

# Appendix-B LTE NB-IoT Band 5

## Effective (Isotropic) Radiated Power Output Data for NB

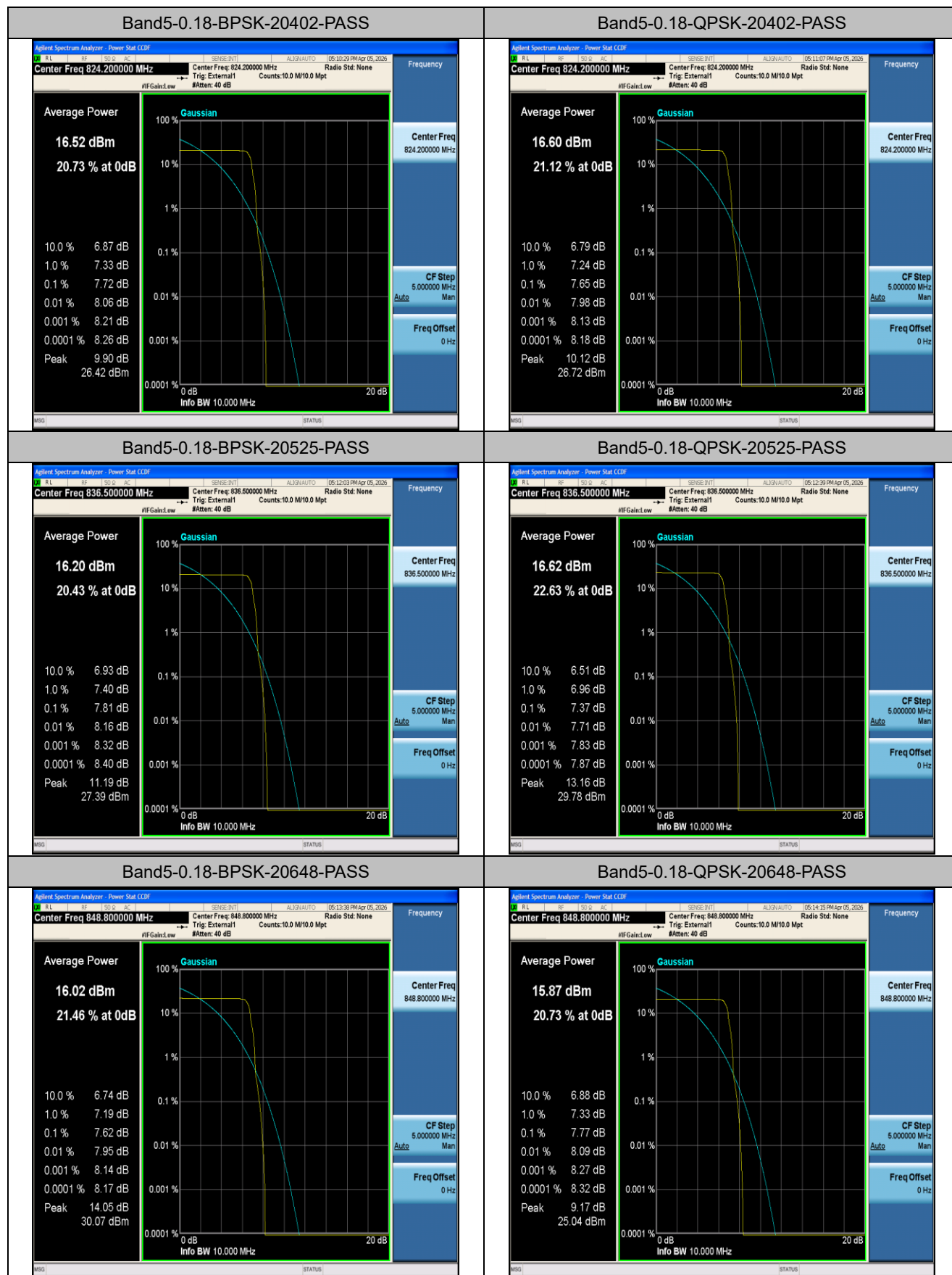
### Test Result

| Band  | OpMode      | SCS     | BW   | Modulation | Channel | Tones | Result (dBm) | ERP (dBm) | Limit (dBm) | Verdict |
|-------|-------------|---------|------|------------|---------|-------|--------------|-----------|-------------|---------|
| Band5 | Stand-Alone | 3.75kHz | 0.18 | BPSK       | 20402   | 1@0   | 21.99        | 26.74     | 38.45       | PASS    |
| Band5 | Stand-Alone | 3.75kHz | 0.18 | QPSK       | 20402   | 1@0   | 21.98        | 26.73     | 38.45       | PASS    |
| Band5 | Stand-Alone | 3.75kHz | 0.18 | BPSK       | 20402   | 1@47  | 21.84        | 26.59     | 38.45       | PASS    |
| Band5 | Stand-Alone | 3.75kHz | 0.18 | QPSK       | 20402   | 1@47  | 22           | 26.75     | 38.45       | PASS    |
| Band5 | Stand-Alone | 3.75kHz | 0.18 | BPSK       | 20525   | 1@0   | 21.92        | 26.67     | 38.45       | PASS    |
| Band5 | Stand-Alone | 3.75kHz | 0.18 | QPSK       | 20525   | 1@0   | 21.75        | 26.5      | 38.45       | PASS    |
| Band5 | Stand-Alone | 3.75kHz | 0.18 | BPSK       | 20525   | 1@47  | 21.64        | 26.39     | 38.45       | PASS    |
| Band5 | Stand-Alone | 3.75kHz | 0.18 | QPSK       | 20525   | 1@47  | 21.75        | 26.5      | 38.45       | PASS    |
| Band5 | Stand-Alone | 3.75kHz | 0.18 | BPSK       | 20648   | 1@0   | 21.48        | 26.23     | 38.45       | PASS    |
| Band5 | Stand-Alone | 3.75kHz | 0.18 | QPSK       | 20648   | 1@0   | 21.42        | 26.17     | 38.45       | PASS    |
| Band5 | Stand-Alone | 3.75kHz | 0.18 | BPSK       | 20648   | 1@47  | 21.5         | 26.25     | 38.45       | PASS    |
| Band5 | Stand-Alone | 3.75kHz | 0.18 | QPSK       | 20648   | 1@47  | 21.46        | 26.21     | 38.45       | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | BPSK       | 20402   | 1@0   | 22.63        | 27.38     | 38.45       | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | QPSK       | 20402   | 1@0   | 22.63        | 27.38     | 38.45       | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | BPSK       | 20402   | 1@11  | 22.59        | 27.34     | 38.45       | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | QPSK       | 20402   | 1@11  | 22.65        | 27.4      | 38.45       | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | BPSK       | 20525   | 1@0   | 22.18        | 26.93     | 38.45       | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | QPSK       | 20525   | 1@0   | 22.13        | 26.88     | 38.45       | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | BPSK       | 20525   | 1@11  | 22.14        | 26.89     | 38.45       | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | QPSK       | 20525   | 1@11  | 22.18        | 26.93     | 38.45       | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | BPSK       | 20648   | 1@0   | 21.87        | 26.62     | 38.45       | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | QPSK       | 20648   | 1@0   | 21.88        | 26.63     | 38.45       | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | BPSK       | 20648   | 1@11  | 21.86        | 26.61     | 38.45       | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | QPSK       | 20648   | 1@11  | 21.87        | 26.62     | 38.45       | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | QPSK       | 20402   | 3@3   | 23.41        | 28.16     | 38.45       | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | QPSK       | 20525   | 3@3   | 22.97        | 27.72     | 38.45       | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | QPSK       | 20648   | 3@3   | 22.68        | 27.43     | 38.45       | PASS    |

**Peak-to-Average Ratio(CCDF) for NB****Test Result**

| Band  | OpMode      | SCS   | BW   | Modulation | Channel | Tones | Result (dB) | Limit (dB) | Verdict |
|-------|-------------|-------|------|------------|---------|-------|-------------|------------|---------|
| Band5 | Stand-Alone | 15kHz | 0.18 | BPSK       | 20402   | 12@0  | 7.72        | <=13       | PASS    |
| Band5 | Stand-Alone | 15kHz | 0.18 | QPSK       | 20402   | 12@0  | 7.65        | <=13       | PASS    |
| Band5 | Stand-Alone | 15kHz | 0.18 | BPSK       | 20525   | 12@0  | 7.81        | <=13       | PASS    |
| Band5 | Stand-Alone | 15kHz | 0.18 | QPSK       | 20525   | 12@0  | 7.37        | <=13       | PASS    |
| Band5 | Stand-Alone | 15kHz | 0.18 | BPSK       | 20648   | 12@0  | 7.62        | <=13       | PASS    |
| Band5 | Stand-Alone | 15kHz | 0.18 | QPSK       | 20648   | 12@0  | 7.77        | <=13       | PASS    |

# Test Graphs

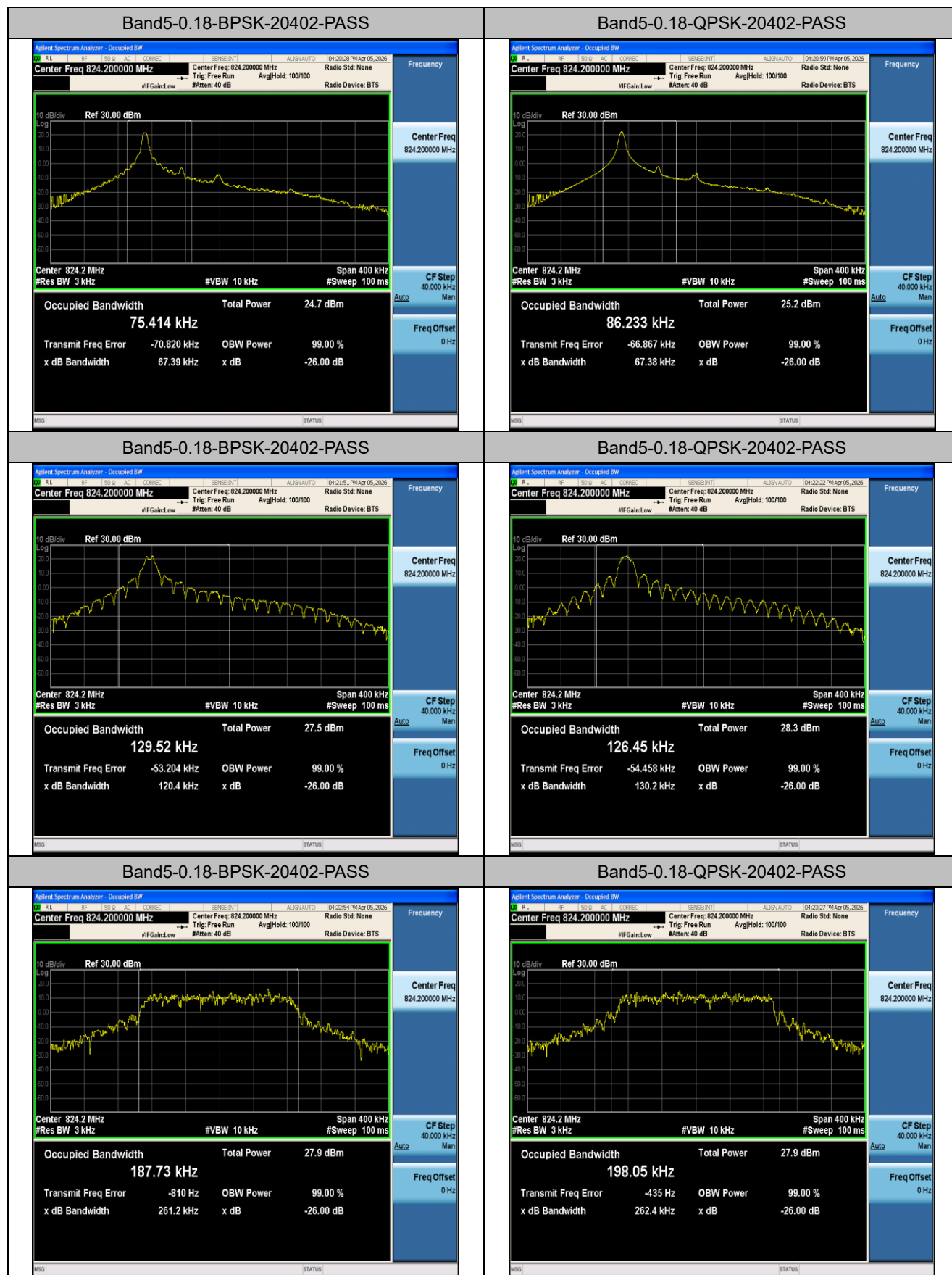


## Emission Bandwidth for NB

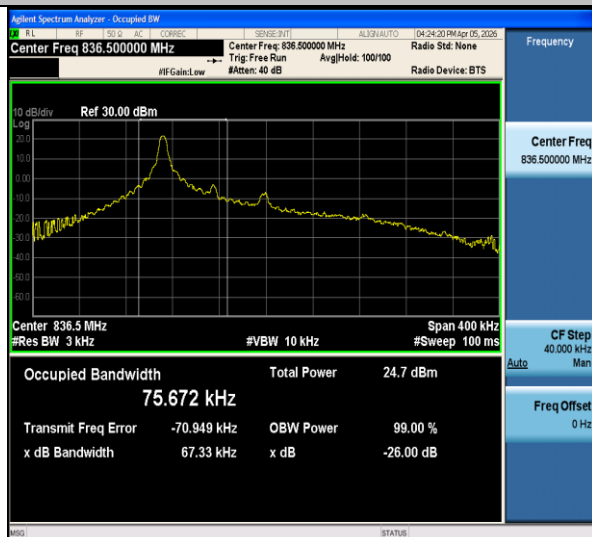
### Test Result

| Band  | OpMode      | SCS     | BW   | Modulation | Channel | Tones | OBW(MHz) | EBW(MHz) | Verdict |
|-------|-------------|---------|------|------------|---------|-------|----------|----------|---------|
| Band5 | Stand-Alone | 3.75kHz | 0.18 | BPSK       | 20402   | 1@0   | 0.07541  | 0.0674   | PASS    |
| Band5 | Stand-Alone | 3.75kHz | 0.18 | QPSK       | 20402   | 1@0   | 0.08623  | 0.0674   | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | BPSK       | 20402   | 1@0   | 0.12952  | 0.1204   | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | QPSK       | 20402   | 1@0   | 0.12645  | 0.1302   | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | BPSK       | 20402   | 12@0  | 0.18773  | 0.2612   | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | QPSK       | 20402   | 12@0  | 0.19805  | 0.2624   | PASS    |
| Band5 | Stand-Alone | 3.75kHz | 0.18 | BPSK       | 20525   | 1@0   | 0.07567  | 0.0673   | PASS    |
| Band5 | Stand-Alone | 3.75kHz | 0.18 | QPSK       | 20525   | 1@0   | 0.08598  | 0.0675   | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | BPSK       | 20525   | 1@0   | 0.13167  | 0.1278   | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | QPSK       | 20525   | 1@0   | 0.12671  | 0.1298   | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | BPSK       | 20525   | 12@0  | 0.18784  | 0.2635   | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | QPSK       | 20525   | 12@0  | 0.18817  | 0.2587   | PASS    |
| Band5 | Stand-Alone | 3.75kHz | 0.18 | BPSK       | 20648   | 1@0   | 0.07303  | 0.0675   | PASS    |
| Band5 | Stand-Alone | 3.75kHz | 0.18 | QPSK       | 20648   | 1@0   | 0.08739  | 0.0677   | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | BPSK       | 20648   | 1@0   | 0.12896  | 0.1275   | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | QPSK       | 20648   | 1@0   | 0.12734  | 0.1311   | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | BPSK       | 20648   | 12@0  | 0.18926  | 0.2641   | PASS    |
| Band5 | Stand-Alone | 15kHz   | 0.18 | QPSK       | 20648   | 12@0  | 0.18833  | 0.2655   | PASS    |

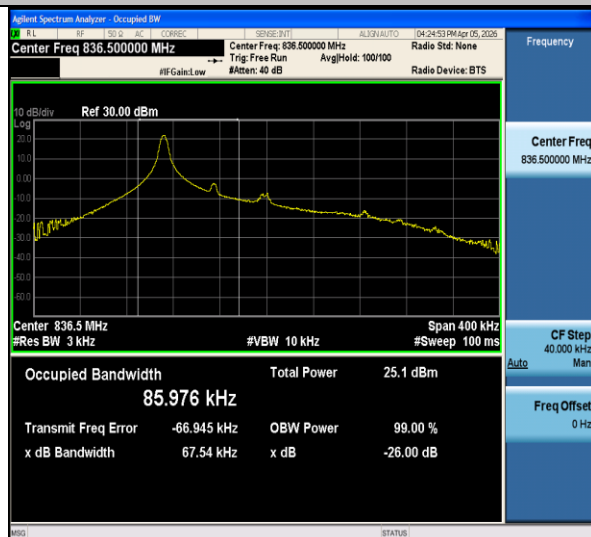
# Test Graphs



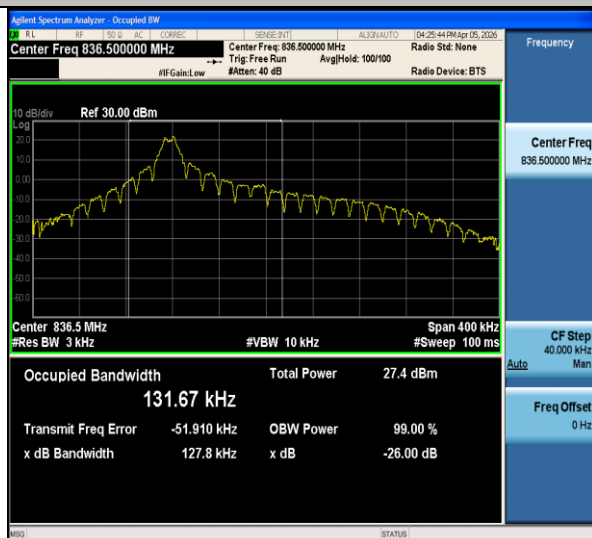
Band5-0.18-BPSK-20525-PASS



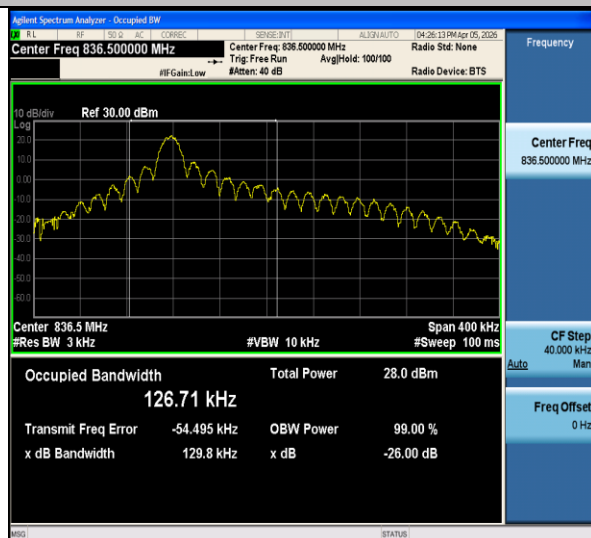
Band5-0.18-QPSK-20525-PASS



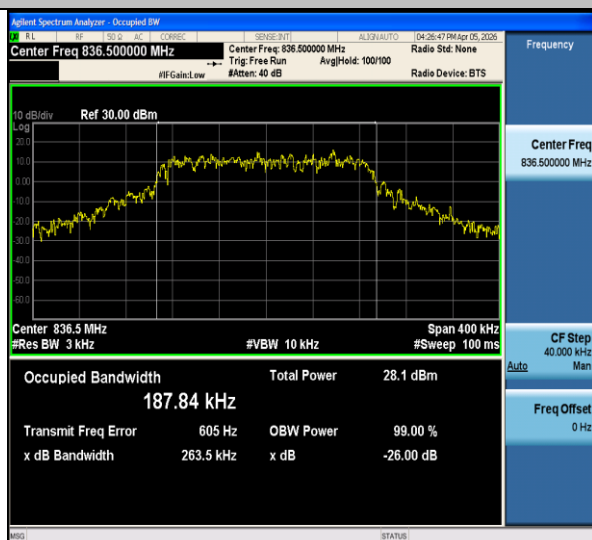
Band5-0.18-BPSK-20525-PASS



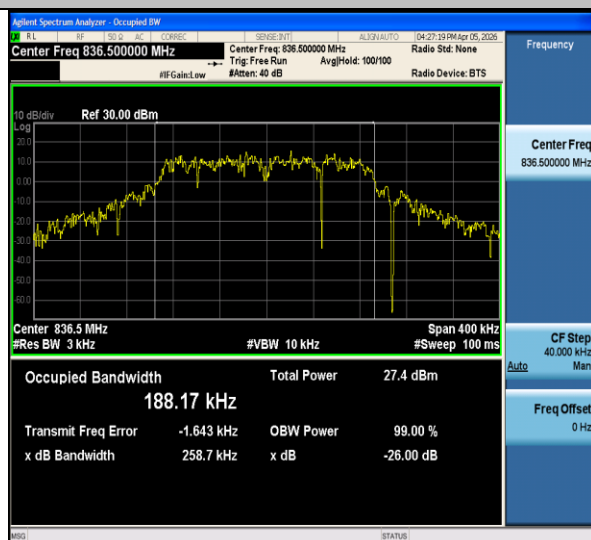
Band5-0.18-QPSK-20525-PASS

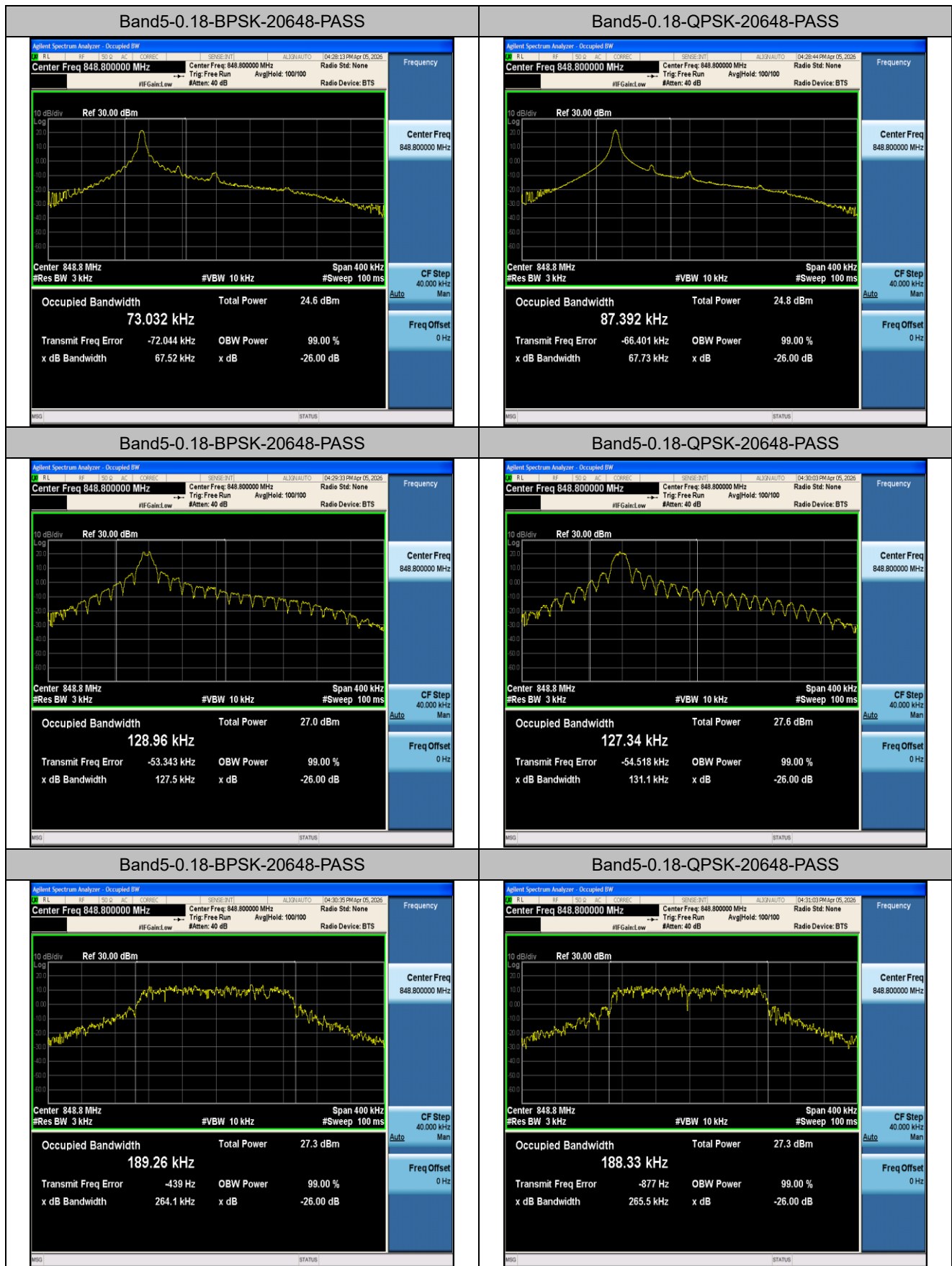


Band5-0.18-BPSK-20525-PASS



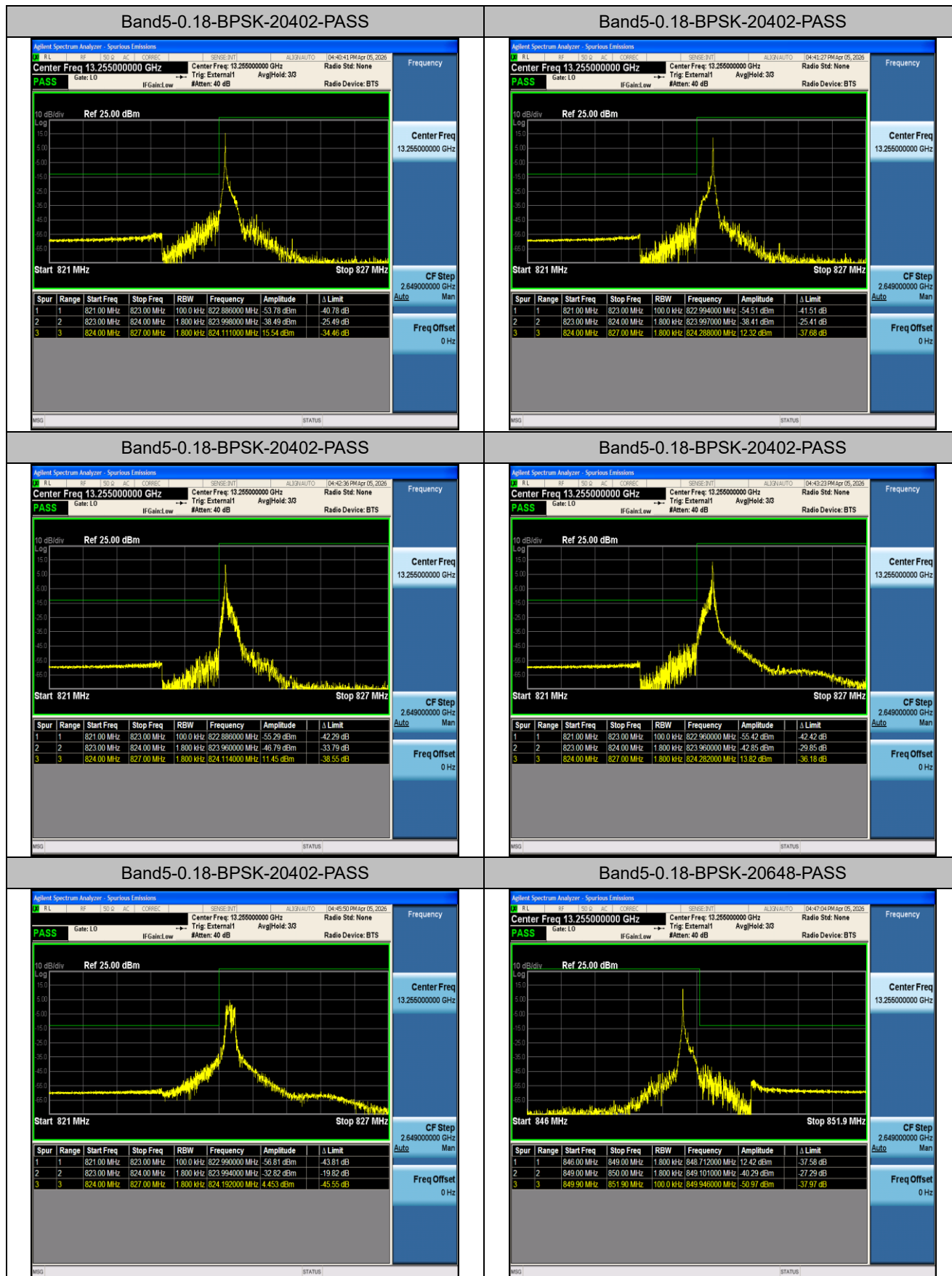
Band5-0.18-QPSK-20525-PASS



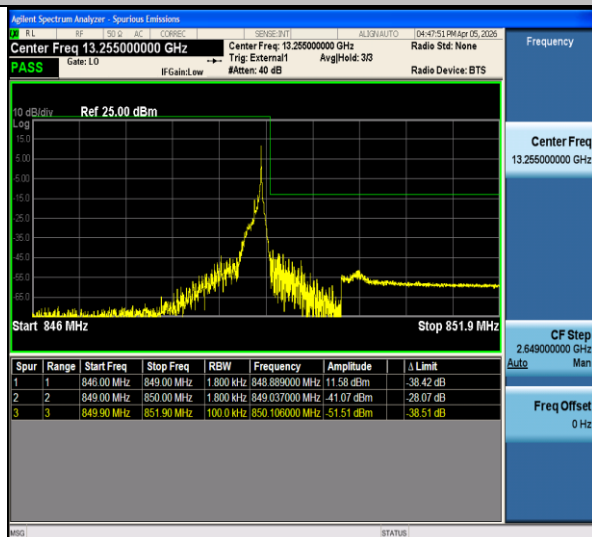


# Band Edge for NB

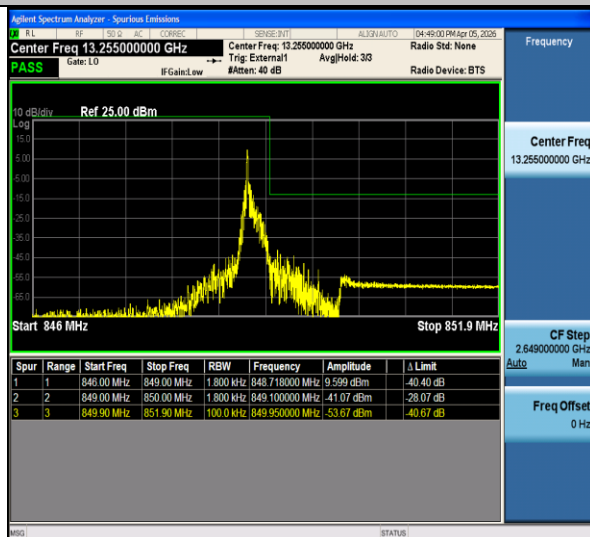
## Test Graphs



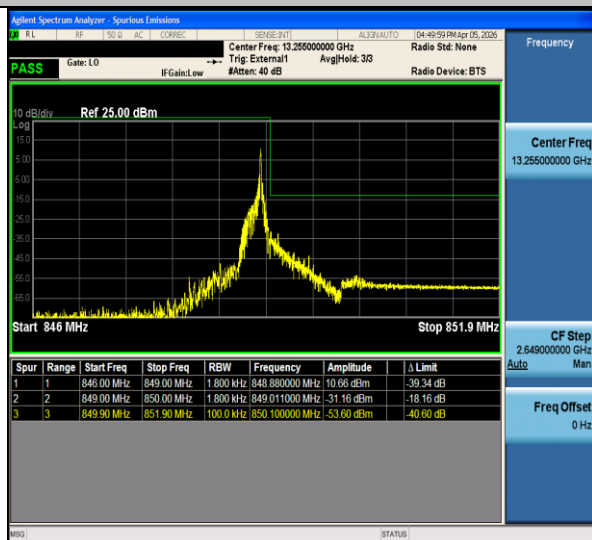
Band5-0.18-BPSK-20648-PASS



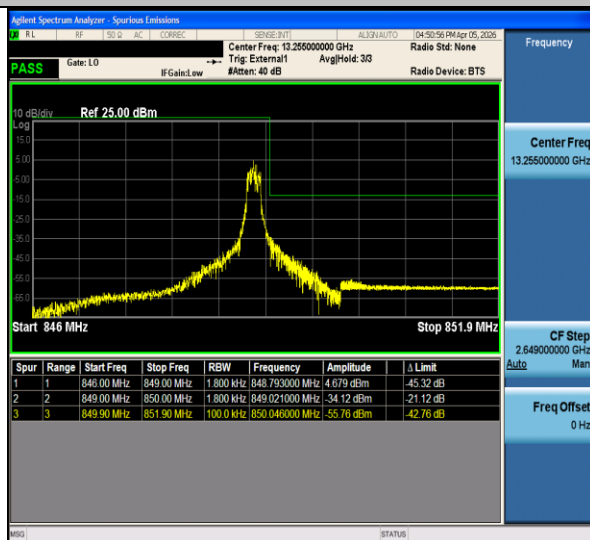
Band5-0.18-BPSK-20648-PASS



Band5-0.18-BPSK-20648-PASS

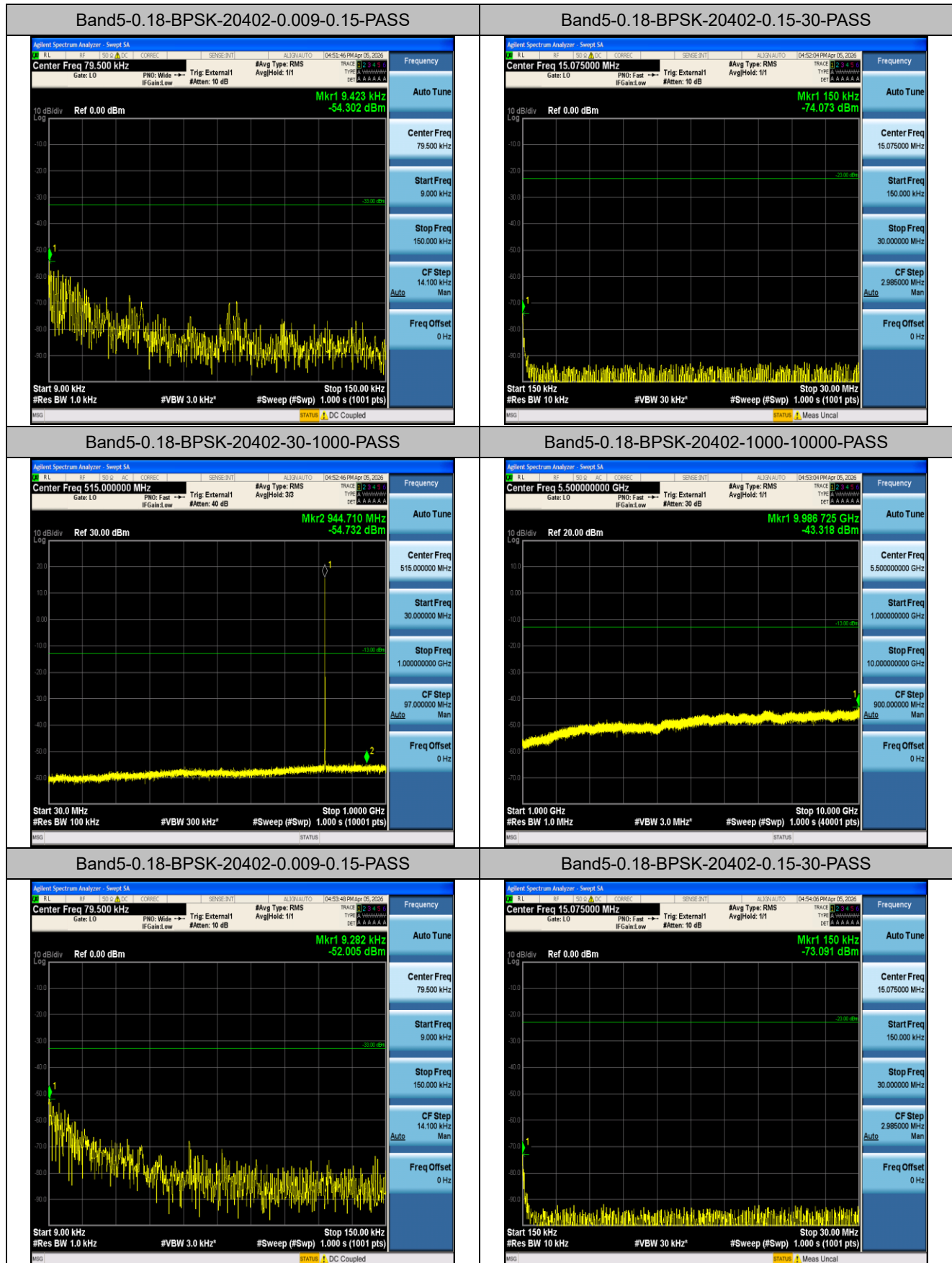


Band5-0.18-BPSK-20648-PASS

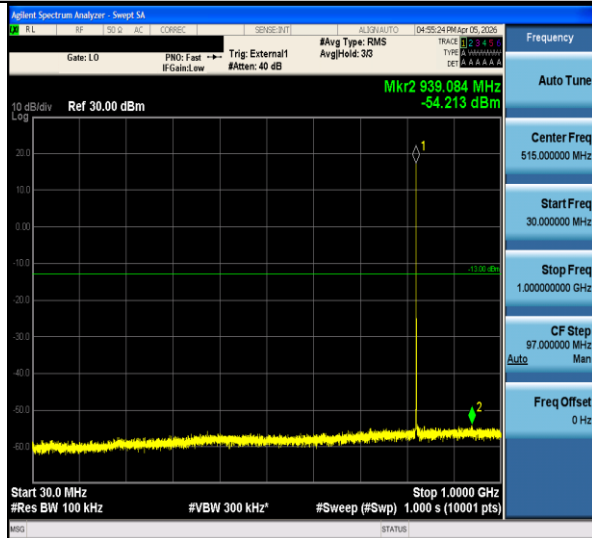


# Conducted Spurious Emission for NB

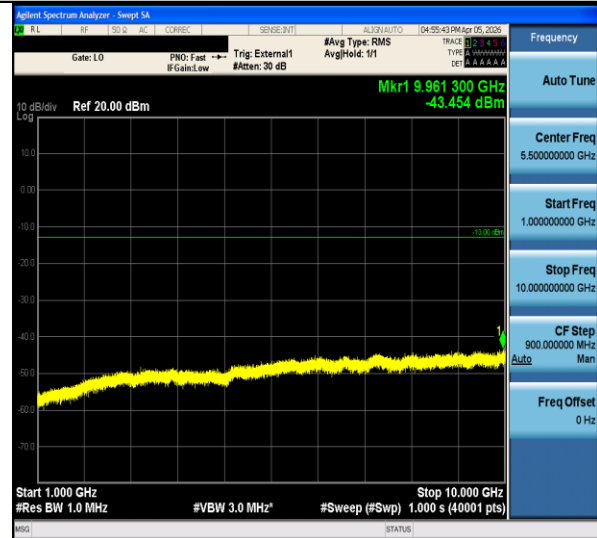
## Test Graphs



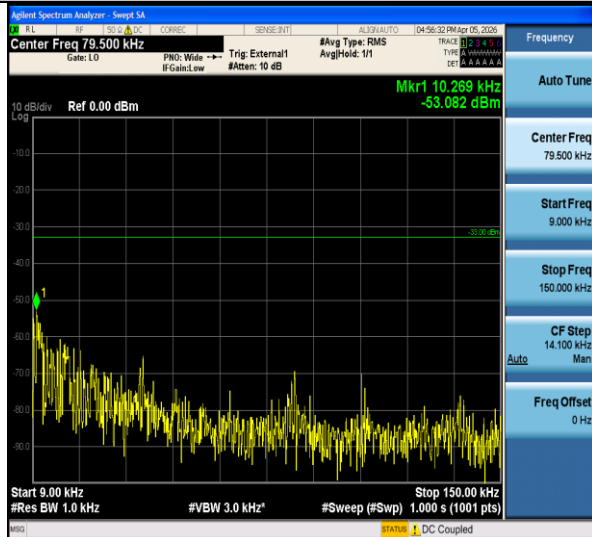
Band5-0.18-BPSK-20402-30-1000-PASS



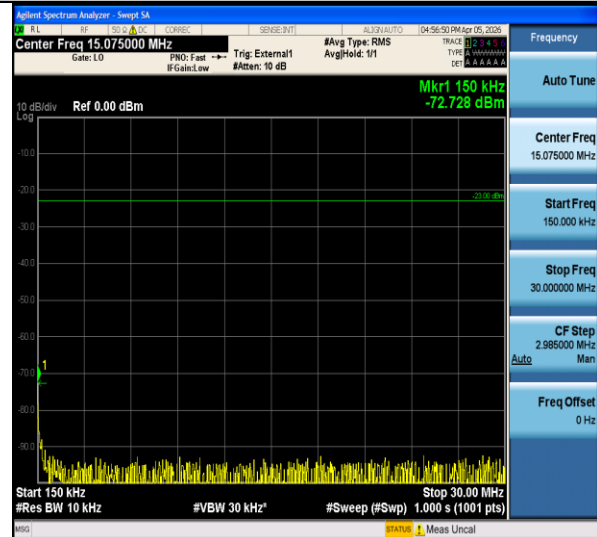
Band5-0.18-BPSK-20402-1000-10000-PASS



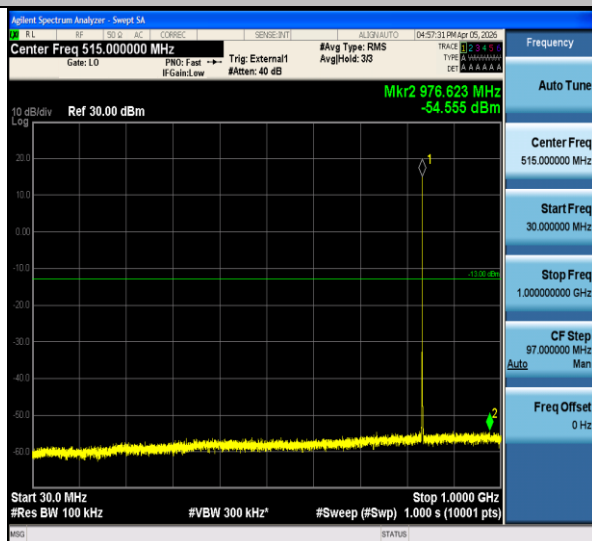
Band5-0.18-BPSK-20525-0.009-0.15-PASS



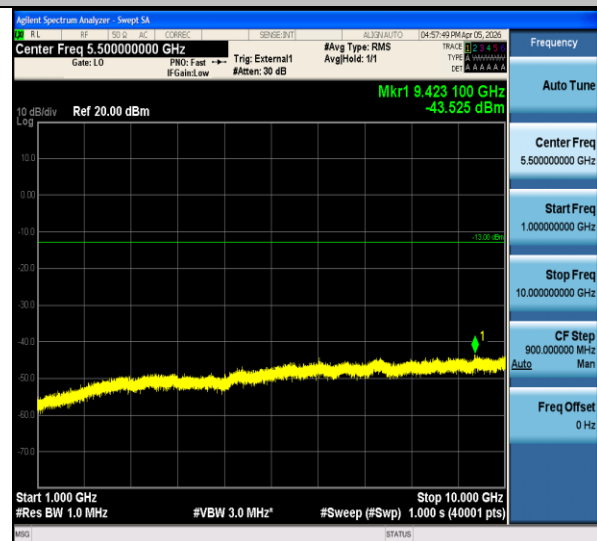
Band5-0.18-BPSK-20525-0.15-30-PASS



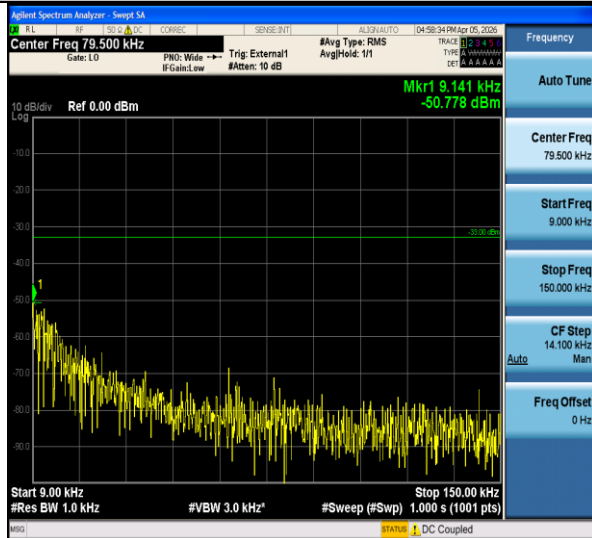
Band5-0.18-BPSK-20525-30-1000-PASS



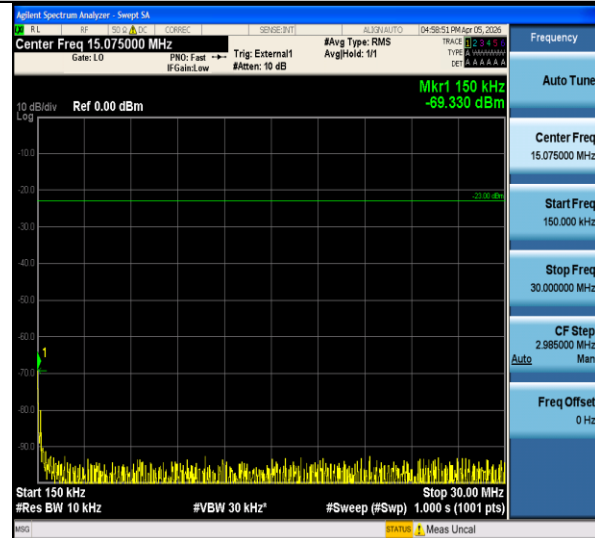
Band5-0.18-BPSK-20525-1000-10000-PASS



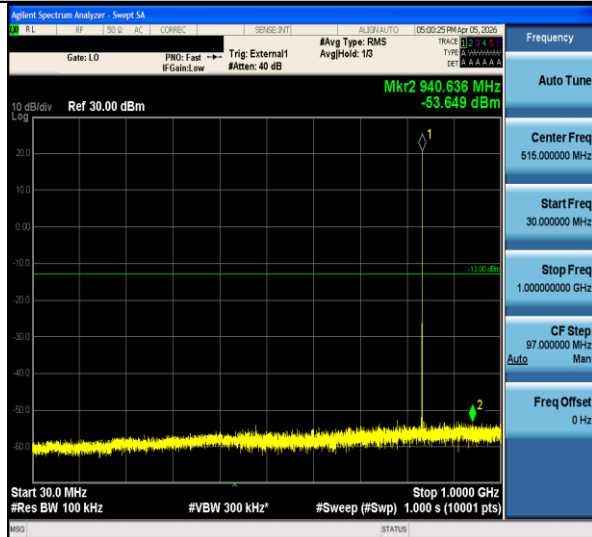
Band5-0.18-BPSK-20525-0.009-0.15-PASS



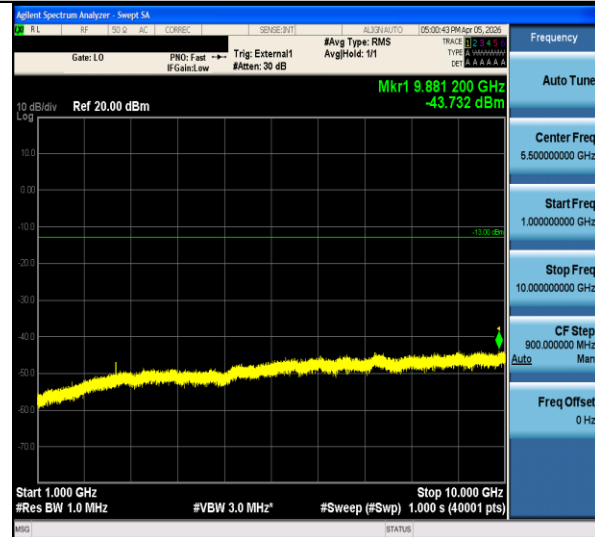
Band5-0.18-BPSK-20525-0.15-30-PASS



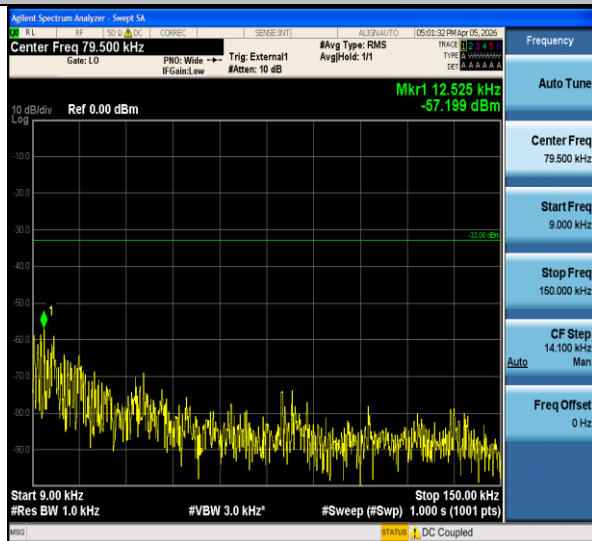
Band5-0.18-BPSK-20525-30-1000-PASS



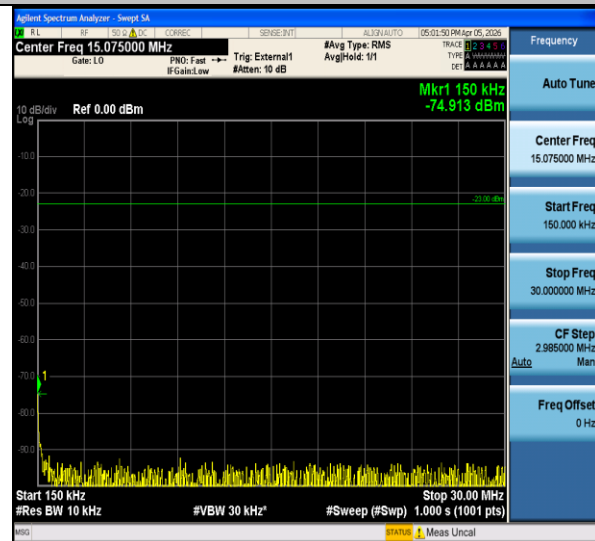
Band5-0.18-BPSK-20525-1000-10000-PASS



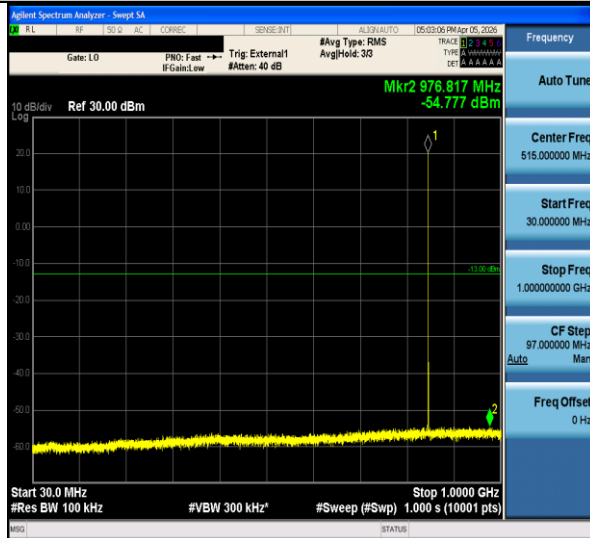
Band5-0.18-BPSK-20648-0.009-0.15-PASS



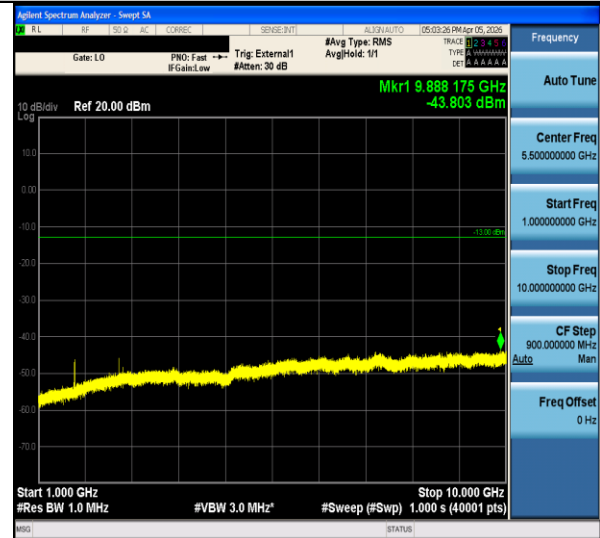
Band5-0.18-BPSK-20648-0.15-30-PASS



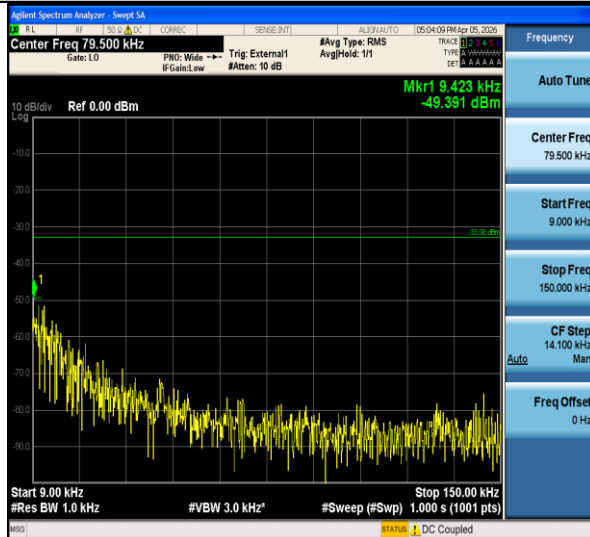
Band5-0.18-BPSK-20648-30-1000-PASS



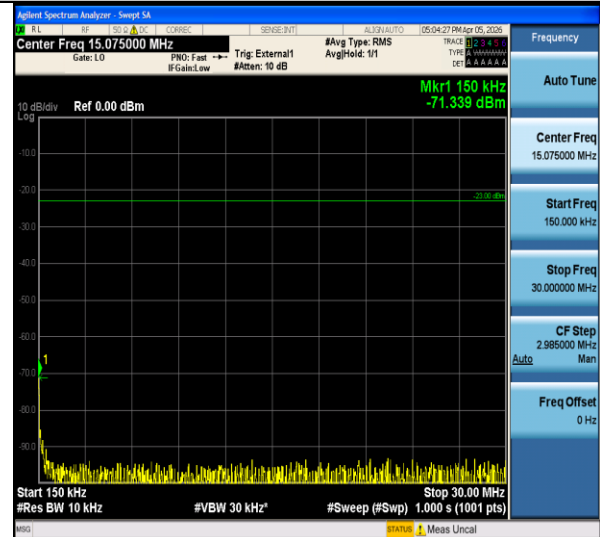
Band5-0.18-BPSK-20648-1000-10000-PASS



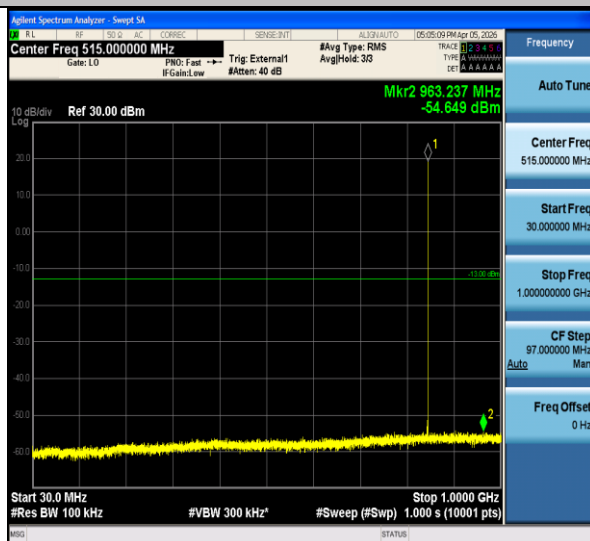
Band5-0.18-BPSK-20648-0.009-0.15-PASS



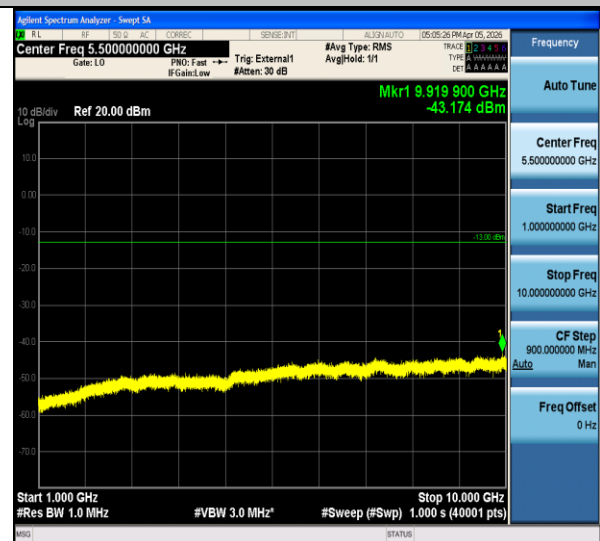
Band5-0.18-BPSK-20648-0.15-30-PASS



Band5-0.18-BPSK-20648-30-1000-PASS



Band5-0.18-BPSK-20648-1000-10000-PASS



## Frequency Stability for NB

## Test Result

| Voltage |             |       |           |            |         |       |               |                  |                |                 |             |         |
|---------|-------------|-------|-----------|------------|---------|-------|---------------|------------------|----------------|-----------------|-------------|---------|
| Band    | OpMode      | SCS   | Bandwidth | Modulation | Channel | Tones | Voltage [Vdc] | Temperature (°C) | Deviation (Hz) | Deviation (ppm) | Limit (ppm) | Verdict |
| Band5   | Stand-Alone | 15kHz | 0.18      | BPSK       | 20525   | 12@0  | VN            | NT               | 8.60           | 0.010281        | ±2.5        | PASS    |
| Band5   | Stand-Alone | 15kHz | 0.18      | BPSK       | 20525   | 12@0  | VL            | NT               | 8.40           | 0.010042        | ±2.5        | PASS    |
| Band5   | Stand-Alone | 15kHz | 0.18      | BPSK       | 20525   | 12@0  | VH            | NT               | 5.90           | 0.007053        | ±2.5        | PASS    |

| Temperature |             |       |           |            |         |       |               |                  |                |                 |             |         |
|-------------|-------------|-------|-----------|------------|---------|-------|---------------|------------------|----------------|-----------------|-------------|---------|
| Band        | OpMode      | SCS   | Bandwidth | Modulation | Channel | Tones | Voltage [Vdc] | Temperature (°C) | Deviation (Hz) | Deviation (ppm) | Limit (ppm) | Verdict |
| Band5       | Stand-Alone | 15kHz | 0.18      | BPSK       | 20525   | 12@0  | NV            | -30              | 5.50           | 0.006575        | ±2.5        | PASS    |
| Band5       | Stand-Alone | 15kHz | 0.18      | BPSK       | 20525   | 12@0  | NV            | -20              | 6.30           | 0.007531        | ±2.5        | PASS    |
| Band5       | Stand-Alone | 15kHz | 0.18      | BPSK       | 20525   | 12@0  | NV            | -10              | 5.40           | 0.006455        | ±2.5        | PASS    |
| Band5       | Stand-Alone | 15kHz | 0.18      | BPSK       | 20525   | 12@0  | NV            | 0                | 6.40           | 0.007651        | ±2.5        | PASS    |
| Band5       | Stand-Alone | 15kHz | 0.18      | BPSK       | 20525   | 12@0  | NV            | 10               | 6.30           | 0.007531        | ±2.5        | PASS    |
| Band5       | Stand-Alone | 15kHz | 0.18      | BPSK       | 20525   | 12@0  | NV            | 20               | 5.20           | 0.006216        | ±2.5        | PASS    |
| Band5       | Stand-Alone | 15kHz | 0.18      | BPSK       | 20525   | 12@0  | NV            | 30               | 5.70           | 0.006814        | ±2.5        | PASS    |
| Band5       | Stand-Alone | 15kHz | 0.18      | BPSK       | 20525   | 12@0  | NV            | 40               | 5.60           | 0.006695        | ±2.5        | PASS    |
| Band5       | Stand-Alone | 15kHz | 0.18      | BPSK       | 20525   | 12@0  | NV            | 50               | 5.90           | 0.007053        | ±2.5        | PASS    |

~The End~