



# RADIO TEST REPORT

**Test Report No. : 10014382H-B-R1**

**Applicant** : Sony Computer Entertainment Inc.  
**Type of Equipment** : Computer Entertainment System  
**Model No.** : CECH-4201x  
**FCC ID** : AK8CBEH19S1  
**Test regulation** : FCC Part 15 Subpart C: 2013  
\*Bluetooth 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 10014382H-B. 10014382H-B is replaced with this report.

**Date of test:** June 11 to June 27, 2013

**Representative test engineer:**

*T. Shimada*

Takumi Shimada  
Engineer of WiSE Japan,  
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



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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	CECH-4201x
Serial No	4000009 for Conducted Emission and Radiated Emission tests 4000010 for Antenna Conducted Terminal test
Country of Manufacture	China/Japan
Receipt Date of Sample	June 10, 2013
Condition of EUT	Engineering 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: CECH-4201x, referred to as the EUT in this report, is a Computer Entertainment System. The EUT contains a Bluetooth and IEEE802.11b/g WLAN module. WLAN antennas do not transmit simultaneously. Bluetooth antenna also does not transmit simultaneously with WLAN antennas.

Details of model name CECH-4201x:

“x” will be replaced by an alphabet denoting the different capacity of storage.

The difference of the capacity of storage does not influence on radio specification.

### **Product Specification**

Maximum clock frequency in the system	3.2GHz
Operating Temperature	5-35 deg. C
Power Supply	AC100-240V, 50Hz/60Hz (made by Chicony)
Size	290 x 60 x 230 mm
Weight	Approx. 2.1kg

### **Radio Specification**

#### **WLAN (IEEE802.11b/g)**

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	Antenna 0: IFA	Antenna 1: PIFA
Antenna Gain	Antenna 0: 1.5 dBi (max)	Antenna 1: 3.0 dBi (max)

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**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	3.0dBi (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 23.4dB, 0.15000MHz, L AV 16.1dB, 0.20392MHz, L	Complied	-	
Carrier Frequency Separation	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) ----- IC: RSS-210 A8.1 (b)	See data.	Complied	Conducted	
20dB Bandwidth	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) ----- IC: RSS-210 A8.1 (a)		Complied	Conducted	
Number of Hopping Frequency	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) ----- IC: RSS-210 A8.1 (d)		Complied	Conducted	
Dwell time	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) ----- IC: RSS-210 A8.1 (d)		Complied	Conducted	
Maximum Peak Output Power	FCC: FCC Public Notice DA 00-705 IC: RSS-Gen 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		3.9dB 2484.503MHz, AV, Hori.	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)**

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.

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### 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
Carrier Frequency Separation 20dB Bandwidth	Tx (Hopping on) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Number of Hopping Frequency	Tx (Hopping on) DH5, 3DH5 Inquiry	-
Dwell time	Tx (Hopping on), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5 Inquiry	-
Maximum Peak Output Power	Tx (Hopping off) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2480MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping on -Hopping off Inquiry	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: LABTOOL_LV2DIAG_20111206  *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-25GHz  
**Test data** : APPENDIX  
**Test result** : Pass

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## **SECTION 7: Antenna Terminal Conducted Tests**

### **Test Procedure**

The tests were made with below setting connected to the antenna port.

<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	3MHz, 5MHz	30kHz 100kHz	100kHz 300kHz	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**

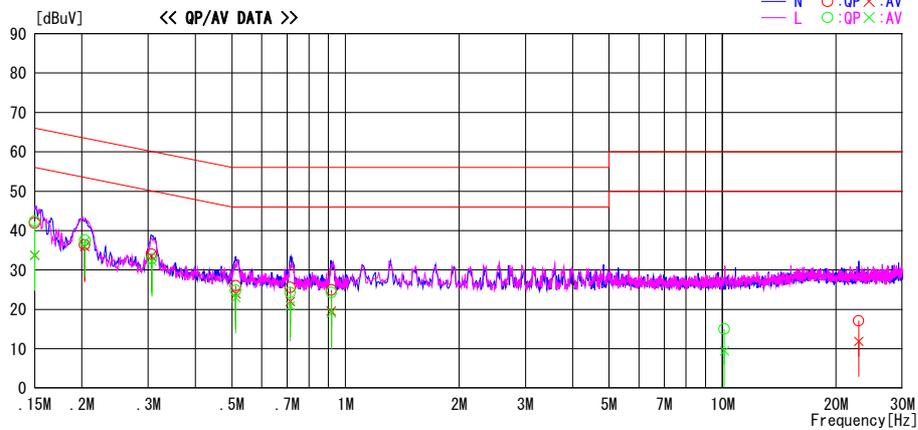
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber  
Date : 2013/06/28

Report No. : 10014383H  
Power : AC 120V / 60Hz  
Temp./Humi. : 24deg. C / 66% RH  
Engineer : Katsunori Okai

Mode / Remarks : BT DH5 2402MHz

LIMIT : FCC15. 207 QP  
FCC15. 207 AV

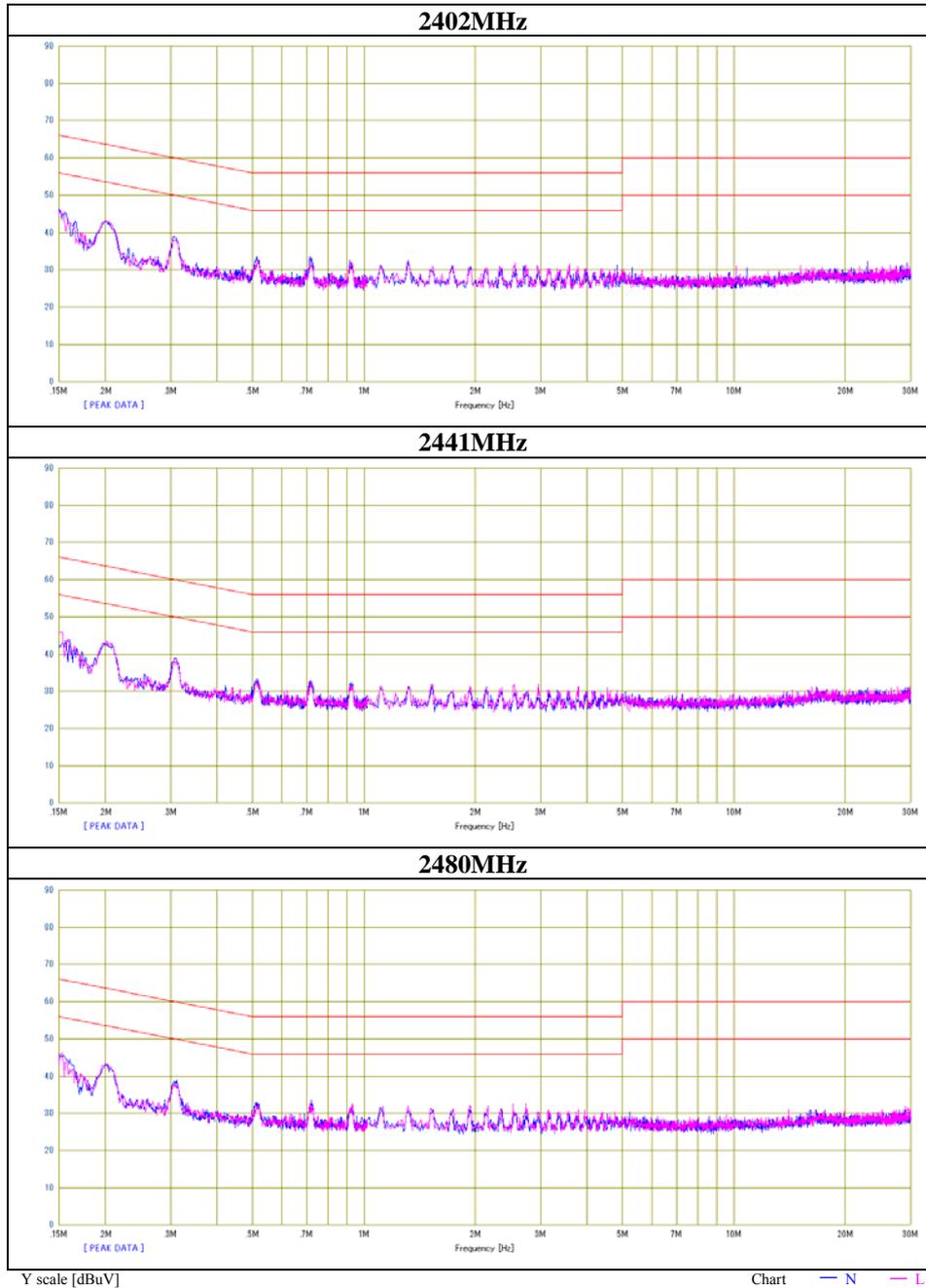


Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	28.7	20.6	13.2	41.9	33.8	66.0	56.0	24.1	22.2	N	
0.20341	23.2	22.8	13.2	36.4	36.0	63.5	53.5	27.1	17.5	N	
0.30573	20.7	20.2	13.3	34.0	33.5	60.1	50.1	26.1	16.6	N	
0.51163	12.7	10.7	13.3	26.0	24.0	56.0	46.0	30.0	22.0	N	
0.71422	12.2	8.6	13.4	25.6	22.0	56.0	46.0	30.4	24.0	N	
0.91692	11.5	6.2	13.4	24.9	19.6	56.0	46.0	31.1	26.4	N	
22.98253	2.2	-3.0	14.9	17.1	11.9	60.0	50.0	42.9	38.1	N	
0.15000	29.2	20.6	13.2	42.4	33.8	66.0	56.0	23.6	22.2	L	
0.20392	24.4	24.1	13.2	37.6	37.3	63.4	53.4	25.8	16.1	L	
0.30686	19.5	19.0	13.3	32.8	32.3	60.1	50.1	27.3	17.8	L	
0.51148	11.5	9.7	13.3	24.8	23.0	56.0	46.0	31.2	23.0	L	
0.71422	10.9	7.5	13.4	24.3	20.9	56.0	46.0	31.7	25.1	L	
0.91793	10.9	5.7	13.4	24.3	19.1	56.0	46.0	31.7	26.9	L	
10.10922	0.8	-4.8	14.2	15.0	9.4	60.0	50.0	45.0	40.6	L	

CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT [dBuV] = READING [dBuV] + C. F [dB] (LISN LOSS + CABLE LOSS + ATETN. LOSS)  
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.	10014382H
Date	06/27/2013
Temperature/ Humidity	24 deg. C / 66% RH
Engineer	Katsunori Okai
Mode	Tx DH5



## Conducted Emission

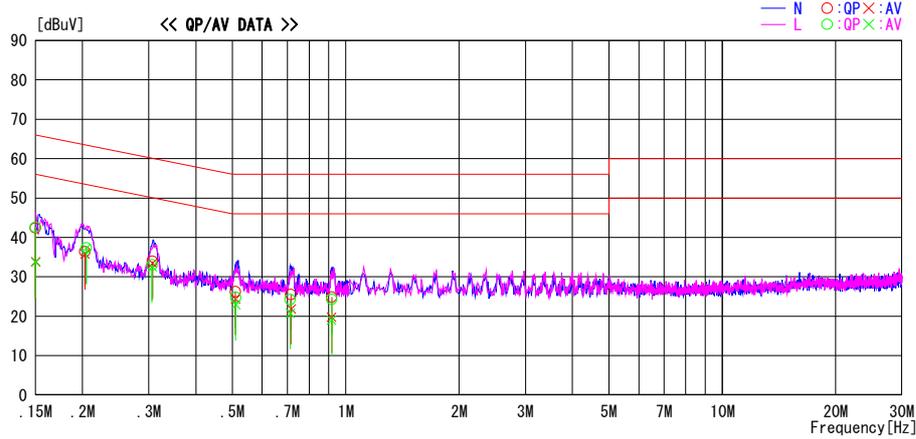
### DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber  
 Date : 2013/06/28

Report No. : 10014383H  
 Power : AC 120V / 60Hz  
 Temp./Humi. : 24deg. C / 66% RH  
 Engineer : Katsunori Okai

Mode / Remarks : BT 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]		
0.15000	29.2	20.7	13.2	42.4	33.9	66.0	56.0	23.6	22.1	N	
0.20292	23.2	22.6	13.2	36.4	35.8	63.5	53.5	27.1	17.7	N	
0.30675	20.6	20.1	13.3	33.9	33.4	60.1	50.1	26.2	16.7	N	
0.50972	12.9	11.0	13.3	26.2	24.3	56.0	46.0	29.8	21.7	N	
0.71551	12.1	8.5	13.4	25.5	21.9	56.0	46.0	30.5	24.1	N	
0.91756	11.4	6.3	13.4	24.8	19.7	56.0	46.0	31.2	26.3	N	
0.15000	29.4	20.5	13.2	42.6	33.7	66.0	56.0	23.4	22.3	L	
0.20462	24.2	24.0	13.2	37.4	37.2	63.4	53.4	26.0	16.2	L	
0.30619	19.7	19.2	13.3	33.0	32.5	60.1	50.1	27.1	17.6	L	
0.51045	11.4	9.6	13.3	24.7	22.9	56.0	46.0	31.3	23.1	L	
0.71289	10.8	7.3	13.4	24.2	20.7	56.0	46.0	31.8	25.3	L	
0.91759	10.9	5.6	13.4	24.3	19.0	56.0	46.0	31.7	27.0	L	

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

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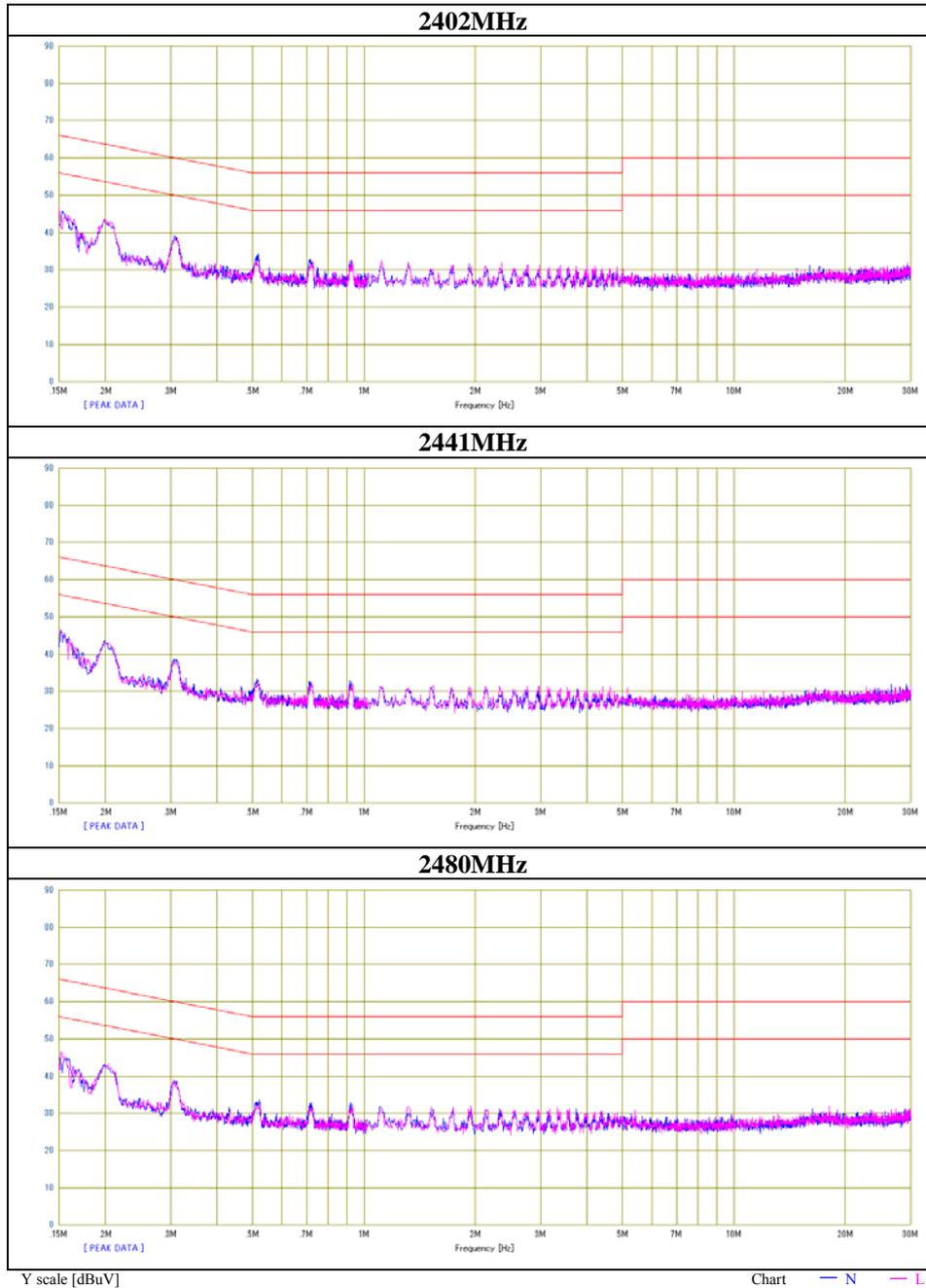
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## Conducted Emission

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10014382H
Date	06/27/2013
Temperature/ Humidity	24 deg. C / 66% RH
Engineer	Katsunori Okai
Mode	Tx 3DH5

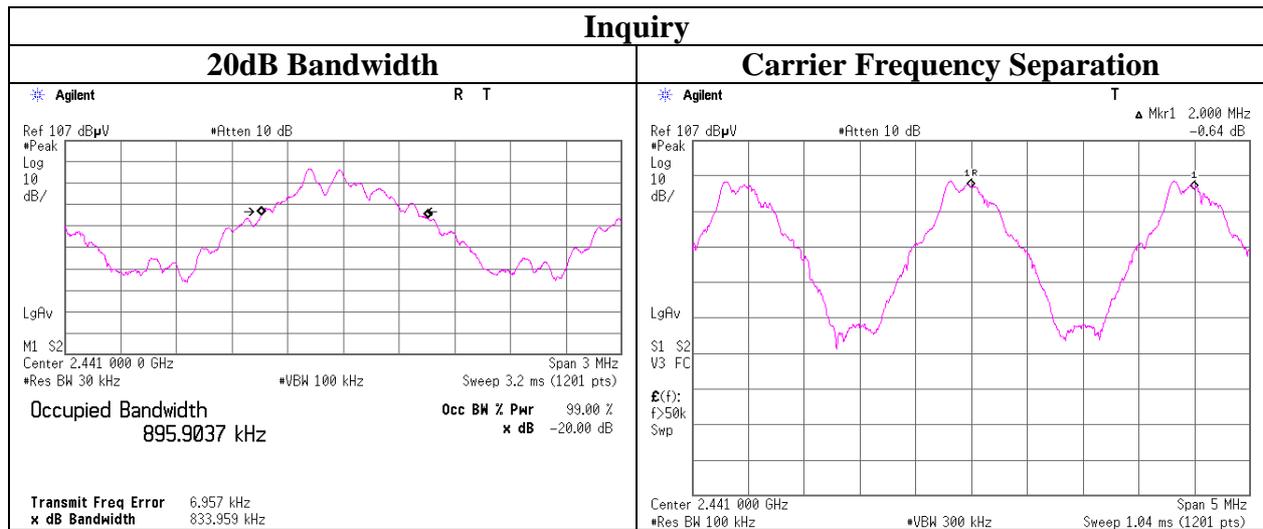


## 20dB Bandwidth and Carrier Frequency Separation

Test place	Head Office EMC Lab. No.11 Measurement Room
Report No.	10014382H
Date	06/11/2013
Temperature/ Humidity	23 deg. C / 52% RH
Engineer	Takayuki 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	0.955	1.000	≥ 0.637
DH5	2441.0	0.968	1.000	≥ 0.645
DH5	2480.0	0.971	1.000	≥ 0.647
3DH5	2402.0	1.274	1.000	≥ 0.849
3DH5	2441.0	1.287	1.000	≥ 0.858
3DH5	2480.0	1.301	1.000	≥ 0.867
Inquiry	2441.0	0.834	2.000	≥ 0.556

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



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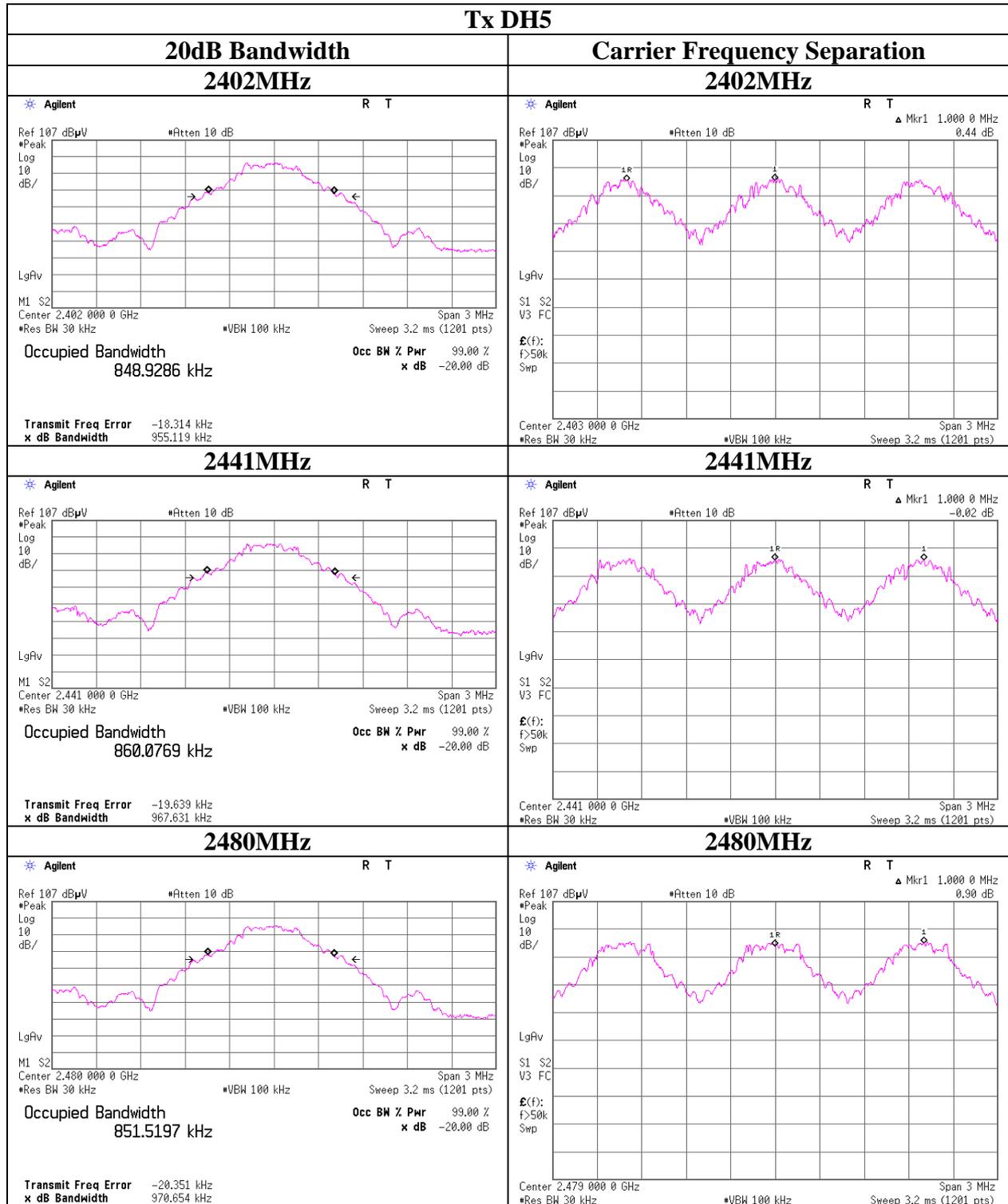
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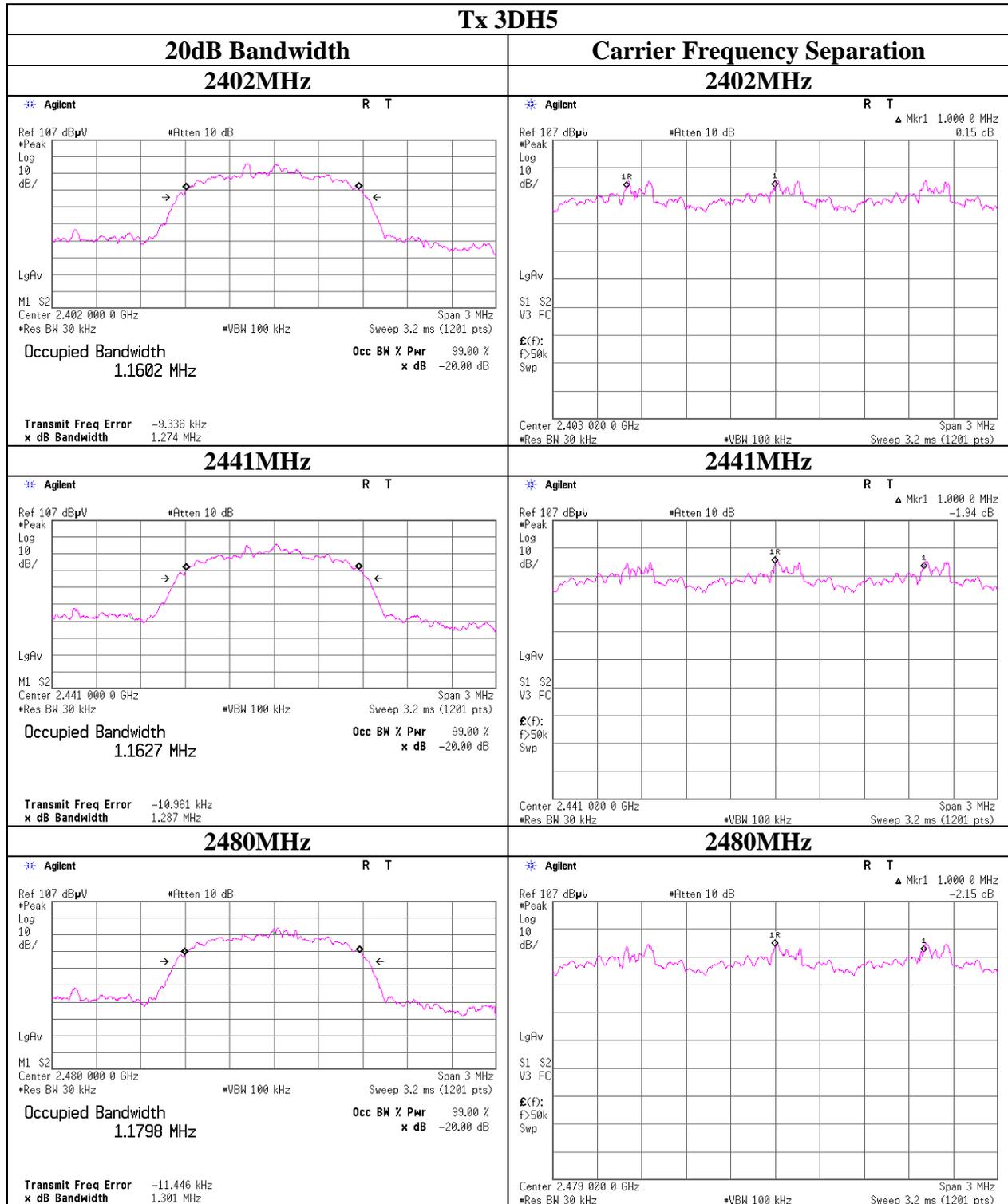
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## 20dB Bandwidth and Carrier Frequency Separation



## 20dB Bandwidth and Carrier Frequency Separation

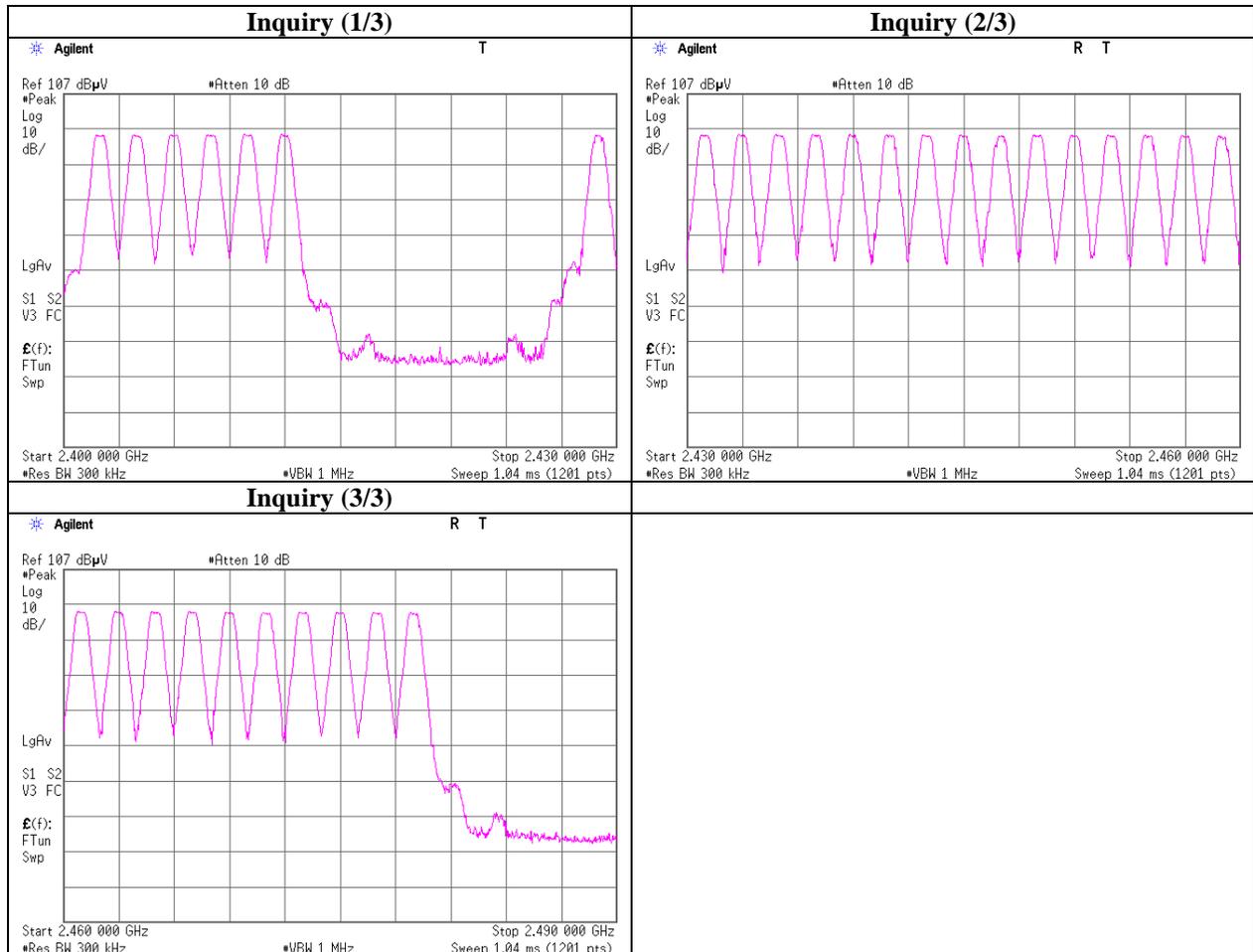


## Number of Hopping Frequency

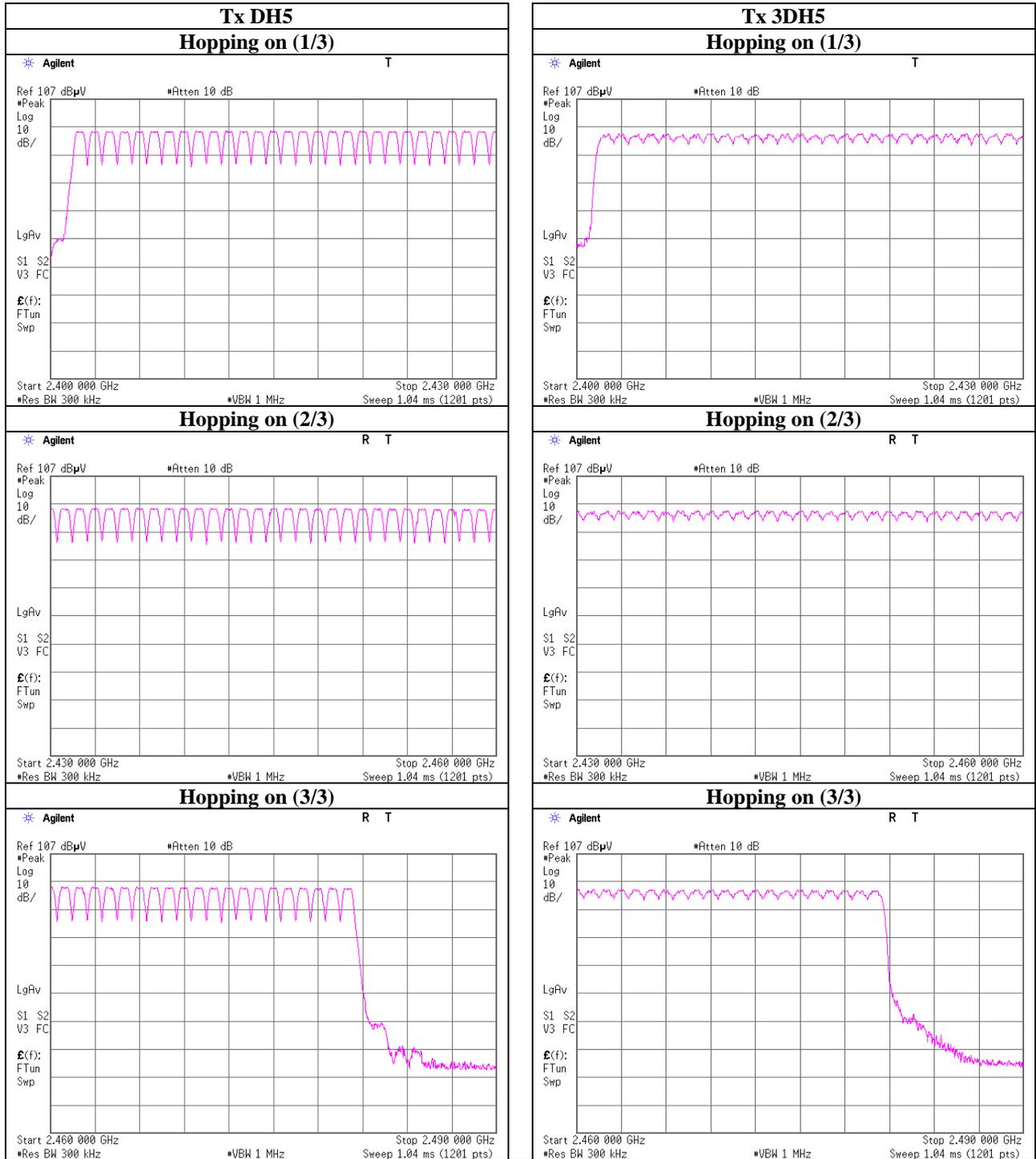
Test place	Head Office EMC Lab. No.11 Measurement Room
Report No.	10014382H
Date	06/11/2013
Temperature/ Humidity	23 deg. C / 52% RH
Engineer	Takayuki Shimada
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

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



### Dwell time

Test place	Head Office EMC Lab. No.11 Measurement Room
Report No.	10014382H
Date	06/11/2013
Temperature/ Humidity	23 deg. C / 52% RH
Engineer	Takayuki 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	48.2 times /	5 sec. x	31.6 sec. =	305 times	0.419	128	400
DH3	28.4 times /	5 sec. x	31.6 sec. =	180 times	1.682	303	400
DH5	20.4 times /	5 sec. x	31.6 sec. =	129 times	2.927	378	400
3DH1	48.6 times /	5 sec. x	31.6 sec. =	308 times	0.423	130	400
3DH3	27.6 times /	5 sec. x	31.6 sec. =	175 times	1.690	296	400
3DH5	20.0 times /	5 sec. x	31.6 sec. =	127 times	2.936	373	400
Inquiry	100.0 times /	1 sec. x	12.8 sec. =	1280 times	0.123	157	400

Sample Calculation

Result = Number of transmission x Length of transmission time

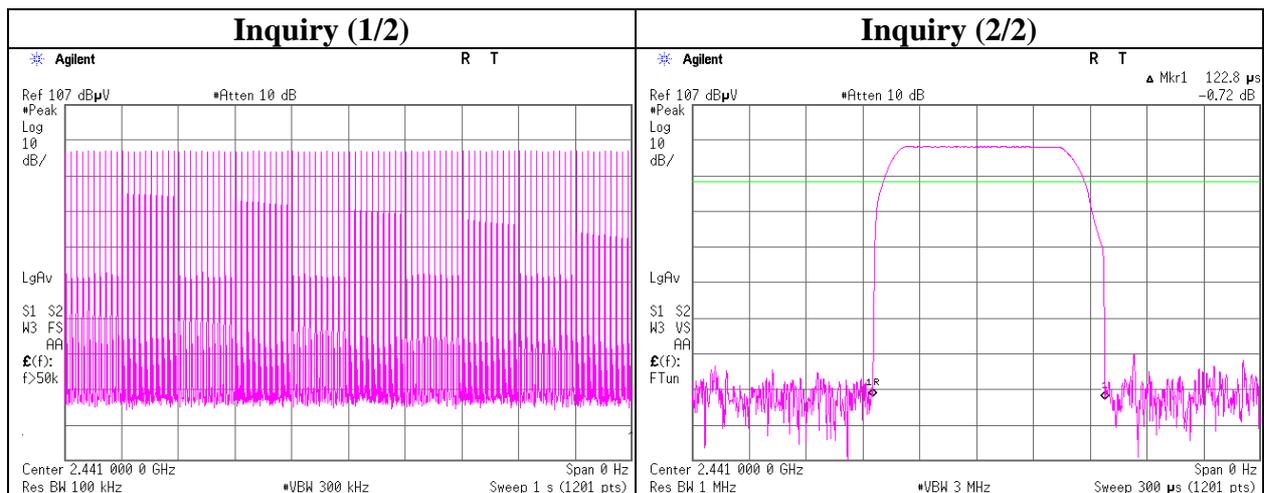
\*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	50	48	48	48	47	48.2
DH3	31	28	27	28	28	28.4
DH5	19	21	19	21	22	20.4
3DH1	48	49	48	49	49	48.6
3DH3	29	26	26	28	29	27.6
3DH5	18	20	19	23	20	20

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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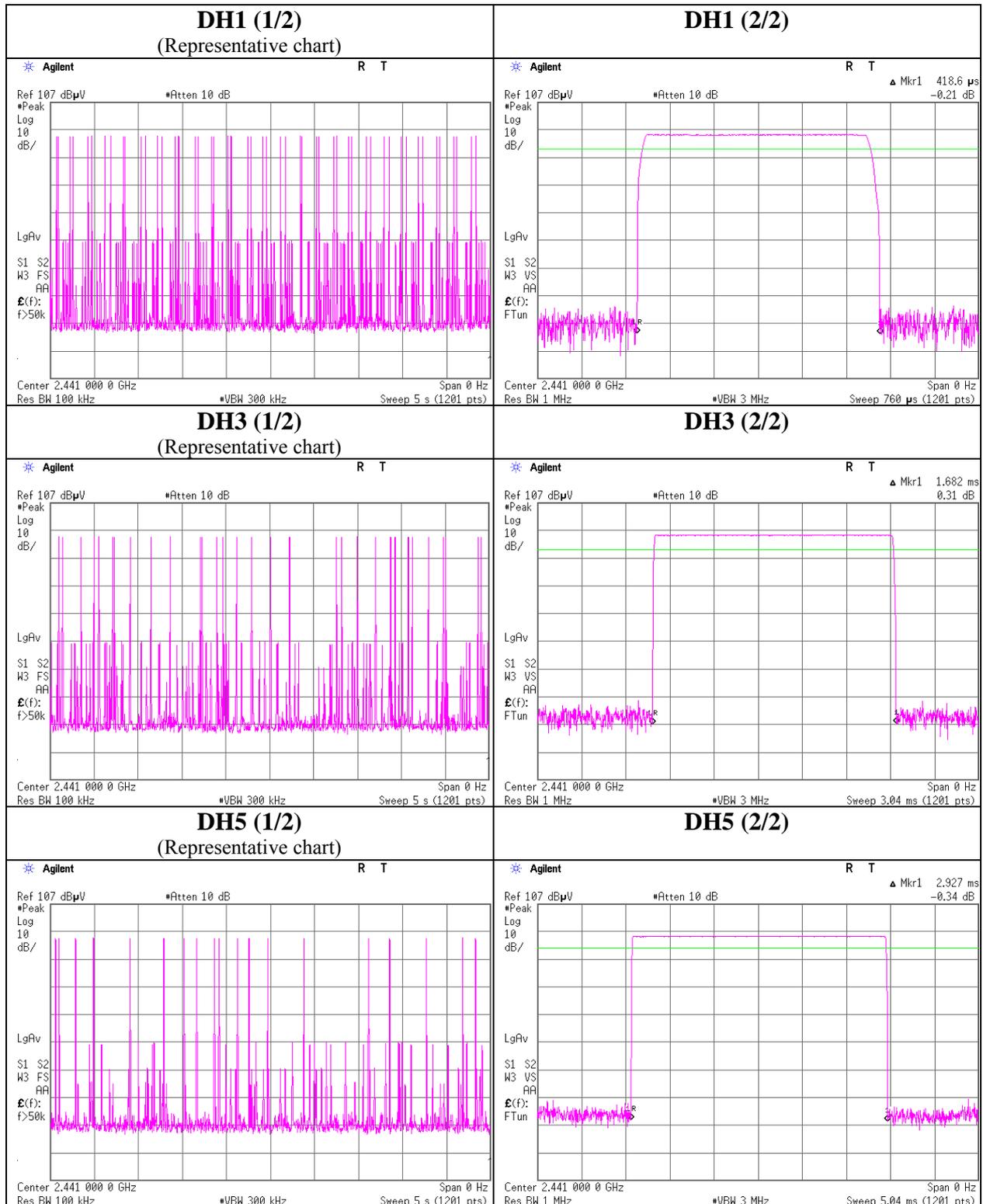
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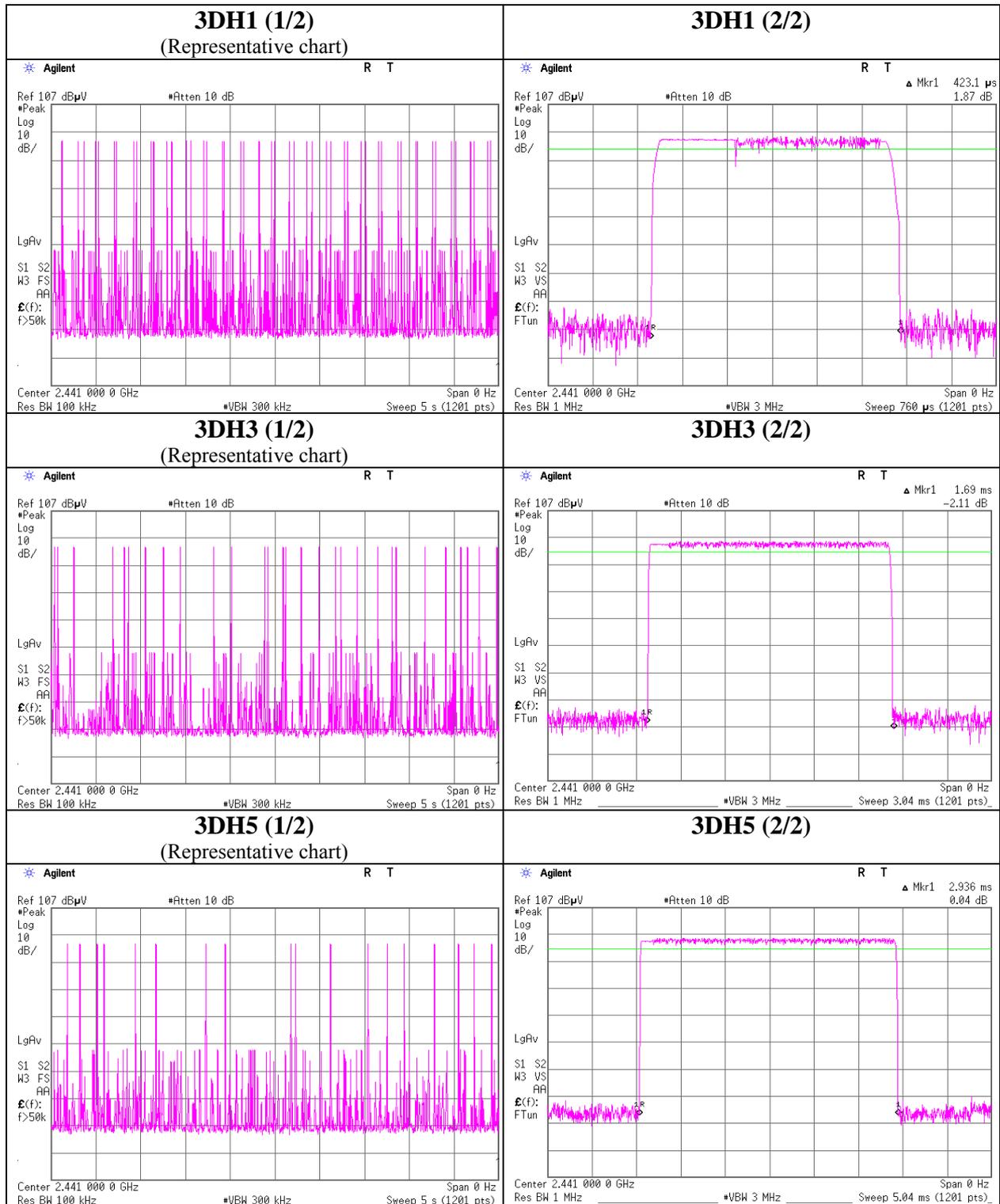
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**Dwell time**



**Dwell time**



### Maximum Peak Output Power

Test place : Head Office EMC Lab. No.11 Measurement Room  
 Report No. : 10014382H  
 Date : 06/11/2013  
 Temperature/ Humidity : 23 deg. C / 52% RH  
 Engineer : Takayuki 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	-11.39	2.05	10.07	0.73	1.18	20.96	125	20.23
DH5	2441	-11.43	2.07	10.07	0.71	1.18	20.96	125	20.25
DH5	2480	-12.12	2.07	10.07	0.02	1.00	20.96	125	20.94
3DH5	2402	-10.75	2.05	10.07	1.37	1.37	20.96	125	19.59
3DH5	2441	-10.72	2.07	10.07	1.42	1.39	20.96	125	19.54
3DH5	2480	-11.48	2.07	10.07	0.66	1.16	20.96	125	20.30
Inquiry	2441	-11.41	2.07	10.07	0.73	1.18	20.96	125	20.23

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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**Head Office EMC Lab.**

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## Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber  
Report No. 10014382H  
Date 06/14/2013 06/15/2013 06/23/2013  
Temperature/ Humidity 23 deg. C / 63% RH 24 deg. C / 60% RH 24 deg. C / 63% RH  
Engineer Takayuki Shimada Takayuki Shimada Takumi Shimada  
(1-10GHz) (Above 1GHz) (Below 1GHz)  
Mode Tx, DH5 2441MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	107.995	QP	37.6	11.3	8.1	32.1	24.9	43.5	18.6	
Hori	405.009	QP	36.4	17.4	10.6	32.0	32.4	46.0	13.6	
Hori	432.002	QP	39.2	17.6	10.8	32.0	35.6	46.0	10.4	
Hori	540.608	QP	32.3	18.6	11.5	32.1	30.3	46.0	15.7	
Hori	576.001	QP	37.7	19.0	11.7	32.1	36.3	46.0	9.7	
Hori	810.915	QP	32.4	21.9	12.9	31.5	35.7	46.0	10.3	
Hori	4882.000	PK	41.3	30.6	4.7	31.4	45.2	73.9	28.7	
Hori	7323.000	PK	42.3	36.0	5.6	32.4	51.5	73.9	22.4	
Hori	9764.000	PK	42.4	39.4	6.4	33.0	55.2	73.9	18.7	
Hori	4882.000	AV	29.2	30.6	4.7	31.4	33.1	53.9	20.8	
Hori	7323.000	AV	30.2	36.0	5.6	32.4	39.4	53.9	14.5	
Hori	9764.000	AV	30.5	39.4	6.4	33.0	43.3	53.9	10.6	
Vert	106.641	QP	45.4	11.1	8.1	32.1	32.5	43.5	11.0	
Vert	405.003	QP	41.1	17.4	10.6	32.0	37.1	46.0	8.9	
Vert	432.000	QP	42.0	17.6	10.8	32.0	38.4	46.0	7.6	
Vert	540.603	QP	35.6	18.6	11.5	32.1	33.6	46.0	12.4	
Vert	576.003	QP	34.4	19.0	11.7	32.1	33.0	46.0	13.0	
Vert	810.913	QP	29.1	21.9	12.9	31.5	32.4	46.0	13.6	
Vert	4882.000	PK	41.5	30.6	4.7	31.4	45.4	73.9	28.5	
Vert	7323.000	PK	42.2	36.0	5.6	32.4	51.4	73.9	22.5	
Vert	9764.000	PK	42.5	39.4	6.4	33.0	55.3	73.9	18.6	
Vert	4882.000	AV	29.2	30.6	4.7	31.4	33.1	53.9	20.8	
Vert	7323.000	AV	30.2	36.0	5.6	32.4	39.4	53.9	14.5	
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).

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

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**Head Office EMC Lab.**

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Facsimile : +81 596 24 8124

## Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber  
Report No. 10014382H  
Date 06/14/2013 06/15/2013 06/23/2013  
Temperature/ Humidity 23 deg. C / 63% RH 24 deg. C / 60% RH 24 deg. C / 63% RH  
Engineer Takayuki Shimada Takayuki Shimada Takumi Shimada  
(1-10GHz) (Above 1GHz) (Below 1GHz)  
Mode Tx, DH5 2480MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	107.993	QP	37.3	11.3	8.1	32.1	24.6	43.5	18.9	
Hori	405.007	QP	36.5	17.4	10.6	32.0	32.5	46.0	13.5	
Hori	432.002	QP	39.3	17.6	10.8	32.0	35.7	46.0	10.3	
Hori	540.605	QP	32.5	18.6	11.5	32.1	30.5	46.0	15.5	
Hori	576.001	QP	37.6	19.0	11.7	32.1	36.2	46.0	9.8	
Hori	810.914	QP	32.2	21.9	12.9	31.5	35.5	46.0	10.5	
Hori	2483.500	PK	52.8	28.4	2.3	32.3	51.2	73.9	22.7	
Hori	2484.503	PK	57.6	28.4	2.3	32.3	56.0	73.9	17.9	
Hori	4960.000	PK	43.1	30.7	4.7	31.4	47.1	73.9	26.8	
Hori	7440.000	PK	44.4	36.2	5.6	32.4	53.8	73.9	20.1	
Hori	9920.000	PK	44.6	39.8	6.4	33.1	57.7	73.9	16.2	
Hori	2483.500	AV	41.7	28.4	2.3	32.3	40.1	53.9	13.8	
Hori	2484.503	AV	51.6	28.4	2.3	32.3	50.0	53.9	3.9	
Hori	4960.000	AV	30.8	30.7	4.7	31.4	34.8	53.9	19.1	
Hori	7440.000	AV	32.0	36.2	5.6	32.4	41.4	53.9	12.5	
Hori	9920.000	AV	32.5	39.8	6.4	33.1	45.6	53.9	8.3	
Vert	106.653	QP	45.1	11.1	8.1	32.1	32.2	43.5	11.3	
Vert	405.002	QP	41.0	17.4	10.6	32.0	37.0	46.0	9.0	
Vert	432.001	QP	42.1	17.6	10.8	32.0	38.5	46.0	7.5	
Vert	540.603	QP	35.2	18.6	11.5	32.1	33.2	46.0	12.8	
Vert	576.001	QP	34.1	19.0	11.7	32.1	32.7	46.0	13.3	
Vert	810.913	QP	29.3	21.9	12.9	31.5	32.6	46.0	13.4	
Vert	2483.500	PK	47.5	28.4	2.3	32.3	45.9	73.9	28.0	
Vert	2484.503	PK	53.8	28.4	2.3	32.3	52.2	73.9	21.7	
Vert	4960.000	PK	43.2	30.7	4.7	31.4	47.2	73.9	26.7	
Vert	7440.000	PK	44.6	36.2	5.6	32.4	54.0	73.9	19.9	
Vert	9920.000	PK	44.8	39.8	6.4	33.1	57.9	73.9	16.0	
Vert	2483.500	AV	34.1	28.4	2.3	32.3	32.5	53.9	21.4	
Vert	2484.503	AV	48.2	28.4	2.3	32.3	46.6	53.9	7.3	
Vert	4960.000	AV	30.8	30.7	4.7	31.4	34.8	53.9	19.1	
Vert	7440.000	AV	32.0	36.2	5.6	32.4	41.4	53.9	12.5	
Vert	9920.000	AV	32.5	39.8	6.4	33.1	45.6	53.9	8.3	

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

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

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

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## Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber  
Report No. 10014382H  
Date 06/14/2013 06/15/2013 06/23/2013  
Temperature/ Humidity 23 deg. C / 63% RH 24 deg. C / 60% RH 24 deg. C / 63% RH  
Engineer Takayuki Shimada Takayuki Shimada Takumi Shimada  
(1-10GHz) (Above 1GHz) (Below 1GHz)  
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	107.986	QP	37.5	11.3	8.1	32.1	24.8	43.5	18.7	
Hori	405.002	QP	36.1	17.4	10.6	32.0	32.1	46.0	13.9	
Hori	432.003	QP	39.2	17.6	10.8	32.0	35.6	46.0	10.4	
Hori	540.604	QP	32.4	18.6	11.5	32.1	30.4	46.0	15.6	
Hori	576.002	QP	37.8	19.0	11.7	32.1	36.4	46.0	9.6	
Hori	810.916	QP	32.0	21.9	12.9	31.5	35.3	46.0	10.7	
Hori	2390.000	PK	47.8	28.2	2.3	32.4	45.9	73.9	28.0	
Hori	4804.000	PK	41.3	30.5	4.8	31.4	45.2	73.9	28.7	
Hori	7206.000	PK	42.0	35.8	5.6	32.3	51.1	73.9	22.8	
Hori	9608.000	PK	42.3	39.0	6.4	33.0	54.7	73.9	19.2	
Hori	2390.000	AV	33.1	28.2	2.3	32.4	31.2	53.9	22.7	
Hori	4804.000	AV	29.2	30.5	4.8	31.4	33.1	53.9	20.8	
Hori	7206.000	AV	30.3	35.8	5.6	32.3	39.4	53.9	14.5	
Hori	9608.000	AV	30.5	39.0	6.4	33.0	42.9	53.9	11.0	
Vert	106.642	QP	45.2	11.1	8.1	32.1	32.3	43.5	11.2	
Vert	405.006	QP	41.3	17.4	10.6	32.0	37.3	46.0	8.7	
Vert	432.001	QP	41.8	17.6	10.8	32.0	38.2	46.0	7.8	
Vert	540.603	QP	35.3	18.6	11.5	32.1	33.3	46.0	12.7	
Vert	576.001	QP	33.9	19.0	11.7	32.1	32.5	46.0	13.5	
Vert	810.912	QP	29.2	21.9	12.9	31.5	32.5	46.0	13.5	
Vert	2390.000	PK	48.7	28.2	2.3	32.4	46.8	73.9	27.1	
Vert	4804.000	PK	41.2	30.5	4.8	31.4	45.1	73.9	28.8	
Vert	7206.000	PK	42.1	35.8	5.6	32.3	51.2	73.9	22.7	
Vert	9608.000	PK	42.5	39.0	6.4	33.0	54.9	73.9	19.0	
Vert	2390.000	AV	33.3	28.2	2.3	32.4	31.4	53.9	22.5	
Vert	4804.000	AV	29.2	30.5	4.8	31.4	33.1	53.9	20.8	
Vert	7206.000	AV	30.3	35.8	5.6	32.3	39.4	53.9	14.5	
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).

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

### 20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	100.7	28.2	2.3	32.4	98.8	-	-	Carrier
Hori	2400.000	AV	58.8	28.2	2.3	32.4	56.9	78.8	21.9	
Vert	2402.000	PK	98.8	28.2	2.3	32.4	96.9	-	-	Carrier
Vert	2400.000	AV	57.3	28.2	2.3	32.4	55.4	76.9	21.5	

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

**UL Japan, Inc.**

**Head Office EMC Lab.**

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## Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber  
Report No. 10014382H  
Date 06/14/2013 06/15/2013 06/23/2013  
Temperature/ Humidity 23 deg. C / 63% RH 24 deg. C / 60% RH 24 deg. C / 63% RH  
Engineer Takayuki Shimada Takayuki Shimada Takumi Shimada  
(1-10GHz) (Above 1GHz) (Below 1GHz)  
Mode Tx, 3DH5 2441MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	107.988	QP	37.3	11.3	8.1	32.1	24.6	43.5	18.9	
Hori	405.007	QP	36.0	17.4	10.6	32.0	32.0	46.0	14.0	
Hori	432.001	QP	39.3	17.6	10.8	32.0	35.7	46.0	10.3	
Hori	540.602	QP	32.7	18.6	11.5	32.1	30.7	46.0	15.3	
Hori	576.002	QP	37.4	19.0	11.7	32.1	36.0	46.0	10.0	
Hori	810.916	QP	32.1	21.9	12.9	31.5	35.4	46.0	10.6	
Hori	4882.000	PK	41.4	30.6	4.7	31.4	45.3	73.9	28.6	
Hori	7323.000	PK	42.1	36.0	5.6	32.4	51.3	73.9	22.6	
Hori	9764.000	PK	42.2	39.4	6.4	33.0	55.0	73.9	18.9	
Hori	4882.000	AV	29.2	30.6	4.7	31.4	33.1	53.9	20.8	
Hori	7323.000	AV	30.2	36.0	5.6	32.4	39.4	53.9	14.5	
Hori	9764.000	AV	30.5	39.4	6.4	33.0	43.3	53.9	10.6	
Vert	106.645	QP	45.1	11.1	8.1	32.1	32.2	43.5	11.3	
Vert	405.004	QP	41.1	17.4	10.6	32.0	37.1	46.0	8.9	
Vert	432.003	QP	41.5	17.6	10.8	32.0	37.9	46.0	8.1	
Vert	540.603	QP	35.5	18.6	11.5	32.1	33.5	46.0	12.5	
Vert	576.002	QP	34.0	19.0	11.7	32.1	32.6	46.0	13.4	
Vert	810.913	QP	29.4	21.9	12.9	31.5	32.7	46.0	13.3	
Vert	4882.000	PK	41.4	30.6	4.7	31.4	45.3	73.9	28.6	
Vert	7323.000	PK	42.3	36.0	5.6	32.4	51.5	73.9	22.4	
Vert	9764.000	PK	42.5	39.4	6.4	33.0	55.3	73.9	18.6	
Vert	4882.000	AV	29.2	30.6	4.7	31.4	33.1	53.9	20.8	
Vert	7323.000	AV	30.2	36.0	5.6	32.4	39.4	53.9	14.5	
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).

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

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Report No. 10014382H  
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Temperature/ Humidity 23 deg. C / 63% RH 24 deg. C / 60% RH 24 deg. C / 63% RH  
Engineer Takayuki Shimada Takayuki Shimada Takumi Shimada  
(1-10GHz) (Above 1GHz) (Below 1GHz)  
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	107.998	QP	37.7	11.3	8.1	32.1	25.0	43.5	18.5	
Hori	405.009	QP	35.8	17.4	10.6	32.0	31.8	46.0	14.2	
Hori	432.002	QP	38.7	17.6	10.8	32.0	35.1	46.0	10.9	
Hori	540.615	QP	32.2	18.6	11.5	32.1	30.2	46.0	15.8	
Hori	576.004	QP	37.6	19.0	11.7	32.1	36.2	46.0	9.8	
Hori	810.920	QP	32.6	21.9	12.9	31.5	35.9	46.0	10.1	
Hori	2483.500	PK	60.5	28.4	2.3	32.3	58.9	73.9	15.0	
Hori	4960.000	PK	43.2	30.7	4.7	31.4	47.2	73.9	26.7	
Hori	7440.000	PK	44.5	36.2	5.6	32.4	53.9	73.9	20.0	
Hori	9920.000	PK	44.7	39.8	6.4	33.1	57.8	73.9	16.1	
Hori	2483.500	AV	39.5	28.4	2.3	32.3	37.9	53.9	16.0	
Hori	4960.000	AV	30.8	30.7	4.7	31.4	34.8	53.9	19.1	
Hori	7440.000	AV	32.0	36.2	5.6	32.4	41.4	53.9	12.5	
Hori	9920.000	AV	32.5	39.8	6.4	33.1	45.6	53.9	8.3	
Vert	106.374	QP	46.8	11.1	8.1	32.1	33.9	43.5	9.6	
Vert	405.009	QP	40.7	17.4	10.6	32.0	36.7	46.0	9.3	
Vert	432.000	QP	41.6	17.6	10.8	32.0	38.0	46.0	8.0	
Vert	540.615	QP	35.9	18.6	11.5	32.1	33.9	46.0	12.1	
Vert	576.002	QP	34.6	19.0	11.7	32.1	33.2	46.0	12.8	
Vert	810.918	QP	29.4	21.9	12.9	31.5	32.7	46.0	13.3	
Vert	2483.500	PK	57.0	28.4	2.3	32.3	55.4	73.9	18.5	
Vert	4960.000	PK	43.0	30.7	4.7	31.4	47.0	73.9	26.9	
Vert	7440.000	PK	44.3	36.2	5.6	32.4	53.7	73.9	20.2	
Vert	9920.000	PK	44.8	39.8	6.4	33.1	57.9	73.9	16.0	
Vert	2483.500	AV	37.0	28.4	2.3	32.3	35.4	53.9	18.5	
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Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

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

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**Head Office EMC Lab.**

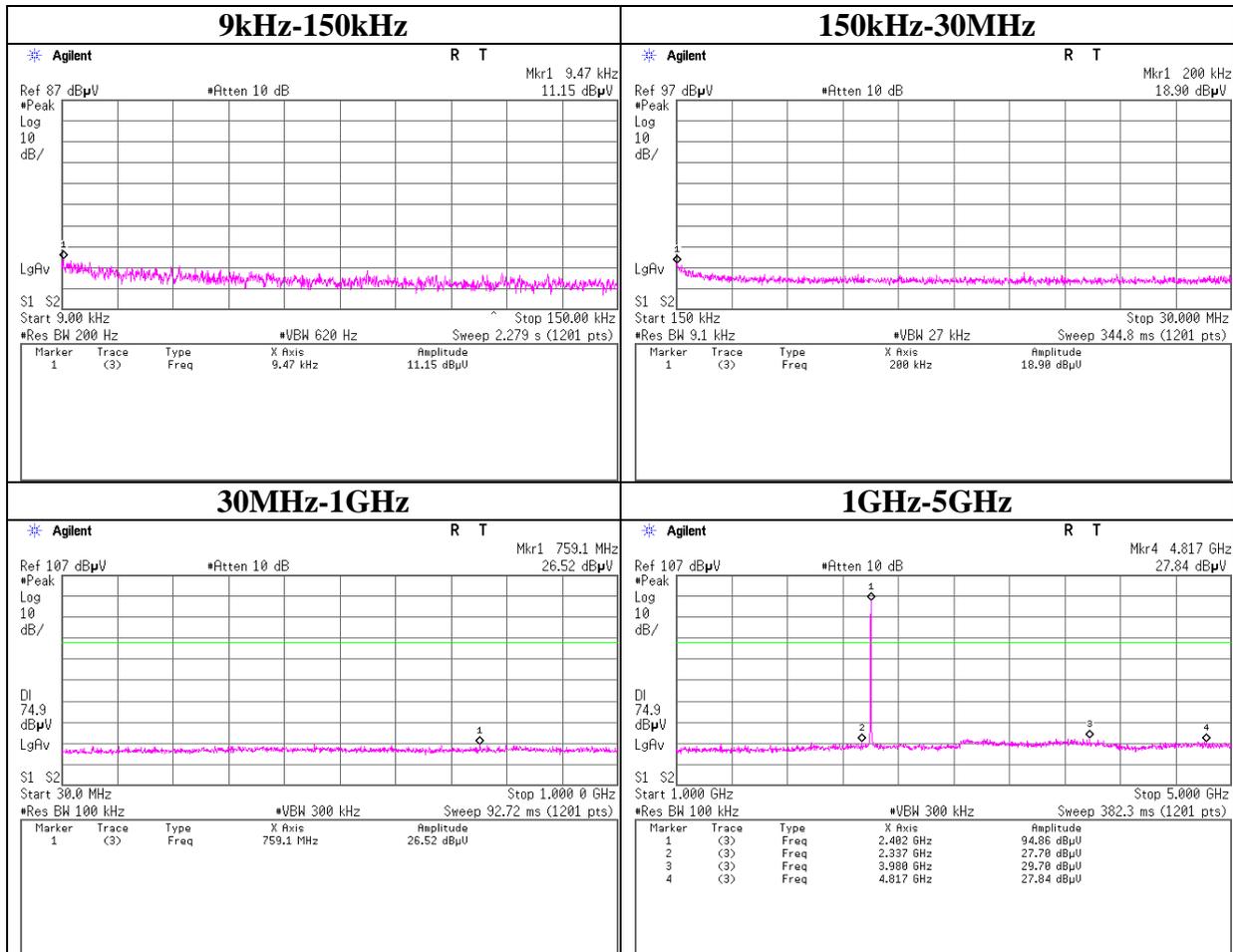
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## Conducted Spurious Emission

### Tx DH5 2402MHz



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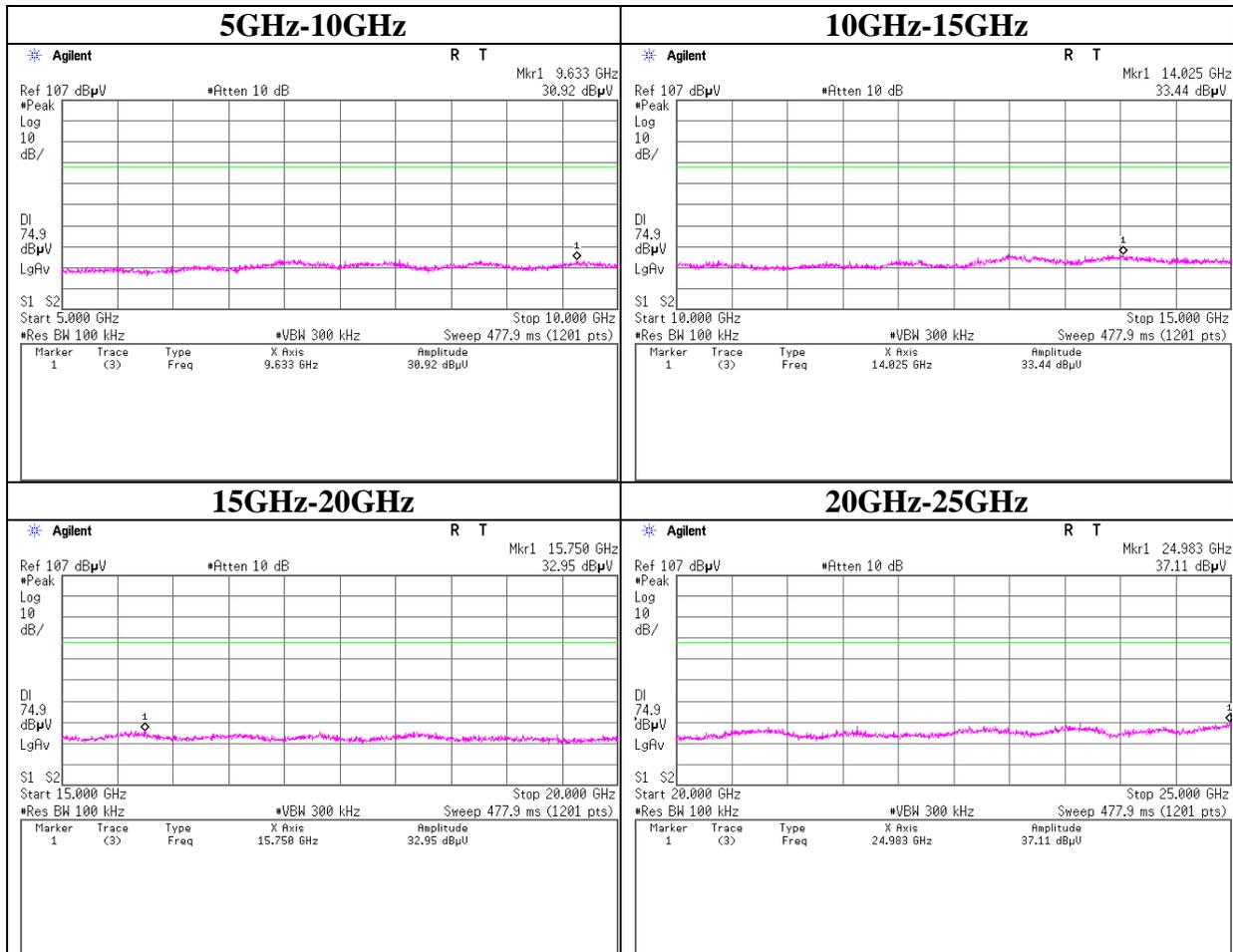
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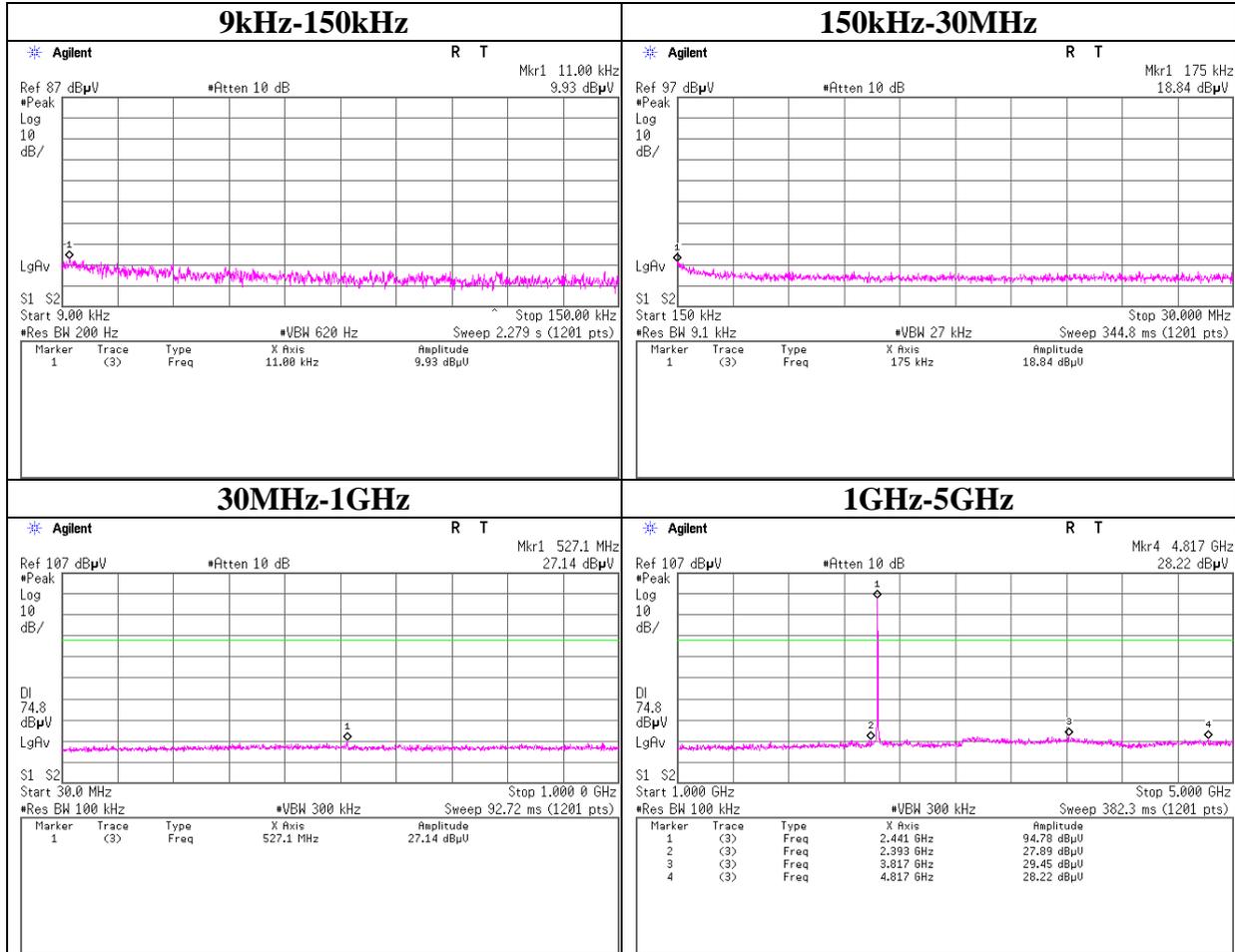
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## Conducted Spurious Emission

### Tx DH5 2441MHz



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**Head Office EMC Lab.**

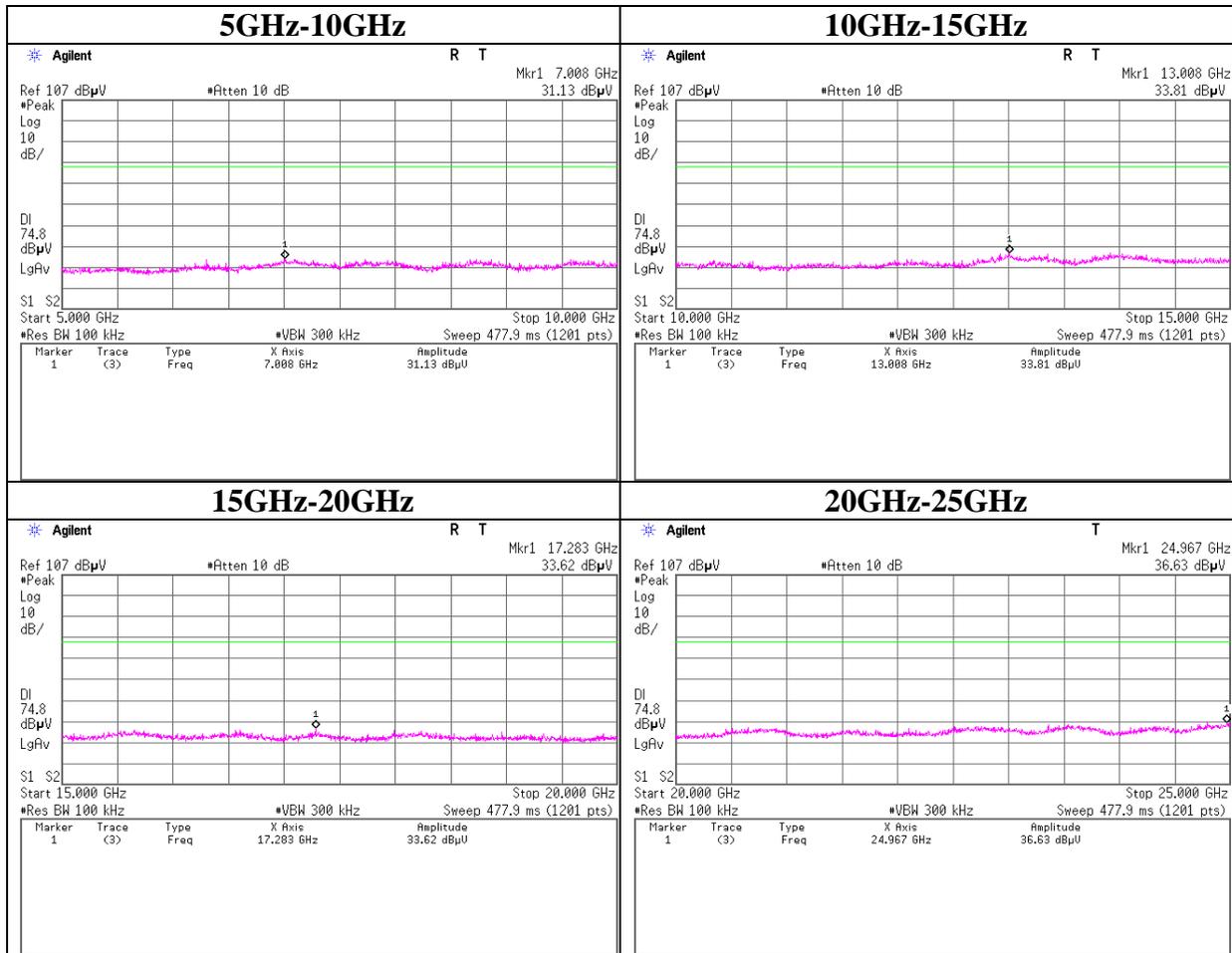
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## Conducted Spurious Emission

### Tx DH5 2441MHz



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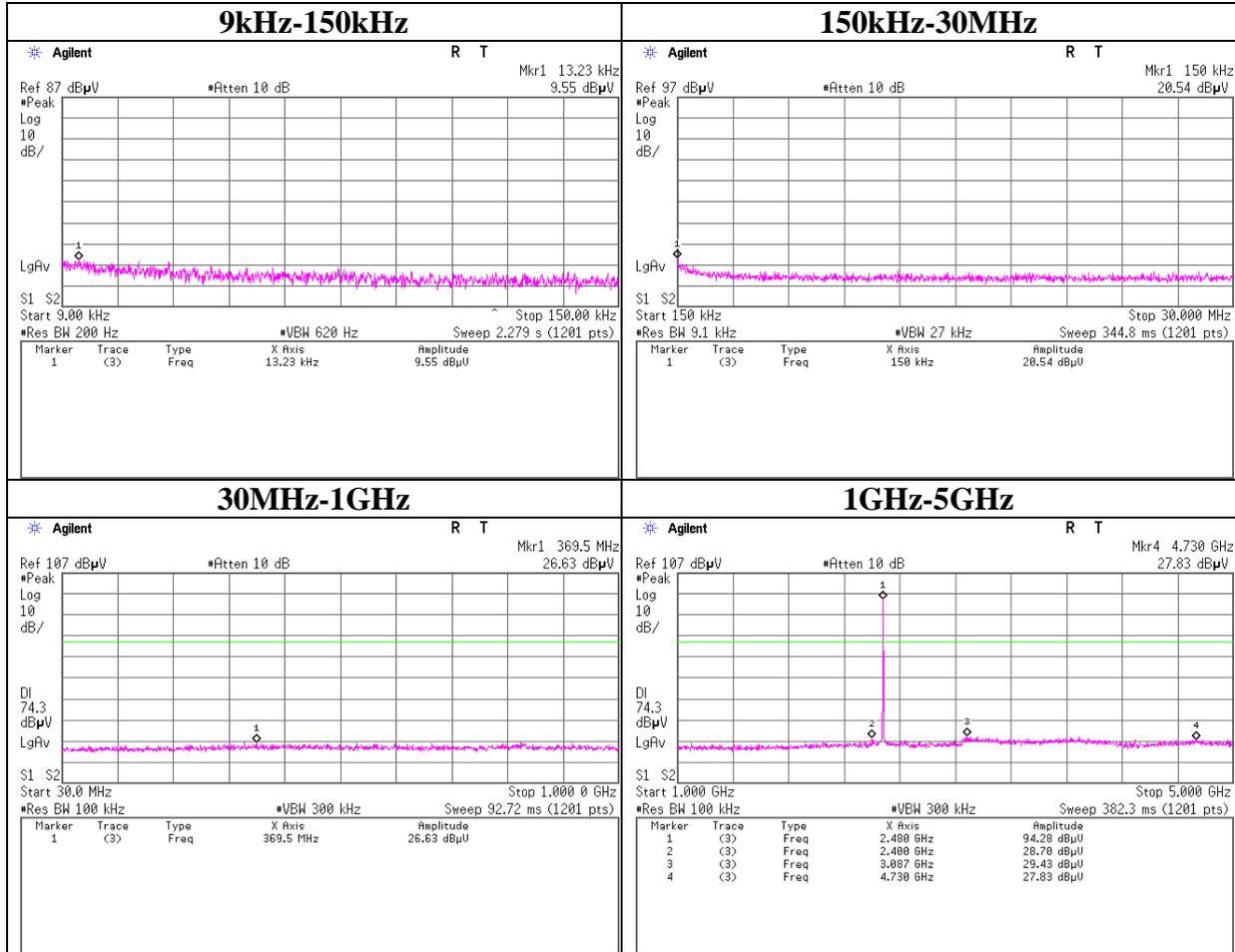
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## Conducted Spurious Emission

### Tx DH5 2480MHz



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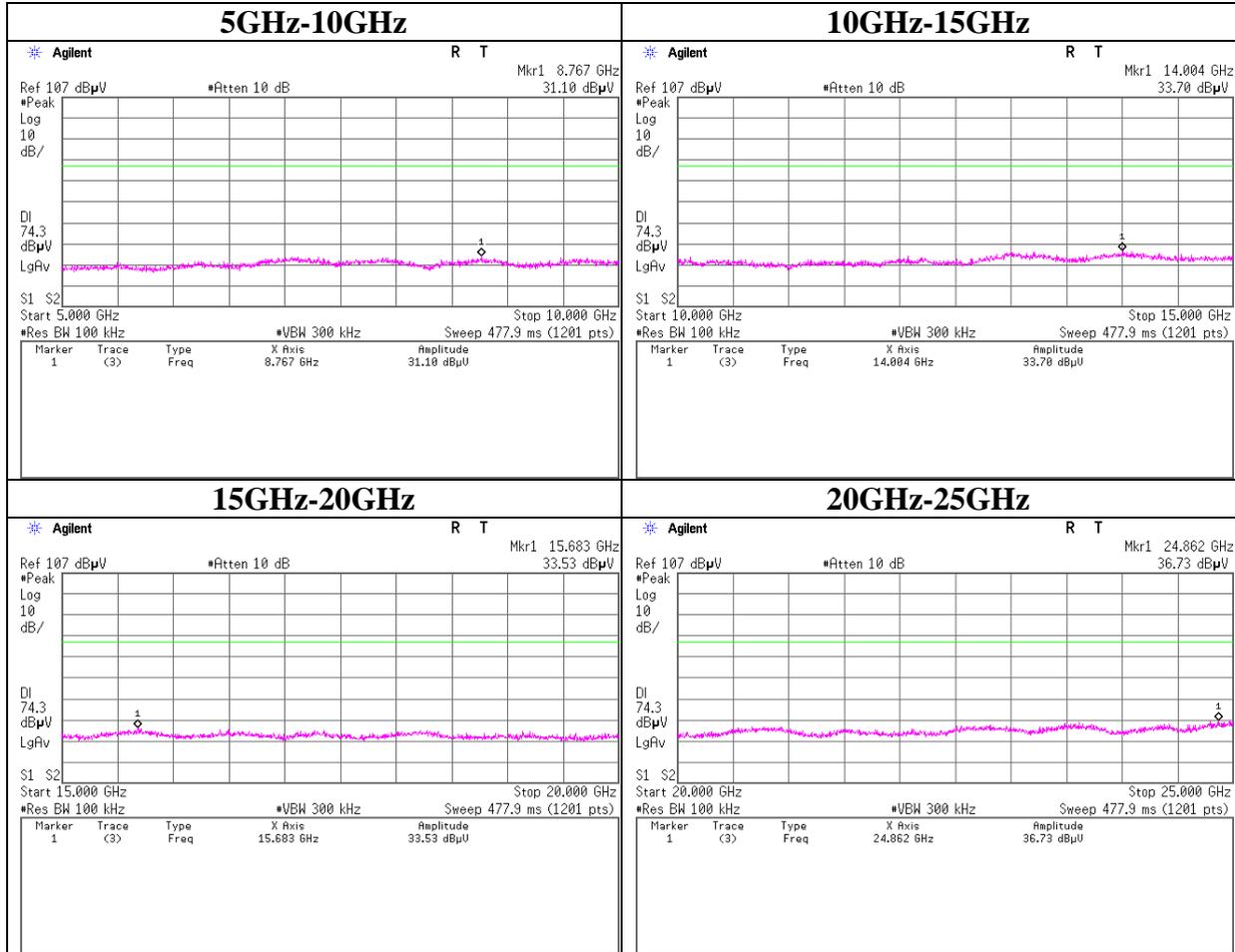
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## Conducted Spurious Emission

### Tx DH5 2480MHz



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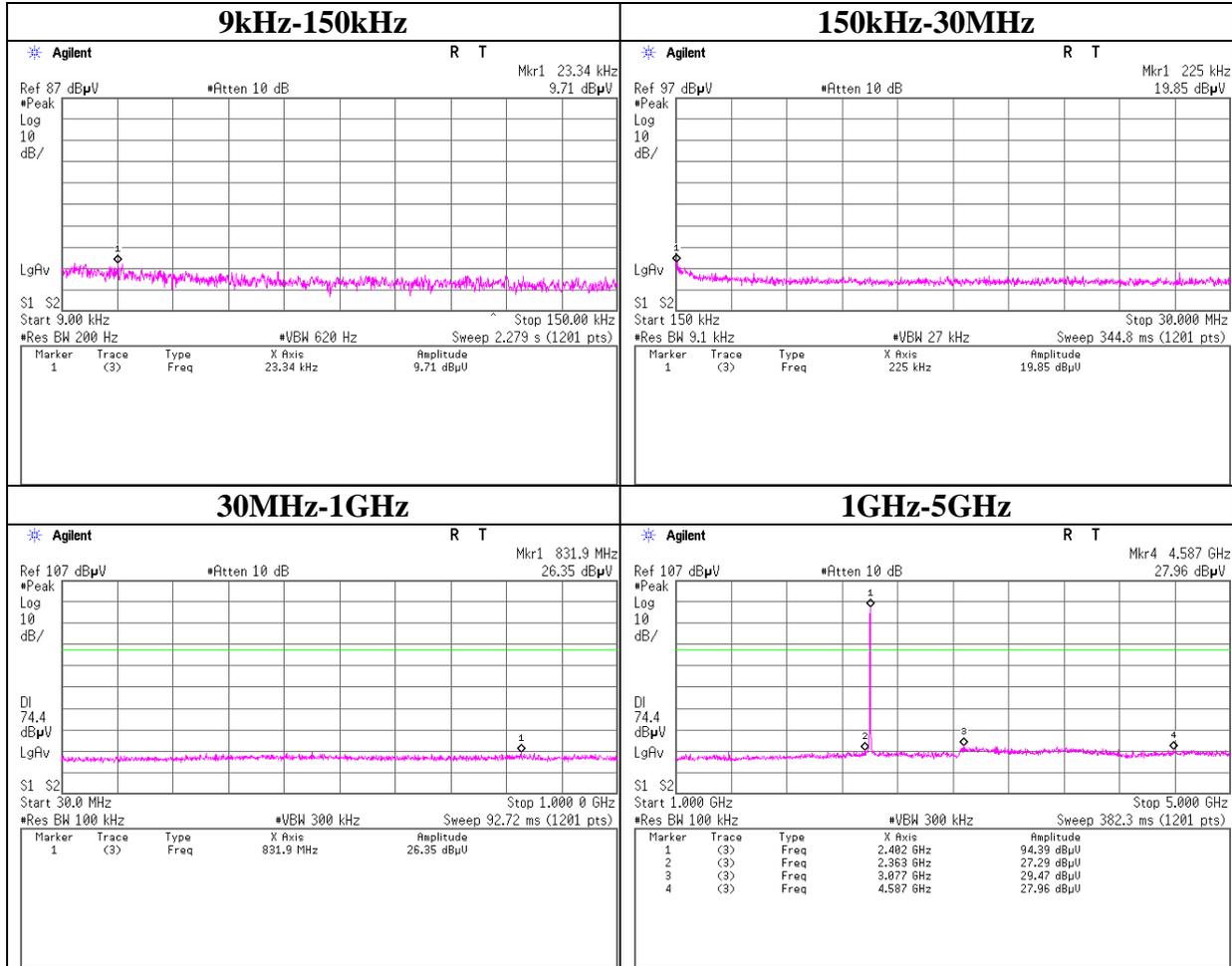
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## Conducted Spurious Emission

### Tx 3DH5 2402MHz



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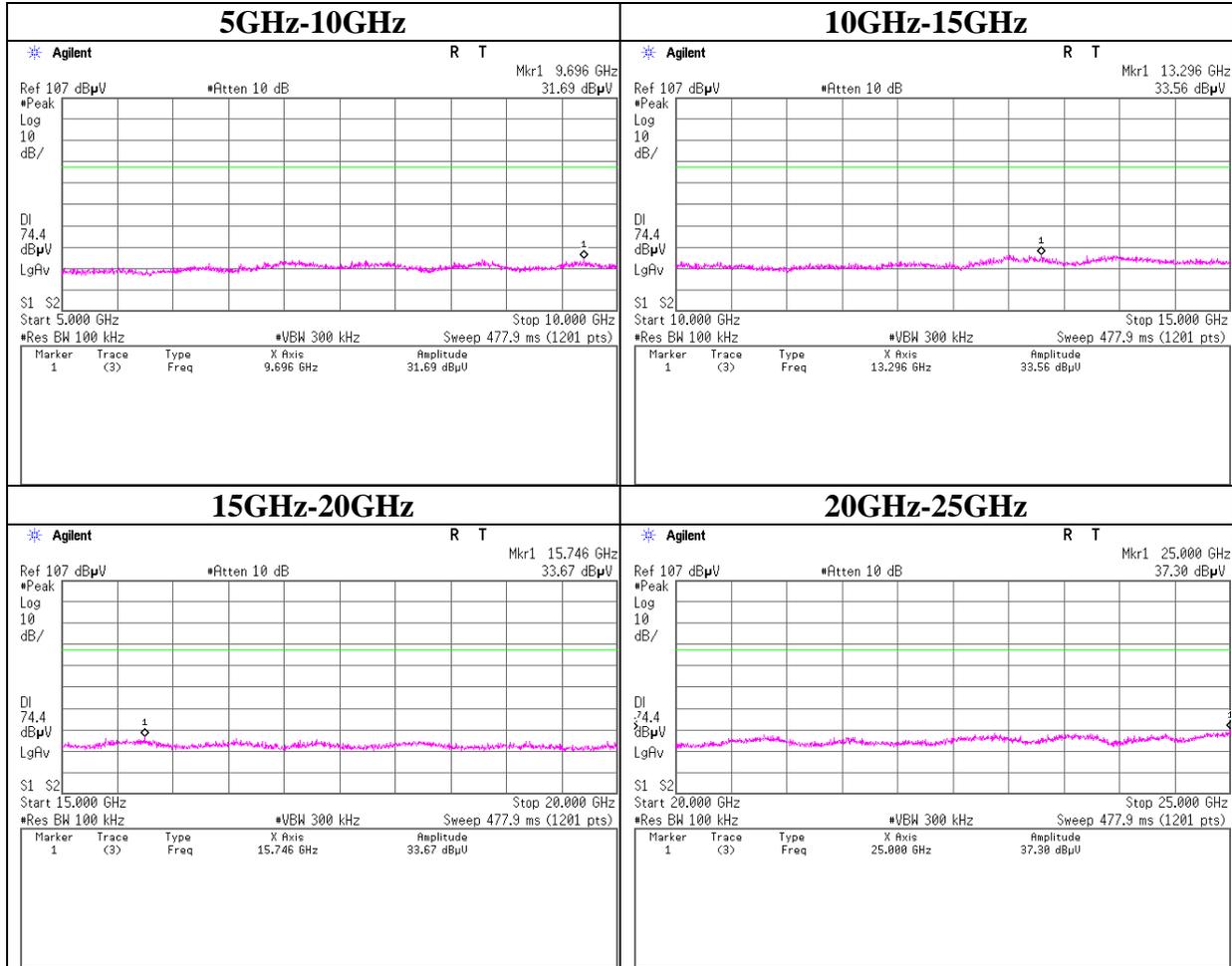
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## Conducted Spurious Emission

### Tx 3DH5 2402MHz



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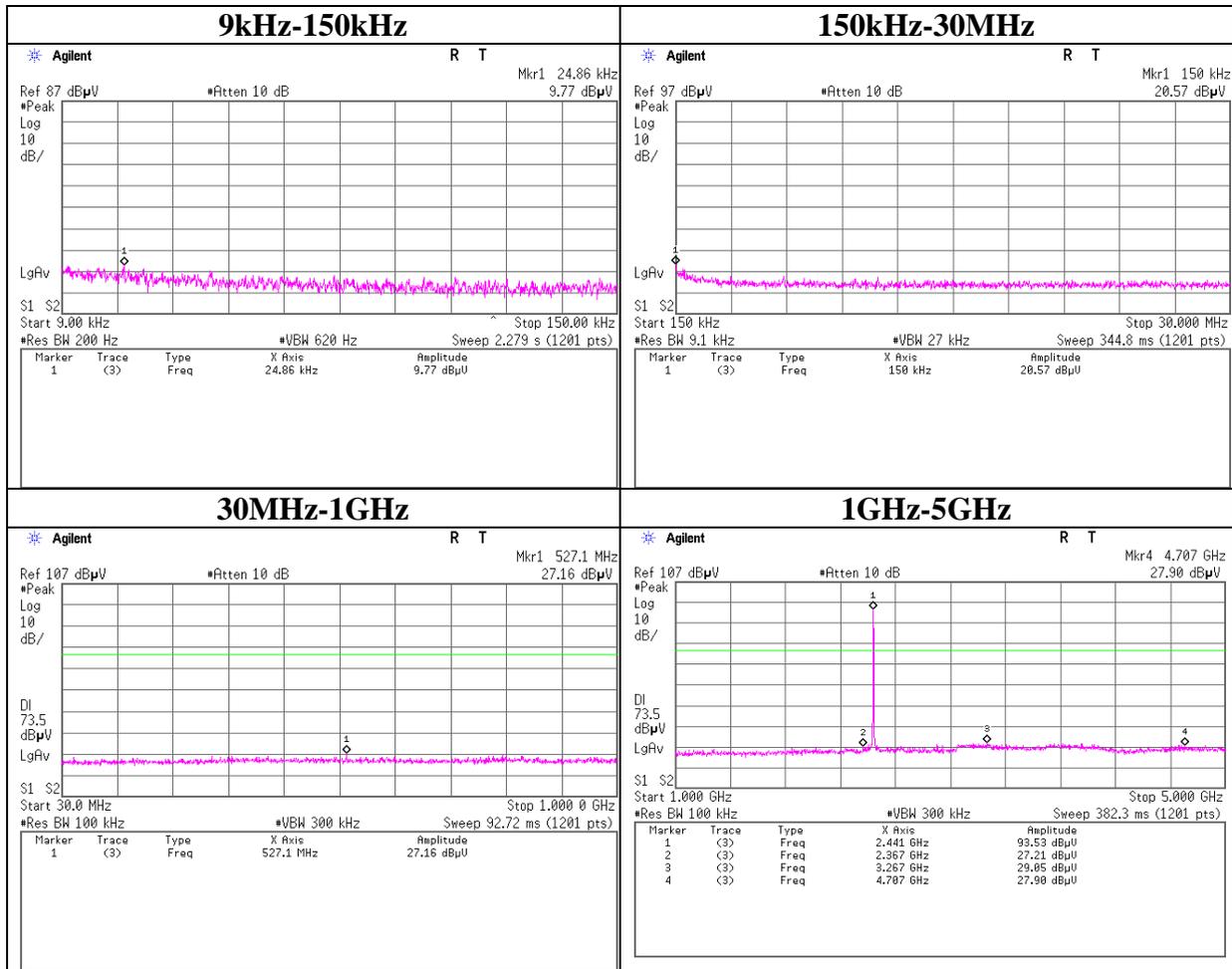
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## Conducted Spurious Emission

### Tx 3DH5 2441MHz



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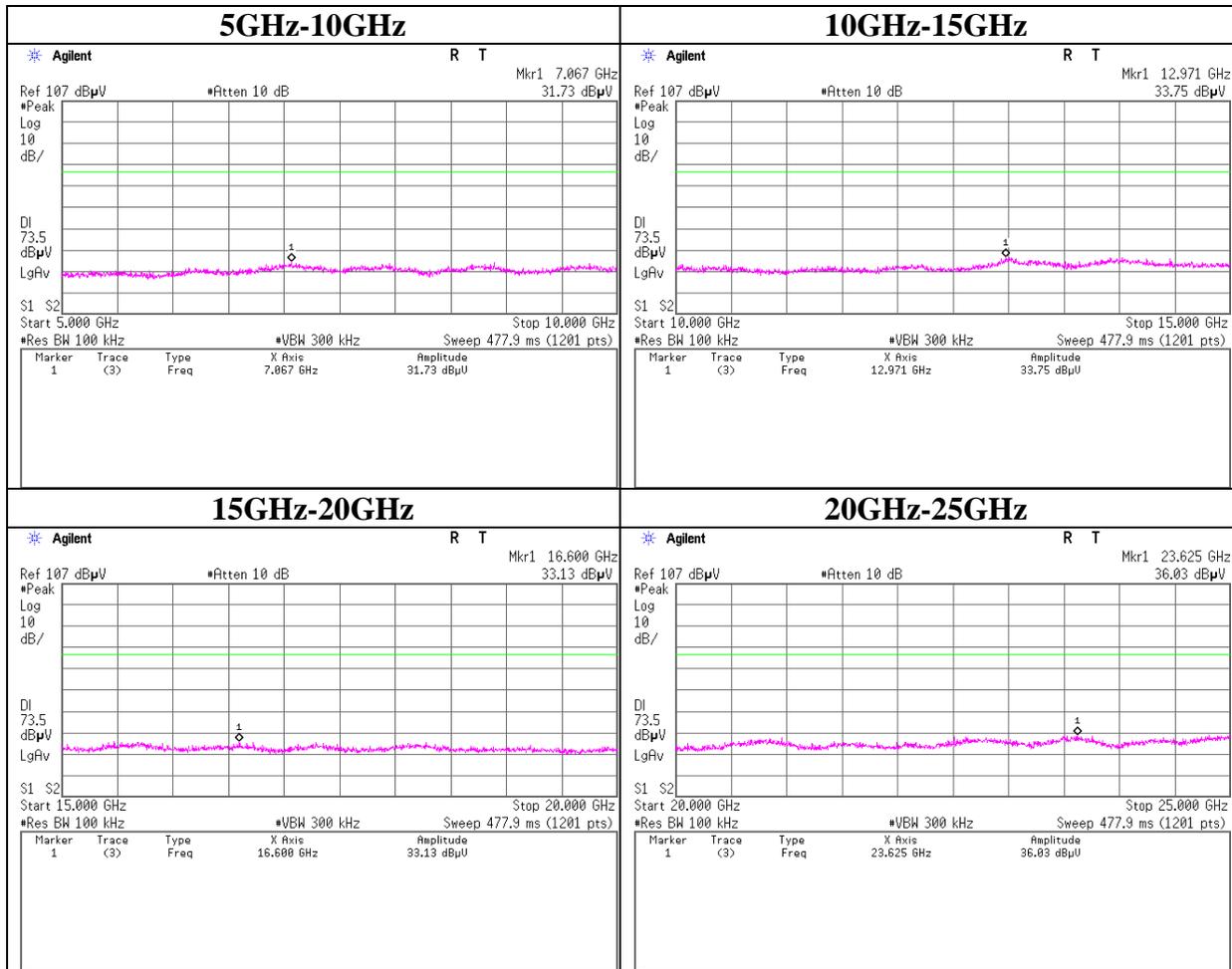
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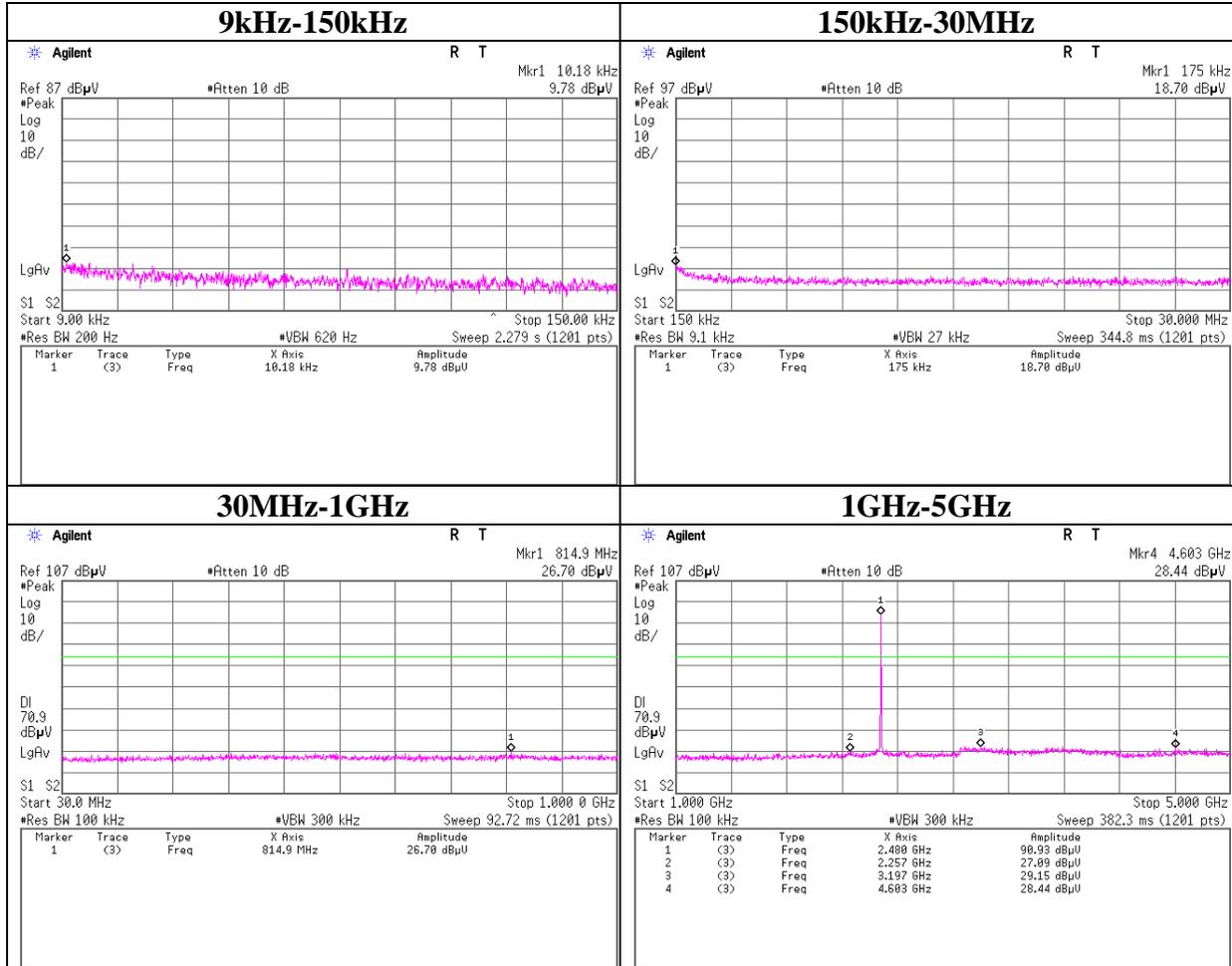
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## Conducted Spurious Emission

### Tx 3DH5 2480MHz



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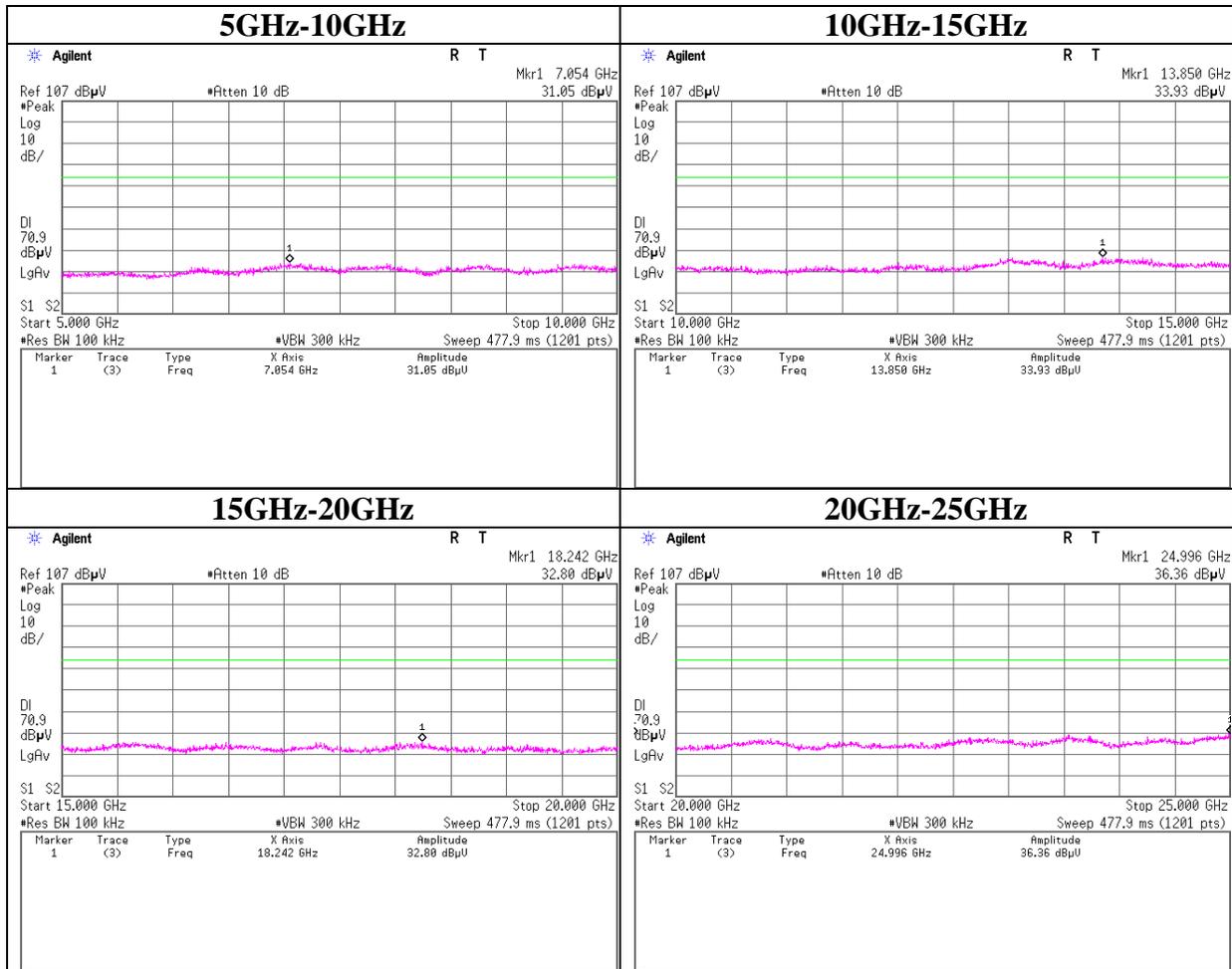
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## Conducted Spurious Emission

### Tx 3DH5 2480MHz



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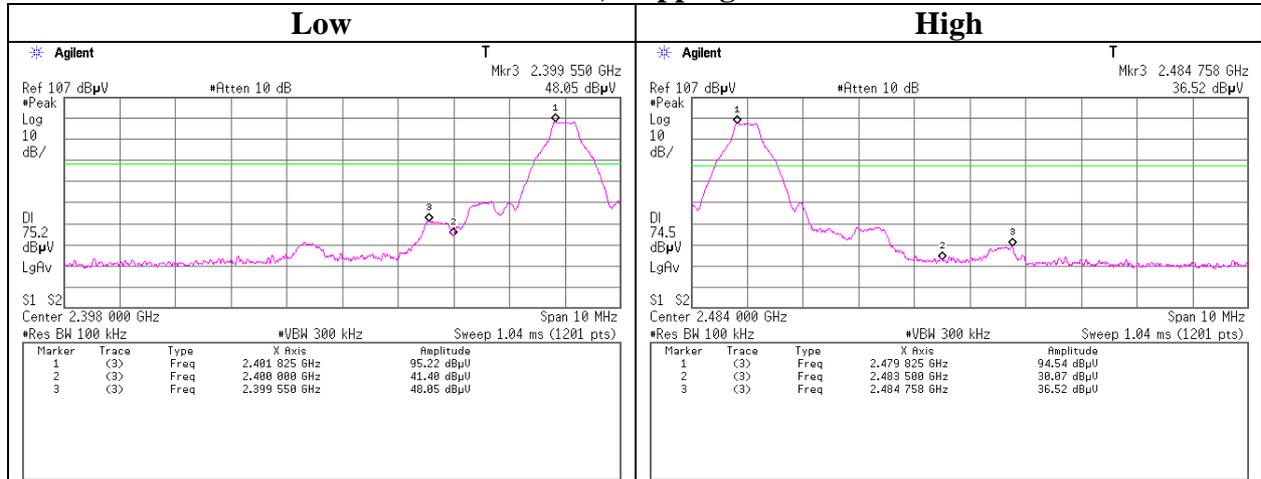
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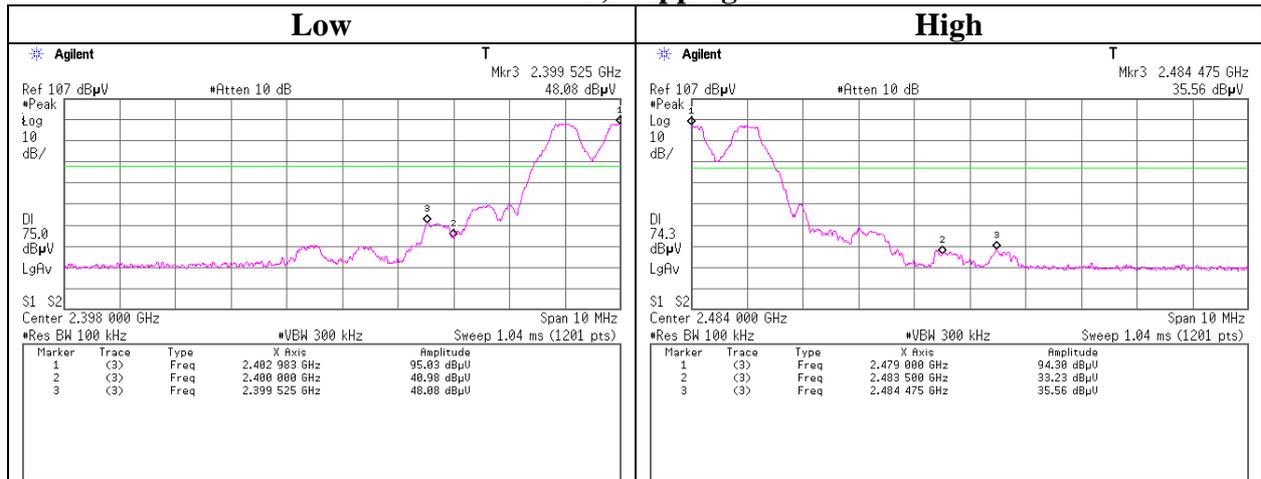
Facsimile : +81 596 24 8124

## Conducted Emission Band Edge compliance

### Tx DH5, Hopping off

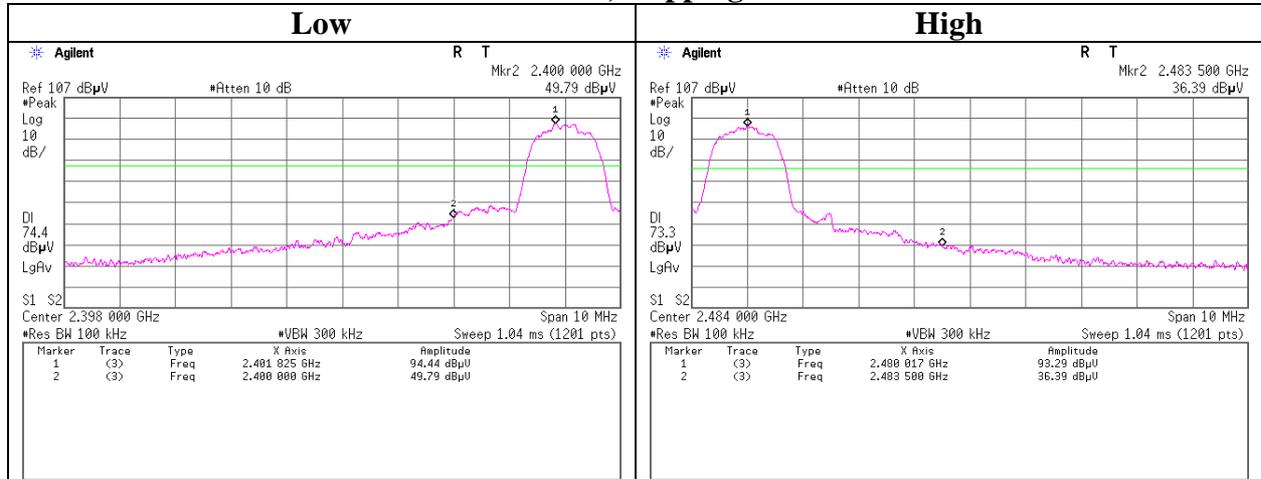


### Tx DH5, Hopping on

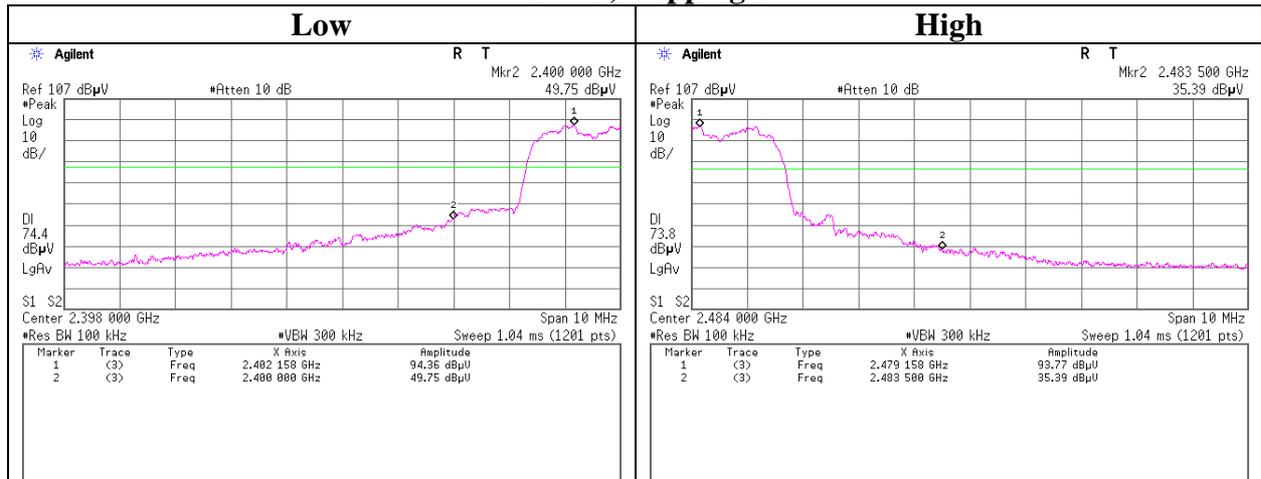


## Conducted Emission Band Edge compliance

### Tx 3DH5, Hopping off



### Tx 3DH5, Hopping on



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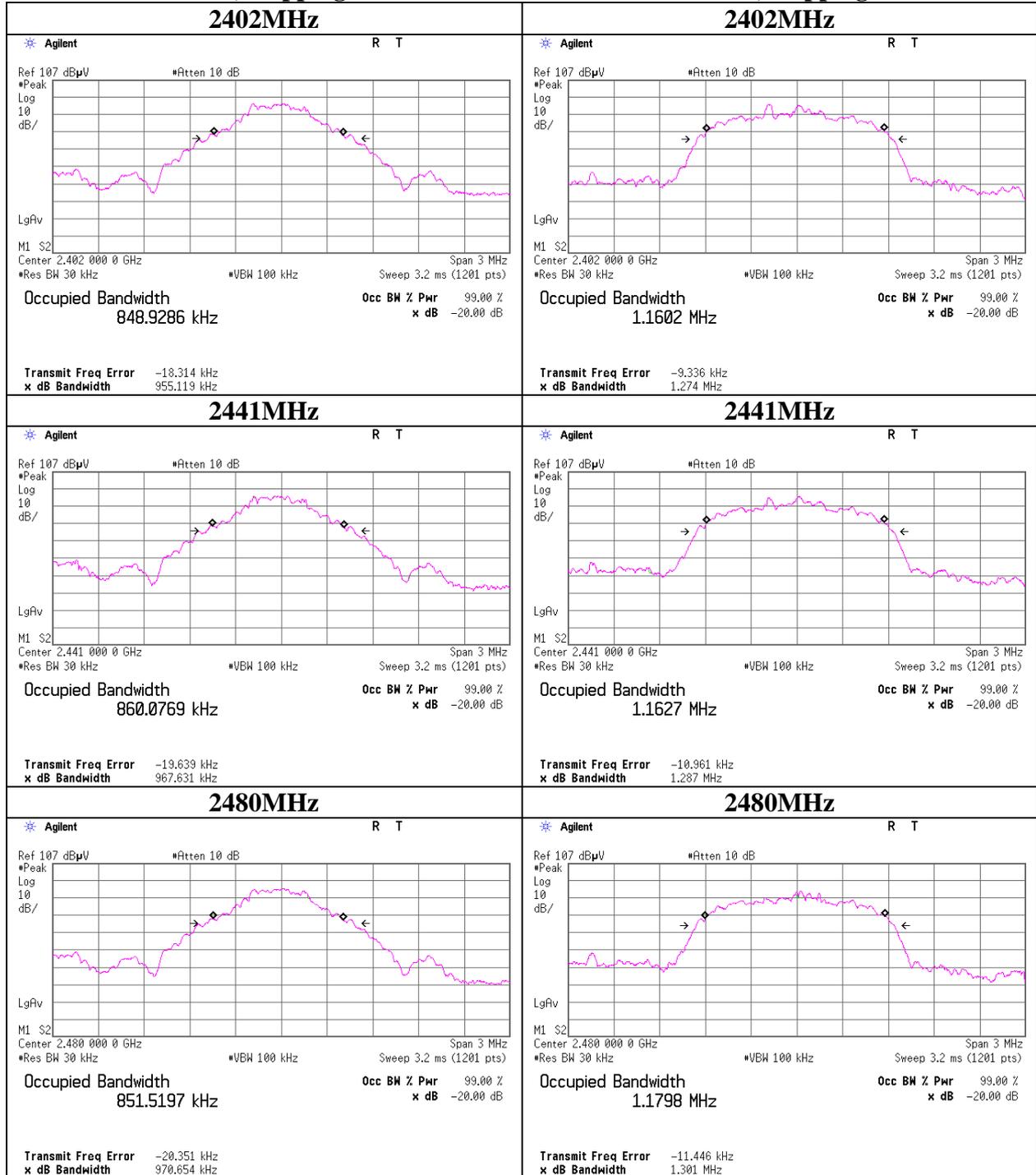
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**99% Occupied Bandwidth**

**Tx DH5, Hopping off**

**Tx 3DH5, Hopping off**



**UL Japan, Inc.**

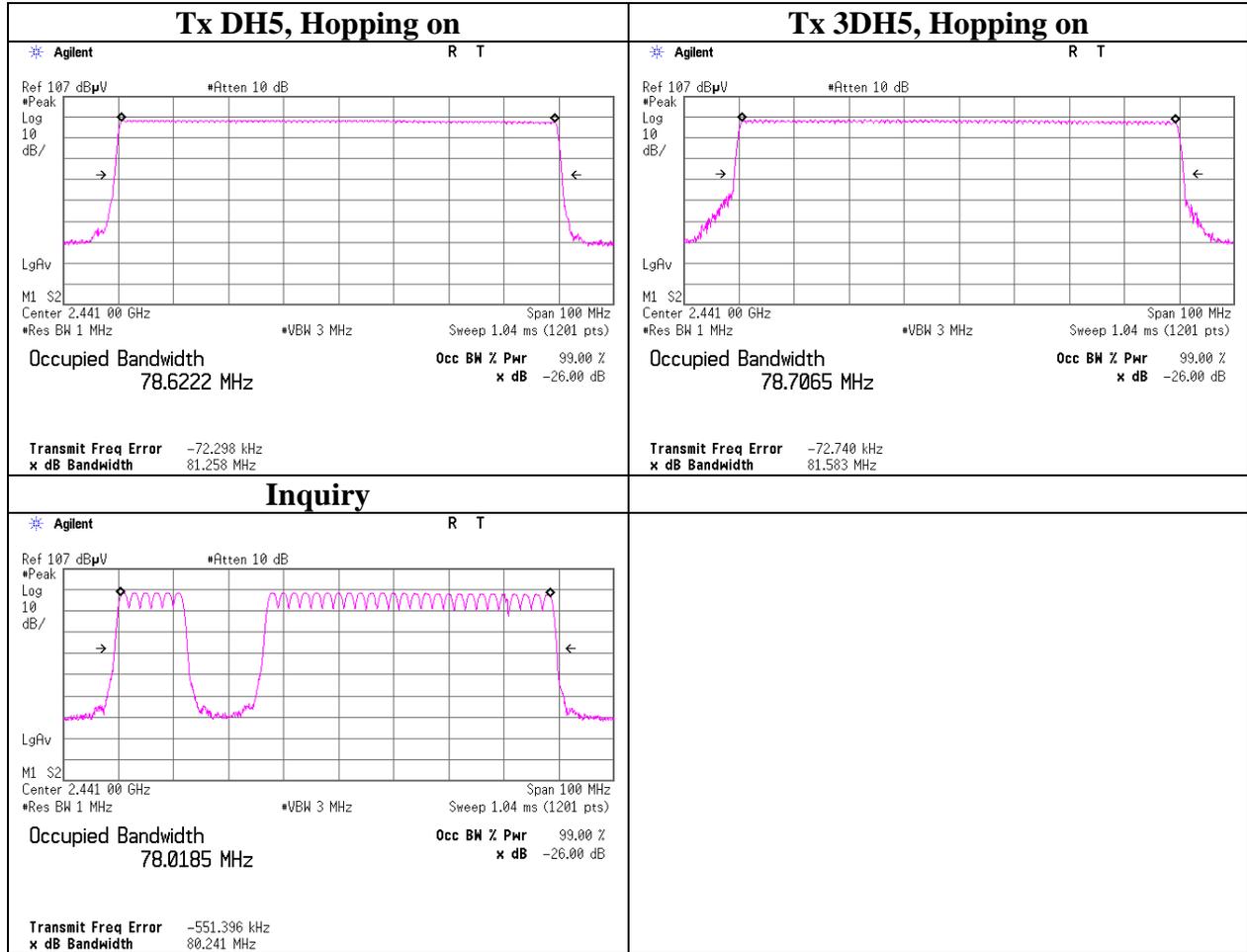
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### 99% Occupied Bandwidth



## APPENDIX 2: Test instruments

### EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2012/12/25 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	AT	2013/04/03 * 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
MFC-01	Microwave Counter	Advantest	R5373	120100309	AT	2012/08/16 * 12
MCC-138	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37953/2	AT	2012/10/17 * 12
MAT-20	Attenuator(10dB)(above 1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-110	-	AT	2013/01/09 * 12
MCC-64	Coaxial Cable	UL Japan	-	-	AT	2013/03/22 * 12
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2012/11/06 * 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	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
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
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	CE	2012/11/21 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE(EUT)	2013/01/07 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE(AE)	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)/suciform141-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

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**The expiration date of the calibration is the end of the expired month.  
All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.**

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

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