RADIO TEST REPORT

Test Report No. 15647760H-C-R2

Customer	**Panasonic Automotive Systems Co., Ltd**
Description of EUT	**Car Navigation**
Model Number of EUT	**AT2401**
FCC ID	**ACJ932AT2401**
Test Regulation	**FCC Part 15 Subpart C**
Test Result	**Complied**
Issue Date	**April 23, 2025**
Remarks	**- Bluetooth (BR / EDR) parts** **- Radiated Spurious Emission only**

Representative Test Engineer	Approved By
Shousei Hamaguchi Engineer	Takumi Shimada Engineer

CERTIFICATE 5107.02

☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan, Inc.

☒ There is no testing item of "Non-accreditation".

Report Cover Page - Form-ULID-003532 (DCS:13-EM-F0429) Issue# 24.0

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REVISION HISTORY

Original Test Report No.: 15647760H-C

This report is a revised version of 15647760H-C-R1. 15647760H-C-R1 is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	15647760H-C	January 23, 2025	-
1	15647760H-C-R1	March 31, 2025	**3.2 Procedures and Results** - Corrected Wort Margin for Spurious Emission & Band Edge Compliance: 7.3 dB, 5000.0 MHz, AV, Vertical ->8.4 dB, (737.6 MHz, QP, Horizontal) / (5000.0 MHz, AV, Vertical)
			4.1 Operating Mode(s) - Corrected information of Software: Date: 2023.04.17 -> Date: 2023.09.27
			4.2 Configuration and peripherals **Table for List of Cables Used** - Corrected information of Cable 11 and 12: DC Cable (Unshielded) -> USB Cable (Shielded)
			APPENDIX 1: Test data **Radiated Spurious Emission** **(page 20)** - Corrected Duty Factor of 3531.5 MHz and 5000 MHz: 1.1 -> - (hyphen) - Deleted Remarks *2) of 3531.5 MHz and 5000 MHz **(page 24)** - Corrected test date: June 30, 2024 -> July 26, 2024
2	15647760H-C-R2	April 23, 2025	**4.2 Configuration and Peripherals** **Table for List of Cables Used** - Corrected information of Cable 11 and 12: USB Cable (Shielded) -> Signal Cable (Unshielded)

Reference: Abbreviations (Including words undescribed in this report)

A2LA	The American Association for Laboratory Accreditation	ICES	Interference-Causing Equipment Standard
AC	Alternating Current	IEC	International Electrotechnical Commission
AFH	Adaptive Frequency Hopping	IEEE	Institute of Electrical and Electronics Engineers
AM	Amplitude Modulation	IF	Intermediate Frequency
Amp, AMP	Amplifier	ILAC	International Laboratory Accreditation Conference
ANSI	American National Standards Institute	ISED	Innovation, Science and Economic Development Canada
Ant, ANT	Antenna	ISO	International Organization for Standardization
AP	Access Point	JAB	Japan Accreditation Board
ASK	Amplitude Shift Keying	LAN	Local Area Network
Atten., ATT	Attenuator	LIMS	Laboratory Information Management System
AV	Average	MCS	Modulation and Coding Scheme
BPSK	Binary Phase-Shift Keying	MRA	Mutual Recognition Arrangement
BR	Bluetooth Basic Rate	N/A	Not Applicable
BT	Bluetooth	NIST	National Institute of Standards and Technology
BT LE	Bluetooth Low Energy	NS	No signal detect.
BW	BandWidth	NSA	Normalized Site Attenuation
Cal Int	Calibration Interval	NVLAP	National Voluntary Laboratory Accreditation Program
CCK	Complementary Code Keying	OBW	Occupied Band Width
Ch., CH	Channel	OFDM	Orthogonal Frequency Division Multiplexing
CISPR	Comite International Special des Perturbations Radioelectriques	P/M	Power meter
CW	Continuous Wave	PCB	Printed Circuit Board
DBPSK	Differential BPSK	PER	Packet Error Rate
DC	Direct Current	PHY	Physical Layer
D-factor	Distance factor	PK	Peak
DFS	Dynamic Frequency Selection	PN	Pseudo random Noise
DQPSK	Differential QPSK	PRBS	Pseudo-Random Bit Sequence
DSSS	Direct Sequence Spread Spectrum	PSD	Power Spectral Density
EDR	Enhanced Data Rate	QAM	Quadrature Amplitude Modulation
EIRP, e.i.r.p.	Equivalent Isotropically Radiated Power	QP	Quasi-Peak
EMC	ElectroMagnetic Compatibility	QPSK	Quadri-Phase Shift Keying
EMI	ElectroMagnetic Interference	RBW	Resolution Band Width
EN	European Norm	RDS	Radio Data System
ERP, e.r.p.	Effective Radiated Power	RE	Radio Equipment
EU	European Union	RF	Radio Frequency
EUT	Equipment Under Test	RMS	Root Mean Square
Fac.	Factor	RSS	Radio Standards Specifications
FCC	Federal Communications Commission	Rx	Receiving
FHSS	Frequency Hopping Spread Spectrum	SA, S/A	Spectrum Analyzer
FM	Frequency Modulation	SG	Signal Generator
Freq.	Frequency	SVSWR	Site-Voltage Standing Wave Ratio
FSK	Frequency Shift Keying	TR	Test Receiver
GFSK	Gaussian Frequency-Shift Keying	Tx	Transmitting
GNSS	Global Navigation Satellite System	VBW	Video BandWidth
GPS	Global Positioning System	Vert.	Vertical
Hori.	Horizontal	WLAN	Wireless LAN

CONTENTS PAGE

SECTION 1: Customer Information

Company Name	Panasonic Automotive Systems Co., Ltd *1)
Address	4261, Ikonobe-cho, Tsuzuki-ku, Yokohama-shi, Kanagawa-ken 224-8520, Japan
Telephone Number	+81-50-1802-5117
Contact Person	Daisuke Takahata

*1) The Grantee name in the FCC application is “Panasonic Corporation of North America”.

The information provided by the customer is as follows;
- Customer, Description of EUT, Model Number of EUT on the cover and other relevant pages
- Operating/Test Mode(s) (Mode(s)) on all the relevant pages
- SECTION 1: Customer Information
- SECTION 2: Equipment Under Test (EUT) other than the Receipt Date and Test Date
- SECTION 4: Operation of EUT during testing

SECTION 2: Equipment Under Test (EUT)

2.1 Identification of EUT

Description	Car Navigation
Model Number	AT2401
Serial Number	Refer to SECTION 4.2
Condition	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	No Modification by the test lab
Receipt Date	June 24, 2024
Test Date	July 25 to August 5, 2024

2.2 Product Description

General Specification

Rating	DC 13.2 V
Operating temperature	-30 deg. C to +65 deg. C

Radio Specification

Bluetooth (BR / EDR / BT LE)

Equipment Type	Transceiver
Frequency of Operation	2402 MHz to 2480 MHz
Type of Modulation	FHSS, GFSK / π/4-DQPSK, 8DPSK / GFSK
Antenna Gain	4.00 dBi

WLAN (IEEE802.11b/11g/11n-20)

Equipment Type	Transceiver
Frequency of Operation	2412 MHz to 2462 MHz
Type of Modulation	DSSS, OFDM
Antenna Gain	4.00 dBi

SECTION 3: Test Specification, Procedures & Results

3.1 Test Specification

Test Specification	FCC Part 15 Subpart C The latest version on the first day of the testing period
Title	FCC 47 CFR Part 15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

3.2 Procedures and Results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Spurious Emission & Band Edge Compliance	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section15.247(d)	8.4 dB (737.6 MHz, QP, Horizontal) (5000.0 MHz, AV, Vertical)	Complied	Radiated (above 30 MHz) *1)
	ISED: RSS-Gen 6.13	**ISED:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10			
Note: UL Japan, Inc.'s EMI Work Procedures: Work Instructions-ULID-003591 and Work Instructions-ULID-003593. * In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred. *1) Radiated test was selected over 30 MHz based on section 15.247(d).					

FCC Part 15.31 (e)
This EUT provides the stable voltage constantly to RF part regardless of input voltage.
Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT.
Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.3 Addition to Standard

No addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

Measurement uncertainty is not taken into account when stating conformity with a specified requirement.
Note: When margins obtained from test results are less than the measurement uncertainty, the test results may exceed the limit.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor k = 2.

Radiated emission

Measurement distance	Frequency range		Unit	Calculated Uncertainty (+/-)
3 m	9 kHz to 30 MHz		dB	3.3
10 m			dB	3.1
3 m	30 MHz to 200 MHz	Horizontal	dB	4.7
		Vertical	dB	4.7
	200 MHz to 1000 MHz	Horizontal	dB	4.8
		Vertical	dB	6.0
10 m	30 MHz to 200 MHz	Horizontal	dB	5.2
		Vertical	dB	5.1
	200 MHz to 1000 MHz	Horizontal	dB	5.2
		Vertical	dB	5.2
3 m	1 GHz to 6 GHz		dB	5.0
	6 GHz to 18 GHz		dB	5.2
1 m	10 GHz to 18 GHz		dB	5.3
	18 GHz to 26.5 GHz		dB	5.2
	26.5 GHz to 40 GHz		dB	4.7
0.5 m	26.5 GHz to 40 GHz		dB	4.8

3.5 Test Location

UL Japan, Inc. Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 Japan
Telephone: +81-596-24-8999
A2LA Certificate Number: 5107.02 / FCC Test Firm Registration Number: 884919
ISED Lab Company Number: 2973C / CAB identifier: JP0002

Test site	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.5 measurement room	6.4 x 6.4 x 3.0	6.4 x 6.4	-	-
No.6 shielded room	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	3.1 x 5.0 x 2.7	3.1 x 5.0	-	-
No.9 measurement room	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.10 shielded room	3.8 x 2.8 x 2.8	3.8 x 2.8	-	-
No.11 measurement room	4.0 x 3.4 x 2.5	N/A	-	-
No.12 measurement room	2.6 x 3.4 x 2.5	N/A	-	-
Large Chamber	16.9 x 22.1 x 10.17	16.9 x 22.1	-	10 m
Small Chamber	5.3 x 6.69 x 3.59	5.3 x 6.69	-	-

3.6 Test Data, Test Instruments, and Test Set Up

Refer to APPENDIX.

SECTION 4: Operation of EUT during testing

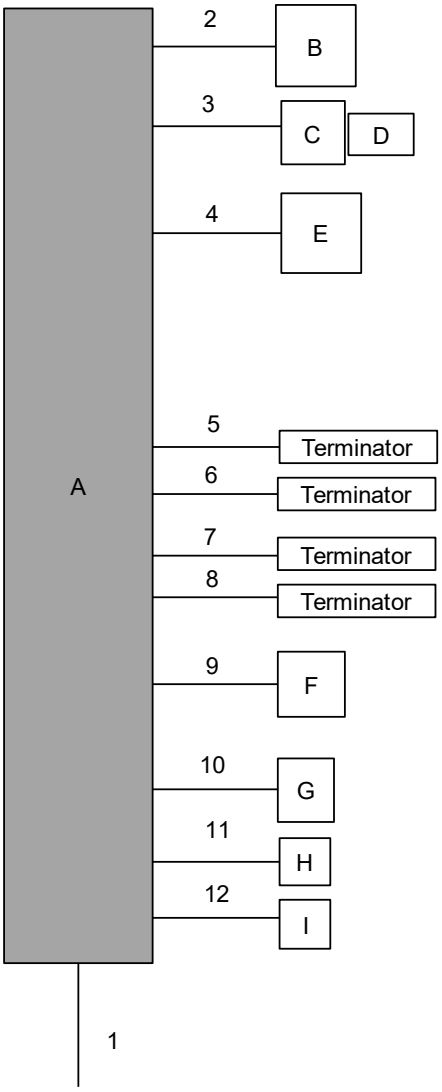
4.1 Operating Mode(s)

Mode	Remarks*
Bluetooth (BT)	BR / EDR, Payload: PRBS9
*EUT has the power settings by the software as follows; Power Setting: 9 dBm Software: bluetooth_LowGrade.exe (Date: 2023.09.27, Storage location: Driven by connected PC) *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.	

Details of Operating Mode(s)

Test Item	Mode	Hopping	Tested Frequency
Radiated Spurious Emission (Below 1 GHz)	Tx 3DH5 *1)	Off	2402 MHz
Radiated Spurious Emission (Above 1 GHz)	Tx DH5 Tx 3DH5	Off	2402 MHz 2441 MHz 2480 MHz
*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test) *2DH mode (2Mb/s EDR: pi/4DQPSK) was excluded for other tests than power measurement by using 3DH mode (3 Mb/s EDR: 8DPSK) as a representative. *It is considered that the non-tested packet type (e.g. inquiry) can be omitted as it is complied with above all the test items based on Bluetooth Core specification.			
*1) Spurious emissions for frequencies below 1 GHz were limited to the channel that had the highest power during the antenna terminal test, as preliminary testing indicated that changing the operating frequency had no significant impact on the emissions in those frequency bands.			

4.2 Configuration and Peripherals



* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support Equipment

No.	Item	Model number	Serial Number	Manufacturer	Remarks
A	Car Navigation	AT2401	500009	Panasonic	EUT
B	ADAS Jig	GVIF3OUT2A	8	Persol AVC Technology Co., Ltd.	-
C	USB BOX	DEP38-10029	-	Japan Aviation Electronics Industory, Ltd.	-
D	USB Memory	RUF3-K16GB	P10416	Buffalo Inc.	-
E	Speaker Dummy	HS50 4RF	-	ARCOL UK Limited	-
F	Steering switch	-	1400	Panasonic	-
G	GPS Antenna	ANN-MS	20N40132	U-Blox	-
H	Microphone	SDA3520A	4AC011628	Panasonic	-
I	Microphone	SDA3520A	4AC011628	Panasonic	-

List of Cables Used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	4.3	Unshielded	Unshielded	-
2	Signal Cable	1.9	Unshielded	Unshielded	-
3	USB Cable	2.3	Shielded	Shielded	-
4	Audio Cable	2.5	Shielded	Shielded	-
5	LAN Cable	3.0	Shielded	Shielded	-
6	Signal Cable	1.0	Shielded	Shielded	-
7	FM Cable	3.0	Shielded	Shielded	-
8	FM Cable	3.0	Shielded	Shielded	-
9	Signal Cable	4.3	Unshielded	Unshielded	-
10	GPS Antenna Cable	2.0	Shielded	Shielded	-
11	Signal Cable	4.3	Unshielded	Unshielded	-
12	Signal Cable	4.3	Unshielded	Unshielded	-

SECTION 5: Radiated Spurious Emission

Test Procedure

[For below 1 GHz]
EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]
EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane. Test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.

The height of the measuring antenna varied between 1 m and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.
The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).
The test was made with the detector (RBW/VBW) in the following table.
When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below;

Frequency	30 MHz to 200 MHz	200 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

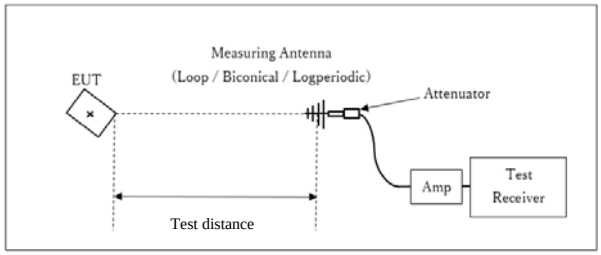
In any 100 kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9 (ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer *a)		Spectrum Analyzer
Detector	QP	PK	AV	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces Duty factor was added to the results.	RBW: 100 kHz VBW: 300 kHz

Figure 1: Test Setup

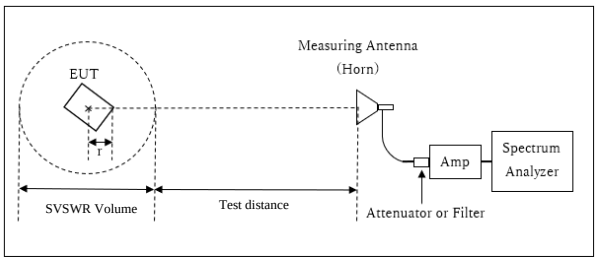
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz to 10 GHz



r : Radius of an outer periphery of EUT
× : Center of turn table

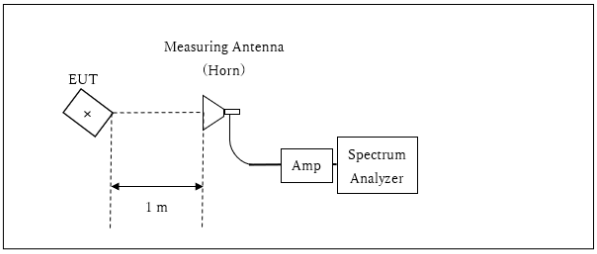
[1 GHz to 6 GHz]
Distance Factor: 20 x log (3.6 m / 3.0 m) = 1.59 dB
*(Test Distance + SVSWR Volume /2) - r = 3.6 m

Test Distance: 3 m
SVSWR Volume : 1.5 m
(SVSWR Volume has been calibrated based on CISPR 16-1-4.)
r: 0.15 m

[6 GHz to 10 GHz]
Distance Factor: 20 x log (3.6 m / 3.0 m) = 1.59 dB
*(Test Distance + SVSWR Volume /2) - r = 3.6 m

Test Distance: 3.25 m
SVSWR Volume : 1.0 m
(SVSWR Volume has been calibrated based on CISPR 16-1-4.)
r: 0.15 m

10 GHz to 26.5 GHz



× : Center of turn table

Distance Factor: 20 x log (1.0 m / 3.0 m) = -9.54 dB
*Test Distance: 1 m

The test was made on EUT at the normal use position.

Test results are rounded off and limit are rounded down, so some differences might be observed.

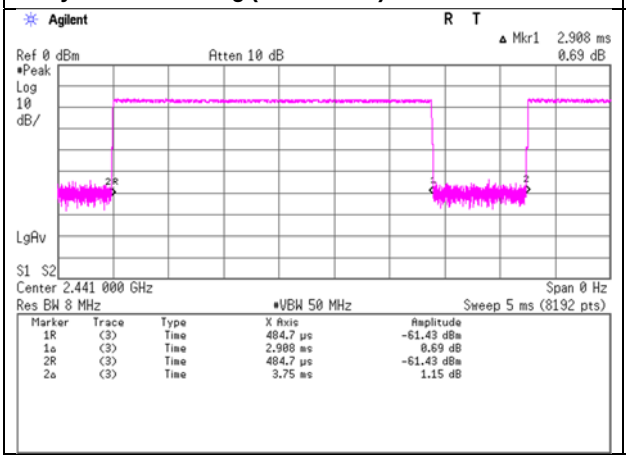
Measurement Range : 30 MHz to 26.5 GHz
Test Data : APPENDIX
Test Result : Pass

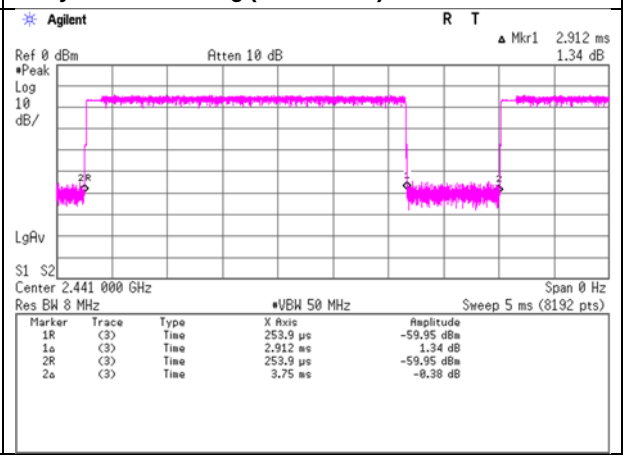
APPENDIX 1: Test data

Burst rate confirmation

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Date	July 26, 2024
Temperature / Humidity	22 deg. C / 59 % RH
Engineer	Shousei Hamaguchi
Mode	Tx

DH5		3DH5	
Tx on / (Tx on + Tx off) =	0.775	Tx on / (Tx on + Tx off) =	0.777
Tx on / (Tx on + Tx off) * 100 =	77.5 %	Tx on / (Tx on + Tx off) * 100 =	77.7 %
Duty factor = 10 * log (3.75 / 2.908) =	1.10 dB	Duty factor = 10 * log (3.75 / 2.912) =	1.10 dB





* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

Radiated Spurious Emission

Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.2	No.2	No.2	No.2
Date	July 25, 2024	July 29, 2024	July 30, 2024	July 31, 2024
Temperature / Humidity	22 deg. C / 57 % RH	24 deg. C / 57 % RH	22 deg. C / 59 % RH	22 deg. C / 63 % RH
Engineer	Shousei Hamaguchi	Tomoya Sone	Tomoya Sone	Tomoya Sone
	(1 GHz to 6 GHz)	(6 GHz to 10 GHz)	(10 GHz to 18 GHz)	(Above 18 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz			

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	2210.0	46.0	36.4	28.4	4.8	34.5	-	44.7	35.1	73.9	53.9	29.2	18.9	
Hori.	2390.0	44.6	34.1	27.7	4.9	34.4	1.1	42.8	33.4	73.9	53.9	31.1	20.6	*1)
Hori.	3531.5	44.1	39.0	29.0	5.7	33.8	-	45.0	39.9	73.9	53.9	28.9	14.0	
Hori.	4804.0	42.0	32.7	31.6	7.2	33.6	-	47.2	37.9	73.9	53.9	26.7	16.0	Floor noise
Hori.	5000.0	45.1	38.8	31.8	6.5	33.6	-	49.9	43.6	73.9	53.9	24.0	10.3	
Hori.	7206.0	42.7	34.5	35.6	8.3	33.4	-	53.2	45.0	73.9	53.9	20.7	8.9	Floor noise
Hori.	9608.0	43.2	35.1	35.7	9.2	34.0	-	54.0	45.9	73.9	53.9	19.9	8.0	Floor noise
Vert.	2210.0	48.7	35.5	28.4	4.8	34.5	-	47.4	34.2	73.9	53.9	26.5	19.7	
Vert.	2390.0	45.4	36.5	27.7	4.9	34.4	1.1	43.6	35.8	73.9	53.9	30.3	18.1	*1)
Vert.	3531.5	46.6	40.8	29.0	5.7	33.8	-	47.5	41.7	73.9	53.9	26.4	12.2	
Vert.	4804.0	42.0	32.7	31.6	7.2	33.6	-	47.2	37.9	73.9	53.9	26.7	16.0	Floor noise
Vert.	5000.0	45.1	40.7	31.8	6.5	33.6	-	49.9	45.5	73.9	53.9	24.0	8.5	
Vert.	7206.0	42.8	34.6	35.6	8.3	33.4	-	53.3	45.1	73.9	53.9	20.6	8.8	Floor noise
Vert.	9608.0	43.3	35.2	35.7	9.2	34.0	-	54.1	46.0	73.9	53.9	19.8	7.9	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
*QP detector was used up to 1GHz.
*1) Not Out of Band emission(Leakage Power)

20dBc Data Sheet

Polarity [Hori/Vert]	Frequency [MHz]	Reading (PK) [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.0	95.8	27.6	4.9	34.4	93.9	-	-	Carrier
Hori.	2400.0	40.1	27.6	4.9	34.4	38.3	73.9	35.6	
Vert.	2402.0	101.6	27.6	4.9	34.4	99.8	-	-	Carrier
Vert.	2400.0	43.8	27.6	4.9	34.4	42.0	79.8	37.8	

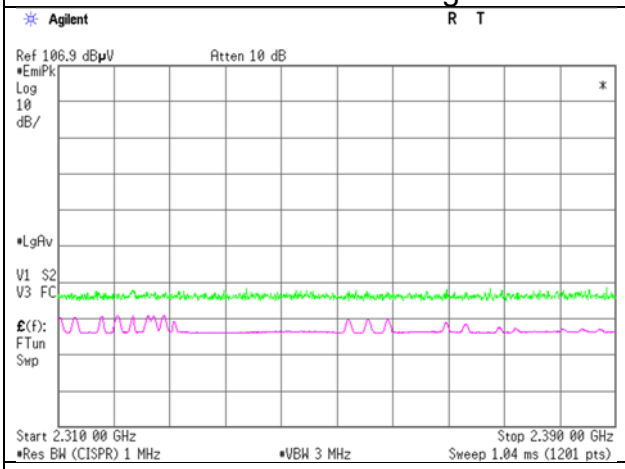
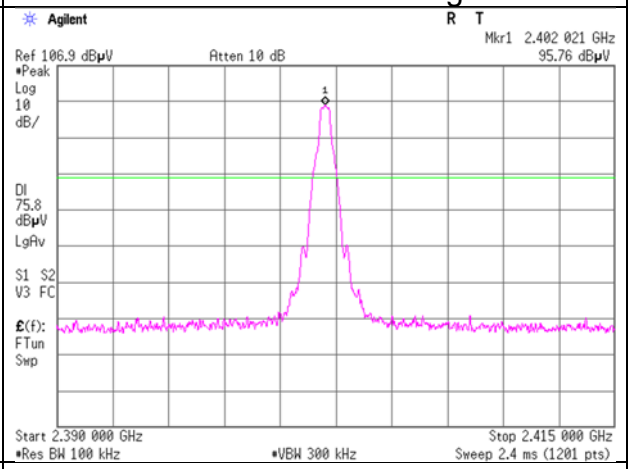
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amprifier)

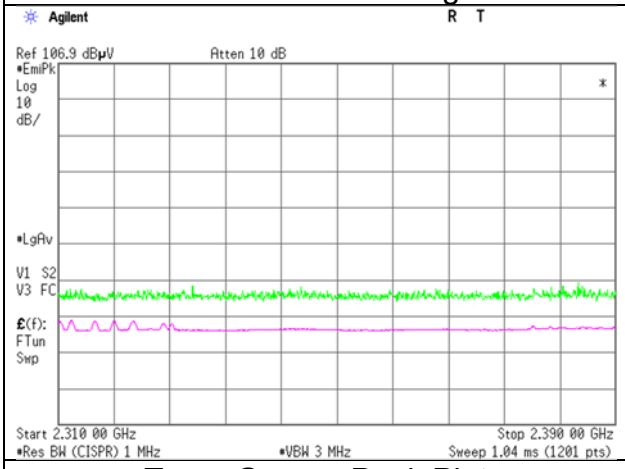
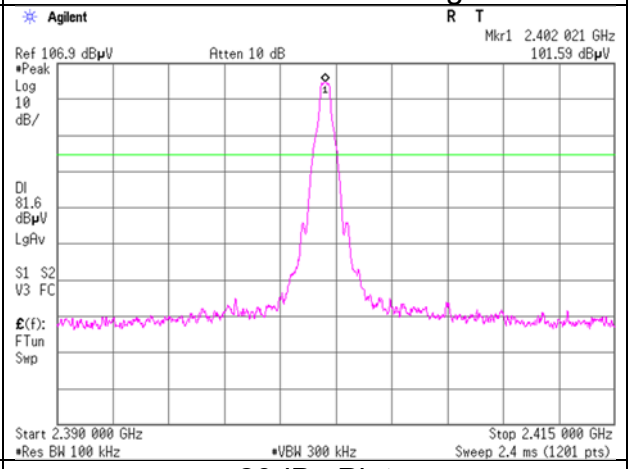
Distance factor:	1 GHz - 6 GHz	20log (3.6 m / 3.0 m) = 1.59 dB
	6 GHz - 10 GHz	20log (3.6 m / 3.0 m) = 1.59 dB
	10 GHz - 26.5 GHz	20log (1.0 m / 3.0 m) = -9.5 dB

*These results have sufficient margin without taking account Duty cycle correction factor.

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	July 25, 2024
Temperature / Humidity	22 deg. C / 57 % RH
Engineer	Shousei Hamaguchi (1 GHz to 6 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz

Horizontal	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

Vertical	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge and authorized band edge were shown in tabular data.

Radiated Spurious Emission

Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.2	No.2	No.2	No.2
Date	July 25, 2024	July 29, 2024	July 30, 2024	July 31, 2024
Temperature / Humidity	22 deg. C / 57 % RH	24 deg. C / 57 % RH	22 deg. C / 59 % RH	22 deg. C / 63 % RH
Engineer	Shousei Hamaguchi	Tomoya Sone	Tomoya Sone	Tomoya Sone
	(1 GHz to 6 GHz)	(6 GHz to 10 GHz)	(10 GHz to 18 GHz)	(Above 18 GHz)
Mode	Tx, Hopping Off, DH5 2441 MHz			

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	2210.0	46.0	36.3	28.4	4.8	34.5	-	44.7	35.0	73.9	53.9	29.2	18.9	
Hori.	3531.5	44.2	38.9	29.0	5.7	33.8	-	45.1	39.8	73.9	53.9	28.8	14.1	
Hori.	4882.0	43.1	34.4	31.6	7.2	33.6	-	48.3	39.6	73.9	53.9	25.6	14.3	Floor noise
Hori.	5000.0	45.2	38.8	31.8	6.5	33.6	-	50.0	43.6	73.9	53.9	23.9	10.3	
Hori.	7323.0	42.4	34.2	35.6	8.4	33.5	-	52.9	44.7	73.9	53.9	21.0	9.2	Floor noise
Hori.	9764.0	42.2	34.1	36.0	9.2	34.1	-	53.4	45.3	73.9	53.9	20.5	8.6	Floor noise
Vert.	2210.0	48.7	35.6	28.4	4.8	34.5	-	47.4	34.2	73.9	53.9	26.5	19.7	
Vert.	3531.5	46.5	40.8	29.0	5.7	33.8	-	47.4	41.7	73.9	53.9	26.5	12.2	
Vert.	4882.0	43.1	34.4	31.6	7.2	33.6	-	48.3	39.6	73.9	53.9	25.6	14.3	Floor noise
Vert.	5000.0	45.2	40.7	31.8	6.5	33.6	-	50.0	45.5	73.9	53.9	23.9	8.5	
Vert.	7323.0	42.3	34.1	35.6	8.4	33.5	-	52.8	44.6	73.9	53.9	21.1	9.3	Floor noise
Vert.	9764.0	42.1	34.0	36.0	9.2	34.1	-	53.3	45.2	73.9	53.9	20.6	8.7	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
*QP detector was used up to 1GHz.

Distance factor:	1 GHz - 6 GHz	20log (3.6 m / 3.0 m) = 1.59 dB
	6 GHz - 10 GHz	20log (3.6 m / 3.0 m) = 1.59 dB
	10 GHz - 26.5 GHz	20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.2	No.2	No.2	No.2
Date	July 25, 2024	July 29, 2024	July 30, 2024	July 31, 2024
Temperature / Humidity	22 deg. C / 57 % RH	24 deg. C / 57 % RH	22 deg. C / 59 % RH	22 deg. C / 63 % RH
Engineer	Shousei Hamaguchi	Tomoya Sone	Tomoya Sone	Tomoya Sone
	(1 GHz to 6 GHz)	(6 GHz to 10 GHz)	(10 GHz to 18 GHz)	(Above 18 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz			

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	2210.0	45.9	36.5	28.4	4.8	34.5	-	44.6	35.2	73.9	53.9	29.3	18.8	
Hori.	2483.5	47.6	37.2	27.5	5.0	34.3	1.1	45.7	36.4	73.9	53.9	28.2	17.5	*1)
Hori.	3531.5	44.2	39.0	29.0	5.7	33.8	-	45.1	39.9	73.9	53.9	28.8	14.0	
Hori.	4960.0	41.4	34.1	31.7	7.2	33.6	-	46.7	39.5	73.9	53.9	27.2	14.4	Floor noise
Hori.	5000.0	45.0	38.8	31.8	6.5	33.6	-	49.8	43.6	73.9	53.9	24.1	10.3	
Hori.	7440.0	41.6	33.6	35.5	8.4	33.5	-	52.0	44.0	73.9	53.9	21.9	9.9	Floor noise
Hori.	9920.0	40.2	33.2	36.2	9.3	34.1	-	51.7	44.6	73.9	53.9	22.2	9.3	Floor noise
Vert.	2210.0	48.7	35.6	28.4	4.8	34.5	-	47.4	34.2	73.9	53.9	26.5	19.7	
Vert.	2483.5	54.2	41.8	27.5	5.0	34.3	1.1	52.4	41.0	73.9	53.9	21.6	12.9	*1)
Vert.	3531.5	46.5	40.8	29.0	5.7	33.8	-	47.4	41.7	73.9	53.9	26.5	12.2	
Vert.	4960.0	41.4	34.1	31.7	7.2	33.6	-	46.7	39.5	73.9	53.9	27.2	14.4	Floor noise
Vert.	5000.0	45.1	40.6	31.8	6.5	33.6	-	49.9	45.4	73.9	53.9	24.0	8.5	
Vert.	7440.0	41.7	33.7	35.5	8.4	33.5	-	52.1	44.1	73.9	53.9	21.8	9.8	Floor noise
Vert.	9920.0	40.3	33.3	36.2	9.3	34.1	-	51.8	44.7	73.9	53.9	22.1	9.2	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
*QP detector was used up to 1GHz.
*1) Not Out of Band emission(Leakage Power)

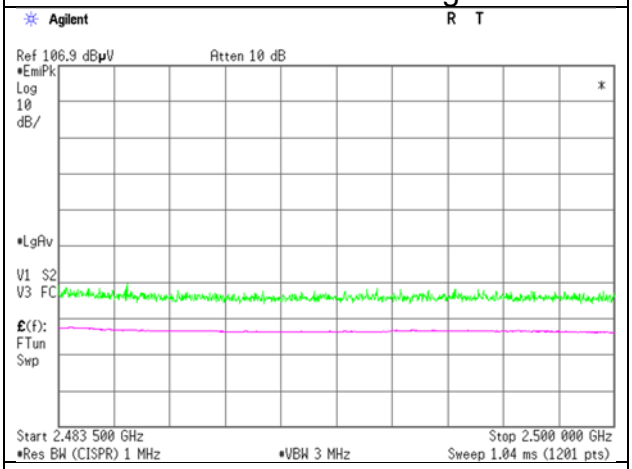
Distance factor:	1 GHz - 6 GHz	20log (3.6 m / 3.0 m) = 1.59 dB
	6 GHz - 10 GHz	20log (3.6 m / 3.0 m) = 1.59 dB
	10 GHz - 26.5 GHz	20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	July 25, 2024
Temperature / Humidity	22 deg. C / 57 % RH
Engineer	Shousei Hamaguchi (1 GHz to 6 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz

Horizontal

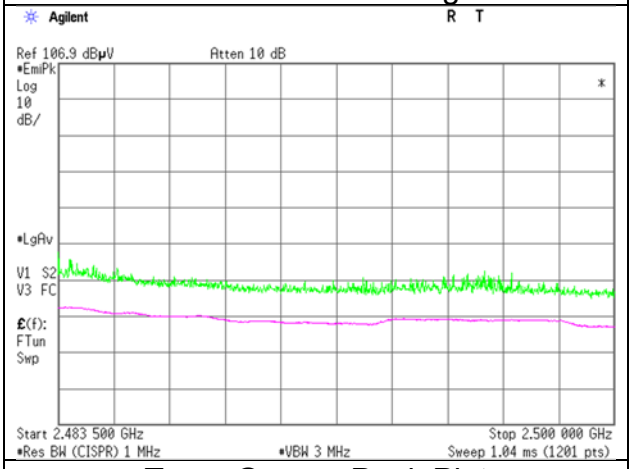
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Test place	Ise EMC Lab.				
Semi Anechoic Chamber	No.2	No.2	No.2	No.2	No.4
Date	July 26, 2024	July 29, 2024	July 30, 2024	July 31, 2024	August 5, 2024
Temperature / Humidity	22 deg. C / 59 % RH	24 deg. C / 57 % RH	22 deg. C / 59 % RH	22 deg. C / 63 % RH	24 deg. C / 55 % RH
Engineer	Shousei Hamaguchi (1 GHz to 6 GHz)	Tomoya Sone (6 GHz to 10 GHz)	Tomoya Sone (10 GHz to 18 GHz)	Tomoya Sone (Above 18 GHz)	Takumi Nishida (Below 1 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz				

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	61.4	33.4	-	9.2	7.0	38.9	-	10.7	-	40.0	-	29.3	-	
Hori.	66.6	30.2	-	9.0	7.1	38.9	-	7.4	-	40.0	-	32.6	-	
Hori.	530.4	32.1	-	17.7	9.9	38.4	-	21.4	-	46.0	-	24.6	-	
Hori.	624.7	40.8	-	19.4	10.2	38.2	-	32.2	-	46.0	-	13.9	-	
Hori.	737.6	45.0	-	20.2	10.6	38.2	-	37.6	-	46.0	-	8.4	-	
Hori.	811.5	41.2	-	20.8	10.9	38.2	-	34.7	-	46.0	-	11.3	-	
Hori.	2210.0	46.1	36.4	28.4	4.8	34.5	-	44.7	35.1	73.9	53.9	29.2	18.8	
Hori.	2390.0	45.0	35.8	27.7	4.9	34.4	1.1	43.2	35.1	73.9	53.9	30.7	18.8	*1)
Hori.	3531.5	44.2	39.1	29.0	5.7	33.8	-	45.1	40.0	73.9	53.9	28.8	13.9	
Hori.	4804.0	41.8	32.6	31.6	7.2	33.6	-	47.0	37.8	73.9	53.9	26.9	16.1	Floor noise
Hori.	5000.0	45.0	38.8	31.8	6.5	33.6	-	49.8	43.6	73.9	53.9	24.1	10.3	
Hori.	7206.0	42.8	34.4	35.6	8.3	33.4	-	53.3	44.9	73.9	53.9	20.6	9.0	Floor noise
Hori.	9608.0	43.3	35.2	35.7	9.2	34.0	-	54.1	46.0	73.9	53.9	19.8	7.9	Floor noise
Vert.	61.4	38.1	-	9.2	7.0	38.9	-	15.4	-	40.0	-	24.6	-	
Vert.	66.6	38.1	-	9.0	7.1	38.9	-	15.3	-	40.0	-	24.7	-	
Vert.	530.4	39.0	-	17.7	9.9	38.4	-	28.3	-	46.0	-	17.7	-	
Vert.	624.7	41.3	-	19.4	10.2	38.2	-	32.7	-	46.0	-	13.4	-	
Vert.	737.6	41.5	-	20.2	10.6	38.2	-	34.1	-	46.0	-	11.9	-	
Vert.	811.5	37.2	-	20.8	10.9	38.2	-	30.7	-	46.0	-	15.3	-	
Vert.	2210.0	48.8	35.6	28.4	4.8	34.5	-	47.5	34.2	73.9	53.9	26.4	19.7	
Vert.	2390.0	45.0	36.3	27.7	4.9	34.4	1.1	43.2	35.5	73.9	53.9	30.7	18.4	*1)
Vert.	3531.5	46.6	40.7	29.0	5.7	33.8	-	47.5	41.6	73.9	53.9	26.4	12.3	
Vert.	4804.0	41.8	32.6	31.6	7.2	33.6	-	47.0	37.8	73.9	53.9	26.9	16.1	Floor noise
Vert.	5000.0	45.1	40.7	31.8	6.5	33.6	-	49.9	45.5	73.9	53.9	24.0	8.5	
Vert.	7206.0	42.8	34.5	35.6	8.3	33.4	-	53.4	45.0	73.9	53.9	20.6	8.9	Floor noise
Vert.	9608.0	43.4	35.3	35.7	9.2	34.0	-	54.2	46.1	73.9	53.9	19.7	7.8	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
*QP detector was used up to 1GHz.
*1) Not Out of Band emission(Leakage Power)

20dBc Data Sheet

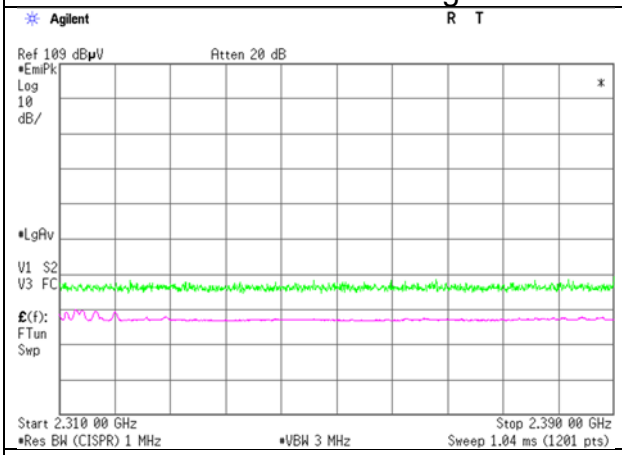
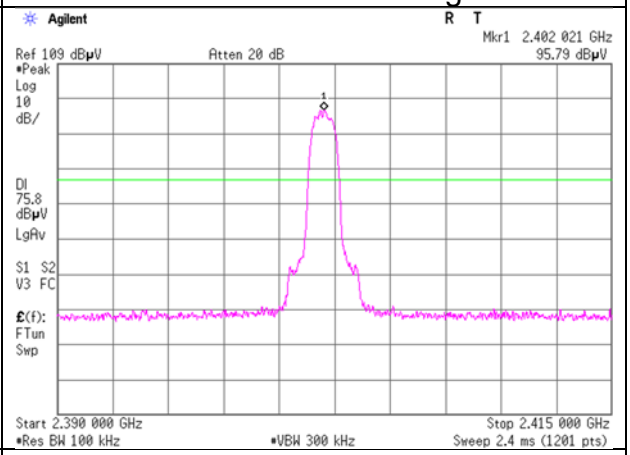
Polarity [Hori/Vert]	Frequency [MHz]	Reading (PK) [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.0	95.8	27.6	4.9	34.4	94.0	-	-	Carrier
Hori.	2400.0	41.2	27.6	4.9	34.4	39.3	74.0	34.6	
Vert.	2402.0	102.3	27.6	4.9	34.4	100.4	-	-	Carrier
Vert.	2400.0	45.6	27.6	4.9	34.4	43.7	80.4	36.7	

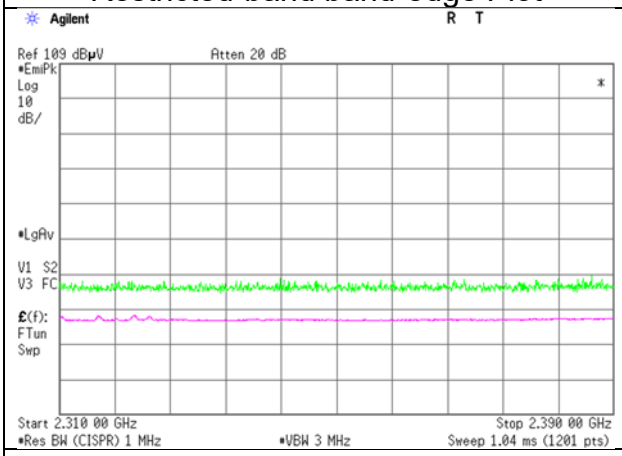
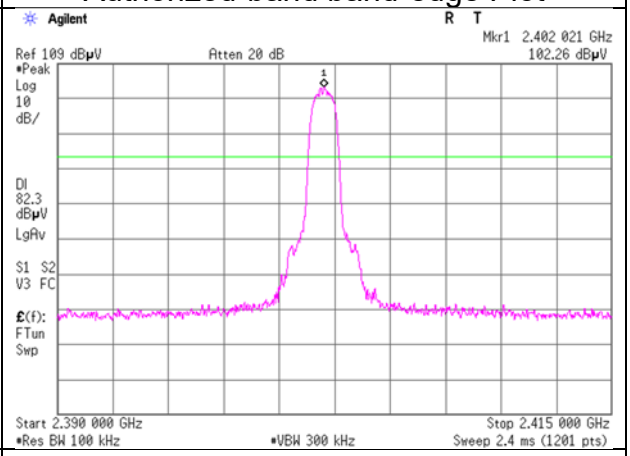
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amprifier)

Distance factor:	1 GHz - 6 GHz	20log (3.6 m / 3.0 m) = 1.59 dB
	6 GHz - 10 GHz	20log (3.6 m / 3.0 m) = 1.59 dB
	10 GHz - 26.5 GHz	20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	July 26, 2024
Date	22 deg. C / 59 % RH
Temperature / Humidity	Shousei Hamaguchi
Engineer	July 26, 2024
	(1 GHz to 6 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz

Horizontal	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

Vertical	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge and authorized band edge were shown in tabular data.

Radiated Spurious Emission

Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.2	No.2	No.2	No.2
Date	July 26, 2024	July 29, 2024	July 30, 2024	July 31, 2024
Temperature / Humidity	22 deg. C / 59 % RH	24 deg. C / 57 % RH	22 deg. C / 59 % RH	22 deg. C / 63 % RH
Engineer	Shousei Hamaguchi	Tomoya Sone	Tomoya Sone	Tomoya Sone
	(1 GHz to 6 GHz)	(6 GHz to 10 GHz)	(10 GHz to 18 GHz)	(Above 18 GHz)
Mode	Tx, Hopping Off, 3DH5 2441 MHz			

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	2210.0	45.9	36.4	28.4	4.8	34.5	-	44.6	35.1	73.9	53.9	29.3	18.8	
Hori.	3531.5	44.2	39.0	29.0	5.7	33.8	-	45.1	39.9	73.9	53.9	28.8	14.0	
Hori.	4882.0	43.1	34.4	31.6	7.2	33.6	-	48.3	39.6	73.9	53.9	25.6	14.3	Floor noise
Hori.	5000.0	45.0	38.8	31.8	6.5	33.6	-	49.8	43.6	73.9	53.9	24.1	10.3	
Hori.	7323.0	42.2	34.1	35.6	8.4	33.5	-	52.7	44.6	73.9	53.9	21.2	9.3	Floor noise
Hori.	9764.0	42.0	34.0	36.0	9.2	34.1	-	53.2	45.2	73.9	53.9	20.7	8.7	Floor noise
Vert.	2210.0	48.7	35.5	28.4	4.8	34.5	-	47.4	34.2	73.9	53.9	26.5	19.7	
Vert.	3531.5	46.5	40.8	29.0	5.7	33.8	-	47.4	41.7	73.9	53.9	26.5	12.2	
Vert.	4882.0	43.1	34.4	31.6	7.2	33.6	-	48.3	39.6	73.9	53.9	25.6	14.3	Floor noise
Vert.	5000.0	45.0	40.8	31.8	6.5	33.6	-	49.8	45.6	73.9	53.9	24.1	8.4	
Vert.	7323.0	42.1	34.0	35.6	8.4	33.5	-	52.6	44.5	73.9	53.9	21.3	9.4	Floor noise
Vert.	9764.0	41.9	33.9	36.0	9.2	34.1	-	53.1	45.1	73.9	53.9	20.8	8.8	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
*QP detector was used up to 1GHz.

Distance factor:	1 GHz - 6 GHz	20log (3.6 m / 3.0 m) = 1.59 dB
	6 GHz - 10 GHz	20log (3.6 m / 3.0 m) = 1.59 dB
	10 GHz - 26.5 GHz	20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.2	No.2	No.2	No.2
Date	July 26, 2024	July 29, 2024	July 30, 2024	July 31, 2024
Temperature / Humidity	22 deg. C / 59 % RH	24 deg. C / 57 % RH	22 deg. C / 59 % RH	22 deg. C / 63 % RH
Engineer	Shousei Hamaguchi	Tomoya Sone	Tomoya Sone	Tomoya Sone
	(1 GHz to 6 GHz)	(6 GHz to 10 GHz)	(10 GHz to 18 GHz)	(Above 18 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz			

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	2210.0	45.7	36.3	28.4	4.8	34.5	-	44.4	35.0	73.9	53.9	29.5	18.9	
Hori.	2483.5	47.6	37.2	27.5	5.0	34.3	1.1	45.7	36.4	73.9	53.9	28.2	17.5	*1)
Hori.	3531.5	44.3	39.1	29.0	5.7	33.8	-	45.2	40.0	73.9	53.9	28.7	13.9	
Hori.	4960.0	41.4	34.1	31.7	7.2	33.6	-	46.7	39.5	73.9	53.9	27.2	14.4	Floor noise
Hori.	5000.0	45.2	38.8	31.8	6.5	33.6	-	50.0	43.6	73.9	53.9	23.9	10.3	
Hori.	7440.0	41.5	33.5	35.5	8.4	33.5	-	51.9	43.9	73.9	53.9	22.0	10.0	Floor noise
Hori.	9920.0	40.1	33.1	36.2	9.3	34.1	-	51.6	44.5	73.9	53.9	22.3	9.4	Floor noise
Vert.	2210.0	48.7	35.4	28.4	4.8	34.5	-	47.4	34.1	73.9	53.9	26.5	19.8	
Vert.	2483.5	54.2	41.8	27.5	5.0	34.3	1.1	52.4	41.0	73.9	53.9	21.6	12.9	*1)
Vert.	3531.5	46.4	40.7	29.0	5.7	33.8	-	47.3	41.6	73.9	53.9	26.6	12.3	
Vert.	4960.0	41.4	34.1	31.7	7.2	33.6	-	46.7	39.5	73.9	53.9	27.2	14.4	Floor noise
Vert.	5000.0	45.1	40.7	31.8	6.5	33.6	-	49.8	45.5	73.9	53.9	24.1	8.5	
Vert.	7440.0	41.6	33.6	35.5	8.4	33.5	-	52.0	44.0	73.9	53.9	21.9	9.9	Floor noise
Vert.	9920.0	40.2	33.2	36.2	9.3	34.1	-	51.7	44.6	73.9	53.9	22.2	9.3	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
*QP detector was used up to 1GHz.
*1) Not Out of Band emission(Leakage Power)

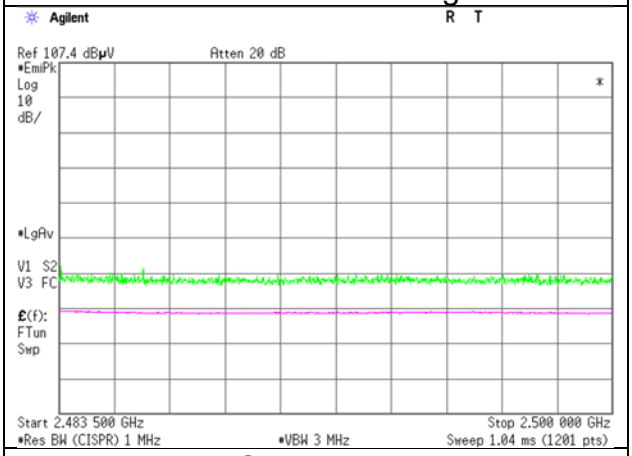
Distance factor:	1 GHz - 6 GHz	20log (3.6 m / 3.0 m) = 1.59 dB
	6 GHz - 10 GHz	20log (3.6 m / 3.0 m) = 1.59 dB
	10 GHz - 26.5 GHz	20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	July 26, 2024
Temperature / Humidity	20 deg. C / 59 % RH
Engineer	Shousei Hamaguchi
	(1 GHz to 10 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz

Horizontal

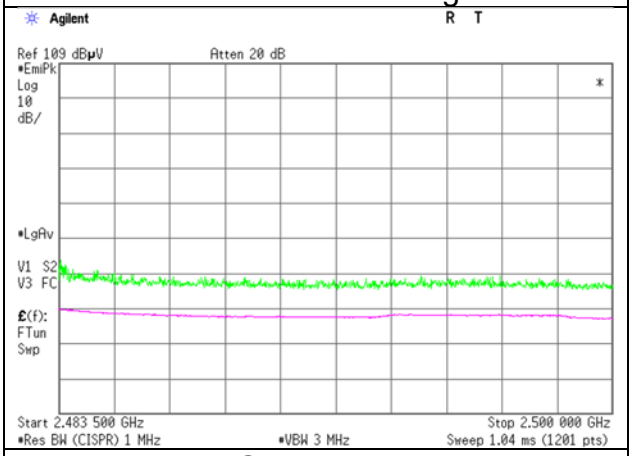
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

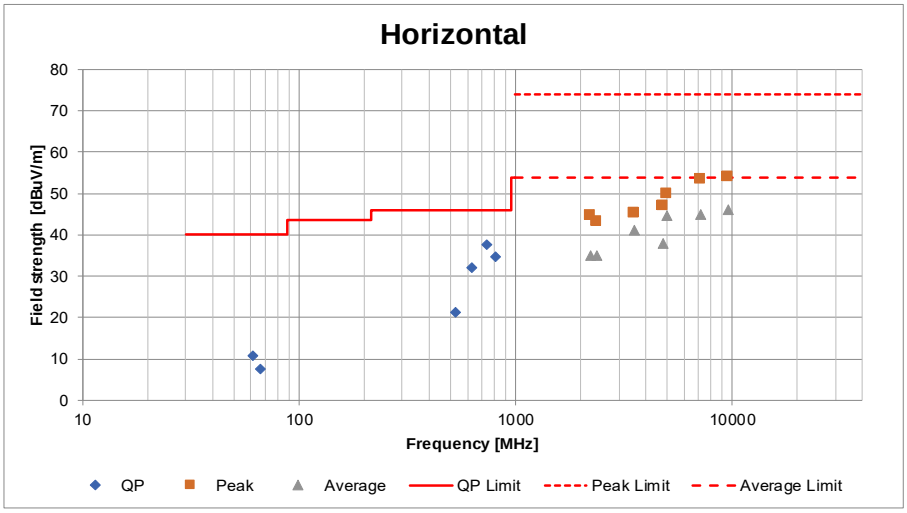


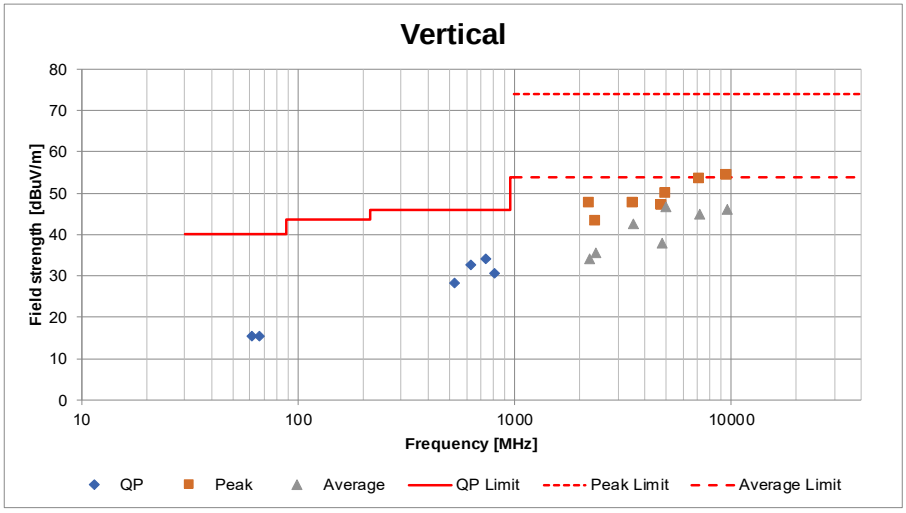
Trace Green : Peak Plot
Trace Purple : Average Plot

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission
(Plot data, Worst case mode for Maximum Peak Output Power)

Test place	Ise EMC Lab.				
Semi Anechoic Chamber	No.2	No.2	No.2	No.2	No.4
Date	July 26, 2024	July 29, 2024	July 30, 2024	July 31, 2024	August 5, 2024
Temperature / Humidity	22 deg. C / 59 % RH	24 deg. C / 57 % RH	22 deg. C / 59 % RH	22 deg. C / 63 % RH	24 deg. C / 55 % RH
Engineer	Shousei Hamaguchi (1 GHz to 6 GHz)	Tomoya Sone (6 GHz to 10 GHz)	Tomoya Sone (10 GHz to 18 GHz)	Tomoya Sone (Above 18 GHz)	Takumi Nishida (Below 1 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz				





*These plots data contain sufficient number to show the trend of characteristic features for EUT.

APPENDIX 2: Test Instruments

Test Equipment

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	141232	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	09/04/2023	12
RE	141265	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-190	07/10/2024	12
RE	141267	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-192	09/21/2023	12
RE	141317	Coaxial Cable	UL Japan	-	-	09/12/2023	12
RE	141331	Attenuator(6dB)	TME	UFA-01	-	02/17/2024	12
RE	141393	Microwave Cable	Junkosha	MWX221	1604S254(1 m) / 1608S088(5 m)	07/06/2024	12
RE	141397	Coaxial Cable	UL Japan	-	-	11/22/2023	12
RE	141425	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103+BBA9106	VHA 91031302	08/10/2023	12
RE	141503	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	06/25/2024	12
RE	141512	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	254	10/17/2023	12
RE	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	08/01/2023	12
RE	141545	DIGITAL HiTESTER	HIOKI E.E. CORPORATION	3805	51201148	02/01/2024	12
RE	141579	Pre Amplifier	Keysight Technologies Inc	8449B	3008A02142	02/17/2024	12
RE	141583	Pre Amplifier	SONOMA INSTRUMENT	310	260833	04/04/2024	12
RE	141585	Pre Amplifier	L3 Narda-MITEQ	MLA-10K01-B01-35	1237616	02/17/2024	12
RE	141884	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY44020357	05/09/2024	12
RE	141950	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	11/20/2023	12
RE	141951	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	05/17/2024	12
RE	142006	AC2_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-06902	04/17/2023	24
RE	142011	AC4_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	12/13/2023	24
RE	142228	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
RE	142230	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
RE	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	197990	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHBB 9124 + BBA 9106	01365	11/29/2023	12
RE	220646	Attenuator	Huber+Suhner	6806_N-50-1	-	03/12/2024	12
RE	234602	Microwave Cable	Huber+Suhner	SF126E/11PC35/ 11PC35/1000M, 5000M	537063/126E / 537074/126E	03/08/2024	12
RE	238713	Double Ridge Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA 9120 C	688	08/10/2023	12
RE	244707	Thermo-Hygrometer	HIOKI E.E. CORPORATION	LR5001	231202102	01/25/2024	12
RE	244710	Thermo-Hygrometer	HIOKI E.E. CORPORATION	LR5001	231202104	01/25/2024	12
RE	246001	Microwave Cable	Huber+Suhner	SF103/11PC35/ 11PC35/1000mm / SF126E/5000mm	800673(1m) / 610204(5m)	03/06/2024	12

***Hyphens for Last Calibration Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.**

The expiration date of the calibration is the end of the expired month.
As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

Test item:

RE: Radiated Emission