



RF Test Report

Applicant: Quectel Wireless Solutions Co., Ltd.
Address: Building 5, Shanghai Business Park Phase III (Area B), No.1016
Tianlin Road, Minhang District, Shanghai, 200233, China
Product: Wi-Fi & Bluetooth Module
Model No.: FCS852R
Brand Name: QUECTEL
FCC ID: XMR2023FCS852R
Standards: FCC CFR47 Part 15C
Report No.: PD20230218RF08
Issue Date: 2024/03/01
Test Result: PASS *

* The above equipment has been tested and compliance with the requirement of the relative standards by Hefei Panwin Technology Co., Ltd.

Reviewed By: Charlie Wang

Approved By: Alec Yang

Hefei Panwin Technology Co., Ltd.

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Revision History

| Report No. | Version | Description | Issue Date | Note |
|----------------|---------|----------------|------------|-------|
| PD20230218RF08 | 01 | Initial Report | 2024/03/01 | Valid |

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Summary of Test Results

| No. | Test Case | FCC Rules | Verdict |
|-----|--|--------------------|----------------|
| 1 | Peak Output Power | 15.247(b)(1) | PASS |
| 2 | 20dB and 99% Bandwidth | 15.247(a)(1) | Reporting only |
| 3 | Conducted Band Edges | 15.247(d) | PASS |
| 4 | Dwell Time of Each Channel | 15.247(a)(1) | PASS |
| 5 | Hopping Channel Separation | 15.247(a)(1) | PASS |
| 6 | Number of Channels | 15.247(a)(1) | PASS |
| 7 | Conducted Spurious Emission | 15.247(d) | PASS |
| 8 | Radiated Band Edges and Radiated Spurious Emission | 15.247(d) | PASS |
| 9 | AC Conducted Emission | 15.207 | PASS |
| 10 | Antenna Requirement | 15.203 & 15.247(b) | PASS |

Date of Testing: 2023/12/16 to 2024/01/27

Date of Sample Received: 2023/12/07

- We, Hefei Panwin Technology Co., Ltd., would like to declare that the tested sample has been evaluated in accordance with the procedures given in applied standard(s) in **Section 2.3** of this report and shown compliance with the applicable technical standards.

- All indications of PASS/FAIL in this report are based on interpretations and/or observations of test results.

Measurement Uncertainties were not taken into account and are published for informational purposes only.

1 General Information

1.1 Notes of the Test Report

This report is invalid without signature of auditor and approver or with any alterations. The report shall not be partially reproduced without written approval of the testing company. Entrusted test results are only responsible for incoming samples. If there is any objection to the testing report, it shall be raised to the testing company within 15 days from the date of receiving the report. In the test results, "NA" means "not applicable", and the test items marked with "Δ" are subcontracted projects.

1.2 Test Facility

FCC (Designation number: CN1361, Test Firm Registration Number: 473156)

Hefei Panwin Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform measurements.

A2LA (Certificate Number: 6849.01)

Hefei Panwin Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform measurement.

1.3 Testing Laboratory

| | |
|---------------------|--|
| Company Name | Hefei Panwin Technology Co., Ltd. |
| Address | Floor 1, Zone E, Plant 2#, Mingzhu Industrial Park, No.106 Chuangxin Avenue, High-tech Zone, Hefei City, Anhui Province, China |
| Telephone | +86-0551-63811775 |
| Post Code | 230031 |

2 General Description of Equipment under Test

2.1 Details of Application

| | |
|-----------------------------|--|
| Applicant | Quectel Wireless Solutions Co., Ltd. |
| Applicant Address | Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, 200233, China |
| Manufacturer | Quectel Wireless Solutions Co., Ltd. |
| Manufacturer Address | Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, 200233, China |

2.2 General Information

| | |
|--|---|
| Product | Wi-Fi & Bluetooth Module |
| Model | FCS852R |
| SN | 1. E1823K90Q000124 2. E1823K90Q000148 |
| Hardware Version | R1.0 |
| Software Version | NA |
| Antenna Type | External Antenna |
| Max. Conducted Power | 8.82dBm |
| Antenna Gain | -0.10dBi |
| Operating voltage range | 3.1 V to 3.6 V; Rated Power Supply Voltage 3.3V |
| Modulation Type | Frequency Hopping Spread Spectrum (FHSS):GFSK, $\pi/4$ -DQPSK, 8-DPSK |
| Operating Frequency Range(s) | Bluetooth : 2402 ~2480 MHz |
| Number of channels | 79 |
| Carrier Frequency of Each Channel | 2402+n*1 MHz; n=0~78 |

Note: The declared of product specification for EUT and/or Antenna presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

2.3 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 15 Subpart C §15.247
- FCC KDB 558074 D01 15.247 Meas Guidance v05r02
- ANSI C63.10-2013

Remark:

All test items were verified and recorded according to the standards and without any deviation during the test.

2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

3 Test Condition

3.1 Test Configuration

Test mode

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). The worst cases were recorded in this report.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes (Z, X, Y axis), receiver antenna polarization (horizontal and vertical), the worst emission was found in Z position and the worst case was recorded.

3.2 Carrier Frequency Channel

| Frequency Band | Channel | Freq (MHz) | Channel | Freq (MHz) | Channel | Freq (MHz) |
|----------------|---------|------------|---------|------------|---------|------------|
| 2400-2483.5MHz | 0 | 2402 | 27 | 2429 | 54 | 2456 |
| | 1 | 2403 | 28 | 2430 | 55 | 2457 |
| | 2 | 2404 | 29 | 2431 | 56 | 2458 |
| | 3 | 2405 | 30 | 2432 | 57 | 2459 |
| | 4 | 2406 | 31 | 2433 | 58 | 2460 |
| | 5 | 2407 | 32 | 2434 | 59 | 2461 |
| | 6 | 2408 | 33 | 2435 | 60 | 2462 |
| | 7 | 2409 | 34 | 2436 | 61 | 2463 |
| | 8 | 2410 | 35 | 2437 | 62 | 2464 |
| | 9 | 2411 | 36 | 2438 | 63 | 2465 |
| | 10 | 2412 | 37 | 2439 | 64 | 2466 |
| | 11 | 2413 | 38 | 2440 | 65 | 2467 |
| | 12 | 2414 | 39 | 2441 | 66 | 2468 |
| | 13 | 2415 | 40 | 2442 | 67 | 2469 |
| | 14 | 2416 | 41 | 2443 | 68 | 2470 |
| | 15 | 2417 | 42 | 2444 | 69 | 2471 |
| | 16 | 2418 | 43 | 2445 | 70 | 2472 |
| | 17 | 2419 | 44 | 2446 | 71 | 2473 |
| | 18 | 2420 | 45 | 2447 | 72 | 2474 |
| | 19 | 2421 | 46 | 2448 | 73 | 2475 |
| | 20 | 2422 | 47 | 2449 | 74 | 2476 |
| | 21 | 2423 | 48 | 2450 | 75 | 2477 |
| | 22 | 2424 | 49 | 2451 | 76 | 2478 |
| | 23 | 2425 | 50 | 2452 | 77 | 2479 |
| | 24 | 2426 | 51 | 2453 | 78 | 2480 |
| | 25 | 2427 | 52 | 2454 | - | - |
| | 26 | 2428 | 53 | 2455 | - | - |

3.3 Equipment List

Conducted

| Instrument | Manufacturer | Model | Asset No. | Cal. Interval | Cal. Due Date |
|-------------------|--------------|---------------------|-----------|---------------|---------------|
| Spectrum Analyzer | KEYSIGHT | N9020B | PWC0055 | 1 Year | 2024/10/11 |
| DC Power | KEYSIGHT | E3640A | PWC0046 | 1 Year | 2024/10/11 |
| RF Control Unit | Tonseced | JS0806-2 | PWC0055 | / | / |
| Shielded Chamber | Maorui | MR543 | PWC0041 | 3 Years | 2026/08/26 |
| Test Software | Tonseced | JS1120-3 V3.2.22 | / | / | / |

Radiated

| Instrument | Manufacturer | Model | Asset No. | Cal. Interval | Cal. Due Date |
|-----------------------------|-------------------|----------------|-----------|---------------|---------------|
| EMI Test Receiver | R&S | ESR7 | PWB0023 | 1 Year | 2024/10/11 |
| Spectrum Analyzer | R&S | FSV3044 | PWB0024 | 1 Year | 2024/10/11 |
| Loop Antenna | R&S | HFH2-Z2E | PWB0026 | 1 Year | 2024/10/21 |
| TRILOG Broadband Antenna | Schwarzbeck | VULB9162 | PWB0029 | 1 Year | 2024/10/14 |
| Double-Ridged Guide Antenna | ETS-Lindgren | 3117 | PWB0031 | 1 Year | 2024/10/12 |
| k Type Horn Antenna | Steatite Antennas | QMS-00880 | PWB0035 | 1 Year | 2024/10/17 |
| Anechoic Chamber | ETS.LINDGREN | Fact 3-2m | PWB0003 | 3 Years | 2026/06/05 |
| Pre-Amplifier | R&S | SCU18F | PWB0034 | 1 Year | 2024/10/11 |
| Pre-Amplifier | R&S | SCU40F1 | PWB0036 | 1 Year | 2024/10/11 |
| Pre-Amplifier | COM-MW | DLNA8 | PWB0094 | 1 Year | 2024/11/08 |
| Test Software | R&S | ELEKTRA 4.20.2 | / | / | / |

3.4 Support Equipment List

| Equipment | Manufacturer | Description | Model | Serial Number |
|------------------|---------------------------------------|----------------|-------------|---------------|
| External Antenna | QUECTEL | / | / | / |
| EVB | QUECTEL | / | / | / |
| USB Cable | / | / | / | / |
| Adapter | Xiamen Xinsenhai Electronics Co., Ltd | Output:12V 60W | P60EB120500 | / |

3.5 Test Uncertainty

| No. | Parameter | Uncertainty |
|-----|---|--|
| 1 | 20dB Emission Bandwidth | 1.9% |
| 2 | Occupied channel bandwidth | 1.9% |
| 3 | Carrier Frequency Separation | 1.9% |
| 4 | Band-edge Spurious Emission | 1.21dB |
| 5 | Conducted RF Spurious Emission | 9kHz-7GHz:1.21dB 7GHz-40GHz: 3.31dB |
| 6 | Radiated Band Edges and Spurious Emission | Below 1GHz: 4.88 dB Above 1GHz: 5.06 dB |
| 7 | Temperature | 3 °C |
| 8 | Humidity | 1.3 % |
| 9 | Supply voltages | 0.006 V |

4 Test Items Description

Ambient condition

Shielded Chamber

| | |
|------------------|----------------|
| Temperature [°C] | 20.3 to 24.7 |
| Humidity [%RH] | 25 to 33 |
| Pressure [kPa] | 102.6 to 103.7 |

Anechoic Chamber

| | |
|------------------|----------------|
| Temperature [°C] | 20.1 to 24.3 |
| Humidity [%RH] | 36 to 48 |
| Pressure [kPa] | 101.1 to 103.6 |

4.1 Output Power Measurement

4.1.1 Limit of Output Power

The maximum peak conducted output power of the intentional radiator shall not exceed the following:

(1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band 0.125 watts. The power limit for 1Mbps, 2Mbps, 3Mbps and AFH modes are 0.125 watts.

4.1.2 Measuring Instruments

The measuring equipment is listed in the section 3.3 of this test report.

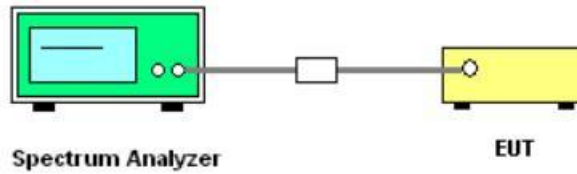
4.1.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 7.8.5.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings for 20dB Bandwidth measurement
 - 1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
 - 2) RBW > 20 dB bandwidth of the emission being measured.
 - 3) VBW ≥ RBW.
 - 4) Sweep: Auto.
 - 5) Detector function: Peak.
 - 6) Trace: Max hold.
 - 7) Allow trace to stabilize.
 - 8) Use the marker-to-peak function to set the marker to the peak of the emission.
4. The indicated level is the peak output power, after any corrections for external attenuators and

cables.

5. A plot of the test results and setup description shall be included in the test report.

4.1.4 Test Setup



4.1.5 Test Results

See Appendix A.1.

4.2 20dB and 99% Bandwidth Measurement

4.2.1 Limit of 20dB and 99% Bandwidth

Reporting only

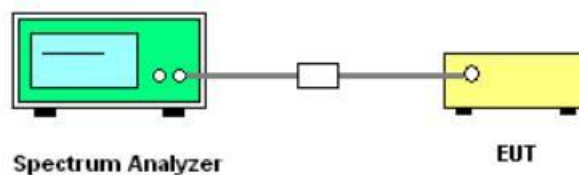
4.2.2 Measuring Instruments

The measuring equipment is listed in the section 3.3 of this test report.

4.2.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 6.9.2 and 6.9.3.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings for 20dB Bandwidth measurement.
 Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hopping channel;
 The RBW is set to 1% to 5% of the 99% OBW, the VBW is set to 3 times the RBW;
 Sweep = auto; Detector function = peak;
 Trace = max hold.
5. Use the following spectrum analyzer settings for 99 % Bandwidth measurement;
 Span = approximately 1.5 to 5 times the 99% bandwidth, centered on a hopping channel;
 The RBW is set to 1% to 5% of the 99% OBW, the VBW is set to 3 times the RBW;
 Sweep = auto; Detector function = peak;
 Trace = max hold.
6. Measure and record the results in the test report.

4.2.4 Test Setup



4.2.5 Test Results

See Appendix A.2.

4.3 Conducted Band Edges Measurement

4.3.1 Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

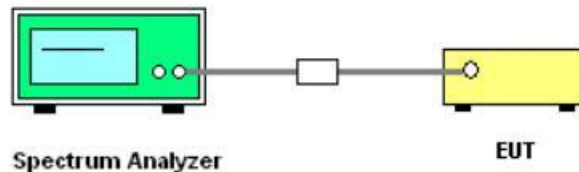
4.3.2 Measuring Instruments

The measuring equipment is listed in the section 3.3 of this test report.

4.3.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 7.8.6.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100kHz, VBW = 300kHz. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100kHz RBW. The attenuation shall be 30 dB instead of 20 dB when RMS conducted output power procedure is used.
4. Enable hopping function of the EUT and then repeat step 2. and 3.
5. Measure and record the results in the test report.

4.3.4 Test Setup



4.3.5 Test Results

See Appendix A.3.

4.4 Dwell Time Measurement

4.4.1 Limit of Dwell Time

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

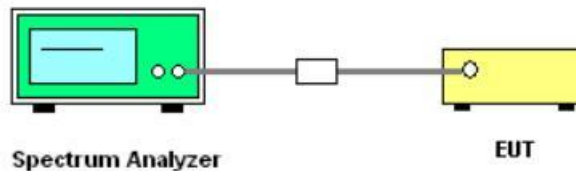
4.4.2 Measuring Instruments

The measuring equipment is listed in the section 3.3 of this test report

4.4.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 7.8.4.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel;
RBW = 1 MHz; VBW \geq RBW; Sweep = as necessary to capture the entire dwell time per hopping channel;
Detector function = peak; Trace = max hold.
6. Measure and record the results in the test report.

4.4.4 Test Setup



4.4.5 Test Results

See Appendix A.4.

4.5 Hopping Channel Separation Measurement

4.5.1 Limit of Hopping Channel Separation

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

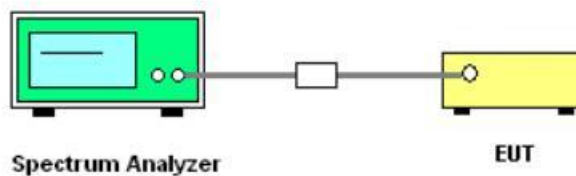
4.5.2 Measuring Instruments

The measuring equipment is listed in the section 3.3 of this test report.

4.5.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 7.8.2.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings:
 - Span = wide enough to capture the peaks of two adjacent channels;
 - RBW = 300kHz; VBW \geq RBW; Sweep = auto; Detector function = peak;
 - Trace = max hold.
6. Measure and record the results in the test report.

4.5.4 Test Setup



4.5.5 Test Results

See Appendix A.5.

4.6 Number of Channel Measurement

4.6.1 Limits of Number of Hopping Frequency

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

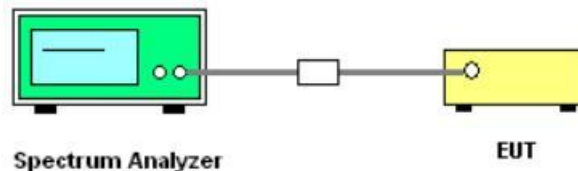
4.6.2 Measuring Instruments

The measuring equipment is listed in the section 3.3 of this test report.

4.6.3 Test Procedure

1. The testing follows ANSI C63.10-2013 clause 7.8.3.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings: Span = the frequency band of operation; RBW = 300kHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold.
6. The number of hopping frequency used is defined as the number of total channel.
7. Record the measurement data derived from spectrum analyzer.

4.6.4 Test Setup



4.6.5 Test Results

See Appendix A.6.

4.7 Conducted Spurious Emission Measurement

4.7.1 Limit of Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

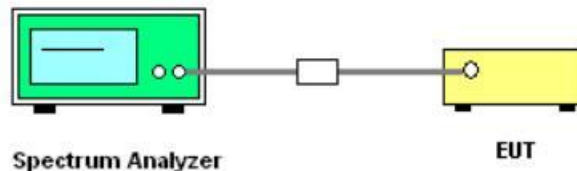
4.7.2 Measuring Instruments

The measuring equipment is listed in the section 3.3 of this test report

4.7.3 Test Procedure

1. The testing follows ANSI C63.10-2013 clause 7.8.8.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW= 300kHz, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

4.7.4 Test Setup



4.7.5 Test Results

See Appendix A.7.

4.8 Radiated Band Edges and Spurious Emission Measurement

4.8.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition radiated emissions which fall in the restricted bands must also comply with the limits as below.

| Frequency of emission (MHz) | Field strength (microvolts/meter) | Measurement Distance (meters) |
|--------------------------------|--------------------------------------|----------------------------------|
| 0.009–0.490 | 2400/F(kHz) | 300 |
| 0.490– 1.705 | 24000/F(kHz) | 30 |
| 1.705–30.0 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above960 | 500 | 3 |

4.8.2 Measuring Instruments

The measuring equipment is listed in the section 3.3 of this test report.

4.8.3 Test Procedures

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured.
 - (2) Set RBW=100 kHz for $f < 1$ GH, RBW=1MHz for $f > 1$ GHz ; VBW \geq RBW; Sweep = auto;Detector function = peak;Trace = max hold for peak.
 - (3) For average measurement: use duty cycle correction factor method per 15.35(c).
Duty cycle = On time/100 milliseconds

$$\text{On time} = N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n$$

Where N_1 is number of type 1 pulses, L , is length of type 1 pulses, etc.

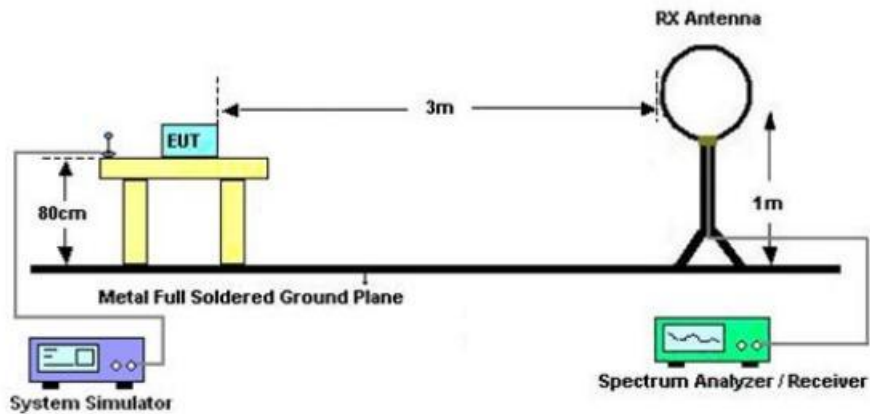
Average Emission Level = Peak Emission Level + 20*log(Duty cycle).

6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Pre-amp Factor = Level
7. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
8. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than peak limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

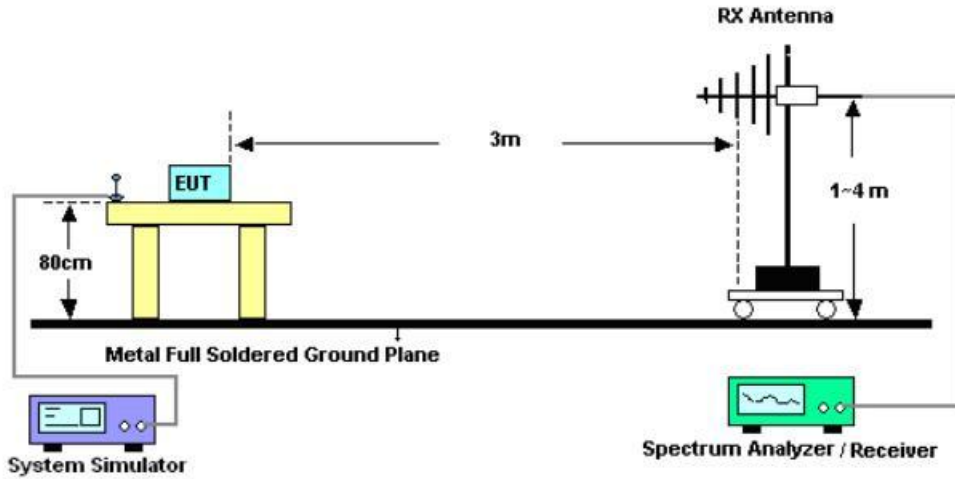
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.79dB) derived from $20\log(\text{dwell time}/100\text{ms})$. This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

4.8.4 Test Setup

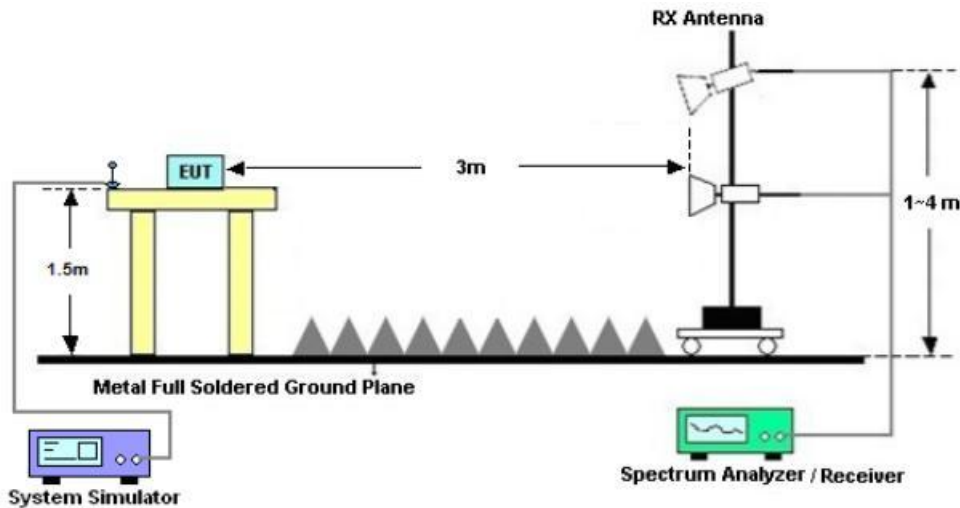
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



4.8.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported. There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

4.8.6 Test Result of Radiated Spurious at Band Edges

See Appendix B.1.

4.8.7 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)

See Appendix B.1.

4.8.8 Duty cycle correction factor for average measurement

See Appendix B.2.

4.9 AC Conducted Emission Measurement

4.9.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

| Frequency of emission (MHz) | Conducted limit (dB μ V) | |
|-----------------------------|------------------------------|-----------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

Decreases with the logarithm of the frequency.

4.9.2 Measuring Instruments

The section 3.3 of List of Measuring Equipment of this test report is used for test.

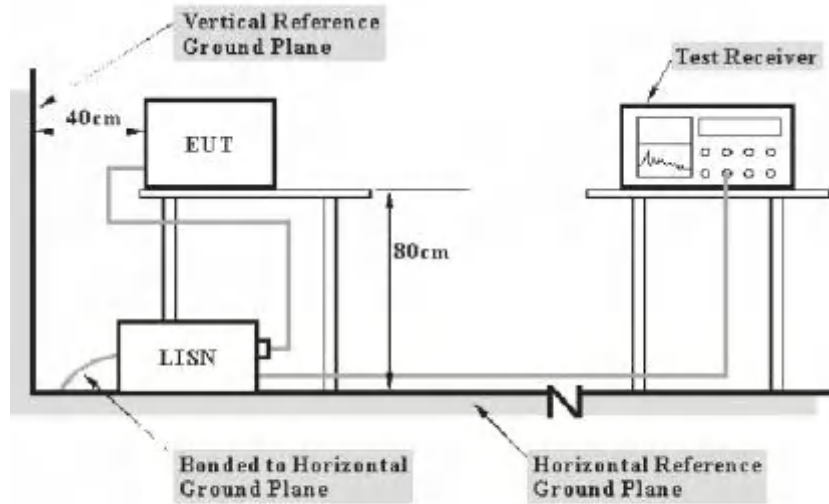
4.9.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth =9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

4.9.4 Test Equipment

| Instrument | Manufacturer | Model | Asset No. | Cal. Interval | Cal. Due Date |
|-------------------|--------------|-----------------|-----------|---------------|---------------|
| EMI Test Receiver | R&S | ESR 3 | PWB0061 | 1 Year | 2024/10/11 |
| LISN | R&S | ENV216 | PWB0062 | 1 Year | 2024/10/11 |
| Shielded Chamber | MIX-BEP | SR 433 | PWB0002 | 3 Years | 2024/08/08 |
| Test Software | R&S | ELEKTRA V4.20.2 | / | / | / |

4.9.5 Test Setup



Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

4.9.6 Test Result

| | | | |
|-----------|-----------------------|--------------|-------------|
| Test Site | EMC 02 Shielding Room | Test Time | 2024/01/30 |
| Engineer | Kane sun | Test Voltage | 120Vac/60Hz |

Ambient condition

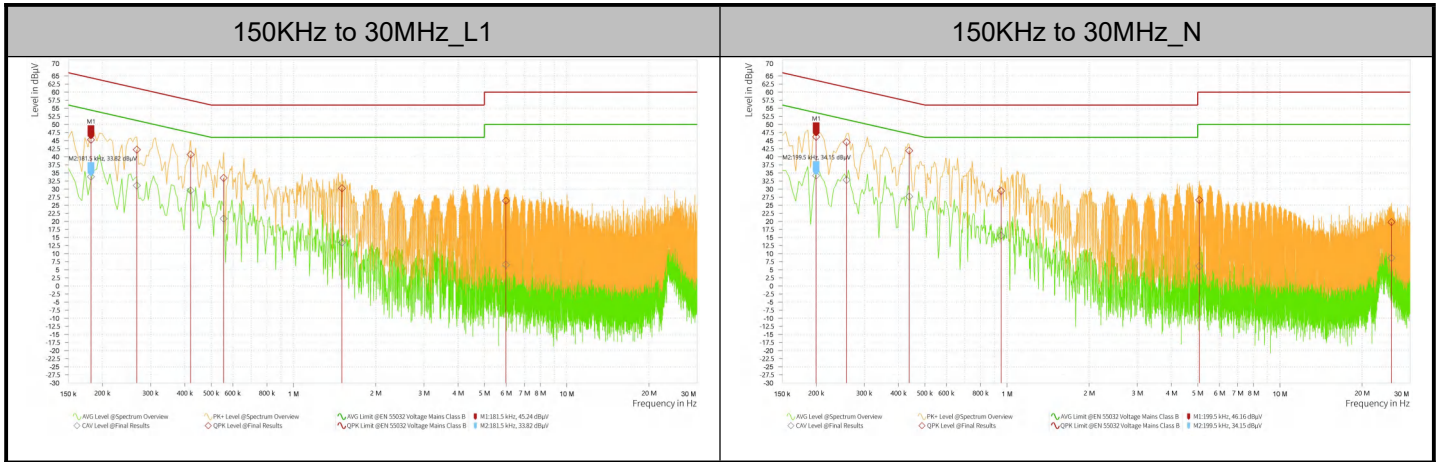
| | | |
|------------------|-------------------|------------------------|
| Temperature | Relative humidity | Pressure |
| 20.3°C to 20.7°C | 40%RH to 41%RH | 101.89kPa to 102.09kPa |

4.9.7 Test Results

| Frequency [MHz] | QPK Level [dBμV] | QPK Limit [dBμV] | QPK Margin [dB] | CAV Level [dBμV] | CAV: AVG Limit [dBμV] | CAV Margin [dB] | Correction [dB] | Line |
|-----------------|------------------|------------------|-----------------|------------------|-----------------------|-----------------|-----------------|------|
| 0.182 | 45.24 | 64.42 | 19.18 | 33.82 | 54.42 | 20.60 | 9.52 | L1 |
| 0.267 | 42.17 | 61.21 | 19.05 | 31.11 | 51.21 | 20.10 | 9.52 | L1 |
| 0.420 | 40.68 | 57.45 | 16.77 | 29.54 | 47.45 | 17.90 | 9.52 | L1 |
| 0.555 | 33.43 | 56.00 | 22.57 | 20.82 | 46.00 | 25.18 | 9.52 | L1 |
| 1.505 | 30.25 | 56.00 | 25.75 | 13.46 | 46.00 | 32.54 | 9.53 | L1 |
| 5.987 | 26.34 | 60.00 | 33.66 | 6.62 | 50.00 | 43.38 | 9.56 | L1 |
| 0.200 | 46.16 | 63.63 | 17.47 | 34.15 | 53.63 | 19.48 | 9.52 | N |

| | | | | | | | | |
|--------|-------|-------|-------|-------|-------|-------|------|---|
| 0.258 | 44.50 | 61.50 | 16.99 | 32.85 | 51.50 | 18.65 | 9.53 | N |
| 0.438 | 41.87 | 57.10 | 15.23 | 27.70 | 47.10 | 19.40 | 9.53 | N |
| 0.951 | 29.41 | 56.00 | 26.59 | 15.57 | 46.00 | 30.43 | 9.53 | N |
| 5.064 | 26.63 | 60.00 | 33.37 | 6.12 | 50.00 | 43.88 | 9.56 | N |
| 25.634 | 19.76 | 60.00 | 40.24 | 8.67 | 50.00 | 41.33 | 9.67 | N |

Test Graphs



4.9.8 Uncertainty Measurement

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT. The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

| CASE | Uncertainty |
|-------------------------------|-------------|
| Continuous Emission (AC port) | 2.92 dB |

4.10 Antenna Requirements

4.10.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

4.10.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

4.10.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

Appendix A – Test Results of Conducted Test

A.1 Output Power Measurement

Test Result Peak

| Test Mode | Antenna | Frequency[MHz] | Conducted Peak Power[dBm] | Conducted Limit[dBm] | Verdict |
|-----------|---------|----------------|---------------------------|----------------------|---------|
| DH5 | Ant1 | 2402 | 7.73 | ≤30.00 | PASS |
| DH5 | Ant1 | 2441 | 7.84 | ≤30.00 | PASS |
| DH5 | Ant1 | 2480 | 7.15 | ≤30.00 | PASS |
| 2DH5 | Ant1 | 2402 | 8.18 | ≤20.97 | PASS |
| 2DH5 | Ant1 | 2441 | 8.32 | ≤20.97 | PASS |
| 2DH5 | Ant1 | 2480 | 7.62 | ≤20.97 | PASS |
| 3DH5 | Ant1 | 2402 | 8.67 | ≤20.97 | PASS |
| 3DH5 | Ant1 | 2441 | 8.82 | ≤20.97 | PASS |
| 3DH5 | Ant1 | 2480 | 8.14 | ≤20.97 | PASS |

A.2 20dB and 99% Bandwidth Measurement

Test Result

20dB Bandwidth

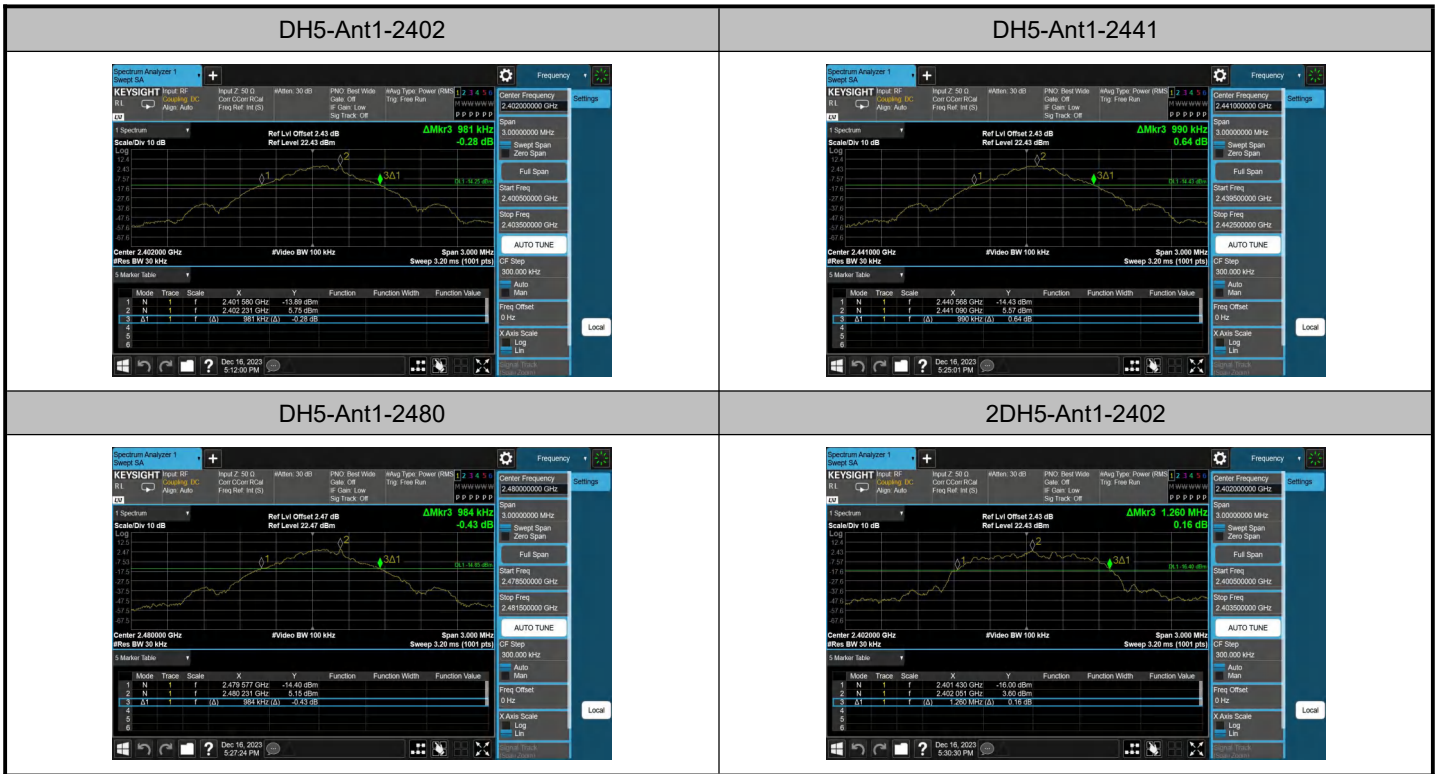
| Test Mode | Antenna | Frequency[MHz] | 20db EBW[MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|-----------|---------|----------------|---------------|----------|----------|------------|---------|
| DH5 | Ant1 | 2402 | 0.981 | 2401.580 | 2402.561 | --- | --- |
| DH5 | Ant1 | 2441 | 0.990 | 2440.568 | 2441.558 | --- | --- |
| DH5 | Ant1 | 2480 | 0.984 | 2479.577 | 2480.561 | --- | --- |
| 2DH5 | Ant1 | 2402 | 1.260 | 2401.430 | 2402.690 | --- | --- |
| 2DH5 | Ant1 | 2441 | 1.266 | 2440.427 | 2441.693 | --- | --- |
| 2DH5 | Ant1 | 2480 | 1.263 | 2479.430 | 2480.693 | --- | --- |
| 3DH5 | Ant1 | 2402 | 1.299 | 2401.409 | 2402.708 | --- | --- |
| 3DH5 | Ant1 | 2441 | 1.293 | 2440.412 | 2441.705 | --- | --- |
| 3DH5 | Ant1 | 2480 | 1.290 | 2479.415 | 2480.705 | --- | --- |

99% Bandwidth

| Test Mode | Antenna | Frequency[MHz] | OCB [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|-----------|---------|----------------|-----------|-----------|-----------|------------|---------|
| DH5 | Ant1 | 2402 | 0.88159 | 2401.6250 | 2402.5066 | --- | --- |
| DH5 | Ant1 | 2441 | 0.88220 | 2440.6256 | 2441.5078 | --- | --- |
| DH5 | Ant1 | 2480 | 0.88666 | 2479.6237 | 2480.5103 | --- | --- |
| 2DH5 | Ant1 | 2402 | 1.1678 | 2401.4788 | 2402.6466 | --- | --- |
| 2DH5 | Ant1 | 2441 | 1.1705 | 2440.4785 | 2441.6490 | --- | --- |
| 2DH5 | Ant1 | 2480 | 1.1689 | 2479.4806 | 2480.6495 | --- | --- |
| 3DH5 | Ant1 | 2402 | 1.1763 | 2401.4737 | 2402.6500 | --- | --- |
| 3DH5 | Ant1 | 2441 | 1.1802 | 2440.4725 | 2441.6527 | --- | --- |
| 3DH5 | Ant1 | 2480 | 1.1781 | 2479.4744 | 2480.6525 | --- | --- |

Test Graphs

20dB Bandwidth



2DH5-Ant1-2441



2DH5-Ant1-2480



3DH5-Ant1-2402



3DH5-Ant1-2441



3DH5-Ant1-2480



99% Bandwidth

DH5-Ant1-2402



DH5-Ant1-2441



DH5-Ant1-2480



2DH5-Ant1-2402



2DH5-Ant1-2441



2DH5-Ant1-2480



3DH5-Ant1-2402



3DH5-Ant1-2441



3DH5-Ant1-2480

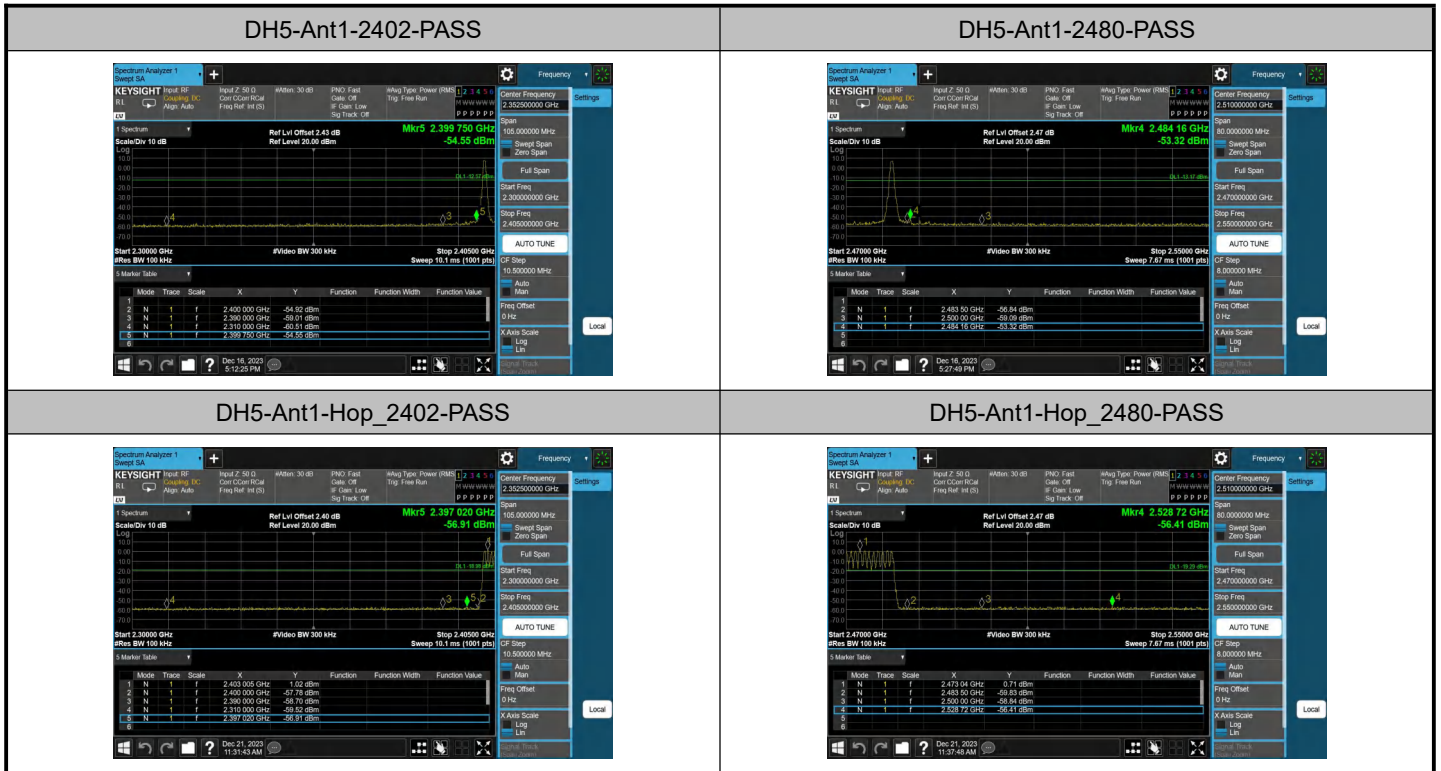


A.3 Conducted Band Edges Measurement

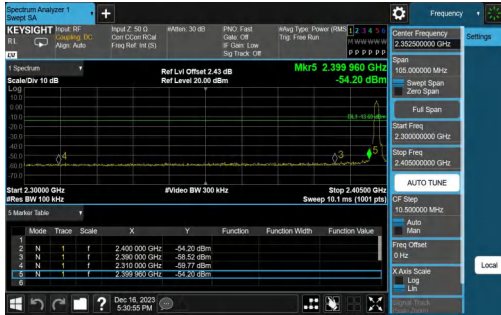
Test Result

| Test Mode | Antenna | Ch Name | Frequency[MHz] | Ref Level [dBm] | Result [dBm] | Limit [dBm] | Verdict |
|-----------|---------|---------|----------------|-----------------|--------------|-------------|---------|
| DH5 | Ant1 | Low | 2402 | 7.43 | -54.55 | ≤-12.57 | PASS |
| DH5 | Ant1 | High | 2480 | 6.83 | -53.32 | ≤-13.17 | PASS |
| DH5 | Ant1 | Low | Hop_2402 | 1.02 | -56.91 | ≤-18.98 | PASS |
| DH5 | Ant1 | High | Hop_2480 | 0.71 | -56.41 | ≤-19.29 | PASS |
| 2DH5 | Ant1 | Low | 2402 | 6.31 | -54.2 | ≤-13.69 | PASS |
| 2DH5 | Ant1 | High | 2480 | 5.74 | -55.29 | ≤-14.26 | PASS |
| 2DH5 | Ant1 | Low | Hop_2402 | 0.55 | -56.62 | ≤-19.45 | PASS |
| 2DH5 | Ant1 | High | Hop_2480 | -0.12 | -56.28 | ≤-20.12 | PASS |
| 3DH5 | Ant1 | Low | 2402 | 6.36 | -54.25 | ≤-13.64 | PASS |
| 3DH5 | Ant1 | High | 2480 | 5.84 | -54.71 | ≤-14.16 | PASS |
| 3DH5 | Ant1 | Low | Hop_2402 | -2.82 | -56.32 | ≤-22.82 | PASS |
| 3DH5 | Ant1 | High | Hop_2480 | -2.46 | -56.01 | ≤-22.46 | PASS |

Test Graphs



2DH5-Ant1-2402-PASS



2DH5-Ant1-2480-PASS



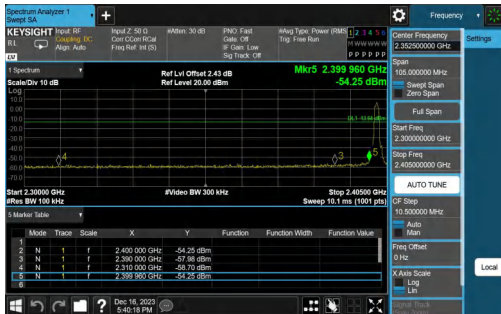
2DH5-Ant1-Hop_2402-PASS



2DH5-Ant1-Hop_2480-PASS



3DH5-Ant1-2402-PASS



3DH5-Ant1-2480-PASS



3DH5-Ant1-Hop_2402-PASS



3DH5-Ant1-Hop_2480-PASS

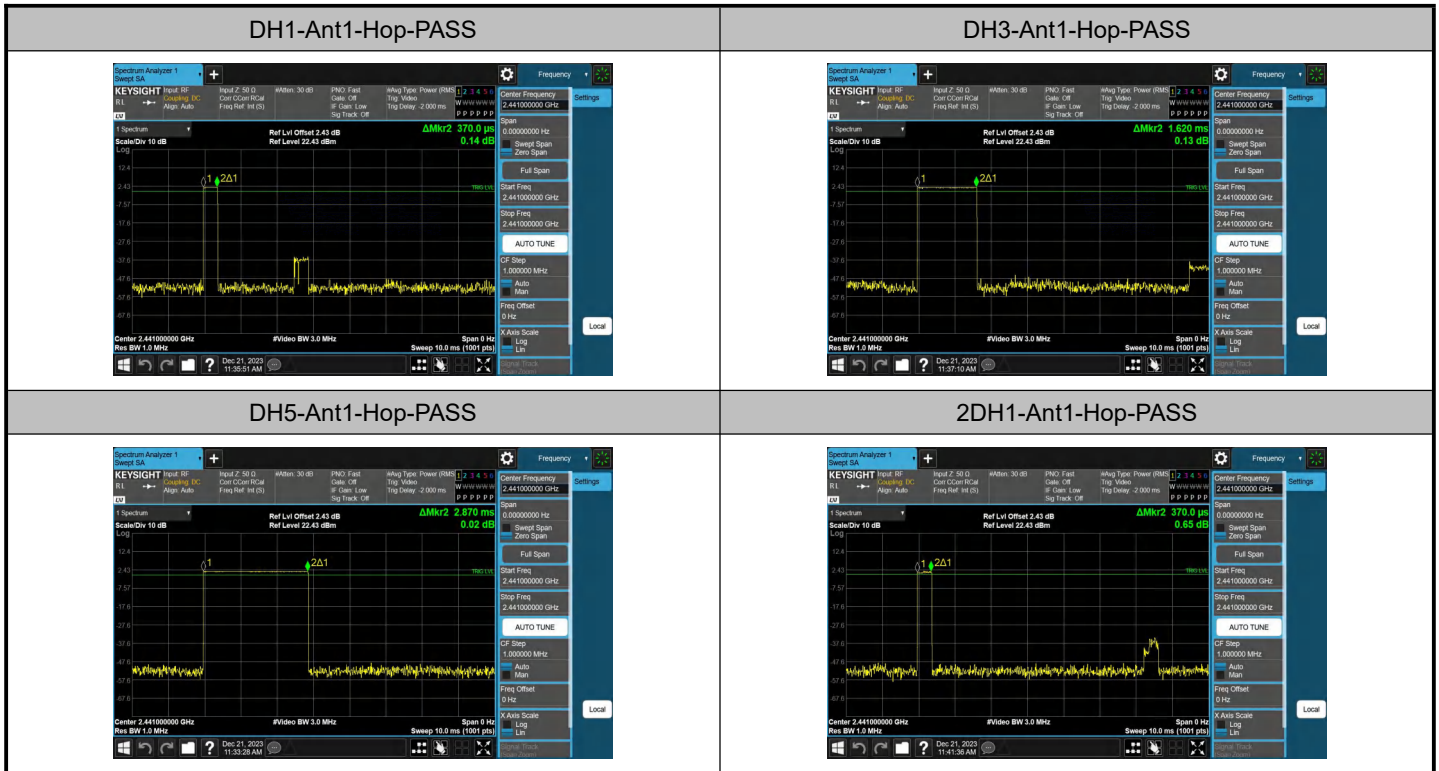


A.4 Dwell Time Measurement

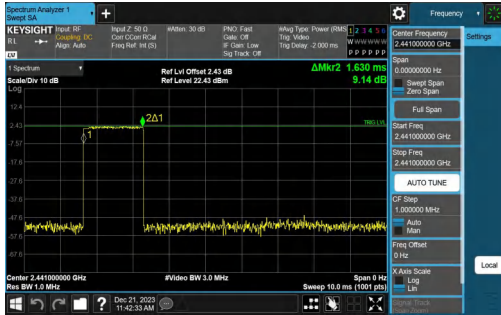
Test Result

| Test Mode | Antenna | Frequency[MHz] | Burst Width [ms] | Total Hops [Num] | Result[s] | Limit[s] | Verdict |
|-----------|---------|----------------|------------------|------------------|-----------|----------|---------|
| DH1 | Ant1 | Hop | 0.370 | 320 | 0.118 | ≤0.4 | PASS |
| DH3 | Ant1 | Hop | 1.620 | 160 | 0.259 | ≤0.4 | PASS |
| DH5 | Ant1 | Hop | 2.870 | 106.67 | 0.306 | ≤0.4 | PASS |
| 2DH1 | Ant1 | Hop | 0.370 | 320 | 0.118 | ≤0.4 | PASS |
| 2DH3 | Ant1 | Hop | 1.630 | 160 | 0.261 | ≤0.4 | PASS |
| 2DH5 | Ant1 | Hop | 2.870 | 106.67 | 0.306 | ≤0.4 | PASS |
| 3DH1 | Ant1 | Hop | 0.380 | 320 | 0.122 | ≤0.4 | PASS |
| 3DH3 | Ant1 | Hop | 1.630 | 160 | 0.261 | ≤0.4 | PASS |
| 3DH5 | Ant1 | Hop | 2.865 | 106.67 | 0.306 | ≤0.4 | PASS |

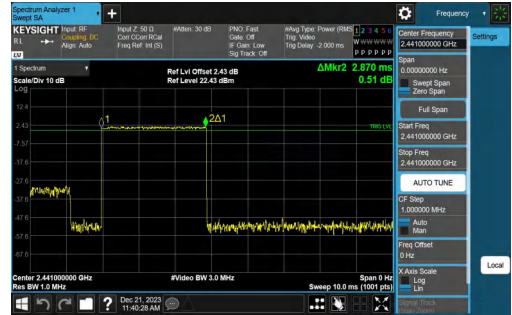
Test Graphs



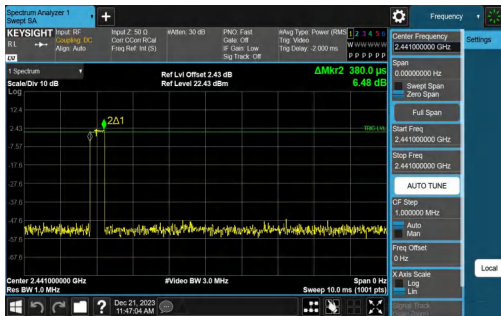
2DH3-Ant1-Hop-PASS



2DH5-Ant1-Hop-PASS



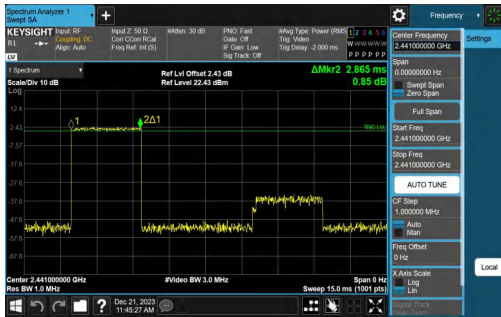
3DH1-Ant1-Hop-PASS



3DH3-Ant1-Hop-PASS



3DH5-Ant1-Hop-PASS

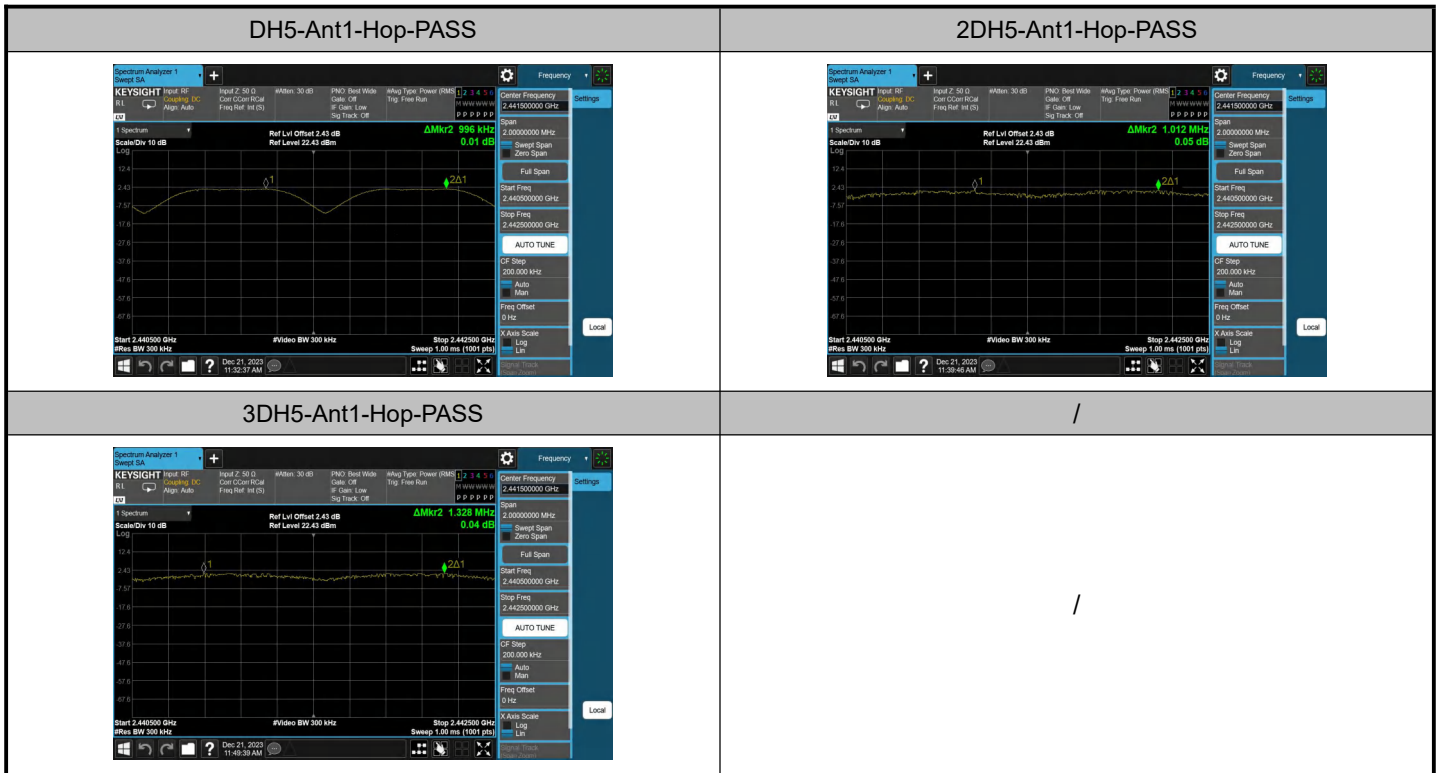


A.5 Hopping Channel Separation

Test Result

| Test Mode | Antenna | Frequency[MHz] | Result[MHz] | Limit[MHz] | Verdict |
|-----------|---------|----------------|-------------|------------|---------|
| DH5 | Ant1 | Hop | 0.996 | ≥0.990 | PASS |
| 2DH5 | Ant1 | Hop | 1.012 | ≥0.844 | PASS |
| 3DH5 | Ant1 | Hop | 1.328 | ≥1.299 | PASS |

Test Graphs

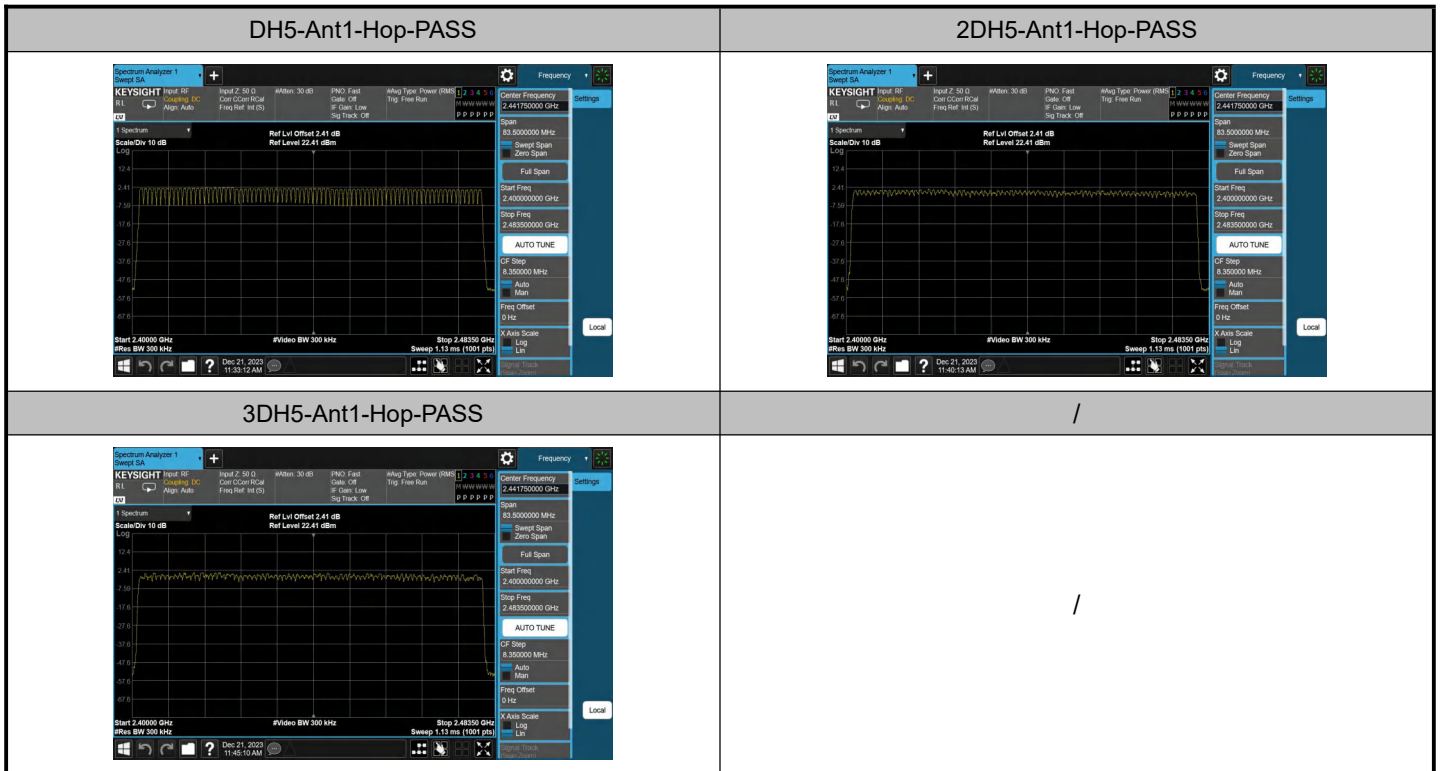


A.6 Number of Channel Measurement

Test Result

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

Test Graphs

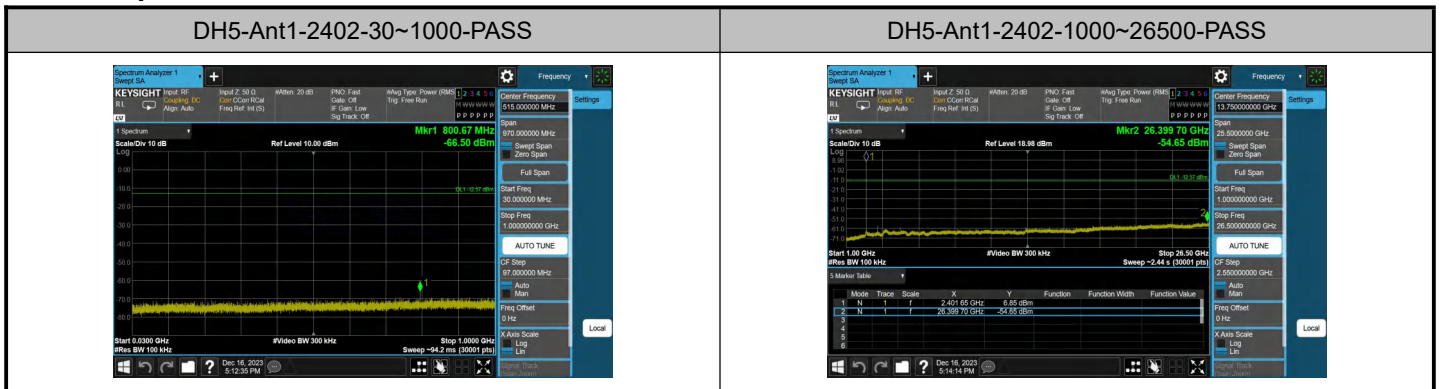


A.7 Conducted Spurious Emission Measurement

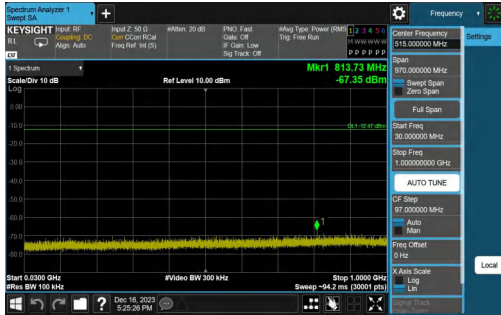
Test Result

| Test Mode | Antenna | Frequency[MHz] | Freq Range [MHz] | Ref Level [dBm] | Result [dBm] | Limit [dBm] | Verdict |
|-----------|---------|----------------|------------------|-----------------|--------------|-------------|---------|
| DH5 | Ant1 | 2402 | 30~1000 | 7.43 | -66.5 | ≤-12.57 | PASS |
| DH5 | Ant1 | 2402 | 1000~26500 | 7.43 | -54.65 | ≤-12.57 | PASS |
| DH5 | Ant1 | 2441 | 30~1000 | 7.53 | -67.35 | ≤-12.47 | PASS |
| DH5 | Ant1 | 2441 | 1000~26500 | 7.53 | -53.89 | ≤-12.47 | PASS |
| DH5 | Ant1 | 2480 | 30~1000 | 6.83 | -63.18 | ≤-13.17 | PASS |
| DH5 | Ant1 | 2480 | 1000~26500 | 6.83 | -55.05 | ≤-13.17 | PASS |
| 2DH5 | Ant1 | 2402 | 30~1000 | 6.31 | -58.79 | ≤-13.69 | PASS |
| 2DH5 | Ant1 | 2402 | 1000~26500 | 6.31 | -54.92 | ≤-13.69 | PASS |
| 2DH5 | Ant1 | 2441 | 30~1000 | 6.44 | -68.32 | ≤-13.56 | PASS |
| 2DH5 | Ant1 | 2441 | 1000~26500 | 6.44 | -54.86 | ≤-13.56 | PASS |
| 2DH5 | Ant1 | 2480 | 30~1000 | 5.74 | -59.32 | ≤-14.26 | PASS |
| 2DH5 | Ant1 | 2480 | 1000~26500 | 5.74 | -54.9 | ≤-14.26 | PASS |
| 3DH5 | Ant1 | 2402 | 30~1000 | 6.36 | -65.38 | ≤-13.64 | PASS |
| 3DH5 | Ant1 | 2402 | 1000~26500 | 6.36 | -54.7 | ≤-13.64 | PASS |
| 3DH5 | Ant1 | 2441 | 30~1000 | 6.47 | -62.21 | ≤-13.53 | PASS |
| 3DH5 | Ant1 | 2441 | 1000~26500 | 6.47 | -55.37 | ≤-13.53 | PASS |
| 3DH5 | Ant1 | 2480 | 30~1000 | 5.84 | -59.46 | ≤-14.16 | PASS |
| 3DH5 | Ant1 | 2480 | 1000~26500 | 5.84 | -55.11 | ≤-14.16 | PASS |

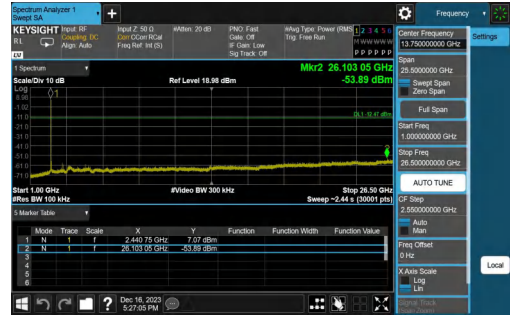
Test Graphs



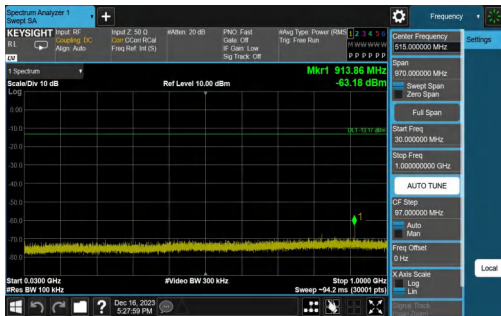
DH5-Ant1-2441-30~1000-PASS



DH5-Ant1-2441-1000~26500-PASS



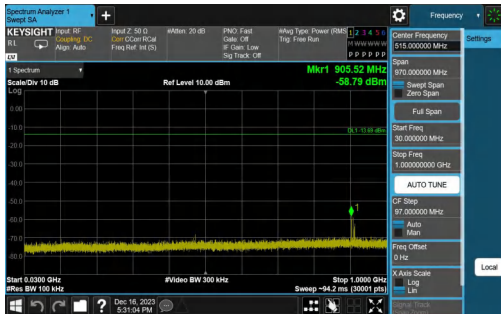
DH5-Ant1-2480-30~1000-PASS



DH5-Ant1-2480-1000~26500-PASS



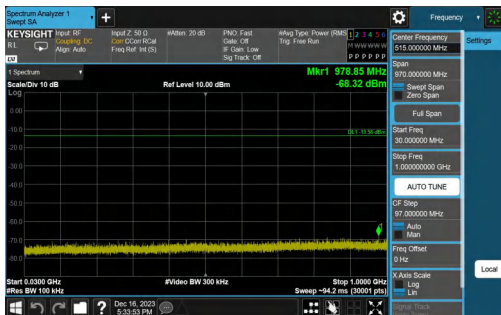
2DH5-Ant1-2402-30~1000-PASS



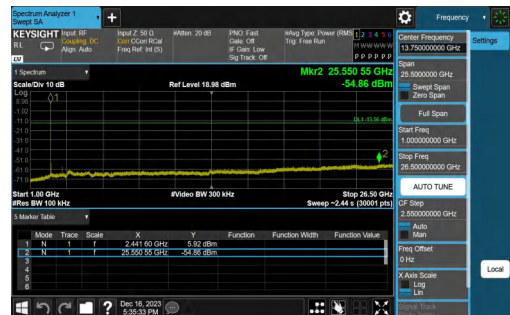
2DH5-Ant1-2402-1000~26500-PASS



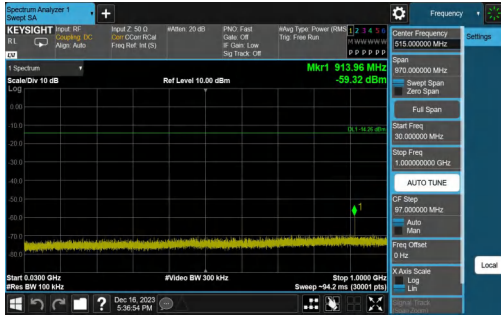
2DH5-Ant1-2441-30~1000-PASS



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



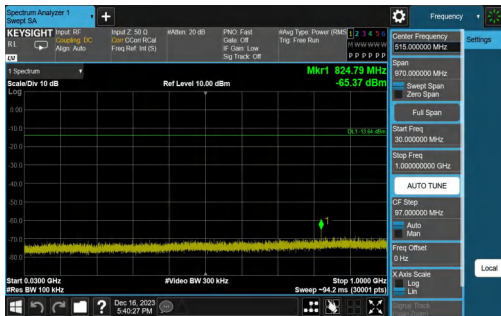
2DH5-Ant1-2480-30~1000-PASS



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



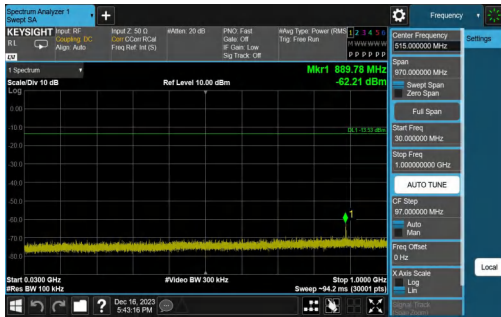
3DH5-Ant1-2402-30~1000-PASS



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



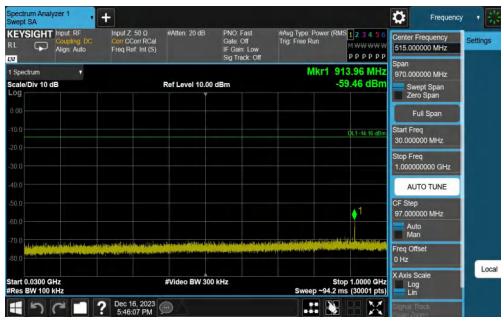
3DH5-Ant1-2441-30~1000-PASS



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



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



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



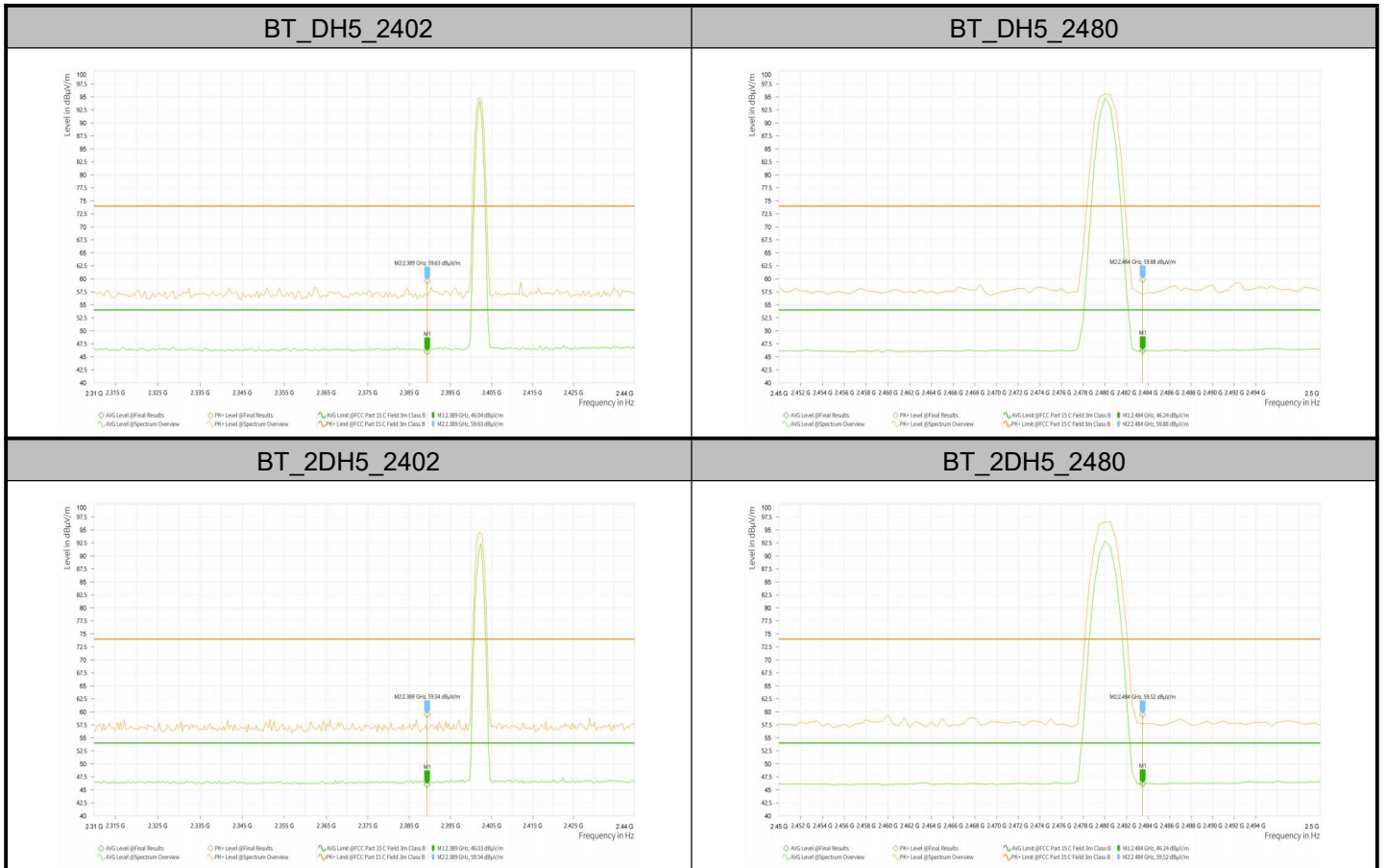
Appendix B – Test Results of Radiated Test

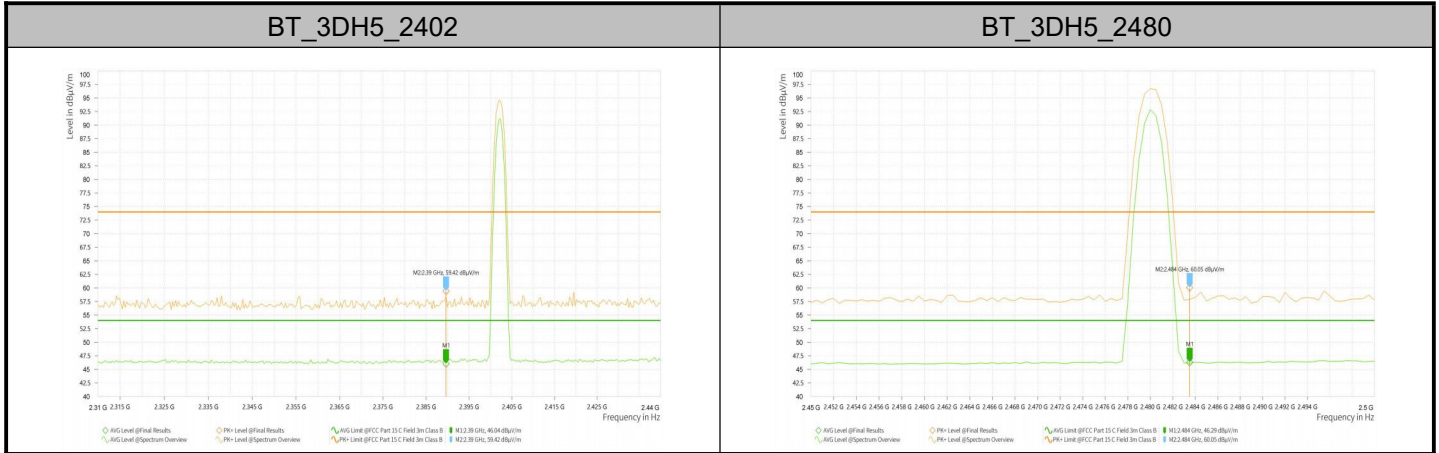
B.1 Radiated Band Edges and Spurious Emission

Test Result_Band Edges

| Test Mode & Test Freq.[MHz] | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | AVG Level [dBμV/m] | AVG Limit [dBμV/m] | AVG Margin [dB] | Polarization | Azimuth [deg] |
|-----------------------------|-----------------|--------------------|--------------------|-----------------|--------------------|--------------------|-----------------|--------------|---------------|
| BT_DH5_2402 | 2,389.325 | 59.63 | 74.00 | 14.37 | 46.04 | 54.00 | 7.96 | H | 359.5 |
| BT_DH5_2480 | 2,483.500 | 59.88 | 74.00 | 14.12 | 46.24 | 54.00 | 7.76 | H | 9.5 |
| BT_2DH5_2402 | 2,389.300 | 59.54 | 74.00 | 14.46 | 46.03 | 54.00 | 7.97 | V | 0 |
| BT_2DH5_2480 | 2,483.500 | 59.52 | 74.00 | 14.48 | 46.24 | 54.00 | 7.76 | H | 42.7 |
| BT_3DH5_2402 | 2,389.625 | 59.42 | 74.00 | 14.58 | 46.04 | 54.00 | 7.96 | H | 153.4 |
| BT_3DH5_2480 | 2,483.500 | 60.05 | 74.00 | 13.95 | 46.29 | 54.00 | 7.71 | V | 241.1 |

Test Graphs_Band Edges





Test Result_Spurious Emission

Note1: Test result Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier the Emissions in the frequency band 9kHz-30MHz and 18GHz-26.5GHz are more than 20dB below the limit are not reported.

Note2: 'Low' indicates a frequency range below 1GHz, and 'High' indicates a frequency range above 1GHz.

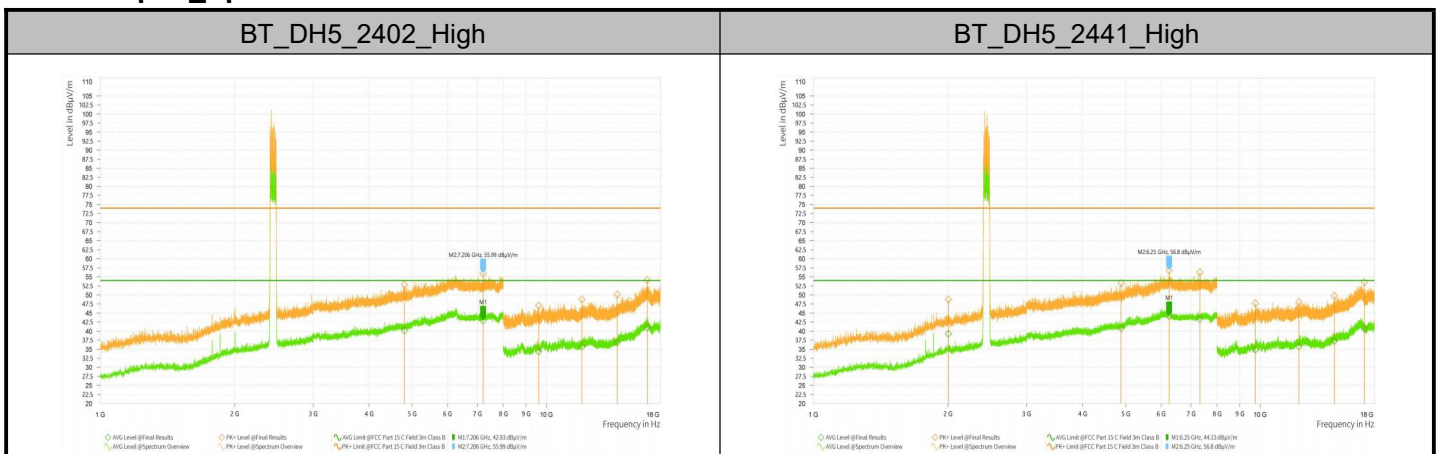
| Test Mode & Test Freq.[MHz] | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | AVG Level [dBμV/m] | AVG Limit [dBμV/m] | AVG Margin [dB] | Polarization | Azimuth [deg] |
|-----------------------------|-----------------|--------------------|--------------------|-----------------|--------------------|--------------------|-----------------|--------------|---------------|
| BT_DH5_2402_High | 4,804.000 | 52.82 | 74.00 | 21.18 | 40.20 | 54.00 | 13.80 | H | 360 |
| | 7,206.000 | 55.99 | 74.00 | 18.01 | 42.93 | 54.00 | 11.07 | H | 203.8 |
| | 9,608.000 | 47.07 | 74.00 | 26.93 | 34.38 | 54.00 | 19.62 | H | 360 |
| | 12,010.000 | 48.74 | 74.00 | 25.26 | 35.74 | 54.00 | 18.26 | H | 141.9 |
| | 14,412.000 | 50.06 | 74.00 | 23.94 | 36.87 | 54.00 | 17.13 | V | 0 |
| | 16,814.000 | 54.12 | 74.00 | 19.88 | 40.91 | 54.00 | 13.09 | H | 0 |
| BT_DH5_2441_High | 2,005.000 | 48.74 | 74.00 | 25.26 | 39.30 | 54.00 | 14.70 | V | 238.4 |
| | 4,882.000 | 53.23 | 74.00 | 20.77 | 40.79 | 54.00 | 13.21 | H | 306.9 |
| | 6,250.000 | 56.80 | 74.00 | 17.20 | 44.13 | 54.00 | 9.87 | H | 252.8 |
| | 7,322.500 | 56.24 | 74.00 | 17.76 | 43.36 | 54.00 | 10.64 | H | 334.1 |
| | 9,746.000 | 47.67 | 74.00 | 26.33 | 34.91 | 54.00 | 19.09 | H | 360 |
| | 12,204.500 | 48.03 | 74.00 | 25.97 | 35.75 | 54.00 | 18.25 | H | 14.5 |
| | 14,645.500 | 49.74 | 74.00 | 24.26 | 37.30 | 54.00 | 16.70 | H | 0 |
| | 17,086.500 | 53.50 | 74.00 | 20.50 | 40.73 | 54.00 | 13.27 | H | 360 |
| BT_DH5_2480_High | 2,005.000 | 49.23 | 74.00 | 24.77 | 41.06 | 54.00 | 12.94 | V | 304.2 |
| | 4,960.000 | 53.40 | 74.00 | 20.60 | 40.59 | 54.00 | 13.41 | V | 0 |
| | 6,270.000 | 57.21 | 74.00 | 16.79 | 44.23 | 54.00 | 9.77 | H | 41.5 |
| | 7,439.500 | 56.11 | 74.00 | 17.89 | 43.50 | 54.00 | 10.50 | H | 27.1 |
| | 9,920.000 | 47.28 | 74.00 | 26.72 | 34.52 | 54.00 | 19.48 | H | 217 |

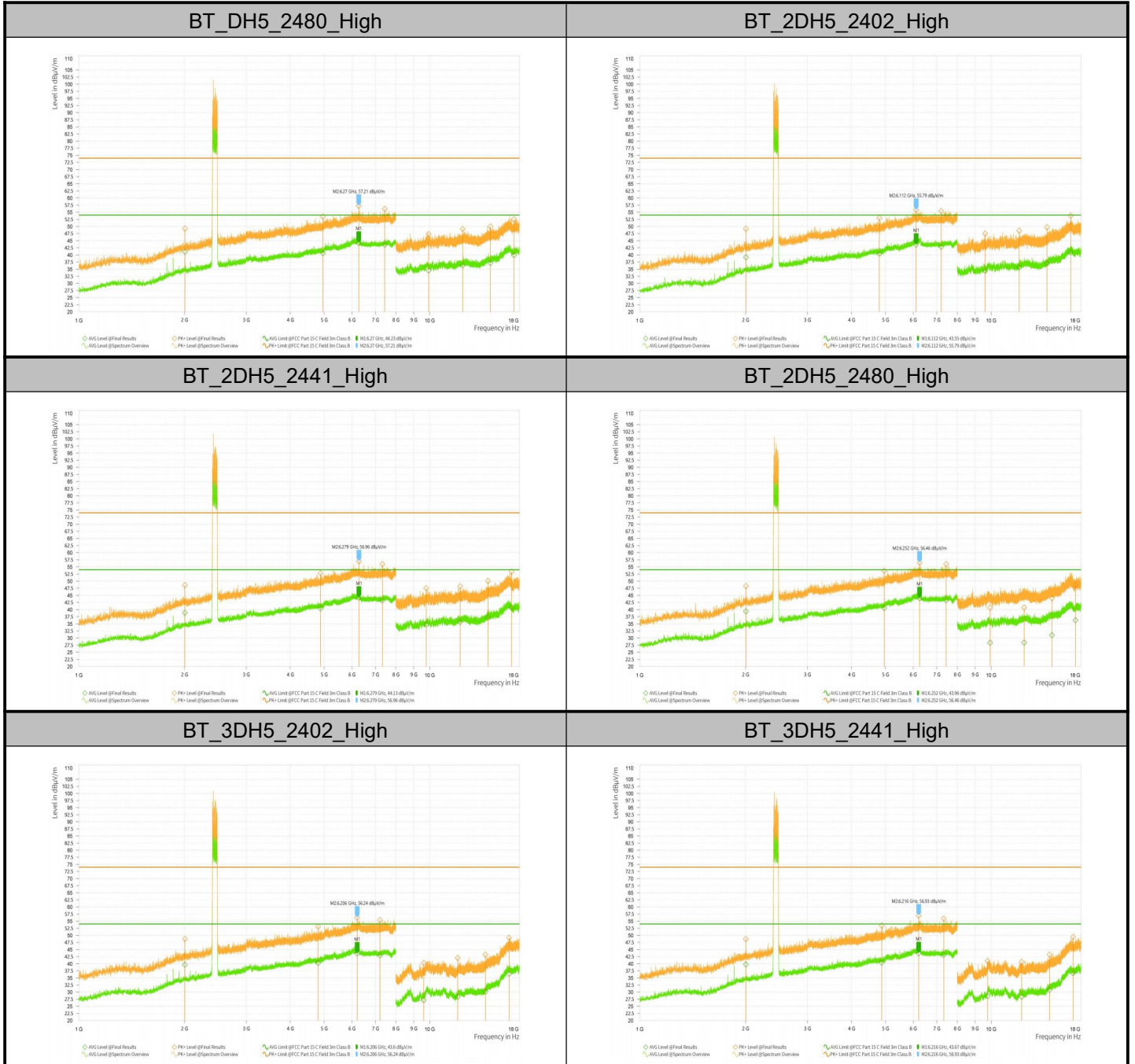
| | | | | | | | | | |
|-------------------|------------|-------|-------|-------|-------|-------|-------|---|-------|
| | 12,400.000 | 49.12 | 74.00 | 24.88 | 36.33 | 54.00 | 17.67 | V | 360 |
| | 14,879.500 | 49.94 | 74.00 | 24.06 | 37.15 | 54.00 | 16.85 | H | 0 |
| | 17,359.500 | 52.51 | 74.00 | 21.49 | 39.93 | 54.00 | 14.07 | H | 156 |
| BT_2DH5_2402_High | 2,005.000 | 49.17 | 74.00 | 24.83 | 39.18 | 54.00 | 14.82 | V | 238.4 |
| | 4,803.500 | 53.00 | 74.00 | 21.00 | 40.46 | 54.00 | 13.54 | H | 318.6 |
| | 6,112.000 | 55.79 | 74.00 | 18.21 | 43.55 | 54.00 | 10.45 | H | 360 |
| | 7,205.500 | 55.36 | 74.00 | 18.64 | 42.83 | 54.00 | 11.17 | V | 89.3 |
| | 9,608.000 | 47.46 | 74.00 | 26.54 | 34.41 | 54.00 | 19.59 | V | 360 |
| | 12,010.000 | 48.45 | 74.00 | 25.55 | 35.69 | 54.00 | 18.31 | V | 141.9 |
| | 14,411.500 | 49.68 | 74.00 | 24.32 | 37.03 | 54.00 | 16.97 | V | 216.9 |
| | 16,813.500 | 53.76 | 74.00 | 20.24 | 40.93 | 54.00 | 13.07 | V | 75 |
| BT_2DH5_2441_High | 2,004.500 | 48.57 | 74.00 | 25.43 | 38.86 | 54.00 | 15.14 | V | 122.8 |
| | 4,882.000 | 52.77 | 74.00 | 21.23 | 40.43 | 54.00 | 13.57 | V | 106 |
| | 6,279.000 | 56.96 | 74.00 | 17.04 | 44.13 | 54.00 | 9.87 | V | 323.4 |
| | 7,323.000 | 55.93 | 74.00 | 18.07 | 43.21 | 54.00 | 10.79 | V | 0 |
| | 9,763.500 | 47.48 | 74.00 | 26.52 | 34.76 | 54.00 | 19.24 | V | 202.9 |
| | 12,206.000 | 48.12 | 74.00 | 25.88 | 35.62 | 54.00 | 18.38 | V | 0 |
| | 14,646.000 | 50.09 | 74.00 | 23.91 | 37.18 | 54.00 | 16.82 | V | 348.4 |
| | 17,086.500 | 53.29 | 74.00 | 20.71 | 40.72 | 54.00 | 13.28 | V | 141.8 |
| BT_2DH5_2480_High | 2,005.000 | 48.23 | 74.00 | 25.77 | 39.36 | 54.00 | 14.64 | V | 238.5 |
| | 4,960.000 | 53.65 | 74.00 | 20.35 | 40.52 | 54.00 | 13.48 | V | 171.8 |
| | 6,251.500 | 56.46 | 74.00 | 17.54 | 43.96 | 54.00 | 10.04 | H | 41.5 |
| | 7,439.500 | 55.98 | 74.00 | 18.02 | 43.32 | 54.00 | 10.68 | H | 27.1 |
| | 9,920.000 | 40.65 | 74.00 | 33.35 | 28.34 | 54.00 | 25.66 | V | 201.8 |
| | 12,399.500 | 40.68 | 74.00 | 33.32 | 28.39 | 54.00 | 25.61 | V | 360 |
| | 14,880.000 | 43.94 | 74.00 | 30.06 | 31.03 | 54.00 | 22.97 | V | 285 |
| | 17,359.500 | 48.55 | 74.00 | 25.45 | 36.26 | 54.00 | 17.74 | V | 78.6 |
| BT_3DH5_2402_High | 2,004.500 | 48.71 | 74.00 | 25.29 | 39.67 | 54.00 | 14.33 | V | 239.6 |
| | 4,804.000 | 53.09 | 74.00 | 20.91 | 40.25 | 54.00 | 13.75 | H | 189.4 |
| | 6,206.000 | 56.24 | 74.00 | 17.76 | 43.60 | 54.00 | 10.40 | H | 0 |
| | 7,206.000 | 55.37 | 74.00 | 18.63 | 42.84 | 54.00 | 11.16 | V | 105.7 |
| | 9,608.000 | 40.22 | 74.00 | 33.78 | 27.21 | 54.00 | 26.79 | V | 0 |
| | 12,010.000 | 42.01 | 74.00 | 31.99 | 28.31 | 54.00 | 25.69 | H | 141.8 |
| | 14,411.500 | 43.16 | 74.00 | 30.84 | 30.18 | 54.00 | 23.82 | V | 203 |
| | 16,813.500 | 49.11 | 74.00 | 24.89 | 36.45 | 54.00 | 17.55 | H | 13 |
| BT_3DH5_2441_High | 2,004.500 | 48.69 | 74.00 | 25.31 | 39.77 | 54.00 | 14.23 | V | 239.7 |
| | 4,882.000 | 53.45 | 74.00 | 20.55 | 40.36 | 54.00 | 13.64 | H | 0 |
| | 6,215.500 | 56.93 | 74.00 | 17.07 | 43.67 | 54.00 | 10.33 | H | 254 |

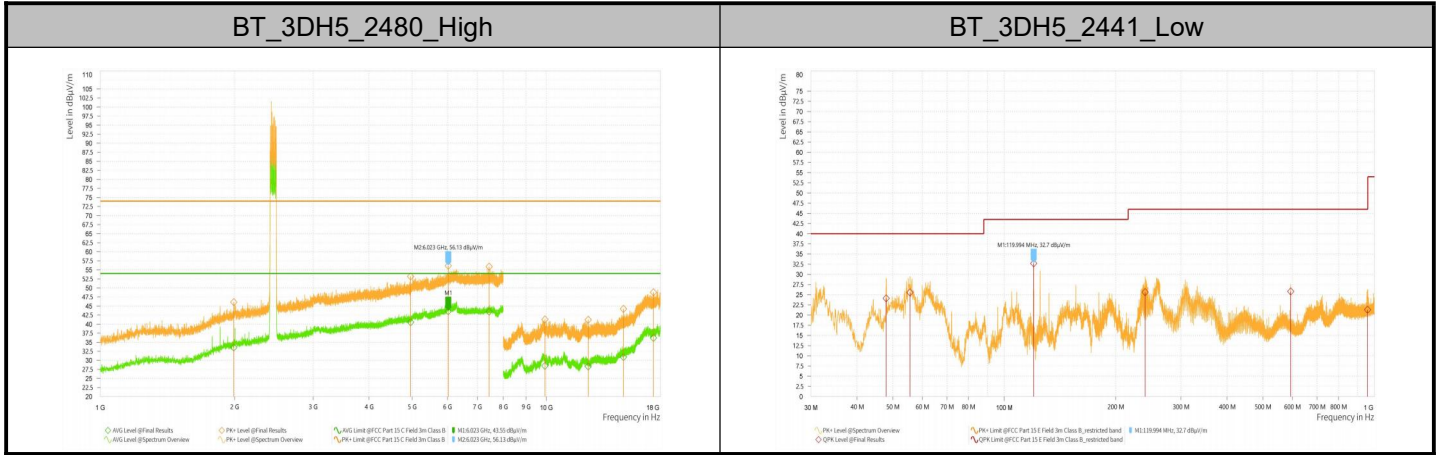
| | | | | | | | | | |
|-------------------|------------|-------|-------|-------|-------|-------|-------|-----|-------|
| | 7,323.000 | 55.85 | 74.00 | 18.15 | 43.09 | 54.00 | 10.91 | H | 360 |
| | 9,763.500 | 40.99 | 74.00 | 33.01 | 28.58 | 54.00 | 25.42 | H | 200.6 |
| | 12,205.000 | 40.59 | 74.00 | 33.41 | 28.30 | 54.00 | 25.70 | H | 282.6 |
| | 14,645.500 | 43.18 | 74.00 | 30.82 | 30.73 | 54.00 | 23.27 | H | 11 |
| | 17,086.500 | 49.43 | 74.00 | 24.57 | 36.66 | 54.00 | 17.34 | V | 0 |
| BT_3DH5_2480_High | 1,991.000 | 46.08 | 74.00 | 27.92 | 33.56 | 54.00 | 20.44 | H | 54.6 |
| | 4,960.000 | 53.17 | 74.00 | 20.83 | 40.54 | 54.00 | 13.46 | H | 0 |
| | 6,022.500 | 56.13 | 74.00 | 17.87 | 43.55 | 54.00 | 10.45 | V | 360 |
| | 7,439.500 | 55.88 | 74.00 | 18.12 | 43.42 | 54.00 | 10.58 | H | 360 |
| | 9,920.500 | 41.32 | 74.00 | 32.68 | 28.46 | 54.00 | 25.54 | H | 360 |
| | 12,400.000 | 41.17 | 74.00 | 32.83 | 28.30 | 54.00 | 25.70 | H | 360 |
| | 14,881.000 | 44.21 | 74.00 | 29.79 | 30.90 | 54.00 | 23.10 | H | 13 |
| 17,359.500 | 48.78 | 74.00 | 25.22 | 36.18 | 54.00 | 17.82 | H | 360 | |

| Test Mode & Test Freq.[MHz] | Frequency [MHz] | QPK Level [dBμV/m] | QPK Limit [dBμV/m] | QPK Margin [dB] | Polarization | Azimuth [deg] |
|-----------------------------|-----------------|--------------------|--------------------|-----------------|--------------|---------------|
| BT_3DH5_2441_Low | 47.945 | 24.11 | 40.00 | 15.89 | V | 0 |
| | 55.597 | 25.55 | 40.00 | 14.45 | V | 155.9 |
| | 119.994 | 32.70 | 43.50 | 10.80 | V | 220.5 |
| | 240.059 | 25.62 | 46.00 | 20.38 | V | 3.8 |
| | 594.001 | 25.82 | 46.00 | 20.18 | V | 286.2 |
| | 958.128 | 21.30 | 46.00 | 24.70 | H | 0 |

Test Graphs_Spurious Emission





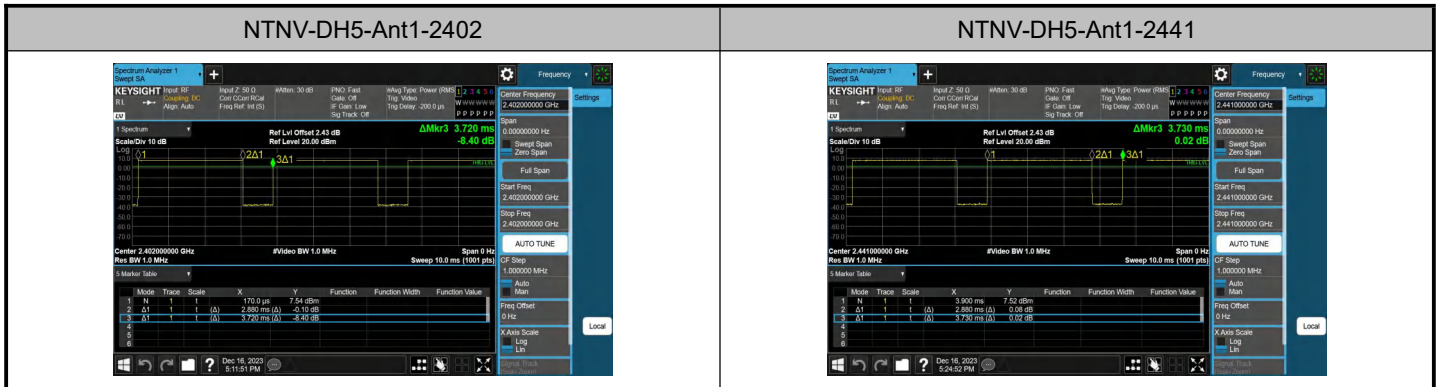


B.2 Duty Cycle

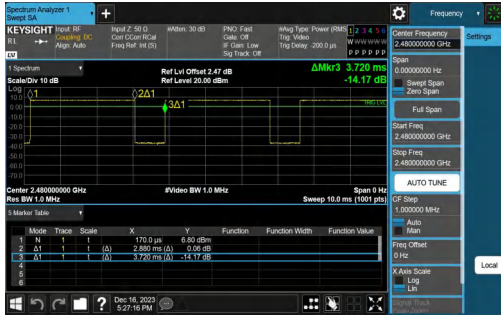
Test Result

| Test Mode | Antenna | Frequency[MHz] | ON Time [ms] | Period [ms] | Duty Cycle [%] | Duty Cycle Factor[dB] |
|-----------|---------|----------------|--------------|-------------|----------------|-----------------------|
| DH5 | Ant1 | 2402 | 2.88 | 3.72 | 77.42 | 1.11 |
| DH5 | Ant1 | 2441 | 2.88 | 3.73 | 77.21 | 1.12 |
| DH5 | Ant1 | 2480 | 2.88 | 3.72 | 77.42 | 1.11 |
| 2DH5 | Ant1 | 2402 | 2.89 | 3.74 | 77.27 | 1.12 |
| 2DH5 | Ant1 | 2441 | 2.89 | 3.74 | 77.27 | 1.12 |
| 2DH5 | Ant1 | 2480 | 2.88 | 3.73 | 77.21 | 1.12 |
| 3DH5 | Ant1 | 2402 | 2.89 | 3.74 | 77.27 | 1.12 |
| 3DH5 | Ant1 | 2441 | 2.89 | 3.74 | 77.27 | 1.12 |
| 3DH5 | Ant1 | 2480 | 2.89 | 3.74 | 77.27 | 1.12 |

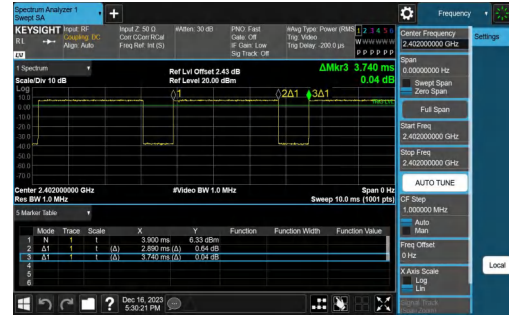
Test Graphs



NTNV-DH5-Ant1-2480



NTNV-2DH5-Ant1-2402



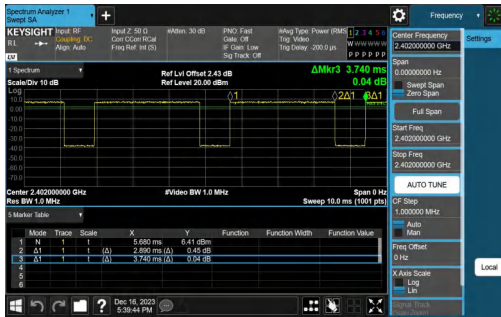
NTNV-2DH5-Ant1-2441



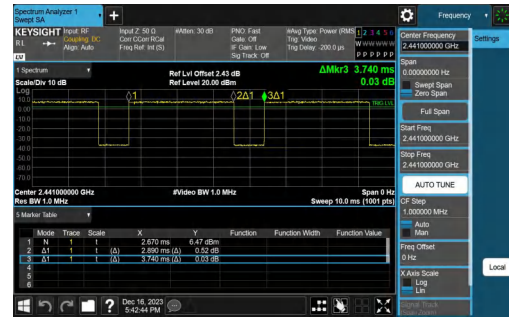
NTNV-2DH5-Ant1-2480



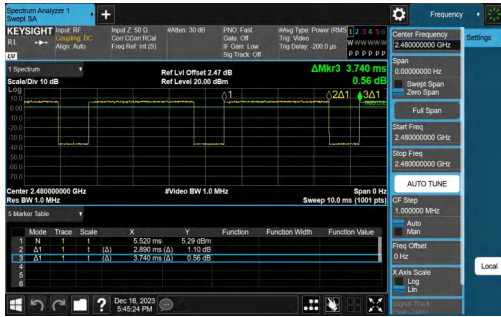
NTNV-3DH5-Ant1-2402



NTNV-3DH5-Ant1-2441



NTNV-3DH5-Ant1-2480



Appendix C – The EUT Appearance

Refer to “Attachment 1: External Photograph” and “ Attachment 2: Internal Photograph” file.

Appendix D – Test Setup Photograph

Refer to “Attachment 5: RF Test Setup Photograph” file.

*****End of the Report*****