



LCIE

Bluetooth Low Energy Template : Release July 2nd, 2021

# TEST REPORT

N°: 24329407-806668-A(FILE#9310523)

Version : 01

## Subject

**Radio spectrum Matters (ERM) tests according to:  
Japanese Radio Law for Article 2 paragraph 1 item (19)  
specified radio equipment categories equipment  
Article 49-20 and the relevant articles of the Ordinance Regulating  
Radio Equipment and MIC Notice No.88 Appendix No.43 Test method**

## Issued to

**STMICROELECTRONICS (Rousset) SAS**  
190 Avenue Celestin Coq  
13106 - Rousset  
FRANCE

## Apparatus under test

- ↗ Product
- ↗ Trade mark
- ↗ Manufacturer
- ↗ Model under test
- ↗ Serial number

**Bluetooth® LE and IEEE 802.15.4 radio module**  
**STMICROELECTRONICS**  
**STMICROELECTRONICS**  
**STM32WBA5MMG**  
**None**

## Conclusion

See Test Program chapter

## Test date

December 18, 2024 to December 23, 2024

## Test location

Moirans

## Composition of document

53 pages

## Document issued on

March 14, 2025

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**Tests operator**

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**Technical manager**



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## PUBLICATION HISTORY

| Version | Date           | Author        | Modification             |
|---------|----------------|---------------|--------------------------|
| 01      | March 14, 2025 | Akram HAKKARI | Creation of the document |
|         |                |               |                          |



## SUMMARY

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## 1. TEST PROGRAM

### References

Japanese Radio Law for Article 2 paragraph 1 item (19) categories equipment, as defined in Japanese Certification Ordinance

### Radio requirement:

| Description                                                                                           | Result - Comments                            |                               |                                        |                                |
|-------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------|----------------------------------------|--------------------------------|
| Communication Method                                                                                  | <input checked="" type="checkbox"/> PASS     | <input type="checkbox"/> FAIL | <input type="checkbox"/> NA            | <input type="checkbox"/> NP(1) |
| Modulation Method                                                                                     | <input checked="" type="checkbox"/> PASS     | <input type="checkbox"/> FAIL | <input type="checkbox"/> NA            | <input type="checkbox"/> NP(1) |
| Frequency Band                                                                                        | <input checked="" type="checkbox"/> PASS     | <input type="checkbox"/> FAIL | <input type="checkbox"/> NA            | <input type="checkbox"/> NP(1) |
| Antenna Power & Antenna Power Tolerance & EIRP                                                        | <input checked="" type="checkbox"/> PASS     | <input type="checkbox"/> FAIL | <input type="checkbox"/> NA            | <input type="checkbox"/> NP(1) |
| Spread Bandwidth                                                                                      | <input checked="" type="checkbox"/> PASS     | <input type="checkbox"/> FAIL | <input type="checkbox"/> NA            | <input type="checkbox"/> NP(1) |
| Spread Factor                                                                                         | <input type="checkbox"/> PASS                | <input type="checkbox"/> FAIL | <input checked="" type="checkbox"/> NA | <input type="checkbox"/> NP(1) |
| Occupied Bandwidth                                                                                    | <input checked="" type="checkbox"/> PASS     | <input type="checkbox"/> FAIL | <input type="checkbox"/> NA            | <input type="checkbox"/> NP(1) |
| Spurious Emissions Intensity                                                                          | <input checked="" type="checkbox"/> PASS     | <input type="checkbox"/> FAIL | <input type="checkbox"/> NA            | <input type="checkbox"/> NP(1) |
| Limit On Secondary Spurious Emissions                                                                 | <input checked="" type="checkbox"/> PASS     | <input type="checkbox"/> FAIL | <input checked="" type="checkbox"/> NA | <input type="checkbox"/> NP(1) |
| Antenna Gain                                                                                          | <input checked="" type="checkbox"/> PASS     | <input type="checkbox"/> FAIL | <input type="checkbox"/> NA            | <input type="checkbox"/> NP(1) |
| Half Power Beam Angle                                                                                 | <input type="checkbox"/> PASS                | <input type="checkbox"/> FAIL | <input checked="" type="checkbox"/> NA | <input type="checkbox"/> NP(1) |
| Carrier Sensing Function                                                                              | <input type="checkbox"/> PASS                | <input type="checkbox"/> FAIL | <input checked="" type="checkbox"/> NA | <input type="checkbox"/> NP(1) |
| Dwell Time                                                                                            | <input type="checkbox"/> PASS                | <input type="checkbox"/> FAIL | <input checked="" type="checkbox"/> NA | <input type="checkbox"/> NP(1) |
| Number of Carrier                                                                                     | <input type="checkbox"/> PASS                | <input type="checkbox"/> FAIL | <input checked="" type="checkbox"/> NA | <input type="checkbox"/> NP(1) |
| Housing Requirements                                                                                  | <input checked="" type="checkbox"/> PASS (2) | <input type="checkbox"/> FAIL | <input type="checkbox"/> NA            | <input type="checkbox"/> NP(1) |
| Interference Prevention Function                                                                      | <input checked="" type="checkbox"/> PASS (3) | <input type="checkbox"/> FAIL | <input type="checkbox"/> NA            | <input type="checkbox"/> NP(1) |
| This table is a summary of test report, see conclusion of each clause of this test report for detail. |                                              |                               |                                        |                                |

(1): Limited Program. Integration of a radio module already assessed

(2): The high-frequency section and modulation section cannot be easily opened

(3): The EUT sends a specific identification code to the wireless associated equipment

PASS: EUT complies with standard's requirement

FAIL: EUT does not comply with standard's requirement

NA: Not Applicable

NP: Test Not Performed

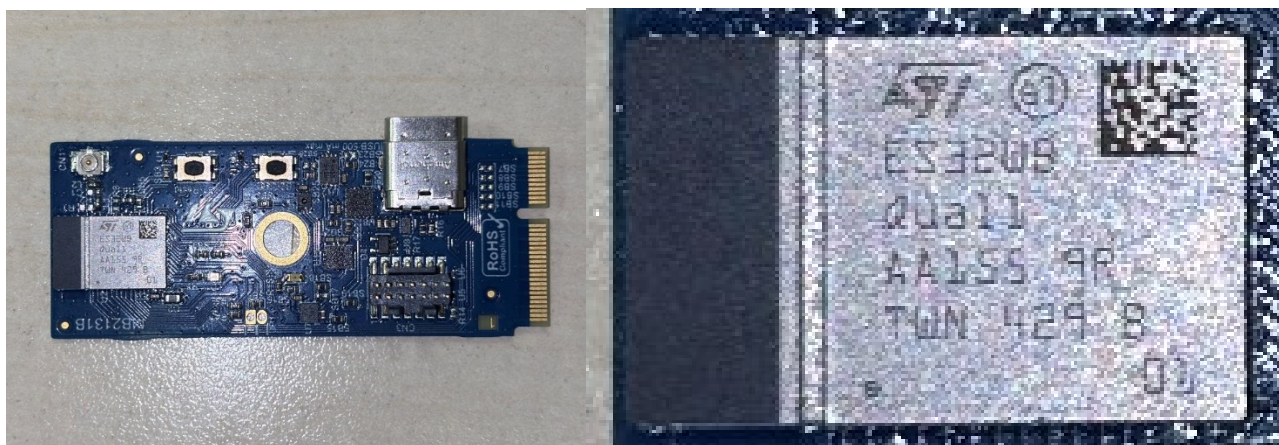
DP: Declaration of provider

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

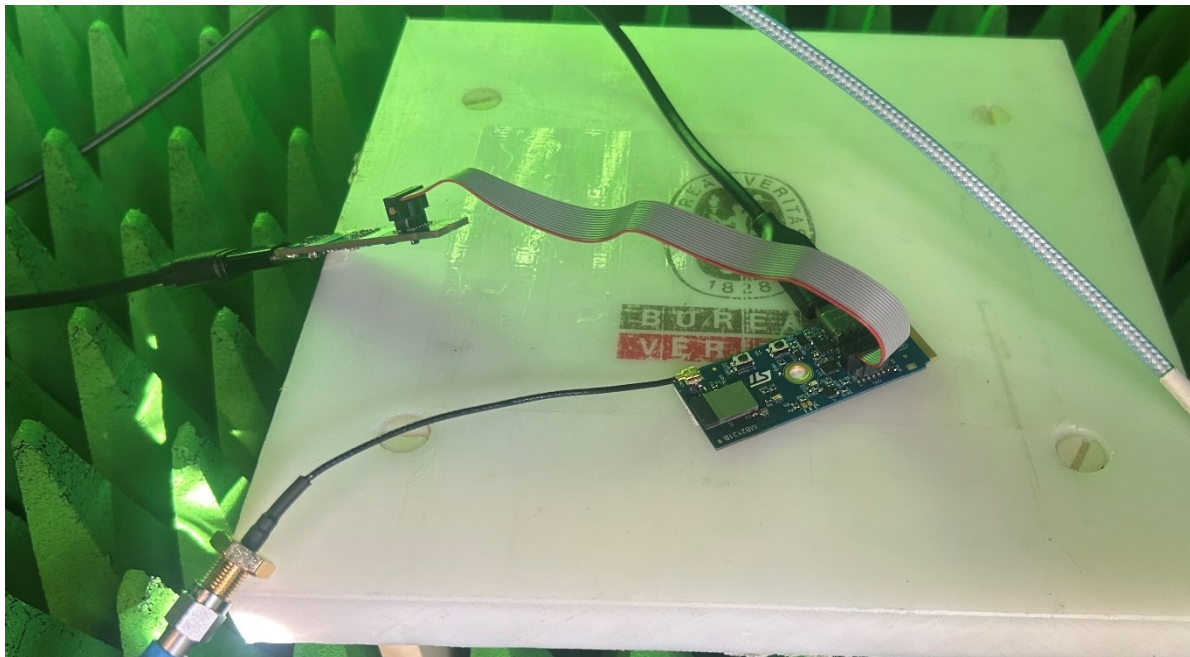
### 2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):  
STM32WBA5MMG

Serial Number: None



Equipment Under Test



Equipment used during conducted

**Power supply:**

| Name    | Type | Rating                       | Reference / Sn | Comments              |
|---------|------|------------------------------|----------------|-----------------------|
| Supply1 | DC   | 1.71 to 3.6 V                | /              | Module power supply   |
| Supply2 | DC   | USB power supply (4 – 5.75V) | /              | Switching AC/ Adapter |

NC: Not communicated by provider

**Inputs/outputs - Cable:**

| Access  | Type  | Length used (m) | Declared <3m | Shielded | Comments                             |
|---------|-------|-----------------|--------------|----------|--------------------------------------|
| Supply1 | USB C | 1.5             | No           | No       | USB only on board and only for power |
| Supply2 | USB C | 1.5             | No           | No       | 100/240VAC – 5VDC                    |
| Access1 | JTAG  | 0.1             | No           | No       | Only for debug                       |

NC: Not communicated by provider

**Auxiliary equipment used during test:**

| Type           | Reference     | Sn | Comments |
|----------------|---------------|----|----------|
| LAPTOP         | LENOVO        | /  | /        |
| Daughter board | STLINK-V3MINE | /  | /        |

NC: Not communicated by provider



### Software & Hardware identification:

-Software version:

-Hardware version:

### Equipment information:

|                          |                                                          |                                                     |                                               |                               |
|--------------------------|----------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------|-------------------------------|
| Bluetooth LE Type:       | <input type="checkbox"/> BLE                             | <input checked="" type="checkbox"/> v6.0            | <input type="checkbox"/> v4.1                 | <input type="checkbox"/> v4.2 |
| Frequency band:          | [2400 – 2483.5] MHz                                      |                                                     |                                               |                               |
| Spectrum Modulation:     | <input checked="" type="checkbox"/> Other Digital method |                                                     |                                               |                               |
| Number of Channel:       | 40                                                       |                                                     |                                               |                               |
| Spacing channel:         | 2MHz                                                     |                                                     |                                               |                               |
| Channel bandwidth:       | 1MHz                                                     |                                                     |                                               |                               |
| Antenna Type:            | <input checked="" type="checkbox"/> Integral             | <input type="checkbox"/> External                   | <input type="checkbox"/> Dedicated            |                               |
| Antenna connector:       | <input checked="" type="checkbox"/> Yes                  | <input type="checkbox"/> No                         | <input type="checkbox"/> Temporary for test   |                               |
| Transmit chains:         | <input type="checkbox"/> 1                               |                                                     |                                               |                               |
|                          | Single antenna                                           |                                                     |                                               |                               |
|                          | Gain 1: 1.88dBi                                          |                                                     |                                               |                               |
| Beam forming gain:       | No                                                       |                                                     |                                               |                               |
| Receiver chains          | 1                                                        |                                                     |                                               |                               |
| Type of equipment:       | <input checked="" type="checkbox"/> Stand-alone          | <input type="checkbox"/> Plug-in                    | <input type="checkbox"/> Combined             |                               |
| Ad-Hoc mode:             | <input type="checkbox"/> Yes                             |                                                     | <input checked="" type="checkbox"/> No        |                               |
| Equipment type:          | <input checked="" type="checkbox"/> Production model     |                                                     | <input type="checkbox"/> Pre-production model |                               |
| Type of power source:    | <input type="checkbox"/> AC power supply                 | <input checked="" type="checkbox"/> DC power supply | <input type="checkbox"/> Battery              |                               |
| Operating voltage range: | Vmin                                                     | <input type="checkbox"/> 90V/50Hz-60Hz              | <input checked="" type="checkbox"/> 4.5Vdc    |                               |
|                          | Vnom:                                                    | <input type="checkbox"/> 100V/50Hz-60Hz             | <input checked="" type="checkbox"/> 5Vdc      |                               |
|                          | Vmax:                                                    | <input type="checkbox"/> 110V/50Hz-60Hz             | <input checked="" type="checkbox"/> 5.5Vdc    |                               |

| CHANNEL PLAN   |                 |                 |                 |
|----------------|-----------------|-----------------|-----------------|
| Channel        | Frequency (MHz) | Channel         | Frequency (MHz) |
| <b>Cmin: 0</b> | 2402            | <b>Cmid: 20</b> | 2442            |
| 1              | 2404            | 21              | 2444            |
| 2              | 2406            | 22              | 2446            |
| 3              | 2408            | 23              | 2448            |
| 4              | 2410            | 24              | 2450            |
| 5              | 2412            | 25              | 2452            |
| 6              | 2414            | 26              | 2454            |
| 7              | 2416            | 27              | 2456            |
| 8              | 2418            | 28              | 2458            |
| 9              | 2420            | 29              | 2460            |
| 10             | 2422            | 30              | 2462            |
| 11             | 2424            | 31              | 2464            |
| 12             | 2426            | 32              | 2466            |
| 13             | 2428            | 33              | 2468            |
| 14             | 2430            | 34              | 2470            |
| 15             | 2432            | 35              | 2472            |
| 16             | 2434            | 36              | 2474            |
| 17             | 2436            | 37              | 2476            |
| 18             | 2438            | 38              | 2478            |
| 19             | 2440            | <b>Cmax: 39</b> | 2480            |

| DATA RATE        |                 |                                     |
|------------------|-----------------|-------------------------------------|
| Data Rate (Mbps) | Modulation Type | Worst Case Modulation               |
| 1                | GFSK            | <input checked="" type="checkbox"/> |

## 2.2. RUNNING MODE

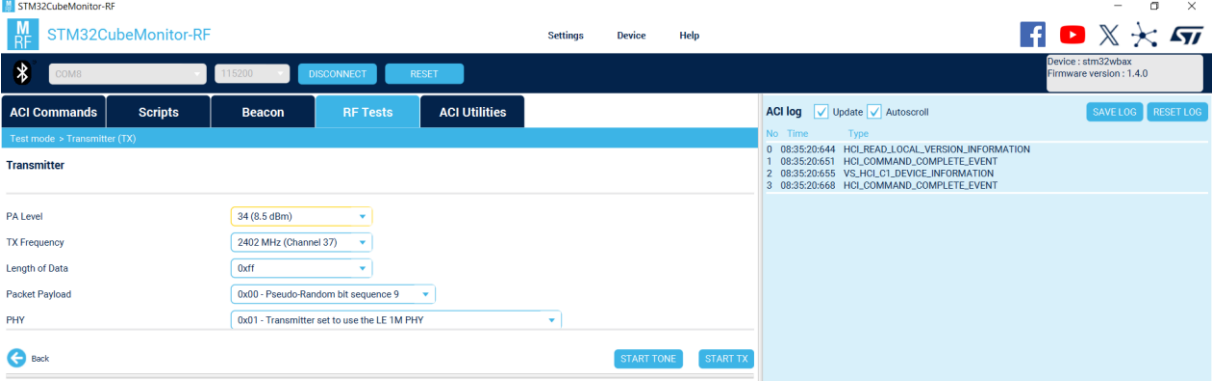
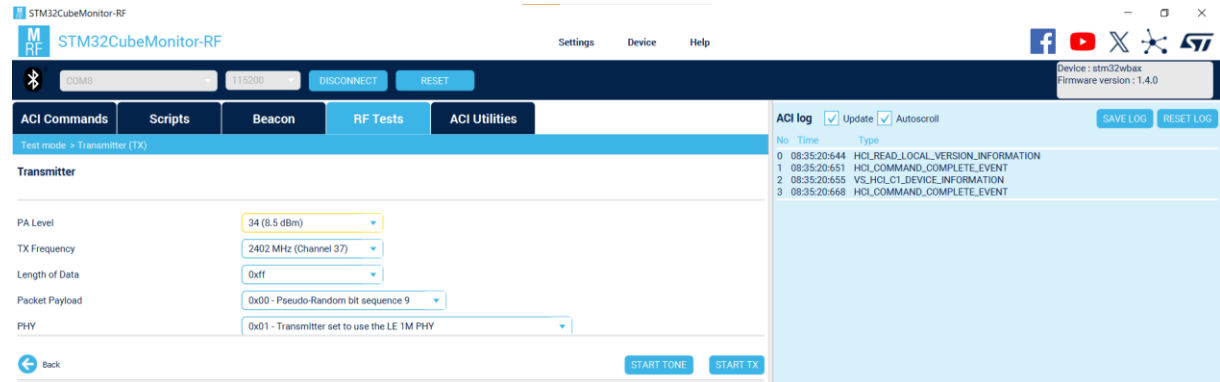
The EUT is set in the following modes during tests:

- Permanent emission with modulation on a fixed channel at the highest power
- Permanent emission without modulation on a fixed channel at the highest power

The EUT is set in the following modes during tests:

- Permanent emission with modulation on a fixed channel at the highest power
- Permanent emission without modulation on a fixed channel at the highest power
- Permanent reception



| Test mode   | Description of test mode                                                                                                                                                                                     |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test mode 1 | <p>Permanent emission with modulation on a fixed channel in the data rate that produced the power set at +10 dBm.</p>      |
| Test mode 2 | <p>Permanent emission without modulation on a fixed channel in the data rate that produced the power set at +10 dBm.</p>  |



Test mode 3

STM32CubeMonitor-RF

STM32CubeMonitor-RF

SettingsDeviceHelp

COM8115200DISCONNECTRESET

Device: stm32wbxxFirmware version: 1.4.0

ACI CommandsScriptsBeaconRF TestsACI Utilities

Test mode > Packet Error Rate (PER) > COM9 > COM8 > Settings

Configure additional settings

☒ PER tests on multiple channels

Fill channel List: 0:39

☐ Get RSSI

Measurement period (sec): 3

☐ Save test verdict in file

Back

START TEST

Test measurement

Transmitted packets count678

Received packets count674

Packet Error Rate (PER):0.59 %

RSSI

ACI logUpdateAutoscrollSAVE LOGRESET LOG

| No. | Time         | Type                             |
|-----|--------------|----------------------------------|
| 63  | 11:35:47:191 | HCI_COMMAND_COMPLETE_EVENT       |
| 64  | 11:35:47:197 | ACL_HALL_1_TX_TEST_PACKET_NUMBER |
| 65  | 11:35:47:203 | HCI_COMMAND_COMPLETE_EVENT       |
| 66  | 11:35:47:209 | HOLLE_TEST_END                   |
| 67  | 11:35:47:213 | HCI_COMMAND_COMPLETE_EVENT       |
| 68  | 11:36:04:334 | HOLLE_RECEIVER_TEST_V2           |
| 69  | 11:36:04:352 | HCI_COMMAND_COMPLETE_EVENT       |
| 70  | 11:36:04:397 | ACL_HALL_SET_TX_POWER_LEVEL      |
| 71  | 11:36:04:400 | HCI_COMMAND_COMPLETE_EVENT       |
| 72  | 11:36:04:402 | HOLLE_TRANSMITTER_TEST_V2        |
| 73  | 11:36:04:421 | HCI_COMMAND_COMPLETE_EVENT       |
| 74  | 11:36:06:643 | HOLLE_TEST_END                   |
| 75  | 11:36:06:648 | HCI_COMMAND_COMPLETE_EVENT       |
| 76  | 11:36:06:650 | ACL_HALL_1_TX_TEST_PACKET_NUMBER |
| 77  | 11:36:06:655 | HCI_COMMAND_COMPLETE_EVENT       |
| 78  | 11:36:06:662 | HOLLE_TEST_END                   |
| 79  | 11:36:06:666 | HCI_COMMAND_COMPLETE_EVENT       |
| 80  | 11:50:46:215 | HOLLE_RECEIVER_TEST_V2           |
| 81  | 11:50:46:231 | HCI_COMMAND_COMPLETE_EVENT       |
| 82  | 11:50:46:281 | ACL_HALL_SET_TX_POWER_LEVEL      |
| 83  | 11:50:46:285 | HCI_COMMAND_COMPLETE_EVENT       |
| 84  | 11:50:46:287 | HOLLE_TRANSMITTER_TEST_V2        |
| 85  | 11:50:46:305 | HCI_COMMAND_COMPLETE_EVENT       |
| 86  | 11:50:49:182 | HOLLE_TEST_END                   |
| 87  | 11:50:49:189 | HCI_COMMAND_COMPLETE_EVENT       |
| 88  | 11:50:49:196 | ACL_HALL_1_TX_TEST_PACKET_NUMBER |
| 89  | 11:50:49:201 | HCI_COMMAND_COMPLETE_EVENT       |
| 90  | 11:50:49:209 | HOLLE_TEST_END                   |
| 91  | 11:50:49:215 | HCI_COMMAND_COMPLETE_EVENT       |
| 92  | 11:50:49:265 | HOLLE_RECEIVER_TEST_V2           |
| 93  | 11:50:49:283 | HCI_COMMAND_COMPLETE_EVENT       |
| 94  | 11:50:49:331 | ACL_HALL_SET_TX_POWER_LEVEL      |
| 95  | 11:50:49:334 | HCI_COMMAND_COMPLETE_EVENT       |
| 96  | 11:50:49:336 | HOLLE_TRANSMITTER_TEST_V2        |
| 97  | 11:50:49:354 | HCI_COMMAND_COMPLETE_EVENT       |
| 98  | 11:50:51:045 | HOLLE_TEST_END                   |
| 99  | 11:50:51:050 | HCI_COMMAND_COMPLETE_EVENT       |
| 100 | 11:50:51:052 | ACL_HALL_1_TX_TEST_PACKET_NUMBER |
| 101 | 11:50:51:056 | HCI_COMMAND_COMPLETE_EVENT       |
| 102 | 11:50:51:063 | HOLLE_TEST_END                   |
| 103 | 11:50:51:066 | HCI_COMMAND_COMPLETE_EVENT       |

## 2.3. EQUIPMENT LABELLING

## 2.4. EQUIPMENT MODIFICATION

☒ None ☐ Modification:

## 2.5. 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. ANTENNA GAIN & ANTENNA PATTERN

#### 3.1. TEST CONDITIONS

Test performed by : Akram HAKKARI  
 Date of test : December 19, 2024  
 Ambient temperature : 23 °C  
 Relative humidity : 38 %

#### 3.2. MANUFACTURER DECLARATION

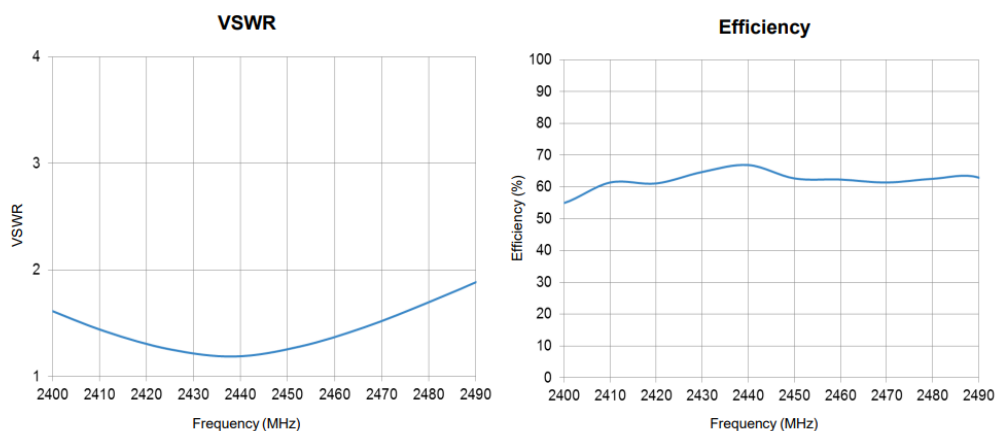
Reference antenna: Ethertronics Part Number : 1001312

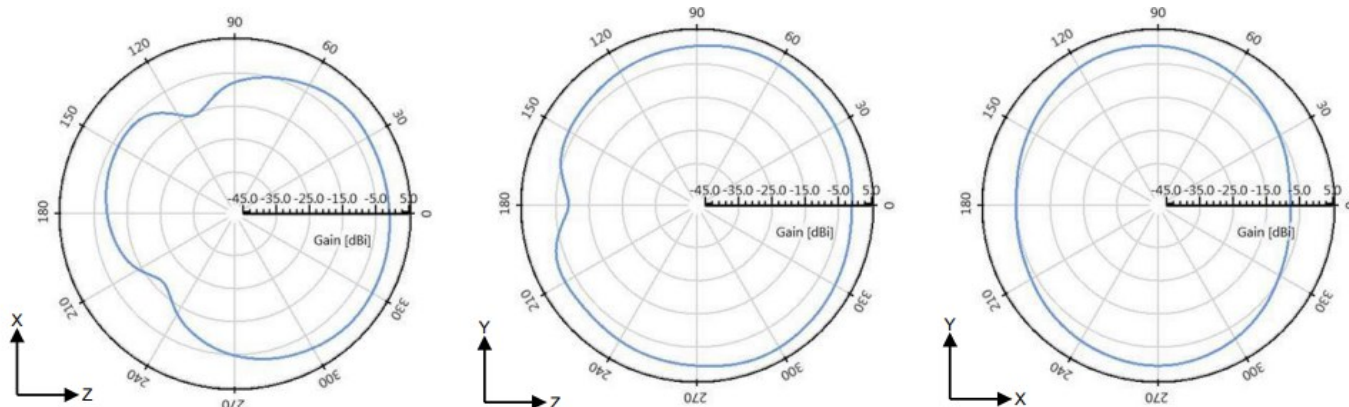
Specifications:

| Electrical             |                    |
|------------------------|--------------------|
| Model Number           | 1001312            |
| Frequency Range        | 2400-2500MHZ       |
| Polarization           | Linear             |
| Gain                   | 1.88dBi            |
| 3dB Beam-Width. H-Plan | 360°               |
| 3dB Beam-Width. E-Plan | 80°                |
| VSWR                   | 1.8:1 max          |
| Input Impedance        | 50Ω                |
| Power Handling         | 0.5 Watt CW        |
| Average Efficiency     | 62%                |
| Mechanical             |                    |
| Mounting               | SMT                |
| Dimensions H*W*D (mm)  | 2.00 x 1.20 x 0.55 |
| Weight                 | 0.003 g            |

#### VSWR, Efficiency Plots

Typical performance on 55 x 25 mm PCB





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

☒ None
 ☐ Divergence:

### 3.4. RESULTS

| Voltage            | Vnom |      |      |
|--------------------|------|------|------|
| Channel            | Cmin | Cmid | Cmax |
| Antenna Gain (dBi) | 1.88 | 1.88 | 1.88 |

### 3.5. CONCLUSION

Antenna Pattern & Antenna Gain measurement performed on the sample of the product **STM32WBA5MMG**, SN: **None**, in configuration and description presented in this test report, show levels **compliant** to the Japanese Radio Law for Article 2 paragraph 1 item 19 specified radio equipment category.

## 4. ANTENNA POWER & TOLERANCE FOR ANTENNA POWER & EIRP

### 4.1. TEST CONDITIONS

Test performed by : Akram HAKKARI  
Date of test : December 19, 2024  
Ambient temperature : 23 °C  
Relative humidity : 38 %

### 4.2. TEST SETUP

- The Equipment under Test is installed:  
☒ FAR ☐ On a table
- Measurement is performed with a spectrum analyzer  
☒ On the EUT conducted access

The Antenna Power & Tolerance or Antenna Power are measured with a thermocouple power meter.  
Mean power at the output of the transmitter (A) is deduced after correction due to RF cables loss between the EUT and the spectrum analyzer.

The Equivalent Isotropic Radiated Power (EIRP in dBm) is defined with the following formula:

$EIRP = \text{Antenna Power} + G$

Antenna Power (dBm): mean power at the output of the transmitter  $+10 \cdot \log(1/x)$

G (dBi): Antenna gain

x: Duty cycle

#### Pre-scan Spectrum Analyzer Setting:

Center frequency= Test frequency  
Span= Twice wider than the Occupied Bandwidth  
Amplitude= Sufficient to observe the signal amplitude  
RBW= 1MHz  
VBW= 3MHz  
Sweep= Auto  
Sweep Point= 5000 points  
Continue Sweep  
Trace= Max Hold  
Detector= Peak  
Marker Search Peak

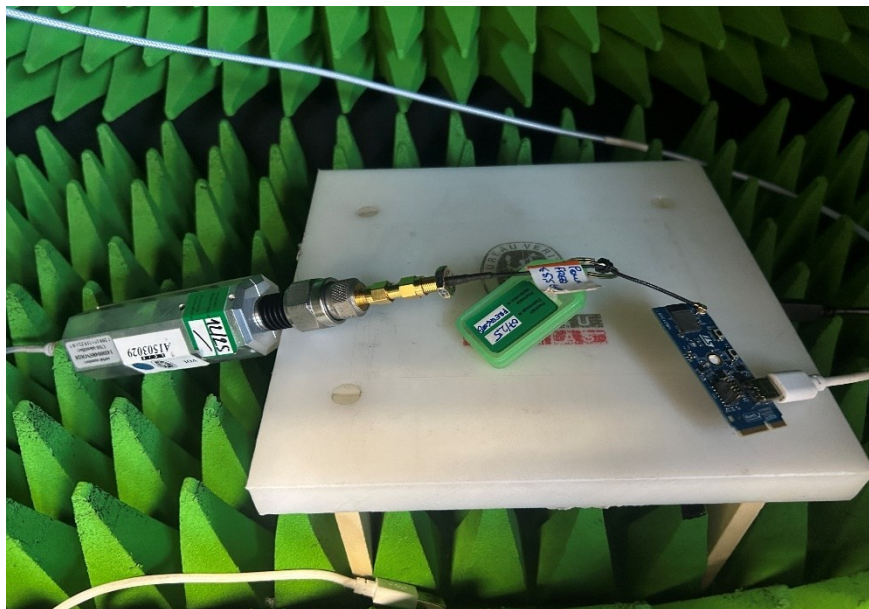
#### Final measurement

##### Spectrum Analyzer Setting:

Center frequency= Marker Search Peak during Pre-scan  
Span= 0  
Amplitude= Sufficient to observe the signal amplitude  
RBW= 1MHz  
VBW= 1MHz  
Sweep= Auto  
Sweep Point= 5000 points  
Continuous Sweep  
Trace= Clear/Write  
Detector= Peak

##### Power Meter Setting:

Connect the Thermocouple power sensor to the IF spectrum analyzer output



Photograph for Antenna Power & Tolerance for Antenna Power

#### 4.3. LIMIT

Antenna Power shall be 10mW or less

Tolerance for Antenna Power shall be inside +20% & -80% tolerance

EIRP shall be less 12.14dBm to 22.14dBm depending to Half Power Beam Width



#### 4.4. TEST EQUIPMENT LIST

| TEST EQUIPMENT USED     |              |          |            |          |         |             |                 |
|-------------------------|--------------|----------|------------|----------|---------|-------------|-----------------|
| Description             | Manufacturer | Model    | Identifier | Cal_Date | Cal_Due | Cal. Method | Cal. Agent name |
| RF Power sensor         | DARE         | RPR3006W | A1503029   | 12/23    | 12/25   | c)          | C               |
| Emission Cable (SMA 1m) | TELEDYNE     | 26GHz    | A5329874   | 08/24    | 08/25   | d)          | A               |
| DC Power Supply         | RS PRO       | RS3005P  | A7042314   | (*)      | (*)     | N/A         | N/A             |
| Full Anechoic Room      | SIEPEL       | —        | D3044024   | (*)      | (*)     | N/A         | N/A             |
| SMA 1.5m                | SUCOFLEX     | 18GHz    | A5329863   | 08/24    | 08/25   | d)          | A               |
| Thermo-hygrometer       | TESTO        | 608-H1   | B4204120   | 03/24    | 03/25   | d)          | A               |
| RADIMATION              | RADIMATION   | 2023.2.4 | L1000139   | (*)      | (*)     | N/A         | N/A             |

(\*) : The missing dates are for equipment that was not calibrated because it was not used for measurement.  
N/A: Not applicable

#### Calibration Agent:

A: LCIE Bureau Veritas, France  
B: R&S, Germany  
C: Kiwa Dare, The Netherlands  
D: Element Metech AB, Sweden

#### Calibration Method :

a) : Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph.  
b) : Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992) (Japan Calibration Service System).  
c) : Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph  
d) Calibration conducted by using other equipment that listed above from a) to c)

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

☒ None ☐ Divergence:

#### 4.6. RESULTS

##### BLE 1Mbps :

| Voltage                         | Vmin   |        |        |
|---------------------------------|--------|--------|--------|
| Channel                         | Cmin   | Cnom   | Cmax   |
| Antenna Power (dBm)             | 8.5    | 8.47   | 8.46   |
| Antenna Power (mW)              | 7.079  | 7.031  | 7.015  |
| Declared Antenna Power (mW)     | 10     | 10     | 10     |
| Tolerance for Antenna Power (%) | -29.21 | -29.69 | -29.85 |
| EIRP (dBm)                      | 10.38  | 10.35  | 10.34  |
| Voltage                         | Vnom   |        |        |
| Channel                         | Cmin   | Cnom   | Cmax   |
| Antenna Power (dBm)             | 8.52   | 8.48   | 8.47   |
| Antenna Power (mW)              | 7.112  | 7.047  | 7.031  |
| Declared Antenna Power (mW)     | 10     | 10     | 10     |
| Tolerance for Antenna Power (%) | -28.88 | -29.53 | -29.69 |
| EIRP (dBm)                      | 10.40  | 10.36  | 10.35  |
| Voltage                         | Vmax   |        |        |
| Channel                         | Cmin   | Cnom   | Cmax   |
| Antenna Power (dBm)             | 8.49   | 8.49   | 8.48   |
| Antenna Power (mW)              | 7.063  | 7.063  | 7.047  |
| Declared Antenna Power (mW)     | 10     | 10     | 10     |
| Tolerance for Antenna Power (%) | -29.37 | -29.37 | -29.53 |
| EIRP (dBm)                      | 10.37  | 10.37  | 10.36  |



## BLE 2Mbps :

| Voltage                         | Vmin   |        |        |
|---------------------------------|--------|--------|--------|
| Channel                         | Cmin   | Cnom   | Cmax   |
| Antenna Power (dBm)             | 8.48   | 8.46   | 8.45   |
| Antenna Power (mW)              | 7.047  | 7.015  | 6.998  |
| Declared Antenna Power (mW)     | 10     | 10     | 10     |
| Tolerance for Antenna Power (%) | -29.53 | -29.85 | -30.02 |
| EIRP (dBm)                      | 10.36  | 10.34  | 10.33  |
| Voltage                         | Vnom   |        |        |
| Channel                         | Cmin   | Cnom   | Cmax   |
| Antenna Power (dBm)             | 8.49   | 8.46   | 8.44   |
| Antenna Power (mW)              | 7.063  | 7.015  | 6.982  |
| Declared Antenna Power (mW)     | 10     | 10     | 10     |
| Tolerance for Antenna Power (%) | -29.37 | -29.85 | -30.18 |
| EIRP (dBm)                      | 10.37  | 10.34  | 10.32  |
| Voltage                         | Vmax   |        |        |
| Channel                         | Cmin   | Cnom   | Cmax   |
| Antenna Power (dBm)             | 8.48   | 8.47   | 8.43   |
| Antenna Power (mW)              | 7.047  | 7.031  | 6.966  |
| Declared Antenna Power (mW)     | 10     | 10     | 10     |
| Tolerance for Antenna Power (%) | -29.53 | -29.69 | -30.34 |
| EIRP (dBm)                      | 10.36  | 10.35  | 10.31  |

## 4.7. CONCLUSION

Antenna Power, Tolerance for Antenna Power & EIRP measurement performed on the sample of the **STM32WBA5MMG**, SN: **None**, in configuration and description presented in this test report, show levels **compliant** to the Japanese Radio Law for Article 2 paragraph 1 item 19 specified radio equipment category.

## 5. FREQUENCY TOLERANCE

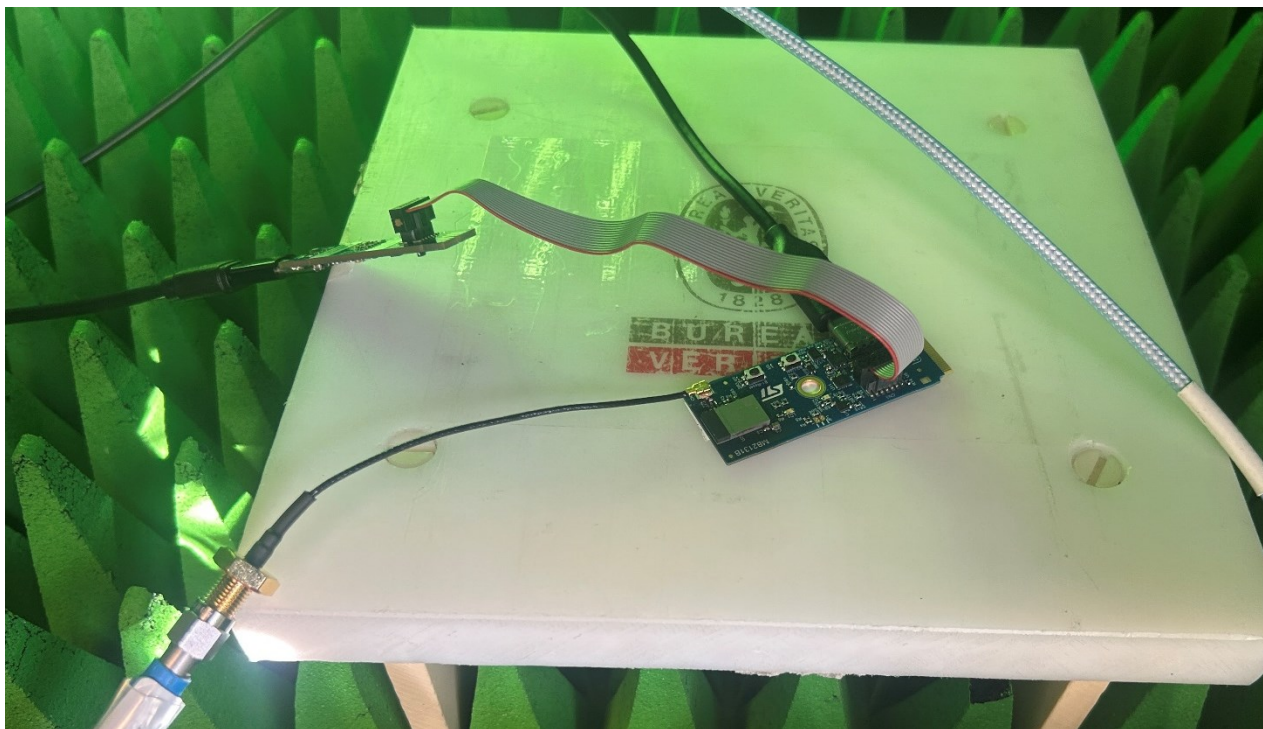
### 5.1. TEST CONDITIONS

Test performed by : Akram HAKKARI  
Date of test : December 20, 2024  
Ambient temperature : 22 °C  
Relative humidity : 38 %

### 5.2. TEST SETUP

- The Equipment under Test is installed:  
☒ FAR ☐ On a table
- Measurement is performed with a spectrum analyzer  
☒ On the EUT conducted access

Spectrum Analyzer Setting for Unmodulated Signal:  
Center frequency= Test frequency  
Span= 100kHz  
Amplitude= Sufficient to observe the signal amplitude  
RBW= 1kHz  
VBW= 3kHz  
Sweep= Auto  
Trace= Max Hold  
Detector= Peak  
Counter function activated



Photograph for Frequency Tolerance

### 5.3. LIMIT

The Frequency Tolerance shall not exceed  $\pm 50\text{ppm}$

### 5.4. TEST EQUIPMENT LIST

| TEST EQUIPMENT USED     |                      |              |            |          |         |             |                 |
|-------------------------|----------------------|--------------|------------|----------|---------|-------------|-----------------|
| Description             | Manufacturer         | Model        | Identifier | Cal_Date | Cal_Due | Cal. Method | Cal. Agent name |
| Attenuator              | Weinschel Associates | WA54-10-1314 | A7122330   | 04/24    | 04/25   | c)          | D               |
| Emission Cable (SMA 1m) | TELEDYNE             | 26GHz        | A5329874   | 08/24    | 08/25   | d)          | A               |
| DC Power Supply         | RS PRO               | RS3005P      | A7042314   | (*)      | (*)     | N/A         | N/A             |
| Full Anechoic Room      | SIEPEL               | —            | D3044024   | (*)      | (*)     | N/A         | N/A             |
| SMA 1.5m                | SUCOFLEX             | 18GHz        | A5329863   | 08/24    | 08/25   | d)          | A               |
| Spectrum analyzer       | ROHDE & SCHWARZ      | FSV 40       | A4060059   | 04/24    | 04/25   | c)          | B               |
| Thermo-hygrometer       | TESTO                | 608-H1       | B4204120   | 03/24    | 03/25   | d)          | A               |

(\*) : The missing dates are for equipment that was not calibrated because it was not used for measurement.

N/A: Not applicable

#### Calibration Agent:

A: LCIE Bureau Veritas, France

B: R&S, Germany

C: Kiwa Dare, The Netherlands

D: Element Metech AB, Sweden

#### Calibration Method :

a) : Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph.

b) : Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992) (Japan Calibration Service System).

c) : Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph

d) Calibration conducted by using other equipment that listed above from a) to c)

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

☒ None

☐ Divergence:

## 5.6. RESULTS



| Voltage                          | Vmin        |             |             |
|----------------------------------|-------------|-------------|-------------|
| Channel                          | Cmin        | Cnom        | Cmax        |
| Declared Frequency (MHz)         | 2402        | 2440        | 2480        |
| Measured Frequency (MHz)         | 2401.990972 | 2439.990526 | 2479.99059  |
| Frequency Tolerance (ppm)        | -3.7584     | -3.8830     | -3.7944     |
| Limite Frequency Tolerance (ppm) | ± 50        | ± 50        | ± 50        |
| Voltage                          | Vnom        |             |             |
| Channel                          | Cmin        | Cnom        | Cmax        |
| Declared Frequency (MHz)         | 2402        | 2440        | 2480        |
| Measured Frequency (MHz)         | 2401.990872 | 2439.990542 | 2479.990341 |
| Frequency Tolerance (ppm)        | -3.8003     | -3.8763     | -3.8948     |
| Limite Frequency Tolerance (ppm) | ± 50        | ± 50        | ± 50        |
| Voltage                          | Vmax        |             |             |
| Channel                          | Cmin        | Cnom        | Cmax        |
| Declared Frequency (MHz)         | 2402        | 2440        | 2480        |
| Measured Frequency (MHz)         | 2401.990831 | 2439.990748 | 2479.990413 |
| Frequency Tolerance (ppm)        | -3.8173     | -3.7918     | -3.8656     |
| Limite Frequency Tolerance (ppm) | ± 50        | ± 50        | ± 50        |

## 5.7. CONCLUSION

Frequency Tolerance measurement performed on the sample of the product **STM32WBA5MMG**, SN: **None**, in configuration and description presented in this test report, show levels **compliant** to the Japanese Radio Law for Article 2 paragraph 1 item 19 specified radio equipment category.



## 6. OCCUPIED CHANNEL BANDWIDTH

### 6.1. TEST CONDITIONS

Test performed by : Akram HAKKARI  
Date of test : December 19, 2024  
Ambient temperature : 23 °C  
Relative humidity : 38 %

### 6.2. TEST SETUP

- The Equipment under Test is installed:  
☒ FAR ☐ On table
- Measurement is performed with a spectrum analyzer  
☒ On the EUT conducted access

The spectrum analyzer occupied bandwidth function is used to find the occupied channel bandwidth.

Set the spectrum analyzer as follows:

Center frequency: Test frequency

Frequency sweep width : About 2~3.5 times the Nominal bandwidth

RBW= 300kHz

VBW= 300kHz

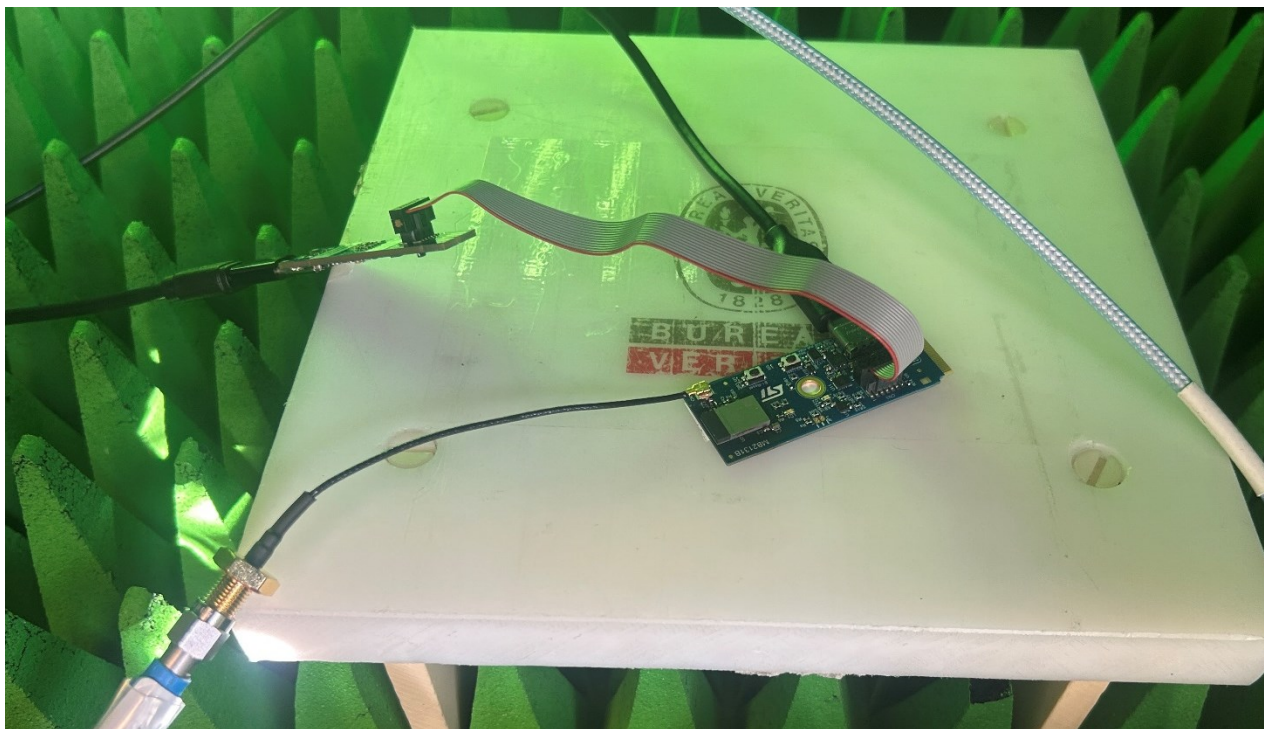
Sweep= Auto

Trace= Max Hold

Detector= Peak

Occupied Bandwidth 99% activated

Spread bandwidth 90% activated



Photograph Occupied Channel Bandwidth



### 6.3. LIMIT

The Occupied Bandwidth shall be 26MHz or less

### 6.4. TEST EQUIPMENT LIST

| TEST EQUIPMENT USED     |                      |              |            |          |         |             |                 |
|-------------------------|----------------------|--------------|------------|----------|---------|-------------|-----------------|
| Description             | Manufacturer         | Model        | Identifier | Cal_Date | Cal_Due | Cal. Method | Cal. Agent name |
| Attenuator              | Weinschel Associates | WA54-10-1314 | A7122330   | 04/24    | 04/25   | c)          | D               |
| Emission Cable (SMA 1m) | TELEDYNE             | 26GHz        | A5329874   | 08/24    | 08/25   | d)          | A               |
| DC Power Supply         | RS PRO               | RS3005P      | A7042314   | (*)      | (*)     | N/A         | N/A             |
| Full Anechoic Room      | SIEPEL               | —            | D3044024   | (*)      | (*)     | N/A         | N/A             |
| SMA 1.5m                | SUCOFLEX             | 18GHz        | A5329863   | 08/24    | 08/25   | d)          | A               |
| Spectrum analyzer       | ROHDE & SCHWARZ      | FSV 40       | A4060059   | 04/24    | 04/25   | c)          | B               |
| Thermo-hygrometer       | TESTO                | 608-H1       | B4204120   | 03/24    | 03/25   | d)          | A               |

(\*) : The missing dates are for equipment that was not calibrated because it was not used for measurement.

N/A: Not applicable

#### Calibration Agent:

A: LCIE Bureau Veritas, France

B: R&S, Germany

C: Kiwa Dare, The Netherlands

D: Element Metech AB, Sweden

#### Calibration Method :

a) : Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph.

b) : Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992) (Japan Calibration Service System).

c) : Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph

d) Calibration conducted by using other equipment that listed above from a) to c)

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

☒ None

☐ Divergence:



## 6.6. RESULTS

### 1Mbps Occupied Bandwidth 1Mbps



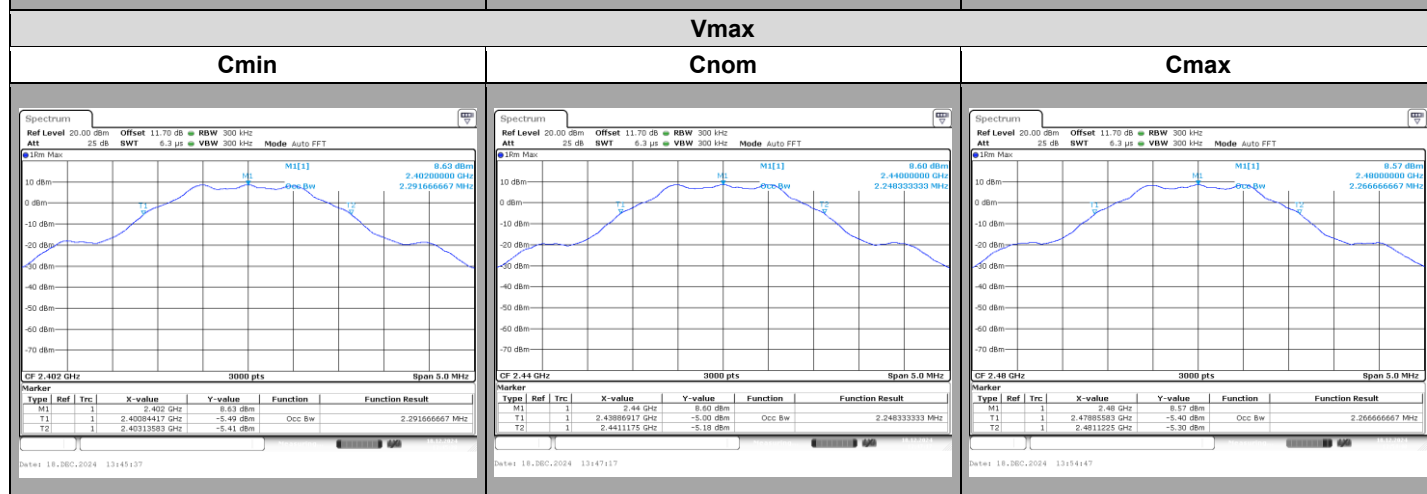
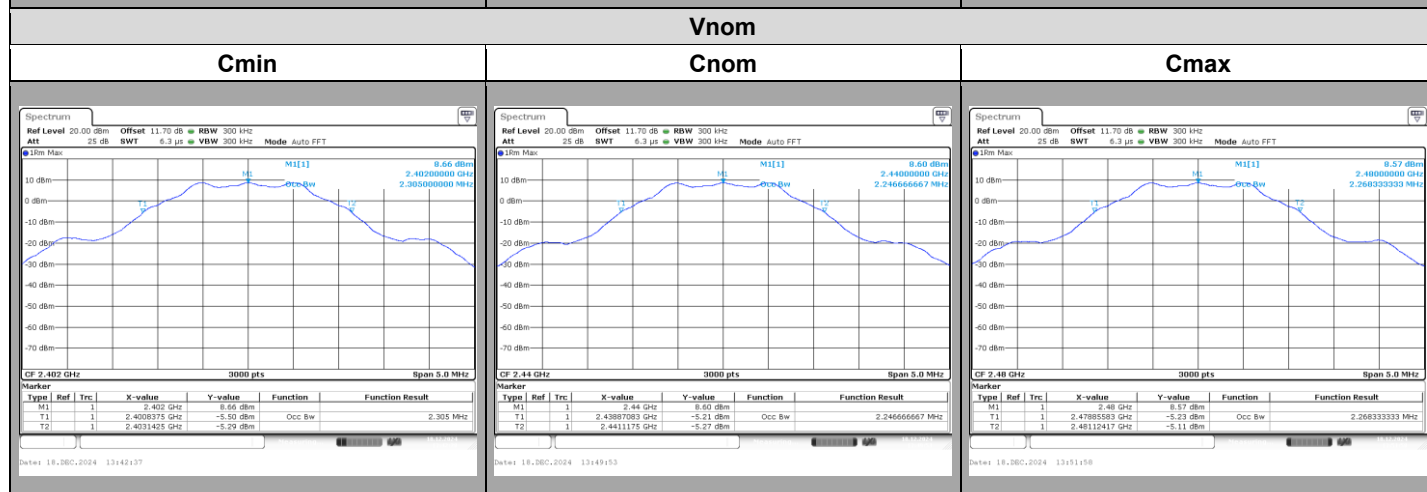
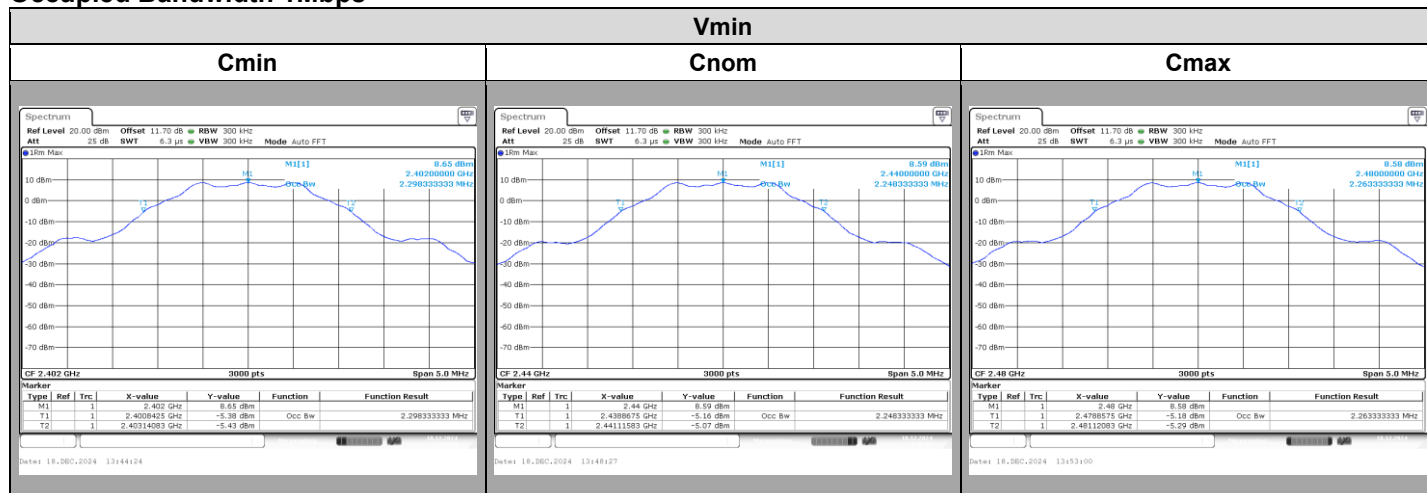
## Spread bandwidth



| <b>Voltage</b>           | <b>Vmin</b> |         |         |
|--------------------------|-------------|---------|---------|
| <b>Channel</b>           | Cmin        | Cnom    | Cmax    |
| Occupied Bandwidth (MHz) | 1.352       | 1.325   | 1.31    |
| Spread Bandwidth (MHz)   | 0.846       | 0.842   | 0.841   |
| Limit (MHz)              | ≤ 26MHz     | ≤ 26MHz | ≤ 26MHz |
| <b>Voltage</b>           | <b>Vnom</b> |         |         |
| <b>Channel</b>           | Cmin        | Cnom    | Cmax    |
| Occupied Bandwidth (MHz) | 1.345       | 1.313   | 1.321   |
| Spread Bandwidth (MHz)   | 0.846       | 0.837   | 0.839   |
| Limit (MHz)              | ≤ 26MHz     | ≤ 26MHz | ≤ 26MHz |
| <b>Voltage</b>           | <b>Vmax</b> |         |         |
| <b>Channel</b>           | Cmin        | Cnom    | Cmax    |
| Occupied Bandwidth (MHz) | 1.367       | 1.32    | 1.325   |
| Spread Bandwidth (MHz)   | 0.848       | 0.841   | 0.843   |
| Limit (MHz)              | ≤ 26MHz     | ≤ 26MHz | ≤ 26MHz |



**2Mbps**  
**Occupied Bandwidth 1Mbps**



## Spread bandwidth



| Voltage                  | Vmin    |         |         |
|--------------------------|---------|---------|---------|
| Channel                  | Cmin    | Cnom    | Cmax    |
| Occupied Bandwidth (MHz) | 2.2983  | 2.2483  | 2.2633  |
| Spread Bandwidth (MHz)   | 1.4566  | 1.42    | 1.4283  |
| Limit (MHz)              | ≤ 26MHz | ≤ 26MHz | ≤ 26MHz |
| Voltage                  | Vnom    |         |         |
| Channel                  | Cmin    | Cnom    | Cmax    |
| Occupied Bandwidth (MHz) | 2.305   | 2.2466  | 2.2683  |
| Spread Bandwidth (MHz)   | 1.4566  | 1.41    | 1.4266  |
| Limit (MHz)              | ≤ 26MHz | ≤ 26MHz | ≤ 26MHz |
| Voltage                  | Vmax    |         |         |
| Channel                  | Cmin    | Cnom    | Cmax    |
| Occupied Bandwidth (MHz) | 2.2916  | 2.2483  | 2.2666  |
| Spread Bandwidth (MHz)   | 1.4633  | 1.4183  | 1.4283  |
| Limit (MHz)              | ≤ 26MHz | ≤ 26MHz | ≤ 26MHz |

## 6.7. CONCLUSION

Occupied Channel Bandwidth measurement performed on the sample of the product. **STM32WBA5MMG**, SN: **None**, in configuration and description presented in this test report, show levels **compliant** to the Japanese Radio Law for Article 2 paragraph 1 item 19 specified radio equipment category.

## 7. SPURIOUS EMISSION INTENSITY

### 7.1. TEST CONDITIONS

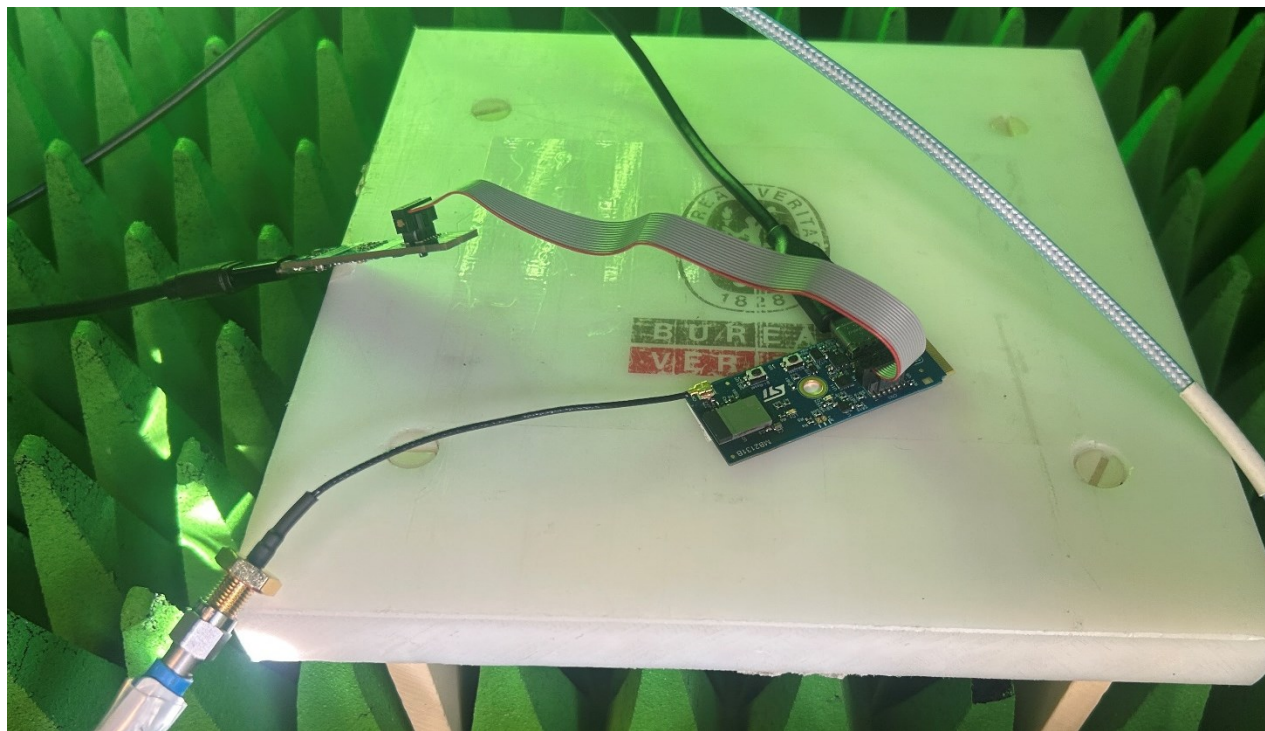
Test performed by : Akram HAKKARI  
Date of test : December 19, 2024  
Ambient temperature : 23 °C  
Relative humidity : 38 %

### 7.2. TEST SETUP

#### Qualification of conducted measurements (30MHz to 12.75GHz):

The power level shall be recorded as the conducted spurious emission level.

The transmitter shall be connected to a 50  $\Omega$  power attenuator. The output of the power attenuator shall be connected to a measuring receiver



Photograph for Spurious Emission Intensity

### 7.3. LIMIT

| Spurious Emission Intensity |                |
|-----------------------------|----------------|
| Frequencies                 | Limit          |
| 30MHz to 2387MHz            | 2.5μW (-26dBm) |
| 2387MHz to 2400MHz          | 25μW (-16dBm)  |
| 2483.5MHz to 2496.5MHz      | 25μW (-16dBm)  |
| 2496.5MHz to 12500MHz       | 2.5μW (-26dBm) |

### 7.4. TEST EQUIPMENT LIST

| TEST EQUIPMENT USED     |                      |              |            |          |         |             |                 |
|-------------------------|----------------------|--------------|------------|----------|---------|-------------|-----------------|
| Description             | Manufacturer         | Model        | Identifier | Cal_Date | Cal_Due | Cal. Method | Cal. Agent name |
| Attenuator              | Weinschel Associates | WA54-10-1314 | A7122330   | 04/24    | 04/25   | c)          | D               |
| Emission Cable (SMA 1m) | TELEDYNE             | 26GHz        | A5329874   | 08/24    | 08/25   | d)          | A               |
| DC Power Supply         | RS PRO               | RS3005P      | A7042314   | (*)      | (*)     | N/A         | N/A             |
| Full Anechoic Room      | SIEPEL               | —            | D3044024   | (*)      | (*)     | N/A         | N/A             |
| SMA 1.5m                | SUCOFLEX             | 18GHz        | A5329863   | 08/24    | 08/25   | d)          | A               |
| Spectrum analyzer       | ROHDE & SCHWARZ      | FSV 40       | A4060059   | 04/24    | 04/25   | c)          | B               |
| Thermo-hygrometer       | TESTO                | 608-H1       | B4204120   | 03/24    | 03/25   | d)          | A               |

(\*) : The missing dates are for equipment that was not calibrated because it was not used for measurement.

N/A: Not applicable

#### Calibration Agent:

A: LCIE Bureau Veritas, France

B: R&S, Germany

C: Kiwa Dare, The Netherlands

D: Element Metech AB, Sweden

#### Calibration Method :

a) : Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph.

b) : Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992) (Japan Calibration Service System).

c) : Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph

d) Calibration conducted by using other equipment that listed above from a) to c)

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

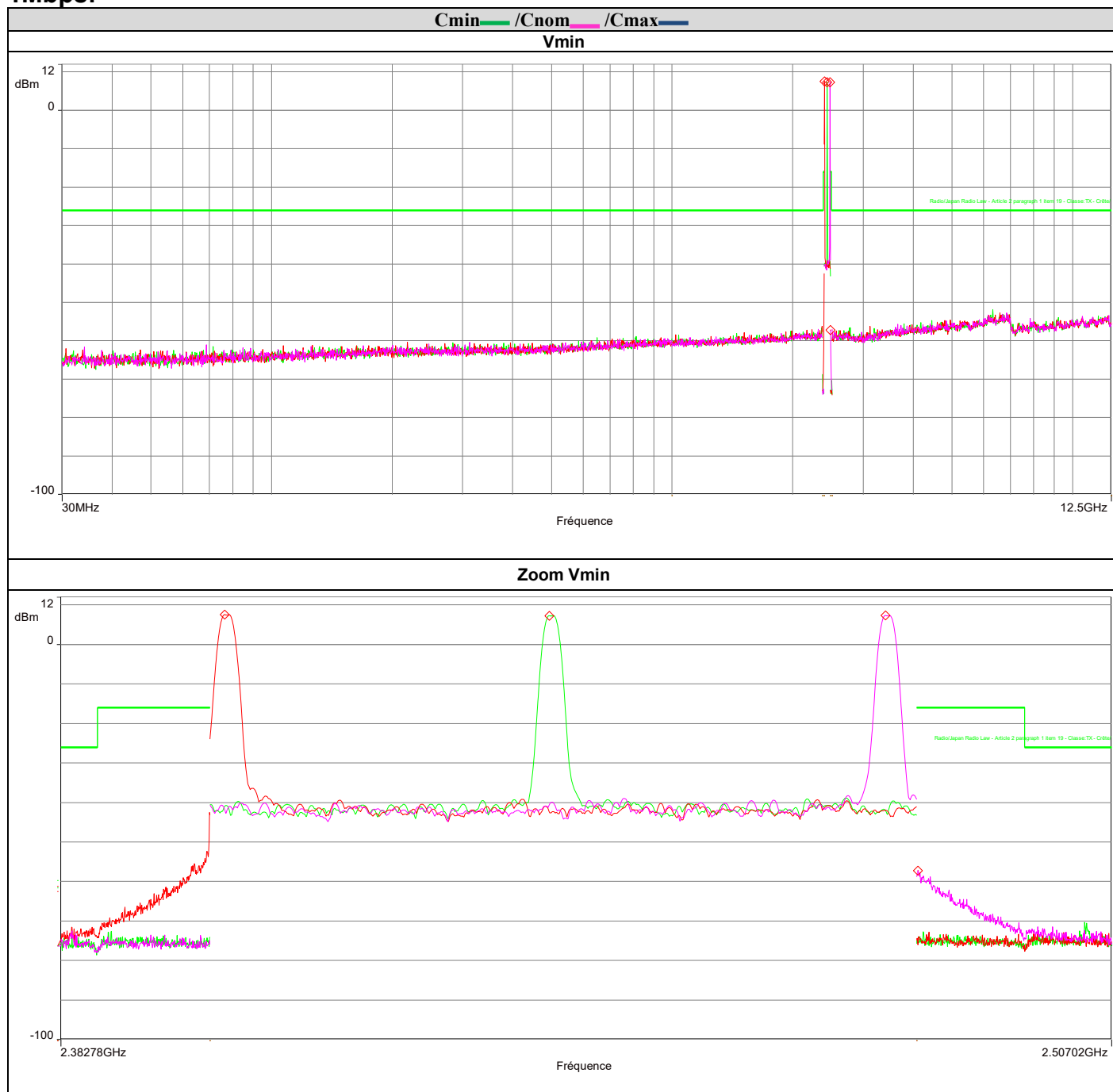
☐ None

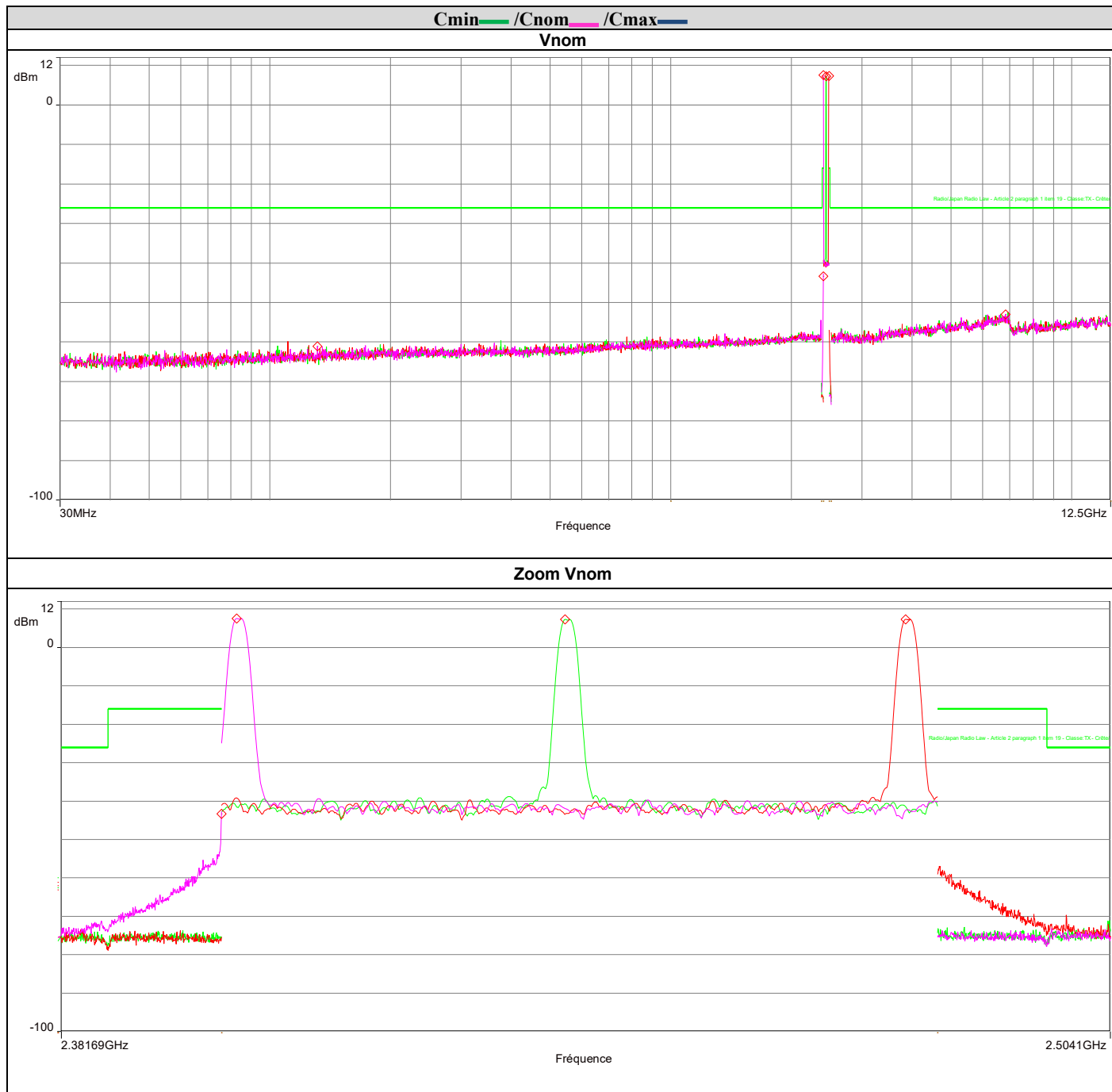
☐ Divergence:

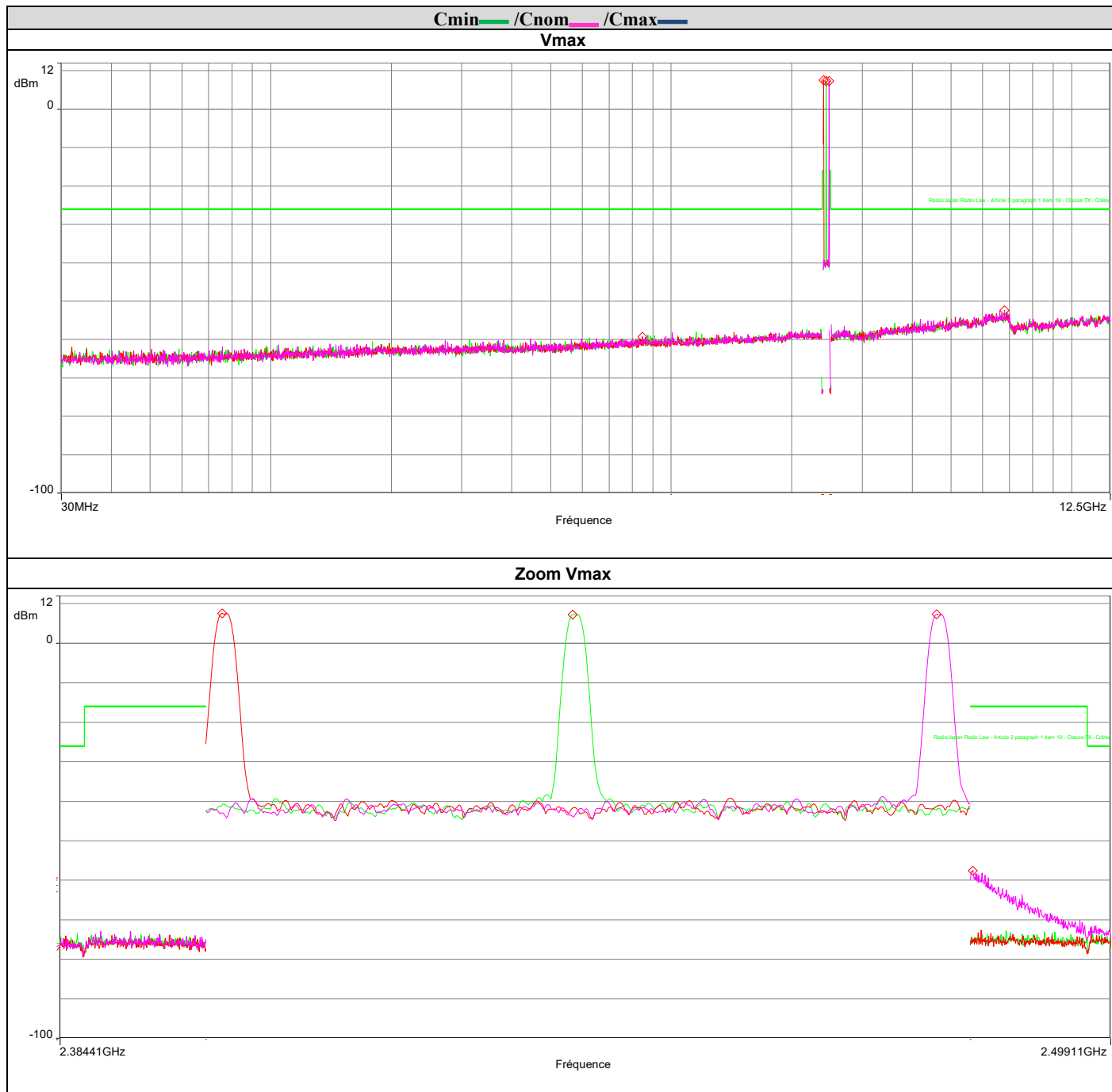


## 7.6. RESULTS

**1Mbps:**





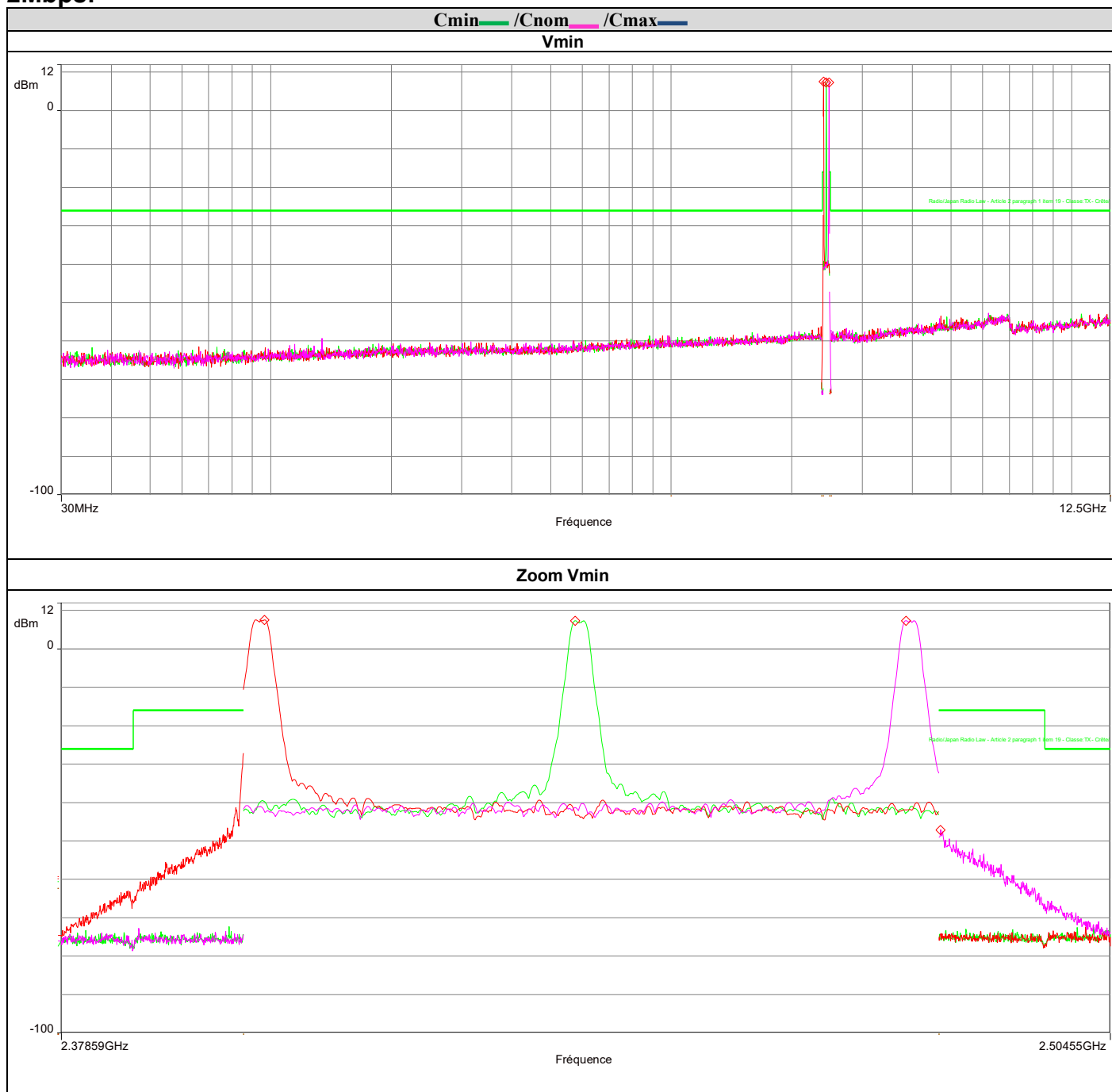


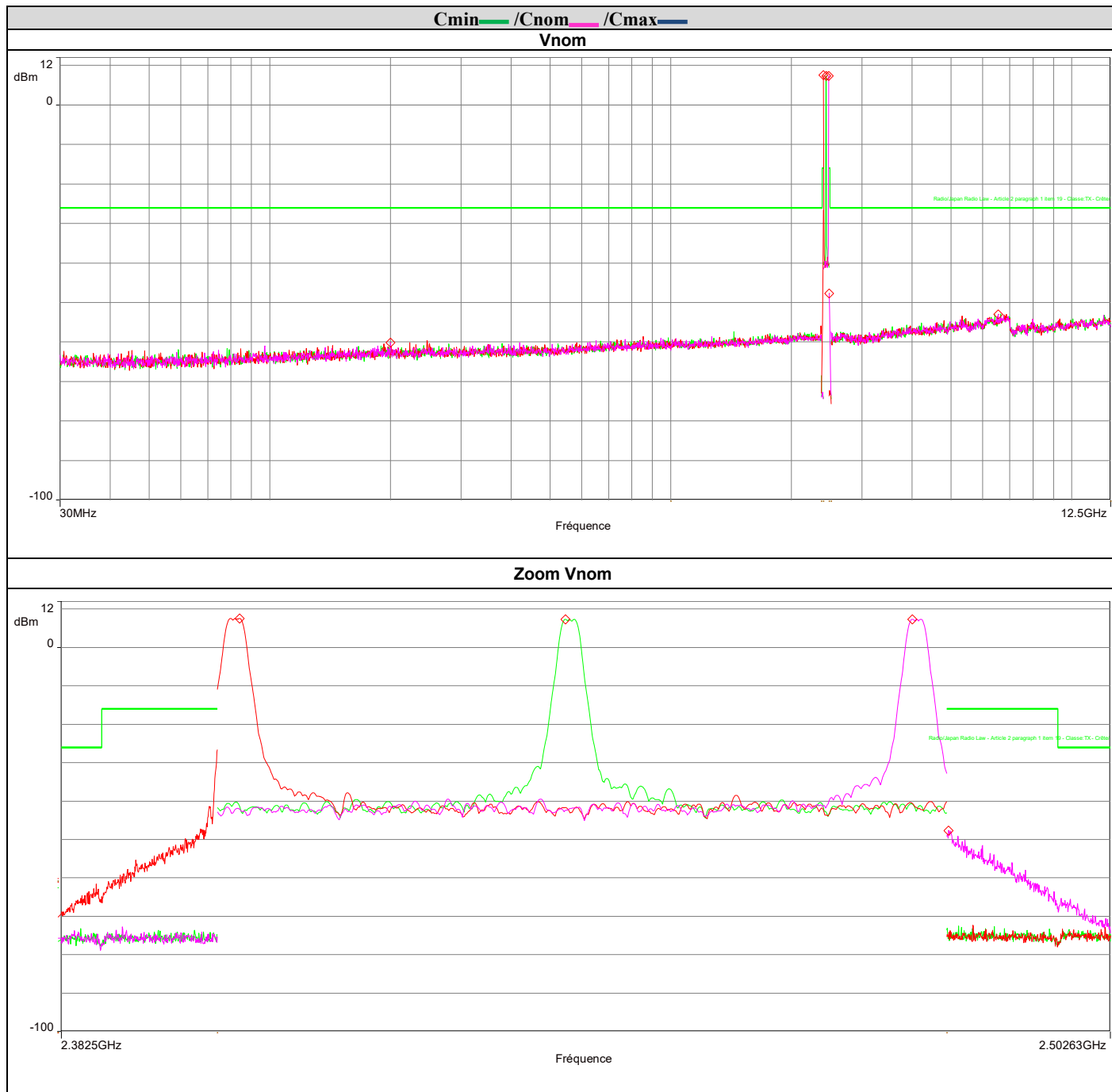
| Vmin            |             |            |                |                            |
|-----------------|-------------|------------|----------------|----------------------------|
| Frequency (MHz) | Level (dBm) | Level (μW) | Limit (μW/MHz) | Level (μW)- Limit (μW/MHz) |
| 740.428         | -59.55      | 1.1092E-06 | 2.5            | -2.49999889                |
| 2401.72845      | 7.51        | 5.63637656 |                |                            |
| 2439.73765      | 7.27        | 5.33334895 |                |                            |
| 2479.75085      | 7.31        | 5.38269783 |                |                            |
| 2483.63         | -57.21      | 1.9011E-06 | 25             | -24.9999981                |
| 2400.08         | -41.98      | 6.3387E-05 | 25             | -24.9999366                |

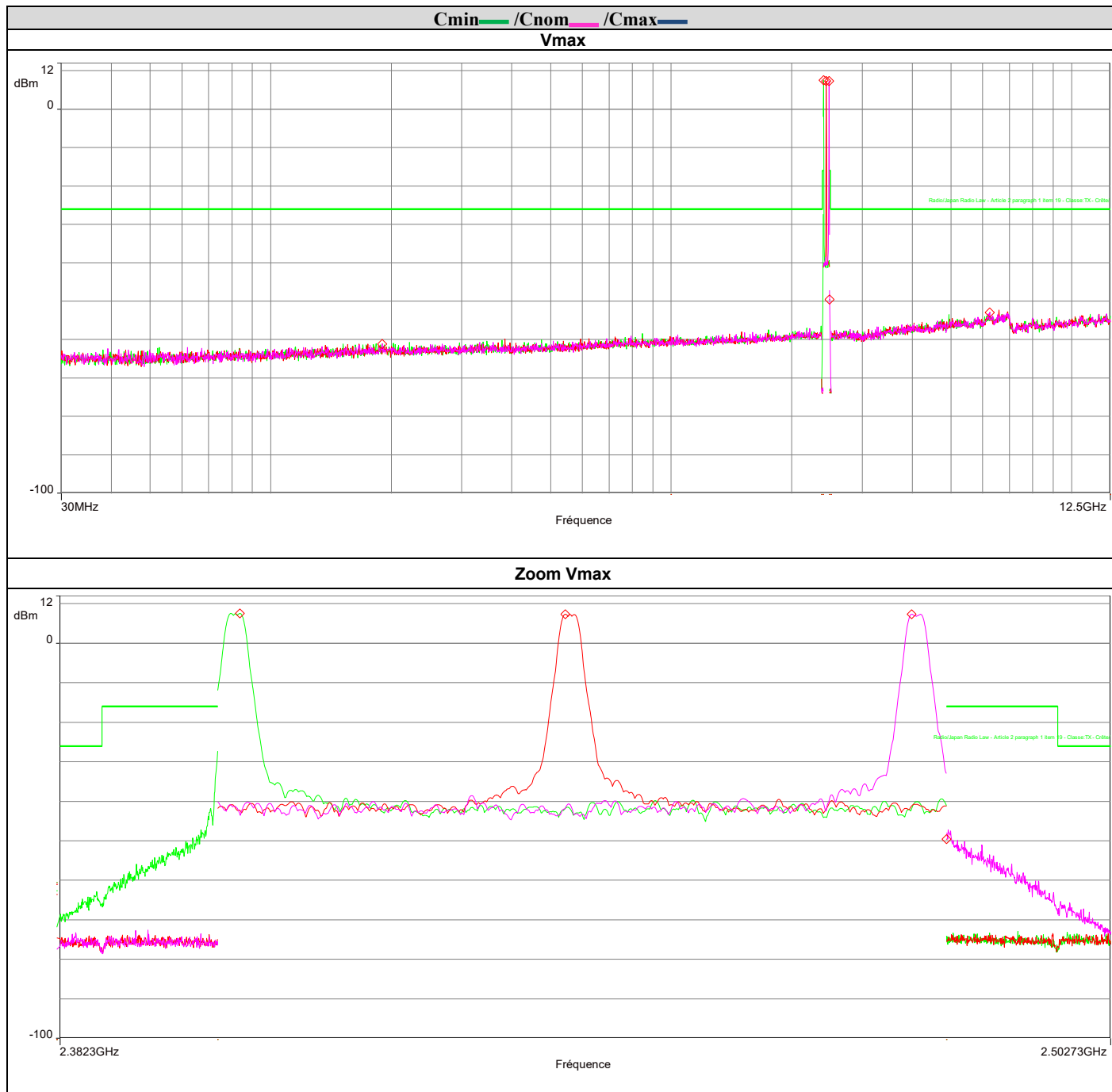
| Vmid            |             |            |                |                            |
|-----------------|-------------|------------|----------------|----------------------------|
| Frequency (MHz) | Level (dBm) | Level (μW) | Limit (μW/MHz) | Level (μW)- Limit (μW/MHz) |
| 131.559         | -61.14      | 7.6913E-07 | 2.5            | -2.49999923                |
| 2399.9792       | -43.34      | 4.6345E-05 | 25             | -24.9999537                |
| 2401.7201       | 7.52        | 5.64936975 |                |                            |
| 2439.7126       | 7.26        | 5.32108259 |                |                            |
| 2479.73415      | 7.32        | 5.39510623 |                |                            |
| 6842.37985      | -53         | 5.0119E-06 | 2.5            | -2.49999499                |
| 2483.5          | -58.9894    | 1.262E-06  | 25             | -24.9999987                |

| Vmax            |             |            |                |                            |
|-----------------|-------------|------------|----------------|----------------------------|
| Frequency (MHz) | Level (dBm) | Level (μW) | Limit (μW/MHz) | Level (μW)- Limit (μW/MHz) |
| 802.702         | -59.7       | 1.0715E-06 | 2.5            | -2.49999893                |
| 848.389         | -59.35      | 1.1614E-06 | 2.5            | -2.49999884                |
| 2401.74515      | 7.52        | 5.64936975 |                |                            |
| 2439.72095      | 7.26        | 5.32108259 |                |                            |
| 2479.75085      | 7.31        | 5.38269783 |                |                            |
| 2483.7288       | -57.6       | 1.7378E-06 | 25             | -24.9999983                |
| 6791.4283       | -52.39      | 5.7677E-06 | 2.5            | -2.49999423                |
| 2399.98         | -75.12      | 3.0761E-08 | 25             | -25                        |

**2Mbps:**







| Vmin            |             |            |                |                            |
|-----------------|-------------|------------|----------------|----------------------------|
| Frequency (MHz) | Level (dBm) | Level (μW) | Limit (μW/MHz) | Level (μW)- Limit (μW/MHz) |
| 134.275         | -59.35      | 1.1614E-06 | 2.5            | -2.49999884                |
| 2402.4716       | 7.52        | 5.64936975 |                |                            |
| 2439.47045      | 7.31        | 5.38269783 |                |                            |
| 2479.492        | 7.33        | 5.40754323 |                |                            |
| 2483.734        | -47.19      | 1.9099E-05 | 25             | -24.9999809                |
| 6204.98595      | -52.76      | 5.2966E-06 | 2.5            | -2.4999947                 |
| 2400.03         | -26.82      | 0.0020797  | 25             | -24.9979203                |

| Vmid            |             |            |                |                            |
|-----------------|-------------|------------|----------------|----------------------------|
| Frequency (MHz) | Level (dBm) | Level (μW) | Limit (μW/MHz) | Level (μW)- Limit (μW/MHz) |
| 199.75          | -60.18      | 9.594E-07  | 2.5            | -2.49999904                |
| 2402.4883       | 7.54        | 5.67544605 |                | 5.675446054                |
| 2439.48715      | 7.3         | 5.37031796 |                |                            |
| 2479.50035      | 7.34        | 5.4200089  |                |                            |
| 2483.7314       | -47.76      | 1.6749E-05 |                |                            |
| 6562.64585      | -52.99      | 5.0234E-06 | 2.5            | -2.49999498                |
| 2399.99         | -26.37      | 0.00230675 | 25             | -24.9976933                |

| Vmax            |             |            |                |                            |
|-----------------|-------------|------------|----------------|----------------------------|
| Frequency (MHz) | Level (dBm) | Level (μW) | Limit (μW/MHz) | Level (μW)- Limit (μW/MHz) |
| 189.662         | -61.15      | 7.6736E-07 | 2.5            | -2.49999923                |
| 2402.49665      | 7.54        | 5.67544605 |                |                            |
| 2439.47045      | 7.31        | 5.38269783 |                |                            |
| 2479.46695      | 7.33        | 5.40754323 |                |                            |
| 2483.5104       | -49.59      | 1.099E-05  | 25             | -24.999989                 |
| 6242.94985      | -52.99      | 5.0234E-06 | 2.5            | -2.49999498                |
| 2400.04         | -27.49      | 0.00178238 | 25             | -24.9982176                |

## 7.7. CONCLUSION

Spurious Emission Intensity measurement performed on the sample of the product. **STM32WBA5MMG**, SN: **None**, in configuration and description presented in this test report, show levels **compliant** to the Japanese Radio Law for Article 2 paragraph 1 item 19 specified radio equipment category.



## 8. LIMIT ON SECONDARY RADIATED EMISSIONS

### 8.1. TEST CONDITIONS

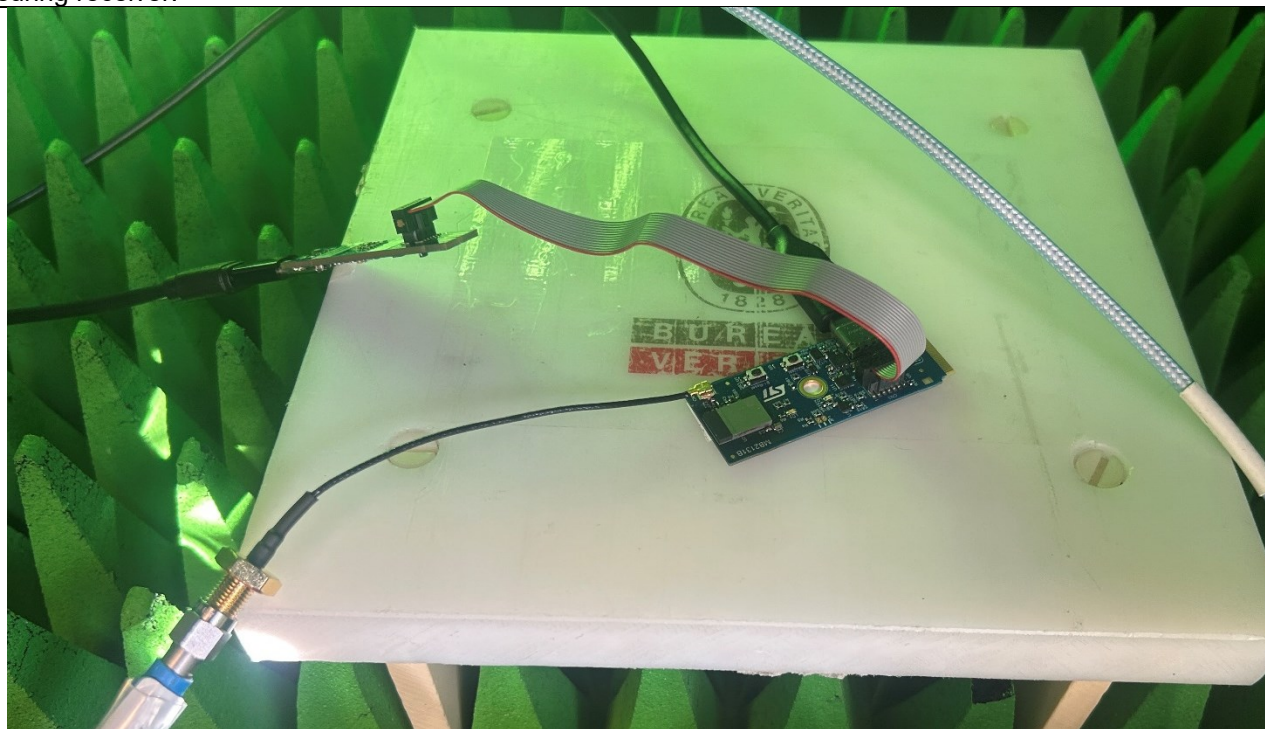
Test performed by : Akram HAKKARI  
Date of test : December 20, 2024  
Ambient temperature : 22 °C  
Relative humidity : 39 %

### 8.2. TEST SETUP

#### Qualification of conducted measurements (30MHz to 12.75GHz):

The power level shall be recorded as the conducted spurious emission level.

The transmitter shall be connected to a 50  $\Omega$  power attenuator. The output of the power attenuator shall be connected to a measuring receiver.



Photograph for Limit On Secondary Radiated Emissions

### 8.3. LIMIT

| Limit On Secondary Radiated Emissions |            |
|---------------------------------------|------------|
| Frequencies                           | Limit      |
| 30MHz to 1GHz                         | 4nW/100kHz |
| 1GHz to 12.75GHz                      | 20nW/MHz   |

### 8.4. TEST EQUIPMENT LIST

| TEST EQUIPMENT USED     |                      |              |            |          |         |             |                 |
|-------------------------|----------------------|--------------|------------|----------|---------|-------------|-----------------|
| Description             | Manufacturer         | Model        | Identifier | Cal_Date | Cal_Due | Cal. Method | Cal. Agent name |
| Attenuator              | Weinschel Associates | WA54-10-1314 | A7122330   | 04/24    | 04/25   | c)          | D               |
| Emission Cable (SMA 1m) | TELEDYNE             | 26GHz        | A5329874   | 08/24    | 08/25   | d)          | A               |
| DC Power Supply         | RS PRO               | RS3005P      | A7042314   | (*)      | (*)     | N/A         | N/A             |
| Full Anechoic Room      | SIEPEL               | _            | D3044024   | (*)      | (*)     | N/A         | N/A             |
| SMA 1.5m                | SUCOFLEX             | 18GHz        | A5329863   | 08/24    | 08/25   | d)          | A               |
| Spectrum analyzer       | ROHDE & SCHWARZ      | FSV 40       | A4060059   | 04/24    | 04/25   | c)          | B               |
| Thermo-hygrometer       | TESTO                | 608-H1       | B4204120   | 03/24    | 03/25   | d)          | A               |

(\*) : The missing dates are for equipment that was not calibrated because it was not used for measurement.

N/A: Not applicable

#### Calibration Agent:

A: LCIE Bureau Veritas, France

B: R&S, Germany

C: Kiwa Dare, The Netherlands

D: Element Metech AB, Sweden

#### Calibration Method :

a) : Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph.

b) : Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992) (Japan Calibration Service System).

c) : Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph

d) Calibration conducted by using other equipment that listed above from a) to c)

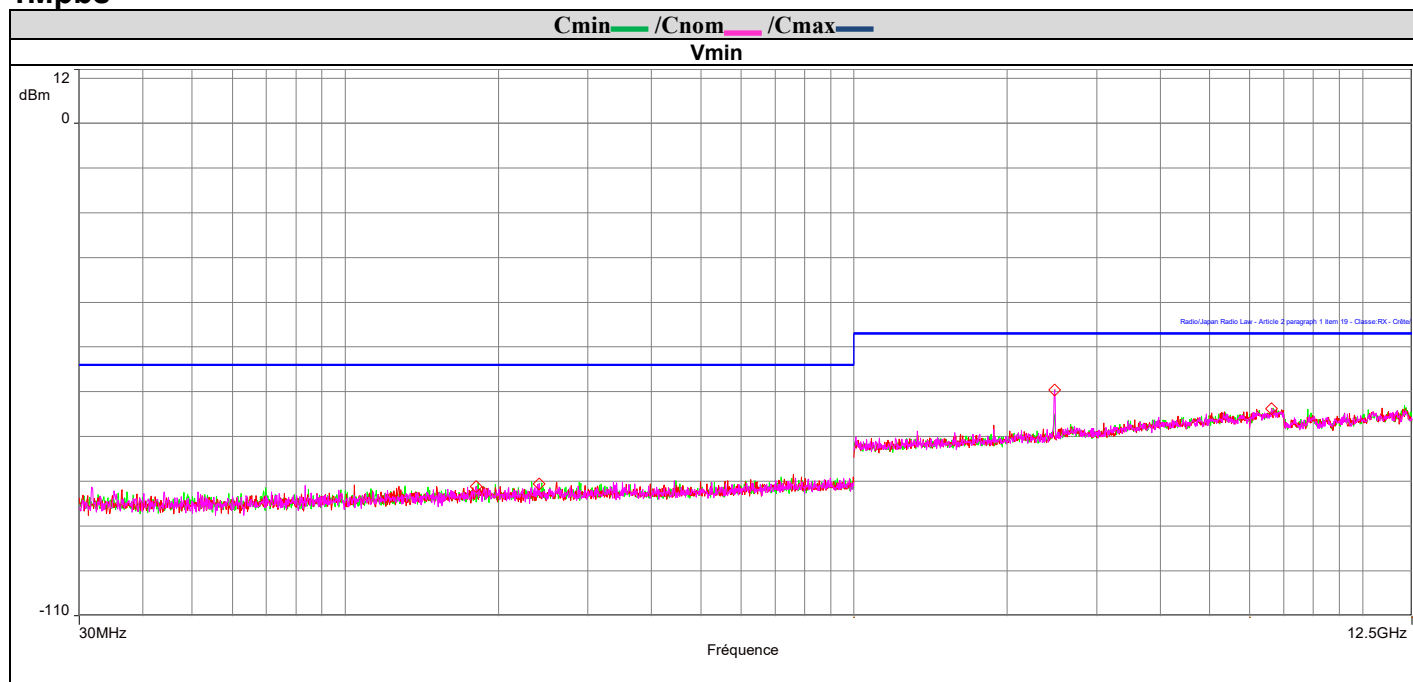
### 8.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒ None

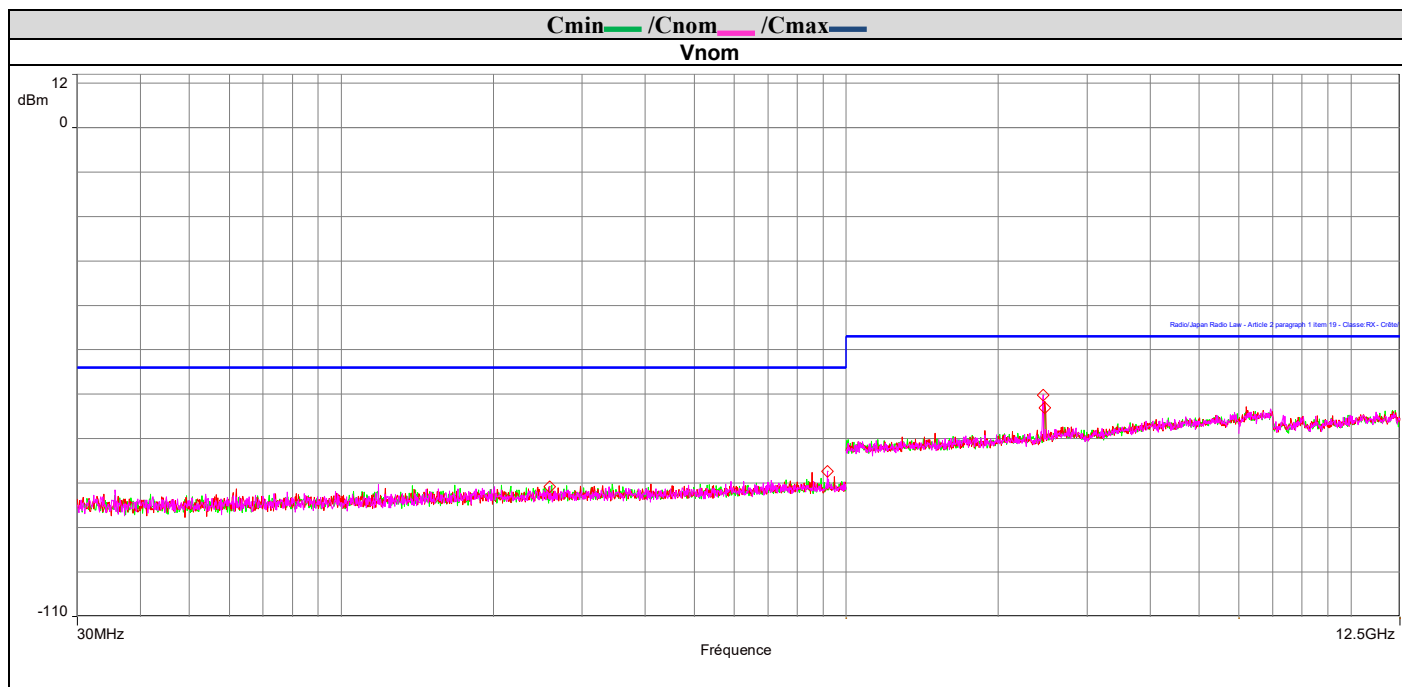
☐ Divergence:

## 8.6. RESULTS

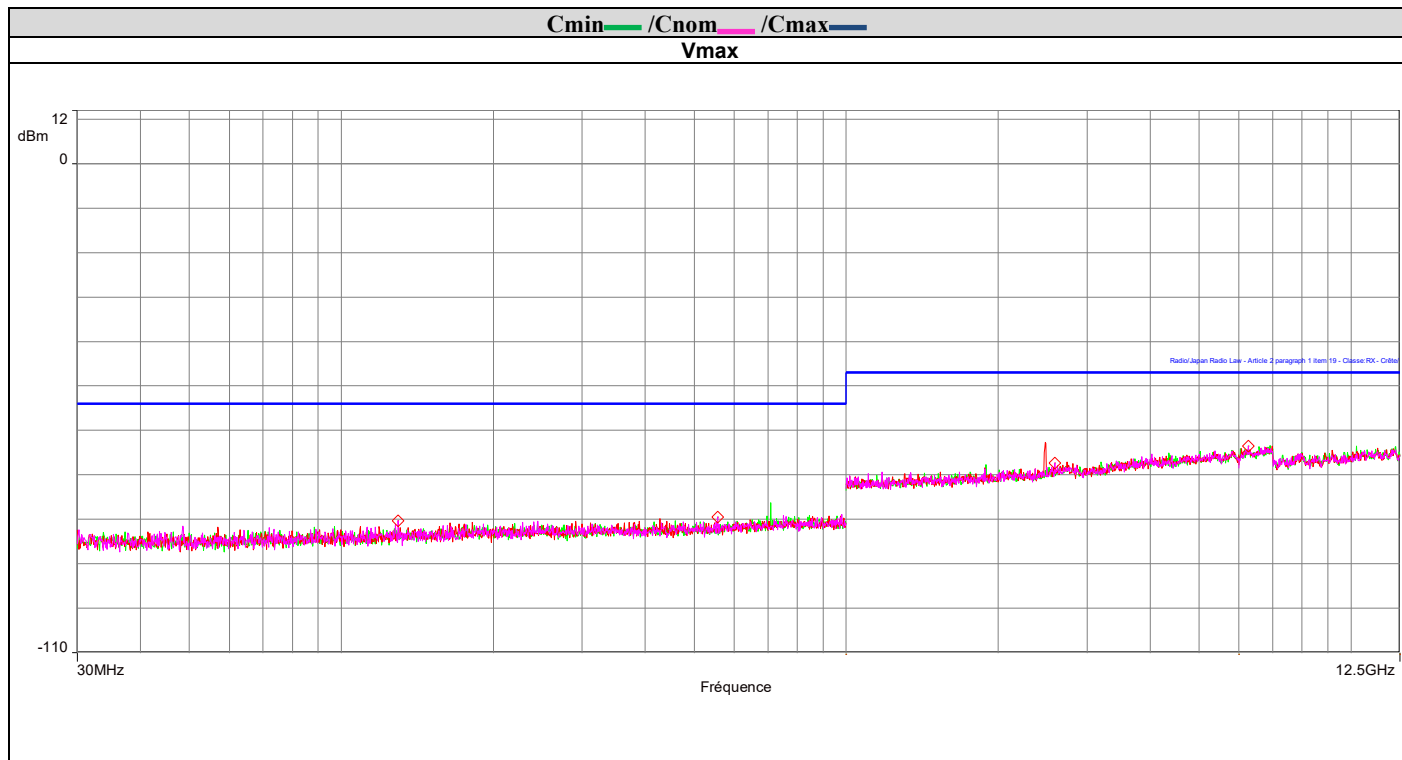
### 1Mbps



| Vmin            |             |            |            |                        |
|-----------------|-------------|------------|------------|------------------------|
| Frequency (MHz) | Level (dBm) | Level (nW) | Limit (nW) | Level (nW)- Limit (nW) |
| 180.738         | -81.16      | 7.656E-09  | 4          | -3.99999999            |
| 240.781         | -80.58      | 8.7498E-09 | 4          | -3.99999999            |
| 2477.5          | -59.55      | 1.1092E-06 | 20         | -19.9999989            |
| 6625.3          | -63.82      | 4.1495E-07 | 20         | -19.9999996            |

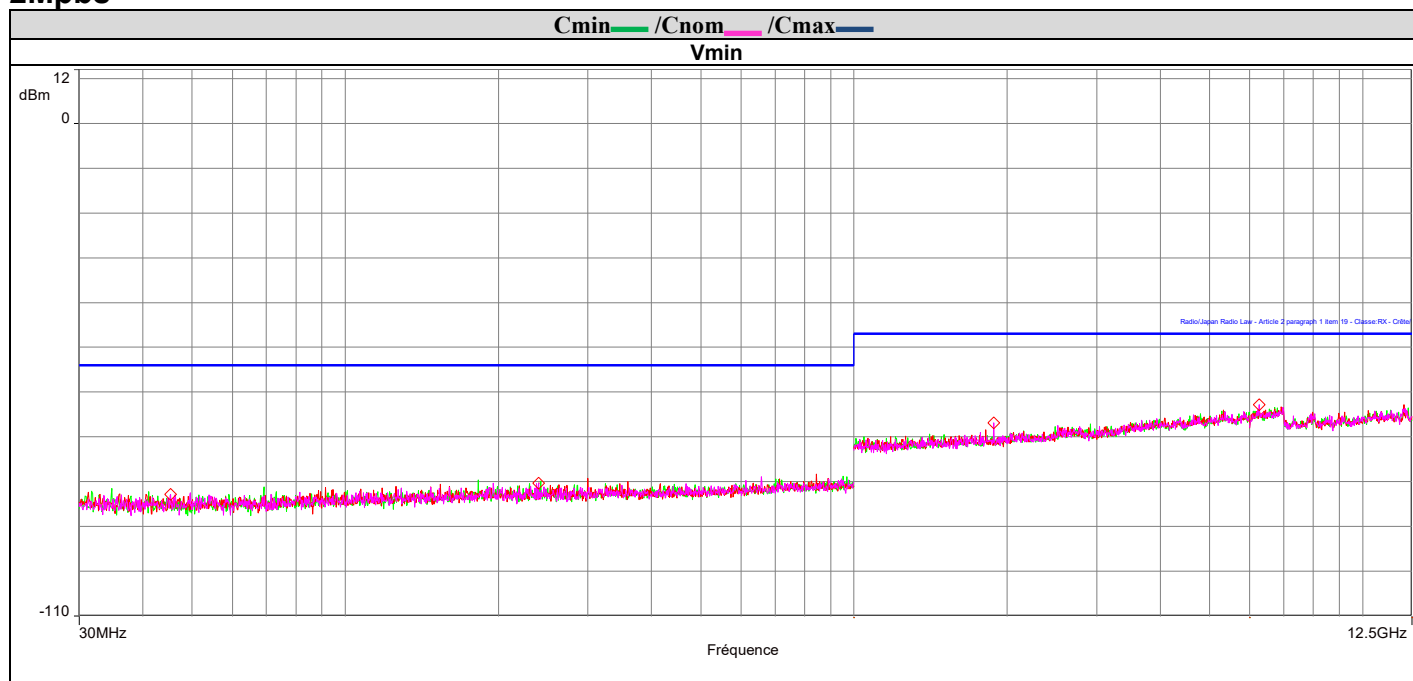


| Vmid            |             |            |            |                        |
|-----------------|-------------|------------|------------|------------------------|
| Frequency (MHz) | Level (dBm) | Level (nW) | Limit (nW) | Level (nW)- Limit (nW) |
| 258.823         | -80.77      | 8.3753E-09 | 4          | -3.99999999            |
| 917.162         | -77.38      | 1.8281E-08 | 4          | -3.99999998            |
| 2454            | -60.21      | 9.528E-07  | 20         | -19.999999             |
| 2475            | -63.09      | 4.9091E-07 | 20         | -19.9999995            |

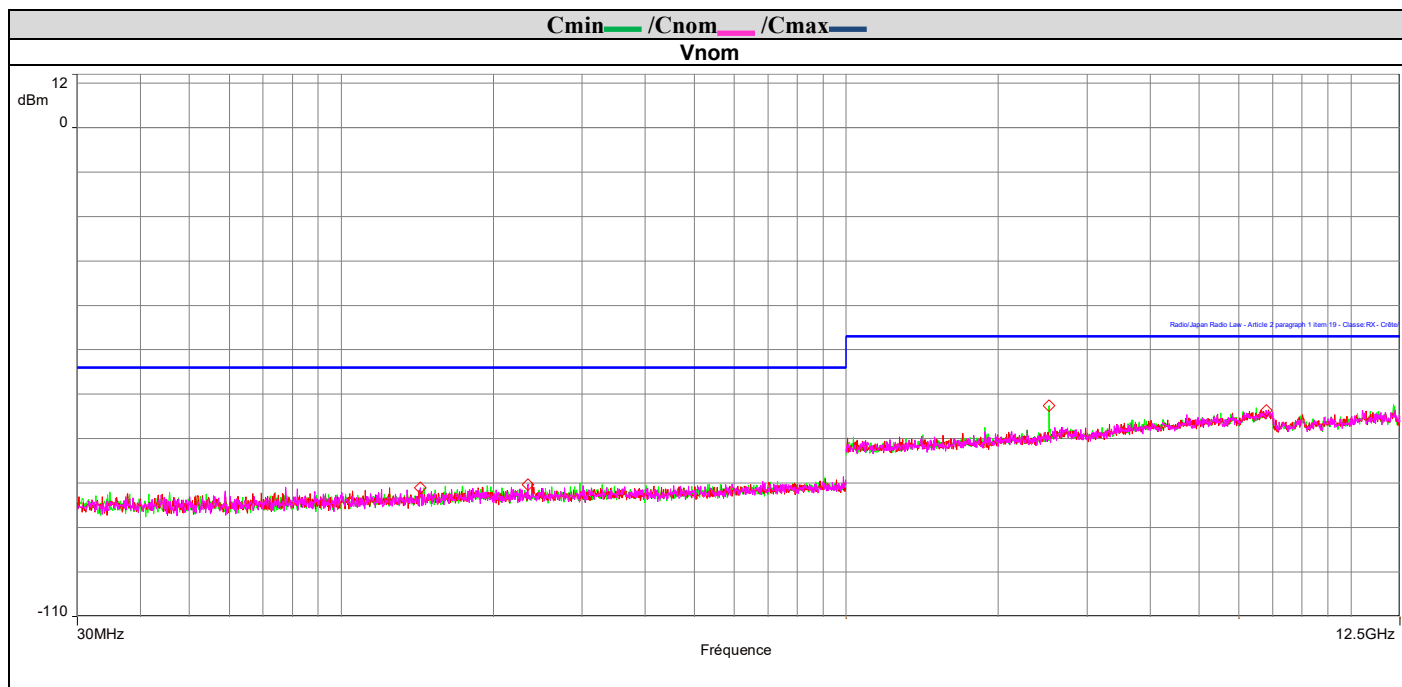


| Vmax            |             |            |            |                        |
|-----------------|-------------|------------|------------|------------------------|
| Frequency (MHz) | Level (dBm) | Level (nW) | Limit (nW) | Level (nW)- Limit (nW) |
| 129.522         | -80.36      | 9.2045E-09 | 4          | -3.99999999            |
| 556.128         | -79.49      | 1.1246E-08 | 4          | -3.99999999            |
| 2592            | -67.3       | 1.8621E-07 | 20         | -19.9999998            |
| 6267.15         | -63.49      | 4.4771E-07 | 20         | -19.9999996            |

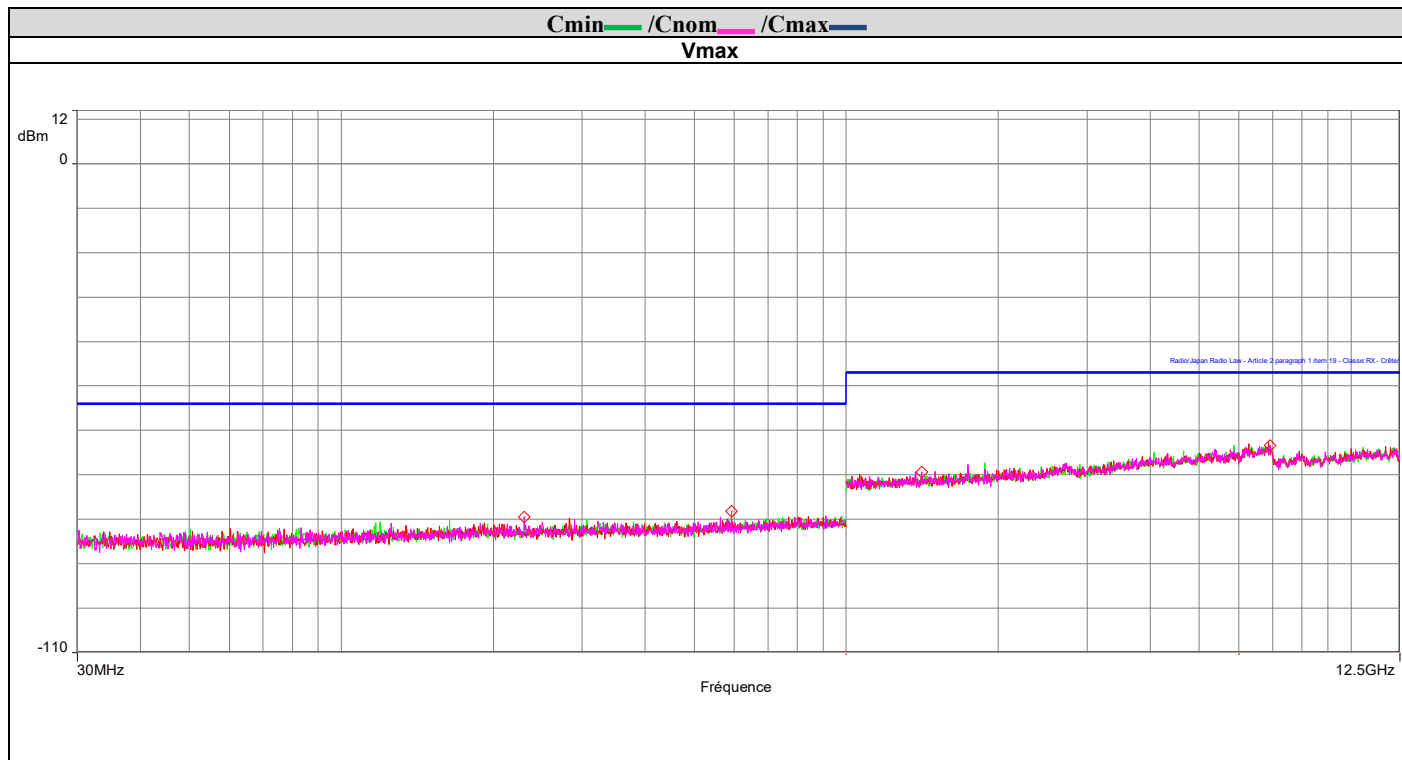
## 2Mbps



| Vmin            |             |            |            |                        |
|-----------------|-------------|------------|------------|------------------------|
| Frequency (MHz) | Level (dBm) | Level (nW) | Limit (nW) | Level (nW)- Limit (nW) |
| 45.326          | -82.81      | 5.236E-09  | 4          | -3.99999999            |
| 239.714         | -80.31      | 9.3111E-09 | 4          | -3.99999999            |
| 1882            | -66.9       | 2.0417E-07 | 20         | -19.9999998            |
| 6263.25         | -62.85      | 5.188E-07  | 20         | -19.9999995            |



| Vmid            |             |            |            |                        |
|-----------------|-------------|------------|------------|------------------------|
| Frequency (MHz) | Level (dBm) | Level (nW) | Limit (nW) | Level (nW)- Limit (nW) |
| 143.49          | -81.03      | 7.8886E-09 | 4          | -3.99999999            |
| 234.088         | -80.33      | 9.2683E-09 | 4          | -3.99999999            |
| 2521.5          | -62.59      | 5.5081E-07 | 20         | -19.9999994            |
| 6795.6          | -63.62      | 4.3451E-07 | 20         | -19.9999996            |



| Vmax            |             |            |            |                        |
|-----------------|-------------|------------|------------|------------------------|
| Frequency (MHz) | Level (dBm) | Level (nW) | Limit (nW) | Level (nW)- Limit (nW) |
| 230.402         | -79.46      | 1.1324E-08 | 4          | -3.99999999            |
| 592.6           | -78.19      | 1.5171E-08 | 4          | -3.99999998            |
| 1413            | -69.37      | 1.1561E-07 | 20         | -19.9999999            |
| 6911.3          | -63.45      | 4.5186E-07 | 20         | -19.9999995            |

## 8.7. CONCLUSION

Limit On Secondary Radiated Emissions measurement performed on the sample of the product **STM32WBA5MMG**, SN: **None**, in configuration and description presented in this test report, show levels **compliant** to the Japanese Radio Law for Article 2 paragraph 1 item 19 specified radio equipment category.



## 9. RADIO INTERFERENCE PREVENTION CAPABILITY MEASUREMENT

### 9.1. TEST CONDITIONS

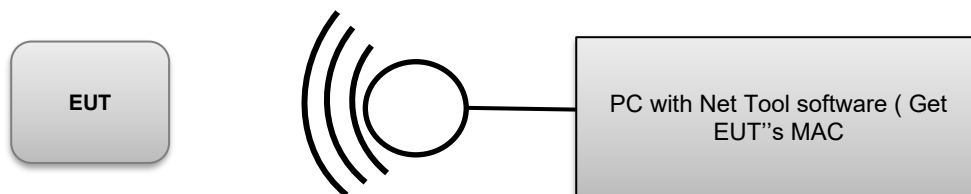
Test performed by : Akram HAKKARI  
Date of test : December 20, 2024  
Ambient temperature : 23 °C  
Relative humidity : 38 %

### 9.2. TEST SETUP

The Equipment Under Test is installed on a table.  
Measurement is performed with a test fixture **and EUT was programmed to be in normal mode.**

Test method which surpass to Clause 23 of Annex No.43 of MIC Notification No.88.

1. In the case that the EUT has the function of automatically transmitting the identification code:
  - a. Transmit the predetermined identification codes form EUT.
  - b. Check the transmitted identification codes with the demodulator.
2. In the case of receiving the identification code:
  - a. Transmit the predetermined identification codes form the counterpart.
  - b. Check if communication is normal.
  - c. Transmit the signals other than predetermined ID codes form the counterpart.
  - d. Check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.



*Radio interference prevention capability measurement*

### 9.3. LIMIT

Identification code shall  $\geq 48$  bits.

### 9.4. TEST EQUIPMENT LIST

| TEST EQUIPMENT USED |              |           |               |
|---------------------|--------------|-----------|---------------|
| Description         | Manufacturer | Model     | Software used |
| Smartphone          | APPLE        | IPHONE 14 | ST BLE Sensor |

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

None


### 9.6. RESULTS

Configuration: Normal mode

| identification code:     |
|--------------------------|
| <b>00:80:E1:2A:36:CD</b> |

15:02 4G 27

Available Boards ⚙️



WBA5M\_CD

-99dBm
00:80:E1:2A:36:CD

### 9.7. CONCLUSION

Radio interference prevention capability measurement performed on the sample of the product **STM32WBA5MMG**, SN: **None**, in configuration and description presented in this test report, show levels **compliant** to the **Japanese Radio Law for Article 2 paragraph 1 item 19** limits.

## 10. CONSTRUCTION PROTECTION CONFIRMATION METHOD

### 10.1. TEST CONDITIONS

Test performed by : Akram HAKKARI  
Date of test : December 20, 2024  
Ambient temperature : 23 °C  
Relative humidity : 38 %

### 10.2. TEST SETUP

The RF and modulation portions are protected against illegal modification as following method:

| No | Method                                                                                                                                                    |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Sealed with special screws.                                                                                                                               |
| 2  | Plastic chassis is being welded using ultrasonic waves.                                                                                                   |
| 3  | Chassis is glued using a special adhesive.                                                                                                                |
| 4  | Metal covers are spot-fused.                                                                                                                              |
| 5  | Cover is specially interlocked.                                                                                                                           |
| 6  | RF and Modulation components are covered with shielding case and this shielding case is soldered                                                          |
| 7  | Shield case is welded at RF and modulation parts, and ID-ROM is welded using the BGA Method.                                                              |
| 8  | Shield case is welded at RF and modulation parts, and ID-ROM is glued at its lead with a special adhesive.                                                |
| 9  | Shield case is welded at RF and modulation parts, and ID-ROM is glued with a non-transparent laminating agent.                                            |
| 10 | RF and Modulation parts are mounted on PCB with surface mount technology, and there is no any adjustable part on PCB or adjustable parts are not exposed. |

### 10.3. LIMIT

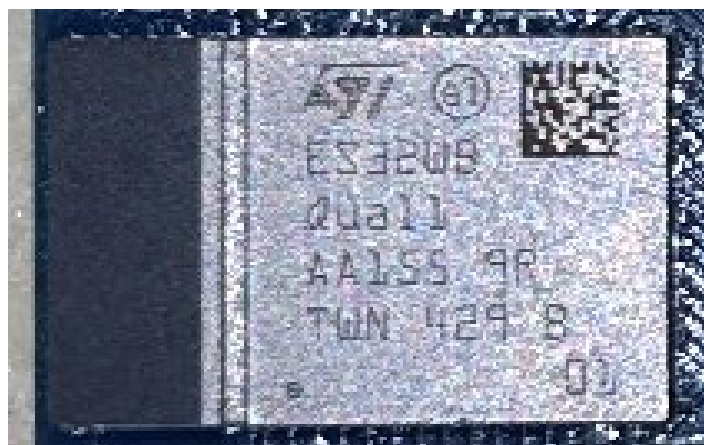
(See Article 49-20, Item 1-a of the Ordinance Regulating Radio Equipment)

The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily.

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

None

## 10.5. RESULTS



*Construction Protection Confirmation Method*

| No | Method                                                                                                                                                    |                                     |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| 10 | RF and Modulation parts are mounted on PCB with surface mount technology, and there is no any adjustable part on PCB or adjustable parts are not exposed. | <input checked="" type="checkbox"/> |

## 10.6. CONCLUSION

Construction protection confirmation method t performed on the sample of the product **STM32WBA5MMG**, SN: **None**, in configuration and description presented in this test report, show levels **compliant** to the **Japanese Radio Law for Article 2 paragraph 1 item 19** limits.

## 11. UNCERTAINTIES CHART

| Kind of test                       | Wide uncertainty laboratory<br>(k=2) $\pm x(\text{dB}) / (\text{Hz}) / \text{ms}$ | Uncertainty limit      |
|------------------------------------|-----------------------------------------------------------------------------------|------------------------|
| RF Output Power, Conducted         | $\pm 0.6 \text{ dB}$                                                              | $\pm 1.5 \text{ dB}$   |
| Power Spectral Density, Conducted  | $\pm 0.6 \text{ dB}$                                                              | $\pm 3 \text{ dB}$     |
| Unwanted Emissions, Conducted      | $\pm 0.6 \text{ dB}$                                                              | $\pm 3 \text{ dB}$     |
| All Emissions, Radiated below 1GHz | $\pm 3.9 \text{ dB}$                                                              | $\pm 6 \text{ dB}$     |
| All Emissions, Radiated above 1GHz | $\pm 3.1 \text{ dB}$                                                              |                        |
| Temperature                        | $\pm 0.5^\circ \text{C}$                                                          | $\pm 3^\circ \text{C}$ |

The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR. The conformity of the sample is directly established by the applicable limits values. This table includes all uncertainties maximum feasible for testing in the laboratory, whether or not made in this report