



RADIO TEST REPORT

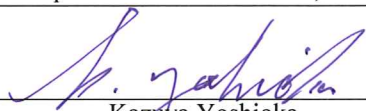
Test Report No. : 10953040H-A-R1

Applicant : Murata Manufacturing Co., Ltd.
Type of Equipment : Communication Module
Model No. : TYPE1FJ
FCC ID : VPYLB1FJ
Test regulation : FCC Part 15 Subpart C: 2015
(WLAN, Bluetooth (Low Energy) parts)
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
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6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. This report is a revised version of 10953040H-A. 10953040H-A is replaced with this report.

Date of test: September 24 to October 6, 2015

Representative test engineer:


Kazuya Yoshioka
Engineer
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Approved by:


Takayuki Shimada
Engineer
Consumer Technology Division



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CONTENTS	PAGE
SECTION 1: Customer information.....	4
SECTION 2: Equipment under test (E.U.T.).....	4
SECTION 3: Test specification, procedures & results.....	6
SECTION 4: Operation of E.U.T. during testing.....	9
SECTION 5: Conducted Emission.....	13
SECTION 6: Radiated Spurious Emission	14
SECTION 7: Antenna Terminal Conducted Tests.....	16
APPENDIX 1: Test data	17
Conducted Emission	17
6dB Bandwidth	23
Maximum Peak Output Power	26
Average Output Power	30
Radiated Spurious Emission	34
Conducted Spurious Emission	76
Power Density	80
99%Occupied Bandwidth	83
APPENDIX 2: Test instruments	85
APPENDIX 3: Photographs of test setup	87
Conducted Emission	87
Radiated Spurious Emission	89
Worst Case Position	91

SECTION 1: Customer information

Company Name	:	Murata Manufacturing Co., Ltd.
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Telephone Number	:	+81-75-955-6736
Facsimile Number	:	+81-75-955-6634
Contact Person	:	Motoo Hayashi

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	Communication Module
Model No.	:	TYPE1FJ
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	VBAT: Typ. 3.3 V, Min. 3.0 V, Max. 4.8 V VDDIO*: Typ. 1.8 V or 3.3 V, Min. 1.71 V, Max. 3.63 V *This doesn't influence the RF Characteristic.
Receipt Date of Sample	:	September 20, 2015
Country of Mass-production	:	China
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab

2.2 Product Description

Model: TYPE1FJ (referred to as the EUT in this report) is a Communication Module.

General Specification

Clock frequency(ies) in the system	:	37.4 MHz
Operating temperature	:	-30 deg. C to +70 deg. C

Radio Specification

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

Equipment Type	Transceiver
Frequency of Operation	2412 MHz - 2462 MHz
Type of Modulation	DSSS, OFDM
Bandwidth & Channel spacing	20 MHz & 5 MHz
Method of frequency generation	Synthesizer
Power Supply (inner)	DC 1.2 V / DC 3.3 V
Antenna Type	Monopole Pattern Antenna
Antenna Gain	+0.8 dBi (Internal) +0.3 dBi (External)

Bluetooth (Ver. 4.1 with EDR function)

Equipment Type	Transceiver
Frequency of Operation	2402 MHz – 2480 MHz
Type of Modulation	BT: FHSS (GFSK, $\pi/4$ DQPSK, 8DPSK) LE: GFSK
Bandwidth & Channel spacing	BT: 1 MHz & 1 MHz LE: 2 MHz & 2 MHz
Method of frequency generation	Synthesizer
Power Supply (inner)	DC 1.2 V / DC 3.3 V
Antenna Type	Monopole Pattern Antenna
Antenna Gain	+0.8 dBi (Internal) +0.3 dBi (External)

*This test report applies for WLAN and Bluetooth Low Energy parts.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2015, final revised on September 8, 2015

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.247 Operation within the bands 902-928MHz,
2400-2483.5MHz, and 5725-5850MHz

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.4-2009 7. AC powerline Conducted Emission measurements IC: RSS-Gen 8.8	FCC: Section 15.207 IC: RSS-Gen 8.8	[External antenna] QP 33.1 dB 0.15000 MHz, L AV 34.7 dB 0.78120 MHz, N [Internal antenna] QP 33.0 dB 0.15000 MHz, L AV 34.8 dB 0.79899 MHz, N	Complied	-
6dB Bandwidth	FCC: KDB 558074 D01 DTS Meas Guidance v03r03 IC: -	FCC: Section 15.247(a)(2) IC: RSS-247 5.2(1)	See data.	Complied	Conducted
Maximum Peak Output Power	FCC: KDB 558074 D01 DTS Meas Guidance v03r03 IC: RSS-Gen 6.12	FCC: Section 15.247(b)(3) IC: RSS-247 5.4(4)		Complied	Conducted
Power Density	FCC: KDB 558074 D01 DTS Meas Guidance v03r03 IC: -	FCC: Section 15.247(e) IC: RSS-247 5.2(2)		Complied	Conducted
Spurious Emission Restricted Band Edges	FCC: KDB 558074 D01 DTS Meas Guidance v03r03 IC: RSS-Gen 6.13	FCC: Section 15.247(d) IC: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	[External antenna] 4.0 dB 2483.500 MHz, AV, Hori. [Internal antenna] 1.2 dB 9748.000 MHz, AV, Hori. 2483.500 MHz, AV, Hori.	Complied	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *1)

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.

*1) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 DTS Meas Guidance v03r03 12.2.7.

* In case any questions arise about test procedure, ANSI C63.4: 2009 is also referred.

FCC Part 15.31 (e)

The RF Module has its own regulator.

The RF Module is constantly provided voltage (DC 1.2V / DC 3.3 V) through the regulator regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203/212 Antenna requirement

[Internal antenna]

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 15.203/212.

[External antenna]

The EUT has a unique antenna connector (Microwave Coaxial Connectors (MM5829-2700RK0) on the Module). Therefore the equipment complies with the requirement of Section 15.203/212.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	IC: RSS-Gen 6.6	IC: -	N/A	-	Conducted

Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

EMI

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k = 2$.
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Test site (semi anechoic chamber)	Conducted emission Uncertainty (+/-)			
	No. 1	No. 2	No. 3	No. 4
150 kHz - 30 MHz	3.5 dB	3.5 dB	3.4 dB	3.5 dB

Test site (semi anechoic chamber)	Radiated emission Uncertainty (+/-)						
	Measurement distance: 3 m				1 m		0.5 m
	9 kHz - 30 MHz	30 MHz - 300 MHz	300 MHz - 1 GHz	1 GHz - 10 GHz	10 GHz - 18 GHz	18 GHz - 26.5 GHz	26.5 GHz - 40 GHz
No. 1	4.3 dB	5.1 dB	6.2 dB	5.5 dB	5.8 dB	5.8 dB	4.3 dB
No. 2	4.2 dB	5.1 dB	6.2 dB	5.4 dB	5.7 dB	5.9 dB	5.6 dB
No. 3	4.4 dB	5.1 dB	6.3 dB	5.2 dB	5.5 dB	5.8 dB	5.5 dB
No. 4	4.7 dB	5.3 dB	6.3 dB	5.3 dB	5.7 dB	5.9 dB	5.5 dB

Antenna terminal test Uncertainty (+/-)							
Power meter		Conducted emission and Power density			Conducted emission		Channel power
Below 1 GHz	Above 1 GHz	Below 1 GHz	1 GHz - 3 GHz	3 GHz - 18 GHz	18 GHz - 26.5 GHz	26.5 GHz - 40 GHz	
0.7 dB	1.5 dB	1.5 dB	1.7 dB	2.8 dB	2.8 dB	2.9 dB	2.6 dB

Conducted Emission test

The data listed in this test report has enough margin, more than the site margin.

Radiated emission test

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

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3.5 Test Location

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Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.6 shielded room	-	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	-	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	-	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	-	3.1 x 5.0 x 2.7	N/A	-	-
No.9 measurement room	-	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	-	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 m x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

SECTION 4: Operation of E.U.T. 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)	11 Mbps, PN9
IEEE 802.11g (11g)	48 Mbps, PN9
IEEE 802.11n MIMO 20MHz BW (11n-20)	MCS 6, PN9
Bluetooth(BT) Low Energy (LE)	Maximum Packet Size, PN9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Low Channel)	
*The power value of the EUT was set for testing as follows (setting value might be different from product specification value); Power settings: WLAN: 9 BT LE: Config:0136 Software: WLAN: MFG Tool Version 7.10.323.48 BT LE: Blue tool 1.8.9.3 *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
Conducted Emission *1)	11g Tx	2412MHz
	BT LE Tx	2402MHz
		2440MHz
		2480MHz
Spurious Emission above 1GHz (Radiated)	11b Tx	2412MHz
	11g Tx *2)	2437MHz
		2462MHz
	BT LE Tx	2402MHz
		2440MHz
		2480MHz
Band edge of Spurious Emission above 1GHz (Radiated)	11n-20 Tx *3)	2412MHz
		2462MHz
Spurious Emission below 1GHz (Radiated)	11g Tx *1)	2412MHz
	BT LE Tx	2402MHz
		2440MHz
		2480MHz
6dB Bandwidth 99% Occupied Bandwidth	11b Tx	2412MHz
	11g Tx	2437MHz
	11n-20 Tx	2462MHz
	BT LE Tx	2402MHz
		2440MHz
		2480MHz
Maximum Peak Output Power, Power Density	11b Tx	2412MHz
	11g Tx	2437MHz
	11n-20 Tx	2462MHz
	BT LE Tx	2402MHz
		2440MHz
		2480MHz
Spurious Emission (Conducted)	11g Tx *1)	2412MHz
	BT LE Tx	2402MHz
		2440MHz
		2480MHz

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

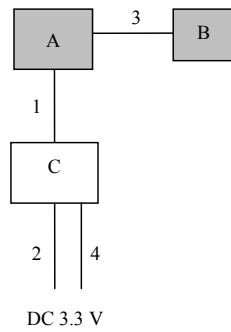
*2) Since 11g and 11n-20 have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest peak output power

*3) Only band edge test was tested on this mode, because the 11g Tx mode had the higher power at antenna terminal test.

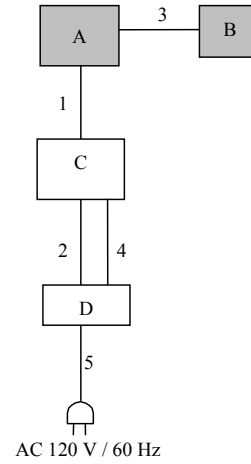
4.2 Configuration and peripherals

[External antenna]

[Radiated emission]

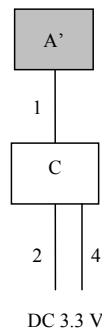


[Conducted emission]

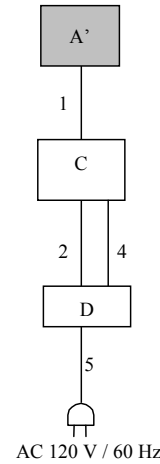


[Internal antenna]

[Radiated emission]



[Conducted emission]



* 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	Communication Module	TYPE1FJ	29: WLAN, 11: BT LE	Murata Manufacturing Co., Ltd.	EUT *1)
			20: WLAN, 11: BT LE	Murata Manufacturing Co., Ltd.	EUT *2)
A'	Communication Module	TYPE1FJ	2: WLAN, 2: BT LE	Murata Manufacturing Co., Ltd.	EUT *2)
B	External Antenna	Type1CH_Antenna	No.1	Murata Manufacturing Co., Ltd.	EUT
C	Jig Board	-	-	Murata Manufacturing Co., Ltd.	-
D	DC Power Supply	PMC35-2A	13090501	KIKUSUI	-

*1) Used for Antenna terminal conducted tests

*2) Used for Radiated emission and Conducted emission tests

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	FPC Cable	0.03	Unshielded	Unshielded	-
2	DC Cable	2.00	Unshielded	Unshielded	*1)
		1.00	Unshielded	Unshielded	*2)
3	Antenna Cable	0.10	Shielded	Shielded	-
4	DC Cable	2.00	Unshielded	Unshielded	*1)
		1.00	Unshielded	Unshielded	*2)
5	AC Cable	1.80	Unshielded	Unshielded	-

*1) Used for all tests except for Conducted emission test

*2) Used for Conducted emission test only

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 m, raised 0.8 m above the conducting ground plane.

The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

For the tests on EUT with other peripherals (as a whole system)

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane. All unused 50ohm connectors of the LISN (AMN) were resistivity terminated in 50 ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber.

The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

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

Detector	: QP and CISPR AV
Measurement range	: 0.15 MHz – 30 MHz
Test data	: APPENDIX
Test result	: Pass

SECTION 6: Radiated Spurious Emission

Test Procedure

It was measured based on "11.0 Emissions in non-restricted frequency bands" of "558074 D01 DTS Meas Guidance v03r03".

EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 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.

The height of the measuring antenna varied between 1 m and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.

The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below;

Frequency	30 MHz to 300 MHz	300 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

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

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

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	Average Power Method: 12.2.5.1 RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces 12.2.5.2 RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces Duty factor was added to the results.	RBW: 100 kHz VBW: 300kHz
Test Distance	3m	3 m (below 10 GHz), 1 m *2) (above 10 GHz)		3 m (below 10 GHz), 1 m *2) (above 10 GHz)

*1) Average Power Measurement was performed based on 6.0 & 12.2.5 of "KDB 558074 D01 DTS Meas Guidance v03r03"

*2) Distance Factor: $20 \times \log(3.0 \text{ m} / 1.0 \text{ m}) = 9.5 \text{ dB}$

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- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT (Module and Antenna) to see the position of maximum noise, and the test was made at the position that has the maximum noise.

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

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

SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

The tests were made with below setting connected to the antenna port.

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
6dB Bandwidth	5 MHz, 20 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak/ Average *2)	-	Power Meter (Sensor: 50 MHz BW)
Peak Power Density	1.5 times the 6dB Bandwidth	3 kHz	10 kHz	Auto	Peak	Max Hold	Spectrum Analyzer *3)
Conducted Spurious Emission *4)	9kHz to 150kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	9.1 kHz	27 kHz				

*1) Peak hold was applied as Worst-case measurement.

*2) Reference data

*3) Section 10.2 Method PKPSD (peak PSD) of "KDB 558074 D01 DTS Meas Guidance v03r03".

*4) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.

Then, wide-band noise near the limit was checked separately, however the noise was low enough as shown in the chart.

(9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 9.1 kHz).

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

Test data : **APPENDIX**

Test result : **Pass**

APPENDIX 1: Test data

Conducted Emission External antenna

DATA OF CONDUCTED EMISSION TEST

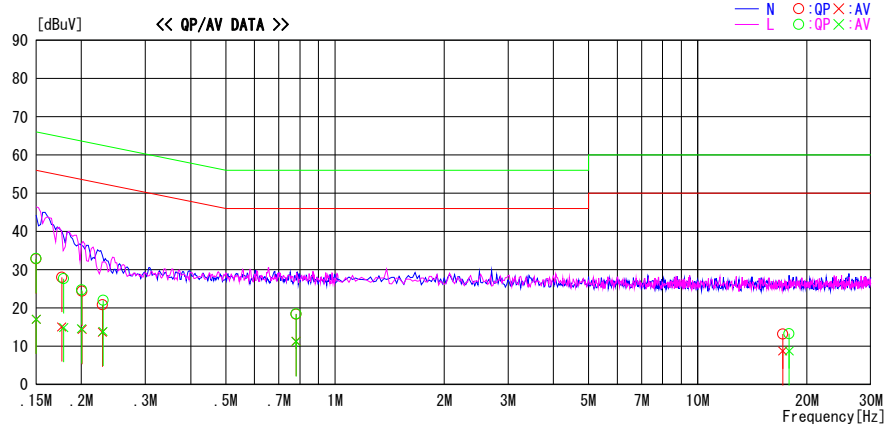
UL Japan, Inc. Ise EMC Lab. No. 2 Semi Anechoic Chamber
Date : 2015/10/06

Report No. : 10953040H

Temp./Humi. : 24deg. C / 61% RH
Engineer : Tomoki Matsui

Mode / Remarks : WLAN 11g 2412MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	19.6	3.9	13.2	32.8	17.1	66.0	56.0	33.2	38.9	N	
0.17648	14.8	1.9	13.2	28.0	15.1	64.6	54.6	36.6	39.5	N	
0.20088	11.2	1.2	13.2	24.4	14.4	63.6	53.6	39.2	39.2	N	
0.22845	7.6	0.5	13.2	20.8	13.7	62.5	52.5	41.7	38.8	N	
0.78120	5.1	-2.0	13.3	18.4	11.3	56.0	46.0	37.6	34.7	N	
17.14320	-1.5	-5.9	14.7	13.2	8.8	60.0	50.0	46.8	41.2	N	
0.15000	19.7	3.9	13.2	32.9	17.1	66.0	56.0	33.1	38.9	L	
0.17871	14.5	1.7	13.2	27.7	14.9	64.5	54.5	36.9	39.6	L	
0.20009	11.5	1.4	13.2	24.7	14.6	63.6	53.6	38.9	39.0	L	
0.22949	8.8	0.7	13.2	22.0	13.9	62.5	52.5	40.5	38.6	L	
0.78120	5.2	-2.1	13.3	18.5	11.2	56.0	46.0	37.5	34.8	L	
17.85820	-1.4	-5.9	14.7	13.3	8.8	60.0	50.0	46.7	41.2	L	

CHART : WITH FACTOR. Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + ATTN + CABLE)
Except for the above table : adequate margin data below the limits.

Conducted Emission
External antenna

DATA OF CONDUCTED EMISSION TEST

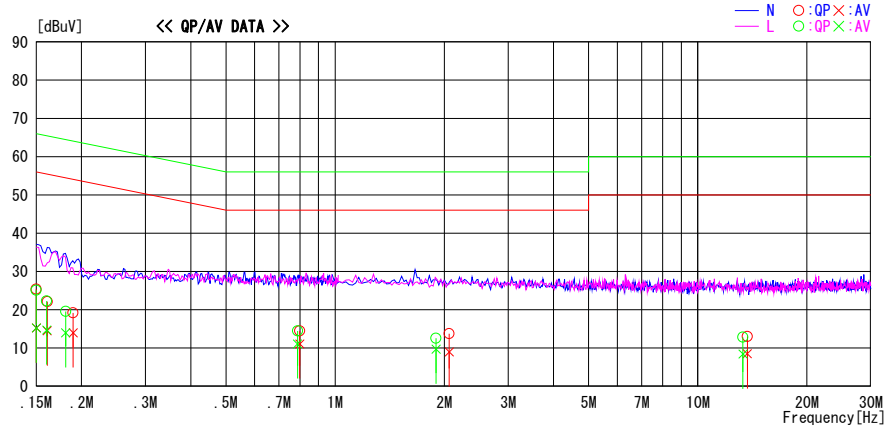
UL Japan, Inc. Ise EMC Lab. No.2 Semi Anechoic Chamber
Date : 2015/10/06

Report No. : 10953040H

Temp./Humi. : 24deg. C / 61% RH
Engineer : Tomoki Matsui

Mode / Remarks : BT LE 2480MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



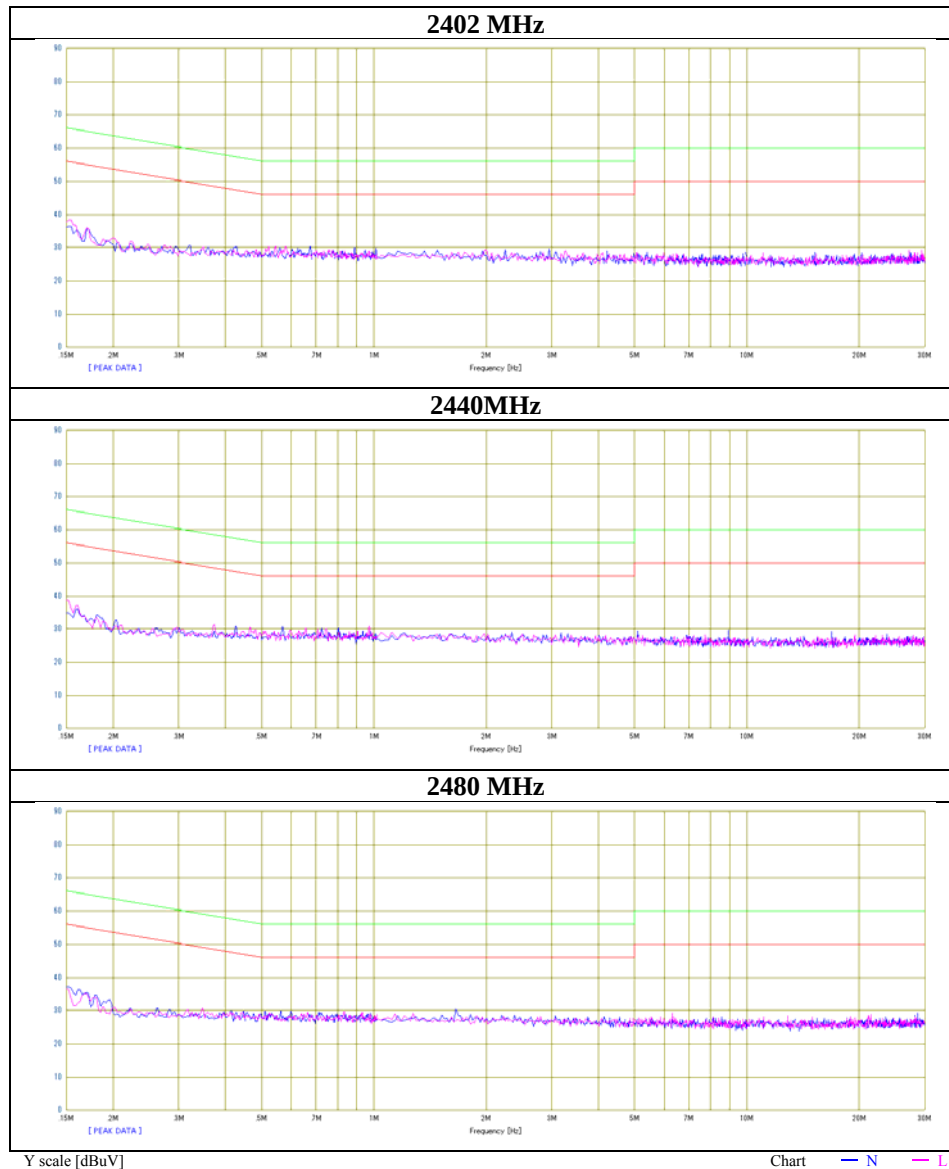
Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	12.2	2.0	13.2	25.4	15.2	66.0	56.0	40.6	40.8	N	
0.16082	8.9	1.3	13.2	22.1	14.5	65.4	55.4	43.3	40.9	N	
0.18962	6.0	0.8	13.2	19.2	14.0	64.1	54.1	44.9	40.1	N	
0.79935	1.2	-2.2	13.3	14.5	11.1	56.0	46.0	41.5	34.9	N	
2.06501	0.3	-4.4	13.4	13.7	9.0	56.0	46.0	42.3	37.0	N	
13.68879	-1.5	-6.0	14.5	13.0	8.5	60.0	50.0	47.0	41.5	N	
0.15000	11.9	2.0	13.2	25.1	15.2	66.0	56.0	40.9	40.8	L	
0.16030	9.1	1.5	13.2	22.3	14.7	65.4	55.4	43.1	40.7	L	
0.18080	6.4	0.8	13.2	19.6	14.0	64.4	54.4	44.8	40.4	L	
0.78768	1.2	-2.2	13.3	14.5	11.1	56.0	46.0	41.5	34.9	L	
1.89842	-0.8	-3.7	13.4	12.6	9.7	56.0	46.0	43.4	36.3	L	
13.31600	-1.6	-6.0	14.4	12.8	8.4	60.0	50.0	47.2	41.6	L	

CHART : WITH FACTOR, Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + ATTN + CABLE)
Except for the above table : adequate margin data below the limits.

Conducted Emission

External antenna

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	10953040H
Date	October 5, 2015
Temperature / Humidity	24 deg. C / 61 % RH
Engineer	Tomoki Matsui
Mode	BT LE



Conducted Emission

Internal antenna

DATA OF CONDUCTED EMISSION TEST

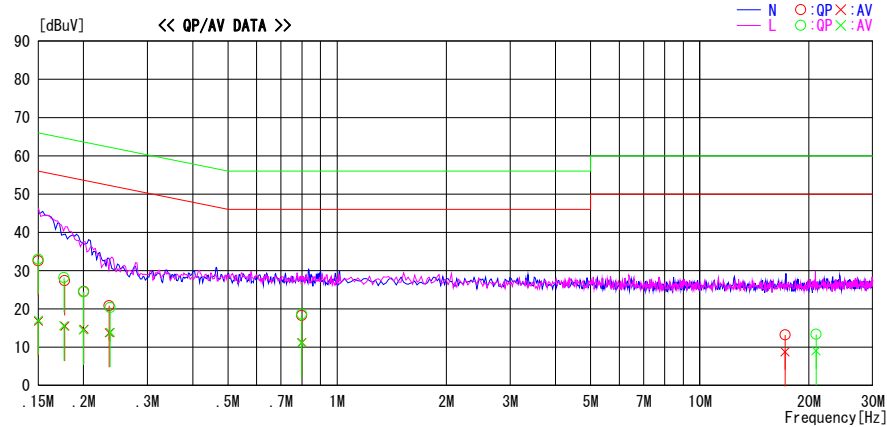
UL Japan, Inc. Ise EMC Lab. No. 2 Semi Anechoic Chamber
Date : 2015/10/06

Report No. : 10953040H

Temp./Humi. : 24deg. C / 61% RH
Engineer : Tomoki Matsui

Mode / Remarks : WLAN 11g 2412MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	19.4	3.6	13.2	32.6	16.8	66.0	56.0	33.4	39.2	N	
0.17750	14.2	2.3	13.2	27.4	15.5	64.6	54.6	37.2	39.1	N	
0.20024	11.4	1.5	13.2	24.6	14.7	63.6	53.6	39.0	38.9	N	
0.23523	7.6	0.6	13.2	20.8	13.8	62.3	52.3	41.5	38.5	N	
0.79899	5.0	-2.1	13.3	18.3	11.2	56.0	46.0	37.7	34.8	N	
17.18400	-1.5	-5.9	14.7	13.2	8.8	60.0	50.0	46.8	41.2	N	
0.15000	19.8	3.9	13.2	33.0	17.1	66.0	56.0	33.0	38.9	L	
0.17649	15.0	2.4	13.2	28.2	15.6	64.6	54.6	36.4	39.0	L	
0.19957	11.3	1.3	13.2	24.5	14.5	63.6	53.6	39.2	39.1	L	
0.23680	7.2	0.7	13.2	20.4	13.9	62.2	52.2	41.8	38.3	L	
0.79874	5.4	-2.2	13.3	18.7	11.1	56.0	46.0	37.4	34.9	L	
20.91520	-1.5	-5.8	14.9	13.4	9.1	60.0	50.0	46.6	40.9	L	

CHART : WITH FACTOR. Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + ATTN + CABLE)
Except for the above table : adequate margin data below the limits.

Conducted Emission

Internal antenna

DATA OF CONDUCTED EMISSION TEST

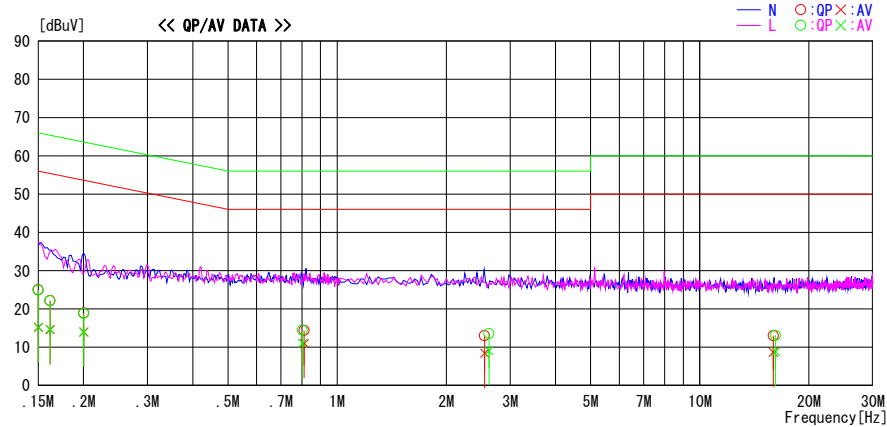
UL Japan, Inc. Ise EMC Lab. No. 2 Semi Anechoic Chamber
Date : 2015/10/05

Report No. : 10953040H

Temp./Humi. : 24deg. C / 61% RH
Engineer : Tomoki Matsui

Mode / Remarks : BT LE 2480MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



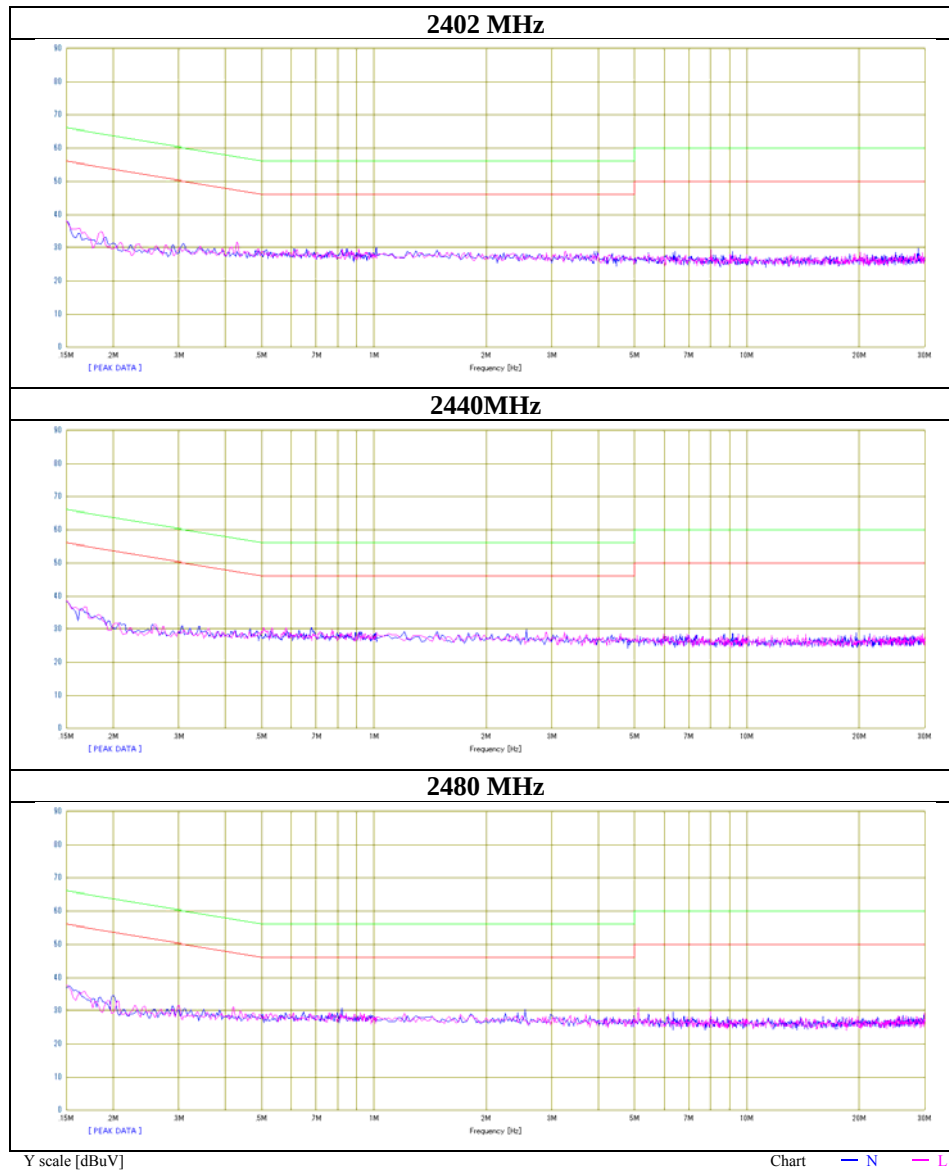
Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	11.8	1.9	13.2	25.0	15.1	66.0	56.0	41.0	40.9	N	
0.16182	9.0	1.4	13.2	22.2	14.6	65.4	55.4	43.2	40.8	N	
0.20027	5.7	0.8	13.2	18.9	14.0	63.6	53.6	44.7	39.6	N	
0.81171	1.1	-2.3	13.3	14.4	11.0	56.0	46.0	41.6	35.0	N	
2.55120	-0.5	-5.1	13.5	13.0	8.4	56.0	46.0	43.0	37.6	N	
15.94413	-1.6	-5.9	14.6	13.0	8.7	60.0	50.0	47.0	41.3	N	
0.15000	11.7	2.0	13.2	24.9	15.2	66.0	56.0	41.1	40.8	L	
0.16152	8.9	1.5	13.2	22.1	14.7	65.4	55.4	43.3	40.7	L	
0.20016	5.6	0.8	13.2	18.8	14.0	63.6	53.6	44.8	39.6	L	
0.80240	1.2	-2.2	13.3	14.5	11.1	56.0	46.0	41.5	34.9	L	
2.62140	0.0	-4.5	13.6	13.6	9.1	56.0	46.0	42.4	36.9	L	
16.17610	-1.5	-5.8	14.6	13.1	8.8	60.0	50.0	46.9	41.2	L	

CHART : WITH FACTOR. Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + ATTN + CABLE)
Except for the above table : adequate margin data below the limits.

Conducted Emission

Internal antenna

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	10953040H
Date	October 5, 2015
Temperature / Humidity	24 deg. C / 61 % RH
Engineer	Tomoki Matsui
Mode	BT LE

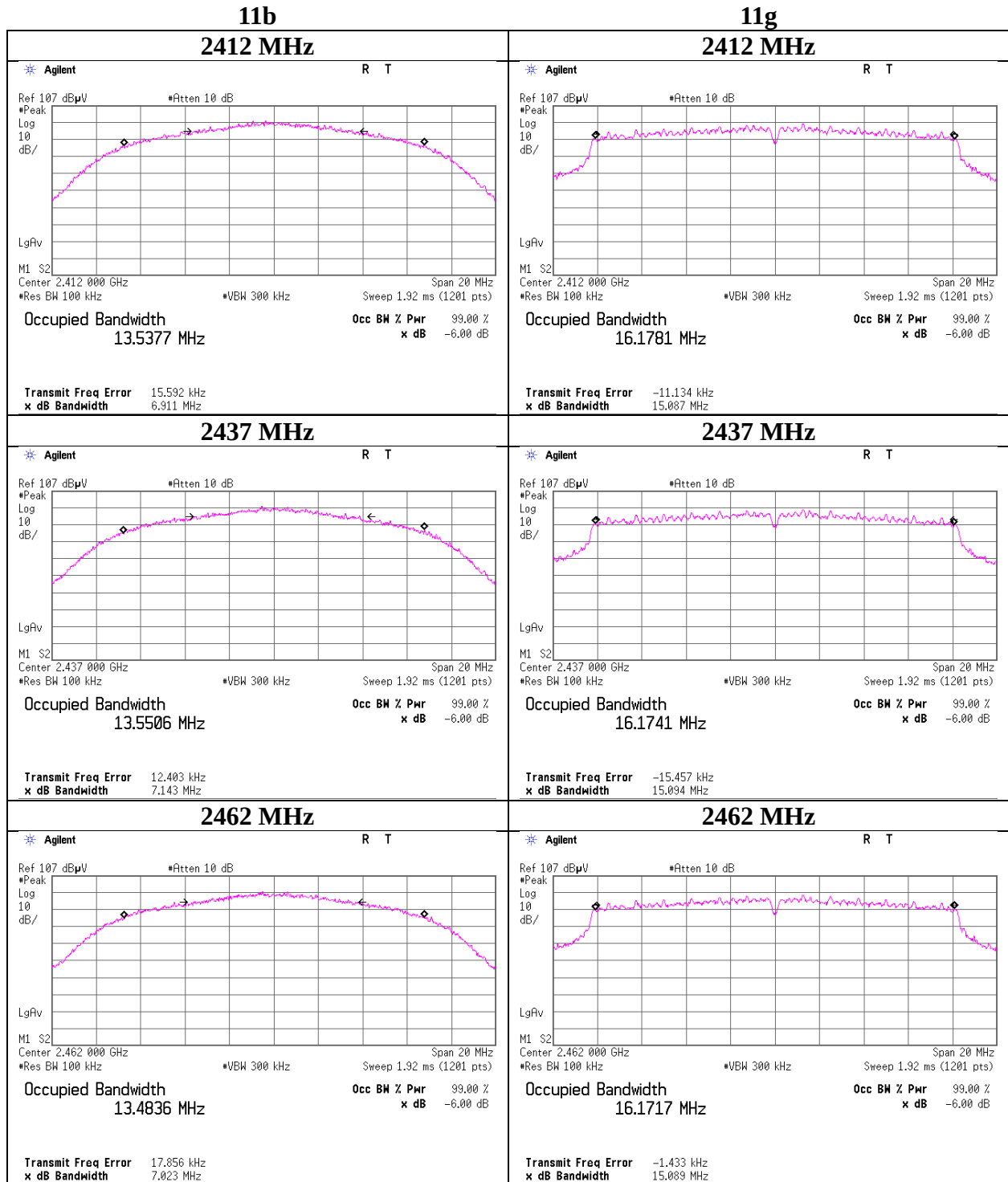


6dB Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10953040H
Date	September 25, 2015 October 1, 2015
Temperature / Humidity	24 deg. C / 67 % RH 24deg. C / 56% RH
Engineer	Tomoki Matsui Satofumi Matsuyama
Mode	Tx

Mode	Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
11b	2412	6.911	> 500
	2437	7.143	> 500
	2462	7.023	> 500
11g	2412	15.087	> 500
	2437	15.094	> 500
	2462	15.089	> 500
11n-20	2412	15.094	> 500
	2437	15.088	> 500
	2462	15.092	> 500
BT LE	2402	0.711	> 500
	2440	0.720	> 500
	2480	0.707	> 500

6dB Bandwidth



UL Japan, Inc.

Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

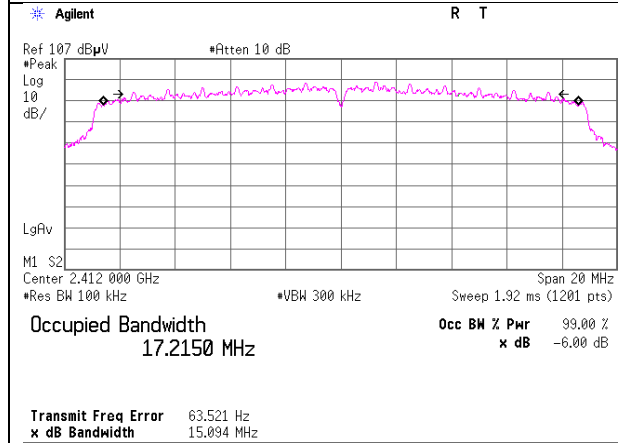
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

6dB Bandwidth

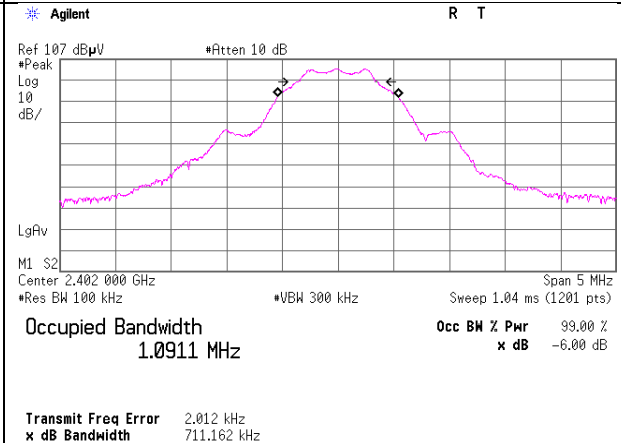
11n-20

2412 MHz

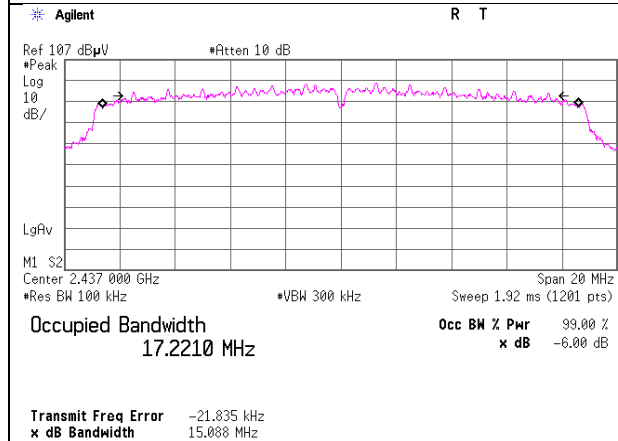


BT LE

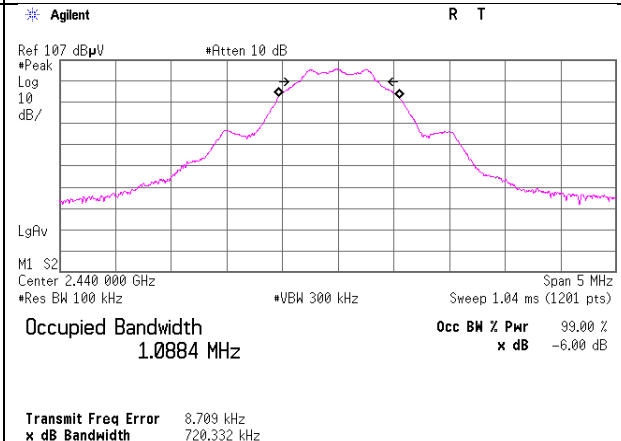
2402 MHz



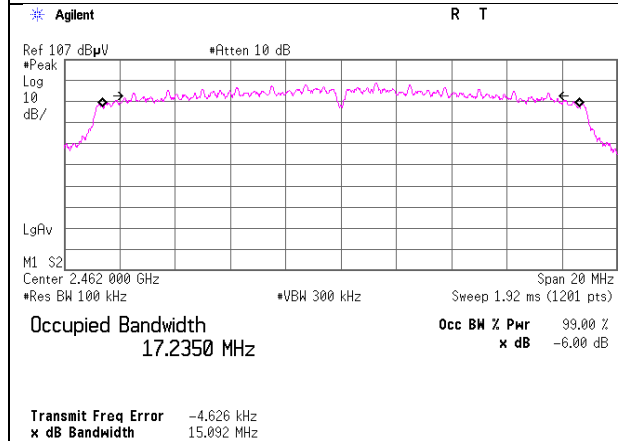
2437 MHz



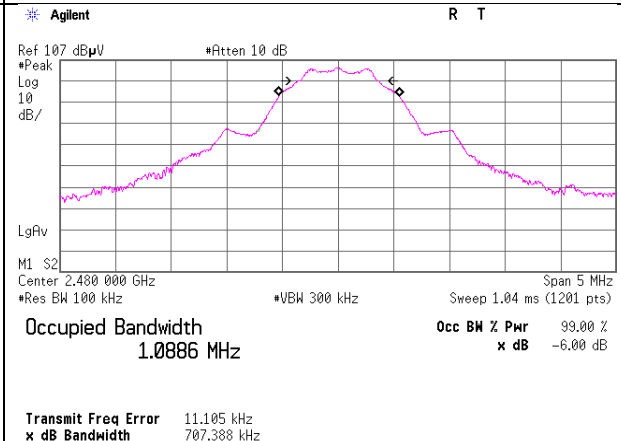
2440 MHz



2462 MHz



2480 MHz



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Maximum Peak Output Power

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10953040H
Date	September 24, 2015
Temperature / Humidity	24 deg. C / 62 % RH
Engineer	Satofumi Matsuyama
Mode	Tx 11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	0.98	2.03	9.77	12.78	18.97	30.00	1000	17.22
2437	0.80	2.04	9.77	12.61	18.24	30.00	1000	17.39
2462	0.75	2.05	9.77	12.57	18.07	30.00	1000	17.43

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

2437MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
1	0.41	
2	0.39	
5.5	0.40	
11	0.80	*

*: Worst Rate

All comparison were carried out on same frequency and measurement factors.

Maximum Peak Output Power

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10953040H
Date	September 24, 2015
Temperature / Humidity	24 deg. C / 62 % RH
Engineer	Satofumi Matsuyama
Mode	Tx 11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	6.40	2.03	9.77	18.20	66.07	30.00	1000	11.80
2437	6.02	2.04	9.77	17.83	60.67	30.00	1000	12.17
2462	5.82	2.05	9.77	17.64	58.08	30.00	1000	12.36

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

2437 MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
6	5.63	
9	5.66	
12	5.80	
18	5.69	
24	5.73	
36	5.80	
48	6.02	*
54	5.87	

*: Worst Rate

All comparison were carried out on same frequency and measurement factors.

Maximum Peak Output Power

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 10953040H
Date : September 24, 2015
Temperature / Humidity : 24 deg. C / 62 % RH
Engineer : Satofumi Matsuyama
Mode : Tx 11n-20

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	6.13	2.03	9.77	17.93	62.09	30.00	1000	12.07
2437	6.02	2.04	9.77	17.83	60.67	30.00	1000	12.17
2462	5.69	2.05	9.77	17.51	56.36	30.00	1000	12.49

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

2437 MHz

MCS Number	Reading	Remark
	[dBm]	
0	5.74	
1	5.68	
2	5.87	
3	5.73	
4	5.69	
5	5.87	
6	6.02	*
7	5.89	

*: Worst Rate

All comparison were carried out on same frequency and measurement factors.

Maximum Peak Output Power

Test place Ise EMC Lab. No.11 Measurement Room
Report No. 10953040H
Date October 1, 2015
Temperature / Humidity 24 deg. C / 50 % RH
Engineer Takafumi Noguchi
Mode Tx BT LE

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2402	-4.17	2.03	9.77	7.63	5.79	30.00	1000	22.37
2440	-3.95	2.04	9.77	7.86	6.11	30.00	1000	22.14
2480	-3.46	2.05	9.77	8.36	6.85	30.00	1000	21.64

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

Average Output Power (Reference data for SAR testing)

Test place	Ise EMC Lab. No.11 Measurement Room	
Report No.	10953040H	
Date	September 24, 2015	October 1, 2015
Temperature / Humidity	24 deg. C / 62 % RH	24 deg. C / 50 % RH
Engineer	Satofumi Matsuyama	Takafumi Noguchi
Mode	Tx	

11b 1Mbps

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Frame power)		Duty factor [dB]	Result (Burst power)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-2.09	2.03	9.77	9.71	9.35	0.00	9.71	9.35
2437	-2.30	2.04	9.77	9.51	8.93	0.00	9.51	8.93
2462	-2.42	2.05	9.77	9.40	8.71	0.00	9.40	8.71

11g 6 Mbps

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Frame power)		Duty factor [dB]	Result (Burst power)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-2.13	2.03	9.77	9.67	9.27	0.06	9.73	9.40
2437	-2.19	2.04	9.77	9.62	9.16	0.06	9.68	9.29
2462	-2.29	2.05	9.77	9.53	8.97	0.06	9.59	9.10

11n-20 MCS 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Frame power)		Duty factor [dB]	Result (Burst power)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-2.27	2.03	9.77	9.53	8.97	0.06	9.59	9.10
2437	-2.38	2.04	9.77	9.43	8.77	0.06	9.49	8.89
2462	-2.43	2.05	9.77	9.39	8.69	0.06	9.45	8.81

BT LE

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Frame power)		Duty factor [dB]	Result (Burst power)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-6.37	2.03	9.77	5.43	3.49	1.78	7.21	5.26
2437	-6.16	2.04	9.77	5.65	3.67	1.78	7.43	5.53
2462	-5.77	2.05	9.77	6.05	4.03	1.78	7.83	6.07

Sample Calculation:

Result (Frame power) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

Result (Burst power) = Frame power + Duty factor

Average Output Power
(Reference data for SAR testing)

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10953040H
Date	September 24, 2015
Temperature / Humidity	24 deg. C / 62 % RH
Engineer	Satofumi Matsuyama
Mode	Tx

2437 MHz

Mode	Rate	Reading	Remarks
	Mbps	[dBm]	
11b	1	-2.30	*
	2	-2.32	
	5.5	-2.31	
	11	-2.37	
11g	6	-2.19	*
	9	-2.27	
	12	-2.23	
	18	-2.34	
	24	-2.32	
	36	-2.34	
	48	-2.58	
	54	-2.58	

Mode	MCS Number	Reading	Remarks
		[dBm]	
11n-20	0	-2.38	*
	1	-2.52	
	2	-2.58	
	3	-2.57	
	4	-2.64	
	5	-2.80	
	6	-2.87	
	7	-2.95	

* Worst rate

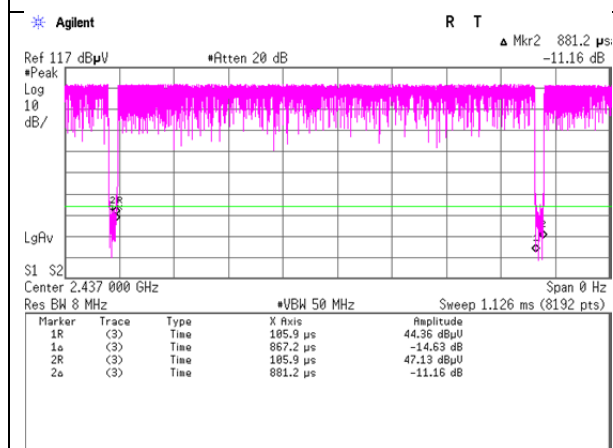
All comparison were carried out on same frequency and measurement factors.

Burst rate confirmation

Test place	Ise EMC Lab. No.11 Measurement Room	
Report No.	10953040H	
Date	September 25, 2015	October 1, 2015
Temperature / Humidity	24 deg. C / 67 % RH	24 deg. C / 50 % RH
Engineer	Tomoki Matsui	Takafumi Noguchi
Mode	Tx	

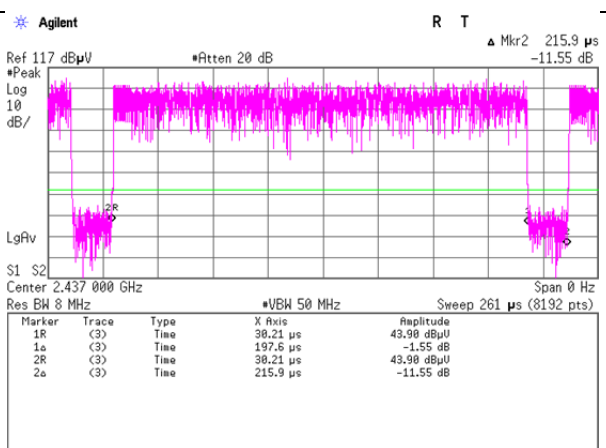
11b 11 Mbps

Tx on / (Tx on + Tx off) = 0.984
Tx on / (Tx on + Tx off) * 100 = 98.4 %
Duty factor = 10 * log (881.2 / 867.2) = 0.07 dB



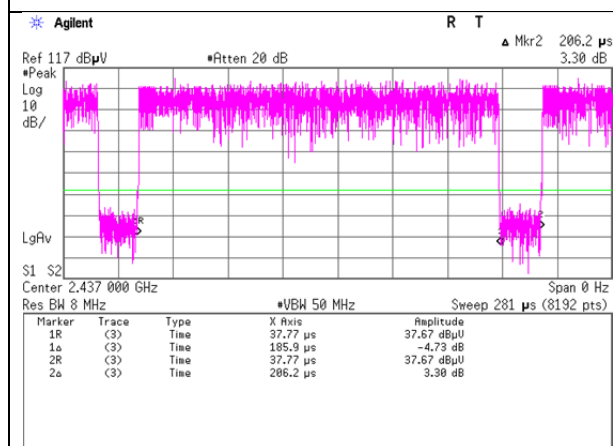
11g 48 Mbps

Tx on / (Tx on + Tx off) = 0.915
Tx on / (Tx on + Tx off) * 100 = 91.5 %
Duty factor = 10 * log (215.9 / 197.6) = 0.38 dB



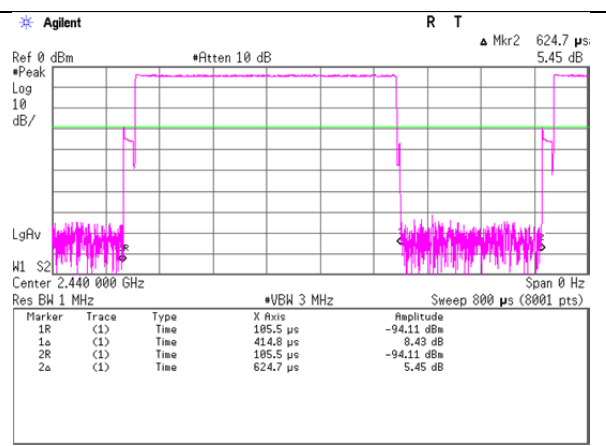
11n-20 MCS 6

Tx on / (Tx on + Tx off) = 0.902
Tx on / (Tx on + Tx off) * 100 = 90.2 %
Duty factor = 10 * log (206.2 / 185.9) = 0.45 dB



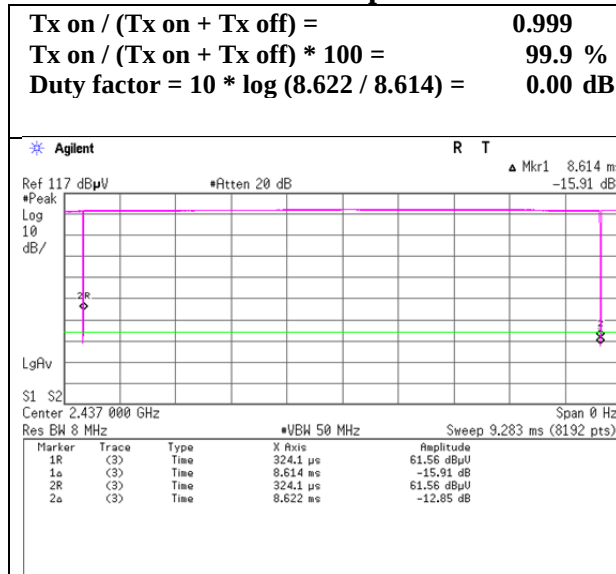
BT LE

Tx on / (Tx on + Tx off) = 0.664
Tx on / (Tx on + Tx off) * 100 = 66.4 %
Duty factor = 10 * log (624.7 / 414.8) = 1.78 dB

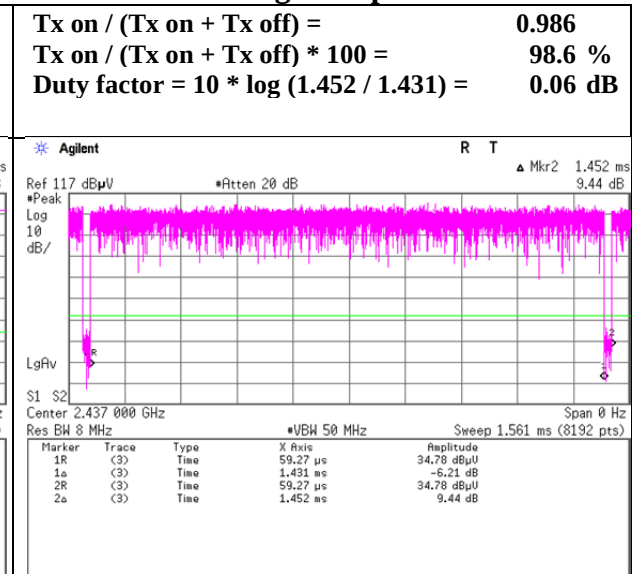


Burst rate confirmation
(Reference data for Average power)

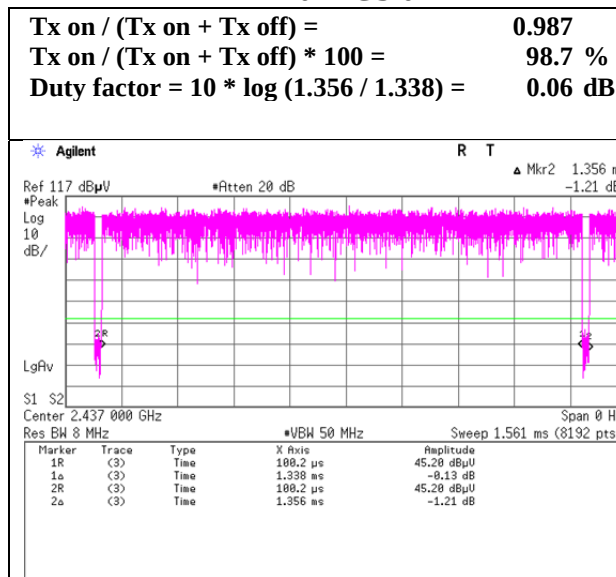
11b 1 Mbps



11g 6 Mbps



11n-20 MCS 0



Radiated Spurious Emission

External antenna

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.4	No.3
Report No.	10953040H	
Date	September 28, 2015	October 3, 2015
Temperature / Humidity	23 deg. C / 57 % RH	22 deg. C / 57 % RH
Engineer	Tomoki Matsui	Takafumi Noguchi
	(1-10GHz)	(10-26.5GHz)
Mode	Tx 11b 2412 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	46.7	27.9	3.4	32.0	-	46.0	73.9	27.9	
Hori	3618.135	PK	48.0	29.1	5.6	31.5	-	51.2	73.9	22.7	
Hori	4824.000	PK	42.9	32.9	5.7	31.3	-	50.2	73.9	23.7	
Hori	7236.000	PK	45.5	36.8	7.0	32.0	-	57.3	73.9	16.6	
Hori	2390.000	AV	35.7	27.9	3.4	32.0	-	35.0	53.9	18.9	
Hori	3618.135	AV	42.2	29.1	4.3	31.5	-	44.1	53.9	9.8	
Hori	4824.000	AV	32.2	32.9	5.7	31.3	-	39.5	53.9	14.4	
Hori	7236.000	AV	36.0	36.8	7.0	32.0	-	47.8	53.9	6.1	
Vert	2390.000	PK	43.9	27.9	3.4	32.0	-	43.2	73.9	30.7	
Vert	3618.112	PK	47.1	29.1	4.3	31.5	-	49.0	73.9	24.9	
Vert	4824.000	PK	42.0	32.9	5.7	31.3	-	49.3	73.9	24.6	
Vert	7236.000	PK	44.7	36.8	7.0	32.0	-	56.5	73.9	17.4	
Vert	2390.000	AV	34.7	27.9	3.4	32.0	-	34.0	53.9	19.9	
Vert	3618.112	AV	43.1	29.1	4.3	31.5	-	45.0	53.9	8.9	
Vert	4824.000	AV	32.7	32.9	5.7	31.3	-	40.0	53.9	13.9	
Vert	7236.000	AV	36.1	36.8	7.0	32.0	-	47.9	53.9	6.0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 10 GHz - 26.5 GHz $20\log(3.0\text{ m} / 1.0\text{ m}) = 9.5\text{ dB}$
 26.5 GHz - 40 GHz $20\log(3.0\text{ m} / 0.5\text{ m}) = 15.6\text{ dB}$

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	91.7	28.0	3.4	32.0	91.1	-	-	Carrier
Hori	2400.000	PK	48.3	28.0	3.4	32.0	47.7	71.1	23.4	
Hori	9648.000	PK	43.8	38.1	7.7	32.4	57.2	71.1	13.9	
Vert	2412.000	PK	89.3	28.0	3.4	32.0	88.7	-	-	Carrier
Vert	2400.000	PK	44.6	28.0	3.4	32.0	44.0	68.7	24.7	
Vert	9648.000	PK	43.6	38.1	7.7	32.4	57.0	68.7	11.7	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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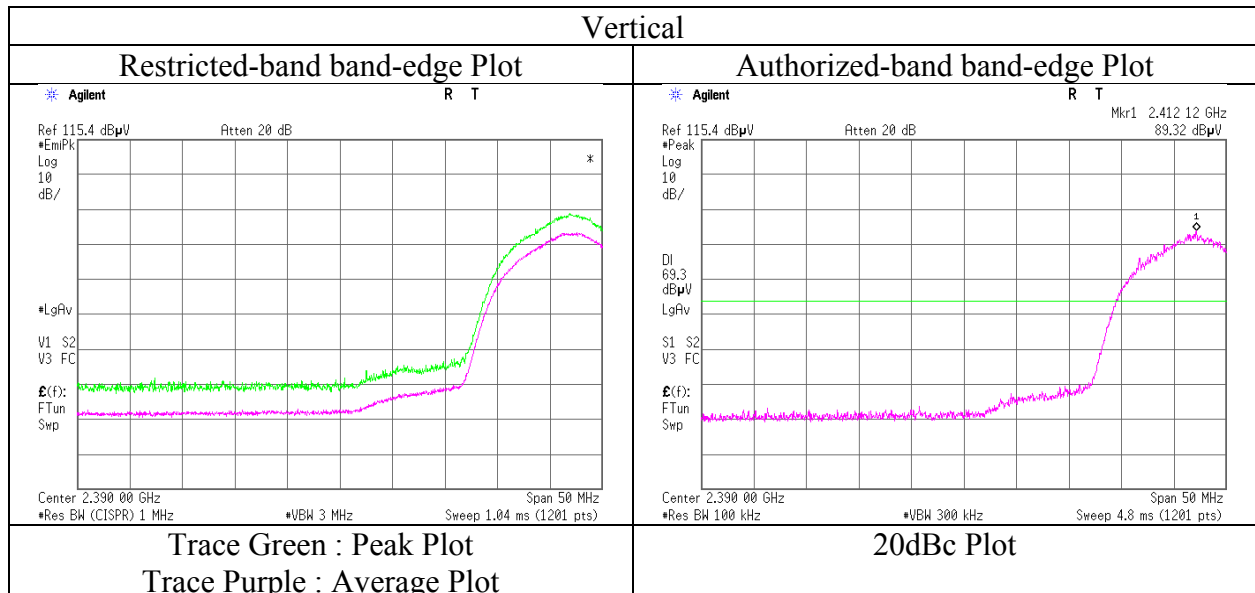
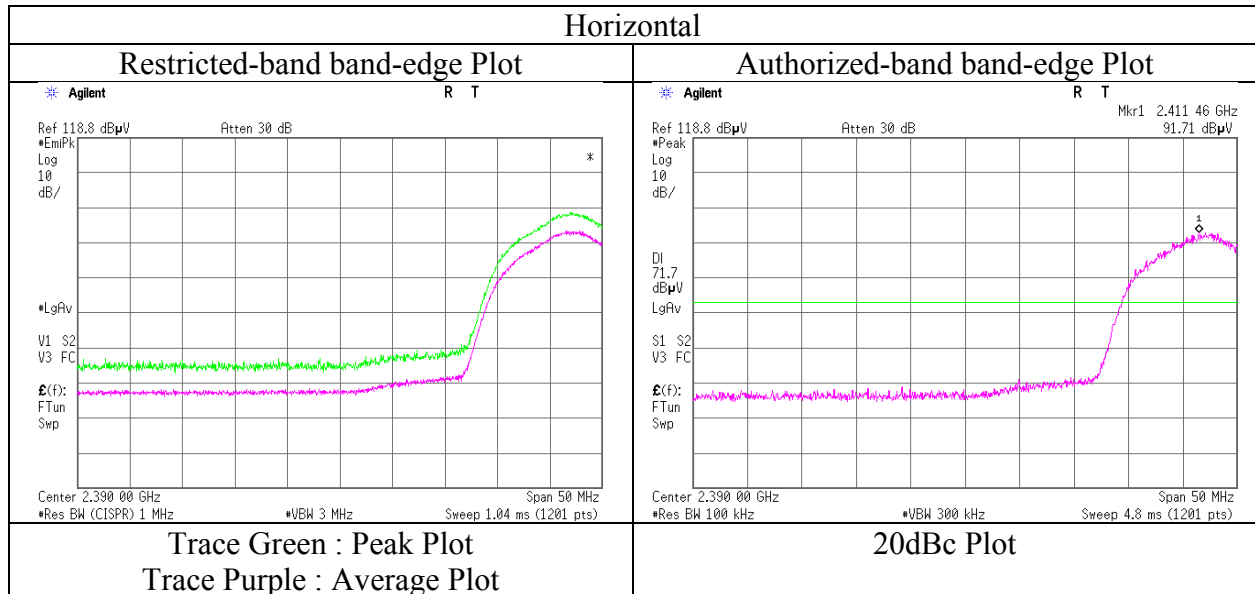
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge)

External antenna

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10953040H
Date	September 28, 2015
Temperature / Humidity	23 deg. C / 57 % RH
Engineer	Tomoki Matsui
	(1-10GHz)
Mode	Tx 11b 2412 MHz



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

UL Japan, Inc.

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Radiated Spurious Emission

External antenna

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.4	No.3
Report No.	10953040H	
Date	September 28, 2015	October 3, 2015
Temperature / Humidity	23 deg. C / 57 % RH	22 deg. C / 57 % RH
Engineer	Tomoki Matsui	Takafumi Noguchi
	(1-10GHz)	(10-26.5GHz)
Mode	Tx 11b 2437 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	3655.417	PK	47.6	29.2	5.6	31.5	-	50.9	73.9	23.0	
Hori	4874.000	PK	41.3	33.1	5.7	31.3	-	48.8	73.9	25.1	
Hori	7311.000	PK	44.2	36.8	7.0	32.0	-	56.0	73.9	17.9	
Hori	3655.417	AV	43.8	29.2	4.3	31.5	-	45.8	53.9	8.1	
Hori	4874.000	AV	32.3	33.1	5.7	31.3	-	39.8	53.9	14.1	
Hori	7311.000	AV	34.5	36.8	7.0	32.0	-	46.3	53.9	7.6	
Vert	3655.399	PK	48.7	29.2	4.3	31.5	-	50.7	73.9	23.2	
Vert	4874.000	PK	41.9	33.1	5.7	31.3	-	49.4	73.9	24.5	
Vert	7311.000	PK	43.8	36.8	7.0	32.0	-	55.6	73.9	18.3	
Vert	3655.399	AV	44.6	29.2	4.3	31.5	-	46.6	53.9	7.3	
Vert	4874.000	AV	32.4	33.1	5.7	31.3	-	39.9	53.9	14.0	
Vert	7311.000	AV	34.6	36.8	7.0	32.0	-	46.4	53.9	7.5	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5 dB
 26.5 GHz - 40 GHz 20log (3.0 m / 0.5 m) = 15.6 dB

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2437.000	PK	93.3	28.0	3.5	32.0	92.8	-	-	Carrier
Hori	9748.000	PK	44.7	38.2	7.7	32.4	58.2	72.8	14.6	
Hori	2437.000	PK	88.2	28.0	3.5	32.0	87.7	-	-	Carrier
Vert	9748.000	PK	43.9	38.2	7.7	32.4	57.4	67.7	10.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

Radiated Spurious Emission

External antenna

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.4	No.3
Report No.	10953040H	
Date	September 28, 2015	October 3, 2015
Temperature / Humidity	23 deg. C / 57 % RH	22 deg. C / 57 % RH
Engineer	Tomoki Matsui	Takafumi Noguchi
	(1-10GHz)	(10-26.5GHz)
Mode	Tx 11b 2462 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	44.8	28.1	3.5	32.0	-	44.4	73.9	29.5	
Hori	3692.941	PK	48.2	29.3	4.3	31.5	-	50.3	73.9	23.6	
Hori	4924.000	PK	41.1	33.3	5.8	31.3	-	48.9	73.9	25.0	
Hori	7386.000	PK	42.8	36.8	6.2	32.1	-	53.7	73.9	20.2	
Hori	2483.500	AV	36.0	28.1	3.5	32.0	-	35.6	53.9	18.3	
Hori	3692.941	AV	44.0	29.3	4.3	31.5	-	46.1	53.9	7.8	
Hori	4924.000	AV	32.4	33.3	5.8	31.3	-	40.2	53.9	13.7	
Hori	7386.000	AV	35.1	36.8	7.0	32.1	-	46.8	53.9	7.1	
Vert	2483.500	PK	43.5	28.1	3.5	32.0	-	43.1	73.9	30.8	
Vert	3692.931	PK	48.3	29.3	4.3	31.5	-	50.4	73.9	23.5	
Vert	4924.000	PK	41.1	33.3	5.8	31.3	-	48.9	73.9	25.0	
Vert	7386.000	PK	42.3	36.8	7.0	32.1	-	54.0	73.9	19.9	
Vert	2483.500	AV	34.5	28.1	3.5	32.0	-	34.1	53.9	19.8	
Vert	3692.931	AV	44.0	29.3	4.3	31.5	-	46.1	53.9	7.8	
Vert	4924.000	AV	32.0	33.3	5.8	31.3	-	39.8	53.9	14.1	
Vert	7386.000	AV	34.1	36.8	7.0	32.1	-	45.8	53.9	8.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 10 GHz - 26.5 GHz $20\log(3.0\text{ m} / 1.0\text{ m}) = 9.5\text{ dB}$
26.5 GHz - 40 GHz $20\log(3.0\text{ m} / 0.5\text{ m}) = 15.6\text{ dB}$

20dBc Data Sheet

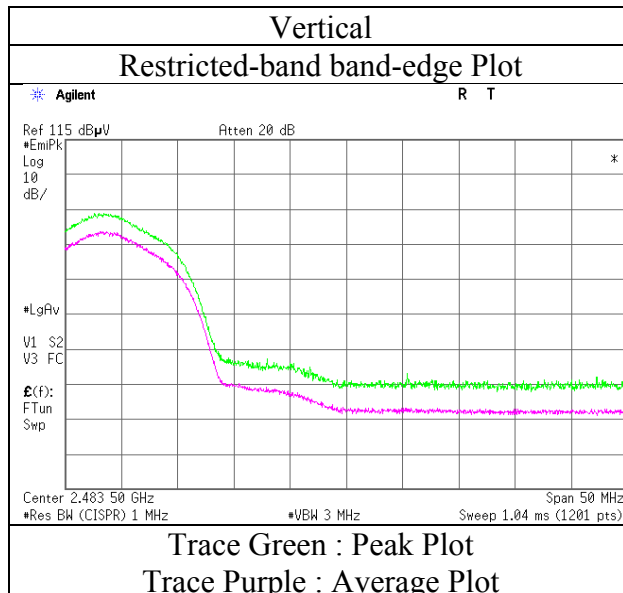
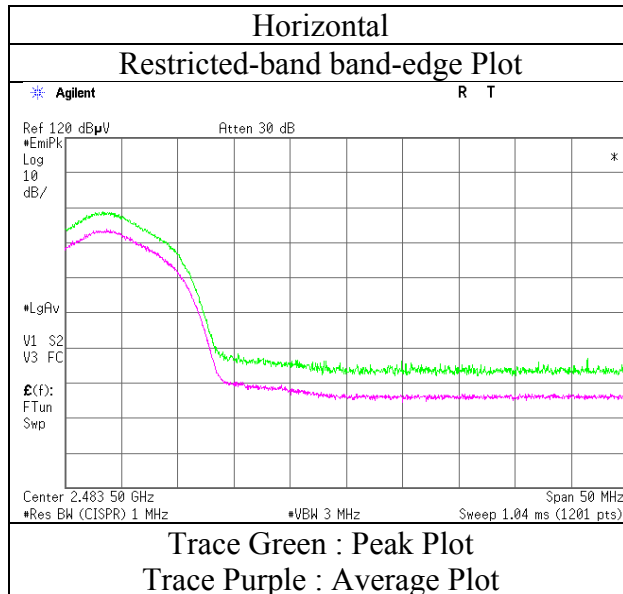
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2462.000	PK	93.4	28.0	3.5	32.0	92.9	-	-	Carrier
Hori	9848.000	PK	45.1	38.2	7.7	32.5	58.5	72.9	14.4	
Vert	2462.000	PK	88.9	28.0	3.5	32.0	88.4	-	-	Carrier
Vert	9848.000	PK	45.5	38.2	7.7	32.5	58.9	68.4	9.5	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

External antenna

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10953040H
Date	September 28, 2015
Temperature / Humidity	23 deg. C / 57 % RH
Engineer	Tomoki Matsui
	(1-10GHz)
Mode	Tx 11b 2462 MHz



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

UL Japan, Inc.

Ise EMC Lab.

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Telephone : +81 596 24 8999

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Radiated Spurious Emission

External antenna

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.2
Report No.	10953040H		
Date	September 28, 2015	October 3, 2015	October 5, 2015
Temperature / Humidity	23 deg. C / 57 % RH	22 deg. C / 57 % RH	23 deg. C / 47 % RH
Engineer	Tomoki Matsui (1-10GHz)	Takafumi Noguchi (10-26.5GHz)	Kazuya Yoshioka (Below 1GHz)
Mode	Tx 11g 2412 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	58.982	QP	24.5	7.7	7.1	28.4	-	10.9	40.0	29.1	
Hori	100.000	QP	21.9	10.1	7.5	28.2	-	11.3	43.5	32.2	
Hori	163.199	QP	23.7	15.6	7.9	27.9	-	19.3	43.5	24.2	
Hori	287.998	QP	27.3	19.1	8.8	27.4	-	27.8	46.0	18.2	
Hori	326.400	QP	27.5	15.4	9.0	27.6	-	24.3	46.0	21.7	
Hori	402.000	QP	28.8	17.6	9.4	28.2	-	27.6	46.0	18.4	
Hori	2390.000	PK	61.1	27.9	3.4	32.0	-	60.4	73.9	13.5	
Hori	3618.030	PK	47.5	29.1	4.3	31.5	-	49.4	73.9	24.5	
Hori	4824.000	PK	41.0	32.9	5.7	31.3	-	48.3	73.9	25.6	Floor noise
Hori	7236.000	PK	43.9	36.8	7.0	32.0	-	55.7	73.9	18.2	
Hori	2390.000	AV	47.8	27.9	3.4	32.0	0.4	47.5	53.9	6.4	*1)
Hori	3618.030	AV	43.2	29.1	4.3	31.5	-	45.1	53.9	8.8	
Hori	4824.000	AV	32.3	32.9	5.7	31.3	-	39.6	53.9	14.3	Floor noise
Hori	7236.000	AV	36.5	36.8	7.0	32.0	0.4	48.7	53.9	5.2	
Vert	58.982	QP	28.2	7.7	7.1	28.4	-	14.6	40.0	25.4	
Vert	100.000	QP	21.9	10.1	7.5	28.2	-	11.3	43.5	32.2	
Vert	163.199	QP	28.8	15.6	7.9	27.9	-	24.4	43.5	19.1	
Vert	288.002	QP	22.9	19.1	8.8	27.4	-	23.4	46.0	22.6	
Vert	326.399	QP	26.3	15.4	9.0	27.6	-	23.1	46.0	22.9	
Vert	401.999	QP	25.6	17.6	9.4	28.2	-	24.4	46.0	21.6	
Vert	2390.000	PK	54.2	27.9	3.4	32.0	-	53.5	73.9	20.4	
Vert	3618.112	PK	47.3	29.1	4.3	31.5	-	49.2	73.9	24.7	
Vert	4824.000	PK	40.5	32.9	5.7	31.3	-	47.8	73.9	26.1	Floor noise
Vert	7236.000	PK	44.0	36.8	7.0	32.0	-	55.8	73.9	18.1	
Vert	2390.000	AV	41.9	27.9	3.4	32.0	0.4	41.6	53.9	12.3	*1)
Vert	3618.112	AV	41.9	29.1	4.3	31.5	-	43.8	53.9	10.1	
Vert	4824.000	AV	32.2	32.9	5.7	31.3	-	39.5	53.9	14.4	Floor noise
Vert	7236.000	AV	34.8	36.8	7.0	32.0	0.4	47.0	53.9	6.9	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5 dB
 26.5 GHz - 40 GHz 20log (3.0 m / 0.5 m) = 15.6 dB

*1) Not Out of Band emission(Leakage Power)

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	91.8	28.0	3.4	32.0	91.2	-	-	Carrier
Hori	2400.000	PK	60.2	28.0	3.4	32.0	59.6	71.2	11.6	
Hori	9648.000	PK	44.4	38.1	7.7	32.4	57.8	71.2	13.4	
Vert	2412.000	PK	86.3	28.0	3.4	32.0	85.7	-	-	Carrier
Vert	2400.000	PK	54.4	28.0	3.4	32.0	53.8	65.7	11.9	
Vert	9648.000	PK	43.2	38.1	7.7	32.4	56.6	65.7	9.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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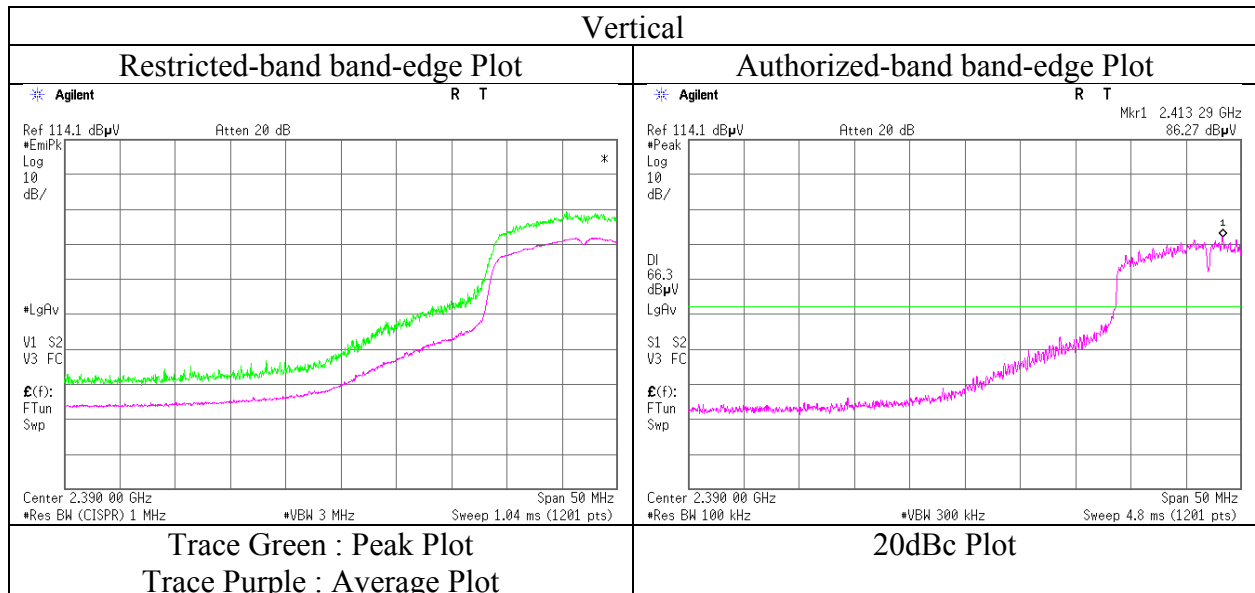
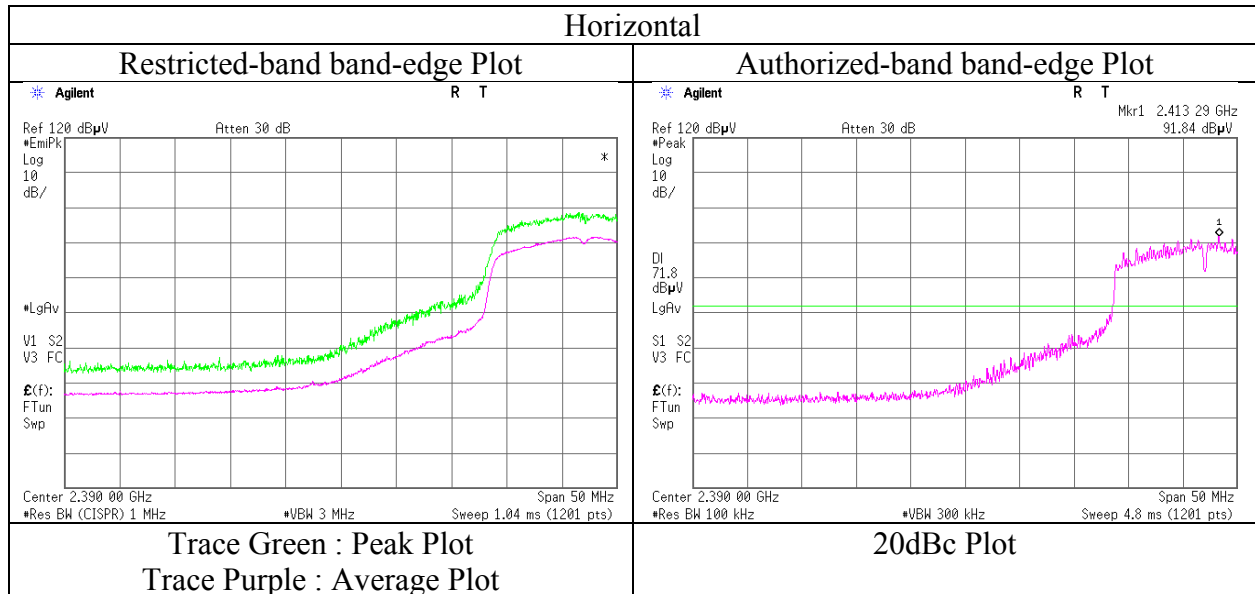
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge)

External antenna

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10953040H
Date	September 28, 2015
Temperature / Humidity	23 deg. C / 57 % RH
Engineer	Tomoki Matsui
	(1-10GHz)
Mode	Tx 11g 2412 MHz



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

UL Japan, Inc.

Ise EMC Lab.

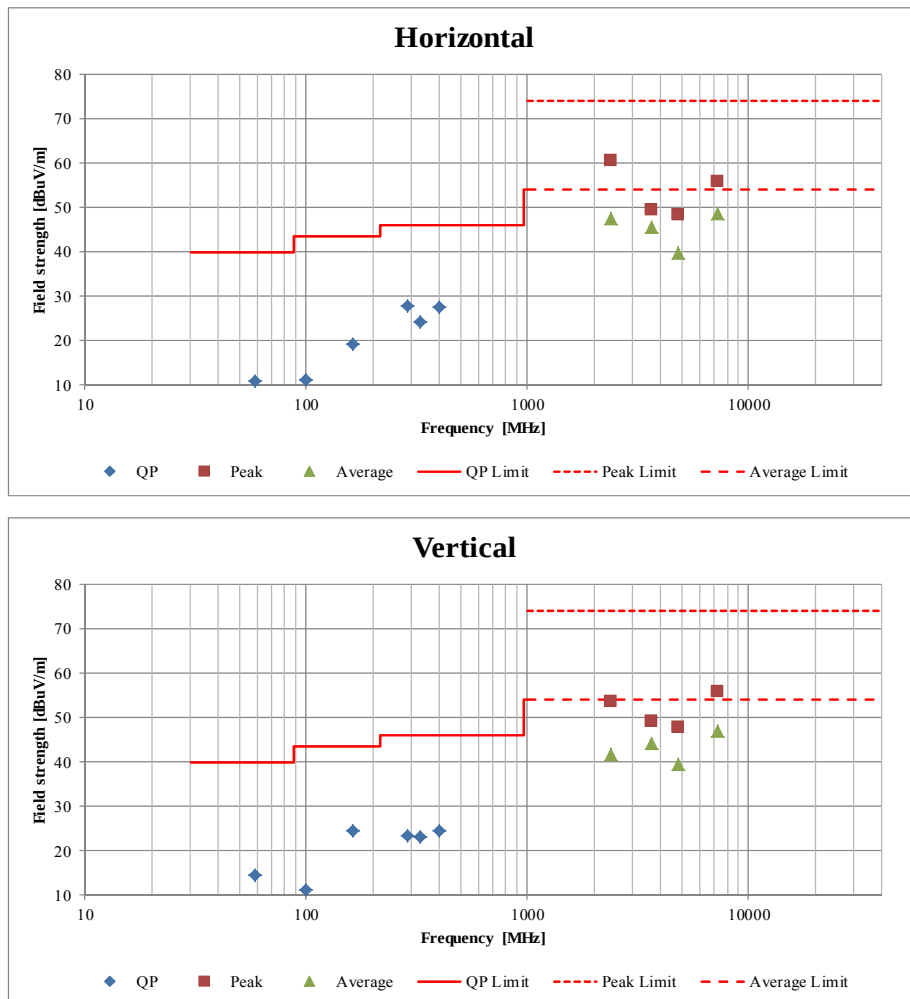
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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission
(Plot data, Worst case)
External antenna

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.2
Report No.	10953040H		
Date	September 28, 2015	October 3, 2015	October 5, 2015
Temperature / Humidity	23 deg. C / 57 % RH	22 deg. C / 57 % RH	23 deg. C / 47 % RH
Engineer	Tomoki Matsui (1-10GHz)	Takafumi Noguchi (10-26.5GHz)	Kazuya Yoshioka (Below 1GHz)
Mode	Tx 11g 2412 MHz		



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

Radiated Spurious Emission

External antenna

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.4	No.3
Report No.	10953040H	
Date	September 28, 2015	October 3, 2015
Temperature / Humidity	23 deg. C / 57 % RH	22 deg. C / 57 % RH
Engineer	Tomoki Matsui	Takafumi Noguchi
	(1-10GHz)	(10-26.5GHz)
Mode	Tx 11g 2437 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	3655.530	PK	47.7	29.2	4.3	31.5	-	49.7	73.9	24.2	
Hori	4874.000	PK	41.8	33.1	5.7	31.3	-	49.3	73.9	24.6	Floor noise
Hori	7311.000	PK	44.7	36.8	7.0	32.0	-	56.5	73.9	17.4	
Hori	3655.530	AV	43.8	29.2	4.3	31.5	-	45.8	53.9	8.1	
Hori	4874.000	AV	32.5	33.1	5.7	31.3	-	40.0	53.9	13.9	Floor noise
Hori	7311.000	AV	35.1	36.8	7.0	32.0	0.4	47.3	53.9	6.6	
Vert	3655.500	PK	48.4	29.2	4.3	31.5	-	50.4	73.9	23.5	
Vert	4874.000	PK	41.5	33.1	5.7	31.3	-	49.0	73.9	24.9	Floor noise
Vert	7311.000	PK	42.8	36.8	7.0	32.0	-	54.6	73.9	19.3	
Vert	3655.500	AV	44.5	29.2	4.3	31.5	-	46.5	53.9	7.4	
Vert	4874.000	AV	32.0	33.1	5.7	31.3	-	39.5	53.9	14.4	Floor noise
Vert	7311.000	AV	34.8	36.8	7.0	32.0	0.4	47.0	53.9	6.9	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5 dB
 26.5 GHz - 40 GHz 20log (3.0 m / 0.5 m) = 15.6 dB

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2437.000	PK	91.6	28.0	3.5	32.0	91.1	-	-	Carrier
Hori	9748.000	PK	44.3	38.2	7.7	32.4	57.8	71.1	13.3	
Vert	2437.000	PK	85.4	28.0	3.5	32.0	84.9	-	-	Carrier
Vert	9748.000	PK	45.0	38.2	7.7	32.4	58.5	64.9	6.4	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

Radiated Spurious Emission

External antenna

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.4	No.3
Report No.	10953040H	
Date	September 28, 2015	October 3, 2015
Temperature / Humidity	23 deg. C / 57 % RH	22 deg. C / 57 % RH
Engineer	Tomoki Matsui	Takafumi Noguchi
	(1-10GHz)	(10-26.5GHz)
Mode	Tx 11g 2462 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	62.1	28.1	3.5	32.0	-	61.7	73.9	12.2	
Hori	3692.941	PK	48.7	29.3	4.3	31.5	-	50.8	73.9	23.1	
Hori	4924.000	PK	40.9	33.3	5.8	31.3	-	48.7	73.9	25.2	Floor noise
Hori	7386.000	PK	42.7	36.8	7.0	32.1	-	54.4	73.9	19.5	
Hori	2483.500	AV	48.3	28.1	3.5	32.0	0.4	48.3	53.9	5.6	*1)
Hori	3692.941	AV	44.7	29.3	4.3	31.5	-	46.8	53.9	7.1	
Hori	4924.000	AV	32.3	33.3	5.8	31.3	-	40.1	53.9	13.8	Floor noise
Hori	7386.000	AV	34.4	36.8	7.0	32.1	0.4	46.5	53.9	7.4	
Vert	2483.500	PK	58.9	28.1	3.5	32.0	-	58.5	73.9	15.4	
Vert	3692.931	PK	48.2	29.3	4.3	31.5	-	50.3	73.9	23.6	
Vert	4924.000	PK	41.1	33.3	5.8	31.3	-	48.9	73.9	25.0	Floor noise
Vert	7386.000	PK	43.2	36.8	7.0	32.1	-	54.9	73.9	19.0	
Vert	2483.500	AV	45.3	28.1	3.5	32.0	0.4	45.3	53.9	8.6	*1)
Vert	3692.931	AV	44.4	29.3	4.3	31.5	-	46.5	53.9	7.4	
Vert	4924.000	AV	32.3	33.3	5.8	31.3	-	40.1	53.9	13.8	Floor noise
Vert	7386.000	AV	34.6	36.8	7.0	32.1	0.4	46.7	53.9	7.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 10 GHz - 26.5 GHz $20\log(3.0\text{ m} / 1.0\text{ m}) = 9.5\text{ dB}$
 26.5 GHz - 40 GHz $20\log(3.0\text{ m} / 0.5\text{ m}) = 15.6\text{ dB}$

*1) Not Out of Band emission(Leakage Power)

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2462.000	PK	91.1	28.0	3.5	32.0	90.6	-	-	Carrier
Hori	9848.000	PK	46.3	38.2	7.7	32.5	59.7	70.6	10.9	
Vert	2462.000	PK	86.8	28.0	3.5	32.0	86.3	-	-	Carrier
Vert	9848.000	PK	45.1	38.2	7.7	32.5	58.5	66.3	7.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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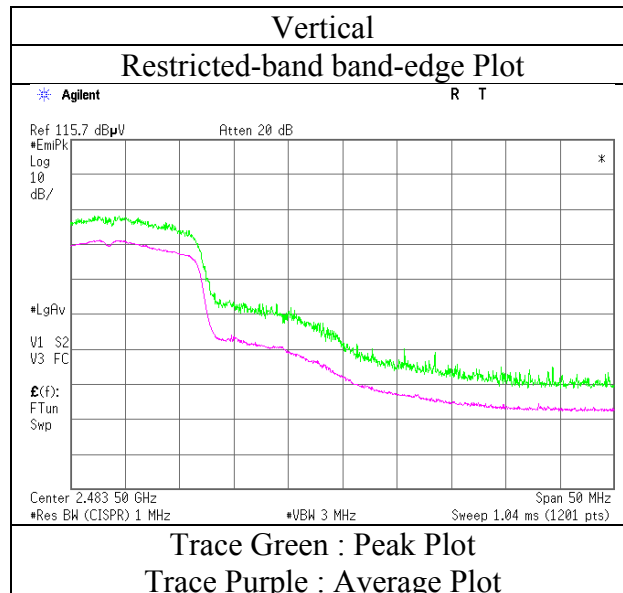
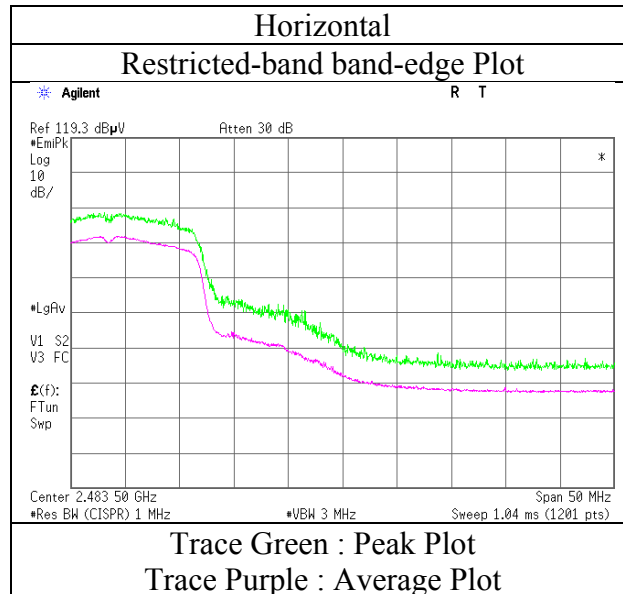
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge)

External antenna

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10953040H
Date	September 28, 2015
Temperature / Humidity	23 deg. C / 57 % RH
Engineer	Tomoki Matsui
	(1-10GHz)
Mode	Tx 11g 2462 MHz



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

Radiated Spurious Emission

External antenna

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10953040H
Date	September 28, 2015
Temperature / Humidity	23 deg. C / 57 % RH
Engineer	Tomoki Matsui
	(Band edge)
Mode	Tx 11n-20 2412 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	60.9	27.9	3.4	32.0	-	60.2	73.9	13.7	
Hori	2390.000	AV	48.2	27.9	3.4	32.0	0.5	48.0	53.9	6.0	*1)
Vert	2390.000	PK	54.6	27.9	3.4	32.0	-	53.9	73.9	20.0	
Vert	2390.000	AV	42.0	27.9	3.4	32.0	0.5	41.8	53.9	12.2	*1)

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 10 GHz - 26.5 GHz $20\log(3.0\text{ m} / 1.0\text{ m}) = 9.5\text{ dB}$
 26.5 GHz - 40 GHz $20\log(3.0\text{ m} / 0.5\text{ m}) = 15.6\text{ dB}$

*1) Not Out of Band emission(Leakage Power)

20dBc Data Sheet

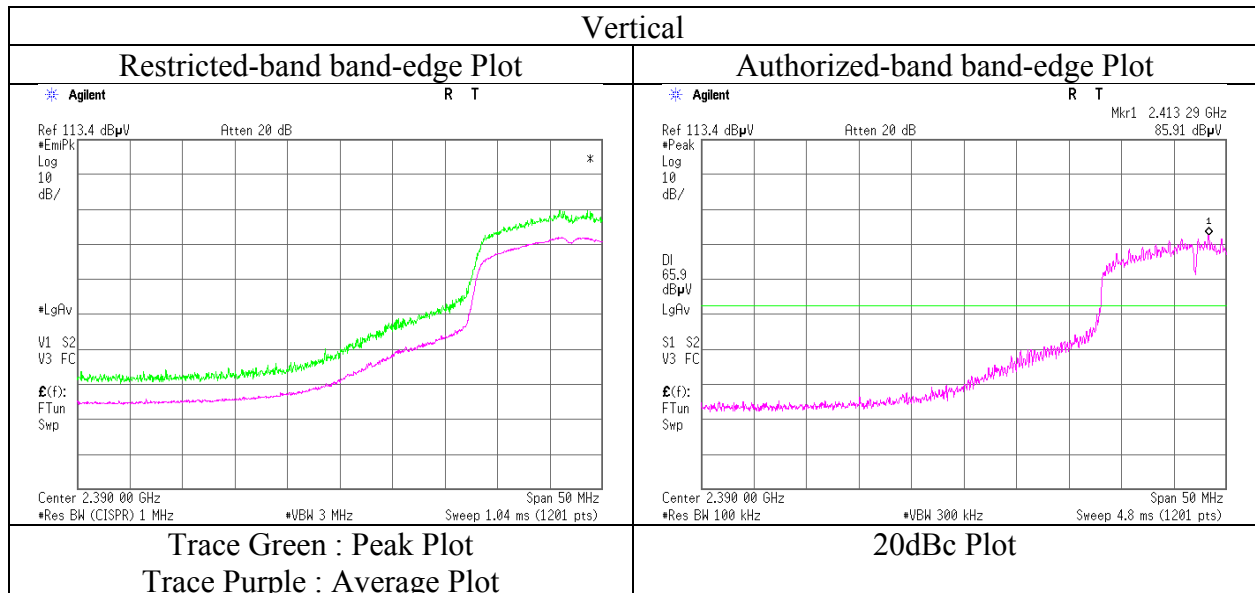
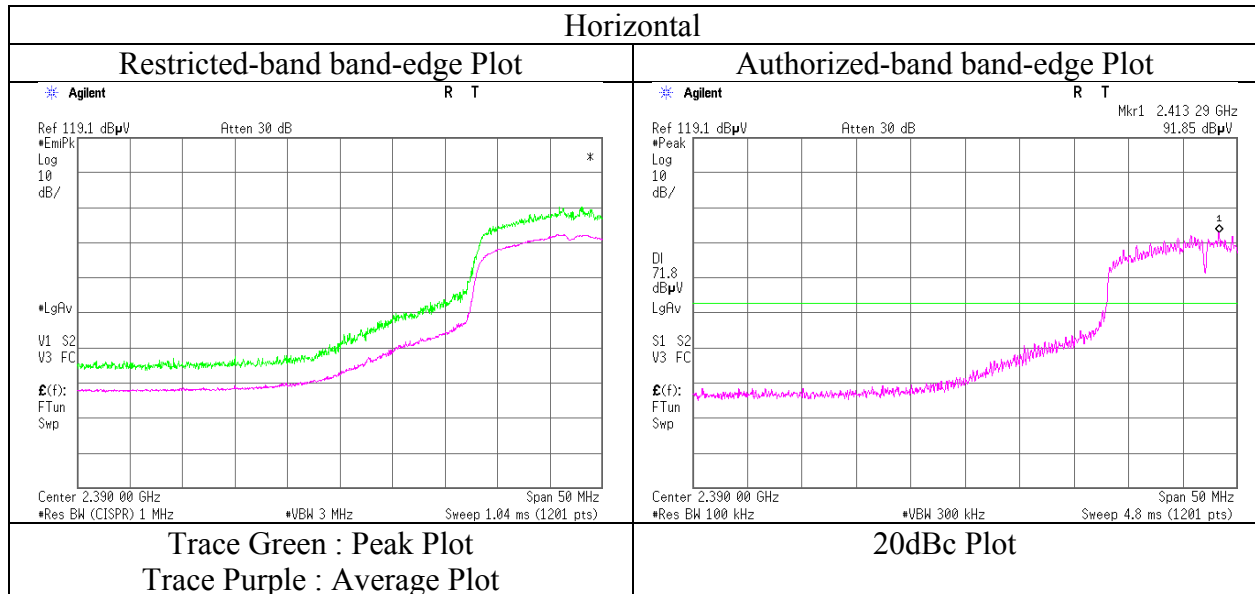
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	91.6	28.0	3.4	32.0	91.0	-	-	Carrier
Hori	2400.000	PK	60.0	28.0	3.4	32.0	59.4	71.0	11.6	
Vert	2412.000	PK	85.7	28.0	3.4	32.0	85.1	-	-	Carrier
Vert	2400.000	PK	53.7	28.0	3.4	32.0	53.1	65.1	12.0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

Radiated Spurious Emission (Reference Plot for band-edge)

External antenna

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10953040H
Date	September 28, 2015
Temperature / Humidity	23 deg. C / 57 % RH
Engineer	Tomoki Matsui
	(Band edge)
Mode	Tx 11n-20 2412 MHz



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

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Radiated Spurious Emission

External antenna

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10953040H
Date	September 28, 2015
Temperature / Humidity	23 deg. C / 57 % RH
Engineer	Tomoki Matsui
	(Band edge)
Mode	Tx 11n-20 2462 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	64.0	28.1	3.5	32.0	-	63.6	73.9	10.3	
Hori	2483.500	AV	49.9	28.1	3.5	32.0	0.5	50.0	53.9	4.0	*1)
Vert	2483.500	PK	61.0	28.1	3.5	32.0	-	60.6	73.9	13.3	
Vert	2483.500	AV	45.9	28.1	3.5	32.0	0.5	46.0	53.9	8.0	*1)

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

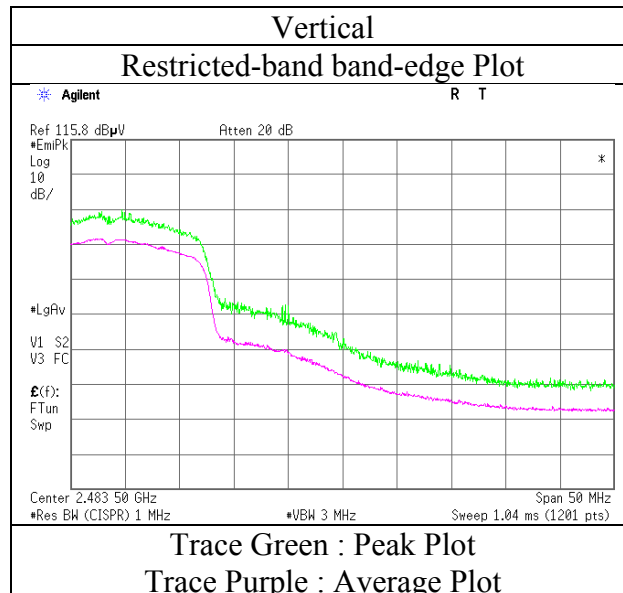
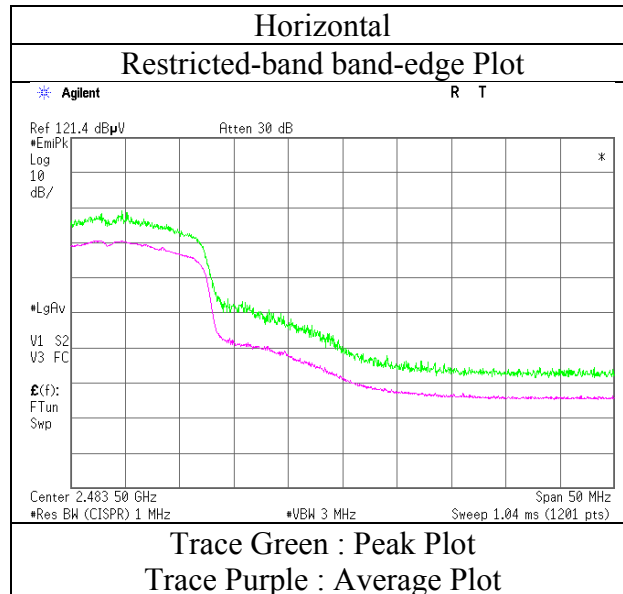
Distance factor: 10 GHz - 26.5 GHz $20\log(3.0\text{ m} / 1.0\text{ m}) = 9.5\text{ dB}$
 26.5 GHz - 40 GHz $20\log(3.0\text{ m} / 0.5\text{ m}) = 15.6\text{ dB}$

*1) Not Out of Band emission(Leakage Power)

Radiated Spurious Emission (Reference Plot for band-edge)

External antenna

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10953040H
Date	September 28, 2015
Temperature / Humidity	23 deg. C / 57 % RH
Engineer	Tomoki Matsui
	(Band edge)
Mode	Tx 11n-20 2462 MHz



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

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Radiated Spurious Emission

Internal antenna

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.4	No.3
Report No.	10953040H	
Date	September 28, 2015	October 3, 2015
Temperature / Humidity	23 deg. C / 57 % RH	22 deg. C / 57 % RH
Engineer	Tomoki Matsui	Takafumi Noguchi
	(1-10GHz)	(10-26.5GHz)
Mode	Tx 11b 2412 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	50.8	27.9	3.4	32.0	-	50.1	73.9	23.8	
Hori	3618.135	PK	48.5	29.1	4.3	31.5	-	50.4	73.9	23.5	
Hori	4824.000	PK	42.2	32.9	5.7	31.3	-	49.5	73.9	24.4	
Hori	7236.000	PK	43.7	36.8	7.0	32.0	-	55.5	73.9	18.4	
Hori	9648.000	PK	46.3	38.1	7.7	32.4	-	59.7	73.9	14.2	
Hori	2390.000	AV	41.7	27.9	3.4	32.0	-	41.0	53.9	12.9	
Hori	3618.135	AV	44.4	29.1	4.3	31.5	-	46.3	53.9	7.6	
Hori	4824.000	AV	32.0	32.9	5.7	31.3	-	39.3	53.9	14.6	
Hori	7236.000	AV	34.8	36.8	7.0	32.0	-	46.6	53.9	7.3	
Hori	9648.000	AV	39.0	38.1	7.7	32.4	-	52.4	53.9	1.5	
Vert	2390.000	PK	47.9	27.9	3.4	32.0	-	47.2	73.9	26.7	
Vert	3618.124	PK	49.1	29.1	4.3	31.5	-	51.0	73.9	22.9	
Vert	4824.000	PK	41.1	32.9	5.7	31.3	-	48.4	73.9	25.5	
Vert	7236.000	PK	44.1	36.8	7.0	32.0	-	55.9	73.9	18.0	
Vert	9648.000	PK	45.9	38.1	7.7	32.4	-	59.3	73.9	14.6	
Vert	2390.000	AV	39.1	27.9	3.4	32.0	-	38.4	53.9	15.5	
Vert	3618.124	AV	45.0	29.1	4.3	31.5	-	46.9	53.9	7.0	
Vert	4824.000	AV	32.5	32.9	5.7	31.3	-	39.8	53.9	14.1	
Vert	7236.000	AV	35.1	36.8	7.0	32.0	-	46.9	53.9	7.0	
Vert	9648.000	AV	37.2	38.1	7.7	32.4	-	50.6	53.9	3.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 10 GHz - 26.5 GHz $20\log(3.0\text{ m} / 1.0\text{ m}) = 9.5\text{ dB}$
 26.5 GHz - 40 GHz $20\log(3.0\text{ m} / 0.5\text{ m}) = 15.6\text{ dB}$

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	101.7	28.0	3.4	32.0	101.1	-	-	Carrier
Hori	2400.000	PK	53.9	28.0	3.4	32.0	53.3	81.1	27.8	
Vert	2412.000	PK	100.8	28.0	3.4	32.0	100.2	-	-	Carrier
Vert	2400.000	PK	52.5	28.0	3.4	32.0	51.9	80.2	28.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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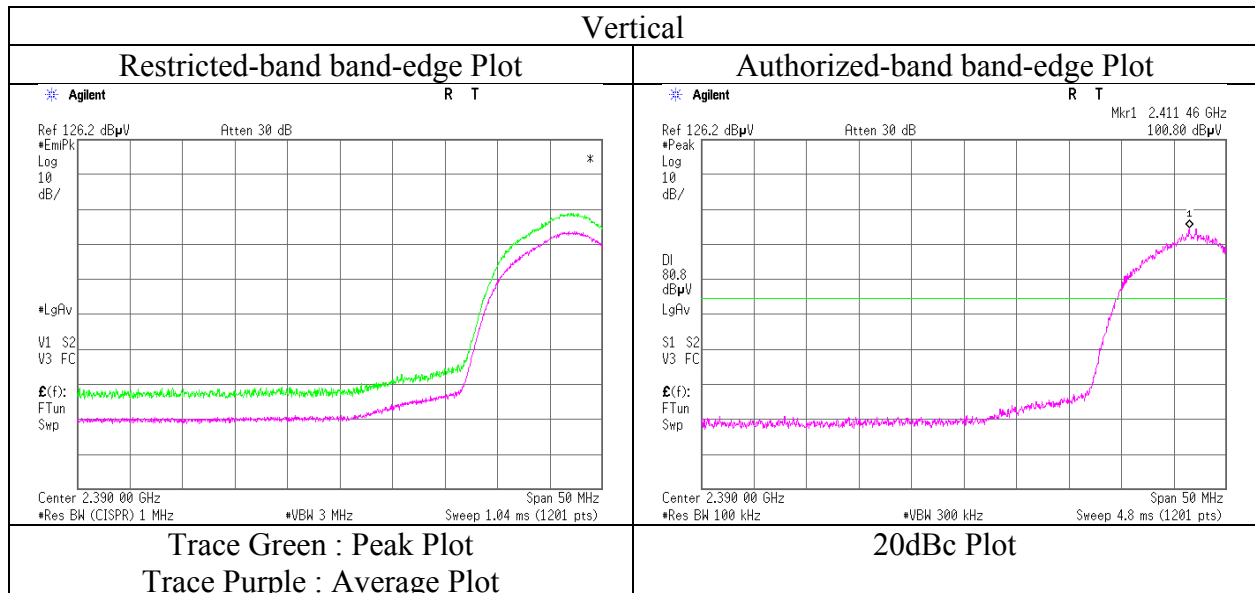
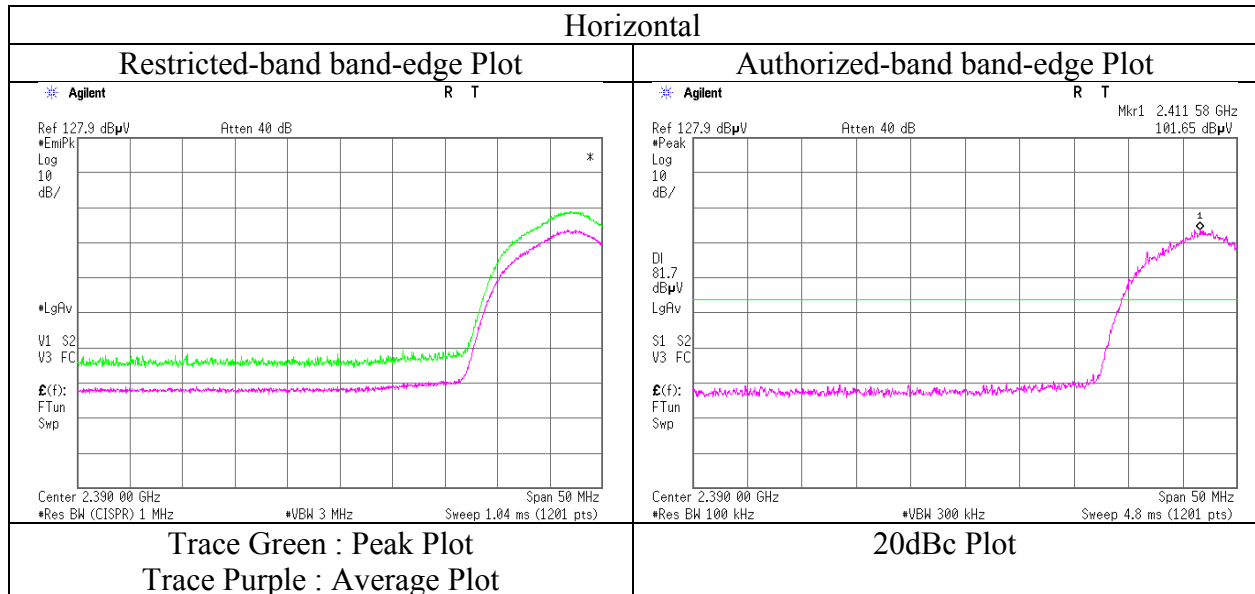
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge)

Internal antenna

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10953040H
Date	September 28, 2015
Temperature / Humidity	23 deg. C / 57 % RH
Engineer	Tomoki Matsui
	(1-10GHz)
Mode	Tx 11b 2412 MHz



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

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Facsimile : +81 596 24 8124

Radiated Spurious Emission

Internal antenna

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10953040H	
Date	October 1, 2015	October 3, 2015
Temperature / Humidity	22 deg. C / 57 % RH	22 deg. C / 57 % RH
Engineer	Kazuya Yoshioka	Takafumi Noguchi
	(1-10GHz)	(10-26.5GHz)
Mode	Tx 11b 2437 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	3655.379	PK	47.8	29.4	4.1	31.5	-	49.8	73.9	24.1	
Hori	4874.000	PK	40.4	31.9	5.5	31.3	-	46.5	73.9	27.4	
Hori	7311.000	PK	42.4	36.0	6.8	32.0	-	53.2	73.9	20.7	
Hori	9748.000	PK	45.3	38.2	7.5	32.4	-	58.6	73.9	15.3	
Hori	3655.379	AV	44.7	29.4	4.1	31.5	-	46.7	53.9	7.2	
Hori	4874.000	AV	32.1	31.9	5.5	31.3	-	38.2	53.9	15.7	
Hori	7311.000	AV	34.8	36.0	6.8	32.0	-	45.6	53.9	8.3	
Hori	9748.000	AV	39.4	38.2	7.5	32.4	-	52.7	53.9	1.2	
Vert	3655.353	PK	45.6	29.4	4.1	31.5	-	47.6	73.9	26.3	
Vert	4874.000	PK	39.7	31.9	5.5	31.3	-	45.8	73.9	28.1	
Vert	7311.000	PK	42.4	36.0	6.8	32.0	-	53.2	73.9	20.7	
Vert	9748.000	PK	43.2	38.2	7.5	32.4	-	56.5	73.9	17.4	
Vert	3655.353	AV	41.8	29.4	4.1	31.5	-	43.8	53.9	10.1	
Vert	4874.000	AV	32.1	31.9	5.5	31.3	-	38.2	53.9	15.7	
Vert	7311.000	AV	35.0	36.0	6.8	32.0	-	45.8	53.9	8.1	
Vert	9748.000	AV	36.8	38.2	7.5	32.4	-	50.1	53.9	3.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 10 GHz - 26.5 GHz $20\log(3.0\text{ m} / 1.0\text{ m}) = 9.5\text{ dB}$
 26.5 GHz - 40 GHz $20\log(3.0\text{ m} / 0.5\text{ m}) = 15.6\text{ dB}$

Radiated Spurious Emission

Internal antenna

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10953040H	
Date	October 1, 2015	October 3, 2015
Temperature / Humidity	22 deg. C / 57 % RH	22 deg. C / 57 % RH
Engineer	Kazuya Yoshioka	Takafumi Noguchi
	(1-10GHz)	(10-26.5GHz)
Mode	Tx 11b 2462 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	47.6	26.9	3.3	32.0	-	45.8	73.9	28.1	
Hori	3693.048	PK	46.5	29.5	4.1	31.5	-	48.6	73.9	25.3	
Hori	4924.000	PK	41.4	32.0	5.4	31.3	-	47.5	73.9	26.4	
Hori	7386.000	PK	42.0	36.0	6.7	32.1	-	52.6	73.9	21.3	
Hori	9848.000	PK	43.7	38.2	7.6	32.5	-	57.0	73.9	16.9	
Hori	2483.500	AV	37.6	26.9	3.3	32.0	-	35.8	53.9	18.1	
Hori	3693.048	AV	42.9	29.5	4.1	31.5	-	45.0	53.9	8.9	
Hori	4924.000	AV	30.4	32.0	5.4	31.3	-	36.5	53.9	17.4	
Hori	7386.000	AV	32.4	36.0	6.7	32.1	-	43.0	53.9	10.9	
Hori	9848.000	AV	36.9	38.2	7.6	32.5	-	50.2	53.9	3.7	
Vert	2483.500	PK	46.8	26.9	3.3	32.0	-	45.0	73.9	28.9	
Vert	3693.073	PK	43.8	29.5	4.1	31.5	-	45.9	73.9	28.0	
Vert	4924.000	PK	41.5	32.0	5.4	31.3	-	47.6	73.9	26.3	
Vert	7386.000	PK	43.1	36.0	6.7	32.1	-	53.7	73.9	20.2	
Vert	9848.000	PK	43.7	38.2	7.6	32.5	-	57.0	73.9	16.9	
Vert	2483.500	AV	38.2	26.9	3.3	32.0	-	36.4	53.9	17.5	
Vert	3693.073	AV	37.2	29.5	4.1	31.5	-	39.3	53.9	14.6	
Vert	4924.000	AV	30.5	32.0	5.4	31.3	-	36.6	53.9	17.3	
Vert	7386.000	AV	34.0	36.0	6.7	32.1	-	44.6	53.9	9.3	
Vert	9848.000	AV	36.2	38.2	7.6	32.5	-	49.5	53.9	4.4	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier)

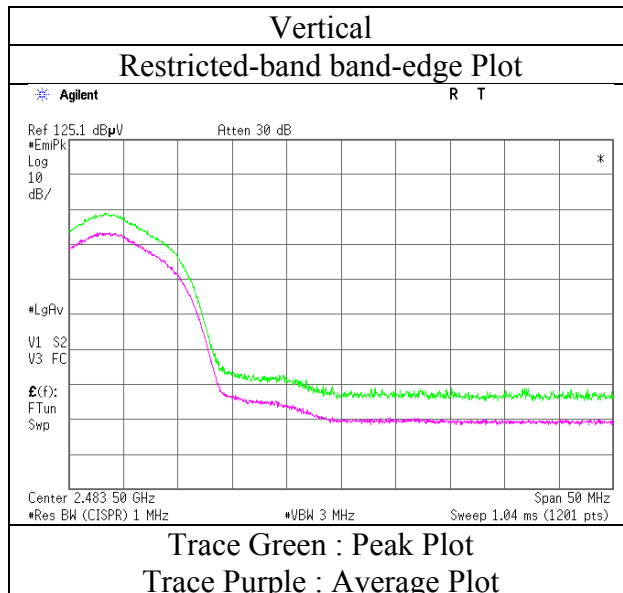
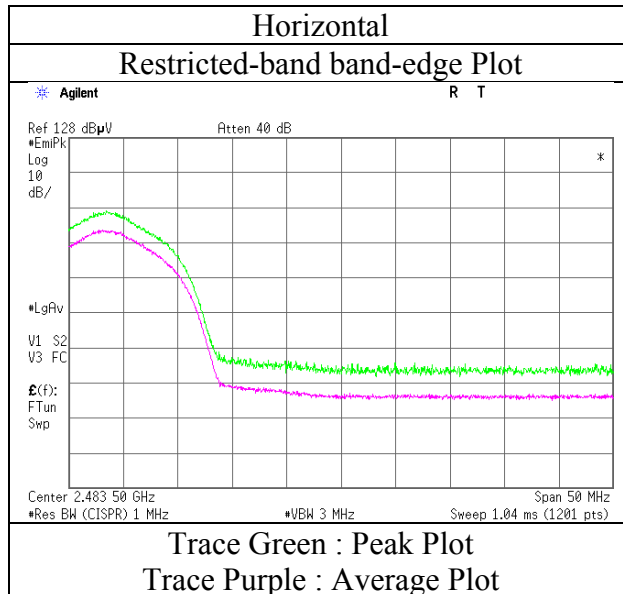
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 10 GHz - 26.5 GHz $20\log(3.0\text{ m} / 1.0\text{ m}) = 9.5\text{ dB}$
 26.5 GHz - 40 GHz $20\log(3.0\text{ m} / 0.5\text{ m}) = 15.6\text{ dB}$

Radiated Spurious Emission (Reference Plot for band-edge)

Internal antenna

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10953040H
Date	October 1, 2015
Temperature / Humidity	22 deg. C / 57 % RH
Engineer	Kazuya Yoshioka
	(1-10GHz)
Mode	Tx 11b 2462 MHz



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

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Radiated Spurious Emission

Internal antenna

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.2
Report No.	10953040H		
Date	October 1, 2015	October 3, 2015	October 5, 2015
Temperature / Humidity	22 deg. C / 59 % RH	22 deg. C / 57 % RH	23 deg. C / 47 % RH
Engineer	Tomoki Matsui (1-10GHz)	Takafumi Noguchi (10-26.5GHz)	Kazuya Yoshioka (Below 1GHz)
Mode	Tx 11g 2412 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	100.000	QP	22.1	10.1	7.5	28.2	-	11.5	43.5	32.0	
Hori	163.199	QP	25.9	15.6	7.9	27.9	-	21.5	43.5	22.0	
Hori	288.000	QP	25.3	19.1	8.8	27.4	-	25.8	46.0	20.2	
Hori	326.397	QP	27.6	15.4	9.0	27.6	-	24.4	46.0	21.6	
Hori	401.997	QP	30.1	17.6	9.4	28.2	-	28.9	46.0	17.1	
Hori	489.598	QP	26.8	18.5	9.7	28.5	-	26.5	46.0	19.5	
Hori	2390.000	PK	68.6	26.9	3.3	32.0	-	66.8	73.9	7.1	
Hori	3618.055	PK	45.6	29.4	4.1	31.5	-	47.6	73.9	26.3	
Hori	4824.000	PK	40.8	31.8	5.5	31.3	-	46.8	73.9	27.1	Floor noise
Hori	7236.000	PK	43.4	36.0	6.7	32.0	-	54.1	73.9	19.8	
Hori	9648.000	PK	44.1	38.2	7.5	32.4	-	57.4	73.9	16.5	
Hori	2390.000	AV	52.6	26.9	3.3	32.0	0.4	51.2	53.9	2.7	*1)
Hori	3618.055	AV	39.5	29.4	4.1	31.5	-	41.5	53.9	12.4	
Hori	4824.000	AV	32.2	31.8	5.5	31.3	-	38.2	53.9	15.7	Floor noise
Hori	7236.000	AV	34.3	36.0	6.7	32.0	0.4	45.4	53.9	8.5	
Hori	9648.000	AV	37.2	38.2	7.5	32.4	0.4	50.9	53.9	3.0	
Vert	100.000	QP	22.1	10.1	7.5	28.2	-	11.5	43.5	32.0	
Vert	163.200	QP	30.8	15.6	7.9	27.9	-	26.4	43.5	17.1	
Vert	288.000	QP	25.3	19.1	8.8	27.4	-	25.8	46.0	20.2	
Vert	326.397	QP	25.9	15.4	9.0	27.6	-	22.7	46.0	23.3	
Vert	401.997	QP	28.3	17.6	9.4	28.2	-	27.1	46.0	18.9	
Vert	489.598	QP	26.5	18.5	9.7	28.5	-	26.2	46.0	19.8	
Vert	2390.000	PK	68.6	26.9	3.3	32.0	-	66.8	73.9	7.1	
Vert	3618.043	PK	47.2	29.4	4.1	31.5	-	49.2	73.9	24.7	
Vert	4824.000	PK	41.0	31.8	5.5	31.3	-	47.0	73.9	26.9	Floor noise
Vert	7236.000	PK	43.0	36.0	6.7	32.0	-	53.7	73.9	20.2	
Vert	9648.000	PK	43.9	38.2	7.5	32.4	-	57.2	73.9	16.7	
Vert	2390.000	AV	52.8	26.9	3.3	32.0	0.4	51.4	53.9	2.5	*1)
Vert	3618.043	AV	42.0	29.4	4.1	31.5	-	44.0	53.9	9.9	
Vert	4824.000	AV	32.2	31.8	5.5	31.3	-	38.2	53.9	15.7	Floor noise
Vert	7236.000	AV	35.0	36.0	6.7	32.0	0.4	46.1	53.9	7.8	
Vert	9648.000	AV	36.9	38.2	7.5	32.4	0.4	50.6	53.9	3.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 10 GHz - 26.5 GHz $20\log(3.0\text{ m} / 1.0\text{ m}) = 9.5\text{ dB}$

26.5 GHz - 40 GHz $20\log(3.0\text{ m} / 0.5\text{ m}) = 15.6\text{ dB}$

*1) Not Out of Band emission(Leakage Power)

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	102.5	26.9	3.3	32.0	100.7	-	-	Carrier
Hori	2400.000	PK	66.9	26.9	3.3	32.0	65.1	80.7	15.6	
Vert	2412.000	PK	101.3	26.9	3.3	32.0	99.5	-	-	Carrier
Vert	2400.000	PK	67.6	26.9	3.3	32.0	65.8	79.5	13.7	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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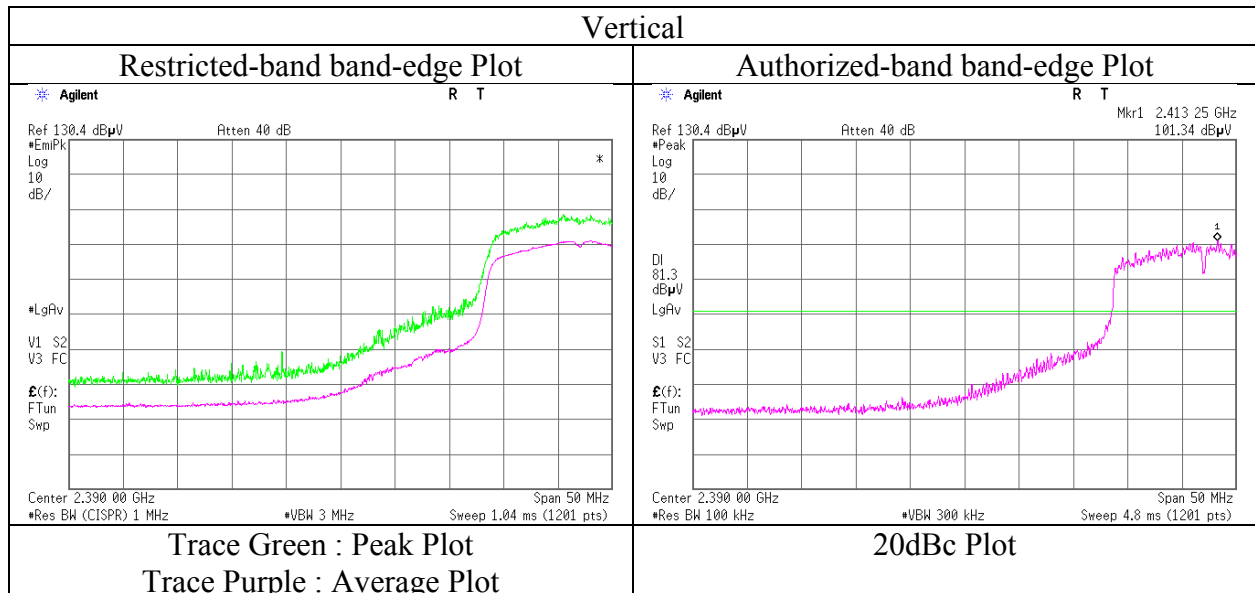
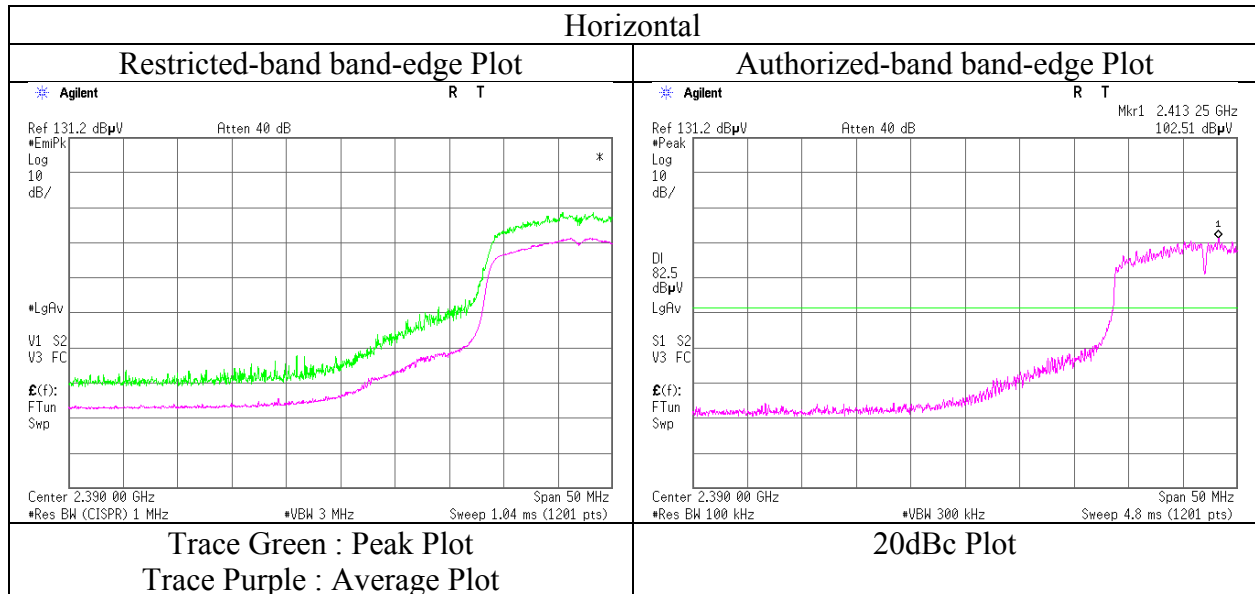
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge)

Internal antenna

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10953040H
Date	October 1, 2015
Temperature / Humidity	22 deg. C / 59 % RH
Engineer	Tomoki Matsui
	(1-10GHz)
Mode	Tx 11g 2412 MHz



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

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Ise EMC Lab.

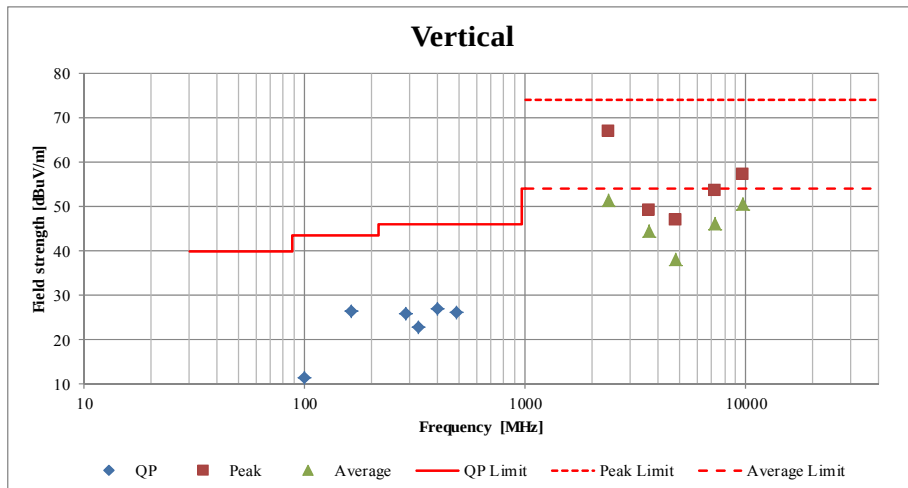
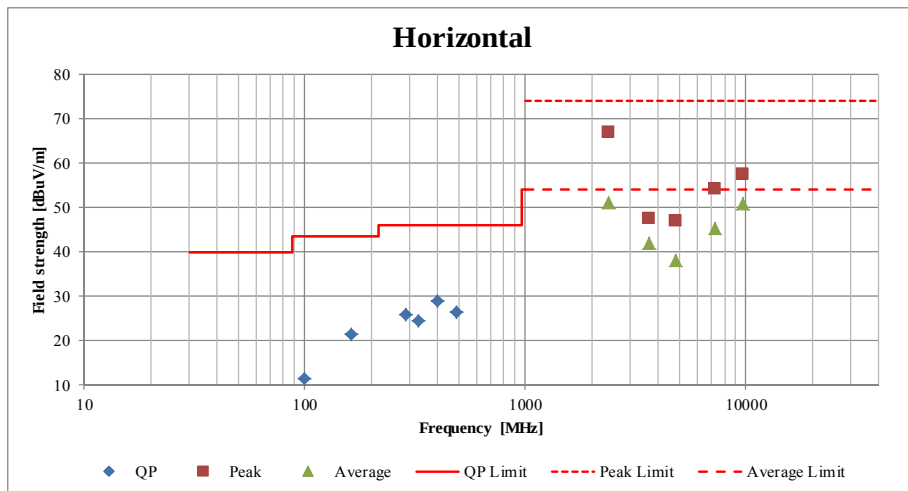
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Facsimile : +81 596 24 8124

Radiated Spurious Emission
(Plot data, Worst case)
Internal antenna

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.2
Report No.	10953040H		
Date	October 1, 2015	October 3, 2015	October 5, 2015
Temperature / Humidity	22 deg. C / 59 % RH	22 deg. C / 57 % RH	23 deg. C / 47 % RH
Engineer	Tomoki Matsui (1-10GHz)	Takafumi Noguchi (10-26.5GHz)	Kazuya Yoshioka (Below 1GHz)
Mode	Tx 11g 2412 MHz		



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

Radiated Spurious Emission

Internal antenna

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10953040H	
Date	October 1, 2015	October 3, 2015
Temperature / Humidity	22 deg. C / 59 % RH	22 deg. C / 57 % RH
Engineer	Tomoki Matsui	Takafumi Noguchi
	(1-10GHz)	(10-26.5GHz)
Mode	Tx 11g 2437 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	3655.550	PK	47.8	29.4	4.1	31.5	-	49.8	73.9	24.1	Floor noise
Hori	4874.000	PK	40.7	31.9	5.5	31.3	-	46.8	73.9	27.1	
Hori	7311.000	PK	42.7	36.0	6.8	32.0	-	53.5	73.9	20.4	
Hori	9748.000	PK	45.5	38.2	7.5	32.4	-	58.8	73.9	15.1	
Hori	3655.550	AV	41.3	29.4	4.1	31.5	-	43.3	53.9	10.6	Floor noise
Hori	4874.000	AV	32.2	31.9	5.5	31.3	-	38.3	53.9	15.6	
Hori	7311.000	AV	34.4	36.0	6.8	32.0	0.4	45.6	53.9	8.3	
Hori	9748.000	AV	38.7	38.2	7.5	32.4	0.4	52.4	53.9	1.5	
Vert	3655.500	PK	47.4	29.4	4.1	31.5	-	49.4	73.9	24.5	Floor noise
Vert	4874.000	PK	41.5	31.9	5.5	31.3	-	47.6	73.9	26.3	
Vert	7311.000	PK	42.8	36.0	6.8	32.0	-	53.6	73.9	20.3	
Vert	9748.000	PK	42.7	38.2	7.5	32.4	-	56.0	73.9	17.9	
Vert	3655.500	AV	40.6	29.4	4.1	31.5	-	42.6	53.9	11.3	Floor noise
Vert	4874.000	AV	32.3	31.9	5.5	31.3	-	38.4	53.9	15.5	
Vert	7311.000	AV	34.8	36.0	6.8	32.0	0.4	46.0	53.9	7.9	
Vert	9748.000	AV	35.4	38.2	7.5	32.4	0.4	49.1	53.9	4.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5 dB
 26.5 GHz - 40 GHz 20log (3.0 m / 0.5 m) = 15.6 dB

Radiated Spurious Emission

Internal antenna

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10953040H
Date	October 1, 2015 October 3, 2015
Temperature / Humidity	22 deg. C / 59 % RH 22 deg. C / 57 % RH
Engineer	Tomoki Matsui Takafumi Noguchi
	(1-10GHz) (10-26.5GHz)
Mode	Tx 11g 2462 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	69.9	26.9	3.3	32.0	-	68.1	73.9	5.8	Floor noise
Hori	3692.815	PK	46.3	29.5	4.1	31.5	-	48.4	73.9	25.5	
Hori	4924.000	PK	40.2	32.0	5.4	31.3	-	46.3	73.9	27.6	
Hori	7386.000	PK	42.4	36.0	6.7	32.1	-	53.0	73.9	20.9	
Hori	9848.000	PK	45.1	38.2	7.6	32.5	-	58.4	73.9	15.5	
Hori	2483.500	AV	54.1	26.9	3.3	32.0	0.4	52.7	53.9	1.2	*1)
Hori	3692.815	AV	41.0	29.5	4.1	31.5	-	43.1	53.9	10.8	Floor noise
Hori	4924.000	AV	31.9	32.0	5.4	31.3	-	38.0	53.9	15.9	
Hori	7386.000	AV	35.3	36.0	6.7	32.1	0.4	46.3	53.9	7.6	
Hori	9848.000	AV	38.1	38.2	7.6	32.5	0.4	51.8	53.9	2.1	
Vert	2483.500	PK	67.1	26.9	3.3	32.0	-	65.3	73.9	8.6	Floor noise
Vert	3692.852	PK	44.9	29.5	4.1	31.5	-	47.0	73.9	26.9	
Vert	4924.000	PK	40.1	32.0	5.4	31.3	-	46.2	73.9	27.7	
Vert	7386.000	PK	43.1	36.0	6.7	32.1	-	53.7	73.9	20.2	
Vert	9848.000	PK	44.1	38.2	7.6	32.5	-	57.4	73.9	16.5	
Vert	2483.500	AV	52.5	26.9	3.3	32.0	0.4	51.1	53.9	2.8	*1)
Vert	3692.852	AV	39.1	29.5	4.1	31.5	-	41.2	53.9	12.7	Floor noise
Vert	4924.000	AV	32.1	32.0	5.4	31.3	-	38.2	53.9	15.7	
Vert	7386.000	AV	35.7	36.0	6.7	32.1	0.4	46.7	53.9	7.2	
Vert	9848.000	AV	36.8	38.2	7.6	32.5	0.4	50.5	53.9	3.4	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

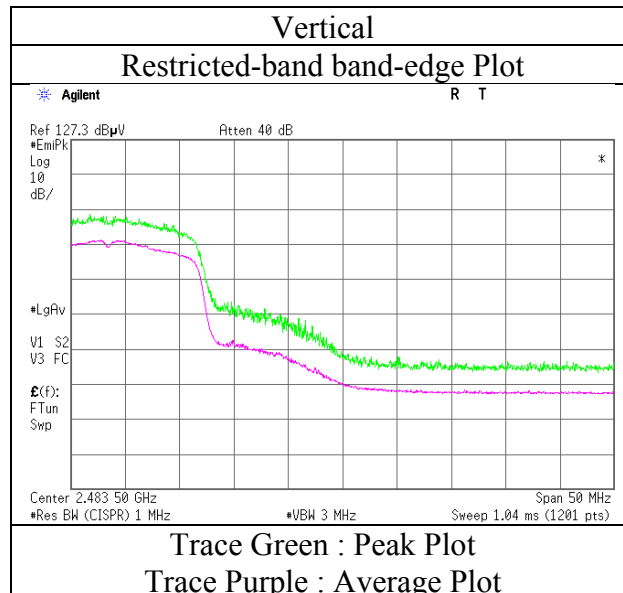
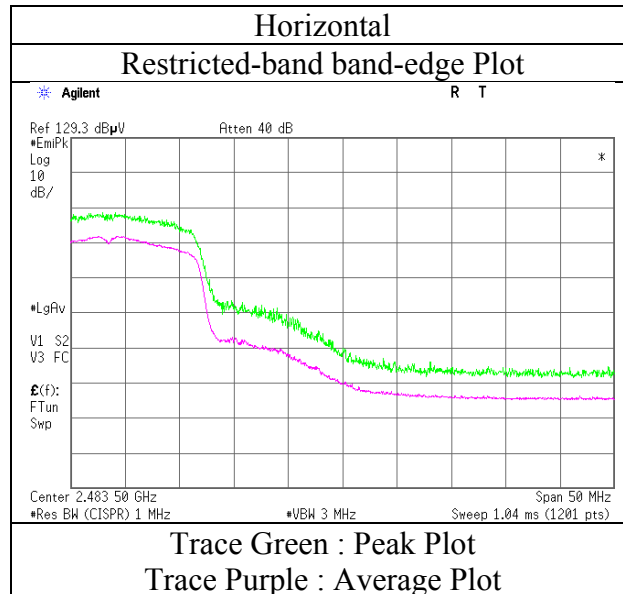
Distance factor: 10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5 dB
 26.5 GHz - 40 GHz 20log (3.0 m / 0.5 m) = 15.6 dB

*1) Not Out of Band emission(Leakage Power)

Radiated Spurious Emission (Reference Plot for band-edge)

Internal antenna

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10953040H
Date	October 1, 2015
Temperature / Humidity	22 deg. C / 59 % RH
Engineer	Tomoki Matsui
	(Band edge)
Mode	Tx 11g 2462 MHz



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

Radiated Spurious Emission

Internal antenna

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10953040H
Date	October 1, 2015
Temperature / Humidity	22 deg. C / 59 % RH
Engineer	Tomoki Matsui
	(Band edge)
Mode	Tx 11n-20 2412 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	66.9	26.9	3.3	32.0	-	65.1	73.9	8.8	
Hori	2390.000	AV	52.2	26.9	3.3	32.0	0.5	50.9	53.9	3.1	*1)
Vert	2390.000	PK	65.1	26.9	3.3	32.0	-	63.3	73.9	10.6	
Vert	2390.000	AV	50.4	26.9	3.3	32.0	0.5	49.1	53.9	4.9	*1)

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 10 GHz - 26.5 GHz $20\log(3.0\text{ m} / 1.0\text{ m}) = 9.5\text{ dB}$
 26.5 GHz - 40 GHz $20\log(3.0\text{ m} / 0.5\text{ m}) = 15.6\text{ dB}$

*1) Not Out of Band emission(Leakage Power)

20dBc Data Sheet

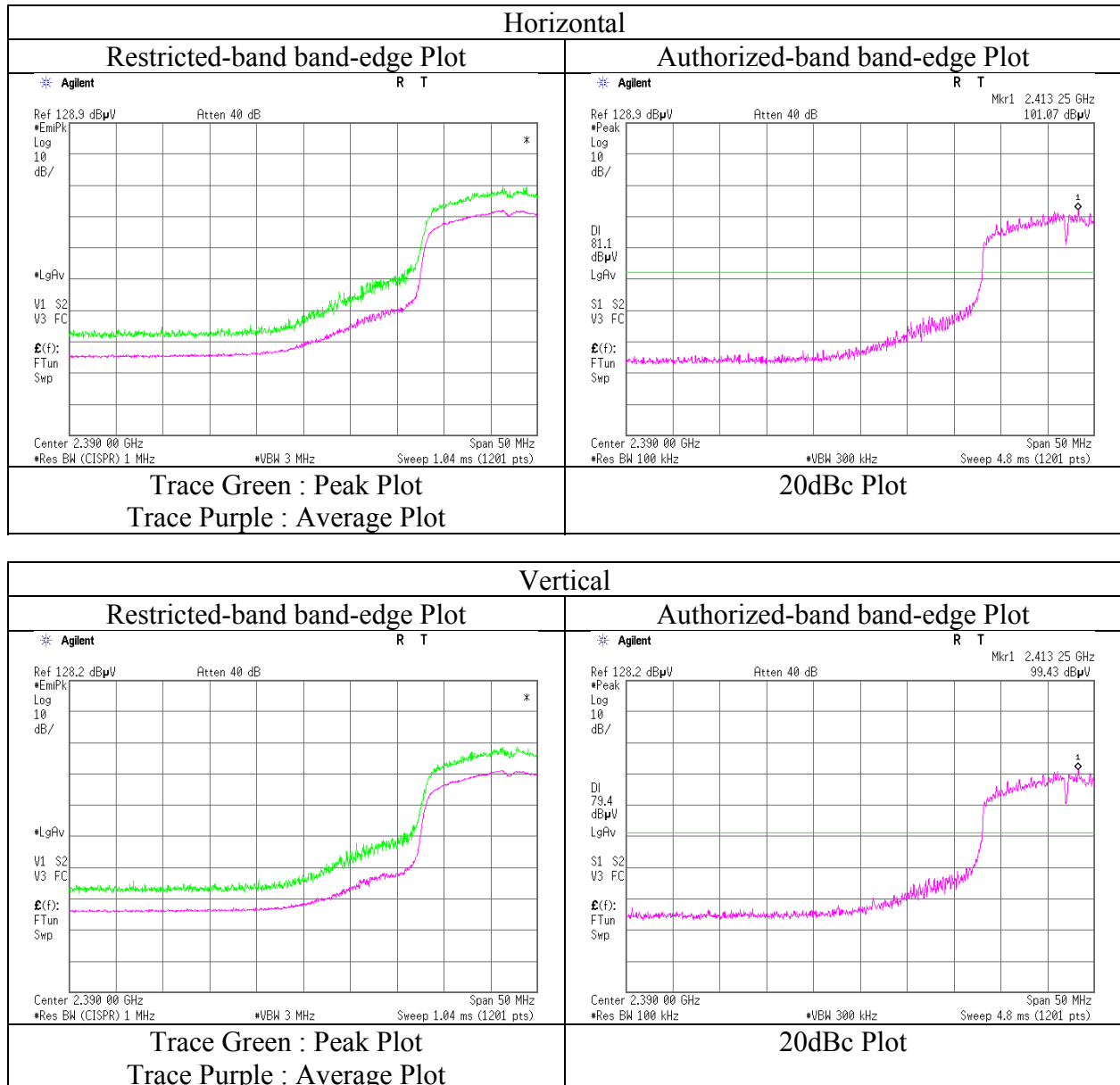
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	100.8	26.9	3.3	32.0	99.0	-	-	Carrier
Hori	2400.000	PK	66.5	26.9	3.3	32.0	64.7	79.0	14.3	
Vert	2412.000	PK	99.2	26.9	3.3	32.0	97.4	-	-	Carrier
Vert	2400.000	PK	64.1	26.9	3.3	32.0	62.3	77.4	15.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

Radiated Spurious Emission (Reference Plot for band-edge)

Internal antenna

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10953040H
Date	October 1, 2015
Temperature / Humidity	22 deg. C / 59 % RH
Engineer	Tomoki Matsui
	(Band edge)
Mode	Tx 11n-20 2412 MHz



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

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Radiated Spurious Emission

Internal antenna

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10953040H
Date	October 1, 2015
Temperature / Humidity	22 deg. C / 59 % RH
Engineer	Tomoki Matsui
	(Band edge)
Mode	Tx 11n-20 2462 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	68.3	26.9	3.3	32.0	-	66.5	73.9	7.4	
Hori	2483.500	AV	54.0	26.9	3.3	32.0	0.5	52.7	53.9	1.2	*1)
Vert	2483.500	PK	67.8	26.9	3.3	32.0	-	66.0	73.9	7.9	
Vert	2483.500	AV	52.4	26.9	3.3	32.0	0.5	51.1	53.9	2.9	*1)

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

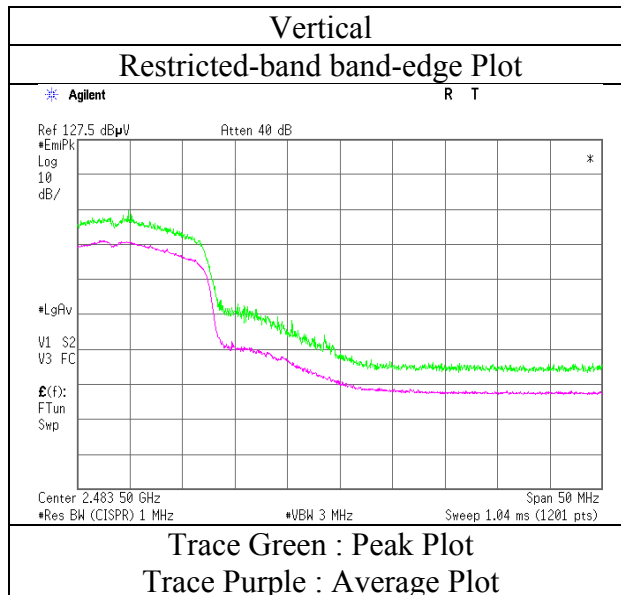
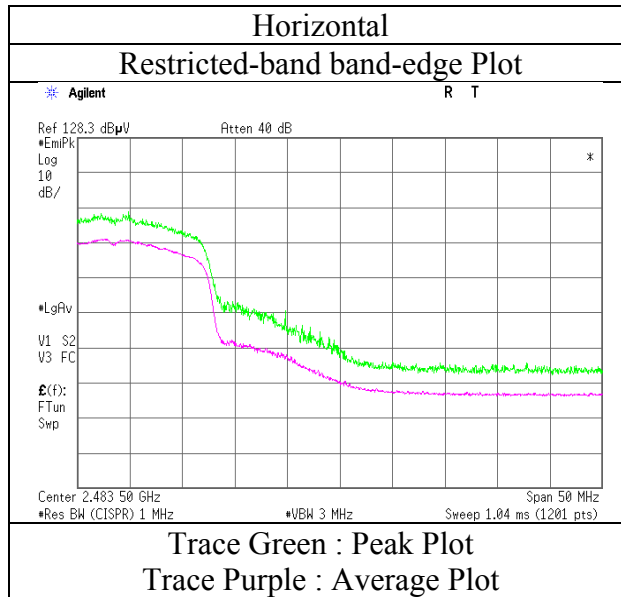
Distance factor: 10 GHz - 26.5 GHz $20\log(3.0\text{ m} / 1.0\text{ m}) = 9.5\text{ dB}$
 26.5 GHz - 40 GHz $20\log(3.0\text{ m} / 0.5\text{ m}) = 15.6\text{ dB}$

*1) Not Out of Band emission(Leakage Power)

Radiated Spurious Emission (Reference Plot for band-edge)

Internal antenna

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10953040H
Date	October 1, 2015
Temperature / Humidity	22 deg. C / 59 % RH
Engineer	Tomoki Matsui
	(Band edge)
Mode	Tx 11n-20 2462 MHz



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

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Radiated Spurious Emission

External antenna

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.2
Report No.	10953040H		
Date	October 2, 2015	October 3, 2015	October 5, 2015
Temperature / Humidity	22 deg. C / 67 % RH	22 deg. C / 57 % RH	23 deg. C / 47 % RH
Engineer	Kazuya Yoshioka (1-10GHz)	Takafumi Noguchi (10-26.5GHz)	Kazuya Yoshioka (Below 1GHz)
Mode	Tx BT LE 2402 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	58.982	QP	23.9	7.7	7.1	28.4	-	10.3	40.0	29.7	
Hori	100.000	QP	22.0	10.1	7.5	28.2	-	11.4	43.5	32.1	
Hori	163.200	QP	21.7	15.6	7.9	27.9	-	17.3	43.5	26.2	
Hori	288.001	QP	25.3	19.1	8.8	27.4	-	25.8	46.0	20.2	
Hori	326.400	QP	21.0	15.4	9.0	27.6	-	17.8	46.0	28.2	
Hori	402.000	QP	21.4	17.6	9.4	28.2	-	20.2	46.0	25.8	
Hori	2390.000	PK	41.2	26.9	3.3	32.0	-	39.4	73.9	34.5	
Hori	4804.000	PK	51.0	31.8	5.5	31.3	-	57.0	73.9	16.9	
Hori	7206.000	PK	41.6	36.0	6.7	32.0	-	52.3	73.9	21.6	Floor noise
Hori	9608.000	PK	42.6	38.2	7.5	32.4	-	55.9	73.9	18.0	Floor noise
Hori	2390.000	AV	31.0	26.9	3.3	32.0	1.8	31.0	53.9	22.9	*1)
Hori	4804.000	AV	41.7	31.8	5.5	31.3	1.8	49.5	53.9	4.4	
Hori	7206.000	AV	31.6	36.0	6.7	32.0	-	42.3	53.9	11.6	Floor noise
Hori	9608.000	AV	31.5	38.2	7.5	32.4	-	44.8	53.9	9.1	Floor noise
Vert	58.982	QP	28.1	7.7	7.1	28.4	-	14.5	40.0	25.5	
Vert	100.000	QP	22.0	10.1	7.5	28.2	-	11.4	43.5	32.1	
Vert	163.200	QP	21.7	15.6	7.9	27.9	-	17.3	43.5	26.2	
Vert	288.001	QP	25.4	19.1	8.8	27.4	-	25.9	46.0	20.1	
Vert	326.400	QP	21.0	15.4	9.0	27.6	-	17.8	46.0	28.2	
Vert	402.000	QP	21.4	17.6	9.4	28.2	-	20.2	46.0	25.8	
Vert	2390.000	PK	41.7	26.9	3.3	32.0	-	39.9	73.9	34.0	
Vert	4804.000	PK	48.9	31.8	5.5	31.3	-	54.9	73.9	19.0	
Vert	7206.000	PK	41.8	36.0	6.7	32.0	-	52.5	73.9	21.4	Floor noise
Vert	9608.000	PK	42.9	38.2	7.5	32.4	-	56.2	73.9	17.7	Floor noise
Vert	2390.000	AV	33.4	26.9	3.3	32.0	1.8	33.4	53.9	20.5	*1)
Vert	4804.000	AV	38.6	31.8	5.5	31.3	1.8	46.4	53.9	7.5	
Vert	7206.000	AV	31.6	36.0	6.7	32.0	-	42.3	53.9	11.6	Floor noise
Vert	9608.000	AV	31.5	38.2	7.5	32.4	-	44.8	53.9	9.1	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

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

26.5 GHz - 40 GHz 20log (3.0 m / 0.5 m) = 15.6 dB

*1) Not Out of Band emission(Leakage Power)

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	96.1	26.9	3.3	32.0	94.3	-	-	Carrier
Hori	2400.000	PK	38.9	26.9	3.3	32.0	37.1	74.3	37.2	
Vert	2402.000	PK	94.4	26.9	3.3	32.0	92.6	-	-	Carrier
Vert	2400.000	PK	36.3	26.9	3.3	32.0	34.5	72.6	38.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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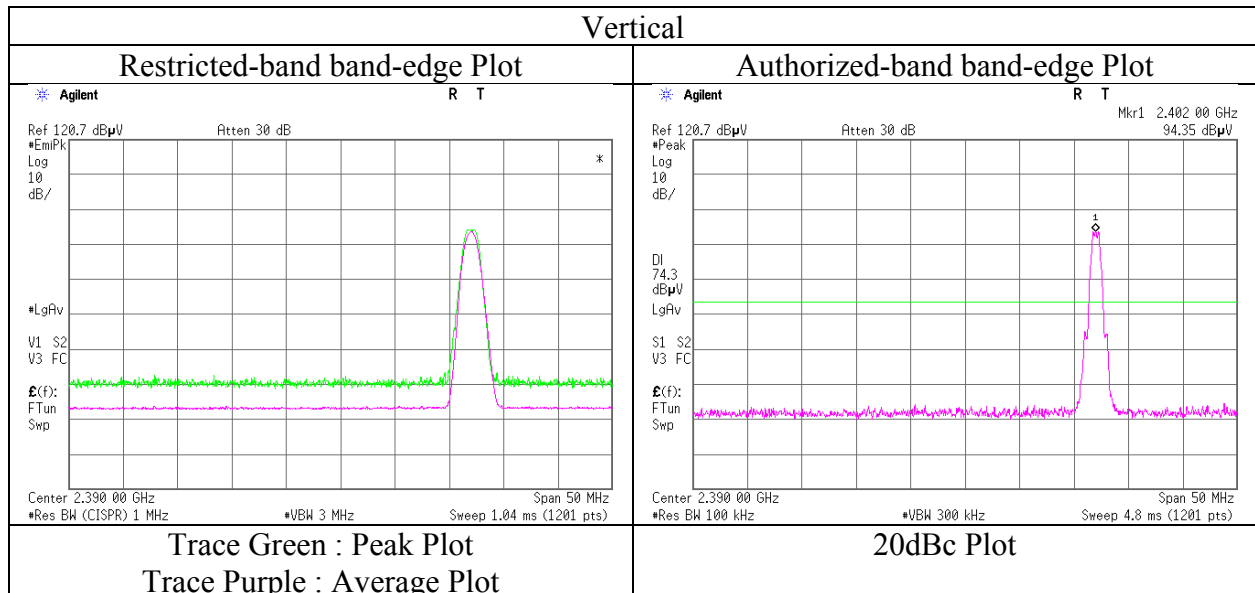
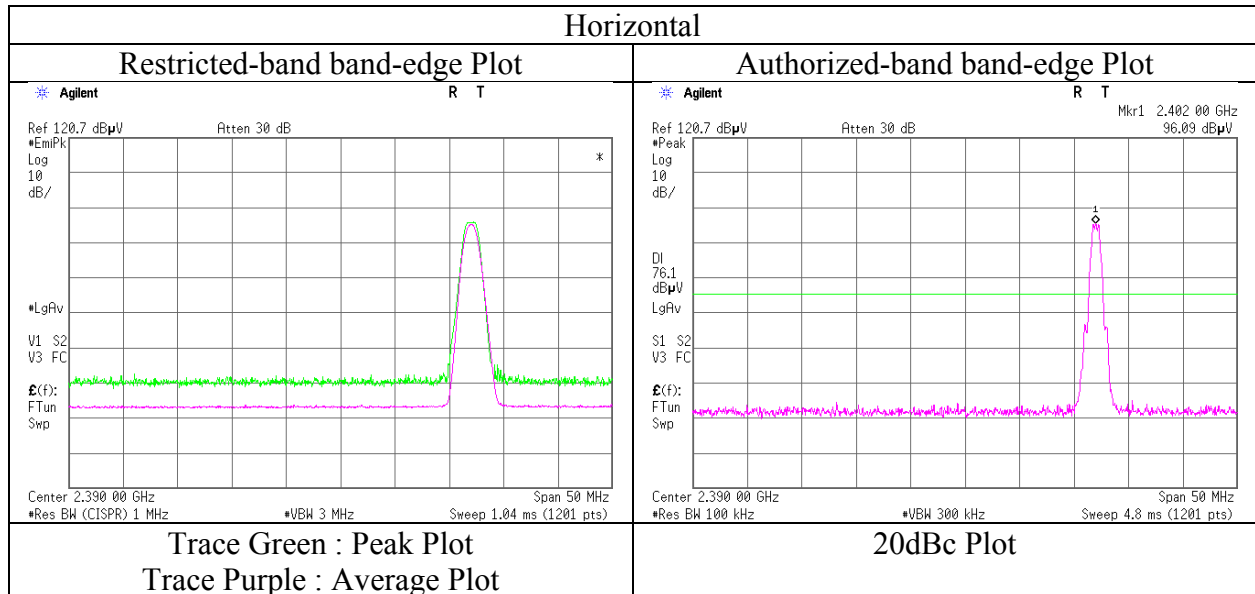
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge)

External antenna

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10953040H
Date	October 2, 2015
Temperature / Humidity	22 deg. C / 67 % RH
Engineer	Kazuya Yoshioka (1-10GHz)
Mode	Tx BT LE 2402 MHz



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

UL Japan, Inc.

Ise EMC Lab.

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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission

External antenna

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.2
Report No.	10953040H		
Date	October 2, 2015	October 3, 2015	October 5, 2015
Temperature / Humidity	22 deg. C / 67 % RH	22 deg. C / 57 % RH	23 deg. C / 47 % RH
Engineer	Kazuya Yoshioka (1-10GHz)	Takafumi Noguchi (10-26.5GHz)	Kazuya Yoshioka (Below 1GHz)
Mode	Tx BT LE 2440 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	58.982	QP	23.9	7.7	7.1	28.4	-	10.3	40.0	29.7	
Hori	100.000	QP	22.0	10.1	7.5	28.2	-	11.4	43.5	32.1	
Hori	163.200	QP	21.7	15.6	7.9	27.9	-	17.3	43.5	26.2	
Hori	288.001	QP	25.3	19.1	8.8	27.4	-	25.8	46.0	20.2	
Hori	326.400	QP	21.0	15.4	9.0	27.6	-	17.8	46.0	28.2	
Hori	402.000	QP	21.4	17.6	9.4	28.2	-	20.2	46.0	25.8	
Hori	4880.000	PK	51.5	31.9	5.5	31.3	-	57.6	73.9	16.3	
Hori	7320.000	PK	41.7	36.0	6.8	32.0	-	52.5	73.9	21.4	Floor noise
Hori	9760.000	PK	41.3	38.2	7.5	32.5	-	54.5	73.9	19.4	Floor noise
Hori	4880.000	AV	41.7	31.9	5.5	31.3	1.8	49.6	53.9	4.3	
Hori	7320.000	AV	33.5	36.0	6.8	32.0	-	44.3	53.9	9.6	Floor noise
Hori	9760.000	AV	34.0	38.2	7.5	32.5	-	47.2	53.9	6.7	Floor noise
Vert	58.982	QP	27.9	7.7	7.1	28.4	-	14.3	40.0	25.7	
Vert	100.000	QP	22.0	10.1	7.5	28.2	-	11.4	43.5	32.1	
Vert	163.200	QP	21.7	15.6	7.9	27.9	-	17.3	43.5	26.2	
Vert	288.001	QP	25.4	19.1	8.8	27.4	-	25.9	46.0	20.1	
Vert	326.400	QP	21.0	15.4	9.0	27.6	-	17.8	46.0	28.2	
Vert	402.000	QP	21.4	17.6	9.4	28.2	-	20.2	46.0	25.8	
Vert	4880.000	PK	49.1	31.9	5.5	31.3	-	55.2	73.9	18.7	
Vert	7320.000	PK	42.0	36.0	6.8	32.0	-	52.8	73.9	21.1	Floor noise
Vert	9760.000	PK	41.7	38.2	7.5	32.5	-	54.9	73.9	19.0	Floor noise
Vert	4880.000	AV	40.2	31.9	5.5	31.3	1.8	48.1	53.9	5.8	
Vert	7320.000	AV	33.5	36.0	6.8	32.0	-	44.3	53.9	9.6	Floor noise
Vert	9760.000	AV	34.0	38.2	7.5	32.5	-	47.2	53.9	6.7	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 10 GHz - 26.5 GHz $20\log(3.0\text{ m} / 1.0\text{ m}) = 9.5\text{ dB}$
26.5 GHz - 40 GHz $20\log(3.0\text{ m} / 0.5\text{ m}) = 15.6\text{ dB}$

*1) Not Out of Band emission(Leakage Power)

Radiated Spurious Emission

External antenna

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.2
Report No.	10953040H		
Date	October 2, 2015	October 3, 2015	October 5, 2015
Temperature / Humidity	22 deg. C / 67 % RH	22 deg. C / 57 % RH	23 deg. C / 47 % RH
Engineer	Kazuya Yoshioka (1-10GHz)	Takafumi Noguchi (10-26.5GHz)	Kazuya Yoshioka (Below 1GHz)
Mode	Tx BT LE 2480 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	58.982	QP	24.0	7.7	7.1	28.4	-	10.4	40.0	29.6	
Hori	100.000	QP	22.0	10.1	7.5	28.2	-	11.4	43.5	32.1	
Hori	163.200	QP	21.7	15.6	7.9	27.9	-	17.3	43.5	26.2	
Hori	288.001	QP	25.2	19.1	8.8	27.4	-	25.7	46.0	20.3	
Hori	326.400	QP	21.0	15.4	9.0	27.6	-	17.8	46.0	28.2	
Hori	402.000	QP	21.4	17.6	9.4	28.2	-	20.2	46.0	25.8	
Hori	2483.500	PK	57.4	26.9	3.3	32.0	-	55.6	73.9	18.3	
Hori	4960.000	PK	49.0	32.1	5.4	31.2	-	55.3	73.9	18.6	
Hori	7440.000	PK	41.2	36.0	6.7	32.1	-	51.8	73.9	22.1	Floor noise
Hori	9920.000	PK	41.2	38.2	7.6	32.5	-	54.5	73.9	19.4	Floor noise
Hori	2483.500	AV	34.0	26.9	3.3	32.0	1.8	34.0	53.9	19.9	*1)
Hori	4960.000	AV	39.3	32.1	5.4	31.2	1.8	47.4	53.9	6.5	
Hori	7440.000	AV	31.0	36.0	6.7	32.1	-	41.6	53.9	12.3	Floor noise
Hori	9920.000	AV	31.3	38.2	7.6	32.5	-	44.6	53.9	9.3	Floor noise
Vert	58.982	QP	28.0	7.7	7.1	28.4	-	14.4	40.0	25.6	
Vert	100.000	QP	22.0	10.1	7.5	28.2	-	11.4	43.5	32.1	
Vert	163.200	QP	21.7	15.6	7.9	27.9	-	17.3	43.5	26.2	
Vert	288.001	QP	25.4	19.1	8.8	27.4	-	25.9	46.0	20.1	
Vert	326.400	QP	21.0	15.4	9.0	27.6	-	17.8	46.0	28.2	
Vert	402.000	QP	21.4	17.6	9.4	28.2	-	20.2	46.0	25.8	
Vert	2483.500	PK	53.5	26.9	3.3	32.0	-	51.7	73.9	22.2	
Vert	4960.000	PK	46.4	32.1	5.4	31.2	-	52.7	73.9	21.2	
Vert	7440.000	PK	41.5	36.0	6.7	32.1	-	52.1	73.9	21.8	Floor noise
Vert	9920.000	PK	41.6	38.2	7.6	32.5	-	54.9	73.9	19.0	Floor noise
Vert	2483.500	AV	38.5	26.9	3.3	32.0	1.8	38.5	53.9	15.4	*1)
Vert	4960.000	AV	37.6	32.1	5.4	31.2	1.8	45.7	53.9	8.2	
Vert	7440.000	AV	31.0	36.0	6.7	32.1	-	41.6	53.9	12.3	Floor noise
Vert	9920.000	AV	31.3	38.2	7.6	32.5	-	44.6	53.9	9.3	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 10 GHz - 26.5 GHz $20\log(3.0\text{ m} / 1.0\text{ m}) = 9.5\text{ dB}$

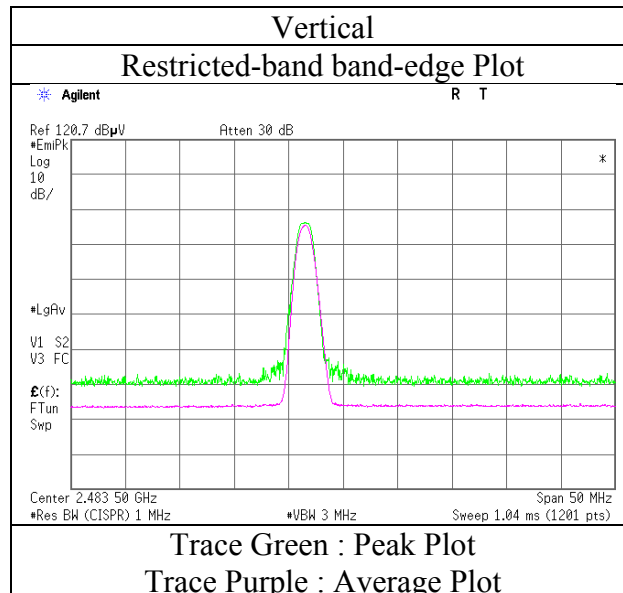
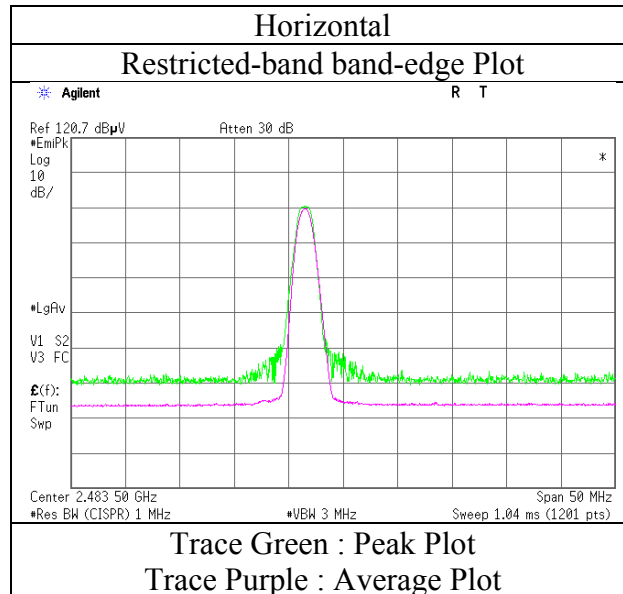
26.5 GHz - 40 GHz $20\log(3.0\text{ m} / 0.5\text{ m}) = 15.6\text{ dB}$

*1) Not Out of Band emission(Leakage Power)

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

External antenna

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10953040H
Date	October 2, 2015
Temperature / Humidity	22 deg. C / 67 % RH
Engineer	Kazuya Yoshioka
	(1-10GHz)
Mode	Tx BT LE 2480 MHz



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

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Ise EMC Lab.

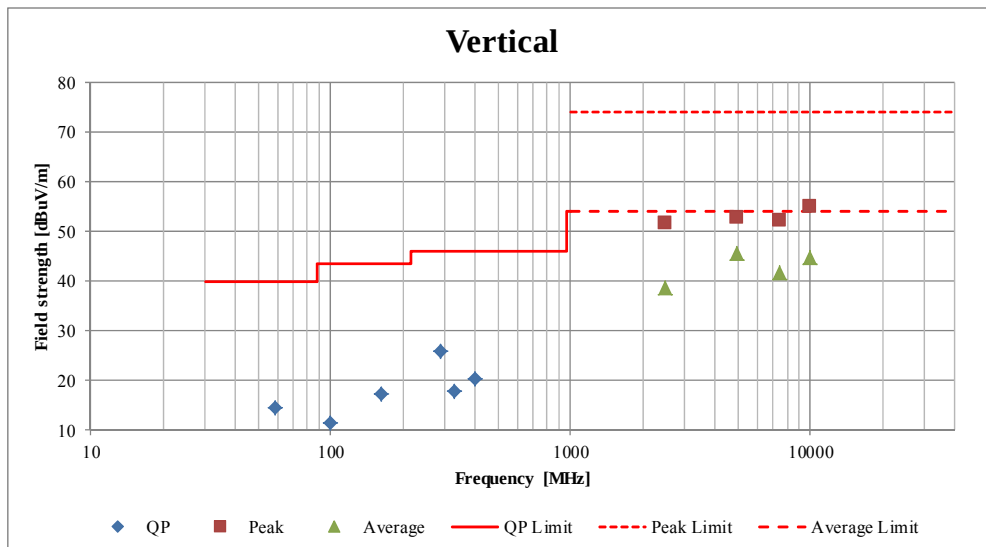
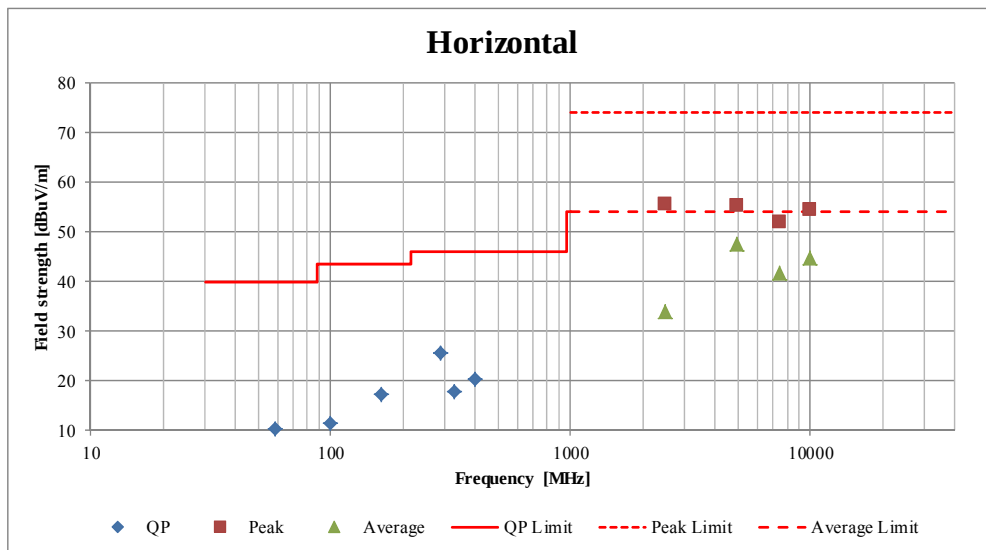
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Radiated Spurious Emission
(Plot data, Worst case)
External antenna

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.2
Report No.	10953040H		
Date	October 2, 2015	October 3, 2015	October 5, 2015
Temperature / Humidity	22 deg. C / 67 % RH	22 deg. C / 57 % RH	23 deg. C / 47 % RH
Engineer	Kazuya Yoshioka (1-10GHz)	Takafumi Noguchi (10-26.5GHz)	Kazuya Yoshioka (Below 1GHz)
Mode	Tx BT LE 2480 MHz		



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

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Radiated Spurious Emission

Internal antenna

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.2
Report No.	10953040H		
Date	October 2, 2015	October 3, 2015	October 5, 2015
Temperature / Humidity	22 deg. C / 61 % RH	22 deg. C / 57 % RH	23 deg. C / 61 % RH
Engineer	Tomoki Matsui (1-10GHz)	Takafumi Noguchi (10-26.5GHz)	Tomoki Matsui (Below 1GHz)
Mode	Tx BT LE 2402 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	100.000	QP	22.2	10.1	7.5	28.2	-	11.6	43.5	31.9	
Hori	163.200	QP	21.5	15.6	7.9	27.9	-	17.1	43.5	26.4	
Hori	288.004	QP	25.2	19.1	8.8	27.4	-	25.7	46.0	20.3	
Hori	326.000	QP	21.1	15.4	9.0	27.6	-	17.9	46.0	28.1	
Hori	402.000	QP	21.4	17.6	9.4	28.2	-	20.2	46.0	25.8	
Hori	489.600	QP	21.8	18.5	9.7	28.5	-	21.5	46.0	24.5	
Hori	2390.000	PK	43.3	26.9	3.3	32.0	-	41.5	73.9	32.4	
Hori	4804.000	PK	42.6	31.8	5.5	31.3	-	48.6	73.9	25.3	
Hori	7206.000	PK	41.2	36.0	6.7	32.0	-	51.9	73.9	22.0	
Hori	9608.000	PK	41.6	38.2	7.5	32.4	-	54.9	73.9	19.0	
Hori	2390.000	AV	33.8	26.9	3.3	32.0	1.8	33.8	53.9	20.1	*1)
Hori	4804.000	AV	34.5	31.8	5.5	31.3	1.8	42.3	53.9	11.6	
Hori	7206.000	AV	32.1	36.0	6.7	32.0	-	42.8	53.9	11.1	Floor noise
Hori	9608.000	AV	32.4	38.2	7.5	32.4	-	45.7	53.9	8.2	Floor noise
Vert	100.000	QP	22.2	10.1	7.5	28.2	-	11.6	43.5	31.9	
Vert	163.200	QP	21.5	15.6	7.9	27.9	-	17.1	43.5	26.4	
Vert	288.004	QP	25.1	19.1	8.8	27.4	-	25.6	46.0	20.4	
Vert	326.000	QP	21.1	15.4	9.0	27.6	-	17.9	46.0	28.1	
Vert	402.000	QP	21.4	17.6	9.4	28.2	-	20.2	46.0	25.8	
Vert	489.600	QP	21.7	18.5	9.7	28.5	-	21.4	46.0	24.6	
Vert	2390.000	PK	43.3	26.9	3.3	32.0	-	41.5	73.9	32.4	
Vert	4804.000	PK	41.6	31.8	5.5	31.3	-	47.6	73.9	26.3	
Vert	7206.000	PK	41.1	36.0	6.7	32.0	-	51.8	73.9	22.1	
Vert	9608.000	PK	42.1	38.2	7.5	32.4	-	55.4	73.9	18.5	
Vert	2390.000	AV	33.6	26.9	3.3	32.0	1.8	33.6	53.9	20.3	*1)
Vert	4804.000	AV	34.0	31.8	5.5	31.3	1.8	41.8	53.9	12.1	
Vert	7206.000	AV	32.1	36.0	6.7	32.0	-	42.8	53.9	11.1	Floor noise
Vert	9608.000	AV	32.2	38.2	7.5	32.4	-	45.5	53.9	8.4	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor:
10 GHz - 26.5 GHz $20\log(3.0\text{ m} / 1.0\text{ m}) = 9.5\text{ dB}$
26.5 GHz - 40 GHz $20\log(3.0\text{ m} / 0.5\text{ m}) = 15.6\text{ dB}$

*1) Not Out of Band emission(Leakage Power)

20dBc Data Sheet

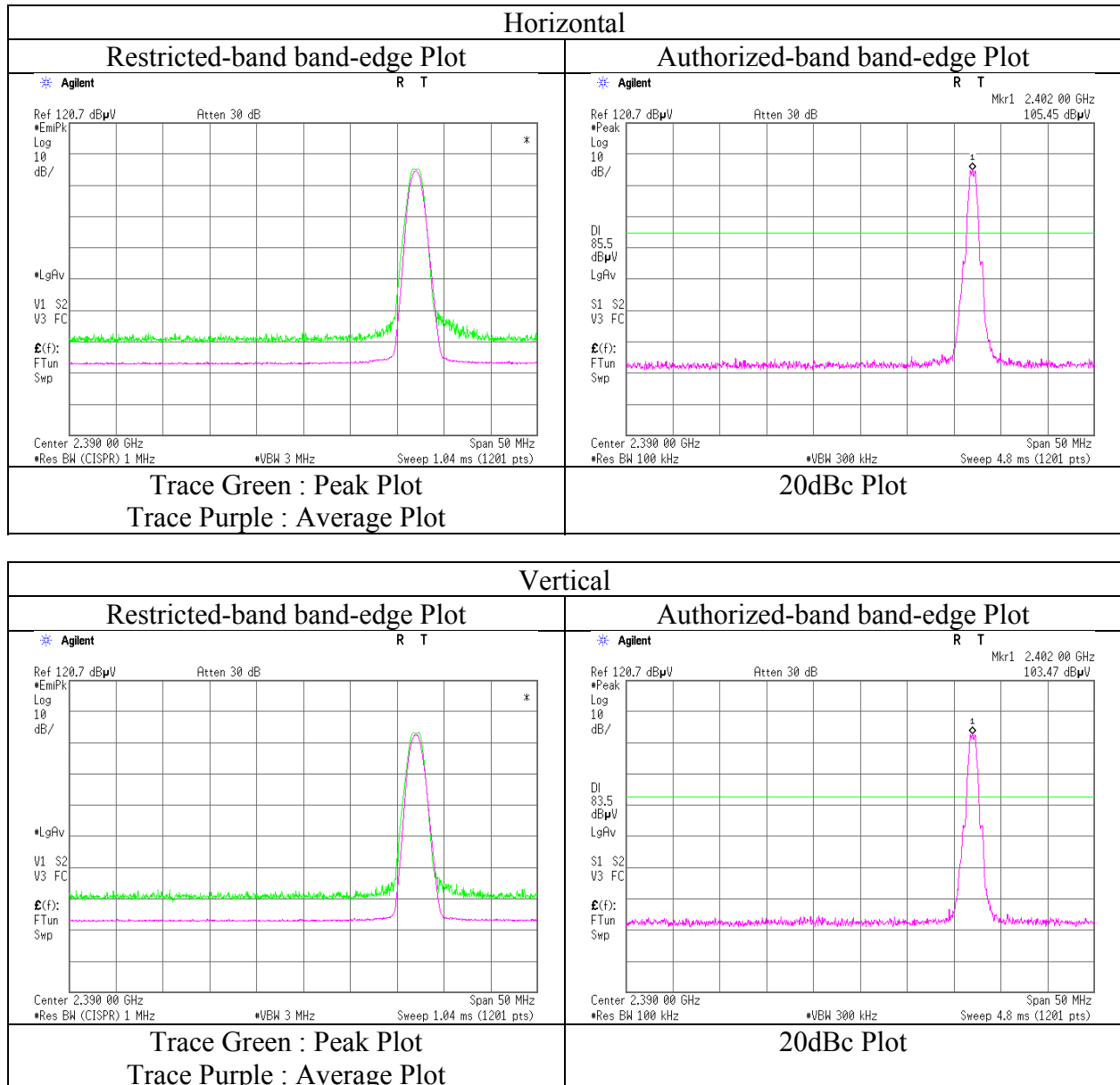
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	105.5	26.9	3.3	32.0	103.7	-	-	Carrier
Hori	2400.000	PK	47.3	26.9	3.3	32.0	45.5	83.7	38.2	Carrier
Vert	2402.000	PK	103.5	26.9	3.3	32.0	101.7	-	-	Carrier
Vert	2400.000	PK	46.3	26.9	3.3	32.0	44.5	81.7	37.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

Radiated Spurious Emission (Reference Plot for band-edge)

Internal antenna

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10953040H
Date	October 2, 2015
Temperature / Humidity	22 deg. C / 61 % RH
Engineer	Tomoki Matsui
	(1-10GHz)
Mode	Tx BT LE 2402 MHz



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

UL Japan, Inc.

Ise EMC Lab.

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Facsimile : +81 596 24 8124

Radiated Spurious Emission

Internal antenna

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.2
Report No.	10953040H		
Date	October 2, 2015	October 3, 2015	October 5, 2015
Temperature / Humidity	22 deg. C / 61 % RH	22 deg. C / 57 % RH	23 deg. C / 61 % RH
Engineer	Tomoki Matsui (1-10GHz)	Takafumi Noguchi (10-26.5GHz)	Tomoki Matsui (Below 1GHz)
Mode	Tx BT LE 2440 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	100.000	QP	22.1	10.1	7.5	28.2	-	11.5	43.5	32.0	
Hori	163.200	QP	21.4	15.6	7.9	27.9	-	17.0	43.5	26.5	
Hori	288.001	QP	25.1	19.1	8.8	27.4	-	25.6	46.0	20.4	
Hori	326.000	QP	21.2	15.4	9.0	27.6	-	18.0	46.0	28.0	
Hori	402.000	QP	21.4	17.6	9.4	28.2	-	20.2	46.0	25.8	
Hori	489.600	QP	21.8	18.5	9.7	28.5	-	21.5	46.0	24.5	
Hori	4880.000	PK	42.5	31.9	5.5	31.3	-	48.6	73.9	25.3	
Hori	7320.000	PK	40.8	36.0	6.8	32.0	-	51.6	73.9	22.3	
Hori	9760.000	PK	41.6	38.2	7.5	32.5	-	54.8	73.9	19.1	
Hori	4880.000	AV	34.6	31.9	5.5	31.3	1.8	42.5	53.9	11.4	
Hori	7320.000	AV	32.5	36.0	6.8	32.0	-	43.3	53.9	10.6	Floor noise
Hori	9760.000	AV	32.3	38.2	7.5	32.5	-	45.5	53.9	8.4	Floor noise
Vert	100.000	QP	22.1	10.1	7.5	28.2	-	11.5	43.5	32.0	
Vert	163.200	QP	21.4	15.6	7.9	27.9	-	17.0	43.5	26.5	
Vert	288.001	QP	25.0	19.1	8.8	27.4	-	25.5	46.0	20.5	
Vert	326.000	QP	21.2	15.4	9.0	27.6	-	18.0	46.0	28.0	
Vert	402.000	QP	21.4	17.6	9.4	28.2	-	20.2	46.0	25.8	
Vert	489.600	QP	21.8	18.5	9.7	28.5	-	21.5	46.0	24.5	
Vert	4880.000	PK	42.1	31.9	5.5	31.3	-	48.2	73.9	25.7	
Vert	7320.000	PK	41.5	36.0	6.8	32.0	-	52.3	73.9	21.6	
Vert	9760.000	PK	40.5	38.2	7.5	32.5	-	53.7	73.9	20.2	
Vert	4880.000	AV	33.3	31.9	5.5	31.3	1.8	41.2	53.9	12.7	
Vert	7320.000	AV	32.1	36.0	6.8	32.0	-	42.9	53.9	11.0	Floor noise
Vert	9760.000	AV	32.0	38.2	7.5	32.5	-	45.2	53.9	8.7	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 10 GHz - 26.5 GHz $20\log(3.0\text{ m} / 1.0\text{ m}) = 9.5\text{ dB}$
26.5 GHz - 40 GHz $20\log(3.0\text{ m} / 0.5\text{ m}) = 15.6\text{ dB}$

*1) Not Out of Band emission(Leakage Power)

Radiated Spurious Emission

Internal antenna

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.2
Report No.	10953040H		
Date	October 2, 2015	October 3, 2015	October 5, 2015
Temperature / Humidity	22 deg. C / 61 % RH	22 deg. C / 57 % RH	23 deg. C / 61 % RH
Engineer	Tomoki Matsui	Takafumi Noguchi	Tomoki Matsui
	(1-10GHz)	(10-26.5GHz)	(Below 1GHz)
Mode	Tx BT LE 2480 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	100.000	QP	22.2	10.1	7.5	28.2	-	11.6	43.5	31.9	
Hori	163.200	QP	21.5	15.6	7.9	27.9	-	17.1	43.5	26.4	
Hori	288.002	QP	25.2	19.1	8.8	27.4	-	25.7	46.0	20.3	
Hori	326.000	QP	21.0	15.4	9.0	27.6	-	17.8	46.0	28.2	
Hori	402.000	QP	21.5	17.6	9.4	28.2	-	20.3	46.0	25.7	
Hori	489.600	QP	21.6	18.5	9.7	28.5	-	21.3	46.0	24.7	
Hori	2483.500	PK	59.7	26.9	3.3	32.0	-	57.9	73.9	16.0	
Hori	4960.000	PK	42.2	32.1	5.4	31.2	-	48.5	73.9	25.4	
Hori	7440.000	PK	41.0	36.0	6.7	32.1	-	51.6	73.9	22.3	
Hori	9920.000	PK	41.4	38.2	7.6	32.5	-	54.7	73.9	19.2	
Hori	2483.500	AV	45.3	26.9	3.3	32.0	1.8	45.3	53.9	8.6	*1)
Hori	4960.000	AV	34.9	32.1	5.4	31.2	1.8	43.0	53.9	10.9	
Hori	7440.000	AV	32.5	36.0	6.7	32.1	-	43.1	53.9	10.8	Floor noise
Hori	9920.000	AV	32.3	38.2	7.6	32.5	-	45.6	53.9	8.3	Floor noise
Vert	100.000	QP	22.2	10.1	7.5	28.2	-	11.6	43.5	31.9	
Vert	163.200	QP	21.5	15.6	7.9	27.9	-	17.1	43.5	26.4	
Vert	288.002	QP	25.3	19.1	8.8	27.4	-	25.8	46.0	20.2	
Vert	326.000	QP	21.0	15.4	9.0	27.6	-	17.8	46.0	28.2	
Vert	402.000	QP	21.5	17.6	9.4	28.2	-	20.3	46.0	25.7	
Vert	489.600	QP	21.6	18.5	9.7	28.5	-	21.3	46.0	24.7	
Vert	2483.500	PK	56.2	26.9	3.3	32.0	-	54.4	73.9	19.5	
Vert	4960.000	PK	42.8	32.1	5.4	31.2	-	49.1	73.9	24.8	
Vert	7440.000	PK	41.9	36.0	6.7	32.1	-	52.5	73.9	21.4	
Vert	9920.000	PK	42.0	38.2	7.6	32.5	-	55.3	73.9	18.6	
Vert	2483.500	AV	41.5	26.9	3.3	32.0	1.8	41.5	53.9	12.4	*1)
Vert	4960.000	AV	33.4	32.1	5.4	31.2	1.8	41.5	53.9	12.4	
Vert	7440.000	AV	32.1	36.0	6.7	32.1	-	42.7	53.9	11.2	Floor noise
Vert	9920.000	AV	32.3	38.2	7.6	32.5	-	45.6	53.9	8.3	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 10 GHz - 26.5 GHz $20\log(3.0\text{ m} / 1.0\text{ m}) = 9.5\text{ dB}$

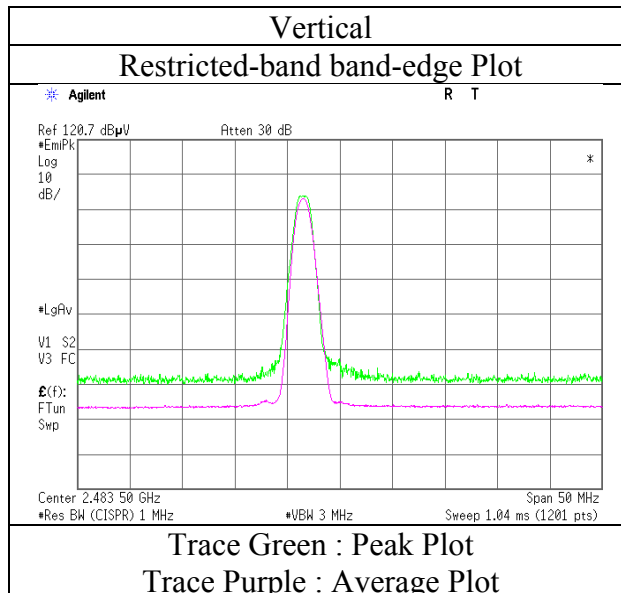
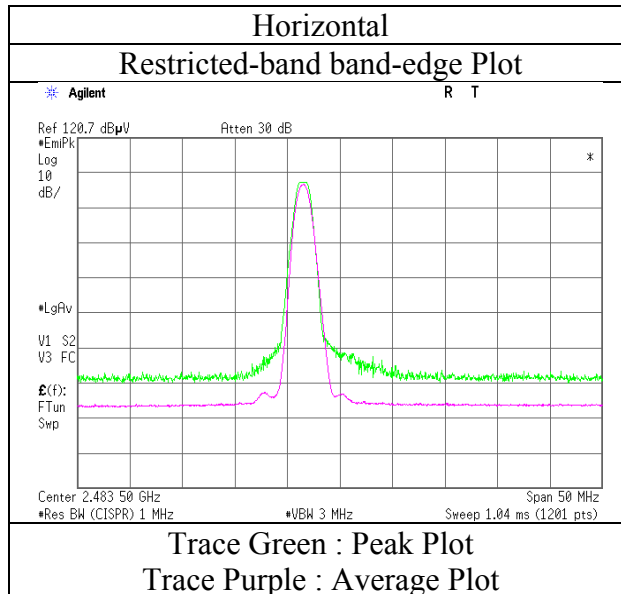
26.5 GHz - 40 GHz $20\log(3.0\text{ m} / 0.5\text{ m}) = 15.6\text{ dB}$

*1) Not Out of Band emission(Leakage Power)

Radiated Spurious Emission (Reference Plot for band-edge)

Internal antenna

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10953040H
Date	October 2, 2015
Temperature / Humidity	22 deg. C / 61 % RH
Engineer	Tomoki Matsui
	(1-10GHz)
Mode	Tx BT LE 2480 MHz



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

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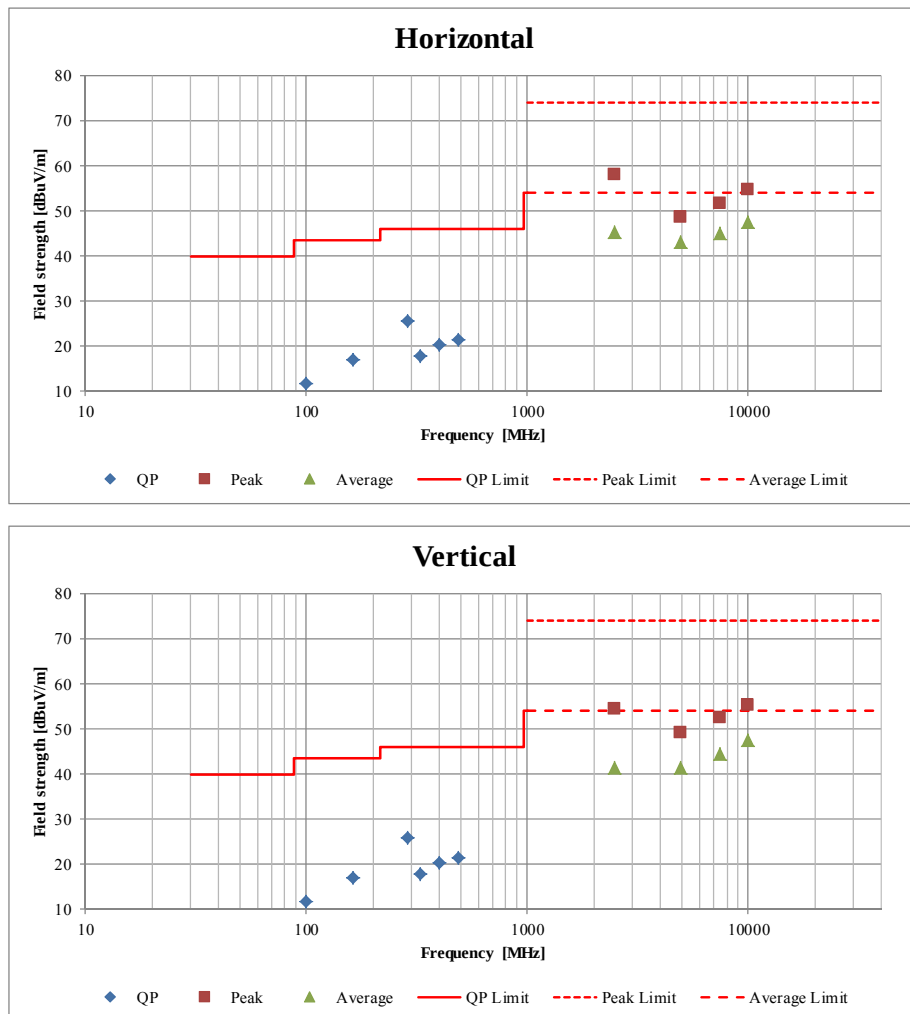
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Radiated Spurious Emission
(Plot data, Worst case)
Internal antenna

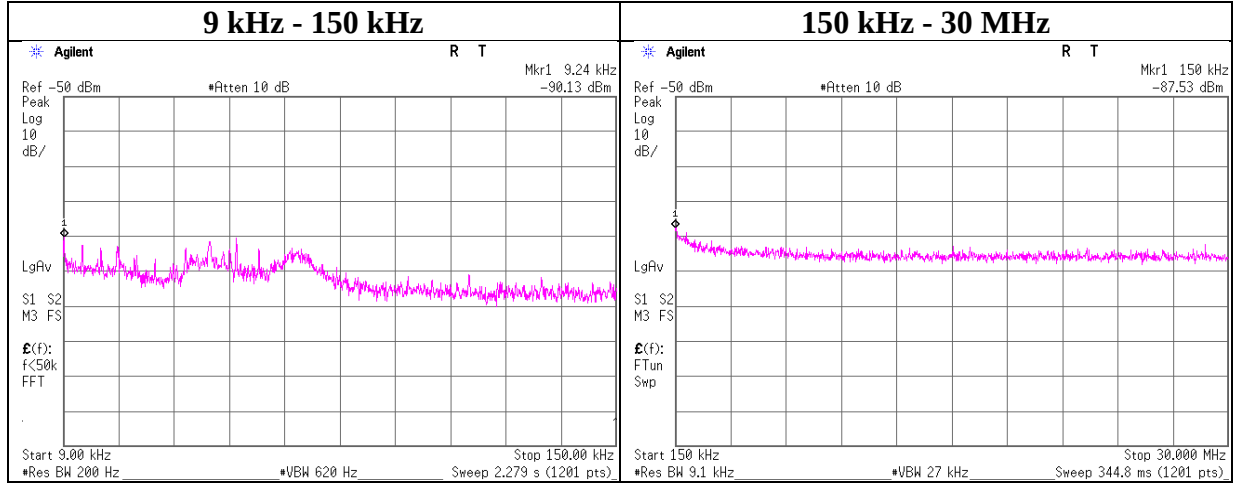
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.2
Report No.	10953040H		
Date	October 2, 2015	October 3, 2015	October 5, 2015
Temperature / Humidity	22 deg. C / 61 % RH	22 deg. C / 57 % RH	23 deg. C / 61 % RH
Engineer	Tomoki Matsui (1-10GHz)	Takafumi Noguchi (10-26.5GHz)	Tomoki Matsui (Below 1GHz)
Mode	Tx BT LE 2480 MHz		



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

Conducted Spurious Emission

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 10953040H
Date : September 25, 2015
Temperature / Humidity : 24 deg. C / 67 % RH
Engineer : Tomoki Matsui
Mode : Tx 11g 2412 MHz



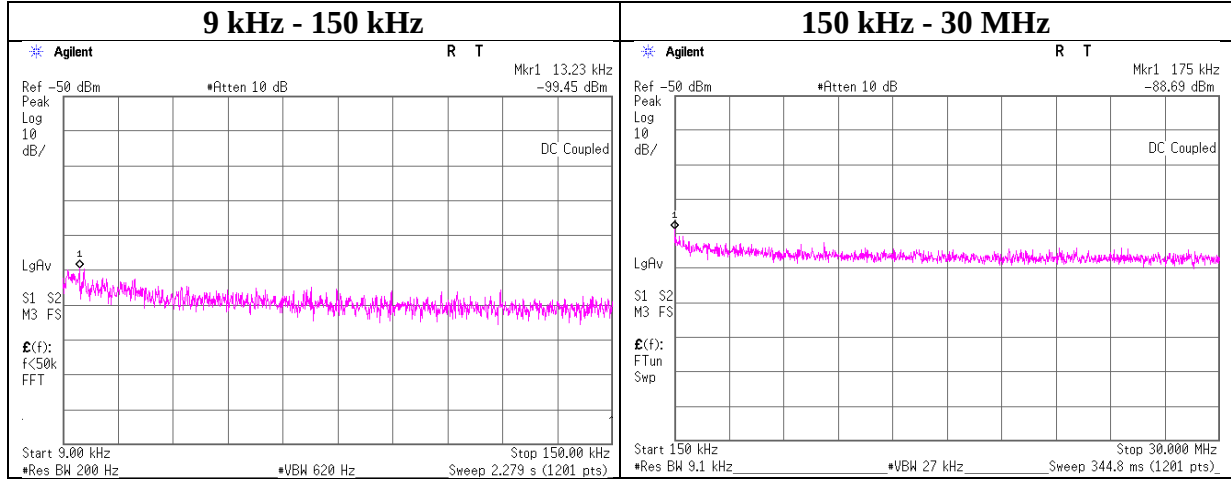
Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
9.24	-90.1	0.01	10.0	2.0	1	-78.1	300	6.0	-16.9	48.2	65.1	
150.00	-87.5	0.01	10.0	2.0	1	-75.5	300	6.0	-14.3	24.0	38.3	

$E = \text{EIRP} - 20 \log(D) + \text{Ground bounce} + 104.8 \text{ [dBuV/m]}$

$\text{EIRP} = \text{Reading} + \text{Cable Loss} + \text{Attenuator Loss} + \text{Antenna Gain} + 10 * \log(N)$

Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10953040H
Date	October 1, 2015
Temperature / Humidity	24deg. C / 56% RH
Engineer	Satofumi Matsuyama
Mode	Tx BT LE 2402 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
13.23	-99.5	0.01	10.0	2.0	1	-87.4	300	6.0	-26.2	45.1	71.3	
175.00	-88.7	0.01	10.0	2.0	1	-76.7	300	6.0	-15.4	22.7	38.1	

$E = \text{EIRP} - 20 \log(D) + \text{Ground bounce} + 104.8 \text{ [dBuV/m]}$

$\text{EIRP} = \text{Reading} + \text{Cable Loss} + \text{Attenuator Loss} + \text{Antenna Gain} + 10 * \log(N)$

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Ise EMC Lab.

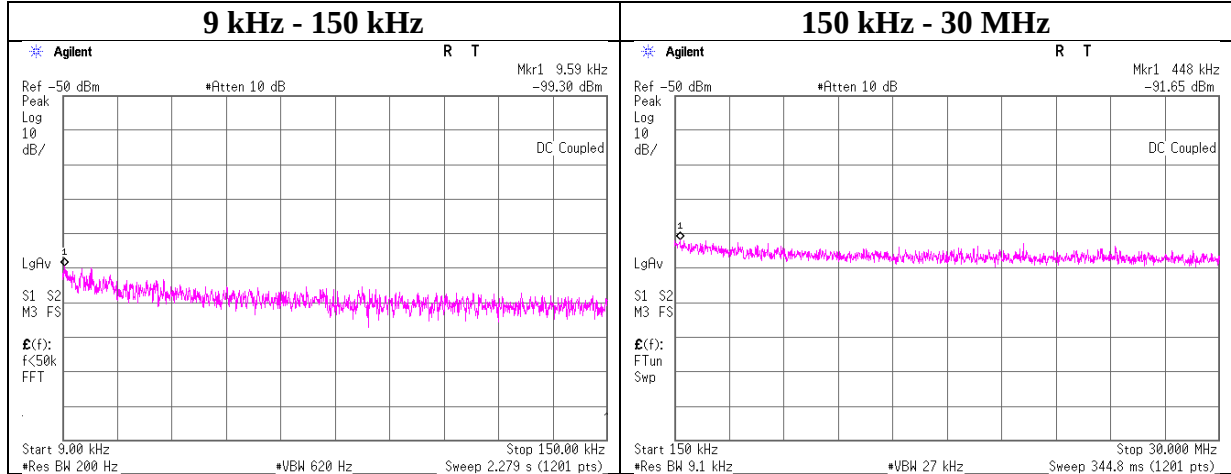
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Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10953040H
Date	October 1, 2015
Temperature / Humidity	24deg. C / 56% RH
Engineer	Satofumi Matsuyama
Mode	Tx BT LE 2440 MHz



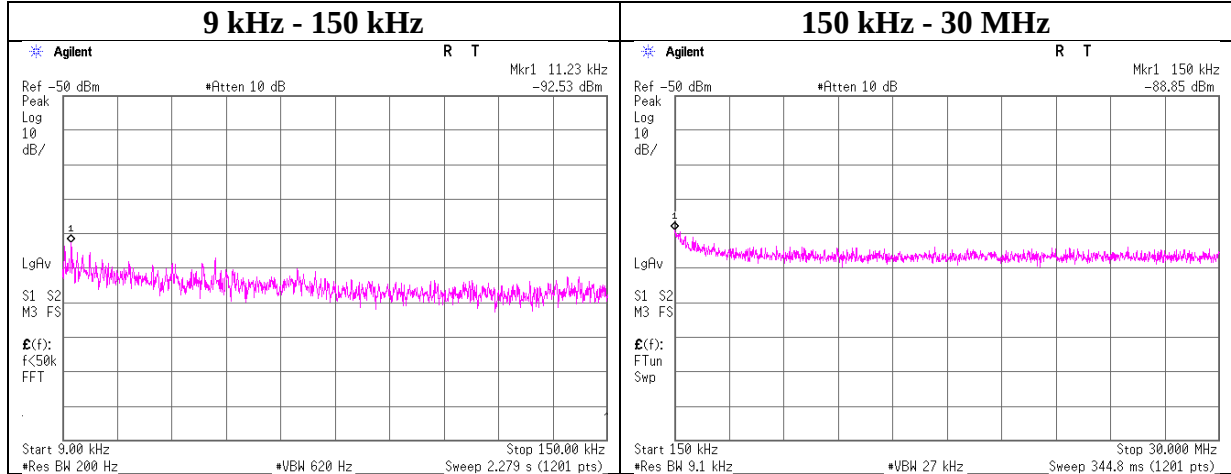
Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
9.59	-99.3	0.01	10.0	2.0	1	-87.3	300	6.0	-26.0	47.9	73.9	
448.00	-91.7	0.01	10.0	2.0	1	-79.6	300	6.0	-18.4	14.5	32.9	

$E = \text{EIRP} - 20 \log(D) + \text{Ground bounce} + 104.8 \text{ [dBuV/m]}$

$\text{EIRP} = \text{Reading} + \text{Cable Loss} + \text{Attenuator Loss} + \text{Antenna Gain} + 10 * \log(N)$

Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10953040H
Date	October 1, 2015
Temperature / Humidity	24deg. C / 56% RH
Engineer	Satofumi Matsuyama
Mode	Tx BT LE 2480 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
11.23	-92.5	0.01	10.0	2.0	1	-80.5	300	6.0	-19.3	46.5	65.8	
150.00	-88.9	0.01	10.0	2.0	1	-76.8	300	6.0	-15.6	24.0	39.6	

$E = \text{EIRP} - 20 \log(D) + \text{Ground bounce} + 104.8 \text{ [dBuV/m]}$

$\text{EIRP} = \text{Reading} + \text{Cable Loss} + \text{Attenuator Loss} + \text{Antenna Gain} + 10 * \log(N)$

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Power Density

Test place	Ise EMC Lab. No.11 Measurement Room	
Report No.	10953040H	
Date	September 25, 2015	October 1, 2015
Temperature / Humidity	24 deg. C / 67 % RH	24deg. C / 56% RH
Engineer	Tomoki Matsui	Satofumi Matsuyama
Mode	Tx	

11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-23.42	2.03	9.77	-11.62	8.00	19.62
2437.00	-24.42	2.04	9.77	-12.61	8.00	20.61
2462.00	-23.76	2.05	9.77	-11.94	8.00	19.94

11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-24.70	2.03	9.77	-12.90	8.00	20.90
2437.00	-25.90	2.04	9.77	-14.09	8.00	22.09
2462.00	-25.85	2.05	9.77	-14.03	8.00	22.03

11n-20

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-25.48	2.03	9.77	-13.68	8.00	21.68
2437.00	-25.28	2.04	9.77	-13.47	8.00	21.47
2462.00	-26.01	2.05	9.77	-14.19	8.00	22.19

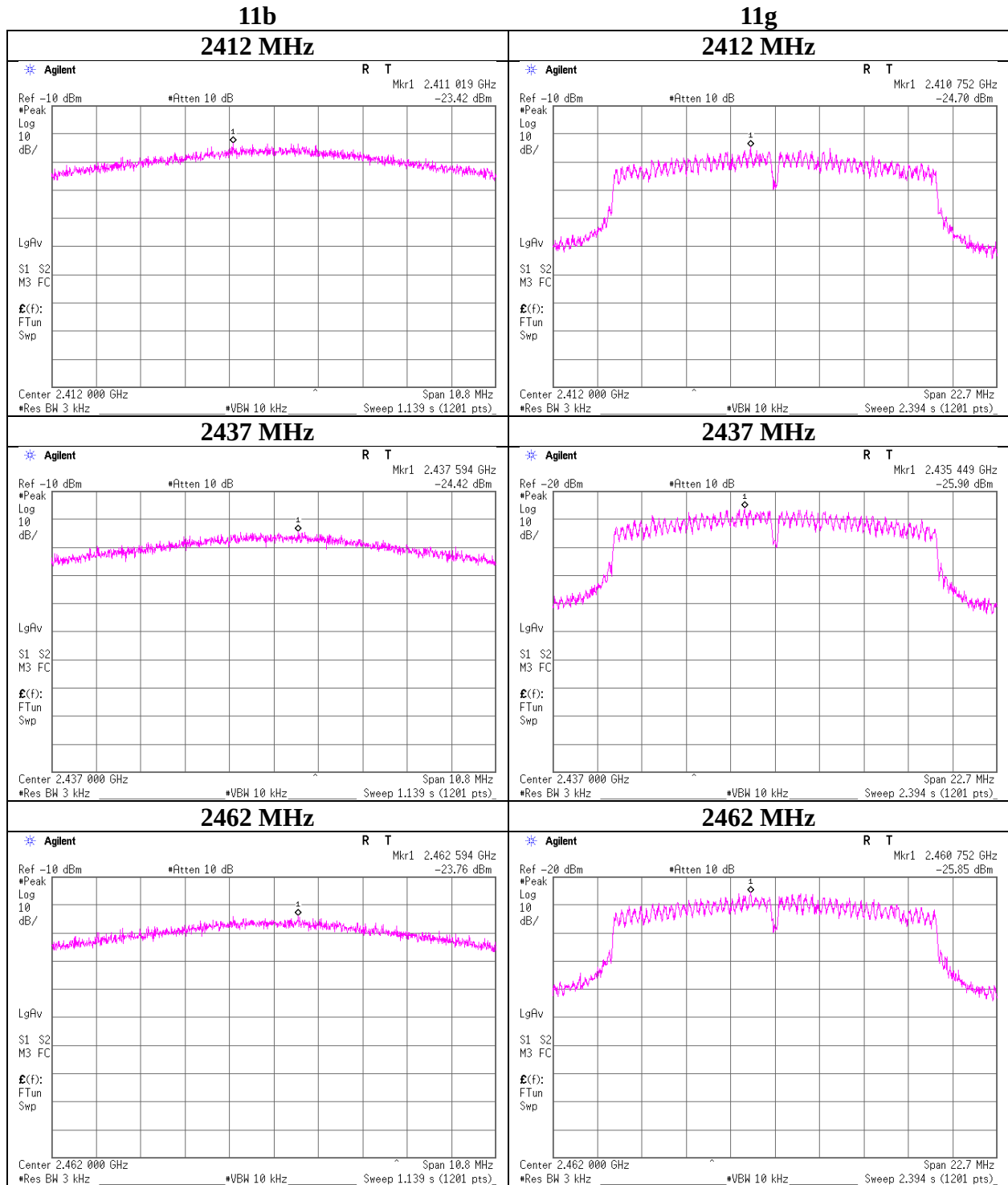
BT LE

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2402.00	-17.90	2.03	9.77	-6.10	8.00	14.10
2440.00	-17.74	2.04	9.77	-5.93	8.00	13.93
2480.00	-17.17	2.05	9.77	-5.35	8.00	13.35

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

Power Density



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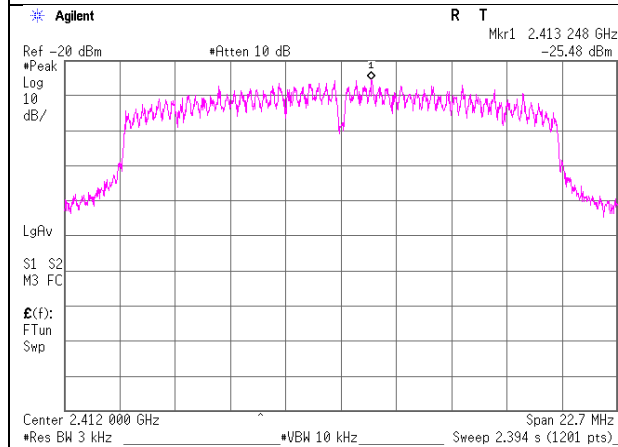
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Power Density

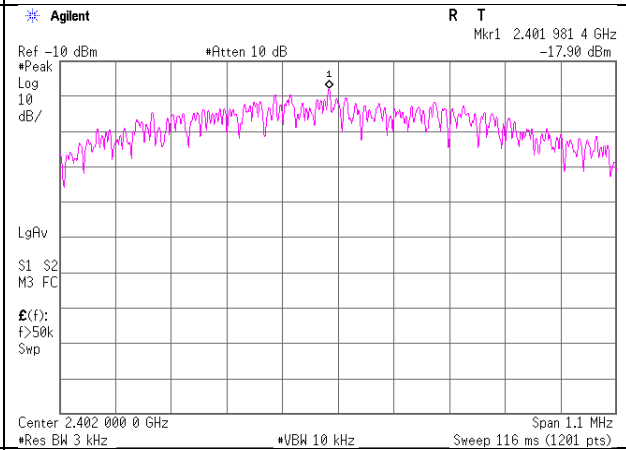
11n-20

2412 MHz

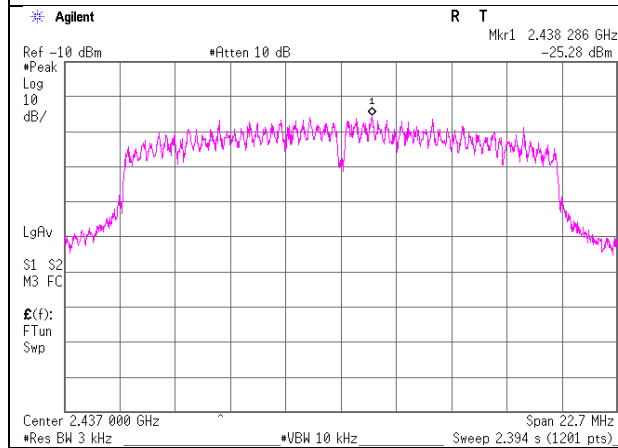


BT LE

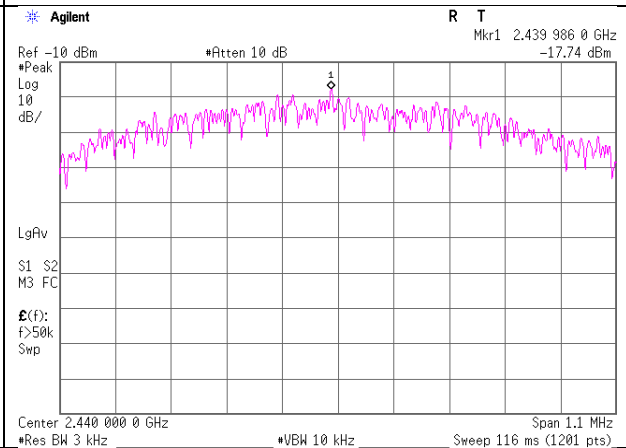
2402 MHz



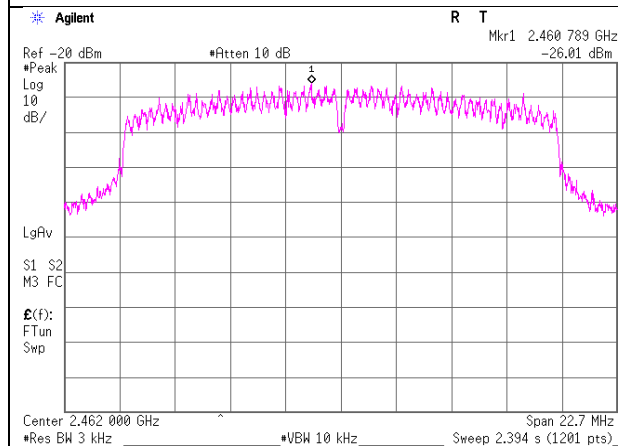
2437 MHz



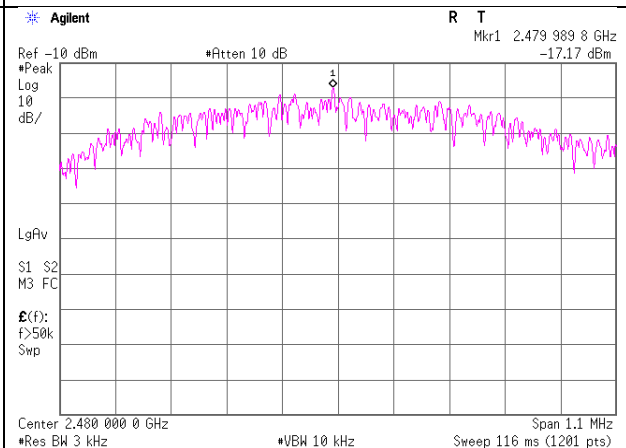
2440 MHz



2462 MHz



2480 MHz



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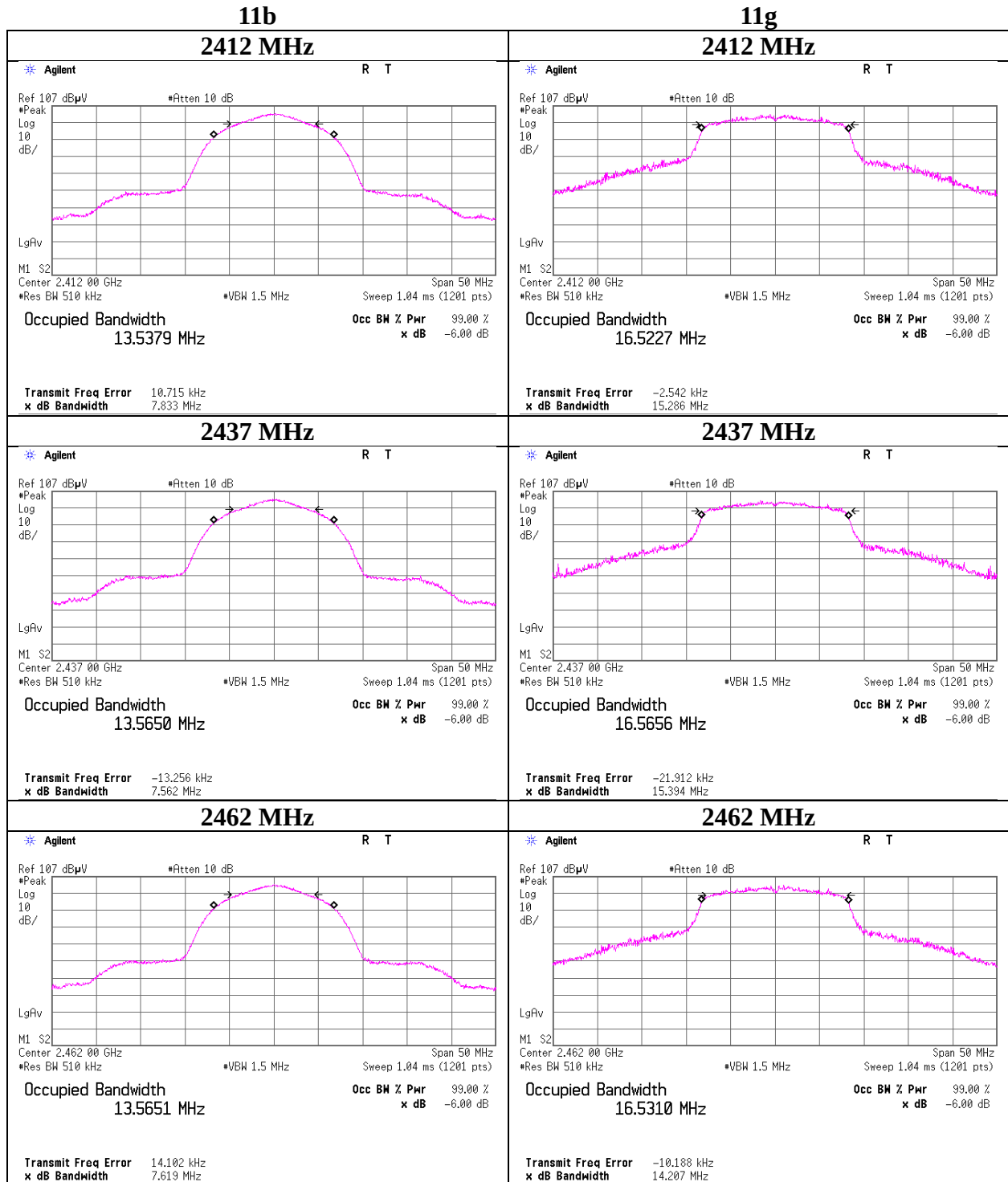
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99%Occupied Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room	
Report No.	10953040H	
Date	September 25, 2015	October 1, 2015
Temperature / Humidity	24 deg. C / 67 % RH	24deg. C / 56% RH
Engineer	Tomoki Matsui	Satofumi Matsuyama
Mode	Tx	



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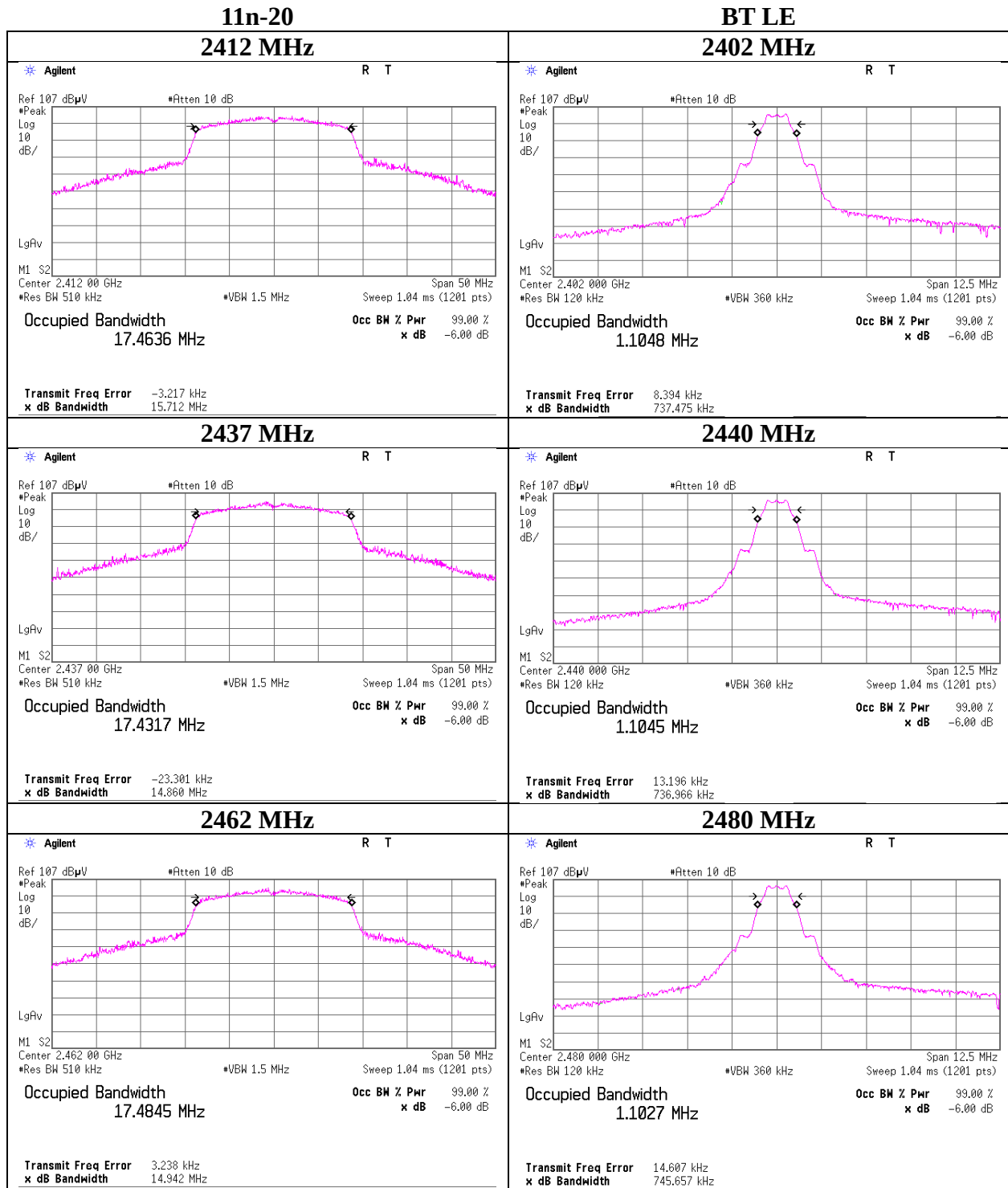
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99% Occupied Bandwidth



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APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2014/10/16 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2014/10/15 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	AT	2015/05/18 * 12
MAT-89	Attenuator	Weinschel Associates	WA56-10	56100305	AT	2015/06/01 * 12
MCC-137	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37954/2	AT	2014/10/02 * 12
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2014/12/22 * 12
MBM-12	Barometer	Sunoh	SBR121	873	AT	2015/02/04 * 36
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE,CE	2015/07/01 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE,CE	2015/01/13 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE,CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE,CE	-
MRENT-124	Spectrum Analyzer	KEYSIGHT	E4440A	MY46187750	RE	2015/06/24 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2015/02/05 * 12
MCC-166	Microwave Cable	Junkosha	MWX221	1303S120(1m) / 1311S167(5m)	RE	
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2015/01/28 * 12
MHF-26	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	002	RE	2015/09/17 * 12
MMM-01	Digital Tester	Fluke	FLUKE 26-3	78030611	RE	2015/08/19 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2015/02/26 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	1501	RE	2015/01/13 * 12
MJM-23	Measure	ASKUL	-	-	RE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2014/11/12 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2015/08/10 * 12
MCC-141	Microwave Cable	Junkosha	MWX221	1305S002R(1m) / 1405S146(5m)	RE	2015/06/22 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2015/03/19 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2015/02/19 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2015/01/13 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
MRENT-122	Spectrum Analyzer	KEYSIGHT	E4440A	MY46187096	RE	2015/06/01 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2015/05/18 * 12
MCC-167	Microwave Cable	Junkosha	MWX221	1404S374(1m) / 1405S074(5m)	RE	2015/05/21 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2015/05/19 * 12
MMM-08	DIGITAL HiTESTER	Hioki	3805	051201197	RE	2015/01/16 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2015/09/16 * 12
MSA-13	Spectrum Analyzer	Agilent	E4440A	MY46185823	RE	2015/06/02 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2015/09/02 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2015/02/06 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2014/11/11 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2015/09/04 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE,CE	2014/11/12 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2014/10/18 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2014/10/18 * 12
MMM-01	Digital Tester	Fluke	FLUKE 26-3	78030611	RE	2015/08/19 * 12
MLS-23	LISN(AMN)	Schwarzbeck	NSLK8127	8127-729	CE(EUT)	2015/07/10 * 12
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/5D-2W(5m)/5D-2W(0.8m)/5D-2W(1m)	-	CE	2015/02/06 * 12
MAT-65	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2015/01/29 * 12

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The expiration date of the calibration is the end of the expired month.

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

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test Item: CE: Conducted Emission test
 RE: Radiated Emission test
 AT: Antenna Terminal Conducted test