



# RADIO TEST REPORT

**Test Report No. : 32GE0144-HO-01-D**

**Applicant** : Sony Computer Entertainment Inc.  
**Type of Equipment** : Computer Entertainment System  
**Model No.** : CECH-4001x  
**FCC ID** : AK8CBEH19C1  
**Test regulation** : FCC Part 15 Subpart C: 2012  
**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.

**Date of test:** March 12 to April 1, 2012

**Representative test engineer:**

*T. Shimada*

Takumi Shimada  
Engineer of WiSE Japan,  
UL Verification Service

**Approved by:**

*M. Nishiyama*

Masanori Nishiyama  
Leader 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	Akiko Tsukada

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

### **2.1 Identification of E.U.T.**

Type of Equipment	Computer Entertainment System
Model No	CECH-4001x
Serial No	1530004 (Power Supply: DELTA) 1530005 (Power Supply: SONY) 1530003 (for Antenna terminal conducted tests)
Rating	AC120V / 60Hz
Country of Manufacture	JAPAN/CHINA
Receipt Date of Sample	March 9, 2012
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-4001x, referred to as the EUT in this report, is a Computer Entertainment System.  
The EUT contains Bluetooth (Ver. 2.0+EDR) module and IEEE802.11b/g WLAN module. Those modules do not transmit simultaneously.

The clock frequencies used in the EUT: Max clock frequency is 3.2GHz.

### Bluetooth (Ver. 2.0+EDR)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	FHSS (GFSK, $\pi/4$ -DQPSK, 8DPSK)
Bandwidth & Channel spacing	1MHz & 1MHz
Power Supply (inner)	DC3.3V/1.8V
Antenna Type	PIFA
Antenna Gain	3.0 dBi (max)
Antenna Connector Type	U.FL

### IEEE802.11b/g WLAN

Equipment Type	Transceiver	
Frequency of Operation	2412-2462MHz	
Type of Modulation	DSSS/OFDM	
Bandwidth & Channel spacing	20MHz & 5MHz	
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)
Antenna Connector Type	Antenna 0: N/A	Antenna 1: U.FL

List of Model No.:

Model No.	Product Name	Note
CECH-4001x*1	Computer Entertainment System	Tested model
DECH-4000Ax*1	Debugging Station	*2
DECH-S4000Ax*1	Debugging Station for AV test	*3

Note:

\*1: "x" will be replaced by an alphabet denoting the different hard disk specification.

\*2: The difference between DECH-4000Ax and CECH-4001x is software only.

\*3: DECH-S4000Ax and DECH-4000Ax is same in specification, but DECH-S4000Ax is for AV test.

The differences among the above three models do not influence on radio specification.

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

### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart C: 2012, final revised on February 1, 2012

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

\*The EUT complies with FCC Part 15 Subpart B: 2011, final revised on February 1, 2012.

### **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 7.6dB, 0.15000MHz, N AV 13.3dB, 0.15000MHz, N	Complied	-
Carrier Frequency Separation	FCC: FCC Public Notice DA 00-705 ----- IC: -	FCC: Section15.247(a)(1) ----- IC: RSS-210 A8.1 (b)	See data.	Complied	Conducted
20dB Bandwidth	FCC: FCC Public Notice DA 00-705 ----- IC: -	FCC: Section15.247(a)(1) ----- IC: RSS-210 A8.1 (a)		Complied	Conducted
Number of Hopping Frequency	FCC: FCC Public Notice DA 00-705 ----- IC: -	FCC: Section15.247(a)(1)(iii) ----- IC: RSS-210 A8.1 (d)		Complied	Conducted
Dwell time	FCC: FCC Public Notice DA 00-705 ----- IC: -	FCC: Section15.247(a)(1)(iii) ----- IC: RSS-210 A8.1 (d)		Complied	Conducted
Maximum Peak Output Power	FCC: FCC Public Notice DA 00-705 ----- IC: RSS-Gen 4.8	FCC: Section15.247(a)(b)(1) ----- IC: RSS-210 A8.4 (2)		Complied	Conducted
Spurious Emission & Band Edge Compliance	FCC: FCC Public Notice DA 00-705 ----- IC: RSS-Gen 4.9	FCC: Section15.247(d) ----- IC: RSS-210 A8.5 RSS-Gen 6 and 7.2.3		5.1dB 2484.407MHz, Horizontal, AV	Complied

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

\* In case any questions arise about test procedure, ANSI C63.4: 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	4.2dB	5.0dB	5.1dB	4.7dB	5.7dB	4.4dB	4.3dB
No.2	4.1dB	5.2dB	5.1dB	4.8dB	5.6dB	4.3dB	4.2dB
No.3	4.5dB	5.0dB	5.2dB	4.8dB	5.6dB	4.5dB	4.2dB
No.4	4.7dB	5.2dB	5.2dB	4.8dB	5.6dB	5.1dB	4.2dB

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

Power meter (+dB)	
Below 1GHz	Above 1GHz
1.0dB	1.0dB

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	
1.0dB	1.1dB	2.7dB	3.2dB	3.3dB	1.5dB

#### 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 test report has enough margin, more than the site margin.

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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	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	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.

## **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 *1)	Tx (Hopping off) DH5, 3DH5	2402MHz 2441MHz 2480MHz
Spurious Emission (Radiated)	Tx (Hopping off) DH5, 3DH5	2402MHz 2441MHz *2) 2480MHz
Spurious Emission (Conducted)	Tx (Hopping off) DH5, 3DH5	2402MHz 2441MHz 2480MHz
Carrier Frequency Separation	Tx (Hopping on) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
20dB Bandwidth	Tx (Hopping off) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Number of Hopping Frequency	Tx (Hopping on) DH5, 3DH5 Inquiry	-
Dwell time	Tx (Hopping on), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5 Inquiry	-
Maximum Peak Output Power	Tx (Hopping off) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2480MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2441MHz 2480MHz

\*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/Version: 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.

\*Antenna 1 has two kinds of manufacturer's antennas (TE Connectivity and LuxShare-ICT) and the test was performed only with TE Connectivity antenna according to the customer's request, because these have similar antenna characteristics and equal maximum gain.

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\*1) The test was performed for both of Power Supply: SONY and DELTA. Other tests except Conducted Emission were performed with Power Supply: SONY as a representative.

\*2) The difference between Power Supply: SONY and DELTA was confirmed by Bluetooth 3DH5 2441 Transmitting (Tx) mode.

## 4.2 Configuration and peripherals

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

**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.

<b>Detector</b>	<b>: QP and AV</b>
<b>Measurement range</b>	<b>: 0.15-30MHz</b>
<b>Test data</b>	<b>: APPENDIX</b>
<b>Test result</b>	<b>: Pass</b>

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## **SECTION 6: Radiated Spurious Emission**

### **Test Procedure**

EUT was placed on a urethane platform of nominal size, 1.5m by 1.0m, 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 *2)	RBW: 100kHz VBW: 300kHz (S/A)
Test Distance	3m	3m (below 10GHz), 1m*1) (above 10GHz),		3m (below 10GHz), 1m*1) (above 10GHz),

\*1) Distance Factor:  $20 \times \log(3.0\text{m}/1.0\text{m}) = 9.5\text{dB}$

\*2) Although 00-705 accepts VBW=10Hz for AV measurements, it was confirmed that superfluous smoothing was not performed.

- 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	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	5MHz	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 *1)	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	20MHz	300kHz	1MHz	Auto	Peak	Max Hold	Spectrum Analyzer

\*1) 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

**APPENDIX 1: Data of EMI test**

**Conducted Emission**  
(Power Supply: SONY)

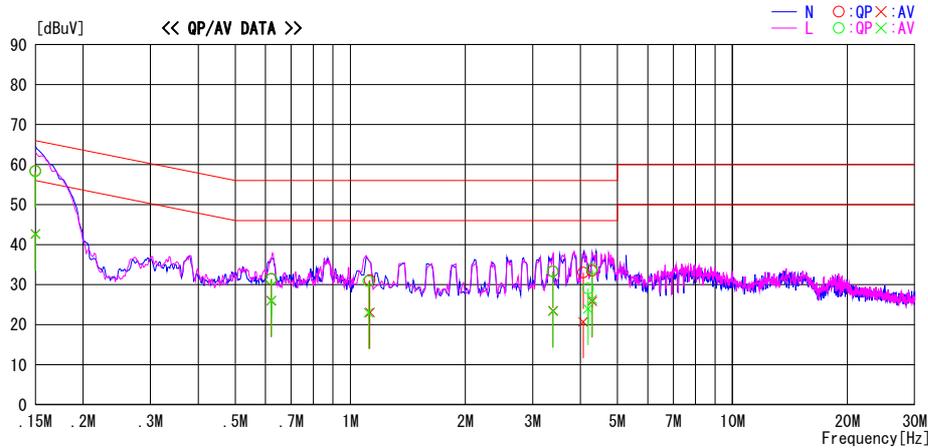
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber  
Date : 2012/03/30

Report No. : 32GE0144-HO-01  
Temp./Humi. : 25deg. C / 32% RH  
Engineer : Hironobu Ohnishi

Mode / Remarks : BT Tx, 2402MHz, DH5

LIMIT : FCC15.207 QP  
FCC15.207 AV

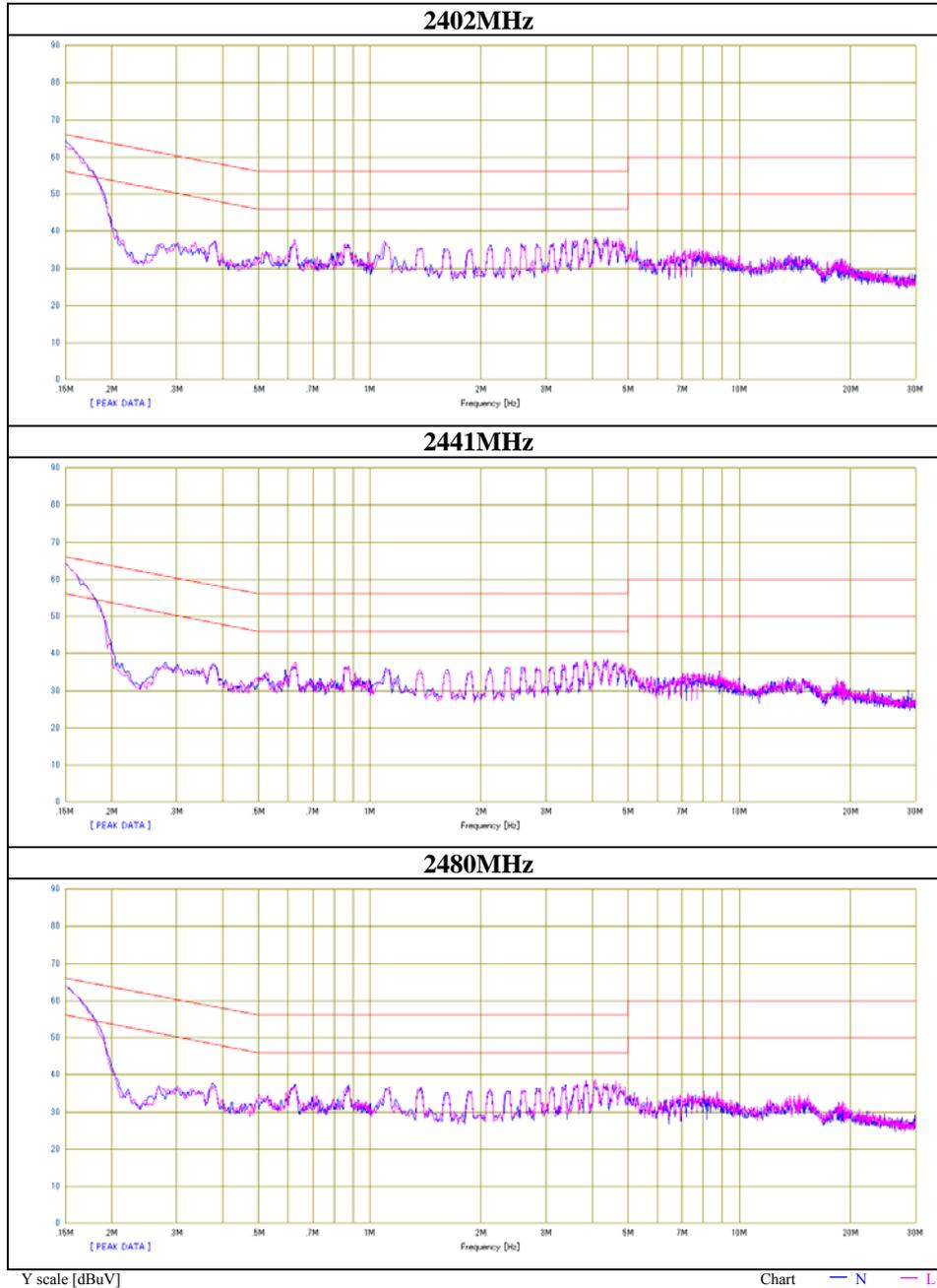


Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	45.1	29.4	13.3	58.4	42.7	66.0	56.0	7.6	13.3	N	
0.62048	18.1	12.7	13.3	31.4	26.0	56.0	46.0	24.6	20.0	N	
1.12496	17.8	9.8	13.3	31.1	23.1	56.0	46.0	24.9	22.9	N	
3.39088	19.7	9.9	13.6	33.3	23.5	56.0	46.0	22.7	22.5	N	
4.06864	19.4	7.1	13.6	33.0	20.7	56.0	46.0	23.0	25.3	N	
4.29348	19.9	12.3	13.6	33.5	25.9	56.0	46.0	22.5	20.1	N	
0.15000	45.0	29.3	13.3	58.3	42.6	66.0	56.0	7.7	13.4	L	
0.62180	18.2	12.8	13.3	31.5	26.1	56.0	46.0	24.5	19.9	L	
1.11688	17.5	9.7	13.3	30.8	23.0	56.0	46.0	25.2	23.0	L	
3.39104	19.7	9.7	13.6	33.3	23.3	56.0	46.0	22.7	22.7	L	
4.18760	15.4	10.4	13.6	29.0	24.0	56.0	46.0	27.0	22.0	L	
4.29528	20.3	12.7	13.6	33.9	26.3	56.0	46.0	22.1	19.7	L	

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

**Conducted Emission**  
(Power Supply: SONY)

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	32GE0144-HO-01
Date	03/30/2012
Temperature/ Humidity	25 deg. C / 32% RH
Engineer	Hironobu Ohnishi
Mode	Tx DH5



**Conducted Emission**  
(Power Supply: SONY)

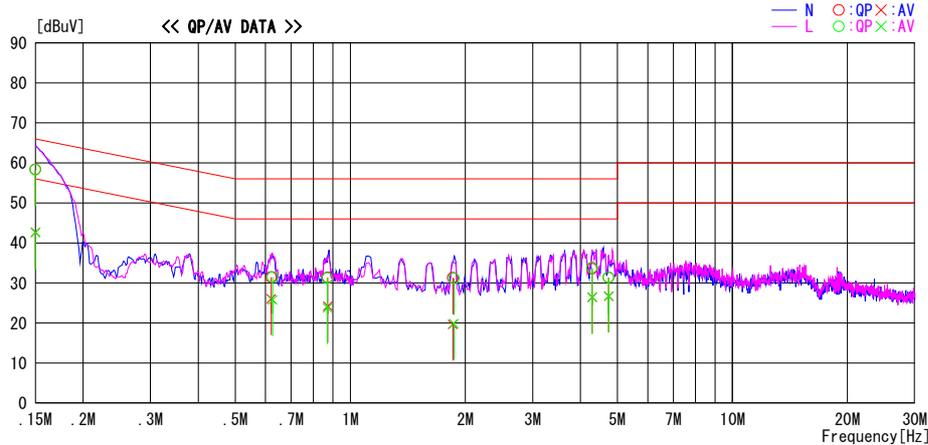
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber  
Date : 2012/03/30

Report No. : 32GE0144-HO-01  
Temp./Humi. : 25deg. C / 32% RH  
Engineer : Hironobu Ohnishi

Mode / Remarks : BT Tx, 2402MHz, 3DH5

LIMIT : FCC15.207 QP  
FCC15.207 AV

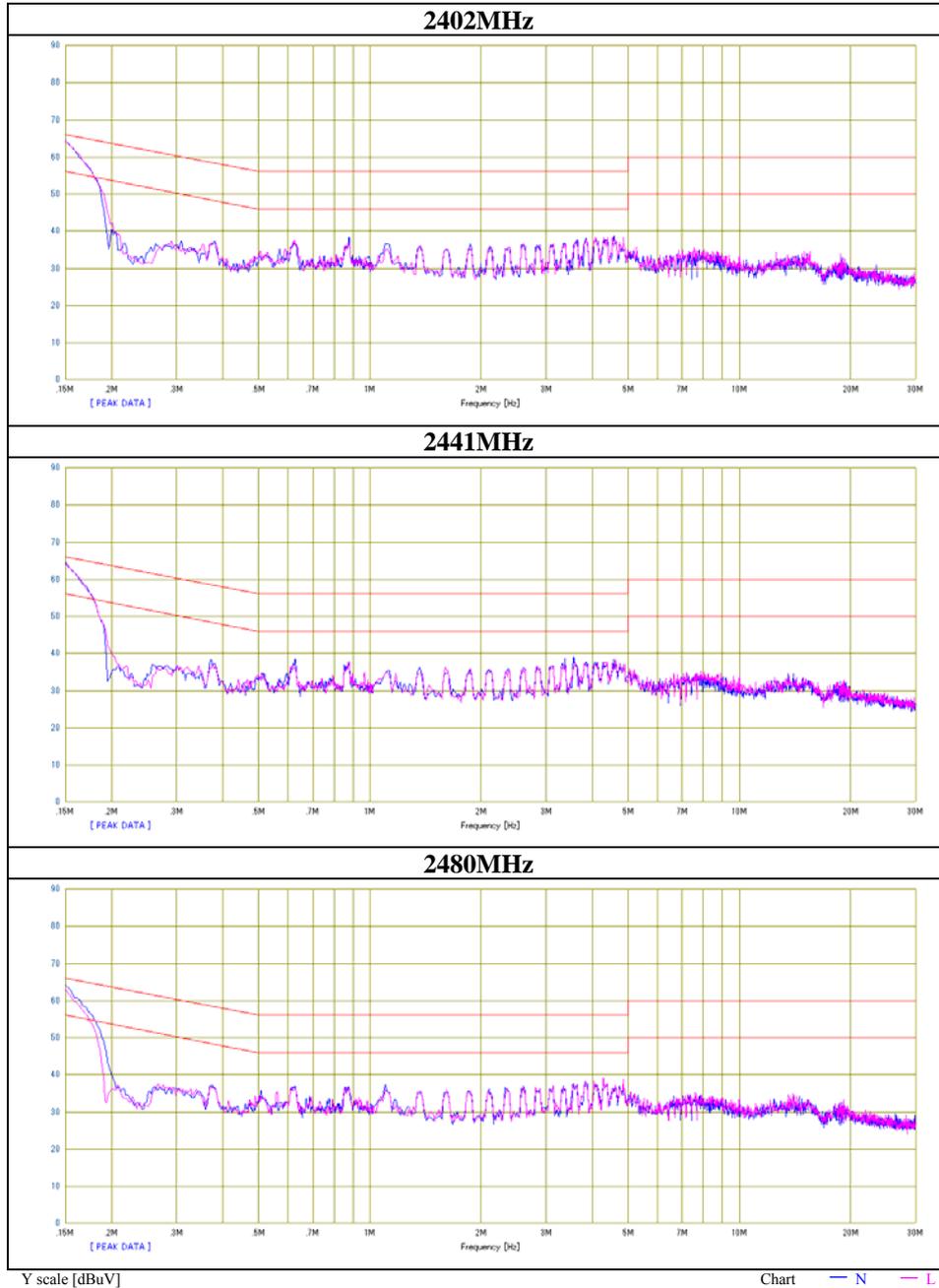


Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	45.1	29.4	13.3	58.4	42.7	66.0	56.0	7.6	13.3	N	
0.62064	18.2	12.8	13.3	31.5	26.1	56.0	46.0	24.5	19.9	N	
0.87248	18.1	10.9	13.3	31.4	24.2	56.0	46.0	24.6	21.8	N	
1.85528	17.9	6.3	13.4	31.3	19.7	56.0	46.0	24.7	26.3	N	
4.29280	20.0	12.8	13.6	33.6	26.4	56.0	46.0	22.4	19.6	N	
4.74224	17.7	13.0	13.7	31.4	26.7	56.0	46.0	24.6	19.3	N	
0.15000	45.0	29.3	13.3	58.3	42.6	66.0	56.0	7.7	13.4	L	
0.62616	18.2	12.5	13.3	31.5	25.8	56.0	46.0	24.5	20.2	L	
0.87072	17.9	10.5	13.3	31.2	23.8	56.0	46.0	24.8	22.2	L	
1.86696	17.7	6.5	13.4	31.1	19.9	56.0	46.0	24.9	26.1	L	
4.29280	20.2	12.9	13.6	33.8	26.5	56.0	46.0	22.2	19.5	L	
4.74068	17.7	13.1	13.7	31.4	26.8	56.0	46.0	24.6	19.2	L	

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

**Conducted Emission**  
(Power Supply: SONY)

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	32GE0144-HO-01
Date	03/30/2012
Temperature/ Humidity	25 deg. C / 32% RH
Engineer	Hironobu Ohnishi
Mode	Tx 3DH5



**Conducted Emission**  
**(Power Supply: DELTA)**

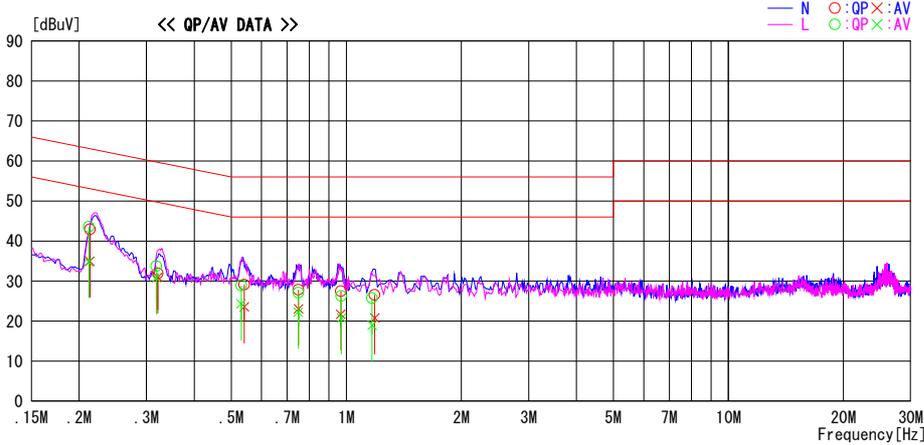
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber  
Date : 2012/03/31

Report No. : 32GE0144-HO-01  
Temp./Humi. : 25deg. C / 32% RH  
Engineer : Hironobu Ohnishi

Mode / Remarks : BT Tx, 2402MHz, DH5

LIMIT : FCC15.207 QP  
FCC15.207 AV

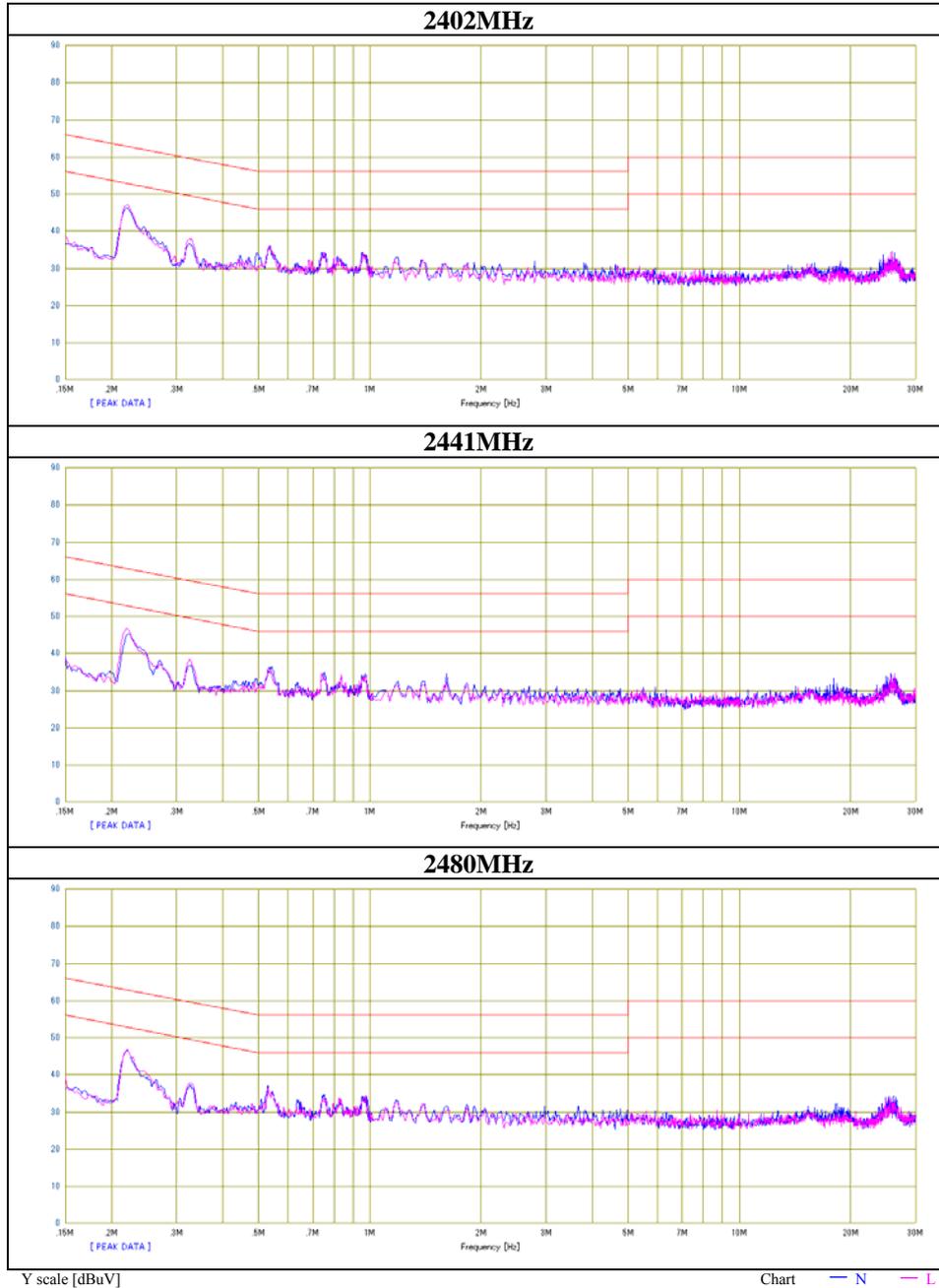


Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.21342	29.7	21.8	13.2	42.9	35.0	63.1	53.1	20.2	18.1	N	
0.32141	18.6	17.7	13.3	31.9	31.0	59.7	49.7	27.8	18.7	N	
0.54051	15.8	10.3	13.3	29.1	23.6	56.0	46.0	26.9	22.4	N	
0.74924	14.5	9.8	13.3	27.8	23.1	56.0	46.0	28.2	22.9	N	
0.96760	14.2	8.4	13.3	27.5	21.7	56.0	46.0	28.5	24.3	N	
1.18680	13.3	7.5	13.3	26.6	20.8	56.0	46.0	29.4	25.2	N	
0.21193	30.4	21.6	13.2	43.6	34.8	63.1	53.1	19.5	18.3	L	
0.31844	20.4	17.5	13.3	33.7	30.8	59.7	49.7	26.0	18.9	L	
0.53095	15.6	11.0	13.3	28.9	24.3	56.0	46.0	27.1	21.7	L	
0.74919	13.8	8.9	13.3	27.1	22.2	56.0	46.0	28.9	23.8	L	
0.97054	13.0	7.5	13.3	26.3	20.8	56.0	46.0	29.7	25.2	L	
1.16770	12.4	5.7	13.3	25.7	19.0	56.0	46.0	30.3	27.0	L	

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

**Conducted Emission**  
**(Power Supply: DELTA)**

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	32GE0144-HO-01
Date	03/30/2012
Temperature/ Humidity	25 deg. C / 32% RH
Engineer	Hironobu Ohnishi
Mode	Tx DH5



**Conducted Emission**  
**(Power Supply: DELTA)**

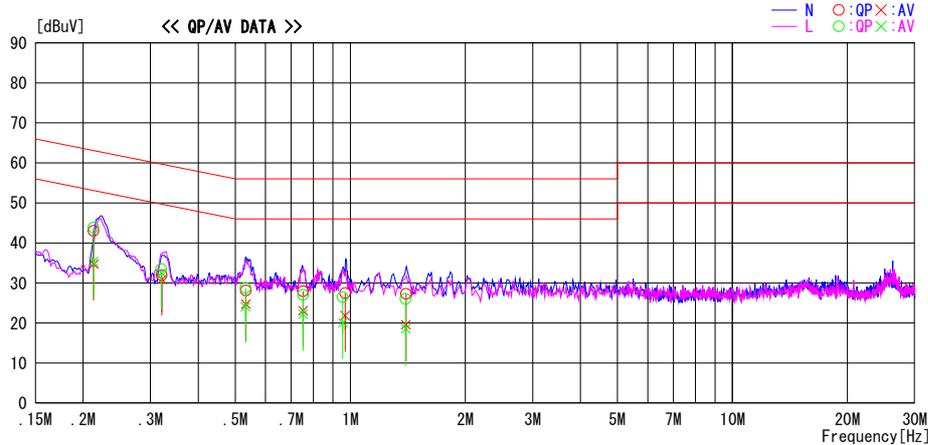
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber  
Date : 2012/03/31

Report No. : 32GE0144-HO-01  
Temp./Humi. : 25deg. C / 32% RH  
Engineer : Hironobu Ohnishi

Mode / Remarks : BT Tx, 2402MHz, 3DH5

LIMIT : FCC15.207 QP  
FCC15.207 AV

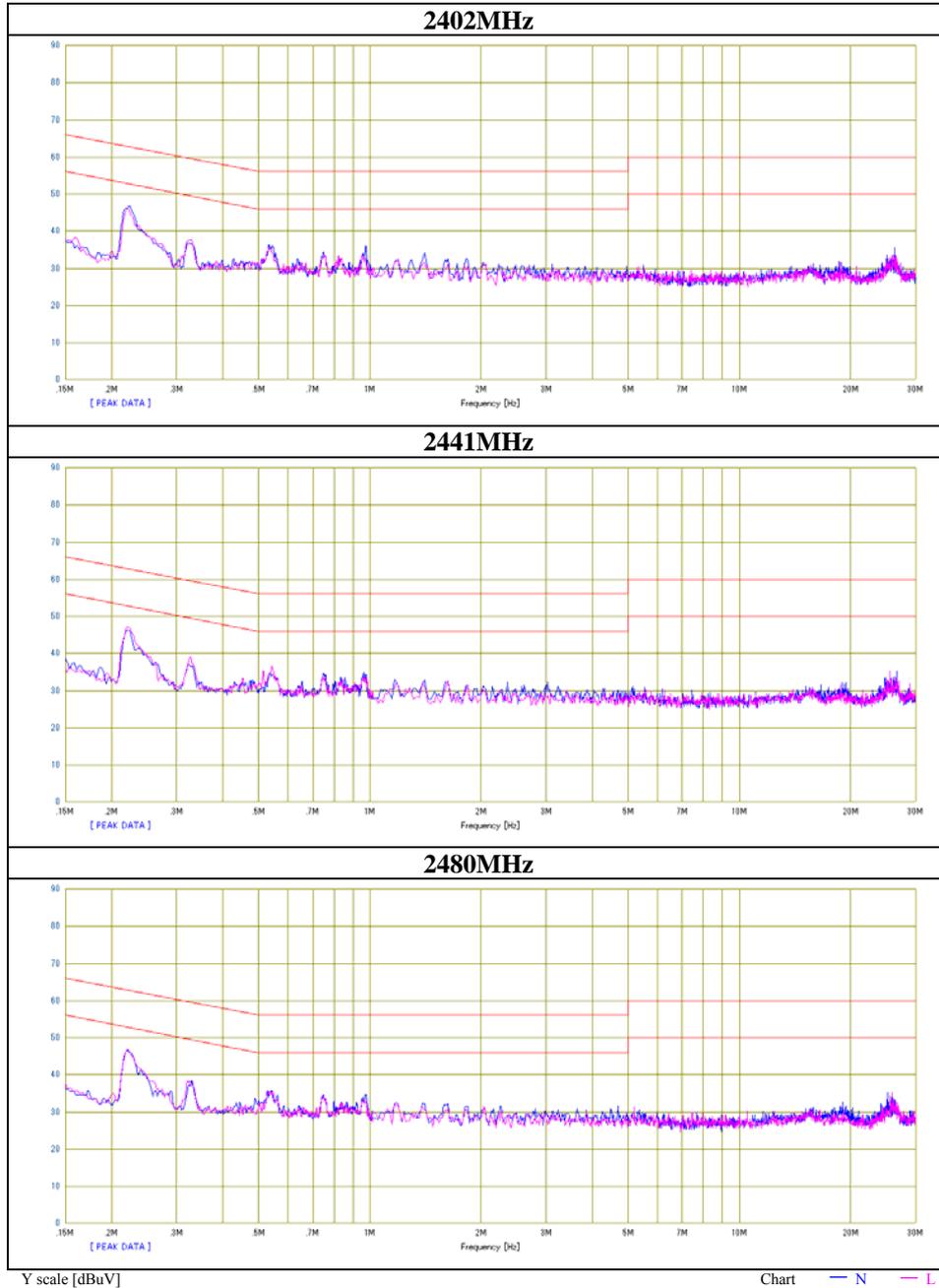


Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.21308	29.8	21.5	13.2	43.0	34.7	63.1	53.1	20.1	18.4	N	
0.32116	18.6	17.6	13.3	31.9	30.9	59.7	49.7	27.8	18.8	N	
0.53336	14.8	11.4	13.3	28.1	24.7	56.0	46.0	27.9	21.3	N	
0.75224	14.6	9.8	13.3	27.9	23.1	56.0	46.0	28.1	22.9	N	
0.96908	14.2	8.6	13.3	27.5	21.9	56.0	46.0	28.5	24.1	N	
1.39784	13.9	6.2	13.4	27.3	19.6	56.0	46.0	28.7	26.4	N	
0.21296	30.6	22.1	13.2	43.8	35.3	63.1	53.1	19.3	17.8	L	
0.32064	20.2	19.2	13.3	33.5	32.5	59.7	49.7	26.2	17.2	L	
0.53168	15.4	10.8	13.3	28.7	24.1	56.0	46.0	27.3	21.9	L	
0.75244	13.7	8.9	13.3	27.0	22.2	56.0	46.0	29.0	23.8	L	
0.95588	13.2	6.8	13.3	26.5	20.1	56.0	46.0	29.5	25.9	L	
1.39688	12.6	5.2	13.4	26.0	18.6	56.0	46.0	30.0	27.4	L	

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

**Conducted Emission**  
**(Power Supply: DELTA)**

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	32GE0144-HO-01
Date	03/30/2012
Temperature/ Humidity	25 deg. C / 32% RH
Engineer	Hironobu Ohnishi
Mode	Tx 3DH5

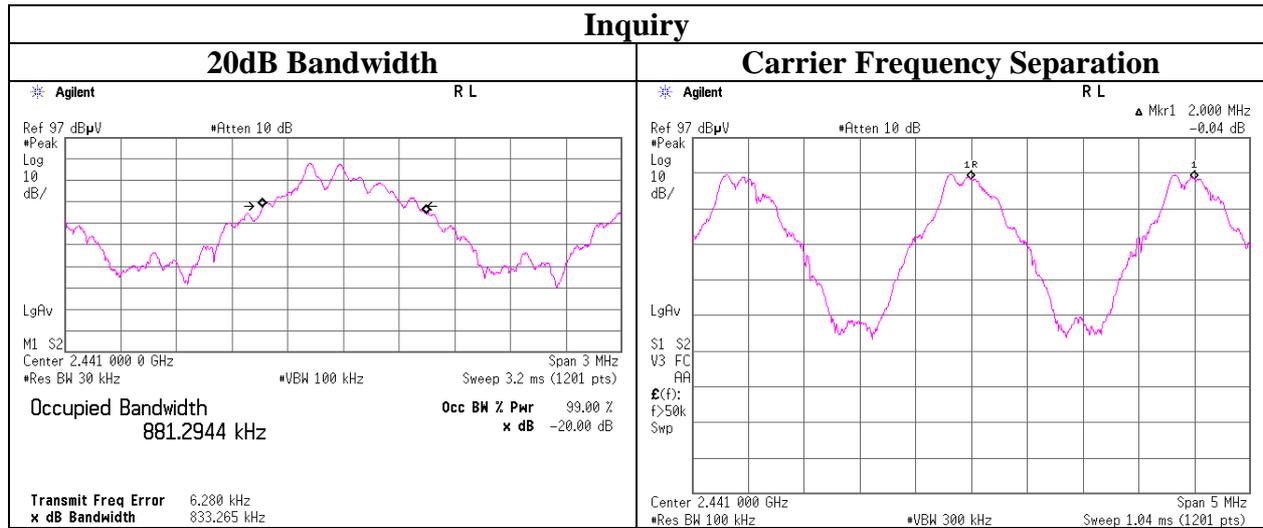


## 20dB Bandwidth and Carrier Frequency Separation

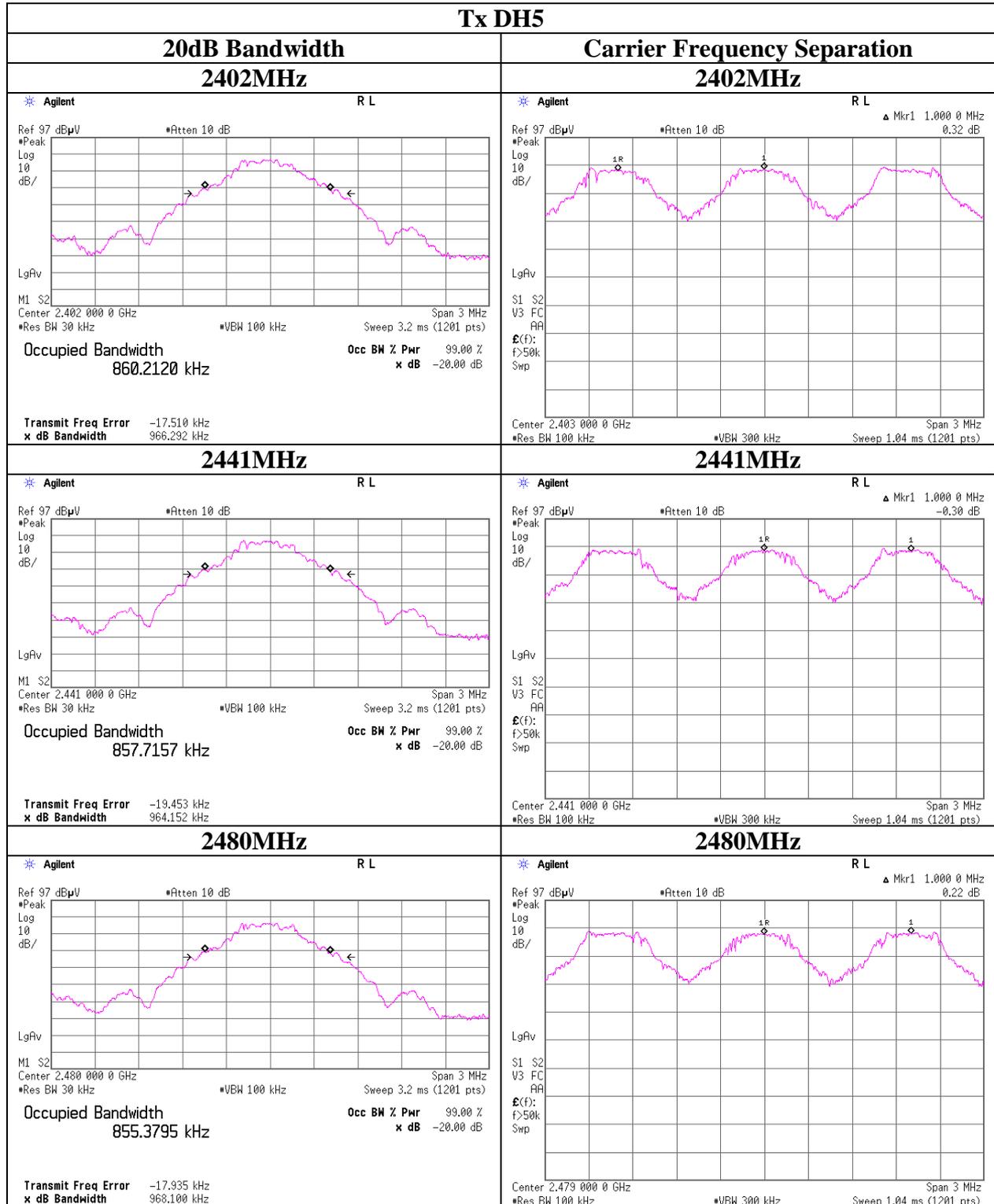
Test place	Head Office EMC Lab. No.3 Measurement Room
Report No.	32GE0144-HO-01
Date	03/13/2012
Temperature/ Humidity	21 deg. C / 45% RH
Engineer	Takeshi Choda
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.966	1.000	$\geq 0.644$
DH5	2441.0	0.964	1.000	$\geq 0.643$
DH5	2480.0	0.968	1.000	$\geq 0.645$
3DH5	2402.0	1.311	1.000	$\geq 0.874$
3DH5	2441.0	1.306	1.000	$\geq 0.871$
3DH5	2480.0	1.308	1.000	$\geq 0.872$
Inquiry	2441.0	0.833	2.000	$\geq 0.555$

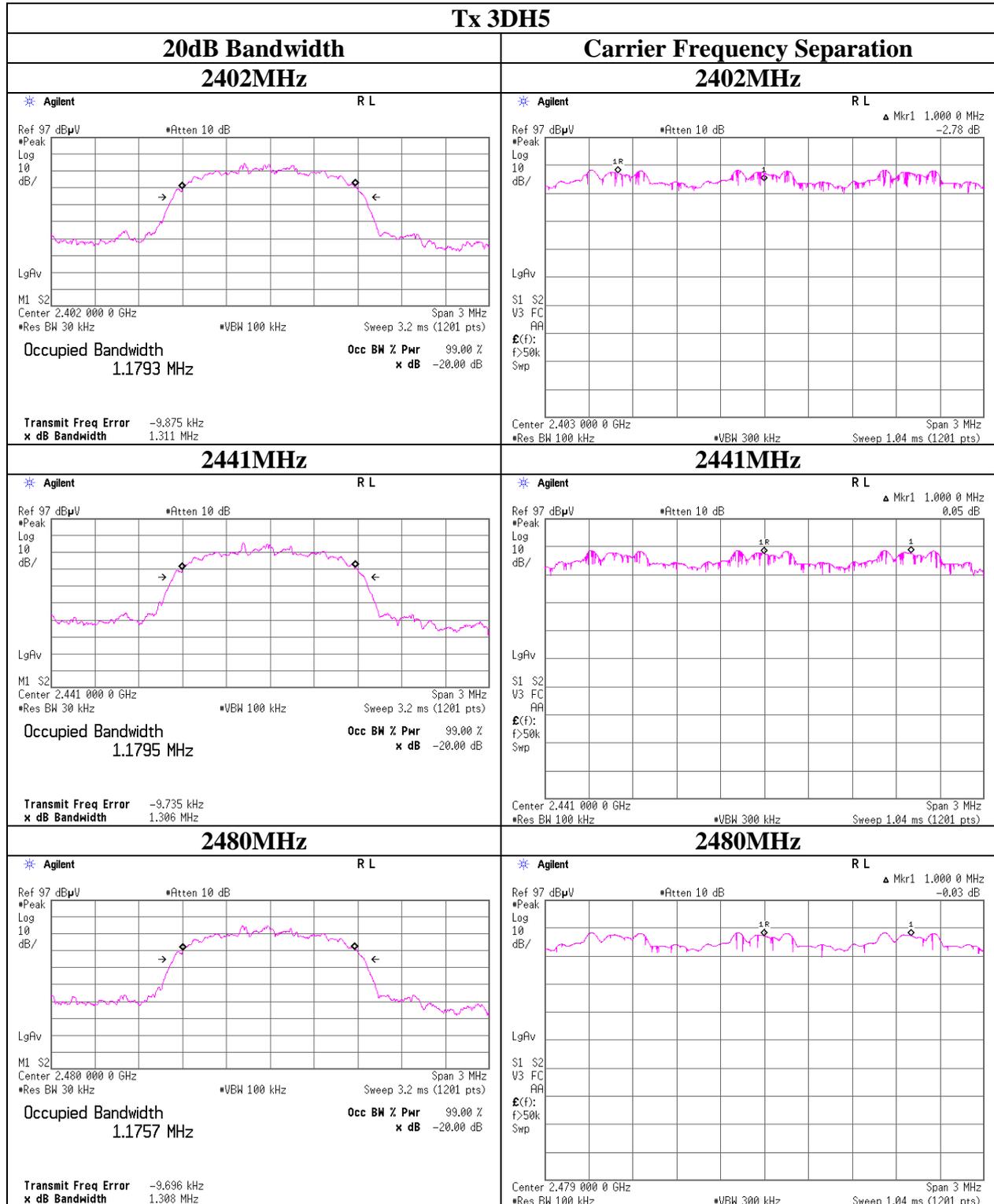
Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).  
No limit applies to 20dB Bandwidth.



**20dB Bandwidth and Carrier Frequency Separation**



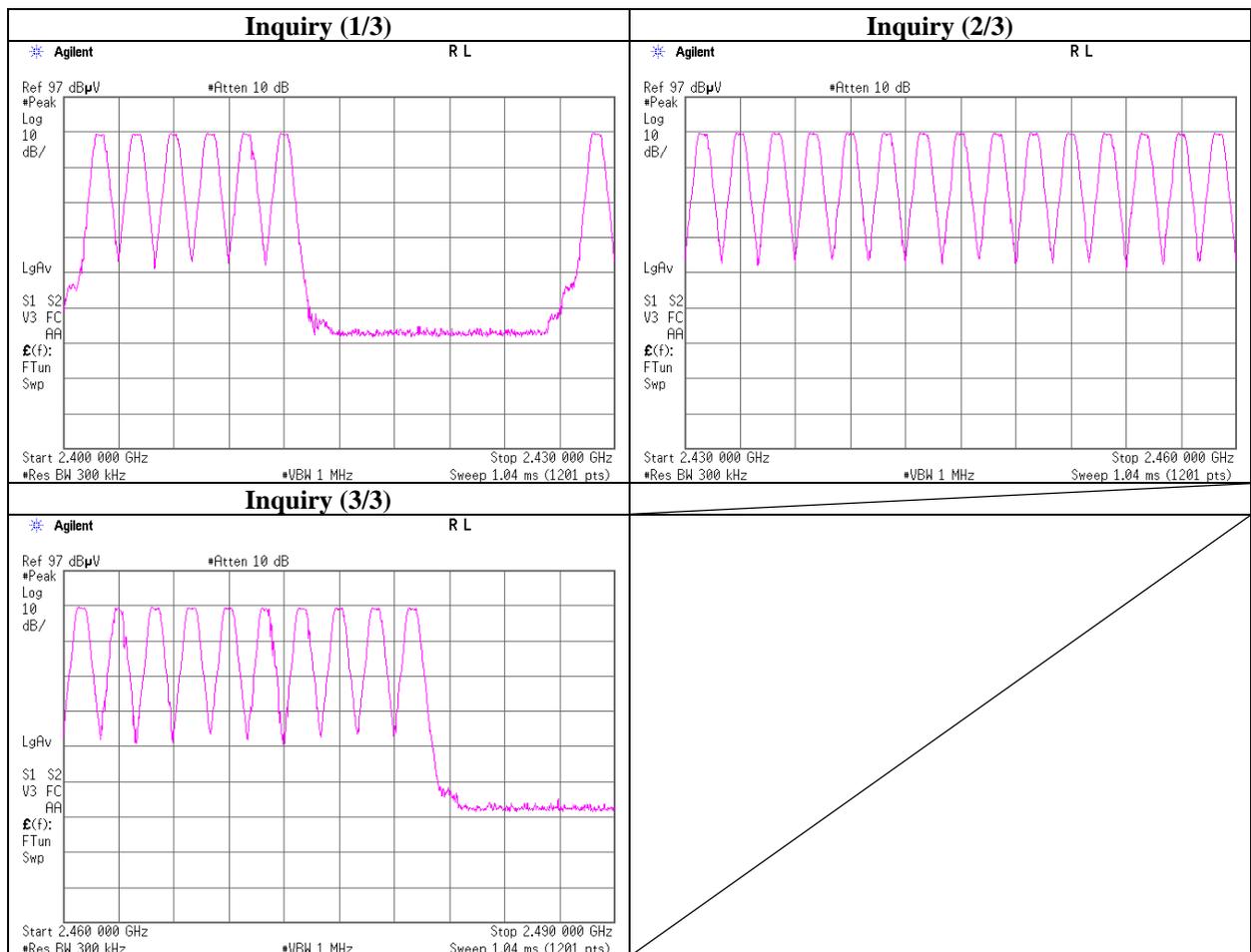
**20dB Bandwidth and Carrier Frequency Separation**



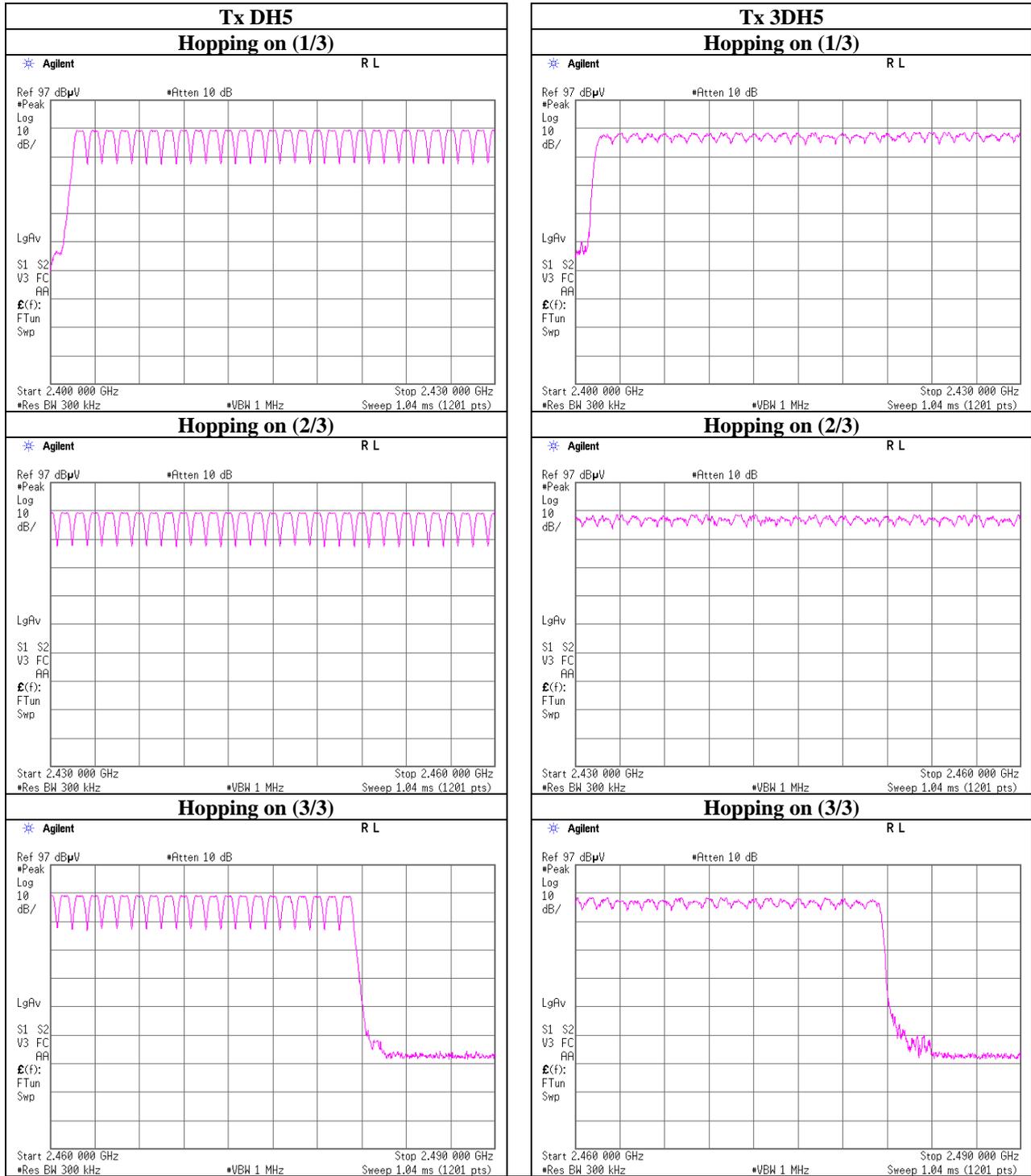
## Number of Hopping Frequency

Test place	Head Office EMC Lab. No.3 Measurement Room
Report No.	32GE0144-HO-01
Date	03/13/2012
Temperature/ Humidity	21 deg. C / 45% RH
Engineer	Takeshi Choda
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

Mode	Number of channel [times]	Limit [times]
DH5	79	>= 15
3DH5	79	>= 15
Inquiry	32	>= 15



## Number of Hopping Frequency



### Dwell time

Test place	Head Office EMC Lab. No.11 Measurement Room
Report No.	32GE0144-HO-01
Date	03/16/2012
Temperature/ Humidity	26 deg. C / 20% RH
Engineer	Yutaka Yoshida
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	50.2 times / 5 sec. x	31.6 sec. =	318 times	0.420	400
DH3	25.4 times / 5 sec. x	31.6 sec. =	161 times	1.680	400
DH5	18.2 times / 5 sec. x	31.6 sec. =	116 times	2.933	400
3DH1	49.8 times / 5 sec. x	31.6 sec. =	315 times	0.422	400
3DH3	26.0 times / 5 sec. x	31.6 sec. =	165 times	1.677	400
3DH5	20.0 times / 5 sec. x	31.6 sec. =	127 times	2.933	400
Inquiry	101.0 times / 1 sec. x	12.8 sec. =	1293 times	0.125	400

Sample Calculation

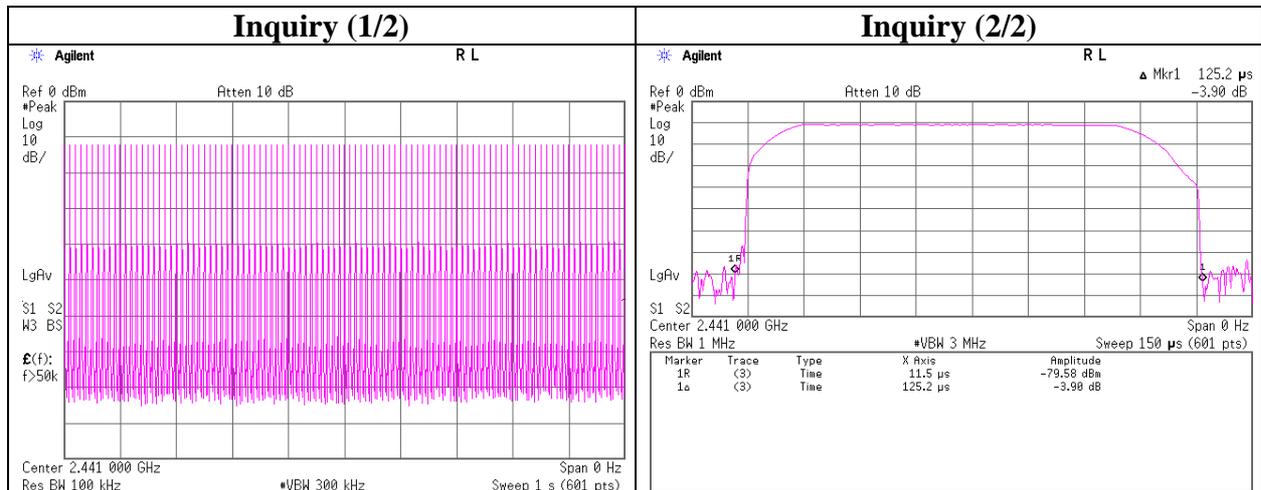
Result = Number of transmission x Length of transmission time

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

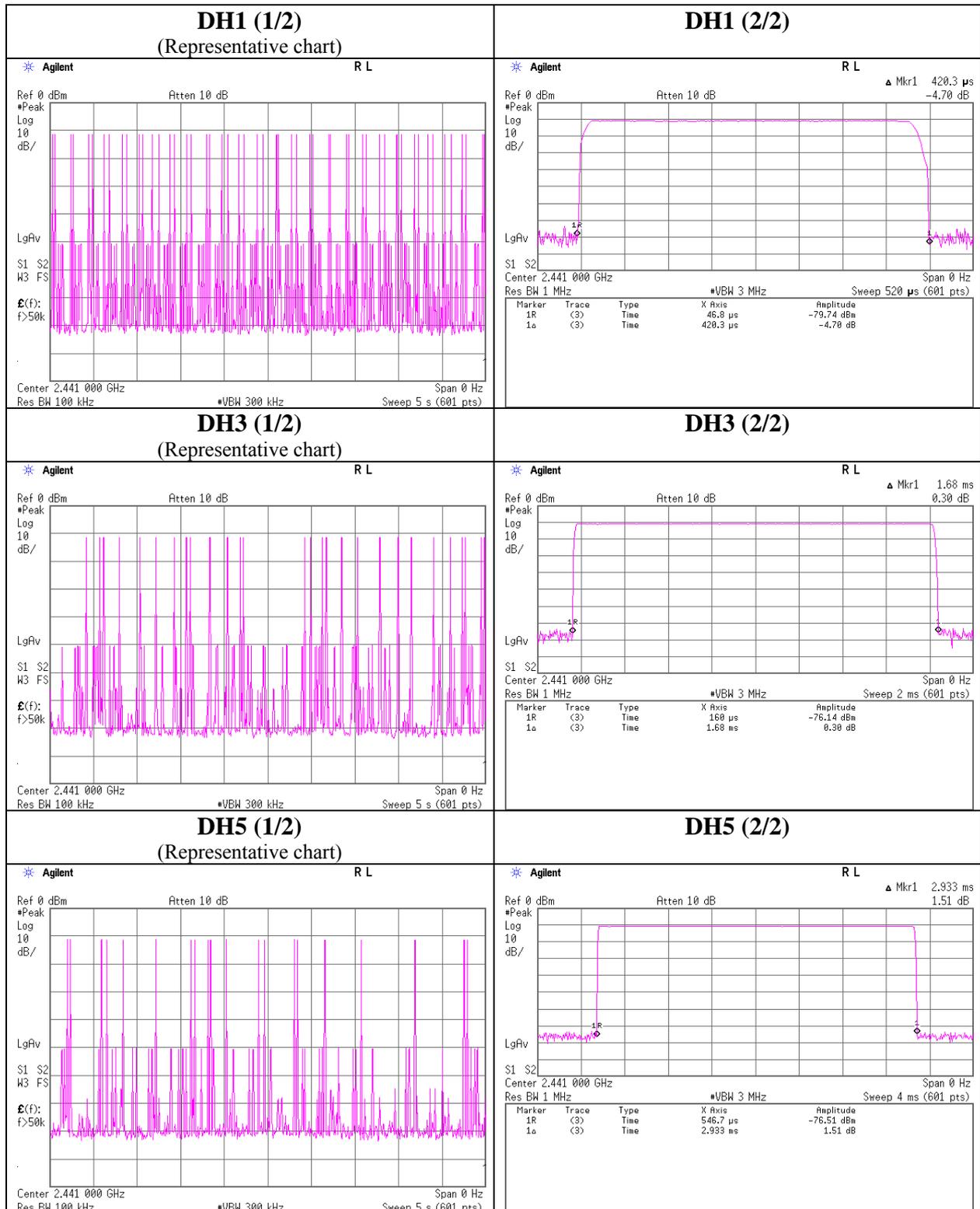
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	52	49	51	48	51	50.2
DH3	24	25	26	28	24	25.4
DH5	20	17	16	18	20	18.2
3DH1	49	50	50	50	50	49.8
3DH3	24	27	25	26	28	26
3DH5	24	13	18	20	25	20

Sample Calculation

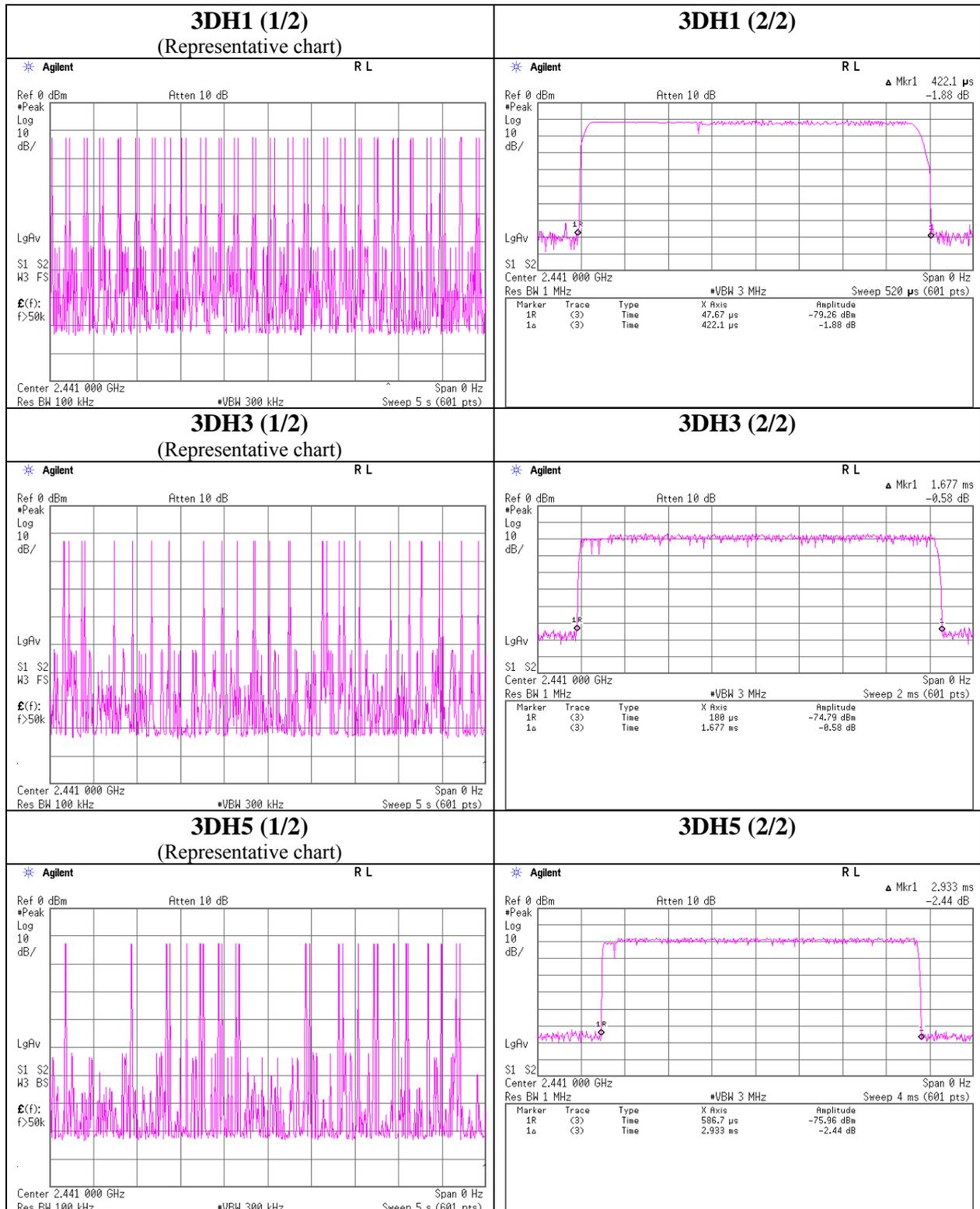
Average= Summation(Sampling 1 to 5) / 5



**Dwell time**



**Dwell time**



## Maximum Peak Output Power

Test place                   Head Office EMC Lab. No.6 Measurement Room  
Report No.                   32GE0144-HO-01  
Date                         03/12/2012  
Temperature/ Humidity     23 deg. C / 32% RH  
Engineer                    Takumi Shimada  
Mode                         Tx (Hopping off) DH5/2DH5/3DH5/Inquiry

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-9.49	0.80	9.96	1.27	1.34	20.96	125	19.69
DH5	2441.0	-9.31	0.80	9.96	1.45	1.40	20.96	125	19.51
DH5	2480.0	-9.73	0.80	9.96	1.03	1.27	20.96	125	19.93
2DH5	2402.0	-8.92	0.80	9.96	1.84	1.53	20.96	125	19.12
2DH5	2441.0	-8.74	0.80	9.96	2.02	1.59	20.96	125	18.94
2DH5	2480.0	-9.17	0.80	9.96	1.59	1.44	20.96	125	19.37
3DH5	2402.0	-8.75	0.80	9.96	2.01	1.59	20.96	125	18.95
3DH5	2441.0	-8.54	0.80	9.96	2.22	1.67	20.96	125	18.74
3DH5	2480.0	-9.03	0.80	9.96	1.73	1.49	20.96	125	19.23
Inquiry	2441.0	-9.28	0.80	9.96	1.48	1.41	20.96	125	19.48

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.

**Radiated Spurious Emission**  
(Power Supply : SONY)

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Report No. 32GE0144-HO-01  
Date 03/24/2012 04/01/2012  
Temperature/ Humidity 23 deg. C / 37% RH 24 deg. C / 41% RH  
Engineer Takayuki Shimada Tomotaka Sasagawa  
(1-26.5GHz) (30-1000MHz)  
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	35.410	QP	23.9	16.3	7.2	32.0	15.4	40.0	24.6	
Hori	69.421	QP	42.5	6.4	7.7	32.1	24.5	40.0	15.5	
Hori	200.544	QP	32.4	16.6	8.8	31.9	25.9	43.5	17.6	
Hori	404.124	QP	34.5	17.7	10.3	32.0	30.5	46.0	15.5	
Hori	576.243	QP	40.9	20.2	11.3	32.0	40.4	46.0	5.6	
Hori	809.321	QP	28.1	23.7	12.5	31.7	32.6	46.0	13.4	
Hori	1595.833	PK	56.7	25.5	1.8	33.2	50.8	73.9	23.1	
Hori	2390.000	PK	48.3	28.1	2.2	32.2	46.4	73.9	27.5	
Hori	2399.774	PK	59.9	28.1	2.2	32.2	58.0	73.9	15.9	
Hori	2400.000	PK	62.0	28.1	2.2	32.2	60.1	-	-	See 20dBc Data Sheet
Hori	4804.000	PK	41.1	31.2	3.9	31.4	44.8	73.9	29.1	
Hori	7206.000	PK	42.2	35.6	4.6	32.4	50.0	73.9	23.9	
Hori	9608.000	PK	42.7	38.3	5.5	33.2	53.3	73.9	20.6	
Hori	24020.000	PK	47.3	38.8	-1.8	31.6	52.7	73.9	21.2	
Hori	1595.833	AV	42.7	25.5	1.8	33.2	36.8	53.9	17.1	
Hori	2390.000	AV	33.8	28.1	2.2	32.2	31.9	53.9	22.0	
Hori	2399.774	AV	49.5	28.1	2.2	32.2	47.6	53.9	6.3	
Hori	2400.000	AV	50.9	28.1	2.2	32.2	49.0	-	-	See 20dBc Data Sheet
Hori	4804.000	AV	29.0	31.2	3.9	31.4	32.7	53.9	21.2	
Hori	7206.000	AV	29.9	35.6	4.6	32.4	37.7	53.9	16.2	
Hori	9608.000	AV	29.9	38.3	5.5	33.2	40.5	53.9	13.4	
Hori	24020.000	AV	35.2	38.8	-1.8	31.6	40.6	53.9	13.3	
Vert	36.423	QP	34.5	16.0	7.2	32.0	25.6	40.0	14.4	
Vert	70.421	QP	45.9	6.4	7.7	32.1	27.7	40.0	12.3	
Vert	200.423	QP	36.8	16.6	8.8	31.9	30.3	43.5	13.2	
Vert	404.231	QP	42.2	17.7	10.3	32.0	38.2	46.0	7.8	
Vert	576.239	QP	35.8	20.2	11.3	32.0	35.3	46.0	10.7	
Vert	811.232	QP	31.2	23.7	12.5	31.6	35.8	46.0	10.2	
Vert	1595.833	PK	57.9	25.5	1.8	33.2	52.0	73.9	21.9	
Vert	2390.000	PK	46.1	28.1	2.2	32.2	44.2	73.9	29.7	
Vert	2399.774	PK	59.6	28.1	2.2	32.2	57.7	73.9	16.2	
Vert	2400.000	PK	61.3	28.1	2.2	32.2	59.4	-	-	See 20dBc Data Sheet
Vert	4804.000	PK	40.8	31.2	3.9	31.4	44.5	73.9	29.4	
Vert	7206.000	PK	42.0	35.6	4.6	32.4	49.8	73.9	24.1	
Vert	9608.000	PK	42.7	38.3	5.5	33.2	53.3	73.9	20.6	
Vert	24020.000	PK	47.1	38.8	-1.8	31.6	52.5	73.9	21.4	
Vert	1595.833	AV	43.6	25.5	1.8	33.2	37.7	53.9	16.2	
Vert	2390.000	AV	33.6	28.1	2.2	32.2	31.7	53.9	22.2	
Vert	2399.774	AV	49.3	28.1	2.2	32.2	47.4	53.9	6.5	
Vert	2400.000	AV	50.7	28.1	2.2	32.2	48.8	-	-	See 20dBc Data Sheet
Vert	4804.000	AV	29.0	31.2	3.9	31.4	32.7	53.9	21.2	
Vert	7206.000	AV	29.9	35.6	4.6	32.4	37.7	53.9	16.2	
Vert	9608.000	AV	29.9	38.3	5.5	33.2	40.5	53.9	13.4	
Vert	24020.000	AV	35.2	38.8	-1.8	31.6	40.6	53.9	13.3	

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).

\*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



**Radiated Spurious Emission**  
(Power Supply : SONY)

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Report No. 32GE0144-HO-01  
Date 03/24/2012 04/01/2012  
Temperature/ Humidity 23 deg. C / 37% RH 24 deg. C / 41% RH  
Engineer Takayuki Shimada Tomotaka Sasagawa  
(1-26.5GHz) (30-1000MHz)  
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	35.213	QP	23.9	16.4	7.2	32.0	15.5	40.0	24.5	
Hori	69.231	QP	43.1	6.5	7.7	32.1	25.2	40.0	14.8	
Hori	200.452	QP	32.4	16.6	8.8	31.9	25.9	43.5	17.6	
Hori	404.421	QP	33.9	17.7	10.3	32.0	29.9	46.0	16.1	
Hori	576.312	QP	41.2	20.2	11.3	32.0	40.7	46.0	5.3	
Hori	809.232	QP	28.1	23.7	12.5	31.7	32.6	46.0	13.4	
Hori	1595.833	PK	57.0	25.5	1.8	33.2	51.1	73.9	22.8	
Hori	4882.000	PK	41.4	31.4	3.8	31.4	45.2	73.9	28.7	
Hori	7323.000	PK	42.2	35.7	4.6	32.5	50.0	73.9	23.9	
Hori	9764.000	PK	42.7	38.5	5.5	33.2	53.5	73.9	20.4	
Hori	24410.000	PK	47.1	38.6	-1.7	31.6	52.4	73.9	21.5	
Hori	1595.833	AV	43.0	25.5	1.8	33.2	37.1	53.9	16.8	
Hori	4882.000	AV	29.0	31.4	3.8	31.4	32.8	53.9	21.1	
Hori	7323.000	AV	30.0	35.7	4.6	32.5	37.8	53.9	16.1	
Hori	9764.000	AV	29.8	38.5	5.5	33.2	40.6	53.9	13.3	
Hori	24410.000	AV	34.6	38.6	-1.7	31.6	39.9	53.9	14.0	
Vert	35.312	QP	33.1	16.4	7.2	32.0	24.6	40.0	15.4	
Vert	70.310	QP	45.2	6.4	7.7	32.1	27.0	40.0	13.0	
Vert	200.542	QP	36.5	16.6	8.8	31.9	30.0	43.5	13.5	
Vert	404.230	QP	42.3	17.7	10.3	32.0	38.3	46.0	7.7	
Vert	576.231	QP	35.4	20.2	11.3	32.0	34.9	46.0	11.1	
Vert	811.551	QP	30.9	23.7	12.5	31.6	35.5	46.0	10.5	
Vert	1595.833	PK	57.9	25.5	1.8	33.2	52.0	73.9	21.9	
Vert	4882.000	PK	41.4	31.4	3.8	31.4	45.2	73.9	28.7	
Vert	7323.000	PK	42.3	35.7	4.6	32.5	50.1	73.9	23.8	
Vert	9764.000	PK	42.5	38.5	5.5	33.2	53.3	73.9	20.6	
Vert	24410.000	PK	47.3	38.6	-1.7	31.6	52.6	73.9	21.3	
Vert	1595.833	AV	43.5	25.5	1.8	33.2	37.6	53.9	16.3	
Vert	4882.000	AV	29.0	31.4	3.8	31.4	32.8	53.9	21.1	
Vert	7323.000	AV	30.0	35.7	4.6	32.5	37.8	53.9	16.1	
Vert	9764.000	AV	29.8	38.5	5.5	33.2	40.6	53.9	13.3	
Vert	24410.000	AV	34.6	38.6	-1.7	31.6	39.9	53.9	14.0	

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

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

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

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

**Radiated Spurious Emission**  
(Power Supply : SONY)

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Report No. 32GE0144-HO-01  
Date 03/24/2012 04/01/2012  
Temperature/ Humidity 23 deg. C / 37% RH 24 deg. C / 41% RH  
Engineer Takayuki Shimada Tomotaka Sasagawa  
(1-26.5GHz) (30-1000MHz)  
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	34.523	QP	24.1	16.7	7.1	32.0	15.9	40.0	24.1	
Hori	69.321	QP	43.1	6.5	7.7	32.1	25.2	40.0	14.8	
Hori	200.423	QP	32.1	16.6	8.8	31.9	25.6	43.5	17.9	
Hori	404.231	QP	34.3	17.7	10.3	32.0	30.3	46.0	15.7	
Hori	576.241	QP	40.9	20.2	11.3	32.0	40.4	46.0	5.6	
Hori	809.323	QP	28.0	23.7	12.5	31.7	32.5	46.0	13.5	
Hori	1595.833	PK	56.8	25.5	1.8	33.2	50.9	73.9	23.0	
Hori	2483.500	PK	52.9	28.5	2.2	32.2	51.4	73.9	22.5	
Hori	2484.407	PK	56.7	28.5	2.2	32.2	55.2	73.9	18.7	
Hori	4960.000	PK	41.7	31.6	3.9	31.4	45.8	73.9	28.1	
Hori	7440.000	PK	42.6	35.8	4.7	32.5	50.6	73.9	23.3	
Hori	9920.000	PK	42.7	38.6	5.6	33.3	53.6	73.9	20.3	
Hori	24800.000	PK	48.5	38.5	-1.6	31.5	53.9	73.9	20.0	
Hori	1595.833	AV	42.9	25.5	1.8	33.2	37.0	53.9	16.9	
Hori	2483.500	AV	38.8	28.5	2.2	32.2	37.3	53.9	16.6	
Hori	2484.407	AV	50.3	28.5	2.2	32.2	48.8	53.9	5.1	
Hori	4960.000	AV	29.0	31.6	3.9	31.4	33.1	53.9	20.8	
Hori	7440.000	AV	30.3	35.8	4.7	32.5	38.3	53.9	15.6	
Hori	9920.000	AV	30.7	38.6	5.6	33.3	41.6	53.9	12.3	
Hori	24800.000	AV	36.5	38.5	-1.6	31.5	41.9	53.9	12.0	
Vert	34.310	QP	34.5	16.8	7.1	32.0	26.3	40.0	13.7	
Vert	70.421	QP	45.2	6.4	7.7	32.1	27.0	40.0	13.0	
Vert	200.312	QP	36.4	16.6	8.8	31.9	29.9	43.5	13.6	
Vert	404.444	QP	42.1	17.7	10.3	32.0	38.1	46.0	7.9	
Vert	576.412	QP	35.4	20.2	11.3	32.0	34.9	46.0	11.1	
Vert	810.310	QP	31.2	23.7	12.5	31.6	35.8	46.0	10.2	
Vert	1595.833	PK	57.7	25.5	1.8	33.2	51.8	73.9	22.1	
Vert	2483.500	PK	50.3	28.5	2.2	32.2	48.8	73.9	25.1	
Vert	2484.407	PK	54.5	28.5	2.2	32.2	53.0	73.9	20.9	
Vert	4960.000	PK	41.7	31.6	3.9	31.4	45.8	73.9	28.1	
Vert	7440.000	PK	42.5	35.8	4.7	32.5	50.5	73.9	23.4	
Vert	9920.000	PK	42.6	38.6	5.6	33.3	53.5	73.9	20.4	
Vert	24800.000	PK	48.3	38.5	-1.6	31.5	53.7	73.9	20.2	
Vert	1595.833	AV	43.5	25.5	1.8	33.2	37.6	53.9	16.3	
Vert	2483.500	AV	35.1	28.5	2.2	32.2	33.6	53.9	20.3	
Vert	2484.407	AV	48.0	28.5	2.2	32.2	46.5	53.9	7.4	
Vert	4960.000	AV	29.0	31.6	3.9	31.4	33.1	53.9	20.8	
Vert	7440.000	AV	30.3	35.8	4.7	32.5	38.3	53.9	15.6	
Vert	9920.000	AV	30.7	38.6	5.6	33.3	41.6	53.9	12.3	
Vert	24800.000	AV	36.5	38.5	-1.6	31.5	41.9	53.9	12.0	

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

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

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

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



**Radiated Spurious Emission**  
**20dBc Data Sheet**  
(Power Supply: SONY)

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	32GE0144-HO-01
Date	03/24/2012
Temperature/ Humidity	23 deg. C / 37% RH
Engineer	Takayuki Shimada
Mode	Tx, 3DH5 2402MHz

**20dBc Data Sheet**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result dBuV/m	Limit dBuV/m	Margin [dB]	Remark
Hori	2402.000	PK	103.4	28.1	2.2	32.2	101.5	-	-	Carrier
Hori	2399.967	PK	56.3	28.1	2.2	32.2	54.4	81.5	27.1	
Hori	2400.000	PK	55.5	28.1	2.2	32.2	53.6	81.5	27.9	
Vert	2402.000	PK	100.5	28.1	2.2	32.2	98.6	-	-	Carrier
Vert	2399.967	PK	53.4	28.1	2.2	32.2	51.5	78.6	27.1	
Vert	2400.000	PK	53.1	28.1	2.2	32.2	51.2	78.6	27.4	

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

**Radiated Spurious Emission**  
(Power Supply : SONY)

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Report No. 32GE0144-HO-01  
Date 03/24/2012 04/01/2012  
Temperature/ Humidity 23 deg. C / 37% RH 24 deg. C / 41% RH  
Engineer Takayuki Shimada Tomotaka Sasagawa  
(1-26.5GHz) (30-1000MHz)  
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	35.253	QP	24.1	16.4	7.2	32.0	15.7	40.0	24.3	
Hori	69.243	QP	43.1	6.5	7.7	32.1	25.2	40.0	14.8	
Hori	200.342	QP	32.3	16.6	8.8	31.9	25.8	43.5	17.7	
Hori	404.524	QP	34.5	17.7	10.3	32.0	30.5	46.0	15.5	
Hori	576.321	QP	41.2	20.2	11.3	32.0	40.7	46.0	5.3	
Hori	809.321	QP	28.1	23.7	12.5	31.7	32.6	46.0	13.4	
Hori	1595.833	PK	56.4	25.5	1.8	33.2	50.5	73.9	23.4	
Hori	4882.000	PK	41.5	31.4	3.8	31.4	45.3	73.9	28.6	
Hori	7323.000	PK	42.3	35.7	4.6	32.5	50.1	73.9	23.8	
Hori	9764.000	PK	42.4	38.5	5.5	33.2	53.2	73.9	20.7	
Hori	24410.000	PK	47.0	38.6	-1.7	31.6	52.3	73.9	21.6	
Hori	1595.833	AV	42.2	25.5	1.8	33.2	36.3	53.9	17.6	
Hori	4882.000	AV	29.0	31.4	3.8	31.4	32.8	53.9	21.1	
Hori	7323.000	AV	30.0	35.7	4.6	32.5	37.8	53.9	16.1	
Hori	9764.000	AV	29.8	38.5	5.5	33.2	40.6	53.9	13.3	
Hori	24410.000	AV	34.6	38.6	-1.7	31.6	39.9	53.9	14.0	
Vert	35.732	QP	35.2	16.2	7.2	32.0	26.5	40.0	13.5	
Vert	70.421	QP	45.9	6.4	7.7	32.1	27.7	40.0	12.3	
Vert	200.541	QP	37.2	16.6	8.8	31.9	30.7	43.5	12.8	
Vert	404.123	QP	42.1	17.7	10.3	32.0	38.1	46.0	7.9	
Vert	576.243	QP	35.8	20.2	11.3	32.0	35.3	46.0	10.7	
Vert	809.992	QP	30.8	23.7	12.5	31.6	35.4	46.0	10.6	
Vert	1595.833	PK	55.8	25.5	1.8	33.2	49.9	73.9	24.0	
Vert	4882.000	PK	41.4	31.4	3.8	31.4	45.2	73.9	28.7	
Vert	7323.000	PK	42.3	35.7	4.6	32.5	50.1	73.9	23.8	
Vert	9764.000	PK	42.7	38.5	5.5	33.2	53.5	73.9	20.4	
Vert	24410.000	PK	47.4	38.6	-1.7	31.6	52.7	73.9	21.2	
Vert	1595.833	AV	41.9	25.5	1.8	33.2	36.0	53.9	17.9	
Vert	4882.000	AV	29.0	31.4	3.8	31.4	32.8	53.9	21.1	
Vert	7323.000	AV	30.0	35.7	4.6	32.5	37.8	53.9	16.1	
Vert	9764.000	AV	29.8	38.5	5.5	33.2	40.6	53.9	13.3	
Vert	24410.000	AV	34.6	38.6	-1.7	31.6	39.9	53.9	14.0	

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

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

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

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

**Radiated Spurious Emission**  
(Power Supply : SONY)

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Report No. 32GE0144-HO-01  
Date 03/24/2012 04/01/2012  
Temperature/ Humidity 23 deg. C / 37% RH 24 deg. C / 41% RH  
Engineer Takayuki Shimada Tomotaka Sasagawa  
(1-26.5GHz) (30-1000MHz)  
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	35.421	QP	23.3	16.3	7.2	32.0	14.8	40.0	25.2	
Hori	69.231	QP	41.5	6.5	7.7	32.1	23.6	40.0	16.4	
Hori	200.653	QP	30.8	16.6	8.8	31.9	24.3	43.5	19.2	
Hori	404.243	QP	33.4	17.7	10.3	32.0	29.4	46.0	16.6	
Hori	576.321	QP	40.5	20.2	11.3	32.0	40.0	46.0	6.0	
Hori	809.232	QP	28.1	23.7	12.5	31.7	32.6	46.0	13.4	
Hori	1595.867	PK	56.8	25.5	1.8	33.2	50.9	73.9	23.0	
Hori	2483.500	PK	62.5	28.5	2.2	32.2	61.0	73.9	12.9	
Hori	2484.387	PK	61.5	28.5	2.2	32.2	60.0	73.9	13.9	
Hori	4960.000	PK	41.8	31.6	3.9	31.4	45.9	73.9	28.0	
Hori	7440.000	PK	42.6	35.8	4.7	32.5	50.6	73.9	23.3	
Hori	9920.000	PK	42.6	38.6	5.6	33.3	53.5	73.9	20.4	
Hori	24800.000	PK	48.1	38.5	-1.6	31.5	53.5	73.9	20.4	
Hori	1595.867	AV	42.6	25.5	1.8	33.2	36.7	53.9	17.2	
Hori	2483.500	AV	41.4	28.5	2.2	32.2	39.9	53.9	14.0	
Hori	2484.387	AV	46.9	28.5	2.2	32.2	45.4	53.9	8.5	
Hori	4960.000	AV	29.0	31.6	3.9	31.4	33.1	53.9	20.8	
Hori	7440.000	AV	30.3	35.8	4.7	32.5	38.3	53.9	15.6	
Hori	9920.000	AV	30.7	38.6	5.6	33.3	41.6	53.9	12.3	
Hori	24800.000	AV	36.5	38.5	-1.6	31.5	41.9	53.9	12.0	
Vert	35.650	QP	33.1	16.3	7.2	32.0	24.5	40.0	15.5	
Vert	69.320	QP	44.3	6.5	7.7	32.1	26.1	40.0	13.9	
Vert	200.521	QP	36.1	16.6	8.8	31.9	29.6	43.5	13.9	
Vert	404.231	QP	40.9	17.7	10.3	32.0	36.9	46.0	9.1	
Vert	576.241	QP	35.4	20.2	11.3	32.0	34.9	46.0	11.1	
Vert	810.551	QP	30.9	23.7	12.5	31.6	35.5	46.0	10.5	
Vert	1595.867	PK	55.2	25.5	1.8	33.2	49.3	73.9	24.6	
Vert	2483.500	PK	60.6	28.5	2.2	32.2	59.1	73.9	14.8	
Vert	2484.387	PK	59.6	28.5	2.2	32.2	58.1	73.9	15.8	
Vert	4960.000	PK	41.7	31.6	3.9	31.4	45.8	73.9	28.1	
Vert	7440.000	PK	42.6	35.8	4.7	32.5	50.6	73.9	23.3	
Vert	9920.000	PK	42.8	38.6	5.6	33.3	53.7	73.9	20.2	
Vert	24800.000	PK	48.5	38.5	-1.6	31.5	53.9	73.9	20.0	
Vert	1595.867	AV	41.1	25.5	1.8	33.2	35.2	53.9	18.7	
Vert	2483.500	AV	39.6	28.5	2.2	32.2	38.1	53.9	15.8	
Vert	2484.387	AV	44.9	28.5	2.2	32.2	43.4	53.9	10.5	
Vert	4960.000	AV	29.0	31.6	3.9	31.4	33.1	53.9	20.8	
Vert	7440.000	AV	30.3	35.8	4.7	32.5	38.3	53.9	15.6	
Vert	9920.000	AV	30.7	38.6	5.6	33.3	41.6	53.9	12.3	
Vert	24800.000	AV	36.5	38.5	-1.6	31.5	41.9	53.9	12.0	

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

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

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

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

**Radiated Spurious Emission**  
(Power Supply : DELTA)

Test place : Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Report No. : 32GE0144-HO-01  
Date : 03/24/2012 04/01/2012  
Temperature/ Humidity : 23 deg. C / 37% RH 24 deg. C / 41% RH  
Engineer : Takayuki Shimada Tomotaka Sasagawa  
(1-26.5GHz) (30-1000MHz)  
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	34.873	QP	23.9	16.6	7.1	32.0	15.6	40.0	24.4	
Hori	69.231	QP	42.1	6.5	7.7	32.1	24.2	40.0	15.8	
Hori	200.563	QP	32.1	16.6	8.8	31.9	25.6	43.5	17.9	
Hori	404.524	QP	34.5	17.7	10.3	32.0	30.5	46.0	15.5	
Hori	576.231	QP	40.9	20.2	11.3	32.0	40.4	46.0	5.6	
Hori	809.231	QP	28.2	23.7	12.5	31.7	32.7	46.0	13.3	
Hori	1595.650	PK	58.0	25.5	1.8	33.2	52.1	73.9	21.8	
Hori	4882.000	PK	41.6	31.4	3.8	31.4	45.4	73.9	28.5	
Hori	7323.000	PK	42.3	35.7	4.6	32.5	50.1	73.9	23.8	
Hori	9764.000	PK	42.2	38.5	5.5	33.2	53.0	73.9	20.9	
Hori	24410.000	PK	47.3	38.6	-1.7	31.6	52.6	73.9	21.3	
Hori	1595.650	AV	44.4	25.5	1.8	33.2	38.5	53.9	15.4	
Hori	4882.000	AV	29.0	31.4	3.8	31.4	32.8	53.9	21.1	
Hori	7323.000	AV	30.0	35.7	4.6	32.5	37.8	53.9	16.1	
Hori	9764.000	AV	29.8	38.5	5.5	33.2	40.6	53.9	13.3	
Hori	24410.000	AV	34.6	38.6	-1.7	31.6	39.9	53.9	14.0	
Vert	34.123	QP	35.4	16.9	7.1	32.0	27.3	40.0	12.7	
Vert	70.031	QP	45.1	6.4	7.7	32.1	26.9	40.0	13.1	
Vert	200.523	QP	36.4	16.6	8.8	31.9	29.9	43.5	13.6	
Vert	404.231	QP	41.2	17.7	10.3	32.0	37.2	46.0	8.8	
Vert	576.210	QP	35.4	20.2	11.3	32.0	34.9	46.0	11.1	
Vert	811.131	QP	31.2	23.7	12.5	31.6	35.8	46.0	10.2	
Vert	1595.650	PK	58.0	25.5	1.8	33.2	52.1	73.9	21.8	
Vert	4882.000	PK	41.5	31.4	3.8	31.4	45.3	73.9	28.6	
Vert	7323.000	PK	42.4	35.7	4.6	32.5	50.2	73.9	23.7	
Vert	9764.000	PK	42.3	38.5	5.5	33.2	53.1	73.9	20.8	
Vert	24410.000	PK	47.4	38.6	-1.7	31.6	52.7	73.9	21.2	
Vert	1595.650	AV	44.3	25.5	1.8	33.2	38.4	53.9	15.5	
Vert	4882.000	AV	29.0	31.4	3.8	31.4	32.8	53.9	21.1	
Vert	7323.000	AV	30.0	35.7	4.6	32.5	37.8	53.9	16.1	
Vert	9764.000	AV	29.8	38.5	5.5	33.2	40.6	53.9	13.3	
Vert	24410.000	AV	34.6	38.6	-1.7	31.6	39.9	53.9	14.0	

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

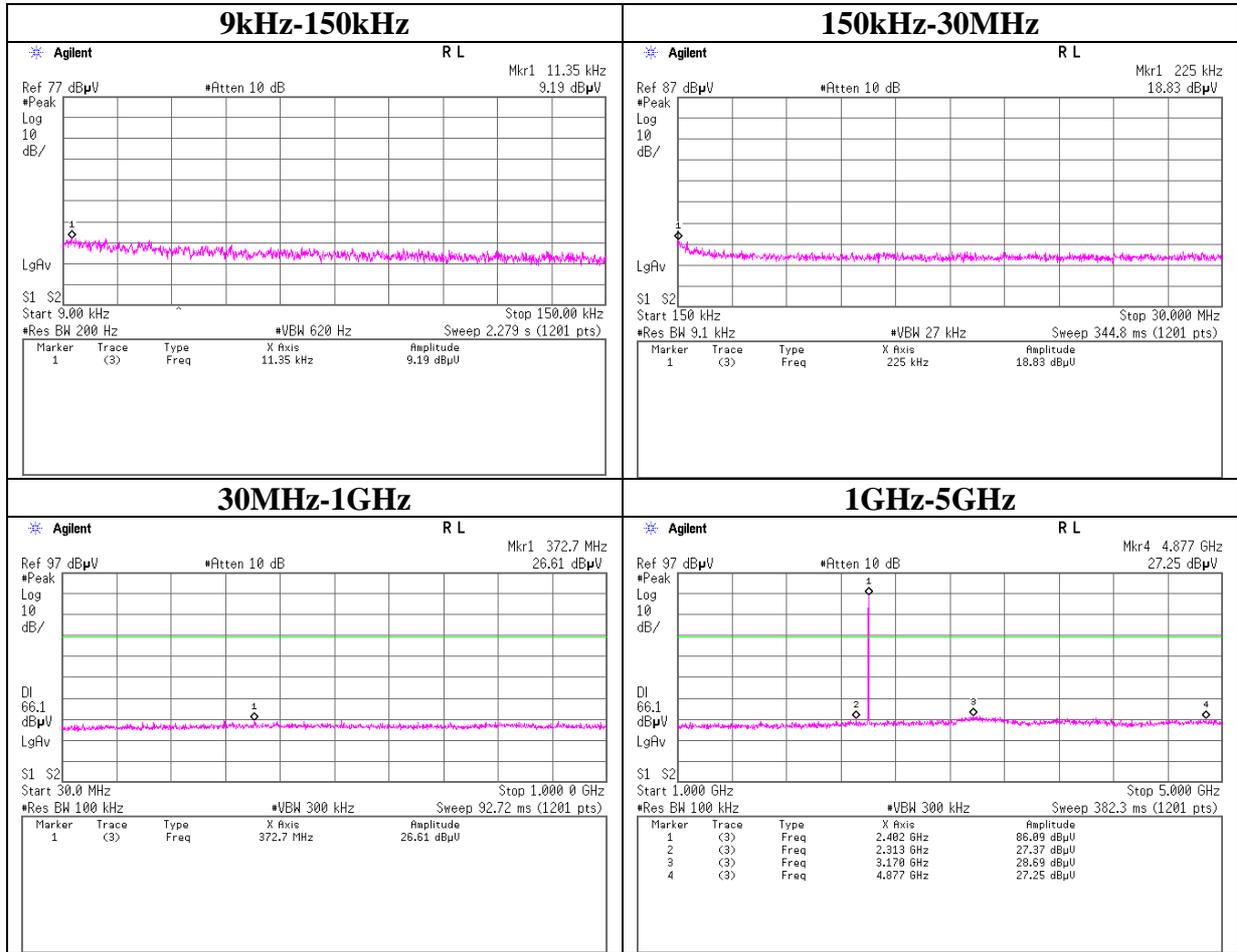
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

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

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

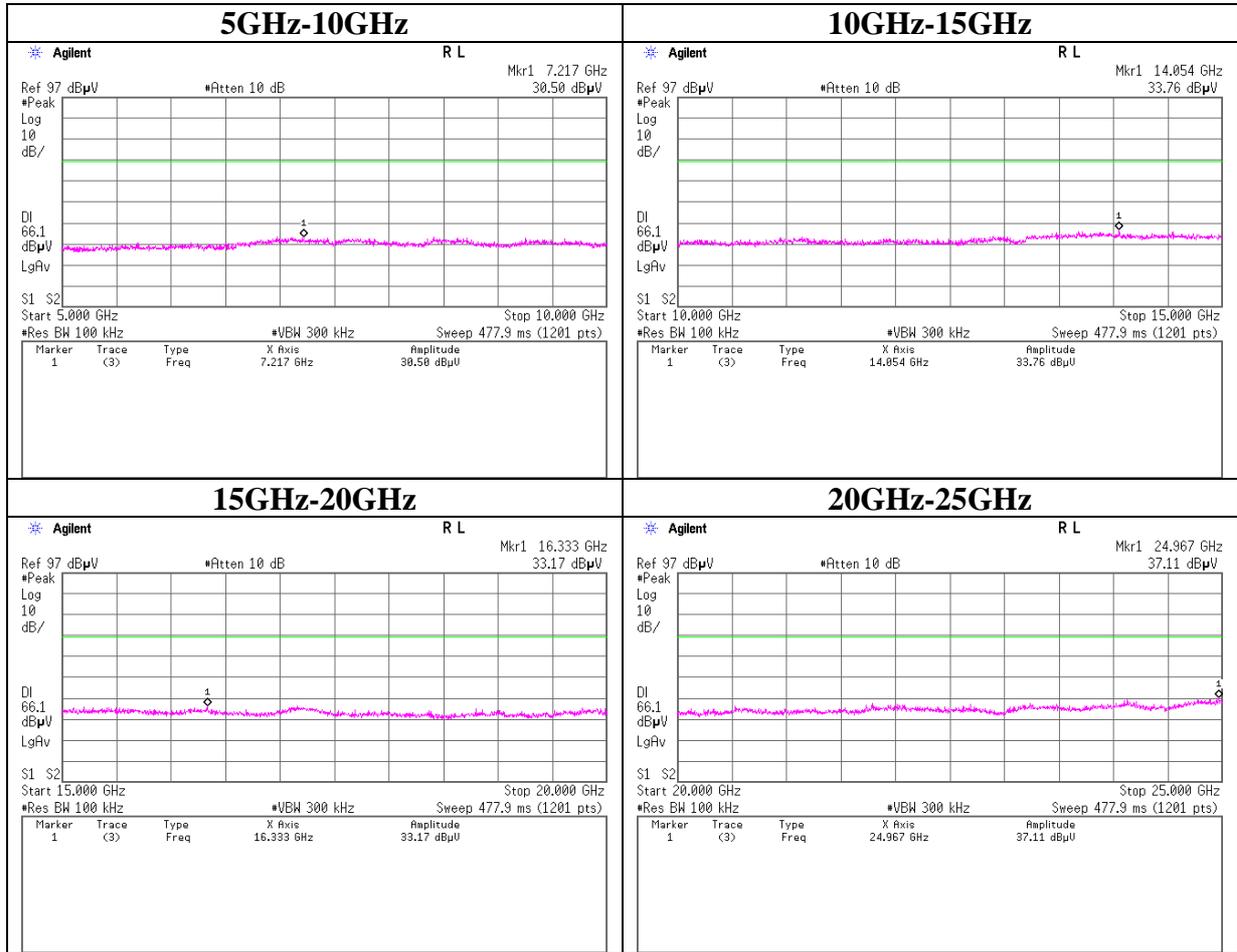
## Conducted Spurious Emission

### Tx DH5 2402MHz



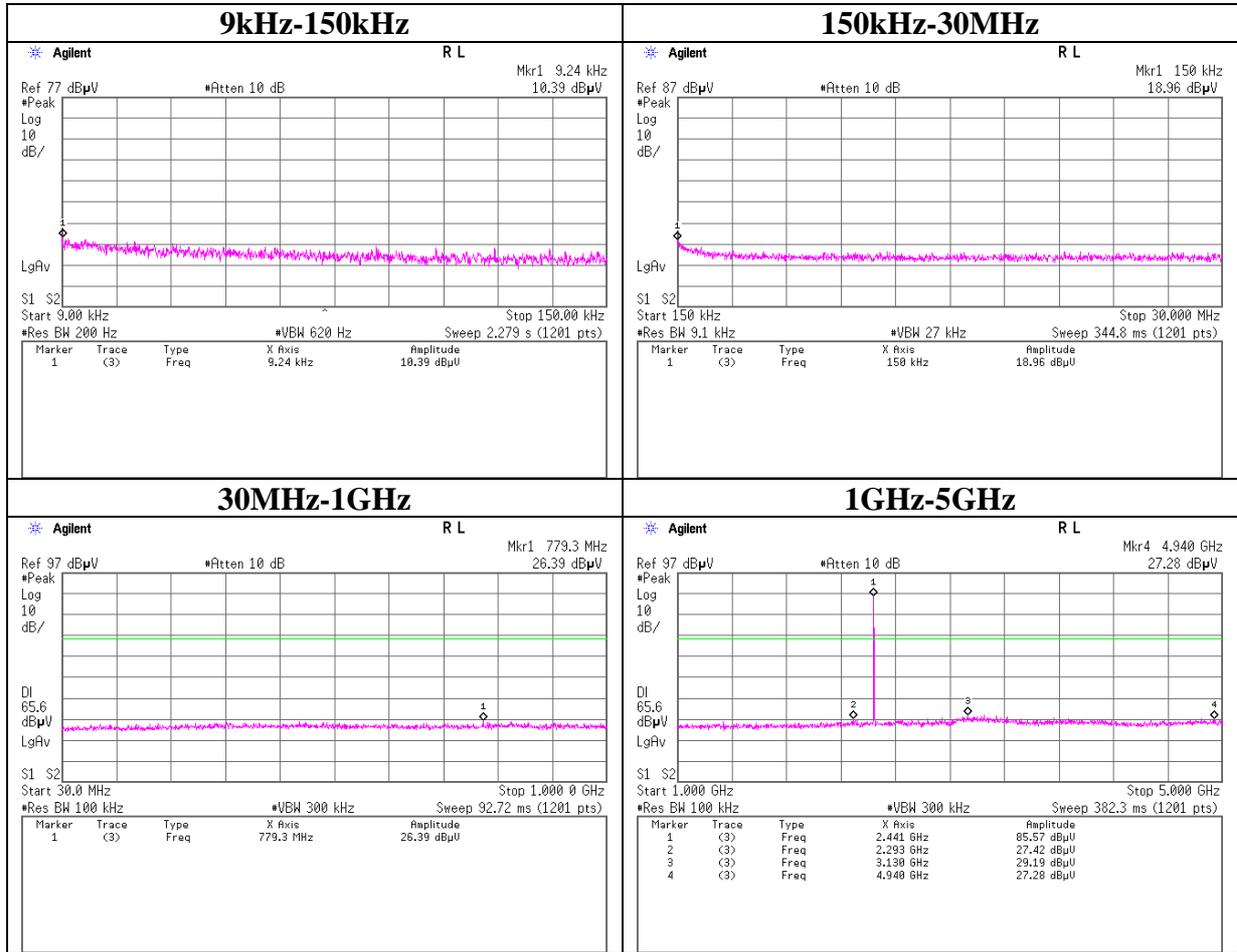
## Conducted Spurious Emission

### Tx DH5 2402MHz



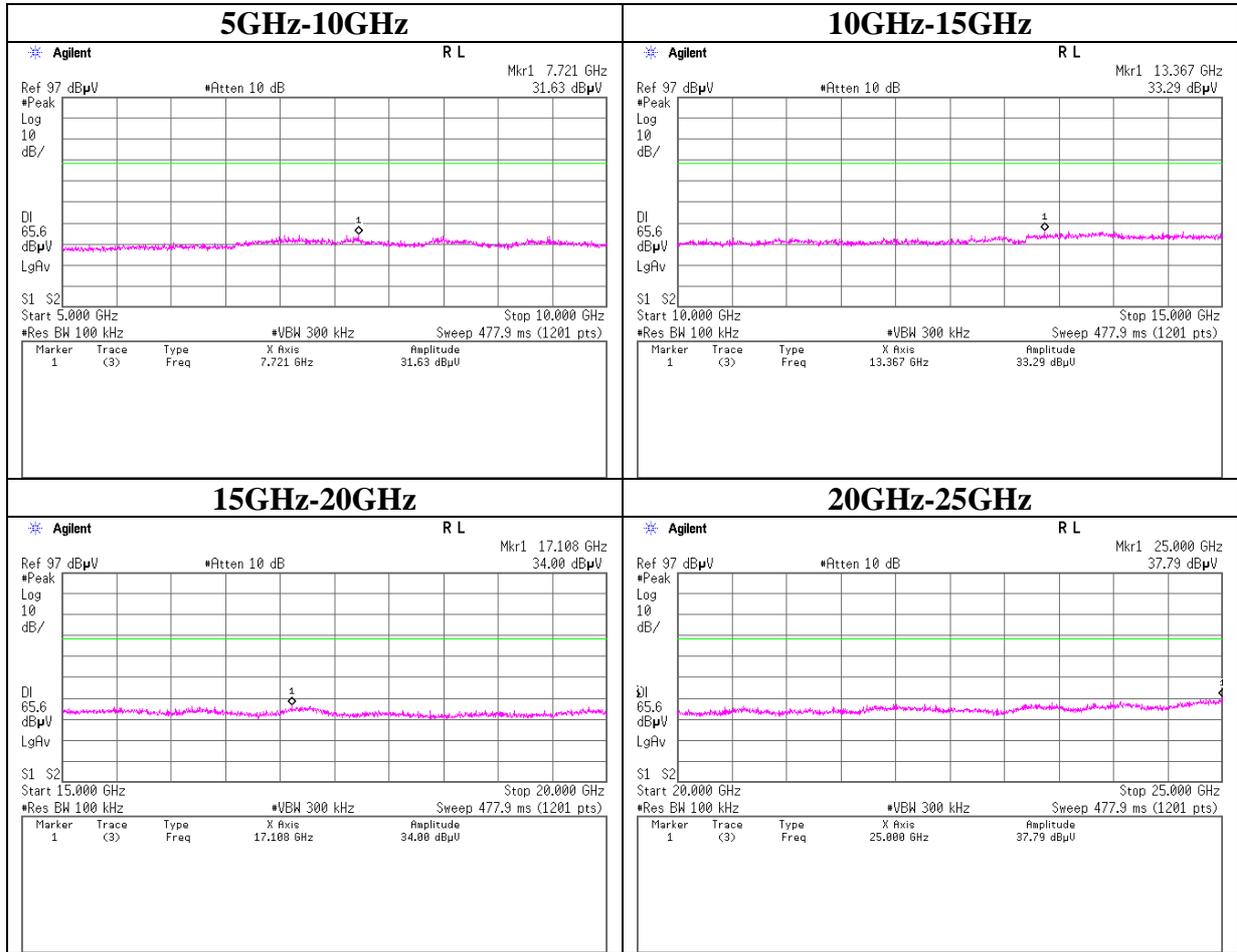
## Conducted Spurious Emission

### Tx DH5 2441MHz



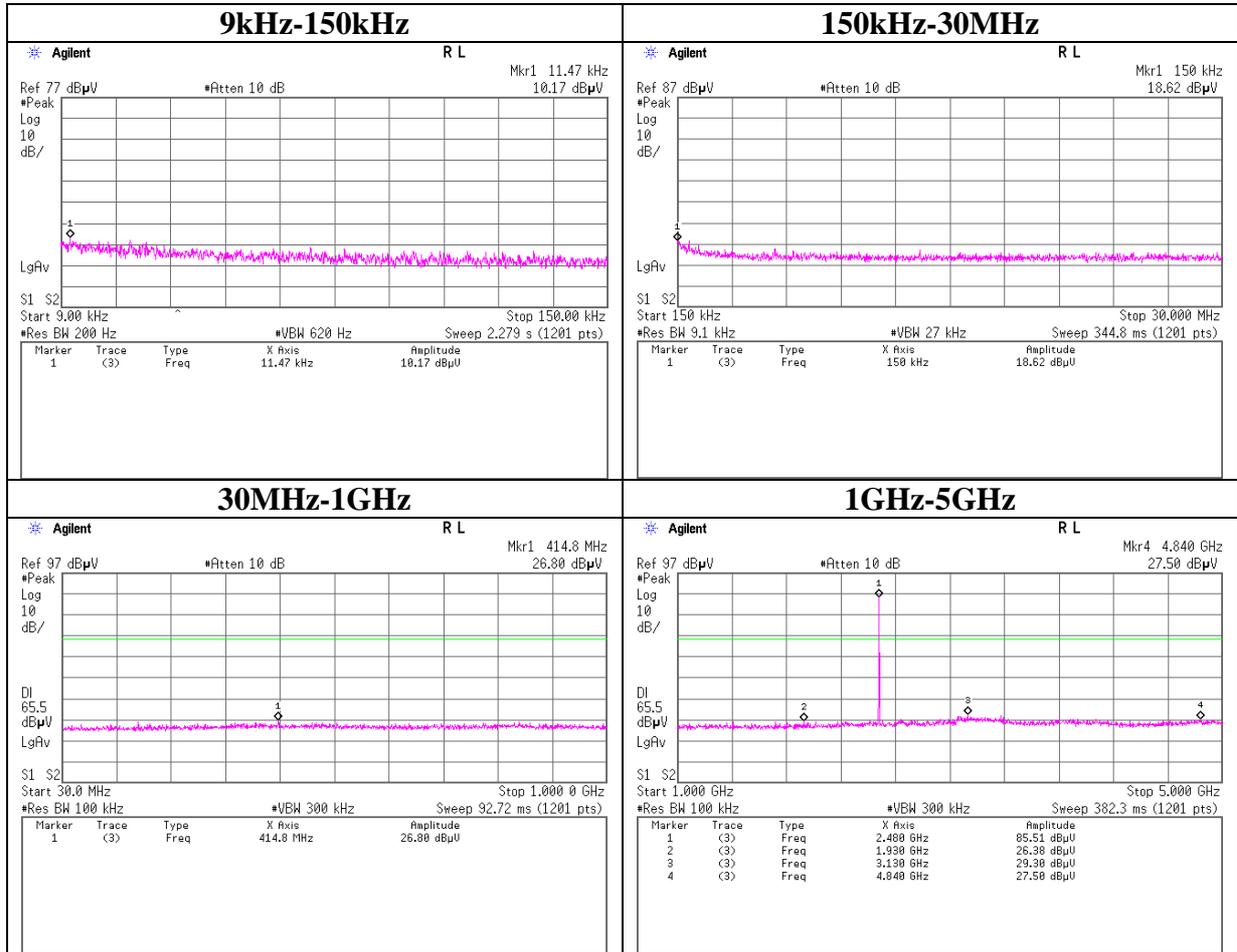
## Conducted Spurious Emission

### Tx DH5 2441MHz



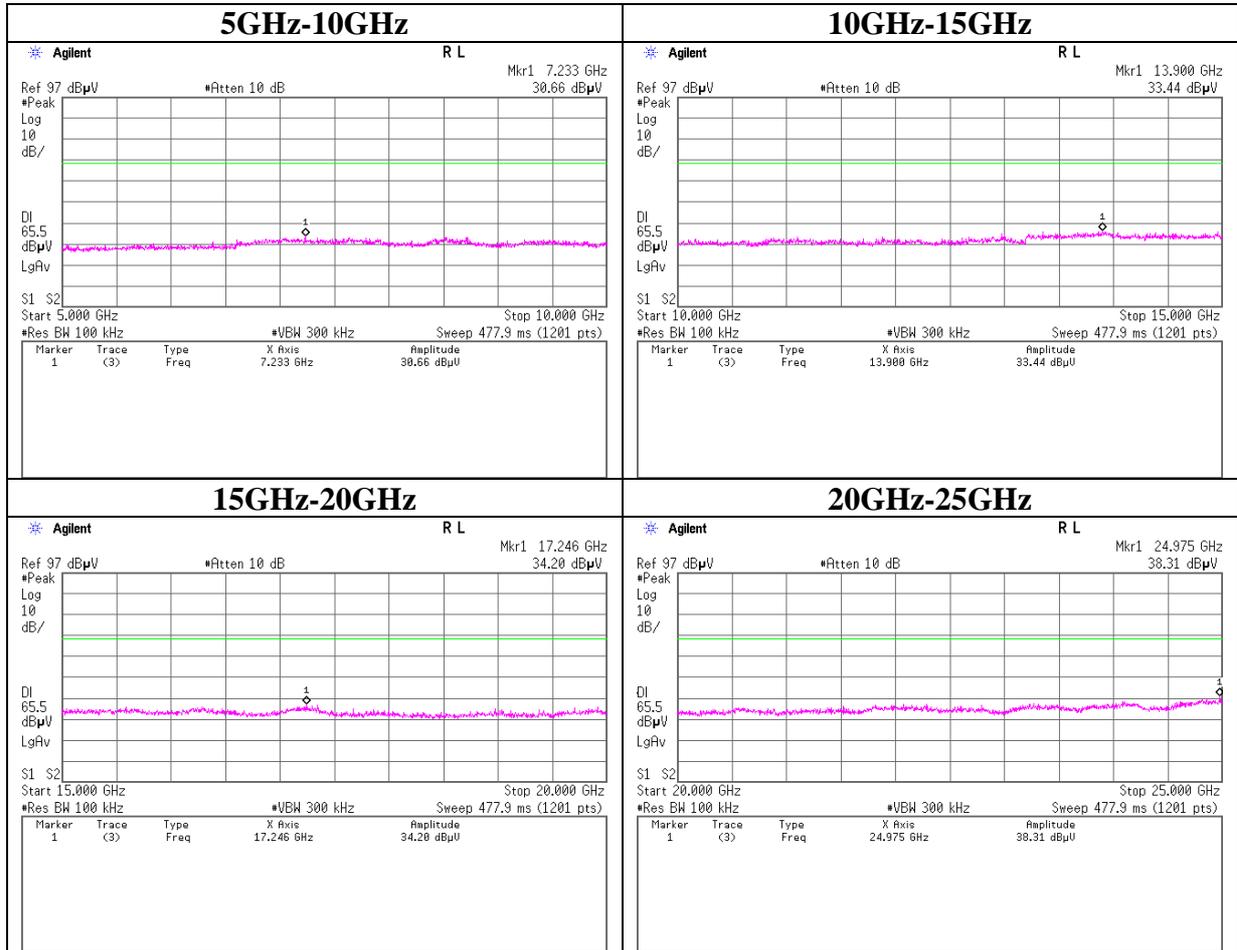
## Conducted Spurious Emission

### Tx DH5 2480MHz



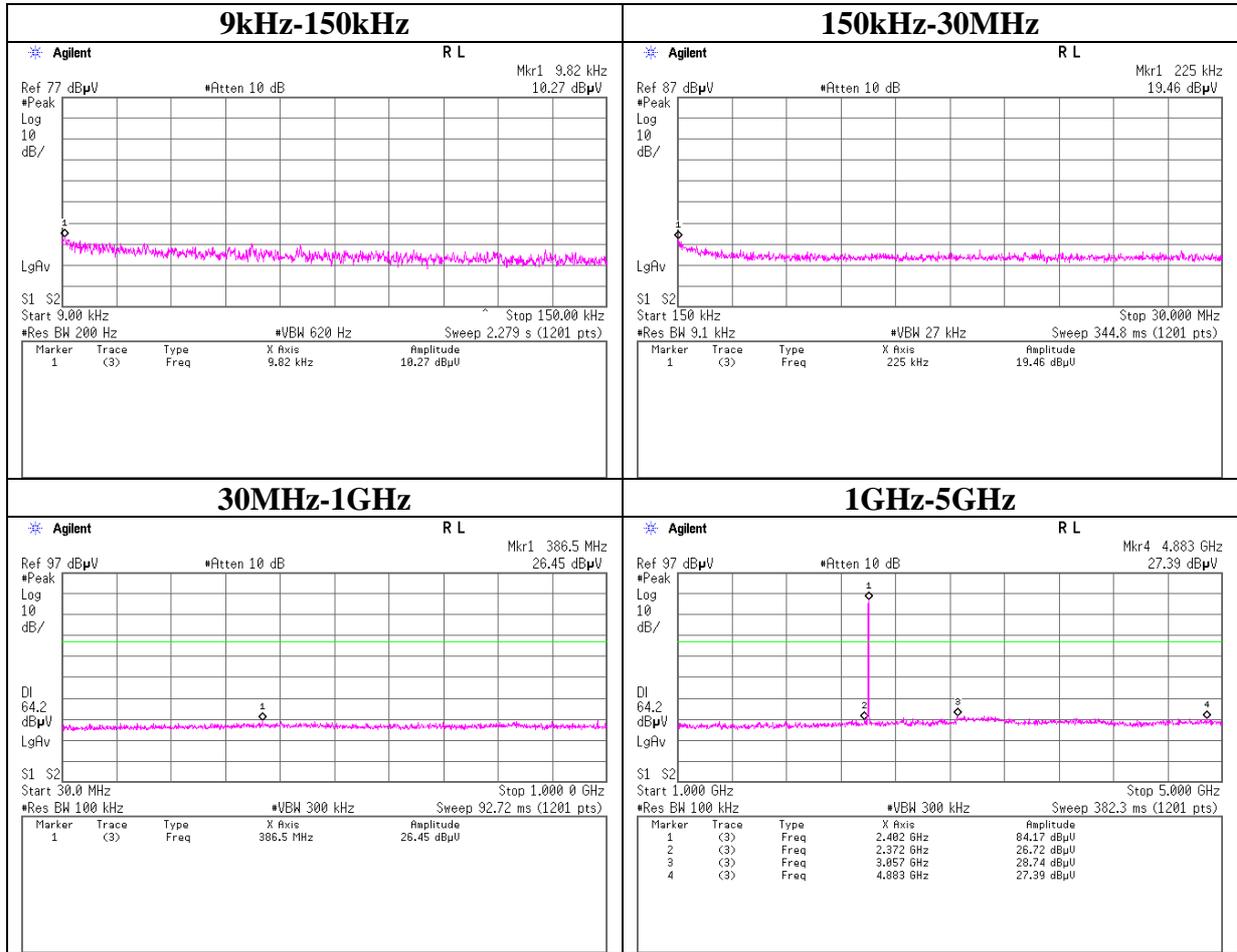
## Conducted Spurious Emission

### Tx DH5 2480MHz



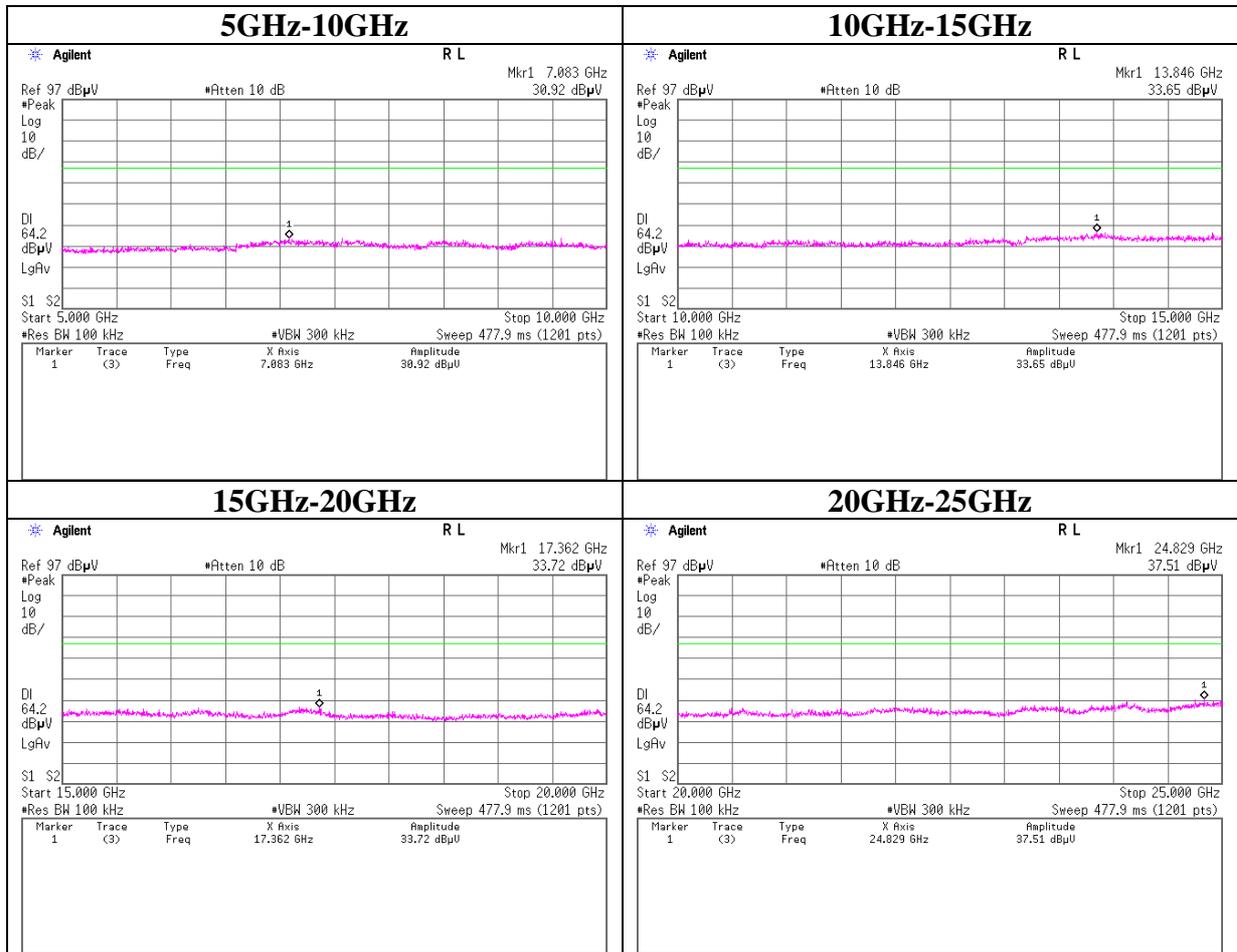
## Conducted Spurious Emission

### Tx 3DH5 2402MHz



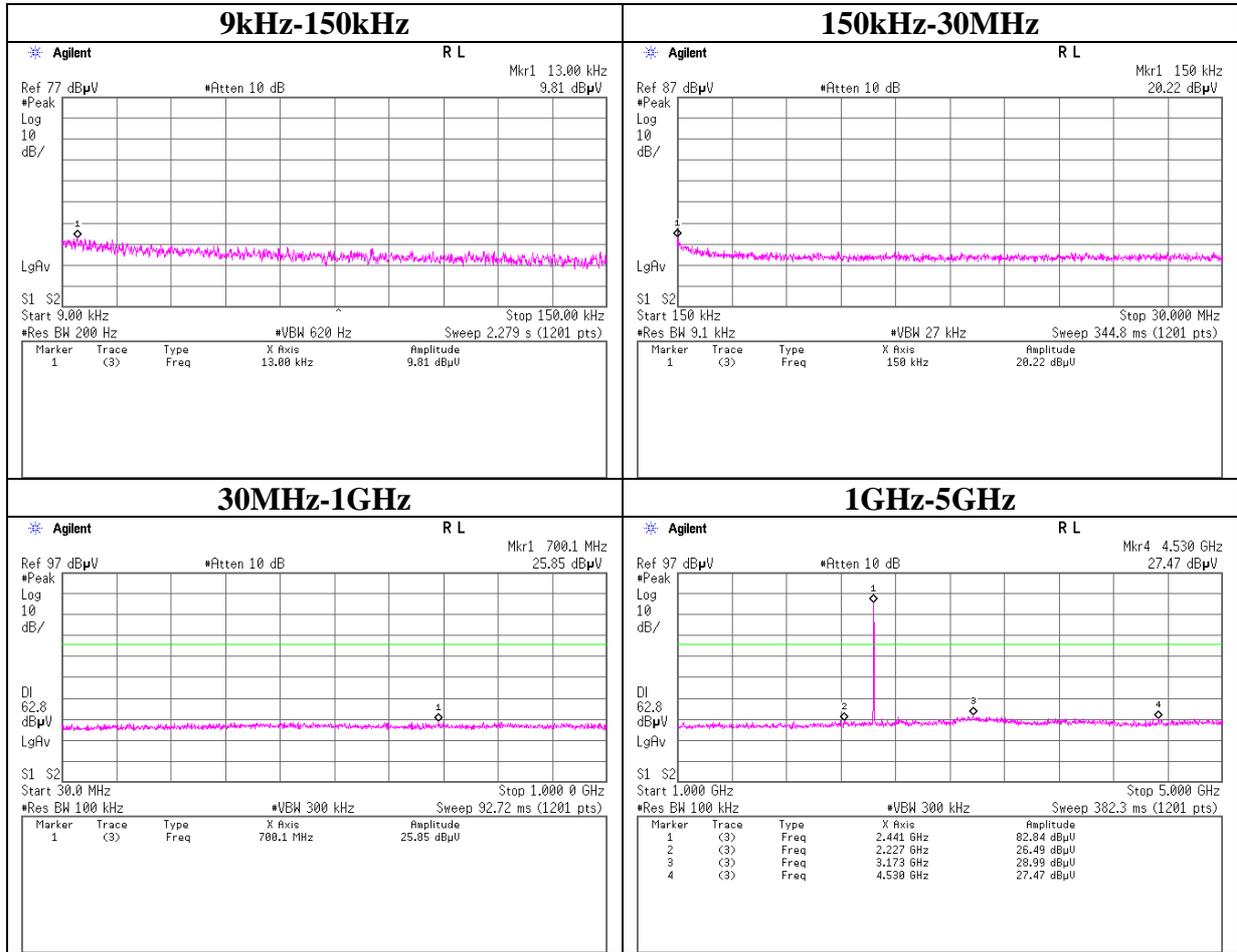
## Conducted Spurious Emission

### Tx 3DH5 2402MHz



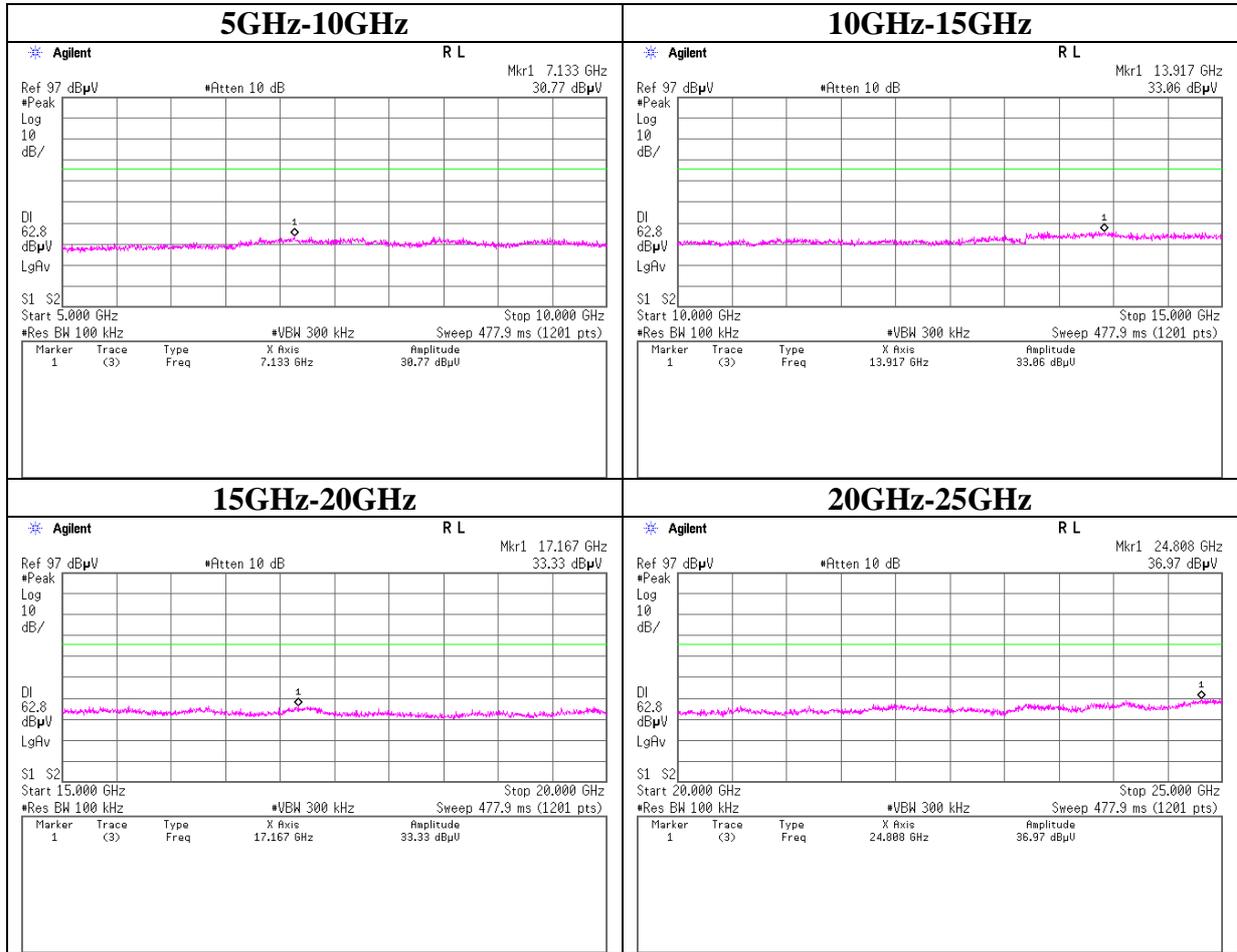
## Conducted Spurious Emission

### Tx 3DH5 2441MHz



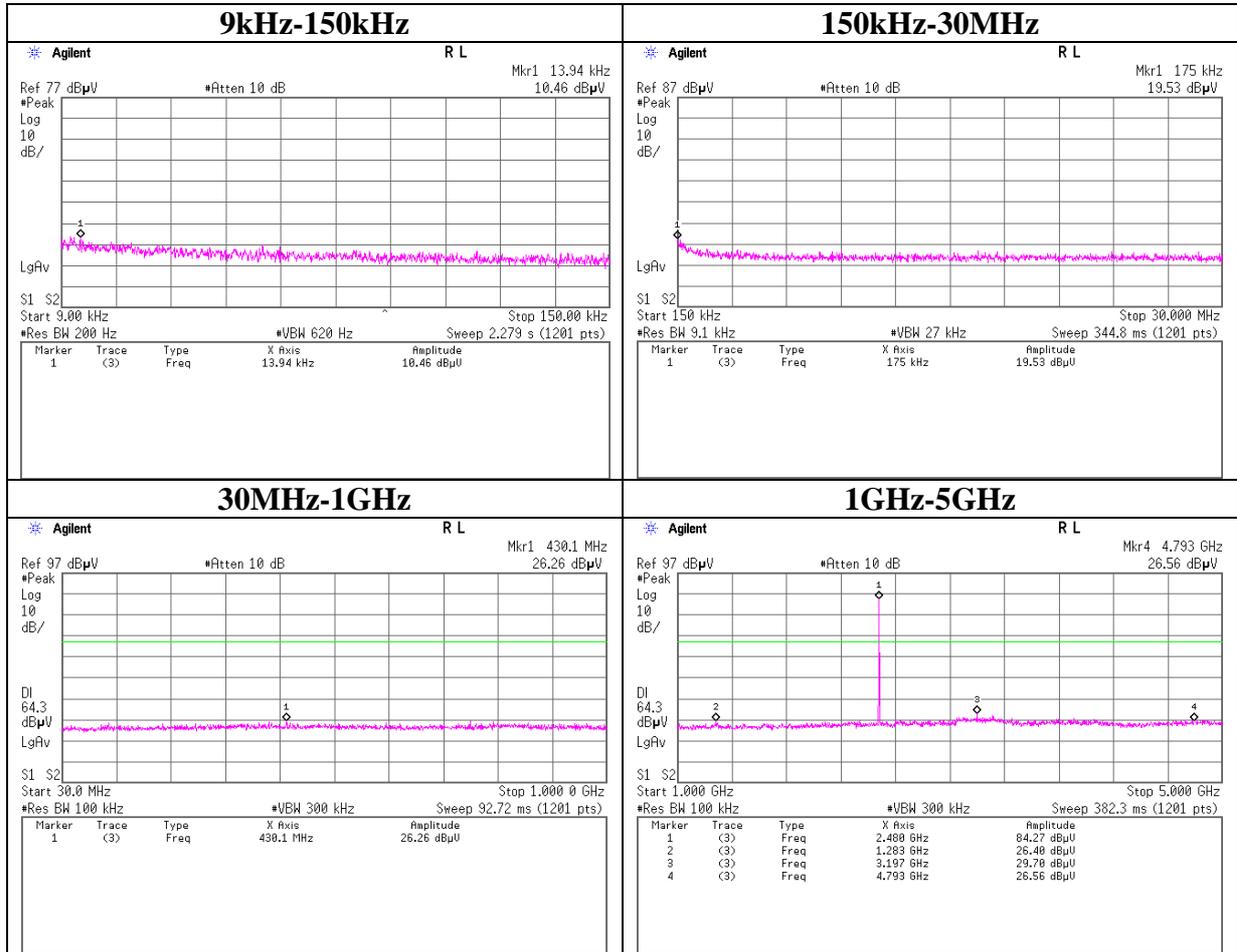
## Conducted Spurious Emission

### Tx 3DH5 2441MHz



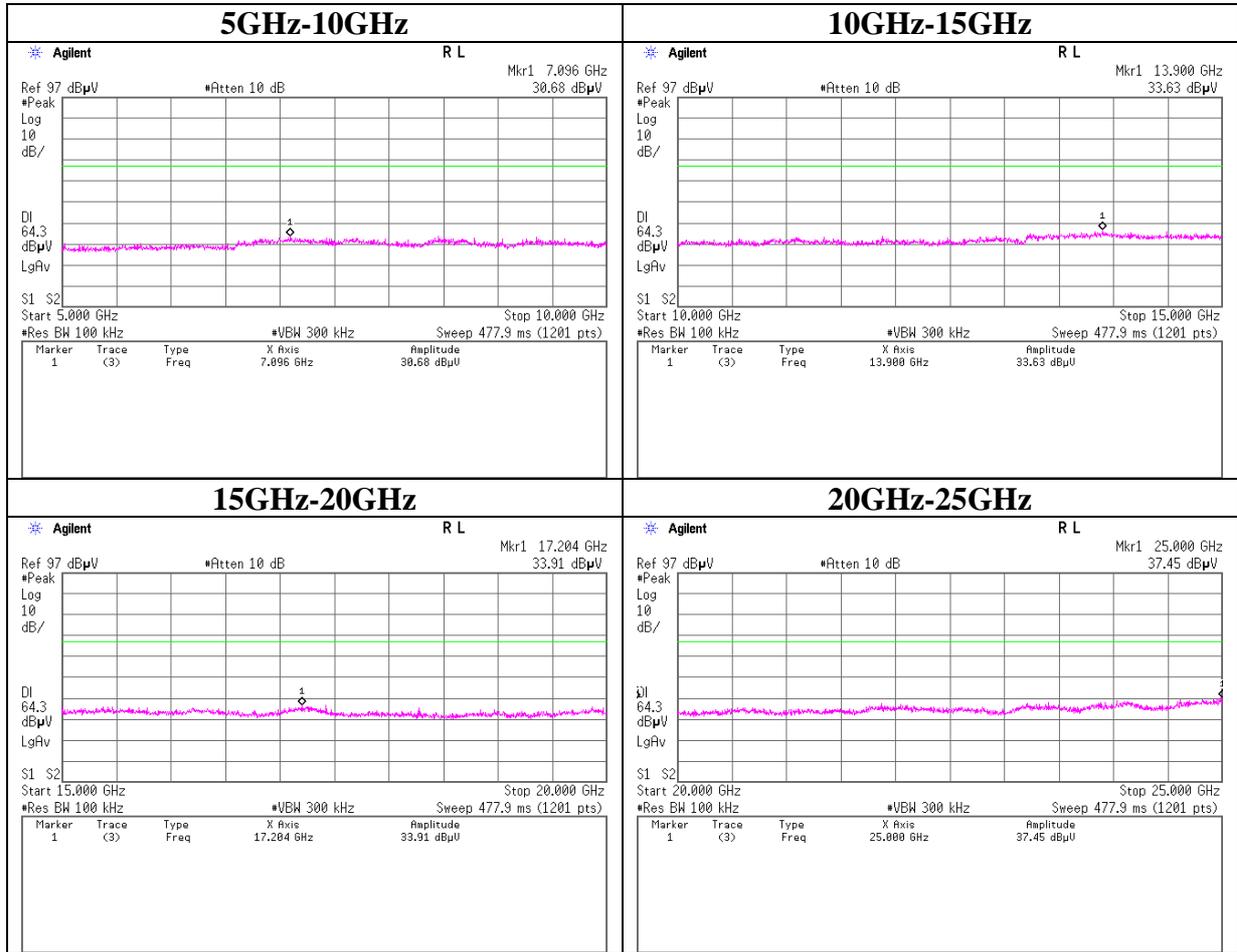
## Conducted Spurious Emission

### Tx 3DH5 2480MHz



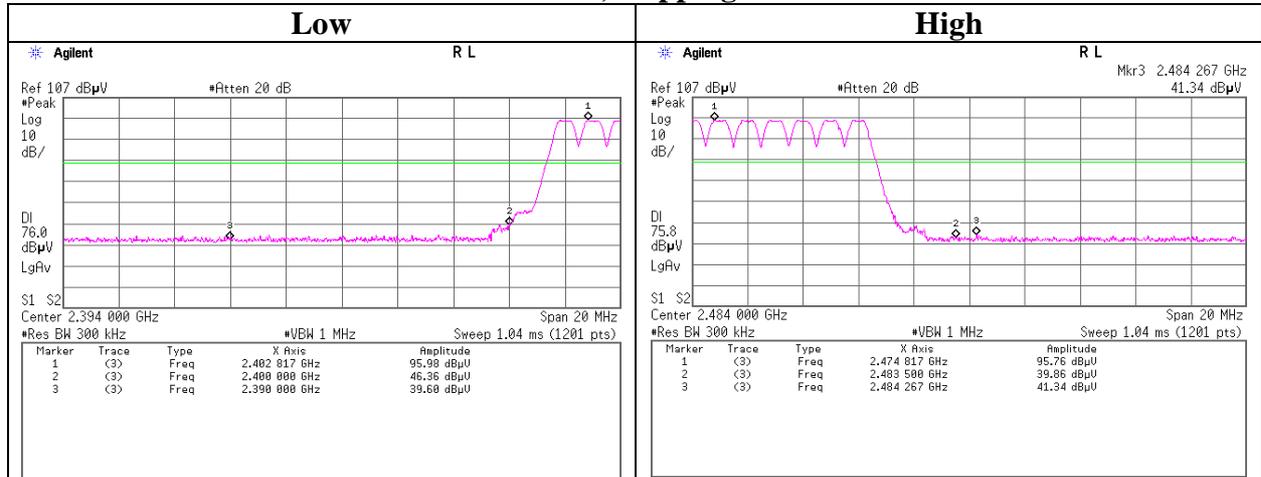
## Conducted Spurious Emission

### Tx 3DH5 2480MHz

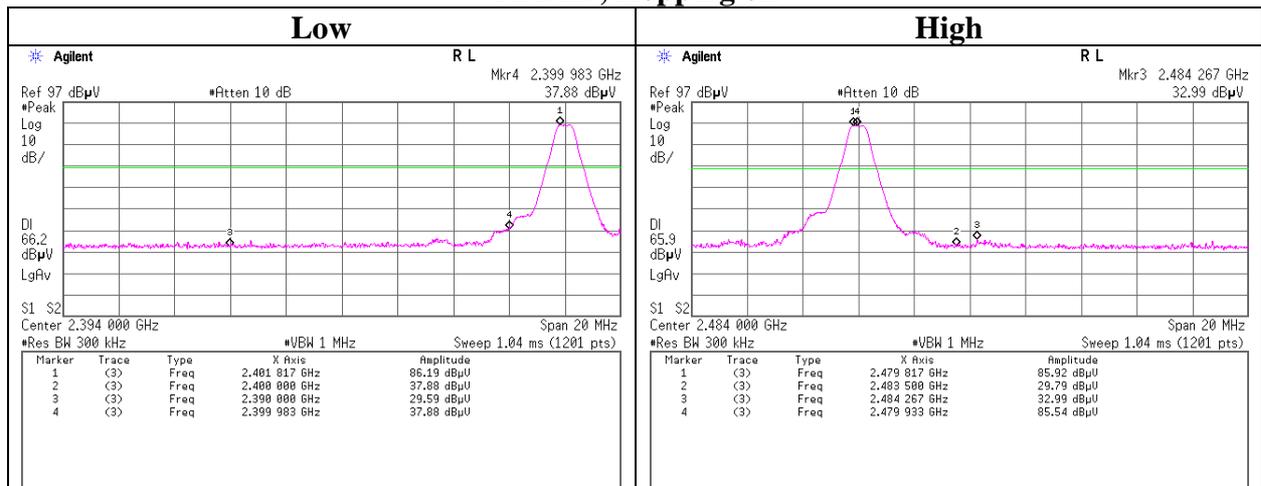


## Conducted Emission Band Edge compliance

### Tx DH5, Hopping on

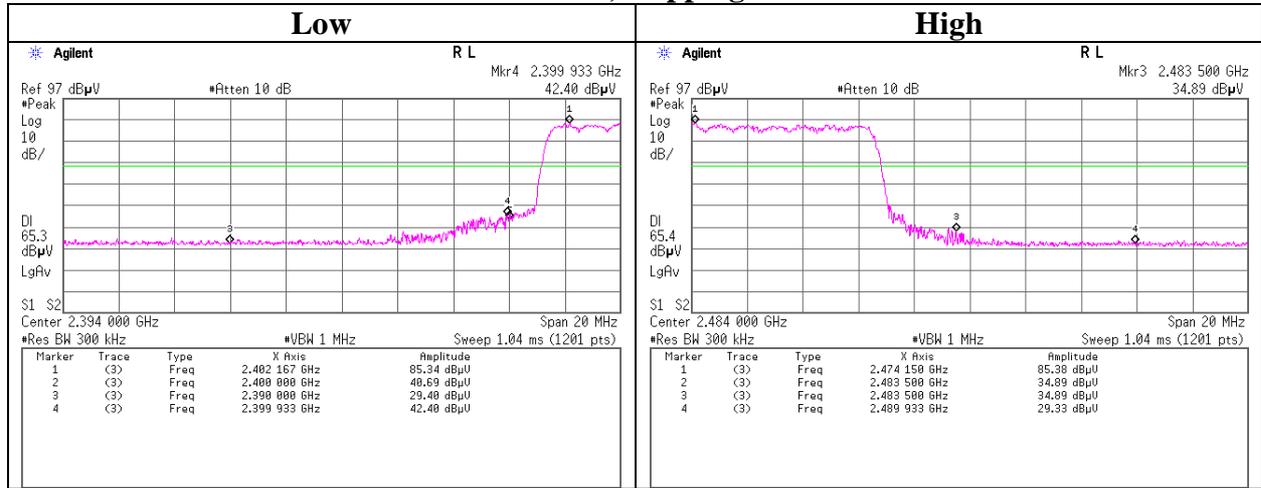


### Tx DH5, Hopping off

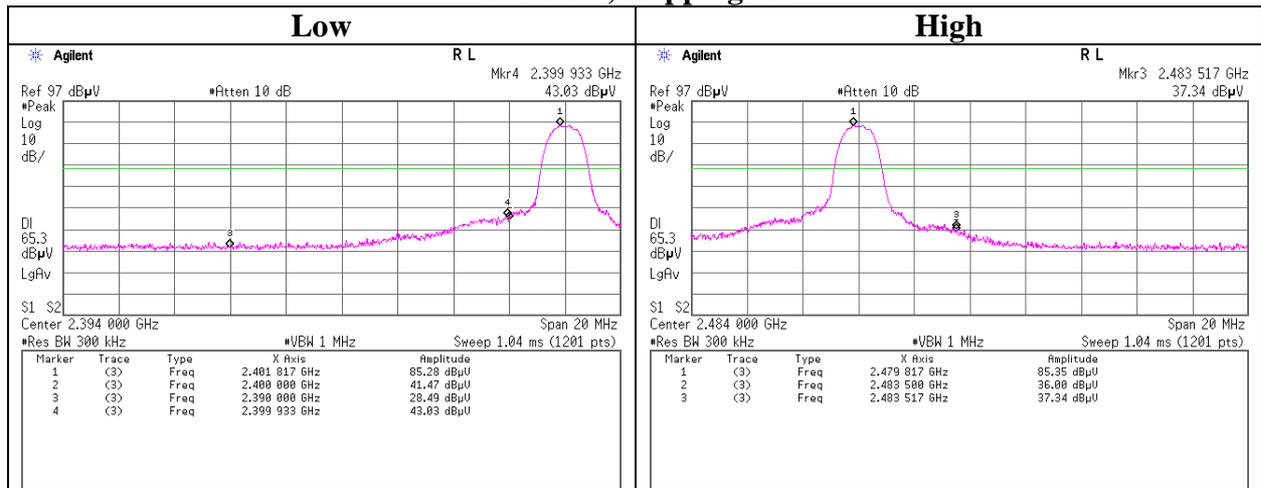


## Conducted Emission Band Edge compliance

### Tx 3DH5, Hopping on



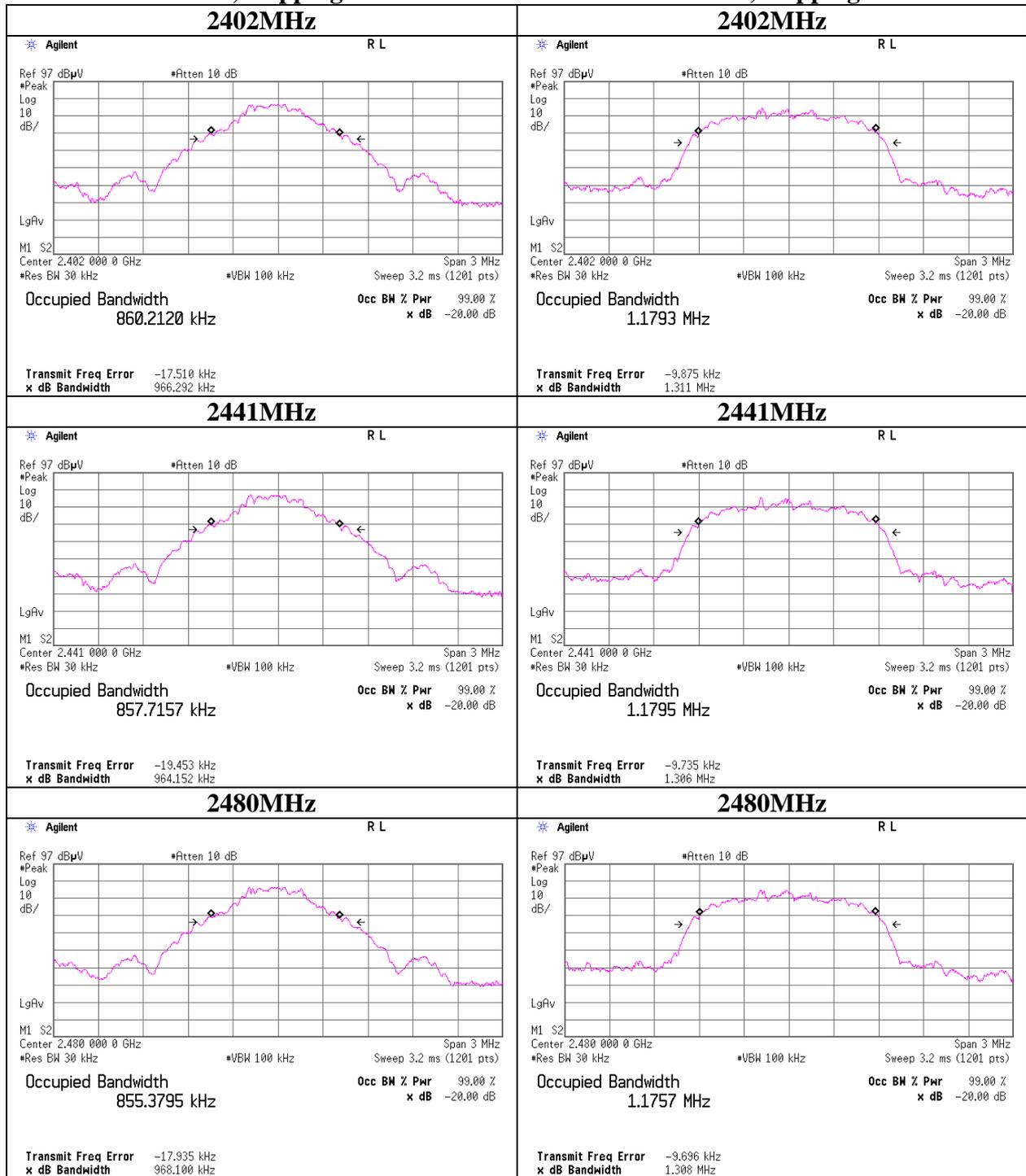
### Tx 3DH5, Hopping off



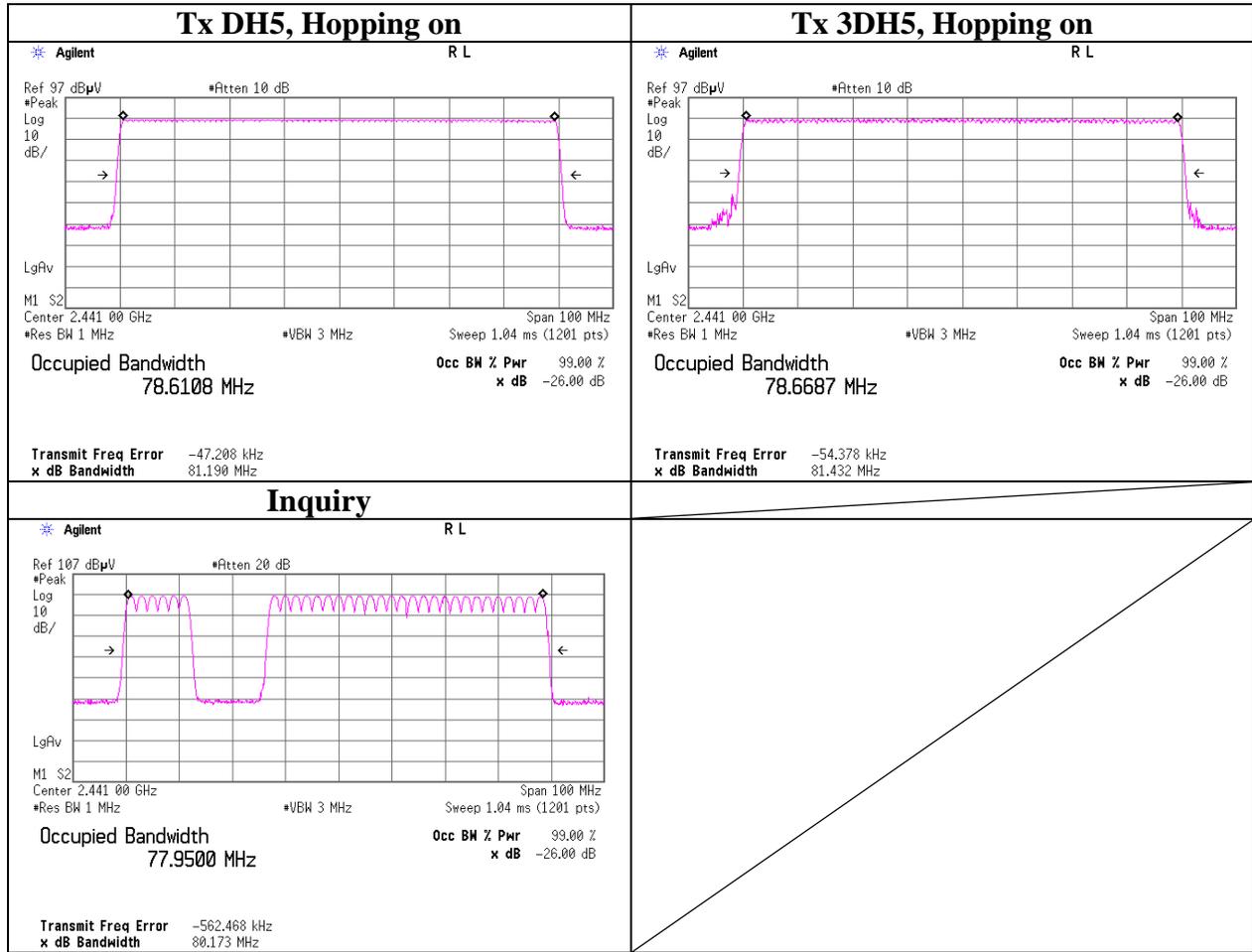
**99% Occupied Bandwidth**

**Tx DH5, Hopping off**

**Tx 3DH5, Hopping off**



### 99% Occupied Bandwidth



## APPENDIX 2: Test instruments

### EMI test equipment (1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MRENT-95	Spectrum Analyzer	Agilent	E4440A	MY46185823	AT	2011/06/30 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT/RE	2012/02/03 * 12
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2011/09/13 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2011/09/13 * 12
MAT-24	Attenuator(10dB)(above 1GHz)	Agilent	8493C	71389	AT	2011/06/23 * 12
MCC-138	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37953/2	AT	2011/10/28 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2012/02/06 * 12
MOS-12	Thermo-Hygrometer	Custom	CTH-180	-	AT	2012/01/06 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	AT	2011/11/23 * 12
MCC-66	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28636/2	AT	2011/04/22 * 12
MAT-21	Attenuator(20dB)(above 1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-120	901247	AT	2012/01/12 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2012/03/27 * 12
MCC-137	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37954/2	AT	2011/10/28 * 12
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2011/12/09 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2012/02/29 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE	2012/02/06 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2011/08/11 * 12
MCC-133	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336164/4(1m) / 340640(5m)	RE	2011/09/07 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2012/03/28 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2011/06/17 * 12
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2011/05/16 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	CE	2012/02/24 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	CE	2012/02/06 * 12
MJM-06	Measure	PROMART	SEN1955	-	CE	
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	CE	2011/04/08 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	CE	2011/08/11 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE(EUT)	2012/02/06 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE(AE)	2012/02/09 * 12
MTA-30	Terminator	TME	CT-01	-	CE	2012/01/11 * 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	2011/07/15 * 12
MAT-66	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2012/01/28 * 12

**EMI test equipment (2/2)**

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	RE	2011/11/23 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE	2011/10/19 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2011/11/16 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2011/11/16 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2012/03/15 * 12
AT-38	Attenuator	Anritsu	MP721B	6200961025	RE	2011/12/08 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2012/03/05 * 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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