



RADIO TEST REPORT

Test Report No. : 10523242H-A-R1

Applicant : Hosiden Corporation
Type of Equipment : Bluetooth audio module
Model No. : HRM1034
FCC ID : VIYHRM1034
Test regulation : FCC Part 15 Subpart C: 2014
Test Result : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
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 10523242H-A. 10523242H-A is replaced with this report.

Date of test: September 8 to 10, 2014 and
October 16, 2014

Representative test engineer:

H. Kukita

Hiroshi Kukita
Engineer

Consumer Technology Division

Approved by:

Takayuki Shimada

Takayuki Shimada
Engineer
Consumer Technology Division



NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
*As for the range of Accreditation in NVLAP, you may refer to the WEB address,
<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

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

13-EM-F0429

CONTENTS	PAGE
SECTION 1: Customer information.....	4
SECTION 2: Equipment under test (E.U.T.).....	4
SECTION 3: Test specification, procedures & results.....	6
SECTION 4: Operation of E.U.T. during testing.....	9
SECTION 5: Conducted Emission.....	12
SECTION 6: Radiated Spurious Emission	13
SECTION 7: Antenna Terminal Conducted Tests.....	14
APPENDIX 1: Data of EMI test.....	15
Conducted Emission	15
20dB Bandwidth and Carrier Frequency Separation.....	19
Number of Hopping Frequency	22
Dwell time.....	24
Maximum Peak Output Power	27
Radiated Spurious Emission	29
Conducted Spurious Emission	48
Conducted Emission Band Edge compliance	60
99%Occupied Bandwidth	62
APPENDIX 2: Test instruments	64
APPENDIX 3: Photographs of test setup	66
Conducted Emission	66
Radiated Spurious Emission	67
Worst Case Position	69

SECTION 1: Customer information

Company Name	:	Hosiden Corporation
Address	:	1-4-33, Kitakyuhoji, Yao-city, Osaka, 581-0071, Japan
Telephone Number	:	+81-72-924-1195
Facsimile Number	:	+81-72-993-0724
Contact Person	:	Keiji Mine

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

2.1 Identification of E.U.T.

Type of Equipment	:	Bluetooth audio module
Model No.	:	HRM1034
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 2.7V to 4.2V (Typ. DC 3.7V)
Receipt Date of Sample	:	September 8, 2014
		October 15, 2014
Country of Mass-production	:	China
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 No.: HRM1034 (referred to as the EUT in this report) is the Bluetooth audio module which is installed in the Stereo Speaker: HBG5006 (host device) manufactured by Hosiden Corporation and AV Receiver: TX-SR444 (host device) manufactured by Onkyo Corporation.

All the tests were performed with EUT which is installed in the Stereo Speaker as a representative according to the customer's request.

Also, spurious emission test was only performed with EUT which is installed in the AV Receiver.

General Specification

Clock frequency(ies) in the system	:	16MHz
------------------------------------	---	-------

Radio Specification

[Bluetooth Ver 3.0]

Radio Type	:	Transceiver
Frequency of Operation	:	2402-2480MHz
Modulation	:	FHSS
Power Supply (radio part input)	:	DC1.25V
Antenna type	:	Printed Meander antenna
Antenna Gain	:	-1.5dBi max

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

Variant model

HRM1034 has three variations, they belong to the same product family as HRM1034. The model name is HRM1034 though the variations will be internally identified as HRM1034-xxxxxx. "xxxxxx" replaces with the chipset model number and shows customer's specific variation for example chipset (see below), Bluetooth friendly device name, user interface and so on. Chipset variation is described as below.

Chipset variation for HRM1034

	Original model	Variation 1	Variation 2
Chipset model number	AB1510	AB1511	AB1510H
Audio output	Stereo	Monaural	Stereo
Additional audio function	none	none	-True wireless stereo -Share me *there functions are not related with Bluetooth function.
Radio block ^{*1)}	-	Same as original	Same as original
Power supply for radio block	-	Same as original	Same as original
PIN assignment ^{*2)}	-	Same as original	Same as original
Electrical spec	-	Same as original	Same as original

Note)

1. Please show attached letter from LSI supplier which mentions that all three chipset have the same radio block and radio performance. (QDID:58142)
2. All three chipset have the same pin assignment, so HRM1034 PCB layout is completely same for all variation.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2014, final revised on August 15, 2014 and effective October 14, 2014

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

* The revision on August 15, 2014 does not affect the test specification applied to the EUT.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.4:2003 7. AC powerline conducted emission measurements IC: RSS-Gen 7.2.4	FCC: Section 15.207 IC: RSS-Gen 7.2.4	QP 18.0dB, 0.69275MHz, L AV 14.8dB, 0.73000MHz, N	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 4.8	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 4.9	FCC: Section15.247(d) IC: RSS-210 A8.5 RSS-Gen 6 and 7.2.3	[Host device: Stereo Speaker] 2.5dB 2483.500MHz, PK, Hori. [Host device: AV Receiver] 0.9dB 2483.500MHz, PK, Vert.	Complied	Conducted/ Radiated

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: 2003 is also referred.

FCC 15.31 (e)

The stable voltage (DC1.25V) is constantly supplied to the EUT regardless of input voltage.
Therefore, this EUT complies with the requirement.

FCC Part 15.203/212 Antenna requirement

It is impossible for end users to replace the antenna, because it is soldered on the circuit board.
Therefore, the equipment complies with the antenna requirement of Section 15.203/212.

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

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	IC: RSS-Gen 4.6.1	IC: RSS-Gen 4.6.1	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	3.6dB
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	4.0dB	5.1dB	5.0dB	5.1dB	6.0dB	4.9dB	4.3dB
No.2	3.9dB	5.2dB	5.0dB	4.9dB	5.9dB	4.7dB	4.2dB
No.3	4.3dB	5.1dB	5.2dB	5.2dB	6.0dB	4.8dB	4.2dB
No.4	4.6dB	5.2dB	5.0dB	5.2dB	6.0dB	5.7dB	4.2dB

*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.

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

3.5 Test Location

UL Japan, Inc. Ise EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8999 Facsimile : +81 596 24 8124

	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 Data of EMI, Test instruments, and Test set up

Refer to APPENDIX.

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

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

4.1 Operating Mode(s)

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

*EUT does not have Inquiry mode

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Conducted Emission, Spurious Emission (Conducted/Radiated), 20dB Bandwidth	Tx (Hopping off) DH5, 3DH5	2402MHz 2441MHz 2480MHz
Carrier Frequency Separation	Tx (Hopping on) DH5, 3DH5	2402MHz 2441MHz 2480MHz
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	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
*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: BDR/EDR: TxGC 47 - Software: Airoha Bluetooth HID LAB Test Tool – Version 1.3.0.2 *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.		

UL Japan, Inc.

Ise EMC Lab.

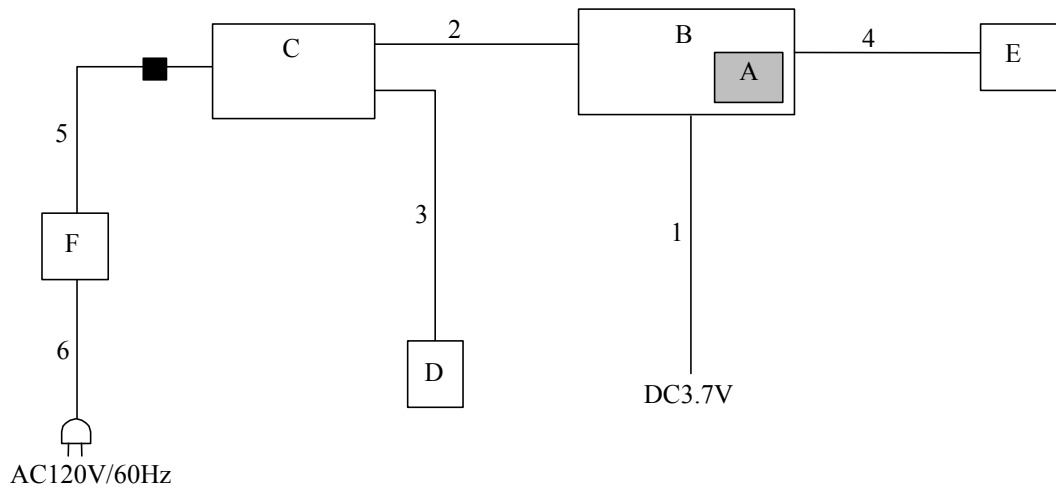
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

4.2 Configuration and peripherals

[Host device: Stereo Speaker]: All tests



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

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Bluetooth audio module	HRM1034	1 for AT*1) 7 for CE/RE*2)	Hosiden Corporation	EUT
B	Stereo Speaker	HBG5006	001	Hosiden Corporation	-
C	Laptop PC	CF-W5AWDAXS	7HKSA86870	Panasonic	-
D	Mouse	MO56UC	520026409	Dell	-
E	CD Player	SL-CT520-S	WL6SA001435R	Panasonic	-
F	AC Adapter	CF-AA6282A M1	6282AM107619146A	Panasonic	-

*1) Used for Antenna Terminal conducted test

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

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	2.1	Unshielded	Unshielded	-
2	USB Cable	3.0	Shielded	Shielded	-
3	Mouse Cable	1.8	Shielded	Shielded	-
4	Audio Cable	1.5	Shielded	Shielded	-
5	DC Cable	1.3	Unshielded	Unshielded	-
6	AC Cable	0.9	Unshielded	Unshielded	-

UL Japan, Inc.

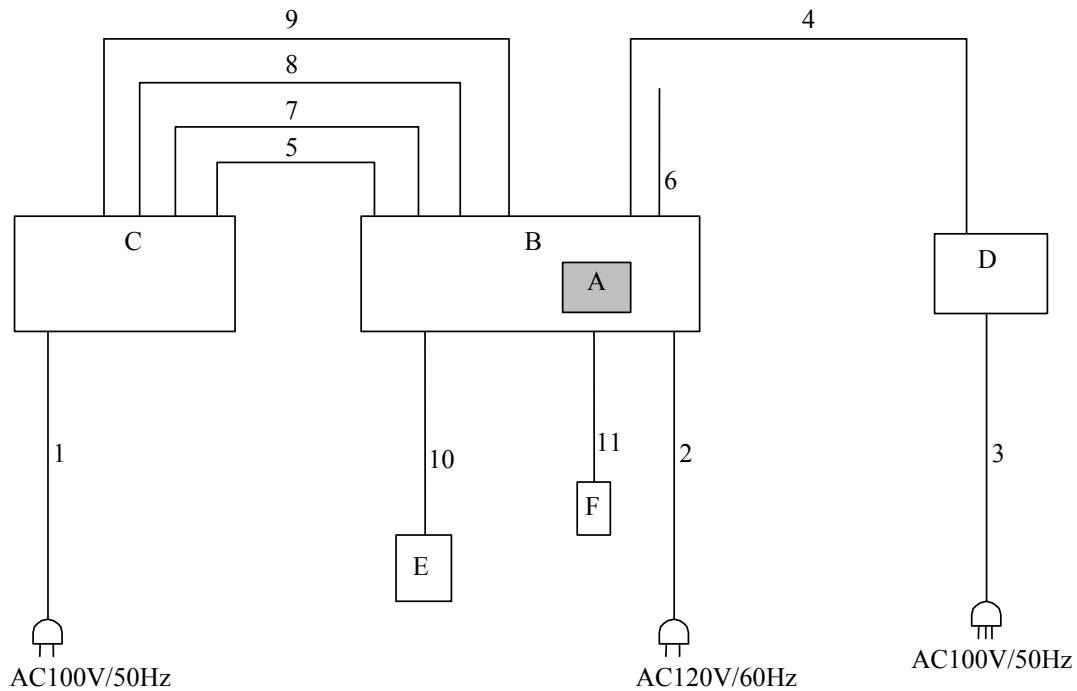
Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

[Host device: AV Receiver]: Spurious emission test only



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

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Bluetooth audio module	HRM1034	7	Hosiden Corporation	EUT
B	AV Receiver	TX-SR444	ES13	Onkyo Corporation	-
C	DVD Player	DV-600AV-S	HEKD013328LS	Pioneer	-
D	TV	M23WSK	107KCBD2Q446	LG	-
E	Earphone	-	-	SONY	-
F	Jig	-	-	Onkyo Corporation	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	AC Cable	1.8	Unshielded	Unshielded	-
2	AC Cable	1.8	Unshielded	Unshielded	-
3	AC Cable	1.8	Unshielded	Unshielded	-
4	HDMI Cable	3.0	Shielded	Shielded	-
5	HDMI Cable	3.0	Shielded	Shielded	-
6	FM antenna Cable	1.5	Shielded	Shielded	-
7	Component Cable	2.0	Shielded	Shielded	-
8	Audio Cable	3.0	Shielded	Shielded	-
9	Digital Audio Cable	3.0	Shielded	Shielded	-
10	Earphone Cable	1.2	Shielded	Shielded	-
11	Jig Cable	0.1	Unshielded	Unshielded	-

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

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.

1) 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 was performed with EUT which is installed in the Stereo Speaker as a representative according to the customer's request.

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

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

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	Below 30MHz	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	Loop	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 5 of RSS-Gen 7.2.5 (IC) and outside the restricted band of FCC15.205 / Table 3 of RSS-Gen 7.2.2 (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: $20 \times \log(3.0\text{m}/1.0\text{m}) = 9.5\text{dB}$

[Host device: Stereo Speaker]

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

[Host device: AV Receiver]

The test was made on EUT at the normal use position.

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

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

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	Enough width to display 20dB Bandwidth	1 to 3% of Span	Three times of RBW	Auto	Peak	Max Hold *1)	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak Average *3)	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	3MHz	30kHz	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 *2)	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) The measurement was performed with Max Hold since the duty cycle was not 100%.
*2) 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.(9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=9.1kHz)
*3) Reference data

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

Test data : APPENDIX
Test result : Pass

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

APPENDIX 1: Data of EMI test

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

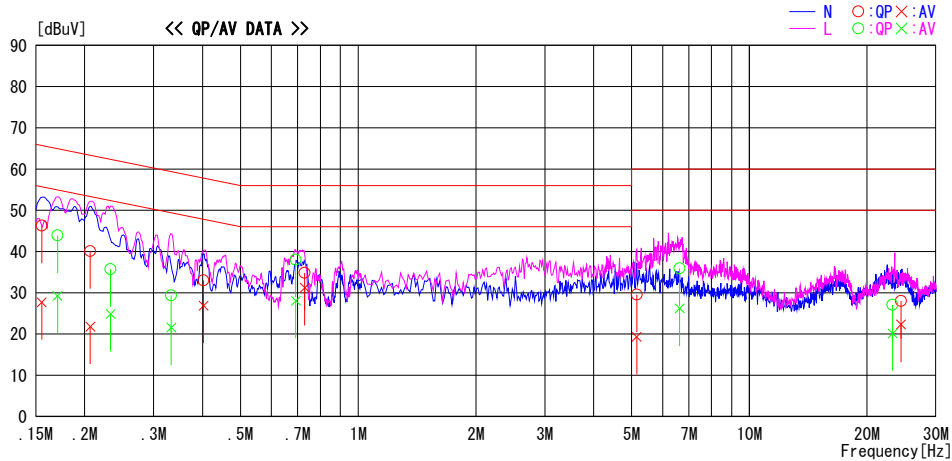
UL Japan, Inc. Ise EMC Lab. No. 2 Semi Anechoic Chamber
Date : 2014/09/10

Report No. : 10523242H

Temp./Humi. : 22deg. C / 66% RH
Engineer : Yuta Moriya

Mode / Remarks : Tx DH5 2402MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase
	QP	AV		QP	AV	QP	AV	QP	AV	
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]	
0.15519	33.1	14.5	13.2	46.3	27.7	65.7	55.7	19.4	28.0	N
0.17030	30.7	16.0	13.2	43.9	29.2	64.9	54.9	21.0	25.7	L
0.20655	26.9	8.6	13.2	40.1	21.8	63.3	53.3	23.2	31.5	N
0.23265	22.5	11.7	13.2	35.7	24.9	62.4	52.4	26.7	27.5	L
0.33270	16.2	8.4	13.2	29.4	21.6	59.4	49.4	30.0	27.8	L
0.40230	19.8	13.7	13.2	33.0	26.9	57.8	47.8	24.8	20.9	N
0.69275	24.7	14.8	13.3	38.0	28.1	56.0	46.0	18.0	17.9	L
0.73000	21.5	17.9	13.3	34.8	31.2	56.0	46.0	21.2	14.8	N
5.15215	15.8	5.5	13.8	29.6	19.3	60.0	50.0	30.4	30.7	N
6.63118	21.9	12.2	14.0	35.9	26.2	60.0	50.0	24.1	23.8	L
23.23240	12.0	5.1	15.1	27.1	20.2	60.0	50.0	32.9	29.8	L
24.42160	12.9	7.2	15.1	28.0	22.3	60.0	50.0	32.0	27.7	N

CHART : WITH FACTOR, Peak hold data. CALCULATION : RESULT = READING + C.F (1SN + CABLE + ATTEN.)
Except for the above table : adequate margin data below the limits.

UL Japan, Inc.

Ise EMC Lab.

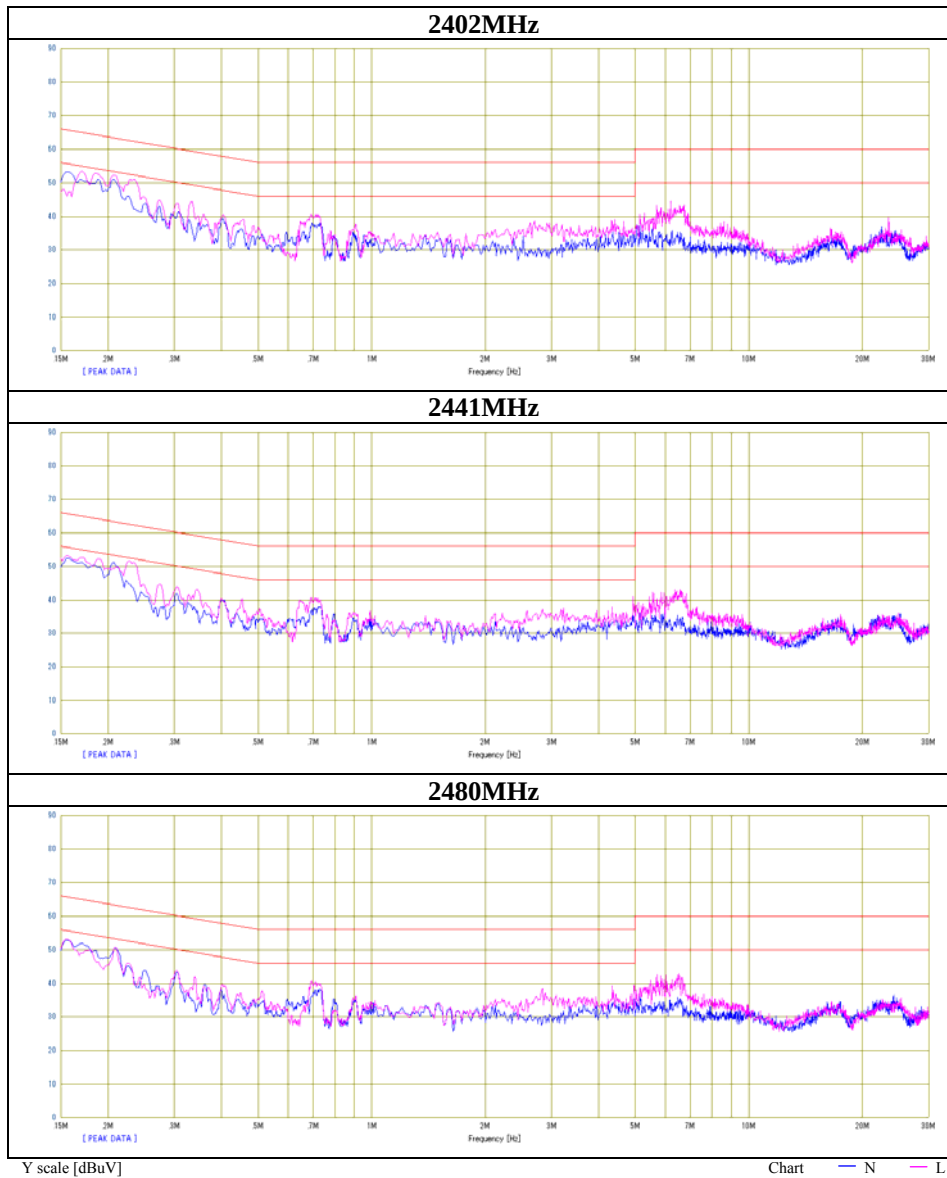
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Emission

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	10523242H
Date	09/10/2014
Temperature/ Humidity	22 deg. C / 66% RH
Engineer	Yuta Moriya
Mode	Tx DH5



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 Emission

DATA OF CONDUCTED EMISSION TEST

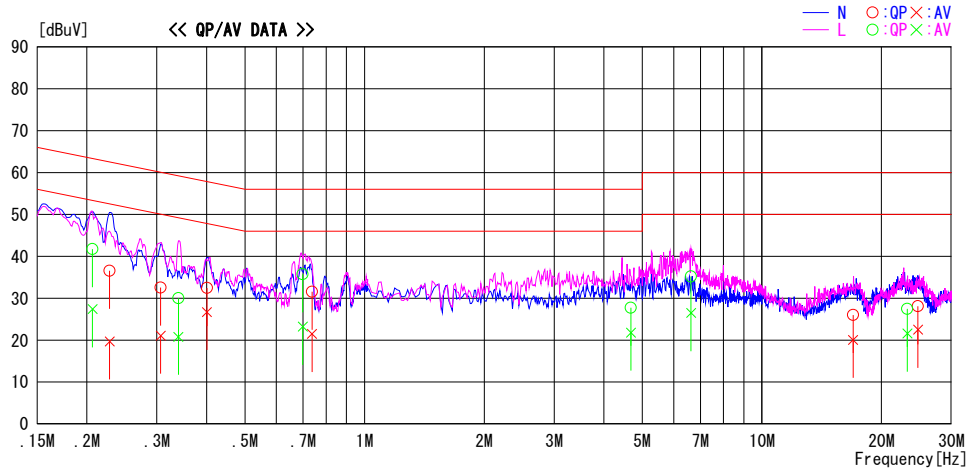
UL Japan, Inc. Ise EMC Lab. No.2 Semi Anechoic Chamber
Date : 2014/09/10

Report No. : 10523242H

Temp./Humi. : 22deg. C / 66% RH
Engineer : Yuta Moriya

Mode / Remarks : Tx 3DH5 2402MHz

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]		
0.22830	23.4	6.5	13.2	36.6	19.7	62.5	52.5	25.9	32.8	N	
0.30660	19.4	7.9	13.2	32.6	21.1	60.1	50.1	27.5	29.0	N	
0.40085	19.3	13.5	13.2	32.5	26.7	57.8	47.8	25.3	21.1	N	
0.73721	18.3	8.2	13.3	31.6	21.5	56.0	46.0	24.4	24.5	N	
16.95740	11.3	5.4	14.7	26.0	20.1	60.0	50.0	34.0	29.9	N	
24.71181	12.9	7.3	15.2	28.1	22.5	60.0	50.0	31.9	27.5	N	
0.20655	28.5	14.2	13.2	41.7	27.4	63.3	53.3	21.6	25.9	L	
0.33995	16.8	7.6	13.2	30.0	20.8	59.2	49.2	29.2	28.4	L	
0.69887	22.4	9.9	13.3	35.7	23.2	56.0	46.0	20.3	22.8	L	
4.67881	13.9	8.0	13.8	27.7	21.8	56.0	46.0	28.3	24.2	L	
6.63253	21.2	12.5	14.0	35.2	26.5	60.0	50.0	24.8	23.5	L	
23.23912	12.4	6.5	15.1	27.5	21.6	60.0	50.0	32.5	28.4	L	

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

UL Japan, Inc.

Ise EMC Lab.

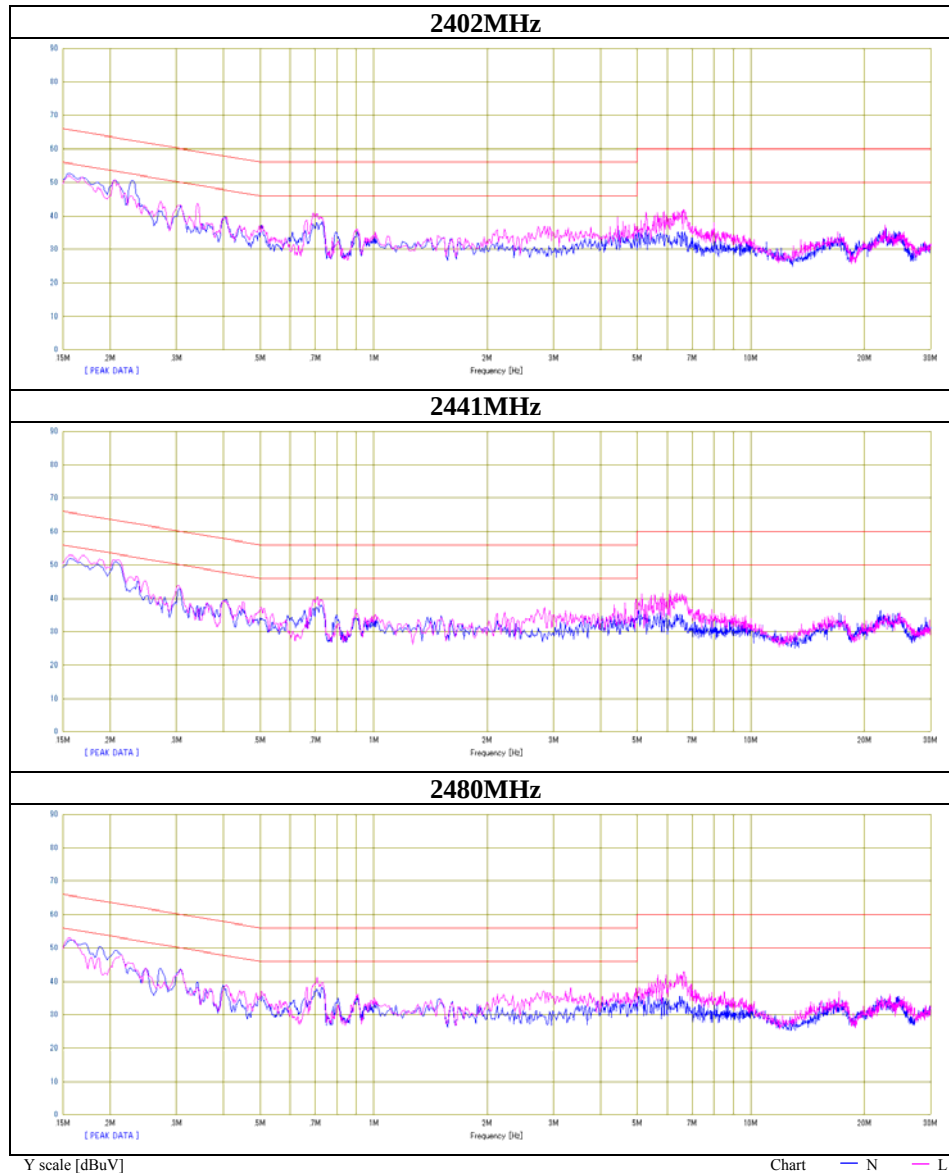
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Emission

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	10523242H
Date	09/10/2014
Temperature/ Humidity	22 deg. C / 66% RH
Engineer	Yuta Moriya
Mode	Tx 3DH5



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

20dB Bandwidth and Carrier Frequency Separation

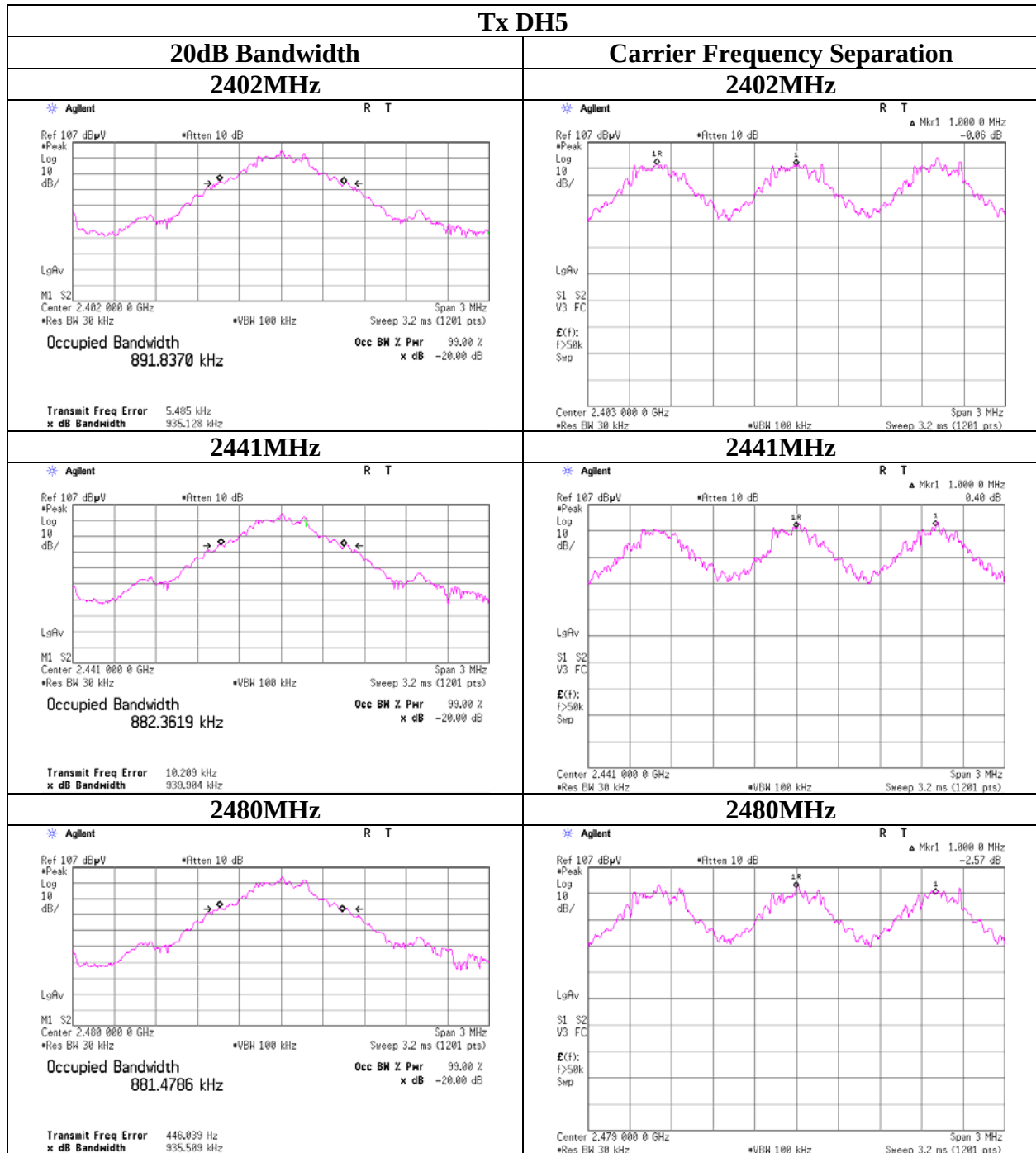
Test place Ise EMC Lab. No.3 Measurement Room
Report No. 10523242H
Date 09/10/2014
Temperature/ Humidity 22deg. C / 56% RH
Engineer Hiroshi Kukita
Mode Tx (Hopping on/off) DH5/3DH5

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.935	1.000	≥ 0.623
DH5	2441.0	0.940	1.000	≥ 0.627
DH5	2480.0	0.936	1.000	≥ 0.624
3DH5	2402.0	1.275	1.000	≥ 0.850
3DH5	2441.0	1.289	1.000	≥ 0.859
3DH5	2480.0	1.290	1.000	≥ 0.860

Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).

No limit applies to 20dB Bandwidth.

20dB Bandwidth and Carrier Frequency Separation



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

20dB Bandwidth and Carrier Frequency Separation

Tx 3DH5	
20dB Bandwidth	Carrier Frequency Separation
2402MHz Ref 107 dBμV #Peak Log 10 dB/ LgAv M1 S2 Center 2.402 000 0 GHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms (1201 pts) Span 3 MHz Occupied Bandwidth 1.2320 MHz Occ BW % Pwr 99.00 % x dB -20.00 dB Transmit Freq Error -1.272 kHz x dB Bandwidth 1.275 MHz	2402MHz Ref 107 dBμV #Peak Log 10 dB/ LgAv S1 S2 V3 FC Center 2.403 000 0 GHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms (1201 pts) Span 3 MHz Mkr1 1.000 0 MHz -0.17 dB
2441MHz Ref 107 dBμV #Peak Log 10 dB/ LgAv M1 S2 Center 2.441 000 0 GHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms (1201 pts) Span 3 MHz Occupied Bandwidth 1.2417 MHz Occ BW % Pwr 99.00 % x dB -20.00 dB Transmit Freq Error -891.783 Hz x dB Bandwidth 1.289 MHz	2441MHz Ref 107 dBμV #Peak Log 10 dB/ LgAv S1 S2 V3 FC Center 2.441 000 0 GHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms (1201 pts) Span 3 MHz Mkr1 1.000 0 MHz 1.46 dB
2480MHz Ref 107 dBμV #Peak Log 10 dB/ LgAv M1 S2 Center 2.480 000 0 GHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms (1201 pts) Span 3 MHz Occupied Bandwidth 1.2301 MHz Occ BW % Pwr 99.00 % x dB -20.00 dB Transmit Freq Error -1.777 kHz x dB Bandwidth 1.290 MHz	2480MHz Ref 107 dBμV #Peak Log 10 dB/ LgAv S1 S2 V3 FC Center 2.479 000 0 GHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms (1201 pts) Span 3 MHz Mkr1 1.000 0 MHz 0.10 dB

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

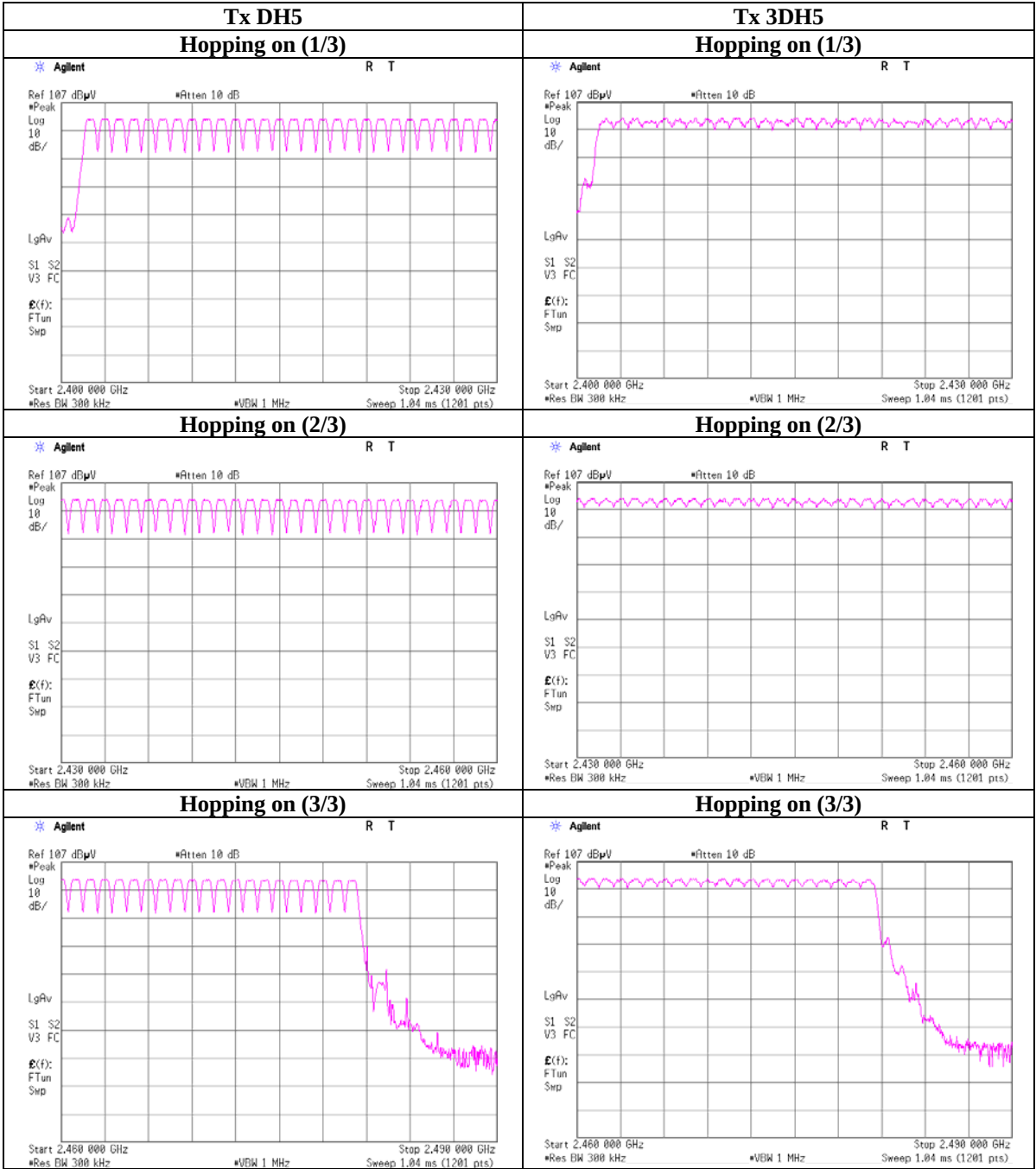
Number of Hopping Frequency

Test place Ise EMC Lab. No.3 Measurement Room
Report No. 10523242H
Date 09/10/2014
Temperature/ Humidity 22deg. C / 56% RH
Engineer Hiroshi Kukita
Mode Tx (Hopping on) DH5/3DH5

Mode	Number of channel [times]	Limit [times]
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



Dwell time

Test place Ise EMC Lab. No.3 Measurement Room
Report No. 10523242H
Date 09/10/2014
Temperature/ Humidity 22deg. C / 56% RH
Engineer Hiroshi Kukita
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 time [msec]	Result [msec]	Limit [msec]
DH1	51.0 times	/	5 sec.	x 31.6 sec. = 323 times	0.442	143	400
DH3	27.0 times	/	5 sec.	x 31.6 sec. = 171 times	1.705	292	400
DH5	17.0 times	/	5 sec.	x 31.6 sec. = 108 times	2.948	318	400
3DH1	51.0 times	/	5 sec.	x 31.6 sec. = 323 times	0.439	142	400
3DH3	27.0 times	/	5 sec.	x 31.6 sec. = 171 times	1.695	290	400
3DH5	17.0 times	/	5 sec.	x 31.6 sec. = 108 times	2.965	320	400

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 $N=79$.

UL Japan, Inc.

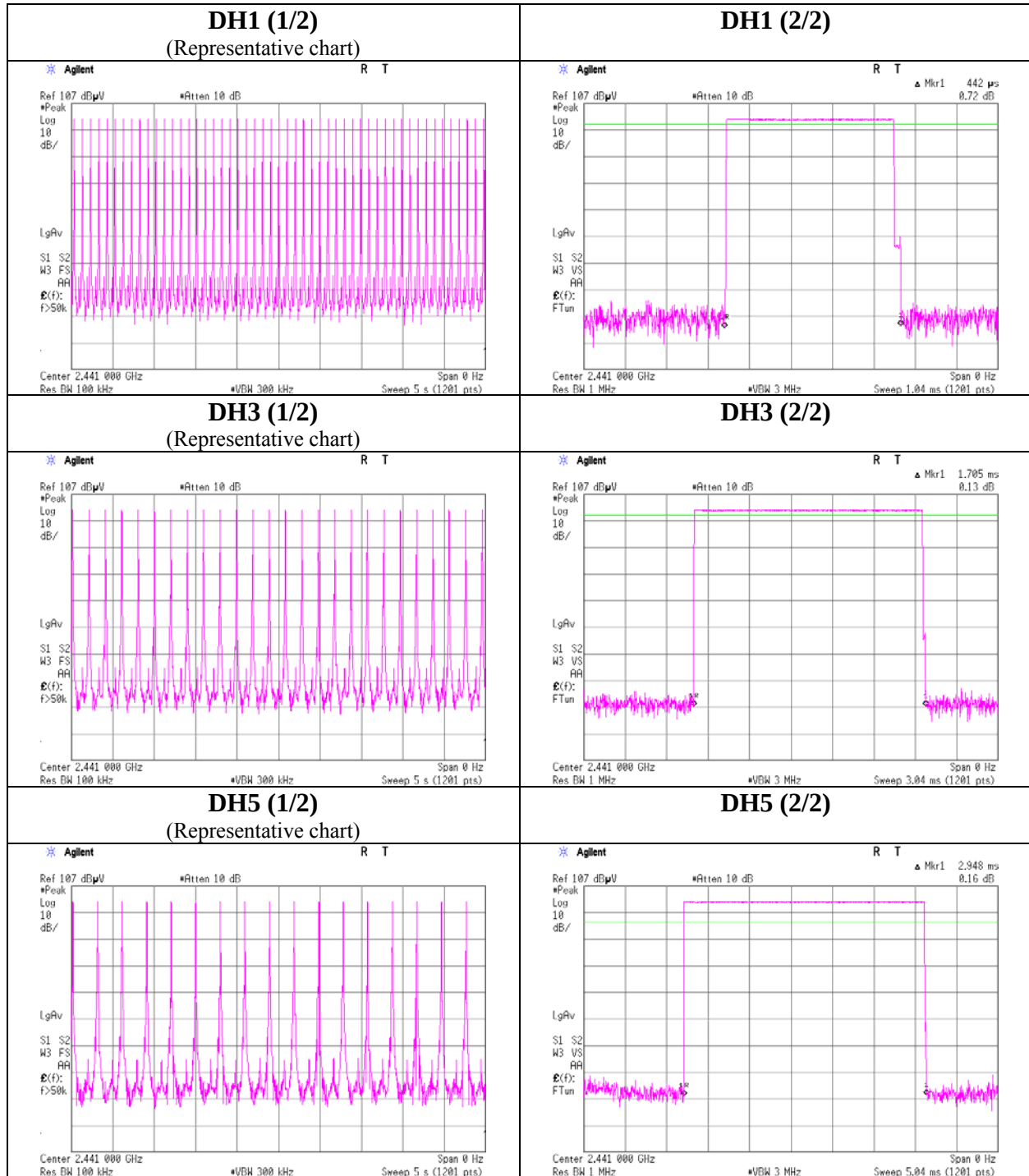
Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Dwell time



UL Japan, Inc.

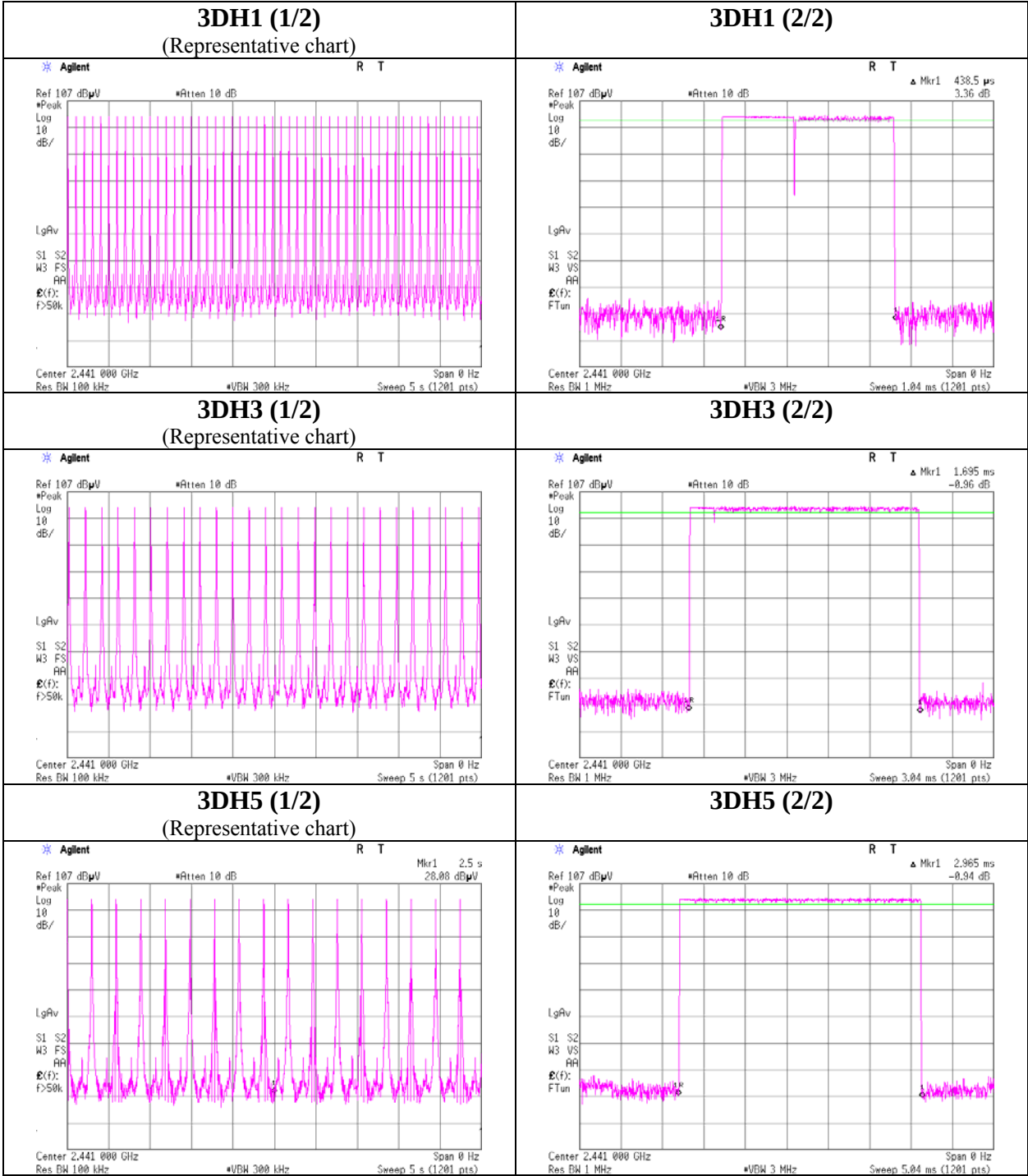
Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Dwell time



Maximum Peak Output Power

Test place : Ise EMC Lab. No.3 Measurement Room
Report No. : 10523242H
Date : 09/10/2014
Temperature/ Humidity : 22deg. C / 56% RH
Engineer : Hiroshi Kukita
Mode : Tx (Hopping off) DH5/2DH5/3DH5

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-5.81	1.81	10.00	6.00	3.98	20.96	125	14.96
DH5	2441.0	-5.96	1.82	10.00	5.86	3.85	20.96	125	15.10
DH5	2480.0	-6.37	1.83	10.00	5.46	3.52	20.96	125	15.50
2DH5	2402.0	-5.17	1.81	10.00	6.64	4.61	20.96	125	14.32
2DH5	2441.0	-5.37	1.82	10.00	6.45	4.42	20.96	125	14.51
2DH5	2480.0	-5.78	1.83	10.00	6.05	4.03	20.96	125	14.91
3DH5	2402.0	-4.96	1.81	10.00	6.85	4.84	20.96	125	14.11
3DH5	2441.0	-5.16	1.82	10.00	6.66	4.63	20.96	125	14.30
3DH5	2480.0	-5.60	1.83	10.00	6.23	4.20	20.96	125	14.73

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.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Average Output Power
(Reference data for SAR testing)

Test place : Ise EMC Lab. No.3 Measurement Room
Report No. : 10523242H
Date : 09/10/2014
Temperature/ Humidity : 22deg. C / 56% RH
Engineer : Hiroshi Kukita
Mode : Tx (Hopping off) DH5/2DH5/3DH5

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm]	[mW]
DH5	2402.0	-7.12	1.81	10.00	4.69	2.94
DH5	2441.0	-7.30	1.82	10.00	4.52	2.83
DH5	2480.0	-7.79	1.83	10.00	4.04	2.54
2DH5	2402.0	-8.00	1.81	10.00	3.81	2.40
2DH5	2441.0	-8.09	1.82	10.00	3.73	2.36
2DH5	2480.0	-8.59	1.83	10.00	3.24	2.11
3DH5	2402.0	-8.02	1.81	10.00	3.79	2.39
3DH5	2441.0	-8.18	1.82	10.00	3.64	2.31
3DH5	2480.0	-8.53	1.83	10.00	3.30	2.14

Sample Calculation:

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

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

[Host device: Stereo Speaker]

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10523242H
Date : 09/08/2014 09/09/2014
Temperature/ Humidity : 24deg. C / 65% RH 23deg. C / 66% RH
Engineer : Yuta Moriya Yuta Moriya
(1-10GHz) (Below 1GHz, Above 10GHz)
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	42.151	QP	32.4	13.8	6.9	28.6	24.5	40.0	15.5	
Hori	54.251	QP	44.2	9.5	7.0	28.5	32.2	40.0	7.8	
Hori	57.277	QP	41.8	8.6	7.0	28.5	28.9	40.0	11.1	
Hori	274.042	QP	26.6	18.3	8.6	27.7	25.8	46.0	20.2	
Hori	367.705	QP	34.9	16.4	9.0	28.1	32.2	46.0	13.8	
Hori	384.008	QP	33.1	16.8	9.1	28.2	30.8	46.0	15.2	
Hori	701.329	QP	31.0	20.2	10.4	28.7	32.9	46.0	13.1	
Hori	2306.072	PK	48.5	27.1	3.0	34.7	43.9	73.9	30.0	
Hori	2390.000	PK	46.3	27.0	3.0	34.7	41.6	73.9	32.3	
Hori	4804.000	PK	47.2	31.8	5.4	33.9	50.5	73.9	23.4	
Hori	7206.000	PK	43.3	35.7	6.5	33.8	51.7	73.9	22.2	
Hori	9608.000	PK	43.4	38.0	7.2	34.4	54.2	73.9	19.7	
Hori	2306.072	AV	39.6	27.1	3.0	34.7	35.0	53.9	18.9	
Hori	2390.000	AV	35.5	27.0	3.0	34.7	30.8	53.9	23.1	
Hori	4804.000	AV	37.5	31.8	5.4	33.9	40.8	53.9	13.1	
Hori	7206.000	AV	31.3	35.7	6.5	33.8	39.7	53.9	14.2	
Hori	9608.000	AV	31.3	38.0	7.2	34.4	42.1	53.9	11.8	
Vert	42.151	QP	44.2	13.8	6.9	28.6	36.3	40.0	3.7	
Vert	48.348	QP	43.6	11.5	7.0	28.5	33.6	40.0	6.4	
Vert	54.251	QP	43.8	9.5	7.0	28.5	31.8	40.0	8.2	
Vert	57.277	QP	41.6	8.6	7.0	28.5	28.7	40.0	11.3	
Vert	272.651	QP	30.7	18.3	8.6	27.7	29.9	46.0	16.1	
Vert	367.705	QP	28.2	16.4	9.0	28.1	25.5	46.0	20.5	
Vert	384.008	QP	31.2	16.8	9.1	28.2	28.9	46.0	17.1	
Vert	701.329	QP	28.8	20.2	10.4	28.7	30.7	46.0	15.3	
Vert	2306.072	PK	49.4	27.1	3.0	34.7	44.8	73.9	29.1	
Vert	2390.000	PK	45.3	27.0	3.0	34.7	40.6	73.9	33.3	
Vert	4804.000	PK	49.7	31.8	5.4	33.9	53.0	73.9	20.9	
Vert	7206.000	PK	43.2	35.7	6.5	33.8	51.6	73.9	22.3	
Vert	9608.000	PK	43.0	38.0	7.2	34.4	53.8	73.9	20.1	
Vert	2306.072	AV	38.9	27.1	3.0	34.7	34.3	53.9	19.6	
Vert	2390.000	AV	33.5	27.0	3.0	34.7	28.8	53.9	25.1	
Vert	4804.000	AV	41.7	31.8	5.4	33.9	45.0	53.9	8.9	
Vert	7206.000	AV	31.4	35.7	6.5	33.8	39.8	53.9	14.1	
Vert	9608.000	AV	31.4	38.0	7.2	34.4	42.2	53.9	11.7	

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).

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

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

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
[Host device: Stereo Speaker]

Test place
Report No.
Date
Temperature/ Humidity
Engineer
Mode

Ise EMC Lab. No.2 Semi Anechoic Chamber
10523242H
09/08/2014
24deg. C / 65% RH
Yuta Moriya
(1-10GHz)
Tx DH5 2402MHz

20dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori	2402.000	PK	100.9	27.0	3.0	34.7	96.2	-	-	Carrier
Hori	2400.000	PK	51.6	27.0	3.0	34.7	46.9	76.2	29.3	
Vert	2402.000	PK	99.3	27.0	3.0	34.7	94.6	-	-	Carrier
Vert	2400.000	PK	45.9	27.0	3.0	34.7	41.2	74.6	33.4	

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

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

[Host device: Stereo Speaker]

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	10523242H	
Date	09/08/2014	09/09/2014
Temperature/ Humidity	24deg. C / 65% RH	23deg. C / 66% RH
Engineer	Yuta Moriya	Yuta Moriya
	(1-10GHz)	(Below 1GHz, Above 10GHz)
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	42.153	QP	32.5	13.8	6.9	28.6	24.6	40.0	15.4	
Hori	54.254	QP	44.4	9.5	7.0	28.5	32.4	40.0	7.6	
Hori	57.276	QP	41.5	8.6	7.0	28.5	28.6	40.0	11.4	
Hori	274.041	QP	26.2	18.3	8.6	27.7	25.4	46.0	20.6	
Hori	367.710	QP	34.4	16.4	9.0	28.1	31.7	46.0	14.3	
Hori	384.021	QP	33.8	16.8	9.1	28.2	31.5	46.0	14.5	
Hori	701.333	QP	31.2	20.2	10.4	28.7	33.1	46.0	12.9	
Hori	2392.952	PK	54.8	27.0	3.0	34.7	50.1	73.9	23.8	
Hori	4882.000	PK	51.0	32.0	5.4	33.9	54.5	73.9	19.4	
Hori	7323.000	PK	46.3	35.8	6.6	33.8	54.9	73.9	19.0	
Hori	9764.000	PK	44.3	38.3	7.3	34.5	55.4	73.9	18.5	
Hori	2392.952	AV	44.6	27.0	3.0	34.7	39.9	53.9	14.0	
Hori	4882.000	AV	43.0	32.0	5.4	33.9	46.5	53.9	7.4	
Hori	7323.000	AV	35.8	35.8	6.6	33.8	44.4	53.9	9.5	
Hori	9764.000	AV	32.9	38.3	7.3	34.5	44.0	53.9	9.9	
Vert	42.153	QP	44.1	13.8	6.9	28.6	36.2	40.0	3.8	
Vert	48.346	QP	43.5	11.5	7.0	28.5	33.5	40.0	6.5	
Vert	54.254	QP	44.0	9.5	7.0	28.5	32.0	40.0	8.0	
Vert	57.276	QP	41.4	8.6	7.0	28.5	28.5	40.0	11.5	
Vert	272.655	QP	30.1	18.3	8.6	27.7	29.3	46.0	16.7	
Vert	367.710	QP	28.4	16.4	9.0	28.1	25.7	46.0	20.3	
Vert	384.021	QP	31.7	16.8	9.1	28.2	29.4	46.0	16.6	
Vert	701.333	QP	28.5	20.2	10.4	28.7	30.4	46.0	15.6	
Vert	2392.952	PK	51.7	27.0	3.0	34.7	47.0	73.9	26.9	
Vert	4882.000	PK	54.1	32.0	5.4	33.9	57.6	73.9	16.3	
Vert	7323.000	PK	47.1	35.8	6.6	33.8	55.7	73.9	18.2	
Vert	9764.000	PK	43.6	38.3	7.3	34.5	54.7	73.9	19.2	
Vert	2392.952	AV	40.7	27.0	3.0	34.7	36.0	53.9	17.9	
Vert	4882.000	AV	46.9	32.0	5.4	33.9	50.4	53.9	3.5	
Vert	7323.000	AV	36.9	35.8	6.6	33.8	45.5	53.9	8.4	
Vert	9764.000	AV	31.2	38.3	7.3	34.5	42.3	53.9	11.7	

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).

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

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

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

[Host device: Stereo Speaker]

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber		
Report No.	10523242H		
Date	09/08/2014	09/09/2014	
Temperature/ Humidity	24deg. C / 65% RH	23deg. C / 66% RH	
Engineer	Yuta Moriya	Yuta Moriya	
	(1-10GHz)	(Below 1GHz, Above 10GHz)	
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	42.152	QP	32.2	13.8	6.9	28.6	24.3	40.0	15.7	
Hori	54.254	QP	44.2	9.5	7.0	28.5	32.2	40.0	7.8	
Hori	57.276	QP	41.3	8.6	7.0	28.5	28.4	40.0	11.6	
Hori	274.042	QP	26.3	18.3	8.6	27.7	25.5	46.0	20.5	
Hori	367.711	QP	34.5	16.4	9.0	28.1	31.8	46.0	14.2	
Hori	384.022	QP	33.7	16.8	9.1	28.2	31.4	46.0	14.6	
Hori	701.331	QP	31.8	20.2	10.4	28.7	33.7	46.0	12.3	
Hori	2483.500	PK	75.2	26.9	3.1	34.7	70.5	73.9	3.4	
Hori	4960.000	PK	45.4	32.2	5.4	34.0	49.0	73.9	24.9	
Hori	7440.000	PK	48.1	35.8	6.6	33.9	56.6	73.9	17.3	
Hori	9920.000	PK	43.4	38.7	7.3	34.5	54.9	73.9	19.0	
Hori	2483.500	AV	42.9	26.9	3.1	34.7	38.2	53.9	15.8	
Hori	4960.000	AV	36.3	32.2	5.4	34.0	39.9	53.9	14.0	
Hori	7440.000	AV	36.7	35.8	6.6	33.9	45.2	53.9	8.7	
Hori	9920.000	AV	31.5	38.7	7.3	34.5	43.0	53.9	11.0	
Vert	42.152	QP	44.2	13.8	6.9	28.6	36.3	40.0	3.7	
Vert	48.341	QP	43.6	11.5	7.0	28.5	33.6	40.0	6.4	
Vert	54.254	QP	44.2	9.5	7.0	28.5	32.2	40.0	7.8	
Vert	57.276	QP	41.2	8.6	7.0	28.5	28.3	40.0	11.7	
Vert	272.657	QP	30.2	18.3	8.6	27.7	29.4	46.0	16.6	
Vert	367.711	QP	28.5	16.4	9.0	28.1	25.8	46.0	20.2	
Vert	384.022	QP	31.3	16.8	9.1	28.2	29.0	46.0	17.0	
Vert	701.331	QP	28.4	20.2	10.4	28.7	30.3	46.0	15.7	
Vert	2483.500	PK	72.6	26.9	3.1	34.7	67.9	73.9	6.0	
Vert	4960.000	PK	51.6	32.2	5.4	34.0	55.2	73.9	18.7	
Vert	7440.000	PK	45.8	35.8	6.6	33.9	54.3	73.9	19.6	
Vert	9920.000	PK	44.2	38.7	7.3	34.5	55.7	73.9	18.2	
Vert	2483.500	AV	40.2	26.9	3.1	34.7	35.5	53.9	18.4	
Vert	4960.000	AV	43.8	32.2	5.4	34.0	47.4	53.9	6.5	
Vert	7440.000	AV	34.3	35.8	6.6	33.9	42.8	53.9	11.1	
Vert	9920.000	AV	32.1	38.7	6.6	34.5	42.9	53.9	11.0	

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).

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

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

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

[Host device: Stereo Speaker]

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	10523242H	
Date	09/08/2014	09/09/2014
Temperature/ Humidity	24deg. C / 65% RH	23deg. C / 66% RH
Engineer	Yuta Moriya	Yuta Moriya
	(1-10GHz)	(Below 1GHz, Above 10GHz)
Mode	Tx 3DH5 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	42.151	QP	32.5	13.8	6.9	28.6	24.6	40.0	15.4	
Hori	54.244	QP	44.0	9.5	7.0	28.5	32.0	40.0	8.0	
Hori	57.252	QP	41.7	8.6	7.0	28.5	28.8	40.0	11.2	
Hori	274.044	QP	26.9	18.3	8.6	27.7	26.1	46.0	19.9	
Hori	367.706	QP	34.7	16.4	9.0	28.1	32.0	46.0	14.0	
Hori	384.003	QP	33.2	16.8	9.1	28.2	30.9	46.0	15.1	
Hori	701.334	QP	30.8	20.2	10.4	28.7	32.7	46.0	13.3	
Hori	2305.945	PK	49.5	27.1	3.0	34.7	44.9	73.9	29.0	
Hori	2354.239	PK	51.8	27.1	3.0	34.7	47.2	73.9	26.7	
Hori	2390.000	PK	44.8	27.0	3.0	34.7	40.1	73.9	33.8	
Hori	4804.000	PK	45.2	31.8	5.4	33.9	48.5	73.9	25.4	
Hori	7206.000	PK	42.7	35.7	6.5	33.8	51.1	73.9	22.8	
Hori	9608.000	PK	43.9	38.0	7.2	34.4	54.7	73.9	19.2	
Hori	2305.945	AV	40.1	27.1	3.0	34.7	35.5	53.9	18.4	
Hori	2354.239	AV	43.2	27.1	3.0	34.7	38.6	53.9	15.3	
Hori	2390.000	AV	33.5	27.0	3.0	34.7	28.8	53.9	25.1	
Hori	4804.000	AV	34.2	31.8	5.4	33.9	37.5	53.9	16.4	
Hori	7206.000	AV	31.2	35.7	6.5	33.8	39.6	53.9	14.3	
Hori	9608.000	AV	31.1	38.0	7.2	34.4	41.9	53.9	12.0	
Vert	42.151	QP	44.3	13.8	6.9	28.6	36.4	40.0	3.6	
Vert	48.225	QP	43.5	11.5	7.0	28.5	33.5	40.0	6.5	
Vert	54.252	QP	43.5	9.5	7.0	28.5	31.5	40.0	8.5	
Vert	57.275	QP	41.7	8.6	7.0	28.5	28.8	40.0	11.2	
Vert	272.654	QP	30.4	18.3	8.6	27.7	29.6	46.0	16.4	
Vert	367.706	QP	28.0	16.4	9.0	28.1	25.3	46.0	20.7	
Vert	384.003	QP	31.0	16.8	9.1	28.2	28.7	46.0	17.3	
Vert	701.334	QP	28.7	20.2	10.4	28.7	30.6	46.0	15.4	
Vert	2305.945	PK	46.9	27.1	3.0	34.7	42.3	73.9	31.6	
Vert	2354.239	PK	49.7	27.1	3.0	34.7	45.1	73.9	28.8	
Vert	2390.000	PK	45.5	27.0	3.0	34.7	40.8	73.9	33.1	
Vert	4804.000	PK	50.1	31.8	5.4	33.9	53.4	73.9	20.5	
Vert	7206.000	PK	43.0	35.7	6.5	33.8	51.4	73.9	22.5	
Vert	9608.000	PK	43.2	38.0	7.2	34.4	54.0	73.9	19.9	
Vert	2305.945	AV	37.1	27.1	3.0	34.7	32.5	53.9	21.4	
Vert	2354.239	AV	41.0	27.1	3.0	34.7	36.4	53.9	17.5	
Vert	2390.000	AV	32.8	27.0	3.0	34.7	28.1	53.9	25.8	
Vert	4804.000	AV	39.8	31.8	5.4	33.9	43.1	53.9	10.8	
Vert	7206.000	AV	31.2	35.7	6.5	33.8	39.6	53.9	14.3	
Vert	9608.000	AV	31.2	38.0	7.2	34.4	42.0	53.9	11.9	

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).

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

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

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
[Host device: Stereo Speaker]

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10523242H
Date : 09/08/2014
Temperature/ Humidity : 24deg. C / 65% RH
Engineer : Yuta Moriya
(1-10GHz)
Mode : Tx 3DH5 2402MHz

20dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori	2402.000	PK	102.7	27.0	3.0	34.7	98.0	-	-	Carrier
Hori	2400.000	PK	48.9	27.0	3.0	34.7	44.2	78.0	33.8	
Vert	2402.000	PK	99.4	27.0	3.0	34.7	94.7	-	-	Carrier
Vert	2400.000	PK	47.6	27.0	3.0	34.7	42.9	74.7	31.8	

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

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
[Host device: Stereo Speaker]

Test place
Report No. 10523242H
Date 09/08/2014 09/09/2014
Temperature/ Humidity 24deg. C / 65% RH 23deg. C / 66% RH
Engineer Yuta Moriya Yuta Moriya
(1-10GHz) (Below 1GHz, Above 10GHz)
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	42.150	QP	32.7	13.8	6.9	28.6	24.8	40.0	15.2	
Hori	54.244	QP	44.2	9.5	7.0	28.5	32.2	40.0	7.8	
Hori	57.256	QP	41.5	8.6	7.0	28.5	28.6	40.0	11.4	
Hori	274.043	QP	26.8	18.3	8.6	27.7	26.0	46.0	20.0	
Hori	367.706	QP	34.4	16.4	9.0	28.1	31.7	46.0	14.3	
Hori	384.007	QP	33.3	16.8	9.1	28.2	31.0	46.0	15.0	
Hori	701.335	QP	30.5	20.2	10.4	28.7	32.4	46.0	13.6	
Hori	2392.952	PK	53.3	27.0	3.0	34.7	48.6	73.9	25.3	
Hori	4882.000	PK	48.4	32.0	5.4	33.9	51.9	73.9	22.0	
Hori	7323.000	PK	44.6	35.8	6.6	33.8	53.2	73.9	20.7	
Hori	9764.000	PK	44.0	38.3	7.3	34.5	55.1	73.9	18.8	
Hori	2392.952	AV	42.3	27.0	3.0	34.7	37.6	53.9	16.4	
Hori	4882.000	AV	37.6	32.0	5.4	33.9	41.1	53.9	12.8	
Hori	7323.000	AV	32.5	35.8	6.6	33.8	41.1	53.9	12.8	
Hori	9764.000	AV	32.2	38.3	7.3	34.5	43.3	53.9	10.6	
Vert	42.150	QP	44.5	13.8	6.9	28.6	36.6	40.0	3.4	
Vert	48.227	QP	43.2	11.5	7.0	28.5	33.2	40.0	6.8	
Vert	54.255	QP	43.4	9.5	7.0	28.5	31.4	40.0	8.6	
Vert	57.275	QP	41.9	8.6	7.0	28.5	29.0	40.0	11.0	
Vert	272.675	QP	30.7	18.3	8.6	27.7	29.9	46.0	16.1	
Vert	367.706	QP	27.4	16.4	9.0	28.1	24.7	46.0	21.3	
Vert	384.007	QP	30.8	16.8	9.1	28.2	28.5	46.0	17.5	
Vert	701.335	QP	28.6	20.2	10.4	28.7	30.5	46.0	15.5	
Vert	2392.952	PK	51.0	27.0	3.0	34.7	46.3	73.9	27.6	
Vert	4882.000	PK	53.2	32.0	5.4	33.9	56.7	73.9	17.2	
Vert	7323.000	PK	45.1	35.8	6.6	33.8	53.7	73.9	20.2	
Vert	9764.000	PK	43.5	38.3	7.3	34.5	54.6	73.9	19.3	
Vert	2392.952	AV	39.9	27.0	3.0	34.7	35.2	53.9	18.7	
Vert	4882.000	AV	45.2	32.0	5.4	33.9	48.7	53.9	5.2	
Vert	7323.000	AV	34.1	35.8	6.6	33.8	42.7	53.9	11.3	
Vert	9764.000	AV	31.2	38.3	7.3	34.5	42.3	53.9	11.6	

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).

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

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

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

[Host device: Stereo Speaker]

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10523242H
Date : 09/08/2014 09/09/2014
Temperature/ Humidity : 24deg. C / 65% RH 23deg. C / 66% RH
Engineer : Yuta Moriya Yuta Moriya
(1-10GHz) (Below 1GHz, Above 10GHz)
Mode : Tx 3DH5 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	42.150	QP	32.6	13.8	6.9	28.6	24.7	40.0	15.3	
Hori	54.248	QP	44.3	9.5	7.0	28.5	32.3	40.0	7.7	
Hori	57.256	QP	41.4	8.6	7.0	28.5	28.5	40.0	11.5	
Hori	274.038	QP	26.2	18.3	8.6	27.7	25.4	46.0	20.6	
Hori	367.706	QP	34.6	16.4	9.0	28.1	31.9	46.0	14.1	
Hori	384.007	QP	33.3	16.8	9.1	28.2	31.0	46.0	15.0	
Hori	701.335	QP	30.1	20.2	10.4	28.7	32.0	46.0	14.0	
Hori	2483.500	PK	76.1	26.9	3.1	34.7	71.4	73.9	2.5	
Hori	4960.000	PK	46.1	32.2	5.4	34.0	49.7	73.9	24.2	
Hori	7440.000	PK	45.9	35.8	6.6	33.9	54.4	73.9	19.5	
Hori	9920.000	PK	43.5	38.7	7.3	34.5	55.0	73.9	18.9	
Hori	2483.500	AV	51.9	26.9	3.1	34.7	47.2	53.9	6.7	
Hori	4960.000	AV	35.9	32.2	5.4	34.0	39.5	53.9	14.4	
Hori	7440.000	AV	34.5	35.8	6.6	33.9	43.0	53.9	10.9	
Hori	9920.000	AV	31.2	38.7	7.3	34.5	42.7	53.9	11.2	
Vert	42.150	QP	44.5	13.8	6.9	28.6	36.6	40.0	3.4	
Vert	48.227	QP	43.1	11.5	7.0	28.5	33.1	40.0	6.9	
Vert	54.253	QP	43.3	9.5	7.0	28.5	31.3	40.0	8.7	
Vert	57.278	QP	41.8	8.6	7.0	28.5	28.9	40.0	11.1	
Vert	272.675	QP	30.6	18.3	8.6	27.7	29.8	46.0	16.2	
Vert	367.706	QP	27.4	16.4	9.0	28.1	24.7	46.0	21.3	
Vert	384.007	QP	30.5	16.8	9.1	28.2	28.2	46.0	17.8	
Vert	701.335	QP	28.4	20.2	10.4	28.7	30.3	46.0	15.7	
Vert	2483.500	PK	72.4	26.9	3.1	34.7	67.7	73.9	6.2	
Vert	4960.000	PK	50.2	32.2	5.4	34.0	53.8	73.9	20.1	
Vert	7440.000	PK	45.1	35.8	6.6	33.9	53.6	73.9	20.3	
Vert	9920.000	PK	43.3	38.7	7.3	34.5	54.8	73.9	19.1	
Vert	2483.500	AV	48.5	26.9	3.1	34.7	43.8	53.9	10.1	
Vert	4960.000	AV	41.6	32.2	5.4	34.0	45.2	53.9	8.7	
Vert	7440.000	AV	33.5	35.8	6.6	33.9	42.0	53.9	11.9	
Vert	9920.000	AV	31.3	38.7	7.3	34.5	42.8	53.9	11.1	

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).

*The 10th harmonic was not seen so the result was its base noise level.
Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

Radiated Spurious Emission

[Host device: AV Receiver]

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10523242H
Date : 10/16/2014
Temperature/ Humidity : 24deg. C / 51% RH
Engineer : Keisuke Kawamura
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	57.267	QP	40.1	8.7	7.5	32.2	24.1	40.0	15.9	
Hori	114.547	QP	44.3	12.2	8.2	32.1	32.6	43.5	10.9	
Hori	171.817	QP	43.3	15.8	8.8	32.1	35.8	43.5	7.7	
Hori	348.751	QP	36.6	15.9	10.3	31.9	30.9	46.0	15.1	
Hori	515.453	QP	34.2	18.3	11.3	32.0	31.8	46.0	14.2	
Hori	687.269	QP	30.2	20.1	12.3	32.1	30.5	46.0	15.5	
Hori	2378.007	PK	47.6	26.7	3.5	32.7	45.1	73.9	28.8	
Hori	2390.000	PK	45.4	26.8	3.5	32.7	43.0	73.9	30.9	
Hori	4804.000	PK	48.2	30.6	5.7	31.8	52.7	73.9	21.2	
Hori	7206.000	PK	49.4	35.9	7.2	32.7	59.8	73.9	14.1	
Hori	9608.000	PK	46.1	38.4	7.8	33.3	59.0	73.9	14.9	
Hori	2378.007	AV	40.9	26.7	3.5	32.7	38.4	53.9	15.5	
Hori	2390.000	AV	32.7	26.8	3.5	32.7	30.3	53.9	23.6	
Vert	57.267	QP	35.2	8.7	7.5	32.2	19.2	40.0	20.8	
Vert	114.547	QP	41.1	12.2	8.2	32.1	29.4	43.5	14.1	
Vert	171.817	QP	43.2	15.8	8.8	32.1	35.7	43.5	7.8	
Vert	348.751	QP	32.8	15.9	10.3	31.9	27.1	46.0	18.9	
Vert	515.453	QP	30.5	18.3	11.3	32.0	28.1	46.0	17.9	
Vert	687.269	QP	29.7	20.1	12.3	32.1	30.0	46.0	16.0	
Vert	2378.007	PK	50.8	26.7	3.5	32.7	48.3	73.9	25.6	
Vert	2390.000	PK	50.7	26.8	3.5	32.7	48.3	73.9	25.6	
Vert	4804.000	PK	49.3	30.6	5.7	31.8	53.8	73.9	20.1	
Vert	7206.000	PK	48.8	35.9	7.2	32.7	59.2	73.9	14.7	
Vert	9608.000	PK	46.6	38.4	7.8	33.3	59.5	73.9	14.4	
Vert	2378.007	AV	45.5	26.7	3.5	32.7	43.0	53.9	10.9	
Vert	2390.000	AV	36.4	26.8	3.5	32.7	34.0	53.9	19.9	

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).

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

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

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

[Host device: AV Receiver]

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10523242H
Date : 10/16/2014
Temperature/ Humidity : 24deg. C / 51% RH
Engineer : Keisuke Kawamura
Mode : Tx DH5 2402MHz

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	99.8	26.8	3.5	32.7	97.4	-	-	Carrier
Hori	2400.000	PK	63.6	26.8	3.5	32.7	61.2	77.4	16.2	
Vert	2402.000	PK	106.1	26.8	3.5	32.7	103.7	-	-	Carrier
Vert	2400.000	PK	69.8	26.8	3.5	32.7	67.4	83.7	16.3	

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

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result dBuV/m	Limit dBuV/m	Margin [dB]	Remark
Hori	4804.000	AV	42.0	30.6	5.7	31.8	-23.7	22.8	53.9	31.1	
Hori	7206.000	AV	42.1	35.9	7.2	32.7	-23.7	28.8	53.9	25.1	
Hori	9608.000	AV	36.2	38.4	7.8	33.3	-23.7	25.4	53.9	28.5	
Vert	4804.000	AV	42.8	30.6	5.7	31.8	-23.7	23.6	53.9	30.3	
Vert	7206.000	AV	40.3	35.9	7.2	32.7	-23.7	27.0	53.9	26.9	
Vert	9608.000	AV	36.2	38.4	7.8	33.3	-23.7	25.4	53.9	28.5	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz))
- Gain(Amplifier) + Dwell time factor (Refer to dwell time data sheet)

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

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

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

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

[Host device: AV Receiver]

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10523242H
Date : 10/16/2014
Temperature/ Humidity : 24deg. C / 51% RH
Engineer : Keisuke Kawamura
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	57.267	QP	39.8	8.7	7.5	32.2	23.8	40.0	16.2	
Hori	114.547	QP	44.5	12.2	8.2	32.1	32.8	43.5	10.7	
Hori	171.817	QP	44.6	15.8	8.8	32.1	37.1	43.5	6.4	
Hori	348.751	QP	36.7	15.9	10.3	31.9	31.0	46.0	15.0	
Hori	515.453	QP	34.2	18.3	11.3	32.0	31.8	46.0	14.2	
Hori	687.269	QP	31.5	20.1	12.3	32.1	31.8	46.0	14.2	
Hori	4882.000	PK	49.0	30.8	5.8	31.7	53.9	73.9	20.0	
Hori	7323.000	PK	52.5	35.9	7.1	32.7	62.8	73.9	11.2	
Hori	9764.000	PK	45.2	38.7	7.8	33.4	58.3	73.9	15.6	
Vert	57.267	QP	37.0	8.7	7.5	32.2	21.0	40.0	19.0	
Vert	114.547	QP	41.1	12.2	8.2	32.1	29.4	43.5	14.1	
Vert	171.817	QP	43.2	15.8	8.8	32.1	35.7	43.5	7.8	
Vert	348.751	QP	33.5	15.9	10.3	31.9	27.8	46.0	18.2	
Vert	515.453	QP	32.8	18.3	11.3	32.0	30.4	46.0	15.6	
Vert	687.269	QP	29.8	20.1	12.3	32.1	30.1	46.0	15.9	
Vert	4882.000	PK	48.4	30.8	5.8	31.7	53.3	73.9	20.6	
Vert	7323.000	PK	51.0	35.9	7.1	32.7	61.3	73.9	12.6	
Vert	9764.000	PK	45.3	38.7	7.8	33.4	58.4	73.9	15.5	

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).

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

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

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4882.000	AV	42.2	30.8	5.8	31.7	-23.7	23.4	53.9	30.5	
Hori	7323.000	AV	45.1	35.9	7.1	32.7	-23.7	31.7	53.9	22.2	
Hori	9764.000	AV	34.3	38.7	7.8	33.4	-23.7	23.7	53.9	30.2	
Vert	4882.000	AV	41.4	30.8	5.8	31.7	-23.7	22.6	53.9	31.3	
Vert	7323.000	AV	44.0	35.9	7.1	32.7	-23.7	30.6	53.9	23.3	
Vert	9764.000	AV	33.4	38.7	7.8	33.4	-23.7	22.8	53.9	31.1	

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

- Gain(Amplifier) + Dwell time factor (Refer to dwell time data sheet)

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

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

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

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

[Host device: AV Receiver]

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10523242H
Date : 10/16/2014
Temperature/ Humidity : 24deg. C / 51% RH
Engineer : Keisuke Kawamura
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	57.267	QP	43.0	8.7	7.5	32.2	27.0	40.0	13.0	
Hori	114.547	QP	44.5	12.2	8.2	32.1	32.8	43.5	10.7	
Hori	171.817	QP	44.3	15.8	8.8	32.1	36.8	43.5	6.7	
Hori	348.751	QP	40.5	15.9	10.3	31.9	34.8	46.0	11.2	
Hori	515.453	QP	38.9	18.3	11.3	32.0	36.5	46.0	9.5	
Hori	687.269	QP	32.1	20.1	12.3	32.1	32.4	46.0	13.6	
Hori	2483.500	PK	69.4	26.9	3.5	32.7	67.1	73.9	6.8	
Hori	4960.000	PK	48.9	30.9	5.7	31.7	53.8	73.9	20.1	
Hori	7440.000	PK	52.9	35.9	7.1	32.7	63.2	73.9	10.7	
Hori	9920.000	PK	43.9	38.9	7.9	33.5	57.2	73.9	16.7	
Hori	12400.000	PK	44.0	39.4	-0.7	33.3	49.4	73.9	24.5	
Hori	2483.500	AV	42.6	26.9	3.5	32.7	40.3	53.9	13.6	
Vert	57.267	QP	36.3	8.7	7.5	32.2	20.3	40.0	19.7	
Vert	114.547	QP	42.1	12.2	8.2	32.1	30.4	43.5	13.1	
Vert	171.817	QP	43.4	15.8	8.8	32.1	35.9	43.5	7.6	
Vert	348.751	QP	36.8	15.9	10.3	31.9	31.1	46.0	14.9	
Vert	515.453	QP	35.3	18.3	11.3	32.0	32.9	46.0	13.1	
Vert	687.269	QP	30.6	20.1	12.3	32.1	30.9	46.0	15.1	
Vert	2483.500	PK	75.1	26.9	3.5	32.7	72.8	73.9	1.1	
Vert	4960.000	PK	48.8	30.9	5.7	31.7	53.7	73.9	20.2	
Vert	7440.000	PK	52.6	35.9	7.1	32.7	62.9	73.9	11.0	
Vert	9920.000	PK	44.1	38.9	7.9	33.5	57.4	73.9	16.5	
Vert	12400.000	PK	44.9	39.4	-0.7	33.3	50.3	73.9	23.6	
Vert	2483.500	AV	48.0	26.9	3.5	32.7	45.7	53.9	8.2	

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).

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

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

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

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4960.000	AV	42.5	30.9	5.7	31.7	-23.7	23.7	53.9	30.2	
Hori	7440.000	AV	46.0	35.9	7.1	32.7	-23.7	32.6	53.9	21.3	
Hori	9920.000	AV	33.4	38.9	7.9	33.5	-23.7	23.0	53.9	30.9	
Hori	12400.000	AV	33.4	39.4	-0.7	33.3	-23.7	15.1	53.9	38.8	
Vert	4960.000	AV	42.7	30.9	5.7	31.7	-23.7	23.9	53.9	30.0	
Vert	7440.000	AV	45.8	35.9	7.1	32.7	-23.7	32.4	53.9	21.5	
Vert	9920.000	AV	33.8	38.9	7.9	33.5	-23.7	23.4	53.9	30.5	
Vert	12400.000	AV	34.7	39.4	-0.7	33.3	-23.7	16.4	53.9	37.5	

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

- Gain(Amplifier) + Dwell time factor (Refer to dwell time data sheet)

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

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

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

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

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

[Host device: AV Receiver]

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10523242H
Date : 10/16/2014
Temperature/ Humidity : 24deg. C / 51% RH
Engineer : Keisuke Kawamura
Mode : Tx 3DH5 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	57.267	QP	43.0	8.7	7.5	32.2	27.0	40.0	13.0	
Hori	114.547	QP	44.5	12.2	8.2	32.1	32.8	43.5	10.7	
Hori	171.817	QP	44.3	15.8	8.8	32.1	36.8	43.5	6.7	
Hori	348.751	QP	40.5	15.9	10.3	31.9	34.8	46.0	11.2	
Hori	515.453	QP	38.9	18.3	11.3	32.0	36.5	46.0	9.5	
Hori	687.269	QP	32.1	20.1	12.3	32.1	32.4	46.0	13.6	
Hori	2378.007	PK	47.7	26.7	3.5	32.7	45.2	73.9	28.7	
Hori	2390.000	PK	46.1	26.8	3.5	32.7	43.7	73.9	30.2	
Hori	4804.000	PK	48.0	30.6	5.7	31.8	52.5	73.9	21.4	
Hori	7206.000	PK	49.7	35.9	7.2	32.7	60.1	73.9	13.8	
Hori	9608.000	PK	45.2	38.4	7.8	33.3	58.1	73.9	15.8	
Hori	2378.007	AV	39.5	26.7	3.5	32.7	37.0	53.9	16.9	
Hori	2390.000	AV	31.4	26.8	3.5	32.7	29.0	53.9	24.9	
Vert	57.267	QP	36.3	8.7	7.5	32.2	20.3	40.0	19.7	
Vert	114.547	QP	42.1	12.2	8.2	32.1	30.4	43.5	13.1	
Vert	171.817	QP	43.4	15.8	8.8	32.1	35.9	43.5	7.6	
Vert	348.751	QP	36.8	15.9	10.3	31.9	31.1	46.0	14.9	
Vert	515.453	QP	35.3	18.3	11.3	32.0	32.9	46.0	13.1	
Vert	687.269	QP	30.6	20.1	12.3	32.1	30.9	46.0	15.1	
Vert	2378.007	PK	50.9	26.7	3.5	32.7	48.4	73.9	25.6	
Vert	2390.000	PK	50.1	26.8	3.5	32.7	47.7	73.9	26.2	
Vert	4804.000	PK	48.2	30.6	5.7	31.8	52.7	73.9	21.2	
Vert	7206.000	PK	48.2	35.9	7.2	32.7	58.6	73.9	15.3	
Vert	9608.000	PK	46.0	38.4	7.8	33.3	58.9	73.9	15.0	
Vert	2378.007	AV	43.8	26.7	3.5	32.7	41.3	53.9	12.6	
Vert	2390.000	AV	34.3	26.8	3.5	32.7	31.9	53.9	22.0	

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).

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

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

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

[Host device: AV Receiver]

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10523242H
Date : 10/16/2014
Temperature/ Humidity : 24deg. C / 51% RH
Engineer : Keisuke Kawamura
Mode : Tx 3DH5 2402MHz

20dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori	2402.000	PK	100.2	26.8	3.5	32.7	97.8	-	-	Carrier
Hori	2400.000	PK	64.1	26.8	3.5	32.7	61.7	77.8	16.1	
Vert	2402.000	PK	106.5	26.8	3.5	32.7	104.1	-	-	Carrier
Vert	2400.000	PK	70.1	26.8	3.5	32.7	67.7	84.1	16.4	

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

Dwell time factor relaxation

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Dwell Factor	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori	4804.000	AV	39.6	30.6	5.7	31.8	-23.7	20.4	53.9	33.5	
Hori	7206.000	AV	39.7	35.9	7.2	32.7	-23.7	26.4	53.9	27.5	
Hori	9608.000	AV	34.8	38.4	7.8	33.3	-23.7	24.0	53.9	29.9	
Vert	4804.000	AV	39.5	30.6	5.7	31.8	-23.7	20.3	53.9	33.6	
Vert	7206.000	AV	38.6	35.9	7.2	32.7	-23.7	25.3	53.9	28.6	
Vert	9608.000	AV	35.2	38.4	7.8	33.3	-23.7	24.4	53.9	29.5	

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

- Gain(Amplifier) + Dwell time factor (Refer to dwell time data sheet)

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

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

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

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

[Host device: AV Receiver]

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10523242H
Date : 10/16/2014
Temperature/ Humidity : 24deg. C / 51% RH
Engineer : Keisuke Kawamura
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	57.267	QP	40.1	8.7	7.5	32.2	24.1	40.0	15.9	
Hori	114.547	QP	44.3	12.2	8.2	32.1	32.6	43.5	10.9	
Hori	171.817	QP	43.3	15.8	8.8	32.1	35.8	43.5	7.7	
Hori	348.751	QP	36.6	15.9	10.3	31.9	30.9	46.0	15.1	
Hori	515.453	QP	34.2	18.3	11.3	32.0	31.8	46.0	14.2	
Hori	687.269	QP	30.2	20.1	12.3	32.1	30.5	46.0	15.5	
Hori	4882.000	PK	47.8	30.8	5.8	31.7	52.7	73.9	21.2	
Hori	7323.000	PK	52.0	35.9	7.1	32.7	62.3	73.9	11.6	
Hori	9764.000	PK	44.1	38.7	7.8	33.4	57.2	73.9	16.7	
Hori	12205.000	PK	40.5	39.5	-0.8	33.4	45.8	73.9	28.1	
Vert	57.267	QP	35.2	8.7	7.5	32.2	19.2	40.0	20.8	
Vert	114.547	QP	41.1	12.2	8.2	32.1	29.4	43.5	14.1	
Vert	171.817	QP	43.2	15.8	8.8	32.1	35.7	43.5	7.8	
Vert	348.751	QP	32.8	15.9	10.3	31.9	27.1	46.0	18.9	
Vert	515.453	QP	30.5	18.3	11.3	32.0	28.1	46.0	17.9	
Vert	687.269	QP	29.7	20.1	12.3	32.1	30.0	46.0	16.0	
Vert	4882.000	PK	47.1	30.8	5.8	31.7	52.0	73.9	21.9	
Vert	7323.000	PK	50.6	35.9	7.1	32.7	60.9	73.9	13.0	
Vert	9764.000	PK	43.5	38.7	7.8	33.4	56.6	73.9	17.3	
Vert	12205.000	PK	43.4	39.5	-0.8	33.4	48.7	73.9	25.2	

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).

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

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

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4882.000	AV	39.8	30.8	5.8	31.7	-23.7	21.0	53.9	32.9	
Hori	7323.000	AV	42.7	35.9	7.1	32.7	-23.7	29.3	53.9	24.6	
Hori	9764.000	AV	32.8	38.7	7.8	33.4	-23.7	22.2	53.9	31.7	
Hori	12205.000	AV	30.0	39.5	-0.8	33.4	-23.7	11.6	53.9	42.3	
Vert	4882.000	AV	39.1	30.8	5.8	31.7	-23.7	20.3	53.9	33.6	
Vert	7323.000	AV	41.6	35.9	7.1	32.7	-23.7	28.2	53.9	25.7	
Vert	9764.000	AV	32.3	38.7	7.8	33.4	-23.7	21.7	53.9	32.2	
Vert	12205.000	AV	31.9	39.5	-0.8	33.4	-23.7	13.5	53.9	40.4	

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

- Gain(Amplifier) + Dwell time factor (Refer to dwell time data sheet)

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

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

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

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

[Host device: AV Receiver]

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10523242H
Date : 10/16/2014
Temperature/ Humidity : 24deg. C / 51% RH
Engineer : Keisuke Kawamura
Mode : Tx 3DH5 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	57.267	QP	39.8	8.7	7.5	32.2	23.8	40.0	16.2	
Hori	114.547	QP	44.5	12.2	8.2	32.1	32.8	43.5	10.7	
Hori	171.817	QP	44.6	15.8	8.8	32.1	37.1	43.5	6.4	
Hori	348.751	QP	36.7	15.9	10.3	31.9	31.0	46.0	15.0	
Hori	515.453	QP	34.2	18.3	11.3	32.0	31.8	46.0	14.2	
Hori	687.269	QP	31.5	20.1	12.3	32.1	31.8	46.0	14.2	
Hori	2483.500	PK	69.2	26.9	3.5	32.7	66.9	73.9	7.0	
Hori	4960.000	PK	46.9	30.9	5.7	31.7	51.8	73.9	22.1	
Hori	7440.000	PK	52.6	35.9	7.1	32.7	62.9	73.9	11.0	
Hori	9920.000	PK	43.6	38.9	7.9	33.5	56.9	73.9	17.0	
Hori	12400.000	PK	40.5	39.4	-0.7	33.3	45.9	73.9	28.0	
Hori	2483.500	AV	47.2	26.9	3.5	32.7	44.9	53.9	9.0	
Vert	57.267	QP	37.0	8.7	7.5	32.2	21.0	40.0	19.0	
Vert	114.547	QP	41.1	12.2	8.2	32.1	29.4	43.5	14.1	
Vert	171.817	QP	43.2	15.8	8.8	32.1	35.7	43.5	7.8	
Vert	348.751	QP	33.5	15.9	10.3	31.9	27.8	46.0	18.2	
Vert	515.453	QP	32.8	18.3	11.3	32.0	30.4	46.0	15.6	
Vert	687.269	QP	29.8	20.1	12.3	32.1	30.1	46.0	15.9	
Vert	2483.500	PK	75.3	26.9	3.5	32.7	73.0	73.9	0.9	
Vert	4960.000	PK	48.4	30.9	5.7	31.7	53.3	73.9	20.6	
Vert	7440.000	PK	49.1	35.9	7.1	32.7	59.4	73.9	14.5	
Vert	9920.000	PK	43.7	38.9	7.9	33.5	57.0	73.9	16.9	
Vert	12400.000	PK	44.8	39.4	-0.7	33.3	50.2	73.9	23.7	
Vert	2483.500	AV	53.0	26.9	3.5	32.7	50.7	53.9	3.2	

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).

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

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

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4960.000	AV	39.3	30.9	5.7	31.7	-23.7	20.5	53.9	33.4	
Hori	7440.000	AV	43.8	35.9	7.1	32.7	-23.7	30.4	53.9	23.5	
Hori	9920.000	AV	32.5	38.9	7.9	33.5	-23.7	22.1	53.9	31.8	
Hori	12400.000	AV	30.0	39.4	-0.7	33.3	-23.7	11.7	53.9	42.2	
Vert	4960.000	AV	40.3	30.9	5.7	31.7	-23.7	21.5	53.9	32.4	
Vert	7440.000	AV	39.8	35.9	7.1	32.7	-23.7	26.4	53.9	27.5	
Vert	9920.000	AV	33.1	38.9	7.9	33.5	-23.7	22.7	53.9	31.2	
Vert	12400.000	AV	33.2	39.4	-0.7	33.3	-23.7	14.9	53.9	39.0	

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

- Gain(Amplifier) + Dwell time factor (Refer to dwell time data sheet)

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

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

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

UL Japan, Inc.

Ise EMC Lab.

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

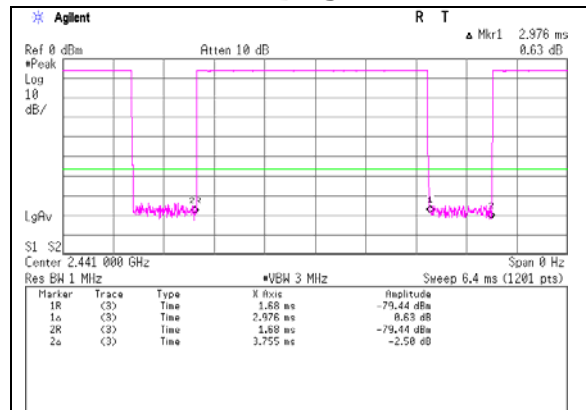
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

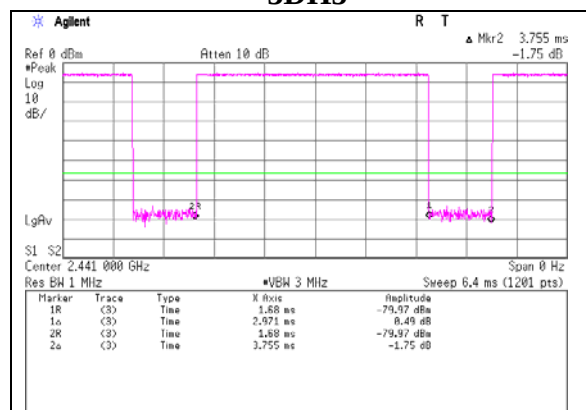
Burst Rate Confirmation **[Host device: Stereo Speaker]**

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	10523242H
Date	09/10/2014
Temperature/ Humidity	22deg. C / 56% RH
Engineer	Hiroshi Kukita
Mode	Tx (Hopping off) DH5/3DH5

DH5



3DH5



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

Burst Rate Confirmation

[Host device: AV Receiver]

Test place

Report No.

Date

Temperature/ Humidity

Engineer

Mode

Ise EMC Lab. No.3 Measurement Room

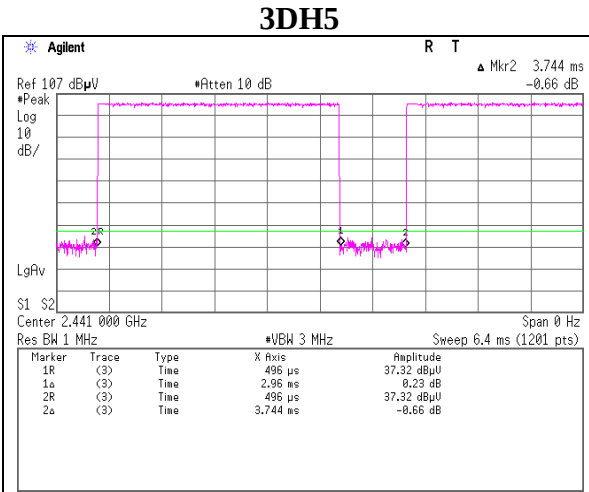
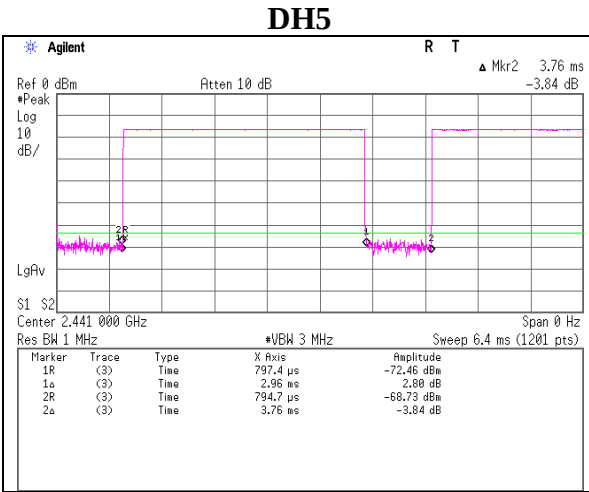
10523242H

10/16/2014

24deg. C / 51% RH

Keisuke Kawamura

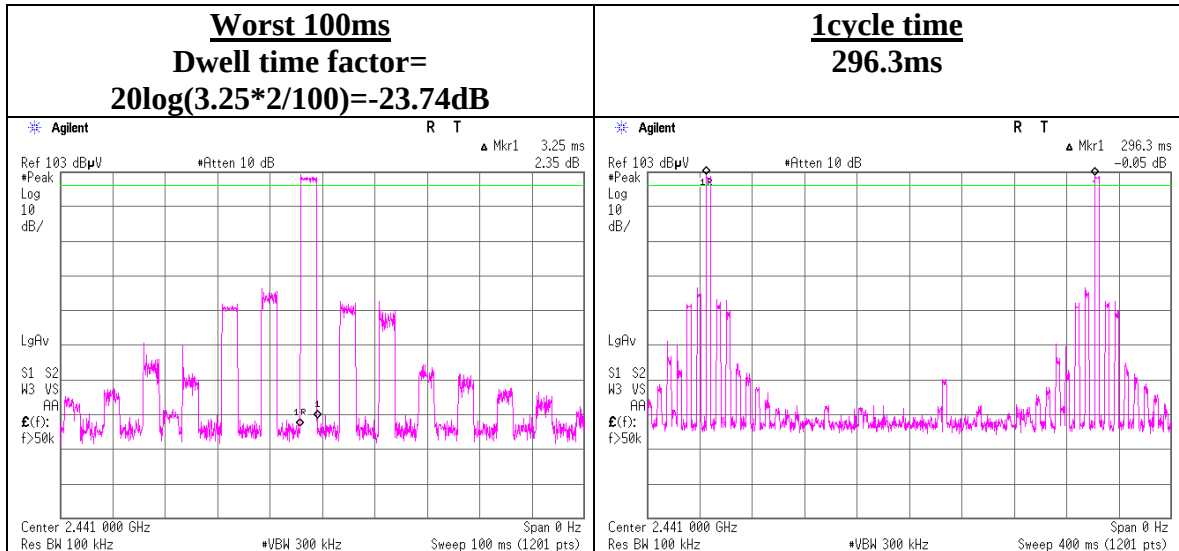
Tx (Hopping off) DH5/3DH5



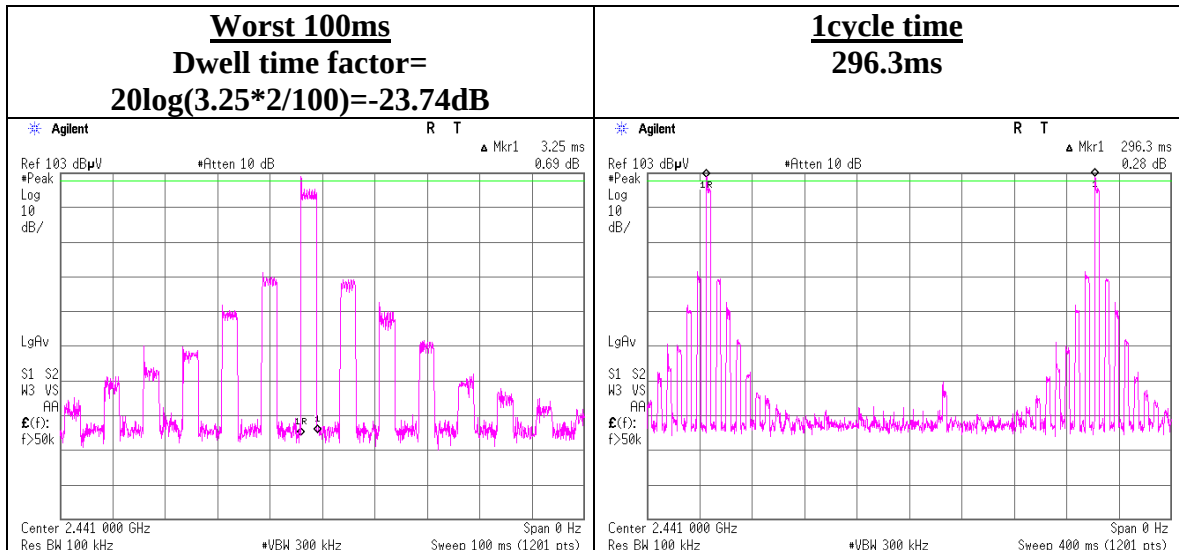
Dwell time factor
[Host device: AV Receiver]

Test place Ise EMC Lab. No.3 Measurement Room
Report No. 10523242H
Date 10/16/2014
Temperature/ Humidity 24deg. C / 51% RH
Engineer Keisuke Kawamura
Mode Tx (Hopping on) DH5/3DH5

DH5



3DH5



UL Japan, Inc.

Ise EMC Lab.

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

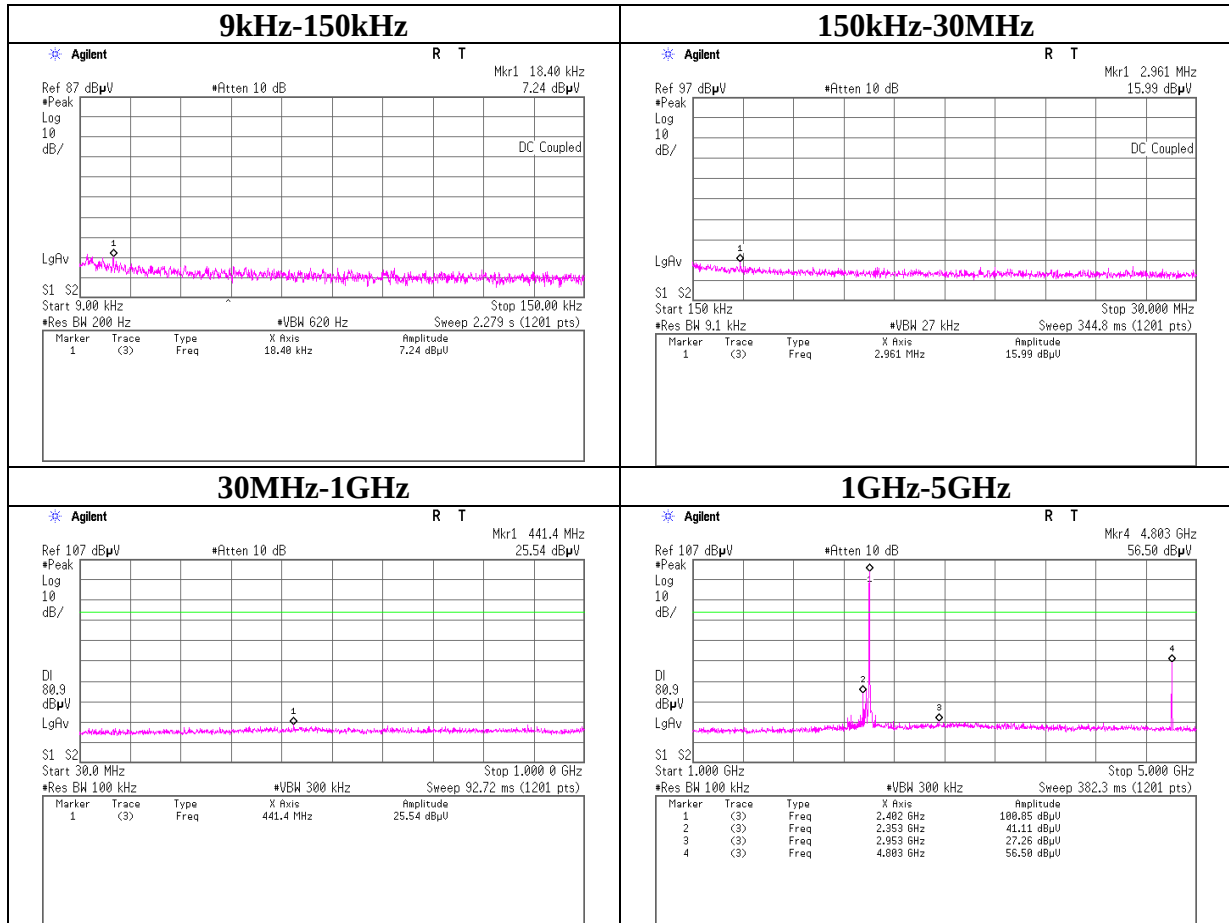
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place : Ise EMC Lab. No.3 Measurement Room
Report No. : 10523242H
Date : 09/10/2014
Temperature/ Humidity : 22deg. C / 56% RH
Engineer : Hiroshi Kukita

Tx DH5 2402MHz



UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

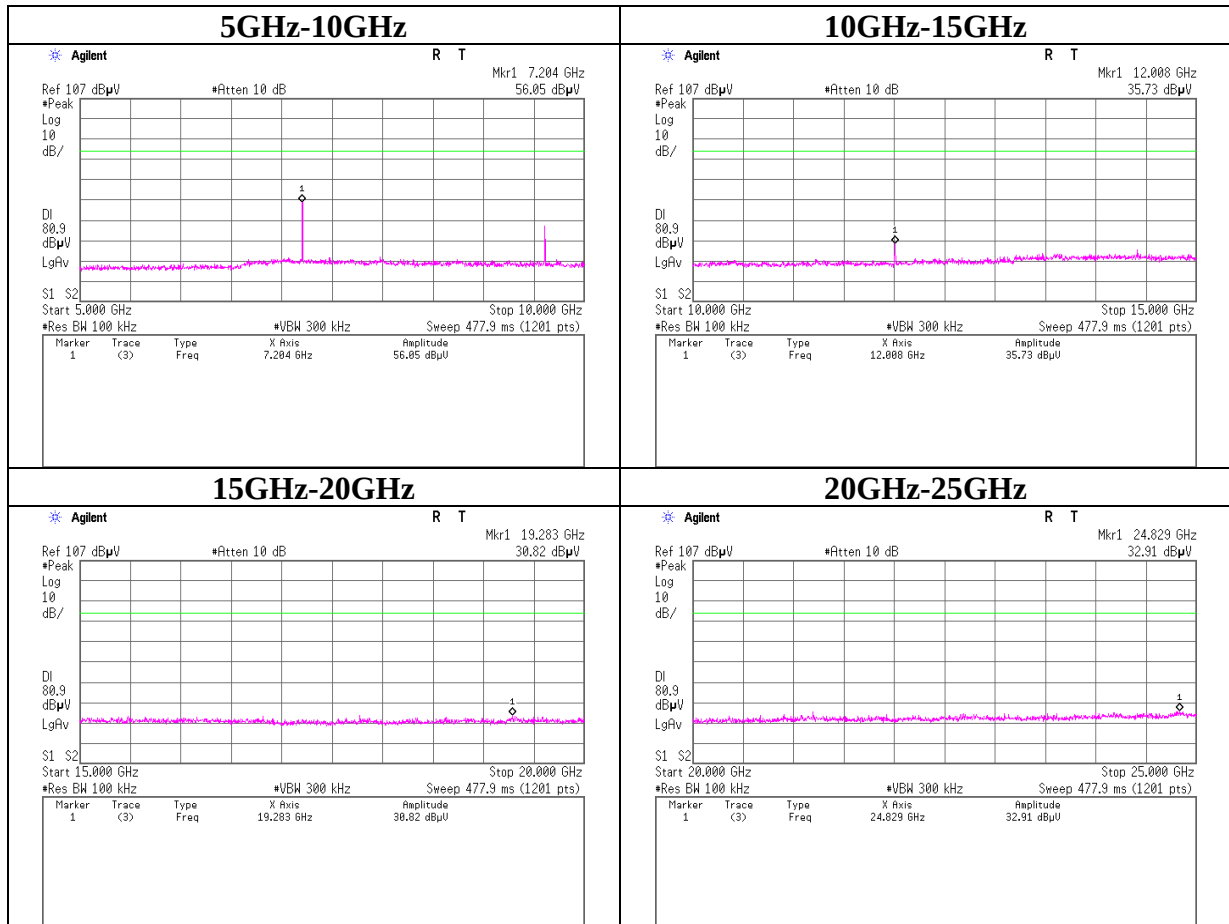
Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place
Report No.
Date
Temperature/ Humidity
Engineer

Ise EMC Lab. No.3 Measurement Room
10523242H
09/10/2014
22deg. C / 56% RH
Hiroshi Kukita

Tx DH5 2402MHz



UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

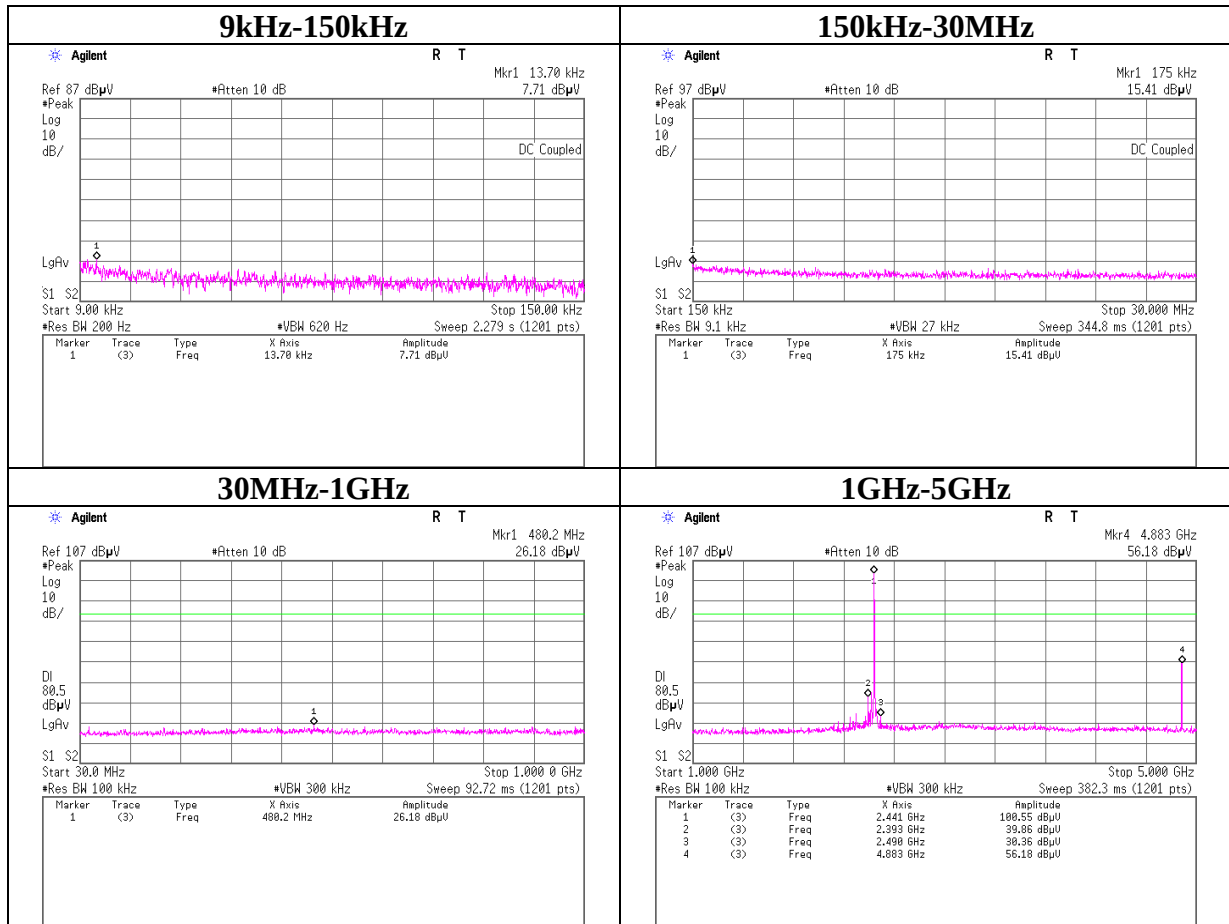
Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place
Report No.
Date
Temperature/ Humidity
Engineer

Ise EMC Lab. No.3 Measurement Room
10523242H
09/10/2014
22deg. C / 56% RH
Hiroshi Kukita

Tx DH5 2441MHz



UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

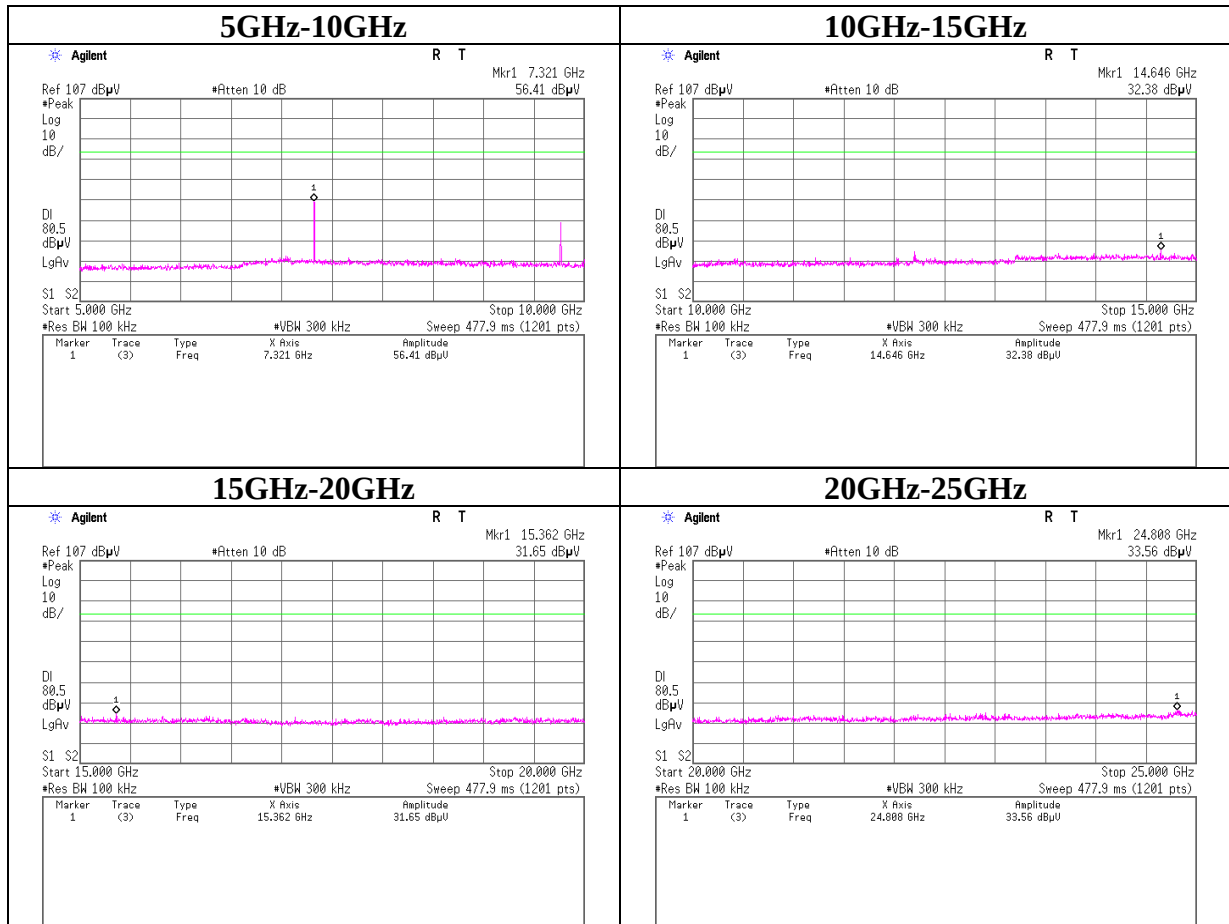
Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place
Report No.
Date
Temperature/ Humidity
Engineer

Ise EMC Lab. No.3 Measurement Room
10523242H
09/10/2014
22deg. C / 56% RH
Hiroshi Kukita

Tx DH5 2441MHz



UL Japan, Inc.

Ise EMC Lab.

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

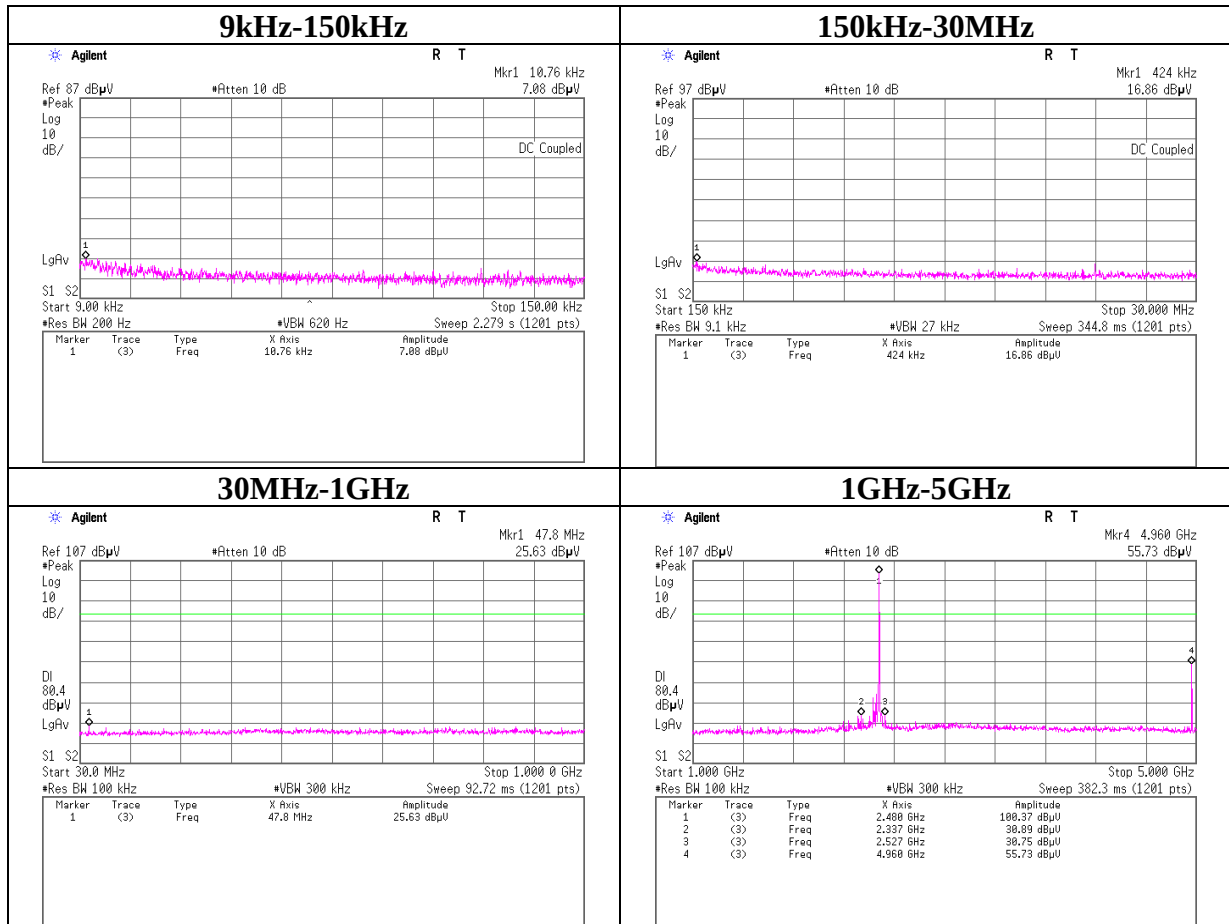
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place : Ise EMC Lab. No.3 Measurement Room
Report No. : 10523242H
Date : 09/10/2014
Temperature/ Humidity : 22deg. C / 56% RH
Engineer : Hiroshi Kukita

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

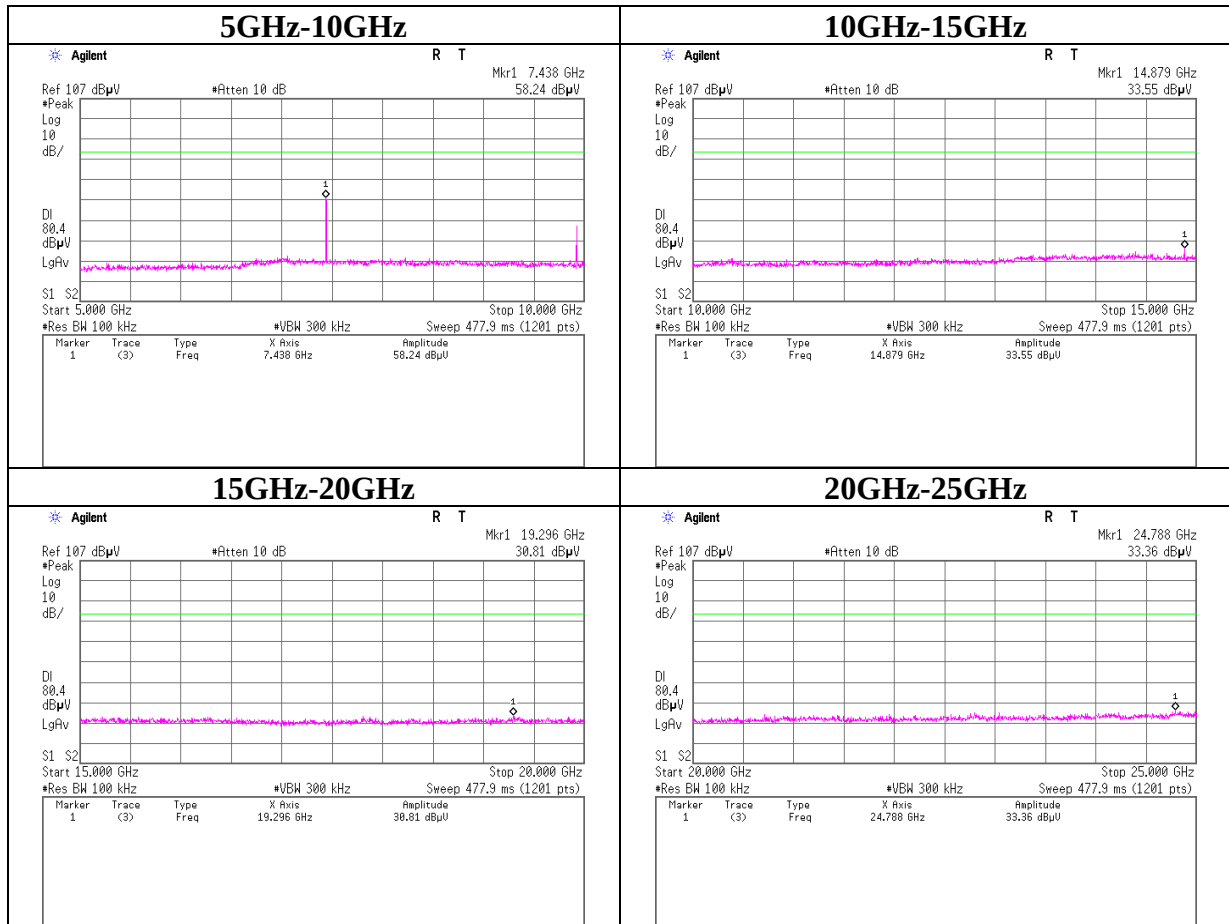
Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place
Report No.
Date
Temperature/ Humidity
Engineer

Ise EMC Lab. No.3 Measurement Room
10523242H
09/10/2014
22deg. C / 56% RH
Hiroshi Kukita

Tx DH5 2480MHz



UL Japan, Inc.

Ise EMC Lab.

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

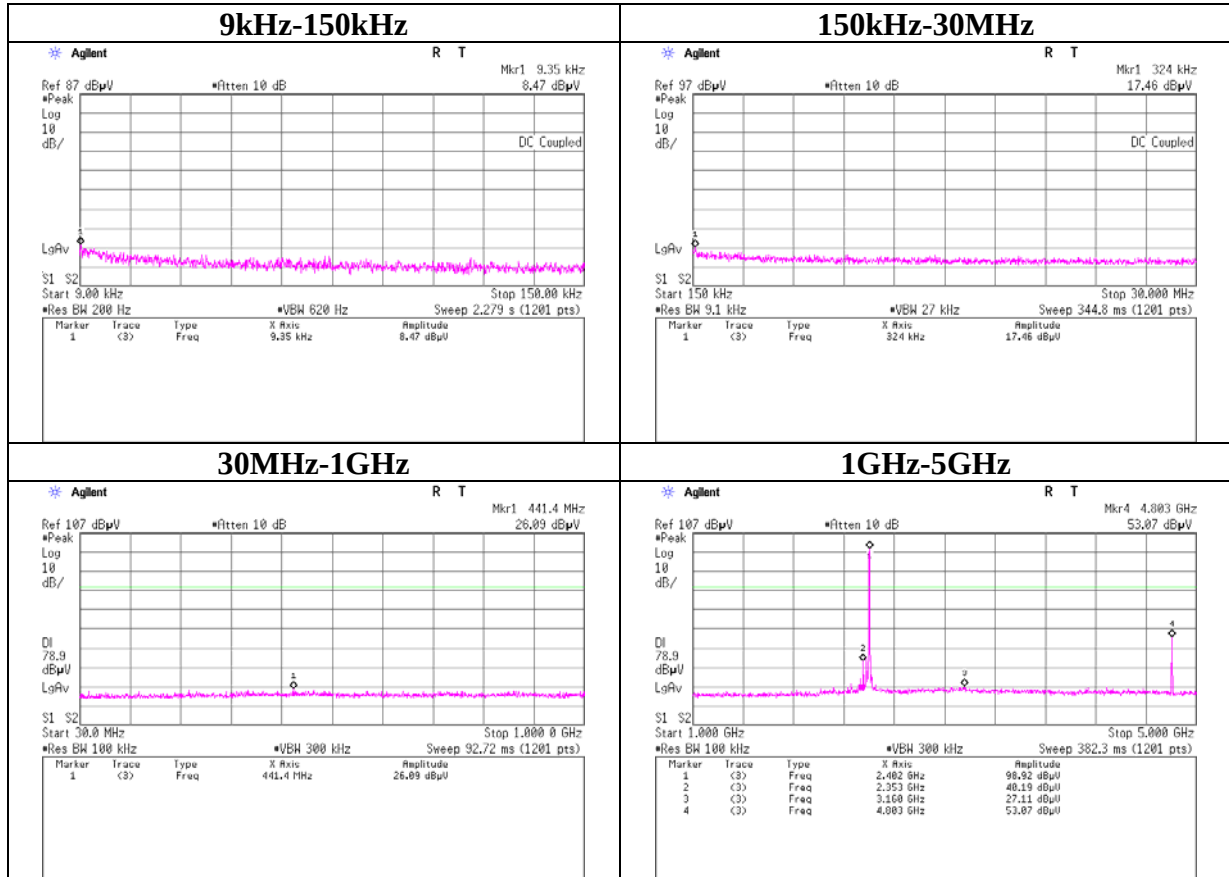
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place : Ise EMC Lab. No.3 Measurement Room
Report No. : 10523242H
Date : 09/10/2014
Temperature/ Humidity : 22deg. C / 56% RH
Engineer : Hiroshi Kukita

Tx 3DH5 2402MHz



UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

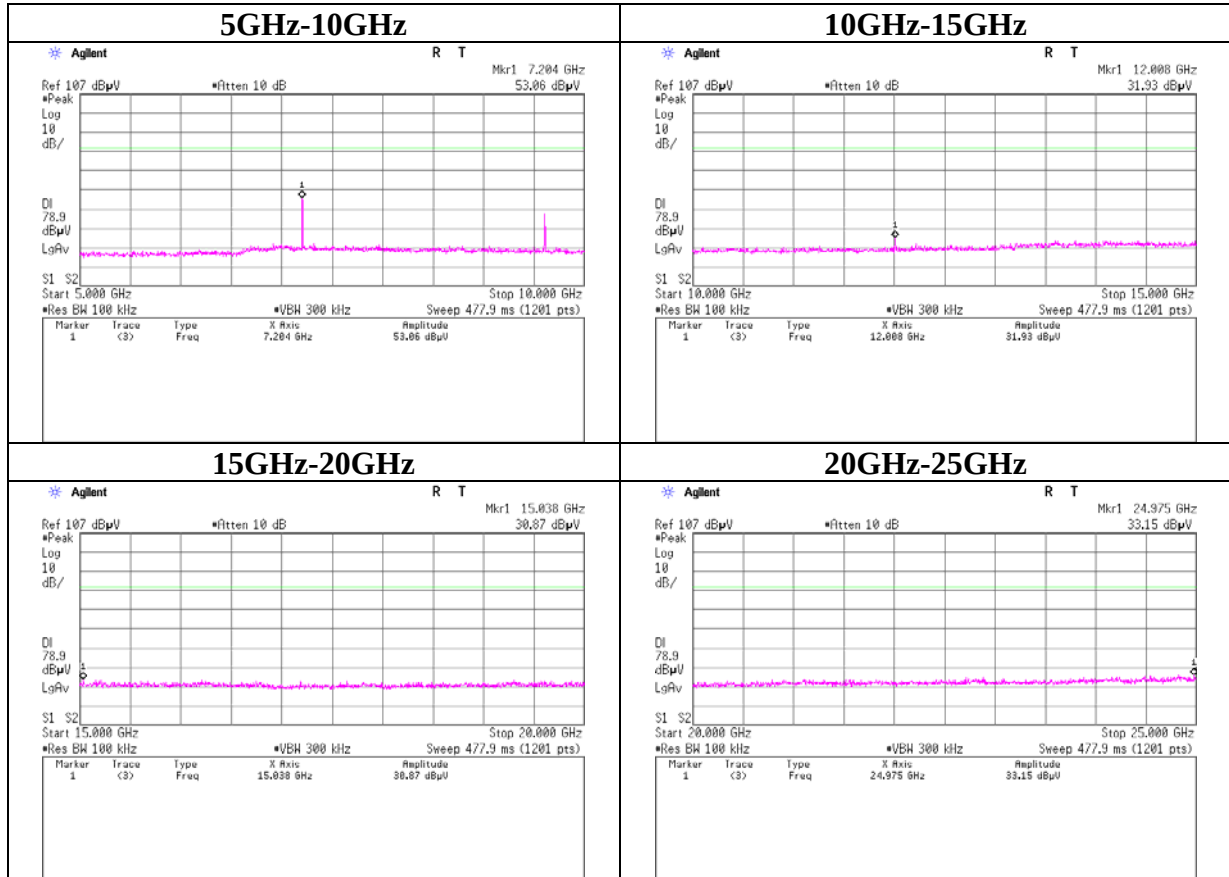
Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place
Report No.
Date
Temperature/ Humidity
Engineer

Ise EMC Lab. No.3 Measurement Room
10523242H
09/10/2014
22deg. C / 56% RH
Hiroshi Kukita

Tx 3DH5 2402MHz



UL Japan, Inc.

Ise EMC Lab.

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

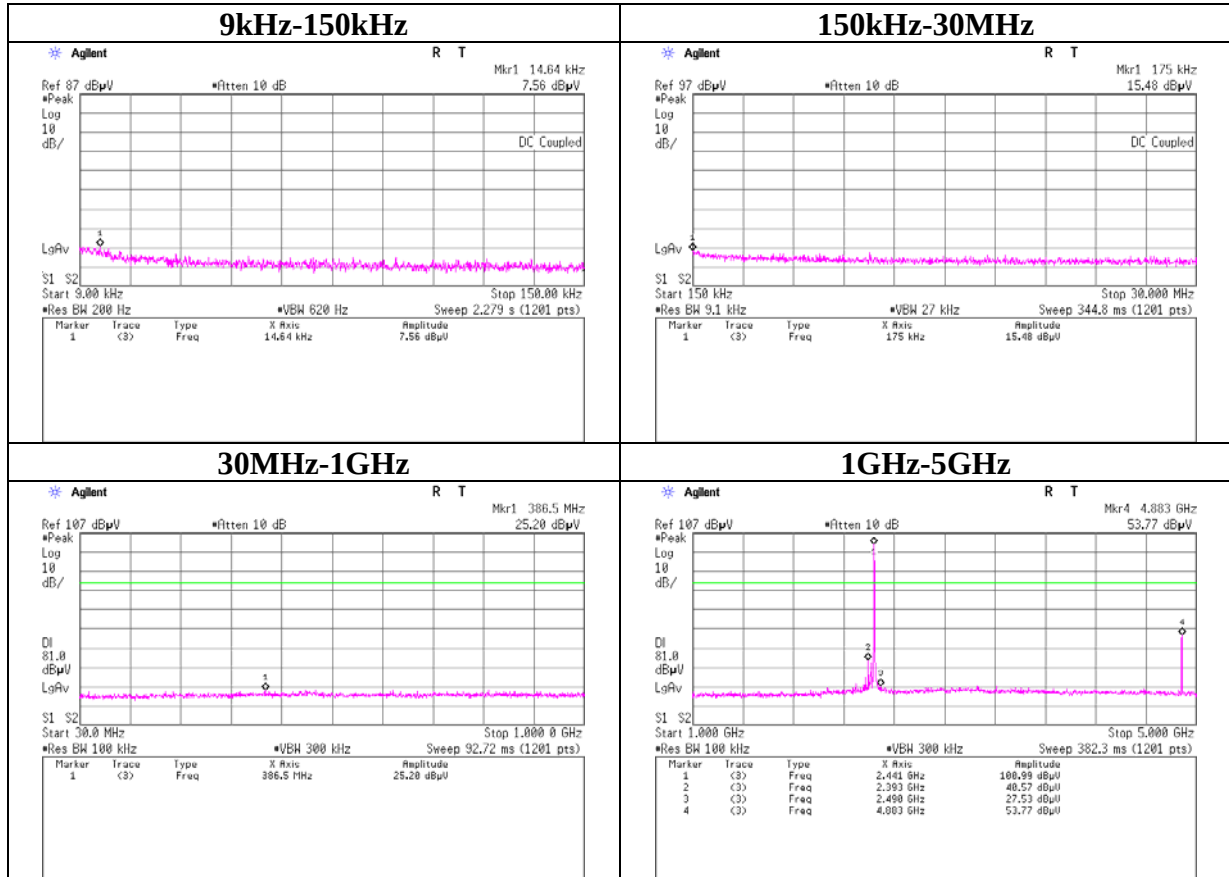
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place : Ise EMC Lab. No.3 Measurement Room
Report No. : 10523242H
Date : 09/10/2014
Temperature/ Humidity : 22deg. C / 56% RH
Engineer : Hiroshi Kukita

Tx 3DH5 2441MHz



UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

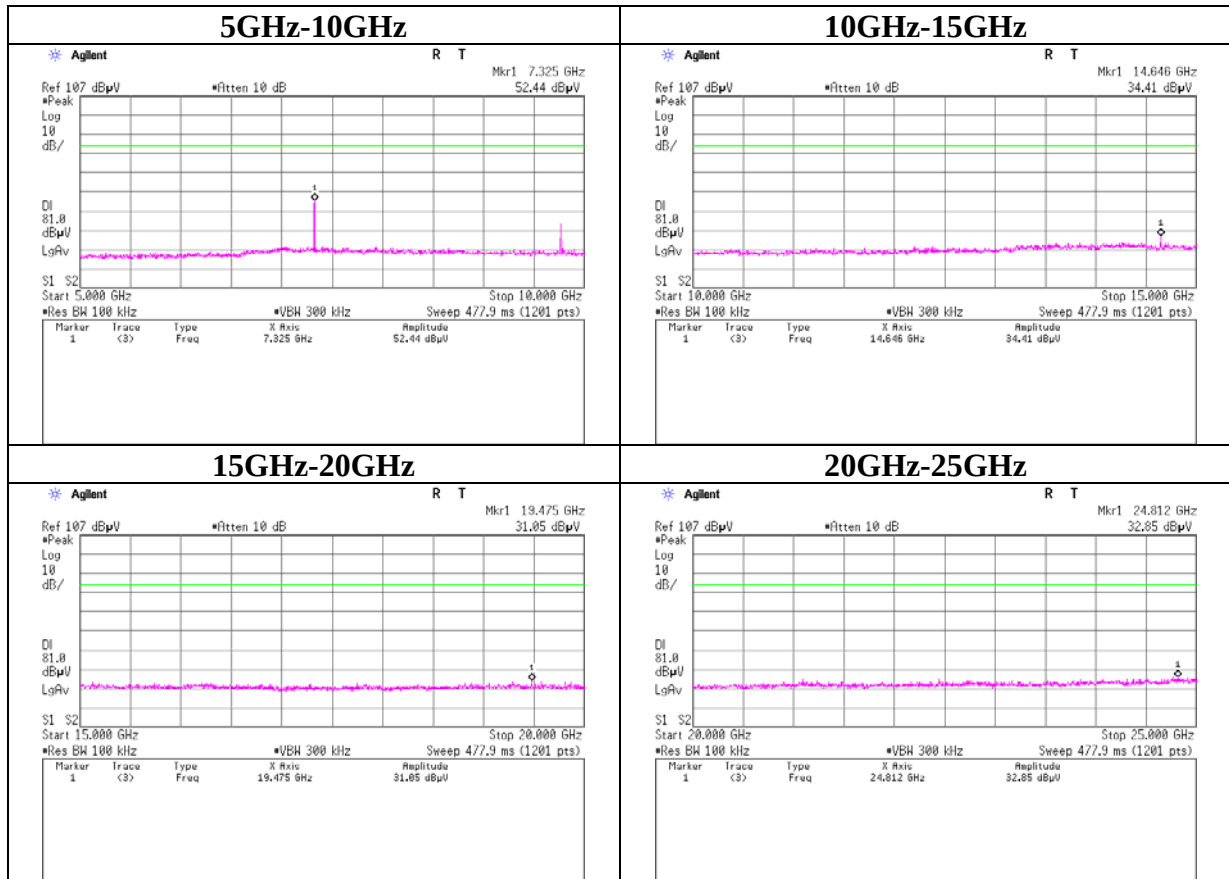
Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place
Report No.
Date
Temperature/ Humidity
Engineer

Ise EMC Lab. No.3 Measurement Room
10523242H
09/10/2014
22deg. C / 56% RH
Hiroshi Kukita

Tx 3DH5 2441MHz



UL Japan, Inc.

Ise EMC Lab.

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

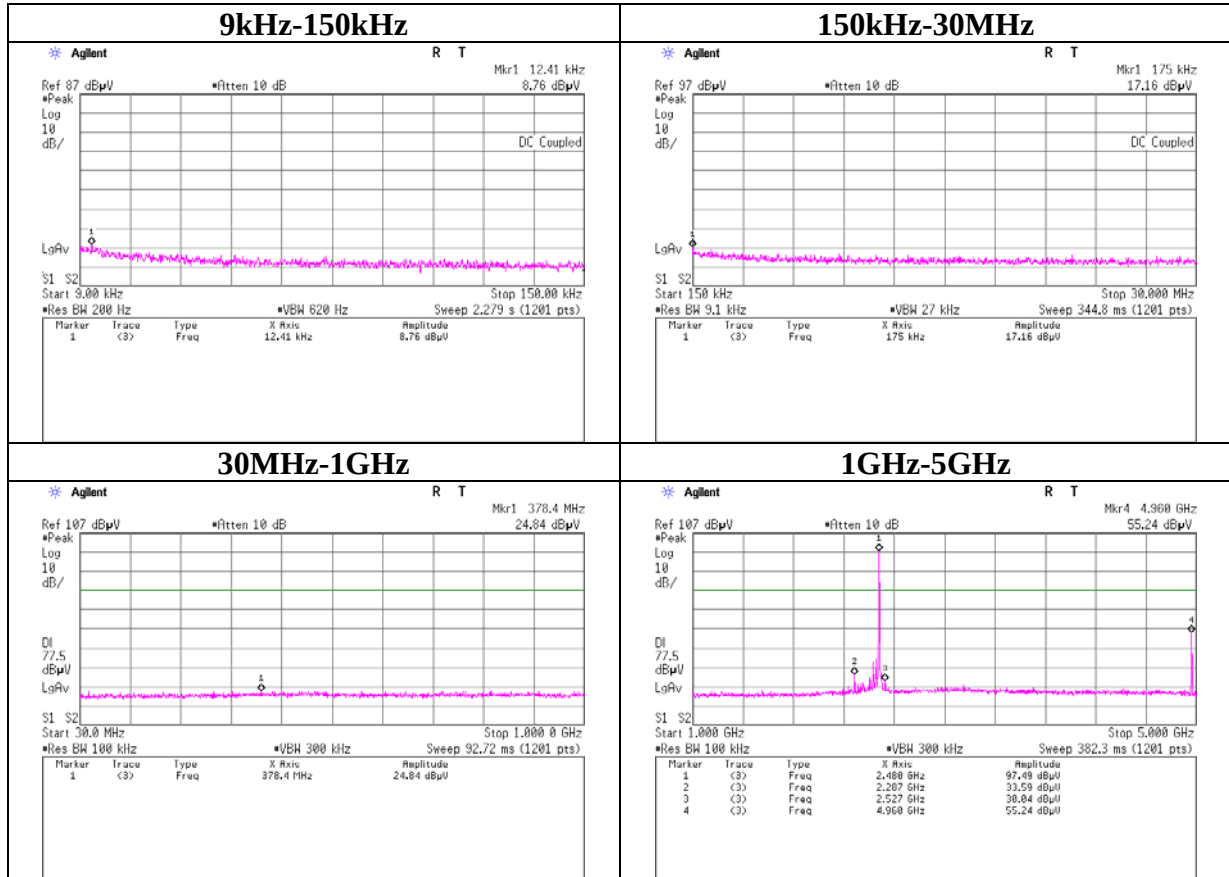
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place Ise EMC Lab. No.3 Measurement Room
Report No. 10523242H
Date 09/10/2014
Temperature/ Humidity 22deg. C / 56% RH
Engineer Hiroshi Kukita

Tx 3DH5 2480MHz



UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

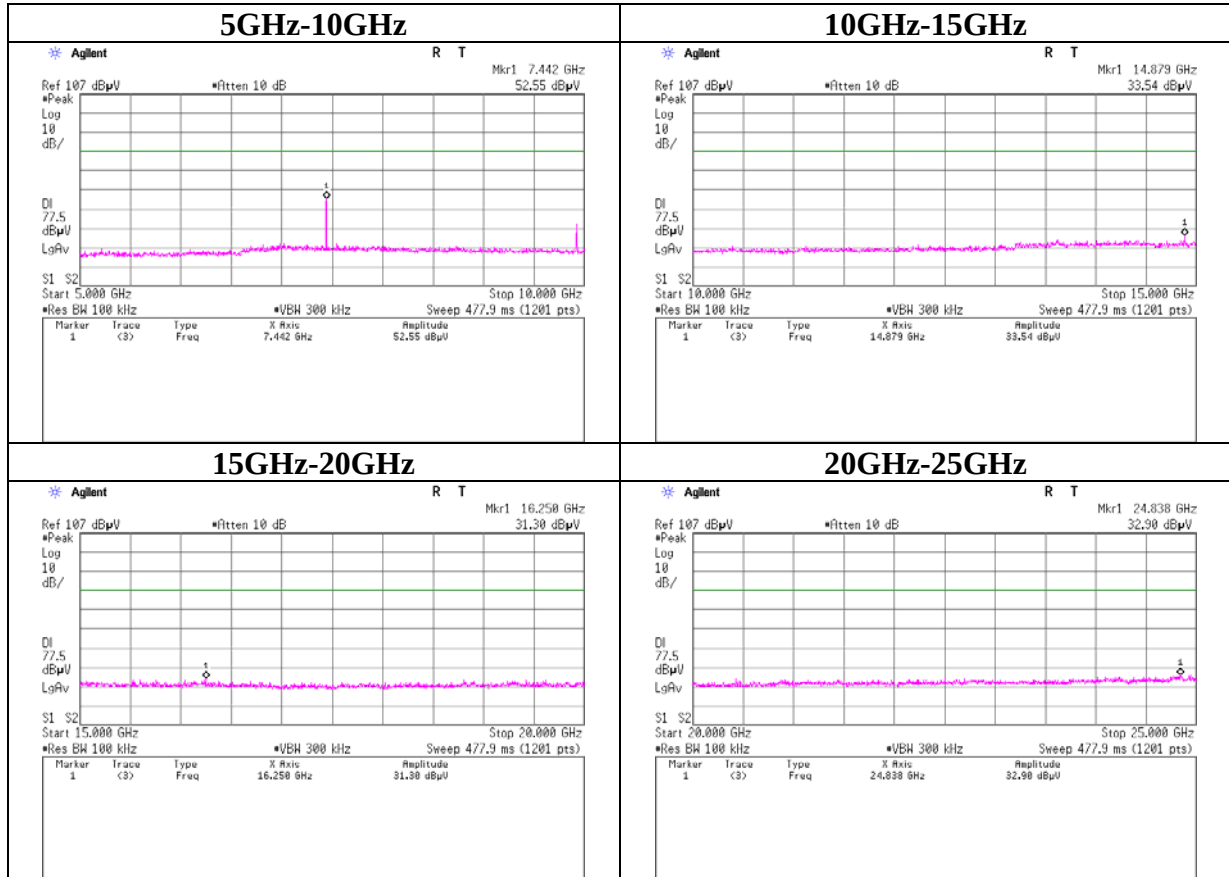
Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place
Report No.
Date
Temperature/ Humidity
Engineer

Ise EMC Lab. No.3 Measurement Room
10523242H
09/10/2014
22deg. C / 56% RH
Hiroshi Kukita

Tx 3DH5 2480MHz



UL Japan, Inc.

Ise EMC Lab.

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

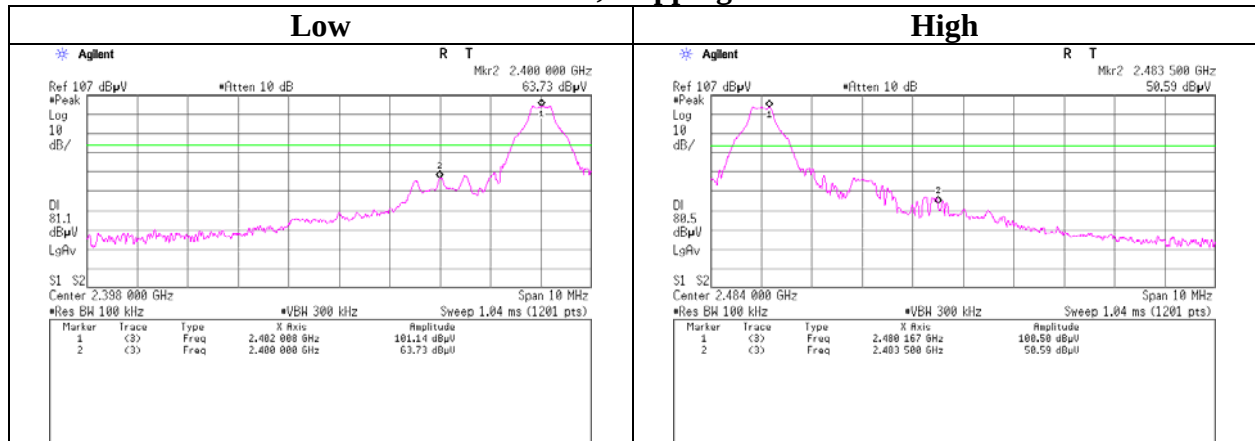
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

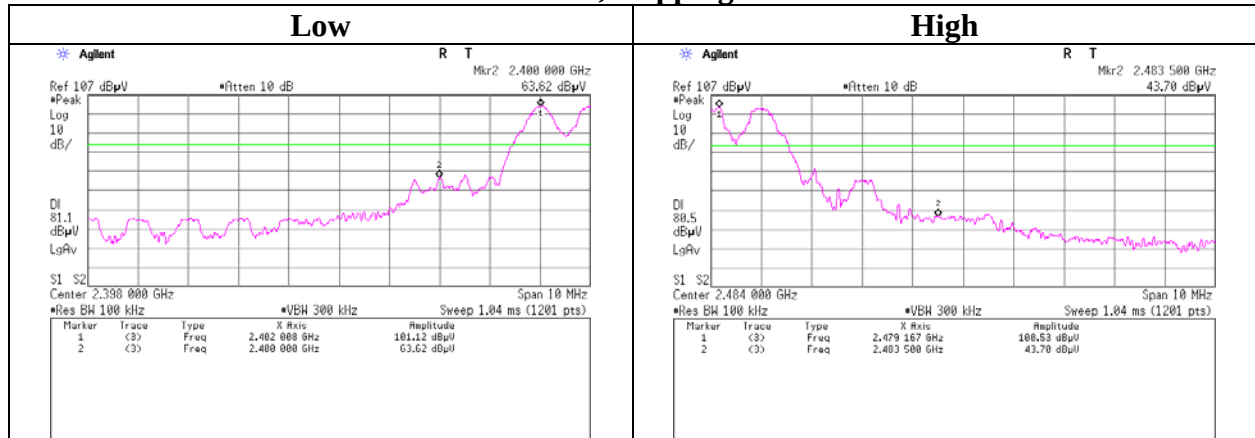
Conducted Emission Band Edge compliance

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	10523242H
Date	09/10/2014
Temperature/ Humidity	22deg. C / 56% RH
Engineer	Hiroshi Kukita

Tx DH5, Hopping off



Tx DH5, Hopping on



UL Japan, Inc.

Ise EMC Lab.

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

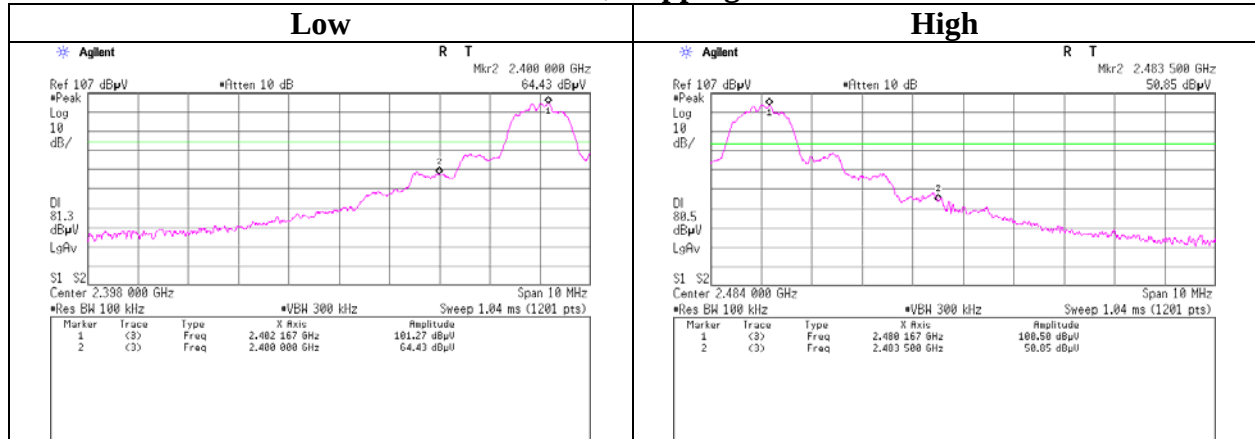
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

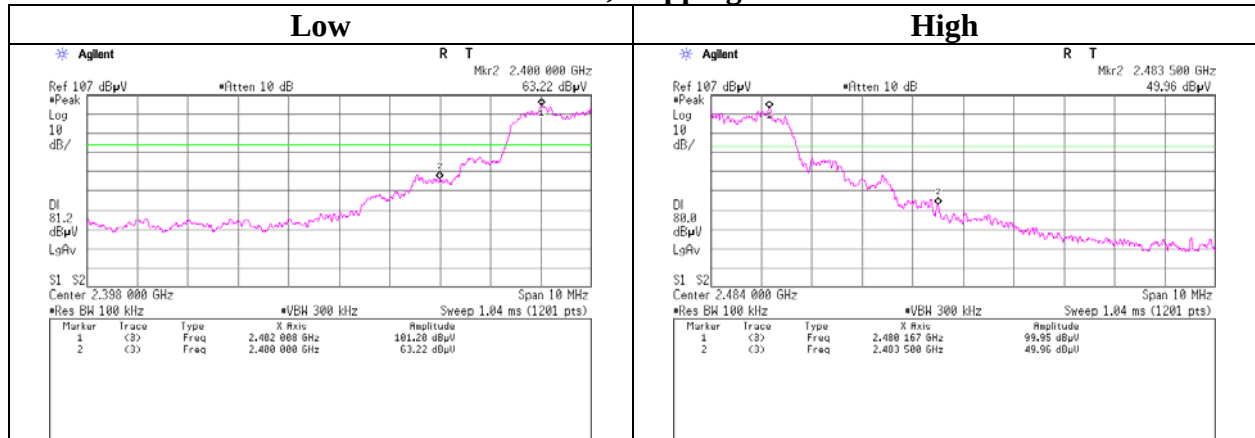
Conducted Emission Band Edge compliance

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	10523242H
Date	09/10/2014
Temperature/ Humidity	22deg. C / 56% RH
Engineer	Hiroshi Kukita

Tx 3DH5, Hopping off



Tx 3DH5, Hopping on



UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

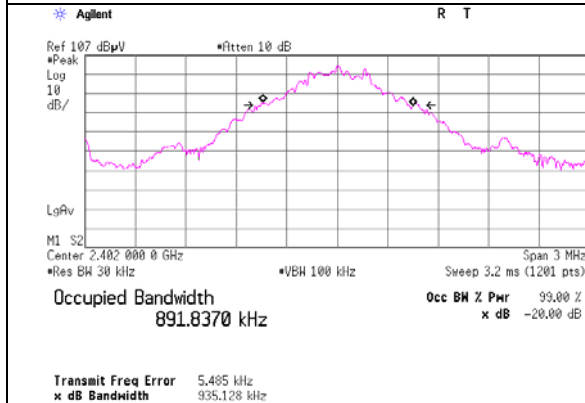
Facsimile : +81 596 24 8124

99%Occupied Bandwidth

Test place : Ise EMC Lab. No.3 Measurement Room
Report No. : 10523242H
Date : 09/10/2014
Temperature/ Humidity : 22deg. C / 56% RH
Engineer : Hiroshi Kukita

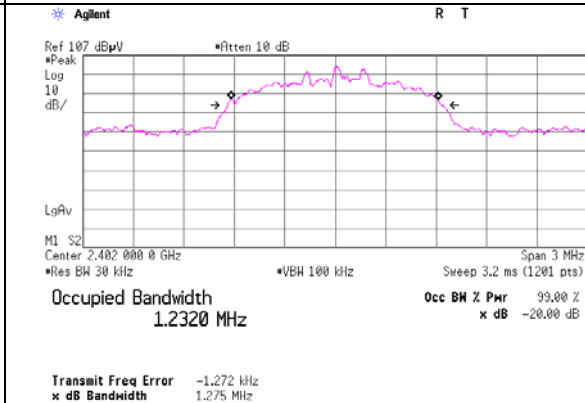
Tx DH5, Hopping off

2402MHz

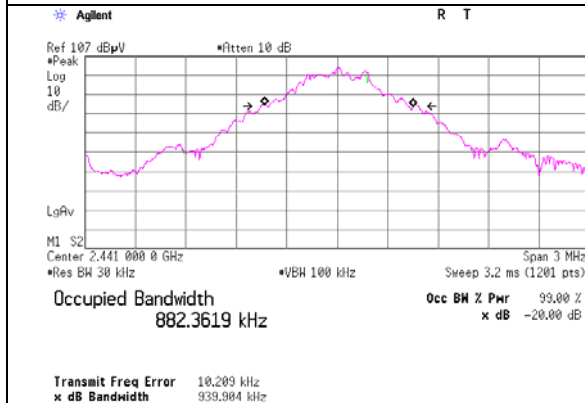


Tx 3DH5, Hopping off

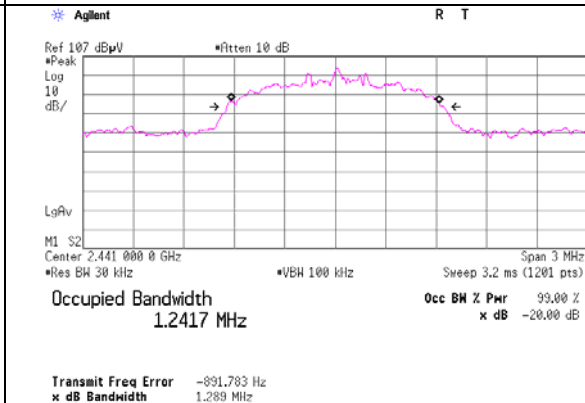
2402MHz



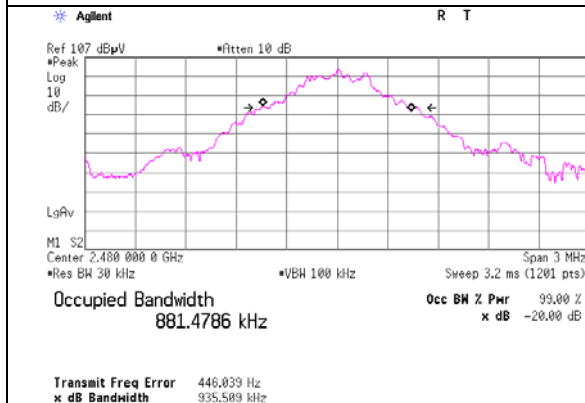
2441MHz



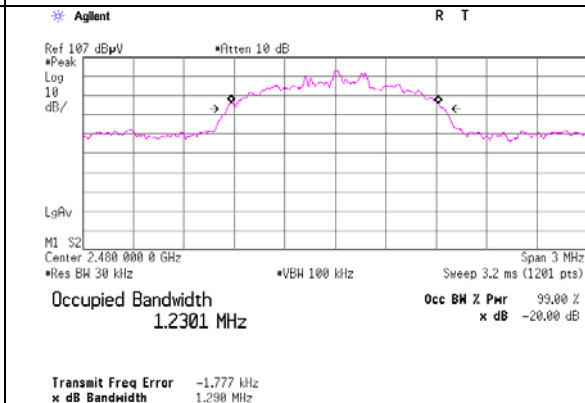
2441MHz



2480MHz



2480MHz



UL Japan, Inc.

Ise EMC Lab.

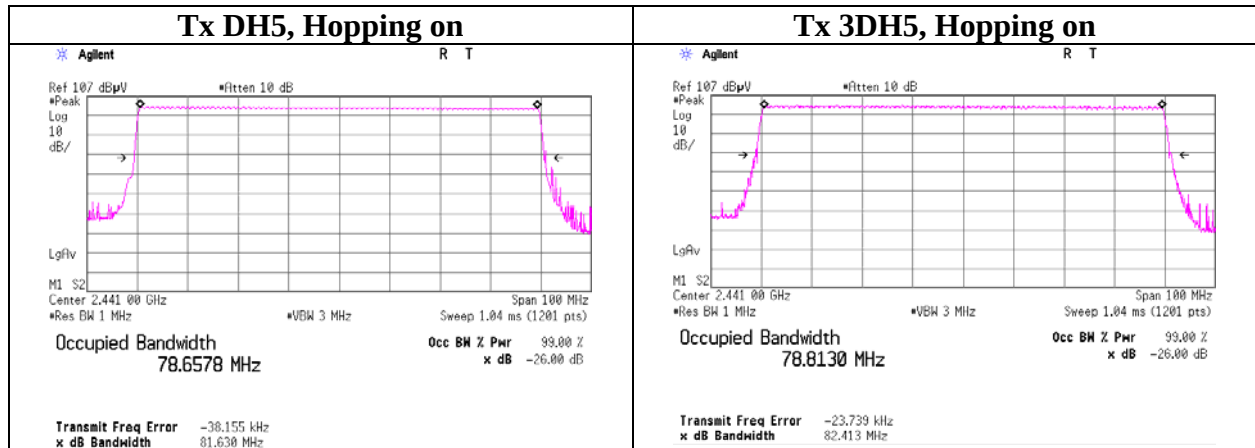
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

99% Occupied Bandwidth

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	10523242H
Date	09/10/2014
Temperature/ Humidity	22deg. C / 56% RH
Engineer	Hiroshi Kukita
Mode	Tx (Hopping on) DH5



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

APPENDIX 2: Test instruments

[Tested date: September 8 to 10, 2014]

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE/CE	2014/06/25 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE/CE	2014/02/20 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE/CE	2014/02/20 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2014/02/21 * 12
MCC-166	Microwave Cable	Junkosha	MWX221	1303S120(1m) / 1311S167(5m)	RE	2013/11/27 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2014/01/21 * 12
MHF-26	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	002	RE	2013/09/01 * 12
MHF-02	High Pass Filter	Tokimec	TF323DCA	-	RE	
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE/CE	2014/06/03 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2013/10/13 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2013/10/13 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2014/02/20 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2013/11/26 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2013/09/12 * 12
MLS-23	LISN(AMN)	Schwarzbeck	NSLK8127	8127-729	CE	2014/07/10 * 12
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/5D-2W(5m)/5D-2W(0.8m)/5D-2W(1m)	-	CE	2014/02/20 * 12
MAT-65	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2014/01/29 * 12
MSA-13	Spectrum Analyzer	Agilent	E4440A	MY46185823	AT	2014/06/06 * 12
MPM-13	Power Meter	Anritsu	ML2495A	0824014	AT	2013/11/15 * 12
MPSE-18	Power sensor	Anritsu	MA2411B	0738174	AT	2013/11/15 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2014/03/13 * 12
MCC-67	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28635/2	AT	2014/04/14 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	AT	2014/02/20 * 12
MBM-14	Barometer	Sunoh	SBR121	1051	AT	2012/07/11 * 36

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

[Tested date: October 16, 2014]

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	2014/02/27 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2014/02/20 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MRENT-116	Spectrum Analyzer	Agilent	E4440A	MY46187620	RE	2014/03/05 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2014/08/19 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2013/10/13 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2013/10/13 * 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	2014/03/14 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2014/05/26 * 12
MCC-166	Microwave Cable	Junkosha	MWX221	1303S120(1m) / 1311S167(5m)	RE	2014/09/24 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2014/03/24 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2014/06/11 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2014/09/22 * 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

RE: Radiated Emission

AT: Antenna Terminal Conducted test

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