



RADIO TEST REPORT

Test Report No. : 11392143S-B-R4

Applicant : Kyowa Electronic Instruments Co., Ltd.
Type of Equipment : Radio frequency module for Small-sized Digital Telemetry Systems
Model No. : MR-2400MA
FCC ID : 2AJE9MR-2400MA
Test regulation : FCC Part 15 Subpart C: 2016
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 11392143S-B-R3. 11392143S-B-R3 is replaced with this report.

Date of test: September 20 to December 22, 2016
January 26, 2017

Representative test engineer:

S. Takano

Shinichi Takano

Engineer

Consumer Technology Division

Approved by:

T. Imamura

Toyokazu Imamura

Leader

Consumer Technology Division



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

UL Japan, Inc.

Shonan EMC Lab.

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

13-EM-F0429

REVISION HISTORY

Original Test Report No.: 11392143S-B

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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.....	12
SECTION 6: Radiated Spurious Emission	13
SECTION 7: Antenna Terminal Conducted Tests.....	15
APPENDIX 1: Test data	16
Conducted Emission	16
6 dB Bandwidth	24
Maximum Peak Output Power	26
Average Output Power	27
Burst rate confirmation	28
Radiated Spurious Emission	29
Conducted Spurious Emission	53
Power Density	56
99 % Occupied Bandwidth.....	58
APPENDIX 2: Test instruments	59
APPENDIX 3: Photographs of test setup	61
Conducted Emission	61
Radiated Spurious Emission	65
Pre-check of Worst Case Position.....	69

SECTION 1: Customer information

Company Name	:	Kyowa Electronic Instruments Co., Ltd.
Address	:	3-5-1, Chofugaoka, Chofu, Tokyo, 182-8520 Japan
Telephone Number	:	+81-42-489-7249
Facsimile Number	:	+81-42-481-9996
Contact Person	:	Kiyoshi Egawa

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

2.1 Identification of E.U.T.

Type of Equipment	:	Radio frequency module for Small-sized Digital Telemetry Systems
Model No.	:	MR-2400MA
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	Typical: DC 3.0 V
Receipt Date of Sample	:	September 20, 2016
Country of Mass-production	:	Japan
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: MR-2400MA (referred to as the EUT in this report) is a Radio frequency module for Small-sized Digital Telemetry Systems.

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	2405 MHz - 2480 MHz
Modulation	:	GFSK
Power Supply (radio part input)	:	DC 1.2 V, 1.7 V
Clock frequency	:	32 MHz, 32.768 kHz

Antenna name, type, gain, connector type

W1030	Lambda/2 dipole antenna,	+2.0 dBi,	Reverse SMA (P)
	with antenna cable 1 & 4 (loss 1.11 dB) total antenna gain: 0.89 dBi		
	with antenna cable 2 & 4 (loss 0.96 dB) total antenna gain: 1.04 dBi		
	with antenna cable 3 & 4 (loss 0.75 dB) total antenna gain: 1.25 dBi *1)		
	with antenna cable 1 & 4 & 5 (loss 4.41 dB) total antenna gain: -2.41 dBi		
	with antenna cable 2 & 4 & 5 (loss 4.26 dB) total antenna gain: -2.26 dBi		
	with antenna cable 3 & 4 & 5 (loss 4.05 dB) total antenna gain: -2.05 dBi		
EXT-ANT2	bow-tie antenna,	+1.7 dBi,	Reverse SMA (J)
	with antenna cable 1 & 4 & 6 (loss 1.11 dB) total antenna gain: 0.59 dBi		
	with antenna cable 2 & 4 & 6 (loss 0.96 dB) total antenna gain: 0.74 dBi		
	with antenna cable 3 & 4 & 6 (loss 0.75 dB) total antenna gain: 0.95 dBi *1)		
	with antenna cable 1 & 4 & 5 & 6 (loss 4.41 dB) total antenna gain: -2.71 dBi		
	with antenna cable 2 & 4 & 5 & 6 (loss 4.26 dB) total antenna gain: -2.56 dBi		
	with antenna cable 3 & 4 & 5 & 6 (loss 4.05 dB) total antenna gain: -2.35 dBi		
	with antenna cable 1 & 4 & 5 & 6 & 7 (loss 4.41 dB) total antenna gain: -2.71 dBi		
	with antenna cable 2 & 4 & 5 & 6 & 7 (loss 4.26 dB) total antenna gain: -2.56 dBi		
	with antenna cable 3 & 4 & 5 & 6 & 7 (loss 4.05 dB) total antenna gain: -2.35 dBi		
A 21 M245001 AH 212	monopole antenna (chip antenna),	+0.9 dBi,	Connector none
MR-ANT1	monopole antenna,	-6.0 dBi,	Connector none

*1) The combination which has the highest antenna gain has been chosen for the test.

Cable and connector:

No.	Cable and connector	Loss [dB]
1	Internal layer pattern (Board 1)	0.48
2	Internal layer pattern (Board 2)	0.33
3	Internal layer pattern (Board 3)	0.12
4	6303090203-150	0.63
5	SMA-RP(P)-SMA-RP(J)-174/U-2000	3.30
6	D-C22-054-A-G (SMA-PR-A-PP)	-
7	D-C22-052-A-G (SMA-PR-LA-PJ)	-

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

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on November 14, 2016 and effective December 14, 2016

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

* The revision on November 14, 2016, 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	20.2 dB, 0.39966 MHz, N QP Tx 2405 MHz Antenna: MR-ANT1	Complied	-
6 dB Bandwidth	FCC: KDB 558074 D01 DTS Meas Guidance v03r05 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 v03r05 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 v03r05 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 v03r05 IC: RSS-Gen 6.13	FCC: Section 15.247(d) IC: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	3.79 dB 4880.00 MHz, AV, Vertical, Tx 2440 MHz Antenna: dipole	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 v03r05 12.2.7.

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

FCC Part 15.31 (e)

The RF Module has its own regulator. The RF Module is constantly provided voltage (DC 1.2 V / 1.7 V) through the regulator regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 / 212 Antenna requirement

W1030 (Lambda/2 dipole antenna), EXT-ANT2 (bow-tie antenna):

There is a unique coupling/antenna connector. Therefore the equipment complies with the requirement.

A 21 M245001 AH 212 (monopole antenna (chip antenna)):

It is impossible for end users to replace the antenna, because it is soldered on the circuit board. Therefore the equipment complies with the requirement.

MR-ANT1 (monopole antenna):

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the product. Therefore, the equipment complies with the antenna requirement.

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

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

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

		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

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	0.76 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	0.79 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.74 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	1.08 dB
Spurious emission (Conducted) below 1GHz	1.5 dB
Spurious emission (Conducted) 1 GHz-3 GHz	1.7 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.4 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.5 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.5 dB
Bandwidth Measurement	0.66 %
Duty cycle and Time Measurement	0.012 %

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.

3.5 Test Location

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
 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	10 m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
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.

SECTION 4: Operation of E.U.T. during testing

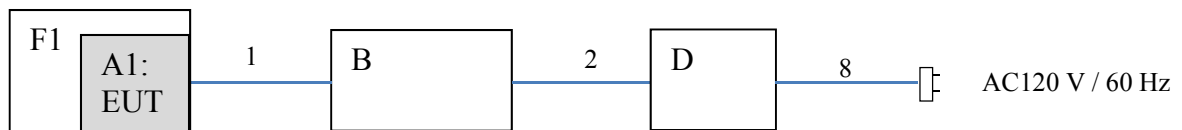
4.1 Operating Mode(s)

Mode	Frequency	Remarks*
Transmitting (Tx)	2405 MHz, 2440 MHz, 2480 MHz	PN9
<p>*Power of the EUT was set by the software as follows; Power settings: Fixed Software Version: MRT-50A_v0.16.exe, ver.0.16</p> <p>*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.</p>		

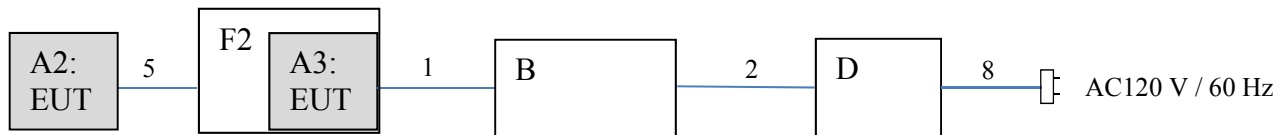
4.2 Configuration and peripherals

[Conducted Emission test]

Monopole antenna (Chip antenna)



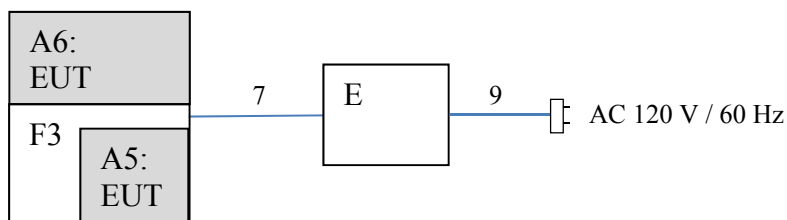
Dipole antenna



Bow-tie antenna



MR-ANT1



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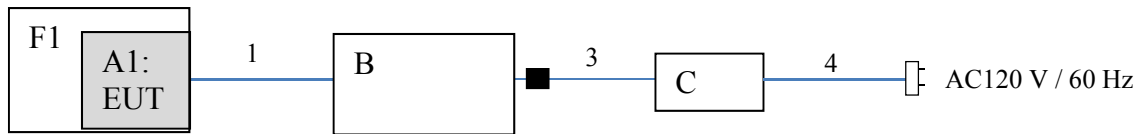
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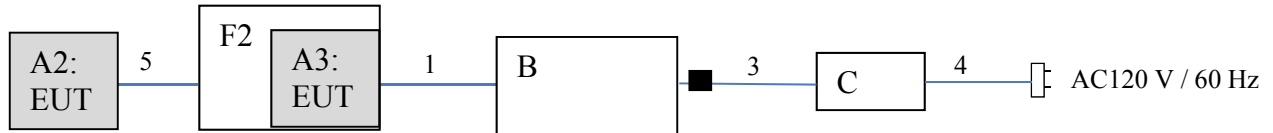
[Other tests]

Monopole antenna (Chip antenna)

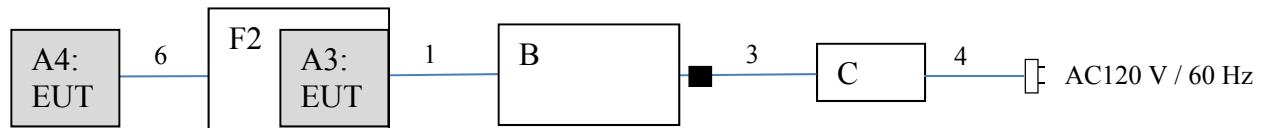
■: Standard ferrite core



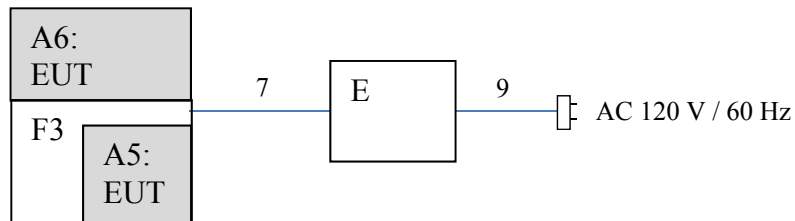
Dipole antenna



Bow-tie antenna



MR-ANT1



* 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
A1	Radio frequency module for Small-sized Digital Telemetry Systems	MR-2400MA	9 *1)	TAIYOYUDEN	EUT
A2	Dipole Antenna	W1030	-	-	EUT
A3	Radio frequency module for Small-sized Digital Telemetry Systems	MR-2400MA	10 *2)	TAIYOYUDEN	EUT
A4	Bow-tie antenna	EXT-ANT2	-	-	EUT
A5	Radio frequency module for Small-sized Digital Telemetry Systems	MR-2400MA	11 *2)	TAIYOYUDEN	EUT
A6	Monopole antenna with conductor	MR-ANT1	-	-	EUT
B	Telemetry Receiver	-	-	Kyowa	-
C	AC Adapter	SA-10A	S09-0202243	Kyowa	-
D	Regulated DC Power supply	PAN35-10A	DE001677	Kikusui	-
E	Regulated DC Power supply	PAN35-10A	NA000955	Kikusui	-
F1	Jig	-	-	-	-
F2	Jig	-	-	-	-
F3	Jig	-	-	-	-

*1) Used for all tests

*2) Used for Conducted Emission test and Radiated Emission test

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Relay harness	0.2	Unshielded	Unshielded	-
2	DC	2.0	Unshielded	Unshielded	-
3	DC	1.8	Unshielded	Unshielded	-
4	AC	1.5	Unshielded	Unshielded	-
5	Antenna	0.15	Shielded	Shielded	-
6	Antenna	0.15	Shielded	Shielded	-
7	DC	1.0	Unshielded	Unshielded	-
8	AC	2.0	Unshielded	Unshielded	-
9	AC	2.2	Unshielded	Unshielded	-

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

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Facsimile : +81 463 50 6401

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.

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.

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.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT via DC power supply in a shielded room.

The EUT via DC power supply 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 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 *3)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	Average Power Method: 12.2.5.2 RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (Linear voltage) Trace: 100 traces Duty factor was added to the results.	RBW: 100 kHz VBW: 300 kHz
Test Distance	3 m	3.95 m *1) (1 GHz – 13 GHz), 1 m *2) (13 GHz – 26.5 GHz)		

*1) Distance Factor: $20 \times \log(3.95 \text{ m} / 3.0 \text{ m}) = 2.39 \text{ dB}$

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

*3) Average Power Measurement was performed based on 6. 0 & 12.2.5 of "KDB 558074 D01 DTS Meas Guidance v03r05"

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.

Monopole antenna (Chip antenna)

Measurement antenna polarization	Carrier	Spurious (Below 1 GHz)	Spurious (1 GHz -13 GHz)	Spurious (13 GHz -26.5 GHz)
Horizontal	X	X	Z	X
Vertical	Z	X	Z	X

Dipole antenna

	Measurement antenna polarization	Carrier	Spurious (Below 1 GHz)	Spurious (1 GHz -13 GHz)	Spurious (13 GHz -26.5 GHz)
Module	Horizontal	X	X	Z	X
	Vertical	Z	X	Z	X
Antenna	Horizontal	X	X	X	X
	Vertical	Y	Y	Y	X

Bow-tie antenna

	Measurement antenna polarization	Carrier	Spurious (Below 1 GHz)	Spurious (1 GHz -13 GHz)	Spurious (13 GHz -26.5 GHz)
Module	Horizontal	X	X	Z	X
	Vertical	Z	X	Z	X
Antenna	Horizontal	Z	X	X	X
	Vertical	Y	X	X	X

MR-ANT1

Measurement antenna polarization	Carrier	Spurious (Below 1 GHz)	Spurious (1 GHz -13 GHz)	Spurious (13 GHz -26.5 GHz)
Horizontal	Z	Z	Z	X
Vertical	Y	Z	Y	X

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

Measurement range : 30 MHz - 26.5 GHz

Test data : APPENDIX

Test result : Pass

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	10 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	Sample	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	9.1 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	10 kHz	30 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 v03r05".
 *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 not detected as shown in the chart.
 (9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 10 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

DATA OF CONDUCTED EMISSION TEST

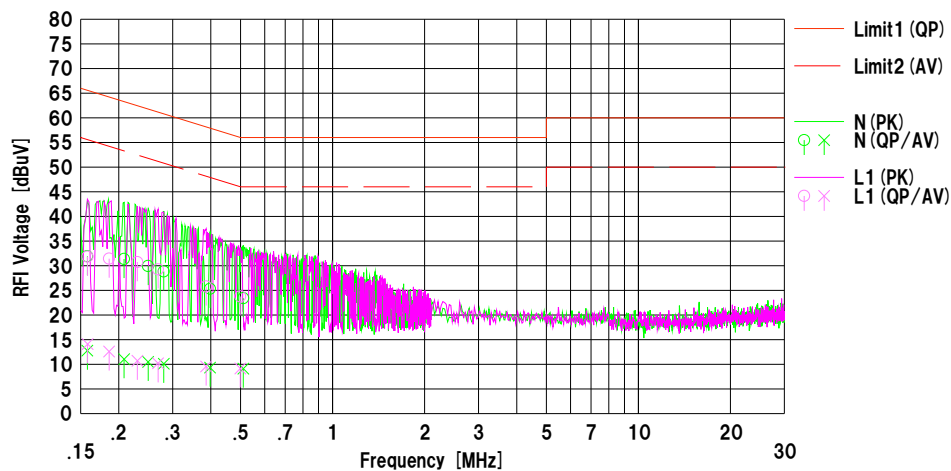
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Date : 2016/12/22

Mode : Tx. 2440 MHz
Power : AC 120 V / 60 Hz (DC 12 V)
Temp./Humi. : 26 deg.C / 38 %RH

Remarks : Antenna : chip

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Shinichi Takano



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<OP> [dBuV]	<AV> [dBuV]		<OP> [dBuV]	<AV> [dBuV]	<OP> [dBuV]	<AV> [dBuV]	<OP> [dB]	<AV> [dB]		
1	0.15783	19.54	0.38	12.39	31.93	12.77	65.58	55.58	33.6	42.8	N	
2	0.20821	18.99	-1.34	12.38	31.37	11.04	63.28	53.28	31.9	42.2	N	
3	0.24946	17.53	-1.91	12.40	29.93	10.49	61.78	51.78	31.8	41.2	N	
4	0.28065	16.45	-2.29	12.39	28.84	10.10	60.80	50.80	31.9	40.7	N	
5	0.39765	12.92	-3.07	12.40	25.32	9.33	57.90	47.90	32.5	38.5	N	
6	0.51074	11.01	-3.28	12.40	23.41	9.12	56.00	46.00	32.5	36.8	N	
7	0.15814	19.45	1.73	12.39	31.84	14.12	65.56	55.56	33.7	41.4	L1	
8	0.18603	19.03	0.21	12.39	31.42	12.60	64.21	54.21	32.7	41.6	L1	
9	0.22995	18.33	-1.69	12.40	30.73	10.71	62.45	52.45	31.7	41.7	L1	
10	0.26895	16.87	-2.19	12.40	29.27	10.21	61.15	51.15	31.8	40.9	L1	
11	0.38595	13.38	-2.84	12.40	25.78	9.56	58.15	48.15	32.3	38.5	L1	
12	0.49930	11.36	-3.24	12.40	23.76	9.16	56.01	46.01	32.2	36.8	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]
LISN: SLS-05

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Shonan EMC Lab

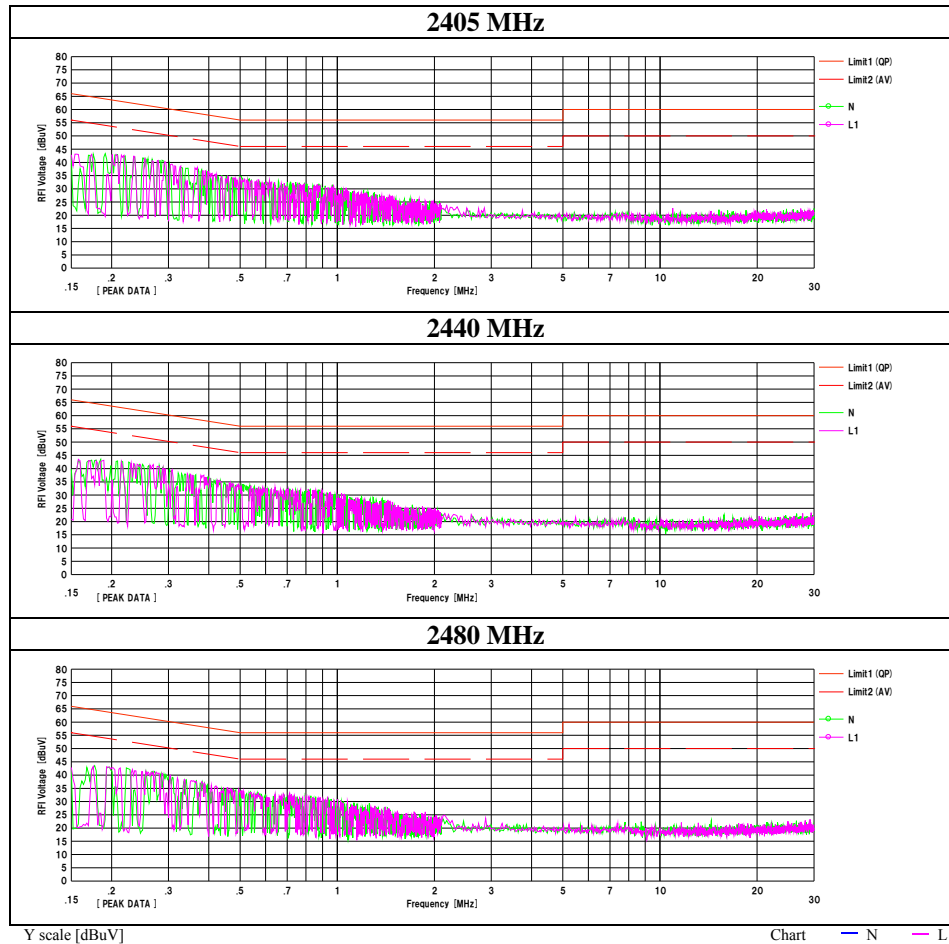
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

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Conducted Emission

Test place : Shonan EMC Lab No.3 Shielded Room
Report No. : 11392143S-B-R4
Date : September 22, 2016
Temperature / Humidity : 24 deg. C / 55 % RH
Engineer : Shinichi Takano
Mode : Tx, Monopole antenna(Chip antenna)



Conducted Emission

DATA OF CONDUCTED EMISSION TEST

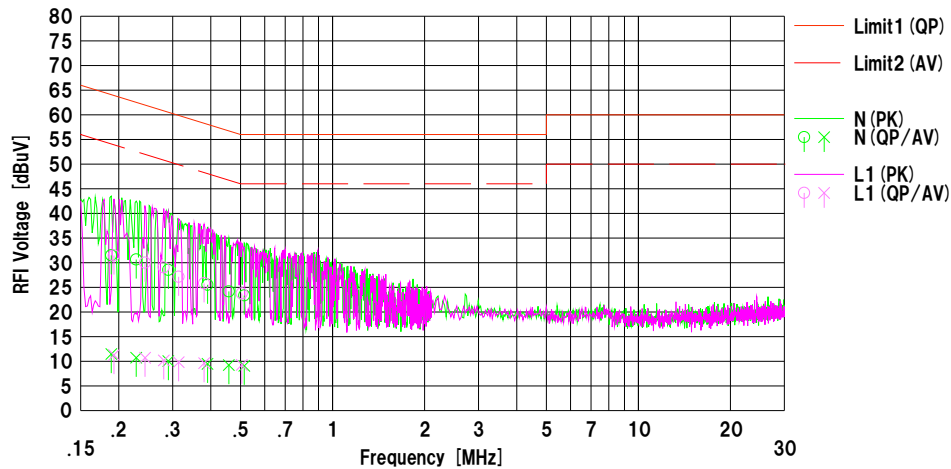
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2016/12/22

Mode : Tx. 2440 MHz
Power : AC 120 V / 60 Hz (DC 12 V)
Temp./Humi. : 26 deg.C / 38 %RH

Remarks : Antenna : Dipole

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Shinichi Takano



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.18904	19.12	-0.91	12.39	31.51	11.48	64.08	54.08	32.5	42.6	N	
2	0.22800	18.26	-1.67	12.40	30.66	10.73	62.52	52.52	31.8	41.7	N	
3	0.29041	16.15	-2.34	12.39	28.54	10.05	60.51	50.51	31.9	40.4	N	
4	0.39006	13.12	-2.91	12.40	25.52	9.49	58.06	48.06	32.5	38.5	N	
5	0.45811	11.78	-3.17	12.40	24.18	9.23	56.73	46.73	32.5	37.5	N	
6	0.51465	10.97	-3.31	12.40	23.37	9.09	56.00	46.00	32.6	36.9	N	
7	0.19290	19.08	-1.10	12.38	31.46	11.28	63.91	53.91	32.4	42.6	L1	
8	0.24362	17.59	-1.69	12.40	29.99	10.71	61.97	51.97	31.9	41.2	L1	
9	0.28064	16.65	-2.21	12.39	29.04	10.18	60.80	50.80	31.7	40.6	L1	
10	0.31380	14.76	-2.57	12.39	27.15	9.82	59.87	49.87	32.7	40.0	L1	
11	0.38017	13.41	-2.78	12.40	25.81	9.62	58.28	48.28	32.4	38.6	L1	
12	0.50490	11.37	-3.12	12.40	23.77	9.28	56.00	46.00	32.2	36.7	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN + Cable + ATT) [dB]
LISN: SLS-05

UL Japan, Inc.

Shonan EMC Lab

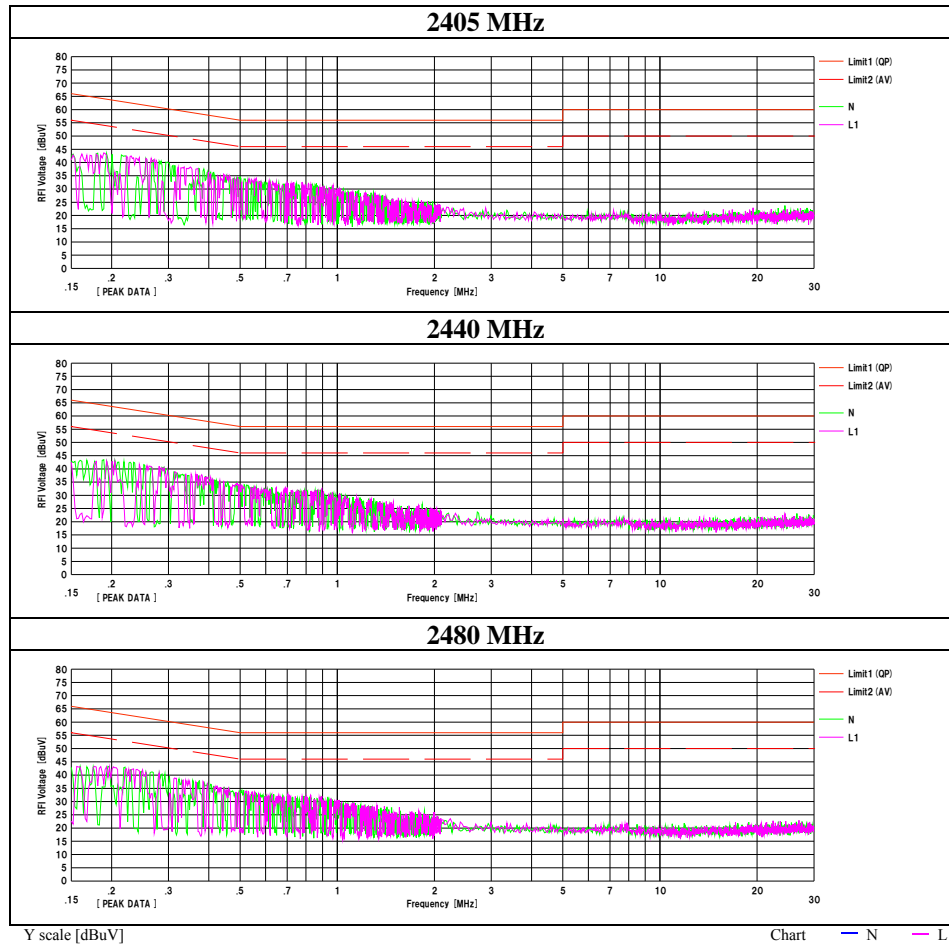
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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Conducted Emission

Test place : Shonan EMC Lab No.3 Shielded Room
Report No. : 11392143S-B-R4
Date : September 22, 2016
Temperature / Humidity : 24 deg. C / 55 % RH
Engineer : Shinichi Takano
Mode : Tx, Dipole Antenna



UL Japan, Inc.

Shonan EMC Lab

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Conducted Emission

DATA OF CONDUCTED EMISSION TEST

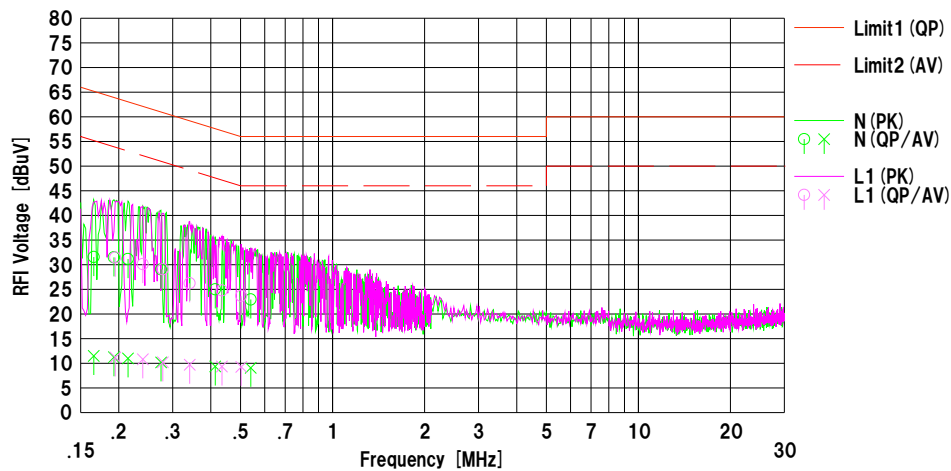
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2016/12/22

Mode : Tx. 2440 MHz
Power : AC 120 V / 60 Hz (DC 12 V)
Temp./Humi. : 26 deg.C / 38 %RH

Remarks : Antenna : Bow-tie

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Shinichi Takano

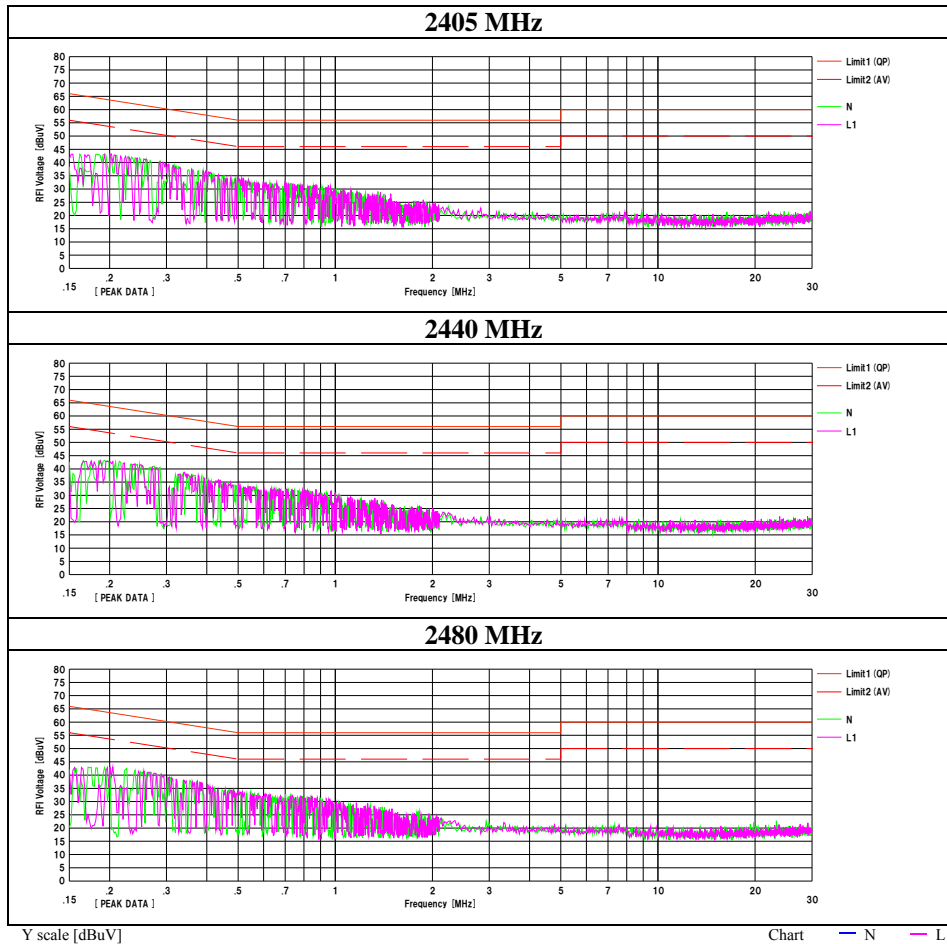


No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.16563	19.17	-0.89	12.40	31.57	11.51	65.18	55.18	33.6	43.6	N	
2	0.19290	19.11	-1.14	12.38	31.49	11.24	63.91	53.91	32.4	42.6	N	
3	0.21435	18.77	-1.40	12.39	31.16	10.99	63.04	53.04	31.8	42.0	N	
4	0.27481	16.64	-2.21	12.40	29.04	10.19	60.97	50.97	31.9	40.7	N	
5	0.41325	12.60	-3.02	12.40	25.00	9.38	57.58	47.58	32.5	38.2	N	
6	0.54002	10.54	-3.32	12.41	22.95	9.09	56.00	46.00	33.0	36.9	N	
7	0.19486	19.06	-1.18	12.38	31.44	11.20	63.83	53.83	32.3	42.6	L1	
8	0.23970	17.73	-1.59	12.40	30.13	10.81	62.11	52.11	31.9	41.3	L1	
9	0.27872	16.67	-2.19	12.39	29.06	10.20	60.85	50.85	31.7	40.6	L1	
10	0.34114	13.85	-2.69	12.39	26.24	9.70	59.18	49.18	32.9	39.4	L1	
11	0.43470	12.38	-3.04	12.40	24.78	9.36	57.16	47.16	32.3	37.8	L1	
12	0.50295	11.28	-3.12	12.40	23.68	9.28	56.00	46.00	32.3	36.7	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]
LISN: SLS-05

Conducted Emission

Test place : Shonan EMC Lab No.3 Shielded Room
Report No. : 11392143S-B-R4
Date : September 22, 2016
Temperature / Humidity : 24 deg. C / 55 % RH
Engineer : Shinichi Takano
Mode : Tx, Bow-tie antenna



UL Japan, Inc.

Shonan EMC Lab

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

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Conducted Emission

DATA OF CONDUCTED EMISSION TEST

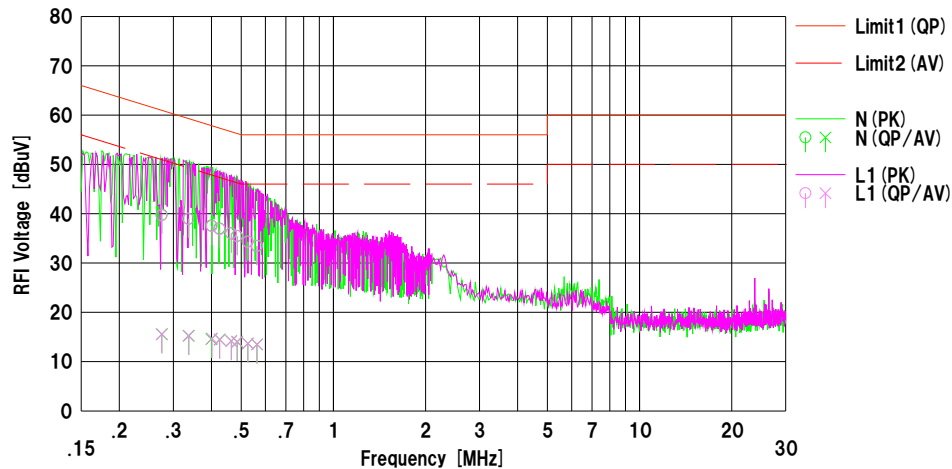
UL Japan, Inc. Shonan EMC Lab. No.1 Shielded Room
Date : 2016/09/30

Mode : Tx, 2405 MHz
Power : AC 120 V / 60 Hz
Temp./Humi. : 25 deg.C / 52 %RH

Remarks : Antenna: MR-ANT1

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Yasumasa Owaki

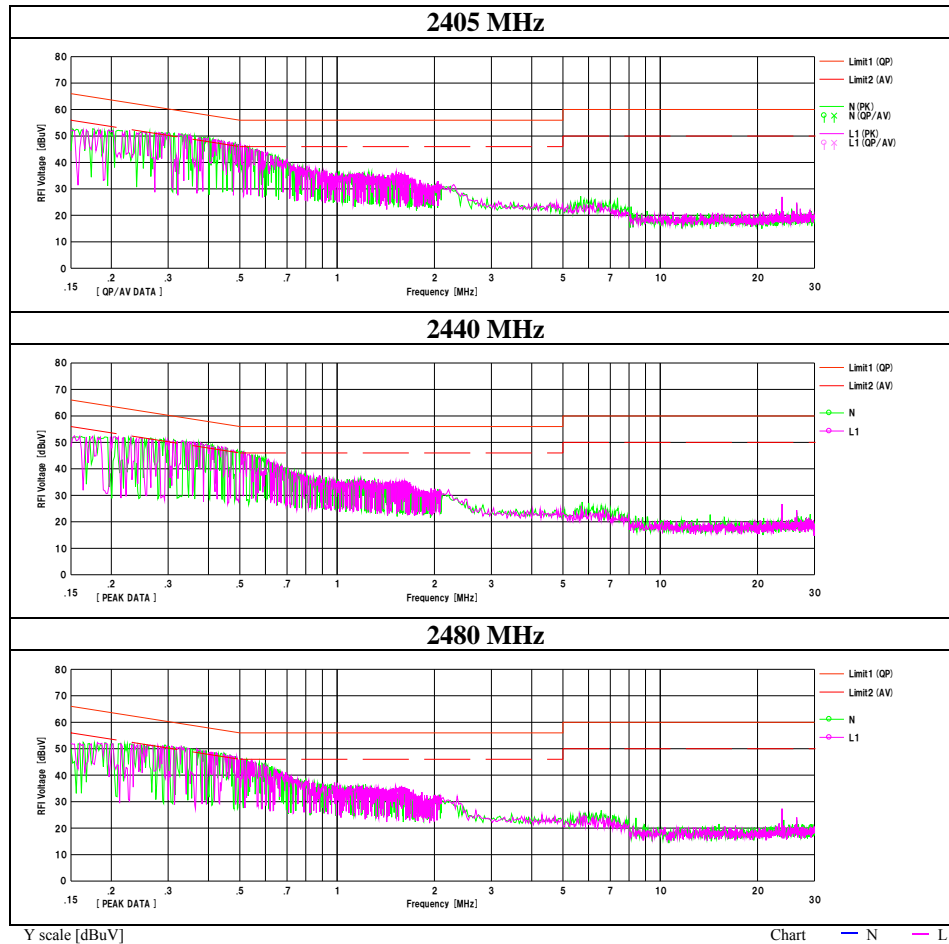


No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.27540	27.30	3.10	12.46	39.76	15.56	60.95	50.95	21.1	35.3	N	
2	0.33733	26.50	2.80	12.46	38.96	15.26	59.27	49.27	20.3	34.0	N	
3	0.39966	25.10	2.10	12.48	37.58	14.58	57.86	47.86	20.2	33.2	N	
4	0.42484	24.50	2.00	12.48	36.98	14.48	57.35	47.35	20.3	32.8	N	
5	0.46382	23.50	1.70	12.48	35.98	14.18	56.62	46.62	20.6	32.4	N	
6	0.48544	23.00	1.50	12.47	35.47	13.97	56.25	46.25	20.7	32.2	N	
7	0.52565	21.90	1.20	12.48	34.38	13.68	56.00	46.00	21.6	32.3	N	
8	0.56292	20.90	1.00	12.50	33.40	13.50	56.00	46.00	22.6	32.5	N	
9	0.27484	27.20	3.10	12.47	39.67	15.57	60.97	50.97	21.3	35.4	L1	
10	0.33621	26.50	2.80	12.46	38.96	15.26	59.30	49.30	20.3	34.0	L1	
11	0.40166	25.00	2.20	12.48	37.48	14.68	57.82	47.82	20.3	33.1	L1	
12	0.42593	24.40	2.00	12.47	36.87	14.47	57.33	47.33	20.4	32.8	L1	
13	0.46388	23.50	1.70	12.48	35.98	14.18	56.62	46.62	20.6	32.4	L1	
14	0.48491	23.00	1.60	12.47	35.47	14.07	56.25	46.25	20.7	32.1	L1	
15	0.52584	21.80	1.20	12.48	34.28	13.68	56.00	46.00	21.7	32.3	L1	
16	0.56361	21.00	1.00	12.50	33.50	13.50	56.00	46.00	22.5	32.5	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN + Cable + ATT) [dB]
LISN: SLS-02

Conducted Emission

Test place	Shonan EMC Lab No.1 Shielded Room
Report No.	11392143S-B-R4
Date	September 29, 2016
Temperature / Humidity	25 deg. C / 52 % RH
Engineer	Yasumasa Owaki
Mode	Tx, MR-ANT1

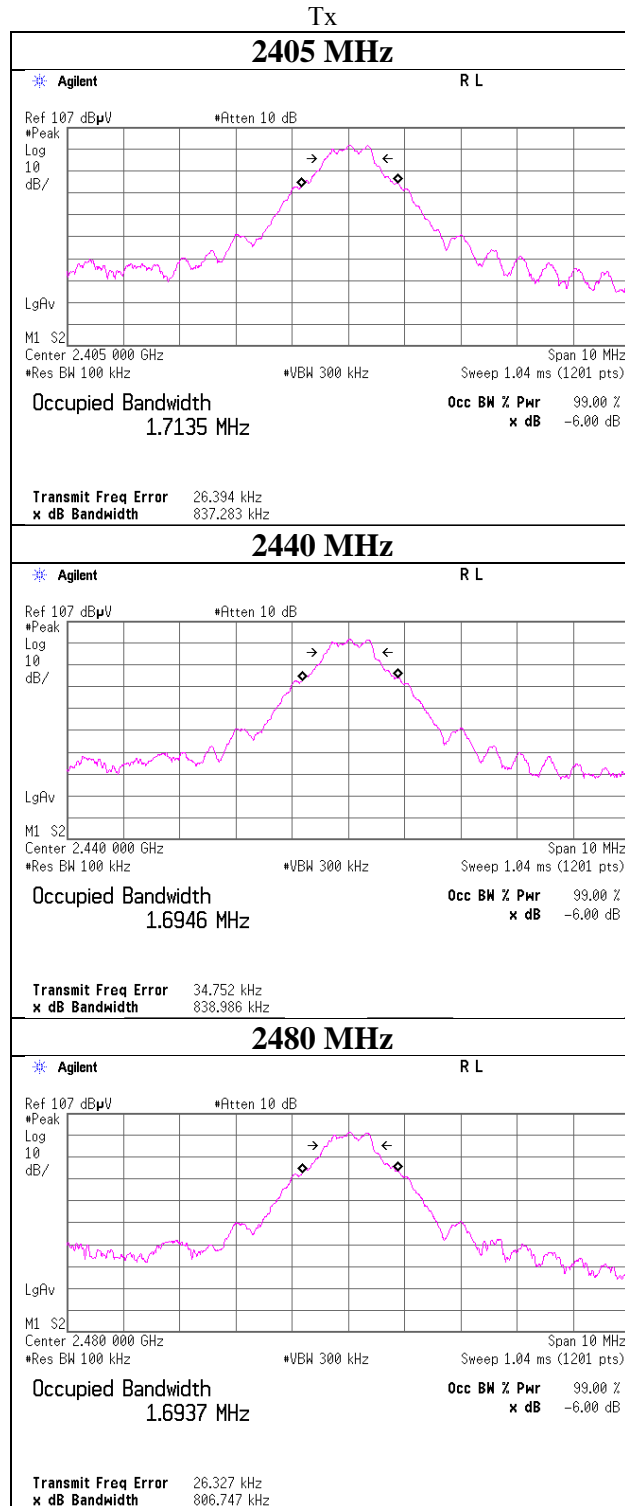


6 dB Bandwidth

Test place Shonan EMC Lab No.3 Shielded Room
Report No. 11392143S-B-R4
Date September 20, 2016
Temperature / Humidity 24 deg. C / 60 % RH
Engineer Hiroyuki Morikawa
Mode Tx

Mode	Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
Tx	2405	0.837	> 500
	2440	0.839	> 500
	2480	0.807	> 500

6dB Bandwidth



Maximum Peak Output Power

Test place Shonan EMC Lab No.3 Shielded Room
Report No. 11392143S-B-R4
Date September 20, 2016
Temperature / Humidity 24 deg. C / 60 % RH
Engineer Hiroyuki Morikawa
Mode Tx

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2405	-8.29	1.84	9.92	3.47	2.22	30.00	1000	26.53
2440	-8.42	1.83	9.92	3.33	2.15	30.00	1000	26.67
2480	-8.79	1.84	9.92	2.97	1.98	30.00	1000	27.03

Sample Calculation:

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

Average Output Power
(Reference data for RF Exposure)

Test place Shonan EMC Lab No.3 Shielded Room
Report No. 11392143S-B-R4
Date September 20, 2016
Temperature / Humidity 24 deg. C / 60 % RH
Engineer Hiroyuki Morikawa
Mode Tx

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2405	-10.11	1.84	9.92	1.65	1.46	1.47	3.12	2.05
2440	-10.26	1.83	9.92	1.49	1.41	1.47	2.96	1.98
2480	-10.63	1.84	9.92	1.13	1.30	1.47	2.60	1.82

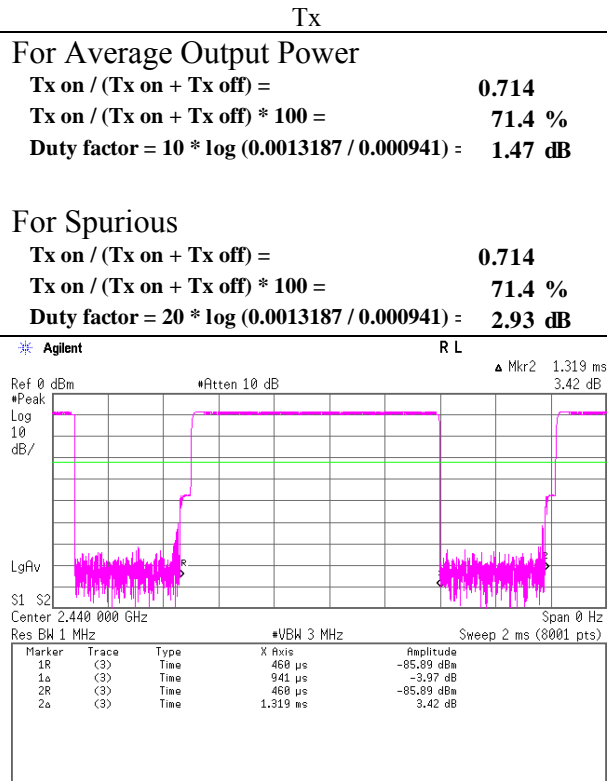
Sample Calculation:

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

Result (Burst power average) = Time average + Duty factor

Burst rate confirmation

Test place	Shonan EMC Lab No.3 Shielded Room
Report No.	11392143S-B-R4
Date	September 20, 2016
Temperature / Humidity	24 deg. C / 60 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx



Radiated Spurious Emission

Test place	Shonan EMC Lab No.3 Semi Anechoic Chamber		
Report No.	11392143S-B-R4		
Date	September 20, 2016	September 22, 2016	September 23, 2016
Temperature / Humidity	25 deg. C / 53 % RH	24 deg. C / 56 % RH	23 deg. C / 55 % RH
Engineer	Kenichi Adachi	Takahiro Suzuki	Takahiro Suzuki
	(1-13 GHz)	(13-26.5 GHz)	(30-1000 MHz)
Mode	Tx, 2405 MHz, Monopole antenna(Chip antenna)		

(* 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.	222.544	QP	33.54	16.63	8.25	32.02	0.00	26.40	46.00	19.6	159	250	
Hori.	328.690	QP	43.57	14.50	8.84	31.95	0.00	34.96	46.00	11.0	100	298	
Hori.	390.741	QP	33.57	15.80	9.13	31.94	0.00	26.56	46.00	19.4	100	305	
Hori.	785.110	QP	32.48	20.86	10.66	31.63	0.00	32.37	46.00	13.6	139	187	
Hori.	887.448	QP	30.04	22.15	10.97	31.12	0.00	32.04	46.00	14.0	127	266	
Hori.	2361.841	PK	56.54	27.29	3.78	36.87	2.39	53.13	73.90	20.8	124	263	*1)
Hori.	2390.000	PK	49.13	27.41	3.81	36.87	2.39	45.87	73.90	28.0	124	263	*1)
Hori.	2391.463	PK	56.68	27.42	3.82	36.87	2.39	53.44	73.90	20.5	124	263	*1)
Hori.	4810.000	PK	52.00	31.15	6.01	36.53	2.39	55.02	73.90	18.9	100	223	
Hori.	7215.000	PK	46.02	36.46	7.55	36.58	2.39	55.84	73.90	18.1	100	173	
Vert.	212.646	QP	26.79	16.46	8.20	32.03	0.00	19.42	43.50	24.1	100	29	
Vert.	335.853	QP	38.87	14.65	8.88	31.94	0.00	30.46	46.00	15.5	154	158	
Vert.	889.878	QP	24.28	22.18	10.97	31.11	0.00	26.32	46.00	19.7	143	330	
Vert.	2361.841	PK	51.95	27.29	3.78	36.87	2.39	48.54	73.90	25.4	100	79	*1)
Vert.	2390.000	PK	45.49	27.41	3.81	36.87	2.39	42.23	73.90	31.7	100	79	*1)
Vert.	2391.463	PK	52.94	27.42	3.82	36.87	2.39	49.70	73.90	24.2	100	79	*1)
Vert.	4810.000	PK	51.15	31.15	6.01	36.53	2.39	54.17	73.90	19.7	100	205	
Vert.	7215.000	PK	45.79	36.46	7.55	36.58	2.39	55.61	73.90	18.3	161	167	

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

Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2361.841	AV	38.02	27.29	3.78	36.87	2.93	2.39	37.54	53.90	16.36	*1)
Hori.	2390.000	AV	35.00	27.41	3.81	36.87	2.93	2.39	34.67	53.90	19.23	*1)
Hori.	2391.463	AV	36.29	27.42	3.82	36.87	2.93	2.39	35.98	53.90	17.92	*1)
Hori.	4810.000	AV	38.79	31.15	6.01	36.53	2.93	2.39	44.74	53.90	9.16	
Hori.	7215.000	AV	36.62	36.46	7.55	36.58	2.93	2.39	49.37	53.90	4.53	
Vert.	2361.841	AV	36.29	27.29	3.78	36.87	2.93	2.39	35.81	53.90	18.09	*1)
Vert.	2390.000	AV	35.78	27.41	3.81	36.87	2.93	2.39	35.45	53.90	18.45	*1)
Vert.	2391.463	AV	35.94	27.42	3.82	36.87	2.93	2.39	35.63	53.90	18.27	*1)
Vert.	4810.000	AV	37.21	31.15	6.01	36.53	2.93	2.39	43.16	53.90	10.74	
Vert.	7215.000	AV	36.35	36.46	7.55	36.58	2.93	2.39	49.10	53.90	4.80	

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 (3.95 m / 3.0 m) = 2.39 dB

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

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

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

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2405.000	PK	95.85	27.47	3.83	36.87	2.39	92.67	-	-	Carrier
Hori.	2400.000	PK	43.04	27.45	3.82	36.87	2.39	39.83	72.67	32.84	
Vert.	2405.000	PK	94.29	27.47	3.83	36.87	2.39	91.11	-	-	Carrier
Vert.	2400.000	PK	40.73	27.45	3.82	36.87	2.39	37.52	71.11	33.59	

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

Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB

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

UL Japan, Inc.

Shonan EMC Lab

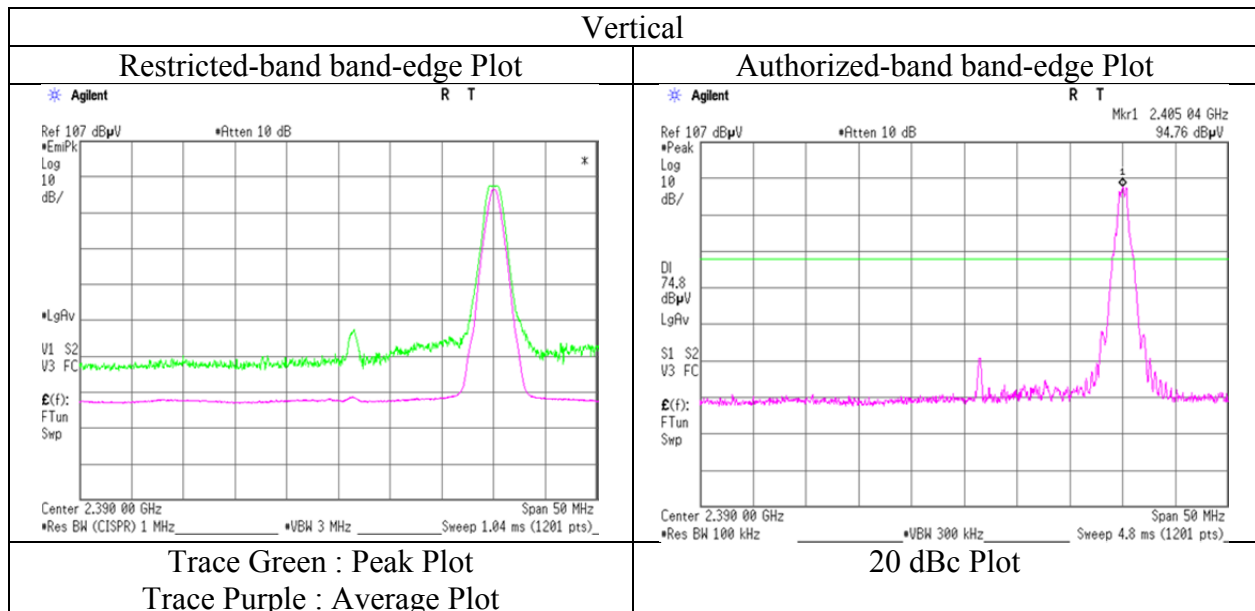
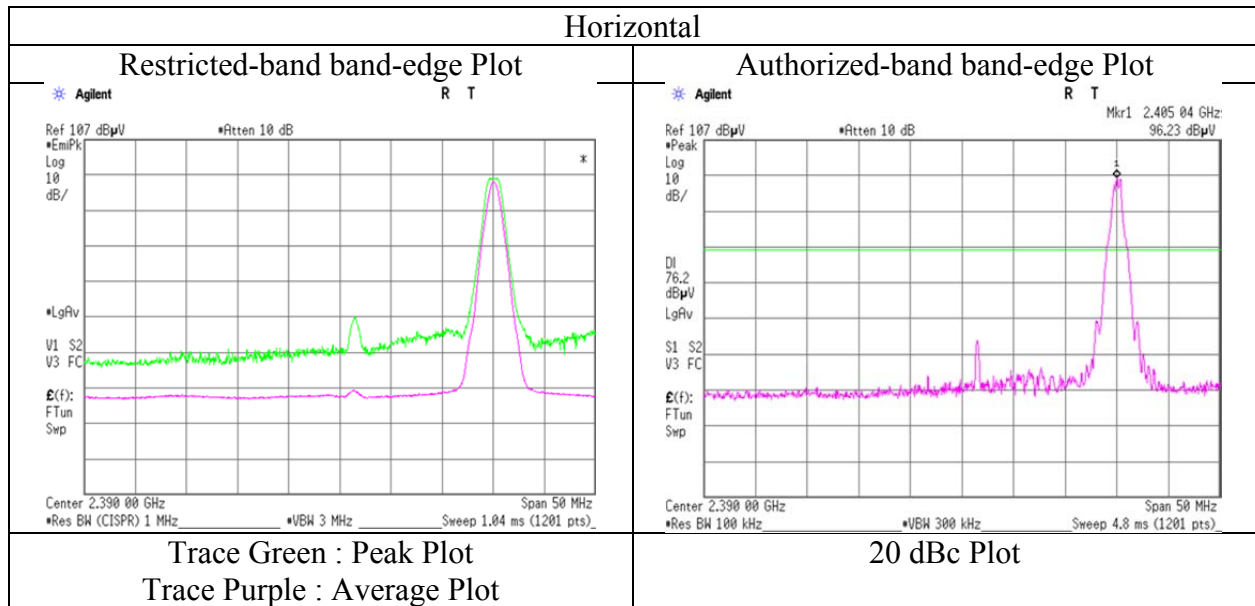
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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.	11392143S-B-R4
Date	September 20, 2016
Temperature / Humidity	25 deg. C / 53 % RH
Engineer	Kenichi Adachi
Mode	Tx, 2405 MHz, Monopole antenna(Chip antenna)



* 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. : 11392143S-B-R4
Date : September 20, 2016 September 22, 2016 September 23, 2016
Temperature / Humidity : 25 deg. C / 53 % RH 24 deg. C / 56 % RH 23 deg. C / 55 % RH
Engineer : Kenichi Adachi Takahiro Suzuki Takahiro Suzuki
(1-13 GHz) (13-26.5 GHz) (30-1000 MHz)
Mode : Tx, 2440 MHz, Monopole antenna(Chip antenna)

(* 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.	222.544	QP	33.54	16.63	8.25	32.02	0.00	26.40	46.00	19.6	159	250	
Hori.	328.690	QP	43.57	14.50	8.84	31.95	0.00	34.96	46.00	11.0	100	298	
Hori.	390.741	QP	33.57	15.80	9.13	31.94	0.00	26.56	46.00	19.4	100	305	
Hori.	785.110	QP	32.48	20.86	10.66	31.63	0.00	32.37	46.00	13.6	139	187	
Hori.	887.448	QP	30.04	22.15	10.97	31.12	0.00	32.04	46.00	14.0	127	266	
Hori.	2483.591	PK	61.19	27.79	3.90	36.85	2.39	58.42	73.90	15.5	127	262	*1)
Hori.	2553.025	PK	57.78	27.92	3.95	36.85	2.39	55.19	73.90	18.7	127	262	*1)
Hori.	4880.000	PK	52.12	31.29	6.04	36.53	2.39	55.31	73.90	18.6	100	224	
Hori.	7320.000	PK	45.81	36.77	7.59	36.65	2.39	55.91	73.90	18.0	100	175	
Vert.	212.554	QP	26.62	16.46	8.20	32.03	0.00	19.25	43.50	24.3	100	7	
Vert.	335.775	QP	38.79	14.65	8.88	31.94	0.00	30.38	46.00	15.6	158	150	
Vert.	2483.591	PK	60.60	27.79	3.90	36.85	2.39	57.83	73.90	16.1	100	83	*1)
Vert.	2553.025	PK	55.58	27.92	3.95	36.85	2.39	52.99	73.90	20.9	100	83	*1)
Vert.	4880.000	PK	51.10	31.29	6.04	36.53	2.39	54.29	73.90	19.6	100	207	
Vert.	7320.000	PK	45.71	36.77	7.59	36.65	2.39	55.81	73.90	18.1	171	147	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.591	AV	39.78	27.79	3.90	36.85	2.93	2.39	39.94	53.90	13.96	*1)
Hori.	2553.025	AV	37.05	27.92	3.95	36.85	2.93	2.39	37.39	53.90	16.51	*1)
Hori.	4880.000	AV	35.75	31.29	6.04	36.53	2.93	2.39	41.87	53.90	12.03	
Hori.	7320.000	AV	35.37	36.77	7.59	36.65	2.93	2.39	48.40	53.90	5.50	
Vert.	2483.591	AV	39.62	27.79	3.90	36.85	2.93	2.39	39.78	53.90	14.12	
Vert.	2553.025	AV	36.96	27.92	3.95	36.85	2.93	2.39	37.30	53.90	16.60	*1)
Vert.	4880.000	AV	35.76	31.29	6.04	36.53	2.93	2.39	41.88	53.90	12.02	*1)
Vert.	7320.000	AV	34.83	36.77	7.59	36.65	2.93	2.39	47.86	53.90	6.04	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$

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

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

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

Radiated Spurious Emission

Test place : Shonan EMC Lab No.3 Semi Anechoic Chamber
Report No. : 11392143S-B-R4
Date : September 20, 2016 September 22, 2016 September 23, 2016
Temperature / Humidity : 25 deg. C / 53 % RH 24 deg. C / 56 % RH 23 deg. C / 55 % RH
Engineer : Kenichi Adachi Takahiro Suzuki Takahiro Suzuki
(1-13 GHz) (13-26.5 GHz) (30-1000 MHz)
Mode : Tx, 2480 MHz, Monopole antenna(Chip antenna)

(* 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.	223.452	QP	33.47	16.64	8.26	32.02	0.00	26.35	46.00	19.7	163	253	
Hori.	327.135	QP	43.39	14.47	8.84	31.95	0.00	34.75	46.00	11.3	100	119	
Hori.	388.754	QP	34.71	15.75	9.12	31.94	0.00	27.64	46.00	18.4	100	296	
Hori.	784.596	QP	33.75	20.86	10.66	31.63	0.00	33.64	46.00	12.4	138	187	
Hori.	894.177	QP	30.03	22.24	10.99	31.08	0.00	32.18	46.00	13.8	130	80	
Hori.	2483.500	PK	60.44	27.79	3.90	36.85	2.39	57.67	73.90	16.2	128	261	*1)
Hori.	2483.593	PK	61.21	27.79	3.90	36.85	2.39	58.44	73.90	15.5	128	261	*1)
Hori.	2553.024	PK	56.25	27.92	3.95	36.85	2.39	53.66	73.90	20.2	128	261	*1)
Hori.	4960.000	PK	50.45	31.45	6.06	36.52	2.39	53.83	73.90	20.1	100	227	
Hori.	7440.000	PK	45.69	37.11	7.63	36.73	2.39	56.09	73.90	17.8	100	171	
Vert.	212.271	QP	26.55	16.45	8.19	32.04	0.00	19.15	43.50	24.4	100	180	
Vert.	335.920	QP	38.68	14.65	8.88	31.94	0.00	30.27	46.00	15.7	149	140	
Vert.	889.953	QP	24.16	22.18	10.97	31.11	0.00	26.20	46.00	19.8	141	163	
Vert.	2483.500	PK	59.09	27.79	3.90	36.85	2.39	56.32	73.90	17.6	100	76	*1)
Vert.	2483.593	PK	59.44	27.79	3.90	36.85	2.39	56.67	73.90	17.2	100	76	*1)
Vert.	2553.024	PK	55.98	27.92	3.95	36.85	2.39	53.39	73.90	20.5	100	76	*1)
Vert.	4960.000	PK	48.98	31.45	6.06	36.52	2.39	52.36	73.90	21.5	100	206	
Vert.	7440.000	PK	45.19	37.11	7.63	36.73	2.39	55.59	73.90	18.3	119	163	

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

Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	39.12	27.79	3.90	36.85	2.93	2.39	39.28	53.90	14.62	*1)
Hori.	2483.593	AV	40.22	27.79	3.90	36.85	2.93	2.39	40.38	53.90	13.52	*1)
Hori.	2553.024	AV	36.27	27.92	3.95	36.85	2.93	2.39	36.61	53.90	17.29	*1)
Hori.	4960.000	AV	40.78	31.45	6.06	36.52	2.93	2.39	47.09	53.90	6.81	
Hori.	7440.000	AV	36.18	37.11	7.63	36.73	2.93	2.39	49.51	53.90	4.39	
Vert.	2483.500	AV	38.88	27.79	3.90	36.85	2.93	2.39	39.04	53.90	14.86	*1)
Vert.	2483.593	AV	40.08	27.79	3.90	36.85	2.93	2.39	40.24	53.90	13.66	*1)
Vert.	2553.024	AV	36.74	27.92	3.95	36.85	2.93	2.39	37.08	53.90	16.82	*1)
Vert.	4960.000	AV	38.65	31.45	6.06	36.52	2.93	2.39	44.96	53.90	8.94	
Vert.	7440.000	AV	35.95	37.11	7.63	36.73	2.93	2.39	49.28	53.90	4.62	

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 (3.95 m / 3.0 m) = 2.39 dB

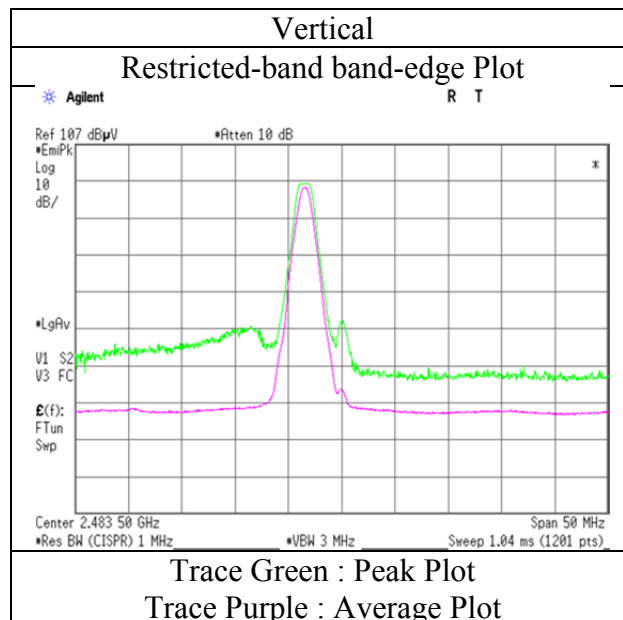
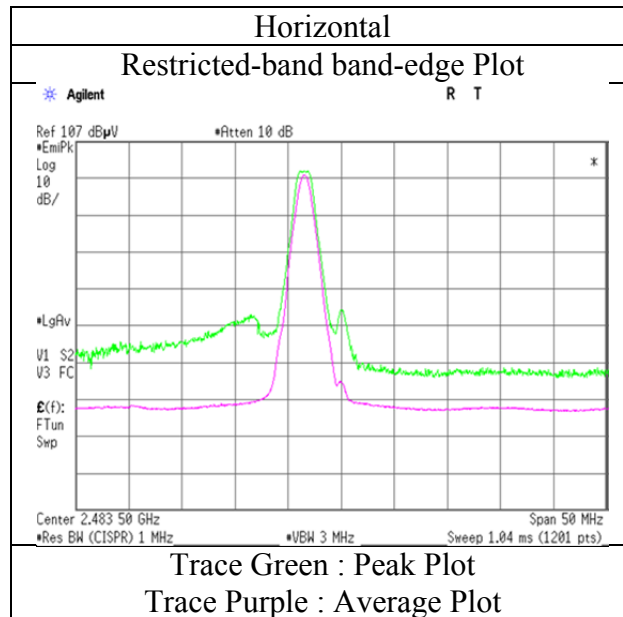
13 GHz - 26.5 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

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

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

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab No.3 Semi Anechoic Chamber
Report No.	11392143S-B-R4
Date	September 20, 2016
Temperature / Humidity	25 deg. C / 53 % RH
Engineer	Kenichi Adachi
Mode	Tx, 2480 MHz, Monopole antenna(Chip antenna)



* 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. : 11392143S-B-R4
Date : September 21, 2016 September 22, 2016 September 23, 2016
Temperature / Humidity : 24 deg. C / 56 % RH 24 deg. C / 56 % RH 23 deg. C / 55 % RH
Engineer : Takahiro Suzuki Takahiro Suzuki Takahiro Suzuki
(1-13 GHz) (13-26.5 GHz) (30-1000 MHz)
Mode : Tx, 2405 MHz, Dipole Antenna

(* 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.	215.912	QP	35.78	16.51	8.22	32.03	0.00	28.48	43.50	15.0	157	117	
Hori.	219.348	QP	36.92	16.57	8.23	32.03	0.00	29.69	46.00	16.3	154	278	
Hori.	328.512	QP	36.44	14.50	8.84	31.95	0.00	27.83	46.00	18.2	155	277	
Hori.	384.512	QP	32.13	15.67	9.11	31.94	0.00	24.97	46.00	21.0	100	346	
Hori.	784.735	QP	33.75	20.86	10.66	31.63	0.00	33.64	46.00	12.4	137	173	
Hori.	868.474	QP	31.82	21.89	10.91	31.23	0.00	33.39	46.00	12.6	125	277	
Hori.	2338.709	PK	56.47	27.20	13.77	40.70	2.39	59.13	73.90	14.8	100	90	*1)
Hori.	2390.000	PK	53.14	27.41	13.82	40.70	2.39	56.06	73.90	17.8	133	277	*1)
Hori.	2394.136	PK	57.04	27.43	13.83	40.70	2.39	59.99	73.90	13.9	160	47	*1)
Hori.	2454.509	PK	58.96	27.67	13.87	40.69	2.39	62.20	73.90	11.7	118	110	*1)
Hori.	2470.234	PK	58.73	27.74	13.90	40.69	2.39	62.07	73.90	11.8	100	275	*1)
Hori.	4810.000	PK	55.86	31.15	6.01	41.53	2.39	53.88	73.90	20.0	100	226	
Hori.	7215.000	PK	51.37	36.46	7.55	41.13	2.39	56.64	73.90	17.3	100	5	
Vert.	215.930	QP	36.03	16.51	8.22	32.03	0.00	28.73	43.50	14.8	100	279	
Vert.	433.829	QP	28.97	16.46	9.32	31.94	0.00	22.81	46.00	23.2	100	1	
Vert.	889.688	QP	25.06	22.18	10.97	31.11	0.00	27.10	46.00	18.9	100	108	
Vert.	2338.648	PK	57.39	27.20	13.77	40.70	2.39	60.05	73.90	13.9	140	172	*1)
Vert.	2390.000	PK	51.07	27.41	13.82	40.70	2.39	53.99	73.90	19.9	111	73	*1)
Vert.	2394.136	PK	58.01	27.43	13.83	40.70	2.39	60.96	73.90	12.9	141	89	*1)
Vert.	2423.157	PK	58.12	27.54	13.85	40.70	2.39	61.20	73.90	12.7	223	349	*1)
Vert.	2454.252	PK	58.23	27.67	13.87	40.69	2.39	61.47	73.90	12.4	157	190	*1)
Vert.	2470.302	PK	57.69	27.74	13.90	40.69	2.39	61.03	73.90	12.9	158	341	
Vert.	4810.000	PK	56.72	31.15	6.01	41.53	2.39	54.74	73.90	19.2	113	61	
Vert.	7215.000	PK	51.90	36.46	7.55	41.13	2.39	57.17	73.90	16.7	100	139	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant. Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2338.709	AV	39.24	27.20	13.77	40.70	2.93	2.39	44.83	53.90	9.07	*1)
Hori.	2390.000	AV	36.72	27.41	13.82	40.70	2.93	2.39	42.57	53.90	11.33	*1)
Hori.	2394.136	AV	39.38	27.43	13.83	40.70	2.93	2.39	45.26	53.90	8.64	*1)
Hori.	2454.509	AV	41.43	27.67	13.87	40.69	2.93	2.39	47.60	53.90	6.30	*1)
Hori.	2470.234	AV	40.14	27.74	13.90	40.69	2.93	2.39	46.41	53.90	7.49	*1)
Hori.	4810.000	AV	40.21	31.15	6.01	41.53	2.93	2.39	41.16	53.90	12.74	
Hori.	7215.000	AV	38.06	36.46	7.55	41.13	2.93	2.39	46.26	53.90	7.64	
Vert.	2338.648	AV	40.06	27.20	13.77	40.70	2.93	2.39	45.65	53.90	8.25	*1)
Vert.	2390.000	AV	37.56	27.41	13.82	40.70	2.93	2.39	43.41	53.90	10.49	*1)
Vert.	2394.136	AV	40.52	27.43	13.83	40.70	2.93	2.39	46.40	53.90	7.50	*1)
Vert.	2423.157	AV	40.76	27.54	13.85	40.70	2.93	2.39	46.77	53.90	7.13	*1)
Vert.	2454.252	AV	40.05	27.67	13.87	40.69	2.93	2.39	46.22	53.90	7.68	*1)
Vert.	2470.302	AV	38.54	27.74	13.90	40.69	2.93	2.39	44.81	53.90	9.09	*1)
Vert.	4810.000	AV	42.76	31.15	6.01	41.53	2.93	2.39	43.71	53.90	10.19	
Vert.	7215.000	AV	40.18	36.46	7.55	41.13	2.93	2.39	48.38	53.90	5.52	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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

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

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant. Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2405.000	PK	96.70	27.47	13.84	40.70	2.39	99.70	-	-	Carrier
Hori.	2400.000	PK	45.81	27.45	13.83	40.70	2.39	48.78	79.70	30.9	
Vert.	2405.000	PK	94.00	27.47	13.84	40.70	2.39	97.00	-	-	Carrier
Vert.	2400.000	PK	42.58	27.45	13.83	40.70	2.39	45.55	77.00	31.5	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

UL Japan, Inc.

Shonan EMC Lab

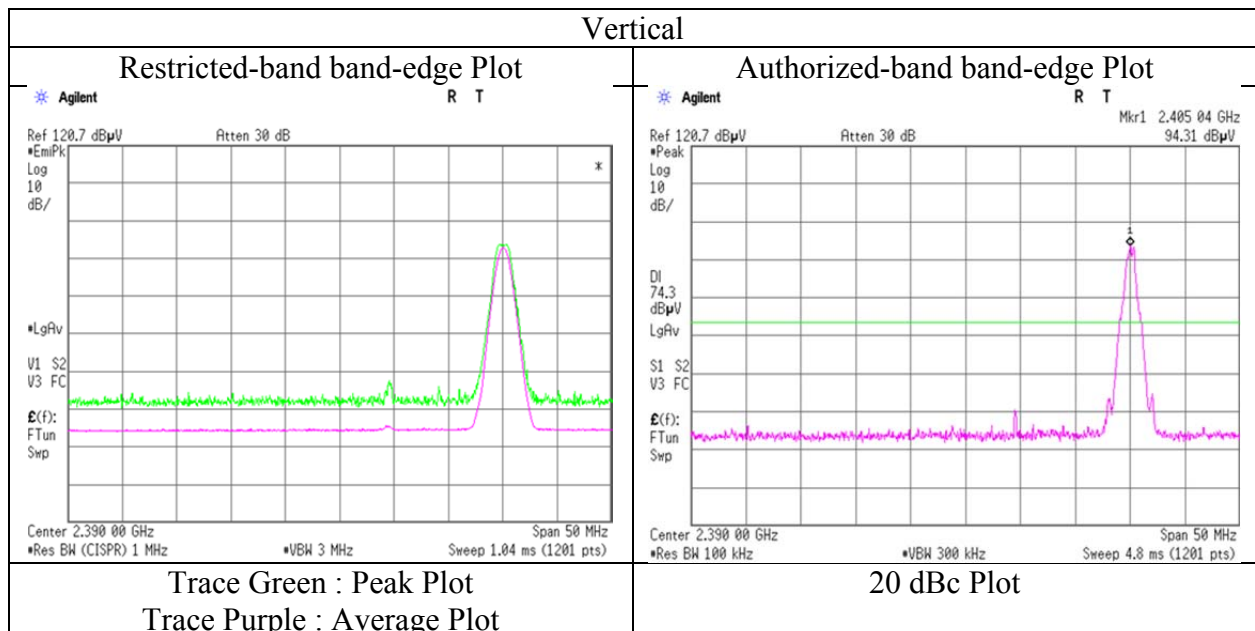
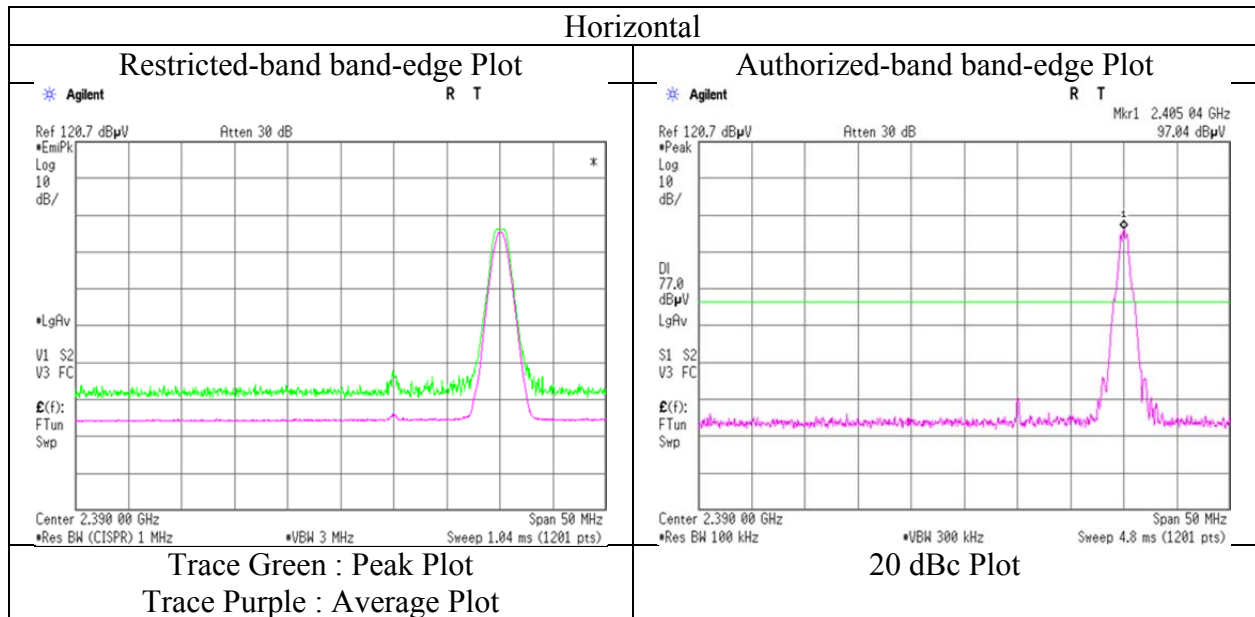
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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.	11392143S-B-R4
Date	September 21, 2016
Temperature / Humidity	24 deg. C / 56 % RH
Engineer	Takahiro Suzuki
Mode	Tx, 2405 MHz, Dipole Antenna



* 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.	11392143S-B-R4		
Date	September 21, 2016	September 22, 2016	September 23, 2016
Temperature / Humidity	24 deg. C / 56 % RH	24 deg. C / 56 % RH	23 deg. C / 55 % RH
Engineer	Takahiro Suzuki	Takahiro Suzuki	Takahiro Suzuki
	(1-13 GHz)	(13-26.5 GHz)	(30-1000 MHz)
Mode	Tx, 2440 MHz, Dipole Antenna		

(* 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.	214.687	QP	35.32	16.49	8.21	32.03	0.00	27.99	43.50	15.5	153	265	
Hori.	218.773	QP	36.05	16.56	8.23	32.03	0.00	28.81	46.00	17.2	156	114	
Hori.	329.391	QP	35.98	14.51	8.85	31.95	0.00	27.39	46.00	18.6	151	269	
Hori.	386.276	QP	34.42	15.70	9.11	31.94	0.00	27.29	46.00	18.7	100	3	
Hori.	787.351	QP	32.88	20.88	10.67	31.62	0.00	32.81	46.00	13.2	139	182	
Hori.	868.793	QP	31.19	21.90	10.91	31.23	0.00	32.77	46.00	13.2	130	276	
Hori.	2338.539	PK	59.15	27.20	13.77	40.70	2.39	61.81	73.90	12.1	104	52	*1)
Hori.	2393.817	PK	57.83	27.42	13.83	40.70	2.39	60.77	73.90	13.1	135	271	*1)
Hori.	2453.559	PK	60.29	27.67	13.87	40.69	2.39	63.53	73.90	10.4	122	271	*1)
Hori.	2469.696	PK	59.09	27.74	13.90	40.69	2.39	62.43	73.90	11.5	111	61	*1)
Hori.	4880.000	PK	50.34	31.29	6.04	41.39	2.39	48.67	73.90	25.2	100	20	
Hori.	7320.000	PK	50.80	36.77	7.59	41.24	2.39	56.31	73.90	17.6	194	214	
Vert.	214.050	QP	35.73	16.48	8.20	32.03	0.00	28.38	43.50	15.1	100	358	
Vert.	435.591	QP	29.00	16.49	9.32	31.94	0.00	22.87	46.00	23.1	100	189	
Vert.	877.100	QP	26.21	22.01	10.93	31.18	0.00	27.97	46.00	18.0	100	335	
Vert.	2338.386	PK	56.83	27.20	13.77	40.70	2.39	59.49	73.90	14.4	135	322	*1)
Vert.	2394.351	PK	54.88	27.43	13.83	40.70	2.39	57.83	73.90	16.1	142	125	*1)
Vert.	2453.945	PK	57.76	27.67	13.87	40.69	2.39	61.00	73.90	12.9	132	99	*1)
Vert.	2469.799	PK	56.82	27.74	13.90	40.69	2.39	60.16	73.90	13.7	100	337	*1)
Vert.	4880.000	PK	55.84	31.29	6.04	41.39	2.39	54.17	73.90	19.7	197	60	
Vert.	7320.000	PK	50.07	36.77	7.59	41.24	2.39	55.58	73.90	18.3	174	151	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2338.539	AV	40.64	27.20	13.77	40.70	2.93	2.39	46.23	53.90	7.67	*1)
Hori.	2393.817	AV	40.56	27.42	13.83	40.70	2.93	2.39	46.43	53.90	7.47	*1)
Hori.	2453.559	AV	40.54	27.67	13.87	40.69	2.93	2.39	46.71	53.90	7.19	*1)
Hori.	2469.696	AV	40.34	27.74	13.90	40.69	2.93	2.39	46.61	53.90	7.29	*1)
Hori.	4880.000	AV	38.67	31.29	6.04	41.39	2.93	2.39	39.93	53.90	13.97	
Hori.	7320.000	AV	40.64	36.77	7.59	41.24	2.93	2.39	49.08	53.90	4.82	
Vert.	2338.386	AV	38.66	27.20	13.77	40.70	2.93	2.39	44.25	53.90	9.65	*1)
Vert.	2394.351	AV	39.75	27.43	13.83	40.70	2.93	2.39	45.63	53.90	8.27	*1)
Vert.	2453.945	AV	39.87	27.67	13.87	40.69	2.93	2.39	46.04	53.90	7.86	*1)
Vert.	2469.799	AV	39.00	27.74	13.90	40.69	2.93	2.39	45.27	53.90	8.63	*1)
Vert.	4880.000	AV	48.85	31.29	6.04	41.39	2.93	2.39	50.11	53.90	3.79	
Vert.	7320.000	AV	39.04	36.77	7.59	41.24	2.93	2.39	47.48	53.90	6.42	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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

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

Radiated Spurious Emission

Test place : Shonan EMC Lab No.3 Semi Anechoic Chamber
Report No. : 11392143S-B-R4
Date : September 21, 2016 September 22, 2016 September 23, 2016
Temperature / Humidity : 24 deg. C / 56 % RH 24 deg. C / 56 % RH 23 deg. C / 55 % RH
Engineer : Takahiro suzuki Takahiro Suzuki Takahiro Suzuki
(1-13 GHz) (13-26.5 GHz) (30-1000 MHz)
Mode : Tx, 2480 MHz, Dipole Antenna

(* 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.	215.340	QP	35.11	16.50	8.21	32.03	0.00	27.79	43.50	15.7	153	128	
Hori.	218.143	QP	37.07	16.55	8.23	32.03	0.00	29.82	46.00	16.2	159	280	
Hori.	334.173	QP	35.95	14.61	8.87	31.94	0.00	27.49	46.00	18.5	152	100	
Hori.	389.422	QP	33.52	15.77	9.13	31.94	0.00	26.48	46.00	19.5	100	1	
Hori.	779.731	QP	32.78	20.82	10.64	31.66	0.00	32.58	46.00	13.4	135	192	
Hori.	893.102	QP	31.13	22.23	10.98	31.09	0.00	33.25	46.00	12.8	123	263	
Hori.	2452.763	PK	57.99	27.67	13.87	40.69	2.39	61.23	73.90	12.7	127	88	*1)
Hori.	2483.500	PK	54.15	27.79	13.91	40.69	2.39	57.55	73.90	16.4	171	91	*1)
Hori.	2512.823	PK	58.15	27.87	13.93	40.70	2.39	61.64	73.90	12.3	124	271	*1)
Hori.	2581.358	PK	57.67	27.95	13.98	40.73	2.39	61.26	73.90	12.6	100	99	*1)
Hori.	4960.000	PK	55.49	31.45	6.06	41.23	2.39	54.16	73.90	19.7	100	217	
Hori.	7440.000	PK	51.63	37.11	7.63	41.37	2.39	57.39	73.90	16.5	100	37	
Vert.	214.666	QP	36.42	16.49	8.21	32.03	0.00	29.09	43.50	14.4	100	356	
Vert.	435.355	QP	29.19	16.48	9.32	31.94	0.00	23.05	46.00	23.0	100	15	
Vert.	786.213	QP	27.36	20.87	10.66	31.63	0.00	27.26	46.00	18.7	100	47	
Vert.	2452.983	PK	57.46	27.67	13.87	40.69	2.39	60.70	73.90	13.2	168	201	*1)
Vert.	2483.500	PK	53.35	27.79	13.91	40.69	2.39	56.75	73.90	17.2	146	358	*1)
Vert.	2512.652	PK	56.70	27.87	13.93	40.70	2.39	60.19	73.90	13.7	117	327	*1)
Vert.	2581.324	PK	55.68	27.95	13.98	40.73	2.39	59.27	73.90	14.6	157	180	*1)
Vert.	4960.000	PK	53.56	31.45	6.06	41.23	2.39	52.23	73.90	21.7	176	135	
Vert.	7440.000	PK	49.69	37.11	7.63	41.37	2.39	55.45	73.90	18.5	146	192	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2452.763	AV	31.69	27.67	13.87	40.69	2.93	2.39	37.86	53.90	16.04	*1)
Hori.	2483.500	AV	40.12	27.79	13.91	40.69	2.93	2.39	46.45	53.90	7.45	*1)
Hori.	2512.823	AV	33.86	27.87	13.93	40.70	2.93	2.39	40.28	53.90	13.62	*1)
Hori.	2581.358	AV	31.99	27.95	13.98	40.73	2.93	2.39	38.51	53.90	15.39	*1)
Hori.	4960.000	AV	45.63	31.45	6.06	41.23	2.93	2.39	47.23	53.90	6.67	
Hori.	7440.000	AV	40.08	37.11	7.63	41.37	2.93	2.39	48.77	53.90	5.13	
Vert.	2452.983	AV	33.46	27.67	13.87	40.69	2.93	2.39	39.63	53.90	14.27	*1)
Vert.	2483.500	AV	34.07	27.79	13.91	40.69	2.93	2.39	40.40	53.90	13.50	*1)
Vert.	2512.652	AV	37.36	27.87	13.93	40.70	2.93	2.39	43.78	53.90	10.12	*1)
Vert.	2581.324	AV	38.48	27.95	13.98	40.73	2.93	2.39	45.00	53.90	8.90	*1)
Vert.	4960.000	AV	43.41	31.45	6.06	41.23	2.93	2.39	45.01	53.90	8.89	
Vert.	7440.000	AV	36.92	37.11	7.63	41.37	2.93	2.39	45.61	53.90	8.29	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$

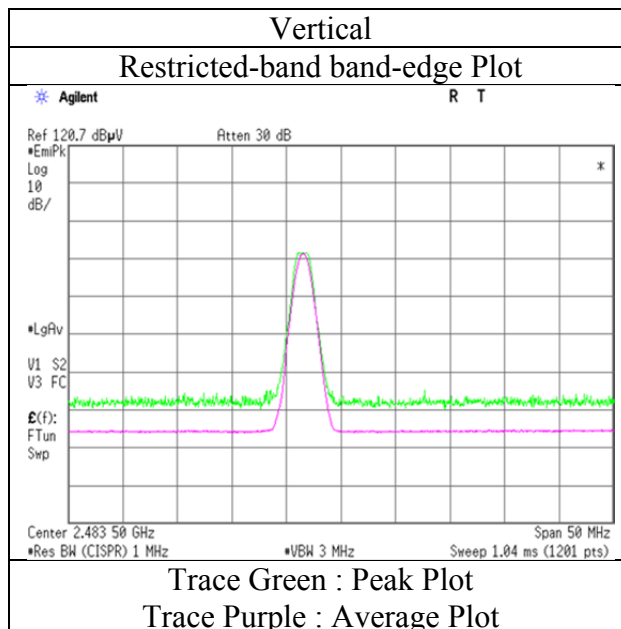
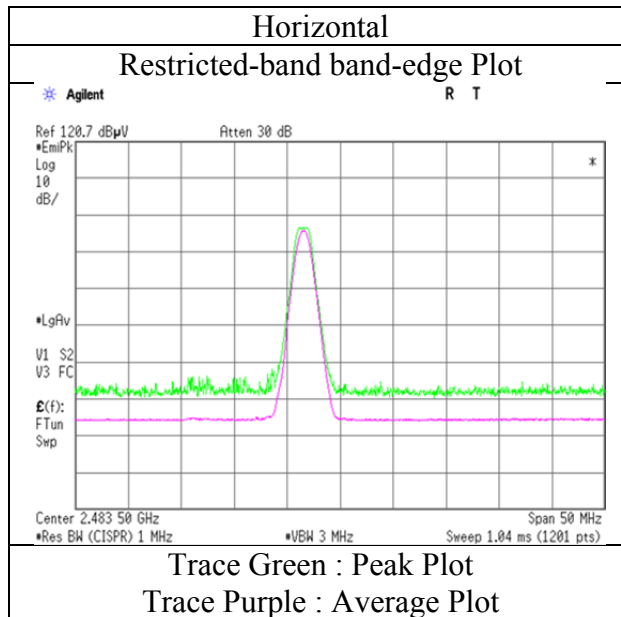
13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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

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

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab No.3 Semi Anechoic Chamber
Report No.	11392143S-B-R4
Date	September 21, 2016
Temperature / Humidity	24 deg. C / 56 % RH
Engineer	Takahiro Suzuki
Mode	Tx, 2480 MHz, Dipole Antenna



* 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. : 11392143S-B-R4
Date : September 21, 2016 September 22, 2016 September 23, 2016
Temperature / Humidity : 24 deg. C / 56 % RH 24 deg. C / 56 % RH 23 deg. C / 55 % RH
Engineer : Takahiro Suzuki Takahiro Suzuki Takahiro Suzuki
(1-13 GHz) (13-26.5 GHz) (30-1000 MHz)
Mode : Tx, 2405 MHz, Bow-tie Antenna

(* 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.	215.801	QP	36.33	16.51	8.21	32.03	0.00	29.02	43.50	14.48	158	276	
Hori.	218.518	QP	38.09	16.56	8.23	32.03	0.00	30.85	46.00	15.15	153	265	
Hori.	329.110	QP	36.67	14.51	8.85	31.95	0.00	28.08	46.00	17.92	142	268	
Hori.	387.293	QP	32.32	15.72	9.12	31.94	0.00	25.22	46.00	20.78	100	352	
Hori.	791.100	QP	33.11	20.91	10.68	31.61	0.00	33.09	46.00	12.91	132	183	
Hori.	884.774	QP	31.96	22.11	10.96	31.14	0.00	33.89	46.00	12.11	127	276	
Hori.	2390.000	PK	50.91	27.41	13.82	40.70	2.39	53.83	73.90	20.07	122	143	*1)
Hori.	2393.572	PK	57.02	27.42	13.83	40.70	2.39	59.96	73.90	13.94	155	56	*1)
Hori.	2422.705	PK	58.18	27.54	13.85	40.70	2.39	61.26	73.90	12.64	114	105	*1)
Hori.	2453.719	PK	59.03	27.67	13.87	40.69	2.39	62.27	73.90	11.63	120	114	*1)
Hori.	4810.000	PK	54.03	31.15	6.01	41.53	2.39	52.05	73.90	21.85	117	332	
Hori.	7215.000	PK	50.11	36.46	7.55	41.13	2.39	55.38	73.90	18.52	132	181	
Vert.	215.855	QP	36.16	16.51	8.21	32.03	0.00	28.85	43.50	14.65	100	358	
Vert.	781.615	QP	27.59	20.84	10.65	31.65	0.00	27.43	46.00	18.57	100	323	
Vert.	869.637	QP	25.62	21.91	10.91	31.23	0.00	27.21	46.00	18.79	100	177	
Vert.	2337.870	PK	57.25	27.20	13.77	40.70	2.39	59.91	73.90	13.99	142	171	*1)
Vert.	2390.000	PK	50.07	27.41	13.82	40.70	2.39	52.99	73.90	20.91	128	119	*1)
Vert.	2393.597	PK	57.89	27.42	13.83	40.70	2.39	60.83	73.90	13.07	138	82	*1)
Vert.	2422.831	PK	57.98	27.54	13.85	40.70	2.39	61.06	73.90	12.84	219	350	*1)
Vert.	2453.395	PK	58.11	27.67	13.87	40.69	2.39	61.35	73.90	12.55	155	186	*1)
Vert.	4810.000	PK	54.08	31.15	6.01	41.53	2.39	52.10	73.90	21.80	133	187	
Vert.	7215.000	PK	49.90	36.46	7.55	41.13	2.39	55.17	73.90	18.73	124	127	

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

Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	35.78	27.41	13.82	40.70	2.93	2.39	41.63	53.90	12.27	*1)
Hori.	2393.572	AV	39.01	27.42	13.83	40.70	2.93	2.39	44.88	53.90	9.02	*1)
Hori.	2422.705	AV	41.02	27.54	13.85	40.70	2.93	2.39	47.03	53.90	6.87	*1)
Hori.	2453.719	AV	41.67	27.67	13.87	40.69	2.93	2.39	47.84	53.90	6.06	*1)
Hori.	4810.000	AV	40.47	31.15	6.01	41.53	2.93	2.39	41.42	53.90	12.48	
Hori.	7215.000	AV	40.26	36.46	7.55	41.13	2.93	2.39	48.46	53.90	5.44	
Vert.	2337.870	AV	40.00	27.20	13.77	40.70	2.93	2.39	45.59	53.90	8.31	*1)
Vert.	2390.000	AV	36.43	27.41	13.82	40.70	2.93	2.39	42.28	53.90	11.62	*1)
Vert.	2393.597	AV	40.32	27.42	13.83	40.70	2.93	2.39	46.19	53.90	7.71	*1)
Vert.	2422.831	AV	40.85	27.54	13.85	40.70	2.93	2.39	46.86	53.90	7.04	*1)
Vert.	2453.395	AV	39.95	27.67	13.87	40.69	2.93	2.39	46.12	53.90	7.78	*1)
Vert.	4810.000	AV	40.96	31.15	6.01	41.53	2.93	2.39	41.91	53.90	11.99	
Vert.	7215.000	AV	40.02	36.46	7.55	41.13	2.93	2.39	48.22	53.90	5.68	

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 (3.95 m / 3.0 m) = 2.39 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

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

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

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2405.000	PK	96.17	27.47	13.84	40.70	2.39	99.17	-	-	Carrier
Hori.	2400.000	PK	41.41	27.45	13.83	40.70	2.39	44.38	79.17	34.8	
Vert.	2405.000	PK	95.33	27.47	13.84	40.70	2.39	98.33	-	-	Carrier
Vert.	2400.000	PK	41.97	27.45	13.83	40.70	2.39	44.94	78.33	33.4	

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

Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

UL Japan, Inc.

Shonan EMC Lab

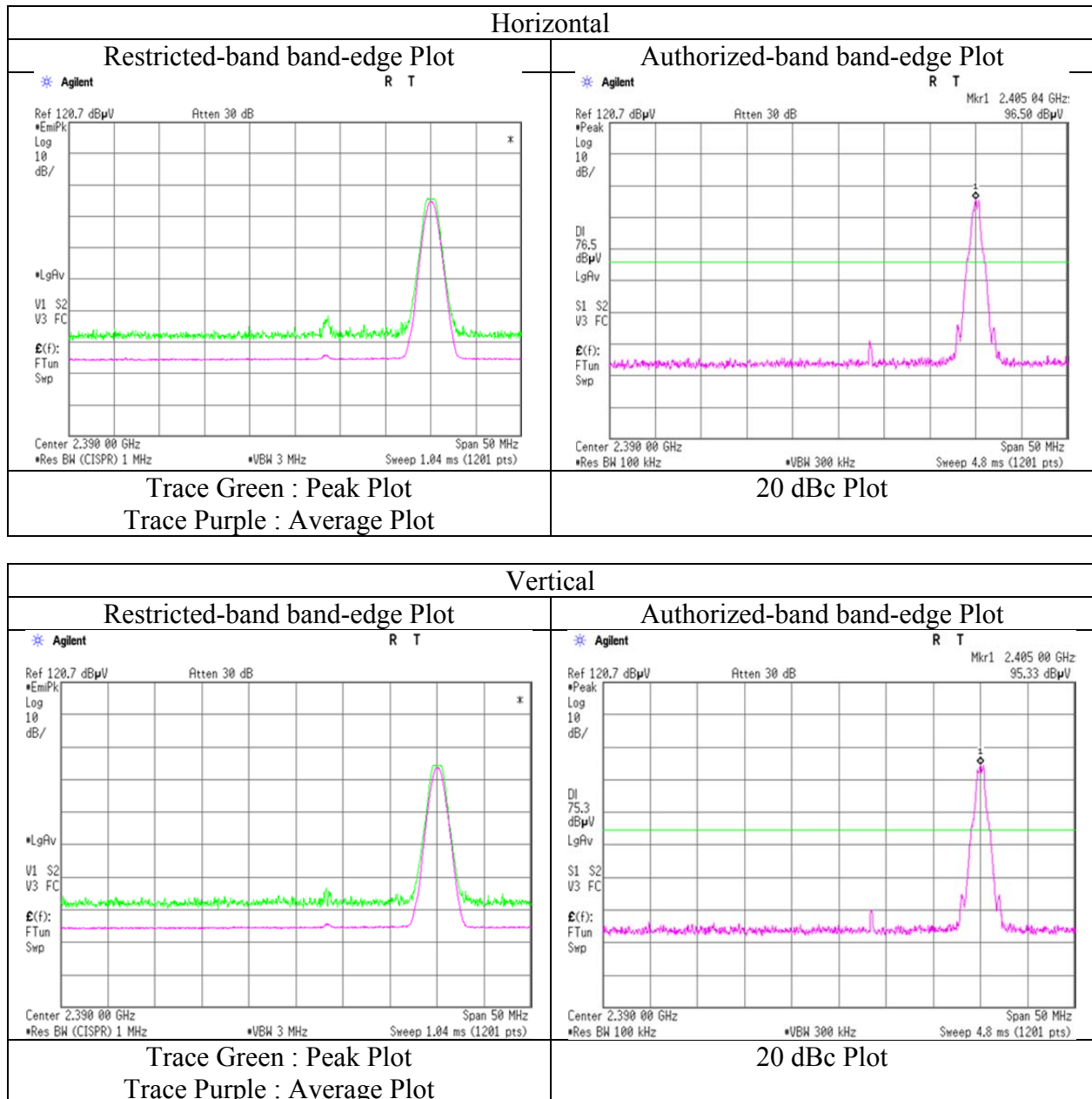
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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.	11392143S-B-R4
Date	September 21, 2016
Temperature / Humidity	24 deg. C / 56 % RH
Engineer	Takahiro Suzuki
Mode	Tx, 2405 MHz, Bow-tie Antenna



* 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. : 11392143S-B-R4
Date : September 21, 2016 September 22, 2016 September 23, 2016
Temperature / Humidity : 24 deg. C / 56 % RH 24 deg. C / 56 % RH 23 deg. C / 55 % RH
Engineer : Takahiro Suzuki Takahiro Suzuki Takahiro Suzuki
(1-13 GHz) (13-26.5 GHz) (30-1000 MHz)
Mode : Tx, 2440 MHz, Bow-tie Antenna

(* 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.	215.856	QP	35.87	16.51	8.21	32.03	0.00	28.56	43.50	14.94	156	86	
Hori.	217.861	QP	37.86	16.55	8.23	32.03	0.00	30.61	46.00	15.39	155	281	
Hori.	333.221	QP	36.18	14.59	8.87	31.94	0.00	27.70	46.00	18.30	138	260	
Hori.	384.720	QP	31.54	15.67	9.11	31.94	0.00	24.38	46.00	21.62	100	335	
Hori.	790.174	QP	33.58	20.90	10.67	31.61	0.00	33.54	46.00	12.46	138	187	
Hori.	899.324	QP	30.79	22.31	11.00	31.05	0.00	33.05	46.00	12.95	130	252	
Hori.	2337.596	PK	59.01	27.19	13.77	40.70	2.39	61.66	73.90	12.24	106	38	*1)
Hori.	2422.719	PK	60.00	27.54	13.85	40.70	2.39	63.08	73.90	10.82	120	264	*1)
Hori.	4880.000	PK	53.37	31.29	6.04	41.39	2.39	51.70	73.90	22.20	124	22	
Hori.	7320.000	PK	50.57	36.77	7.59	41.24	2.39	56.08	73.90	17.82	176	209	
Vert.	215.192	QP	37.07	16.50	8.21	32.03	0.00	29.75	43.50	13.75	100	181	
Vert.	784.538	QP	28.00	20.86	10.66	31.63	0.00	27.89	46.00	18.11	100	39	
Vert.	887.300	QP	26.43	22.15	10.96	31.12	0.00	28.42	46.00	17.58	100	138	
Vert.	2337.813	PK	57.12	27.20	13.77	40.70	2.39	59.78	73.90	14.12	130	314	*1)
Vert.	2422.372	PK	54.99	27.54	13.85	40.70	2.39	58.07	73.90	15.83	139	121	*1)
Vert.	2452.933	PK	57.93	27.67	13.87	40.69	2.39	61.17	73.90	12.73	127	104	*1)
Vert.	4880.000	PK	57.24	31.29	6.04	41.39	2.39	55.57	73.90	18.33	141	3	
Vert.	7320.000	PK	50.37	36.77	7.59	41.24	2.39	55.88	73.90	18.02	128	146	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2337.596	AV	40.13	27.19	13.77	40.70	2.93	2.39	45.71	53.90	8.19	*1)
Hori.	2422.719	AV	40.34	27.54	13.85	40.70	2.93	2.39	46.35	53.90	7.55	*1)
Hori.	4880.000	AV	40.07	31.29	6.04	41.39	2.93	2.39	41.33	53.90	12.57	
Hori.	7320.000	AV	38.12	36.77	7.59	41.24	2.93	2.39	46.56	53.90	7.34	
Vert.	2337.813	AV	39.07	27.20	13.77	40.70	2.93	2.39	44.66	53.90	9.24	*1)
Vert.	2422.372	AV	40.07	27.54	13.85	40.70	2.93	2.39	46.08	53.90	7.82	*1)
Vert.	2452.933	AV	40.01	27.67	13.87	40.69	2.93	2.39	46.18	53.90	7.72	*1)
Vert.	4880.000	AV	43.54	31.29	6.04	41.39	2.93	2.39	44.80	53.90	9.10	
Vert.	7320.000	AV	39.45	36.77	7.59	41.24	2.93	2.39	47.89	53.90	6.01	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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

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

Radiated Spurious Emission

Test place	Shonan EMC Lab No.3 Semi Anechoic Chamber		
Report No.	11392143S-B-R4		
Date	September 21, 2016	September 22, 2016	September 23, 2016
Temperature / Humidity	24 deg. C / 56 % RH	24 deg. C / 56 % RH	23 deg. C / 55 % RH
Engineer	Takahiro Suzuki	Takahiro Suzuki	Takahiro Suzuki
	(1-13 GHz)	(13-26.5 GHz)	(30-1000 MHz)
Mode	Tx, 2480 MHz, Bow-tie Antenna		

(* 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.	215.821	QP	35.99	16.51	8.21	32.03	0.00	28.68	43.50	14.82	162	294	
Hori.	217.878	QP	37.63	16.55	8.23	32.03	0.00	30.38	46.00	15.62	151	278	
Hori.	328.583	QP	37.04	14.50	8.84	31.95	0.00	28.43	46.00	17.57	138	221	
Hori.	387.264	QP	32.03	15.72	9.12	31.94	0.00	24.93	46.00	21.07	100	4	
Hori.	781.364	QP	32.75	20.83	10.65	31.65	0.00	32.58	46.00	13.42	142	177	
Hori.	888.718	QP	30.68	22.17	10.97	31.12	0.00	32.70	46.00	13.30	133	294	
Hori.	2483.500	PK	51.91	27.79	13.91	40.69	2.39	55.31	73.90	18.59	119	149	*1)
Hori.	2512.806	PK	58.00	27.87	13.93	40.70	2.39	61.49	73.90	12.41	119	266	*1)
Hori.	2580.559	PK	58.23	27.95	13.97	40.73	2.39	61.81	73.90	12.09	100	109	*1)
Hori.	4960.000	PK	56.44	31.45	6.06	41.23	2.39	55.11	73.90	18.79	100	46	
Hori.	7440.000	PK	50.59	37.11	7.63	41.37	2.39	56.35	73.90	17.55	100	210	
Vert.	215.213	QP	35.77	16.50	8.21	32.03	0.00	28.45	43.50	15.05	100	132	
Vert.	788.952	QP	28.16	20.89	10.67	31.62	0.00	28.10	46.00	17.90	100	17	
Vert.	885.345	QP	24.37	22.12	10.96	31.14	0.00	26.31	46.00	19.69	100	268	
Vert.	2453.313	PK	57.34	27.67	13.87	40.69	2.39	60.58	73.90	13.32	160	195	*1)
Vert.	2483.500	PK	54.28	27.79	13.91	40.69	2.39	57.68	73.90	16.22	207	166	*1)
Vert.	2512.865	PK	57.09	27.87	13.93	40.70	2.39	60.58	73.90	13.32	151	352	*1)
Vert.	4960.000	PK	57.07	31.45	6.06	41.23	2.39	55.74	73.90	18.16	112	200	
Vert.	7440.000	PK	50.15	37.11	7.63	41.37	2.39	55.91	73.90	17.99	100	163	

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

Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	33.25	27.79	13.91	40.69	2.93	2.39	39.58	53.90	14.32	*1)
Hori.	2512.806	AV	33.37	27.87	13.93	40.70	2.93	2.39	39.79	53.90	14.11	*1)
Hori.	2580.559	AV	32.47	27.95	13.97	40.73	2.93	2.39	38.98	53.90	14.92	*1)
Hori.	4960.000	AV	45.28	31.45	6.06	41.23	2.93	2.39	46.88	53.90	7.02	
Hori.	7440.000	AV	39.44	37.11	7.63	41.37	2.93	2.39	48.13	53.90	5.77	
Vert.	2453.313	AV	33.32	27.67	13.87	40.69	2.93	2.39	39.49	53.90	14.41	*1)
Vert.	2483.500	AV	37.11	27.79	13.91	40.69	2.93	2.39	43.44	53.90	10.46	*1)
Vert.	2512.865	AV	38.00	27.87	13.93	40.70	2.93	2.39	44.42	53.90	9.48	*1)
Vert.	4960.000	AV	46.41	31.45	6.06	41.23	2.93	2.39	48.01	53.90	5.89	
Vert.	7440.000	AV	39.11	37.11	7.63	41.37	2.93	2.39	47.80	53.90	6.10	

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 (3.95 m / 3.0 m) = 2.39 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

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

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

UL Japan, Inc.

Shonan EMC Lab

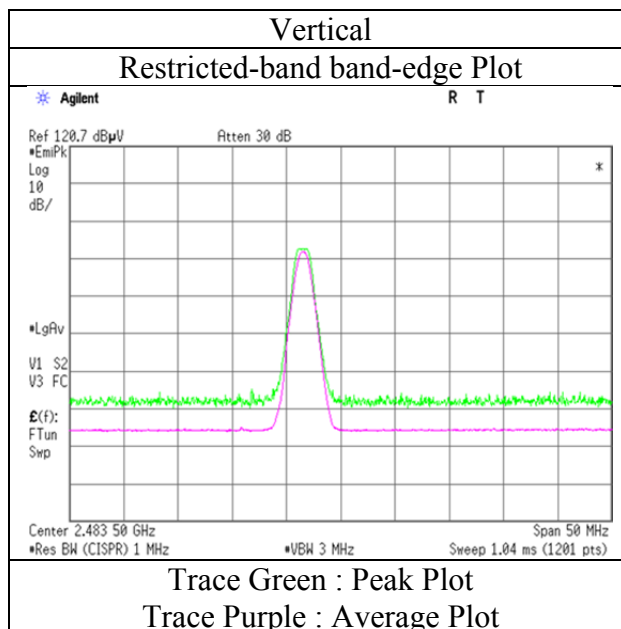
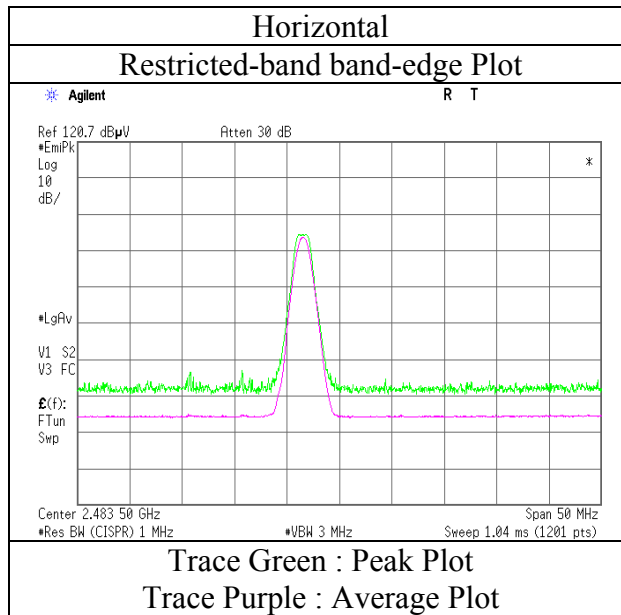
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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.	11392143S-B-R4
Date	September 21, 2016
Temperature / Humidity	24 deg. C / 56 % RH
Engineer	Takahiro Suzuki
Mode	Tx, 2480 MHz, Bow-tie Antenna



* 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.	11392143S-B-R4		
Date	September 28, 2016	September 29, 2016	January 26, 2017
Temperature / Humidity	22 deg. C / 73 % RH	24 deg. C / 67 % RH	24 deg. C / 32 % RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Hiroyuki Morikawa
	(1-2.8 GHz)	(2.8-26.5 GHz)	(30-1000 MHz)
Test place	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Mode	Tx, 2405 MHz, MR-ANT1		

(* 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.	181.793	QP	22.50	16.28	7.95	32.06	0.00	14.67	43.50	28.8	100	0	
Hori.	2390.000	PK	47.89	27.21	13.79	40.70	2.48	50.67	73.90	23.2	159	176	
Hori.	4810.000	PK	52.03	31.14	5.93	41.53	2.48	50.05	73.90	23.8	171	61	
Hori.	7215.000	PK	46.39	36.26	7.15	41.13	2.48	51.15	73.90	22.7	134	63	
Hori.	9620.000	PK	45.36	38.15	8.04	40.49	2.48	53.54	73.90	20.3	100	0	
Vert.	66.663	QP	31.60	6.79	6.73	32.16	0.00	12.96	40.00	27.0	100	285	
Vert.	69.335	QP	30.70	6.39	6.88	32.16	0.00	11.81	40.00	28.1	100	269	
Vert.	71.999	QP	35.80	6.27	7.10	32.16	0.00	17.01	40.00	22.9	100	279	
Vert.	74.669	QP	30.90	6.24	7.32	32.16	0.00	12.30	40.00	27.7	100	284	
Vert.	77.333	QP	31.30	6.22	7.52	32.15	0.00	12.89	40.00	27.1	100	288	
Vert.	2390.000	PK	48.20	27.21	13.79	40.70	2.48	50.98	73.90	22.9	171	352	
Vert.	4810.000	PK	49.63	31.14	5.93	41.53	2.48	47.65	73.90	26.2	174	124	
Vert.	7215.000	PK	45.19	36.26	7.15	41.13	2.48	49.95	73.90	23.9	175	107	
Vert.	9620.000	PK	44.63	38.15	8.04	40.49	2.48	52.81	73.90	21.0	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 (3.99 m / 3.0 m) = 2.48 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	36.49	27.21	13.79	40.70	2.93	2.48	42.20	53.90	11.7	*1)
Hori.	4810.000	AV	41.21	31.14	5.93	41.53	2.93	2.48	42.16	53.90	11.7	
Hori.	7215.000	AV	37.76	36.26	7.15	41.13	2.93	2.48	45.45	53.90	8.4	
Hori.	9620.000	AV	35.51	38.15	8.04	40.49	2.93	2.48	46.62	53.90	7.3	
Vert.	2390.000	AV	36.25	27.21	13.79	40.70	2.93	2.48	41.96	53.90	11.9	*1)
Vert.	4810.000	AV	40.44	31.14	5.93	41.53	2.93	2.48	41.39	53.90	12.5	
Vert.	7215.000	AV	37.18	36.26	7.15	41.13	2.93	2.48	44.87	53.90	9.0	
Vert.	9620.000	AV	35.63	38.15	8.04	40.49	2.93	2.48	46.74	53.90	7.2	

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 (3.99 m / 3.0 m) = 2.48 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

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

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

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2405.000	PK	83.68	27.26	13.80	40.70	2.48	86.52	-	-	Carrier
Hori.	2400.000	PK	36.60	27.25	13.80	40.70	2.48	39.43	66.52	27.1	
Vert.	2405.000	PK	85.93	27.26	13.80	40.70	2.48	88.77	-	-	Carrier
Vert.	2400.000	PK	37.17	27.25	13.80	40.70	2.48	40.00	68.77	28.8	

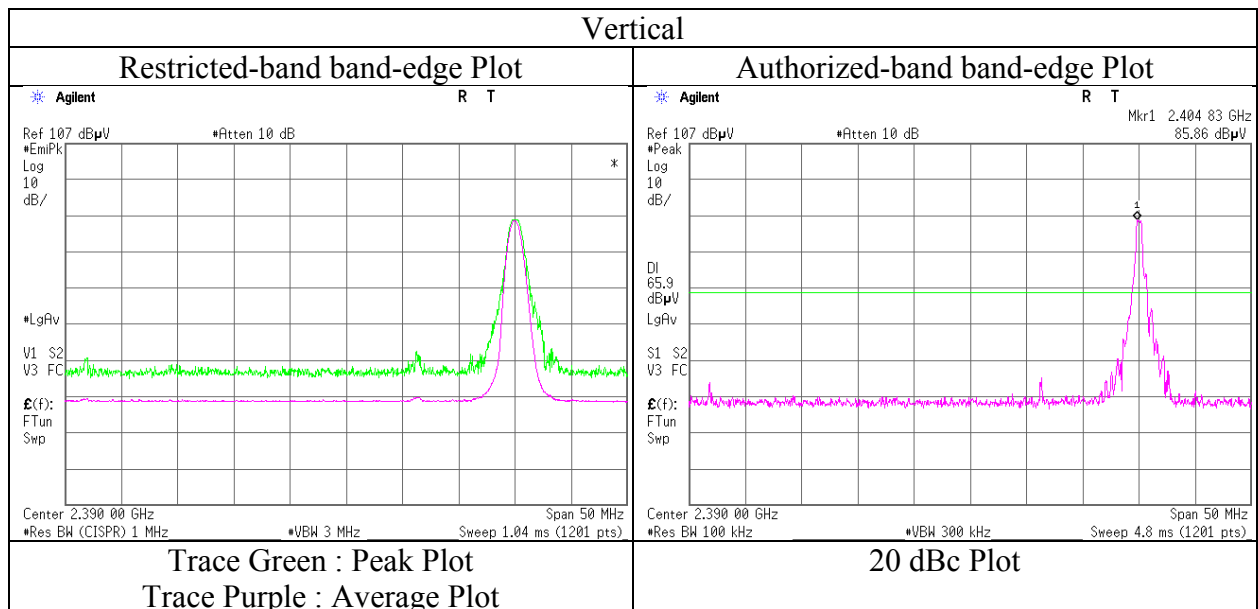
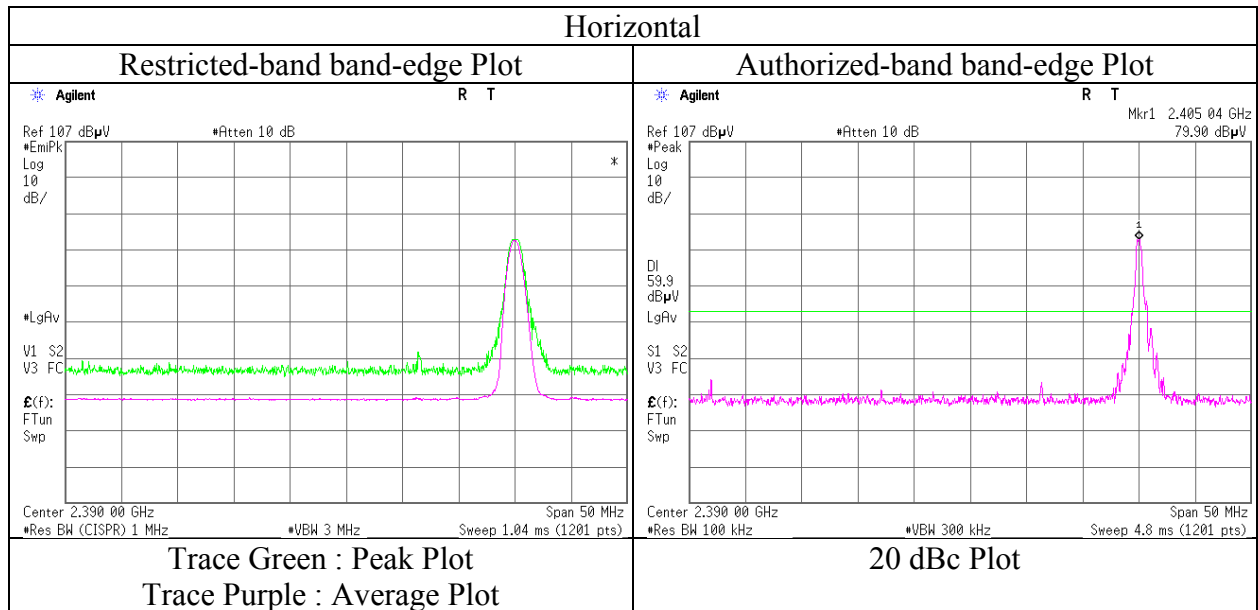
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : 20log (3.99 m / 3.0 m) = 2.48 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab No1 Semi Anechoic Chamber
Report No.	11392143S-B-R4
Date	September 28, 2016
Temperature / Humidity	22 deg. C / 73 % RH
Engineer	Yasumasa Owaki
Mode	Tx, 2405 MHz, MR-ANT1



* 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.	11392143S-B-R4		
Date	September 28, 2016	September 29, 2016	January 26, 2017
Temperature / Humidity	22 deg. C / 73 % RH	24 deg. C / 67 % RH	24 deg. C / 32 % RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Hiroyuki Morikawa
	(1-2.8 GHz)	(2.8-26.5 GHz)	(30-1000 MHz)
Test place	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Mode	Tx, 2440 MHz, MR-ANT1		

(* 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.	163.753	QP	21.90	15.56	8.00	32.08	0.00	13.38	43.50	30.1	100	0	
Hori.	4880.000	PK	51.52	31.29	5.96	41.39	2.48	49.86	73.90	24.0	174	52	
Hori.	7320.000	PK	47.26	36.40	7.17	41.24	2.48	52.07	73.90	21.8	149	60	
Hori.	9760.000	PK	43.93	38.35	8.10	40.41	2.48	52.45	73.90	21.4	100	0	
Vert.	61.335	QP	28.60	7.60	6.68	32.16	0.00	10.72	40.00	29.2	100	291	
Vert.	66.663	QP	31.60	6.79	6.73	32.16	0.00	12.96	40.00	27.0	100	291	
Vert.	72.003	QP	35.90	6.27	7.10	32.16	0.00	17.11	40.00	22.8	100	289	
Vert.	74.665	QP	31.00	6.24	7.32	32.16	0.00	12.40	40.00	27.6	100	292	
Vert.	77.336	QP	31.30	6.22	7.52	32.15	0.00	12.89	40.00	27.1	100	293	
Vert.	4880.000	PK	49.75	31.29	5.96	41.39	2.48	48.09	73.90	25.8	186	136	
Vert.	7320.000	PK	47.01	36.40	7.17	41.24	2.48	51.82	73.90	22.0	150	188	
Vert.	9760.000	PK	44.31	38.35	8.10	40.41	2.48	52.83	73.90	21.0	100	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.99\text{ m} / 3.0\text{ m}) = 2.48\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4880.000	AV	39.18	31.29	5.96	41.39	2.93	2.48	40.45	53.90	13.4	
Hori.	7320.000	AV	38.34	36.40	7.17	41.24	2.93	2.48	46.08	53.90	7.8	
Hori.	9760.000	AV	35.76	38.35	8.10	40.41	2.93	2.48	47.21	53.90	6.7	
Vert.	4880.000	AV	38.59	31.29	5.96	41.39	2.93	2.48	39.86	53.90	14.0	
Vert.	7320.000	AV	37.62	36.40	7.17	41.24	2.93	2.48	45.36	53.90	8.5	
Vert.	9760.000	AV	35.51	38.35	8.10	40.41	2.93	2.48	46.96	53.90	6.9	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.99\text{ m} / 3.0\text{ m}) = 2.48\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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

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

Radiated Spurious Emission

Test place	Shonan EMC Lab No.1, 3 Semi Anechoic Chamber		
Report No.	11392143S-B-R4		
Date	September 28, 2016	September 29, 2016	January 26, 2017
Temperature / Humidity	22 deg. C / 73 % RH	24 deg. C / 67 % RH	24 deg. C / 32 % RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Hiroyuki Morikawa
	(1-2.8 GHz)	(2.8-26.5 GHz)	(30-1000 MHz)
Test place	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Mode	Tx, 2480 MHz, MR-ANT1		

(* 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.	161.826	QP	22.30	15.47	7.99	32.08	0.00	13.68	43.50	29.8	100	0	
Hori.	2483.500	PK	50.47	27.52	13.88	40.69	2.48	53.66	73.90	20.2	184	151	
Hori.	4960.000	PK	49.34	31.45	5.99	41.23	2.48	48.03	73.90	25.8	150	182	
Hori.	7440.000	PK	47.60	36.57	7.19	41.37	2.48	52.47	73.90	21.4	166	60	
Hori.	9920.000	PK	44.78	38.58	8.18	40.32	2.48	53.70	73.90	20.2	100	0	
Vert.	66.669	QP	31.70	6.79	6.73	32.16	0.00	13.06	40.00	26.9	100	288	
Vert.	69.335	QP	30.70	6.39	6.88	32.16	0.00	11.81	40.00	28.1	100	280	
Vert.	71.999	QP	35.80	6.27	7.10	32.16	0.00	17.01	40.00	22.9	100	286	
Vert.	74.667	QP	31.00	6.24	7.32	32.16	0.00	12.40	40.00	27.6	100	288	
Vert.	77.336	QP	31.20	6.22	7.52	32.15	0.00	12.79	40.00	27.2	100	289	
Vert.	2483.500	PK	52.73	27.52	13.88	40.69	2.48	55.92	73.90	17.9	142	341	
Vert.	4960.000	PK	48.77	31.45	5.99	41.23	2.48	47.46	73.90	26.4	188	114	
Vert.	7440.000	PK	46.28	36.57	7.19	41.37	2.48	51.15	73.90	22.7	179	284	
Vert.	9920.000	PK	45.02	38.58	8.18	40.32	2.48	53.94	73.90	19.9	100	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.99\text{ m} / 3.0\text{ m}) = 2.48\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	36.75	27.52	13.88	40.69	2.93	2.48	42.87	53.90	11.0	*1)
Hori.	4960.000	AV	38.22	31.45	5.99	41.23	2.93	2.48	39.84	53.90	14.1	
Hori.	7440.000	AV	38.65	36.57	7.19	41.37	2.93	2.48	46.45	53.90	7.4	
Hori.	9920.000	AV	35.19	38.58	8.18	40.32	2.93	2.48	47.04	53.90	6.9	
Vert.	2483.500	AV	36.87	27.52	13.88	40.69	2.93	2.48	42.99	53.90	10.9	*1)
Vert.	4960.000	AV	38.17	31.45	5.99	41.23	2.93	2.48	39.79	53.90	14.1	
Vert.	7440.000	AV	37.58	36.57	7.19	41.37	2.93	2.48	45.38	53.90	8.5	
Vert.	9920.000	AV	35.17	38.58	8.18	40.32	2.93	2.48	47.02	53.90	6.9	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.99\text{ m} / 3.0\text{ m}) = 2.48\text{ dB}$

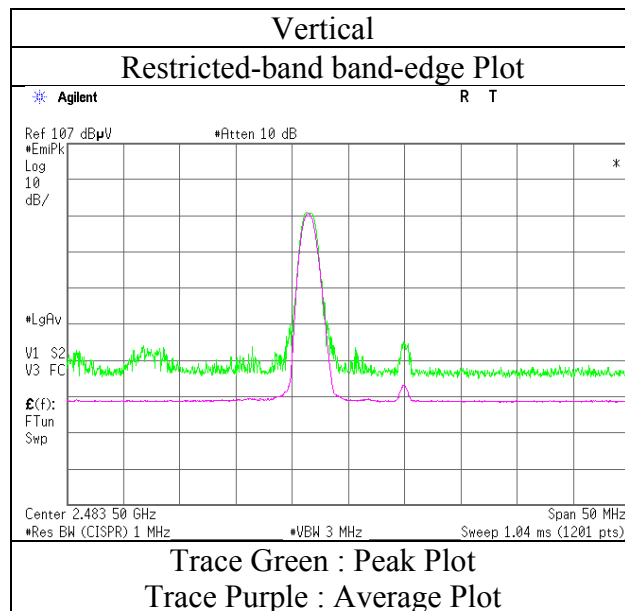
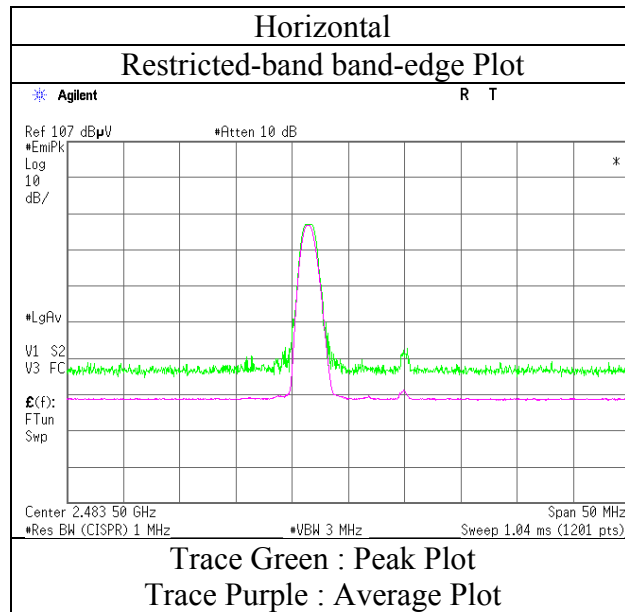
13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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

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

Radiated Spurious Emission
(Reference Plot for band-edge)

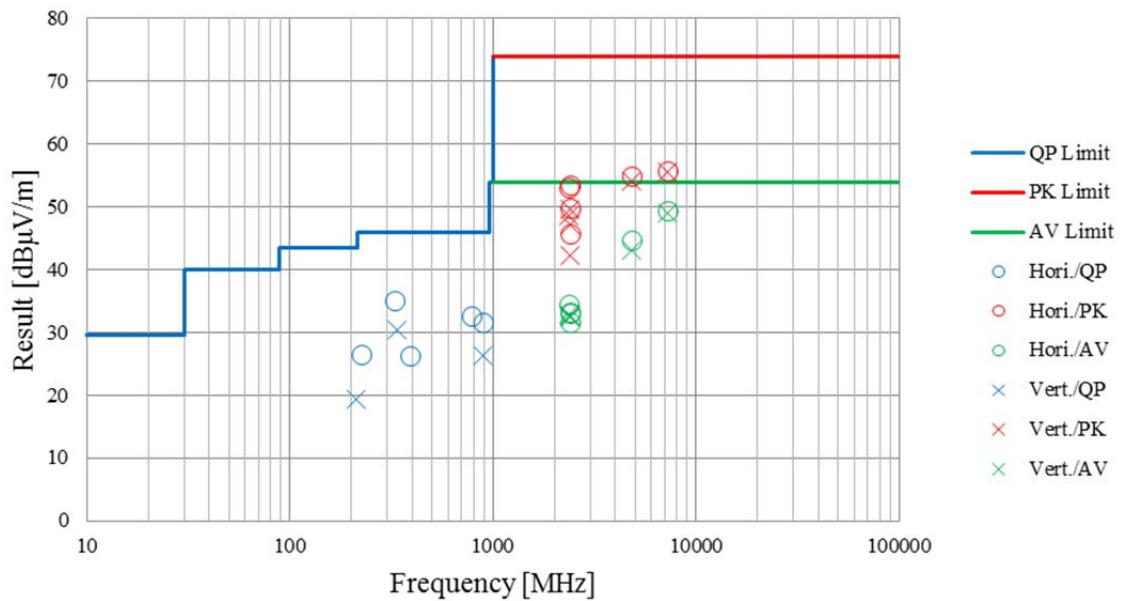
Test place : Shonan EMC Lab No.1 Semi Anechoic Chamber
Report No. : 11392143S-B-R4
Date : September 28, 2016
Temperature / Humidity : 22 deg. C / 73 % RH
Engineer : Yasumasa Owaki
Mode : Tx, 2480 MHz, MR-ANT1



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

Radiated Spurious Emission **(Plot data, Worst case)**

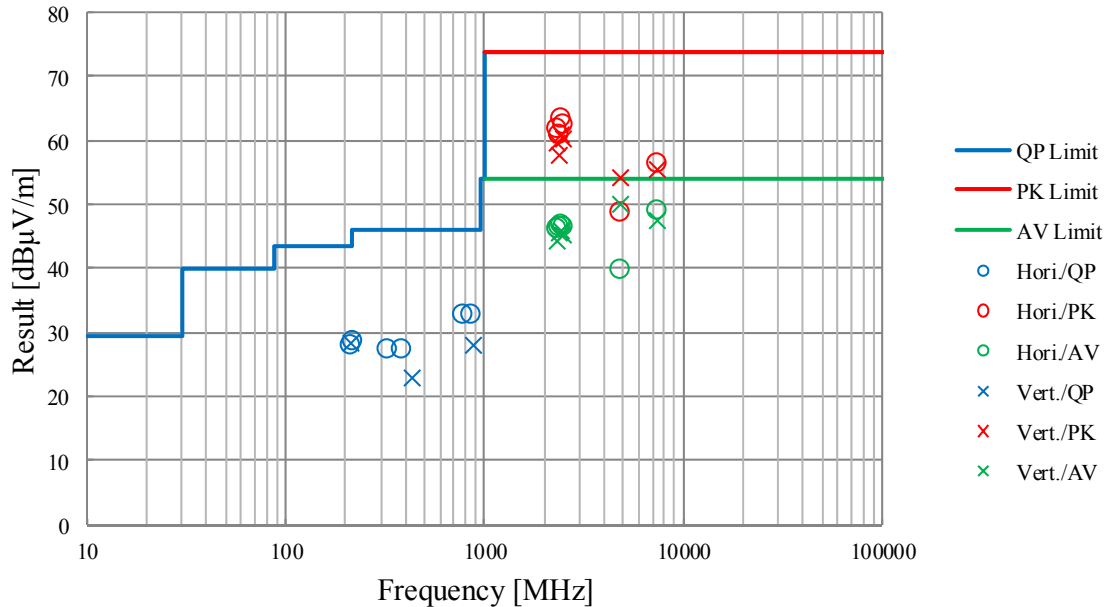
Test place	Shonan EMC Lab No.3 Semi Anechoic Chamber		
Report No.	11392143S-B-R4		
Date	September 20, 2016	September 22, 2016	September 23, 2016
Temperature / Humidity	24 deg. C / 56 % RH	24 deg. C / 56 % RH	23 deg. C / 55 % RH
Engineer	Kenichi Adachi	Takahiro Suzuki	Takahiro Suzuki
	(1-13 GHz)	(13-26.5 GHz)	(30-1000 MHz)
Mode	Tx, 2405 MHz, Monopole antenna(Chip antenna)		



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

Radiated Spurious Emission **(Plot data, Worst case)**

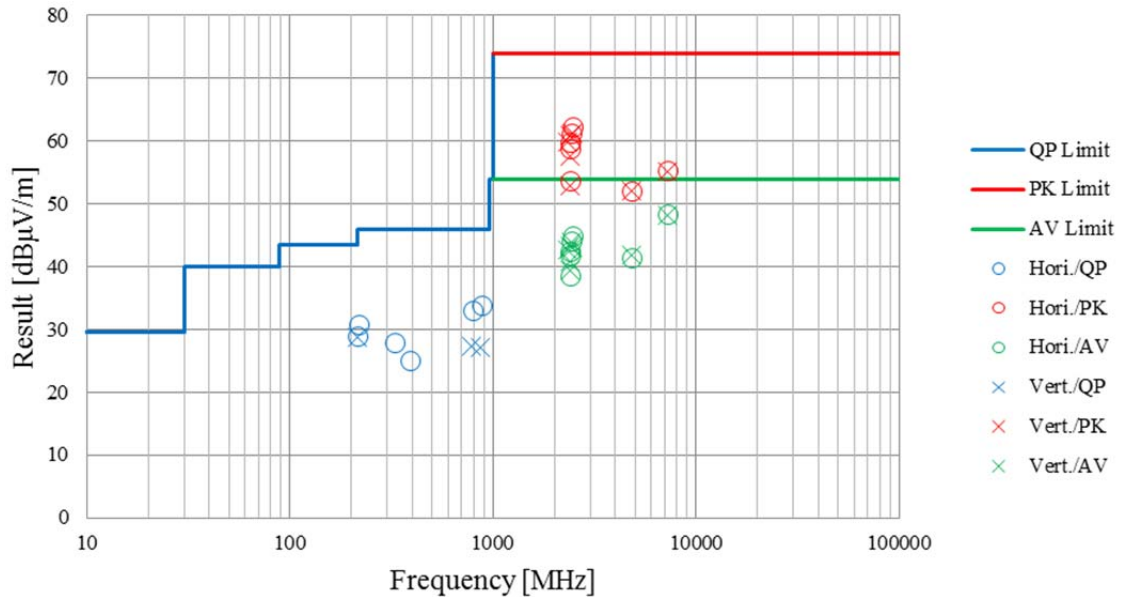
Test place	Shonan EMC Lab No.3 Semi Anechoic Chamber		
Report No.	11392143S-B-R4		
Date	September 21, 2016	September 22, 2016	September 23, 2016
Temperature / Humidity	24 deg. C / 56 % RH	24 deg. C / 56 % RH	23 deg. C / 55 % RH
Engineer	Kenichi Adachi (1-13 GHz)	Takahiro Suzuki (13-26.5 GHz)	Takahiro Suzuki (30-1000 MHz)
Mode	Tx, 2440 MHz, Dipole antenna		



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

Radiated Spurious Emission **(Plot data, Worst case)**

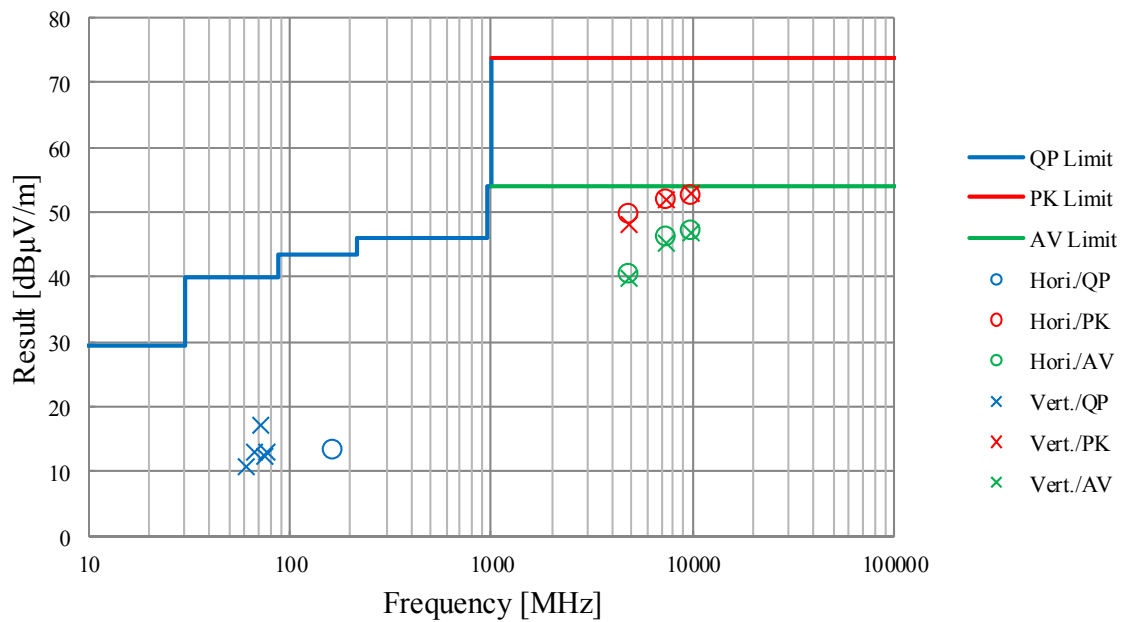
Test place	Shonan EMC Lab No.3 Semi Anechoic Chamber		
Report No.	11392143S-B-R4		
Date	September 20, 2016	September 22, 2016	September 23, 2016
Temperature / Humidity	24 deg. C / 56 % RH	24 deg. C / 56 % RH	23 deg. C / 55 % RH
Engineer	Kenichi Adachi (1-13 GHz)	Takahiro Suzuki (13-26.5 GHz)	Takahiro Suzuki (30-1000 MHz)
Mode	Tx, 2405 MHz, Bow-tie antenna		



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

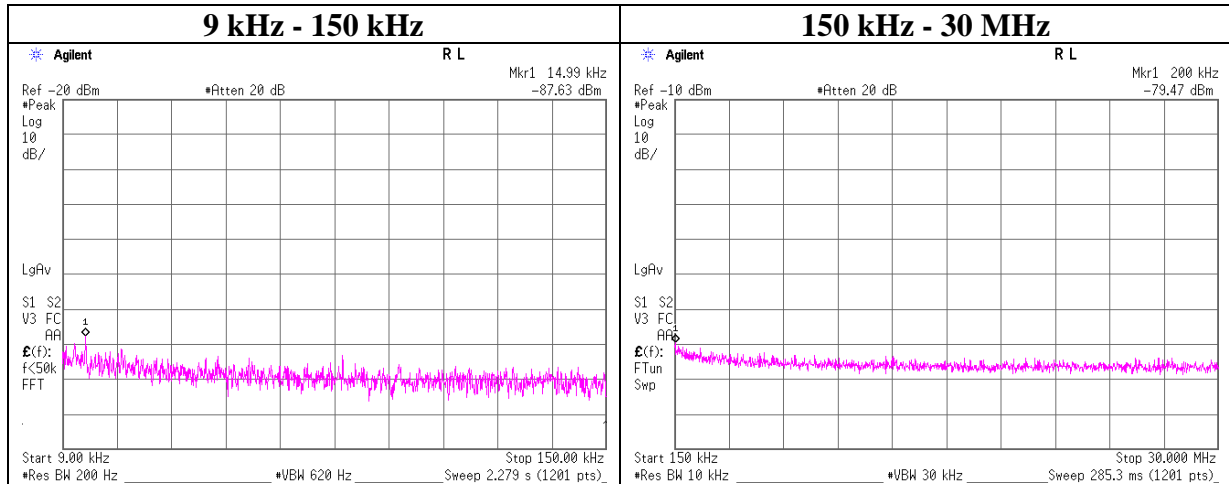
Radiated Spurious Emission **(Plot data, Worst case)**

Test place	Shonan EMC Lab No.1, 3 Semi Anechoic Chamber		
Report No.	11392143S-B-R4		
Date	September 28, 2016	September 29, 2016	January 26, 2017
Temperature / Humidity	22 deg. C / 73 % RH	24 deg. C / 67 % RH	24 deg. C / 32 % RH
Engineer	Yasumasa Owaki (1-2.8 GHz)	Yasumasa Owaki (2.8-26.5 GHz)	Hiroyuki Morikawa (30-1000 MHz)
Test place	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Mode	Tx, 2440 MHz, MR-ANT1		



Conducted Spurious Emission

Test place : Shonan EMC Lab No.3 Shielded Room
Report No. : 11392143S-B-R4
Date : September 20, 2016
Temperature / Humidity : 24 deg. C / 60 % RH
Engineer : Hiroyuki Morikawa
Mode : Tx 2405 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
14.99	-87.6	0.01	9.8	2.0	1	-75.8	300	6.0	-14.5	44.0	58.5	
200.00	-79.5	0.02	9.8	2.0	1	-67.6	300	6.0	-6.4	21.5	27.9	

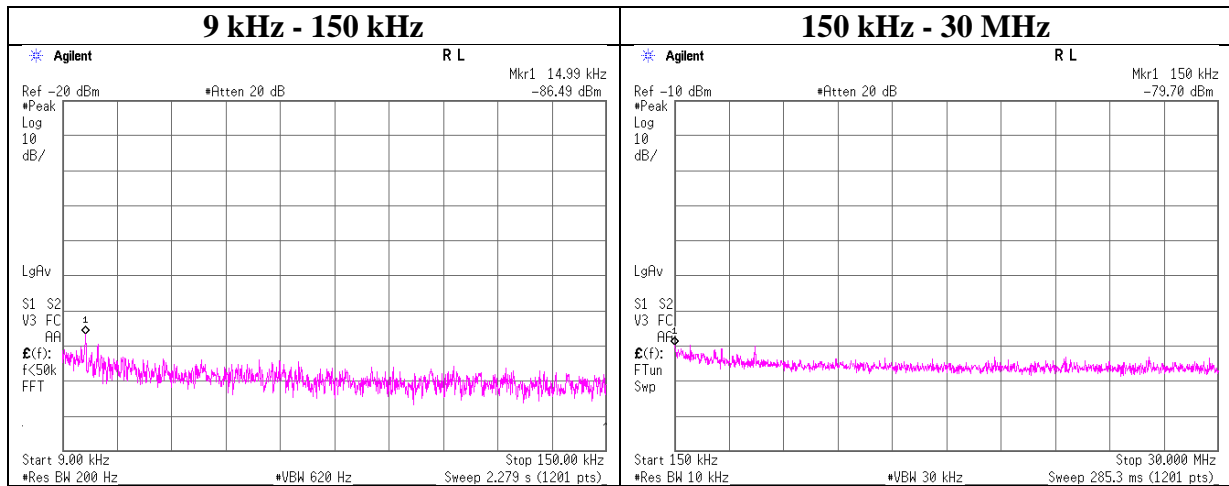
E = EIRP - 20 log (D) + Ground bounce + 104.8 [dBuV/m]

EIRP = Reading + Cable Loss + Attenuator Loss + Antenna Gain + 10 * log (N)

*If antenna gain is less than 2.0 dBi, 2.0 dBi is applied to the test result based on KDB 558074.

Conducted Spurious Emission

Test place	Shonan EMC Lab No.3 Shielded Room
Report No.	11392143S-B-R4
Date	September 20, 2016
Temperature / Humidity	24 deg. C / 60 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx 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
14.99	-86.5	0.01	9.8	2.0	1	-74.6	300	6.0	-13.4	44.0	57.4	
150.00	-79.7	0.02	9.8	2.0	1	-67.8	300	6.0	-6.6	24.0	30.6	

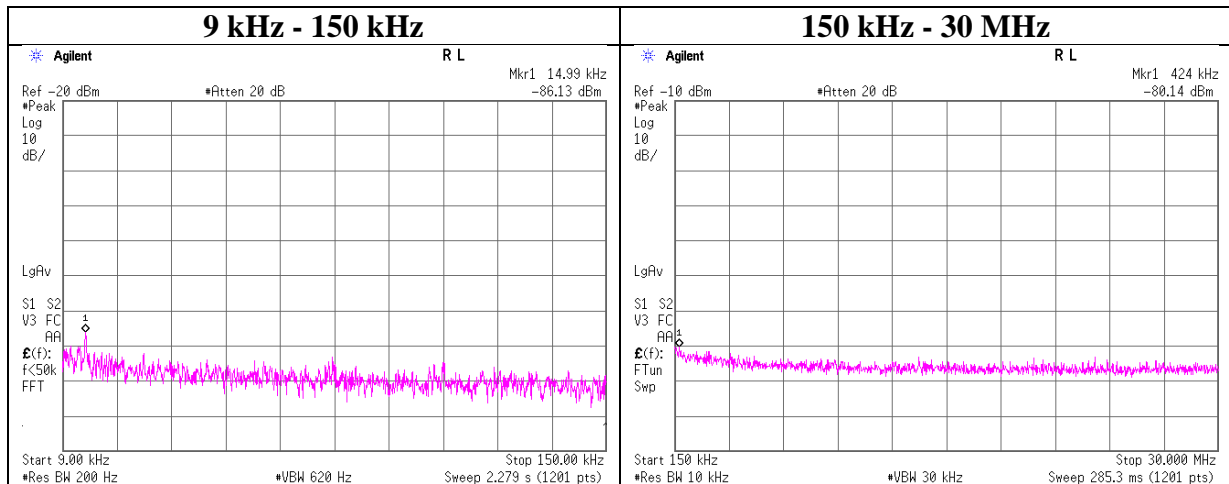
$E = \text{EIRP} - 20 \log(D) + \text{Ground bounce} + 104.8 \text{ [dBuV/m]}$

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

*If antenna gain is less than 2.0 dBi, 2.0 dBi is applied to the test result based on KDB 558074.

Conducted Spurious Emission

Test place : Shonan EMC Lab No.3 Shielded Room
Report No. : 11392143S-B-R4
Date : September 20, 2016
Temperature / Humidity : 24 deg. C / 60 % RH
Engineer : Hiroyuki Morikawa
Mode : Tx 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
14.99	-86.1	0.01	9.8	2.0	1	-74.3	300	6.0	-13.0	44.0	57.0	
424.00	-79.5	0.02	9.8	2.0	1	-67.6	300	6.0	-6.4	15.0	21.4	

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

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

*If antenna gain is less than 2.0 dBi, 2.0 dBi is applied to the test result based on KDB 558074.

Power Density

Test place Shonan EMC Lab No.3 Shielded Room
Report No. 11392143S-B-R4
Date September 20, 2016
Temperature / Humidity 24 deg. C / 60 % RH
Engineer Hiroyuki Morikawa
Mode Tx

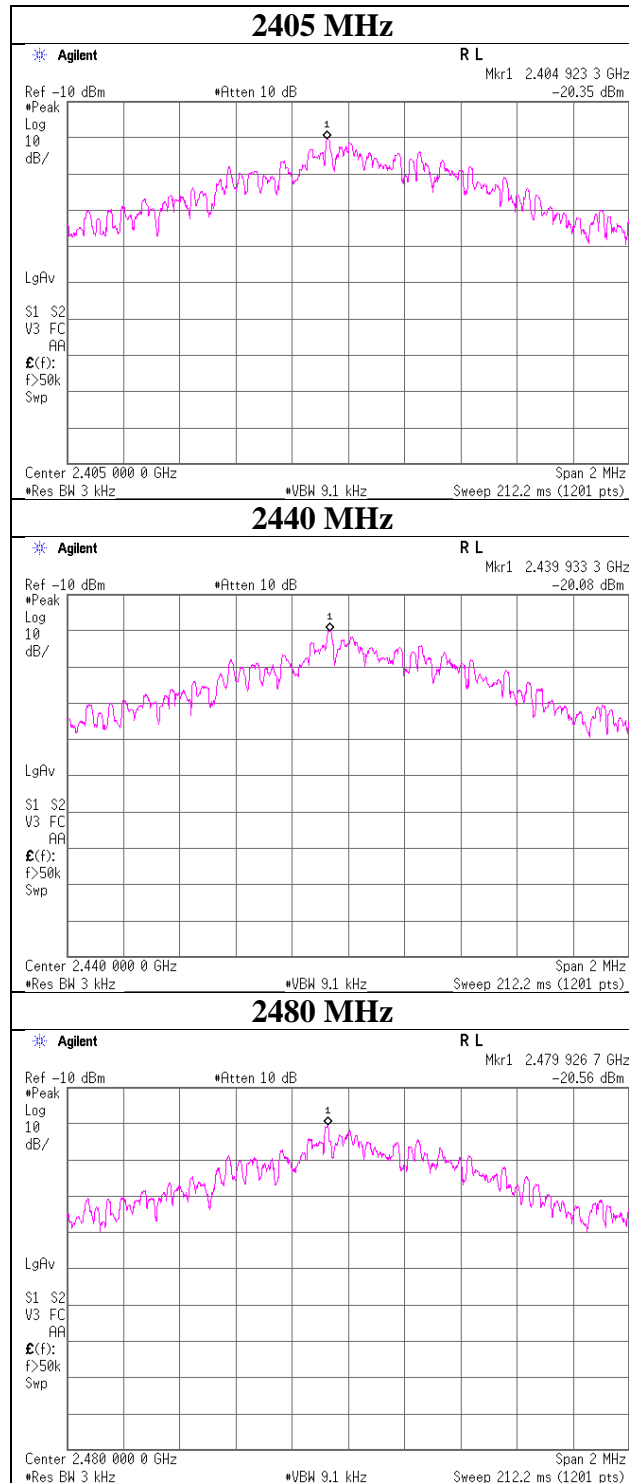
Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2405.00	-20.35	1.84	9.92	-8.59	8.00	16.59
2440.00	-20.08	1.83	9.92	-8.33	8.00	16.33
2480.00	-20.56	1.84	9.92	-8.80	8.00	16.80

Sample Calculation:

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

Power Density

Tx



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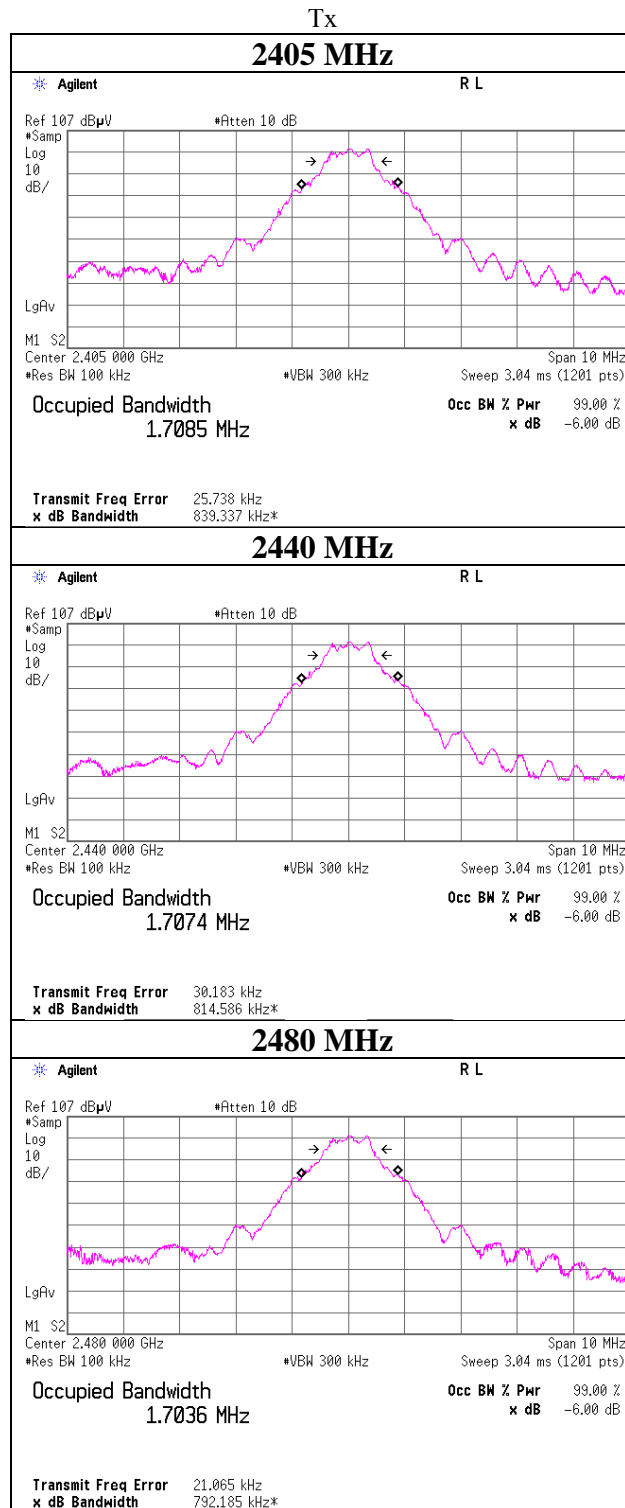
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

99 % Occupied Bandwidth

Test place	Shonan EMC Lab No.3 Shielded Room
Report No.	11392143S-B-R4
Date	September 20, 2016
Temperature / Humidity	24 deg. C / 60 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx



APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY482501 52	AT	2015/09/16 * 12 *1)
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2016/04/01 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2016/04/01 * 12
SAT10-10	Attenuator	Weinschel Corp.	54A-10	37584	AT	2016/04/18 * 12
SCC-G13	Coaxial Cable	Suhner	SUCOFLEX 102	31599/2	AT	2016/03/23 * 12
SCC-H13	Microwave cable	RS Pro	R-132G7210 100CO	-	AT	2016/04/18 * 12
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE,AT,CE	2015/11/18 * 12 *1)
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	AT	2015/12/07 * 12 *1)
SAEC-03(SVS WR)	Semi-Anechoic Chamber	TDK	SAEC-03(SV SWR)	3	RE	2016/07/25 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2016/08/22 * 12
SAJ-01	Antenna Tilt Jig	Intelligent System Engineering Co., Ltd	Antenna Tilt Jig	T-S001	RE	Pre Check
SCC-G04	Coaxial Cable	Junkosha	J12J102207-0 0	JUN-12-14- 018	RE	2016/06/23 * 12
SAT10-05	Attenuator(above1GH z)	Agilent	8493C-010	74864	RE	2015/11/04 * 12 *1)
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2015/11/16 * 12 *1)
KAF-02	Pre Amplifier	Hewlett Packard	8449B	3008A0126 8	RE	2016/04/22 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2016/05/11 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY482501 06	RE	2016/03/23 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,M F)	-	RE,CE	-
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2015/10/22 * 12 *1)
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2015/11/18 * 12 *1)
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY482501 06	RE	2016/03/23 * 12
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2016/03/22 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2016/03/15 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2016/03/23 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	RE	2016/03/08 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NS A)	3	RE	2016/07/15 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2015/10/11 * 12 *1)
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108 A	UHALP 9108-A 0901	RE	2015/10/11 * 12 *1)
SAT6-08	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	RE	2016/08/04 * 12
SCC-C1/C2/C3 /C4/C5/C10/SR SE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Su hner/Suhner/Suhner/Su hner/TOYO	8D2W/12DSF A/141PE/141 PE/141PE/14 1PE/NS4906	-/0901-271(RF Selector)	RE	2016/04/22 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2016/02/25 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE,CE	2016/03/28 * 12
SJM-15	Measure	ASKUL	-	-	RE,CE	-

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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

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SCC-C9/C10/S RSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141 PE/NS4906	-/0901-271(RF Selector)	CE	2016/04/22 * 12
SAT3-07	Attenuator	JFW	50HF-003N	-	CE	2015/09/18 * 12 *1)
SLS-05	LISN	Rohde & Schwarz	ENV216	100516	CE	2016/02/09 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2015/12/07 * 12*1)
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NS A)	3	RE	2016/07/15 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2016/10/18 * 12
SLA-01	Logperiodic Antenna	Schwarzbeck	UHALP9108 A	UHALP 9108-A 0888	RE	2016/10/15 * 12
SAT6-08	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	RE	2016/08/04 * 12
SCC-C1/C2/C3 /C4/C5/C10/SR SE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suh ner/Suhner/Suhner/Su hner/TOYO	8D2W/12DSF A/141PE/141 PE/141PE/14 1PE/NS4906	-/0901-271(RF Selector)	RE	2016/04/22 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2016/02/25 * 12
STR-07	Test Receiver	Rohde & Schwarz	ESU26	100484	RE	2016/09/28 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2016/10/12 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2016/10/17 * 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.

*1) This test equipment was used for the tests before the expiration date of the calibration.

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