



RADIO TEST REPORT

Test Report No. : 32BE0096-HO-01-B-R2

Applicant : Sony Computer Entertainment Inc.
Type of Equipment : Development Kit
Model No. : PDEL-1001
FCC ID : AK8PDE1001A
Test regulation : FCC Part 15 Subpart C: 2011
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
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 32BE0096-HO-01-B-R1. 32BE0096-HO-01-B-R1 is replaced with this report.

Date of test: September 14 to October 11, 2011

Representative test engineer:

T. Shimada

Takumi Shimada
Engineer of WiSE Japan,
UL Verification Service

Approved by:

M. Fujimura

Mitsuru Fujimura
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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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	Development Kit
Model No	PDEL-1001
Serial No	Refer to Section 4, Clause 4.2
Country of Manufacture	Japan
Receipt Date of Sample	September 13, 2011
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 No: PDEL-1001 (referred to as the EUT in this report) is the Development Kit.

Product Specification

Maximum clock frequency	500MHz
Operating Temperature	5-35 deg. C
Power Supply	DC5V (AC Adaptor)
Size	182 x 18.6 x 86.5 mm
Weight	280 g

Radio Specification: WLAN 11b/g/n-20

Equipment Type	Transceiver
Frequency of Operation	2412-2462MHz
Type of Modulation	11b: DSSS/CCK, 11g/n-20: OFDM
Bandwidth	11b: 26MHz, 11g/n-20: 20MHz
Channel spacing	5MHz
Method of frequency generation	Synthesizer
Power Supply (inner)	DC3.1/1.8V
Antenna Type	PIFA
Antenna Gain	1.1dBi max

*Please refer to Test Report No. 31BE0096-HO-01-A-R2 for WLAN part.

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Radio Specification: Bluetooth (Ver. 2.1+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)	DC3.1/1.8V
Antenna Type	PIFA
Antenna Gain	-3.5dBi max

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2011, final revised on July 8, 2011 and effective August 8, 2011

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 July 8, 2011 and effective August 8, 2011

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 11.1dB 2.22988MHz, N AV 4.4dB 2.22988MHz, 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		8.2dB 7323.000MHz, PK, 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 (DC3.1/1.8V) constantly to RF part regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

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

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	IC: RSS-Gen 4.6.1	IC: RSS-Gen 4.6.1	N/A	-	Conducted
Receiver Spurious Emission	IC: RSS-Gen 4.10	IC: RSS-Gen 6	7.3dB 4001.925MHz, AV, Hori.	Complied	Radiated

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	3.1dB
No.2	3.3dB
No.3	3.7dB
No.4	3.2dB

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	3.5dB	5.1dB	5.2dB	4.8dB	5.1dB	4.4dB	4.3dB
No.2	4.0dB	5.1dB	5.2dB	4.8dB	5.0dB	4.3dB	4.2dB
No.3	4.2dB	4.7dB	5.2dB	4.8dB	5.0dB	4.5dB	4.2dB
No.4	4.0dB	5.0dB	5.1dB	4.8dB	5.0dB	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)

Test Item	Mode	Tested frequency
Conducted Emission, Spurious Emission (Conducted/Radiated)	Tx (Hopping off) DH5, 3DH5	2402MHz 2441MHz 2480MHz
Carrier Frequency Separation	Tx (Hopping on) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
20dB Bandwidth	Tx (Hopping off) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Number of Hopping Frequency	Tx (Hopping on) DH5, 3DH5 Inquiry	-
Dwell time	Tx (Hopping on), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5 Inquiry	-
Maximum Peak Output Power	Tx (Hopping off) DH5, 2DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2480MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2441MHz 2480MHz
Spurious Emissions (Receiver) (Conducted/Radiated)	Rx	2441MHz
<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: WLAN/BT LAB TEST, Ver. 1.00 *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

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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 AV
Measurement range : 0.15-30MHz
Test data : APPENDIX
Test result : Pass

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SECTION 6: Radiated Spurious Emission

Test Procedure

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

The height of the measuring antenna varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.

The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below;

Frequency	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	Biconical	Logperiodic	Horn

Frequency	Below 1GHz	Above 1GHz	
Instrument used	Test Receiver	Spectrum Analyzer	
Detector	QP	PK	AV
IF Bandwidth	BW 120kHz(T/R)	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 10Hz or RBW: 1MHz VBW: 270Hz *1)

*1) Used for the band edge of the carrier and the harmonics that can be measured. The VBW is based on the inverse of the duty cycle (see Appendix). 270Hz was used for DH5 and 3DH5.

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

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

Measurement range : 30M-25GHz
Test data : APPENDIX
Test result : Pass

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SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
20dB Bandwidth	3MHz	30kHz	100kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	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 and 3MHz	100kHz and 30kHz	300kHz and 100kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30MHz	300kHz	1MHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time	Zero Span	100kHz, 1MHz	300kHz, 3MHz	As necessary capture the entire dwell time per hopping channel	Peak	Max Hold	Spectrum Analyzer
Conducted Spurious Emission *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

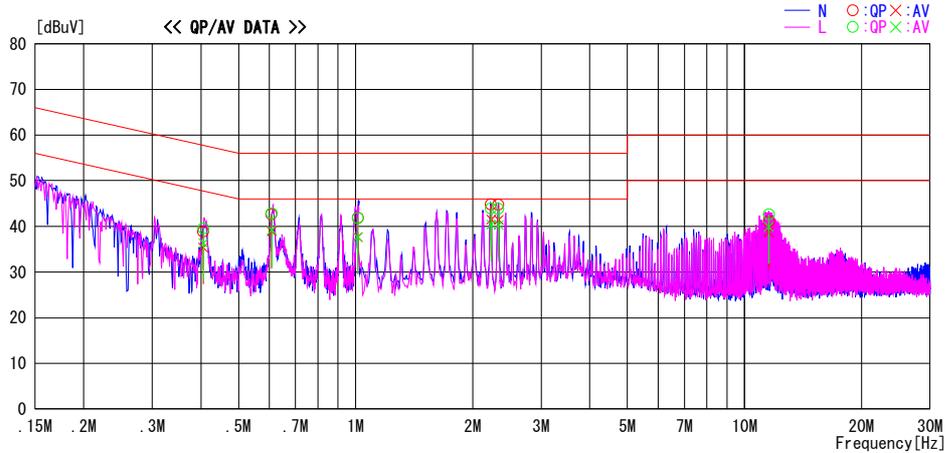
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
 Date : 2011/10/11

Report No. : 32BE0096-HO-01
 Temp./Humi. : 22deg. C / 65% RH
 Engineer : Takumi Shimada

Mode / Remarks : BT Tx 2441MHz DH5

LIMIT : FCC15.207 QP
 FCC15.207 AV

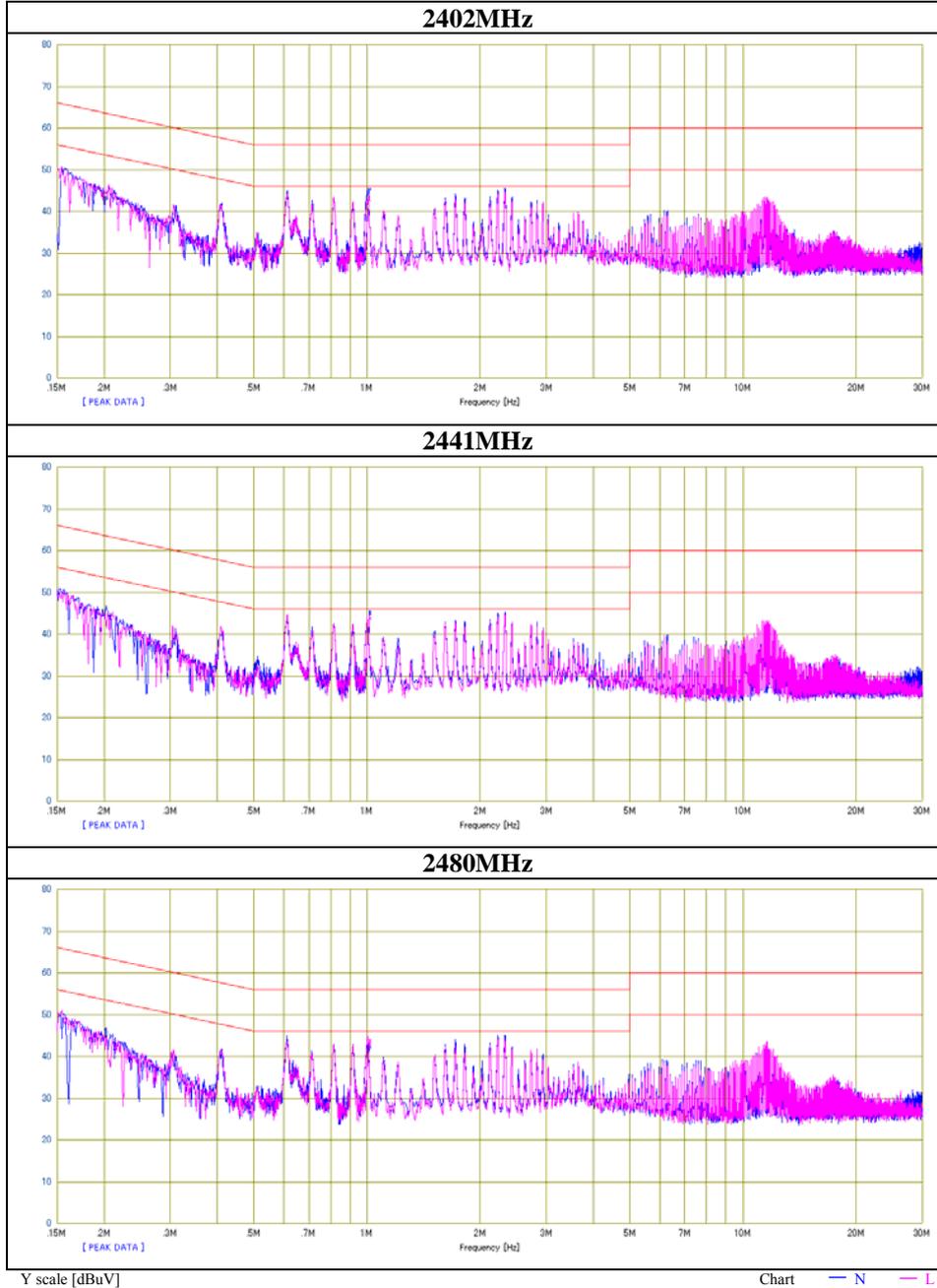


Frequency [MHz]	Reading Level		Corr. [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.40547	25.5	22.1	13.3	38.8	35.4	57.7	47.7	18.9	12.3	N	
0.60820	29.3	25.6	13.3	42.6	38.9	56.0	46.0	13.4	7.1	N	
1.01369	28.5	24.2	13.4	41.9	37.6	56.0	46.0	14.1	8.4	N	
2.23035	31.4	28.1	13.4	44.8	41.5	56.0	46.0	11.2	4.5	N	
2.33135	31.3	28.0	13.4	44.7	41.4	56.0	46.0	11.3	4.6	N	
11.55559	26.9	24.5	14.2	41.1	38.7	60.0	50.0	18.9	11.3	N	
0.40623	26.2	23.0	13.3	39.5	36.3	57.7	47.7	18.2	11.4	L	
0.60880	29.5	25.9	13.3	42.8	39.2	56.0	46.0	13.2	6.8	L	
1.01320	28.4	24.2	13.4	41.8	37.6	56.0	46.0	14.2	8.4	L	
2.23043	30.5	27.0	13.4	43.9	40.4	56.0	46.0	12.1	5.6	L	
2.33104	30.4	26.9	13.4	43.8	40.3	56.0	46.0	12.2	5.7	L	
11.55567	28.4	25.7	14.2	42.6	39.9	60.0	50.0	17.4	10.1	L	

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

Conducted Emission

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	32BE0096-HO-01
Date	10/11/2011
Temperature/ Humidity	22 deg.C/ 65% RH
Engineer	Takumi Shimada
Mode	Tx DH5



Conducted Emission

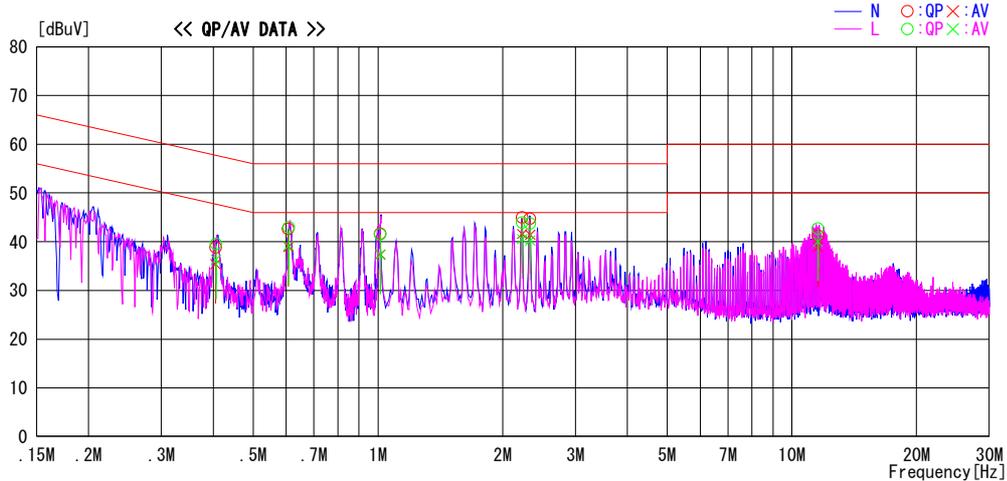
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
 Date : 2011/10/11

Report No. : 32BE0096-HO-01
 Temp./Humi. : 22deg. C / 65% RH
 Engineer : Takumi Shimada

Mode / Remarks : BT Tx 2441MHz 3DH5

LIMIT : FCC15.207 QP
 FCC15.207 AV

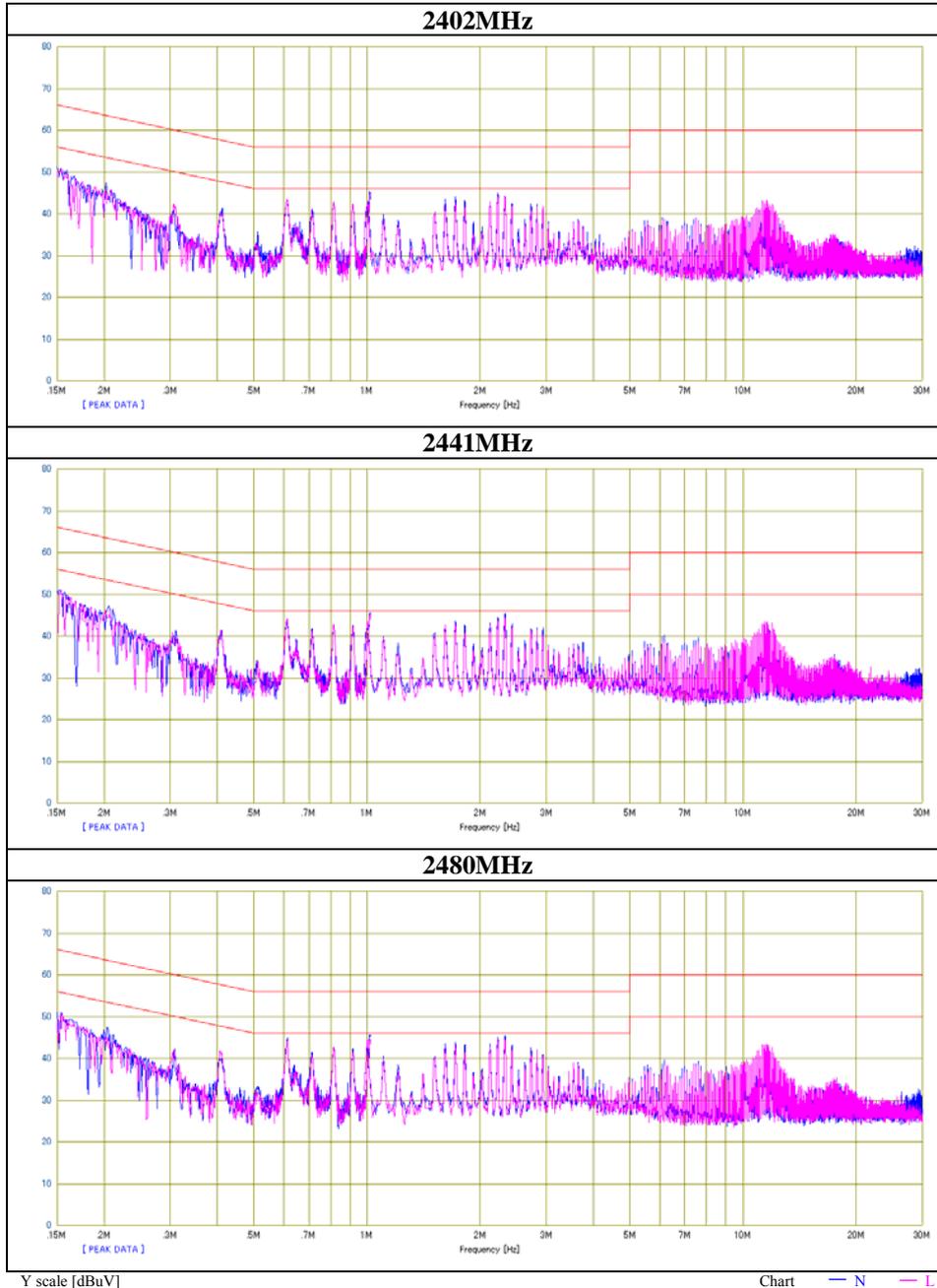


Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.40544	25.5	22.1	13.3	38.8	35.4	57.7	47.7	18.9	12.3	N	
0.60820	29.3	25.6	13.3	42.6	38.9	56.0	46.0	13.4	7.1	N	
1.01264	28.2	24.0	13.4	41.6	37.4	56.0	46.0	14.4	8.6	N	
2.22988	31.5	28.2	13.4	44.9	41.6	56.0	46.0	11.1	4.4	N	
2.33084	31.3	28.0	13.4	44.7	41.4	56.0	46.0	11.3	4.6	N	
11.55466	27.0	24.7	14.2	41.2	38.9	60.0	50.0	18.8	11.1	N	
0.40627	26.2	23.0	13.3	39.5	36.3	57.7	47.7	18.2	11.4	L	
0.60856	29.6	25.9	13.3	42.9	39.2	56.0	46.0	13.1	6.8	L	
1.01260	28.1	23.9	13.4	41.5	37.3	56.0	46.0	14.5	8.7	L	
2.23024	30.5	27.1	13.4	43.9	40.5	56.0	46.0	12.1	5.5	L	
2.33052	30.3	26.8	13.4	43.7	40.2	56.0	46.0	12.3	5.8	L	
11.55550	28.5	25.8	14.2	42.7	40.0	60.0	50.0	17.3	10.0	L	

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

Conducted Emission

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	32BE0096-HO-01
Date	10/11/2011
Temperature/ Humidity	22 deg.C / 65% RH
Engineer	Takumi Shimada
Mode	Tx 3DH5



Conducted Emission
 Reference data

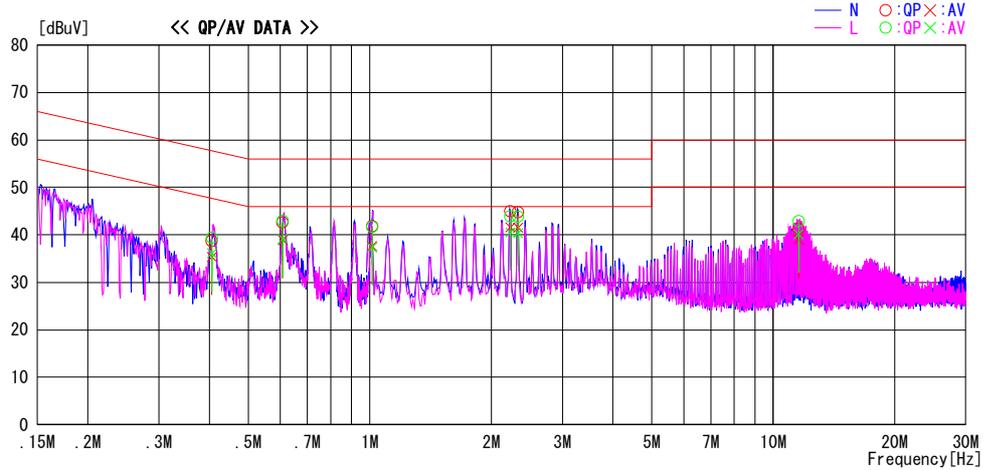
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
 Date : 2011/10/11

Report No. : 32BE0096-H0-01
 Temp./Humi. : 22deg. C / 65% RH
 Engineer : Takumi Shimada

Mode / Remarks : BT Rx 2441MHz

LIMIT : FCC15.207 QP
 FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.40584	25.4	22.1	13.3	38.7	35.4	57.7	47.7	19.0	12.3	N	
0.60780	29.3	25.6	13.3	42.6	38.9	56.0	46.0	13.4	7.1	N	
1.01356	28.4	24.2	13.4	41.8	37.6	56.0	46.0	14.2	8.4	N	
2.22982	31.5	28.2	13.4	44.9	41.6	56.0	46.0	11.1	4.4	N	
2.33148	31.4	28.1	13.4	44.8	41.5	56.0	46.0	11.2	4.5	N	
11.55456	27.1	24.8	14.2	41.3	39.0	60.0	50.0	18.7	11.0	N	
0.40634	26.1	22.9	13.3	39.4	36.2	57.7	47.7	18.3	11.5	L	
0.60824	29.6	25.9	13.3	42.9	39.2	56.0	46.0	13.1	6.8	L	
1.01288	28.2	24.0	13.4	41.6	37.4	56.0	46.0	14.4	8.6	L	
2.22982	30.5	27.1	13.4	43.9	40.5	56.0	46.0	12.1	5.5	L	
2.33094	30.4	27.0	13.4	43.8	40.4	56.0	46.0	12.2	5.6	L	
11.55456	28.6	25.9	14.2	42.8	40.1	60.0	50.0	17.2	9.9	L	

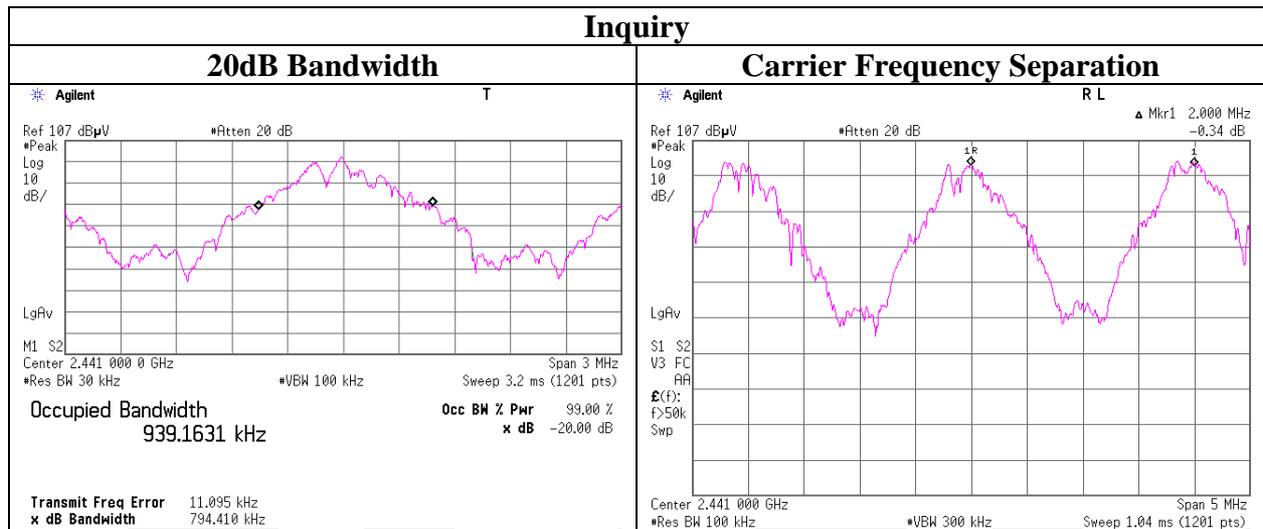
CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT=READING+C.F (LISN LOSS+CABLE LOSS+ATTN. LOSS)
 Except for the above table : adequate margin data below the limits.

20dB Bandwidth and Carrier Frequency Separation

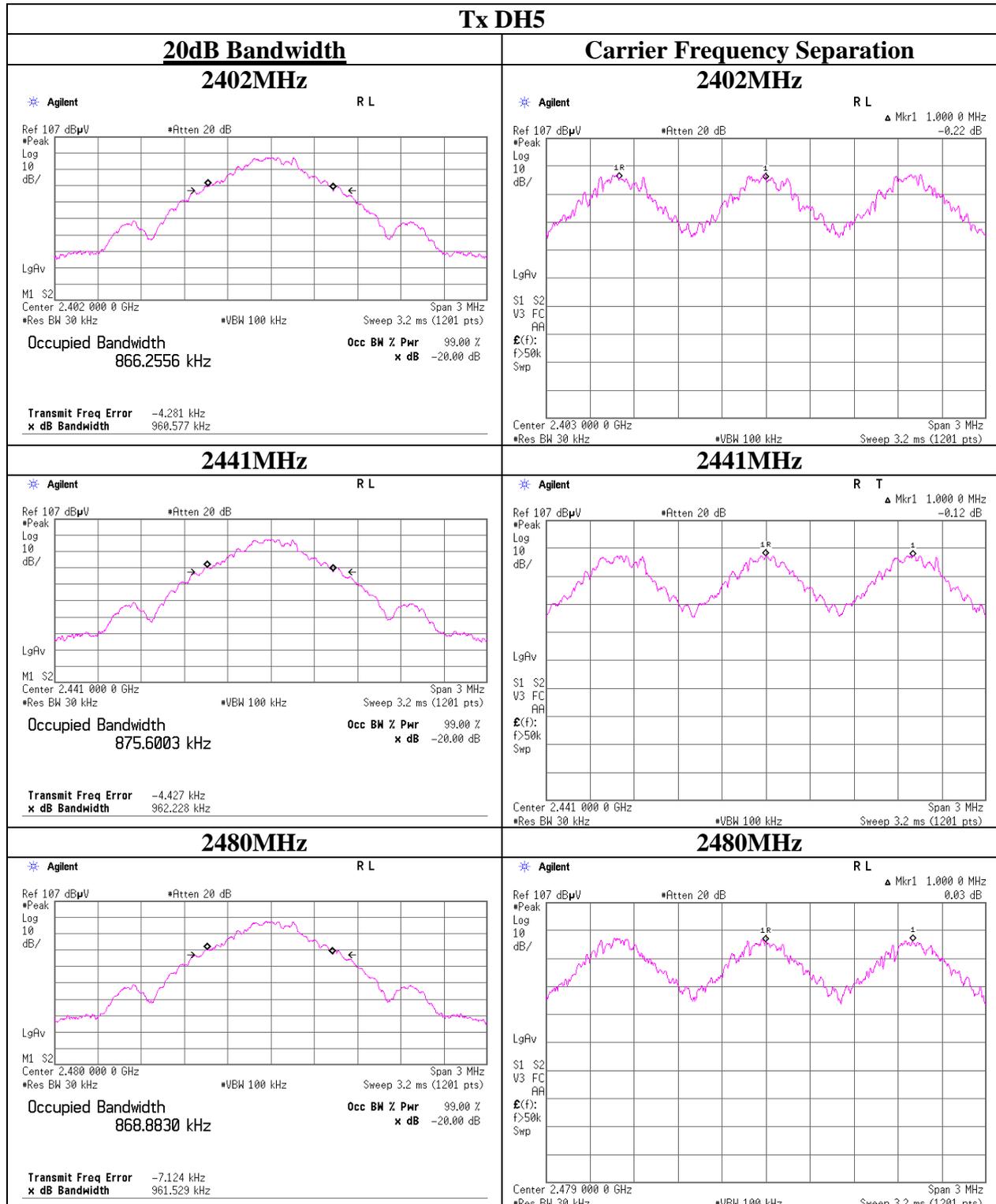
Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	32BE0096-HO-01
Date	10/06/2011
Temperature/ Humidity	23 deg.C/ 68% RH
Engineer	Motoya Imura
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.961	1.000	≥ 0.640
DH5	2441.0	0.962	1.000	≥ 0.641
DH5	2480.0	0.962	1.000	≥ 0.641
3DH5	2402.0	1.331	1.000	≥ 0.887
3DH5	2441.0	1.309	1.000	≥ 0.873
3DH5	2480.0	1.313	1.000	≥ 0.875
Inquiry	2441.0	0.794	2.000	≥ 0.529

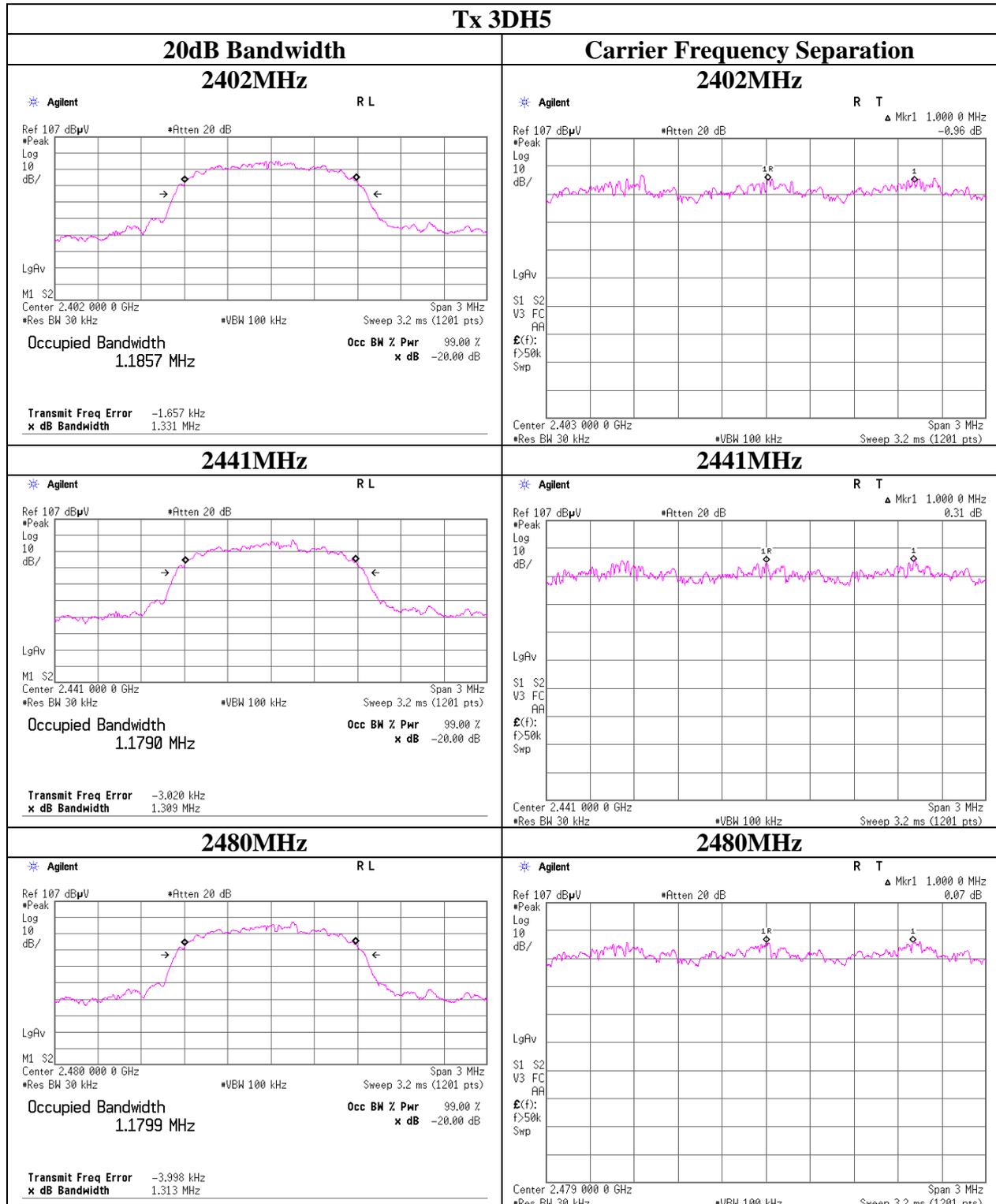
Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).
 No limit applies to 20dB Bandwidth.



20dB Bandwidth and Carrier Frequency Separation



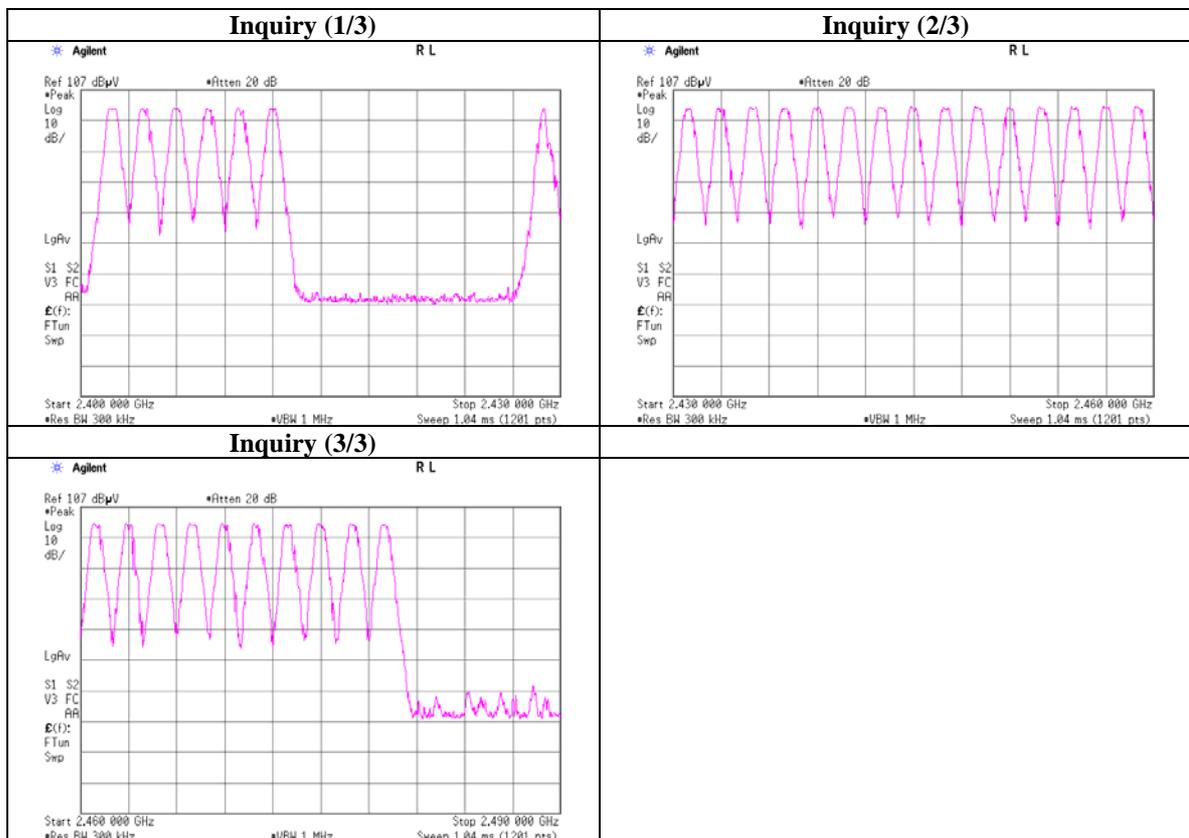
20dB Bandwidth and Carrier Frequency Separation



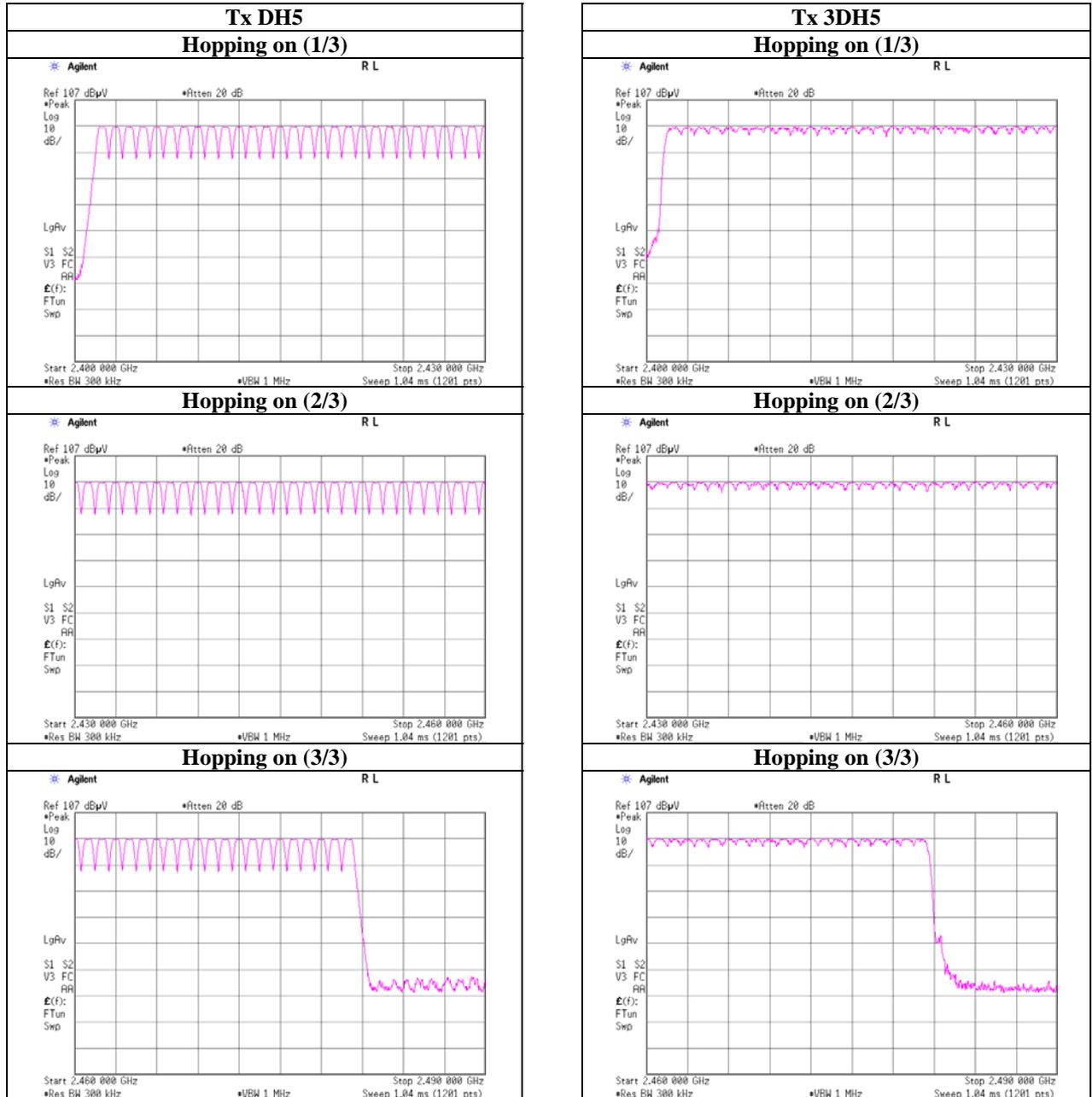
Number of Hopping Frequency

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	32BE0096-HO-01
Date	10/06/2011
Temperature/ Humidity	23 deg.C/ 68% RH
Engineer	Motoya Imura
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.6 Measurement Room
Report No.	32BE0096-HO-01
Date	10/06/2011
Temperature/ Humidity	23 deg.C/ 68% RH
Engineer	Motoya Imura
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	51.6 times / 5 sec. x 31.6 sec. = 327 times	0.398	130	400
DH3	28.0 times / 5 sec. x 31.6 sec. = 177 times	1.662	294	400
DH5	19.4 times / 5 sec. x 31.6 sec. = 123 times	2.927	360	400
3DH1	51.2 times / 5 sec. x 31.6 sec. = 324 times	0.406	131	400
3DH3	27.2 times / 5 sec. x 31.6 sec. = 172 times	1.662	286	400
3DH5	20.2 times / 5 sec. x 31.6 sec. = 128 times	2.912	373	400
Inquiry	100.0 times / 1 sec. x 12.8 sec. = 1280 times	0.103	132	400

Sample Calculation

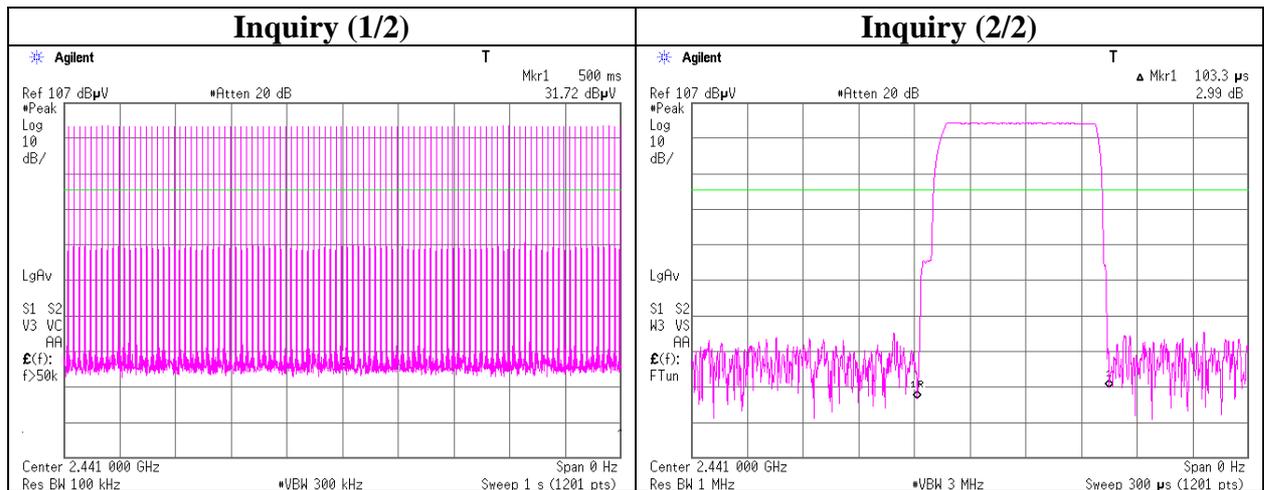
Result = Number of transmission x Length of transmission time

*Average data of 5 tests.(except Inquiry)

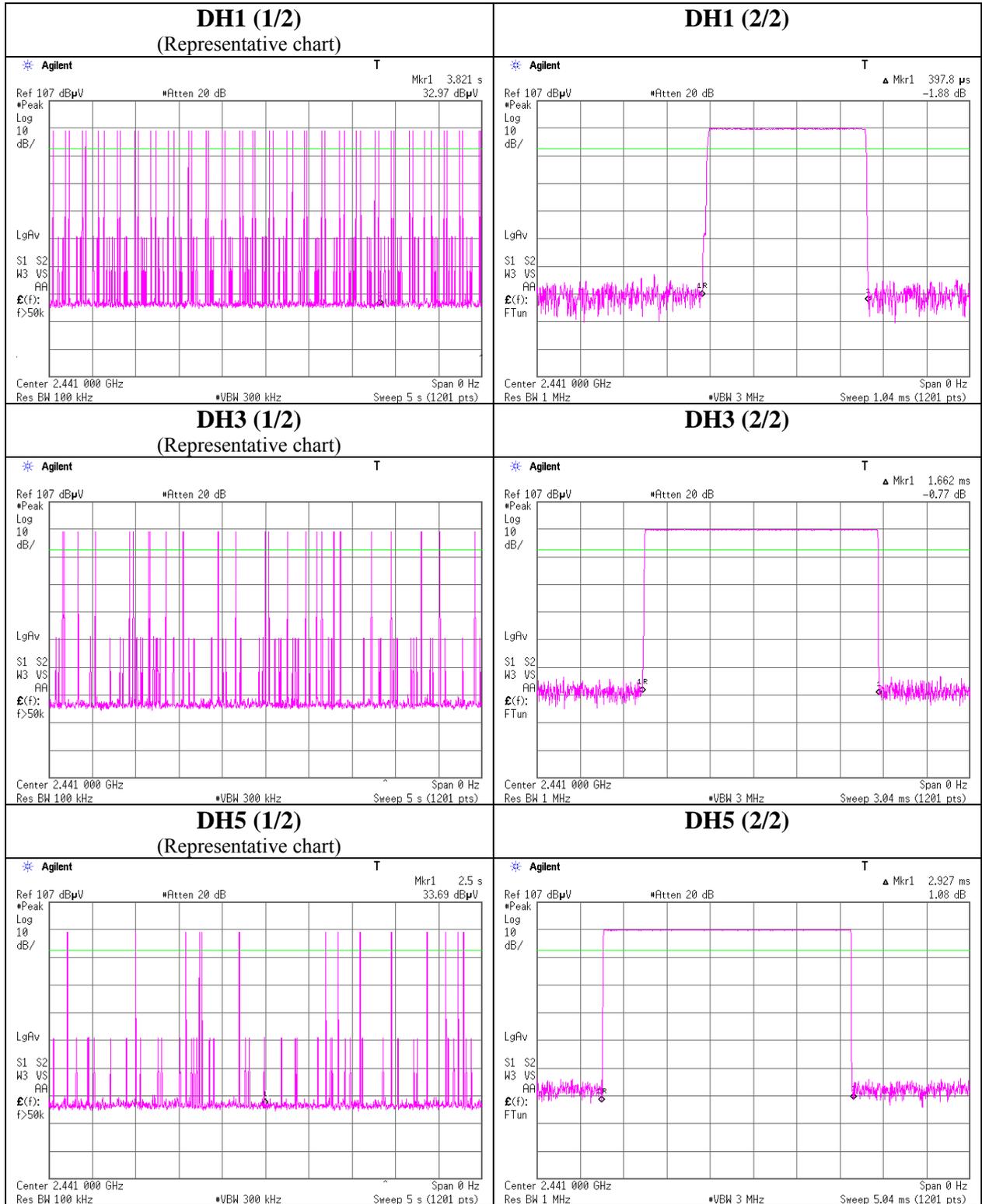
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	51	52	53	51	51	51.6
DH3	24	28	30	26	32	28
DH5	16	21	22	20	18	19.4
3DH1	51	51	52	51	51	51.2
3DH3	24	26	29	28	29	27.2
3DH5	19	17	22	22	21	20.2

Sample Calculation

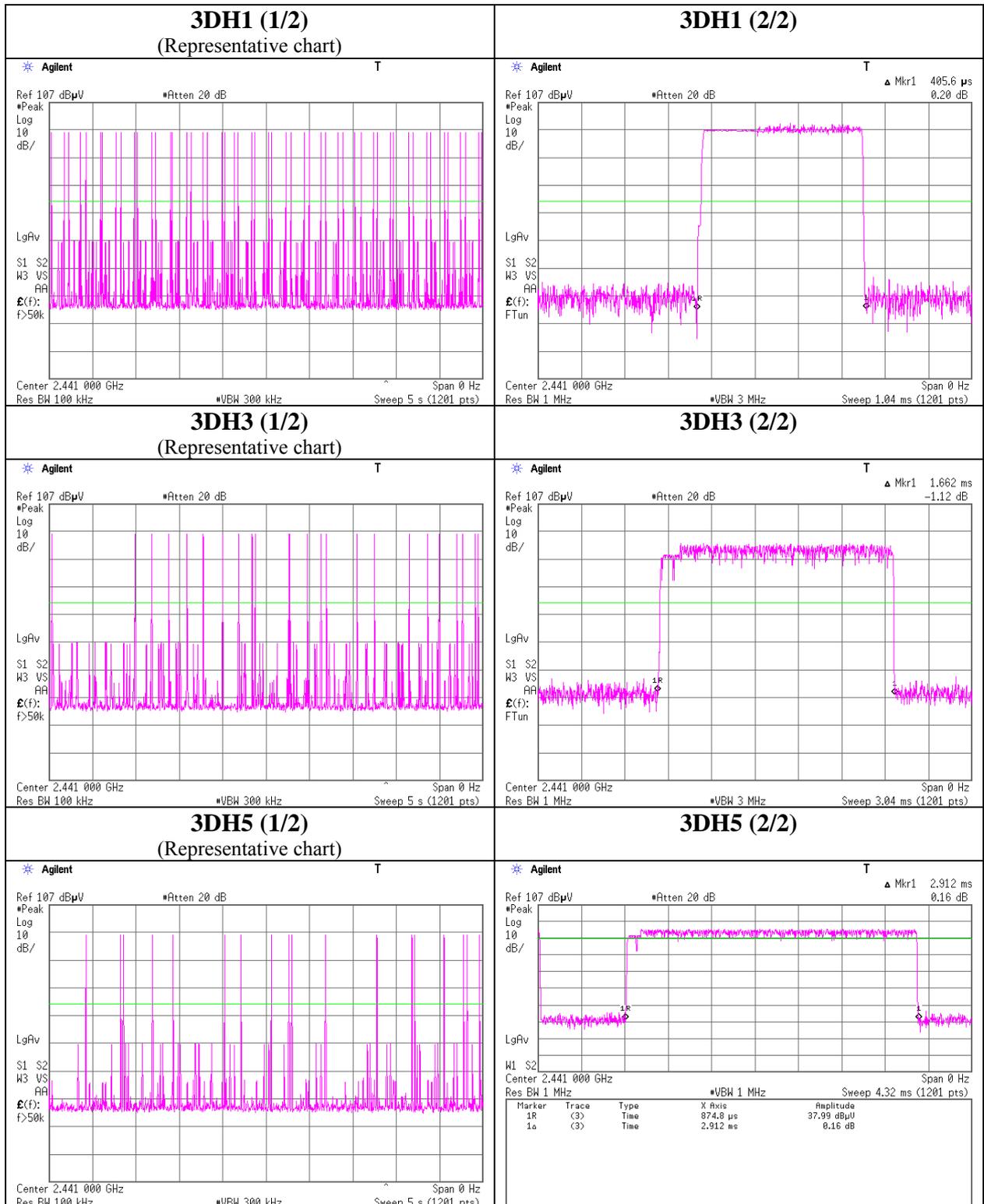
Average= Summation(Sampling 1 to 5) / 5



Dwell time



Dwell time



Maximum Peak Output Power

Test place : Head Office EMC Lab. No.6 Measurement Room
 Report No. : 32BE0096-HO-01
 Date : 09/14/2011
 Temperature/ Humidity : 23 deg.C/ 68% 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	-10.28	0.50	9.96	0.18	1.04	20.97	125	20.79
DH5	2441.0	-10.07	0.50	9.96	0.39	1.09	20.97	125	20.58
DH5	2480.0	-10.03	0.50	9.96	0.43	1.10	20.97	125	20.54
2DH5	2402.0	-8.06	0.50	9.96	2.40	1.74	20.97	125	18.57
2DH5	2441.0	-7.79	0.50	9.96	2.67	1.85	20.97	125	18.30
2DH5	2480.0	-7.63	0.50	9.96	2.83	1.92	20.97	125	18.14
3DH5	2402.0	-7.44	0.50	9.96	3.02	2.00	20.97	125	17.95
3DH5	2441.0	-7.15	0.50	9.96	3.31	2.14	20.97	125	17.66
3DH5	2480.0	-7.00	0.50	9.96	3.46	2.22	20.97	125	17.51
Inquiry	2441.0	-10.54	0.50	9.96	-0.08	0.98	20.97	125	21.05

Sample Calculation:

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

Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not influence on the output power and bandwidth of the EUT.

As this device had AFH mode and frequency separation could not meet the requirement of over 20dB BW without 2/3 relaxation, 125mW power limit was applied to it.

UL Japan, Inc.

Head Office EMC Lab.

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

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Radiated Spurious Emission

Test place : Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 32BE0096-HO-01
Date : 10/05/2011 10/07/2011
Temperature/ Humidity : 21 deg.C/ 55% RH 25 deg.C/ 51% RH
Engineer : Tomotaka Sasagawa Takumi Shimada
(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	65.275	QP	43.1	7.2	7.5	32.2	25.6	40.0	14.4	
Hori	125.005	QP	33.3	13.4	8.3	32.1	22.9	43.5	20.6	
Hori	250.012	QP	42.4	17.2	9.3	32.1	36.8	46.0	9.2	
Hori	448.613	QP	33.6	18.5	10.7	32.1	30.7	46.0	15.3	
Hori	500.020	QP	34.6	19.2	11.0	32.1	32.7	46.0	13.3	
Hori	750.034	QP	31.3	22.8	12.4	32.0	34.5	46.0	11.5	
Hori	2323.670	PK	44.5	27.8	2.1	32.2	42.2	73.9	31.7	
Hori	2390.000	PK	45.5	28.1	2.2	32.2	43.6	73.9	30.4	
Hori	2400.000	PK	56.0	28.1	2.2	32.2	54.1	73.9	19.8	
Hori	2501.001	PK	45.6	28.6	2.2	32.2	44.2	73.9	29.7	
Hori	4804.000	PK	44.2	31.2	4.8	31.4	48.8	73.9	25.1	
Hori	7206.000	PK	52.8	35.6	5.6	32.4	61.6	73.9	12.3	
Hori	9608.000	PK	44.5	38.3	6.7	33.2	56.3	73.9	17.6	
Hori	12010.000	PK	45.0	39.1	-1.8	33.2	49.1	73.9	24.8	
Hori	24020.000	PK	46.7	38.8	-0.9	31.6	53.0	73.9	20.9	
Hori	2323.670	AV	33.2	27.8	2.1	32.2	30.9	53.9	23.0	
Hori	2390.000	AV	30.8	28.1	2.2	32.2	28.9	53.9	25.0	
Hori	2501.001	AV	34.0	28.6	2.2	32.2	32.6	53.9	21.3	
Hori	24020.000	AV	34.1	38.8	-0.9	31.6	40.4	53.9	13.5	
Vert	60.195	QP	48.6	7.9	7.4	32.2	31.7	40.0	8.3	
Vert	125.002	QP	41.3	13.4	8.3	32.1	30.9	43.5	12.6	
Vert	250.015	QP	37.7	17.2	9.3	32.1	32.1	46.0	13.9	
Vert	448.609	QP	35.8	18.5	10.7	32.1	32.9	46.0	13.1	
Vert	500.019	QP	35.6	19.2	11.0	32.1	33.7	46.0	12.3	
Vert	750.034	QP	26.5	22.8	12.4	32.0	29.7	46.0	16.3	
Vert	2330.003	PK	44.5	27.8	2.2	32.2	42.3	73.9	31.6	
Vert	2390.000	PK	43.6	28.1	2.2	32.2	41.7	73.9	32.2	
Vert	2400.000	PK	54.8	28.1	2.2	32.2	52.9	73.9	21.0	
Vert	2500.321	PK	46.1	28.6	2.2	32.2	44.7	73.9	29.2	
Vert	4804.000	PK	44.5	31.2	4.8	31.4	49.1	73.9	24.8	
Vert	7206.000	PK	48.7	35.6	5.6	32.4	57.5	73.9	16.4	
Vert	9608.000	PK	43.7	38.3	6.7	33.2	55.5	73.9	18.4	
Vert	12010.000	PK	52.1	39.1	-1.8	33.2	56.2	73.9	17.7	
Vert	24020.000	PK	47.0	38.8	-0.9	31.6	53.3	73.9	20.6	
Vert	2330.003	AV	32.4	27.8	2.2	32.2	30.2	53.9	23.7	
Vert	2390.000	AV	30.6	28.1	2.2	32.2	28.7	53.9	25.2	
Vert	2500.321	AV	34.2	28.6	2.2	32.2	32.8	53.9	21.1	
Vert	24020.000	AV	33.7	38.8	-0.9	31.6	40.0	53.9	13.9	

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

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

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

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

*For the band edge of the carrier and the harmonics that emission was found, the test was performed with VBW of the average detector set at 270Hz. For other average detectors, VBW was set at 10Hz.

Radiated Spurious Emission
Dwell time factor relaxation

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. 32BE0096-HO-01
Date 10/05/2011 10/07/2011
Temperature/ Humidity 21 deg.C/ 55% RH 25 deg.C/ 51% RH
Engineer Tomotaka Sasagawa Takumi Shimada
(1-26.5GHz) (30-1000MHz)
Mode Tx, DH5 2402MHz

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2400.000	AV	43.8	28.1	2.2	32.2	-24.2	17.7	53.9	36.2	
Hori	4804.000	AV	33.2	31.2	4.8	31.4	-24.2	13.6	53.9	40.3	
Hori	7206.000	AV	49.2	35.6	5.6	32.4	-24.2	33.8	53.9	20.1	
Hori	9608.000	AV	33.1	38.3	6.7	33.2	-24.2	20.7	53.9	33.2	
Hori	12010.000	AV	35.2	39.1	-1.8	33.2	-24.2	15.1	53.9	38.8	
Vert	2400.000	AV	42.6	28.1	2.2	32.2	-24.2	16.5	53.9	37.4	
Vert	4804.000	AV	37.3	31.2	4.8	31.4	-24.2	17.7	53.9	36.2	
Vert	7206.000	AV	45.0	35.6	5.6	32.4	-24.2	29.6	53.9	24.3	
Vert	9608.000	AV	32.4	38.3	6.7	33.2	-24.2	20.0	53.9	33.9	
Vert	12010.000	AV	42.3	39.1	-1.8	33.2	-24.2	22.2	53.9	31.7	

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

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

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

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

Radiated Spurious Emission

Test place : Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 32BE0096-HO-01
Date : 10/05/2011 10/07/2011
Temperature/ Humidity : 21 deg.C/ 55% RH 25 deg.C/ 51% RH
Engineer : Tomotaka Sasagawa Takumi Shimada
(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	65.153	QP	43.2	7.2	7.5	32.2	25.7	40.0	14.3	
Hori	125.002	QP	33.4	13.4	8.3	32.1	23.0	43.5	20.5	
Hori	250.011	QP	41.8	17.2	9.3	32.1	36.2	46.0	9.8	
Hori	448.605	QP	33.3	18.5	10.7	32.1	30.4	46.0	15.6	
Hori	500.021	QP	34.9	19.2	11.0	32.1	33.0	46.0	13.0	
Hori	750.033	QP	31.5	22.8	12.4	32.0	34.7	46.0	11.3	
Hori	2355.336	PK	45.6	27.9	2.2	32.2	43.5	73.9	30.4	
Hori	2501.001	PK	46.2	28.6	2.2	32.2	44.8	73.9	29.1	
Hori	4882.000	PK	48.2	31.4	4.8	31.4	53.0	73.9	20.9	
Hori	7323.000	PK	53.4	35.7	5.6	32.5	62.2	73.9	11.7	
Hori	9764.000	PK	44.5	38.5	6.8	33.2	56.6	73.9	17.3	
Hori	12205.000	PK	46.7	39.2	-1.8	33.2	50.9	73.9	23.0	
Hori	24410.000	PK	46.9	38.6	-0.8	31.6	53.1	73.9	20.8	
Hori	2355.336	AV	32.4	27.9	2.2	32.2	30.3	53.9	23.6	
Hori	2501.001	AV	33.0	28.6	2.2	32.2	31.6	53.9	22.3	
Hori	24410.000	AV	34.1	38.6	-0.8	31.6	40.3	53.9	13.6	
Vert	60.058	QP	48.3	7.9	7.4	32.2	31.4	40.0	8.6	
Vert	125.001	QP	41.5	13.4	8.3	32.1	31.1	43.5	12.4	
Vert	250.014	QP	37.6	17.2	9.3	32.1	32.0	46.0	14.0	
Vert	448.613	QP	35.7	18.5	10.7	32.1	32.8	46.0	13.2	
Vert	500.018	QP	35.3	19.2	11.0	32.1	33.4	46.0	12.6	
Vert	750.034	QP	27.2	22.8	12.4	32.0	30.4	46.0	15.6	
Vert	2355.421	PK	45.3	27.9	2.2	32.2	43.2	73.9	30.7	
Vert	2501.001	PK	45.6	28.6	2.2	32.2	44.2	73.9	29.7	
Vert	4882.000	PK	50.4	31.4	4.8	31.4	55.2	73.9	18.7	
Vert	7323.000	PK	51.2	35.7	5.6	32.5	60.0	73.9	13.9	
Vert	9764.000	PK	45.2	38.5	6.8	33.2	57.3	73.9	16.6	
Vert	12205.000	PK	47.5	39.2	-1.8	33.2	51.7	73.9	22.2	
Vert	24410.000	PK	47.2	38.6	-0.8	31.6	53.4	73.9	20.5	
Vert	2355.421	AV	33.4	27.9	2.2	32.2	31.3	53.9	22.6	
Vert	2501.001	AV	34.2	28.6	2.2	32.2	32.8	53.9	21.1	
Vert	24410.000	AV	33.9	38.6	-0.8	31.6	40.1	53.9	13.8	

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

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

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

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

*For the band edge of the carrier and the harmonics that emission was found, the test was performed with VBW of the average detector set at 270Hz. For other average detectors, VBW was set at 10Hz.

Radiated Spurious Emission

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. 32BE0096-HO-01
Date 10/05/2011 10/11/2011
Temperature/ Humidity 21 deg.C/ 55% RH 22 deg.C/ 65% RH
Engineer Tomotaka Sasagawa Takumi Shimada
(1-26.5GHz) (30-1000MHz)
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	64.697	QP	42.9	7.2	7.5	32.2	25.4	40.0	14.6	
Hori	125.005	QP	36.8	13.4	8.3	32.1	26.4	43.5	17.1	
Hori	250.010	QP	42.0	17.2	9.3	32.1	36.4	46.0	9.6	
Hori	448.611	QP	37.7	18.5	10.7	32.1	34.8	46.0	11.2	
Hori	500.021	QP	34.2	19.2	11.0	32.1	32.3	46.0	13.7	
Hori	750.032	QP	30.3	22.8	12.4	32.0	33.5	46.0	12.5	
Hori	2323.670	PK	45.6	27.8	2.1	32.2	43.3	73.9	30.6	
Hori	2390.000	PK	48.1	28.1	2.2	32.2	46.2	73.9	27.7	
Hori	2400.000	PK	65.4	28.1	2.2	32.2	63.5	73.9	10.4	
Hori	2501.001	PK	45.2	28.6	2.2	32.2	43.8	73.9	30.1	
Hori	4804.000	PK	44.3	31.2	4.8	31.4	48.9	73.9	25.0	
Hori	7206.000	PK	54.4	35.6	5.6	32.4	63.2	73.9	10.7	
Hori	9608.000	PK	42.6	38.3	6.7	33.2	54.4	73.9	19.5	
Hori	12010.000	PK	46.1	39.1	-1.8	33.2	50.2	73.9	23.7	
Hori	24020.000	PK	47.0	38.8	-0.9	31.6	53.3	73.9	20.6	
Hori	2323.670	AV	32.1	27.8	2.1	32.2	29.8	53.9	24.1	
Hori	2390.000	AV	31.5	28.1	2.2	32.2	29.6	53.9	24.3	
Hori	2501.001	AV	33.2	28.6	2.2	32.2	31.8	53.9	22.1	
Hori	24020.000	AV	34.5	38.8	-0.9	31.6	40.8	53.9	13.1	
Vert	65.094	QP	48.4	7.2	7.5	32.2	30.9	40.0	9.1	
Vert	125.002	QP	41.2	13.4	8.3	32.1	30.8	43.5	12.7	
Vert	250.012	QP	39.0	17.2	9.3	32.1	33.4	46.0	12.6	
Vert	448.612	QP	36.5	18.5	10.7	32.1	33.6	46.0	12.4	
Vert	500.021	QP	36.1	19.2	11.0	32.1	34.2	46.0	11.8	
Vert	750.032	QP	27.9	22.8	12.4	32.0	31.1	46.0	14.9	
Vert	2336.336	PK	45.6	27.9	2.2	32.2	43.5	73.9	30.4	
Vert	2390.000	PK	47.7	28.1	2.2	32.2	45.8	73.9	28.1	
Vert	2400.000	PK	65.7	28.1	2.2	32.2	63.8	73.9	10.2	
Vert	2501.001	PK	46.1	28.6	2.2	32.2	44.7	73.9	29.2	
Vert	4804.000	PK	47.9	31.2	4.8	31.4	52.5	73.9	21.4	
Vert	7206.000	PK	51.8	35.6	5.6	32.4	60.6	73.9	13.3	
Vert	9608.000	PK	45.2	38.3	6.7	33.2	57.0	73.9	16.9	
Vert	12010.000	PK	56.2	39.1	-1.8	33.2	60.3	73.9	13.6	
Vert	24020.000	PK	46.9	38.8	-0.9	31.6	53.2	73.9	20.7	
Vert	2336.336	AV	35.1	27.9	2.2	32.2	33.0	53.9	20.9	
Vert	2390.000	AV	31.0	28.1	2.2	32.2	29.1	53.9	24.8	
Vert	2501.001	AV	34.9	28.6	2.2	32.2	33.5	53.9	20.4	
Vert	24020.000	AV	34.0	38.8	-0.9	31.6	40.3	53.9	13.6	

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

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

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

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

*For the band edge of the carrier and the harmonics that emission was found, the test was performed with VBW of the average detector set at 270Hz. For other average detectors, VBW was set at 10Hz.

Radiated Spurious Emission
Dwell time factor relaxation

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. 32BE0096-HO-01
Date 10/05/2011 10/11/2011
Temperature/ Humidity 21 deg.C/ 55% RH 22 deg.C/ 65% RH
Engineer Tomotaka Sasagawa Takumi Shimada
(1-26.5GHz) (30-1000MHz)
Mode Tx, 3DH5 2402MHz

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2400.000	AV	51.6	28.1	2.2	32.2	-24.2	25.5	53.9	28.4	
Hori	4804.000	AV	37.2	31.2	4.8	31.4	-24.2	17.6	53.9	36.3	
Hori	7206.000	AV	48.2	35.6	5.6	32.4	-24.2	32.8	53.9	21.1	
Hori	9608.000	AV	32.5	38.3	6.7	33.2	-24.2	20.1	53.9	33.8	
Hori	12010.000	AV	34.9	39.1	-1.8	33.2	-24.2	14.8	53.9	39.1	
Vert	2400.000	AV	51.9	28.1	2.2	32.2	-24.2	25.8	53.9	28.1	
Vert	4804.000	AV	42.1	31.2	4.8	31.4	-24.2	22.5	53.9	31.4	
Vert	7206.000	AV	41.7	35.6	5.6	32.4	-24.2	26.3	53.9	27.6	
Vert	9608.000	AV	34.6	38.3	6.7	33.2	-24.2	22.2	53.9	31.7	
Vert	12010.000	AV	48.1	39.1	-1.8	33.2	-24.2	28.0	53.9	25.9	

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

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

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

Test place : Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 32BE0096-HO-01
Date : 10/05/2011 10/11/2011
Temperature/ Humidity : 21 deg.C/ 55% RH 22 deg.C/ 65% RH
Engineer : Tomotaka Sasagawa Takumi Shimada
(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	64.586	QP	42.7	7.3	7.5	32.2	25.3	40.0	14.7	
Hori	125.003	QP	36.9	13.4	8.3	32.1	26.5	43.5	17.0	
Hori	250.010	QP	42.1	17.2	9.3	32.1	36.5	46.0	9.5	
Hori	448.613	QP	37.5	18.5	10.7	32.1	34.6	46.0	11.4	
Hori	500.022	QP	34.4	19.2	11.0	32.1	32.5	46.0	13.5	
Hori	750.032	QP	30.1	22.8	12.4	32.0	33.3	46.0	12.7	
Hori	2374.336	PK	44.5	28.0	2.2	32.2	42.5	73.9	31.4	
Hori	2501.001	PK	45.2	28.6	2.2	32.2	43.8	73.9	30.1	
Hori	4882.000	PK	51.4	31.4	4.8	31.4	56.2	73.9	17.7	
Hori	7323.000	PK	56.9	35.7	5.6	32.5	65.7	73.9	8.2	
Hori	9764.000	PK	43.7	38.5	6.8	33.2	55.8	73.9	18.1	
Hori	12205.000	PK	45.0	39.2	-1.8	33.2	49.2	73.9	24.7	
Hori	24410.000	PK	47.1	38.6	-0.8	31.6	53.3	73.9	20.6	
Hori	2374.336	AV	31.5	28.0	2.2	32.2	29.5	53.9	24.4	
Hori	2501.001	AV	32.0	28.6	2.2	32.2	30.6	53.9	23.3	
Hori	24410.000	AV	33.9	38.6	-0.8	31.6	40.1	53.9	13.8	
Vert	64.738	QP	48.2	7.2	7.5	32.2	30.7	40.0	9.3	
Vert	125.002	QP	41.3	13.4	8.3	32.1	30.9	43.5	12.6	
Vert	250.011	QP	39.2	17.2	9.3	32.1	33.6	46.0	12.4	
Vert	448.611	QP	36.4	18.5	10.7	32.1	33.5	46.0	12.5	
Vert	500.021	QP	36.3	19.2	11.0	32.1	34.4	46.0	11.6	
Vert	750.031	QP	27.7	22.8	12.4	32.0	30.9	46.0	15.1	
Vert	2356.421	PK	45.6	27.9	2.2	32.2	43.5	73.9	30.4	
Vert	2501.001	PK	46.5	28.6	2.2	32.2	45.1	73.9	28.8	
Vert	4882.000	PK	54.5	31.4	4.8	31.4	59.3	73.9	14.6	
Vert	7323.000	PK	54.6	35.7	5.6	32.5	63.4	73.9	10.5	
Vert	9764.000	PK	45.7	38.5	6.8	33.2	57.8	73.9	16.1	
Vert	12205.000	PK	54.6	39.2	-1.8	33.2	58.8	73.9	15.1	
Vert	24410.000	PK	46.7	38.6	-0.8	31.6	52.9	73.9	21.0	
Vert	2356.421	AV	33.4	27.9	2.2	32.2	31.3	53.9	22.6	
Vert	2501.001	AV	34.2	28.6	2.2	32.2	32.8	53.9	21.1	
Vert	24410.000	AV	34.2	38.6	-0.8	31.6	40.4	53.9	13.5	

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

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

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

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

*For the band edge of the carrier and the harmonics that emission was found, the test was performed with VBW of the average detector set at 270Hz. For other average detectors, VBW was set at 10Hz.

Radiated Spurious Emission
Dwell time factor relaxation

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. 32BE0096-HO-01
Date 10/05/2011 10/11/2011
Temperature/ Humidity 21 deg.C/ 55% RH 22 deg.C/ 65% RH
Engineer Tomotaka Sasagawa Takumi Shimada
(1-26.5GHz) (30-1000MHz)
Mode Tx, 3DH5 2441MHz

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4882.000	AV	46.3	31.4	4.8	31.4	-24.2	26.9	53.9	27.0	
Hori	7323.000	AV	50.9	35.7	5.6	32.5	-24.2	35.5	53.9	18.4	
Hori	9764.000	AV	31.2	38.5	6.8	33.2	-24.2	19.1	53.9	34.8	
Hori	12205.000	AV	33.9	39.2	-1.8	33.2	-24.2	13.9	53.9	40.0	
Vert	4882.000	AV	50.3	31.4	4.8	31.4	-24.2	30.9	53.9	23.0	
Vert	7323.000	AV	45.2	35.7	5.6	32.5	-24.2	29.8	53.9	24.1	
Vert	9764.000	AV	35.2	38.5	6.8	33.2	-24.2	23.1	53.9	30.8	
Vert	12205.000	AV	45.1	39.2	-1.8	33.2	-24.2	25.1	53.9	28.8	

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

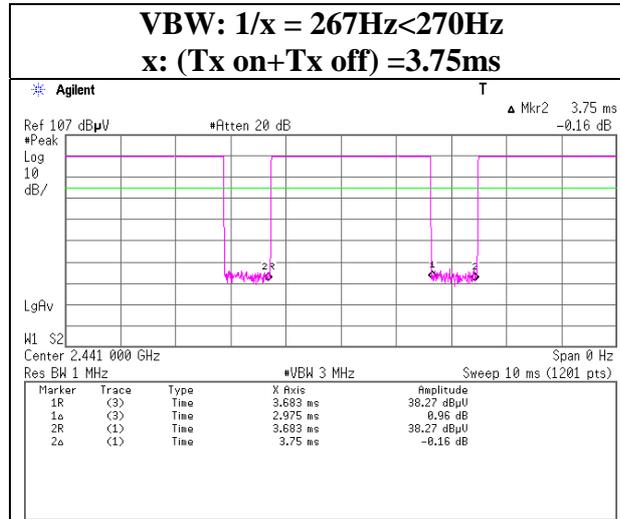
- Gain(Amplifier) + Dwell time factor (Refer to dwell time data sheet)

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

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

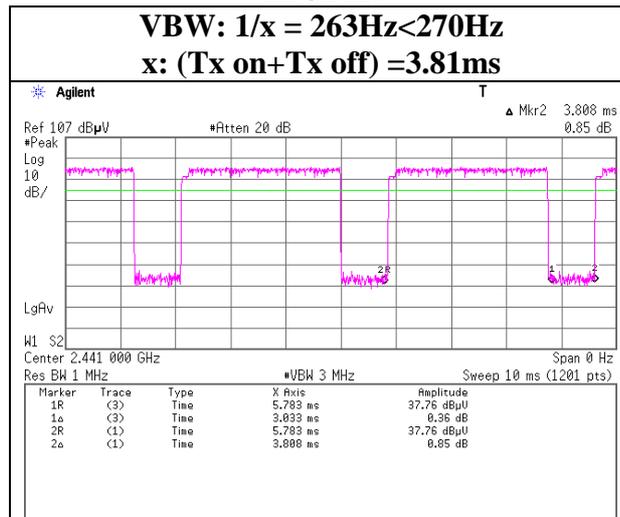
VBW (AV) Calculation
Tx DH5

VBW: $1/x = 267\text{Hz} < 270\text{Hz}$
x: (Tx on+Tx off) = 3.75ms



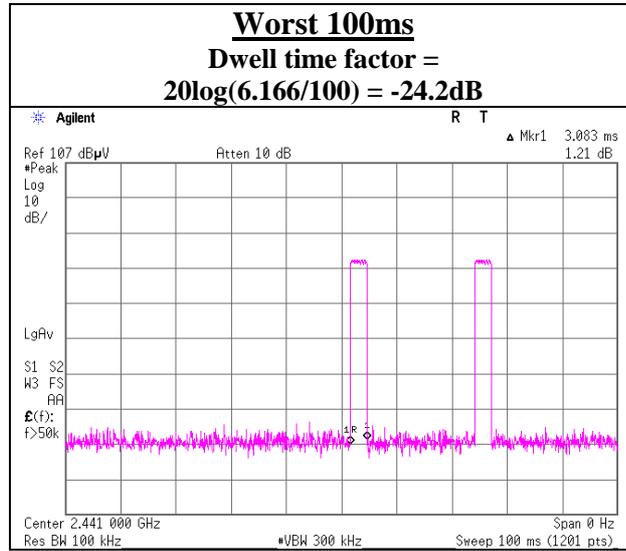
VBW (AV) Calculation
Tx 3DH5

VBW: $1/x = 263\text{Hz} < 270\text{Hz}$
x: (Tx on+Tx off) = 3.81ms

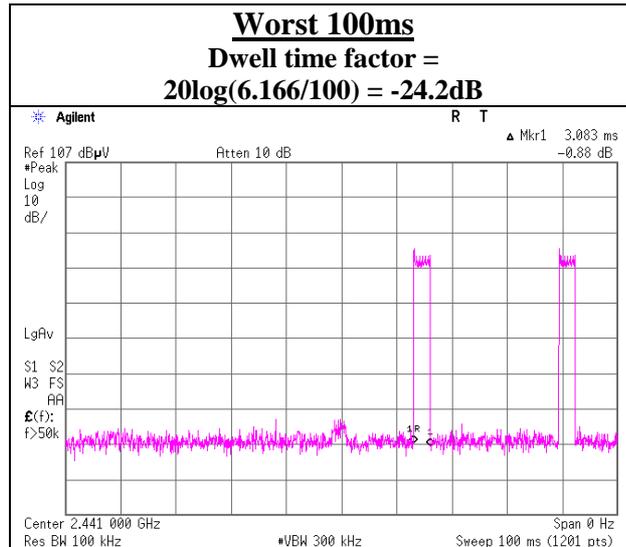


Dwell time factor

Tx DH5



Tx 3DH5



UL Japan, Inc.

Head Office EMC Lab.

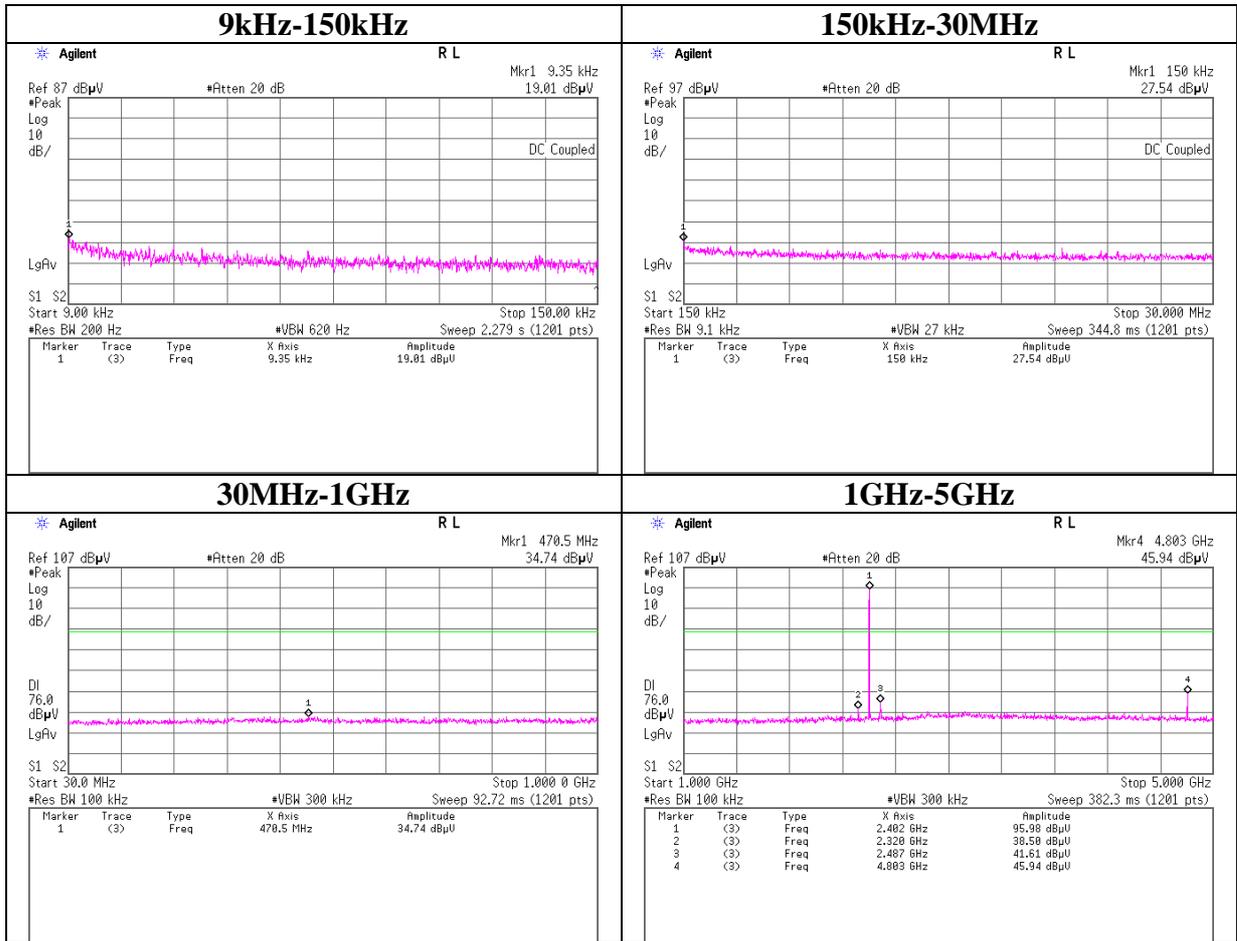
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

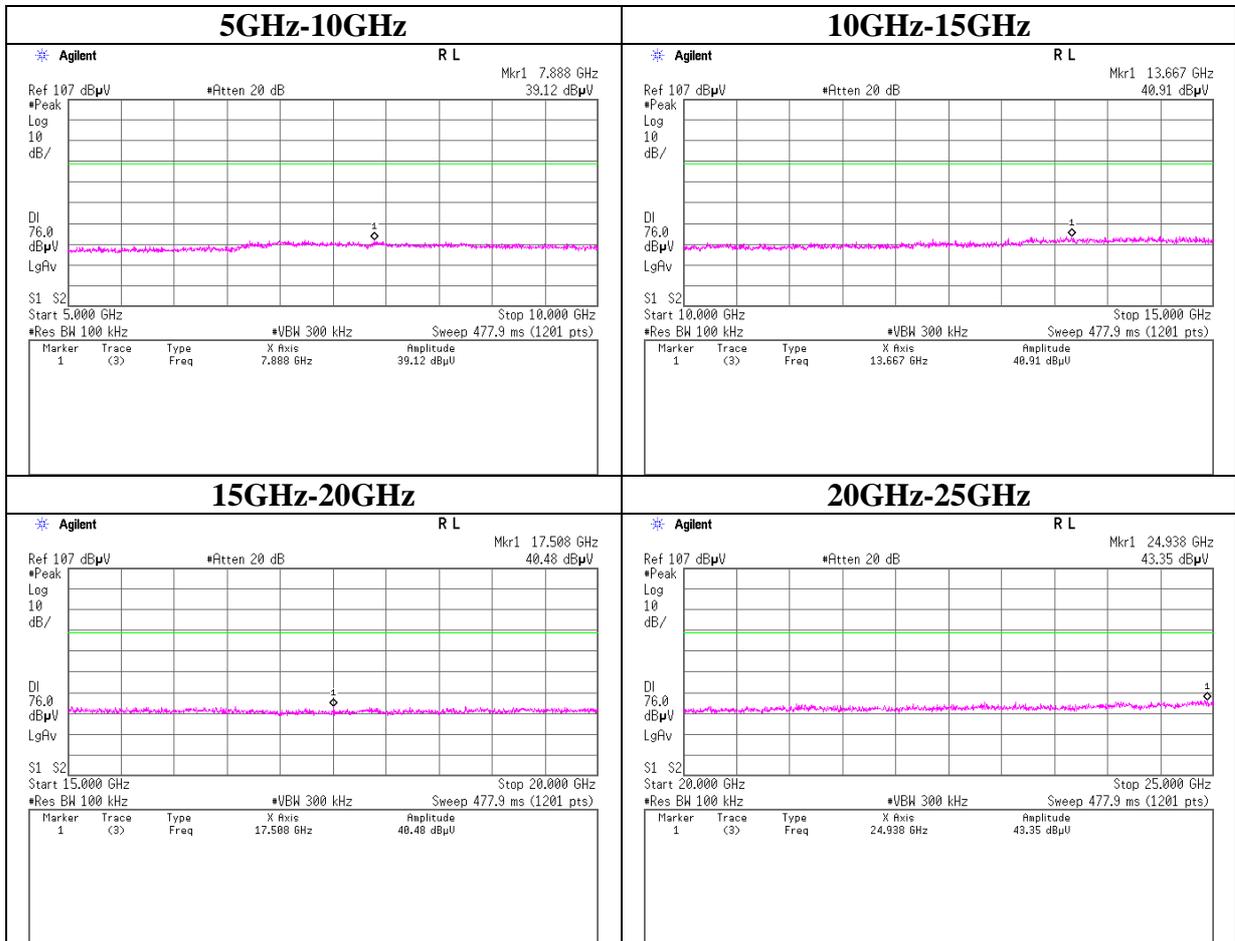
Conducted Spurious Emission

Tx DH5 2402MHz



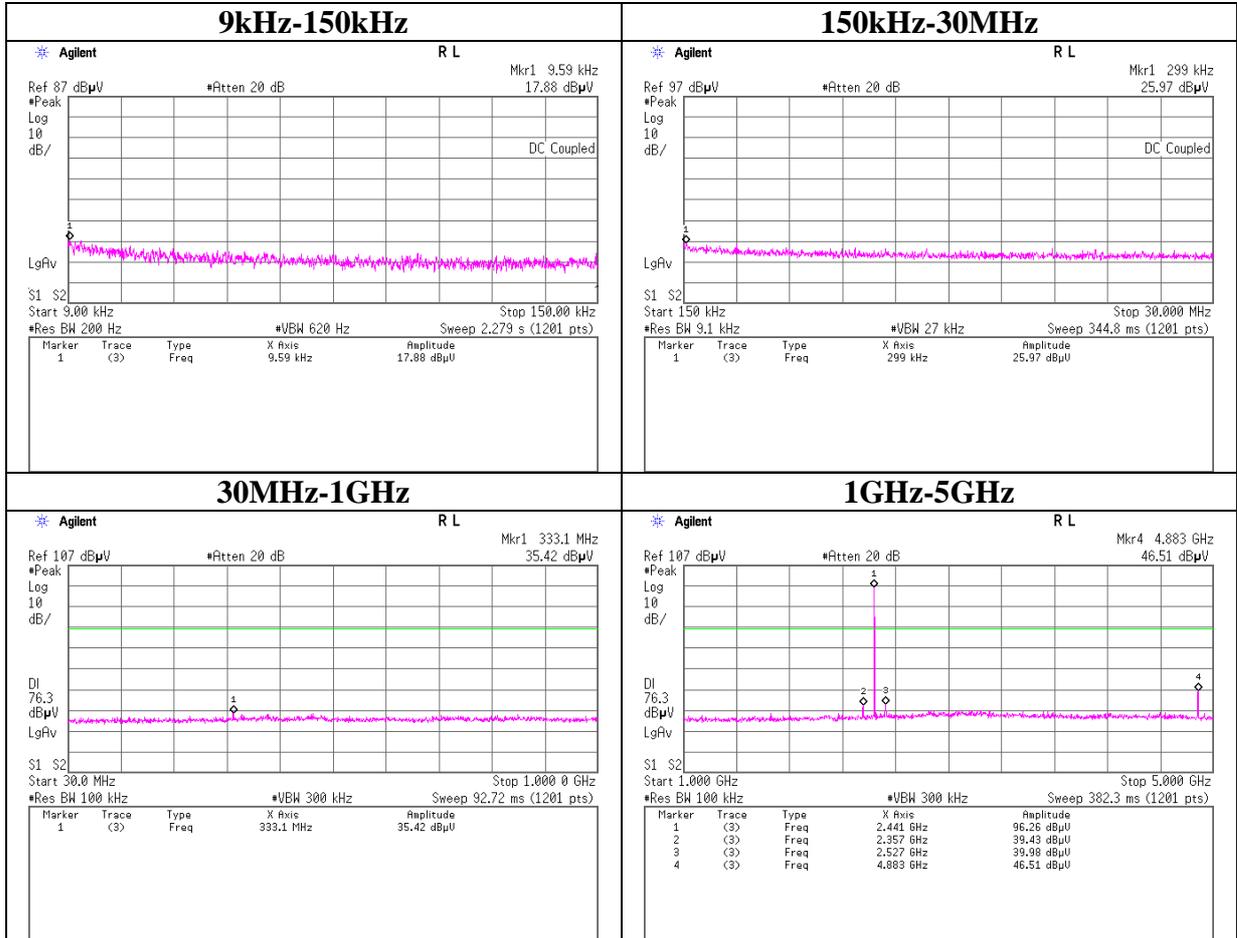
Conducted Spurious Emission

Tx DH5 2402MHz



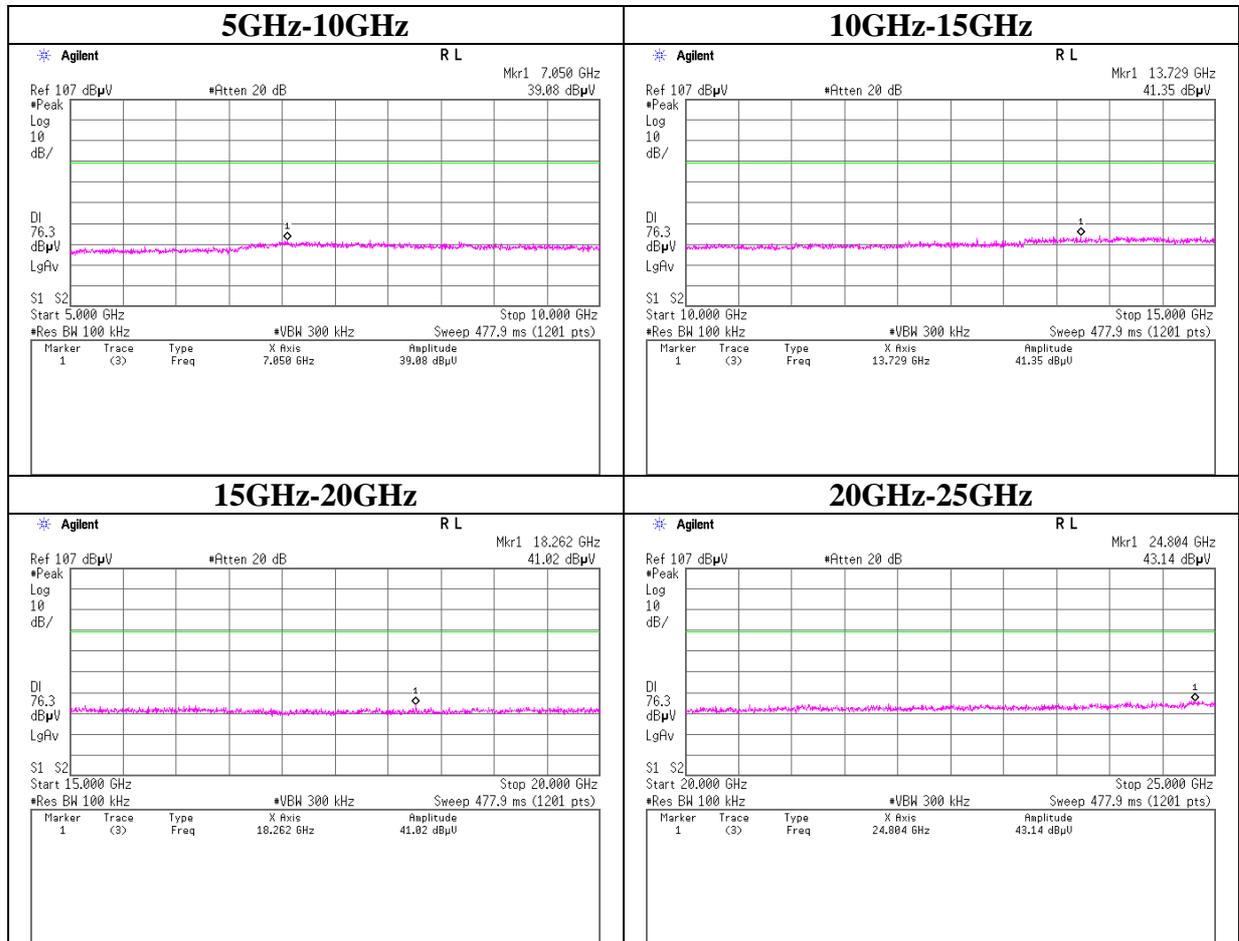
Conducted Spurious Emission

Tx DH5 2441MHz



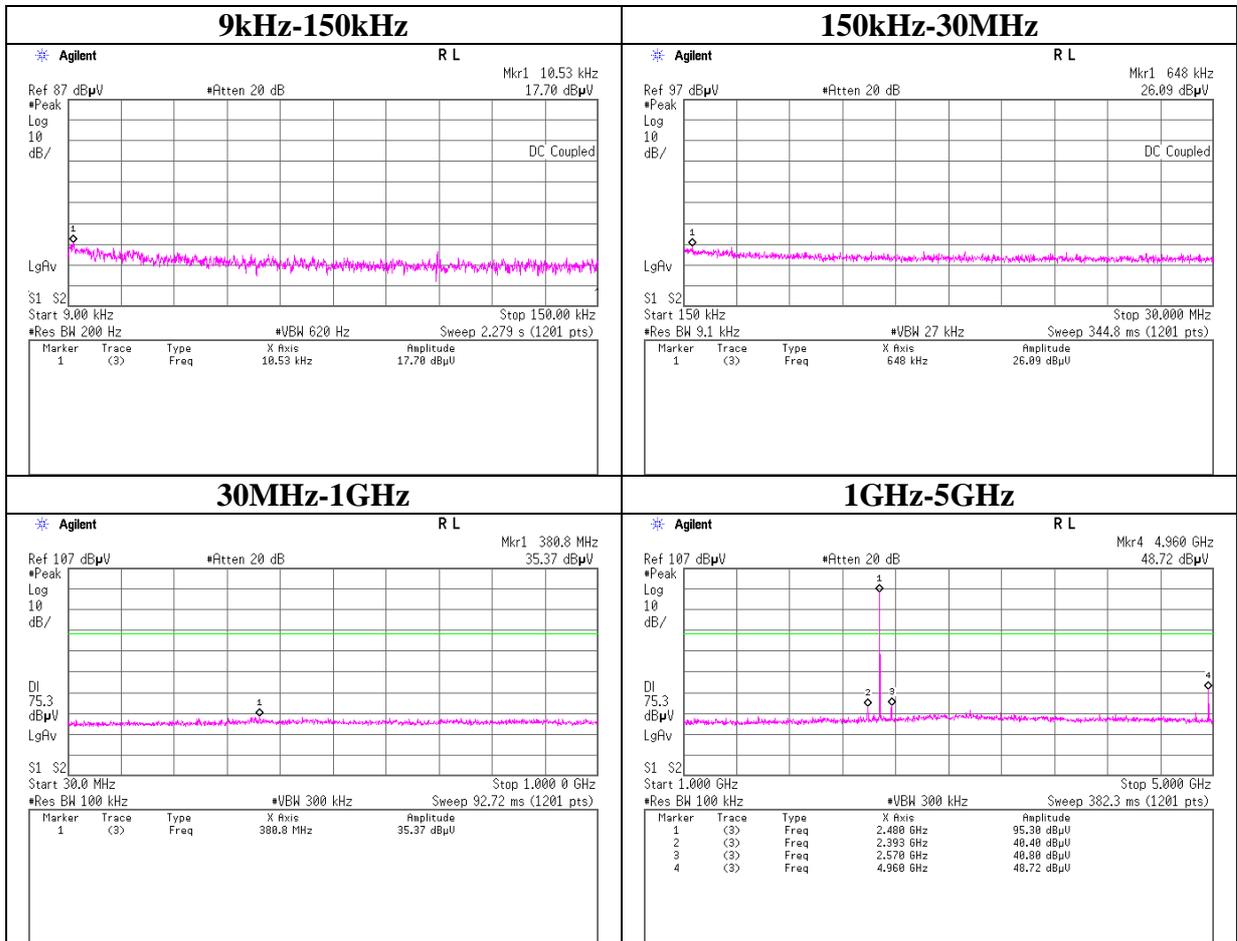
Conducted Spurious Emission

Tx DH5 2441MHz



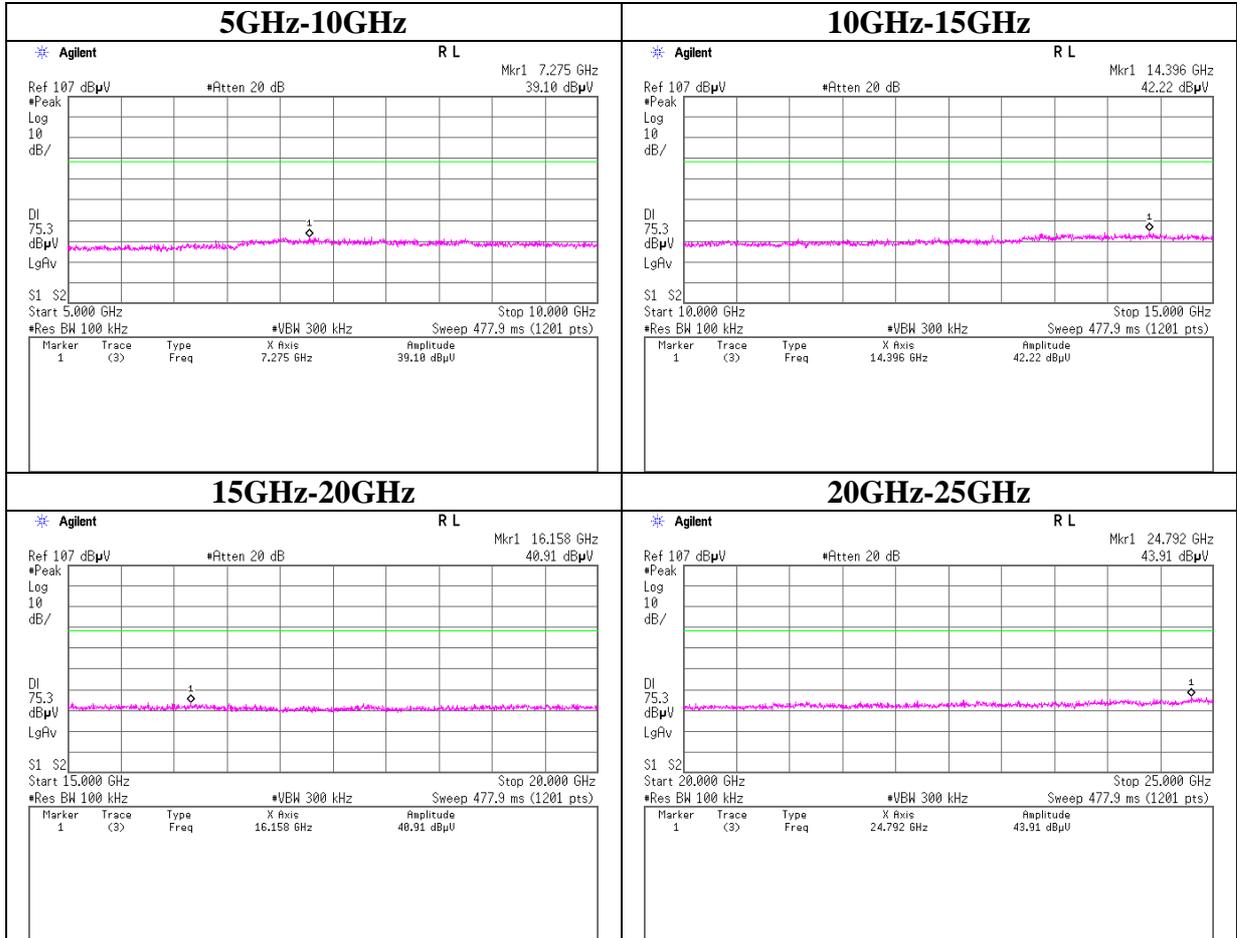
Conducted Spurious Emission

Tx DH5 2480MHz



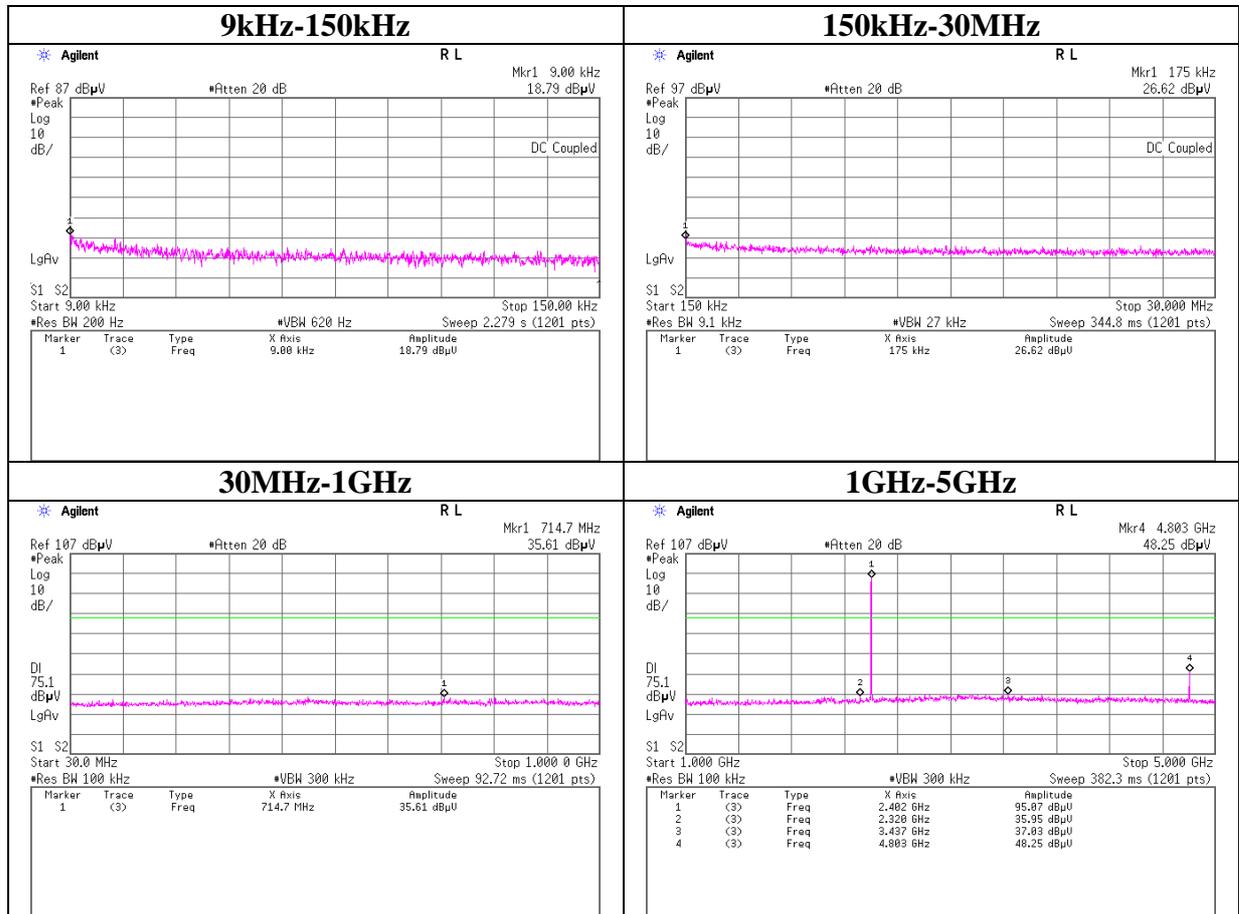
Conducted Spurious Emission

Tx DH5 2480MHz



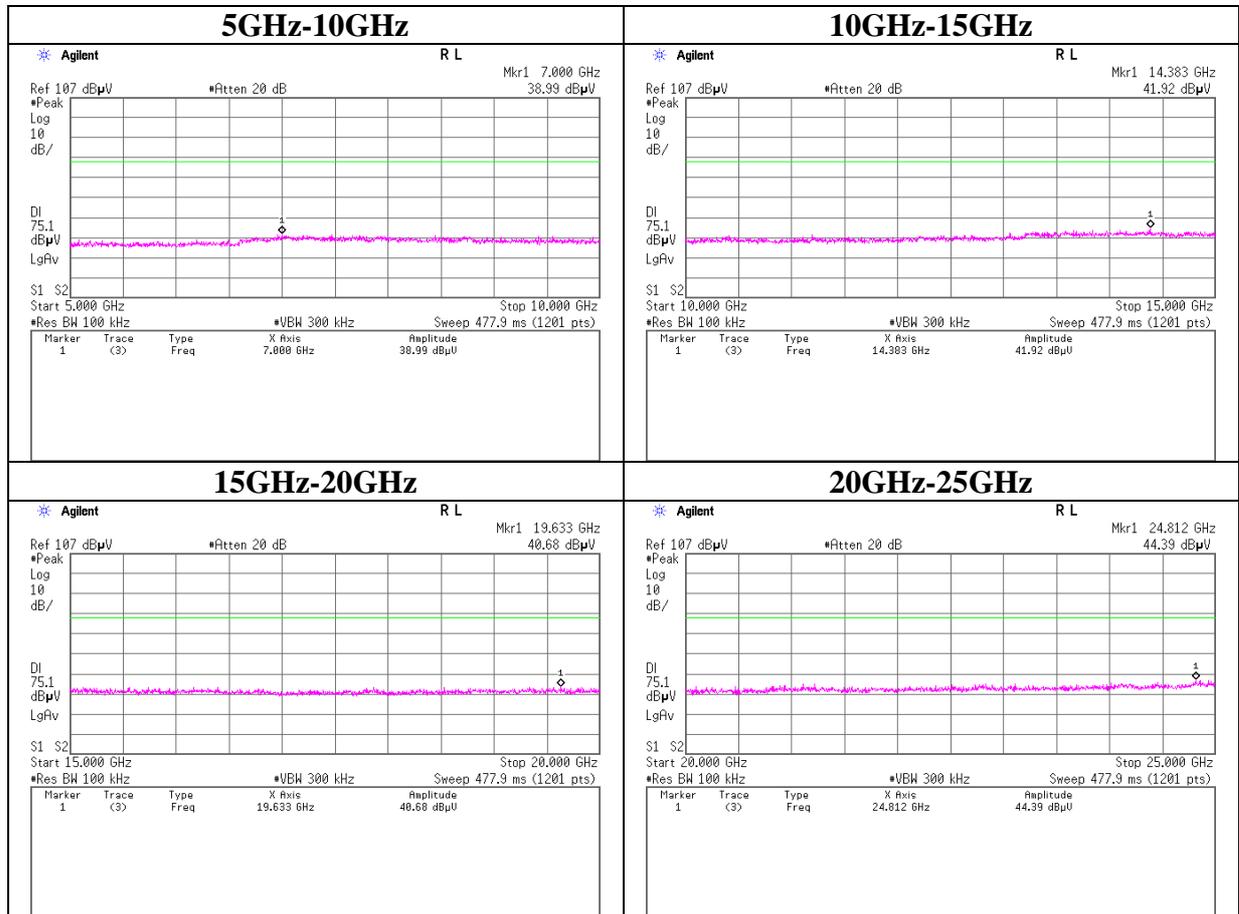
Conducted Spurious Emission

Tx 3DH5 2402MHz



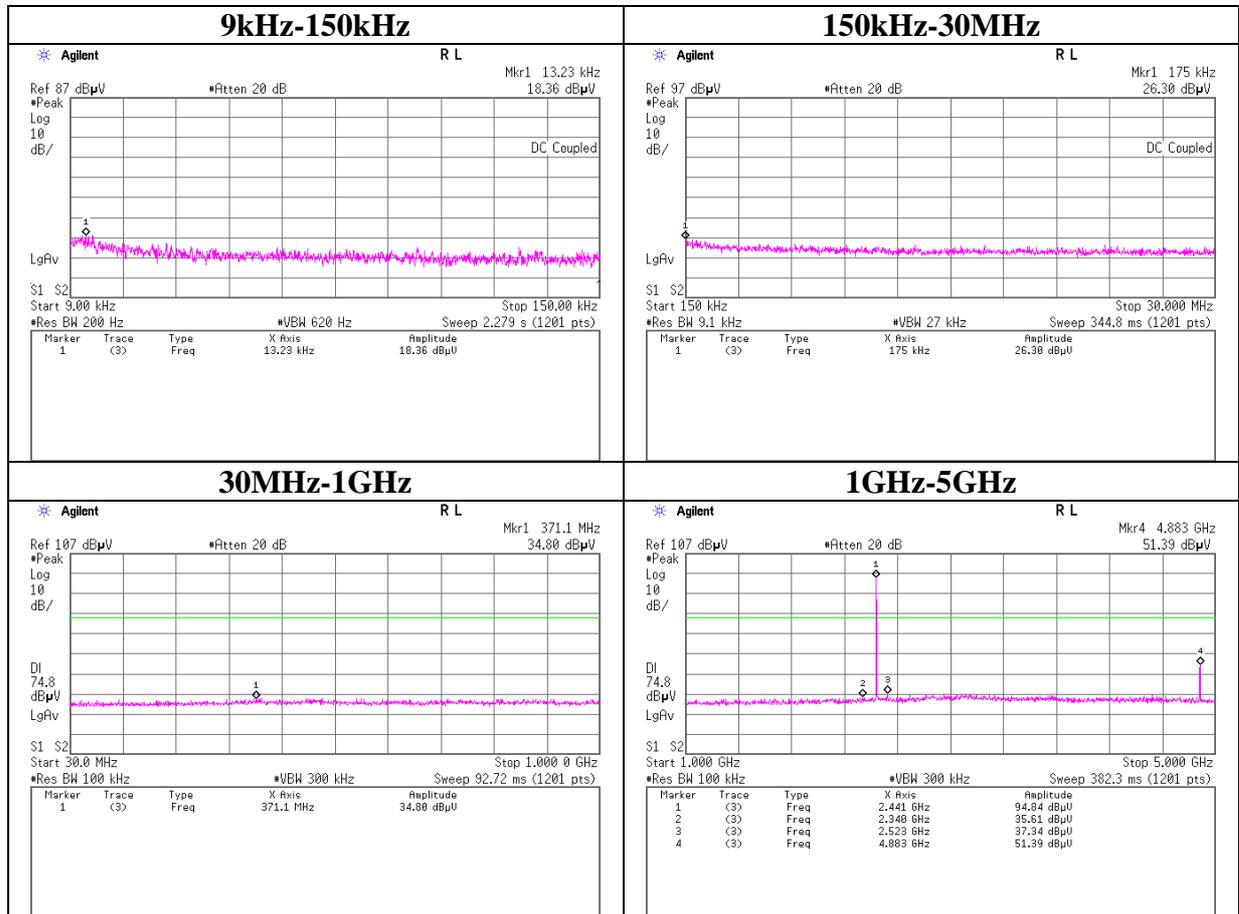
Conducted Spurious Emission

Tx 3DH5 2402MHz



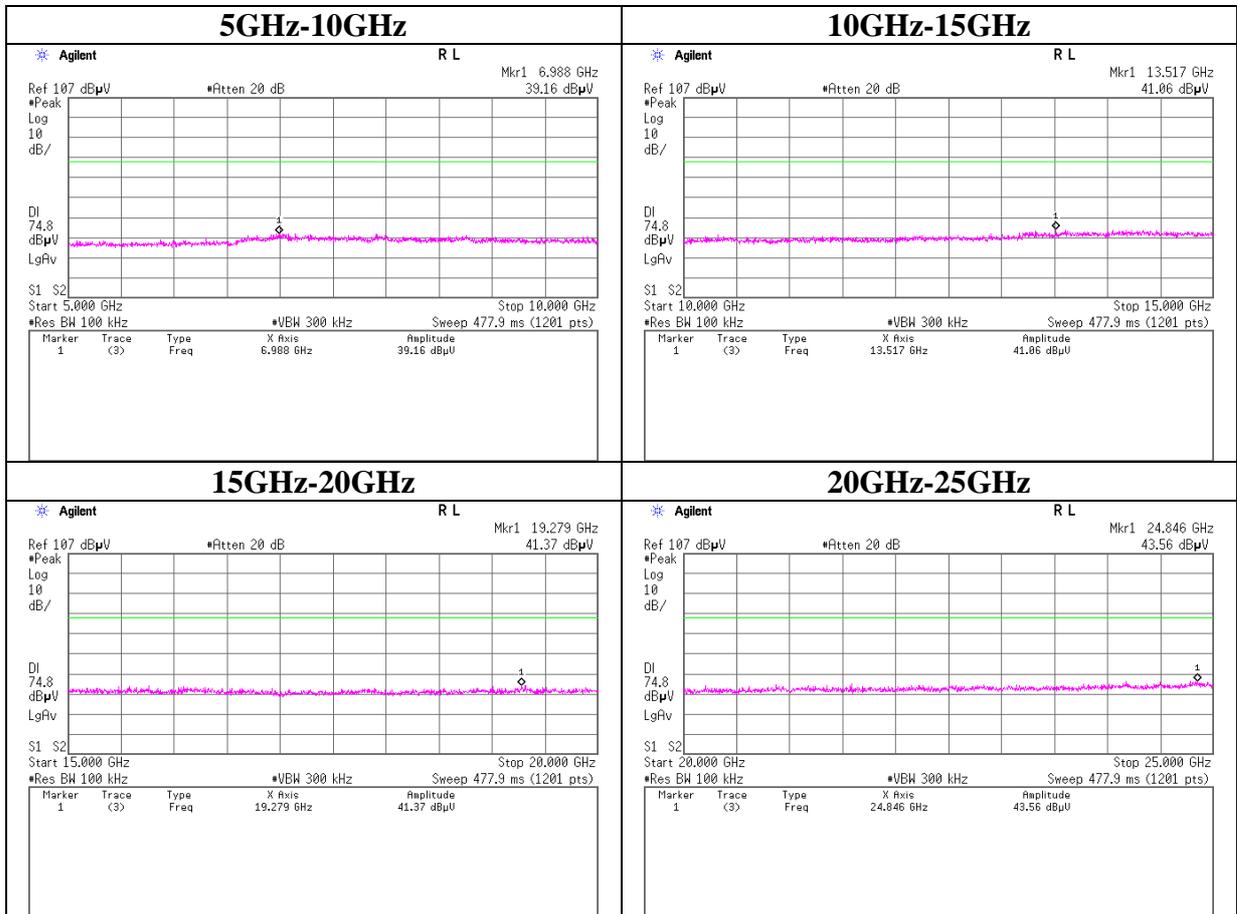
Conducted Spurious Emission

Tx 3DH5 2441MHz



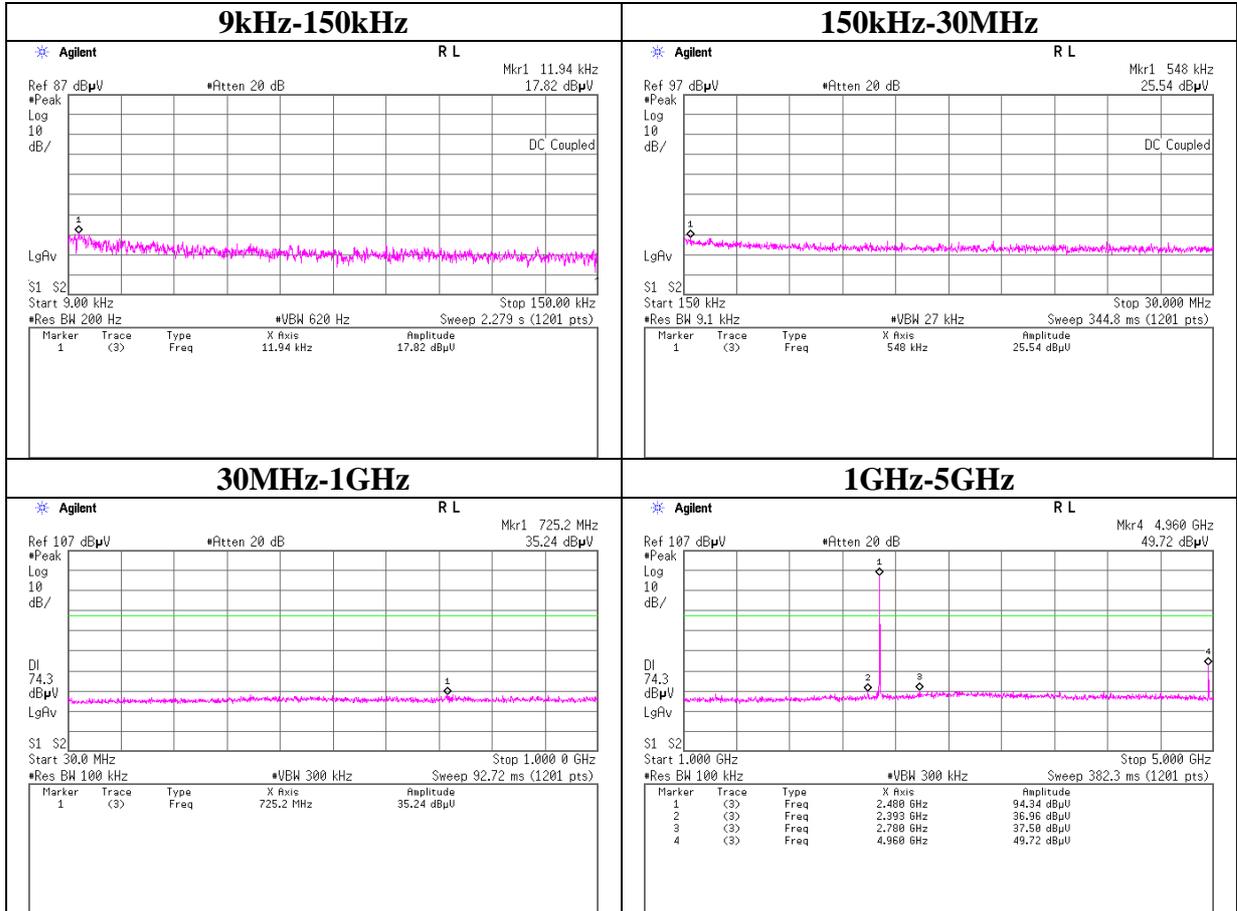
Conducted Spurious Emission

Tx 3DH5 2441MHz



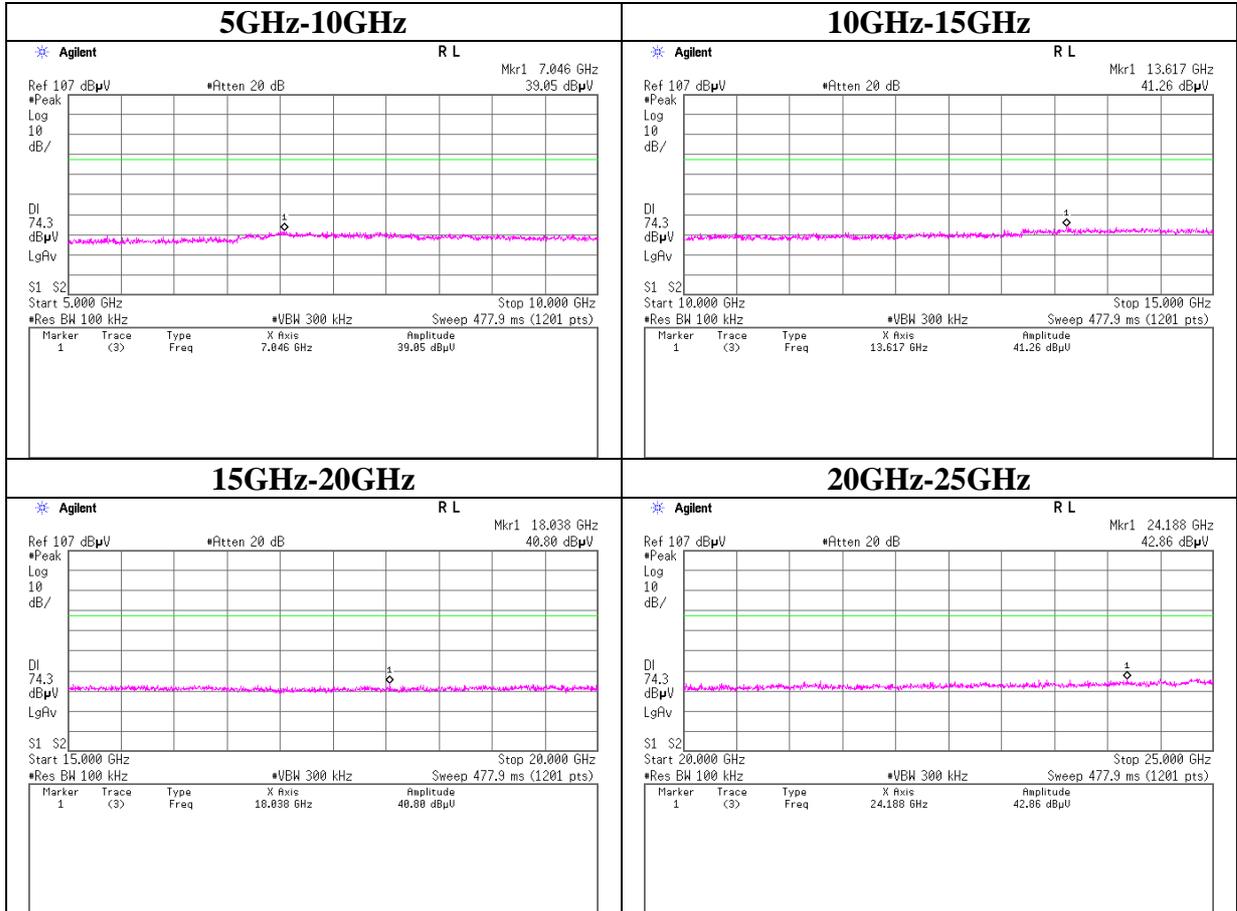
Conducted Spurious Emission

Tx 3DH5 2480MHz



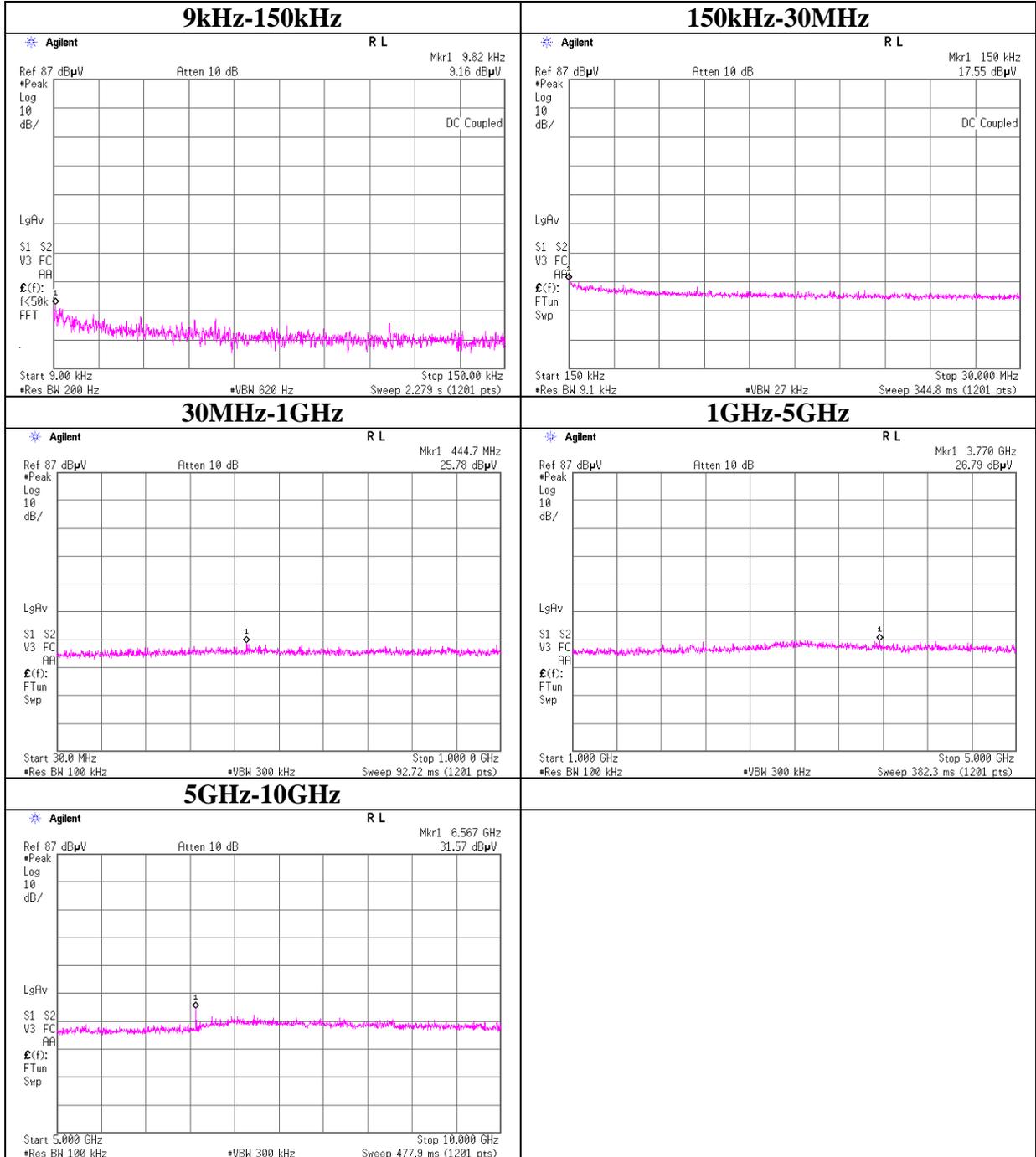
Conducted Spurious Emission

Tx 3DH5 2480MHz



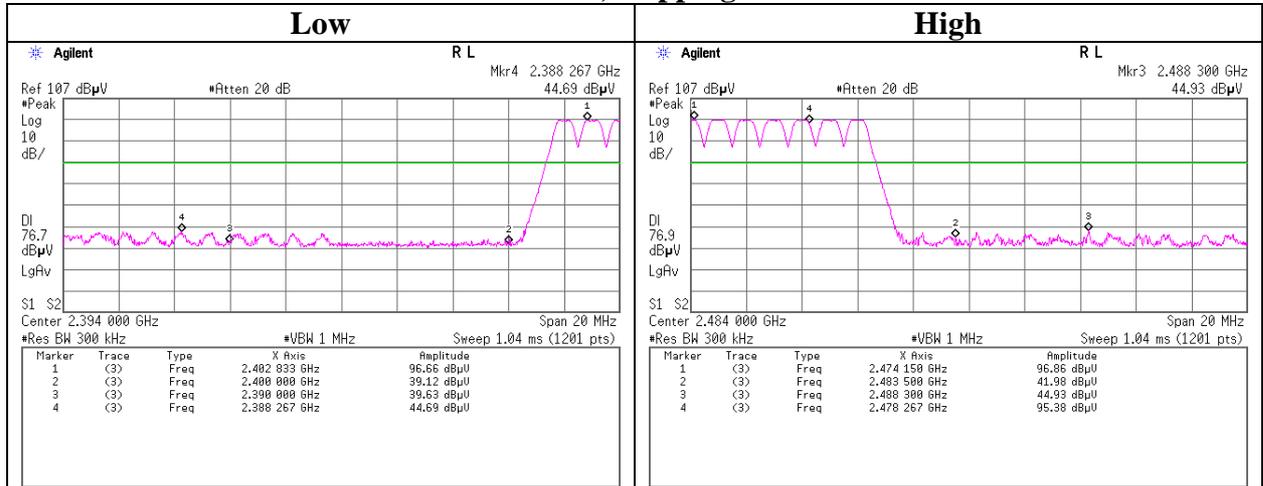
Conducted Spurious Emission
 Reference data

Rx 2441MHz

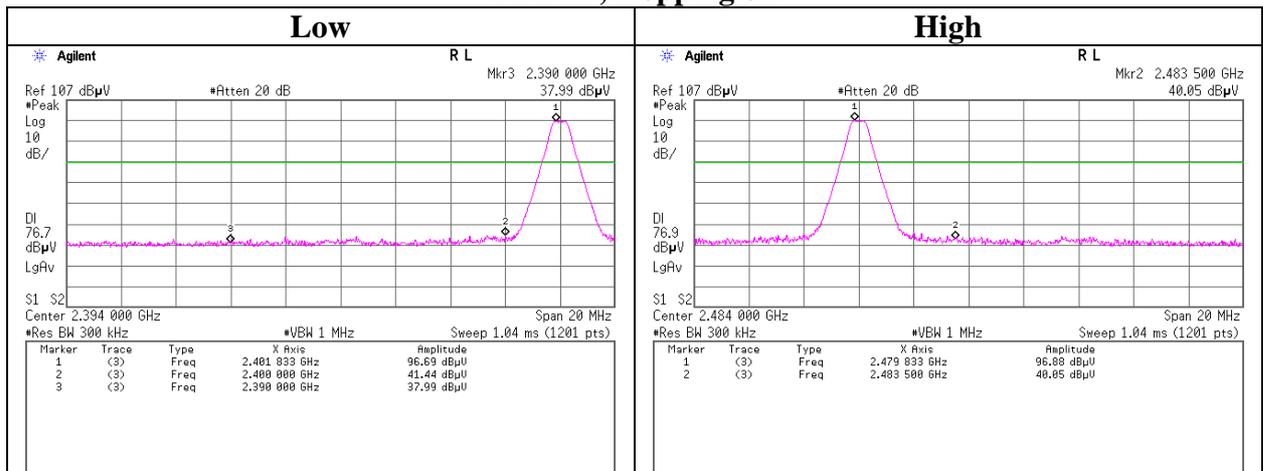


Conducted Emission Band Edge compliance

Tx DH5, Hopping on

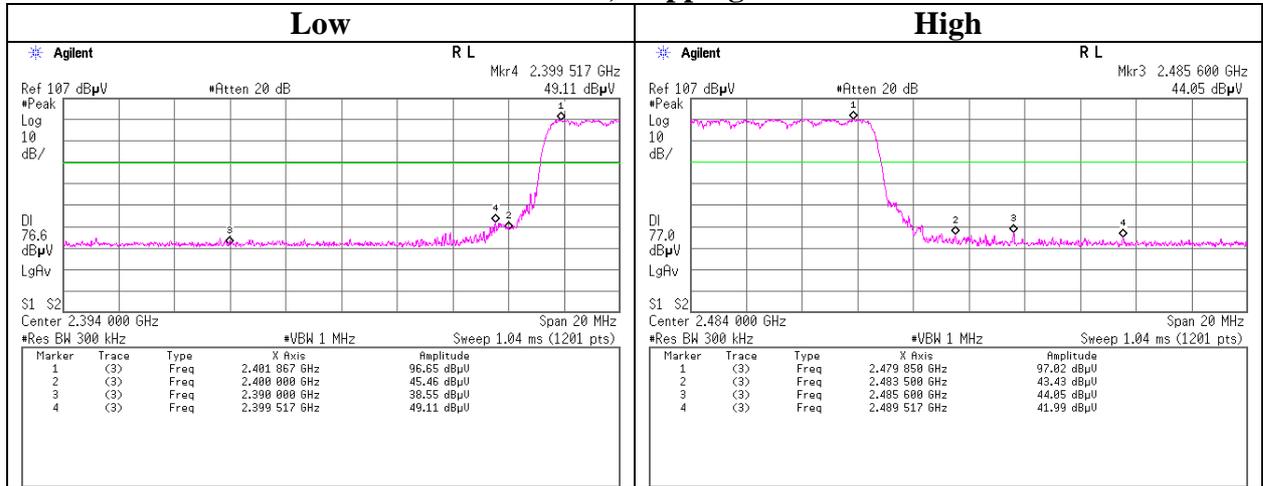


Tx DH5, Hopping off

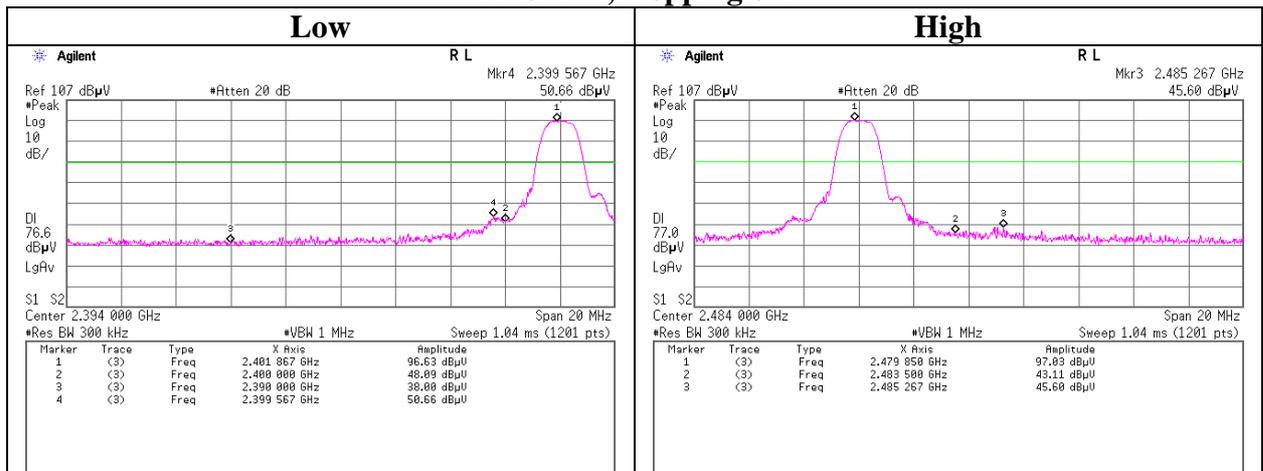


Conducted Emission Band Edge compliance

Tx 3DH5, Hopping on



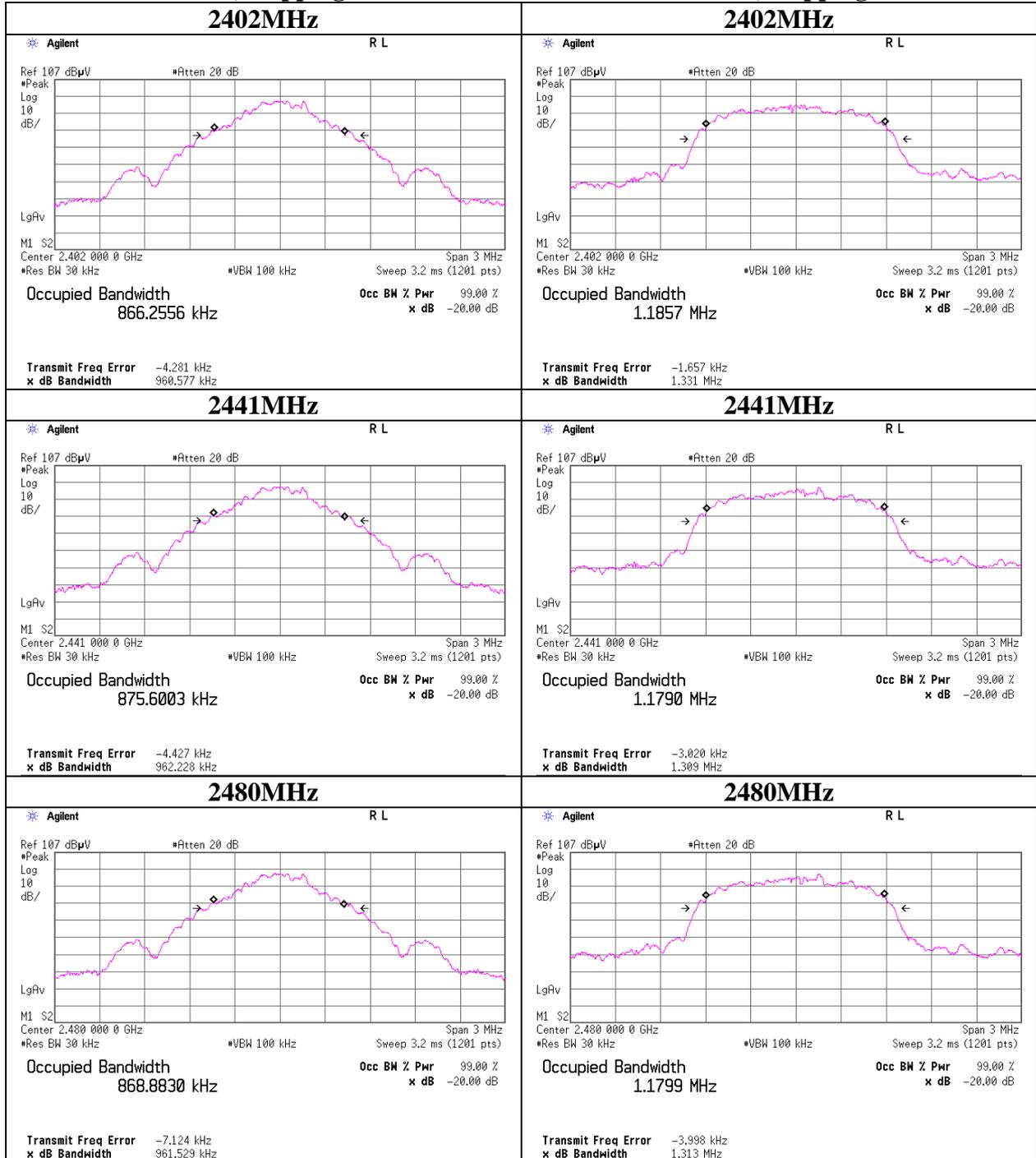
Tx 3DH5, Hopping off



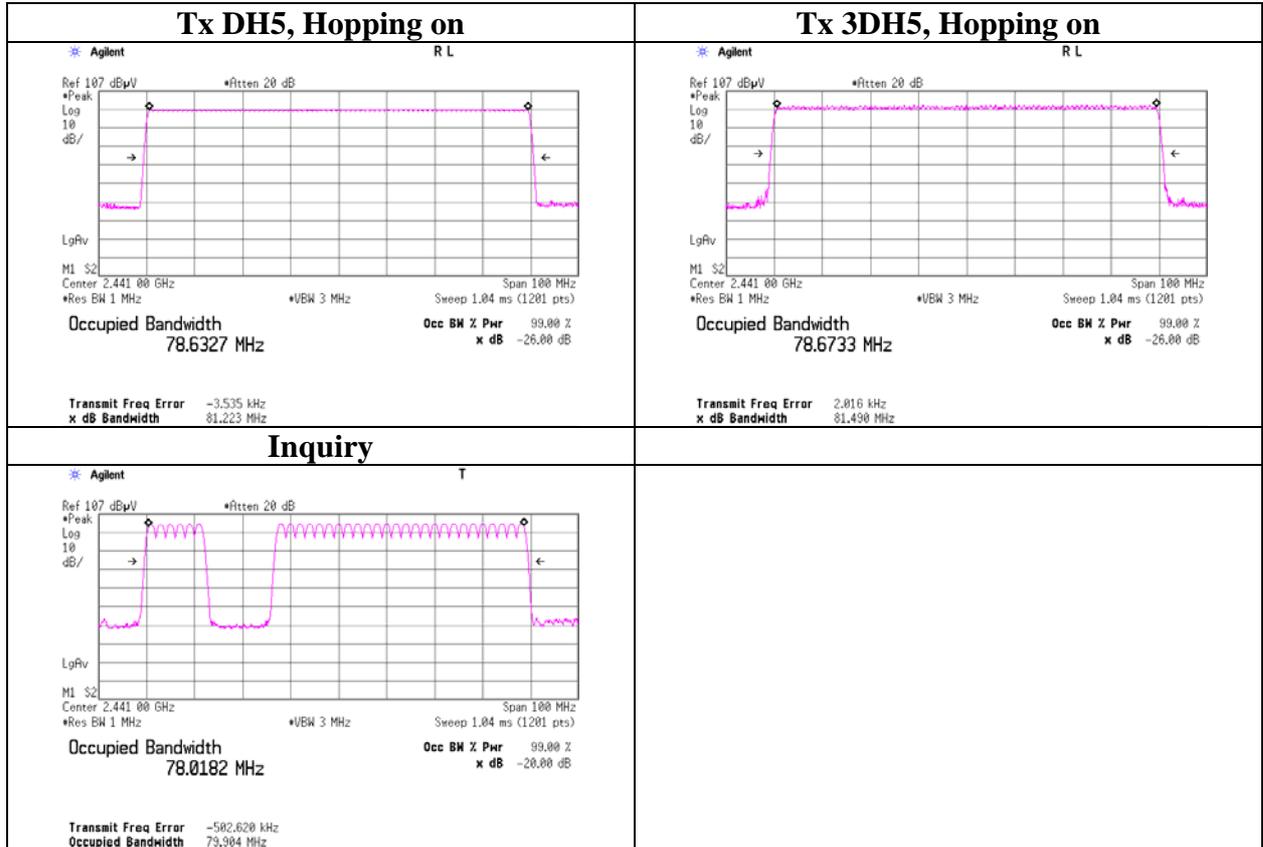
99% Occupied Bandwidth

Tx DH5, Hopping off

Tx 3DH5, Hopping off



99% Occupied Bandwidth



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2011/03/01 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE/CE	2011/02/23 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	RE/CE	2010/11/18 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2011/08/11 * 12
MCC-56	Microwave Cable	Suhner	SUCOFLEX104	270875/4(1m) / 284655(5m)	RE	2011/03/02 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2011/03/10 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2011/06/17 * 12
MRENT-95	Spectrum Analyzer	Agilent	E4440A	MY46185820	AT	2011/06/30 * 12
MPM-12	Power Meter	Anritsu	ML2495A	0825002	AT	2011/08/09 * 12
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	AT	2011/08/09 * 12
MAT-24	Attenuator(10dB)(above 1 GHz)	Agilent	8493C	71389	AT	2011/06/23 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2011/02/23 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE	2010/10/27 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2011/08/17 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2011/08/17 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2011/03/25 * 12
MAT-51	Attenuator(6dB)	Weinschel	2	AS3557	RE	2011/01/14 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2011/03/04 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2011/04/08 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE(AE)	2011/02/20 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE(EUT)	2011/02/22 * 12
MTA-31	Terminator	TME	CT-01	-	CE	2011/01/05 * 12
MAT-67	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2011/02/22 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/ SFM141(5m)/ 421-010(1m)/ suoform141-PE(1m)/ RFM-E121(Switcher)	-/04178	CE	2011/07/04 * 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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