

## Appendix: Bluetooth LE

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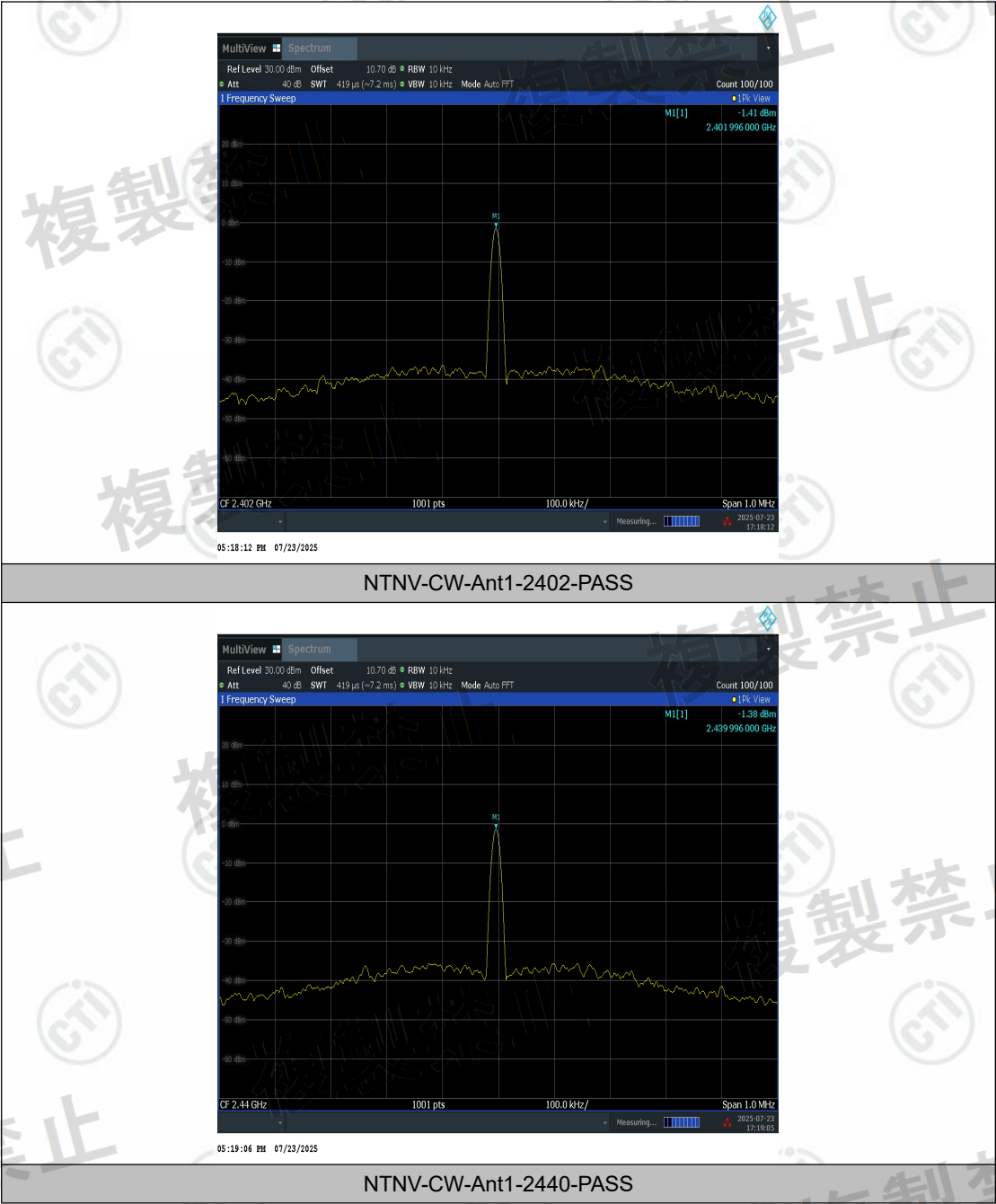
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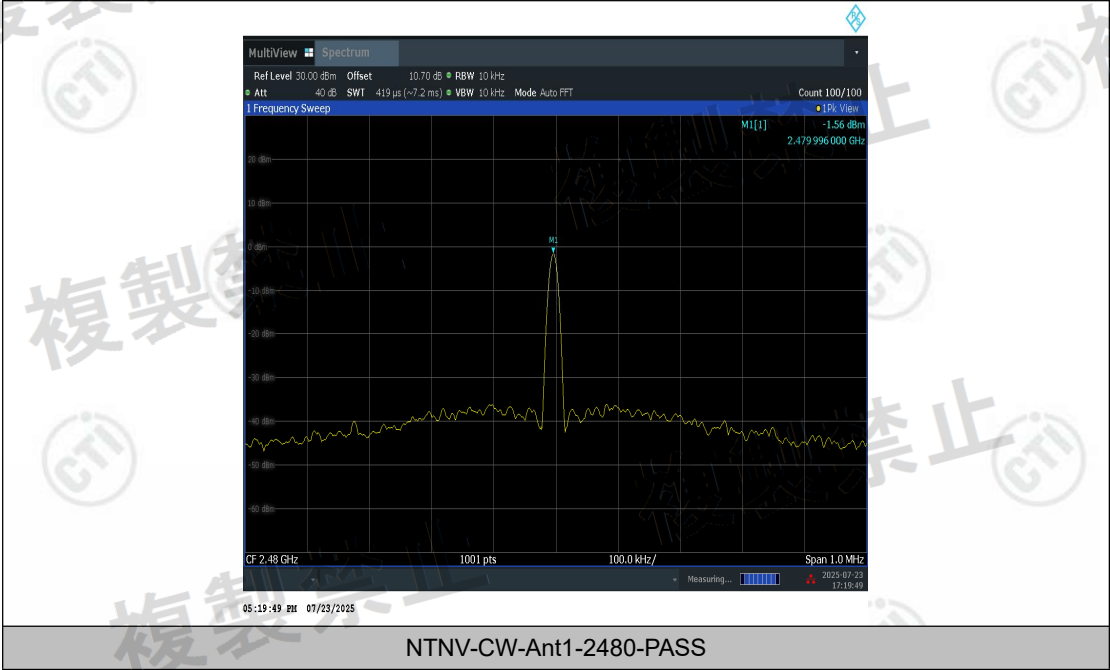
Appendix A: Frequency Error

Test Result

| TestCondition | TestMode | Antenna | Freq(MHz) | CenterFreq<br>[MHz] | Result[ppm] | Limit[ppm] | Verdict |
|---------------|----------|---------|-----------|---------------------|-------------|------------|---------|
| NTNV          | CW       | Ant1    | 2402      | 2401.996            | -1.66528    | ±50        | PASS    |
| NTNV          | CW       | Ant1    | 2440      | 2439.996            | -1.63934    | ±50        | PASS    |
| NTNV          | CW       | Ant1    | 2480      | 2479.996            | -1.61290    | ±50        | PASS    |

Test Graphs





## Appendix B: Antenna Power

### Test Result

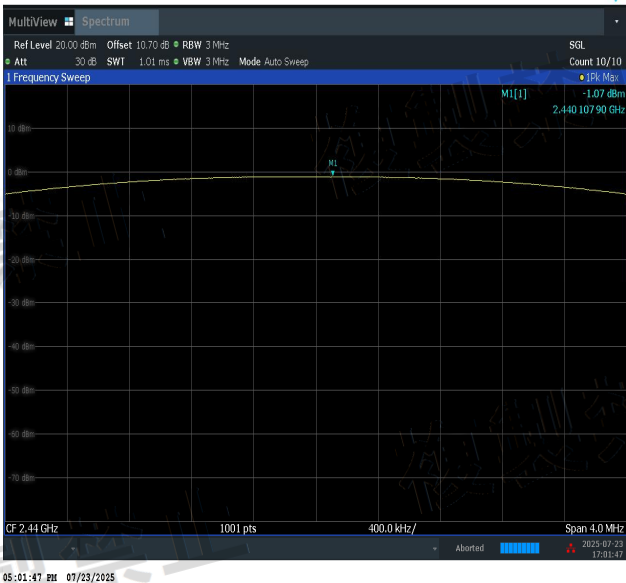
| TestCondition | TestMode | Antenna | Freq (MHz) | Result(dBm) | Result(mW) | Limit(mW) | Verdict |
|---------------|----------|---------|------------|-------------|------------|-----------|---------|
| NTNV          | BLE_1M   | Ant1    | 2402       | -1.45       | 0.7161     | ≤10       | PASS    |
| NTNV          | BLE_1M   | Ant1    | 2440       | -1.41       | 0.7228     | ≤10       | PASS    |
| NTNV          | BLE_1M   | Ant1    | 2480       | -1.55       | 0.6998     | ≤10       | PASS    |
| NTNV          | BLE_2M   | Ant1    | 2402       | -1.48       | 0.7112     | ≤10       | PASS    |
| NTNV          | BLE_2M   | Ant1    | 2440       | -1.40       | 0.7244     | ≤10       | PASS    |
| NTNV          | BLE_2M   | Ant1    | 2480       | -1.53       | 0.7031     | ≤10       | PASS    |

| Test Condition | Test Mode | Antenna | Freq (MHz) | Power (mW) | Rated Power (mW) | Result (%) | Limit (%) | Verdict |
|----------------|-----------|---------|------------|------------|------------------|------------|-----------|---------|
| NTNV           | BLE_1M    | Ant1    | 2402       | 0.7161     | 0.7              | +2.3       | NA, +20   | PASS    |
| NTNV           | BLE_1M    | Ant1    | 2440       | 0.7228     | 0.7              | +3.25      | NA, +20   | PASS    |
| NTNV           | BLE_1M    | Ant1    | 2480       | 0.6998     | 0.7              | -0.028     | NA, +20   | PASS    |
| NTNV           | BLE_2M    | Ant1    | 2402       | 0.7112     | 0.7              | +1.6       | NA, +20   | PASS    |
| NTNV           | BLE_2M    | Ant1    | 2440       | 0.7244     | 0.7              | +3.48      | NA, +20   | PASS    |
| NTNV           | BLE_2M    | Ant1    | 2480       | 0.7031     | 0.7              | +0.44      | NA, +20   | PASS    |

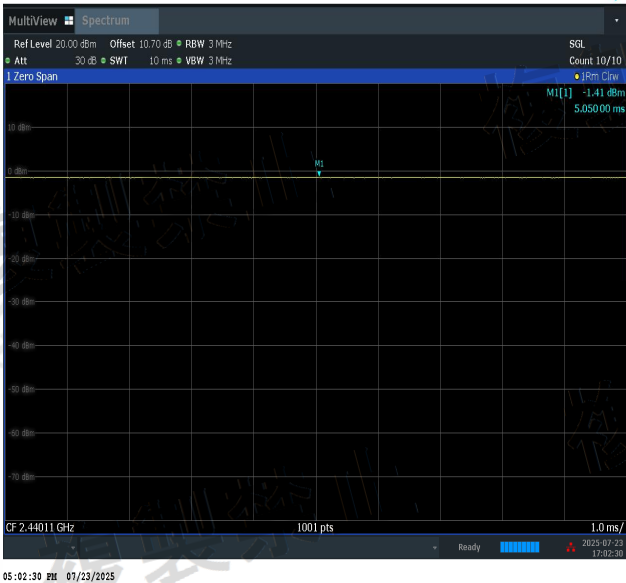
| Test Condition | Test Mode | Antenna | Freq (MHz) | Result(dBm) | EIRP(dBm) | Limit(dBm) | Verdict |
|----------------|-----------|---------|------------|-------------|-----------|------------|---------|
| NTNV           | BLE_1M    | Ant1    | 2402       | -1.45       | 0.25      | ≤12.14     | PASS    |
| NTNV           | BLE_1M    | Ant1    | 2440       | -1.41       | 0.29      | ≤12.14     | PASS    |
| NTNV           | BLE_1M    | Ant1    | 2480       | -1.55       | 0.15      | ≤12.14     | PASS    |
| NTNV           | BLE_2M    | Ant1    | 2402       | -1.48       | 0.22      | ≤12.14     | PASS    |
| NTNV           | BLE_2M    | Ant1    | 2440       | -1.40       | 0.30      | ≤12.14     | PASS    |
| NTNV           | BLE_2M    | Ant1    | 2480       | -1.53       | 0.17      | ≤12.14     | PASS    |

Test Graphs

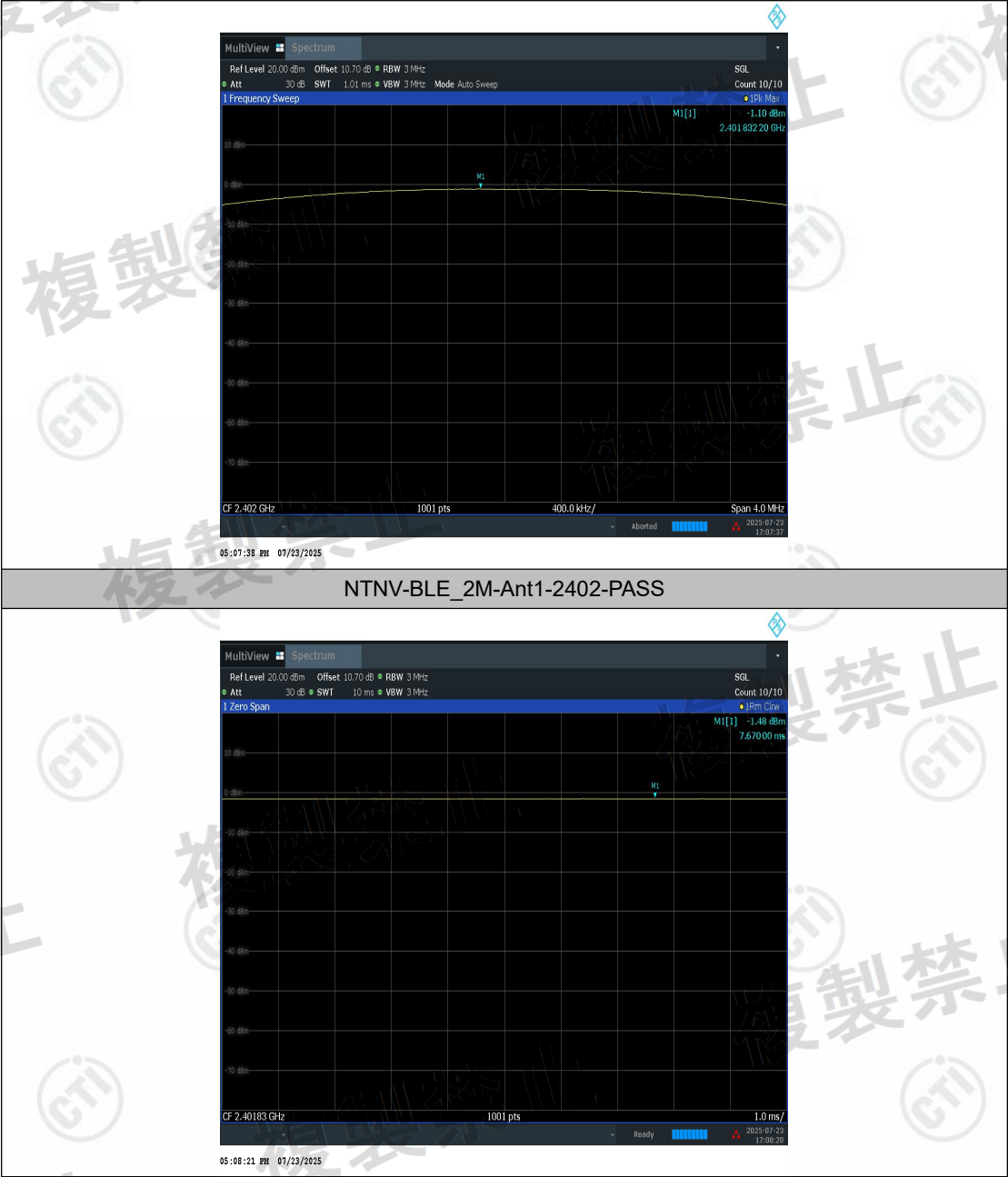


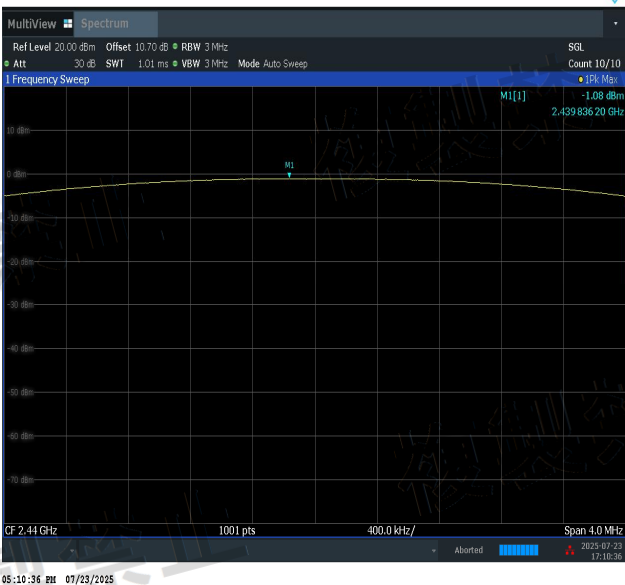


NTNV-BLE\_1M-Ant1-2440-PASS









NTNV-BLE\_2M-Ant1-2440-PASS





NTNV-BLE\_2M-Ant1-2480-PASS

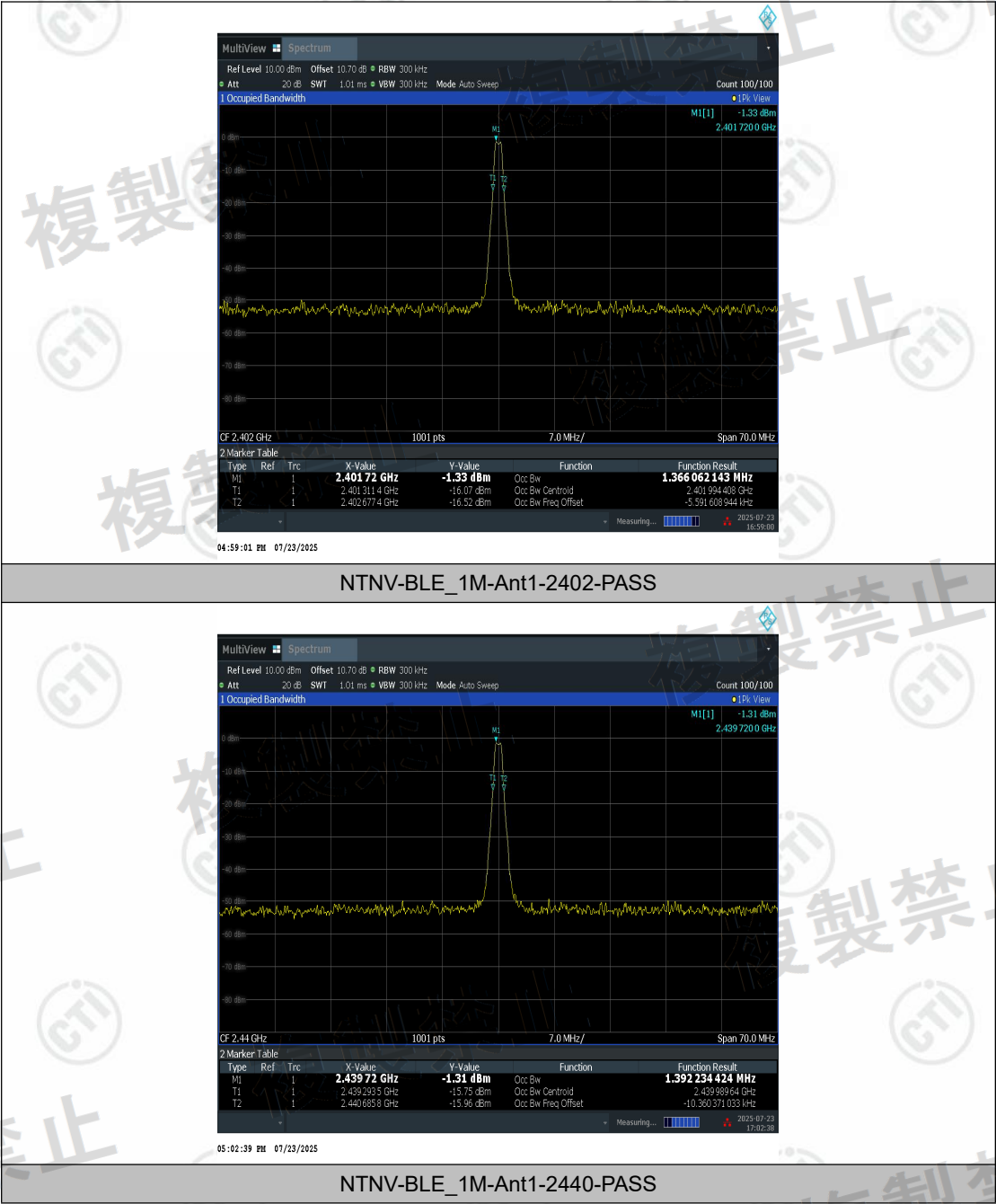


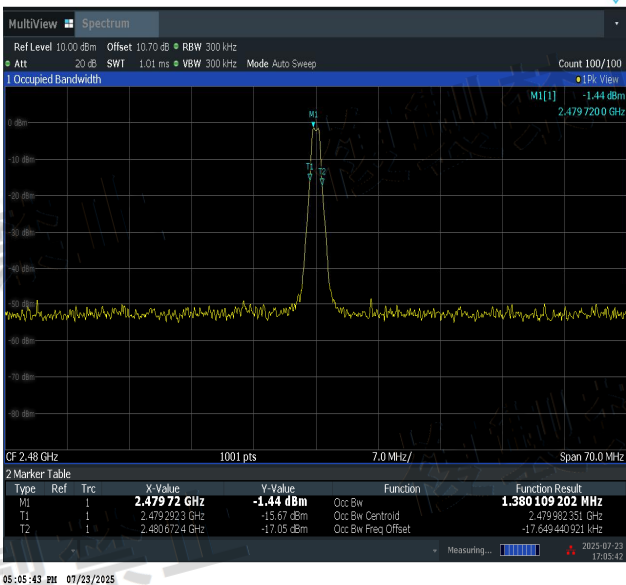
## Appendix C: Occupied Bandwidth

### Test Result

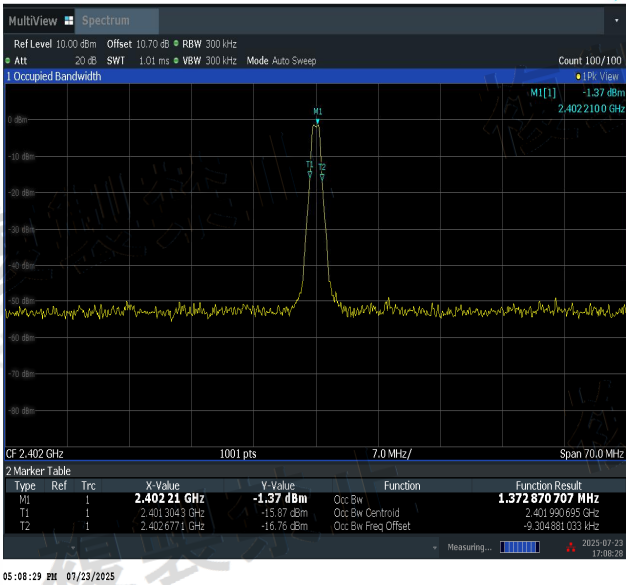
| TestCondition | TestMode | Antenna | Freq(MHz) | Result [MHz] | Limit [MHz] | Verdict |
|---------------|----------|---------|-----------|--------------|-------------|---------|
| NTNV          | BLE_1M   | Ant1    | 2402      | 1.366        | ≤26         | PASS    |
| NTNV          | BLE_1M   | Ant1    | 2440      | 1.392        | ≤26         | PASS    |
| NTNV          | BLE_1M   | Ant1    | 2480      | 1.380        | ≤26         | PASS    |
| NTNV          | BLE_2M   | Ant1    | 2402      | 1.373        | ≤26         | PASS    |
| NTNV          | BLE_2M   | Ant1    | 2440      | 1.378        | ≤26         | PASS    |
| NTNV          | BLE_2M   | Ant1    | 2480      | 1.381        | ≤26         | PASS    |

Test Graphs

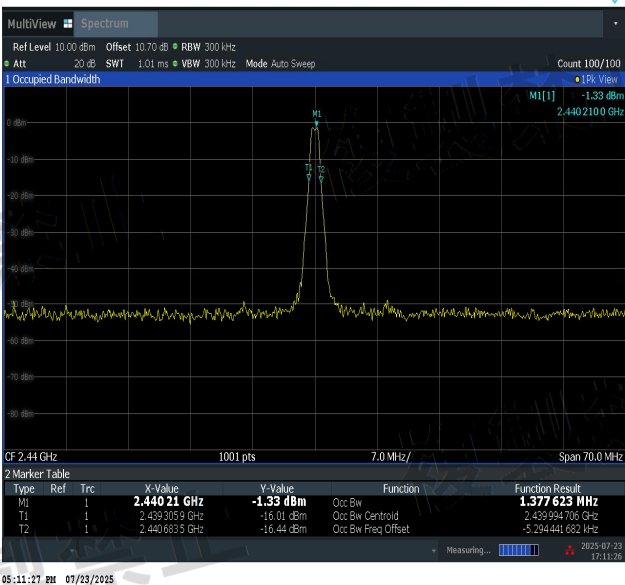




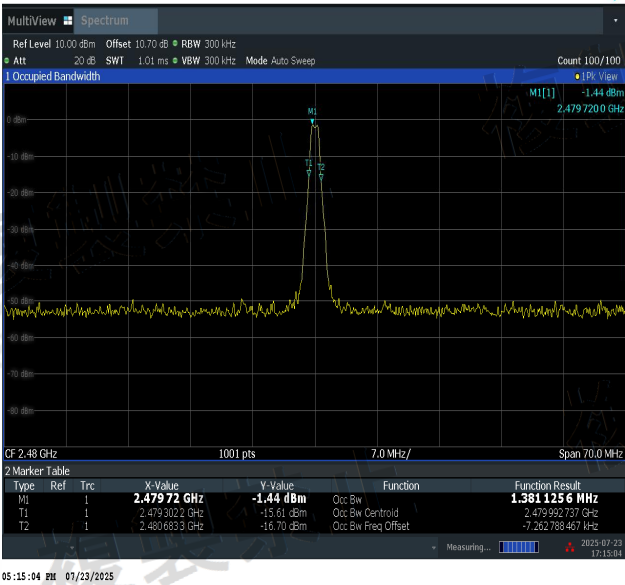
NTVN-BLE\_1M-Ant1-2480-PASS



NTVN-BLE\_2M-Ant1-2402-PASS



NTNV-BLE\_2M-Ant1-2440-PASS



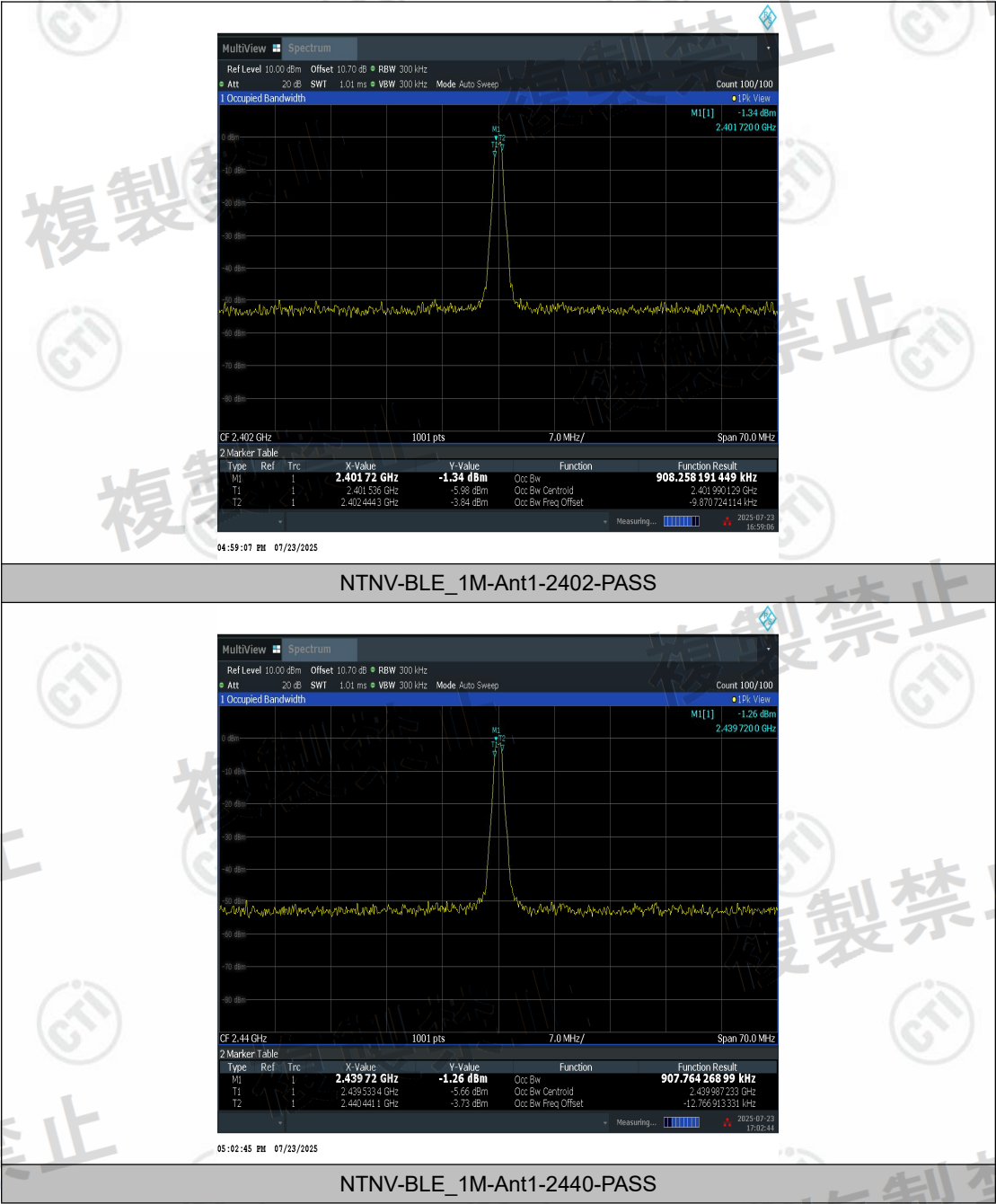
NTNV-BLE\_2M-Ant1-2480-PASS

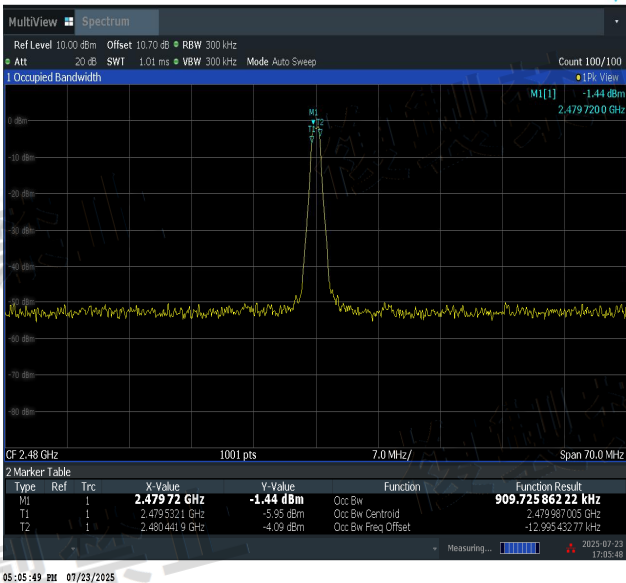
## Appendix D: Spread Bandwidth

### Test Result

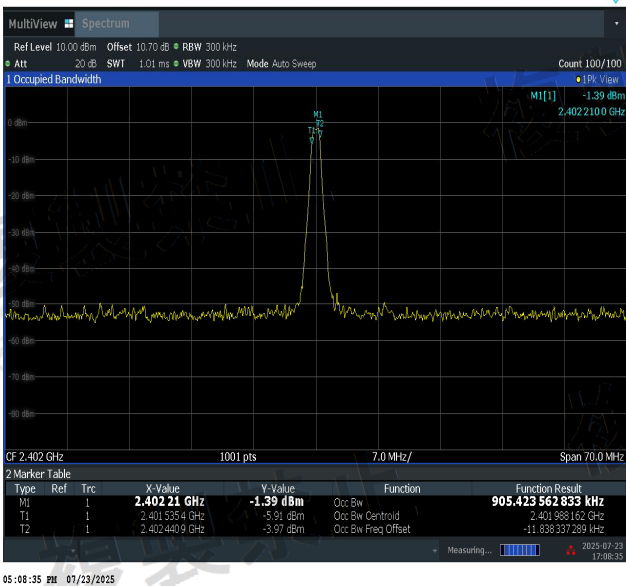
| TestCondition | TestMode | Antenna | Freq(MHz) | Result [MHz] | Limit [MHz] | Verdict |
|---------------|----------|---------|-----------|--------------|-------------|---------|
| NTNV          | BLE_1M   | Ant1    | 2402      | 0.908        | ≥0.5        | PASS    |
| NTNV          | BLE_1M   | Ant1    | 2440      | 0.908        | ≥0.5        | PASS    |
| NTNV          | BLE_1M   | Ant1    | 2480      | 0.910        | ≥0.5        | PASS    |
| NTNV          | BLE_2M   | Ant1    | 2402      | 0.905        | ≥0.5        | PASS    |
| NTNV          | BLE_2M   | Ant1    | 2440      | 0.915        | ≥0.5        | PASS    |
| NTNV          | BLE_2M   | Ant1    | 2480      | 0.910        | ≥0.5        | PASS    |

Test Graphs

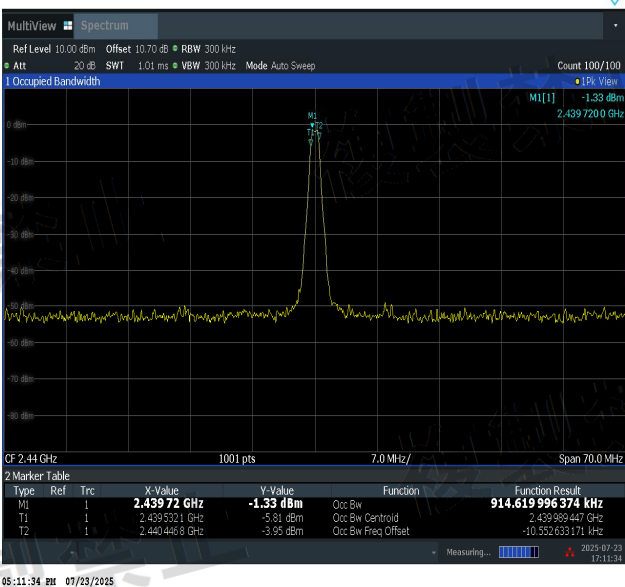




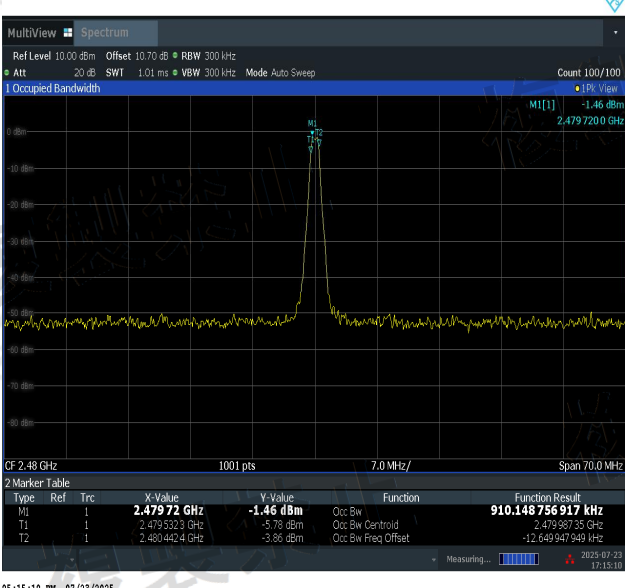
NTVN-BLE\_1M-Ant1-2480-PASS



NTVN-BLE\_2M-Ant1-2402-PASS



NTVN-BLE\_2M-Ant1-2440-PASS



NTVN-BLE\_2M-Ant1-2480-PASS

## Appendix E: Unwanted Emission Strength

### Test Result

| TestCondition | TestMode | Antenna | Freq (MHz) | Freq.Range [MHz] | Result Freq (MHz) | Result [dBm/MHz] | Result [μW/MHz] | Limit [μW/MHz] | Verdict         |
|---------------|----------|---------|------------|------------------|-------------------|------------------|-----------------|----------------|-----------------|
| NTNV          | BLE_1M   | Ant1    | 2402       | 30~1000          | 542.16            | -52.85           | 0.00519         | ≤2.5           | PASS            |
| NTNV          | BLE_1M   | Ant1    | 2402       | 1000~2387        | 2291.99           | -43.51           | 0.04457         | ≤2.5           | PASS            |
| NTNV          | BLE_1M   | Ant1    | 2402       | 2387~2400        | 2400.00           | -28.75           | 1.33352         | ≤25            | PASS            |
| NTNV          | BLE_1M   | Ant1    | 2402       | 2483.5~2496.5    | 2492.18           | -32.76           | 0.52966         | ≤25            | PASS            |
| NTNV          | BLE_1M   | Ant1    | 2402       | 2496.5~13000     | 2693.97           | -48.07           | 0.01560         | ≤2.5           | PASS            |
| NTNV          | BLE_1M   | Ant1    | 2440       | 30~1000          | 608.85            | -53.39           | 0.00458         | ≤2.5           | PASS            |
| NTNV          | BLE_1M   | Ant1    | 2440       | 1000~2387        | 2323.20           | -43.11           | 0.04887         | ≤2.5           | PASS            |
| NTNV          | BLE_1M   | Ant1    | 2440       | 2387~2400        | 2391.34           | -33.24           | 0.47424         | ≤25            | PASS            |
| NTNV          | BLE_1M   | Ant1    | 2440       | 2483.5~2496.5    | 2487.11           | -32.45           | 0.56885         | ≤25            | PASS            |
| NTNV          | BLE_1M   | Ant1    | 2440       | 2496.5~13000     | 2862.55           | -47.36           | 0.01837         | ≤2.5           | PASS            |
| NTNV          | BLE_1M   | Ant1    | 2480       | 30~1000          | 825.40            | -52.36           | 0.00581         | ≤2.5           | PASS            |
| NTNV          | BLE_1M   | Ant1    | 2480       | 1000~2387        | 2254.19           | -42.77           | 0.05284         | ≤2.5           | PASS            |
| NTNV          | BLE_1M   | Ant1    | 2480       | 2387~2400        | 2396.80           | -33.26           | 0.47206         | ≤25            | PASS            |
| NTNV          | BLE_1M   | Ant1    | 2480       | 2483.5~2496.5    | 2494.23           | -32.74           | 0.53211         | ≤25            | PASS            |
| NTNV          | BLE_1M   | Ant1    | 2480       | 2496.5~13000     | 2911.39           | -48.22           | 0.01507         | ≤2.5           | PASS            |
| NTNV          | BLE_2M   | Ant1    | 2402       | 30~1000          | 590.42            | -53.10           | 0.00490         | ≤2.5           | PASS            |
| NTNV          | BLE_2M   | Ant1    | 2402       | 1000~2387        | 2256.28           | -43.35           | 0.04624         | ≤2.5           | PASS            |
| NTNV          | BLE_2M   | Ant1    | 2402       | 2387~2400        | 2399.99           | -20.08           | 9.81748         | ≤25            | See table below |
| NTNV          | BLE_2M   | Ant1    | 2402       | 2483.5~2496.5    | 2491.49           | -32.84           | 0.52000         | ≤25            | PASS            |
| NTNV          | BLE_2M   | Ant1    | 2402       | 2496.5~13000     | 2817.91           | -48.15           | 0.01531         | ≤2.5           | PASS            |
| NTNV          | BLE_2M   | Ant1    | 2440       | 30~1000          | 574.41            | -52.70           | 0.00537         | ≤2.5           | PASS            |
| NTNV          | BLE_2M   | Ant1    | 2440       | 1000~2387        | 2147.05           | -43.41           | 0.04560         | ≤2.5           | PASS            |
| NTNV          | BLE_2M   | Ant1    | 2440       | 2387~2400        | 2391.84           | -32.80           | 0.52481         | ≤25            | PASS            |
| NTNV          | BLE_2M   | Ant1    | 2440       | 2483.5~2496.5    | 2495.93           | -32.37           | 0.57943         | ≤25            | PASS            |
| NTNV          | BLE_2M   | Ant1    | 2440       | 2496.5~13000     | 2969.68           | -48.29           | 0.01483         | ≤2.5           | PASS            |
| NTNV          | BLE_2M   | Ant1    | 2480       | 30~1000          | 568.59            | -53.01           | 0.00500         | ≤2.5           | PASS            |
| NTNV          | BLE_2M   | Ant1    | 2480       | 1000~2387        | 1715.35           | -43.19           | 0.04797         | ≤2.5           | PASS            |
| NTNV          | BLE_2M   | Ant1    | 2480       | 2387~2400        | 2399.78           | -32.93           | 0.50933         | ≤25            | PASS            |
| NTNV          | BLE_2M   | Ant1    | 2480       | 2483.5~2496.5    | 2495.04           | -32.59           | 0.55081         | ≤25            | PASS            |
| NTNV          | BLE_2M   | Ant1    | 2480       | 2496.5~13000     | 2801.63           | -47.82           | 0.01652         | ≤2.5           | PASS            |

## Test Result\_Step2

| TestCondition | TestMode | Antenna | Freq(MHz) | Freq.[MHz] | Result[dBm/MHz] | Limit[dBm/MHz] | Result[μW/MHz] | Limit[μW/MHz] | Verdict |
|---------------|----------|---------|-----------|------------|-----------------|----------------|----------------|---------------|---------|
| NTNV          | BLE_2M   | Ant1    | 2402      | 2399.99    | -26.75          | ≤-16           | 2.11349        | ≤25           | PASS    |

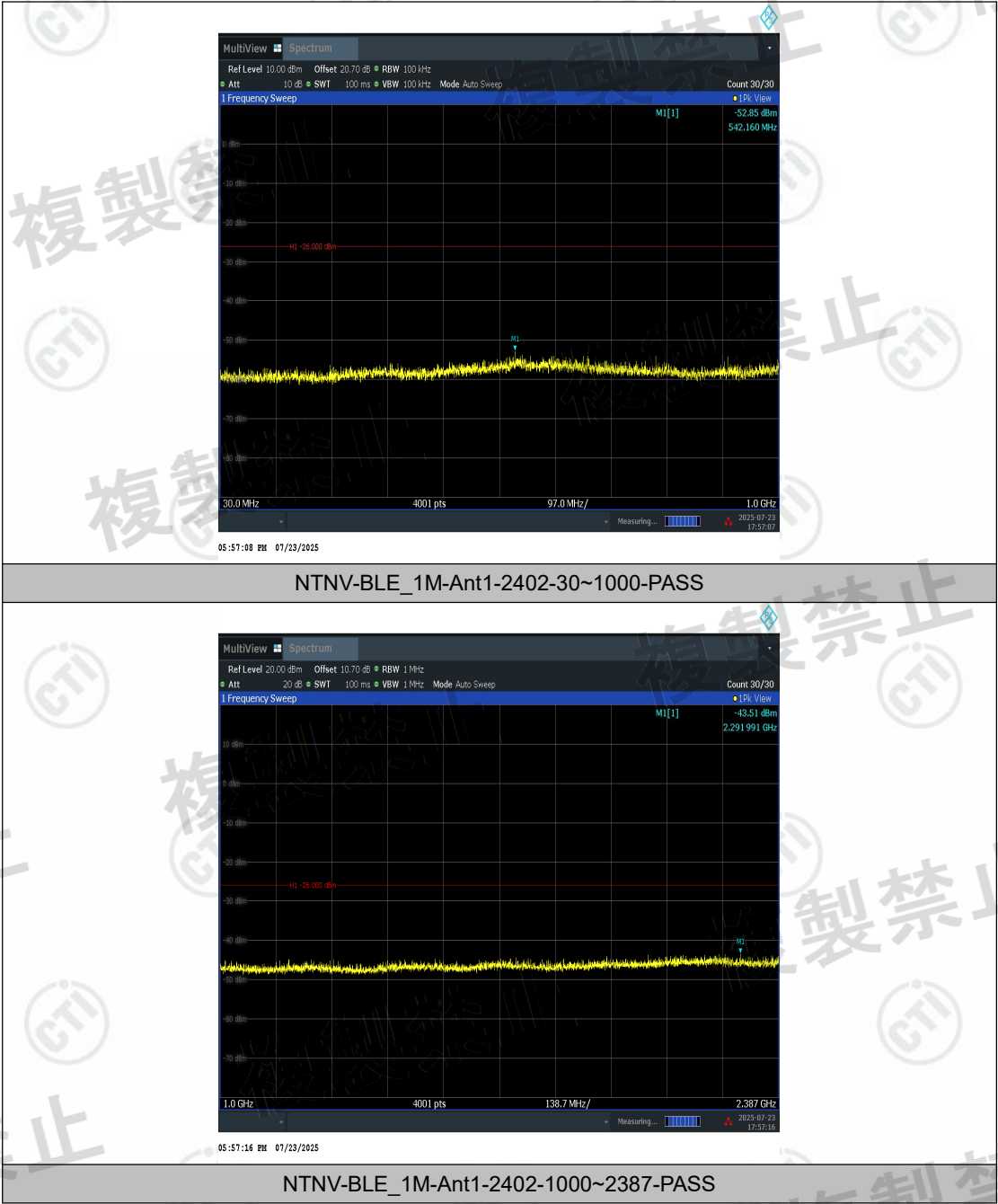
Note:

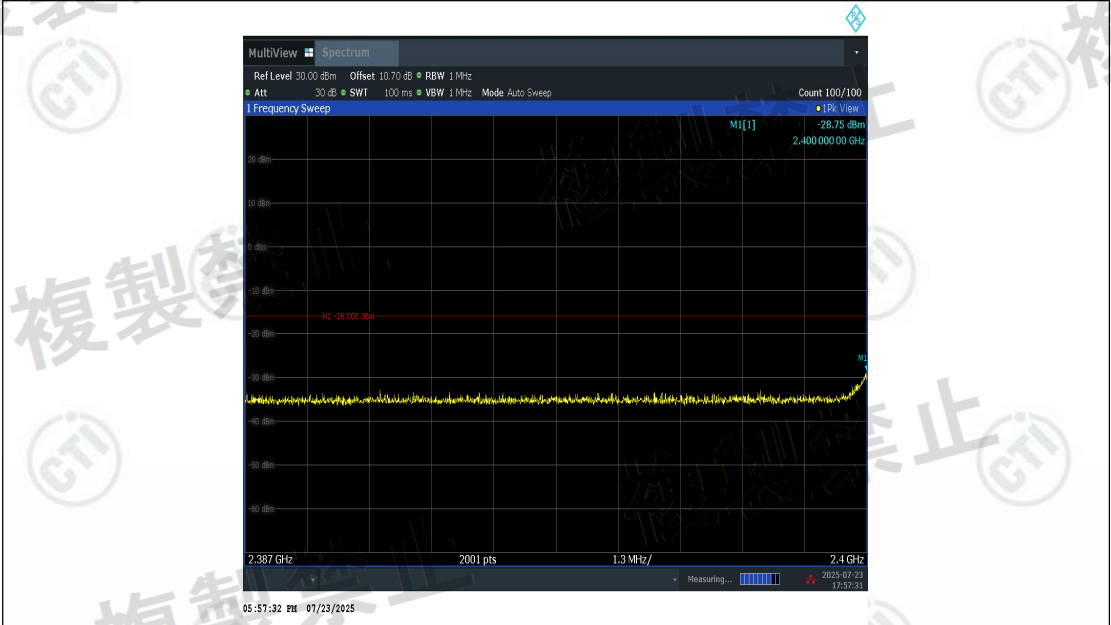
$\text{dBm/1MHz} = \text{dBm/100kHz} + 10 \times \log_{10} (1\text{MHz}/100\text{kHz})$

$\text{dBm/1MHz} = \text{dBm/100kHz} + 10$

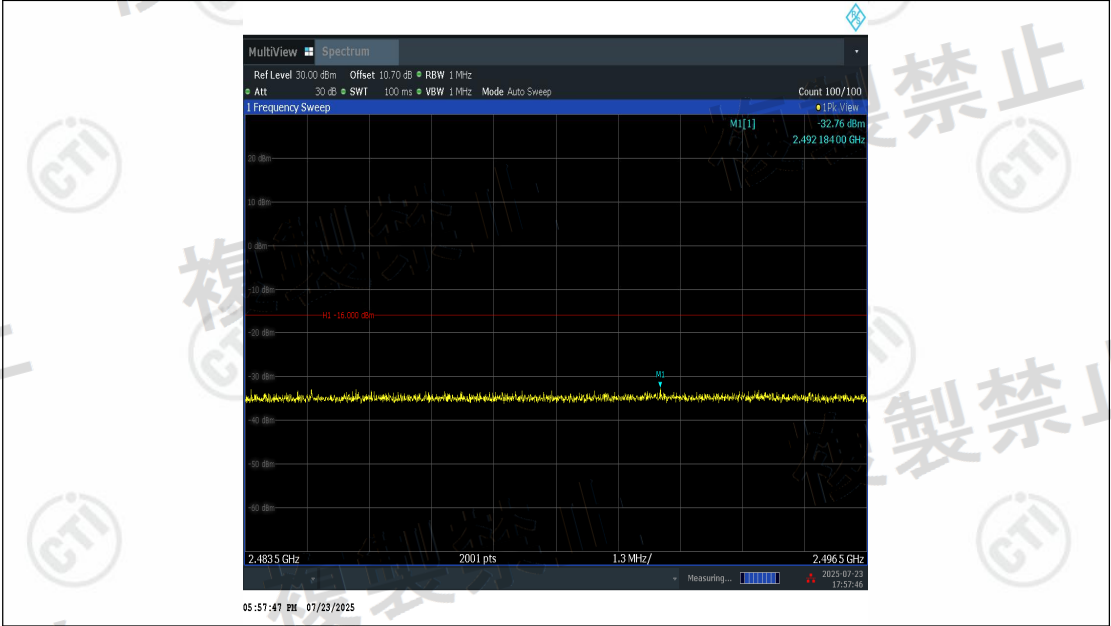
During the 30M-1000M testing process, a 10 dB factor was added for the test.

Test Graphs





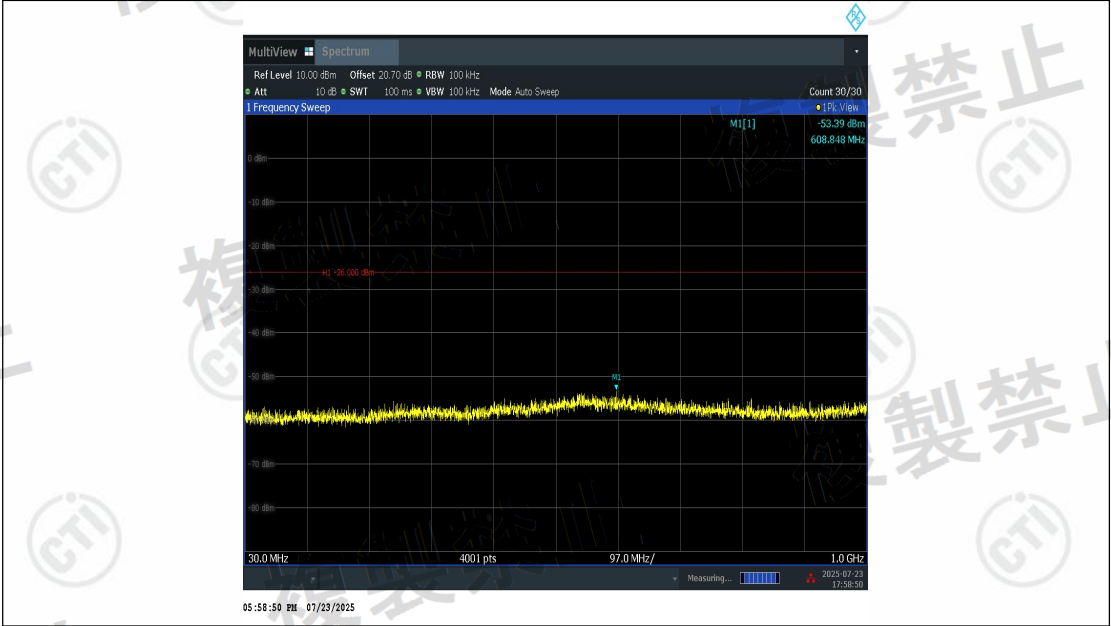
NTNV-BLE\_1M-Ant1-2402-2387~2400-PASS



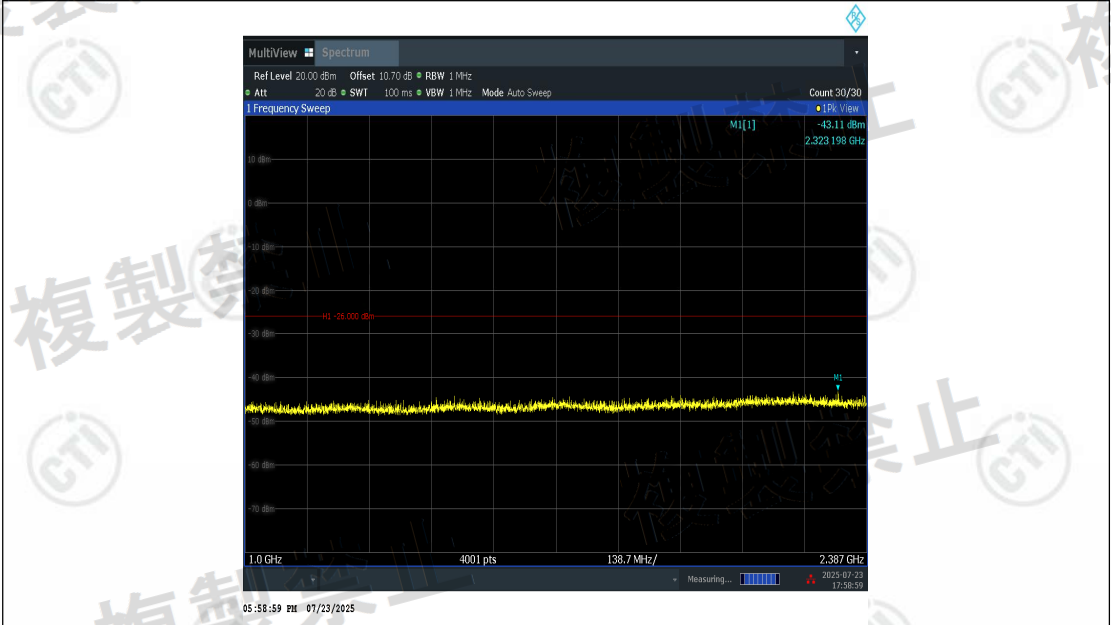
NTNV-BLE\_1M-Ant1-2402-2483.5~2496.5-PASS



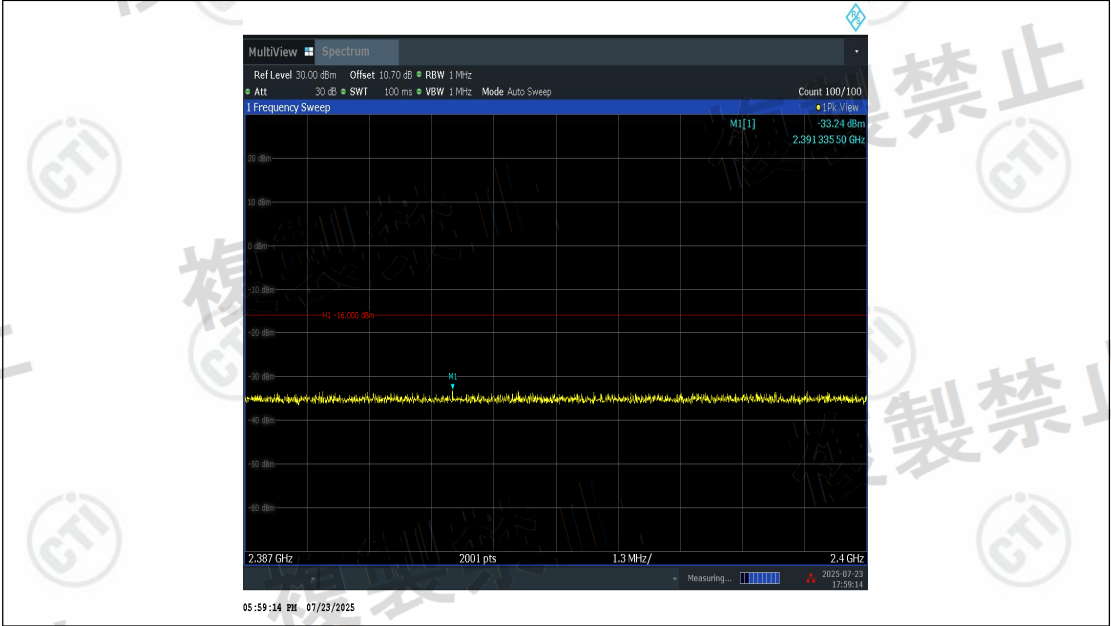
NTNV-BLE\_1M-Ant1-2402-2496.5~13000-PASS



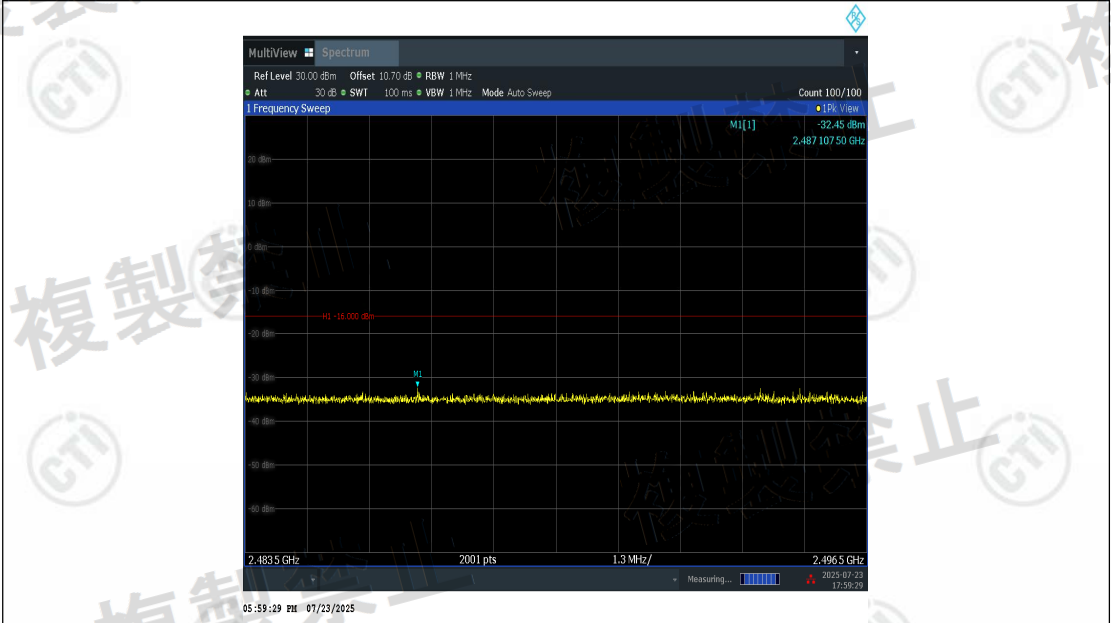
NTNV-BLE\_1M-Ant1-2440-30~1000-PASS



NTNV-BLE\_1M-Ant1-2440-1000~2387-PASS



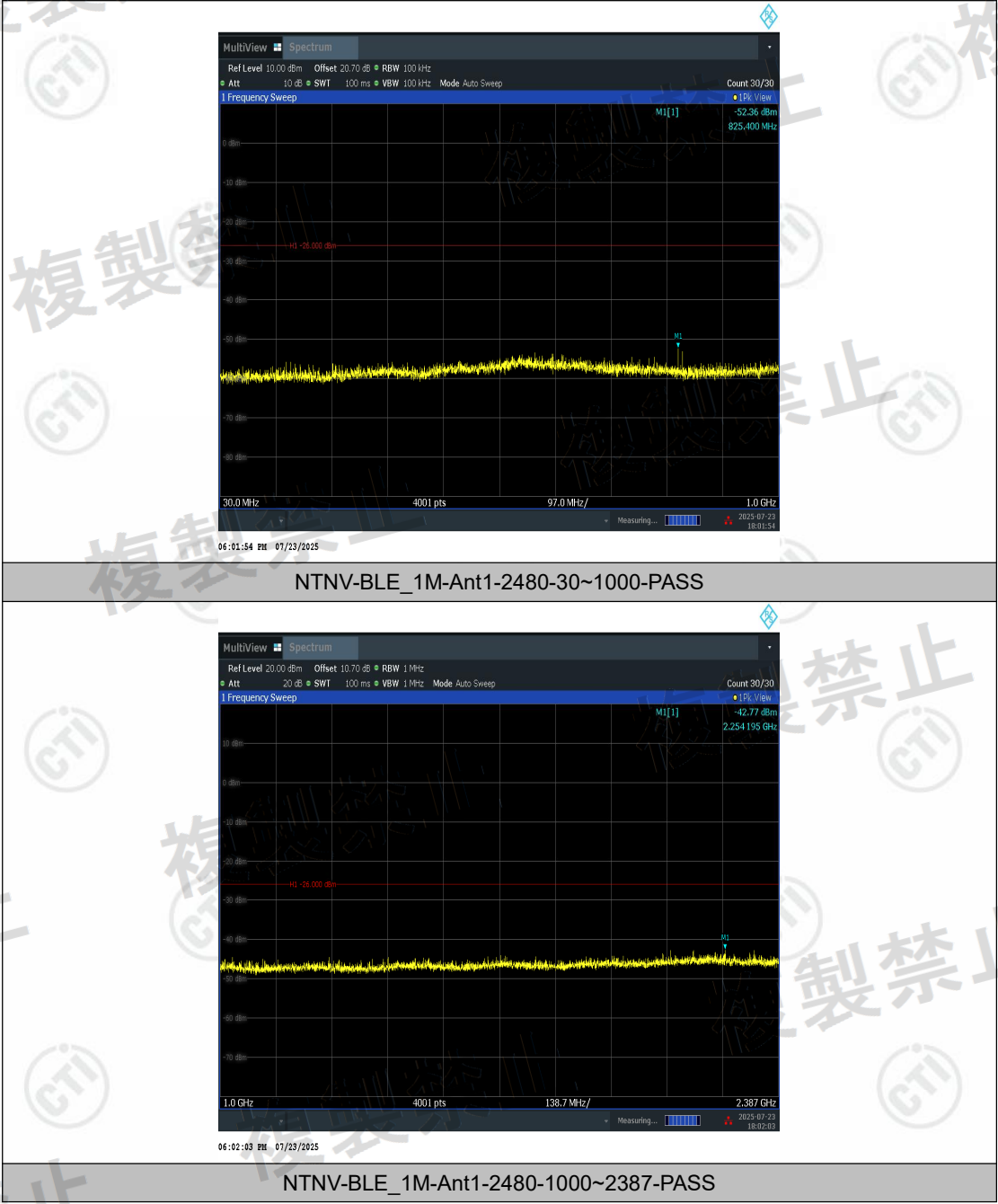
NTNV-BLE\_1M-Ant1-2440-2387~2400-PASS

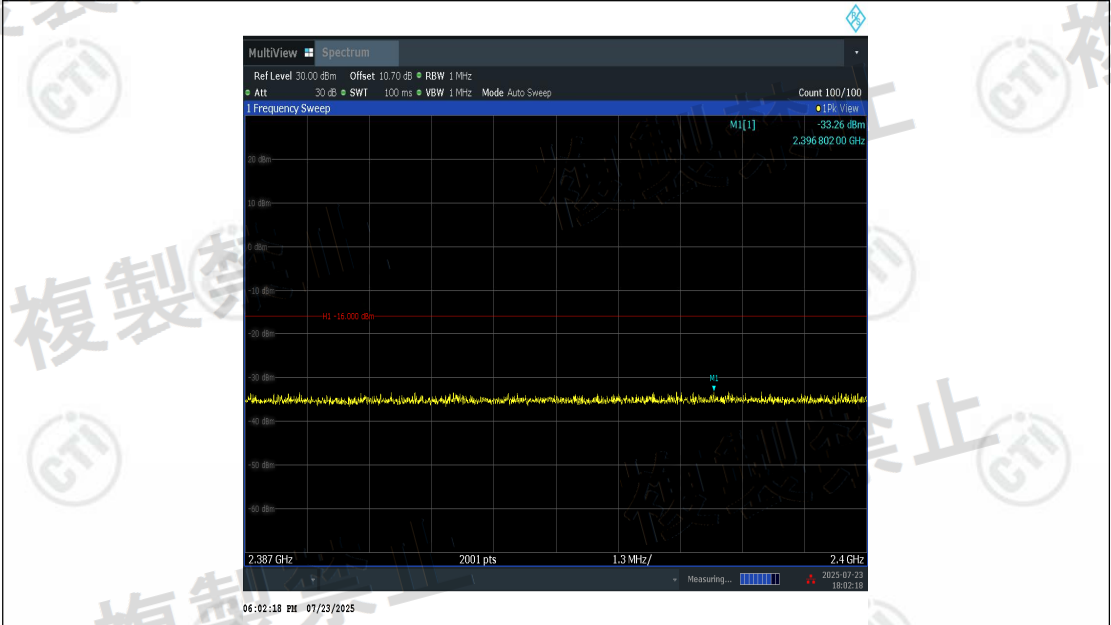


NTNV-BLE\_1M-Ant1-2440-2483.5~2496.5-PASS

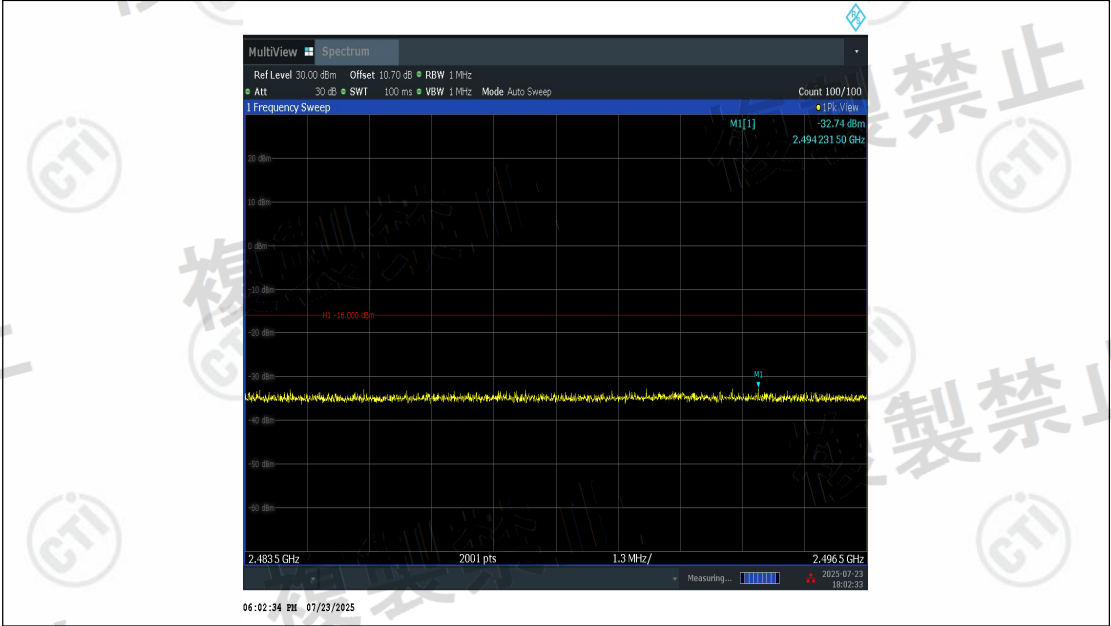


NTNV-BLE\_1M-Ant1-2440-2496.5~13000-PASS

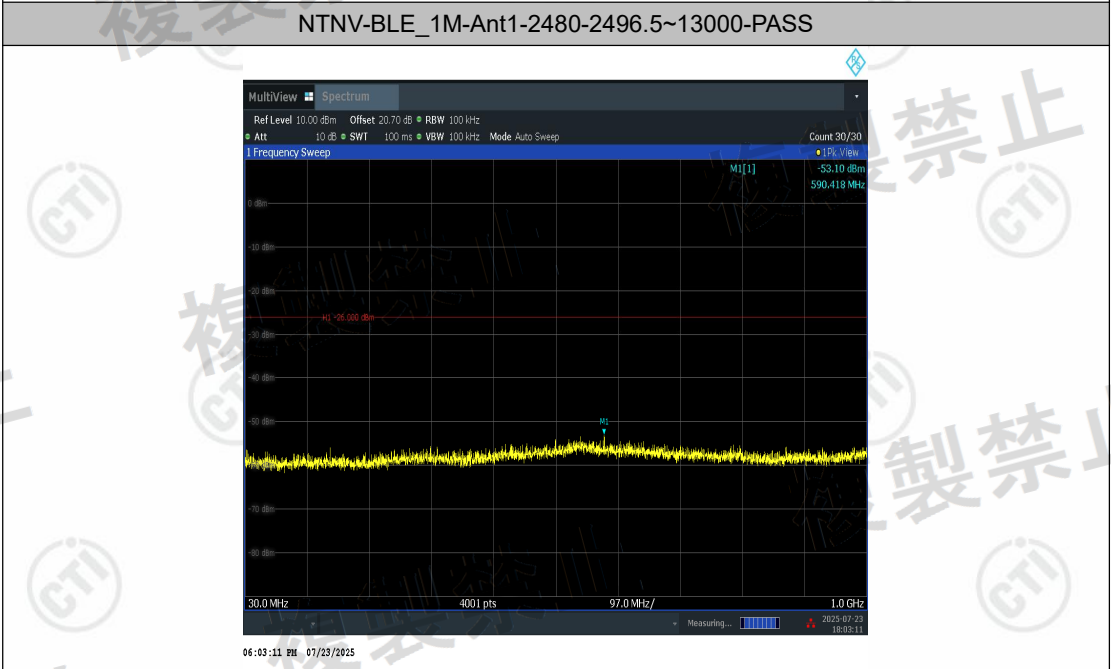


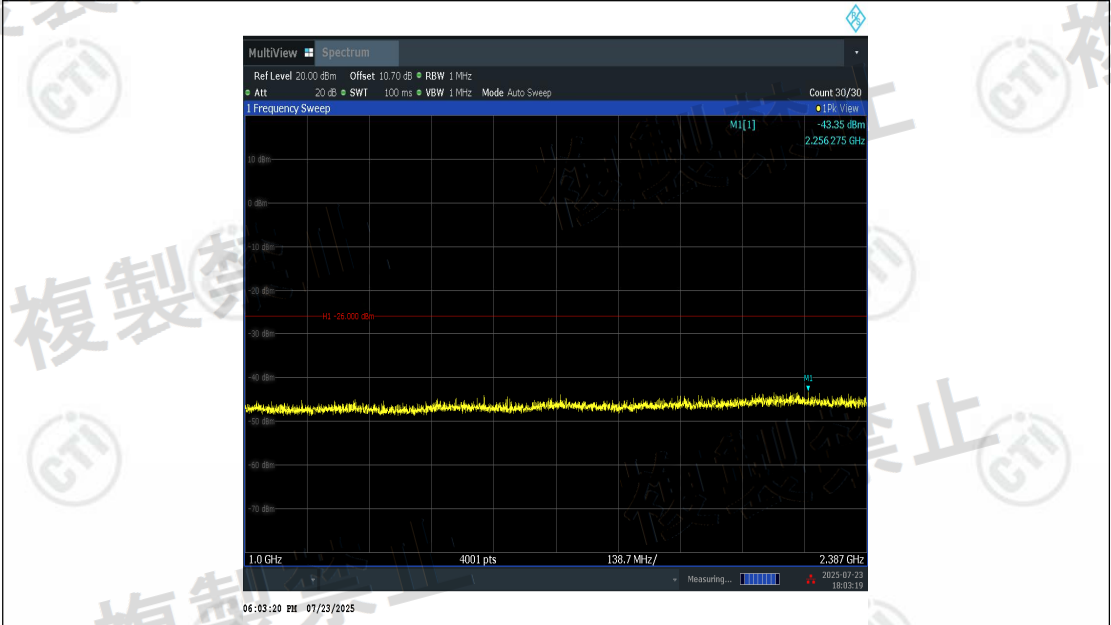


NTNV-BLE\_1M-Ant1-2480-2387~2400-PASS

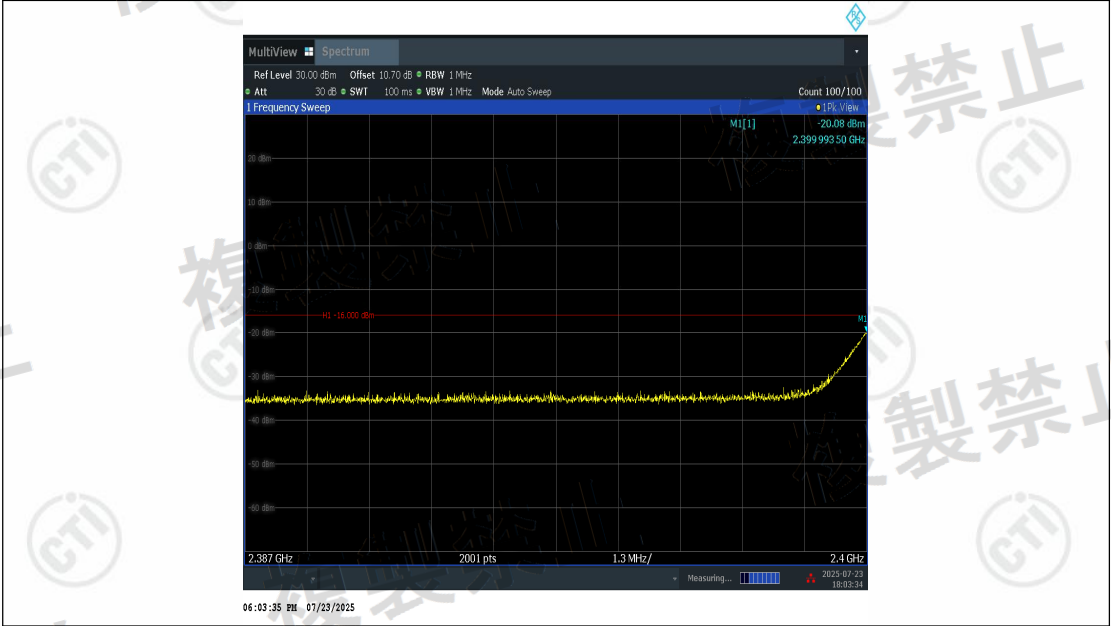


NTNV-BLE\_1M-Ant1-2480-2483.5~2496.5-PASS

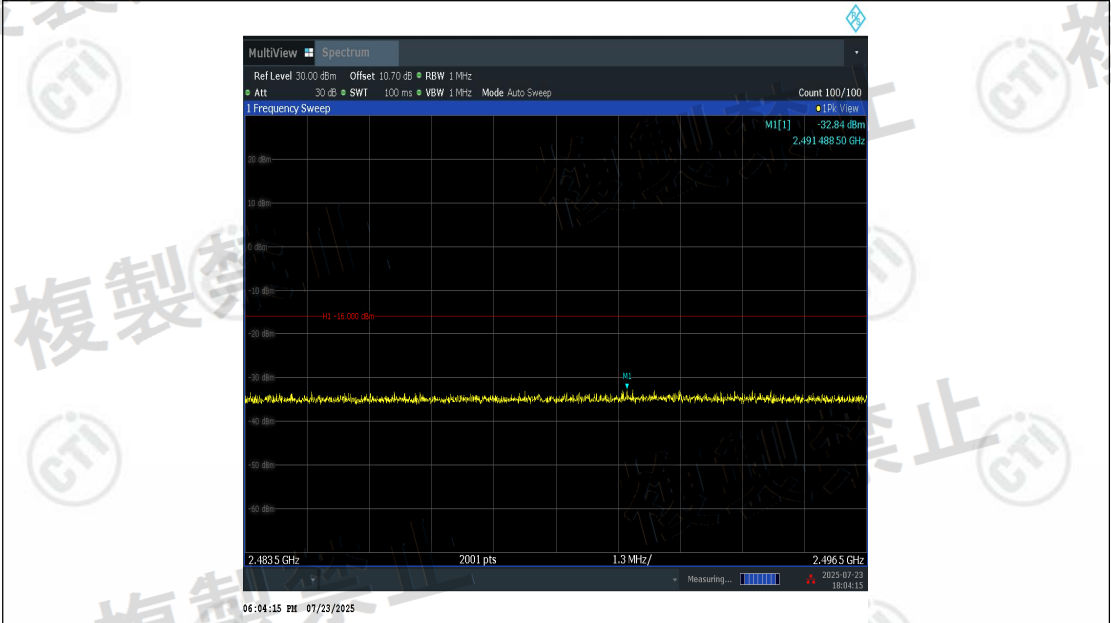




NTNV-BLE\_2M-Ant1-2402-1000~2387-PASS



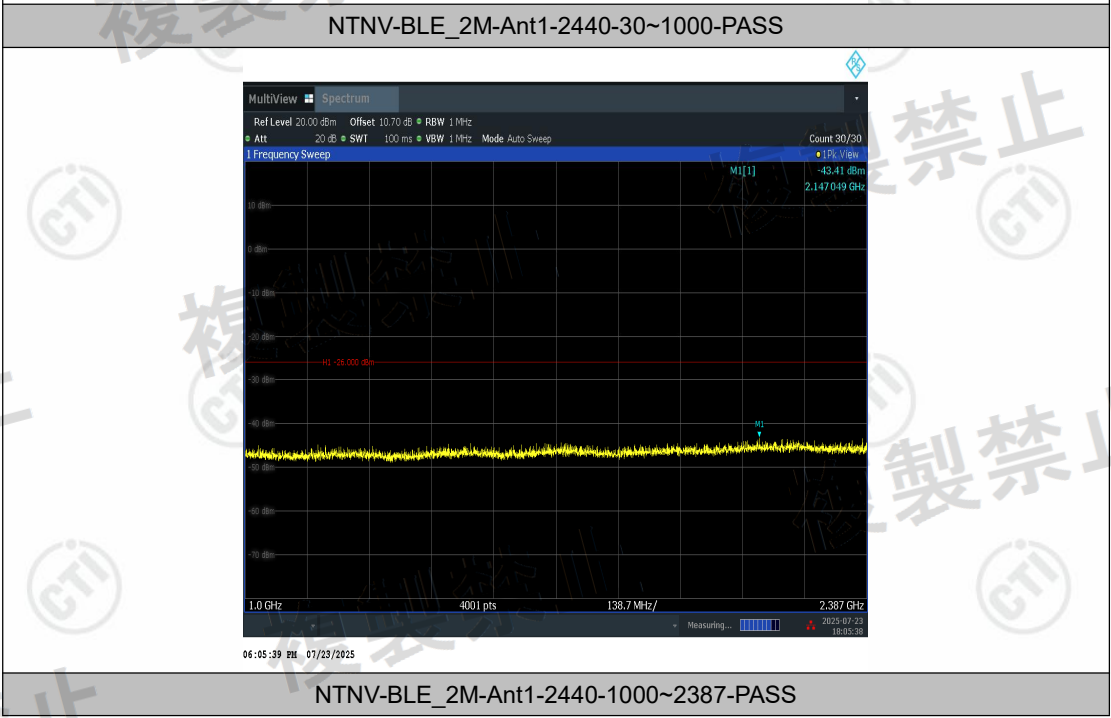
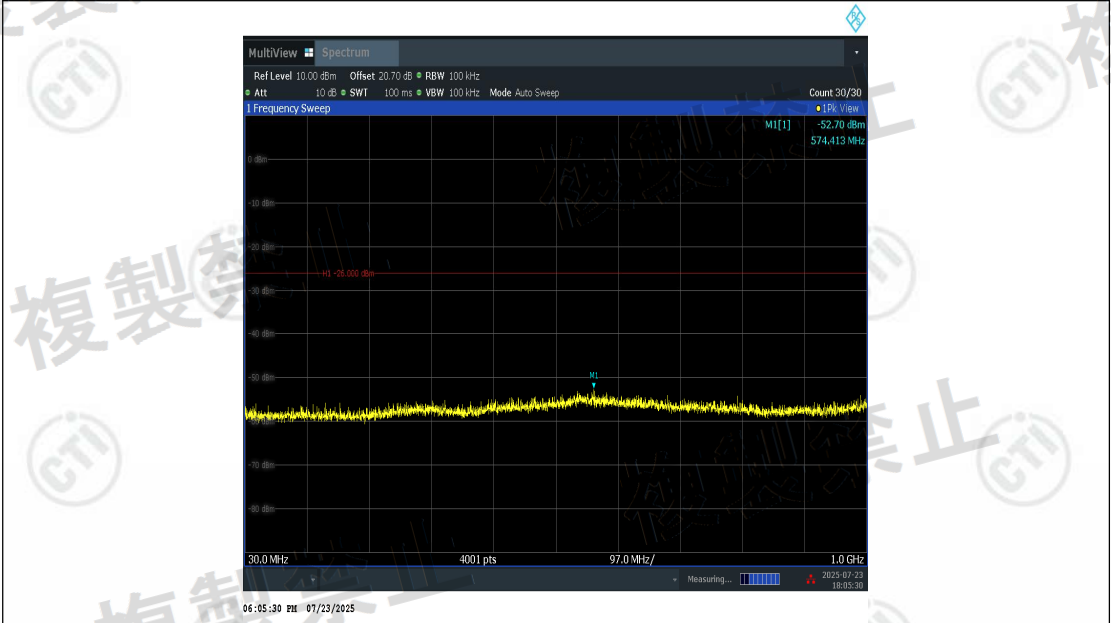
NTNV-BLE\_2M-Ant1-2402-2387~2400-See table below

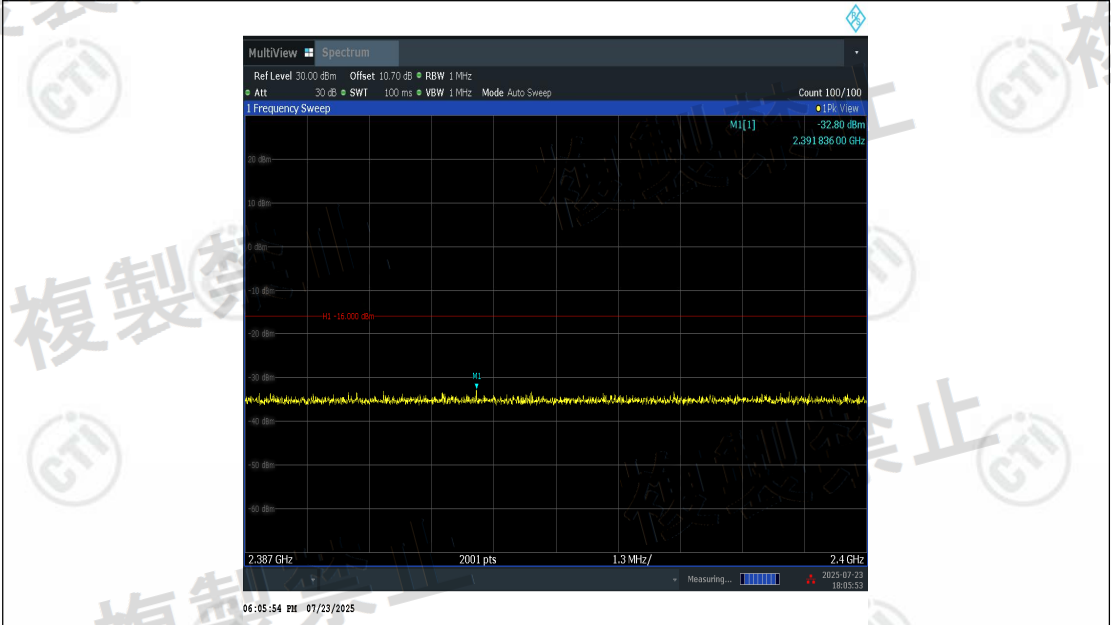


NTNV-BLE\_2M-Ant1-2402-2483.5~2496.5-PASS

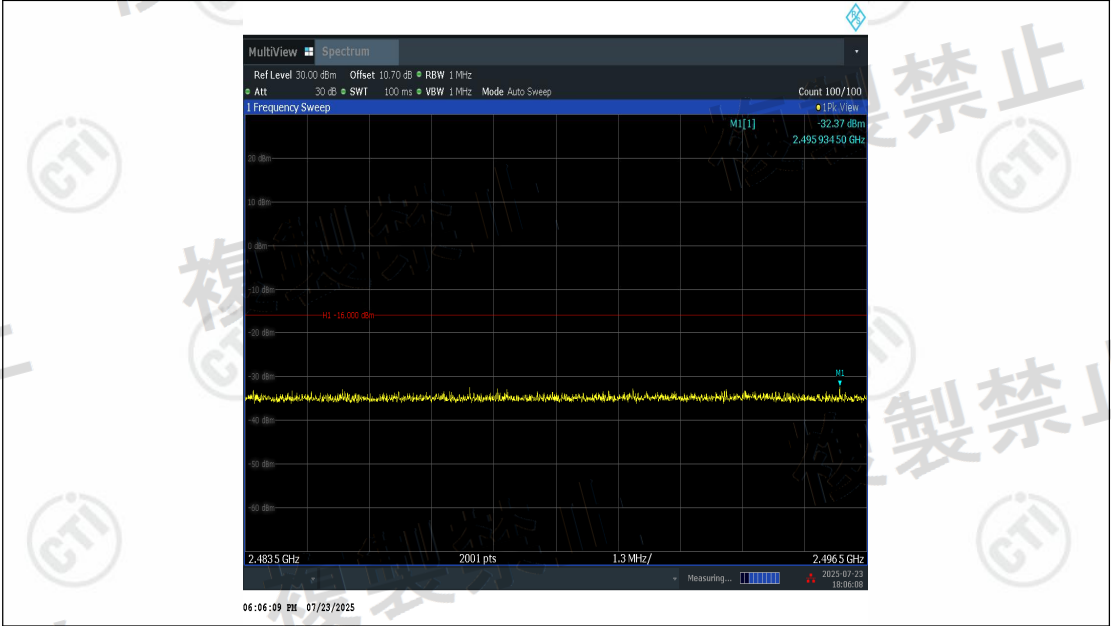


NTNV-BLE\_2M-Ant1-2402-2496.5~13000-PASS





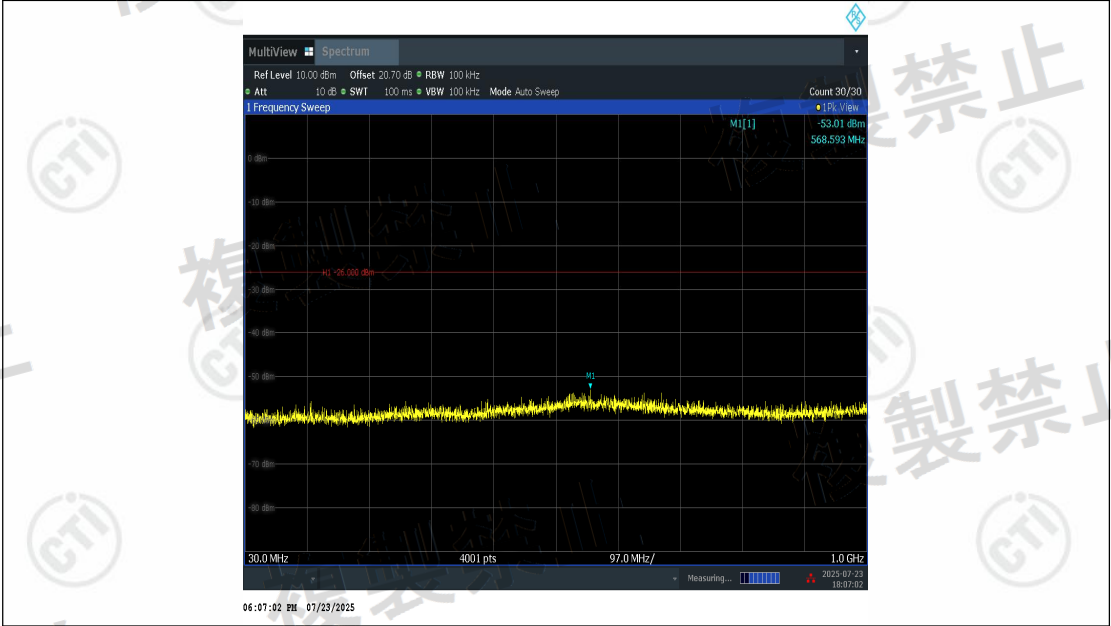
NTNV-BLE\_2M-Ant1-2440-2387~2400-PASS



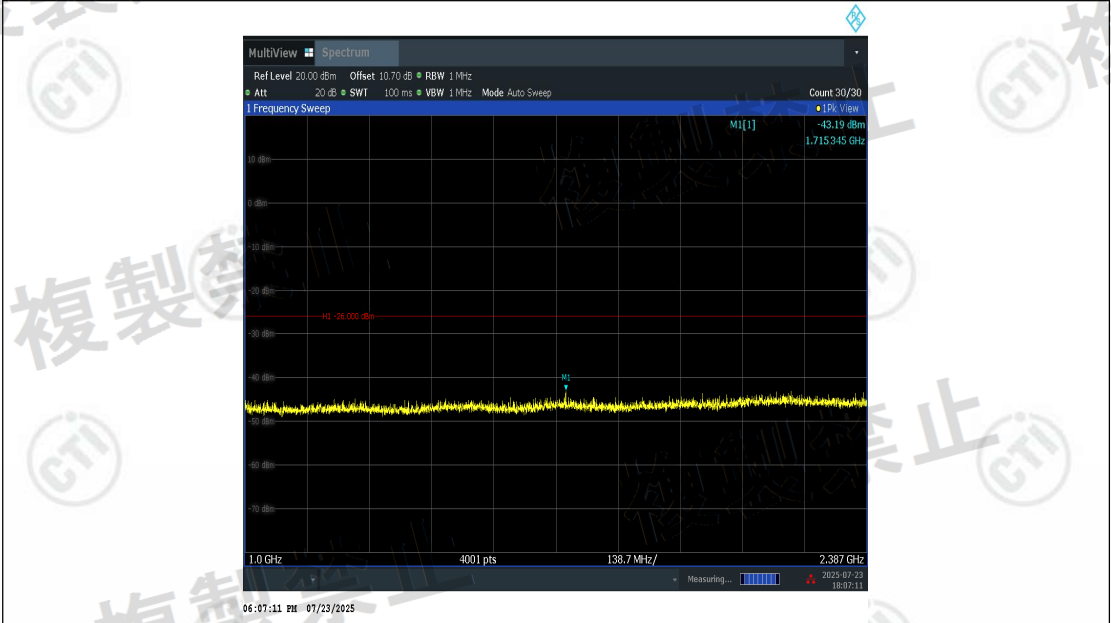
NTNV-BLE\_2M-Ant1-2440-2483.5~2496.5-PASS



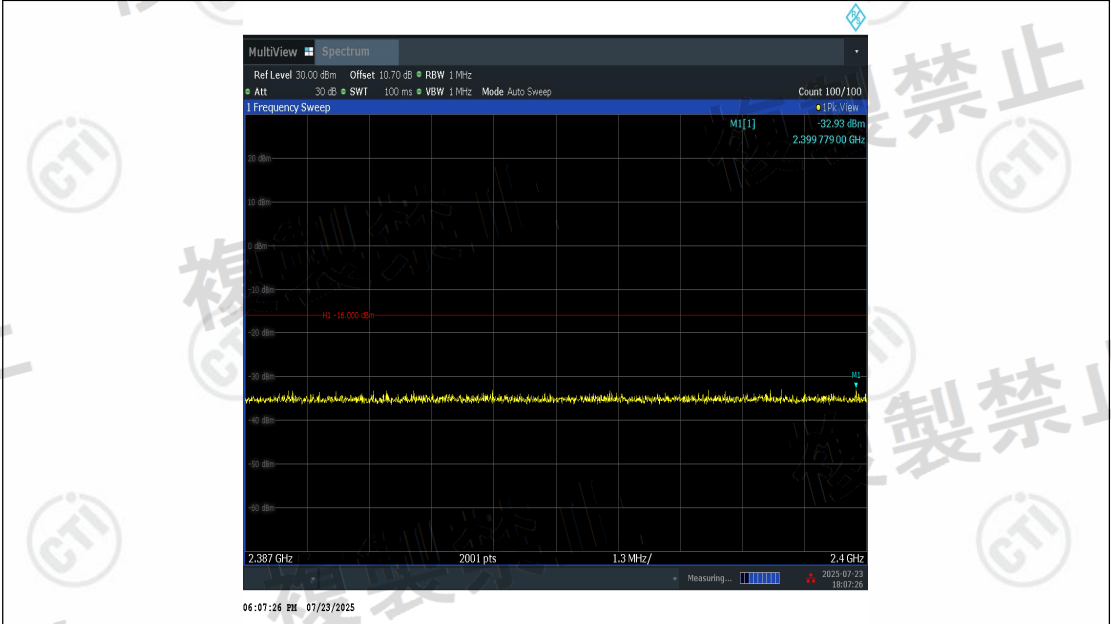
NTNV-BLE\_2M-Ant1-2440-2496.5~13000-PASS



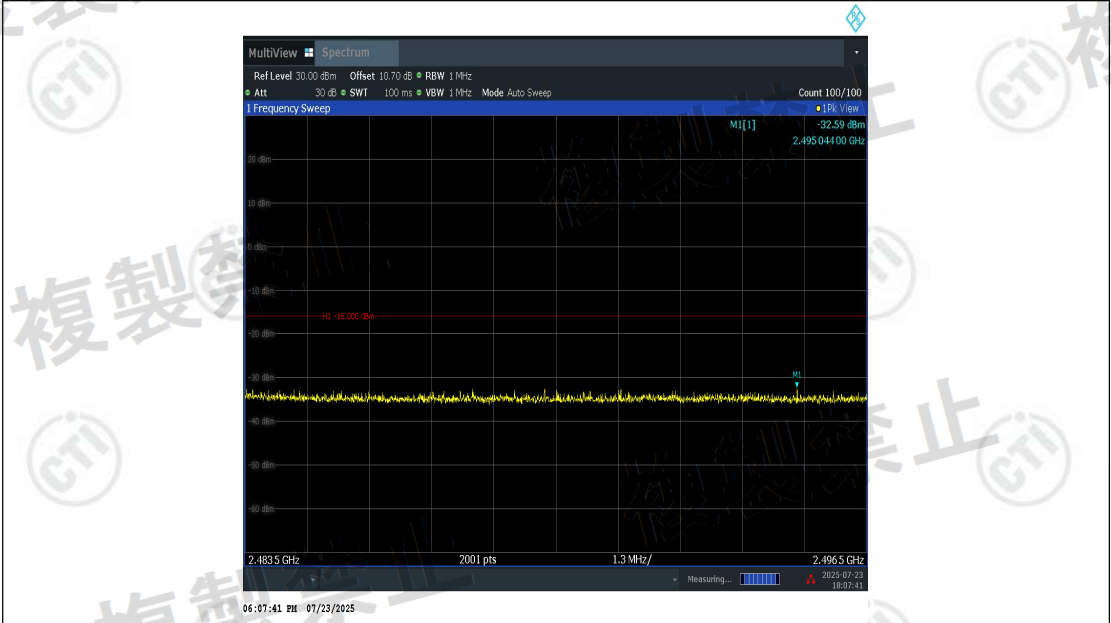
NTNV-BLE\_2M-Ant1-2480-30~1000-PASS



NTNV-BLE\_2M-Ant1-2480-1000~2387-PASS



NTNV-BLE\_2M-Ant1-2480-2387~2400-PASS

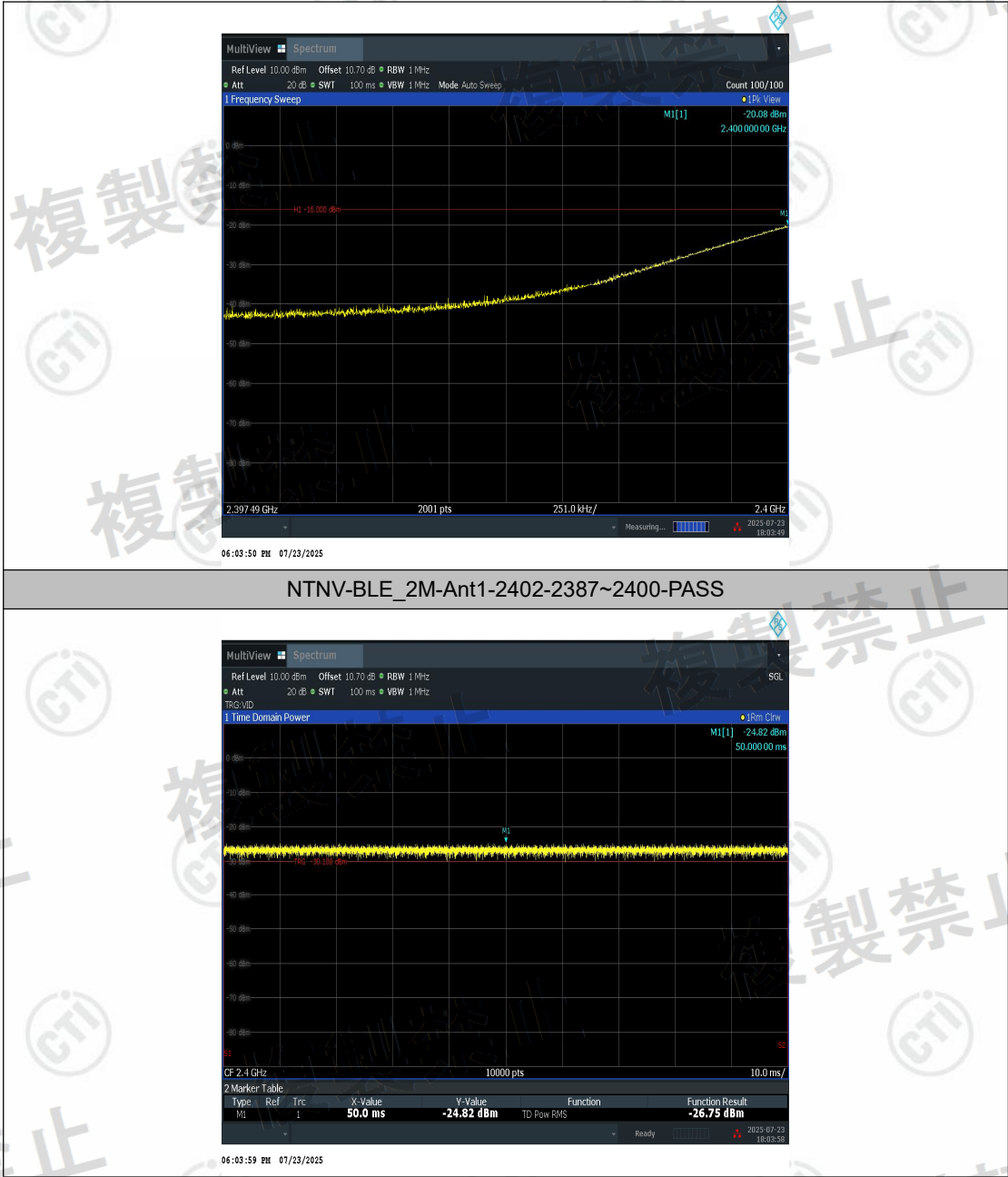


NTNV-BLE\_2M-Ant1-2480-2483.5~2496.5-PASS



NTNV-BLE\_2M-Ant1-2480-2496.5~13000-PASS

Test Graphs\_Step2

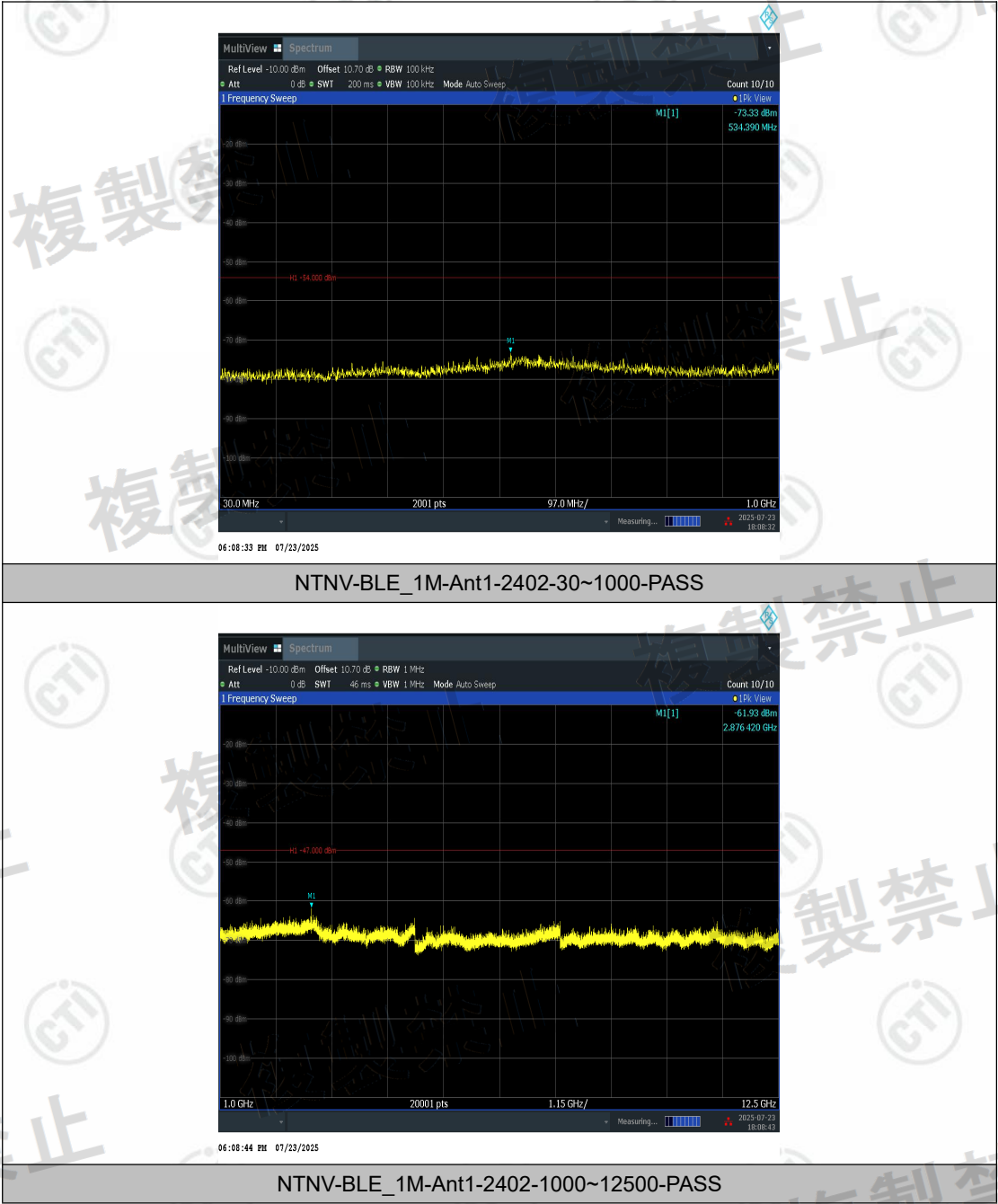


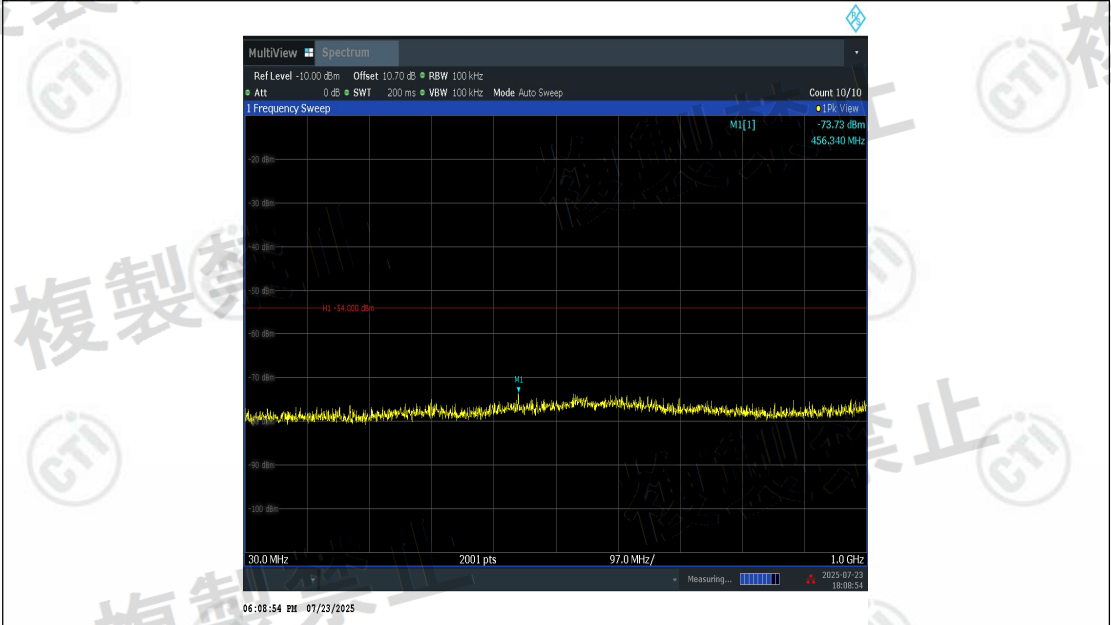
## Appendix F: Secondary Radiated Emission Strength

### Test Result

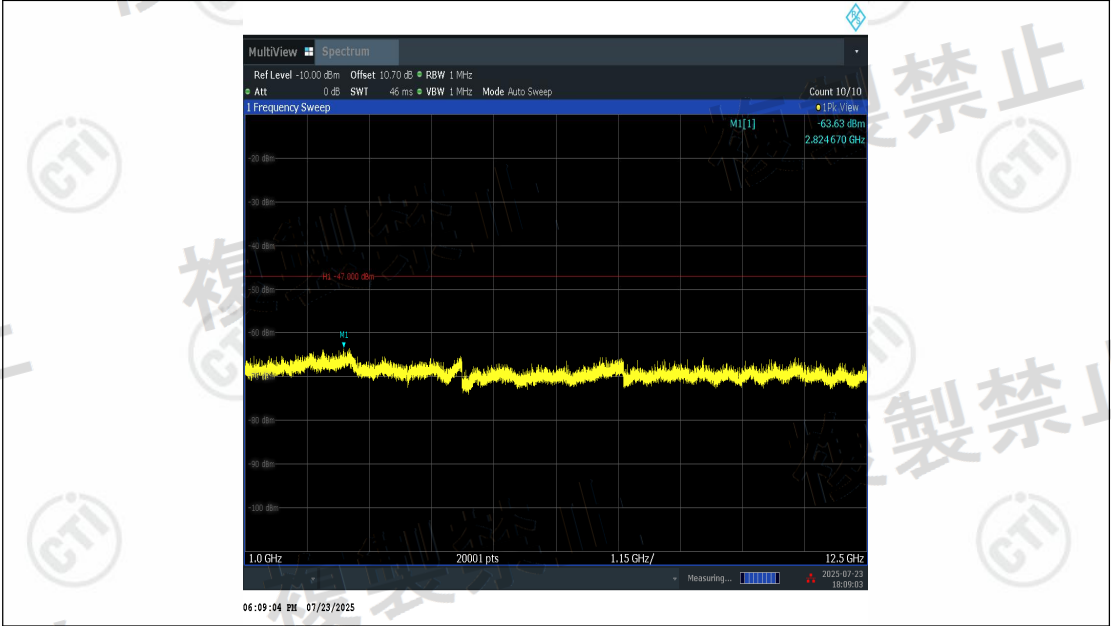
| Test Condition | Test Mode | Antenna | Freq (MHz) | Freq.Range [MHz] | ResultFreq (MHz) | Result [dBm] | Result [nW] | Limit [nW] | Verdict |
|----------------|-----------|---------|------------|------------------|------------------|--------------|-------------|------------|---------|
| NTNV           | BLE_1M    | Ant1    | 2402       | 30~1000          | 534.39           | -73.33       | 0.04645     | ≤4         | PASS    |
| NTNV           | BLE_1M    | Ant1    | 2402       | 1000~12500       | 2876.42          | -61.93       | 0.64121     | ≤20        | PASS    |
| NTNV           | BLE_1M    | Ant1    | 2440       | 30~1000          | 456.34           | -73.73       | 0.04236     | ≤4         | PASS    |
| NTNV           | BLE_1M    | Ant1    | 2440       | 1000~12500       | 2824.67          | -63.63       | 0.43351     | ≤20        | PASS    |
| NTNV           | BLE_1M    | Ant1    | 2480       | 30~1000          | 553.30           | -73.54       | 0.04426     | ≤4         | PASS    |
| NTNV           | BLE_1M    | Ant1    | 2480       | 1000~12500       | 2275.00          | -63.95       | 0.40272     | ≤20        | PASS    |
| NTNV           | BLE_2M    | Ant1    | 2402       | 30~1000          | 639.10           | -73.58       | 0.04385     | ≤4         | PASS    |
| NTNV           | BLE_2M    | Ant1    | 2402       | 1000~12500       | 2839.05          | -63.50       | 0.44668     | ≤20        | PASS    |
| NTNV           | BLE_2M    | Ant1    | 2440       | 30~1000          | 592.56           | -73.04       | 0.04966     | ≤4         | PASS    |
| NTNV           | BLE_2M    | Ant1    | 2440       | 1000~12500       | 2423.34          | -62.30       | 0.58884     | ≤20        | PASS    |
| NTNV           | BLE_2M    | Ant1    | 2480       | 30~1000          | 631.83           | -73.40       | 0.04571     | ≤4         | PASS    |
| NTNV           | BLE_2M    | Ant1    | 2480       | 1000~12500       | 2881.59          | -63.87       | 0.41020     | ≤20        | PASS    |

Test Graphs

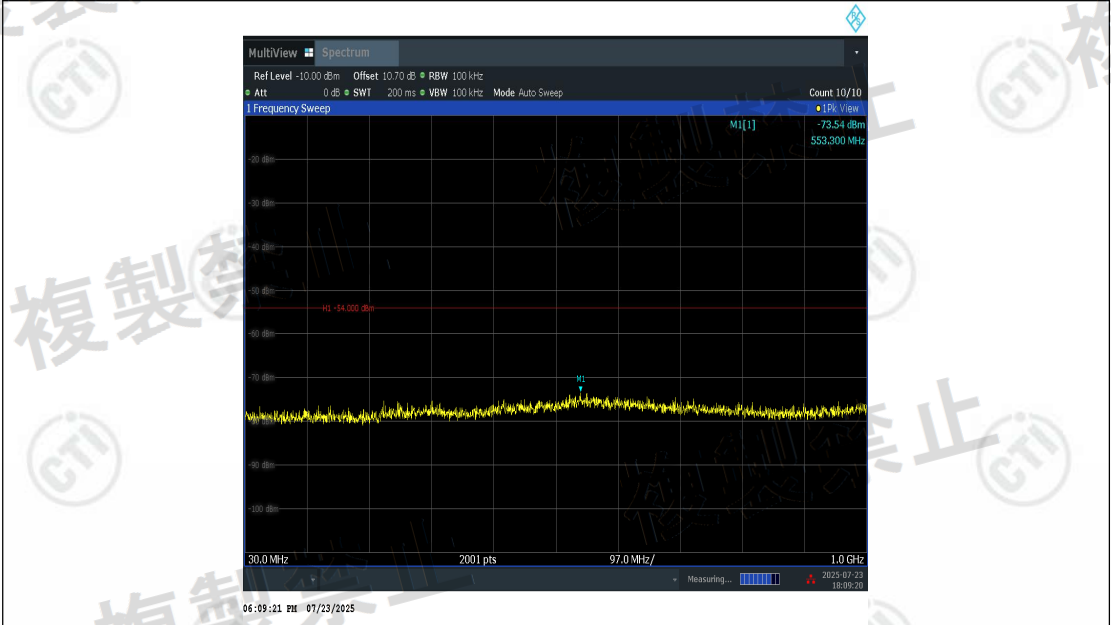




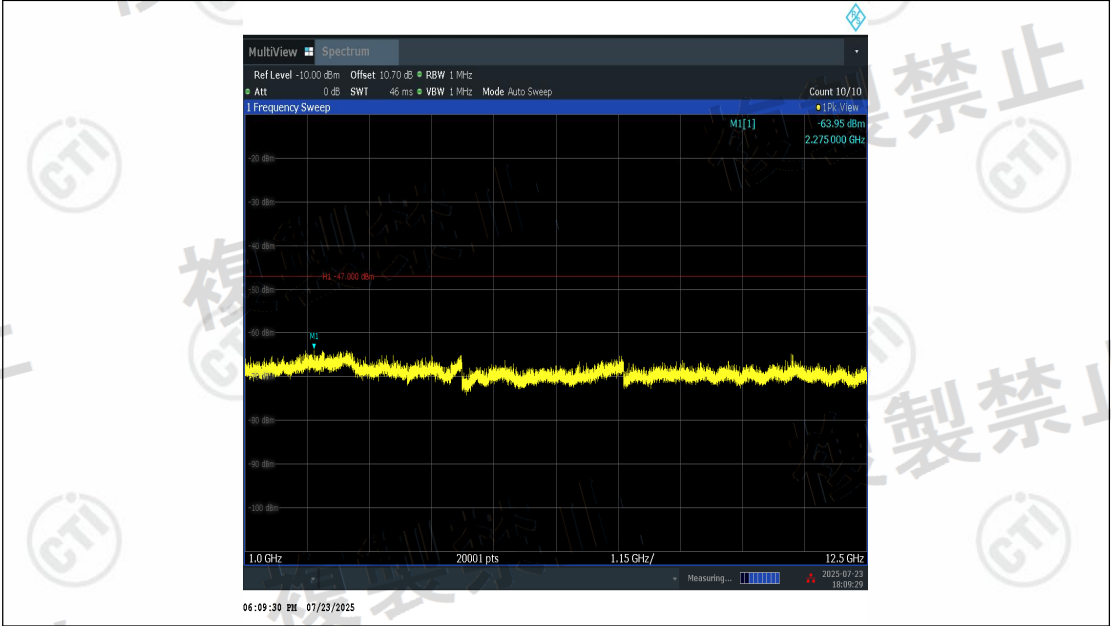
NTNV-BLE\_1M-Ant1-2440-30~1000-PASS



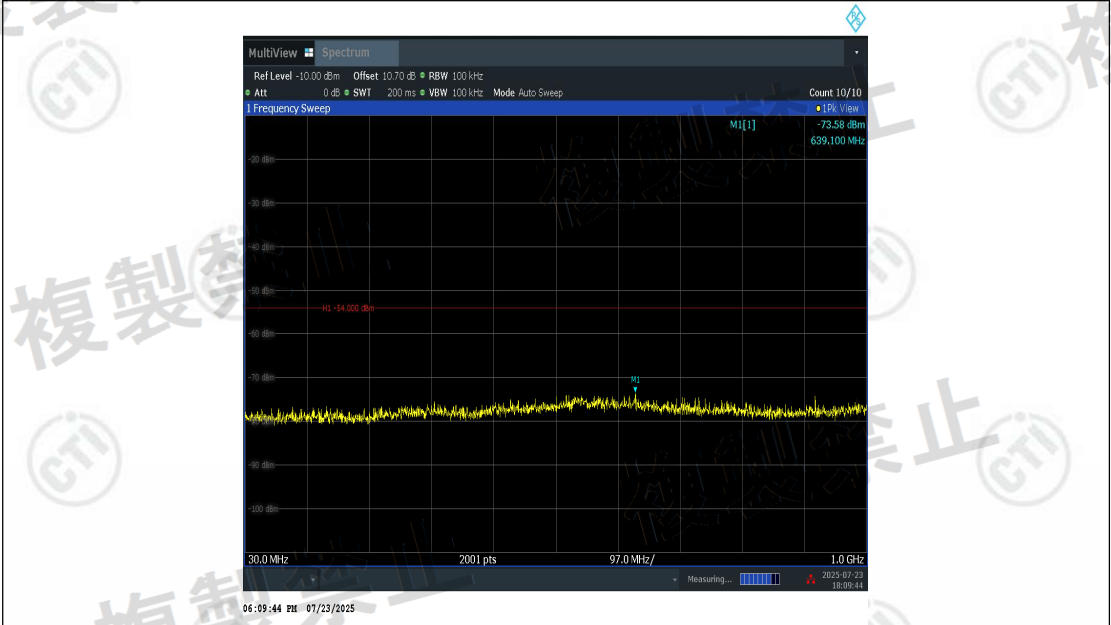
NTNV-BLE\_1M-Ant1-2440-1000~12500-PASS



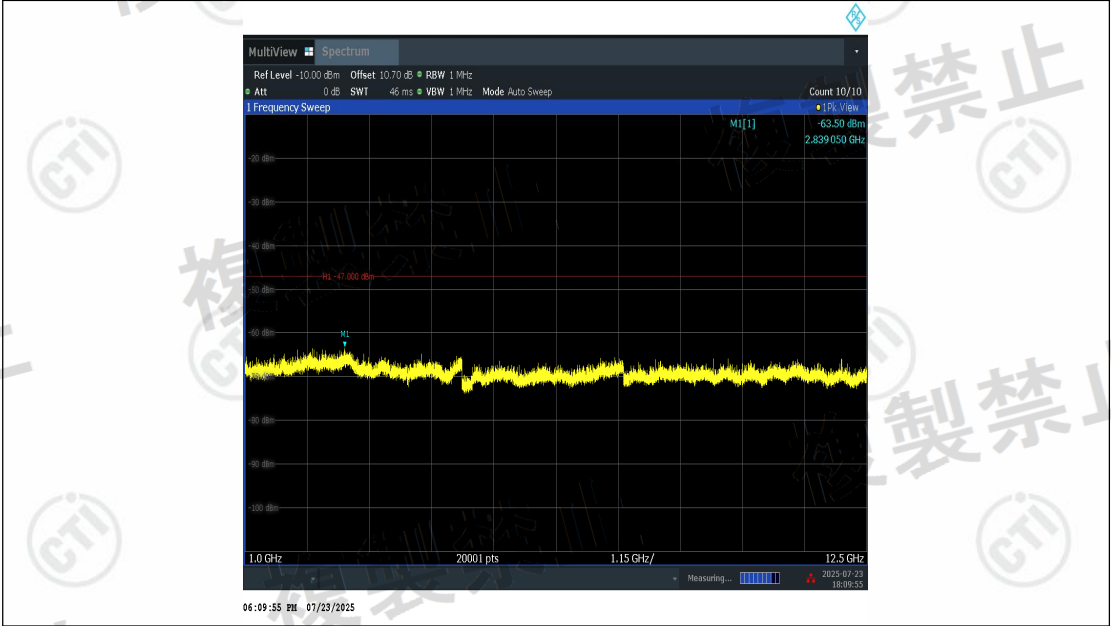
NTNV-BLE\_1M-Ant1-2480-30~1000-PASS



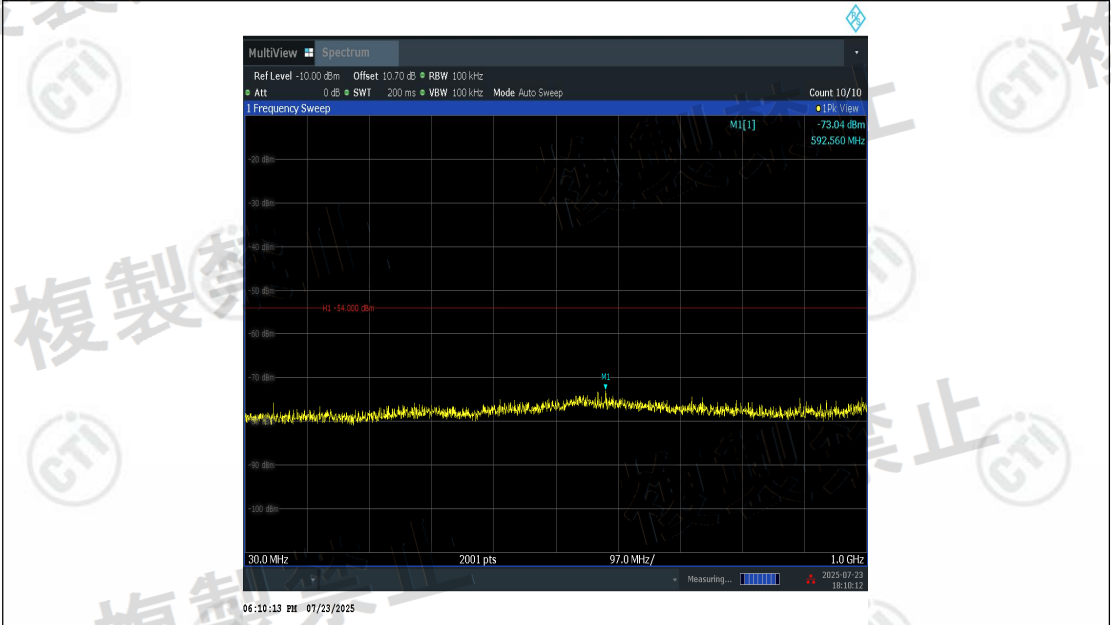
NTNV-BLE\_1M-Ant1-2480-1000~12500-PASS



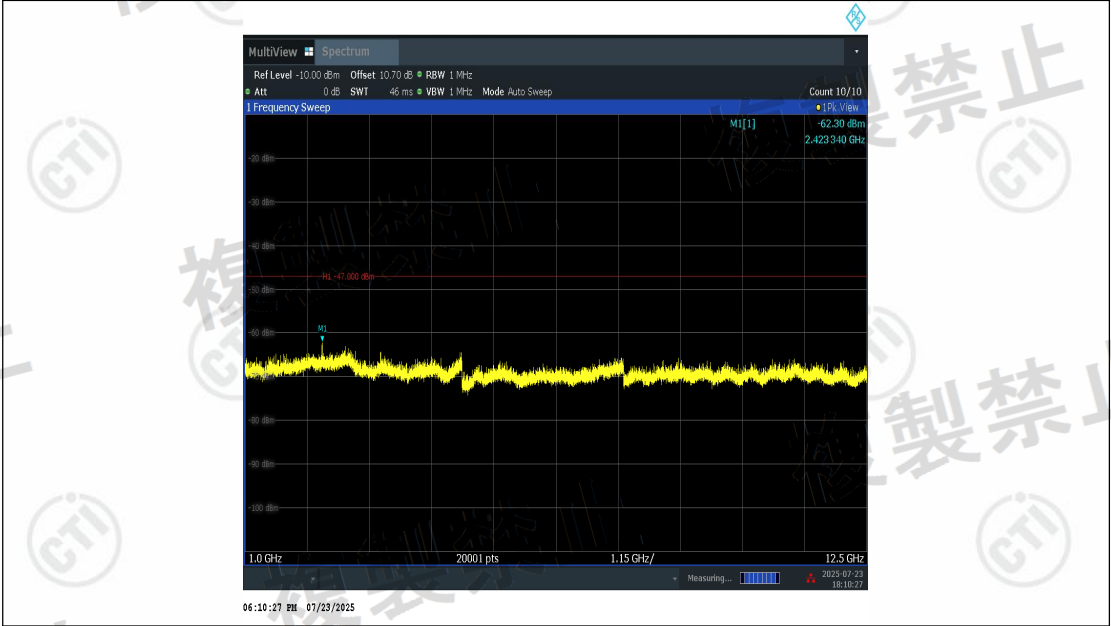
NTNV-BLE\_2M-Ant1-2402-30~1000-PASS



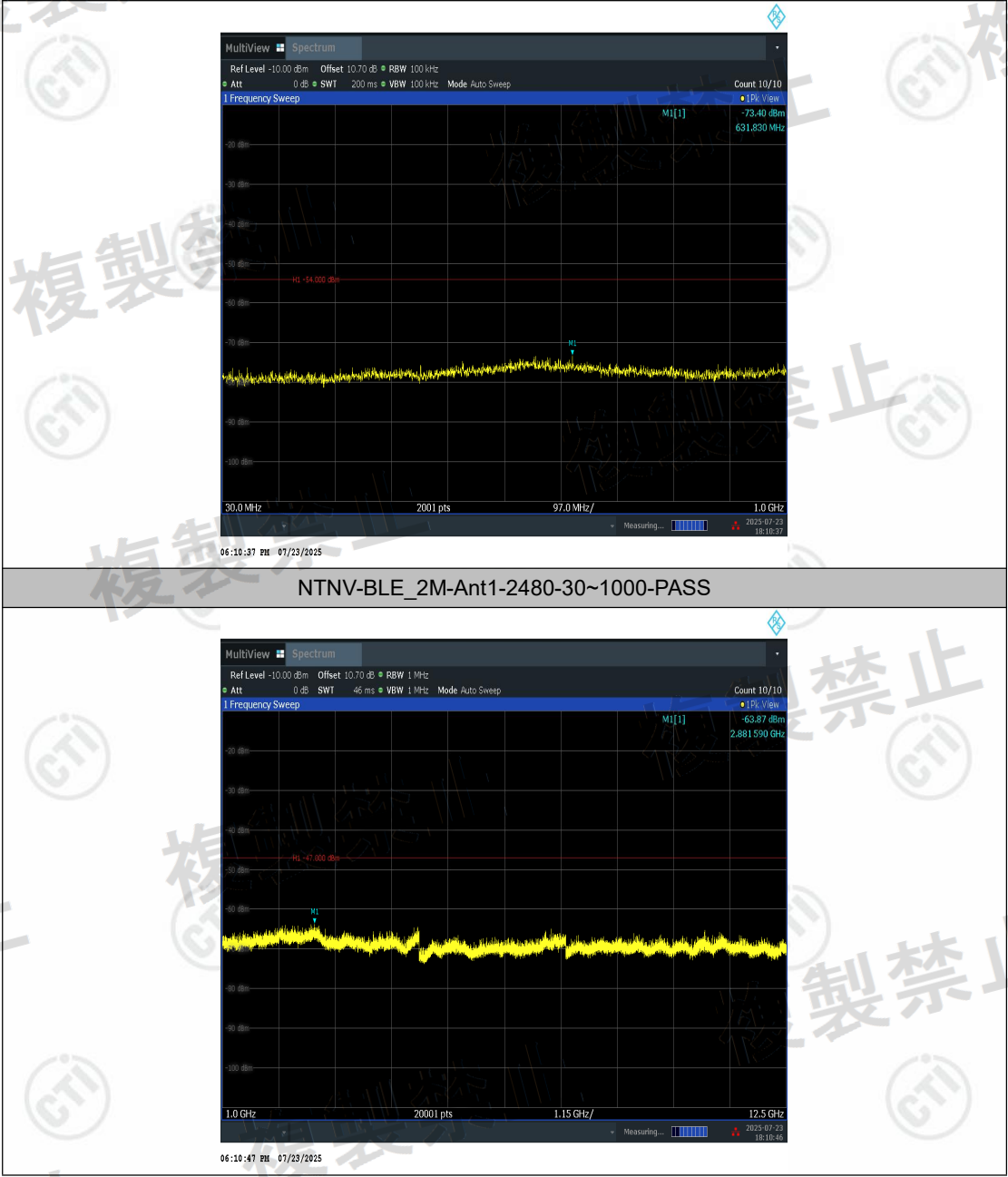
NTNV-BLE\_2M-Ant1-2402-1000~12500-PASS



NTNV-BLE\_2M-Ant1-2440-30~1000-PASS



NTNV-BLE\_2M-Ant1-2440-1000~12500-PASS



\*\*\* End of Report \*\*\*