 | Ant1 | 2480 | 0.88977 | 2479.5409 | 2480.4307 | --- | --- |
| 2DH5 | Ant1 | 2402 | 1.2035 | 2401.3829 | 2402.5864 | --- | --- |
| 2DH5 | Ant1 | 2441 | 1.2066 | 2440.3804 | 2441.5870 | --- | --- |
| 2DH5 | Ant1 | 2480 | 1.1801 | 2479.3941 | 2480.5742 | --- | --- |

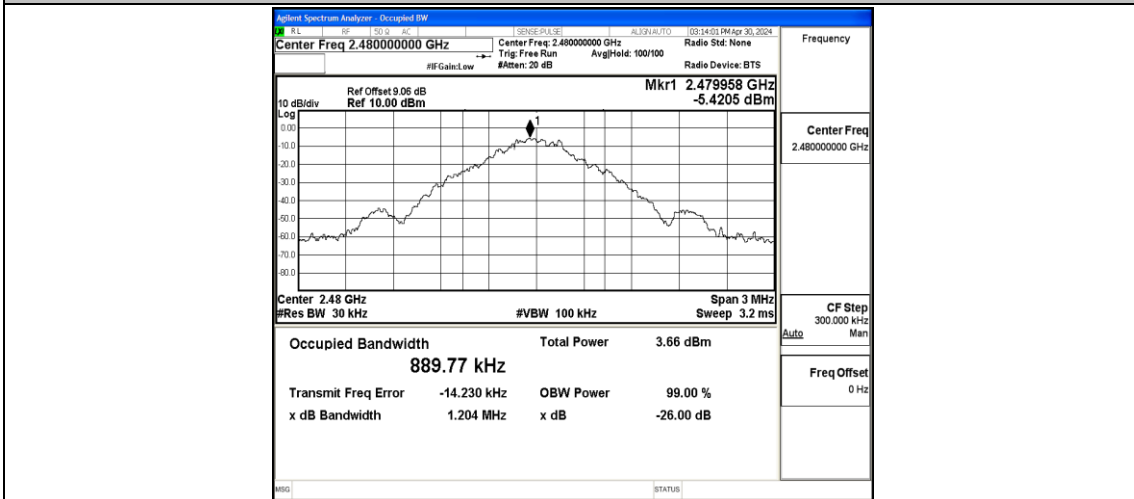
Test Graphs



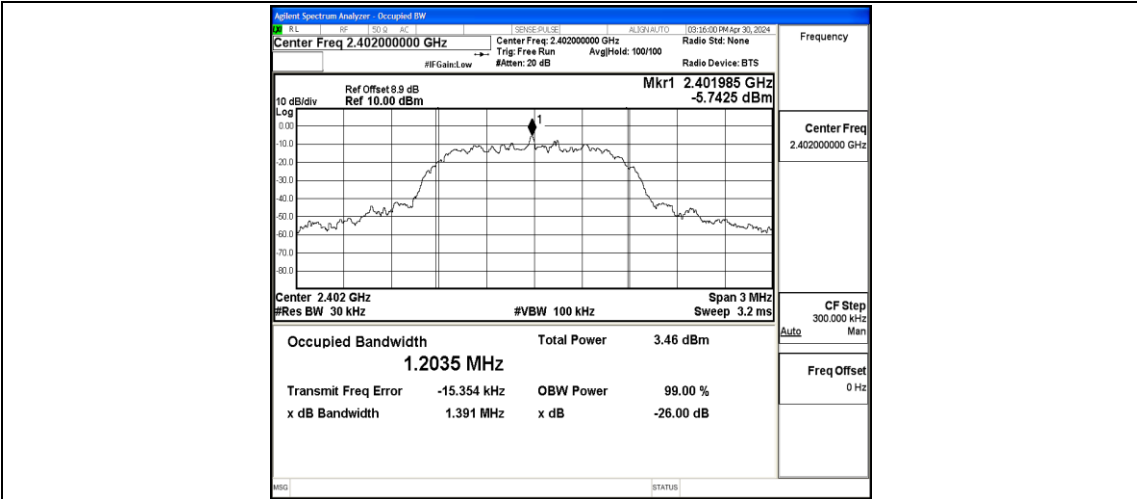
DH5-Ant1-2402



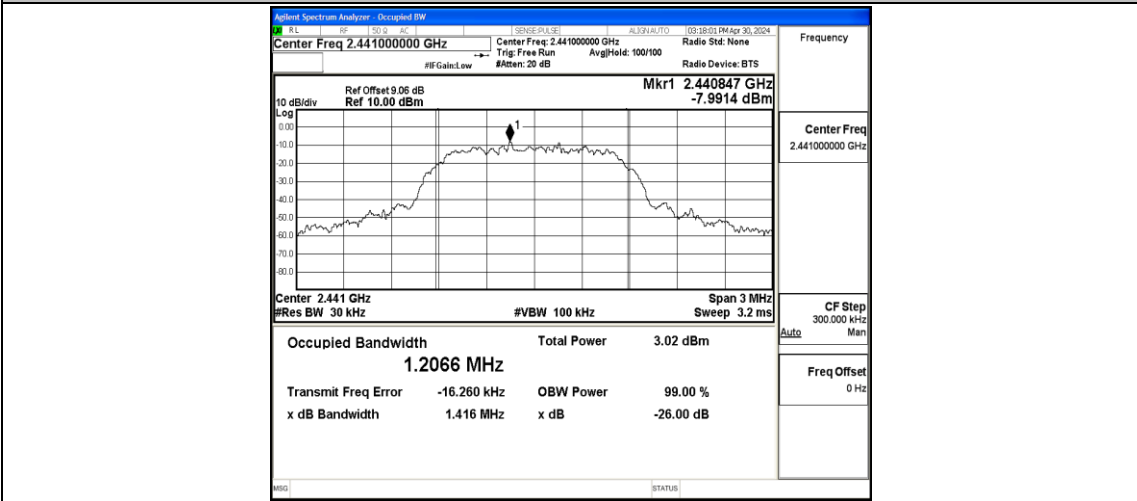
DH5-Ant1-2441



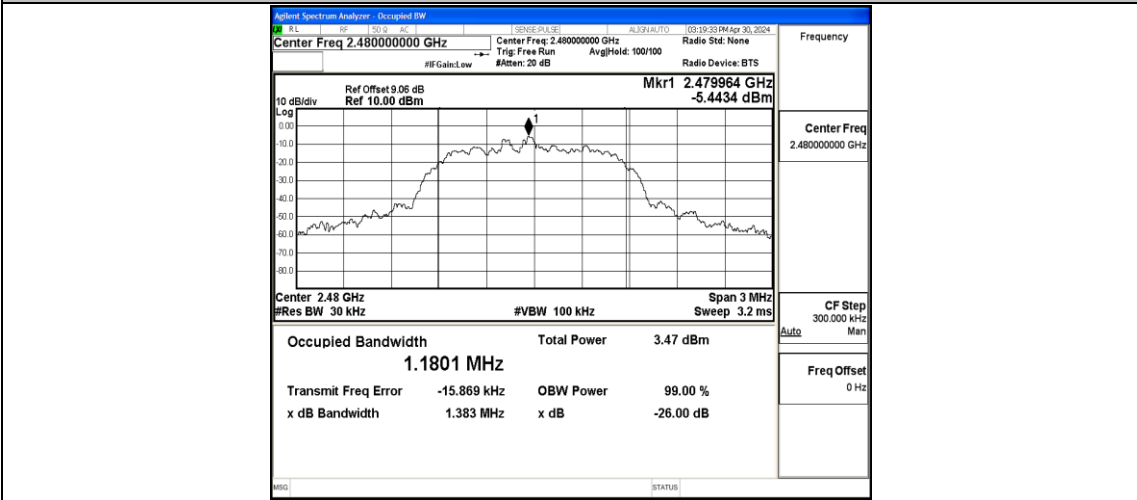
DH5-Ant1-2480



2DH5-Ant1-2402



2DH5-Ant1-2441



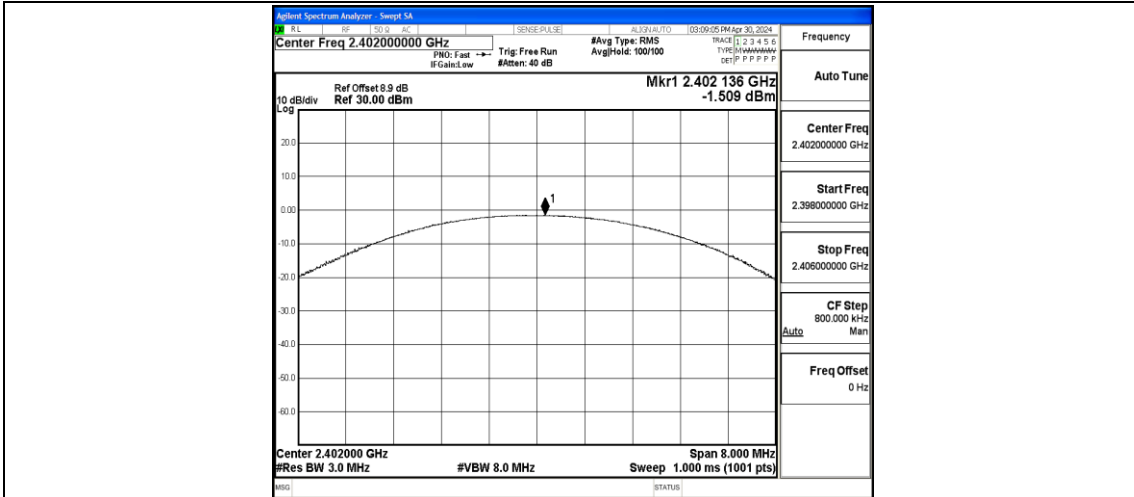
2DH5-Ant1-2480

Appendix C: Maximum peak conducted output power

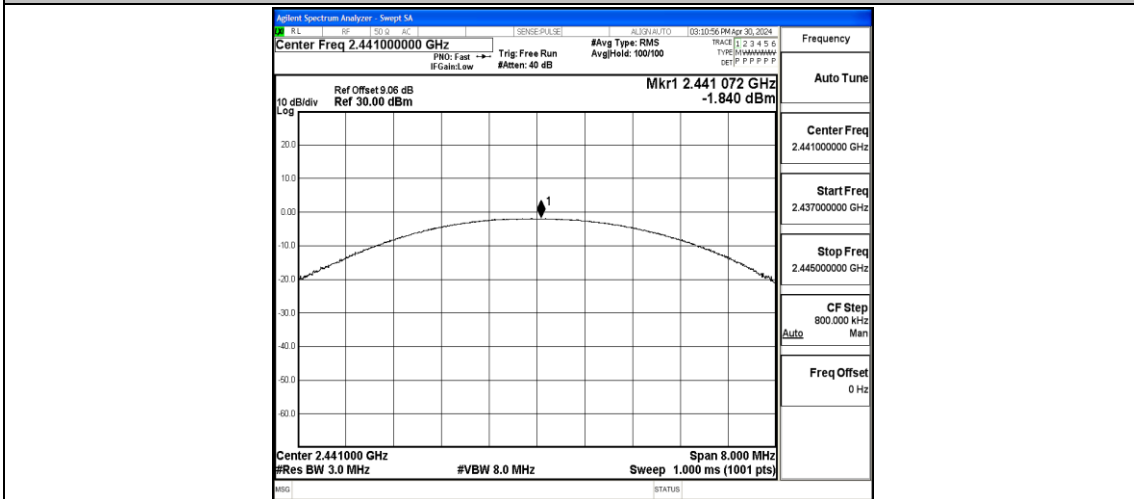
Test Result

| Test Mode | Antenna | Frequency[MHz] | Conducted Peak Power[dBm] | Conducted Limit[dBm] | Verdict |
|-----------|---------|----------------|---------------------------|----------------------|---------|
| DH5 | Ant1 | 2402 | -1.51 | ≤30 | PASS |
| DH5 | Ant1 | 2441 | -1.84 | ≤30 | PASS |
| DH5 | Ant1 | 2480 | -2.49 | ≤30 | PASS |
| 2DH5 | Ant1 | 2402 | -0.86 | ≤30 | PASS |
| 2DH5 | Ant1 | 2441 | -1.08 | ≤30 | PASS |
| 2DH5 | Ant1 | 2480 | -1.71 | ≤30 | PASS |

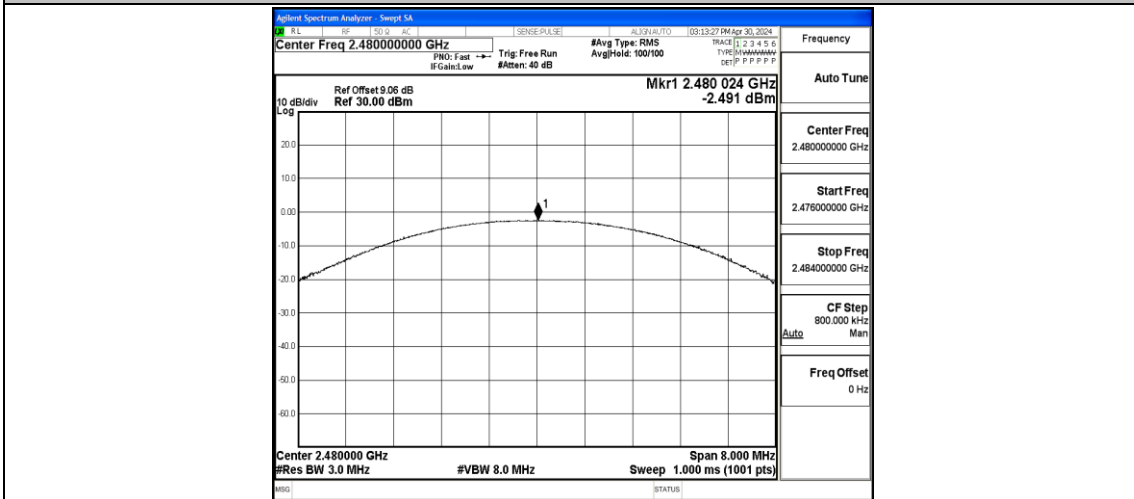
Test Graphs



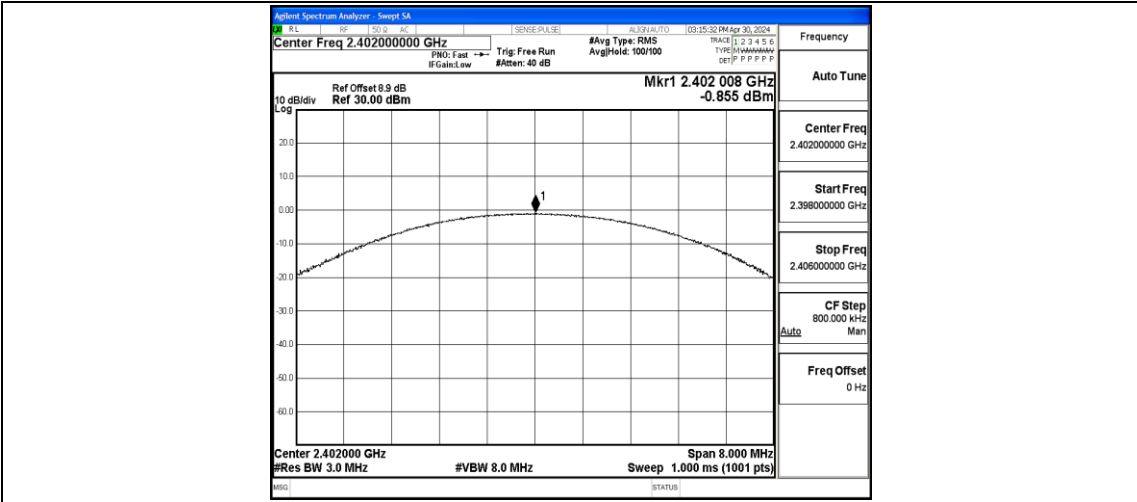
DH5-Ant1-2402-PASS



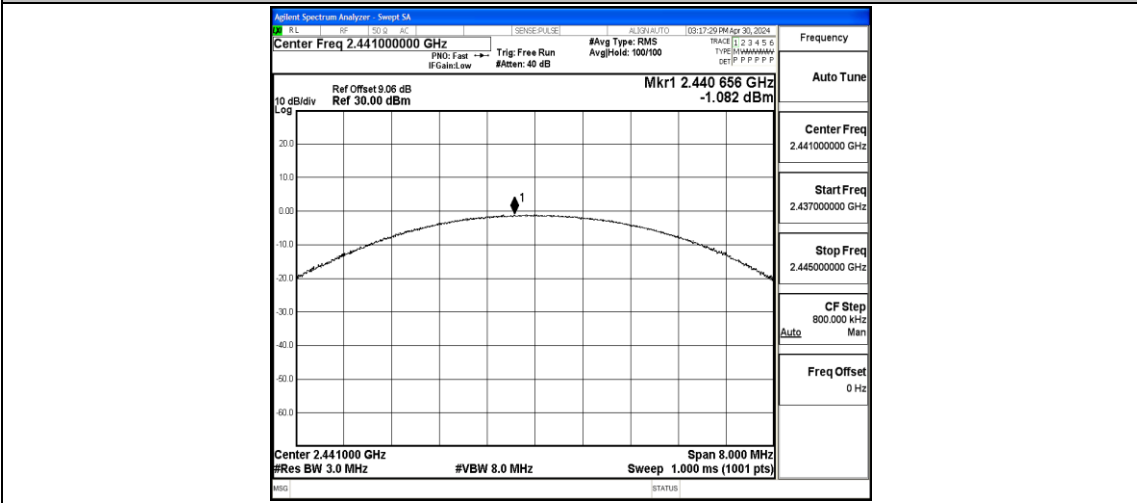
DH5-Ant1-2441-PASS



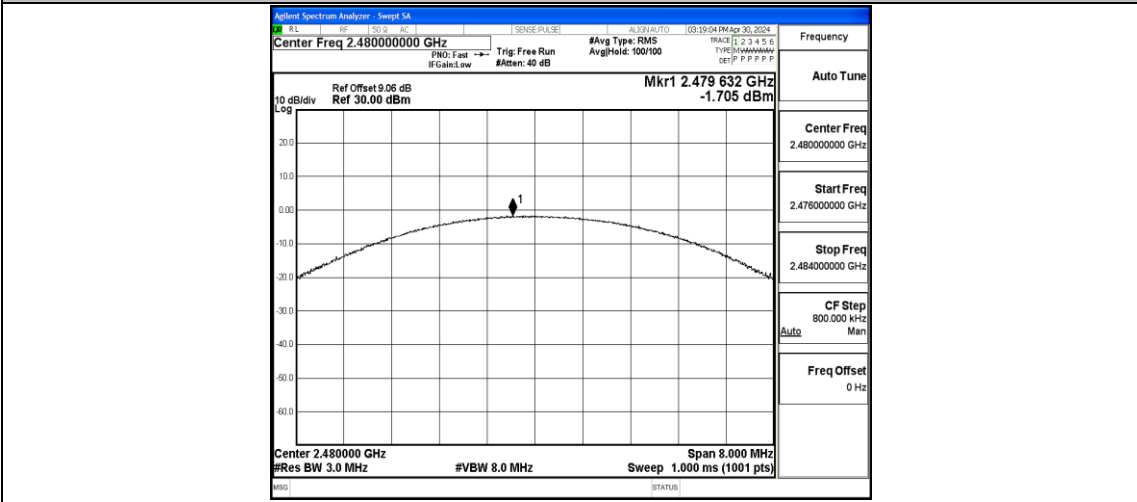
DH5-Ant1-2480-PASS



2DH5-Ant1-2402-PASS



2DH5-Ant1-2441-PASS



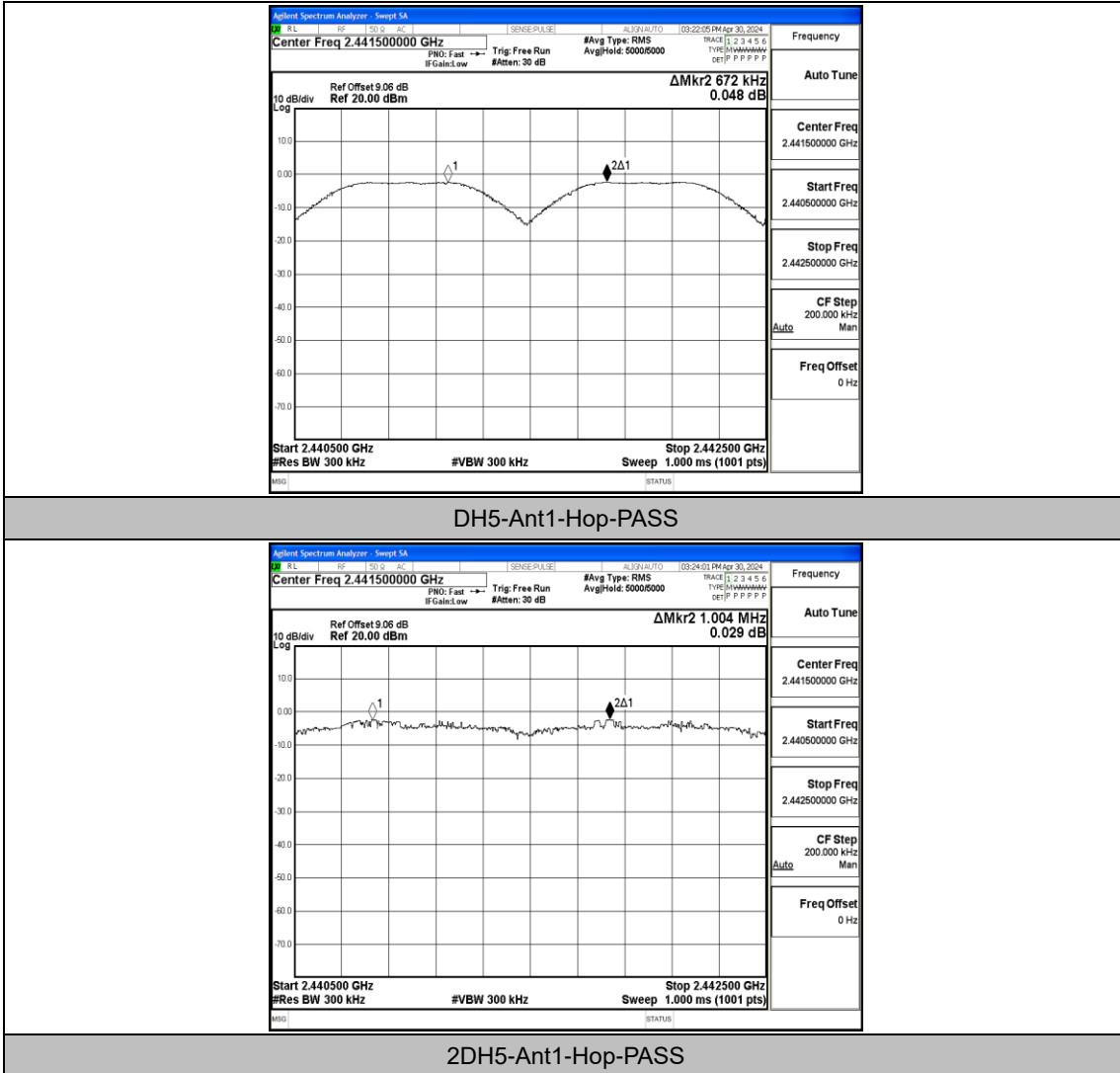
2DH5-Ant1-2480-PASS

Appendix D: Carrier frequency separation

Test Result

| TestMode | Antenna | Frequency[MHz] | Result[MHz] | Limit[MHz] | Verdict |
|----------|---------|----------------|-------------|--------------|---------|
| DH5 | Ant1 | Hop | 0.672 | ≥ 0.664 | PASS |
| 2DH5 | Ant1 | Hop | 1.004 | ≥ 0.876 | PASS |

Test Graphs

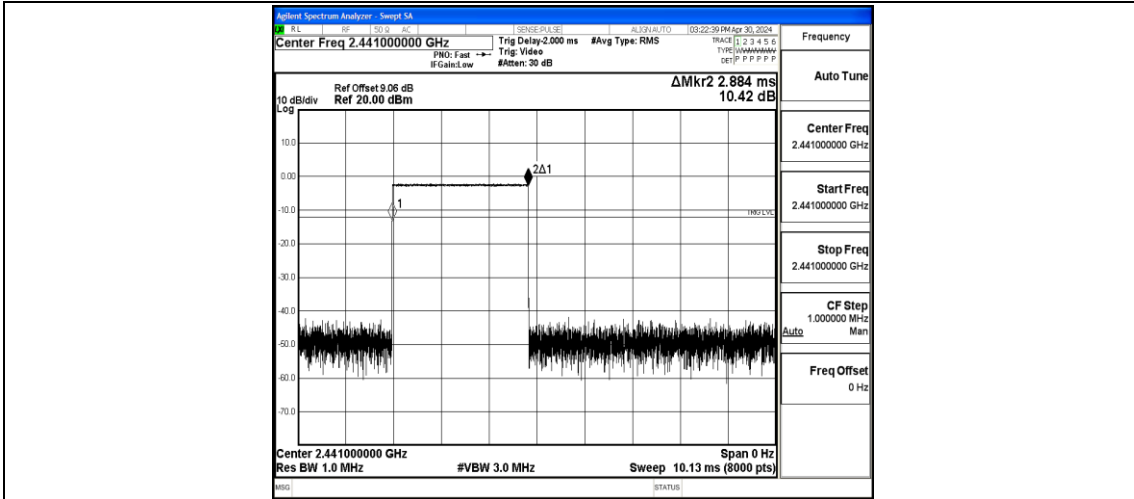


Appendix E: Time of occupancy

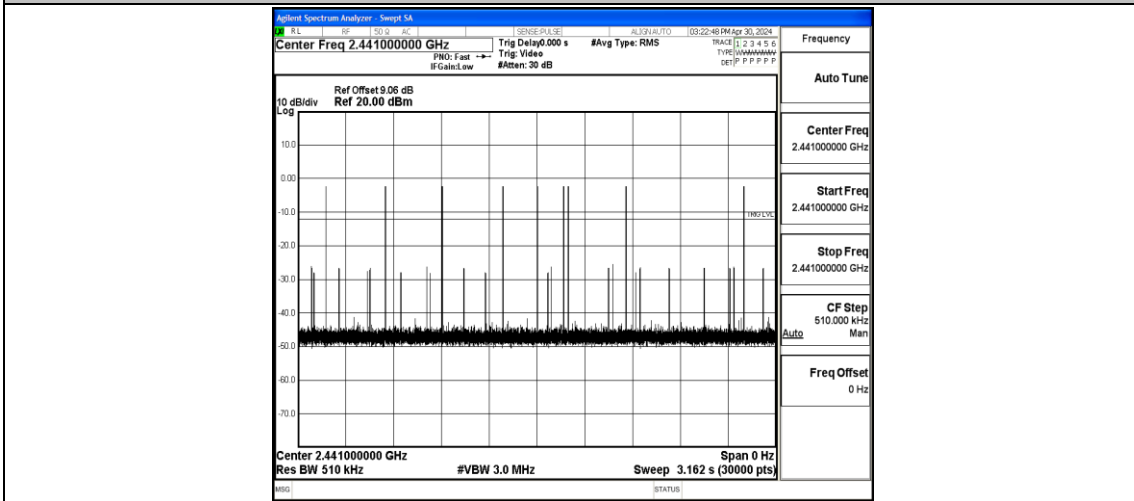
Test Result

| TestMode | Antenna | Frequency[MHz] | BurstWidth [ms] | TotalHops [Num] | Result[s] | Limit[s] | Verdict |
|----------|---------|----------------|--------------------|--------------------|-----------|----------|---------|
| DH5 | Ant1 | Hop | 2.884 | 110 | 0.317 | ≤0.4 | PASS |
| 2DH5 | Ant1 | Hop | 2.891 | 100 | 0.289 | ≤0.4 | PASS |

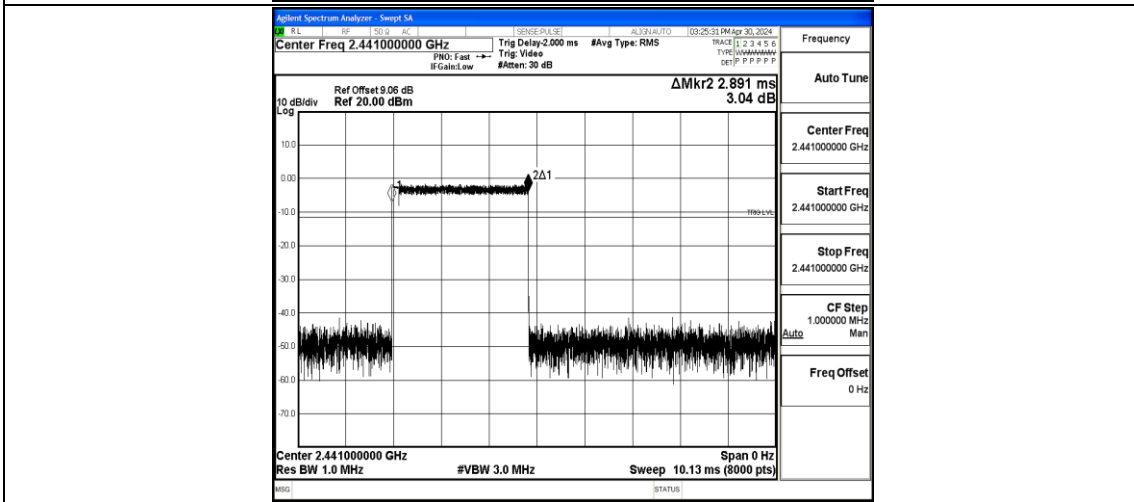
Test Graphs

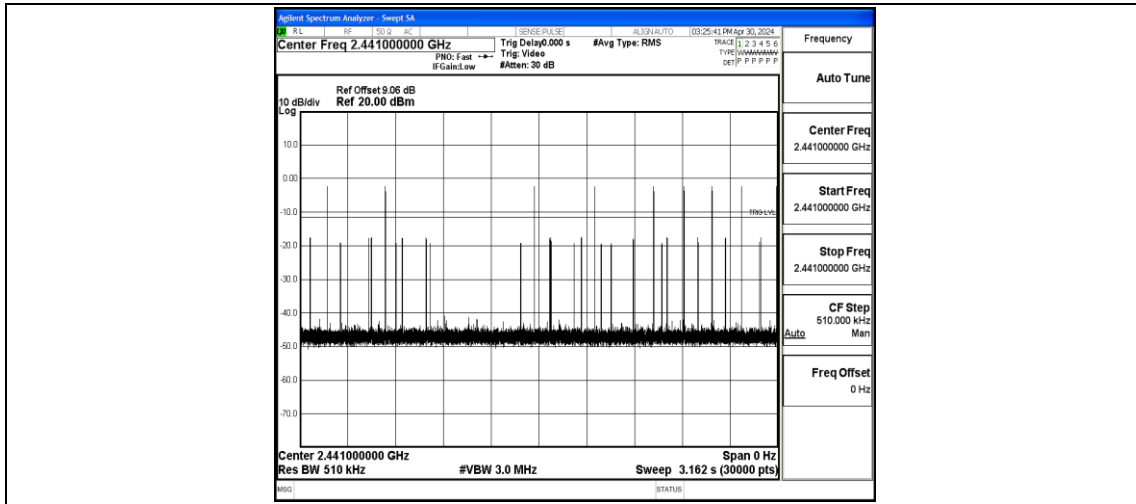


DH5-Ant1-Hop-PASS



2DH5-Ant1-Hop-PASS





Appendix F: Number of hopping channels

Test Result

| TestMode | Antenna | Frequency[MHz] | Result[Num] | Limit[Num] | Verdict |
|----------|---------|----------------|-------------|------------|---------|
| DH5 | Ant1 | Hop | 79 | ≥15 | PASS |
| 2DH5 | Ant1 | Hop | 79 | ≥15 | PASS |

Test Graphs

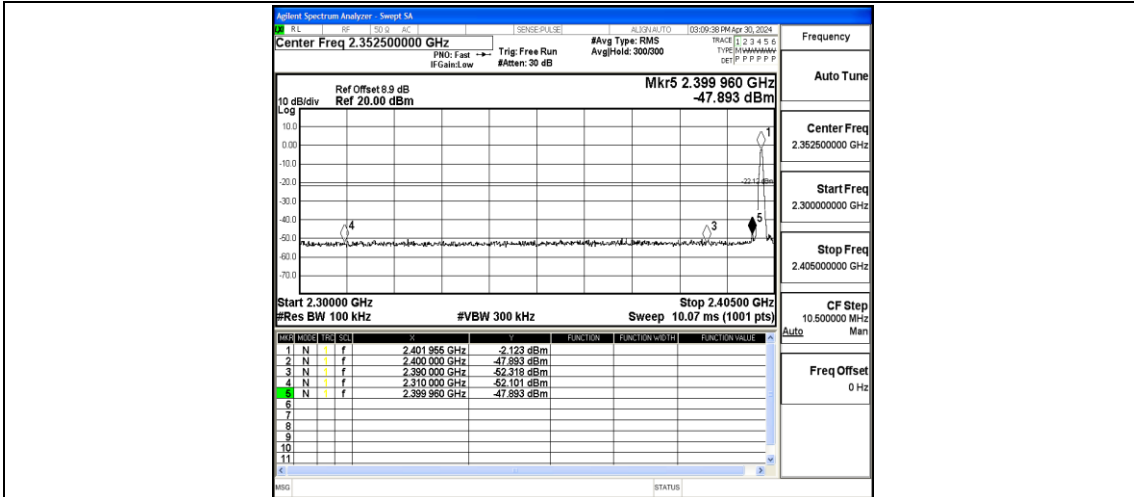


Appendix G: Band edge measurements

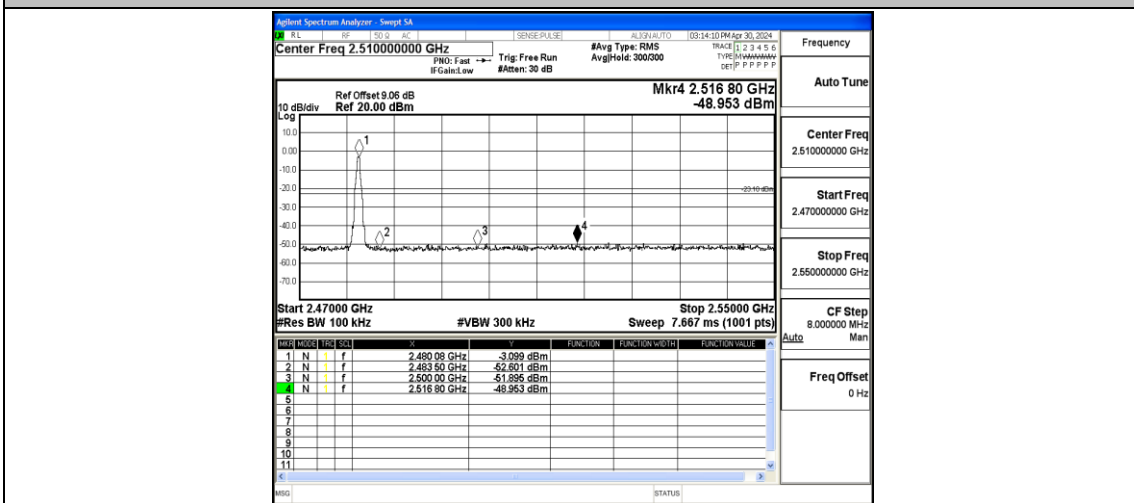
Test Result

| TestMode | Antenna | ChName | Frequency[MHz] | RefLevel [dBm] | Result [dBm] | Limit [dBm] | Verdict |
|----------|---------|--------|----------------|----------------|--------------|-------------|---------|
| DH5 | Ant1 | Low | 2402 | -2.12 | -47.89 | ≤-22.12 | PASS |
| DH5 | Ant1 | High | 2480 | -3.10 | -48.95 | ≤-23.1 | PASS |
| DH5 | Ant1 | Low | Hop_2402 | -3.17 | -49.95 | ≤-23.17 | PASS |
| DH5 | Ant1 | High | Hop_2480 | -2.96 | -49.07 | ≤-22.96 | PASS |
| 2DH5 | Ant1 | Low | 2402 | -2.22 | -48.65 | ≤-22.22 | PASS |
| 2DH5 | Ant1 | High | 2480 | -3.97 | -49.24 | ≤-23.97 | PASS |
| 2DH5 | Ant1 | Low | Hop_2402 | -6.55 | -50.62 | ≤-26.55 | PASS |
| 2DH5 | Ant1 | High | Hop_2480 | -3.41 | -48.77 | ≤-23.41 | PASS |

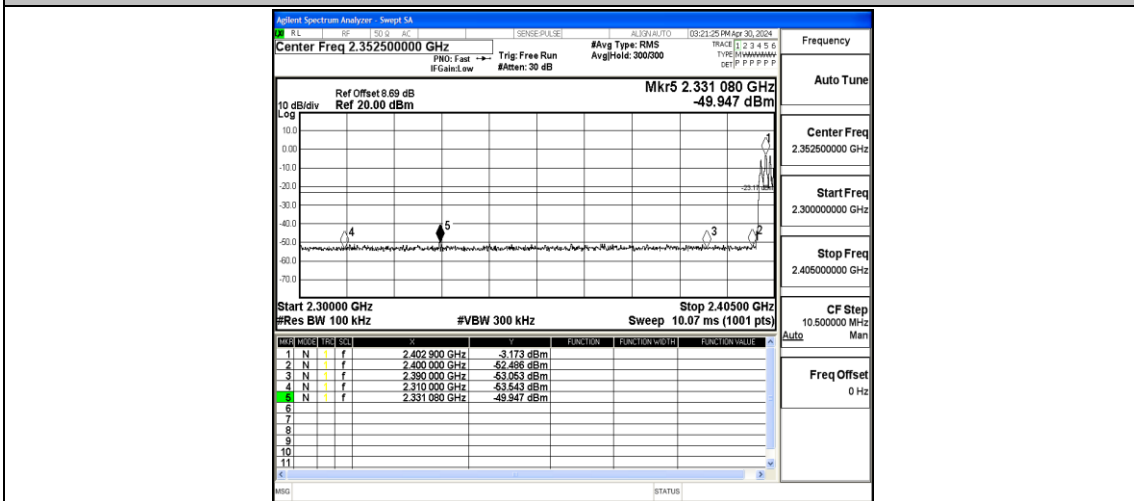
Test Graphs



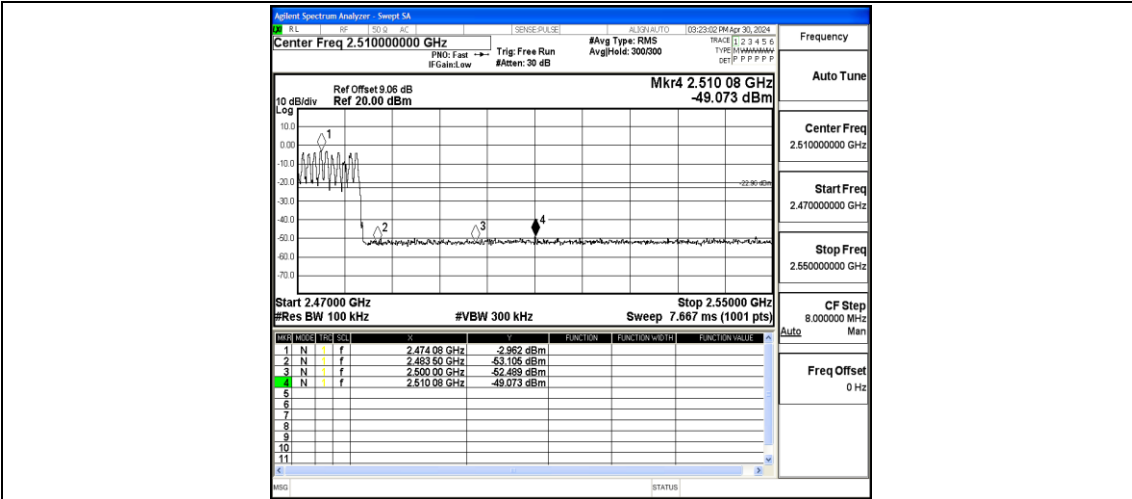
DH5-Ant1-2402-PASS



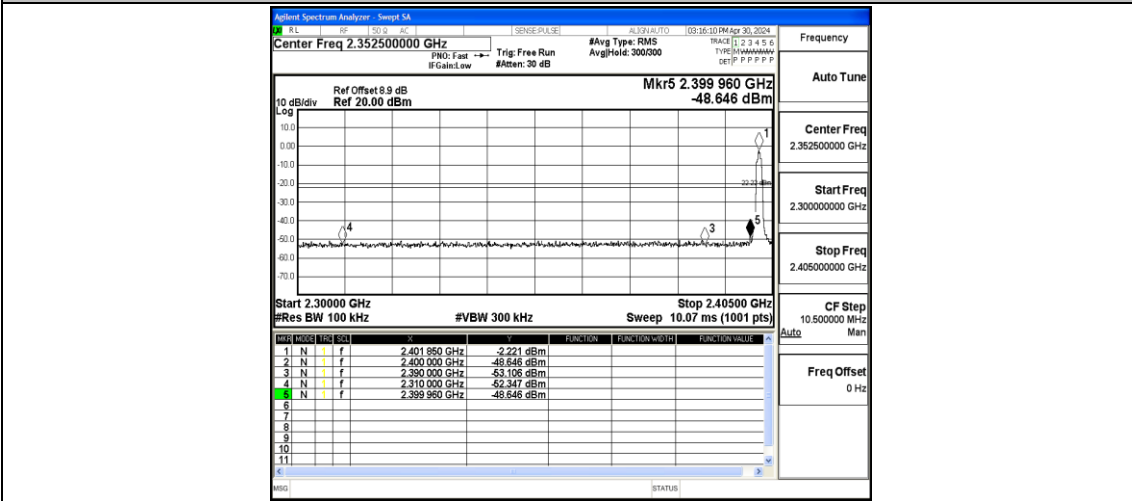
DH5-Ant1-2480-PASS



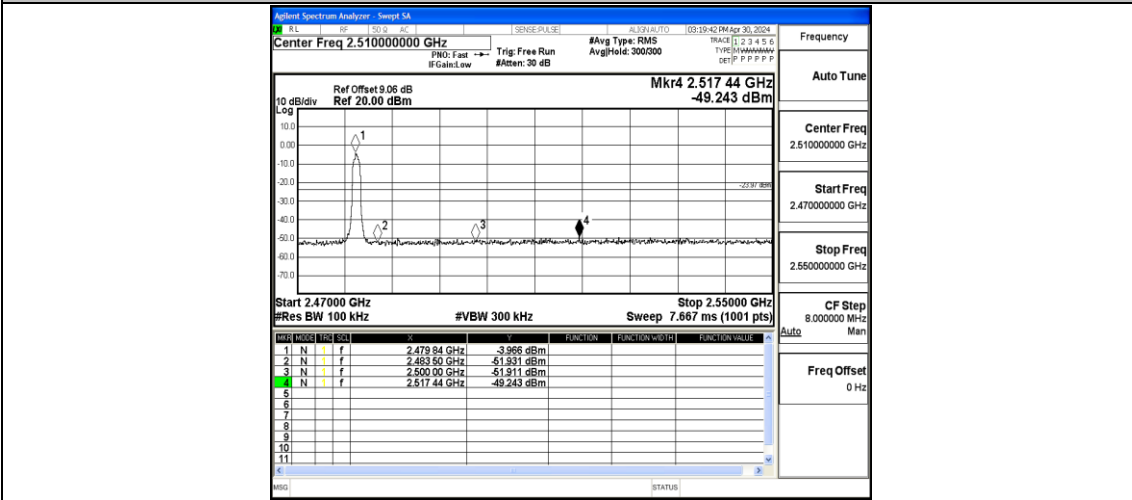
DH5-Ant1-Hop_2402-PASS



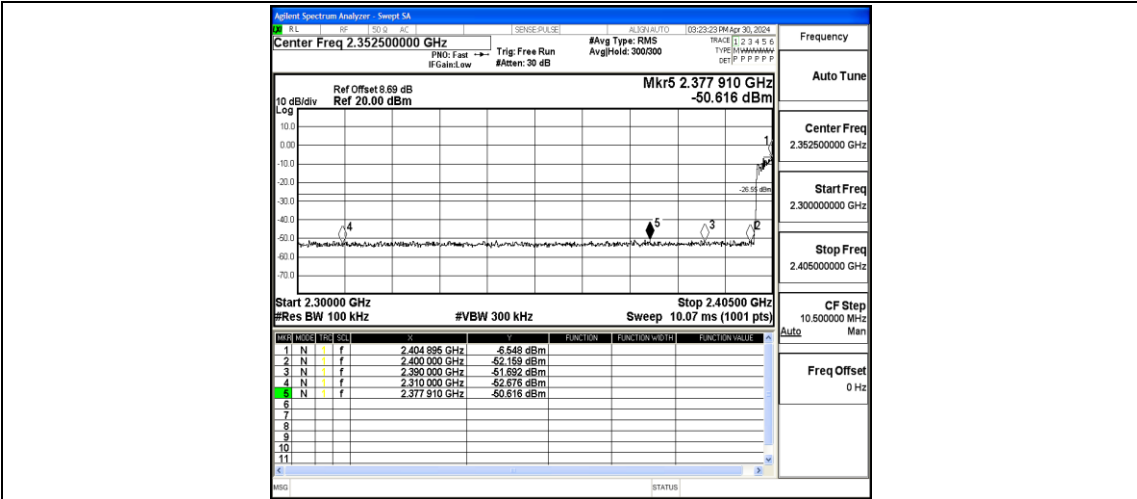
DH5-Ant1-Hop_2480-PASS



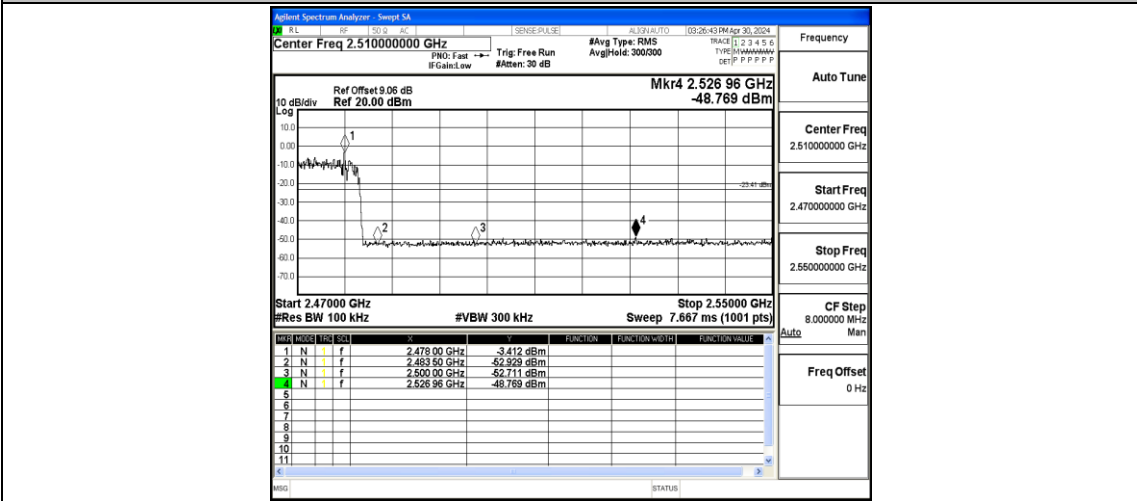
2DH5-Ant1-2402-PASS



2DH5-Ant1-2480-PASS



2DH5-Ant1-Hop_2402-PASS



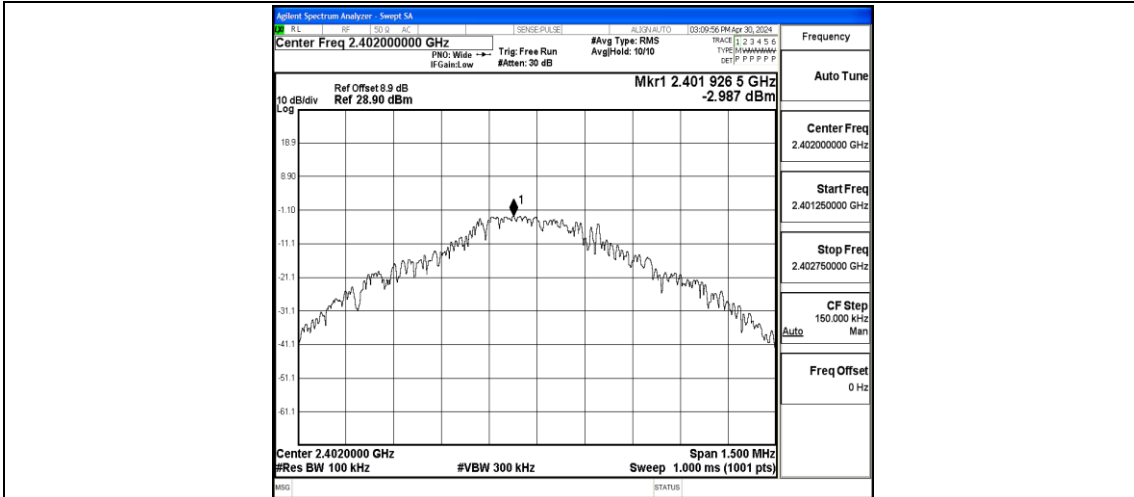
2DH5-Ant1-Hop_2480-PASS

Appendix H: Conducted Spurious Emission

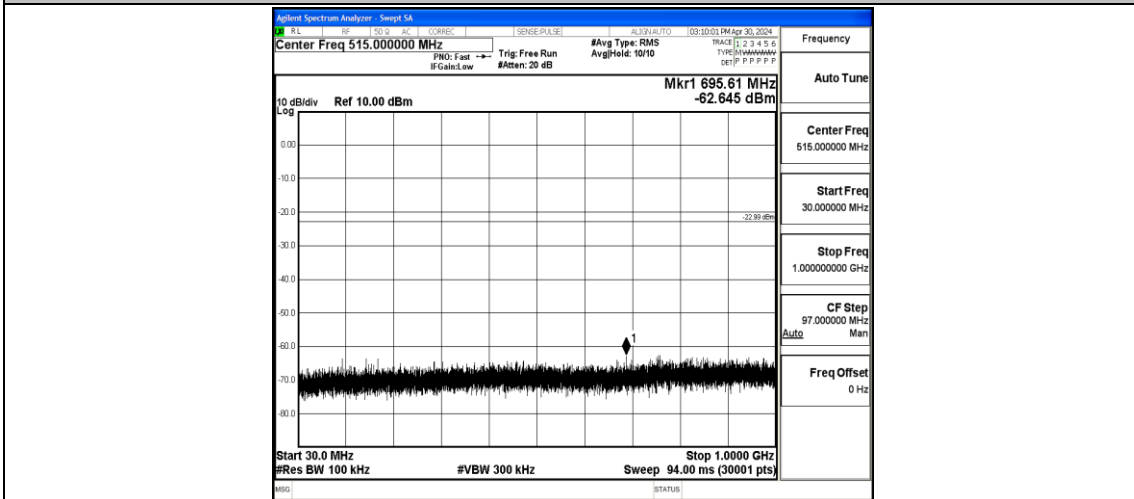
Test Result

| TestMode | Antenna | Frequency[MHz] | FreqRange [MHz] | RefLevel [dBm] | Result [dBm] | Limit [dBm] | Verdict |
|----------|---------|----------------|-----------------|----------------|--------------|-------------|---------|
| DH5 | Ant1 | 2402 | 0~Reference | -2.99 | -2.99 | --- | PASS |
| DH5 | Ant1 | 2402 | 30~1000 | -2.99 | -62.65 | ≤-22.99 | PASS |
| DH5 | Ant1 | 2402 | 1000~26500 | -2.99 | -33.23 | ≤-22.99 | PASS |
| DH5 | Ant1 | 2441 | 0~Reference | -2.85 | -2.85 | --- | PASS |
| DH5 | Ant1 | 2441 | 30~1000 | -2.85 | -62.86 | ≤-22.85 | PASS |
| DH5 | Ant1 | 2441 | 1000~26500 | -2.85 | -31.14 | ≤-22.85 | PASS |
| DH5 | Ant1 | 2480 | 0~Reference | -3.80 | -3.80 | --- | PASS |
| DH5 | Ant1 | 2480 | 30~1000 | -3.80 | -61.26 | ≤-23.8 | PASS |
| DH5 | Ant1 | 2480 | 1000~26500 | -3.80 | -30.45 | ≤-23.8 | PASS |
| 2DH5 | Ant1 | 2402 | 0~Reference | -6.25 | -6.25 | --- | PASS |
| 2DH5 | Ant1 | 2402 | 30~1000 | -6.25 | -55.57 | ≤-26.25 | PASS |
| 2DH5 | Ant1 | 2402 | 1000~26500 | -6.25 | -32.86 | ≤-26.25 | PASS |
| 2DH5 | Ant1 | 2441 | 0~Reference | -5.95 | -5.95 | --- | PASS |
| 2DH5 | Ant1 | 2441 | 30~1000 | -5.95 | -62.82 | ≤-25.95 | PASS |
| 2DH5 | Ant1 | 2441 | 1000~26500 | -5.95 | -31.08 | ≤-25.95 | PASS |
| 2DH5 | Ant1 | 2480 | 0~Reference | -5.50 | -5.50 | --- | PASS |
| 2DH5 | Ant1 | 2480 | 30~1000 | -5.50 | -62.3 | ≤-25.5 | PASS |
| 2DH5 | Ant1 | 2480 | 1000~26500 | -5.50 | -30.45 | ≤-25.5 | PASS |

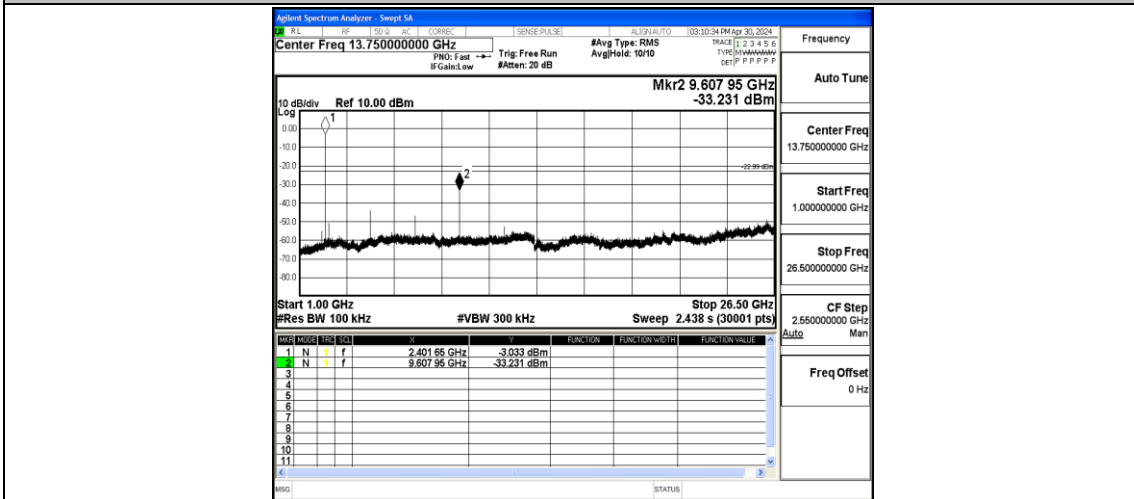
Test Graphs



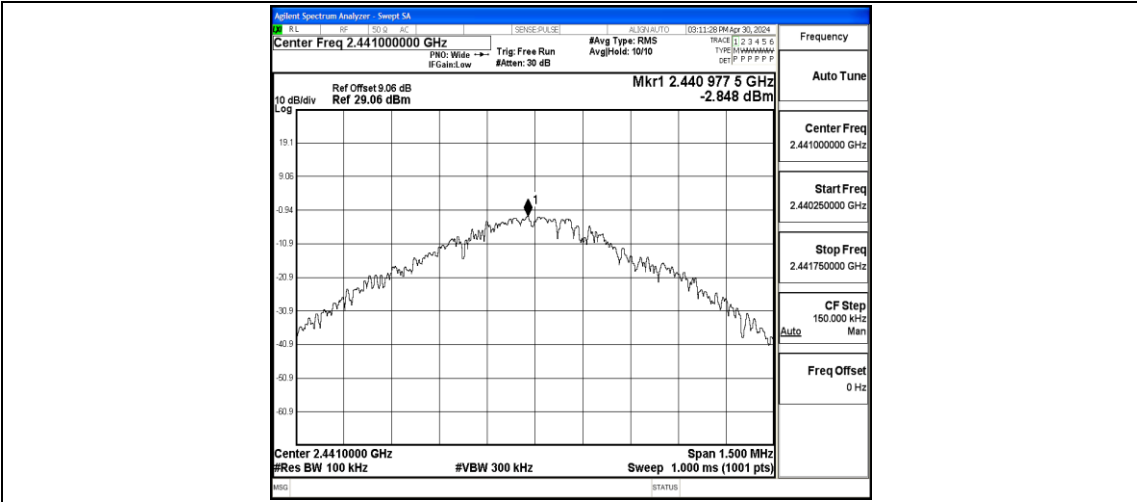
DH5-Ant1-2402-0~Reference-PASS



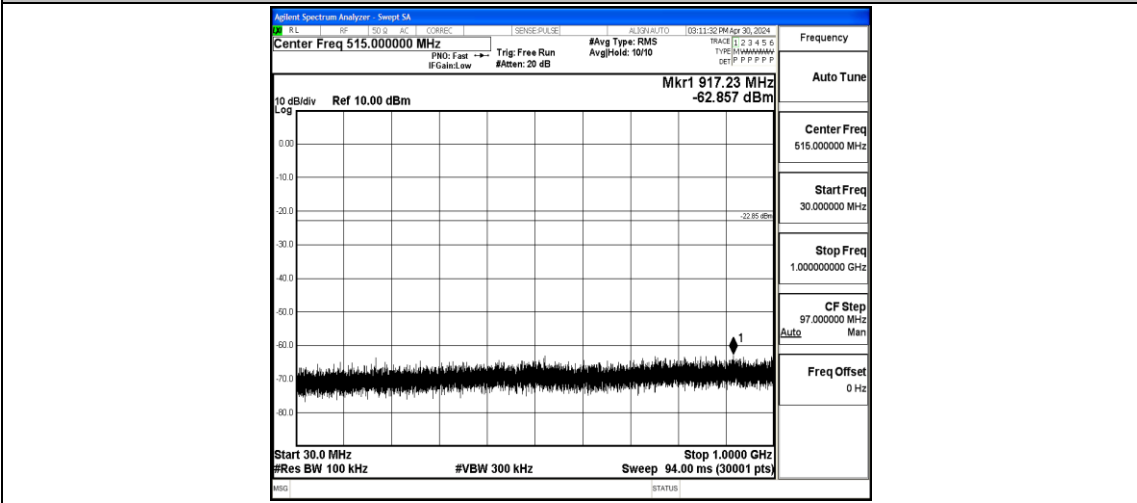
DH5-Ant1-2402-30~1000-PASS



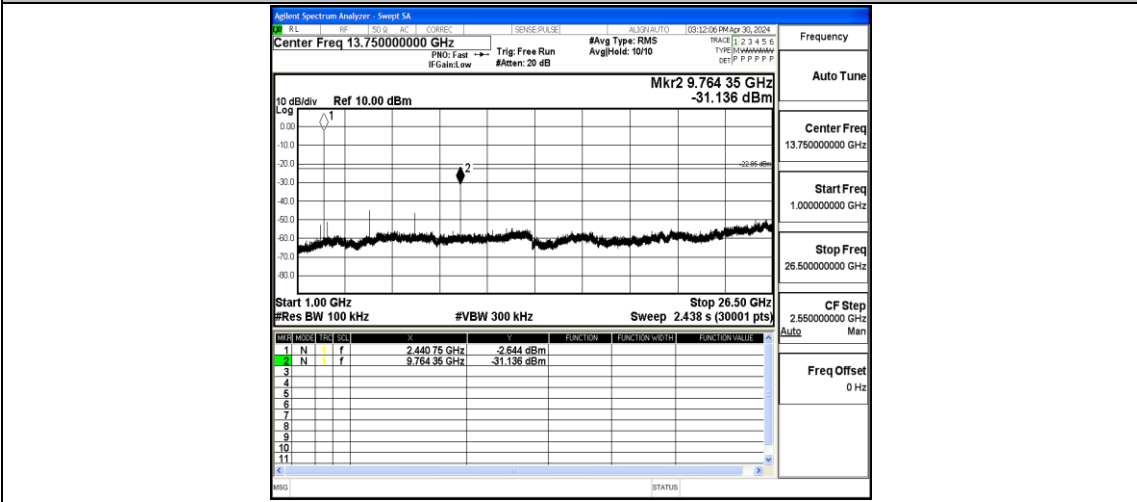
DH5-Ant1-2402-1000~26500-PASS



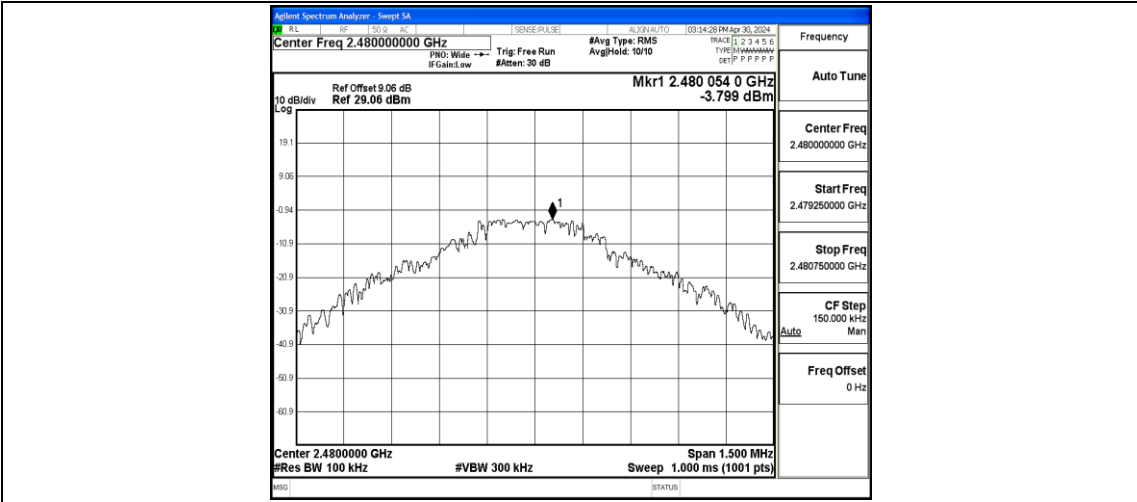
DH5-Ant1-2441-0~Reference-PASS



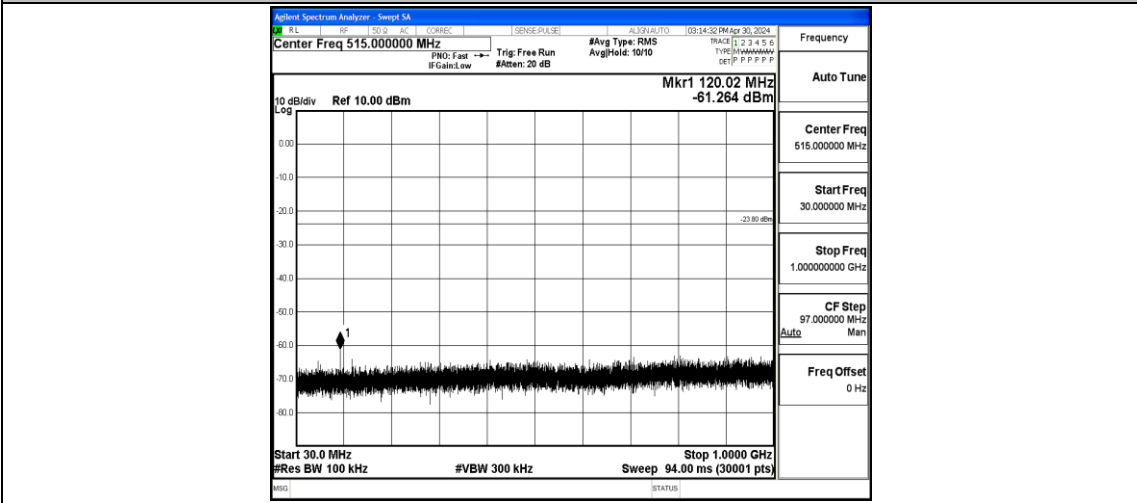
DH5-Ant1-2441-30~1000-PASS



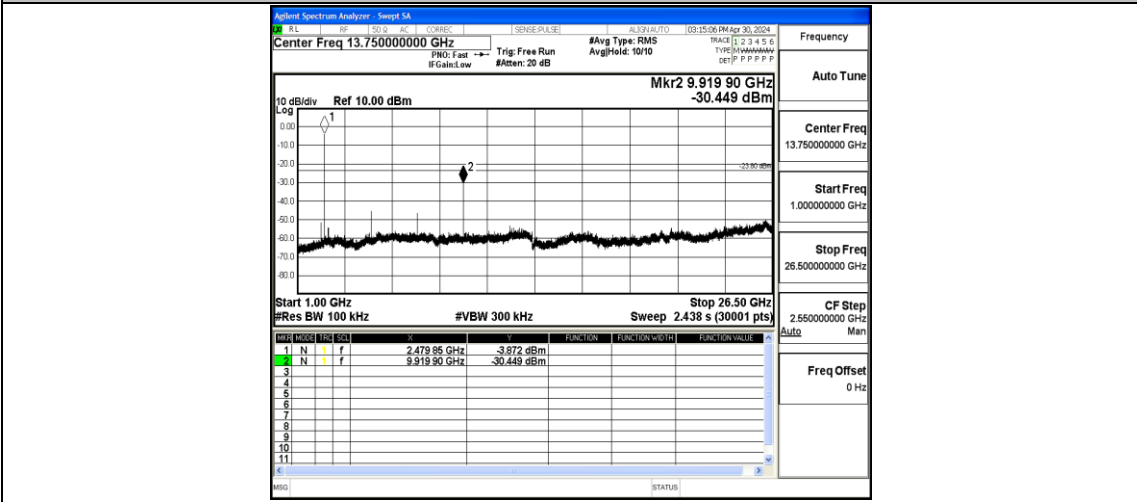
DH5-Ant1-2441-1000~26500-PASS



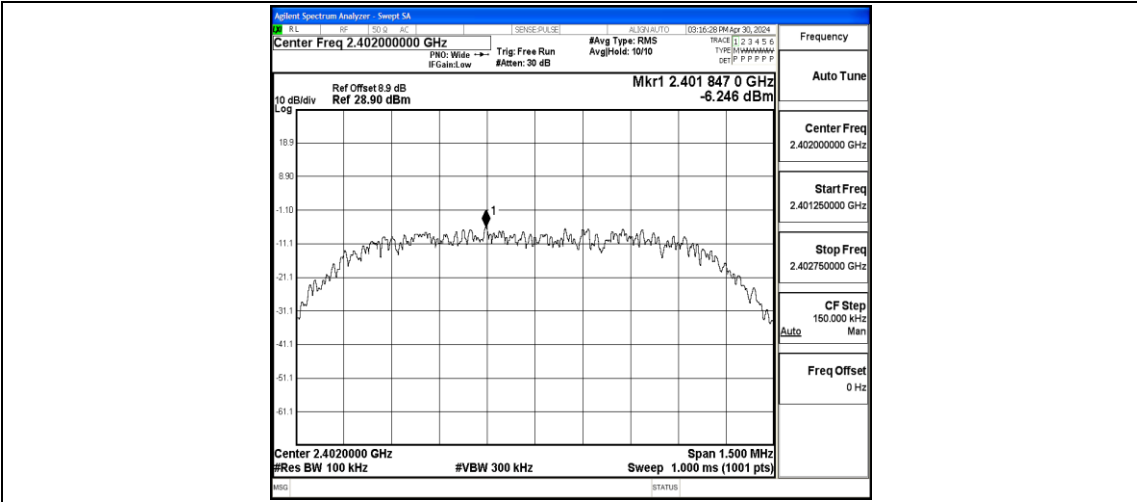
DH5-Ant1-2480-0~Reference-PASS



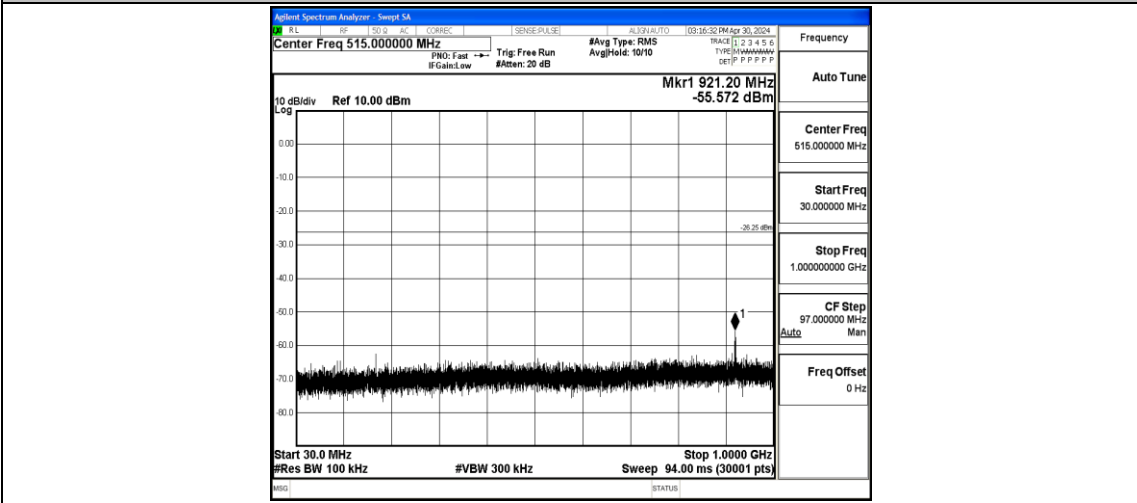
DH5-Ant1-2480-30~1000-PASS



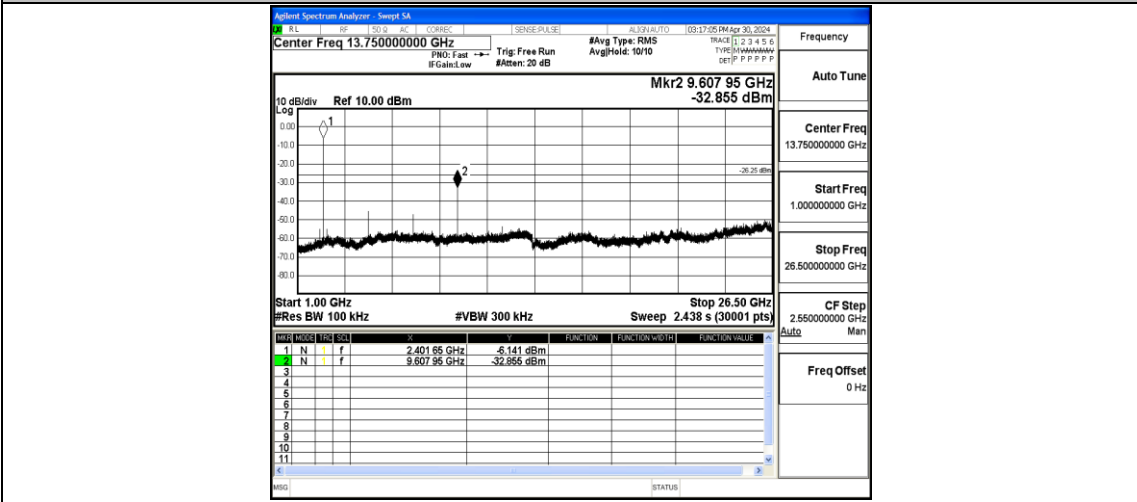
DH5-Ant1-2480-1000~26500-PASS



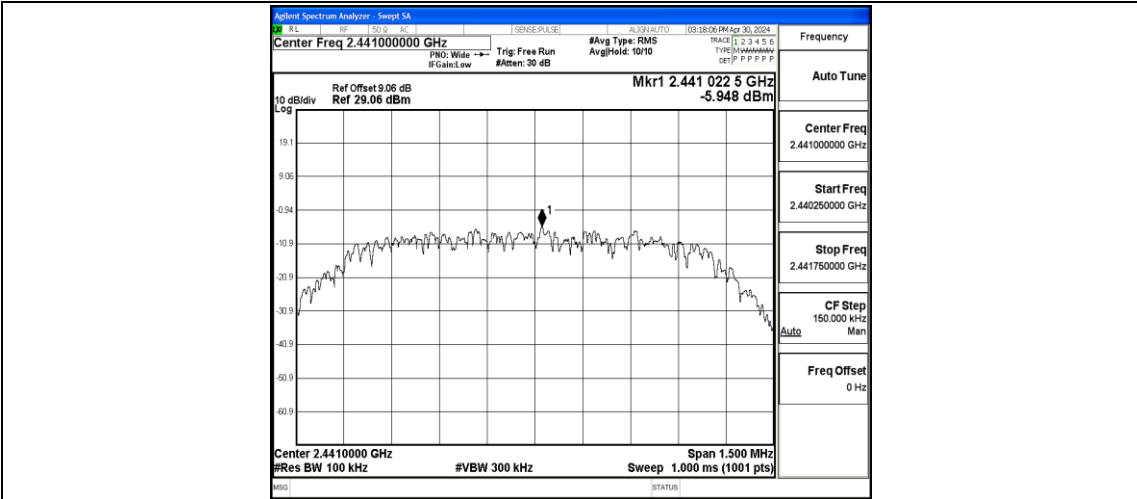
2DH5-Ant1-2402-0~Reference-PASS



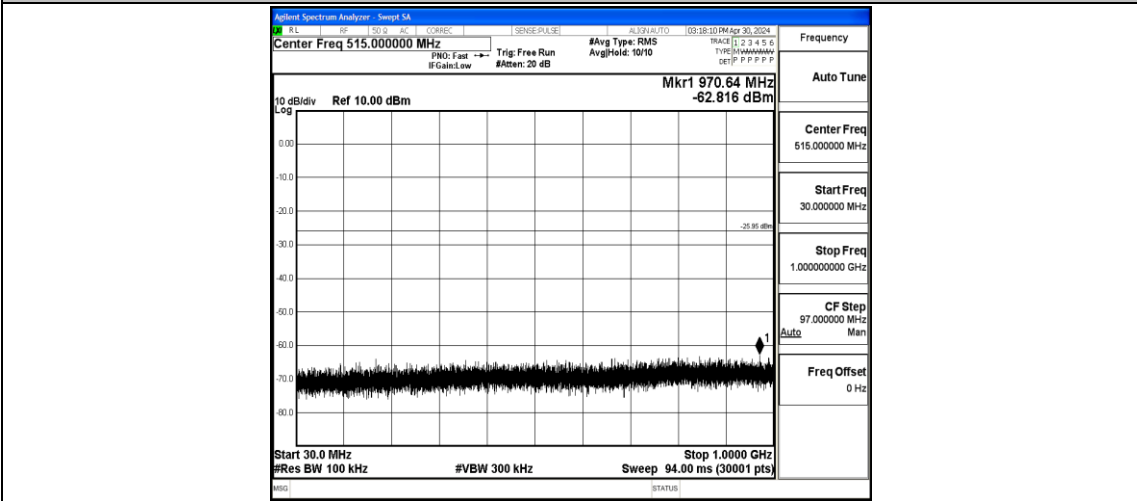
2DH5-Ant1-2402-30~1000-PASS



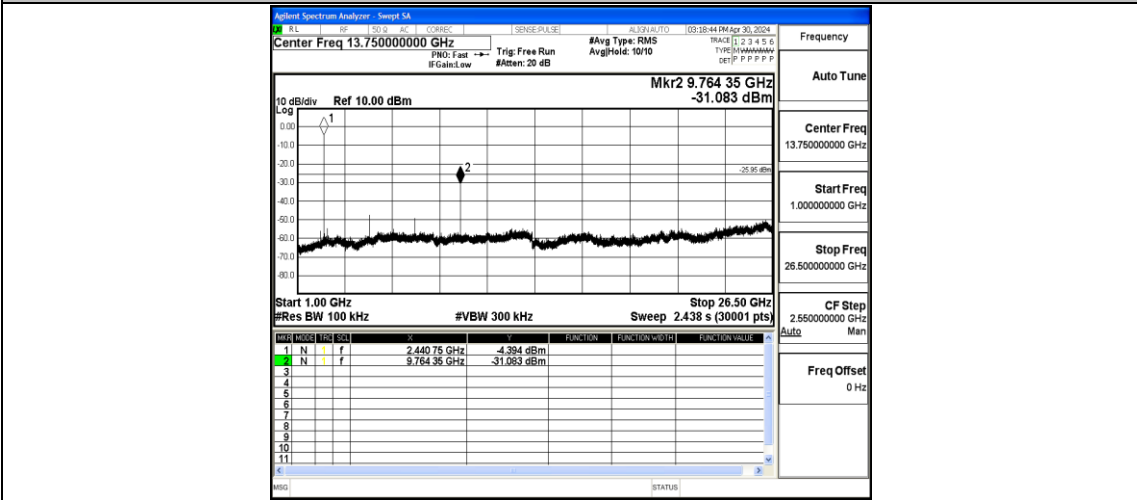
2DH5-Ant1-2402-1000~26500-PASS



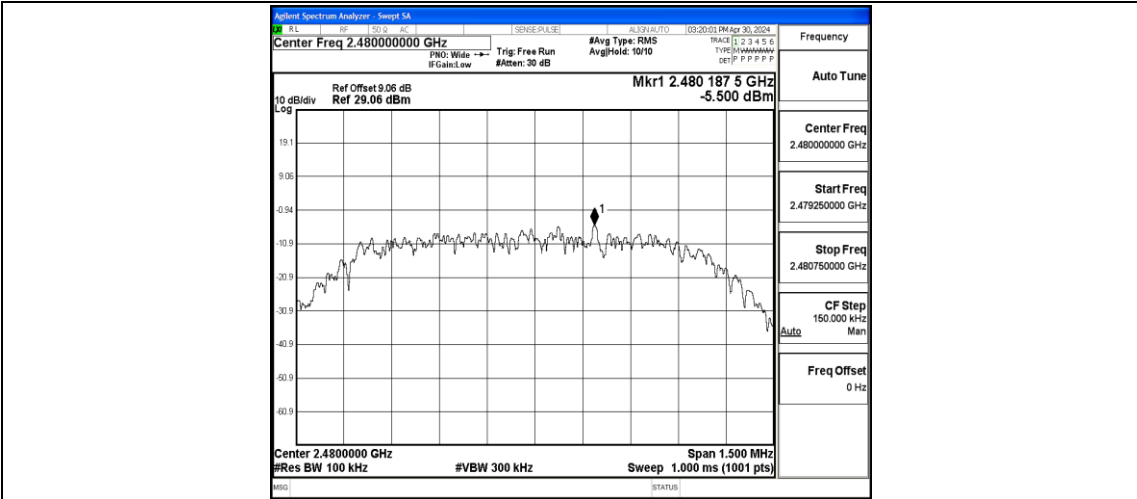
2DH5-Ant1-2441-0~Reference-PASS



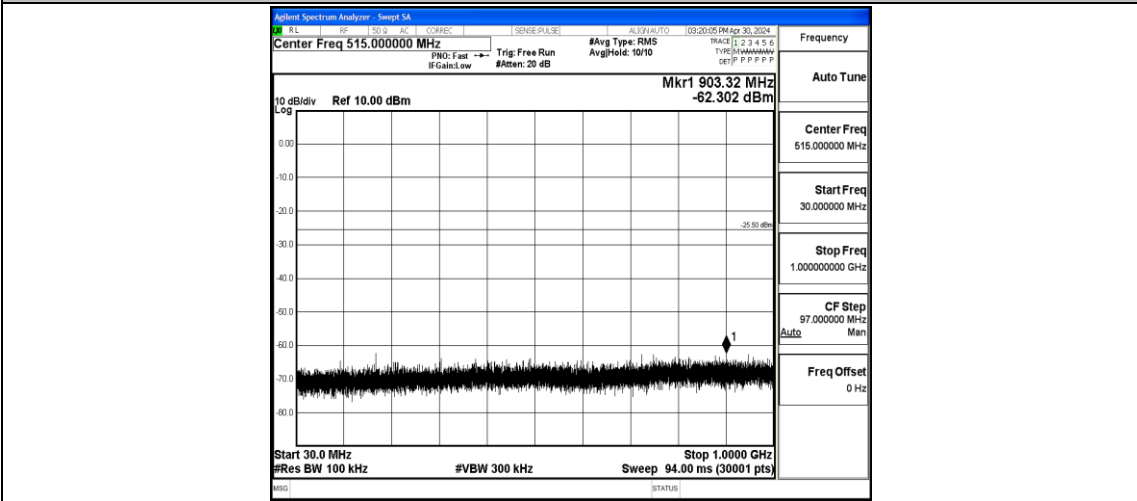
2DH5-Ant1-2441-30~1000-PASS



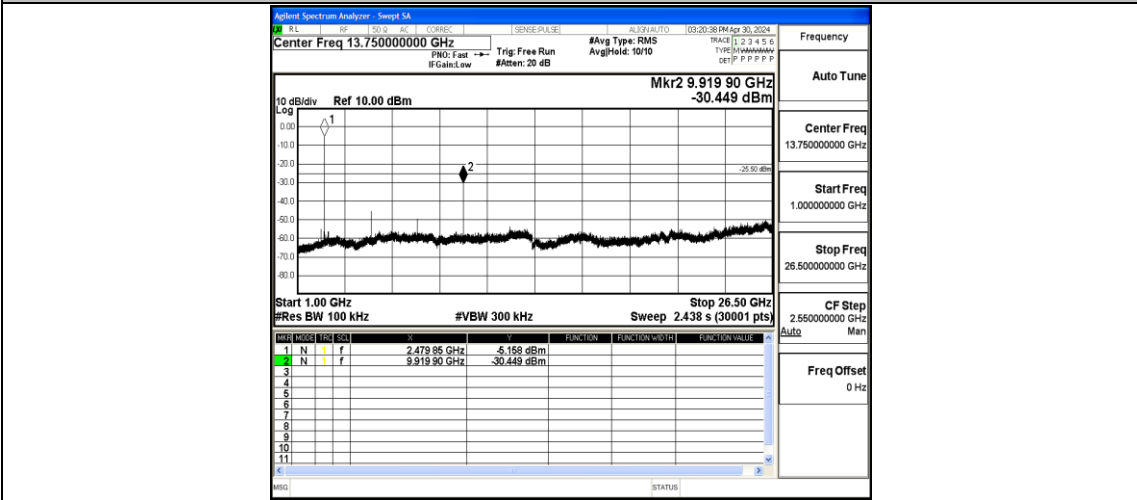
2DH5-Ant1-2441-1000~26500-PASS



2DH5-Ant1-2480-0~Reference-PASS



2DH5-Ant1-2480-30~1000-PASS



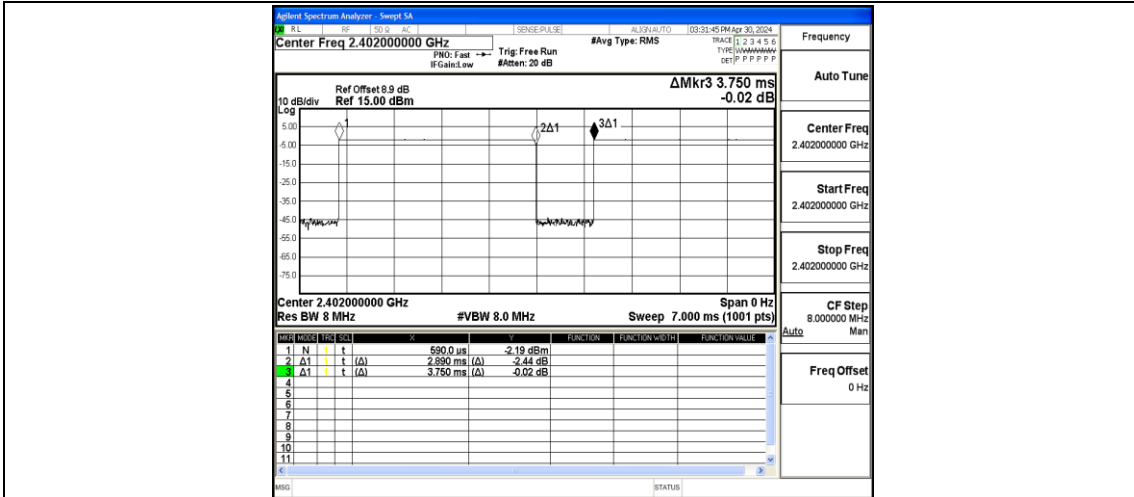
2DH5-Ant1-2480-1000~26500-PASS

Appendix I: Duty Cycle

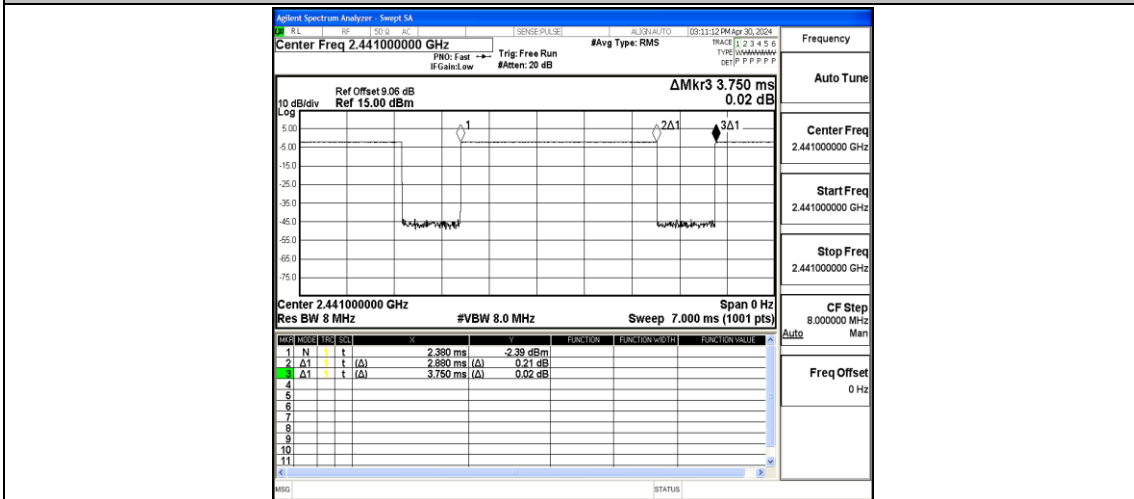
Test Result

| TestMode | Antenna | Frequency[MHz] | ON Time [ms] | Period [ms] | Duty Cycle [%] | Duty Cycle Factor[dB] |
|----------|---------|----------------|--------------|-------------|----------------|-----------------------|
| DH5 | Ant1 | 2402 | 2.89 | 3.75 | 77.07 | 1.13 |
| DH5 | Ant1 | 2441 | 2.88 | 3.75 | 76.80 | 1.15 |
| DH5 | Ant1 | 2480 | 2.88 | 3.74 | 77.01 | 1.13 |
| 2DH5 | Ant1 | 2402 | 2.89 | 3.74 | 77.27 | 1.12 |
| 2DH5 | Ant1 | 2441 | 2.89 | 3.75 | 77.07 | 1.13 |
| 2DH5 | Ant1 | 2480 | 2.89 | 3.75 | 77.07 | 1.13 |

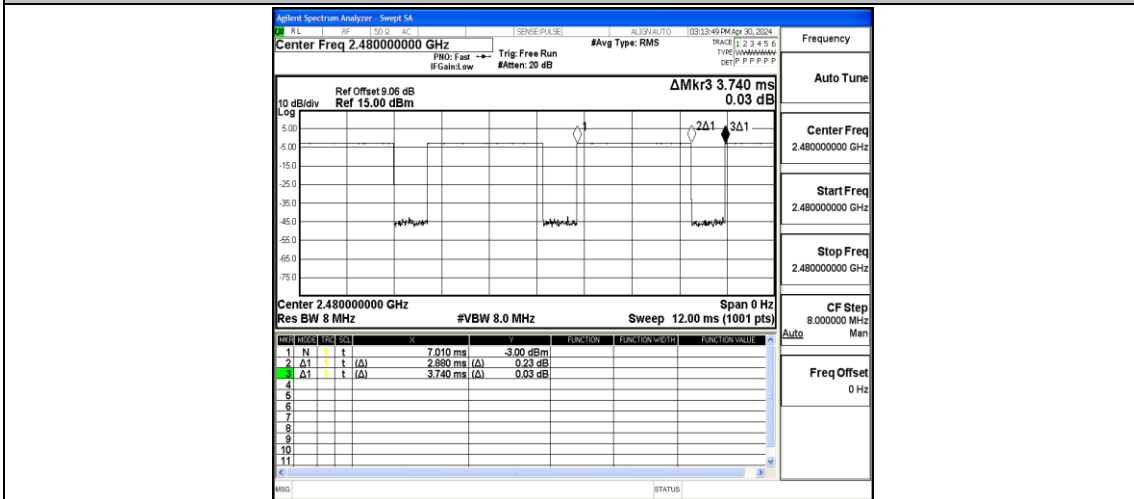
Test Graphs



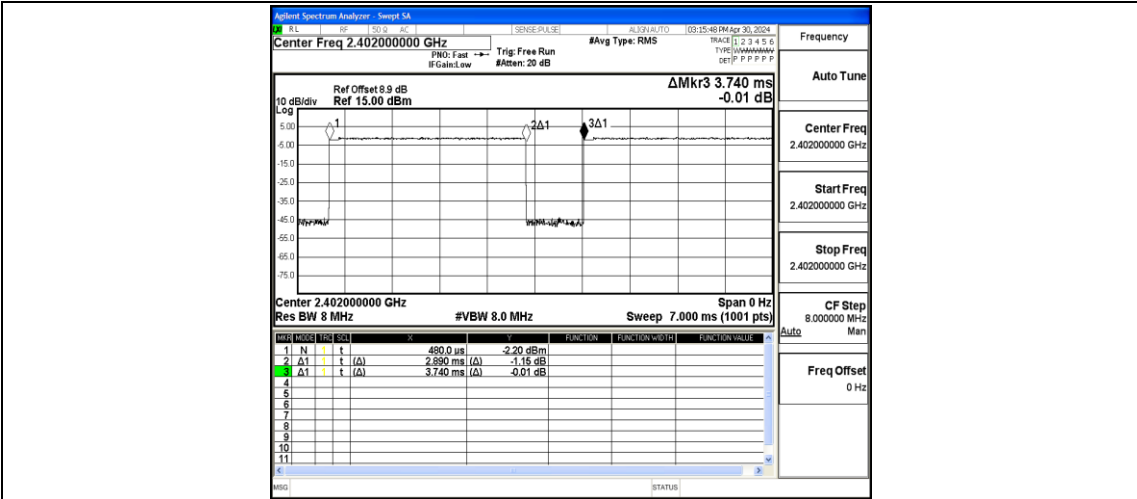
NTNV-DH5-Ant1-2402



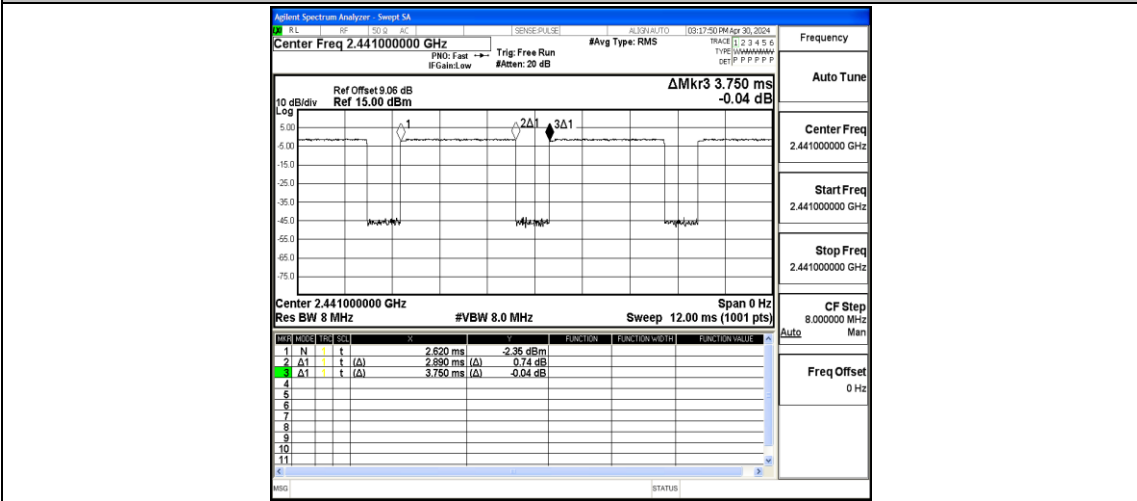
NTNV-DH5-Ant1-2441



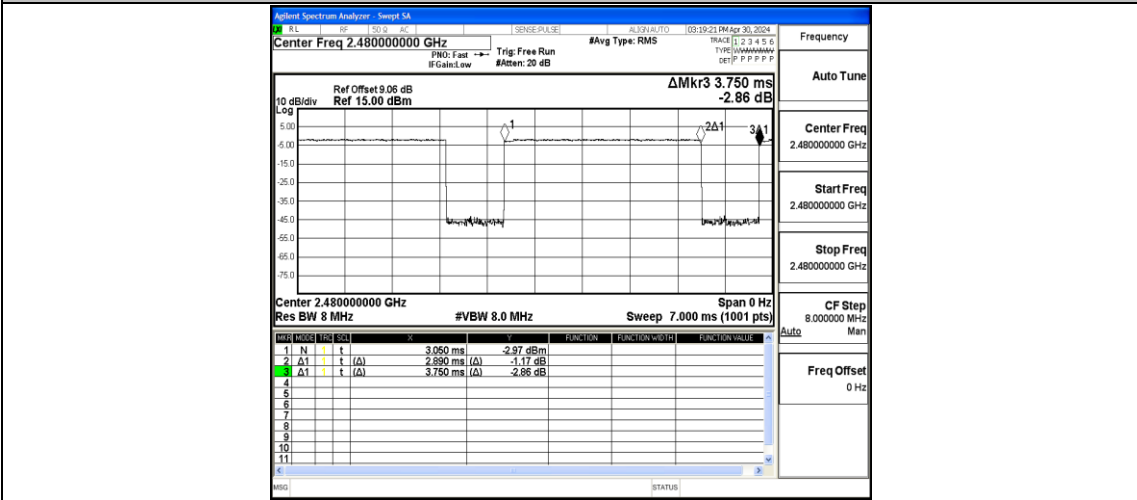
NTNV-DH5-Ant1-2480



NTNV-2DH5-Ant1-2402



NTNV-2DH5-Ant1-2441



NTNV-2DH5-Ant1-2480

Appendix J: Emissions in Restricted Bands

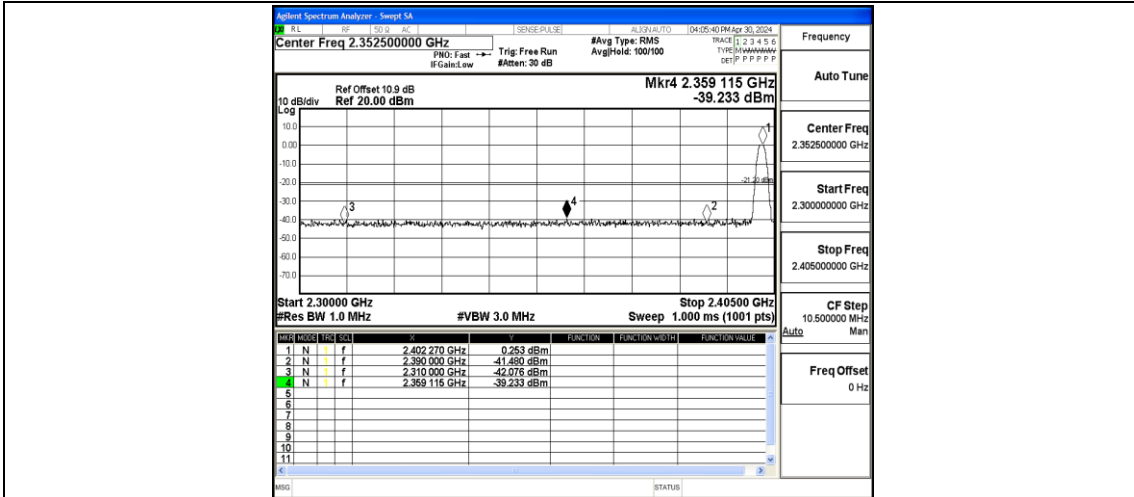
Test Result

| TestMode | Antenna | ChName | Frequency [MHz] | Detector | Freq [MHz] | Result [dBm] | Limit [dBm] | Result [dBuV/m] | Limit [dBuV/m] | Verdict |
|----------|---------|--------|-----------------|----------|------------|--------------|-------------|-----------------|----------------|---------|
| DH5 | Ant1 | Low | 2402 | Peak | 2390.000 | -41.48 | ≤-21.20 | 53.72 | ≤74 | PASS |
| DH5 | Ant1 | Low | 2402 | Peak | 2310.000 | -42.08 | ≤-21.20 | 53.12 | ≤74 | PASS |
| DH5 | Ant1 | Low | 2402 | Peak | 2359.115 | -39.23 | ≤-21.20 | 55.97 | ≤74 | PASS |
| DH5 | Ant1 | Low | 2402 | AV | 2390.000 | -48.63 | ≤-41.20 | 46.57 | ≤54 | PASS |
| DH5 | Ant1 | Low | 2402 | AV | 2310.000 | -49.33 | ≤-41.20 | 45.87 | ≤54 | PASS |
| DH5 | Ant1 | Low | 2402 | AV | 2365.520 | -48.22 | ≤-41.20 | 46.98 | ≤54 | PASS |
| DH5 | Ant1 | High | 2480 | Peak | 2483.500 | -41 | ≤-21.20 | 54.20 | ≤74 | PASS |
| DH5 | Ant1 | High | 2480 | Peak | 2500.000 | -40.47 | ≤-21.20 | 54.73 | ≤74 | PASS |
| DH5 | Ant1 | High | 2480 | Peak | 2499.360 | -38.41 | ≤-21.20 | 56.79 | ≤74 | PASS |
| DH5 | Ant1 | High | 2480 | AV | 2483.500 | -48.67 | ≤-41.20 | 46.53 | ≤54 | PASS |
| DH5 | Ant1 | High | 2480 | AV | 2500.000 | -48.53 | ≤-41.20 | 46.67 | ≤54 | PASS |
| DH5 | Ant1 | High | 2480 | AV | 2498.320 | -47.45 | ≤-41.20 | 47.75 | ≤54 | PASS |
| 2DH5 | Ant1 | Low | 2402 | Peak | 2390.000 | -41.45 | ≤-21.20 | 53.75 | ≤74 | PASS |
| 2DH5 | Ant1 | Low | 2402 | Peak | 2310.000 | -41.47 | ≤-21.20 | 53.73 | ≤74 | PASS |
| 2DH5 | Ant1 | Low | 2402 | Peak | 2367.515 | -38.78 | ≤-21.20 | 56.42 | ≤74 | PASS |
| 2DH5 | Ant1 | Low | 2402 | AV | 2390.000 | -48.94 | ≤-41.20 | 46.26 | ≤54 | PASS |
| 2DH5 | Ant1 | Low | 2402 | AV | 2310.000 | -49.36 | ≤-41.20 | 45.84 | ≤54 | PASS |
| 2DH5 | Ant1 | Low | 2402 | AV | 2374.340 | -48.18 | ≤-41.20 | 47.02 | ≤54 | PASS |
| 2DH5 | Ant1 | High | 2480 | Peak | 2483.500 | -41.92 | ≤-21.20 | 53.28 | ≤74 | PASS |
| 2DH5 | Ant1 | High | 2480 | Peak | 2500.000 | -40.98 | ≤-21.20 | 54.22 | ≤74 | PASS |
| 2DH5 | Ant1 | High | 2480 | Peak | 2489.520 | -38.32 | ≤-21.20 | 56.88 | ≤74 | PASS |
| 2DH5 | Ant1 | High | 2480 | AV | 2483.500 | -48.9 | ≤-41.20 | 46.30 | ≤54 | PASS |
| 2DH5 | Ant1 | High | 2480 | AV | 2500.000 | -47.86 | ≤-41.20 | 47.34 | ≤54 | PASS |
| 2DH5 | Ant1 | High | 2480 | AV | 2499.120 | -47.2 | ≤-41.20 | 48.00 | ≤54 | PASS |

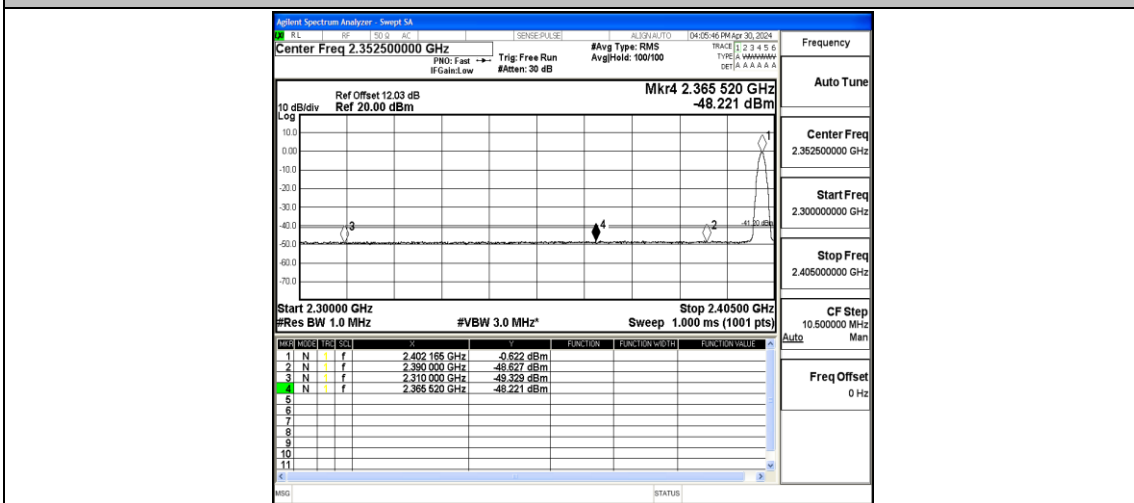
Note:

1. The Antenna Gain is compensated in the graph.
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.

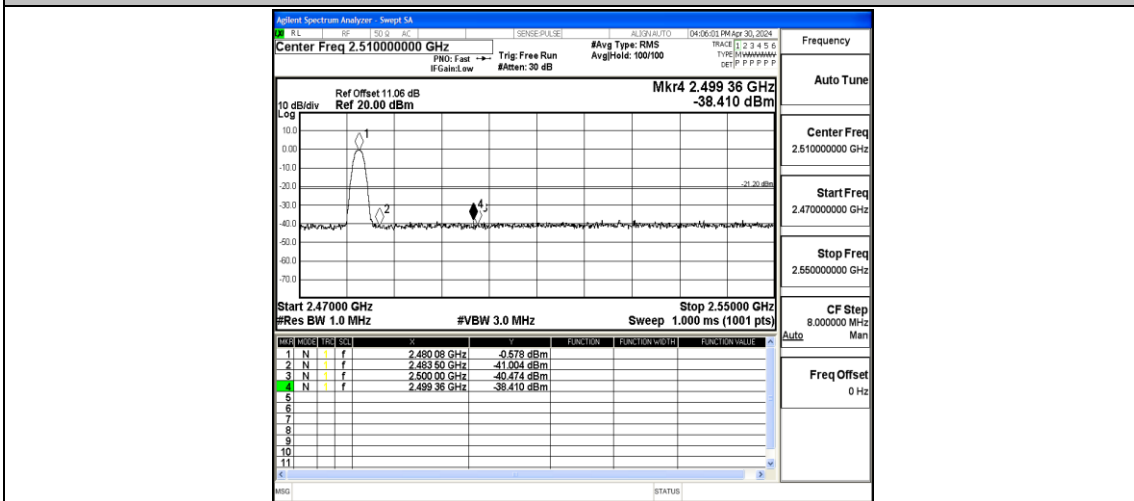
Test Graphs



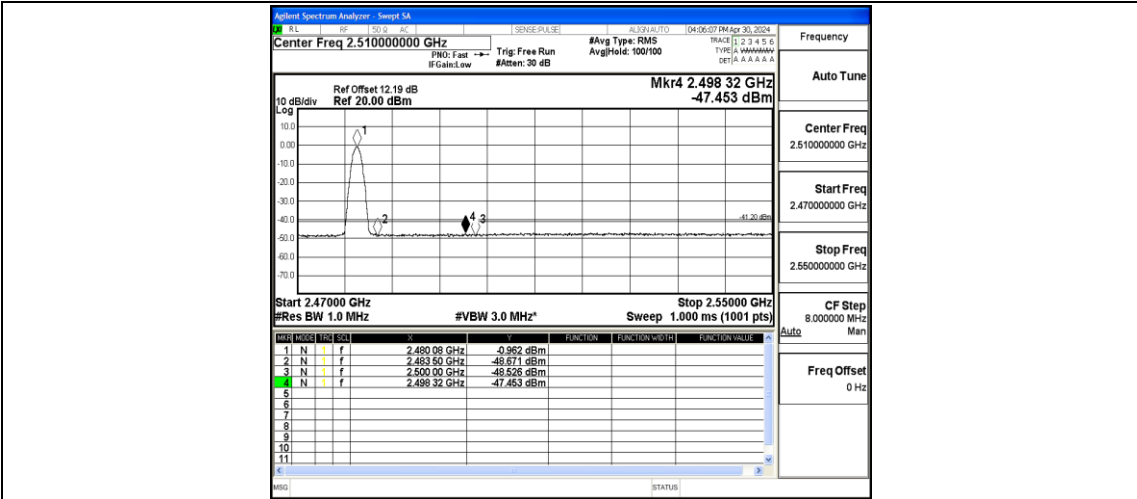
DH5-Ant1-2402-PASS



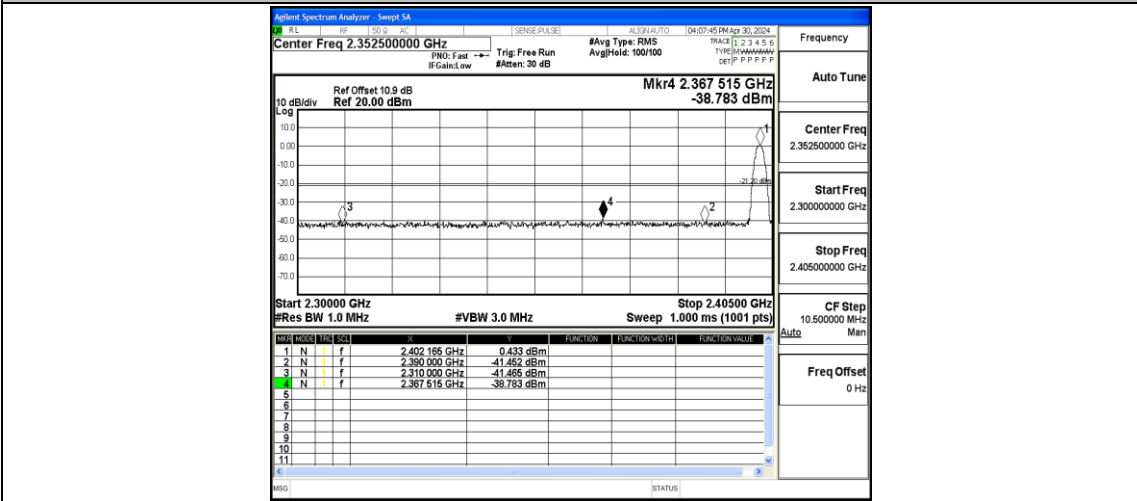
DH5-Ant1-2402-PASS



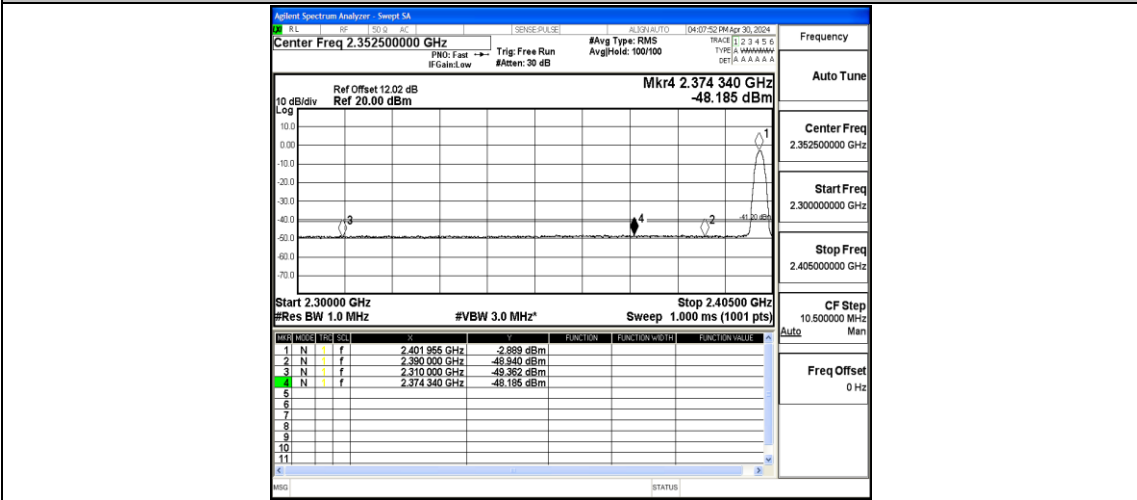
DH5-Ant1-2480-PASS



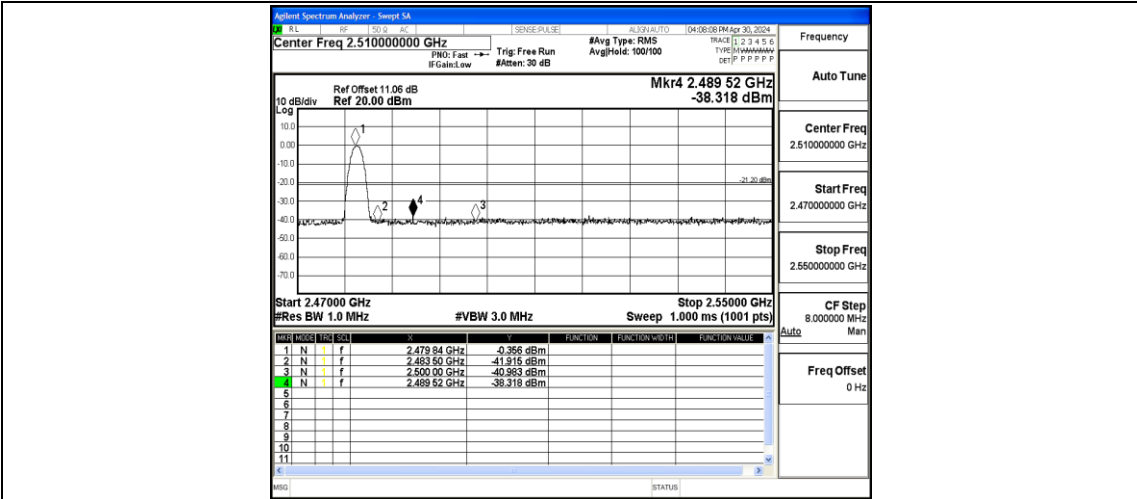
DH5-Ant1-2480-PASS



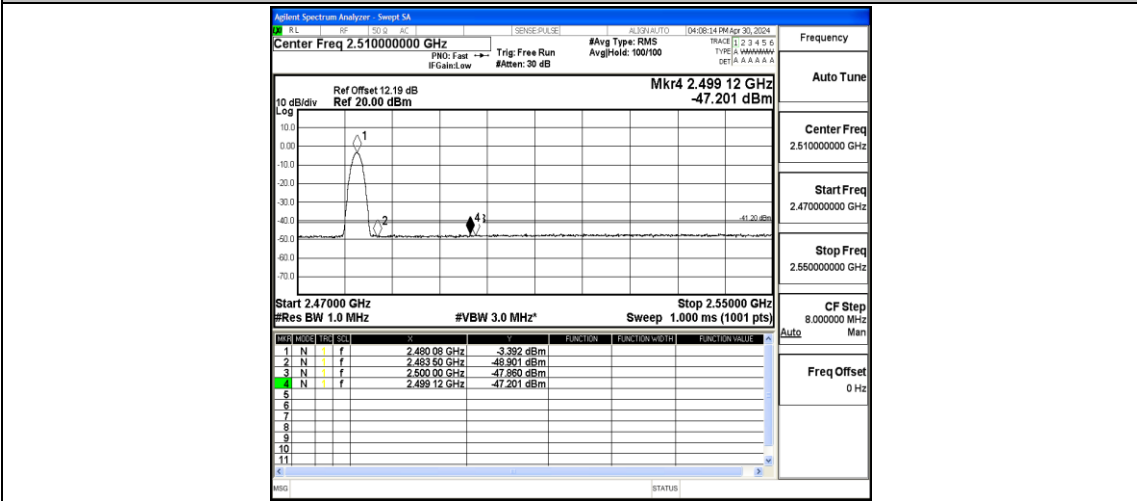
2DH5-Ant1-2402-PASS



2DH5-Ant1-2402-PASS



2DH5-Ant1-2480-PASS



2DH5-Ant1-2480-PASS