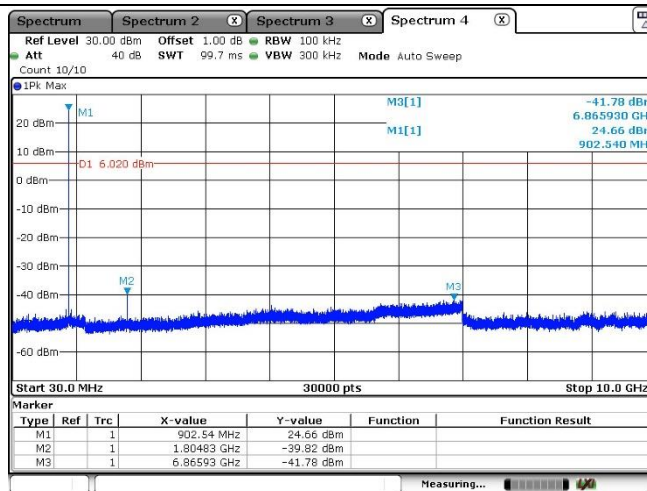




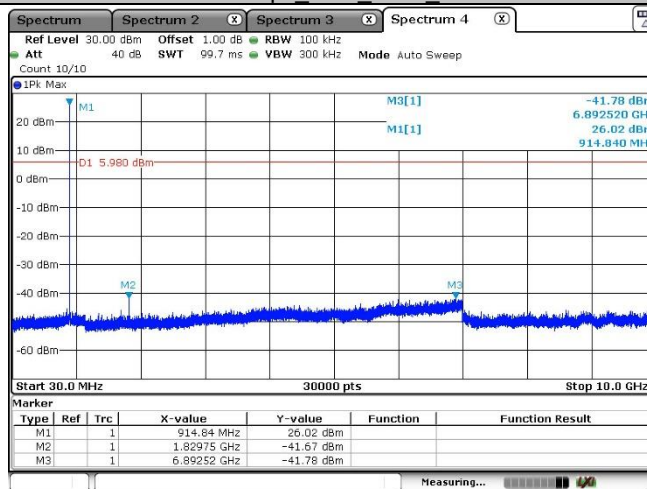
Date: 12 MAY 2023 09:58:27

### 2GFSK-150kbps Ant1 LCH Spurious



Date: 12 MAY 2023 10:17:43

### 2GFSK-150 kbps Ant1 MCH Reference



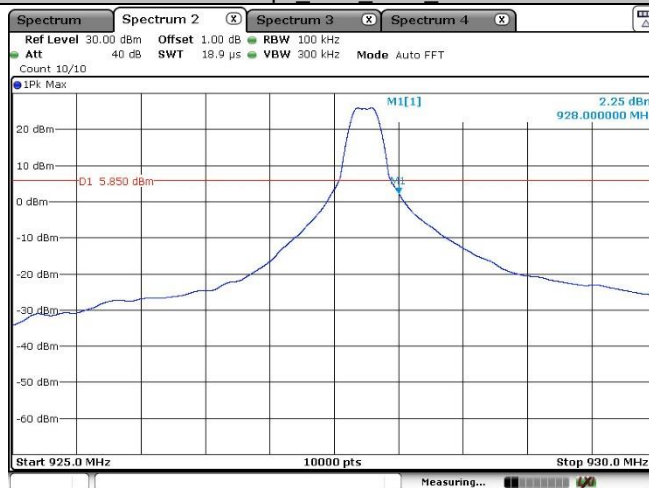
Date: 12 MAY 2023 10:18:16

### 2GFSK-150 kbps Ant1 MCH Spurious



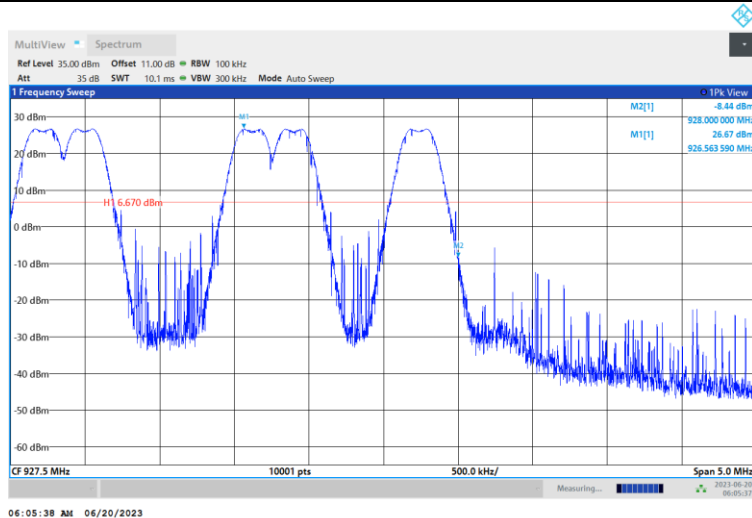
Date: 12 MAY. 2023 10:27:18

### 2GFSK-150 kbps Ant1\_HCH\_Reference



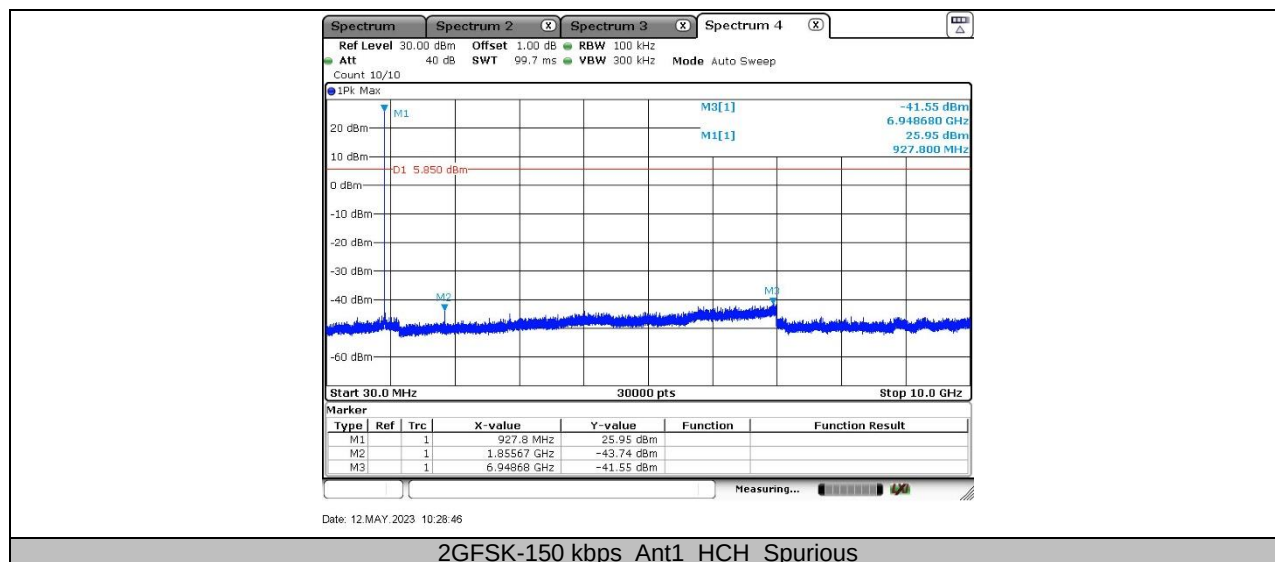
Date: 12 MAY. 2023 10:27:56

### 2GFSK-150 kbps Ant1\_HCH\_Bandedge



06:05:38 AM 06/20/2023

### 2GFSK-150 kbps Ant1\_HCH\_Bandedge Hopping on



**16. FCC.SubG.2GFSK.250kbps****16.1. Appendix A6: DUTY CYCLE****16.1.1. Test Result**

| Test Mode      | On Time (msec) | Period (msec) | Duty Cycle x (Linear) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | 1/T Minimum VBW (kHz) | Final setting For VBW (kHz) |
|----------------|----------------|---------------|-----------------------|----------------|-----------------------------------|-----------------------|-----------------------------|
| 2GFSK-250 kbps | 215.068        | 501.05        | 0.4292                | 42.92%         | 3.67                              | 0.0046                | 1                           |

Note:

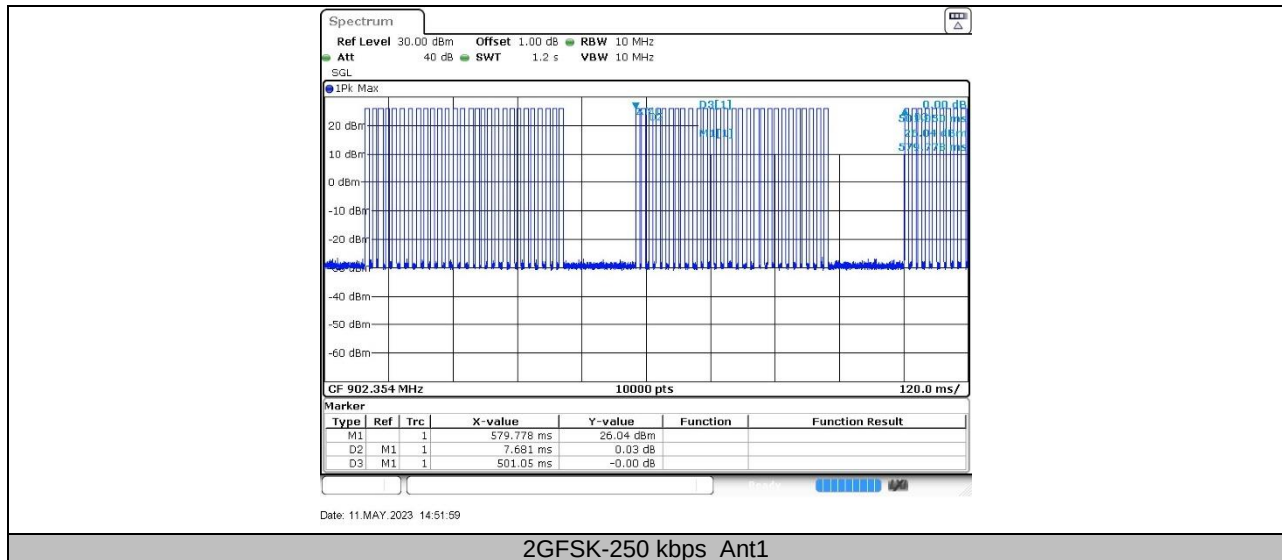
Duty Cycle Correction Factor= $10\log(1/x)$ .

Where: x is Duty Cycle (Linear)

Where: T is On Time

If that calculated VBW is not available on the analyzer then the next higher value should be used.

## Test Graphs



## 16.2. Appendix B6: 20DB BANDWIDTH & OCCUPIED CHANNEL BANDWIDTH

### 16.2.1. Test Result

| Test Mode      | Antenna | Channel | 20db EBW[MHz] | OCB [MHz] | Verdict |
|----------------|---------|---------|---------------|-----------|---------|
| 2GFSK-250 kbps | Ant1    | LCH     | 0.4038        | 0.32071   | PASS    |
|                |         | MCH     | 0.3960        | 0.31318   | PASS    |
|                |         | HCH     | 0.4030        | 0.32086   | PASS    |

## 16.2.2. Test Graphs



### 16.3. Appendix C6: CONDUCTED OUTPUT POWER

#### 16.3.1. Test Result

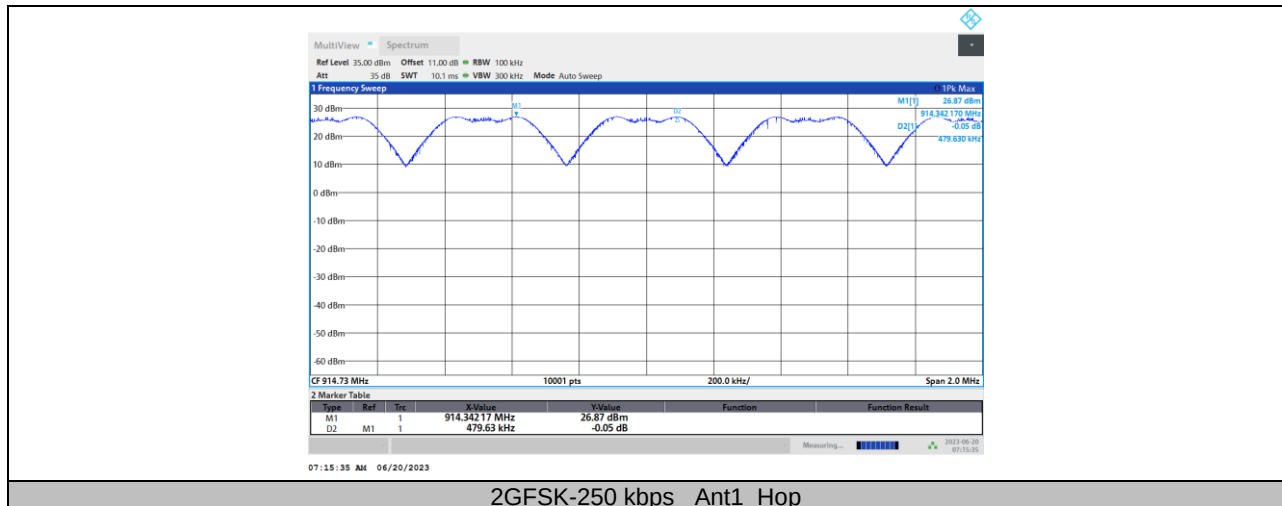
| Test Mode      | Antenna | Channel | PEAK<br>Result[dBm] | AVG<br>Result[dBm] | Limit[dBm] | Verdict |
|----------------|---------|---------|---------------------|--------------------|------------|---------|
| 2GFSK-250 kbps | Ant1    | Low     | 26.63               | 26.51              | ≤30        | PASS    |
|                |         | Mid     | 26.60               | 26.48              | ≤30        | PASS    |
|                |         | High    | 26.34               | 26.22              | ≤30        | PASS    |

## 16.4. Appendix D6: CARRIER FREQUENCY SEPARATION

### 16.4.1. Test Result

| Test Mode      | Antenna | Channel | Result [MHz] | Limit[MHz] | Verdict |
|----------------|---------|---------|--------------|------------|---------|
| 2GFSK-250 kbps | Ant1    | Hop     | 0.480        | 0.4038     | PASS    |

### 16.4.2. Test Graphs

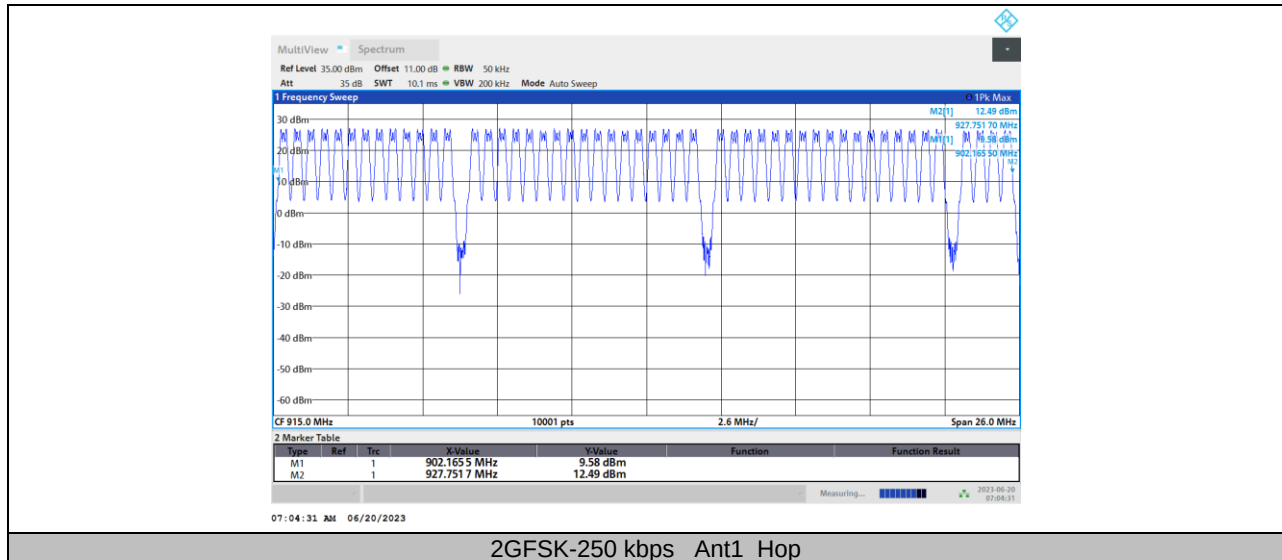


## 16.5. Appendix E6: NUMBER OF HOPPING FREQUENCIES

### 16.5.1. Test Result

| Test Mode      | Antenna | Channel | Result[Num] | Limit[Num] | Verdict |
|----------------|---------|---------|-------------|------------|---------|
| 2GFSK-250 kbps | Ant1    | Hop     | 51          | ≥25        | PASS    |

### 16.5.2. Test Graphs



**16.6. Appendix F6: TIME OF OCCUPANCY (DWELL TIME)****16.6.1. Test Result**

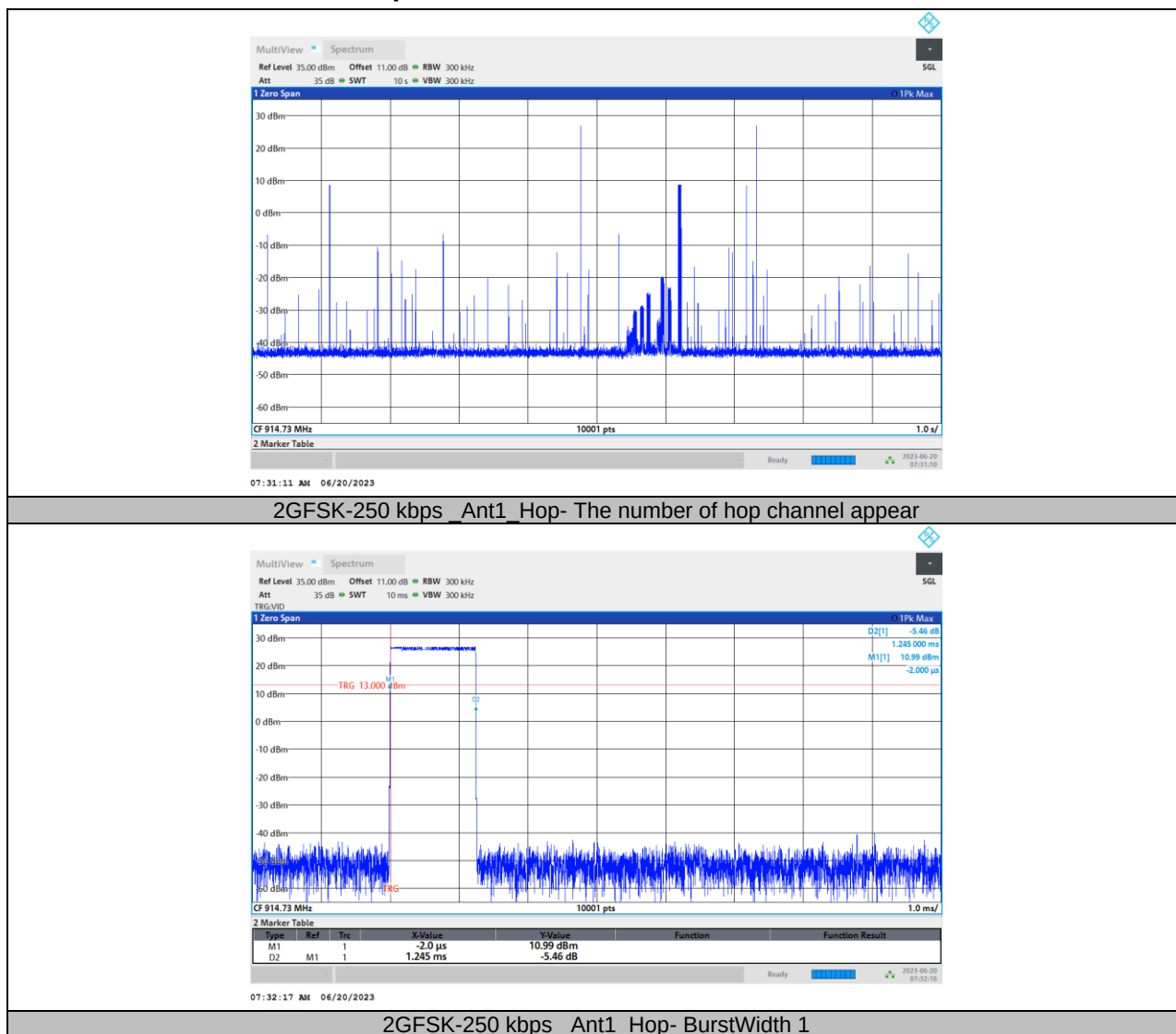
| Test Mode      | Antenna | Channel | Time of single slot [ms] | number of single slot | Burst Width [ms/hop/ch] | The number of hop channel appear | Dwell Time [ms] | Limit [ms] | Results |
|----------------|---------|---------|--------------------------|-----------------------|-------------------------|----------------------------------|-----------------|------------|---------|
| 2GFSK-250 kbps | Ant1    | Hop     | 1.245                    | 1                     | 1.245                   | 3                                | 3.735           | 400        | PASS    |

Note:

2GFSK-250 kbps: The dwell time = Time of single slot \* The number of hop channel appear within 10s

BurstWidth =Time of single slot\*number of single slot

## 16.6.2. Test Graphs

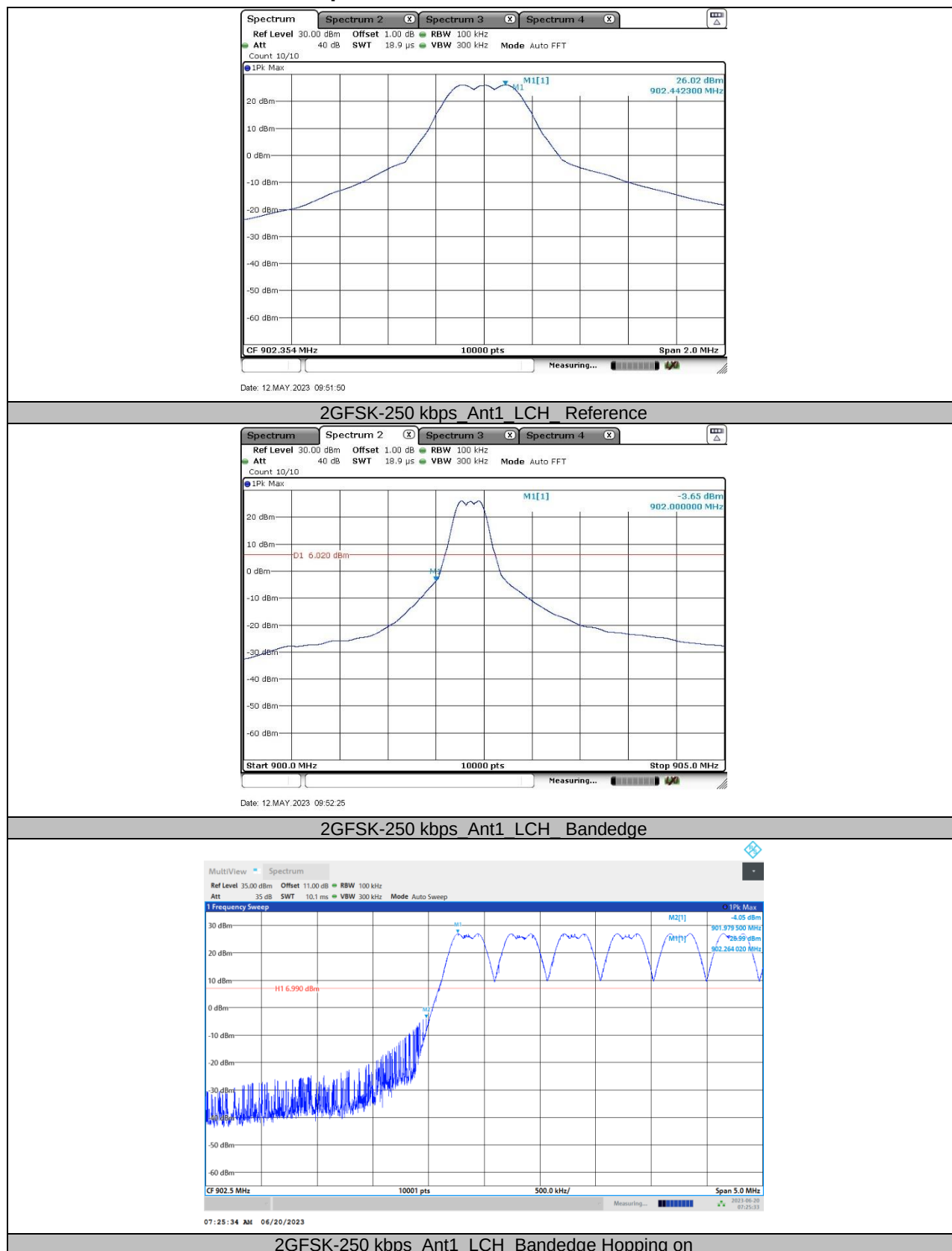


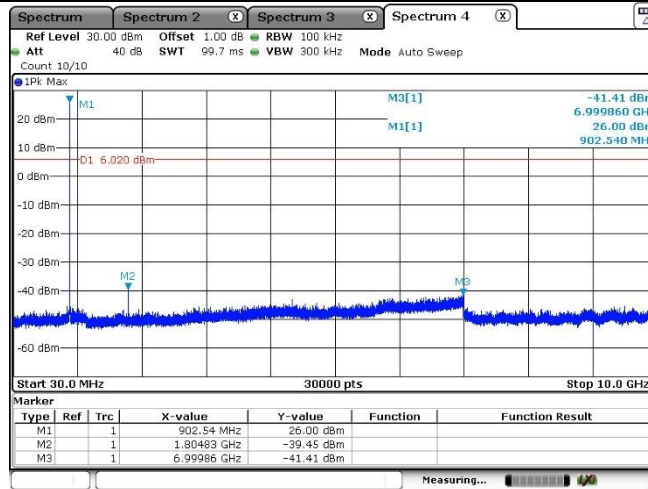
## 16.7. Appendix G6: CONDUCTED SPURIOUS EMISSION

### 16.7.1. Test Result

| Test Mode      | Antenna | ChName   | Result [dBm]         | Verdict |
|----------------|---------|----------|----------------------|---------|
| 2GFSK-250 kbps | Ant1    | LCH      | See the below graphs | PASS    |
|                |         | MCH      |                      | PASS    |
|                |         | HCH      |                      | PASS    |
|                |         | Hop_Low  |                      | PASS    |
|                |         | Hop_High |                      | PASS    |

## 16.7.2. Test Graphs





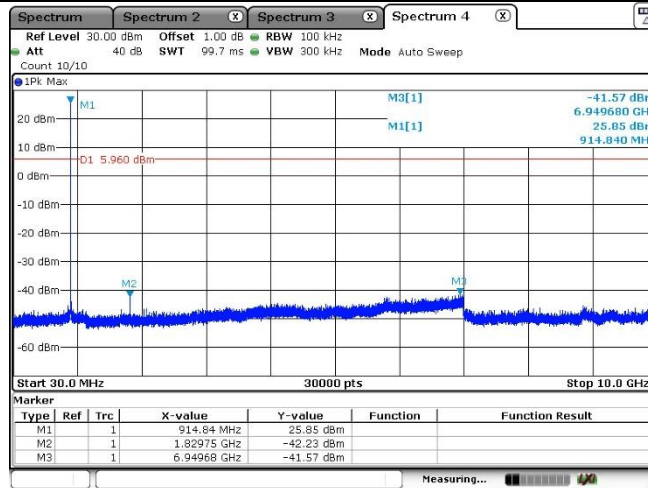
Date: 12 MAY. 2023 09:53:05

### 2GFSK-250kbps Ant1 LCH Spurious



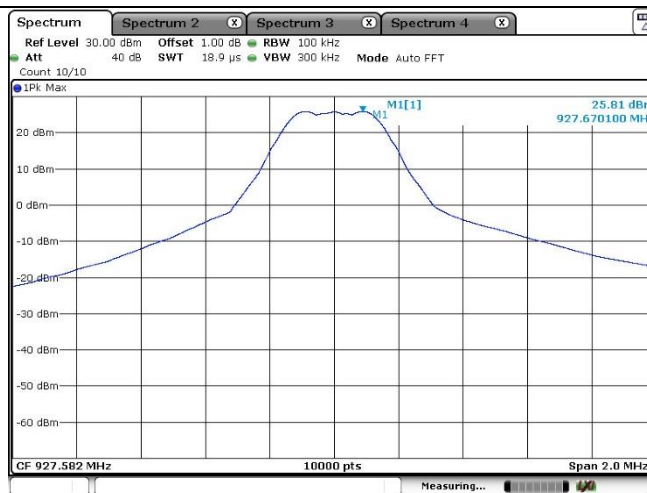
Date: 12 MAY. 2023 09:50:34

### 2GFSK-250 kbps Ant1 MCH Reference



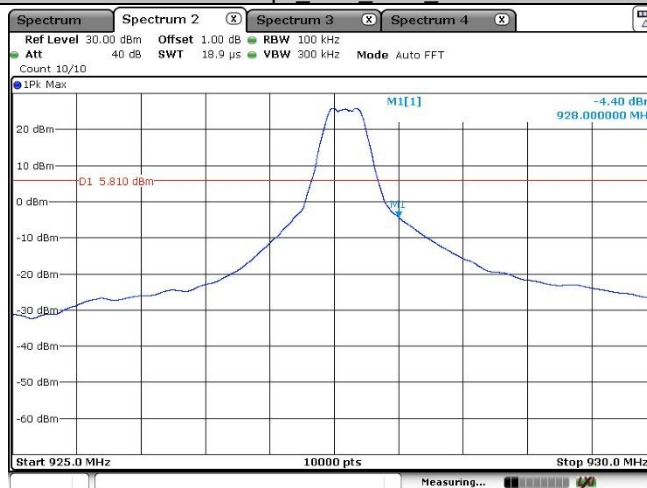
Date: 12 MAY. 2023 09:51:06

### 2GFSK-250 kbps Ant1 MCH Spurious



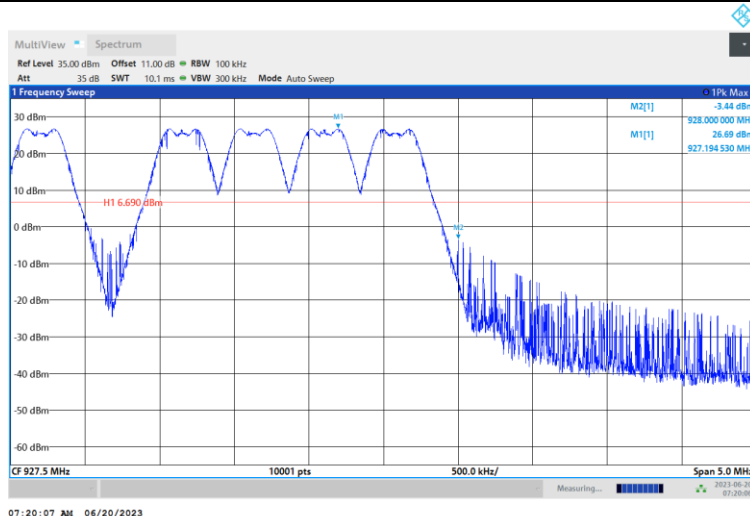
Date: 12 MAY. 2023 09:46:14

### 2GFSK-250 kbps Ant1\_HCH\_Reference



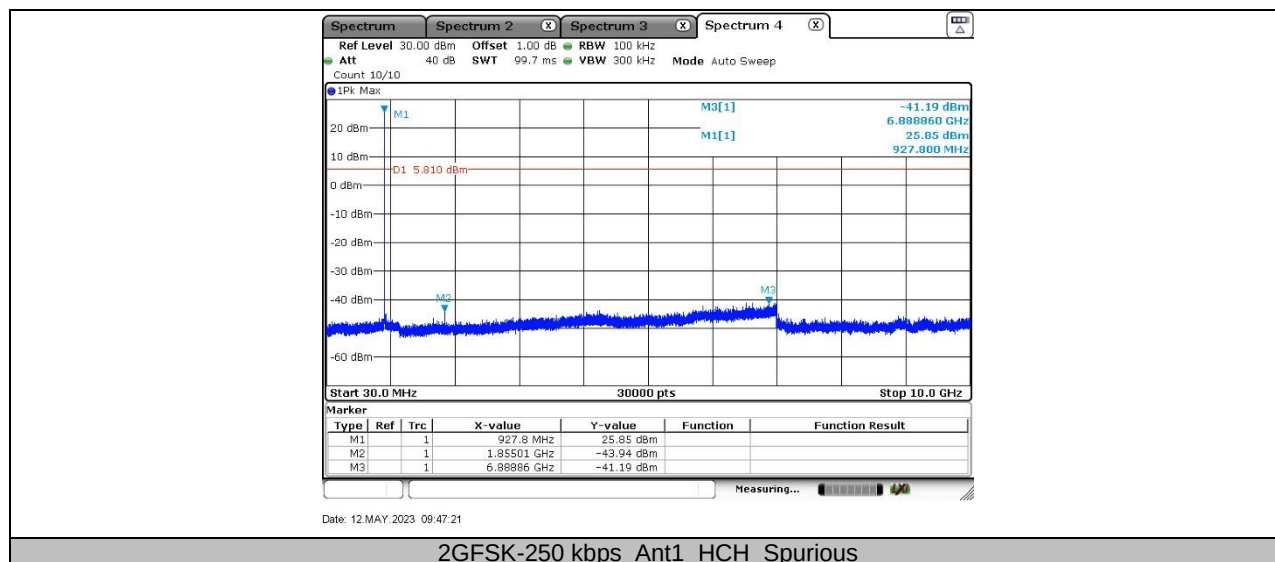
Date: 12 MAY. 2023 09:46:37

### 2GFSK-250 kbps Ant1\_HCH\_Bandedge



07:20:07 AM 06/20/2023

### 2GFSK-250 kbps Ant1\_HCH\_Bandedge Hopping on



**17. FCC.SubG.4GFSK.200kbps****17.1. Appendix A7: DUTY CYCLE****17.1.1. Test Result**

| Test Mode      | On Time<br>(msec) | Period<br>(msec) | Duty Cycle<br>x<br>(Linear) | Duty<br>Cycle<br>(%) | Duty Cycle<br>Correction<br>Factor<br>(dB) | 1/T<br>Minimum<br>VBW<br>(kHz) | Final<br>setting<br>For VBW<br>(kHz) |
|----------------|-------------------|------------------|-----------------------------|----------------------|--------------------------------------------|--------------------------------|--------------------------------------|
| 4GFSK-200 kbps | 225.423           | 502.81           | 0.4483                      | 44.83                | 3.48                                       | 0.0044                         | 1                                    |

Note:

Duty Cycle Correction Factor= $10\log(1/x)$ .

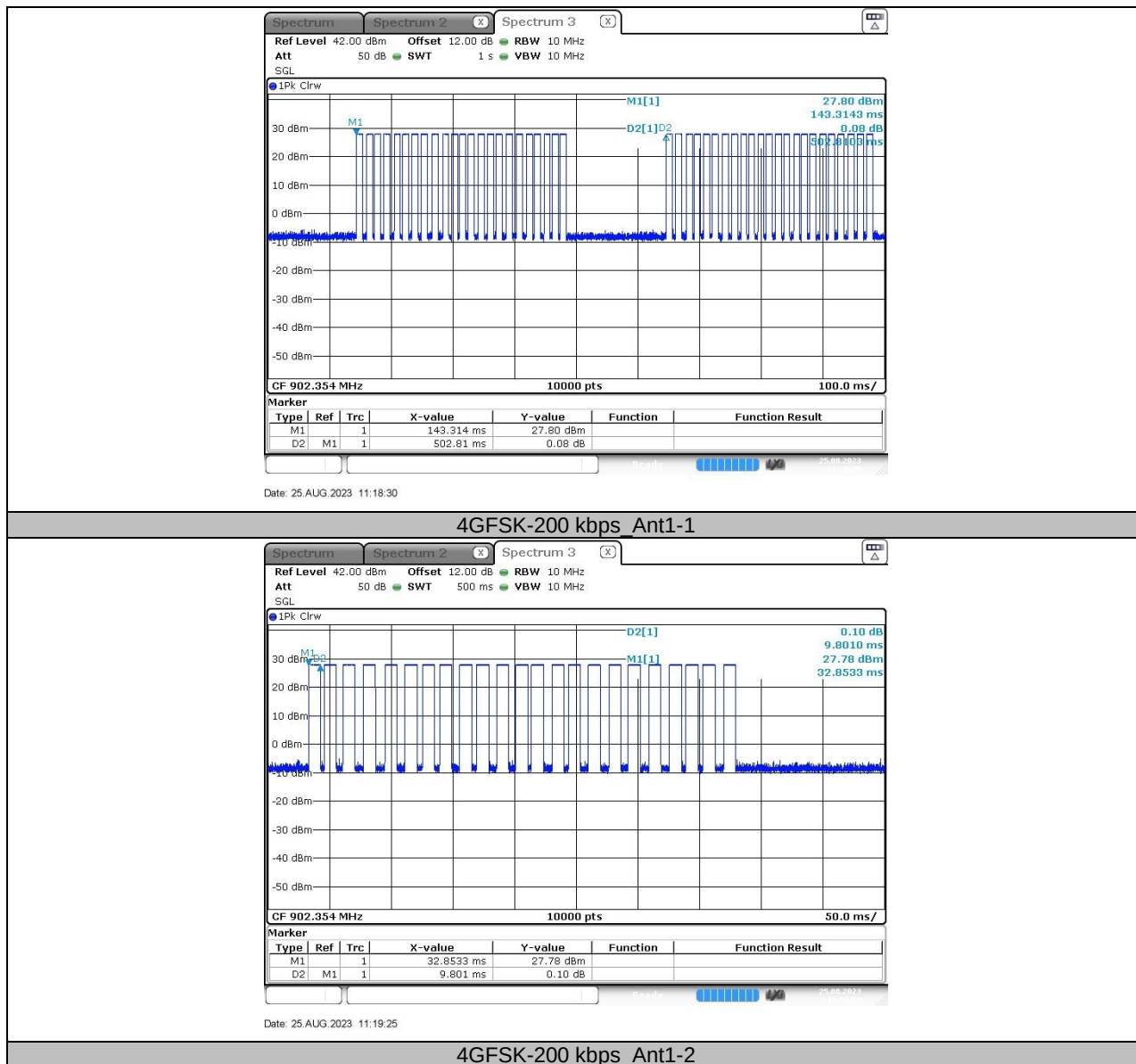
Where: x is Duty Cycle (Linear)

Where: T is On Time

On Time= $D2-2*2=9.801*23=225.423$  ms

If that calculated VBW is not available on the analyzer then the next higher value should be used.

## Test Graphs

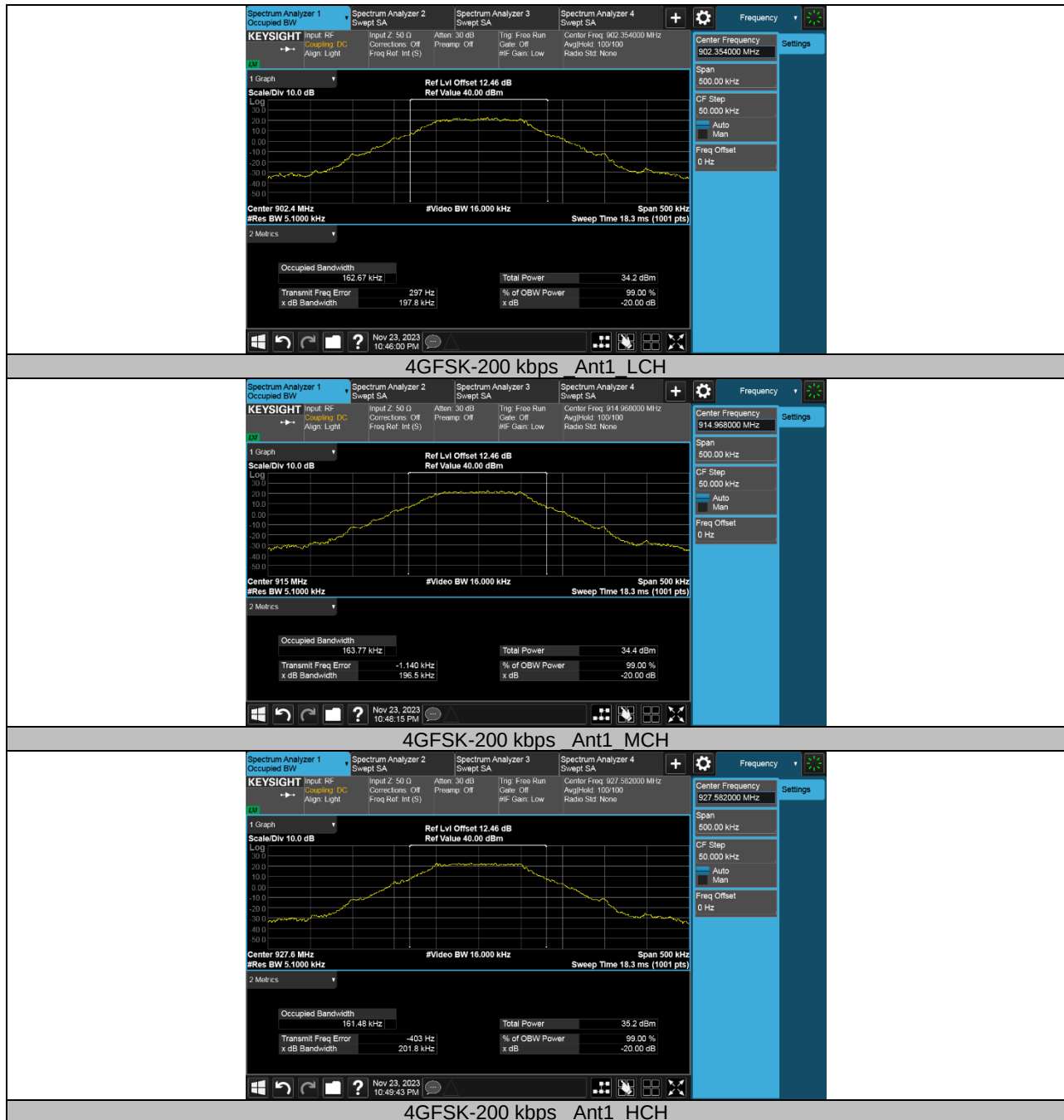


## 17.2. Appendix B7: 20DB BANDWIDTH & OCCUPIED CHANNEL BANDWIDTH

### 17.2.1. Test Result

| Test Mode      | Antenna | Channel | 20db EBW[MHz] | OCB [MHz] | Verdict |
|----------------|---------|---------|---------------|-----------|---------|
| 4GFSK-200 kbps | Ant1    | LCH     | 0.1978        | 0.16267   | PASS    |
|                |         | MCH     | 0.1965        | 0.16377   | PASS    |
|                |         | HCH     | 0.2018        | 0.16148   | PASS    |

## 17.2.2. Test Graphs



### 17.3. Appendix C7: CONDUCTED OUTPUT POWER

#### 17.3.1. Test Result

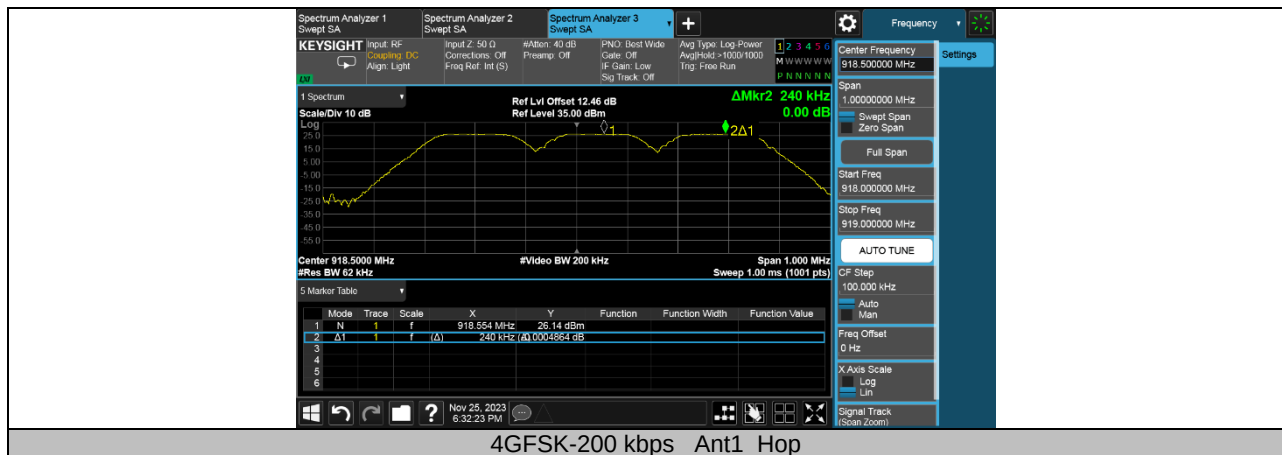
| Test Mode      | Antenna | Channel | PEAK<br>Result[dBm] | AVG<br>Result[dBm] | Limit[dBm] | Verdict |
|----------------|---------|---------|---------------------|--------------------|------------|---------|
| 4GFSK-200 kbps | Ant1    | LCH     | 26.03               | 25.98              | ≤30        | PASS    |
|                |         | MCH     | 26.23               | 26.19              | ≤30        | PASS    |
|                |         | HCH     | 26.09               | 26.02              | ≤30        | PASS    |

## 17.4. Appendix D7: CARRIER FREQUENCY SEPARATION

### 17.4.1. Test Result

| Test Mode      | Antenna | Channel | Result [MHz] | Limit[MHz] | Verdict |
|----------------|---------|---------|--------------|------------|---------|
| 4GFSK-200 kbps | Ant1    | Hop     | 0.240        | ≥0.2018    | PASS    |

### 17.4.2. Test Graphs

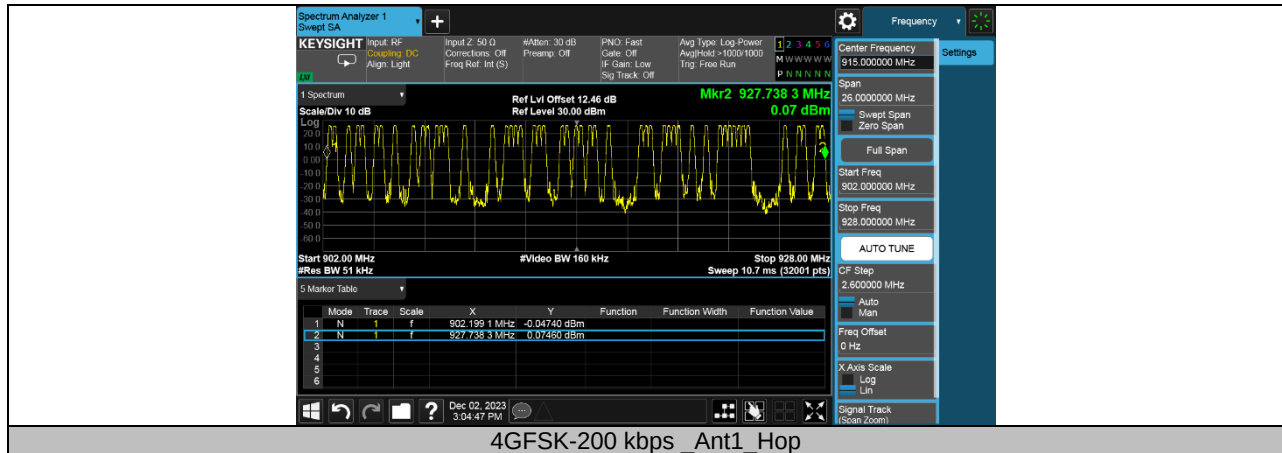


## 17.5. Appendix E7: NUMBER OF HOPPING FREQUENCIES

### 17.5.1. Test Result

| Test Mode      | Antenna | Channel | Result[Num] | Limit[Num] | Verdict |
|----------------|---------|---------|-------------|------------|---------|
| 4GFSK-200 kbps | Ant1    | Hop     | 51          | ≥50        | PASS    |

### 17.5.2. Test Graphs



## 17.6. Appendix F7: TIME OF OCCUPANCY (DWELL TIME)

### 17.6.1. Test Result

| Test Mode      | Antenna | Channel | Time of single slot 1 [ms] | number of single slot 1 | Burst Width 1 [ms/hop/ch] | The number of hop channel appear |
|----------------|---------|---------|----------------------------|-------------------------|---------------------------|----------------------------------|
| 4GFSK-200 kbps | Ant1    | Hop     | 3.200                      | 10                      | 32.00                     | 8                                |

| Test Mode      | Antenna | Channel | Dwell Time [ms] | Limit [ms] | Results |
|----------------|---------|---------|-----------------|------------|---------|
| 4GFSK-200 kbps | Ant1    | Hop     | 256.00          | 400        | PASS    |

Note:

4GFSK-200 kbps: The dwell time = Time of single slot \* The number of hop channel appear within 20s

BurstWidth = Time of single slot \* number of single slot

## 17.6.2. Test Graphs



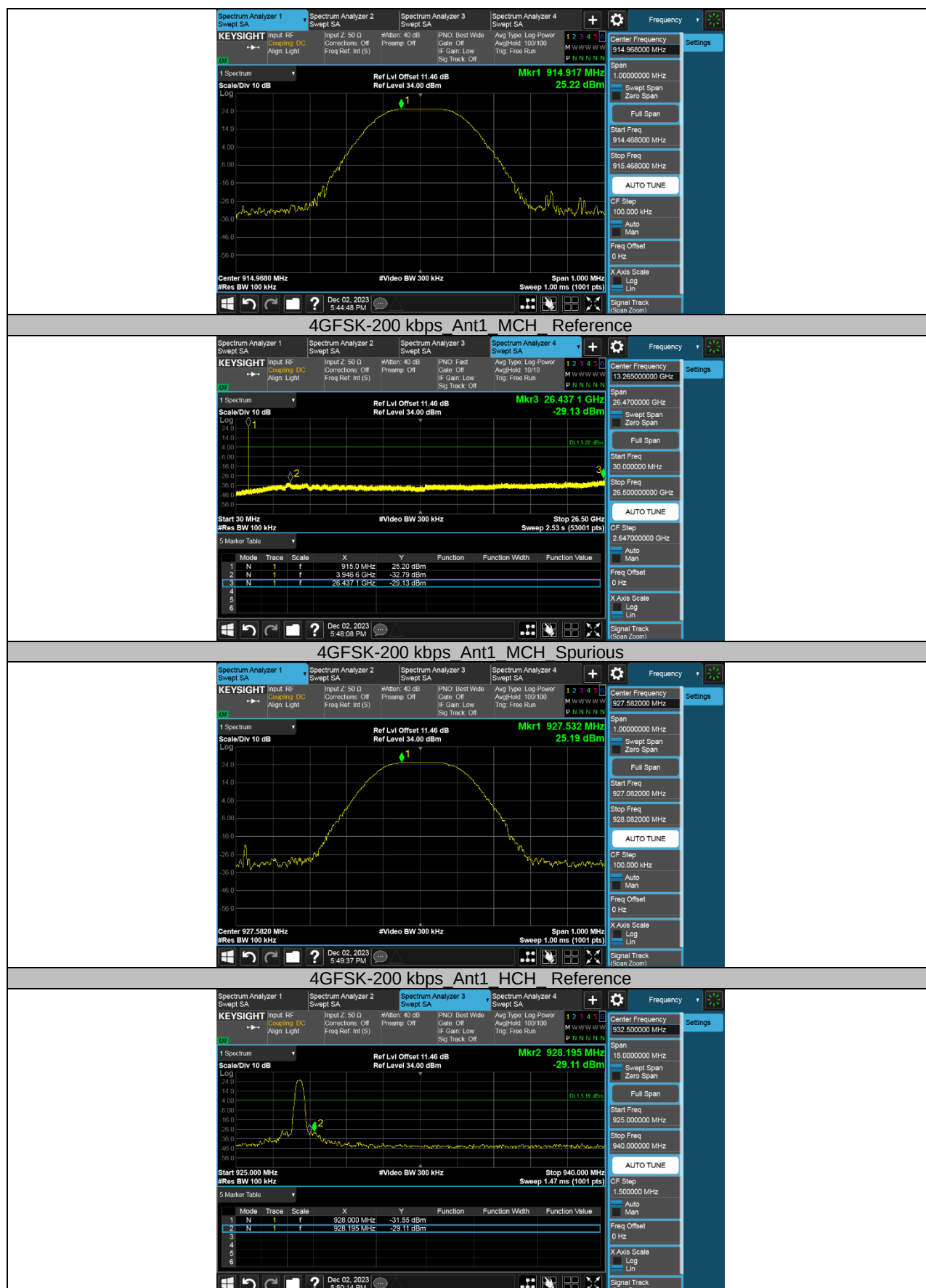
## 17.7. Appendix G7: CONDUCTED BAND EDGE AND SPURIOUS EMISSION

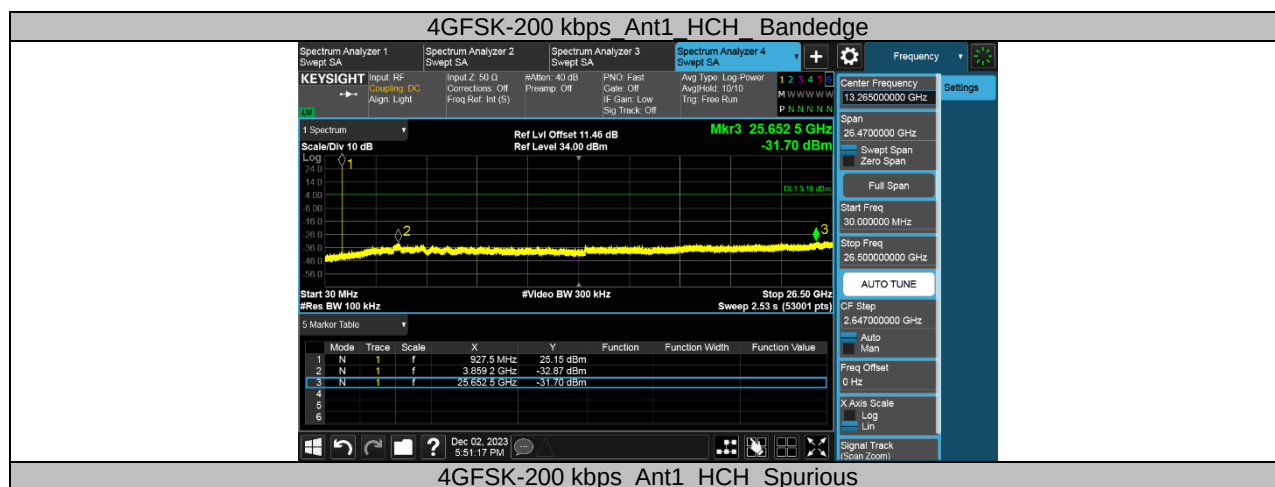
### 17.7.1. Test Result

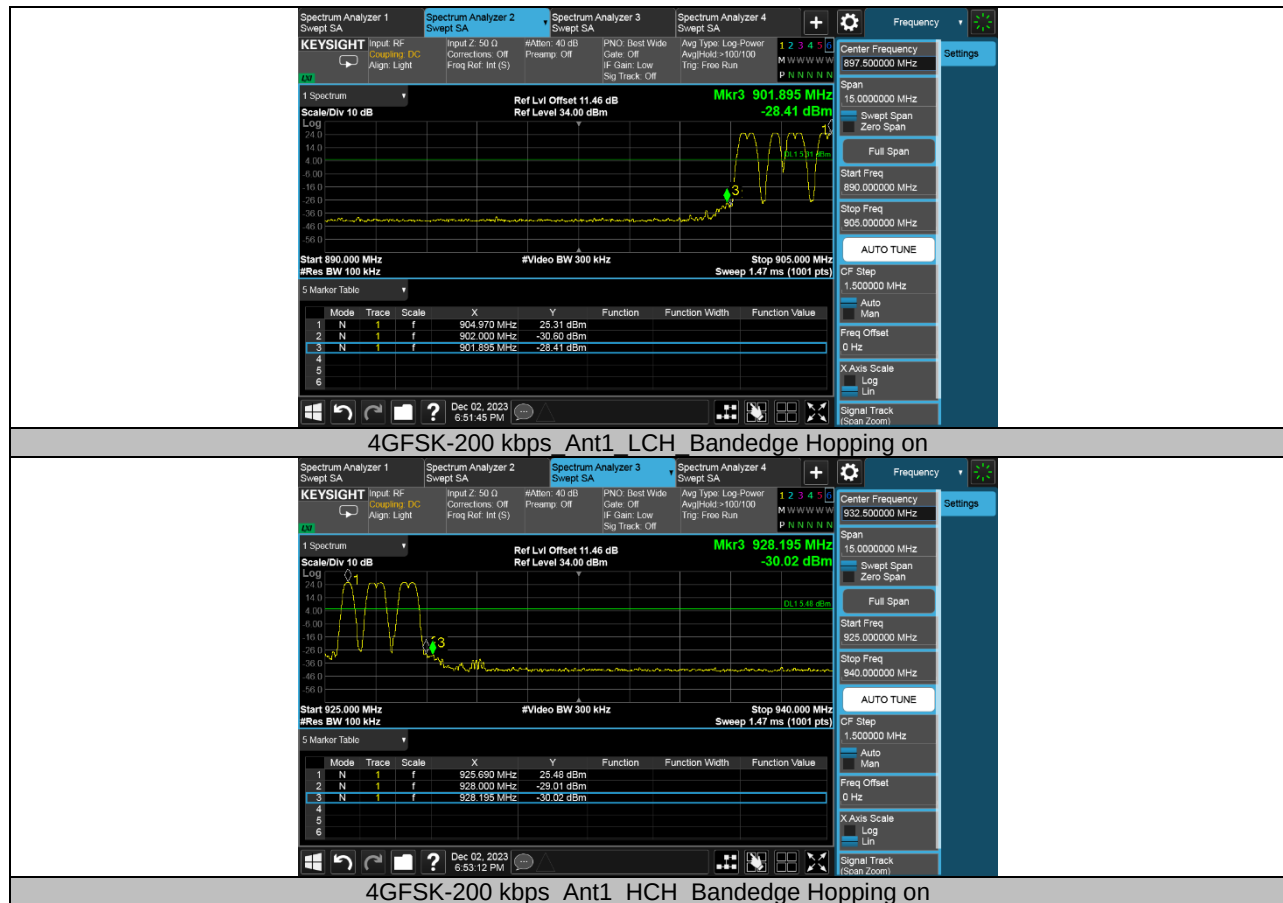
| Test Mode      | Antenna | ChName  | Result [dBm]         | Verdict |
|----------------|---------|---------|----------------------|---------|
| 4GFSK-200 kbps | Ant1    | LCH     | See the below graphs | PASS    |
|                |         | MCH     |                      | PASS    |
|                |         | HCH     |                      | PASS    |
|                |         | Hop_LCH |                      | PASS    |
|                |         | Hop_HCH |                      | PASS    |

## 17.7.2. Test Graphs









**18. FCC.SubG.4GFSK.250kbps****18.1. Appendix A8: DUTY CYCLE****18.1.1. Test Result**

| Test Mode      | On Time<br>(msec) | Period<br>(msec) | Duty Cycle<br>x<br>(Linear) | Duty<br>Cycle<br>(%) | Duty Cycle<br>Correction<br>Factor<br>(dB) | 1/T<br>Minimum<br>VBW<br>(kHz) | Final<br>setting<br>For VBW<br>(kHz) |
|----------------|-------------------|------------------|-----------------------------|----------------------|--------------------------------------------|--------------------------------|--------------------------------------|
| 4GFSK-250 kbps | 218.1452          | 501.51           | 0.4350                      | 43.50                | 3.62                                       | 0.0046                         | 1                                    |

Note:

Duty Cycle Correction Factor= $10\log(1/x)$ .

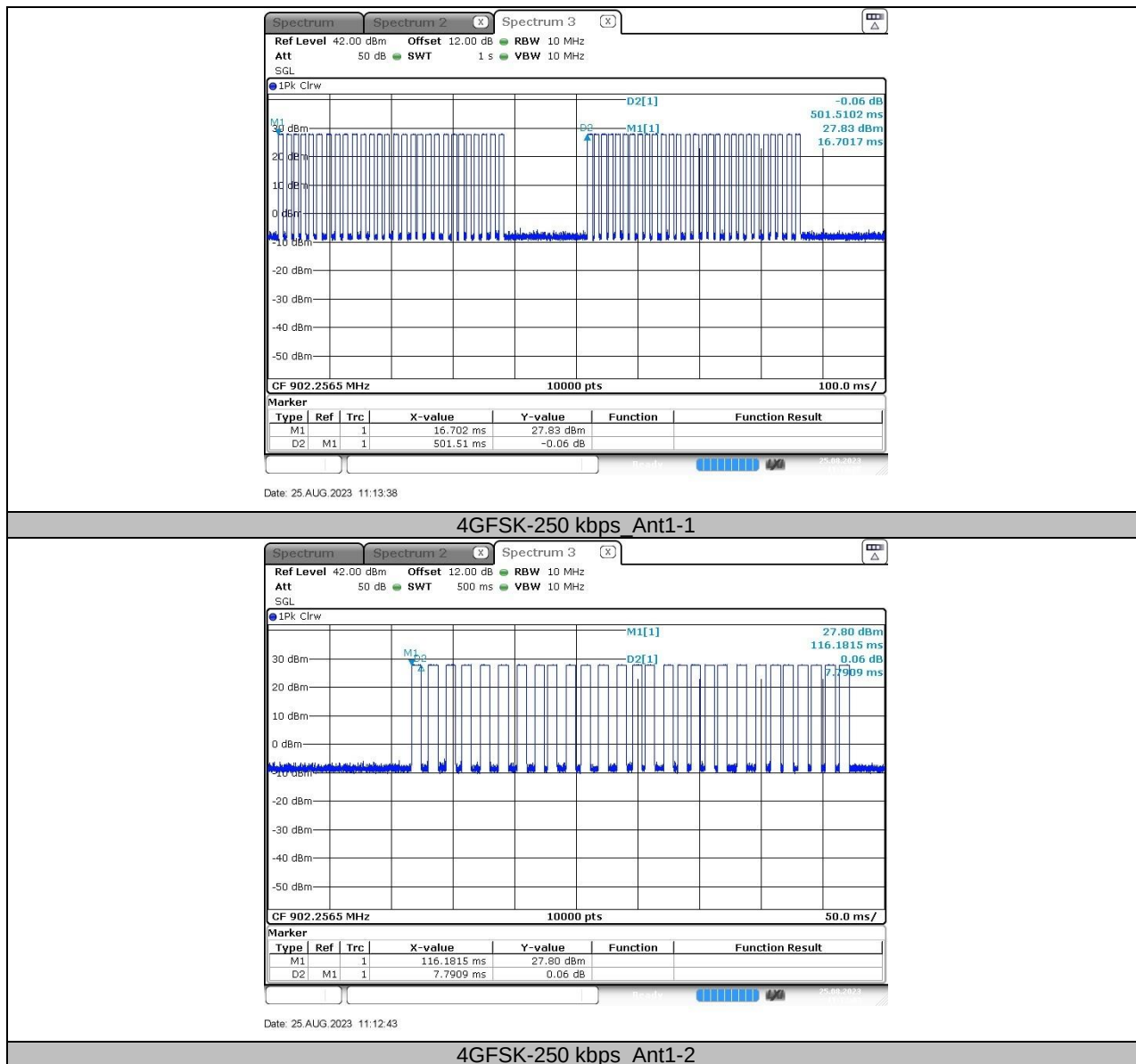
Where: x is Duty Cycle (Linear)

Where: T is On Time

On Time= $D2-2*2=7.7909*28=218.1452$  ms

If that calculated VBW is not available on the analyzer then the next higher value should be used.

## Test Graphs

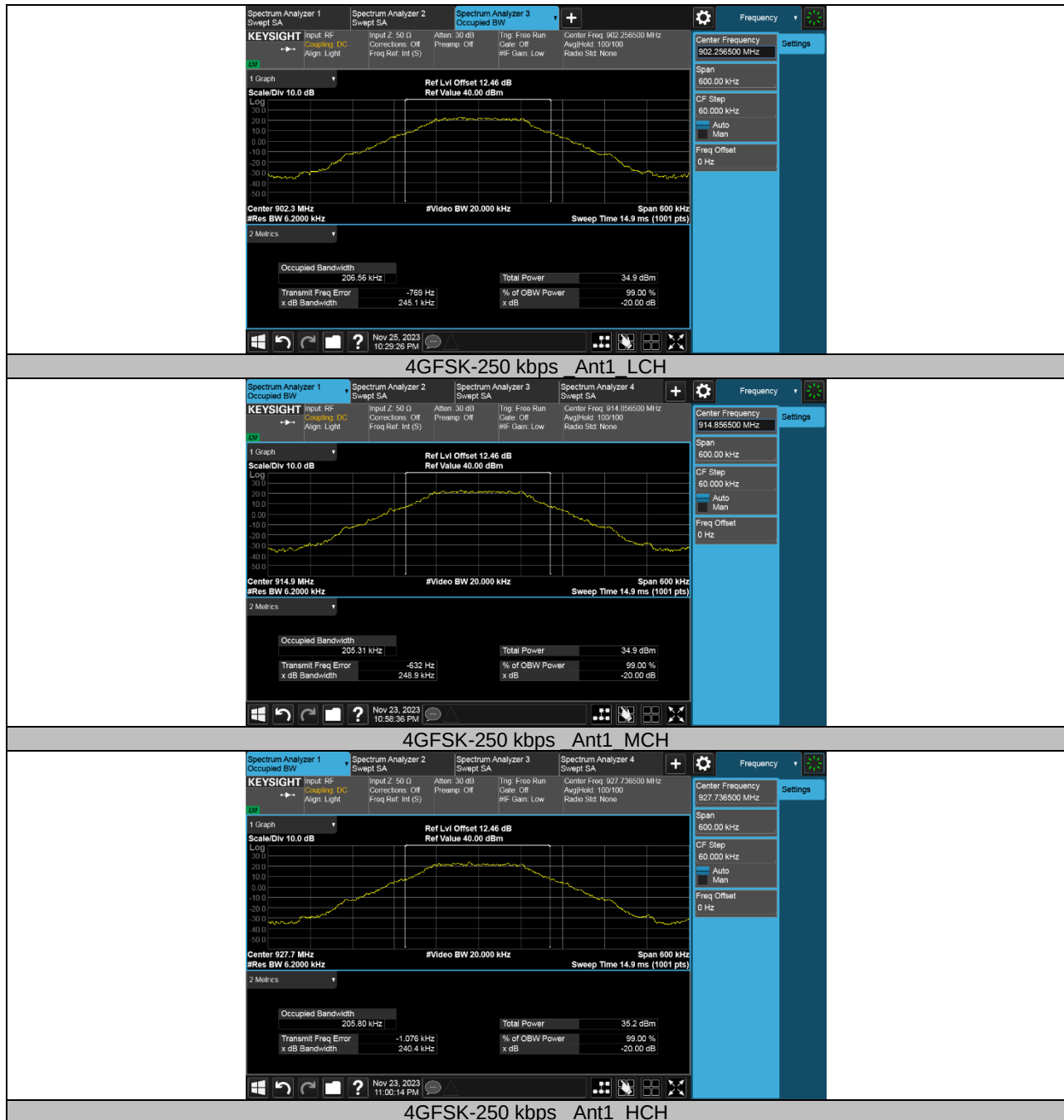


## 18.2. Appendix B8: 20DB BANDWIDTH & OCCUPIED CHANNEL BANDWIDTH

### 18.2.1. Test Result

| Test Mode      | Antenna | Channel | 20db EBW[MHz] | OCB [MHz] | Verdict |
|----------------|---------|---------|---------------|-----------|---------|
| 4GFSK-250 kbps | Ant1    | LCH     | 0.2451        | 0.20656   | PASS    |
|                |         | MCH     | 0.2489        | 0.20531   | PASS    |
|                |         | HCH     | 0.2404        | 0.20580   | PASS    |

## 18.2.2. Test Graphs



### 18.3. Appendix C8: CONDUCTED OUTPUT POWER

#### 18.3.1. Test Result

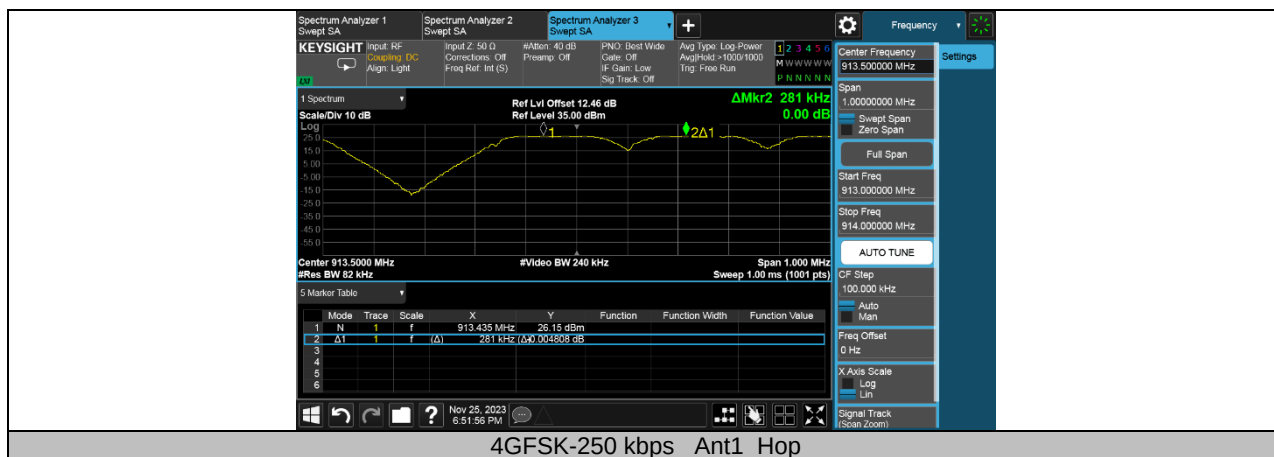
| Test Mode      | Antenna | Channel | PEAK<br>Result[dBm] | AVG<br>Result[dBm] | Limit[dBm] | Verdict |
|----------------|---------|---------|---------------------|--------------------|------------|---------|
| 4GFSK-200 kbps | Ant1    | LCH     | 26.04               | 25.99              | ≤30        | PASS    |
|                |         | MCH     | 26.11               | 26.08              | ≤30        | PASS    |
|                |         | HCH     | 26.14               | 26.10              | ≤30        | PASS    |

## 18.4. Appendix D8: CARRIER FREQUENCY SEPARATION

### 18.4.1. Test Result

| Test Mode      | Antenna | Channel | Result [MHz] | Limit[MHz] | Verdict |
|----------------|---------|---------|--------------|------------|---------|
| 4GFSK-250 kbps | Ant1    | Hop     | 0.281        | ≥0.2489    | PASS    |

### 18.4.2. Test Graphs

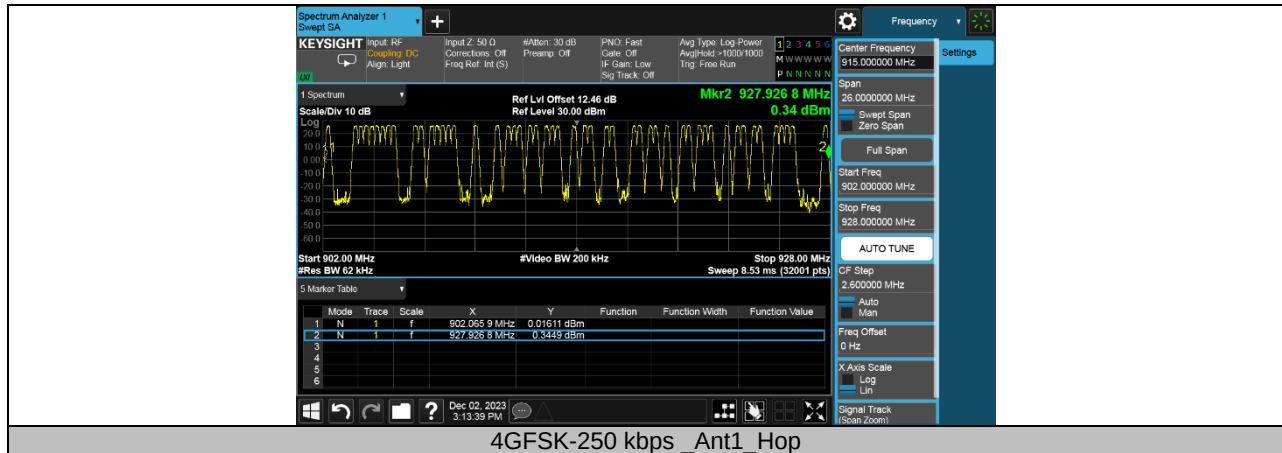


## 18.5. Appendix E8: NUMBER OF HOPPING FREQUENCIES

### 18.5.1. Test Result

| Test Mode      | Antenna | Channel | Result[Num] | Limit[Num] | Verdict |
|----------------|---------|---------|-------------|------------|---------|
| 4GFSK-250 kbps | Ant1    | Hop     | 51          | ≥50        | PASS    |

### 18.5.2. Test Graphs



## 18.6. Appendix F8: TIME OF OCCUPANCY (DWELL TIME)

### 18.6.1. Test Result

| Test Mode      | Antenna | Channel | Time of single slot 1 [ms] | number of single slot 1 | Burst Width 1 [ms/hop/ch] | The number of hop channel appear |
|----------------|---------|---------|----------------------------|-------------------------|---------------------------|----------------------------------|
| 4GFSK-250 kbps | Ant1    | Hop     | 2.800                      | 10                      | 28.00                     | 7                                |

| Test Mode      | Antenna | Channel | Dwell Time [ms] | Limit [ms] | Results |
|----------------|---------|---------|-----------------|------------|---------|
| 4GFSK-250 kbps | Ant1    | Hop     | 196.00          | 400        | PASS    |

Note:

4GFSK-250 kbps: The dwell time = Time of single slot \* The number of hop channel appear within 20s

BurstWidth = Time of single slot \* number of single slot

## 18.6.2. Test Graphs



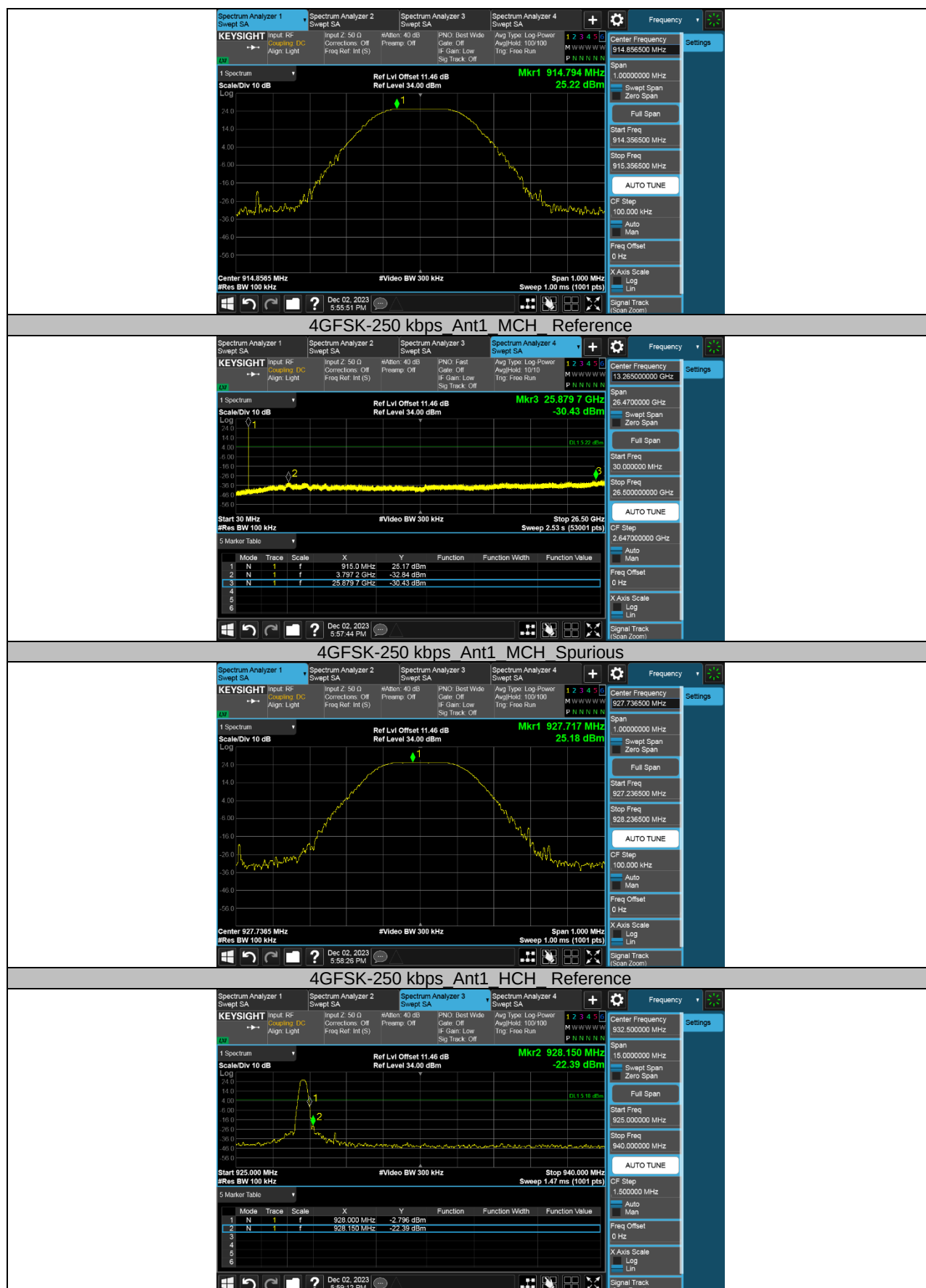
## 18.7. Appendix G8: CONDUCTED BAND EDGE AND SPURIOUS EMISSION

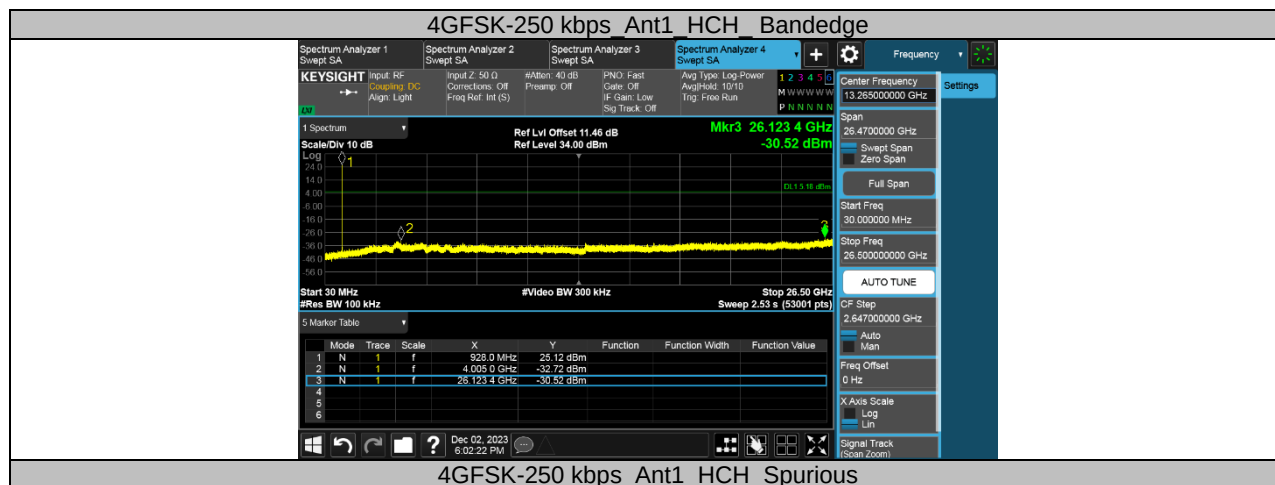
### 18.7.1. Test Result

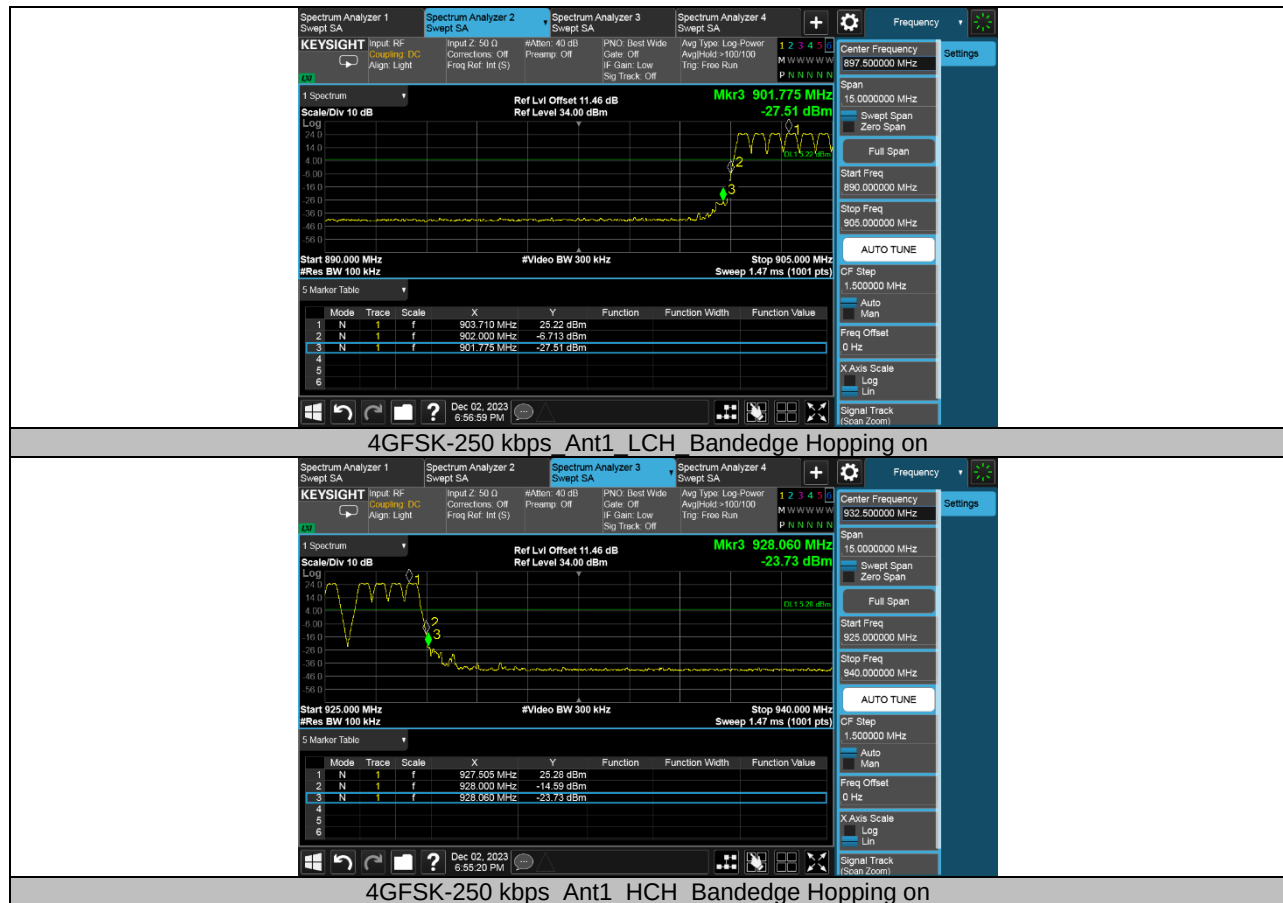
| Test Mode      | Antenna | ChName  | Result [dBm]         | Verdict |
|----------------|---------|---------|----------------------|---------|
| 4GFSK-250 kbps | Ant1    | LCH     | See the below graphs | PASS    |
|                |         | MCH     |                      | PASS    |
|                |         | HCH     |                      | PASS    |
|                |         | Hop_LCH |                      | PASS    |
|                |         | Hop_HCH |                      | PASS    |

## 18.7.2. Test Graphs









**19. FCC.SubG.4GFSK.350kbps****19.1. Appendix A9: DUTY CYCLE****19.1.1. Test Result**

| Test Mode      | On Time<br>(msec) | Period<br>(msec) | Duty Cycle<br>x<br>(Linear) | Duty<br>Cycle<br>(%) | Duty Cycle<br>Correction<br>Factor<br>(dB) | 1/T<br>Minimum<br>VBW<br>(kHz) | Final<br>setting<br>For VBW<br>(kHz) |
|----------------|-------------------|------------------|-----------------------------|----------------------|--------------------------------------------|--------------------------------|--------------------------------------|
| 4GFSK-350 kbps | 218.033           | 495.13           | 0.4404                      | 44.04                | 3.56                                       | 0.0046                         | 1                                    |

Note:

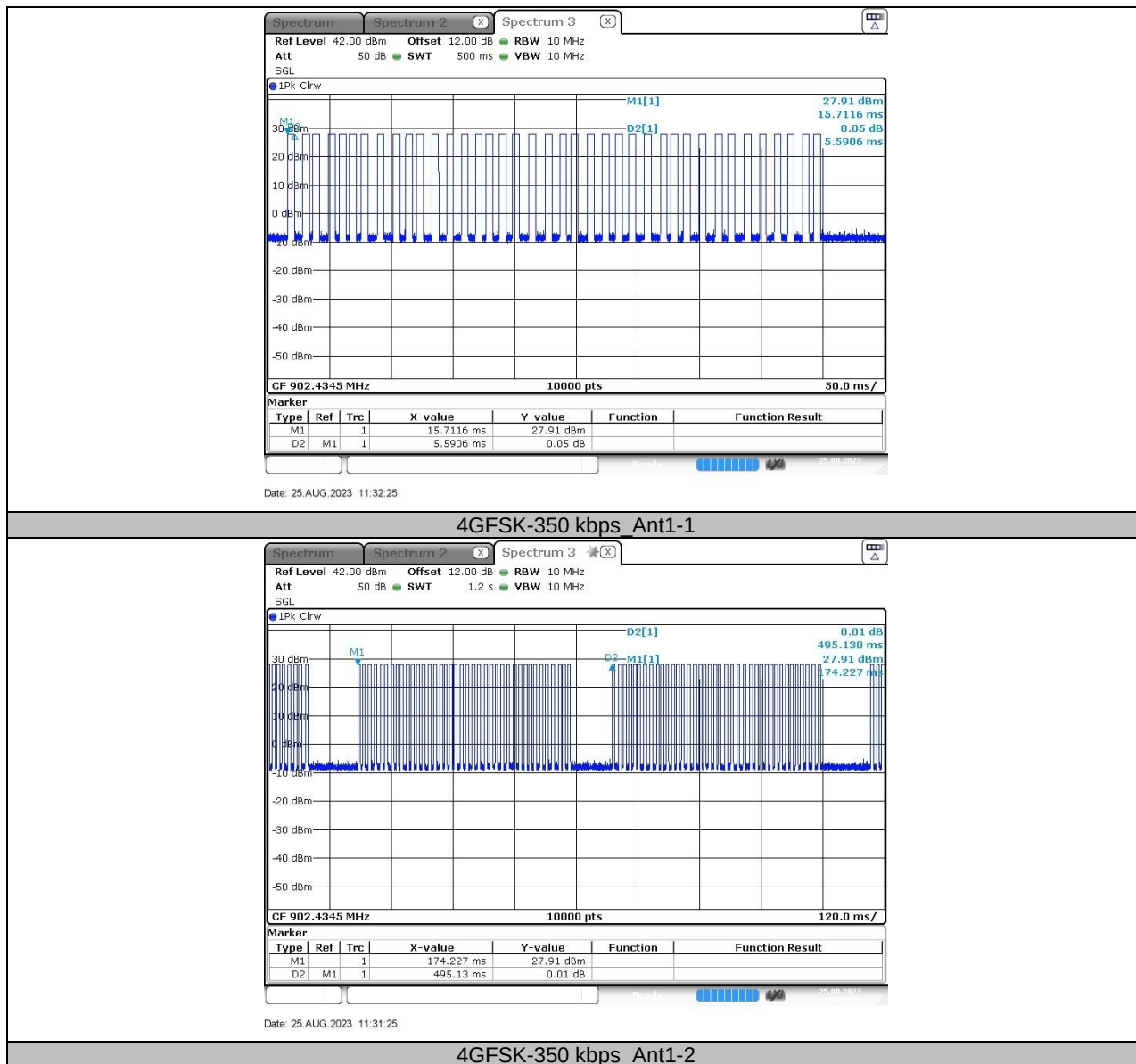
Duty Cycle Correction Factor= $10\log(1/x)$ .

Where: x is Duty Cycle (Linear)

Where: T is On Time

If that calculated VBW is not available on the analyzer then the next higher value should be used.

## Test Graphs



## 19.2. Appendix B9: 20DB BANDWIDTH & OCCUPIED CHANNEL BANDWIDTH

### 19.2.1. Test Result

| Test Mode      | Antenna | Channel | 20db EBW[MHz] | OCB [MHz] | Verdict |
|----------------|---------|---------|---------------|-----------|---------|
| 4GFSK-350 kbps | Ant1    | LCH     | 0.3505        | 0.28471   | PASS    |
|                |         | MCH     | 0.3424        | 0.28084   | PASS    |
|                |         | HCH     | 0.3487        | 0.28394   | PASS    |