



RADIO TEST REPORT

Test Report No. 13408125M-B-R1

Applicant : **Panasonic Corporation**
Type of EUT : **Car Navigation**
Model Number of EUT : **AT2104**
FCC ID : **ACJ932AT2104**
Test regulation : **FCC Part 15 Subpart C:2020**
***WLAN and Bluetooth Low Energy part**
Test items : **Radiated emission test**
Test Result : **Complied (Refer to SECTION 3.2)**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
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.
5. This test report must not be used by the customer to claim any endorsement by the A2LA accreditation body.
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 13408125M-B. 13408125M-B is replaced with this report.

Date of test: July 2 to August 28, 2020

Representative test engineer:



Kazuhiro Ando
Engineer
Consumer Technology Division

Approved by:



Kenichi Suda
Manager
Consumer Technology Division



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".

UL Japan, Inc.

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REVISION HISTORY

Original Test Report No.: 13408125M-B

Revision	Test report No.	Date	Page revised	Contents																																																														
- (Original)	13408125M-B	September 30, 2020	-	-																																																														
1	13408125M-B-R1	November 17, 2020	P.6	Correction of “Radio Specification”: from <table><tr><td>IEEE802.11ac (80 MHz band)</td><td></td><td>IEEE802.11ac (80 MHz band)</td></tr><tr><td>5210 MHz, 5755 MHz</td><td>=></td><td>5210 MHz, 5775 MHz</td></tr></table> to	IEEE802.11ac (80 MHz band)		IEEE802.11ac (80 MHz band)	5210 MHz, 5755 MHz	=>	5210 MHz, 5775 MHz																																																								
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1	13408125M-B-R1	November 17, 2020	P.17	Adding comment: “* The above chart is obtained with the Maximum Packet Size set that can be by test software, and it is different from the maximum duty cycle of the product.”																																																														
1	13408125M-B-R1	November 17, 2020	P.18	Correction of comment: from “data communication mode” to “Advertising mode”																																																														
1	13408125M-B-R1	November 17, 2020	P.26	Correction of Horizontal Limit in 20 dBc Data Sheet from 76.53 dBuV/m to 77.74 dBuV/m.																																																														
1	13408125M-B-R1	November 17, 2020	P.65, 67, 68, 70, 72, 73, 127, 129, 130	Adding comment: “*2) Spurious emissions of the same duty cycle as carrier.”																																																														

Reference: Abbreviations (Including words undescribed in this report)

A2LA	The American Association for Laboratory Accreditation	MCS	Modulation and Coding Scheme
AC	Alternating Current	MRA	Mutual Recognition Arrangement
AFH	Adaptive Frequency Hopping	N/A	Not Applicable
AM	Amplitude Modulation	NIST	National Institute of Standards and Technology
Amp, AMP	Amplifier	NS	No signal detect.
ANSI	American National Standards Institute	NSA	Normalized Site Attenuation
Ant, ANT	Antenna	NVLAP	National Voluntary Laboratory Accreditation Program
AP	Access Point	OBW	Occupied Band Width
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	Quadri-Phase Shift Keying
CW	Continuous Wave	RBW	Resolution Band Width
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	RSS	Radio Standards Specifications
DSSS	Direct Sequence Spread Spectrum	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	Test Receiver
EN	European Norm	Tx	Transmitting
ERP, e.r.p.	Effective Radiated Power	VBW	Video BandWidth
EU	European Union	Vert.	Vertical
EUT	Equipment Under Test	WLAN	Wireless LAN
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		
LIMS	Laboratory Information Management System		

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SECTION 1: Customer information

Company Name	:	Panasonic Corporation
Address	:	4261 Ikonobe-cho, Tsuzuki-ku, Yokohama-shi, Kanagawa, 224-8520 Japan
Telephone Number	:	+81-50-3758-9201
Contact Person	:	Ichiro Hirose

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	:	Car Navigation
Model Number	:	AT2104
Serial Number	:	Refer to SECTION 4.2
Rating	:	DC 13.2 V
Receipt Date	:	June 30, 2020
Country of Mass-production	:	Japan, Mexico, Czech Republic
Condition	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	:	No Modification by the test lab.

2.2 Product Description

Model: AT2104 (referred to as the EUT in this report) is a Car Navigation.

There are 2 type for AT2104; Hi type(14 inch Display) and Lo type(8 inch Display). The same RF Part and antenna are installed in these models, however antenna gain and antenna arrangement are different.

General specification

The maximum clock frequencies used in the EUT: 125 MHz

Radio Specification

	IEEE802.11b	IEEE802.11g	IEEE802.11n (20 MHz band)	IEEE802.11n (40 MHz band)
Frequency of operation	2412 MHz - 2462 MHz	2412 MHz - 2462 MHz	2412 MHz – 2462 MHz, 5180 MHz – 5240 MHz, 5745 MHz – 5825 MHz	5190 MHz, 5230 MHz, 5755 MHz, 5795 MHz
Channel spacing	5 MHz		2.4 GHz band: 5 MHz 5 GHz band: 20 MHz	40 MHz
Modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (64QAM, 16QAM, QPSK, BPSK)	OFDM (64QAM, 16QAM, QPSK, BPSK)	
	IEEE802.11a	IEEE802.11ac (20 MHz band)	IEEE802.11ac (40 MHz band)	IEEE802.11ac (80 MHz band)
Frequency of operation	5180 MHz – 5240 MHz, 5745 MHz – 5825 MHz	5180 MHz – 5240 MHz, 5745 MHz – 5825 MHz	5190 MHz, 5230 MHz, 5755 MHz, 5795 MHz	5210 MHz, 5775 MHz
Channel spacing	20 MHz		40 MHz	80 MHz
Modulation	OFDM (64QAM, 16QAM, QPSK, BPSK)	OFDM (256QAM,16QAM,QPSK,BPSK)		
	Bluetooth (BR/EDR)		Bluetooth Low Energy	
Frequency of operation	2402 MHz - 2480 MHz		2402 MHz - 2480 MHz	
Channel spacing	1 MHz		2 MHz	
Modulation	FHSS, GFSK, $\pi/4$ DQPSK, 8DPSK		FHSS, GFSK	
Antenna type	Inverted F type antenna			
Antenna Gain	Hi type (14 inch Display)	RF0	2.4 GHz WLAN	-0.83 dBi
			U-NII-1	2.17 dBi
			U-NII-3	2.37 dBi
		RF1	BT, BT LE	-0.13 dBi
			U-NII-1	2.59 dBi
			U-NII-3	2.64 dBi
	Lo type (8 inch Display)	RF0	2.4 GHz WLAN	2.25 dBi
			U-NII-1	1.41 dBi
			U-NII-3	0.99 dBi
		RF1	BT, BT LE	-0.22 dBi
U-NII-1	1.08 dBi			
U-NII-3	2.14 dBi			
Antenna Connector type	U.FL connector			
Operating Temperature	-30 deg. C to + 65 deg. C			

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
 FCC Part 15 final revised on May 26, 2020 and effective July 27, 2020 except 15.258
 * The revision does not affect the test result conducted before its effective date.

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

* 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	FCC: Section15.247(d)	Hi type 1.9 dB 2390.000 MHz, AV, Hori.	Complied# a)	Radiated (above 30 MHz) *1)
	ISED: RSS-Gen 6.13	ISED: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	Lo type 2.6 dB 2483.500 MHz, AV, Hori.		
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.

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3.4 Uncertainty

There is no applicable rule of uncertainty in this applied standard. Therefore, the results are derived depending on whether or not laboratory uncertainty is applied.

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

Conducted emission

Frequency range	Required Uncertainty (+/-)	Uncertainty (+/-)
0.15 MHz to 30 MHz	3.4 dB	3.3 dB

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 26.5 GHz		5.6 dB
0.5 m	26.5 GHz to 40 GHz	Not Defined	5.9 dB

Antenna Terminal test

Test Item	Required Uncertainty (+/-)	Uncertainty (+/-)
6 dB Bandwidth / 99 % Occupied Bandwidth	Not Defined	1.6 %
Maximum Output Power	0.75 dB	0.73 dB
Burst Rate	Not Defined	0.256 %
Power Density	4 dB	2.2 dB
Conducted Spurious Emission (9 kHz to 30 MHz)	4 dB	2.2 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

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)	1 Mbps, PN9
IEEE 802.11g (11g)	24 Mbps, PN9
IEEE 802.11n SISO 20 MHz BW (11n-20)	MCS 2, PN9
Bluetooth (BT) Low Energy (LE)	Uncoded 1 M-PHY, Maximum Packet Size, PRBS9
	Uncoded 2 M-PHY, Maximum Packet Size, 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: 13 dBm, 11g: 12 dBm (2412 MHz, 2462 MHz), 14 dBm (2417 MHz to 2457 MHz) 11n-20: 11 dBm (2412 MHz, 2462 MHz), 13 dBm (2417 MHz to 2457 MHz) BT LE 1 M-PHY: Fixed BT LE 2 M-PHY: Fixed Software : Labtool Version: 2.0.0.71 (Date: 2020.05.29, Storage location: EUT memory)	
*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 frequency
Radiated Spurious Emission (Below 1 GHz)	Tx, 11g	2437 MHz
	Tx BT LE 1 M-PHY	2402 MHz
	Tx BT LE 2 M-PHY	2440 MHz
		2480 MHz
Radiated Spurious Emission (Above 1 GHz)	Tx, 11b	2412 MHz
		2437 MHz
		2462 MHz
	Tx, 11g,	2412 MHz
	Tx, 11n-20	2417 MHz *1)
		2437 MHz
		2457 MHz *1)
		2462 MHz
	Tx, 11b with Tx 11ac-20 MIMO 5745 MHz	2412 MHz
		2437 MHz
		2462 MHz
	Tx, 11g with Tx 11ac-20 MIMO 5745 MHz	2412 MHz
	Tx, 11n-20 with Tx 11ac-20 MIMO 5745 MHz	2417 MHz *1)
		2437 MHz
		2457 MHz *1)
		2462 MHz
	Tx BT LE 1 M-PHY	2402 MHz
	Tx BT LE 2 M-PHY	2440 MHz
		2480 MHz

*1) Band-edge only

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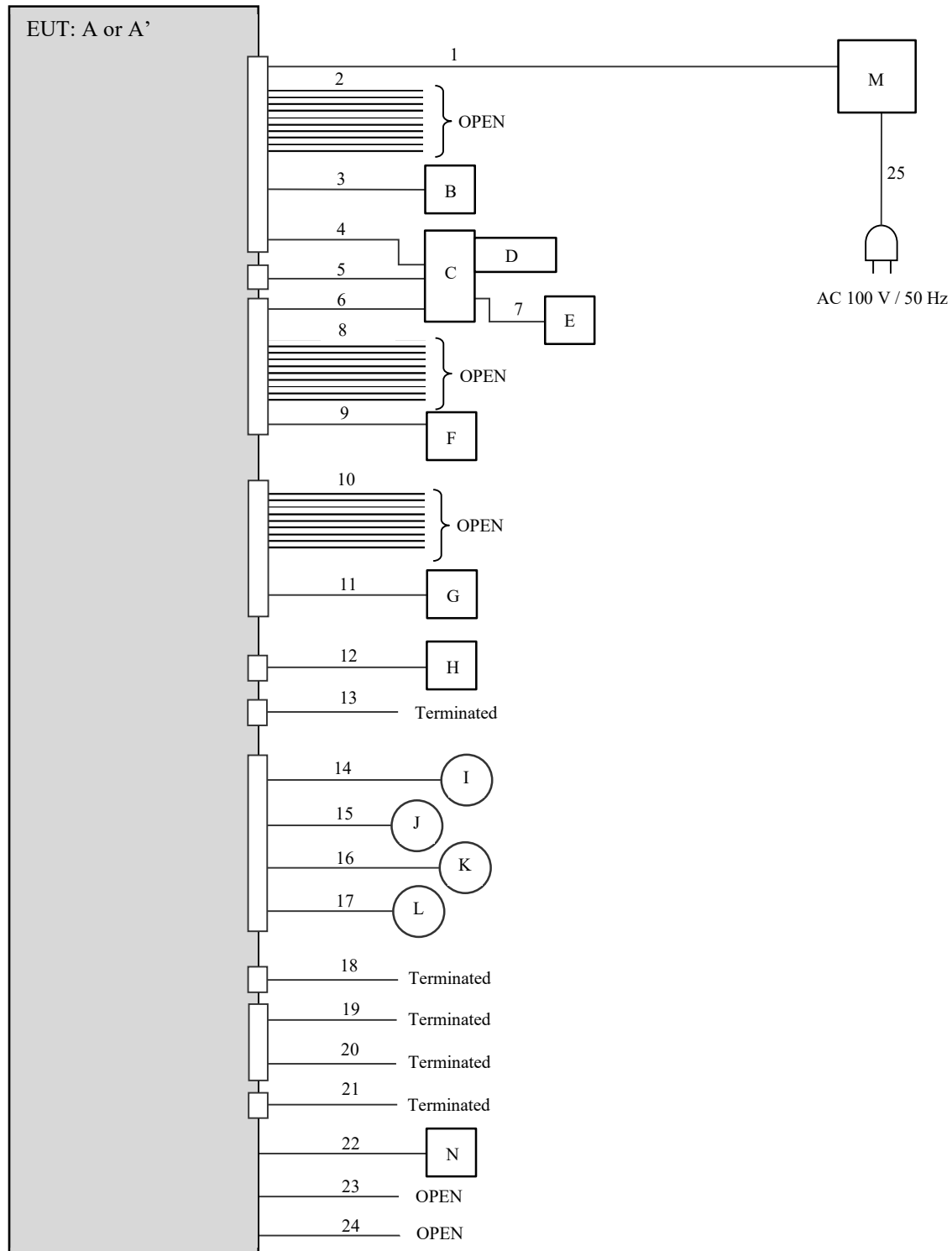
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4.2 Configuration and peripherals



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

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Car Navigation	AT2104	500025	Panasonic Corporation	EUT, Hi type
A'	Car Navigation	AT2104	500109	Panasonic Corporation	EUT, Lo type
B	Steering Switch	ST-SW-IF	0011	Panasonic Corporation	-
C	IF-Box	DEP32-10078	034	Panasonic Corporation	-
D	USB Memory	D33B29	-	Silicon Power	-
E	Smart Phone	ZTE B2016	cffdc231	ZTE	-
F	MIC	SDA3510A	0DC062841	Panasonic Corporation	-
G	MIC	SDA3510A	0DC062517	Panasonic Corporation	-
H	Rear Camera	GP-KDM301RC	06SD00026	Panasonic Corporation	-
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	Power Supply (DC)	GSV3000	1708192899	DIAMOND ANTENNA	-
N	JIG	J5DBG	WR14-4333	-	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC	3.0	Unshielded	Unshielded	-
2	Signal	3.0	Unshielded	Unshielded	-
3	Steering Switch	3.0 + 0.1	Unshielded	Unshielded	-
4	DC	3.0	Unshielded	Unshielded	-
5	IF-Box	2.5	Shielded	Shielded	-
6	Signal	3.0	Unshielded	Unshielded	-
7	USB	1.0	Shielded	Shielded	-
8	Signal	3.0	Unshielded	Unshielded	-
9	MIC	3.0 + 0.4	Unshielded	Unshielded	-
10	Signal	3.0	Unshielded	Unshielded	-
11	MIC	3.0 + 0.4	Unshielded	Unshielded	-
12	Rear Camera	3.0 + 0.2	Unshielded	Unshielded	-
13	GPS	0.1 + 2.5	Shielded	Shielded	-
14	Speaker	3.0 + 1.0	Unshielded	Unshielded	-
15	Speaker	3.0 + 1.0	Unshielded	Unshielded	-
16	Speaker	3.0 + 1.0	Unshielded	Unshielded	-
17	Speaker	3.0 + 1.0	Unshielded	Unshielded	-
18	DCM	3.0	Shielded	Shielded	-
19	FM	0.1 + 1.0	Shielded	Shielded	-
20	FM	0.1 + 1.5	Shielded	Shielded	-
21	Sirius XM	1.0	Shielded	Shielded	-
22	Signal	0.1	Unshielded	Unshielded	*1)
23	UART	0.2	Unshielded	Unshielded	*1)
24	Signal	0.15	Unshielded	Unshielded	*1)
25	AC	1.7	Unshielded	Unshielded	-

*1) This cable is for testing and is not included with products.

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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 beam width 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), *2)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	11.12.2.5.1 RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces 11.12.2.5.2 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.

*2) In unwanted emission derived from BT LE carrier, measurement with Average detector was not performed.

The limit for Average detector is applied to the measurement value with Peak detector used Duty cycle correction factor (DCCF).

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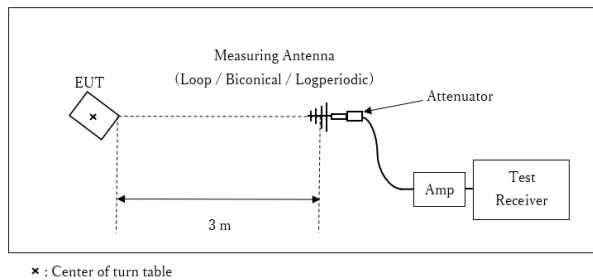
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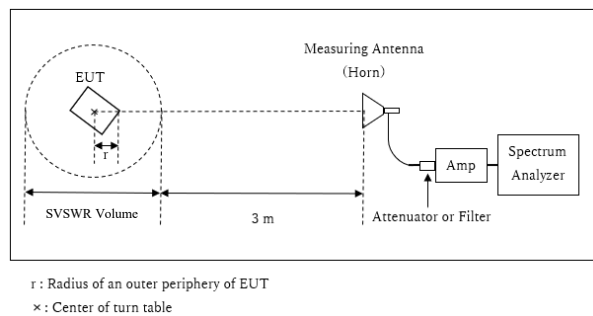
Figure 1: Test Setup

Below 1 GHz



Test Distance: 3 m

1 GHz - 10 GHz



Hi type

Distance Factor: $20 \times \log (3.8 \text{ m} / 3.0 \text{ m}) = 2.05 \text{ dB}$

* Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 3.8 \text{ m}$

Lo type

Distance Factor: $20 \times \log (3.87 \text{ m} / 3.0 \text{ m}) = 2.21 \text{ dB}$

* Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 3.87 \text{ m}$

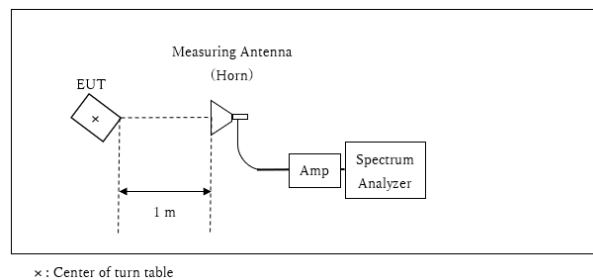
SVSWR Volume : 2.0 m

(SVSWR Volume has been calibrated based on CISPR 16-1-4.)

r = 0.2 m (Hi type)

r = 0.13 m (Lo type)

10 GHz - 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 carrier level and noise levels were confirmed at each position of 0 deg. and 30 deg. of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Worst case:

< Hi type (14 inch Display) for WLAN >

Antenna polarization	Carrier (Band edge)	Spurious				
		Below 1 GHz	Above 1 GHz			
			1 GHz - 2.8 GHz	2.8 GHz - 10 GHz	10 GHz - 18 GHz	18 GHz - 26.5 GHz
Horizontal	0 deg.	0 deg.	0 deg.	30 deg.	30 deg.	30 deg.
Vertical	0 deg.	0 deg.	0 deg.	30 deg.	30 deg.	30 deg.

< Hi type (14 inch Display) for BT LE >

Antenna polarization	Carrier (Band edge)	Spurious				
		Below 1 GHz	Above 1 GHz			
			1 GHz - 2.8 GHz	2.8 GHz - 10 GHz	10 GHz - 18 GHz	18 GHz - 26.5 GHz
Horizontal	30 deg.	0 deg.	30 deg.	30 deg.	30 deg.	30 deg.
Vertical	30 deg.	0 deg.	30 deg.	30 deg.	30 deg.	30 deg.

< Lo type (8 inch Display) for WLAN >

Antenna polarization	Carrier (Band edge)	Spurious				
		Below 1 GHz	Above 1 GHz			
			1 GHz - 2.8 GHz	2.8 GHz - 10 GHz	10 GHz - 18 GHz	18 GHz - 26.5 GHz
Horizontal	30 deg.	0 deg.	30 deg.	30 deg.	30 deg.	30 deg.
Vertical	30 deg.	0 deg.	30 deg.	30 deg.	30 deg.	30 deg.

< Lo type (8 inch Display) for BT LE >

Antenna polarization	Carrier (Band edge)	Spurious				
		Below 1 GHz	Above 1 GHz			
			1 GHz - 2.8 GHz	2.8 GHz - 10 GHz	10 GHz - 18 GHz	18 GHz - 26.5 GHz
Horizontal	30 deg.	0 deg.	30 deg.	30 deg.	30 deg.	30 deg.
Vertical	30 deg.	0 deg.	30 deg.	30 deg.	30 deg.	30 deg.

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

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

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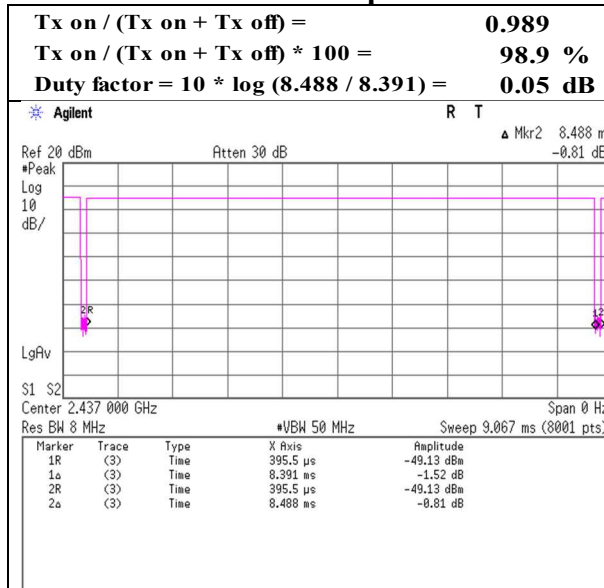
Facsimile : +81 478 82 3373

APPENDIX 1: Test data

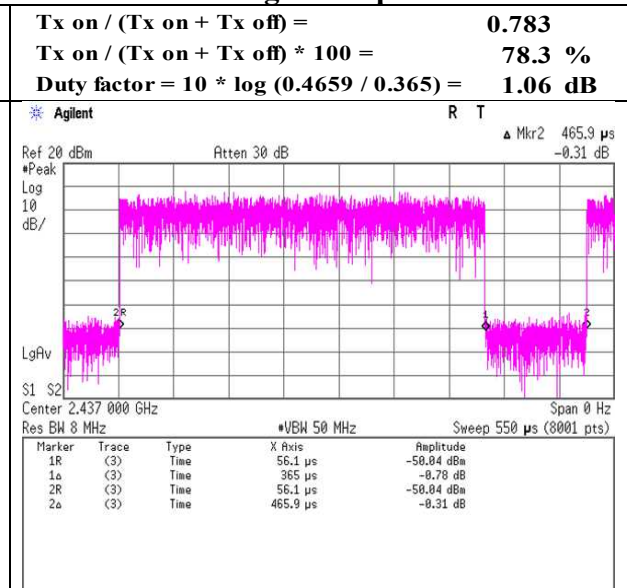
Burst rate confirmation

Report No. 13408125M-B-R1
Test place Shonan EMC Lab. No.5 Shielded Room
Date July 3, 2020 August 6, 2020
Temperature / Humidity 23 deg. C / 67 % RH 24 deg. C / 65 % RH
Engineer Kazuya Noda Shiro Kobayashi
Mode Tx

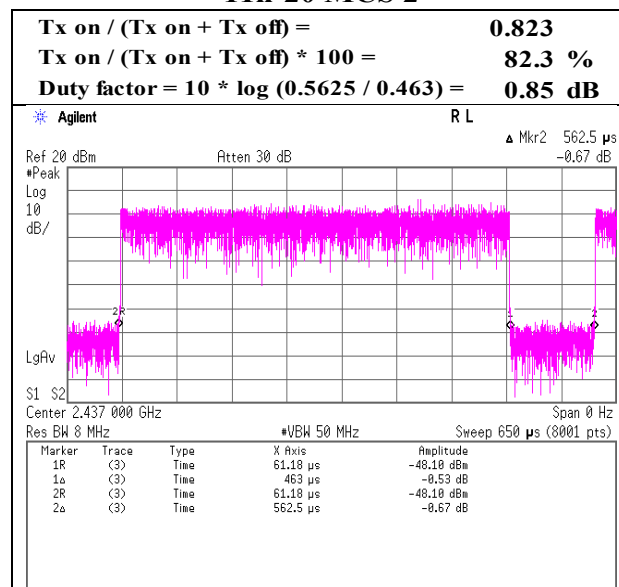
11b 1 Mbps



11g 24 Mbps



11n-20 MCS 2



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

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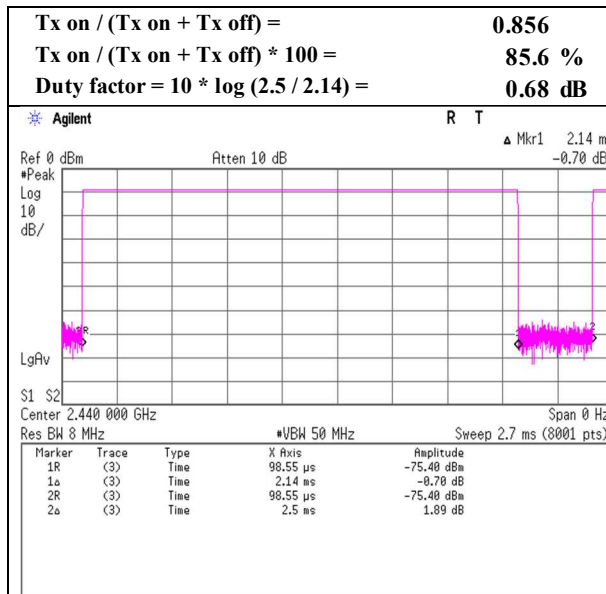
Telephone : +81 478 88 6500

Facsimile : +81 478 82 3373

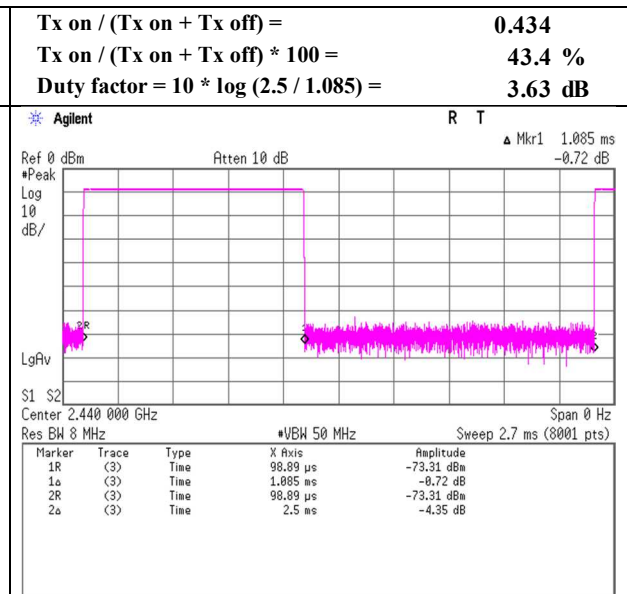
Burst rate confirmation

Report No.	13408125M-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	July 3, 2020 August 6, 2020
Temperature / Humidity	23 deg. C / 67 % RH 24 deg. C / 65 % RH
Engineer	Kazuya Noda Shiro Kobayashi
Mode	Tx

BT LE 1 M-PHY



BT LE 2 M-PHY

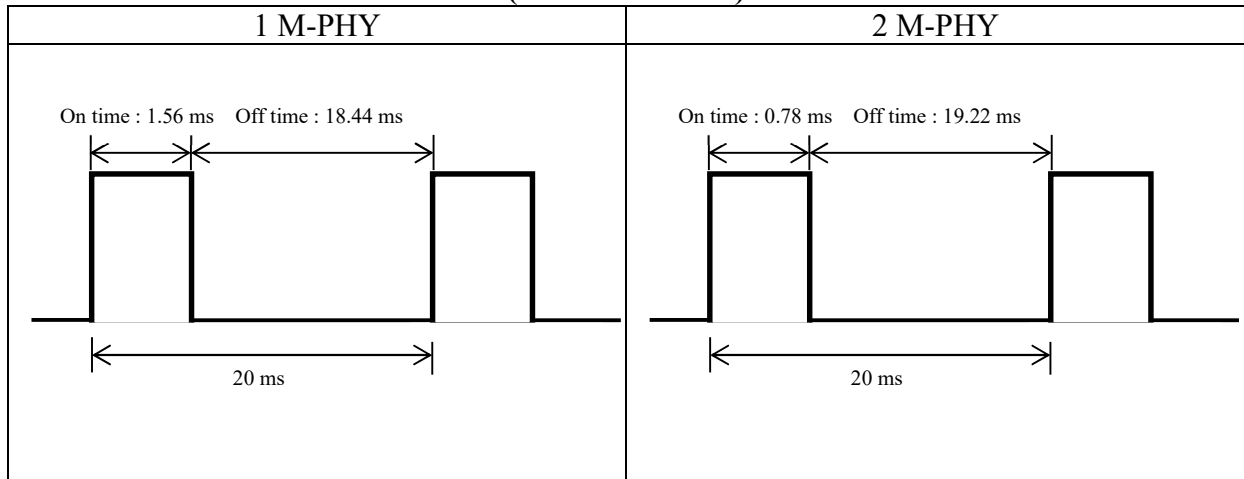


- * Since the burst rate is not different between the channels, the data has been obtained on the representative channel.
- * The above chart is obtained with the Maximum Packet Size set that can be by test software, and it is different from the maximum duty cycle of the product.

Duty cycle correction factor

The information provided from the customer.

(Reference chart)



(for Duty cycle correction factor for Radiated Spurious Emission)

Worst 100 ms case

1 M-PHY	2 M-PHY
$DCCF = 20 \log(1.56 \times 5 / 100) = -22.15 \text{ dB}$	$DCCF = 20 \log(0.78 \times 5 / 100) = -28.17 \text{ dB}$

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

*Worst TX Duty cycle BLE is Advertising mode.

The actual measurement value was applied as Duty Cycle Correction factor.

Radiated Spurious Emission

Report No.	13408125M-B-R1			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.6	No.6	No.6	No.6
Date	July 26, 2020	July 27, 2020	July 27, 2020	July 28, 2020
Temperature / Humidity	22 deg. C / 60 % RH	23 deg. C / 59 % RH	23 deg. C / 59 % RH	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx 11b 2412 MHz			
EUT	Hi type			

(* 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.	2093.040	PK	52.60	29.06	13.10	43.86	2.05	52.95	73.9	20.9	143	197	
Hori.	2390.000	PK	52.10	27.61	13.32	43.84	2.05	51.24	73.9	22.6	325	285	
Hori.	4824.000	PK	52.84	32.50	5.36	45.18	2.05	47.57	73.9	26.3	138	355	
Hori.	7236.000	PK	49.00	37.22	6.64	43.99	2.05	50.92	73.9	22.9	150	0	Floor noise
Hori.	9648.000	PK	46.28	37.97	7.41	41.88	2.05	51.83	73.9	22.0	150	0	Floor noise
Hori.	2093.040	AV	43.50	29.06	13.10	43.86	2.05	43.85	53.9	10.0	143	197	
Hori.	2390.000	AV	43.70	27.61	13.32	43.84	2.05	42.84	53.9	11.0	325	285	
Hori.	4824.000	AV	44.92	32.50	5.36	45.18	2.05	39.65	53.9	14.2	138	355	
Hori.	7236.000	AV	40.42	37.22	6.64	43.99	2.05	42.34	53.9	11.5	150	0	Floor noise
Hori.	9648.000	AV	38.23	37.97	7.41	41.88	2.05	43.78	53.9	10.1	150	0	Floor noise
Vert.	2093.040	PK	52.80	29.06	13.10	43.86	2.05	53.15	73.9	20.7	157	174	
Vert.	2390.000	PK	51.90	27.61	13.32	43.84	2.05	51.04	73.9	22.8	151	68	
Vert.	4824.000	PK	52.58	32.50	5.36	45.18	2.05	47.31	73.9	26.5	110	334	
Vert.	7236.000	PK	49.44	37.22	6.64	43.99	2.05	51.36	73.9	22.5	150	0	Floor noise
Vert.	9648.000	PK	47.18	37.97	7.41	41.88	2.05	52.73	73.9	21.1	150	0	Floor noise
Vert.	2093.040	AV	44.10	29.06	13.10	43.86	2.05	44.45	53.9	9.4	157	174	
Vert.	2390.000	AV	43.10	27.61	13.32	43.84	2.05	42.24	53.9	11.6	151	68	
Vert.	4824.000	AV	45.21	32.50	5.36	45.18	2.05	39.94	53.9	13.9	110	334	
Vert.	7236.000	AV	40.63	37.22	6.64	43.99	2.05	42.55	53.9	11.3	150	0	Floor noise
Vert.	9648.000	AV	38.36	37.97	7.41	41.88	2.05	43.91	53.9	9.9	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 : 20log (3.8 m / 3.0 m) = 2.05 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	99.60	27.67	13.34	43.83	2.05	98.83	-	-	Carrier
Hori.	2398.500	PK	52.40	27.63	13.33	43.83	2.05	51.58	78.83	27.2	
Hori.	2400.000	PK	44.10	27.63	13.33	43.83	2.05	43.28	78.83	35.5	
Vert.	2412.000	PK	97.70	27.67	13.34	43.83	2.05	96.93	-	-	Carrier
Vert.	2398.500	PK	52.10	27.63	13.33	43.83	2.05	51.28	76.93	25.6	
Vert.	2400.000	PK	43.70	27.63	13.33	43.83	2.05	42.88	76.93	34.0	

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

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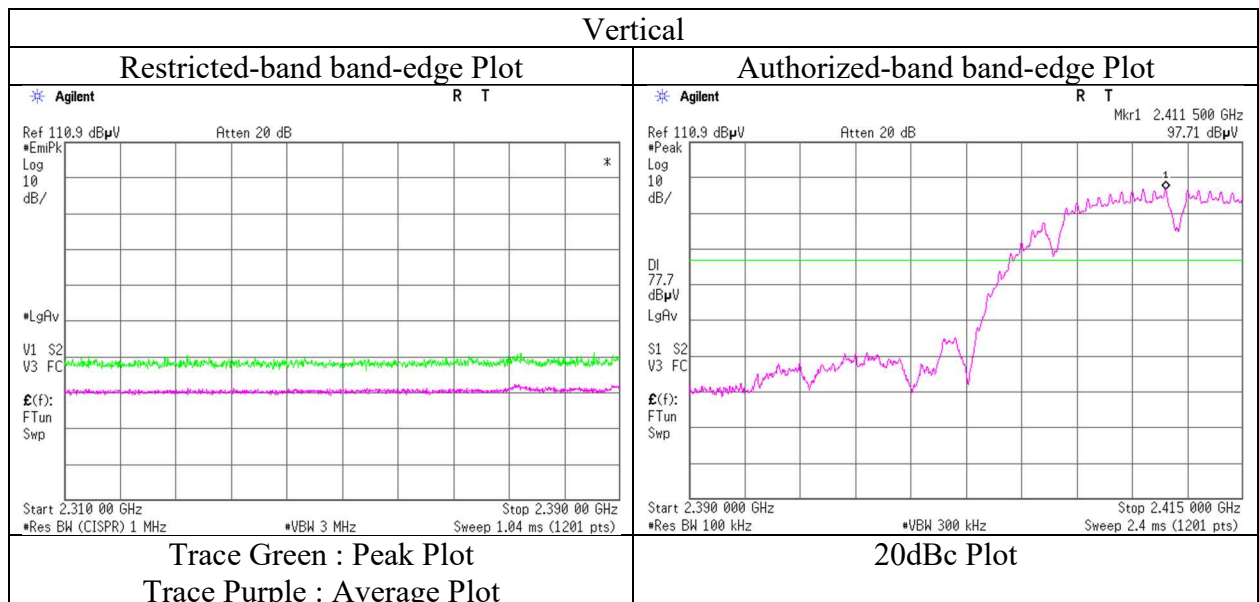
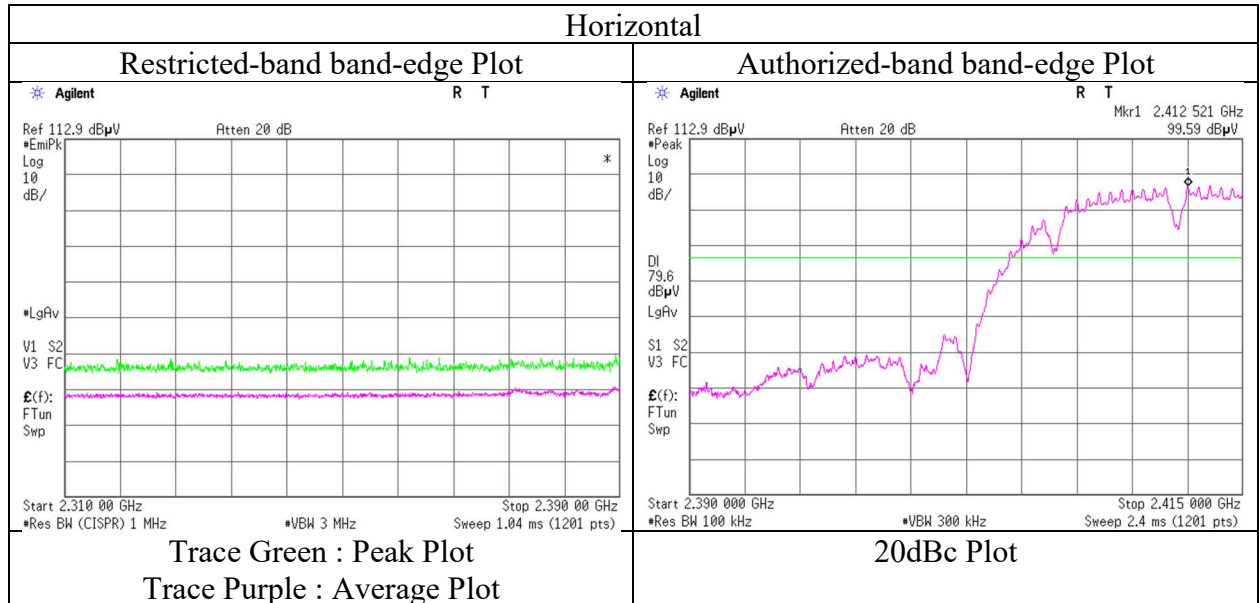
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	July 26, 2020
Temperature / Humidity	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando
Mode	Tx 11b 2412 MHz
EUT	Hi type



* 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.

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Radiated Spurious Emission

Report No.	13408125M-B-R1			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.6	No.6	No.6	No.6
Date	July 26, 2020	July 27, 2020	July 27, 2020	July 28, 2020
Temperature / Humidity	22 deg. C / 60 % RH	23 deg. C / 59 % RH	23 deg. C / 59 % RH	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx 11b 2437 MHz			
EUT	Hi type			

(* 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.	2093.000	PK	52.20	29.06	13.10	43.86	2.05	52.55	73.9	21.3	214	196	
Hori.	4874.000	PK	51.17	32.57	5.39	45.20	2.05	45.98	73.9	27.9	133	355	
Hori.	7311.000	PK	48.68	37.36	6.69	43.82	2.05	50.96	73.9	22.9	150	0	Floor noise
Hori.	9748.000	PK	46.16	37.96	7.45	41.80	2.05	51.82	73.9	22.0	150	0	Floor noise
Hori.	2093.000	AV	43.60	29.06	13.10	43.86	2.05	43.95	53.9	9.9	214	196	
Hori.	4874.000	AV	43.83	32.57	5.39	45.20	2.05	38.64	53.9	15.2	133	355	
Hori.	7311.000	AV	40.12	37.36	6.69	43.82	2.05	42.40	53.9	11.5	150	0	Floor noise
Hori.	9748.000	AV	38.73	37.96	7.45	41.80	2.05	44.39	53.9	9.5	150	0	Floor noise
Vert.	2093.000	PK	52.30	29.06	13.10	43.86	2.05	52.65	73.9	21.2	173	178	
Vert.	4874.000	PK	51.92	32.57	5.39	45.20	2.05	46.73	73.9	27.1	125	332	
Vert.	7311.000	PK	48.40	37.36	6.69	43.82	2.05	50.68	73.9	23.2	150	0	Floor noise
Vert.	9748.000	PK	46.39	37.96	7.45	41.80	2.05	52.05	73.9	21.8	150	0	Floor noise
Vert.	2093.000	AV	44.70	29.06	13.10	43.86	2.05	45.05	53.9	8.8	173	178	
Vert.	4874.000	AV	44.20	32.57	5.39	45.20	2.05	39.01	53.9	14.8	125	332	
Vert.	7311.000	AV	40.21	37.36	6.69	43.82	2.05	42.49	53.9	11.4	150	0	Floor noise
Vert.	9748.000	AV	38.71	37.96	7.45	41.80	2.05	44.37	53.9	9.5	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 : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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.	13408125M-B-R1			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.6	No.6	No.6	No.6
Date	July 28, 2020	July 27, 2020	July 27, 2020	July 28, 2020
Temperature / Humidity	22 deg. C / 60 % RH	23 deg. C / 59 % RH	23 deg. C / 59 % RH	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx 11b 2462 MHz			
EUT	Hi type			

(* 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.	2093.000	PK	50.70	29.06	13.10	43.86	2.05	51.05	73.9	22.8	188	206	
Hori.	2483.500	PK	51.00	27.94	13.39	43.80	2.05	50.58	73.9	23.3	348	288	
Hori.	4924.000	PK	51.48	32.62	5.41	45.24	2.05	46.32	73.9	27.5	121	355	
Hori.	7386.000	PK	49.46	37.46	6.69	43.63	2.05	52.03	73.9	21.8	150	0	Floor noise
Hori.	9848.000	PK	47.76	38.11	7.48	41.76	2.05	53.64	73.9	20.2	150	0	Floor noise
Hori.	2093.000	AV	43.60	29.06	13.10	43.86	2.05	43.95	53.9	9.9	188	206	
Hori.	2483.500	AV	42.10	27.94	13.39	43.80	2.05	41.68	53.9	12.2	348	288	
Hori.	4924.000	AV	44.30	32.62	5.41	45.24	2.05	39.14	53.9	14.7	121	355	
Hori.	7386.000	AV	40.33	37.46	6.69	43.63	2.05	42.90	53.9	11.0	150	0	Floor noise
Hori.	9848.000	AV	38.49	38.11	7.48	41.76	2.05	44.37	53.9	9.5	150	0	Floor noise
Vert.	2093.000	PK	52.60	29.06	13.10	43.86	2.05	52.95	73.9	20.9	136	195	
Vert.	2483.500	PK	51.40	27.94	13.39	43.80	2.05	50.98	73.9	22.9	131	356	
Vert.	4924.000	PK	52.49	32.62	5.41	45.24	2.05	47.33	73.9	26.5	100	13	
Vert.	7386.000	PK	48.99	37.46	6.69	43.63	2.05	51.56	73.9	22.3	150	0	Floor noise
Vert.	9848.000	PK	46.72	38.11	7.48	41.76	2.05	52.60	73.9	21.3	150	0	Floor noise
Vert.	2093.000	AV	44.80	29.06	13.10	43.86	2.05	45.15	53.9	8.7	136	195	
Vert.	2483.500	AV	41.80	27.94	13.39	43.80	2.05	41.38	53.9	12.5	131	356	
Vert.	4924.000	AV	44.25	32.62	5.41	45.24	2.05	39.09	53.9	14.8	100	13	
Vert.	7386.000	AV	40.29	37.46	6.69	43.63	2.05	42.86	53.9	11.0	150	0	Floor noise
Vert.	9848.000	AV	38.54	38.11	7.48	41.76	2.05	44.42	53.9	9.4	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 : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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

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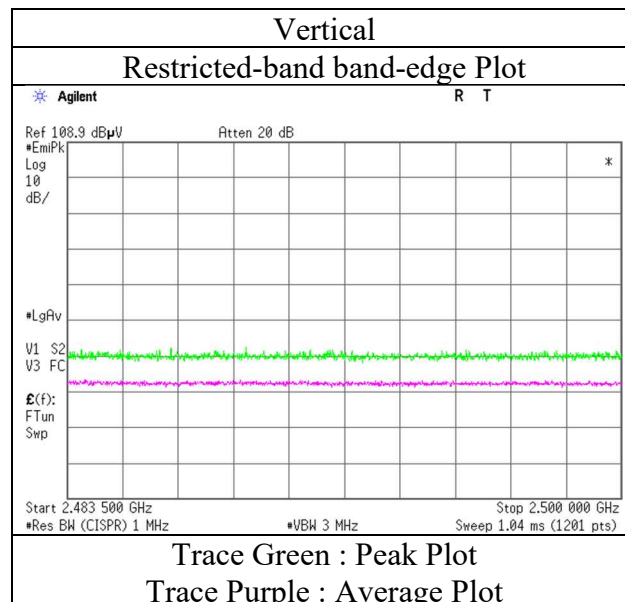
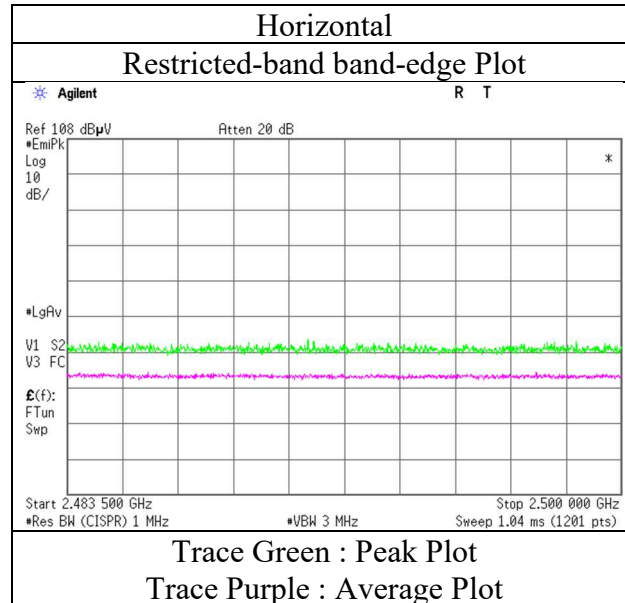
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	July 28, 2020
Temperature / Humidity	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando
Mode	Tx 11b 2462 MHz
EUT	Hi type



* 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.	13408125M-B-R1			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.6	No.6	No.6	No.6
Date	July 29, 2020	July 27, 2020	July 27, 2020	July 28, 2020
Temperature / Humidity	22 deg. C / 57 % RH	23 deg. C / 59 % RH	23 deg. C / 59 % RH	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx 11g 2412 MHz			
EUT	Hi type			

(* 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.	2092.203	PK	51.70	29.07	13.10	43.86	2.05	52.06	73.9	21.8	237	295	
Hori.	2390.000	PK	66.00	27.61	13.32	43.84	2.05	65.14	73.9	8.7	291	291	
Hori.	4824.000	PK	50.73	32.50	5.36	45.18	2.05	45.46	73.9	28.4	150	0	Floor noise
Hori.	7236.000	PK	47.99	37.22	6.64	43.99	2.05	49.91	73.9	23.9	150	0	Floor noise
Hori.	9648.000	PK	46.85	37.97	7.41	41.88	2.05	52.40	73.9	21.5	150	0	Floor noise
Hori.	2092.203	AV	43.90	29.07	13.10	43.86	2.05	44.26	53.9	9.6	237	295	
Vert.	2092.298	PK	52.30	29.07	13.10	43.86	2.05	52.66	73.9	21.2	145	184	
Vert.	2390.000	PK	65.90	27.61	13.32	43.84	2.05	65.04	73.9	8.8	175	70	
Vert.	4824.000	PK	51.38	32.50	5.36	45.18	2.05	46.11	73.9	27.7	150	0	Floor noise
Vert.	7236.000	PK	48.41	37.22	6.64	43.99	2.05	50.33	73.9	23.5	150	0	Floor noise
Vert.	9648.000	PK	46.76	37.97	7.41	41.88	2.05	52.31	73.9	21.5	150	0	Floor noise
Vert.	2092.298	AV	44.50	29.07	13.10	43.86	2.05	44.86	53.9	9.0	145	184	

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 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.	2390.000	AV	49.00	27.61	13.32	43.84	1.06	2.05	49.20	53.9	4.7	*1)
Hori.	4824.000	AV	44.28	32.50	5.36	45.18	1.06	2.05	40.07	53.9	13.8	Floor noise
Hori.	7236.000	AV	40.79	37.22	6.64	43.99	1.06	2.05	43.77	53.9	10.1	Floor noise
Hori.	9648.000	AV	38.37	37.97	7.41	41.88	1.06	2.05	44.98	53.9	8.9	Floor noise
Vert.	2390.000	AV	49.20	27.61	13.32	43.84	1.06	2.05	49.40	53.9	4.5	*1)
Vert.	4824.000	AV	43.70	32.50	5.36	45.18	1.06	2.05	39.49	53.9	14.4	Floor noise
Vert.	7236.000	AV	41.17	37.22	6.64	43.99	1.06	2.05	44.15	53.9	9.7	Floor noise
Vert.	9648.000	AV	38.27	37.97	7.41	41.88	1.06	2.05	44.88	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 : 20log (3.8 m / 3.0 m) = 2.05 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)

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	97.30	27.67	13.34	43.83	2.05	96.53	-	-	Carrier
Hori.	2400.000	PK	59.90	27.63	13.33	43.83	2.05	59.08	76.53	17.4	
Vert.	2412.000	PK	96.60	27.67	13.34	43.83	2.05	95.83	-	-	Carrier
Vert.	2400.000	PK	59.20	27.63	13.33	43.83	2.05	58.38	75.83	17.4	

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

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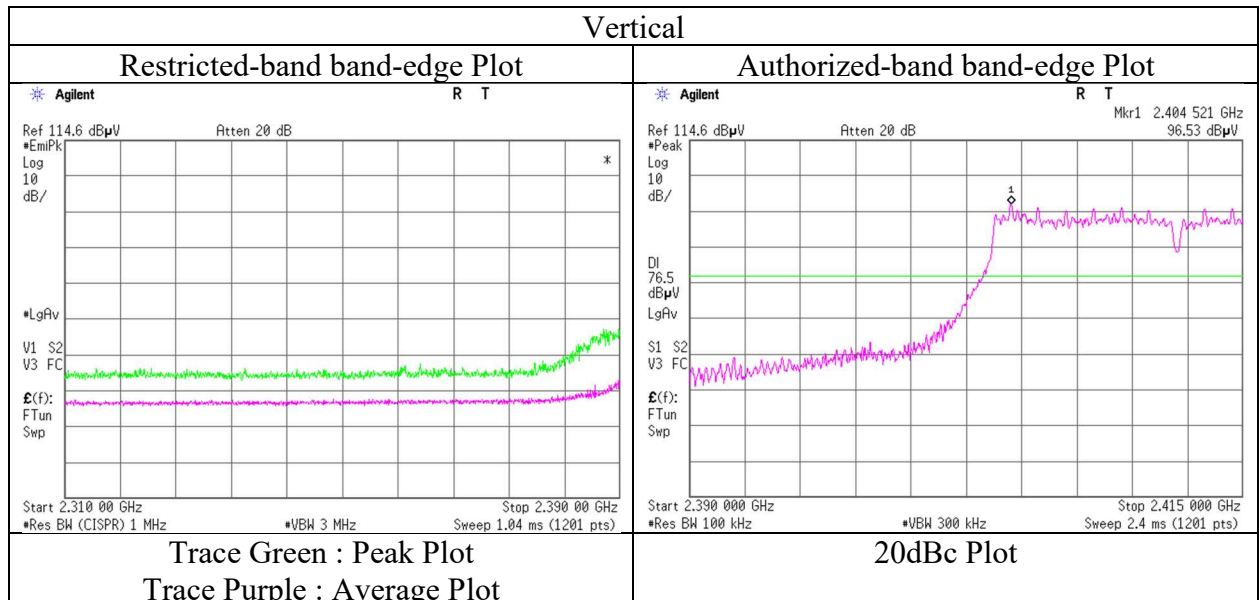
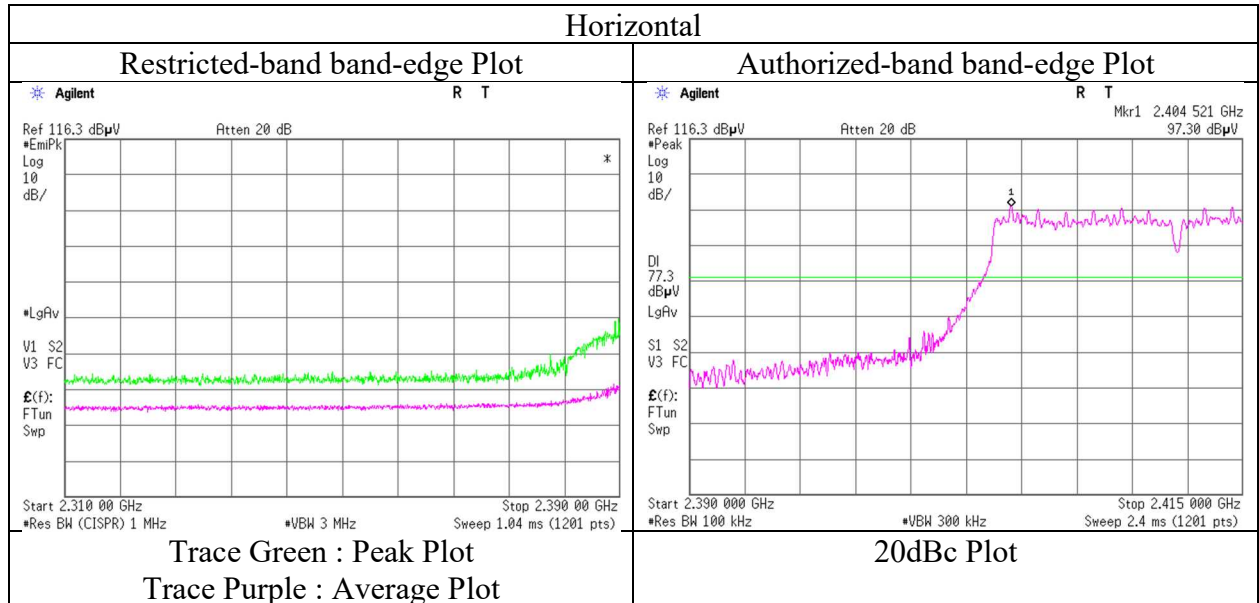
1614, Mushihata, Katori-shi, Chiba-ken, 289-0341 Japan

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	July 29, 2020
Temperature / Humidity	22 deg. C / 57 % RH
Engineer	Kazuhiro Ando
Mode	Tx 11g 2412 MHz
EUT	Hi type



* 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. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date July 29, 2020
Temperature / Humidity 22 deg. C / 57 % RH
Engineer Kazuhiro Ando
(1 GHz - 2.8 GHz)
Mode Tx 11g 2417 MHz
EUT Hi type

(* 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	66.80	27.61	13.32	43.84	2.05	65.94	73.9	7.9	318	288	
Vert.	2390.000	PK	66.70	27.61	13.32	43.84	2.05	65.84	73.9	8.0	160	57	

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 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.	2390.000	AV	51.80	27.61	13.32	43.84	1.06	2.05	52.00	53.9	1.9	*1)
Vert.	2390.000	AV	51.60	27.61	13.32	43.84	1.06	2.05	51.80	53.9	2.1	*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 : 20log (3.8 m / 3.0 m) = 2.05 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)

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.	2417.000	PK	98.50	27.68	13.34	43.83	2.05	97.74	-	-	Carrier
Hori.	2399.200	PK	61.60	27.63	13.33	43.83	2.05	60.78	77.74	16.9	
Hori.	2400.000	PK	59.40	27.63	13.33	43.83	2.05	58.58	77.74	19.1	
Vert.	2417.000	PK	97.60	27.68	13.34	43.83	2.05	96.84	-	-	Carrier
Vert.	2399.182	PK	60.80	27.63	13.33	43.83	2.05	59.98	76.84	16.8	
Vert.	2400.000	PK	58.30	27.63	13.33	43.83	2.05	57.48	76.84	19.3	

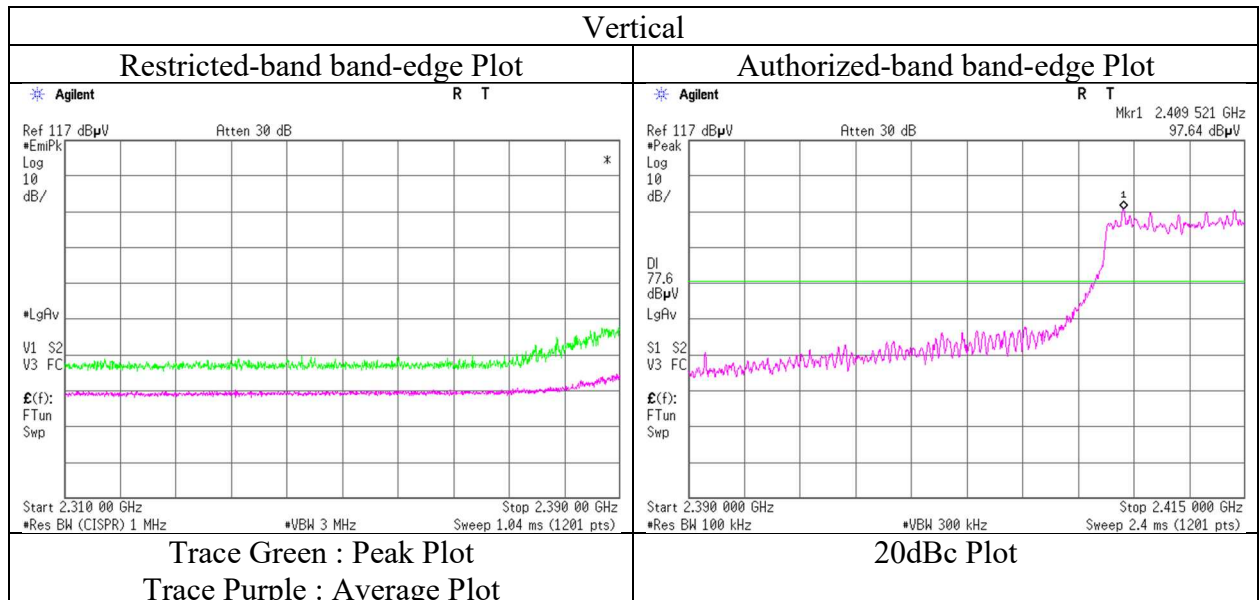
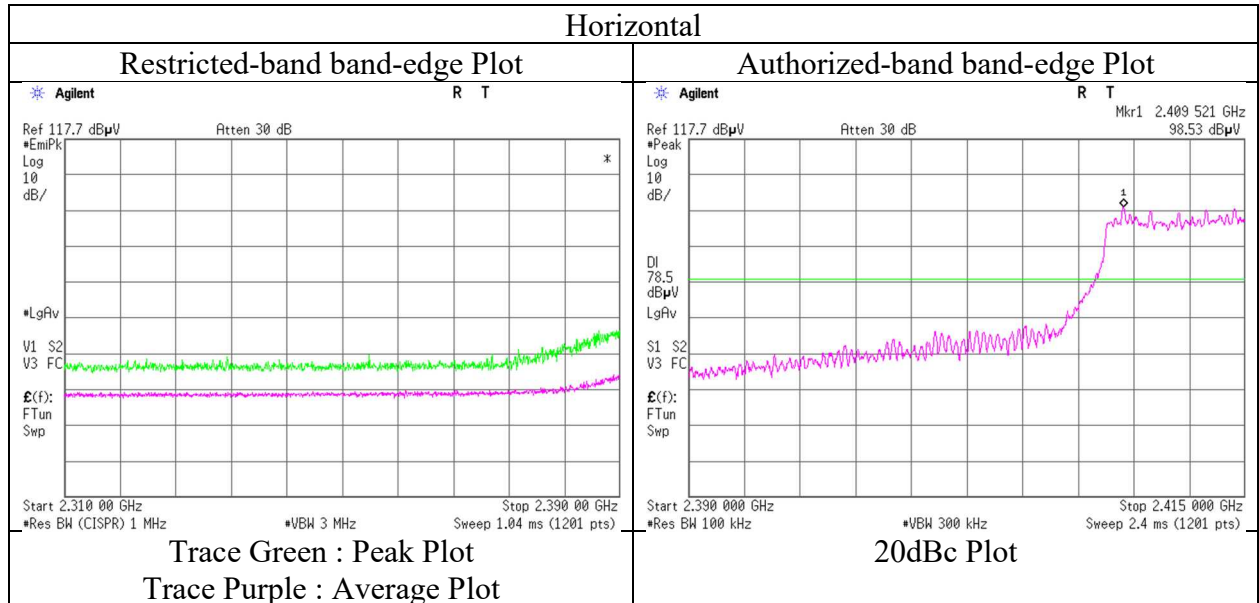
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	July 29, 2020
Temperature / Humidity	22 deg. C / 57 % RH
Engineer	Kazuhiro Ando
Mode	Tx 11g 2417 MHz
EUT	Hi type



* 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.	13408125M-B-R1				
Test place	Kashima EMC Lab.				
Semi Anechoic Chamber	No.6	No.6	No.6	No.6	No.6
Date	August 6, 2020	July 28, 2020	July 27, 2020	July 27, 2020	July 28, 2020
Temperature / Humidity	22 deg. C / 55 % RH	22 deg. C / 60 % RH	23 deg. C / 59 % RH	23 deg. C / 59 % RH	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe
	(30 MHz -1000 MHz)	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx 11g 2437 MHz				
EUT	Hi type				

(* 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.	232.672	QP	49.40	10.80	7.64	32.35	0.00	35.49	46.0	10.5	161	298	
Hori.	387.827	QP	42.90	15.44	8.56	32.27	0.00	34.63	46.0	11.3	100	11	
Hori.	477.294	QP	43.30	17.53	9.02	32.24	0.00	37.61	46.0	8.3	100	24	
Hori.	593.580	QP	42.50	19.69	9.52	32.23	0.00	39.48	46.0	6.5	187	243	
Hori.	772.597	QP	39.60	22.21	10.25	32.02	0.00	40.04	46.0	5.9	116	222	
Hori.	838.371	QP	40.10	22.80	10.51	31.80	0.00	41.61	46.0	4.3	117	217	
Hori.	2093.000	PK	51.00	29.06	13.10	43.86	2.05	51.35	73.9	22.5	204	156	
Hori.	4874.000	PK	50.76	32.57	5.39	45.20	2.05	45.57	73.9	28.3	150	0	Floor noise
Hori.	7311.000	PK	48.67	37.36	6.69	43.82	2.05	50.95	73.9	22.9	150	0	Floor noise
Hori.	9748.000	PK	47.01	37.96	7.45	41.80	2.05	52.67	73.9	21.2	150	0	Floor noise
Hori.	2093.000	AV	42.50	29.06	13.10	43.86	2.05	42.85	53.9	11.0	204	156	
Vert.	593.667	QP	42.20	19.69	9.52	32.23	0.00	39.18	46.0	6.8	132	345	
Vert.	772.582	QP	38.50	22.21	10.25	32.02	0.00	38.94	46.0	7.0	100	168	
Vert.	838.265	QP	37.10	22.80	10.51	31.80	0.00	38.61	46.0	7.3	100	302	
Vert.	2093.000	PK	51.90	29.06	13.10	43.86	2.05	52.25	73.9	21.6	132	199	
Vert.	4874.000	PK	51.57	32.57	5.39	45.20	2.05	46.38	73.9	27.5	150	0	Floor noise
Vert.	7311.000	PK	47.58	37.36	6.69	43.82	2.05	49.86	73.9	24.0	150	0	Floor noise
Vert.	9748.000	PK	46.52	37.96	7.45	41.80	2.05	52.18	73.9	21.7	150	0	Floor noise
Vert.	2093.000	AV	43.60	29.06	13.10	43.86	2.05	43.95	53.9	9.9	132	199	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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	43.19	32.57	5.39	45.20	1.06	2.05	39.06	53.9	14.8	Floor noise
Hori.	7311.000	AV	40.22	37.36	6.69	43.82	1.06	2.05	43.56	53.9	10.3	Floor noise
Hori.	9748.000	AV	38.58	37.96	7.45	41.80	1.06	2.05	45.30	53.9	8.6	Floor noise
Vert.	4874.000	AV	43.28	32.57	5.39	45.20	1.06	2.05	39.15	53.9	14.7	Floor noise
Vert.	7311.000	AV	40.25	37.36	6.69	43.82	1.06	2.05	43.59	53.9	10.3	Floor noise
Vert.	9748.000	AV	38.63	37.96	7.45	41.80	1.06	2.05	45.35	53.9	8.5	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 : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date July 29, 2020
Temperature / Humidity 22 deg. C / 57 % RH
Engineer Kazuhiro Ando
(1 GHz - 2.8 GHz)
Mode Tx 11g 2457 MHz
EUT Hi type

(* 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	55.97	27.94	13.39	43.80	2.05	55.55	73.9	18.3	149	23	
Vert.	2483.500	PK	59.25	27.94	13.39	43.80	2.05	58.83	73.9	15.0	139	73	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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	43.86	27.94	13.39	43.80	1.06	2.05	44.50	53.9	9.4	*1)
Vert.	2483.500	AV	45.71	27.94	13.39	43.80	1.06	2.05	46.35	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 : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

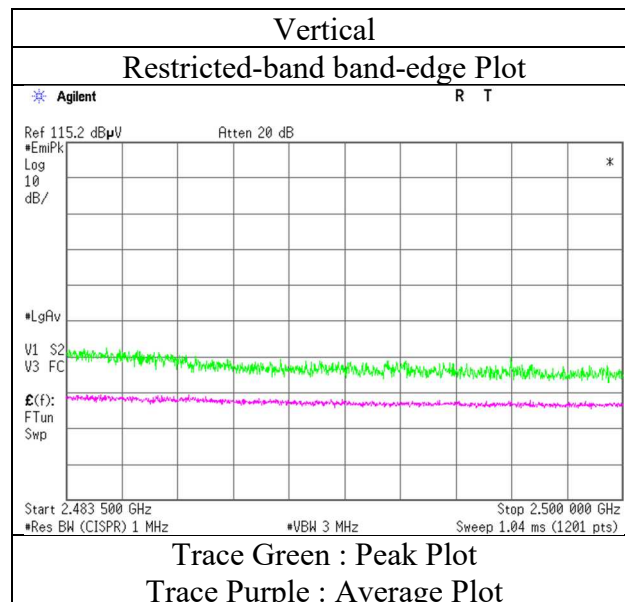
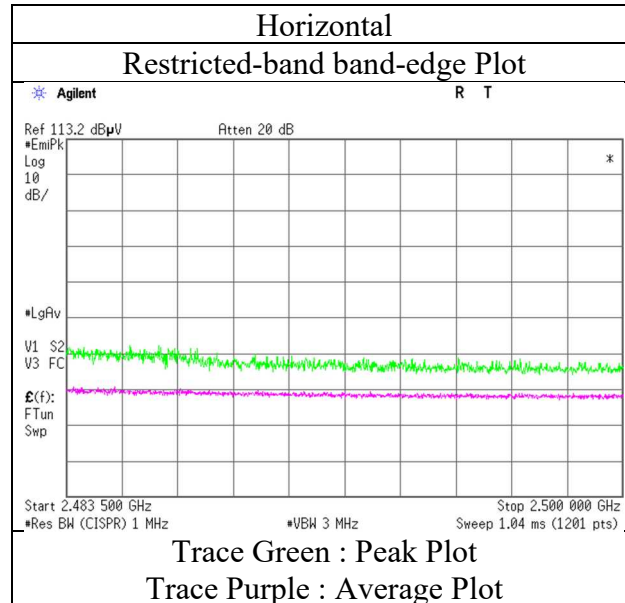
10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date July 29, 2020
Temperature / Humidity 22 deg. C / 57 % RH
Engineer Kazuhiro Ando
Mode Tx 11g 2457 MHz
EUT Hi type



* 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.	13408125M-B-R1			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.6	No.6	No.6	No.6
Date	July 28, 2020	July 27, 2020	July 27, 2020	July 28, 2020
Temperature / Humidity	22 deg. C / 60 % RH	23 deg. C / 59 % RH	23 deg. C / 59 % RH	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx 11g 2462 MHz			
EUT	Hi type			

(* 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.	2093.000	PK	51.20	29.06	13.10	43.86	2.05	51.55	73.9	22.3	244	262	
Hori.	2483.500	PK	58.40	27.94	13.39	43.80	2.05	57.98	73.9	15.9	349	289	
Hori.	4924.000	PK	50.06	32.62	5.41	45.24	2.05	44.90	73.9	29.0	150	0	Floor noise
Hori.	7386.000	PK	47.32	37.46	6.69	43.63	2.05	49.89	73.9	24.0	150	0	Floor noise
Hori.	9848.000	PK	47.97	38.11	7.48	41.76	2.05	53.85	73.9	20.0	150	0	Floor noise
Hori.	2093.000	AV	42.50	29.06	13.10	43.86	2.05	42.85	53.9	11.0	244	262	
Vert.	2093.000	PK	51.60	29.06	13.10	43.86	2.05	51.95	73.9	21.9	151	180	
Vert.	2483.500	PK	61.40	27.94	13.39	43.80	2.05	60.98	73.9	12.9	194	38	
Vert.	4924.000	PK	50.92	32.62	5.41	45.24	2.05	45.76	73.9	28.1	150	0	Floor noise
Vert.	7386.000	PK	48.52	37.46	6.69	43.63	2.05	51.09	73.9	22.8	150	0	Floor noise
Vert.	9848.000	PK	46.47	38.11	7.48	41.76	2.05	52.35	73.9	21.5	150	0	Floor noise
Vert.	2093.000	AV	43.60	29.06	13.10	43.86	2.05	43.95	53.9	9.9	151	180	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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	43.70	27.94	13.39	43.80	1.06	2.05	44.34	53.9	9.5	*1)
Hori.	4924.000	AV	42.80	32.62	5.41	45.24	1.06	2.05	38.70	53.9	15.2	Floor noise
Hori.	7386.000	AV	40.30	37.46	6.69	43.63	1.06	2.05	43.93	53.9	9.9	Floor noise
Hori.	9848.000	AV	38.58	38.11	7.48	41.76	1.06	2.05	45.52	53.9	8.3	Floor noise
Vert.	2483.500	AV	44.40	27.94	13.39	43.80	1.06	2.05	45.04	53.9	8.8	*1)
Vert.	4924.000	AV	42.85	32.62	5.41	45.24	1.06	2.05	38.75	53.9	15.1	Floor noise
Vert.	7386.000	AV	40.38	37.46	6.69	43.63	1.06	2.05	44.01	53.9	9.8	Floor noise
Vert.	9848.000	AV	38.49	38.11	7.48	41.76	1.06	2.05	45.43	53.9	8.4	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 : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

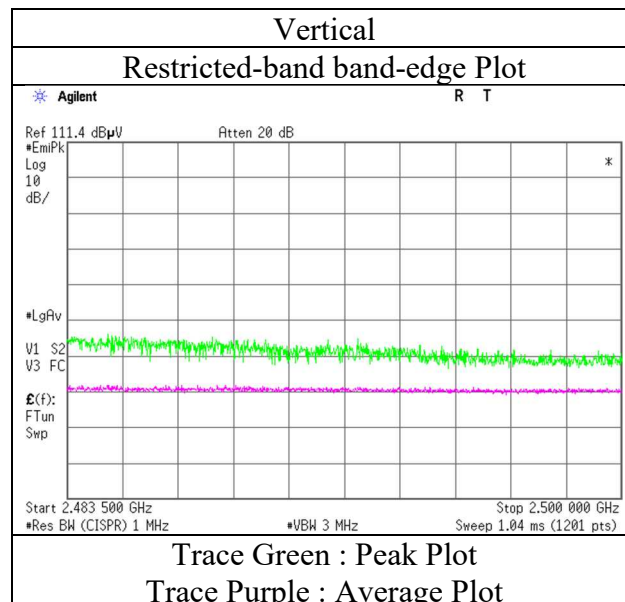
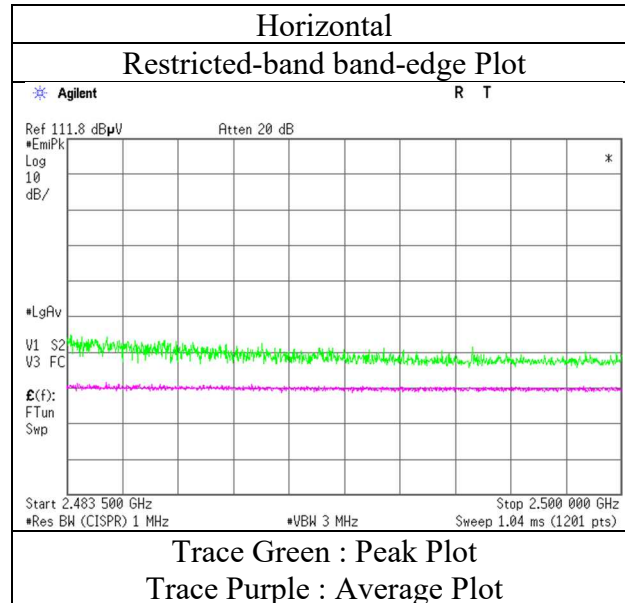
10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date July 28, 2020
Temperature / Humidity 22 deg. C / 60 % RH
Engineer Kazuhiro Ando
Mode Tx 11g 2462 MHz
EUT Hi type



* 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.	13408125M-B-R1			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.6	No.6	No.6	No.6
Date	July 29, 2020	July 27, 2020	July 27, 2020	July 28, 2020
Temperature / Humidity	22 deg. C / 57 % RH	23 deg. C / 59 % RH	23 deg. C / 59 % RH	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx 11n-20 2412 MHz			
EUT	Hi type			

(* 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.	2092.182	PK	51.50	29.07	13.10	43.86	2.05	51.86	73.9	22.0	233	258	
Hori.	2390.000	PK	65.80	27.61	13.32	43.84	2.05	64.94	73.9	8.9	305	288	
Hori.	4824.000	PK	51.41	32.50	5.36	45.18	2.05	46.14	73.9	27.7	150	0	Floor noise
Hori.	7236.000	PK	49.16	37.22	6.64	43.99	2.05	51.08	73.9	22.8	150	0	Floor noise
Hori.	9648.000	PK	47.12	37.97	7.41	41.88	2.05	52.67	73.9	21.2	150	0	Floor noise
Hori.	2092.182	AV	43.70	29.07	13.10	43.86	2.05	44.06	53.9	9.8	233	258	
Vert.	2092.353	PK	51.40	29.07	13.10	43.86	2.05	51.76	73.9	22.1	155	183	
Vert.	2390.000	PK	64.50	27.61	13.32	43.84	2.05	63.64	73.9	10.2	174	70	
Vert.	4824.000	PK	51.85	32.50	5.36	45.18	2.05	46.58	73.9	27.3	150	0	Floor noise
Vert.	7236.000	PK	49.70	37.22	6.64	43.99	2.05	51.62	73.9	22.2	150	0	Floor noise
Vert.	9648.000	PK	47.28	37.97	7.41	41.88	2.05	52.83	73.9	21.0	150	0	Floor noise
Vert.	2092.353	AV	44.30	29.07	13.10	43.86	2.05	44.66	53.9	9.2	155	183	

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 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.	2390.000	AV	49.40	27.61	13.32	43.84	0.85	2.05	49.39	53.9	4.5	*1)
Hori.	4824.000	AV	43.21	32.50	5.36	45.18	0.85	2.05	38.79	53.9	15.1	Floor noise
Hori.	7236.000	AV	40.42	37.22	6.64	43.99	0.85	2.05	43.19	53.9	10.7	Floor noise
Hori.	9648.000	AV	38.01	37.97	7.41	41.88	0.85	2.05	44.41	53.9	9.4	Floor noise
Vert.	2390.000	AV	48.90	27.61	13.32	43.84	0.85	2.05	48.89	53.9	5.0	*1)
Vert.	4824.000	AV	41.34	32.50	5.36	45.18	0.85	2.05	36.92	53.9	16.9	Floor noise
Vert.	7236.000	AV	41.80	37.22	6.64	43.99	0.85	2.05	44.57	53.9	9.3	Floor noise
Vert.	9648.000	AV	38.14	37.97	7.41	41.88	0.85	2.05	44.54	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 : 20log (3.8 m / 3.0 m) = 2.05 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)

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	96.10	27.67	13.34	43.83	2.05	95.33	-	-	Carrier
Hori.	2400.000	PK	59.40	27.63	13.33	43.83	2.05	58.58	75.33	16.7	
Vert.	2412.000	PK	95.30	27.67	13.34	43.83	2.05	94.53	-	-	Carrier
Vert.	2400.000	PK	57.60	27.63	13.33	43.83	2.05	56.78	74.53	17.7	

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

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Kashima EMC Lab.

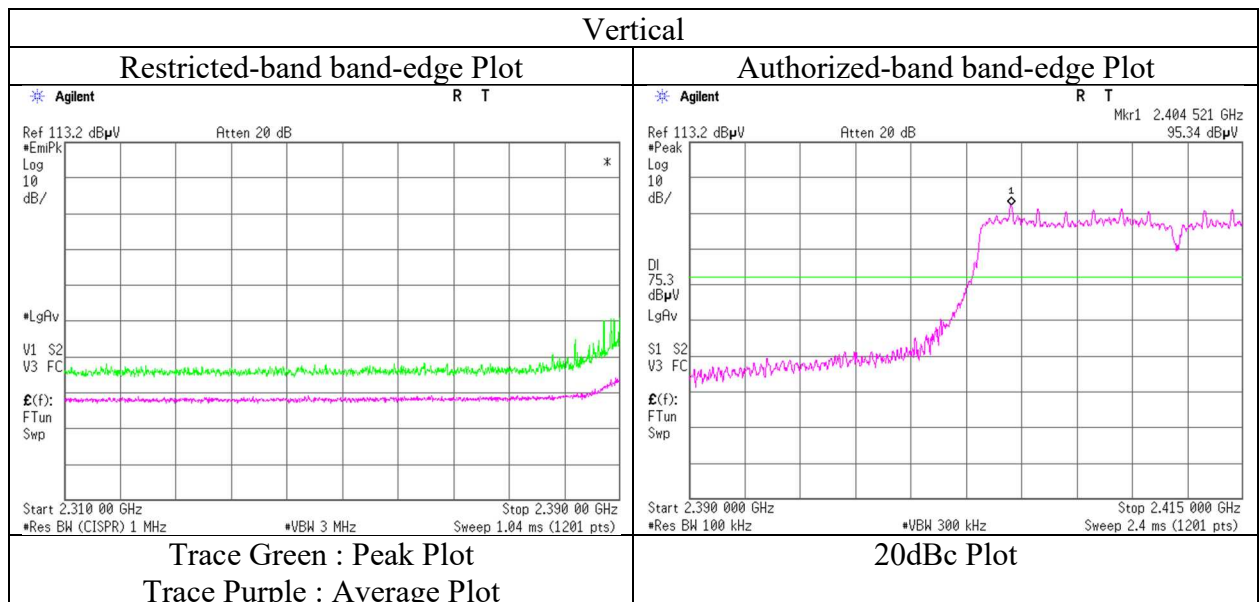
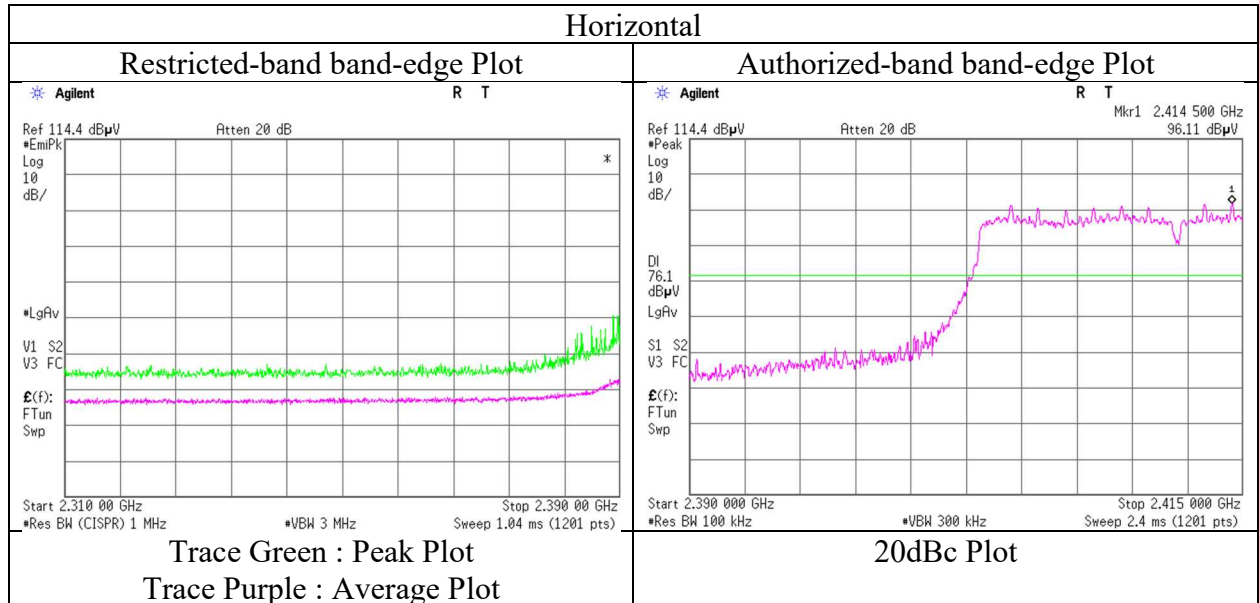
1614, Mushiata, Katori-shi, Chiba-ken, 289-0341 Japan

Telephone : +81 478 88 6500

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	July 29, 2020
Temperature / Humidity	22 deg. C / 57 % RH
Engineer	Kazuhiro Ando
Mode	Tx 11n-20 2412 MHz
EUT	Hi type



* 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.

UL Japan, Inc.

Kashima EMC Lab.

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Radiated Spurious Emission

Report No. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date July 29, 2020
Temperature / Humidity 22 deg. C / 57 % RH
Engineer Kazuhiro Ando
(1 GHz - 2.8 GHz)
Mode Tx 11n-20 2417 MHz
EUT Hi type

(* 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	65.70	27.61	13.32	43.84	2.05	64.84	73.9	9.0	315	290	
Vert.	2390.000	PK	65.10	27.61	13.32	43.84	2.05	64.24	73.9	9.6	165	69	

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 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.	2390.000	AV	49.20	27.61	13.32	43.84	0.85	2.05	49.19	53.9	4.7	*1)
Vert.	2390.000	AV	49.67	27.61	13.32	43.84	0.85	2.05	49.66	53.9	4.2	*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 : 20log (3.8 m / 3.0 m) = 2.05 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)

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.	2417.000	PK	96.80	27.68	13.34	43.83	2.05	96.04	-	-	Carrier
Hori.	2399.155	PK	57.90	27.63	13.33	43.83	2.05	57.08	76.04	18.9	
Hori.	2400.000	PK	57.60	27.63	13.33	43.83	2.05	56.78	76.04	19.2	
Vert.	2417.000	PK	97.50	27.68	13.34	43.83	2.05	96.74	-	-	Carrier
Vert.	2399.350	PK	58.70	27.63	13.33	43.83	2.05	57.88	76.74	18.8	
Vert.	2400.000	PK	58.30	27.63	13.33	43.83	2.05	57.48	76.74	19.2	

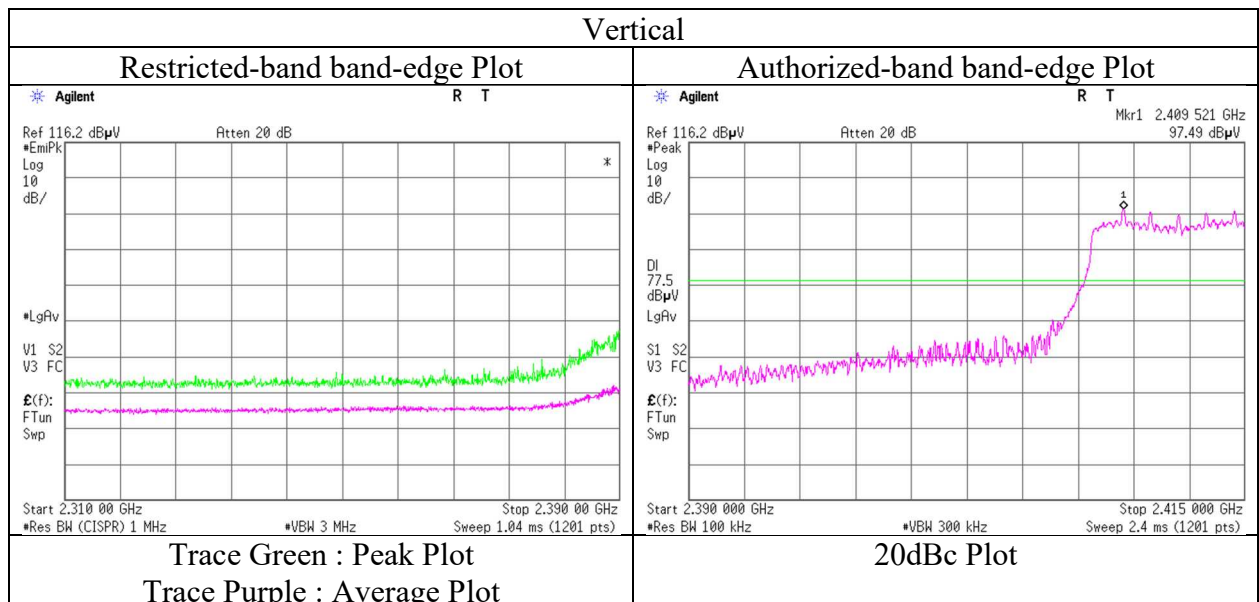
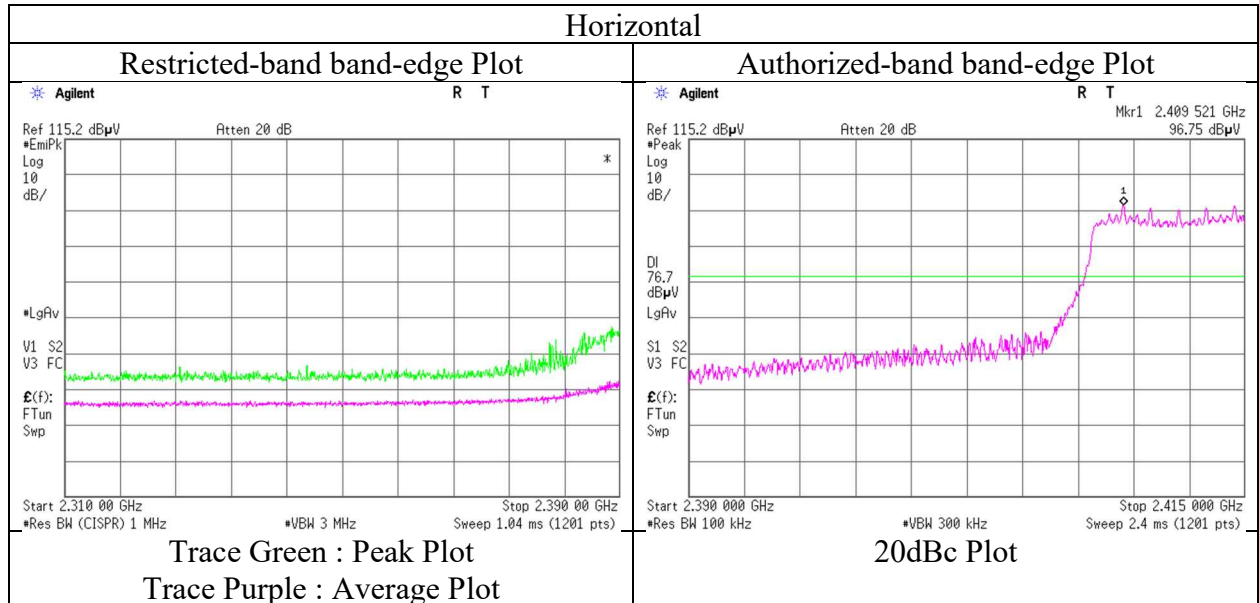
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	July 29, 2020
Temperature / Humidity	22 deg. C / 57 % RH
Engineer	Kazuhiro Ando
Mode	Tx 11n-20 2417 MHz
EUT	Hi type



* 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.	13408125M-B-R1			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.6	No.6	No.6	No.6
Date	July 29, 2020	July 27, 2020	July 27, 2020	July 28, 2020
Temperature / Humidity	22 deg. C / 57 % RH	23 deg. C / 59 % RH	23 deg. C / 59 % RH	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx 11n-20 2437 MHz			
EUT	Hi type			

(* 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.	2093.240	PK	51.80	29.06	13.10	43.86	2.05	52.15	73.9	21.7	270	203	
Hori.	4874.000	PK	51.41	32.57	5.39	45.20	2.05	46.22	73.9	27.6	150	0	Floor noise
Hori.	7311.000	PK	49.16	37.36	6.69	43.82	2.05	51.44	73.9	22.4	150	0	Floor noise
Hori.	9748.000	PK	47.12	37.96	7.45	41.80	2.05	52.78	73.9	21.1	150	0	Floor noise
Hori.	2093.240	AV	44.10	29.06	13.10	43.86	2.05	44.45	53.9	9.4	270	203	
Vert.	2092.856	PK	51.90	29.06	13.10	43.86	2.05	52.25	73.9	21.6	156	180	
Vert.	4874.000	PK	52.07	32.57	5.39	45.20	2.05	46.88	73.9	27.0	150	0	Floor noise
Vert.	7311.000	PK	47.99	37.36	6.69	43.82	2.05	50.27	73.9	23.6	150	0	Floor noise
Vert.	9748.000	PK	46.70	37.96	7.45	41.80	2.05	52.36	73.9	21.5	150	0	Floor noise
Vert.	2092.856	AV	44.40	29.06	13.10	43.86	2.05	44.75	53.9	9.1	156	180	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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	42.84	32.57	5.39	45.20	0.85	2.05	38.50	53.9	15.4	Floor noise
Hori.	7311.000	AV	39.43	37.36	6.69	43.82	0.85	2.05	42.56	53.9	11.3	Floor noise
Hori.	9748.000	AV	38.05	37.96	7.45	41.80	0.85	2.05	44.56	53.9	9.3	Floor noise
Vert.	4874.000	AV	42.42	32.57	5.39	45.20	0.85	2.05	38.08	53.9	15.8	Floor noise
Vert.	7311.000	AV	39.27	37.36	6.69	43.82	0.85	2.05	42.40	53.9	11.5	Floor noise
Vert.	9748.000	AV	38.32	37.96	7.45	41.80	0.85	2.05	44.83	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 : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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

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Radiated Spurious Emission

Report No.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	July 29, 2020
Temperature / Humidity	22 deg. C / 57 % RH
Engineer	Kazuhiro Ando
	(1 GHz - 2.8 GHz)
Mode	Tx 11n-20 2457 MHz
EUT	Hi type

(* 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	55.60	27.94	13.39	43.80	2.05	55.18	73.9	18.7	149	20	
Vert.	2483.500	PK	56.20	27.94	13.39	43.80	2.05	55.78	73.9	18.1	150	65	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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	42.30	27.94	13.39	43.80	0.85	2.05	42.73	53.9	11.1	*1)
Vert.	2483.500	AV	43.30	27.94	13.39	43.80	0.85	2.05	43.73	53.9	10.1	*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 : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

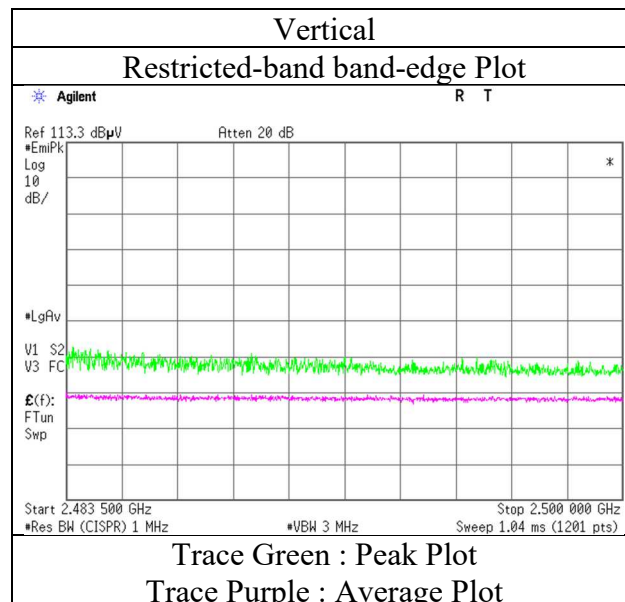
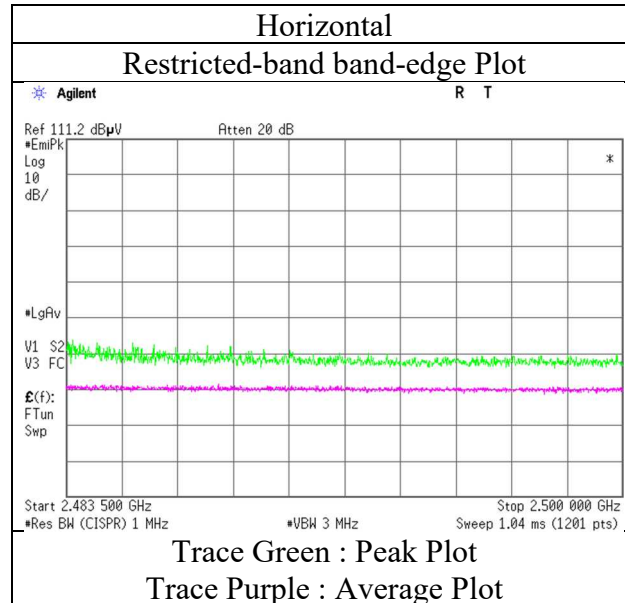
10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date July 29, 2020
Temperature / Humidity 22 deg. C / 57 % RH
Engineer Kazuhiro Ando
Mode Tx 11n-20 2457 MHz
EUT Hi type



* 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.

UL Japan, Inc.

Kashima EMC Lab.

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Radiated Spurious Emission

Report No.	13408125M-B-R1			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.6	No.6	No.6	No.6
Date	July 29, 2020	July 27, 2020	July 27, 2020	July 28, 2020
Temperature / Humidity	22 deg. C / 57 % RH	23 deg. C / 59 % RH	23 deg. C / 59 % RH	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx 11n-20 2462 MHz			
EUT	Hi type			

(* 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.	2092.964	PK	52.60	29.06	13.10	43.86	2.05	52.95	73.9	20.9	228	262	
Hori.	2483.500	PK	57.50	27.94	13.39	43.80	2.05	57.08	73.9	16.8	312	286	
Hori.	4924.000	PK	50.23	32.62	5.41	45.24	2.05	45.07	73.9	28.8	150	0	Floor noise
Hori.	7386.000	PK	48.49	37.46	6.69	43.63	2.05	51.06	73.9	22.8	150	0	Floor noise
Hori.	9848.000	PK	46.73	38.11	7.48	41.76	2.05	52.61	73.9	21.2	150	0	Floor noise
Hori.	2092.964	AV	43.90	29.06	13.10	43.86	2.05	44.25	53.9	9.6	228	262	
Vert.	2092.353	PK	51.70	29.07	13.10	43.86	2.05	52.06	73.9	21.8	114	175	
Vert.	2483.500	PK	61.00	27.94	13.39	43.80	2.05	60.58	73.9	13.3	187	35	
Vert.	4924.000	PK	49.88	32.62	5.41	45.24	2.05	44.72	73.9	29.1	150	0	Floor noise
Vert.	7386.000	PK	48.76	37.46	6.69	43.63	2.05	51.33	73.9	22.5	150	0	Floor noise
Vert.	9848.000	PK	46.92	38.11	7.48	41.76	2.05	52.80	73.9	21.1	150	0	Floor noise
Vert.	2092.353	AV	44.20	29.07	13.10	43.86	2.05	44.56	53.9	9.3	114	175	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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	43.20	27.94	13.39	43.80	0.85	2.05	43.63	53.9	10.2	*1)
Hori.	4924.000	AV	41.35	32.62	5.41	45.24	0.85	2.05	37.04	53.9	16.8	Floor noise
Hori.	7386.000	AV	39.95	37.46	6.69	43.63	0.85	2.05	43.37	53.9	10.5	Floor noise
Hori.	9848.000	AV	38.01	38.11	7.48	41.76	0.85	2.05	44.74	53.9	9.1	Floor noise
Vert.	2483.500	AV	44.60	27.94	13.39	43.80	0.85	2.05	45.03	53.9	8.8	*1)
Vert.	4924.000	AV	41.12	32.62	5.41	45.24	0.85	2.05	36.81	53.9	17.0	Floor noise
Vert.	7386.000	AV	39.58	37.46	6.69	43.63	0.85	2.05	43.00	53.9	10.9	Floor noise
Vert.	9848.000	AV	37.61	38.11	7.48	41.76	0.85	2.05	44.34	53.9	9.5	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 : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

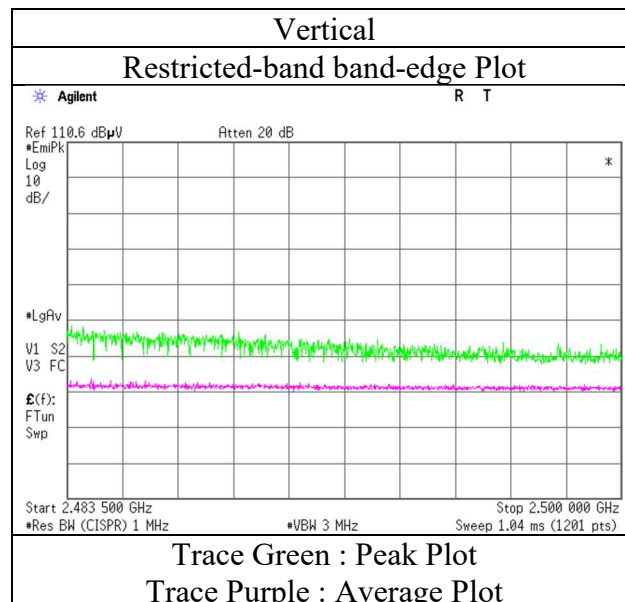
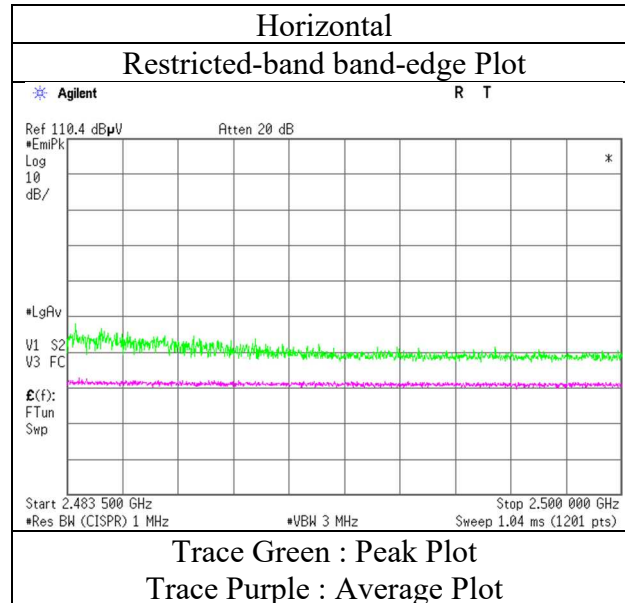
10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	July 29, 2020
Temperature / Humidity	22 deg. C / 57 % RH
Engineer	Kazuhiro Ando
Mode	Tx 11n-20 2462 MHz
EUT	Hi type

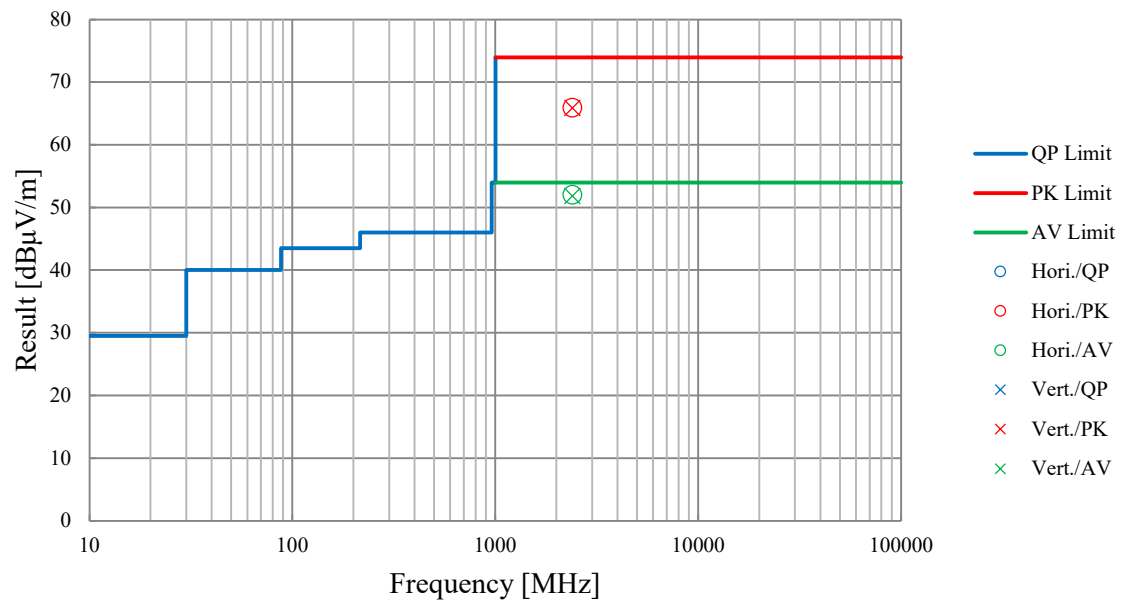


* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.

Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission (Plot data, Worst case)

Report No. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date July 29, 2020
Temperature / Humidity 22 deg. C / 57 % RH
Engineer Kazuhiro Ando
(1 GHz ~2.8 GHz)
Mode Tx 11g 2417 MHz
EUT Hi type



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

Radiated Spurious Emission

Report No. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date August 4, 2020
Temperature / Humidity 23 deg. C / 54 % RH
Engineer Hiromitsu Tanabe
(1 GHz - 2.8 GHz)
Mode Tx 11b 2412 MHz with 11ac-20 MIMO 5745 MHz
EUT Hi type

(* 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	51.13	27.61	13.32	43.84	2.05	50.27	73.9	23.6	317	284	
Hori.	2390.000	AV	43.30	27.61	13.32	43.84	2.05	42.44	53.9	11.4	317	284	
Vert.	2390.000	PK	52.02	27.61	13.32	43.84	2.05	51.16	73.9	22.7	150	70	
Vert.	2390.000	AV	43.50	27.61	13.32	43.84	2.05	42.64	53.9	11.2	150	70	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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	99.20	27.67	13.34	43.83	2.05	98.43	-	-	Carrier
Hori.	2398.500	PK	53.30	27.63	13.33	43.83	2.05	52.48	78.43	25.9	
Hori.	2400.000	PK	44.80	27.63	13.33	43.83	2.05	43.98	78.43	34.4	
Vert.	2412.000	PK	97.64	27.67	13.34	43.83	2.05	96.87	-	-	Carrier
Vert.	2398.500	PK	51.68	27.63	13.33	43.83	2.05	50.86	76.87	26.0	
Vert.	2400.000	PK	44.02	27.63	13.33	43.83	2.05	43.20	76.87	33.6	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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

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Kashima EMC Lab.

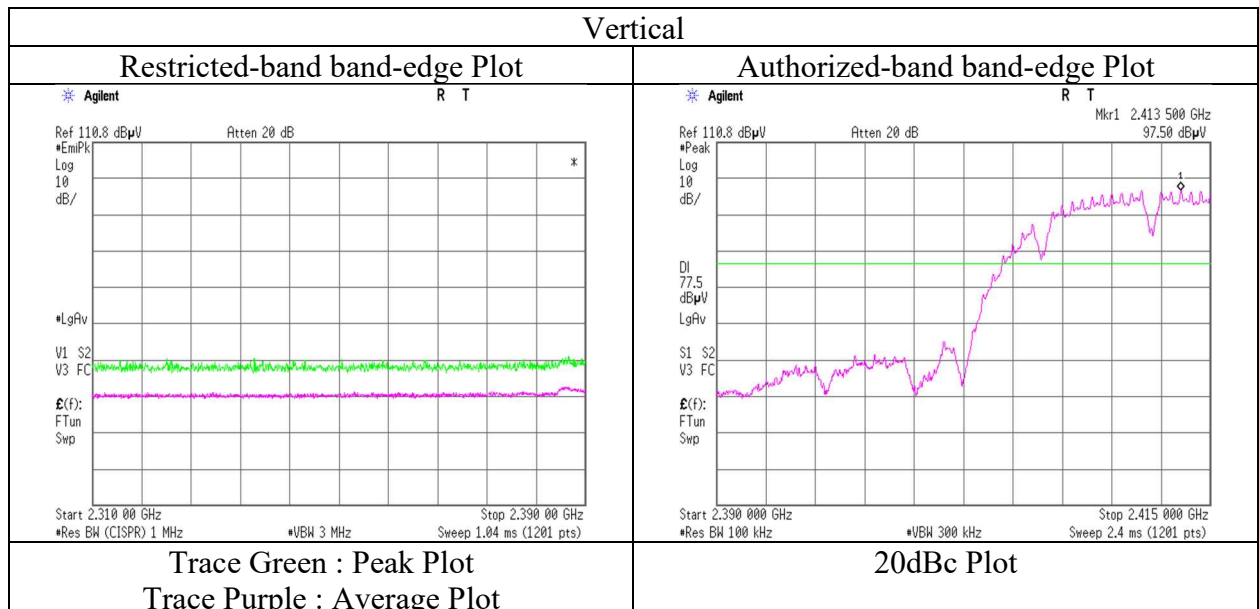
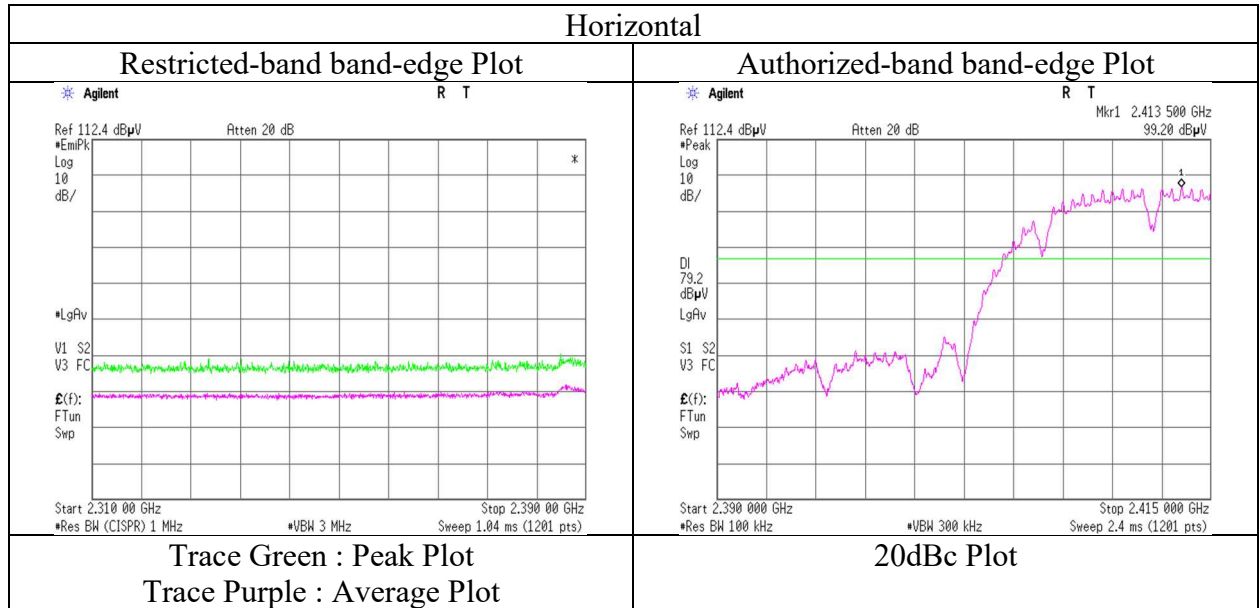
1614, Mushihata, Katori-shi, Chiba-ken, 289-0341 Japan

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	August 4, 2020
Temperature / Humidity	23 deg. C / 54 % RH
Engineer	Hiromitsu Tanabe
Mode	Tx 11b 2412 MHz with 11ac-20 MIMO 5745 MHz
EUT	Hi type



* 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. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date August 4, 2020
Temperature / Humidity 23 deg. C / 54 % RH
Engineer Hiromitsu Tanabe
(1 GHz - 2.8 GHz)
Mode Tx 11b 2462 MHz with 11ac-20 MIMO 5745 MHz
EUT Hi type

(* 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	50.24	27.94	13.39	43.80	2.05	49.82	73.9	24.0	110	25	
Hori.	2483.500	AV	41.45	27.94	13.39	43.80	2.05	41.03	53.9	12.8	110	25	
Vert.	2483.500	PK	50.08	27.94	13.39	43.80	2.05	49.66	73.9	24.2	105	73	
Vert.	2483.500	AV	41.59	27.94	13.39	43.80	2.05	41.17	53.9	12.7	105	73	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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.

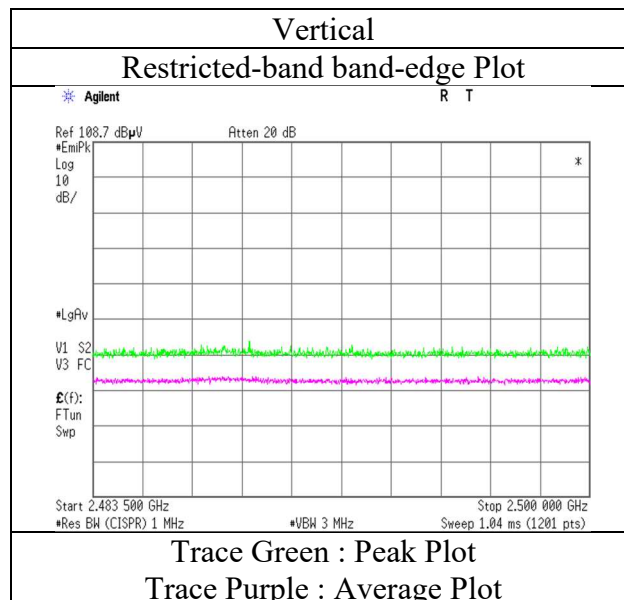
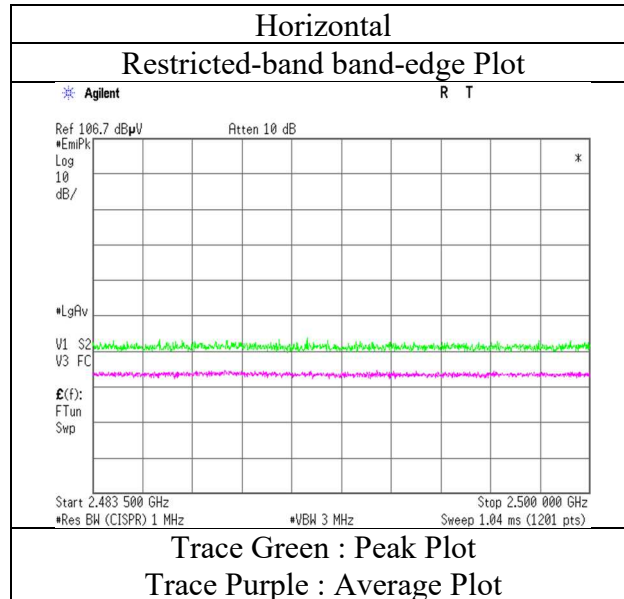
1614, Mushihata, Katori-shi, Chiba-ken, 289-0341 Japan

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Facsimile : +81 478 82 3373

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	August 4, 2020
Temperature / Humidity	23 deg. C / 54 % RH
Engineer	Hiromitsu Tanabe
Mode	Tx 11b 2462 MHz with 11ac-20 MIMO 5745 MHz
EUT	Hi type



* 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. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date August 4, 2020
Temperature / Humidity 23 deg. C / 54 % RH
Engineer Hiromitsu Tanabe
(1 GHz - 2.8 GHz)
Mode Tx 11g 2412 MHz with 11ac-20 MIMO 5745 MHz
EUT Hi type

(* 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	65.00	27.61	13.32	43.84	2.05	64.14	73.9	9.7	310	290	
Vert.	2390.000	PK	65.30	27.61	13.32	43.84	2.05	64.44	73.9	9.4	173	68	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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	48.10	27.61	13.32	43.84	1.06	2.05	48.30	53.9	5.6 *1)	
Vert.	2390.000	AV	49.10	27.61	13.32	43.84	1.06	2.05	49.30	53.9	4.6 *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 : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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	97.20	27.67	13.34	43.83	2.05	96.43	-	-	Carrier
Hori.	2400.000	PK	58.15	27.63	13.33	43.83	2.05	57.33	76.43	19.1	
Vert.	2412.000	PK	96.55	27.67	13.34	43.83	2.05	95.78	-	-	Carrier
Vert.	2400.000	PK	59.80	27.63	13.33	43.83	2.05	58.98	75.78	16.8	

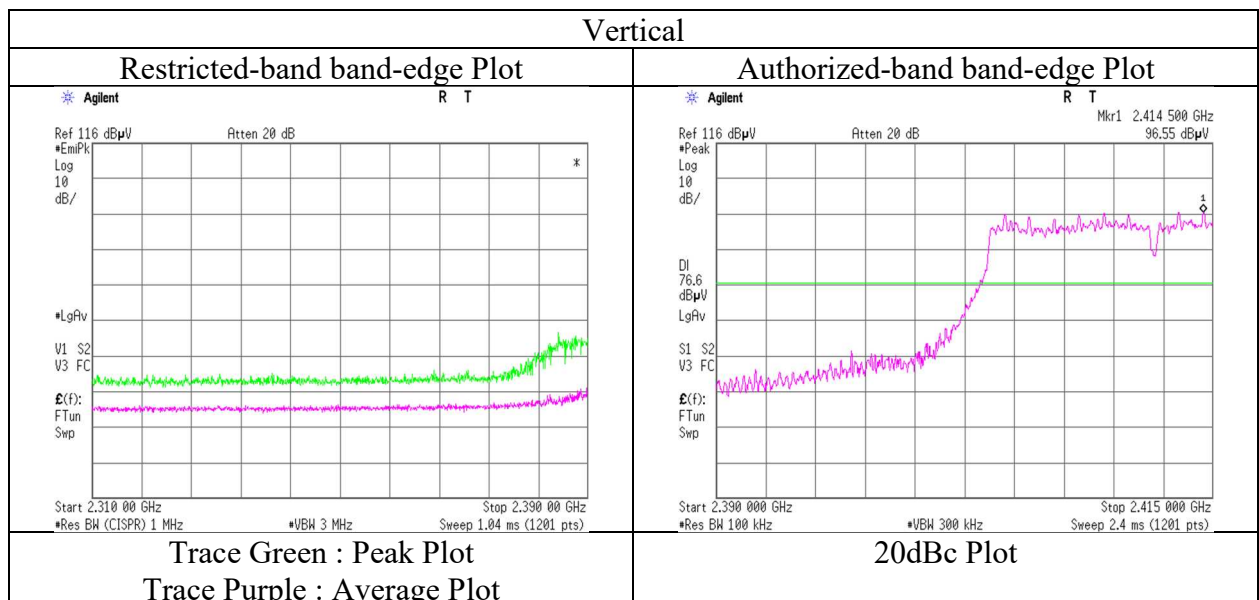
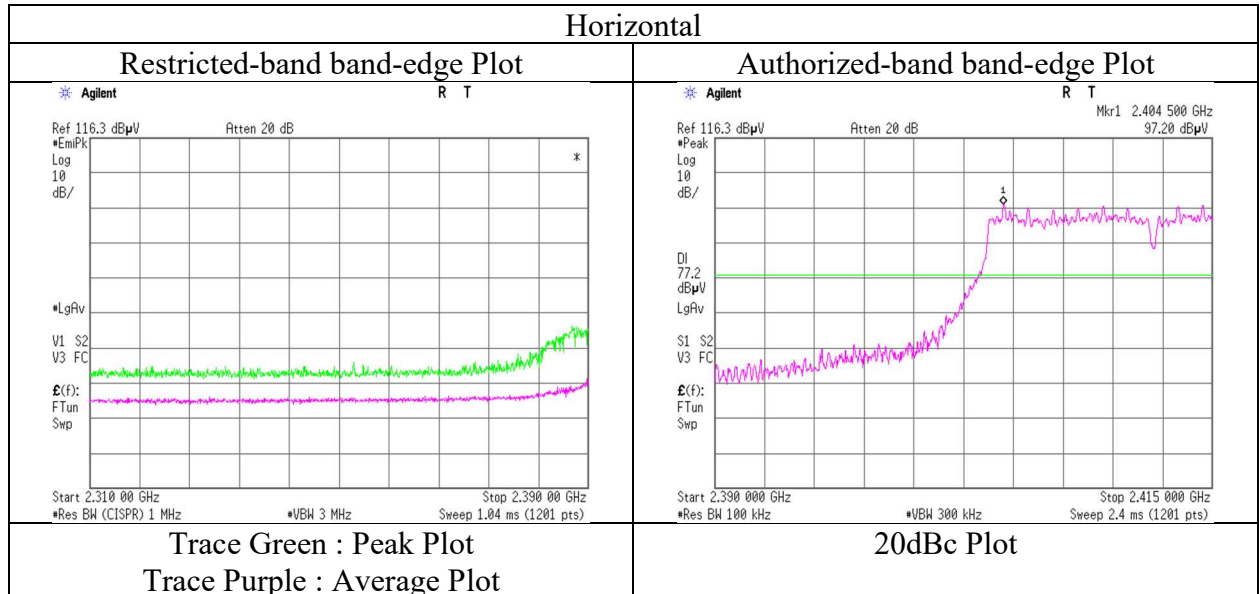
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	August 4, 2020
Temperature / Humidity	23 deg. C / 54 % RH
Engineer	Hiromitsu Tanabe
Mode	Tx 11g 2412 MHz with 11ac-20 MIMO 5745 MHz
EUT	Hi type



* 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. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date August 4, 2020
Temperature / Humidity 23 deg. C / 54 % RH
Engineer Hiromitsu Tanabe
(1 GHz - 2.8 GHz)
Mode Tx 11g 2417 MHz with 11ac-20 MIMO 5745 MHz
EUT Hi type

(* 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	65.80	27.61	13.32	43.84	2.05	64.94	73.9	8.9	315	285	
Vert.	2390.000	PK	66.00	27.61	13.32	43.84	2.05	65.14	73.9	8.7	155	60	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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	51.70	27.61	13.32	43.84	1.06	2.05	51.90	53.9	2.0	*1)
Vert.	2390.000	AV	51.55	27.61	13.32	43.84	1.06	2.05	51.75	53.9	2.1	*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 : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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.	2417.000	PK	98.03	27.68	13.34	43.83	2.05	97.27	-	-	Carrier
Hori.	2399.175	PK	61.65	27.63	13.33	43.83	2.05	60.83	77.27	16.4	
Hori.	2400.000	PK	58.80	27.63	13.33	43.83	2.05	57.98	77.27	19.2	
Vert.	2417.000	PK	96.82	27.68	13.34	43.83	2.05	96.06	-	-	Carrier
Vert.	2398.890	PK	60.62	27.63	13.33	43.83	2.05	59.80	76.06	16.2	
Vert.	2400.000	PK	57.70	27.63	13.33	43.83	2.05	56.88	76.06	19.1	

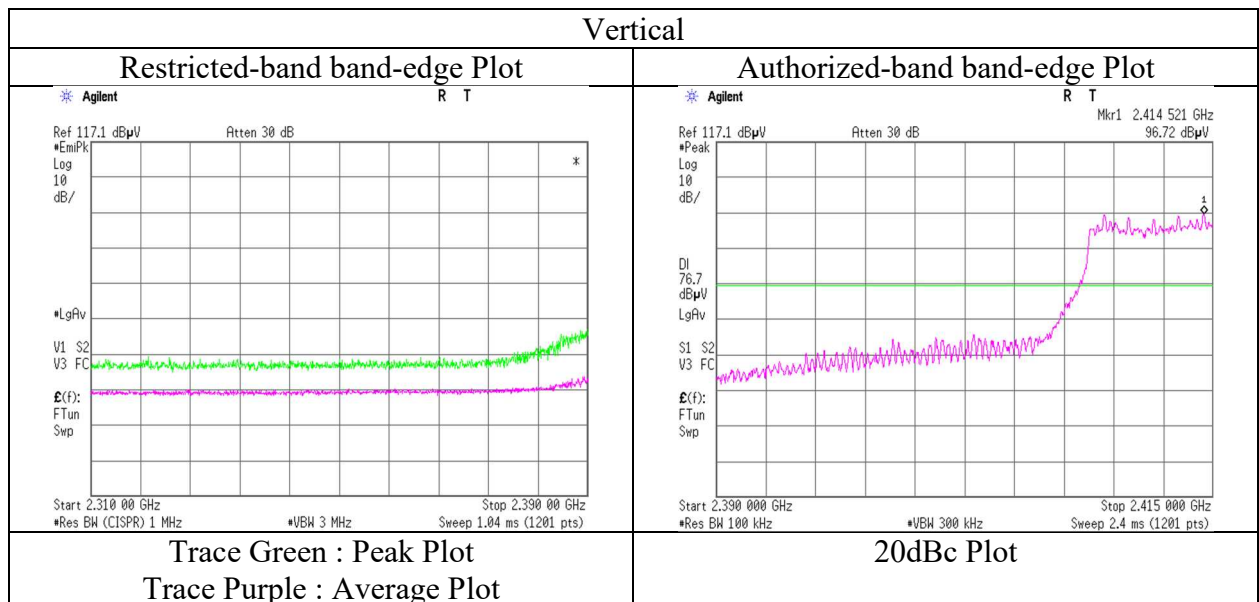
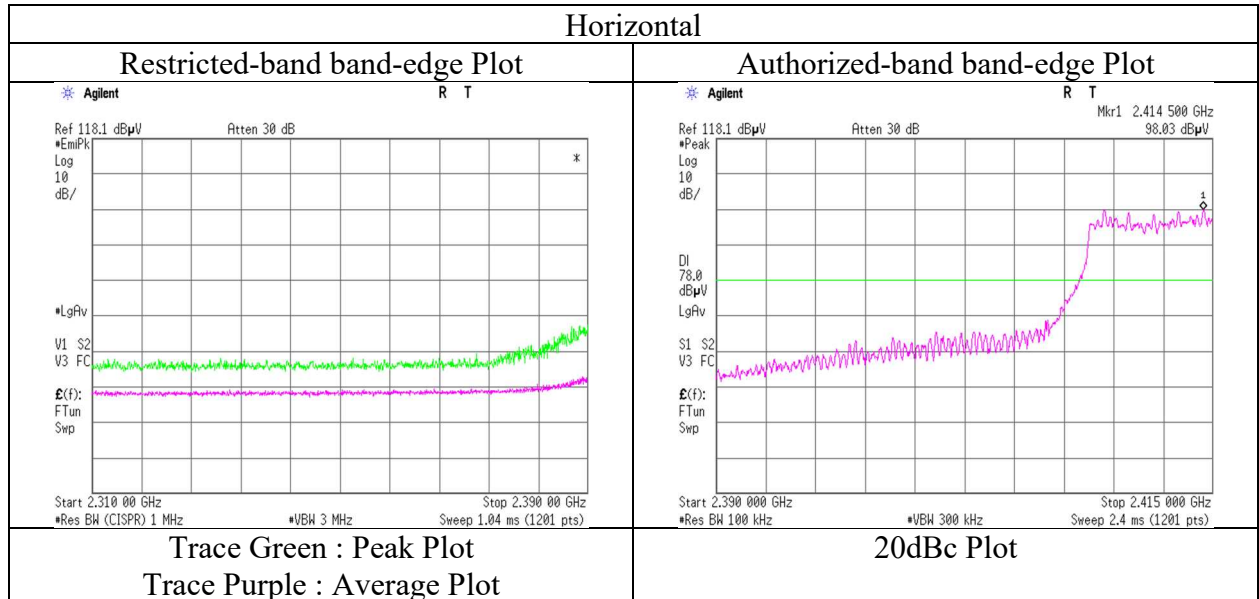
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	August 4, 2020
Temperature / Humidity	23 deg. C / 54 % RH
Engineer	Hiromitsu Tanabe
Mode	Tx 11g 2417 MHz with 11ac-20 MIMO 5745 MHz
EUT	Hi type



* 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.	13408125M-B-R1				
Test place	Kashima EMC Lab.				
Semi Anechoic Chamber	No.6	No.6	No.6	No.6	No.6
Date	August 6, 2020	August 5, 2020	July 5, 2020	July 5, 2020	July 5, 2020
Temperature / Humidity	22 deg. C / 55 % RH	22 deg. C / 60 % RH	22 deg. C / 60 % RH	23 deg. C / 54 % RH	23 deg. C / 54 % RH
Engineer	Kazuhiro Ando	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe
	(30 MHz -1000 MHz)	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx 11g 2437 MHz with 11ac-20 MIMO 5745 MHz				
EUT	Hi type				

(* 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.	232.705	QP	49.30	10.80	7.64	32.35	0.00	35.39	46.0	10.6	136	295	
Hori.	387.771	QP	42.50	15.43	8.56	32.27	0.00	34.22	46.0	11.7	100	16	
Hori.	477.174	QP	43.00	17.53	9.02	32.24	0.00	37.31	46.0	8.6	100	22	
Hori.	593.465	QP	42.30	19.68	9.52	32.23	0.00	39.27	46.0	6.7	184	247	
Hori.	772.466	QP	39.50	22.20	10.25	32.02	0.00	39.93	46.0	6.0	112	208	
Hori.	838.225	QP	40.50	22.80	10.51	31.80	0.00	42.01	46.0	3.9	108	214	
Hori.	2092.500	PK	51.62	29.07	13.10	43.86	2.05	51.98	73.9	21.9	262	186	
Hori.	4874.000	PK	51.69	32.57	5.39	45.20	2.05	46.50	73.9	27.4	150	0	Floor noise
Hori.	7311.000	PK	48.84	37.36	6.69	43.82	2.05	51.12	73.9	22.7	150	0	Floor noise
Hori.	9748.000	PK	47.91	37.96	7.45	41.80	2.05	53.57	73.9	20.3	150	0	Floor noise
Hori.	2092.500	AV	44.04	29.07	13.10	43.86	2.05	44.40	53.9	9.5	262	186	
Vert.	593.595	QP	43.60	19.69	9.52	32.23	0.00	40.58	46.0	5.4	118	341	
Vert.	772.565	QP	38.50	22.21	10.25	32.02	0.00	38.94	46.0	7.0	100	165	
Vert.	837.968	QP	38.40	22.79	10.51	31.80	0.00	39.90	46.0	6.1	100	299	
Vert.	2092.500	PK	50.44	29.07	13.10	43.86	2.05	50.80	73.9	23.1	184	156	
Vert.	4874.000	PK	50.97	32.57	5.39	45.20	2.05	45.78	73.9	28.1	150	0	Floor noise
Vert.	7311.000	PK	47.94	37.36	6.69	43.82	2.05	50.22	73.9	23.6	150	0	Floor noise
Vert.	9748.000	PK	46.33	37.96	7.45	41.80	2.05	51.99	73.9	21.9	150	0	Floor noise
Vert.	2092.500	AV	43.53	29.07	13.10	43.86	2.05	43.89	53.9	10.0	184	156	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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	43.36	32.57	5.39	45.20	1.06	2.05	39.23	53.9	14.6	
Hori.	7311.000	AV	39.84	37.36	6.69	43.82	1.06	2.05	43.18	53.9	10.7	
Hori.	9748.000	AV	38.28	37.96	7.45	41.80	1.06	2.05	45.00	53.9	8.9	
Vert.	4874.000	AV	43.11	32.57	5.39	45.20	1.06	2.05	38.98	53.9	14.9	
Vert.	7311.000	AV	40.30	37.36	6.69	43.82	1.06	2.05	43.64	53.9	10.2	
Vert.	9748.000	AV	38.21	37.96	7.45	41.80	1.06	2.05	44.93	53.9	8.9	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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.

Radiated Spurious Emission

Report No. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date August 4, 2020
Temperature / Humidity 23 deg. C / 54 % RH
Engineer Hiromitsu Tanabe
(1 GHz - 2.8 GHz)
Mode Tx 11g 2457 MHz with 11ac-20 MIMO 5745 MHz
EUT Hi type

(* 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	57.40	27.94	13.39	43.80	2.05	56.98	73.9	16.9	112	25	
Vert.	2483.500	PK	59.40	27.94	13.39	43.80	2.05	58.98	73.9	14.9	116	73	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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	44.70	27.94	13.39	43.80	1.06	2.05	45.34	53.9	8.5	*1)
Vert.	2483.500	AV	46.40	27.94	13.39	43.80	1.06	2.05	47.04	53.9	6.8	*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 : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

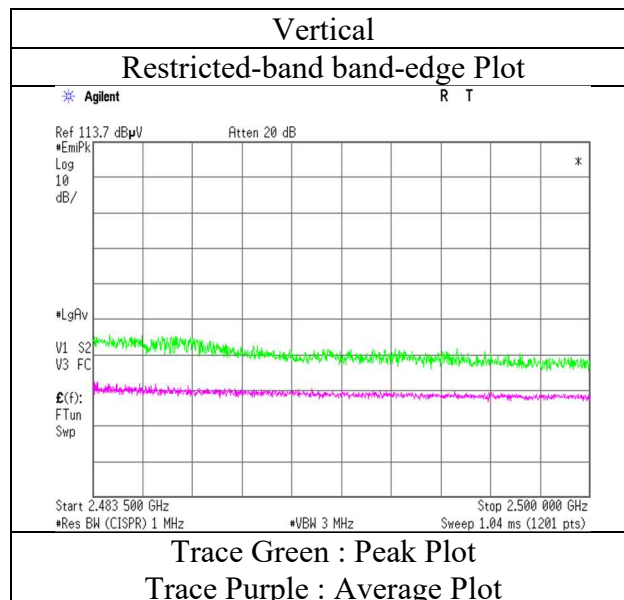
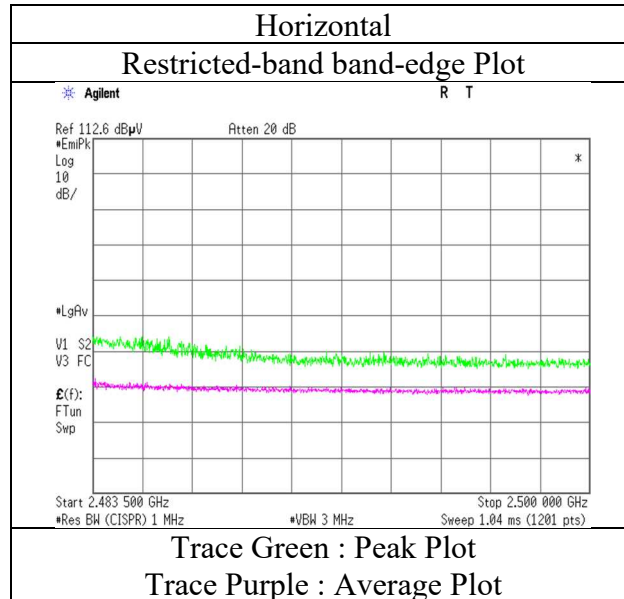
10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	August 4, 2020
Temperature / Humidity	23 deg. C / 54 % RH
Engineer	Hiromitsu Tanabe
Mode	Tx 11g 2457 MHz with 11ac-20 MIMO 5745 MHz
EUT	Hi type



* 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.

UL Japan, Inc.

Kashima EMC Lab.

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

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Radiated Spurious Emission

Report No. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date August 4, 2020
Temperature / Humidity 23 deg. C / 54 % RH
Engineer Hiromitsu Tanabe
(1 GHz - 2.8 GHz)
Mode Tx 11g 2462 MHz with 11ac-20 MIMO 5745 MHz
EUT Hi type

(* 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	55.08	27.94	13.39	43.80	2.05	54.66	73.9	19.2	109	25	
Vert.	2483.500	PK	59.20	27.94	13.39	43.80	2.05	58.78	73.9	15.1	100	71	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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	42.13	27.94	13.39	43.80	1.06	2.05	42.77	53.9	11.1	*1)
Vert.	2483.500	AV	43.25	27.94	13.39	43.80	1.06	2.05	43.89	53.9	10.0	*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 : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

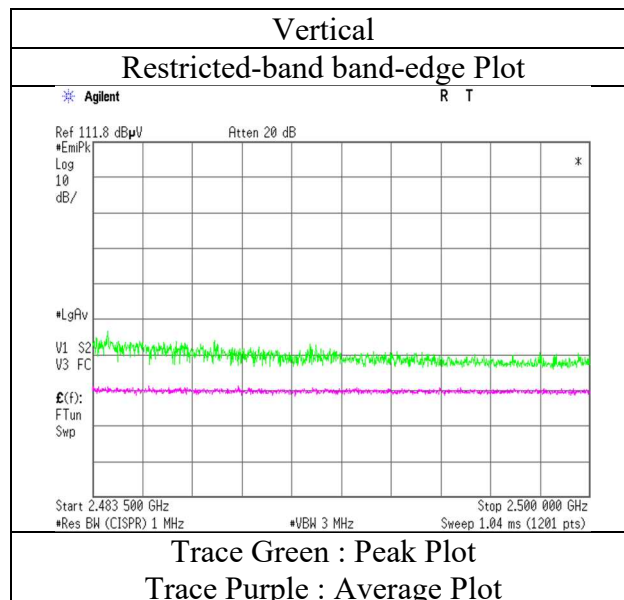
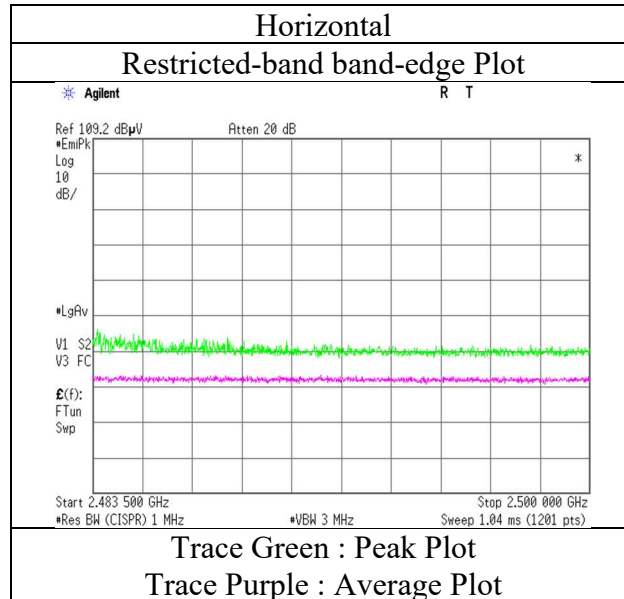
10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date August 4, 2020
Temperature / Humidity 23 deg. C / 54 % RH
Engineer Hiromitsu Tanabe
Mode Tx 11g 2462 MHz with 11ac-20 MIMO 5745 MHz
EUT Hi type



* 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.

UL Japan, Inc.

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

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Radiated Spurious Emission

Report No. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date August 4, 2020
Temperature / Humidity 23 deg. C / 54 % RH
Engineer Hiromitsu Tanabe
(1 GHz - 2.8 GHz)
Mode Tx 11n-20 2412 MHz with 11ac-20 MIMO 5745 MHz
EUT Hi type

(* 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	64.50	27.61	13.32	43.84	2.05	63.64	73.9	10.2	313	292	
Vert.	2390.000	PK	64.16	27.61	13.32	43.84	2.05	63.30	73.9	10.6	171	68	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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	48.30	27.61	13.32	43.84	0.85	2.05	48.29	53.9	5.6 *1)	
Vert.	2390.000	AV	47.49	27.61	13.32	43.84	0.85	2.05	47.48	53.9	6.4 *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 : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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	96.66	27.67	13.34	43.83	2.05	95.89	-	-	Carrier
Hori.	2400.000	PK	58.67	27.63	13.33	43.83	2.05	57.85	75.89	18.0	
Vert.	2412.000	PK	95.51	27.67	13.34	43.83	2.05	94.74	-	-	Carrier
Vert.	2400.000	PK	58.67	27.63	13.33	43.83	2.05	57.85	74.74	16.8	

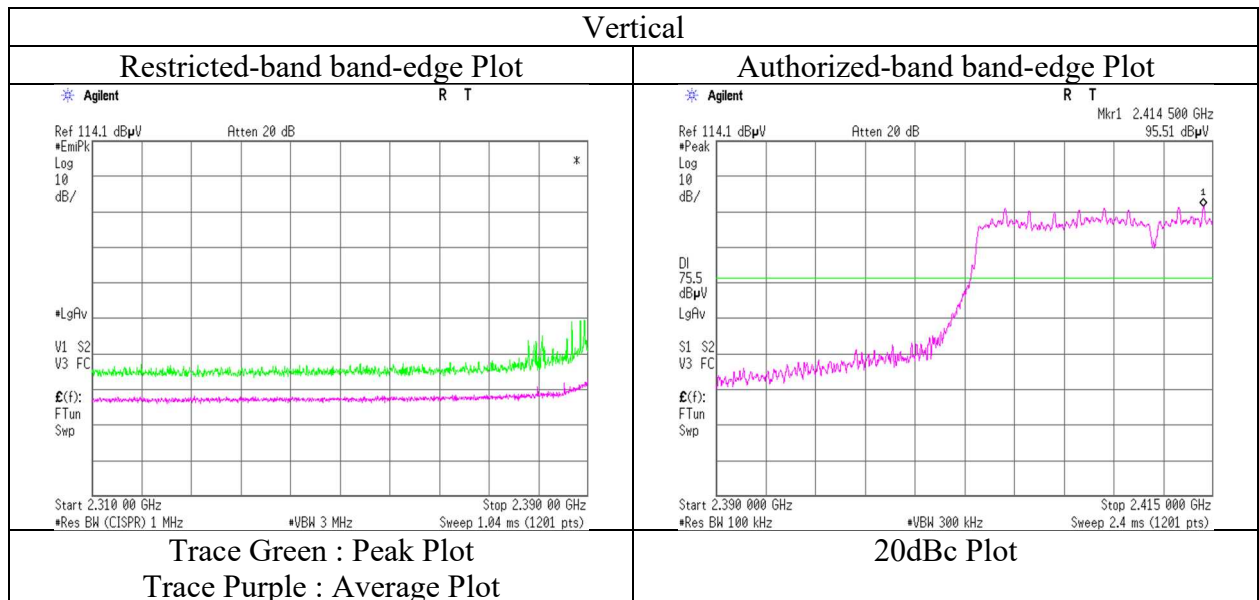
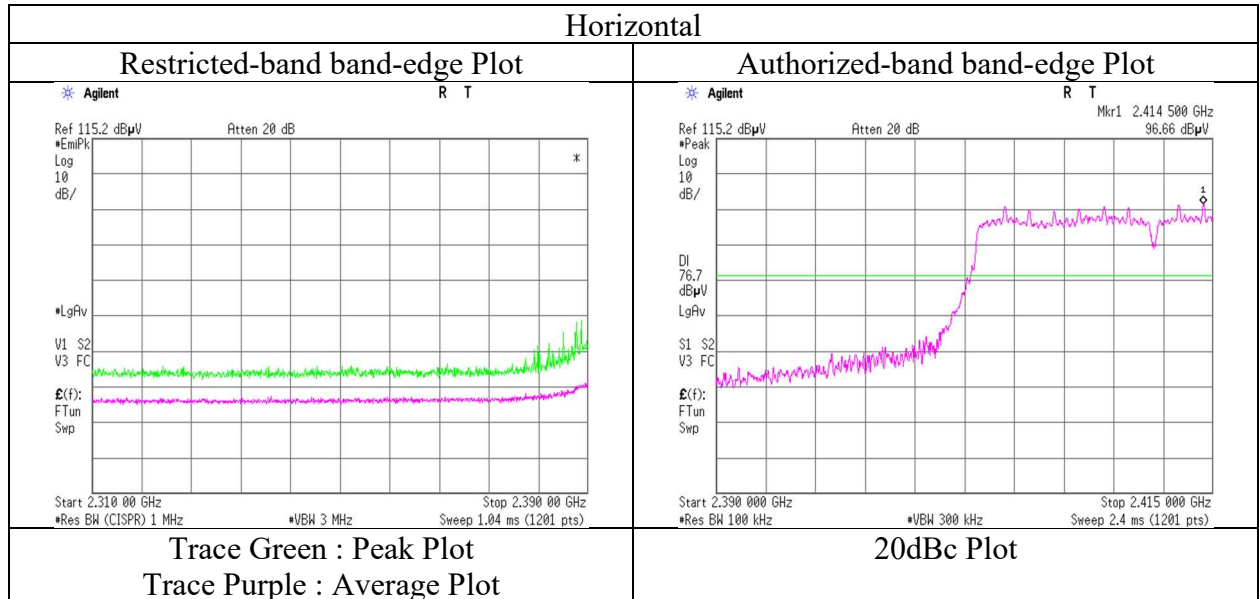
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	August 4, 2020
Temperature / Humidity	23 deg. C / 54 % RH
Engineer	Hiromitsu Tanabe
Mode	Tx 11n-20 2412 MHz with 11ac-20 MIMO 5745 MHz
EUT	Hi type



* 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. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date August 4, 2020
Temperature / Humidity 23 deg. C / 54 % RH
Engineer Hiromitsu Tanabe
(1 GHz -2.8 GHz)
Mode Tx 11n-20 2417 MHz with 11ac-20 MIMO 5745 MHz
EUT Hi type

(* 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	64.81	27.61	13.32	43.84	2.05	63.95	73.9	9.9	315	295	
Vert.	2390.000	PK	65.24	27.61	13.32	43.84	2.05	64.38	73.9	9.5	160	70	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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	49.50	27.61	13.32	43.84	0.85	2.05	49.49	53.9	4.4	*1)
Vert.	2390.000	AV	49.66	27.61	13.32	43.84	0.85	2.05	49.65	53.9	4.2	*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 : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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.	2417.000	PK	95.40	27.68	13.34	43.83	2.05	94.64	-	-	Carrier
Hori.	2398.250	PK	58.50	27.63	13.33	43.83	2.05	57.68	74.64	16.9	
Hori.	2400.000	PK	58.00	27.63	13.33	43.83	2.05	57.18	74.64	17.4	
Vert.	2417.000	PK	97.81	27.68	13.34	43.83	2.05	97.05	-	-	Carrier
Vert.	2398.400	PK	58.33	27.63	13.33	43.83	2.05	57.51	77.05	19.5	
Vert.	2400.000	PK	58.50	27.63	13.33	43.83	2.05	57.68	77.05	19.3	

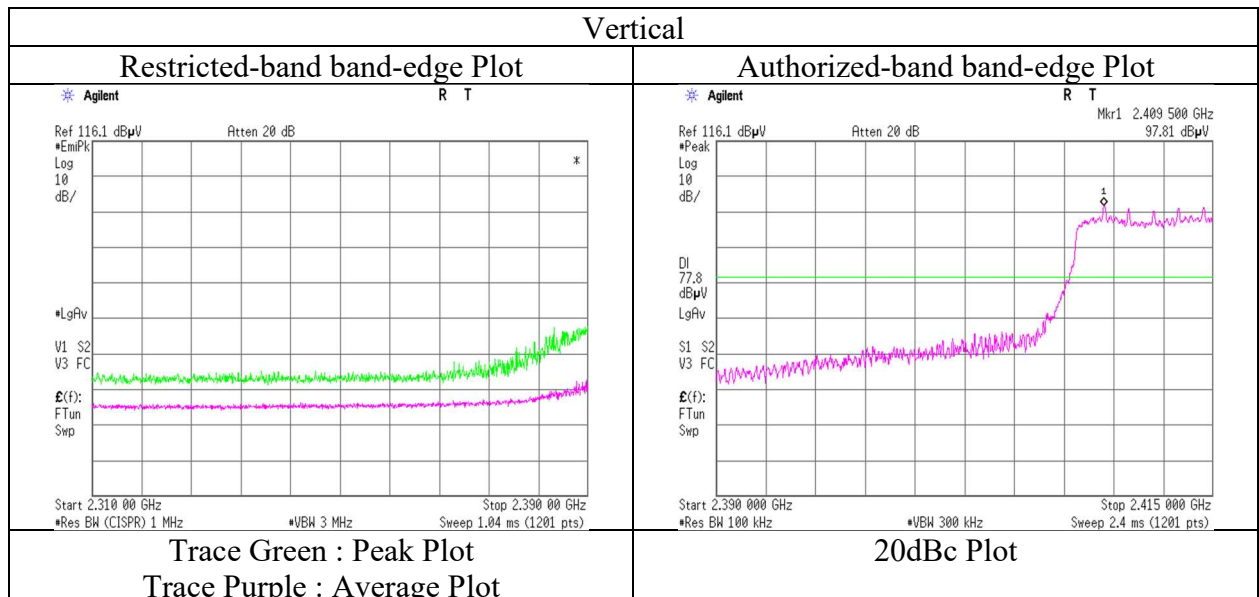
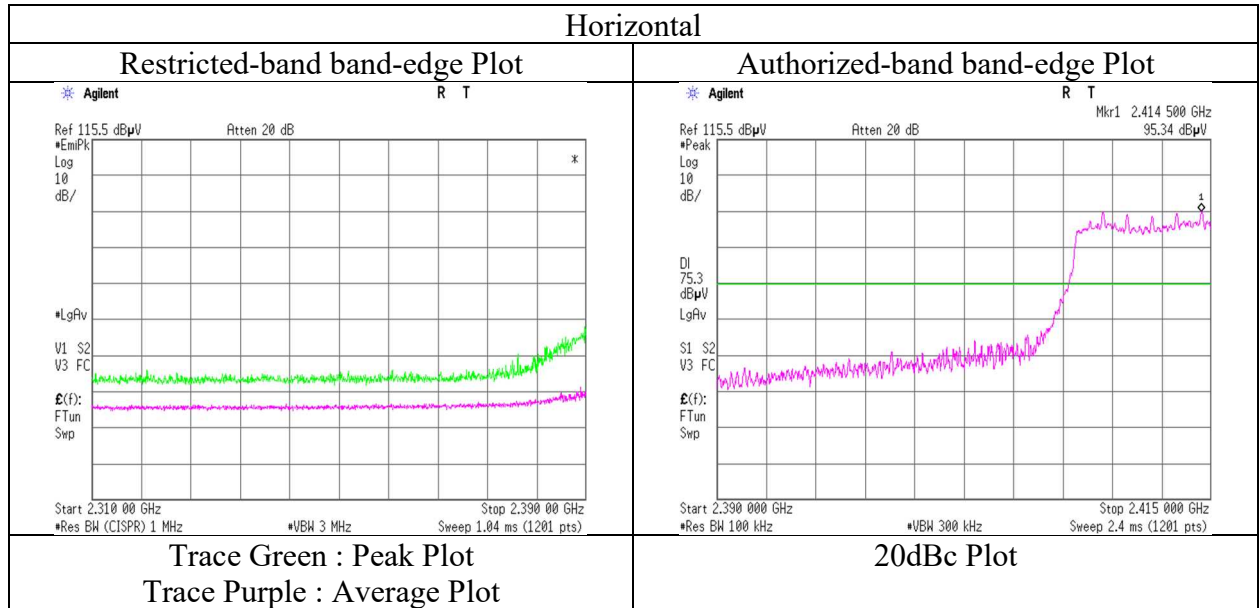
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	August 4, 2020
Temperature / Humidity	23 deg. C / 54 % RH
Engineer	Hiromitsu Tanabe
Mode	Tx 11n-20 2417 MHz with 11ac-20 MIMO 5745 MHz
EUT	Hi type



* 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.

UL Japan, Inc.

Kashima EMC Lab.

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

Telephone : +81 478 88 6500

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Radiated Spurious Emission

Report No. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date August 4, 2020
Temperature / Humidity 23 deg. C / 54 % RH
Engineer Hiromitsu Tanabe
(1 GHz - 2.8 GHz)
Mode Tx 11n-20 2457 MHz with 11ac-20 MIMO 5745 MHz
EUT Hi type

(* 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	58.02	27.94	13.39	43.80	2.05	57.60	73.9	16.3	112	25	
Vert.	2483.500	PK	58.31	27.94	13.39	43.80	2.05	57.89	73.9	16.0	114	74	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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	42.14	27.94	13.39	43.80	0.85	2.05	42.57	53.9	11.3	*1)
Vert.	2483.500	AV	43.01	27.94	13.39	43.80	0.85	2.05	43.44	53.9	10.4	*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 : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

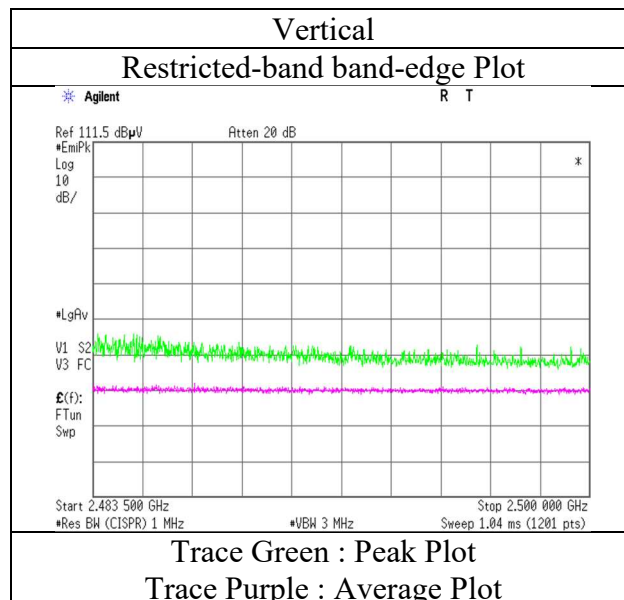
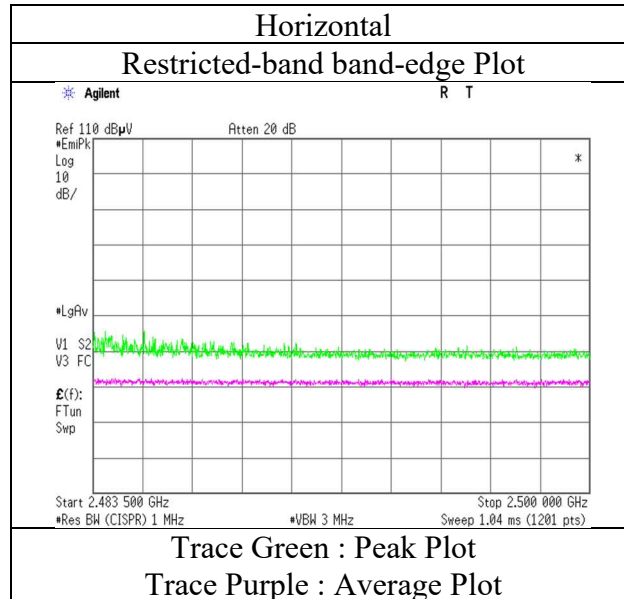
10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date August 4, 2020
Temperature / Humidity 23 deg. C / 54 % RH
Engineer Hiromitsu Tanabe
Mode Tx 11n-20 2457 MHz with 11ac-20 MIMO 5745 MHz
EUT Hi type



* 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.

UL Japan, Inc.

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Radiated Spurious Emission

Report No. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date August 4, 2020
Temperature / Humidity 23 deg. C / 54 % RH
Engineer Hiromitsu Tanabe
(1 GHz -2.8 GHz)
Mode Tx 11n-20 2462 MHz with 11ac-20 MIMO 5745 MHz
EUT Hi type

(* 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	54.81	27.94	13.39	43.80	2.05	54.39	73.9	19.5	112	25	
Vert.	2483.500	PK	55.75	27.94	13.39	43.80	2.05	55.33	73.9	18.5	104	72	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

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	41.85	27.94	13.39	43.80	0.85	2.05	42.28	53.9	11.6	*1)
Vert.	2483.500	AV	42.59	27.94	13.39	43.80	0.85	2.05	43.02	53.9	10.8	*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 : $20\log(3.8\text{ m} / 3.0\text{ m}) = 2.05\text{ dB}$

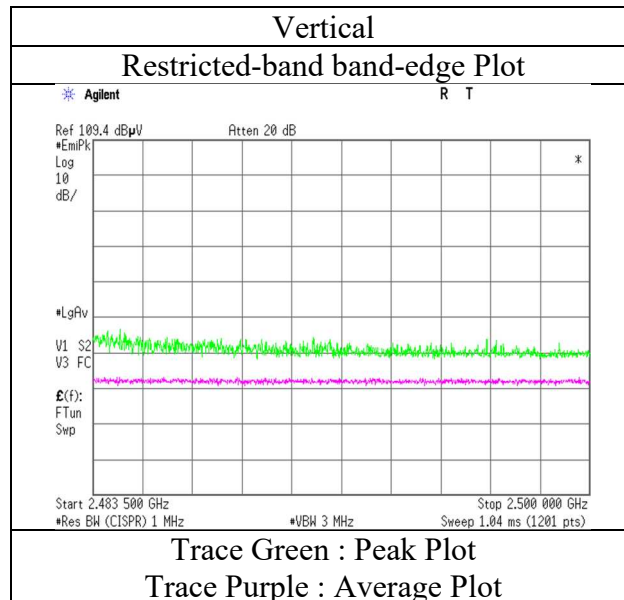
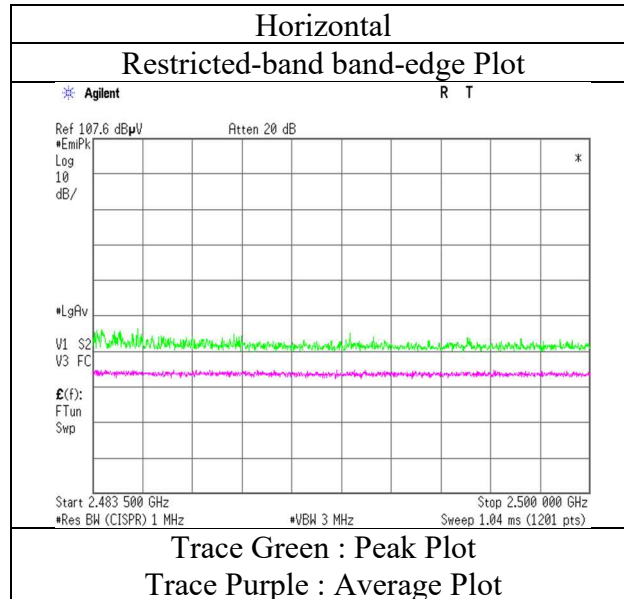
10 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	August 4, 2020
Temperature / Humidity	23 deg. C / 54 % RH
Engineer	Hiromitsu Tanabe
Mode	Tx 11n-20 2462 MHz with 11ac-20 MIMO 5745 MHz
EUT	Hi type

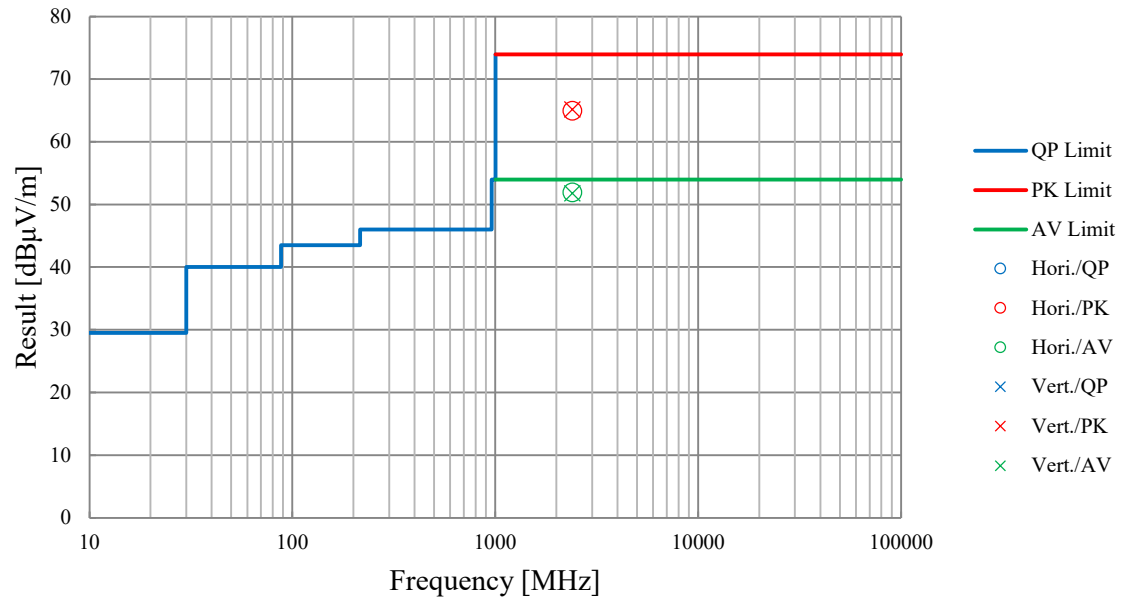


* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.

Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission (Plot data, Worst case)

Report No. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date August 4, 2020
Temperature / Humidity 23 deg. C / 54 % RH
Engineer Hiromitsu Tanabe
(1 GHz -2.8 GHz)
Mode Tx 11g 2417 MHz with 11ac-20 MIMO 5745 MHz
EUT Hi type



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

Radiated Spurious Emission

Report No. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date July 11, 2020 No.6 July 26, 2020 No.6 July 23, 2020 No.6 July 28, 2020 No.6 July 28, 2020
Temperature / Humidity 22 deg. C / 55 % RH 22 deg. C / 60 % RH 23 deg. C / 55 % RH 22 deg. C / 60 % RH 22 deg. C / 60 % RH
Engineer Kazuhiro Ando Kazuhiro Ando Kazuhiro Ando Kazuhiro Ando Hiromitsu Tanabe
(30 MHz -1000 MHz) (1 GHz -2.8 GHz) (2.8 GHz -10 GHz) (10 GHz -18 GHz) (18 GHz -26.5 GHz)
Mode Tx BT LE 1M-PHY 2402 MHz
EUT Hi type

(* 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.	391.704	QP	45.30	15.50	8.58	32.27	0.00	37.11	46.0	8.8	100	12	
Hori.	466.017	QP	39.80	17.36	8.97	32.25	0.00	33.88	46.0	12.1	199	157	
Hori.	477.167	QP	43.70	17.53	9.02	32.24	0.00	38.01	46.0	7.9	188	160	
Hori.	652.839	QP	36.00	20.46	9.80	32.20	0.00	34.06	46.0	11.9	145	48	
Hori.	875.035	QP	33.00	22.98	10.61	31.60	0.00	34.99	46.0	11.0	100	216	
Hori.	913.975	QP	29.90	23.74	10.73	31.35	0.00	33.02	46.0	12.9	100	171	
Hori.	2093.630	PK	52.40	29.06	13.10	43.86	2.05	52.75	73.9	21.1	196	181	
Hori.	2336.940	PK	50.80	27.51	13.28	43.86	2.05	49.78	73.9	24.1	206	297	
Hori.	2390.000	PK	51.10	27.61	13.32	43.84	2.05	50.24	73.9	23.6	260	287	
Hori.	4804.000	PK	52.50	32.53	5.35	45.17	2.05	47.26	73.9	26.6	150	0	Floor noise
Hori.	7206.000	PK	53.30	37.17	6.63	44.07	2.05	55.08	73.9	18.8	159	278	
Hori.	9608.000	PK	47.10	37.97	7.39	41.90	2.05	52.61	73.9	21.2	150	0	Floor noise
Hori.	2093.630	AV	44.10	29.06	13.10	43.86	2.05	44.45	53.9	9.4	196	181	
Vert.	391.704	QP	40.60	15.50	8.58	32.27	0.00	32.41	46.0	13.5	184	44	
Vert.	477.908	QP	42.70	17.54	9.02	32.24	0.00	37.02	46.0	8.9	137	51	
Vert.	702.008	QP	33.30	20.86	10.00	32.16	0.00	32.00	46.0	14.0	100	24	
Vert.	2093.630	PK	52.90	29.06	13.10	43.86	2.05	53.25	73.9	20.6	163	248	
Vert.	2336.940	PK	53.70	27.51	13.28	43.86	2.05	52.68	73.9	21.2	134	3	
Vert.	2390.000	PK	50.80	27.61	13.32	43.84	2.05	49.94	73.9	23.9	151	3	
Vert.	4804.000	PK	52.50	32.53	5.35	45.17	2.05	47.26	73.9	26.6	150	0	Floor noise
Vert.	7206.000	PK	55.50	37.17	6.63	44.07	2.05	57.28	73.9	16.6	112	35	
Vert.	9608.000	PK	47.20	37.97	7.39	41.90	2.05	52.71	73.9	21.1	150	0	Floor noise
Vert.	2093.630	AV	44.30	29.06	13.10	43.86	2.05	44.65	53.9	9.2	163	248	

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

Peak measurement value with Duty cycle correction factor (DCCF)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	DCCF [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2336.940	PK	50.80	27.51	13.28	43.86	-22.15	2.05	27.63	53.9	26.3	*2)
Hori.	2390.000	PK	51.10	27.61	13.32	43.84	-22.15	2.05	28.09	53.9	25.8	*1)
Hori.	4804.000	PK	52.50	32.53	5.35	45.17	-22.15	2.05	25.11	53.9	28.8	Floor noise
Hori.	7206.000	PK	53.30	37.17	6.63	44.07	-22.15	2.05	32.93	53.9	21.0	
Hori.	9608.000	PK	47.10	37.97	7.39	41.90	-22.15	2.05	30.46	53.9	23.4	Floor noise
Vert.	2336.940	PK	53.70	27.51	13.28	43.86	-22.15	2.05	30.53	53.9	23.4	*2)
Vert.	2390.000	PK	50.80	27.61	13.32	43.84	-22.15	2.05	27.79	53.9	26.1	*1)
Vert.	4804.000	PK	52.50	32.53	5.35	45.17	-22.15	2.05	25.11	53.9	28.8	Floor noise
Vert.	7206.000	PK	55.50	37.17	6.63	44.07	-22.15	2.05	35.13	53.9	18.8	
Vert.	9608.000	PK	47.20	37.97	7.39	41.90	-22.15	2.05	30.56	53.9	23.3	Floor noise

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

Duty cycle correction factor (DCCF) refer to "Duty cycle correction factor" sheet.

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

*2) Spurious emission of the same duty cycle as carrier.

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	99.40	27.64	13.33	43.83	2.05	98.59	-	-	Carrier
Hori.	2399.560	PK	47.80	27.63	13.33	43.83	2.05	46.98	78.59	31.6	
Hori.	2400.000	PK	46.20	27.63	13.33	43.83	2.05	45.38	78.59	33.2	
Vert.	2402.000	PK	101.00	27.64	13.33	43.83	2.05	100.19	-	-	Carrier
Vert.	2399.600	PK	48.60	27.63	13.33	43.83	2.05	47.78	80.19	32.4	
Vert.	2400.000	PK	46.90	27.63	13.33	43.83	2.05	46.08	80.19	34.1	

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

UL Japan, Inc.

Kashima EMC Lab.

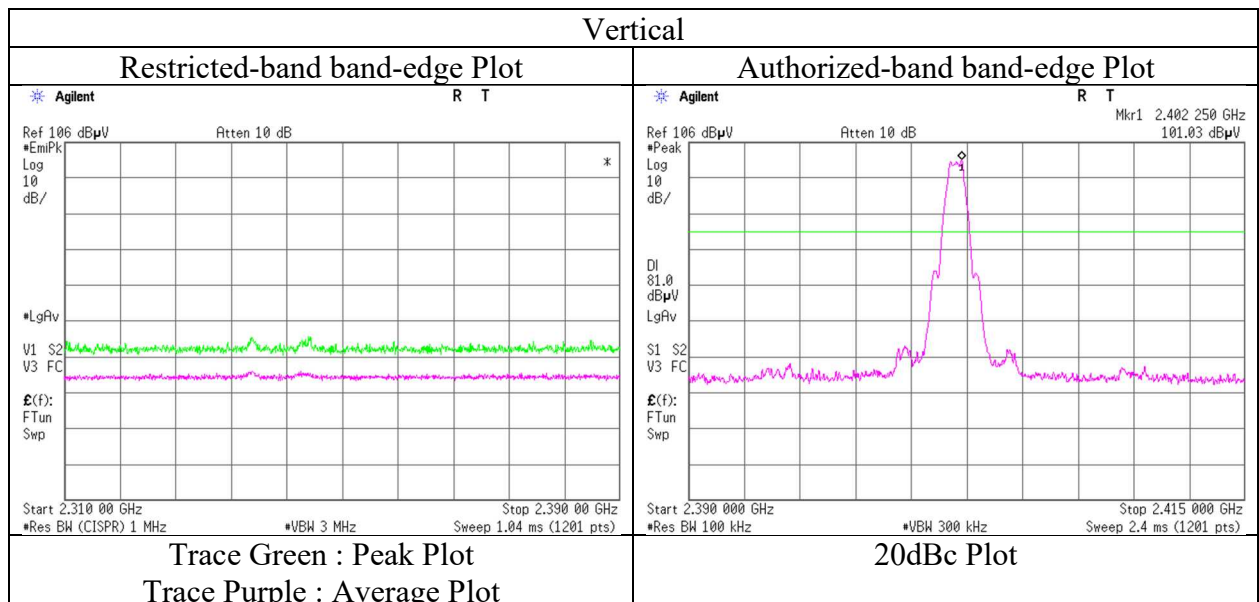
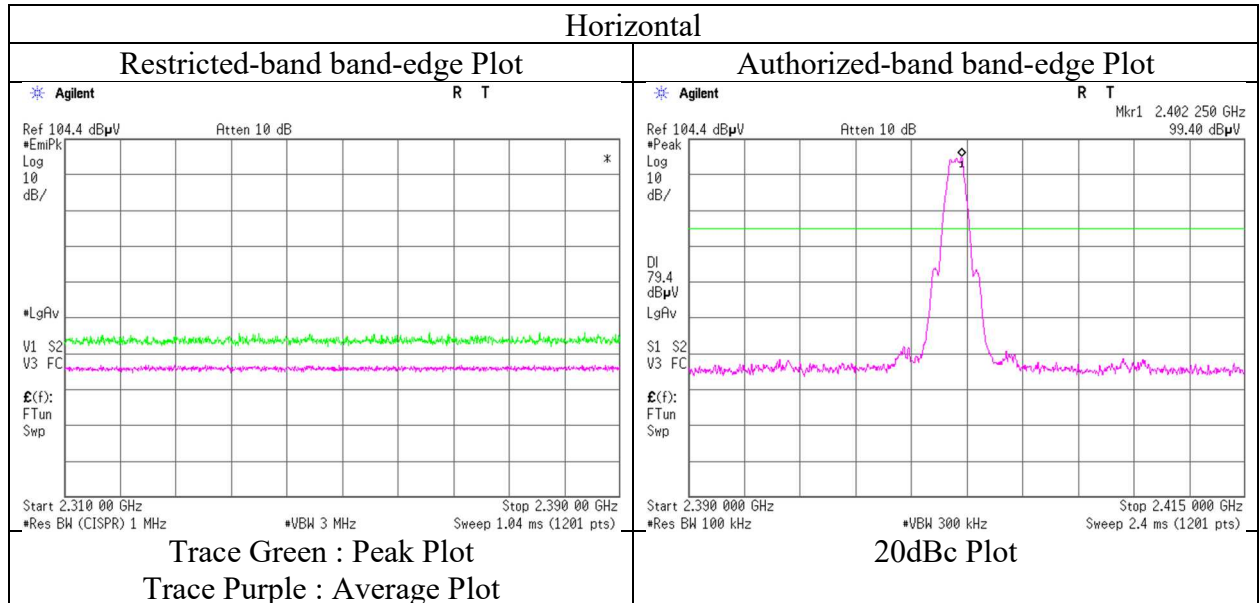
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	July 26, 2020
Temperature / Humidity	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando
Mode	Tx BT LE 1M-PHY 2402 MHz
EUT	Hi type



* 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.	13408125M-B-R1				
Test place	Kashima EMC Lab.				
Semi Anechoic Chamber	No.6	No.6	No.6	No.6	No.6
Date	July 11, 2020	July 26, 2020	July 23, 2020	July 28, 2020	July 28, 2020
Temperature / Humidity	22 deg. C / 55 % RH	22 deg. C / 60 % RH	23 deg. C / 55 % RH	22 deg. C / 60 % RH	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando	Kazuhiro Ando	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe
	(30 MHz -1000 MHz)	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx BT LE 1M-PHY 2440 MHz				
EUT	Hi type				

(* 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.	391.704	QP	46.20	15.50	8.58	32.27	0.00	38.01	46.0	7.9	100	16	
Hori.	466.116	QP	40.10	17.36	8.97	32.25	0.00	34.18	46.0	11.8	213	153	
Hori.	478.052	QP	43.40	17.54	9.02	32.24	0.00	37.72	46.0	8.2	184	160	
Hori.	652.839	QP	36.00	20.46	9.80	32.20	0.00	34.06	46.0	11.9	141	46	
Hori.	875.590	QP	33.10	22.99	10.61	31.60	0.00	35.10	46.0	10.9	100	199	
Hori.	913.975	QP	30.00	23.74	10.73	31.35	0.00	33.12	46.0	12.8	100	165	
Hori.	2093.460	PK	52.10	29.06	13.10	43.86	2.05	52.45	73.9	21.4	197	179	
Hori.	2368.840	PK	52.40	27.56	13.30	43.85	2.05	51.46	73.9	22.4	140	291	
Hori.	2497.580	PK	52.20	28.00	13.40	43.79	2.05	51.86	73.9	22.0	134	296	
Hori.	4880.000	PK	50.10	32.59	5.39	45.21	2.05	44.92	73.9	28.9	150	0	Floor noise
Hori.	7320.000	PK	49.90	37.38	6.68	43.80	2.05	52.21	73.9	21.6	163	313	
Hori.	9760.000	PK	46.50	37.98	7.45	41.79	2.05	52.19	73.9	21.7	150	0	Floor noise
Hori.	2093.460	AV	44.00	29.06	13.10	43.86	2.05	44.35	53.9	9.5	197	179	
Vert.	391.704	QP	40.80	15.50	8.58	32.27	0.00	32.61	46.0	13.3	172	53	
Vert.	478.052	QP	42.60	17.54	9.02	32.24	0.00	36.92	46.0	9.0	132	50	
Vert.	702.376	QP	32.80	20.87	10.00	32.16	0.00	31.51	46.0	14.4	100	33	
Vert.	2093.460	PK	52.70	29.06	13.10	43.86	2.05	53.05	73.9	20.8	158	251	
Vert.	2368.650	PK	54.00	27.55	13.30	43.85	2.05	53.05	73.9	20.8	140	4	
Vert.	2497.580	PK	53.80	28.00	13.40	43.79	2.05	53.46	73.9	20.4	145	6	
Vert.	4880.000	PK	50.90	32.59	5.39	45.21	2.05	45.72	73.9	28.1	150	0	Floor noise
Vert.	7320.000	PK	53.00	37.38	6.68	43.80	2.05	55.31	73.9	18.5	144	35	
Vert.	9760.000	PK	46.90	37.98	7.45	41.79	2.05	52.59	73.9	21.3	150	0	Floor noise
Vert.	2093.460	AV	44.40	29.06	13.10	43.86	2.05	44.75	53.9	9.1	158	251	

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

Peak measurement value with Duty cycle correction factor (DCCF)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	DCCF [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2368.840	PK	52.40	27.56	13.30	43.85	-22.15	2.05	29.31	53.9	24.6	*2)
Hori.	2497.580	PK	52.20	28.00	13.40	43.79	-22.15	2.05	29.71	53.9	24.2	*2)
Hori.	4880.000	PK	50.10	32.59	5.39	45.21	-22.15	2.05	22.77	53.9	31.1	Floor noise
Hori.	7320.000	PK	49.90	37.38	6.68	43.80	-22.15	2.05	30.06	53.9	23.8	
Hori.	9760.000	PK	46.50	37.98	7.45	41.79	-22.15	2.05	30.04	53.9	23.9	Floor noise
Vert.	2368.650	PK	54.00	27.55	13.30	43.85	-22.15	2.05	30.90	53.9	23.0	*2)
Vert.	2497.580	PK	53.80	28.00	13.40	43.79	-22.15	2.05	31.31	53.9	22.6	*2)
Vert.	4880.000	PK	50.90	32.59	5.39	45.21	-22.15	2.05	23.57	53.9	30.3	Floor noise
Vert.	7320.000	PK	53.00	37.38	6.68	43.80	-22.15	2.05	33.16	53.9	20.7	
Vert.	9760.000	PK	46.90	37.98	7.45	41.79	-22.15	2.05	30.44	53.9	23.5	Floor noise

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

Duty cycle correction factor (DCCF) refer to "Duty cycle correction factor" sheet.

*2) Spurious emission of the same duty cycle as carrier.

UL Japan, Inc.

Kashima EMC Lab.

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

Telephone : +81 478 88 6500

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Radiated Spurious Emission

Report No.	13408125M-B-R1					
Test place	Kashima EMC Lab.					
Semi Anechoic Chamber	No.6	No.6	No.6	No.6	No.6	No.6
Date	July 11, 2020	July 26, 2020	July 23, 2020	July 28, 2020	July 28, 2020	July 28, 2020
Temperature / Humidity	22 deg. C / 55 % RH	22 deg. C / 60 % RH	23 deg. C / 55 % RH	22 deg. C / 60 % RH	22 deg. C / 60 % RH	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando	Kazuhiro Ando	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe
	(30 MHz -1000 MHz)	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)	
Mode	Tx BT LE 1M-PHY 2480 MHz					
EUT	Hi type					

(* 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.	391.704	QP	45.60	15.50	8.58	32.27	0.00	37.41	46.0	8.5	100	12	
Hori.	465.795	QP	40.00	17.35	8.97	32.25	0.00	34.07	46.0	11.9	218	161	
Hori.	477.996	QP	43.50	17.54	9.02	32.24	0.00	37.82	46.0	8.1	188	156	
Hori.	652.839	QP	36.30	20.46	9.80	32.20	0.00	34.36	46.0	11.6	150	51	
Hori.	874.616	QP	32.70	22.98	10.61	31.61	0.00	34.68	46.0	11.3	100	194	
Hori.	913.975	QP	30.20	23.74	10.73	31.35	0.00	33.32	46.0	12.6	100	174	
Hori.	2093.260	PK	52.50	29.06	13.10	43.86	2.05	52.85	73.9	21.0	209	178	
Hori.	2483.500	PK	50.90	27.94	13.39	43.80	2.05	50.48	73.9	23.4	115	298	
Hori.	2538.870	PK	53.40	28.20	13.43	43.77	2.05	53.31	73.9	20.5	118	294	
Hori.	4960.000	PK	51.70	32.55	5.43	45.26	2.05	46.47	73.9	27.4	150	0	Floor noise
Hori.	7440.000	PK	51.70	37.41	6.69	43.50	2.05	54.35	73.9	19.5	149	33	
Hori.	9920.000	PK	46.30	38.22	7.50	41.76	2.05	52.31	73.9	21.5	150	0	Floor noise
Hori.	2093.260	AV	43.60	29.06	13.10	43.86	2.05	43.95	53.9	9.9	209	178	
Vert.	391.704	QP	40.60	15.50	8.58	32.27	0.00	32.41	46.0	13.5	181	52	
Vert.	477.996	QP	42.40	17.54	9.02	32.24	0.00	36.72	46.0	9.2	130	56	
Vert.	701.586	QP	32.20	20.86	10.00	32.16	0.00	30.90	46.0	15.1	100	32	
Vert.	2093.260	PK	52.00	29.06	13.10	43.86	2.05	52.35	73.9	21.5	161	248	
Vert.	2483.500	PK	51.40	27.94	13.39	43.80	2.05	50.98	73.9	22.9	127	3	
Vert.	2538.870	PK	53.90	28.20	13.43	43.77	2.05	53.81	73.9	20.0	129	3	
Vert.	4960.000	PK	52.50	32.55	5.43	45.26	2.05	47.27	73.9	26.6	150	0	Floor noise
Vert.	7440.000	PK	52.90	37.41	6.69	43.50	2.05	55.55	73.9	18.3	154	34	
Vert.	9920.000	PK	47.00	38.22	7.50	41.76	2.05	53.01	73.9	20.8	150	0	Floor noise
Vert.	2093.260	AV	44.20	29.06	13.10	43.86	2.05	44.55	53.9	9.3	161	248	

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

Peak measurement value with Duty cycle correction factor (DCCF)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	DCCF [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	PK	50.90	27.94	13.39	43.80	-22.15	2.05	28.33	53.9	25.6	*1)
Hori.	2538.870	PK	53.40	28.20	13.43	43.77	-22.15	2.05	31.16	53.9	22.7	*2)
Hori.	4960.000	PK	51.70	32.55	5.43	45.26	-22.15	2.05	24.32	53.9	29.6	Floor noise
Hori.	7440.000	PK	51.70	37.41	6.69	43.50	-22.15	2.05	32.20	53.9	21.7	
Hori.	9920.000	PK	46.30	38.22	7.50	41.76	-22.15	2.05	30.16	53.9	23.7	Floor noise
Vert.	2483.500	PK	51.40	27.94	13.39	43.80	-22.15	2.05	28.83	53.9	25.1	*1)
Vert.	2538.870	PK	53.90	28.20	13.43	43.77	-22.15	2.05	31.66	53.9	22.2	*2)
Vert.	4960.000	PK	52.50	32.55	5.43	45.26	-22.15	2.05	25.12	53.9	28.8	Floor noise
Vert.	7440.000	PK	52.90	37.41	6.69	43.50	-22.15	2.05	33.40	53.9	20.5	
Vert.	9920.000	PK	47.00	38.22	7.50	41.76	-22.15	2.05	30.86	53.9	23.0	Floor noise

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

Duty cycle correction factor (DCCF) refer to "Duty cycle correction factor" sheet.

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

*2) Spurious emission of the same duty cycle as carrier.

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Kashima EMC Lab.

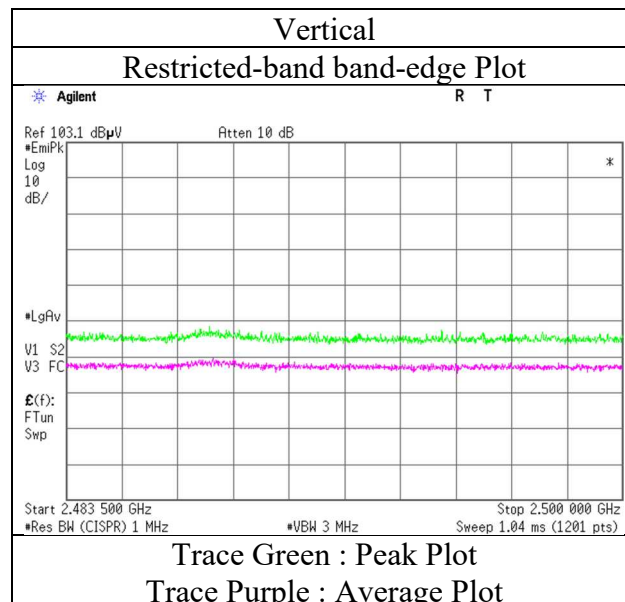
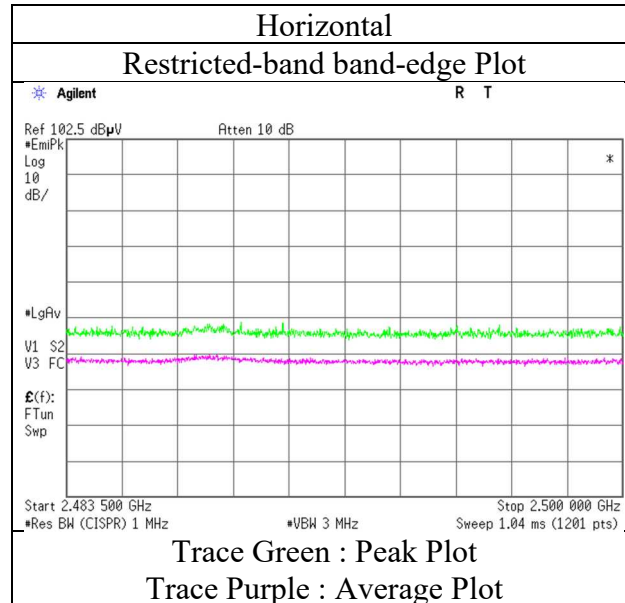
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Radiated Spurious Emission **(Reference Plot for band-edge)**

Report No. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date July 26, 2020
Temperature / Humidity 22 deg. C / 60 % RH
Engineer Kazuhiro Ando
Mode Tx BT LE 1M-PHY 2480 MHz
EUT Hi type



* 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.	13408125M-B-R1				
Test place	Kashima EMC Lab.				
Semi Anechoic Chamber	No.6	No.6	No.6	No.6	No.6
Date	July 11, 2020	July 26, 2020	July 27, 2020	July 28, 2020	July 28, 2020
Temperature / Humidity	22 deg. C / 55 % RH	22 deg. C / 60 % RH	23 deg. C / 59 % RH	22 deg. C / 60 % RH	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando	Kazuhiro Ando	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe
	(30 MHz -1000 MHz)	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx BT LE 2M-PHY 2402 MHz				
EUT	Hi type				

(* 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.	391.704	QP	45.20	15.50	8.58	32.27	0.00	37.01	46.0	8.9	100	15	
Hori.	465.483	QP	40.00	17.35	8.97	32.25	0.00	34.07	46.0	11.9	215	154	
Hori.	477.497	QP	43.40	17.53	9.02	32.24	0.00	37.71	46.0	8.2	201	160	
Hori.	652.839	QP	35.90	20.46	9.80	32.20	0.00	33.96	46.0	12.0	148	47	
Hori.	874.411	QP	32.60	22.98	10.61	31.61	0.00	34.58	46.0	11.4	100	208	
Hori.	913.975	QP	29.80	23.74	10.73	31.35	0.00	32.92	46.0	13.0	100	169	
Hori.	2093.120	PK	51.90	29.06	13.10	43.86	2.05	52.25	73.9	21.6	194	178	
Hori.	2340.200	PK	51.00	27.51	13.28	43.86	2.05	49.98	73.9	23.9	254	290	
Hori.	2390.000	PK	51.30	27.61	13.32	43.84	2.05	50.44	73.9	23.4	259	289	
Hori.	4804.000	PK	52.49	32.53	5.35	45.17	2.05	47.25	73.9	26.6	150	0	Floor noise
Hori.	7206.000	PK	52.18	37.17	6.63	44.07	2.05	53.96	73.9	19.9	113	338	
Hori.	9608.000	PK	47.92	37.97	7.39	41.90	2.05	53.43	73.9	20.4	150	0	Floor noise
Hori.	2093.120	AV	43.90	29.06	13.10	43.86	2.05	44.25	53.9	9.6	194	178	
Vert.	391.704	QP	40.50	15.50	8.58	32.27	0.00	32.31	46.0	13.6	190	48	
Vert.	477.497	QP	42.20	17.53	9.02	32.24	0.00	36.51	46.0	9.4	138	51	
Vert.	701.194	QP	33.40	20.85	9.99	32.16	0.00	32.08	46.0	13.9	100	29	
Vert.	2093.120	PK	52.20	29.06	13.10	43.86	2.05	52.55	73.9	21.3	157	254	
Vert.	2340.200	PK	56.70	27.51	13.28	43.86	2.05	55.68	73.9	18.2	118	4	
Vert.	2390.000	PK	50.90	27.61	13.32	43.84	2.05	50.04	73.9	23.8	152	4	
Vert.	4804.000	PK	52.29	32.53	5.35	45.17	2.05	47.05	73.9	26.8	150	0	Floor noise
Vert.	7206.000	PK	55.23	37.17	6.63	44.07	2.05	57.01	73.9	16.8	108	34	
Vert.	9608.000	PK	46.97	37.97	7.39	41.90	2.05	52.48	73.9	21.4	150	0	Floor noise
Vert.	2093.120	AV	44.00	29.06	13.10	43.86	2.05	44.35	53.9	9.5	157	254	

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

Peak measurement value with Duty cycle correction factor (DCCF)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	DCCF [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2340.200	PK	51.00	27.51	13.28	43.86	-28.17	2.05	21.81	53.9	32.1	*2)
Hori.	2390.000	PK	51.30	27.61	13.32	43.84	-28.17	2.05	22.27	53.9	31.6	*1)
Hori.	4804.000	PK	52.49	32.53	5.35	45.17	-28.17	2.05	19.08	53.9	34.8	Floor noise
Hori.	7206.000	PK	52.18	37.17	6.63	44.07	-28.17	2.05	25.79	53.9	28.1	
Hori.	9608.000	PK	47.92	37.97	7.39	41.90	-28.17	2.05	25.26	53.9	28.6	Floor noise
Vert.	2340.200	PK	56.70	27.51	13.28	43.86	-28.17	2.05	27.51	53.9	26.4	*2)
Vert.	2390.000	PK	50.90	27.61	13.32	43.84	-28.17	2.05	21.87	53.9	32.0	*1)
Vert.	4804.000	PK	52.29	32.53	5.35	45.17	-28.17	2.05	18.88	53.9	35.0	Floor noise
Vert.	7206.000	PK	55.23	37.17	6.63	44.07	-28.17	2.05	28.84	53.9	25.1	
Vert.	9608.000	PK	46.97	37.97	7.39	41.90	-28.17	2.05	24.31	53.9	29.6	Floor noise

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

Duty cycle correction factor (DCCF) refer to "Duty cycle correction factor" sheet.

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

*2) Spurious emission of the same duty cycle as carrier.

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	99.00	27.64	13.33	43.83	2.05	98.19	-	-	Carrier
Hori.	2400.000	PK	67.30	27.63	13.33	43.83	2.05	66.48	78.19	11.7	
Vert.	2402.000	PK	99.80	27.64	13.33	43.83	2.05	98.99	-	-	Carrier
Vert.	2400.000	PK	68.20	27.63	13.33	43.83	2.05	67.38	78.99	11.6	

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

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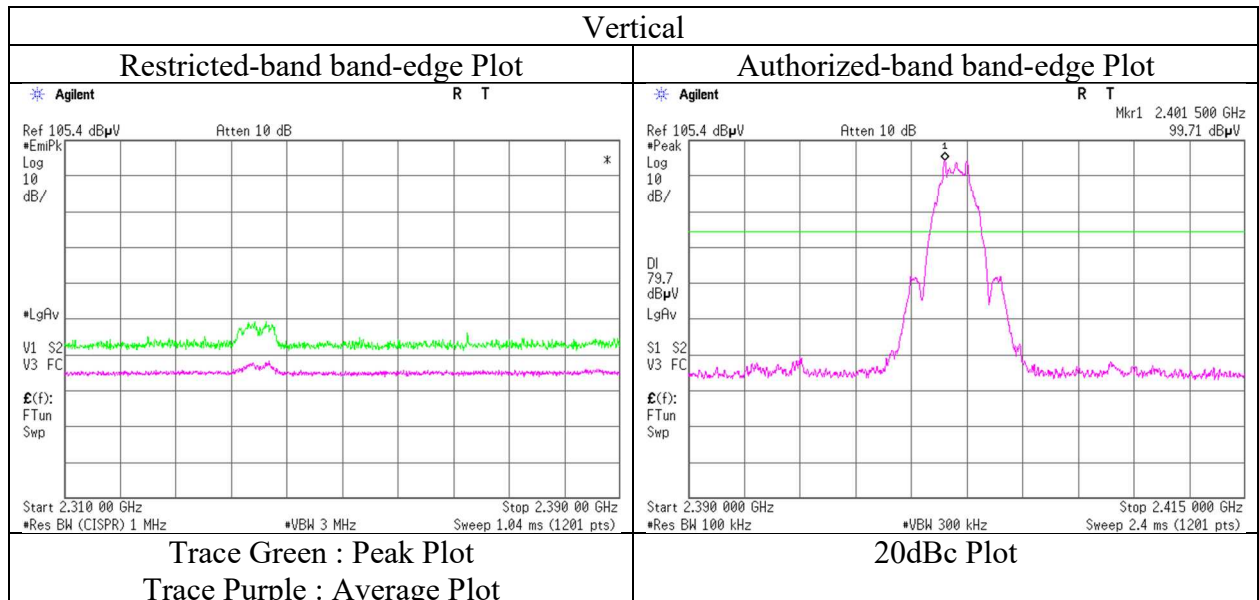
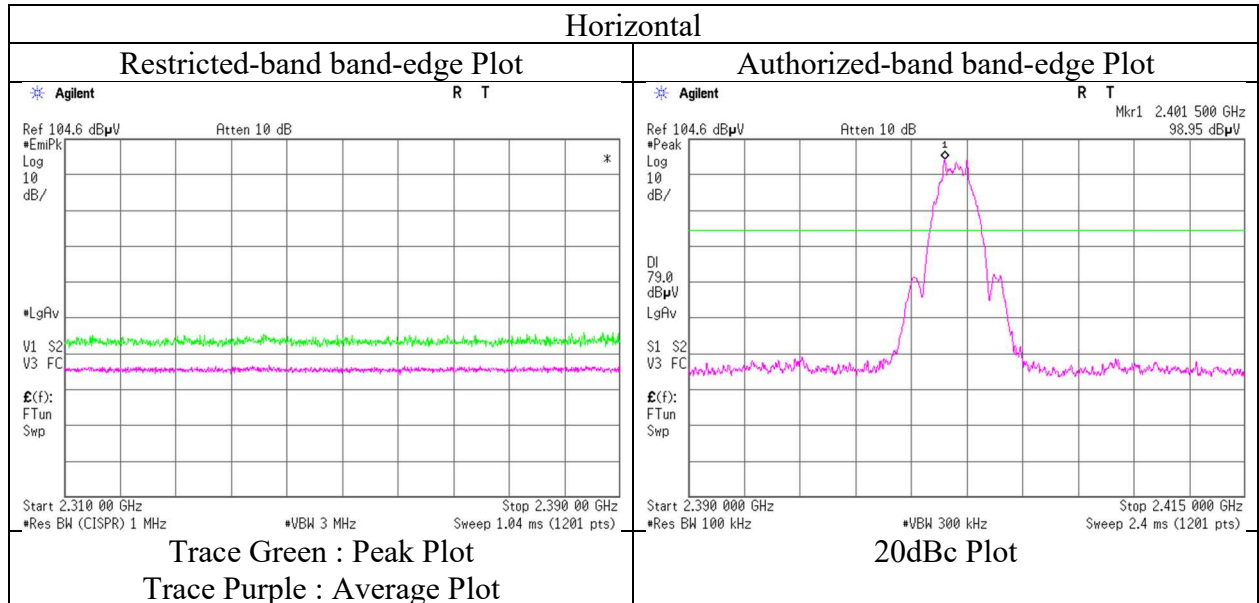
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Facsimile : +81 478 82 3373

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	July 26, 2020
Temperature / Humidity	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando
Mode	Tx BT LE 2M-PHY 2402 MHz
EUT	Hi type



* 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.	13408125M-B-R1				
Test place	Kashima EMC Lab.				
Semi Anechoic Chamber	No.6	No.6	No.6	No.6	No.6
Date	July 11, 2020	July 26, 2020	July 27, 2020	July 28, 2020	July 28, 2020
Temperature / Humidity	22 deg. C / 55 % RH	22 deg. C / 60 % RH	23 deg. C / 59 % RH	22 deg. C / 60 % RH	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando	Kazuhiro Ando	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe
	(30 MHz -1000 MHz)	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx BT LE 2M-PHY 2440 MHz				
EUT	Hi type				

(* 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.	391.704	QP	45.00	15.50	8.58	32.27	0.00	36.81	46.0	9.1	100	20	
Hori.	465.402	QP	39.60	17.35	8.97	32.25	0.00	33.67	46.0	12.3	226	156	
Hori.	477.405	QP	43.00	17.53	9.02	32.24	0.00	37.31	46.0	8.6	187	154	
Hori.	652.839	QP	36.10	20.46	9.80	32.20	0.00	34.16	46.0	11.8	153	46	
Hori.	873.974	QP	32.50	22.98	10.61	31.61	0.00	34.48	46.0	11.5	100	206	
Hori.	913.975	QP	30.20	23.74	10.73	31.35	0.00	33.32	46.0	12.6	100	174	
Hori.	2093.220	PK	51.80	29.06	13.10	43.86	2.05	52.15	73.9	21.7	196	180	
Hori.	2375.180	PK	54.20	27.57	13.32	43.84	2.05	53.30	73.9	20.6	294	281	
Hori.	2503.600	PK	53.40	28.03	13.40	43.79	2.05	53.09	73.9	20.8	243	298	
Hori.	4880.000	PK	51.93	32.59	5.39	45.21	2.05	46.75	73.9	27.1	150	0	Floor noise
Hori.	7320.000	PK	50.08	37.38	6.68	43.80	2.05	52.39	73.9	21.5	185	31	
Hori.	9760.000	PK	46.83	37.98	7.45	41.79	2.05	52.52	73.9	21.3	150	0	Floor noise
Hori.	2093.220	AV	44.30	29.06	13.10	43.86	2.05	44.65	53.9	9.2	196	180	
Vert.	391.704	QP	41.80	15.50	8.58	32.27	0.00	33.61	46.0	12.3	173	43	
Vert.	477.405	QP	42.00	17.53	9.02	32.24	0.00	36.31	46.0	9.6	127	53	
Vert.	701.118	QP	32.30	20.85	9.99	32.16	0.00	30.98	46.0	15.0	100	22	
Vert.	2093.220	PK	52.40	29.06	13.10	43.86	2.05	52.75	73.9	21.1	159	250	
Vert.	2375.180	PK	56.80	27.57	13.32	43.84	2.05	55.90	73.9	18.0	134	6	
Vert.	2503.600	PK	56.60	28.03	13.40	43.79	2.05	56.29	73.9	17.6	134	4	
Vert.	4880.000	PK	51.71	32.59	5.39	45.21	2.05	46.53	73.9	27.3	150	0	Floor noise
Vert.	7320.000	PK	51.91	37.38	6.68	43.80	2.05	54.22	73.9	19.6	109	34	
Vert.	9760.000	PK	46.81	37.98	7.45	41.79	2.05	52.50	73.9	21.4	150	0	Floor noise
Vert.	2093.220	AV	44.50	29.06	13.10	43.86	2.05	44.85	53.9	9.0	159	250	

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

Peak measurement value with Duty cycle correction factor (DCCF)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	DCCF [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2375.180	PK	54.20	27.57	13.32	43.84	-28.17	2.05	25.13	53.9	28.8	*2)
Hori.	2503.600	PK	53.40	28.03	13.40	43.79	-28.17	2.05	24.92	53.9	29.0	*2)
Hori.	4880.000	PK	51.93	32.59	5.39	45.21	-28.17	2.05	18.58	53.9	35.3	Floor noise
Hori.	7320.000	PK	50.08	37.38	6.68	43.80	-28.17	2.05	24.22	53.9	29.7	
Hori.	9760.000	PK	46.83	37.98	7.45	41.79	-28.17	2.05	24.35	53.9	29.6	Floor noise
Vert.	2375.180	PK	56.80	27.57	13.32	43.84	-28.17	2.05	27.73	53.9	26.2	*2)
Vert.	2503.600	PK	56.60	28.03	13.40	43.79	-28.17	2.05	28.12	53.9	25.8	*2)
Vert.	4880.000	PK	51.71	32.59	5.39	45.21	-28.17	2.05	18.36	53.9	35.5	Floor noise
Vert.	7320.000	PK	51.91	37.38	6.68	43.80	-28.17	2.05	26.05	53.9	27.9	
Vert.	9760.000	PK	46.81	37.98	7.45	41.79	-28.17	2.05	24.33	53.9	29.6	Floor noise

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

Duty cycle correction factor (DCCF) refer to "Duty cycle correction factor" sheet.

*2) Spurious emission of the same duty cycle as carrier.

UL Japan, Inc.

Kashima EMC Lab.

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

Telephone : +81 478 88 6500

Facsimile : +81 478 82 3373

Radiated Spurious Emission

Report No.	13408125M-B-R1				
Test place	Kashima EMC Lab.				
Semi Anechoic Chamber	No.6	No.6	No.6	No.6	No.6
Date	July 11, 2020	July 26, 2020	July 27, 2020	July 28, 2020	July 28, 2020
Temperature / Humidity	22 deg. C / 55 % RH	22 deg. C / 60 % RH	23 deg. C / 59 % RH	22 deg. C / 60 % RH	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando	Kazuhiro Ando	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe
	(30 MHz -1000 MHz)	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx BT LE 2M-PHY 2480 MHz				
EUT	Hi type				

(* 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.	391.704	QP	45.20	15.50	8.58	32.27	0.00	37.01	46.0	8.9	100	22	
Hori.	466.222	QP	39.40	17.36	8.97	32.25	0.00	33.48	46.0	12.5	224	153	
Hori.	477.963	QP	43.60	17.54	9.02	32.24	0.00	37.92	46.0	8.0	203	160	
Hori.	652.839	QP	35.40	20.46	9.80	32.20	0.00	33.46	46.0	12.5	144	52	
Hori.	875.039	QP	32.50	22.98	10.61	31.60	0.00	34.49	46.0	11.5	100	209	
Hori.	913.975	QP	30.10	23.74	10.73	31.35	0.00	33.22	46.0	12.7	100	165	
Hori.	2093.230	PK	51.90	29.06	13.10	43.86	2.05	52.25	73.9	21.6	204	183	
Hori.	2483.500	PK	51.30	27.94	13.39	43.80	2.05	50.88	73.9	23.0	113	298	
Hori.	2546.020	PK	54.20	28.24	13.44	43.76	2.05	54.17	73.9	19.7	106	292	
Hori.	4960.000	PK	51.65	32.55	5.43	45.26	2.05	46.42	73.9	27.4	150	0	Floor noise
Hori.	7440.000	PK	50.77	37.41	6.69	43.50	2.05	53.42	73.9	20.4	152	30	
Hori.	9920.000	PK	46.29	38.22	7.50	41.76	2.05	52.30	73.9	21.6	150	0	Floor noise
Hori.	2093.230	AV	43.70	29.06	13.10	43.86	2.05	44.05	53.9	9.8	204	183	
Vert.	391.704	QP	40.70	15.50	8.58	32.27	0.00	32.51	46.0	13.4	185	48	
Vert.	477.963	QP	42.60	17.54	9.02	32.24	0.00	36.92	46.0	9.0	130	55	
Vert.	701.816	QP	32.00	20.86	10.00	32.16	0.00	30.70	46.0	15.3	100	20	
Vert.	2093.230	PK	51.70	29.06	13.10	43.86	2.05	52.05	73.9	21.8	153	255	
Vert.	2483.500	PK	52.20	27.94	13.39	43.80	2.05	51.78	73.9	22.1	131	4	
Vert.	2546.020	PK	56.60	28.24	13.44	43.76	2.05	56.57	73.9	17.3	138	4	
Vert.	4960.000	PK	51.50	32.55	5.43	45.26	2.05	46.27	73.9	27.6	150	0	Floor noise
Vert.	7440.000	PK	50.57	37.41	6.69	43.50	2.05	53.22	73.9	20.6	123	33	
Vert.	9920.000	PK	45.88	38.22	7.50	41.76	2.05	51.89	73.9	22.0	150	0	Floor noise
Vert.	2093.230	AV	43.90	29.06	13.10	43.86	2.05	44.25	53.9	9.6	153	255	

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

Peak measurement value with Duty cycle correction factor (DCCF)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	DCCF [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	PK	51.30	27.94	13.39	43.80	-28.17	2.05	22.71	53.9	31.2	*1)
Hori.	2546.020	PK	54.20	28.24	13.44	43.76	-28.17	2.05	26.00	53.9	27.9	*2)
Hori.	4960.000	PK	51.65	32.55	5.43	45.26	-28.17	2.05	18.25	53.9	35.7	Floor noise
Hori.	7440.000	PK	50.77	37.41	6.69	43.50	-28.17	2.05	25.25	53.9	28.7	
Hori.	9920.000	PK	46.29	38.22	7.50	41.76	-28.17	2.05	24.13	53.9	29.8	Floor noise
Vert.	2483.500	PK	52.20	27.94	13.39	43.80	-28.17	2.05	23.61	53.9	30.3	*1)
Vert.	2546.020	PK	56.60	28.24	13.44	43.76	-28.17	2.05	28.40	53.9	25.5	*2)
Vert.	4960.000	PK	51.50	32.55	5.43	45.26	-28.17	2.05	18.10	53.9	35.8	Floor noise
Vert.	7440.000	PK	50.57	37.41	6.69	43.50	-28.17	2.05	25.05	53.9	28.9	
Vert.	9920.000	PK	45.88	38.22	7.50	41.76	-28.17	2.05	23.72	53.9	30.2	Floor noise

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

Distance factor : 1 GHz - 10 GHz : 20log (3.8 m / 3.0 m) = 2.05 dB

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

Duty cycle correction factor (DCCF) refer to "Duty cycle correction factor" sheet.

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

*2) Spurious emission of the same duty cycle as carrier.

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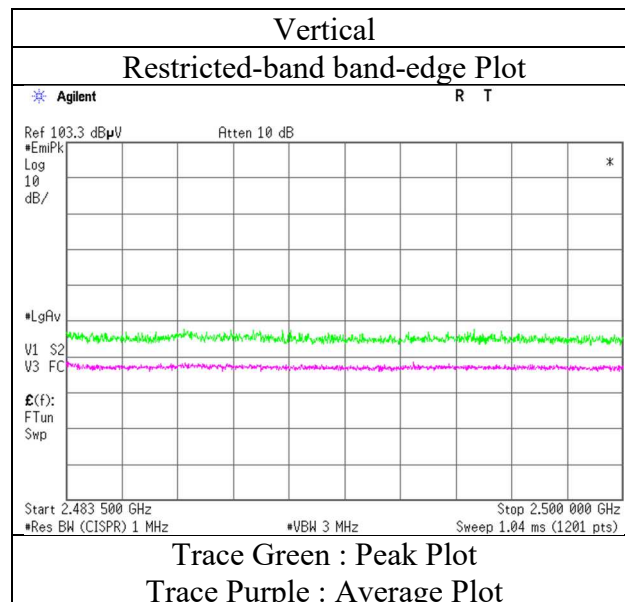
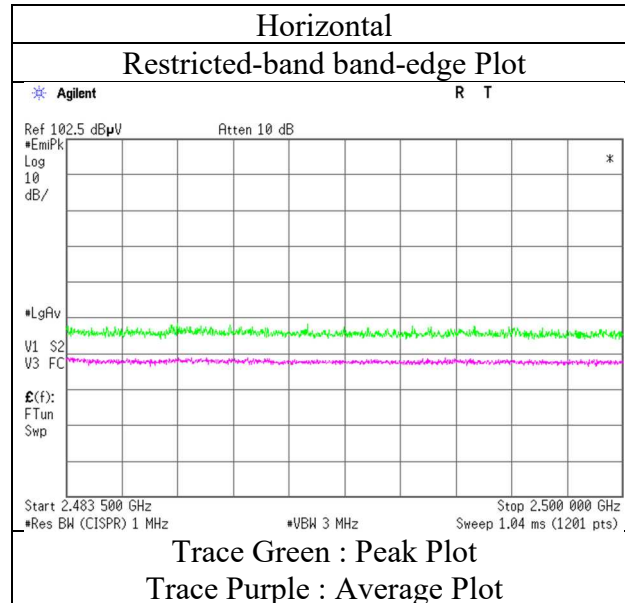
1614, Mushiata, Katori-shi, Chiba-ken, 289-0341 Japan

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

Report No. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date July 26, 2020
Temperature / Humidity 22 deg. C / 60 % RH
Engineer Kazuhiro Ando
Mode Tx BT LE 2M-PHY 2480 MHz
EUT Hi type

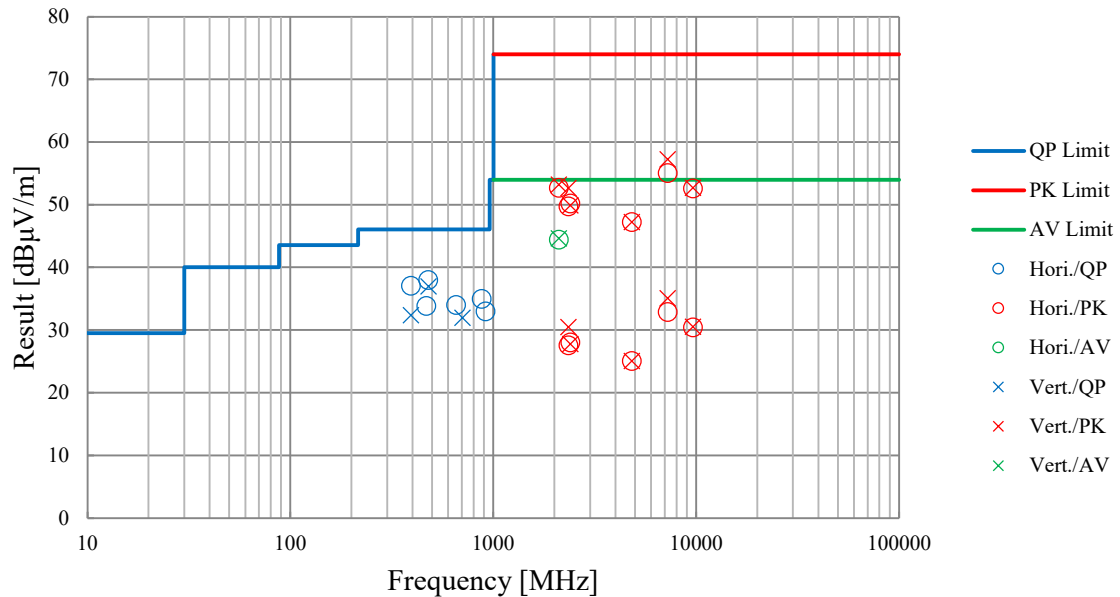


* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.

Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	13408125M-B-R1				
Test place	Kashima EMC Lab.				
Semi Anechoic Chamber	No.6	No.6	No.6	No.6	No.6
Date	July 11, 2020	July 26, 2020	July 23, 2020	July 28, 2020	July 28, 2020
Temperature / Humidity	22 deg. C / 55 % RH	22 deg. C / 60 % RH	23 deg. C / 55 % RH	22 deg. C / 60 % RH	22 deg. C / 60 % RH
Engineer	Kazuhiro Ando	Kazuhiro Ando	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe
	(30 MHz -1000 MHz)	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx BT LE 1M-PHY 2402 MHz				
EUT	Hi type				



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

Radiated Spurious Emission

Report No.	13408125M-B-R1			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.6	No.6	No.6	No.6
Date	July 7, 2020	July 3, 2020	July 6, 2020	July 6, 2020
Temperature / Humidity	22 deg. C / 56 % RH	22 deg. C / 52 % RH	24 deg. C / 55 % RH	23 deg. C / 52 % RH
Engineer	Kazuhiro Ando	Hiromitsu Tanabe	Kazuhiro Ando	Hiromitsu Tanabe
	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx 11b 2412 MHz			
EUT	Lo type			

(* 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.	2111.000	PK	51.60	28.92	13.12	43.87	2.21	51.98	73.9	21.9	236	246	
Hori.	2390.000	PK	53.10	27.61	13.32	43.84	2.21	52.40	73.9	21.5	191	65	
Hori.	4824.000	PK	51.22	32.50	5.36	45.18	2.21	46.11	73.9	27.7	172	348	
Hori.	7236.000	PK	47.89	37.22	6.64	43.99	2.21	49.97	73.9	23.9	150	0	Floor noise
Hori.	9648.000	PK	45.08	37.97	7.41	41.88	2.21	50.79	73.9	23.1	150	0	Floor noise
Hori.	2111.000	AV	44.90	28.92	13.12	43.87	2.21	45.28	53.9	8.6	236	246	
Hori.	2390.000	AV	42.20	27.61	13.32	43.84	2.21	41.50	53.9	12.4	191	65	
Hori.	4824.000	AV	44.25	32.50	5.36	45.18	2.21	39.14	53.9	14.7	172	348	
Hori.	7236.000	AV	40.49	37.22	6.64	43.99	2.21	42.57	53.9	11.3	150	0	Floor noise
Hori.	9648.000	AV	38.02	37.97	7.41	41.88	2.21	43.73	53.9	10.1	150	0	Floor noise
Vert.	2111.000	PK	51.30	28.92	13.12	43.87	2.21	51.68	73.9	22.2	153	231	
Vert.	2390.000	PK	51.30	27.61	13.32	43.84	2.21	50.60	73.9	23.3	258	0	
Vert.	4824.000	PK	53.94	32.50	5.36	45.18	2.21	48.83	73.9	25.0	190	34	
Vert.	7236.000	PK	48.12	37.22	6.64	43.99	2.21	50.20	73.9	23.7	150	0	Floor noise
Vert.	9648.000	PK	46.34	37.97	7.41	41.88	2.21	52.05	73.9	21.8	150	0	Floor noise
Vert.	2111.000	AV	44.80	28.92	13.12	43.87	2.21	45.18	53.9	8.7	153	231	
Vert.	2390.000	AV	42.00	27.61	13.32	43.84	2.21	41.30	53.9	12.6	258	0	
Vert.	4824.000	AV	44.85	32.50	5.36	45.18	2.21	39.74	53.9	14.1	190	34	
Vert.	7236.000	AV	40.58	37.22	6.64	43.99	2.21	42.66	53.9	11.2	150	0	Floor noise
Vert.	9648.000	AV	37.98	37.97	7.41	41.88	2.21	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 : 20log (3.87 m / 3.0 m) = 2.21 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	98.70	27.67	13.34	43.83	2.21	98.09	-	-	Carrier
Hori.	2398.500	PK	51.70	27.63	13.33	43.83	2.21	51.04	78.09	27.0	
Hori.	2400.000	PK	40.20	27.63	13.33	43.83	2.21	39.54	78.09	38.5	
Vert.	2412.000	PK	98.10	27.67	13.34	43.83	2.21	97.49	-	-	Carrier
Vert.	2397.500	PK	50.40	27.62	13.33	43.83	2.21	49.73	77.49	27.7	
Vert.	2400.000	PK	42.60	27.63	13.33	43.83	2.21	41.94	77.49	35.5	

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

Distance factor : 1 GHz - 10 GHz : 20log (3.87 m / 3.0 m) = 2.21 dB

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

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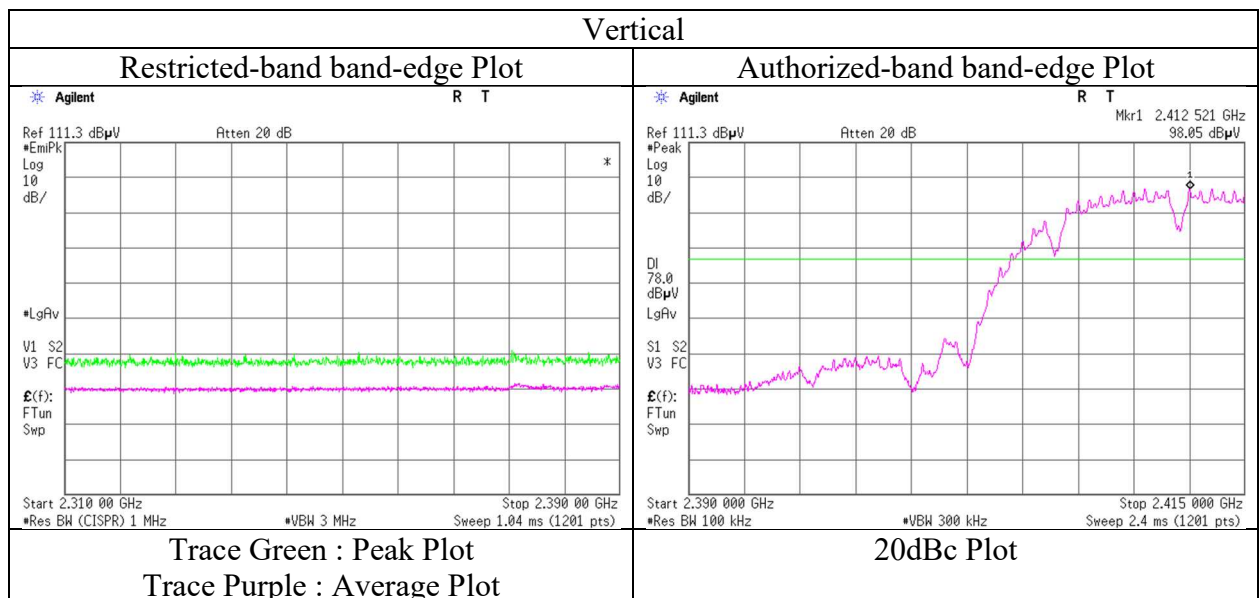
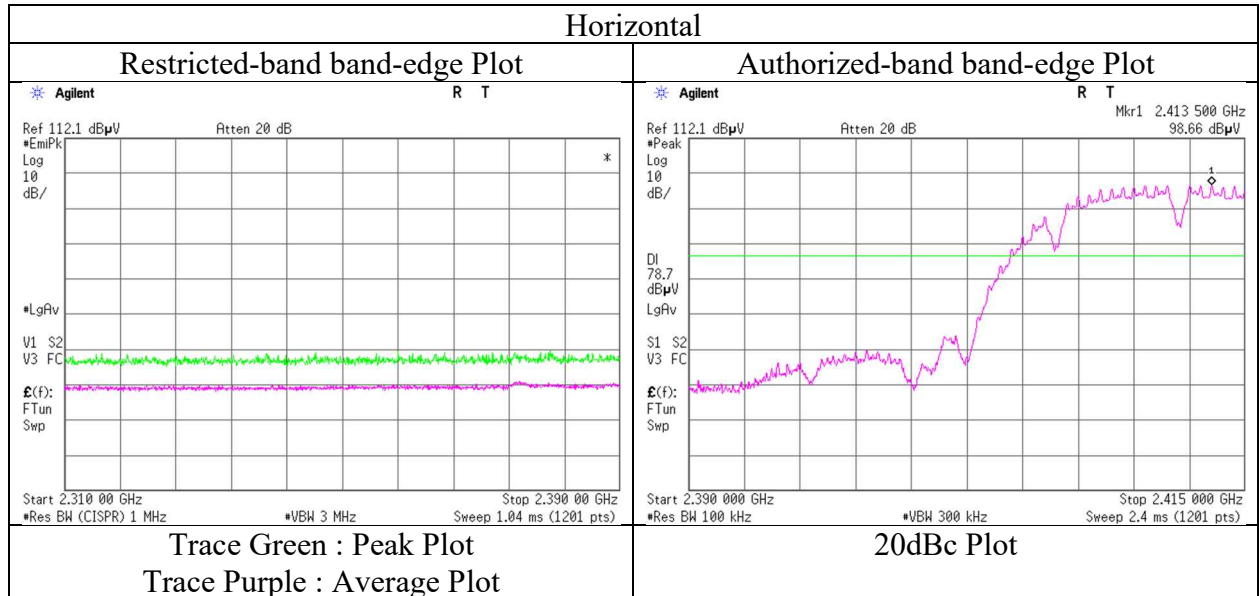
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	July 7, 2020
Temperature / Humidity	22 deg. C / 56 % RH
Engineer	Kazuhiro Ando
Mode	Tx 11b 2412 MHz
EUT	Lo type



* 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.	13408125M-B-R1			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.6	No.6	No.6	No.6
Date	July 7, 2020	July 6, 2020	July 6, 2020	July 6, 2020
Temperature / Humidity	22 deg. C / 56 % RH	24 deg. C / 55 % RH	23 deg. C / 52 % RH	23 deg. C / 52 % RH
Engineer	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx 11b 2437 MHz			
EUT	Lo type			

(* 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.	2111.000	PK	51.30	28.92	13.12	43.87	2.21	51.68	73.9	22.2	237	244	
Hori.	4874.000	PK	52.36	32.57	5.39	45.20	2.21	47.33	73.9	26.5	138	308	
Hori.	7311.000	PK	47.70	37.36	6.69	43.82	2.21	50.14	73.9	23.7	150	0	Floor noise
Hori.	9748.000	PK	46.77	37.96	7.45	41.80	2.21	52.59	73.9	21.3	150	0	Floor noise
Hori.	2111.000	AV	44.90	28.92	13.12	43.87	2.21	45.28	53.9	8.6	237	244	
Hori.	4874.000	AV	44.42	32.57	5.39	45.20	2.21	39.39	53.9	14.5	138	308	
Hori.	7311.000	AV	39.71	37.36	6.69	43.82	2.21	42.15	53.9	11.7	150	0	Floor noise
Hori.	9748.000	AV	38.27	37.96	7.45	41.80	2.21	44.09	53.9	9.8	150	0	Floor noise
Vert.	2111.000	PK	48.20	28.92	13.12	43.87	2.21	48.58	73.9	25.3	152	234	
Vert.	4874.000	PK	52.08	32.57	5.39	45.20	2.21	47.05	73.9	26.8	141	37	
Vert.	7311.000	PK	47.95	37.36	6.69	43.82	2.21	50.39	73.9	23.5	150	0	Floor noise
Vert.	9748.000	PK	46.05	37.96	7.45	41.80	2.21	51.87	73.9	22.0	150	0	Floor noise
Vert.	2111.000	AV	44.90	28.92	13.12	43.87	2.21	45.28	53.9	8.6	152	234	
Vert.	4874.000	AV	44.84	32.57	5.39	45.20	2.21	39.81	53.9	14.0	141	37	
Vert.	7311.000	AV	39.82	37.36	6.69	43.82	2.21	42.26	53.9	11.6	150	0	Floor noise
Vert.	9748.000	AV	38.15	37.96	7.45	41.80	2.21	43.97	53.9	9.9	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 : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.21\text{ dB}$

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

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Facsimile : +81 478 82 3373

Radiated Spurious Emission

Report No.	13408125M-B-R1			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.6	No.6	No.6	No.6
Date	July 7, 2020	July 6, 2020	July 6, 2020	July 6, 2020
Temperature / Humidity	22 deg. C / 56 % RH	24 deg. C / 55 % RH	23 deg. C / 52 % RH	23 deg. C / 52 % RH
Engineer	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx 11b 2462 MHz			
EUT	Lo type			

(* 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.	2111.000	PK	51.80	28.92	13.12	43.87	2.21	52.18	73.9	21.7	201	259	
Hori.	2483.500	PK	51.00	27.94	13.39	43.80	2.21	50.74	73.9	23.1	215	74	
Hori.	4924.000	PK	50.33	32.62	5.41	45.24	2.21	45.33	73.9	28.5	130	309	
Hori.	7386.000	PK	48.64	37.46	6.69	43.63	2.21	51.37	73.9	22.5	150	0	Floor noise
Hori.	9848.000	PK	46.89	38.11	7.48	41.76	2.21	52.93	73.9	20.9	150	0	Floor noise
Hori.	2111.000	AV	45.40	28.92	13.12	43.87	2.21	45.78	53.9	8.1	201	259	
Hori.	2483.500	AV	42.10	27.94	13.39	43.80	2.21	41.84	53.9	12.0	215	74	
Hori.	4924.000	AV	43.27	32.62	5.41	45.24	2.21	38.27	53.9	15.6	130	309	
Hori.	7386.000	AV	39.98	37.46	6.69	43.63	2.21	42.71	53.9	11.1	150	0	Floor noise
Hori.	9848.000	AV	38.05	38.11	7.48	41.76	2.21	44.09	53.9	9.8	150	0	Floor noise
Vert.	2111.000	PK	51.50	28.92	13.12	43.87	2.21	51.88	73.9	22.0	152	233	
Vert.	2483.500	PK	50.90	27.94	13.39	43.80	2.21	50.64	73.9	23.2	219	11	
Vert.	4924.000	PK	51.07	32.62	5.41	45.24	2.21	46.07	73.9	27.8	149	39	
Vert.	7386.000	PK	48.18	37.46	6.69	43.63	2.21	50.91	73.9	22.9	150	0	Floor noise
Vert.	9848.000	PK	46.91	38.11	7.48	41.76	2.21	52.95	73.9	20.9	150	0	Floor noise
Vert.	2111.000	AV	44.80	28.92	13.12	43.87	2.21	45.18	53.9	8.7	152	233	
Vert.	2483.500	AV	41.60	27.94	13.39	43.80	2.21	41.34	53.9	12.5	219	11	
Vert.	4924.000	AV	44.03	32.62	5.41	45.24	2.21	39.03	53.9	14.8	149	39	
Vert.	7386.000	AV	40.23	37.46	6.69	43.63	2.21	42.96	53.9	10.9	150	0	Floor noise
Vert.	9848.000	AV	38.13	38.11	7.48	41.76	2.21	44.17	53.9	9.7	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 : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.21\text{ dB}$

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

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Kashima EMC Lab.

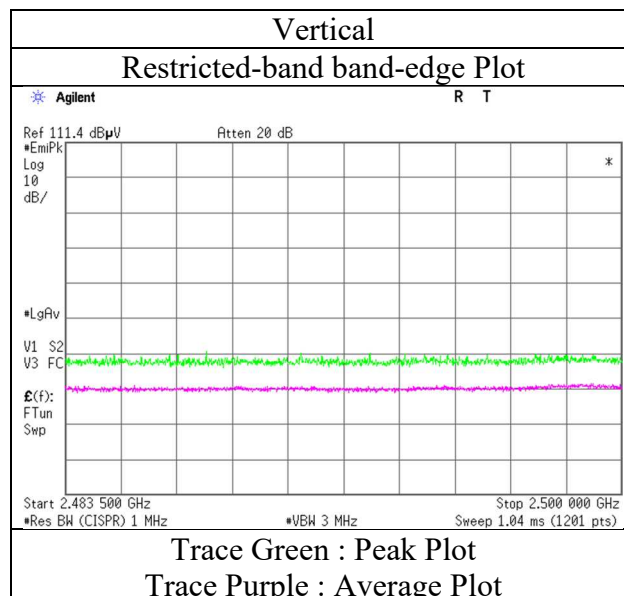
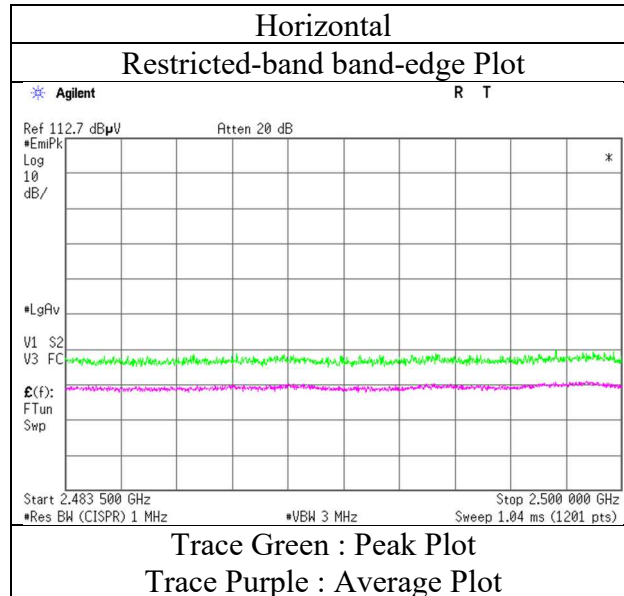
1614, Mushihata, Katori-shi, Chiba-ken, 289-0341 Japan

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

Report No. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date July 7, 2020
Temperature / Humidity 22 deg. C / 56 % RH
Engineer Kazuhiro Ando
Mode Tx 11b 2462 MHz
EUT Lo type



* 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.

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Radiated Spurious Emission

Report No.	13408125M-B-R1			
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.6	No.6	No.6	No.6
Date	July 7, 2020	July 6, 2020	July 6, 2020	July 6, 2020
Temperature / Humidity	22 deg. C / 56 % RH	24 deg. C / 55 % RH	23 deg. C / 52 % RH	23 deg. C / 52 % RH
Engineer	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz -2.8 GHz)	(2.8 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx 11g 2412 MHz			
EUT	Lo type			

(* 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.	2111.930	PK	52.10	28.92	13.12	43.87	2.21	52.48	73.9	21.4	221	243	
Hori.	2390.000	PK	64.80	27.61	13.32	43.84	2.21	64.10	73.9	9.8	282	60	
Hori.	4824.000	PK	50.87	32.50	5.36	45.18	2.21	45.76	73.9	28.1	150	0	Floor noise
Hori.	7236.000	PK	48.57	37.22	6.64	43.99	2.21	50.65	73.9	23.2	150	0	Floor noise
Hori.	9648.000	PK	46.93	37.97	7.41	41.88	2.21	52.64	73.9	21.2	150	0	Floor noise
Hori.	2111.930	AV	43.80	28.92	13.12	43.87	2.21	44.18	53.9	9.7	221	243	
Vert.	2111.930	PK	51.80	28.92	13.12	43.87	2.21	52.18	73.9	21.7	133	248	
Vert.	2390.000	PK	61.50	27.61	13.32	43.84	2.21	60.80	73.9	13.1	258	0	
Vert.	4824.000	PK	51.21	32.50	5.36	45.18	2.21	46.10	73.9	27.8	150	0	Floor noise
Vert.	7236.000	PK	49.34	37.22	6.64	43.99	2.21	51.42	73.9	22.4	150	0	Floor noise
Vert.	9648.000	PK	46.80	37.97	7.41	41.88	2.21	52.51	73.9	21.3	150	0	Floor noise
Vert.	2111.930	AV	44.10	28.92	13.12	43.87	2.21	44.48	53.9	9.4	133	248	

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

Distance factor : 1 GHz - 10 GHz : 20log (3.87 m / 3.0 m) = 2.21 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.	2390.000	AV	47.30	27.61	13.32	43.84	1.06	2.21	47.66	53.9	6.2	*1)
Hori.	4824.000	AV	43.49	32.50	5.36	45.18	1.06	2.21	39.44	53.9	14.4	Floor noise
Hori.	7236.000	AV	40.42	37.22	6.64	43.99	1.06	2.21	43.56	53.9	10.3	Floor noise
Hori.	9648.000	AV	37.99	37.97	7.41	41.88	1.06	2.21	44.76	53.9	9.1	Floor noise
Vert.	2390.000	AV	45.30	27.61	13.32	43.84	1.06	2.21	45.66	53.9	8.2	*1)
Vert.	4824.000	AV	43.46	32.50	5.36	45.18	1.06	2.21	39.41	53.9	14.4	Floor noise
Vert.	7236.000	AV	40.35	37.22	6.64	43.99	1.06	2.21	43.49	53.9	10.4	Floor noise
Vert.	9648.000	AV	38.10	37.97	7.41	41.88	1.06	2.21	44.87	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 : 20log (3.87 m / 3.0 m) = 2.21 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)

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	97.80	27.67	13.34	43.83	2.21	97.19	-	-	Carrier
Hori.	2400.000	PK	60.10	27.63	13.33	43.83	2.21	59.44	77.19	17.7	
Vert.	2412.000	PK	94.70	27.67	13.34	43.83	2.21	94.09	-	-	Carrier
Vert.	2400.000	PK	57.70	27.63	13.33	43.83	2.21	57.04	74.09	17.0	

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

Distance factor : 1 GHz - 10 GHz : 20log (3.87 m / 3.0 m) = 2.21 dB

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

UL Japan, Inc.

Kashima EMC Lab.

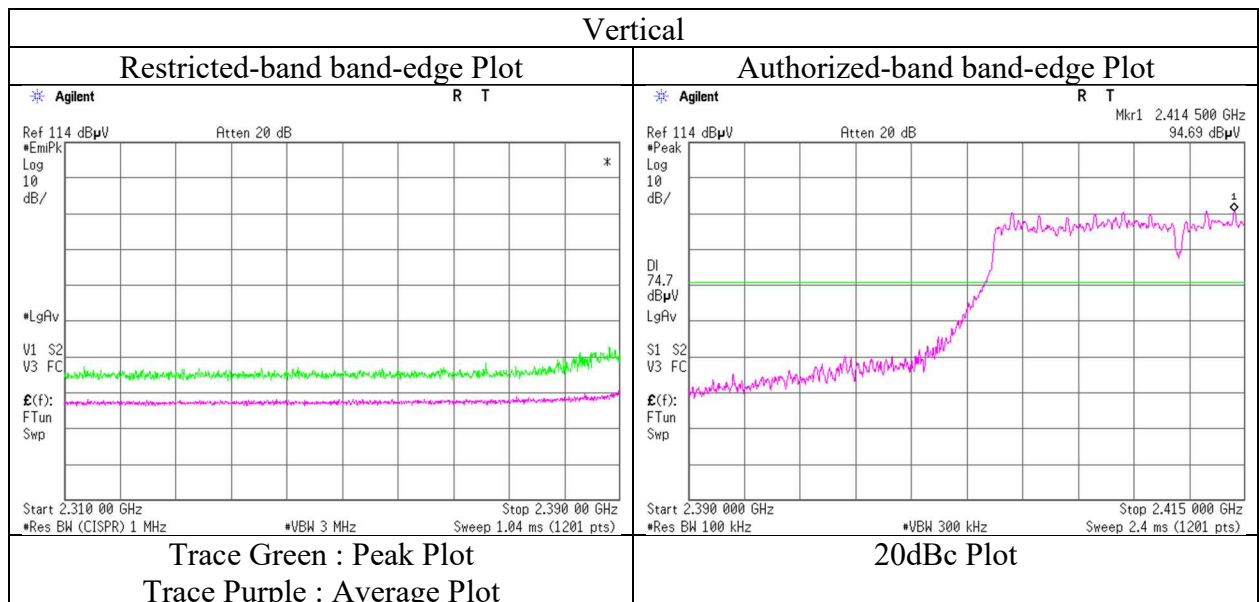
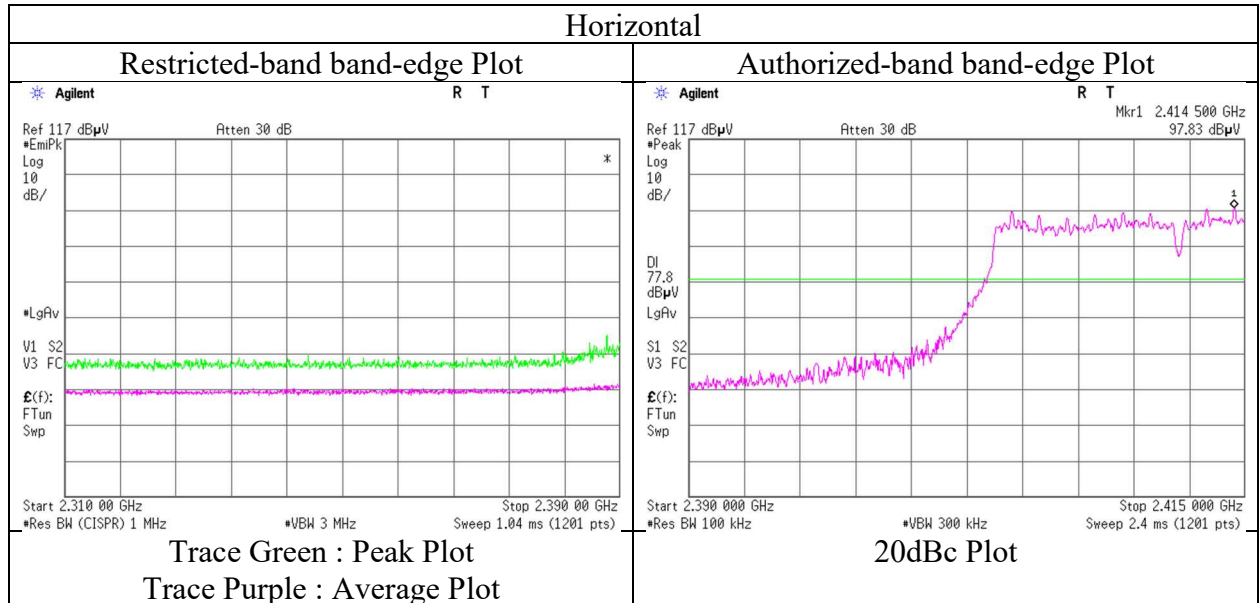
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13408125M-B-R1
Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.6
Date	July 7, 2020
Temperature / Humidity	22 deg. C / 56 % RH
Engineer	Kazuhiro Ando
Mode	Tx 11g 2412 MHz
EUT	Lo type



* 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.

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Radiated Spurious Emission

Report No. 13408125M-B-R1
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.6
Date July 7, 2020
Temperature / Humidity 22 deg. C / 56 % RH
Engineer Kazuhiro Ando
(1 GHz -2.8 GHz)
Mode Tx 11g 2417 MHz
EUT Lo type

(* 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	64.80	27.61	13.32	43.84	2.21	64.10	73.9	9.8	283	59	
Vert.	2390.000	PK	62.90	27.61	13.32	43.84	2.21	62.20	73.9	11.7	259	0	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.21\text{ dB}$

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	50.40	27.61	13.32	43.84	1.06	2.21	50.76	53.9	3.1	*1)
Vert.	2390.000	AV	48.30	27.61	13.32	43.84	1.06	2.21	48.66	53.9	5.2	*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 : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.21\text{ dB}$

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.	2417.000	PK	99.30	27.68	13.34	43.83	2.21	98.70	-	-	Carrier
Hori.	2399.200	PK	61.30	27.63	13.33	43.83	2.21	60.64	78.70	18.0	
Hori.	2400.000	PK	58.10	27.63	13.33	43.83	2.21	57.44	78.70	21.2	
Vert.	2417.000	PK	96.50	27.68	13.34	43.83	2.21	95.90	-	-	Carrier
Vert.	2399.200	PK	58.30	27.63	13.33	43.83	2.21	57.64	75.90	18.2	
Vert.	2400.000	PK	55.90	27.63	13.33	43.83	2.21	55.24	75.90	20.6	

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.21\text{ dB}$

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