



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

Product Name: TWS Bluetooth headphones



Trade Mark:

Test Model: PW40

FCC ID: 2BS89-PW40

### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 23.5°C    |
| Relative Humidity: | 58%       |
| ATM Pressure:      | 100.0 kPa |
| Test Engineer:     | Allen Lai |
| Supervised by:     | Max Zhang |
| NOTE               | N/A       |

## Appendix A: 20dB Emission Bandwidth

### Test Result

| Test Mode | Antenna | Frequency<br>[MHz] | 20db EBW<br>[MHz] | FL<br>[MHz] | FH<br>[MHz] | Limit<br>[MHz] | Verdict |
|-----------|---------|--------------------|-------------------|-------------|-------------|----------------|---------|
| DH5       | Ant1    | 2402               | 0.960             | 2401.529    | 2402.489    | ---            | ---     |
| DH5       | Ant1    | 2441               | 0.957             | 2440.532    | 2441.489    | ---            | ---     |
| DH5       | Ant1    | 2480               | 0.963             | 2479.532    | 2480.495    | ---            | ---     |
| 2DH5      | Ant1    | 2402               | 1.311             | 2401.340    | 2402.651    | ---            | ---     |
| 2DH5      | Ant1    | 2441               | 1.281             | 2440.367    | 2441.648    | ---            | ---     |
| 2DH5      | Ant1    | 2480               | 1.317             | 2479.331    | 2480.648    | ---            | ---     |
| 3DH5      | Ant1    | 2402               | 1.293             | 2401.346    | 2402.639    | ---            | ---     |
| 3DH5      | Ant1    | 2441               | 1.302             | 2440.343    | 2441.645    | ---            | ---     |
| 3DH5      | Ant1    | 2480               | 1.305             | 2479.349    | 2480.654    | ---            | ---     |

Note: offset(dB) = cable loss(dB) + attenuator factor(dB)





## Test Graphs



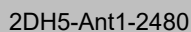
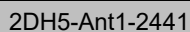


DH5-Ant1-2480



2DH5-Ant1-2402







3DH5-Ant1-2402



3DH5-Ant1-2441







## Appendix B: Occupied Channel Bandwidth

### Test Result

| Test Mode | Antenna | Frequency<br>[MHz] | OCB<br>[MHz] | FL<br>[MHz] | FH<br>[MHz] | Limit<br>[MHz] | Verdict |
|-----------|---------|--------------------|--------------|-------------|-------------|----------------|---------|
| DH5       | Ant1    | 2402               | 0.84739      | 2401.5727   | 2402.4201   | ---            | ---     |
| DH5       | Ant1    | 2441               | 0.87119      | 2440.5645   | 2441.4357   | ---            | ---     |
| DH5       | Ant1    | 2480               | 0.87551      | 2479.5585   | 2480.4340   | ---            | ---     |
| 2DH5      | Ant1    | 2402               | 1.1725       | 2401.4105   | 2402.5830   | ---            | ---     |
| 2DH5      | Ant1    | 2441               | 1.1845       | 2440.4036   | 2441.5881   | ---            | ---     |
| 2DH5      | Ant1    | 2480               | 1.1862       | 2479.4031   | 2480.5893   | ---            | ---     |
| 3DH5      | Ant1    | 2402               | 1.1752       | 2401.4161   | 2402.5913   | ---            | ---     |
| 3DH5      | Ant1    | 2441               | 1.1900       | 2440.4007   | 2441.5907   | ---            | ---     |
| 3DH5      | Ant1    | 2480               | 1.1952       | 2479.3987   | 2480.5939   | ---            | ---     |

Note: offset(dB) = cable loss(dB) + attenuator factor(dB)





## Test Graphs





DH5-Ant1-2480



2DH5-Ant1-2402



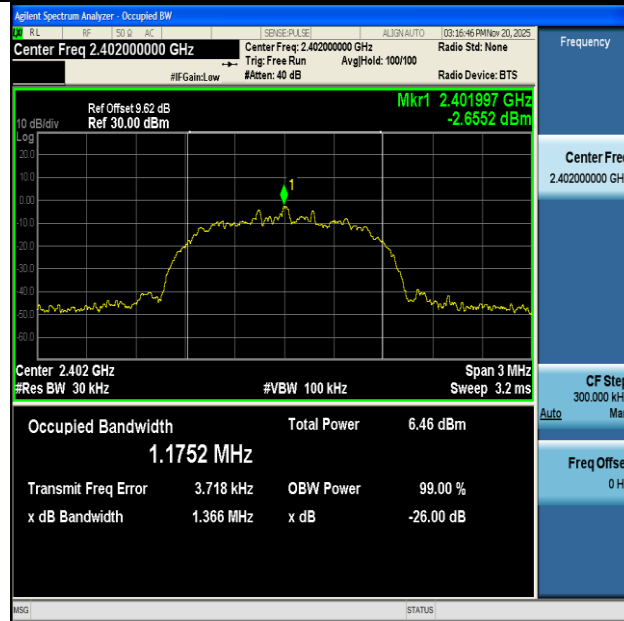


2DH5-Ant1-2441

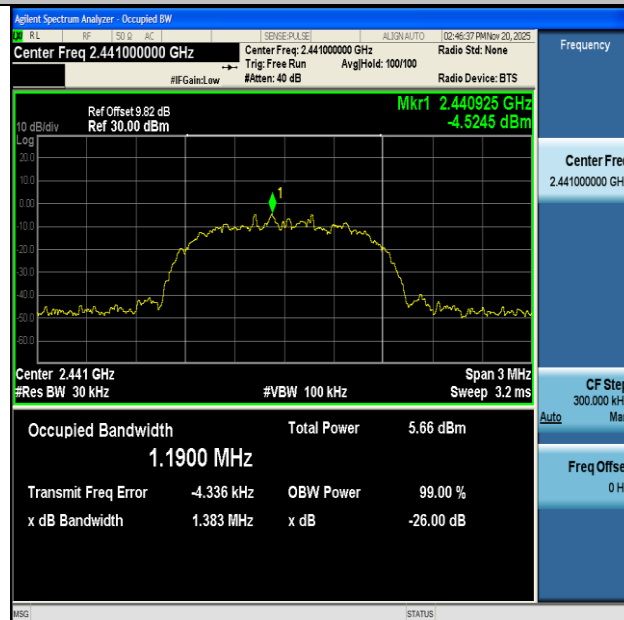


2DH5-Ant1-2480



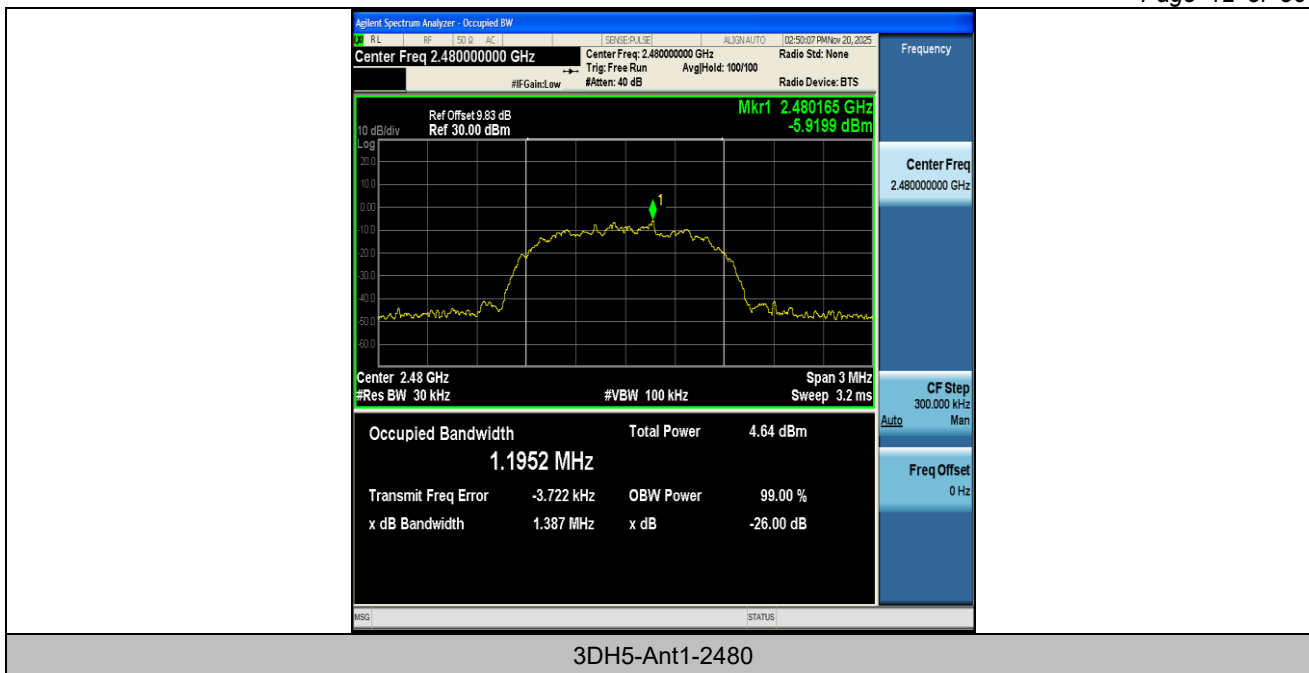


3DH5-Ant1-2402



3DH5-Ant1-2441







## Appendix C: Maximum peak conducted output power

### Test Result

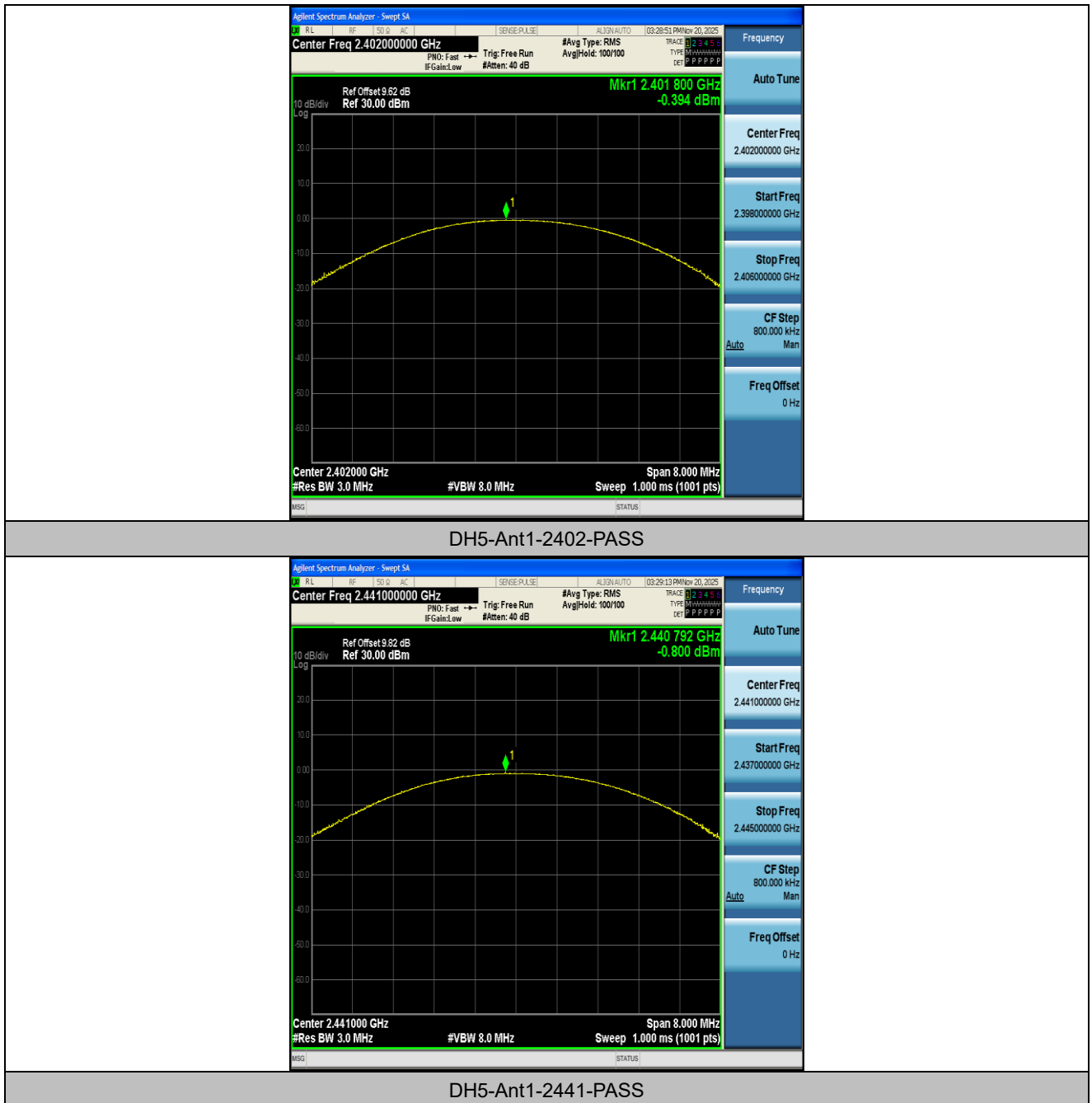
| Test Mode | Antenna | Frequency [MHz] | Conducted Peak Power [dBm] | Conducted Limit [dBm] | Verdict |
|-----------|---------|-----------------|----------------------------|-----------------------|---------|
| DH5       | Ant1    | 2402            | -0.39                      | ≤30                   | PASS    |
| DH5       | Ant1    | 2441            | -0.80                      | ≤30                   | PASS    |
| DH5       | Ant1    | 2480            | -1.72                      | ≤30                   | PASS    |
| 2DH5      | Ant1    | 2402            | 1.68                       | ≤20.97                | PASS    |
| 2DH5      | Ant1    | 2441            | 1.14                       | ≤20.97                | PASS    |
| 2DH5      | Ant1    | 2480            | 0.16                       | ≤20.97                | PASS    |
| 3DH5      | Ant1    | 2402            | 2.27                       | ≤20.97                | PASS    |
| 3DH5      | Ant1    | 2441            | 1.71                       | ≤20.97                | PASS    |
| 3DH5      | Ant1    | 2480            | 0.85                       | ≤20.97                | PASS    |

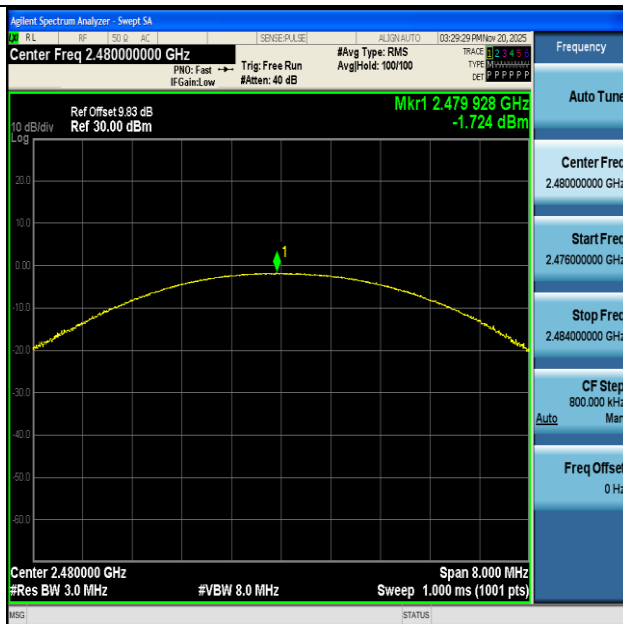
Note: offset(dB) = cable loss(dB) + attenuator factor(dB)



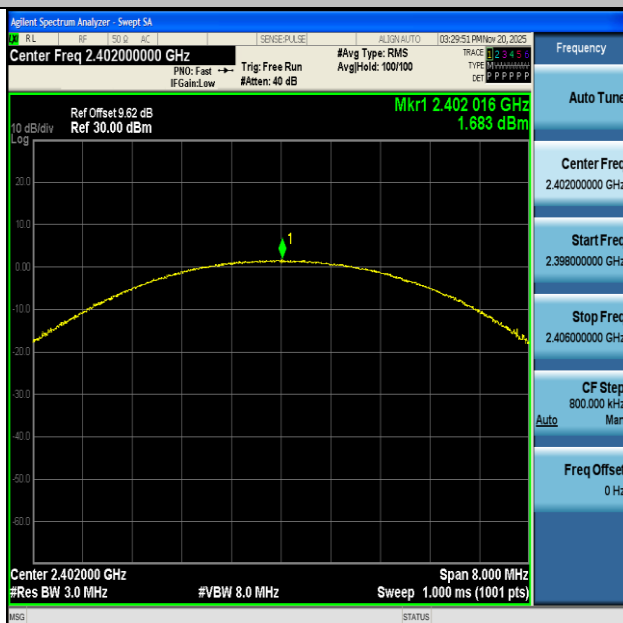


## Test Graphs



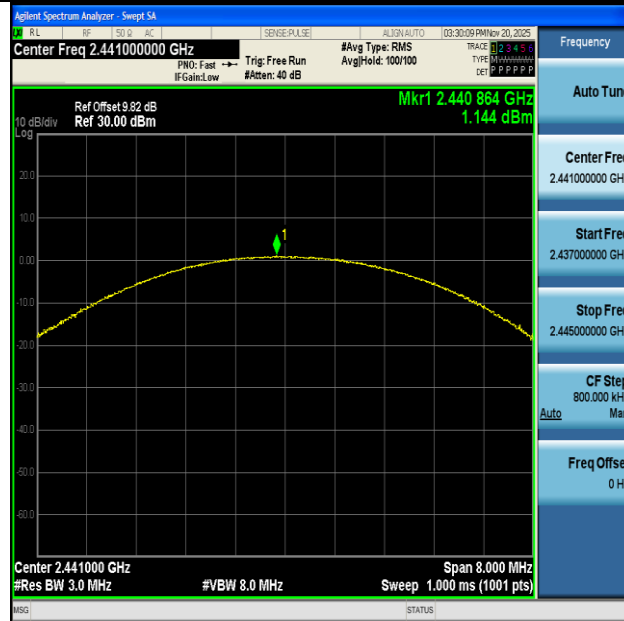


DH5-Ant1-2480-PASS

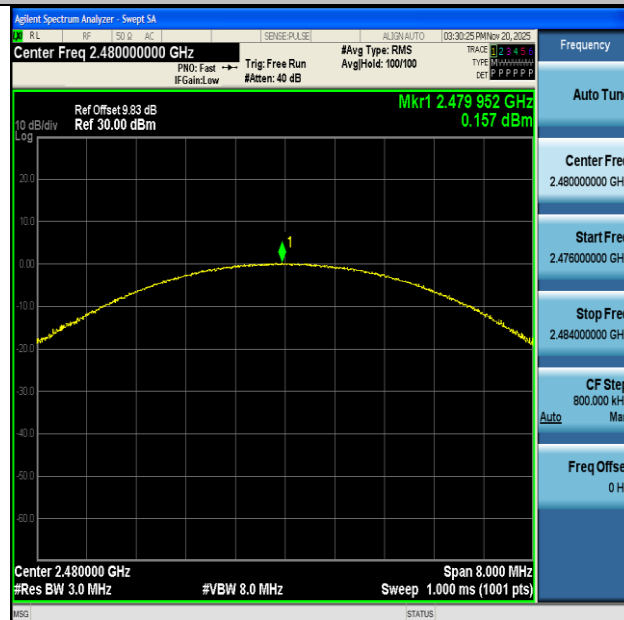


2DH5-Ant1-2402-PASS



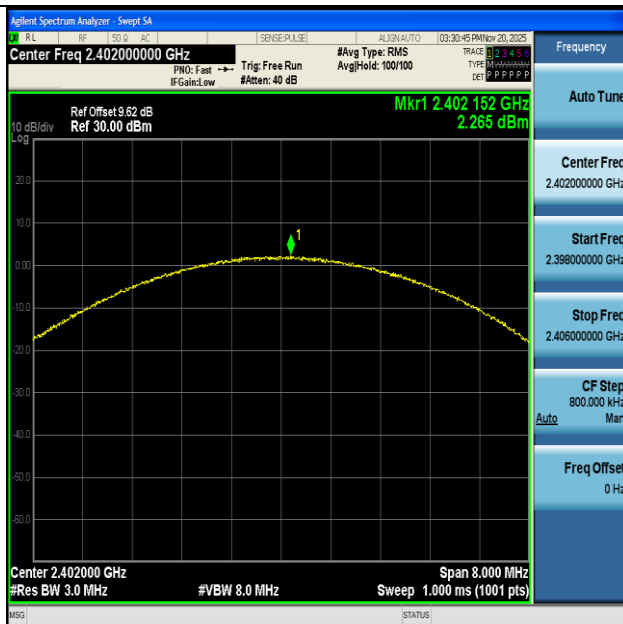


2DH5-Ant1-2441-PASS

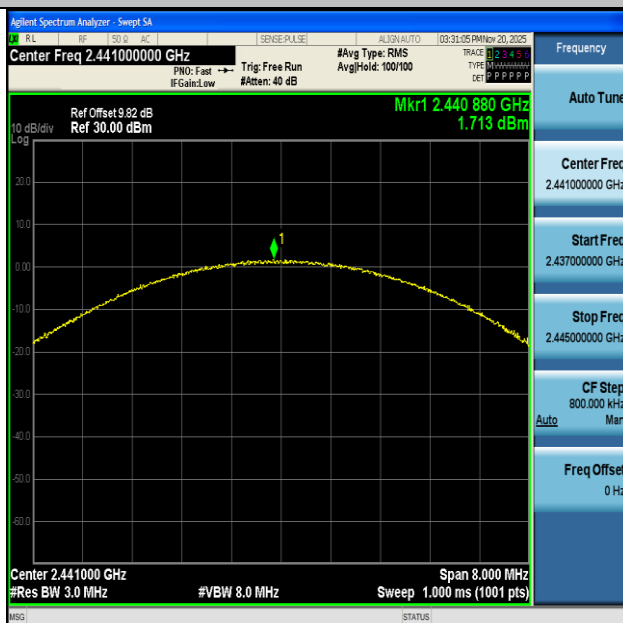


2DH5-Ant1-2480-PASS



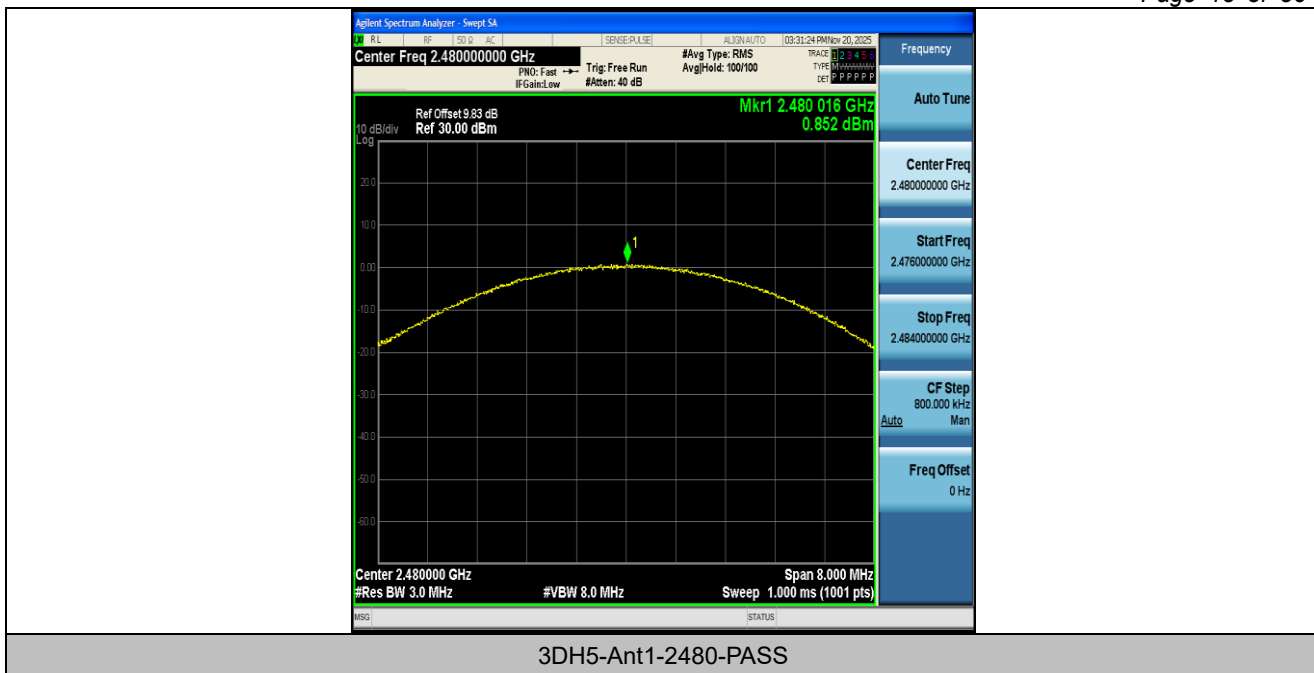


3DH5-Ant1-2402-PASS



3DH5-Ant1-2441-PASS







## Appendix D: Carrier frequency separation

### Test Result

| Test Mode | Antenna | Frequency<br>[MHz] | Result<br>[MHz] | Limit<br>[MHz] | Verdict |
|-----------|---------|--------------------|-----------------|----------------|---------|
| DH5       | Ant1    | Hop                | 1.006           | $\geq 0.963$   | PASS    |
| 2DH5      | Ant1    | Hop                | 1.008           | $\geq 0.878$   | PASS    |
| 3DH5      | Ant1    | Hop                | 0.984           | $\geq 0.870$   | PASS    |

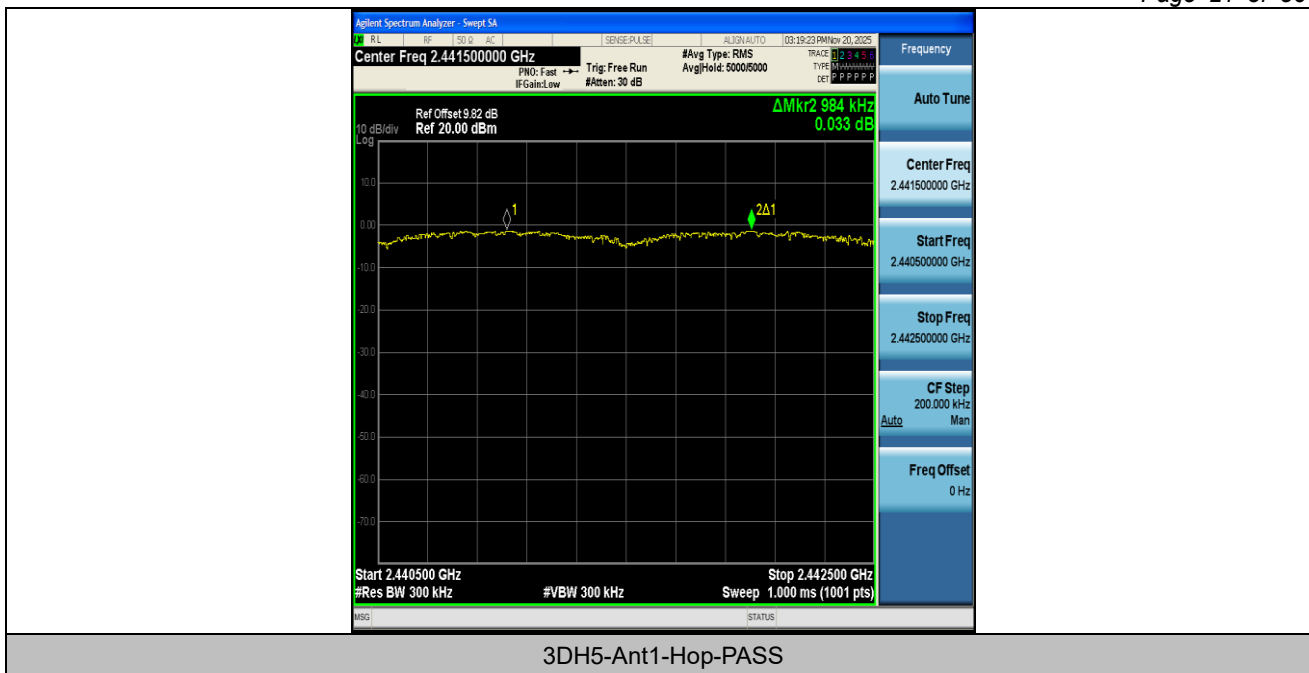
Note: offset(dB) = cable loss(dB) + attenuator factor(dB)





## Test Graphs







## Appendix E: Time of occupancy

### Test Result

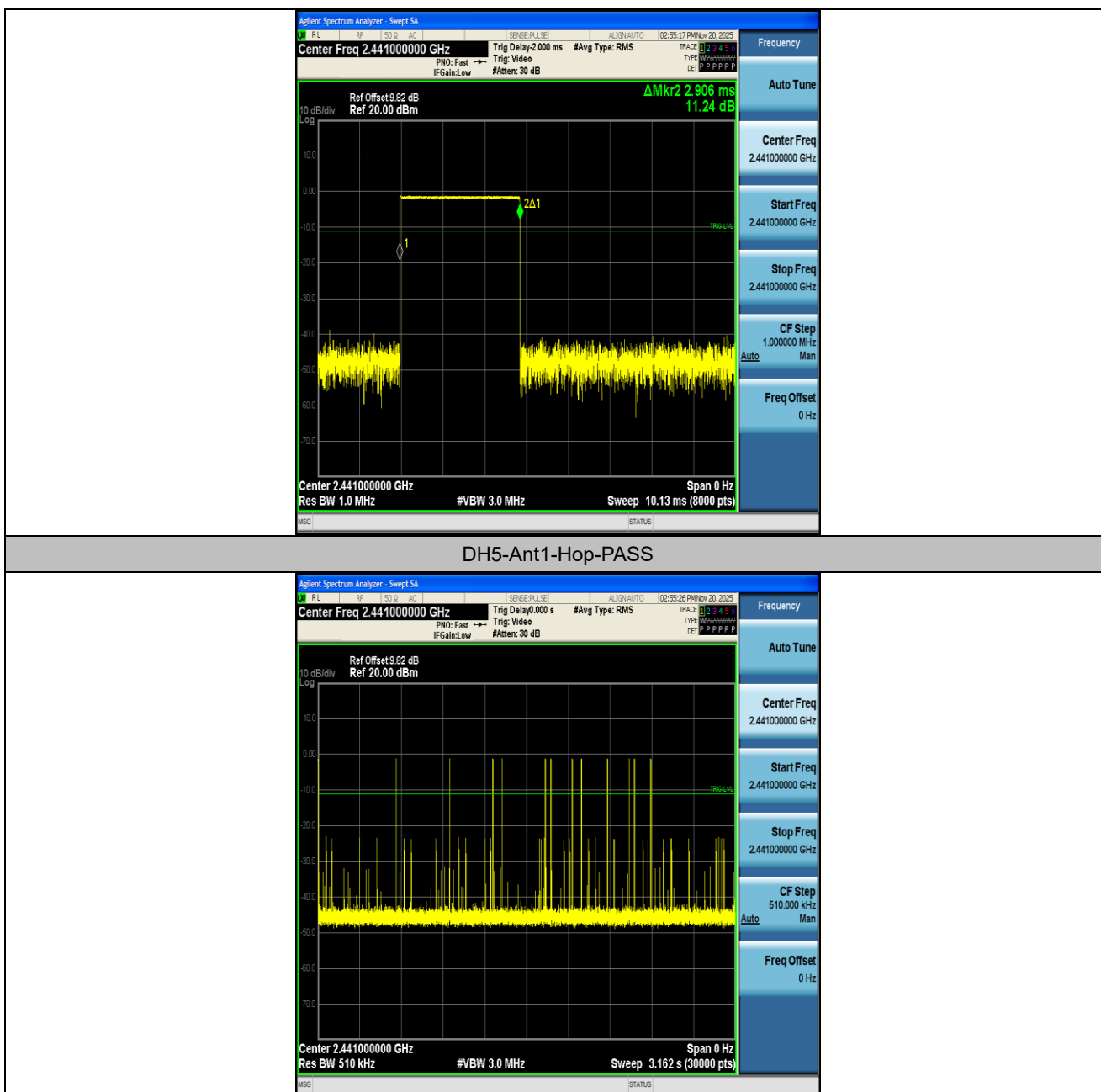
| Test Mode | Antenna | Frequency<br>[MHz] | Burst Width<br>[ms] | TotalHops<br>[Num] | Result<br>[s] | Limit<br>[s] | Verdict |
|-----------|---------|--------------------|---------------------|--------------------|---------------|--------------|---------|
| DH5       | Ant1    | Hop                | 2.906               | 130                | 0.378         | ≤0.4         | PASS    |
| 2DH5      | Ant1    | Hop                | 2.911               | 100                | 0.291         | ≤0.4         | PASS    |
| 3DH5      | Ant1    | Hop                | 2.912               | 120                | 0.349         | ≤0.4         | PASS    |

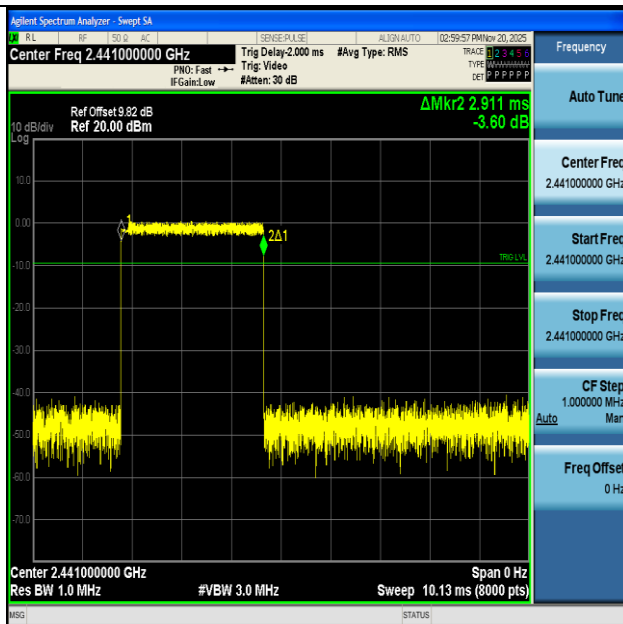
Note: offset(dB) = cable loss(dB) + attenuator factor(dB)



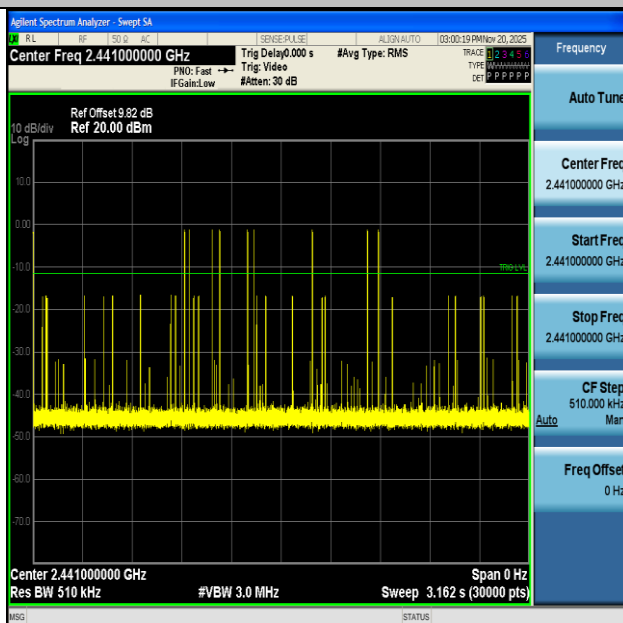


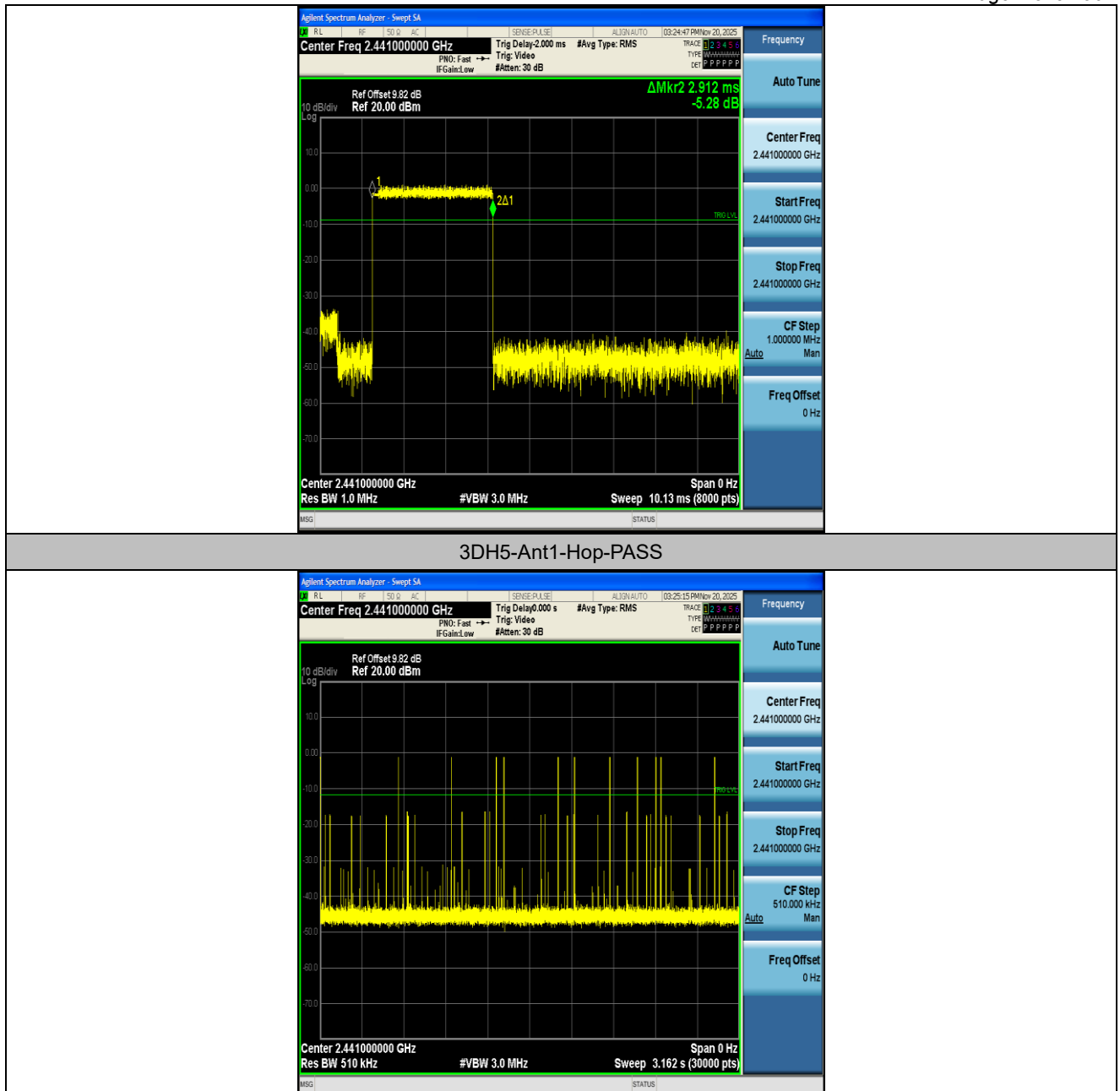
## Test Graphs





### 2DH5-Ant1-Hop-PASS







## Appendix F: Number of hopping channels

### Test Result

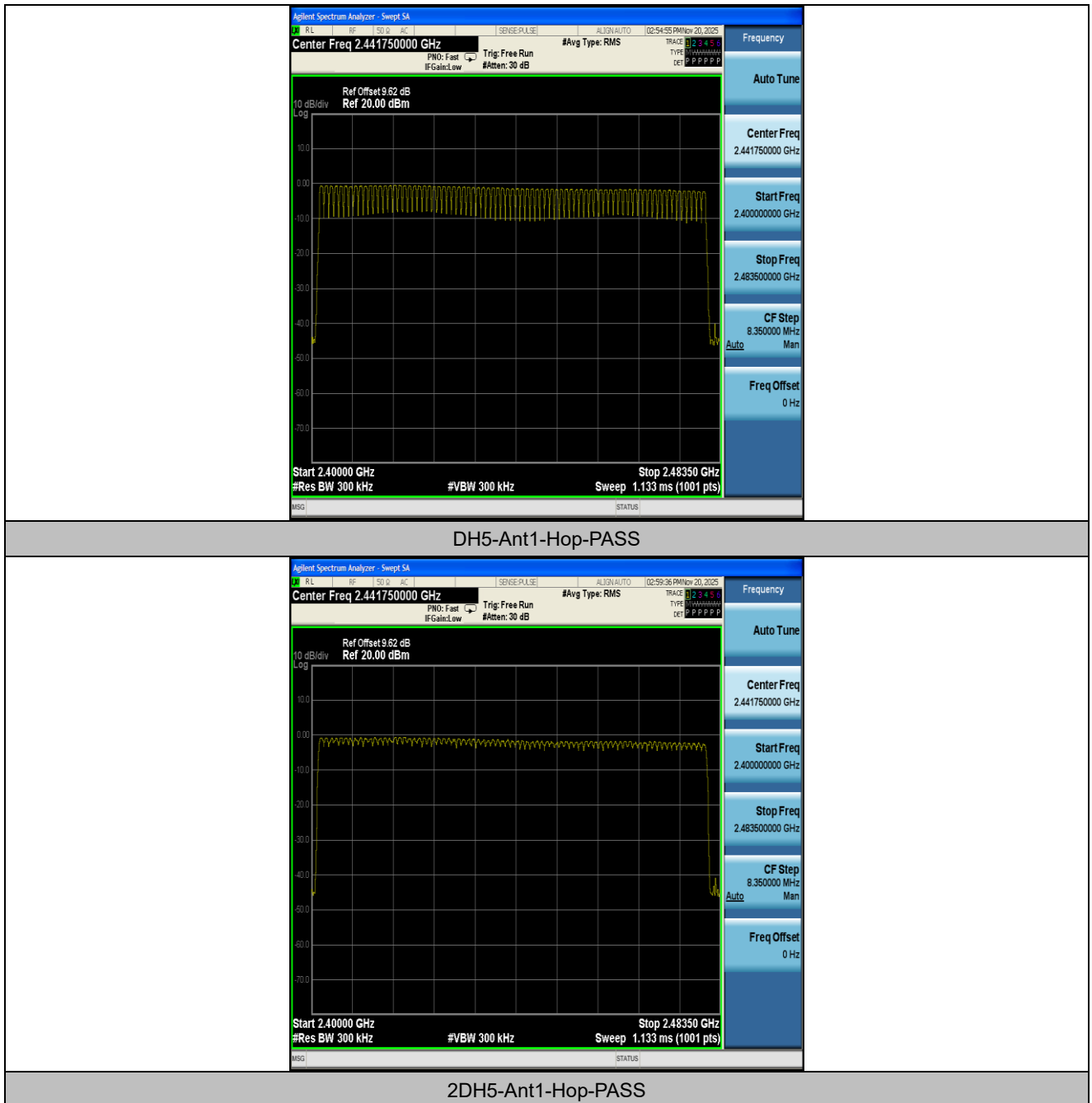
| Test Mode | Antenna | Frequency<br>[MHz] | Result<br>[Num] | Limit<br>[Num] | Verdict |
|-----------|---------|--------------------|-----------------|----------------|---------|
| DH5       | Ant1    | Hop                | 79              | ≥15            | PASS    |
| 2DH5      | Ant1    | Hop                | 79              | ≥15            | PASS    |
| 3DH5      | Ant1    | Hop                | 79              | ≥15            | PASS    |

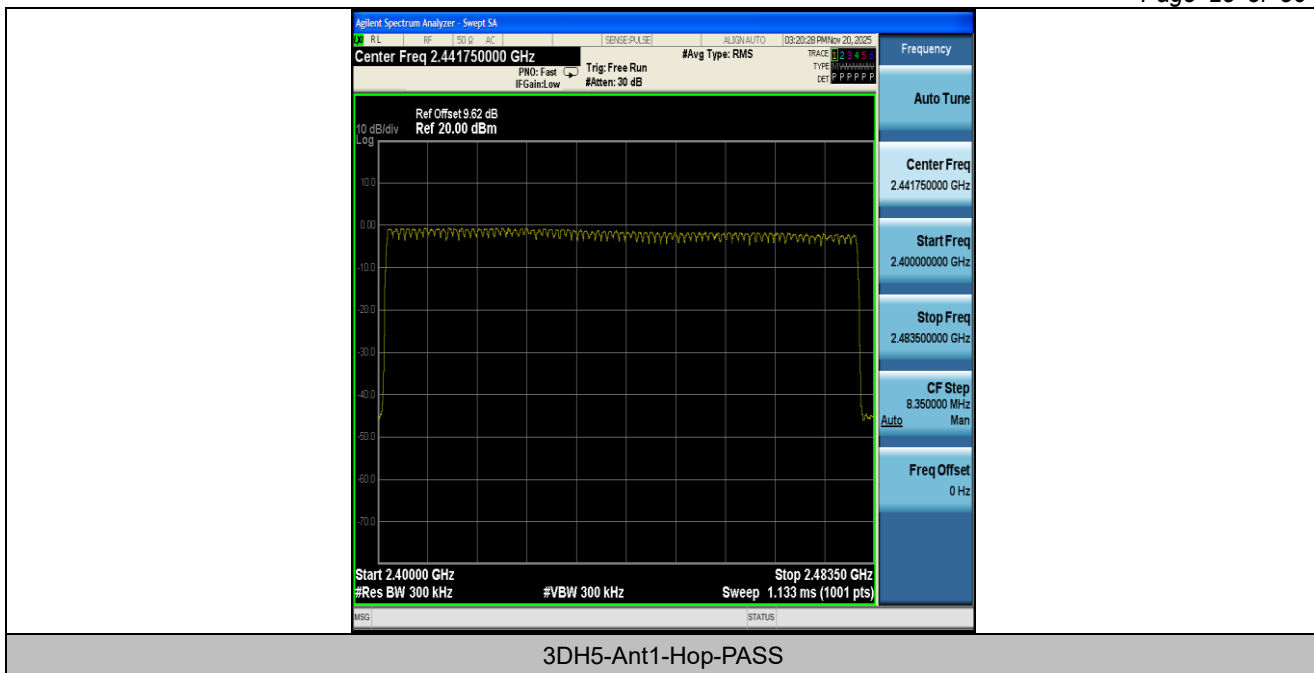
Note: offset(dB) = cable loss(dB) + attenuator factor(dB)





## Test Graphs







## Appendix G: Band edge measurements

### Test Result

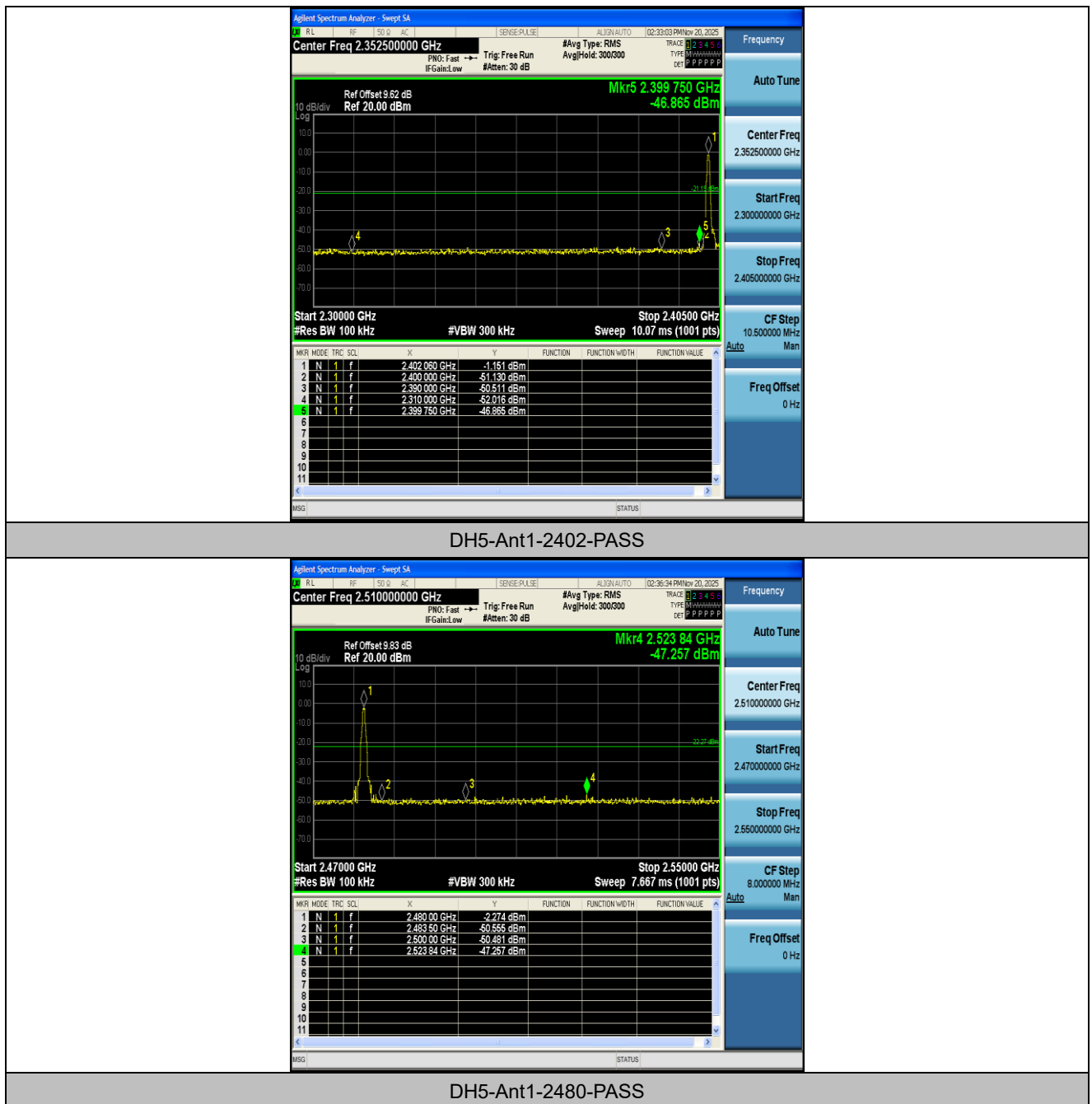
| Test Mode | Antenna | Ch.Name | Frequency [MHz] | RefLevel [dBm] | Result [dBm] | Limit [dBm] | Verdict |
|-----------|---------|---------|-----------------|----------------|--------------|-------------|---------|
| DH5       | Ant1    | Low     | 2402            | -1.15          | -46.87       | ≤-21.15     | PASS    |
| DH5       | Ant1    | High    | 2480            | -2.27          | -47.26       | ≤-22.27     | PASS    |
| DH5       | Ant1    | Low     | Hop_2402        | -1.01          | -48.14       | ≤-21.01     | PASS    |
| DH5       | Ant1    | High    | Hop_2480        | -2.22          | -47.69       | ≤-22.22     | PASS    |
| 2DH5      | Ant1    | Low     | 2402            | -0.75          | -46.35       | ≤-20.75     | PASS    |
| 2DH5      | Ant1    | High    | 2480            | -2.07          | -47.56       | ≤-22.07     | PASS    |
| 2DH5      | Ant1    | Low     | Hop_2402        | -3.45          | -48.83       | ≤-23.45     | PASS    |
| 2DH5      | Ant1    | High    | Hop_2480        | -3.28          | -47.79       | ≤-23.28     | PASS    |
| 3DH5      | Ant1    | Low     | 2402            | -1.01          | -46.23       | ≤-21.01     | PASS    |
| 3DH5      | Ant1    | High    | 2480            | -2.25          | -47.55       | ≤-22.25     | PASS    |
| 3DH5      | Ant1    | Low     | Hop_2402        | -1.87          | -48.24       | ≤-21.87     | PASS    |
| 3DH5      | Ant1    | High    | Hop_2480        | -4.42          | -47.08       | ≤-24.42     | PASS    |

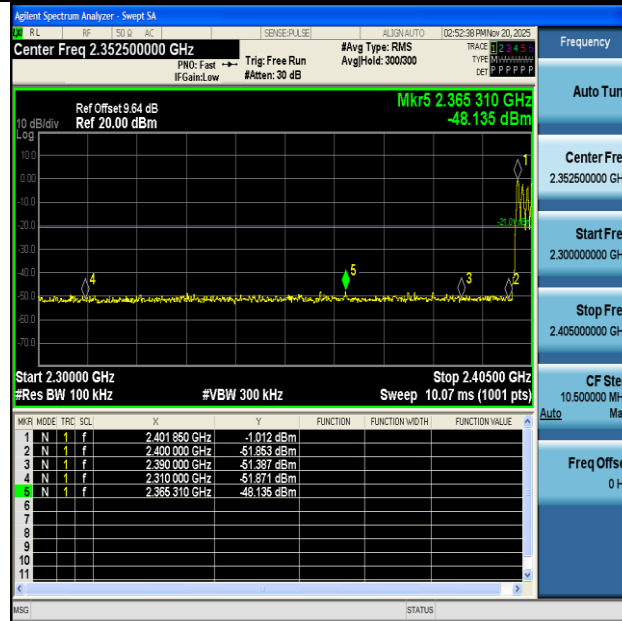
Note: offset(dB) = cable loss(dB) + attenuator factor(dB)



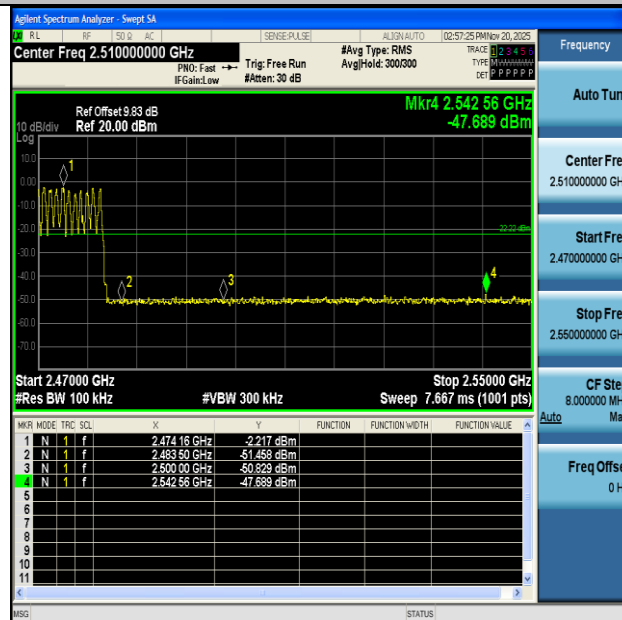


## Test Graphs



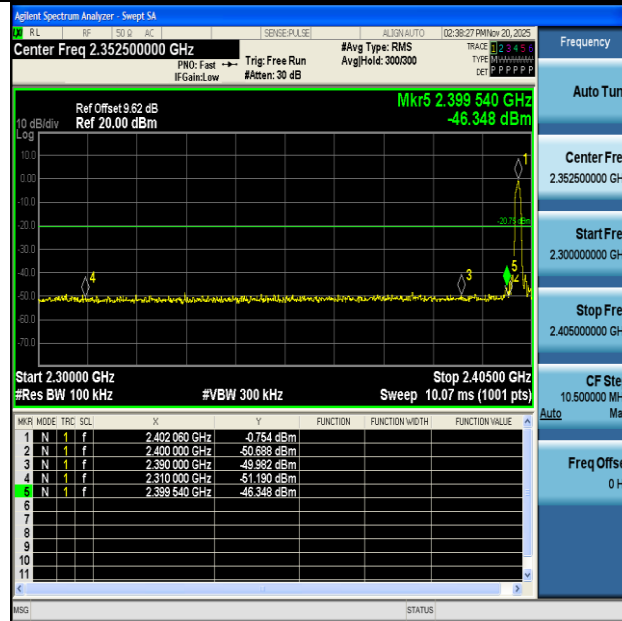


DH5-Ant1-Hop\_2402-PASS

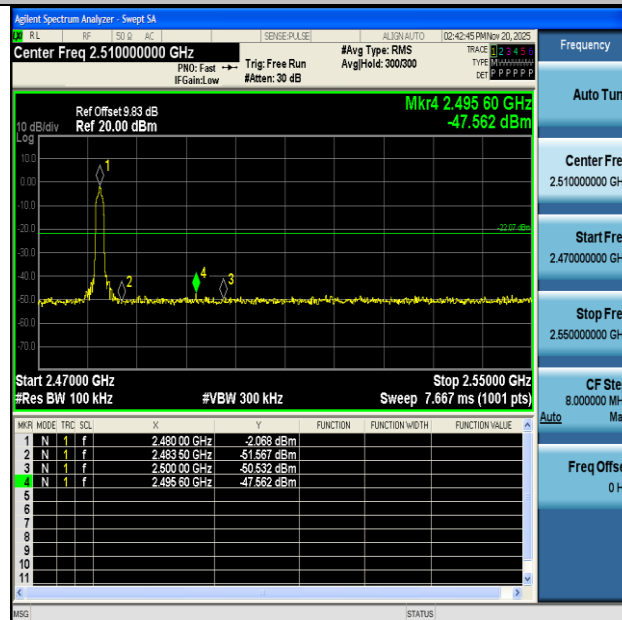


DH5-Ant1-Hop\_2480-PASS



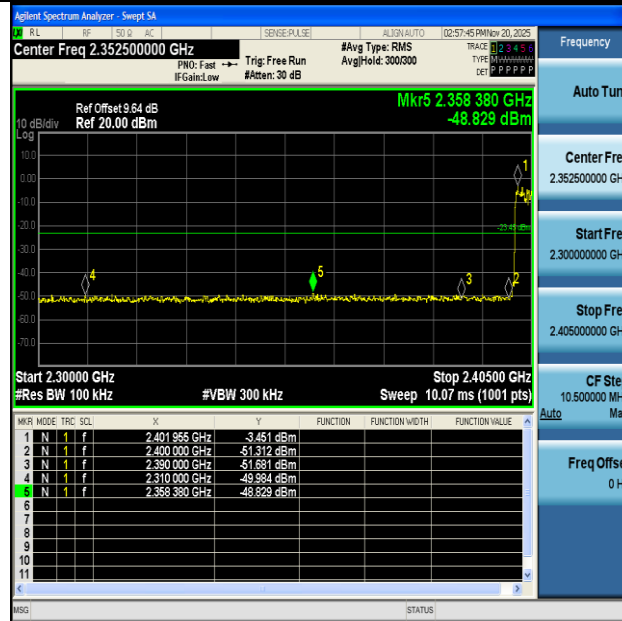


2DH5-Ant1-2402-PASS

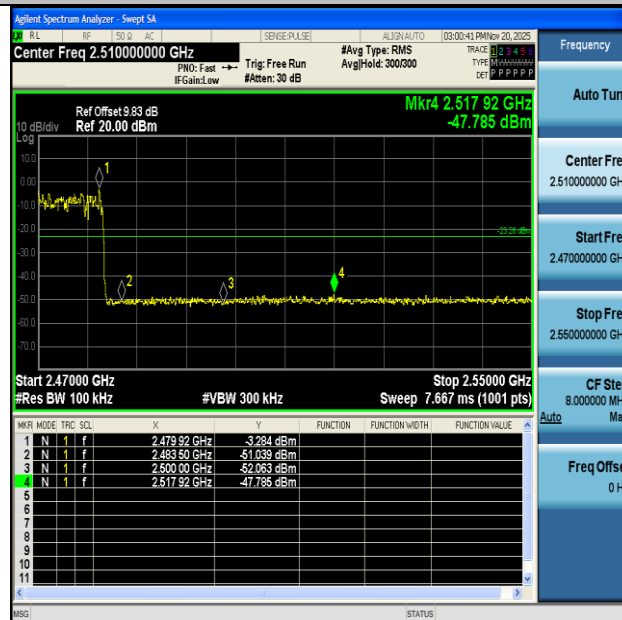


2DH5-Ant1-2480-PASS



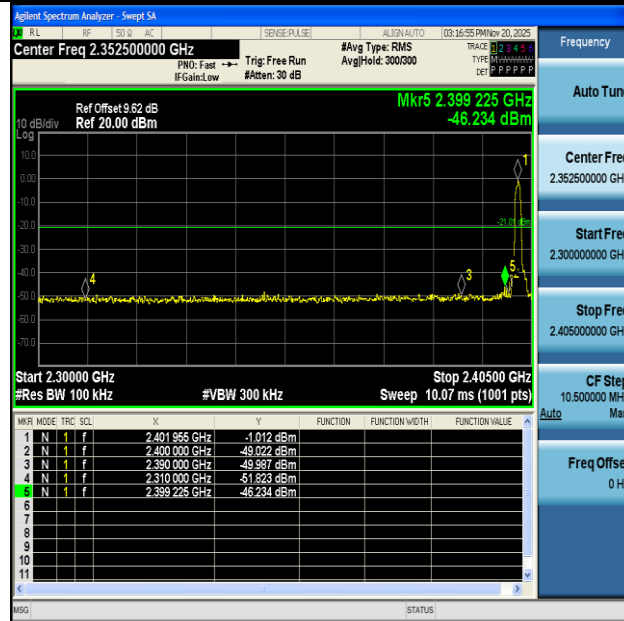


2DH5-Ant1-Hop\_2402-PASS

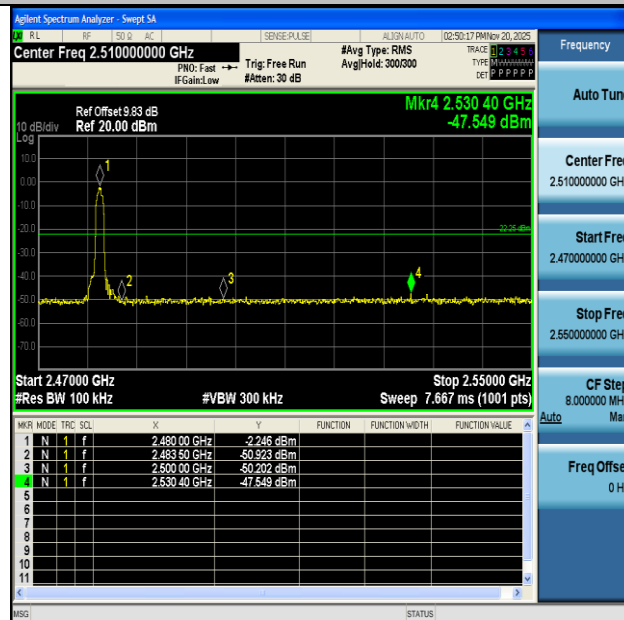


2DH5-Ant1-Hop\_2480-PASS



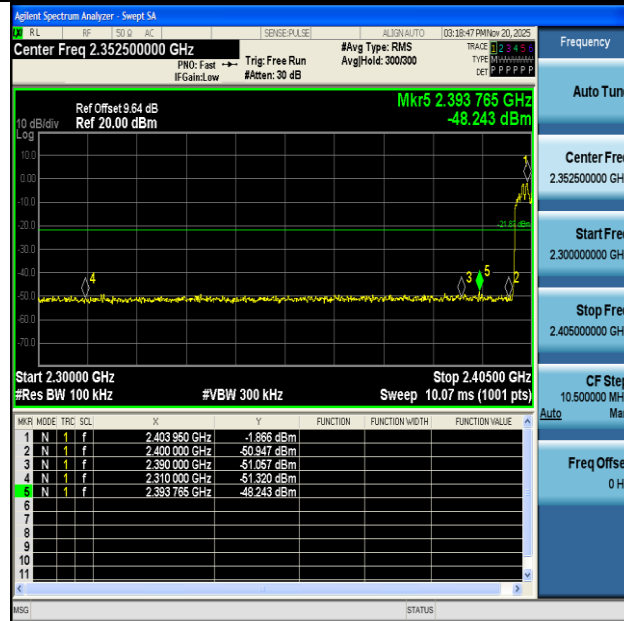


3DH5-Ant1-2402-PASS

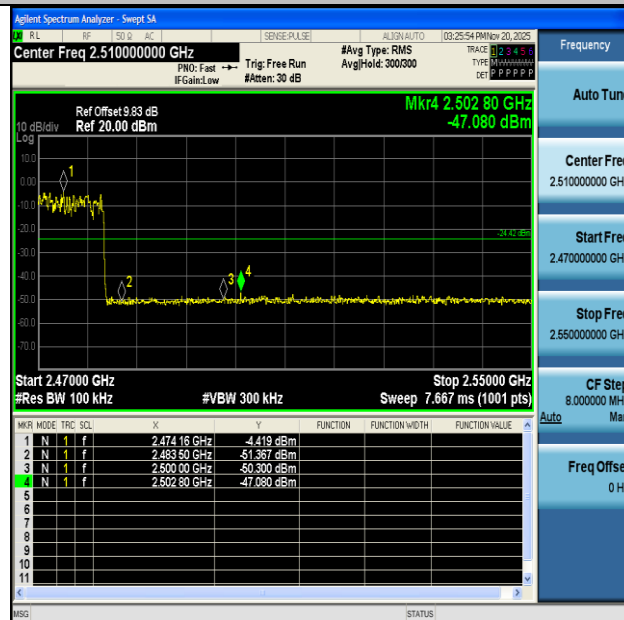


3DH5-Ant1-2480-PASS





3DH5-Ant1-Hop\_2402-PASS



3DH5-Ant1-Hop\_2480-PASS





## Appendix H: Conducted Spurious Emission

### Test Result

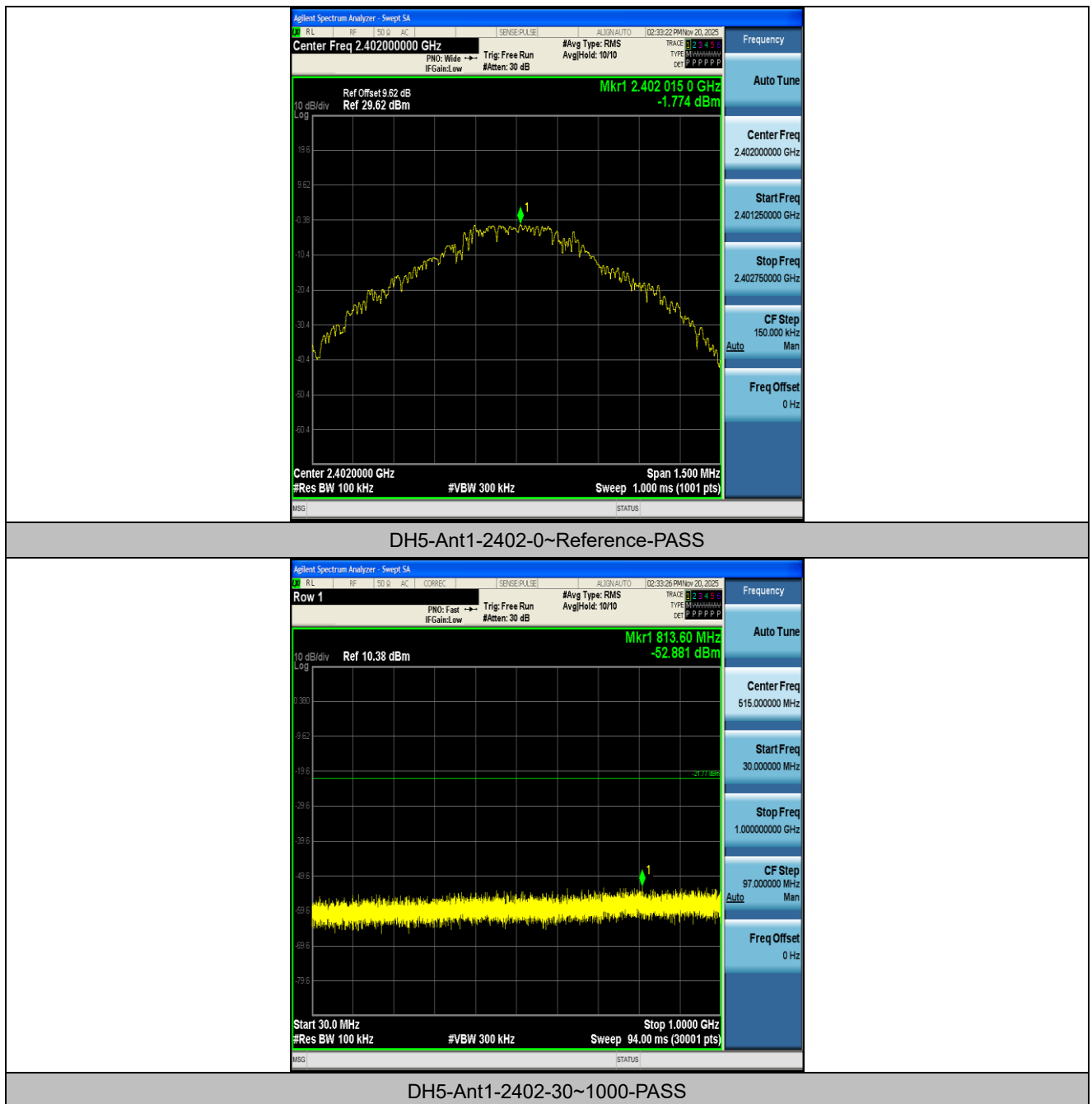
| Test Mode | Antenna | Frequency [MHz] | Freq. Range [MHz] | Ref. Level [dBm] | Result [dBm] | Limit [dBm]   | Verdict |
|-----------|---------|-----------------|-------------------|------------------|--------------|---------------|---------|
| DH5       | Ant1    | 2402            | 0~Reference       | -1.77            | -1.77        | ---           | PASS    |
| DH5       | Ant1    | 2402            | 30~1000           | -1.77            | -52.88       | $\leq -21.77$ | PASS    |
| DH5       | Ant1    | 2402            | 1000~26500        | -1.77            | -26.87       | $\leq -21.77$ | PASS    |
| DH5       | Ant1    | 2441            | 0~Reference       | -1.37            | -1.37        | ---           | PASS    |
| DH5       | Ant1    | 2441            | 30~1000           | -1.37            | -52.19       | $\leq -21.37$ | PASS    |
| DH5       | Ant1    | 2441            | 1000~26500        | -1.37            | -26.81       | $\leq -21.37$ | PASS    |
| DH5       | Ant1    | 2480            | 0~Reference       | -3.10            | -3.10        | ---           | PASS    |
| DH5       | Ant1    | 2480            | 30~1000           | -3.10            | -52.06       | $\leq -23.1$  | PASS    |
| DH5       | Ant1    | 2480            | 1000~26500        | -3.10            | -27.17       | $\leq -23.1$  | PASS    |
| 2DH5      | Ant1    | 2402            | 0~Reference       | -3.85            | -3.85        | ---           | PASS    |
| 2DH5      | Ant1    | 2402            | 30~1000           | -3.85            | -51.71       | $\leq -23.85$ | PASS    |
| 2DH5      | Ant1    | 2402            | 1000~26500        | -3.85            | -27.07       | $\leq -23.85$ | PASS    |
| 2DH5      | Ant1    | 2441            | 0~Reference       | -1.92            | -1.92        | ---           | PASS    |
| 2DH5      | Ant1    | 2441            | 30~1000           | -1.92            | -52.55       | $\leq -21.92$ | PASS    |
| 2DH5      | Ant1    | 2441            | 1000~26500        | -1.92            | -26.89       | $\leq -21.92$ | PASS    |
| 2DH5      | Ant1    | 2480            | 0~Reference       | -3.81            | -3.81        | ---           | PASS    |
| 2DH5      | Ant1    | 2480            | 30~1000           | -3.81            | -52.44       | $\leq -23.81$ | PASS    |
| 2DH5      | Ant1    | 2480            | 1000~26500        | -3.81            | -27.11       | $\leq -23.81$ | PASS    |
| 3DH5      | Ant1    | 2402            | 0~Reference       | -3.09            | -3.09        | ---           | PASS    |
| 3DH5      | Ant1    | 2402            | 30~1000           | -3.09            | -51.05       | $\leq -23.09$ | PASS    |
| 3DH5      | Ant1    | 2402            | 1000~26500        | -3.09            | -26.1        | $\leq -23.09$ | PASS    |
| 3DH5      | Ant1    | 2441            | 0~Reference       | -1.49            | -1.49        | ---           | PASS    |
| 3DH5      | Ant1    | 2441            | 30~1000           | -1.49            | -51.14       | $\leq -21.49$ | PASS    |
| 3DH5      | Ant1    | 2441            | 1000~26500        | -1.49            | -27.3        | $\leq -21.49$ | PASS    |
| 3DH5      | Ant1    | 2480            | 0~Reference       | -2.89            | -2.89        | ---           | PASS    |
| 3DH5      | Ant1    | 2480            | 30~1000           | -2.89            | -52.3        | $\leq -22.89$ | PASS    |
| 3DH5      | Ant1    | 2480            | 1000~26500        | -2.89            | -25.85       | $\leq -22.89$ | PASS    |

Note: offset(dB) in Reference test plots = cable loss(dB) + attenuator factor(dB); For spurious emissions plots from 30MHz to 26.5GHz, the cable loss and attenuator factors have been set in the 'Input Correction' of the Spectrum Analyzer during the test.



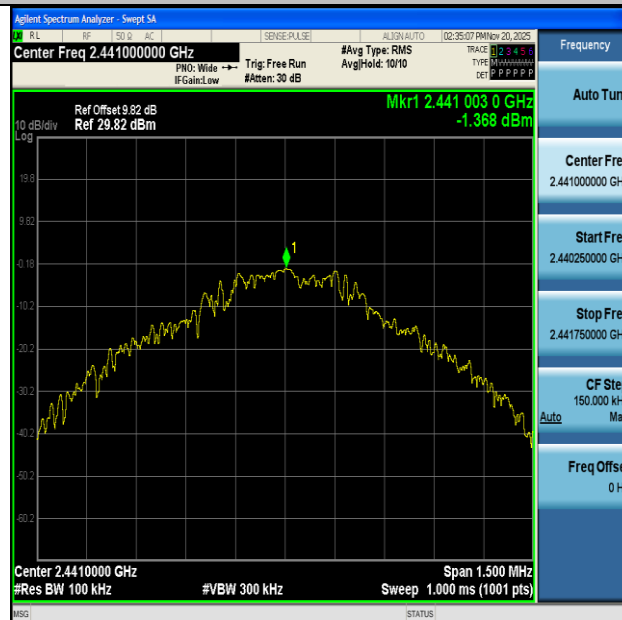


## Test Graphs



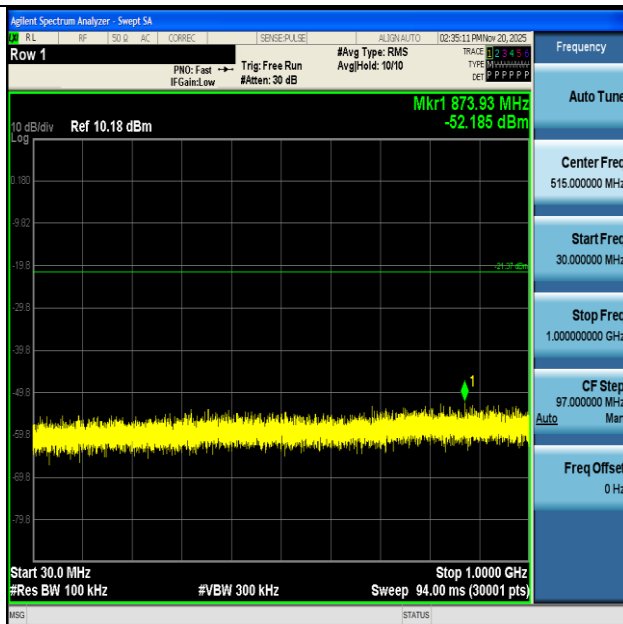


DH5-Ant1-2402-1000~26500-PASS

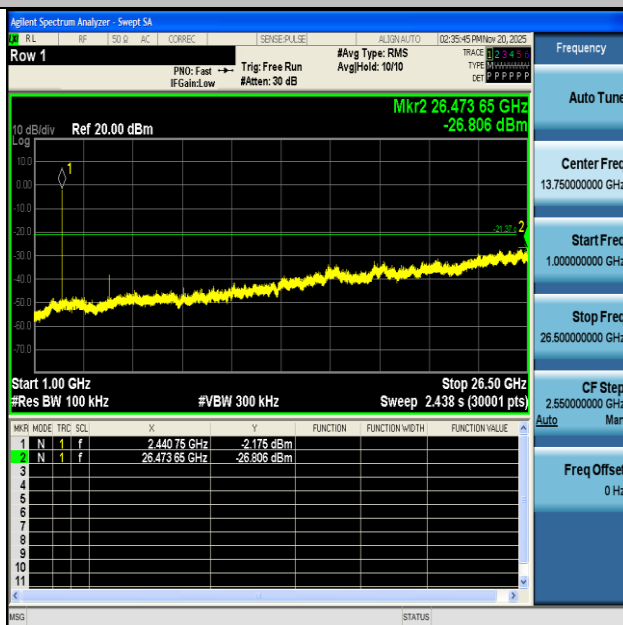


DH5-Ant1-2441-0~Reference-PASS



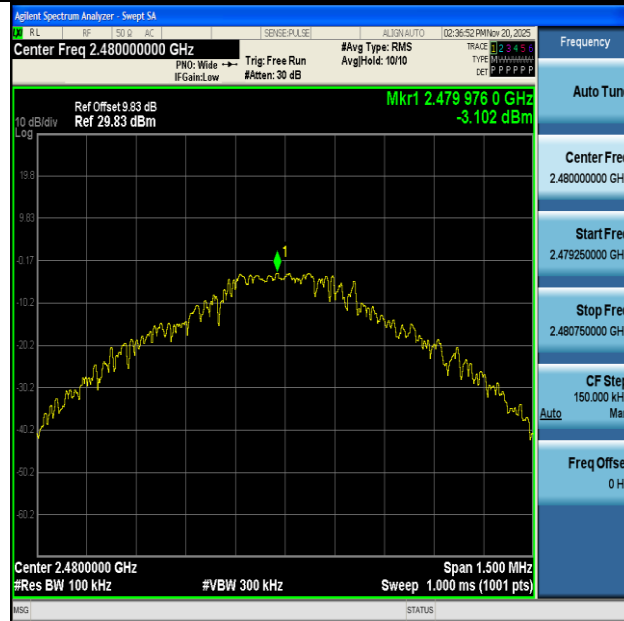


DH5-Ant1-2441-30~1000-PASS

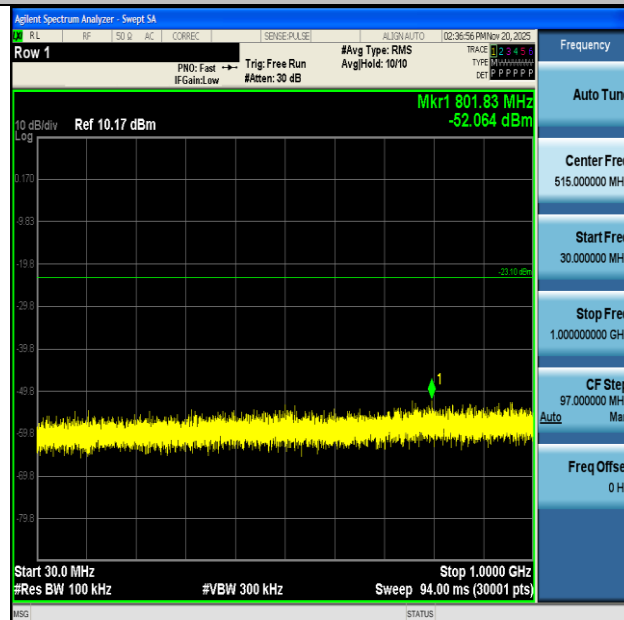


DH5-Ant1-2441-1000~26500-PASS





DH5-Ant1-2480-0~Reference-PASS

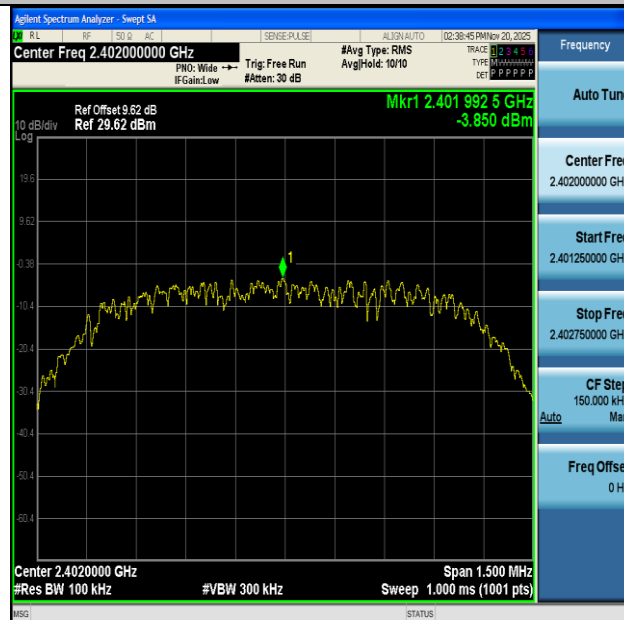


DH5-Ant1-2480-30~1000-PASS



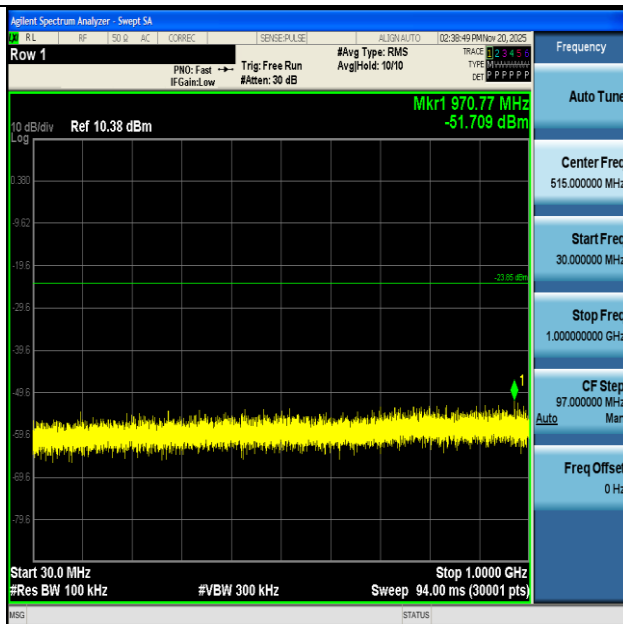


DH5-Ant1-2480-1000~26500-PASS

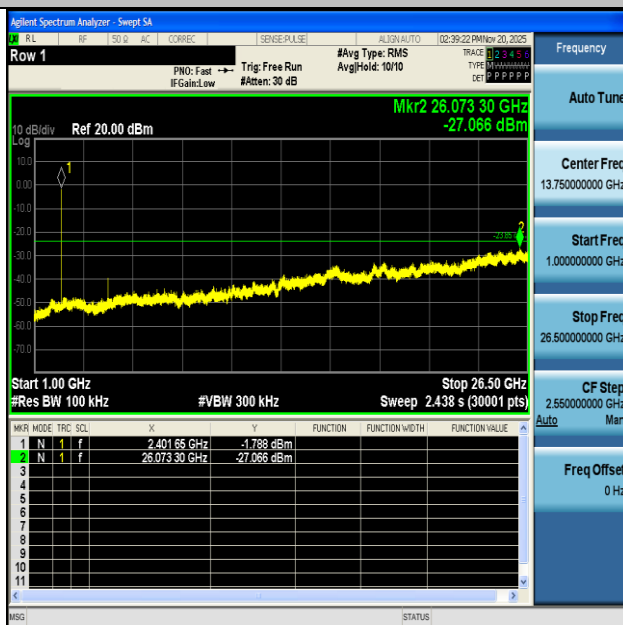


2DH5-Ant1-2402-0~Reference-PASS



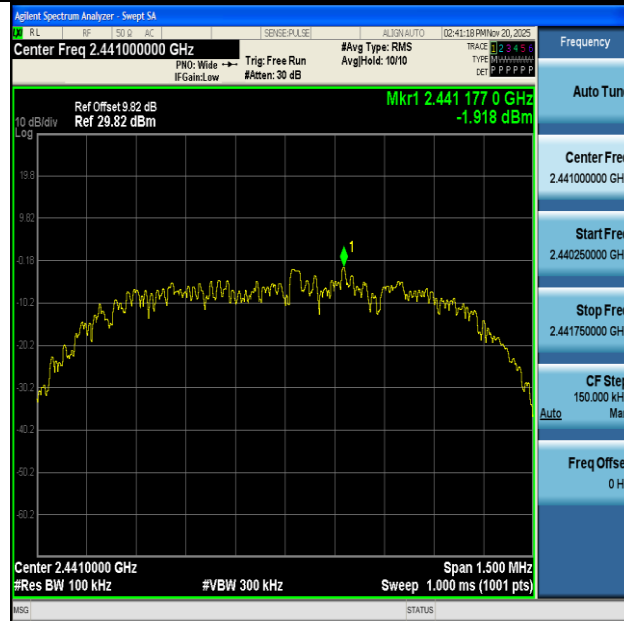


2DH5-Ant1-2402-30~1000-PASS

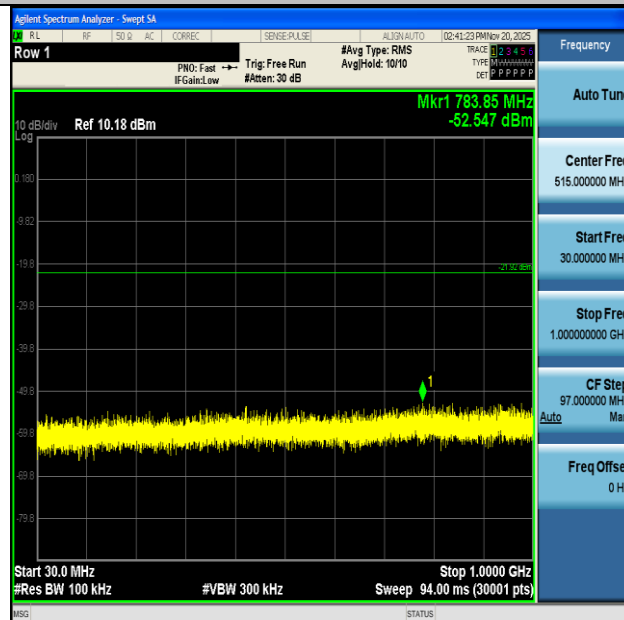


2DH5-Ant1-2402-1000~26500-PASS



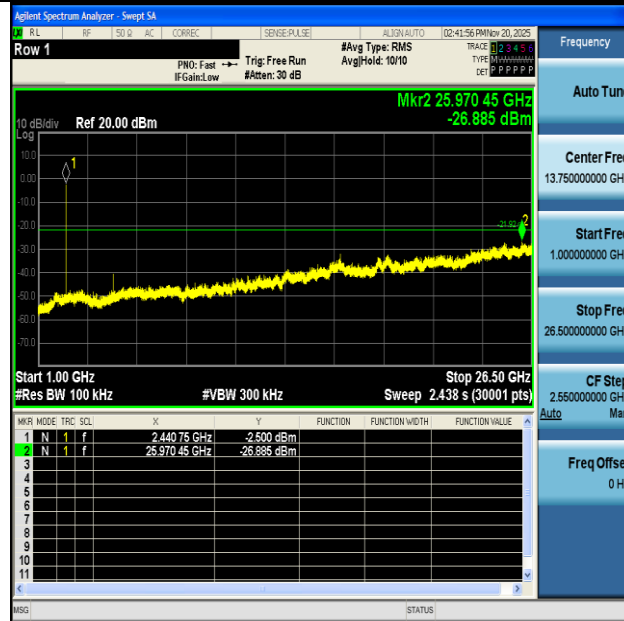


2DH5-Ant1-2441-0~Reference-PASS

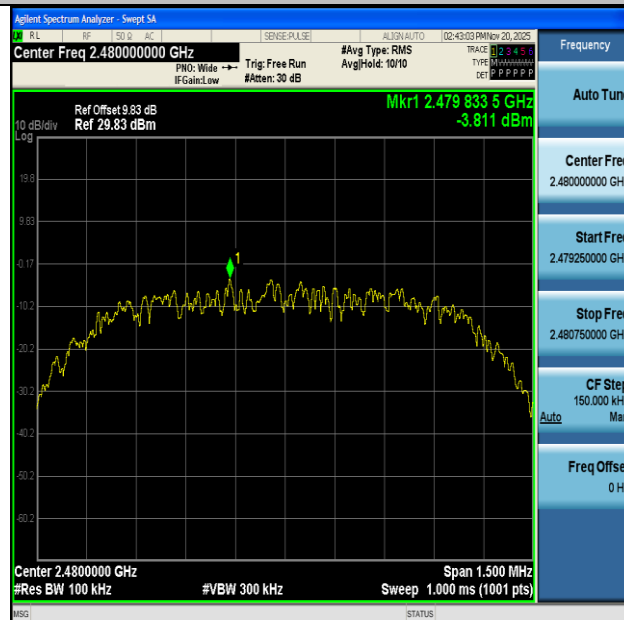


2DH5-Ant1-2441-30~1000-PASS



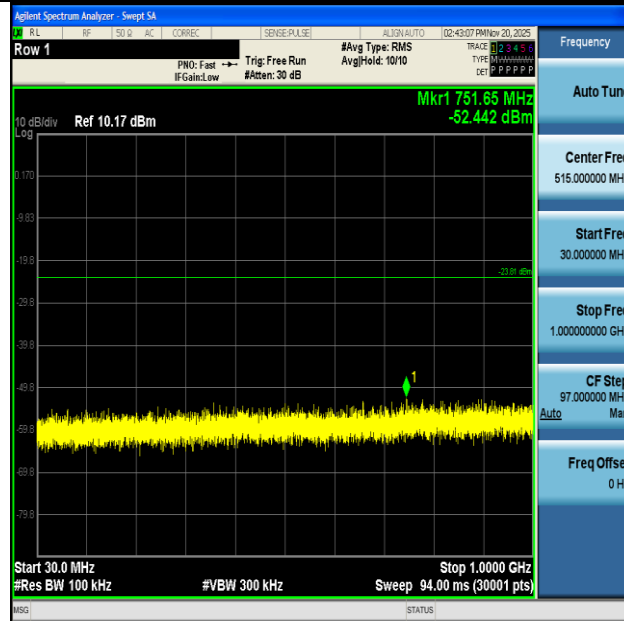


2DH5-Ant1-2441-1000~26500-PASS

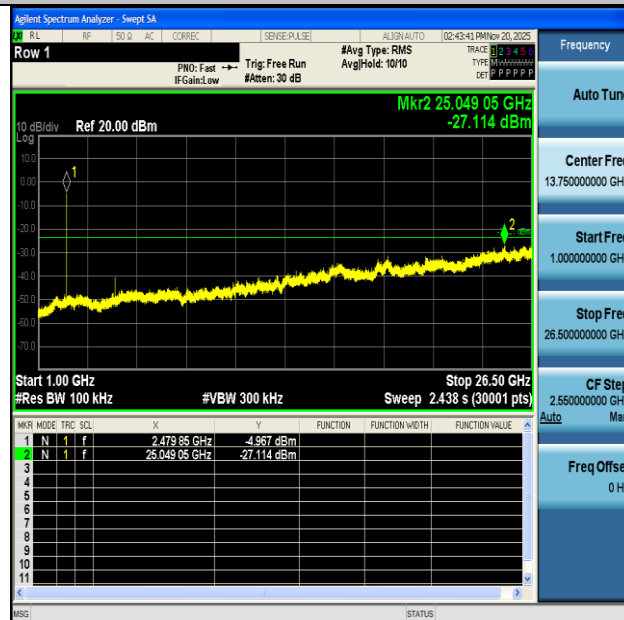


2DH5-Ant1-2480-0~Reference-PASS





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

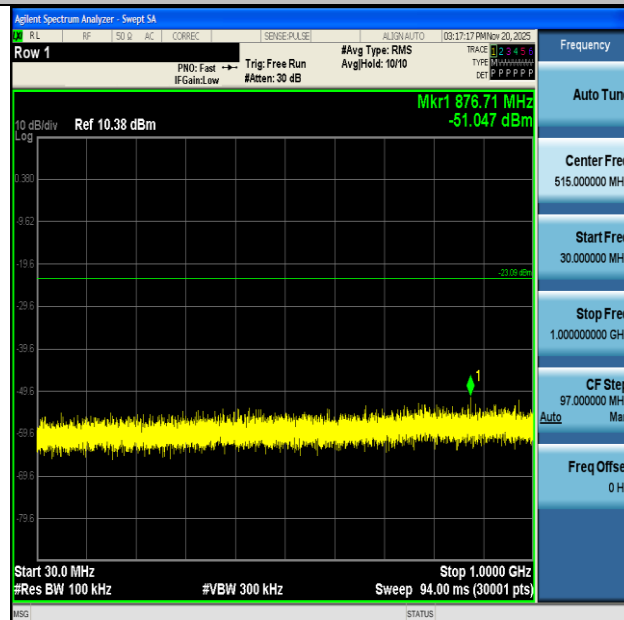


2DH5-Ant1-2480-1000~26500-PASS



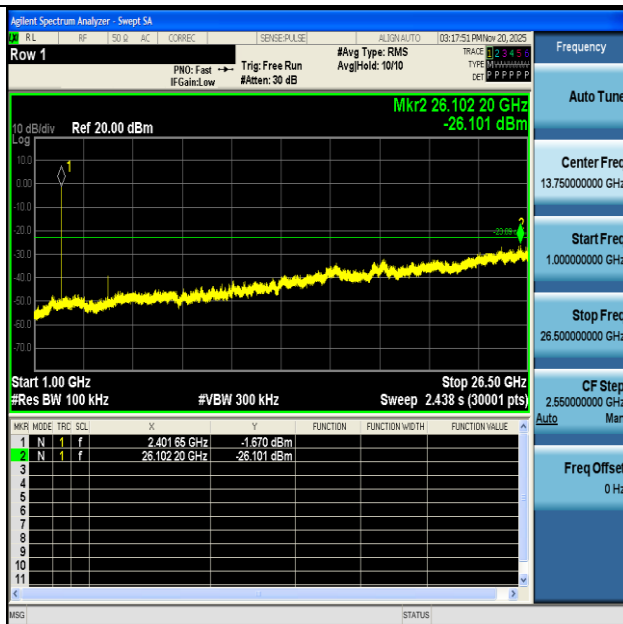


3DH5-Ant1-2402-0~Reference-PASS

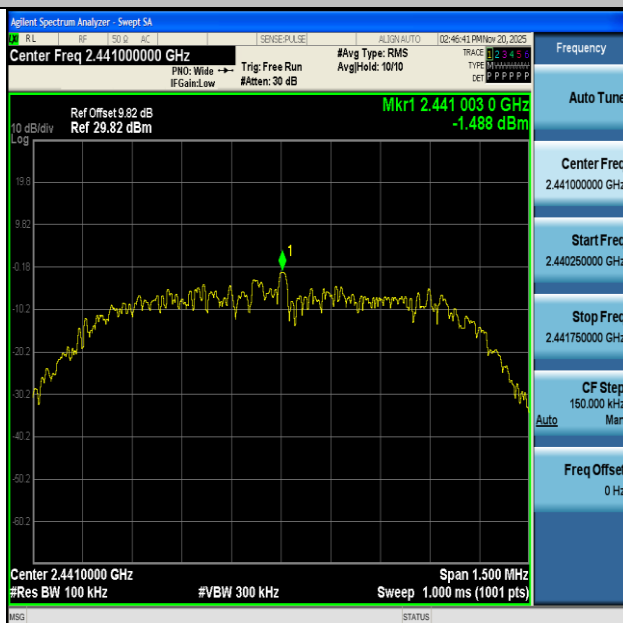


3DH5-Ant1-2402-30~1000-PASS



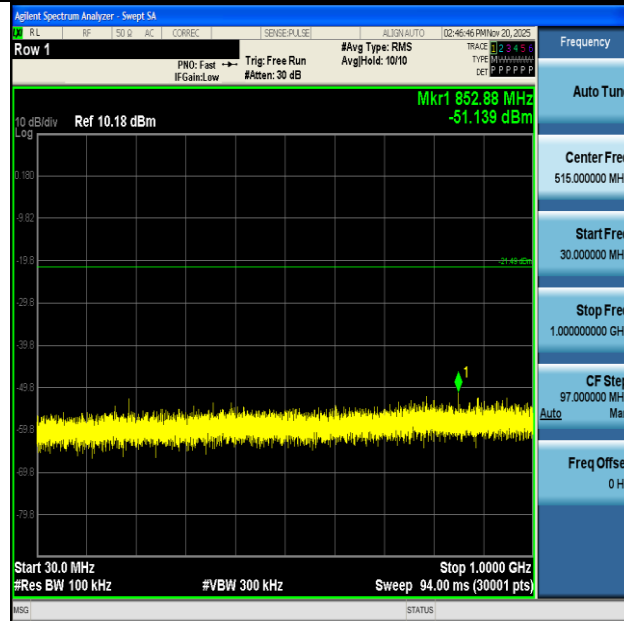


3DH5-Ant1-2402-1000~26500-PASS



3DH5-Ant1-2441-0~Reference-PASS





3DH5-Ant1-2441-30~1000-PASS

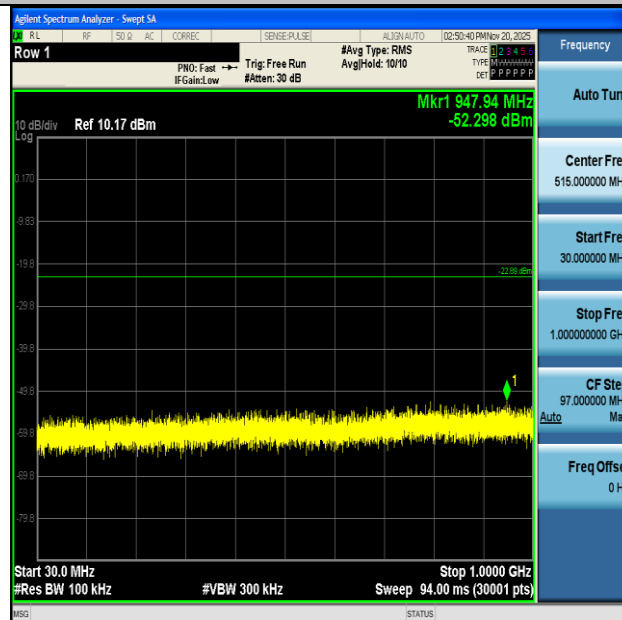


3DH5-Ant1-2441-1000~26500-PASS



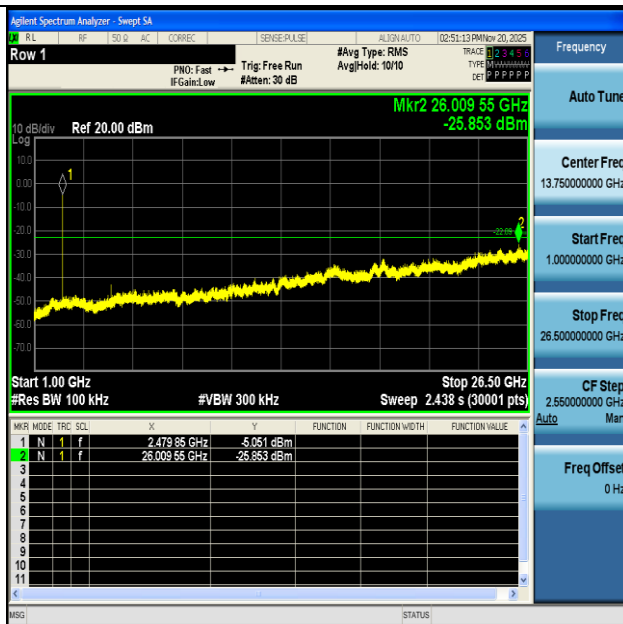


3DH5-Ant1-2480-0~Reference-PASS



3DH5-Ant1-2480-30~1000-PASS





3DH5-Ant1-2480-1000~26500-PASS





## Appendix I: Duty Cycle

### Test Result

| Test Mode | Antenna | Frequency<br>[MHz] | ON Time<br>[ms] | Period<br>[ms] | Duty Cycle<br>[%] | Duty Cycle<br>Factor<br>[dB] |
|-----------|---------|--------------------|-----------------|----------------|-------------------|------------------------------|
| DH5       | Ant1    | 2402               | 2.90            | 3.75           | 77.33             | 1.12                         |
| DH5       | Ant1    | 2441               | 2.90            | 3.75           | 77.33             | 1.12                         |
| DH5       | Ant1    | 2480               | 2.91            | 3.76           | 77.39             | 1.11                         |
| 2DH5      | Ant1    | 2402               | 2.91            | 3.75           | 77.60             | 1.10                         |
| 2DH5      | Ant1    | 2441               | 2.91            | 3.75           | 77.60             | 1.10                         |
| 2DH5      | Ant1    | 2480               | 2.91            | 3.75           | 77.60             | 1.10                         |
| 3DH5      | Ant1    | 2402               | 2.91            | 3.75           | 77.60             | 1.10                         |
| 3DH5      | Ant1    | 2441               | 2.91            | 3.75           | 77.60             | 1.10                         |
| 3DH5      | Ant1    | 2480               | 2.90            | 3.75           | 77.33             | 1.12                         |

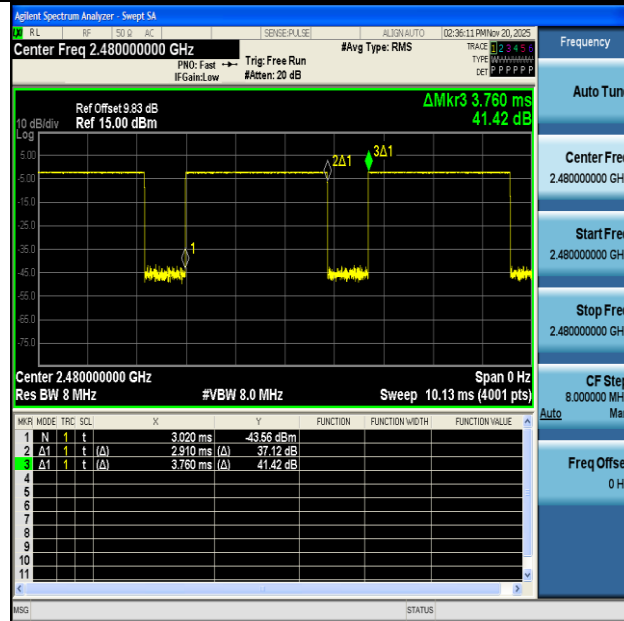
Note: offset(dB) = cable loss(dB) + attenuator factor(dB)



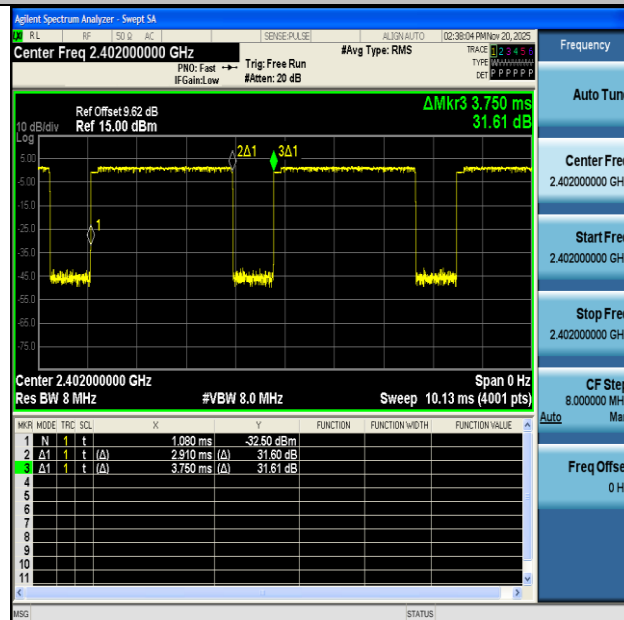


## Test Graphs



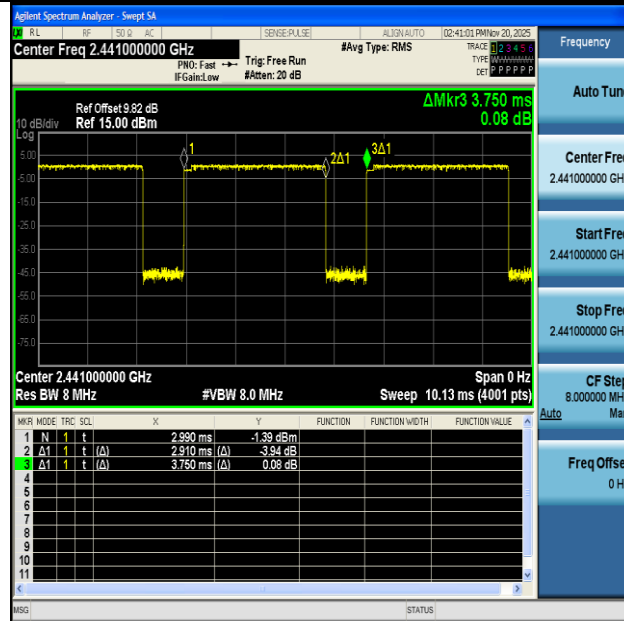


NTNV-DH5-Ant1-2480

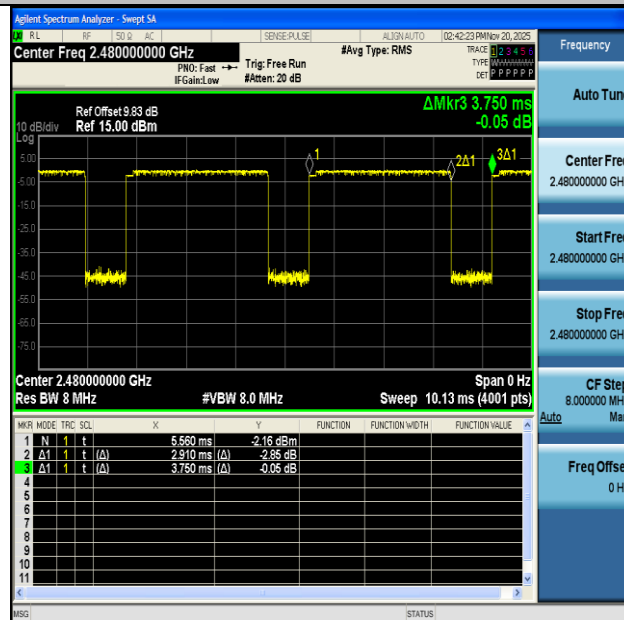


NTNV-2DH5-Ant1-2402



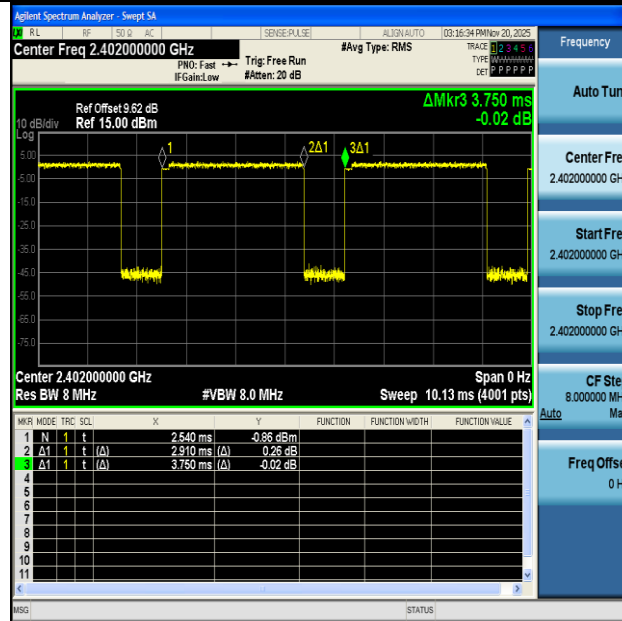


NTNV-2DH5-Ant1-2441

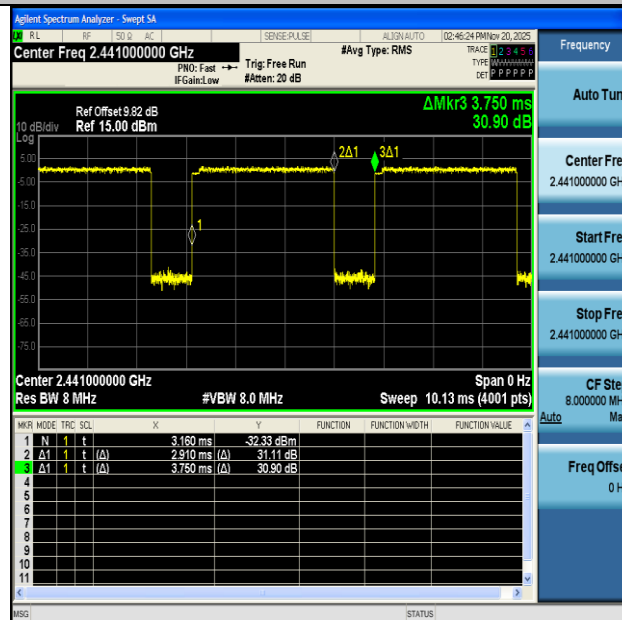


NTNV-2DH5-Ant1-2480



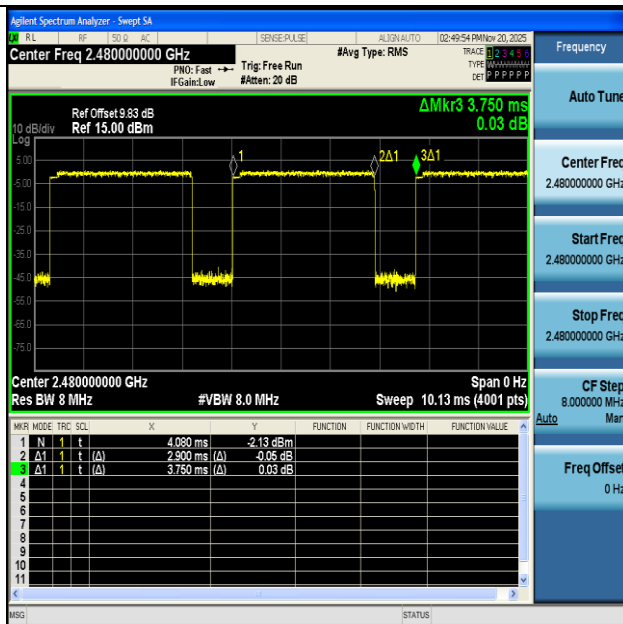


NTNV-3DH5-Ant1-2402



NTNV-3DH5-Ant1-2441





NTNV-3DH5-Ant1-2480

