Bluetooth Low Energy Template: Release October 22nd, 2022

# TEST REPORT

**N°: 21490906-798426-C(FILE#7873522)** **Version : 01**

| | |
|---|---|
| **Subject** | **Radio spectrum matters tests according to standards: 47 CFR Part 15.247 & RSS-247 ISSUE 3 & RSS-Gen Issue 5** |
| **Issued to** | **INGENICO**<br>9 Avenue de la gare - Rovaltain TGV BP25156<br>26958 – VALENCE Cedex 9<br>FRANCE |
| **Apparatus under test** | |
| ↳ Product | **Payment terminal** |
| ↳ Trade mark | **INGENICO** |
| ↳ Manufacturer | **INGENICO** |
| ↳ Model under test | **AXIUM RX9000** |
| ↳ Serial number | **2419MR900209 / 2419MR900267** |
| ↳ FCC ID | **XKB-RX9CLWBT** |
| ↳ IC | **2586D-RX9CLWBT** |
| **Conclusion** | See Test Program chapter |
| **Test date** | May 13, 2024 to June 7, 2024 |
| **Test location** | Moirans |
| **FCC Test site** | FR0008 - 918017 (MOI) |
| **ISED Test site** | FR0008 - 6500A |
| **Sample receipt date** | May 10, 2024 |
| **Composition of document** | 89 pages |
| **Document issued on** | August 12, 2024 |

**Written by :**
Akram HAKKARI
**Tests operator**

**Approved by :**
Majid MOURZAGH
**Technical manager**

## PUBLICATION HISTORY

| Version | Date | Author | Modification |
|---|---|---|---|
| 01 | August 12, 2024 | Akram HAKKARI | Creation of the document |

*Each new edition of this test report replaces and cancels the previous edition. The control of the old editions of report is under responsibility of client.*

## SUMMARY

# 1. TEST PROGRAM

**References**

- **47 CFR Part 15.247**
- **RSS 247 ISSUE 3**
- **RSS Gen Issue 5**
- **KDB 558074 D01 DTS Meas Guidance v05r02**
- **ANSI C63.10-2013**

**Radio requirement:**

| Clause (47CFR Part 15.247 & RSS-247 ISSUE 3 & RSS-Gen Issue 5) Test Description | Test result - Comments | | | |
|---|---|---|---|---|
| Occupied Bandwidth | ☑ PASS | ☐ FAIL | ☐ NA | ☐ NP(1) |
| 20dB Bandwidth | ☑ PASS | ☐ FAIL | ☐ NA | ☐ NP(1) |
| Number of Hopping Frequency | ☑ PASS | ☐ FAIL | ☐ NA | ☐ NP(1) |
| Carrier Frequency Separation | ☑ PASS | ☐ FAIL | ☐ NA | ☐ NP(1) |
| Time of Occupancy | ☑ PASS | ☐ FAIL | ☐ NA | ☐ NP(1) |
| Duty Cycle | ☑ PASS | ☐ FAIL | ☐ NA | ☐ NP(1) |
| Maximum Conducted Output Power | ☑ PASS | ☐ FAIL | ☐ NA | ☐ NP(1) |
| Conducted Spurious Emission at the Band Edge | ☑ PASS | ☐ FAIL | ☐ NA | ☐ NP(1) |
| Unwanted Emissions into Non-Restricted Frequency Bands | ☑ PASS | ☐ FAIL | ☐ NA() | ☐ NP(1) |
| AC Power Line Conducted Emission | ☑ PASS | ☐ FAIL | ☐ NA(2) | ☐ NP(1) |
| Unwanted Emissions into Restricted Frequency Bands | ☑ PASS | ☐ FAIL | ☐ NA | ☐ NP(1) |
| Receiver Radiated emissions | ☑ PASS | ☐ FAIL | ☑ NA | ☐ NP(1) |
| This table is a summary of test report, see conclusion of each clause of this test report for detail. | | | | |

(1): Limited program
(2): EUT not directly or indirectly connected to the AC Power Public Network

PASS: EUT complies with standard's requirement
FAIL: EUT does not comply with standard's requirement
NA: Not Applicable
NP: Test Not Performed

## 2. EQUIPMENT UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER)

### 2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

**Equipment under test (EUT):**
**INGENICO AXIUM RX9000** **Serial Number: 2419MR900209 / 2419MR900267**

Equipment Under Test

**Power supply:**
During all the tests, EUT is supplied by $V_{nom}$: 240 VAC
For measurement with different voltage, it will be presented in test method.

| Name | Type | Rating | Reference / Sn | Comments |
|---|---|---|---|---|
| Supply1 | DC | 8-14 VDC | NC | - |
| Supply2 | PoE | 12.95W max | NC | - |

**Voltage table used (for Power Line Conducted Emissions):**

| Access | Type | Length used (m) | Declared <3m | Shielded | Comments |
|---|---|---|---|---|---|
| Supply1 | 240 VAC – 50Hz | NC | NC | No | - |
| Supply2 | PoE | NC | NC | Yes | - |
| Access1 | COMBOX | NC | No | NC | - |

| Access | Type | Length used (m) | Declared <3m | Shielded | Comments |
|---|---|---|---|---|---|
| Supply1 | 240 VAC – 50Hz | 1.5 | NC | No | - |
| Supply2 | PoE | 1.5 | NC | Yes | - |
| Access1 | COMBOX | 2.2 | No | NC | - |

**Equipment information:**

| | | | | |
|---|---|---|---|---|
| Bluetooth Classic Type: | ☐ **v1.2** | ☐ **v2.0** | ☐ **v2.1+EDR** | ☐ **v3.0+HS** |
| | ☐ **v4.0** | ☐ **v4.1** | | ☑ **v4.2** |
| Frequency band: | [2400 – 2483.5] MHz | | | |
| Spectrum Modulation: | ☑ FHSS | | | |
| Number of Channel: | Maximum: | 79 | Minimum: | 20 |
| Spacing channel: | 1MHz | | | |
| Channel bandwidth: | 1MHz | | | |
| Antenna Type: | ☑ Integral | ☐ External | | ☐ Dedicated |
| Antenna connector: | ☐ Yes | ☐ No | | ☑ Temporary for test |
| Transmit chains: Antenna Requirements §15.203 | 1 | | | |
| | Single antenna | | | |
| | Gain: 1.1dBi | | | |
| | The transmitter uses an integral antenna and it permanently connected | | | |
| Beam forming gain: | No | | | |
| Receiver chains | 1 | | | |
| Type of equipment: | ☑ Stand-alone | ☐ Plug-in | | ☐ Combined |
| Ad-Hoc mode: | ☐ Yes | | ☑ No | |
| Duty cycle: | ☑ Continuous duty | ☐ Intermittent duty | | ☐ 100% duty |
| Equipment type: | ☑ Production model | | ☐ Pre-production model | |
| Operating temperature range: | Tmin: | ☐ -20°C | ☐ 0°C | ☑ -10°C |
| | Tnom: | 20°C | | |
| | Tmax: | ☐ 35°C | ☐ 55°C | ☑ 45°C |
| Type of power source: | ☑ AC power supply | ☐ DC power supply | | ☐ Battery |
| Operating voltage range: | Vnom: | ☑ 230V/50Hz | | ☐ 24Vdc |

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

| DATA RATE | | | | |
|---|---|---|---|---|
| **Available for EUT** | **Modulation type** | **Max. Data Rate (Mbps)** | **Packet type** | **Worst Case Modulation** |
| ☑ | GFSK | 1 | 1-DM1 | ☐ |
| | GFSK | 1 | 1-DH1 | ☐ |
| | GFSK | 1 | 1-DM3 | ☐ |
| | GFSK | 1 | 1-DH3 | ☐ |
| | GFSK | 1 | 1-DM5 | ☐ |
| | GFSK | 1 | 1-DH5 | ☑ |
| ☐ | GFSK | 1 | AUX1 | ☐ |
| ☑ | π/4 DQPSK | 2 | 2-DH1 | ☐ |
| | π/4 DQPSK | 2 | 2-DH3 | ☐ |
| | π/4 DQPSK | 2 | 2-DH5 | ☑ |
| | 8DPSK | 3 | 3-DH1 | ☐ |
| | 8DPSK | 3 | 3-DH3 | ☐ |
| | 8DPSK | 3 | 3-DH5 | ☑ |

## 2.2. RUNNING MODE

| Test mode | Description of test mode |
|---|---|
| Test mode 1 | Permanent emission with modulation on a fixed channel with the data rate that produced the highest power.<br>adb root<br>adb remount<br>adb shell<br>bdt_unisoc<br>enable<br>set_nonsig_tx enable 0 pattern channel pac_type pac_len power_type power_value pac_cnt<br>enable: 1 means start transmission, 0 means stop transmission<br>pattern : 1->00000000, 2->11111111, 3->10101010, 4->PRBS9, 9->11110000<br>channel : Specified channel (hexadecimal)<br>pac_type :packets type, the relationship between index and pac_type is shown in the following table.<br>pac_len : TX packet length (hexadecimal)<br>power_type :power type. Default is 1<br>power_value :Power value range, 0~9, default is 9<br>pac_cnt : Specified pac_cnt, 0 means continuous TX.<br><br>All tests are done with 9 at power value |
| Test mode 2 | Permanent emission with modulation on a fixed channel with the data rate that produced the highest power.<br>adb root<br>adb remount<br>adb shell<br>bdt_unisoc<br>enable<br>set_nonsig_tx enable 0 pattern channel pac_type pac_len power_type power_value pac_cnt<br>enable: 1 means start transmission, 0 means stop transmission<br>pattern : 1->00000000, 2->11111111, 3->10101010, 4->PRBS9, 9->11110000<br>channel : FF for hopping<br>pac_type :packets type, the relationship between index and pac_type is shown in the following table.<br>pac_len : TX packet length (hexadecimal)<br>power_type :power type. Default is 1<br>power_value :Power value range, 0~9, default is 9<br>pac_cnt : Specified pac_cnt, 0 means continuous TX.<br><br>All tests are done with 9 at power value |
| Test mode 3 | Permanent reception<br>adb root<br>adb remount<br>adb shell<br>bdt_unisoc<br>enable set_nonsig_tx enable 0 pattern channel pac_type rx_gain bdaddr<br>enable: 1 means start transmission, 0 means stop transmission<br>pattern : 1->00000000, 2->11111111, 3->10101010, 4->PRBS9, 9->11110000<br>channel : Specified channel (hexadecimal)<br>pac_type :packets type, the relationship between index and pac_type is shown in the above table.<br>rx_gain: Gain parameter, which is fixed at 7F.<br>bdaddr : The Bluetooth address of the device : XX:XX:XX:XX:XX:XX<br>get_nonsig_rx_data 0 |

| Test | Running mode | |
|---|---|---|
| Occupied Bandwidth | ☑ Test mode 1 (1) | ☐ Alternative test mode() |
| 20dB Bandwidth | ☑ Test mode 1 (1) | ☐ Alternative test mode() |
| Number of Hopping Frequency | ☑ Test mode 2 (1) | ☐ Alternative test mode() |
| Carrier Frequency Separation | ☑ Test mode 1 (1) | ☐ Alternative test mode() |
| Time of Occupancy | ☑ Test mode 2 (1) | ☐ Alternative test mode() |
| Duty Cycle | ☑ Test mode 1 (1) | ☐ Alternative test mode() |
| Maximum Conducted Output Power | ☑ Test mode 1 (1) | ☐ Alternative test mode() |
| Conducted Spurious Emission at the Band Edge | ☑ Test mode 1 (1) | ☐ Alternative test mode() |
| Unwanted Emissions into Non-Restricted Frequency Bands | ☑ Test mode 1 (1) | ☐ Alternative test mode() |
| AC Power Line Conducted Emission | ☑ Test mode 2 (1) | ☐ Alternative test mode() |
| Unwanted Emissions into Restricted Frequency Bands | ☑ Test mode 1 (1) | ☐ Alternative test mode() |
| Receiver Radiated emissions | ☑ Test mode 3 (1) | ☐ Alternative test mode() |

(1) Following commands with the specific test software “X” are used to set the product:
a. – See document “X”(provided by customer) for the command used during test.

| Hardware information | | |
|---|---|---|
| Software (if applicable): | **V. :** | **NC** |
| | | |

## 2.3. EQUIPMENT LABELLING



## 2.4. EQUIPMENT MODIFICATION

☑ None ☐ Modification:

## 2.5. *FIELD STRENGTH CALCULATION*

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follow:

FS = RA + AF + CF – AG

Where FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Factor
AG = Amplifier Gain

Assume a receiver reading of 52.5dBµV is obtained. The antenna factor of 7.4 and a cable factor of 1.1 are added. The amplifier gain of 29dB is subtracted, giving a field strength of 32 dBµV/m.
FS = 52.5 + 7.4 + 1.1 – 29 = 32 dBµV/m
The 32 dBµV/m value can be mathematically converted to its corresponding level in µV/m.
Level in µV/m = Common Antilogarithm [(32dBµV/m)/20] = 39.8 µV/m.

## 2.6. *TEST DISTANCE EXTRAPOLATION – FCC/ISED*

The field strength is extrapolated to the new measurement distance using formula from FCC Part15.31 (f) and §6.5-6.6 RSS-GEN:

Below 30MHz,

$$FS_{limit} = FS_{max} - 40\log\left(\frac{d_{limit}}{d_{measure}}\right)$$

Above 30MHz,

$$FS_{limit} = FS_{max} - 20\log\left(\frac{d_{limit}}{d_{measure}}\right)$$

*Where:*
*$FS_{limit}$ is the calculation of field strength at the limit distance, expressed in dBµV/m*
*$FS_{max}$ is the measured field strength, expressed in dBµV/m*
*$d_{measure}$ is the distance of the measurement point from the EUT*
*$d_{limit}$ is the reference limit distance*

## 2.7. *CALIBRATION DATE*

The calibration intervals are extended at 12+2 months. This extended interval is based on the fact that there is sufficient calibration data to statistically establish a trend or based on experience of use of the test equipment to assure good measurement results for a longer period.

# 3. OCCUPIED BANDWIDTH

## 3.1. TEST CONDITIONS

| | | |
|---|---|---|
| Date of test | : | May 22, 2024 |
| Test performed by | : | Akram HAKKARI |
| Relative humidity (%) | : | 32 |
| Ambient temperature (°C) | : | 21 |

## 3.2. TEST SETUP

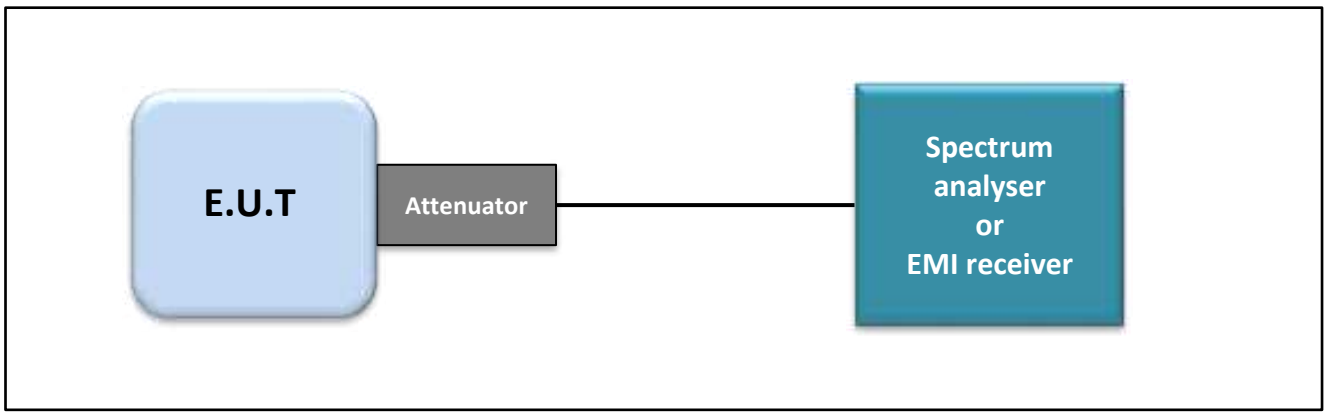
- The Equipment under Test is installed:
☐ On a table
☑ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

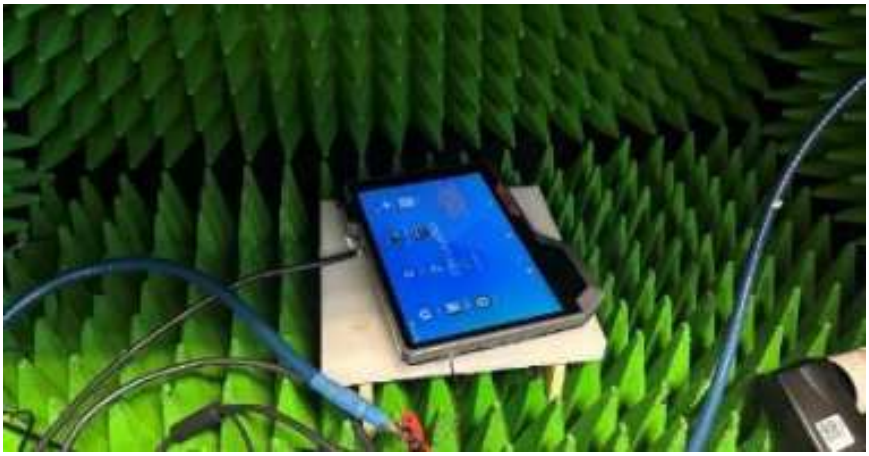
- Test Procedure:
☐ RSS-Gen Issue 5 § 6.7
☐ ANSI C63.10 § 6.9.2

***Measurement Procedure:***

a) RBW shall be in the range of 1% to 5% of the anticipated occupied bandwidth
b) Set the video bandwidth (VBW) ≥ 3 x RBW
c) SPAN = Capture all products of the modulation process
d) Detector = Peak.
e) Trace mode = max hold.
f) Sweep = auto couple.
g) Allow the trace to stabilize.
h) OBW 99% function of spectrum analyzer used




Test set up of Occupied Bandwidth



Photograph for Occupied bandwidth

### 3.3. *LIMIT*

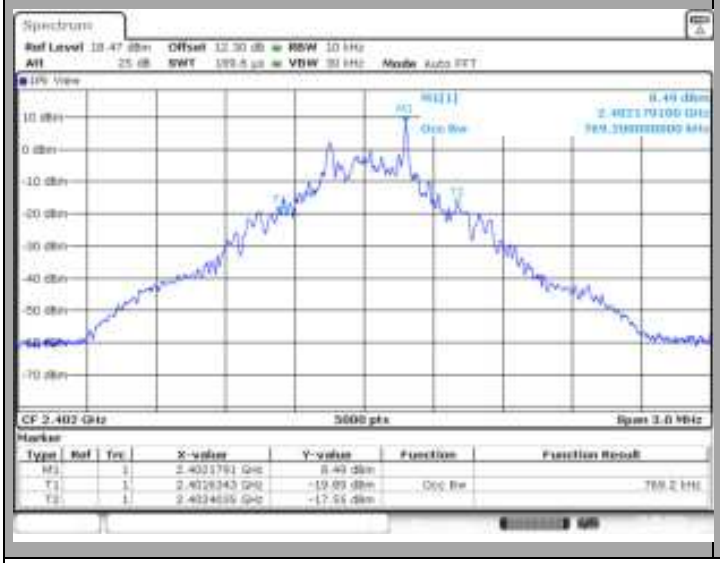
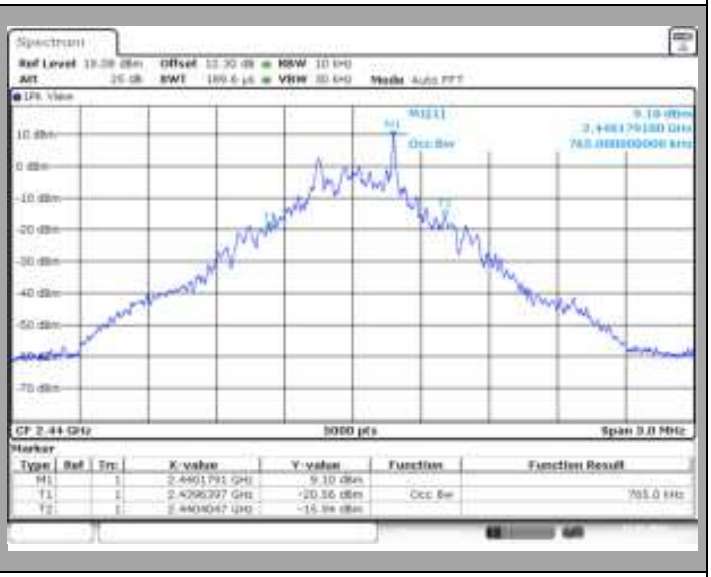
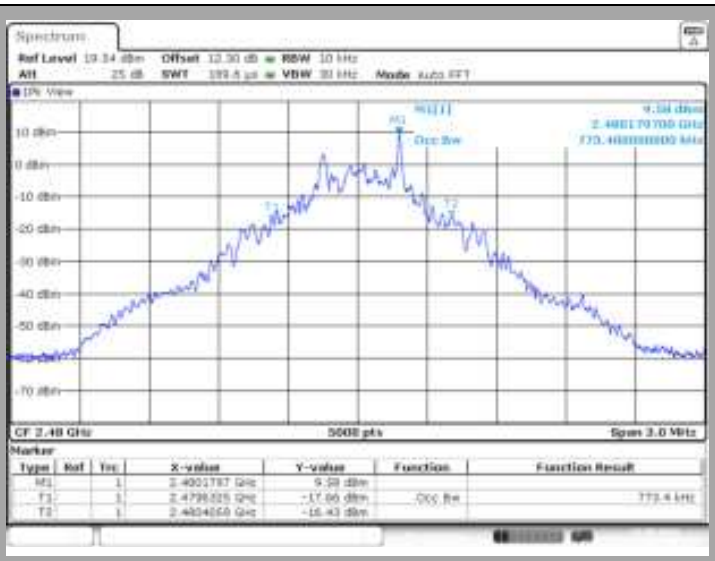
None

### 3.4. TEST EQUIPMENT LIST

| TEST EQUIPMENT USED | | | | | |
|---|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Identifier** | **Cal_Date** | **Cal_Due** |
| Attenuator 10dB | AEROFLEX | _ | A7122268 | 07/23 | 07/25 |
| Cable Measure | _ | 36G | A5329604 | 02/24 | 02/25 |
| Full Anechoic Room | SIEPEL | _ | D3044024 | | |
| Multimeter - CEM | FLUKE | 87 | A1240251 | 10/23 | 10/25 |
| SMK 1.2m (Ampl <-> chamber) | HUBER-SUHNER | SUCOFLEX 102 | A5330062 | 04/23 | 04/26 |
| Spectrum analyzer | ROHDE & SCHWARZ | FSV 40 | A4060059 | 04/24 | 04/26 |
| Thermo-hygrometer | TESTO | 608-H1 | B4204120 | 03/23 | 03/25 |
| Thermo-hygrometer (PM1/2/3) | KIMO | HQ 210 | B4206022 | 05/23 | 05/25 |

Note: In our quality system, the test equipment calibration due is more & less 2 months

## 3.5. RESULTS

| Occupied Bandwidth (DH5) | |
|---|---|
| **Cmin** | **Cnom** |
|  |  |
| **Cmax** | |
|  | |

| Channel | Occupied Bandwidth (MHz) |
|---|---|
| **Cmin** | 0.769 |
| **Cnom** | 0.765 |
| **Cmax** | 0.773 |

| Occupied Bandwidth<br>(2-DH5) | |
|---|---|
| **Cmin** | **Cnom** |
|  |  |
| **Cmax** | |
|  | |

| Channel | Occupied Bandwidth (MHz) |
|---|---|
| **Cmin** | 1.155 |
| **Cnom** | 1.152 |
| **Cmax** | 1.154 |

| Occupied Bandwidth<br>(3-DH5) | |
|---|---|
| **Cmin** | **Cnom** |
|  |  |
| **Cmax** | |
|  | |

| Channel | Occupied Bandwidth (MHz) |
|---|---|
| **Cmin** | 1.174 |
| **Cnom** | 1.173 |
| **Cmax** | 1.170 |

## 3.6. *CONCLUSION*

Occupied Channel Bandwidth measurement performed on the sample of the product **INGENICO AXIUM RX9000**, SN: **2419MR900209 / 2419MR900267**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS-GEN ISSUE 5** limits.

# 4. 20dB Emission Bandwidth

## 4.1. TEST CONDITIONS

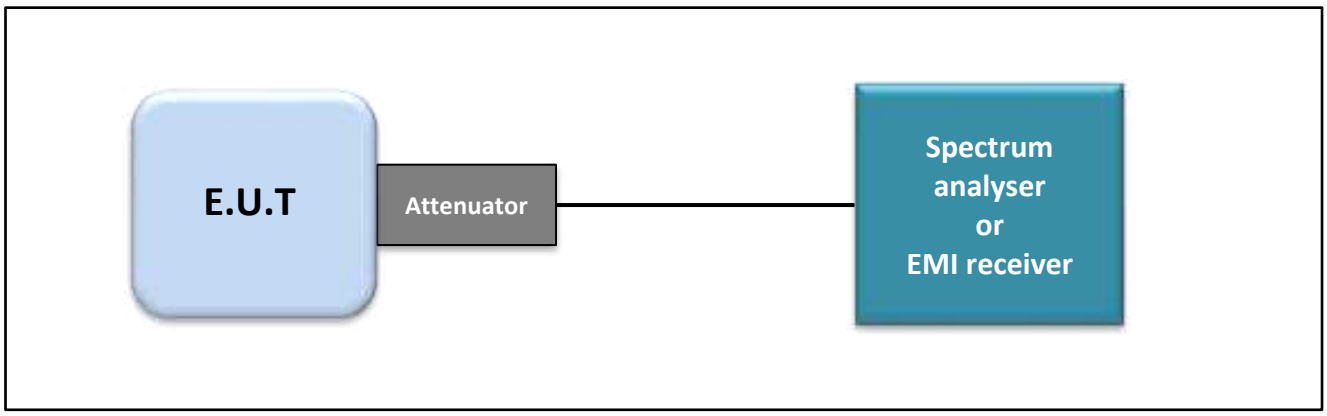
| | | |
|---|---|---|
| Date of test | : | May 22, 2024 |
| Test performed by | : | Akram HAKKARI |
| Relative humidity (%) | : | 32 |
| Ambient temperature (°C) | : | 21 |

## 4.2. TEST SETUP

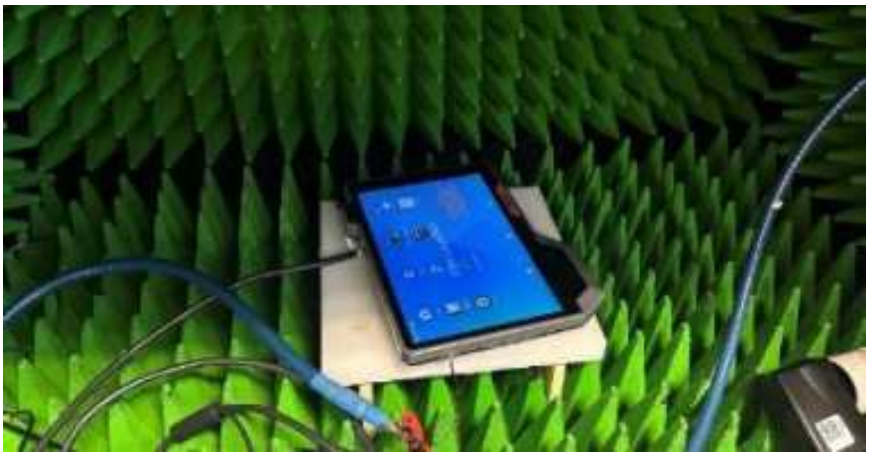
- The Equipment Under Test is installed:
☐ On a table
☑ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

- Test Procedure:
☑ ANSI C63.10 § 6.9.2:
The EUT is placed in an anechoic chamber; levels have been corrected to be in compliant with the Peak Output Power measured. The EUT is turn ON and using the MaxHold function, the frequency separation of two frequencies that were attenuated 20dB from the Peak Output Power level. A delta marker is used to measure the frequency difference as the emission bandwidth.




Test set up of 20dB Emission Bandwidth



Photograph for 20dB emission bandwidth

## 4.3. LIMIT

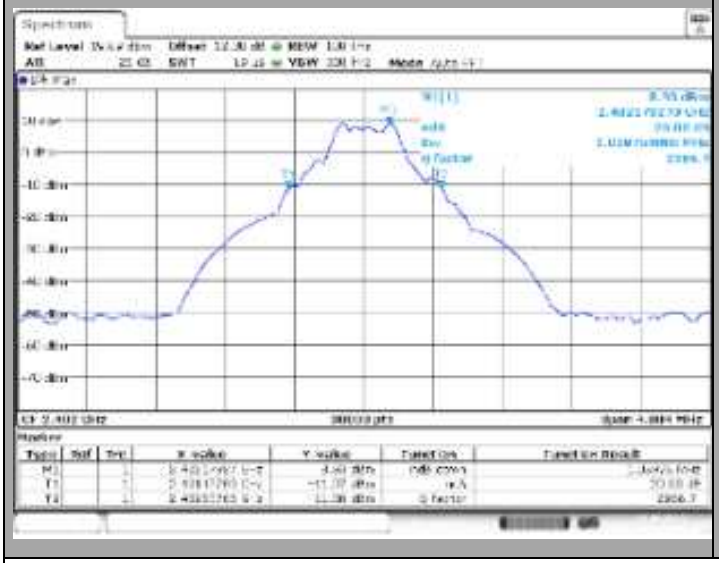
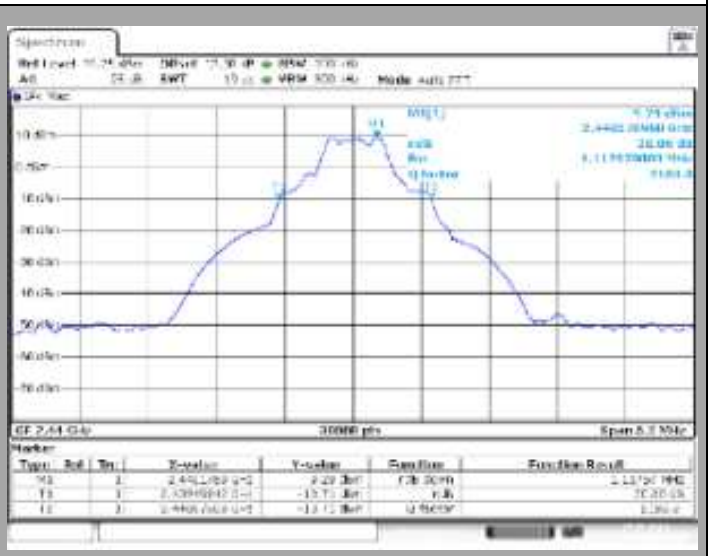
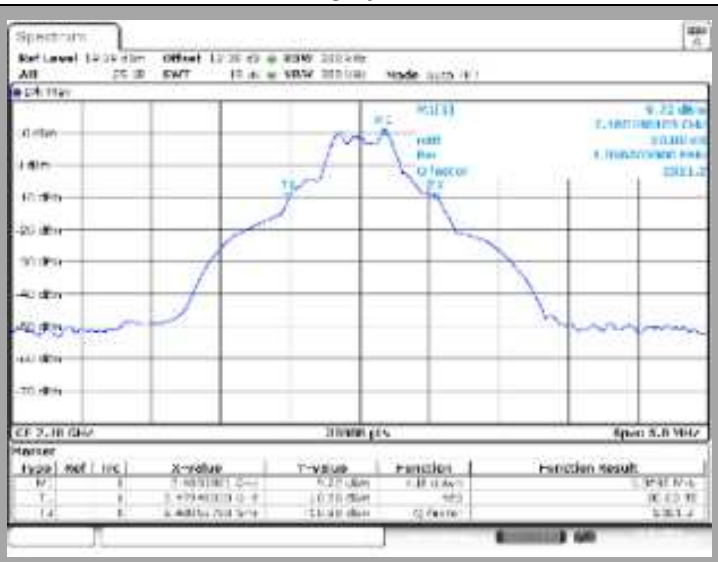
The maximum allowed 20dB bandwidth of hopping channel is 500kHz.

## 4.4. TEST EQUIPMENT LIST

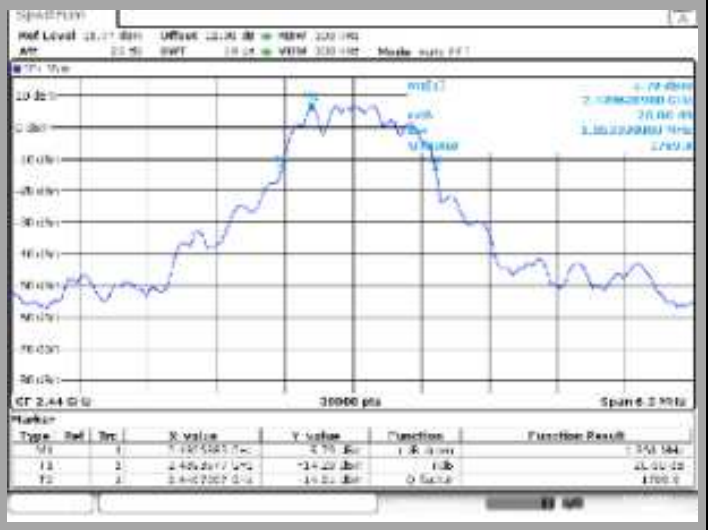
| TEST EQUIPMENT USED | | | | | |
|---|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Identifier** | **Cal_Date** | **Cal_Due** |
| Attenuator 10dB | AEROFLEX | _ | A7122268 | 07/23 | 07/25 |
| Cable Measure | _ | 36G | A5329604 | 02/24 | 02/25 |
| Full Anechoic Room | SIEPEL | _ | D3044024 | | |
| Multimeter - CEM | FLUKE | 87 | A1240251 | 10/23 | 10/25 |
| SMK 1.2m (Ampl <-> chamber) | HUBER-SUHNER | SUCOFLEX 102 | A5330062 | 04/23 | 04/26 |
| Spectrum analyzer | ROHDE & SCHWARZ | FSV 40 | A4060059 | 04/24 | 04/26 |
| Thermo-hygrometer | TESTO | 608-H1 | B4204120 | 03/23 | 03/25 |
| Thermo-hygrometer (PM1/2/3) | KIMO | HQ 210 | B4206022 | 05/23 | 05/25 |

Note: In our quality system, the test equipment calibration due is more & less 2 months

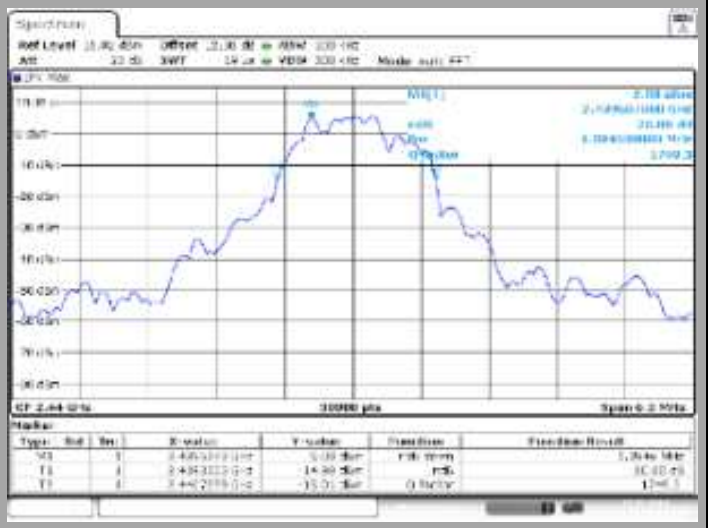
## 4.5. RESULTS

| GFSK (DH5) | |
|---|---|
| **Cmin** | **Cnom** |
|  |  |
| **Cmax** | |
|  | |

| Channel | 20dB Bandwidth (MHz) |
|---|---|
| **Cmin** | 1.05 |
| **Cnom** | 1.11 |
| **Cmax** | 1.06 |

| π/4 DQPSK (2-DH5) | |
|---|---|
| **Cmin** | **Cnom** |
|  |  |
| **Cmax** | |
|  | |

| Channel | 20dB Bandwidth (MHz) |
|---|---|
| **Cmin** | 1.34 |
| **Cnom** | 1.36 |
| **Cmax** | 1.36 |

| 8DPSK (3-DH5) | |
|---|---|
| **Cmin** | **Cnom** |
|  |  |
| **Cmax** | |
|  | |

| Channel | 20dB Bandwidth (MHz) |
|---|---|
| **Cmin** | 1.39 |
| **Cnom** | 1.39 |
| **Cmax** | 1.38 |

## 4.6. CONCLUSION

20dB Emission Bandwidth measurement performed on the sample of the product **INGENICO** AXIUM **RX9000**, SN: **2419MR900209** / **2419MR900267**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 3** limits.

# 5. CARRIER FREQUENCY SEPARATION

## 5.1. TEST CONDITIONS

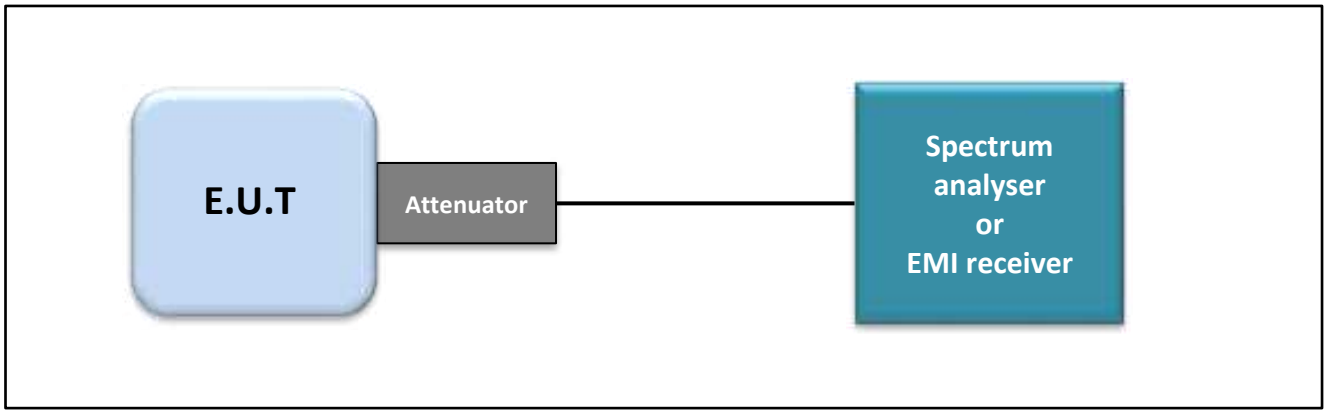
| | | |
|---|---|---|
| Date of test | : | May 22, 2024 |
| Test performed by | : | Akram HAKKARI |
| Relative humidity (%) | : | 32 |
| Ambient temperature (°C) | : | 21 |

## 5.2. TEST SETUP

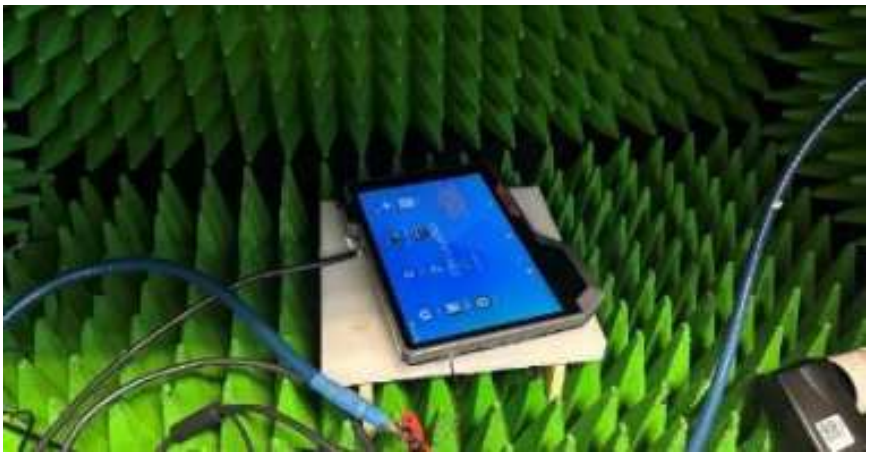
- The Equipment Under Test is installed:
☑ On a table
☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

- Test Procedure:
☑ ANSI C63.10 § 7.8.2:
The EUT is placed in an anechoic chamber; levels have been corrected to be in compliant with the Peak Output Power measured. The EUT is turn ON and using the MaxHold function, the separation of two adjacent channels is recorded. A delta marker is used to measure the frequency difference.




Test set up of Carrier Frequency Separation



Photograph for Carrier Frequency Separation

## 5.3. LIMIT

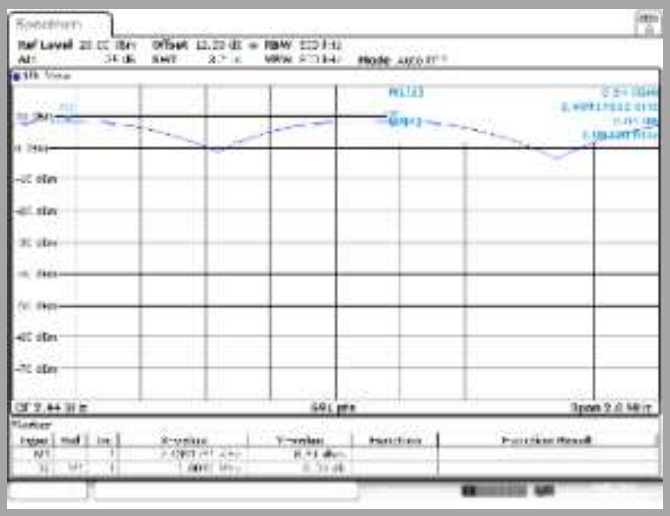
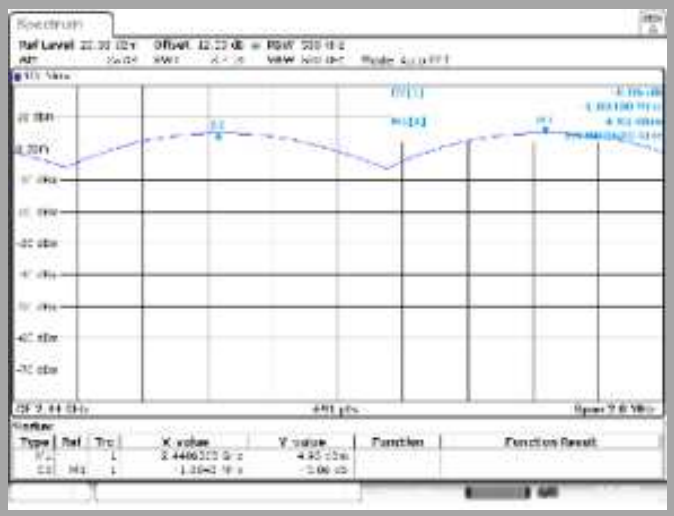
Carrier Frequency Separation shall be at least two-thirds of the 20dB Bandwidth

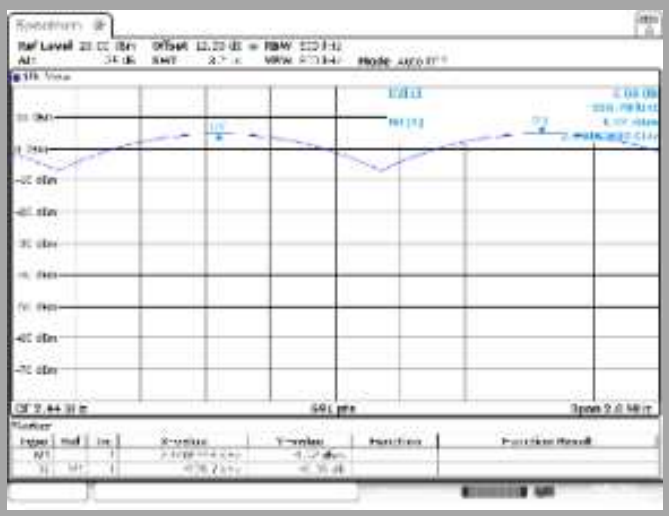
## 5.4. TEST EQUIPMENT LIST

| TEST EQUIPMENT USED | | | | | |
|---|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Identifier** | **Cal_Date** | **Cal_Due** |
| Attenuator 10dB | AEROFLEX | _ | A7122268 | 07/23 | 07/25 |
| Cable Measure | _ | 36G | A5329604 | 02/24 | 02/25 |
| Full Anechoic Room | SIEPEL | _ | D3044024 | | |
| Multimeter - CEM | FLUKE | 87 | A1240251 | 10/23 | 10/25 |
| SMK 1.2m (Ampl <-> chamber) | HUBER-SUHNER | SUCOFLEX 102 | A5330062 | 04/23 | 04/26 |
| Spectrum analyzer | ROHDE & SCHWARZ | FSV 40 | A4060059 | 04/24 | 04/26 |
| Thermo-hygrometer | TESTO | 608-H1 | B4204120 | 03/23 | 03/25 |
| Thermo-hygrometer (PM1/2/3) | KIMO | HQ 210 | B4206022 | 05/23 | 05/25 |

Note: In our quality system, the test equipment calibration due is more & less 2 months

## 5.5. RESULTS

| DH5 | 2DH5 |
|---|---|
|  |  |

| 3DH5 |
|---|
|  |

| | Carrier Frequency Separation (MHz) | Limit (MHz) |
|---|---|---|
| **DH5** | 1.004 | Minimum 2/3 of 20dB Emission Bandwidth |
| **2DH5** | 1.004 | Minimum 2/3 of 20dB Emission Bandwidth |
| **3DH5** | 0.995 | Minimum 2/3 of 20dB Emission Bandwidth |

## 5.6. CONCLUSION

Carrier Frequency Separation measurement performed on the sample of the product **INGENICO** AXIUM **RX9000**, SN: **2419MR900209** / **2419MR900267**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS-GEN ISSUE 5** limits.

# 6. NUMBER OF HOPPING FREQUENCY

## 6.1. TEST CONDITIONS

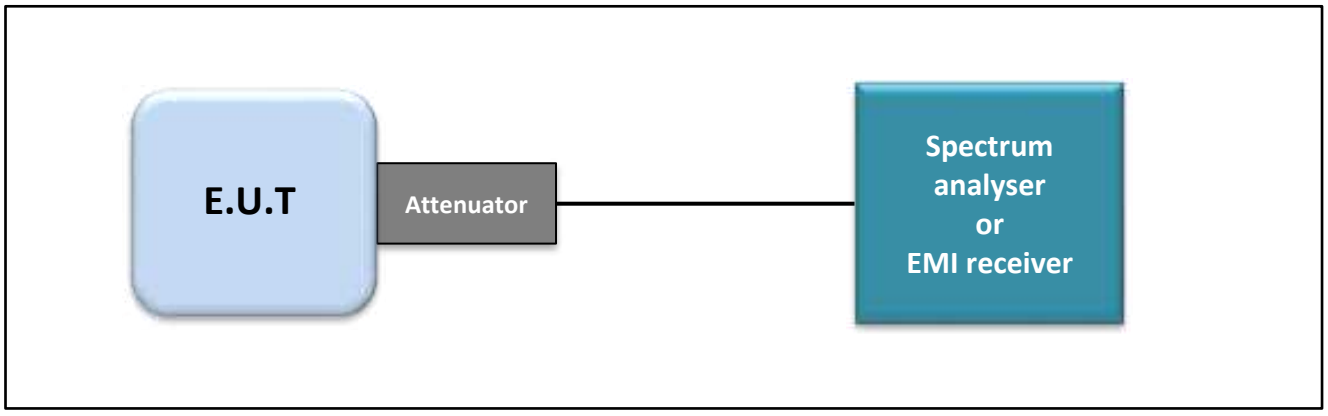
| | | |
|---|---|---|
| Date of test | : | May 22, 2024 |
| Test performed by | : | Akram HAKKARI |
| Relative humidity (%) | : | 32 |
| Ambient temperature (°C) | : | 21 |

## 6.2. TEST SETUP

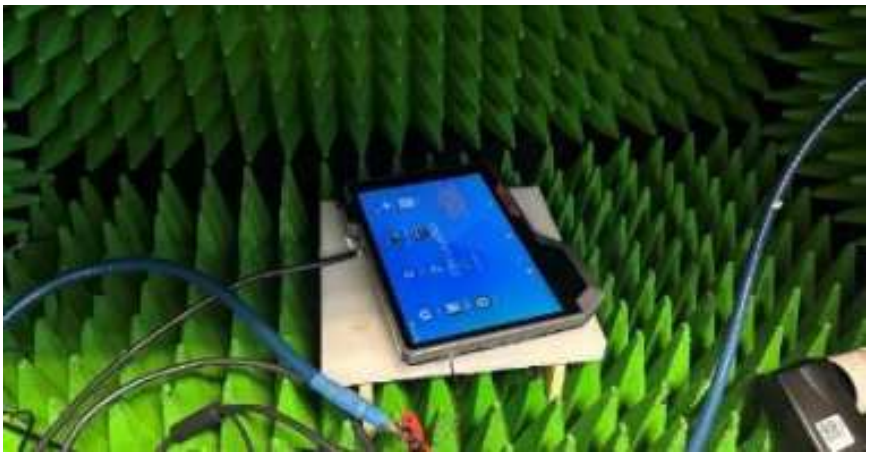
- The Equipment Under Test is installed:
☐ On a table
☑ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

- Test Procedure:
☑ ANSI C63.10 § 7.8.3:
The EUT is placed in an anechoic chamber. The EUT is turn ON and using the MaxHold function and a delta marker the number of frequencies used for this FHSS system is recorded, see following graphs.




Test set up of Number of Hopping Frequency



Photograph for Number of Frequency Hopping

## 6.3. LIMIT

Number of Hopping Frequencies shall be at least 15 channels

## 6.4. TEST EQUIPMENT LIST

| TEST EQUIPMENT USED | | | | | |
|---|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Identifier** | **Cal_Date** | **Cal_Due** |
| Attenuator 10dB | AEROFLEX | _ | A7122268 | 07/23 | 07/25 |
| Cable Measure | _ | 36G | A5329604 | 02/24 | 02/25 |
| Full Anechoic Room | SIEPEL | _ | D3044024 | | |
| Multimeter - CEM | FLUKE | 87 | A1240251 | 10/23 | 10/25 |
| SMK 1.2m (Ampl <-> chamber) | HUBER-SUHNER | SUCOFLEX 102 | A5330062 | 04/23 | 04/26 |
| Spectrum analyzer | ROHDE & SCHWARZ | FSV 40 | A4060059 | 04/24 | 04/26 |
| Thermo-hygrometer | TESTO | 608-H1 | B4204120 | 03/23 | 03/25 |
| Thermo-hygrometer (PM1/2/3) | KIMO | HQ 210 | B4206022 | 05/23 | 05/25 |

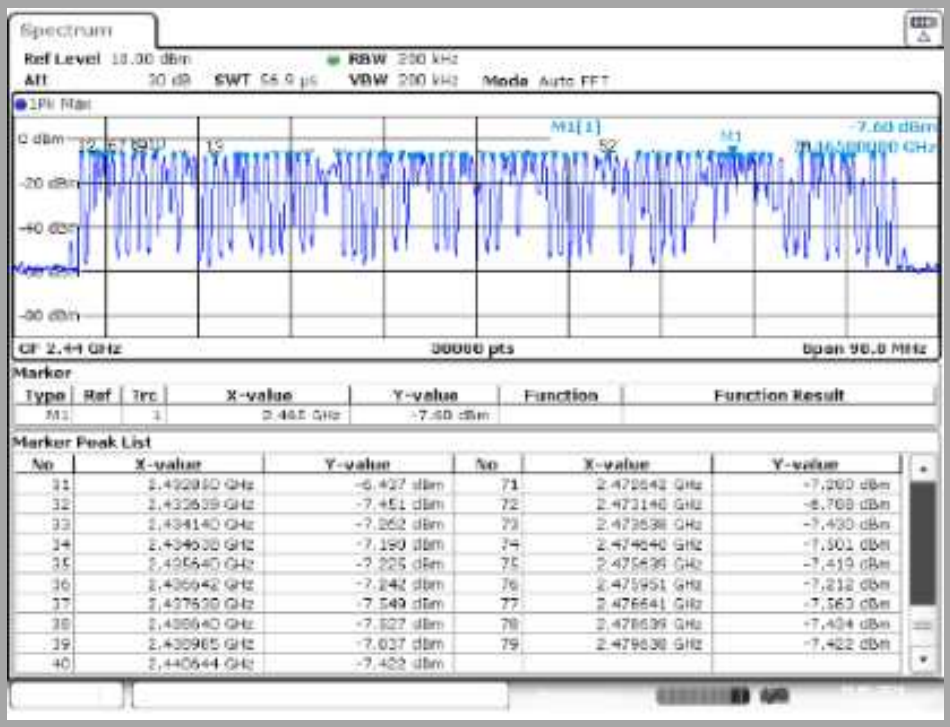
Note: In our quality system, the test equipment calibration due is more & less 2 months

## 6.5. RESULTS

| GFSK (DH5) |
|---|
| **Call** |

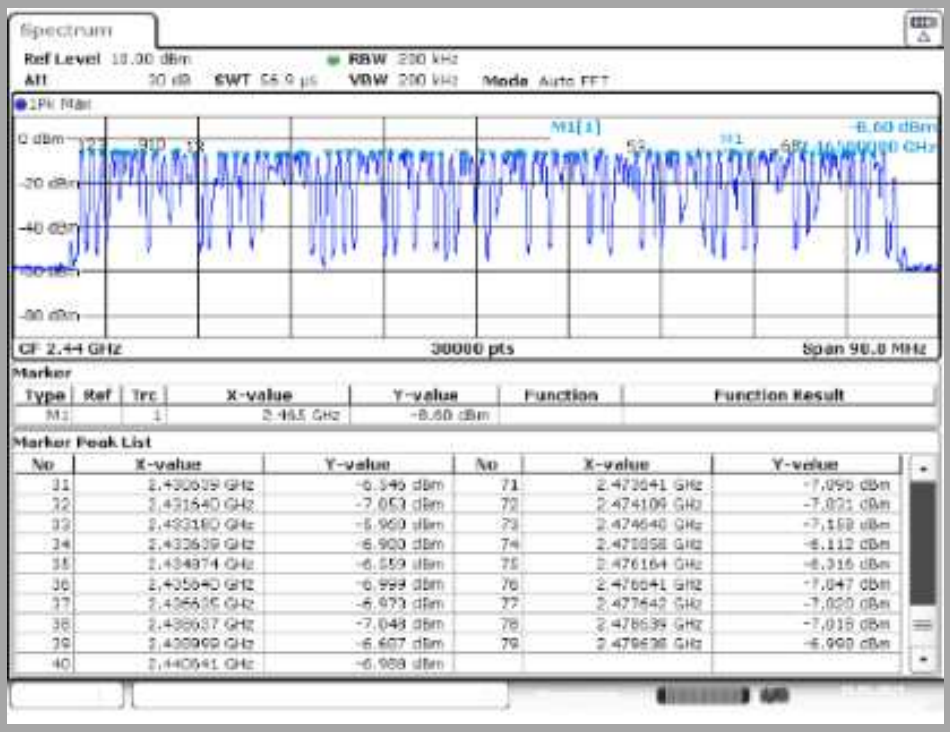

| Channel | Number of Hopping Frequencies | Limit |
|---|---|---|
| **Call** | 79 | Minimum 15 |

| π/4 DQPSK (2-DH5) |
|---|
| **Call** |




| Channel | Number of Hopping Frequencies | Limit |
|---|---|---|
| **Call** | 79 | Minimum 15 |

| 8DPSK (3-DH5) |
|---|
| **Call** |




| Channel | Number of Hopping Frequencies | Limit |
|---|---|---|
| **Call** | 79 | Minimum 15 |

## 6.6. CONCLUSION

Number of Frequency Hopping measurement performed on the sample of the product **INGENICO** AXIUM **RX9000**, SN: **2419MR900209** / **2419MR900267**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS-GEN ISSUE 5** limits.

# 7. TIME OF OCCUPANCY

## 7.1. TEST CONDITIONS

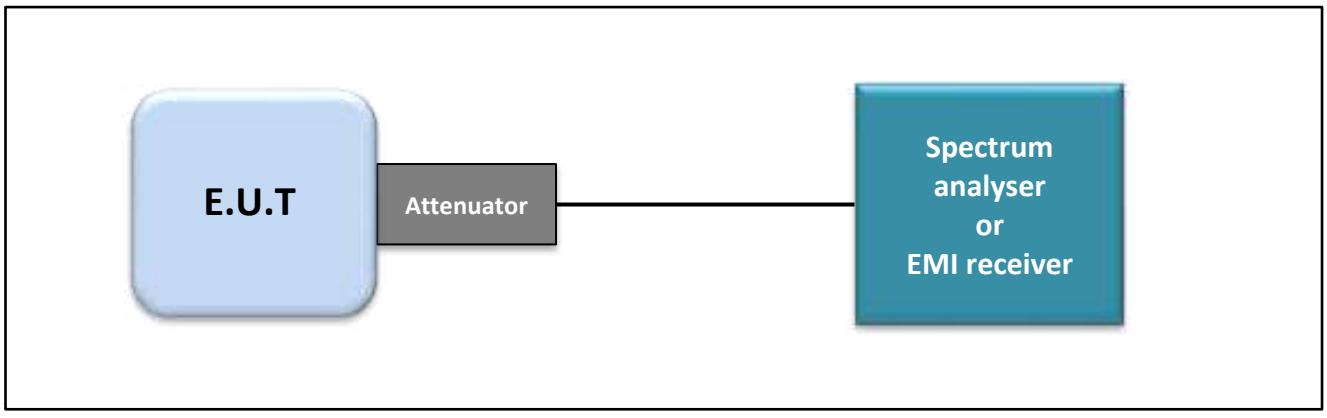
| | | |
|---|---|---|
| Date of test | : | May 22, 2024 |
| Test performed by | : | Akram HAKKARI |
| Relative humidity (%) | : | 32 |
| Ambient temperature (°C) | : | 21 |

## 7.2. TEST SETUP

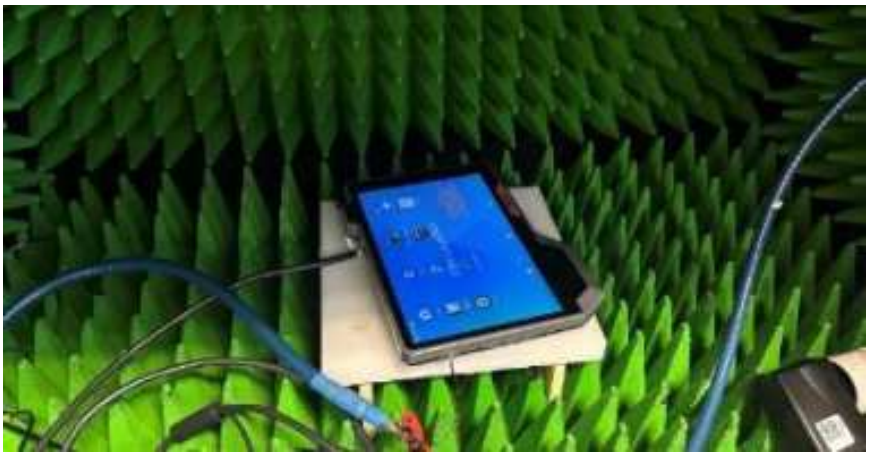
- The Equipment Under Test is installed:
☐ On a table
☑ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

- Test Procedure:
☑ ANSI C63.10 § 7.8.4
Dwell Time is measured and calculated using the zero SPAN mode on a channel frequency and a SWEEP with an adapter value to measure the number of transmission within a period and the time of transmission
RBW: 100kHz




Test set up of Time of Occupancy



Photograph for Time of Occupancy

## 7.3. LIMIT

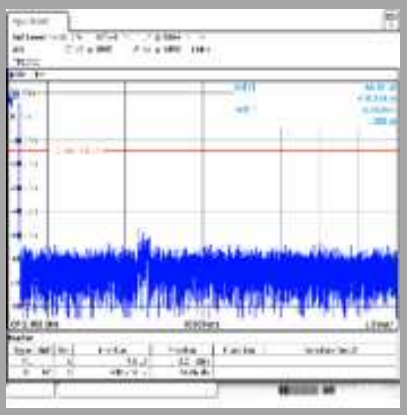
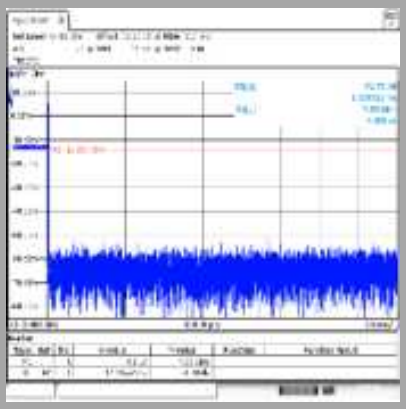
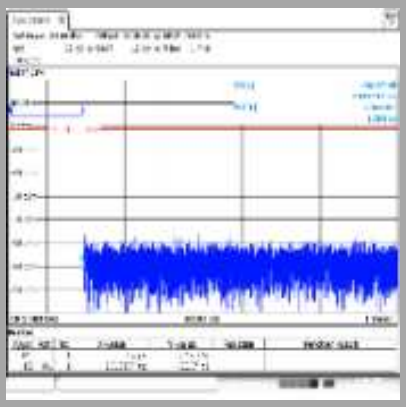
The Time of Occupancy shall not exceed 0.4s within any period of 0.4s multiplied by the number of hopping channels employed

## 7.4. TEST EQUIPMENT LIST

| TEST EQUIPMENT USED | | | | | |
|---|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Identifier** | **Cal_Date** | **Cal_Due** |
| Attenuator 10dB | AEROFLEX | _ | A7122268 | 07/23 | 07/25 |
| Cable Measure | _ | 36G | A5329604 | 02/24 | 02/25 |
| Full Anechoic Room | SIEPEL | _ | D3044024 | | |
| Multimeter - CEM | FLUKE | 87 | A1240251 | 10/23 | 10/25 |
| SMK 1.2m (Ampl <-> chamber) | HUBER-SUHNER | SUCOFLEX 102 | A5330062 | 04/23 | 04/26 |
| Spectrum analyzer | ROHDE & SCHWARZ | FSV 40 | A4060059 | 04/24 | 04/26 |
| Thermo-hygrometer | TESTO | 608-H1 | B4204120 | 03/23 | 03/25 |
| Thermo-hygrometer (PM1/2/3) | KIMO | HQ 210 | B4206022 | 05/23 | 05/25 |

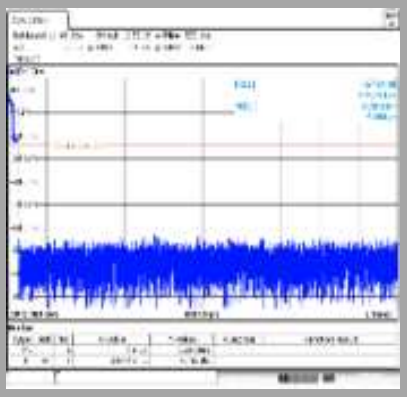
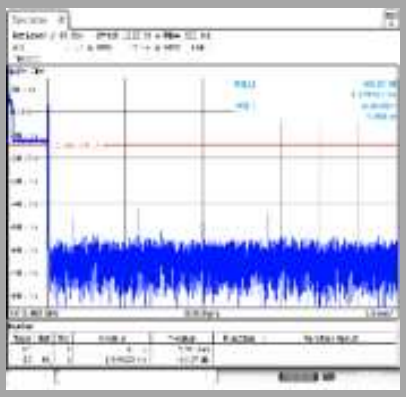
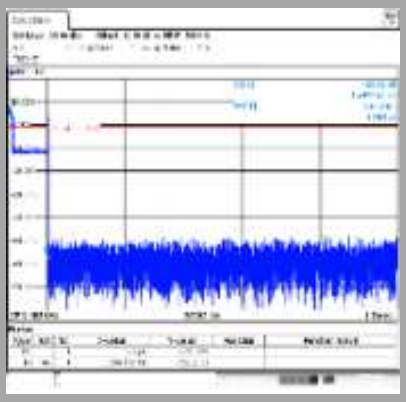
Note: In our quality system, the test equipment calibration due is more & less 2 months

## 7.5. RESULTS

| Burst Length | | |
|---|---|---|
| DH1 | DH3 | DH5 |
|  |  |  |

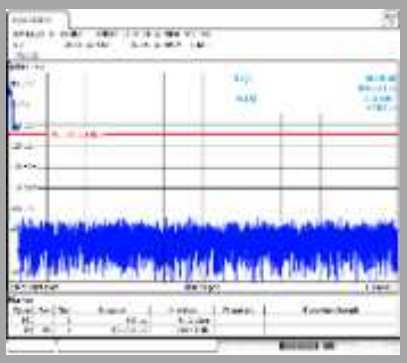
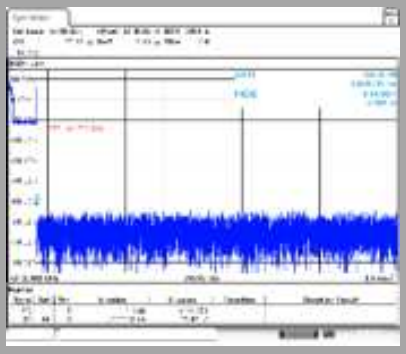
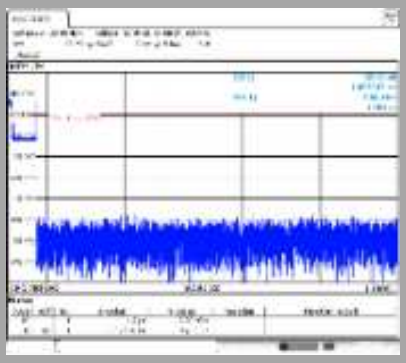
| Packet Type | Burst Length (ms) | Time of Occupancy (ms) | Limit of Time of Occupancy (ms) |
|---|---|---|---|
| DH1 | 0.43 | 158.2 | 400 |
| DH3 | 1.55 | 254.2 | 400 |
| DH5 | 2.91 | 359.6 | 400 |

**Note:** Period of 31.6 seconds (79 channels x 0.4)

| Burst Length | | |
|---|---|---|
| **2DH1** | **2DH3** | **2DH5** |
|  |  |  |

| **Packet Type** | Burst Length (ms) | Time of Occupancy (ms) | Limit of Time of Occupancy (ms) |
|---|---|---|---|
| 2DH1 | 0.4 | 137.42 | 400 |
| 2DH3 | 1.55 | 272.8 | 400 |
| 2DH5 | 1.54 | 161.2 | 400 |

**Note:** Period of 31.6 seconds (79 channels x 0.4)

| Burst Length | | |
|---|---|---|
| **3DH1** | **3DH3** | **3DH5** |
|  |  |  |

| **Packet Type** | Burst Length (ms) | Time of Occupancy (ms) | Limit of Time of Occupancy (ms) |
|---|---|---|---|
| 2DH1 | 0.4 | 132.8 | 400 |
| 2DH3 | 1.08 | 164.16 | 400 |
| 2DH5 | 1.08 | 91.56 | 400 |

**Note:** Period of 31.6 seconds (79 channels x 0.4)

## 7.6. CONCLUSION

Time of Occupancy measurement performed on the sample of the product **INGENICO** AXIUM **RX9000**, SN: **2419MR900209** / **2419MR900267**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS-GEN ISSUE 5** limits.

# 8. MAXIMUM CONDUCTED OUTPUT POWER

## 8.1. TEST CONDITIONS

| | | |
|---|---|---|
| Date of test | : | May 23, 2024 |
| Test performed by | : | Akram HAKKARI |
| Relative humidity (%) | : | 32 |
| Ambient temperature (°C) | : | 21 |

## 8.2. TEST SETUP

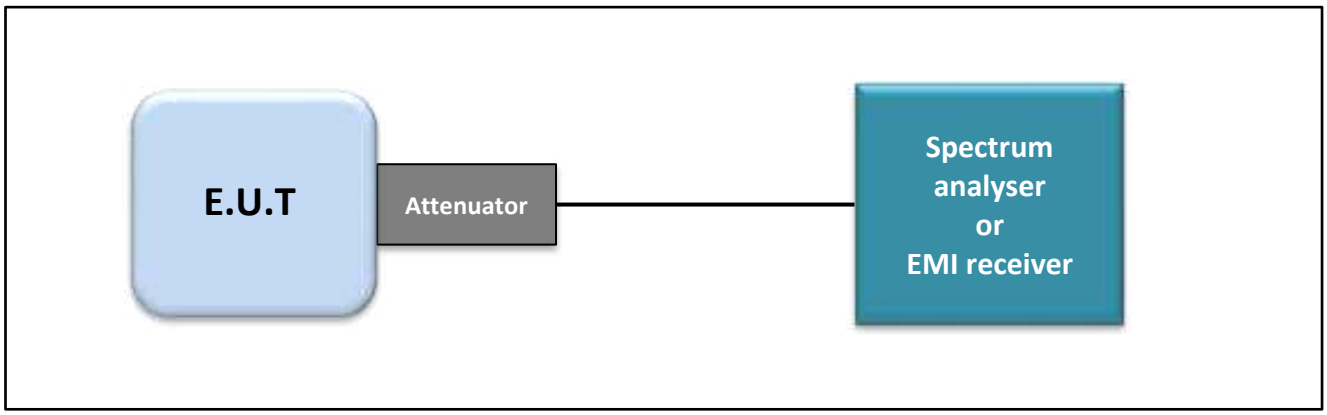
- The Equipment Under Test is installed:
☐ On a table
☑ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

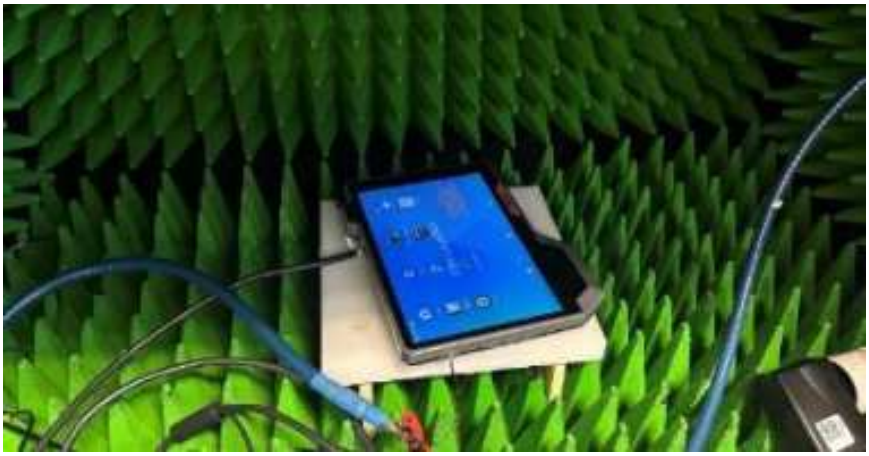
- Test Procedure:
☑ ANSI C63.10 § 7.8.5

***Measurement Procedure:***

a) 1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
b) 2) RBW > 20 dB bandwidth of the emission being measured.
c) 3) VBW ≥ RBW.
d) 4) Sweep: Auto.
e) 5) Detector function: Peak.
f) 6) Trace: Max hold.




Test set up of Maximum Conducted Output Power



Photograph for Maximum Conducted Output Power

## 8.3. LIMIT

Maximum Conducted Output power:
Shall not exceed 21dBm
Limits are reduced by G-6dBi if Antenna Gain above 6dBi

## 8.4. TEST EQUIPMENT LIST

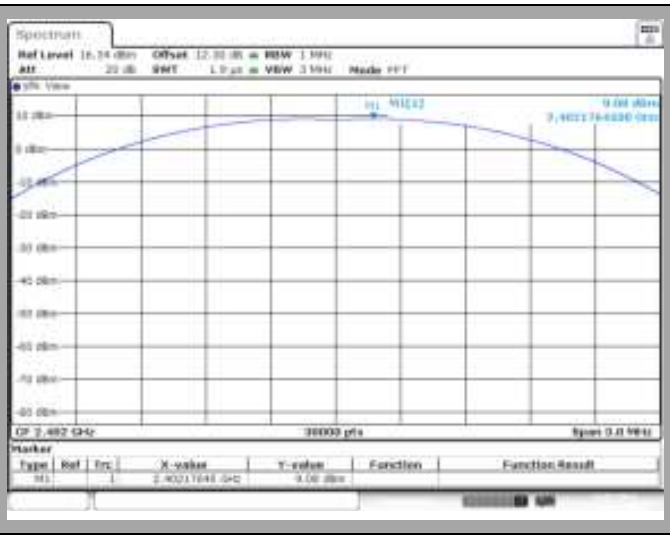
| TEST EQUIPMENT USED | | | | | |
|---|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Identifier** | **Cal_Date** | **Cal_Due** |
| Attenuator 10dB | AEROFLEX | _ | A7122268 | 07/23 | 07/25 |
| Cable Measure | _ | 36G | A5329604 | 02/24 | 02/25 |
| Full Anechoic Room | SIEPEL | _ | D3044024 | | |
| Multimeter - CEM | FLUKE | 87 | A1240251 | 10/23 | 10/25 |
| SMK 1.2m (Ampl <-> chamber) | HUBER-SUHNER | SUCOFLEX 102 | A5330062 | 04/23 | 04/26 |
| Spectrum analyzer | ROHDE & SCHWARZ | FSV 40 | A4060059 | 04/24 | 04/26 |
| Thermo-hygrometer | TESTO | 608-H1 | B4204120 | 03/23 | 03/25 |
| Thermo-hygrometer (PM1/2/3) | KIMO | HQ 210 | B4206022 | 05/23 | 05/25 |

Note: In our quality system, the test equipment calibration due is more & less 2 months

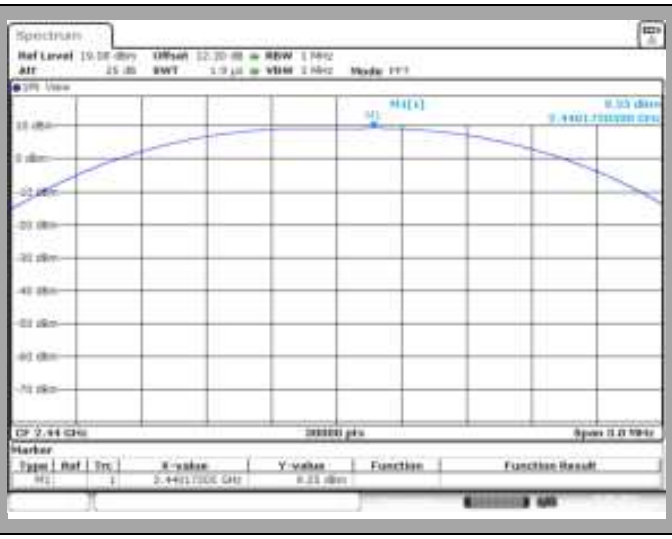
## 8.5. RESULTS

**GFSK (DH5)**

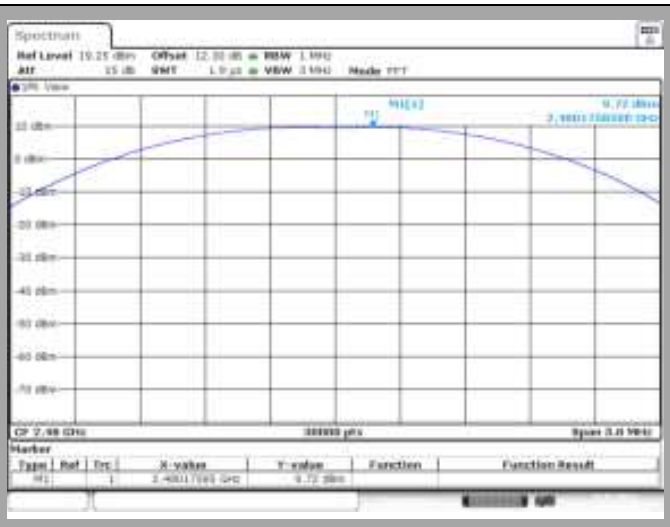
**Cmin**



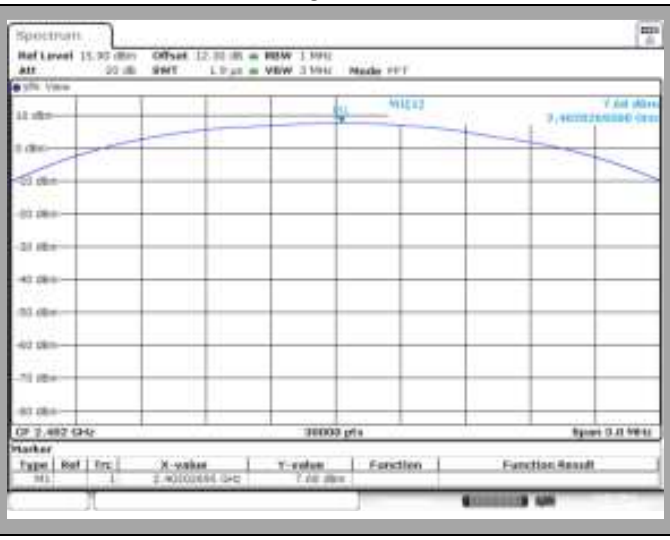
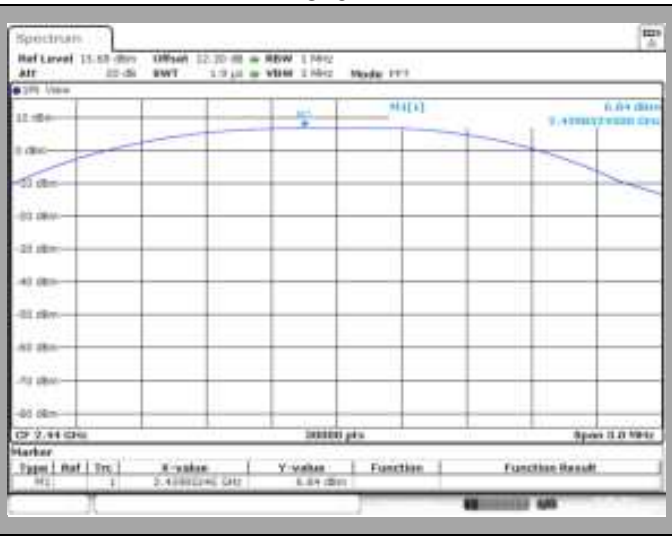
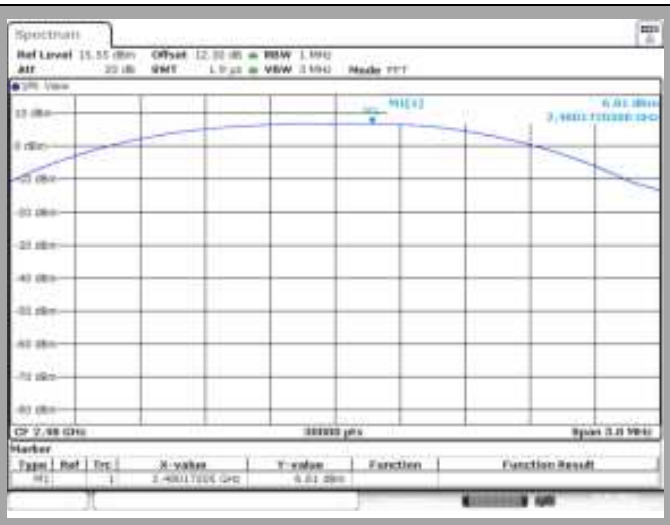
**Cnom**



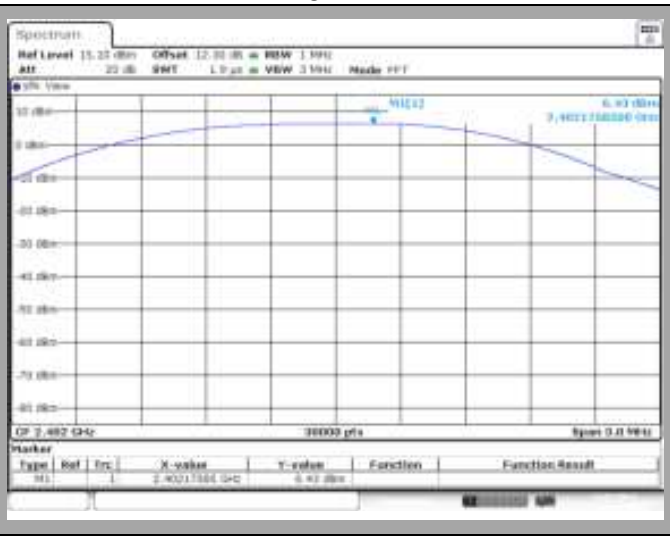
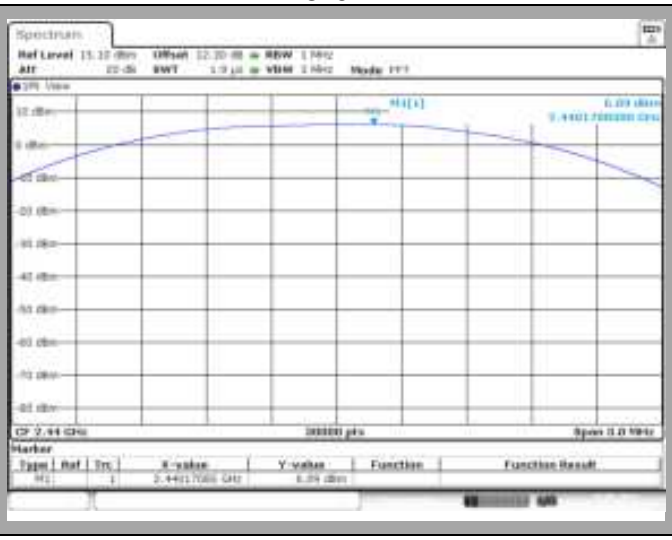
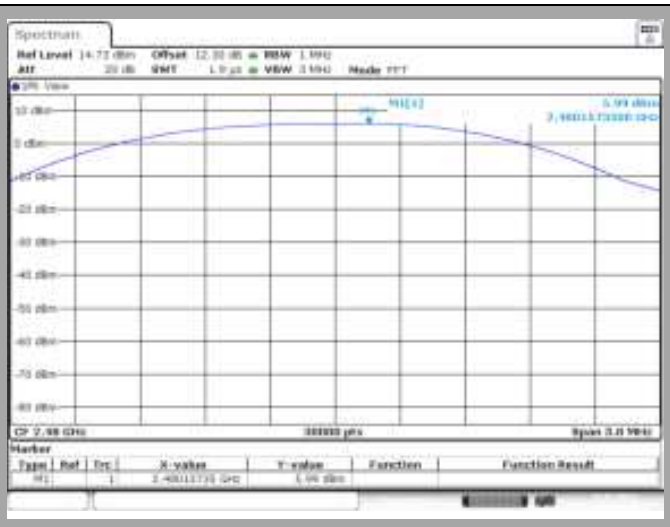
**Cmax**



| Channel | Offset Cable + Att (dB) | Antenna Gain (dBi) | Maximum Conducted Power (dBm) | Limit (dBm) |
|---|---|---|---|---|
| **Cmin** | **12.3** | 1.1 | 9.08 | 21dBm. Reduced by G-6dBi if Antenna Gain above 6dBi |
| **Cnom** | **12.3** | 1.1 | 9.25 | 21dBm. Reduced by G-6dBi if Antenna Gain above 6dBi |
| **Cmax** | **12.3** | 1.1 | 9.72 | 21dBm. Reduced by G-6dBi if Antenna Gain above 6dBi |

| π/4 DQPSK (2-DH5) | |
|---|---|
| **Cmin** | **Cnom** |
|  |  |
| **Cmax** | |
|  | |

| Channel | Offset Cable + Att (dB) | Antenna Gain (dBi) | Maximum Conducted Power (dBm) | Limit (dBm) |
|---|---|---|---|---|
| **Cmin** | **12.3** | 1.1 | 7.68 | 21dBm. Reduced by G-6dBi if Antenna Gain above 6dBi |
| **Cnom** | **12.3** | 1.1 | 6.84 | 21dBm. Reduced by G-6dBi if Antenna Gain above 6dBi |
| **Cmax** | **12.3** | 1.1 | 6.81 | 21dBm. Reduced by G-6dBi if Antenna Gain above 6dBi |

| π/4 DQPSK (3-DH5) | |
|---|---|
| **Cmin** | **Cnom** |
|  |  |
| **Cmax** | |
|  | |

| Channel | Offset Cable + Att (dB) | Antenna Gain (dBi) | Maximum Conducted Power (dBm) | Limit (dBm) |
|---|---|---|---|---|
| **Cmin** | **12.3** | 1 | 6.43 | 21dBm. Reduced by G-6dBi if Antenna Gain above 6dBi |
| **Cnom** | **12.3** | 1 | 6.09 | 21dBm. Reduced by G-6dBi if Antenna Gain above 6dBi |
| **Cmax** | **12.3** | 1 | 5.99 | 21dBm. Reduced by G-6dBi if Antenna Gain above 6dBi |

## 8.6. CONCLUSION

Maximum Conducted Output Power measurement performed on the sample of the product **INGENICO AXIUM RX9000**, SN: **2419MR900209** / **2419MR900267**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 3** limits.

# 9. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS AT THE BAND EDGE

## 9.1. TEST CONDITIONS

| | | |
|---|---|---|
| Date of test | : | May 23, 2024 |
| Test performed by | : | Akram HAKKARI |
| Relative humidity (%) | : | 32 |
| Ambient temperature (°C) | : | 21 |

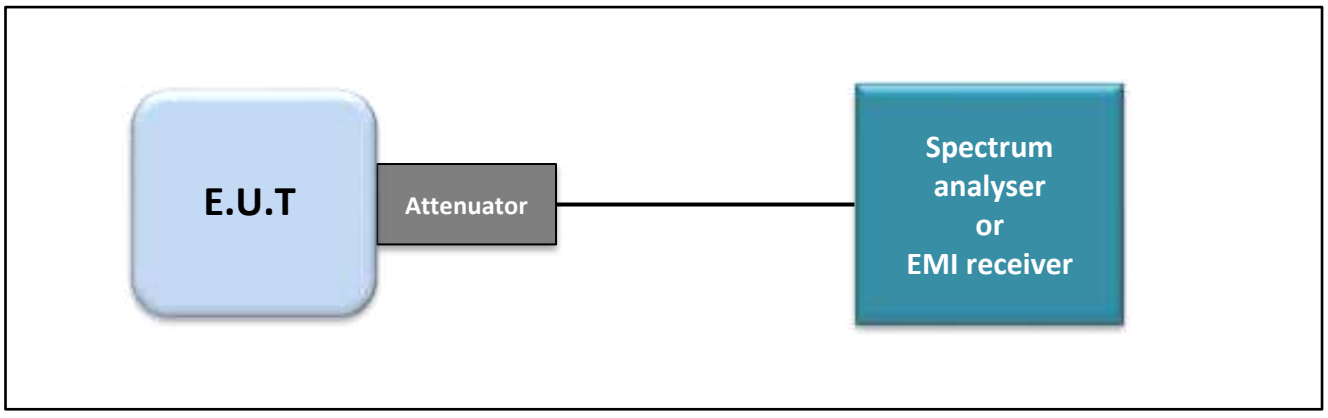
## 9.2. TEST SETUP

- The Equipment Under Test is installed:
☐ On a table
☑ In an anechoic chamber

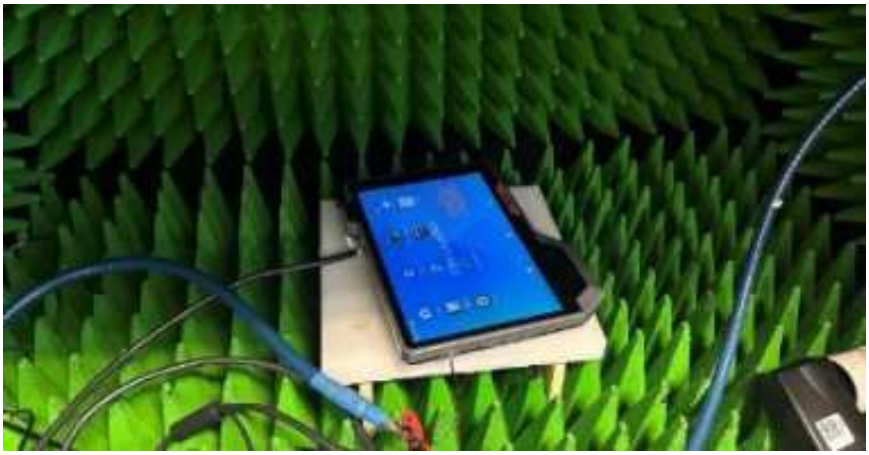
- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

Packet type: 1-DH5 / 2-DH5 / 3-DH5 Worst case presented

- Test Procedure:
☑ ANSI C63.10 § 7.8.6




Test set up of Unwanted Emissions into Non-Restricted Frequency Bands at the Band Edge



Photograph for Unwanted Emission into non-restricted frequency bands at the band edge

## 9.3. LIMIT

All Spurious Emissions must be at least 20dB below the Fundamental Radiator Level at the Band Edge Edge “2400MHz & 2483,5MHz”

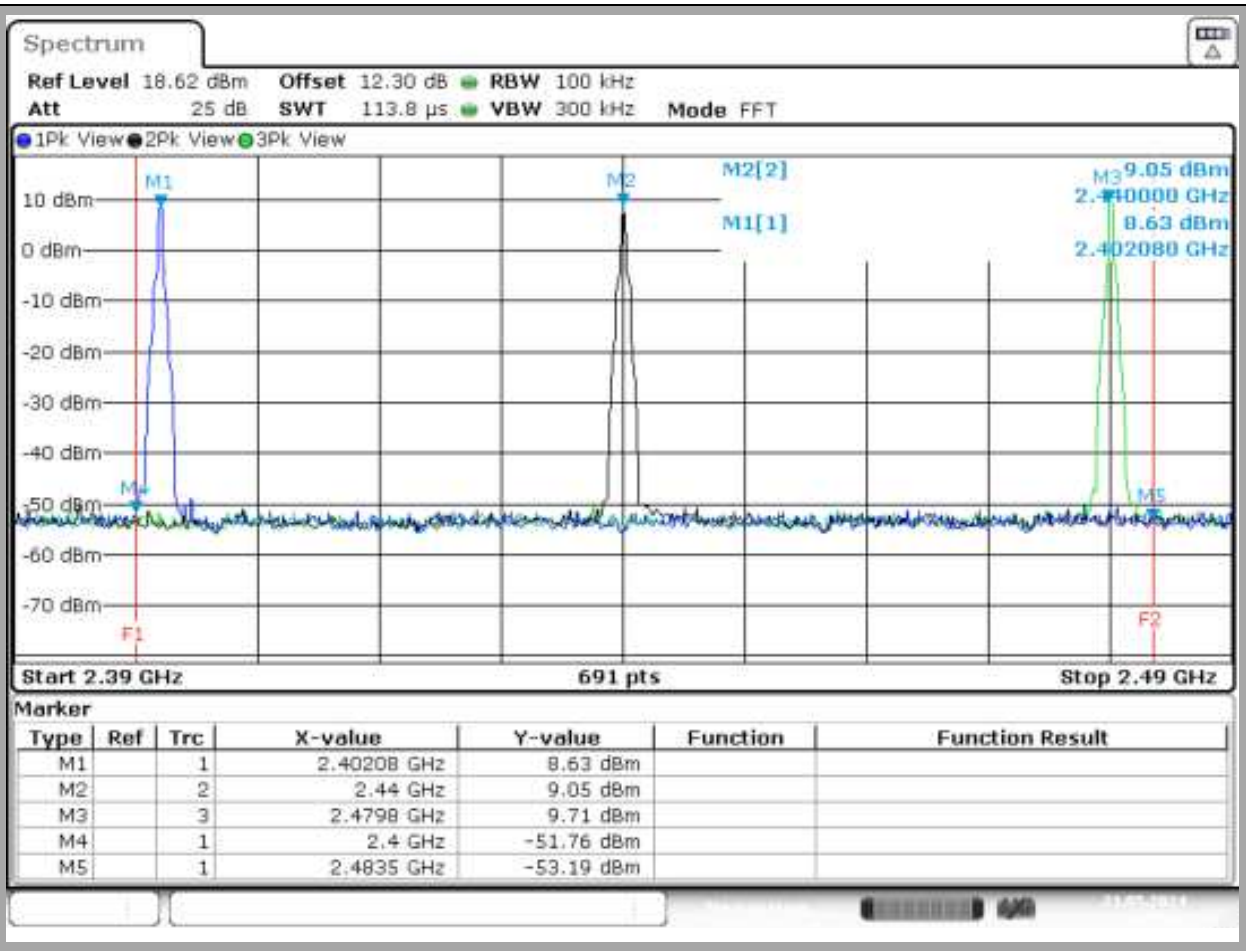
## 9.4. TEST EQUIPMENT LIST

| TEST EQUIPMENT USED | | | | | |
|---|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Identifier** | **Cal_Date** | **Cal_Due** |
| Attenuator 10dB | AEROFLEX | _ | A7122268 | 07/23 | 07/25 |
| Cable Measure | _ | 36G | A5329604 | 02/24 | 02/25 |
| Full Anechoic Room | SIEPEL | _ | D3044024 | | |
| Multimeter - CEM | FLUKE | 87 | A1240251 | 10/23 | 10/25 |
| SMK 1.2m (Ampl <-> chamber) | HUBER-SUHNER | SUCOFLEX 102 | A5330062 | 04/23 | 04/26 |
| Spectrum analyzer | ROHDE & SCHWARZ | FSV 40 | A4060059 | 04/24 | 04/26 |
| Thermo-hygrometer | TESTO | 608-H1 | B4204120 | 03/23 | 03/25 |
| Thermo-hygrometer (PM1/2/3) | KIMO | HQ 210 | B4206022 | 05/23 | 05/25 |

Note: In our quality system, the test equipment calibration due is more & less 2 months

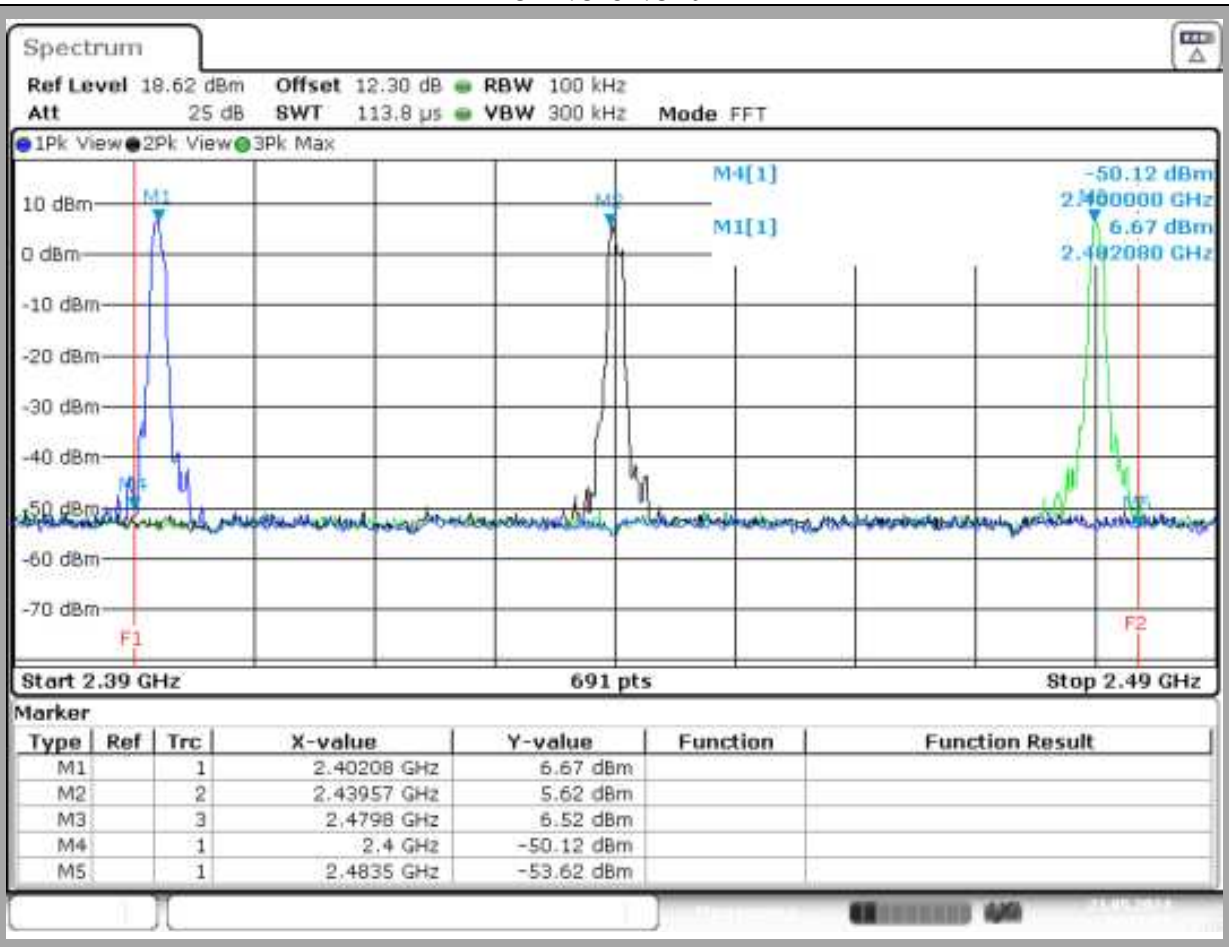
## 9.5. RESULTS

| DH1 |
|---|
| Cmin/Cnom/Cmax |



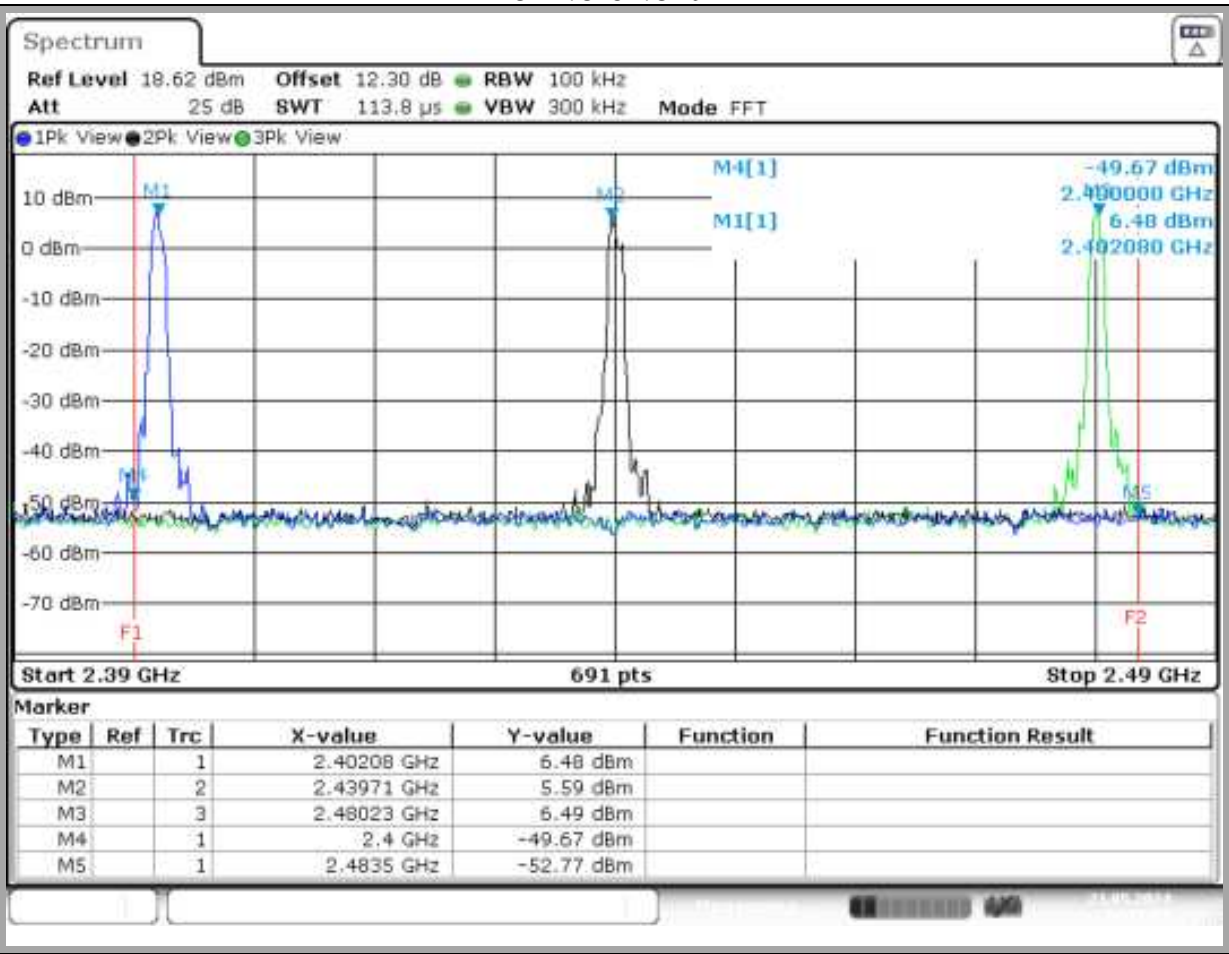

| Frequency (MHz) | Level (dBc) | Limit (dBc) |
|---|---|---|
| 2400 | 51.76 | 20 |
| 2483.5 | 53.19 | 20 |

| 2-DH1 |
|---|
| Cmin/Cnom/Cmax |



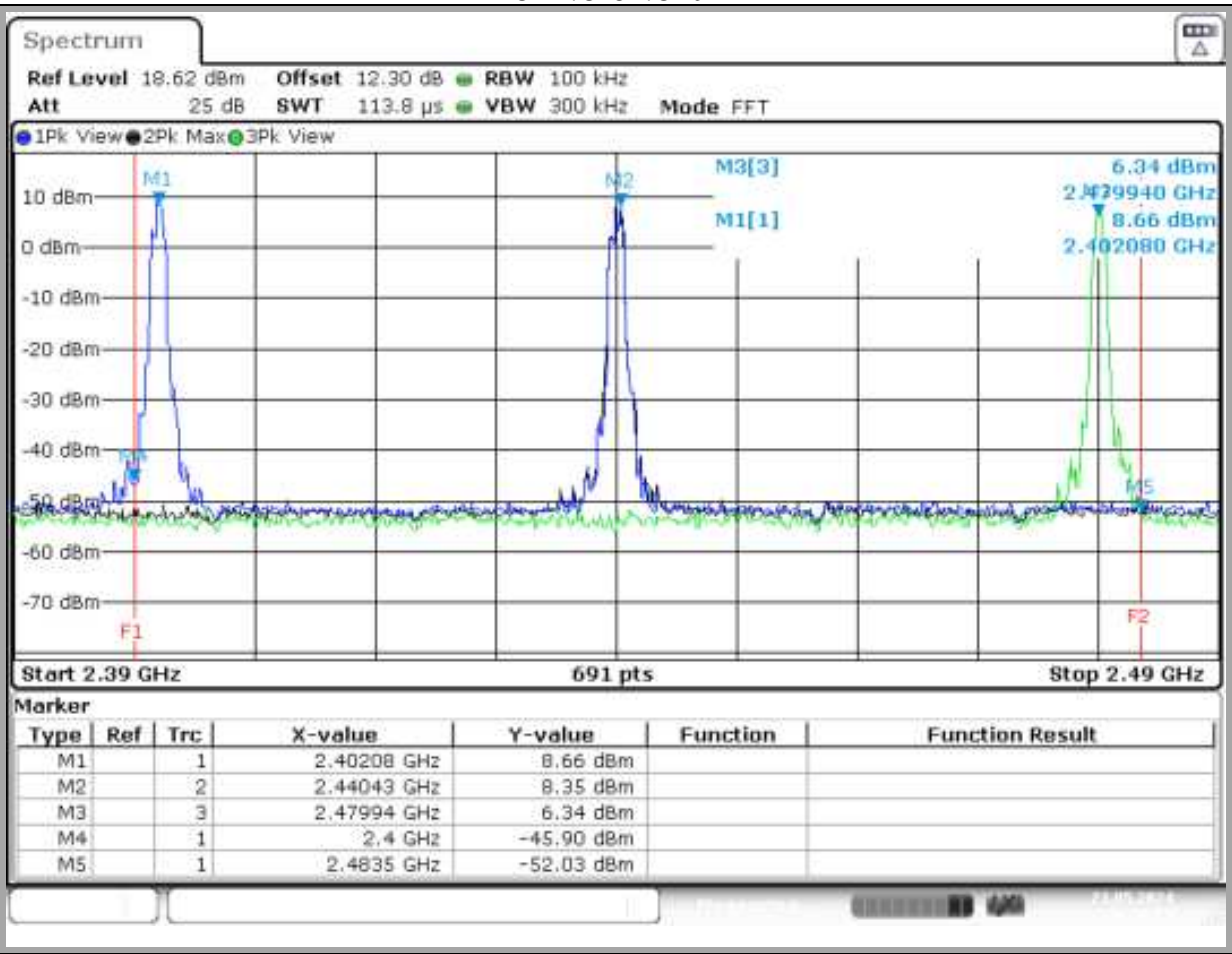

| Frequency (MHz) | Level (dBc) | Limit (dBc) |
|---|---|---|
| 2400 | 50.12 | 20 |
| 2483.5 | 53.62 | 20 |

| 3-DH1 |
|---|
| Cmin/Cnom/Cmax |



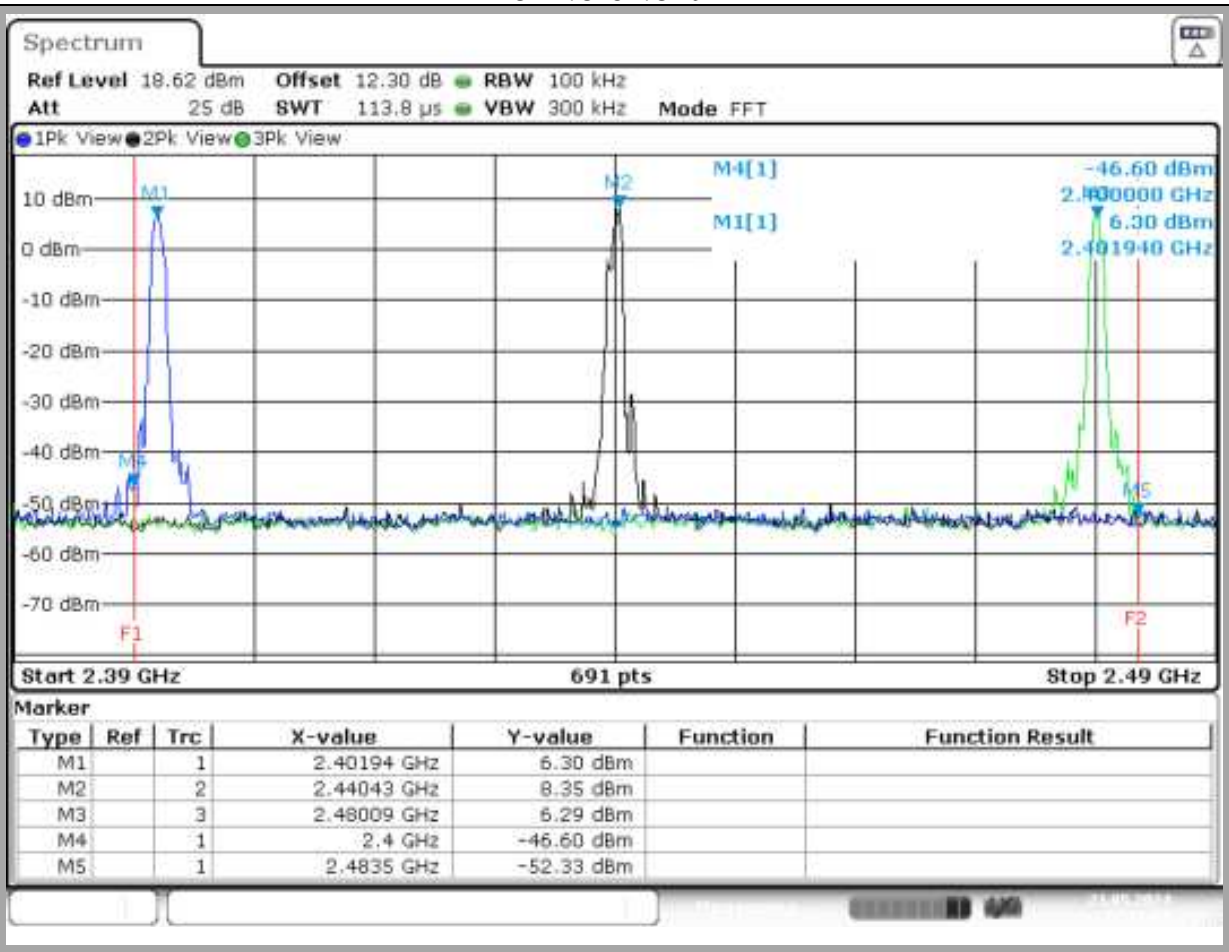

| Frequency (MHz) | Level (dBc) | Limit (dBc) |
|---|---|---|
| 2400 | 49.67 | 20 |
| 2483.5 | 52.77 | 20 |

| DH3 |
|---|
| Cmin/Cnom/Cmax |



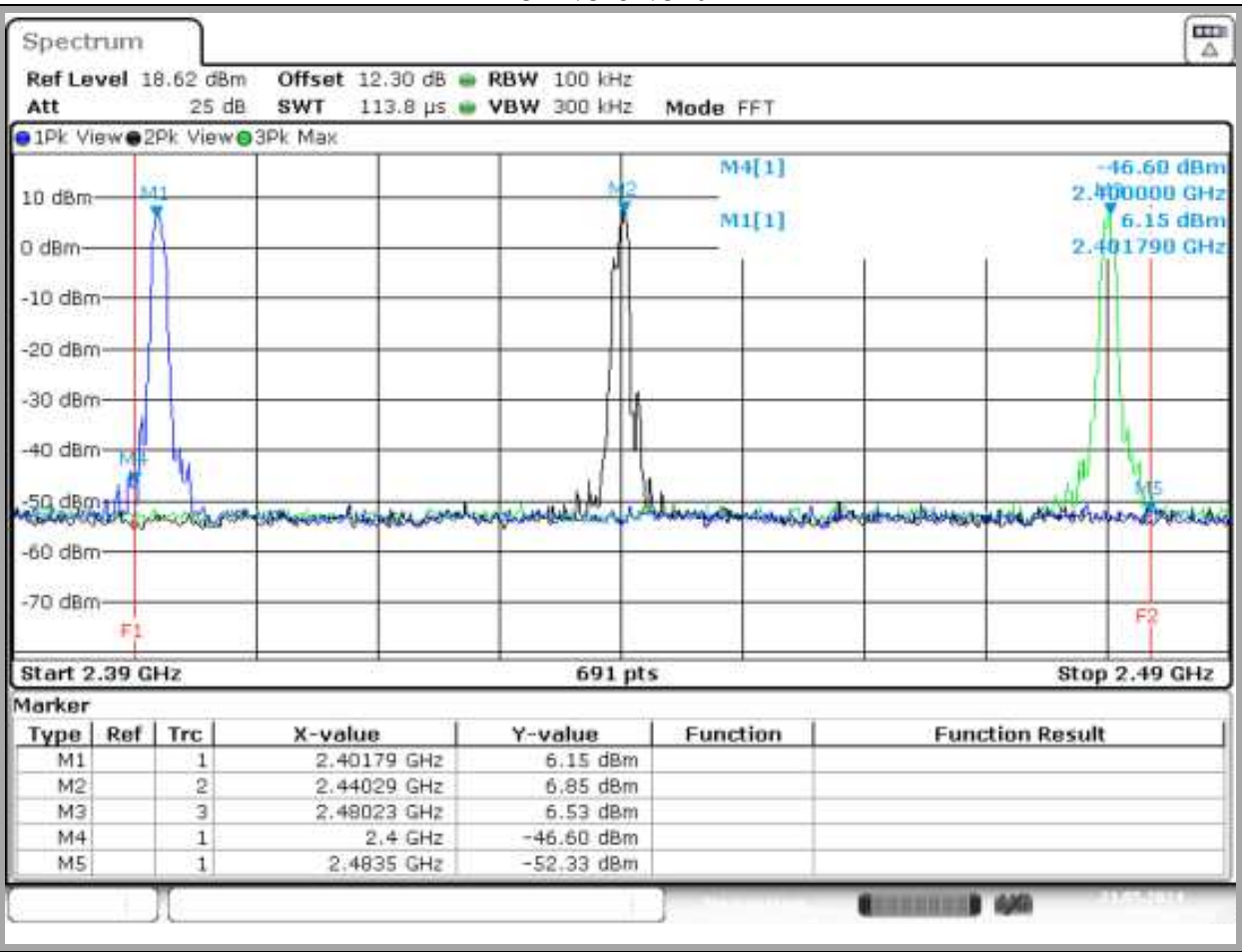

| Frequency (MHz) | Level (dBc) | Limit (dBc) |
|---|---|---|
| 2400 | 45.9 | 20 |
| 2483.5 | 52.03 | 20 |

| 2-DH3 |
|---|
| Cmin/Cnom/Cmax |



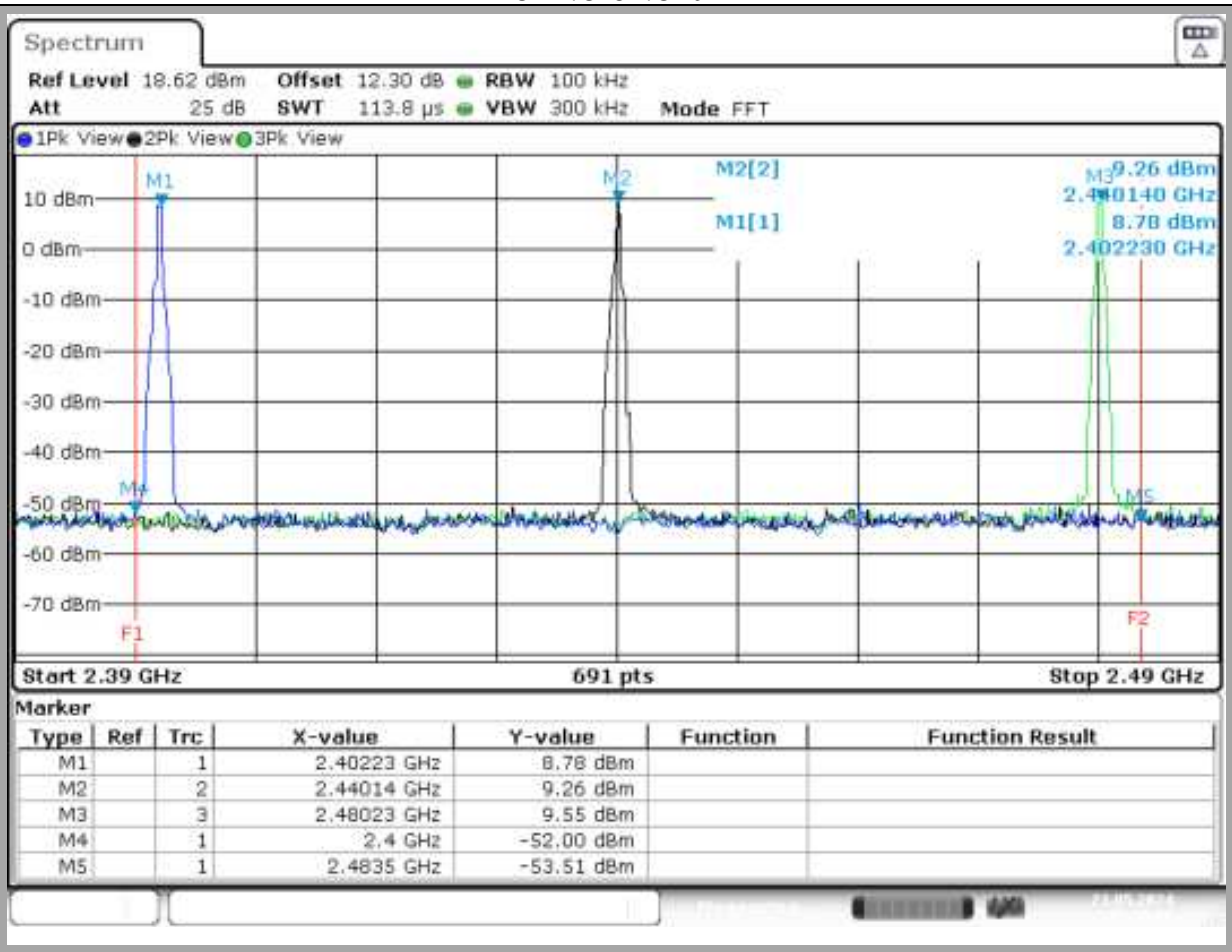

| Frequency (MHz) | Level (dBc) | Limit (dBc) |
|---|---|---|
| 2400 | 46.6 | 20 |
| 2483.5 | 52.33 | 20 |

| 3-DH3 |
|---|
| Cmin/Cnom/Cmax |



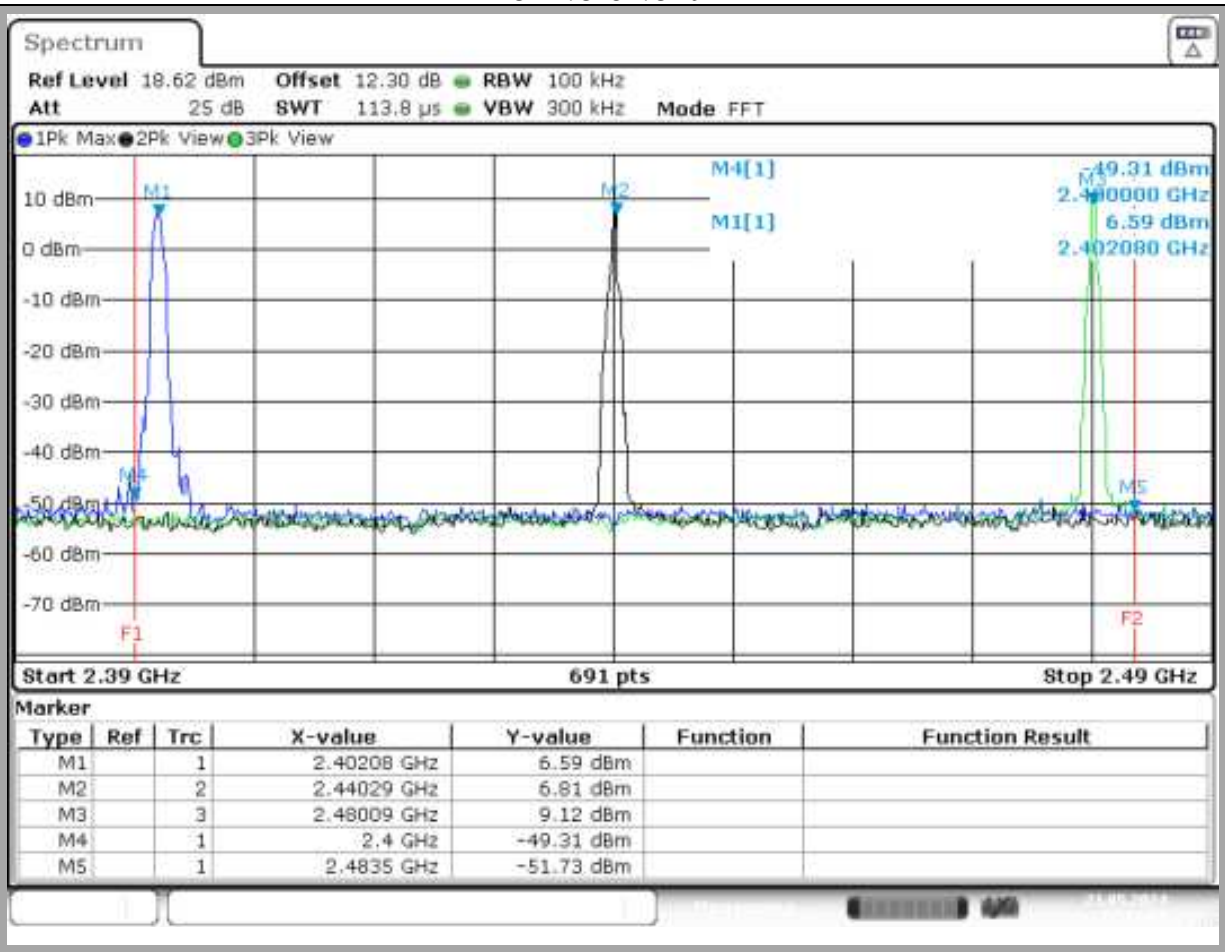

| Frequency (MHz) | Level (dBc) | Limit (dBc) |
|---|---|---|
| 2400 | 46.6 | 20 |
| 2483.5 | 52.33 | 20 |

| DH5 |
|---|
| Cmin/Cnom/Cmax |



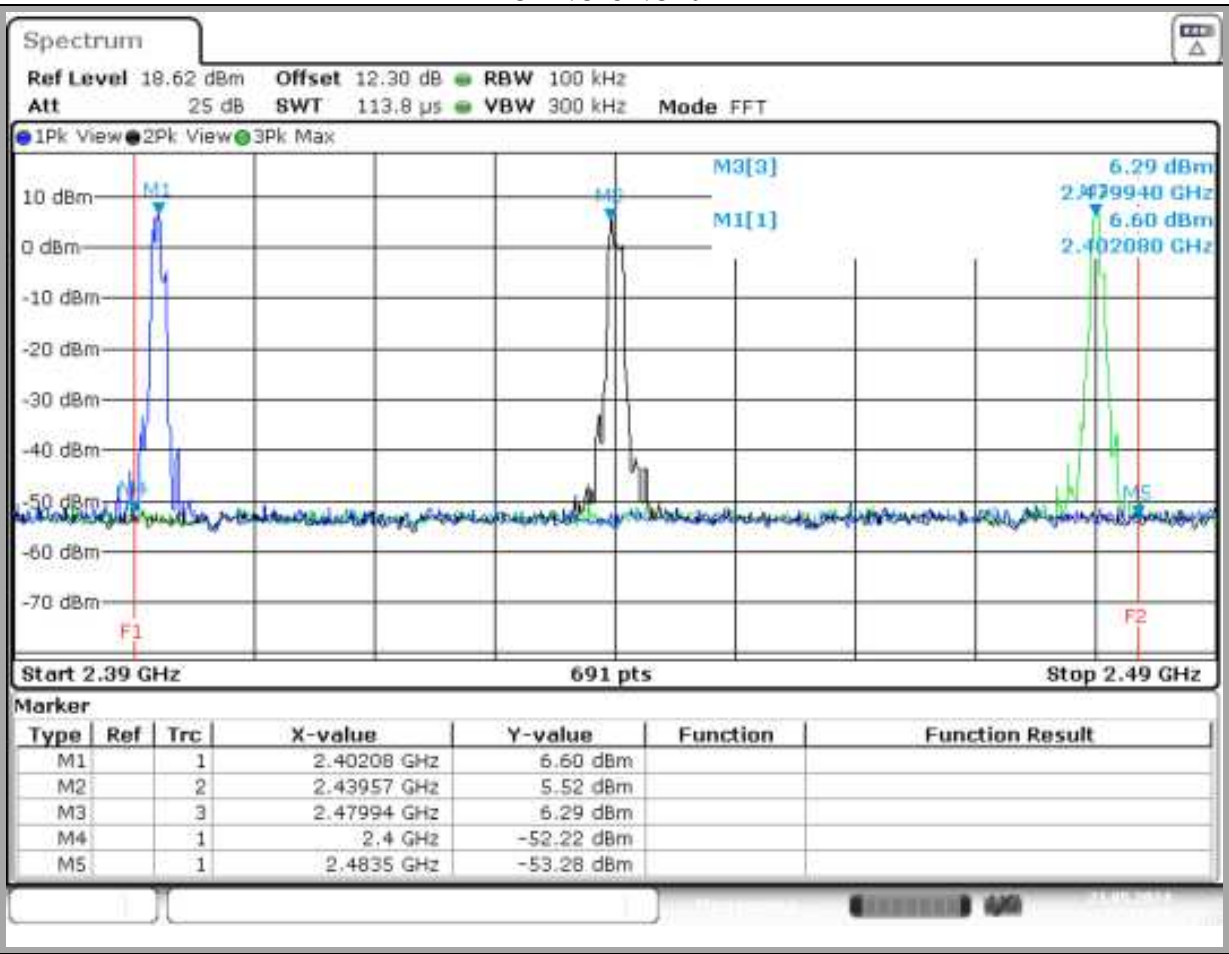

| Frequency (MHz) | Level (dBc) | Limit (dBc) |
|---|---|---|
| 2400 | 52 | 20 |
| 2483.5 | 53.51 | 20 |

| 2-DH5 |
|---|
| Cmin/Cnom/Cmax |




| Frequency (MHz) | Level (dBc) | Limit (dBc) |
|---|---|---|
| 2400 | 49.3 | 20 |
| 2483.5 | 51.73 | 20 |

| 3-DH5 |
|---|
| Cmin/Cnom/Cmax |




| Frequency (MHz) | Level (dBc) | Limit (dBc) |
|---|---|---|
| 2400 | 52.22 | 20 |
| 2483.5 | 53.28 | 20 |

## 9.6. CONCLUSION

Unwanted Emission into non-restricted frequency bands at the band edge measurement performed on the sample of the product **INGENICO AXIUM RX9000**, SN: **2419MR900209 / 2419MR900267**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 3** limits.

# 10. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS

## 10.1. TEST CONDITIONS

| | | |
|---|---|---|
| Date of test | : | May 24, 2024 |
| Test performed by | : | Akram HAKKARI |
| Relative humidity (%) | : | 32 |
| Ambient temperature (°C) | : | 22 |

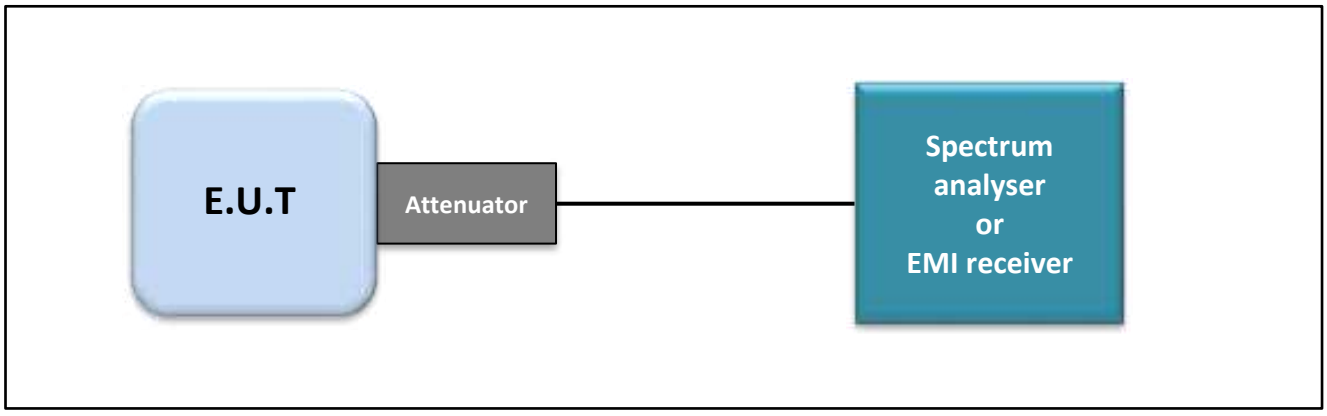
## 10.2. TEST SETUP

- The Equipment under Test is installed:
☐ On a table
☑ In an anechoic chamber

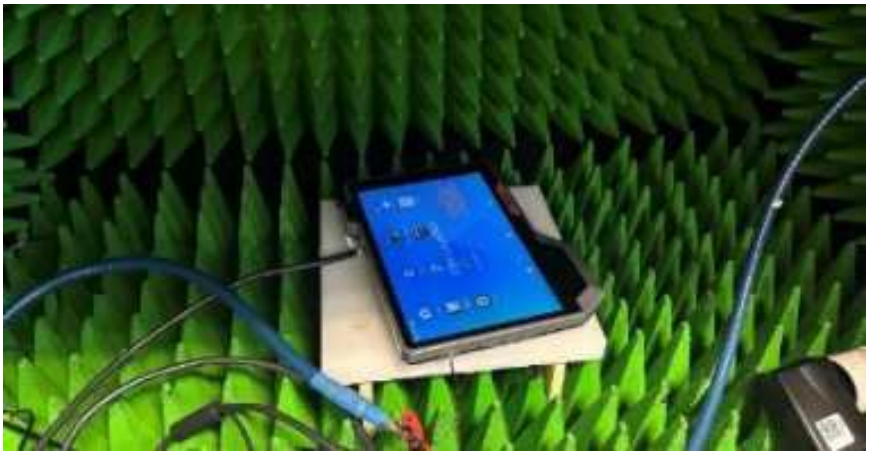
- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

Packet type: 1-DH5 / 2-DH5 / 3-DH5 Worst case presented

- Test Procedure:
☑ ANSI C63.10 § 7.8.8




Test set up of Unwanted Emissions into Non-Restricted Frequency Bands



Photograph for Unwanted Emission into non-restricted frequency bands

## 10.3. LIMIT

All Spurious Emissions must be at least 20 below the Fundamental Radiator Level

## 10.4. TEST EQUIPMENT LIST

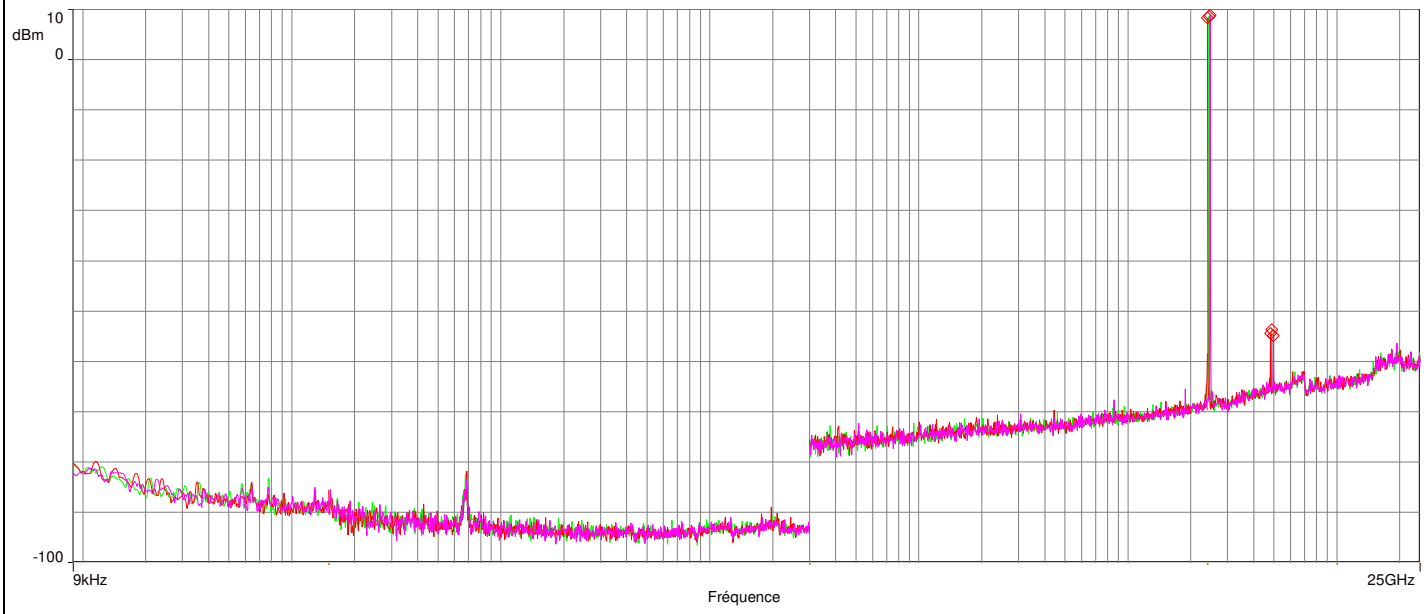
| TEST EQUIPMENT USED | | | | | |
|---|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Identifier** | **Cal_Date** | **Cal_Due** |
| Attenuator 10dB | AEROFLEX | _ | A7122268 | 07/23 | 07/25 |
| Cable Measure | _ | 36G | A5329604 | 02/24 | 02/25 |
| Full Anechoic Room | SIEPEL | _ | D3044024 | | |
| Multimeter - CEM | FLUKE | 87 | A1240251 | 10/23 | 10/25 |
| SMK 1.2m (Ampl <-> chamber) | HUBER-SUHNER | SUCOFLEX 102 | A5330062 | 04/23 | 04/26 |
| Spectrum analyzer | ROHDE & SCHWARZ | FSV 40 | A4060059 | 04/24 | 04/26 |
| Thermo-hygrometer | TESTO | 608-H1 | B4204120 | 03/23 | 03/25 |
| Thermo-hygrometer (PM1/2/3) | KIMO | HQ 210 | B4206022 | 05/23 | 05/25 |

Note: In our quality system, the test equipment calibration due is more & less 2 months

## 10.5. RESULTS

**Worst case presented (DH5)**

**Cmin /Cnom /Cmax**




| Frequency (MHz) | Level (dBm) | Level (dBc) | Limit (dBc) |
|---|---|---|---|
| 2402.00 | 8.26 | | |
| 4804.38 | -54.44 | -62.7 | -20 |
| 2442.00 | 8.6 | | |
| 4880.38 | -53.71 | -62.3 | -20 |
| 2480.00 | 8.77 | | |
| 4960.44 | -54.89 | -63.5 | -20 |

## 10.6. CONCLUSION

Unwanted Emission into non-restricted frequency bands measurement performed on the sample of the product **INGENICO AXIUM RX9000**, SN: **2419MR900209 / 2419MR900267**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 3** limits.

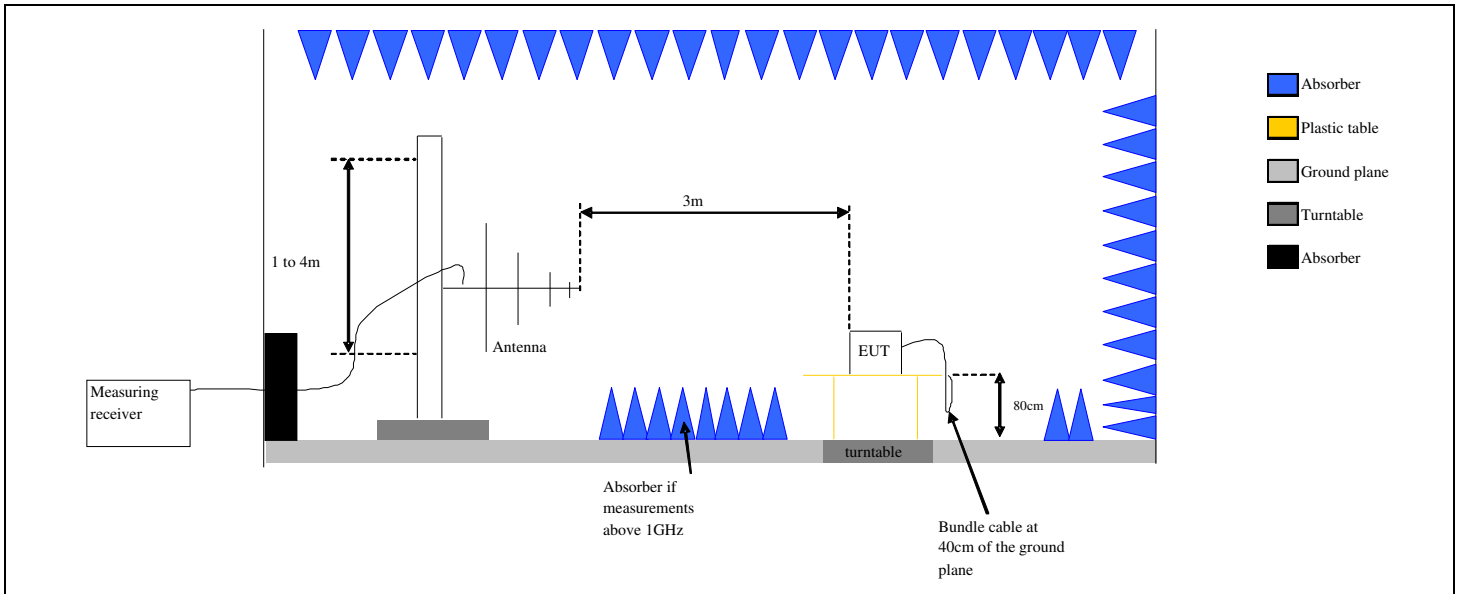
# 11. UNWANTED EMISSIONS IN RESTRICTED FREQUENCY BANDS

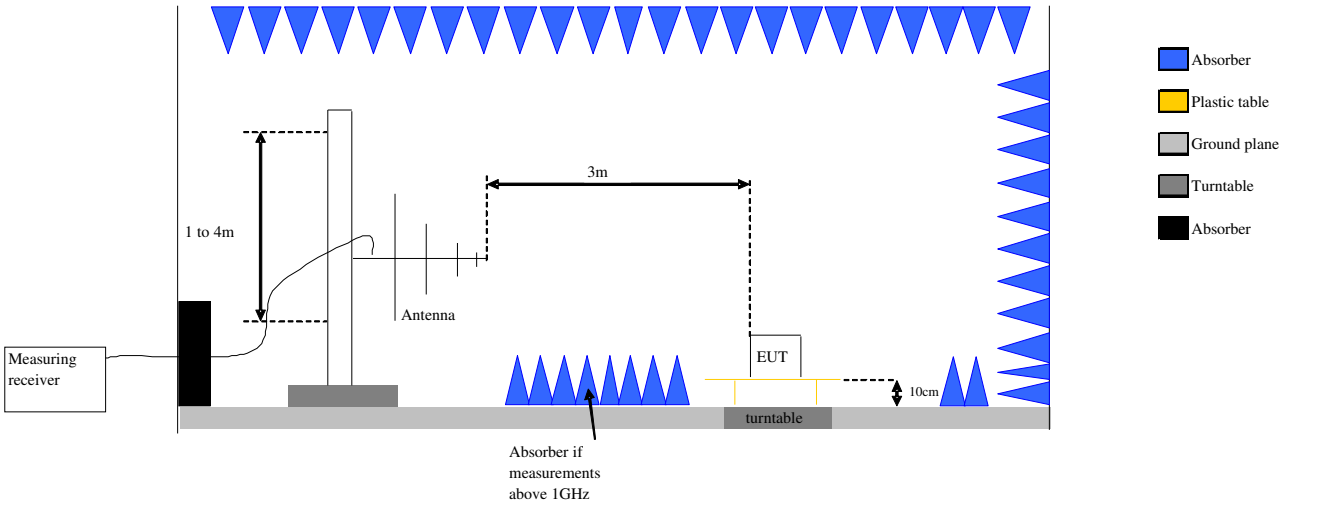
## 11.1. TEST CONDITIONS

| | | |
|---|---|---|
| Date of test | : | May 16, 2024 |
| Test performed by | : | Akram HAKKARI |
| Relative humidity (%) | : | 33 |
| Ambient temperature (°C) | : | 22 |

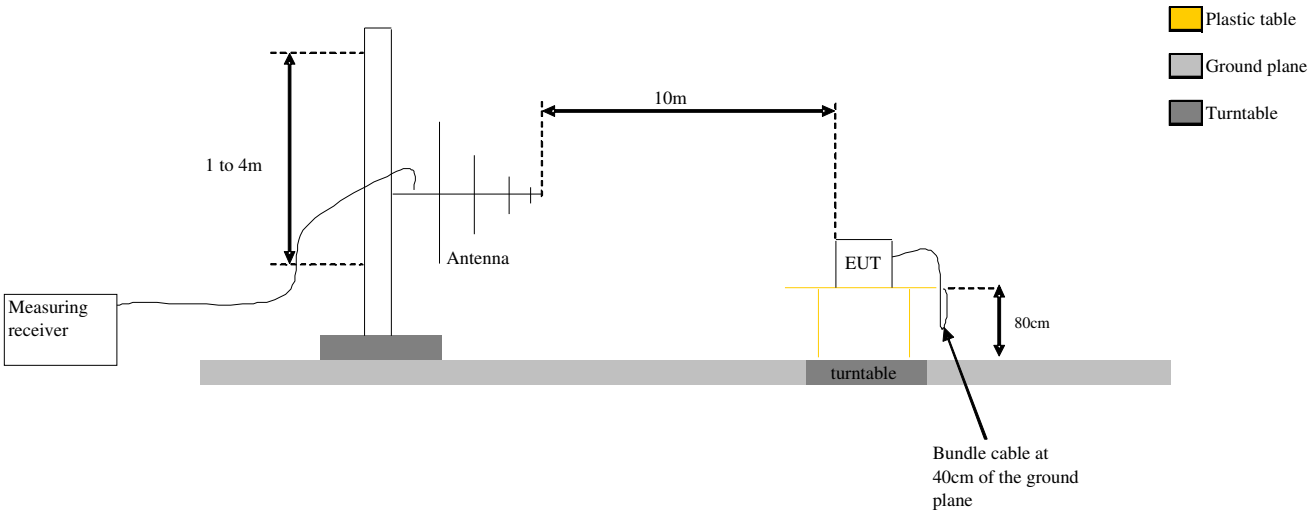
## 11.2. TEST SETUP

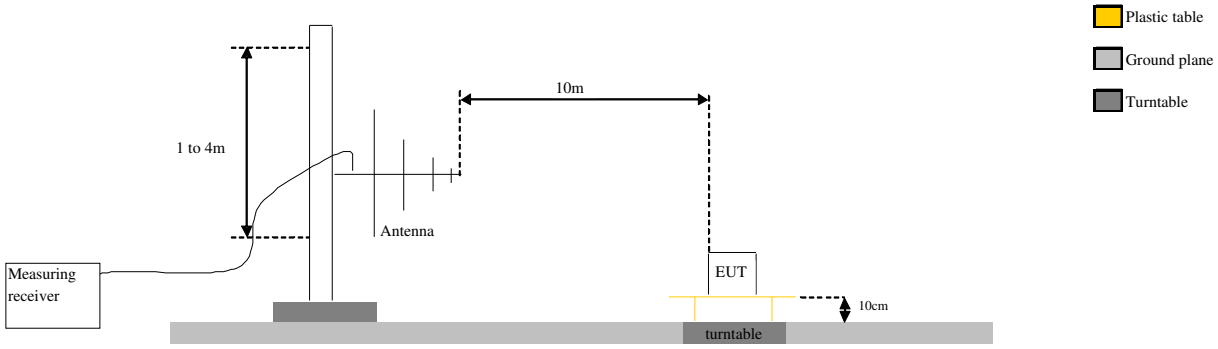
The product has been tested according to ANSI C63.10 (2013) and FCC part15 subpart C.
Test is performed in parallel, perpendicular and ground parallel axis with a loop antenna below 30MHz. Measurement bandwidth was 200Hz below 150kHz and 9kHz between 150kHz & 30MHz. The level has been maximised by the turntable rotation of 360 degrees range on all axis of EUT used in normal configuration. Antenna height was 1m. The EUT is placed **on an open area test site**. Distance between measuring antenna and the EUT is **10m**.
Test is performed in horizontal (H) and vertical (V) polarization with **bilog** between 30MHz & 1GHz and with a horn antenna above 1GHz. Measurement bandwidth was 120kHz below 1GHz and 1MHz above 1GHz. The level has been maximised by the turntable rotation of 360 degrees range on all axis of EUT used in normal configuration. The EUT is place at 1.5m high above 1GHz and at 0.8m high under 1GHz. The EUT is placed **in a full anechoic chamber** above 1GHz and **on an open area test site** from 30MHz to 1GHz. Distance between measuring antenna and the EUT is **3m**.
The height antenna is varied from 1m to 4m from 30MHz to 1GHz and above 1GHz is:
☐ On mast, varied from 1m to 4m
☑ Fixed and centered on the EUT (EUT smaller than the beamwidth of the measurement antenna, ANSI C63.10 §6.6.5)
Frequency list has been created with anechoic chamber pre-scan results.






Test set up of Unwanted Emissions in Restricted Frequency Bands in semi anechoic chamber




Test Set up for radiated measurement in open area test site

Photograph for Unwanted Emission in restricted frequency bands

## 11.3. LIMIT

| Measure at 300m | | |
|---|---|---|
| **Frequency range** | **Level** | **Detector** |
| 9kHz-490kHz | 67.6dBµV/m /F(kHz) | QPeak |
| **Measure at 30m** | | |
| **Frequency range** | **Level** | **Detector** |
| 490kHz-1.705MHz | 87.6dBµV/m /F(kHz) | QPeak |
| 1.705MHz-30MHz | 29.5dBµV/m | QPeak |
| **Measure at 10m** | | |
| **Frequency range** | **Level** | **Detector** |
| 30MHz to 88MHz | 29.5dBµV/m | QPeak |
| 88MHz to 216MHz | 33dBµV/m | QPeak |
| 216MHz to 960MHz | 35.5BµV/m | QPeak |
| 960MHz to 1000MHz | 43.5dBµV/m | QPeak |
| Above 1000MHz | 63.5dBµV/m | Peak |
| | 43.5dBµV/m | Average |

| Measure at 3m | | |
|---|---|---|
| **Frequency range** | **Level** | **Detector** |
| 30MHz to 88MHz | 40dBµV/m | QPeak |
| 88MHz to 216MHz | 43.5dBµV/m | QPeak |
| 216MHz to 960MHz | 46BµV/m | QPeak |
| 960MHz to 1000MHz | 54dBµV/m | QPeak |
| Above 1000MHz | 74dBµV/m | Peak |
| | 54dBµV/m | Average |

## 11.4. TEST EQUIPMENT LIST

| TEST EQUIPMENT USED | | | | | |
|---|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Identifier** | **Cal_Date** | **Cal_Due** |
| Amplifier 10MHz - 18GHz | LCIE SUD EST | _ | A7102082 | 05/22 | 05/24 |
| Antenna Bi-log | AH System | SAS-521-7 | C2040180 | 05/23 | 05/25 |
| Antenna horn 18GHz | EMCO | 3115 | C2042029 | 03/22 | 03/25 |
| BAT EMC | NEXIO | v3.21.0.32 | L1000115 | | |
| CABLE | TELEDYNE | R82-0404-0.5M | A5330010 | 03/22 | 03/25 |
| Cable 0.75m | - | 18GHz | A5329900 | 08/22 | 08/24 |
| Cable SMA 40cm | WITHWAVE | W101-SM1-0.4M | A5329979 | 10/23 | 10/26 |
| Comb EMR HF | YORK | CGE01 | A3169114 | | |
| CONTROLLER | INNCO | CO3000 | D3044034 | | |
| Emission Cable (SMA 1m) | TELEDYNE | 26GHz | A5329874 | 08/22 | 08/25 |
| Emission Cable (SMA 3.3m) | TELEDYNE | 26GHz | A5329875 | 08/22 | 08/25 |
| Filter Matrice | LCIE SUD EST | Combined filters | A7484078 | 03/23 | 03/25 |
| Rehausse Table C3 | LCIE | _ | F2000511 | | |
| Rehausse Table C3 | LCIE | _ | F2000507 | | |
| Semi-Anechoic chamber #3 (BF) | SIEPEL | _ | D3044017_BF | 04/22 | 04/25 |
| Semi-Anechoic chamber #3 (VSWR) | SIEPEL | _ | D3044017_VSWR | 04/22 | 04/25 |
| Spectrum analyzer | ROHDE & SCHWARZ | FSU 26 | A4060058 | 09/23 | 09/25 |
| Table C3 | LCIE | _ | F2000461 | | |
| Thermo-hygrometer (PM1/2/3) | KIMO | HQ 210 | B4206022 | 05/23 | 05/25 |
| TILT | INNCO | TILT | D3044033 | | |
| Turntable chamber (Cage#3) | ETS Lingren | Model 2165 | F2000371 | | |
| Turntable controller (Cage#3) | ETS Lingren | Model 2090 | F2000444 | | |

Note: In our quality system, the test equipment calibration due is more & less 2 months

## 11.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

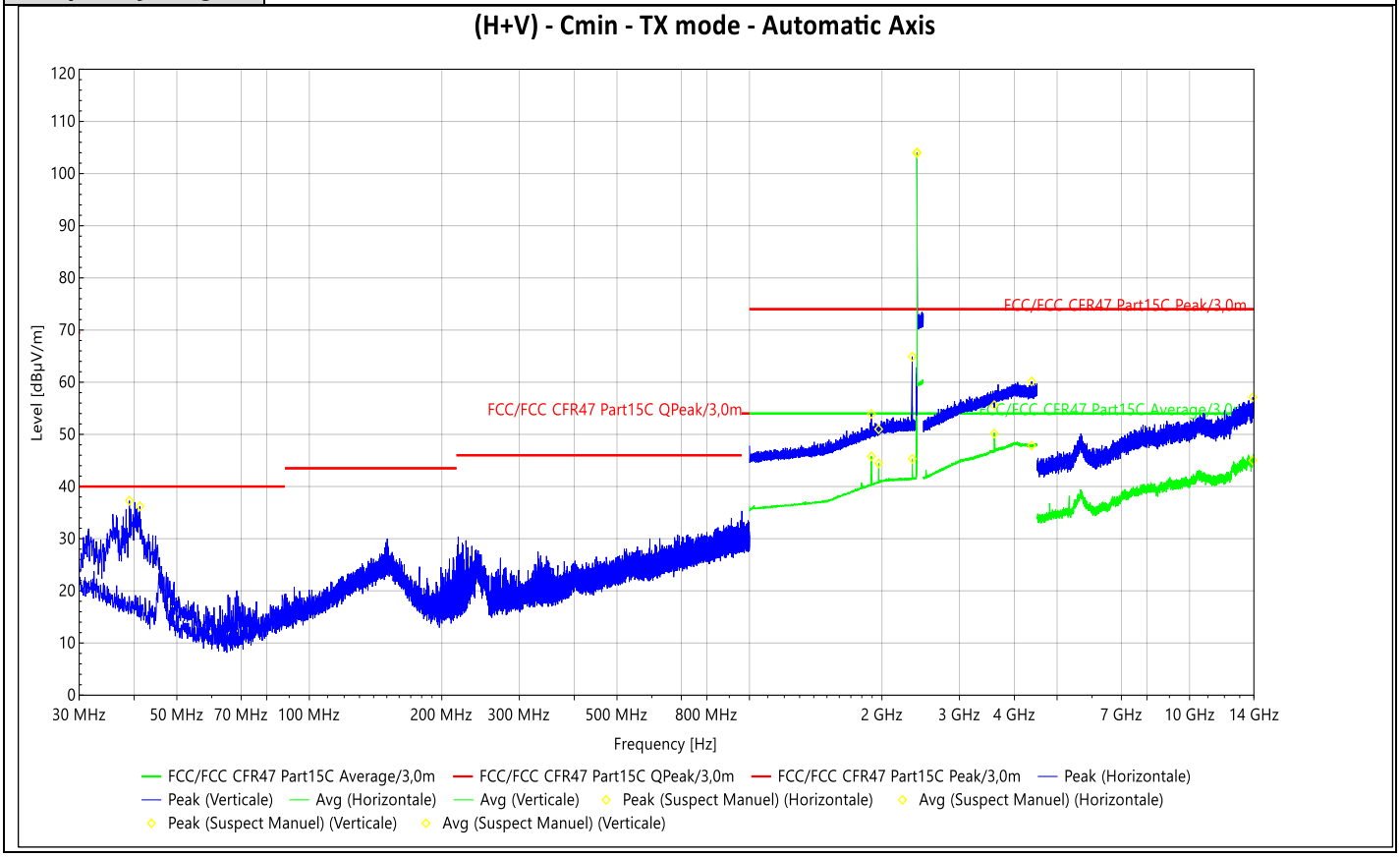
## 11.6. RESULTS

### 11.6.1. 30MHz to 14GHz

**Graphs – Pre characterization:**

| Graph identifier | | Polarization | Mode | Channel | EUT position | Comments |
|---|---|---|---|---|---|---|
| Emr# | 1 | H/V | TX | Cmin | Axis XY/Z | DH5 Supply 1 |
| Emr# | 2 | H/V | TX | Cmid | Axis XY/Z | DH5 Supply 1 |
| Emr# | 3 | H/V | TX | Cmax | Axis XY/Z | DH5 Supply 1 |
| Emr# | 4 | H/V | TX | Cmin | Axis XY/Z | 2DH5 Supply 1 |
| Emr# | 5 | H/V | TX | Cmid | Axis XY/Z | 2DH5 Supply 1 |
| Emr# | 6 | H/V | TX | Cmax | Axis XY/Z | 2DH5 Supply 1 |
| Emr# | 7 | H/V | TX | Cmin | Axis XY/Z | 3DH5 Supply 1 |
| Emr# | 8 | H/V | TX | Cmid | Axis XY/Z | 3DH5 Supply 1 |
| Emr# | 9 | H/V | TX | Cmax | Axis XY/Z | 3DH5 Supply 1 |
| Emr# | 10 | H/V | TX | Cmin | Axis XY/Z | DH5 Supply 2 |
| Emr# | 11 | H/V | TX | Cmid | Axis XY/Z | DH5 Supply 2 |
| Emr# | 12 | H/V | TX | Cmax | Axis XY/Z | DH5 Supply 2 |
| Emr# | 13 | H/V | TX | Cmin | Axis XY/Z | 2DH5 Supply 2 |
| Emr# | 14 | H/V | TX | Cmid | Axis XY/Z | 2DH5 Supply 2 |
| Emr# | 15 | H/V | TX | Cmax | Axis XY/Z | 2DH5 Supply 2 |
| Emr# | 16 | H/V | TX | Cmin | Axis XY/Z | 3DH5 Supply 2 |
| Emr# | 17 | H/V | TX | Cmid | Axis XY/Z | 3DH5 Supply 2 |
| Emr# | 18 | H/V | TX | Cmax | Axis XY/Z | 3DH5 Supply 2 |

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#1 |
| **Frequency range:** | 30 MHz to 14 GHz |

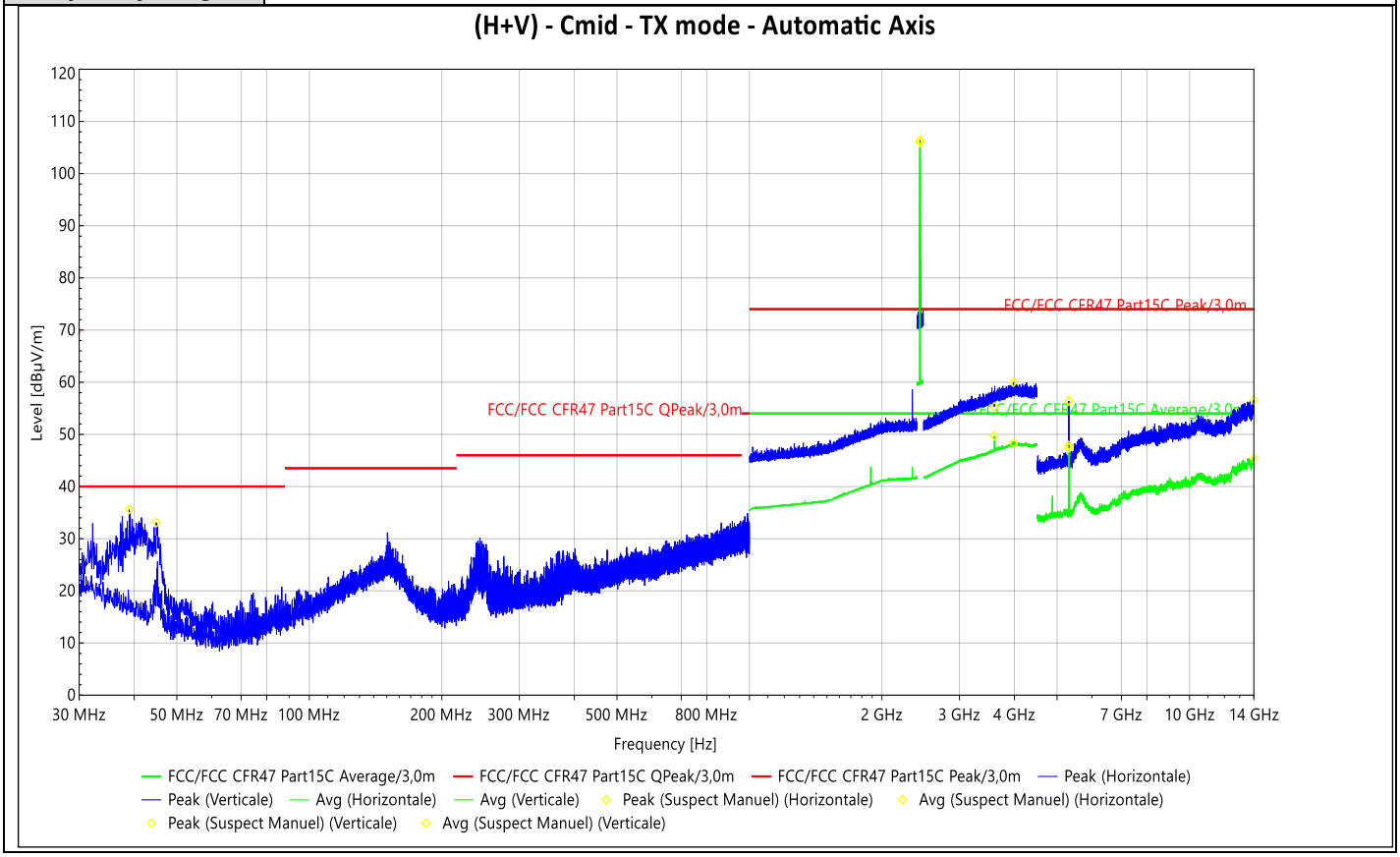



## Pre-Characterization:

| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Avg (dBµV/m) | Lim.Avg (dBµV/m) | Lim.QP (dBµV/m) | Angle (°) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|---|---|---|
| 1.8925 GHz | 53.92 | 74.00 | 45.79 | 54.00 | | 0 | H | 34.55 |
| 1.966 GHz | 51.00 | 74.00 | 44.47 | 54.00 | | 314 | H | 35.07 |
| 2.343649999 GHz | 64.92 | 74.00 | 45.31 | 54.00 | | 242 | H | 35.48 |
| 4.3769935 GHz | 60.16 | 74.00 | 47.83 | 54.00 | | 0 | H | 41.07 |
| 13.9259 GHz | 57.12 | 74.00 | 45.00 | 54.00 | | 187 | H | -4.42 |
| 3.599834399 GHz | 55.61 | 74.00 | 50.15 | 54.00 | | 0 | V | 40.05 |
| 2.40212925 GHz* | 104.08 | 74.00 | 103.92 | 54.00 | | 194 | V | 35.51 |
| 39.021 MHz | 37.28 | | | | 40.00 | 74 | V | 17.19 |
| 41.2035 MHz | 36.22 | | | | 40.00 | 94 | V | 16.10 |

*Carrier frequency
No significant frequency observed due to RF module see the EMC test report (30 MHz to1GHz)

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#2 |
| **Frequency range:** | 30 MHz to 14 GHz |

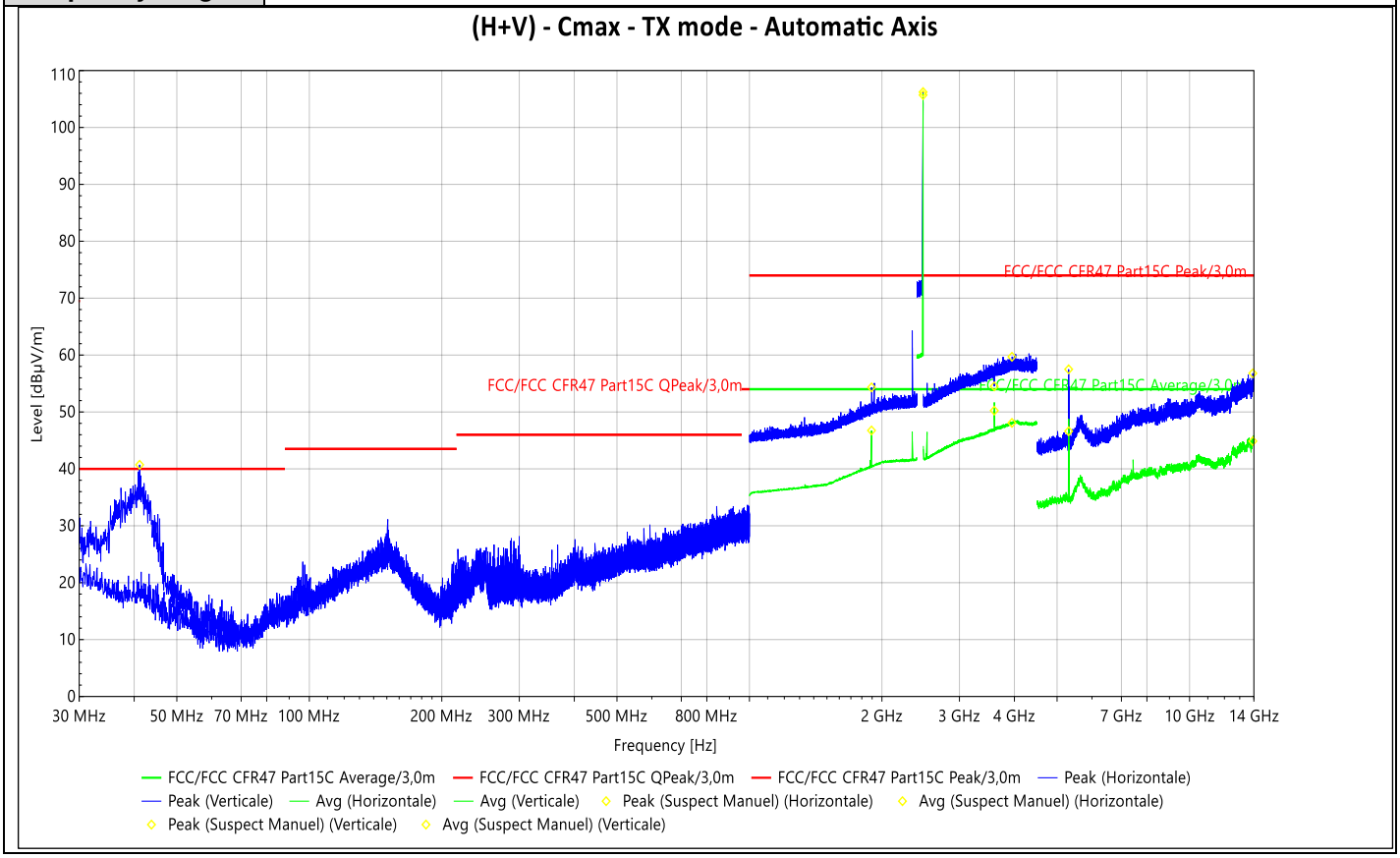



## Pre-Characterization:

| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Avg (dBµV/m) | Lim.Avg (dBµV/m) | Lim.QP (dBµV/m) | Angle (°) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|---|---|---|
| 3.599834399 GHz | 55.30 | 74.00 | 49.70 | 54.00 | | 73 | H | 40.05 |
| 3.979743 GHz | 59.99 | 74.00 | 48.31 | 54.00 | | 34 | H | 41.28 |
| 5.31415 GHz | 56.43 | 74.00 | 47.87 | 54.00 | | 305 | H | -17.56 |
| 13.99335 GHz | 56.55 | 74.00 | 45.40 | 54.00 | | 263 | H | -3.94 |
| 5.31415 GHz | 56.41 | 74.00 | 47.44 | 54.00 | | 198 | V | -17.56 |
| 2.44020525 GHz* | 106.37 | 74.00 | 105.98 | 54.00 | | 191 | V | 35.55 |
| 38.9725 MHz | 35.63 | | | | 40.00 | 272 | V | 17.21 |
| 44.8895 MHz | 33.09 | | | | 40.00 | 178 | V | 14.32 |

*Carrier frequency
No significant frequency observed due to RF module see the EMC test report (30 MHz to1GHz)

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#3 |
| **Frequency range:** | 30 MHz to 14 GHz |

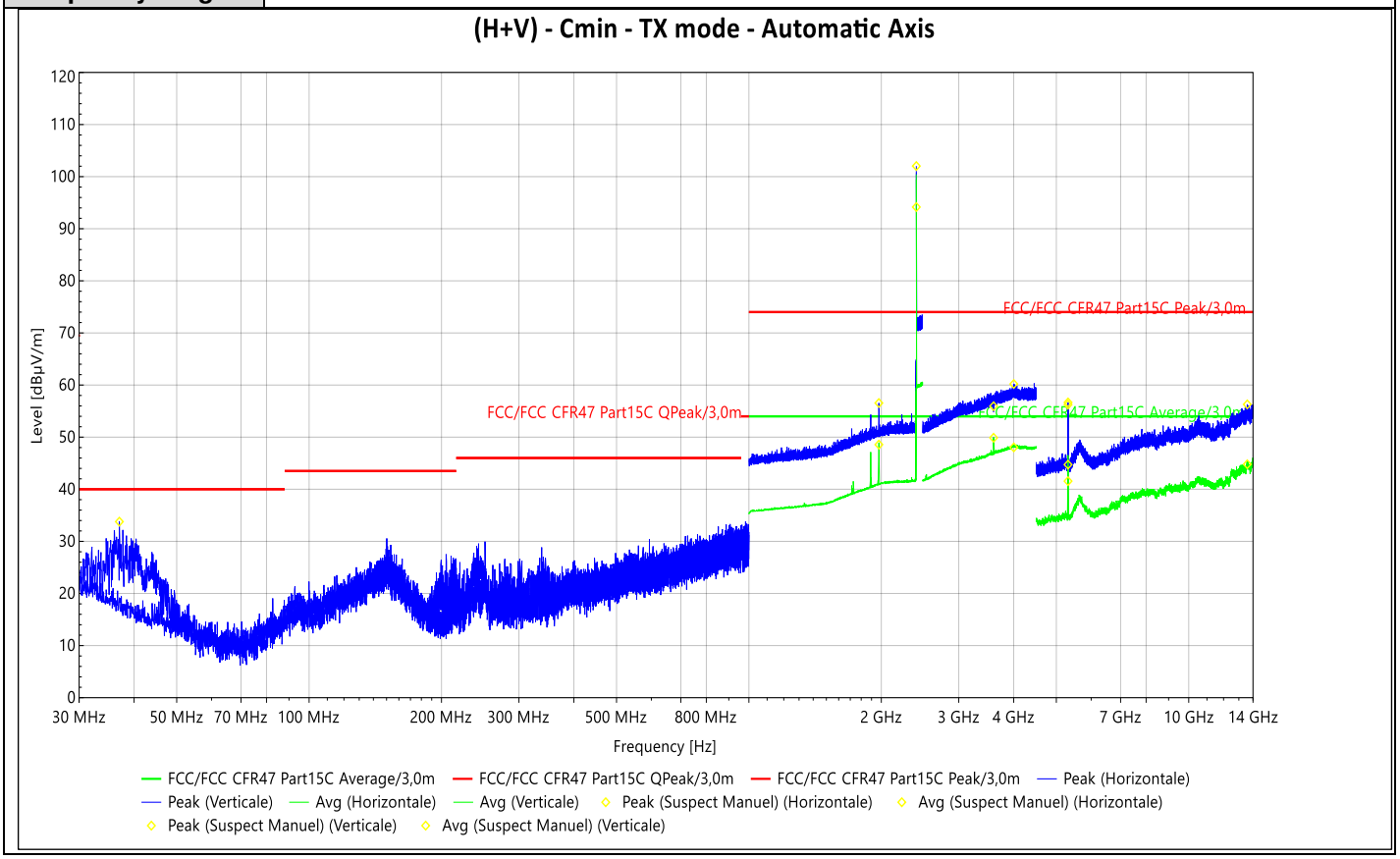



## Pre-Characterization:

| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Avg (dBµV/m) | Lim.Avg (dBµV/m) | Lim.QP (dBµV/m) | Angle (°) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|---|---|---|
| 3.599834399 GHz | 54.50 | 74.00 | 50.24 | 54.00 | | 123 | H | 40.05 |
| 3.9482856 GHz | 59.70 | 74.00 | 48.08 | 54.00 | | 112 | H | 41.15 |
| 5.31225 GHz | 57.50 | 74.00 | 46.62 | 54.00 | | 124 | H | -17.57 |
| 13.920199999 GHz | 56.79 | 74.00 | 44.87 | 54.00 | | 0 | H | -4.45 |
| 2.48020175 GHz | 106.22 | 74.00 | 105.70 | 54.00 | | 166 | V | 35.55 |
| 1.8939 GHz | 54.32 | 74.00 | 46.75 | 54.00 | | 72 | V | 34.56 |
| 41.155 MHz | 40.72 | | | | 40.00 | 327 | V | 16.12 |

*Carrier frequency
No significant frequency observed due to RF module see the EMC test report (30 MHz to1GHz)

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#4 |
| **Frequency range:** | 30 MHz to 14 GHz |

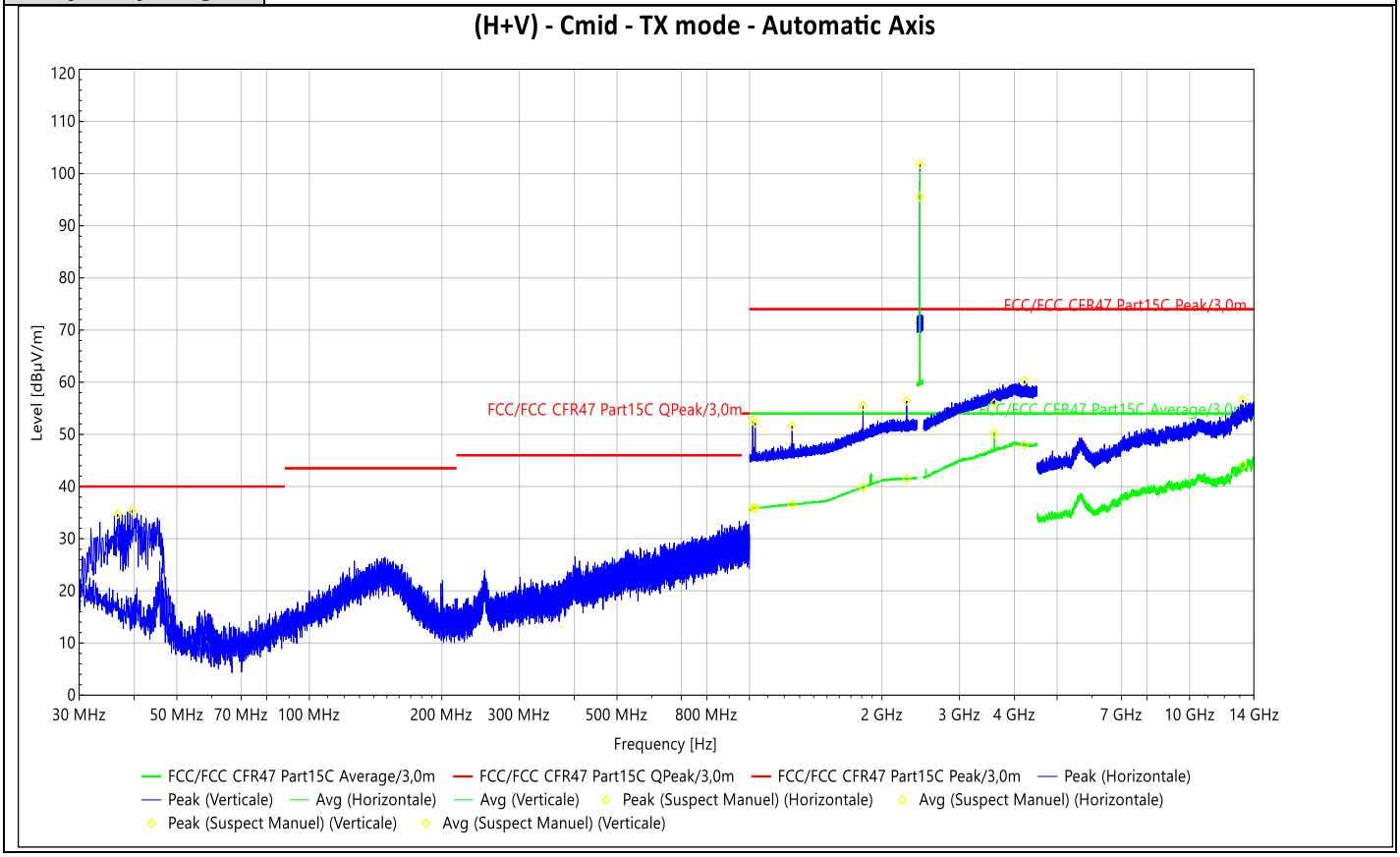



## Pre-Characterization:

| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Avg (dBµV/m) | Lim.Avg (dBµV/m) | Lim.QP (dBµV/m) | Angle (°) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|---|---|---|
| 3.599834399 GHz | 55.94 | 74.00 | 49.88 | 54.00 | | 221 | H | 40.05 |
| 4.0015212 GHz | 60.20 | 74.00 | 48.04 | 54.00 | | 32 | H | 41.37 |
| 5.3151 GHz | 56.24 | 74.00 | 44.73 | 54.00 | | 114 | H | -17.56 |
| 13.58485 GHz | 56.29 | 74.00 | 44.80 | 54.00 | | 187 | H | -5.96 |
| 5.31605 GHz | 56.66 | 74.00 | 41.56 | 54.00 | | 112 | V | -17.55 |
| 2.40212925 GHz* | 102.03 | 74.00 | 94.16 | 54.00 | | 206 | V | 35.51 |
| 1.9744 GHz | 56.55 | 74.00 | 48.57 | 54.00 | | 237 | V | 35.12 |
| 37.0325 MHz | 33.78 | | | | 40.00 | 54 | V | 18.23 |

*Carrier frequency
No significant frequency observed due to RF module see the EMC test report (30 MHz to1GHz)

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#5 |
| **Frequency range:** | 30 MHz to 14 GHz |

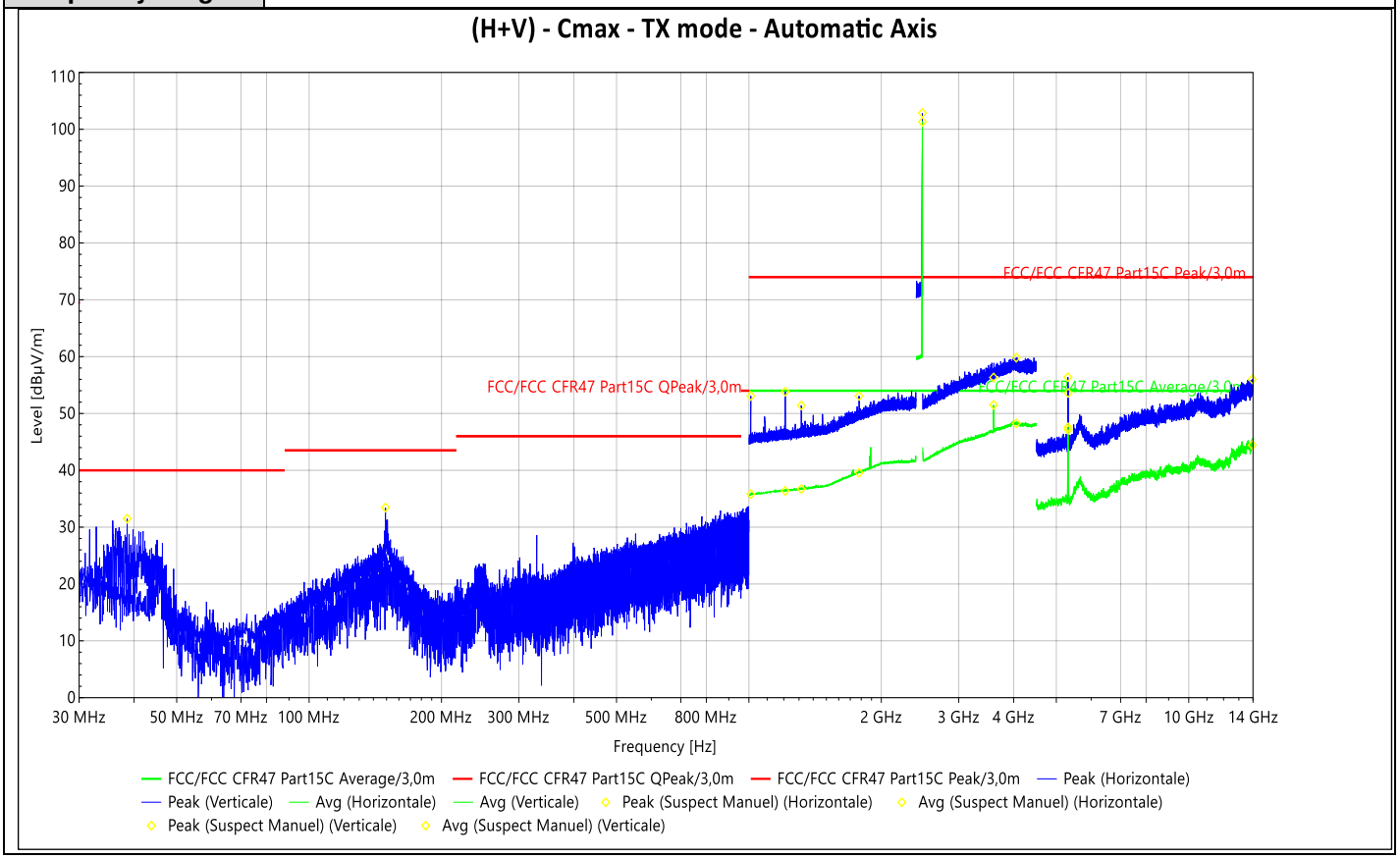



## Pre-Characterization:

| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Avg (dBµV/m) | Lim.Avg (dBµV/m) | Lim.QP (dBµV/m) | Angle (°) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|---|---|---|
| 2.44003825 GHz* | 101.82 | 74.00 | 95.50 | 54.00 | | 256 | H | 35.55 |
| 3.599834399 GHz | 55.99 | 74.00 | 50.21 | 54.00 | | 355 | H | 40.05 |
| 13.217199999 GHz | 56.59 | 74.00 | 44.09 | 54.00 | | 260 | H | -7.40 |
| 4.21769 GHz | 60.28 | 74.00 | 47.98 | 54.00 | | 354 | V | 41.24 |
| 1.01715 GHz | 52.68 | 74.00 | 35.96 | 54.00 | | 184 | V | 30.34 |
| 1.03115 GHz | 52.23 | 74.00 | 35.90 | 54.00 | | 0 | V | 30.38 |
| 1.24955 GHz | 51.62 | 74.00 | 36.59 | 54.00 | | 252 | V | 30.95 |
| 1.81165 GHz | 55.44 | 74.00 | 39.82 | 54.00 | | 302 | V | 34.02 |
| 2.2761 GHz | 56.44 | 74.00 | 41.49 | 54.00 | | 144 | V | 35.44 |
| 36.693 MHz | 34.70 | | | | 40.00 | 87 | V | 18.42 |
| 39.5545 MHz | 35.42 | | | | 40.00 | 171 | V | 16.93 |

*Carrier frequency
No significant frequency observed due to RF module see the EMC test report (30 MHz to1GHz)

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#6 |
| **Frequency range:** | 30 MHz to 14 GHz |

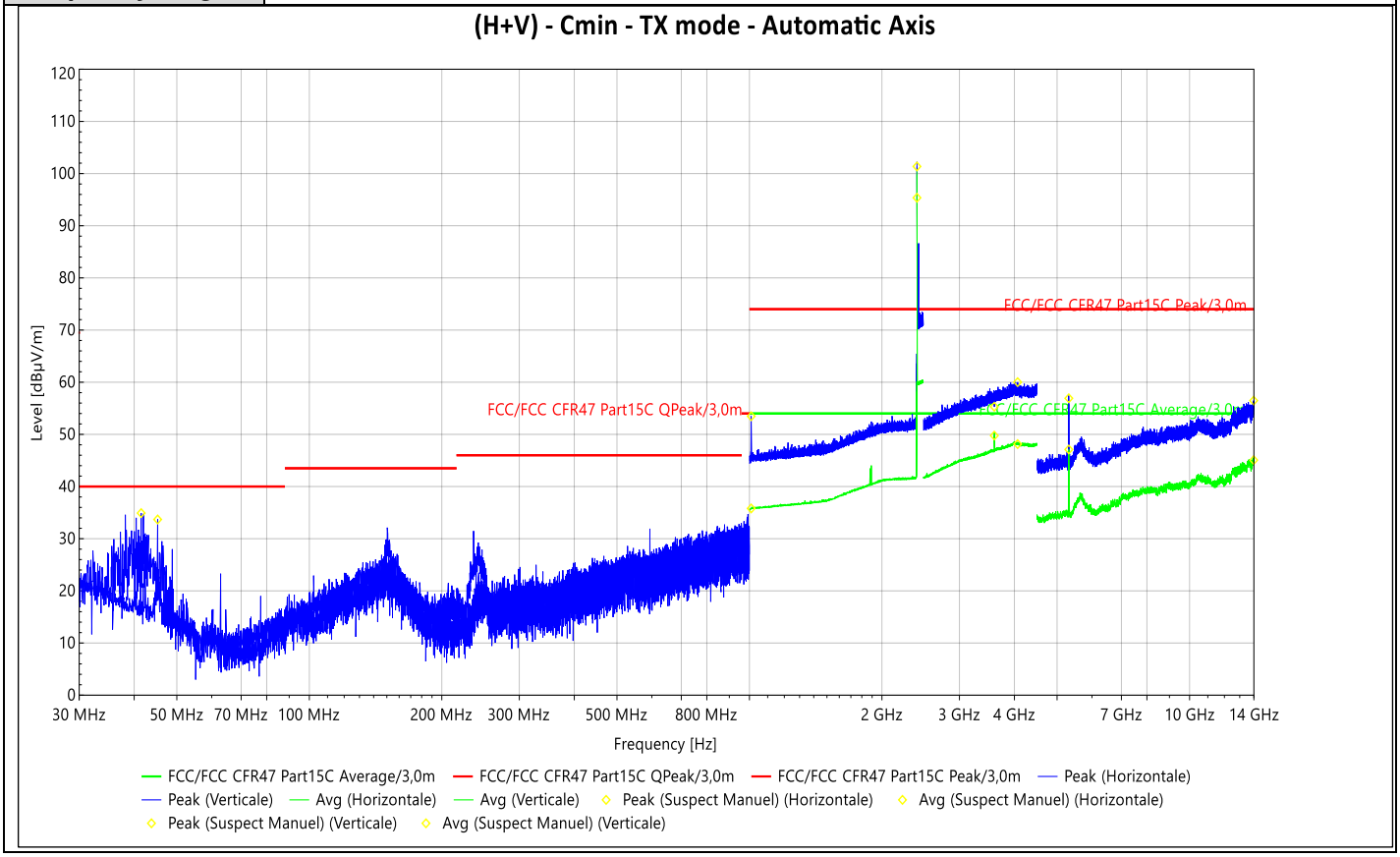



**Pre-Characterization:**

| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Avg (dBµV/m) | Lim.Avg (dBµV/m) | Lim.QP (dBµV/m) | Angle (°) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|---|---|---|
| 149.1645 MHz | 33.45 | | | | 43.50 | 94 | H | 24.20 |
| 3.599834399 GHz | 56.33 | 74.00 | 51.51 | 54.00 | | 114 | H | 40.05 |
| 5.31985 GHz | 53.61 | 74.00 | 47.16 | 54.00 | | 0 | H | -17.54 |
| 5.3132 GHz | 56.38 | 74.00 | 47.57 | 54.00 | | 217 | V | -17.57 |
| 13.943949999 GHz | 56.00 | 74.00 | 44.44 | 54.00 | | 37 | V | -4.34 |
| 4.0539502 GHz | 59.82 | 74.00 | 48.27 | 54.00 | | 113 | V | 41.32 |
| 2.47970075 GHz* | 102.88 | 74.00 | 101.30 | 54.00 | | 165 | V | 35.55 |
| 1.01015 GHz | 53.06 | 74.00 | 35.82 | 54.00 | | 159 | V | 30.21 |
| 1.20965 GHz | 53.83 | 74.00 | 36.38 | 54.00 | | 132 | V | 30.88 |
| 1.31535 GHz | 51.41 | 74.00 | 36.71 | 54.00 | | 134 | V | 31.12 |
| 1.7798 GHz | 53.08 | 74.00 | 39.56 | 54.00 | | 329 | V | 33.81 |
| 38.5845 MHz | 31.50 | | | | 40.00 | 0 | V | 17.42 |

*Carrier frequency
No significant frequency observed due to RF module see the EMC test report (30 MHz to1GHz)

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#7 |
| **Frequency range:** | 30 MHz to 14 GHz |

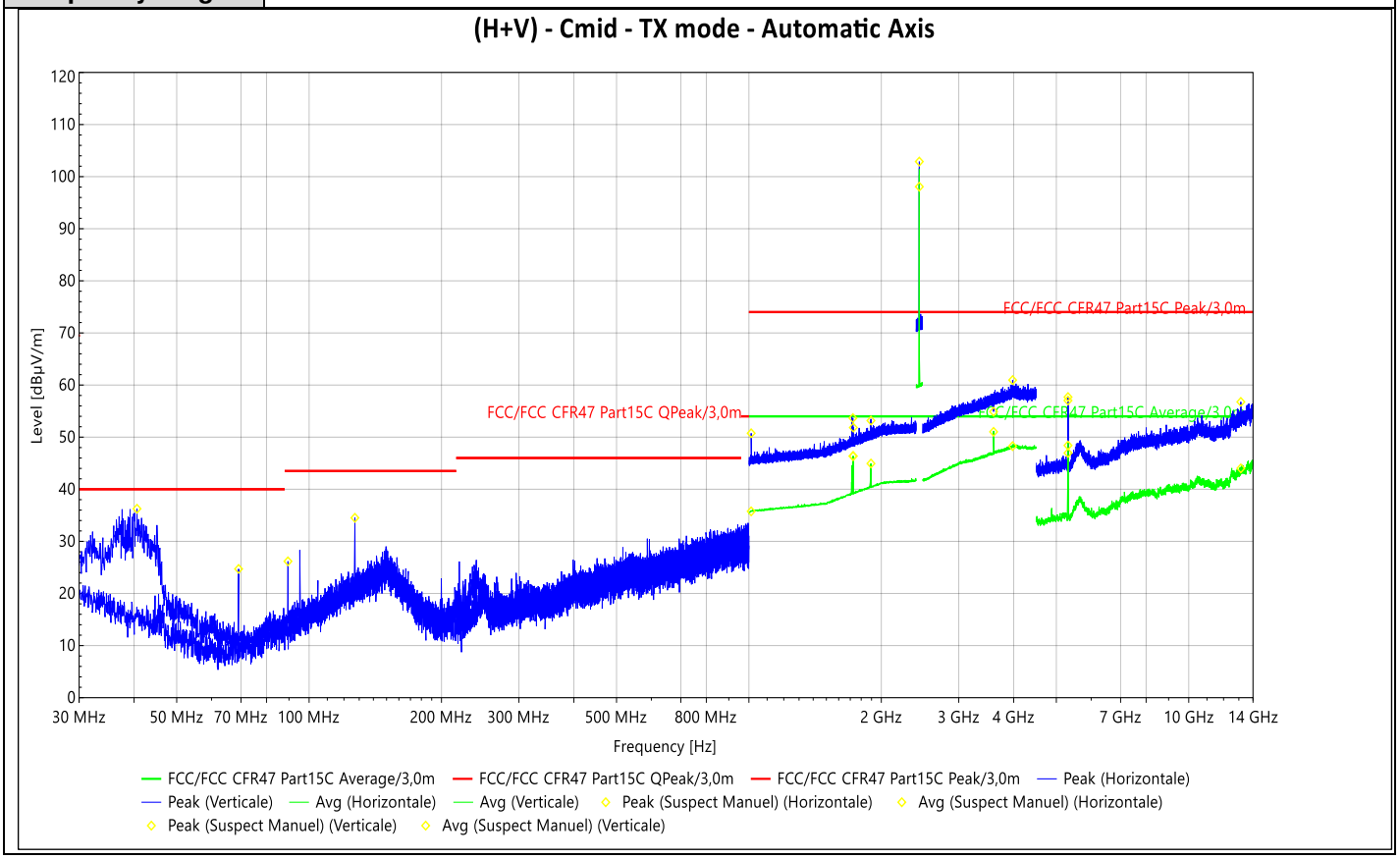



## Pre-Characterization:

| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Avg (dBµV/m) | Lim.Avg (dBµV/m) | Lim.QP (dBµV/m) | Angle (°) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|---|---|---|
| 2.40196225 GHz* | 101.36 | 74.00 | 95.36 | 54.00 | | 282 | H | 35.51 |
| 45.229 MHz | 33.69 | | | | 40.00 | 317 | H | 14.16 |
| 1.0091 GHz | 53.48 | 74.00 | 35.80 | 54.00 | | 240 | H | 30.18 |
| 3.599834399 GHz | 55.30 | 74.00 | 49.77 | 54.00 | | 341 | H | 40.05 |
| 13.9829 GHz | 56.47 | 74.00 | 45.07 | 54.00 | | 0 | H | -4.04 |
| 5.31605 GHz | 56.92 | 74.00 | 47.10 | 54.00 | | 203 | V | -17.55 |
| 4.0676624 GHz | 60.00 | 74.00 | 48.14 | 54.00 | | 0 | V | 41.29 |
| 41.4945 MHz | 34.91 | | | | 40.00 | 12 | V | 15.95 |

*Carrier frequency
No significant frequency observed due to RF module see the EMC test report (30 MHz to1GHz)

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#8 |
| **Frequency range:** | 30 MHz to 14 GHz |

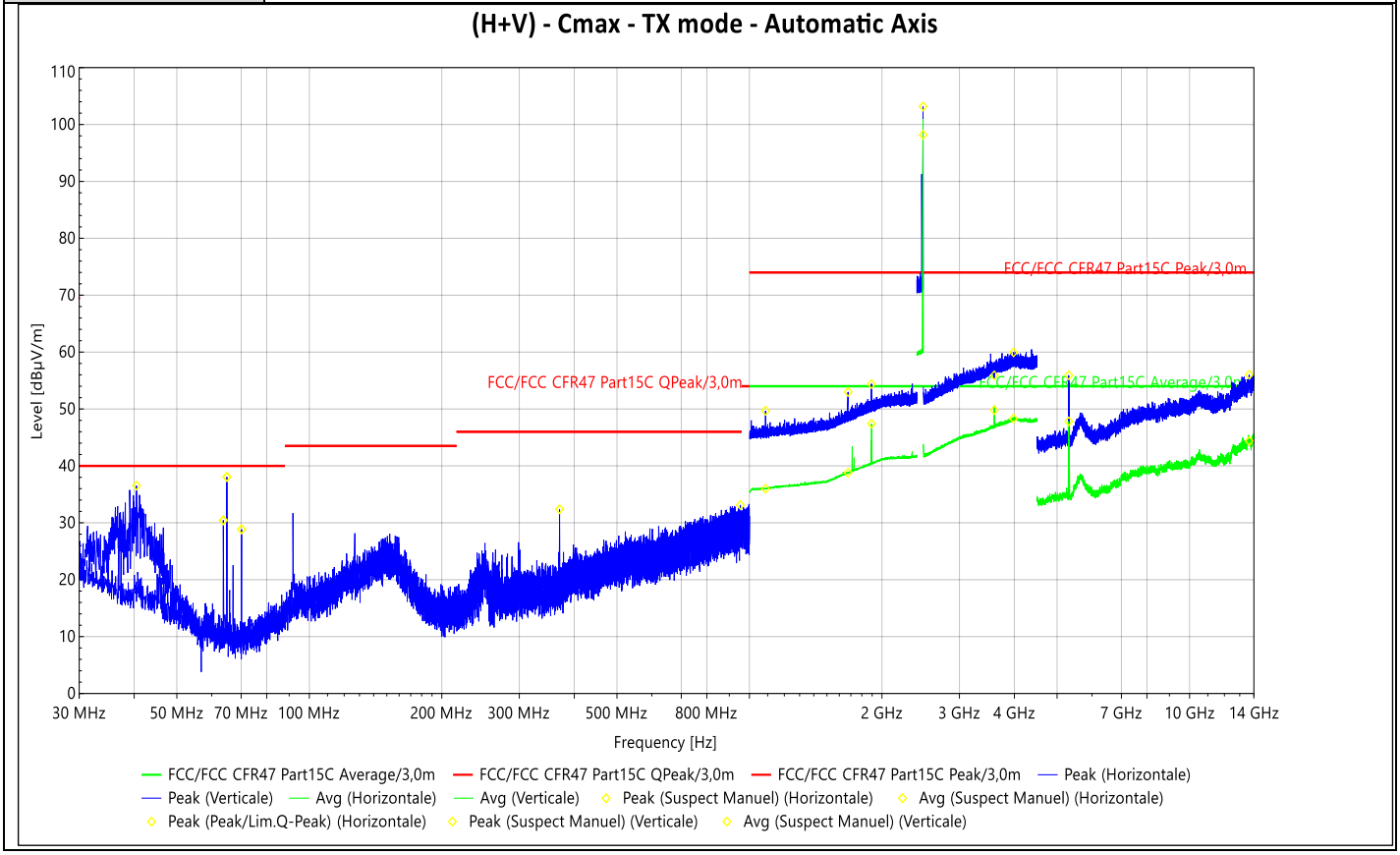



## Pre-Characterization:

| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Avg (dBµV/m) | Lim.Avg (dBµV/m) | Lim.QP (dBµV/m) | Angle (°) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|---|---|---|
| 1.723449999 GHz | 53.66 | 74.00 | 46.36 | 54.00 | | 67 | H | 33.41 |
| 3.9765166 GHz | 60.95 | 74.00 | 48.28 | 54.00 | | 274 | H | 41.26 |
| 5.31415 GHz | 57.03 | 74.00 | 48.41 | 54.00 | | 233 | H | -17.56 |
| 13.136449999 GHz | 56.77 | 74.00 | 44.01 | 54.00 | | 262 | H | -7.10 |
| 5.3151 GHz | 57.70 | 74.00 | 46.96 | 54.00 | | 112 | V | -17.56 |
| 3.599834399 GHz | 54.90 | 74.00 | 51.02 | 54.00 | | 0 | V | 40.05 |
| 2.44008 GHz* | 102.89 | 74.00 | 98.07 | 54.00 | | 195 | V | 35.55 |
| 1.0119 GHz | 50.75 | 74.00 | 35.76 | 54.00 | | 264 | V | 30.26 |
| 1.7273 GHz | 51.84 | 74.00 | 46.37 | 54.00 | | 267 | V | 33.43 |
| 1.89425 GHz | 53.18 | 74.00 | 44.94 | 54.00 | | 188 | V | 34.56 |
| 40.6215 MHz | 36.26 | | | | 40.00 | 51 | V | 16.40 |
| 69.1395 MHz | 24.71 | | | | 40.00 | 230 | V | 10.79 |
| 89.5095 MHz | 26.17 | | | | 43.50 | 182 | V | 14.85 |
| 127.097 MHz | 34.52 | | | | 43.50 | 230 | V | 21.63 |

*Carrier frequency
No significant frequency observed due to RF module see the EMC test report (30 MHz to1GHz)

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#9 |
| **Frequency range:** | 30 MHz to 14 GHz |

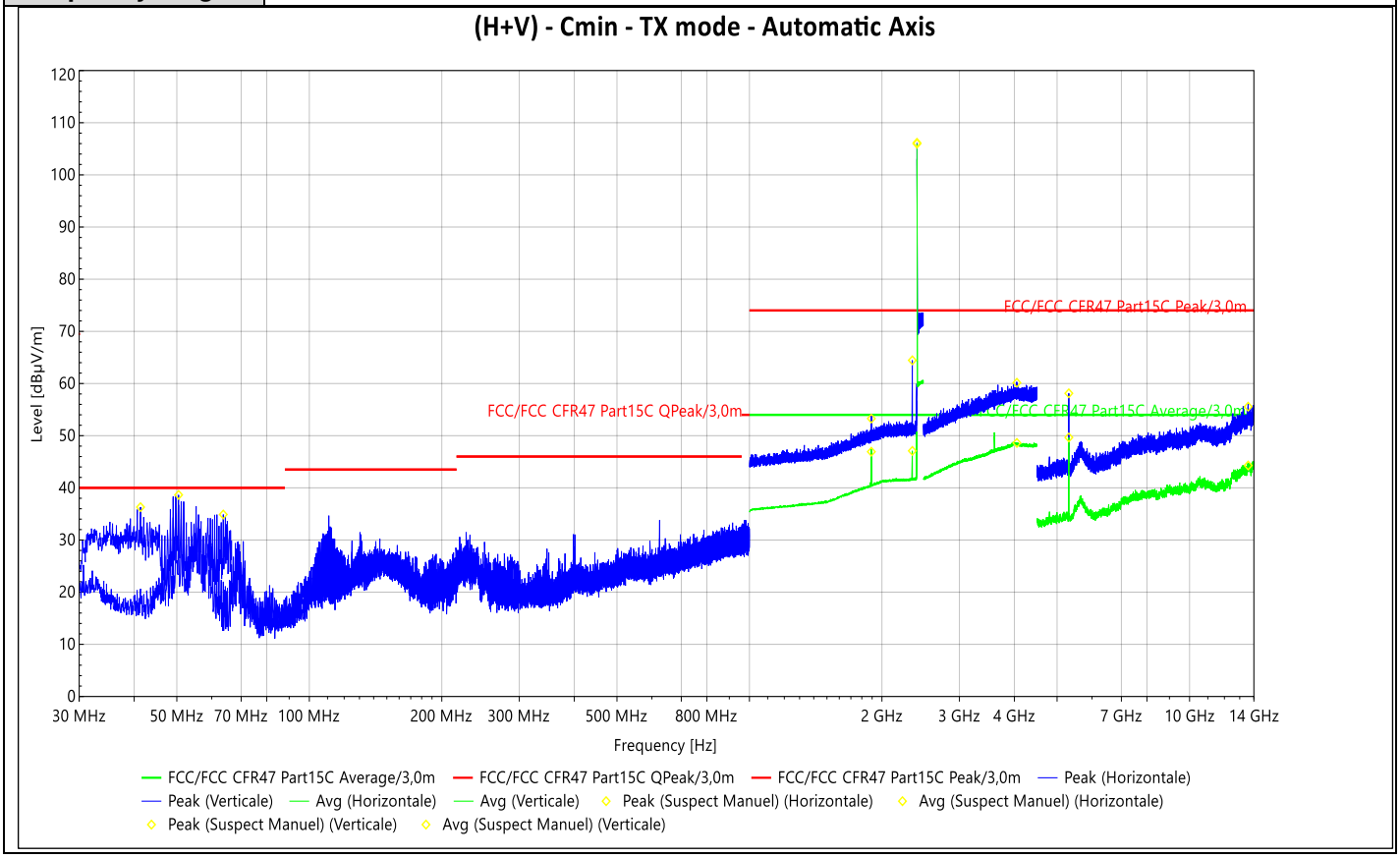



## Pre-Characterization:

| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Avg (dBµV/m) | Lim.Avg (dBµV/m) | Lim.QP (dBµV/m) | Angle (°) | Polar. | Correct. (dB) | PK-Lim.QP (dB) | Angle (°) | Tilt (°) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 63.756 MHz | 30.44 | | | | 40.00 | 283 | H | 10.20 | | | |
| 63.756 MHz | 30.44 | | | | 40.00 | | H | 10.20 | -9.56 | 283 | 0.50 |
| 64.9685 MHz | 38.06 | | | | 40.00 | 283 | H | 10.26 | | | |
| 64.9685 MHz | 38.06 | | | | 40.00 | | H | 10.26 | -1.94 | 283 | 0.50 |
| 70.158 MHz | 28.85 | | | | 40.00 | 283 | H | 11.02 | | | |
| 70.158 MHz | 28.85 | | | | 40.00 | | H | 11.02 | -11.15 | 283 | 0.50 |
| 370.373 MHz | 32.40 | | | | 46.00 | | H | 19.48 | -13.60 | 171 | 0.50 |
| 953.7795 MHz | 33.13 | | | | 46.00 | | H | 29.08 | -12.87 | 117 | 0.50 |
| 1.8939 GHz | 54.37 | 74.00 | 47.42 | 54.00 | | 29 | H | 34.56 | | | |
| 3.9805496 GHz | 59.95 | 74.00 | 48.32 | 54.00 | | 7 | H | 41.28 | | | |
| 5.31415 GHz | 55.93 | 74.00 | 47.82 | 54.00 | | 262 | H | -17.56 | | | |
| 13.66465 GHz | 56.03 | 74.00 | 44.38 | 54.00 | | 324 | H | -5.49 | | | |
| 3.59983439 GHz | 55.91 | 74.00 | 49.80 | 54.00 | | 246 | V | 40.05 | | | |
| 2.479993 GHz* | 103.18 | 74.00 | 98.19 | 54.00 | | 190 | V | 35.55 | | | |
| 1.0875 GHz | 49.69 | 74.00 | 35.99 | 54.00 | | 254 | V | 30.53 | | | |
| 1.6748 GHz | 53.00 | 74.00 | 38.80 | 54.00 | | 291 | V | 33.05 | | | |
| 40.476 MHz | 36.52 | | | | 40.00 | 60 | V | 16.47 | | | |

*Carrier frequency
No significant frequency observed due to RF module see the EMC test report (30 MHz to1GHz)

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#10 |
| **Frequency range:** | 30 MHz to 14 GHz |

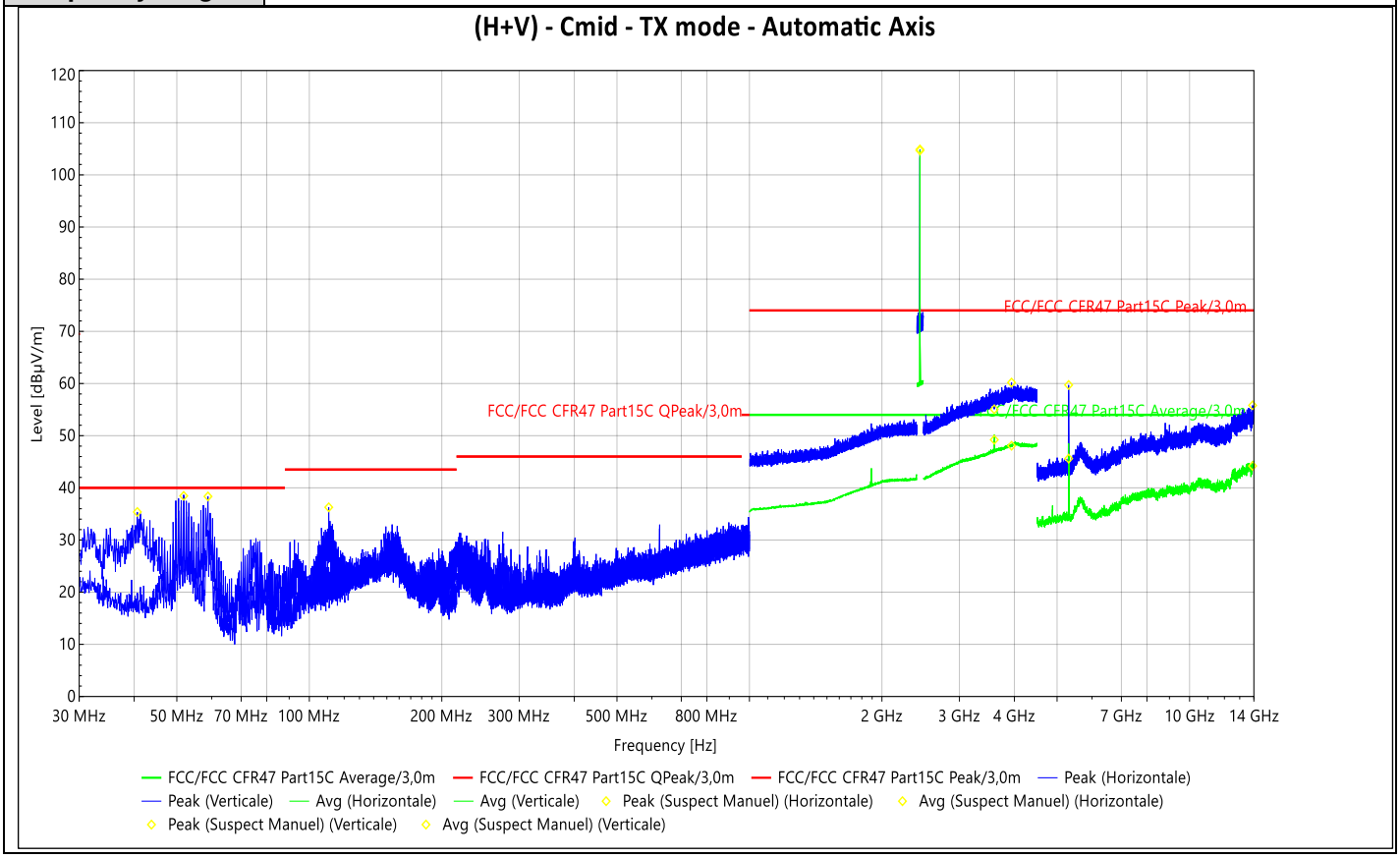



## Pre-Characterization:

| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Avg (dBµV/m) | Lim.Avg (dBµV/m) | Lim.QP (dBµV/m) | Angle (°) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|---|---|---|
| 2.40212925 GHz* | 106.15 | 74.00 | 105.97 | 54.00 | | 192 | H | 35.71 |
| 2.3447 GHz | 64.45 | 74.00 | 47.09 | 54.00 | | 167 | H | 35.68 |
| 5.317 GHz | 58.12 | 74.00 | 49.66 | 54.00 | | 212 | H | -17.55 |
| 13.58675 GHz | 55.56 | 74.00 | 44.29 | 54.00 | | 272 | V | -5.95 |
| 4.051530399 GHz | 60.15 | 74.00 | 48.61 | 54.00 | | 56 | V | 41.69 |
| 1.89215 GHz | 53.28 | 74.00 | 46.92 | 54.00 | | 219 | V | 34.70 |
| 41.349 MHz | 36.30 | | | | 40.00 | 137 | V | 16.03 |
| 50.467 MHz | 38.65 | | | | 40.00 | 300 | V | 12.04 |
| 63.756 MHz | 34.89 | | | | 40.00 | 338 | V | 10.20 |

*Carrier frequency
No significant frequency observed due to RF module see the EMC test report (30 MHz to1GHz)

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#11 |
| **Frequency range:** | 30 MHz to 14 GHz |

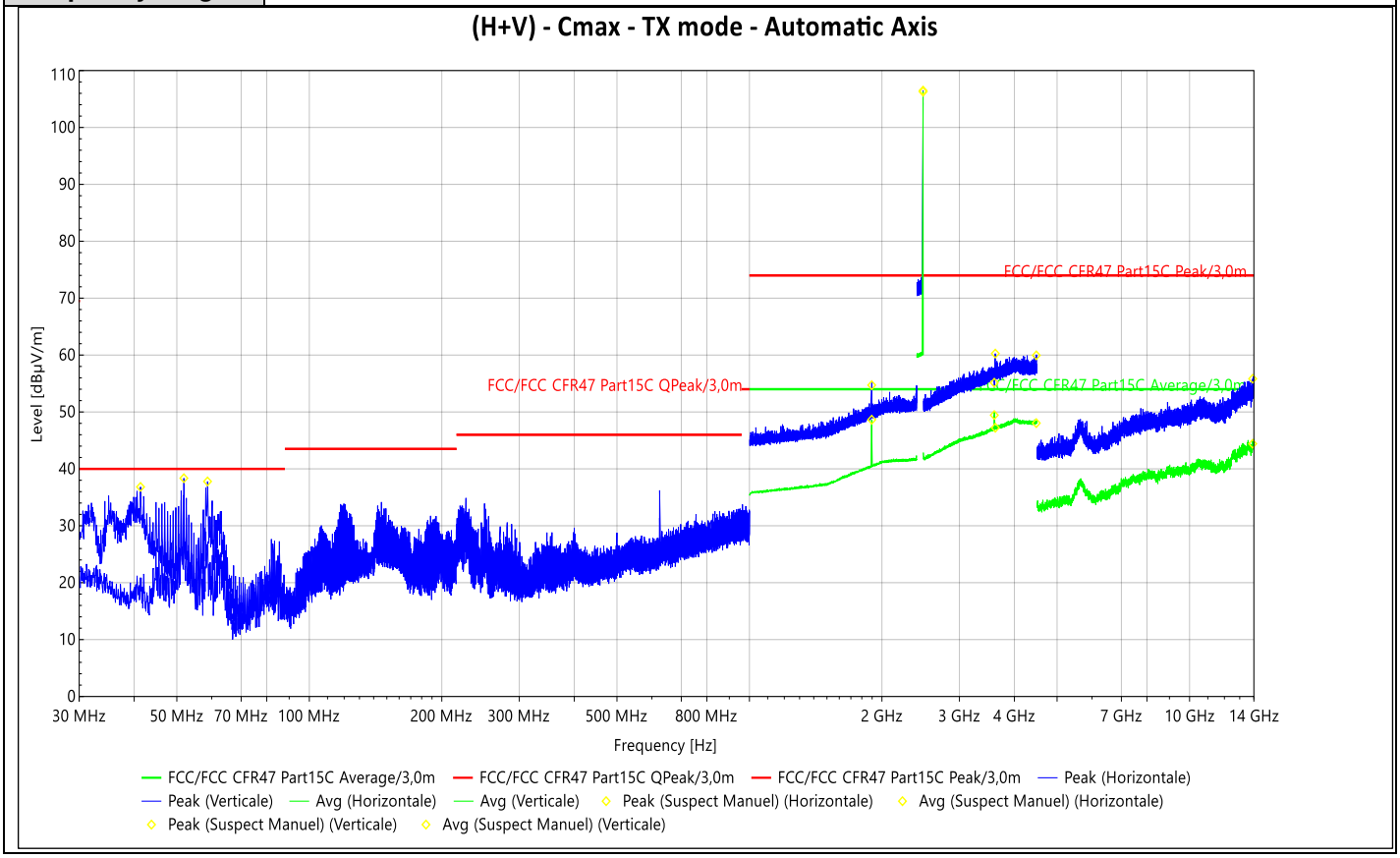



## Pre-Characterization:

| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Avg (dBµV/m) | Lim.Avg (dBµV/m) | Lim.QP (dBµV/m) | Angle (°) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|---|---|---|
| 110.704 MHz | 36.27 | | | | 43.50 | 0 | H | 18.77 |
| 3.9402196 GHz | 60.18 | 74.00 | 48.07 | 54.00 | | 81 | H | 41.43 |
| 13.9069 GHz | 55.82 | 74.00 | 44.20 | 54.00 | | 256 | H | -4.51 |
| 5.31225 GHz | 59.72 | 74.00 | 45.61 | 54.00 | | 213 | V | -17.57 |
| 3.599834399 GHz | 55.06 | 74.00 | 49.22 | 54.00 | | 33 | V | 40.39 |
| 2.44012175 GHz* | 104.87 | 74.00 | 104.68 | 54.00 | | 194 | V | 35.77 |
| 40.67 MHz | 35.37 | | | | 40.00 | 329 | V | 16.37 |
| 51.825 MHz | 38.46 | | | | 40.00 | 0 | V | 11.61 |
| 58.8575 MHz | 38.35 | | | | 40.00 | 276 | V | 10.25 |

*Carrier frequency
No significant frequency observed due to RF module see the EMC test report (30 MHz to1GHz)

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#12 |
| **Frequency range:** | 30 MHz to 14 GHz |

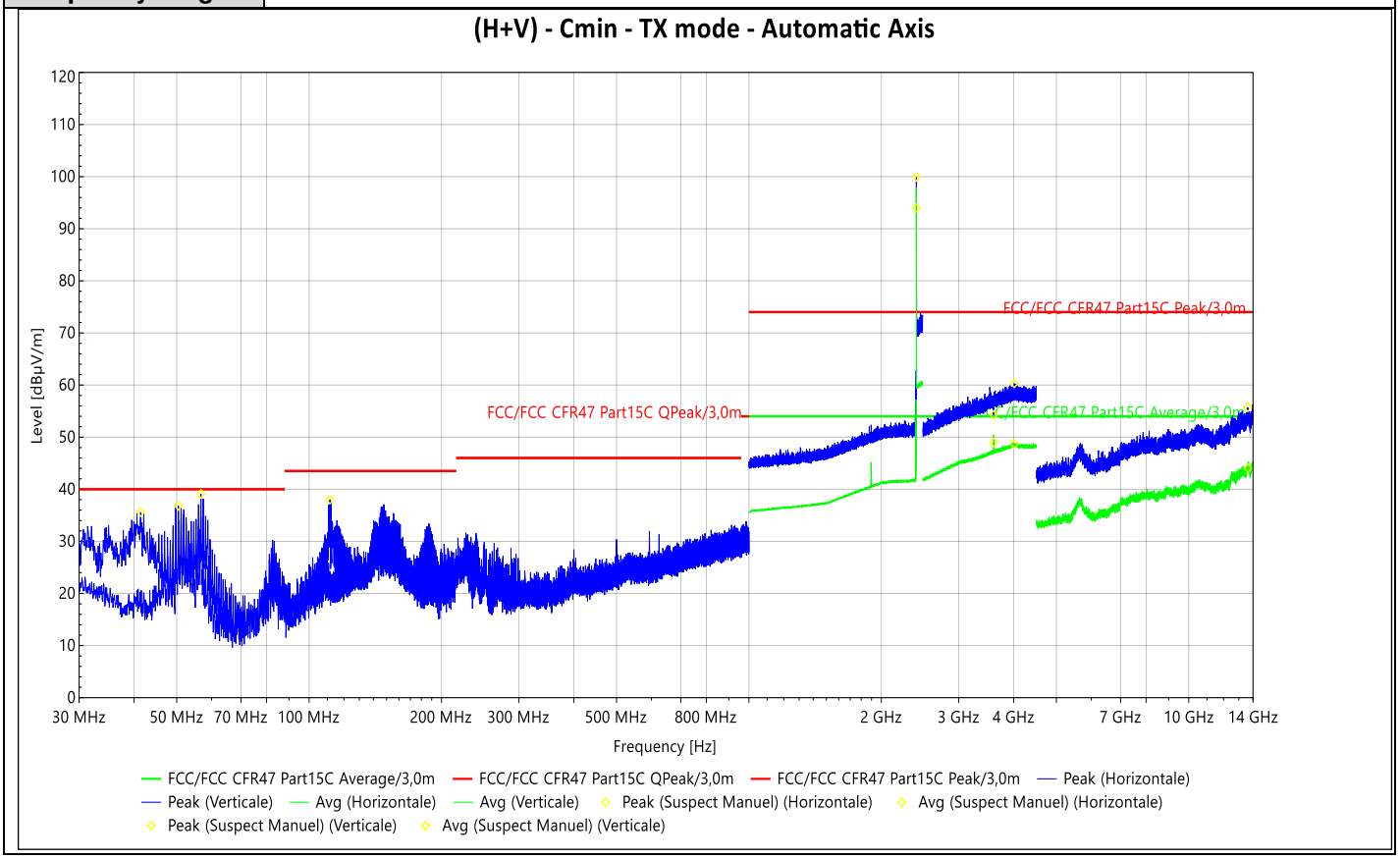



## Pre-Characterization:

| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Avg (dBµV/m) | Lim.Avg (dBµV/m) | Lim.QP (dBµV/m) | Angle (°) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|---|---|---|
| 2.48016 GHz* | 106.47 | 74.00 | 106.28 | 54.00 | | 194 | H | 35.77 |
| 51.8735 MHz | 38.36 | | | | 40.00 | 345 | H | 11.59 |
| 13.9126 GHz | 55.84 | 74.00 | 44.41 | 54.00 | | 138 | V | -4.48 |
| 3.599834399 GHz | 55.14 | 74.00 | 49.45 | 54.00 | | 140 | V | 40.39 |
| 3.6191928 GHz | 60.26 | 74.00 | 47.23 | 54.00 | | 73 | V | 40.43 |
| 4.4846746 GHz | 59.95 | 74.00 | 48.04 | 54.00 | | 19 | V | 41.46 |
| 1.89565 GHz | 54.71 | 74.00 | 48.64 | 54.00 | | 260 | V | 34.73 |
| 41.349 MHz | 36.83 | | | | 40.00 | 53 | V | 16.03 |
| 58.712 MHz | 37.78 | | | | 40.00 | 257 | V | 10.26 |

*Carrier frequency
No significant frequency observed due to RF module see the EMC test report (30 MHz to1GHz)

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#13 |
| **Frequency range:** | 30 MHz to 14 GHz |

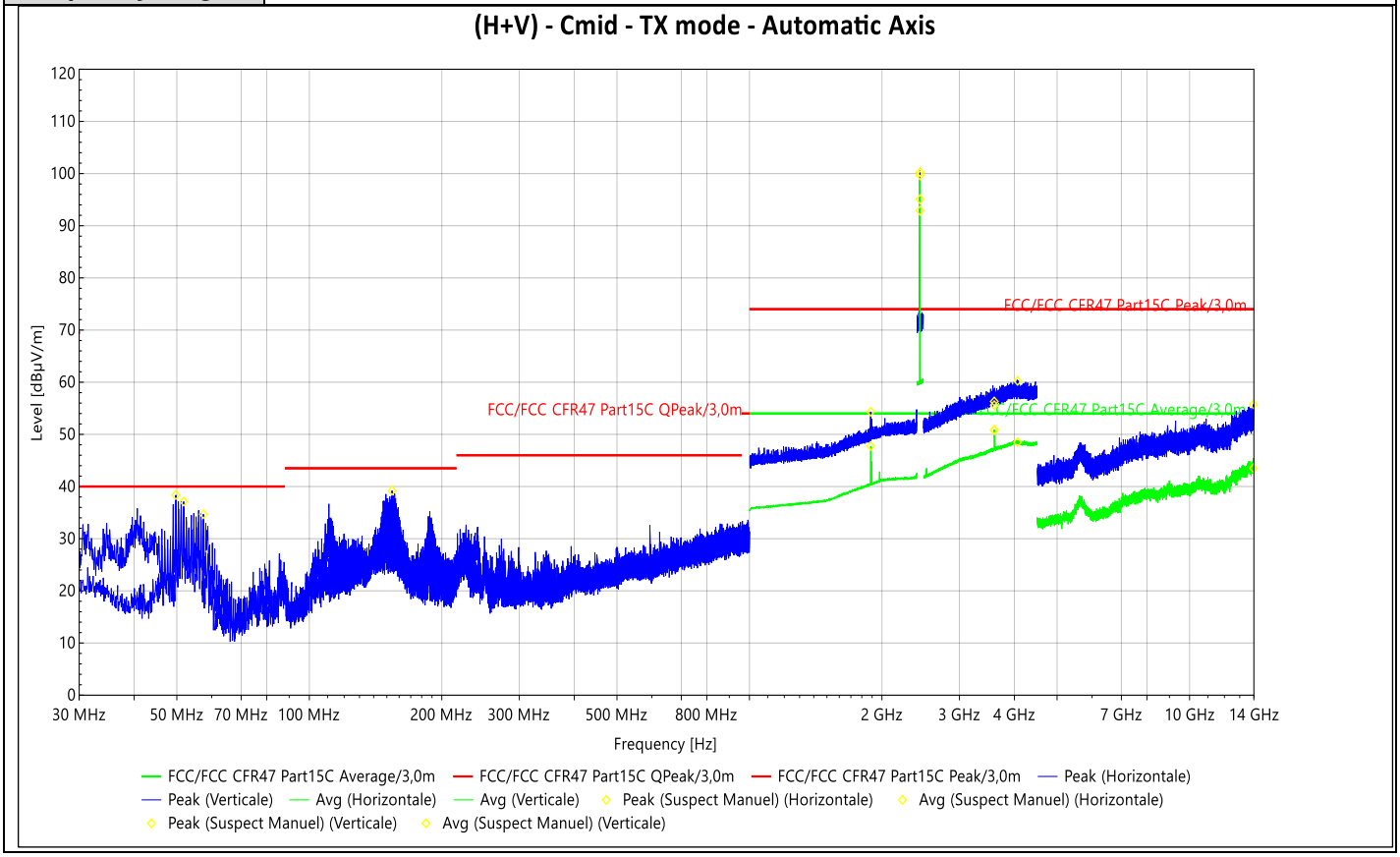



## Pre-Characterization:

| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Avg (dBµV/m) | Lim.Avg (dBµV/m) | Lim.QP (dBµV/m) | Angle (°) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|---|---|---|
| 111.5285 MHz | 38.02 | | | | 43.50 | 330 | H | 18.96 |
| 4.0107971 GHz | 60.32 | 74.00 | 48.72 | 54.00 | | 123 | H | 41.73 |
| 13.6276 GHz | 55.73 | 74.00 | 44.05 | 54.00 | | 292 | H | -5.71 |
| 3.599834399 GHz | 54.28 | 74.00 | 48.99 | 54.00 | | 123 | V | 40.39 |
| 2.40212925 GHz* | 99.95 | 74.00 | 94.00 | 54.00 | | 342 | V | 35.71 |
| 41.3975 MHz | 35.60 | | | | 40.00 | 0 | V | 16.00 |
| 50.467 MHz | 36.81 | | | | 40.00 | 314 | V | 12.04 |
| 56.772 MHz | 39.14 | | | | 40.00 | 111 | V | 10.48 |

*Carrier frequency
No significant frequency observed due to RF module see the EMC test report (30 MHz to1GHz)

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#14 |
| **Frequency range:** | 30 MHz to 14 GHz |

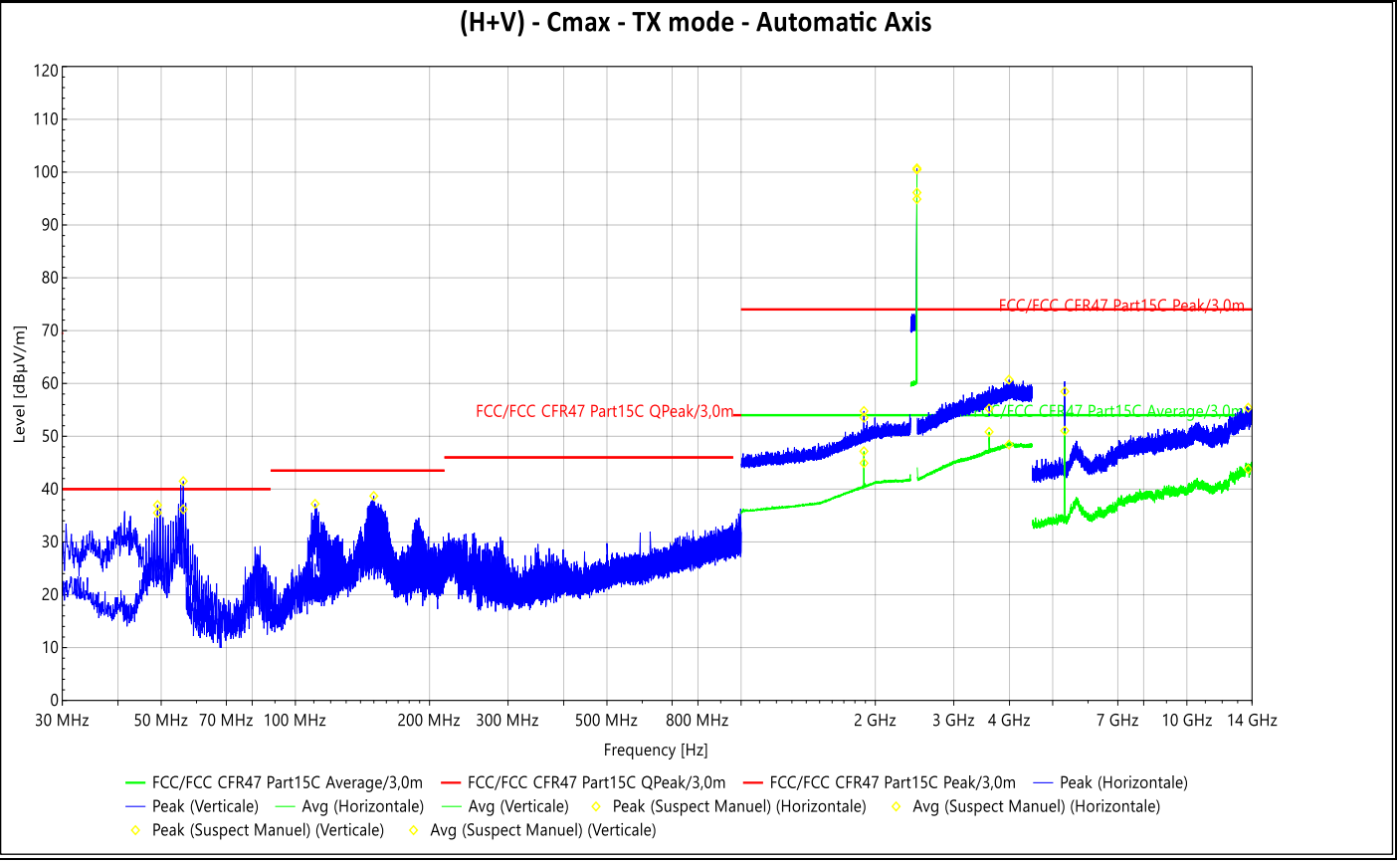



## Pre-Characterization:

| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Avg (dBµV/m) | Lim.Avg (dBµV/m) | Lim.QP (dBµV/m) | Angle (°) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|---|---|---|
| 2.44020525 GHz* | 99.67 | 74.00 | 92.88 | 54.00 | | 143 | H | 35.77 |
| 51.825 MHz | 37.12 | | | | 40.00 | 183 | H | 11.61 |
| 3.599834399 GHz | 55.58 | 74.00 | 50.81 | 54.00 | | 191 | H | 40.39 |
| 13.96485 GHz | 55.75 | 74.00 | 43.52 | 54.00 | | 23 | V | -4.22 |
| 3.599834399 GHz | 56.31 | 74.00 | 50.90 | 54.00 | | 0 | V | 40.39 |
| 4.0664525 GHz | 60.26 | 74.00 | 48.52 | 54.00 | | 259 | V | 41.66 |
| 2.44020525 GHz | 100.26 | 74.00 | 95.08 | 54.00 | | 18 | V | 35.77 |
| 1.8855 GHz | 54.34 | 74.00 | 47.78 | 54.00 | | 84 | V | 34.66 |
| 49.7395 MHz | 38.37 | | | | 40.00 | 295 | V | 12.30 |
| 57.451 MHz | 34.71 | | | | 40.00 | 259 | V | 10.39 |
| 154.16 MHz | 39.22 | | | | 43.50 | 115 | V | 24.06 |

*Carrier frequency
No significant frequency observed due to RF module see the EMC test report (30 MHz to1GHz)

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#15 |
| **Frequency range:** | 30 MHz to 14 GHz |

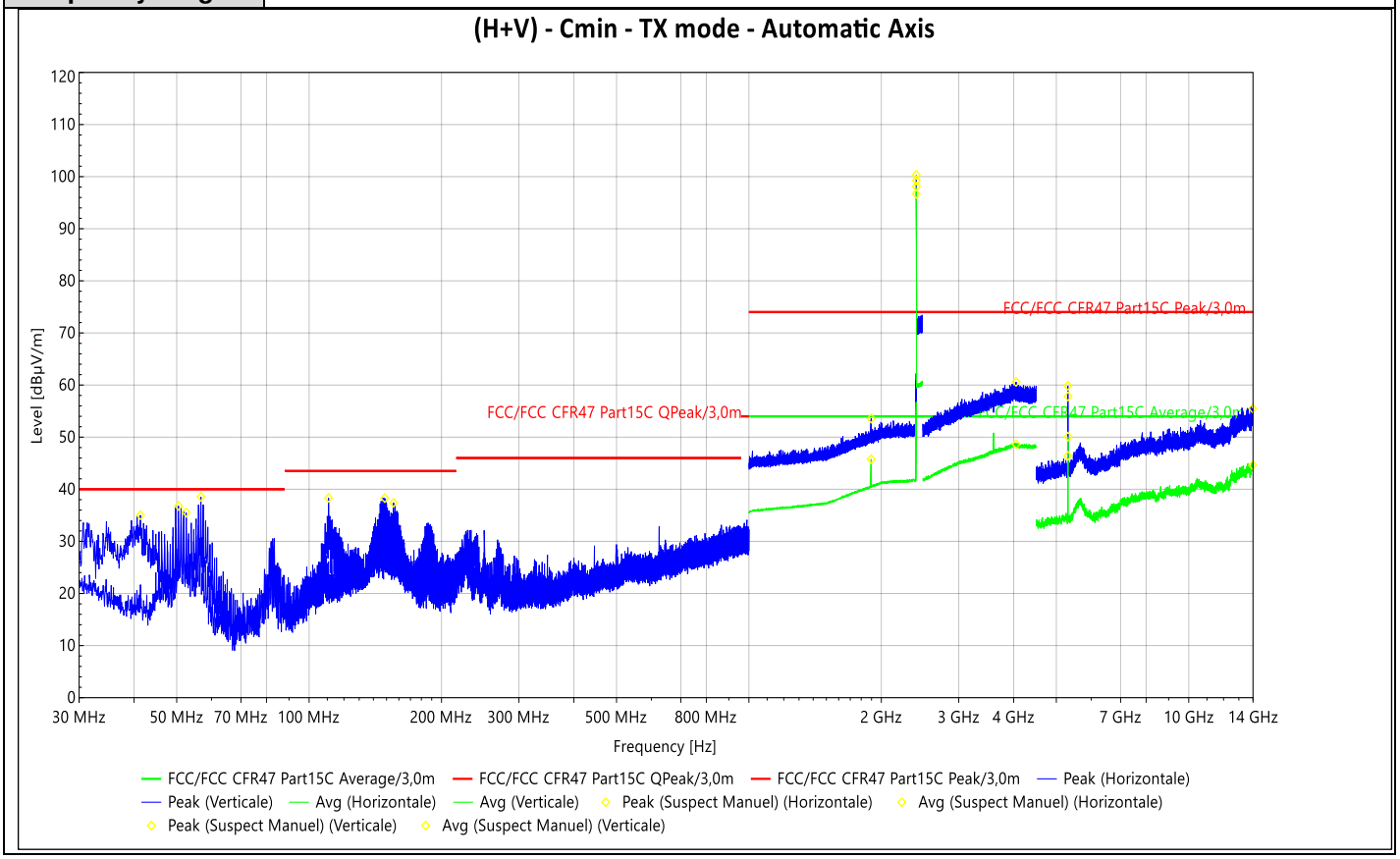



## Pre-Characterization:

| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Avg (dBµV/m) | Lim.Avg (dBµV/m) | Lim.QP (dBµV/m) | Angle (°) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|---|---|---|
| 2.48016 GHz | 100.48 | 74.00 | 94.88 | 54.00 | | 356 | H | 35.77 |
| 49.0605 MHz | 35.51 | | | | 40.00 | 165 | H | 12.56 |
| 56.0445 MHz | 36.18 | | | | 40.00 | 118 | H | 10.62 |
| 110.7525 MHz | 37.21 | | | | 43.50 | 316 | H | 18.78 |
| 1.88585 GHz | 53.52 | 74.00 | 44.92 | 54.00 | | 111 | H | 34.66 |
| 3.599834399 GHz | 55.23 | 74.00 | 50.83 | 54.00 | | 0 | H | 40.39 |
| 3.9894222 GHz | 60.72 | 74.00 | 48.43 | 54.00 | | 0 | H | 41.67 |
| 5.3227 GHz | 58.48 | 74.00 | 51.05 | 54.00 | | 2 | H | -17.52 |
| 13.725449999 GHz | 55.41 | 74.00 | 43.79 | 54.00 | | 184 | H | -5.15 |
| 2.48016 GHz | 100.74 | 74.00 | 96.13 | 54.00 | | 345 | V | 35.77 |
| 1.8855 GHz | 54.78 | 74.00 | 47.16 | 54.00 | | 139 | V | 34.66 |
| 49.0605 MHz | 36.98 | | | | 40.00 | 309 | V | 12.56 |
| 56.0445 MHz | 41.50 | | | | 40.00 | 78 | V | 10.62 |
| 149.9405 MHz | 38.69 | | | | 43.50 | 64 | V | 24.13 |

*Carrier frequency
No significant frequency observed due to RF module see the EMC test report (30 MHz to1GHz)

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#16 |
| **Frequency range:** | 30 MHz to 14 GHz |

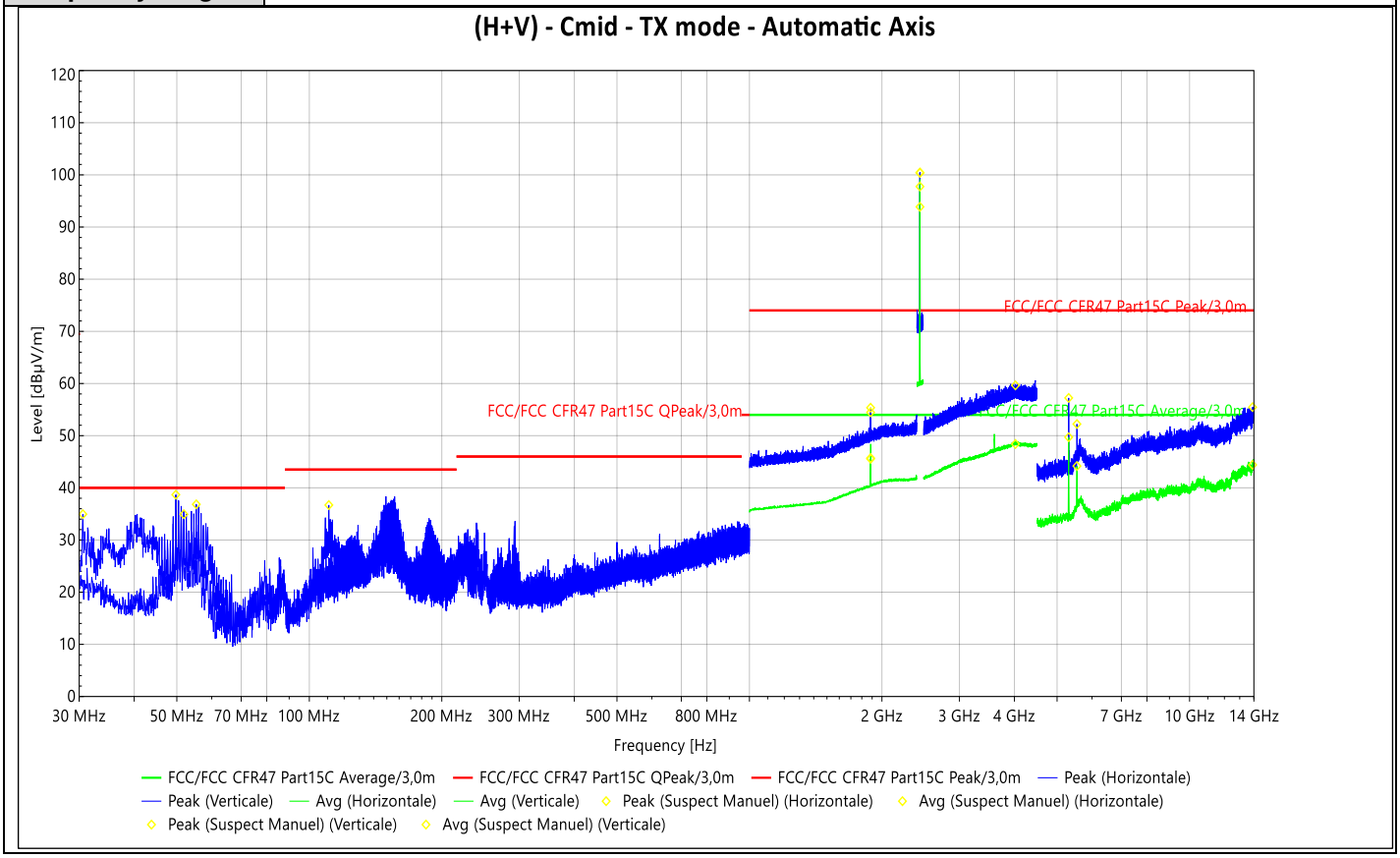



## Pre-Characterization:

| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Avg (dBµV/m) | Lim.Avg (dBµV/m) | Lim.QP (dBµV/m) | Angle (°) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|---|---|---|
| 52.5525 MHz | 35.54 | | | | 40.00 | 201 | H | 11.39 |
| 110.7525 MHz | 38.34 | | | | 43.50 | 265 | H | 18.78 |
| 2.4017535 GHz* | 100.31 | 74.00 | 96.69 | 54.00 | | 156 | H | 35.71 |
| 4.0503205 GHz | 60.60 | 74.00 | 48.64 | 54.00 | | 354 | H | 41.70 |
| 5.31225 GHz | 59.86 | 74.00 | 46.40 | 54.00 | | 100 | V | -17.57 |
| 5.317 GHz | 57.81 | 74.00 | 50.10 | 54.00 | | 178 | V | -17.55 |
| 13.967699999 GHz | 55.53 | 74.00 | 44.61 | 54.00 | | 241 | V | -4.20 |
| 2.40171175 GHz* | 99.28 | 74.00 | 98.09 | 54.00 | | 42 | V | 35.71 |
| 1.896 GHz | 53.57 | 74.00 | 45.79 | 54.00 | | 124 | V | 34.74 |
| 41.349 MHz | 35.02 | | | | 40.00 | 329 | V | 16.03 |
| 50.467 MHz | 36.80 | | | | 40.00 | 280 | V | 12.04 |
| 56.772 MHz | 38.56 | | | | 40.00 | 107 | V | 10.48 |
| 148.5825 MHz | 38.30 | | | | 43.50 | 136 | V | 24.17 |
| 155.615 MHz | 37.42 | | | | 43.50 | 164 | V | 23.83 |

*Carrier frequency
No significant frequency observed due to RF module see the EMC test report (30 MHz to1GHz)

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#17 |
| **Frequency range:** | 30 MHz to 14 GHz |

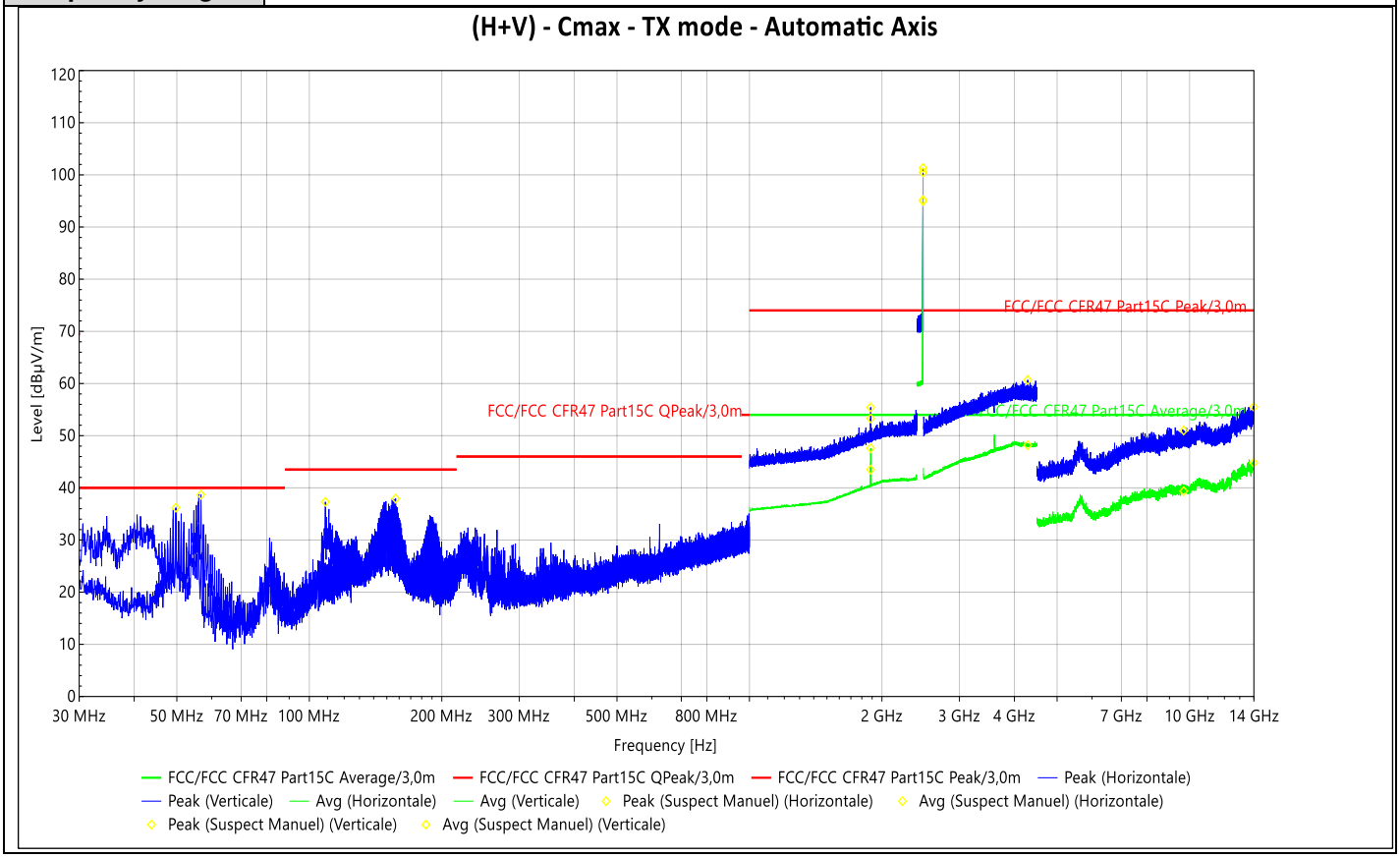



## Pre-Characterization:

| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Avg (dBµV/m) | Lim.Avg (dBµV/m) | Lim.QP (dBµV/m) | Angle (°) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|---|---|---|
| 2.439746 GHz* | 100.38 | 74.00 | 97.76 | 54.00 | | 156 | H | 35.77 |
| 51.8735 MHz | 34.94 | | | | 40.00 | 210 | H | 11.59 |
| 110.7525 MHz | 36.70 | | | | 43.50 | 331 | H | 18.78 |
| 1.8848 GHz | 54.47 | 74.00 | 45.56 | 54.00 | | 0 | H | 34.65 |
| 5.3132 GHz | 57.24 | 74.00 | 49.71 | 54.00 | | 282 | V | -17.57 |
| 5.5469 GHz | 52.22 | 74.00 | 44.19 | 54.00 | | 220 | V | -15.59 |
| 13.9069 GHz | 55.47 | 74.00 | 44.41 | 54.00 | | 68 | V | -4.51 |
| 4.0212829 GHz | 59.65 | 74.00 | 48.41 | 54.00 | | 232 | V | 41.72 |
| 2.4401635 GHz* | 100.44 | 74.00 | 93.87 | 54.00 | | 18 | V | 35.77 |
| 1.8848 GHz | 55.36 | 74.00 | 45.71 | 54.00 | | 271 | V | 34.65 |
| 30.582 MHz | 34.95 | | | | 40.00 | 208 | V | 21.66 |
| 49.7395 MHz | 38.69 | | | | 40.00 | 281 | V | 12.30 |
| 55.3655 MHz | 36.84 | | | | 40.00 | 144 | V | 10.72 |

*Carrier frequency
No significant frequency observed due to RF module see the EMC test report (30 MHz to1GHz)

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#18 |
| **Frequency range:** | 30 MHz to 14 GHz |




## Pre-Characterization:

| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Avg (dBµV/m) | Lim.Avg (dBµV/m) | Lim.QP (dBµV/m) | Angle (°) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|---|---|---|
| 2.479993 GHz* | 101.32 | 74.00 | 95.17 | 54.00 | | 181 | H | 35.77 |
| 108.764 MHz | 37.31 | | | | 43.50 | 325 | H | 18.37 |
| 1.8848 GHz | 53.30 | 74.00 | 43.50 | 54.00 | | 310 | H | 34.65 |
| 4.2882675 GHz | 60.69 | 74.00 | 48.17 | 54.00 | | 115 | H | 41.51 |
| 9.69745 GHz | 51.00 | 74.00 | 39.37 | 54.00 | | 105 | H | -11.37 |
| 13.9886 GHz | 55.52 | 74.00 | 44.80 | 54.00 | | 89 | H | -3.99 |
| 2.48016 GHz | 100.48 | 74.00 | 94.97 | 54.00 | | 343 | V | 35.77 |
| 1.88515 GHz | 55.44 | 74.00 | 47.60 | 54.00 | | 0 | V | 34.66 |
| 49.7395 MHz | 36.20 | | | | 40.00 | 323 | V | 12.30 |
| 56.7235 MHz | 38.68 | | | | 40.00 | 285 | V | 10.49 |
| 157.07 MHz | 37.94 | | | | 43.50 | 27 | V | 23.59 |

*Carrier frequency
No significant frequency observed due to RF module see the EMC test report (30 MHz to1GHz)

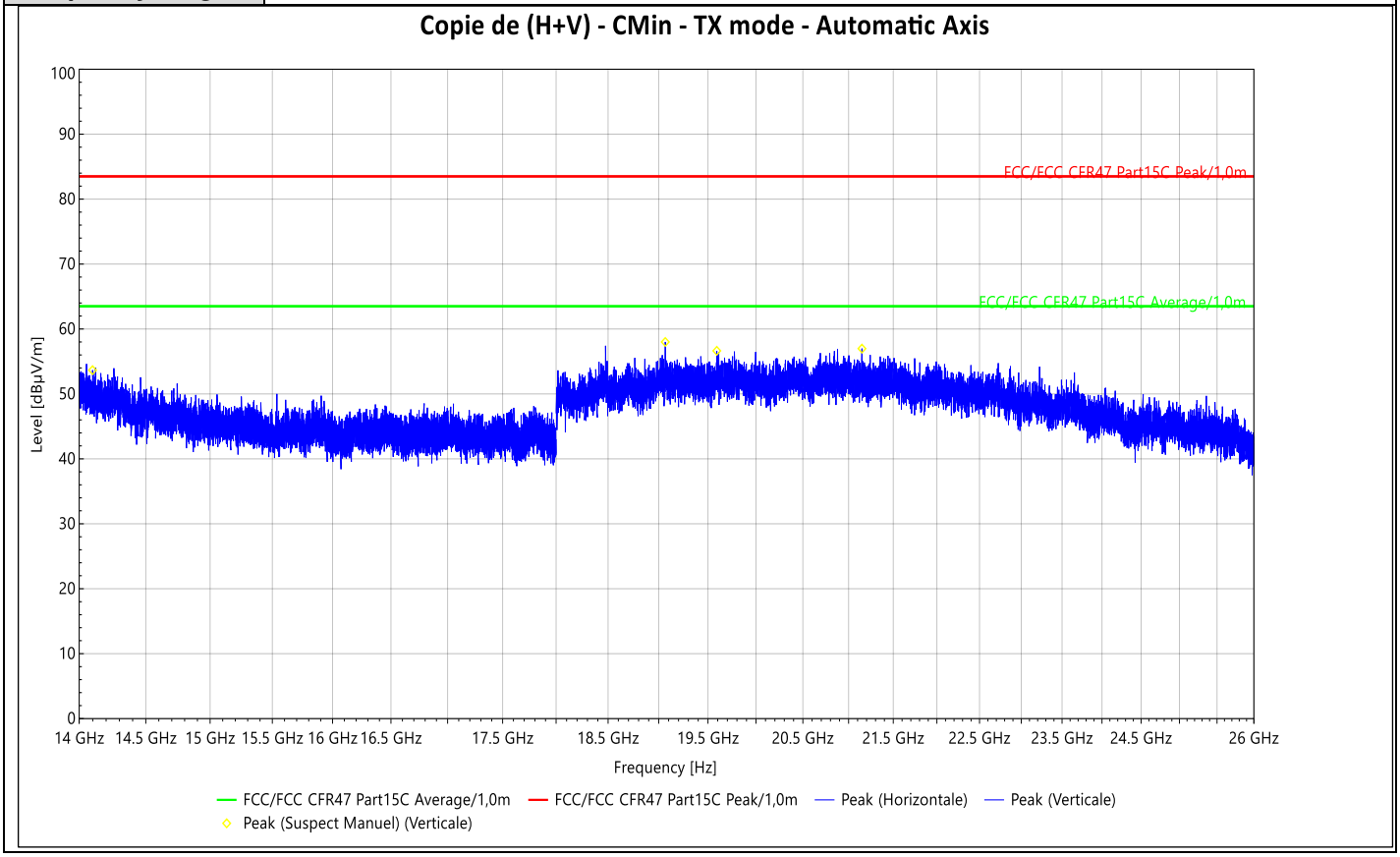
| Test Frequency (MHz) | Meter Reading dB(µV) | Detector (Pk/QP/Av) | Transducer Factor (dB) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|
| 39.021 | 24.0 | QP | 14.0 | 38.0 | 40.0 | -2.0 |
| 41.2035 | 23.7 | QP | 13.8 | 37.5 | 40.0 | -2.5 |
| 38.9725 | 22.6 | QP | 14.0 | 36.6 | 40.0 | -3.4 |
| 44.8895 | 21.8 | QP | 13.2 | 35.0 | 40.0 | -5.0 |
| 41.155 | 24.6 | QP | 13.8 | 38.4 | 40.0 | -1.6 |
| 36.693 | 23.3 | QP | 14.1 | 37.4 | 40.0 | -2.6 |
| 39.5545 | 24.2 | QP | 14.0 | 38.2 | 40.0 | -1.8 |
| 41.4945 | 22.5 | QP | 13.8 | 36.3 | 40.0 | -3.7 |
| 40.6215 | 23.4 | QP | 13.9 | 37.3 | 40.0 | -2.7 |
| 40.4760 | 24.0 | QP | 13.9 | 37.9 | 40.0 | -2.1 |
| 64.9685 | 22.2 | QP | 7.9 | 30.1 | 40.0 | -9.9 |
| 35.9170 | 24.2 | QP | 14.2 | 38.4 | 40.0 | -1.6 |
| 38.7785 | 23.1 | QP | 14.0 | 37.1 | 40.0 | -2.9 |
| 40.3305 | 23.3 | QP | 13.9 | 37.2 | 40.0 | -2.8 |
| 56.0445 | 23.7 | QP | 10.4 | 34.1 | 40.0 | -5.9 |
| 112.7895 | 24.3 | QP | 12.7 | 37.0 | 43.5 | -6.5 |
| 31.9885 | 23.0 | QP | 13.9 | 36.9 | 40.0 | -3.1 |
| 60.2155 | 23.6 | QP | 9.1 | 32.7 | 40.0 | -7.3 |
| 150.668 | 23.4 | QP | 18.9 | 42.3 | 43.5 | -1.2 |
| 183.5995 | 23.9 | QP | 16.3 | 40.2 | 43.5 | -3.3 |
| 58.8575 | 23.2 | QP | 9.5 | 32.7 | 40.0 | -7.3 |
| 141.5985 | 22.8 | QP | 17.5 | 40.3 | 43.5 | -3.2 |

### 11.6.1. 14GHz to 25GHz

**Graphs – Pre characterization:**

| Graph identifier | | Polarization | Mode | Channel | EUT position | Comments |
|---|---|---|---|---|---|---|
| Emr# | 1 | H/V | TX | Cmin | Axis XY/Z | DH5 |
| Emr# | 2 | H/V | TX | Cmid | Axis XY/Z | DH5 |
| Emr# | 3 | H/V | TX | Cmax | Axis XY/Z | DH5 |
| Emr# | 4 | H/V | TX | Cmin | Axis XY/Z | 2DH5 |
| Emr# | 5 | H/V | TX | Cmid | Axis XY/Z | 2DH5 |
| Emr# | 6 | H/V | TX | Cmax | Axis XY/Z | 2DH5 |
| Emr# | 7 | H/V | TX | Cmin | Axis XY/Z | 3DH5 |
| Emr# | 8 | H/V | TX | Cmid | Axis XY/Z | 3DH5 |
| Emr# | 9 | H/V | TX | Cmax | Axis XY/Z | 3DH5 |

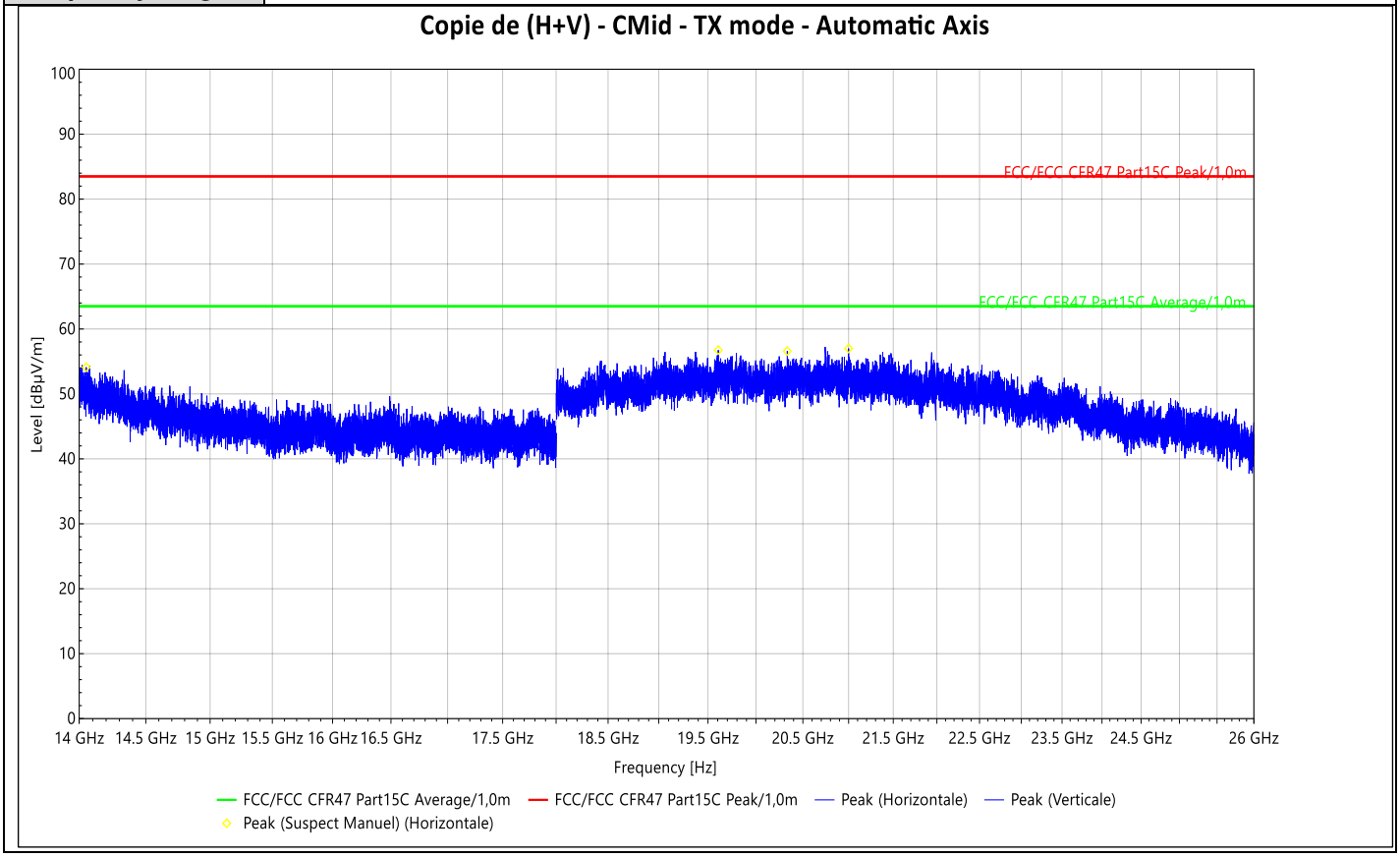
| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#1 |
| **Frequency range:** | 14 GHz to 26 GHz |




| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Lim.Avg (dBµV/m) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|
| 14.099 GHz | 53.66 | 83.50 | 63.50 | V | 2.97 |
| 19.066 GHz | 58.00 | 83.50 | 63.50 | V | 4.08 |
| 19.591 GHz | 56.64 | 83.50 | 63.50 | V | 3.68 |
| 21.148 GHz | 56.98 | 83.50 | 63.50 | V | 2.63 |

No significant frequency observed

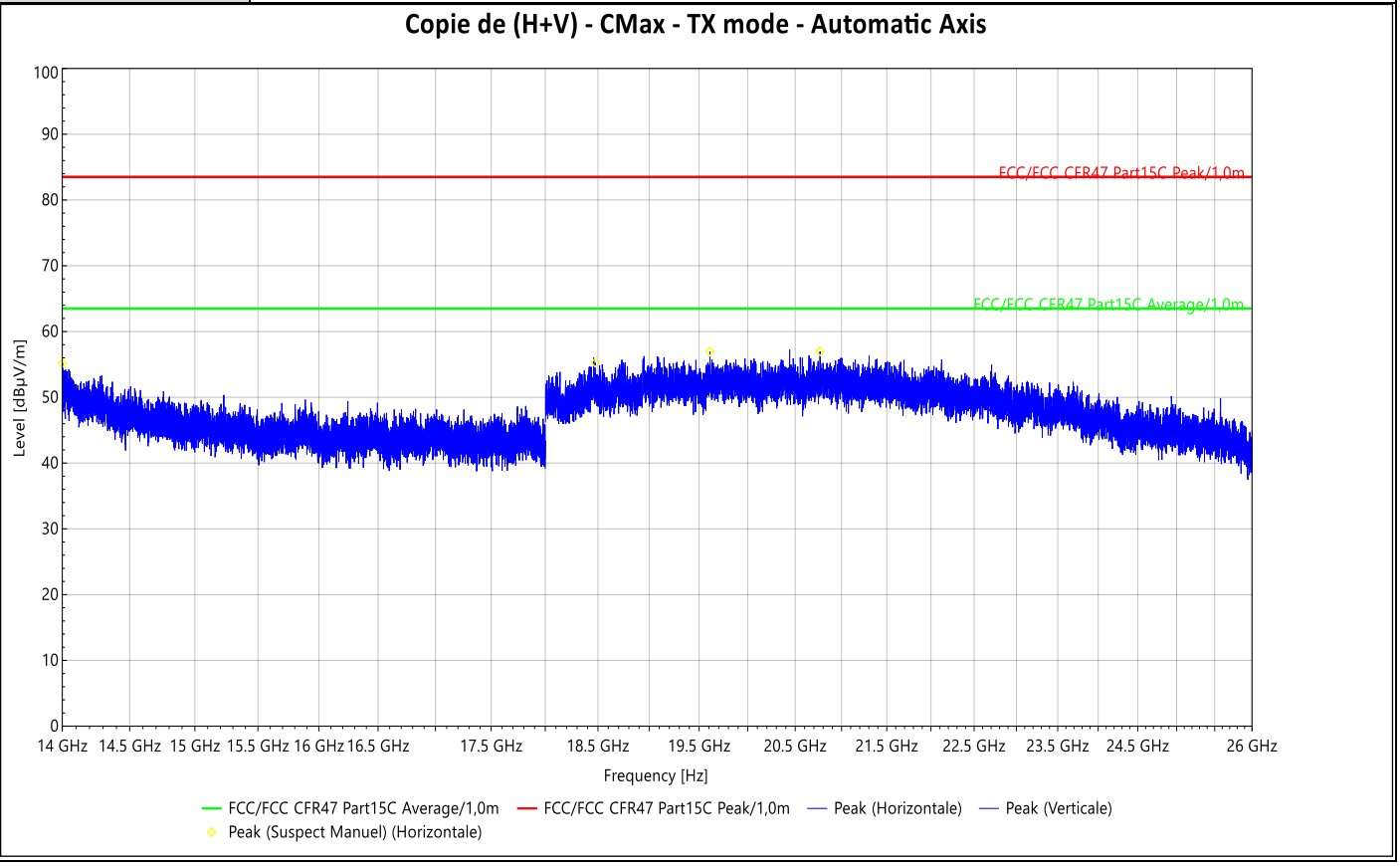
| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#2 |
| **Frequency range:** | 14 GHz to 26 GHz |




| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Lim.Avg (dBµV/m) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|
| 14.052 GHz | 54.11 | 83.50 | 63.50 | H | 3.32 |
| 19.606 GHz | 56.74 | 83.50 | 63.50 | H | 3.75 |
| 20.332 GHz | 56.60 | 83.50 | 63.50 | H | 3.40 |
| 21GHz | 57.00 | 83.50 | 63.50 | H | 3.13 |

No significant frequency observed

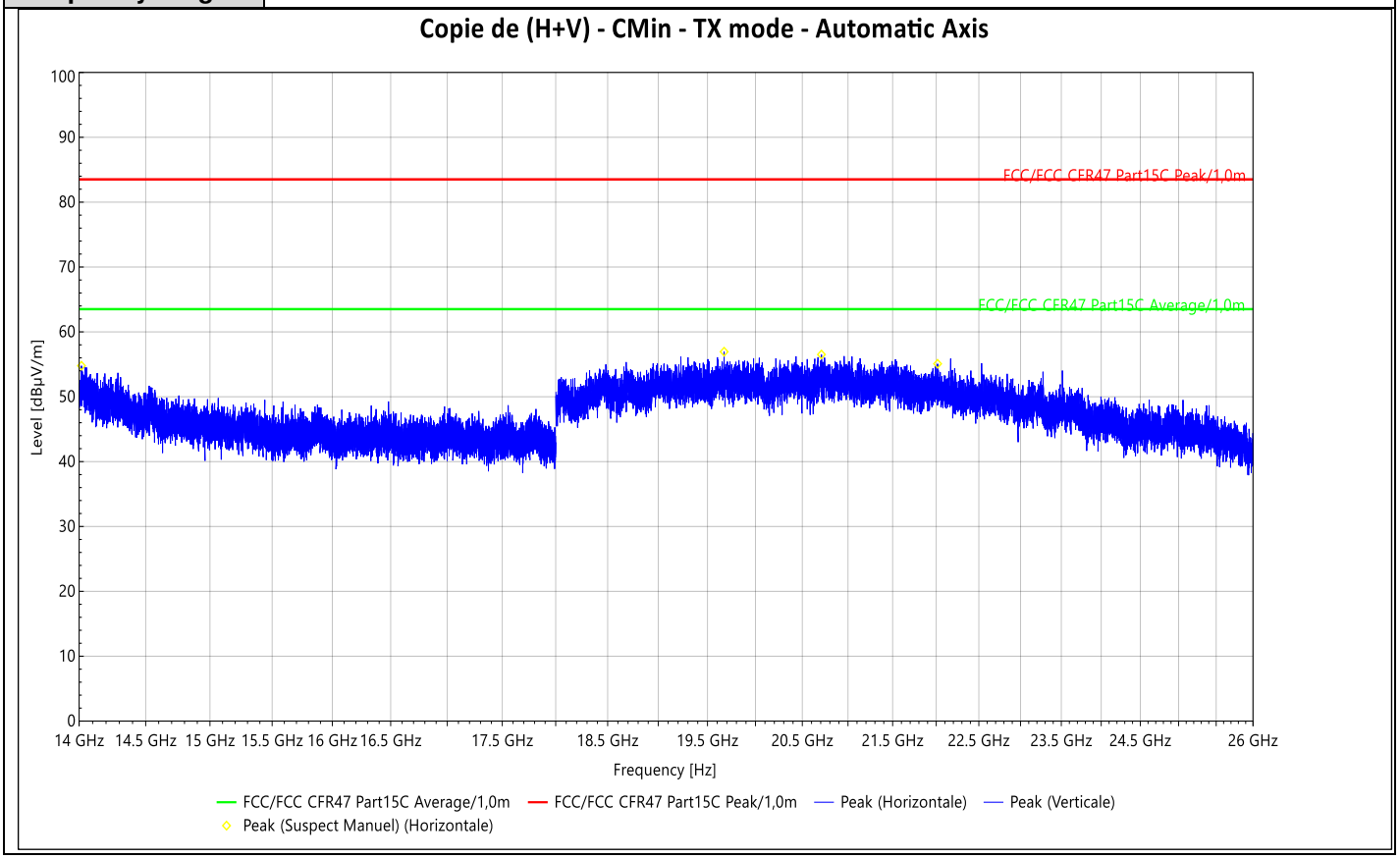
| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#3 |
| **Frequency range:** | 14 GHz to 26 GHz |




| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Lim.Avg (dBµV/m) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|
| 14.001 GHz | 55.22 | 83.50 | 63.50 | H | 3.62 |
| 18.473 GHz | 55.28 | 83.50 | 63.50 | H | 3.41 |
| 19.61 GHz | 56.95 | 83.50 | 63.50 | H | 3.75 |
| 20.766 GHz | 56.97 | 83.50 | 63.50 | H | 2.55 |

No significant frequency observed

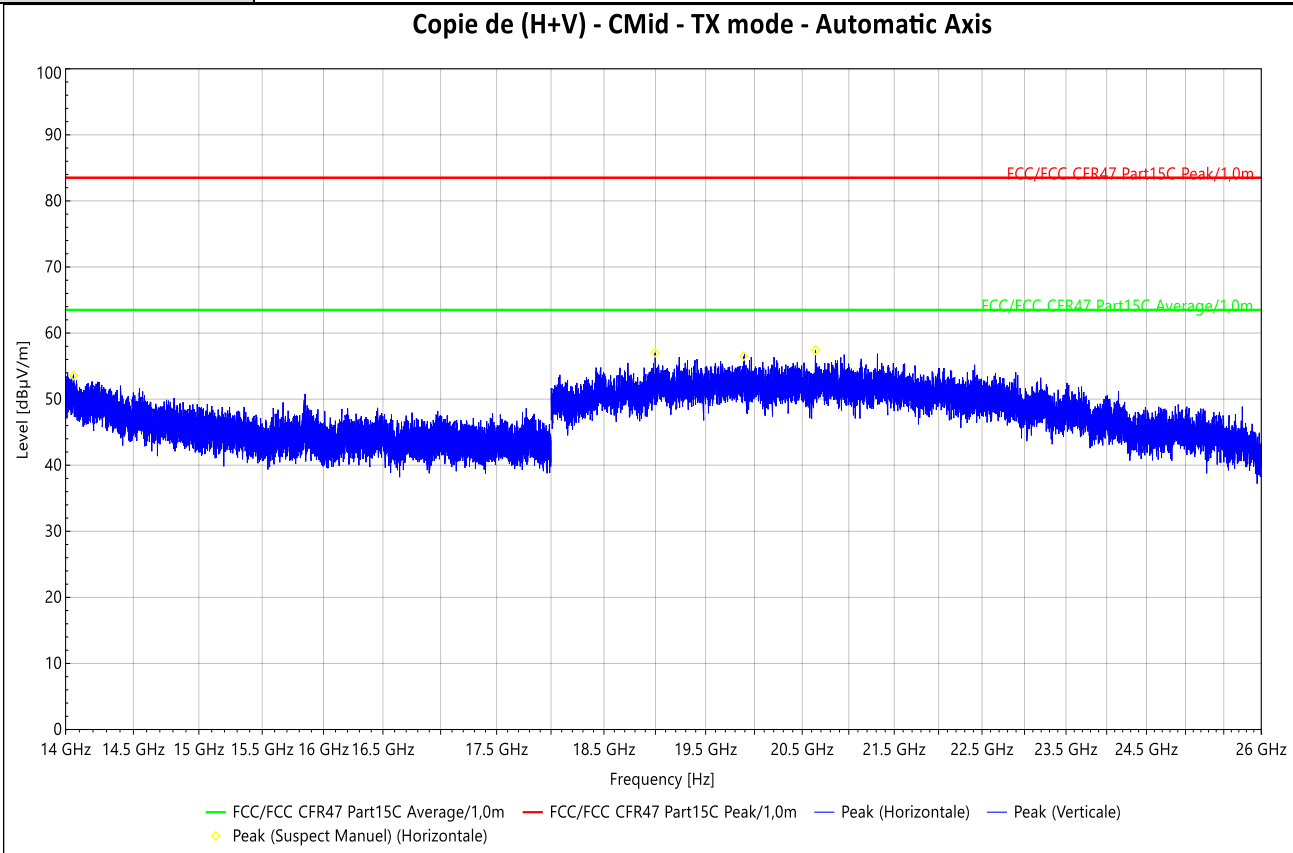
| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#4 |
| **Frequency range:** | 14 GHz to 26 GHz |




| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Lim.Avg (dBµV/m) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|
| 14.017 GHz | 54.78 | 83.50 | 63.50 | H | 3.53 |
| 19.672 GHz | 56.94 | 83.50 | 63.50 | H | 3.76 |
| 20.708 GHz | 56.51 | 83.50 | 63.50 | H | 2.50 |
| 22.016 GHz | 55.08 | 83.50 | 63.50 | H | 2.19 |

No significant frequency observed

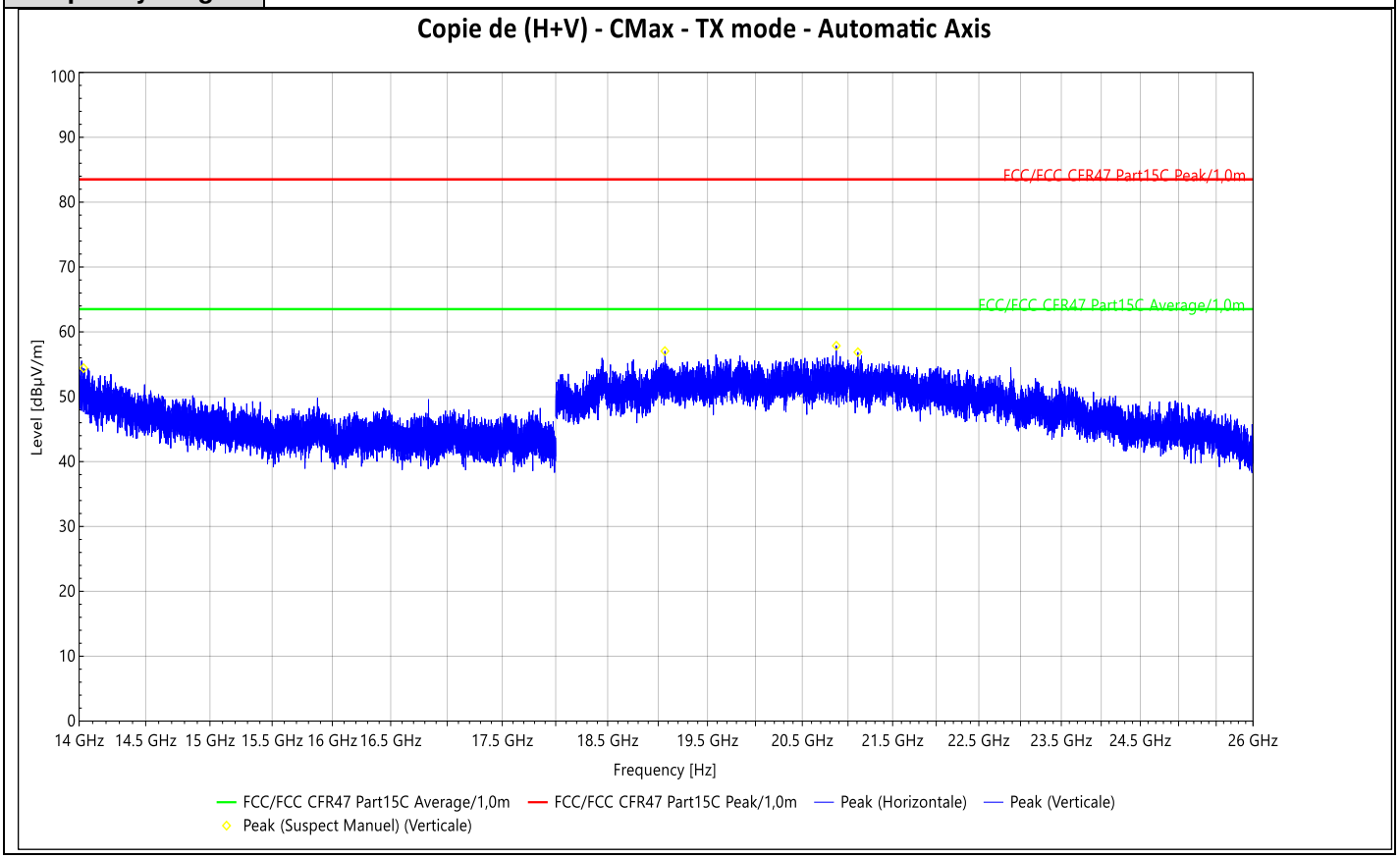
| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#5 |
| **Frequency range:** | 14 GHz to 26 GHz |




| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Lim.Avg (dBµV/m) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|
| 14.057 GHz | 53.58 | 83.50 | 63.50 | H | 3.28 |
| 18.996 GHz | 57.02 | 83.50 | 63.50 | H | 3.84 |
| 19.887 GHz | 56.50 | 83.50 | 63.50 | H | 3.56 |
| 20.642 GHz | 57.42 | 83.50 | 63.50 | H | 2.41 |

No significant frequency observed

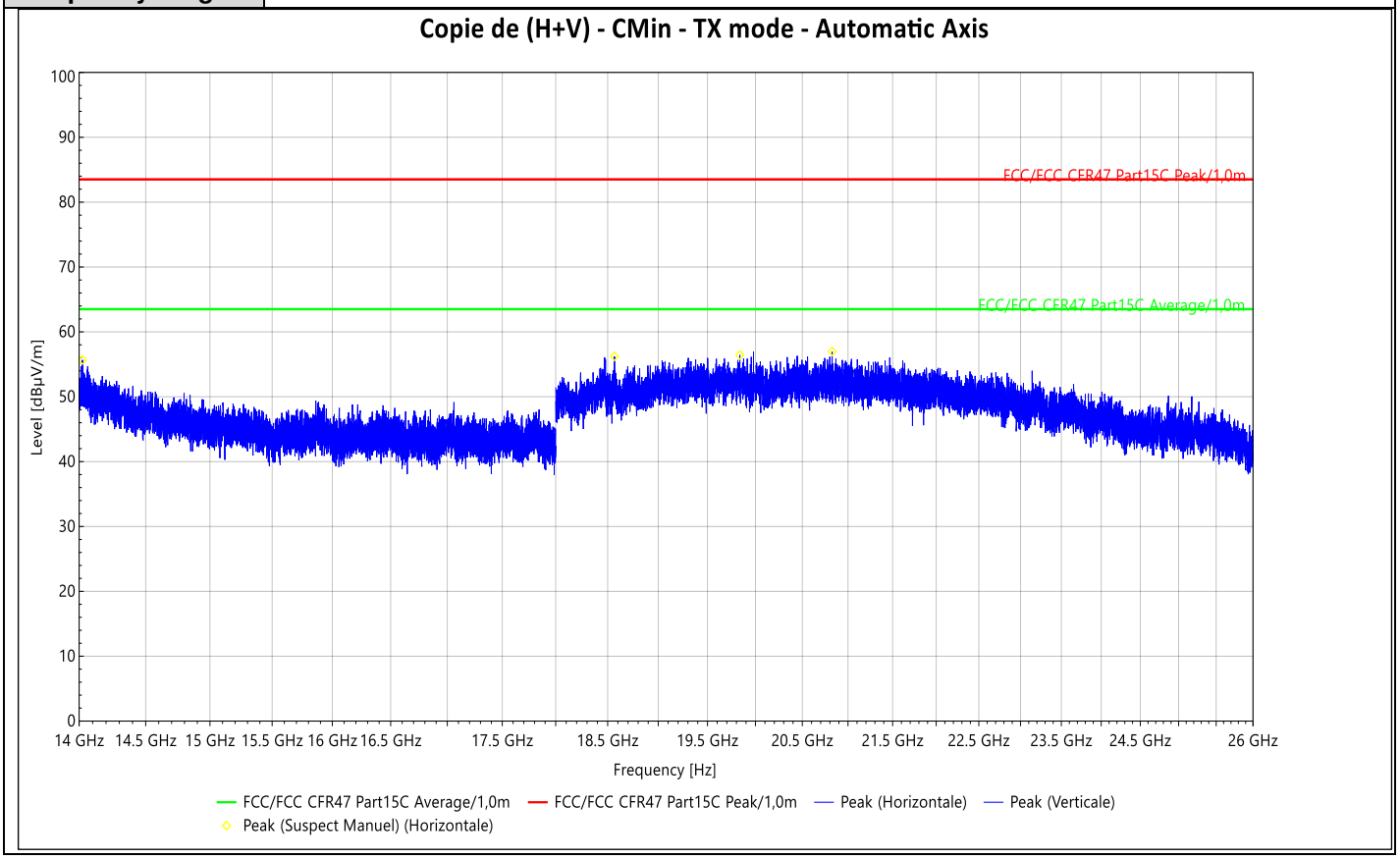
| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#6 |
| **Frequency range:** | 14 GHz to 26 GHz |




| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Lim.Avg (dBµV/m) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|
| 14.033 GHz | 54.41 | 83.50 | 63.50 | V | 3.44 |
| 19.067 GHz | 57.04 | 83.50 | 63.50 | V | 4.08 |
| 20.871 GHz | 57.86 | 83.50 | 63.50 | V | 2.76 |
| 21.11 GHz | 56.87 | 83.50 | 63.50 | V | 2.72 |

No significant frequency observed

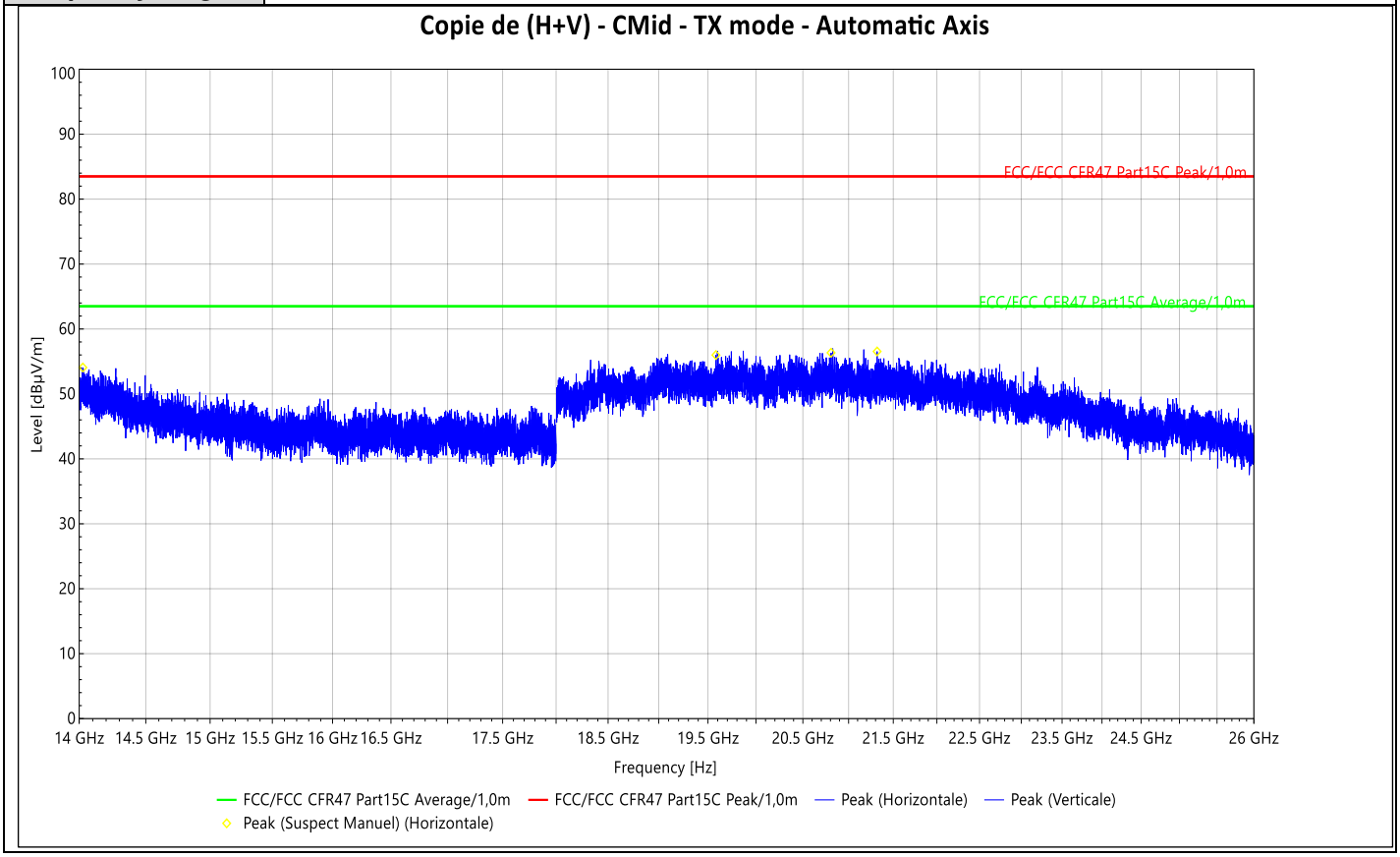
| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#7 |
| **Frequency range:** | 14 GHz to 26 GHz |




| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Lim.Avg (dBµV/m) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|
| 14.0245 GHz | 55.68 | 83.50 | 63.50 | H | 3.48 |
| 18.567 GHz | 56.22 | 83.50 | 63.50 | H | 2.91 |
| 19.836 GHz | 56.44 | 83.50 | 63.50 | H | 3.78 |
| 20.825 GHz | 56.98 | 83.50 | 63.50 | H | 2.65 |

No significant frequency observed

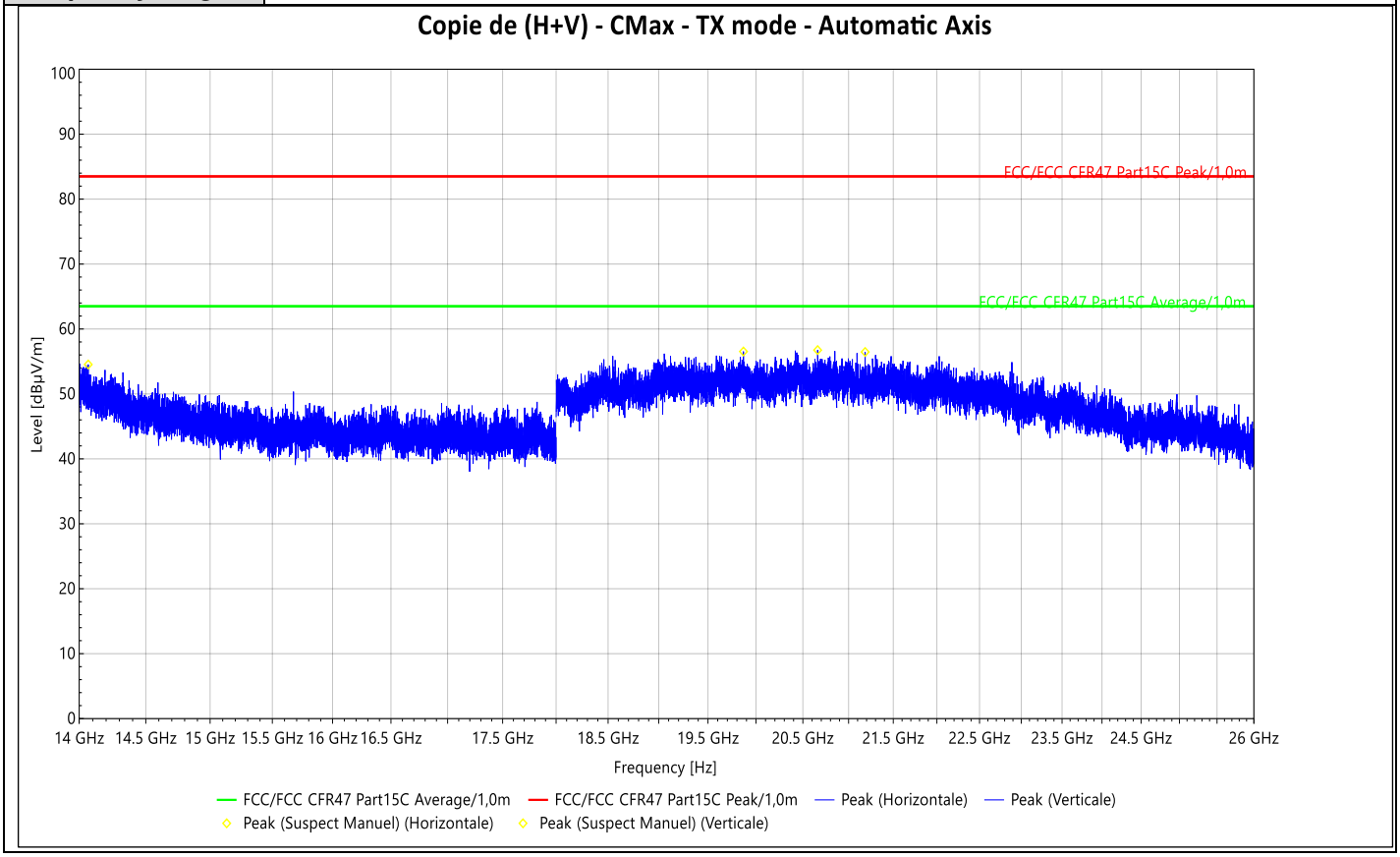
| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#8 |
| **Frequency range:** | 14 GHz to 26 GHz |




| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Lim.Avg (dBµV/m) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|
| 14.027 GHz | 54.07 | 83.50 | 63.50 | H | 3.47 |
| 19.582 GHz | 55.99 | 83.50 | 63.50 | H | 3.62 |
| 20.807 GHz | 56.34 | 83.50 | 63.50 | H | 2.60 |
| 21.318 GHz | 56.54 | 83.50 | 63.50 | H | 2.55 |

No significant frequency observed

| Radiated Emissions | |
|---|---|
| **Graph name:** | Emr#9 |
| **Frequency range:** | 14 GHz to 26 GHz |




| Frequency | PK Level (dBµV/m) | Lim.PK (dBµV/m) | Lim.Avg (dBµV/m) | Polar. | Correct. (dB) |
|---|---|---|---|---|---|
| 14.067 GHz | 54.53 | 83.50 | 63.50 | H | 3.21 |
| 19.868 GHz | 56.53 | 83.50 | 63.50 | V | 3.67 |
| 20.66 GHz | 56.75 | 83.50 | 63.50 | V | 2.43 |
| 21.184 GHz | 56.46 | 83.50 | 63.50 | V | 2.54 |

No significant frequency observed

## 11.7. CONCLUSION

Unwanted Emission in restricted frequency bands measurement performed on the sample of the product **INGENICO AXIUM RX9000**, SN: **2419MR900209** / **2419MR900267**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.247 & RSS 247 ISSUE 3 limits.

## 12. UNCERTAINTIES CHART

| **Type de mesure / *Kind of measurement*** | **Incertitude élargie laboratoire / *Wide uncertainty laboratory* (k=2) ± x** | **Incertitude limite du CISPR / *CISPR uncertainty limit* ± y** |
|---|---|---|
| *Measurement of conducted disturbances in voltage on the power port* | 3.29dB | 3.4 dB |
| *Measurement of conducted disturbances in voltage on the telecommunication port.* | 3.26 dB | 5dB |
| *Measurement of discontinuous conducted disturbances in voltage* | 3.33 dB | 3.4 dB |
| *Measurement of conducted disturbances in current* | 2.67 dB | 2.9dB |
| *Spurious emission, radiated (Semi anechoic chamber & open test site)* | *5.60 dB* | *6 dB* |
| *Spurious emission, radiated (Full anechoic chamber above 1GHz)* | *±3.8 dB* | *±6 dB* |
| *Occupied Channel Bandwidth* | *±2.8 %* | *±5 %* |
| *RF power, conducted* | *±1.2 dB* | *±1.5 dB* |
| *Power Spectral Density, Conducted* | *±1.7 dB* | *±3 dB* |
| *Spurious emission, conducted* | *±2.3 dB* | *±3 dB* |
| *Temperature* | *±0.75 °C* | *±3 °C* |
| *Supply Voltages* | *±1.7 %* | *±3 %* |
| *Time* | *±2.3 %* | *±5 %* |

Les valeurs d'incertitudes calculées du laboratoire étant inférieures aux valeurs d'incertitudes limites établies par la norme, la conformité de l'échantillon est établie directement par les niveaux limites applicables. / *The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the standard. The conformity of the sample is directly established by the applicable limits values.*