



# RADIO TEST REPORT

**Test Report No. : 10022574H-B-R1**

**Applicant** : Sony Computer Entertainment Inc.  
**Type of Equipment** : Computer Entertainment System  
**Model No.** : CUH-1001A  
**FCC ID** : AK8CUH100C1  
**Test regulation** : FCC Part 15 Subpart C: 2013  
\*Bluetooth (BDR/EDR) Part  
**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 report is a revised version of 10022574H-B. 10022574H-B is replaced with this report.

**Date of test:** June 5 to July 18, 2013

**Representative test engineer:**

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UL Verification Service

**Approved by:**

*M. Nishiyama*

Masanori Nishiyama  
Manager of WiSE Japan,  
UL Verification Service



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>

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13-EM-F0429

**REVISION HISTORY**

**Original Test Report No.: 10022574H-B**

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10022574H-B	July 17, 2013	-	-
1	10022574H-B-R1	July 18, 2013	4	Correction of the word: “electrical ratings” to “rating label” in Note *1 of Section 2.2
1	10022574H-B-R1	July 18, 2013	6	Addition of the statement on FCC 15B compliance
1	10022574H-B-R1	July 18, 2013	20	Carrier Frequency Separation (3DH5) data was taken and replaced the original ones.

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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-1001A
Serial No	20689DD2A5A3 for Antenna Terminal Conducted test 1500008 for Conducted Emission and Radiated Emission tests
Country of Manufacture	China/Japan
Receipt Date of Sample	June 3, 2013
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-1001A is the Computer Entertainment System. .

List of Model No.:

Model No.	Product Name	Note
CUH-1001A	Computer Entertainment System	Tested model
DUH-T1000AA	Test Kit (for PlayStation®4)	*1

Note:

\*1: Model DUH-T1000AA is identical to Model CUH-1001A except for rating label, software, and accessories. The difference between CUH-1001A and DUH-T1000AA does not influence on radio specification.

### **Product Specification**

Maximum clock frequency in the system	2.75GHz
Operating Temperature	5-35 deg. C
Power Supply	AC100-240V, 50Hz/60Hz
Size	275 x 53x 305 mm
Weight	Approx. 2.8kg

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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	20MHz & 5MHz
Method of frequency generation	Synthesizer
Power Supply (inner)	DC3.3V/1.8V
Antenna Type	PIFA (Antenna A/B)
Antenna Gain: G <sub>ANT</sub>	3.0dBi (Antenna A/B)
Directional Gain	6.01dBi (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	1MHz & 1MHz
Method of frequency generation	Synthesizer
Power Supply (inner)	DC3.3V/1.8V
Antenna Type	PIFA
Antenna Gain	4.5 dBi (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)	DC3.3V/1.8V
Antenna Type	PIFA
Antenna Gain	4.5 dBi (peak)

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## **SECTION 3: Test specification, procedures & results**

### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart C: 2013, final revised on June 11, 2013 and effective July 11, 2013

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 June 11, 2013 does not affect the test specification applied to the EUT.

\*The EUT complies with FCC Part 15 Subpart B: 2013, final revised on June 11, 2013 and effective July 11, 2013.

### **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 17.6dB, 4.04029MHz, L AV 19.9dB 0.36263MHz, N 0.36335MHz, 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 *1)	Conducted	
20dB Bandwidth	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) IC: RSS-210 A8.1 (a)		Complied *1)	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 *1)	Conducted	
Dwell time	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) IC: RSS-210 A8.1 (d)		Complied *1)	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 *1)	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		1.0dB 7323.000MHz, AV, Vert.	Complied *1) for Conducted only	Conducted/ Radiated

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

\*1) The test data in UL Japan Report No. 10017505H-B was used in this report, as the embedded radio module is same as the one in the EUT of the above report.

\* In case any questions arise about test procedure, ANSI C63.4: 2003 is also referred.

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**FCC 15.31 (e)**

This EUT provides stable voltage(DC3.3/1.8V) 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.

**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	3.6dB
No.3	3.6dB
No.4	3.6dB

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	5.0dB	5.1dB	4.9dB	5.8dB	4.4dB	4.3dB
No.2	4.3dB	5.2dB	5.1dB	5.0dB	5.7dB	4.3dB	4.2dB
No.3	4.6dB	5.0dB	5.1dB	5.0dB	5.7dB	4.5dB	4.2dB
No.4	4.8dB	5.2dB	5.0dB	5.0dB	5.7dB	5.2dB	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.

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### 3.5 Test Location

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	FCC Registration Number	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	313583	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	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	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	134570	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	4.75 x 5.4 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	-	-	8.8 x 4.6 x 2.8m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

\* 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.

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## **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)

<b>Test Item</b>	<b>Mode</b>	<b>Tested frequency</b>
Conducted Emission Spurious Emission (Conducted/Radiated)	Tx (Hopping off) DH5, 3DH5	2402MHz 2441MHz 2480MHz
20dB Bandwidth Maximum Peak Output Power	Tx (Hopping off) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Number of Hopping Frequency Carrier Frequency Separation	Tx (Hopping on) DH5, 3DH5 Inquiry	-
Dwell time	Tx (Hopping on), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5 Inquiry	-
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)  *EUT has the power settings by the software as follows;  Power settings: Same as production model  Software: CPro_DOS_Labtool_Ver1.0.8.24  *This setting of software is the worst case.  Any conditions under the normal use do not exceed the condition of setting.  In addition, end users cannot change the settings of the output power of the product.</p>		

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## 4.2 Configuration and peripherals

**This page has been submitted for a separate exhibit.**

## **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	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(T/R)	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 10Hz *1)	RBW: 100kHz VBW: 300kHz (S/A)
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-26.5GHz  
**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.

<b>Test</b>	<b>Span</b>	<b>RBW</b>	<b>VBW</b>	<b>Sweep time</b>	<b>Detector</b>	<b>Trace</b>	<b>Instrument used</b>
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	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	5MHz, 3MHz	100kHz, 30kHz	300kHz, 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	Max Hold	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)

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

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

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**APPENDIX 1: Data of EMI test**

**Conducted Emission**

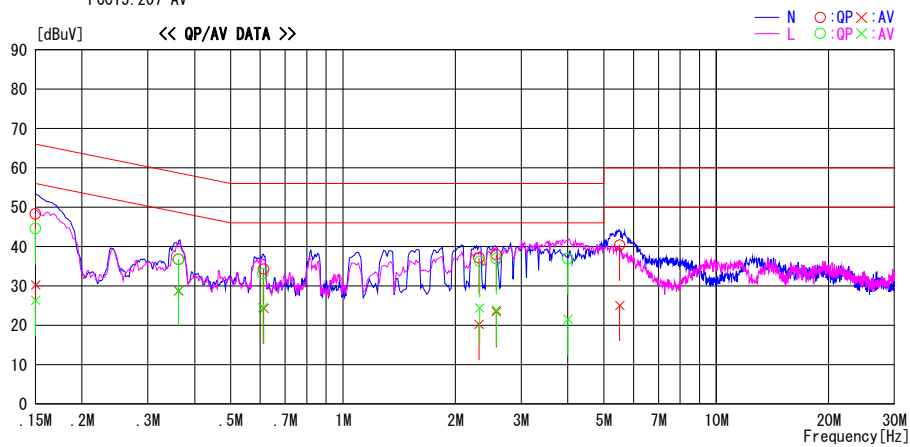
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No. 3 Semi Anechoic Chamber  
 Date : 2013/06/21

Report No. : 10022574H  
 Power : AC120V / 60Hz  
 Temp./Humi. : 23deg. C / 66% RH  
 Engineer : Takumi Shimada

Mode / Remarks : BT DH5 2441MHz

LIMIT : FCC15. 207 QP  
 FCC15. 207 AV

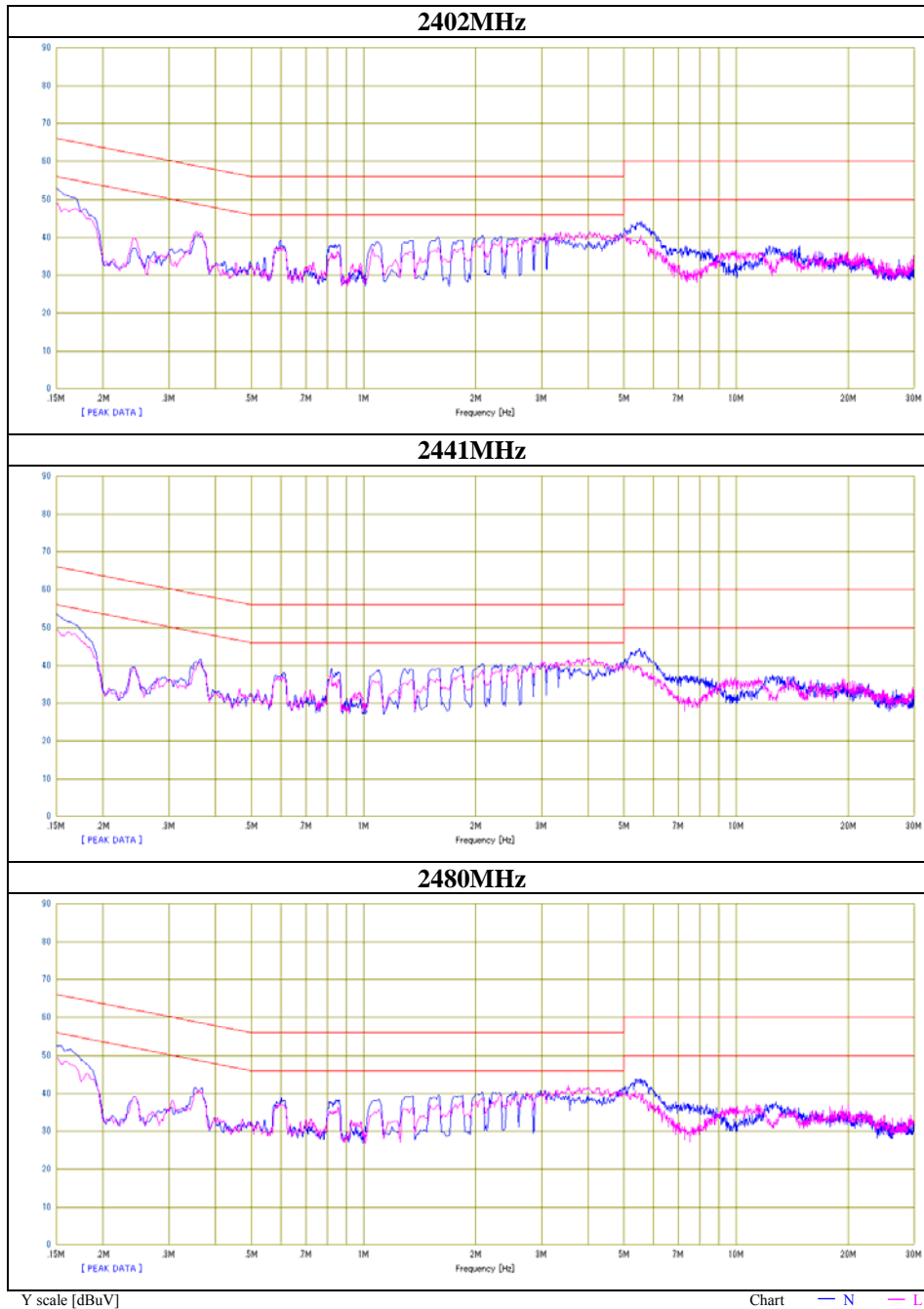


Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	35.1	17.0	13.2	48.3	30.2	66.0	56.0	17.7	25.8	N	
0.36263	23.4	15.5	13.3	36.7	28.8	58.7	48.7	22.0	19.9	N	
0.61348	21.0	11.0	13.3	34.3	24.3	56.0	46.0	21.7	21.7	N	
2.31145	23.6	6.7	13.5	37.1	20.2	56.0	46.0	18.9	25.8	N	
2.57465	24.4	10.0	13.5	37.9	23.5	56.0	46.0	18.1	22.5	N	
5.50790	26.7	11.4	13.7	40.4	25.1	60.0	50.0	19.6	24.9	N	
0.15000	31.4	13.1	13.2	44.6	26.3	66.0	56.0	21.4	29.7	L	
0.36247	23.4	15.4	13.3	36.7	28.7	58.7	48.7	22.0	20.0	L	
0.60967	19.8	11.2	13.3	33.1	24.5	56.0	46.0	22.9	21.5	L	
2.32299	22.7	10.9	13.5	36.2	24.4	56.0	46.0	19.8	21.6	L	
2.57499	23.4	10.4	13.5	36.9	23.9	56.0	46.0	19.1	22.1	L	
4.00079	23.2	7.8	13.7	36.9	21.5	56.0	46.0	19.1	24.5	L	

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

## Conducted Emission

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10022574H
Date	06/21/2013
Temperature/ Humidity	23deg. C / 66% RH
Engineer	Takumi Shimada
Mode	Tx DH5



## Conducted Emission

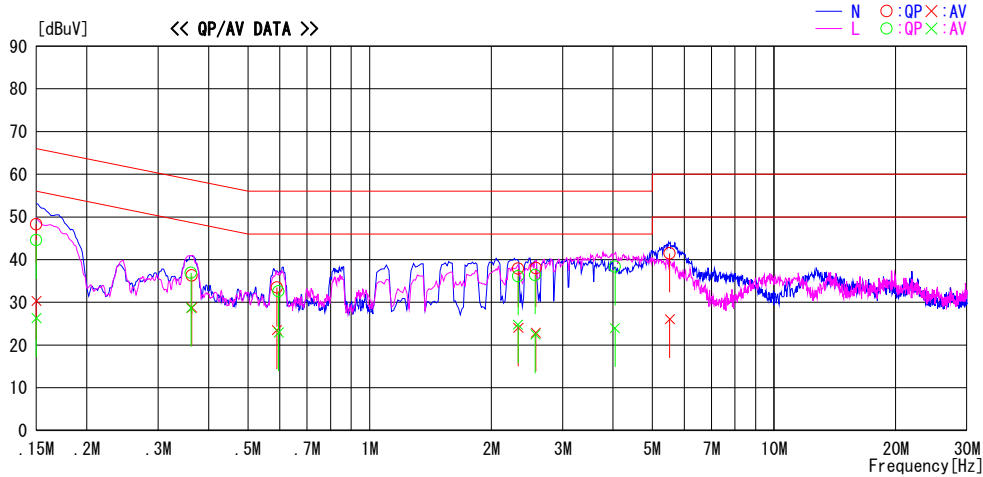
### DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber  
 Date : 2013/06/21

Report No. : 10022574H  
 Power : AC120V / 60Hz  
 Temp./Humi. : 23deg. C / 66% RH  
 Engineer : Takumi Shimada

Mode / Remarks : BT 3DH5 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]		
0.15000	35.1	17.1	13.2	48.3	30.3	66.0	56.0	17.7	25.7	N	
0.36335	23.0	15.5	13.3	36.3	28.8	58.7	48.7	22.4	19.9	N	
0.58974	20.2	10.2	13.3	33.5	23.5	56.0	46.0	22.5	22.5	N	
2.32945	24.4	10.6	13.5	37.9	24.1	56.0	46.0	18.1	21.9	N	
2.57807	24.5	9.4	13.5	38.0	22.9	56.0	46.0	18.0	23.1	N	
5.52406	27.8	12.4	13.7	41.5	26.1	60.0	50.0	18.5	23.9	N	
0.15000	31.4	13.1	13.2	44.6	26.3	66.0	56.0	21.4	29.7	L	
0.36201	23.6	15.4	13.3	36.9	28.7	58.7	48.7	21.8	20.0	L	
0.59618	19.3	9.7	13.3	32.6	23.0	56.0	46.0	23.4	23.0	L	
2.32754	22.6	11.3	13.5	36.1	24.8	56.0	46.0	19.9	21.2	L	
2.56695	22.9	9.0	13.5	36.4	22.5	56.0	46.0	19.6	23.5	L	
4.04029	24.7	10.3	13.7	38.4	24.0	56.0	46.0	17.6	22.0	L	

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

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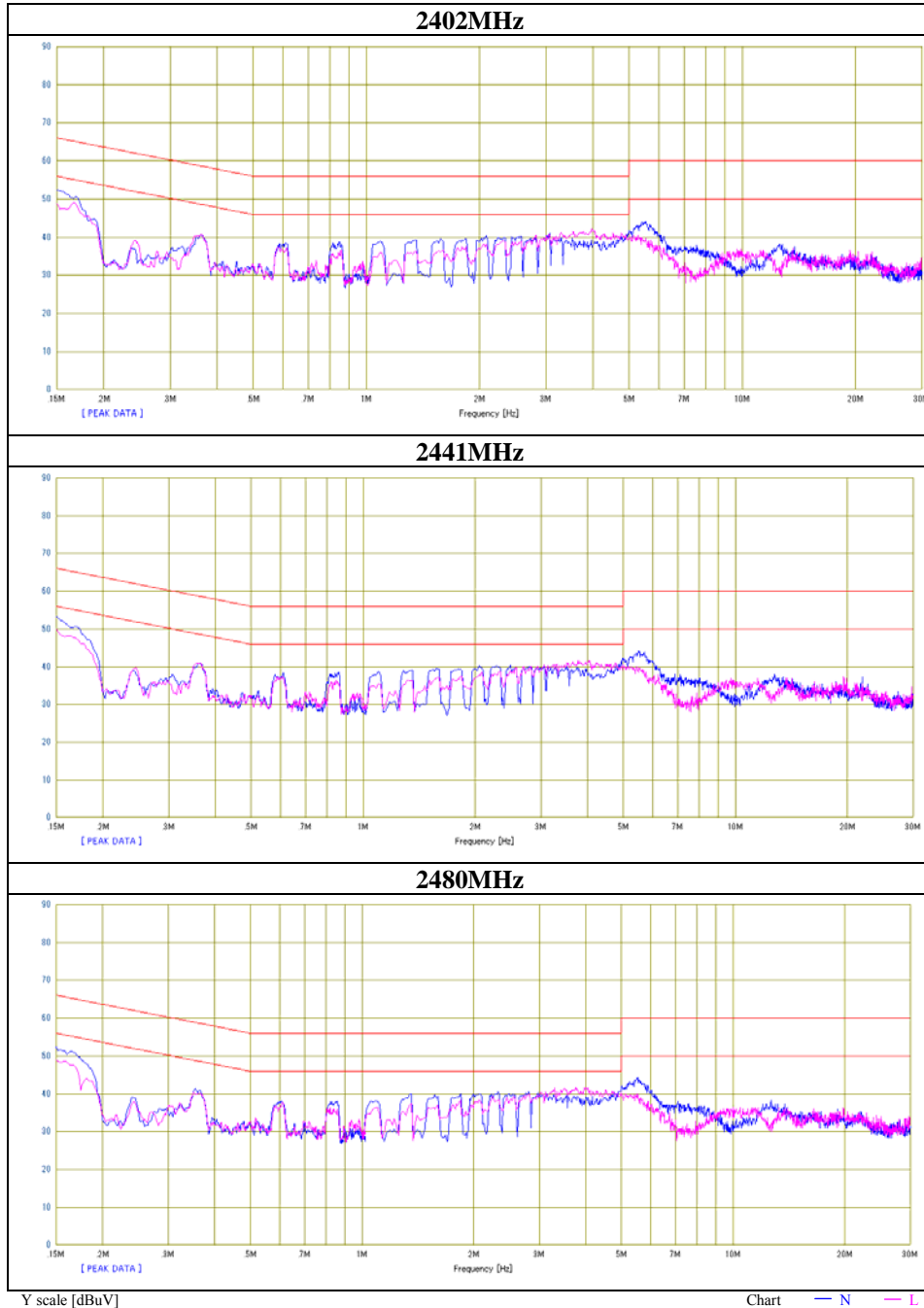
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124



## Conducted Emission

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10022574H
Date	06/21/2013
Temperature/ Humidity	23deg. C / 66% RH
Engineer	Takumi Shimada
Mode	Tx 3DH5



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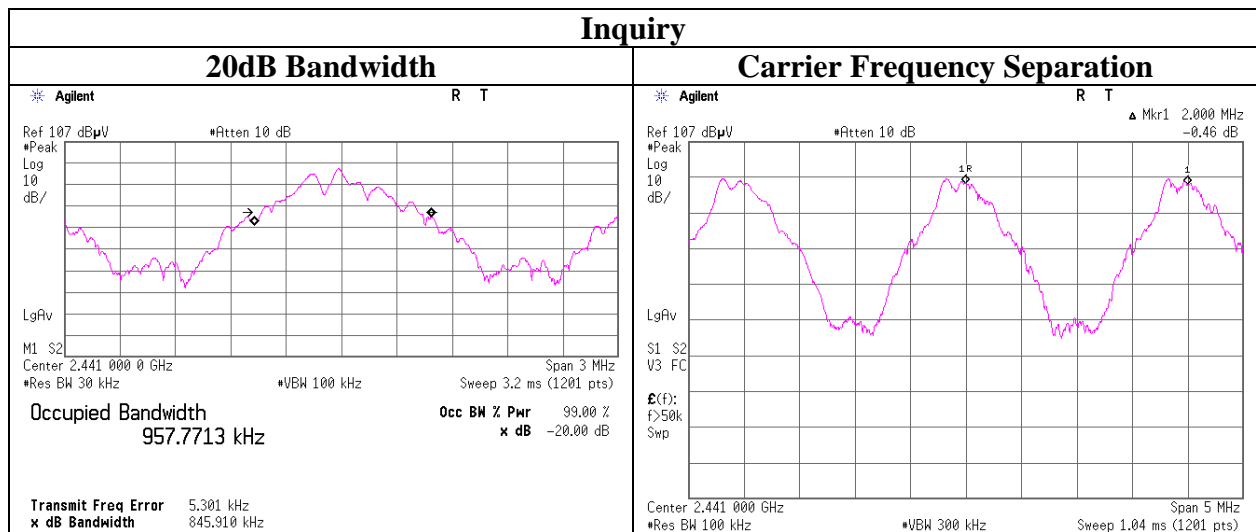
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## 20dB Bandwidth and Carrier Frequency Separation

Test place	Head Office EMC Lab. No.6 Measurement Room	
Report No.	10022574H	
Date	06/06/2013	07/18/2013
Temperature/ Humidity	25 deg. C / 57% RH	25 deg. C / 59% RH
Engineer	Takumi Shimada	Takumi Shimada
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	0.977	1.000	≧ 0.651
DH5	2441.0	0.962	1.000	≧ 0.642
DH5	2480.0	1.027	1.000	≧ 0.685
3DH5	2402.0	1.312	1.000	≧ 0.875
3DH5	2441.0	1.311	1.000	≧ 0.874
3DH5	2480.0	1.320	1.000	≧ 0.880
Inquiry	2441.0	0.846	2.000	≧ 0.564

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



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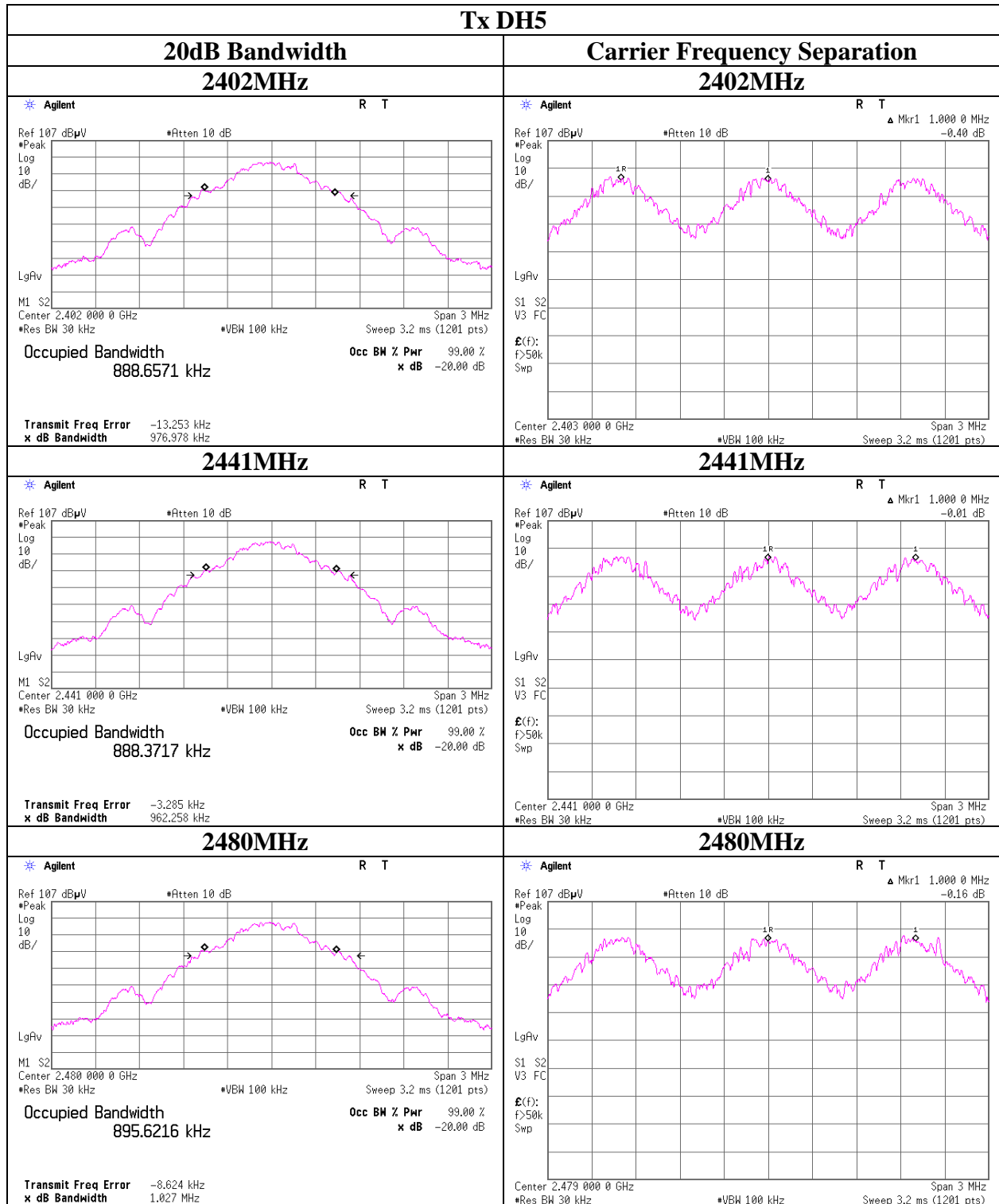
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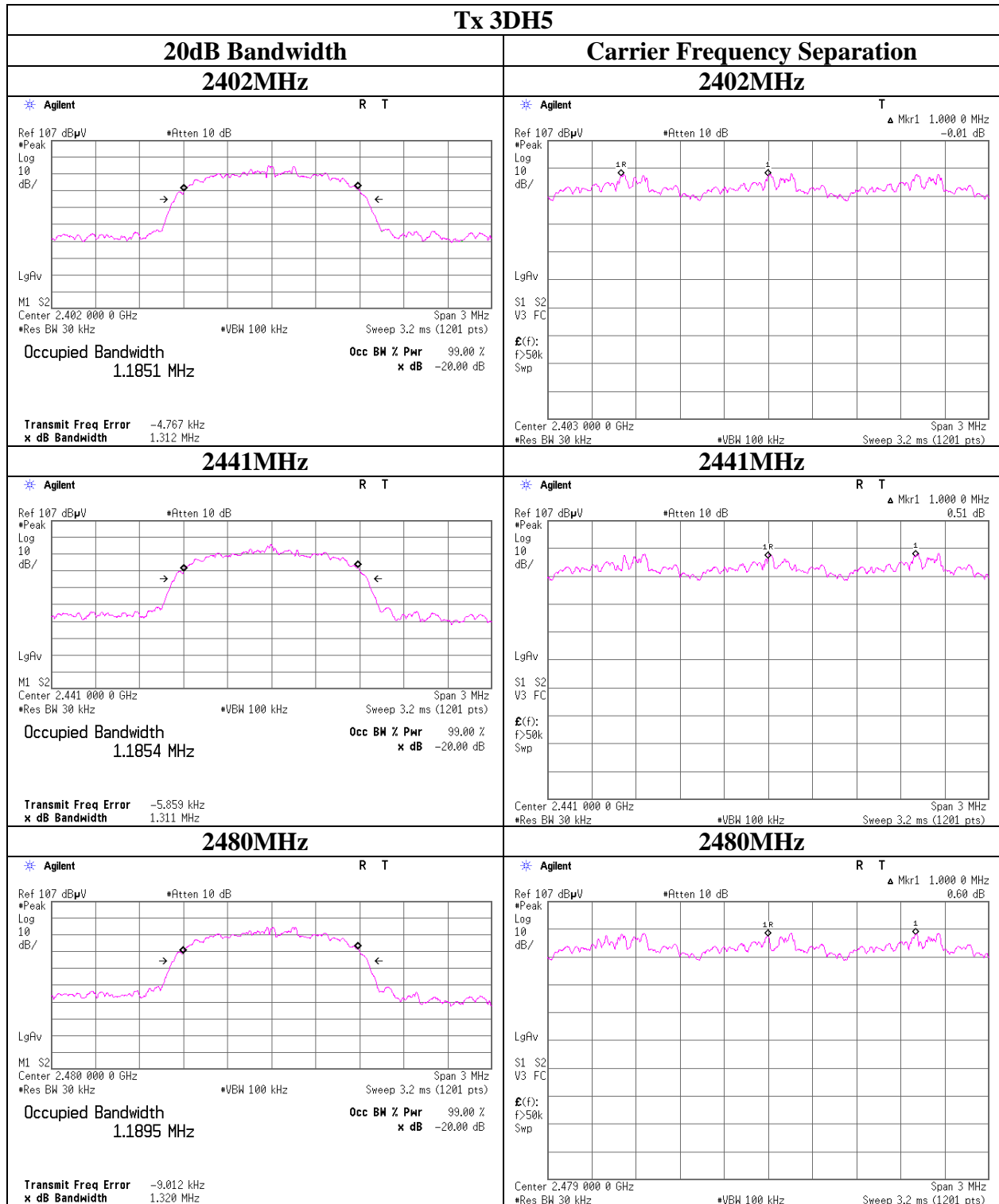
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

## 20dB Bandwidth and Carrier Frequency Separation



## 20dB Bandwidth and Carrier Frequency Separation

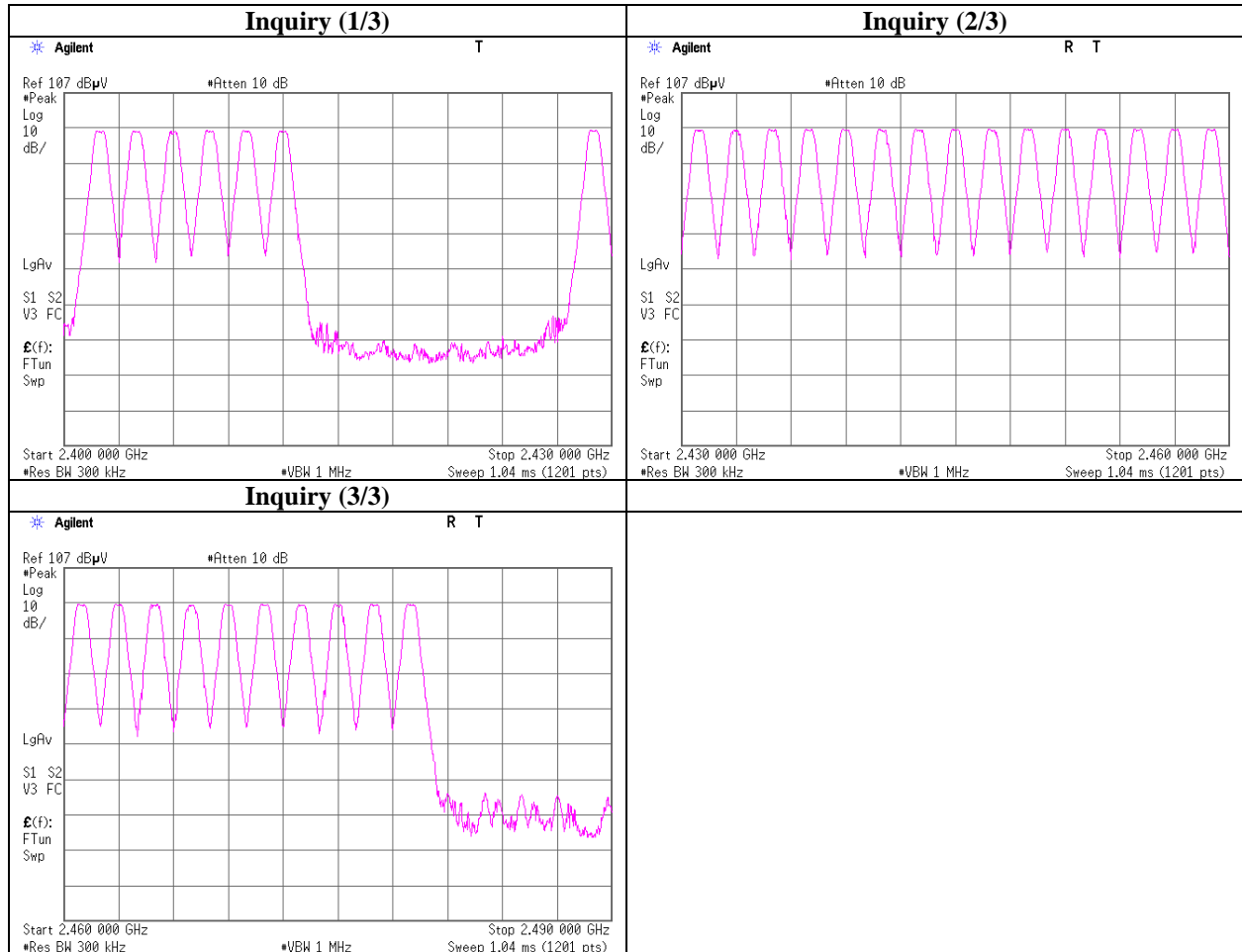


## Number of Hopping Frequency

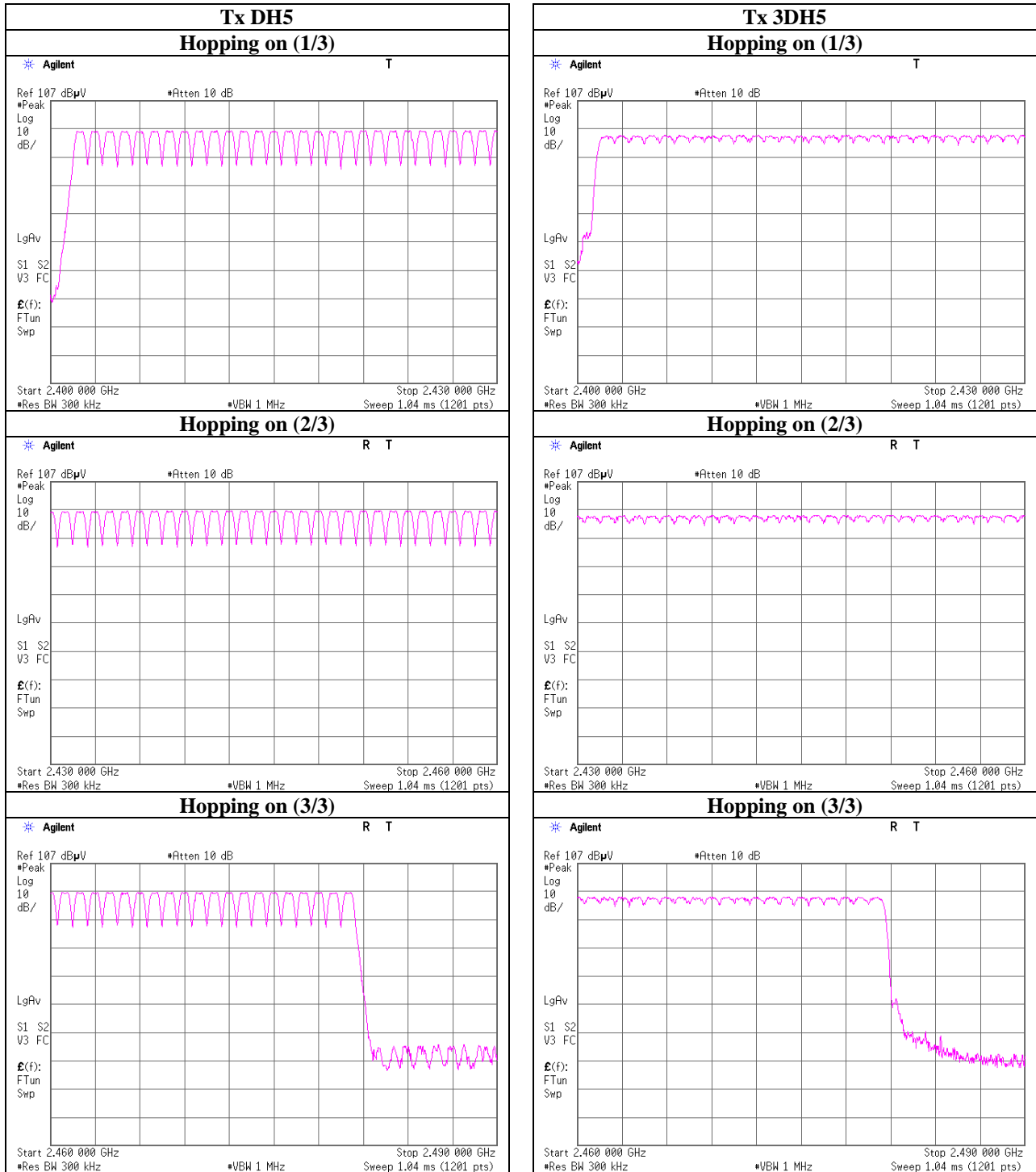
Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	10022574H
Date	06/06/2013
Temperature/ Humidity	25 deg. C / 57% RH
Engineer	Takumi Shimada
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

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	Head Office EMC Lab. No.6 Measurement Room
Report No.	10022574H
Date	06/06/2013
Temperature/ Humidity	25 deg. C / 57% RH
Engineer	Takumi Shimada
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	0.402	125	400
DH3	24.6 times / 5 sec. x 31.6 sec. = 156 times	1.659	259	400
DH5	16.6 times / 5 sec. x 31.6 sec. = 105 times	2.927	307	400
3DH1	50.4 times / 5 sec. x 31.6 sec. = 319 times	0.407	130	400
3DH3	26.0 times / 5 sec. x 31.6 sec. = 165 times	1.672	276	400
3DH5	17.6 times / 5 sec. x 31.6 sec. = 112 times	2.927	328	400
Inquiry	100.0 times / 1 sec. x 12.8 sec. = 1280 times	0.104	133	400

Sample Calculation

Result = Number of transmission x Length of transmission time

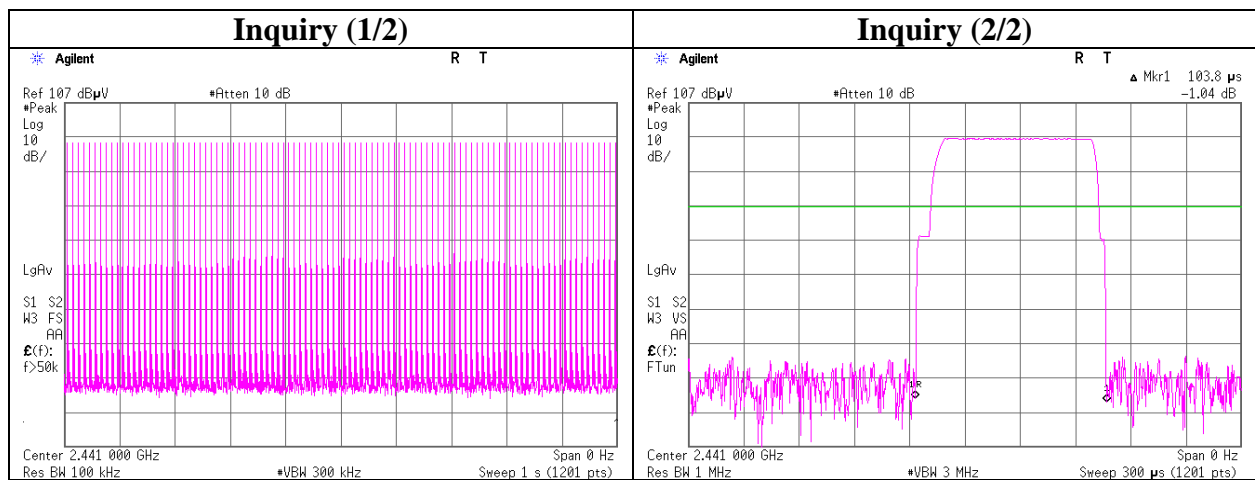
\*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	48	50	50	50	48	49.2
DH3	24	25	25	20	29	24.6
DH5	17	18	15	16	17	16.6
3DH1	50	50	50	51	51	50.4
3DH3	30	24	26	24	26	26
3DH5	18	16	19	20	15	17.6

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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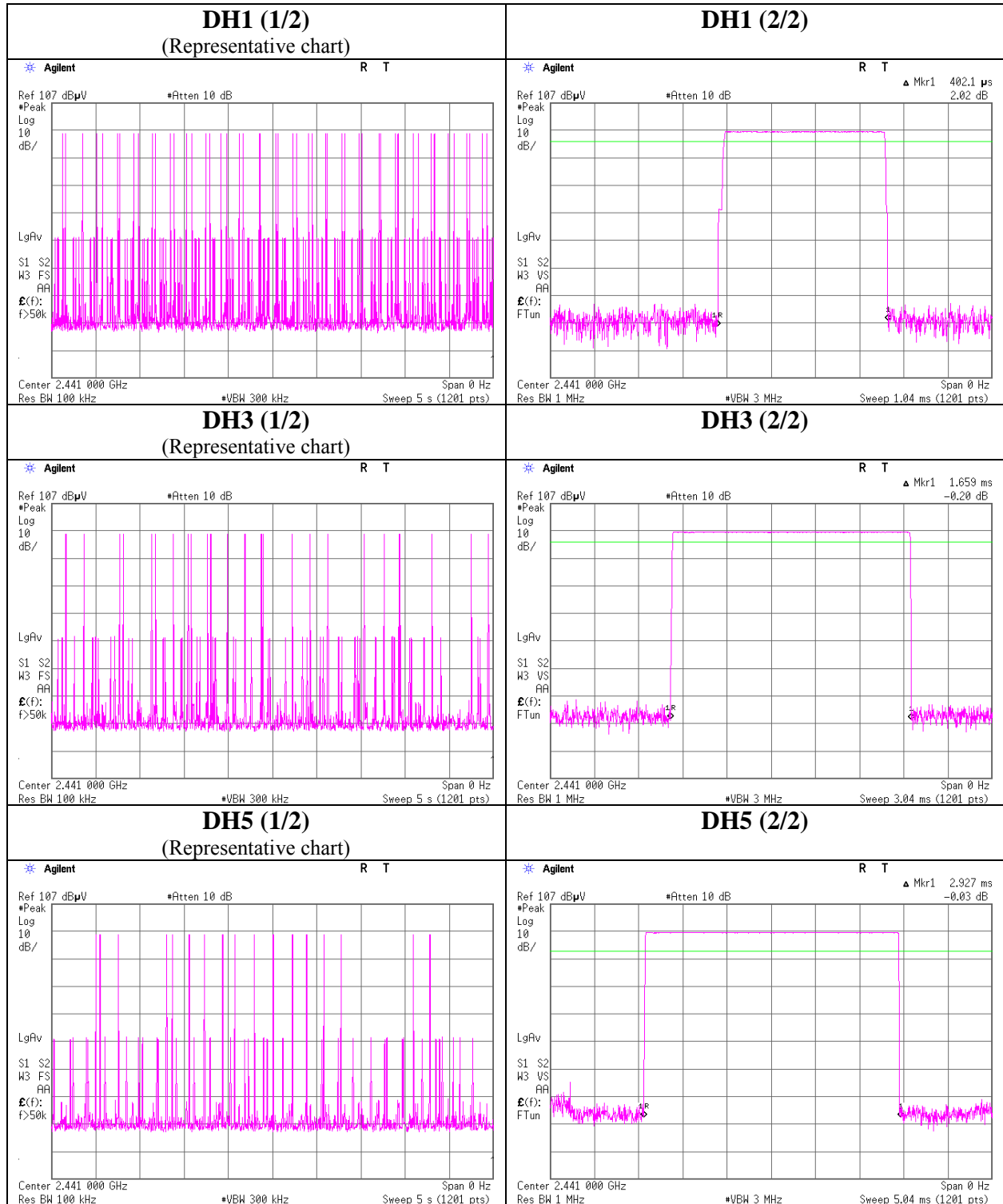
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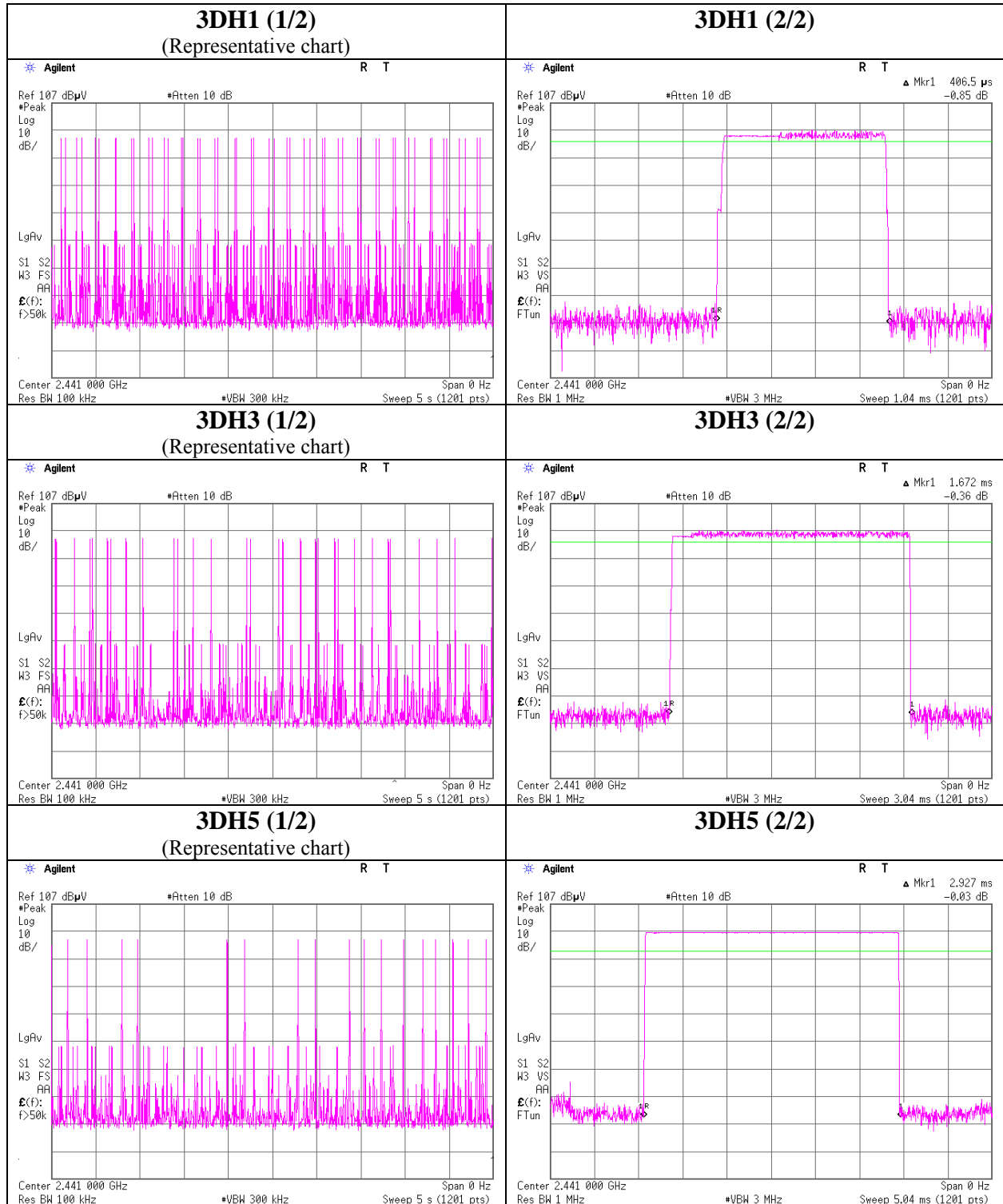
Facsimile : +81 596 24 8124

**Dwell time**





**Dwell time**



## Maximum Peak Output Power

Test place : Head Office EMC Lab. No.6 Measurement Room  
 Report No. : 10022574H  
 Date : 06/05/2013  
 Temperature/ Humidity : 25 deg. C / 53% RH  
 Engineer : Takumi Shimada  
 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	-10.67	2.07	10.01	1.41	1.38	20.96	125	19.55
DH5	2441.0	-10.21	2.09	10.01	1.89	1.55	20.96	125	19.07
DH5	2480.0	-10.15	2.09	10.01	1.95	1.57	20.96	125	19.01
3DH5	2402.0	-9.64	2.07	10.01	2.44	1.75	20.96	125	18.52
3DH5	2441.0	-9.18	2.09	10.01	2.92	1.96	20.96	125	18.04
3DH5	2480.0	-9.10	2.09	10.01	3.00	2.00	20.96	125	17.96
Inquiry	2441.0	-9.93	2.09	10.01	2.17	1.65	20.96	125	18.79

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.

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## Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber  
Report No. 10022574H  
Date 06/17/2013 06/20/2013  
Temperature/ Humidity 23 deg. C / 62% RH 23 deg. C / 66% RH  
Engineer Takayuki Shimada Takumi Shimada  
(1-10GHz) (30-1000MHz and 10-26.5GHz)  
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	105.388	QP	47.5	10.9	8.1	32.1	34.4	43.5	9.1	
Hori	250.548	QP	37.1	17.3	9.5	32.1	31.8	46.0	14.2	
Hori	718.766	QP	37.3	20.6	12.4	32.0	38.3	46.0	7.7	
Hori	742.522	QP	39.7	21.0	12.6	31.9	41.4	46.0	4.6	
Hori	781.267	QP	34.3	21.6	12.8	31.6	37.1	46.0	8.9	
Hori	891.029	QP	31.3	22.1	13.3	31.0	35.7	46.0	10.3	
Hori	2390.000	PK	42.4	28.2	12.4	32.4	50.6	73.9	23.3	
Hori	4804.000	PK	41.2	30.5	4.8	31.4	45.1	73.9	28.8	
Hori	9608.000	PK	42.6	39.0	6.4	33.0	55.0	73.9	18.9	
Hori	2390.000	AV	30.3	28.2	12.4	32.4	38.5	53.9	15.4	
Hori	4804.000	AV	29.3	30.5	4.8	31.4	33.2	53.9	20.7	
Hori	9608.000	AV	30.5	39.0	6.4	33.0	42.9	53.9	11.0	
Vert	105.669	QP	45.8	11.0	8.1	32.1	32.8	43.5	10.7	
Vert	250.480	QP	39.2	17.3	9.5	32.1	33.9	46.0	12.1	
Vert	718.766	QP	31.2	20.6	12.4	32.0	32.2	46.0	13.8	
Vert	742.522	QP	34.5	21.0	12.6	31.9	36.2	46.0	9.8	
Vert	781.267	QP	29.5	21.6	12.8	31.6	32.3	46.0	13.7	
Vert	891.029	QP	32.9	22.1	13.3	31.0	37.3	46.0	8.7	
Vert	2390.000	PK	42.8	28.2	12.4	32.4	51.0	73.9	22.9	
Vert	4804.000	PK	41.0	30.5	4.8	31.4	44.9	73.9	29.0	
Vert	9608.000	PK	42.4	39.0	6.4	33.0	54.8	73.9	19.1	
Vert	2390.000	AV	30.3	28.2	12.4	32.4	38.5	53.9	15.4	
Vert	4804.000	AV	29.3	30.5	4.8	31.4	33.2	53.9	20.7	
Vert	9608.000	AV	30.5	39.0	6.4	33.0	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  $20\log(3.0m/1.0m)=9.5dB$

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

### 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	96.9	28.2	12.4	32.4	105.1	-	-	Carrier
Hori	2400.000	PK	39.6	28.2	12.4	32.4	47.8	85.1	37.3	
Hori	7206.000	PK	48.8	35.8	5.6	32.3	57.9	85.1	27.2	
Vert	2402.000	PK	98.2	28.2	12.4	32.4	106.4	-	-	Carrier
Vert	2400.000	PK	40.6	28.2	12.4	32.4	48.8	86.4	37.6	
Vert	7206.000	PK	51.8	35.8	5.6	32.3	60.9	86.4	25.5	

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

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## Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber  
Report No. 10022574H  
Date 06/17/2013 06/20/2013  
Temperature/ Humidity 23 deg. C / 62% RH 23 deg. C / 66% RH  
Engineer Takayuki Shimada Takumi Shimada  
(1-10GHz) (30-1000MHz and 10-26.5GHz)  
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	105.413	QP	47.4	10.9	8.1	32.1	34.3	43.5	9.2	
Hori	250.521	QP	37.3	17.3	9.5	32.1	32.0	46.0	14.0	
Hori	718.764	QP	37.7	20.6	12.4	32.0	38.7	46.0	7.3	
Hori	742.521	QP	39.6	21.0	12.6	31.9	41.3	46.0	4.7	
Hori	781.262	QP	34.2	21.6	12.8	31.6	37.0	46.0	9.0	
Hori	891.041	QP	31.1	22.1	13.3	31.0	35.5	46.0	10.5	
Hori	4882.000	PK	40.9	30.6	4.7	31.4	44.8	73.9	29.1	
Hori	7323.000	PK	48.6	36.0	5.6	32.4	57.8	73.9	16.1	
Hori	9764.000	PK	42.4	39.4	6.4	33.0	55.2	73.9	18.7	
Hori	4882.000	AV	29.3	30.6	4.7	31.4	33.2	53.9	20.7	
Hori	7323.000	AV	39.2	36.0	5.6	32.4	48.4	53.9	5.5	
Hori	9764.000	AV	30.5	39.4	6.4	33.0	43.3	53.9	10.6	
Vert	105.563	QP	45.6	10.9	8.1	32.1	32.5	43.5	11.0	
Vert	250.495	QP	39.4	17.3	9.5	32.1	34.1	46.0	11.9	
Vert	718.764	QP	31.1	20.6	12.4	32.0	32.1	46.0	13.9	
Vert	742.521	QP	34.5	21.0	12.6	31.9	36.2	46.0	9.8	
Vert	781.262	QP	29.4	21.6	12.8	31.6	32.2	46.0	13.8	
Vert	891.033	QP	33.0	22.1	13.3	31.0	37.4	46.0	8.6	
Vert	4882.000	PK	40.9	30.6	4.7	31.4	44.8	73.9	29.1	
Vert	7323.000	PK	51.5	36.0	5.6	32.4	60.7	73.9	13.2	
Vert	9764.000	PK	42.3	39.4	6.4	33.0	55.1	73.9	18.8	
Vert	4882.000	AV	29.3	30.6	4.7	31.4	33.2	53.9	20.7	
Vert	7323.000	AV	43.7	36.0	5.6	32.4	52.9	53.9	1.0	
Vert	9764.000	AV	30.5	39.4	6.4	33.0	43.3	53.9	10.6	

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

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## Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber  
Report No. 10022574H  
Date 06/17/2013 06/20/2013  
Temperature/ Humidity 23 deg. C / 62% RH 23 deg. C / 66% RH  
Engineer Takayuki Shimada Takumi Shimada  
(1-10GHz) (30-1000MHz and 10-26.5GHz)  
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	105.523	QP	47.5	10.9	8.1	32.1	34.4	43.5	9.1	
Hori	250.523	QP	37.3	17.3	9.5	32.1	32.0	46.0	14.0	
Hori	718.765	QP	37.5	20.6	12.4	32.0	38.5	46.0	7.5	
Hori	742.523	QP	39.2	21.0	12.6	31.9	40.9	46.0	5.1	
Hori	781.264	QP	33.8	21.6	12.8	31.6	36.6	46.0	9.4	
Hori	891.046	QP	31.3	22.1	13.3	31.0	35.7	46.0	10.3	
Hori	2483.500	PK	44.3	28.4	12.4	32.3	52.8	73.9	21.1	
Hori	4960.000	PK	41.5	30.7	4.7	31.4	45.5	73.9	28.4	
Hori	7440.000	PK	46.9	36.2	5.6	32.4	56.3	73.9	17.6	
Hori	9920.000	PK	42.8	39.8	6.4	33.1	55.9	73.9	18.0	
Hori	2483.500	AV	31.3	28.4	12.4	32.3	39.8	53.9	14.1	
Hori	4960.000	AV	29.3	30.7	4.7	31.4	33.3	53.9	20.6	
Hori	7440.000	AV	36.9	36.2	5.6	32.4	46.3	53.9	7.6	
Hori	9920.000	AV	31.0	39.8	6.4	33.1	44.1	53.9	9.8	
Vert	105.582	QP	45.3	10.9	8.1	32.1	32.2	43.5	11.3	
Vert	250.504	QP	39.3	17.3	9.5	32.1	34.0	46.0	12.0	
Vert	718.763	QP	31.4	20.6	12.4	32.0	32.4	46.0	13.6	
Vert	742.518	QP	34.1	21.0	12.6	31.9	35.8	46.0	10.2	
Vert	781.262	QP	29.7	21.6	12.8	31.6	32.5	46.0	13.5	
Vert	891.041	QP	32.8	22.1	13.3	31.0	37.2	46.0	8.8	
Vert	2483.500	PK	44.7	28.4	12.4	32.3	53.2	73.9	20.7	
Vert	4960.000	PK	41.6	30.7	4.7	31.4	45.6	73.9	28.3	
Vert	7440.000	PK	49.8	36.2	5.6	32.4	59.2	73.9	14.7	
Vert	9920.000	PK	42.7	39.8	6.4	33.1	55.8	73.9	18.1	
Vert	2483.500	AV	31.4	28.4	12.4	32.3	39.9	53.9	14.0	
Vert	4960.000	AV	29.3	30.7	4.7	31.4	33.3	53.9	20.6	
Vert	7440.000	AV	40.2	36.2	5.6	32.4	49.6	53.9	4.3	
Vert	9920.000	AV	31.0	39.8	6.4	33.1	44.1	53.9	9.8	

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

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## Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber  
Report No. 10022574H  
Date 06/17/2013 06/20/2013  
Temperature/ Humidity 23 deg. C / 62% RH 23 deg. C / 66% RH  
Engineer Takayuki Shimada Takumi Shimada  
(1-10GHz) (30-1000MHz and 10-26.5GHz)  
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	105.442	QP	47.4	10.9	8.1	32.1	34.3	43.5	9.2	
Hori	250.519	QP	37.3	17.3	9.5	32.1	32.0	46.0	14.0	
Hori	718.765	QP	37.7	20.6	12.4	32.0	38.7	46.0	7.3	
Hori	742.521	QP	39.6	21.0	12.6	31.9	41.3	46.0	4.7	
Hori	781.266	QP	34.2	21.6	12.8	31.6	37.0	46.0	9.0	
Hori	891.264	QP	31.1	22.1	13.3	31.0	35.5	46.0	10.5	
Hori	2390.000	PK	45.5	28.2	12.4	32.4	53.7	73.9	20.2	
Hori	4804.000	PK	41.1	30.5	4.8	31.4	45.0	73.9	28.9	
Hori	9608.000	PK	42.5	39.0	6.4	33.0	54.9	73.9	19.0	
Hori	2390.000	AV	30.5	28.2	12.4	32.4	38.7	53.9	15.2	
Hori	4804.000	AV	29.3	30.5	4.8	31.4	33.2	53.9	20.7	
Hori	9608.000	AV	30.5	39.0	6.4	33.0	42.9	53.9	11.0	
Vert	105.486	QP	45.6	10.9	8.1	32.1	32.5	43.5	11.0	
Vert	250.513	QP	39.4	17.3	9.5	32.1	34.1	46.0	11.9	
Vert	718.765	QP	31.1	20.6	12.4	32.0	32.1	46.0	13.9	
Vert	742.521	QP	34.1	21.0	12.6	31.9	35.8	46.0	10.2	
Vert	781.266	QP	29.4	21.6	12.8	31.6	32.2	46.0	13.8	
Vert	891.026	QP	32.6	22.1	13.3	31.0	37.0	46.0	9.0	
Vert	2390.000	PK	47.3	28.2	12.4	32.4	55.5	73.9	18.4	
Vert	4804.000	PK	41.2	30.5	4.8	31.4	45.1	73.9	28.8	
Vert	9608.000	PK	42.4	39.0	6.4	33.0	54.8	73.9	19.1	
Vert	2390.000	AV	30.7	28.2	12.4	32.4	38.9	53.9	15.0	
Vert	4804.000	AV	29.3	30.5	4.8	31.4	33.2	53.9	20.7	
Vert	9608.000	AV	30.5	39.0	6.4	33.0	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  $20\log(3.0m/1.0m)=9.5dB$

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

### 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	92.7	28.2	12.4	32.4	100.9	-	-	Carrier
Hori	2400.000	PK	44.4	28.2	12.4	32.4	52.6	80.9	28.3	
Hori	7206.000	PK	42.8	35.8	5.6	32.3	51.9	80.9	29.0	
Vert	2402.000	PK	94.2	28.2	12.4	32.4	102.4	-	-	Carrier
Vert	2400.000	PK	46.5	28.2	12.4	32.4	54.7	82.4	27.7	
Vert	7206.000	PK	46.2	35.8	5.6	32.3	55.3	82.4	27.1	

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

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## Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber  
Report No. 10022574H  
Date 06/17/2013 06/20/2013  
Temperature/ Humidity 23 deg. C / 62% RH 23 deg. C / 66% RH  
Engineer Takayuki Shimada Takumi Shimada  
(1-10GHz) (30-1000MHz and 10-26.5GHz)  
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	105.531	QP	47.2	10.9	8.1	32.1	34.1	43.5	9.4	
Hori	250.522	QP	37.4	17.3	9.5	32.1	32.1	46.0	13.9	
Hori	718.764	QP	37.9	20.6	12.4	32.0	38.9	46.0	7.1	
Hori	742.522	QP	38.7	21.0	12.6	31.9	40.4	46.0	5.6	
Hori	781.230	QP	34.1	21.6	12.8	31.6	36.9	46.0	9.1	
Hori	891.028	QP	30.6	22.1	13.3	31.0	35.0	46.0	11.0	
Hori	4882.000	PK	40.9	30.6	4.7	31.4	44.8	73.9	29.1	
Hori	7323.000	PK	47.0	36.0	5.6	32.4	56.2	73.9	17.7	
Hori	9764.000	PK	42.3	39.4	6.4	33.0	55.1	73.9	18.8	
Hori	4882.000	AV	29.3	30.6	4.7	31.4	33.2	53.9	20.7	
Hori	7323.000	AV	36.9	36.0	5.6	32.4	46.1	53.9	7.8	
Hori	9764.000	AV	30.5	39.4	6.4	33.0	43.3	53.9	10.6	
Vert	105.528	QP	45.3	10.9	8.1	32.1	32.2	43.5	11.3	
Vert	250.516	QP	39.1	17.3	9.5	32.1	33.8	46.0	12.2	
Vert	718.763	QP	31.2	20.6	12.4	32.0	32.2	46.0	13.8	
Vert	742.522	QP	34.7	21.0	12.6	31.9	36.4	46.0	9.6	
Vert	781.263	QP	29.3	21.6	12.8	31.6	32.1	46.0	13.9	
Vert	891.031	QP	32.8	22.1	13.3	31.0	37.2	46.0	8.8	
Vert	4882.000	PK	41.1	30.6	4.7	31.4	45.0	73.9	28.9	
Vert	7323.000	PK	51.2	36.0	5.6	32.4	60.4	73.9	13.5	
Vert	9764.000	PK	42.4	39.4	6.4	33.0	55.2	73.9	18.7	
Vert	4882.000	AV	29.3	30.6	4.7	31.4	33.2	53.9	20.7	
Vert	7323.000	AV	42.4	36.0	5.6	32.4	51.6	53.9	2.3	
Vert	9764.000	AV	30.5	39.4	6.4	33.0	43.3	53.9	10.6	

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

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Engineer Takayuki Shimada Takumi Shimada  
(1-10GHz) (30-1000MHz and 10-26.5GHz)  
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	105.533	QP	47.3	10.9	8.1	32.1	34.2	43.5	9.3	
Hori	250.522	QP	37.3	17.3	9.5	32.1	32.0	46.0	14.0	
Hori	718.762	QP	38.1	20.6	12.4	32.0	39.1	46.0	6.9	
Hori	742.521	QP	38.2	21.0	12.6	31.9	39.9	46.0	6.1	
Hori	781.267	QP	34.4	21.6	12.8	31.6	37.2	46.0	8.8	
Hori	891.021	QP	30.3	22.1	13.3	31.0	34.7	46.0	11.3	
Hori	2483.500	PK	52.3	28.4	12.4	32.3	60.8	73.9	13.1	
Hori	4960.000	PK	41.6	30.7	4.7	31.4	45.6	73.9	28.3	
Hori	7440.000	PK	46.7	36.2	5.6	32.4	56.1	73.9	17.8	
Hori	9920.000	PK	42.8	39.8	6.4	33.1	55.9	73.9	18.0	
Hori	2483.500	AV	34.8	28.4	12.4	32.3	43.3	53.9	10.6	
Hori	4960.000	AV	29.3	30.7	4.7	31.4	33.3	53.9	20.6	
Hori	7440.000	AV	35.7	36.2	5.6	32.4	45.1	53.9	8.8	
Hori	9920.000	AV	31.0	39.8	6.4	33.1	44.1	53.9	9.8	
Vert	105.527	QP	45.2	10.9	8.1	32.1	32.1	43.5	11.4	
Vert	250.521	QP	39.0	17.3	9.5	32.1	33.7	46.0	12.3	
Vert	718.763	QP	31.1	20.6	12.4	32.0	32.1	46.0	13.9	
Vert	742.521	QP	34.1	21.0	12.6	31.9	35.8	46.0	10.2	
Vert	781.267	QP	29.1	21.6	12.8	31.6	31.9	46.0	14.1	
Vert	891.031	QP	32.7	22.1	13.3	31.0	37.1	46.0	8.9	
Vert	2483.500	PK	52.9	28.4	12.4	32.3	61.4	73.9	12.5	
Vert	4960.000	PK	41.4	30.7	4.7	31.4	45.4	73.9	28.5	
Vert	7440.000	PK	49.3	36.2	5.6	32.4	58.7	73.9	15.2	
Vert	9920.000	PK	42.8	39.8	6.4	33.1	55.9	73.9	18.0	
Vert	2483.500	AV	35.0	28.4	12.4	32.3	43.5	53.9	10.4	
Vert	4960.000	AV	29.3	30.7	4.7	31.4	33.3	53.9	20.6	
Vert	7440.000	AV	39.2	36.2	5.6	32.4	48.6	53.9	5.3	
Vert	9920.000	AV	31.0	39.8	6.4	33.1	44.1	53.9	9.8	

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

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

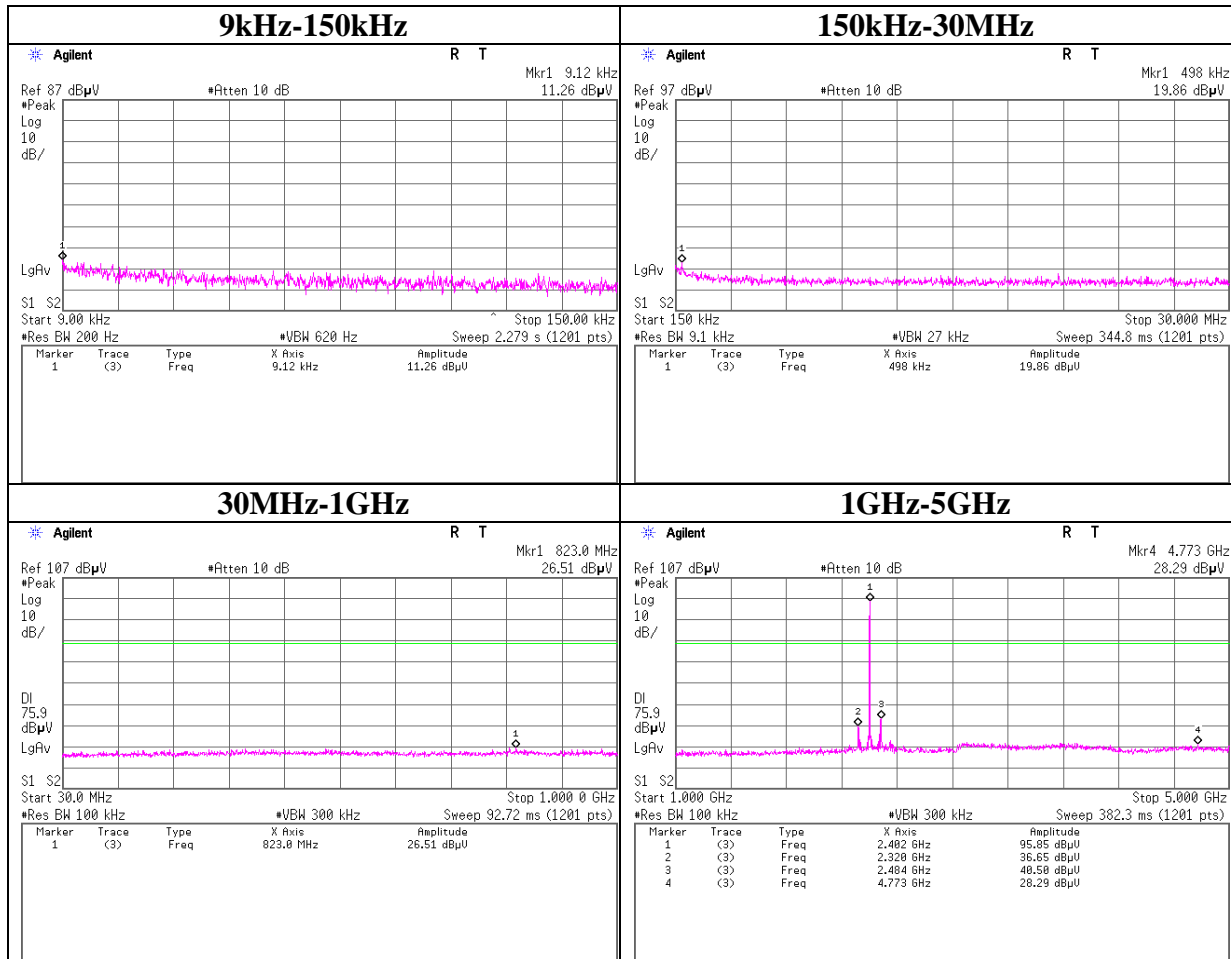
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Facsimile : +81 596 24 8124



## Conducted Spurious Emission

### Tx DH5 2402MHz



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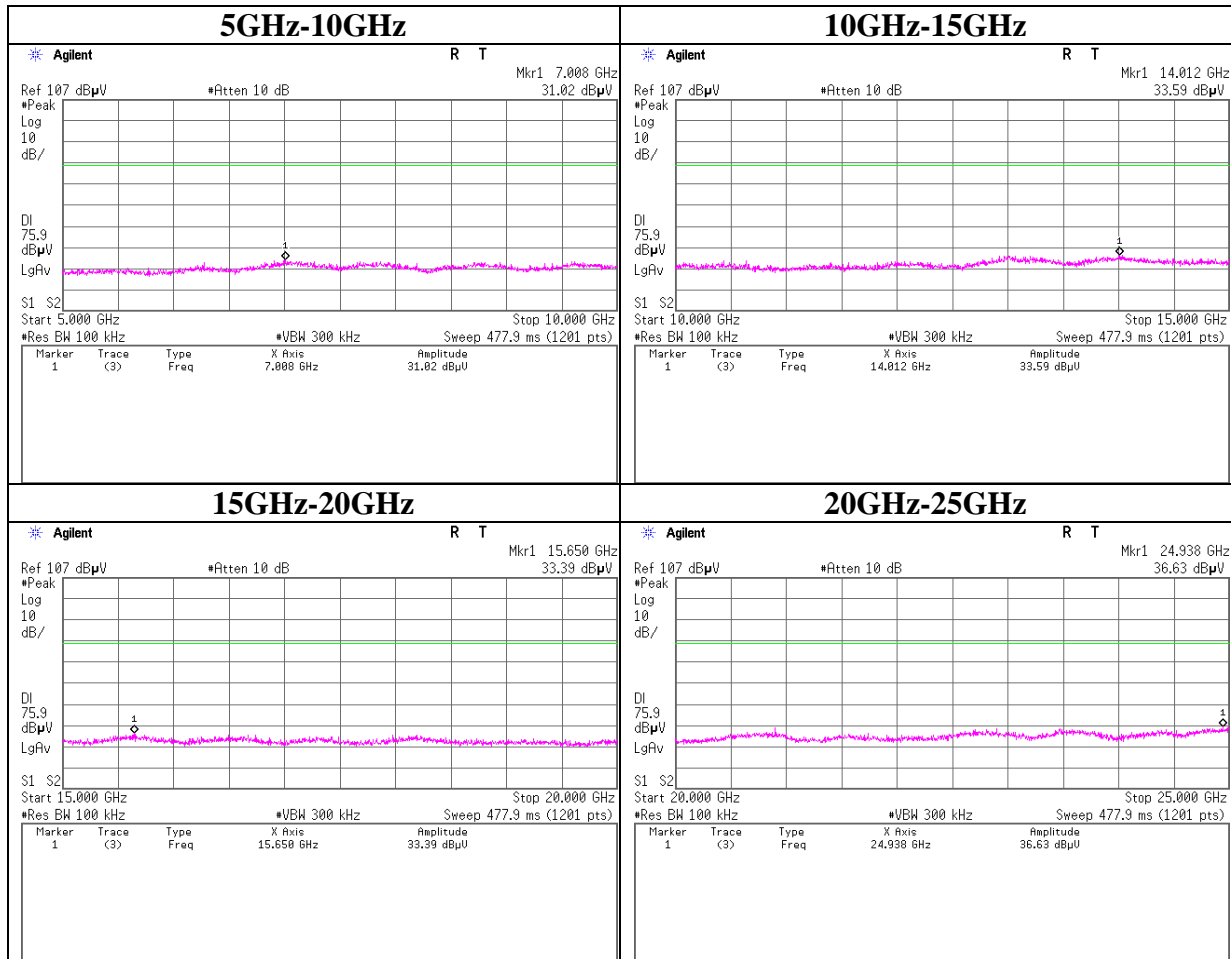
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## Conducted Spurious Emission

### Tx DH5 2402MHz



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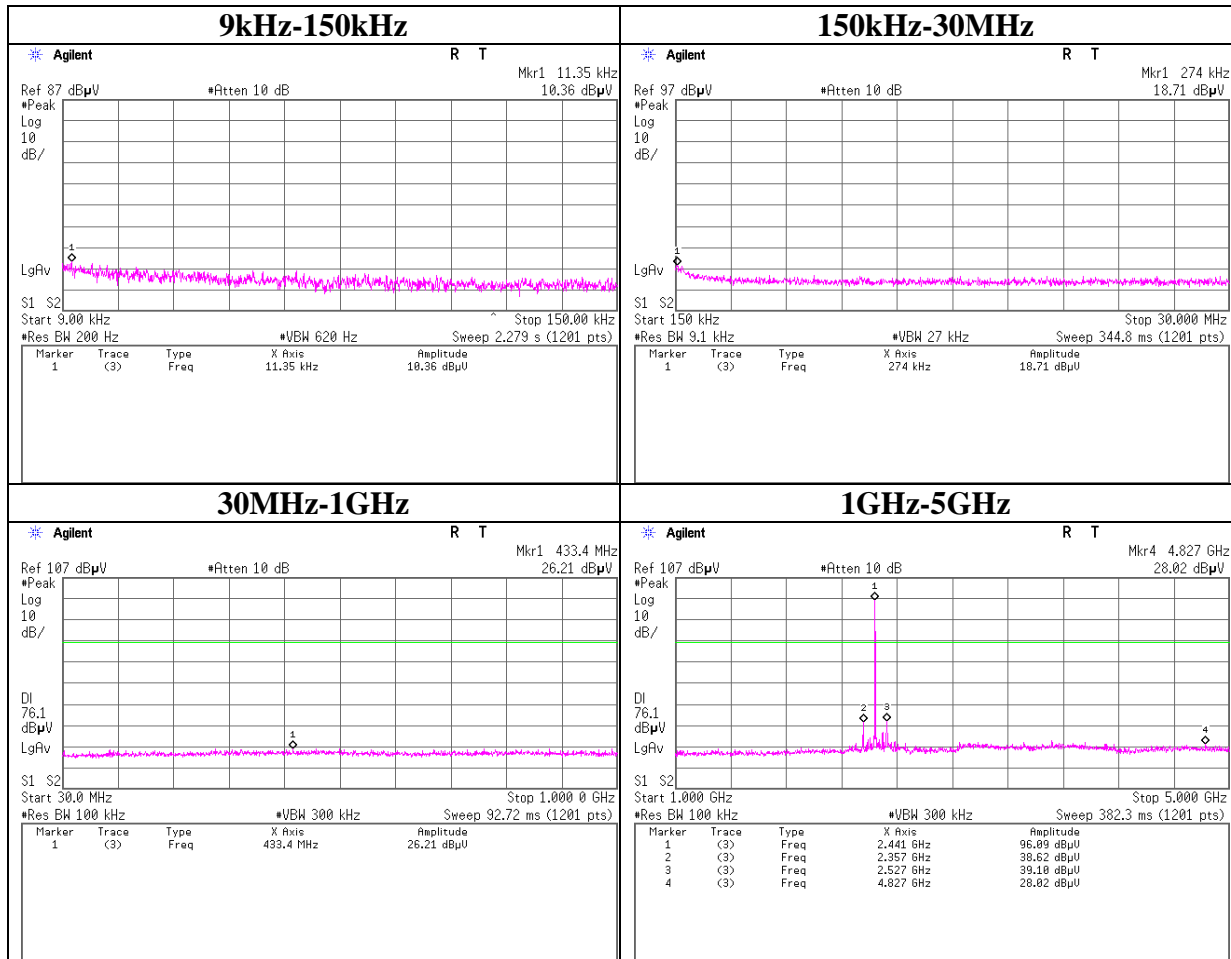
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## Conducted Spurious Emission

### Tx DH5 2441MHz



**UL Japan, Inc.**

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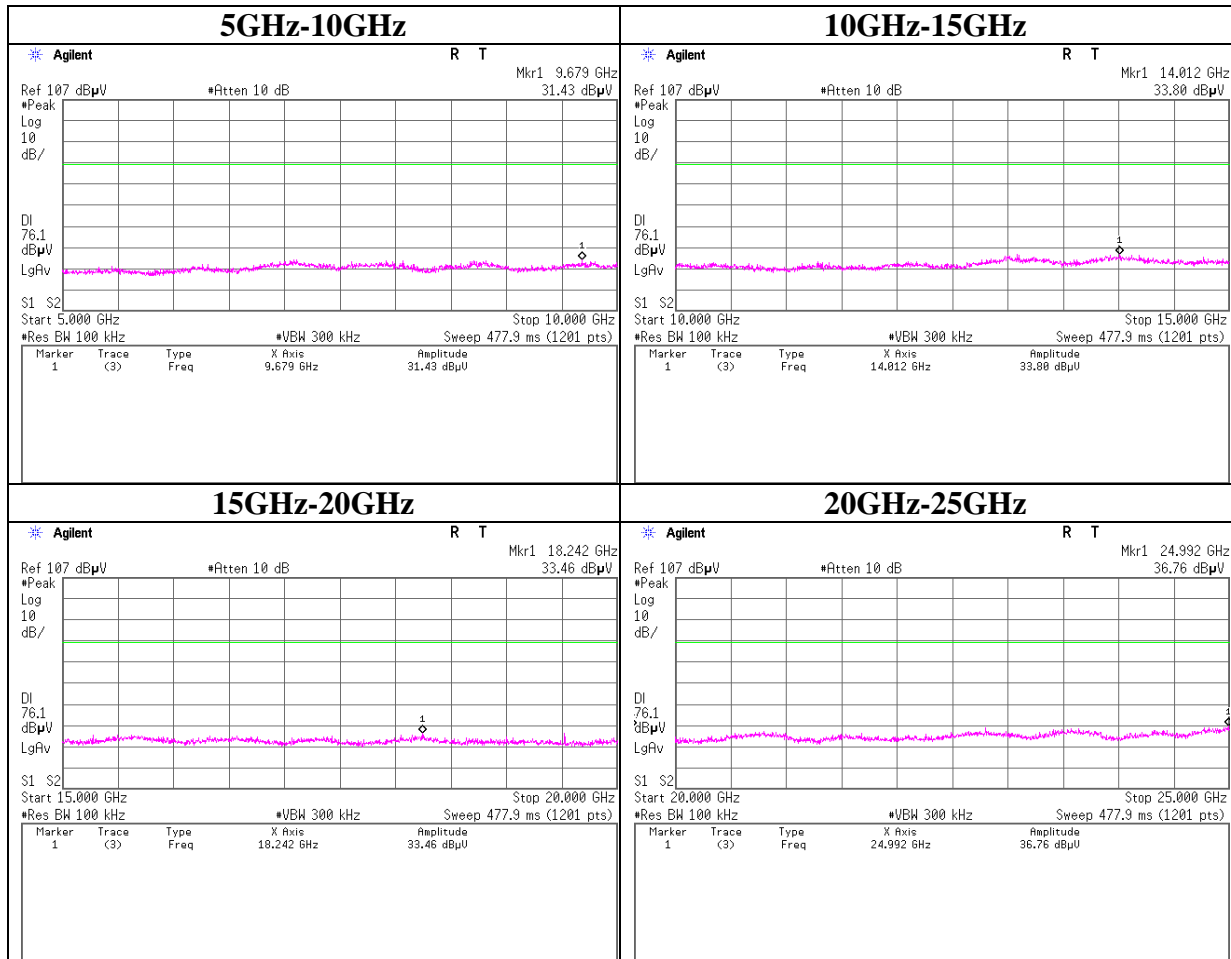
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## Conducted Spurious Emission

### Tx DH5 2441MHz



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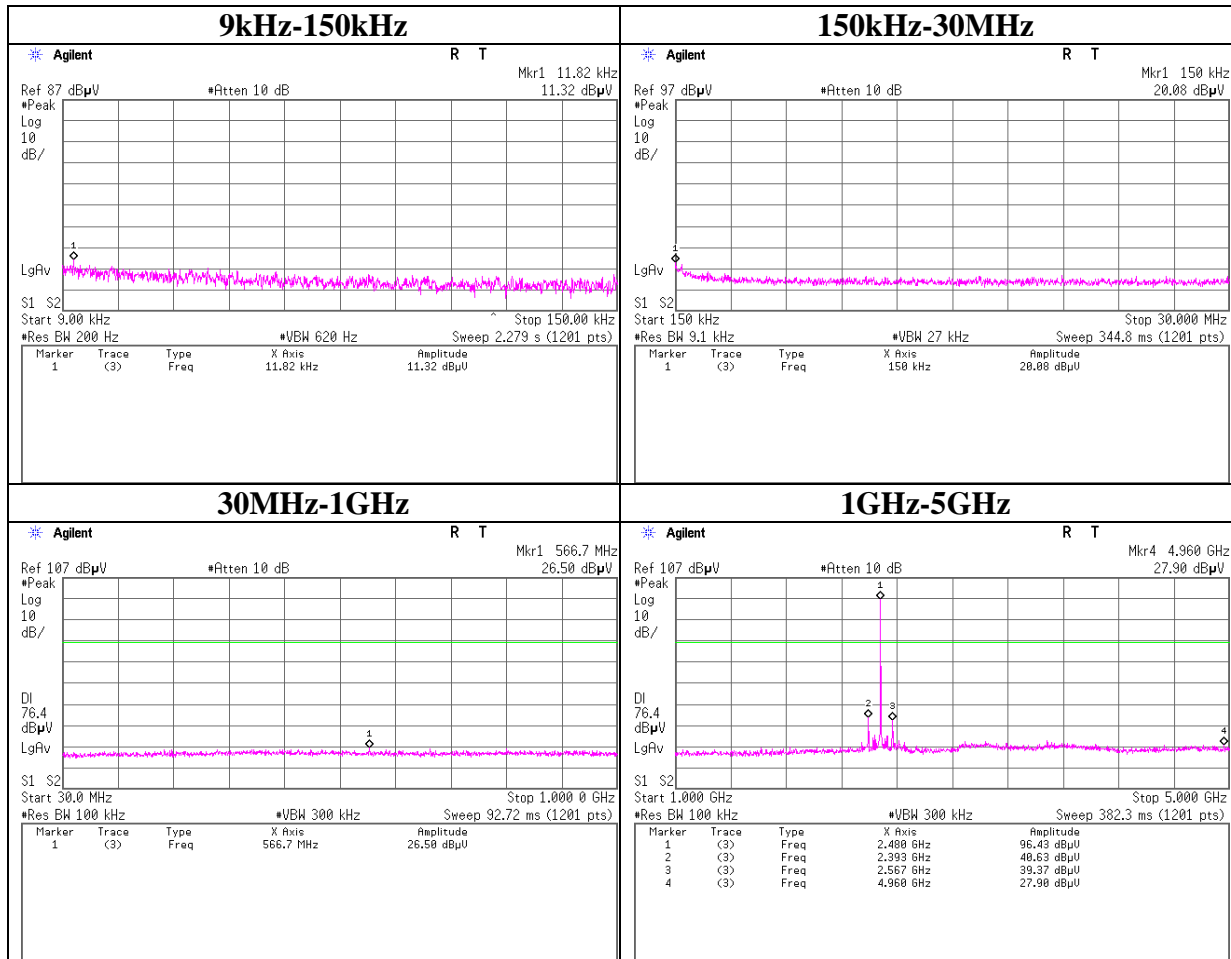
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## Conducted Spurious Emission

### Tx DH5 2480MHz



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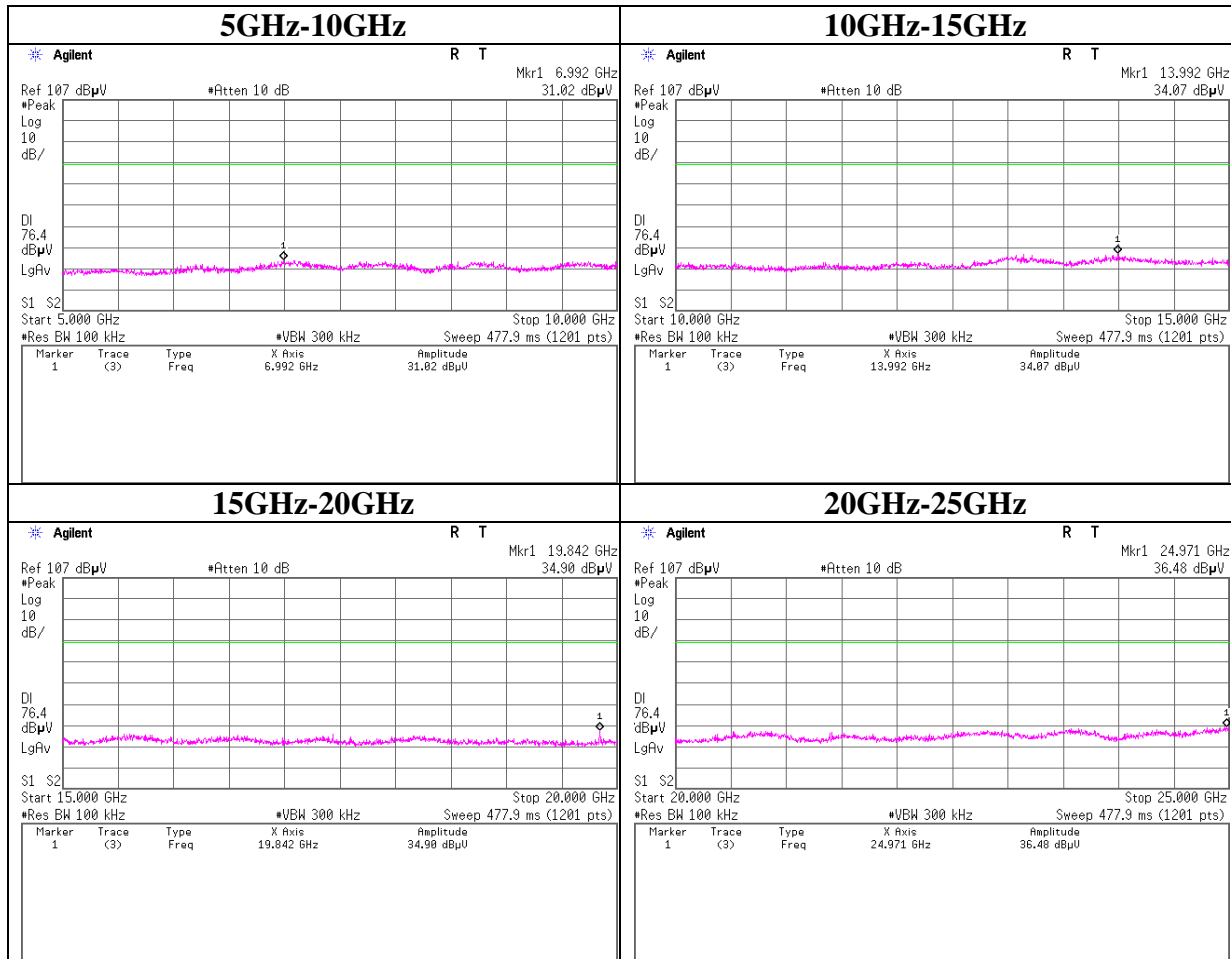
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## Conducted Spurious Emission

### Tx DH5 2480MHz



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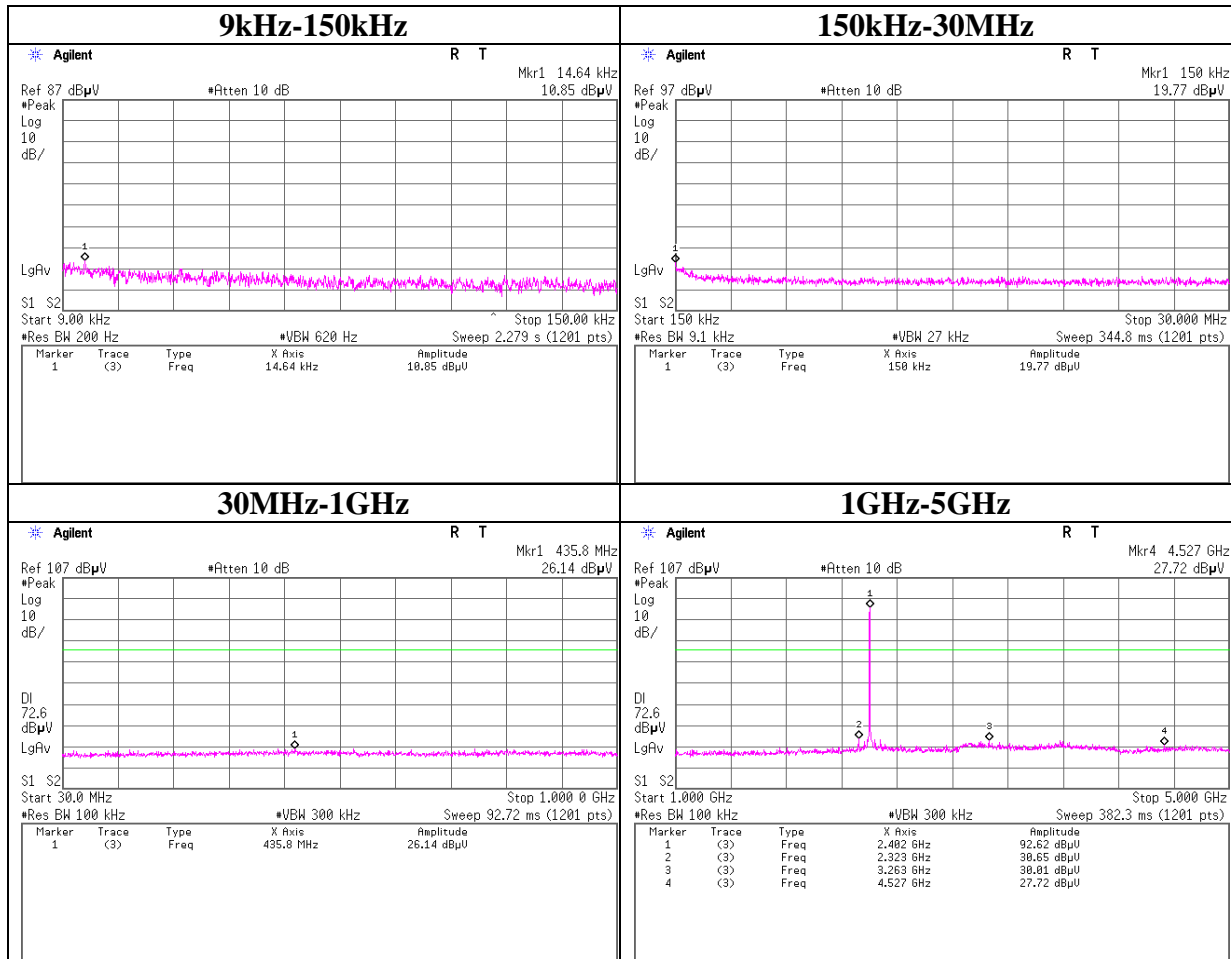
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## Conducted Spurious Emission

### Tx 3DH5 2402MHz



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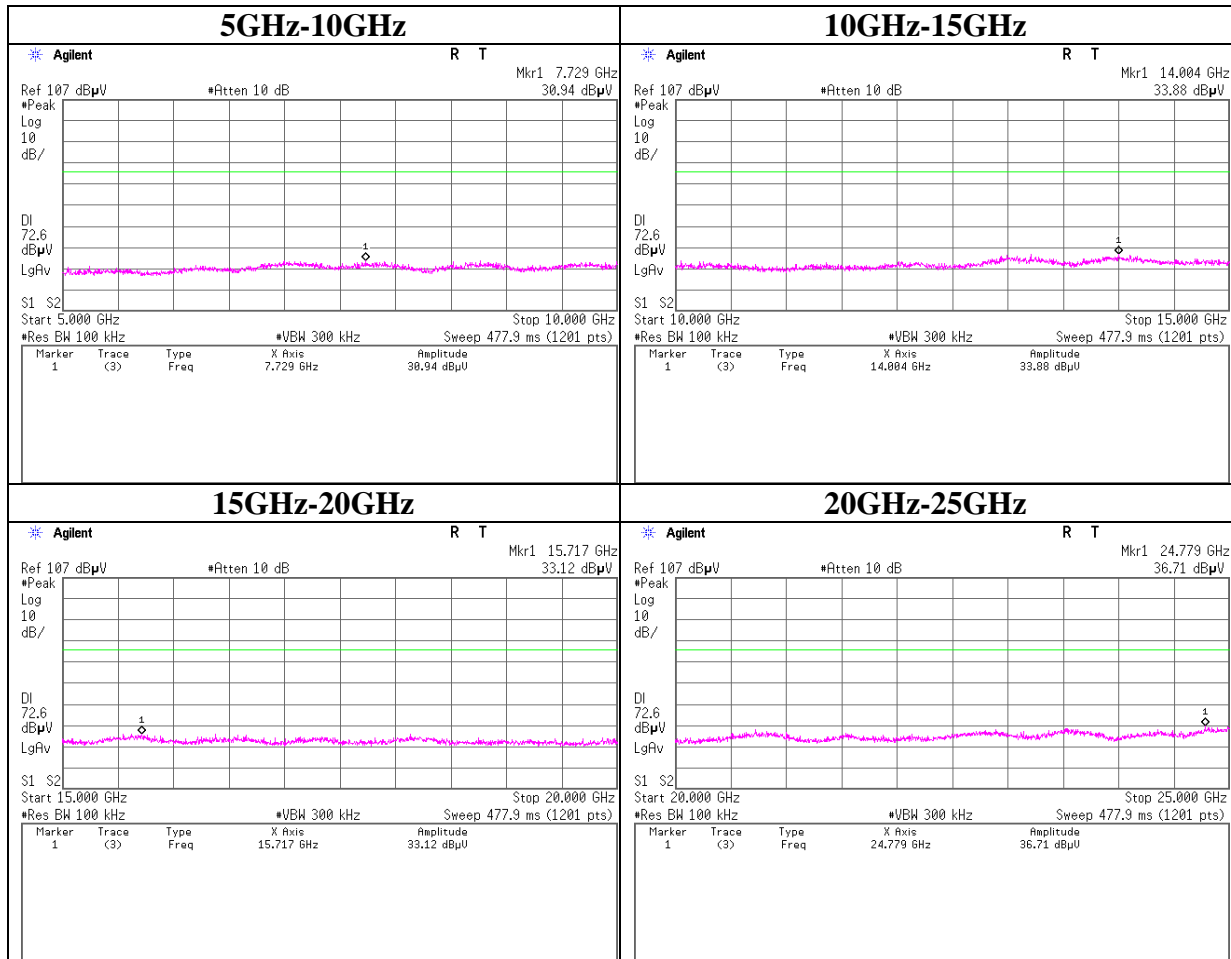
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## Conducted Spurious Emission

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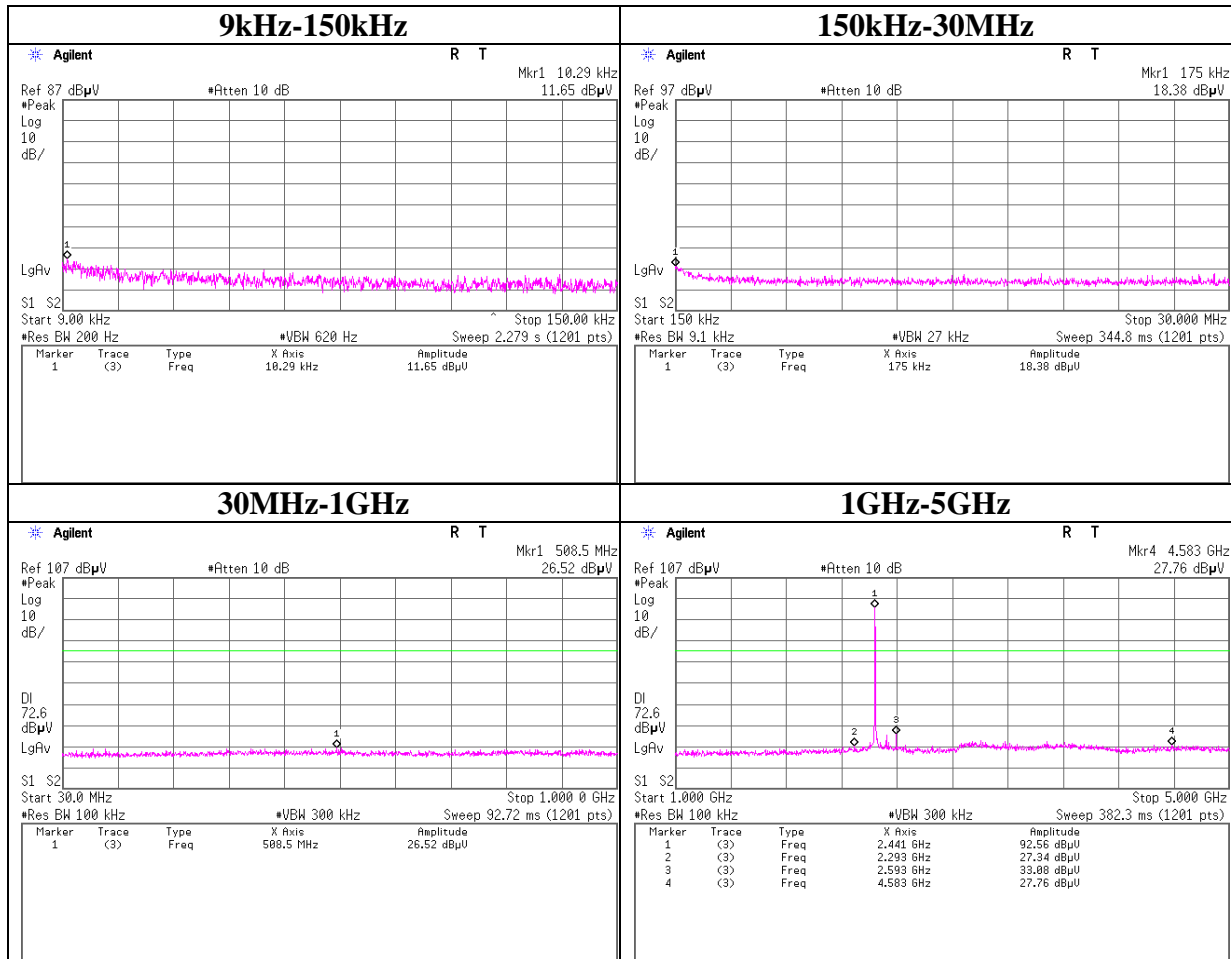
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## Conducted Spurious Emission

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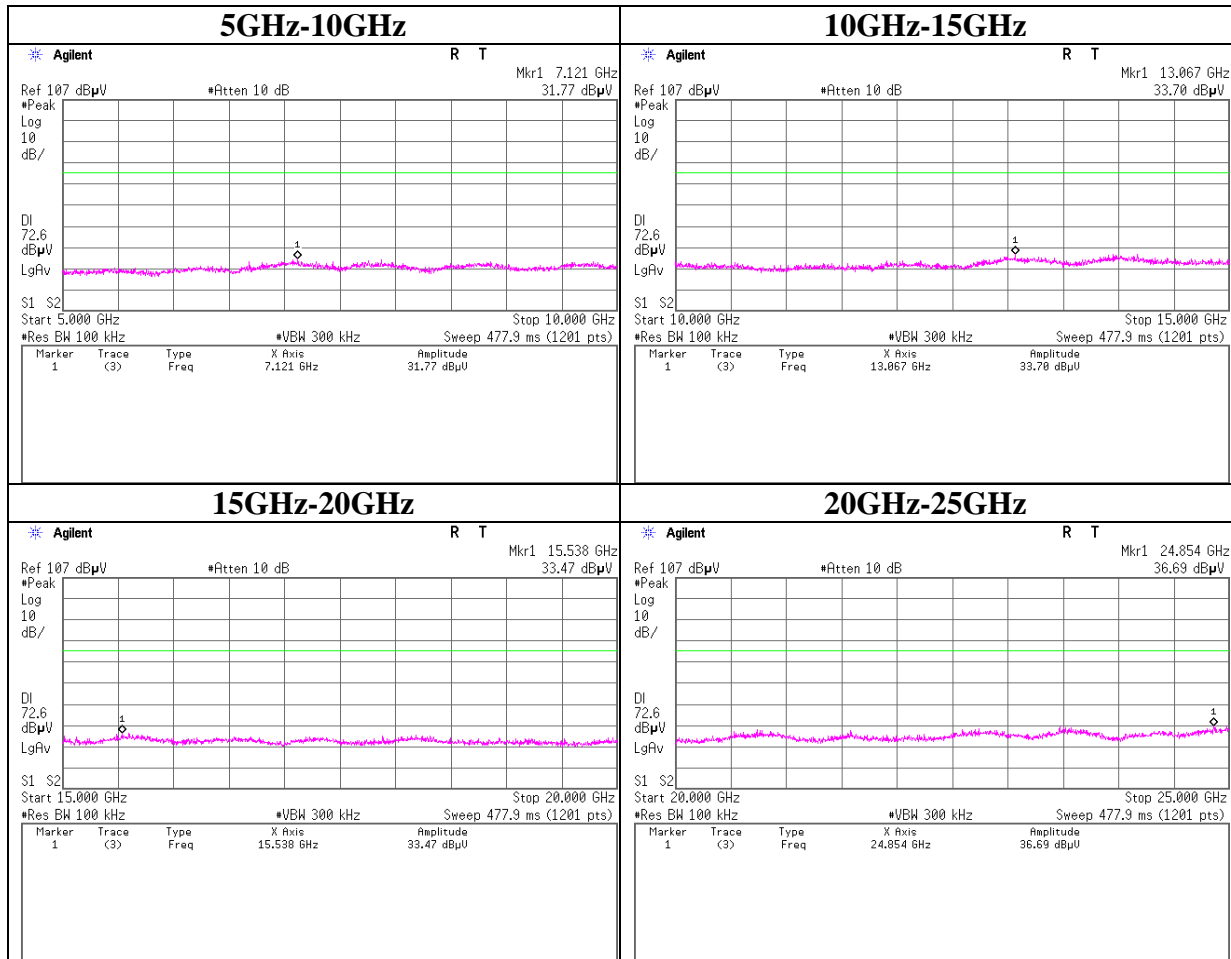
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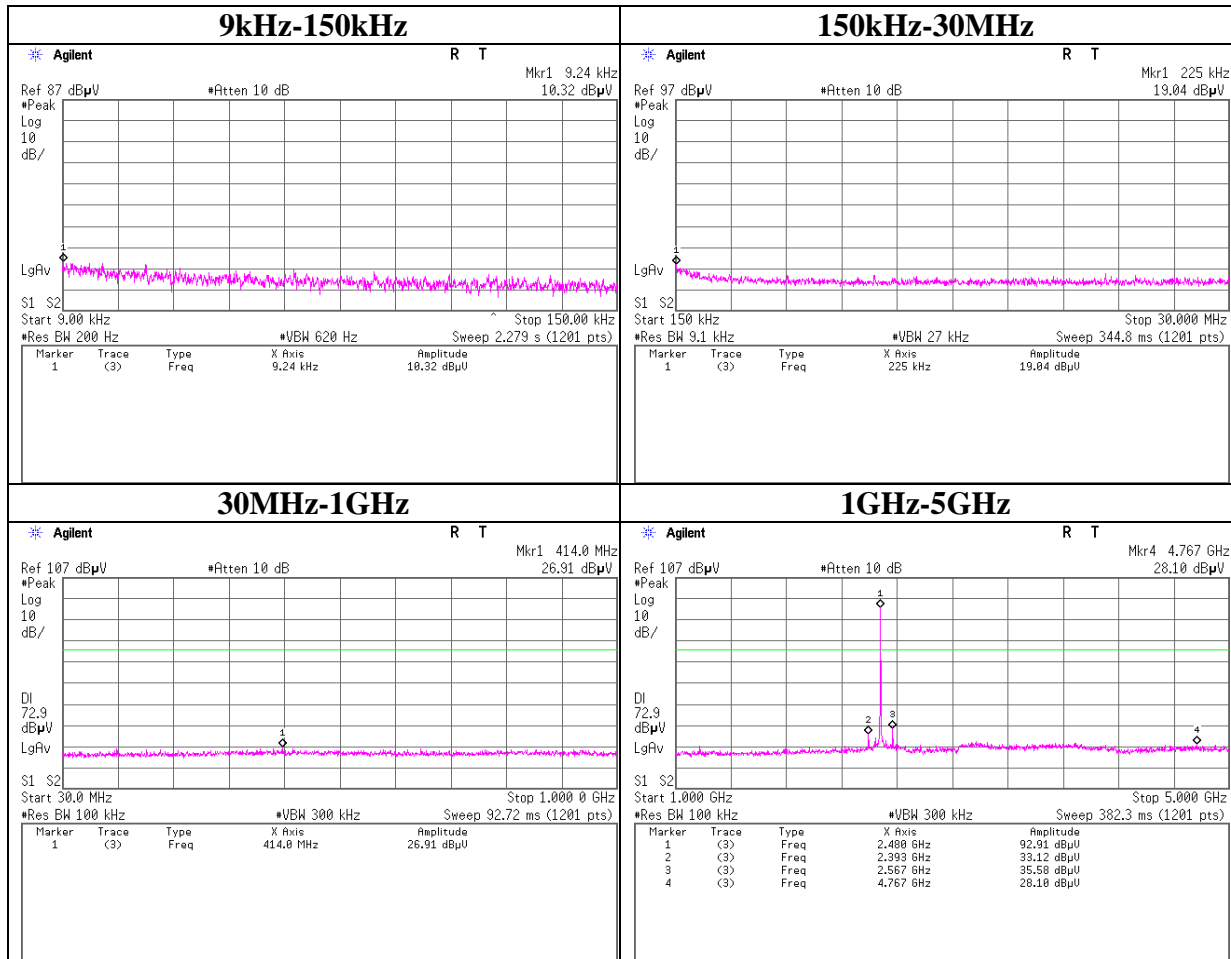
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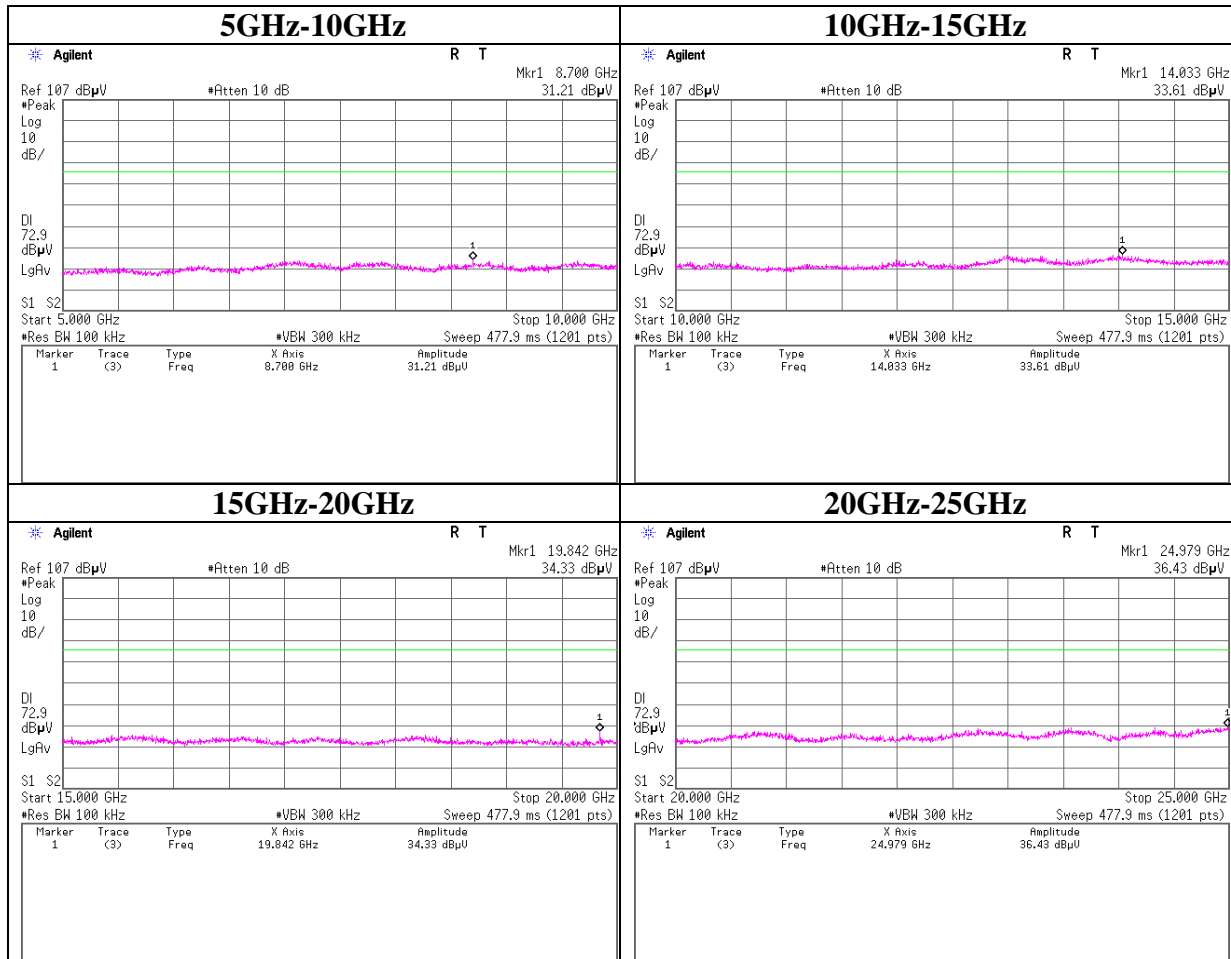
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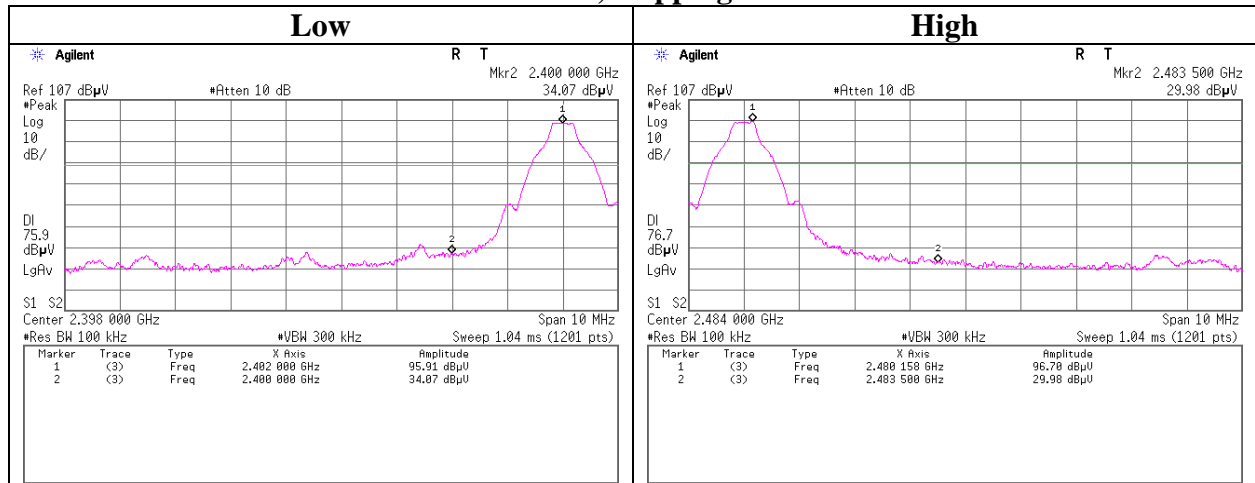
## Conducted Spurious Emission

### Tx 3DH5 2480MHz

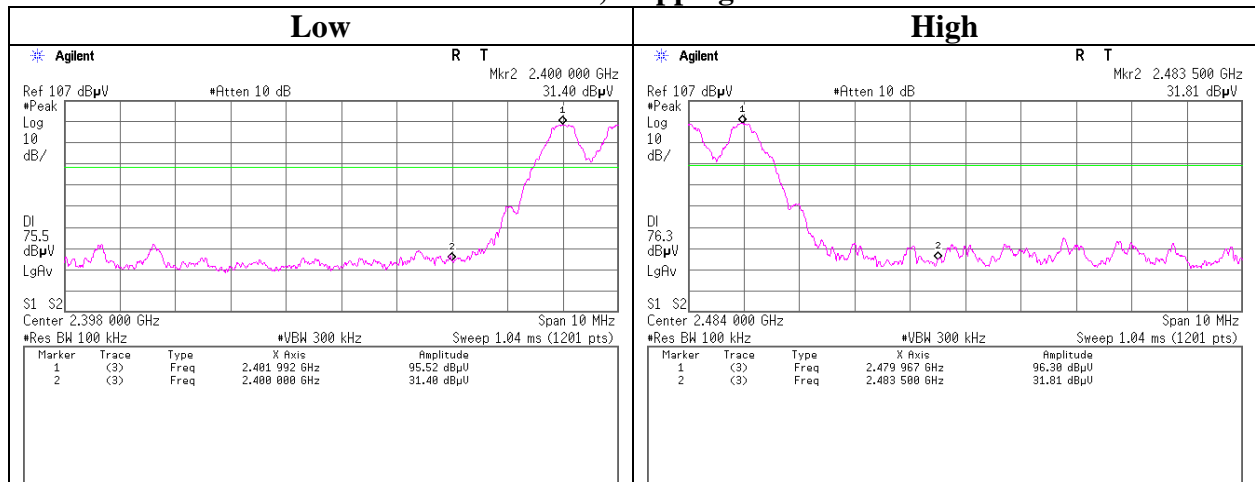


## Conducted Emission Band Edge compliance

### Tx DH5, Hopping off



### Tx DH5, Hopping on



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**Head Office EMC Lab.**

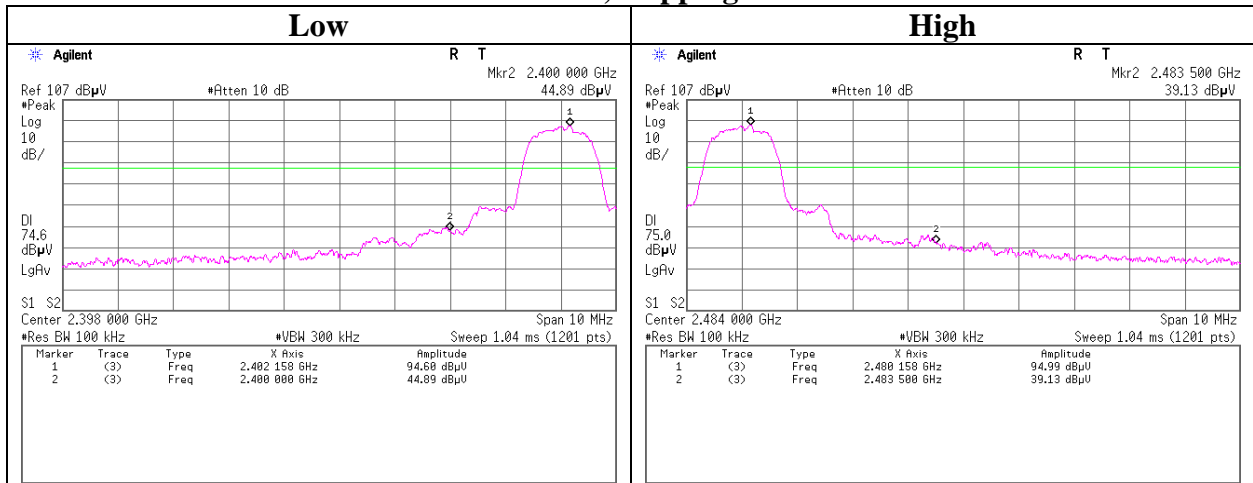
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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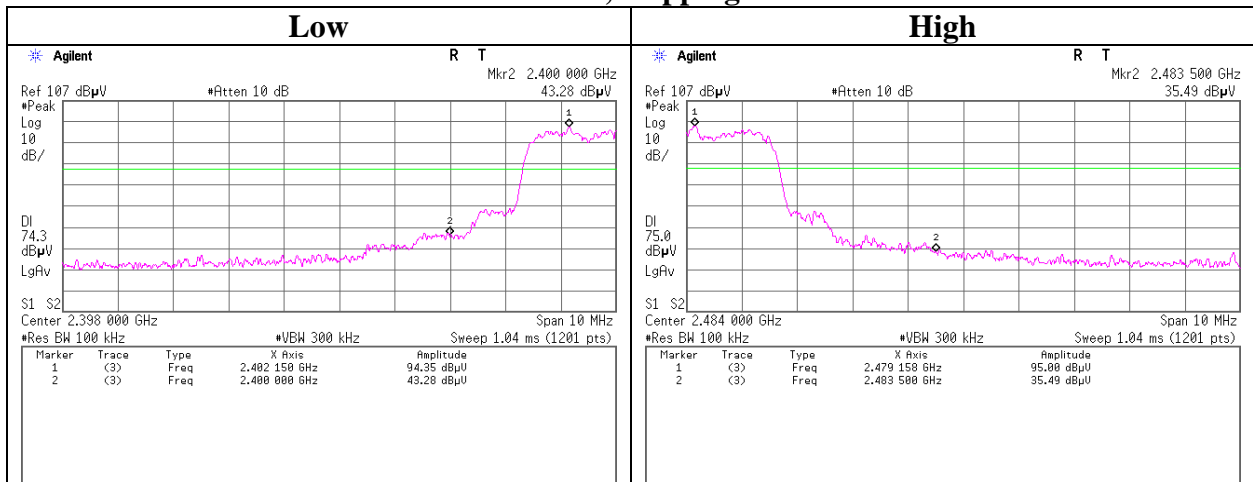
Facsimile : +81 596 24 8124

**Conducted Emission Band Edge compliance**

**Tx 3DH5, Hopping off**



**Tx 3DH5, Hopping on**



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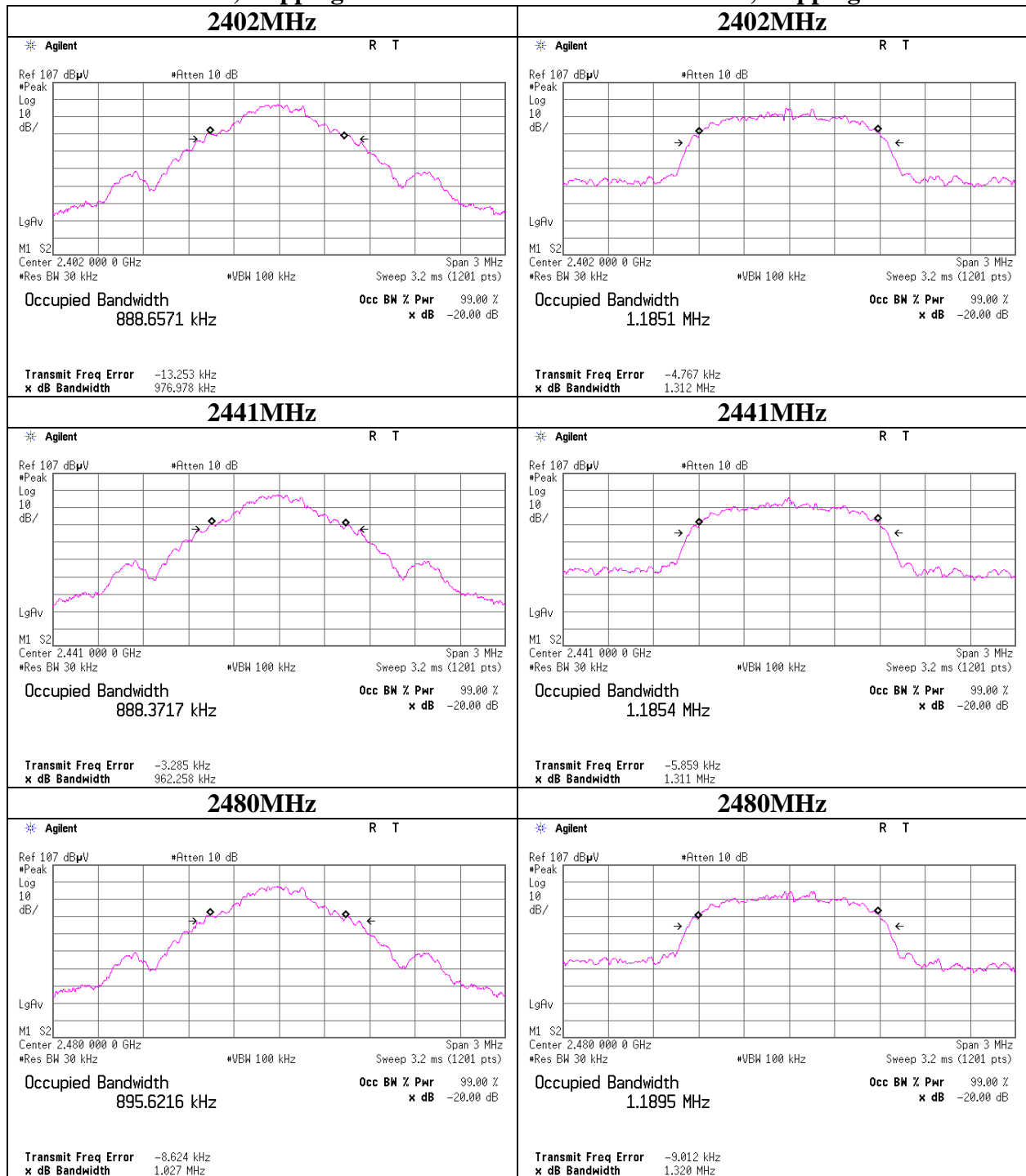
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**99% Occupied Bandwidth**

**Tx DH5, Hopping off**

**Tx 3DH5, Hopping off**



**UL Japan, Inc.**

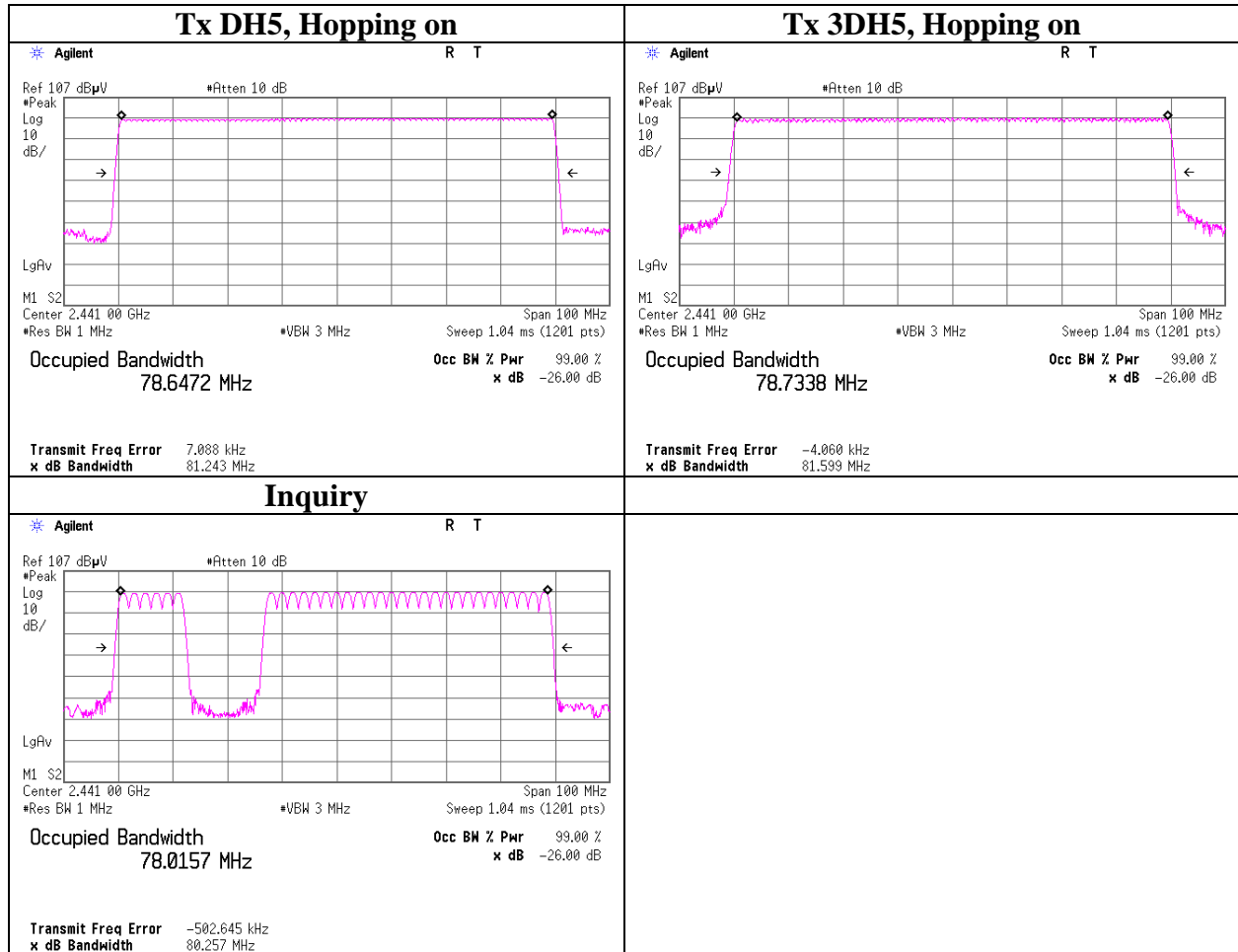
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### 99% Occupied Bandwidth





## **APPENDIX 2: Test instruments**

### **EMI test equipment**

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	AT	2013/04/03 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2013/03/21 * 12
MCC-67	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28635/2	AT	2013/04/16 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2012/10/08 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2012/10/08 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2013/02/26 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2013/02/28 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE/CE	2013/02/26 * 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	2012/11/20 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2013/05/17 * 12
MCC-133	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336164/4(1m) / 340640(5m)	RE	2012/09/05 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2013/03/12 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2013/05/17 * 12
MAT-20	Attenuator(10dB)(above 1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-110	-	RE	2013/01/09 * 12
MCC-76	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278967/4	RE	2012/12/24 * 12
MHF-19	High Pass Filter 3.5-18.0GHz	TOKIMEC	TF323DCA	602	RE	2012/09/12 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE / CE	2012/08/23 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2012/10/08 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2012/10/08 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2012/07/12 * 12
MAT-70	Attenuator(6dB)	Agilent	8491A-006	MY52460153	RE	2013/04/05 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2013/03/12 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE(AE)	2013/01/07 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE(EUT)	2013/01/07 * 12
MTA-31	Terminator	TME	CT-01	-	CE	2013/01/21 * 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	2012/07/12 * 12
MAT-66	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2013/01/22 * 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**

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