



RADIO TEST REPORT

Test Report No. : 11182619H-B-R2

Applicant : silex technology, Inc.
Type of Equipment : SDIO Wireless Module
Model No. : SX-SDMAC
FCC ID : N6C-SDMAC
Test regulation : FCC Part 15 Subpart C: 2016
(Bluetooth part)
Test Result : Complied

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4. The test results in this report are traceable to the national or international standards.
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6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. This report is a revised version of 11182619H-B-R1. 11182619H-B-R1 is replaced with this report.

Date of test: March 29 to September 23, 2016

Representative test engineer:


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Approved by:


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13-EM-F0429

REVISION HISTORY

Original Test Report No.: 11182619H-B

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SECTION 1: Customer information

Company Name	:	silex technology, Inc.
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Contact Person	:	Toshiro Kometani

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

2.1 Identification of E.U.T.

Type of Equipment	:	SDIO Wireless Module
Model No.	:	SX-SDMAC
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 3.3 V
Receipt Date of Sample	:	March 7, 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: SX-SDMAC (referred to as the EUT in this report) is a SDIO Wireless Module.

General Specification

Clock frequency(ies) in the system : 48 MHz
 Operating Temperature : -40 deg. C - +85 deg. C

Radio Specification

Radio Type : Transceiver
 Method of Frequency Generation : Synthesizer
 Power Supply (inner) : DC 1.1 V

	IEEE802.11b	IEEE802.11g/n (20 M band)	IEEE802.11a/n/ac (20 M band)	IEEE802.11n/ac (40 M band)	IEEE802.11ac (80 M band)	Bluetooth Ver.4.0 with EDR function
Frequency of operation	2412 MHz - 2462 MHz	2412 MHz - 2462 MHz	2412 MHz - 2462 MHz 5180 MHz - 5240 MHz 5260 MHz - 5320 MHz 5500 MHz - 5700 MHz 5745 MHz - 5825 MHz	2422 MHz - 2452 MHz 5190 MHz - 5230 MHz 5270 MHz - 5310 MHz 5510 MHz - 5670 MHz 5755 MHz - 5795 MHz	5210 MHz 5290 MHz 5530 MHz - 5610 MHz 5775 MHz	2402 MHz - 2480 MHz *1)
Type of modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (64QAM, 16QAM, QPSK, BPSK)	11a/n: OFDM (64QAM, 16QAM, QPSK, BPSK) 11ac: OFDM (64QAM, 16QAM, QPSK, BPSK, 256QAM)			BT: FHSS (GFSK, $\pi/4$ -DQPSK, 8-DPSK) LE: GFSK
Channel spacing	5 MHz		20 MHz	40 MHz	80 MHz	BT: 1 MHz LE: 2 MHz
Antenna type	[Antenna 1] Model Name: 146153 PCB antenna (Dipole antenna) [Antenna 2] Model Name: H2U84W1H1S Chip Antenna					
Antenna Connector type	Antenna 1: U.FL Alternative connectorUFL Antenna 2: -none					
Antenna Gain	Antenna 1: 3.25 dBi (2.4 GHz Band), 5.0 dBi (5 GHz Band) Antenna 2: 1.40 dBi (2.4 GHz Band), 2.3 dBi (5 GHz Band)					

*1) This test report applies to Bluetooth Ver.4.1 with EDR function (2402 MHz - 2480 MHz).

* Spurious emission test was performed with two antenna type (PCB antenna (Dipole antenna) and chip antenna).

** WLAN and Bluetooth do not transmit simultaneously.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC part 15 final revised on April 6, 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

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	QP 14.7 dB 0.43940 MHz, N/ 0.43730 MHz, N AV 10.4 dB 0.43730 MHz, N	Complied	-
Carrier Frequency Separation	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) IC: RSS-247 5.1 (2)	See data.	Complied	Conducted
20dB Bandwidth	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) IC: RSS-247 5.1 (1)		Complied	Conducted
Number of Hopping Frequency	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) IC: RSS-247 5.1 (4)		Complied	Conducted
Dwell time	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) IC: RSS-247 5.1 (4)		Complied	Conducted
Maximum Peak Output Power	FCC: FCC Public Notice DA 00-705 IC: RSS-Gen 6.12	FCC: Section15.247(a)(b)(1) IC: RSS-247 5.4 (2)		Complied	Conducted
Spurious Emission & Band Edge Compliance	FCC: FCC Public Notice DA 00-705 IC: RSS-Gen 6.13	FCC: Section15.247(d) IC: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	2.5 dB 20879.980MHz, AV, Vertical.	Complied	Conducted/ 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)

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

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FCC Part 15.31 (e)

The stable voltage (DC1.1V) was provided to the EUT during the tests.
Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

[PCB antenna (Dipole antenna)]

The EUT has a unique coupling/antenna connector (UFL).
Therefore the equipment complies with the requirement of 15.203.

[Chip Antenna]

The antenna is not removable from the EUT.
Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.3 Addition to standard

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

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

3.4 Uncertainty

EMI

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k = 2$.
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Antenna terminal test Uncertainty (+/-)							
Power meter		Conducted emission and Power density			Conducted emission		Channel power
Below 1 GHz	Above 1 GHz	Below 1 GHz	1 GHz -3 GHz	3 GHz -18 GHz	18 GHz -26.5 GHz	26.5 GHz -40 GHz	
0.9 dB	1.0 dB	1.4 dB	1.7 dB	2.8 dB	2.8 dB	2.9 dB	2.6 dB

Frequency range	Conducted emission using AMN(LISN) (+/-)
0.009 – 0.15MHz	3.5 dB
0.15 – 30MHz	3.0 dB

Test distance	Radiated emission (+/-) 9 kHz - 30 MHz
3m	3.8 dB
10m	3.7 dB

Polarity	Radiated emission (Below 1GHz)			
	(3 m*) (+/-)		(10 m*) (+/-)	
	30 – 200 MHz	200 – 1000MHz	30 – 200 MHz	200 – 1000MHz
Horizontal	5.0 dB	5.3 dB	5.0 dB	5.0 dB
Vertical	4.7 dB	5.9 dB	5.0 dB	5.1 dB

Radiated emission (Above 1GHz)				
(3 m*) (+/-)		(1 m*) (+/-)		(10 m*) (+/-)
1 – 6GHz	6 – 18GHz	10 – 26.5 GHz	26.5 – 40GHz	1 -18 GHz
5.2 dB	5.4 dB	5.5 dB	5.5 dB	5.4 dB

*Measurement distance

Conducted Emission test

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

Radiated emission test

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

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3.5 Test Location

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

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

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

4.1 Operating Mode(s)

Bluetooth (BT): Transmitting (Tx), Payload: PRBS9

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Conducted Emission, Spurious Emission (Conducted/Radiated)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Carrier Frequency Separation	Tx (Hopping On) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
20dB Bandwidth	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Number of Hopping Frequency	Tx (Hopping On) DH5, 3DH5	-
Dwell time	Tx (Hopping On), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5	-
Maximum Peak Output Power	Tx (Hopping Off) DH5, 2DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping On -Hopping Off	2402 MHz 2480 MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping On -Hopping Off	2402 MHz 2441 MHz 2480 MHz
*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test) *2DH mode (2Mb/s EDR: pi/4DQPSK) was excluded for other tests than power measurement by using 3DH mode (3 Mb/s EDR: 8DPSK) as a representative. * It is considered that the non-tested packet type (e.g. inquiry) can be omitted as it is complied with above all the test items based on Bluetooth Core specification. *In normal use, the external antenna might not be connected when the internal antenna is used. Therefore, the test was performed under the worst condition based on the result of pre-testing. *EUT has the power settings by the software as follows (power setting value might be different from product specification value); Power settings: BDR: 6 or 7 EDR: 7 Software: QRCT Version 3.0.197.0 *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.		

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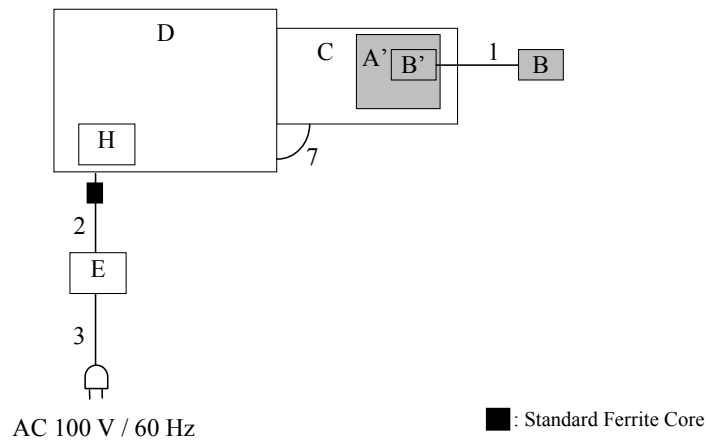
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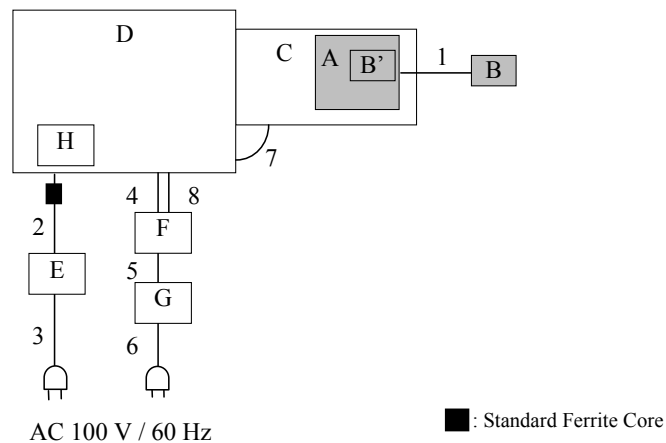
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Configuration and peripherals

[Conducted emission test]



[Radiated emission / Antenna Terminal Conducted test]



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

Description of EUT and Support Equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	SDIO Wireless Module	SX-SDMAC	84253F-011034	silex technology, Inc.	EUT
A'	SDIO Wireless Module	SX-SDMAC	84253F-011035	silex technology, Inc.	EUT
B	PCB Antenna	146153	-	MOLEX	EUT
B'	Chip Antenna	H2U84W1H1S	-	Unictron	EUT
C	Jig	PW102660	-	silex technology, Inc.	*1)
D	Jig	MCIMX6Q-SDB	-	silex technology, Inc.	-
E	AC Adapter	ATS030-A050	-	SCEPTER POWER	-
F	Laptop PC	E5540	HK42N12	DELL	-
G	AC Adapter	HA65NM130	CN-06TFFF-74661-4BO-06R0-A00	DELL	-
H	SD Card	SDHC Class4	-	San Disk	-

*1) The test was performed with the module that as normal assumed implementation conditions (without a solid ground)

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Antenna Cable	0.05	Unshielded	Unshielded	-
2	DC Cable	1.00	Unshielded	Unshielded	-
3	AC Cable	1.90	Unshielded	Unshielded	-
4	USB Cable	2.80	Shielded	Shielded	-
5	DC Cable	1.80	Unshielded	Unshielded	-
6	AC Cable	0.90	Unshielded	Unshielded	-
7	Flat Cable	0.15	Unshielded	Unshielded	-
8	LAN Cable	2.00	Shielded	Shielded	-

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SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8m above the conducting ground plane.

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

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

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

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

The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

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

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

SECTION 6: Radiated Spurious Emission

Test Procedure

[For below 1GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1GHz]

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 200 MHz	200 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	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	RBW: 1 MHz VBW: 10 Hz *1)	RBW: 100 kHz VBW: 300 kHz
Test Distance	3 m	4.5 m*2) (1 GHz - 10 GHz), 1 m*3) (10 GHz - 26.5 GHz),		4.5 m*2) (1 GHz - 10 GHz), 1 m*3) (10 GHz - 26.5 GHz),

*1) Although DA 00-705 accepts VBW = 10 Hz for AV measurements, it was confirmed that superfluous smoothing was not performed.

*2) Distance Factor: $20 \times \log(4.5 \text{ m}/3.0 \text{ m}) = 3.53 \text{ dB}$

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

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

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

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

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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
20dB Bandwidth	3 MHz	30 kHz	100 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak Average *2)	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	3 MHz	30 kHz	100 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30 MHz	300 kHz	1 MHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time	Zero Span	100 kHz, 1 MHz	300 kHz, 3 MHz	As necessary capture the entire dwell time per hopping channel	Peak	Clear Write	Spectrum Analyzer
Conducted Spurious Emission *3)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	9.1 kHz	27 kHz				
	30 MHz to 25 GHz	100 kHz	300 kHz				
Conducted Spurious Emission Band Edge compliance	10 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer

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

*2) Reference data

*3) 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 = 9.1 kHz)

EUT has two power setting for BDR function. The maximum peak output power test was performed by both setting and other test contents were performed highest power setting.

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

*Antenna terminal conducted tests were performed on U.FL port because the structures of the route to both antennas are the same.

Test data : APPENDIX

Test result : Pass

APPENDIX 1: Test data

Conducted Emission (Antenna : M/N 146153)

DATA OF CONDUCTED EMISSION TEST

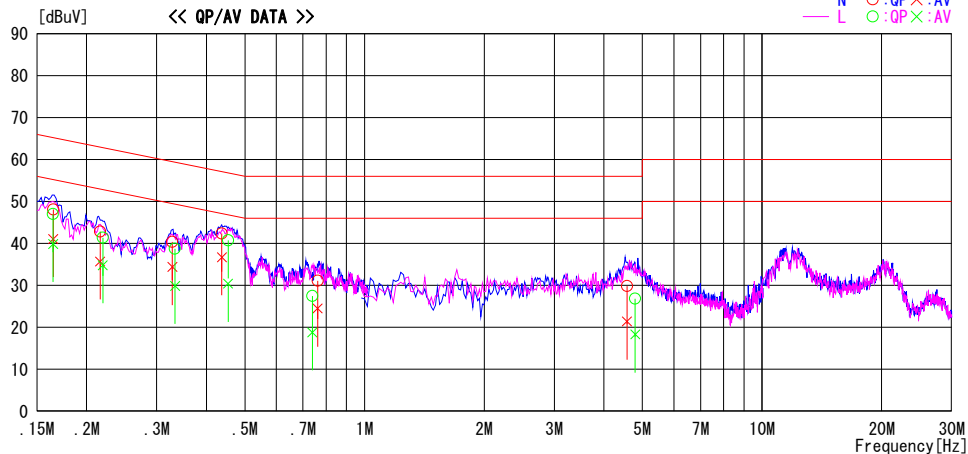
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2016/08/20

Report No. : 11182619H

Temp./Humi. : 21deg. C / 63% RH
Engineer : Kazuya Yoshioka

Mode / Remarks : DH5 2441MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.16470	34.9	27.9	13.2	48.1	41.1	65.2	55.2	17.1	14.1	N	
0.21620	29.6	22.5	13.2	42.8	35.7	63.0	53.0	20.2	17.3	N	
0.32855	27.1	21.1	13.3	40.4	34.4	59.5	49.5	19.1	15.1	N	
0.43730	29.1	23.4	13.3	42.4	36.7	57.1	47.1	14.7	10.4	N	
0.76190	17.7	11.1	13.4	31.1	24.5	56.0	46.0	24.9	21.5	N	
4.57200	15.9	7.5	13.9	29.8	21.4	56.0	46.0	26.2	24.6	N	
0.16453	33.8	26.7	13.2	47.0	39.9	65.2	55.2	18.2	15.3	L	
0.21960	28.2	21.6	13.2	41.4	34.8	62.8	52.8	21.4	18.0	L	
0.33344	25.4	16.6	13.3	38.7	29.9	59.4	49.4	20.7	19.5	L	
0.45400	27.4	17.1	13.3	40.7	30.4	56.8	46.8	16.1	16.4	L	
0.73928	14.2	5.5	13.3	27.5	18.8	56.0	46.0	28.5	27.2	L	
4.79600	12.9	4.4	13.9	26.8	18.3	56.0	46.0	29.2	27.7	L	

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

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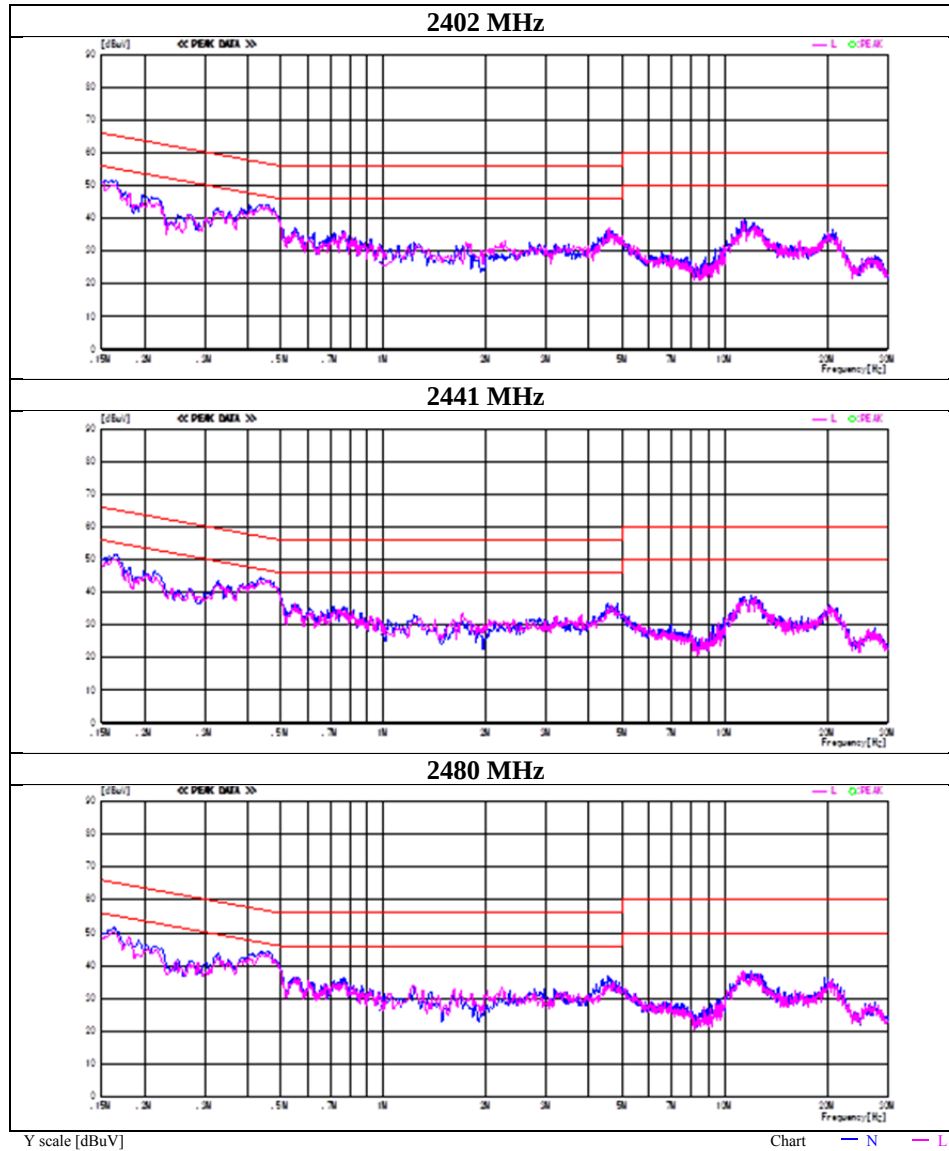
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Emission

(Antenna : M/N 146153)

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	11182619H
Date	August 20, 2016
Temperature / Humidity	21 deg. C / 63 % RH
Engineer	Kazuya Yoshioka
Mode	Tx, Hopping Off, DH5



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Conducted Emission
(Antenna : M/N 146153)

DATA OF CONDUCTED EMISSION TEST

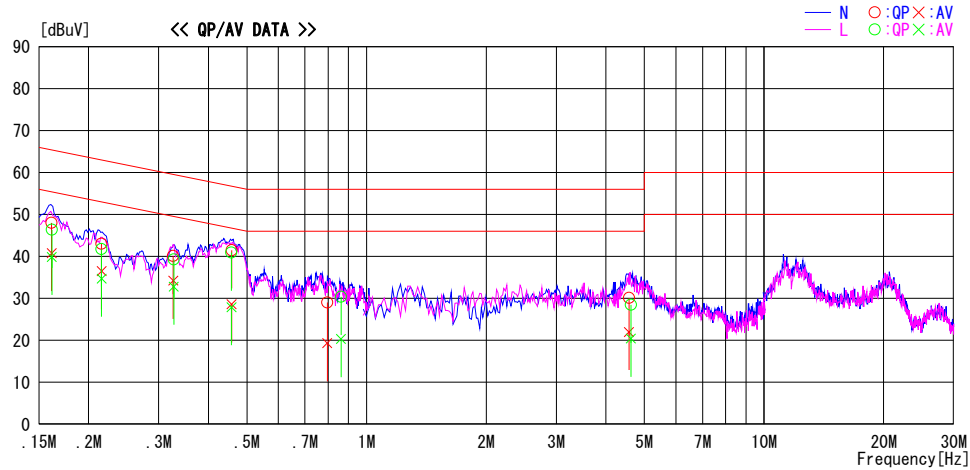
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2016/08/20

Report No. : 11182619H

Temp./Humi. : 21deg. C / 63% RH
Engineer : Kazuya Yoshioka

Mode / Remarks : 3DH5 2441MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



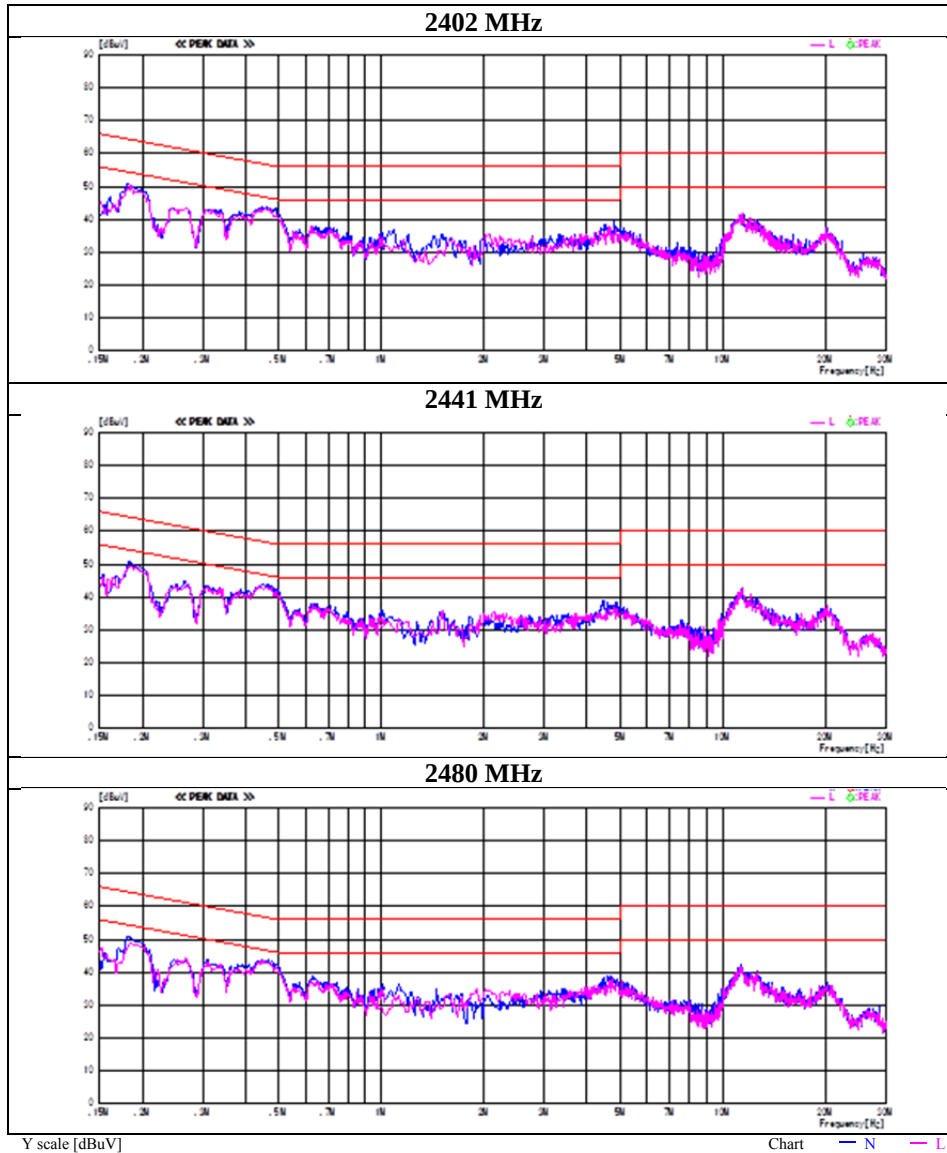
Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.16130	34.8	27.6	13.2	48.0	40.8	65.4	55.4	17.4	14.6	N	
0.21544	29.8	23.3	13.2	43.0	36.5	63.0	53.0	20.0	16.5	N	
0.32610	26.8	20.9	13.3	40.1	34.2	59.5	49.5	19.4	15.3	N	
0.45796	28.2	15.3	13.3	41.5	28.6	56.7	46.7	15.2	18.1	N	
0.79675	15.6	5.9	13.4	29.0	19.3	56.0	46.0	27.0	26.7	N	
4.57247	16.2	8.1	13.9	30.1	22.0	56.0	46.0	25.9	24.0	N	
0.16149	33.2	26.7	13.2	46.4	39.9	65.4	55.4	19.0	15.5	L	
0.21540	28.5	21.5	13.2	41.7	34.7	63.0	53.0	21.3	18.3	L	
0.32730	26.0	19.5	13.3	39.3	32.8	59.5	49.5	20.2	16.7	L	
0.45710	27.6	14.6	13.3	40.9	27.9	56.7	46.7	15.8	18.8	L	
0.86275	17.0	6.9	13.4	30.4	20.3	56.0	46.0	25.6	25.7	L	
4.62360	14.6	6.5	13.9	28.5	20.4	56.0	46.0	27.5	25.6	L	

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

Conducted Emission

(Antenna : M/N 146153)

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	11182619H
Date	August 20, 2016
Temperature / Humidity	21 deg. C / 63 % RH
Engineer	Kazuya Yoshioka
Mode	Tx, Hopping Off, 3DH5



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Conducted Emission
(Antenna : M/N H2U84W1H1S)

DATA OF CONDUCTED EMISSION TEST

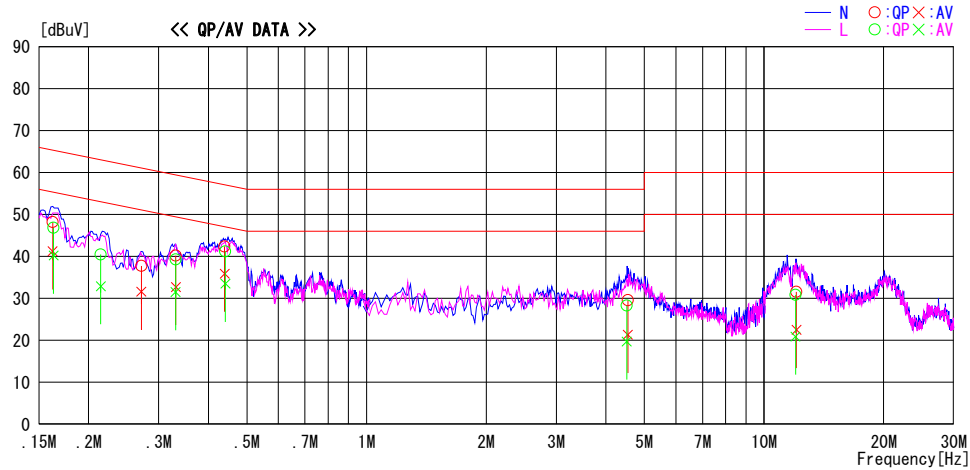
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2016/08/20

Report No. : 11182619H

Temp./Humi. : 21deg. C / 63% RH
Engineer : Kazuya Yoshioka

Mode / Remarks : BT DH5 2441MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



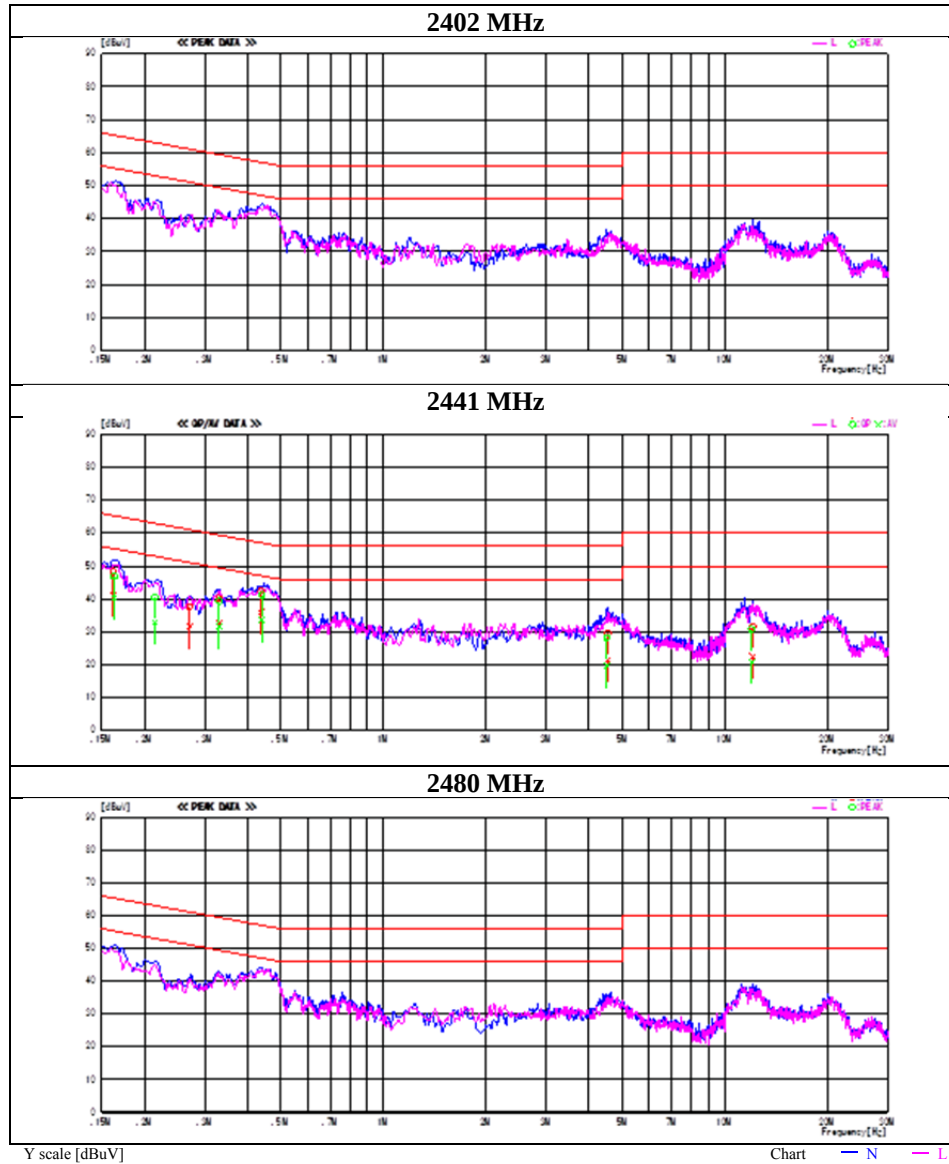
Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.16228	35.0	28.0	13.2	48.2	41.2	65.3	55.3	17.1	14.1	N	
0.27137	24.4	18.3	13.3	37.7	31.6	61.1	51.1	23.4	19.5	N	
0.33118	26.9	19.4	13.3	40.2	32.7	59.4	49.4	19.2	16.7	N	
0.43940	29.1	22.6	13.3	42.4	35.9	57.1	47.1	14.7	11.2	N	
4.54440	15.6	7.4	13.9	29.5	21.3	56.0	46.0	26.5	24.7	N	
12.05920	17.1	8.0	14.5	31.6	22.5	60.0	50.0	28.4	27.5	N	
0.16310	33.6	27.0	13.2	46.8	40.2	65.3	55.3	18.5	15.1	L	
0.21445	27.3	19.7	13.2	40.5	32.9	63.0	53.0	22.5	20.1	L	
0.33110	26.0	18.2	13.3	39.3	31.5	59.4	49.4	20.1	17.9	L	
0.44120	27.9	20.2	13.3	41.2	33.5	57.0	47.0	15.8	13.5	L	
4.51400	14.4	5.8	13.9	28.3	19.7	56.0	46.0	27.7	26.3	L	
11.99240	16.3	6.4	14.5	30.8	20.9	60.0	50.0	29.2	29.1	L	

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

Conducted Emission

(Antenna : M/N H2U84W1H1S)

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	11182619H
Date	August 20, 2016
Temperature / Humidity	21 deg. C / 63 % RH
Engineer	Kazuya Yoshioka
Mode	Tx, Hopping Off, DH5



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Conducted Emission
(Antenna : M/N H2U84W1H1S)

DATA OF CONDUCTED EMISSION TEST

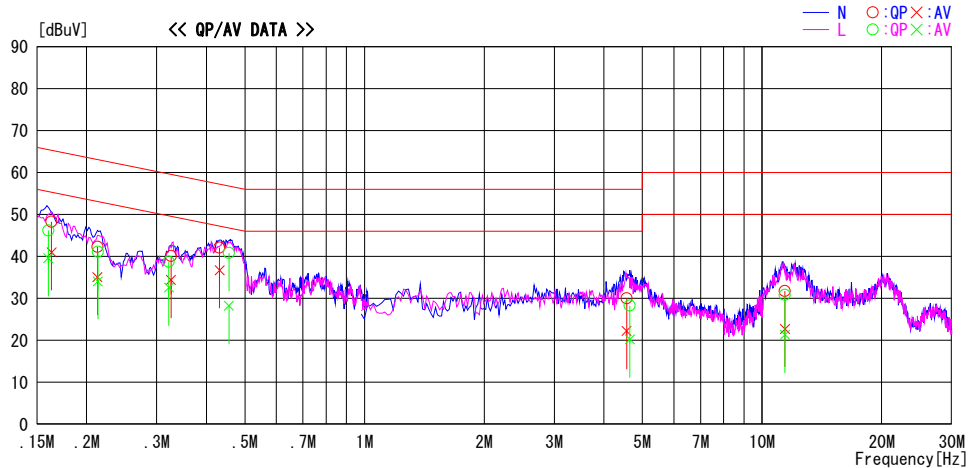
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2016/08/20

Report No. : 11182619H

Temp./Humi. : 21deg. C / 63% RH
Engineer : Kazuya Yoshioka

Mode / Remarks : BT 3DH5 2441MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



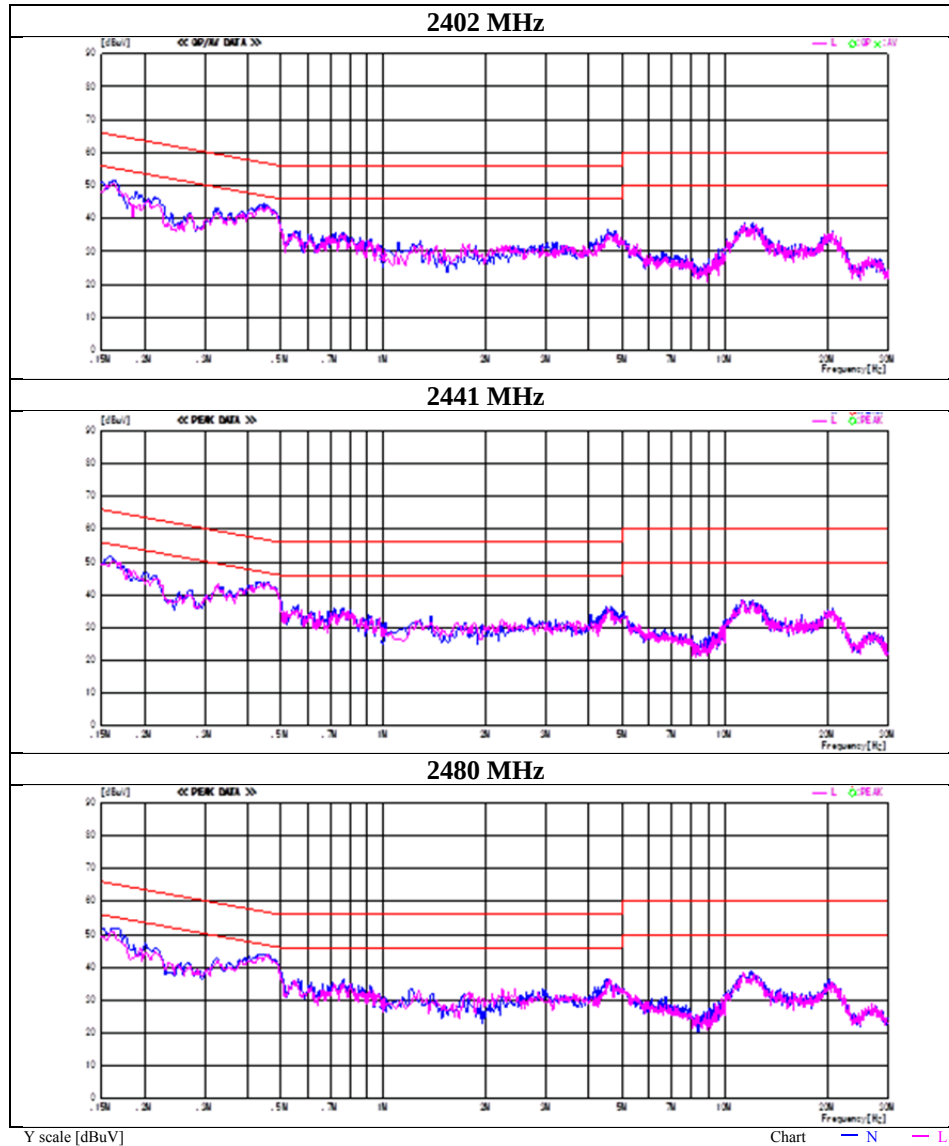
Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.16321	35.1	27.8	13.2	48.3	41.0	65.3	55.3	17.0	14.3	N	
0.21295	29.1	21.9	13.2	42.3	35.1	63.1	53.1	20.8	18.0	N	
0.32574	26.8	21.1	13.3	40.1	34.4	59.6	49.6	19.5	15.2	N	
0.43162	28.8	23.4	13.3	42.1	36.7	57.2	47.2	15.1	10.5	N	
4.56412	16.1	8.3	13.9	30.0	22.2	56.0	46.0	26.0	23.8	N	
11.41600	17.2	8.2	14.5	31.7	22.7	60.0	50.0	28.3	27.3	N	
0.16010	33.0	26.4	13.2	46.2	39.6	65.5	55.5	19.3	15.9	L	
0.21330	27.9	20.9	13.2	41.1	34.1	63.1	53.1	22.0	19.0	L	
0.32210	25.4	19.3	13.3	38.7	32.6	59.7	49.7	21.0	17.1	L	
0.45591	27.5	14.9	13.3	40.8	28.2	56.8	46.8	16.0	18.6	L	
4.65160	14.4	6.3	13.9	28.3	20.2	56.0	46.0	27.7	25.8	L	
11.41654	16.3	6.8	14.5	30.8	21.3	60.0	50.0	29.2	28.7	L	

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

Conducted Emission

(Antenna : M/N H2U84W1H1S)

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	11182619H
Date	August 20, 2016
Temperature / Humidity	21 deg. C / 63 % RH
Engineer	Kazuya Yoshioka
Mode	Tx, Hopping Off, 3DH5



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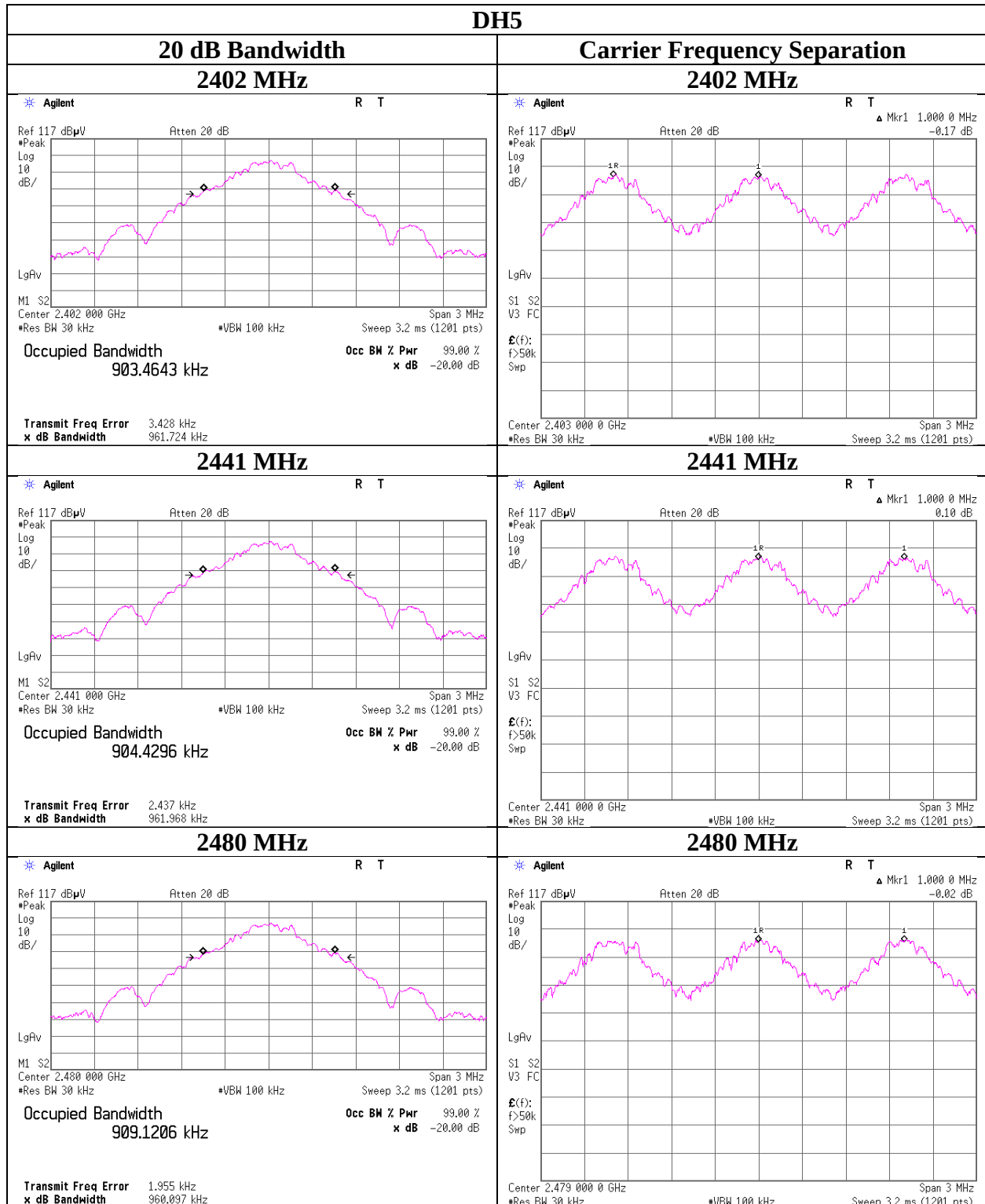
20dB Bandwidth and Carrier Frequency Separation

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 11182619H
Date : March 29, 2016
Temperature / Humidity : 25 deg. C / 21 % RH
Engineer : Yutaka Yoshida
Mode : Tx Hopping Off/On

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.962	1.000	≥ 0.641
DH5	2441.0	0.962	1.000	≥ 0.641
DH5	2480.0	0.960	1.000	≥ 0.640
3DH5	2402.0	1.298	1.000	≥ 0.865
3DH5	2441.0	1.299	1.000	≥ 0.866
3DH5	2480.0	1.297	1.000	≥ 0.865

Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater)
No limit applies to 20dB Bandwidth.

20dB Bandwidth and Carrier Frequency Separation



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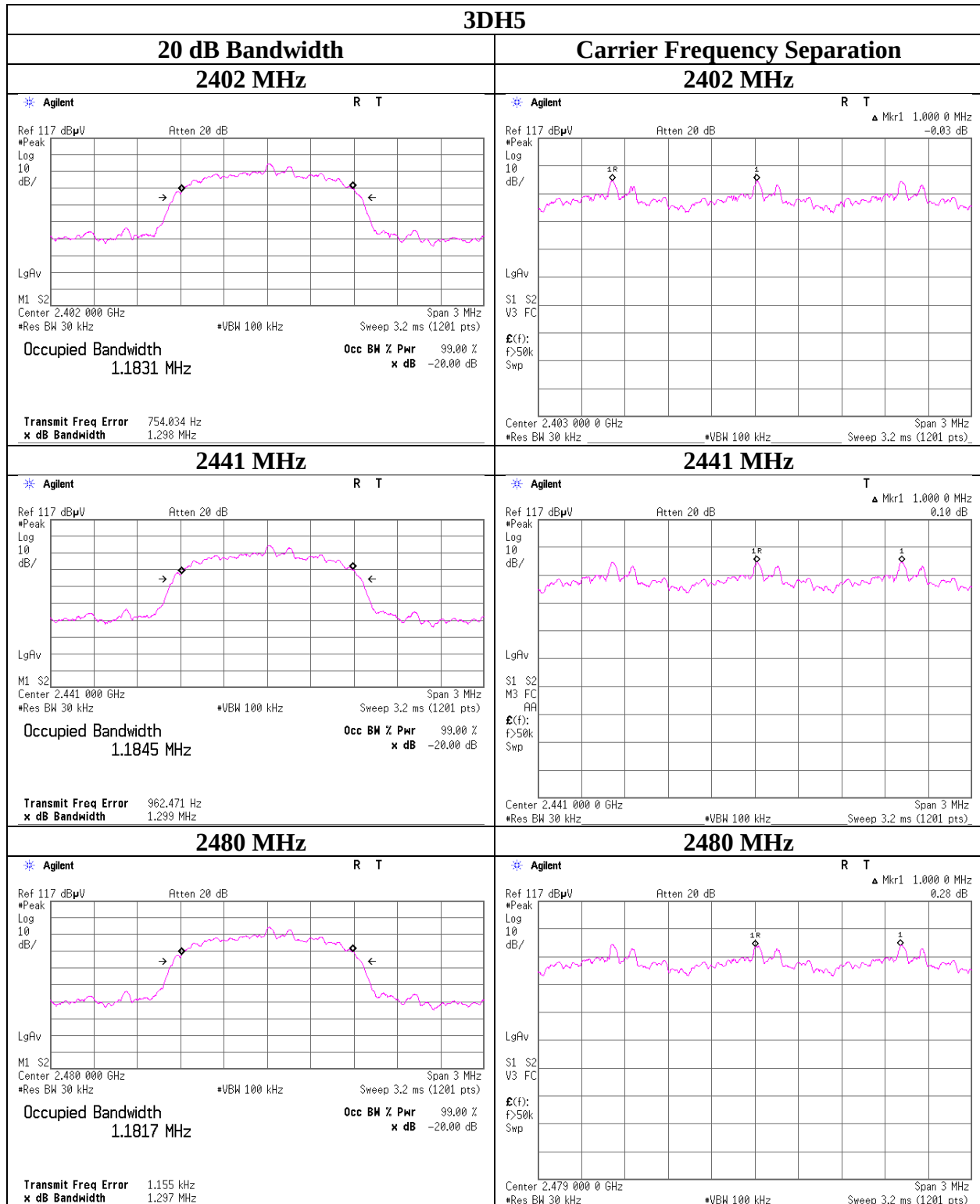
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20dB Bandwidth and Carrier Frequency Separation



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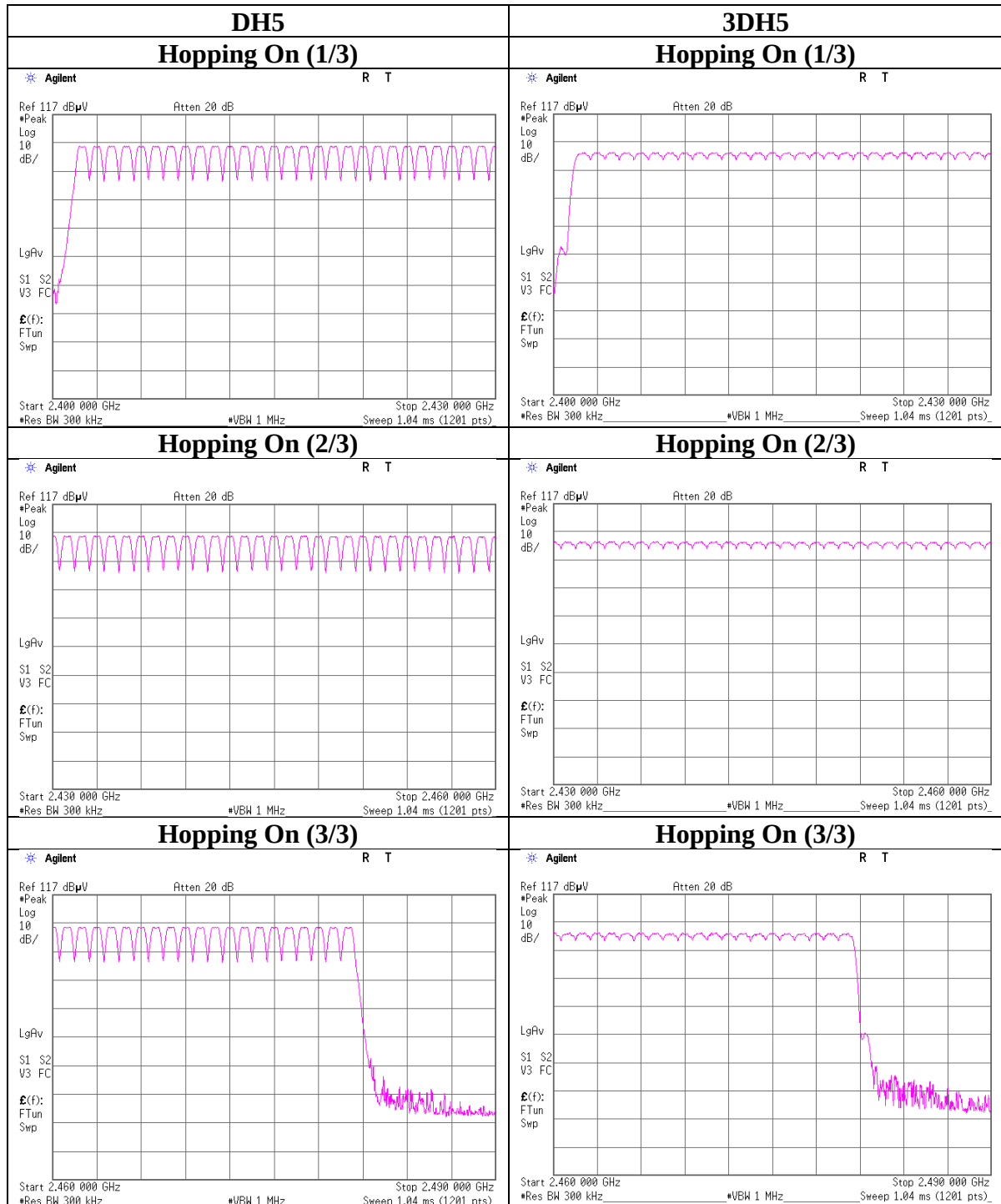
Number of Hopping Frequency

Test place Ise EMC Lab. No.11 Measurement Room
Report No. 11182619H
Date March 29, 2016
Temperature / Humidity 25 deg. C / 21 % RH
Engineer Yutaka Yoshida
Mode Tx, Hopping On

Mode	Number of channel [channels]	Limit [channels]
DH5	79	≥ 15
3DH5	79	≥ 15

Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification.

Number of Hopping Frequency



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Dwell time

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 11182619H
Date : March 30, 2016
Temperature / Humidity : 22 deg. C / 27 % RH
Engineer : Yutaka Yoshida
Mode : Tx, Hopping On

Mode	Number of transmission in a 31.6(79 Hopping x 0.4) / 12.8 (32 Hopping x 0.4) second period				Length of transmission [msec]	Result [msec]	Limit [msec]
DH1	49.8 times	/	5 sec. x	31.6 sec. = 315 times	0.401	126	400
DH3	25.0 times	/	5 sec. x	31.6 sec. = 158 times	1.662	263	400
DH5	17.2 times	/	5 sec. x	31.6 sec. = 109 times	2.911	317	400
3DH1	49.4 times	/	5 sec. x	31.6 sec. = 313 times	0.408	128	400
3DH3	27.0 times	/	5 sec. x	31.6 sec. = 171 times	1.662	284	400
3DH5	17.4 times	/	5 sec. x	31.6 sec. = 110 times	2.915	321	400

Sample Calculation

Result = Number of transmission x Length of transmission

*Average data of 5 tests.(except Inquiry)

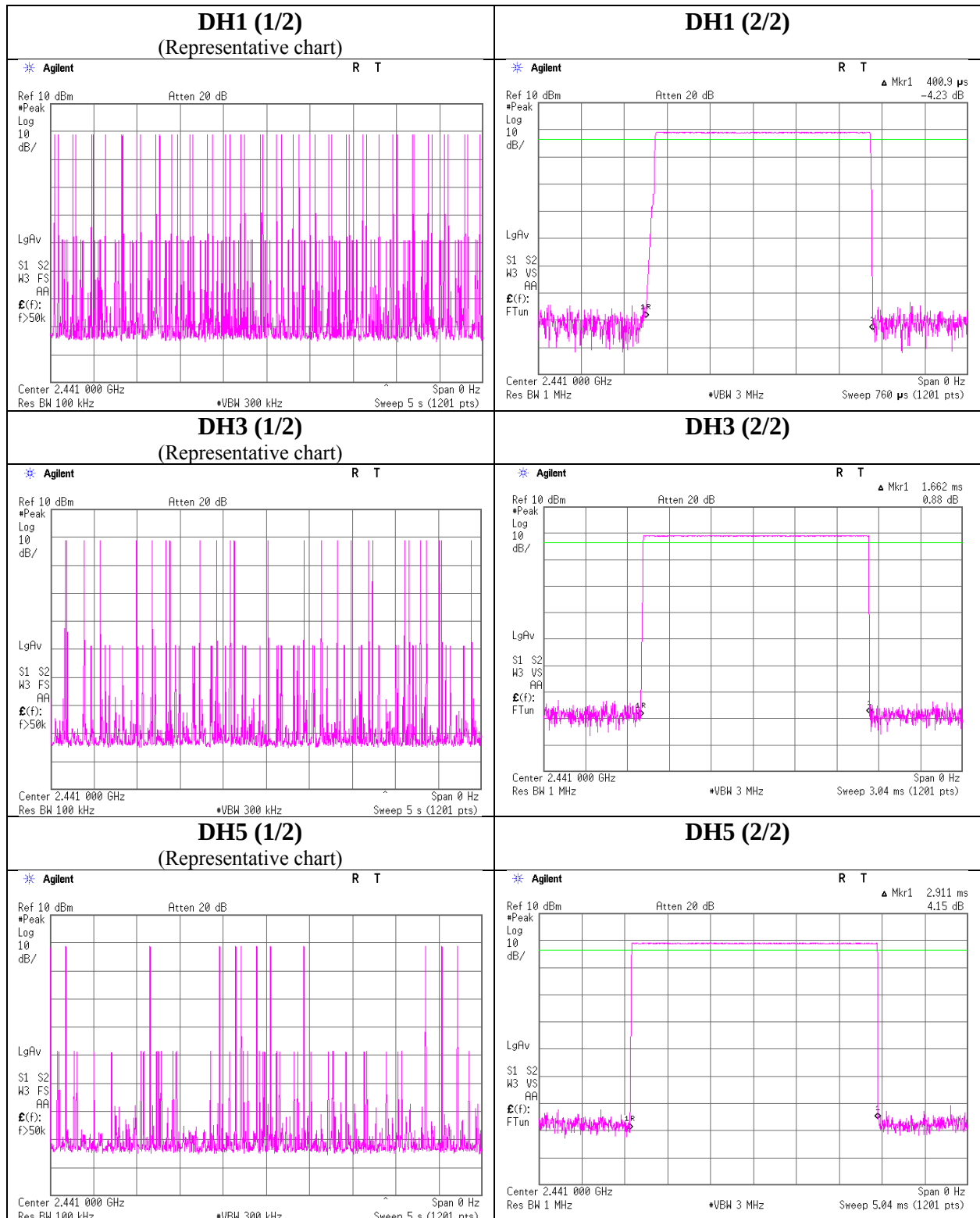
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	49	49	50	51	50	49.8
DH3	26	25	26	21	27	25
DH5	12	21	18	21	14	17.2
3DH1	50	50	48	50	49	49.4
3DH3	28	29	25	29	24	27
3DH5	18	19	17	16	17	17.4

Sample Calculation

Average = Summation (Sampling 1 to 5) / 5

This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in $N \times 0.4s$, where N is the number of channels being used in the hopping sequence ($20 \leq N \leq 79$), is always less than 0.4s regardless of packet size. This is confirmed in the test report for $N = 79$.

Dwell time



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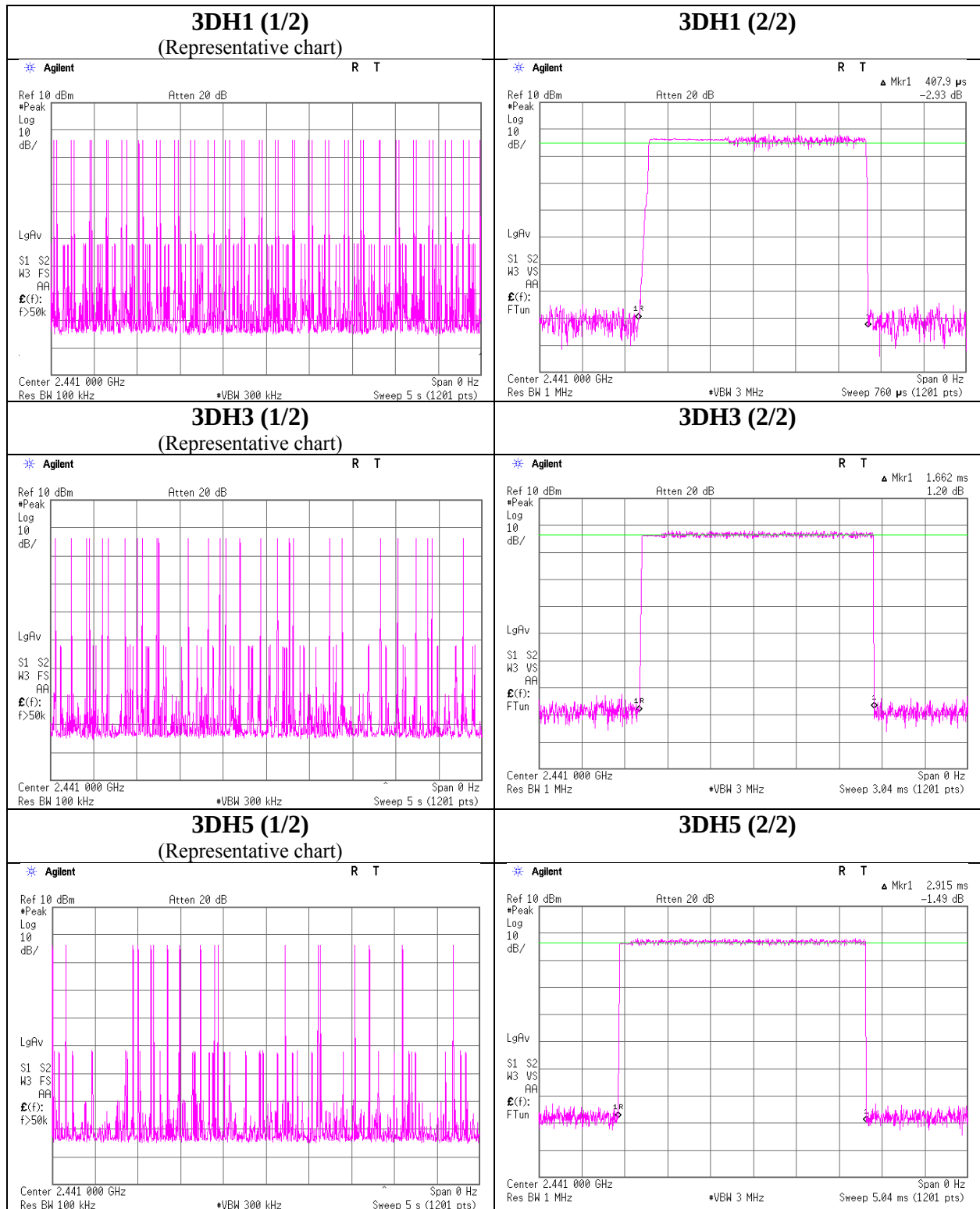
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Dwell time



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Maximum Peak Output Power

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 11182619H
Date : September 23, 2016
Temperature / Humidity : 25 deg. C / 56 % RH
Engineer : Ken Fujita
Mode : Tx, Hopping Off

Power setting : BDR: 6

Mode	Freq. [MHz]	Reading PK [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-14.12	1.60	10.03	-2.50	0.56	20.96	125	23.46
DH5	2441.0	-13.42	1.61	10.03	-1.78	0.66	20.96	125	22.74
DH5	2480.0	-13.08	1.62	10.03	-1.43	0.72	20.96	125	22.39

Sample Calculation:
Result = Reading + Cable Loss + Attenuator Loss

Power setting : BDR: 7 / EDR: 7

Mode	Freq. [MHz]	Reading PK [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-10.41	1.60	10.03	1.22	1.32	20.96	125	19.74
DH5	2441.0	-10.21	1.61	10.03	1.43	1.39	20.96	125	19.53
DH5	2480.0	-10.28	1.62	10.03	1.37	1.37	20.96	125	19.59
2DH5	2402.0	-11.40	1.60	10.03	0.23	1.05	20.96	125	20.73
2DH5	2441.0	-11.15	1.61	10.03	0.49	1.12	20.96	125	20.47
2DH5	2480.0	-11.88	1.62	10.03	-0.23	0.95	20.96	125	21.19
3DH5	2402.0	-10.42	1.60	10.03	1.21	1.32	20.96	125	19.75
3DH5	2441.0	-10.22	1.61	10.03	1.42	1.39	20.96	125	19.54
3DH5	2480.0	-10.28	1.62	10.03	1.37	1.37	20.96	125	19.59

Sample Calculation:
Result = Reading + Cable Loss + Attenuator Loss

Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not influence on the output power and bandwidth of the EUT.
As this device had AFH mode and frequency separation could not meet the requirement of over 20dB BW without 2/3 relaxation, 125mW power limit was applied to it.

Average Output Power
(Reference data for RF Exposure)

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 11182619H
Date : September 23, 2016
Temperature / Humidity : 25 deg. C / 21 % RH
Engineer : Ken Fujita
Mode : Tx, Hopping Off

◎BDR: 6

Mode	Freq. [MHz]	Reading AV [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
					[dBm]	[mW]		[dBm]	[mW]
DH5	2402.0	-15.77	1.60	10.03	-4.15	0.38	1.09	-3.06	0.49
DH5	2441.0	-15.11	1.61	10.03	-3.47	0.45	1.09	-2.38	0.58
DH5	2480.0	-14.73	1.62	10.03	-3.08	0.49	1.09	-1.99	0.63

Sample Calculation:

Result (Time average) = Reading + Cable Loss + Attenuator Loss

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

*The equipment and cables were not used for factor 0 dB of the data sheets.

◎BDR: 7
EDR: 7

Mode	Freq. [MHz]	Reading AV [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
					[dBm]	[mW]		[dBm]	[mW]
DH5	2402.0	-11.79	1.60	10.03	-0.17	0.96	1.09	0.92	1.24
DH5	2441.0	-11.68	1.61	10.03	-0.04	0.99	1.09	1.05	1.27
DH5	2480.0	-11.70	1.62	10.03	-0.05	0.99	1.09	1.04	1.27
2DH5	2402.0	-15.31	1.60	10.03	-3.69	0.43	1.09	-2.60	0.55
2DH5	2441.0	-14.93	1.61	10.03	-3.29	0.47	1.09	-2.20	0.60
2DH5	2480.0	-14.92	1.62	10.03	-3.27	0.47	1.09	-2.18	0.61
3DH5	2402.0	-13.03	1.60	10.03	-1.41	0.72	1.09	-0.32	0.93
3DH5	2441.0	-12.92	1.61	10.03	-1.28	0.74	1.09	-0.19	0.96
3DH5	2480.0	-13.18	1.62	10.03	-1.53	0.70	1.09	-0.44	0.90

Sample Calculation:

Result (Time average) = Reading + Cable Loss + Attenuator Loss

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

*The equipment and cables were not used for factor 0 dB of the data sheets.

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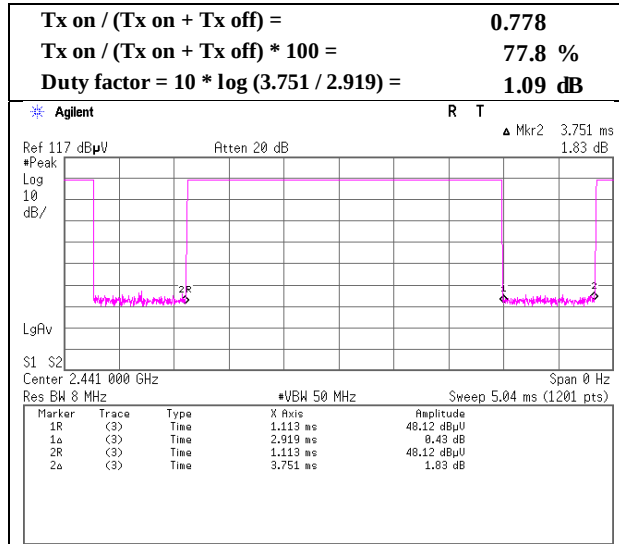
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

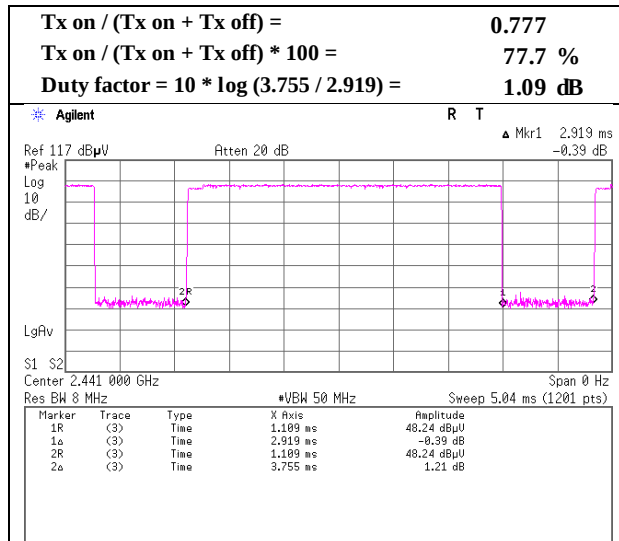
Burst Rate Confirmation

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 11182619H
Date : March 29, 2016
Temperature / Humidity : 25 deg. C / 21 % RH
Engineer : Yutaka Yoshida
Mode : Tx, Hopping Off

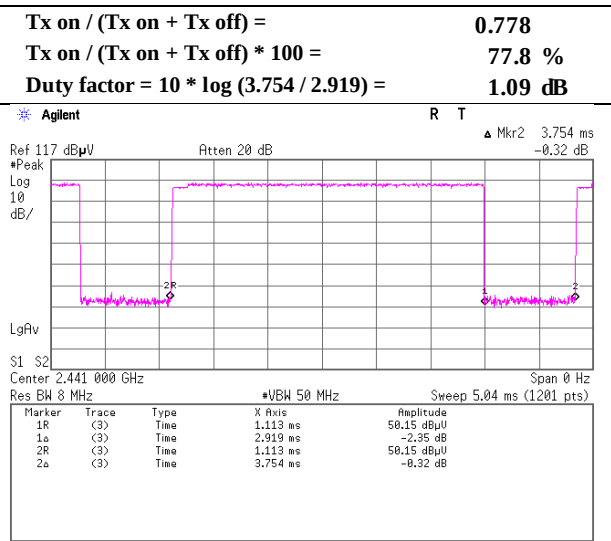
DH5



2DH5

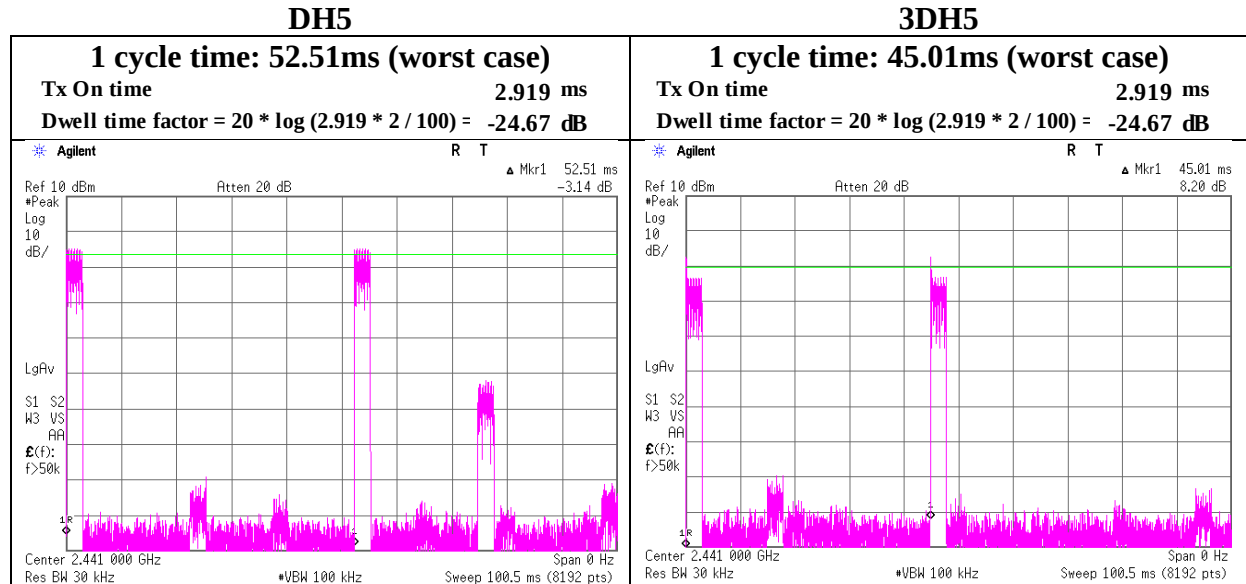


3DH5



Dwell time factor
(Reference Data)

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11182619H
Date	March 30, 2016
Temperature / Humidity	22 deg. C / 27 % RH
Engineer	Yutaka Yoshida
Mode	Tx, Hopping On



*Dwell time factor did not need to be applied to the Radiated Emission Test.

UL Japan, Inc.

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Facsimile : +81 596 24 8124

Radiated Spurious Emission

(Antenna : M/N 146153)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11182619H		
Date	June 14, 2016	June 15, 2016	August 19, 2016
Temperature / Humidity	21 deg. C / 52 % RH	22 deg. C / 64 % RH	23 deg. C / 62 % RH
Engineer	Takafumi Noguchi	Tomoki Matsui	Satofumi Matsuyama
	(1 GHz - 10 GHz)	(Above 10 GHz)	(Below 1 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	272.228	QP	39.5	13.0	9.7	32.0	30.2	46.0	15.8	
Hori	296.989	QP	48.8	13.5	9.9	31.9	40.3	46.0	5.7	
Hori	321.736	QP	35.7	14.0	10.1	31.9	27.9	46.0	18.1	
Hori	325.526	QP	33.1	14.1	10.1	31.9	25.4	46.0	20.6	
Hori	742.453	QP	35.1	20.2	12.6	31.8	36.1	46.0	9.9	
Hori	874.959	QP	36.3	21.8	13.3	31.1	40.3	46.0	5.7	
Hori	1875.126	PK	47.4	26.0	6.5	33.1	46.8	73.9	27.1	
Hori	2390.000	PK	49.2	26.7	6.8	32.7	50.0	73.9	23.9	
Hori	4804.000	PK	46.1	31.0	9.1	31.8	54.4	73.9	19.5	
Hori	7206.000	PK	42.8	35.7	8.9	32.6	54.8	73.9	19.1	Floor Noise
Hori	9608.000	PK	43.6	37.2	9.6	33.2	57.2	73.9	16.7	Floor Noise
Hori	20879.980	PK	48.1	38.2	-1.0	33.0	52.3	73.9	21.6	
Hori	1875.126	AV	41.4	26.0	6.5	33.1	40.8	53.9	13.1	
Hori	2390.000	AV	32.0	26.7	6.8	32.7	32.8	53.9	21.1	
Hori	4804.000	AV	37.4	31.0	9.1	31.8	45.7	53.9	8.2	
Hori	7206.000	AV	31.4	35.7	8.9	32.6	43.4	53.9	10.5	Floor Noise
Hori	9608.000	AV	32.3	37.2	9.6	33.2	45.9	53.9	8.0	Floor Noise
Hori	20879.980	AV	43.6	38.2	-1.0	33.0	47.8	53.9	6.1	
Vert	272.228	QP	35.1	13.0	9.7	32.0	25.8	46.0	20.2	
Vert	296.989	QP	44.7	13.5	9.9	31.9	36.2	46.0	9.8	
Vert	321.736	QP	31.3	14.0	10.1	31.9	23.5	46.0	22.5	
Vert	325.526	QP	29.3	14.1	10.1	31.9	21.6	46.0	24.4	
Vert	742.453	QP	29.6	20.2	12.6	31.8	30.6	46.0	15.4	
Vert	874.959	QP	37.3	21.8	13.3	31.1	41.3	46.0	4.7	
Vert	1875.126	PK	48.5	26.0	6.5	33.1	47.9	73.9	26.0	
Vert	2390.000	PK	48.2	26.7	6.8	32.7	49.0	73.9	24.9	
Vert	4804.000	PK	46.4	31.0	9.1	31.8	54.7	73.9	19.2	
Vert	7206.000	PK	43.0	35.7	8.9	32.6	55.0	73.9	18.9	Floor Noise
Vert	9608.000	PK	43.7	37.2	9.6	33.2	57.3	73.9	16.6	Floor Noise
Vert	20879.980	PK	50.2	38.2	-1.0	33.0	54.4	73.9	19.5	
Vert	1875.126	AV	43.6	26.0	6.5	33.1	43.0	53.9	10.9	
Vert	2390.000	AV	31.5	26.7	6.8	32.7	32.3	53.9	21.6	
Vert	4804.000	AV	37.7	31.0	9.1	31.8	46.0	53.9	7.9	
Vert	7206.000	AV	31.3	35.7	8.9	32.6	43.3	53.9	10.6	Floor Noise
Vert	9608.000	AV	32.4	37.2	9.6	33.2	46.0	53.9	7.9	Floor Noise
Vert	20879.980	AV	47.2	38.2	-1.0	33.0	51.4	53.9	2.5	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 1 GHz - 10 GHz $20\log(4.5\text{ m} / 3.0\text{ m}) = 3.53\text{ dB}$

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

***These results have sufficient margin without taking account Dwell time factor.**

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	108.6	26.7	6.8	32.7	109.4	-	-	Carrier
Hori	2400.000	PK	48.6	26.7	6.8	32.7	49.4	89.4	40.0	
Vert	2402.000	PK	108.9	26.7	6.8	32.7	109.7	-	-	Carrier
Vert	2400.000	PK	48.6	26.7	6.8	32.7	49.4	89.7	40.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

UL Japan, Inc.

Ise EMC Lab.

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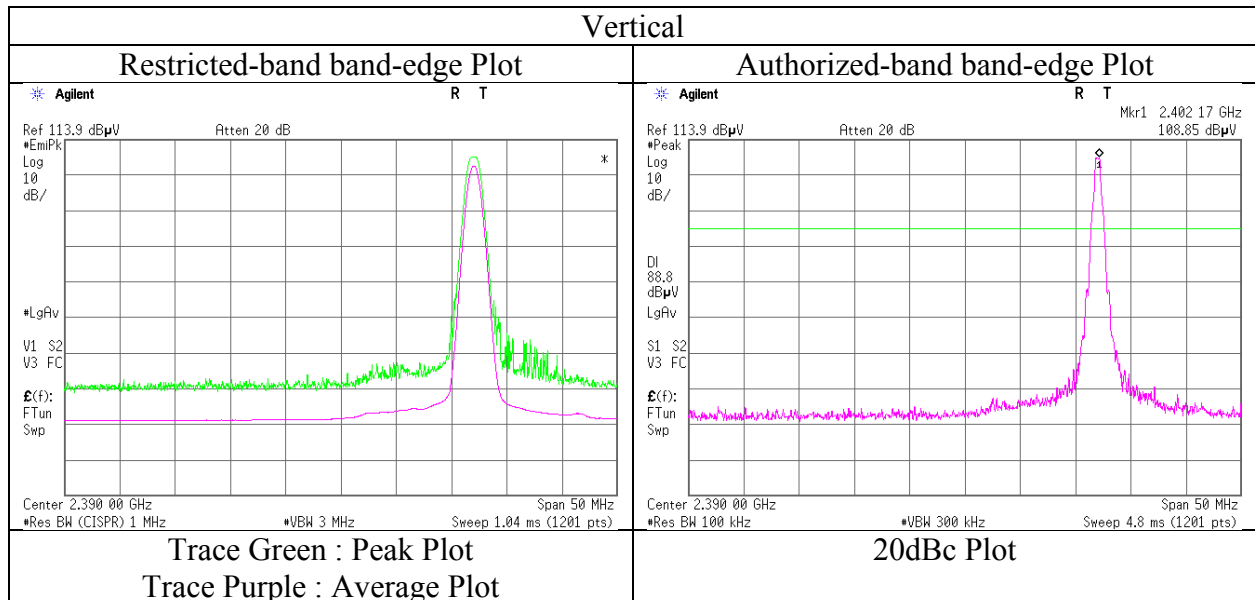
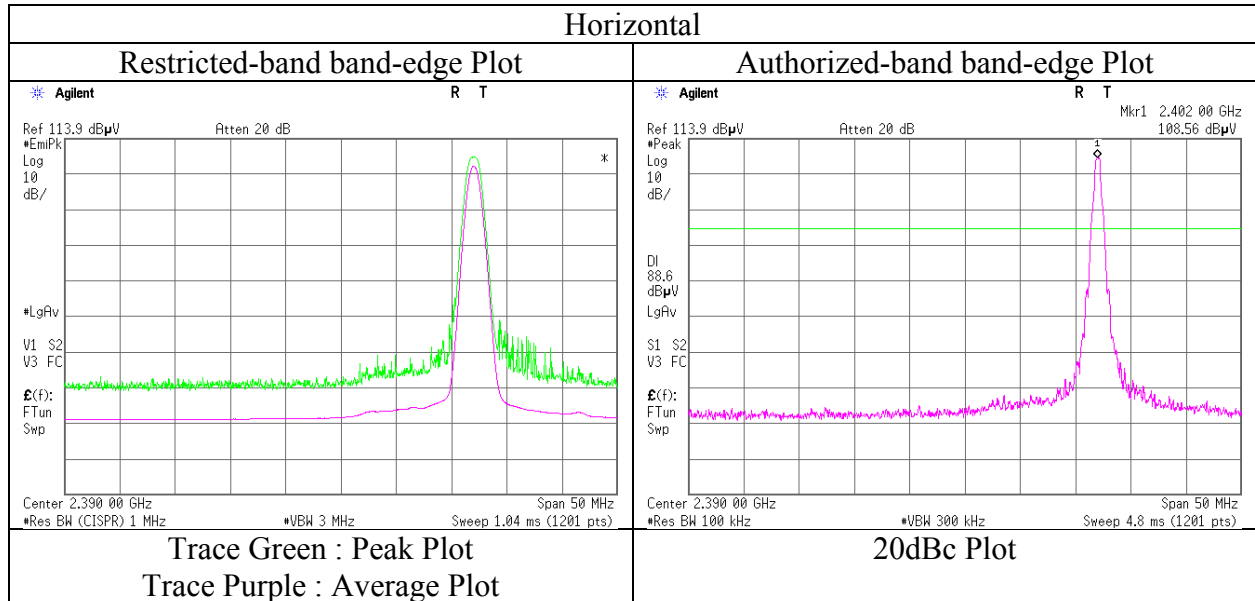
Telephone : +81 596 24 8999

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Radiated Spurious Emission

Reference Plot for band-edge(Antenna : M/N 146153)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11182619H
Date	June 14, 2016
Temperature / Humidity	21 deg. C / 52 % RH
Engineer	Takafumi Noguchi
	(1 GHz - 10 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz



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

Radiated Spurious Emission

(Antenna : M/N 146153)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11182619H		
Date	June 14, 2016	June 15, 2016	August 19, 2016
Temperature / Humidity	21 deg. C / 52 % RH	22 deg. C / 64 % RH	23 deg. C / 62 % RH
Engineer	Takafumi Noguchi	Tomoki Matsui	Satofumi Matsuyama
	(1 GHz - 10 GHz)	(Above 10 GHz)	(Below 1 GHz)
Mode	Tx, Hopping Off, DH5 2441 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	272.228	QP	38.5	13.0	9.7	32.0	29.2	46.0	16.8	
Hori	296.989	QP	49.0	13.5	9.9	31.9	40.5	46.0	5.5	
Hori	321.736	QP	35.5	14.0	10.1	31.9	27.7	46.0	18.3	
Hori	325.526	QP	33.3	14.1	10.1	31.9	25.6	46.0	20.4	
Hori	742.453	QP	29.9	20.2	12.6	31.8	30.9	46.0	15.1	
Hori	874.959	QP	36.4	21.8	13.3	31.1	40.4	46.0	5.6	
Hori	1875.126	PK	47.4	26.0	6.5	33.1	46.8	73.9	27.1	
Hori	4882.000	PK	45.9	31.3	9.1	31.7	54.6	73.9	19.3	
Hori	7323.000	PK	43.1	35.6	8.9	32.6	55.0	73.9	18.9	Floor Noise
Hori	9764.000	PK	43.4	37.2	9.6	33.3	56.9	73.9	17.0	Floor Noise
Hori	20879.980	PK	48.0	38.2	-1.0	33.0	52.2	73.9	21.7	
Hori	1875.126	AV	41.4	26.0	6.5	33.1	40.8	53.9	13.1	
Hori	4882.000	AV	37.3	31.3	9.1	31.7	46.0	53.9	7.9	
Hori	7323.000	AV	31.0	35.6	8.9	32.6	42.9	53.9	11.0	Floor Noise
Hori	9764.000	AV	32.2	37.2	9.6	33.3	45.7	53.9	8.2	Floor Noise
Hori	20879.980	AV	43.7	38.2	-1.0	33.0	47.9	53.9	6.0	
Vert	272.228	QP	34.1	13.0	9.7	32.0	24.8	46.0	21.2	
Vert	296.989	QP	44.8	13.5	9.9	31.9	36.3	46.0	9.7	
Vert	321.736	QP	31.1	14.0	10.1	31.9	23.3	46.0	22.7	
Vert	325.526	QP	29.4	14.1	10.1	31.9	21.7	46.0	24.3	
Vert	742.453	QP	25.6	20.2	12.6	31.8	26.6	46.0	19.4	
Vert	874.959	QP	36.9	21.8	13.3	31.1	40.9	46.0	5.1	
Vert	1875.126	PK	48.3	26.0	6.5	33.1	47.7	73.9	26.2	
Vert	4882.000	PK	46.3	31.3	9.1	31.7	55.0	73.9	18.9	
Vert	7323.000	PK	42.3	35.6	8.9	32.6	54.2	73.9	19.7	Floor Noise
Vert	9764.000	PK	43.5	37.2	9.6	33.3	57.0	73.9	16.9	Floor Noise
Vert	20879.980	PK	50.7	38.2	-1.0	33.0	54.9	73.9	19.0	
Vert	1875.126	AV	43.7	26.0	6.5	33.1	43.1	53.9	10.8	
Vert	4882.000	AV	37.4	31.3	9.1	31.7	46.1	53.9	7.8	
Vert	7323.000	AV	30.9	35.6	8.9	32.6	42.8	53.9	11.1	Floor Noise
Vert	9764.000	AV	32.2	37.2	9.6	33.3	45.7	53.9	8.2	Floor Noise
Vert	20879.980	AV	47.1	38.2	-1.0	33.0	51.3	53.9	2.6	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 1 GHz - 10 GHz $20\log(4.5\text{ m} / 3.0\text{ m}) = 3.53\text{ dB}$
10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

*These results have sufficient margin without taking account Dwell time factor.

Radiated Spurious Emission

(Antenna : M/N 146153)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11182619H		
Date	June 14, 2016	June 15, 2016	August 19, 2016
Temperature / Humidity	21 deg. C / 52 % RH	22 deg. C / 64 % RH	23 deg. C / 62 % RH
Engineer	Takafumi Noguchi	Tomoki Matsui	Satofumi Matsuyama
	(1 GHz - 10 GHz)	(Above 10 GHz)	(Below 1 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	272.228	QP	38.2	13.0	9.7	32.0	28.9	46.0	17.1	
Hori	296.989	QP	49.2	13.5	9.9	31.9	40.7	46.0	5.3	
Hori	321.736	QP	35.1	14.0	10.1	31.9	27.3	46.0	18.7	
Hori	325.526	QP	33.1	14.1	10.1	31.9	25.4	46.0	20.6	
Hori	742.453	QP	30.0	20.2	12.6	31.8	31.0	46.0	15.0	
Hori	874.959	QP	36.2	21.8	13.3	31.1	40.2	46.0	5.8	
Hori	1875.126	PK	47.4	26.0	6.5	33.1	46.8	73.9	27.1	
Hori	2483.500	PK	58.3	26.8	6.9	32.6	59.4	73.9	14.5	
Hori	4960.000	PK	46.1	31.5	8.3	31.7	54.2	73.9	19.7	
Hori	7440.000	PK	42.6	35.5	9.0	32.7	54.4	73.9	19.5	Floor Noise
Hori	9920.000	PK	43.7	37.2	9.7	33.4	57.2	73.9	16.7	Floor Noise
Hori	20879.980	PK	48.4	38.2	-1.0	33.0	52.6	73.9	21.3	
Hori	1875.126	AV	43.6	26.0	6.5	33.1	43.0	53.9	10.9	
Hori	2483.500	AV	36.3	26.8	6.9	32.6	37.4	53.9	16.5	
Hori	4960.000	AV	36.2	31.5	9.0	31.7	45.0	53.9	8.9	
Hori	7440.000	AV	30.5	35.5	9.0	32.7	42.3	53.9	11.6	Floor Noise
Hori	9920.000	AV	32.1	37.2	9.7	33.4	45.6	53.9	8.3	Floor Noise
Hori	20879.980	AV	43.7	38.2	-1.0	33.0	47.9	53.9	6.0	
Vert	272.228	QP	34.0	13.0	9.7	32.0	24.7	46.0	21.3	
Vert	296.989	QP	44.4	13.5	9.9	31.9	35.9	46.0	10.1	
Vert	321.736	QP	31.3	14.0	10.1	31.9	23.5	46.0	22.5	
Vert	325.526	QP	29.3	14.1	10.1	31.9	21.6	46.0	24.4	
Vert	742.453	QP	25.9	20.2	12.6	31.8	26.9	46.0	19.1	
Vert	874.959	QP	35.9	21.8	13.3	31.1	39.9	46.0	6.1	
Vert	1875.126	PK	48.2	26.0	6.5	33.1	47.6	73.9	26.3	
Vert	2483.500	PK	59.0	26.8	6.9	32.6	60.1	73.9	13.8	
Vert	4960.000	PK	45.9	31.5	9.0	31.7	54.7	73.9	19.2	
Vert	7440.000	PK	42.5	35.5	9.0	32.7	54.3	73.9	19.6	Floor Noise
Vert	9920.000	PK	43.7	37.2	9.7	33.4	57.2	73.9	16.7	Floor Noise
Vert	20879.980	PK	49.0	38.2	-1.0	33.0	53.2	73.9	20.7	
Vert	1875.126	AV	43.6	26.0	6.5	33.1	43.0	53.9	10.9	
Vert	2483.500	AV	36.8	26.8	6.9	32.6	37.9	53.9	16.0	
Vert	4960.000	AV	37.4	31.5	9.0	31.7	46.2	53.9	7.7	
Vert	7440.000	AV	30.8	35.5	9.0	32.7	42.6	53.9	11.3	Floor Noise
Vert	9920.000	AV	32.4	37.2	9.7	33.4	45.9	53.9	8.0	Floor Noise
Vert	20879.980	AV	45.4	38.2	-1.0	33.0	49.6	53.9	4.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

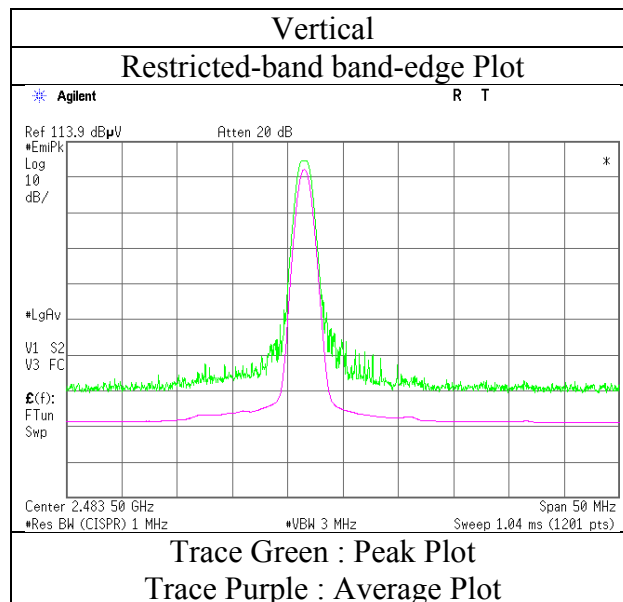
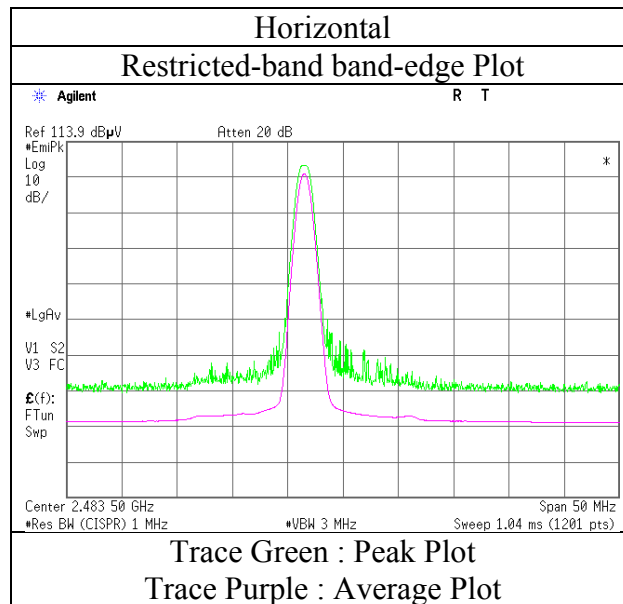
*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.53 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

***These results have sufficient margin without taking account Dwell time factor.**

Radiated Spurious Emission
Reference Plot for band-edge (Antenna : M/N 146153)

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11182619H
Date : June 14, 2016
Temperature / Humidity : 21 deg. C / 52 % RH
Engineer : Takafumi Noguchi
(1 GHz - 10 GHz)
Mode : Tx, Hopping Off, DH5 2480 MHz



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

Radiated Spurious Emission

(Antenna : M/N 146153)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11182619H		
Date	June 14, 2016	June 15, 2016	August 19, 2016
Temperature / Humidity	21 deg. C / 52 % RH	22 deg. C / 64 % RH	23 deg. C / 62 % RH
Engineer	Takafumi Noguchi	Tomoki Matsui	Satofumi Matsuyama
	(1 GHz - 10 GHz)	(Above 10 GHz)	(Below 1 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	272.228	QP	38.0	13.0	9.7	32.0	28.7	46.0	17.3	
Hori	296.989	QP	48.7	13.5	9.9	31.9	40.2	46.0	5.8	
Hori	321.736	QP	34.1	14.0	10.1	31.9	26.3	46.0	19.7	
Hori	325.526	QP	32.8	14.1	10.1	31.9	25.1	46.0	20.9	
Hori	742.453	QP	30.2	20.2	12.6	31.8	31.2	46.0	14.8	
Hori	874.959	QP	36.0	21.8	13.3	31.1	40.0	46.0	6.0	
Hori	1875.126	PK	47.1	26.0	6.5	33.1	46.5	73.9	27.4	
Hori	2390.000	PK	50.1	26.7	6.8	32.7	50.9	73.9	23.0	
Hori	4804.000	PK	44.4	31.0	9.1	31.8	52.7	73.9	21.2	
Hori	7206.000	PK	42.8	35.7	8.9	32.6	54.8	73.9	19.1	Floor Noise
Hori	9608.000	PK	43.4	37.2	9.6	33.2	57.0	73.9	16.9	Floor Noise
Hori	20879.980	PK	48.2	38.2	-1.0	33.0	52.4	73.9	21.5	
Hori	1875.126	AV	41.4	26.0	6.5	33.1	40.8	53.9	13.1	
Hori	2390.000	AV	32.1	26.7	6.8	32.7	32.9	53.9	21.0	
Hori	4804.000	AV	32.8	31.0	9.1	31.8	41.1	53.9	12.8	
Hori	7206.000	AV	31.4	35.7	8.9	32.6	43.4	53.9	10.5	Floor Noise
Hori	9608.000	AV	32.4	37.2	9.6	33.2	46.0	53.9	7.9	Floor Noise
Hori	20879.980	AV	43.8	38.2	-1.0	33.0	48.0	53.9	5.9	
Vert	272.228	QP	33.7	13.0	9.7	32.0	24.4	46.0	21.6	
Vert	296.989	QP	44.1	13.5	9.9	31.9	35.6	46.0	10.4	
Vert	321.736	QP	31.2	14.0	10.1	31.9	23.4	46.0	22.6	
Vert	325.526	QP	29.5	14.1	10.1	31.9	21.8	46.0	24.2	
Vert	742.453	QP	25.6	20.2	12.6	31.8	26.6	46.0	19.4	
Vert	874.959	QP	36.4	21.8	13.3	31.1	40.4	46.0	5.6	
Vert	1875.126	PK	48.6	26.0	6.5	33.1	48.0	73.9	25.9	
Vert	2390.000	PK	50.5	26.7	6.8	32.7	51.3	73.9	22.6	
Vert	4804.000	PK	44.8	31.0	9.1	31.8	53.1	73.9	20.8	
Vert	7206.000	PK	42.7	35.7	8.9	32.6	54.7	73.9	19.2	Floor Noise
Vert	9608.000	PK	44.3	37.2	9.6	33.2	57.9	73.9	16.0	Floor Noise
Vert	20879.980	PK	50.4	38.2	-1.0	33.0	54.6	73.9	19.3	
Vert	1875.126	AV	43.6	26.0	6.5	33.1	43.0	53.9	10.9	
Vert	2390.000	AV	32.1	26.7	6.8	32.7	32.9	53.9	21.0	
Vert	4804.000	AV	33.5	31.0	9.1	31.8	41.8	53.9	12.1	
Vert	7206.000	AV	31.4	35.7	8.9	32.6	43.4	53.9	10.5	Floor Noise
Vert	9608.000	AV	32.7	37.2	9.6	33.2	46.3	53.9	7.6	Floor Noise
Vert	20879.980	AV	47.1	38.2	-1.0	33.0	51.3	53.9	2.6	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.53 dB

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

***These results have sufficient margin without taking account Dwell time factor.**

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	105.8	26.7	6.8	32.7	106.6	-	-	Carrier
Hori	2400.000	PK	50.7	26.7	6.8	32.7	51.5	86.6	35.1	
Vert	2402.000	PK	106.3	26.7	6.8	32.7	107.1	-	-	Carrier
Vert	2400.000	PK	50.8	26.7	6.8	32.7	51.6	87.1	35.5	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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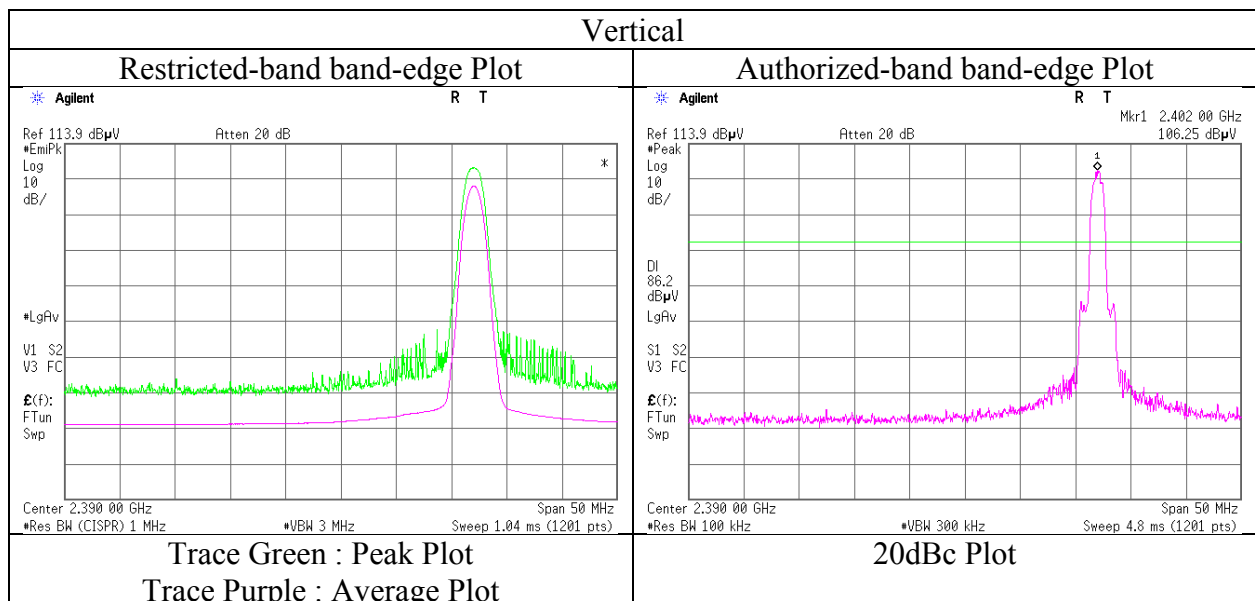
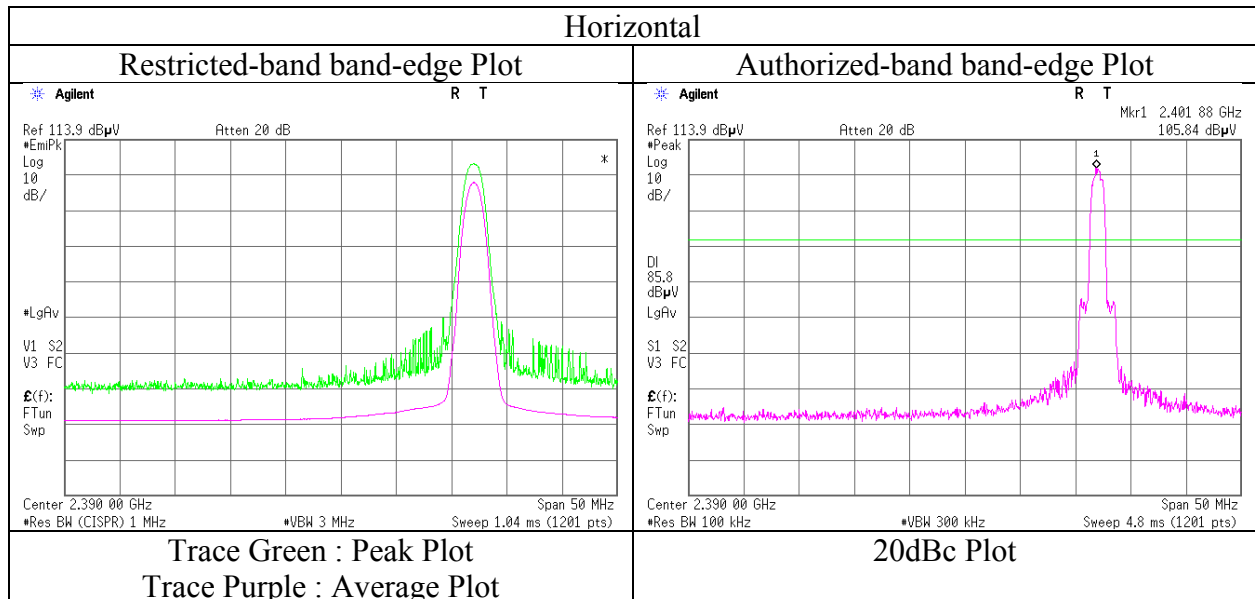
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission

Reference Plot for band-edge (Antenna : M/N 146153)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11182619H
Date	June 14, 2016
Temperature / Humidity	21 deg. C / 52 % RH
Engineer	Takafumi Noguchi
	(1 GHz - 10 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz



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

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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission

(Antenna : M/N 146153)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11182619H		
Date	June 14, 2016	June 15, 2016	August 19, 2016
Temperature / Humidity	21 deg. C / 52 % RH	22 deg. C / 64 % RH	23 deg. C / 62 % RH
Engineer	Takafumi Noguchi	Tomoki Matsui	Satofumi Matsuyama
	(1 GHz - 10 GHz)	(Above 10 GHz)	(Below 1 GHz)
Mode	Tx, Hopping Off, 3DH5 2441 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	272.228	QP	38.2	13.0	9.7	32.0	28.9	46.0	17.1	
Hori	296.989	QP	48.8	13.5	9.9	31.9	40.3	46.0	5.7	
Hori	321.736	QP	34.4	14.0	10.1	31.9	26.6	46.0	19.4	
Hori	325.526	QP	32.9	14.1	10.1	31.9	25.2	46.0	20.8	
Hori	742.453	QP	30.3	20.2	12.6	31.8	31.3	46.0	14.7	
Hori	874.959	QP	36.1	21.8	13.3	31.1	40.1	46.0	5.9	
Hori	1875.126	PK	47.6	26.0	6.5	33.1	47.0	73.9	26.9	
Hori	4882.000	PK	44.5	31.3	9.1	31.7	53.2	73.9	20.7	
Hori	7323.000	PK	42.9	35.6	8.9	32.6	54.8	73.9	19.1	Floor Noise
Hori	9764.000	PK	43.6	37.2	9.6	33.3	57.1	73.9	16.8	Floor Noise
Hori	20879.980	PK	48.3	38.2	-1.0	33.0	52.5	73.9	21.4	
Hori	1875.126	AV	41.4	26.0	6.5	33.1	40.8	53.9	13.1	
Hori	4882.000	AV	33.1	31.3	9.1	31.7	41.8	53.9	12.1	
Hori	7323.000	AV	30.7	35.6	8.9	32.6	42.6	53.9	11.3	Floor Noise
Hori	9764.000	AV	32.5	37.2	9.6	33.3	46.0	53.9	7.9	Floor Noise
Hori	20879.980	AV	43.9	38.2	-1.0	33.0	48.1	53.9	5.8	
Vert	272.228	QP	33.9	13.0	9.7	32.0	24.6	46.0	21.4	
Vert	296.989	QP	44.5	13.5	9.9	31.9	36.0	46.0	10.0	
Vert	321.736	QP	31.6	14.0	10.1	31.9	23.8	46.0	22.2	
Vert	325.526	QP	29.6	14.1	10.1	31.9	21.9	46.0	24.1	
Vert	742.453	QP	25.7	20.2	12.6	31.8	26.7	46.0	19.3	
Vert	874.959	QP	36.8	21.8	13.3	31.1	40.8	46.0	5.2	
Vert	1875.126	PK	48.3	26.0	6.5	33.1	47.7	73.9	26.2	
Vert	4882.000	PK	44.2	31.3	9.1	31.7	52.9	73.9	21.0	
Vert	7323.000	PK	42.1	35.6	8.9	32.6	54.0	73.9	19.9	Floor Noise
Vert	9764.000	PK	43.7	37.2	9.6	33.3	57.2	73.9	16.7	Floor Noise
Vert	20879.980	PK	50.2	38.2	-1.0	33.0	54.4	73.9	19.5	
Vert	1875.126	AV	43.6	26.0	6.5	33.1	43.0	53.9	10.9	
Vert	4882.000	AV	33.3	31.3	9.1	31.7	42.0	53.9	11.9	
Vert	7323.000	AV	30.7	35.6	8.9	32.6	42.6	53.9	11.3	Floor Noise
Vert	9764.000	AV	32.5	37.2	9.6	33.3	46.0	53.9	7.9	Floor Noise
Vert	20879.980	AV	47.0	38.2	-1.0	33.0	51.2	53.9	2.7	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.53 dB

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

***These results have sufficient margin without taking account Dwell time factor.**

Radiated Spurious Emission
(Antenna : M/N 146153)

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11182619H
Date : June 14, 2016 June 15, 2016 August 19, 2016
Temperature / Humidity : 21 deg. C / 52 % RH 22 deg. C / 64 % RH 23 deg. C / 62 % RH
Engineer : Takafumi Noguchi Tomoki Matsui Satofumi Matsuyama
(1 GHz - 10 GHz) (Above 10 GHz) (Below 1 GHz)
Mode : Tx, Hopping Off, 3DH5 2480 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	272.228	QP	36.5	13.0	9.7	32.0	27.2	46.0	18.8	
Hori	296.989	QP	49.1	13.5	9.9	31.9	40.6	46.0	5.4	
Hori	321.736	QP	35.7	14.0	10.1	31.9	27.9	46.0	18.1	
Hori	325.526	QP	33.1	14.1	10.1	31.9	25.4	46.0	20.6	
Hori	742.453	QP	29.0	20.2	12.6	31.8	30.0	46.0	16.0	
Hori	874.959	QP	36.1	21.8	13.3	31.1	40.1	46.0	5.9	
Hori	1875.126	PK	47.5	26.0	6.5	33.1	46.9	73.9	27.0	
Hori	2483.500	PK	59.7	26.8	6.9	32.6	60.8	73.9	13.1	
Hori	4960.000	PK	43.8	31.5	9.0	31.7	52.6	73.9	21.3	
Hori	7440.000	PK	42.9	35.5	9.0	32.7	54.7	73.9	19.2	Floor Noise
Hori	9920.000	PK	43.8	37.2	9.7	33.4	57.3	73.9	16.6	Floor Noise
Hori	20879.980	PK	48.0	38.2	-1.0	33.0	52.2	73.9	21.7	
Hori	1875.126	AV	43.6	26.0	6.5	33.1	43.0	53.9	10.9	
Hori	2483.500	AV	36.1	26.8	6.9	32.6	37.2	53.9	16.7	
Hori	4960.000	AV	33.0	31.5	9.0	31.7	41.8	53.9	12.1	
Hori	7440.000	AV	30.8	35.5	9.0	32.7	42.6	53.9	11.3	Floor Noise
Hori	9920.000	AV	32.2	37.2	9.7	33.4	45.7	53.9	8.2	Floor Noise
Hori	20879.980	AV	43.9	38.2	-1.0	33.0	48.1	53.9	5.8	
Vert	272.228	QP	35.1	13.0	9.7	32.0	25.8	46.0	20.2	
Vert	296.989	QP	44.7	13.5	9.9	31.9	36.2	46.0	9.8	
Vert	321.736	QP	31.3	14.0	10.1	31.9	23.5	46.0	22.5	
Vert	325.526	QP	29.3	14.1	10.1	31.9	21.6	46.0	24.4	
Vert	742.453	QP	29.1	20.2	12.6	31.8	30.1	46.0	15.9	
Vert	874.959	QP	36.8	21.8	13.3	31.1	40.8	46.0	5.2	
Vert	1875.126	PK	48.3	26.0	6.5	33.1	47.7	73.9	26.2	
Vert	2483.500	PK	60.4	26.8	6.9	32.6	61.5	73.9	12.4	
Vert	4960.000	PK	44.1	31.5	9.0	31.7	52.9	73.9	21.0	
Vert	7440.000	PK	42.2	35.5	9.0	32.7	54.0	73.9	19.9	Floor Noise
Vert	9920.000	PK	43.7	37.2	9.7	33.4	57.2	73.9	16.7	Floor Noise
Vert	20879.980	PK	50.0	38.2	-1.0	33.0	54.2	73.9	19.7	
Vert	1875.126	AV	43.5	26.0	6.5	33.1	42.9	53.9	11.0	
Vert	2483.500	AV	36.7	26.8	6.9	32.6	37.8	53.9	16.1	
Vert	4960.000	AV	32.7	31.5	9.0	31.7	41.5	53.9	12.4	
Vert	7440.000	AV	30.3	35.5	9.0	32.7	42.1	53.9	11.8	Floor Noise
Vert	9920.000	AV	32.1	37.2	9.7	33.4	45.6	53.9	8.3	Floor Noise
Vert	20879.980	AV	47.0	38.2	-1.0	33.0	51.2	53.9	2.7	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

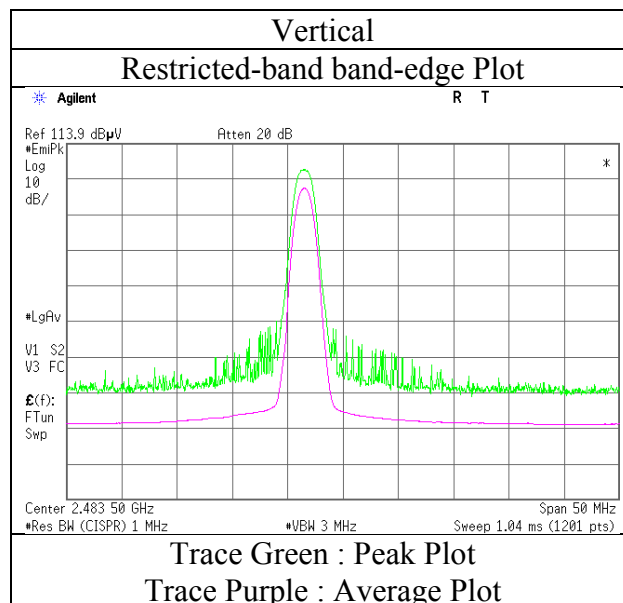
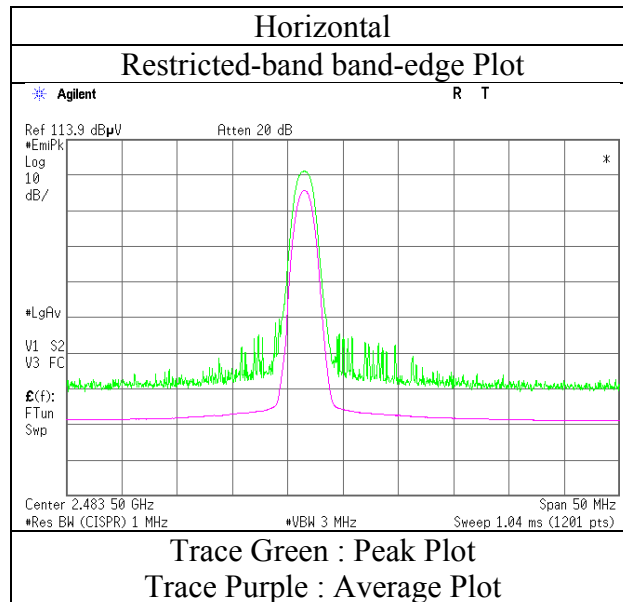
*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.53 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

***These results have sufficient margin without taking account Dwell time factor.**

Radiated Spurious Emission
Reference Plot for band-edge (Antenna : M/N 146153)

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11182619H
Date : June 14, 2016
Temperature / Humidity : 21 deg. C / 52 % RH
Engineer : Takafumi Noguchi
(1 GHz - 10 GHz)
Mode : Tx, Hopping Off, 3DH5 2480 MHz



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

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Ise EMC Lab.

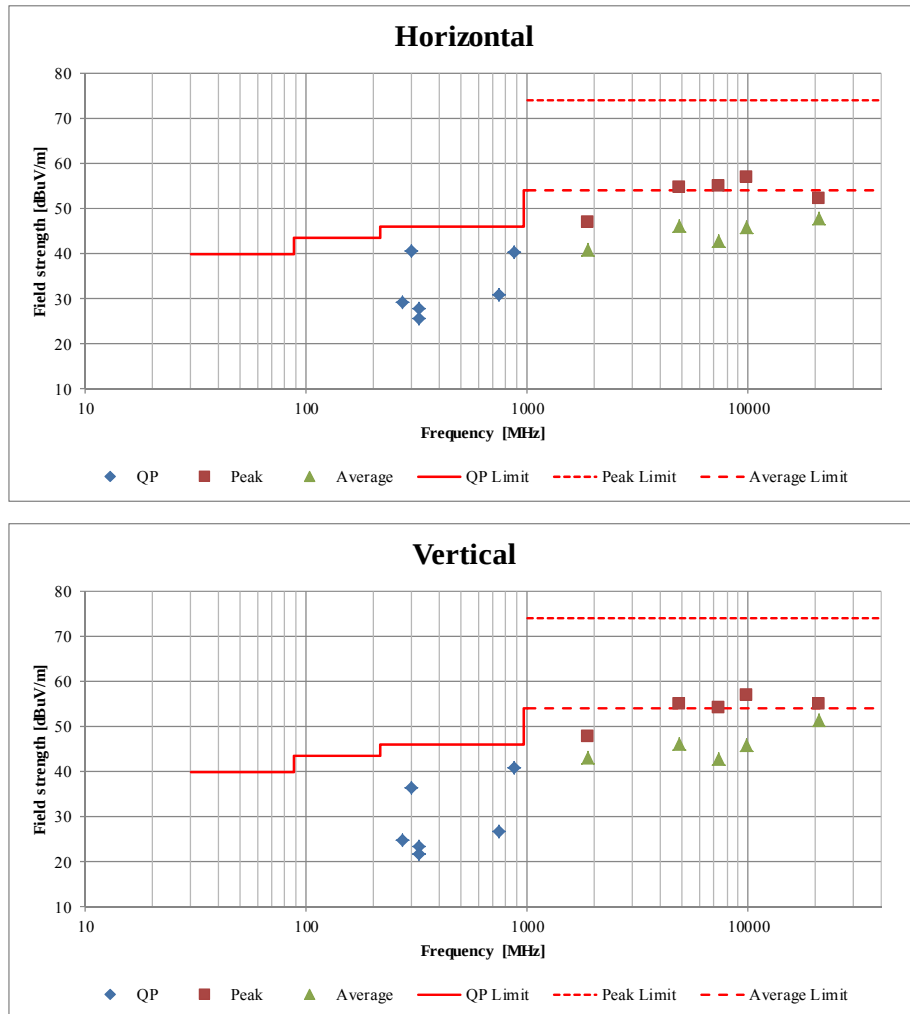
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Radiated Spurious Emission
Plot data, Worst case (Antenna : M/N 146153)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11182619H		
Date	June 14, 2016	June 15, 2016	August 19, 2016
Temperature / Humidity	21 deg. C / 52 % RH	22 deg. C / 64 % RH	23 deg. C / 62 % RH
Engineer	Takafumi Noguchi	Tomoki Matsui	Satofumi Matsuyama
	(1 GHz - 10 GHz)	(Above 10 GHz)	(Below 1 GHz)
Mode	Tx, Hopping Off, DH5 2441 MHz		



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

Radiated Spurious Emission

(Antenna : M/N H2U84W1H1S)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11182619H		
Date	June 20, 2016	June 21, 2016	August 19, 2016
Temperature / Humidity	23 deg. C / 70 % RH	21 deg. C / 54 % RH	22 deg. C / 54 % RH
Engineer	Yuta Moriya	Keisuke Kawamura	Takafumi Noguchi
	(1 GHz - 10 GHz)	(Above 10 GHz)	(Below 1 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	272.228	QP	35.8	13.0	9.7	32.0	-	26.5	46.0	19.5	
Hori	296.989	QP	46.8	13.5	9.9	31.9	-	38.3	46.0	7.7	
Hori	321.736	QP	34.8	14.0	10.1	31.9	-	27.0	46.0	19.0	
Hori	325.526	QP	32.5	14.1	10.1	31.9	-	24.8	46.0	21.2	
Hori	742.453	QP	33.3	20.2	12.6	31.8	-	34.3	46.0	11.7	
Hori	874.959	QP	34.8	21.8	13.3	31.1	-	38.8	46.0	7.2	
Hori	2390.000	PK	42.9	26.7	6.8	32.7	-	43.7	73.9	30.2	
Hori	4804.000	PK	43.9	31.0	9.1	31.8	-	52.2	73.9	21.7	
Hori	7206.000	PK	42.5	35.7	10.3	32.6	-	55.9	73.9	18.0	Floor noise
Hori	9608.000	PK	44.6	37.2	11.0	33.2	-	59.6	73.9	14.3	Floor noise
Hori	20880.060	PK	44.4	38.2	-1.0	33.0	-	48.6	73.9	25.3	
Hori	2390.000	AV	28.6	26.7	6.8	32.7	-	29.4	53.9	24.5	
Hori	4804.000	AV	34.0	31.0	9.1	31.8	-	42.3	53.9	11.6	
Hori	7206.000	AV	30.9	35.7	10.3	32.6	-	44.3	53.9	9.6	Floor noise
Hori	9608.000	AV	32.4	37.2	11.0	33.2	-	47.4	53.9	6.5	Floor noise
Hori	20880.060	AV	36.5	38.2	-1.0	33.0	-	40.7	53.9	13.2	
Vert	272.228	QP	31.3	13.0	9.7	32.0	-	22.0	46.0	24.0	
Vert	296.989	QP	40.4	13.5	9.9	31.9	-	31.9	46.0	14.1	
Vert	321.736	QP	28.3	14.0	10.1	31.9	-	20.5	46.0	25.5	
Vert	325.526	QP	26.8	14.1	10.1	31.9	-	19.1	46.0	26.9	
Vert	742.453	QP	29.5	20.2	12.6	31.8	-	30.5	46.0	15.5	
Vert	874.959	QP	34.2	21.8	13.3	31.1	-	38.2	46.0	7.8	
Vert	2390.000	PK	41.5	26.7	6.8	32.7	-	42.3	73.9	31.6	
Vert	4804.000	PK	42.8	31.0	9.1	31.8	-	51.1	73.9	22.8	
Vert	7206.000	PK	42.4	35.7	10.3	32.6	-	55.8	73.9	18.1	
Vert	9608.000	PK	44.6	37.2	11.0	33.2	-	59.6	73.9	14.3	Floor noise
Vert	20880.060	PK	49.4	38.2	-1.0	33.0	-	53.6	73.9	20.3	
Vert	2390.000	AV	28.7	26.7	6.8	32.7	-	29.5	53.9	24.4	
Vert	4804.000	AV	32.6	31.0	9.1	31.8	-	40.9	53.9	13.0	
Vert	7206.000	AV	30.9	35.7	10.3	32.6	-	44.3	53.9	9.6	Floor noise
Vert	9608.000	AV	32.4	37.2	11.0	33.2	-	47.4	53.9	6.5	Floor noise
Vert	20880.060	AV	46.1	38.2	-1.0	33.0	-	50.3	53.9	3.6	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.53 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

***These results have sufficient margin without taking account Dwell time factor.**

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	100.6	26.7	6.8	32.7	101.4	-	-	Carrier
Hori	2400.000	PK	41.3	26.7	6.8	32.7	42.1	81.4	39.3	
Vert	2402.000	PK	100.4	26.7	6.8	32.7	101.2	-	-	Carrier
Vert	2400.000	PK	40.0	26.7	6.8	32.7	40.8	81.2	40.4	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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Ise EMC Lab.

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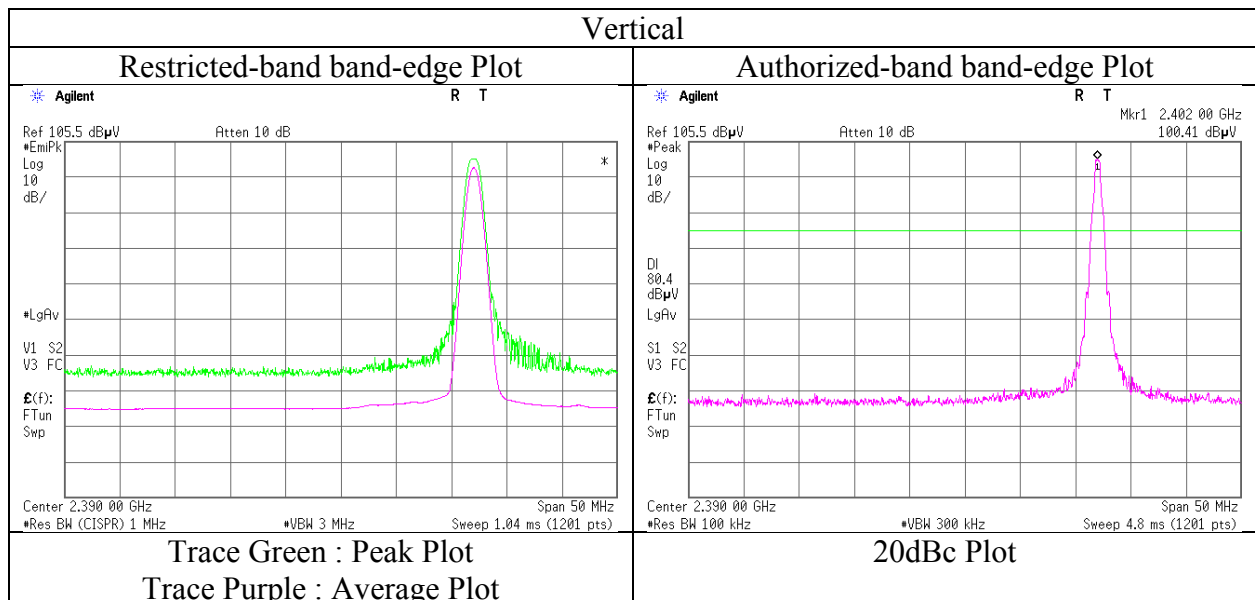
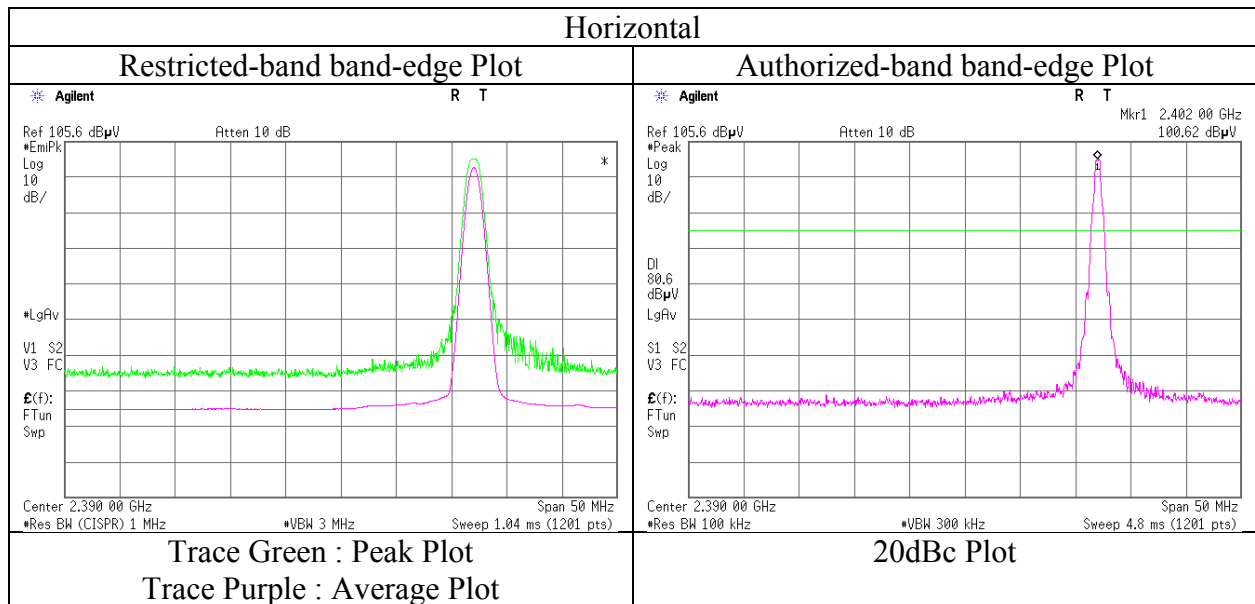
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission

Reference Plot for band-edge (Antenna : M/N H2U84W1H1S)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11182619H
Date	June 20, 2016
Temperature / Humidity	23 deg. C / 70 % RH
Engineer	Yuta Moriya
	(1 GHz - 10 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz



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

UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission
(Antenna : M/N H2U84W1H1S)

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11182619H
Date : June 20, 2016 June 21, 2016 August 19, 2016
Temperature / Humidity : 23 deg. C / 70 % RH 21 deg. C / 54 % RH 22 deg. C / 548 % RH
Engineer : Yuta Moriya Keisuke Kawamura Takafumi Noguchi
(1 GHz - 10 GHz) (Above 10 GHz) (Below 1 GHz)
Mode : Tx, Hopping Off, DH5 2441 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	272.228	QP	36.3	13.0	9.7	32.0	-	27.0	46.0	19.0	
Hori	296.989	QP	46.8	13.5	9.9	31.9	-	38.3	46.0	7.7	
Hori	321.736	QP	34.0	14.0	10.1	31.9	-	26.2	46.0	19.8	
Hori	325.526	QP	31.4	14.1	10.1	31.9	-	23.7	46.0	22.3	
Hori	742.453	QP	33.2	20.2	12.6	31.8	-	34.2	46.0	11.8	
Hori	874.959	QP	34.6	21.8	13.3	31.1	-	38.6	46.0	7.4	
Hori	4882.000	PK	43.3	31.3	9.1	31.7	-	52.0	73.9	21.9	
Hori	7323.000	PK	42.8	35.6	10.3	32.6	-	56.1	73.9	17.8	Floor noise
Hori	9764.000	PK	43.7	37.2	11.0	33.3	-	58.6	73.9	15.3	Floor noise
Hori	20880.060	PK	45.1	38.2	-1.0	33.0	-	49.3	73.9	24.6	
Hori	4882.000	AV	33.2	31.3	9.1	31.7	-	41.9	53.9	12.0	
Hori	7323.000	AV	30.2	35.6	10.3	32.6	-	43.5	53.9	10.4	Floor noise
Hori	9764.000	AV	32.0	37.2	11.0	33.3	-	46.9	53.9	7.0	Floor noise
Hori	20880.060	AV	36.3	38.2	-1.0	33.0	-	40.5	53.9	13.4	
Vert	272.228	QP	31.2	13.0	9.7	32.0	-	21.9	46.0	24.1	
Vert	296.989	QP	40.6	13.5	9.9	31.9	-	32.1	46.0	13.9	
Vert	321.736	QP	28.3	14.0	10.1	31.9	-	20.5	46.0	25.5	
Vert	325.526	QP	26.7	14.1	10.1	31.9	-	19.0	46.0	27.0	
Vert	742.453	QP	29.6	20.2	12.6	31.8	-	30.6	46.0	15.4	
Vert	874.959	QP	34.2	21.8	13.3	31.1	-	38.2	46.0	7.8	
Vert	4882.000	PK	42.8	31.3	9.1	31.7	-	51.5	73.9	22.4	
Vert	7323.000	PK	42.4	35.6	10.3	32.6	-	55.7	73.9	18.2	Floor noise
Vert	9764.000	PK	44.2	37.2	11.0	33.3	-	59.1	73.9	14.8	Floor noise
Vert	20880.060	PK	49.6	38.2	-1.0	33.0	-	53.8	73.9	20.1	
Vert	4882.000	AV	31.7	31.3	9.1	31.7	-	40.4	53.9	13.5	
Vert	7323.000	AV	30.6	35.6	10.3	32.6	-	43.9	53.9	10.0	Floor noise
Vert	9764.000	AV	32.3	37.2	11.0	33.3	-	47.2	53.9	6.7	Floor noise
Vert	20880.060	AV	46.0	38.2	-1.0	33.0	-	50.2	53.9	3.7	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.53 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

***These results have sufficient margin without taking account Dwell time factor.**

Radiated Spurious Emission

(Antenna : M/N H2U84W1H1S)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11182619H		
Date	June 20, 2016	June 21, 2016	August 19, 2016
Temperature / Humidity	23 deg. C / 70 % RH	21 deg. C / 54 % RH	22 deg. C / 548 % RH
Engineer	Yuta Moriya	Keisuke Kawamura	Takafumi Noguchi
	(1 GHz - 10 GHz)	(Above 10 GHz)	(Below 1 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	272.228	QP	36.0	13.0	9.7	32.0	-	26.7	46.0	19.3	
Hori	296.989	QP	47.1	13.5	9.9	31.9	-	38.6	46.0	7.4	
Hori	321.736	QP	34.1	14.0	10.1	31.9	-	26.3	46.0	19.7	
Hori	325.526	QP	31.3	14.1	10.1	31.9	-	23.6	46.0	22.4	
Hori	742.453	QP	33.2	20.2	12.6	31.8	-	34.2	46.0	11.8	
Hori	874.959	QP	34.6	21.8	13.3	31.1	-	38.6	46.0	7.4	
Hori	2483.500	PK	56.0	26.8	6.9	32.6	-	57.1	73.9	16.8	
Hori	4960.000	PK	43.0	31.5	9.0	31.7	-	51.8	73.9	22.1	
Hori	7440.000	PK	42.0	35.5	10.3	32.7	-	55.1	73.9	18.8	Floor noise
Hori	9920.000	PK	43.5	37.2	11.1	33.4	-	58.4	73.9	15.5	Floor noise
Hori	20880.060	PK	45.1	38.2	-1.0	33.0	-	49.3	73.9	24.6	
Hori	2483.500	AV	34.0	26.8	6.9	32.6	-	35.1	53.9	18.8	
Hori	4960.000	AV	32.6	31.5	9.0	31.7	-	41.4	53.9	12.5	
Hori	7440.000	AV	30.1	35.5	10.3	32.7	-	43.2	53.9	10.7	Floor noise
Hori	9920.000	AV	32.1	37.2	11.1	33.4	-	47.0	53.9	6.9	Floor noise
Hori	20880.060	AV	36.2	38.2	-1.0	33.0	-	40.4	53.9	13.5	
Vert	272.228	QP	31.1	13.0	9.7	32.0	-	21.8	46.0	24.2	
Vert	296.989	QP	41.2	13.5	9.9	31.9	-	32.7	46.0	13.3	
Vert	321.736	QP	28.1	14.0	10.1	31.9	-	20.3	46.0	25.7	
Vert	325.526	QP	26.7	14.1	10.1	31.9	-	19.0	46.0	27.0	
Vert	742.453	QP	29.8	20.2	12.6	31.8	-	30.8	46.0	15.2	
Vert	874.959	QP	34.1	21.8	13.3	31.1	-	38.1	46.0	7.9	
Vert	2483.500	PK	55.1	26.8	6.9	32.6	-	56.2	73.9	17.7	
Vert	4960.000	PK	42.0	31.5	9.0	31.7	-	50.8	73.9	23.1	
Vert	7440.000	PK	41.8	35.5	10.3	32.7	-	54.9	73.9	19.0	Floor noise
Vert	9920.000	PK	44.1	37.2	11.1	33.4	-	59.0	73.9	14.9	Floor noise
Vert	20880.060	PK	49.5	38.2	-1.0	33.0	-	53.7	73.9	20.2	
Vert	2483.500	AV	34.0	26.8	6.9	32.6	-	35.1	53.9	18.8	
Vert	4960.000	AV	31.1	31.5	9.0	31.7	-	39.9	53.9	14.0	
Vert	7440.000	AV	30.2	35.5	10.3	32.7	-	43.3	53.9	10.6	Floor noise
Vert	9920.000	AV	32.1	37.2	11.1	33.4	-	47.0	53.9	6.9	Floor noise
Vert	20880.060	AV	46.0	38.2	-1.0	33.0	-	50.2	53.9	3.7	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

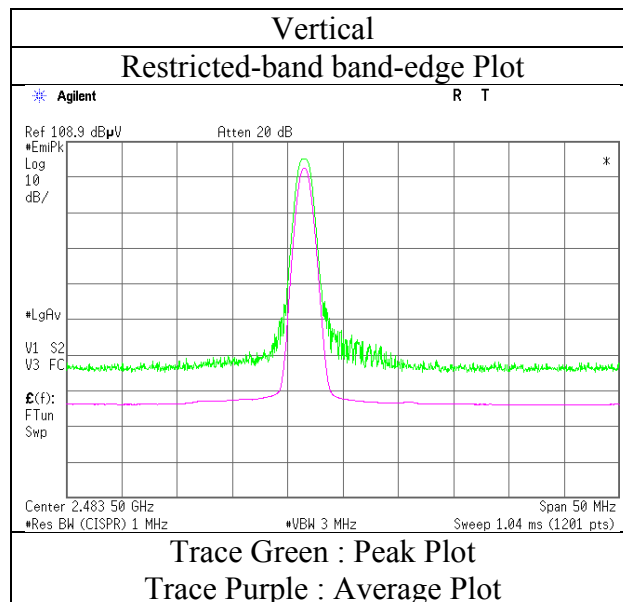
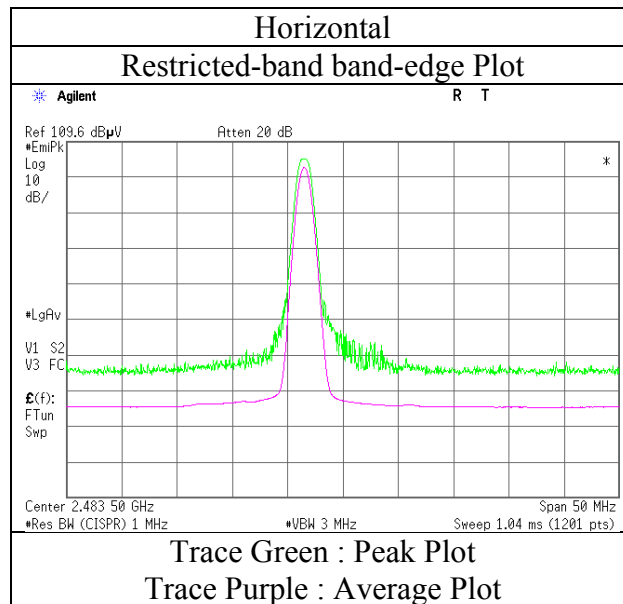
Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.53 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

***These results have sufficient margin without taking account Dwell time factor.**

Radiated Spurious Emission

Reference Plot for band-edge (Antenna : M/N H2U84W1H1S)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11182619H
Date	June 20, 2016
Temperature / Humidity	23 deg. C / 70 % RH
Engineer	Yuta Moriya
	(1 GHz - 10 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz



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

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Radiated Spurious Emission

(Antenna : M/N H2U84W1H1S)

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11182619H
Date : June 20, 2016 June 21, 2016 August 19, 2016
Temperature / Humidity : 23 deg. C / 70 % RH 21 deg. C / 54 % RH 22 deg. C / 548 % RH
Engineer : Yuta Moriya Keisuke Kawamura Takafumi Noguchi
(1 GHz - 10 GHz) (Above 10 GHz) (Below 1 GHz)
Mode : Tx, Hopping Off, 3DH5 2402 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	272.228	QP	35.9	13.0	9.7	32.0	-	26.6	46.0	19.4	
Hori	296.989	QP	47.2	13.5	9.9	31.9	-	38.7	46.0	7.3	
Hori	321.736	QP	34.1	14.0	10.1	31.9	-	26.3	46.0	19.7	
Hori	325.526	QP	31.3	14.1	10.1	31.9	-	23.6	46.0	22.4	
Hori	742.453	QP	33.1	20.2	12.6	31.8	-	34.1	46.0	11.9	
Hori	874.959	QP	34.4	21.8	13.3	31.1	-	38.4	46.0	7.6	
Hori	2390.000	PK	43.4	26.7	6.8	32.7	-	44.2	73.9	29.7	
Hori	4804.000	PK	41.7	31.0	9.1	31.8	-	50.0	73.9	23.9	
Hori	7206.000	PK	42.3	35.7	10.3	32.6	-	55.7	73.9	18.2	Floor noise
Hori	9608.000	PK	44.4	37.2	11.0	33.2	-	59.4	73.9	14.5	Floor noise
Hori	20880.060	PK	45.2	38.2	-1.0	33.0	-	49.4	73.9	24.5	
Hori	2390.000	AV	30.2	26.7	6.8	32.7	-	31.0	53.9	22.9	
Hori	4804.000	AV	30.9	31.0	9.1	31.8	-	39.2	53.9	14.7	
Hori	7206.000	AV	31.0	35.7	10.3	32.6	-	44.4	53.9	9.5	Floor noise
Hori	9608.000	AV	32.1	37.2	11.0	33.2	-	47.1	53.9	6.8	Floor noise
Hori	20880.060	AV	37.9	38.2	-1.0	33.0	-	42.1	53.9	11.8	
Vert	272.228	QP	31.2	13.0	9.7	32.0	-	21.9	46.0	24.1	
Vert	296.989	QP	41.5	13.5	9.9	31.9	-	33.0	46.0	13.0	
Vert	321.736	QP	28.6	14.0	10.1	31.9	-	20.8	46.0	25.2	
Vert	325.526	QP	26.5	14.1	10.1	31.9	-	18.8	46.0	27.2	
Vert	742.453	QP	29.7	20.2	12.6	31.8	-	30.7	46.0	15.3	
Vert	874.959	QP	34.1	21.8	13.3	31.1	-	38.1	46.0	7.9	
Vert	2390.000	PK	42.3	26.7	6.8	32.7	-	43.1	73.9	30.8	
Vert	4804.000	PK	42.2	31.0	9.1	31.8	-	50.5	73.9	23.4	
Vert	7206.000	PK	42.3	35.7	10.3	32.6	-	55.7	73.9	18.2	Floor noise
Vert	9608.000	PK	44.4	37.2	11.0	33.2	-	59.4	73.9	14.5	Floor noise
Vert	20880.060	PK	49.5	38.2	-1.0	33.0	-	53.7	73.9	20.2	
Vert	2390.000	AV	28.7	26.7	6.8	32.7	-	29.5	53.9	24.4	
Vert	4804.000	AV	30.8	31.0	9.1	31.8	-	39.1	53.9	14.8	
Vert	7206.000	AV	30.8	35.7	10.3	32.6	-	44.2	53.9	9.7	Floor noise
Vert	9608.000	AV	32.1	37.2	11.0	33.2	-	47.1	53.9	6.8	Floor noise
Vert	20880.060	AV	46.2	38.2	-1.0	33.0	-	50.4	53.9	3.5	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

Distance factor: 1 GHz - 10 GHz $20\log(4.5\text{ m} / 3.0\text{ m}) = 3.53\text{ dB}$
10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

***These results have sufficient margin without taking account Dwell time factor.**

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	98.6	26.7	6.8	32.7	99.4	-	-	Carrier
Hori	2400.000	PK	43.2	26.7	6.8	32.7	44.0	79.4	35.4	
Vert	2402.000	PK	98.1	26.7	6.8	32.7	98.9	-	-	Carrier
Vert	2400.000	PK	42.7	26.7	6.8	32.7	43.5	78.9	35.4	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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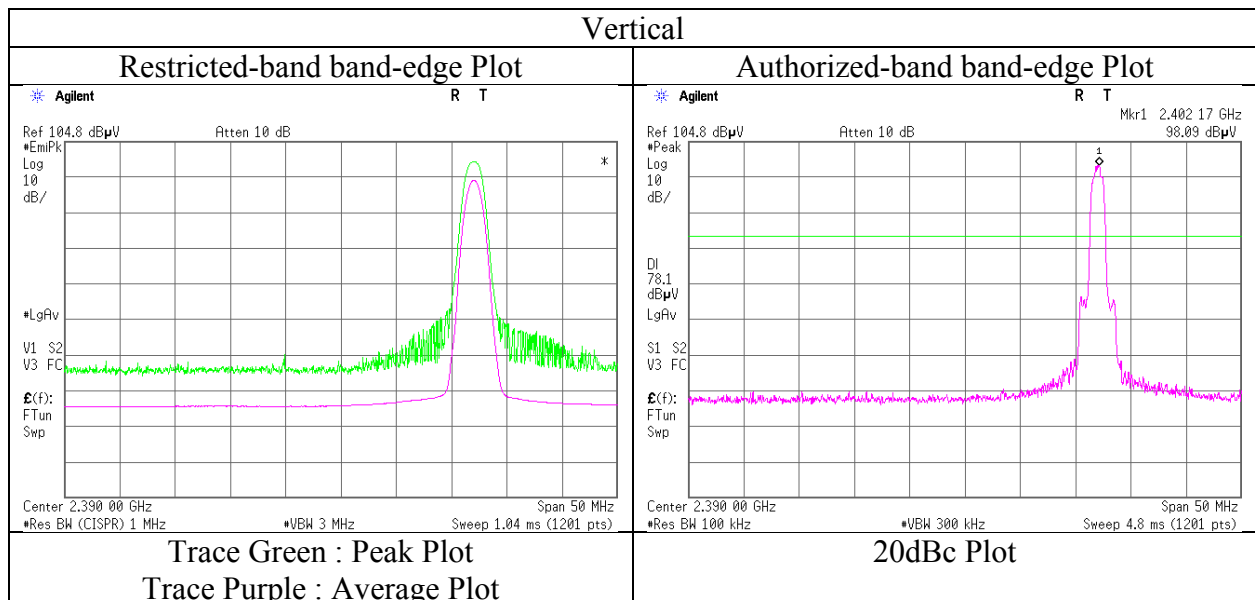
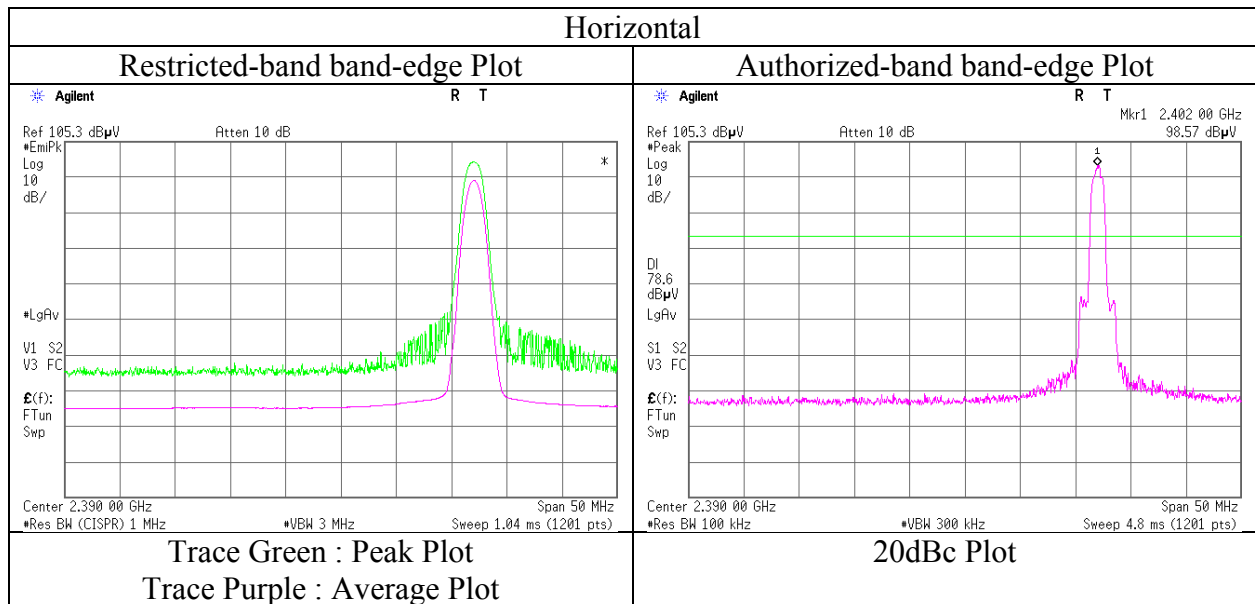
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission

Reference Plot for band-edge (Antenna : M/N H2U84W1H1S)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11182619H
Date	June 20, 2016
Temperature / Humidity	23 deg. C / 70 % RH
Engineer	Yuta Moriya
	(1 GHz - 10 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz



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

UL Japan, Inc.

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Facsimile : +81 596 24 8124

Radiated Spurious Emission
(Antenna : M/N H2U84W1H1S)

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11182619H
Date : June 20, 2016 June 21, 2016 August 19, 2016
Temperature / Humidity : 23 deg. C / 70 % RH 21 deg. C / 54 % RH 22 deg. C / 548 % RH
Engineer : Yuta Moriya Keisuke Kawamura Takafumi Noguchi
(1 GHz - 10 GHz) (Above 10 GHz) (Below 1 GHz)
Mode : Tx, Hopping Off, 3DH5 2441 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	272.228	QP	36.5	13.0	9.7	32.0	-	27.2	46.0	18.8	
Hori	296.989	QP	46.8	13.5	9.9	31.9	-	38.3	46.0	7.7	
Hori	321.736	QP	34.0	14.0	10.1	31.9	-	26.2	46.0	19.8	
Hori	325.526	QP	32.0	14.1	10.1	31.9	-	24.3	46.0	21.7	
Hori	742.453	QP	33.1	20.2	12.6	31.8	-	34.1	46.0	11.9	
Hori	874.959	QP	34.6	21.8	13.3	31.1	-	38.6	46.0	7.4	
Hori	4882.000	PK	42.7	31.3	9.1	31.7	-	51.4	73.9	22.5	
Hori	7323.000	PK	42.5	35.6	10.3	32.6	-	55.8	73.9	18.1	Floor noise
Hori	9764.000	PK	43.3	37.2	11.0	33.3	-	58.2	73.9	15.7	Floor noise
Hori	20880.060	PK	44.4	38.2	-1.0	33.0	-	48.6	73.9	25.3	
Hori	4882.000	AV	30.9	31.3	9.1	31.7	-	39.6	53.9	14.3	
Hori	7323.000	AV	30.1	35.6	10.3	32.6	-	43.4	53.9	10.5	Floor noise
Hori	9764.000	AV	31.9	37.2	11.0	33.3	-	46.8	53.9	7.1	Floor noise
Hori	20880.060	AV	36.5	38.2	-1.0	33.0	-	40.7	53.9	13.2	
Vert	272.228	QP	31.2	13.0	9.7	32.0	-	21.9	46.0	24.1	
Vert	296.989	QP	40.5	13.5	9.9	31.9	-	32.0	46.0	14.0	
Vert	321.736	QP	27.9	14.0	10.1	31.9	-	20.1	46.0	25.9	
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Vert	7323.000	PK	42.3	35.6	10.3	32.6	-	55.6	73.9	18.3	Floor noise
Vert	9764.000	PK	44.1	37.2	11.0	33.3	-	59.0	73.9	14.9	Floor noise
Vert	20880.060	PK	49.4	38.2	-1.0	33.0	-	53.6	73.9	20.3	
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Vert	9764.000	AV	32.0	37.2	11.0	33.3	-	46.9	53.9	7.0	Floor noise
Vert	20880.060	AV	46.1	38.2	-1.0	33.0	-	50.3	53.9	3.6	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.53 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

***These results have sufficient margin without taking account Dwell time factor.**

Radiated Spurious Emission

(Antenna : M/N H2U84W1H1S)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11182619H		
Date	June 20, 2016	June 21, 2016	August 19, 2016
Temperature / Humidity	23 deg. C / 70 % RH	21 deg. C / 54 % RH	22 deg. C / 548 % RH
Engineer	Yuta Moriya	Keisuke Kawamura	Takafumi Noguchi
	(1 GHz - 10 GHz)	(Above 10 GHz)	(Below 1 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	272.228	QP	36.3	13.0	9.7	32.0	-	27.0	46.0	19.0	
Hori	296.989	QP	46.7	13.5	9.9	31.9	-	38.2	46.0	7.8	
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Hori	325.526	QP	31.9	14.1	10.1	31.9	-	24.2	46.0	21.8	
Hori	742.453	QP	33.1	20.2	12.6	31.8	-	34.1	46.0	11.9	
Hori	874.959	QP	34.7	21.8	13.3	31.1	-	38.7	46.0	7.3	
Hori	2483.500	PK	57.0	26.8	6.9	32.6	-	58.1	73.9	15.8	
Hori	4960.000	PK	41.6	31.5	9.0	31.7	-	50.4	73.9	23.5	
Hori	7440.000	PK	42.2	35.5	10.3	32.7	-	55.3	73.9	18.6	Floor noise
Hori	9920.000	PK	44.0	37.2	11.1	33.4	-	58.9	73.9	15.0	Floor noise
Hori	20880.060	PK	45.1	38.2	-1.0	33.0	-	49.3	73.9	24.6	
Hori	2483.500	AV	34.9	26.8	6.9	32.6	-	36.0	53.9	17.9	
Hori	4960.000	AV	30.2	31.5	9.0	31.7	-	39.0	53.9	14.9	
Hori	7440.000	AV	30.2	35.5	10.3	32.7	-	43.3	53.9	10.6	Floor noise
Hori	9920.000	AV	31.7	37.2	11.1	33.4	-	46.6	53.9	7.3	Floor noise
Hori	20880.060	AV	36.2	38.2	-1.0	33.0	-	40.4	53.9	13.5	
Vert	272.228	QP	31.2	13.0	9.7	32.0	-	21.9	46.0	24.1	
Vert	296.989	QP	40.5	13.5	9.9	31.9	-	32.0	46.0	14.0	
Vert	321.736	QP	28.1	14.0	10.1	31.9	-	20.3	46.0	25.7	
Vert	325.526	QP	26.6	14.1	10.1	31.9	-	18.9	46.0	27.1	
Vert	742.453	QP	29.8	20.2	12.6	31.8	-	30.8	46.0	15.2	
Vert	874.959	QP	34.1	21.8	13.3	31.1	-	38.1	46.0	7.9	
Vert	2483.500	PK	56.7	26.8	6.9	32.6	-	57.8	73.9	16.1	
Vert	4960.000	PK	41.9	31.5	9.0	31.7	-	50.7	73.9	23.2	
Vert	7440.000	PK	41.3	35.5	10.3	32.7	-	54.4	73.9	19.5	Floor noise
Vert	9920.000	PK	44.0	37.2	11.1	33.4	-	58.9	73.9	15.0	Floor noise
Vert	20880.060	PK	49.5	38.2	-1.0	33.0	-	53.7	73.9	20.2	
Vert	2483.500	AV	33.6	26.8	6.9	32.6	-	34.7	53.9	19.2	
Vert	4960.000	AV	30.6	31.5	9.0	31.7	-	39.4	53.9	14.5	
Vert	7440.000	AV	30.1	35.5	10.3	32.7	-	43.2	53.9	10.7	Floor noise
Vert	9920.000	AV	31.8	37.2	11.1	33.4	-	46.7	53.9	7.2	Floor noise
Vert	20880.060	AV	46.0	38.2	-1.0	33.0	-	50.2	53.9	3.7	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

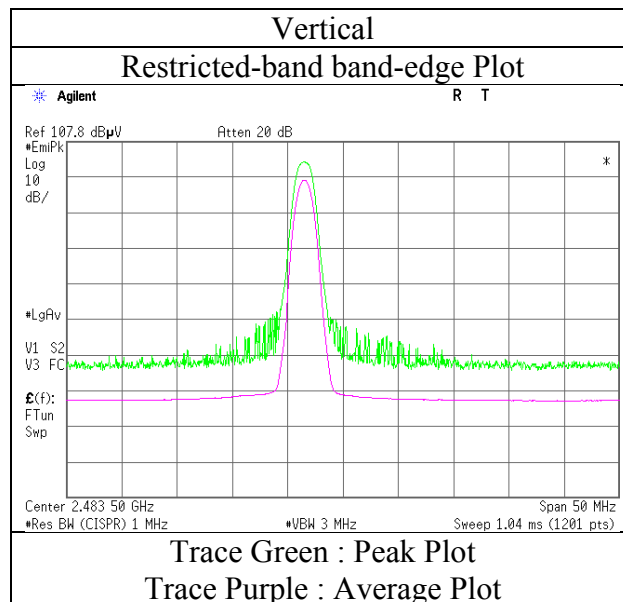
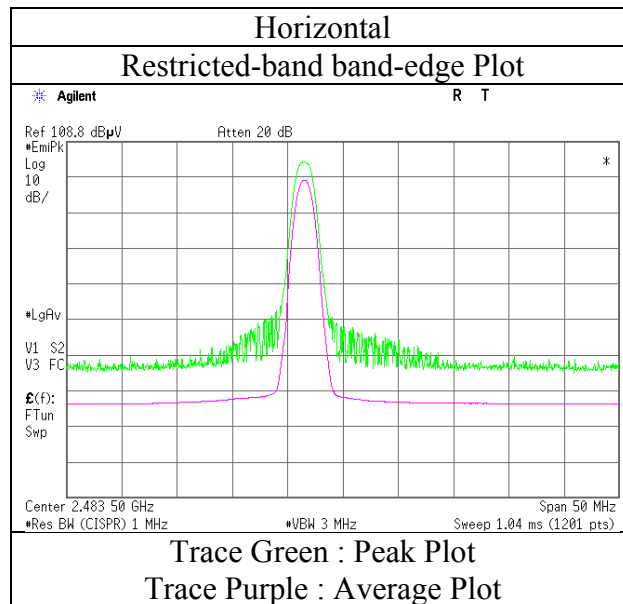
Distance factor: 1 GHz - 10 GHz $20\log(4.5\text{ m} / 3.0\text{ m}) = 3.53\text{ dB}$
10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

***These results have sufficient margin without taking account Dwell time factor.**

Radiated Spurious Emission

Reference Plot for band-edge (Antenna : M/N H2U84W1H1S)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11182619H
Date	June 20, 2016
Temperature / Humidity	23 deg. C / 70 % RH
Engineer	Yuta Moriya
	(1 GHz - 10 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz



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

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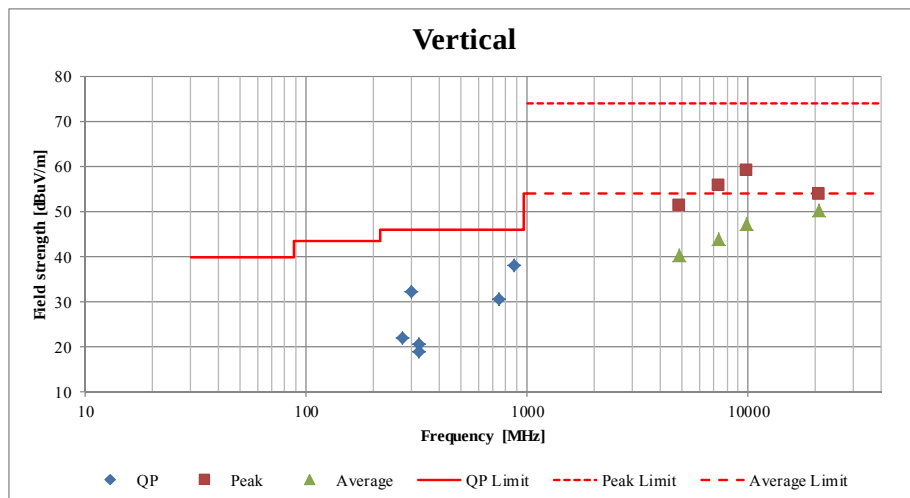
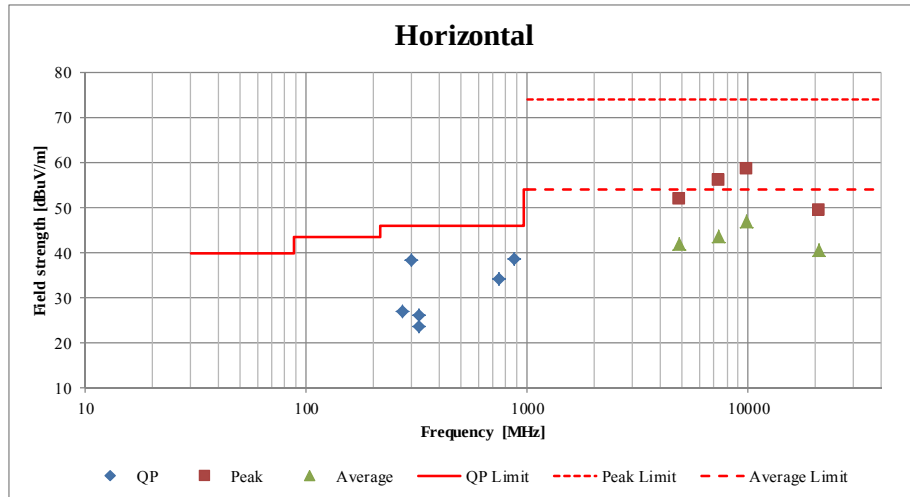
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission

Plot data, Worst case (Antenna : M/N H2U84W1H1S)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11182619H		
Date	June 20, 2016	June 21, 2016	August 19, 2016
Temperature / Humidity	23 deg. C / 70 % RH	21 deg. C / 54 % RH	22 deg. C / 54 % RH
Engineer	Yuta Moriya (1 GHz - 10 GHz)	Keisuke Kawamura (Above 10 GHz)	Takafumi Noguchi (Below 1 GHz)
Mode	Tx, Hopping Off, DH5 2441 MHz		



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

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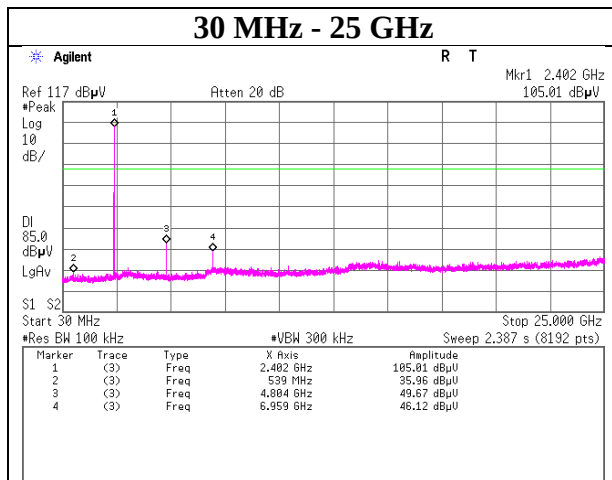
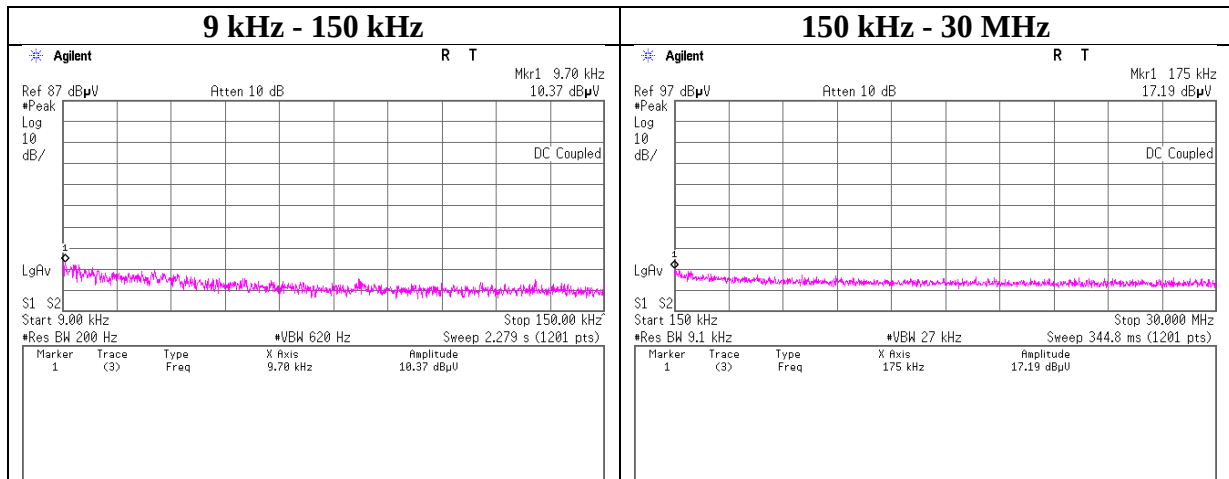
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 11182619H
Date : March 29, 2016
Temperature / Humidity : 25 deg. C / 21 % RH
Engineer : Yutaka Yoshida
Mode : Tx, Hopping Off, DH5

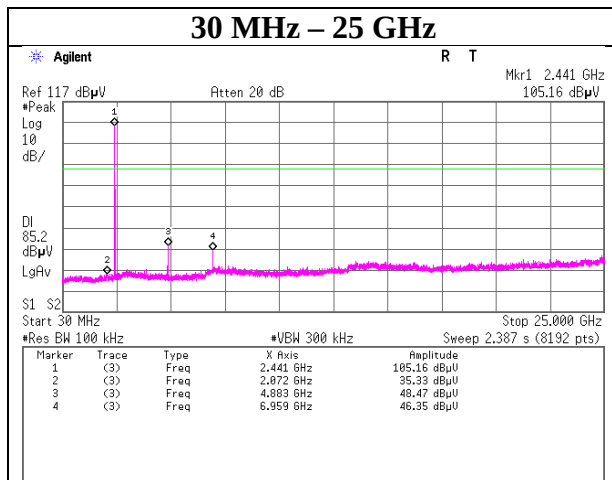
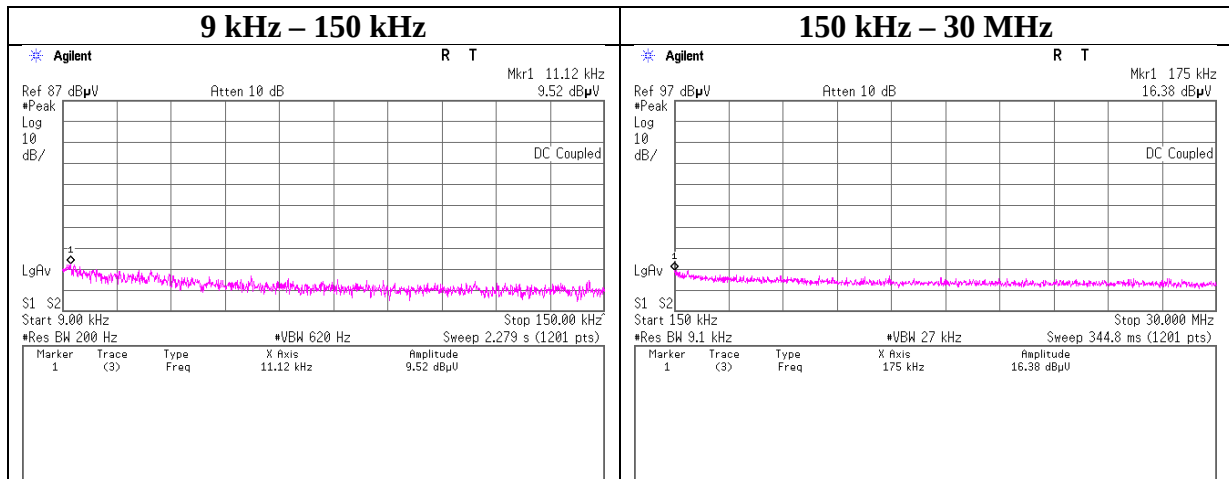
2402 MHz



Conducted Spurious Emission

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 11182619H
Date : March 29, 2016
Temperature / Humidity : 25 deg. C / 21 % RH
Engineer : Takayuki Shimada
Mode : Tx, Hopping Off, DH5

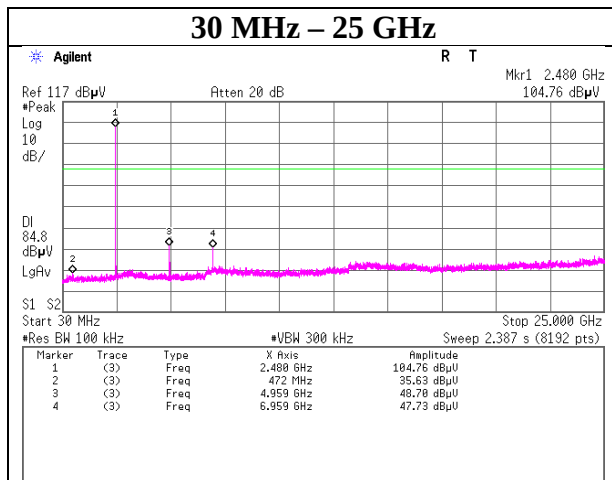
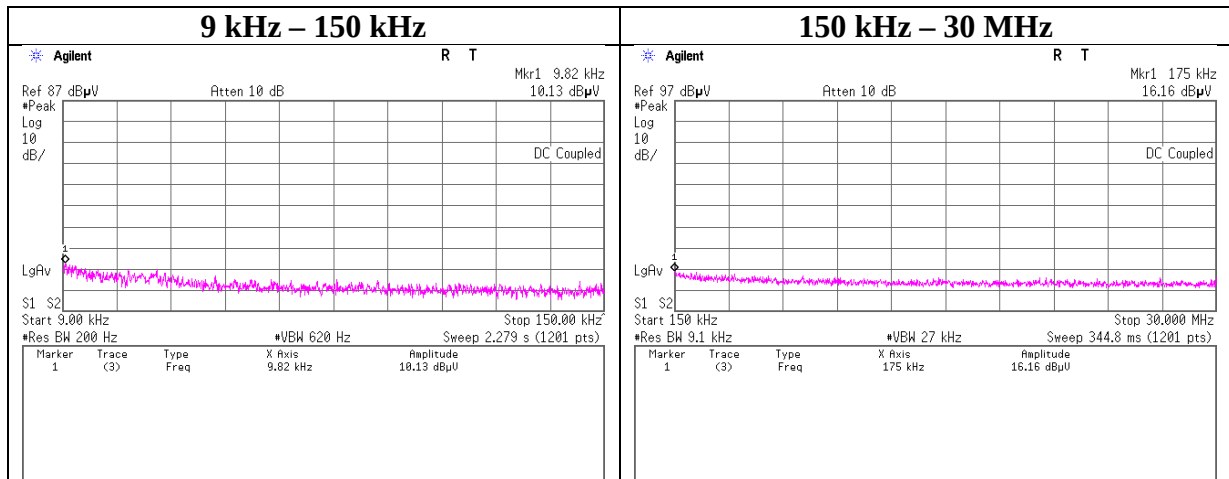
2441 MHz



Conducted Spurious Emission

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 11182619H
Date : March 29, 2016
Temperature / Humidity : 25 deg. C / 21 % RH
Engineer : Yutaka Yoshida
Mode : Tx, Hopping Off, DH5

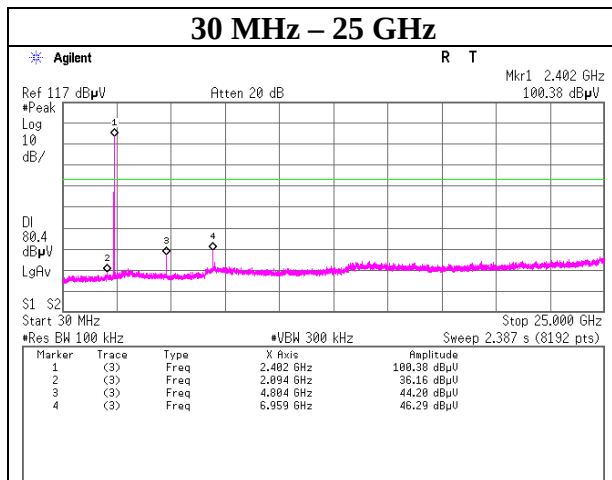
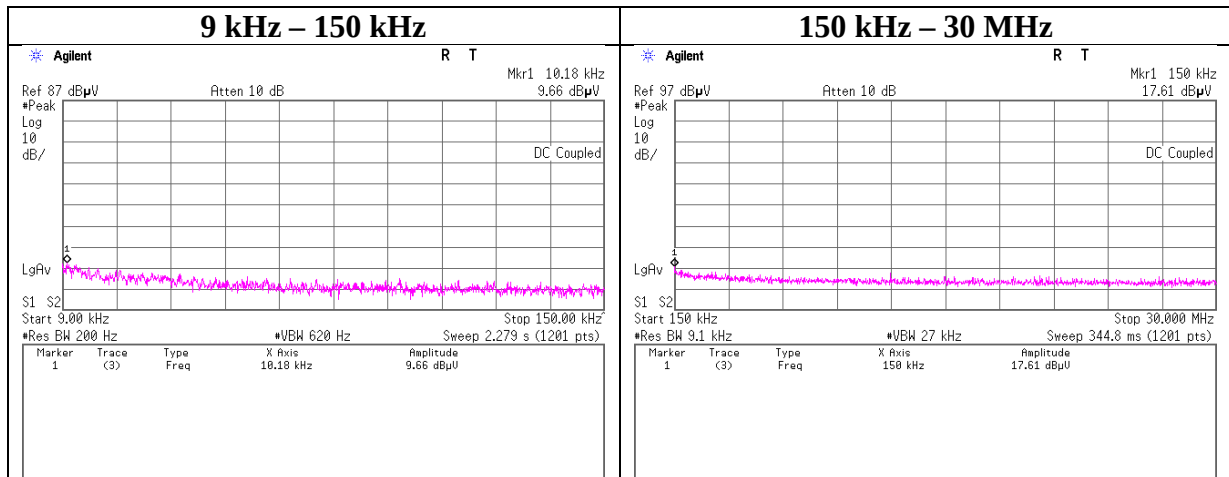
2480 MHz



Conducted Spurious Emission

Test place : Ise EMC Lab. No.1 Measurement Room
Report No. : 11182619H
Date : March 29, 2016
Temperature / Humidity : 25 deg. C / 21 % RH
Engineer : Yutaka Yoshida
Mode : Tx, Hopping Off, 3DH5

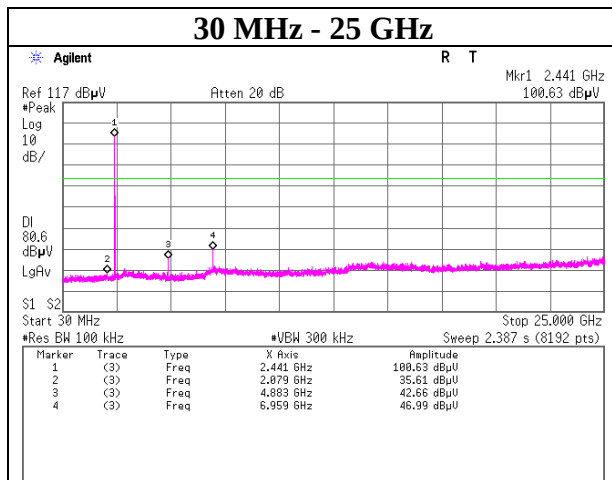
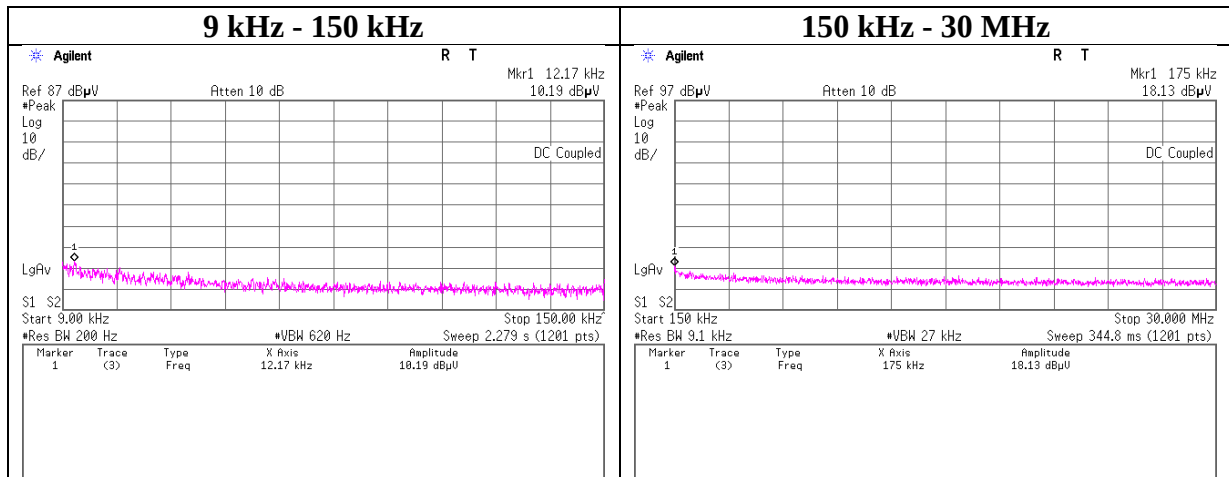
2402 MHz



Conducted Spurious Emission

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 11182619H
Date : March 29, 2016
Temperature / Humidity : 25 deg. C / 21 % RH
Engineer : Yutaka Yoshida
Mode : Tx, Hopping Off, 3DH5

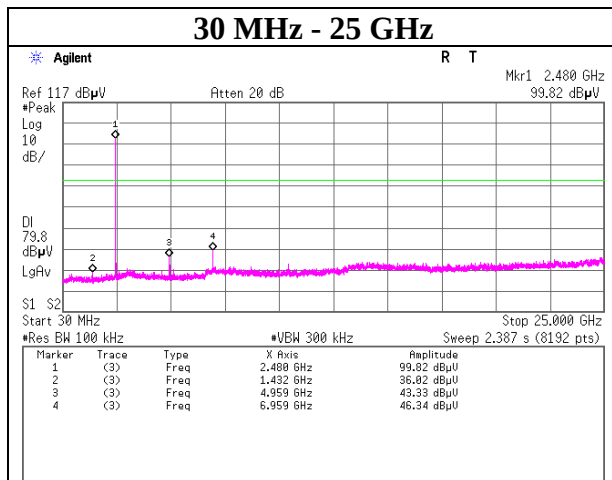
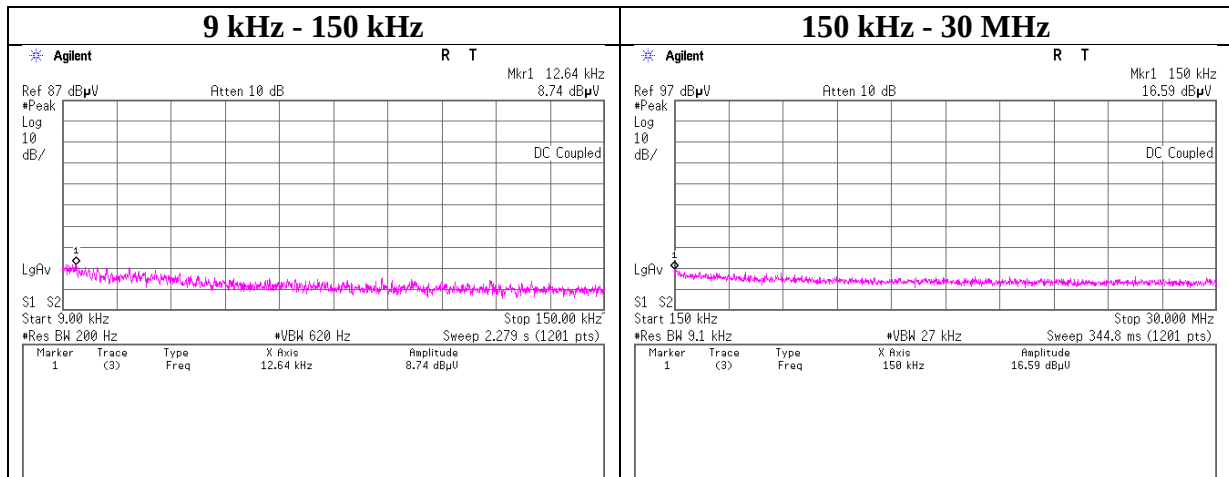
2441 MHz



Conducted Spurious Emission

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 11182619H
Date : March 29, 2016
Temperature / Humidity : 25 deg. C / 21 % RH
Engineer : Yutaka Yoshida
Mode : Tx, Hopping Off, 3DH5

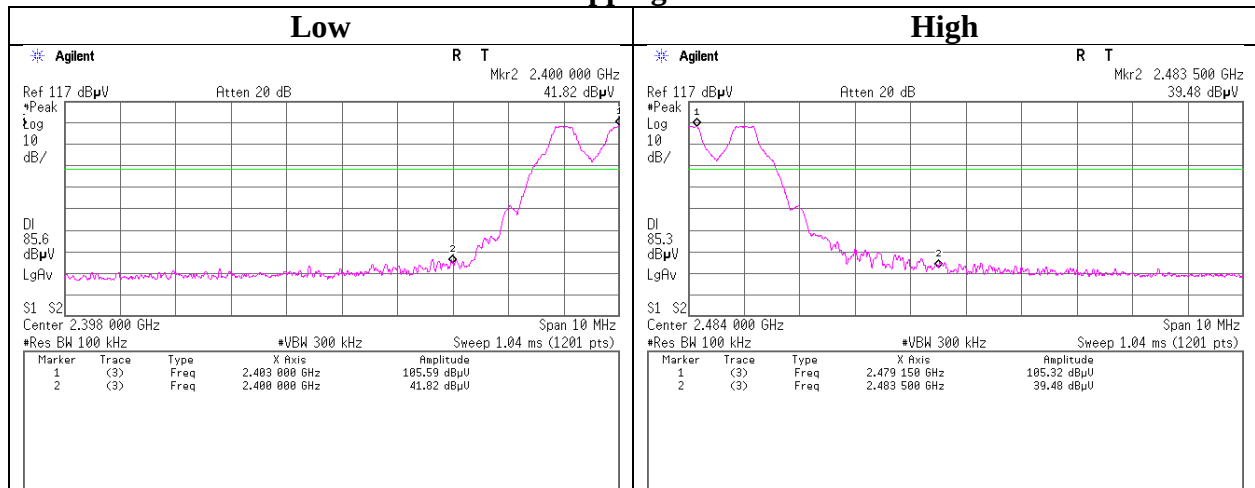
2480 MHz



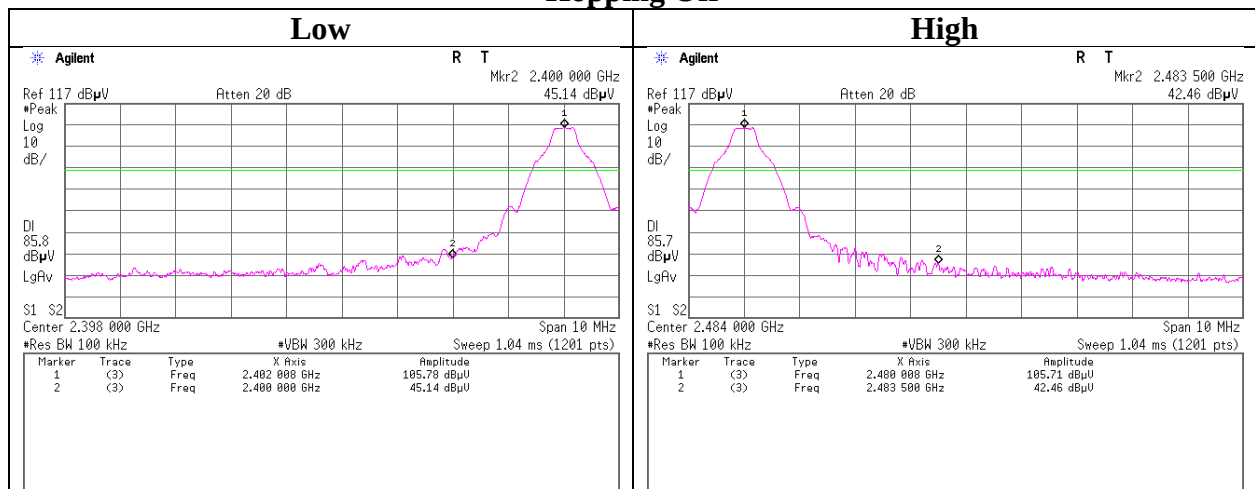
Conducted Emission Band Edge compliance

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11182619H
Date	March 29, 2016
Temperature / Humidity	25 deg. C / 21 % RH
Engineer	Yutaka Yoshida
Mode	Tx DH5

Hopping On



Hopping Off



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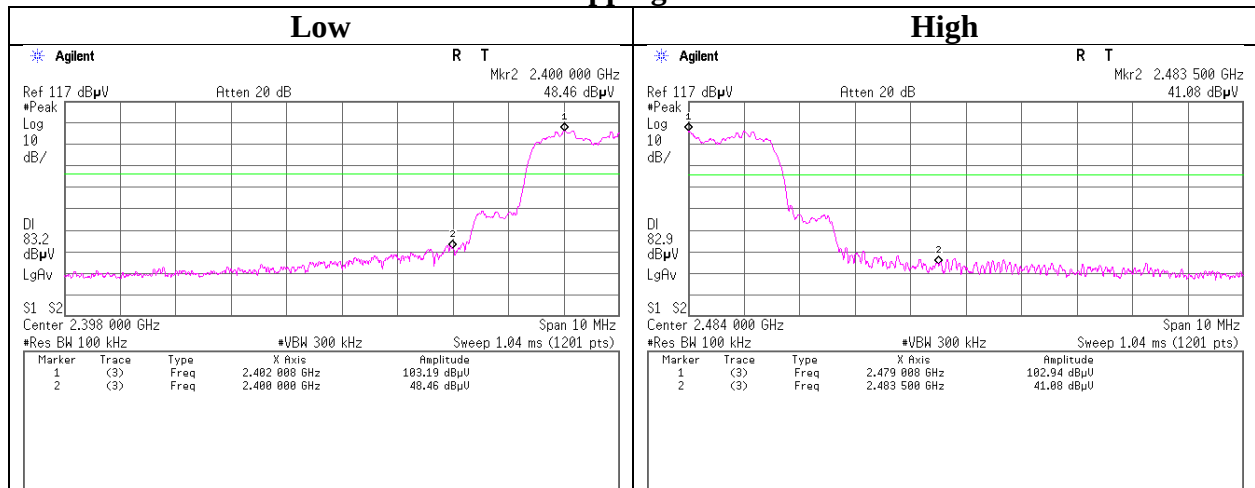
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

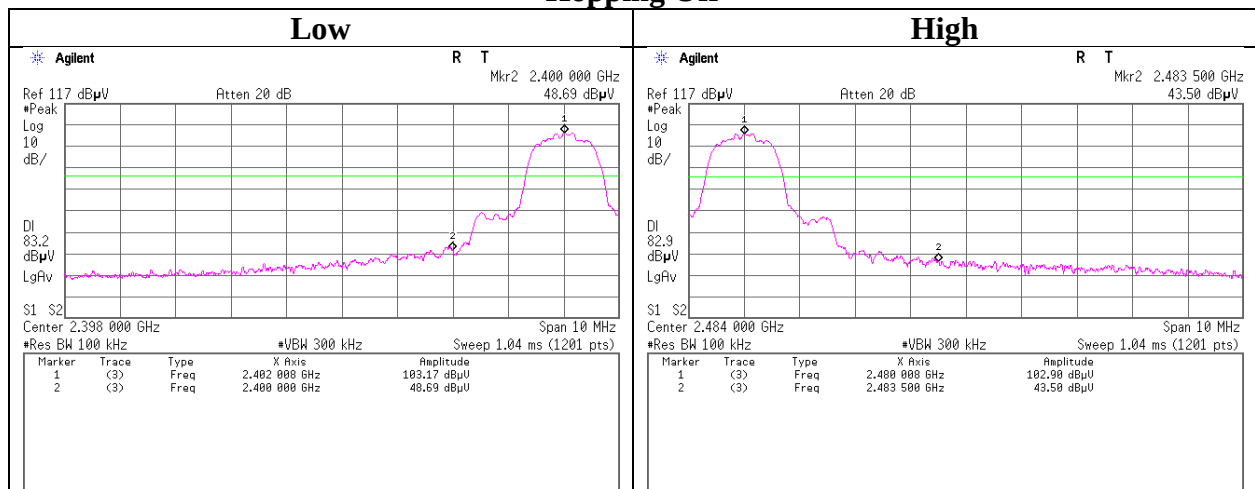
Conducted Emission Band Edge compliance

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 11182619H
Date : March 29, 2016
Temperature / Humidity : 25 deg. C / 21 % RH
Engineer : Yutaka Yoshida
Mode : Tx 3DH5

Hopping On



Hopping Off



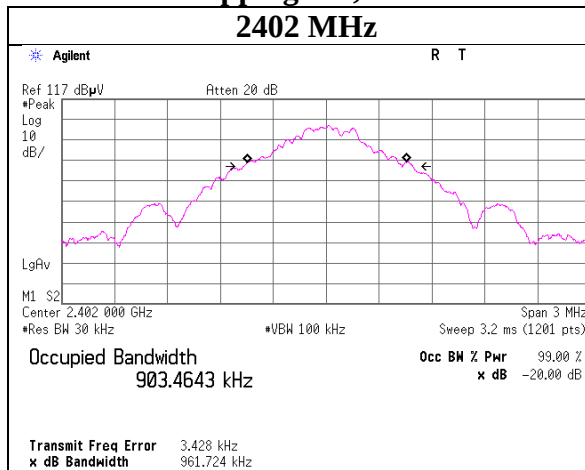
99% Occupied Bandwidth

Test place
Report No.

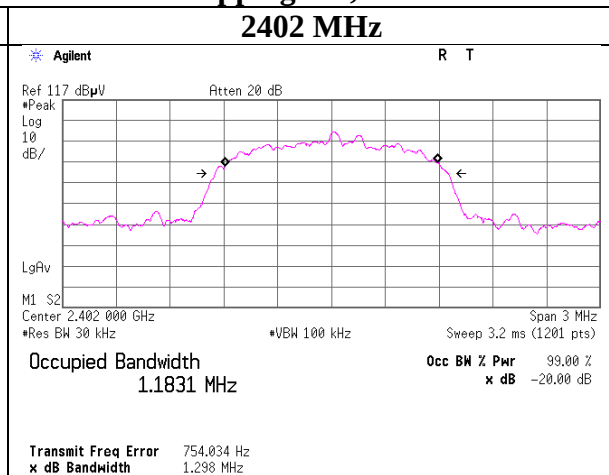
Date
Temperature / Humidity
Engineer
Mode

Ise EMC Lab. No.11 Measurement Room
11182619H
March 29, 2016
25 deg. C / 21 % RH
Yutaka Yoshida
Tx Hopping Off

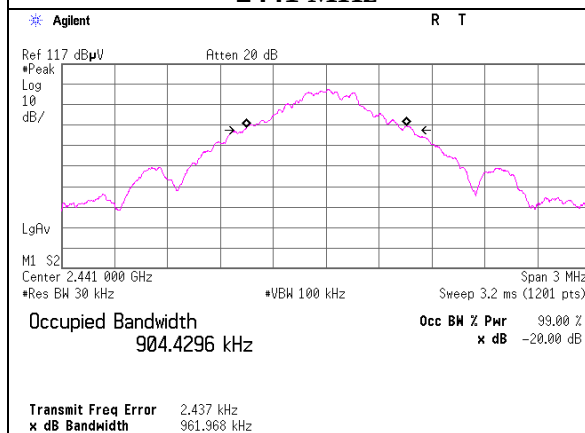
Hopping Off, DH5



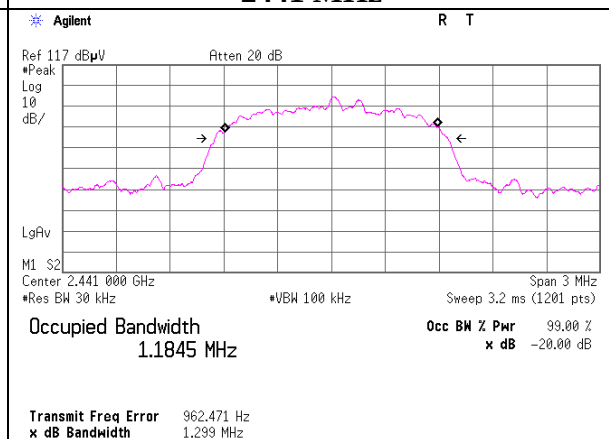
Hopping Off, 3DH5



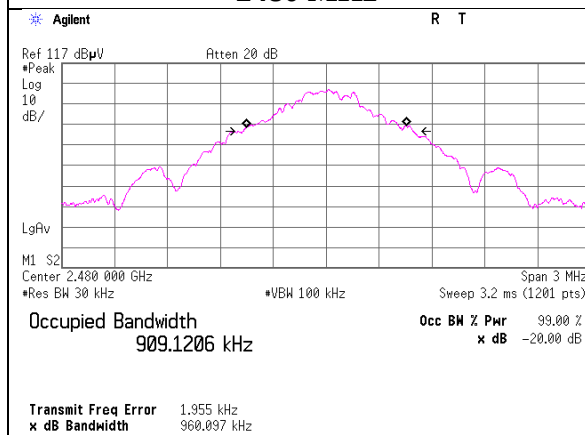
2441 MHz



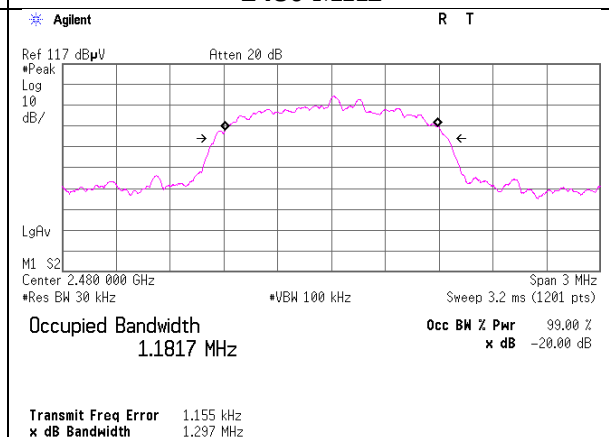
2441 MHz



2480 MHz



2480 MHz



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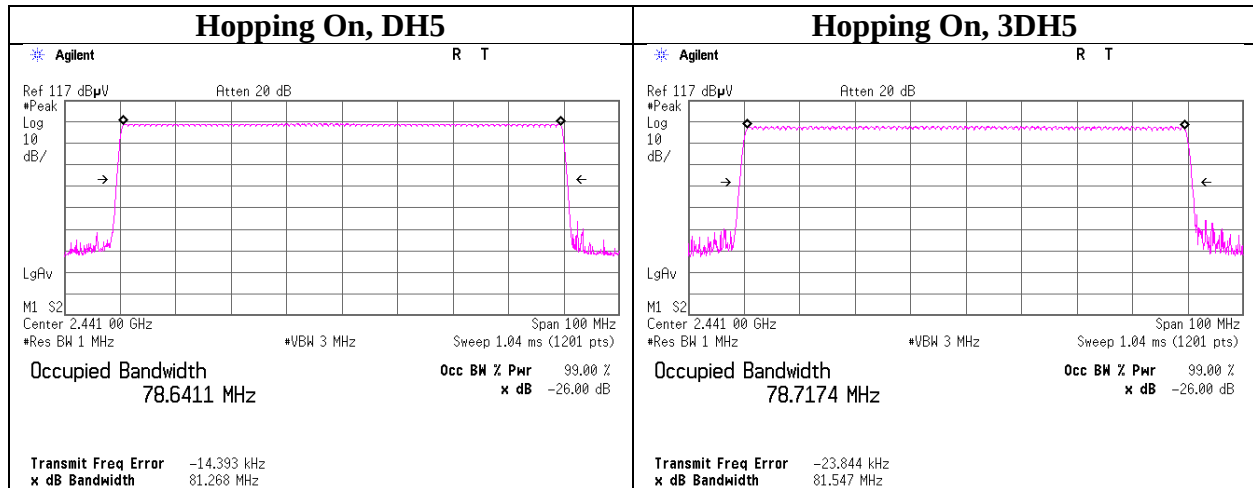
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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

99% Occupied Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11182619H
Date	March 29, 2016
Temperature / Humidity	25 deg. C / 21 % RH
Engineer	Yutaka Yoshida
Mode	Tx Hopping On



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APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2015/10/01 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2016/01/21 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2015/11/06 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2016/05/29 * 12
MCC-167	Microwave Cable	Junkosha	MWX221	1404S374(1m) / 1405S074(5m)	RE	2016/05/20 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2016/03/24 * 12
MMM-08	DIGITAL HiTESTER	Hioki	3805	051201197	RE	2016/01/13 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2015/09/16 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2016/05/29 * 12
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2016/05/16 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	CE	2015/09/02 * 12
MLS-23	LISN(AMN)	Schwarzbeck	NSLK8127	8127-729	CE	2015/07/10 * 12
MCC-112	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SF M141(3m)/suc of orm141-PE(1m)/ 421-010(1.5m)/ RFM-E321(Switcher)	-/00640	CE	2015/07/02 * 12
MAT-66	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2016/01/14 * 12
MSA-13	Spectrum Analyzer	Agilent	E4440A	MY46185823	AT	2015/06/02 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2015/10/19 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2015/10/19 * 12
MAT-25	Attenuator(10dB)(above 1GHz)	Agilent	8493C	71642	AT	2015/06/18 * 12
MCC-67	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28635/2	AT	2015/04/09 * 12
MCC-205	Microwave Cable	RS Components	R-132G7210200 CD	-	AT	2016/02/08 * 12
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2015/12/08 * 12
MDPS-20	REGULATED DC POWER SUPPLY	TEXIO	PW16-5ADP	171116437	AT	Pre Check
MMM-11	Digital HiTESTER	Hioki	3805	060100600	AT	2015/05/20 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2015/10/01 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2016/01/21 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE	2016/05/19 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2015/09/02 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2015/10/11 * 12
MLA-22	Logperiodic Antenna(200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-191	RE	2016/01/30 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2016/07/26 * 12
MAT-70	Attenuator(6dB)	Agilent	8491A-006	MY52460153	RE	2016/04/05 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2016/03/24 * 12
MMM-08	DIGITAL HiTESTER	Hioki	3805	051201197	RE	2016/01/13 * 12

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

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

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

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

APPENDIX 3: Photographs of test setup

Conducted Emission

(Antenna : M/N 146153)

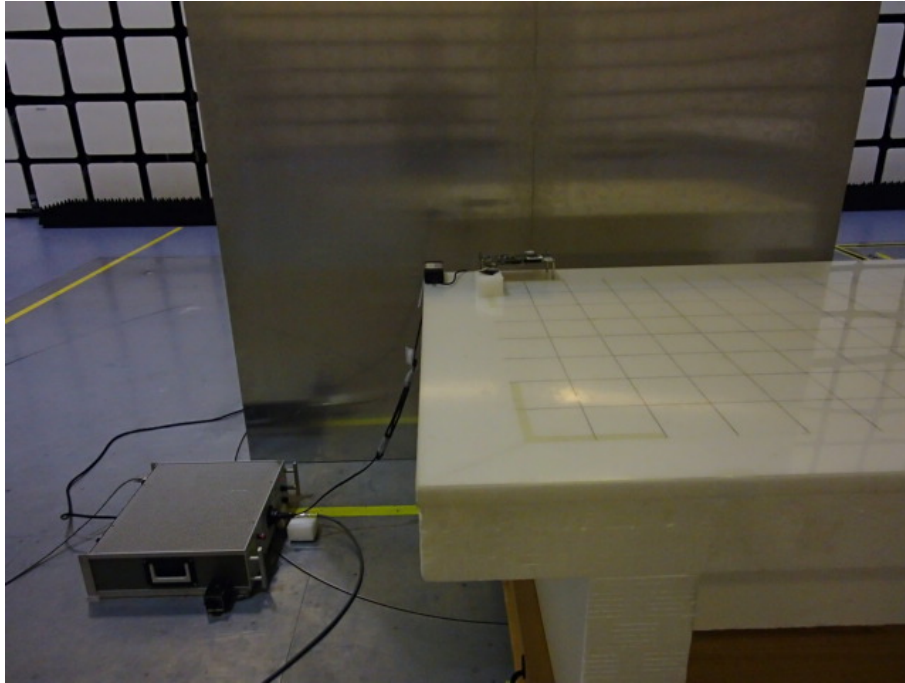


Photo 1

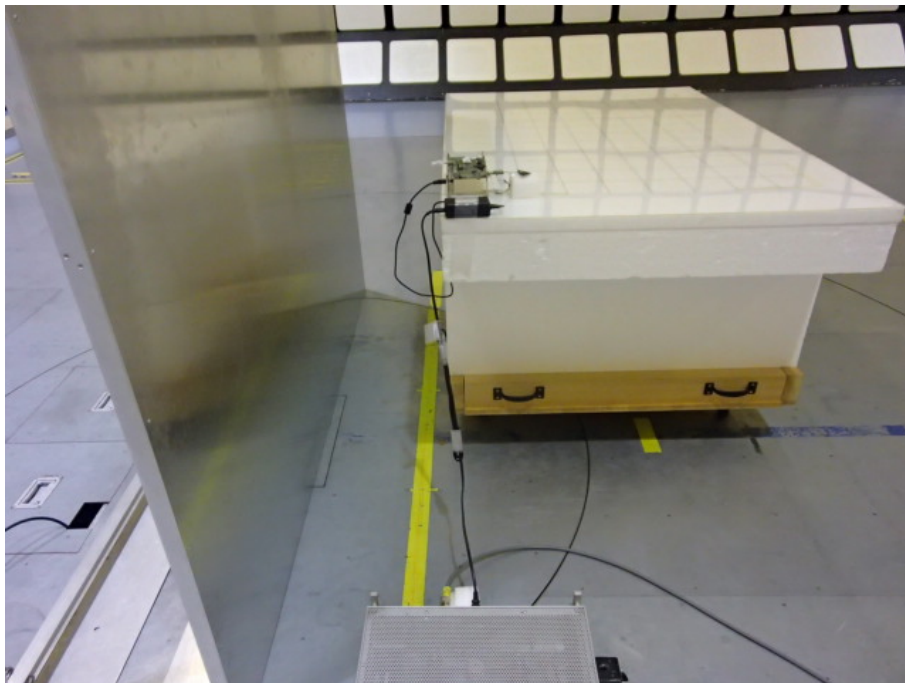


Photo 2

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Conducted Emission
(Antenna : M/N H2U84W1H1S)

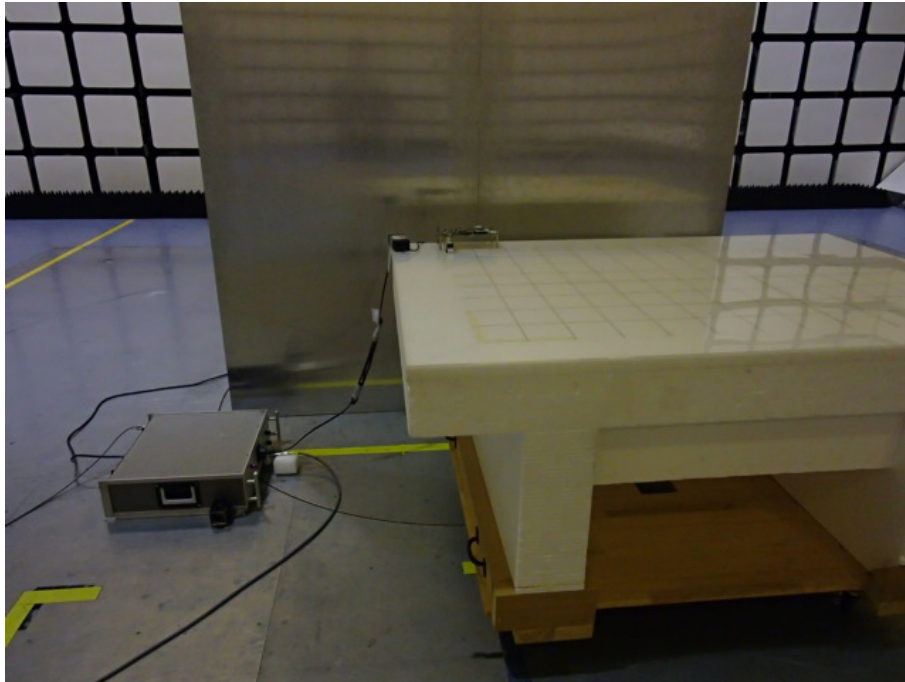


Photo 1

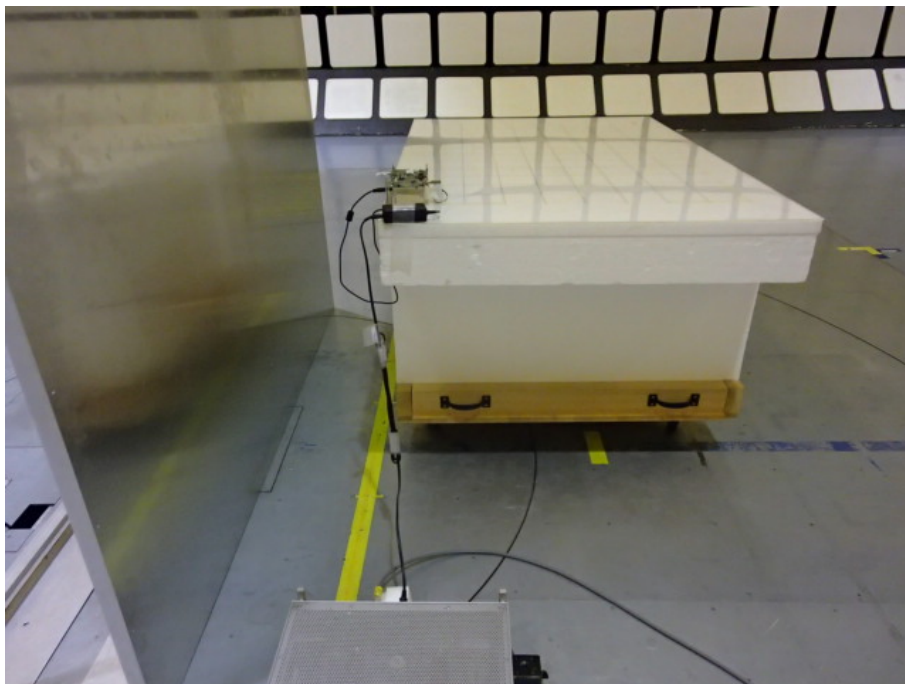


Photo 2

Radiated Spurious Emission
(Antenna : M/N 146153)

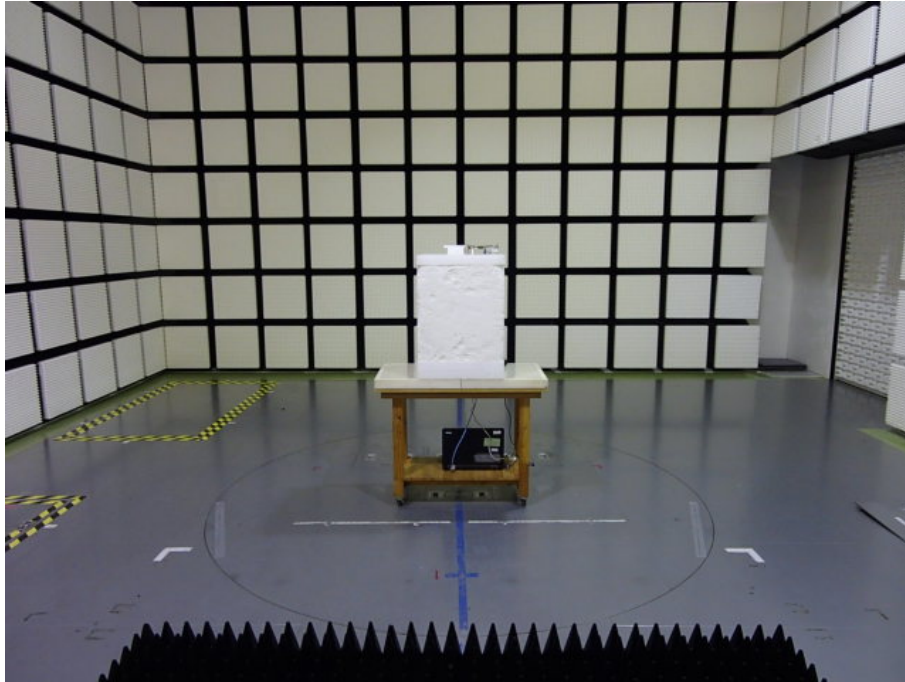


Photo 1

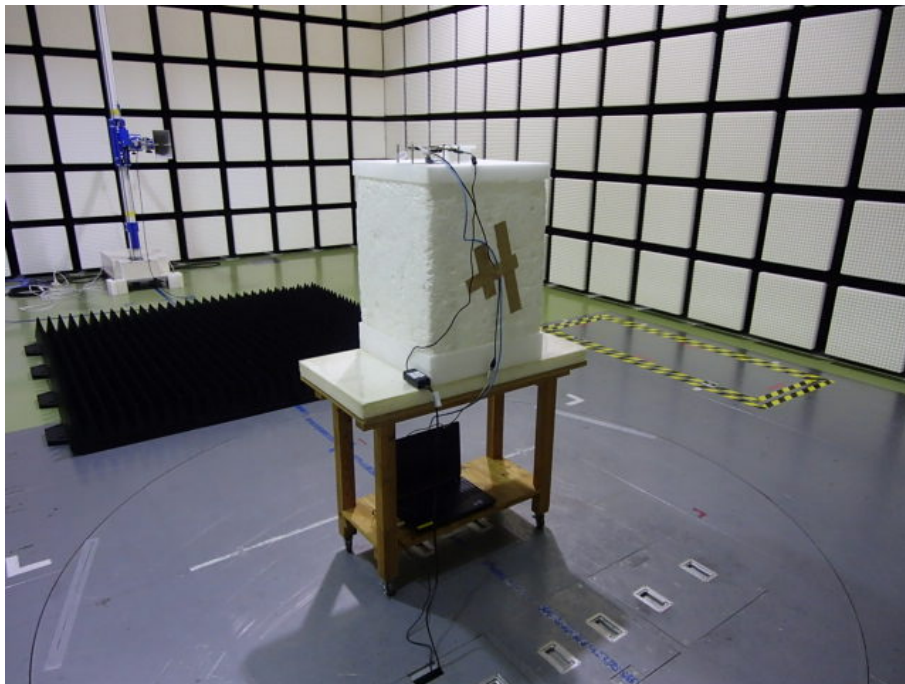


Photo 2

Worst Case Position

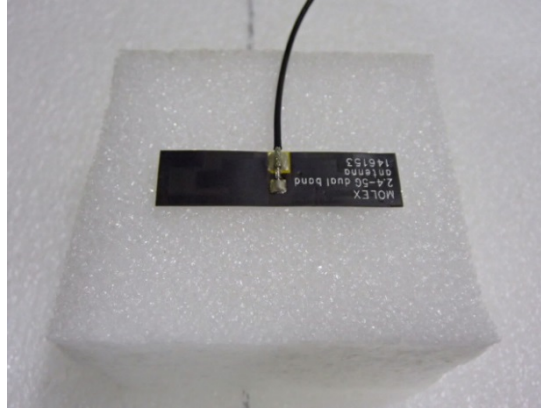
(Antenna : M/N 146153)

(Antenna)

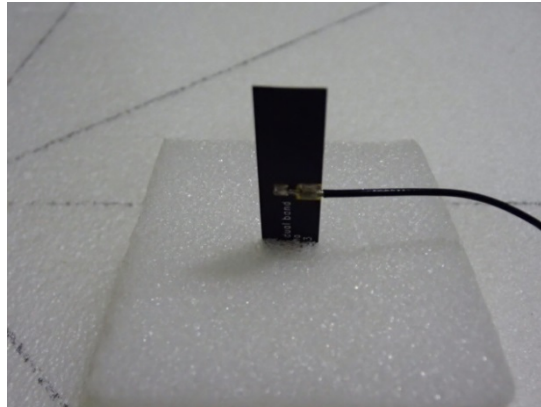
Above 1GHz (Horizontal: X-axis / Vertical: Y-axis)

Above 18GHz and Below 1GHz (Horizontal: X-axis / Vertical: X-axis)

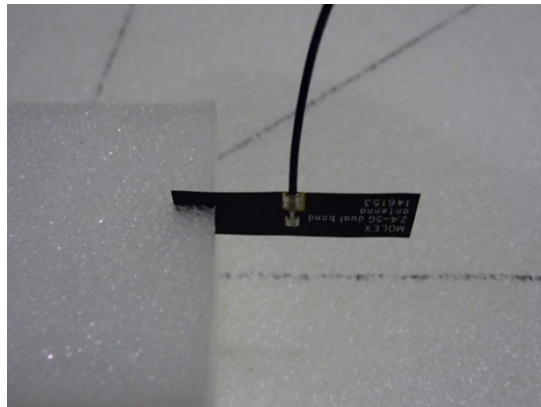
X-axis



Y-axis



Z-axis



Worst Case Position

(Antenna : M/N 146153)

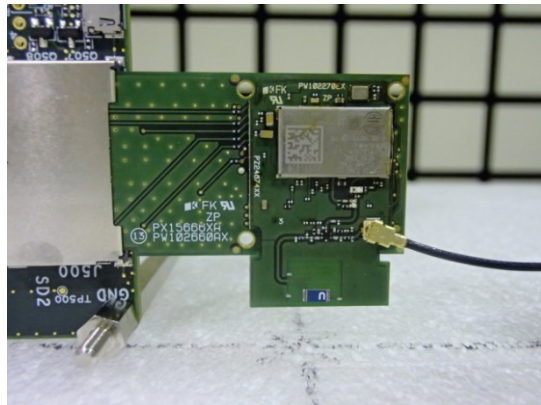
(Module)

(Horizontal: X-axis/ Vertical:X-axis)

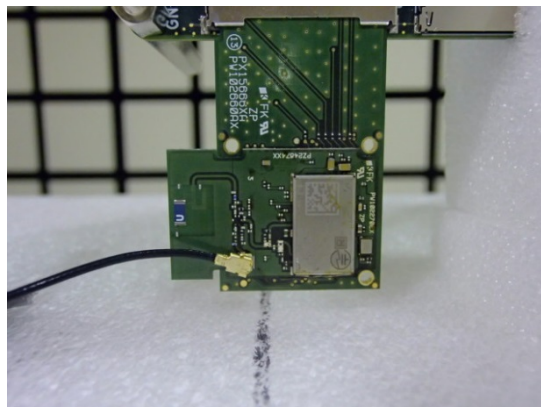
X-axis



Y-axis



Z-axis



Radiated Spurious Emission
(Antenna : M/N H2U84W1H1S)

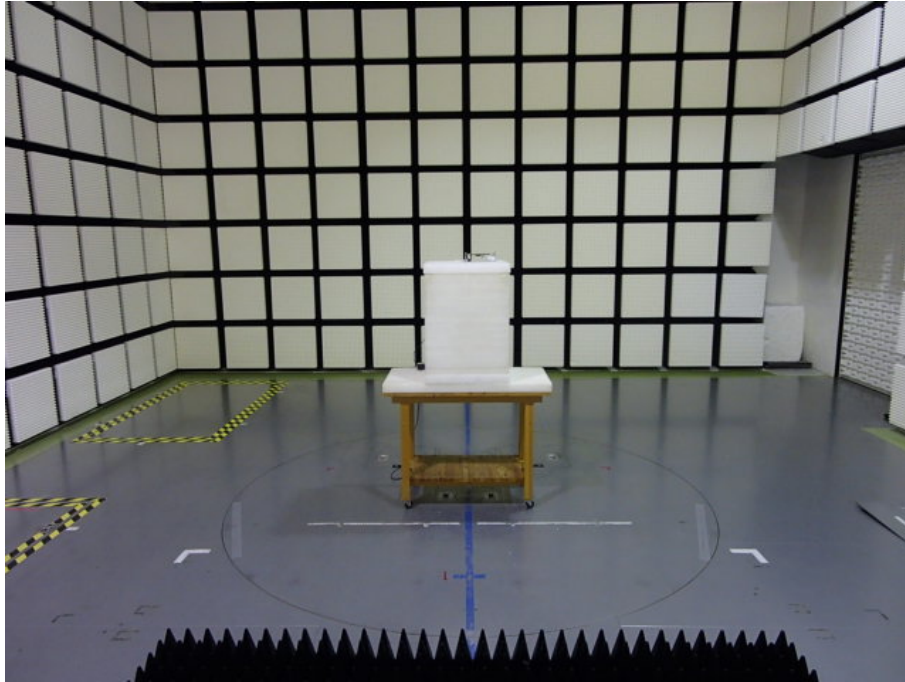


Photo 1

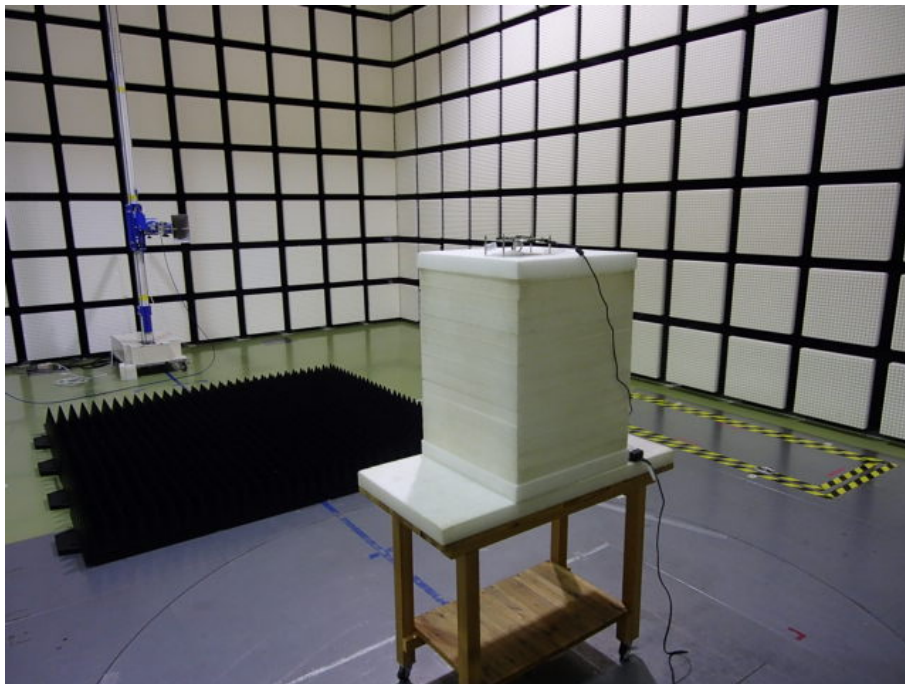


Photo 2

Worst Case Position
(Antenna : M/N H2U84W1H1S)

(Antenna and Module)

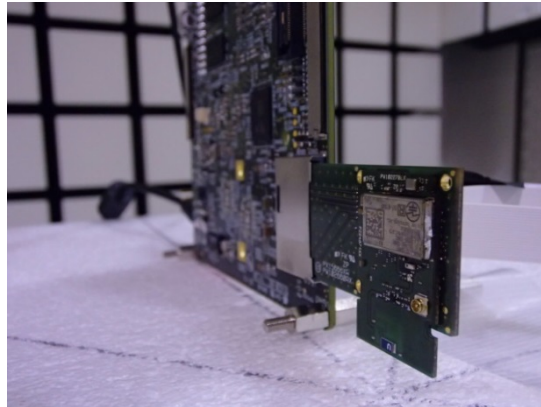
Above 1GHz (Horizontal: X-axis/ Vertical:X-axis)

Below 1GHz (Horizontal: X-axis/ Vertical:X-axis)

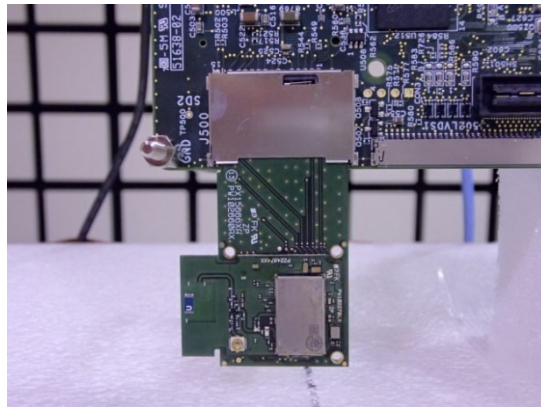
X-axis



Y-axis



Z-axis



End of Report

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