



Test report No.
Page
Issued date
FCC ID

: 13977035M-A-R1
: 1 of 59
: March 15, 2022
: A269ZUA165

RADIO TEST REPORT

Test Report No. : 13977035M-A-R1

Applicant : ALPS ALPINE CO., LTD.
Type of EUT : Head unit
Model Number of EUT : AH00ICB
FCC ID : A269ZUA165
Test regulation : FCC Part 15 Subpart C: 2021
* Wireless LAN 2.4 GHz band and Bluetooth low energy part
Test item : Radiated Spurious Emission test
Test result : Complied (Refer to SECTION 3)

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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6. This test report covers Radio technical requirements.
It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. The all test items in this test report are conducted by UL Japan, Inc. Kashima EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in SECTION 1.
10. This report is a revised version of 13977035M-A. 13977035M-A is replaced with this report.
11. For original test report(s) referred in this report, the latest version (including any revisions) is always referred.

Date of test: October 20 to December 20, 2021

Representative test engineer:

Kazuhiro Ando
Engineer

Approved by:

Kenichi Suda
Manager



CERTIFICATE 1266.01

- ☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
☒ There is no testing item of "Non-accreditation".

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Kashima EMC Lab.

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REVISION HISTORY

Original Test Report No.: 13977035M-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	13977035M-A	January 31, 2022	-	-
1	13977035M-A-R1	March 15, 2022	P.14, P.15	Add the following description; * This Burst rate confirmation data is quoted from the data of Report No.13977035S-A (Antenna Terminal Conducted Tests).

Reference: Abbreviations (Including words undescribed in this report)

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

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SECTION 1: Customer information

Company Name : ALPS ALPINE CO., LTD.
Address : 20-1 Yoshima Industrial park, Iwaki, Fukushima Prefecture 970-1192 Japan
Telephone Number : +81-246-36-4111
Contact Person : Kenji Nagase

The information provided from the customer is as follows;

- Applicant, Type of EUT, Model Number of EUT, FCC ID 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
 - SECTION 4: Operation of EUT during testing
- * The laboratory is exempted from liability of any test results affected from the above information in SECTION 2 and 4.

SECTION 2: Equipment under test (EUT)

2.1 Identification of EUT

Type : Head unit
Model Number : AH00ICB
Serial Number : Refer to SECTION 4.2
Receipt Date : October 19, 2021
Condition : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification : No Modification by the test lab.

2.2 Product Description

Model: AH00ICB (referred to as the EUT in this report) is a Head unit.

The EUT has following similar model:

Model Name	Details
AH00ICB (EUT)	External amplifier model
AH00ICB 1	Internal amplifier model

General Specification

Rating : DC 13.2 V
Operating Temperature : -30 deg. C - +70 deg. C

Radio Specification

Bluetooth

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Antenna type	:	Internal Chip Antenna
Modulation	:	FHSS (GFSK, $\pi/4$ -DQPSK, 8DPSK)
Antenna Gain	:	-0.2 dBi

Bluetooth Low Energy

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Antenna type	:	Internal Chip Antenna
Modulation	:	GFSK
Antenna Gain	:	-0.2 dBi

WLAN 2.4 GHz (IEEE802.11b/g/n-20)

Radio Type	:	Transceiver
Frequency of Operation	:	2412 MHz - 2462 MHz
Antenna type	:	Internal Chip Antenna
Modulation	:	DSSS (CCK, DQPSK, DBPSK) OFDM (64QAM, 16QAM, QPSK, BPSK)
Antenna Gain	:	-0.2 dBi

WLAN 5 GHz (IEEE802.11a/n-20/n-40/ac-20/ac-40/ac-80)

Radio Type	:	Transceiver
Frequency of Operation	:	5180 MHz - 5825 MHz
Antenna type	:	Internal Chip Antenna
Modulation	:	OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Antenna Gain	:	+2.71 dBi (Chain 1) +2.71 dBi (Chain 2)

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on May 3, 2021 and effective July 2, 2021

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

* Also the EUT complies with FCC Part 15 Subpart B.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Spurious Emission Restricted Band Edges	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.13	FCC: Section15.247(d) ISED: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	4.0 dB 2483.500 MHz, AV, Hori.	Complied# a)	Radiated (above 30 MHz) *1)
Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422. *1) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02 8.5 and 8.6. a) Refer to APPENDIX 1 (data of Radiated Spurious Emission)					
Symbols: Complied The data of this test item has enough margin, more than the measurement uncertainty. Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.					

* In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred.

FCC Part 15.31 (e)

The EUT provides stable voltage constantly to the RF Part regardless of input voltage. Instead of a new battery, DC power supply was used for the test. That does not affect the test result, therefore the 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

There is no applicable rule of uncertainty in this applied standard. Therefore, the results are derived depending on whether laboratory uncertainty is applied.

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	Required Uncertainty (+/-)	Uncertainty (+/-)
3 m	9 kHz to 30 MHz	Not Defined	2.9 dB
	30 MHz to 200 MHz	6.3 dB	6.1 dB
	200 MHz to 1000 MHz		6.2 dB
	1 GHz to 6 GHz	5.2 dB	5.0 dB
	6 GHz to 18 GHz	5.5 dB	5.4 dB
	18 GHz to 40 GHz	Not Defined	5.5 dB
1 m	1 GHz to 18 GHz	Not Defined	5.4 dB
	18 GHz to 40 GHz		5.6 dB
0.5 m	26.5 GHz to 40 GHz	Not Defined	5.9 dB

3.5 Test Location

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A2LA Certificate Number: 1266.01 / FCC Test Firm Registration Number: 910230

ISED Lab Company Number: 4659A / CAB identifier: JP0006

Test site	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Open site	6.0 x 5.5 x 2.5	20 x 40	10 m
No.5 Open site	8.6 x 7.1 x 2.4	18 x 23	10 m
No.1 Shielded room	5.4 x 4.5 x 2.3	-	-
No.5 Shielded Room	4.2 x 3.1 x 2.5	-	-
No.9 Shielded Room	6.1 x 3.6 x 2.8	-	-
No.6 Semi-anechoic Chamber	8.5 x 5.5 x 5.2	-	3 m
No.10 Semi-anechoic Chamber	18.4 x 9.9 x 7.7	-	10 m
No.11 Semi-anechoic Chamber	9.0 x 6.5 x 5.2	-	3 m
No.1 Measurement room	5.0 x 3.7 x 2.6	-	-
No.2 Measurement room	4.3 x 4.4 x 2.7	-	-
No.3 Measurement room	4.5 x 5.3 x 2.7	-	-

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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SECTION 4: Operation of EUT during testing

4.1 Operating Mode(s)

Test operating mode was determined as follows according to “Section 1 of 6 802.11 a/b/g/n testing - Managing Complex Regulatory Approvals - ” of TCB Council Workshop October 2009.

Mode	Remarks*
IEEE 802.11b (11b)	5.5 Mbps (Short), PN9
IEEE 802.11g (11g)	36 Mbps, PN9
IEEE 802.11n 20 MHz BW SISO (11n-20)	MCS 5, PN9
Bluetooth Low Energy (BT LE)	PRBS9
*The worst condition was determined based on the test result of Maximum Peak Output Power. (Mid Channel)	
*Power of the EUT was set by the software as follows; Power settings: 11b: 14 dBm, 11g/n-20: 11 dBm BT LE: 8 (setting value) Software: QRCT (Qualcomm Radio Control Toolkit) v4.0.00195.0 (Date: 2021.10.19, 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.	

*The details of Operating mode(s)

Test Item	Operating Mode	Tested Antenna *2)	Tested frequency
Radiated Spurious Emission (Below 1 GHz)	Tx 11g Tx 11g with Tx 11a 5700 MHz	Chain 1	2462 MHz *1)
	Tx BT LE	Chain 2	2402 MHz 2440 MHz 2480 MHz
	Tx BT LE with Tx 11a 5785 MHz	Chain 2	2440 MHz *1)
Radiated Spurious Emission (Above 1 GHz)	Tx 11b Tx 11g Tx 11n-20	Chain 1	2412 MHz 2437 MHz 2462 MHz
	Tx BT LE	Chain 2	2402 MHz 2440 MHz 2480 MHz
	Tx 11g with Tx 11a 5700 MHz	Chain 1	2412 MHz *3) 2462 MHz
	Tx 11b with Tx 11a 5700 MHz Tx 11n-20 with Tx 11a 5700 MHz	Chain 1	2412 MHz *3) 2462 MHz *3)
	Tx BT LE with Tx 11a 5785 MHz	Chain 2	2402 MHz *3) 2440 MHz 2480 MHz *3)

*1) The mode was tested as a representative, because it had the highest power at antenna terminal test.

*2) The test was performed with the antenna that had higher power as a representative.

Wireless LAN 2.4 GHz is transmitted with only Test antenna (Chain 1).

Bluetooth low energy is transmitted with only Test antenna (Chain 2).

*3) Band-edge only

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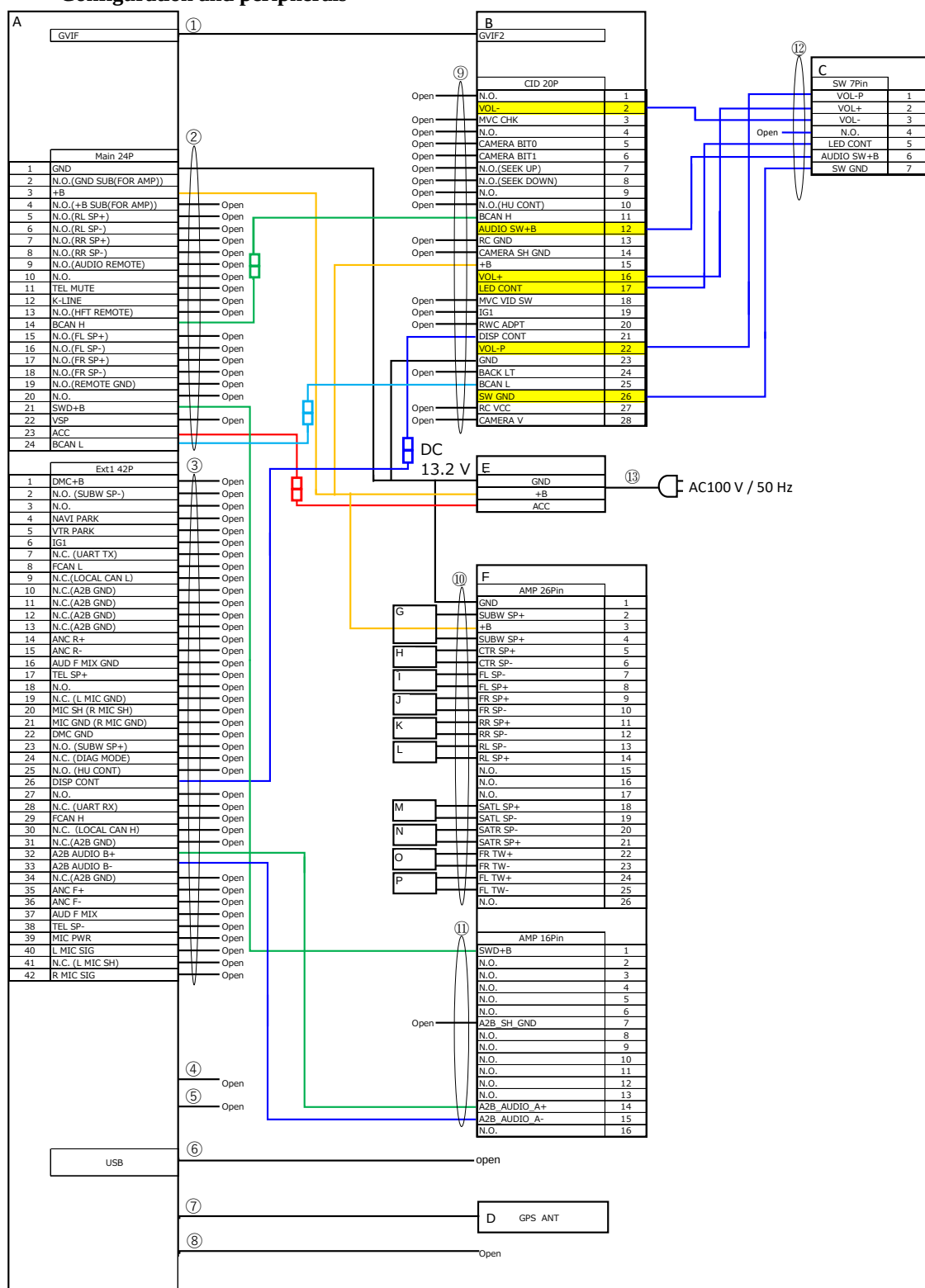
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4.2 Configuration and peripherals



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

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Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Head unit	AH00ICB	60	ALPS ALPINE CO., LTD.	EUT
B	Display	QH00159A	109	ALPS ALPINE CO., LTD.	-
C	Switch Unit	SP008GB	-	ALPS ALPINE CO., LTD.	-
D	GPS Antenna	8B550-T20-A11	0993	YOKOWO	-
E	DC Power Supply	GSV3000	2010221559	DIAMOND ANTENNA	-
F	Amplifier	8A400-30AA-A01-M1	86427800200496-21118119	BOSE	-
G	Speaker	KFC-RS101	-	JVC KENWOOD	-
H	Speaker	KFC-RS101	-	JVC KENWOOD	-
I	Speaker	KFC-RS101	-	JVC KENWOOD	-
J	Speaker	KFC-RS101	-	JVC KENWOOD	-
K	Speaker	KFC-RS101	-	JVC KENWOOD	-
L	Speaker	KFC-RS101	-	JVC KENWOOD	-
M	Speaker	KFC-RS101	-	JVC KENWOOD	-
N	Speaker	KFC-RS101	-	JVC KENWOOD	-
O	Speaker	VSP-10	-	AUTOBACS	-
P	Speaker	VSP-10	-	AUTOBACS	-

List of cables used

No.	Name	Length (m)	Shielded	Remark
1	GVIF Cable	2.4	Shielded	-
2	Main Harness	2.0	Unshielded	-
3	EXT1 Harness	2.0	Unshielded	-
4	Ethernet Cable	2.0	Unshielded	-
5	EXT2 Cable	2.0	Unshielded	-
6	USB Cable	2.3	Shielded	-
7	GPS Antenna Cable	7.2	Shielded	-
8	Tuner Cable (Main/Sub)	2.2	Shielded	-
9	Display Harness	0.5	Shielded	-
10	Amplifier Harness	0.5	Unshielded	-
11	Amplifier Harness	0.5	Unshielded	-
12	Switch Unit Harness	0.5	Unshielded	-
13	AC Power Cable	2.0	Unshielded	-

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SECTION 5: Radiated Spurious Emission

Test Procedure

It was measured based on "8.5 and 8.6 of KDB 558074 D01 15.247 Meas Guidance v05r02".

[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.

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.

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 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	Below 1 GHz	Above 1 GHz
Antenna Type	Hybrid	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		Spectrum Analyzer
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	<u>11.12.2.5.1</u> RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces <u>11.12.2.5.2</u> The duty cycle was less than 98% for detected noise, a duty factor was added to the 11.12.2.5.1 results.	RBW: 100 kHz VBW: 300 kHz

*1) Average Power Measurement was performed based on ANSI C63.10-2013.

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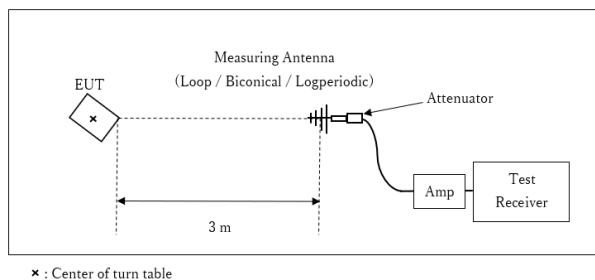
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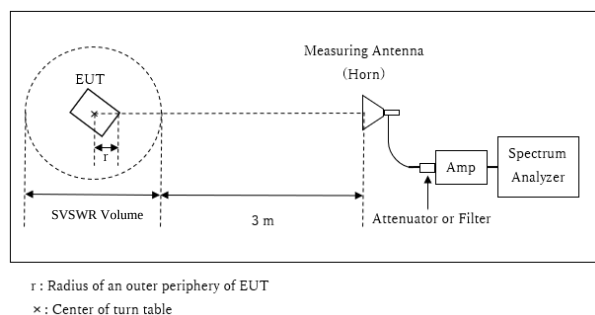
Figure 1: Test Setup

Below 1 GHz



Test Distance: 3 m

1 GHz to 10 GHz



[No.10 Test site]

Distance Factor: $20 \times \log (4.39 \text{ m} / 3 \text{ m}) = 3.31 \text{ dB}$

*Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 4.39 \text{ m}$

SVSWR Volume: 3 m

(SVSWR Volume has been calibrated based on CISPR 16-1-4,
 $r = 0.11 \text{ m}$

[No.11 Test site]

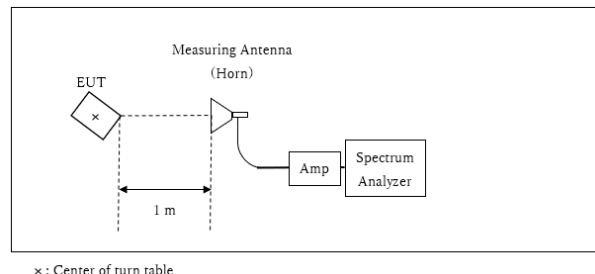
Distance Factor: $20 \times \log (3.89 \text{ m} / 3 \text{ m}) = 2.26 \text{ dB}$

*Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 3.89 \text{ m}$

SVSWR Volume: 2 m

(SVSWR Volume has been calibrated based on CISPR 16-1-4,
 $r = 0.11 \text{ m}$

10 GHz to 26.5 GHz



Distance Factor: $20 \times \log (1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

*Test Distance: 1 m

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

The test results and limit are rounded off to one decimal place, so some differences might be observed.

Measurement range	: 30 MHz to 26.5 GHz
Test data	: APPENDIX
Test result	: Pass

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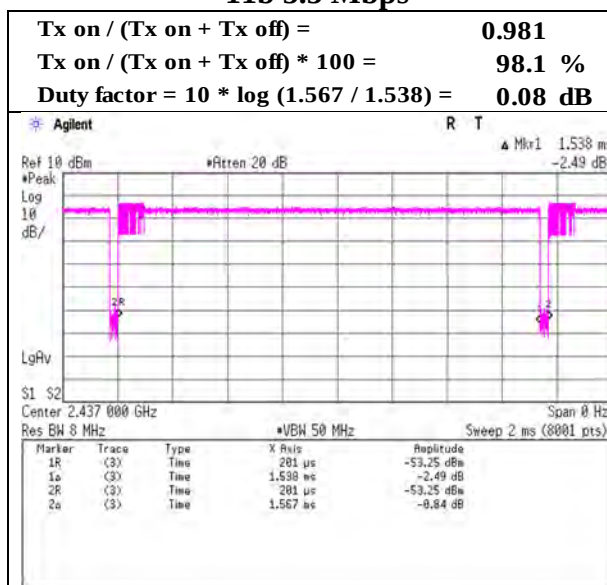
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APPENDIX 1: Test data

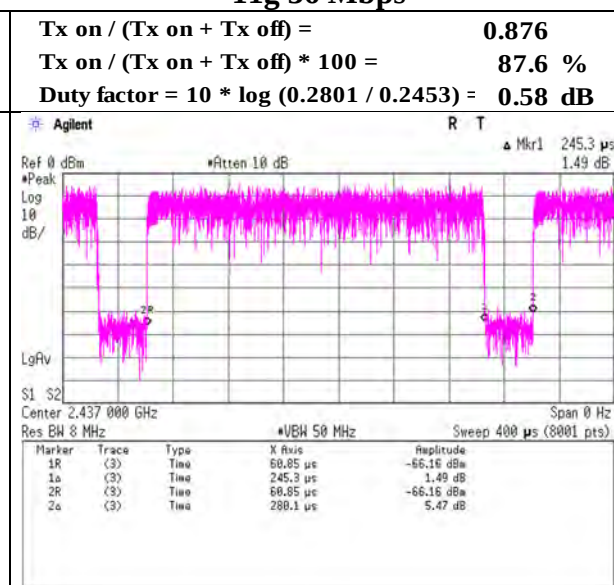
Burst rate confirmation

Report No.	13977035M-A
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	October 20, 2021
Temperature / Humidity	23 deg. C / 46 % RH
Engineer	Kenichi Adachi
Mode	Tx

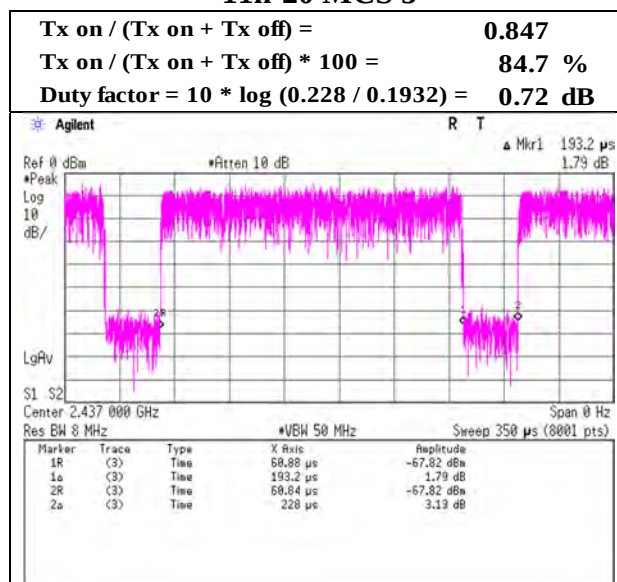
11b 5.5 Mbps



11g 36 Mbps



11n-20 MCS 5



* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.
 * This Burst rate confirmation data is quoted from the data of Report No.13977035S-A (Antenna Terminal Conducted Tests).

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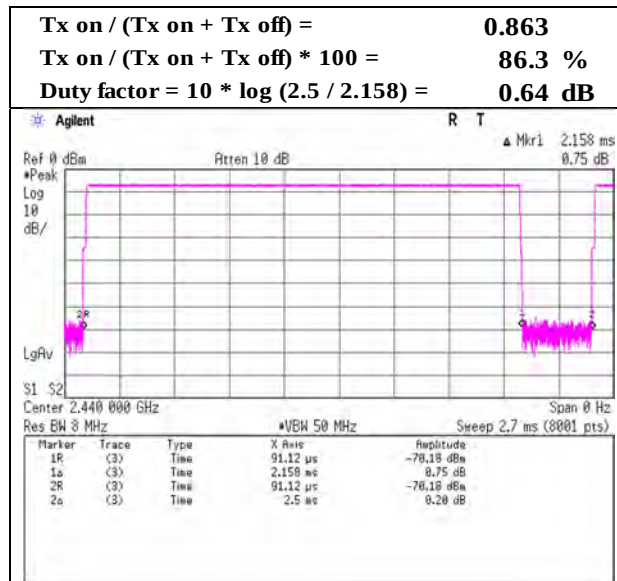
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Burst rate confirmation

Report No.	13977035M-A
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	November 11, 2021
Temperature / Humidity	24 deg. C / 30 % RH
Engineer	Shiro Kobayashi
Mode	Tx

BT LE 1M-PHY



- * Since the burst rate is not different between the channels, the data has been obtained on the representative channel.
- * This Burst rate confirmation data is quoted from the data of Report No.13977035S-A (Antenna Terminal Conducted Tests).

Radiated Spurious Emission

Report No.	13977035M-A		
Test place	Kashima EMC Lab.		
Semi Anechoic Chamber	No.10	No.10	No.10
Date	December 3, 2021	December 1, 2021	December 1, 2021
Temperature / Humidity	20 deg. C / 42 % RH	22 deg. C / 52 % RH	22 deg. C / 52 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11b 2412 MHz		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	50.30	27.61	13.54	43.88	3.31	50.88	73.9	23.0	148	54	
Hori.	4824.000	PK	51.20	32.63	5.58	45.19	3.31	47.53	73.9	26.3	150	0	Floor noise
Hori.	7236.000	PK	48.60	37.38	6.89	44.01	3.31	52.17	73.9	21.7	150	0	Floor noise
Hori.	9648.000	PK	45.40	37.95	7.76	41.94	3.31	52.48	73.9	21.4	150	0	Floor noise
Hori.	2390.000	AV	41.20	27.61	13.54	43.88	3.31	41.78	53.9	12.1	148	54	
Hori.	4824.000	AV	42.20	32.63	5.58	45.19	3.31	38.53	53.9	15.3	150	0	Floor noise
Hori.	7236.000	AV	38.80	37.38	6.89	44.01	3.31	42.37	53.9	11.5	150	0	Floor noise
Hori.	9648.000	AV	36.20	37.95	7.76	41.94	3.31	43.28	53.9	10.6	150	0	Floor noise
Vert.	2390.000	PK	51.00	27.61	13.54	43.88	3.31	51.58	73.9	22.3	154	343	
Vert.	4824.000	PK	50.90	32.63	5.58	45.19	3.31	47.23	73.9	26.6	150	0	Floor noise
Vert.	7236.000	PK	48.50	37.38	6.89	44.01	3.31	52.07	73.9	21.8	150	0	Floor noise
Vert.	9648.000	PK	45.70	37.95	7.76	41.94	3.31	52.78	73.9	21.1	150	0	Floor noise
Vert.	2390.000	AV	41.40	27.61	13.54	43.88	3.31	41.98	53.9	11.9	154	343	
Vert.	4824.000	AV	42.10	32.63	5.58	45.19	3.31	38.43	53.9	15.4	150	0	Floor noise
Vert.	7236.000	AV	39.10	37.38	6.89	44.01	3.31	42.67	53.9	11.2	150	0	Floor noise
Vert.	9648.000	AV	36.40	37.95	7.76	41.94	3.31	43.48	53.9	10.4	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	96.60	27.65	13.56	43.87	3.31	97.25	-	-	Carrier
Hori.	2399.475	PK	52.00	27.60	13.55	43.88	3.31	52.58	77.25	24.6	
Hori.	2400.000	PK	50.00	27.60	13.55	43.88	3.31	50.58	77.25	26.6	
Vert.	2412.000	PK	98.40	27.65	13.56	43.87	3.31	99.05	-	-	Carrier
Vert.	2399.375	PK	52.20	27.60	13.55	43.88	3.31	52.78	79.05	26.2	
Vert.	2400.000	PK	51.70	27.60	13.55	43.88	3.31	52.28	79.05	26.7	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

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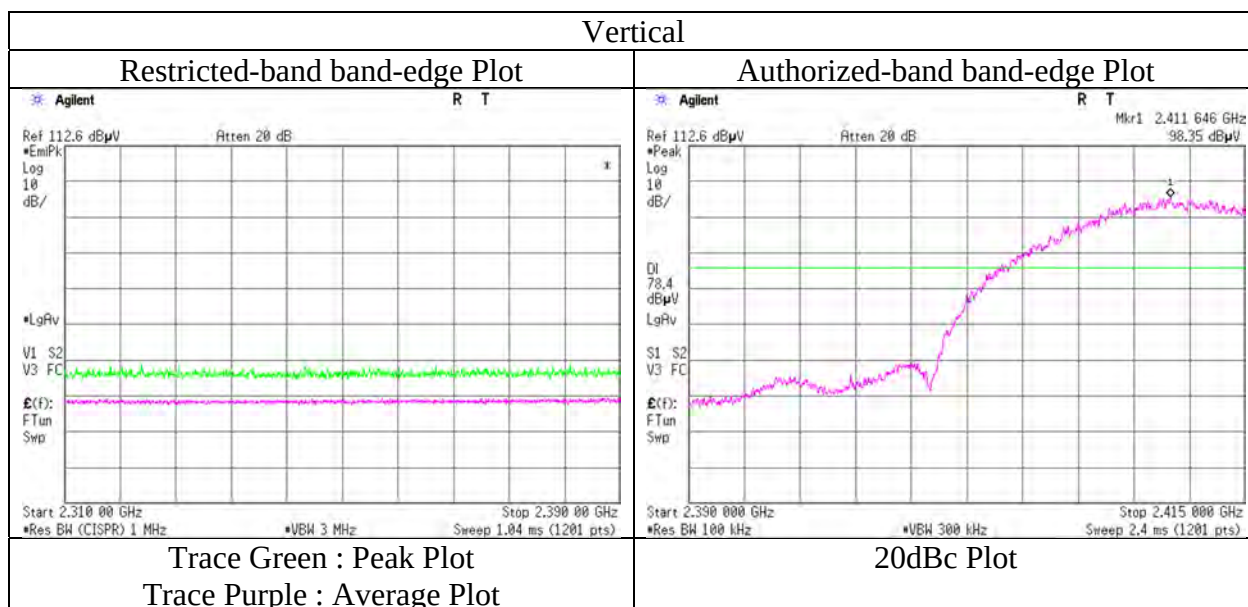
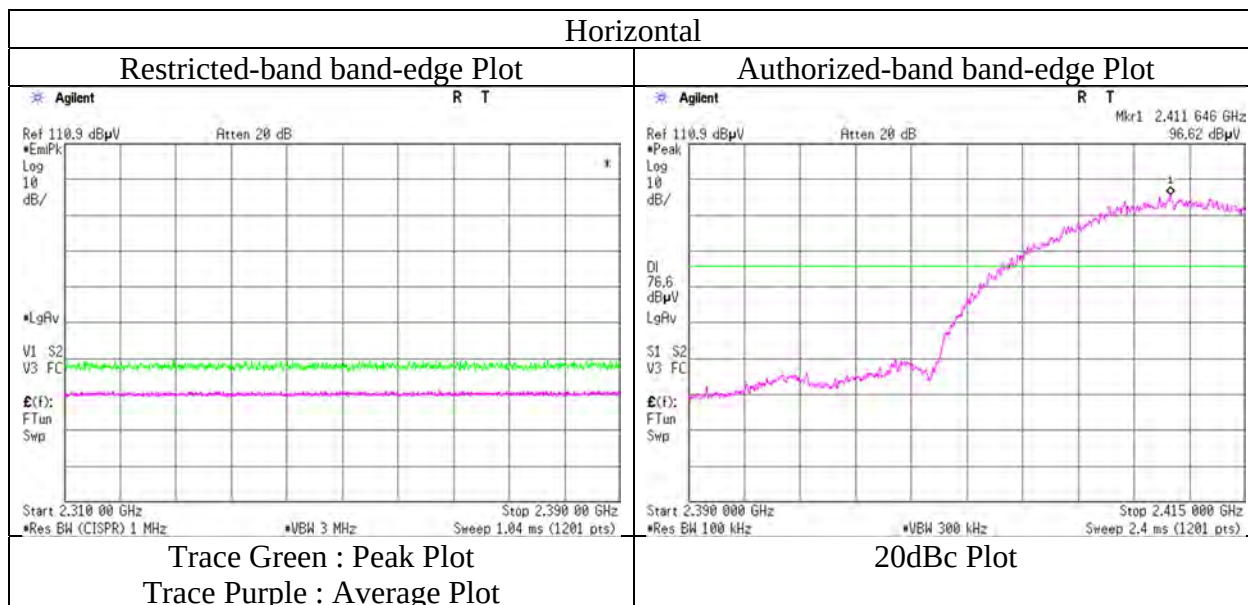
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.10
Date	December 3, 2021
Temperature / Humidity	20 deg. C / 42 % RH
Engineer	Hiromitsu Tanabe (1 GHz - 10 GHz)
Mode	Tx 11b 2412 MHz



* 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

Report No.	13977035M-A		
Test place	Kashima EMC Lab.		
Semi Anechoic Chamber	No.10	No.10	No.10
Date	December 3, 2021	December 1, 2021	December 1, 2021
Temperature / Humidity	20 deg. C / 42 % RH	22 deg. C / 52 % RH	22 deg. C / 52 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11b 2437 MHz		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	50.00	32.61	5.59	45.22	3.31	46.29	73.9	27.6	150	0	Floor noise
Hori.	7311.000	PK	47.20	37.53	6.91	43.85	3.31	51.10	73.9	22.8	150	0	Floor noise
Hori.	9748.000	PK	44.80	38.09	7.82	41.85	3.31	52.17	73.9	21.7	150	0	Floor noise
Hori.	4874.000	AV	41.40	32.61	5.59	45.22	3.31	37.69	53.9	16.2	150	0	Floor noise
Hori.	7311.000	AV	38.10	37.53	6.91	43.85	3.31	42.00	53.9	11.9	150	0	Floor noise
Hori.	9748.000	AV	35.70	38.09	7.82	41.85	3.31	43.07	53.9	10.8	150	0	Floor noise
Vert.	4874.000	PK	50.50	32.61	5.59	45.22	3.31	46.79	73.9	27.1	150	0	Floor noise
Vert.	7311.000	PK	47.60	37.53	6.91	43.85	3.31	51.50	73.9	22.4	150	0	Floor noise
Vert.	9748.000	PK	44.50	38.09	7.82	41.85	3.31	51.87	73.9	22.0	150	0	Floor noise
Vert.	4874.000	AV	41.50	32.61	5.59	45.22	3.31	37.79	53.9	16.1	150	0	Floor noise
Vert.	7311.000	AV	38.20	37.53	6.91	43.85	3.31	42.10	53.9	11.8	150	0	Floor noise
Vert.	9748.000	AV	35.80	38.09	7.82	41.85	3.31	43.17	53.9	10.7	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

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Radiated Spurious Emission

Report No.	13977035M-A		
Test place	Kashima EMC Lab.		
Semi Anechoic Chamber	No.10	No.10	No.10
Date	December 3, 2021	December 1, 2021	December 1, 2021
Temperature / Humidity	20 deg. C / 42 % RH	22 deg. C / 52 % RH	22 deg. C / 52 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11b 2462 MHz		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	50.80	28.01	13.61	43.82	3.31	51.91	73.9	21.9	335	46	
Hori.	4924.000	PK	50.00	32.67	5.65	45.24	3.31	46.39	73.9	27.5	150	0	Floor noise
Hori.	7386.000	PK	47.90	37.49	6.97	43.65	3.31	52.02	73.9	21.8	150	0	Floor noise
Hori.	9848.000	PK	45.70	38.11	7.84	41.77	3.31	53.19	73.9	20.7	150	0	Floor noise
Hori.	2483.500	AV	41.50	28.01	13.61	43.82	3.31	42.61	53.9	11.2	335	46	
Hori.	4924.000	AV	40.80	32.67	5.65	45.24	3.31	37.19	53.9	16.7	150	0	Floor noise
Hori.	7386.000	AV	38.80	37.49	6.97	43.65	3.31	42.92	53.9	10.9	150	0	Floor noise
Hori.	9848.000	AV	36.10	38.11	7.84	41.77	3.31	43.59	53.9	10.3	150	0	Floor noise
Vert.	2483.500	PK	51.40	28.01	13.61	43.82	3.31	52.51	73.9	21.3	145	340	
Vert.	4924.000	PK	49.20	32.67	5.65	45.24	3.31	45.59	73.9	28.3	150	0	Floor noise
Vert.	7386.000	PK	48.20	37.49	6.97	43.65	3.31	52.32	73.9	21.5	150	0	Floor noise
Vert.	9848.000	PK	45.00	38.11	7.84	41.77	3.31	52.49	73.9	21.4	150	0	Floor noise
Vert.	2483.500	AV	42.00	28.01	13.61	43.82	3.31	43.11	53.9	10.7	145	340	
Vert.	4924.000	AV	40.80	32.67	5.65	45.24	3.31	37.19	53.9	16.7	150	0	Floor noise
Vert.	7386.000	AV	38.80	37.49	6.97	43.65	3.31	42.92	53.9	10.9	150	0	Floor noise
Vert.	9848.000	AV	36.20	38.11	7.84	41.77	3.31	43.69	53.9	10.2	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39\text{ m} / 3.0\text{ m}) = 3.31\text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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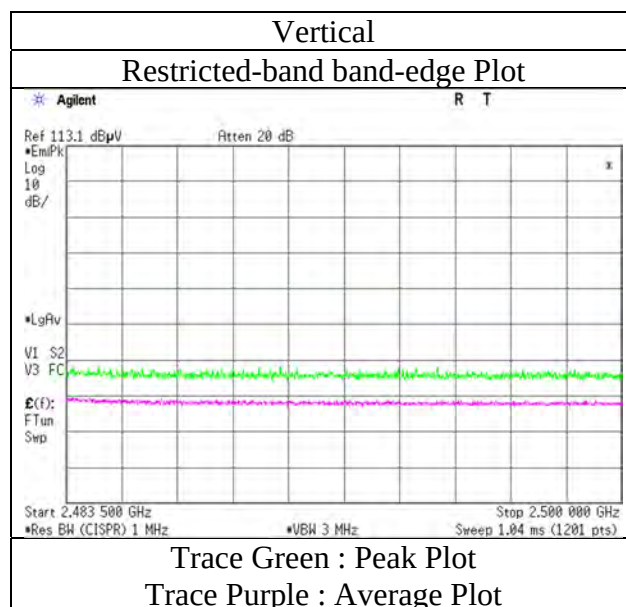
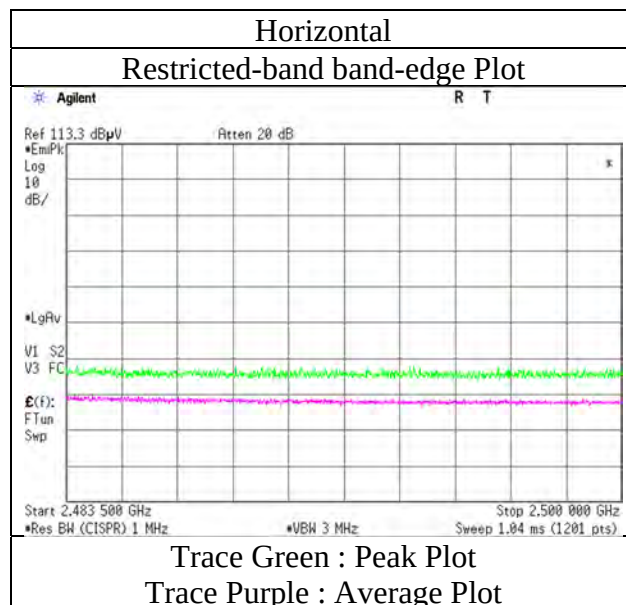
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No. 13977035M-A
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.10
Date December 3, 2021
Temperature / Humidity 20 deg. C / 42 % RH
Engineer Hiromitsu Tanabe
(1 GHz - 10 GHz)
Mode Tx 11b 2462 MHz



* 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

Report No.	13977035M-A		
Test place	Kashima EMC Lab.		
Semi Anechoic Chamber	No.10	No.10	No.10
Date	December 3, 2021	December 1, 2021	December 1, 2021
Temperature / Humidity	20 deg. C / 42 % RH	22 deg. C / 52 % RH	22 deg. C / 52 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11g 2412 MHz		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	56.80	27.61	13.54	43.88	3.31	57.38	73.9	16.5	148	52	
Hori.	4824.000	PK	50.90	32.63	5.58	45.19	3.31	47.23	73.9	26.6	150	0	Floor noise
Hori.	7236.000	PK	47.30	37.38	6.89	44.01	3.31	50.87	73.9	23.0	150	0	Floor noise
Hori.	9648.000	PK	44.50	37.95	7.76	41.94	3.31	51.58	73.9	22.3	150	0	Floor noise
Vert.	2390.000	PK	57.30	27.61	13.54	43.88	3.31	57.88	73.9	16.0	122	343	
Vert.	4824.000	PK	50.50	32.63	5.58	45.19	3.31	46.83	73.9	27.0	150	0	Floor noise
Vert.	7236.000	PK	48.60	37.38	6.89	44.01	3.31	52.17	73.9	21.7	150	0	Floor noise
Vert.	9648.000	PK	44.80	37.95	7.76	41.94	3.31	51.88	73.9	22.0	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	44.70	27.61	13.54	43.88	0.58	3.31	45.86	53.9	8.0 *1)	
Hori.	4824.000	AV	42.10	32.63	5.58	45.19	0.58	3.31	39.01	53.9	14.8	Floor noise
Hori.	7236.000	AV	39.00	37.38	6.89	44.01	0.58	3.31	43.15	53.9	10.7	Floor noise
Hori.	9648.000	AV	36.10	37.95	7.76	41.94	0.58	3.31	43.76	53.9	10.1	Floor noise
Vert.	2390.000	AV	44.70	27.61	13.54	43.88	0.58	3.31	45.86	53.9	8.0 *1)	
Vert.	4824.000	AV	42.10	32.63	5.58	45.19	0.58	3.31	39.01	53.9	14.8	Floor noise
Vert.	7236.000	AV	38.90	37.38	6.89	44.01	0.58	3.31	43.05	53.9	10.8	Floor noise
Vert.	9648.000	AV	36.10	37.95	7.76	41.94	0.58	3.31	43.76	53.9	10.1	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Duty factor + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	90.10	27.65	13.56	43.87	3.31	90.75	-	-	Carrier
Hori.	2399.792	PK	57.50	27.60	13.55	43.88	3.31	58.08	70.75	12.6	
Hori.	2400.000	PK	56.50	27.60	13.55	43.88	3.31	57.08	70.75	13.6	
Vert.	2412.000	PK	91.50	27.65	13.56	43.87	3.31	92.15	-	-	Carrier
Vert.	2399.833	PK	57.60	27.60	13.55	43.88	3.31	58.18	72.15	13.9	
Vert.	2400.000	PK	56.60	27.60	13.55	43.88	3.31	57.18	72.15	14.9	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

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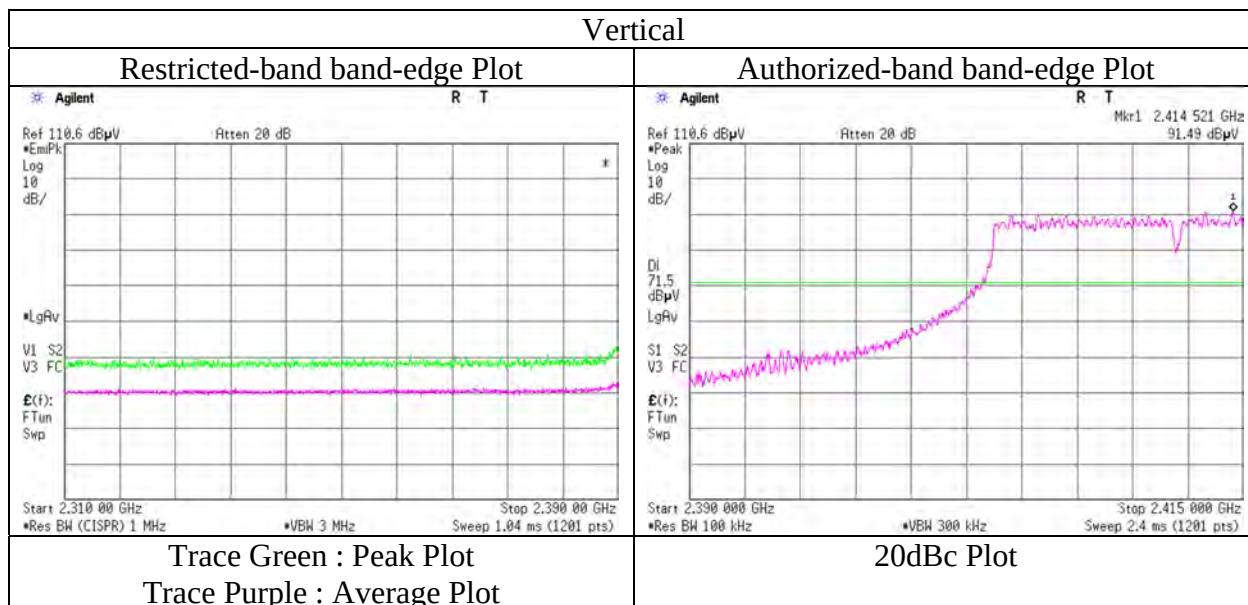
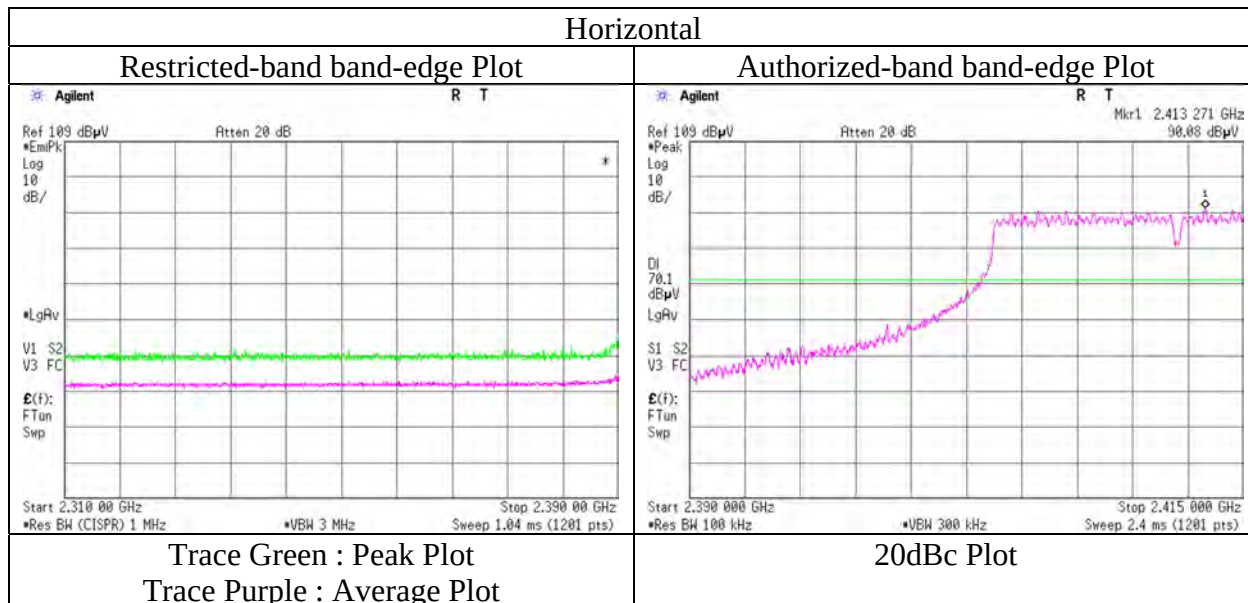
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.10
Date	December 3, 2021
Temperature / Humidity	20 deg. C / 42 % RH
Engineer	Hiromitsu Tanabe
	(1 GHz - 10 GHz)
Mode	Tx 11g 2412 MHz



* 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

Report No.	13977035M-A		
Test place	Kashima EMC Lab.		
Semi Anechoic Chamber	No.10	No.10	No.10
Date	December 3, 2021	December 1, 2021	December 1, 2021
Temperature / Humidity	20 deg. C / 42 % RH	22 deg. C / 52 % RH	22 deg. C / 52 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11g 2437 MHz		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	50.10	32.61	5.59	45.22	3.31	46.39	73.9	27.5	150	0	Floor noise
Hori.	7311.000	PK	47.00	37.53	6.91	43.85	3.31	50.90	73.9	23.0	150	0	Floor noise
Hori.	9748.000	PK	45.60	38.09	7.82	41.85	3.31	52.97	73.9	20.9	150	0	Floor noise
Vert.	4874.000	PK	50.40	32.61	5.59	45.22	3.31	46.69	73.9	27.2	150	0	Floor noise
Vert.	7311.000	PK	46.40	37.53	6.91	43.85	3.31	50.30	73.9	23.6	150	0	Floor noise
Vert.	9748.000	PK	44.30	38.09	7.82	41.85	3.31	51.67	73.9	22.2	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4874.000	AV	41.50	32.61	5.59	45.22	0.58	3.31	38.37	53.9	15.5	Floor noise
Hori.	7311.000	AV	38.10	37.53	6.91	43.85	0.58	3.31	42.58	53.9	11.3	Floor noise
Hori.	9748.000	AV	35.80	38.09	7.82	41.85	0.58	3.31	43.75	53.9	10.1	Floor noise
Vert.	4874.000	AV	41.60	32.61	5.59	45.22	0.58	3.31	38.47	53.9	15.4	Floor noise
Vert.	7311.000	AV	38.20	37.53	6.91	43.85	0.58	3.31	42.68	53.9	11.2	Floor noise
Vert.	9748.000	AV	35.80	38.09	7.82	41.85	0.58	3.31	43.75	53.9	10.1	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Duty factor + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

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Radiated Spurious Emission

Report No.	13977035M-A			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.10	No.10	No.10	No.10
Date	December 18, 2021	December 3, 2021	December 1, 2021	December 1, 2021
Temperature / Humidity	20 deg. C / 48 % RH	20 deg. C / 42 % RH	22 deg. C / 52 % RH	22 deg. C / 52 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(30 MHz - 1000 MHz)	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11g 2462 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	304.482	QP	40.46	13.59	8.76	31.35	0.00	31.46	46.0	14.5	109	224	
Hori.	412.777	QP	33.46	15.87	9.65	31.26	0.00	27.72	46.0	18.2	100	147	
Hori.	942.851	QP	26.86	23.95	12.23	30.90	0.00	32.14	46.0	13.8	100	311	
Hori.	2483.500	PK	57.70	28.01	13.61	43.82	3.31	58.81	73.9	15.0	259	57	
Hori.	4924.000	PK	49.60	32.67	5.65	45.24	3.31	45.99	73.9	27.9	150	0	Floor noise
Hori.	7386.000	PK	48.40	37.49	6.97	43.65	3.31	52.52	73.9	21.3	150	0	Floor noise
Hori.	9848.000	PK	45.50	38.11	7.84	41.77	3.31	52.99	73.9	20.9	150	0	Floor noise
Vert.	35.661	QP	42.49	12.74	5.97	31.64	0.00	29.56	40.0	10.4	100	238	
Vert.	71.307	QP	33.01	11.31	6.51	31.58	0.00	19.25	40.0	20.7	100	326	
Vert.	304.804	QP	35.21	13.60	8.77	31.35	0.00	26.23	46.0	19.7	100	151	
Vert.	346.011	QP	32.65	14.30	9.24	31.32	0.00	24.87	46.0	21.1	100	171	
Vert.	407.531	QP	33.25	15.73	9.61	31.27	0.00	27.32	46.0	18.6	100	243	
Vert.	742.157	QP	28.08	21.76	11.31	31.01	0.00	30.14	46.0	15.8	100	339	
Vert.	944.581	QP	27.55	23.94	12.23	30.89	0.00	32.83	46.0	13.1	169	0	
Vert.	2483.500	PK	59.10	28.01	13.61	43.82	3.31	60.21	73.9	13.6	147	345	
Vert.	4924.000	PK	49.80	32.67	5.65	45.24	3.31	46.19	73.9	27.7	150	0	Floor noise
Vert.	7386.000	PK	47.90	37.49	6.97	43.65	3.31	52.02	73.9	21.8	150	0	Floor noise
Vert.	9848.000	PK	44.80	38.11	7.84	41.77	3.31	52.29	73.9	21.6	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	46.00	28.01	13.61	43.82	0.58	3.31	47.69	53.9	6.2	*1)
Hori.	4924.000	AV	40.80	32.67	5.65	45.24	0.58	3.31	37.77	53.9	16.1	Floor noise
Hori.	7386.000	AV	38.80	37.49	6.97	43.65	0.58	3.31	43.50	53.9	10.4	Floor noise
Hori.	9848.000	AV	36.40	38.11	7.84	41.77	0.58	3.31	44.47	53.9	9.4	Floor noise
Vert.	2483.500	AV	46.00	28.01	13.61	43.82	0.58	3.31	47.69	53.9	6.2	*1)
Vert.	4924.000	AV	41.00	32.67	5.65	45.24	0.58	3.31	37.97	53.9	15.9	Floor noise
Vert.	7386.000	AV	38.80	37.49	6.97	43.65	0.58	3.31	43.50	53.9	10.4	Floor noise
Vert.	9848.000	AV	36.40	38.11	7.84	41.77	0.58	3.31	44.47	53.9	9.4	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Duty factor + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

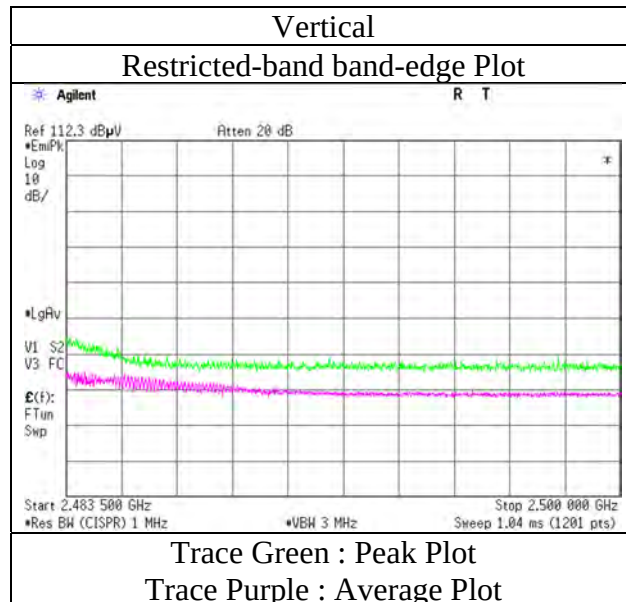
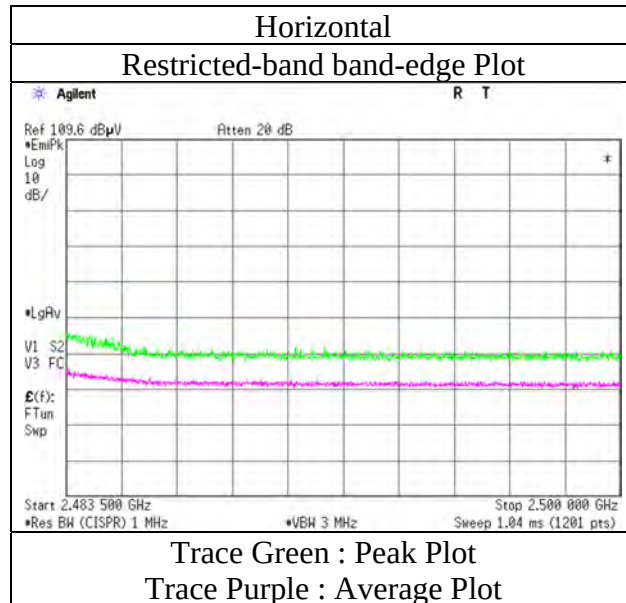
10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission **(Reference Plot for band-edge)**

Report No. 13977035M-A
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.10
Date December 3, 2021
Temperature / Humidity 20 deg. C / 42 % RH
Engineer Hiromitsu Tanabe
(1 GHz - 10 GHz)
Mode Tx 11g 2462 MHz



* 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

Report No.	13977035M-A		
Test place	Kashima EMC Lab.		
Semi Anechoic Chamber	No.10	No.10	No.10
Date	December 3, 2021	December 1, 2021	December 1, 2021
Temperature / Humidity	20 deg. C / 42 % RH	22 deg. C / 52 % RH	22 deg. C / 52 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11n-20 2412 MHz		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	57.90	27.61	13.54	43.88	3.31	58.48	73.9	15.4	145	50	
Hori.	4824.000	PK	50.40	32.63	5.58	45.19	3.31	46.73	73.9	27.1	150	0	Floor noise
Hori.	7236.000	PK	47.50	37.38	6.89	44.01	3.31	51.07	73.9	22.8	150	0	Floor noise
Hori.	9648.000	PK	44.70	37.95	7.76	41.94	3.31	51.78	73.9	22.1	150	0	Floor noise
Vert.	2390.000	PK	58.70	27.61	13.54	43.88	3.31	59.28	73.9	14.6	121	346	
Vert.	4824.000	PK	50.20	32.63	5.58	45.19	3.31	46.53	73.9	27.3	150	0	Floor noise
Vert.	7236.000	PK	47.80	37.38	6.89	44.01	3.31	51.37	73.9	22.5	150	0	Floor noise
Vert.	9648.000	PK	44.90	37.95	7.76	41.94	3.31	51.98	73.9	21.9	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	45.80	27.61	13.54	43.88	0.72	3.31	47.10	53.9	6.8	*1)
Hori.	4824.000	AV	42.20	32.63	5.58	45.19	0.72	3.31	39.25	53.9	14.6	Floor noise
Hori.	7236.000	AV	38.90	37.38	6.89	44.01	0.72	3.31	43.19	53.9	10.7	Floor noise
Hori.	9648.000	AV	36.10	37.95	7.76	41.94	0.72	3.31	43.90	53.9	10.0	Floor noise
Vert.	2390.000	AV	45.90	27.61	13.54	43.88	0.72	3.31	47.20	53.9	6.7	*1)
Vert.	4824.000	AV	41.90	32.63	5.58	45.19	0.72	3.31	38.95	53.9	14.9	Floor noise
Vert.	7236.000	AV	38.80	37.38	6.89	44.01	0.72	3.31	43.09	53.9	10.8	Floor noise
Vert.	9648.000	AV	36.00	37.95	7.76	41.94	0.72	3.31	43.80	53.9	10.1	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Duty factor + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	89.90	27.65	13.56	43.87	3.31	90.55	-	-	Carrier
Hori.	2399.867	PK	57.50	27.60	13.55	43.88	3.31	58.08	70.55	12.4	
Hori.	2400.000	PK	56.80	27.60	13.55	43.88	3.31	57.38	70.55	13.1	
Vert.	2412.000	PK	91.60	27.65	13.56	43.87	3.31	92.25	-	-	Carrier
Vert.	2399.625	PK	58.40	27.60	13.55	43.88	3.31	58.98	72.25	13.2	
Vert.	2400.000	PK	57.30	27.60	13.55	43.88	3.31	57.88	72.25	14.3	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

UL Japan, Inc.

Kashima EMC Lab.

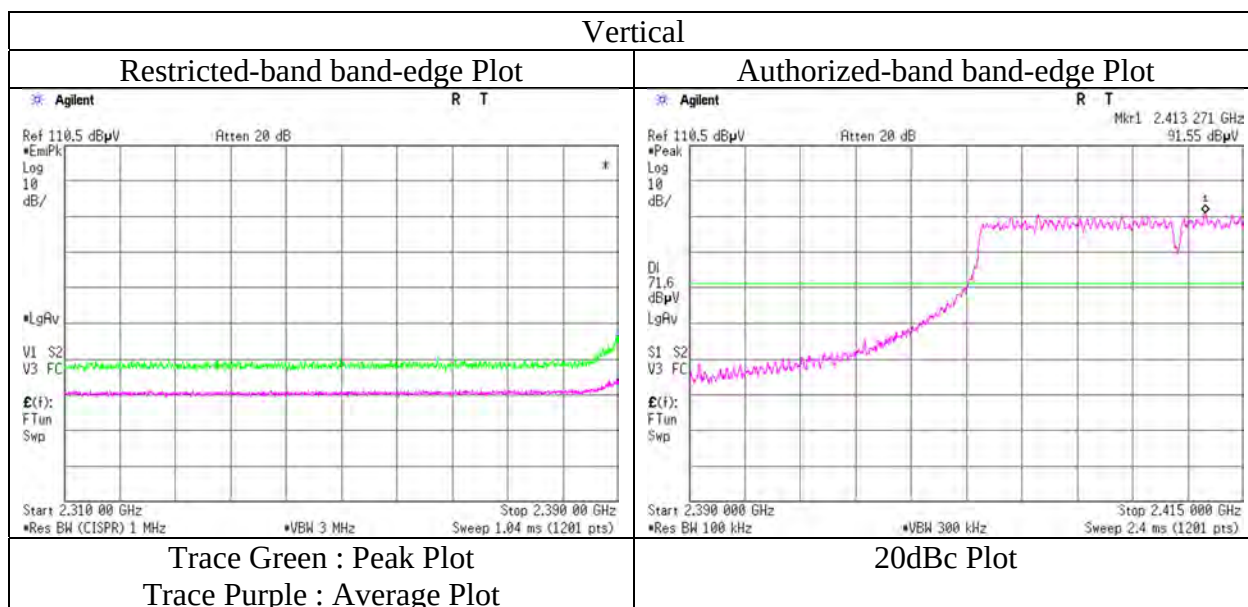
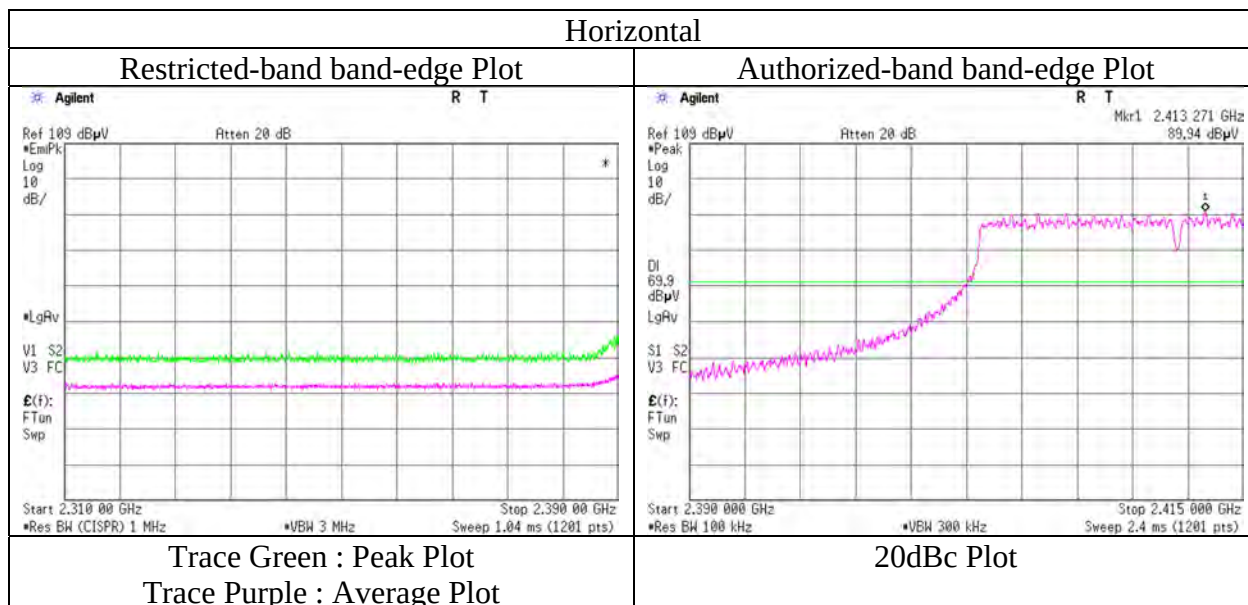
1614, Mushihata, Katori-shi, Chiba-ken, 289-0341 Japan

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.10
Date	December 3, 2021
Temperature / Humidity	20 deg. C / 42 % RH
Engineer	Hiromitsu Tanabe
	(1 GHz - 10 GHz)
Mode	Tx 11n-20 2412 MHz



* 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

Report No.	13977035M-A		
Test place	Kashima EMC Lab.		
Semi Anechoic Chamber	No.10	No.10	No.10
Date	December 3, 2021	December 1, 2021	December 1, 2021
Temperature / Humidity	20 deg. C / 42 % RH	22 deg. C / 52 % RH	22 deg. C / 52 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11n-20 2437 MHz		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	50.10	32.61	5.59	45.22	3.31	46.39	73.9	27.5	150	0	Floor noise
Hori.	7311.000	PK	46.10	37.53	6.91	43.85	3.31	50.00	73.9	23.9	150	0	Floor noise
Hori.	9748.000	PK	44.20	38.09	7.82	41.85	3.31	51.57	73.9	22.3	150	0	Floor noise
Vert.	4874.000	PK	51.30	32.61	5.59	45.22	3.31	47.59	73.9	26.3	150	0	Floor noise
Vert.	7311.000	PK	46.10	37.53	6.91	43.85	3.31	50.00	73.9	23.9	150	0	Floor noise
Vert.	9748.000	PK	44.60	38.09	7.82	41.85	3.31	51.97	73.9	21.9	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4874.000	AV	41.50	32.61	5.59	45.22	0.72	3.31	38.51	53.9	15.3	Floor noise
Hori.	7311.000	AV	38.10	37.53	6.91	43.85	0.72	3.31	42.72	53.9	11.1	Floor noise
Hori.	9748.000	AV	35.90	38.09	7.82	41.85	0.72	3.31	43.99	53.9	9.9	Floor noise
Vert.	4874.000	AV	41.40	32.61	5.59	45.22	0.72	3.31	38.41	53.9	15.4	Floor noise
Vert.	7311.000	AV	38.20	37.53	6.91	43.85	0.72	3.31	42.82	53.9	11.0	Floor noise
Vert.	9748.000	AV	35.90	38.09	7.82	41.85	0.72	3.31	43.99	53.9	9.9	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Duty factor + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

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Radiated Spurious Emission

Report No.	13977035M-A		
Test place	Kashima EMC Lab.		
Semi Anechoic Chamber	No.10	No.10	No.10
Date	December 3, 2021	December 1, 2021	December 1, 2021
Temperature / Humidity	20 deg. C / 42 % RH	22 deg. C / 52 % RH	22 deg. C / 52 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11n-20 2462 MHz		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	61.30	28.01	13.61	43.82	3.31	62.41	73.9	11.4	265	56	
Hori.	4924.000	PK	50.10	32.67	5.65	45.24	3.31	46.49	73.9	27.4	150	0	Floor noise
Hori.	7386.000	PK	47.70	37.49	6.97	43.65	3.31	51.82	73.9	22.0	150	0	Floor noise
Hori.	9848.000	PK	45.20	38.11	7.84	41.77	3.31	52.69	73.9	21.2	150	0	Floor noise
Vert.	2483.500	PK	62.80	28.01	13.61	43.82	3.31	63.91	73.9	9.9	145	345	
Vert.	4924.000	PK	48.50	32.67	5.65	45.24	3.31	44.89	73.9	29.0	150	0	Floor noise
Vert.	7386.000	PK	47.50	37.49	6.97	43.65	3.31	51.62	73.9	22.2	150	0	Floor noise
Vert.	9848.000	PK	44.90	38.11	7.84	41.77	3.31	52.39	73.9	21.5	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	48.00	28.01	13.61	43.82	0.72	3.31	49.83	53.9	4.0 *1)	
Hori.	4924.000	AV	40.70	32.67	5.65	45.24	0.72	3.31	37.81	53.9	16.0	Floor noise
Hori.	7386.000	AV	38.60	37.49	6.97	43.65	0.72	3.31	43.44	53.9	10.4	Floor noise
Hori.	9848.000	AV	36.20	38.11	7.84	41.77	0.72	3.31	44.41	53.9	9.4	Floor noise
Vert.	2483.500	AV	47.30	28.01	13.61	43.82	0.72	3.31	49.13	53.9	4.7	*1)
Vert.	4924.000	AV	41.00	32.67	5.65	45.24	0.72	3.31	38.11	53.9	15.7	Floor noise
Vert.	7386.000	AV	39.00	37.49	6.97	43.65	0.72	3.31	43.84	53.9	10.0	Floor noise
Vert.	9848.000	AV	36.30	38.11	7.84	41.77	0.72	3.31	44.51	53.9	9.3	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Duty factor + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

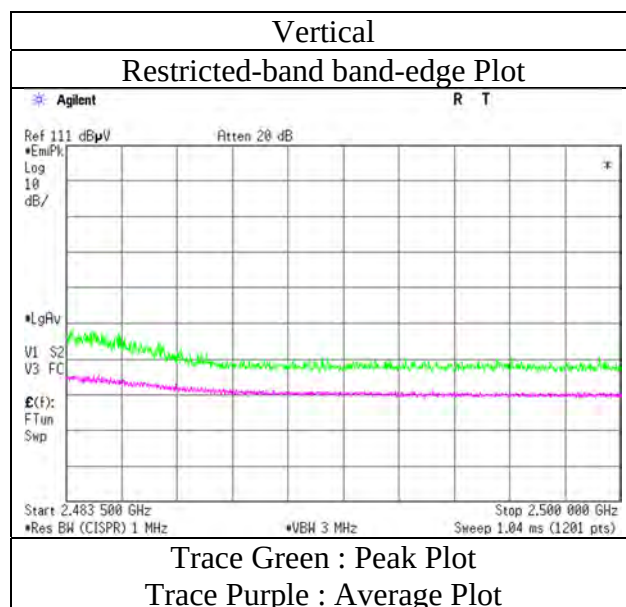
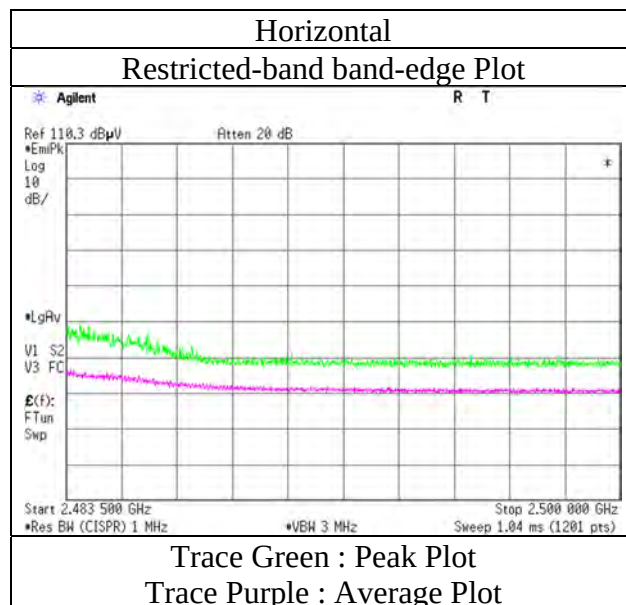
10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission **(Reference Plot for band-edge)**

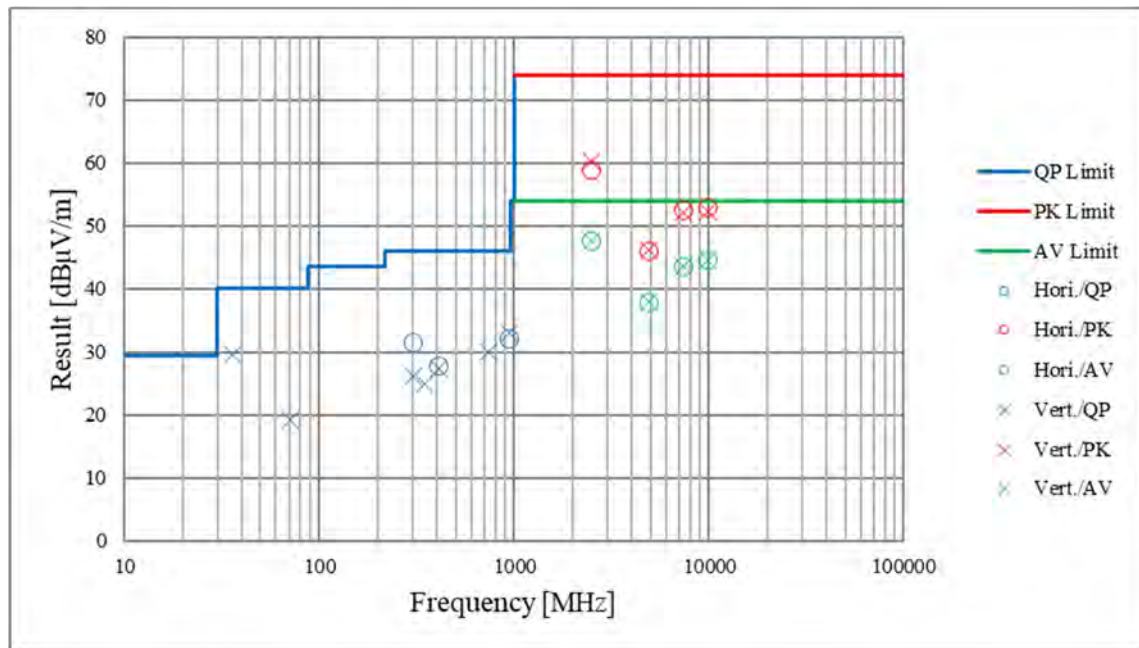
Report No. 13977035M-A
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.10
Date December 3, 2021
Temperature / Humidity 20 deg. C / 42 % RH
Engineer Hiromitsu Tanabe
(1 GHz - 10 GHz)
Mode Tx 11n-20 2462 MHz



* 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)

Report No.	13977035M-A			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.10	No.10	No.10	No.10
Date	December 18, 2021	December 3, 2021	December 1, 2021	December 1, 2021
Temperature / Humidity	20 deg. C / 48 % RH	20 deg. C / 42 % RH	22 deg. C / 52 % RH	22 deg. C / 52 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(30 MHz - 1000 MHz)	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11g 2462 MHz			



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

Radiated Spurious Emission

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.10
Date	December 8, 2021
Temperature / Humidity	22 deg. C / 45 % RH
Engineer	Hiromitsu Tanabe
	(1 GHz - 2.8 GHz)
Mode	Tx 11b 2412 MHz with 11a 5700 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	51.00	27.61	13.54	43.88	3.31	51.58	73.9	22.3	158	300	
Hori.	2390.000	AV	41.50	27.61	13.54	43.88	3.31	42.08	53.9	11.8	158	300	
Vert.	2390.000	PK	51.30	27.61	13.54	43.88	3.31	51.88	73.9	22.0	122	350	
Vert.	2390.000	AV	41.70	27.61	13.54	43.88	3.31	42.28	53.9	11.6	122	350	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log(4.39 m / 3.0 m) = 3.31 dB

10 GHz - 26.5 GHz : 20log(1.0 m / 3.0 m) = -9.54 dB

20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	97.20	27.65	13.56	43.87	3.31	97.85	-	-	Carrier
Hori.	2397.492	PK	49.90	27.60	13.55	43.88	3.31	50.48	77.85	27.3	
Hori.	2400.000	PK	47.60	27.60	13.55	43.88	3.31	48.18	77.85	29.6	
Vert.	2412.000	PK	98.90	27.65	13.56	43.87	3.31	99.55	-	-	Carrier
Vert.	2397.525	PK	51.10	27.60	13.55	43.88	3.31	51.68	79.55	27.8	
Vert.	2400.000	PK	48.10	27.60	13.55	43.88	3.31	48.68	79.55	30.8	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log(4.39 m / 3.0 m) = 3.31 dB

10 GHz - 26.5 GHz : 20log(1.0 m / 3.0 m) = -9.54 dB

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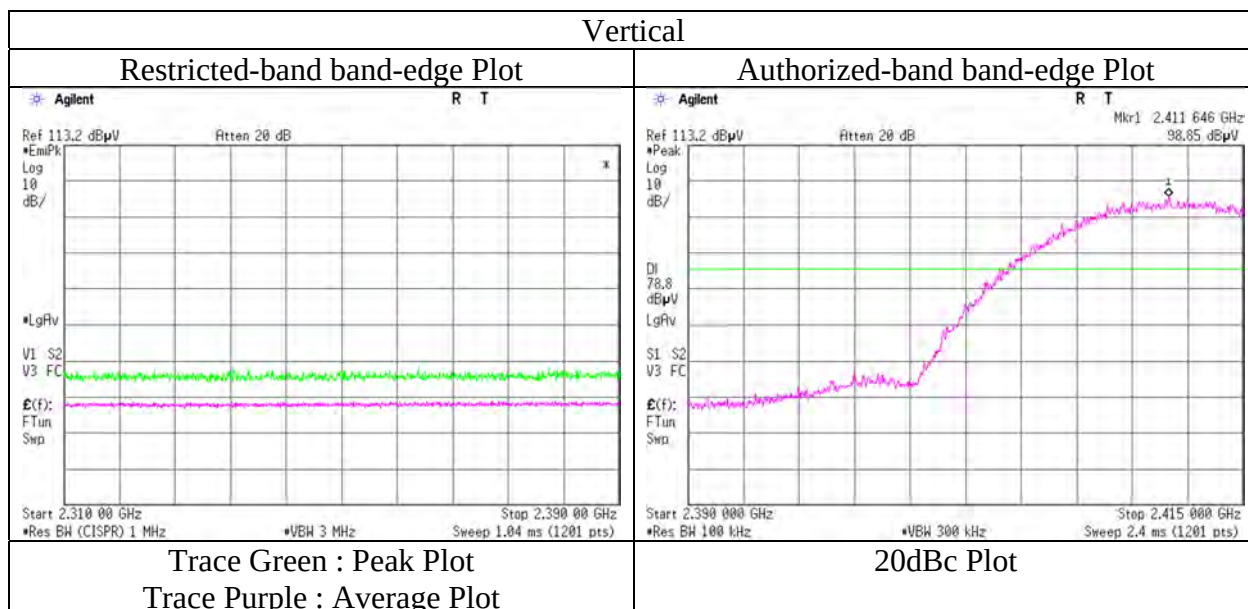
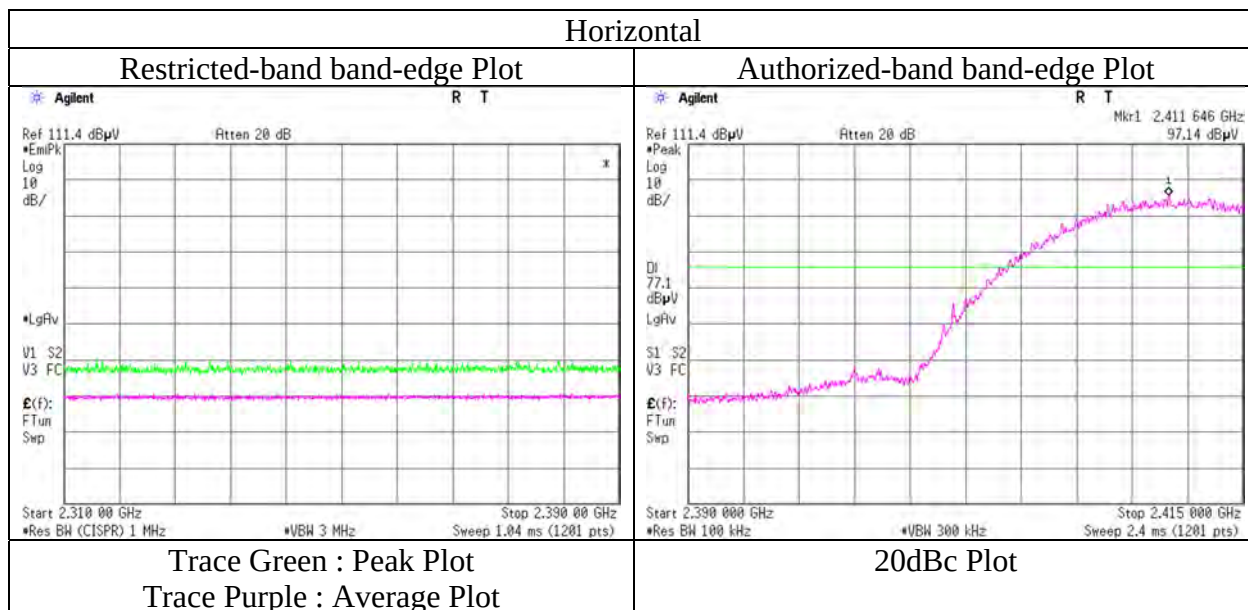
1614, Mushihata, Katori-shi, Chiba-ken, 289-0341 Japan

Telephone : +81 478 88 6500

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.10
Date	December 8, 2021
Temperature / Humidity	22 deg. C / 45 % RH
Engineer	Hiromitsu Tanabe
	(1 GHz - 2.8 GHz)
Mode	Tx 11b 2412 MHz with 11a 5700 MHz



* 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

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.10
Date	December 8, 2021
Temperature / Humidity	22 deg. C / 45 % RH
Engineer	Hiromitsu Tanabe
	(1 GHz - 2.8 GHz)
Mode	Tx 11b 2462 MHz with 11a 5700 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	51.00	28.01	13.61	43.82	3.31	52.11	73.9	21.7	273	303	
Hori.	2483.500	AV	41.60	28.01	13.61	43.82	3.31	42.71	53.9	11.1	273	303	
Vert.	2483.500	PK	51.30	28.01	13.61	43.82	3.31	52.41	73.9	21.4	146	345	
Vert.	2483.500	AV	41.80	28.01	13.61	43.82	3.31	42.91	53.9	10.9	146	345	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

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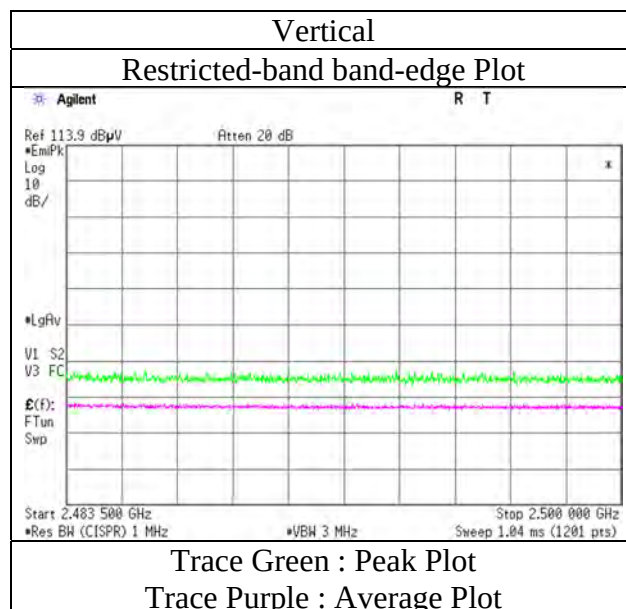
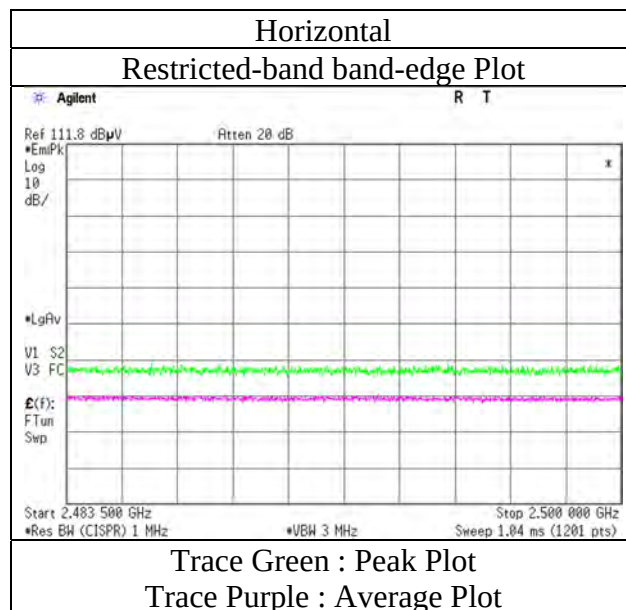
1614, Mushihata, Katori-shi, Chiba-ken, 289-0341 Japan

Telephone : +81 478 88 6500

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.10
Date	December 8, 2021
Temperature / Humidity	22 deg. C / 45 % RH
Engineer	Hiromitsu Tanabe (1 GHz - 2.8 GHz)
Mode	Tx 11b 2462 MHz with 11a 5700 MHz



* 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

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.10
Date	December 8, 2021
Temperature / Humidity	22 deg. C / 45 % RH
Engineer	Hiromitsu Tanabe
	(1 GHz - 2.8 GHz)
Mode	Tx 11g 2412 MHz with 11a 5700 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	56.20	27.61	13.54	43.88	3.31	56.78	73.9	17.1	309	51	
Vert.	2390.000	PK	56.90	27.61	13.54	43.88	3.31	57.48	73.9	16.4	150	345	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	43.50	27.61	13.54	43.88	0.58	3.31	44.66	53.9	9.2	*1)
Vert.	2390.000	AV	44.30	27.61	13.54	43.88	0.58	3.31	45.46	53.9	8.4	*1)

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Duty factor + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	90.60	27.65	13.56	43.87	3.31	91.25	-	-	Carrier
Hori.	2394.458	PK	57.90	27.60	13.55	43.88	3.31	58.48	71.25	12.7	
Hori.	2400.000	PK	57.50	27.60	13.55	43.88	3.31	58.08	71.25	13.1	
Vert.	2412.000	PK	91.00	27.65	13.56	43.87	3.31	91.65	-	-	Carrier
Vert.	2394.500	PK	58.10	27.60	13.55	43.88	3.31	58.68	71.65	12.9	
Vert.	2400.000	PK	57.80	27.60	13.55	43.88	3.31	58.38	71.65	13.2	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

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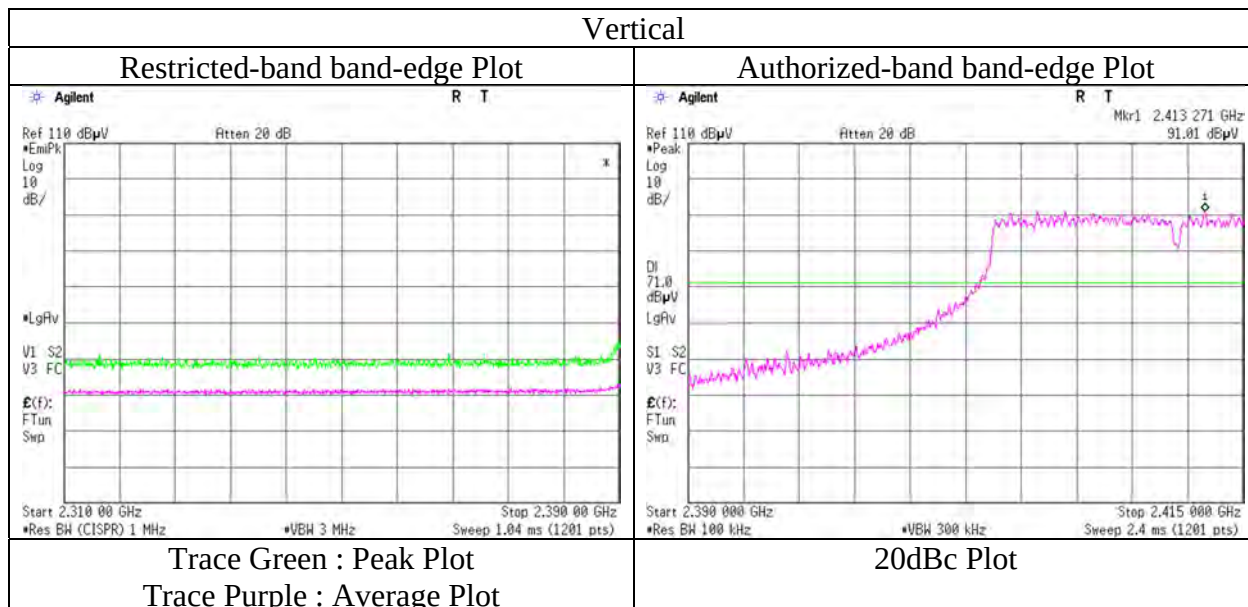
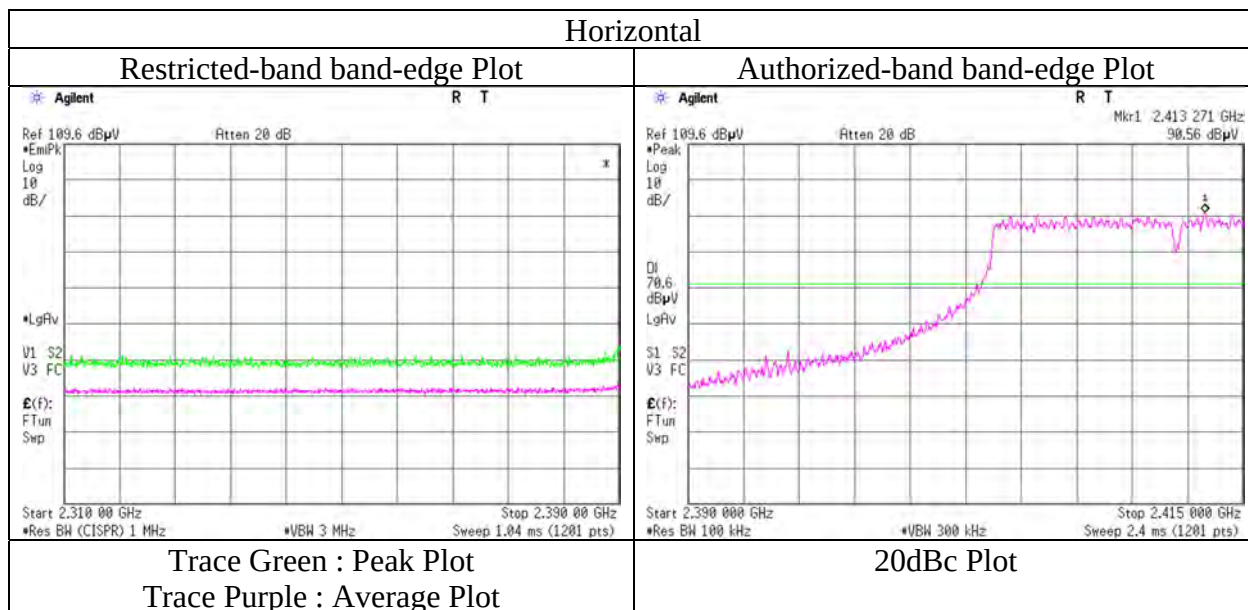
1614, Mushihata, Katori-shi, Chiba-ken, 289-0341 Japan

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.10
Date	December 8, 2021
Temperature / Humidity	22 deg. C / 45 % RH
Engineer	Hiromitsu Tanabe
	(1 GHz - 2.8 GHz)
Mode	Tx 11g 2412 MHz with 11a 5700 MHz



* 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

Report No.	13977035M-A			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.11	No.10	No.10	No.11
Date	December 8, 2021	December 8, 2021	December 17, 2021	December 7, 2021
Temperature / Humidity	23 deg. C / 41 % RH	22 deg. C / 45 % RH	21 deg. C / 45 % RH	20 deg. C / 45 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(30 MHz - 1000 MHz)	(1 GHz - 2.8 GHz)	(2.8 GHz - 10 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11g 2462 MHz with 11a 5700 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	336.064	QP	37.50	14.31	7.75	31.99	0.00	27.57	46.0	18.4	100	293	
Hori.	940.015	QP	27.50	24.13	9.93	31.09	0.00	30.47	46.0	15.5	100	179	
Hori.	2483.500	PK	59.40	28.01	13.61	43.82	3.31	60.51	73.9	13.3	331	54	
Hori.	4924.000	PK	53.20	32.67	5.65	45.24	3.31	49.59	73.9	24.3	100	285	
Hori.	7386.000	PK	48.60	37.49	6.97	43.65	3.31	52.72	73.9	21.1	150	0	Floor noise
Hori.	9848.000	PK	45.80	38.11	7.84	41.77	3.31	53.29	73.9	20.6	150	0	Floor noise
Vert.	35.637	QP	39.30	12.86	5.73	32.21	0.00	25.68	40.0	14.3	100	262	
Vert.	54.036	QP	28.60	13.76	5.94	32.20	0.00	16.10	40.0	23.9	279	104	
Vert.	306.740	QP	36.00	13.71	7.61	32.01	0.00	25.31	46.0	20.6	100	252	
Vert.	439.256	QP	30.00	16.87	8.22	31.98	0.00	23.11	46.0	22.8	100	297	
Vert.	743.052	QP	29.70	21.98	9.32	31.99	0.00	29.01	46.0	16.9	100	24	
Vert.	937.201	QP	27.10	24.11	9.92	31.11	0.00	30.02	46.0	15.9	108	188	
Vert.	2483.500	PK	60.30	28.01	13.61	43.82	3.31	61.41	73.9	12.4	150	346	
Vert.	4924.000	PK	57.00	32.67	5.65	45.24	3.31	53.39	73.9	20.5	390	355	
Vert.	7386.000	PK	48.40	37.49	6.97	43.65	3.31	52.52	73.9	21.3	150	0	Floor noise
Vert.	9848.000	PK	45.40	38.11	7.84	41.77	3.31	52.89	73.9	21.0	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	45.30	28.01	13.61	43.82	0.58	3.31	46.99	53.9	6.9	*1)
Hori.	4924.000	AV	46.10	32.67	5.65	45.24	0.58	3.31	43.07	53.9	10.8	
Hori.	7386.000	AV	38.90	37.49	6.97	43.65	0.58	3.31	43.60	53.9	10.3	Floor noise
Hori.	9848.000	AV	36.60	38.11	7.84	41.77	0.58	3.31	44.67	53.9	9.2	Floor noise
Vert.	2483.500	AV	45.80	28.01	13.61	43.82	0.58	3.31	47.49	53.9	6.4	*1)
Vert.	4924.000	AV	50.20	32.67	5.65	45.24	0.58	3.31	47.17	53.9	6.7	
Vert.	7386.000	AV	39.40	37.49	6.97	43.65	0.58	3.31	44.10	53.9	9.8	Floor noise
Vert.	9848.000	AV	36.70	38.11	7.84	41.77	0.58	3.31	44.77	53.9	9.1	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Duty factor + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

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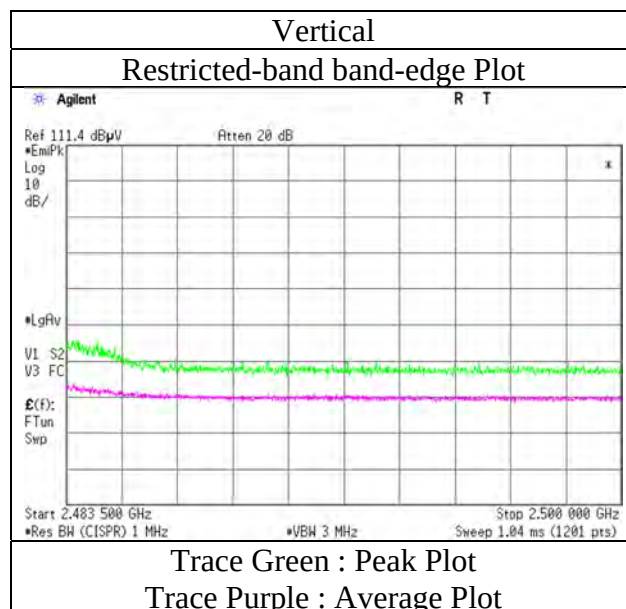
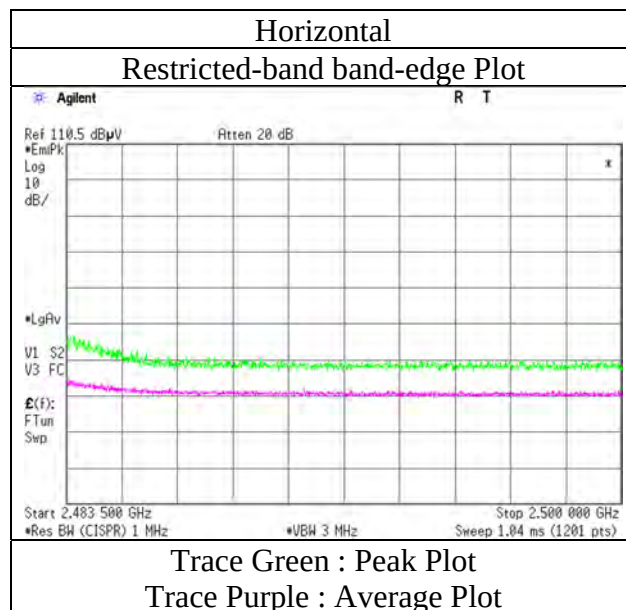
1614, Mushihata, Katori-shi, Chiba-ken, 289-0341 Japan

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Radiated Spurious Emission **(Reference Plot for band-edge)**

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.10
Date	December 8, 2021
Temperature / Humidity	22 deg. C / 45 % RH
Engineer	Hiromitsu Tanabe (1 GHz - 2.8 GHz)
Mode	Tx 11g 2462 MHz with 11a 5700 MHz



* 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

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.10
Date	December 8, 2021
Temperature / Humidity	22 deg. C / 45 % RH
Engineer	Hiromitsu Tanabe
	(1 GHz - 2.8 GHz)
Mode	Tx 11n-20 2412 MHz with 11a 5700 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	58.40	27.61	13.54	43.88	3.31	58.98	73.9	14.9	317	301	
Vert.	2390.000	PK	61.20	27.61	13.54	43.88	3.31	61.78	73.9	12.1	150	349	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39\text{ m} / 3.0\text{ m}) = 3.31\text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	44.40	27.61	13.54	43.88	0.72	3.31	45.70	53.9	8.2	*1)
Vert.	2390.000	AV	45.10	27.61	13.54	43.88	0.72	3.31	46.40	53.9	7.5	*1)

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Duty factor + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39\text{ m} / 3.0\text{ m}) = 3.31\text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	90.00	27.65	13.56	43.87	3.31	90.65	-	-	Carrier
Hori.	2394.133	PK	58.40	27.60	13.55	43.88	3.31	58.98	70.65	11.6	
Hori.	2400.000	PK	58.10	27.60	13.55	43.88	3.31	58.68	70.65	11.9	
Vert.	2412.000	PK	90.70	27.65	13.56	43.87	3.31	91.35	-	-	Carrier
Vert.	2394.458	PK	58.80	27.60	13.55	43.88	3.31	59.38	71.35	11.9	
Vert.	2400.000	PK	58.30	27.60	13.55	43.88	3.31	58.88	71.35	12.4	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39\text{ m} / 3.0\text{ m}) = 3.31\text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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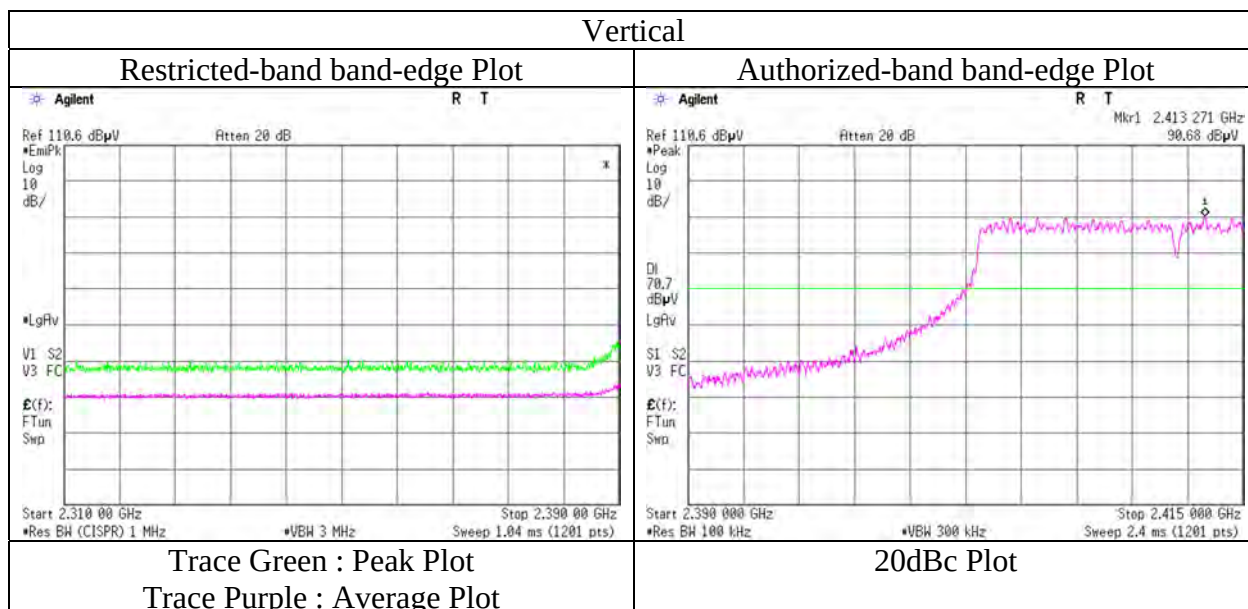
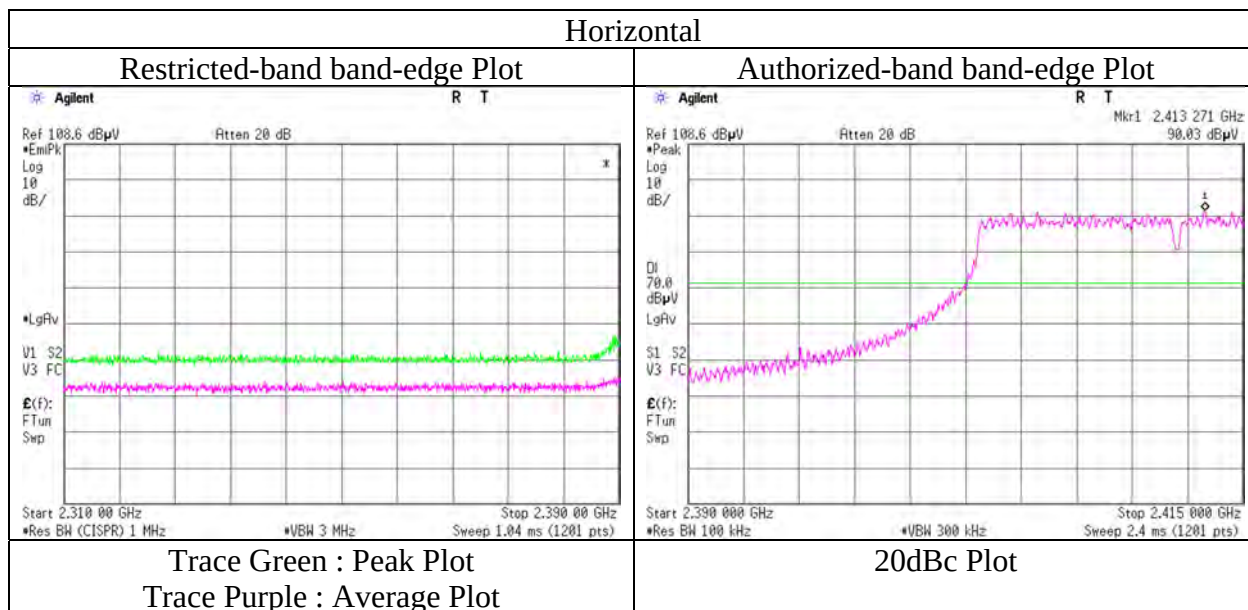
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.10
Date	December 8, 2021
Temperature / Humidity	22 deg. C / 45 % RH
Engineer	Hiromitsu Tanabe
	(1 GHz - 2.8 GHz)
Mode	Tx 11n-20 2412 MHz with 11a 5700 MHz



* 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

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.10
Date	December 8, 2021
Temperature / Humidity	22 deg. C / 45 % RH
Engineer	Hiromitsu Tanabe
	(1 GHz - 2.8 GHz)
Mode	Tx 11n-20 2462 MHz with 11a 5700 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	59.80	28.01	13.61	43.82	3.31	60.91	73.9	12.9	243	297	
Vert.	2483.500	PK	62.50	28.01	13.61	43.82	3.31	63.61	73.9	10.2	148	349	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	45.60	28.01	13.61	43.82	0.72	3.31	47.43	53.9	6.4	*1)
Vert.	2483.500	AV	47.30	28.01	13.61	43.82	0.72	3.31	49.13	53.9	4.7	*1)

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Duty factor + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(4.39 \text{ m} / 3.0 \text{ m}) = 3.31 \text{ dB}$

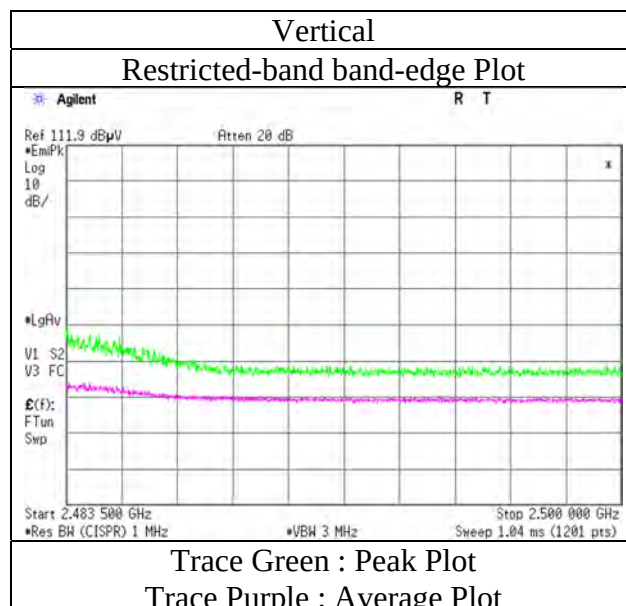
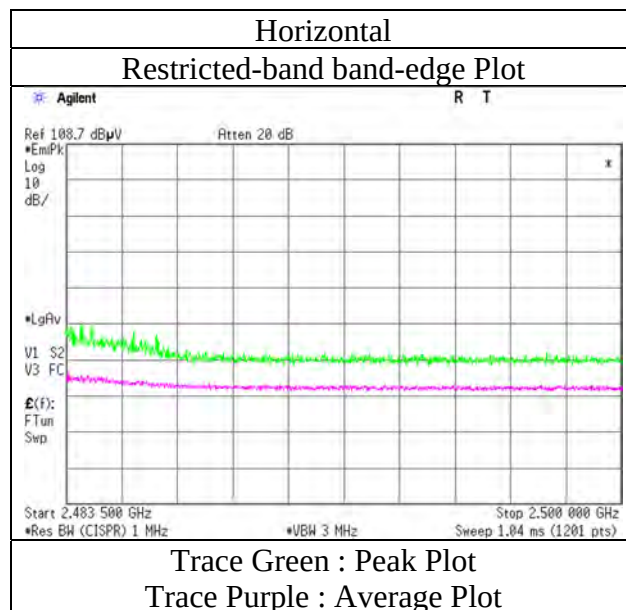
10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.10
Date	December 8, 2021
Temperature / Humidity	22 deg. C / 45 % RH
Engineer	Hiromitsu Tanabe (1 GHz - 2.8 GHz)
Mode	Tx 11n-20 2462 MHz with 11a 5700 MHz

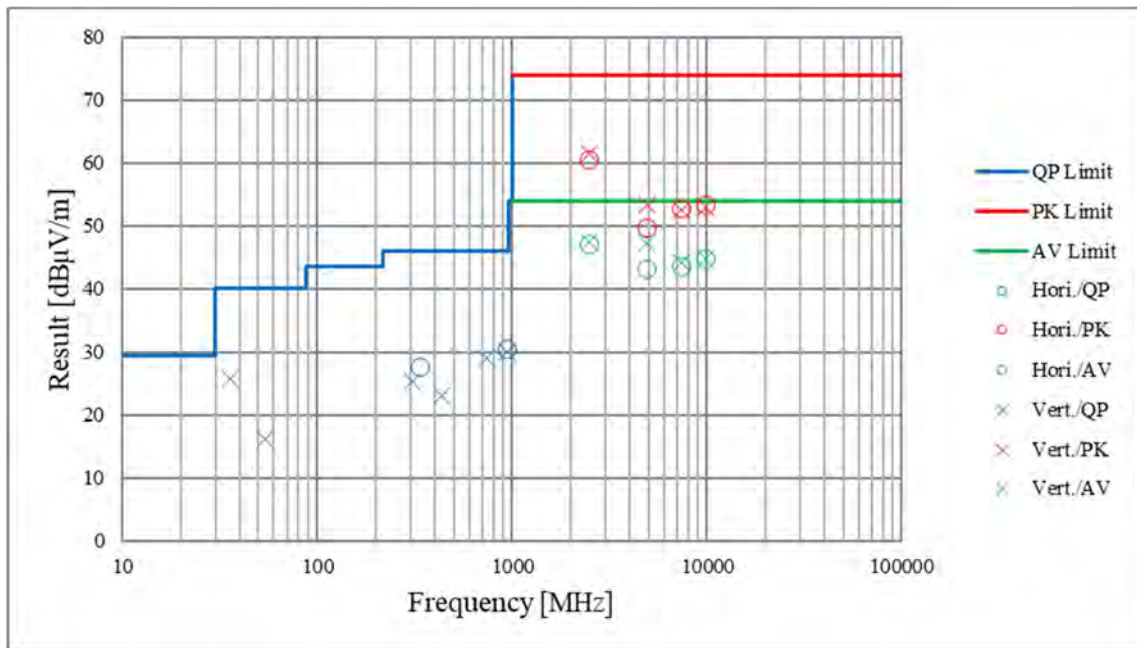


* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

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

Report No.	13977035M-A			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.11	No.10	No.10	No.11
Date	December 8, 2021	December 8, 2021	December 17, 2021	December 7, 2021
Temperature / Humidity	23 deg. C / 41 % RH	22 deg. C / 45 % RH	21 deg. C / 45 % RH	20 deg. C / 45 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(30 MHz - 1000 MHz)	(1 GHz - 2.8 GHz)	(2.8 GHz - 10 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11g 2462 MHz with 11a 5700 MHz			



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

Radiated Spurious Emission

Report No.	13977035M-A			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.11	No.11	No.11	No.11
Date	November 11, 2021	November 10, 2021	November 10, 2021	November 11, 2021
Temperature / Humidity	20 deg. C / 44 % RH	23 deg. C / 56 % RH	23 deg. C / 56 % RH	20 deg. C / 44 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(30 MHz - 1000 MHz)	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx BT LE 2402 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	290.589	QP	41.30	13.23	7.50	32.02	0.00	30.01	46.0	15.9	130	145	
Hori.	416.644	QP	36.40	16.04	8.08	31.97	0.00	28.55	46.0	17.4	100	307	
Hori.	2390.000	PK	46.70	27.61	13.54	41.42	2.26	48.69	73.9	25.2	100	226	
Hori.	4804.000	PK	47.70	32.69	5.57	41.17	2.26	47.05	73.9	26.8	150	0	Floor noise
Hori.	7206.000	PK	45.70	37.26	6.90	39.72	2.26	52.40	73.9	21.5	150	0	Floor noise
Hori.	9608.000	PK	43.10	38.09	7.76	38.54	2.26	52.67	73.9	21.2	150	0	Floor noise
Vert.	35.656	QP	39.30	12.86	5.72	32.21	0.00	25.67	40.0	14.3	100	277	
Vert.	43.818	QP	31.60	13.64	5.81	32.21	0.00	18.84	40.0	21.1	100	252	
Vert.	289.755	QP	33.80	13.22	7.50	32.02	0.00	22.50	46.0	23.5	100	88	
Vert.	332.452	QP	33.10	14.30	7.71	31.99	0.00	23.12	46.0	22.8	100	83	
Vert.	740.111	QP	29.00	21.85	9.26	31.99	0.00	28.12	46.0	17.8	100	340	
Vert.	944.497	QP	26.30	24.12	9.89	31.06	0.00	29.25	46.0	16.7	100	0	
Vert.	2390.000	PK	46.30	27.61	13.54	41.42	2.26	48.29	73.9	25.6	165	11	
Vert.	4804.000	PK	47.60	32.69	5.57	41.17	2.26	46.95	73.9	26.9	150	0	Floor noise
Vert.	7206.000	PK	46.60	37.26	6.90	39.72	2.26	53.30	73.9	20.6	150	0	Floor noise
Vert.	9608.000	PK	43.50	38.09	7.76	38.54	2.26	53.07	73.9	20.8	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.89\text{ m} / 3.0\text{ m}) = 2.26\text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	37.70	27.61	13.54	41.42	0.64	2.26	40.33	53.9	13.5	*1)
Hori.	4804.000	AV	38.60	32.69	5.57	41.17	0.64	2.26	38.59	53.9	15.3	Floor noise
Hori.	7206.000	AV	36.40	37.26	6.90	39.72	0.64	2.26	43.74	53.9	10.1	Floor noise
Hori.	9608.000	AV	34.80	38.09	7.76	38.54	0.64	2.26	45.01	53.9	8.8	Floor noise
Vert.	2390.000	AV	37.80	27.61	13.54	41.42	0.64	2.26	40.43	53.9	13.4	*1)
Vert.	4804.000	AV	38.60	32.69	5.57	41.17	0.64	2.26	38.59	53.9	15.3	Floor noise
Vert.	7206.000	AV	36.50	37.26	6.90	39.72	0.64	2.26	43.84	53.9	10.0	Floor noise
Vert.	9608.000	AV	34.70	38.09	7.76	38.54	0.64	2.26	44.91	53.9	8.9	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Duty factor + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.89\text{ m} / 3.0\text{ m}) = 2.26\text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	91.70	27.61	13.55	41.42	2.26	93.70	-	-	Carrier
Hori.	2400.000	PK	38.20	27.60	13.55	41.42	2.26	40.19	73.70	33.5	
Vert.	2402.000	PK	93.70	27.61	13.55	41.42	2.26	95.70	-	-	Carrier
Vert.	2400.000	PK	38.40	27.60	13.55	41.42	2.26	40.39	75.70	35.3	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.89\text{ m} / 3.0\text{ m}) = 2.26\text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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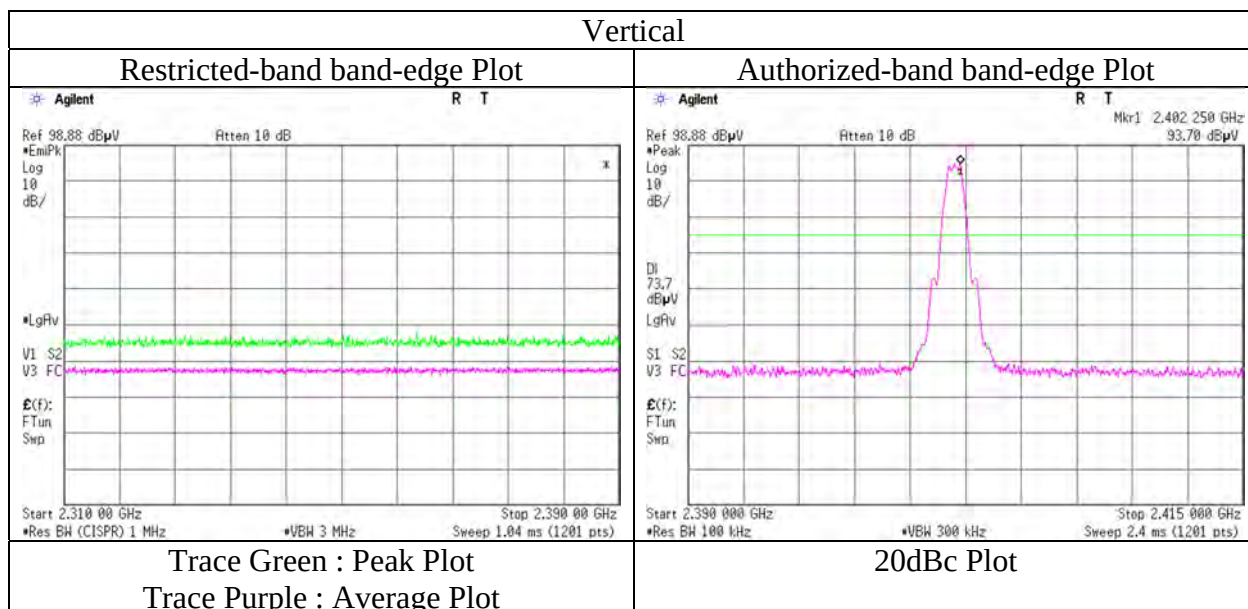
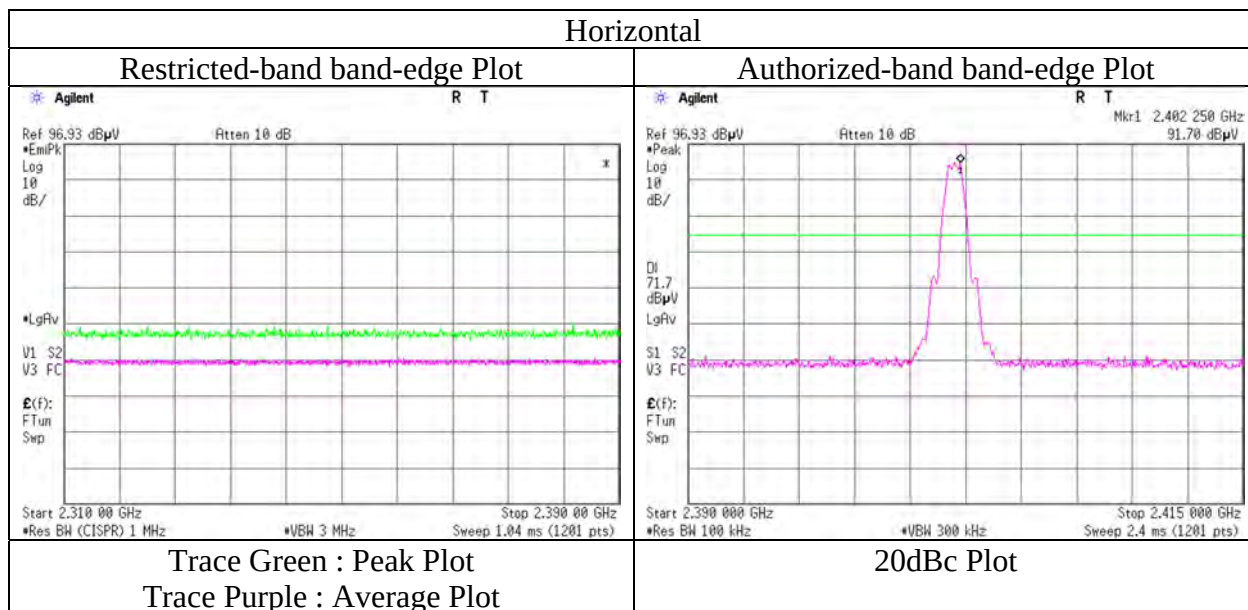
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Facsimile : +81 478 82 3373

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.11
Date	November 10, 2021
Temperature / Humidity	23 deg. C / 56 % RH
Engineer	Hiromitsu Tanabe (1 GHz - 10 GHz)
Mode	Tx BT LE 2402 MHz



* 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

Report No.	13977035M-A			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.11	No.11	No.11	No.11
Date	November 11, 2021	November 10, 2021	November 10, 2021	November 11, 2021
Temperature / Humidity	20 deg. C / 44 % RH	23 deg. C / 56 % RH	23 deg. C / 56 % RH	20 deg. C / 44 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(30 MHz - 1000 MHz)	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx BT LE 2440 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	290.735	QP	41.00	13.23	7.51	32.02	0.00	29.72	46.0	16.2	160	142	
Hori.	415.043	QP	36.50	15.97	8.08	31.97	0.00	28.58	46.0	17.4	100	303	
Hori.	4880.000	PK	47.00	32.62	5.62	41.18	2.26	46.32	73.9	27.5	150	0	Floor noise
Hori.	7320.000	PK	44.10	37.54	6.93	39.66	2.26	51.17	73.9	22.7	150	0	Floor noise
Hori.	9760.000	PK	43.20	38.09	7.81	38.41	2.26	52.95	73.9	20.9	150	0	Floor noise
Vert.	35.654	QP	38.70	12.86	5.72	32.21	0.00	25.07	40.0	14.9	100	249	
Vert.	43.595	QP	31.80	13.59	5.81	32.21	0.00	18.99	40.0	21.0	100	242	
Vert.	290.659	QP	34.00	13.23	7.51	32.02	0.00	22.72	46.0	23.2	100	98	
Vert.	329.446	QP	33.50	14.28	7.69	31.99	0.00	23.48	46.0	22.5	100	93	
Vert.	740.700	QP	28.50	21.88	9.26	31.99	0.00	27.65	46.0	18.3	100	337	
Vert.	944.436	QP	26.00	24.12	9.89	31.06	0.00	28.95	46.0	17.0	100	0	
Vert.	4880.000	PK	46.30	32.62	5.62	41.18	2.26	45.62	73.9	28.2	150	0	Floor noise
Vert.	7320.000	PK	45.10	37.54	6.93	39.66	2.26	52.17	73.9	21.7	150	0	Floor noise
Vert.	9760.000	PK	43.30	38.09	7.81	38.41	2.26	53.05	73.9	20.8	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log(3.89 m / 3.0 m) = 2.26 dB

10 GHz - 26.5 GHz : 20log(1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4880.000	AV	37.40	32.62	5.62	41.18	0.64	2.26	37.36	53.9	16.5	Floor noise
Hori.	7320.000	AV	35.90	37.54	6.93	39.66	0.64	2.26	43.61	53.9	10.2	Floor noise
Hori.	9760.000	AV	34.50	38.09	7.81	38.41	0.64	2.26	44.89	53.9	9.0	Floor noise
Vert.	4880.000	AV	36.00	32.62	5.62	41.18	0.64	2.26	35.96	53.9	17.9	Floor noise
Vert.	7320.000	AV	35.10	37.54	6.93	39.66	0.64	2.26	42.81	53.9	11.0	Floor noise
Vert.	9760.000	AV	34.40	38.09	7.81	38.41	0.64	2.26	44.79	53.9	9.1	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Duty factor + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log(3.89 m / 3.0 m) = 2.26 dB

10 GHz - 26.5 GHz : 20log(1.0 m / 3.0 m) = -9.54 dB

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

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Radiated Spurious Emission

Report No.	13977035M-A			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.11	No.11	No.11	No.11
Date	November 11, 2021	November 10, 2021	November 10, 2021	November 11, 2021
Temperature / Humidity	20 deg. C / 44 % RH	23 deg. C / 56 % RH	23 deg. C / 56 % RH	20 deg. C / 44 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(30 MHz - 1000 MHz)	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx BT LE 2480 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	290.836	QP	41.50	13.24	7.51	32.02	0.00	30.23	46.0	15.7	137	142	
Hori.	414.880	QP	38.10	15.97	8.08	31.97	0.00	30.18	46.0	15.8	100	303	
Hori.	2483.500	PK	46.70	28.01	13.61	41.40	2.26	49.18	73.9	24.7	312	299	
Hori.	4960.000	PK	46.80	32.69	5.67	41.18	2.26	46.24	73.9	27.6	150	0	Floor noise
Hori.	7440.000	PK	44.60	37.51	6.98	39.58	2.26	51.77	73.9	22.1	150	0	Floor noise
Hori.	9920.000	PK	43.40	38.26	7.87	38.27	2.26	53.52	73.9	20.3	150	0	Floor noise
Vert.	35.652	QP	38.50	12.86	5.72	32.21	0.00	24.87	40.0	15.1	100	281	
Vert.	43.765	QP	31.80	13.63	5.81	32.21	0.00	19.03	40.0	20.9	100	232	
Vert.	290.779	QP	34.70	13.24	7.51	32.02	0.00	23.43	46.0	22.5	100	100	
Vert.	329.845	QP	33.80	14.29	7.69	31.99	0.00	23.79	46.0	22.2	100	87	
Vert.	740.085	QP	28.50	21.85	9.26	31.99	0.00	27.62	46.0	18.3	100	341	
Vert.	945.077	QP	27.10	24.12	9.89	31.06	0.00	30.05	46.0	15.9	100	0	
Vert.	2483.500	PK	46.90	28.01	13.61	41.40	2.26	49.38	73.9	24.5	160	312	
Vert.	4960.000	PK	47.40	32.69	5.67	41.18	2.26	46.84	73.9	27.0	150	0	Floor noise
Vert.	7440.000	PK	44.90	37.51	6.98	39.58	2.26	52.07	73.9	21.8	150	0	Floor noise
Vert.	9920.000	PK	43.40	38.26	7.87	38.27	2.26	53.52	73.9	20.3	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.89\text{ m} / 3.0\text{ m}) = 2.26\text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	37.60	28.01	13.61	41.40	0.64	2.26	40.72	53.9	13.1	*1)
Hori.	4960.000	AV	38.10	32.69	5.67	41.18	0.64	2.26	38.18	53.9	15.7	Floor noise
Hori.	7440.000	AV	36.10	37.51	6.98	39.58	0.64	2.26	43.91	53.9	9.9	Floor noise
Hori.	9920.000	AV	34.30	38.26	7.87	38.27	0.64	2.26	45.06	53.9	8.8	Floor noise
Vert.	2483.500	AV	37.90	28.01	13.61	41.40	0.64	2.26	41.02	53.9	12.8	*1)
Vert.	4960.000	AV	38.30	32.69	5.67	41.18	0.64	2.26	38.38	53.9	15.5	Floor noise
Vert.	7440.000	AV	36.30	37.51	6.98	39.58	0.64	2.26	44.11	53.9	9.7	Floor noise
Vert.	9920.000	AV	34.10	38.26	7.87	38.27	0.64	2.26	44.86	53.9	9.0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Duty factor + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.89\text{ m} / 3.0\text{ m}) = 2.26\text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

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Kashima EMC Lab.

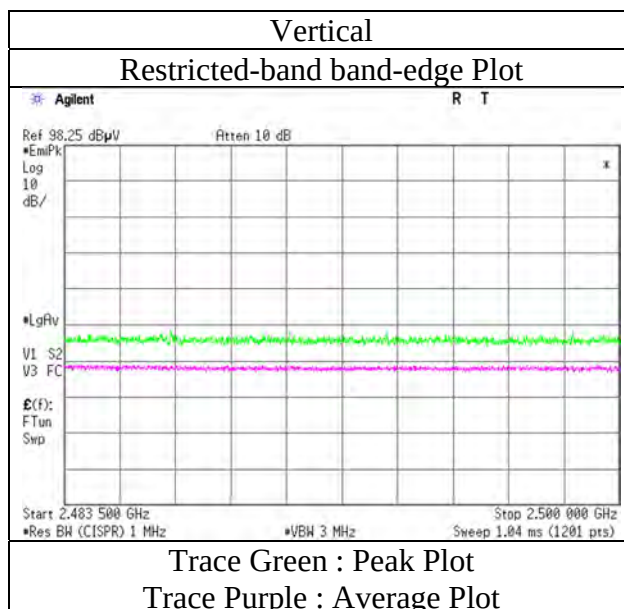
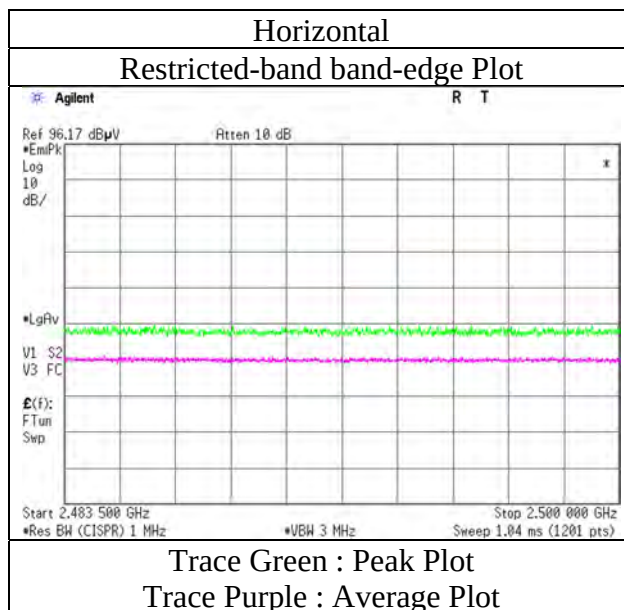
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Radiated Spurious Emission **(Reference Plot for band-edge)**

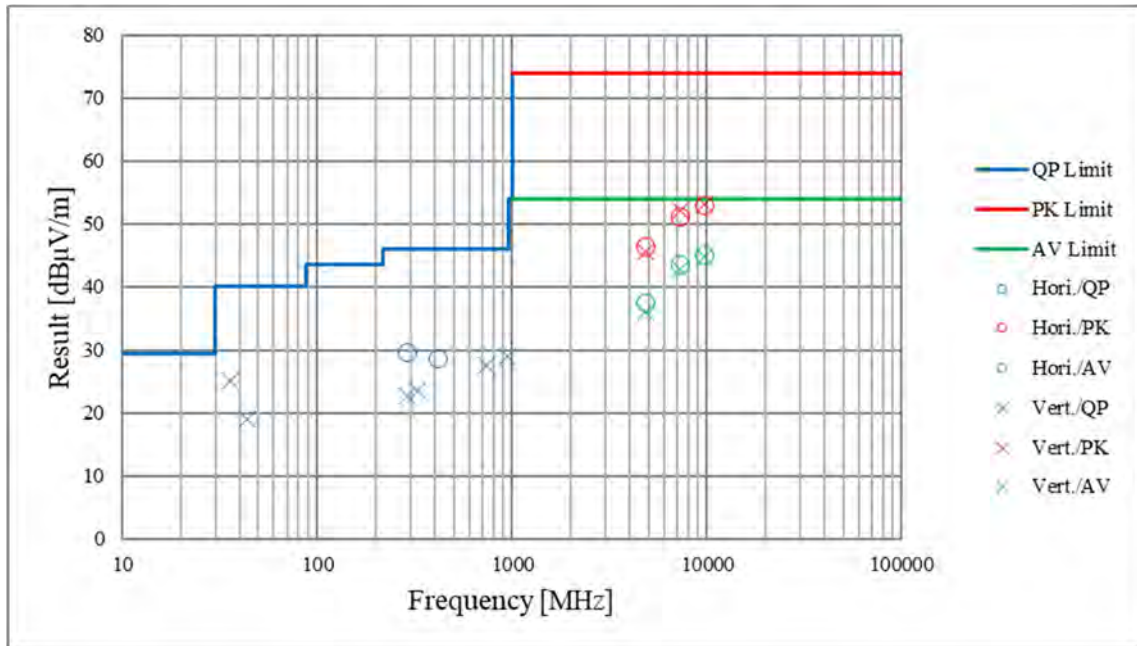
Report No. 13977035M-A
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.11
Date November 10, 2021
Temperature / Humidity 23 deg. C / 56 % RH
Engineer Hiromitsu Tanabe
(1 GHz - 10 GHz)
Mode Tx BT LE 2480 MHz



* 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)

Report No.	13977035M-A			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.11	No.11	No.11	No.11
Date	November 11, 2021	November 10, 2021	November 10, 2021	November 11, 2021
Temperature / Humidity	20 deg. C / 44 % RH	23 deg. C / 56 % RH	23 deg. C / 56 % RH	20 deg. C / 44 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(30 MHz - 1000 MHz)	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx BT LE 2440 MHz			



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

Radiated Spurious Emission

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.10
Date	December 6, 2021
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Hiromitsu Tanabe
	(1 GHz - 2.8 GHz)
Mode	Tx BT LE 2402 MHz with 11a 5785 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	50.00	27.61	13.54	43.88	2.26	49.53	73.9	24.3	159	300	
Vert.	2390.000	PK	49.80	27.61	13.54	43.88	2.26	49.33	73.9	24.5	147	313	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.89 \text{ m} / 3.0 \text{ m}) = 2.26 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	40.80	27.61	13.54	43.88	0.64	2.26	40.97	53.9	12.9	*1)
Vert.	2390.000	AV	41.00	27.61	13.54	43.88	0.64	2.26	41.17	53.9	12.7	*1)

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Duty factor + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.89 \text{ m} / 3.0 \text{ m}) = 2.26 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	94.00	27.61	13.55	43.88	2.26	93.54	-	-	Carrier
Hori.	2400.000	PK	41.10	27.60	13.55	43.88	2.26	40.63	73.54	32.9	
Vert.	2402.000	PK	95.70	27.61	13.55	43.88	2.26	95.24	-	-	Carrier
Vert.	2400.000	PK	41.30	27.60	13.55	43.88	2.26	40.83	75.24	34.4	

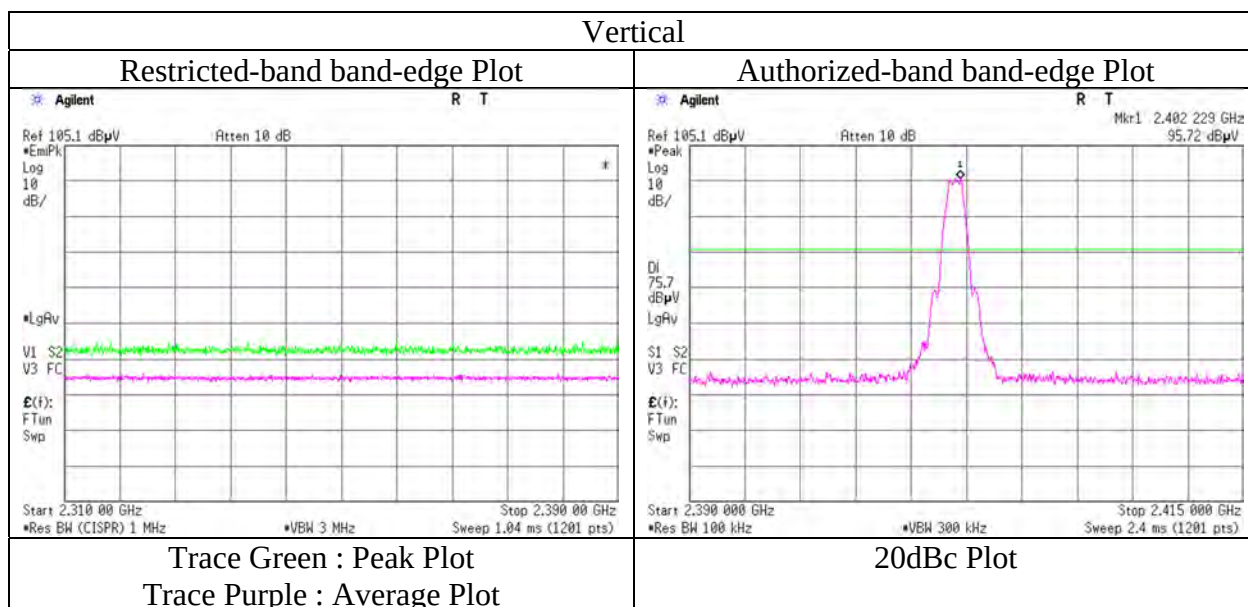
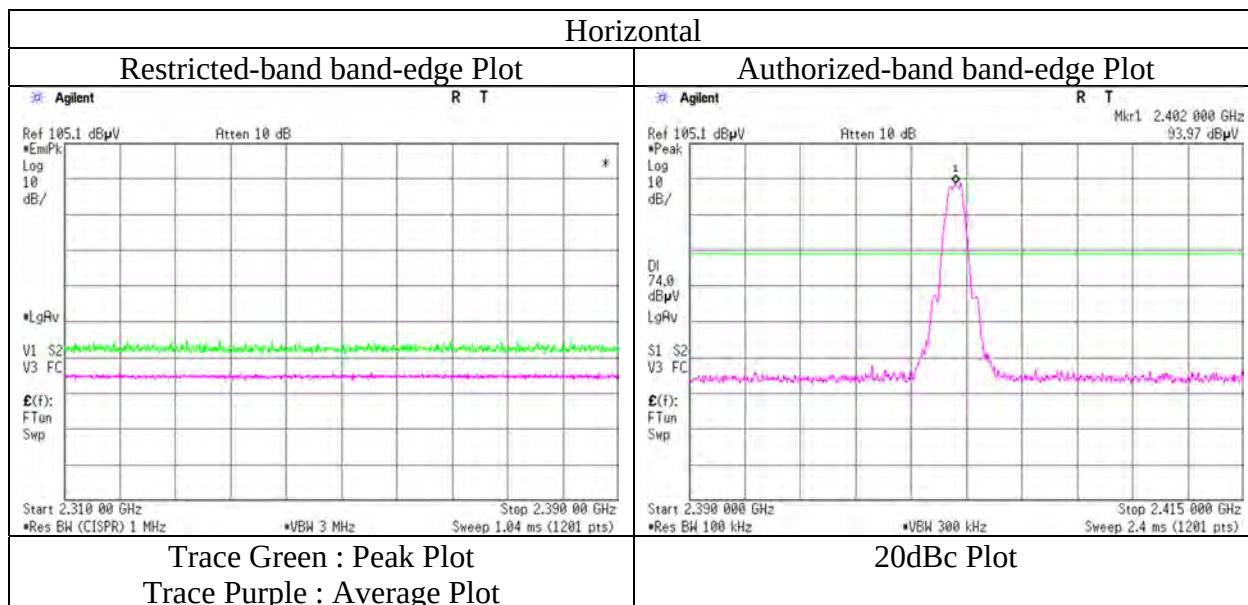
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.89 \text{ m} / 3.0 \text{ m}) = 2.26 \text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.11
Date	December 6, 2021
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Hiromitsu Tanabe (1 GHz - 2.8 GHz)
Mode	Tx BT LE 2402 MHz with 11a 5785 MHz



* 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

Report No.	13977035M-A			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.11	No.11	No.11	No.11
Date	December 8, 2021	December 20, 2021	December 7, 2021	December 7, 2021
Temperature / Humidity	23 deg. C / 41 % RH	21 deg. C / 43 % RH	20 deg. C / 45 % RH	20 deg. C / 45 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(30 MHz - 1000 MHz)	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx BT LE 2440 MHz with 11a 5785 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	320.603	QP	37.50	14.08	7.68	32.00	0.00	27.26	46.0	18.7	100	122	
Hori.	951.736	QP	26.40	24.15	9.97	31.00	0.00	29.52	46.0	16.4	100	153	
Hori.	4880.000	PK	52.20	32.62	5.62	45.22	2.26	47.48	73.9	26.4	150	0	Floor noise
Hori.	7320.000	PK	48.60	37.54	6.93	43.82	2.26	51.51	73.9	22.3	150	0	Floor noise
Hori.	9760.000	PK	47.50	38.09	7.81	41.84	2.26	53.82	73.9	20.0	150	0	Floor noise
Vert.	35.646	QP	38.70	12.86	5.73	32.21	0.00	25.08	40.0	14.9	100	275	
Vert.	54.058	QP	27.80	13.75	5.94	32.20	0.00	15.29	40.0	24.7	270	100	
Vert.	306.712	QP	36.40	13.70	7.61	32.01	0.00	25.70	46.0	20.3	100	264	
Vert.	437.005	QP	29.60	16.82	8.21	31.98	0.00	22.65	46.0	23.3	100	299	
Vert.	743.615	QP	29.80	22.00	9.33	31.99	0.00	29.14	46.0	16.8	100	18	
Vert.	945.115	QP	25.10	24.12	9.95	31.06	0.00	28.11	46.0	17.8	101	8	
Vert.	4880.000	PK	51.30	32.62	5.62	45.22	2.26	46.58	73.9	27.3	150	0	Floor noise
Vert.	7320.000	PK	48.20	37.54	6.93	43.82	2.26	51.11	73.9	22.7	150	0	Floor noise
Vert.	9760.000	PK	47.40	38.09	7.81	41.84	2.26	53.72	73.9	20.1	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.89\text{ m} / 3.0\text{ m}) = 2.26\text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4880.000	AV	42.70	32.62	5.62	45.22	0.64	2.26	38.62	53.9	15.2	Floor noise
Hori.	7320.000	AV	39.40	37.54	6.93	43.82	0.64	2.26	42.95	53.9	10.9	Floor noise
Hori.	9760.000	AV	37.80	38.09	7.81	41.84	0.64	2.26	44.76	53.9	9.1	Floor noise
Vert.	4880.000	AV	42.80	32.62	5.62	45.22	0.64	2.26	38.72	53.9	15.1	Floor noise
Vert.	7320.000	AV	39.30	37.54	6.93	43.82	0.64	2.26	42.85	53.9	11.0	Floor noise
Vert.	9760.000	AV	38.00	38.09	7.81	41.84	0.64	2.26	44.96	53.9	8.9	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Duty factor + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.89\text{ m} / 3.0\text{ m}) = 2.26\text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

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Radiated Spurious Emission

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.11
Date	December 6, 2021
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Hiromitsu Tanabe (1 GHz - 2.8 GHz)
Mode	Tx BT LE 2480 MHz with 11a 5785 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	50.00	28.01	13.61	43.82	2.26	50.06	73.9	23.8	187	54	
Vert.	2483.500	PK	52.10	28.01	13.61	43.82	2.26	52.16	73.9	21.7	133	325	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.89\text{ m} / 3.0\text{ m}) = 2.26\text{ dB}$

10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	41.10	28.01	13.61	43.82	0.64	2.26	41.80	53.9	12.1	*1)
Vert.	2483.500	AV	41.70	28.01	13.61	43.82	0.64	2.26	42.40	53.9	11.5	*1)

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Duty factor + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.89\text{ m} / 3.0\text{ m}) = 2.26\text{ dB}$

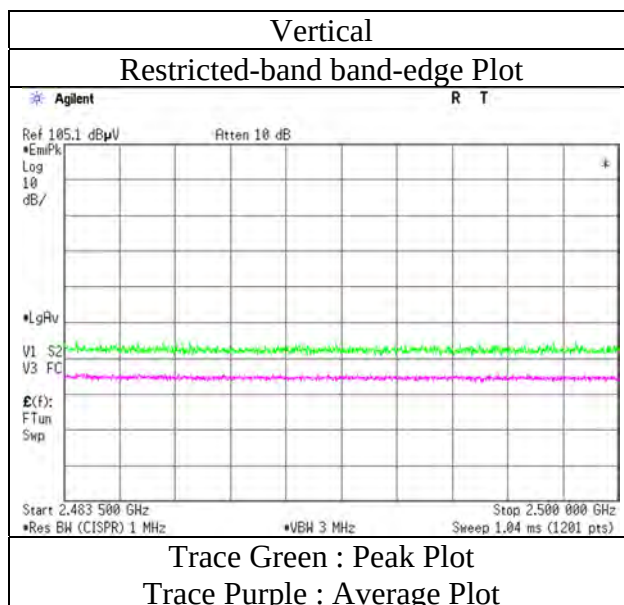
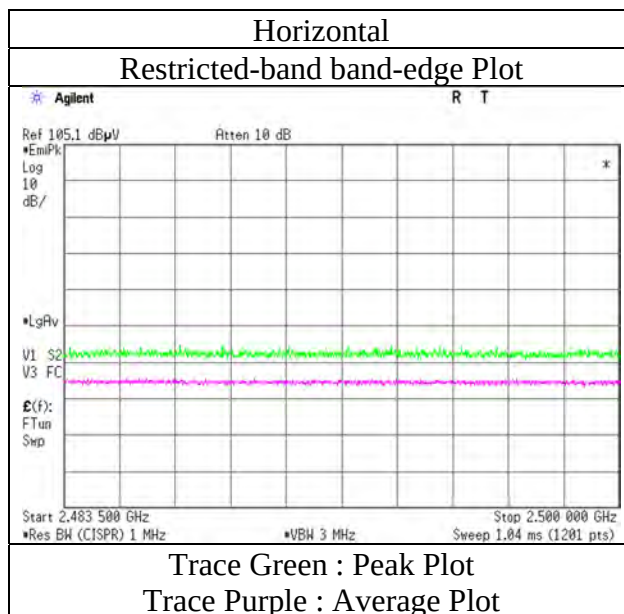
10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13977035M-A
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.11
Date	December 6, 2021
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Hiromitsu Tanabe
	(1 GHz - 2.8 GHz)
Mode	Tx BT LE 2480 MHz with 11a 5785 MHz

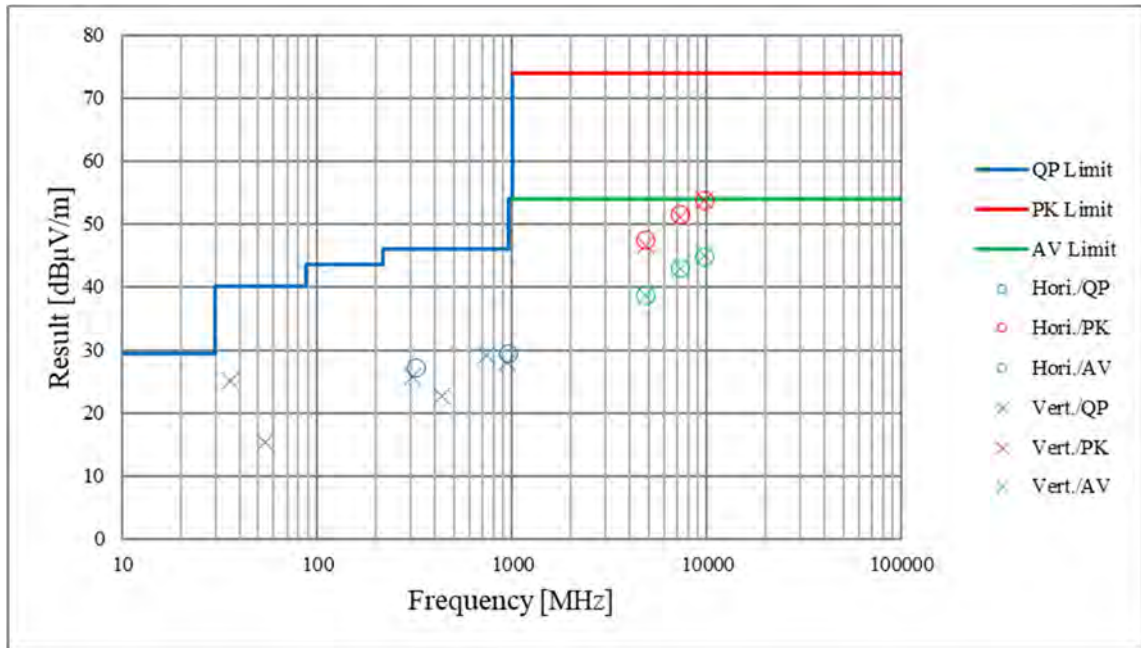


* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions. Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

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

Report No.	13977035M-A			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.11	No.11	No.11	No.11
Date	December 8, 2021	December 20, 2021	December 7, 2021	December 7, 2021
Temperature / Humidity	23 deg. C / 41 % RH	21 deg. C / 43 % RH	20 deg. C / 45 % RH	20 deg. C / 45 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(30 MHz - 1000 MHz)	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx BT LE 2440 MHz with 11a 5785 MHz			



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

APPENDIX 2: Test instruments

Test equipment

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	CBL-08	143121	LOGBICON	Schwarzbeck Mess-Elektronik OHG	VULB 9168	343	2021/04/26	12
RE	CAT5-03	178806	5dB Fixed Atten.	Pasternack Enterprises	PE7047-5	none	2021/04/21	12
RE	CCC-S10-R3	143165	10 Site RE 3m System	UL Japan Inc.	none	none	2021/08/10	12
RE	CAF-28	183880	Pre-Amplifier	UL Japan Inc.	ZKL-2	001	2021/04/26	12
RE	CTR-09	144199	Test Receiver	Keysight Technologies Inc	N9038A	MY53290016	2021/07/16	12
RE(GHz)	CHA-24	143455	Double Ridged Wave Guide	ETS-Lindgren (Cedar Park, Texas)	3115	00204569	2021/02/06	12
RE(GHz)	CAF-22	142940	Pre-Amplifier	Micro Wave Factory	MPR-1G26.5-35	161399	2021/06/11	12
RE(GHz)	CAF-18	142908	Pre-Amplifier	TOYO	TPA0118-36	A-1001	2021/02/08	12
RE(GHz)	CCC-G16	192243	Microwave Cable	Huber+Suhner	SF104/11N /11PC35/8000MM	808995/4	2021/01/19	12
RE(GHz)	CCC-G13	171928	Microwave Cable	Huber+Suhner	SF102/SKm/SKm /1000mm	801389/2	2021/08/03	12
RE(GHz)	CAT10-17	143023	10dB Fixed Atten.	Weinschel - API Technologies Corp	54A-10	56251	2021/05/14	12
RE(GHz)	CHF-04	143442	HPF	MICRO-TRONICS	HPM50111-02	009	2021/05/14	12
RE(GHz)	TSA-01	143642	Spectrum Analyzer	Keysight Technologies Inc	N9030A	MY53310670 Version A.13.12	2021/05/24	12
RE(GHz)	CCC-G16	192243	Microwave Cable	Huber+Suhner	SF104/11N /11PC35/8000MM	808995/4	2021/01/19	12
RE(GHz)	CHA-07	143438	Double Ridged Horn	ETS-Lindgren (Cedar Park, Texas)	3160-09	00166043	2021/06/05	12
RE(GHz)	CAF-19	142937	Pre-Amplifier	TOYO	HAP18-26W	00000035	2021/06/23	12
RE(GHz)	CCC-W09	143113	Micro Wave Cable	Suhner	SUCOFLEX104	MY588/4	2021/08/03	12
RE	CSCL-12	143653	Ruler	TAJIMA	L19-55	none	-	-
RE	COS-10	143542	Temperature & Humidity Indicator	HIOKI E.E. CORPORATION	3641/9680-50	090999895 /090905406	2021/06/24	12
RE	CBM-10	143133	Barometer	Sunoh	SBR-151	001439	2021/11/24	36
RE	CTS-14	144216	Digital Multimeter	Fluke Corporation	115	994460954	2021/10/20	12
RE	COTS-CEMI-03	178804	EMI Software	TSJ (Techno Science Japan)	TEPTO-DV3 (RE,CE,ME,PE)	Ver 3.1.0484	-	-

*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

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