



LCIE

Bluetooth Low Energy Template : Release July 2nd, 2021

TEST REPORT

N°: 32858294-825211-A(FILE#15233277)

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

MANUFACTURE FRANCAISE DES PNEUMATIQUES
MICHELIN
23 PLACE DES CARMES DECHAUX
63000 – CLERMONT-FERRAND
FRANCE

Apparatus under test

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

Tire Mounted Sensor

MICHELIN

MANUFACTURE FRANCAISE DES PNEUMATIQUES MICHELIN

TMS AQ-01

F40046A0031A

Conclusion

See Test Program chapter

Test date

June 30, 2026

Test location

Moirans

Composition of document

47 pages

Document issued on

August 20, 2026

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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	☒ PASS	☐ FAIL	☐ NA	☐ NP(1)
Modulation Method	☒ PASS	☐ FAIL	☐ NA	☐ NP(1)
Frequency Band	☒ PASS	☐ FAIL	☐ NA	☐ NP(1)
Antenna Power & Antenna Power Tolerance & EIRP	☒ PASS	☐ FAIL	☐ NA	☐ NP(1)
Spread Bandwidth	☒ PASS	☐ FAIL	☐ NA	☐ NP(1)
Spread Factor	☐ PASS	☐ FAIL	☒ NA	☐ NP(1)
Occupied Bandwidth	☒ PASS	☐ FAIL	☐ NA	☐ NP(1)
Spurious Emissions Intensity	☒ PASS	☐ FAIL	☐ NA	☐ NP(1)
Limit On Secondary Spurious Emissions	☒ PASS	☐ FAIL	☒ NA	☐ NP(1)
Antenna Gain	☒ PASS	☐ FAIL	☐ NA	☐ NP(1)
Half Power Beam Angle	☐ PASS	☐ FAIL	☒ NA	☐ NP(1)
Carrier Sensing Function	☐ PASS	☐ FAIL	☒ NA	☐ NP(1)
Dwell Time	☐ PASS	☐ FAIL	☒ NA	☐ NP(1)
Number of Carrier	☐ PASS	☐ FAIL	☒ NA	☐ NP(1)
Housing Requirements	☒ PASS (2)	☐ FAIL	☐ NA	☐ NP(1)
Interference Prevention Function	☒ PASS (3)	☐ 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. 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

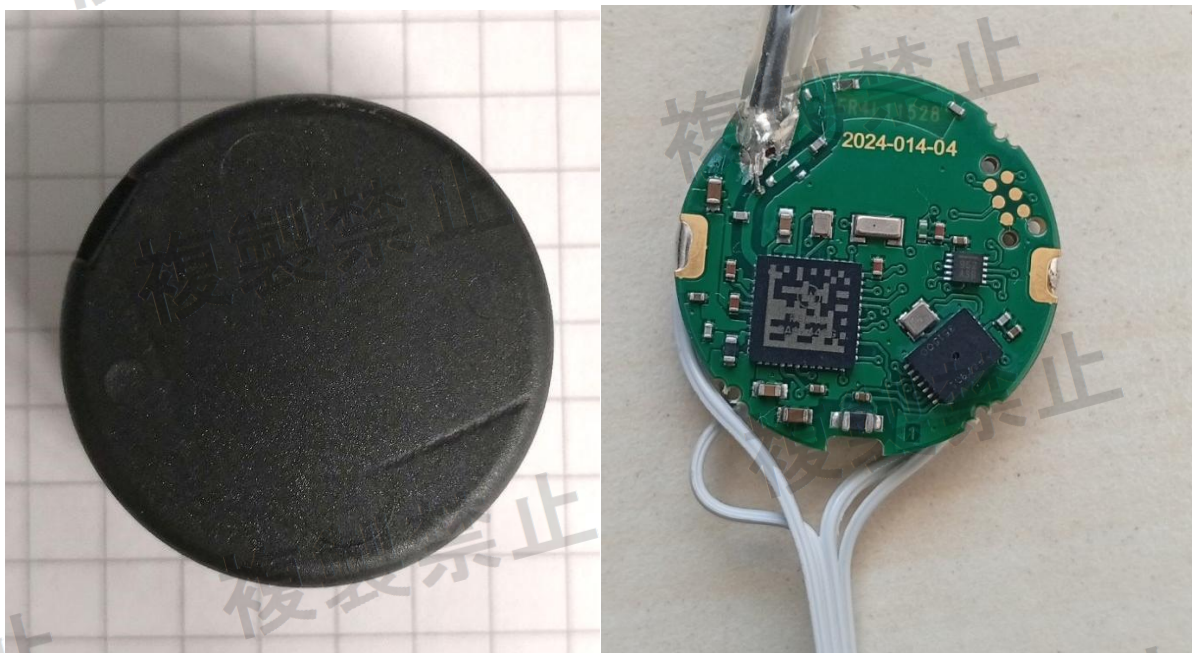
DP: Declaration of provider

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

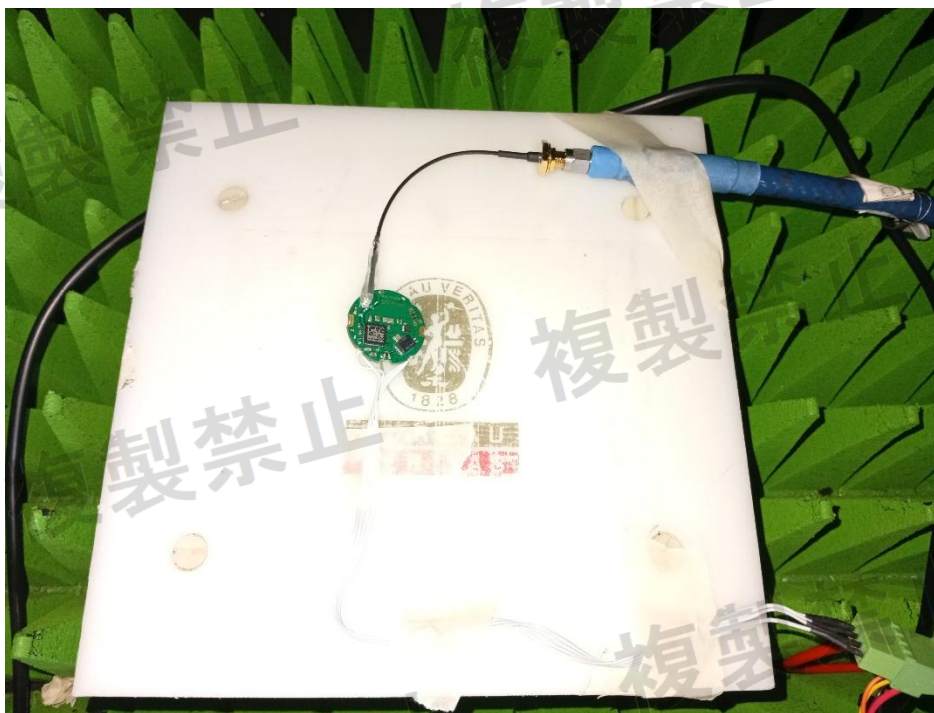
2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):

TMS AQ-01 Serial Number: F40046A0031A



Equipment Under Test



Equipment used during conducted

Power supply:

Name	Type	Rating	Reference / Sn	Comments
Supply1	Battery	3V	/	/

NC: Not communicated by provider

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Comments
Supply1	4 wires	0.2	Yes	No	Used only for test

NC: Not communicated by provider

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
LAPTOP	LENOVO	/	/

NC: Not communicated by provider

**Software & Hardware identification:**

-Software version:

-Hardware version:

Equipment information:

Bluetooth LE Type:	☒ BLE	☐ v6.0	☐ v4.1	☒ v4.2
Frequency band:	[2400 – 2483.5] MHz			
Spectrum Modulation:	☒ Other Digital method			
Number of Channel:	40			
Spacing channel:	2MHz			
Channel bandwidth:	1MHz			
Antenna Type:	☒ Integral	☐ External	☐ Dedicated	
Antenna connector:	☐ Yes	☐ No	☒ Temporary for test	
Transmit chains:	☐ 1			
	Single antenna			
	Gain : -1.54dBi			
Beam forming gain:	No			
Receiver chains	1			
Type of equipment:	☒ Stand-alone	☐ Plug-in	☐ Combined	
Ad-Hoc mode:	☐ Yes		☒ No	
Equipment type:	☒ Production model		☐ Pre-production model	
Type of power source:	☐ AC power supply	☐ DC power supply	☒ Battery	
Operating voltage range:	Vmin	☐ 90V/50Hz-60Hz	☒ 2.7Vdc	
	Vnom:	☐ 100V/50Hz-60Hz	☒ 3Vdc	
	Vmax:	☐ 110V/50Hz-60Hz	☒ 3.3Vdc	



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CHANNEL PLAN

Channel	Frequency (MHz)	Channel	Frequency (MHz)
Cmin: 0	2402	Cmid: 20	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	Cmax: 39	2480

DATA RATE

Data Rate (Mbps)	Modulation Type	Worst Case Modulation
1	GFSK	☒

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



L C I E

Test mode

Description of test mode

Permanent emission with modulation on a fixed channel in the data rate that produced the power below:
BLE TX

3.4.2 Transmit in Modulated mode (1 - N frames)

This command emits one or more modulated frames, on a specified channel, with a specified power, spaced by a specified interval.

Please refer to the command **MMx** & **MMx_M** of the [Table 5 Command presets list](#).

For example, send this command:

4D 49 21 33 62 09 06 03 AA AA AA AA 01 64 00 00 00 C8 00 00 00 AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA 43 48

Test mode 1

MMx & MMx_M command format		
Field	Description	Example value (Hexadecimal)
Start Of Frame	Always equals 4D49h	4D 49
Length	Equals to 12h plus the size of the RF payload	21 (12h + Fh ; see RF Payload)
Command ID	Always equals 33h for this command	33
Channel	Channel frequency (MHz) 16-bits, Least Significant Byte First	62 09 (2402MHz)
Power	RF power (dBm) 8-bit signed two's complement	06 (+6dBm - max power)
Sync word length	Length of the sync word. Allowed values: - 00h → 8-bits - 01h → 16-bits - 02h → 24-bits - 03h → 32-bits	03 (32-bits)
Sync word	Sync Word, sent Most Significant Byte First, but Least Significant Bit First.	AA AA AA AA
Preamble length	Length of the preamble in bytes The preamble is fixed to AAh.	01 (1 byte)
Number of frames	Number of identical frames to be sent 32-bits, Least Significant Byte First	64 00 00 00 (100 frames)
Interval	Time interval between frames in milliseconds. 32-bits, Least Significant Byte First	C8 00 00 00 (200ms interval)
RF payload	Contents of the payload to be sent in the RF frame.	AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA (15=Fh bytes in total)
End Of Frame	Always equals 4348h	43 48

Table 4 MMx & MMx_M command format

With this command, the TMS should transmit 100 frames with 200ms interval on 2402MHz at +6dBm.



L C I E

Test mode 1

Permanent emission with modulation on a fixed channel in the data rate that produced the power below:

BLE TX3.4.1 [Transmit in Carrier Wave mode](#)

This command emits a Carrier Wave on a specified channel, with a specified power, and during a specified duration.

Please refer to the command **CWx** of the [Table 5 Command presets list](#).

For example, send this command:

4D 49 08 32 62 09 06 20 4E 00 00 43 48

CWx command format		
Field	Description	Example value (Hexadecimal)
Start Of Frame	Always equals 4D49h	4D 49
Length	Always equals 08h for this command	08
Command ID	Always equals 32h for this command	32
Channel	Channel frequency (MHz) 16-bits, Least Significant Byte First	62 09 (2402MHz)
Power	RF power (dBm) 8-bits signed two's complement	06 (+6dBm - max power)
Duration	Duration of the Carrier Wave 32-bits, Least Significant Byte First	20 4E 00 00 (20 000ms)
End Of Frame	Always equals 4348h	43 48

Table 3 CWx command format

Test mode 2

BLE RX

Permanent Reception

3.4.3 [Receive mode](#)

This command sets the TMS in RF receive mode on a specified channel with a specified duration.

Please refer to the command **RXx** of the [Table 5 Command presets list](#).

For example, send this command:

4D 49 07 34 62 09 20 4E 00 00 43 48

CWx command format		
Field	Description	Example value (Hexadecimal)
Start Of Frame	Always equals 4D49h	4D 49
Length	Always equals 07h for this command	07
Command ID	Always equals 34h for this command	34
Channel	Channel frequency (MHz) 16-bits, Least Significant Byte First	62 09 (2402MHz)
Duration	Duration of the Carrier Wave 32-bits, Least Significant Byte First	20 4E 00 00 (20 000ms)
End Of Frame	Always equals 4348h	43 48

With this command, the TMS should be in receive mode during 20s on channel 2402MHz.



2.3. EQUIPMENT LABELLING

None

2.4. EQUIPMENT MODIFICATION

☒ None ☐ Modification:

2.5. CALIBRATION DATE

The calibration intervals are extended at 4 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.

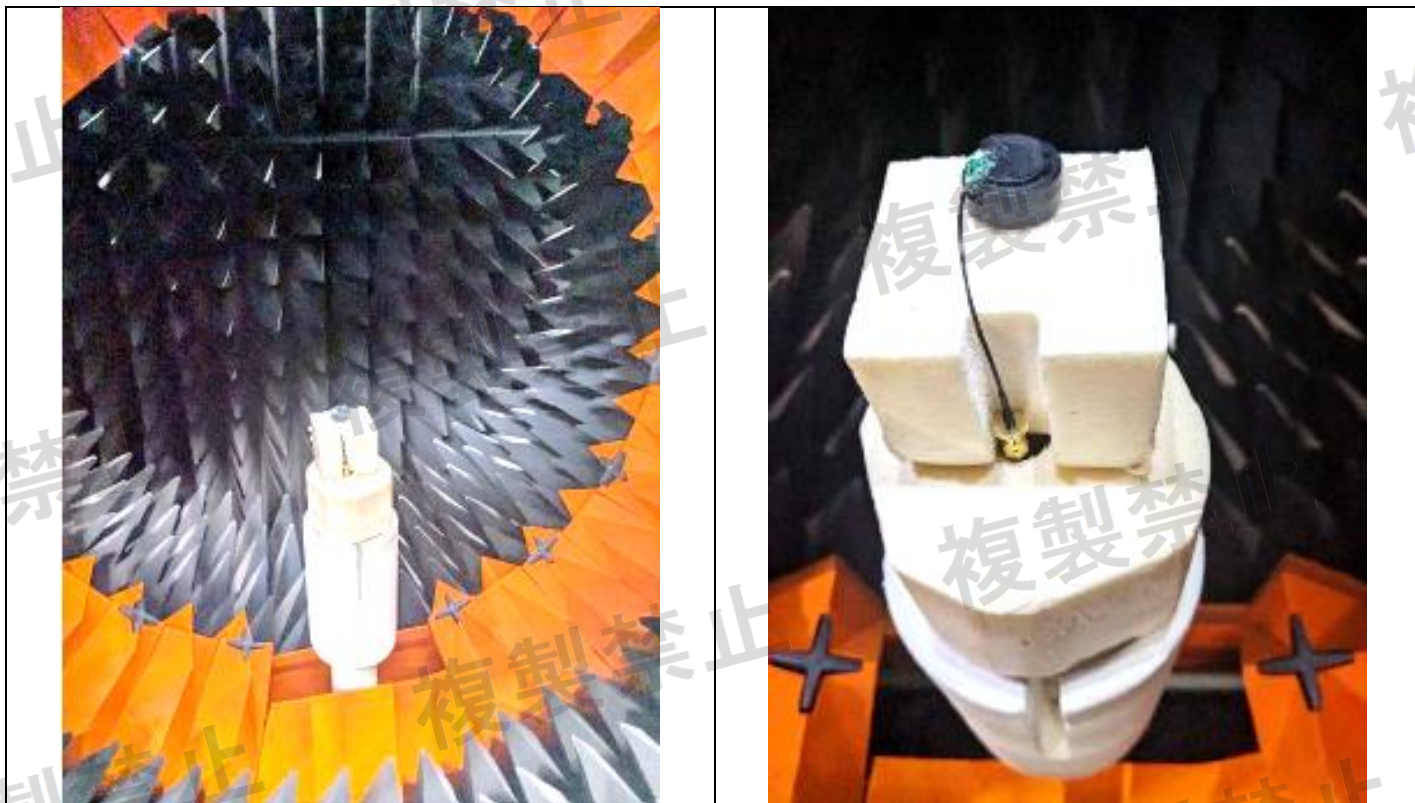
3. ANTENNA GAIN & ANTENNA PATTERN

3.1. TEST CONDITIONS

Test performed by : Marlon BOUBY
 Date of test : July 1, 2026
 Ambient temperature : 23 °C
 Relative humidity : 45 %

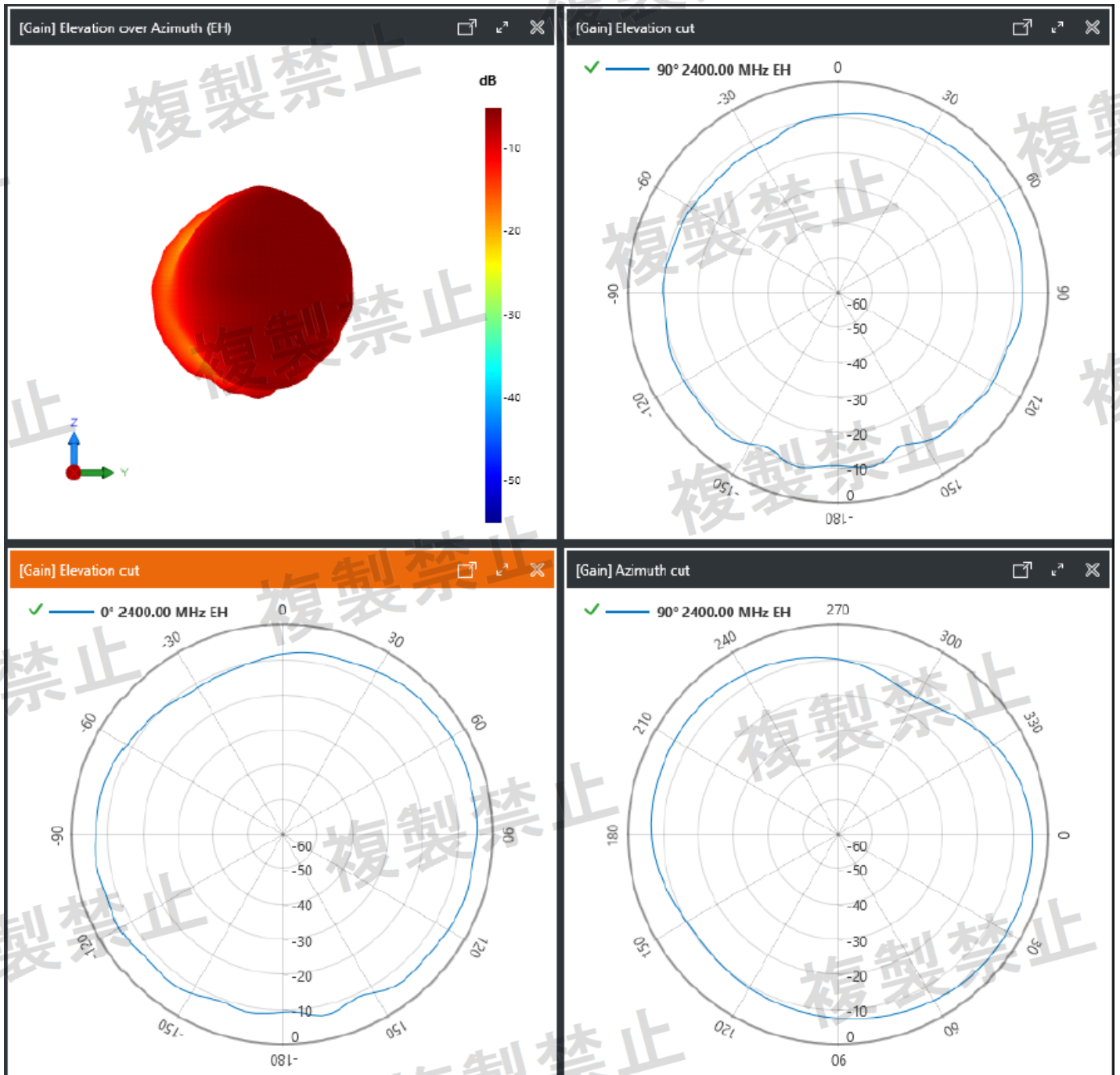
3.2. MANUFACTURER DECLARATION

Below is the information obtained from test report TMS AP-01-01 Antenna Measurement provided by the MANUFACTURE FRANCAISE DES PNEUMATIQUES MICHELIN.



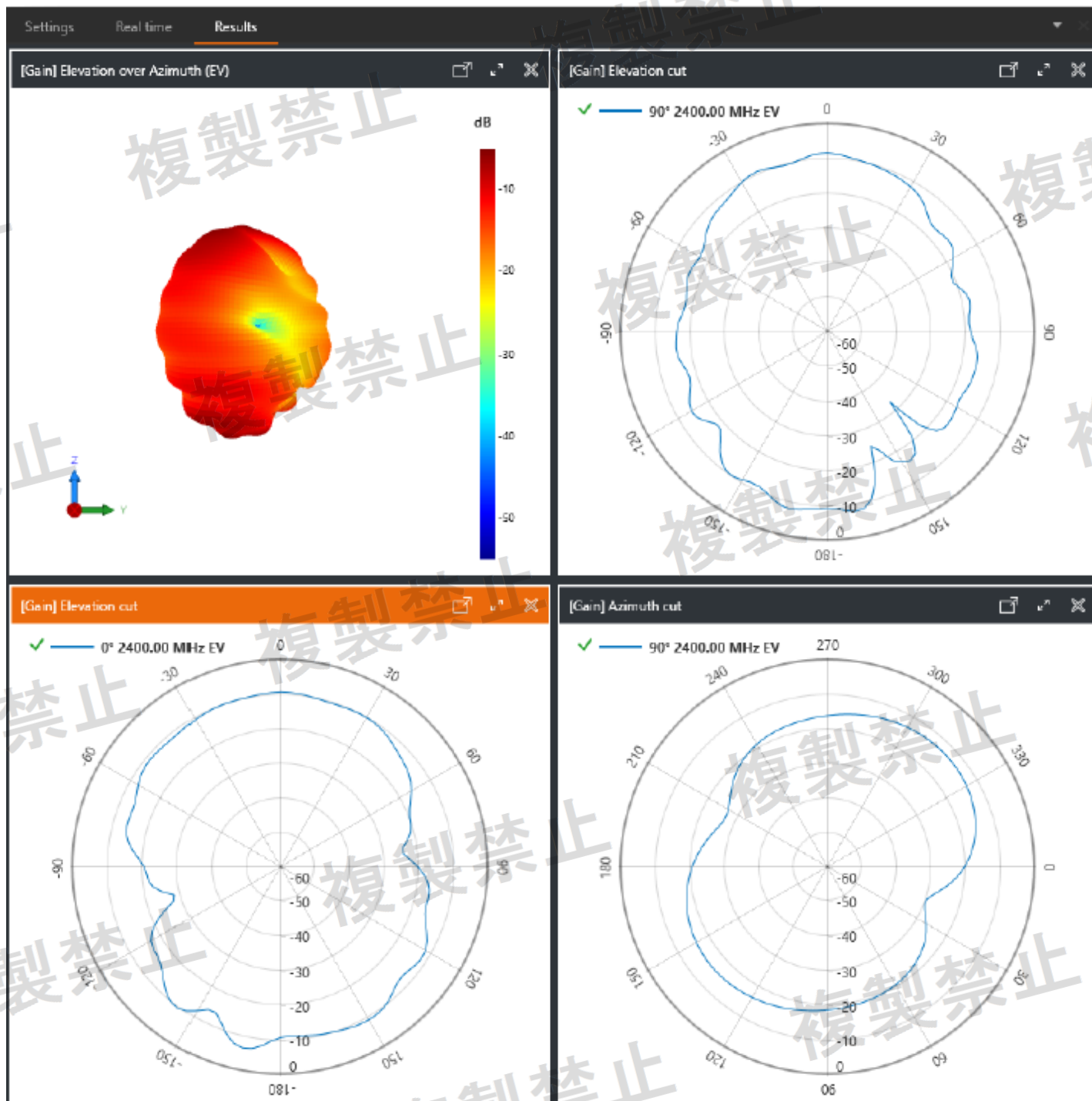


L C I E





L C I E



[Antenna Parameters] Frequency cut	
Frequency	Gain
2400.00 MHz	-3.88 dB
2405.00 MHz	-3.53 dB
2410.00 MHz	-3.21 dB
2415.00 MHz	-2.83 dB
2420.00 MHz	-2.62 dB
2425.00 MHz	-2.46 dB
2430.00 MHz	-2.27 dB
2435.00 MHz	-2.11 dB
2440.00 MHz	-1.96 dB
2445.00 MHz	-1.93 dB
2450.00 MHz	-1.88 dB
2455.00 MHz	-1.89 dB
2460.00 MHz	-1.62 dB
2465.00 MHz	-1.54 dB
2470.00 MHz	-1.68 dB
2475.00 MHz	-1.99 dB
2480.00 MHz	-2.11 dB
2485.00 MHz	-2.07 dB
2490.00 MHz	-1.98 dB
2495.00 MHz	-2.09 dB
2500.00 MHz	-2.48 dB

Conclusion

The antenna A9001978 from AVX Kyocera place on a PCB (ref 2023-011-01) reached a measured maximum peak gain of -1.54 dBi in the frequency band 2400-24500MHz.

In the Bluetooth advertising channels 2402, 2426 and 2480MHz, the antenna A9001978 reached a measured maximum peak gain of -2.11 dBi.



4. ANTENNA POWER & TOLERANCE FOR ANTENNA POWER & EIRP

4.1. TEST CONDITIONS

Test performed by : Marlon BOUBY
Date of test : July 1, 2026
Ambient temperature : 23 °C
Relative humidity : 45 %

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

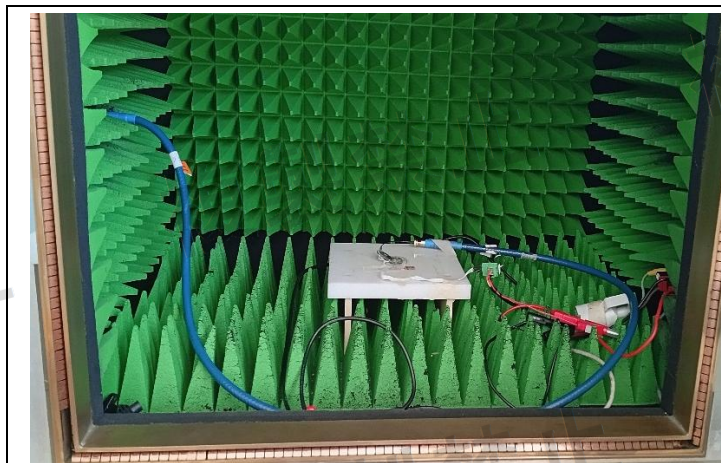
Continuous Sweep

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
POWER METER	DARE	RPR3006W	A1503032	11/2024	11/2026	c)	C
CABLE	SUCOFLEX	18GHz	A5329864	01/2025	07/2026	d)	A
DC Power Supply	RS PRO	RS3005P	A7042314	(*)	(*)	N/A	N/A
Full Anechoic Room	SIEPEL	—	D3044024	(*)	(*)	N/A	N/A
CABLE	SUCOFLEX	18GHz	A5329863	08/2025	08/2026	d)	A
THERMO HYGROMETER	TESTO	608-H2	B4204121	05/2025	05/2027	d)	A
CONTROL TOOLS	FLUKE	289	A1241119	05/2025	05/2027	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)	4.1	3.68	3.99
Antenna Power (mW)	2.570	2.333	2.506
Declared Antenna Power (mW)	5	5	5
Tolerance for Antenna Power (%)	-48.59	-53.33	-49.88
EIRP (dBm)	2.56	2.14	2.45
Voltage	Vnom		
Channel	Cmin	Cnom	Cmax
Antenna Power (dBm)	4.03	4.16	3.9
Antenna Power (mW)	2.529	2.606	2.455
Declared Antenna Power (mW)	5	5	5
Tolerance for Antenna Power (%)	-49.41	-47.88	-50.91
EIRP (dBm)	2.49	2.62	2.36
Voltage	Vmax		
Channel	Cmin	Cnom	Cmax
Antenna Power (dBm)	3.92	4.11	3.89
Antenna Power (mW)	2.466	2.576	2.449
Declared Antenna Power (mW)	5	5	5
Tolerance for Antenna Power (%)	-50.68	-48.47	-51.02
EIRP (dBm)	2.38	2.57	2.35

4.7. CONCLUSION

Antenna Power, Tolerance for Antenna Power & EIRP measurement performed on the sample of the **TMS AQ-01**, SN: **F40046A0031A**, 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 : Marlon BOUBY
Date of test : July 1, 2026
Ambient temperature : 23 °C
Relative humidity : 45 %

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

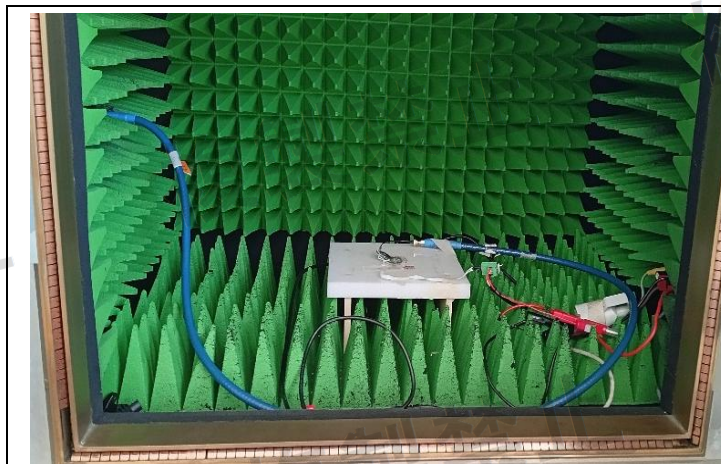
VBW= 3kHz

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
CABLE	SUCOFLEX	18GHz	A5329864	01/2025	07/2026	d)	A
DC Power Supply	RS PRO	RS3005P	A7042314	(*)	(*)	N/A	N/A
Full Anechoic Room	SIEPEL	—	D3044024	(*)	(*)	N/A	N/A
CABLE	SUCOFLEX	18GHz	A5329863	08/2025	08/2026	d)	A
THERMO HYGROMETER	TESTO	608-H2	B4204121	05/2025	05/2027	d)	A
CONTROL TOOLS	FLUKE	289	A1241119	05/2025	05/2027	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).

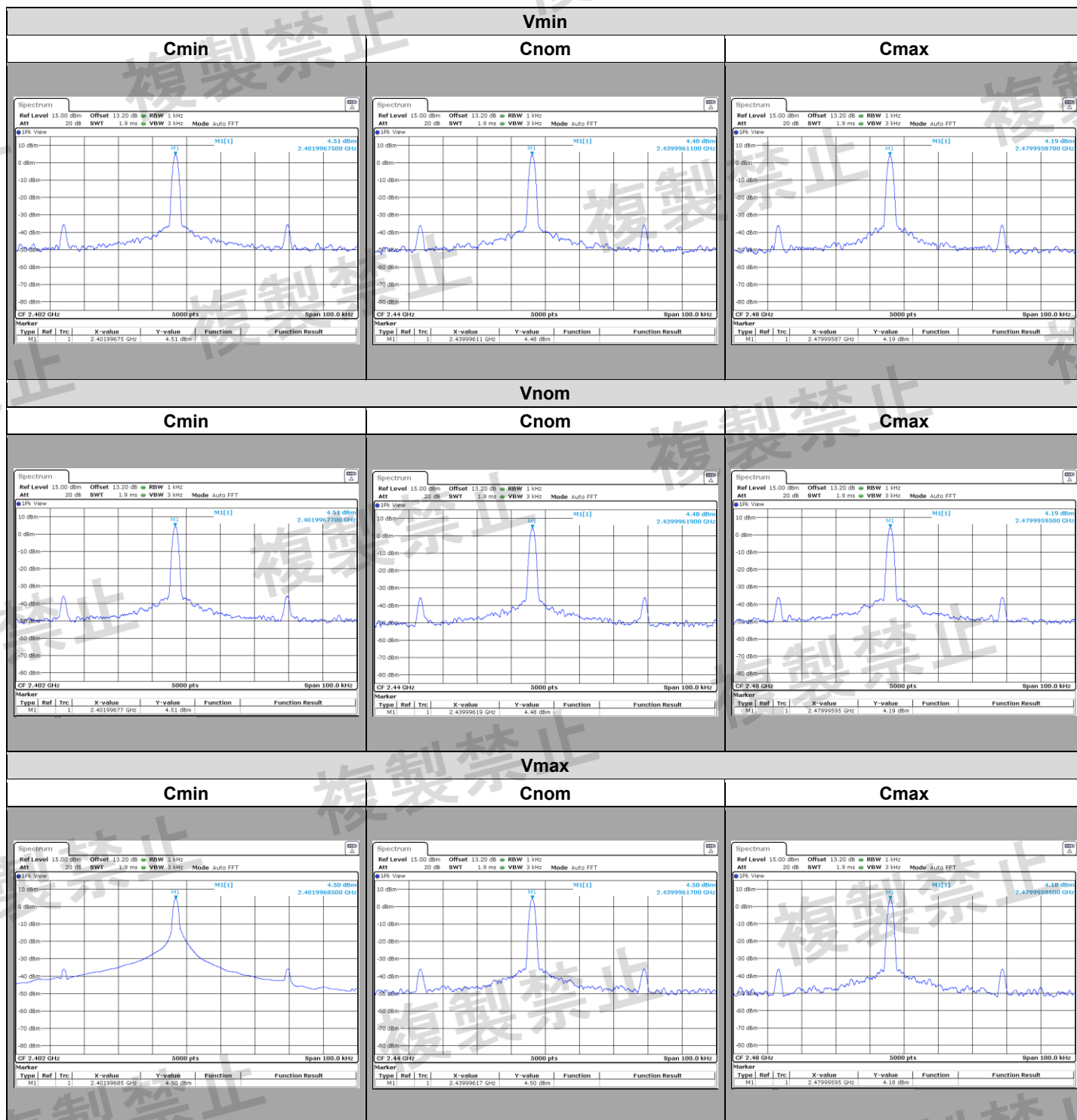
c) : Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph

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)	2401.99675	2439.99611	2479.99587
Frequency Tolerance (ppm)	-1.3530	-1.5943	-1.6653
Limite Frequency Tolerance (ppm)	± 50	± 50	± 50
Voltage	Vnom		
Channel	Cmin	Cnom	Cmax
Declared Frequency (MHz)	2402	2440	2480
Measured Frequency (MHz)	2401.99677	2439.99619	2479.99595
Frequency Tolerance (ppm)	-1.3447	-1.5615	-1.6331
Limite Frequency Tolerance (ppm)	± 50	± 50	± 50
Voltage	Vmax		
Channel	Cmin	Cnom	Cmax
Declared Frequency (MHz)	2402	2440	2480
Measured Frequency (MHz)	2401.99685	2439.99617	2479.99595
Frequency Tolerance (ppm)	-1.3114	-1.5697	-1.6331
Limite Frequency Tolerance (ppm)	± 50	± 50	± 50

5.7. CONCLUSION

Frequency Tolerance measurement performed on the sample of the product TMS **AQ-01**, SN: **F40046A0031A**, 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 : Marlon BOUBY
Date of test : July 1, 2026
Ambient temperature : 23 °C
Relative humidity : 45 %

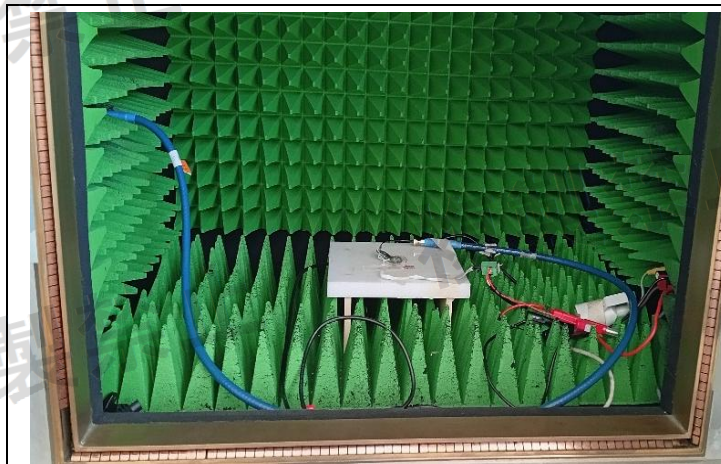
6.2. TEST SETUP

- 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
CABLE	SUCOFLEX	18GHz	A5329864	01/2025	07/2026	d)	A
DC Power Supply	RS PRO	RS3005P	A7042314	(*)	(*)	N/A	N/A
Full Anechoic Room	SIEPEL	—	D3044024	(*)	(*)	N/A	N/A
CABLE	SUCOFLEX	18GHz	A5329863	08/2025	08/2026	d)	A
THERMO HYGROMETER	TESTO	608-H2	B4204121	05/2025	05/2027	d)	A
CONTROL TOOLS	FLUKE	289	A1241119	05/2025	05/2027	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

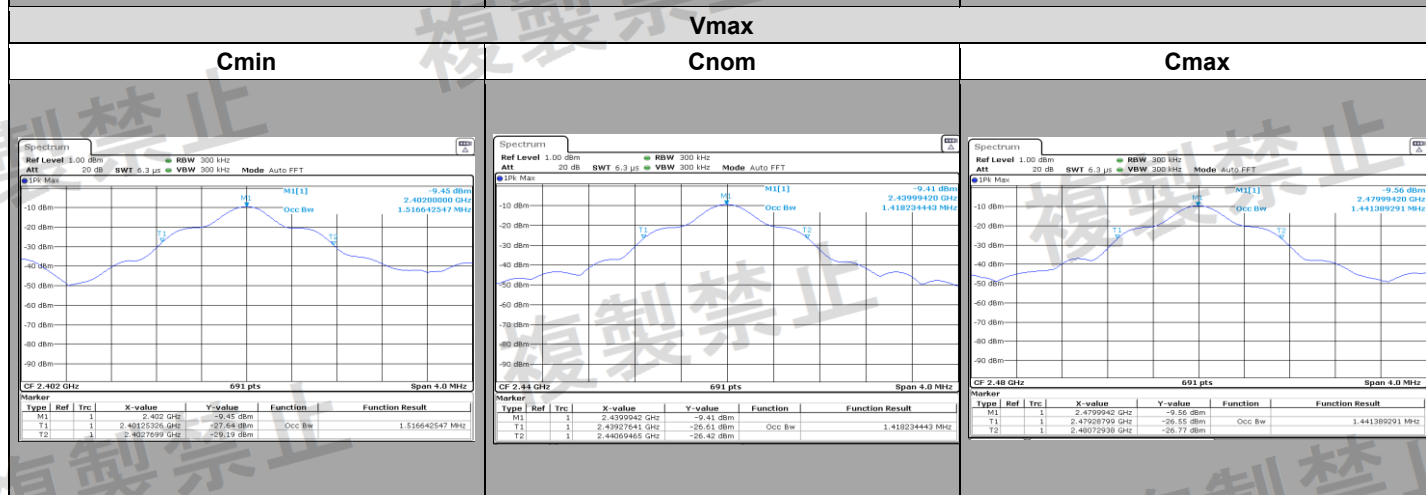
d) Calibration conducted by using other equipment that listed above from a) to c)

6.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒ None

☐ Divergence:

1Mbps
Occupied Bandwidth 1Mbps





LCIE

Spread bandwidth 1Mbps



Voltage		Vmin	
Channel	Cmin	Cnom	Cmax
Occupied Bandwidth (MHz)	1.638	1.459	1.436
Spread Bandwidth (MHz)	0.856	0.821	0.793
Limit (MHz)	≤ 26MHz	≤ 26MHz	≤ 26MHz
Voltage		Vnom	
Channel	Cmin	Cnom	Cmax
Occupied Bandwidth (MHz)	1.568	1.499	1.458
Spread Bandwidth (MHz)	0.804	0.810	0.798
Limit (MHz)	≤ 26MHz	≤ 26MHz	≤ 26MHz
Voltage		Vmax	
Channel	Cmin	Cnom	Cmax
Occupied Bandwidth (MHz)	1.5166	1.418	1.441
Spread Bandwidth (MHz)	0.827	0.804	0.775
Limit (MHz)	≤ 26MHz	≤ 26MHz	≤ 26MHz

6.7. CONCLUSION

Occupied Channel Bandwidth measurement performed on the sample of the product. **TMS AQ-01**, SN: **F40046A0031A**, 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

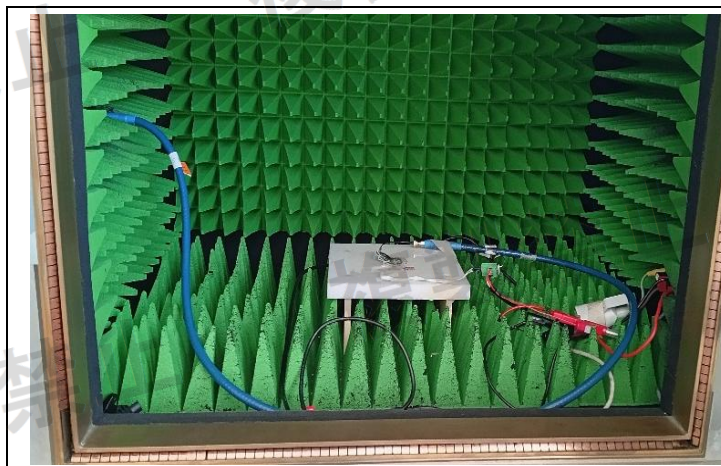
Test performed by : Marlon BOUBY
Date of test : July 1, 2026
Ambient temperature : 23 °C
Relative humidity : 45 %

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 Ω 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
CABLE	SUCOFLEX	18GHz	A5329864	01/2025	07/2026	d)	A
DC Power Supply	RS PRO	RS3005P	A7042314	(*)	(*)	N/A	N/A
Full Anechoic Room	SIEPEL	—	D3044024	(*)	(*)	N/A	N/A
CABLE	SUCOFLEX	18GHz	A5329863	08/2025	08/2026	d)	A
THERMO HYGROMETER	TESTO	608-H2	B4204121	05/2025	05/2027	d)	A
CONTROL TOOLS	FLUKE	289	A1241119	05/2025	05/2027	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

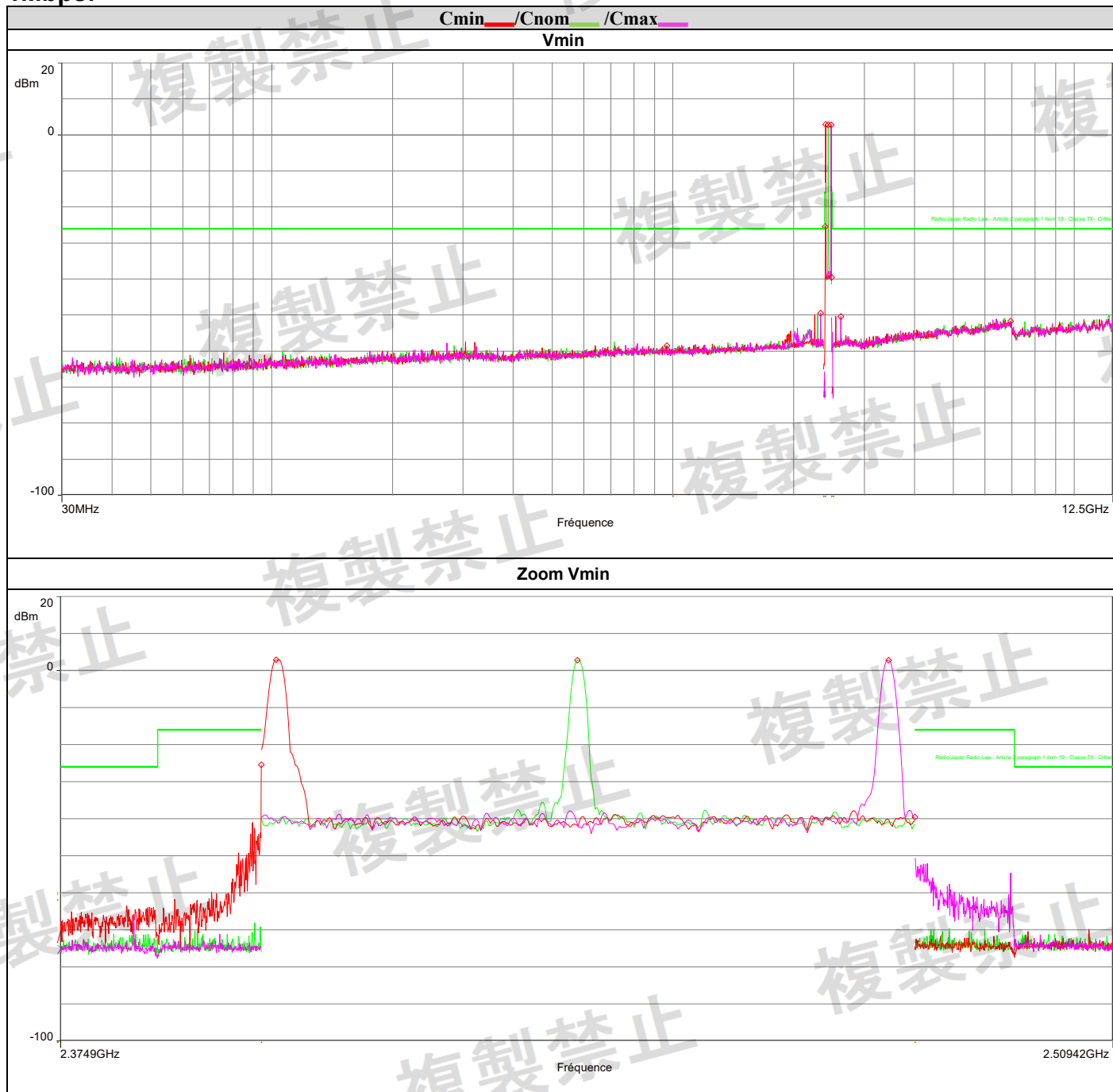
☒ None ☐ Divergence:



L C I E

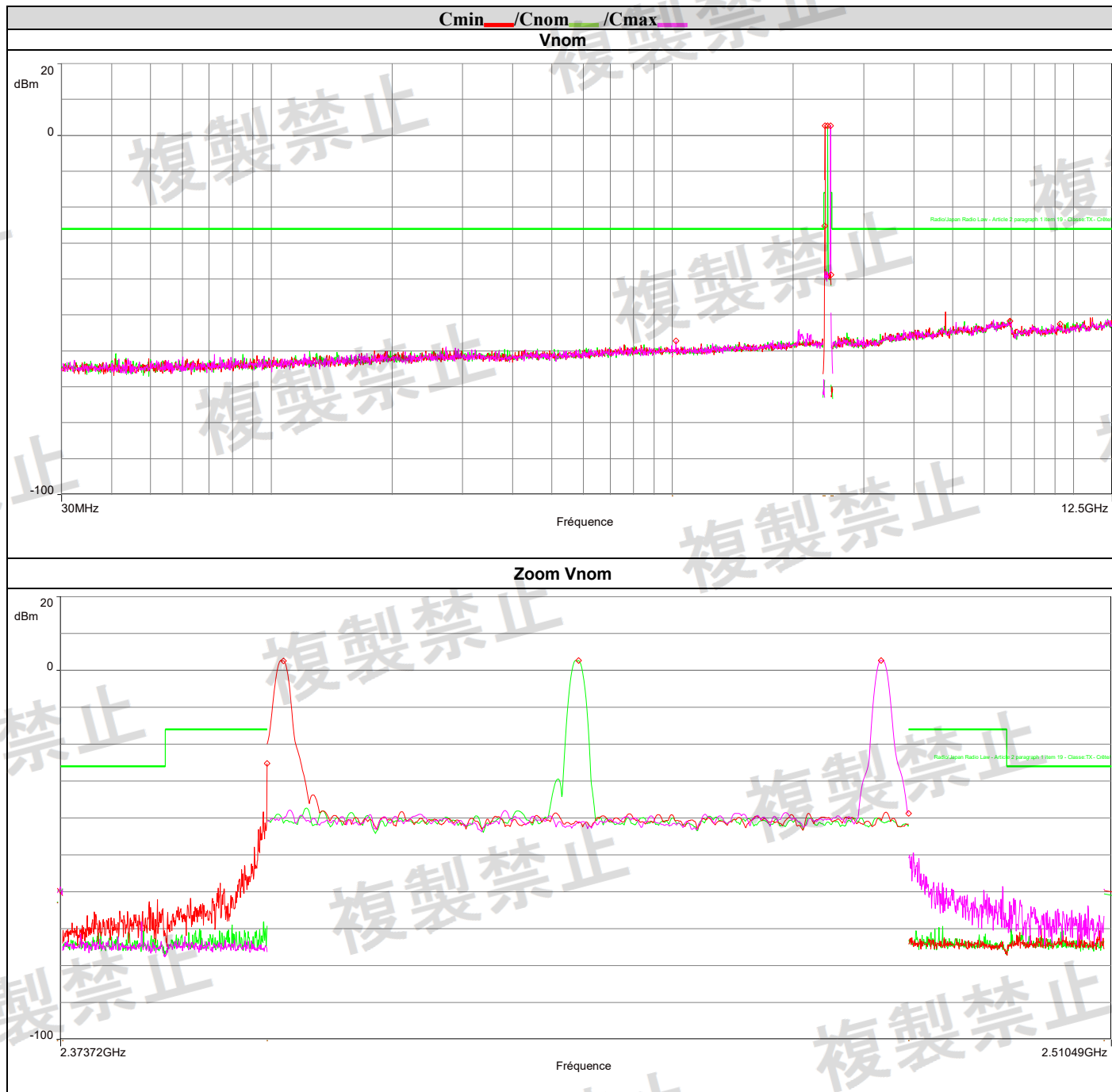
7.6. RESULTS

1Mbps:



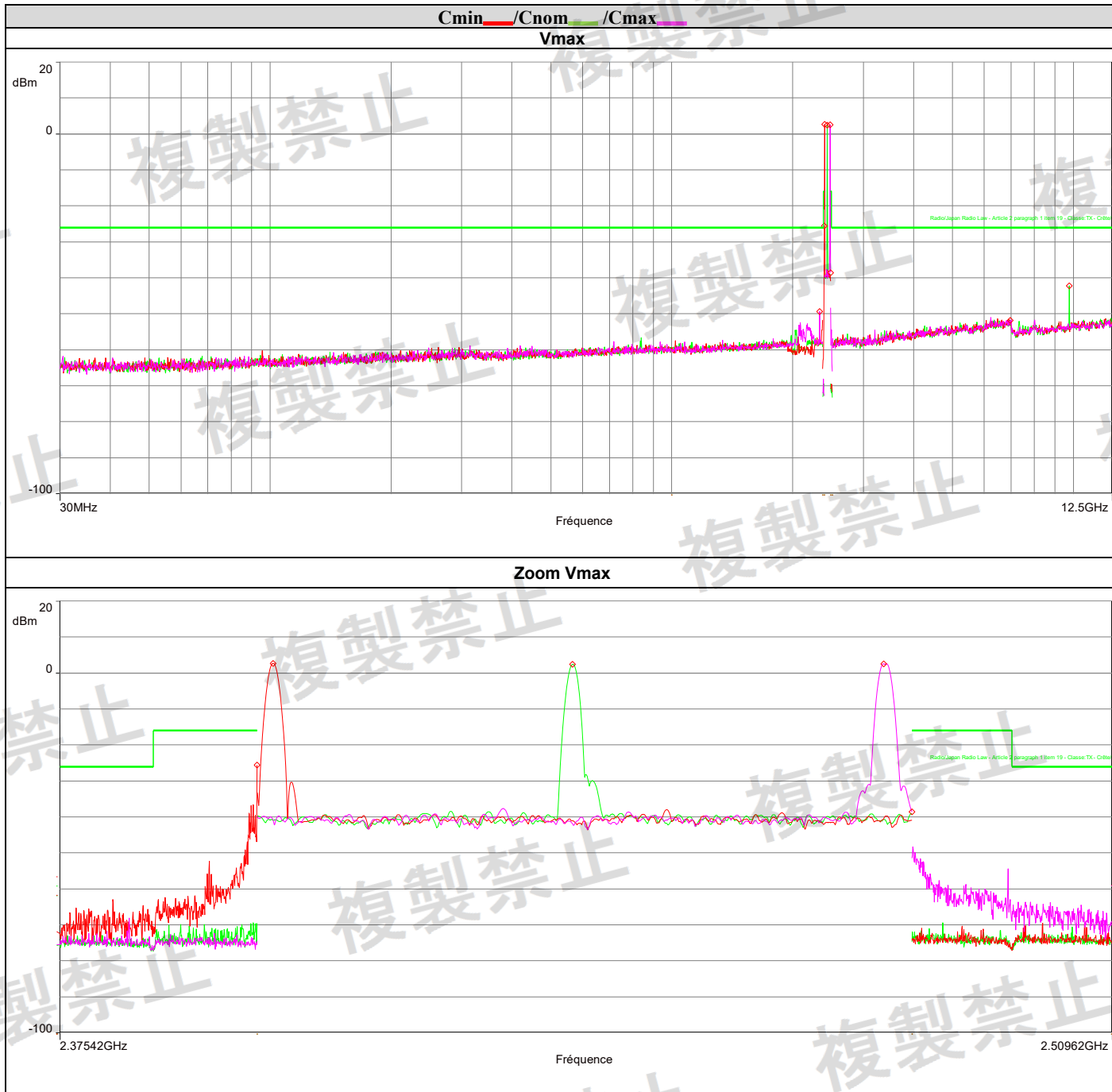


L C I E





L C I E





Vmin				
Frequency (MHz)	Level (dBm)	Level (uW/MHz)	Limit (uW/MHz)	Level (uW/MHz)- Limit (uW/MHz)
966.050	-58.56	0.001	2.50	-2.50
2400.000	-25.46	2.844	25.00	-22.16
2401.8202	2.90	1584.893		
2440.066	2.77	1892.344		
2480.118	2.79	1901.078		
2483.500	-39.57	0.110	25.00	-24.89
5372.777	-53.39	0.005	2.50	-2.50
6943.283	-51.38	0.007	2.50	-2.50

Vmid				
Frequency (MHz)	Level (dBm)	Level (uW/MHz)	Limit (uW/MHz)	Level (uW/MHz)- Limit (uW/MHz)
1021.022	-57.18	0.002	2.50	-2.50
2400.000	-25.25	2.985	25.00	-22.02
2402.079	2.61	1823.897		
2440.180	2.62	1828.100		
2479.842	2.72	1870.681		
2483.500	-38.78	0.132	25.00	-24.87
6944.282	-51.66	0.007	2.50	-2.50
9257.083	-52.48	0.006	2.50	-2.50

Vmax				
Frequency (MHz)	Level (dBm)	Level (uW/MHz)	Limit (uW/MHz)	Level (uW/MHz)- Limit (uW/MHz)
936.756	-57.75	0.002	2.50	-2.50
2400.000	-25.56	2.779	25.00	-22.22
2401.987	2.71	1866.379		
2439.863	2.41	1741.807		
2479.834	2.59	1815.515		
2483.500	-38.57	0.139	25.00	-24.86
6962.265	-51.85	0.007	2.50	-2.50
9759.605	-42.26	0.059	2.50	-2.44



7.7. CONCLUSION

Spurious Emission Intensity measurement performed on the sample of the product. **TMS AQ-01**, SN: **F40046A0031A**, 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

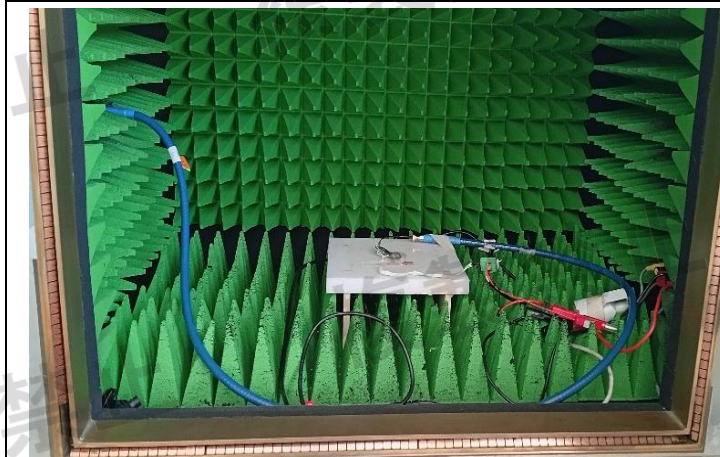
Test performed by : Marlon BOUBY
Date of test : July 1, 2026
Ambient temperature : 23 °C
Relative humidity : 45 %

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 Ω 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
CABLE	SUCOFLEX	18GHz	A5329864	01/2025	07/2026	d)	A
DC Power Supply	RS PRO	RS3005P	A7042314	(*)	(*)	N/A	N/A
Full Anechoic Room	SIEPEL	—	D3044024	(*)	(*)	N/A	N/A
CABLE	SUCOFLEX	18GHz	A5329863	08/2025	08/2026	d)	A
THERMO HYGROMETER	TESTO	608-H2	B4204121	05/2025	05/2027	d)	A
CONTROL TOOLS	FLUKE	289	A1241119	05/2025	05/2027	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 :

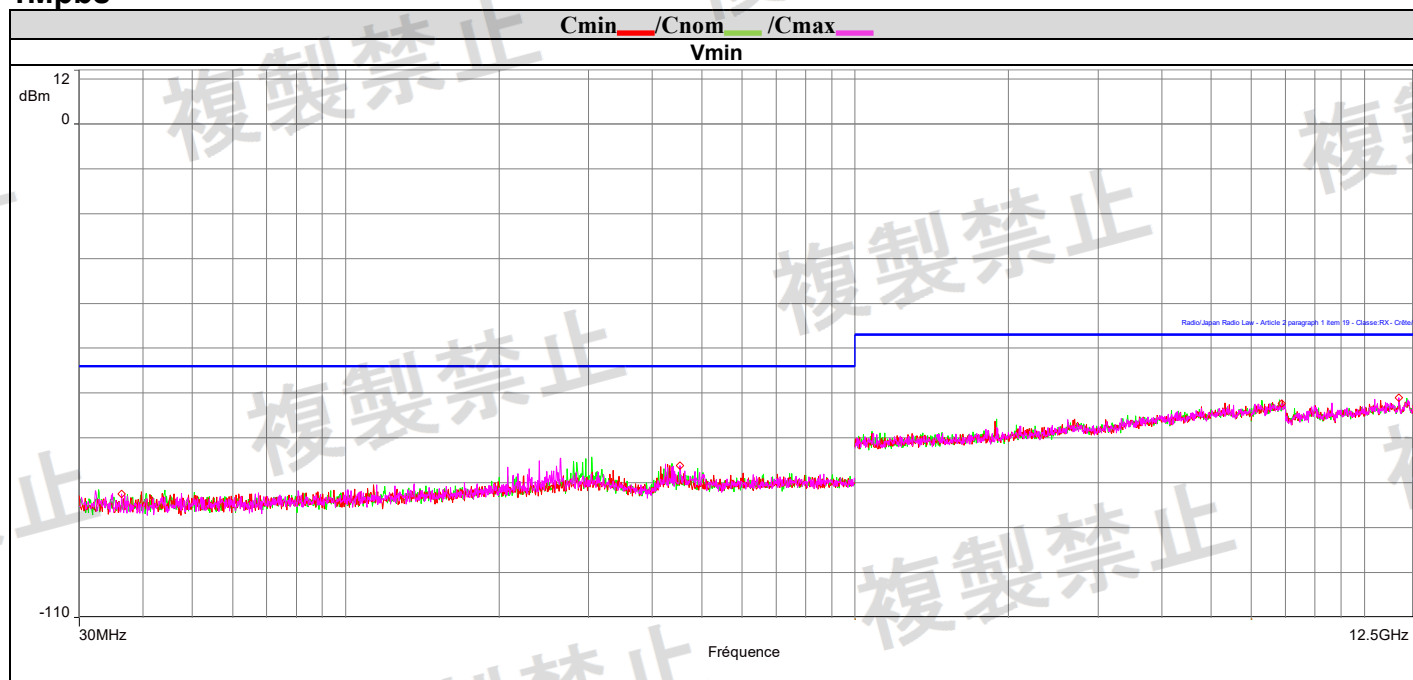
- a) : Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph.
b) : Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992) (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

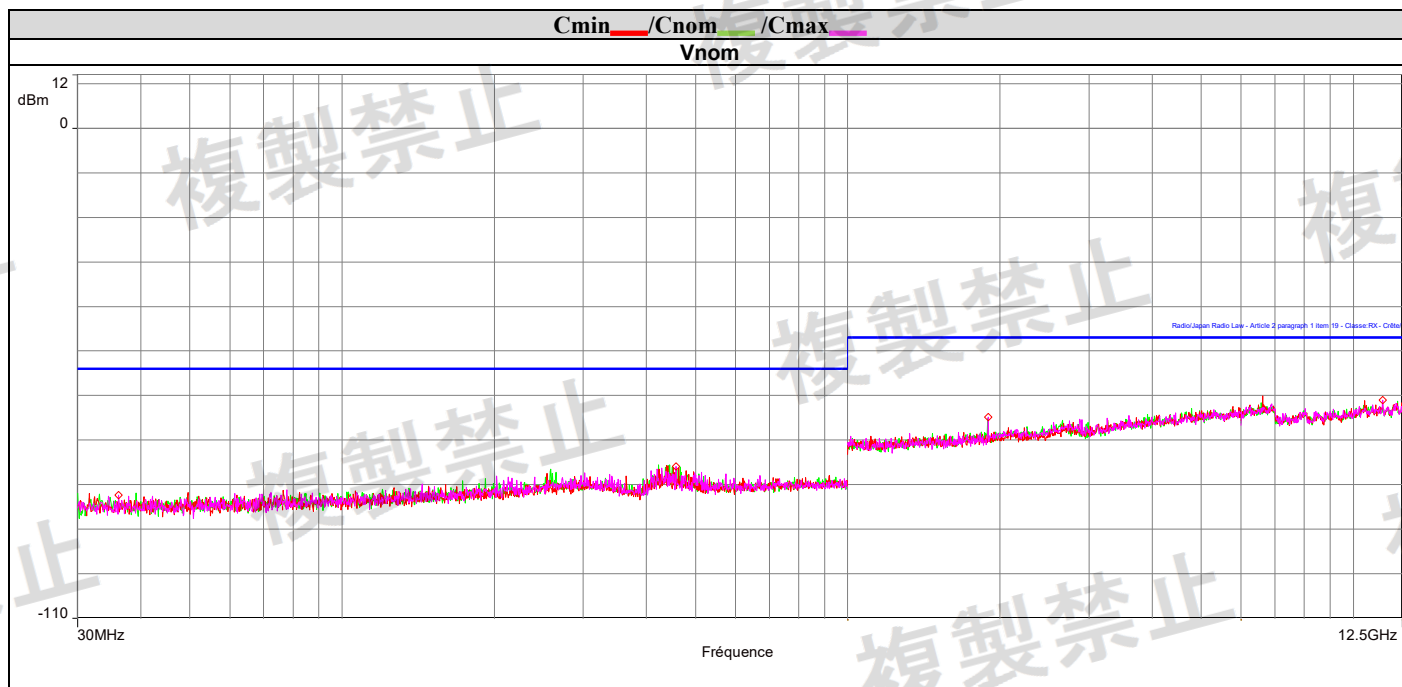
☒ None ☐ Divergence:

8.6. RESULTS

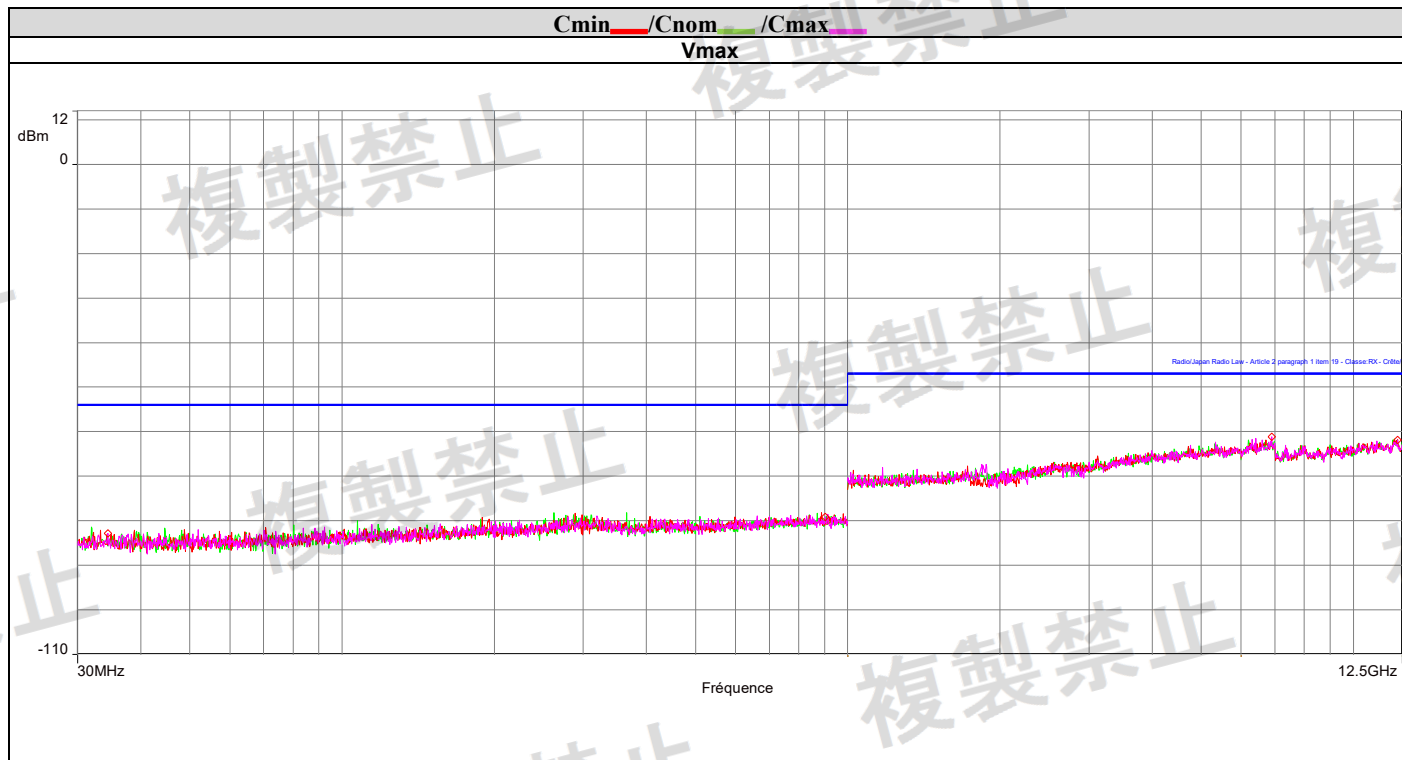
1Mbps



Vmin				
Frequency (MHz)	Level (dBm)	Level (nW)	Limit (nW)	Level (nW) - Limit (nW)
36.305	-82.41	0.006	4.00	-3.99
453.111	-76.14	0.024	4.00	-3.98
69872.300	-62.32	0.586	20.00	-19.41
11675.150	-60.98	0.798	20.00	-19.20



Vmid				
Frequency (MHz)	Level (dBm)	Level (nW)	Limit (nW)	Level (nW)- Limit (nW)
36.111	-82.37	0.006	4.00	-3.99
457.770	-75.95	0.025	4.00	-3.98
1895.000	-64.83	0.329	20.00	-19.67
11437.900	-60.98	0.798	20.00	-19.20



Vmax				
Frequency (MHz)	Level (dBm)	Level (nW)	Limit (nW)	Level (nW) - Limit (nW)
34.462	-82.79	0.005	4.00	-3.99
902.515	-79.08	0.012	4.00	-3.98
6889.95	-61.20	0.758	20.00	-19.24
12227.65	-61.89	0.641	20.00	-19.36

8.7. CONCLUSION

Limit On Secondary Radiated Emissions measurement performed on the sample of the product **TMS AQ-01**, SN: **F40046A0031A**, 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

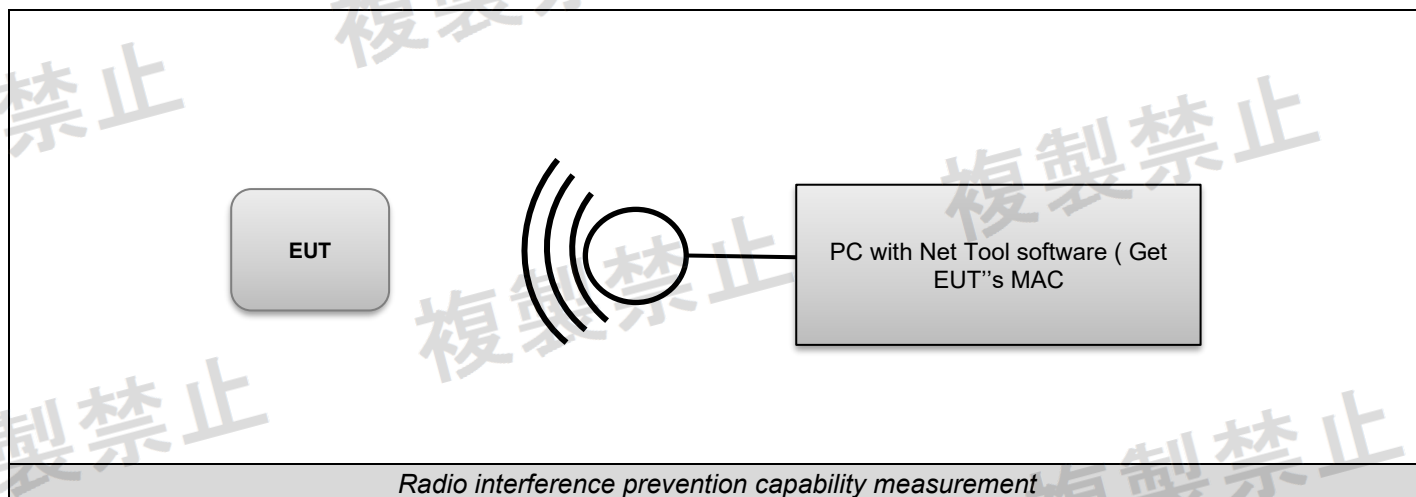
Test performed by : Marlon BOUBY
Date of test : July 8, 2026
Ambient temperature : 23 °C
Relative humidity : 45 %

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.





9.3. LIMIT

Identification code shall ≥ 48 bits.

9.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED			
Description	Manufacturer	Model	Software used
Laptop	LENOVO	L470	HTerm V0.8.9

9.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

9.6. RESULTS

Configuration: Normal mode

identification code:

F4 00 46 A0 03 1A

Sequence Overview

TMS_command_presets

- Ping
- CWL (2402MHz, +6dBm, 20s)
- CWM (2440MHz, +6dBm, 20s)
- CWH (2480MHz, +6dBm, 20s)
- MML (2402MHz, +6dBm, 1 Frame)
- MMM (2440MHz, +6dBm, 1 Frame)
- MMH (2480MHz, +6dBm, 1 Frame)
- MML_M (2402MHz, +6dBm, 100 Frame, 200ms spacing)
- MMM_M (2440MHz, +6dBm, 100 Frame, 200ms spacing)
- MMH_M (2480MHz, +6dBm, 100 Frame, 200ms spacing)
- RXL (2402MHz, 20s)
- RXM (2440MHz, 20s)
- RXH (2480MHz, 20s)

Received Data

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43				
4D	49	02	80	00	43	48	4D	49	0C	81	01	1A	03	A0	46	00	F4	00	00	00	00	43	48																							

Selection (12:17) 6 - Timediff 00:00:00.000.0

Input control

Clear transmitted ☐ Ascii ☒ Hex ☐ Dec ☐ Bin Send on enter None

Type: HEX



9.7. CONCLUSION

Radio interference prevention capability measurement performed on the sample of the product **TMS AQ-01**, SN: **F40046A0031A**, 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 : Marlon BOUBY
Date of test : July 1, 2026
Ambient temperature : 23 °C
Relative humidity : 45 %

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.	☒

10.6. CONCLUSION

Construction protection confirmation method performed on the sample of the product **TMS AQ-01**, SN: **F40046A0031A**, 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 (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