



RADIO TEST REPORT

Test Report No. : 10724035H-D-R1

Applicant : Sony Computer Entertainment Inc.
Type of Equipment : Computer Entertainment System
Model No. : CUH-1215A
FCC ID : AK8CUH120Z1
Test regulation : FCC Part 15 Subpart C: 2015
*Bluetooth Part
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
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6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. This report is a revised version of 10724035H-D. 10724035H-D is replaced with this report.

Date of test: March 19 to April 3, 2015

Representative test engineer:

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Takumi Shimada
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13-EM-F0429

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SECTION 1: Customer information

Company Name	Sony Computer Entertainment Inc.
Brand Name	SONY
Address	1-7-1 Konan, Minato-ku, Tokyo, 108-0075 Japan
Telephone Number	+81-3-6748-6333
Facsimile Number	+81-3-6748-6383
Contact Person	Kiyoto Sasaki

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

2.1 Identification of E.U.T.

Type of Equipment	Computer Entertainment System
Model No	CUH-1215A
Serial No	Refer to Clause 4.2
Country of Manufacture	China/Japan
Receipt Date of Sample	March 12, 2015
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

CUH-1215A is the Computer Entertainment System.

List of Model No.:

Model No.	Product Name	HDD capacity
CUH-1215A*	Computer Entertainment System	500GB
CUH-1215B	Computer Entertainment System	1TB
DUH-T1200AA	Testing Kit	500GB

*Tested model

Product Specification

Maximum clock frequency in the system	2.75GHz
Clock frequency in the system (radio part)	40MHz
Operating Temperature	5-35 deg. C
Power Supply	AC 100-240V, 50Hz/60Hz
Size	275 x 53x 305 mm
Weight	Approx. 2.5kg

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Radio Specification

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

Equipment Type	Transceiver
Frequency of Operation	2412-2462MHz
Type of Modulation	DSSS, OFDM
Bandwidth & Channel spacing	Less than 20MHz & 5MHz
Method of frequency generation	Synthesizer
Power Supply (inner)	DC 3.3V/1.8V
Antenna Type	IFA (Antenna A/B)
Antenna Gain: G _{ANT}	4.0dBi (Antenna A/B)
Directional Gain	7.01dBi (Antenna A/B)

Bluetooth (BDR/EDR)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	FHSS (GFSK, $\pi/4$ DQPSK, 8DPSK)
Bandwidth & Channel spacing	79MHz & 1MHz
Method of frequency generation	Synthesizer
Power Supply (inner)	DC 3.3V/1.8V
Antenna Type	PIFA
Antenna Gain	5.6dBi (peak)

Bluetooth (Low Energy)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	GFSK
Bandwidth & Channel spacing	1MHz & 2MHz
Method of frequency generation	Synthesizer
Power Supply (inner)	DC 3.3V/1.8V
Antenna Type	PIFA
Antenna Gain	5.6dBi (peak)

This test report applies to Bluetooth (BDR/EDR).

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2015, final revised on January 21, 2015

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

* The EUT complies with FCC Part 15 Subpart B: 2015, final revised on January 21, 2015.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.4:2009 7. AC powerline conducted emission measurements IC: RSS-Gen 8.8	FCC: Section 15.207 IC: RSS-Gen 8.8	QP 8.1dB 0.15653MHz, L 0.15485MHz, L AV 8.0dB 0.20003MHz, L 0.20001MHz, L	Complied	-
Carrier Frequency Separation	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) IC: RSS-210 A8.1 (b)	See data.	Complied	Conducted
20dB Bandwidth	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) IC: RSS-210 A8.1 (a)		Complied	Conducted
Number of Hopping Frequency	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) IC: RSS-210 A8.1 (d)		Complied	Conducted
Dwell time	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) IC: RSS-210 A8.1 (d)		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-210 A8.4 (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-210 A8.5 RSS-Gen 8.9 RSS-Gen 8.10		3.0dB 742.496MHz, QP, Vert.	Complied

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

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

FCC 15.31 (e)

This EUT provides stable voltage (DC 3.3V/1.8V) constantly to RF Part regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

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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.

Test room (semi-anechoic chamber)	Conducted emission (+dB)
	150kHz-30MHz
No.1	3.5dB
No.2	3.5dB
No.3	3.4dB
No.4	3.5dB

Test room (semi-anechoic chamber)	Radiated emission						
	(3m*)(+dB)				(1m*)(+dB)		(0.5m*)(+dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.3dB	5.5dB	6.3dB	5.5dB	5.8dB	5.8dB	4.3dB
No.2	4.2dB	5.4dB	6.3dB	5.4dB	5.7dB	5.9dB	5.6dB
No.3	4.4dB	5.4dB	6.4dB	5.2dB	5.5dB	5.8dB	5.5dB
No.4	4.7dB	5.6dB	6.4dB	5.3dB	5.7dB	5.9dB	5.5dB

*3m/1m/0.5m = Measurement distance

Power meter (+dB)	
Below 1GHz	Above 1GHz
0.7dB	1.5dB

Antenna terminal conducted emission and Power density (+dB)			Antenna terminal conducted emission (+dB)		Channel power (+dB)
Below 1GHz	1GHz-3GHz	3GHz-18GHz	18GHz-26.5GHz	26.5GHz-40GHz	
1.5dB	1.7dB	2.8dB	2.8dB	2.9dB	2.6dB

Conducted Emission test

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

Radiated emission test(3m)

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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	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	4.0 x 4.5 x 2.7m	4.0 x 4.5 m	-
No.6 measurement room	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	8.0 x 4.6 x 2.8m	2.4 x 2.4m	-
No.11 measurement room	-	6.2 x 4.7 x 3.0m	4.8 x 4.6m	-

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

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

4.1 Operating Mode(s)

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

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Conducted Emission *1) Spurious Emission (Conducted/Radiated *1))	Tx (Hopping off) DH5, 3DH5	2402MHz 2441MHz 2480MHz
Carrier Frequency Separation	Tx (Hopping on) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
20dB Bandwidth	Tx (Hopping off) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Number of Hopping Frequency	Tx (Hopping on) DH5, 3DH5 Inquiry	-
Dwell time	Tx (Hopping on), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5 Inquiry	-
Maximum Peak Output Power	Tx (Hopping off) DH5, 2DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2480MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2441MHz 2480MHz
<p>*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. *EUT has the power settings by the software as follows; Power settings: Same as production model Software: CPro_DOS_Labtool_Ver2.0.0.68 *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. *1) The test was performed for both of Power Supply: Chicony and DELTA.</p>		

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4.2 Configuration and peripherals

This page has been submitted for a separate exhibit.

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SECTION 5: Conducted Emission

Test Procedure and conditions

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

The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm 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 30cm to 40cm long and were hanged at a 40cm height to the ground plane. All unused 50ohm connectors of the LISN(AMN) were resistivity terminated in 50ohm 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	: 0.15-30MHz
Test data	: APPENDIX
Test result	: Pass

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SECTION 6: Radiated Spurious Emission

Test Procedure

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

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

The height of the measuring antenna varied between 1 and 4m 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	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	Biconical	Logperiodic	Horn

In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

20dBc 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 1GHz	Above 1GHz		20dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV	PK
IF Bandwidth	BW 120kHz	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 10Hz *1)	RBW: 100kHz VBW: 300kHz
Test Distance	3m	3m (below 10GHz), 1m*2) (above 10GHz)		3m (below 10GHz), 1m*2) (above 10GHz)

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

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

- The carrier level and noise levels were confirmed at each position of X and Y axes of EUT 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 : 30M-25GHz
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	3MHz	30kHz	100kHz	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	5MHz or 3MHz	100kHz or 30kHz	300kHz or 100kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30MHz	300kHz	1MHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time	Zero Span	100kHz, 1MHz	300kHz, 3MHz	As necessary capture the entire dwell time per hopping channel	Peak	Clear Write	Spectrum Analyzer
Conducted Spurious Emission *3)	9kHz to 150kHz	200Hz	620Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	9.1kHz	27kHz				
	30MHz to 25GHz (Less or equal to 5GHz)	100kHz	300kHz				
Conducted Spurious Emission Band Edge compliance	10MHz	100kHz	300kHz	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 low enough as shown in the chart.(9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=9.1kHz).

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

Test data : **APPENDIX**
Test result : **Pass**

APPENDIX 1: Test data

Conducted Emission
 (Power Supply: Chicony)

DATA OF CONDUCTED EMISSION TEST

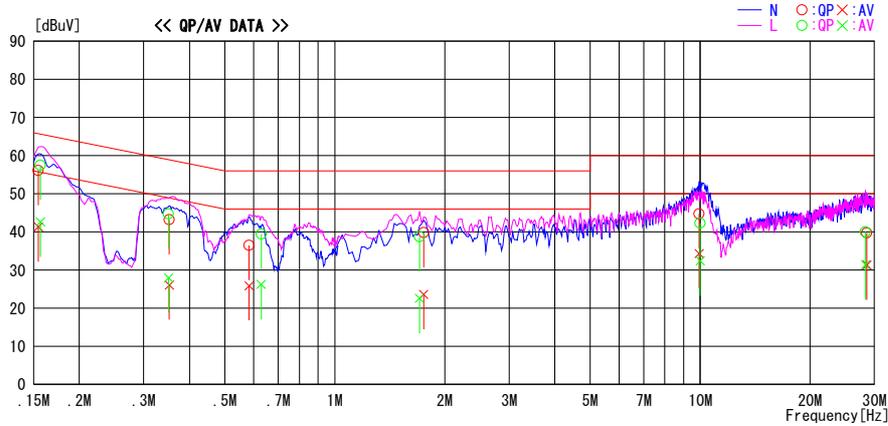
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
 Date: 2015/04/03

Report No. : 10724035H

Temp./Humi. : 24deg. C / 44% RH
 Engineer : Yuta Moriya

Mode / Remarks : BT DH5 Tx 2441MHz

LIMIT : FCC15.207 QP
 FCC15.207 AV

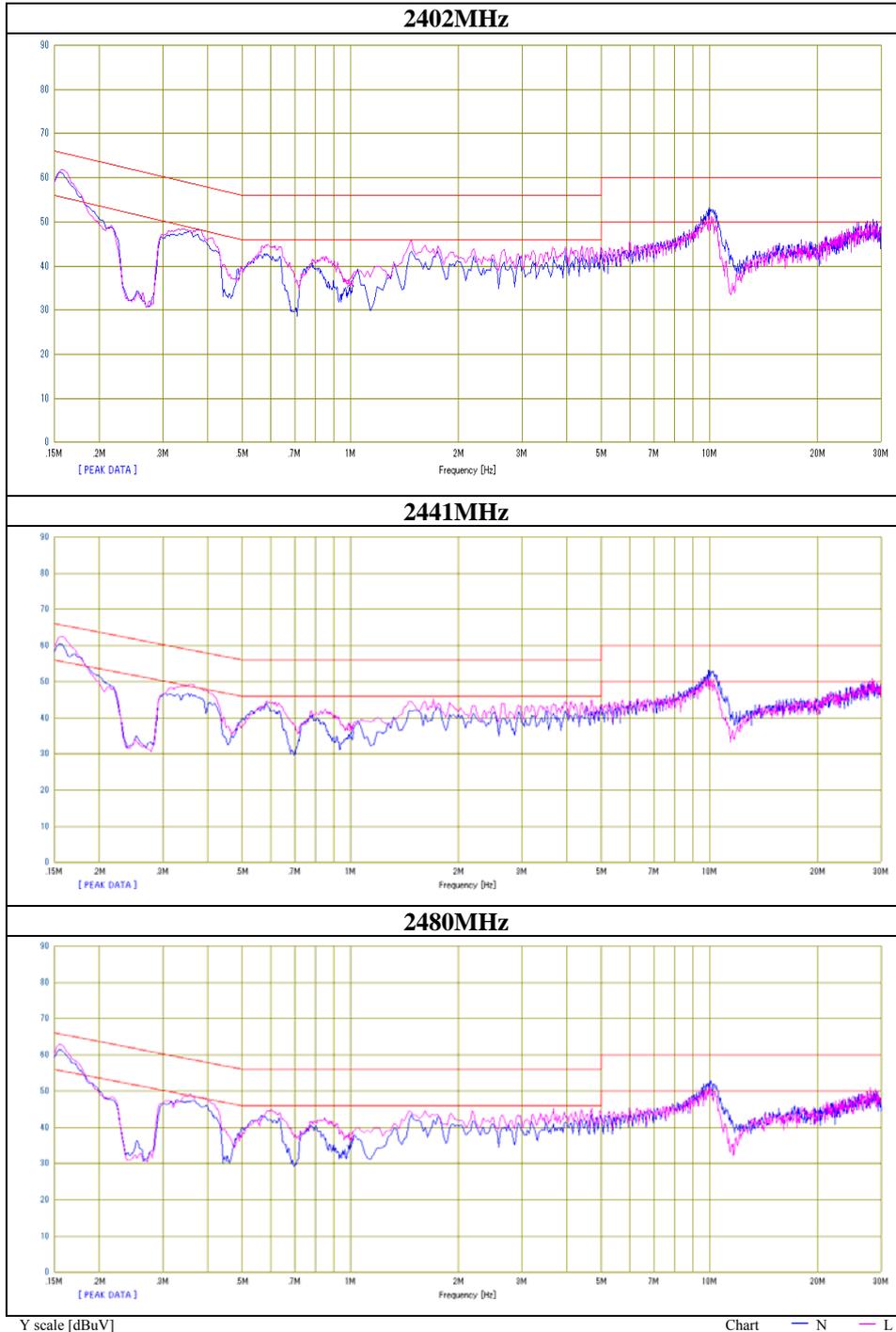


Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15435	42.9	28.1	13.2	56.1	41.3	65.8	55.8	9.7	14.5	N	
0.35228	29.9	12.8	13.3	43.2	26.1	58.9	48.9	15.7	22.8	N	
0.58283	23.2	12.6	13.3	36.5	25.9	56.0	46.0	19.5	20.1	N	
1.75095	26.4	10.2	13.4	39.8	23.6	56.0	46.0	16.2	22.4	N	
9.93680	30.7	20.3	14.0	44.7	34.3	60.0	50.0	15.3	15.7	N	
28.59654	24.8	16.4	14.9	39.7	31.3	60.0	50.0	20.3	18.7	N	
0.15653	44.3	29.4	13.2	57.5	42.6	65.6	55.6	8.1	13.0	L	
0.35080	31.4	14.7	13.3	44.7	28.0	58.9	48.9	14.2	20.9	L	
0.62900	26.2	12.9	13.3	39.5	26.2	56.0	46.0	16.5	19.8	L	
1.70560	25.3	9.2	13.4	38.7	22.6	56.0	46.0	17.3	23.4	L	
10.00462	28.3	18.4	14.0	42.3	32.4	60.0	50.0	17.7	17.6	L	
28.34592	25.1	16.5	14.9	40.0	31.4	60.0	50.0	20.0	18.6	L	

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

Conducted Emission
 (Power Supply: Chicony)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10724035H
Date	04/03/2015
Temperature/ Humidity	24deg. C / 40% RH
Engineer	Yuta Moriya
Mode	Tx DH5



Conducted Emission (Power Supply: Chicony)

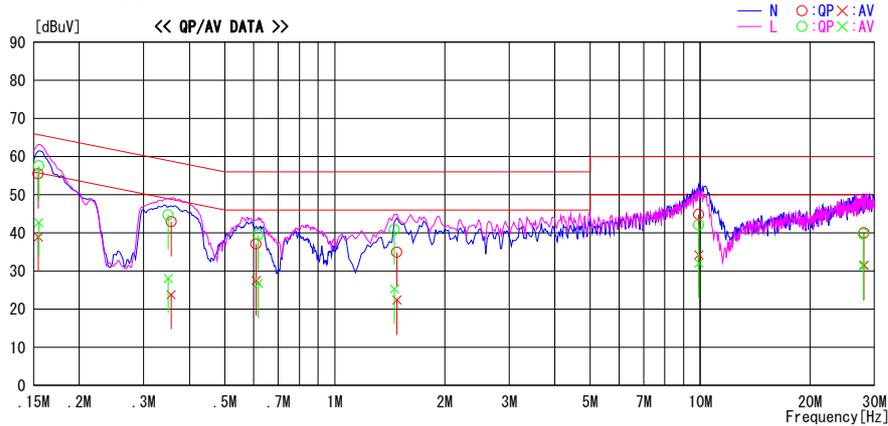
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
 Date: 2015/04/03

Report No. : 10724035H
 Temp./Humi. : 24deg. C / 44% RH
 Engineer : Yuta Moriya

Mode / Remarks : BT 3DH5 Tx 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]		
0.15435	42.3	25.7	13.2	55.5	38.9	65.8	55.8	10.3	16.9	N	
0.35663	29.6	10.5	13.3	42.9	23.8	58.8	48.8	15.9	25.0	N	
0.60892	23.8	14.2	13.3	37.1	27.5	56.0	46.0	18.9	18.5	N	
1.47885	21.5	9.0	13.4	34.9	22.4	56.0	46.0	21.1	23.6	N	
9.91392	30.8	20.2	14.0	44.8	34.2	60.0	50.0	15.2	15.8	N	
28.09529	25.1	16.6	14.9	40.0	31.5	60.0	50.0	20.0	18.5	N	
0.15485	44.4	29.5	13.2	57.6	42.7	65.7	55.7	8.1	13.0	L	
0.35011	31.4	14.8	13.3	44.7	28.1	59.0	49.0	14.3	20.9	L	
0.61762	26.2	13.5	13.3	39.5	26.8	56.0	46.0	16.5	19.2	L	
1.45618	27.4	11.9	13.4	40.8	25.3	56.0	46.0	15.2	20.7	L	
9.91392	28.1	18.1	14.0	42.1	32.1	60.0	50.0	17.9	17.9	L	
27.94492	24.9	16.6	14.8	39.7	31.4	60.0	50.0	20.3	18.6	L	

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

UL Japan, Inc.
Ise EMC Lab.

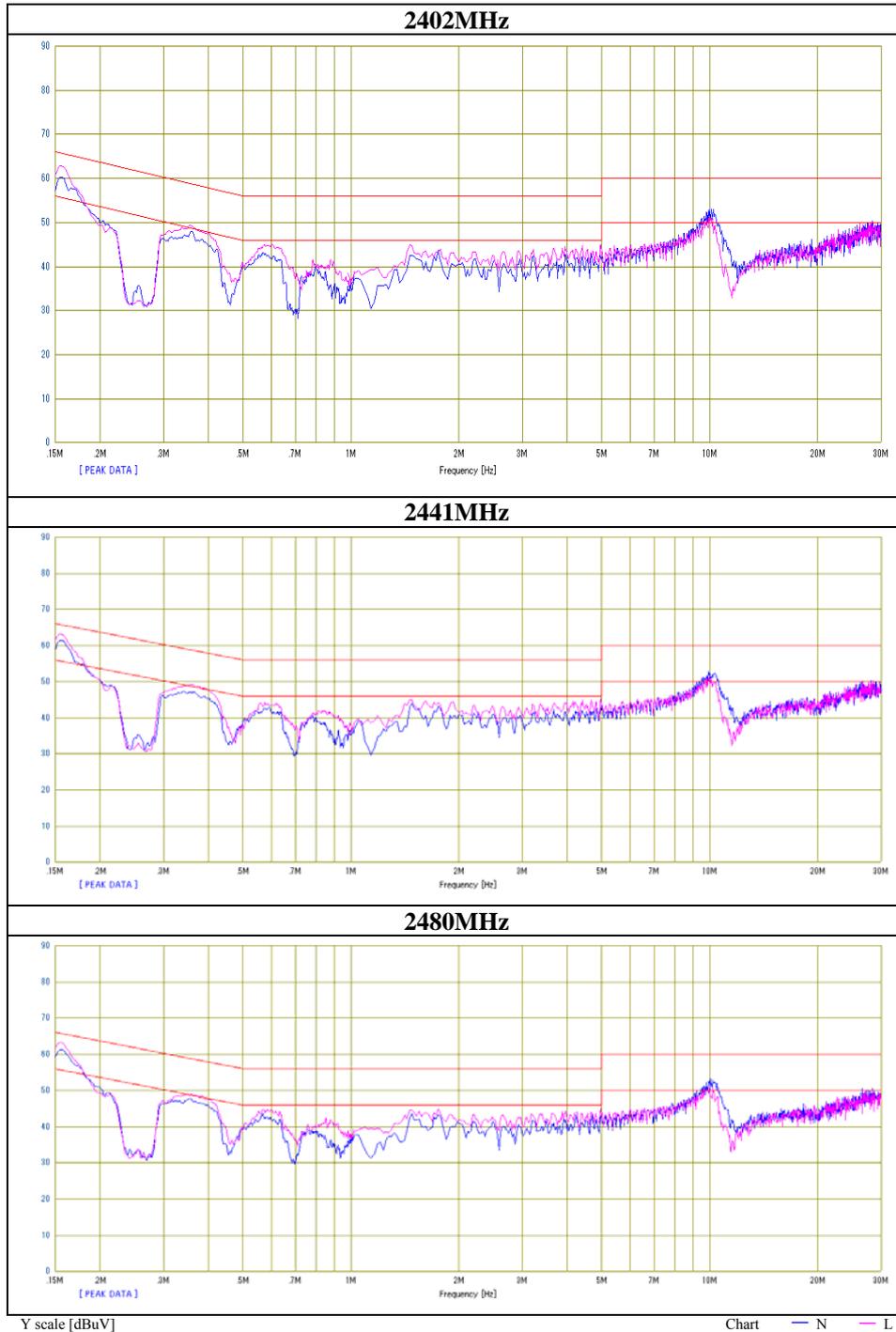
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Conducted Emission
 (Power Supply: Chicony)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10724035H
Date	04/03/2015
Temperature/ Humidity	24deg. C / 40% RH
Engineer	Yuta Moriya
Mode	Tx 3DH5



Conducted Emission (Power Supply: DELTA)

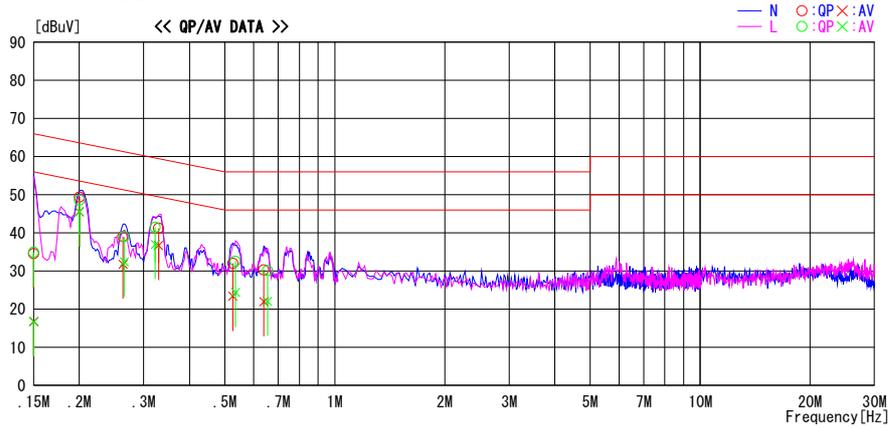
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
 Date: 2015/04/03

Report No. : 10724035H
 Temp./Humi. : 24deg. C / 44% RH
 Engineer : Yuta Moriya

Mode / Remarks : Tx BT DHS 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]		
0.15000	21.4	3.6	13.2	34.6	16.8	66.0	56.0	31.4	39.3	N	
0.20020	36.1	32.2	13.3	49.4	45.5	63.6	53.6	14.2	8.1	N	
0.26328	25.7	18.5	13.3	39.0	31.8	61.3	51.3	22.3	19.5	N	
0.32953	27.9	23.4	13.3	41.2	36.7	59.5	49.5	18.3	12.8	N	
0.52628	18.7	10.1	13.3	32.0	23.4	56.0	46.0	24.0	22.6	N	
0.63937	17.0	8.7	13.3	30.3	22.0	56.0	46.0	25.7	24.0	N	
0.15000	21.7	3.5	13.2	34.9	16.7	66.0	56.0	31.1	39.3	L	
0.20003	35.3	32.3	13.3	48.6	45.6	63.6	53.6	15.0	8.0	L	
0.26528	25.7	19.1	13.3	39.0	32.4	61.3	51.3	22.3	18.9	L	
0.32270	28.2	23.7	13.3	41.5	37.0	59.6	49.6	18.1	12.6	L	
0.53498	19.3	11.1	13.3	32.6	24.4	56.0	46.0	23.4	21.6	L	
0.65460	16.8	8.8	13.3	30.1	22.1	56.0	46.0	25.9	23.9	L	

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

UL Japan, Inc.
Ise EMC Lab.

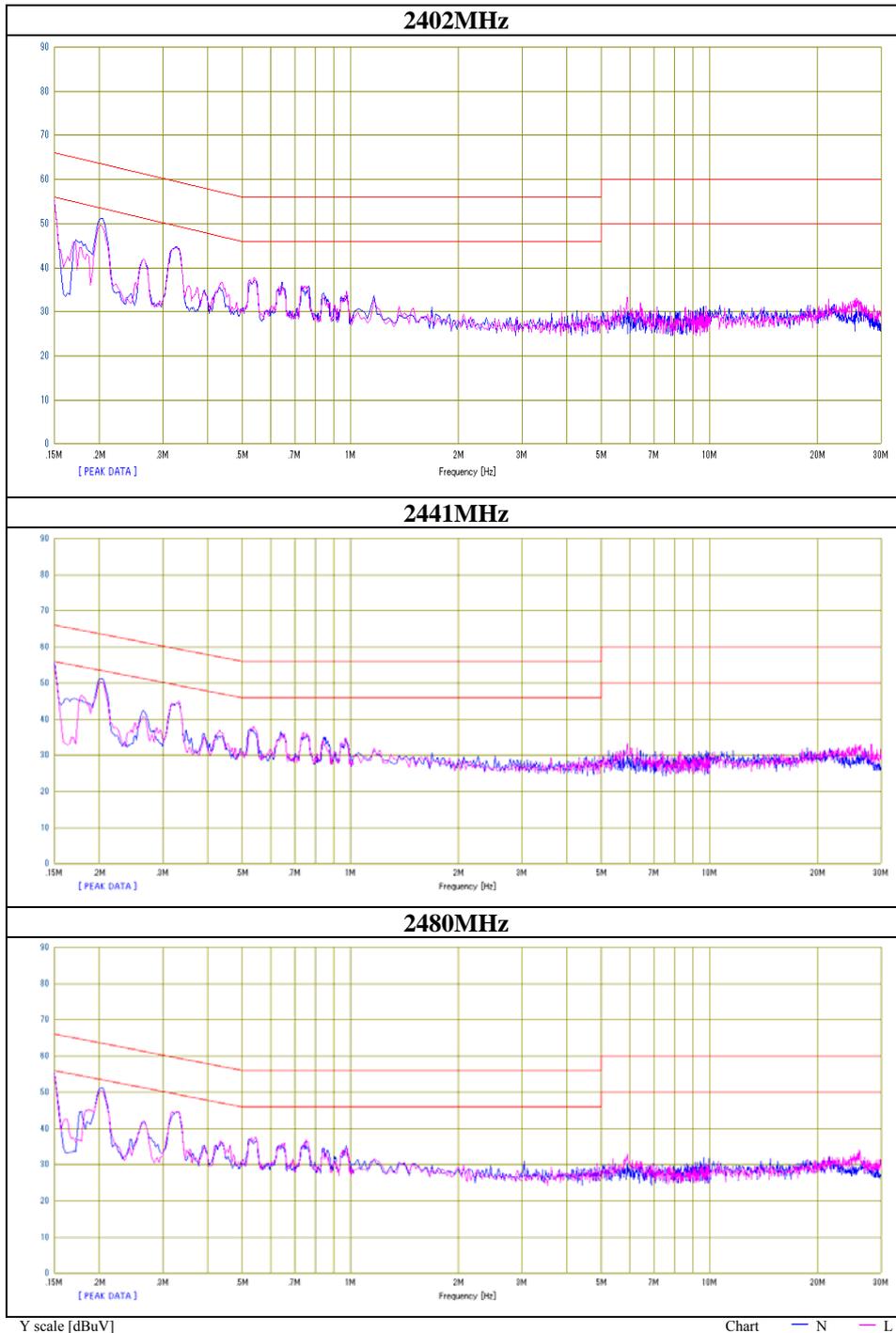
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Conducted Emission
 (Power Supply: DELTA)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10724035H
Date	04/03/2015
Temperature/ Humidity	24deg. C / 40% RH
Engineer	Yuta Moriya
Mode	Tx DH5



Conducted Emission

(Power Supply: DELTA)

DATA OF CONDUCTED EMISSION TEST

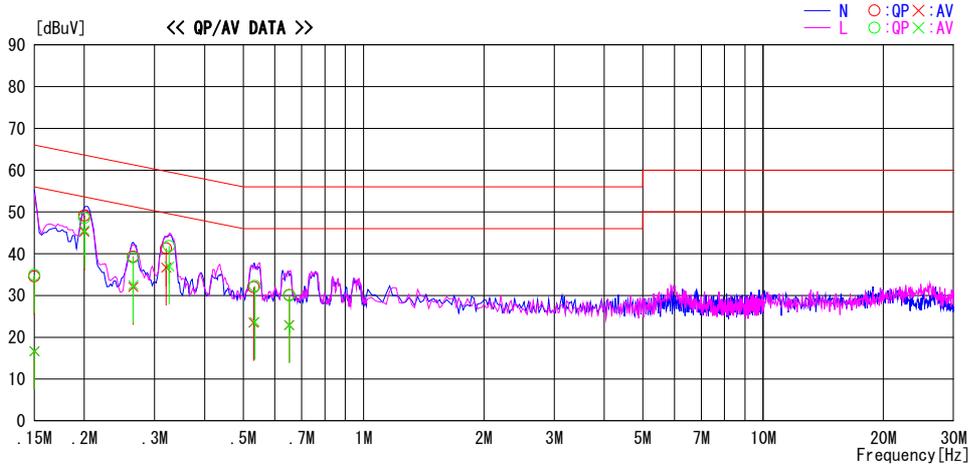
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
 Date: 2015/04/03

Report No. : 10724035H

Temp./Humi. : 24deg. C / 44% RH
 Engineer : Yuta Moriya

Mode / Remarks : Tx 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]		
0.15000	21.3	3.5	13.2	34.5	16.7	66.0	56.0	31.5	39.3	N	
0.20021	35.8	31.9	13.3	49.1	45.2	63.6	53.6	14.5	8.4	N	
0.26528	26.0	18.8	13.3	39.3	32.1	61.3	51.3	22.0	19.2	N	
0.32062	28.0	23.4	13.3	41.3	36.7	59.7	49.7	18.4	13.0	N	
0.53063	18.7	10.2	13.3	32.0	23.5	56.0	46.0	24.0	22.5	N	
0.65132	16.8	9.7	13.3	30.1	23.0	56.0	46.0	25.9	23.0	N	
0.15000	21.7	3.5	13.2	34.9	16.7	66.0	56.0	31.1	39.4	L	
0.20001	35.3	32.3	13.3	48.6	45.6	63.6	53.6	15.0	8.0	L	
0.26528	25.8	19.2	13.3	39.1	32.5	61.3	51.3	22.2	18.8	L	
0.32618	28.5	23.7	13.3	41.8	37.0	59.5	49.5	17.7	12.5	L	
0.53410	19.0	10.4	13.3	32.3	23.7	56.0	46.0	23.7	22.3	L	
0.65150	16.7	9.6	13.3	30.0	22.9	56.0	46.0	26.0	23.1	L	

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

UL Japan, Inc.
Ise EMC Lab.

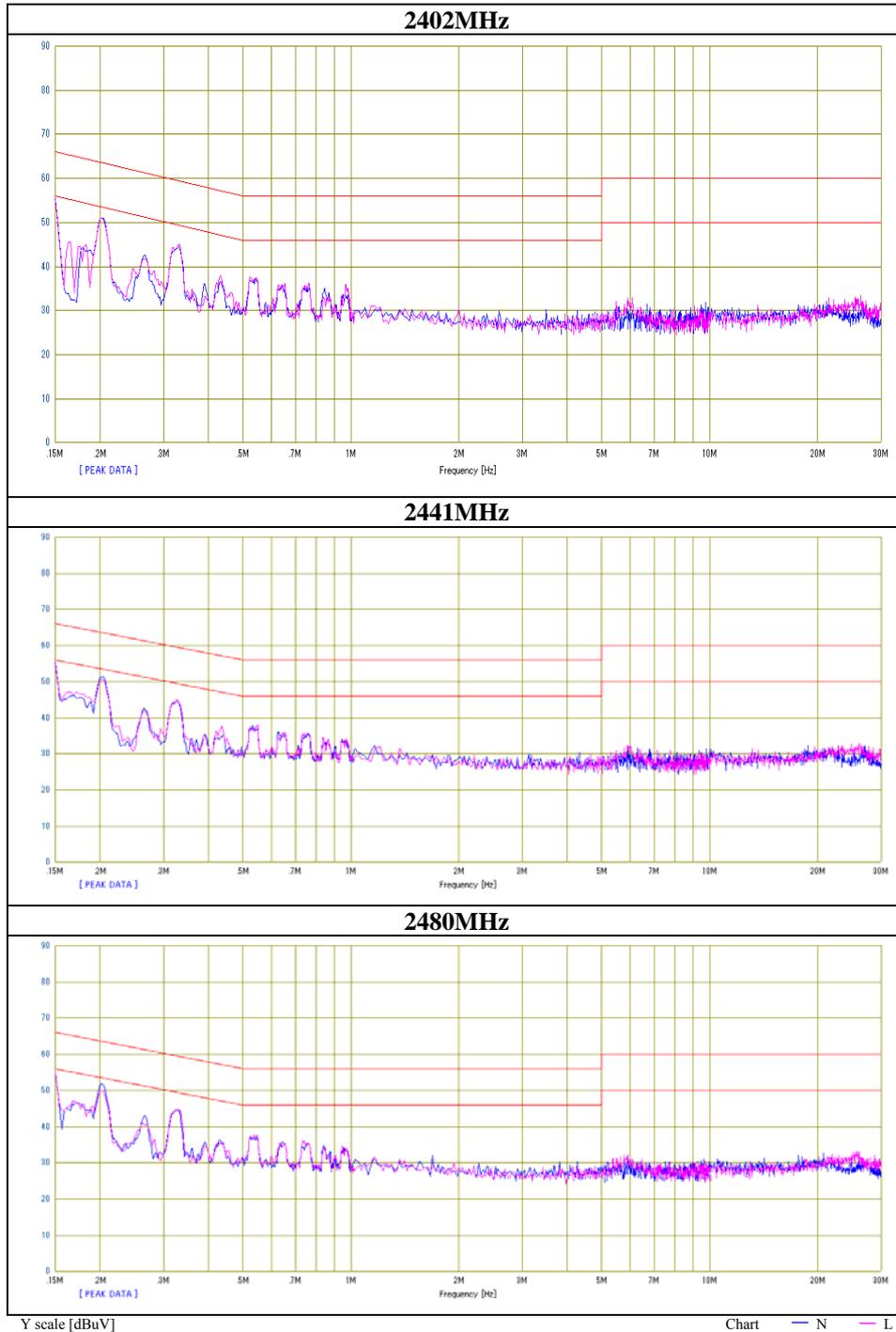
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Conducted Emission
 (Power Supply: DELTA)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10724035H
Date	04/03/2015
Temperature/ Humidity	24deg. C / 40% RH
Engineer	Yuta Moriya
Mode	Tx 3DH5

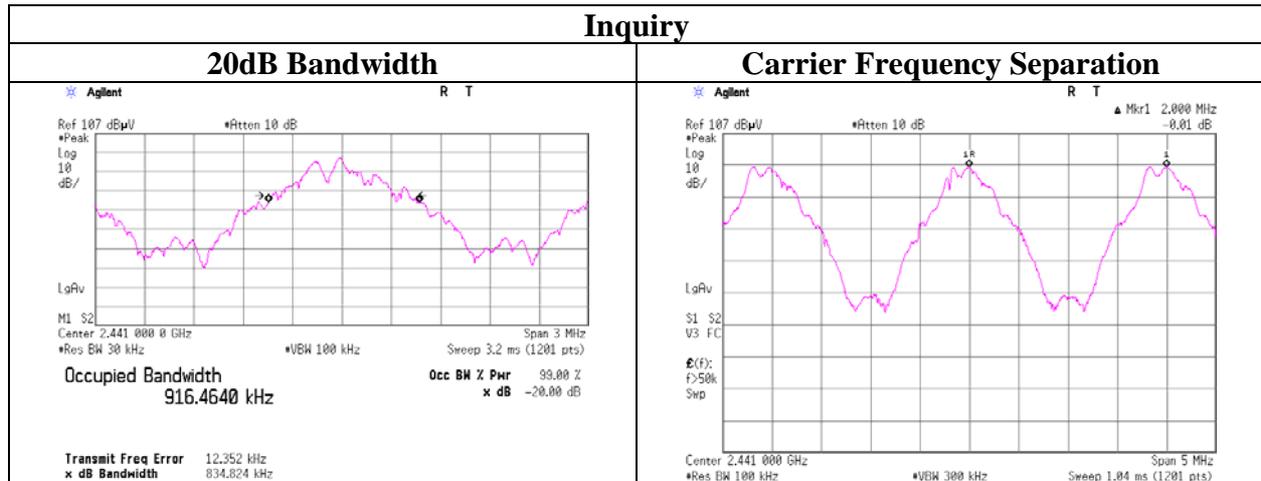


20dB Bandwidth and Carrier Frequency Separation

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.941	1.000	≥ 0.627
DH5	2441.0	0.962	1.000	≥ 0.641
DH5	2480.0	0.948	1.000	≥ 0.632
3DH5	2402.0	1.293	1.000	≥ 0.862
3DH5	2441.0	1.283	1.000	≥ 0.855
3DH5	2480.0	1.290	1.000	≥ 0.860
Inquiry	2441.0	0.835	2.000	≥ 0.557

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



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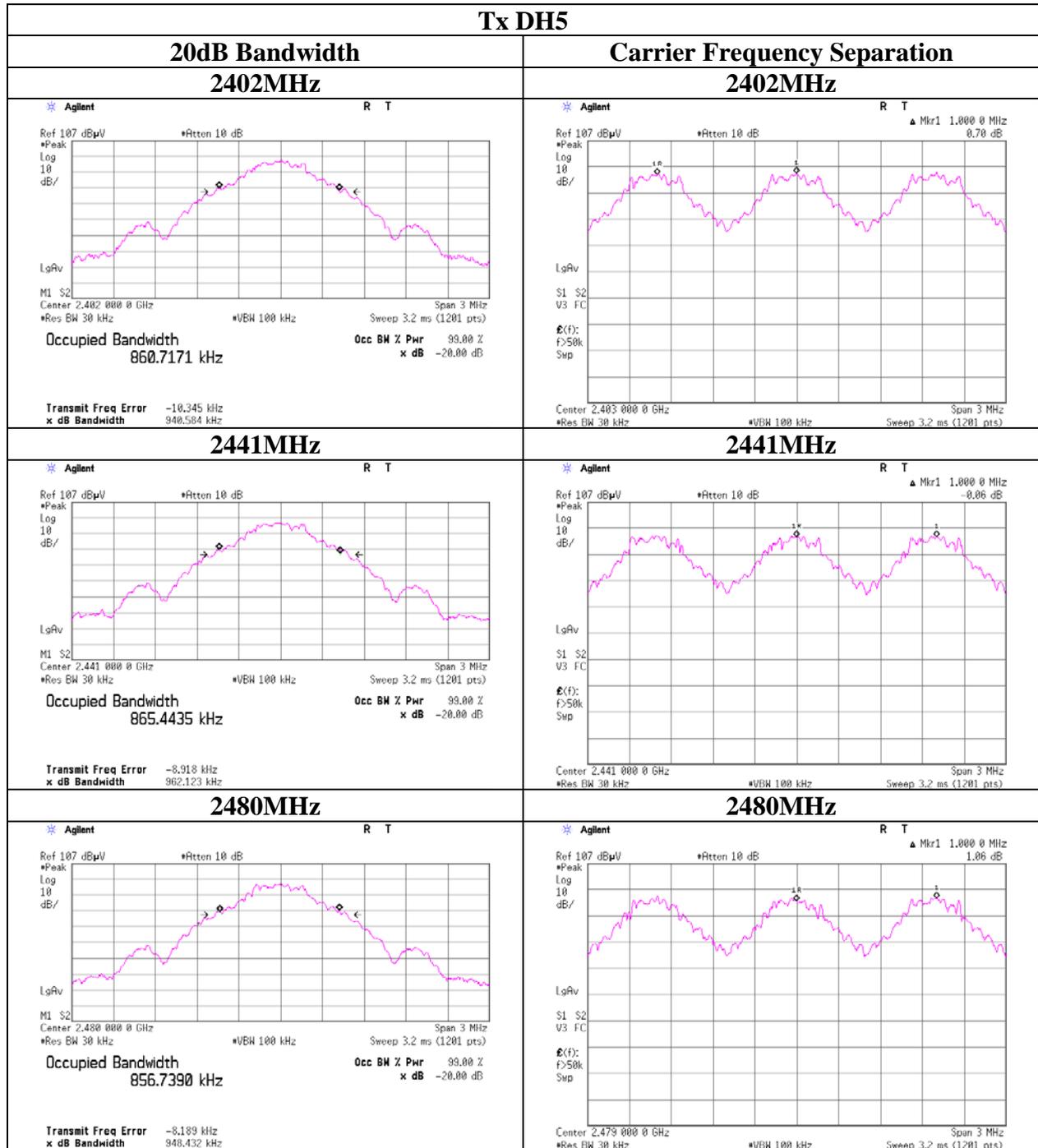
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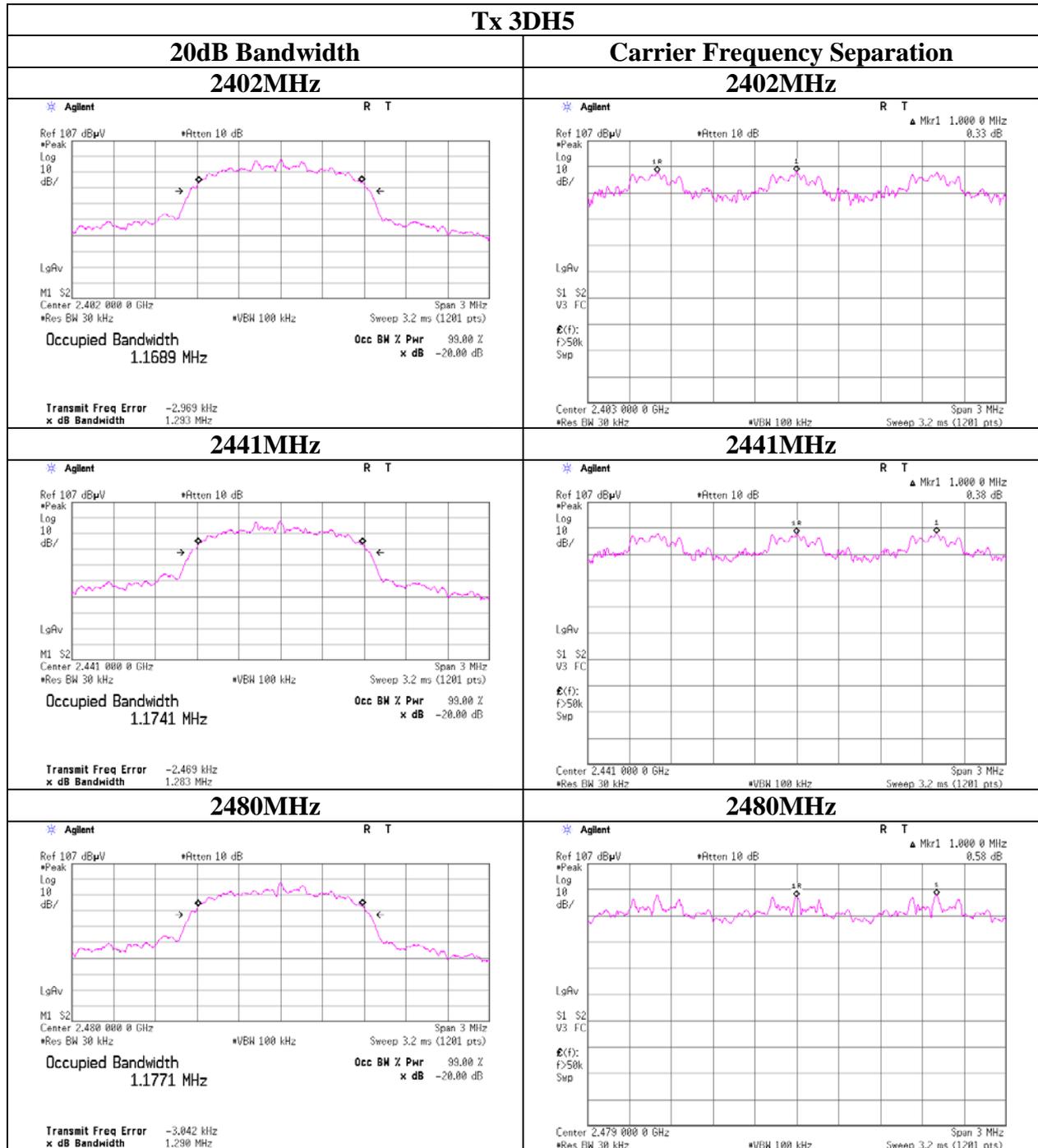
20dB Bandwidth and Carrier Frequency Separation



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20dB Bandwidth and Carrier Frequency Separation



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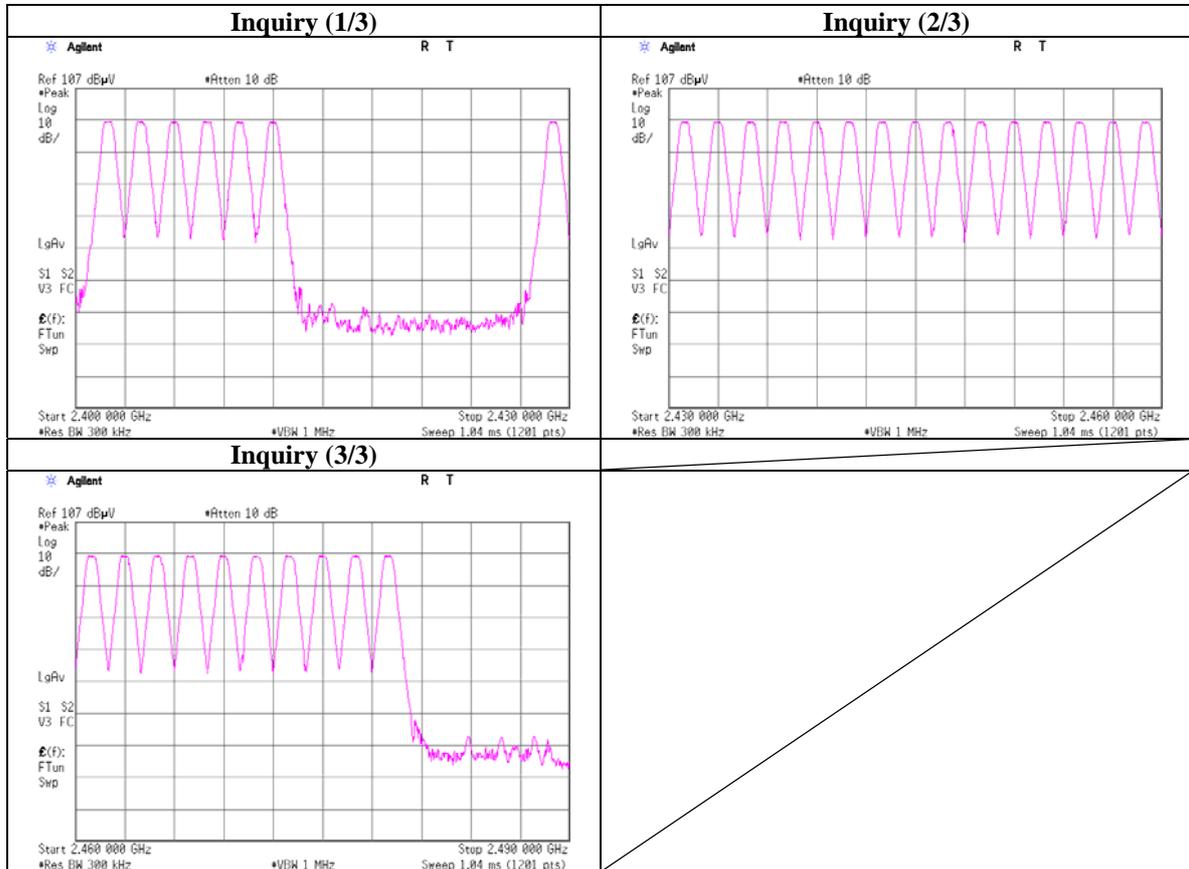
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Number of Hopping Frequency

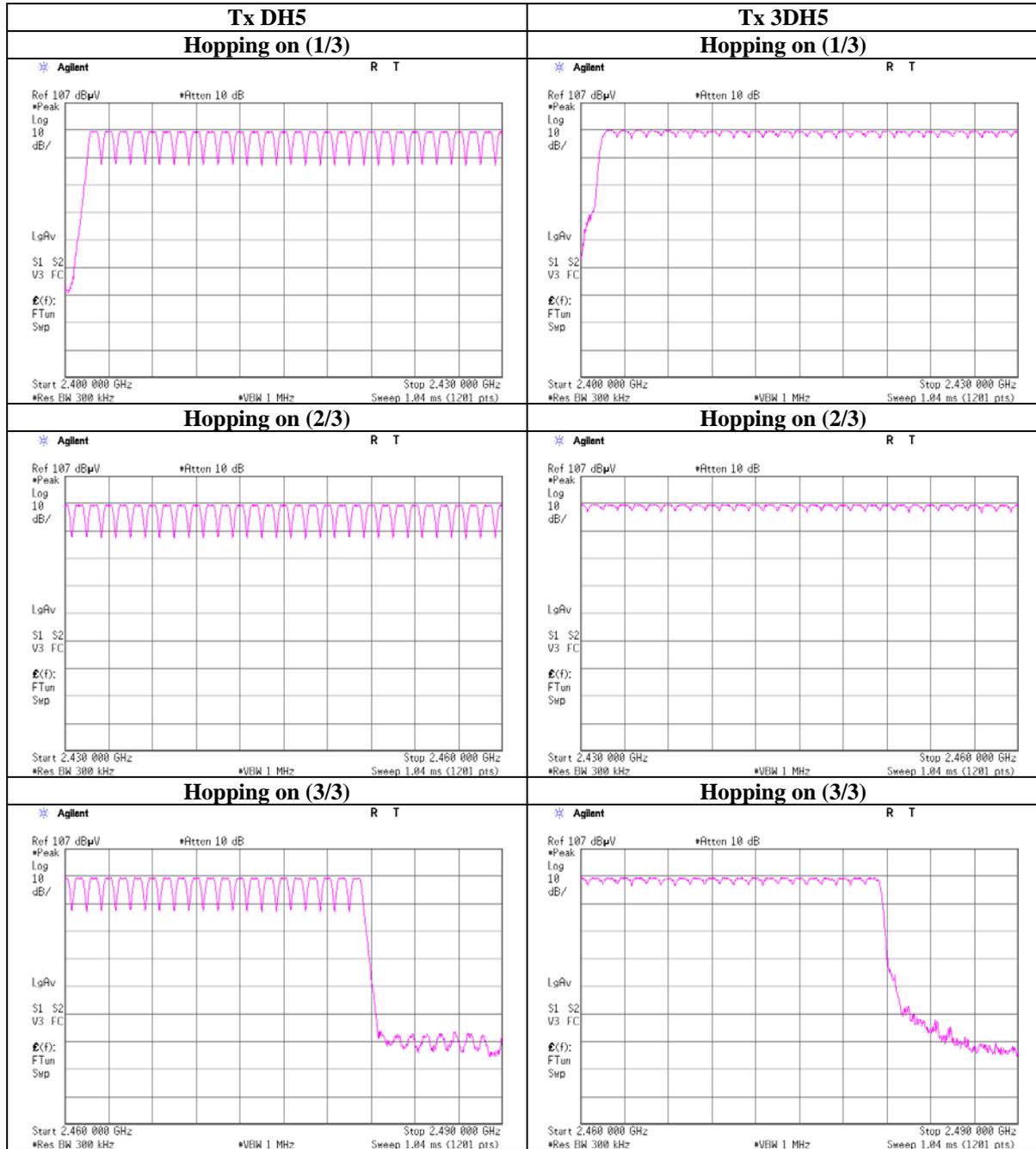
Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

Mode	Number of channel [times]	Limit [times]
DH5	79	>= 15
3DH5	79	>= 15
Inquiry	32	>= 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.6 Measurement Room
 Report No. : 10724035H
 Date : 03/20/2015
 Temperature/ Humidity : 23deg. C / 47% RH
 Engineer : Ken Fujita
 Mode : Tx (Hopping on) DH5/3DH5/Inquiry

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 time [msec]	Result [msec]	Limit [msec]
DH1	49.2 times / 5 sec. x 31.6 sec. = 311 times	0.406	126	400
DH3	26.2 times / 5 sec. x 31.6 sec. = 166 times	1.671	277	400
DH5	16.6 times / 5 sec. x 31.6 sec. = 105 times	2.933	308	400
3DH1	50.6 times / 5 sec. x 31.6 sec. = 320 times	0.408	131	400
3DH3	26.8 times / 5 sec. x 31.6 sec. = 170 times	1.673	284	400
3DH5	15.8 times / 5 sec. x 31.6 sec. = 100 times	2.918	292	400
Inquiry	100.0 times / 1 sec. x 12.8 sec. = 1280 times	0.110	141	400

Sample Calculation

Result = Number of transmission x Length of transmission time

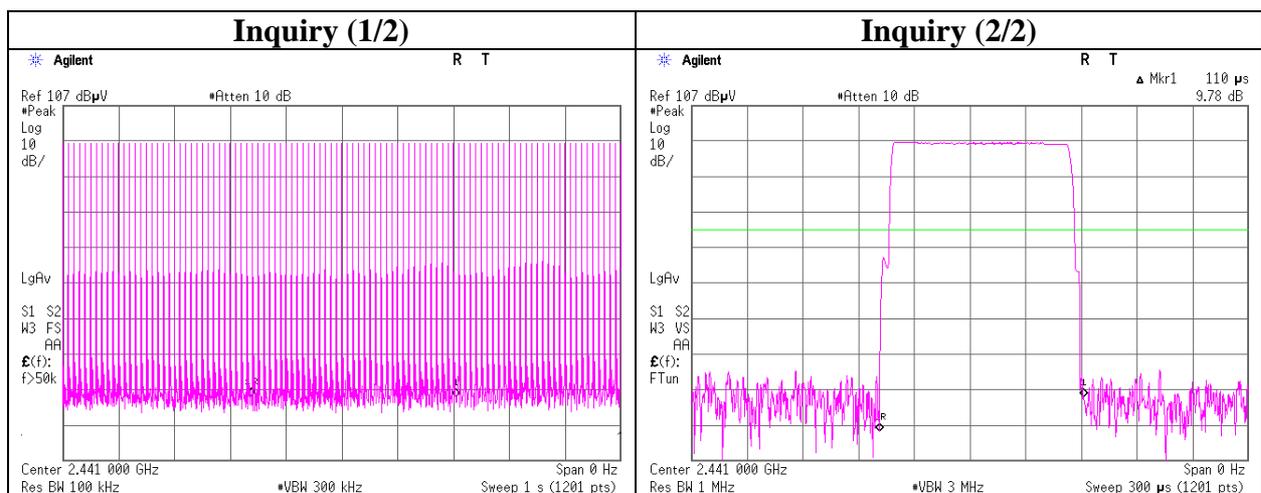
*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	50	48	49	49	50	49.2
DH3	23	24	26	28	30	26.2
DH5	16	19	18	15	15	16.6
3DH1	50	52	51	50	50	50.6
3DH3	27	28	27	26	26	26.8
3DH5	16	15	17	16	15	15.8

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 $N=79$.



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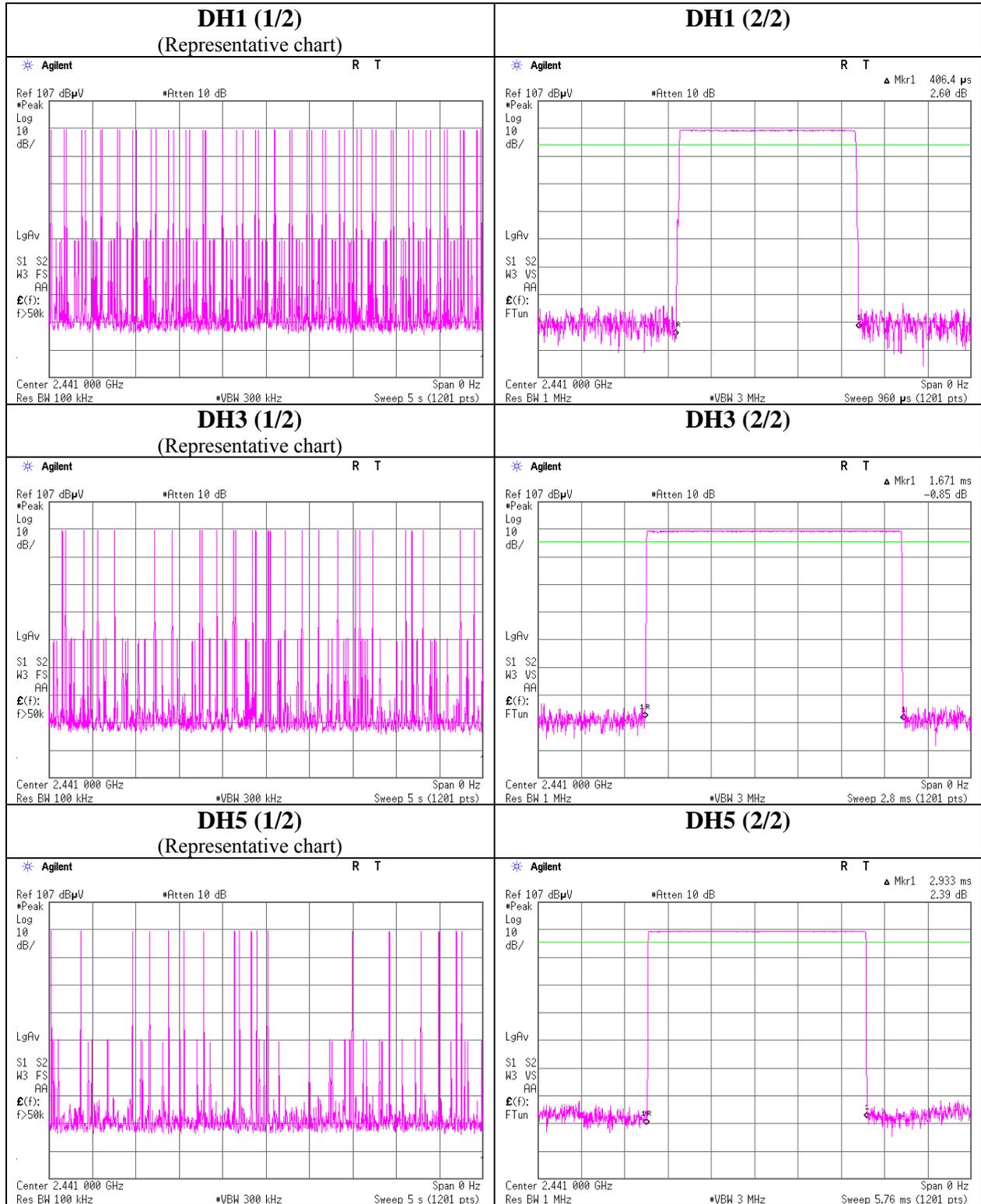
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Dwell time



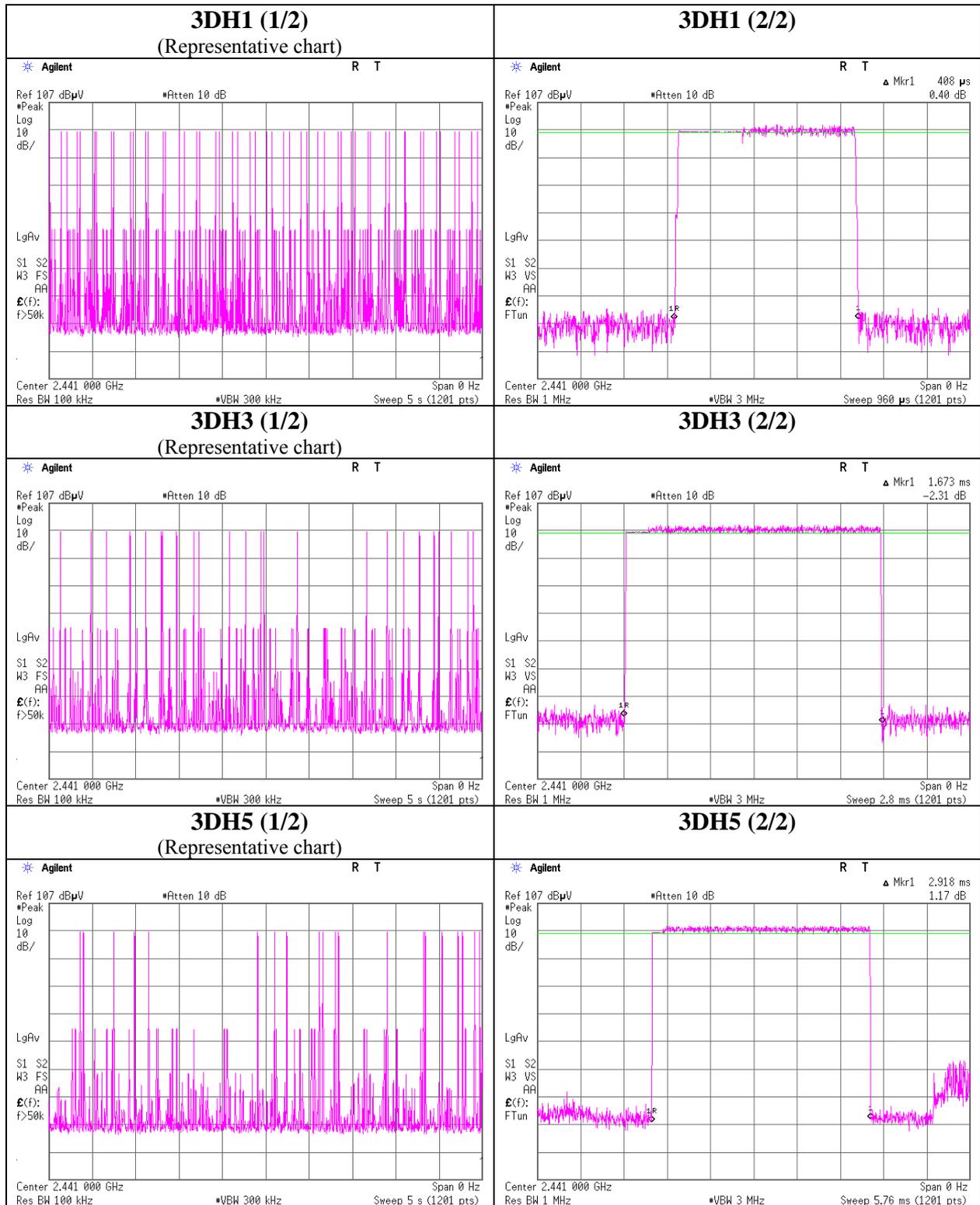
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Dwell time



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Maximum Peak Output Power

Test place : Ise EMC Lab. No.6 Measurement Room
Report No. : 10724035H
Date : 03/19/2015
Temperature/ Humidity : 23deg. C / 47% RH
Engineer : Ken Fujita
Mode : Tx (Hopping off) DH5/3DH5/Inquiry

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-10.33	2.07	10.11	1.85	1.53	20.96	125	19.11
DH5	2441.0	-10.37	2.09	10.11	1.83	1.52	20.96	125	19.13
DH5	2480.0	-10.49	2.09	10.11	1.71	1.48	20.96	125	19.25
2DH5	2402.0	-7.64	2.07	10.11	4.54	2.84	20.96	125	16.42
2DH5	2441.0	-7.86	2.09	10.11	4.34	2.72	20.96	125	16.62
2DH5	2480.0	-8.10	2.09	10.11	4.10	2.57	20.96	125	16.86
3DH5	2402.0	-7.30	2.07	10.11	4.88	3.08	20.96	125	16.08
3DH5	2441.0	-7.53	2.09	10.11	4.67	2.93	20.96	125	16.29
3DH5	2480.0	-7.79	2.09	10.11	4.41	2.76	20.96	125	16.55
Inquiry	2441.0	-10.08	2.09	10.11	2.12	1.63	20.96	125	18.84

Sample Calculation:

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

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.

UL Japan, Inc.

Ise EMC Lab.

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Average Output Power
(Reference data for SAR testing)

Test place : Ise EMC Lab. No.6 Measurement Room
Report No. : 10724035H
Date : 03/19/2015
Temperature/ Humidity : 23deg. C / 47% RH
Engineer : Ken Fujita
Mode : Tx (Hopping off) DH5/3DH5

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm]	[mW]
DH5	2402.0	-11.52	2.07	10.11	0.66	1.16
DH5	2441.0	-11.56	2.09	10.11	0.64	1.16
DH5	2480.0	-11.67	2.09	10.11	0.53	1.13
2DH5	2402.0	-11.49	2.07	10.11	0.69	1.17
2DH5	2441.0	-11.50	2.09	10.11	0.70	1.17
2DH5	2480.0	-11.97	2.09	10.11	0.23	1.05
3DH5	2402.0	-11.32	2.07	10.11	0.86	1.22
3DH5	2441.0	-11.54	2.09	10.11	0.66	1.16
3DH5	2480.0	-11.79	2.09	10.11	0.41	1.10

Sample Calculation:

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

Radiated Spurious Emission
(Power Supply: Chicony)

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10724035H
Date : 03/28/2015 04/01/2015
Temperature/ Humidity : 20deg. C / 35% RH 19deg. C / 49% RH
Engineer : Takafumi Noguchi Ken Fujita
(Below 1GHz) (Above 1GHz)
Mode : Tx, DH5 2441MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	69.434	QP	48.4	6.2	7.6	32.1	30.1	40.0	9.9	
Hori	148.520	QP	41.5	14.9	8.6	32.2	32.8	43.5	10.7	
Hori	281.502	QP	42.6	18.8	9.8	32.0	39.2	46.0	6.8	
Hori	301.434	QP	43.5	14.7	10.0	32.0	36.2	46.0	9.8	
Hori	499.998	QP	38.8	18.2	11.2	32.1	36.1	46.0	9.9	
Hori	742.514	QP	38.0	21.2	12.6	31.9	39.9	46.0	6.1	
Hori	2748.776	PK	61.1	27.1	3.5	31.7	60.0	73.9	13.9	
Hori	4882.000	PK	41.9	30.8	4.4	31.3	45.8	73.9	28.1	Floor Noise
Hori	7323.000	PK	43.3	35.9	5.6	32.0	52.8	73.9	21.1	Floor Noise
Hori	9764.000	PK	41.6	38.7	6.5	32.5	54.3	73.9	19.6	Floor Noise
Hori	2748.776	AV	41.3	27.1	3.5	31.7	40.2	53.9	13.7	
Hori	4882.000	AV	32.1	30.8	4.4	31.3	36.0	53.9	17.9	Floor Noise
Hori	7323.000	AV	30.2	35.9	5.6	32.0	39.7	53.9	14.2	Floor Noise
Hori	9764.000	AV	31.4	38.7	6.5	32.5	44.1	53.9	9.8	Floor Noise
Vert	47.248	QP	46.6	11.5	7.3	32.2	33.2	40.0	6.8	
Vert	105.110	QP	45.0	10.8	8.1	32.3	31.6	43.5	11.9	
Vert	148.510	QP	43.5	14.9	8.6	32.2	34.8	43.5	8.7	
Vert	296.960	QP	40.3	19.6	9.9	32.0	37.8	46.0	8.2	
Vert	499.989	QP	37.0	18.2	11.2	32.1	34.3	46.0	11.7	
Vert	742.479	QP	39.9	21.2	12.6	31.9	41.8	46.0	4.2	
Vert	2749.791	PK	61.1	27.1	3.5	31.7	60.0	73.9	13.9	
Vert	4882.000	PK	42.2	30.8	4.4	31.3	46.1	73.9	27.8	Floor Noise
Vert	7323.000	PK	41.7	35.9	5.6	32.0	51.2	73.9	22.7	Floor Noise
Vert	9764.000	PK	42.2	38.7	6.5	32.5	54.9	73.9	19.0	Floor Noise
Vert	2749.791	AV	37.2	27.1	3.5	31.7	36.1	53.9	17.8	
Vert	4882.000	AV	34.1	30.8	4.4	31.3	38.0	53.9	15.9	Floor Noise
Vert	7323.000	AV	31.1	35.9	5.6	32.0	40.6	53.9	13.3	Floor Noise
Vert	9764.000	AV	30.5	38.7	6.5	32.5	43.2	53.9	10.7	Floor Noise

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

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

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

Radiated Spurious Emission
(Power Supply: Chicony)

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10724035H
Date : 03/28/2015 04/01/2015
Temperature/ Humidity : 20deg. C / 35% RH 19deg. C / 49% RH
Engineer : Takafumi Noguchi Ken Fujita
(Below 1GHz) (Above 1GHz)
Mode : Tx, 3DH5 2441MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	69.451	QP	48.4	6.2	7.6	32.1	30.1	40.0	9.9	
Hori	148.517	QP	41.4	14.9	8.6	32.2	32.7	43.5	10.8	
Hori	281.448	QP	42.4	18.8	9.8	32.0	39.0	46.0	7.0	
Hori	301.794	QP	43.3	14.7	10.0	32.0	36.0	46.0	10.0	
Hori	499.996	QP	38.9	18.2	11.2	32.1	36.2	46.0	9.8	
Hori	742.480	QP	37.7	21.2	12.6	31.9	39.6	46.0	6.4	
Hori	2749.778	PK	60.2	27.1	3.5	31.7	59.1	73.9	14.8	
Hori	4882.000	PK	41.3	30.8	4.4	31.3	45.2	73.9	28.7	Floor Noise
Hori	7323.000	PK	42.6	35.9	5.6	32.0	52.1	73.9	21.8	Floor Noise
Hori	9764.000	PK	42.4	38.7	6.5	32.5	55.1	73.9	18.8	Floor Noise
Hori	2749.778	AV	39.2	27.1	3.5	31.7	38.1	53.9	15.8	
Hori	4882.000	AV	29.4	30.8	4.4	31.3	33.3	53.9	20.6	Floor Noise
Hori	7323.000	AV	30.8	35.9	5.6	32.0	40.3	53.9	13.6	Floor Noise
Hori	9764.000	AV	30.7	38.7	6.5	32.5	43.4	53.9	10.5	Floor Noise
Vert	47.537	QP	46.8	11.5	7.3	32.2	33.4	40.0	6.6	
Vert	104.457	QP	45.7	10.7	8.1	32.3	32.2	43.5	11.3	
Vert	148.495	QP	44.1	14.9	8.6	32.2	35.4	43.5	8.1	
Vert	297.054	QP	40.0	19.6	9.9	32.0	37.5	46.0	8.5	
Vert	499.996	QP	37.1	18.2	11.2	32.1	34.4	46.0	11.6	
Vert	742.516	QP	40.8	21.2	12.6	31.9	42.7	46.0	3.3	
Vert	2737.512	PK	63.1	27.1	3.4	31.7	61.9	73.9	12.0	
Vert	4882.000	PK	42.3	30.8	4.4	31.3	46.2	73.9	27.7	Floor Noise
Vert	7323.000	PK	42.5	35.9	5.6	32.0	52.0	73.9	21.9	Floor Noise
Vert	9764.000	PK	43.0	38.7	6.5	32.5	55.7	73.9	18.2	Floor Noise
Vert	2737.512	AV	42.6	27.1	3.4	31.7	41.4	53.9	12.5	
Vert	4882.000	AV	33.3	30.8	4.4	31.3	37.2	53.9	16.7	Floor Noise
Vert	7323.000	AV	31.0	35.9	5.6	32.0	40.5	53.9	13.4	Floor Noise
Vert	9764.000	AV	30.8	38.7	6.5	32.5	43.5	53.9	10.4	Floor Noise

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

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

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

Radiated Spurious Emission
(Power Supply: DELTA)

Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. 10724035H
Date 03/29/2015 03/31/2015
Temperature/ Humidity 21deg. C / 38% RH 22deg. C / 44% RH
Engineer Tomoki Matsui Ken Fujita
(Below 1GHz) (Above 1GHz)
Mode Tx, DH5 2402MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	70.018	QP	46.1	6.1	7.7	32.1	27.8	40.0	12.2	
Hori	132.005	QP	42.9	13.8	8.4	32.2	32.9	43.5	10.6	
Hori	148.502	QP	38.0	14.9	8.6	32.2	29.3	43.5	14.2	
Hori	283.527	QP	42.1	18.9	9.8	32.0	38.8	46.0	7.2	
Hori	300.055	QP	40.2	14.7	10.0	32.0	32.9	46.0	13.1	
Hori	405.007	QP	36.8	17.6	10.6	32.0	33.0	46.0	13.0	
Hori	499.995	QP	39.5	18.2	11.2	32.1	36.8	46.0	9.2	
Hori	742.495	QP	40.6	21.2	12.6	31.9	42.5	46.0	3.5	
Hori	810.013	QP	31.6	22.2	12.9	31.5	35.2	46.0	10.8	
Hori	2390.000	PK	45.9	26.8	3.2	32.0	43.9	73.9	30.0	
Hori	2729.250	PK	66.0	27.1	3.4	31.7	64.8	73.9	9.1	
Hori	4804.000	PK	42.3	30.6	4.3	31.3	45.9	73.9	28.0	Floor Noise
Hori	7206.000	PK	41.2	35.9	5.6	32.0	50.7	73.9	23.2	Floor Noise
Hori	9608.000	PK	42.6	38.4	6.4	32.4	55.0	73.9	18.9	Floor Noise
Hori	2390.000	AV	33.5	26.8	3.2	32.0	31.5	53.9	22.4	
Hori	2729.250	AV	43.5	27.1	3.4	31.7	42.3	53.9	11.6	
Hori	4804.000	AV	32.2	30.6	4.3	31.3	35.8	53.9	18.1	Floor Noise
Hori	7206.000	AV	31.3	35.9	5.6	32.0	40.8	53.9	13.1	Floor Noise
Hori	9608.000	AV	32.5	38.4	6.4	32.4	44.9	53.9	9.0	Floor Noise
Vert	46.530	QP	41.9	11.7	7.3	32.2	28.7	40.0	11.3	
Vert	73.410	QP	46.0	6.3	7.7	32.1	27.9	40.0	12.1	
Vert	101.530	QP	47.9	10.3	8.1	32.3	34.0	43.5	9.5	
Vert	148.500	QP	40.5	14.9	8.6	32.2	31.8	43.5	11.7	
Vert	405.014	QP	38.3	17.6	10.6	32.0	34.5	46.0	11.5	
Vert	499.994	QP	37.3	18.2	11.2	32.1	34.6	46.0	11.4	
Vert	664.852	QP	33.4	20.1	12.2	32.2	33.5	46.0	12.5	
Vert	742.496	QP	41.1	21.2	12.6	31.9	43.0	46.0	3.0	
Vert	810.022	QP	31.1	22.2	12.9	31.5	34.7	46.0	11.3	
Vert	2390.000	PK	47.7	26.8	3.2	32.0	45.7	73.9	28.2	
Vert	2730.830	PK	62.6	27.1	3.4	31.7	61.4	73.9	12.5	
Vert	4804.000	PK	42.3	30.6	4.3	31.3	45.9	73.9	28.0	Floor Noise
Vert	7206.000	PK	41.3	35.9	5.6	32.0	50.8	73.9	23.1	Floor Noise
Vert	9608.000	PK	42.0	38.4	6.4	32.4	54.4	73.9	19.5	Floor Noise
Vert	2390.000	AV	37.4	26.8	3.2	32.0	35.4	53.9	18.5	
Vert	2730.830	AV	43.2	27.1	3.4	31.7	42.0	53.9	11.9	
Vert	4804.000	AV	31.2	30.6	4.3	31.3	34.8	53.9	19.1	Floor Noise
Vert	7206.000	AV	31.0	35.9	5.6	32.0	40.5	53.9	13.4	Floor Noise
Vert	9608.000	AV	31.2	38.4	6.4	32.4	43.6	53.9	10.3	Floor Noise

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

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

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

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	100.4	26.8	3.2	32.0	98.4	-	-	Carrier
Hori	2400.000	PK	39.7	26.8	3.2	32.0	37.7	78.4	40.7	
Vert	2402.000	PK	106.5	26.8	3.2	32.0	104.5	-	-	Carrier
Vert	2400.000	PK	46.9	26.8	3.2	32.0	44.9	84.5	39.6	

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

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Radiated Spurious Emission
(Power Supply: DELTA)

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10724035H
Date : 03/29/2015 03/31/2015
Temperature/ Humidity : 21deg. C / 38% RH 22deg. C / 44% RH
Engineer : Tomoki Matsui Ken Fujita
(Below 1GHz) (Above 1GHz)
Mode : Tx, DH5 2441MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	69.989	QP	46.1	6.1	7.6	32.1	27.7	40.0	12.3	
Hori	132.013	QP	42.2	13.8	8.4	32.2	32.2	43.5	11.3	
Hori	148.498	QP	38.8	14.9	8.6	32.2	30.1	43.5	13.4	
Hori	283.561	QP	42.1	18.9	9.8	32.0	38.8	46.0	7.2	
Hori	300.045	QP	40.0	14.7	10.0	32.0	32.7	46.0	13.3	
Hori	405.011	QP	36.8	17.6	10.6	32.0	33.0	46.0	13.0	
Hori	499.996	QP	39.2	18.2	11.2	32.1	36.5	46.0	9.5	
Hori	742.495	QP	40.4	21.2	12.6	31.9	42.3	46.0	3.7	
Hori	810.016	QP	31.6	22.2	12.9	31.5	35.2	46.0	10.8	
Hori	2748.708	PK	60.9	27.1	3.5	31.7	59.8	73.9	14.1	
Hori	4882.000	PK	42.6	30.8	4.4	31.3	46.5	73.9	27.4	Floor Noise
Hori	7323.000	PK	42.6	35.9	5.6	32.0	52.1	73.9	21.8	Floor Noise
Hori	9764.000	PK	42.8	38.7	6.5	32.5	55.5	73.9	18.4	Floor Noise
Hori	2748.708	AV	41.2	27.1	3.5	31.7	40.1	53.9	13.8	
Hori	4882.000	AV	31.7	30.8	4.4	31.3	35.6	53.9	18.3	Floor Noise
Hori	7323.000	AV	30.4	35.9	5.6	32.0	39.9	53.9	14.0	Floor Noise
Hori	9764.000	AV	31.0	38.7	6.5	32.5	43.7	53.9	10.2	Floor Noise
Vert	46.370	QP	42.0	11.8	7.3	32.2	28.9	40.0	11.1	
Vert	73.190	QP	46.2	6.3	7.7	32.1	28.1	40.0	11.9	
Vert	101.740	QP	47.9	10.4	8.1	32.3	34.1	43.5	9.4	
Vert	148.504	QP	41.0	14.9	8.6	32.2	32.3	43.5	11.2	
Vert	405.006	QP	38.2	17.6	10.6	32.0	34.4	46.0	11.6	
Vert	499.994	QP	37.3	18.2	11.2	32.1	34.6	46.0	11.4	
Vert	664.900	QP	34.2	20.1	12.2	32.2	34.3	46.0	11.7	
Vert	742.497	QP	40.7	21.2	12.6	31.9	42.6	46.0	3.4	
Vert	810.017	QP	30.9	22.2	12.9	31.5	34.5	46.0	11.5	
Vert	2749.810	PK	60.8	27.1	3.5	31.7	59.7	73.9	14.2	
Vert	4882.000	PK	42.3	30.8	4.4	31.3	46.2	73.9	27.7	Floor Noise
Vert	7323.000	PK	42.3	35.9	5.6	32.0	51.8	73.9	22.1	Floor Noise
Vert	9764.000	PK	42.3	38.7	6.5	32.5	55.0	73.9	18.9	Floor Noise
Vert	2749.810	AV	36.8	27.1	3.5	31.7	35.7	53.9	18.2	
Vert	4882.000	AV	33.1	30.8	4.4	31.3	37.0	53.9	16.9	Floor Noise
Vert	7323.000	AV	30.6	35.9	5.6	32.0	40.1	53.9	13.8	Floor Noise
Vert	9764.000	AV	30.3	38.7	6.5	32.5	43.0	53.9	10.9	Floor Noise

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

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

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

UL Japan, Inc.

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Radiated Spurious Emission
(Power Supply: DELTA)

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10724035H
Date : 03/29/2015 03/31/2015
Temperature/ Humidity : 21deg. C / 38% RH 22deg. C / 44% RH
Engineer : Tomoki Matsui Ken Fujita
(Below 1GHz) (Above 1GHz)
Mode : Tx, DH5 2480MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	70.034	QP	45.8	6.1	7.7	32.1	27.5	40.0	12.5	
Hori	132.016	QP	42.3	13.8	8.4	32.2	32.3	43.5	11.2	
Hori	148.492	QP	38.9	14.9	8.6	32.2	30.2	43.5	13.3	
Hori	283.546	QP	42.0	18.9	9.8	32.0	38.7	46.0	7.3	
Hori	300.057	QP	40.4	14.7	10.0	32.0	33.1	46.0	12.9	
Hori	404.997	QP	36.3	17.6	10.6	32.0	32.5	46.0	13.5	
Hori	500.000	QP	38.8	18.2	11.2	32.1	36.1	46.0	9.9	
Hori	742.525	QP	40.5	21.2	12.6	31.9	42.4	46.0	3.6	
Hori	810.006	QP	31.8	22.2	12.9	31.5	35.4	46.0	10.6	
Hori	2483.500	PK	49.2	26.9	3.2	32.0	47.3	73.9	26.6	
Hori	2749.583	PK	65.7	27.1	3.5	31.7	64.6	73.9	9.3	
Hori	4960.000	PK	41.8	30.9	4.4	31.2	45.9	73.9	28.0	Floor Noise
Hori	7440.000	PK	41.8	35.9	5.7	32.1	51.3	73.9	22.6	Floor Noise
Hori	9920.000	PK	41.1	38.9	6.5	32.5	54.0	73.9	19.9	Floor Noise
Hori	2483.500	AV	37.1	26.9	3.2	32.0	35.2	53.9	18.7	
Hori	2749.583	AV	42.4	27.1	3.5	31.7	41.3	53.9	12.6	
Hori	4960.000	AV	30.2	30.9	4.4	31.2	34.3	53.9	19.6	Floor Noise
Hori	7440.000	AV	30.1	35.9	5.7	32.1	39.6	53.9	14.3	Floor Noise
Hori	9920.000	AV	30.0	38.9	6.5	32.5	42.9	53.9	11.0	Floor Noise
Vert	46.120	QP	42.7	11.9	7.3	32.2	29.7	40.0	10.3	
Vert	73.284	QP	46.2	6.3	7.7	32.1	28.1	40.0	11.9	
Vert	101.420	QP	46.7	10.3	8.1	32.3	32.8	43.5	10.7	
Vert	148.502	QP	41.8	14.9	8.6	32.2	33.1	43.5	10.4	
Vert	405.007	QP	38.3	17.6	10.6	32.0	34.5	46.0	11.5	
Vert	499.998	QP	37.2	18.2	11.2	32.1	34.5	46.0	11.5	
Vert	664.870	QP	33.9	20.1	12.2	32.2	34.0	46.0	12.0	
Vert	742.503	QP	40.6	21.2	12.6	31.9	42.5	46.0	3.5	
Vert	810.024	QP	31.1	22.2	12.9	31.5	34.7	46.0	11.3	
Vert	2483.500	PK	51.2	26.9	3.2	32.0	49.3	73.9	24.6	
Vert	2749.655	PK	61.1	27.1	3.5	31.7	60.0	73.9	13.9	
Vert	4960.000	PK	41.8	30.9	4.4	31.2	45.9	73.9	28.0	Floor Noise
Vert	7440.000	PK	42.6	35.9	5.7	32.1	52.1	73.9	21.8	Floor Noise
Vert	9920.000	PK	42.2	38.9	6.5	32.5	55.1	73.9	18.8	Floor Noise
Vert	2483.500	AV	39.1	26.9	3.2	32.0	37.2	53.9	16.7	
Vert	2749.655	AV	38.9	27.1	3.5	31.7	37.8	53.9	16.1	
Vert	4960.000	AV	30.9	30.9	4.4	31.2	35.0	53.9	18.9	Floor Noise
Vert	7440.000	AV	30.6	35.9	5.7	32.1	40.1	53.9	13.8	Floor Noise
Vert	9920.000	AV	30.4	38.9	6.5	32.5	43.3	53.9	10.6	Floor Noise

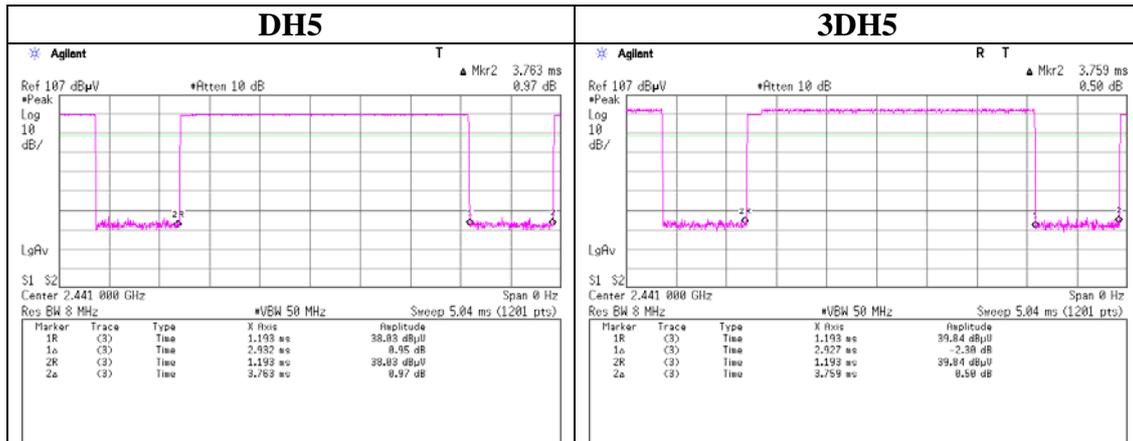
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

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

Burst Rate Confirmation

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping off) DH5/3DH5



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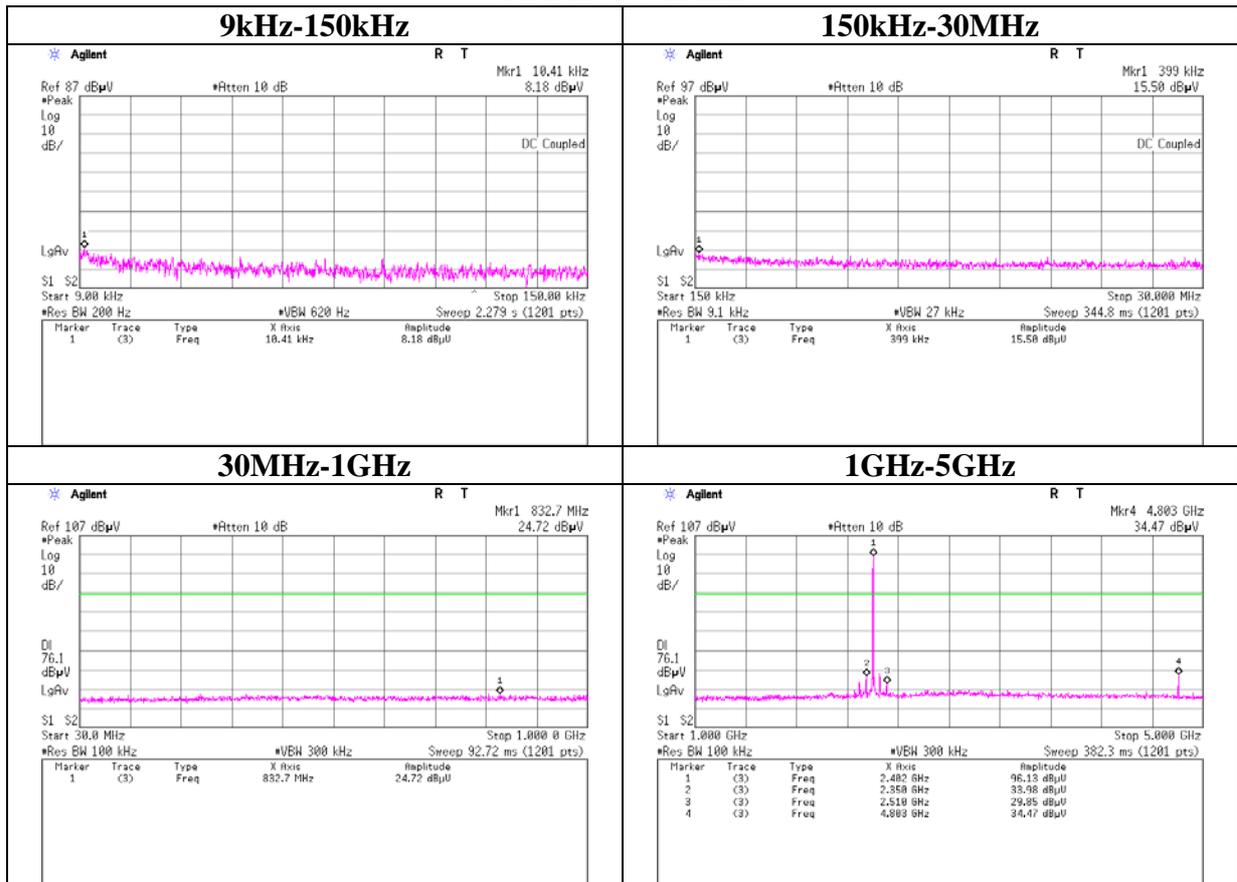
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping off) DH5

Tx DH5 2402MHz



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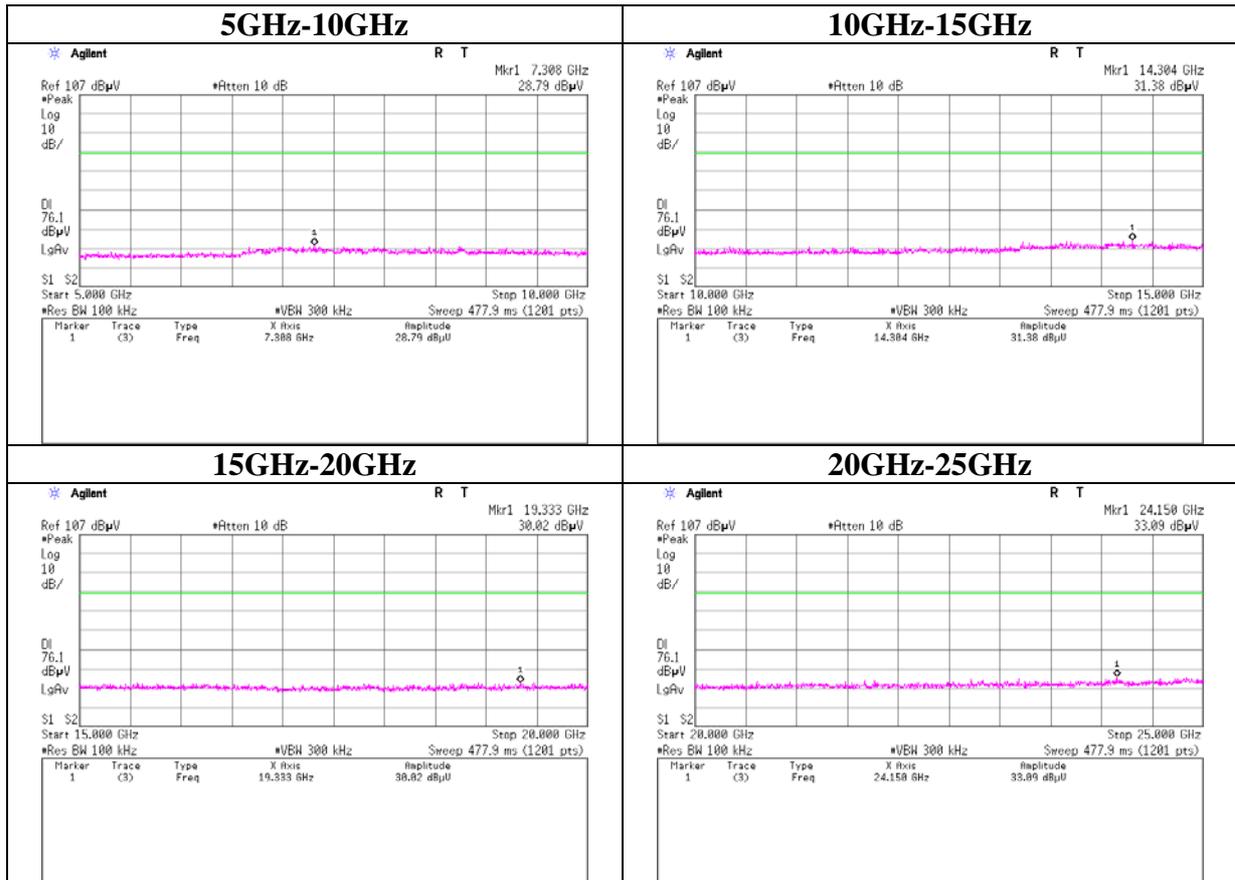
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping off) DH5

Tx DH5 2402MHz



UL Japan, Inc.

Ise EMC Lab.

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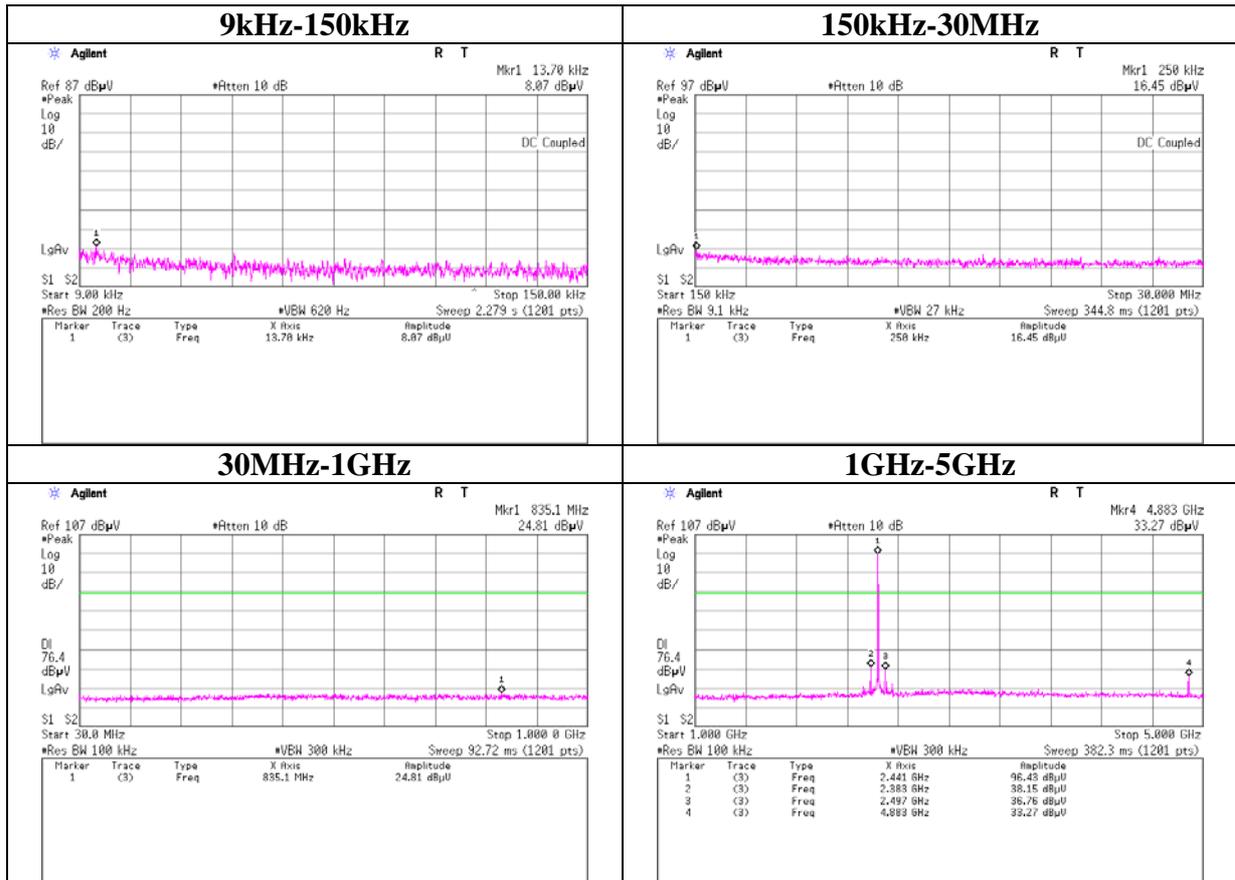
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping off) DH5

Tx DH5 2441MHz



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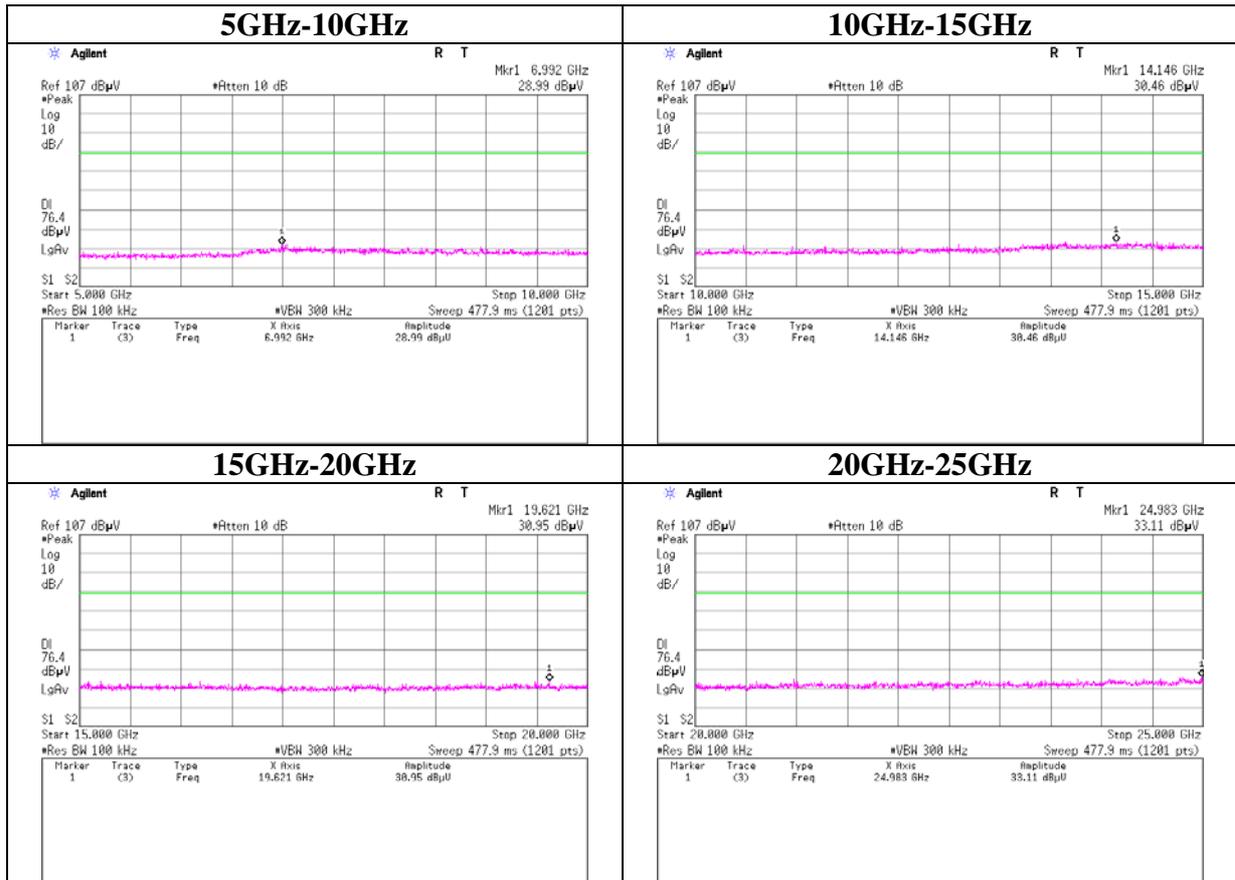
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Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping off) DH5

Tx DH5 2441MHz



UL Japan, Inc.

Ise EMC Lab.

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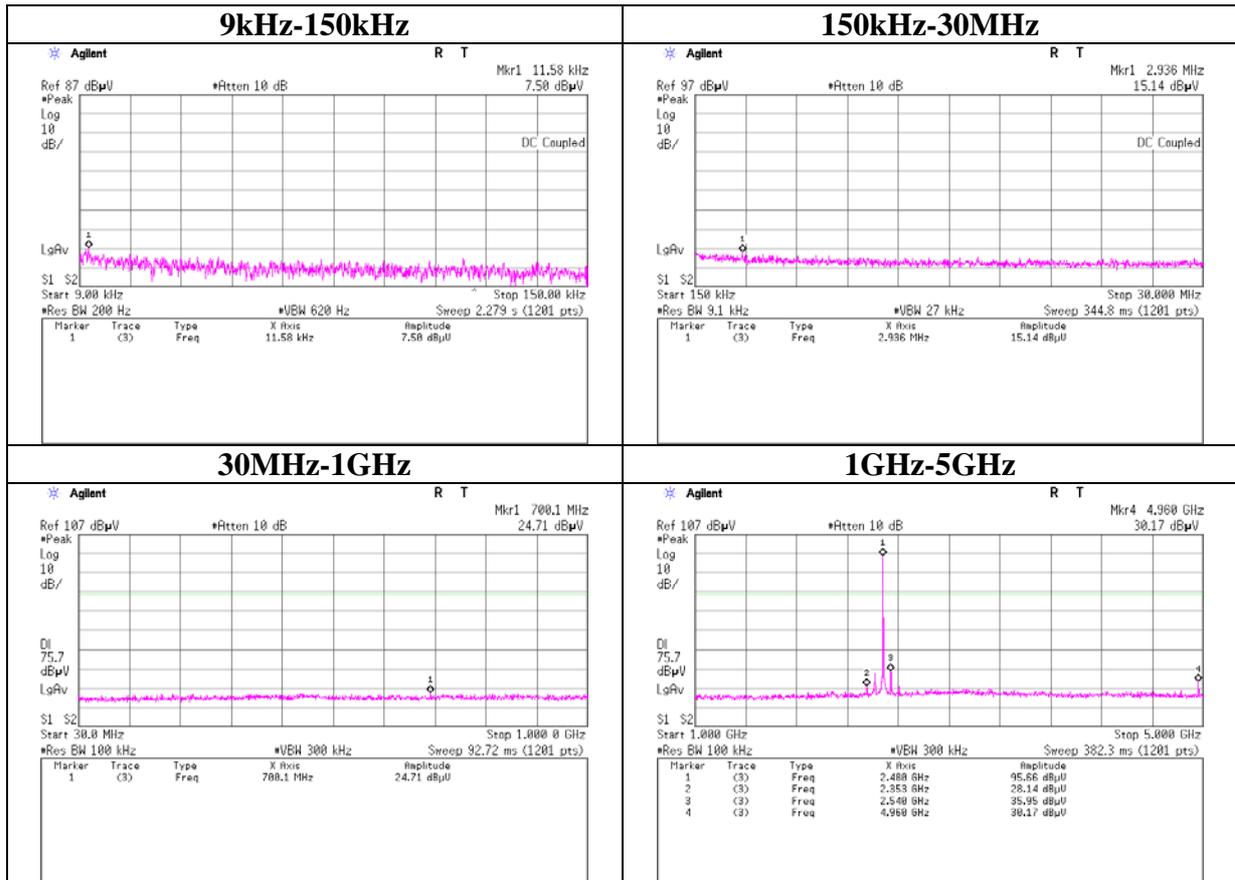
Telephone : +81 596 24 8999

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Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping off) DH5

Tx DH5 2480MHz



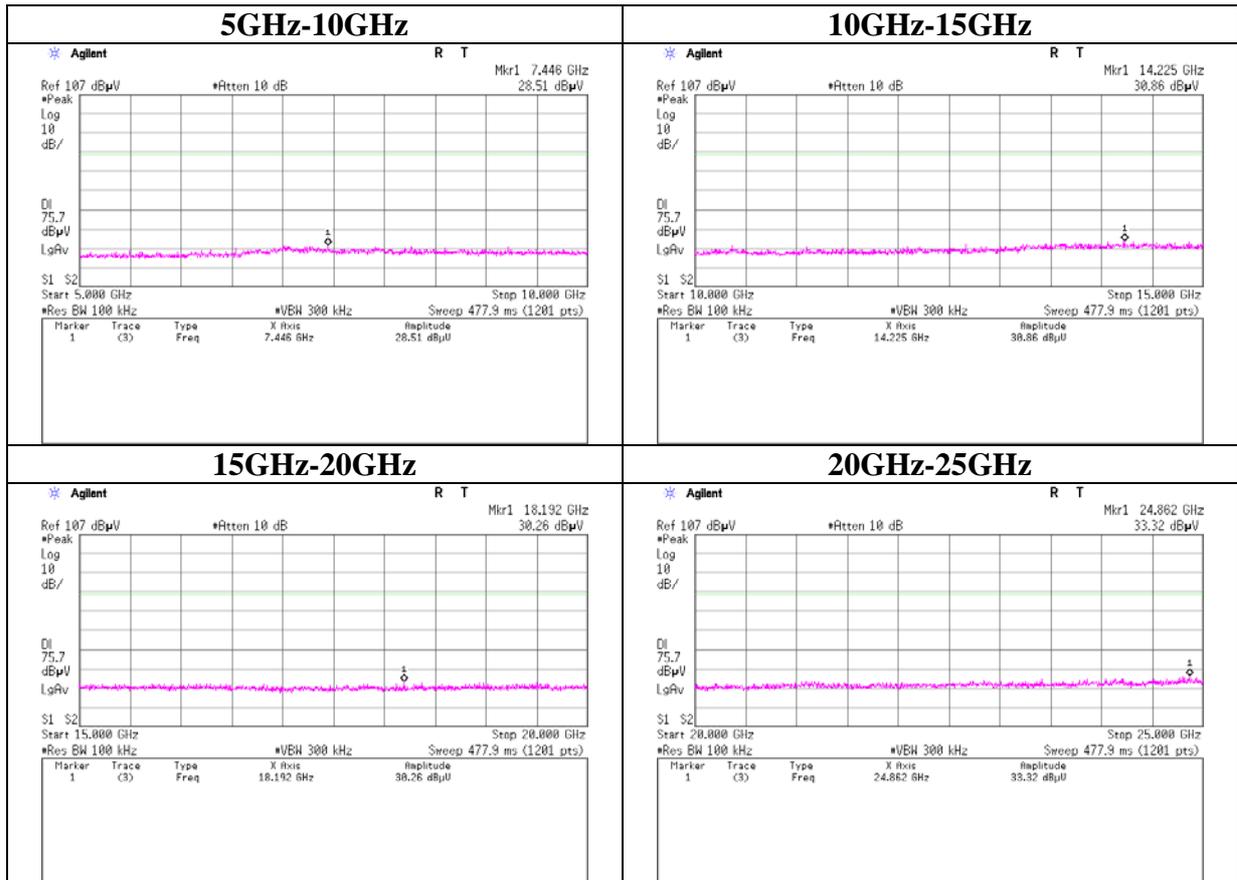
UL Japan, Inc.
Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
 Telephone : +81 596 24 8999
 Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping off) DH5

Tx DH5 2480MHz



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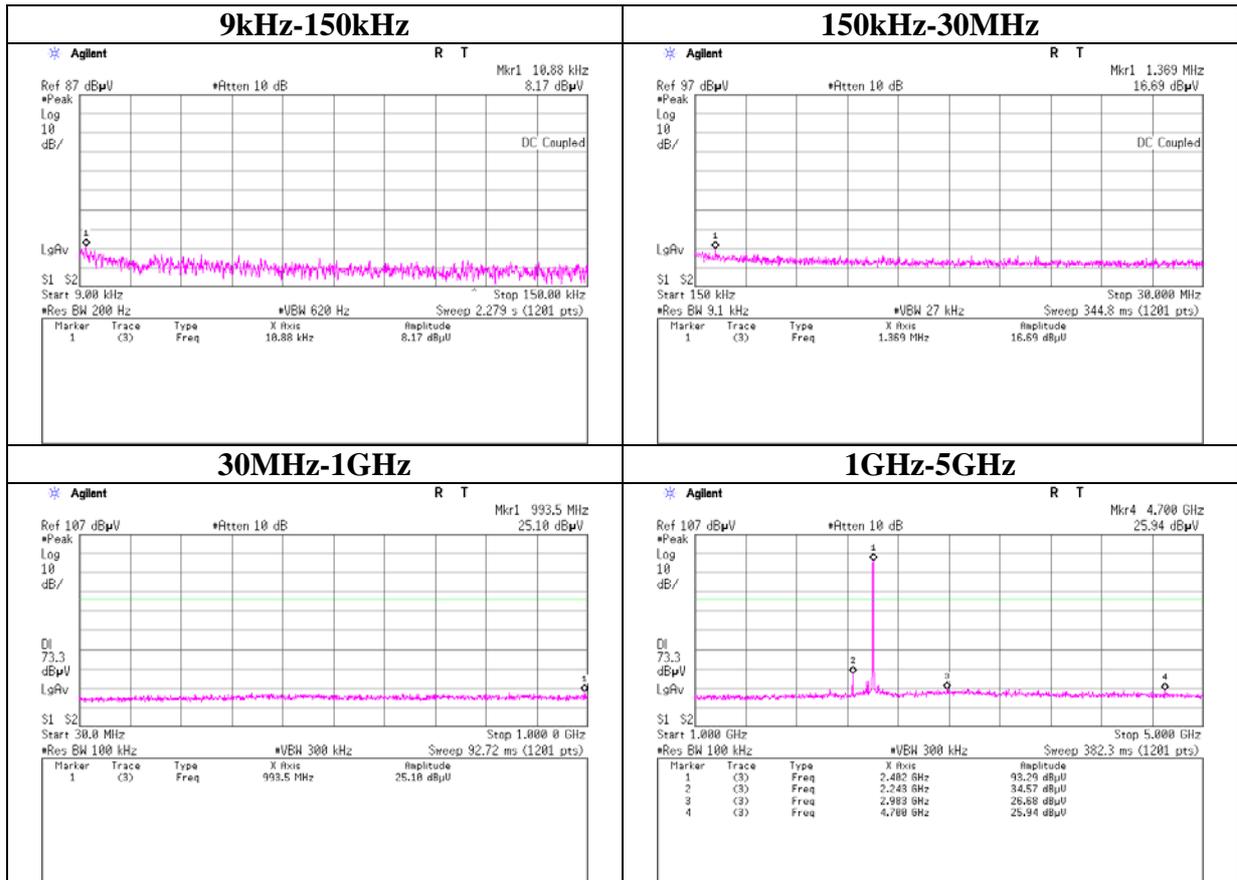
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping off) 3DH5

Tx 3DH5 2402MHz



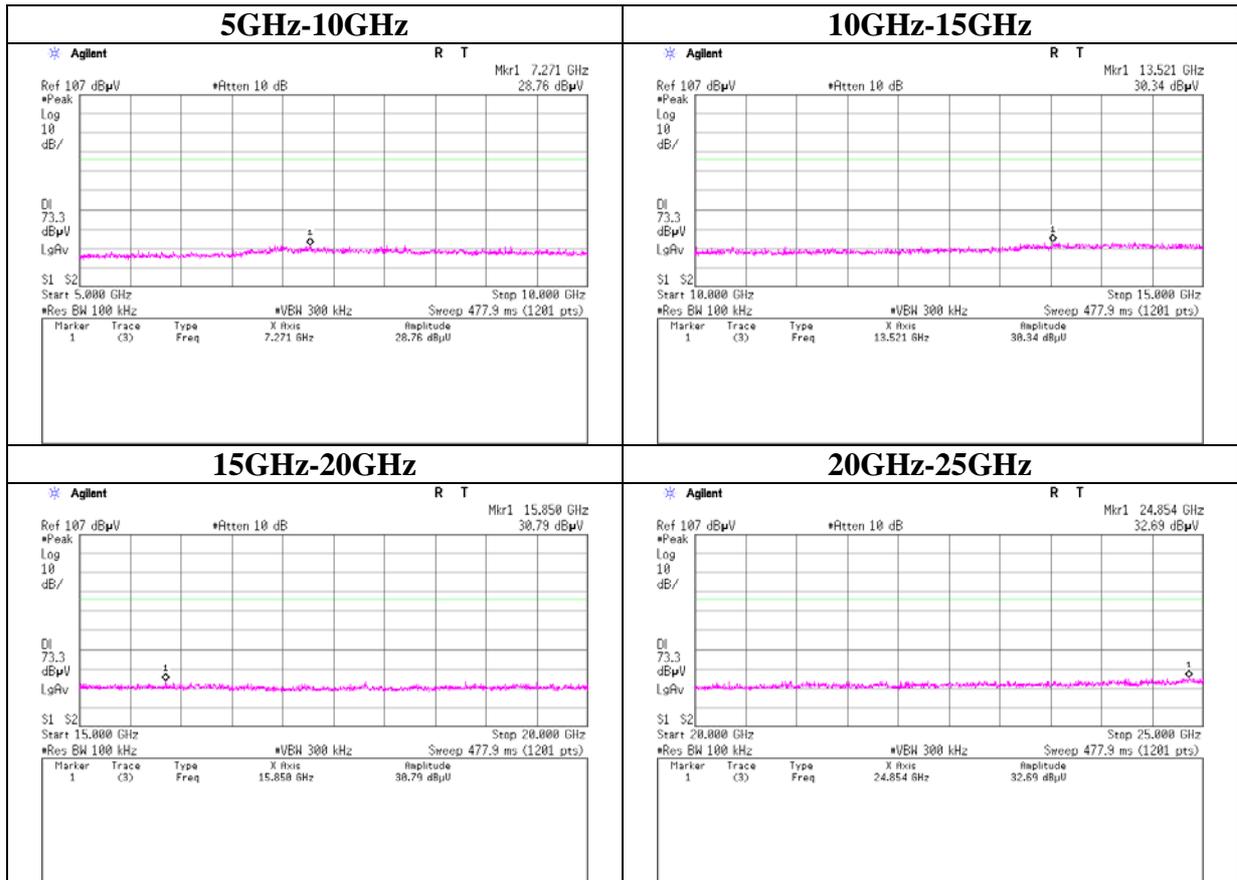
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Ise EMC Lab.

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Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping off) 3DH5

Tx 3DH5 2402MHz



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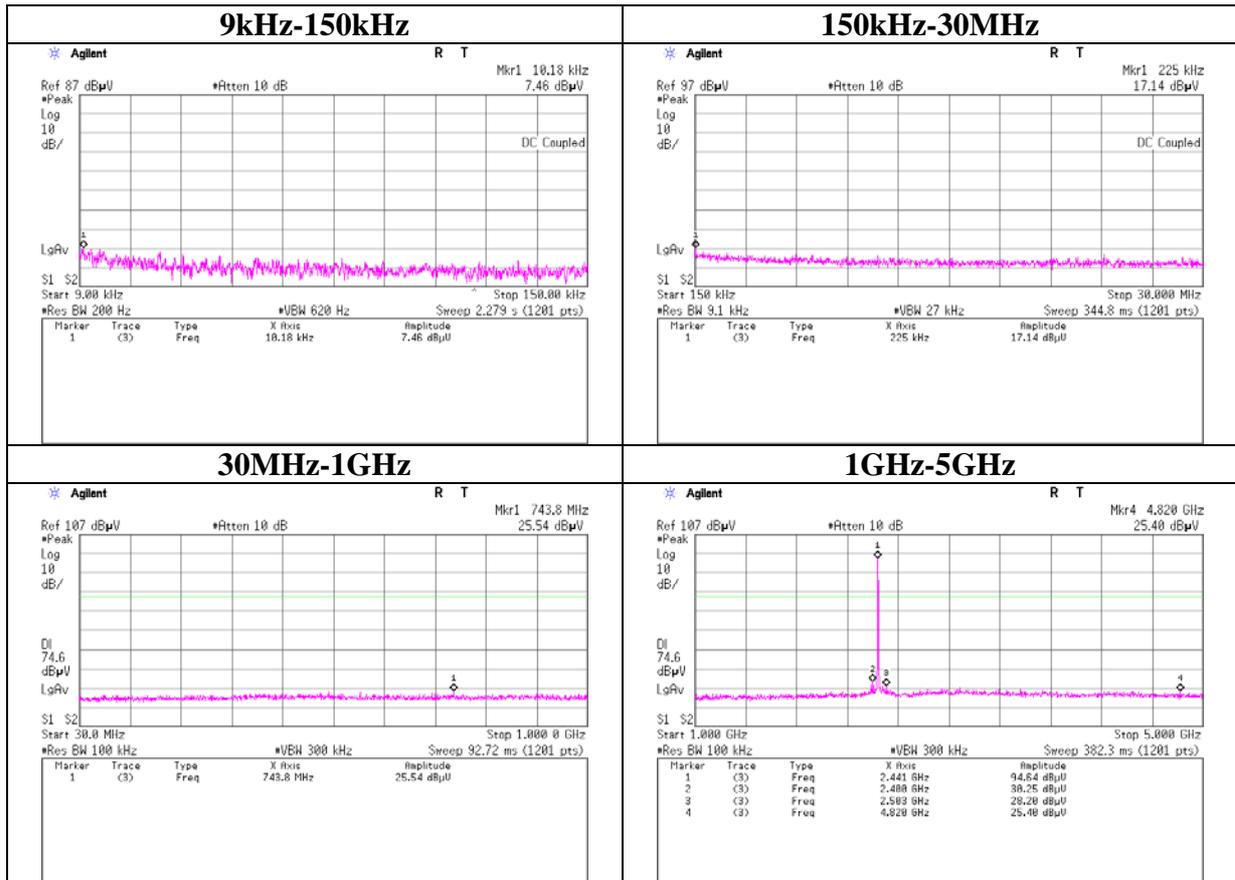
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping off) 3DH5

Tx 3DH5 2441MHz



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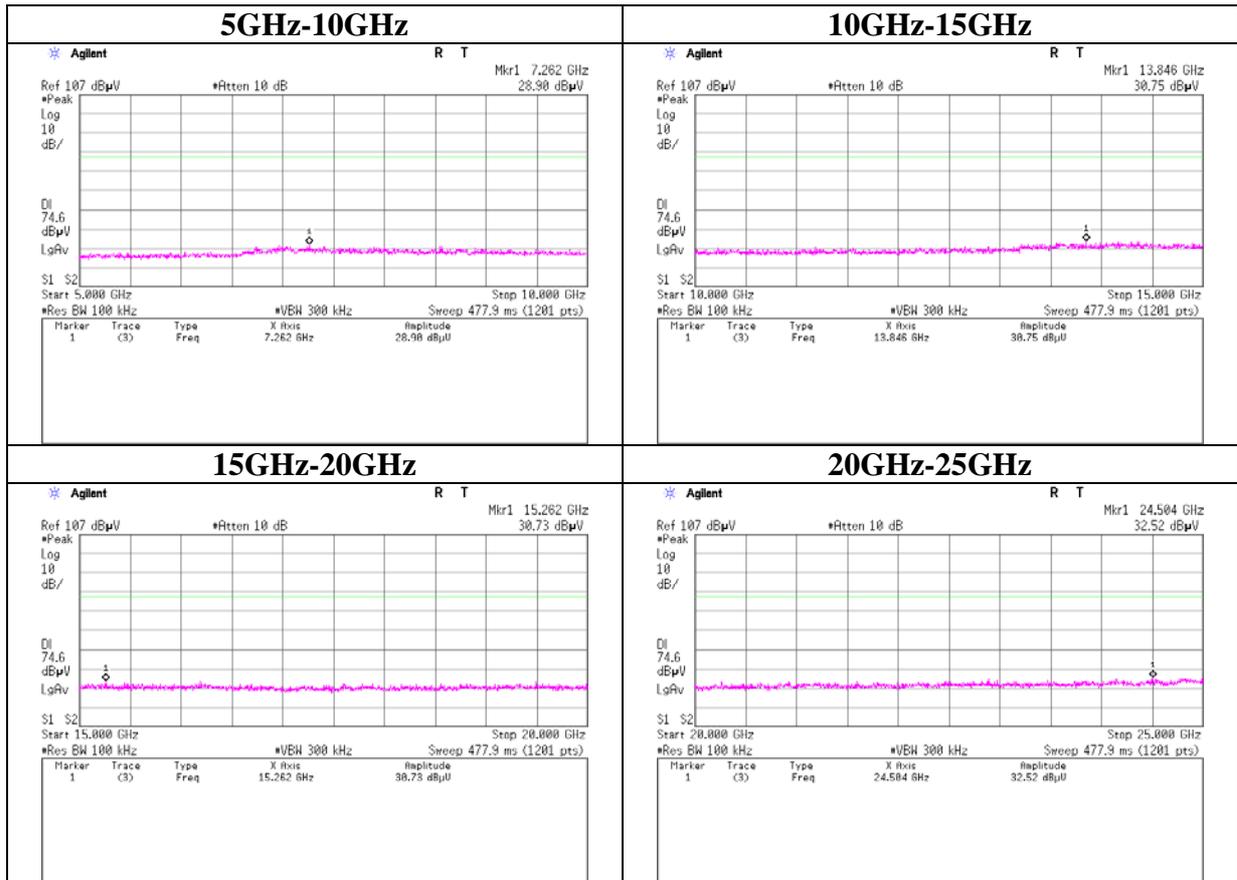
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping off) 3DH5

Tx 3DH5 2441MHz



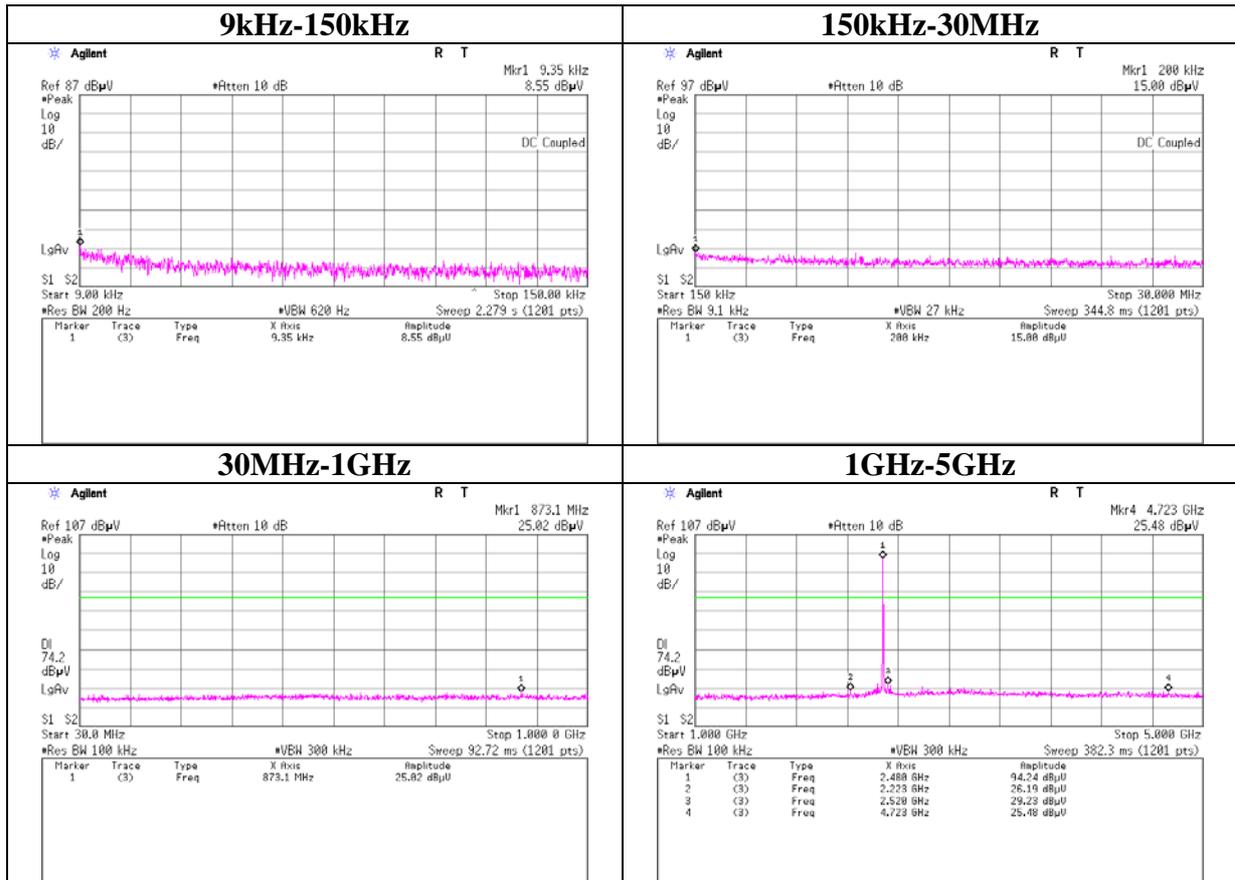
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Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping off) 3DH5

Tx 3DH5 2480MHz



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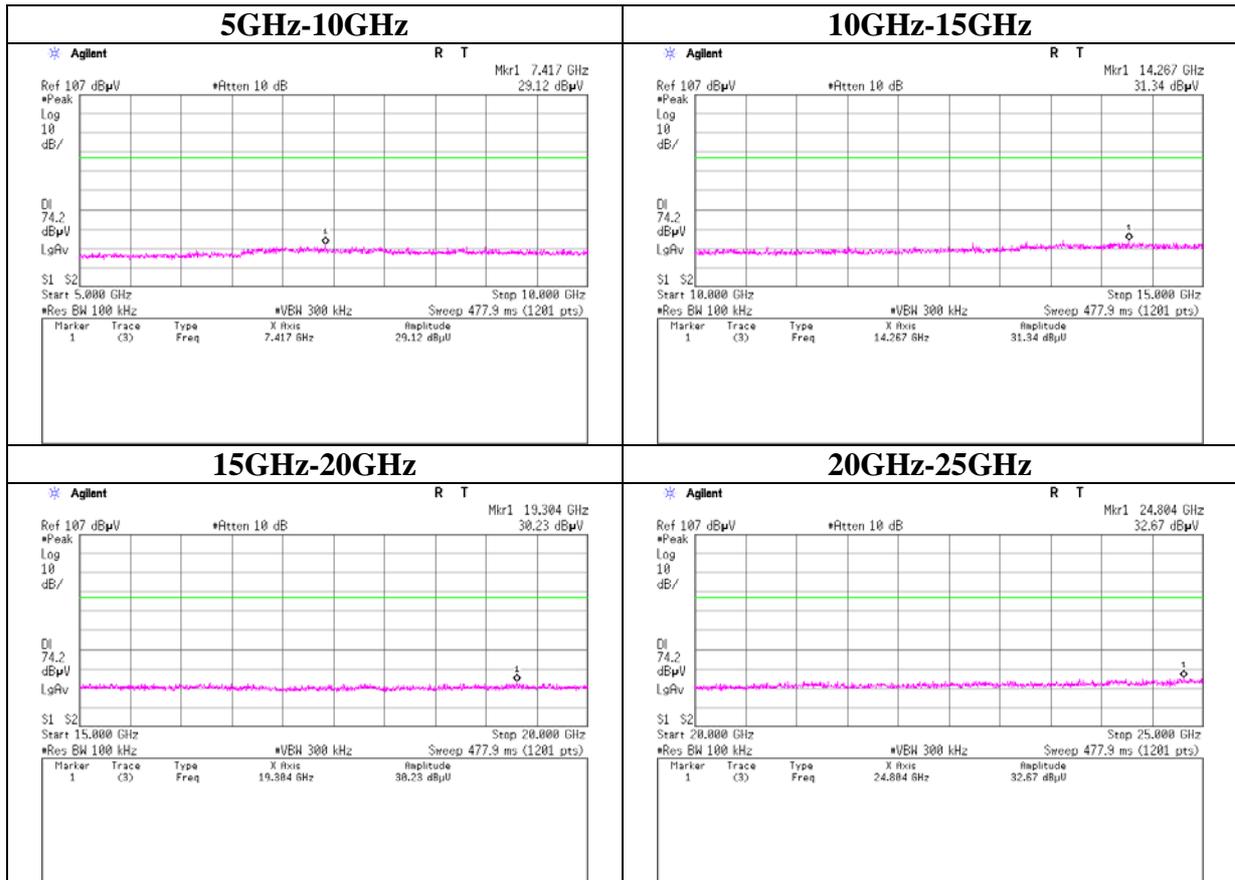
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping off) 3DH5

Tx 3DH5 2480MHz



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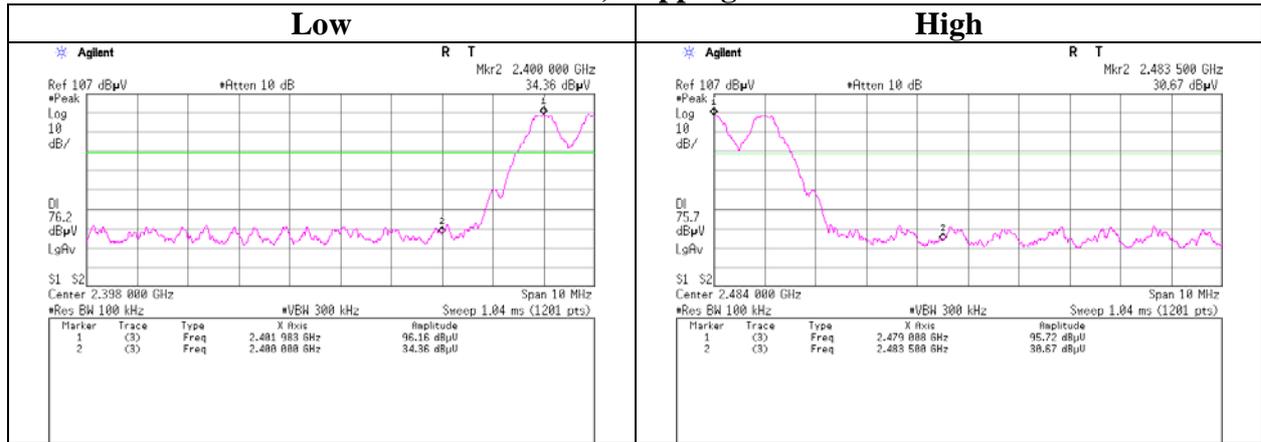
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

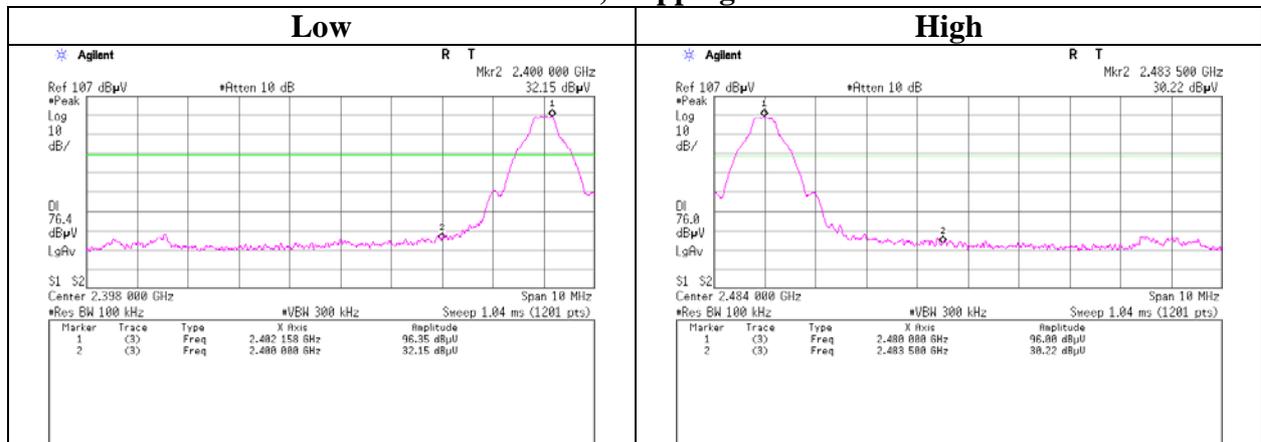
Conducted Emission Band Edge compliance

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping on/off) DH5

Tx DH5, Hopping on



Tx DH5, Hopping off



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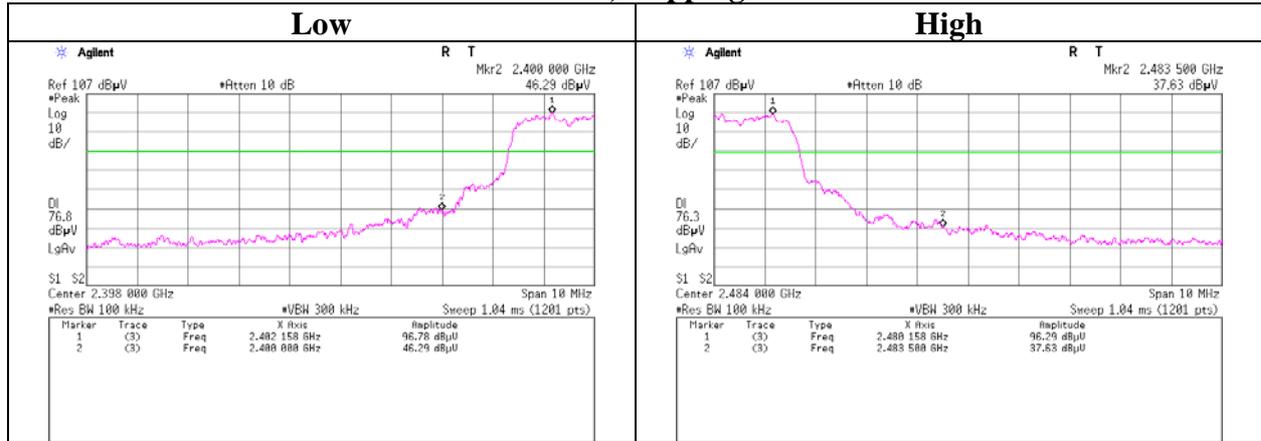
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

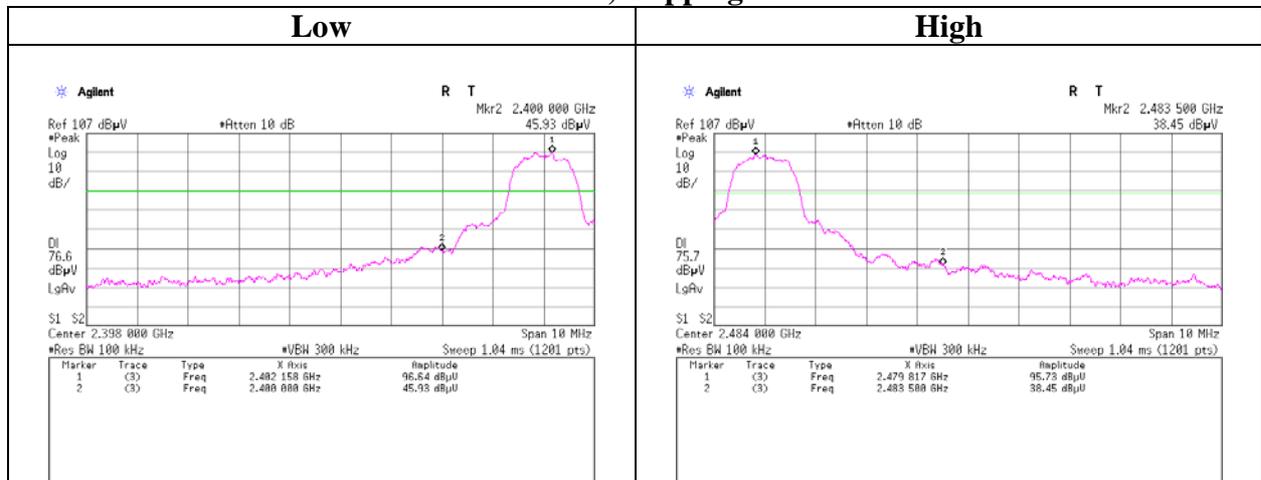
Conducted Emission Band Edge compliance

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping on/off) 3DH5

Tx 3DH5, Hopping on



Tx 3DH5, Hopping off



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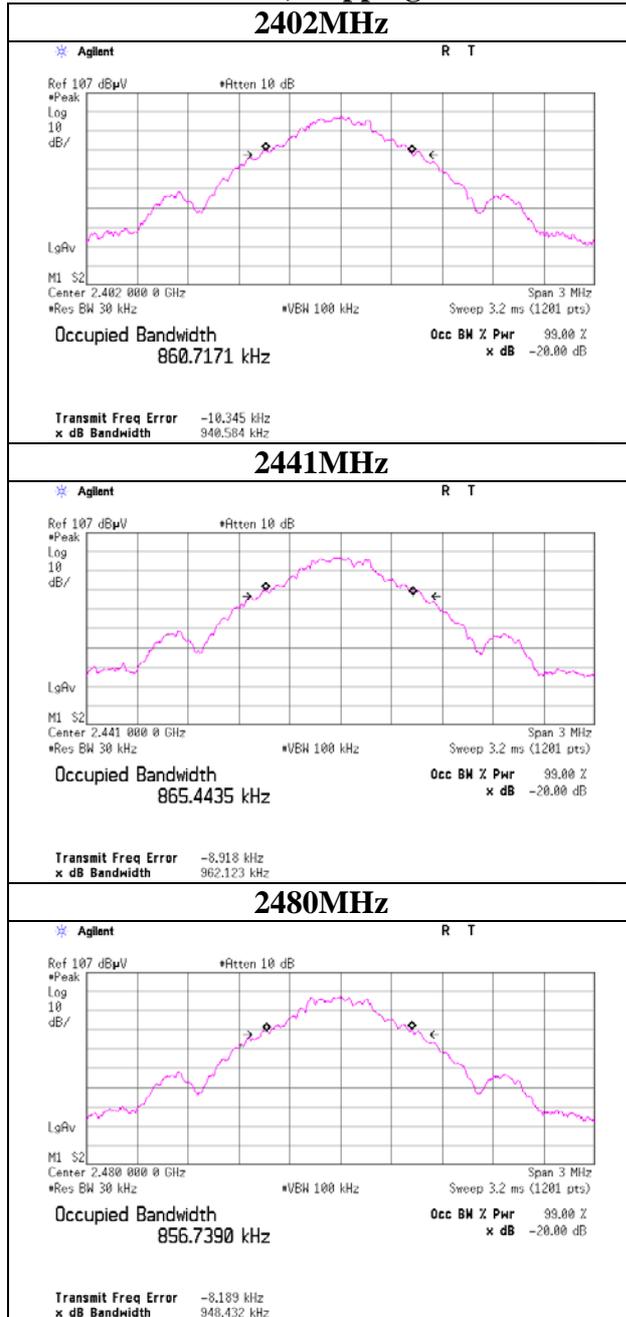
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

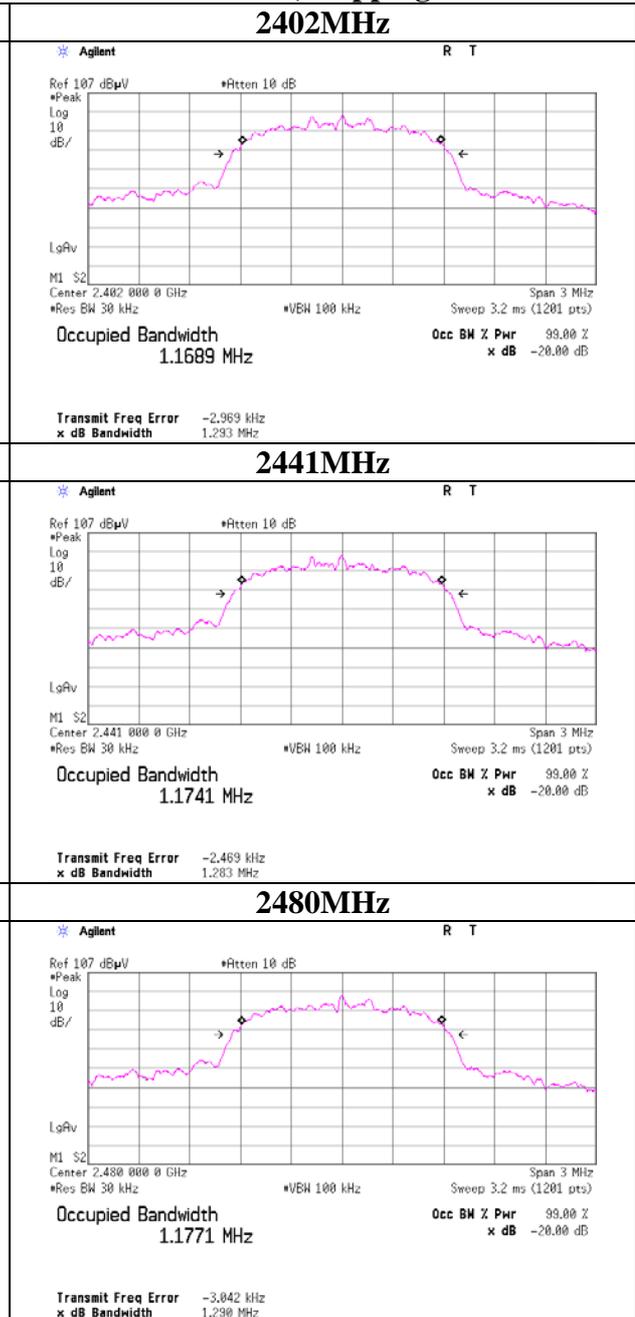
99% Occupied Bandwidth

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping off) DH5/3DH5

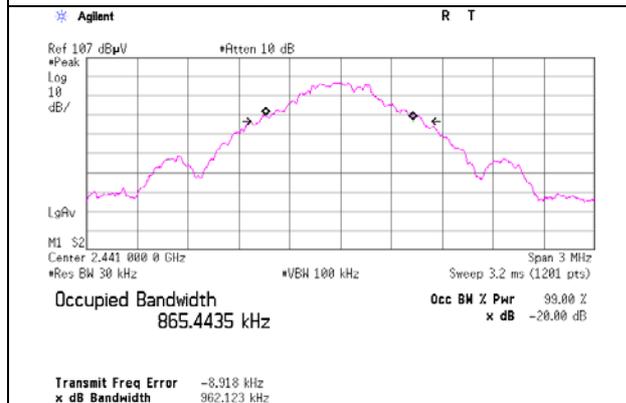
Tx DH5, Hopping off



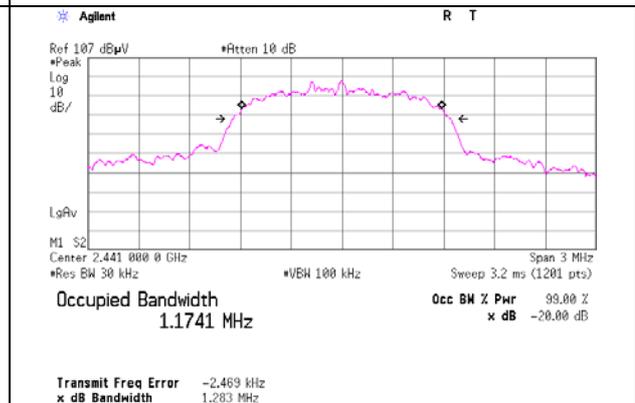
Tx 3DH5, Hopping off



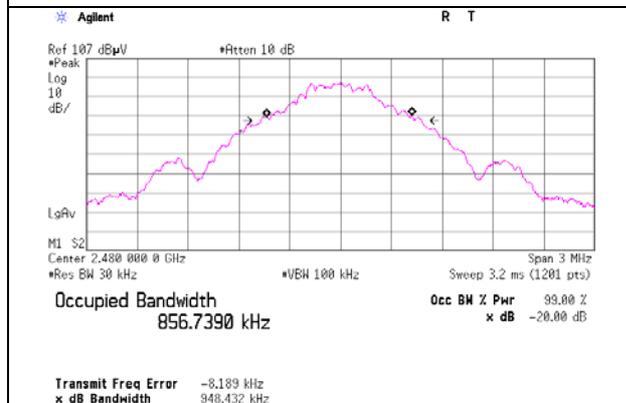
2441MHz



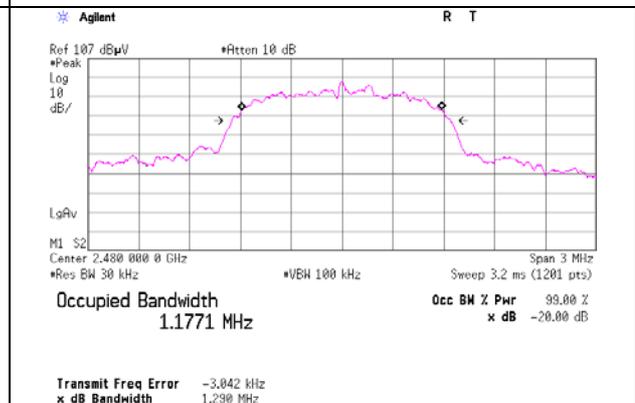
2441MHz



2480MHz



2480MHz

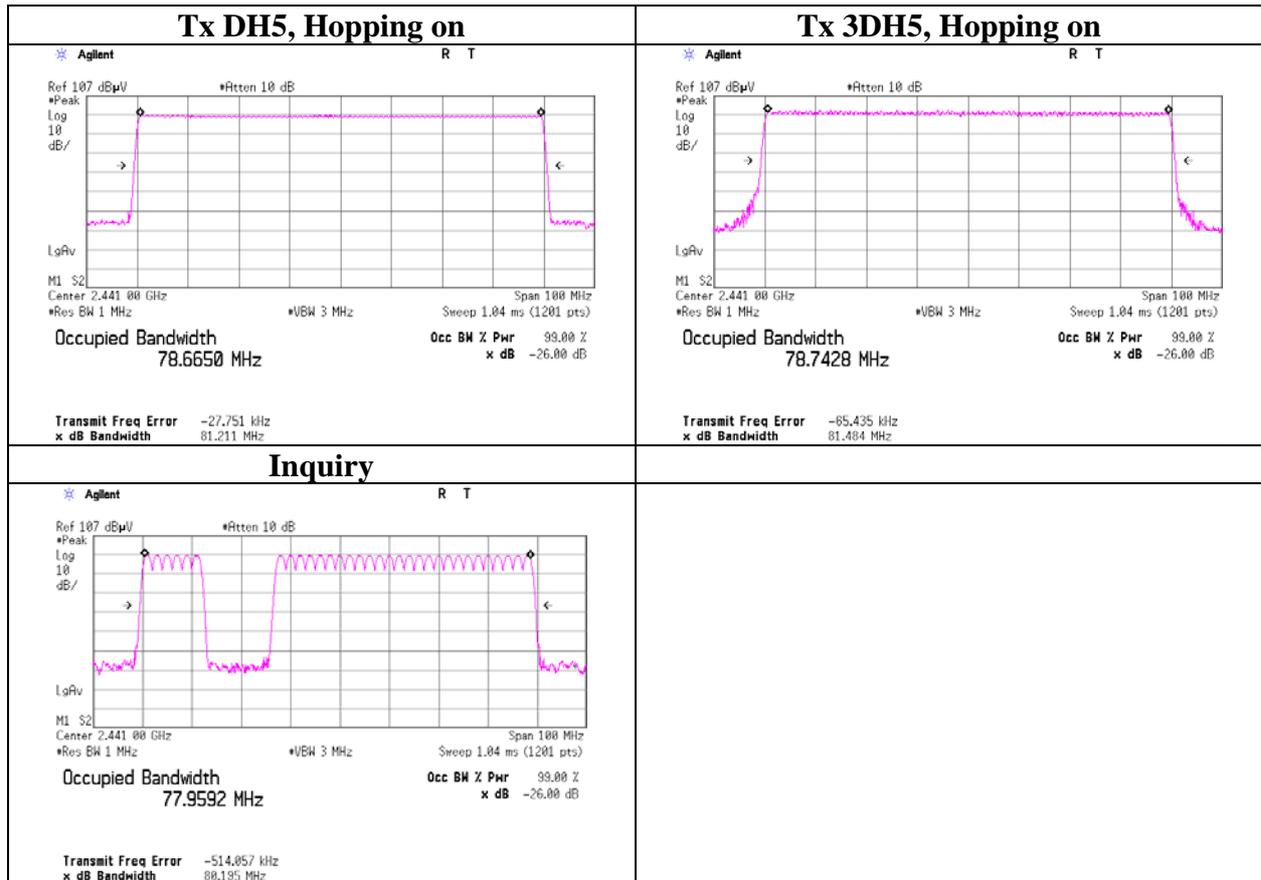


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99% Occupied Bandwidth

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10724035H
Date	03/20/2015
Temperature/ Humidity	23deg. C / 47% RH
Engineer	Ken Fujita
Mode	Tx (Hopping on) DH5/3DH5/Inquiry



APPENDIX 2: Test instruments

EMI 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/CE	2015/02/19 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE/CE	2015/01/13 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE/CE	2014/04/08 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2014/05/26 * 12
MCC-167	Microwave Cable	Junkosha	MWX221	1404S374(1m) / 1405S074(5m)	RE	2014/05/26 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2015/03/19 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2014/09/22 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2014/05/26 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE/CE	2014/08/19 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2014/10/18 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2014/10/18 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2014/07/14 * 12
MAT-70	Attenuator(6dB)	Agilent	8491A-006	MY52460153	RE	2014/04/14 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2015/03/10 * 12
MTW-03	Torque wrench	HUBER+SUHNER	74 Z-0-0-21	98142	RE	2015/01/16 * 36
MLS-23	LISN(AMN)	Schwarzbeck	NSLK8127	8127-729	CE(EUT)	2014/07/10 * 12
MLS-24	LISN(AMN)	Schwarzbeck	NSLK8127	8127-730	CE(AE)	2014/07/10 * 12
MTA-31	Terminator	TME	CT-01	-	CE	2015/01/19 * 12
MCC-112	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(3m)/sucoform141-PE(1m)/421-010(1.5m)/RFM-E321(Switcher)	-/00640	CE	2014/07/14 * 12
MAT-66	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2015/01/29 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	1401	AT	2015/01/13 * 12
MSA-13	Spectrum Analyzer	Agilent	E4440A	MY46185823	AT	2014/06/06 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2014/10/06 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2014/10/06 * 12
MCC-138	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37953/2	AT	2014/10/02 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2015/03/18 * 12

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

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

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

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

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