# TEST REPORT

| | |
|---|---|
| **Application No.:** | SHCR2410002121HS |
| **FCC ID:** | 2BMRV8013877EV |
| **Applicant:** | DREAM ON ME INC |
| **Address of Applicant:** | 45 VERONICA AVE SOMERSET NJ 08873 |
| **Manufacturer:** | Anhui Cool Baby Science & Technology Development Corporation |
| **Address of Manufacturer:** | NORTH INDUSTRY PARK, JINAN ZONE, LUAN CITY, ANHUI PROVINCE, CHINA |
| **Factory:** | Anhui Cool Baby Science & Technology Development Corporation |
| **Address of Factory:** | NORTH INDUSTRY PARK, JINAN ZONE, LUAN CITY, ANHUI PROVINCE, CHINA |
| **Equipment Under Test (EUT):** | |
| **EUT Name:** | Intelligent Bassinet |
| **Model No.:** | 3877EV |
| **Standard(s) :** | 47 CFR Part 15, Subpart C 15.247 |
| **Date of Receipt:** | 2024-10-23 |
| **Date of Test:** | 2024-10-24 to 2024-11-28 |
| **Date of Issue:** | 2024-11-29 |
| **Test Result:** | **Pass*** |

* In the configuration tested, the EUT complied with the standards specified above.

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Member of the SGS Group (SGS SA)

| Revision Record | | | |
|---|---|---|---|
| **Version** | **Description** | **Date** | **Remark** |
| 00 | Original | 2024-11-29 | / |
| | | | |
| | | | |

| | | | | |
|---|---|---|---|---|
| **Authorized for issue by:** | | | | |
| **Tested By** | | Wade Zhang<br>**Wade Zhang/Project Engineer** | | |
| **Approved By** | | Parlam Zhan<br>**Parlam Zhan / Reviewer** | | |

# 2 Test Summary

| Radio Spectrum Technical Requirement | | | | |
|---|---|---|---|---|
| **Item** | **Standard** | **Method** | **Requirement** | **Result** |
| Antenna Requirement | 47 CFR Part 15, Subpart C 15.247 | N/A | 47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4) | Pass |
| Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence | | N/A | 47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h) | Pass |

| Radio Spectrum Matter Part | | | | |
|---|---|---|---|---|
| **Item** | **Standard** | **Method** | **Requirement** | **Result** |
| Conducted Peak Output Power | 47 CFR Part 15, Subpart C 15.247 | ANSI C63.10 (2013) Section 7.8.5 | 47 CFR Part 15, Subpart C 15.247(b)(1) | Pass |
| 20dB Bandwidth | | ANSI C63.10 (2013) Section 7.8.7 | 47 CFR Part 15, Subpart C 15.247(a)(1) | Pass |
| Carrier Frequencies Separation | | ANSI C63.10 (2013) Section 7.8.2 | 47 CFR Part 15, Subpart C 15.247a(1) | Pass |
| Hopping Channel Number | | ANSI C63.10 (2013) Section 7.8.3 | 47 CFR Part 15, Subpart C 15.247a(1)(iii) | Pass |
| Dwell Time | | ANSI C63.10 (2013) Section 7.8.4 | 47 CFR Part 15, Subpart C 15.247a(1)(iii) | Pass |
| Conducted Band Edges Measurement | | ANSI C63.10 (2013) Section 7.8.6 | 47 CFR Part 15, Subpart C 15.247(d) | Pass |
| Conducted Spurious Emissions | | ANSI C63.10 (2013) Section 7.8.8 | 47 CFR Part 15, Subpart C 15.247(d) | Pass |
| Radiated Spurious Emissions Below 1GHz | | ANSI C63.10 (2013) Section 6.4,6.5 | 47 CFR Part 15, Subpart C 15.205 & 15.209 | Pass |
| Radiated Emissions which fall in the restricted bands | | ANSI C63.10 (2013) Section 6.10.5 | 47 CFR Part 15, Subpart C 15.205 & 15.209 | Pass |
| Radiated Spurious Emissions Above 1GHz | | ANSI C63.10 (2013) Section 6.6 | 47 CFR Part 15, Subpart C 15.205 & 15.209 | Pass |
| Conducted Emissions at AC Power Line (150kHz-30MHz) | | ANSI C63.10 (2013) Section 6.2 | 47 CFR Part 15, Subpart C 15.207 | Pass |

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# 4 General Information

## 4.1 Details of E.U.T.

| | |
|---|---|
| Power supply: | AC 120 V 60Hz<br><br>Adapter Model: HYT-1203000<br>Input:AC100-240V 50/60Hz 0.8A max<br>Output: DC12V 3A |
| Test Voltage: | AC 120 V 60Hz |
| Operation Frequency: | 2402MHz to 2480MHz |
| Modulation Type: | GFSK, pi/4DQPSK, 8DPSK |
| Number of Channels: | 79 |
| Channel Spacing: | 1MHz |
| Spectrum Spread Technology: | Frequency Hopping Spread Spectrum(FHSS) |
| Antenna Type: | PCB Antenna |
| Antenna Gain: | 1.9 dBi (Provided by manufacturer) |
| Antenna Number: | 1 |

## 4.2 Description of Support Units

| Description | Manufacturer | Model No. | Serial No. |
|---|---|---|---|
| Laptop | LENOVO | L460 | - |
| SecureCRT | VanDyke | V 6.2.0 | - |
| Serial port adapter plate | - | Test Plate 3 | - |

## 4.3 Power level setting using in test

| Channel | Power setting | | |
|---|---|---|---|
| | DH5 | 2DH5 | 3DH5 |
| Low | 7 | 7 | 6 |
| Middle | 7 | 7 | 6 |
| High | 7 | 7 | 6 |

## 4.4 Measurement Uncertainty

| No. | Item | Measurement Uncertainty |
|---|---|---|
| 1 | Radio Frequency | $8.4 \times 10^{-8}$ |
| 2 | Timeout | 2s |
| 3 | Duty cycle | 0.4% |
| 4 | Occupied Bandwidth | 3% |
| 5 | RF conducted power | 0.6dB |
| 6 | RF power density | 2.9dB |
| 7 | Conducted Spurious emissions | 0.75dB |
| 8 | RF Radiated power | 5.2dB (Below 1GHz) |
| | | 5.9dB (Above 1GHz) |
| 9 | Radiated Spurious emission test | 4.2dB (Below 30MHz) |
| | | 4.5dB (30MHz-1GHz) |
| | | 5.1dB (1GHz-6GHz) |
| | | 5.4dB (6GHz-18GHz) |
| 10 | Temperature test | 1°C |
| 11 | Humidity test | 3% |
| 12 | Supply voltages | 1.5% |
| 13 | Time | 3% |

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## 4.5 Test Location

All tests were performed at:
SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab
588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China
Tel: +86 21 6191 5666 Fax: +86 21 6191 5678
No tests were sub-contracted.
Note:
1. SGS is not responsible for wrong test results due to incorrect information (e.g. max. clock frequency, highest internal frequency, antenna gain, cable loss, etc ) is provided by the applicant. (if applicable).
2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (if applicable).
3. Sample source: sent by customer.

## 4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

**• A2LA (Certificate No. 6332.01)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the American Association for Laboratory Accreditation(A2LA).

**• FCC (Designation Number: CN1301)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

**• ISED (CAB Identifier: CN0020)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 8617A

**• VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

## 4.7 Deviation from Standards

None

## 4.8 Abnormalities from Standard Conditions

None

# 5 Equipment List

| Equipment | Manufacturer | Model No | Inventory No | Cal Date | Cal Due Date |
|---|---|---|---|---|---|
| **RF Conducted Test** | | | | | |
| Spectrum Analyzer | R&S | FSP-30 | SHEM002-1 | 2023-12-19 | 2024-12-18 |
| Spectrum Analyzer | Keysight | N9020B | SHEM241-1 | 2023-12-19 | 2024-12-18 |
| Spectrum Analyzer | Agilent | N9020A | SHEM181-1 | 2024-07-31 | 2025-07-30 |
| Signal Generator | R&S | SMR20 | SHEM006-1 | 2024-07-31 | 2025-07-30 |
| Signal Generator | Agilent | N5182A | SHEM182-1 | 2024-07-31 | 2025-07-30 |
| Communication Tester | R&S | CMW270 | SHEM183-1 | 2024-05-23 | 2025-05-22 |
| Communication Tester | R&S | CMW500 | SHEM268-1 | 2024-05-23 | 2025-05-22 |
| Power Sensor | Keysight | U2021XA * 4 | SHEM293-1 | 2024-07-31 | 2025-07-30 |
| Splitter | Anritsu | MA1612A | SHEM185-1 | / | / |
| Coupler | e-meca | 803-S-1 | SHEM186-1 | / | / |
| High-low Temp Cabinet | Suzhou Zhihe | TL-40 | SHEM087-1 | 2024-11-05 | 2026-11-04 |
| AC Power Stabilizer | APC | KDF-31020T-V0-F0 | SHEM216-1 | 2023-12-19 | 2024-12-18 |
| DC Power Supply | HP | 6010A | SHEM222-1 | 2023-12-19 | 2024-12-18 |
| Conducted test Cable | / | RF01~RF04 | / | 2023-12-19 | 2024-12-18 |
| Switcher | Tonscend | JS0806 | SHEM293-1 | 2024-07-31 | 2025-07-30 |
| Test software | Tonscend | JS Tonscend BT/WIFI System | Version: 2.6 | / | / |
| Switcher+Power Sensor | TST | TSPS2023R | SHEM263-1 | 2024-07-31 | 2025-07-30 |
| Test software | TST | TST PASS | Version: 2.0 | / | / |
| **RF Radiated Test** | | | | | |
| EMI test Receiver | R&S | ESU40 | SHEM051-1 | 2023-12-19 | 2024-12-18 |
| Spectrum Analyzer | R&S | FSP-30 | SHEM002-1 | 2023-12-19 | 2024-12-18 |
| Communication Tester | R&S | CMW500 | SHEM268-1 | 2024-05-23 | 2025-05-22 |
| Loop Antenna (9kHz-30MHz) | Schwarzbeck | FMZB1519 | SHEM135-1 | 2023-12-19 | 2024-12-18 |
| Antenna (25MHz-2GHz) | Schwarzbeck | VULB9168 | SHEM048-1 | 2023-09-03 | 2025-09-02 |
| Antenna (25MHz-2GHz) | Schwarzbeck | VULB9168 | SHEM202-1 | 2023-04-17 | 2025-04-16 |
| Horn Antenna (1-18GHz) | Schwarzbeck | HF906 | SHEM009-1 | 2024-08-05 | 2026-08-04 |
| Horn Antenna (1-18GHz) | Schwarzbeck | BBHA9120D | SHEM050-1 | 2023-09-03 | 2025-09-02 |
| Horn Antenna (14-40GHz) | Schwarzbeck | BBHA 9170 | SHEM049-1 | 2023-09-03 | 2025-09-02 |
| Pre-Amplifier | HP | 8447D | SHEM236-1 | 2023-12-19 | 2024-12-18 |
| High-amplifier (14-40GHz) | Schwarzbeck | 10001 | SHEM049-2 | 2023-12-19 | 2024-12-18 |
| Band Filter | LORCH | 9BRX-875/X150 | SHEM156-1 | / | / |
| Band Filter | LORCH | 13BRX-1950/X500 | SHEM083-2 | / | / |
| Band Filter | LORCH | 5BRX-2400/X200 | SHEM155-1 | / | / |
| Band Filter | LORCH | 5BRX-5500/X1000 | SHEM157-2 | / | / |
| High pass Filter | Wainwright | WHK3.0/18G | SHEM157-1 | / | / |
| High pass Filter | Wainwright | WHKS1700 | SHEM157-3 | / | / |
| Semi/Fully Anechoic | ST | 11*6*6M | SHEM078-2 | 2023-05-06 | 2026-05-05 |
| RE test Cable | / | PT18-NMNM-10M | SHEM217-2 | 2023-12-19 | 2024-12-18 |
| Test software | ESE | E3 | Version: 6.111221a | / | / |

| Conducted Emissions at Mains Terminals (150kHz-30MHz) | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal Date** | **Cal Due Date** |
| EMI test receiver | Rohde & Schwarz | ESR7 | SHEM162-1 | 2023/12/19 | 2024/12/18 |
| Line impedance stabilization network | SCHWARZBECK | NSLK8127 | SHEM061-1 | 2023/12/19 | 2024/12/18 |
| Line impedance stabilization network | EMCO | 3816_2 | SHEM019-1 | 2023/12/19 | 2024/12/18 |
| Pulse limiter | Rohde & Schwarz | ESH3-Z2 | SHEM029-1 | 2023/12/19 | 2024/12/18 |
| Shielding Room | ZHONGYU | 8*4*3M | SHEM079-2 | 2023/12/19 | 2024/12/18 |
| CE test Cable | / | / | SHEM172-1 | 2023/12/19 | 2024/12/18 |
| Test Software | ESE | e3 | Version: 6.191211 | N/A | N/A |

# 6 Radio Spectrum Technical Requirement

## 6.1 Antenna Requirement

### 6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

### 6.1.2 Conclusion

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is PCB antenna and no consideration of replacement. The best case gain of the antenna is 1.9 dBi.

Antenna location: Refer to internal photo.

## 6.2 Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence

### 6.2.1 Test Requirement:

47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)

### 6.2.2 Conclusion

Standard Requirement:

The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

Compliance for section 15.247(a)(1):

According to Technical Specification, the pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

> Number of shift register stages: 9

> Length of pseudo-random sequence: 29 -1 = 511 bits

> Longest sequence of zeros: 8 (non-inverted signal)

Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:

Each frequency used equally on the average by each transmitter.

According to Technical Specification, the receivers are designed to have input and IF bandwidths that match the hopping channel bandwidths of any transmitters and shift frequencies in synchronization with the transmitted signals.

Compliance for section 15.247(g):

According to Technical Specification, the system transmits the packet with the pseudorandom hopping frequency with a continuous data and the short burst transmission from the Bluetooth system is also transmitted under the frequency hopping system with the pseudorandom hopping frequency system.

Compliance for section 15.247(h):

According to Technical specification, the system incorporates with an adaptive system to detect other user within the spectrum band so that it individually and independently to avoid hopping on the occupied channels.

The system is designed not have the ability to coordinated with other FHSS System in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitter.

# 7 Radio Spectrum Matter Test Results

## 7.1 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(1)

Test Method: ANSI C63.10 (2013) Section 7.8.5

Limit:

| Frequency range(MHz) | Output power of the intentional radiator(watt) |
|---|---|
| 902-928 | 1 for ≥50 hopping channels |
| | 0.25 for 25≤ hopping channels <50 |
| | 1 for digital modulation |
| 2400-2483.5 | 1 for ≥75 non-overlapping hopping channels |
| | 0.125 for all other frequency hopping systems |
| | 1 for digital modulation |
| 5725-5850 | 1 for frequency hopping systems and digital modulation |

### 7.1.1 E.U.T. Operation

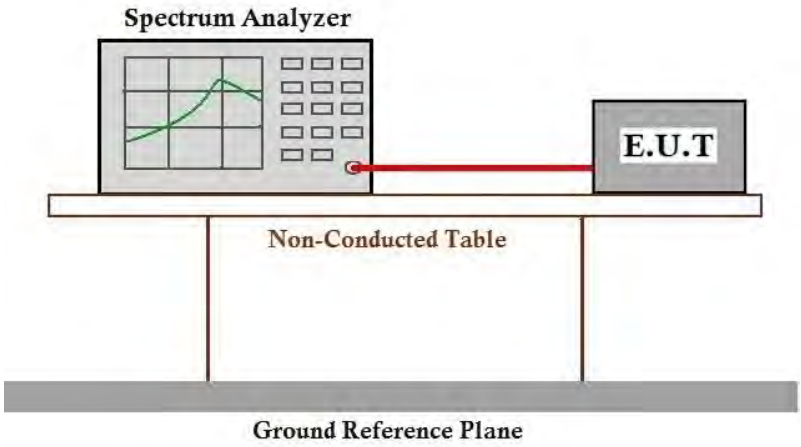
Operating Environment:

Temperature: 24.0 °C Humidity: 56.1 % RH Atmospheric Pressure: 1010 mbar

### 7.1.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|---|---|---|
| Final test | 00 | TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report. |

### 7.1.3 Test Setup Diagram




### 7.1.4 Measurement Procedure and Data

Note: Since the verify power the same operating range bandwidth and smaller power can be covered by the higher power.

Please Refer to Appendix for Details

## 7.2 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247(a)(1)

Test Method: ANSI C63.10 (2013) Section 7.8.7

### 7.2.1 E.U.T. Operation

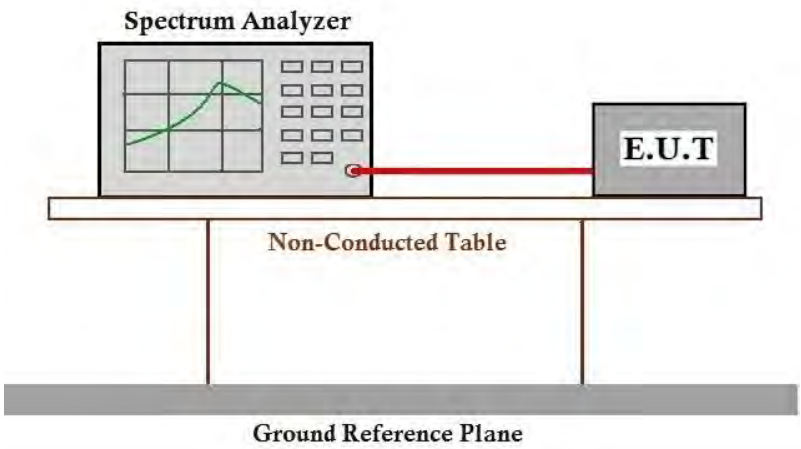
Operating Environment:

Temperature: 24.0 °C Humidity: 56.2 % RH Atmospheric Pressure: 1010 mbar

### 7.2.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|---|---|---|
| Final test | 00 | TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report. |

### 7.2.3 Test Setup Diagram




### 7.2.4 Measurement Procedure and Data

Please Refer to Appendix for Details

## 7.3 Carrier Frequencies Separation

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)

Test Method: ANSI C63.10 (2013) Section 7.8.2

Limit:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, 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, provided the systems operate with an output power no greater than 125 mW.

### 7.3.1 E.U.T. Operation

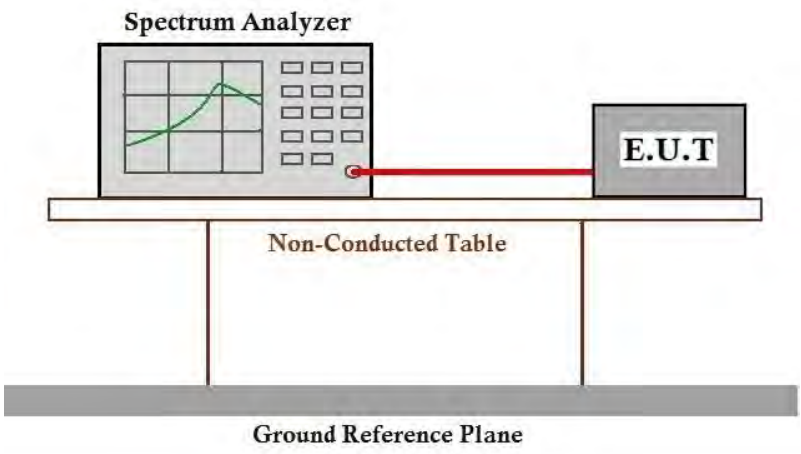
Operating Environment:

Temperature: 23.9 °C Humidity: 56.3 % RH Atmospheric Pressure: 1010 mbar

### 7.3.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|---|---|---|
| Final test | 01 | TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report. |

### 7.3.3 Test Setup Diagram




### 7.3.4 Measurement Procedure and Data

Please Refer to Appendix for Details

## 7.4 Hopping Channel Number

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)
Test Method: ANSI C63.10 (2013) Section 7.8.3

Limit:

| Frequency range(MHz) | Number of hopping channels (minimum) |
|---|---|
| 902-928 | 50 for 20dB bandwidth <250kHz |
| | 25 for 20dB bandwidth ≥250kHz |
| 2400-2483.5 | 15 |
| 5725-5850 | 75 |

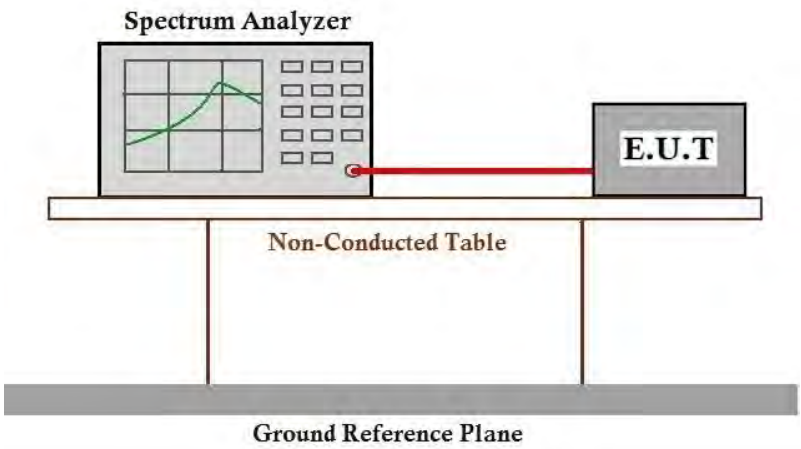
### 7.4.1 E.U.T. Operation

Operating Environment:
Temperature: 23.9 °C Humidity: 56.4 % RH Atmospheric Pressure: 1010 mbar

### 7.4.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|---|---|---|
| Final test | 01 | TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report. |

### 7.4.3 Test Setup Diagram




### 7.4.4 Measurement Procedure and Data

Please Refer to Appendix for Details

## 7.5 Dwell Time

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)
Test Method: ANSI C63.10 (2013) Section 7.8.4

Limit:

| Frequency(MHz) | Limit |
|---|---|
| 902-928 | 0.4S within a 20S period(20dB bandwidth<250kHz) |
| | 0.4S within a 10S period(20dB bandwidth≥250kHz) |
| 2400-2483.5 | 0.4S within a period of 0.4S multiplied by the number of hopping channels |
| 5725-5850 | 0.4S within a 30S period |

### 7.5.1 E.U.T. Operation

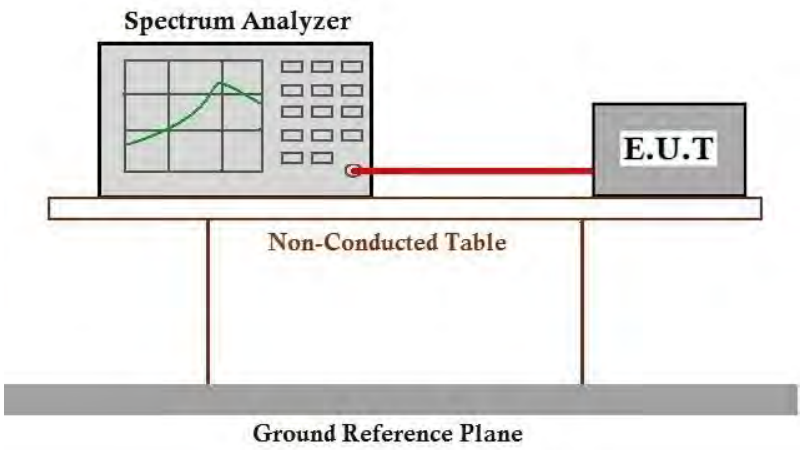
Operating Environment:

Temperature: 24.0 °C Humidity: 56.4 % RH Atmospheric Pressure: 1010 mbar

### 7.5.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|---|---|---|
| Final test | 01 | TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report. |

### 7.5.3 Test Setup Diagram




### 7.5.4 Measurement Procedure and Data

Please Refer to Appendix for Details

## 7.6 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2013) Section 7.8.6

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

### 7.6.1 E.U.T. Operation

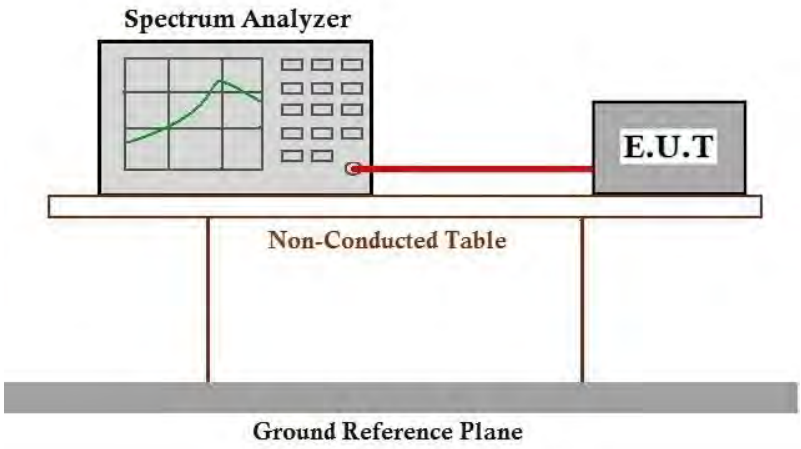
Operating Environment:

Temperature: 24.0 °C Humidity: 56.4 % RH Atmospheric Pressure: 1010 mbar

### 7.6.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|---|---|---|
| Final test | 00 | TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report. |
| Final test | 01 | TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report. |

### 7.6.3 Test Setup Diagram




### 7.6.4 Measurement Procedure and Data

Please Refer to Appendix for Details

## 7.7 Conducted Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2013) Section 7.8.8

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

### 7.7.1 E.U.T. Operation

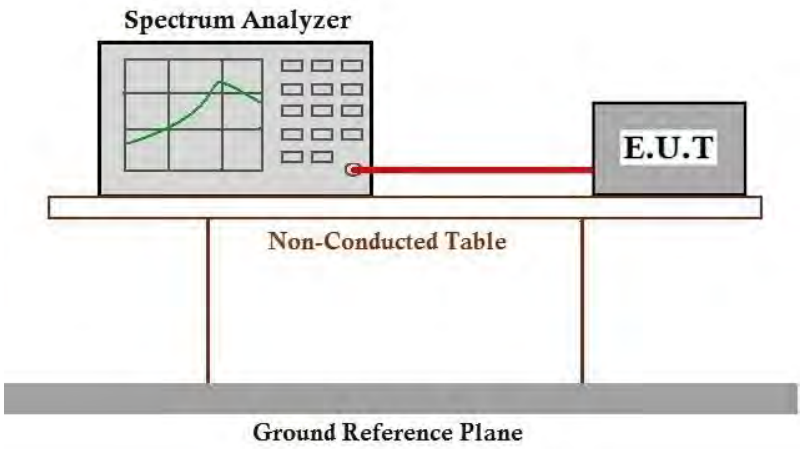
Operating Environment:

Temperature: 24.0 °C Humidity: 56.4 % RH Atmospheric Pressure: 1010 mbar

### 7.7.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|---|---|---|
| Final test | 00 | TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report. |

### 7.7.3 Test Setup Diagram




### 7.7.4 Measurement Procedure and Data

Please Refer to Appendix for Details

## 7.8 Radiated Spurious Emissions Below 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4,6.5

Limit:

| Frequency(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 |
| 960-1000 | 500 | 3 |

### 7.8.1 E.U.T. Operation

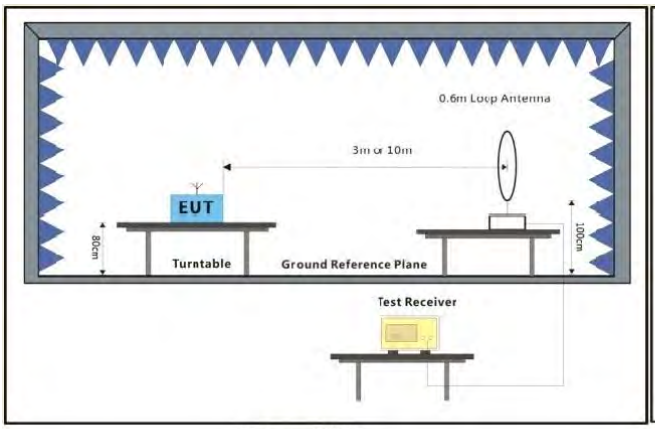
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

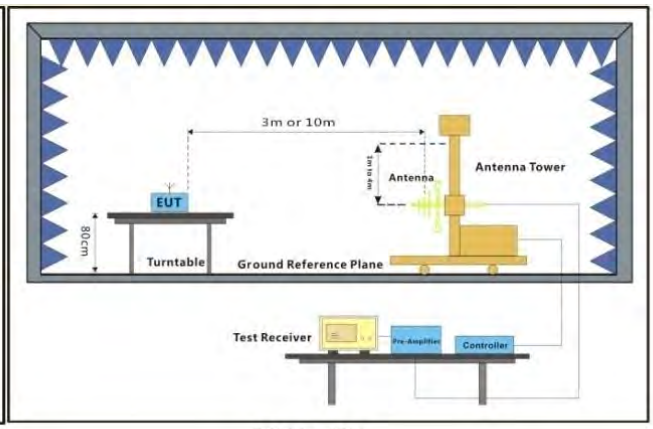
### 7.8.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|---|---|---|
| Final test | 00 | TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report. |

### 7.8.3 Test Setup Diagram




Below 30MHz




30MHz-1GHz

### 7.8.4 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

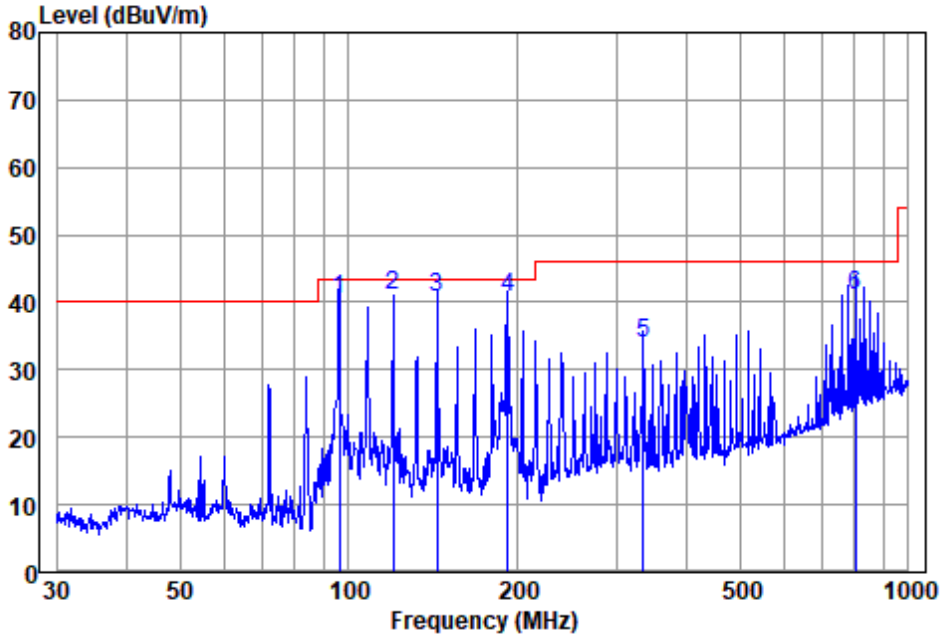
i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

Test Mode: 00; Polarity: Horizontal

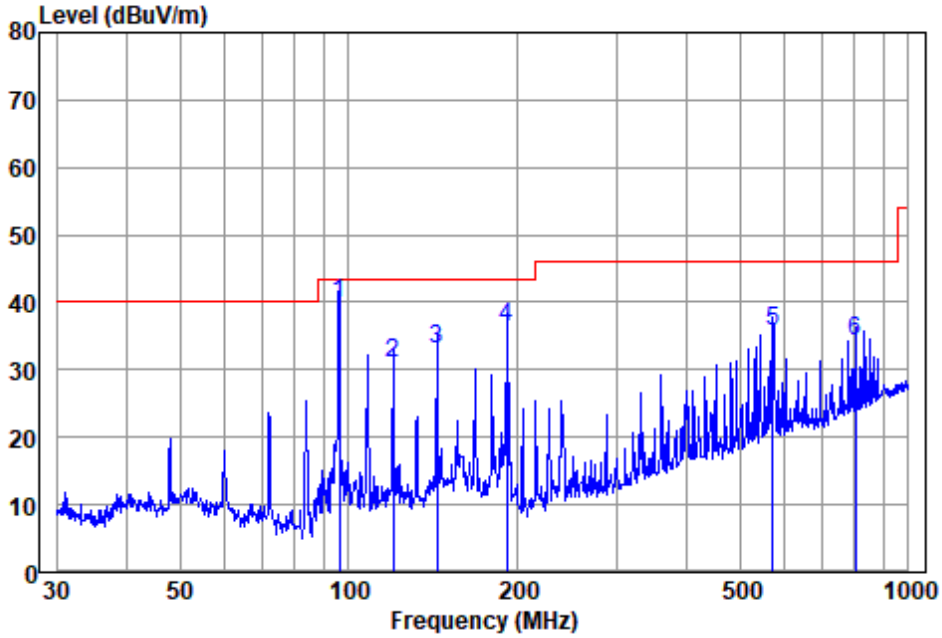



Antenna Polarity :HORIZONTAL
EUT/Project :2121HS
Test mode :00

| | Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 1 | 96.099 | 63.37 | 8.40 | 2.00 | 33.20 | 40.57 | 43.50 | -2.93 | QP |
| 2 | 119.856 | 60.69 | 11.10 | 2.30 | 33.11 | 40.98 | 43.50 | -2.52 | QP |
| 3 | 143.830 | 57.67 | 13.50 | 2.67 | 33.02 | 40.82 | 43.50 | -2.68 | QP |
| 4 | 192.419 | 60.29 | 10.44 | 2.91 | 33.00 | 40.64 | 43.50 | -2.86 | QP |
| 5 | 336.035 | 48.12 | 14.49 | 3.94 | 32.73 | 33.82 | 46.00 | -12.18 | QP |
| 6 | 804.603 | 44.23 | 22.45 | 6.51 | 32.18 | 41.01 | 46.00 | -4.99 | QP |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Vertical




Antenna Polarity :VERTICAL
EUT/Project :2121HS
Test mode :00

| | Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 1 | 96.099 | 62.54 | 8.40 | 2.00 | 33.20 | 39.74 | 43.50 | -3.76 | QP |
| 2 | 119.856 | 50.77 | 11.10 | 2.30 | 33.11 | 31.06 | 43.50 | -12.44 | QP |
| 3 | 143.830 | 49.83 | 13.50 | 2.67 | 33.02 | 32.98 | 43.50 | -10.52 | QP |
| 4 | 191.745 | 56.02 | 10.48 | 2.91 | 33.00 | 36.41 | 43.50 | -7.09 | QP |
| 5 | 572.614 | 43.93 | 19.26 | 5.30 | 32.70 | 35.79 | 46.00 | -10.21 | QP |
| 6 | 804.603 | 37.43 | 22.45 | 6.51 | 32.18 | 34.21 | 46.00 | -11.79 | QP |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

## 7.9 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.10.5

Limit:

| Frequency(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 |
| Above 960 | 500 | 3 |
| Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. | | |

### 7.9.1 E.U.T. Operation

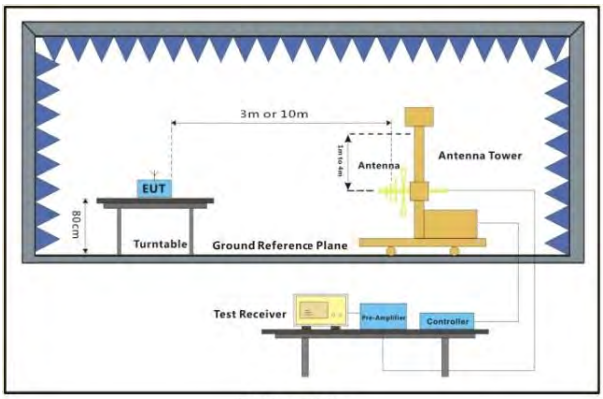
Operating Environment:

Temperature: 24.0 °C Humidity: 56.1 % RH Atmospheric Pressure: 1010 mbar

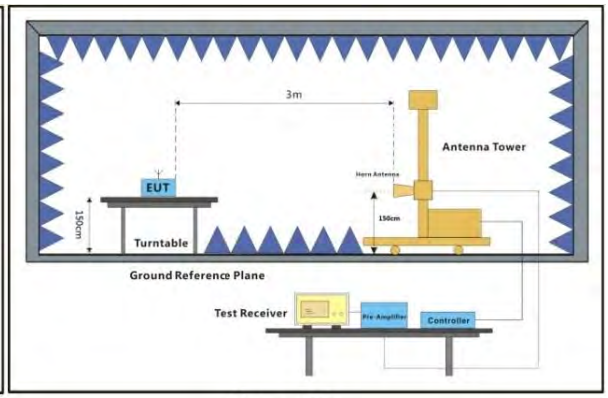
### 7.9.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|---|---|---|
| Final test | 00 | TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report. |

### 7.9.3 Test Setup Diagram




30MHz-1GHz




Above 1GHz

### 7.9.4 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

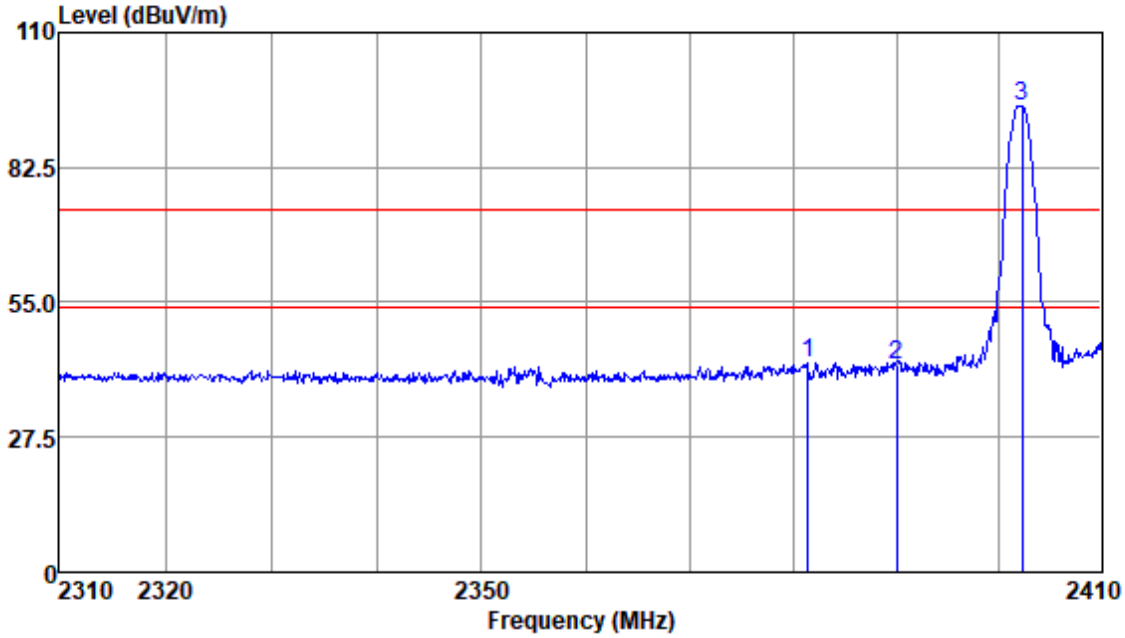
Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

Remark 3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for Peak detection (PK) and Average detection (AV) at frequency above 1GHz.

Remark 4:For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ⩾1/T (Duty cycle＜98%) or 10Hz (Duty cycle⩾98%) for Average detection (AV) at frequency above 1GHz.

Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:Low

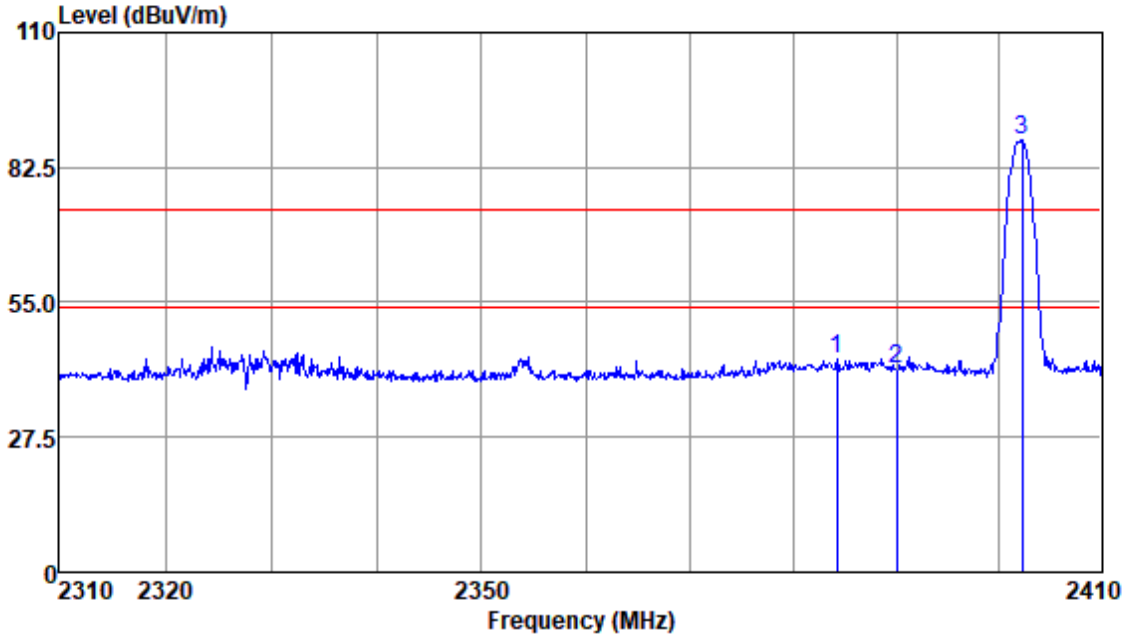



Antenna Polarity :HORIZONTAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 2381.37 | 45.83 | 28.76 | 3.33 | 35.17 | 42.75 | 74.00 | -31.25 | Peak |
| 2390.00 | 45.14 | 28.80 | 3.34 | 35.18 | 42.10 | 74.00 | -31.90 | Peak |
| 2402.25 | 98.11 | 28.85 | 3.34 | 35.19 | 95.11 | 74.00 | 21.11 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:Low

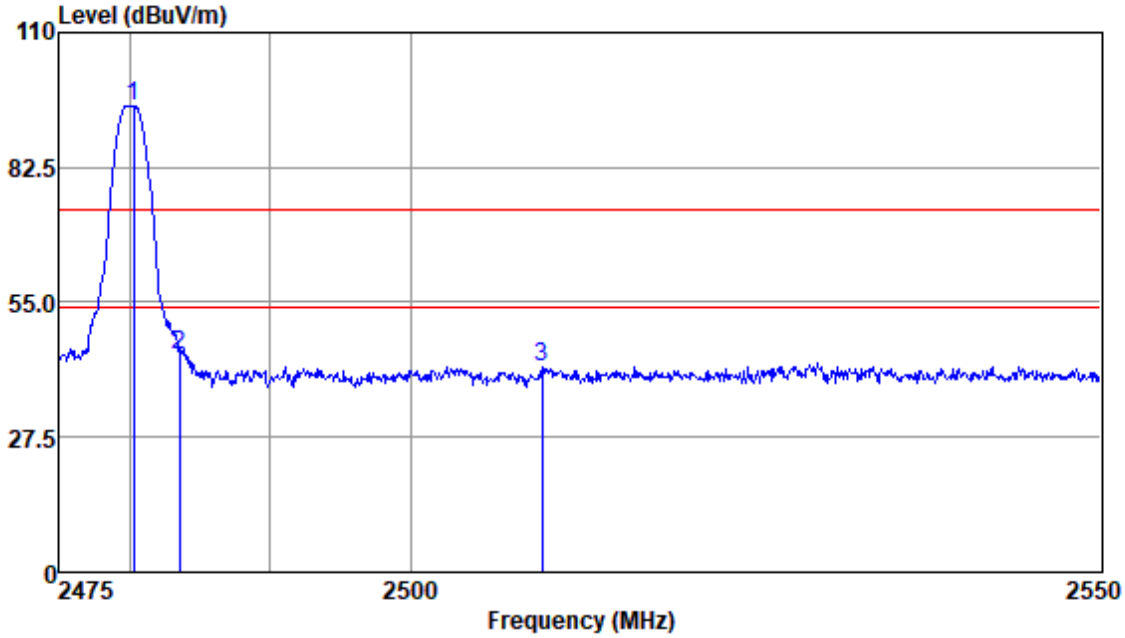



Antenna Polarity :VERTICAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 2384.20 | 46.64 | 28.80 | 3.34 | 35.18 | 43.60 | 74.00 | -30.40 | Peak |
| 2390.00 | 44.58 | 28.80 | 3.34 | 35.18 | 41.54 | 74.00 | -32.46 | Peak |
| 2402.25 | 90.91 | 28.85 | 3.34 | 35.19 | 87.91 | 74.00 | 13.91 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:High

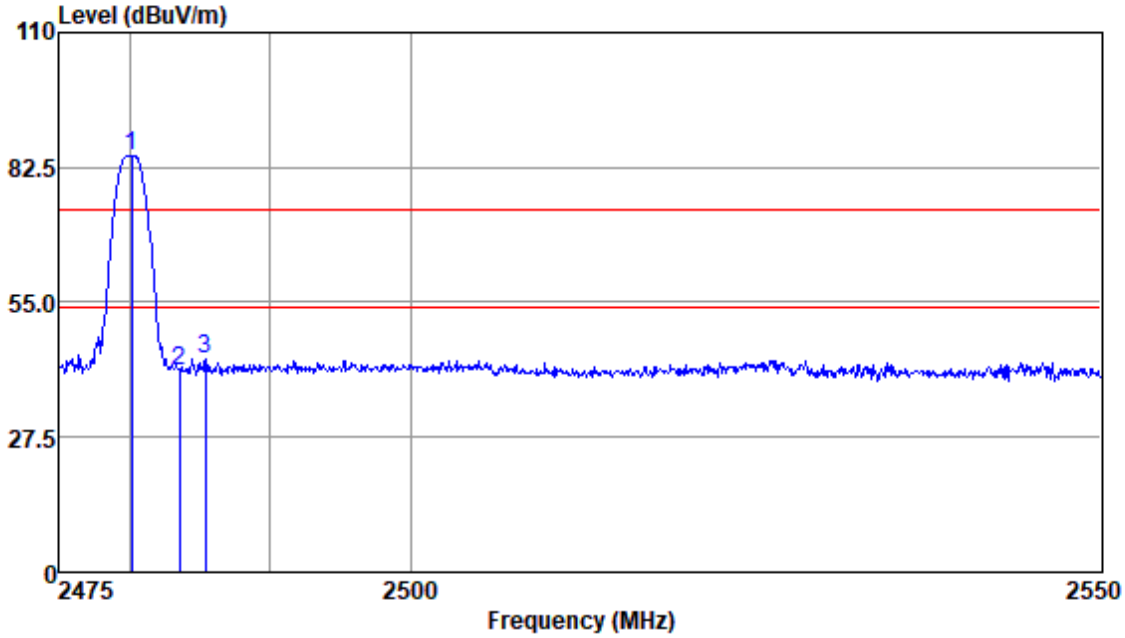



Antenna Polarity :HORIZONTAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 2480.25 | 97.86 | 29.08 | 3.40 | 35.25 | 95.09 | 74.00 | 21.09 | Peak |
| 2483.50 | 47.20 | 29.09 | 3.36 | 35.26 | 44.39 | 74.00 | -29.61 | Peak |
| 2509.45 | 44.75 | 29.13 | 3.39 | 35.28 | 41.99 | 74.00 | -32.01 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:High

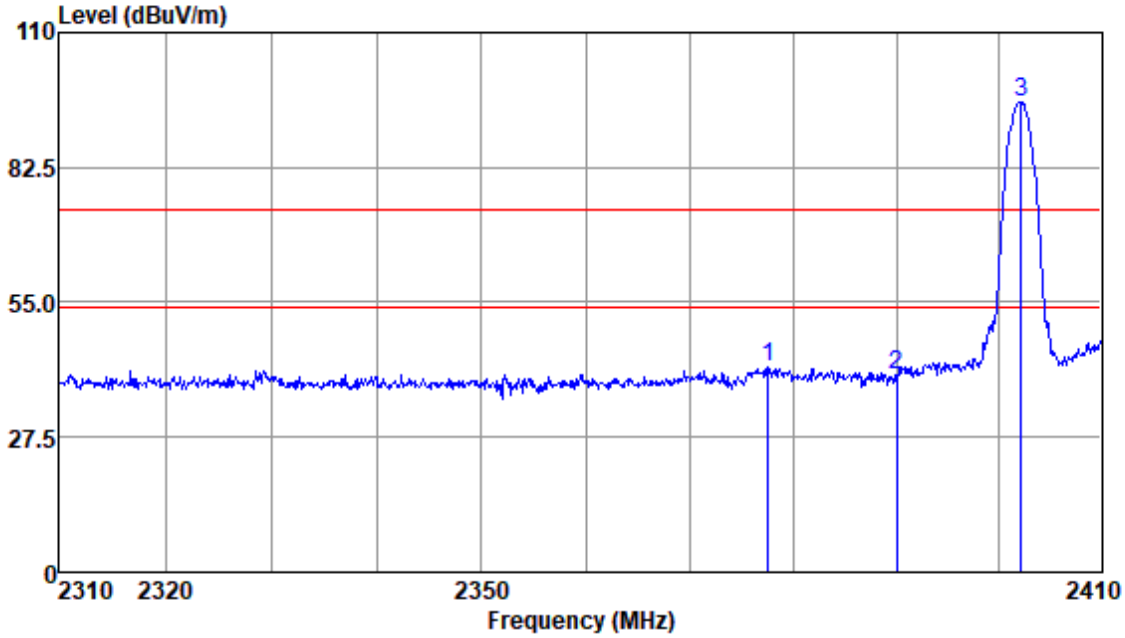



Antenna Polarity :VERTICAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 2480.10 | 87.72 | 29.08 | 3.40 | 35.25 | 84.95 | 74.00 | 10.95 | Peak |
| 2483.50 | 43.98 | 29.09 | 3.36 | 35.26 | 41.17 | 74.00 | -32.83 | Peak |
| 2485.37 | 46.43 | 29.09 | 3.36 | 35.26 | 43.62 | 74.00 | -30.38 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Horizontal; Modulation:π/4 DQPSK; Channel:Low

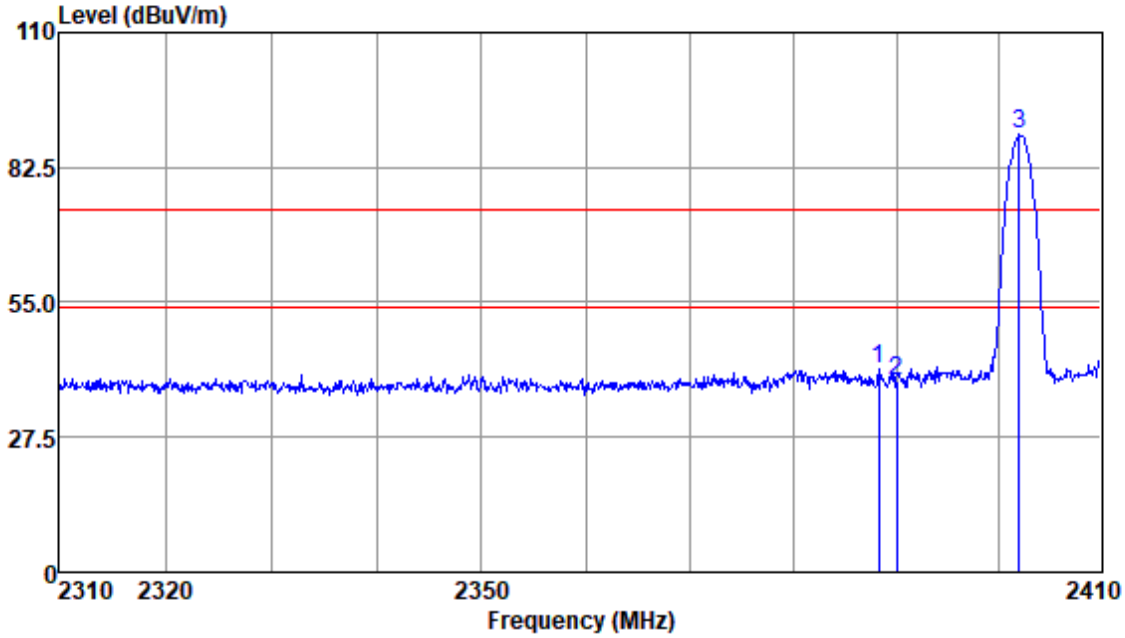



Antenna Polarity :HORIZONTAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 2377.54 | 44.75 | 28.76 | 3.33 | 35.17 | 41.67 | 74.00 | -32.33 | Peak |
| 2390.00 | 43.03 | 28.80 | 3.34 | 35.18 | 39.99 | 74.00 | -34.01 | Peak |
| 2402.15 | 98.87 | 28.85 | 3.34 | 35.19 | 95.87 | 74.00 | 21.87 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Vertical; Modulation:π/4 DQPSK; Channel:Low

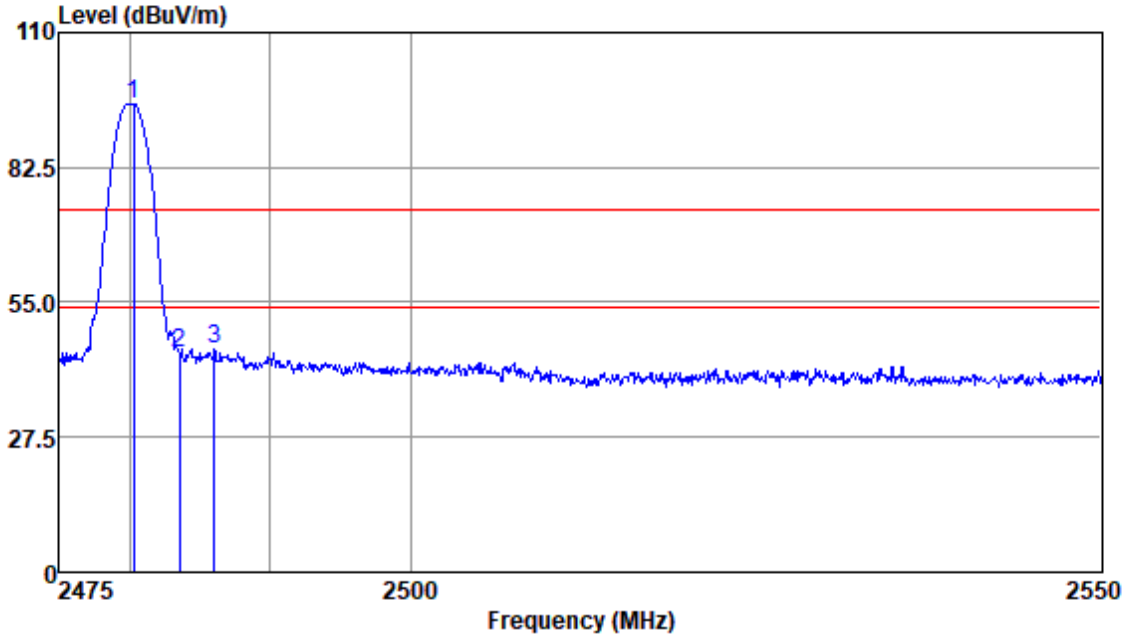



Antenna Polarity :VERTICAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 2388.24 | 44.60 | 28.80 | 3.34 | 35.18 | 41.56 | 74.00 | -32.44 | Peak |
| 2390.00 | 42.20 | 28.80 | 3.34 | 35.18 | 39.16 | 74.00 | -34.84 | Peak |
| 2401.95 | 92.18 | 28.85 | 3.34 | 35.19 | 89.18 | 74.00 | 15.18 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Horizontal; Modulation:π/4 DQPSK; Channel:High

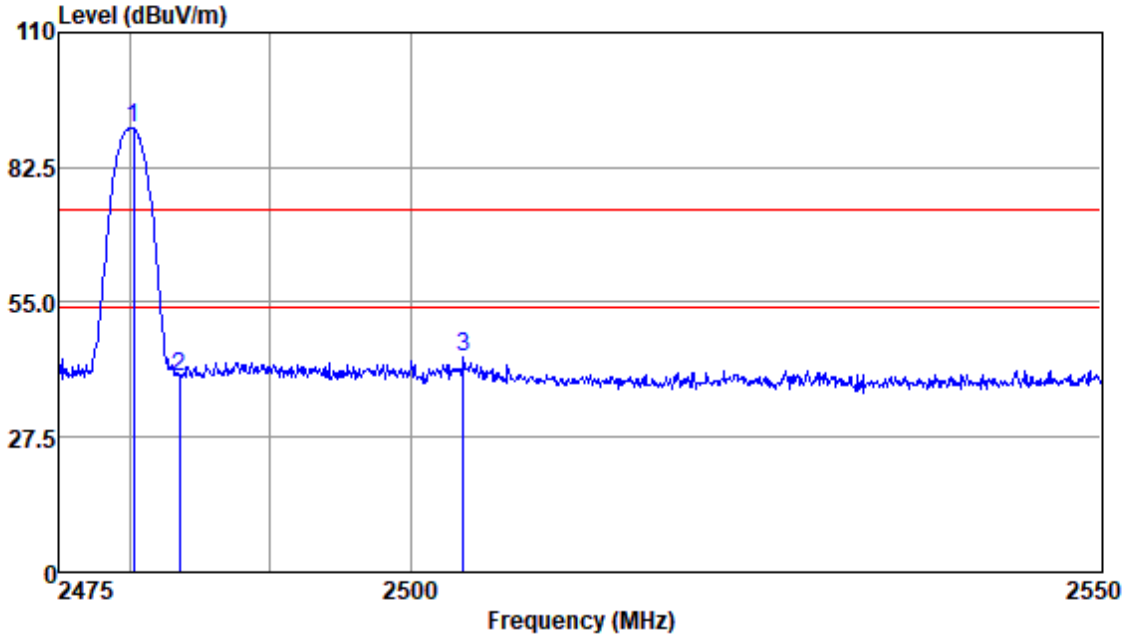



Antenna Polarity :HORIZONTAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 2480.25 | 98.31 | 29.08 | 3.40 | 35.25 | 95.54 | 74.00 | 21.54 | Peak |
| 2483.50 | 47.46 | 29.09 | 3.36 | 35.26 | 44.65 | 74.00 | -29.35 | Peak |
| 2486.03 | 48.26 | 29.09 | 3.36 | 35.26 | 45.45 | 74.00 | -28.55 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Vertical; Modulation:π/4 DQPSK; Channel:High

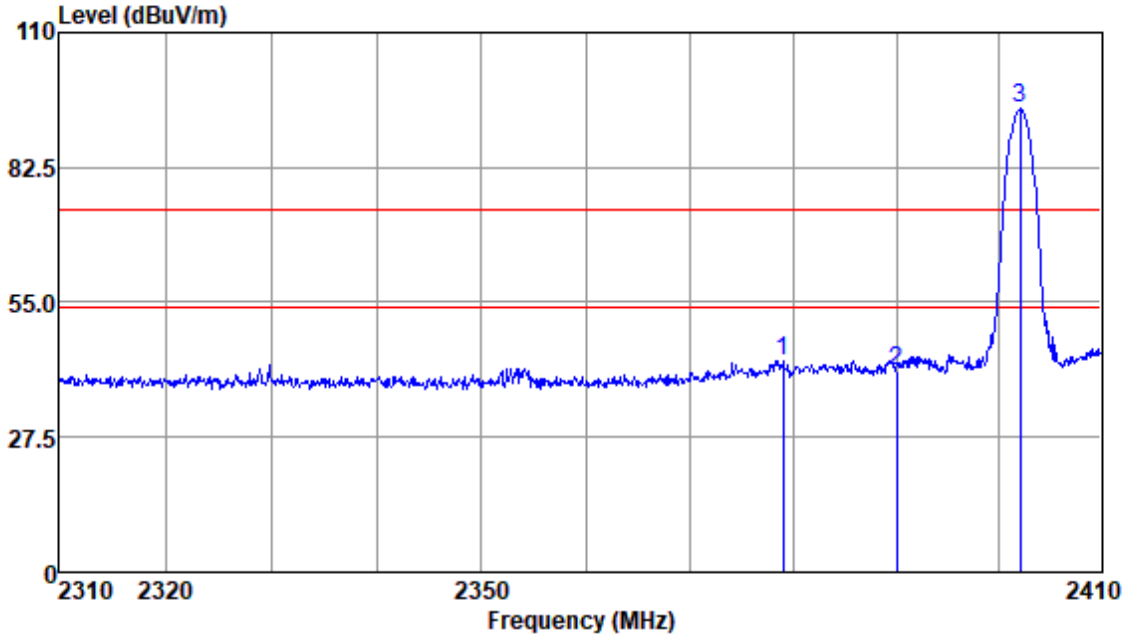



Antenna Polarity :VERTICAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 2480.25 | 93.38 | 29.08 | 3.40 | 35.25 | 90.61 | 74.00 | 16.61 | Peak |
| 2483.50 | 42.39 | 29.09 | 3.36 | 35.26 | 39.58 | 74.00 | -34.42 | Peak |
| 2503.83 | 46.66 | 29.13 | 3.39 | 35.28 | 43.90 | 74.00 | -30.10 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Horizontal; Modulation:8DPSK; Channel:Low

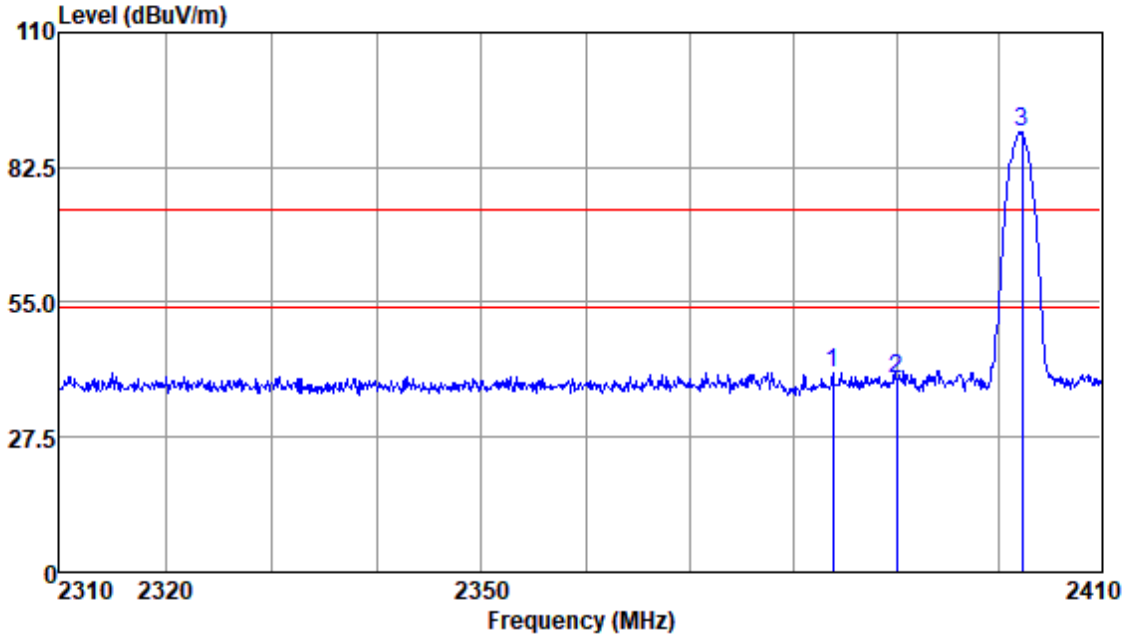



Antenna Polarity :HORIZONTAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 2379.05 | 46.15 | 28.76 | 3.33 | 35.17 | 43.07 | 74.00 | -30.93 | Peak |
| 2390.00 | 44.18 | 28.80 | 3.34 | 35.18 | 41.14 | 74.00 | -32.86 | Peak |
| 2402.05 | 97.45 | 28.85 | 3.34 | 35.19 | 94.45 | 74.00 | 20.45 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Vertical; Modulation:8DPSK; Channel:Low

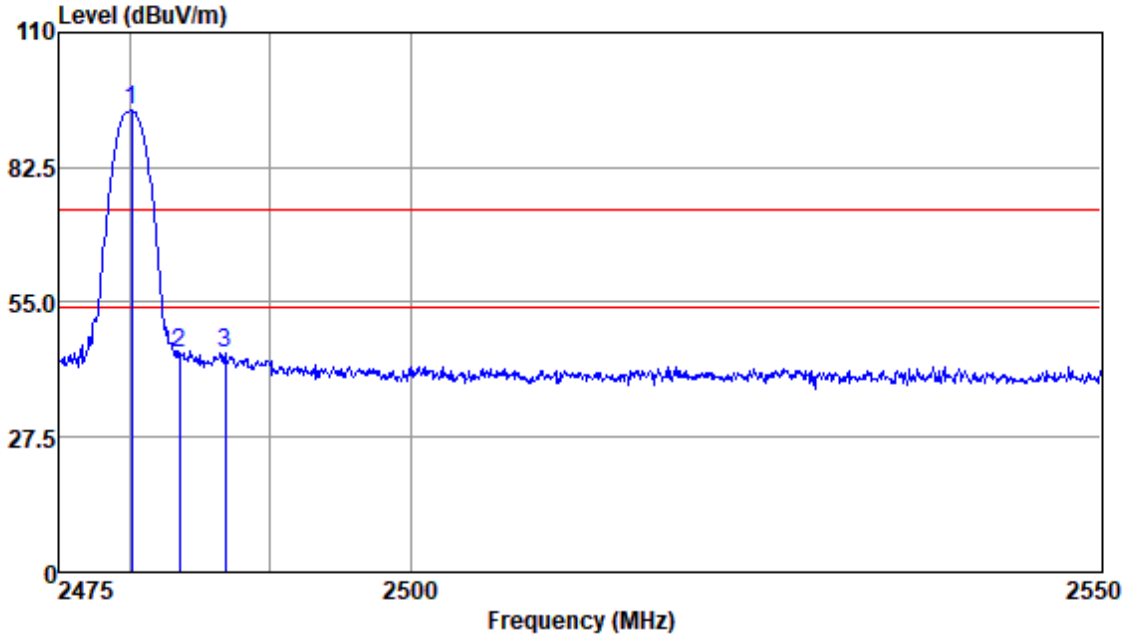



Antenna Polarity :VERTICAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 2383.79 | 43.60 | 28.80 | 3.34 | 35.18 | 40.56 | 74.00 | -33.44 | Peak |
| 2390.00 | 42.32 | 28.80 | 3.34 | 35.18 | 39.28 | 74.00 | -34.72 | Peak |
| 2402.25 | 92.84 | 28.85 | 3.34 | 35.19 | 89.84 | 74.00 | 15.84 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Horizontal; Modulation:8DPSK; Channel:High

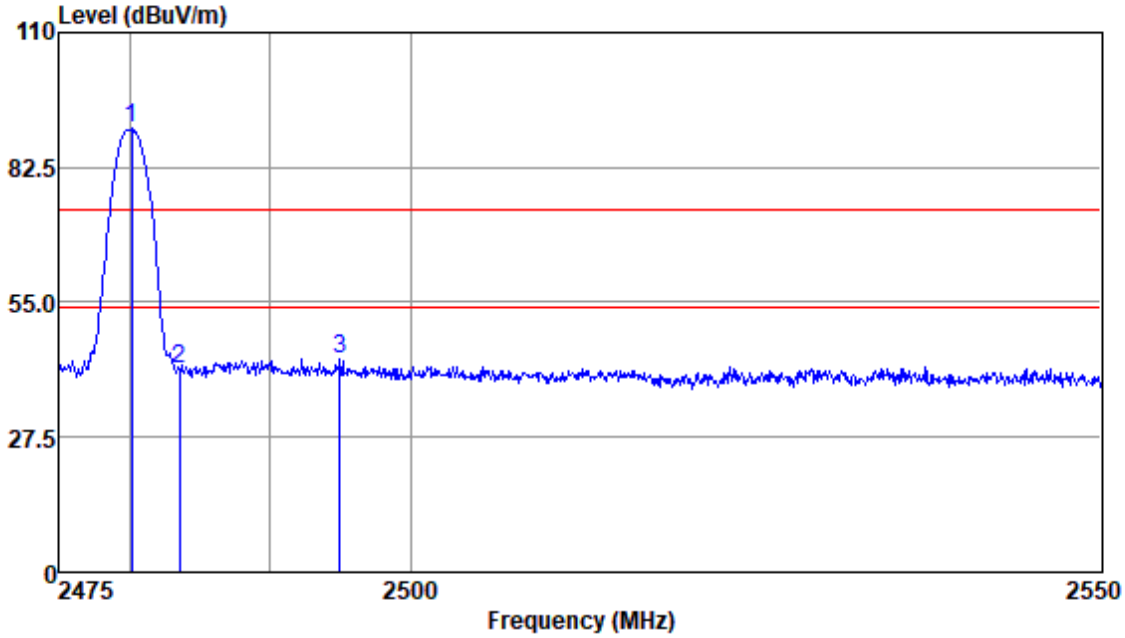



Antenna Polarity :HORIZONTAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 2480.10 | 96.94 | 29.08 | 3.40 | 35.25 | 94.17 | 74.00 | 20.17 | Peak |
| 2483.50 | 47.35 | 29.09 | 3.36 | 35.26 | 44.54 | 74.00 | -29.46 | Peak |
| 2486.78 | 47.65 | 29.09 | 3.36 | 35.26 | 44.84 | 74.00 | -29.16 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Vertical; Modulation:8DPSK; Channel:High




Antenna Polarity :VERTICAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 2480.10 | 93.10 | 29.08 | 3.40 | 35.25 | 90.33 | 74.00 | 16.33 | Peak |
| 2483.50 | 44.40 | 29.09 | 3.36 | 35.26 | 41.59 | 74.00 | -32.41 | Peak |
| 2494.96 | 46.28 | 29.10 | 3.33 | 35.26 | 43.45 | 74.00 | -30.55 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

## 7.10 Radiated Spurious Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.6

Limit:

| Frequency(MHz) | Field strength(microvolts/meter) | Measurement distance(meters) |
|---|---|---|
| Above 1000 | 500 | 3 |

### 7.10.1 E.U.T. Operation

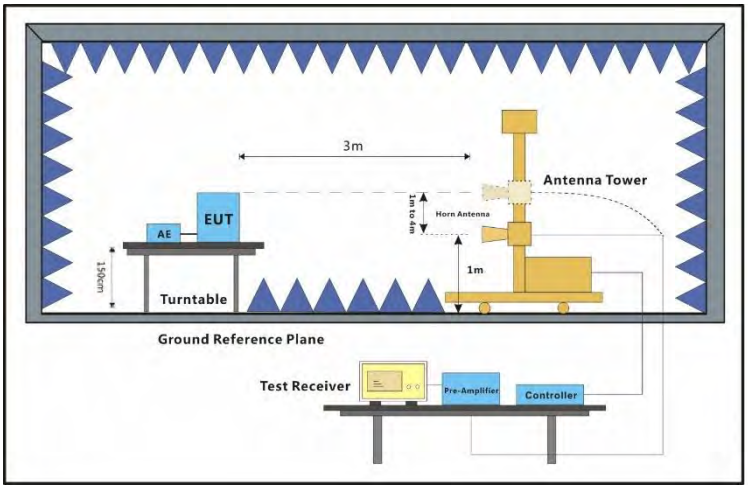
Operating Environment:

Temperature: 24.0 °C Humidity: 55.9 % RH Atmospheric Pressure: 1010 mbar

### 7.10.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|---|---|---|
| Final test | 00 | TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report. |

### 7.10.3 Test Setup Diagram



### 7.10.4 Measurement Procedure and Data

a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

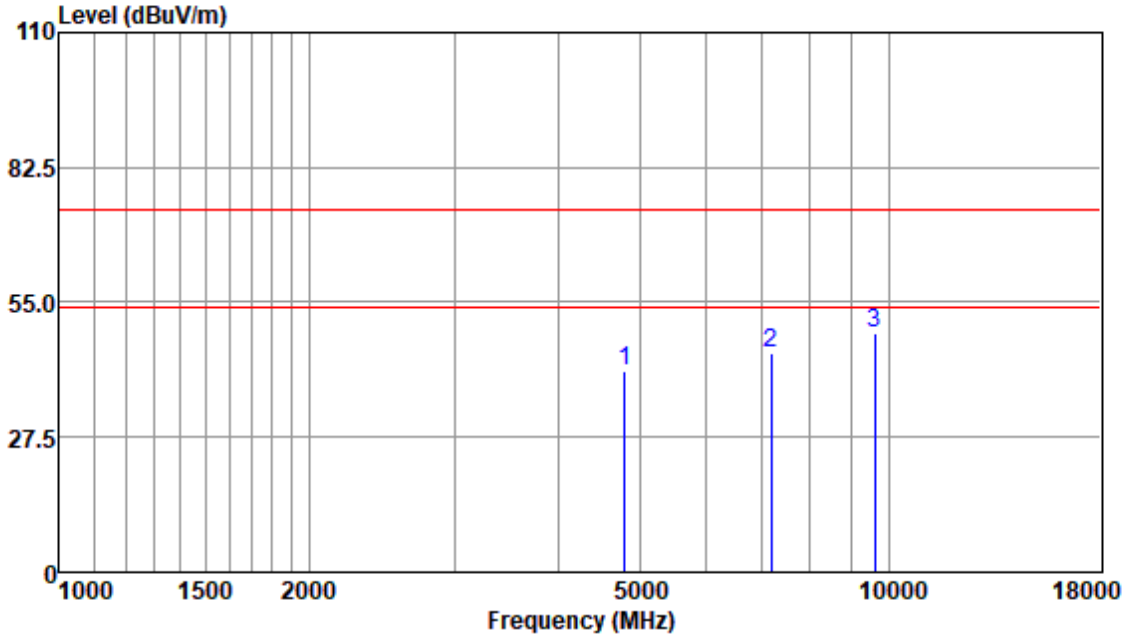
2. Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

4: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for Peak detection (PK) and Average detection (AV) at frequency above 1GHz.

5:For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ⩾1/T (Duty cycle＜98%) or 10Hz (Duty cycle⩾98%) for Average detection (AV) at frequency above 1GHz.

Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:Low

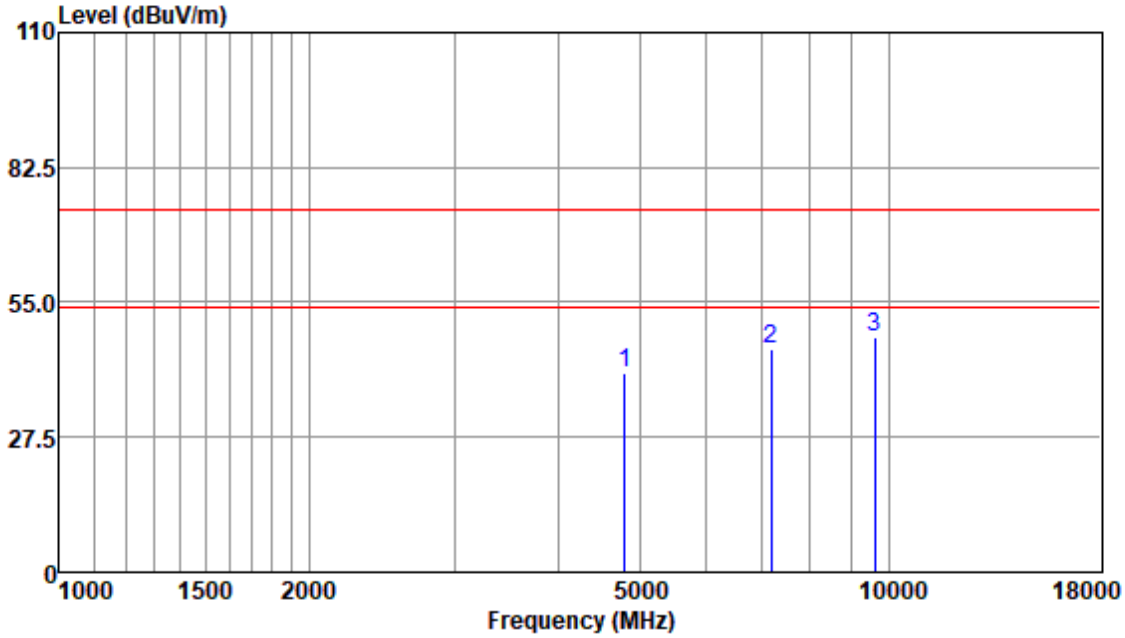



Antenna Polarity :HORIZONTAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4804.11 | 38.84 | 33.57 | 5.22 | 36.79 | 40.84 | 74.00 | -33.16 | Peak |
| 7206.31 | 36.73 | 36.24 | 7.13 | 35.53 | 44.57 | 74.00 | -29.43 | Peak |
| 9608.43 | 36.01 | 37.75 | 8.66 | 33.58 | 48.84 | 74.00 | -25.16 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:Low

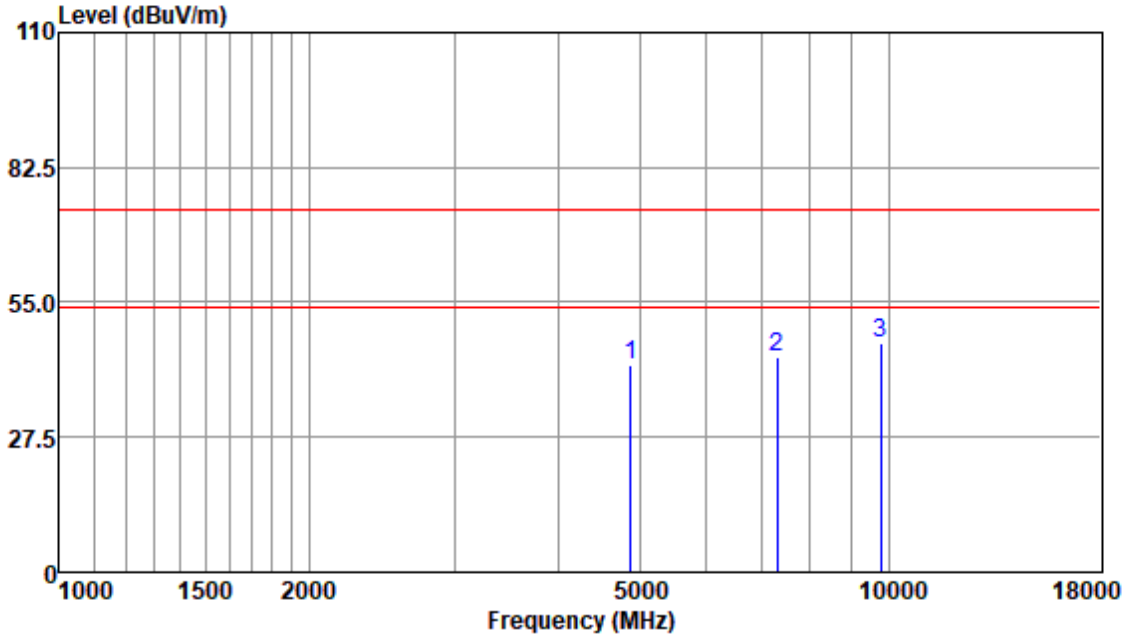



Antenna Polarity :VERTICAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4804.11 | 38.48 | 33.57 | 5.22 | 36.79 | 40.48 | 74.00 | -33.52 | Peak |
| 7206.31 | 37.78 | 36.24 | 7.13 | 35.53 | 45.62 | 74.00 | -28.38 | Peak |
| 9608.43 | 35.24 | 37.75 | 8.66 | 33.58 | 48.07 | 74.00 | -25.93 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:middle

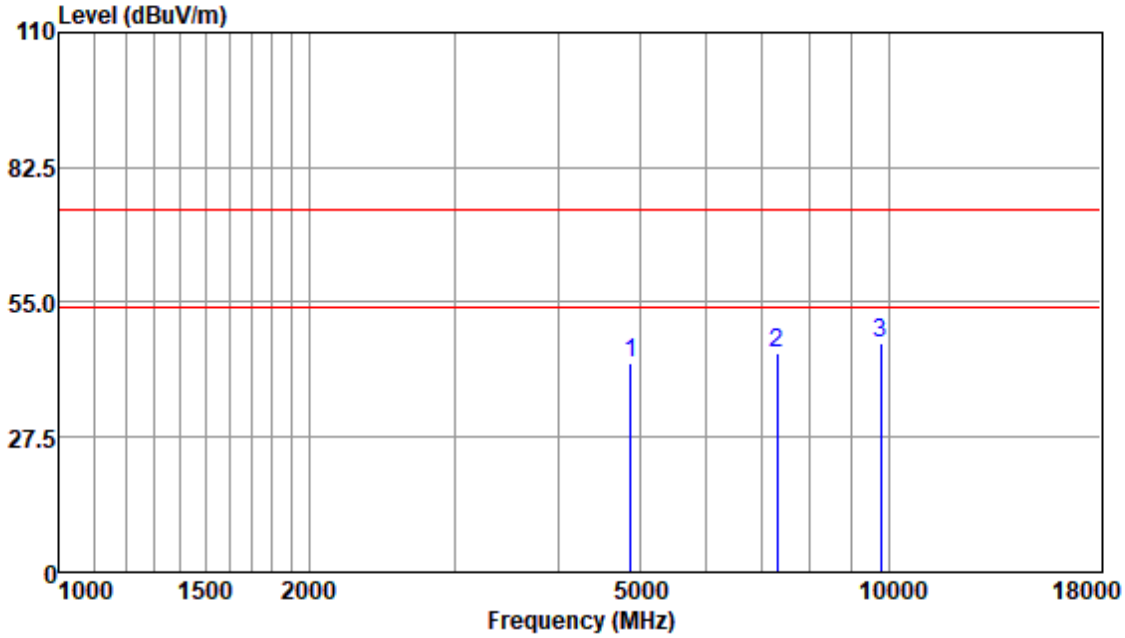



Antenna Polarity :HORIZONTAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4882.15 | 40.08 | 33.66 | 5.36 | 36.81 | 42.29 | 74.00 | -31.71 | Peak |
| 7323.27 | 35.50 | 36.33 | 7.33 | 35.42 | 43.74 | 74.00 | -30.26 | Peak |
| 9764.37 | 33.92 | 37.54 | 8.84 | 33.50 | 46.80 | 74.00 | -27.20 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:middle

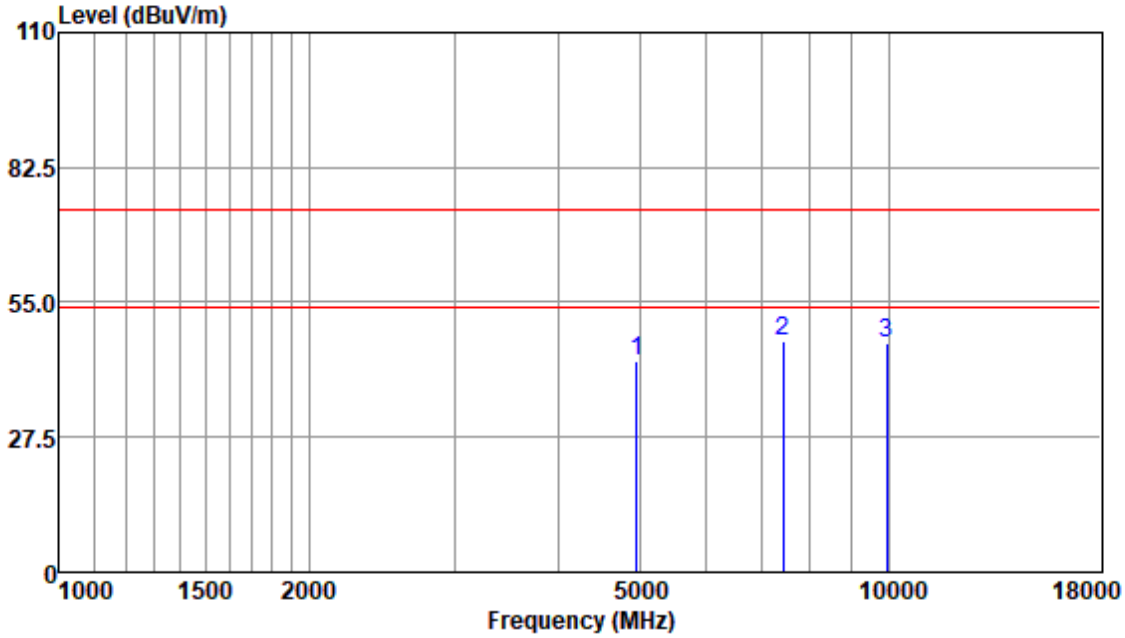



Antenna Polarity :VERTICAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4882.15 | 40.48 | 33.66 | 5.36 | 36.81 | 42.69 | 74.00 | -31.31 | Peak |
| 7323.27 | 36.56 | 36.33 | 7.33 | 35.42 | 44.80 | 74.00 | -29.20 | Peak |
| 9764.37 | 33.60 | 37.54 | 8.84 | 33.50 | 46.48 | 74.00 | -27.52 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:High

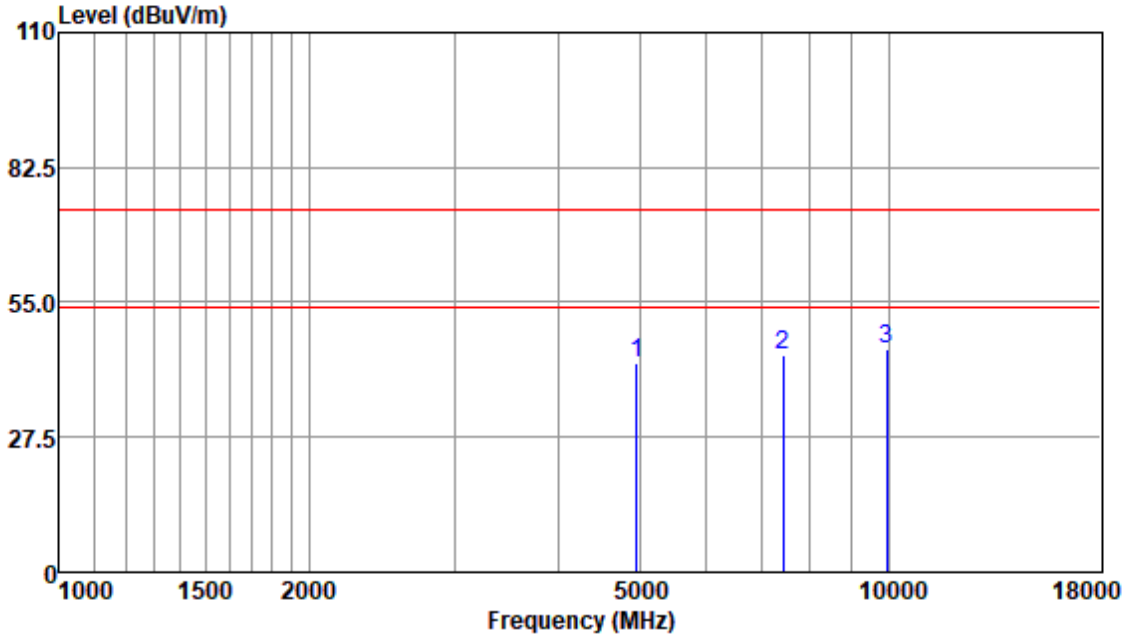



Antenna Polarity :HORIZONTAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4960.31 | 40.63 | 33.65 | 5.46 | 36.83 | 42.91 | 74.00 | -31.09 | Peak |
| 7440.91 | 38.87 | 36.31 | 7.43 | 35.34 | 47.27 | 74.00 | -26.73 | Peak |
| 9920.99 | 33.63 | 37.62 | 8.69 | 33.41 | 46.53 | 74.00 | -27.47 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:High

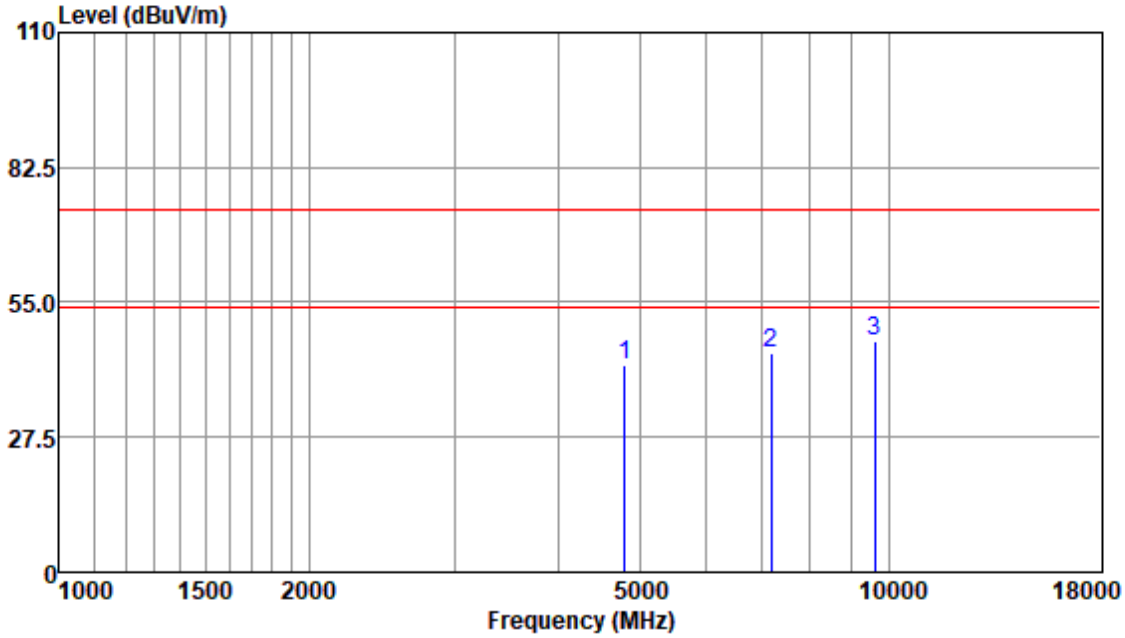



Antenna Polarity :VERTICAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4960.31 | 40.18 | 33.65 | 5.46 | 36.83 | 42.46 | 74.00 | -31.54 | Peak |
| 7440.91 | 35.78 | 36.31 | 7.43 | 35.34 | 44.18 | 74.00 | -29.82 | Peak |
| 9920.99 | 32.59 | 37.62 | 8.69 | 33.41 | 45.49 | 74.00 | -28.51 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Horizontal; Modulation:π/4 DQPSK; Channel:Low

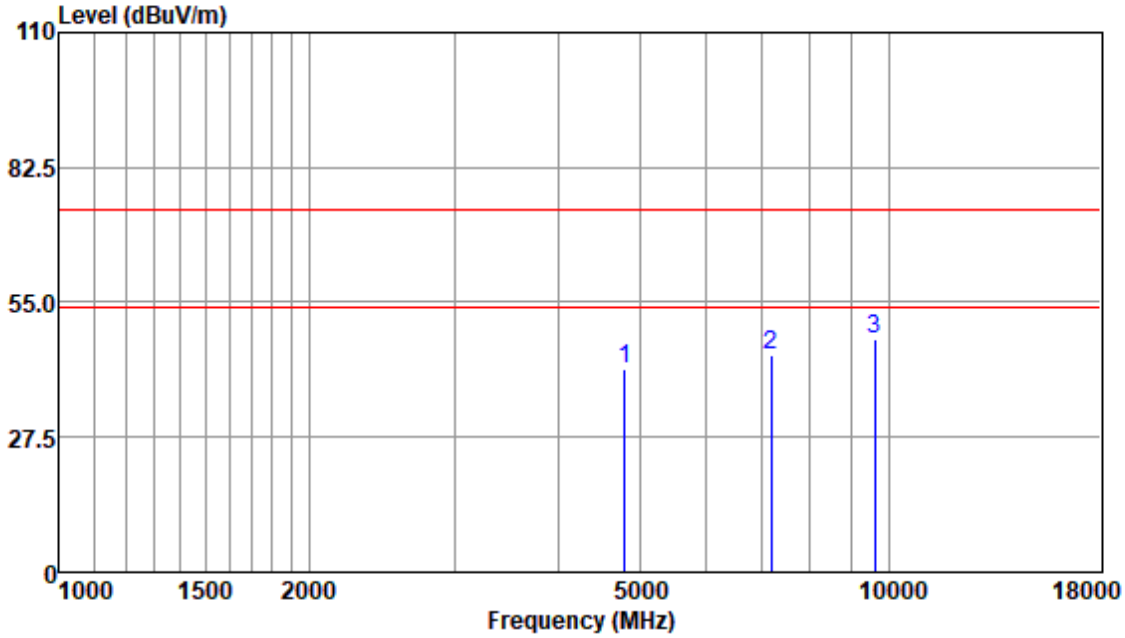



Antenna Polarity :HORIZONTAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4804.11 | 40.14 | 33.57 | 5.22 | 36.79 | 42.14 | 74.00 | -31.86 | Peak |
| 7206.31 | 36.93 | 36.24 | 7.13 | 35.53 | 44.77 | 74.00 | -29.23 | Peak |
| 9608.43 | 34.39 | 37.75 | 8.66 | 33.58 | 47.22 | 74.00 | -26.78 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Vertical; Modulation:π/4 DQPSK; Channel:Low

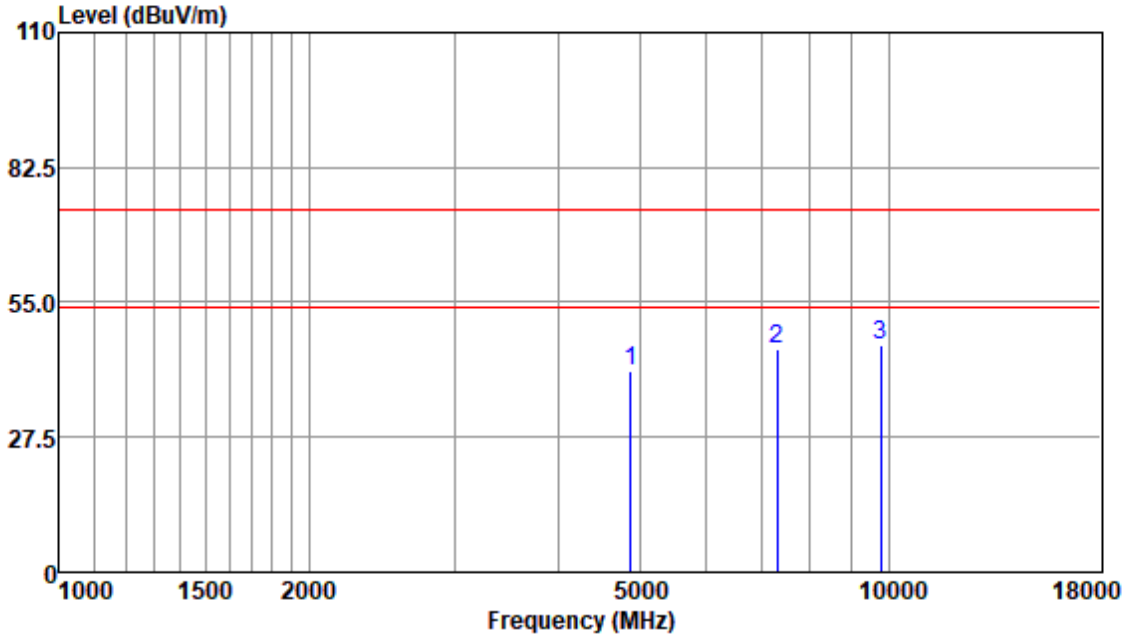



Antenna Polarity :VERTICAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4804.11 | 39.37 | 33.57 | 5.22 | 36.79 | 41.37 | 74.00 | -32.63 | Peak |
| 7206.31 | 36.33 | 36.24 | 7.13 | 35.53 | 44.17 | 74.00 | -29.83 | Peak |
| 9608.43 | 34.76 | 37.75 | 8.66 | 33.58 | 47.59 | 74.00 | -26.41 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Horizontal; Modulation:π/4 DQPSK; Channel:middle

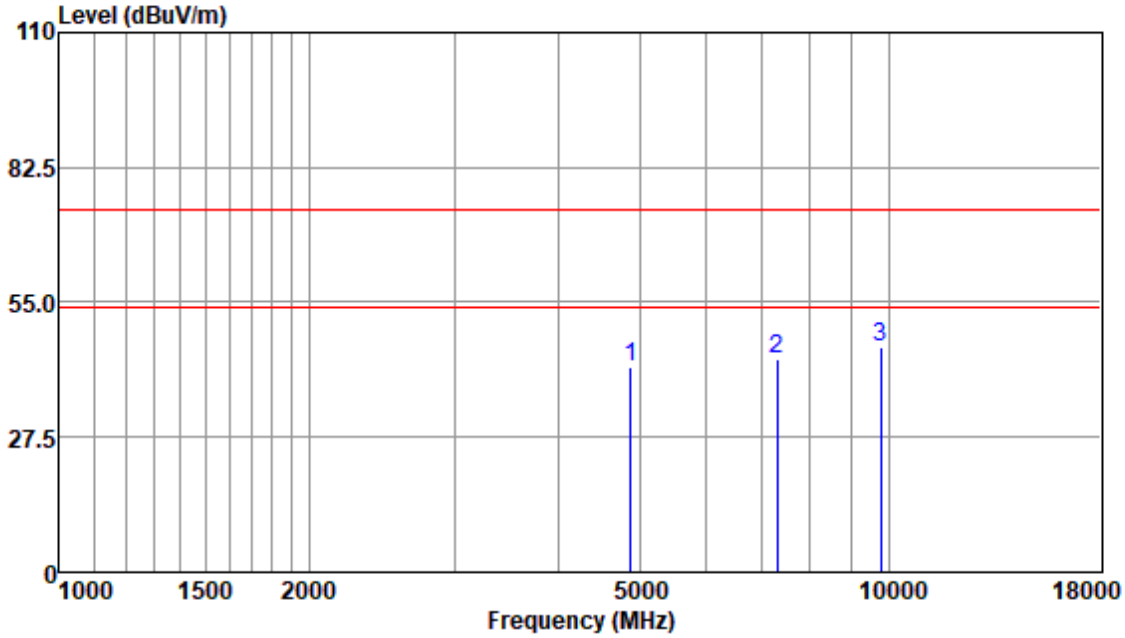



Antenna Polarity :HORIZONTAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4882.15 | 38.87 | 33.66 | 5.36 | 36.81 | 41.08 | 74.00 | -32.92 | Peak |
| 7323.27 | 37.25 | 36.33 | 7.33 | 35.42 | 45.49 | 74.00 | -28.51 | Peak |
| 9764.37 | 33.37 | 37.54 | 8.84 | 33.50 | 46.25 | 74.00 | -27.75 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Vertical; Modulation:π/4 DQPSK; Channel:middle

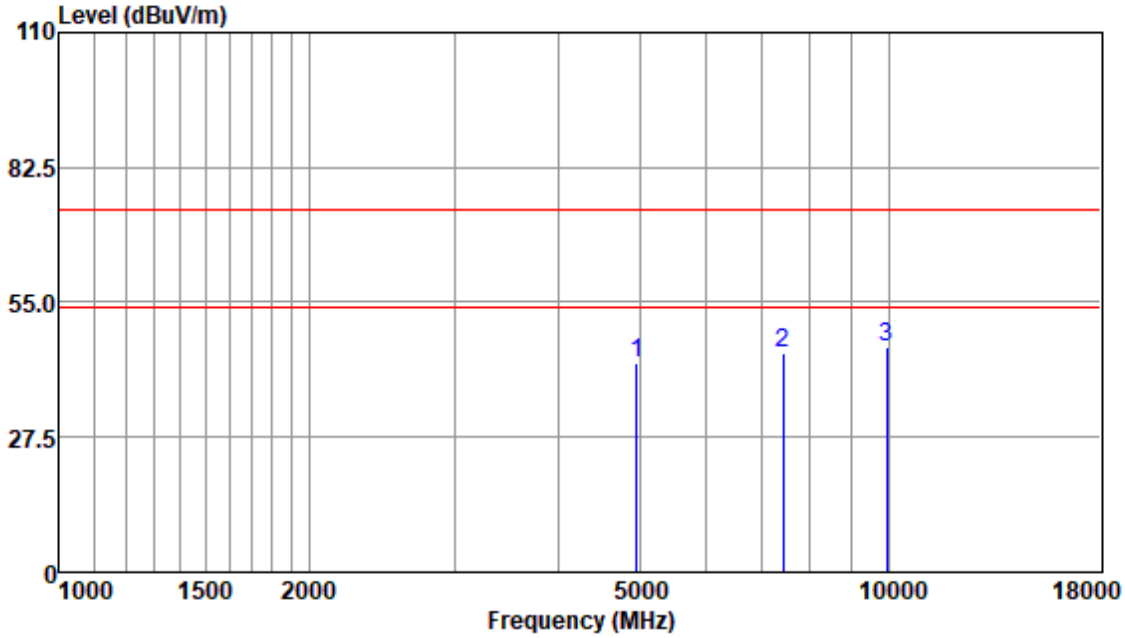



Antenna Polarity :VERTICAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4882.15 | 39.72 | 33.66 | 5.36 | 36.81 | 41.93 | 74.00 | -32.07 | Peak |
| 7323.27 | 35.08 | 36.33 | 7.33 | 35.42 | 43.32 | 74.00 | -30.68 | Peak |
| 9764.37 | 32.81 | 37.54 | 8.84 | 33.50 | 45.69 | 74.00 | -28.31 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Horizontal; Modulation:π/4 DQPSK; Channel:High

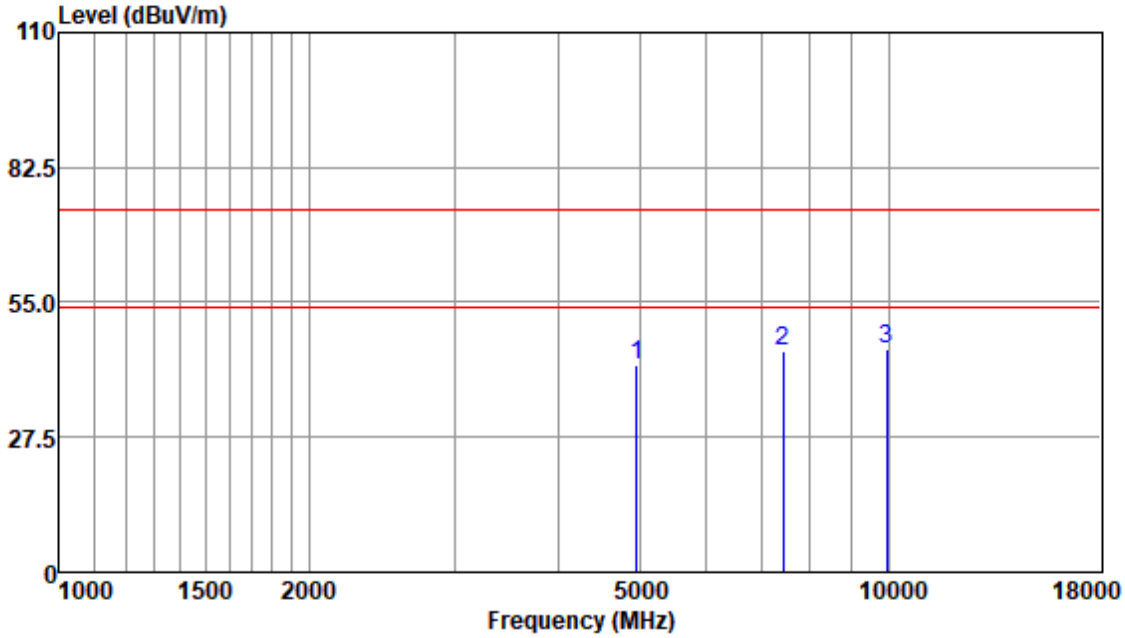



Antenna Polarity :HORIZONTAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4960.31 | 40.37 | 33.65 | 5.46 | 36.83 | 42.65 | 74.00 | -31.35 | Peak |
| 7440.91 | 36.13 | 36.31 | 7.43 | 35.34 | 44.53 | 74.00 | -29.47 | Peak |
| 9920.99 | 33.00 | 37.62 | 8.69 | 33.41 | 45.90 | 74.00 | -28.10 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Vertical; Modulation:π/4 DQPSK; Channel:High

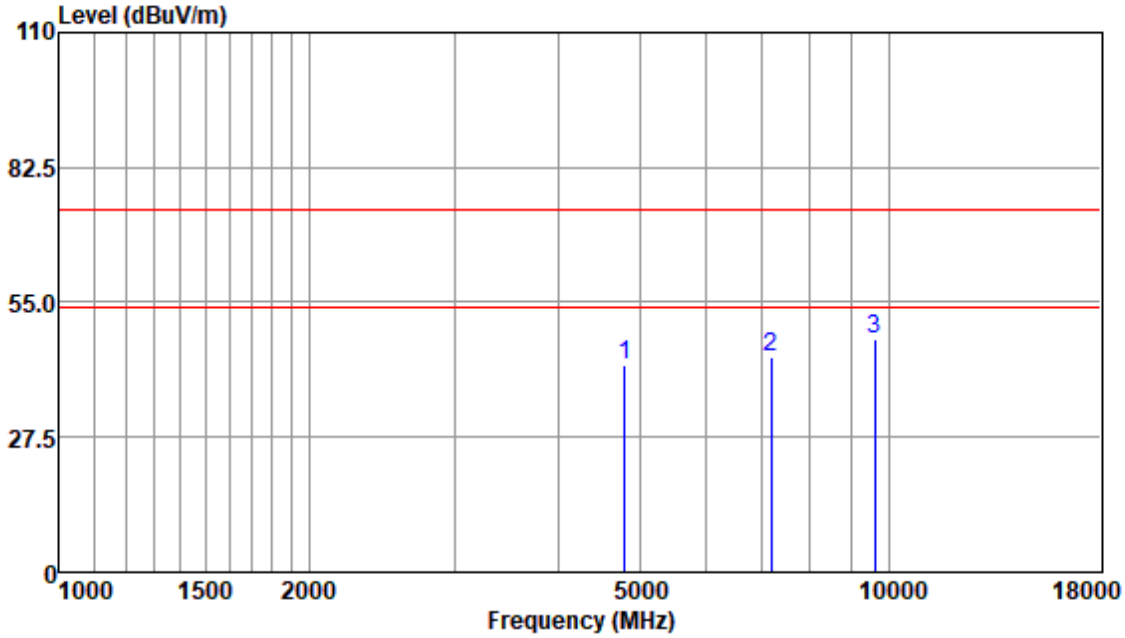



Antenna Polarity :VERTICAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4960.31 | 39.79 | 33.65 | 5.46 | 36.83 | 42.07 | 74.00 | -31.93 | Peak |
| 7440.91 | 36.62 | 36.31 | 7.43 | 35.34 | 45.02 | 74.00 | -28.98 | Peak |
| 9920.99 | 32.70 | 37.62 | 8.69 | 33.41 | 45.60 | 74.00 | -28.40 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Horizontal; Modulation:8DPSK; Channel:Low

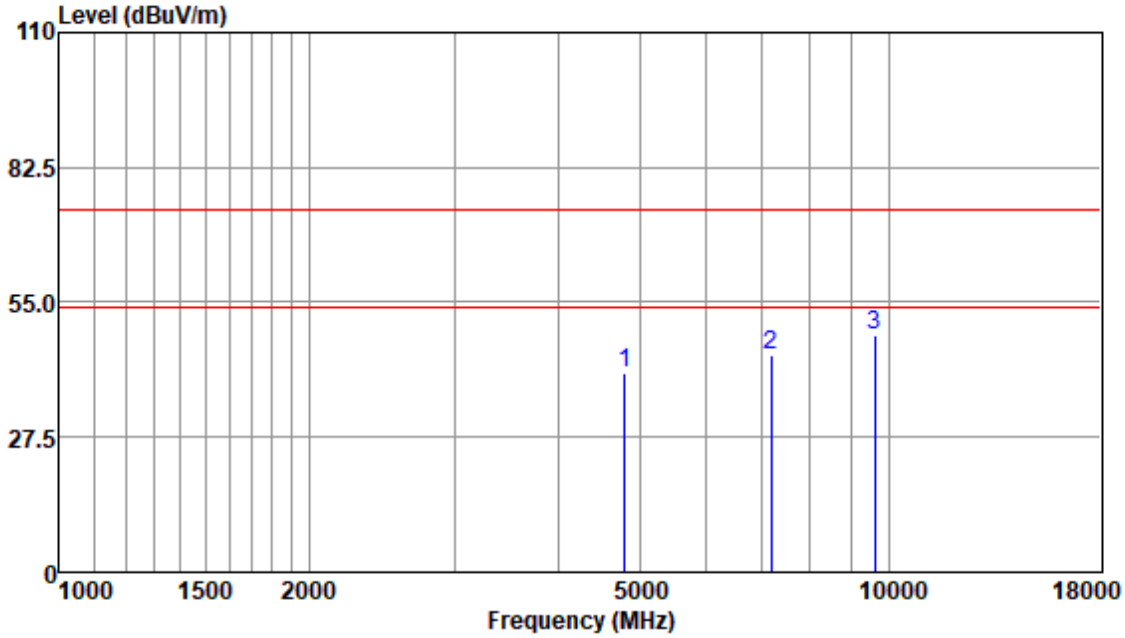



Antenna Polarity :HORIZONTAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4804.11 | 40.22 | 33.57 | 5.22 | 36.79 | 42.22 | 74.00 | -31.78 | Peak |
| 7206.31 | 36.12 | 36.24 | 7.13 | 35.53 | 43.96 | 74.00 | -30.04 | Peak |
| 9608.43 | 34.46 | 37.75 | 8.66 | 33.58 | 47.29 | 74.00 | -26.71 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Vertical; Modulation:8DPSK; Channel:Low

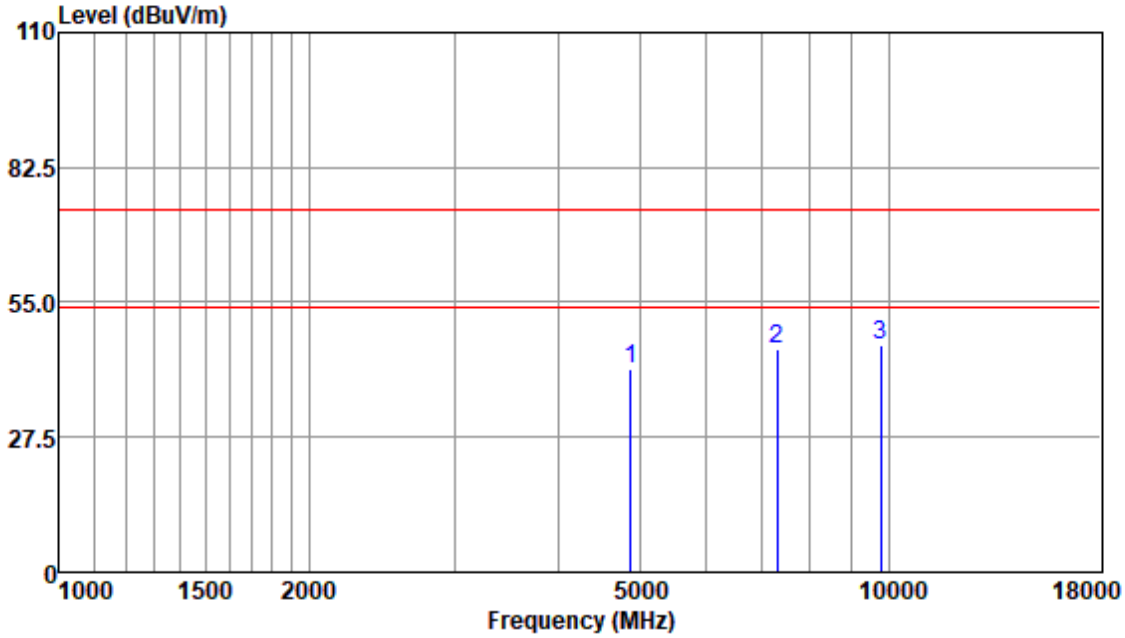



Antenna Polarity :VERTICAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4804.11 | 38.63 | 33.57 | 5.22 | 36.79 | 40.63 | 74.00 | -33.37 | Peak |
| 7206.31 | 36.21 | 36.24 | 7.13 | 35.53 | 44.05 | 74.00 | -29.95 | Peak |
| 9608.43 | 35.33 | 37.75 | 8.66 | 33.58 | 48.16 | 74.00 | -25.84 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Horizontal; Modulation:8DPSK; Channel:middle

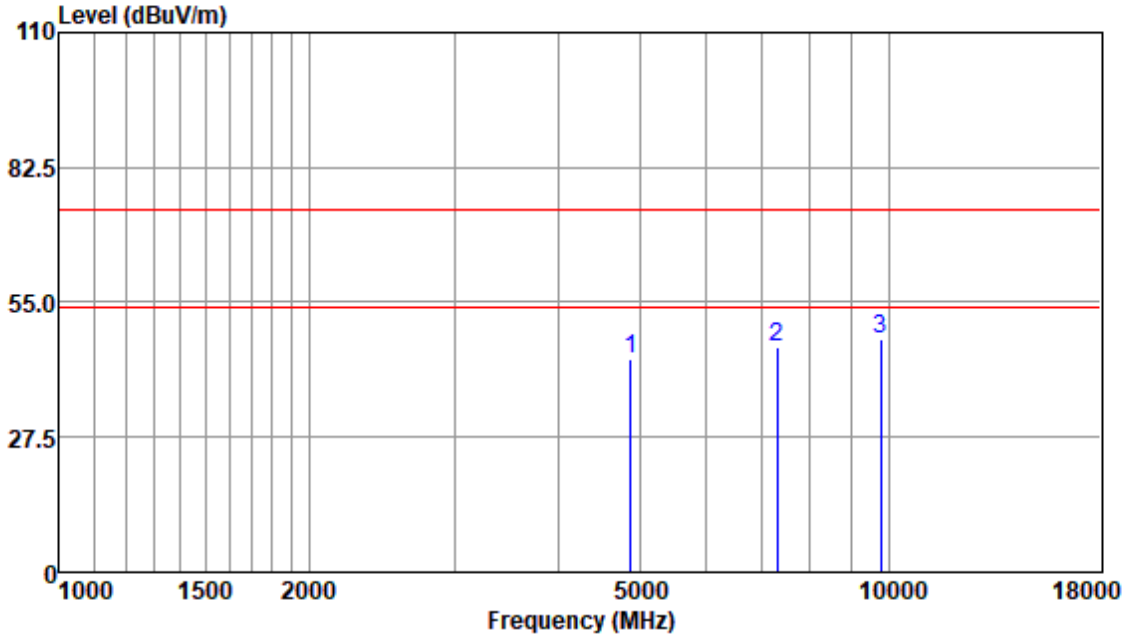



Antenna Polarity :HORIZONTAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4882.15 | 39.33 | 33.66 | 5.36 | 36.81 | 41.54 | 74.00 | -32.46 | Peak |
| 7323.27 | 37.28 | 36.33 | 7.33 | 35.42 | 45.52 | 74.00 | -28.48 | Peak |
| 9764.37 | 33.31 | 37.54 | 8.84 | 33.50 | 46.19 | 74.00 | -27.81 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Vertical; Modulation:8DPSK; Channel:middle

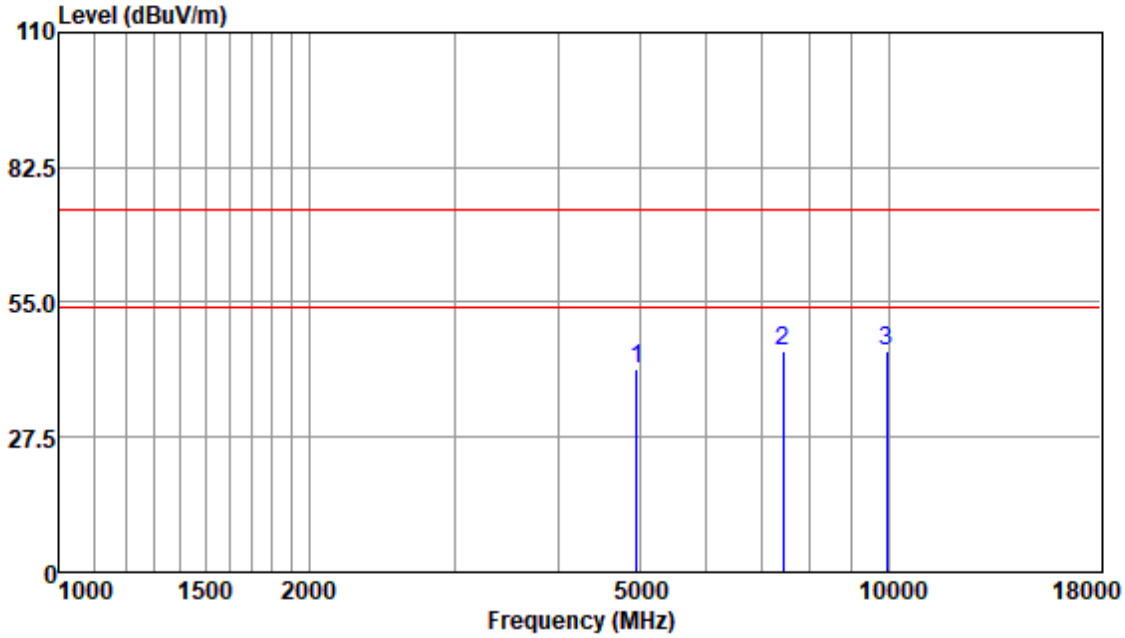



Antenna Polarity :VERTICAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4882.15 | 41.26 | 33.66 | 5.36 | 36.81 | 43.47 | 74.00 | -30.53 | Peak |
| 7323.27 | 37.54 | 36.33 | 7.33 | 35.42 | 45.78 | 74.00 | -28.22 | Peak |
| 9764.37 | 34.66 | 37.54 | 8.84 | 33.50 | 47.54 | 74.00 | -26.46 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Horizontal; Modulation:8DPSK; Channel:High

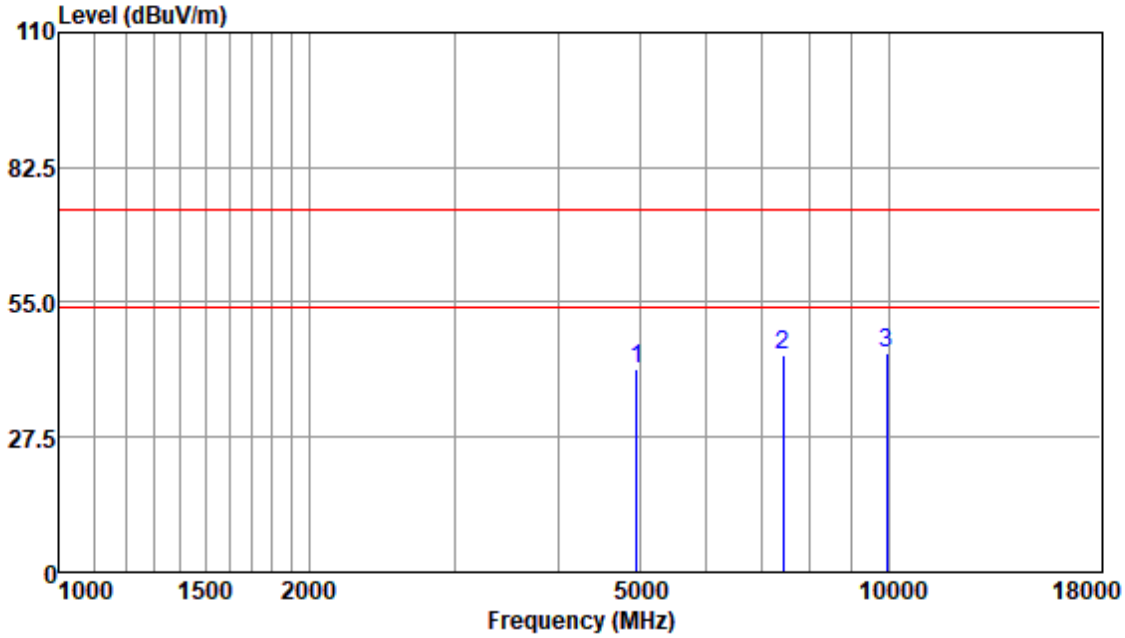



Antenna Polarity :HORIZONTAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4960.31 | 39.03 | 33.65 | 5.46 | 36.83 | 41.31 | 74.00 | -32.69 | Peak |
| 7440.91 | 36.83 | 36.31 | 7.43 | 35.34 | 45.23 | 74.00 | -28.77 | Peak |
| 9920.99 | 32.07 | 37.62 | 8.69 | 33.41 | 44.97 | 74.00 | -29.03 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 00; Polarity: Vertical; Modulation:8DPSK; Channel:High




Antenna Polarity :VERTICAL
EUT/Project :2121HS

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4960.31 | 39.09 | 33.65 | 5.46 | 36.83 | 41.37 | 74.00 | -32.63 | Peak |
| 7440.91 | 36.00 | 36.31 | 7.43 | 35.34 | 44.40 | 74.00 | -29.60 | Peak |
| 9920.99 | 31.87 | 37.62 | 8.69 | 33.41 | 44.77 | 74.00 | -29.23 | Peak |

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

## 7.11 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

| Frequency of emission(MHz) | Conducted limit(dBμV) | |
|---|---|---|
| | 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. | | |
| Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz | | |

### 7.11.1 E.U.T. Operation

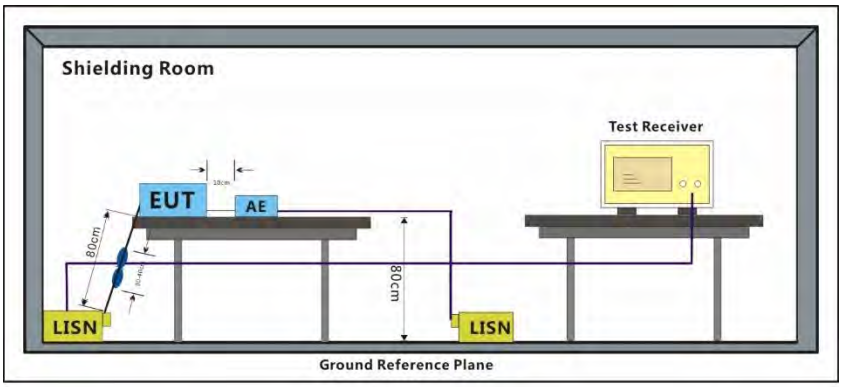
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

### 7.11.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|---|---|---|
| Final test | 00 | TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report. |

### 7.11.3 Test Setup Diagram



### 7.11.4 Measurement Procedure and Data

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

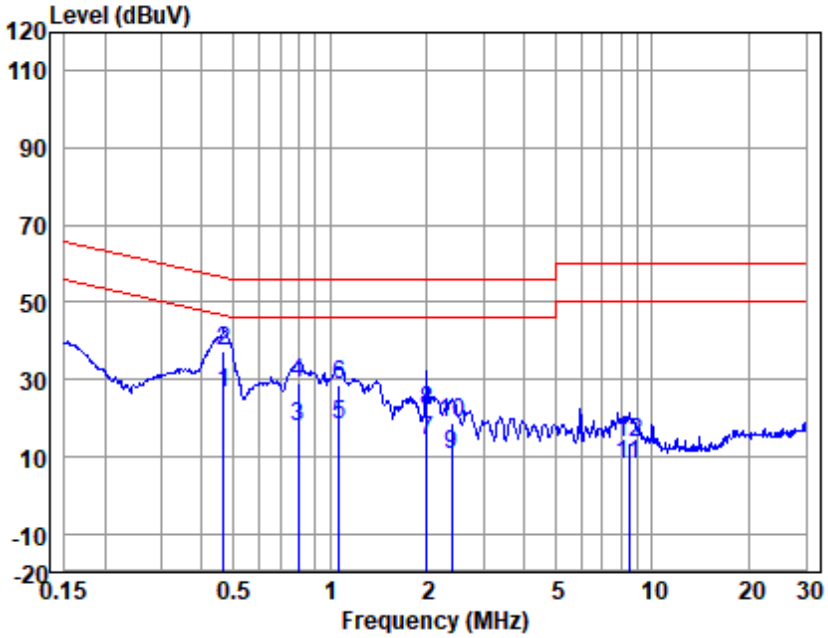
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: Level=Read Level+ Cable Loss+ LISN Factor

Test Mode: 00; Line: Live line

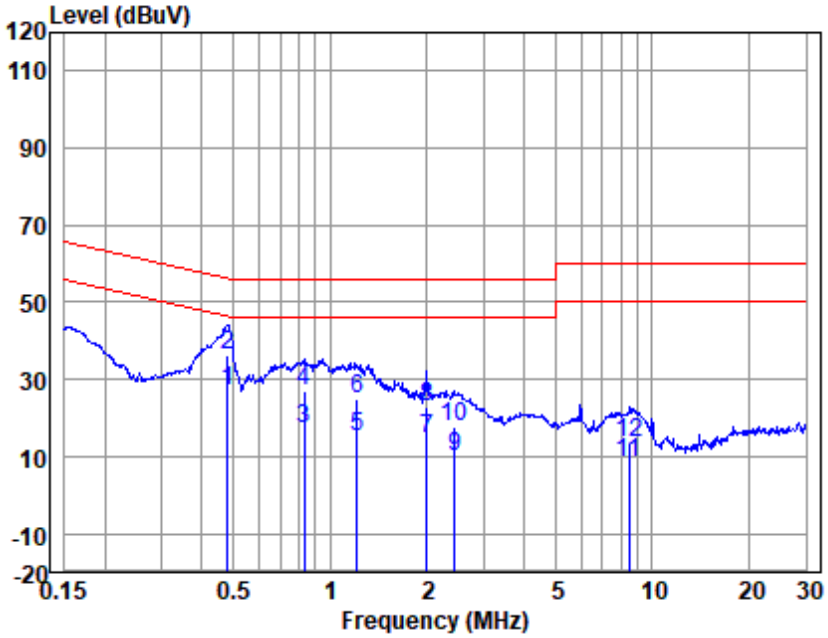



LISN : LINE
EUT/Project No : 2121HS
Test Mode : 00

| | Freq (MHz) | Read level (dBuV) | LISN Factor (dB) | Cable Loss (dB) | Emission Level (dBuV) | Limit (dBuV) | Over Limit (dB) | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.47 | 16.40 | 0.22 | 9.90 | 26.52 | 46.54 | -20.02 | Average |
| 2 | 0.47 | 27.14 | 0.22 | 9.90 | 37.26 | 56.54 | -19.28 | QP |
| 3 | 0.80 | 7.52 | 0.20 | 9.94 | 17.66 | 46.00 | -28.34 | Average |
| 4 | 0.80 | 18.79 | 0.20 | 9.94 | 28.93 | 56.00 | -27.07 | QP |
| 5 | 1.07 | 7.90 | 0.20 | 10.01 | 18.11 | 46.00 | -27.89 | Average |
| 6 | 1.07 | 18.32 | 0.20 | 10.01 | 28.53 | 56.00 | -27.47 | QP |
| 7 | 1.99 | 3.57 | 0.20 | 10.10 | 13.87 | 46.00 | -32.13 | Average |
| 8 | 1.99 | 11.74 | 0.20 | 10.10 | 22.04 | 56.00 | -33.96 | QP |
| 9 | 2.38 | -0.03 | 0.22 | 10.12 | 10.31 | 46.00 | -35.69 | Average |
| 10 | 2.38 | 8.29 | 0.22 | 10.12 | 18.63 | 56.00 | -37.37 | QP |
| 11 | 8.50 | -2.84 | 0.45 | 10.35 | 7.96 | 50.00 | -42.04 | Average |
| 12 | 8.50 | 2.83 | 0.45 | 10.35 | 13.63 | 60.00 | -46.37 | QP |

Notes: Emission Level = Read Level +LISN Factor + Cable loss

Test Mode: 00; Line: Neutral Line




LISN : NEUTRAL
EUT/Project No : 2121HS
Test Mode : 00

| | Freq (MHz) | Read level (dBuV) | LISN Factor (dB) | Cable Loss (dB) | Emission Level (dBuV) | Limit (dBuV) | Over Limit (dB) | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.48 | 17.00 | 0.30 | 9.90 | 27.20 | 46.32 | -19.12 | Average |
| 2 | 0.48 | 26.36 | 0.30 | 9.90 | 36.56 | 56.32 | -19.76 | QP |
| 3 | 0.83 | 7.20 | 0.30 | 9.95 | 17.45 | 46.00 | -28.55 | Average |
| 4 | 0.83 | 16.79 | 0.30 | 9.95 | 27.04 | 56.00 | -28.96 | QP |
| 5 | 1.22 | 4.85 | 0.30 | 10.03 | 15.18 | 46.00 | -30.82 | Average |
| 6 | 1.22 | 14.48 | 0.30 | 10.03 | 24.81 | 56.00 | -31.19 | QP |
| 7 | 1.99 | 4.37 | 0.30 | 10.10 | 14.77 | 46.00 | -31.23 | Average |
| 8 | 1.99 | 12.23 | 0.30 | 10.10 | 22.63 | 56.00 | -33.37 | QP |
| 9 | 2.43 | -0.38 | 0.34 | 10.12 | 10.08 | 46.00 | -35.92 | Average |
| 10 | 2.43 | 7.44 | 0.34 | 10.12 | 17.90 | 56.00 | -38.10 | QP |
| 11 | 8.50 | -2.63 | 0.45 | 10.35 | 8.17 | 50.00 | -41.83 | Average |
| 12 | 8.50 | 2.91 | 0.45 | 10.35 | 13.71 | 60.00 | -46.29 | QP |

Notes: Emission Level = Read Level +LISN Factor + Cable loss

# 8 Test Setup Photo

Refer to Appendix - Test Setup Photo for SHCR2410002121HS

# 9 EUT Constructional Details (EUT Photos)

Refer to Appendix_Photographs of EUT Constructional Details for SHCR2410002121HS

# 10 Appendix

## 10.1 Appendix A: 20dB Emission Bandwidth

### 10.1.1 Test Result

| Test Mode | Antenna | Channel | 20dB EBW[MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | 2402 | 0.951 | 2401.556 | 2402.507 | --- | --- |
| | | 2441 | 1.023 | 2440.496 | 2441.519 | --- | --- |
| | | 2480 | 1.038 | 2479.493 | 2480.531 | --- | --- |
| 2DH5 | Ant1 | 2402 | 1.314 | 2401.358 | 2402.672 | --- | --- |
| | | 2441 | 1.344 | 2440.343 | 2441.687 | --- | --- |
| | | 2480 | 1.335 | 2479.352 | 2480.687 | --- | --- |
| 3DH5 | Ant1 | 2402 | 1.359 | 2401.334 | 2402.693 | --- | --- |
| | | 2441 | 1.308 | 2440.367 | 2441.675 | --- | --- |
| | | 2480 | 1.305 | 2479.367 | 2480.672 | --- | --- |

### 10.1.2 Test Graphs

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

## 10.2 Appendix B: Occupied Channel Bandwidth

### 10.2.1 Test Result

| Test Mode | Antenna | Channel | OCB [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | 2402 | 0.87873 | 2401.5721 | 2402.4509 | --- | --- |
| | | 2441 | 0.88325 | 2440.5706 | 2441.4538 | --- | --- |
| | | 2480 | 0.90417 | 2479.5630 | 2480.4672 | --- | --- |
| 2DH5 | Ant1 | 2402 | 1.1914 | 2401.4198 | 2402.6112 | --- | --- |
| | | 2441 | 1.1878 | 2440.4224 | 2441.6102 | --- | --- |
| | | 2480 | 1.1995 | 2479.4197 | 2480.6192 | --- | --- |
| 3DH5 | Ant1 | 2402 | 1.2053 | 2401.4043 | 2402.6096 | --- | --- |
| | | 2441 | 1.2106 | 2440.4026 | 2441.6132 | --- | --- |
| | | 2480 | 1.1974 | 2479.4107 | 2480.6081 | --- | --- |

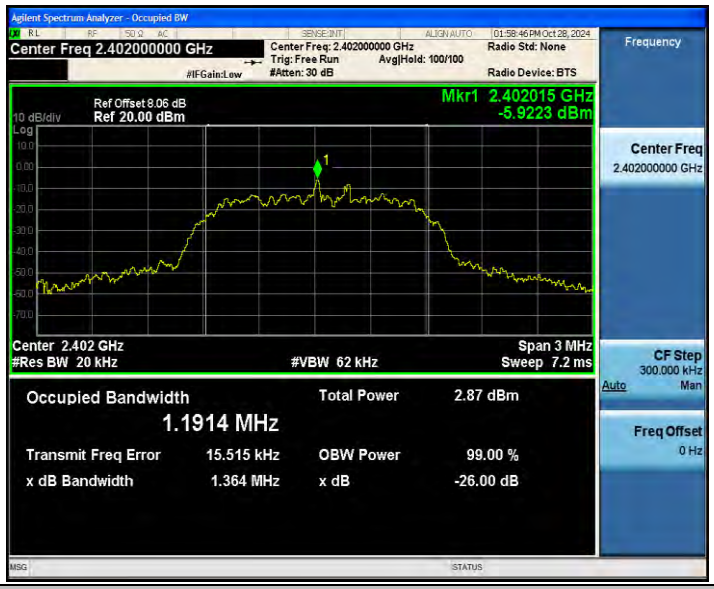
### 10.2.2 Test Graphs

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

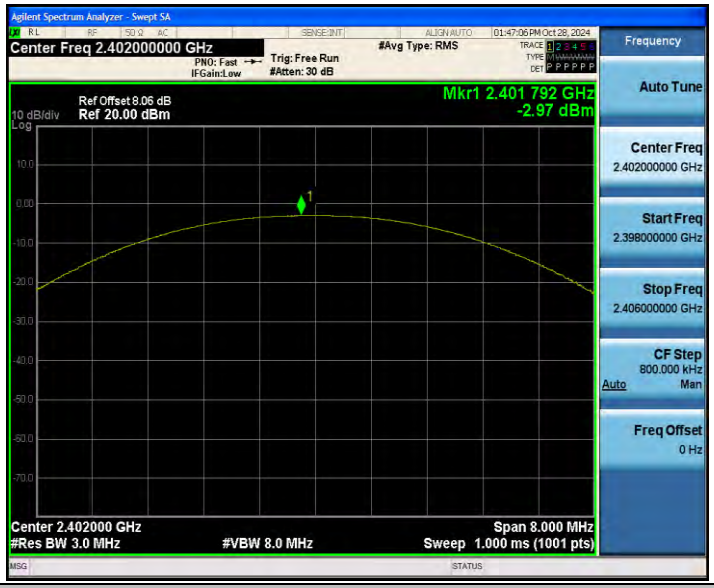
## 10.3 Appendix C: Maximum conducted output power

### 10.3.1 Test Result

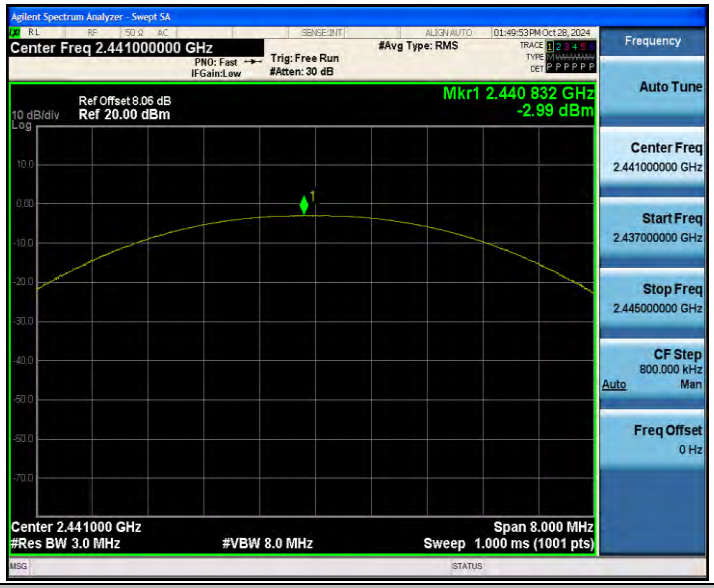
| Test Mode | Antenna | Channel | Result[dBm] | Limit[dBm] | Verdict |
|---|---|---|---|---|---|
| DH5 | Ant1 | 2402 | -2.97 | ≤20.97 | PASS |
| | | 2441 | -2.99 | ≤20.97 | PASS |
| | | 2480 | -3.51 | ≤20.97 | PASS |
| 2DH5 | Ant1 | 2402 | -2.11 | ≤20.97 | PASS |
| | | 2441 | -2.15 | ≤20.97 | PASS |
| | | 2480 | -2.70 | ≤20.97 | PASS |
| 3DH5 | Ant1 | 2402 | -3.74 | ≤20.97 | PASS |
| | | 2441 | -3.75 | ≤20.97 | PASS |
| | | 2480 | -4.32 | ≤20.97 | PASS |

### 10.3.2 Test Graphs

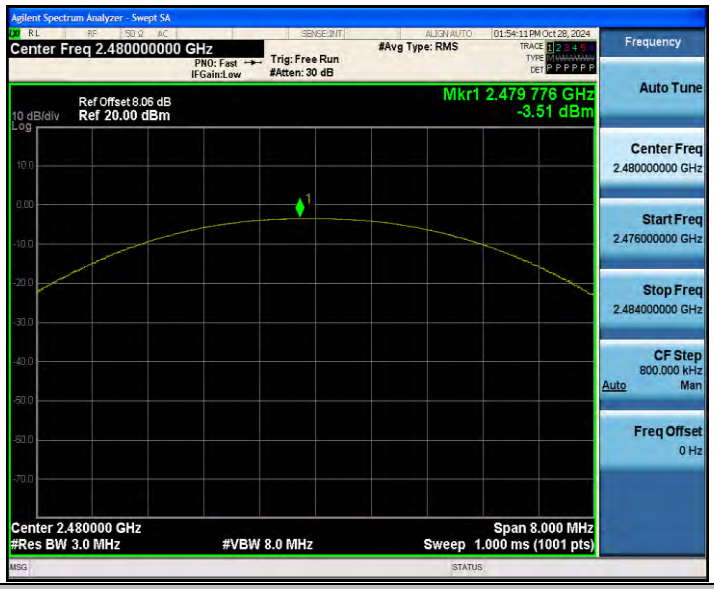
DH5_Ant1_2402




DH5_Ant1_2441

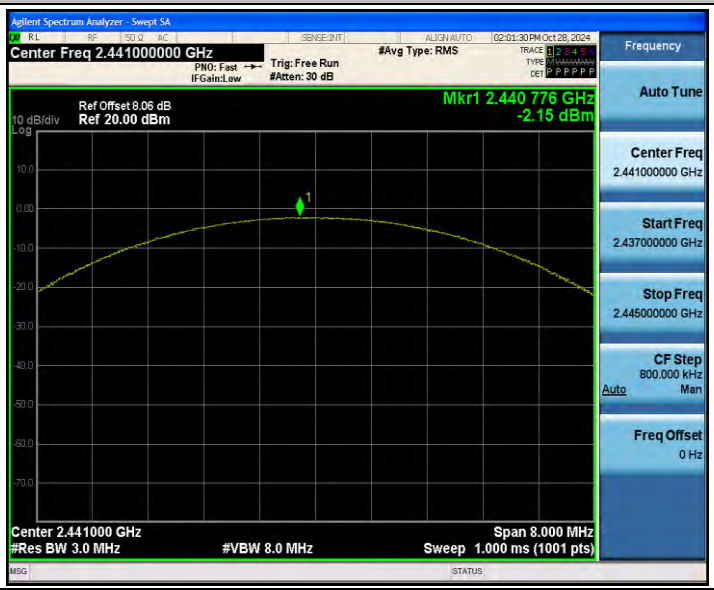



DH5_Ant1_2480

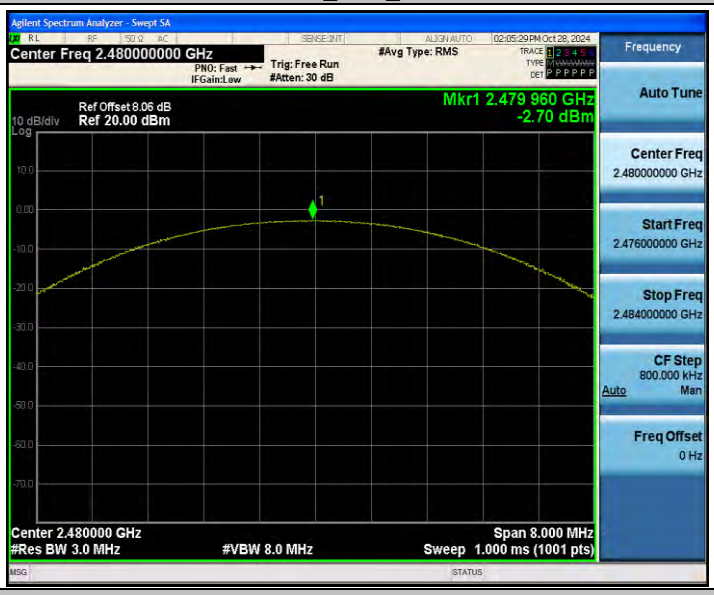



2DH5_Ant1_2402

2DH5_Ant1_2441



2DH5_Ant1_2480




3DH5_Ant1_2402

3DH5_Ant1_2441

3DH5_Ant1_2480

## 10.4 Appendix D: Carrier frequency separation

### 10.4.1 Test Result

| Test Mode | Antenna | Channel | Result[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|
| DH5 | Ant1 | Hop | 1.11 | ≥1.038 | PASS |
| 2DH5 | Ant1 | Hop | 1.122 | ≥0.896 | PASS |
| 3DH5 | Ant1 | Hop | 0.964 | ≥0.906 | PASS |

### 10.4.2 Test Graphs

DH5_Ant1_Hop

2DH5_Ant1_Hop

3DH5_Ant1_Hop

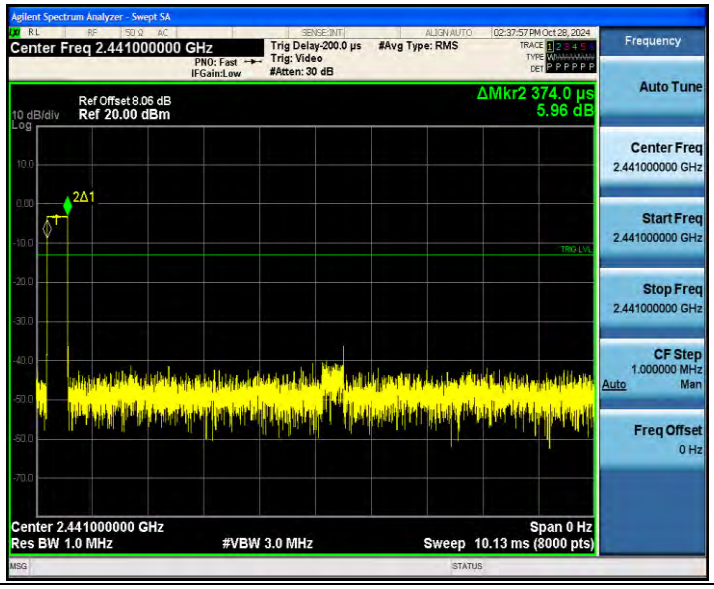
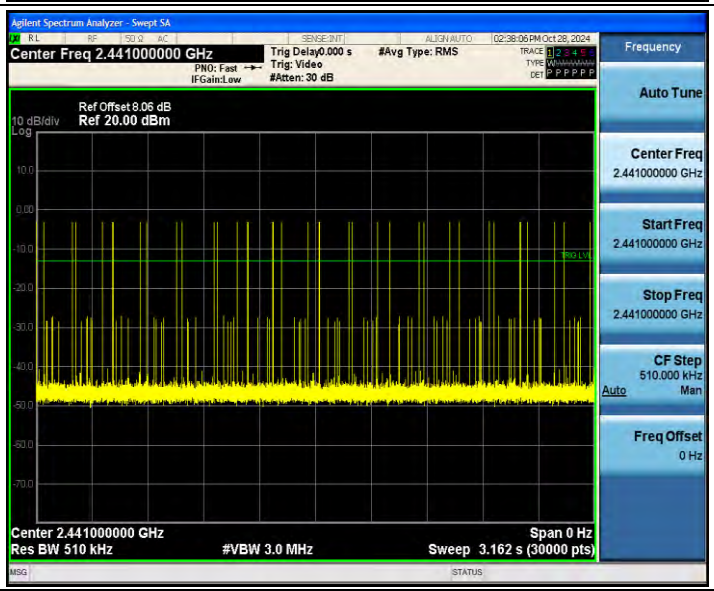
Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441500000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 5000/5000
03:02:07 PM Oct 28, 2024
Ref Offset 8.06 dB
10 dB/div
Ref 20.00 dBm
Log
ΔMkr2 964 kHz
0.763 dB
1
2Δ1
Start 2.440500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.442500 GHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.441500000 GHz
Start Freq
2.440500000 GHz
Stop Freq
2.442500000 GHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz

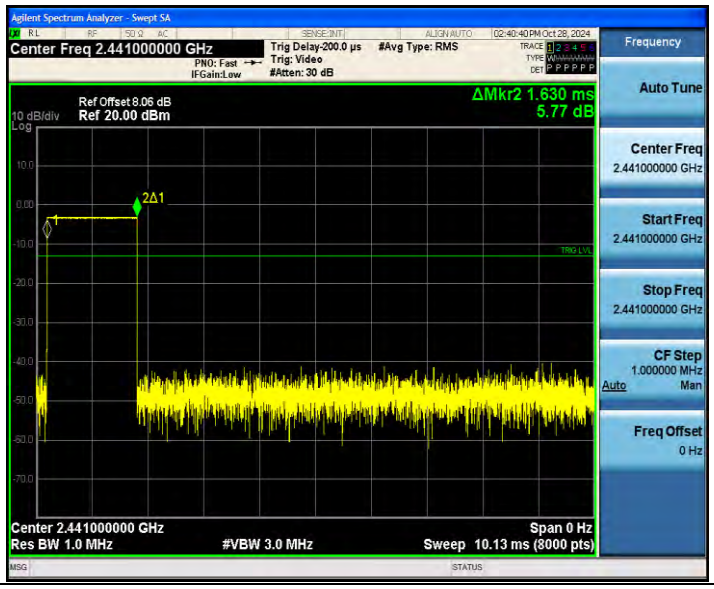
## 10.5 Appendix E: Time of occupancy

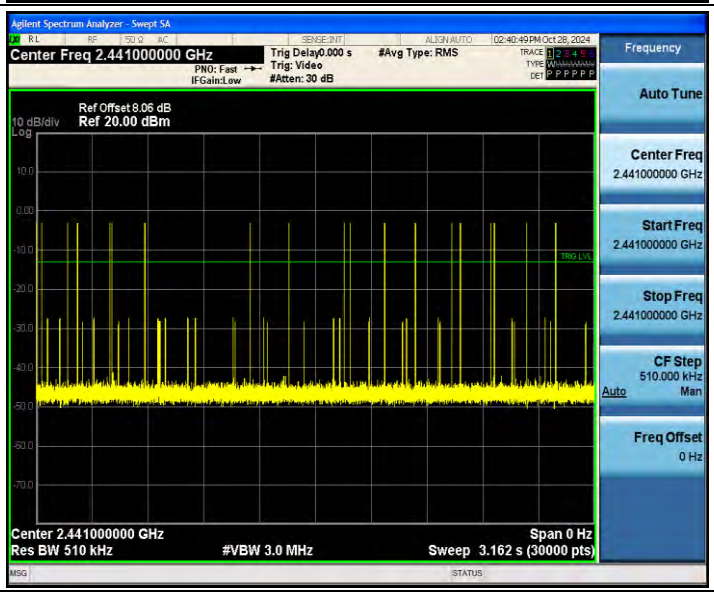
### 10.5.1 Test Result

| Test Mode | Antenna | Channel | BurstWidth [ms] | TotalHops [Num] | Result[s] | Limit[s] | Verdict |
|---|---|---|---|---|---|---|---|
| DH1 | Ant1 | Hop | 0.374 | 330 | 0.123 | ≤0.4 | PASS |
| DH3 | Ant1 | Hop | 1.630 | 190 | 0.31 | ≤0.4 | PASS |
| DH5 | Ant1 | Hop | 2.878 | 90 | 0.259 | ≤0.4 | PASS |
| 2DH1 | Ant1 | Hop | 0.383 | 330 | 0.126 | ≤0.4 | PASS |
| 2DH3 | Ant1 | Hop | 1.635 | 140 | 0.229 | ≤0.4 | PASS |
| 2DH5 | Ant1 | Hop | 2.883 | 80 | 0.231 | ≤0.4 | PASS |
| 3DH1 | Ant1 | Hop | 0.383 | 330 | 0.126 | ≤0.4 | PASS |
| 3DH3 | Ant1 | Hop | 1.633 | 160 | 0.261 | ≤0.4 | PASS |
| 3DH5 | Ant1 | Hop | 2.884 | 80 | 0.231 | ≤0.4 | PASS |

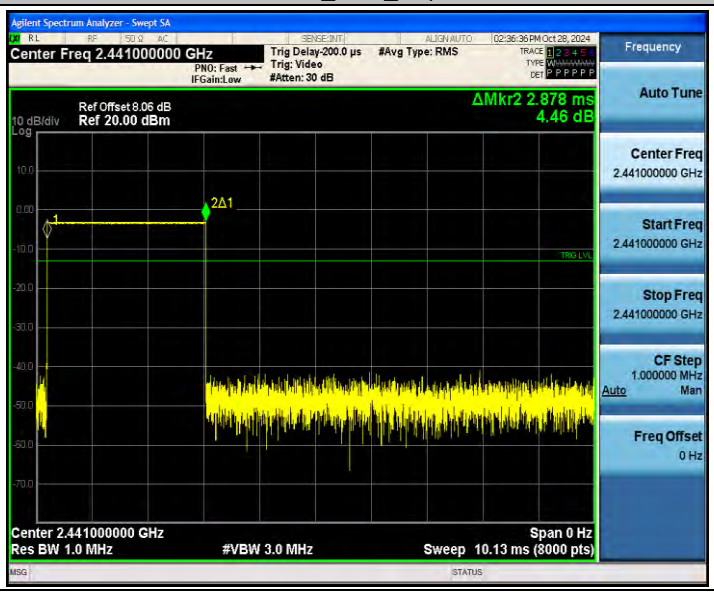
### 10.5.2 Test Graphs

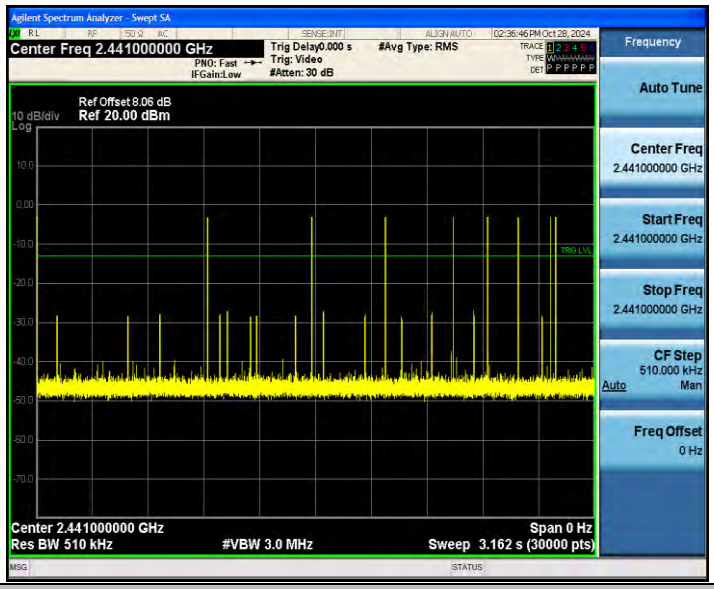
| DH1_Ant1_Hop |
|---|
|  |
|  |
| DH3_Ant1_Hop |


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
Trig Delay-200.0 µs
#Avg Type: RMS
Trig: Video
#Atten: 30 dB
PNO: Fast
IFGain:Low
02:40:40 PM Oct 28, 2024
Ref Offset 8.06 dB
10 dB/div
Ref 20.00 dBm
ΔMkr2 1.630 ms
5.77 dB
2Δ1
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 10.13 ms (8000 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

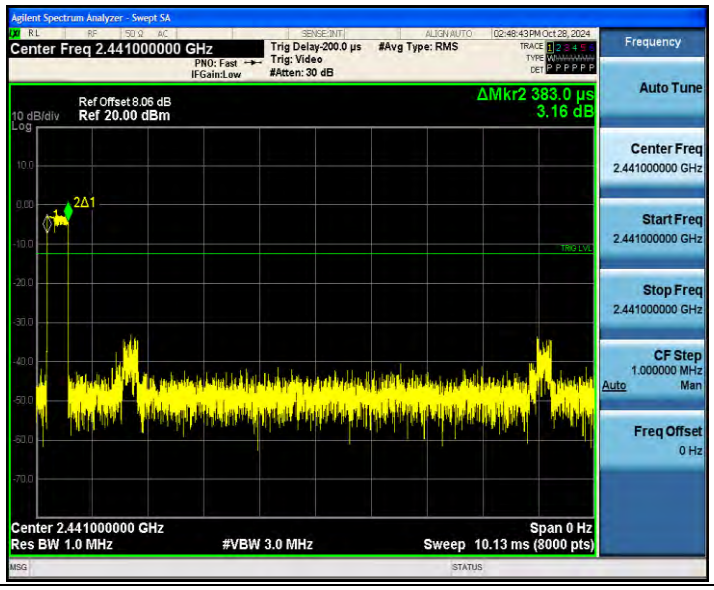

Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
Trig Delay0.000 s
#Avg Type: RMS
Trig: Video
#Atten: 30 dB
PNO: Fast
IFGain:Low
02:40:49 PM Oct 28, 2024
Ref Offset 8.06 dB
10 dB/div
Ref 20.00 dBm
Center 2.441000000 GHz
Res BW 510 kHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 3.162 s (30000 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
510.000 kHz
Auto
Man
Freq Offset
0 Hz

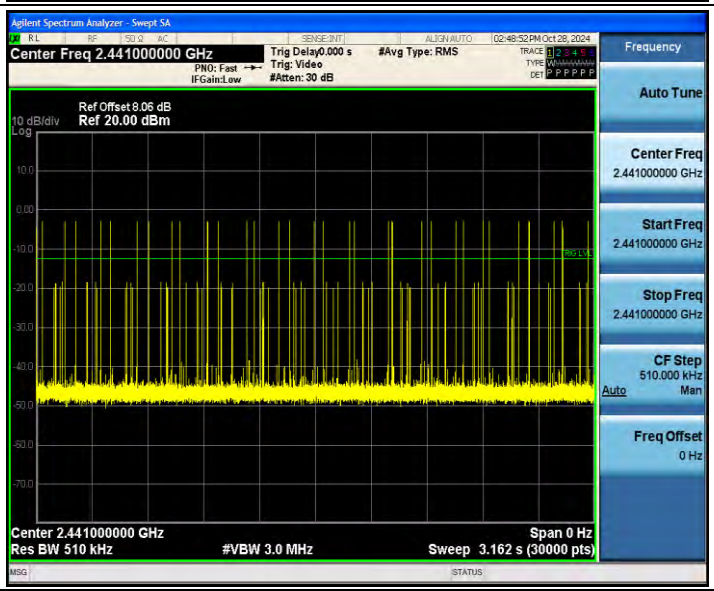
DH5_Ant1_Hop


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
Trig Delay-200.0 µs
#Avg Type: RMS
Trig: Video
#Atten: 30 dB
PNO: Fast
IFGain:Low
02:36:36 PM Oct 28, 2024
Ref Offset 8.06 dB
10 dB/div
Ref 20.00 dBm
ΔMkr2 2.878 ms
4.46 dB
2Δ1
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 10.13 ms (8000 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

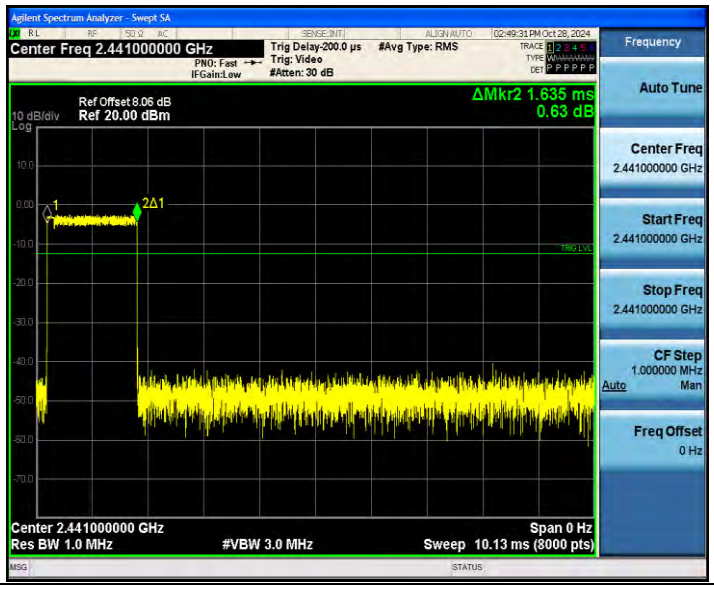


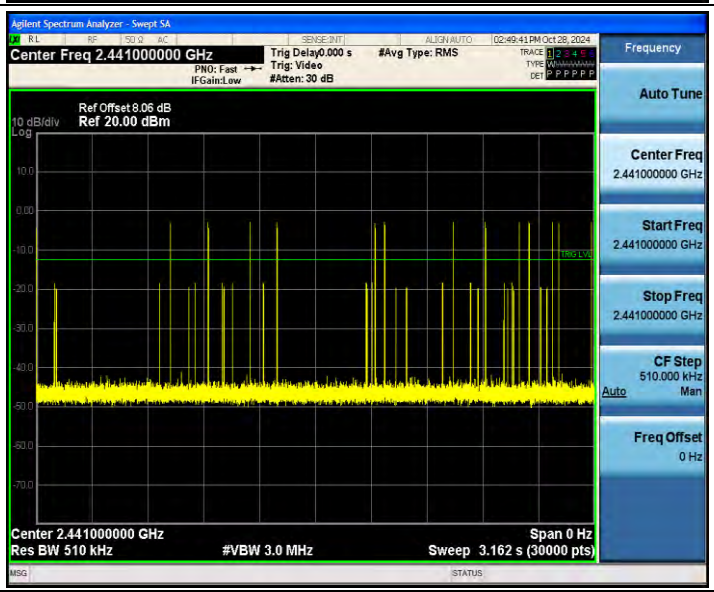

2DH1_Ant1_Hop



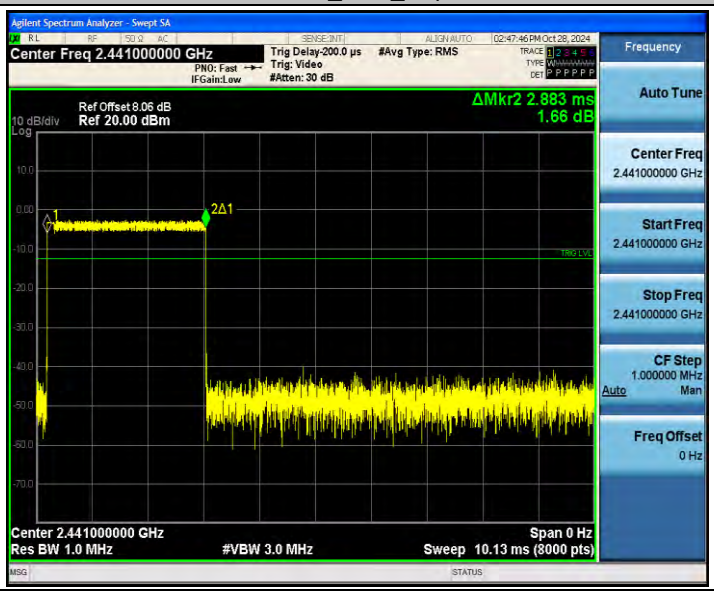



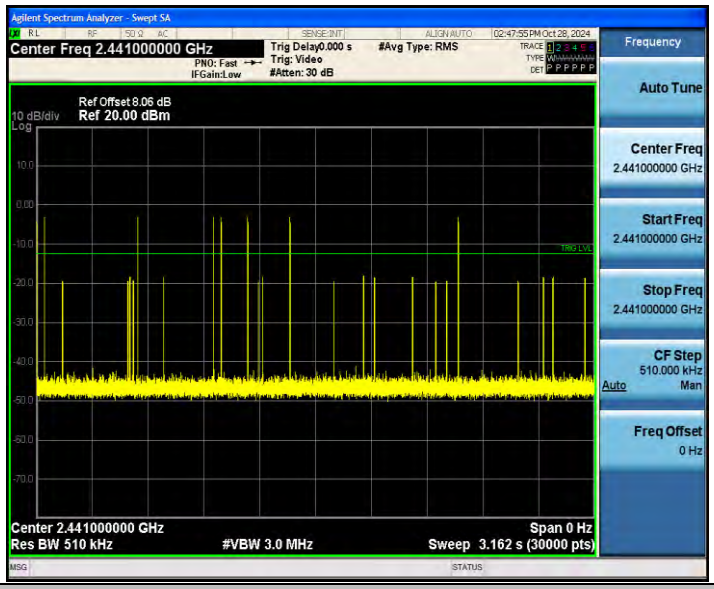

2DH3_Ant1_Hop



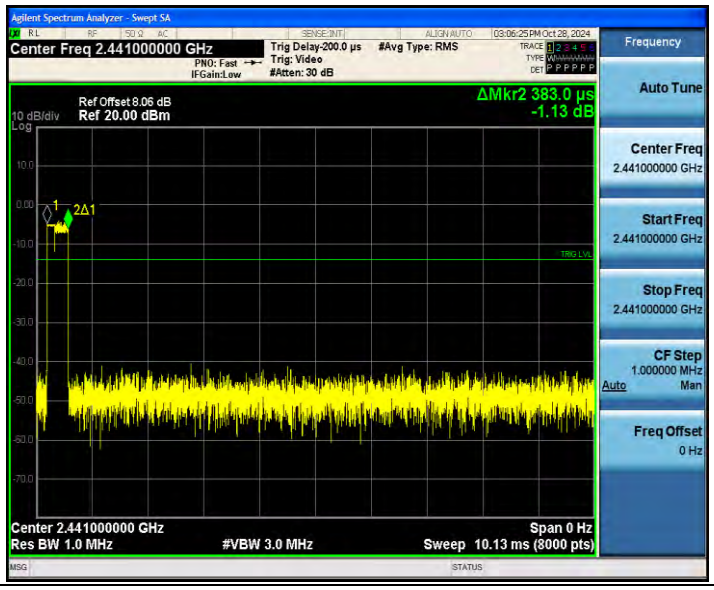



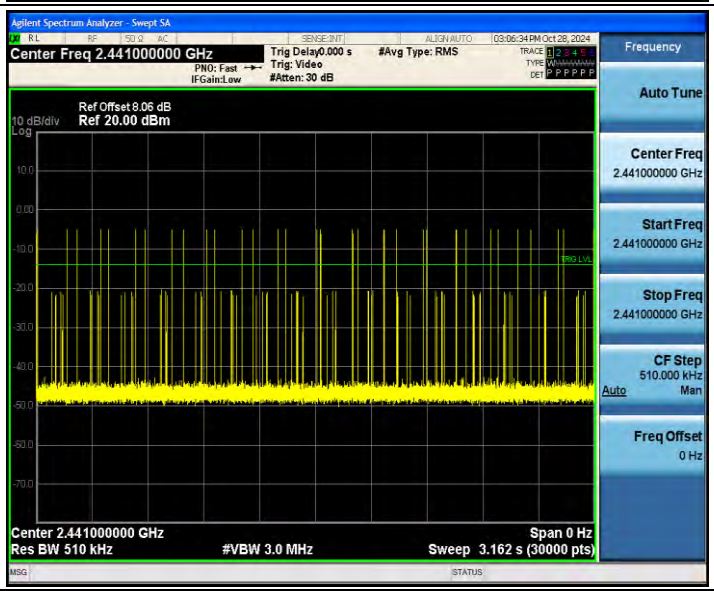

2DH5_Ant1_Hop



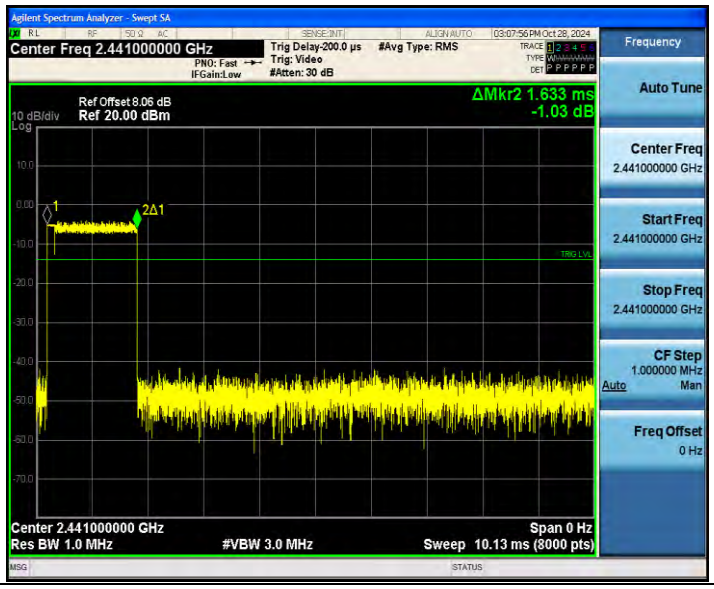


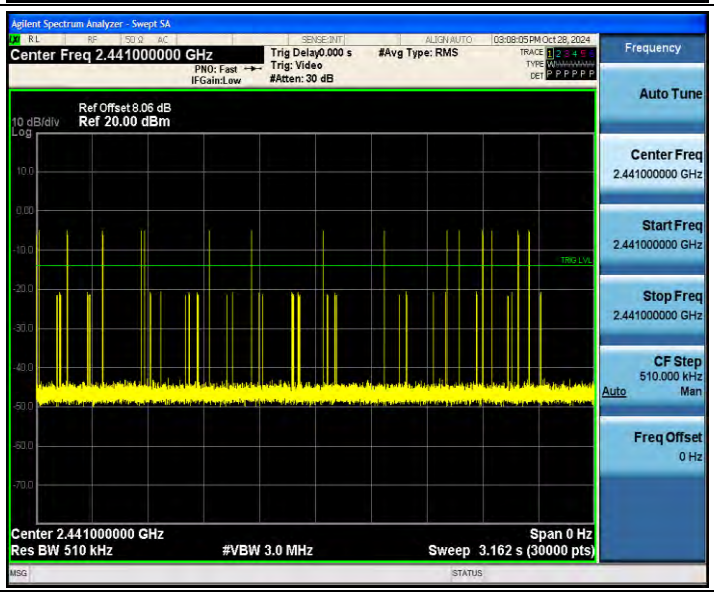

3DH1_Ant1_Hop



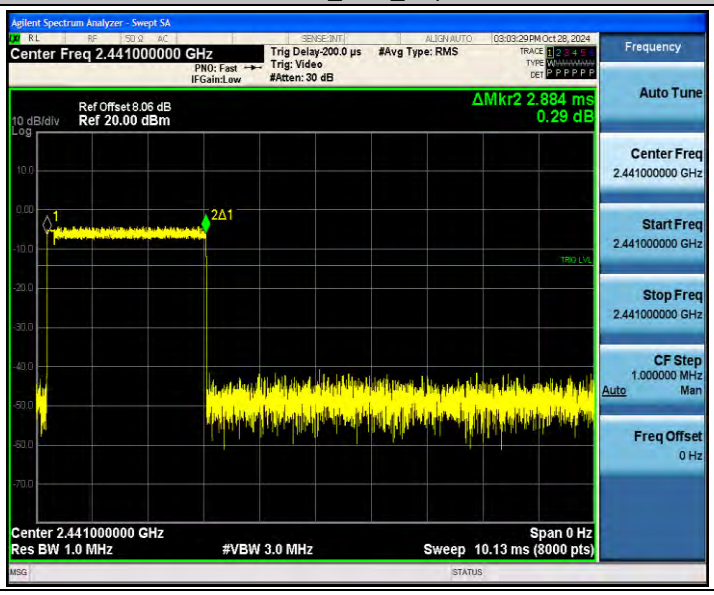



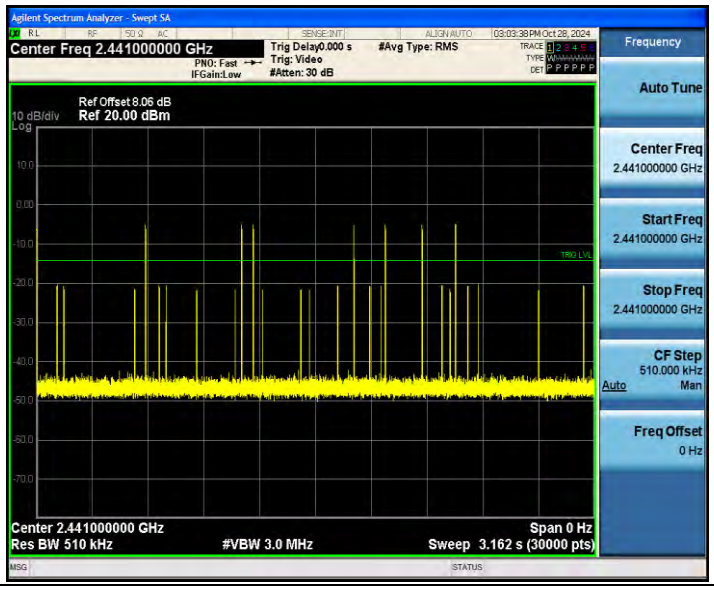

3DH3_Ant1_Hop




3DH5_Ant1_Hop




Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
Trig Delay0.000 s
Trig: Video
#Atten: 30 dB
#Avg Type: RMS
03:03:38 PM Oct 28, 2024
Ref Offset 8.06 dB
10 dB/div
Ref 20.00 dBm
Log
Center 2.441000000 GHz
Res BW 510 kHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 3.162 s (30000 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
510.000 kHz
Auto
Man
Freq Offset
0 Hz

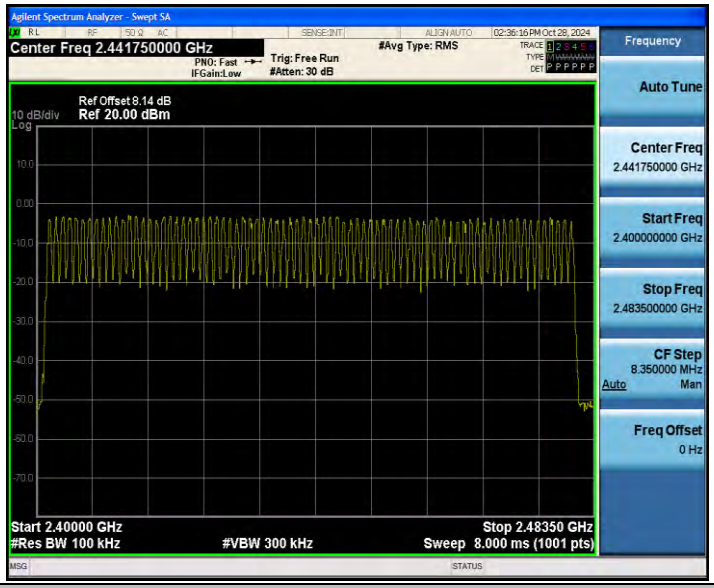
## 10.6 Appendix F: Number of hopping channels

### 10.6.1 Test Result

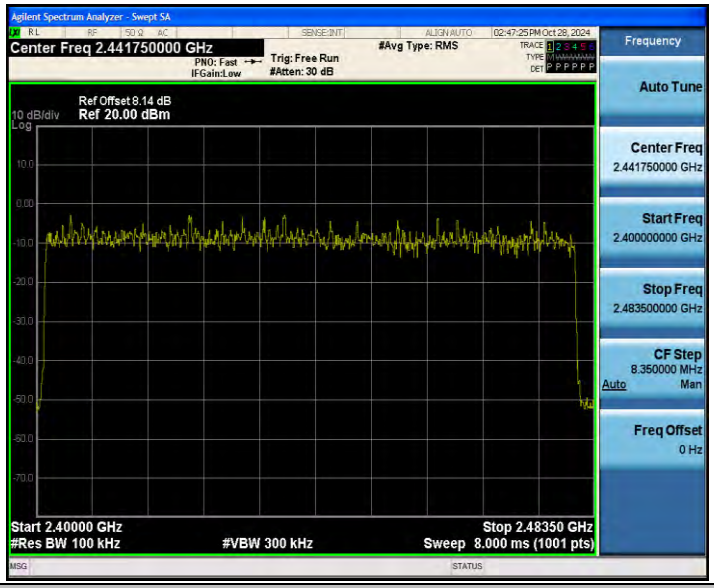
| Test Mode | Antenna | Channel | Result[Num] | Limit[Num] | Verdict |
|---|---|---|---|---|---|
| DH5 | Ant1 | Hop | 79 | ≥15 | PASS |
| 2DH5 | Ant1 | Hop | 79 | ≥15 | PASS |
| 3DH5 | Ant1 | Hop | 79 | ≥15 | PASS |

### 10.6.2 Test Graphs

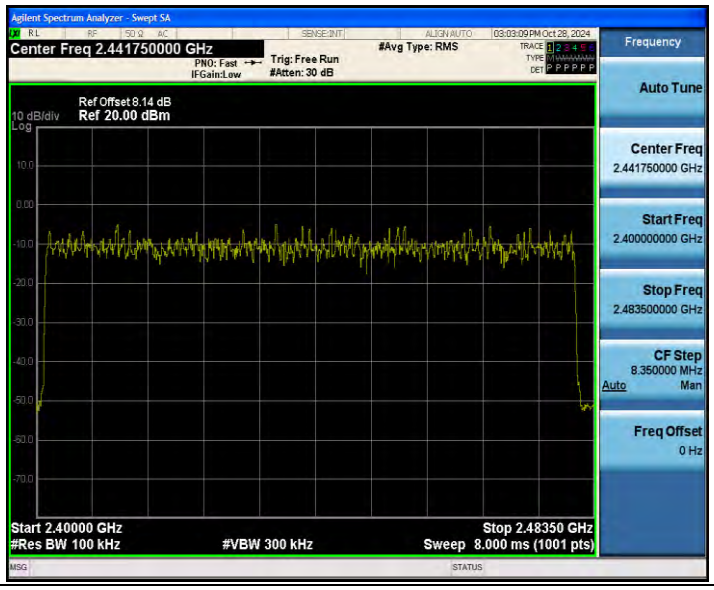
DH5_Ant1_Hop




2DH5_Ant1_Hop




3DH5_Ant1_Hop


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
03:03:09 PM Oct 28, 2024
Ref Offset 8.14 dB
10 dB/div
Ref 20.00 dBm
Log
Start 2.40000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.48350 GHz
Sweep 8.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.441750000 GHz
Start Freq
2.400000000 GHz
Stop Freq
2.483500000 GHz
CF Step
8.350000 MHz
Auto
Man
Freq Offset
0 Hz

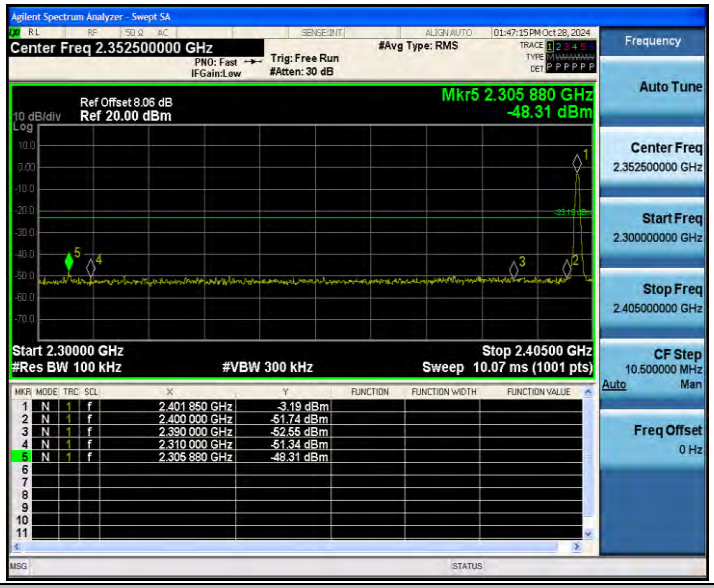
## 10.7 Appendix G: Band edge measurements

### 10.7.1 Test Result

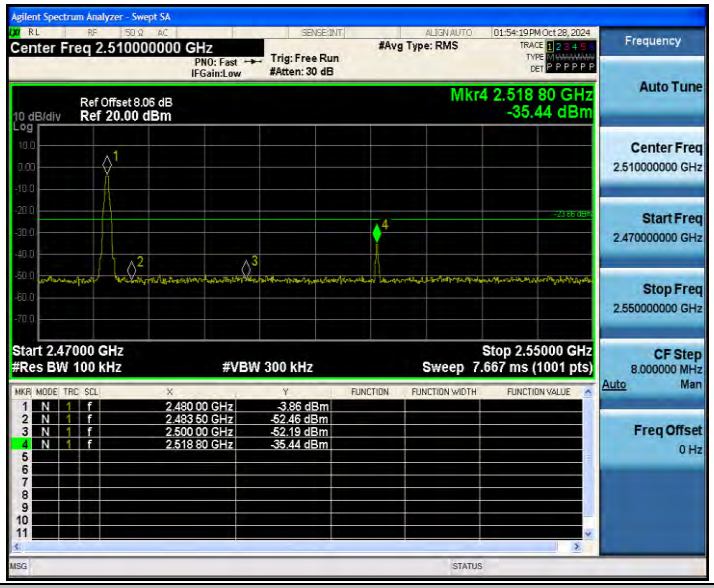
| Test Mode | Antenna | ChName | Channel | RefLevel [dBm] | Result [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | Low | 2402 | -3.19 | -48.31 | ≤-23.19 | PASS |
| | | High | 2480 | -3.86 | -35.45 | ≤-23.86 | PASS |
| | | Low | Hop_2402 | -2.55 | -47.19 | ≤-22.55 | PASS |
| | | High | Hop_2480 | -3.65 | -31.87 | ≤-23.65 | PASS |
| 2DH5 | Ant1 | Low | 2402 | -3.37 | -49.72 | ≤-23.37 | PASS |
| | | High | 2480 | -3.77 | -36.25 | ≤-23.77 | PASS |
| | | Low | Hop_2402 | -6.17 | -48.89 | ≤-26.17 | PASS |
| | | High | Hop_2480 | -6.11 | -48.58 | ≤-26.11 | PASS |
| 3DH5 | Ant1 | Low | 2402 | -6.87 | -50.06 | ≤-26.87 | PASS |
| | | High | 2480 | -5.69 | -35.78 | ≤-25.69 | PASS |
| | | Low | Hop_2402 | -7.45 | -49.22 | ≤-27.45 | PASS |
| | | High | Hop_2480 | -6.28 | -35.44 | ≤-26.28 | PASS |

### 10.7.2 Test Graphs

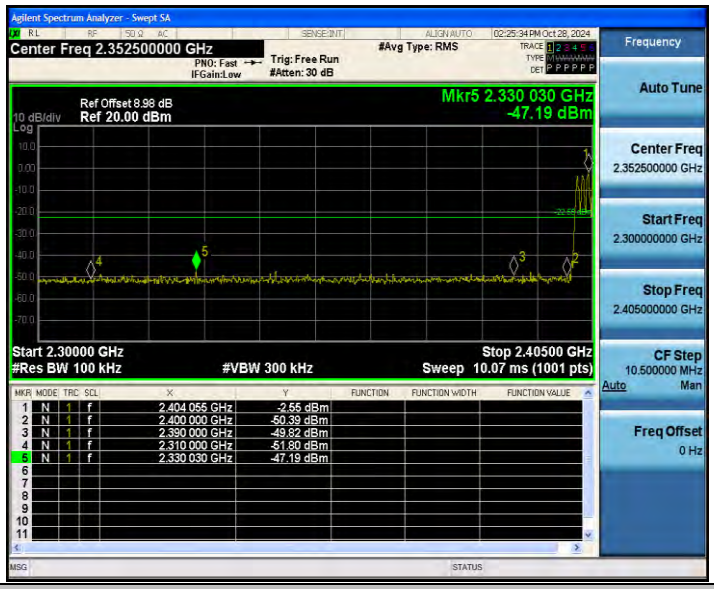
DH5_Ant1_Low_2402



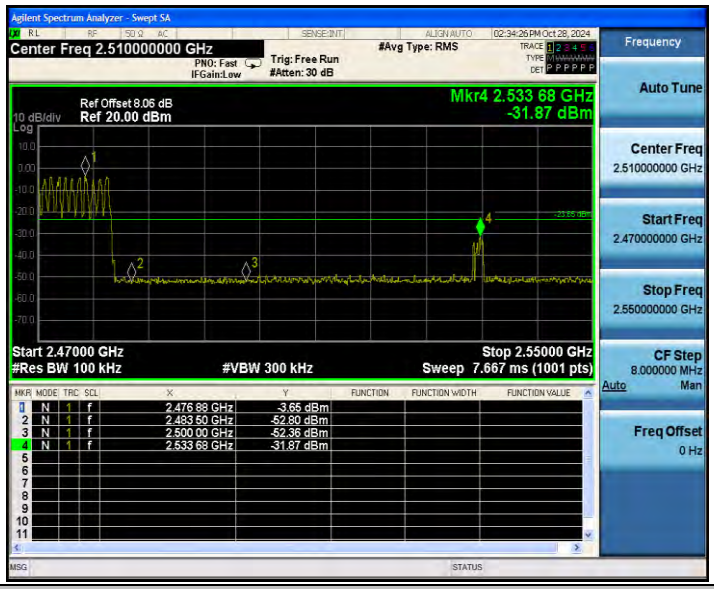

DH5_Ant1_High_2480



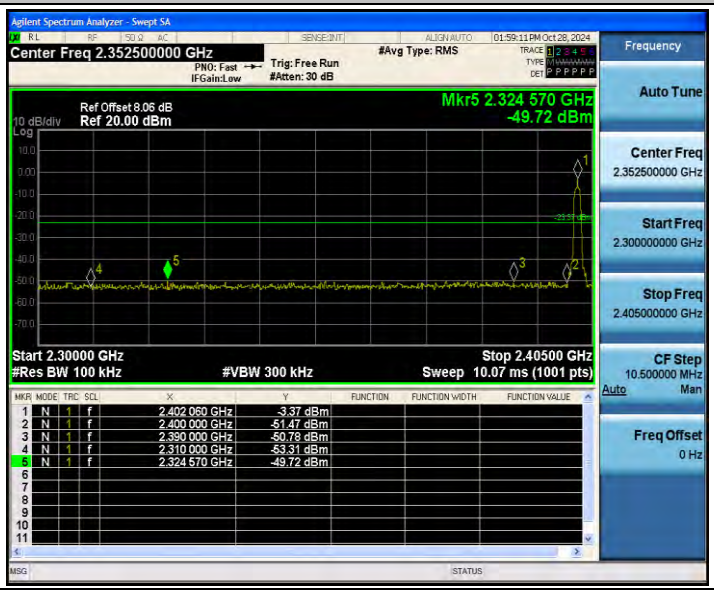

DH5_Ant1_Low_Hop_2402



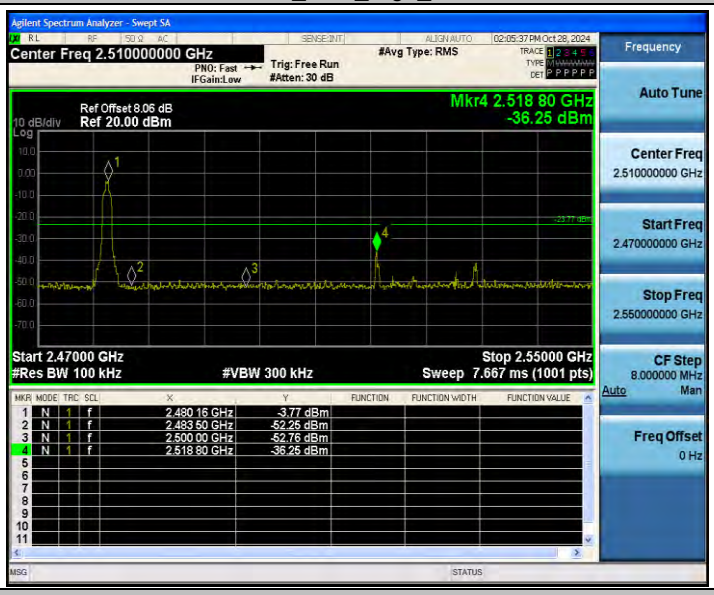

DH5_Ant1_High_Hop_2480



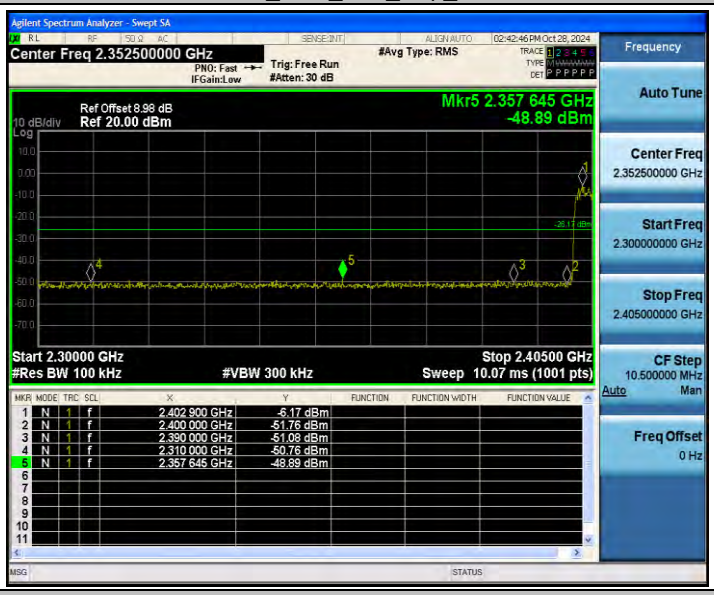

2DH5_Ant1_Low_2402



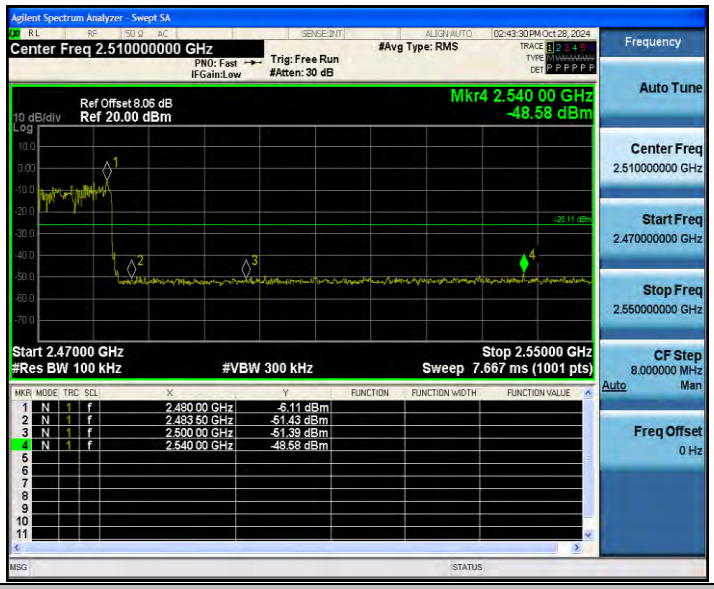
2DH5_Ant1_High_2480



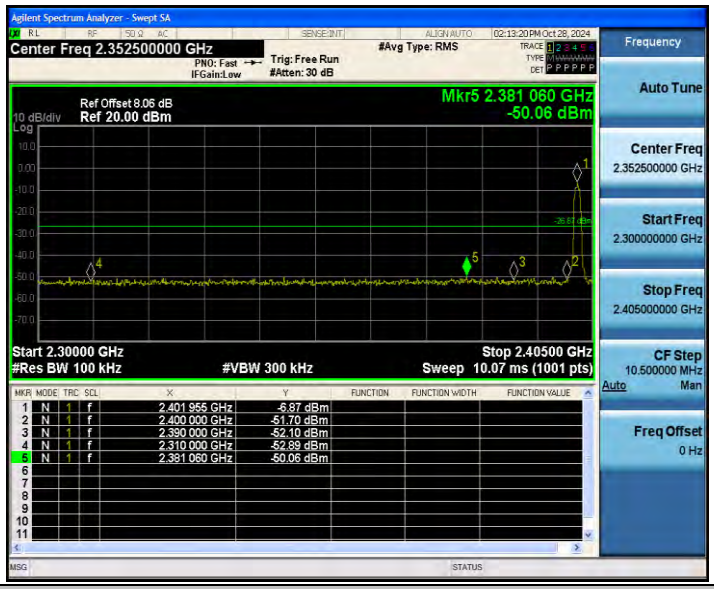

2DH5_Ant1_Low_Hop_2402



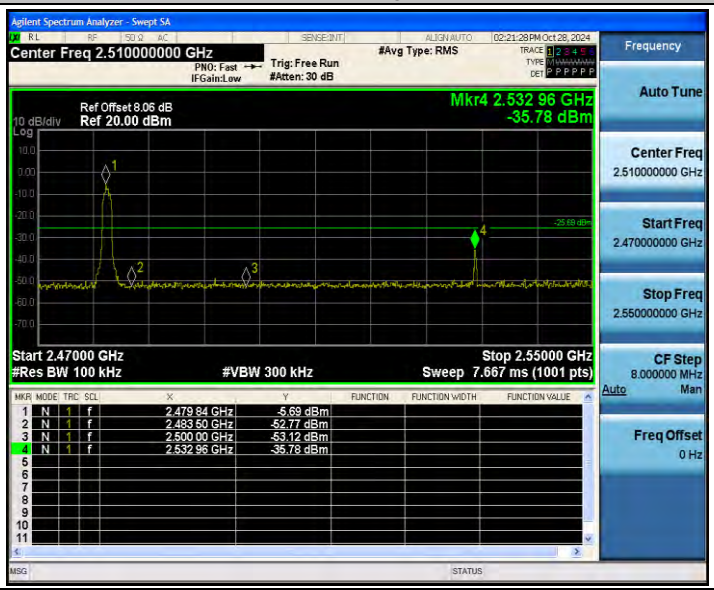

2DH5_Ant1_High_Hop_2480



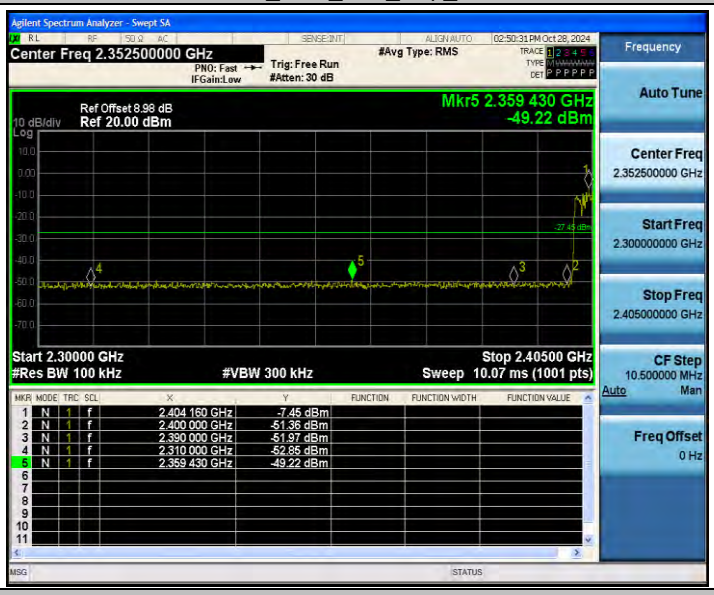

3DH5_Ant1_Low_2402



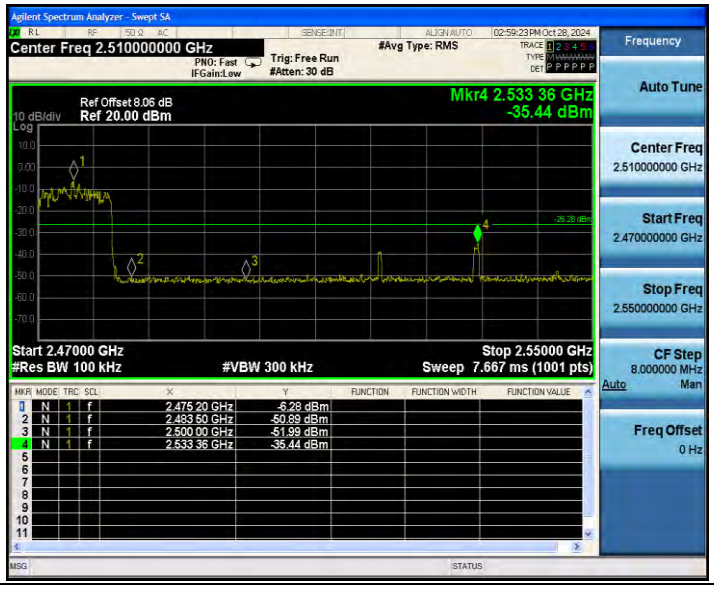

3DH5_Ant1_High_2480



3DH5_Ant1_Low_Hop_2402




3DH5_Ant1_High_Hop_2480



## 10.8 Appendix H: Conducted Spurious Emission

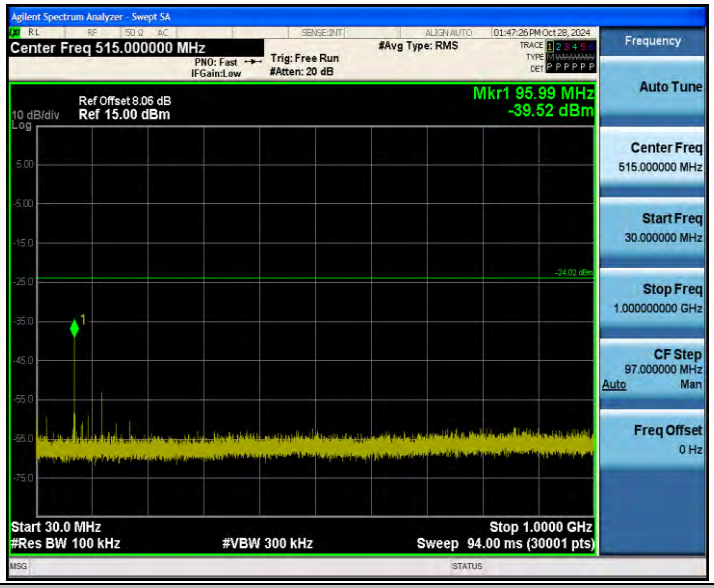
### 10.8.1 Test Result

| Test Mode | Antenna | Channel | FreqRange [MHz] | RefLevel [dBm] | Result [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | 2402 | Reference | -4.02 | -4.02 | --- | PASS |
| | | | 30~1000 | -4.02 | -39.53 | ≤-24.02 | PASS |
| | | | 1000~26500 | -4.02 | -42.56 | ≤-24.02 | PASS |
| | | 2441 | Reference | -3.36 | -3.36 | --- | PASS |
| | | | 30~1000 | -3.36 | -53.59 | ≤-23.36 | PASS |
| | | | 1000~26500 | -3.36 | -36.79 | ≤-23.36 | PASS |
| | | 2480 | Reference | -4.43 | -4.43 | --- | PASS |
| | | | 30~1000 | -4.43 | -38.74 | ≤-24.43 | PASS |
| | | | 1000~26500 | -4.43 | -42.14 | ≤-24.43 | PASS |
| 2DH5 | Ant1 | 2402 | Reference | -6.22 | -6.22 | --- | PASS |
| | | | 30~1000 | -6.22 | -53.79 | ≤-26.22 | PASS |
| | | | 1000~26500 | -6.22 | -42.99 | ≤-26.22 | PASS |
| | | 2441 | Reference | -4.63 | -4.63 | --- | PASS |
| | | | 30~1000 | -4.63 | -52.9 | ≤-24.63 | PASS |
| | | | 1000~26500 | -4.63 | -43.24 | ≤-24.63 | PASS |
| | | 2480 | Reference | -7.05 | -7.05 | --- | PASS |
| | | | 30~1000 | -7.05 | -38.72 | ≤-27.05 | PASS |
| | | | 1000~26500 | -7.05 | -41.88 | ≤-27.05 | PASS |
| 3DH5 | Ant1 | 2402 | Reference | -5.38 | -5.38 | --- | PASS |
| | | | 30~1000 | -5.38 | -50.11 | ≤-25.38 | PASS |
| | | | 1000~26500 | -5.38 | -43.3 | ≤-25.38 | PASS |
| | | 2441 | Reference | -8.52 | -8.52 | --- | PASS |
| | | | 30~1000 | -8.52 | -38.44 | ≤-28.52 | PASS |
| | | | 1000~26500 | -8.52 | -43.13 | ≤-28.52 | PASS |
| | | 2480 | Reference | -8.37 | -8.37 | --- | PASS |
| | | | 30~1000 | -8.37 | -51.65 | ≤-28.37 | PASS |
| | | | 1000~26500 | -8.37 | -42.89 | ≤-28.37 | PASS |

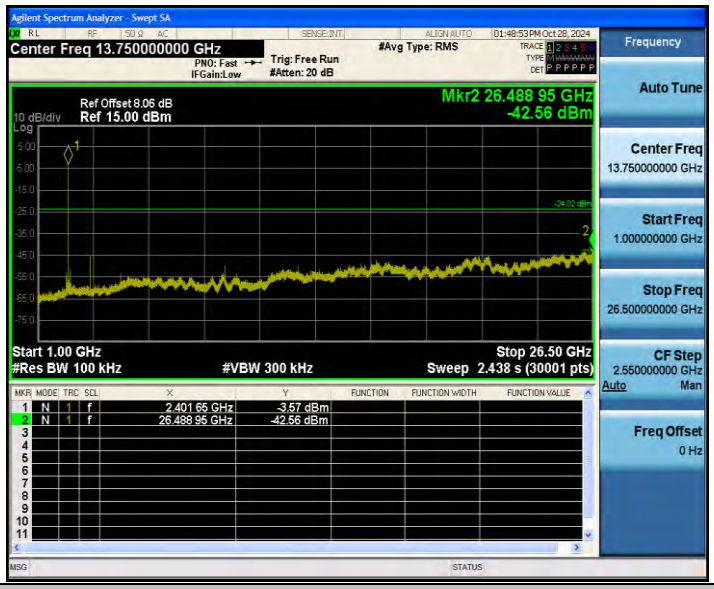
### 10.8.2 Test Graphs

DH5_Ant1_2402_0~Reference

DH5_Ant1_2402_30~1000

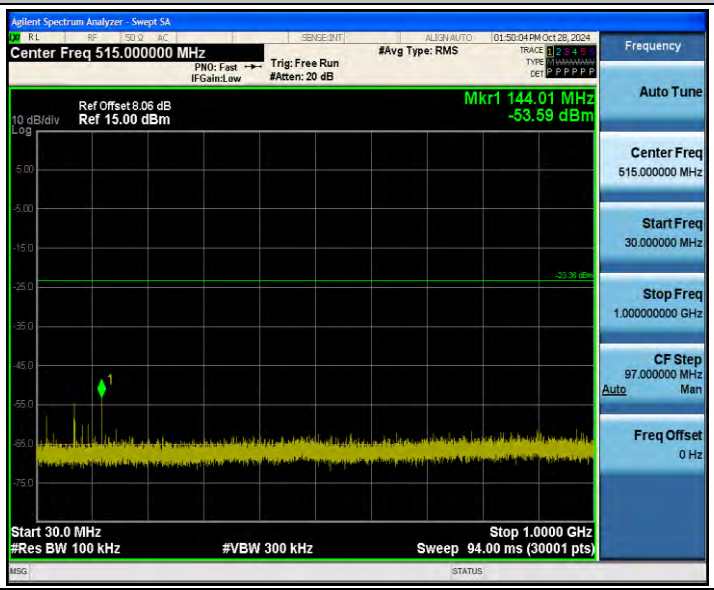



DH5_Ant1_2402_1000~26500

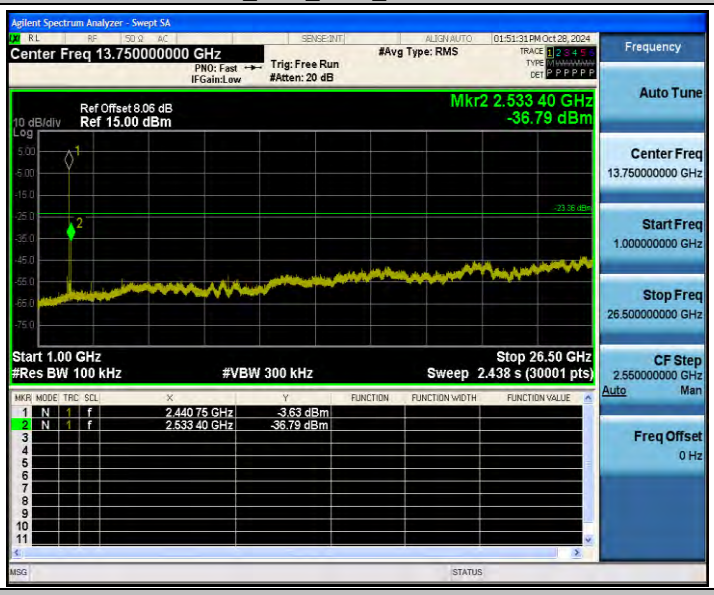



DH5_Ant1_2441_0~Reference

DH5_Ant1_2441_30~1000

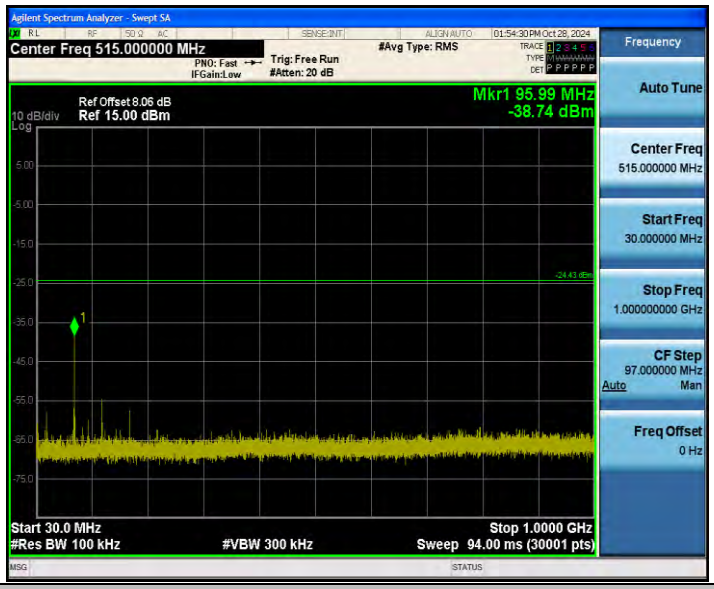


DH5_Ant1_2441_1000~26500

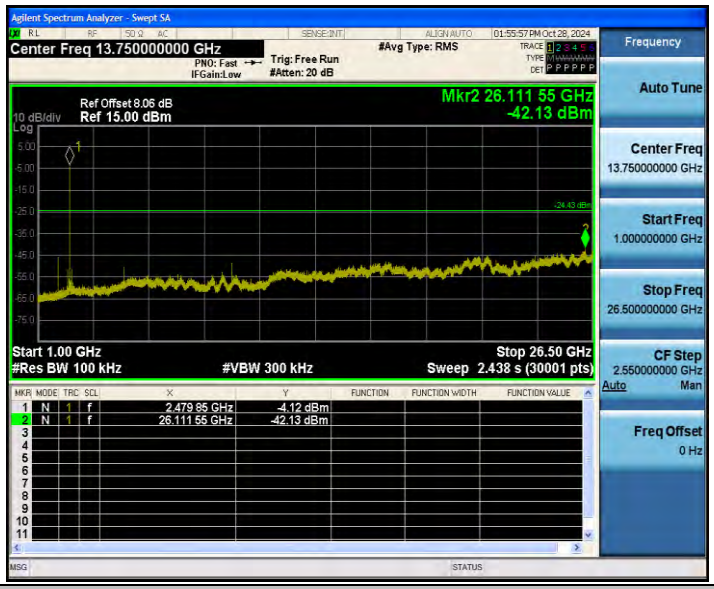



DH5_Ant1_2480_0~Reference

DH5_Ant1_2480_30~1000




DH5_Ant1_2480_1000~26500

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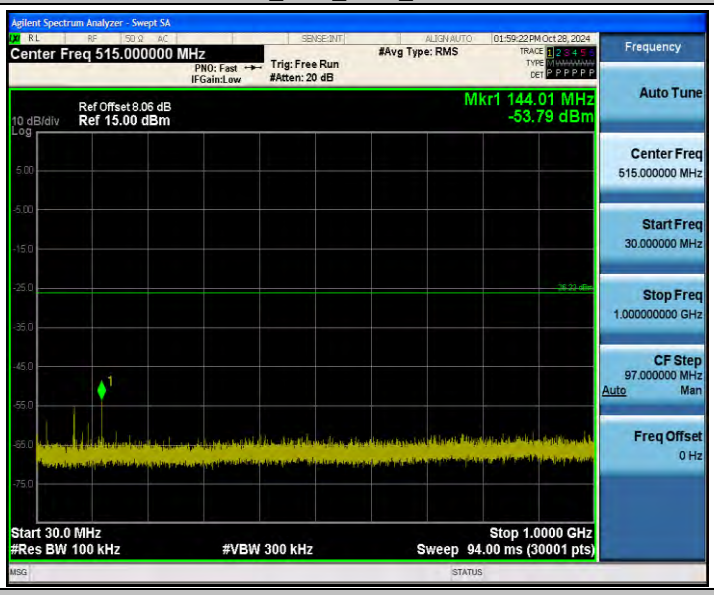


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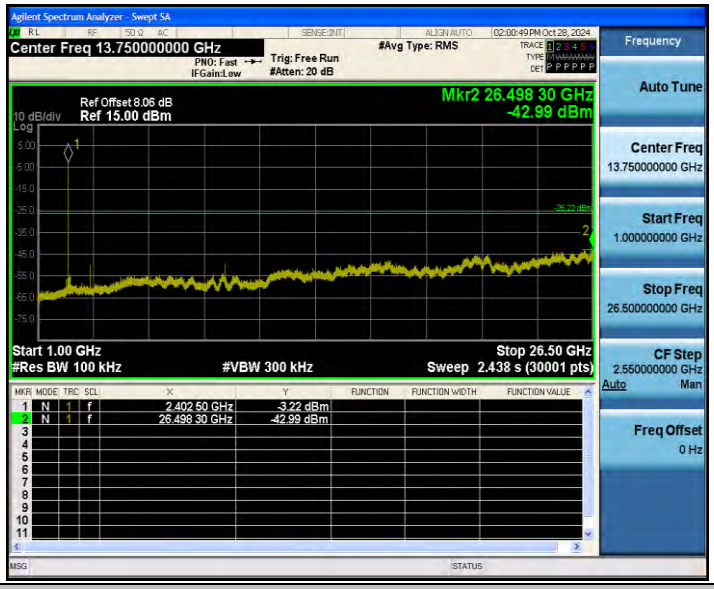


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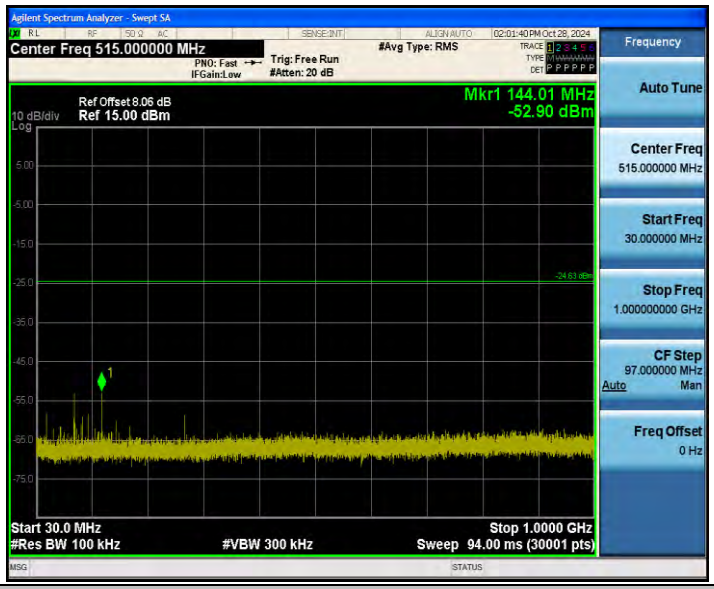


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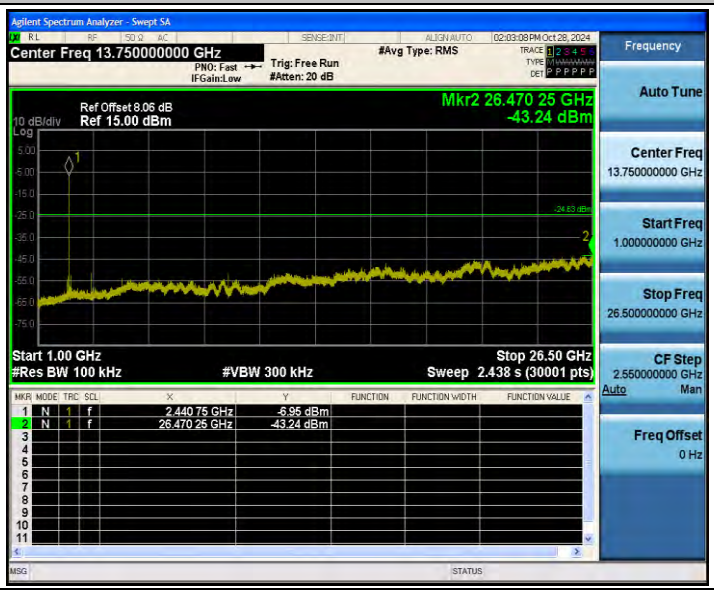

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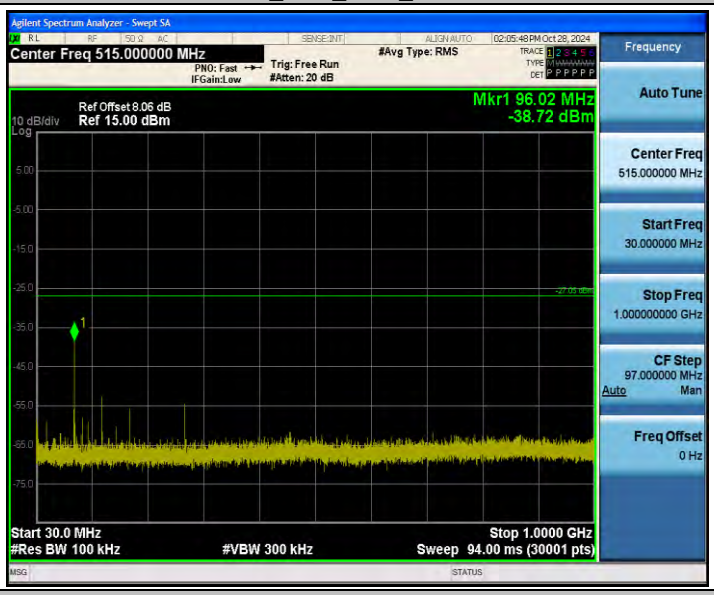
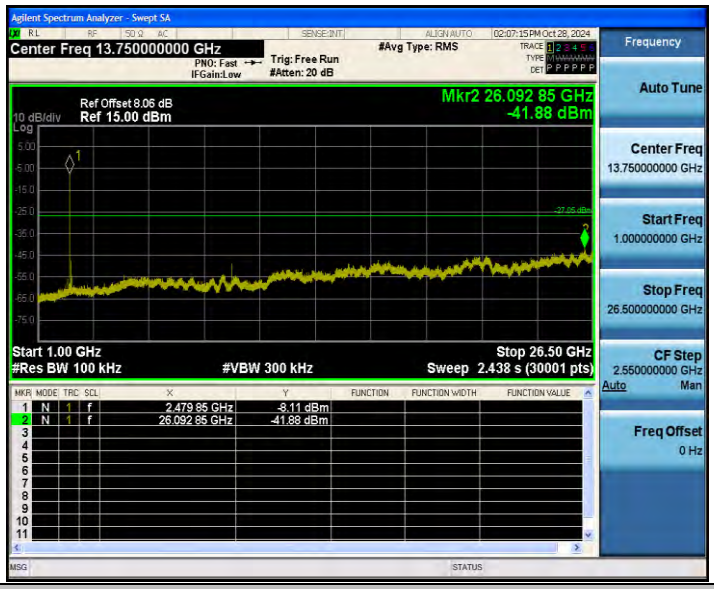



2DH5_Ant1_2480_1000~26500




3DH5_Ant1_2402_0~Reference

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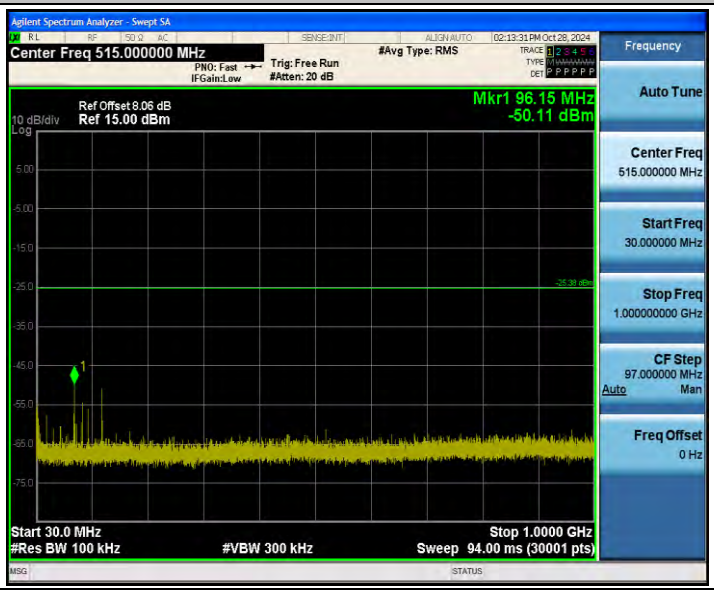

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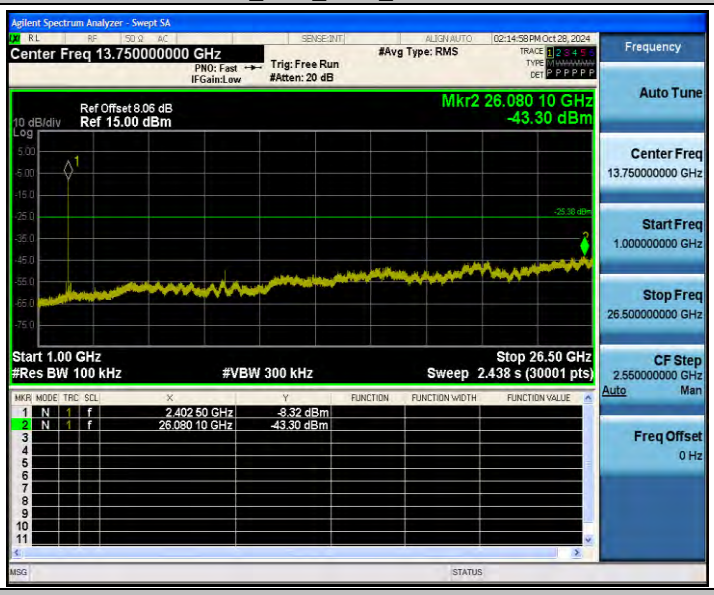


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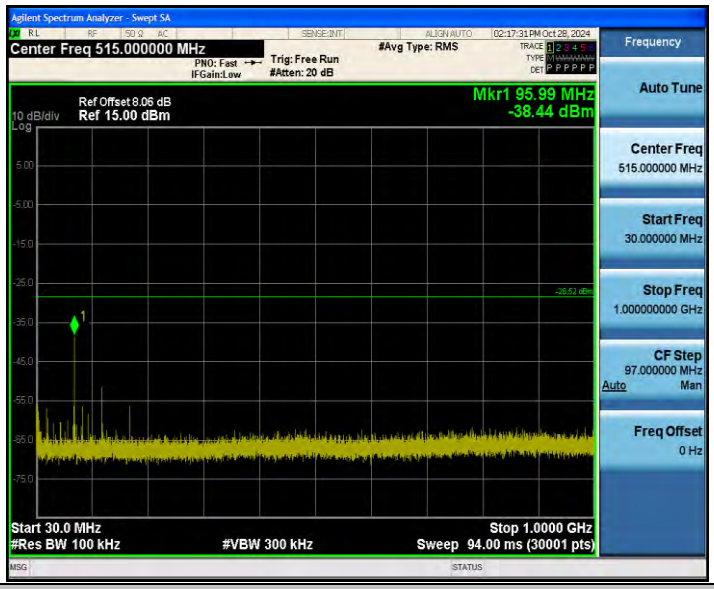


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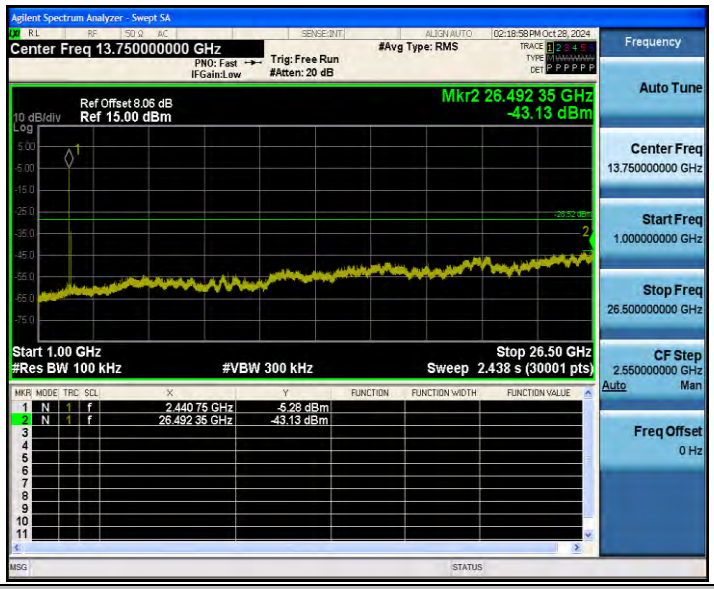


3DH5_Ant1_2480_0~Reference

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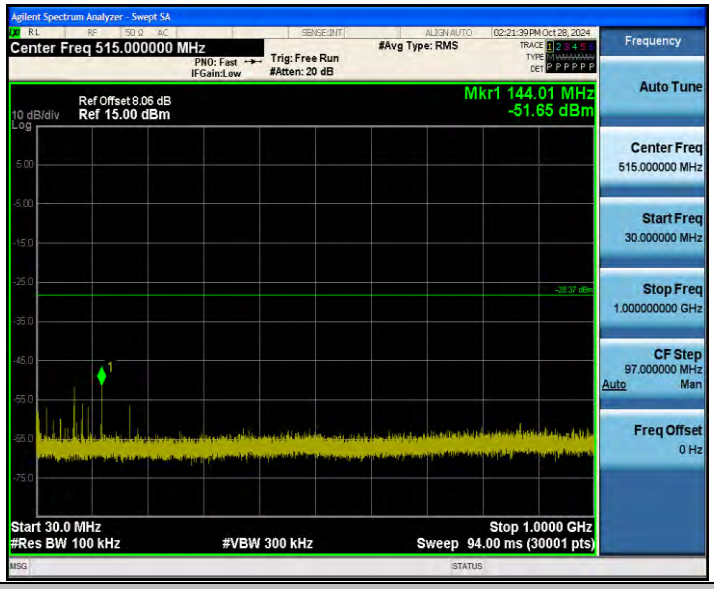
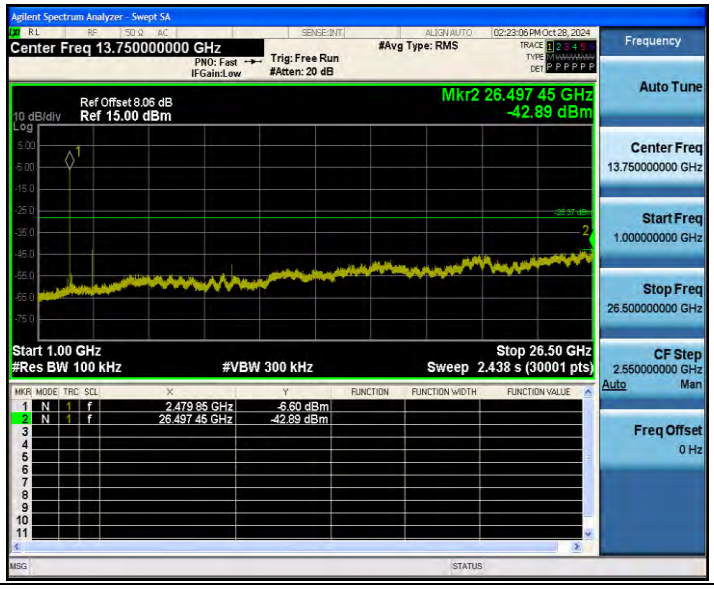



3DH5_Ant1_2480_1000~26500




- End of the Report -