



RADIO TEST REPORT

Test Report No. : 11170944S-A-R1
(Original test report: 11014760S-A-R2)

Applicant : Sony Corporation
Type of Equipment : Wireless Transceiver Module
Model No. : BNSY25
FCC ID : AK8BNSY25
Test regulation : FCC Part 15 Subpart C: 2015
Test item : Radiated spurious emission
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.
5. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
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 11170944S-A. 11170944S-A is replaced with this report.

Date of test: March 5 to 30, 2016

Representative test engineer:

Y. Ishikawa

Yosuke Ishikawa
Engineer

Consumer Technology Division

Approved by:

T. Imamura

Toyokazu Imamura
Leader

Consumer Technology Division



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Testing
RTL02610

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

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Facsimile : +81 463 50 6401

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SECTION 1: Customer information

Company Name : Sony Global Manufacturing & Operations Corporation
Address : 8-4 Shiomi Kisarazu-shi, Chiba, 292-0834 Japan
Telephone Number : +81-438-37-3982
Contact Person : Kazuhiko Nagano

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

2.1 Identification of E.U.T.

Type of Equipment : Wireless Transceiver Module
Model No. : BNSY25
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC 3.3 V, DC 2.8 V, DC 1.8 V
Receipt Date of Sample : February 22, 2016
Country of Mass-production : China, Taiwan
Condition of EUT : Production 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: BNSY25 (referred to as the EUT in this report) is a Wireless Transceiver Module.
* BNSY25 is Controller IC (MT8591, etc.) and RF front-end part (DHSR-SY25).

General Specification

Clock frequency(ies) in the system : 26 MHz

Radio Specification

Radio Type : Transceiver
Frequency of Operation : Wireless LAN part:
2412-2462 MHz,
5180-5320 MHz, 5500-5700 MHz, 5745-5825 MHz
Bluetooth part:
2402-2480 MHz
Modulation : Wireless LAN part:
2.4 GHz bands: DBPSK, DQPSK, CCK, OFDM
5 GHz bands: OFDM
Bluetooth part:
BDR (Basic Data Rate): GFSK
EDR (Enhanced Data Rate): $\pi/4$ -DQPSK, 8DPSK
LE (Low Energy mode): GFSK
Antenna type : Dipole
Antenna connector : MHF4
Antenna Gain : 2400 - 2483.5 MHz: +1.43 dBi max (include antenna cable 350 mm)
5150 - 5250 MHz: +0.59 dBi max (include antenna cable 350 mm)
5250 - 5350 MHz: -0.33 dBi max (include antenna cable 350 mm)
5470 - 5725 MHz: +0.08 dBi max (include antenna cable 350 mm)
5725 - 5850 MHz: +0.05 dBi max (include antenna cable 350 mm)

Remarks: This Wireless Module consists of 1 chip each of 5 GHz band and 2.4 GHz band.

*Refer to the test reports: 11014760S-B-R1 and 11170944S-B-R1 for FCC 15.247 (Bluetooth part).
Refer to the test reports: 11014760S-C-R2, 11014760S-D and 11170944S-C-R1 for FCC 15.407.

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2015, final revised on November 23, 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

*Some parts are effective on and after December 17, 2015 or December 23, 2015. The revision does not affect the test specification applied to the EUT.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.10-2013 6. Standard test methods IC: RSS-Gen 8.8	FCC: Section 15.207 IC: RSS-Gen 8.8		-	*1)
6dB Bandwidth	FCC: KDB 558074 D01 DTS Meas Guidance v03r05 IC: -	FCC: Section 15.247(a)(2) IC: RSS-247 5.2(1)		-	*1)
Maximum Peak Output Power	FCC: KDB 558074 D01 DTS Meas Guidance v03r05 IC: RSS-Gen 6.12	FCC: Section 15.247(b)(3) IC: RSS-247 5.4(4)		-	*1)
Power Density	FCC: KDB 558074 D01 DTS Meas Guidance v03r05 IC: -	FCC: Section 15.247(e) IC: RSS-247 5.2(2)		-	*1)
Spurious Emission Restricted Band Edges	FCC: KDB 558074 D01 DTS Meas Guidance v03r05 IC: RSS-Gen 6.13	FCC: Section 15.247(d) IC: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	0.1 dB 2483.500 MHz, AV, Horizontal (Tx, 11n-20, 2462 MHz)	Complied	Conducted (below 30 MHz)*1/ Radiated (above 30 MHz) *2)

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

*1) Refer to the original test report: 11014760S-A-R2.

*2) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 DTS Meas Guidance v03r05 12.2.7.

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

FCC Part 15.31 (e)

This EUT is provided the stable voltage (DC 3.3 V, DC 2.8 V, DC 1.8 V) constantly to RF unit regardless of input voltage from PMIC. Therefore, the equipment complies with the requirement.

FCC Part 15.203 / 212

The EUT has a unique coupling/antenna connector. Therefore, the equipment complies with the antenna requirement.

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3.3 Addition to standard

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

3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k = 2$.
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Item	Frequency range	Uncertainty (+/-)			
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4 SAC / SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.1 dB	2.1 dB	2.6 dB	2.2 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	2.7 dB	2.7 dB	3.1 dB	-
	30 MHz-300 MHz	4.4 dB	4.4 dB	4.6 dB	-
	300 MHz-1 GHz	5.6 dB	5.5 dB	5.3 dB	-
	1 GHz-13 GHz	5.2 dB	5.2 dB	5.2 dB	-
Radiated emission (Measurement distance: 1 m)	13 GHz-18 GHz	4.9 dB	4.9 dB	4.9 dB	-
	18 GHz-40 GHz	4.9 dB	4.9 dB	4.9 dB	-

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

Radiated emission test

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

3.5 Test Location

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JAB Accreditation No. RTL02610

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
No.4 Semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
No.1 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.2 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.3 Shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
No.4 Shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
No.5 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.6 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.8 shielded room	-	3.45 x 5.5 x 2.4	3.45 x 5.5	-
No.1 Measurement room	-	2.55 x 4.1 x 2.5	-	-

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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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 *1)
Transmitting (Tx), IEEE 802.11b (11b)	1 Mbps, PN9
Transmitting (Tx), IEEE 802.11g (11g)	48 Mbps, PN9
Transmitting (Tx), IEEE 802.11n SISO 20 MHz BW (11n-20)	MCS 7, PN9
Transmitting (Tx), Bluetooth Low Energy mode (BT LE)	PRBS9
*Transmitting duty was refer to APEENDIX.	
*The worst condition was determined based on the test result of Maximum Conducted Output Power.(Original test report)	
*1) Power of the EUT was set by the software as follows; (IEEE802.11b / 11g / 11n): Power settings: Fixed Software: MT6625 RF Test Version 0.3 (Bluetooth LE): Power settings: Fixed Software: MT6625 BT Test Version 0.2 *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 operation mode(s)

Test Item	Operating Mode	Tested Antenna cable (length)	Tested Frequency
Spurious Emission (below 1 GHz)	Tx, 11n-20 *2)	350 mm	2412 MHz
	Tx, BT LE	350 mm	2402 MHz 2440 MHz 2480 MHz
Spurious Emission (above 1 GHz)	Tx, 11b, Tx, 11g, Tx, 11n-20	350 mm	2412 MHz 2437 MHz 2462 MHz
	Tx, BT LE	350 mm	2402 MHz 2440 MHz 2480 MHz
*2) The mode was tested as a representative, because it had the highest power at antenna terminal test.(Original test report)			

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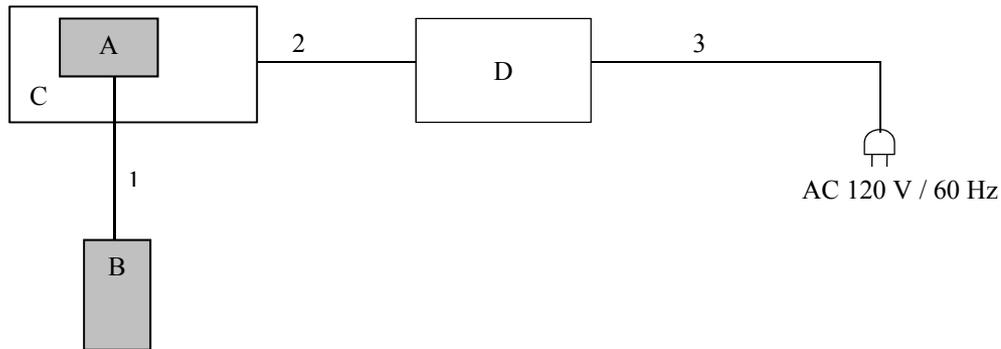
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4.2 Configuration and peripherals



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

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wireless Transceiver Module	BNSY25	0F081530001703 *1) 0F08153000E603 *2)	Front-end: Wistron NeWeb Corporation Control IC: MediaTek	EUT
B	Antenna	Y121JT008A-X-S	-	WIESON TECHNOLOGIES CO., LTD	EUT
C	Jig board	-	-	Sony	-
D	AC Adaptor	AC-M1208WW	M1521540404	Sony	-

*1) Used in March 5, 6 and 7

*2) Used in March 24 and 30

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Cable (Antenna)	0.35	Shielded	Shielded	-
2	Output cord (AC Adaptor)	1.0	Unshielded	Unshielded	-
3	Power Supply Cord	0.7	Unshielded	Unshielded	-

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SECTION 5: Radiated Spurious Emission

Test Procedure

It was measured based on "11.0 Emissions in non-restricted frequency bands" of "558074 D01 DTS Meas Guidance v03r05".

[For below 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane.

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

The height of the measuring antenna varied between 1 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: (for Wireless LAN (11b)): <u>12.2.5.1</u> RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (Linear voltage) Trace: 100 traces (for Bluetooth LE): <u>12.2.5.2</u> RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (Linear voltage) Trace: 100 traces Duty factor was added to the results. (for Wireless LAN (11g and 11n-20)): <u>12.2.5.3</u> Method VB *1) RBW: 1 MHz VBW: 1/T (*T = transmission duration)	RBW: 100 kHz VBW: 300kHz
Test Distance	3 m	4.37 m *2) (below 13 GHz, SVSWR), 1 m *3) (above 13 GHz)		4.37 m *2) (below 13 GHz, SVSWR), 1 m *3) (above 13 GHz)

*1) Average Power Measurement was performed based on 6.0 & 12.2.5 of "KDB 558074 D01 DTS Meas Guidance v03r05"

*2) Distance Factor: $20 \times \log(4.37 \text{ m}/3 \text{ m}) = 3.2 \text{ dB}$

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

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

	Test Antenna	Carrier	Spurious			
			30 MHz-1 GHz	1-13 GHz	13-18 GHz	18-26 GHz
Module	Horizontal	Z	X	Z	Y	Z
	Vertical	Z	Z	Z	X	Z
Antenna	Horizontal	Y	X	Y	Y	X
	Vertical	Z	X	Z	Y	X

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

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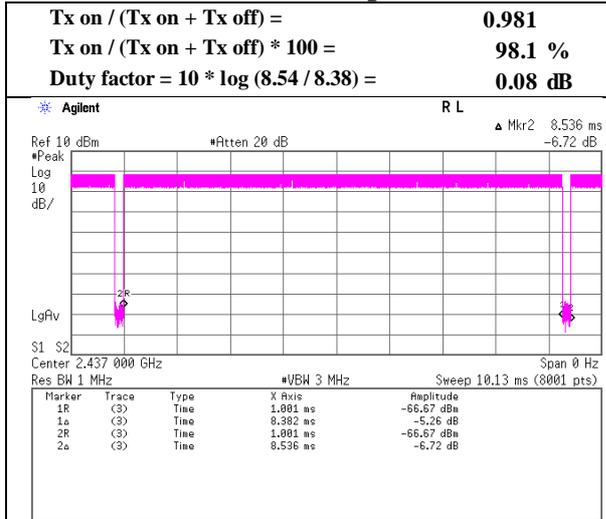
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APPENDIX 1: Test data

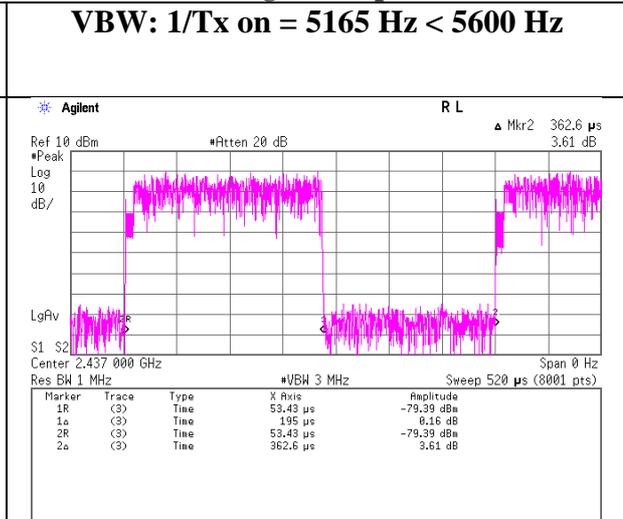
Burst rate confirmation

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	11170944S-A-R1	
Date	March 6, 2016	March 5, 2016
Temperature / Humidity	26 deg. C / 28 % RH	27 deg. C / 31 % RH
Engineer	Kenichi Adachi	Hiroyuki Morikawa
Mode	Tx	

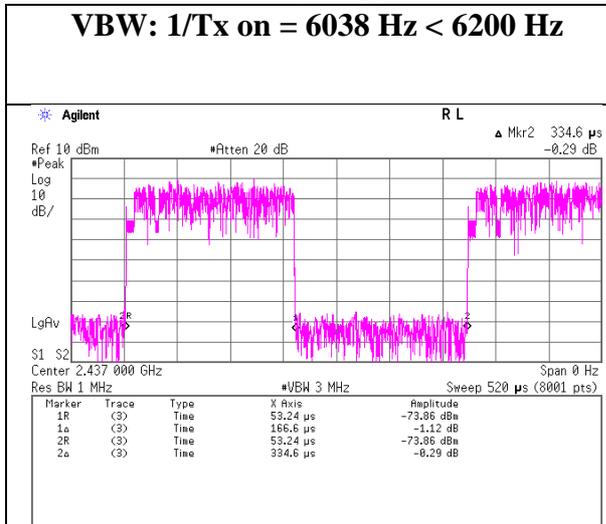
11b 1 Mbps



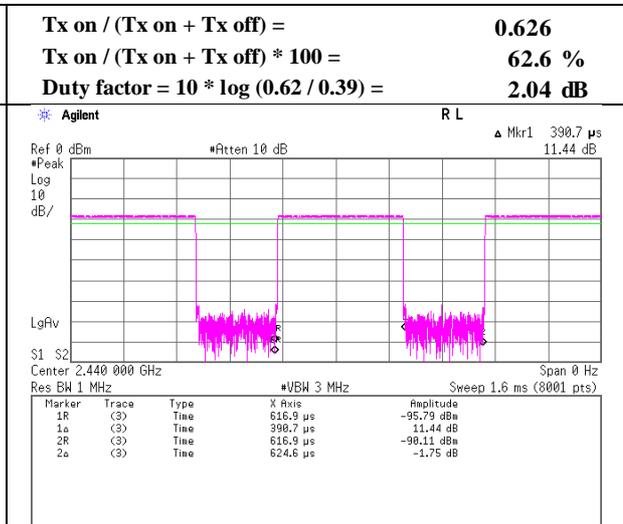
11g 48 Mbps



11n-20 MCS 7

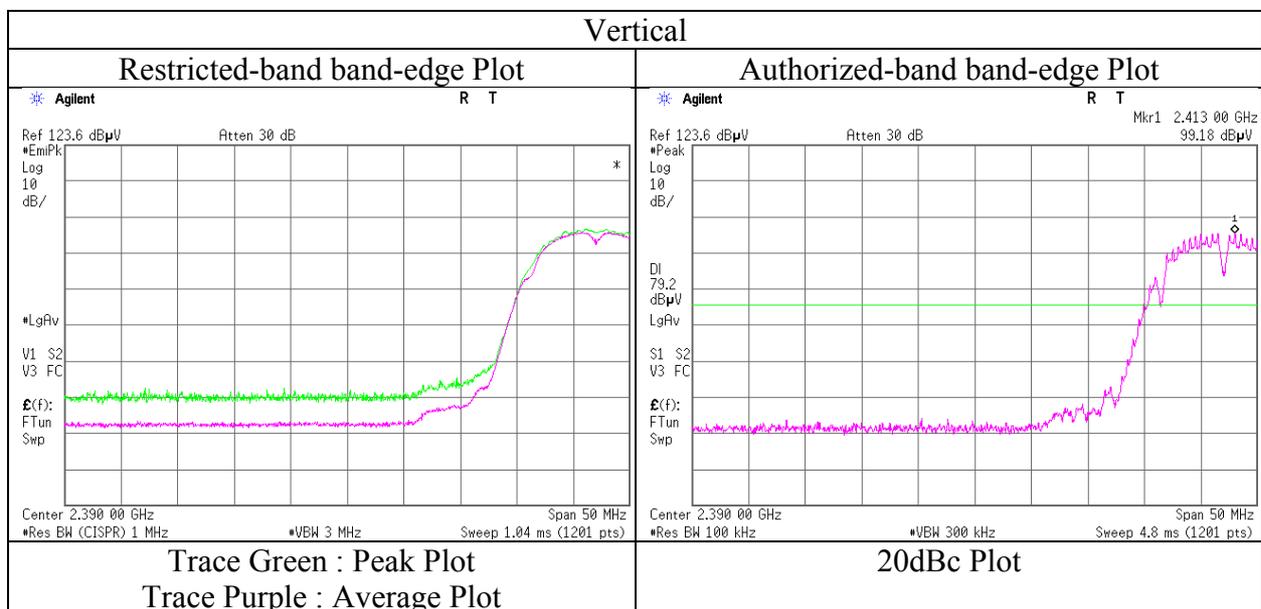
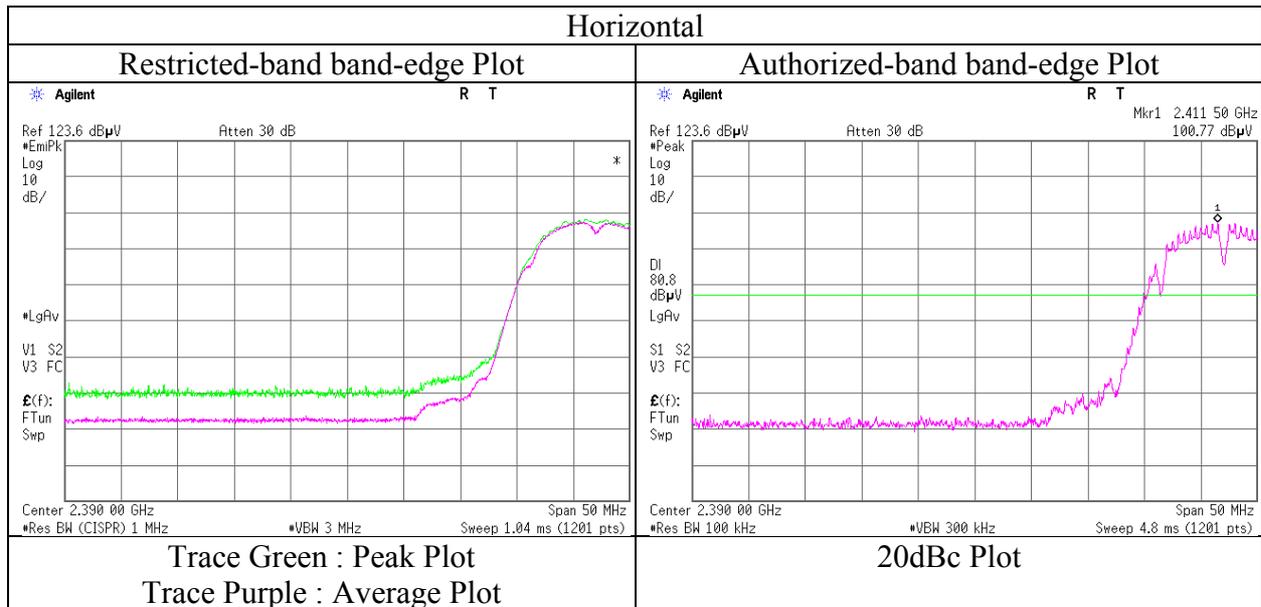


BT LE



Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11170944S-A-R1
Date	March 6, 2016
Temperature / Humidity	26 deg. C / 28 % RH
Engineer	Kenichi Adachi (1-13 GHz)
Mode	Tx 11b 2412 MHz



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11170944S-A-R1
Date : March 6, 2016 March 24, 2016 March 30, 2016
Temperature / Humidity : 26 deg. C / 28 % RH 25 deg. C / 45 % RH 25 deg. C / 37 % RH
Engineer : Kenichi Adachi Hiroyuki Morikawa Yosuke Ishikawa
 (1-13 GHz) (13-18 GHz) (18-26.5 GHz)
Mode : Tx 11b 2437 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	49.2	31.7	5.9	39.5	3.2	50.5	73.9	23.4	152	12	
Hori.	7311.000	PK	45.5	36.9	7.3	40.2	3.2	52.7	73.9	21.2	100	0	
Hori.	9748.000	PK	45.7	38.5	8.3	39.5	3.2	56.2	73.9	17.7	100	0	
Hori.	12185.000	PK	44.0	39.6	9.5	39.4	3.2	56.9	73.9	17.0	100	0	
Hori.	4874.000	AV	43.7	31.7	5.9	39.5	3.2	45.0	53.9	8.9	152	12	
Hori.	7311.000	AV	36.4	36.9	7.3	40.2	3.2	43.6	53.9	10.3	100	0	
Hori.	9748.000	AV	36.3	38.5	8.3	39.5	3.2	46.8	53.9	7.2	100	0	
Hori.	12185.000	AV	35.6	39.6	9.5	39.4	3.2	48.5	53.9	5.4	100	0	
Vert.	4874.000	PK	49.0	31.7	5.9	39.5	3.2	50.3	73.9	23.6	116	52	
Vert.	7311.000	PK	45.4	36.9	7.3	40.2	3.2	52.6	73.9	21.3	100	0	
Vert.	9748.000	PK	45.6	38.5	8.3	39.5	3.2	56.1	73.9	17.8	100	0	
Vert.	12185.000	PK	44.1	39.6	9.5	39.4	3.2	57.0	73.9	16.9	100	0	
Vert.	4874.000	AV	43.1	31.7	5.9	39.5	3.2	44.4	53.9	9.5	116	52	
Vert.	7311.000	AV	36.3	36.9	7.3	40.2	3.2	43.5	53.9	10.4	100	0	
Vert.	9748.000	AV	36.2	38.5	8.3	39.5	3.2	46.7	53.9	7.2	100	0	
Vert.	12185.000	AV	35.7	39.6	9.5	39.4	3.2	48.6	53.9	5.3	100	0	

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

Distance factor : 1 GHz - 13 GHz : 20log(4.35 m / 3.0 m) = 3.2 dB

13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11170944S-A-R1
Date : March 6, 2016 March 24, 2016 March 30, 2016
Temperature / Humidity : 26 deg. C / 28 % RH 25 deg. C / 45 % RH 25 deg. C / 37 % RH
Engineer : Kenichi Adachi Hiroyuki Morikawa Yosuke Ishikawa
 (1-13 GHz) (13-18 GHz) (18-26.5 GHz)
Mode : Tx 11b 2462 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	50.7	27.9	13.8	41.0	3.2	54.6	73.9	19.3	208	206	
Hori.	2487.933	PK	51.8	27.9	13.8	41.0	3.2	55.7	73.9	18.2	208	206	
Hori.	4924.000	PK	49.5	31.9	5.9	39.4	3.2	51.1	73.9	22.8	151	11	
Hori.	7386.000	PK	45.9	36.9	7.4	40.3	3.2	53.1	73.9	20.8	100	0	
Hori.	9848.000	PK	44.6	38.5	8.4	39.4	3.2	55.3	73.9	18.6	100	0	
Hori.	12310.000	PK	44.8	39.6	9.5	39.5	3.2	57.6	73.9	16.3	100	0	
Hori.	2483.500	AV	39.9	27.9	13.8	41.0	3.2	43.8	53.9	10.1	208	206	
Hori.	2487.933	AV	40.5	27.9	13.8	41.0	3.2	44.4	53.9	9.5	208	206	
Hori.	4924.000	AV	43.6	31.9	5.9	39.4	3.2	45.2	53.9	8.7	151	11	
Hori.	7386.000	AV	36.9	36.9	7.4	40.3	3.2	44.1	53.9	9.8	100	0	
Hori.	9848.000	AV	36.0	38.5	8.4	39.4	3.2	46.7	53.9	7.2	100	0	
Hori.	12310.000	AV	36.2	39.6	9.5	39.5	3.2	49.0	53.9	4.9	100	0	
Vert.	2483.500	PK	47.0	27.9	13.8	41.0	3.2	50.9	73.9	23.0	119	38	
Vert.	2487.933	PK	48.3	27.9	13.8	41.0	3.2	52.2	73.9	21.7	119	38	
Vert.	4924.000	PK	49.3	31.9	5.9	39.4	3.2	50.9	73.9	23.0	115	63	
Vert.	7386.000	PK	45.8	36.9	7.4	40.3	3.2	53.0	73.9	20.9	100	0	
Vert.	9848.000	PK	44.5	38.5	8.4	39.4	3.2	55.2	73.9	18.7	100	0	
Vert.	12310.000	PK	44.9	39.6	9.5	39.5	3.2	57.7	73.9	16.2	100	0	
Vert.	2483.500	AV	38.5	27.9	13.8	41.0	3.2	42.4	53.9	11.5	119	38	
Vert.	2487.933	AV	38.9	27.9	13.8	41.0	3.2	42.8	53.9	11.1	119	38	
Vert.	4924.000	AV	43.5	31.9	5.9	39.4	3.2	45.1	53.9	8.8	115	63	
Vert.	7386.000	AV	36.2	36.9	7.4	40.3	3.2	43.4	53.9	10.5	100	0	
Vert.	9848.000	AV	35.9	38.5	8.4	39.4	3.2	46.6	53.9	7.3	100	0	
Vert.	12310.000	AV	36.3	39.6	9.5	39.5	3.2	49.1	53.9	4.8	100	0	

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

Distance factor : 1 GHz - 13 GHz : 20log(4.35 m / 3.0 m) = 3.2 dB

13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

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Shonan EMC Lab.

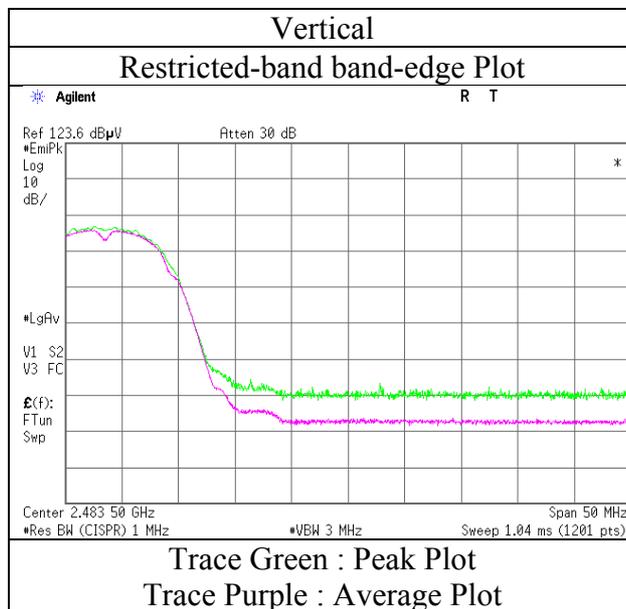
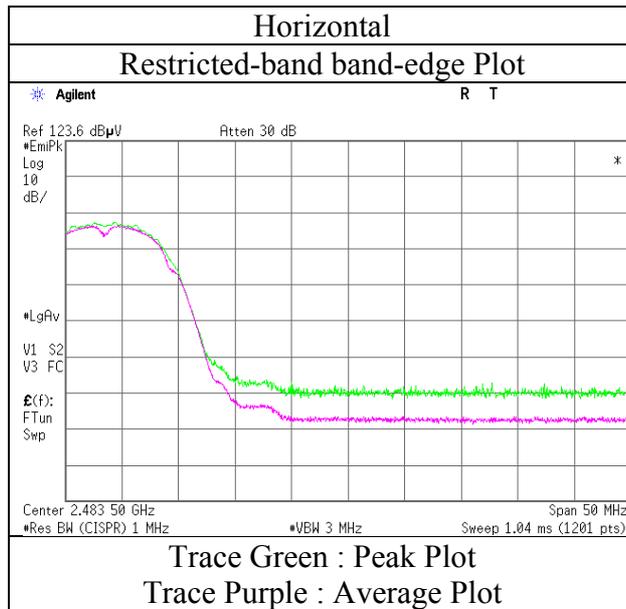
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11170944S-A-R1
Date : March 6, 2016
Temperature / Humidity : 26 deg. C / 28 % RH
Engineer : Kenichi Adachi
(1-13 GHz)
Mode : Tx 11b 2462 MHz



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11170944S-A-R1
Date : March 6, 2016 March 24, 2016 March 30, 2016
Temperature / Humidity : 26 deg. C / 28 % RH 25 deg. C / 45 % RH 25 deg. C / 37 % RH
Engineer : Kenichi Adachi Hiroyuki Morikawa Yosuke Ishikawa
 (1-13 GHz) (13-18 GHz) (18-26.5 GHz)
Mode : Tx 11g 2412 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	59.7	27.8	13.7	41.0	3.2	63.4	73.9	10.5	222	203	
Hori.	2483.500	PK	52.2	27.9	13.8	41.0	3.2	56.1	73.9	17.8	222	203	
Hori.	2492.020	PK	52.4	27.9	13.8	41.0	3.2	56.3	73.9	17.6	222	203	
Hori.	4824.000	PK	48.7	31.5	5.8	39.5	3.2	49.7	73.9	24.2	147	7	
Hori.	7236.000	PK	45.2	36.9	7.2	40.1	3.2	52.4	73.9	21.5	100	0	
Hori.	9648.000	PK	44.7	38.5	8.3	39.6	3.2	55.1	73.9	18.8	100	0	
Hori.	12060.000	PK	45.1	39.7	9.4	39.3	3.2	58.1	73.9	15.8	100	0	
Hori.	2390.000	AV	44.6	27.8	13.7	41.0	3.2	48.3	53.9	5.6	222	203	VBW:5.6 kHz
Hori.	2483.500	AV	43.9	27.9	13.8	41.0	3.2	47.8	53.9	6.1	222	203	VBW:5.6 kHz
Hori.	2492.020	AV	45.0	27.9	13.8	41.0	3.2	48.9	53.9	5.0	222	203	VBW:5.6 kHz
Hori.	4824.000	AV	40.6	31.5	5.8	39.5	3.2	41.6	53.9	12.3	147	7	VBW:5.6 kHz
Hori.	7236.000	AV	35.4	36.9	7.2	40.1	3.2	42.6	53.9	11.3	100	0	VBW:5.6 kHz
Hori.	9648.000	AV	35.2	38.5	8.3	39.6	3.2	45.6	53.9	8.3	100	0	VBW:5.6 kHz
Hori.	12060.000	AV	35.4	39.7	9.4	39.3	3.2	48.4	53.9	5.5	100	0	VBW:5.6 kHz
Vert.	2390.000	PK	57.8	27.8	13.7	41.0	3.2	61.5	73.9	12.4	121	30	
Vert.	2483.500	PK	52.5	27.9	13.8	41.0	3.2	56.4	73.9	17.5	121	30	
Vert.	2492.020	PK	52.7	27.9	13.8	41.0	3.2	56.6	73.9	17.3	121	30	
Vert.	4824.000	PK	50.2	31.5	5.8	39.5	3.2	51.2	73.9	22.7	112	50	
Vert.	7236.000	PK	45.3	36.9	7.2	40.1	3.2	52.5	73.9	21.4	100	0	
Vert.	9648.000	PK	44.6	38.5	8.3	39.6	3.2	55.0	73.9	18.9	100	0	
Vert.	12060.000	PK	45.2	39.7	9.4	39.3	3.2	58.2	73.9	15.7	100	0	
Vert.	2390.000	AV	44.1	27.8	13.7	41.0	3.2	47.8	53.9	6.1	121	30	VBW:5.6 kHz
Vert.	2483.500	AV	43.9	27.9	13.8	41.0	3.2	47.8	53.9	6.1	121	30	VBW:5.6 kHz
Vert.	2492.020	AV	44.6	27.9	13.8	41.0	3.2	48.5	53.9	5.4	121	30	VBW:5.6 kHz
Vert.	4824.000	AV	42.0	31.5	5.8	39.5	3.2	43.0	53.9	10.9	112	50	VBW:5.6 kHz
Vert.	7236.000	AV	35.5	36.9	7.2	40.1	3.2	42.7	53.9	11.2	100	0	VBW:5.6 kHz
Vert.	9648.000	AV	35.1	38.5	8.3	39.6	3.2	45.5	53.9	8.4	100	0	VBW:5.6 kHz
Vert.	12060.000	AV	35.5	39.7	9.4	39.3	3.2	48.5	53.9	5.4	100	0	VBW:5.6 kHz

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

Distance factor : 1 GHz - 13 GHz : 20log(4.35 m / 3.0 m) = 3.2 dB

13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	99.0	27.8	13.7	41.0	3.2	102.7	-	-	Carrier
Hori.	2400.000	PK	56.1	27.8	13.7	41.0	3.2	59.8	82.7	22.9	
Vert.	2412.000	PK	97.5	27.8	13.7	41.0	3.2	101.2	-	-	Carrier
Vert.	2400.000	PK	55.6	27.8	13.7	41.0	3.2	59.3	81.2	21.9	

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

Distance factor : 1 GHz - 13 GHz : 20log(4.35 m / 3.0 m) = 3.2 dB

13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

UL Japan, Inc.

Shonan EMC Lab.

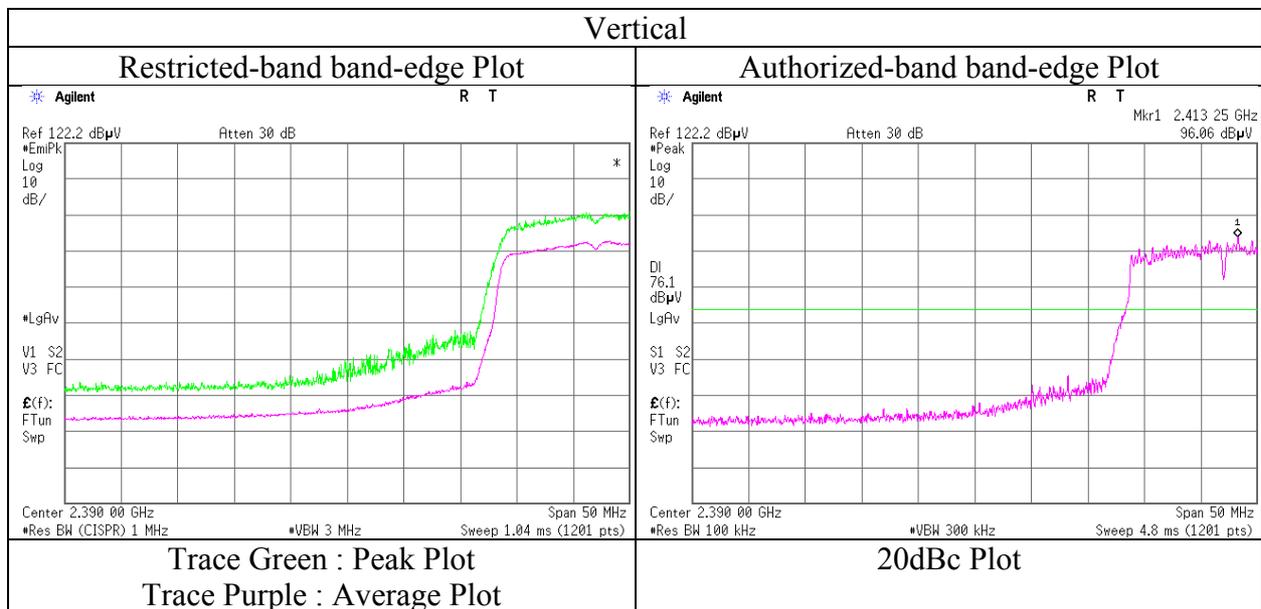
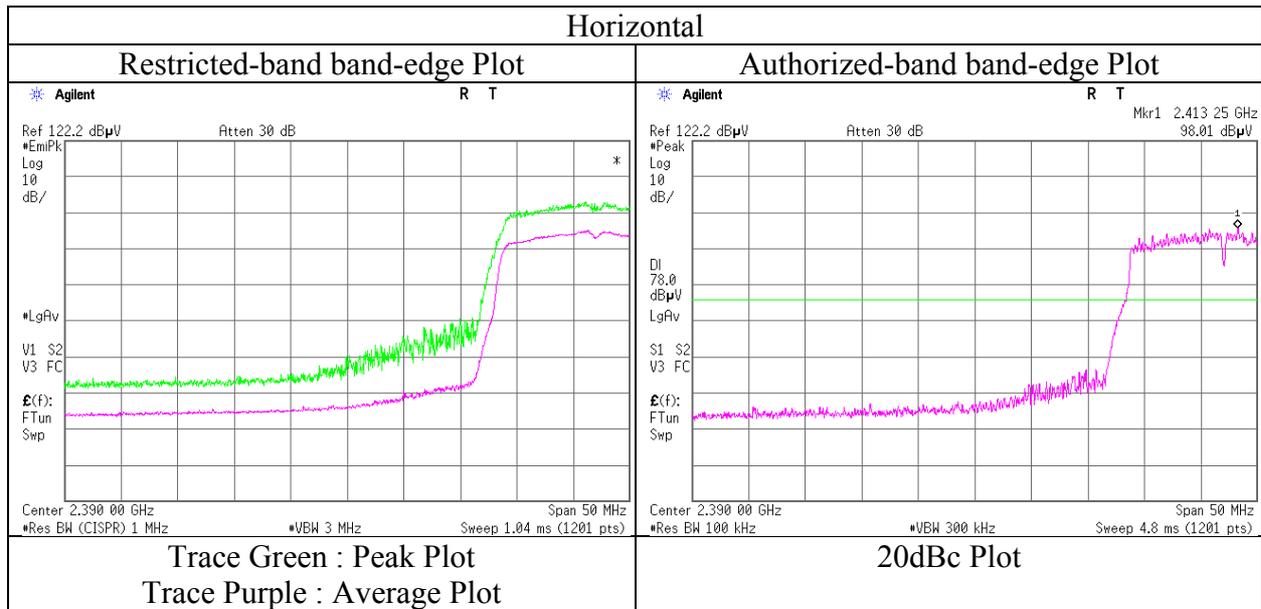
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11170944S-A-R1
Date	March 6, 2016
Temperature / Humidity	26 deg. C / 28 % RH
Engineer	Kenichi Adachi (1-13 GHz)
Mode	Tx 11g 2412 MHz



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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11170944S-A-R1		
Date	March 6, 2016	March 24, 2016	March 30, 2016
Temperature / Humidity	26 deg. C / 28 % RH	25 deg. C / 45 % RH	25 deg. C / 37 % RH
Engineer	Kenichi Adachi (1-13 GHz)	Hiroyuki Morikawa (13-18 GHz)	Yosuke Ishikawa (18-26.5 GHz)
Mode	Tx 11g 2437 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	53.7	27.8	13.7	41.0	3.2	57.4	73.9	16.5	209	204	
Hori.	2483.500	PK	53.9	27.9	13.8	41.0	3.2	57.8	73.9	16.1	209	204	
Hori.	4874.000	PK	50.7	31.7	5.9	39.5	3.2	52.0	73.9	21.9	148	6	
Hori.	7311.000	PK	45.6	36.9	7.3	40.2	3.2	52.8	73.9	21.1	100	0	
Hori.	9748.000	PK	45.8	38.5	8.3	39.5	3.2	56.3	73.9	17.6	100	0	
Hori.	12185.000	PK	44.1	39.6	9.5	39.4	3.2	57.0	73.9	16.9	100	0	
Hori.	2390.000	AV	43.7	27.8	13.7	41.0	3.2	47.4	53.9	6.5	209	204	VBW:5.6 kHz
Hori.	2483.500	AV	45.0	27.9	13.8	41.0	3.2	48.9	53.9	5.0	209	204	VBW:5.6 kHz
Hori.	4874.000	AV	42.0	31.7	5.9	39.5	3.2	43.3	53.9	10.6	148	6	VBW:5.6 kHz
Hori.	7311.000	AV	35.8	36.9	7.3	40.2	3.2	43.0	53.9	10.9	100	0	VBW:5.6 kHz
Hori.	9748.000	AV	35.6	38.5	8.3	39.5	3.2	46.1	53.9	7.8	100	0	VBW:5.6 kHz
Hori.	12185.000	AV	35.5	39.6	9.5	39.4	3.2	48.4	53.9	5.5	100	0	VBW:5.6 kHz
Vert.	2390.000	PK	52.3	27.8	13.7	41.0	3.2	56.0	73.9	17.9	132	32	
Vert.	2483.500	PK	53.5	27.9	13.8	41.0	3.2	57.4	73.9	16.5	132	32	
Vert.	4874.000	PK	50.2	31.7	5.9	39.5	3.2	51.5	73.9	22.4	111	48	
Vert.	7311.000	PK	45.5	36.9	7.3	40.2	3.2	52.7	73.9	21.2	100	0	
Vert.	9748.000	PK	45.7	38.5	8.3	39.5	3.2	56.2	73.9	17.7	100	0	
Vert.	12185.000	PK	44.0	39.6	9.5	39.4	3.2	56.9	73.9	17.0	100	0	
Vert.	2390.000	AV	41.5	27.8	13.7	41.0	3.2	45.2	53.9	8.7	132	32	VBW:5.6 kHz
Vert.	2483.500	AV	43.8	27.9	13.8	41.0	3.2	47.7	53.9	6.2	132	32	VBW:5.6 kHz
Vert.	4874.000	AV	41.7	31.7	5.9	39.5	3.2	43.0	53.9	10.9	111	48	VBW:5.6 kHz
Vert.	7311.000	AV	35.7	36.9	7.3	40.2	3.2	42.9	53.9	11.0	100	0	VBW:5.6 kHz
Vert.	9748.000	AV	35.5	38.5	8.3	39.5	3.2	46.0	53.9	7.9	100	0	VBW:5.6 kHz
Vert.	12185.000	AV	35.4	39.6	9.5	39.4	3.2	48.3	53.9	5.6	100	0	VBW:5.6 kHz

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

Distance factor : 1 GHz - 13 GHz : $20\log(4.35\text{ m} / 3.0\text{ m}) = 3.2\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11170944S-A-R1		
Date	March 6, 2016	March 24, 2016	March 30, 2016
Temperature / Humidity	26 deg. C / 28 % RH	25 deg. C / 45 % RH	25 deg. C / 37 % RH
Engineer	Kenichi Adachi (1-13 GHz)	Hiroyuki Morikawa (13-18 GHz)	Yosuke Ishikawa (18-26.5 GHz)
Mode	Tx 11g 2462 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant. Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2382.037	PK	48.1	27.7	13.7	41.0	3.2	51.7	73.9	22.2	205	202	
Hori.	2390.000	PK	48.0	27.8	13.7	41.0	3.2	51.7	73.9	22.2	205	202	
Hori.	2483.500	PK	65.7	27.9	13.8	41.0	3.2	69.6	73.9	4.3	205	202	
Hori.	4924.000	PK	48.4	31.9	5.9	39.4	3.2	50.0	73.9	23.9	156	12	
Hori.	7386.000	PK	45.8	36.9	7.4	40.3	3.2	53.0	73.9	20.9	100	0	
Hori.	9848.000	PK	44.5	38.5	8.4	39.4	3.2	55.2	73.9	18.7	100	0	
Hori.	12310.000	PK	44.9	39.6	9.5	39.5	3.2	57.7	73.9	16.2	100	0	
Hori.	2382.037	AV	40.4	27.7	13.7	41.0	3.2	44.0	53.9	9.9	205	202	VBW:5.6 kHz
Hori.	2390.000	AV	38.5	27.8	13.7	41.0	3.2	42.2	53.9	11.7	205	202	VBW:5.6 kHz
Hori.	2483.500	AV	49.8	27.9	13.8	41.0	3.2	53.7	53.9	0.2	205	202	VBW:5.6 kHz
Hori.	4924.000	AV	39.1	31.9	5.9	39.4	3.2	40.7	53.9	13.2	156	12	VBW:5.6 kHz
Hori.	7386.000	AV	35.9	36.9	7.4	40.3	3.2	43.1	53.9	10.8	100	0	VBW:5.6 kHz
Hori.	9848.000	AV	35.2	38.5	8.4	39.4	3.2	45.9	53.9	8.0	100	0	VBW:5.6 kHz
Hori.	12310.000	AV	35.4	39.6	9.5	39.5	3.2	48.2	53.9	5.7	100	0	VBW:5.6 kHz
Vert.	2382.037	PK	48.7	27.7	13.7	41.0	3.2	52.3	73.9	21.6	117	34	
Vert.	2390.000	PK	48.5	27.8	13.7	41.0	3.2	52.2	73.9	21.7	117	34	
Vert.	2483.500	PK	65.4	27.9	13.8	41.0	3.2	69.3	73.9	4.6	117	34	
Vert.	4924.000	PK	47.7	31.9	5.9	39.4	3.2	49.3	73.9	24.6	116	48	
Vert.	7386.000	PK	45.7	36.9	7.4	40.3	3.2	52.9	73.9	21.0	100	0	
Vert.	9848.000	PK	44.6	38.5	8.4	39.4	3.2	55.3	73.9	18.6	100	0	
Vert.	12310.000	PK	44.8	39.6	9.5	39.5	3.2	57.6	73.9	16.3	100	0	
Vert.	2382.037	AV	41.0	27.7	13.7	41.0	3.2	44.6	53.9	9.3	117	34	VBW:5.6 kHz
Vert.	2390.000	AV	39.8	27.8	13.7	41.0	3.2	43.5	53.9	10.4	117	34	VBW:5.6 kHz
Vert.	2483.500	AV	49.5	27.9	13.8	41.0	3.2	53.4	53.9	0.5	117	34	VBW:5.6 kHz
Vert.	4924.000	AV	38.8	31.9	5.9	39.4	3.2	40.4	53.9	13.5	116	48	VBW:5.6 kHz
Vert.	7386.000	AV	35.8	36.9	7.4	40.3	3.2	43.0	53.9	10.9	100	0	VBW:5.6 kHz
Vert.	9848.000	AV	35.3	38.5	8.4	39.4	3.2	46.0	53.9	7.9	100	0	VBW:5.6 kHz
Vert.	12310.000	AV	35.3	39.6	9.5	39.5	3.2	48.1	53.9	5.8	100	0	VBW:5.6 kHz

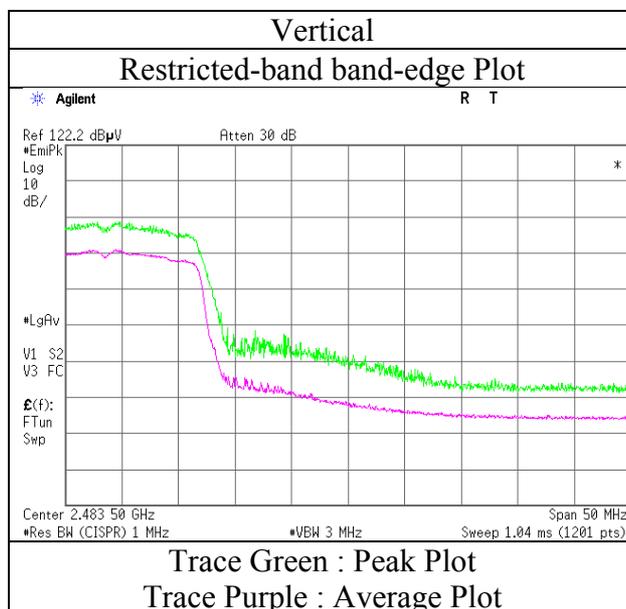
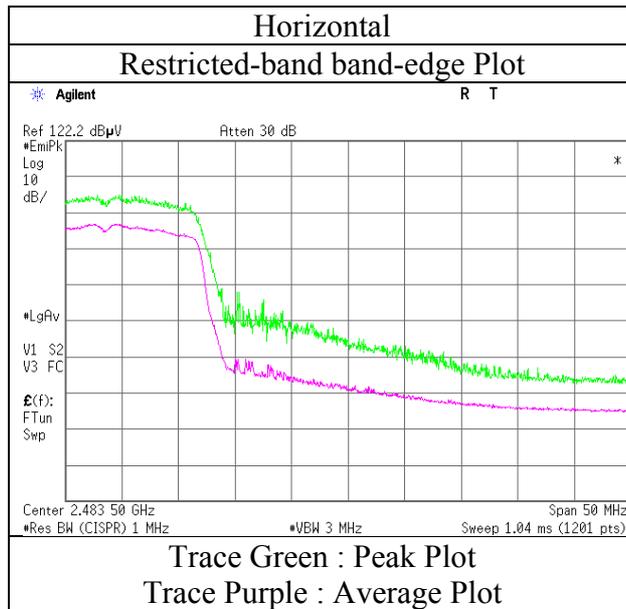
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : 20log(4.35 m / 3.0 m) = 3.2 dB

13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

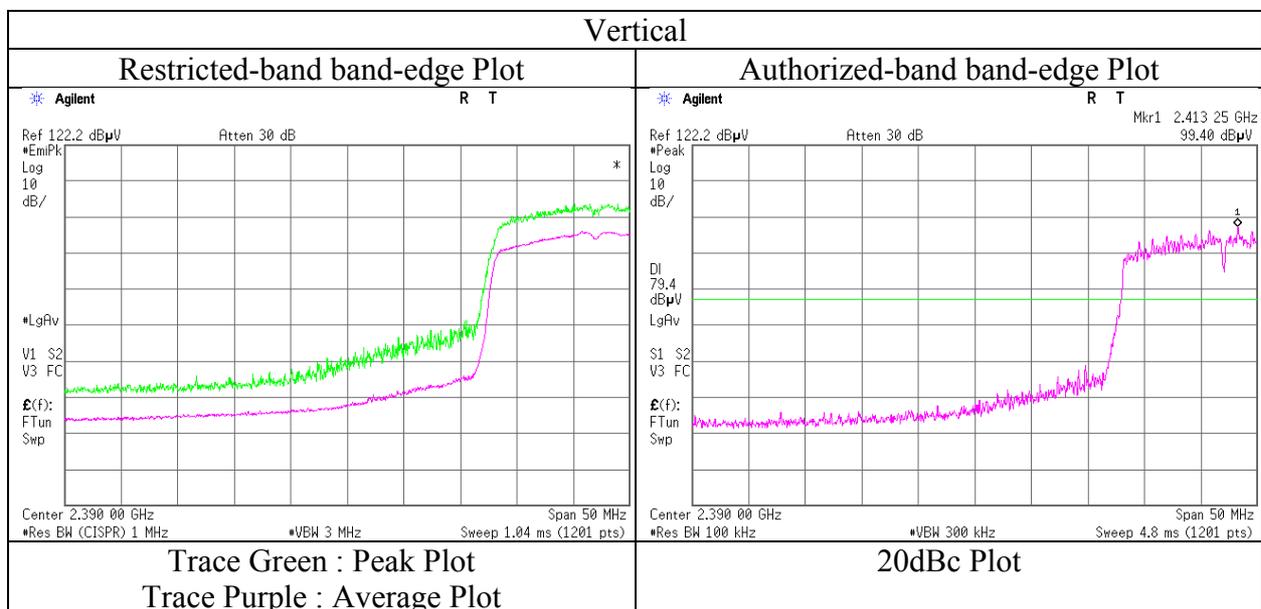
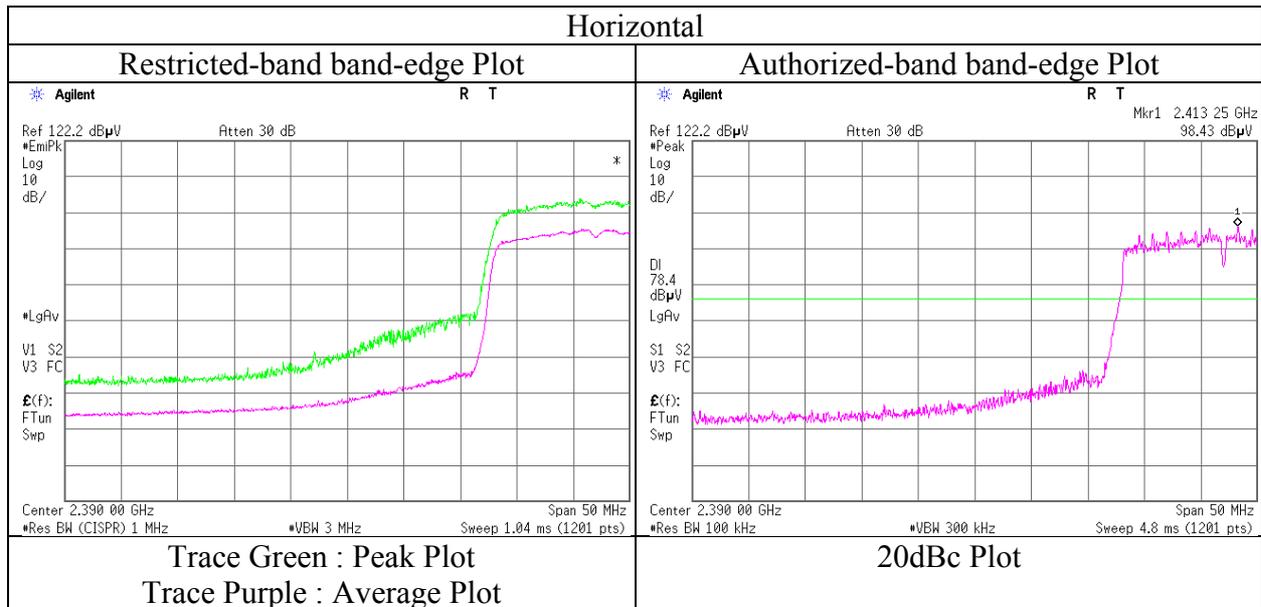
Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11170944S-A-R1
Date : March 6, 2016
Temperature / Humidity : 26 deg. C / 28 % RH
Engineer : Kenichi Adachi
(1-13 GHz)
Mode : Tx 11g 2462 MHz



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

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11170944S-A-R1
Date : March 6, 2016
Temperature / Humidity : 26 deg. C / 28 % RH
Engineer : Kenichi Adachi
(1-13 GHz)
Mode : Tx 11n-20 2412 MHz



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11170944S-A-R1
Date : March 6, 2016 March 24, 2016 March 30, 2016
Temperature / Humidity : 26 deg. C / 28 % RH 25 deg. C / 45 % RH 25 deg. C / 37 % RH
Engineer : Kenichi Adachi Hiroyuki Morikawa Yosuke Ishikawa
 (1-13 GHz) (13-18 GHz) (18-26.5 GHz)
Mode : Tx 11n-20 2437 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	53.3	27.8	13.7	41.0	3.2	57.0	73.9	16.9	206	199	
Hori.	2483.500	PK	53.5	27.9	13.8	41.0	3.2	57.4	73.9	16.5	206	199	
Hori.	4874.000	PK	50.9	31.7	5.9	39.5	3.2	52.2	73.9	21.7	152	13	
Hori.	7311.000	PK	45.5	36.9	7.3	40.2	3.2	52.7	73.9	21.2	100	0	
Hori.	9748.000	PK	45.7	38.5	8.3	39.5	3.2	56.2	73.9	17.7	100	0	
Hori.	12185.000	PK	44.0	39.6	9.5	39.4	3.2	56.9	73.9	17.0	100	0	
Hori.	2390.000	AV	43.3	27.8	13.7	41.0	3.2	47.0	53.9	6.9	206	199	VBW:6.2 kHz
Hori.	2483.500	AV	44.7	27.9	13.8	41.0	3.2	48.6	53.9	5.3	206	199	VBW:6.2 kHz
Hori.	4874.000	AV	42.3	31.7	5.9	39.5	3.2	43.6	53.9	10.3	152	13	VBW:6.2 kHz
Hori.	7311.000	AV	35.9	36.9	7.3	40.2	3.2	43.1	53.9	10.8	100	0	VBW:6.2 kHz
Hori.	9748.000	AV	35.7	38.5	8.3	39.5	3.2	46.2	53.9	7.7	100	0	VBW:6.2 kHz
Hori.	12185.000	AV	35.9	39.6	9.5	39.4	3.2	48.8	53.9	5.1	100	0	VBW:6.2 kHz
Vert.	2390.000	PK	52.0	27.8	13.7	41.0	3.2	55.7	73.9	18.2	127	34	
Vert.	2483.500	PK	53.1	27.9	13.8	41.0	3.2	57.0	73.9	16.9	127	34	
Vert.	4874.000	PK	50.4	31.7	5.9	39.5	3.2	51.7	73.9	22.2	114	61	
Vert.	7311.000	PK	45.4	36.9	7.3	40.2	3.2	52.6	73.9	21.3	100	0	
Vert.	9748.000	PK	45.6	38.5	8.3	39.5	3.2	56.1	73.9	17.8	100	0	
Vert.	12185.000	PK	44.1	39.6	9.5	39.4	3.2	57.0	73.9	16.9	100	0	
Vert.	2390.000	AV	41.2	27.8	13.7	41.0	3.2	44.9	53.9	9.0	127	34	VBW:6.2 kHz
Vert.	2483.500	AV	43.6	27.9	13.8	41.0	3.2	47.5	53.9	6.4	127	34	VBW:6.2 kHz
Vert.	4874.000	AV	41.8	31.7	5.9	39.5	3.2	43.1	53.9	10.8	114	61	VBW:6.2 kHz
Vert.	7311.000	AV	35.8	36.9	7.3	40.2	3.2	43.0	53.9	10.9	100	0	VBW:6.2 kHz
Vert.	9748.000	AV	35.6	38.5	8.3	39.5	3.2	46.1	53.9	7.8	100	0	VBW:6.2 kHz
Vert.	12185.000	AV	36.0	39.6	9.5	39.4	3.2	48.9	53.9	5.0	100	0	VBW:6.2 kHz

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

Distance factor : 1 GHz - 13 GHz : $20\log(4.35\text{ m} / 3.0\text{ m}) = 3.2\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11170944S-A-R1
Date : March 6, 2016 March 24, 2016 March 30, 2016
Temperature / Humidity : 26 deg. C / 28 % RH 25 deg. C / 45 % RH 25 deg. C / 37 % RH
Engineer : Kenichi Adachi Hiroyuki Morikawa Yosuke Ishikawa
 (1-13 GHz) (13-18 GHz) (18-26.5 GHz)
Mode : Tx 11n-20 2462 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant. Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2382.024	PK	49.9	27.7	13.7	41.0	3.2	53.5	73.9	20.4	207	201	
Hori.	2390.000	PK	48.7	27.8	13.7	41.0	3.2	52.4	73.9	21.5	207	201	
Hori.	2483.500	PK	65.8	27.9	13.8	41.0	3.2	69.7	73.9	4.2	207	201	
Hori.	4924.000	PK	48.5	31.9	5.9	39.4	3.2	50.1	73.9	23.8	153	11	
Hori.	7386.000	PK	45.9	36.9	7.4	40.3	3.2	53.1	73.9	20.8	100	0	
Hori.	9848.000	PK	44.6	38.5	8.4	39.4	3.2	55.3	73.9	18.6	100	0	
Hori.	12310.000	PK	44.8	39.6	9.5	39.5	3.2	57.6	73.9	16.3	100	0	
Hori.	2382.024	AV	42.4	27.7	13.7	41.0	3.2	46.0	53.9	7.9	207	201	VBW:6.2 kHz
Hori.	2390.000	AV	40.0	27.8	13.7	41.0	3.2	43.7	53.9	10.2	207	201	VBW:6.2 kHz
Hori.	2483.500	AV	49.9	27.9	13.8	41.0	3.2	53.8	53.9	0.1	207	201	VBW:6.2 kHz
Hori.	4924.000	AV	39.5	31.9	5.9	39.4	3.2	41.1	53.9	12.8	153	11	VBW:6.2 kHz
Hori.	7386.000	AV	35.9	36.9	7.4	40.3	3.2	43.1	53.9	10.8	100	0	VBW:6.2 kHz
Hori.	9848.000	AV	35.6	38.5	8.4	39.4	3.2	46.3	53.9	7.6	100	0	VBW:6.2 kHz
Hori.	12310.000	AV	35.8	39.6	9.5	39.5	3.2	48.6	53.9	5.3	100	0	VBW:6.2 kHz
Vert.	2382.024	PK	47.5	27.7	13.7	41.0	3.2	51.1	73.9	22.8	116	33	
Vert.	2390.000	PK	47.3	27.8	13.7	41.0	3.2	51.0	73.9	22.9	116	33	
Vert.	2483.500	PK	60.0	27.9	13.8	41.0	3.2	63.9	73.9	10.0	116	33	
Vert.	4924.000	PK	47.8	31.9	5.9	39.4	3.2	49.4	73.9	24.5	121	55	
Vert.	7386.000	PK	45.8	36.9	7.4	40.3	3.2	53.0	73.9	20.9	100	0	
Vert.	9848.000	PK	44.5	38.5	8.4	39.4	3.2	55.2	73.9	18.7	100	0	
Vert.	12310.000	PK	44.9	39.6	9.5	39.5	3.2	57.7	73.9	16.2	100	0	
Vert.	2382.024	AV	39.1	27.7	13.7	41.0	3.2	42.7	53.9	11.2	116	33	VBW:6.2 kHz
Vert.	2390.000	AV	38.4	27.8	13.7	41.0	3.2	42.1	53.9	11.8	116	33	VBW:6.2 kHz
Vert.	2483.500	AV	48.4	27.9	13.8	41.0	3.2	52.3	53.9	1.6	116	33	VBW:6.2 kHz
Vert.	4924.000	AV	39.1	31.9	5.9	39.4	3.2	40.7	53.9	13.2	121	55	VBW:6.2 kHz
Vert.	7386.000	AV	35.8	36.9	7.4	40.3	3.2	43.0	53.9	10.9	100	0	VBW:6.2 kHz
Vert.	9848.000	AV	35.5	38.5	8.4	39.4	3.2	46.2	53.9	7.7	100	0	VBW:6.2 kHz
Vert.	12310.000	AV	36.0	39.6	9.5	39.5	3.2	48.8	53.9	5.1	100	0	VBW:6.2 kHz

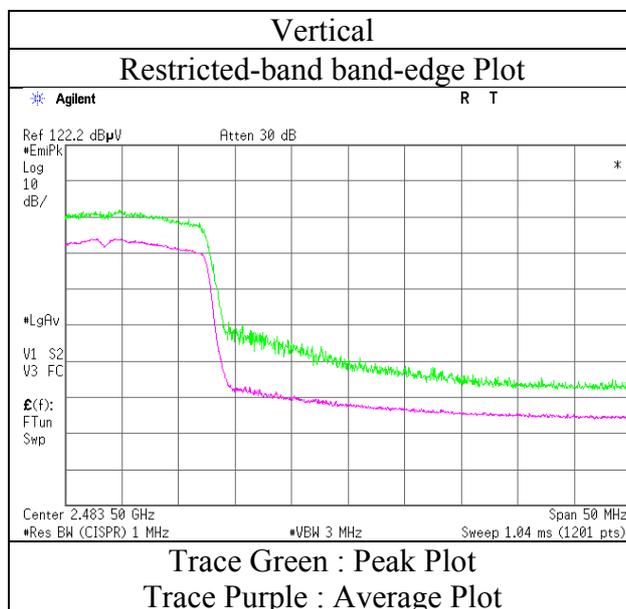
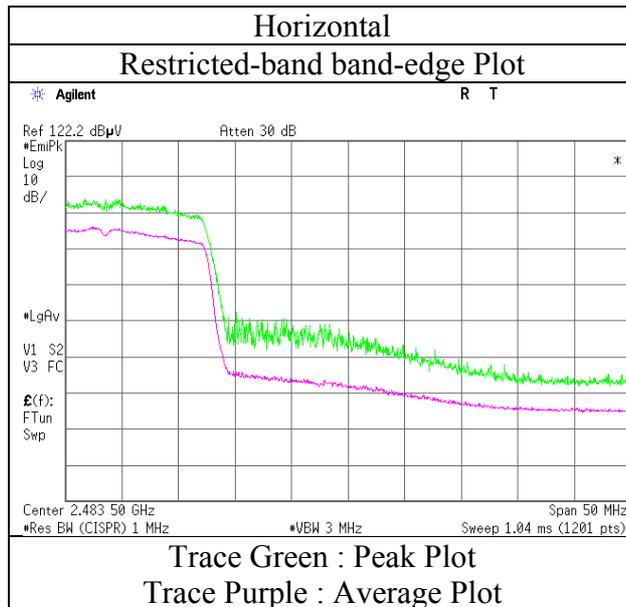
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : 20log(4.35 m / 3.0 m) = 3.2 dB

13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

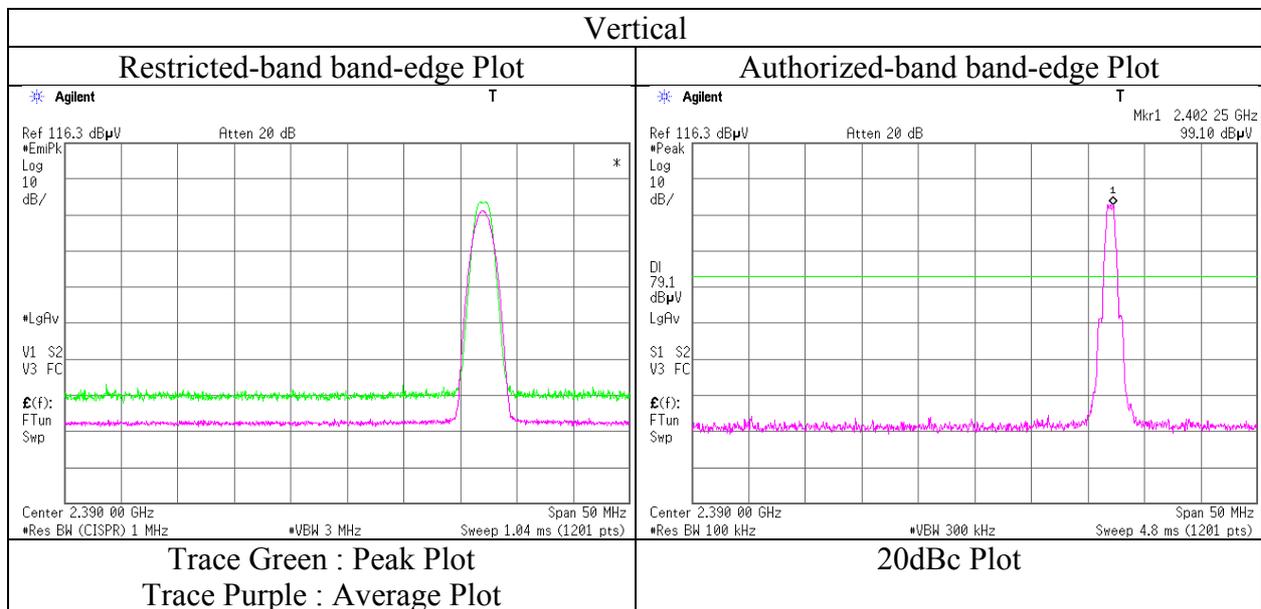
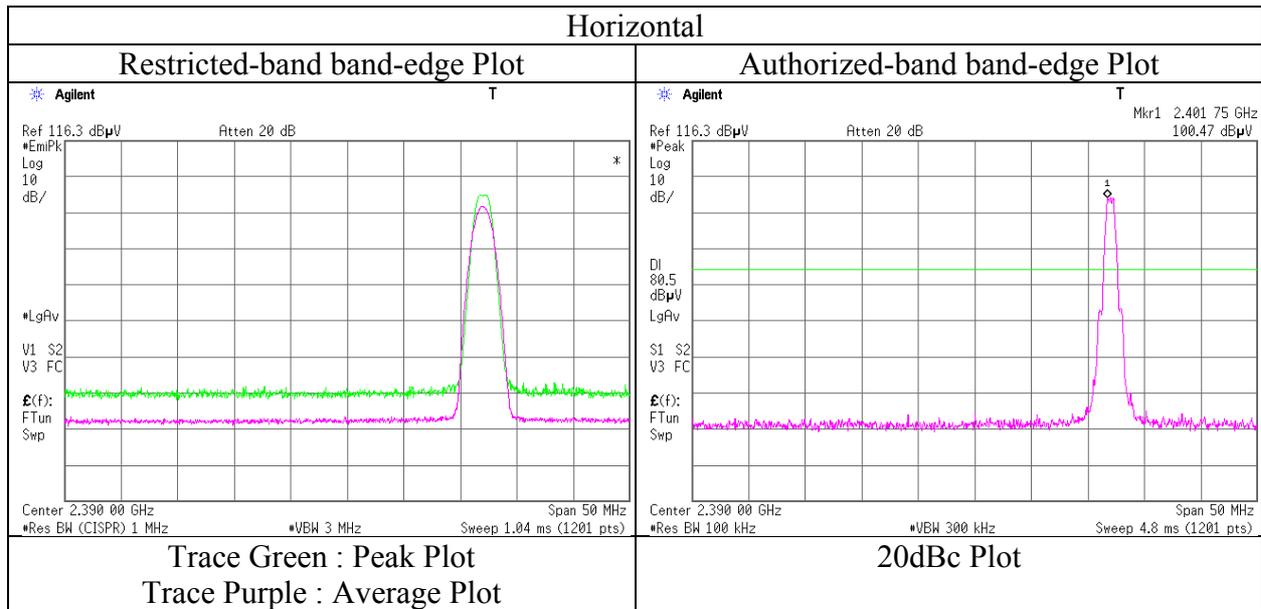
Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11170944S-A-R1
Date : March 6, 2016
Temperature / Humidity : 26 deg. C / 28 % RH
Engineer : Kenichi Adachi
(1-13 GHz)
Mode : Tx 11n-20 2462 MHz



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

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11170944S-A-R1
Date	March 5, 2016
Temperature / Humidity	27 deg. C / 31 % RH
Engineer	Hiroyuki Morikawa (1-13 GHz)
Mode	Tx BT LE 2402 MHz



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

Radiated Spurious Emission

Test place Shonan EMC Lab. No.1, 3 Semi Anechoic Chamber
Report No. 11170944S-A-R1
Date March 5, 2016 March 24, 2016 March 30, 2016 March 7, 2016
Temperature / Humidity 27 deg. C / 31 % RH 25 deg. C / 45 % RH 25 deg. C / 37 % RH 25 deg. C / 45 % RH
Engineer Hiroyuki Morikawa Hiroyuki Morikawa Yosuke Ishikawa Hiroyuki Morikawa
(1-13 GHz) (13-18 GHz) (18-26.5 GHz) (30-1000 MHz)
(3AC) (3AC) (3AC) (1AC)
Mode Tx BT LE 2441 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	171.292	QP	32.7	15.8	8.9	31.8	0.0	25.6	43.5	17.9	175	262	
Hori.	225.790	QP	35.2	16.7	9.4	31.7	0.0	29.6	46.0	16.4	146	161	
Hori.	835.590	QP	34.2	21.5	9.3	31.7	0.0	33.3	46.0	12.7	100	341	
Hori.	4880.000	PK	45.9	31.7	5.9	39.5	3.2	47.2	73.9	26.7	392	18	
Hori.	7320.000	PK	45.2	36.9	7.3	40.2	3.2	52.4	73.9	21.5	150	0	
Hori.	9760.000	PK	45.3	38.5	8.3	39.5	3.2	55.8	73.9	18.1	150	0	
Vert.	67.499	QP	48.6	6.3	7.3	31.8	0.0	30.4	40.0	9.6	100	58	
Vert.	167.917	QP	33.9	15.6	8.9	31.8	0.0	26.6	43.5	16.9	100	297	
Vert.	225.795	QP	34.6	16.7	9.4	31.7	0.0	29.0	46.0	17.0	100	128	
Vert.	4880.000	PK	46.8	31.7	5.9	39.5	3.2	48.1	73.9	25.8	100	119	
Vert.	7320.000	PK	44.9	36.9	7.3	40.2	3.2	52.1	73.9	21.8	150	0	
Vert.	9760.000	PK	45.2	38.5	8.3	39.5	3.2	55.7	73.9	18.2	150	0	

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

Distance factor : 1 GHz - 13 GHz : 20log(4.35 m / 3.0 m) = 3.2 dB

13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4880.000	AV	37.5	31.7	5.9	39.5	4.0	3.2	42.8	53.9	11.1	
Hori.	7320.000	AV	36.2	36.9	7.3	40.2	4.0	3.2	47.4	53.9	6.5	
Hori.	9760.000	AV	35.6	38.5	8.3	39.5	4.0	3.2	50.1	53.9	3.8	
Vert.	4880.000	AV	38.1	31.7	5.9	39.5	4.0	3.2	43.4	53.9	10.5	
Vert.	7320.000	AV	36.2	36.9	7.3	40.2	4.0	3.2	47.4	53.9	6.5	
Vert.	9760.000	AV	35.7	38.5	8.3	39.5	4.0	3.2	50.2	53.9	3.7	

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

Distance factor : 1 GHz - 13 GHz : 20log(4.35 m / 3.0 m) = 3.2 dB

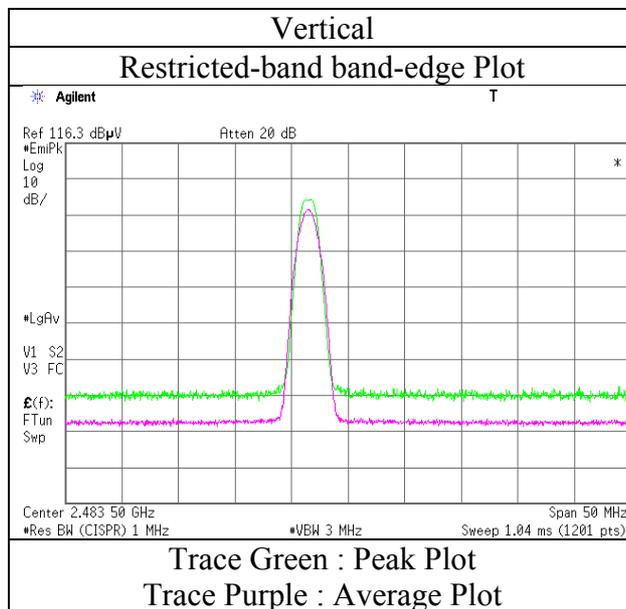
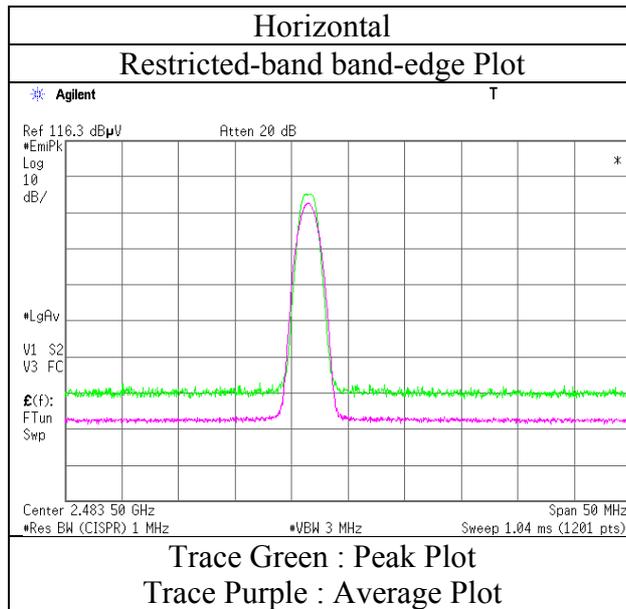
13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

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

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

Radiated Spurious Emission
(Reference Plot for band-edge)

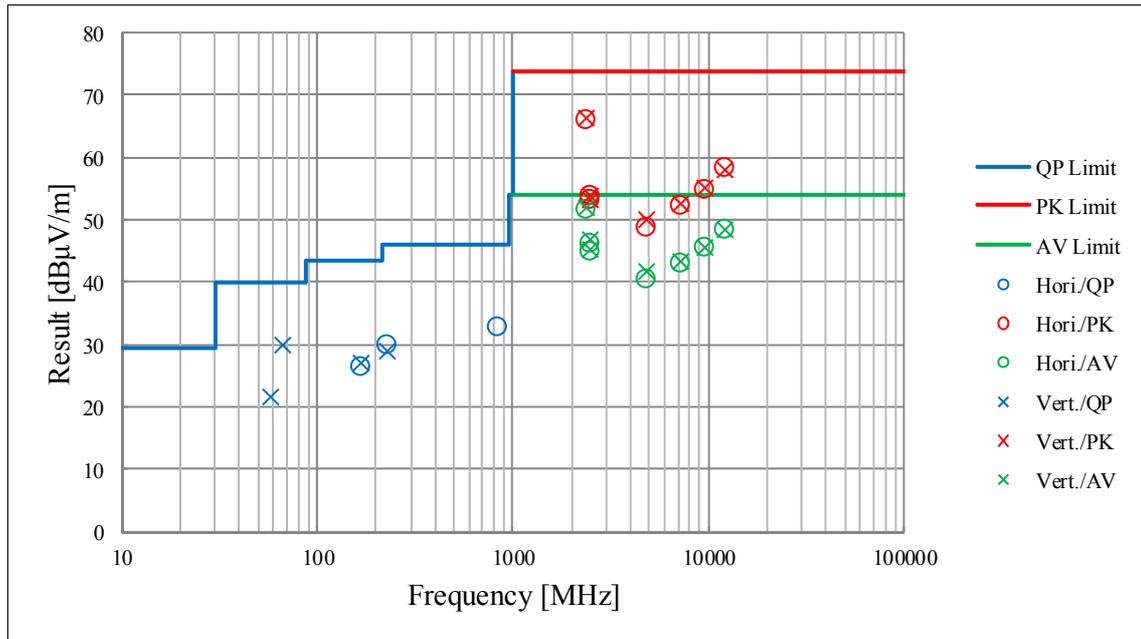
Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11170944S-A-R1
Date : March 5, 2016
Temperature / Humidity : 27 deg. C / 31 % RH
Engineer : Hiroyuki Morikawa
(1-13 GHz)
Mode : Tx BT LE 2480 MHz



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

Radiated Spurious Emission
(Plot data, Worst case)

Test place	Shonan EMC Lab. No.1, 3 Semi Anechoic Chamber			
Report No.	11170944S-A-R1			
Date	March 6, 2016	March 24, 2016	March 30, 2016	March 7, 2016
Temperature / Humidity	26 deg. C / 28 % RH	25 deg. C / 45 % RH	25 deg. C / 37 % RH	25 deg. C / 45 % RH
Engineer	Kenichi Adachi (1-13 GHz) (3AC)	Hiroyuki Morikawa (13-18 GHz) (3AC)	Yosuke Ishikawa (18-26.5 GHz) (3AC)	Hiroyuki Morikawa (30-1000 MHz) (1AC)
Mode	Tx 11n-20 2412 MHz			



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

APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAEC-03(SVS WR)	Semi-Anechoic Chamber	TDK	SAEC-03(SV SWR)	3	RE	2015/08/28 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2015/08/11 * 12
SCC-G04	Coaxial Cable	Junkosha	J12J102207-00	JUN-12-14-018	RE	2015/06/08 * 12
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2015/11/04 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2015/11/16 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2015/05/27 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2015/05/19 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	RE	2016/03/28 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE	-
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2015/10/22 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2015/11/18 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	RE	2015/09/16 * 12
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2016/02/19 * 12
KAT6-04	Attenuator	INMET	18N-6dB	-	RE	2015/12/18 * 12
SAT3-09	Attenuator	JFW	50HF-003N	-	RE	2015/08/31 * 12
SBA-01	Biconical Antenna	Schwarzbeck	BBA9106	91032664	RE	2015/10/11 * 12
SCC-A1/A3/A5/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2015/04/17 * 12
SCC-A2/A4/A6/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2015/04/17 * 12
SLA-01	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP9108-A0888	RE	2015/10/11 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2015/10/22 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE	2015/11/06 * 12
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2015/07/13 * 12
STS-01	Digital Hitester	Hioki	3805-50	080997812	RE	2015/11/18 * 12
SJM-16	Measure	ASKUL	-	-	RE	-
SHA-05	Horn Antenna	ETS LINDGREN	3160-09	LM4210	RE	2015/03/17 * 12
SAF-09	Pre Amplifier	TOYO Corporation	HAP18-26W	00000018	RE	2015/09/07 * 12
SCC-G20	Coaxial Cable	Junkosha	J12J102518-00	APR-15-15-003	RE	2015/04/30 * 12

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: RE: Radiated Emission test

UL Japan, Inc.

Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401